

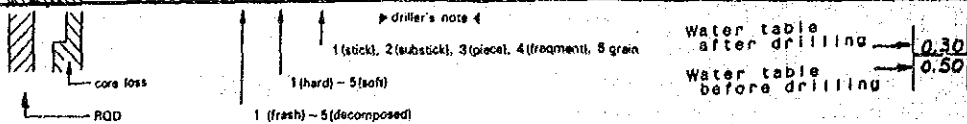
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-2 (SHEET 2 of 4)

LOCATION DAM DEPTH OF HOLE 70.00 m COMMENCED 2-9-1987
 ELEVATION 510.834 m DEPTH OF OVERBURDEN 17.00 m COMPLETED 17-9-1987
 COORDINATE X: 452.695.19 LENGTH OF ROCK DRILLING 53.00 m DRILLED BY DSI
Y: 4178.256.85 TOTAL LENGTH OF CORE 58.75 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 90 CORE RECOVERY 83.9 %
 BEARING OF ANGLE HOLE -

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION		
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	LUGEON					m	
0			0-100%									0	490.834		
1	Peridotite	V	[Hatched]	φ86 mm	Dark gray	2	2	2	20.5m: Calcite vein 2mm	Lu = (14)	1.30	1.30			
2									21.0 wide along 25° dip crack.	Po max. = 8.0					
3									21.3	21.0~21.3m: Serpentine				kg/cm ²	
4									2	2				1mm wide along several	Lu = (34)
5									3	3				23.0 cracks.	Po max. = 8.0
6									3	3				21.9m: Calcite vein 1mm	Lu = (44)
7									2	2				24.0 wide.	Po max. = 8.0
8									3	3				23.0m: Calcite vein 1mm	Lu = (45)
9									3	3				26.0 wide.	Po max. = 8.0
10									3	3				26.3 26.0m: Calcite vein 1mm	Lu = (22)
11															
12															
13															
14															
15															
16															
17															
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36															
37															
38															
39															
40												470.834			



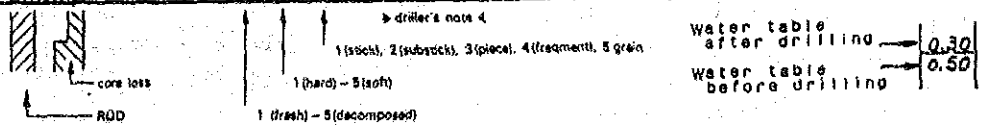
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-2 (SHEET 3 OF 4)

LOCATION DAM DEPTH OF HOLE 70.00 m COMMENCED 2 - 9 - 1987
 ELEVATION 510.834 m DEPTH OF OVERBURDEN 17.00 m COMPLETED 17 - 9 - 1987
 COORDINATE X 453 695 19 LENGTH OF ROCK DRILLING 53.00 m DRILLED BY DSI
Y 4178 252 45 TOTAL LENGTH OF CORE 58.75 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 90 CORE RECOVERY 83.9 %
 BEARING OF ANGLE HOLE -

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
4.0m			0 → 100%									0m	470.834m
1		✓					3	40.5	41.5m and 44.5m: 45° dip cracks, no filling.	Lu = 0 P _{o max} = 10.0		1	
2		✓										2	
3		✓								Lu = 0 P _{o max} = 10.0		3	
4		✓									1.30	4	
5		✓					1			Lu = 1.2 P _{o max} = 10.0	1.30	5	
6		✓					1					6	
7		✓					2			Lu = 2.2 P _{o max} = 10.0		7	
8		✓							48.7m: 45° dip crack, no filling.	Lu = 0 P _{o max} = 10.0		8	
9		✓					2		49.1m: Serpentine less than 1mm wide along 15° dip crack.		1.30	9	
50	Peridotite	✓					2		52.2m: Serpentine 1mm wide along 35° dip crack.	Lu = 0 P _{o max} = 10.0	1.30	0	
1		✓										1	
2		✓										2	
3		✓								Lu = 0 P _{o max} = 10.0		3	
4		✓						54.0				4	
5		✓								Lu = 0 P _{o max} = 10.0		5	
6		✓					2				1.30	6	
7		✓								Lu = 0 P _{o max} = 10.0	1.30	7	
8		✓										8	
9		✓					1	58.5	59.3m: Serpentine 1mm wide along 70° dip crack.	Lu = 0 P _{o max} = 10.0		9	
60		✓					2	60.0				0	450.834



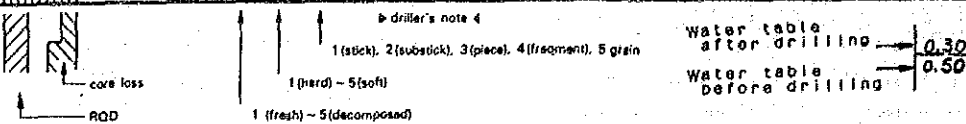
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-2 (SHEET 4 OF 4)

LOCATION DAM DEPTH OF HOLE 70.00 m COMMENCED 2 - 9 - 1987
 ELEVATION 510.834 m DEPTH OF OVERBURDEN 17.00 m COMPLETED 17 - 9 - 1987
 COORDINATE X: 452,675.79 LENGTH OF ROCK DRILLING 53.00 m DRILLED BY DSI
Y: 4,178,850.45 TOTAL LENGTH OF CORE 58.75 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 90 CORE RECOVERY 83.9 %
 BEARING OF ANGLE HOLE -

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION		
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER			DEPTH	ELEVATION
6.0m			0 → 100%									0m	450.834m		
1	Peridotite	[Hatched pattern]	φ86 mm	Dark gray	2	2	2	60.8	60.8~63.0m: Serpentine	Lu = 0 Po max. = 10.0	1.30	1	440.834m		
2								61.0	1~2mm wide along many cracks.			2		2	1.30
3								63.0		2	2	Lu = 0 Po max. = 10.0		3	
4								64.0		3	2	Lu = 0 Po max. = 10.0		4	
5										1	2			5	
6								66.0	66.0~66.4m: Serpentine	3	2	Lu = 0 Po max. = 10.0		1.30	6
7								66.4	1mm wide along several cracks.						7
8										1	2	Lu = 0 Po max. = 10.0		1.30	8
9									R.Q.D (Av) = 86%						9
70															



GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-3 (SHEET 1 of 5)

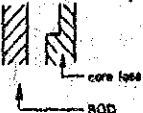
LOCATION	DAM	DEPTH OF HOLE	100.00 m	COMMENCED	25 - 8 - 1988
ELEVATION	607.609 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	11 - 9 - 1988
COORDINATE	$\begin{matrix} 452559.74 \\ 477456.23 \end{matrix}$	LENGTH OF ROCK DRILLING	100.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90	TOTAL LENGTH OF CORE	100.00 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	100.0 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0			0-100%							LUGEON	m	0m	607.609
0.5							3		No surface soil.	Lu = (40)			
1		✓					4		0~1.5m: Piece-fragment cores.	Po max. = 3.0 kg/cm ²		1	
2							15					2	
3		✓					2		1.9m: Oxidization crack,	Lu = (41)		3	
4		✓				2	3.0		80° dip.	Po max. = 3.0		4	
5		✓				3	3.2					5	
6		✓				3	3.5		2.1m: Oxidization crack,			6	
7		✓				3	3.9		70° dip.			7	
8		✓				2	4.7		3.5~3.9m: Serpentine	Lu > 100		8	
9		✓				3	5.0		2~3mm wide along several cracks (65° dip).	Po max. = 3.0		9	
10		✓				2	6.8					10	
11		✓				2	7.0		4.7m and 5.0m: Serpentine	Lu = (33)		11	
12		✓				2	7.5		2~3mm wide along 65° dip cracks.	Po max. = 5.0		12	
13		✓				2	7.7					13	
14		✓				2	9.8		5.3m: Serpentine 2mm wide along 20° dip crack.	Lu = (6)		14	
15		✓				2	10.0		6.1m: Serpentine 2mm wide along 70° dip crack	Po max. = 5.0		15	
16		✓				1			7.5~7.7m: Fragment cores, oxidization.	Lu = 5.1		16	
17		✓				1			12.0~14.8m: Serpentine 1~2mm wide along vertical crack.	Po max. = 10.0		17	
18		✓				2	14.0					18	
19		✓				3	14.2		14.0~14.2m: Piece cores, no serpentine.	Lu = 5.5		19	
20		✓				1			15.8m: Serpentine 1~2mm wide along 45° dip crack.	Po max. = 10.0		20	
21		✓				2						21	
22		✓				1						22	
23		✓				1						23	
24		✓				2						24	
25		✓				1						25	
26		✓				1						26	
27		✓				2						27	
28		✓				1						28	
29		✓				1						29	
30		✓				2						30	
31		✓				1						31	
32		✓				1						32	
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68		✓				1						68	
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95		✓				1						95	
96		✓				2						96	
97		✓				1						97	
98		✓				1						98	
99		✓				2						99	
100		✓				1						100	

Peridotite

φ86mm

Dark gray



driller's note 4
 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 (grain)
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
 Water table before drilling → 0.50

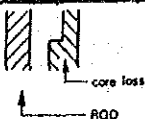
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-3 (SHEET 2 OF 5)

LOCATION DAM DEPTH OF HOLE 100.00 m COMMENCED 25 - 8 - 1988
 ELEVATION 607.609 m DEPTH OF OVERBURDEN 0 m COMPLETED 11 - 9 - 1988
 COORDINATE X 452,539.74 LENGTH OF ROCK DRILLING 100.00 m DRILLED BY DSI
Y 177,956.03 TOTAL LENGTH OF CORE 100.00 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 90 CORE RECOVERY 100.0 %
 BEARING OF ANGLE HOLE -

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION	
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION				
0m			0=100%							LUGEON	m	0m	607.609m
1		✓					1			Lu = 5.5		1	
2							2	22.0	22.0~22.7m: Piece cores.	Po max. = 10.0		2	
3		✓					3	22.7	Weak serpentinization.	Lu = 2.9		3	
4							2		25.0m: Weathered calcite vein less than 1mm wide (60° dip).	Po max. = 10.0	15.20	4	
5		✓								Lu = 0	21.16	5	
6										Po max. = 10.0		6	
7		✓						27.0		Lu = 0		7	
8										Po max. = 10.0	15.00	8	
9		✓								Lu = 0	15.00	9	
10	Peridotite	✓					2		29.8~30.6m: Serpentine less than 1mm wide along several cracks.	Po max. = 10.0		10	
11		✓					1			Lu = 3.4		11	
12							1		33.5m: Calcite vein 5mm wide (30° dip)	Po max. = 10.0	22.45	12	
13		✓					2			Lu = 2.9	16.70	13	
14									33.6~34.0m core: Laboratory test.	Po max. = 10.0		14	
15		✓								Lu = 5.2		15	
16										Po max. = 10.0	32.45	16	
17		✓								Lu = 6.2	28.95	17	
18										Po max. = 10.0		18	
19		✓						39.0	39.0~40.0m: Piece cores. no serpentine.	Lu = 7.4		19	
20							3	40.0		Po max. = 10.0	16.70	20	567.609



driller's note 4
 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
 Water table before drilling → 0.50

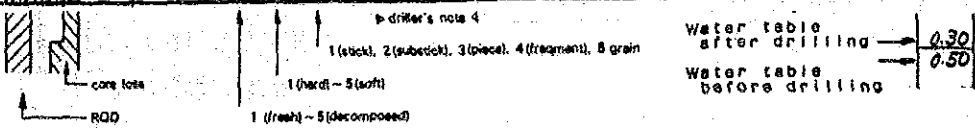
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-3 (SHEET 3 OF 5)

LOCATION	DAM	DEPTH OF HOLE	100.00 m	COMMENCED	25 - 8 - 1988
ELEVATION	607.609 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	11 - 9 - 1988
COORDINATE	X: 452,559.74 Y: 177,956.03	LENGTH OF ROCK DRILLING	100.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90	TOTAL LENGTH OF CORE	100.00 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	100.0 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION METHOD OF BIT OR CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
4.0m			0 → 100%									0m	567.609m
1		✓							40.0m: Serpentine 1mm wide along 45° dip crack.	Lu=0 Po max. = 10.0 kg/cm ²	34.60	1	
2										Lu=0 Po max. = 10.0		2	
3		✓						1		Lu=0 Po max. = 10.0		3	
4								1		Lu=0 Po max. = 10.0	25.98	4	
5		✓						2	Serpentinization is weak. Scattered serpentine less than 1mm wide.	Lu=0 Po max. = 10.0	25.98	5	
6										Lu=0 Po max. = 10.0		6	
7		✓								Lu=0 Po max. = 10.0		7	
8										Lu=0 Po max. = 10.0	27.50	8	
9	Peridotite	✓		φ86 mm				2		Lu=0 Po max. = 10.0	41.36	9	
50								2		Lu=0 Po max. = 10.0		0	
1		✓						2		Lu=0 Po max. = 10.0		1	
2		✓								Lu=0 Po max. = 10.0	31.70	2	
3		✓								Lu=0 Po max. = 10.0	31.70	3	
4		✓						1	Continued stick ~ substick cores.	Lu=0 Po max. = 10.0		4	
5		✓						1		Lu=0 Po max. = 10.0		5	
6								2		Lu=0 Po max. = 10.0	28.90	6	
7		✓								Lu=0 Po max. = 10.0	41.60	7	
8										Lu=0 Po max. = 10.0		8	
9		✓								Lu=0 Po max. = 10.0		9	
60										Lu=0 Po max. = 10.0	31.55	0	567.609



GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-3 (SHEET 4 of 5)

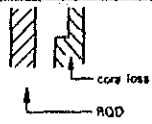
LOCATION DAM DEPTH OF HOLE 100.00 m COMMENCED 25 - 8 - 1988
 ELEVATION 607.609 m DEPTH OF OVERBURDEN 0 m COMPLETED 11 - 9 - 1988
 COORDINATE X 452,559.74 LENGTH OF ROCK DRILLING 100.00 m DRILLED BY DSI
 Y 4,177,956.03 TOTAL LENGTH OF CORE 100.00 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 90 CORE RECOVERY 100.0 %
 BEARING OF ANGLE HOLE -

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0			0 → 100							LUGEON	m	0	527.609
1		✓						60.0		Lu = 0 P _{o max.} = 10.0 kg/cm ²	37.55	1	
2							2			Lu = 0 P _{o max.} = 10.0		2	
3		✓								Lu = 0 P _{o max.} = 10.0		3	
4		✓									27.70 38.90	4	
5		✓								Lu = 0 P _{o max.} = 10.0		5	
6		✓						65.5 65.7	65.5~65.7 m: Piece ~ fragment cores, weak serpentinization.	Lu = 0 P _{o max.} = 10.0		6	
7		✓					2			Lu = 0 P _{o max.} = 10.0		7	
8		✓						67.5			27.10 27.10	8	
9		✓					1			Lu = 0 P _{o max.} = 10.0		9	
10		✓					1			Lu = 0 P _{o max.} = 10.0		0	
11		✓					2			Lu = 0 P _{o max.} = 10.0		1	
12		✓						72.0	73.0 m and 73.2 m: Serpentine 1mm wide along 50° dip cracks.	Lu = 0 P _{o max.} = 10.0	32.10 46.70	2	
13		✓					2			Lu = 0 P _{o max.} = 10.0		3	
14		✓							74.5 m: Serpentine 1- 2 mm wide along 50° dip crack.	Lu = 0 P _{o max.} = 10.0		4	
15		✓						75.0		Lu = 0 P _{o max.} = 10.0		5	
16		✓					1				34.90 34.90	6	
17		✓					1			Lu = 0 P _{o max.} = 10.0		7	
18		✓					2			Lu = 0 P _{o max.} = 10.0		8	
19		✓						79.0		Lu = 0 P _{o max.} = 10.0		9	
20		✓					2				34.95	0	527.609

Peridotite

486 mm

Dark gray



driller's note
 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 (grain)
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
 Water table before drilling → 0.50

GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK - 3 (SHEET 5 OF 5)

LOCATION DAM	DEPTH OF HOLE 100.00 m	COMMENCED 25 - 8 - 1988	
ELEVATION 607.609 m	DEPTH OF OVERBURDEN 0 m	COMPLETED 11 - 9 - 1988	
COORDINATE X 452.359.74 Y 477.356.03	LENGTH OF ROCK DRILLING 100.00 m	DRILLED BY DSI	
ANGLE FROM HORIZONTAL 90°	TOTAL LENGTH OF CORE 100.00 m	LOGGED BY JICA	
BEARING OF ANGLE HOLE -	CORE RECOVERY 100.0 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION	
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION				
0			0 → 100%							LUGEON	m	0m	527.609m
1		✓								Lu = 0 P _{o max} = 10.0	43.05	1	
2		✓								Lu = 0 P _{o max} = 10.0		2	
3		✓								Lu = 0 P _{o max} = 10.0		3	
4		✓								Lu = 0 P _{o max} = 10.0	45.80 45.80	4	
5		✓								Lu = 0 P _{o max} = 10.0		5	
6		✓								86.3m : Serpentine 1mm wide along 85° dip crack.		6	
7		✓								Lu = 0 P _{o max} = 10.0		7	
8		✓					2			Lu = 0 P _{o max} = 10.0	30.00 53.00	8	
9		✓								88.6~89.1m core : Laboratory test.		9	
10		✓					2			Lu = 0 P _{o max} = 10.0		10	
11		✓								89.5m : Serpentine 1~2 mm wide along 30° dip crack.		11	
12		✓								Lu = 0 P _{o max} = 10.0	44.70 44.70	12	
13		✓								91.1m : Serpentine 1~2 mm wide along horizontal crack.		13	
14		✓								Lu = 0 P _{o max} = 10.0		14	
15		✓								92.4m : Serpentine and calcite vein less than 1mm wide.		15	
16		✓								Lu = 0 P _{o max} = 10.0	47.80 59.70	16	
17		✓								Lu = 0 P _{o max} = 10.0		17	
18		✓								Lu = 0 P _{o max} = 10.0		18	
19		✓								Lu = 0 P _{o max} = 10.0		19	
20		✓								Lu = 0 P _{o max} = 10.0		20	
100		✓								100.0 End of drill hole	55.60	0	507.609

Peridotite

φ86 mm

Dark gray

980

R.Q.D (Av.) = 91%

100.0 End of drill hole



driller's note 4
 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 (grain)
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
 Water table before drilling → 0.50

GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-4 (SHEET 1 of 4)

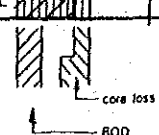
LOCATION DAM DEPTH OF HOLE 80.00 m COMMENCED 10-8-1988
 ELEVATION 607.222 m DEPTH OF OVERBURDEN 0 m COMPLETED 24-8-1988
 COORDINATE X: 452,560.15 LENGTH OF ROCK DRILLING 80.00 m DRILLED BY DSI
Y: 4,177,955.30 TOTAL LENGTH OF CORE 80.00 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 45 CORE RECOVERY 100.0 %
 BEARING OF ANGLE HOLE S25°E

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0m			0-100%							LUGEON	m	0m	607.222
0-1							2	No surface soil.		Lu = (98)			
1-2							3	1.5 Oxidization crack is few		Po max. = 3.0	1.50		
2-3							2	2.6m: Serpentine 1mm wide along 30° dip crack.		Lu > 100	1.50		
3-4							3	(to drilling direction)		Po max. = 3.0			
4-5							2			Lu = (28)			
5-6										Po max. = 5.0			
6-7							3-4	5.8-6.1m: Piece-fragment cores, weak serpentinization.		Lu = 0	6.00		
7-8							1	8.2m: Serpentine 1-5mm wide along 30° dip crack.		Po max. = 5.0	6.00		
8-9							2	9.3m: Serpentine 1mm wide along 30° dip crack.		Lu = 0	2.05		
9-10							1			Po max. = 5.0	2.05		
10-11							2			Lu = 0			
11-12										Po max. = 10.0			
12-13										Lu = 0	2.00		
13-14										Po max. = 10.0	1.30		
14-15							3	14.0-15.0 m: Piece cores weak serpentinization.		Lu = 0			
15-16										Po max. = 10.0			
16-17							1	16.0-16.3 m core: Laboratory test.		Lu = 2.0	2.70		
17-18							1			Po max. = 10.0	16.00		
18-19							2	16.5m: Serpentine 2mm wide along 45° dip crack.		Lu = 6.2			
19-20										Po max. = 10.0			
20-21							2	17.1m: Serpentine and calcite vein 2mm wide		Lu = 3.9			
21-22										Po max. = 10.0			
22-23										Lu = 0	3.00		
23-24										Po max. = 10.0			
24-25										Lu = 0			593.080

Peridotite

φ86 mm

Dark gray



driller's note
 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 (grain)
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

Water table after drilling → 2.30
 Water table before drilling → 2.30

GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-4 (SHEET 2 OF 4)

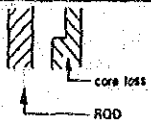
LOCATION	DAM	DEPTH OF HOLE	80.00 m	COMMENCED	10-8-1988
ELEVATION	607.222 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	24-8-1988
COORDINATE	X 452.560.15 Y 4.177.935.30	LENGTH OF ROCK DRILLING	80.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	45°	TOTAL LENGTH OF CORE	80.00 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	S25°E	CORE RECOVERY	100.0 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
2.0m			0 → 100%									0m	583.080 m
1		✓					1	19.8m : Serpentine 1-5 mm wide along 30° dip crack.		Lu = 2.9 P _{omax} = 10.0 kg/cm ²		3.00	
2		✓					2	22.0 ~ 22.5 m : Weak serpentinization.		Lu = 3.8 P _{omax} = 10.0			
3		✓					1						
4		✓					5					10.60	
5		✓					2			Lu = 0.4 P _{omax} = 10.0		13.00	
6		✓					3	25.5 ~ 26.0 m : Piece cores.					
7		✓					2	26.0 80° dip crack with thin serpentine.		Lu = 3.0 P _{omax} = 10.0			
8		✓					1	26.8m : Serpentine 1mm wide				17.00	
9		✓					2			Lu = 0 P _{omax} = 10.0		17.00	
10		✓					2						
11		✓					1	30.6m : Serpentine 1-5 mm wide along 20° dip crack		Lu = 1.3 P _{omax} = 10.0			
12		✓					1					13.76	
13		✓					2			Lu = 0.4 P _{omax} = 10.0		29.10	
14		✓					2						
15		✓					2			Lu = 3.0 P _{omax} = 10.0			
16		✓					1	37.3m, 37.4m and 37.7m : Serpentine 1mm wide along 55° dip cracks.				18.70	
17		✓					1			Lu = 4.8 P _{omax} = 10.0		18.70	
18		✓					2						
19		✓					2			Lu = 1.2 P _{omax} = 10.0			
20		✓					2					17.15	578.938

Ferridote

φ86 mm

Dark gray



driller's note
 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 (grain)
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
 Water table before drilling → 0.50

GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-4 (SHEET 3 OF 4)

LOCATION DAM
 ELEVATION 607.222 m
 COORDINATE X 452,560.15
 Y 4,177,959.30
 ANGLE FROM HORIZONTAL 45
 BEARING OF ANGLE HOLE S25°E

DEPTH OF HOLE 80.00 m COMMENCED 10-8-1988
 DEPTH OF OVERBURDEN 0 m COMPLETED 24-8-1988
 LENGTH OF ROCK DRILLING 80.00 m DRILLED BY DSI
 TOTAL LENGTH OF CORE 80.00 m LOGGED BY JICA
 CORE RECOVERY 100.0 %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
4.0m			0 → 100%							LUGEON	m	0m	578.938 ^m
1		✓					1	42.1m : Serpentine 1mm wide along 30° dip crack.	Lu = 1.6 P _{o max.} = 10.0 kg/cm ²		38.50		
2		✓					3						
3		✓					2		Lu = 15.0 P _{o max.} = 10.0				
4		✓									18.20		
5		✓						44.5	Lu = 4.0 P _{o max.} = 10.0		18.20		
6		✓											
7		✓						47.5m : Calcite vein 1mm wide, 60° dip.	Lu = 6.3 P _{o max.} = 10.0				
8		✓					2				21.70		
9		✓						48.8m : Serpentine 1mm wide along 30° dip and 45° dip cracks.	Lu = 0.4 P _{o max.} = 10.0		49.30		
10	Peridotite	✓		986 mm			2		49.80 m				
11		✓						50.4m : Serpentine 1mm wide.	Lu = 0 P _{o max.} = 10.0				
12		✓						51.7-52.0m core : Laboratory test.	Lu = 0 P _{o max.} = 10.0		22.10		
13		✓									22.10		
14		✓					3	53.5 53.5-54.3m : Piece cores					
15		✓						54.3 thin meshy serpentine.					
16		✓					2		Lu = 0 P _{o max.} = 10.0				
17		✓					3						
18		✓						56.0m : Calcite vein 2 cm wide and serpentine			16.90		
19		✓					2	5mm wide along 35° dip crack.	Lu = 0 P _{o max.} = 10.0		48.90		
20		✓					2						
21		✓					3	57.2m : Serpentine 1mm wide along 20° dip crack.	Lu = 0 P _{o max.} = 10.0				
22		✓					2						
23		✓											
24		✓									17.15		569.796

Peridotite

Dark gray

driller's note 4

1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain

1 (hard) - 5 (soft)

1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
 Water table before drilling → 0.50

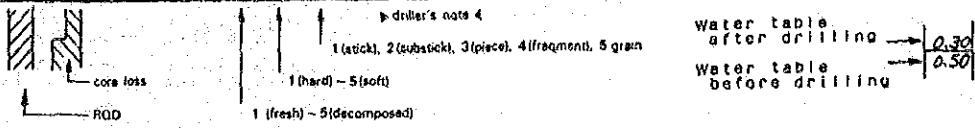
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-4 (SHEET 4 OF 4)

LOCATION	DAM	DEPTH OF HOLE	80.00 m	COMMENCED	10- 8 -1988
ELEVATION	607.222 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	24- 8 -1988
COORDINATE	X 452,560.15 Y 4172,955.30	LENGTH OF ROCK DRILLING	80.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	45	TOTAL LENGTH OF CORE	80.00 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	S25°E	CORE RECOVERY	100.0 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0m			0-100%									0m	566.786m
1		✓					2			Lu = 0 P _{max.} = 10.0	17.15	1	
2		✓					3	62.0 62.3		Lu = 0 P _{max.} = 10.0		2	
3		✓								Lu = 0 P _{max.} = 10.0		3	
4		✓					2			Lu = 0 P _{max.} = 10.0	26.70 48.50	4	
5		✓								Lu = 0 P _{max.} = 10.0		5	
6		✓								Lu = 0 P _{max.} = 10.0		6	
7		✓					3	67.2 67.5	67.2~67.5 m: Thin meshy serpentine.	Lu = 0 P _{max.} = 10.0		7	
8		✓					1			Lu = 0 P _{max.} = 10.0	17.90 17.90	8	
9		✓					1			Lu = 0 P _{max.} = 10.0		9	
70	Peridotite	✓		φ86 mm			2		Dark grey	Lu = 0 P _{max.} = 10.0		0	
1		✓					2			Lu = 0 P _{max.} = 10.0		1	
2		✓					2			Lu = 0 P _{max.} = 10.0	18.30 48.45	2	
3		✓					1			Lu = 0 P _{max.} = 10.0		3	
4		✓					3			Lu = 0 P _{max.} = 10.0		4	
5		✓								Lu = 0 P _{max.} = 10.0		5	
6		✓								Lu = 0 P _{max.} = 10.0	18.00 18.00	6	
7		✓					3	77.3 77.8	75.5~76.0 m core : Laboratory test. 77.3~77.8 m: 90° dip crack.	Lu = 0 P _{max.} = 10.0		7	
8		✓					2			Lu = 0 P _{max.} = 10.0		8	
9		✓					1			Lu = 0 P _{max.} = 10.0		9	
80		✓					3		R.A.D (Av.) = 86%	Lu = 0 P _{max.} = 10.0	18.36	0	550.653



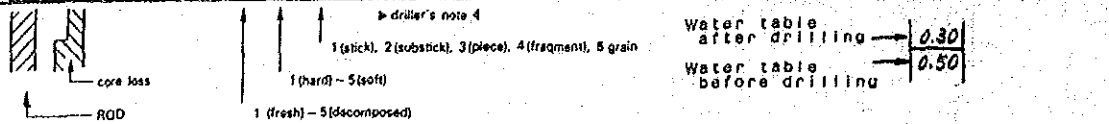
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-5 (SHEET 1 OF 5)

LOCATION	DAM	DEPTH OF HOLE	100.00 m	COMMENCED	14 - 7 - 1988
ELEVATION	517.561 m	DEPTH OF OVERBURDEN	39.00 m	COMPLETED	6 - 9 - 1988
COORDINATE	X: 452534.89 Y: 4178057.82	LENGTH OF ROCK DRILLING	61.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	55°	TOTAL LENGTH OF CORE	69.97 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	S40°E	CORE RECOVERY	69.97 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION AND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0m			0 → 100%							LUGEON	m	0m	517.561m
1									<p>Alluvium.</p> <p>They include peridotite and some limestone gravels.</p> <p>No fine material in core box.</p> <p>0-26m: All peridotite gravels.</p>				
2													
3										3.00			
4										3.00			
5													
6										6.00			
7										6.00			
8										7.50			
9										7.50			
10										7.60			
11									7.60				
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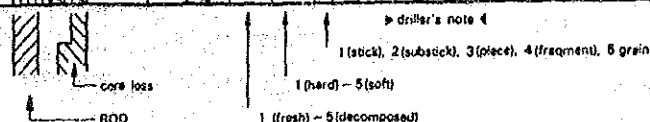
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-5 (SHEET 2 of 5)

LOCATION DAM	DEPTH OF HOLE 100.00 m	COMMENCED 14 - 7 - 1988
ELEVATION 517.561 m	DEPTH OF OVERBURDEN 39.00 m	COMPLETED 6 - 9 - 1988
COORDINATE N 452 534.29 E 4172.057.82	LENGTH OF ROCK DRILLING 61.00 m	DRILLED BY DSI
ANGLE FROM HORIZONTAL 55°	TOTAL LENGTH OF CORE 69.97 m	LOGGED BY JICA
BEARING OF ANGLE HOLE S 40° E	CORE RECOVERY 69.97 %	

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
2.0m			0-100%							LUGEON	mm	0m	517.561
1											7.30	1	
2											7.30	2	
3									26.0-27.5m: Included red shale gravels.		7.30	3	
4											7.30	4	
5											7.30	5	
6											7.30	6	
7											7.30	7	
8											7.30	8	
9									29.0-30.5m: Included limestone gravels.		7.30	9	
10											7.30	0	
1											7.30	1	
2											7.30	2	
3											7.30	3	
4											7.30	4	
5											7.30	5	
6											7.30	6	
7											7.30	7	
8											7.30	8	
9									38-39m: Included limestone gravels.		7.30	9	
10											7.30	0	
39.0													
									peridotite.	Lu = 22.0 Pomax = 10.0 kg/cm ²			485.614
40													484.795



Water table after drilling → 0.30
Water table before drilling → 0.50

GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-5 (SHEET 3 OF 5)

LOCATION DAM
 ELEVATION 517561 m
 COORDINATE X: 452534.29
Y: 4178057.82
 ANGLE FROM HORIZONTAL 55
 BEARING OF ANGLE HOLE S40°E

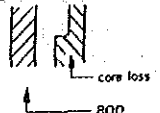
DEPTH OF HOLE 100.00 m COMMENCED 14-7-1988
 DEPTH OF OVERBURDEN 39.00 m COMPLETED 6-9-1988
 LENGTH OF ROCK DRILLING 61.00 m DRILLED BY DSI
 TOTAL LENGTH OF CORE 69.97 m LOGGED BY JICA
 CORE RECOVERY 69.97 %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
4.0m			0 → 100%							LUGEON	m	0m	484.795m
1		✓					3	39.0~42.0m: Piece ~ fragment cores.	Lu = 0 Pomax. = 10.0 kg/cm ²				
2		✓					4	41.5m, 42.0m and 42.2m: calcite vein 1mm wide.	Lu = 0 Pomax. = 10.0	7.30	7.30		
3		✓					3	42.1m: Serpentine 1mm wide.	Lu = 0 Pomax. = 10.0				
4		✓					2		Lu = 0 Pomax. = 10.0				
5		✓					2		Lu = 0 Pomax. = 10.0	7.30	8.15		
6		✓					3		Lu = 0 Pomax. = 10.0				
7		✓					3		Lu = 0 Pomax. = 10.0				
8		✓					2	48.8m: Serpentine 3mm wide.	Lu = 0 Pomax. = 10.0				
9		✓					2	50.5m: Serpentine lens, diameter 1cm.	Lu = 0 Pomax. = 10.0				
5.0	Peridotite	✓					2		Lu = 0 Pomax. = 10.0	8.15	8.15		
1		✓					3		Lu = 0 Pomax. = 10.0				
2		✓					3		Lu = 0 Pomax. = 10.0				
3		✓					3		Lu = 0 Pomax. = 10.0				
4		✓					4	54.3~54.5m and 54.8~54.5m: Fragment cores, weak serpentinization.	Lu = 19.0 Pomax. = 10.0				
5		✓					2		Lu = 16.1 Pomax. = 10.0	8.15	8.00		
6		✓					1		Lu = 4.8 Pomax. = 10.0	8.00	8.15		
7		✓					3						
8		✓					3						
9		✓					3						
6.0													468.412

Peridotite

φ57 mm

Dark gray



driller's note
 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
 Water table before drilling → 0.50

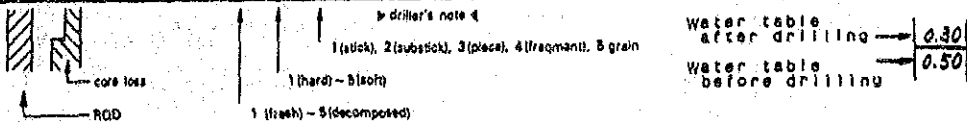
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE NO. SK-5 (SHEET 4 OF 5)

LOCATION DAM	DEPTH OF HOLE 100.00 m	COMMENCED 14 - 7 - 1988	
ELEVATION 517.561 m	DEPTH OF OVERBURDEN 39.00 m	COMPLETED 6 - 9 - 1988	
COORDINATE N 452,534.29 E 417,057.82	LENGTH OF ROCK DRILLING 61.00 m	DRILLED BY DSI	
ANGLE FROM HORIZONTAL 55°	TOTAL LENGTH OF CORE 69.97 m	LOGGED BY JICA	
BEARING OF ANGLE HOLE S 40° E	CORE RECOVERY 69.97 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION							
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER			LUGEON	m					
0m			0 → 100%									0m	517.561m							
1	Peridotite	✓	✓	φ57mm	Dark gray	2	2	3	2 ← 61.2~61.4m core : Laboratory test.	Lu = 0 P _{o max.} = 10.0 kg/cm ²	8.00 8.00	1								
2									3											
3																Lu = 0 P _{o max.} = 10.0				
4									64.2	64.2~66.0m : Poor core recovery. Piece cores.	Lu = 0 P _{o max.} = 10.0									
5																				
6									66.0	66.4m : Serpentine 1mm wide. 66.8m : Weak serpentinization 2~3cm wide.	Lu = 0 P _{o max.} = 10.0	8.15 8.15								
7																				
8																				
9																Lu = 0 P _{o max.} = 10.0	8.00 8.20			
0																				
1								Lu = 0 P _{o max.} = 10.0												
2																				
3								Lu = 0 P _{o max.} = 10.0												
4									8.00 8.15											
5								Lu = 0 P _{o max.} = 10.0												
6																				
7								76.0 ← 76.0~76.4m core : Laboratory test.	Lu = 0 P _{o max.} = 10.0											
8																				
9																				
0								78.0	Lu = 0 P _{o max.} = 10.0	7.90 8.10										
1																				
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7																				
8																				
9																				
0																				



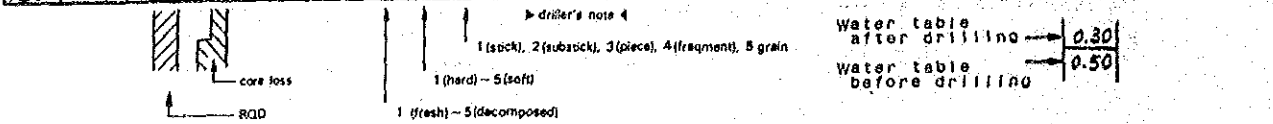
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. **SK-5** (SHEET **5** OF **5**)

LOCATION DAM	DEPTH OF HOLE 100.00 m	COMMENCED 14 - 7 - 1988
ELEVATION 517561 m	DEPTH OF OVERBURDEN 39.00 m	COMPLETED 6 - 9 - 1988
COORDINATE X: 452,534.39 Y: 6,178,057.82	LENGTH OF ROCK DRILLING 61.00 m	DRILLED BY DSI
ANGLE FROM HORIZONTAL 55°	TOTAL LENGTH OF CORE 69.97 m	LOGGED BY JICA
BEARING OF ANGLE HOLE S 40° E	CORE RECOVERY 69.97 %	

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER PRESSURE TEST		LEAKAGE OF DRILLING WATER			
8.0m			0-100%								LUGEON	m	0m	452,029
1		✓					2				$L_u = 0$ $P_{o max} = 10.0$ kg/cm ²	8.00	1	
2							3					8.05	2	
3		✓					3			84.0m: Slickenside 60° dip.	$L_u = 0$ $P_{o max} = 10.0$		3	
4							3-4			84.4-84.7m: Piece- fragment cores, thin serpentine.	$L_u = 0$ $P_{o max} = 10.0$		4	
5		✓					1					8.00	5	
6							1					8.00	6	
7		✓					2				$L_u = 0$ $P_{o max} = 10.0$		7	
8										89.0-89.5m: Piece cores no serpentine.	$L_u = 0$ $P_{o max} = 10.0$		8	
9		✓					3					8.15	9	
10							2					8.15	0	
1	Peridotite	✓									$L_u = 0$ $P_{o max} = 10.0$		1	
2		✓					1						2	
3		✓					1				$L_u = 0$ $P_{o max} = 10.0$		3	
4		✓					2					8.10	4	
5		✓										8.10	5	
6		✓								95.6-96.0m core: Laboratory test.	$L_u = 0$ $P_{o max} = 10.0$		6	
7		✓											7	
8		✓					2			98.0-100.0m: Weak ser- pentinization.		8.00	8	
9		✓					1					8.15	9	
10		✓					3			R.A.D (Av.) = 53%	$L_u = 0$ $P_{o max} = 10.0$		0	
										100.0 End of drill hole		8.10	0	435,646



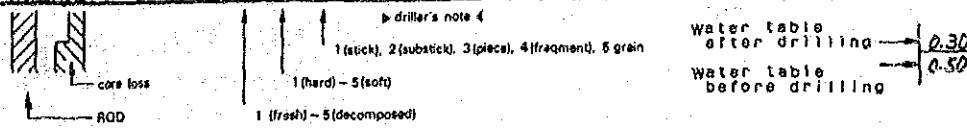
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-6 (SHEET 1 of 5)

LOCATION	DAM	DEPTH OF HOLE	90.00m	COMMENCED	11 - 8 - 1988
ELEVATION	542.365 m	DEPTH OF OVERBURDEN	2.00m	COMPLETED	1 - 9 - 1988
COORDINATE	X: 452.510.97 Y: 178.097.07	LENGTH OF ROCK DRILLING	88.00m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	89.23m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	99.1%		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT Casing	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0.3			0 → 100%									0m	542.365m
0-1.5	Alluvium	○			Brown				Alluvium. 0~1.5m: Sand and gravels 1.5~2.0m: Peridotite gravels.			2.00	542.365
2.0-9.5	Peridotite	∇			Dark gray				Peridotite. 2.0~9.5m: Many oxidation cracks.	Lu = (70) P _{max} = 3.0 1.3/cm ²		2.00	
5.2		∇				3	2	2	5.2m: Weathered serpentine 1mm wide.	Lu > 100 P _{max} = 3.0		2.00	
10.2		∇						2	10.2m: Serpentine 1~5 mm wide along horizontal crack.	Lu = (40) P _{max} = 5.0		5.85	
11.8		∇						2	11.8m: Weathered serpentine 1mm wide along 60° dip crack.	Lu = (63) P _{max} = 5.0		6.50	
14.0		∇						2				8.10	
16.9		∇						2				8.20	
18.5		∇						2				10.80	
		∇						1				12.00	
		∇						2				14.50	
		∇						1				16.9	
		∇						2				13.70	
		∇						1				13.90	
		∇						1					
20								2					522.363



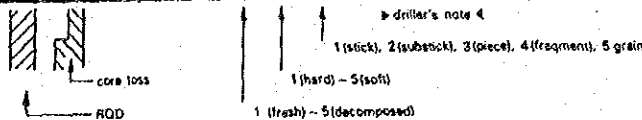
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-6 (SHEET 2 OF 5)

LOCATION DAM DEPTH OF HOLE 90.00m COMMENCED 11-8-1988
 ELEVATION 542.365 m DEPTH OF OVERBURDEN 2.00m COMPLETED 1-9-1988
 COORDINATE X. 452,510.97 LENGTH OF ROCK DRILLING 88.00m DRILLED BY DSI
 Y. 4,178,092.07 TOTAL LENGTH OF CORE 89.23m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 90° CORE RECOVERY 99.1%
 BEARING OF ANGLE HOLE -

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
2.0m			0 → 100%									0m	542.365 ^m
1	Peridotite	V	100%	φ86 mm	Dark gray	2	2	4	29.9-30.3m: Fragment cores, meshy serpentine	Lu = 0	P _{max} = 10.0	15.50	18.50
2									30.3-31.3m: Piece ~ fragment cores, meshy serpentine 1mm wide (60° dip).	Lu = 0	P _{max} = 10.0		
3									31.3-31.8m: Piece ~ fragment cores, meshy serpentine 1mm wide (70°-90° dip).	Lu = 0	P _{max} = 10.0		
4									31.8-35.8m: Piece cores, no serpentine.	Lu = 0	P _{max} = 10.0		
5									35.8-36.0m: Piece cores, no serpentine.	Lu = 0	P _{max} = 10.0		
6									36.0-36.5m core: Laboratory test.	Lu = 0	P _{max} = 10.0		
7									36.5-37.8m: Piece cores, no serpentine.	Lu = 0	P _{max} = 10.0		
8									37.8-38.5m: Piece cores, no serpentine.	Lu = 0	P _{max} = 10.0		
9									38.5-40.0m: Piece cores, no serpentine.	Lu = 0	P _{max} = 10.0		
4.0													



Water table after drilling → 0.30
 Water table before drilling → 0.50

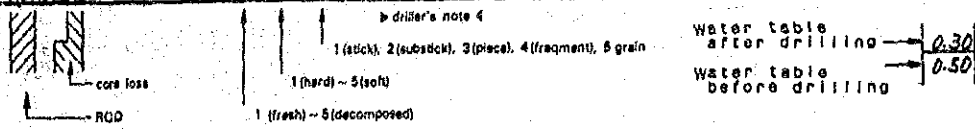
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK - 6 (SHEET 3 OF 5)

LOCATION	DAM	DEPTH OF HOLE	90.00m	COMMENCED	11 - 8 - 1988
ELEVATION	542.365 m	DEPTH OF OVERBURDEN	2.00m	COMPLETED	1 - 9 - 1988
COORDINATE	X: 452.310.97 Y: 178.097.07	LENGTH OF ROCK DRILLING	88.00m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	89.23 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	99.1 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION																																																																																								
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER																																																																																										
4.0m			0 → 100%									0m	542.365m																																																																																								
1	Peridotite	V	φ86 mm						2 1 3 40.7m : Serpentine 1mm 41.0 wide along 70° dip crack.	Lu = 0 P _{o max.} = 10.0 kg/cm ²	14.50 16.70	1																																																																																									
2														Dark gray									2																																																																														
3																																		3																																																																			
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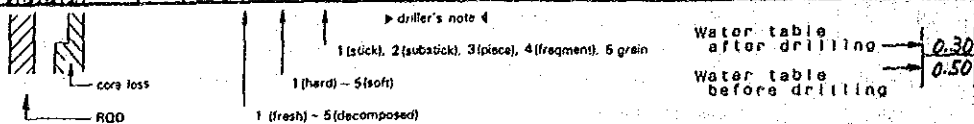
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-6 (SHEET 4 OF 5)

LOCATION	DAM	DEPTH OF HOLE	90.00m	COMMENCED	11 - 8 - 1988
ELEVATION	542.365 m	DEPTH OF OVERBURDEN	2.00m	COMPLETED	1 - 9 - 1988
COORDINATE	X: 452.370.97 Y: 179.097.07	LENGTH OF ROCK DRILLING	88.00m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	89.23 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	99.1 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BITTING CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER PRESSURE TEST		LEAKAGE OF DRILLING WATER	LUGEON		
6.0m			0 → 100%									21.00	0m	462.365m
1		✓									Lu = 0 P _{max.} = 10.0 kg/cm ²		1	
2											Lu = 0 P _{max.} = 10.0		2	
3		✓									Lu = 0 P _{max.} = 10.0		3	
4											Lu = 0 P _{max.} = 10.0		4	
5		✓									Lu = 0 P _{max.} = 10.0		5	
6											Lu = 0 P _{max.} = 10.0	14.00	6	
7		✓									Lu = 0 P _{max.} = 10.0	14.00	7	
8											Lu = 0 P _{max.} = 10.0		8	
9		✓									Lu = 0 P _{max.} = 10.0		9	
70	Peridotite	✓									Lu = 0 P _{max.} = 10.0	14.20	0	
1		✓									Lu = 0 P _{max.} = 10.0	20.00	1	
2											Lu = 0 P _{max.} = 10.0		2	
3		✓									Lu = 0 P _{max.} = 10.0		3	
4											Lu = 0 P _{max.} = 10.0		4	
5		✓									Lu = 0 P _{max.} = 10.0		5	
6											Lu = 0 P _{max.} = 10.0		6	
7		✓									Lu = 0 P _{max.} = 10.0		7	
8											Lu = 0 P _{max.} = 10.0	14.00	8	
9		✓									Lu = 0 P _{max.} = 10.0	14.50	9	
80											Lu = 0 P _{max.} = 10.0		0	462.365



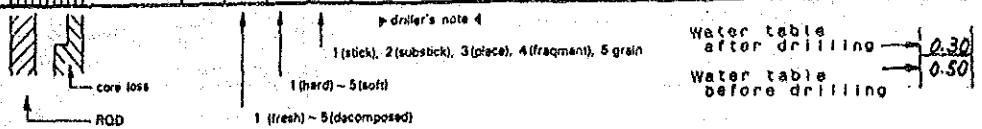
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-6 (SHEET 5 OF 5)

LOCATION	DAM	DEPTH OF HOLE	90.00m	COMMENCED	11 - 8 - 1988
ELEVATION	542.365 m	DEPTH OF OVERBURDEN	2.00m	COMPLETED	1 - 9 - 1988
COORDINATE	X 452,510.97 Y 4,178,027.07	LENGTH OF ROCK DRILLING	88.00m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	89.23 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	99.1 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	GENERAL KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION												
					DOLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION															
0			0 → 100%								0m	462.365 ^m												
1	Peridotite	<	<	φ76 mm	Dark gray	2	2	1 1 2	26.5m: Meshy serpentine 10cm wide, weak serpentinization.	Lu = 0 P _{max} = 10.0 kg/cm ²	14.50 21.30	1												
2													2	2	2	2	2	2	2	2	2	2	2	
3													3	3	3	3	3	3	3	3	3	3	3	3
4													4	4	4	4	4	4	4	4	4	4	4	4
5													5	5	5	5	5	5	5	5	5	5	5	5
6													6	6	6	6	6	6	6	6	6	6	6	6
7													7	7	7	7	7	7	7	7	7	7	7	7
8													8	8	8	8	8	8	8	8	8	8	8	8
9													9	9	9	9	9	9	9	9	9	9	9	9
0																					89.4~89.8m core: Laboratory test. R-Q-D (Av.) = 91%			
0									90.0 End of drill hole		14.50	452.365												



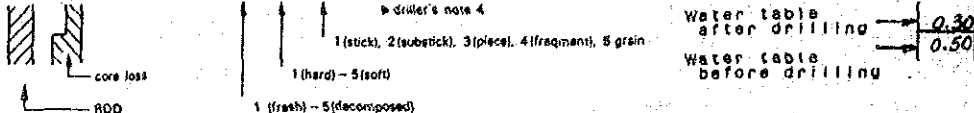
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-7 (SHEET 1 OF 4)

LOCATION DAM DEPTH OF HOLE 80.00 m COMMENCED 23-9-1988
 ELEVATION 603.687 m DEPTH OF OVERBURDEN 0 m COMPLETED 6-10-1988
 COORDINATE X: 452434.67 LENGTH OF ROCK DRILLING 80.00 m DRILLED BY DSI
Y: 178108.32 TOTAL LENGTH OF CORE 80.00 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 60 CORE RECOVERY 100.0 %
 BEARING OF ANGLE HOLE N25°W

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0.0			0 → 100%							LUGEON	m	0m	603.687m
0.0							3	No surface soil.		0.00	overflow 0.54/m		
1.0		✓					4	13 Peridotite.		Lu = (17)		1	
2.0		✓								P _{max} = 3.0	1.00	2	
3.0		✓						4.1m: Oxidization crack		P _{max} = 3.0	1.00	3	
4.0		✓						45° dip.				4	
5.0		✓						4.3m and 4.5m: Serpentine 1mm wide along 0°		Lu = (9)		5	
6.0		✓						15° dip cracks.		P _{max} = 5.0		6	
7.0		✓					1	(to drilling direction)		Lu = (5)	3.00	7	
8.0		✓					1	6.1m: Serpentine 1mm wide along 15° dip crack.		P _{max} = 5.0	3.00	8	
9.0		✓					2			Lu = 0		9	
10.0	Peridotite	✓					2			P _{max} = 5.0	3.60	10	
11.0		✓									6.30	11	
12.0		✓								Lu = 0		12	
13.0		✓								P _{max} = 10.0		13	
14.0		✓								Lu = 0		14	
15.0		✓								P _{max} = 10.0		15	
16.0		✓								Lu = 0	6.95	16	
17.0		✓								P _{max} = 10.0	6.95	17	
18.0		✓						18.0-19.5m: Oxidization cracks, weak serpentinization.		Lu = 1.4		18	
19.0		✓					3			P _{max} = 10.0		19	
20.0		✓					2			Lu = 2.6		20	
							2			P _{max} = 10.0			
							3			Lu = 13.0	16.34		
							3			P _{max} = 10.0	17.00		
							2					0	586.366



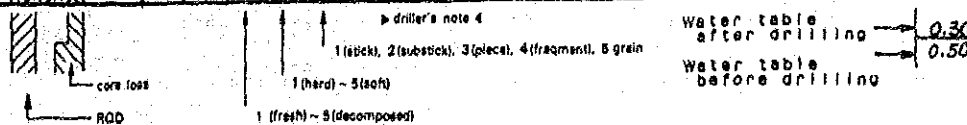
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-7 (SHEET 2 of 4)

LOCATION DAM	DEPTH OF HOLE 80.00 m	COMMENCED 23-9-1988	
ELEVATION 603.687 m	DEPTH OF OVERBURDEN 0 m	COMPLETED 6-10-1988	
COORDINATE 8 452 439.67 74 178 108.32	LENGTH OF ROCK DRILLING 80.00 m	DRILLED BY DSI	
ANGLE FROM HORIZONTAL 60°	TOTAL LENGTH OF CORE 80.00 m	LOGGED BY JICA	
BEARING OF ANGLE HOLE N 25° W	CORE RECOVERY 100.0 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION																																																																	
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER			LUGEON	m																																																															
0			0 → 100%									0m	586.366																																																																	
1	Peridotite	V	100%		Dark gray	2	2				Lu=0 P _{max} = 10.0 kg/cm ²	15.00 15.00	1																																																																	
2															2	2			Lu=0 P _{max} = 10.0	15.68 20.00	2																																																									
3																							2	2			Lu=0 P _{max} = 10.0	10.00 10.00	3																																																	
4																															2	2			Lu=0 P _{max} = 10.0	3.00 3.00	4																																									
5																																							2	2			Lu=0 P _{max} = 10.0	0.00 0.00	5																																	
6																																															2	2			Lu=0 P _{max} = 10.0	0.00 0.00	6																									
7																																																							2	2			Lu=0 P _{max} = 10.0	0.00 0.00	7																	
8																																																															2	2			Lu=0 P _{max} = 10.0	0.00 0.00	8									
9																																																																							2	2			Lu=0 P _{max} = 10.0	0.00 0.00	9	
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1	2	2			Lu=0 P _{max} = 10.0	0.00 0.00	1																																																																							
2									2	2			Lu=0 P _{max} = 10.0	0.00 0.00	2																																																															
3																	2	2			Lu=0 P _{max} = 10.0	0.00 0.00	3																																																							
4																									2	2			Lu=0 P _{max} = 10.0	0.00 0.00	4																																															
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6																																									2	2			Lu=0 P _{max} = 10.0	0.00 0.00	6																															
7																																																	2	2			Lu=0 P _{max} = 10.0	0.00 0.00	7																							
8																																																									2	2			Lu=0 P _{max} = 10.0	0.00 0.00	8															
9																																																																	2	2			Lu=0 P _{max} = 10.0	0.00 0.00	9							
0																																																																									2	2			Lu=0 P _{max} = 10.0	0.00 0.00



GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

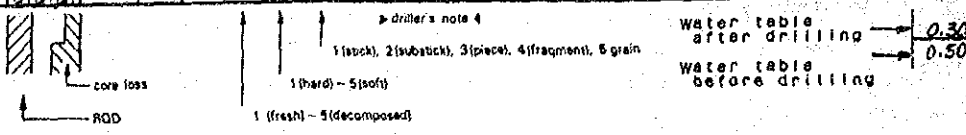
HOLE No. **SK-7** (SHEET 3 of 4)

LOCATION DAM	DEPTH OF HOLE 80.00 m	COMMENCED 23-9-1988
ELEVATION 603.687 m	DEPTH OF OVERBURDEN 0 m	COMPLETED 6-10-1988
COORDINATE X: 452.439.87 Y: 4173.108.32	LENGTH OF ROCK DRILLING 80.00 m	DRILLED BY DSI
ANGLE FROM HORIZONTAL 60°	TOTAL LENGTH OF CORE 80.00 m	LOGGED BY JICA
BEARING OF ANGLE HOLE N25°W	CORE RECOVERY 100.0 %	

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION	
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER			
4.0m			0 → 100%							LUGEON	m	0m	569.046 m	
1	Peridotite	V	V						42.5~44.5m: Thin serpentine along 70°~80° dip crack.	Lu = 0 P _{max} = 10.0 kg/cm ²	0.00	1		
2									44.5	45.0~45.6m: Serpentine 1mm wide along 40° dip crack.	Lu = 0 P _{max} = 10.0	0.00	2	
3									45.6	47.1~47.4m: Calcite vein 2~3mm wide, serpentine 1mm wide and talc less than 1mm wide. Meshy.	Lu = 0 P _{max} = 10.0	0.00	3	
4									47.4	47.9~51.5m: Serpentine 1mm wide along many cracks.	Lu = 0 P _{max} = 10.0	0.00	4	
5									51.5	54.8m: Serpentine 1mm wide along 40° dip crack.	Lu = 0 P _{max} = 10.0	0.00	5	
6									54.8	57.2m: Meshy serpentine 1mm wide.	Lu = 0 P _{max} = 10.0	0.00	6	
7									57.2	58.1m: Serpentine 1mm wide along 30° dip crack.	Lu = 0 P _{max} = 10.0	0.00	7	
8									58.1				8	
9													9	
60													60	551.725

Dark gray

φ76 mm



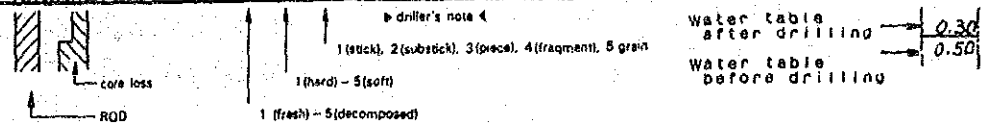
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SK-7 (SHEET 4 of 4)

LOCATION DAM DEPTH OF HOLE 80.00 m COMMENCED 23-9-1988
 ELEVATION 603.687 m DEPTH OF OVERBURDEN 0 m COMPLETED 6-10-1988
 COORDINATE X: 452439.67 LENGTH OF ROCK DRILLING 80.00 m DRILLED BY DSI
Y: 4178108.32 TOTAL LENGTH OF CORE 80.00 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 60° CORE RECOVERY 100.0 %
 BEARING OF ANGLE HOLE N25°W

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION	
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION				
6.0m			0 → 100%							LUGEON	m	0m	651.725
1	Peridotite	✓	[Hatched]		Dark gray	2	2	2	60.3m: Serpentine 1mm wide along 30° dip crack.	Lu=0	Pomax=10.0	1	
2									62.7m: Serpentine 1mm wide along 10° dip crack.	Lu=0	Pomax=10.0	2	0.00
3										Lu=0	Pomax=10.0	3	0.00
4										Lu=0	Pomax=10.0	4	0.00
5										Lu=0	Pomax=10.0	5	0.00
6										Lu=0	Pomax=10.0	6	0.00
7										Lu=0	Pomax=10.0	7	0.00
8										Lu=0	Pomax=10.0	8	0.00
9										Lu=0	Pomax=10.0	9	0.00
10										Lu=0	Pomax=10.0	10	0.00
11		Lu=0	Pomax=10.0	11	0.00								
12		Lu=0	Pomax=10.0	12	0.00								
13		Lu=0	Pomax=10.0	13	0.00								
14		Lu=0	Pomax=10.0	14	0.00								
15		Lu=0	Pomax=10.0	15	0.00								
16		Lu=0	Pomax=10.0	16	0.00								
17		Lu=0	Pomax=10.0	17	0.00								
18		Lu=0	Pomax=10.0	18	0.00								
19		Lu=0	Pomax=10.0	19	0.00								
20		Lu=0	Pomax=10.0	20	0.00								
21		Lu=0	Pomax=10.0	21	0.00								
22		Lu=0	Pomax=10.0	22	0.00								
23		Lu=0	Pomax=10.0	23	0.00								
24		Lu=0	Pomax=10.0	24	0.00								
25		Lu=0	Pomax=10.0	25	0.00								
26		Lu=0	Pomax=10.0	26	0.00								
27		Lu=0	Pomax=10.0	27	0.00								
28		Lu=0	Pomax=10.0	28	0.00								
29		Lu=0	Pomax=10.0	29	0.00								
30		Lu=0	Pomax=10.0	30	0.00								
31		Lu=0	Pomax=10.0	31	0.00								
32		Lu=0	Pomax=10.0	32	0.00								
33		Lu=0	Pomax=10.0	33	0.00								
34		Lu=0	Pomax=10.0	34	0.00								
35		Lu=0	Pomax=10.0	35	0.00								
36		Lu=0	Pomax=10.0	36	0.00								
37		Lu=0	Pomax=10.0	37	0.00								
38		Lu=0	Pomax=10.0	38	0.00								
39		Lu=0	Pomax=10.0	39	0.00								
40		Lu=0	Pomax=10.0	40	0.00								
41		Lu=0	Pomax=10.0	41	0.00								
42		Lu=0	Pomax=10.0	42	0.00								
43		Lu=0	Pomax=10.0	43	0.00								
44		Lu=0	Pomax=10.0	44	0.00								
45		Lu=0	Pomax=10.0	45	0.00								
46		Lu=0	Pomax=10.0	46	0.00								
47		Lu=0	Pomax=10.0	47	0.00								
48		Lu=0	Pomax=10.0	48	0.00								
49		Lu=0	Pomax=10.0	49	0.00								
50		Lu=0	Pomax=10.0	50	0.00								
51		Lu=0	Pomax=10.0	51	0.00								
52		Lu=0	Pomax=10.0	52	0.00								
53		Lu=0	Pomax=10.0	53	0.00								
54		Lu=0	Pomax=10.0	54	0.00								
55		Lu=0	Pomax=10.0	55	0.00								
56		Lu=0	Pomax=10.0	56	0.00								
57		Lu=0	Pomax=10.0	57	0.00								
58		Lu=0	Pomax=10.0	58	0.00								
59		Lu=0	Pomax=10.0	59	0.00								
60		Lu=0	Pomax=10.0	60	0.00								
61		Lu=0	Pomax=10.0	61	0.00								
62		Lu=0	Pomax=10.0	62	0.00								
63		Lu=0	Pomax=10.0	63	0.00								
64		Lu=0	Pomax=10.0	64	0.00								
65		Lu=0	Pomax=10.0	65	0.00								
66		Lu=0	Pomax=10.0	66	0.00								
67		Lu=0	Pomax=10.0	67	0.00								
68		Lu=0	Pomax=10.0	68	0.00								
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75		Lu=0	Pomax=10.0	75	0.00								
76		Lu=0	Pomax=10.0	76	0.00								
77		Lu=0	Pomax=10.0	77	0.00								
78		Lu=0	Pomax=10.0	78	0.00								
79		Lu=0	Pomax=10.0	79	0.00								
80		Lu=0	Pomax=10.0	80	0.00								



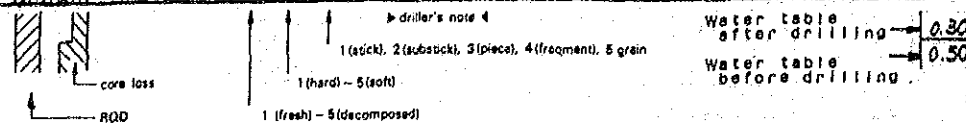
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. **TB-1** (SHEET **1** OF **5**)

LOCATION HEADRACE TUNNEL	DEPTH OF HOLE 90.00 m	COMMENCED 4 - 5 - 1988
ELEVATION 631.357 m	DEPTH OF OVERBURDEN 3.00 m	COMPLETED 8 - 6 - 1988
COORDINATE X: 455,757.98 Y: 172,232.91	LENGTH OF ROCK DRILLING 87.00 m	DRILLED BY DSI
ANGLE FROM HORIZONTAL 90°	TOTAL LENGTH OF CORE 89.50 m	LOGGED BY JICA
BEARING OF ANGLE HOLE -	CORE RECOVERY 99.4 %	

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION						
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER PRESSURE TEST		LEAKAGE OF DRILLING WATER	LUGEON			m					
0m			0 → 100%									0m	631.357							
1.0	Alluvium	○			Dark brown	Gray			1.0	Alluvium. 0.0~1.0m: Dark brownish soil and gravels.		1.00	1.00	1						
2.0															3.0	1.0~3.0m: Gray limestone gravels.			2	
3.0																				3.0
3.4	Limestone				Gray	ω		3.9	3.9	There are oxidation zones in the fissures.	P _{max.} = 3.0 kg/cm ²	5.25	7.00	4						
3.9															5.0	3.9~5.0m: Vertical solution crack.	Lu = (54)	P _{max.} = 5.0	5	
5.0																				6.0
6.0															8.5	9.5	9.5m: Calcite vein 1cm wide filled solution crack, 45° dip.	Lu = 65.0	P _{max.} = 10.0	
8.5																				11.5
11.5															13.0	13.0	13.0	Lu = 16.0	P _{max.} = 10.0	
13.0																				14.5
14.5															16.0	16.0~16.6m: Horizontal cracks 5cm interval.	Lu = 58.0	P _{max.} = 10.0	11	
16.0																				18.8
16.6															18.8	18.8	18.8	Lu = 55.0	P _{max.} = 10.0	
18.8																				



GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. **TB-1** (SHEET **2** OF **5**)

LOCATION	HEADRACE TUNNEL	DEPTH OF HOLE	9000 m	COMMENCED	4 - 5 - 1988
ELEVATION	631.357 m	DEPTH OF OVERBURDEN	3.00 m	COMPLETED	8 - 6 - 1988
COORDINATE	453.757.95 172.232.91	LENGTH OF ROCK DRILLING	87.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	89.50 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	99.4 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	DESCRIPTION	LEAKAGE OF DRILLING WATER	LUGEON	m		
2.0			0 → 100%									0m	611.357 ^m
1							1			$P_{o\ max.} = 10.0$ $\frac{kgf}{cm^2}$	20.57	1	
2							2	21.9		$L_u = 60.0$ $P_{o\ max.} = 10.0$	21.00	2	
3						2	3	23.0 ~ 24.5 m: Piece cores				3	
4						3	3	7cm interval cracks, 70° dip.		$L_u = 45.0$ $P_{o\ max.} = 10.0$		4	
6							2	25.0			22.60	5	
8							2	25 ~ 90m (End of drill hole): More meshy calcite veins.		$L_u = 39.0$ $P_{o\ max.} = 10.0$	22.60	8	
8							2	26.5m and 30~32m: Calcite vein rich.		$L_u = 24.0$ $P_{o\ max.} = 10.0$		8	
9							2	28.0 Calcite vein rich.			28.70	9	
10							1	28.0m: Brownish weathered zone 4cm wide, 15° dip.		$L_u = 13.0$ $P_{o\ max.} = 10.0$	29.00	10	
1							2	31.0				1	
2							2	31.7m: Oxidization crack 1mm wide, 70° dip.		$L_u = 6.5$ $P_{o\ max.} = 10.0$		2	
3							2	33.0			29.55	3	
4							2			$L_u = 2.1$ $P_{o\ max.} = 10.0$	29.80	4	
5							2					5	
6							2			$L_u = 12.8$ $P_{o\ max.} = 10.0$		6	
7							3	36.5			30.75	7	
8							1			$L_u = 8.9$ $P_{o\ max.} = 10.0$	30.75	8	
9							2	39.0m: Oxidization crack along calcite vein.		$L_u = 25.0$		9	
40								40.0				0	591.357

Limestone

φ86 mm

Gray Cu



driller's note 4
1 (stick), 2 (subsock), 3 (piece), 4 (fragment), 5 (grain)
1 (hard) - 5 (soft)
1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
Water table before drilling → 0.50

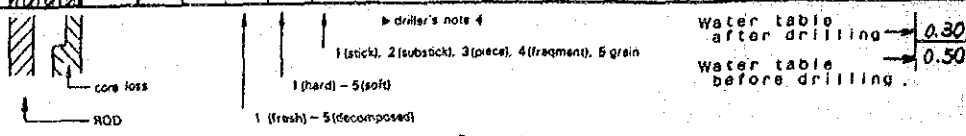
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. TB-1 (SHEET 3 OF 5)

LOCATION HEADRACE TUNNEL DEPTH OF HOLE 90.00 m COMMENCED 4 - 5 - 1988
 ELEVATION 631.357 m DEPTH OF OVERBURDEN 3.00 m COMPLETED 8 - 6 - 1988
 COORDINATE $\begin{matrix} X & 455.737, 93 \\ Y & 14172.232, 91 \end{matrix}$ LENGTH OF ROCK DRILLING 87.00 m DRILLED BY DSI
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE 89.50 m LOGGED BY JICA
 BEARING OF ANGLE HOLE - CORE RECOVERY 99.4 %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
				CEMENTATION KIND OF BIT CASING	COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
4.0m			0 → 100%									0m	591.357m
1	Limestone (bituminous)				Dark gray	2	1	3	2	40.0~57.0 m	$P_{max} = 10.0$ $18/cm^2$	33.45	
2										Limestone (bituminous)	$Lu = 0$	39.25	
3										40.0m: Solution crack with clay material.	$P_{max} = 10.0$		
4											$Lu = 0$		
5											$P_{max} = 10.0$	35.45	
6											$Lu = 0$	35.45	
7											$P_{max} = 10.0$		
8										46.85~47.0m core: Microscopic observation.	$Lu = 0$	35.60	
9											$P_{max} = 10.0$	37.30	
10											$Lu = 0$		
1	Limestone				Gray	2	1	3	2	57.0	$P_{max} = 10.0$	34.40	
2										Gray, hard limestone.	$Lu = 0$	39.20	
3											$P_{max} = 10.0$		
4											$Lu = 0$		
5											$P_{max} = 10.0$	33.40	
6											$Lu = 0$	33.40	
7											$P_{max} = 10.0$		
8										57.5m: Solution crack 70° dip.	$Lu = 0$		
9											$P_{max} = 10.0$	33.00	
10											$Lu = 12.7$	31.25	
60											7	574.357	
												0	531.357



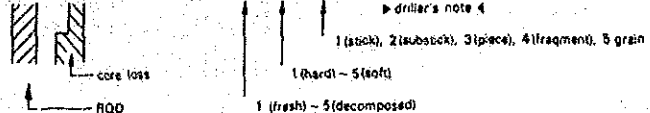
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. TB-1 (SHEET 4 OF 5)

LOCATION HEADRACE TUNNEL DEPTH OF HOLE 90.00 m COMMENCED 4 - 5 - 1988
 ELEVATION 631.357 m DEPTH OF OVERBURDEN 3.00 m COMPLETED 8 - 6 - 1988
 COORDINATE X 495.757.98 LENGTH OF ROCK DRILLING 87.00 m DRILLED BY DSI
 Y 4172.232.91 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE 89.50 m LOGGED BY JICA
 BEARING OF ANGLE HOLE - CORE RECOVERY 99.4 %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTA. KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION											
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER PRESSURE TEST		LEAKAGE OF DRILLING WATER														
6.0m			0=100%									0m	531.357												
1	Limestone	[Hatched pattern]			Grey	2	1	1	60m: Small cavities rich.	P _{max} = 10.0 12/cm ²		1													
2														3	2	62.0m: Calcite vein 1cm wide filled solution crack.	Lu = 29.0 P _{max} = 10.0	57.20 57.20							
3														3	2	62.0~69.0m: More oxidization zone. Many solution cracks with clay material.	Lu = 38.0 P _{max} = 10.0								
4														3	1	63.5~65.2m: Fragment cores caused by two direction solution cracks.	Lu = 28.0 P _{max} = 10.0	58.06 59.25							
5														3	2				65.2						
6																									
7																									
8																									
9																									
10																									
11	Limestone (bituminous)	[Hatched pattern]			Dark gray	2	2	2	75.0~90.0m (End of drill hole): Limestone (bituminous).	Lu = 7.9 P _{max} = 10.0		1	58.10 58.10												
12														3	2	Lu = 0 P _{max} = 10.0									
13														3	2	Lu = 0 P _{max} = 10.0									
14														3	1	Lu = 0 P _{max} = 10.0									
15														3	2	Lu = 0 P _{max} = 10.0									
16																									
17																									
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Water table after drilling → 0.30
 Water table before drilling → 0.50

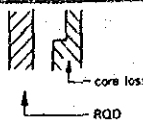
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. TB-1 (SHEET 5 OF 5)

LOCATION HEADRACE TUNNEL DEPTH OF HOLE 90.00 m COMMENCED 4 - 5 - 1988
 ELEVATION 631.357 m DEPTH OF OVERBURDEN 3.00 m COMPLETED 8 - 6 - 1988
 COORDINATE X 453.757.93 Y 4172.232.91 LENGTH OF ROCK DRILLING 87.00 m DRILLED BY DSI
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE 89.50 m LOGGED BY JICA
 BEARING OF ANGLE HOLE -- CORE RECOVERY 99.4 %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION																																								
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER PRESSURE TEST		LEAKAGE OF DRILLING WATER	LUGEON			m																																							
0			0 → 100%									0m	511.357m																																									
1	Limestone (bituminous)	φ86 mm							83.9~84.4m core: Laboratory test.	Lu = 0 P _{o max.} = 10.0		1																																										
2														1	84.7~84.9m core: Microscopic observation.	Lu = 0 P _{o max.} = 10.0		2																																				
3														2						85.2~86.0m: Calcite vein rich	Lu = 0 P _{o max.} = 10.0		3																															
4														2											85.4~85.6m: Oxidization calcite vein, fragment cores.	Lu = 0 P _{o max.} = 10.0		4																										
5														3																R.O.D (Av.) = 86%	Lu = 0 P _{o max.} = 10.0		5																					
6														3																					90.0 End of drill hole	Lu = 0 P _{o max.} = 10.0		6																
7														1																													7											
8														1																																		8						
9														2																																							9	
0																																																						



driller's note 4
 1 (stick), 2 (subpack), 3 (piece), 4 (fragment), 5 (gran)
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
 Water table before drilling → 0.50

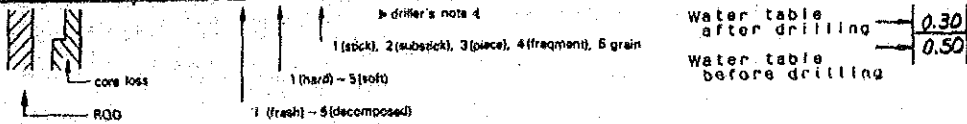
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. **TB-2** (SHEET 1 OF 10)

LOCATION	HEADRACE TUNNEL	DEPTH OF HOLE	190.00 m	COMMENCED	10 - 5 - 1988
ELEVATION	740.076 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	19 - 7 - 1988
COORDINATE	X: 760.825.88 Y: 4168.653.59	LENGTH OF ROCK DRILLING	190.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90	TOTAL LENGTH OF CORE	81.20 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	81.20/190 = 89.2 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0m			0 → 100%							LUGEON	m	0m	740.076m
1									Non-coring			1	
2												2	
3												3	
4												4	
5		ST			Grey			4.5	5.0 Massive limestone			5	
6									Non-coring			6	
7												7	
8												8	
9		ST			Grey			9.5	10.0 Limestone with shale layer 1cm thick at 9.75m.			9	
10									Non-coring			10	
11												11	
12												12	
13												13	
14		ST			Dark grey			14.5				14	
15								15.0				15	
16									Non-coring			16	
17												17	
18												18	
19												19	
20		ST			Grey			19.5	20.0 Massive limestone			20	720.076



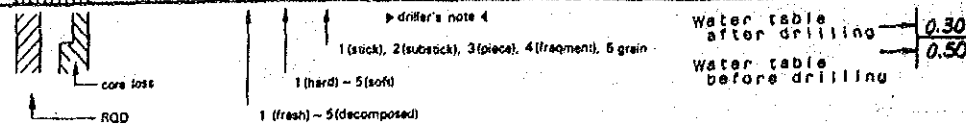
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. TB-2 (SHEET 2 of 10)

LOCATION HEADRACE TUNNEL DEPTH OF HOLE 190.00 m COMMENCED 10 - 5 - 1988
 ELEVATION 740.076 m DEPTH OF OVERBURDEN 0 m COMPLETED 19 - 7 - 1988
 COORDINATE X 760.825.88 Y 4.168.653.59 LENGTH OF ROCK DRILLING 190.00 m DRILLED BY DSI
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE 81.20 m LOGGED BY JICA
 BEARING OF ANGLE HOLE - CORE RECOVERY $\frac{81.2}{190} = 89.2\%$

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTA-TION KIND OF BIT BY CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHER - ING	HARD - NESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
2.0m			0-100%							LUGEON	m	0m	740.076m
1									Non-coring		5.00	1	
2											12.50	2	
3												3	
4												4	
5		LS			Gray			26.5	25.0 Massive limestone		5.65	5	
6									Non-coring		6.50	6	
7												7	
8												8	
9												9	
10		ST			Gray			29.5	30.0 Massive limestone		8.00	10	
11									Non-coring		28.00	11	
12												12	
13												13	
14												14	
15		ST			Gray			34.5	35.0 Massive limestone		6.00	15	
16									Non-coring		6.50	16	
17												17	
18												18	
19												19	
20		ST			Gray			39.5	40.5 Massive limestone		7.00	20	700.076



GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. TB-2 (SHEET 3 of 10)

LOCATION	HEADRACE TUNNEL	DEPTH OF HOLE	190.00 m	COMMENCED	10 - 5 - 1988
ELEVATION	740.076 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	19 - 7 - 1988
COORDINATE	X: 760.825.80 Y: 4168.653.59	LENGTH OF ROCK DRILLING	190.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	81.20 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	81.2/110 = 89.2 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
4.0m			0-100%							LUGEON	m	0m	740.076m
1									Non-coring				
2													
3													
4													
5					Gray			44.5	50.0 Massive limestone				
6									Non-coring				
7											7.15		
8											7.30		
9													
5.0					Gray			49.5	50.0 Massive limestone				
1									Non-coring				
2													
3											10.50		
4											36.70		
5					Gray			54.5	55.0 Massive limestone				
6									Non-coring				
7													
8													
9													
6.0					Gray			59.5	60.0 Massive limestone				
													680.076



driller's note 4

1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 grain

1 (hard) - 5 (soft)

1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30

Water table before drilling → 0.50

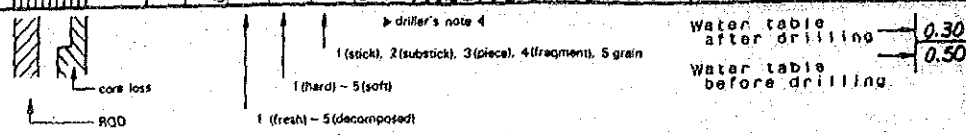
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. TB-2 (SHEET 4 of 10)

LOCATION HEADRACE TUNNEL DEPTH OF HOLE 190.00 m COMMENCED 10 - 5 - 1988
 ELEVATION 740.076 m DEPTH OF OVERBURDEN 0 m COMPLETED 19 - 7 - 1988
 COORDINATE X: 760.825.80 Y: 4.168.653.59 LENGTH OF ROCK DRILLING 190.00 m DRILLED BY DSI
 ANGLE FROM HORIZONTAL 90 TOTAL LENGTH OF CORE 81.20 m LOGGED BY JICA
 BEARING OF ANGLE HOLE - CORE RECOVERY $\frac{81.20}{190} = 89.2\%$

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER PRESSURE TEST		LEAKAGE OF DRILLING WATER	LUGEON		
0			0 → 100%										0m	740.076m
1										Non-coring				
2														
3														
4														
5		LS			Gray				64.5	65.0 Massive limestone				
6												32.00		
7										Non-coring		56.50		
8														
9														
10		LS			Gray				69.5	70.0 Massive limestone				
11												26.40		
12										Non-coring		28.00		
13														
14														
15		LS			Gray				74.5	75.0 Massive limestone				
16														
17										Non-coring				
18														
19														
20		LS			Gray				79.5	80.0 Massive limestone				
21												27.00		
22												59.50		
23														
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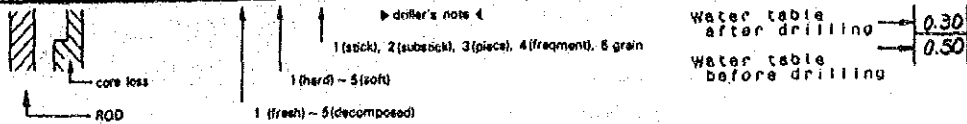
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. TB-2 (SHEET 5 of 10)

LOCATION HEADRACE TUNNEL **DEPTH OF HOLE** 190.00 m **COMMENCED** 10 - 5 - 1988
ELEVATION 740.076 m **DEPTH OF OVERBURDEN** 0 m **COMPLETED** 19 - 7 - 1988
COORDINATE $X = 760.425.80$
 $Y = 4168.453.89$ **LENGTH OF ROCK DRILLING** 190.00 m **DRILLED BY** DSI
ANGLE FROM HORIZONTAL 90° **TOTAL LENGTH OF CORE** 81.20 m **LOGGED BY** JICA
BEARING OF ANGLE HOLE - **CORE RECOVERY** $\frac{81.20}{190} = 89.2\%$

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT DRILLING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	LUGEON				
0			0 → 100%								27.00	0m	660.076 m
1										Non-coring			
2										Non-coring			
3										Non-coring			
4										Non-coring	28.00		
5	LS				Gray				84.5	85.0 Massive limestone	68.00		
6										Non-coring			
7										Non-coring			
8										Non-coring	60.55		
9										Non-coring	68.00		
10	LS				Gray				89.5	90.0 Massive limestone			
11										Non-coring			
12										Non-coring	68.50		
13										Non-coring	68.50		
14										Non-coring			
15	LS				Gray				94.5	95.0 Massive limestone			
16										Non-coring			
17										Non-coring	45.20		
18										Non-coring	46.00		
19										Non-coring			
20	LS				Gray				99.5	100.0 Massive limestone	71.00		640.076

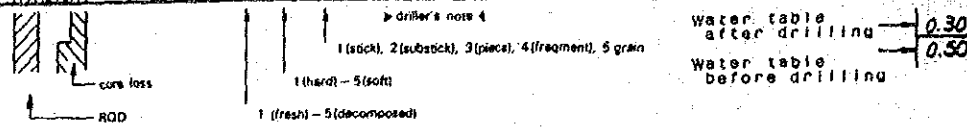


GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT HOLE No. **TB-2** (SHEET **6** OF **10**)

LOCATION **HEADRACE TUNNEL** DEPTH OF HOLE **190.00** m COMMENCED **10 - 5 - 1988**
 ELEVATION **740.076** m DEPTH OF OVERBURDEN **0** m COMPLETED **19 - 7 - 1988**
 COORDINATE X **460.825.80** LENGTH OF ROCK DRILLING **190.00** m DRILLED BY **DSI**
 Y **4168.653.59** TOTAL LENGTH OF CORE **81.20** m LOGGED BY **JICA**
 ANGLE FROM HORIZONTAL **90** CORE RECOVERY $\frac{81.20}{190} = 89.2$ %
 BEARING OF ANGLE HOLE **-**

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER PRESSURE TEST		LEAKAGE OF DRILLING WATER	LUCEON		
0			0 + 100%									0	640.076	
1										Non-coring				
2														
3														
4										104.5 ~ 105.0 m core : Microscopic observation.				
5						Gray				104.5 105.0 Massive limestone	76.50 97.90			
6										Non-coring				
7														
8														
9										109.5			630.576	
10										Gray, hard limestone.	76.30 79.30			
1										112.5 m: Oxidization crack.	Lu = 0.5 P _{o max.} = 10.0 kg/cm ²			
2						Gray	2	2	1		Lu = 0 P _{o max.} = 10.0			
3										112.6 ~ 113.1 m core : Laboratory test.				
4										113.85 ~ 114.0 m core : Microscopic observation.	79.30 97.00			
5										115.8			624.276	
6										115.8 ~ 136.0 m : Limestone (bituminous).	Lu = 0 P _{o max.} = 10.0			
7						Dark gray	2	3	2	117.0 117.2				
8										117.0 ~ 117.2 m : Fragment cores.	73.50 74.00			
9														
10													620.076	



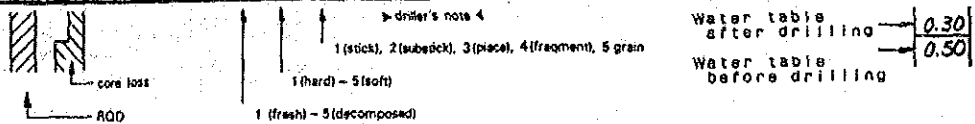
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. TB-2 (SHEET 7 OF 10)

LOCATION	HEADRACE TUNNEL	DEPTH OF HOLE	190.00 m	COMMENCED	10 - 5 - 1988
ELEVATION	740.076 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	19 - 7 - 1988
COORDINATE	X: 466,825.89 Y: 4168,653.59	LENGTH OF ROCK DRILLING	190.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	81.20 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	$\frac{81.2}{90} = 89.2\%$		

DEPTH	ROCK NAME	L.O.G.	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION	
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER			
0			0-100%							LUGEON	m	0	740.076	
1	Limestone (bituminous)	[Hatched pattern]	[Hatched pattern]	[Hatched pattern]	Dark gray	3	2	3	121.5	No oxidization crack.	Lu = 0	73.40 86.00	1	
2											Pomax = 10.0 kg/cm ²			
3											Lu = 0			
4											Pomax = 10.0			
5											Lu = 0			
6											Pomax = 10.0			
7											Lu = 0			
8											Pomax = 10.0			
9											Lu = 0			
10											Pomax = 10.0			
11	Quartz sandstone	[Hatched pattern]	[Hatched pattern]	[Hatched pattern]	Light gray	3	2	2	125.0	124.6-124.78m core: Microscopic observation.	Lu = 0	67.00 67.00	5	
12											Pomax = 10.0			
13											Lu = 0			
14											Pomax = 10.0			
15											Lu = 0			
16											Pomax = 10.0			
17											Lu = 0			
18											Pomax = 10.0			
19											Lu = 0			
20											Pomax = 10.0			
21	Quartz sandstone	[Hatched pattern]	[Hatched pattern]	[Hatched pattern]	Light gray	3	2	2	127.6	127.6-128.0m: Re-consolidated fracture zone, 15° dip.	Lu = 0	67.05 67.05	6	
22											Pomax = 10.0			
23											Lu = 0			
24											Pomax = 10.0			
25											Lu = 0			
26											Pomax = 10.0			
27											Lu = 0			
28											Pomax = 10.0			
29											Lu = 0			
30											Pomax = 10.0			
31	Quartz sandstone	[Hatched pattern]	[Hatched pattern]	[Hatched pattern]	Light gray	3	2	2	129.5	No solution crack.	Lu = 0	86.00 86.00	7	
32											Pomax = 10.0			
33											Lu = 0			
34											Pomax = 10.0			
35											Lu = 0			
36											Pomax = 10.0			
37											Lu = 0			
38											Pomax = 10.0			
39											Lu = 0			
40											Pomax = 10.0			
41	Quartz sandstone	[Hatched pattern]	[Hatched pattern]	[Hatched pattern]	Light gray	3	2	2	136.0	136.0-149.0m Quartz sandstone.	Lu = 0	63.00 63.00	8	
42											Pomax = 10.0			
43											Lu = 0			
44											Pomax = 10.0			
45											Lu = 0			
46											Pomax = 10.0			
47											Lu = 0			
48											Pomax = 10.0			
49											Lu = 0			
50											Pomax = 10.0			
51	Quartz sandstone	[Hatched pattern]	[Hatched pattern]	[Hatched pattern]	Light gray	3	2	2	138.0	139.5-140.3m: Piece-fragment cores.	Lu = 0	65.10	9	
52											Pomax = 10.0			
53											Lu = 0			
54											Pomax = 10.0			
55											Lu = 0			
56											Pomax = 10.0			
57											Lu = 0			
58											Pomax = 10.0			
59											Lu = 0			
60											Pomax = 10.0			



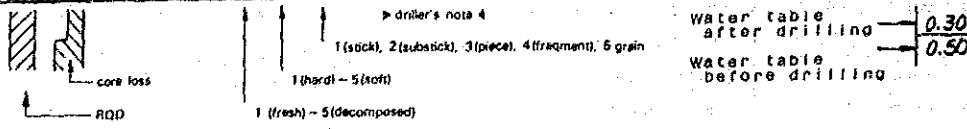
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. TB-2 (SHEET 8 of 10)

LOCATION HEADRACE TUNNEL DEPTH OF HOLE 190.00 m COMMENCED 10 - 5 - 1988
 ELEVATION 740.076 m DEPTH OF OVERBURDEN 0 m COMPLETED 19 - 7 - 1988
 COORDINATE X: 460.825.88 Y: 4168.653.59 LENGTH OF ROCK DRILLING 190.00 m DRILLED BY DSI
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE 81.20 m LOGGED BY JICA
 BEARING OF ANGLE HOLE - CORE RECOVERY $\frac{81.20}{190} = 89.2\%$

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER PRESSURE TEST		LEAKAGE OF DRILLING WATER			
14.0m			0 → 100%								LUGEON	m	0m	740.076
1	Quartz sandstone				Light gray	2	3	140.3	144.4 ~ 144.6m and 145.1 ~ 145.5m: Fragment cores. oxidization cracks.	Lu = 0 P _{max} = 10.0 (kg/cm ²)	63.00	1		
2								2						
3								3	142.4	Lu = 0 P _{max} = 10.0	65.40	2		
4								2	142.7					
5								4	144.4	Lu = 0 P _{max} = 10.0	87.50	3		
6								2	144.6					
7								3	145.1	Lu = 0 P _{max} = 10.0	146.5 ~ 146.7m core: Microscopic observation.	75.30	4	
8								2	145.5					
9	Sandy limestone				Dark gray	2	4	149.0	149.0 ~ 180.0m: Sandy limestone.	Lu = 0 P _{max} = 10.0	76.00	5		
10								2						149.2
11								4	152.0	Lu = 0 P _{max} = 10.0	77.00	6		
12								2	152.3					
13								2	152.0m core: Microscopic observation.	Lu = 0 P _{max} = 10.0	78.00	7		
14								2	155.0					
15								2	155.0m core: Laboratory test.	Lu = 0 P _{max} = 10.0	76.20	8		
16								2	155.0					
17								2	No oxidization crack.	Lu = 0 P _{max} = 10.0	77.00	9		
18								2	155.0					
19	2		Lu = 0 P _{max} = 10.0	156.00	10									
20	2	160.0												



GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT HOLE No. TB-2 (SHEET 9 OF 10)

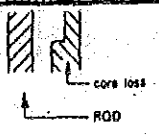
LOCATION	HEADRACE TUNNEL	DEPTH OF HOLE	190.00 m	COMMENCED	10 - 5 - 1988
ELEVATION	740.076 m	DEPTH OF OVERBURDEN	0 m	COMPLETED	19 - 7 - 1988
COORDINATE	X: 750.825.80 Y: 4168.653.59	LENGTH OF ROCK DRILLING	190.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90	TOTAL LENGTH OF CORE	81.20 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	$\frac{81.2}{190} = 89.2\%$		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING				
16.0m			0 → 100%						LUGEON	m	0m	520.076m
16.0								1600	Lu = 0 P _{o max} = 10.0 kg/cm ²	88.00	1	
1								160.0 ~ 168.0m : Poor core recovery, 50 ~ 75%.		88.00	2	
2										88.00	3	
3									Lu = 0 P _{o max} = 10.0	88.00	4	
4								← 163.6 ~ 163.75m core : Microscopic observation.		88.00	5	
5									Lu = 0 P _{o max} = 10.0	92.15	6	
6										88.00	7	
7									Lu = 0 P _{o max} = 10.0	88.00	8	
8											9	
9									Lu = 0 P _{o max} = 10.0	88.00	0	
170								170.0 ~ 172.0m : Poor core recovery, 50%.		88.00	1	
1									Lu = 0 P _{o max} = 10.0	88.00	2	
2											3	
3									Lu = 0 P _{o max} = 10.0	89.12	4	
4										89.10	5	
5									Lu = 0 P _{o max} = 10.0	176.00	6	
6										29.50	7	
7									Lu = 0 P _{o max} = 10.0		8	
8										90.00	9	
9								178.0 178.0 ~ 180.0m : Core recovery 75%.	Lu = 17.5 179.00m	100.00	0	
180								180.0	P _{o max} = 10.0	179.00	0	560.076

Sandy limestone

φ 56 mm

Dark gray



driller's note 4
 1 (rock), 2 (subrock), 3 (piece), 4 (fragment), 5 grain
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
 Water table before drilling → 0.50

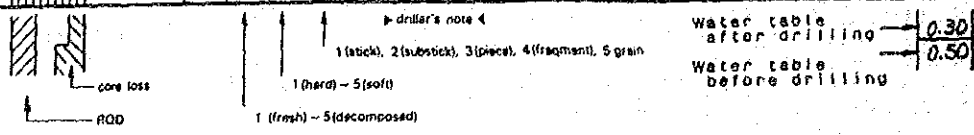
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. **TB-2** (SHEET 10 of 10)

LOCATION **HEADRACE TUNNEL** DEPTH OF HOLE **190.00** m COMMENCED **10 - 5 - 1988**
 ELEVATION **740.076** m DEPTH OF OVERBURDEN **0** m COMPLETED **19 - 7 - 1988**
 COORDINATE X: **460.825.89** LENGTH OF ROCK DRILLING **190.00** m DRILLED BY **DSI**
 Y: **4168.653.59** TOTAL LENGTH OF CORE **81.20** m LOGGED BY **JICA**
 ANGLE FROM HORIZONTAL **90** CORE RECOVERY $\frac{81.20}{190} = 89.2$ %
 BEARING OF ANGLE HOLE **-**

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
18.0m			0 → 100%							LUGEON	m	0m	740.076
1	Dolomitic limestone	φ56 mm						180.0 180.0 ~ 190.0m (End of drill hole): Dolomitic limestone. 180.0 ~ 188.0m: Core recovery 50 ~ 75%.	Lu = 0 P _{o max} = 10.0 kg/cm ²	179.00	179.00		
2													
3													
4													
5													
6													
7													
8													
9													
190													
1								189.0	Lu = 0 P _{o max} = 10.0	179.00	179.00	550.076	
2								190.0 End of drill hole		179.00	179.00		
3								R-B-D (A _v) = 60%					
4													
5													
6													
7													
8													
9													
0													



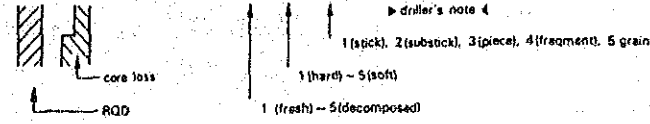
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. PB-1 (SHEET 1 OF 4)

LOCATION <u>POWER PLANT</u>	DEPTH OF HOLE <u>71.00</u> m	COMMENCED <u>25-5-1988</u>	
ELEVATION <u>391.912</u> m	DEPTH OF OVERBURDEN <u>4.00</u> m	COMPLETED <u>16-6-1988</u>	
COORDINATE <u>482.758.89</u> <u>Y. 4.166.135.83</u>	LENGTH OF ROCK DRILLING <u>67.00</u> m	DRILLED BY <u>DSI</u>	
ANGLE FROM HORIZONTAL <u>90</u>	TOTAL LENGTH OF CORE <u>70.37</u> m	LOGGED BY <u>JICA</u>	
BEARING OF ANGLE HOLE <u>-</u>	CORE RECOVERY <u>99.1</u> %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER TABLE		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0.5			0 → 100%								LUGEON	m	0m	391.912
1	Talus deposit	△			Dark gray Brown				0.5	Talus deposit.				
2									Oxidized gravels and clay.					
3														
4	Sandstone				Brownish dark green Brown	w	w		3.3		Lu = (10)	2.40 3.07		387.912
4.0									4.0 ~ 25.5 m :	Po max. = 3.0 kg/cm ²				
4.5									Sandstone (graywacke).					
5.8									7.0 ~ 7.5 m : Many oxidation cracks.	Lu = (22) Po max. = 5.0				
6.8														
7.0														
7.5														
8.45									8.45 ~ 8.60 m core : Microscopic observation.	Lu = (12) Po max. = 5.0				
9.5									9.9 m : Calcite vein 1 mm wide (45° dip).	Lu = 9.8 Po max. = 10.0				
11.3														
12.0														
14.1	14.1 m : Horizontal oxidization crack.	Lu = 10.5 Po max. = 10.0	5.82 11.00											
16.0		Lu = 4.9 Po max. = 10.0												
17.0		Lu = 6.8 Po max. = 10.0												
17.5														
18.0		Lu = 5.4 Po max. = 10.0												
19.5		Lu = 5.8												
20					11.25	11.00								



Water table after drilling → 0.30
 Water table before drilling → 0.50

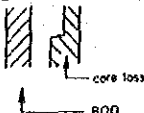
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. PB-1 (SHEET 2 of 4)

LOCATION **POWER PLANT** DEPTH OF HOLE **71.00 m** COMMENCED **25-5-1988**
 ELEVATION **391.912 m** DEPTH OF OVERBURDEN **4.00 m** COMPLETED **16-6-1988**
 COORDINATE **X: 462.758.53** LENGTH OF ROCK DRILLING **67.00 m** DRILLED BY **DSI**
Y: 4166.135.83 TOTAL LENGTH OF CORE **70.37 m** LOGGED BY **JICA**
 ANGLE FROM HORIZONTAL **90** CORE RECOVERY **99.1 %**
 BEARING OF ANGLE HOLE **-**

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION		
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER PRESSURE TEST		LEAKAGE OF DRILLING WATER					
2.0m			0 = 100%								LUGEON	m	0m	371.912		
0-1	Sandstone			ø86 mm	Greenish gray	2	3	3	20.5	20.5~21.0m, 21.6~22.5m and 23.0~23.5m: Fragment cores, cracky zones.	P _{max} = 10.0 kg/cm ²	11.12				
1															4	21.0
2															3	21.6
3															4	22.5
4															3	23.0
5															4	23.5
6															3	24.0
7															2	24.6~25.0m core: Laboratory test.
8															3	25.7
9															3	26.5
10	Shale			ø76 mm	Greenish gray	2	3	3	27.0	25.5~26.5m: Greenish gray ~ purple shale. Boundary dip is 35° at 25.5m. 25.7~26.5m: Dark gray shale, lamina 40° dip.	P _{max} = 10.0	11.03				
1															3	27.0
2															3	27.4
3															4	27.7
4															3	30.0
5															4	30.5
6															3	31.3
7															4	32.0
8															3	32.0m and 33.0m: Oxidization cracks.
9															2	34.0
10					Greenish gray	2	2	3	35.5	33.9~34.0m: Fragment cores.	P _{max} = 10.0	11.00				
1															3	35.5
2															4	38.4
3															3	39.0
4															2	39.0
5															3	39.0
6															2	39.0
7															3	39.0
8															2	39.0
9															3	39.0
40																



driller's note
 1 (stick), 2 (substick), 3 (piece), 4 (fragment), 5 (grain)
 1 (hard) - 5 (soft)
 1 (fresh) - 5 (decomposed)

Water table after drilling → 0.30
 Water table before drilling → 0.50

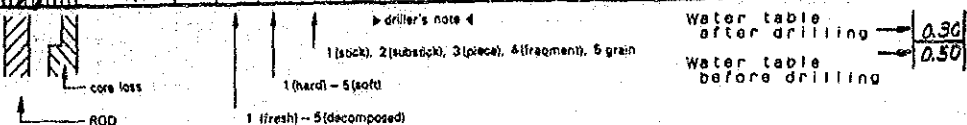
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. PB-1 (SHEET 3 OF 4)

LOCATION	POWER PLANT	DEPTH OF HOLE	71.00 m	COMMENCED	25-5-1988
ELEVATION	391.912 m	DEPTH OF OVERBURDEN	4.00 m	COMPLETED	16-6-1988
COORDINATE	X: 462.959.84 Y: 4166.135.83	LENGTH OF ROCK DRILLING	67.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90	TOTAL LENGTH OF CORE	70.37 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	99.1 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					WATER TABLE		DEPTH	ELEVATION						
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER								
4.0	Shale		0-100%		Greenish gray	W-2	2	40.1	40.5 m: Lamina 35° dip.	P _{o max.} = 10.0		0m	351.912						
1								40.5		Lu = 0	8.70	1							
2									41.9	42.0-42.5 m core: Laboratory test.	P _{o max.} = 10.0	24.00	2						
3							Purple	N-1	2	43.5		Lu = 0	18.84	3					
4									3	43.5-44.6 m: Fragment cores.	P _{o max.} = 10.0	18.84	4						
5									3		Lu = 0		5						
6							Greenish gray	W-3	3	45.6		P _{o max.} = 10.0	8.57	6					
7									4	46.0	Lu = 2.2	22.80	7						
8									3	46.4	P _{o max.} = 10.0		8						
9									3	47.5	Lu = 0	22.80	9	342.712					
10	Sandstone								49.2	Boundary dip is 45° at 49.2 m.	Lu = 0								
1															2	50.1	P _{o max.} = 10.0		
2															2	50.7	Lu = 3.3		
3															3	52.8	P _{o max.} = 10.0	9.24	
4															3	52.8-54.5 m: Many oxidization cracks.	Lu = 1.8	22.80	
5															3	54.5	P _{o max.} = 10.0		
6															2	55.3-55.9 m core: Laboratory test.	Lu = 0		
7															1		P _{o max.} = 10.0	10.00	
8															2	58.2-58.35 m core: Microscopic observation.	Lu = 0	10.00	
9															3	59.3	P _{o max.} = 10.0		
60							3		Lu = 0		0	331.912							



Water table after drilling → 0.30
 Water table before drilling → 0.50

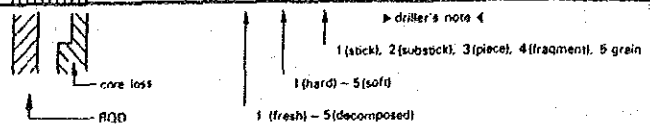
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. PB-1 (SHEET 4 OF 4)

LOCATION	POWER PLANT	DEPTH OF HOLE	71.00 m	COMMENCED	25-5-1988
ELEVATION	391.912 m	DEPTH OF OVERBURDEN	4.00 m	COMPLETED	16-6-1988
COORDINATE	X 462758.54 Y 4166135.83	LENGTH OF ROCK DRILLING	67.00 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	70.37 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	99.1 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0m			0-100%							LUGEON	m	0m	391.912 ^m
1	SS				Greenish gray	2-3	2	3	60.5	P _{o max} = 10.0 kg/cm ²	9.33	1	391.412
2	Shale				"	2-3	2	3	61.5	Lu = 0	22.69	2	
3	Shale				Purple	2	2	3		P _{o max} = 10.0		3	
4	Sandstone				Purple	3	1	1	64.0	Lu = 0		4	327.912
5	Sandstone				Greenish gray	2	2	2-3	64.0-65.5m: Sandstone.	P _{o max} = 10.0	9.30	5	326.412
6					"	2	2	3	65.5	Lu = 0	9.30	6	
7	Shale				Purple	2	3	3-4	66.0-66.15m core: Microscopic observation.	P _{o max} = 10.0	9.30	7	
8	Shale				Purple	2	3	4	65.5-70.0m: Shale.	Lu = 0	29.50	8	
9					"	2	3	3	69.0	P _{o max} = 10.0	9.08	9	
10	SS				Greenish gray	2	2	3	70.0	Lu = 0	28.50	0	321.912
11					"	2	2	3	71.0	P _{o max} = 10.0	34.96	1	320.912
12									End of drill hole				
13									R:Q:D (Av) = 48%				



Water table after drilling → 0.30
 Water table before drilling → 0.50

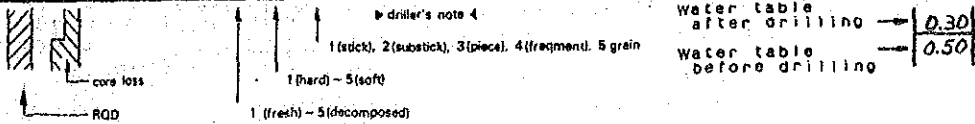
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. PB-2 (SHEET 1 of 4)

LOCATION	PENSTOCK	DEPTH OF HOLE	70.00 m	COMMENCED	7 - 4 - 1988
ELEVATION	521.353 m	DEPTH OF OVERBURDEN	2.25 m	COMPLETED	24 - 5 - 1988
COORDINATE	X: 452.565.39 Y: 4166.145.90	LENGTH OF ROCK DRILLING	67.75 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90	TOTAL LENGTH OF CORE	68.85 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	98.4 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER		
0.0			0 → 100 %							LUGEON	m	0m	521.353 m
0-2.25	Talus deposit	△			Gray				0-2.25 m: Talus deposit. Limestone gravels φ20cm.	Lu = (0)		1	
2.25					Light gray				2.25-56.0m: Massive limestone.	P _{o max} = 3.0 kg/cm ²		2	519.103
3.1					2	2	3			Lu = (7)	1.00	3	
4.5					3					P _{o max} = 3.0	1.00	4	
5.4									5.4-8.5m: Many solution cracks. 70°-80° dip	Lu = (19)		5	
6.0										P _{o max} = 5.0	1.90	6	
7.0										Lu > 100	6.00	7	
8.5										P _{o max} = 0		8	
10.0	Limestone				Gray		3			Lu > 100		9	
10.0										P _{o max} = 0	10.00	10	
11.0										Lu = (80)	10.00	11	
12.0										P _{o max} = 5.0		12	
14.0									14-16m: Meshy calcite vein.	Lu = (67)		13	
14.0										P _{o max} = 5.0	14.00	14	
15.0										Lu > 100	14.00	15	
15.8										P _{o max} = 1.0		16	
16.0										Lu = (67)		17	
17.2									15.8-16.0m and 17.2-17.5m: Fragment coils	P _{o max} = 1.0		18	
17.5										Lu = 36.5		19	
18.5										P _{o max} = 10.0		20	
19.5									18.5m: Solution crack 70°-80° d.p.	Lu = 21.0	16.50	21	
20.0										P _{o max} = 10.0	16.50	22	501.353



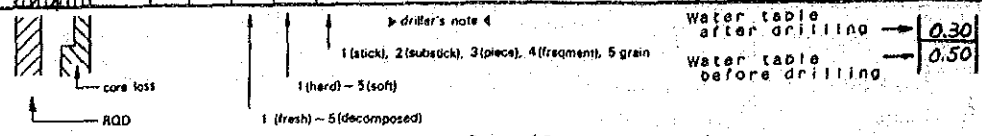
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. PB-2 (SHEET 2 OF 4)

LOCATION PENSTOCK DEPTH OF HOLE 70.00 m COMMENCED 7 - 4 - 1988
 ELEVATION 521.353 m DEPTH OF OVERBURDEN 2.25 m COMPLETED 24 - 5 - 1988
 COORDINATE X. 462.565.39 LENGTH OF ROCK DRILLING 67.75 m DRILLED BY DSI
Y. 4.166.193.90 TOTAL LENGTH OF CORE 68.85 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 90° CORE RECOVERY 98.4 %
 BEARING OF ANGLE HOLE -

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTA-TION OF KIND OF BIT CASING	OBSERVATION OF CORE				WATER TABLE	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHER-ING	HARD-NESS	CORE CUTTING					
0			0 → 100%								0m	521.353m	
0.5							3	20.0					
1.0							2	21.0		Lu > 100 P _{max.} = 1.0 18/cm ²			
2.0							2	22.0	22.0 ~ 25.4 m : Fragmentary cores.		22.00		
3.0							4	25.4		Lu > 100 P _{max.} = 1.0	25.00		
4.0							2	26.0			25.00		
5.0							3	27.0		Lu > 100 P _{max.} = 1.0	28.00		
6.0							2	28.0	28.0 m : Meshy calcite vein 5~10mm wide.		28.00		
7.0							4	30.0	30.0 m : Calcite vein filled open crack.		30.00		
8.0							4	33.4		Lu = 25.0 P _{max.} = 10.0	32.00		
9.0							2	34.0	34.0 ~ 34.15 m core : Microscopic observation.		32.00		
0							3	34.5		Lu > 100 P _{max.} = 1.0	34.00		
1							3	35.4		Lu = 25.0 P _{max.} = 10.0	34.00		
2							2	36.6	Many oxidization cracks		36.00		
3							2	38.5		Lu = 96 P _{max.} = 1.0	36.00		
4							4	39.5		Lu = 87 P _{max.} = 1.0	39.00		
5							2	40.0			39.00		
6							3	40.0			40.00		



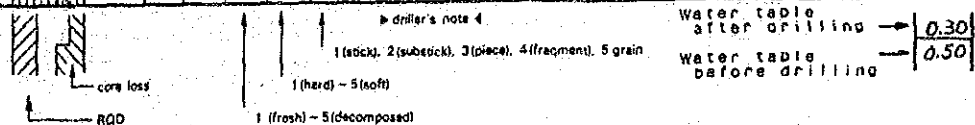
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. PB-2 (SHEET 3 of 4)

LOCATION PENSTOCK	DEPTH OF HOLE 70.00 m	COMMENCED 7 - 4 - 1988	
ELEVATION 521.353 m	DEPTH OF OVERBURDEN 2.25 m	COMPLETED 24 - 5 - 1988	
COORDINATE Y + 462.565 39 X + 186.145 90	LENGTH OF ROCK DRILLING 67.75 m	DRILLED BY DSI	
ANGLE FROM HORIZONTAL 90	TOTAL LENGTH OF CORE 68.85 m	LOGGED BY JICA	
BEARING OF ANGLE HOLE -	CORE RECOVERY 98.4 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION												
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	WATER PRESSURE TEST		LEAKAGE OF DRILLING WATER	LUGEON			m											
4.00			0 → 100%										0m	491.353m												
1	Limestone	[Hatched Pattern]	[Hatched Pattern]	[Hatched Pattern]	Gray	2	2	3	440	45.4 ~ 45.8 m core: Laboratory test.	Lu = 8.0 P _{max} = 10.0	45.85	45.85	42.00												
2															Lu = 24.0 P _{max} = 8.0	42.00										
3																										
4																										
5																										
6																										
7																										
8																										
8.2																	47.8 ~ 48.2 m: Fragment cores, many thin organic material layers.	Lu = 7.6 P _{max} = 10.0	47.8							
8.2																				Lu = 0 P _{max} = 10.0	48.2					
9																										
10																										
11																										
12																										
13																										
14																										
15																										
16	56.0 ~ 64.2 m: Sandstone contained organic material.	Lu = 5.3 P _{max} = 10.0	56.0																							
17				Lu = 0 P _{max} = 10.0	57.5																					
18																										
19																										
20																										
21																										
22																										
23																										
24																										
25						57.85 ~ 57.95 m core: Microscopic observation.	Lu = 0 P _{max} = 10.0	57.85																		
26	Lu = 0 P _{max} = 10.0	58.0																								
27																										
28																										
29																										
30																										
31																										
32																										
33																										
34			Sandstone	[Hatched Pattern]	[Hatched Pattern]				[Hatched Pattern]	Dark gray	2	4	5	54.3	53.82m	49.10	49.10	52.29								
35																										
36																										
37																										
38																										
39																										
40																										
41																										
42																										
43	Sandstone	[Hatched Pattern]				[Hatched Pattern]	[Hatched Pattern]	Dark gray											2	4	5	54.3	53.82m	49.10	49.10	52.29
44																										
45																										
46																										
47																										
48																										
49																										
50																										
51																										
52			Sandstone	[Hatched Pattern]	[Hatched Pattern]				[Hatched Pattern]	Dark gray	2	4	5	54.3	53.82m	49.10	49.10	52.29								
53																										
54																										
55																										
56																										
57																										
58																										
59																										
60	Sandstone	[Hatched Pattern]				[Hatched Pattern]	[Hatched Pattern]	Dark gray											2	4	5	54.3	53.82m	49.10	49.10	52.29
61																										
62																										
63																										
64																										
65																										
66																										
67																										
68																										
69			Sandstone	[Hatched Pattern]	[Hatched Pattern]				[Hatched Pattern]	Dark gray	2	4	5	54.3	53.82m	49.10	49.10	52.29								
70																										
71																										
72																										
73																										
74																										
75																										
76																										
77																										
78	Sandstone	[Hatched Pattern]				[Hatched Pattern]	[Hatched Pattern]	Dark gray											2	4	5	54.3	53.82m	49.10	49.10	52.29
79																										
80																										
81																										
82																										
83																										
84																										
85																										
86																										
87			Sandstone	[Hatched Pattern]	[Hatched Pattern]				[Hatched Pattern]	Dark gray	2	4	5	54.3	53.82m	49.10	49.10	52.29								
88																										
89																										
90																										
91																										
92																										
93																										
94																										
95																										
96	Sandstone	[Hatched Pattern]				[Hatched Pattern]	[Hatched Pattern]	Dark gray											2	4	5	54.3	53.82m	49.10	49.10	52.29
97																										
98																										
99																										
100																										



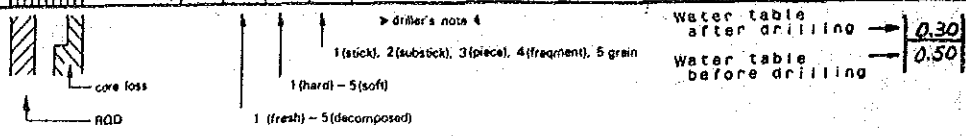
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. PB-2 (SHEET 4 of 4)

LOCATION PENSTOCK DEPTH OF HOLE 70.00 m COMMENCED 7 - 4 - 1988
 ELEVATION 521.353 m DEPTH OF OVERBURDEN 2.25 m COMPLETED 24 - 5 - 1988
 COORDINATE X: 462.585.39 LENGTH OF ROCK DRILLING 67.75 m DRILLED BY DSI
Y: 166.147.90 TOTAL LENGTH OF CORE 68.85 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 90 CORE RECOVERY 98.4 %
 BEARING OF ANGLE HOLE -

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF BIT CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION	
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER			
0			100%							LUGEON	m	0m	446.353	
0-1	Sandstone	[Pattern]	[Pattern]	[Pattern]	Dark gray	2	4	4	5	Cores are brittle. Core recovery 60-90%.	Lu = 0	54.46	[Scale]	
1-2											P _{o max.} = 10.0 kg/cm ²	54.46		
2-3											Lu = 0	54.60		
3-4											P _{o max.} = 10.0	54.60		
4-5	Limestone	[Pattern]	[Pattern]	[Pattern]	Gray	2	3	3	64.2 ~ 70.0m (End of drill hole): Limestone	Lu = 0	54.60	[Scale]	457.153	
5-6										P _{o max.} = 10.0	50.24			
6-7										67.80 ~ 67.95m core: Microscopic observation.	Lu = 0			49.56
7-8									68.8 ~ 69.2m core: Laboratory test.	P _{o max.} = 10.0	49.56			
8-9									70.0 End of drill hole	Lu = 0	31.56		451.353	
9-10									R.Q.D (Av.) = 56%	P _{o max.} = 10.0				



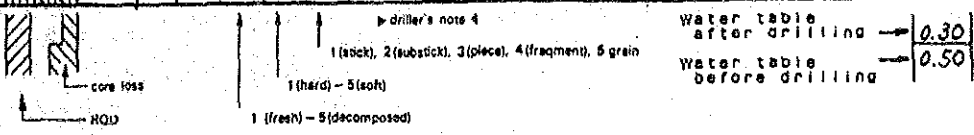
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SSK-1 (SHEET 1 OF 3)

LOCATION	Alternative Power Plant	DEPTH OF HOLE	50.00 m	COMMENCED	23-9-1987
ELEVATION	520.518 m	DEPTH OF OVERBURDEN	35.50 m	COMPLETED	9-10-1987
COORDINATE	8 453.591.59 Y.A. 177.144.65	LENGTH OF ROCK DRILLING	15.50 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	31.35 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	62.7 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION CLASS OF BIT CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	LUGEON				
0m			0-100%									0m	520.518 m
1										0.7 Alluvium. 0~0.7m: Brownish gravel and sand.			
2													
3											1.50		
4										0.7~35.5m: Peridotite gravels. No fine material in core boxes.			
5													
6													
7													
8													
9													
10	Alluvium												
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													500.518



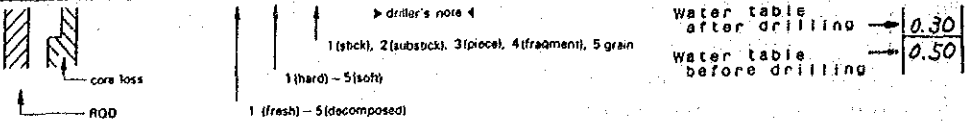
GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SSK - 1 (SHEET 2 OF 3)

LOCATION	Alternative Power Plant	DEPTH OF HOLE	50.00 m	COMMENCED	23 - 9 - 1987
ELEVATION	520.518 m	DEPTH OF OVERBURDEN	35.50 m	COMPLETED	9 - 10 - 1987
COORDINATE	X 453.591.59 Y 4177.144.65	LENGTH OF ROCK DRILLING	15.50 m	DRILLED BY	DSI
ANGLE FROM HORIZONTAL	90°	TOTAL LENGTH OF CORE	31.35 m	LOGGED BY	JICA
BEARING OF ANGLE HOLE	-	CORE RECOVERY	62.7 %		

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION KIND OF CASING	OBSERVATION OF CORE					DESCRIPTION	WATER TABLE		DEPTH	ELEVATION
					COLOR	WEATHERING	HARDNESS	CORE CUTTING	LEAKAGE OF DRILLING WATER		LUGEON	m		
2.0			0 → 100%									0m	520.518	
1	Alluvium	○								ditto.		20.00	1	
2		○									2			
3		○									3			
4		○									23.00	4		
5		○									24.80	5		
6		○									22.50	6		
7		○									19.00	7		
8		○									27.00	8		
9		○									27.00	9		
30											27.00	0		
1	Peridotite	○								Cracky peridotite. Thin serpentine layers are seen along the cracks.		27.00	1	
2		○									29.00	2		
3		○									26.00	3		
4		○									28.50	4		
5		○									26.00	5		
6		○									10.50	6		
7		○									35.5	7		
8		○									5.50	8		
9		○									26.50	9		
40												0	485.018	



GEOLOGIC LOG OF DRILL HOLE

GOKTAS PROJECT

HOLE No. SSK-1 (SHEET 3 OF 3)

LOCATION Alternative Power Plant DEPTH OF HOLE 50.00 m COMMENCED 23-9-1987
 ELEVATION 520.518 m DEPTH OF OVERBURDEN 35.50 m COMPLETED 9-10-1987
 COORDINATE X 453.591.54 LENGTH OF ROCK DRILLING 15.50 m DRILLED BY DSI
Y 4177.144.65 TOTAL LENGTH OF CORE 31.35 m LOGGED BY JICA
 ANGLE FROM HORIZONTAL 90 CORE RECOVERY 62.7 %
 BEARING OF ANGLE HOLE -

DEPTH	ROCK NAME	L.O.G.	CORE RECOVERY	CEMENTATION KIND OF CASING	OBSERVATION OF CORE				DESCRIPTION	WATER TABLE		DEPTH	ELEVATION									
					COLOR	WEATHERING	HARDNESS	CORE CUTTING		WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER											
4.0m			0 → 100%							LUGEON	ml	0m	480.518m									
1	Peridotite	✓		φ66 mm	Dark gray	N	W	W	f	Piece and fragment cores continue. No oxidization along cracks.	Lu = 1.3	24.80	1									
2		Pomax = 10.0 kg/cm ²																				
3		Lu = 1.0	24.80								2											
4		Pomax = 10.0																				
5		Lu = 0	24.80												3							
6		Pomax = 10.0																				
7		Lu = 0	24.80														4					
8		Pomax = 10.0																				
9		Lu = 0	24.80																5			
10		Pomax = 10.0																				
50.0										R-Q-D (Av.) = 10%				24.80							0	470.518
														1								
												2										
												3										
												4										
												5										
												6										
												7										
												8										
												9										
												0										

