Attachment A1

Drilling Log

DRILL LOG

SITE	Power House	HOLE NO.	SK-102
LATITUDE	0303.56	LONGITUDE 5971.89	ELEVATION 615.25m
DATE	"May 18 - Oct.30, 1989"		DEPTH 341.60m
ANGLE	180° 60° DOWN 0° 90° 0.00°	DIRECTION 270° W 0° N 90° E 180° S 0.00°	SLOPE HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT Ø DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
0			Quaternary	Top soil				5/18 (1.00)			0 50 100	0 50 100	0 10 20 30 40 50
1	1.00	614.25					Moderately weathered rock. Light brown.						
2						Ab-c							
3	3.00	612.25					Moderately weathered rocks. Joint; stained brown, with thin clay, 45-60deg.	5/20 (3.00)					
4													
5							8.4-8.6m: Greenish gray clay(3cm) in60deg. joint.	5/22 (5.40)					
6						Ab-cIV	12.8-13.6m: Irregular openings filled by greenish brown clay(1-3cm).						
7													
8	8.40	606.85					Solution is rare.	5/23 (8.45)					
9	9.00	606.25				?bIV							
10													
11						AcIV		5/24 (11.10)					
12	12.80	602.45											
13	13.60	601.65				AdIV							
14	13.80	601.45				AcIII	Moderately weathered rocks. Light brown-light gray.						
15								5/25 (15.10)	DB.101				
16						Ab-cIII	Joint; stained brown, open partly, 20-45 & 60deg.						
17	17.20	598.65					21.4-21.8m: Vertical open joint, filled by calsite(ico).	5/26 (17.20)					
18	17.70	597.55				Ab-c1	27.4-27.5m: 70deg. joint filled by green clay(ico).						
19							Solution is rare.						
20						Ab-cIV		5/27 (20.05)					
21													
22													
23	23.05	592.20											
24						Ab-cIII							
25													
26	25.60	589.65				Ab-c1							
27	27.05	588.20				Ab-cIII		5/29 (27.10)					
28	27.50	587.75					Conglomeratic limestone, very hard, composed of green-gray clayey matrix & 0.5-1.0cm gravels of limestone (light brown,10cm in max. size). Solution is very rare.						
29						AcIII							
30	30.00	585.25					27.90-28.30m: 1.0cm green clay along vertical joint.						

Note: R.Q.D is Rock Quality Designation. R.Q.D=(Total length of cylindric cores longer than 10 cm)/(Total drill length) x 100%
LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
DEPTH and ELEVATION are in meter
DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-102
LATITUDE	0303.56	LONGITUDE	5971.89	ELEVATION	615.25m
DATE	"May 18 - Oct.30, 1989"			DEPTH	341.60m
ANGLE	160° 65° 0° 0.00°	DIRECTION	270° W 0° N 90° E 180° S 0.00°	SLOPE	HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT Ø DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
31						AcIII	Conglomeratic limestone, very hard, composed of greenish gray clayey matrix and 0.5-1cm dia. gravels of limestone(light brown, 10cm dia. in max.). Solution is seen very rarely. Joints: 10-30deg. & rarely 60-80deg. stained brown. 32.80-33.20m: Oxidation(brown stained) along 30 & 70deg. joints. 43.90-44.10m: Brown clay along 50deg. joint.						
32													
33	33.20	582.05						5/30 (33.20)					
34						AcII							
35	35.00	580.25											
36						AcIII							
37													
38	38.00	577.25						5/31 (38.00)					
39													
40						AcII							
41													
42	42.25	573.00											
43										8/14 (43.40)			
44			Hakuba formation	Limestone		AcIII		6/1 (44.00)					
45									90.101				
46	46.25	569.00											
47													
48	47.80	567.25				Ab-cIV	Slightly weathered rocks. Light brown. Joints; 20-40deg., rarely 60-70 & 90deg., brown stained, partly with thin clay. 55.1-55.75: Cores are mostly fragments. 55.75-57.4m: Dark gray. Joint; 10-20deg., with a little solution.						
49	49.15	566.10											
50	50.55	564.70				Ab-cIII		6/2 (50.55)					
51						Ab-cIV							
52	52.60	562.25											
53						Ab-cIII				8/8 (52.70)			
54	54.00	561.25						6/3 (54.00)					
55	55.15	560.10				Ab-cIV							
	55.60	559.65				Ac-dIV							
56						AbIV							
57	57.40	557.85											
58	57.70	557.55				AdIV	Moderately weathered rocks. Brown-light brown. Joints; stained brown, 10-30deg. 58.5-58.8m: Highly weathered along 40deg. joint, with brown clay.						
	57.90	557.35				AcIV							
59	59.00	556.25				AdIV							
	59.20	556.05											
60	60.00	555.25				AbIV							

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*DEPTH and ELEVATION are in meter
*DIAMETER is in millimeter

DRILL LOG

SITE	Power House	HOLE NO.	SK-102
LATITUDE	8303.56	LONGITUDE 5971.89	ELEVATION 615.25m
DATE	May 18 - Oct.30, 1989		DEPTH 341.60m
ANGLE	100° 90° 90° 0.00°	DIRECTION 270° N 0° W 90° E 180° S 0.00°	SLOPE HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
61	60.99	554.35	Madura formation	Limestone		BIV	59.2m to 75.55m: Slightly weathered rocks. Light brown.	6/5 (60.00)			0 50 100	0 50 100	0 10 20 30 40 50
62						BIII	Joint; 10-30deg., rare 40 & 70deg., brown stained, with thin clay partly.						
63							64.1-64.5m: Dark greenish gray.			6/13 (63.80)			
64	63.99	551.36				BII							
65													
66										6/2 (66.50)			
67	66.99	548.36						6/6 (66.00)		6/8 (67.00)			
68										6/14 (67.75)			
69													
70													
71						BIV		6/7 (71.00)					
72													
73													
74													
75	75.10	540.10				BIII			08.101				
	75.55	539.70				CIII	Moderately weathered rocks. Yellowish brown, partly gray.			6/9 (75.95)			
76	76.00	539.35											
77							Joint: 70-80deg. with 1-2cm clay.						
78							81.1-81.3m: 30deg. joint, filled by green clay & calsite(2-3cm).	6/8 (78.00)					
79													
80						CIV							
81													
82										6/10 (82.25)			
83								6/9 (83.00)					
84	84.00	531.25					Moderately to slightly weathered rocks. 84.0-84.6m: Fractured zone; greenish brown clay(10cm) along 30-45deg. joints.			8/7 (84.50)			
85													
86						CB-CIV	84.6-87.3: Light brown. Joint brown stained, 10-30deg. rare 60-70deg. Solution is rare.	6/10 (85.00)					
87	87.30	527.95					Moderately weathered rocks. Cores are rock fragments and green clay along 30deg. joints.						
	87.60	527.70				CIV							
88							87.6m to 95.0m: Slightly weathered rocks. Light brown-greenish gray.						
89	89.00	526.25				BIV							
90	90.00	525.25				BIII	Joint; brown stained, partly with						

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DRILL LOG

SITE	Power House			HOLE NO.	SK-102
LATITUDE	8303.56	LONGITUDE	5971.89	ELEVATION	615.25m
DATE	"May 18 - Oct.30, 1989"			DEPTH	341.60m
ANGLE	180° UP / DOWN 0° — 90° — 0.00°	DIRECTION	270° W / 0° N / 90° E / 180° S — 0.00°	SLOPE	HORIZON 90° — 0° — 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	CORE RATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value / Lugeon Value / K Value : cm/sec
91							thin clay, 20-30, rarely 60-70deg.				0 50 100	0 50 100	0 10 20 30 40 50
92							89.4-89.6m: fractured along 30deg. joint, with clay.			8/12 [91.60]			
93						AbIII	94.9-95.0m: 1-3cm brown clay in 60deg. joint.			6/15 [93.60]			
94										8/11 [94.60]			
95	95.00	520.25					Slightly weathered rocks. Light brown-gray.						
96													
97							Joint; stained brown, partly with thin clay, 30-40deg. & rarely 60deg.	6/13 [97.60]					
98							104.15-104.25m: 30deg. joint with clay.						
99							105.75-105.85m: 30deg. joint with greenish gray clay(1cm).						
100							Solition is rare.						
101						AbIV							
102													
103													
104				Limestone				6/14 [103.60]					
105			Nadine formation						66.101				
106													
107													
108	107.60	507.25					Slightly weathered rocks. Light brown. Joint; stained brown, 10-30deg., rarely 45deg.						
109													
110							112.6-112.7m: 1cm opening.	6/15 [109.60]					
111						AbIII	Solution is rare.			7/4 [110.75] [111.75]			
112										7/11 [112.20]			
113										6/30 [113.20] [113.84] [113.90]			
114													
115	115.60	499.65				AbII							
116	116.00	499.25						6/16 [116.60]		6/26 [116.00]			
117													
118						AbIII							
119	119.00	496.25						6/17 [119.60]		8/21 [119.00] [119.90]			
120	120.00	495.25											

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DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-102
LATITUDE	8303.56	LONGITUDE	5971.89	ELEVATION	615.25m
DATE	"May 10 - Oct.30, 1989"			DEPTH	341.60m
ANGLE	100° up 90° 0.00°	DIRECTION	270° N 0° W 90° E 180° S 0.00°	SLOPE	HORIZON 0° 90° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL
121							119.00-127.65m: Slightly weathered rocks. Light brown to brown. Joint; stained brown, with clay partly, 30-40deg., rarely 70deg. 119.7-119.8m: 1cm brown clay in 45deg. joint. 125.45-125.7m: Brown clay(1-2cm) in 70deg. joint. Solution is rare.			
122						AbIII				
123										
124										
125	125.00	490.25						6/19 (125.00)		
126						AbII				
127										
	127.65	487.35				AaII	Cores are rock fragments and green-brown clay.	6/20 (128.00)		
128	128.00	487.25					Fresh rocks. Light gray. Joint; 10-30deg. in general. Solution is rare.			
129										
130										
131								6/21 (131.00)		
132						AaII				
133										
134	134.00	481.25					Fresh rocks. Light gray to gray. Joint; 20-30deg. in general, rarely vertical with thin calsite. Small solutions are seen scatteringly.			
135			Nodaira formation	Limestone					89.101	
136										
137	137.00	478.25						6/24 (137.00)		
138										
139										
140										
141										
142										
143						AaIII		6/25 (143.00)		
144										
145										
146	145.60	469.65					Fresh rocks. Light brown-gray. Cores are cylindrical, and many fragments. Joint; 60-70deg. & vertical), without brown stain. Solutions are seen scatteringly.			
147										
148	147.55	467.70					Fresh rocks. Light brown. Cores are cylindrical. Joint; 20-30deg., rarely 70deg. &			
149										
150										

CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
0 50 100	0 50 100	0 10 20 30 40 50

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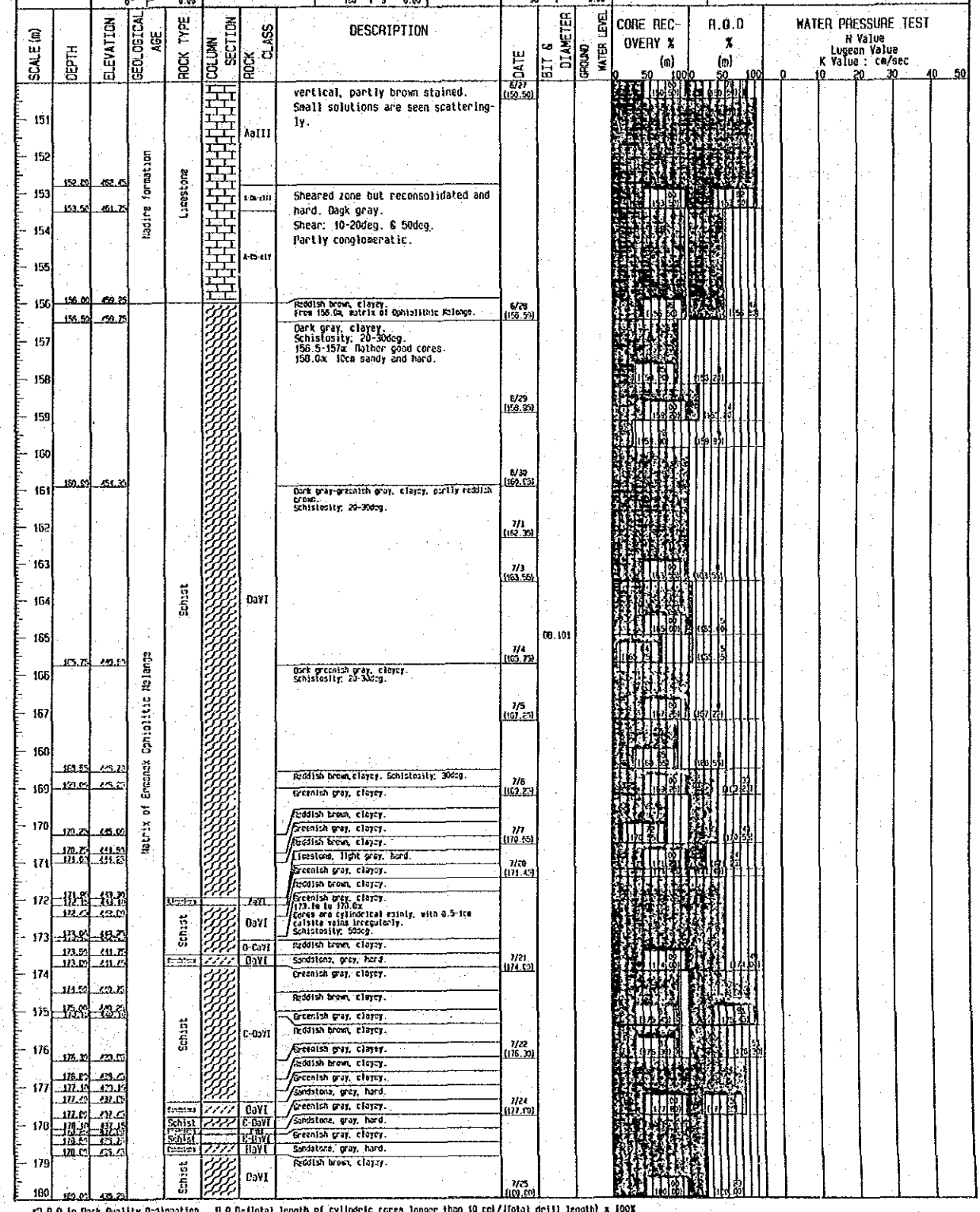
DRILL LOG

SITE	Power House	HOLE NO.	SK-102
LATITUDE	8303.56	LONGITUDE 5971.89	ELEVATION 615.25m
DATE	"May 10 - Oct.30. 1989"		DEPTH 341.60m
ANGLE	100° 90° 80° 90° 0° 0.00°	DIRECTION 270° W 180° 90° N 0° E S 0.00°	SLOPE HORIZON 90° 0° 0.00°



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※DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-102
LATITUDE	8303.56	LONGITUDE	5971.89	ELEVATION	615.25m
DATE	"May 18 - Oct.30, 1969"			DEPTH	341.60m
ANGLE	109° up 90° 0° 0.00°	DIRECTION	270° N 0° W 90° E 180° S 0.00°	SLOPE	HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
							Schist, greenish gray, clayey.						
				Sandstone		DaVI	Sandstone, gray, hard.						
181	180.05	434.40				CaVI	Greenish gray, clayey, with 45deg. schistosity.						
182	182.00	433.05		Schist		CaVI	Reddish brown, clayey.	7/26 (182.50)					
	182.50	432.75				C-DaVI	Greenish gray, clayey.						
183	183.05	432.20				CaVI	Reddish brown to brown, clayey, with 45deg. schistosity.						
184	184.10	431.15					Greenish gray, clayey, with 30-40deg. schistosity, partly sandy.						
185							Irregular greenish gray and reddish brown. Cores are mostly cylindrical.	7/27 (185.35)					
186													
187	187.25	428.00					Greenish gray, clayey, with 45deg. schistosity, partly sandy.						
188	188.10	427.15					Reddish brown, clayey, 30-40deg. schistosity.	7/28 (188.25)					
189													
190								7/29 (189.35)	08.101				
	190.60	424.65		Sandstone		DaVI	Sandstone, greenish gray, hard, partly conglomeratic.						
191	191.00	424.25		Schist		CaVI	Reddish brown, clayey, 30-40deg. schistosity.						
192													
193	193.40	421.85						7/31 (193.35)					
	193.95	421.30					Greenish gray, partly sandy.						
194	194.60	420.65				C-DaVI	Reddish brown, clayey.						
	194.80	420.45					Green, sandy.						
195	195.65	419.60				CaVI	Reddish brown, sandy, 30-40deg. schistosity.						
	195.80	419.45		Sandstone		DaVI	Sandstone, greenish gray, hard.						
196	196.00	419.25		Schist			Reddish brown, partly greenish gray.	8/1 (196.35)					
	196.35	418.90					Greenish gray, sandy.						
	196.60	418.65					Reddish brown, partly greenish gray. 197.8-197.92 Conglomeratic.						
197													
198	197.90	417.35				CaVI	Greenish gray to gray, sandy.						
	198.60	416.65					Reddish brown, partly sandy, with 40deg. schistosity.	8/2 (198.35)					
199													
200	200.35	414.90		Limestone			Limestone, greenish gray, hard.						
	200.70	414.55					Mainly reddish brown, partly gray, with 30-40deg. schistosity.						
201													
202	202.10	413.15		Sandstone		DaVI	Coarse sandstone, hard, mainly reddish brown.	8/5 (202.35)					
203													
	203.85	411.40					Schist, greenish gray.						
	204.05	411.20				DaVI	Coarse sandstone, hard.						
204	204.20	411.05		Schist		CaVI	Reddish brown, partly greenish gray, clayey.		08.86				
205	205.05	410.20					Greenish gray, sandy.						
	205.20	410.05					Reddish brown, sandy.						
	205.70	409.55					Sandstone, greenish gray, hard, coarse and conglomeratic.	8/7 (205.00)					Upper Depth : 203.00 Lower Depth : 205.00 Lugeon Value : 0.10 K Value : 0.000003
206							Reddish brown, partly gray, with 45-60deg. schistosity. Partly sandstone and schist.						
207				Conglomerate		C-DaVI							
208													
209	209.00	405.25					Sandstone, dark grey to reddish brown.	8/9 (209.00)					
	209.35	405.90		Conglomerate		DaVI	Conglomerate, reddish brown.						
	209.60	405.65		Sandstone		CaVI	Sandstone, greenish grey.						
	210.05	405.20		Schist		CaVI							

Matrix of Emanek Ophiolitic Melange

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DRILL LOG

SITE	Power House	HOLE NO.	SK-102
LATITUDE	0303.56	LONGITUDE 5971.89	ELEVATION 615.25m
DATE	"May 18 - Oct.30, 1989"		DEPTH 341.60m
ANGLE	60° 90° 0.00°	DIRECTION 270° N 0° W 180 E 90° S 0.00°	SLOPE HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT Ø	DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
211	210.60	404.65		Schist		CaVI	Reddish brown, clayey.							
				Sandstone		BaVI	Sandstone, greenish gray, partly reddish brown.							
	211.35	403.90		Schist		C-DaVI	Schist, reddish brown, clayey.							
	211.60	403.65		Sandstone		BaVI	Sandstone, greenish gray.	8/10 (212.00)						
212							Reddish brown, clayey, partly sandy.							
213				Schist		C-DaVI								
214	214.25	401.00		Sandstone		DaVI	Reddish brown.	8/11 (215.60)						
215	216.00	399.25				CaVI	Reddish brown, partly greenish gray, clayey, with 30deg. schistosity.							
216														
217				Schist		DaV	Sandy, good cores, reddish brown, with 20-30deg. schistosity.							
218	218.00	397.25						8/12 (218.00)						
219						BaIV								
220	219.80	395.45				C-DaVI	Reddish brown-greenish brown, clayey.	8/14 (220.70)						
221	221.70	393.55		Limestone		BaVI	Gray. Cores are fragments only.							
222								8/16 (222.20)						
223	223.00	392.25						8/17 (223.40)						
	223.55	391.70		Schist		DaVI	Green.							
224	224.70	390.55		Limestone		DaVI	Light gray. Cores are only fragments.	8/18 (224.70)						
225	225.55	389.70		Schist		DaVI	Green, sandy.			90.65				
226	225.90	389.35				CaVI	Reddish brown, clayey.							
227	227.40	387.85				DaVI	Green. Cores are costly fragments.	8/19 (227.40)						
	228.60	386.65				C-DaVI	Sandy, reddish brown.							
228	228.80	386.45		Sandstone		DaVI	Cores are fragments only. Alternation of limestone and sandstone.							
229	229.35	385.90		Limestone										
230	230.00	385.25		Sandstone				8/21 (230.60)						
	230.25	385.00		Limestone										
231	230.55	384.70		Schist		C-DaVI	Sandy, green.							
	231.20	384.05				DaVI	Clayey, green.							
	231.70	383.55					Sandy, green.							
232						C-DaVI	Reddish brown, partly sandy. 30-40deg. schistosity.	8/22 (232.50)						
233														
234	233.00	382.45					Green, clayey. Cores are fragments only.	8/23 (234.20)						
235						DaVI								
236	235.60	380.05						8/24 (235.60)						
237							Fractured zone: greenish gray clay and rock fragments, partly brown.							
238						D-EaVI								
239	238.10	377.15						8/25 (239.30)						
	238.30	376.95				DaVI	Dark gray, schistosity is seen slightly.							
240				Sandstone		DaIV								

Matrix of Ensenada Cohisitic Melange

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DRILL LOG

SITE	Power House			HOLE NO.	SK-102
LATITUDE	8303.56	LONGITUDE	5971.89	ELEVATION	615.25m
DATE	"May 18 - Oct.30, 1989"			DEPTH	341.60m
ANGLE	163° UP 50° DOWN 0° 0.00°	DIRECTION	270° W 0° N 90° E 180° S 0.00°	SLOPE	HORIZON 0° 90° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
241	240.50	374.75	Matrix of Emmenak Ophiolitic Melange	Sandstone		DaIV					0 50 100	0 50 100	0 10 20 30 40 50
	241.25	374.00				DaVI	Reddish brown, 20deg. schistosity.	8/28 (241.60)					
242								8/29 (242.29)					
	242.80	372.45											
243				Schist			Reddish brown, with schistosity 20-30deg. highly. Clayey.						
244							247.65-248.25m Contain limestone irregularly.						
245							Fracturing is seen partly.						
246						C-DaVI		8/31 (246.45)					
247													
248													
249								9/1 (249.30)					
250	250.30	364.95		Sandstone		DaVI	Green, green clay in 70deg. joint.						
	250.65	364.60		Limestone		DaIV	Light gray-brown, joint stained brown.	9/2 (251.80)					
252	252.15	363.10		Schist		CaVI	Reddish brown, clayey. Schistosity: 20-40 & 60deg.						
253							252.15-252.35 & 252.85-253.6m Contain limestone irregularly.						
254								9/4 (254.00)					
255	255.00	360.25							DB.86				
				Limestone		DaIV	Light gray. Joint: 10-30deg., brown stained with scall solutions.						
257	257.40	357.85		Schist		CaVI	Reddish brown.	9/5 (257.60)					
	257.75	357.50		Limestone		DaVI	Limestone, light gray, hard.						
258	258.10	357.15		Schist		CaVI	Reddish brown, clayey.						
259	259.20	356.05		Limestone		DaVI	Limestone, light gray, hard.						
	259.50	355.75		Schist		C-DaVI	Reddish brown, clayey.						
260	260.05	355.20		Limestone		DaVI	Limestone, light gray, hard.						
	260.15	355.10		Schist		C-DaVI	Reddish brown, clayey, 20-30deg. schistosity.	9/8 (259.03)					
	260.60	354.65		Limestone		DaVI	Limestone, light gray, hard.						
261	260.80	354.45					Reddish brown, clayey, with 20-30deg. schistosity.						
262				Schist		C-DaVI							
263	263.20	352.05											
				Limestone		DaVI	Light gray, hard, with 20deg. joint.	9/7 (263.09)					
264	264.20	351.05											
	264.40	350.85					Light gray, hard but cracky, with 10-30deg. joint many.						
265	265.10	350.15											
	265.35	349.90					Sandstone, light gray, hard, with 10deg. joint.						
	265.50	349.75				CaV-VI	Fresh rocks. Light grey. Joint: 10-20deg. rarely 45deg.						
266							Solution caves: Many in 265.35-269.7m, and rare in others.	9/8 (265.09)					
	266.05	349.20											
267							265.65-266.15m sandy.						
268				Limestone		DaIV							
269								9/9 (269.09)					
270	270.00	345.25											

R.Q.D is Rock Quality Designation. R.Q.D=(total length of cylindric cores longer than 10 cm)/(total drill length) x 100%
LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
DEPTH and ELEVATION are in meter
DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-102
LATITUDE	0303.56	LONGITUDE	5971.89	ELEVATION	615.25m
DATE	"May 18 - Oct.30, 1989"			DEPTH	341.60m
ANGLE	90° 60° 30° 0° (DIP) 0.00°	DIRECTION	270° W 0° N 90° E 180° S 0.00°	SLOPE	HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
271			Hadire formation	Limestone		BaIV	Fresh rock. Light gray. Joints: 10-20deg., rarely 45deg. Solution is rarely seen.	[279.39]					
272													
273	273.35	341.90						9/19 [273.35]					
274						BaIV-V							
275													
276	276.25	338.99						9/20 [276.25]					
277						BaIV							
278													
279								9/21 [279.39]					
280	279.89	335.45		Limestone		BaVI	Sandstone, soft, black.						
	280.45	334.80				BaIV	Fresh rocks. Light gray. Joint: 10-20deg., rarely 50deg. Solution is a little.						
281				Limestone									
	281.86	333.43						9/22 [282.39]					
282													
283						BaVI							
284													
285								9/23 [285.29]	08.86				
286	286.09	329.25											
	286.50	328.70				BaIV	Coarse sandstone, without schistosity.						
287	287.10	328.15	Matrix of Erenek Ophiolitic Melange	Sandstone		CaVI	Black, medium hard to soft, with schistosity slightly. Contain some gravel of sandstone and conglomerate.						
288								9/25 [288.29]					
289													
290													
	290.65	324.60				BaIV	Light gray, hard, block in basalt.	9/25 [291.29]					
291	291.25	324.00				CaVI							
292													
	292.55	322.55											
293						CaVI	Black, medium hard to soft, with schistosity slightly. Contain some gravel of sandstone and conglomerate.						
294								9/27 [294.29]					
295													
296	296.25	319.05											
	296.85	318.45				BaVI	Black, medium hard to hard, with schistosity slightly. Contain some gravel of sandstone and conglomerate.	9/28 [297.15]					
297	297.15	318.15				CaVI	Black, medium hard to soft, with schistosity slightly. Contain some gravel of sandstone and conglomerate.						
298													
299	299.20	315.05											
300						BaVI	Black, medium hard to hard, with schistosity slightly.	9/29 [300.01]					

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※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-102
LATITUDE	0303.56	LONGITUDE	5971.89	ELEVATION	615.25m
DATE	"May 18 - Oct.30, 1989"			DEPTH	341.60m
ANGLE	180° UP / DOWN 0° / 90° / 0.00°	DIRECTION	270° W / 0° N / 90° E / 180° S / 0.00°	SLOPE	HORIZON 90° / 0° / 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT Ø DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
301			Matrix of Emenek Cholalitic Melange	Sandstone		BaVI	Contain sose gravel of sandstone and conglomerate.						
302	302.20	313.05						9/30 (302.00)					
303							Black, medium hard to soft, with schistosity slightly (10-20deg.). Contain sose gravel of sandstone and conglomerate.						
304													
305								10/2 (304.99)	08.86				
306													
307													
308						CaVI		10/3 (307.95)					
309													
310								10/4 (310.15)					
311								10/9 (311.55)					
312								10/10 (312.20)					
313													
314	314.50	300.75						10/12 (314.10)					
315	314.80	300.45		Limestone		CaVI	Limestone, light gray, hard.						
316				Sandstone			Black, medium hard to soft, with schistosity slightly (10-20deg.). Contain sose limestone gravel.						
317								10/13 (317.00)					
318						CaVI		10/14 (317.00)					
319								10/16 (319.39)					
320									08.76				
321	321.00	293.80											
322	322.00	292.80		Limestone		AaIV	Light gray, hard.	10/17 (322.00)					
	322.30	292.50		Sandstone		CaV	Black, medium hard to soft, with a little schistosity. Contain sose limestone gravel.						
323	323.10	292.15		Limestone		AaV	Limestone, hard, light gray.						
	323.65	291.60		Sandstone		CaV	Black, medium hard to soft, with a little schistosity. Contain sose limestone gravel.						
324							324.30-324.45m Limestone.						
325	325.00	290.25				CaVI		10/18 (325.00)					
326	326.00	289.25					Dark gray, hard, fine grained.						
327						D-CaIV	326.10-326.25m Limestone, hard, light gray.						
328	328.00	287.25						10/19 (328.00)					
	328.05	287.20				CaVI	Black, medium hard to soft, with a little schistosity. Contain sose limestone gravel.						
329	329.00	286.25				CaVI	Dark gray, hard, fine grained.						
	329.20	286.05				CaVI	Black, medium hard to soft, with a little schistosity. Contain sose limestone gravel.						
330													

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※DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-102
LATITUDE	8303.56	LONGITUDE	5971.09	ELEVATION	615.25m
DATE	"May 10 - Oct.30, 1989"			DEPTH	341.60m
ANGLE	100° 15° 0° 0.00°	DIRECTION	270° N 0° W 90° E 180° S 0.00°	SLOPE	HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL
331	330.90	284.35	Matrix of Ercenek Ophiolitic Melange	Limestone		CaVI		10/20 (330.85)	86.76	
	331.45	283.85		Claystone		DaVI	Claystone, soft.			
332				Sandstone		BaVI	Mostly fine grained, partly containing some limestone gravel.	10/21 (332.15)		
333	333.85	281.40						10/23 (333.85)		
334				Schist		DaVI	Green, clayey.	10/24 (334.75)		
335	334.75	280.50		Sandstone		BaVI	Dark gray to black.			
336								10/25 (335.65)		
337	337.20	278.05						10/26 (337.20)		
338				Schist		DaVI	Reddish brown, clayey, containing some limestone gravel. 339.00-339.25m, 339.75-339.95m & 340.35-340.65m Green colored.	10/27 (338.30)		
339								10/28 (339.35)		
340								10/30 (340.60)		
341	341.60	273.65						11/1 (341.60)		
342										
343										
344										
345										
346										
347										
348										
349										
350										
351										
352										
353										
354										
355										
356										
357										
358										
359										
360										

CORE RECOVERY % (m) 0 50 100 | R.Q.D % (m) 0 50 100 | WATER PRESSURE TEST N Value, Lugeon Value, K Value : cm/sec 0 10 20 30 40 50

※R.Q.D is Rock Quality Designation, R.Q.D=(Total length of cylindric cores longer than 10 cm)/(Total drill length) x 100%
※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Tailrace Tunnel			HOLE NO.	SK-106
LATITUDE	0499.46	LONGITUDE	6424.62	ELEVATION	369.55m
DATE	"Sep.1 - Sep.30, 1989"			DEPTH	90.00m
ANGLE	180° UP / DOWN 0° / 90° / 0.00°	DIRECTION	N 0° / W 270° / E 90° / S 180° / 0.00°	SLOPE	HORIZON 0° / 90° / 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value / Lugeon Value / K Value : cm/sec
0											0 50 100	0 50 100	0 10 20 30 40 50
1							0-3.4m: Boulder of limestone, fresh rocks.			9/2 (1.65)			
2							3.4-4.35m: Gravels and rock fragments of limestone.	9/1 (1.00)	D.B101				
3							4.35-6.0m: Boulder of limestone fresh & hard.						
4							6.0-6.90m: Rock fragments & gravels of limestone (hard & chalky limestone (white).	9/2 (4.30)					
5			Quaternary							10/2 (10.25) (5.65)			
6													
7	6.90	362.65		River bed deposit				9/5 (10.50)					
8							Slightly weathered rocks. Joint: 10-30, 45-60deg., brown stained.		D.B86				
9						AbIII	7.4-7.8m: 60deg. joint with thin clay.						
10	9.65 / 10.05	359.90 / 359.50				AbIV	6.9-8.5m: Cavity; filled by light yellow hard materials, without opening.	9/6 (10.00)					
11								9/9 (11.00)					
12						AbIII	18.0-18.1m: Cavity along 40deg. joint, filled by hard clay.						
13													
14	13.65	355.90											
15								9/11 (14.65)					
16						AbIV							
17													
18	17.20	351.35	Nadare formation					9/19 (17.20)					
19						AbIII		9/10 (19.50)					
20									D.B76				
21	21.00	348.55											
22	22.45	347.10						9/20 (22.50)					
23							Fresh rocks. Gray. Joint: 20-30deg., rarely stained brown.						
24							30.15-30.0m: Opening(ies) along 20 & 60deg. joints, without filling.						
25						AbIII							
26								9/21 (25.50)					
27													
28													
29													
30													

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LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
DEPTH and ELEVATION are in meter
DIAMETER is in millimeter

DRILL LOG

SITE	Tailrace Tunnel			HOLE NO.	SK-10G
LATITUDE	8499.46	LONGITUDE	6424.62	ELEVATION	369.55m
DATE	"Sep.1 - Sep.30, 1989"			DEPTH	90.00m
ANGLE	150° 90° 0° 0.00°	DIRECTION	270° W 0° N 90° E 180° S 0.00°	SLOPE	HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
31						Ks-bIII							
32	32.10	337.45					Fresh rocks. Gray. Joint: 20-30deg., rarely stained brown.	9/22 (32.10)					
33							33.1-33.3m: Opening(1cm) along 70deg. joints, without filling						
34							34.3-34.6m: Cores are rock fragments.						
35	34.60	334.95				Ks-bIV	Fresh rocks. Gray. Joint: 10-30deg., rarely stained brown.	9/23 (35.20)					
36							35.6m: Opening(3cm) along 40deg. joints, filled by hard gray clay.						
37													
38	38.20	331.35					35.9-36.5m: Many openings(0.5-1cm) along 20-45deg.						
39						Ks-bIII	37.5m: 1cm opening, filled by calsite partly.						
40	40.00	329.55											
	40.30	329.25					Fresh rocks. Gray. Joint: 10-30deg., rarely stained brown.	9/25 (40.00)					
41													
42						Ks-bIV	42.45-42.75 & 43.3-43.4m: Cores are fragments.						
43							43.4-43.5m: 1cm opening.						
44	43.50	326.05						9/26 (44.50)					
45			Neogene formation	Limestone			Fresh rocks, without oxidation. Joint: 20-45deg.		0.876				
46							47.4m: 1cm opening.						
47							50.25m: 40deg. open joint(0.5-1cm), with calsite partly.						
48													
49													
50						Ks-bIII		9/27 (50.90)					
51													
52													
53													
54													
55													
56	56.30	313.20											
57													
58						Ks-bII							
59								9/28 (59.34)					
60													

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※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Tailrace Tunnel			HOLE NO.	SK-106
LATITUDE	8499.46	LONGITUDE	6424.62	ELEVATION	369.55m
DATE	"Sep.1 - Sep.30, 1989"			DEPTH	90.00m
ANGLE	103° UP 0° DOWN 59° 0.00°	DIRECTION	270° W 180° S 90° E 0° 0.00°	SLOPE	HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
61	61.35	308.20	Nagira formation	Limestone		As-bIII	Fresh rocks, without oxidation. Joint: 20-45deg.						
62	62.25	307.30					62.0m: 1cm opening, with calsite partly.						
63							65.25-65.8m: 0.5-1cm opening, without fill.						
64							69.0-69.1m: 50-60deg. open joint, without fill.						
65													
66													
67													
68								9/29 (68.30)					
69													
70						As-bIII							
71	71.25	298.30					Fresh rocks, without oxidation. With many small solution openings.						
72													
73													
74								9/30 (74.20)					
75									0.876				
76													
77													
78	78.25	291.30					Fresh rocks, without oxidation. Joint: 20-45deg. and rarely 70deg.						
79							82.3 & 85.9-86.0m: 1cm opening, with calsite.						
80								10/2 (80.60)					
81							78.25-82.0m: Cores were lost due to flood.						
82	82.60	287.65											
83						As-bIII							
84	84.60	285.65						10/3 (84.60)					
85													
86						As-bII		10/4 (85.10)					
87								10/9 (87.20)					
88	88.60	281.65											
89						As-bIII							
90	89.90	279.95						10/10 (89.60)					

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※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Tailrace Tunnel	HOLE NO.	SK-107
LATITUDE	9255.17	LONGITUDE 7504.22	ELEVATION 368.09m
DATE	Sep. 1 - Oct. 10, 1989		DEPTH 50.30m
ANGLE		DIRECTION	SLOPE

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL
1						Ee	Highly weathered and sheared rocks. Brown, with clayey materials.	1/12 (2.00)		
2										
3	3.00	365.80				Dc	Moderately weathered rock. Bituminous, dark gray.	4/12 (4.00)		
4	4.00	364.00				Ca-bII	Fresh rock, gray. Partly chalky (light gray).			
5	4.55	363.55					Oxidation: 7.10m: 0-5deg. joint. 8.15-8.20m: 90deg. joint.			
6						Ca-bII		5/12 (7.00)		
7							4.60-5.00m: Sandy.	6/12 (8.00)		8/12 (7.40)
8	8.00	360.09				Ca-bIII				
9	8.15	359.94				CaII	Fresh rock, gray. Partly chalky (light gray) & sandy. No oxidation.			9/12 (10.00) (10.35)
10								7/12 (11.00)		
11						CaII	Joint: 0-5deg. (bedding) and rarely 10-20deg.			11/12 (11.45)
12										
13	13.45	354.64								
14	14.00	354.09	Sorosi formation	Mar1		CaIII	13.55-13.70m: 70deg. joint.	8/12 (14.00)		
15						CaII			HC.66	15/12 (15.00) 28/12 (15.25)
16								9/12 (15.30)		25/12 (15.20)
17	17.00 (17.20)	351.09 (350.89)						11/12 (17.00)		13/12 (17.50)
18						CaIV	Fresh, gray, partly chalky (light gray). Joints with thin clay & slickenside: 17.20-17.75m: 10-15deg. 24.50-24.70m & 25.00-25.50m: 70deg. Other joints: 0-5 deg. (bedding) & rarely 10-30deg. No oxidation.			
19	19.20	349.89						12/12 (19.20)		
20						CaIII				
21										
22	22.20	346.89						13/12 (22.20)		
23	23.00	345.09				CaII				
24						CaIII				
25								14/12 (25.00)		
26	25.80 (25.35)	342.29 (342.74)								
27						CaII	Fresh, partly chalky. Joint: Similar to the above section. 30.45-30.00m: Fractured along 45 & 60deg. joints.			
28								15/12 (28.00)		
29	29.00	339.09				CaIII				
30	30.00	338.09								

CORE RECOVERY % (m) 0 50 100 | R.Q.D % (m) 0 50 100 | WATER PRESSURE TEST N Value, Lugeon Value, K Value : cm/sec 0 10 20 30 40 50

Upper Depth : 8.00
Lower Depth : 8.80
Lugeon Value: 14.50
K Value : 0.000000

Upper Depth : 8.00
Lower Depth : 11.00
Lugeon Value: 34.40
K Value : 0.000000

Upper Depth : 11.00
Lower Depth : 14.00
Lugeon Value: 23.70
K Value : 0.000000

Upper Depth : 14.00
Lower Depth : 17.00
Lugeon Value: 0
K Value : 0.000000

Upper Depth : 17.00
Lower Depth : 20.00
Lugeon Value: 12.70
K Value : 0.000000

Upper Depth : 20.00
Lower Depth : 23.00
Lugeon Value: 10.80
K Value : 0.000000

Upper Depth : 23.00
Lower Depth : 26.00
Lugeon Value: 53.30
K Value : 0.000000

Upper Depth : 26.00
Lower Depth : 29.00
Lugeon Value: 0.00
K Value : 0.000000

Upper Depth : 29.00
Lower Depth : 30.00
Lugeon Value: 0.00
K Value : 0.000000

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*LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
*DEPTH and ELEVATION are in meter
*DIAMETER is in millimeter

DRILL LOG

SITE	Tailrace Tunnel			HOLE NO.	SK-107
LATITUDE	9255.17	LONGITUDE	7504.22	ELEVATION	368.89m
DATE	Sep. 1 - Oct. 10, 1989			DEPTH	50.30m
ANGLE	180° 60° 0° 90° 0.00°	DIRECTION	270° N 0° W 90° E 180° S 0.00°	SLOPE	HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
31	30.00	338.89				CaIII	Fresh, gray, partly chalky (light gray).	18/12 (39.80)					Upper Depth : 30.00 Lower Depth : 32.00 Lugeon Value: 0.00 K Value 0.000000
32	32.00	336.89				CaII	Joint: 0-5deg. (bedding). 35.00-35.10m 60deg. 35.50-35.80m 80deg.						
33								10/12 (34.00)					
34	34.00	334.89				CaIII	35.80-35.90m & 38.10-38.80m Fractured.						Upper Depth : 32.00 Lower Depth : 35.00 Lugeon Value: 0.00 K Value 0.000000
35	35.00	333.89				CaIV							
36	35.40	332.49						19/12 (35.40)					
37						CaI							Upper Depth : 35.00 Lower Depth : 38.00 Lugeon Value: 0.00 K Value 0.000000
38	38.00	330.89						20/12 (38.00)					
39	39.15	329.74				CaIV	Fresh rock, gray. Partly chalky (light gray).	22/12 (40.60)					
40							Joint: 0-5deg. (bedding), rarely 10-20deg.		MC.86				Upper Depth : 38.00 Lower Depth : 41.00 Lugeon Value: 0.00 K Value 0.000000
41	41.00	327.89	Gomal formation	Marl				23/12 (41.00)					
42	42.00	326.89				CaI	39.25-39.40m 80-90deg.joints with slickenside.						
	42.30	326.59				CaV	Fractured: 39.90-40.20m	25/12 (42.60)					
	43.04	325.85				CaI	39.40-39.50m 10-30deg.joints, with slickenside.						
43						CaIV							Upper Depth : 41.00 Lower Depth : 44.00 Lugeon Value: 0.00 K Value 0.000000
44	44.00	324.89				CaIII	Fresh rock, gray. Partly chalky (light gray).						
45	45.30	323.59						26/12 (45.30)					
46						CaIV	Joint: 0-5deg. (bedding), rarely 10-20deg.						Upper Depth : 44.00 Lower Depth : 47.00 Lugeon Value: 0.00 K Value 0.000000
47							46.35-46.60m & 47.40-47.80m 80-90deg.joints with slickenside.	27/12 (47.00)					
48							Fractured: 45.00-45.35m 46.00-46.35m 47.00-47.20m 47.40-49.70m						
49	49.00	320.89				CaV		28/12 (49.60)					Upper Depth : 47.00 Lower Depth : 50.00 Lugeon Value: 0.00 K Value 0.000000
	49.60	319.29				CaIV							
50	50.00	318.89				CaI		29/12 (50.30)					
	50.30	318.59											
51													
52													
53													
54													
55													
56													
57													
58													
59													
60													

※R.Q.D is Rock Quality Designation, R.Q.D=(Total length of cylindric cores longer than 10 cm)/(Total drill length) x 100%
※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Power House	HOLE NO.	SK-108a
LATITUDE	8401.01	LONGITUDE	6140.73
ELEVATION	484.19m		
DATE		DEPTH	72.00m
ANGLE		DIRECTION	SLOPE

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
1	0.50	483.69		Top soil			Sandy silt, with limestone fragments.						
2			Quaternary	Talus deposit				25/11 (3.00)	N.C115				
3													
4								27/11 (5.00)					
5	5.00	479.19					Moderately weathered rock, brown-light gray, partly conglomeratic.						
6													
7	8.70	477.49					9.40-9.55m & 9.70-10.00m: Cavity filled by yellow clay & gravels.						
8						AdIII		29/11 (8.00)					
9							Joints: 60-70deg. rarely 20-40deg., brown stained.						
10	10.00	474.19					10.90-14.00m: Fresh, dark gray.						
11	10.50	473.69				AdIV	17.50-18.30m: Cavity(2-3cm) along 70-90deg. joint.						
12	12.00	472.19						30/11 (12.00)					
13													
14													
15						AcIII		2/12 (15.00)					
16													
17													
18	18.00	466.19	Wadire formation	Limestone				4/12 (18.00)	D.D101				
19	18.50	465.69				AaII							
20	19.30	464.89				AaIV	Moderately weathered rock, light gray, partly conglomeratic.						
21	21.00	463.19					23.60-23.65m, 25.40-25.60m & 26.55-26.70m: Cavity, partly filled by calcite.	5/12 (22.00)					
22						AaII		6/12 (23.00)					
23							Joints: 20-30deg., rarely oxidation.						
24							Fractured zone: 19.70-21.00m & 25.40-25.70m.						
25	25.00	459.19				AaIV							
26	25.00	459.19						7/12 (25.00)					
27	25.75	458.44				AaIII							
28	27.00	457.19											
29						AaII							
30													

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※DIAMETER is in millimeter

DRILL LOG

SITE	Power House	HOLE NO.	SK-10Ba
LATITUDE	8401.81	LONGITUDE 6140.73	ELEVATION 484.19m
DATE			DEPTH 72.00m
ANGLE	UP 120° / DOWN 0° / 90° / 0.00°	DIRECTION / SLOPE	HORIZON 90° / 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value / Lugeon Value / K Value : cm/sec
31	31.00	453.19				AaII		8/12 (31.00)			0 50 100	0 50 100	0 10 20 30 40 50
32	32.00	452.19						9/12 (32.00)					
33						AaIII	Moderately weathered rock, light gray, partly conglomeratic. Only small solutions are seen irregularly. Joints: 10-20deg., rarely with oxidation.						
34													
35	35.00	449.19						11/12 (35.00)					
36	35.50	448.69				AaIV	Fractured: 34.80-35.50m & 36.40-36.60m.						
37						AaII		12/12 (38.00)					
38	38.50	445.69											
39	39.50	444.69				Ab-cII	Highly weathered rock, light yellowish gray, partly conglomeratic, with many solutions.						
40	40.50	443.69				Ab-cIII							
41	41.00	443.19				Ab-cII	38.50-41.50m & 42.40-42.80m: Limestone fragments and light yellow sandy-clayey materials (filling materials in cavity?).	13/12 (41.00)					
42						Ab-clV							
43	43.00	441.19						14/12 (43.00)					
44			Nadare formation	Limestone		Ab-cIII	Highly weathered rock, light yellowish gray, with many solutions. Composed of limestone fragments and light yellow sandy-clayey materials (filling materials in cavity?).						
45									D.810i				
46													
47								15/12 (47.00)					
48								16/12 (49.00)					
49	49.00	435.19											
50	50.00	434.19											
51						AaIII	Moderately weathered rock, light gray, partly conglomeratic. Cavity: 51.80-51.90m: filled by gravels & sandy clay, hard.					
52													
53	53.00	431.19						18/12 (53.00)					
54	54.00	430.19				AaII	57.40-57.60m, 58.50-59.00m & 60.80-61.00m: 1-5cm wide, irregularly seen.	19/12 (54.50)					
55							Joints: 10-20deg., brown stained.						
56						AaIII	Fractured: 57.90-58.30m & 61.10-61.40m.						
57	57.10	427.09											
58	58.00	426.19				AbIV		20/12 (58.00)					
59						AaIII							
60													

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※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-108a
LATITUDE	8401.81	LONGITUDE	6140.73	ELEVATION	484.19m
DATE				DEPTH	72.00m
ANGLE	180° UP / DOWN 0° / 90° / 0.00°	DIRECTION	270° W / 0° N / 90° E / 180° S / 0.00°	SLOPE	HORIZON 0° / 90° / 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
61	61.50	422.69	Nacire formation	Limestone		Aa111					0 50 100	0 50 100	0 10 20 30 40 50
62							Moderately weathered rock, light grey, partly conglomeratic. Cores are almost fragments. Cylindrical cores are seen in: 67.30-67.90m, 68.50-68.80m, 70.00-70.60m & 70.80-71.80m.	21/12 (62.00)					
63								22/12 (63.50)					
64						Aa-bV		23/12 (64.50)					
65													
66								25/12 (66.50)	0.B101				
67	67.10	417.09											
68	68.50	415.69				Aa-bIV		26/12 (68.00)					
69						Aa-bV							
70	70.00	414.19						27/12 (70.00)					
71						Aa-bIV							
72	72.00	412.19						28/12 (72.00)					
73													
74													
75													
76													
77													
78													
79													
80													
81													
82													
83													
84													
85													
86													
87													
88													
89													
90													

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※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
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※DIAMETER is in millimeter

DRILL LOG

SITE	Power House	HOLE NO.	SK-109b
LATITUDE	8401.81 LONGITUDE 6140.73	ELEVATION	484.19m
DATE	Jan.23 - Mar.10, 1990	DEPTH	201.20m
ANGLE	100° UP / DOWN 0° — 90° — 0.00° DIRECTION	270° W / 0° N / 90° E / 180° S — 0.00° SLOPE	HORIZON 90° — 0° — 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value / Lugeon Value / K Value : cm/sec
1	1.00	483.19	Quaternary	Top soil							0 50 100	0 50 100	0 10 20 30 40 50
2				Talus deposit			Sandy silt and limestone fragments.		HC.101				
3								23/1 (3.00)					
4													
5	5.00	479.19						24/1 (5.00)					
6	5.60	478.59				AdIV	Cores are mostly fragments, brown stained.						
7	7.15	477.04				AdIII							
8	8.00	476.19						25/1 (8.00)					
9													
10													
11													
12	12.50	471.69				AdIV		26/1 (12.00)					
13							Moderately weathered, light gray, conglomeratic.						
14							Joints: 30-40deg., brown stained.	27/1 (14.00)					
15							23.00-24.10m: 90deg. joint is seen.						
16	15.70	468.49	Nadare formation	Limestone					DB.101				
17													
18													
19													
20								28/1 (20.00)					
21						AdIII							
22													
23													
24													
25													
26	26.00	458.19											
27	27.00	457.19						30/1 (27.00)					
28						AdII	Fresh, dark grey, conglomeratic. Joints: 10-20deg., without oxidation.						
29													
30	30.00	454.19											

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※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-108b
LATITUDE	8401.81	LONGITUDE	6140.73	ELEVATION	484.19m
DATE	Jan.23 - Mar.10, 1990			DEPTH	201.20m
ANGLE	90° 0° 00.00°	DIRECTION	270° W 180° S 0° N 90° E 00.00°	SLOPE	HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
31						Ib-cII							
32													
33	33.00	451.19					Fresh, light grey, congloceratic. Joints: 20-30deg., with oxidation rarely. Many small solution cavities are seen irregularly. Fractured: 49.00-50.70m, 55.00-56.00m & 57.00-58.00m.						
34													
35													
36													
37													
38	38.00	446.19				Ib-cIII		3I/I (30.00)					
39													
40													
41													
42													
43													
44	44.00	440.19	Nabire formation	Limestone									
45						Ib-cII			03.101				
46													
47	47.00	437.19											
48						Ib-cIII							
49	49.00	435.19						I/2 (49.00)					
50													
51													
52						Ib-cIV							
53													
54													
55													
56	55.00	429.19				Ib-cIII							
57	57.00	427.19						2/2 (57.00)					
58						Ib-cIV							
59	59.00	425.19											
60	60.00	424.19				Ib-cIII		3/2 (59.00)					

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*LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
*DEPTH and ELEVATION are in meter
*DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-108b
LATITUDE	6401.81	LONGITUDE	6140.73	ELEVATION	484.19m
DATE	Jan.23 ~ Mar.10, 1990			DEPTH	201.20m
ANGLE	180° UP / DOWN 0° / 90° / 0.00°	DIRECTION	270° W / 0° N / 90° E / 180° S / 0.00°	SLOPE	HORIZON 90° / 0° / 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value / Lugeon Value / K Value : cm/sec
61						Ab-cIII							
62													
63	63.40	420.79											
64							Cores are mostly fragments, brown stained.						
65													
66													
67						Ab-cIV		5/2 (67.00)					
68													
69													
70	70.60	413.59											
71						Ab-cV		5/2 (72.00)					
72	72.40	411.79											
73	73.00	411.19				Ab-cIV	Fresh, dark grey, conglomeratic.						
74	74.00	410.19	Nadire formation	Limestone		Ab-cV	Joints: 10-20deg., without oxidation.						
75						Ib-cIII	72.70-74.00m: Cores are only fragments.		08.101				
76	75.80	408.39				Ab-cIV							
77	76.80	407.39				Ib-cIII	77.00m & 77.35m: 10deg. joints, filled by1.0cm brown clay.	7/2 (77.50)					
78	77.50	406.69					77.55m: 30deg. joint, filled by 3.0cm brown clay.						
79							69.65-80.70m: Solution, filled by calcite & clay.						
80													
81						Ab-cV	87.45-89.60m: Cores are mostly fragments.						
82								8/2 (82.50)					
83													
84													
85	84.65	373.54											
86						Ab-cIV							
87	87.45	370.74											
88								9/2 (89.50)					
89						Ab-cV							
90	89.80	368.39											

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※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-108b
LATITUDE	8401.01	LONGITUDE	6140.73	ELEVATION	484.19m
DATE	Jan.23 - Mar.10, 1990			DEPTH	291.20m
ANGLE	180° UP 90° 0.00°	DIRECTION	270° W 0° N 90° E 180° S 0.00°	SLOPE	HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
91	91.50	392.20	Nagire formation	Limestone		Ab-cV	90.30-91.90m: Cores are almost fragments. Joint: 30-40deg. in general. 93.00-93.50m: Solution(2cm in max.) along 70-80deg. joints.	10/2 (91.50)					
92													
93						Ab-cIV							
94	94.00	390.19											
	94.30	389.89				Ab-cIII	94.50m: 40deg. joint, with 10cm reddish brown clay & gravel. 94.70m: 50deg. joint, with 10cm gray clay & gravel.						
95	95.50	388.69				AdIII	95.30m: 10deg. joint, with 5cm reddish brown clay. 96.50m: 20deg. joint, with 1cm reddish brown clay. 96.35-96.75m: Partly filled by calcite & clay.						
96													
97						Ab-cIII	96.75-98.50m: Solutions(max.1cm) along irregular joints. 99.15-99.90m: Cores are mostly fragments.						
98	98.30	385.89					99.90-101.40m: Small solutions along irregular joints. 101.40-101.60m: 40-70deg. joints, filled by 0.5cm reddish brown clay. 101.60-102.85m: Small solutions along irregular joints.	12/2 (98.30)					
99													
100						Ab-cIV							
101													
102													
103	103.00	381.19						13/2 (103.50)					
104						Ab-cV	Cores are mostly fragments. Small solutions are seen along irregular joints.						
105	105.20	377.19							08.101				
106							Small solutions are seen along irregular joints.						
107						Ab-cIV							
108	108.80	375.39											
109							108.60-113.90m Cores are mostly fragments. Small solutions are seen along irregular joints.	15/2 (109.70)					
110													
111							113.90-116.00m Solutions (max. 2cm) are seen.						
112						Ab-cV	116.00-119.30m Cores are mostly fragments. Small solutions are seen along irregular joints.						
113													
114													
115	115.20	369.00											
116						Bb-cIV							
117	117.00	367.19						16/2 (117.00)					
118	118.50	365.69				Ab-cV							
119													
120	120.00	364.19				Ab-cIV							

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※DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-100b
LATITUDE	8401.81	LONGITUDE	6140.73	ELEVATION	484.19m
DATE	Jan.23 - Mar.10. 1990			DEPTH	201.20m
ANGLE	53° / 0.00°	DIRECTION	0° / 0.00°	SLOPE	90° / 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
											0 50 100	0 50 100	0 10 20 30 40 50
121							Joints: 10-30deg., partly filled by thin clay. 120.70m: 40deg. joint, with thin clay. 122.95m: 20deg. joint, with 1cm clay & gravel. 125.20m: 20deg. joint, with 1cm clay & gravel.	17/2 (120.50)					
122													
123						Ab-cIV							
124													
125													
126								19/2 (125.60)					
127	126.50	357.69					127.50-131.65m: Conglomeratic limestone. Dark gray-black, hard. Joints: 40-70deg., with gray clay (0.5cm in max.).						
128								20/2 (128.70)					
129						Ab-cIII							
130													
131	131.70	352.49											
132						Ab-cIV	132.00-132.15m: 40-50deg. joints, with clay (0.5cm in max.). 134.90-135.05m: Solution (15cm wide), partly filled by calcite.						
133	133.50	350.69											
134						Ab-cII							
135	134.70 135.65	349.49 348.54	Nadira formation	Limestone			135.05-140.50m: Joint: 40-50deg. rarely 70deg. Partly filled by clay (0.3cm in max. thickness).		08.101				
136													
137							140.50-140.90m: Solution, 1cm wide in max.	21/2 (137.00)					
138							140.90-144.50m: Joints: 5-20deg. rarely 70-80deg. Partly filled by thin clay & calcite.						
139							144.50m: 5deg. joint, filled by 2cm brown clay & gravel.						
140						Ab-cIII	144.50-149.00m: Joints: 30-40deg., with thin clay & calcite.						
141							149.00-149.50m: Cores are mostly fragments.						
142													
143													
144													
145	145.00	339.19						22/2 (145.03)					
146													
147						Ab-cIV							
148													
149													
150	150.00	334.19											

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※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-108o
LATITUDE	8401.81	LONGITUDE	6140.73	ELEVATION	484.19m
DATE	Jan.23 - Mar.10, 1990			DEPTH	201.20m
ANGLE	90° 0.00°	DIRECTION	SLOPE		

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
151							150.30-151.10m: Cores are mostly fragments. 151.70-153.00m: Small solutions in some parts. 153.00-154.40m: 30-40deg. joints, with thin clay(max.0.5cm) partly. 154.40-154.90m: Cores are mostly fragments. 154.90-158.15m: 30-40deg. joints, partly with thin clay(max.0.5cm thick). 158.15-158.35m: 80deg. joint, filled by 1cm brown clay. 160.05-161.25m: Cores are mostly fragments.	23/2 (151.70)					
152													
153													
154						Ab-cIV		24/2 (154.00)					
155													
156													
157	157.35	326.84											
158						Ab-cIII			08.101				
159	159.50	324.69						26/2 (159.50)					
160						Ab-cIV							
161	161.25	322.94											
162						Ab-cIII							
163	163.05	321.15					163.35-163.40m: 70deg. joint, with calcite, clay & gravel. 163.40-165.90m: 40-50deg. joints, partly with thin clay and calcite. 165.90-169.90m: Solution(3cm wide in max.) is seen along joints. 170.70-170.90m: Solutions along 80deg. joint, filled by calcite. 170.90-180.00m: 40-50deg. joints, partly with thin calcite& clay.						
164			Hadira formation	Limestone		AaIII							
165													
166													
167	165.00	317.25						27/2 (165.00)					
168													
169													
170						AaII							
171													
172													
173	172.00	311.25							08.65				
174													
175													
176						AaIII							
177													
178													
179								28/2 (178.00)					
180	180.00	304.19											

*R.Q.D is Rock Quality Designation. R.Q.D=[total length of cylindric cores longer than 10 cm]/[total drill length] x 100%
*LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
*DEPTH and ELEVATION are in meter
*DIAMETER is in millimeter

DRILL LOG

SITE	Power House			HOLE NO.	SK-108b
LATITUDE	0401.81	LONGITUDE	6140.73	ELEVATION	484.19m
DATE	Jan.23 - Mar.10, 1990			DEPTH	201.20m
ANGLE	180° UP DOWN 0° 90° 0.00°	DIRECTION	270° W N 0° 90° E 180° S 0.00°	SLOPE	HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
181							180.70-180.90m: Solutions(ice in max.) along joints.				0 50 100	0 50 100	0 10 20 30 40 50
182							180.80-191.55m: Dark gray to black, fractured but hard. Joints: 20-40deg., partly filled by 1cm black & dark green clay.						
183							191.55-192.05m: Reddish brown clay, partly hard.						
184													
185													
186						AaIII							
187													
188								1/3 (187.69)					
189									88.86				
190													
191	191.47	292.72	Nabire formation	Limestone									
192						AaIV							
193	193.45	290.74						2/3 (193.45)					
194						AaIII							
195													
196	195.75	289.44				AaIV		3/3 (196.75)					
197	197.75	287.44				DaVI	Dark green, greenish gray to gray, partly reddish brown, clayey.						
198			Rocks of Cretaceous Meimeju	Consist			198.80-200.30m: Clay, grayish brown.	6/3 (197.93)					
199	199.52	285.33				EaVI		7/3 (199.80)	88.76				
200	200.30	283.80											
201	201.20	282.99				DaVI		8/3 (201.20)					
202													
203													
204													
205													
206													
207													
208													
209													
210													

※R.Q.D is Rock Quality Ocsignation. R.Q.D=(Total length of cylindric cores longer than 10 cm)/(Total drill length) x 100%
※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Landslide Area			HOLE NO.	SK-220
LATITUDE	9165.13	LONGITUDE	5701.12	ELEVATION	748.78m
DATE	Jun.3 - Sep.15, 1989			DEPTH	150.00m
ANGLE	UP 90° / DOWN 0° / 0.00°	DIRECTION	270° W 180° S 0° N 90° E / 0.00°	SLOPE	HORIZON 90° 0° / 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT Ø	DIAMETER	GROUND WATER LEVEL
			Holocene	Top soil						HC 116mm	
1	1.00	747.78				Ba-bII	Block of chalky limestone in debris of landslide. White-light yellow. Joint; stained brown. 8.05-8.2m. Cavity.	3-Jun (1.50)			
2	1.50	747.28									
3						Ba-b					
	3.50	745.28				Ba-bIV					
4											
5											
6	5.50	743.28				Ba-bIII					
7	7.00	741.78						5-Jun (7.00)			
8						Ba-bII					
9	8.60	739.78					Mostly rock fragments of chalky limestone. Debris of landslide. White-light yellow. Joint: Stained brown, with slickensides.	6-Jun (10.00)			
10											
11											
12											
13								7-Jun (13.00)			
14											
15											
16								8-Jun (16.00)		66 85mm	
17											
18								9-Jun (18.00)			8/9 (18.50)
19			Ermenek formation	Chalky limestone		c-Ba-bV					6/9 (19.00)
20											4/9 (20.16)
21								10-Jun (21.00)			2/9 (21.00)
22											
23											5/9 (22.80)
24								12-Jun (24.00)			
25											
26											
27								13-Jun (27.00)			
28											
29											
30	30.00	718.78						14-Jun (30.00)			

CORE RECOVERY % (m) 0 50 100 | R.Q.D % (m) 0 50 100 | WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec 0 10 20 30 40 50

Upper Depth : 5.00
Lower Depth : 7.00
Lugeon Value: 8.60
K Value : 0.060000

Upper Depth : 7.00
Lower Depth : 9.00
Lugeon Value: 100.00
K Value : 0.000000

※R.Q.D is Rock Quality Designation, R.Q.D=(Total length of cylindric cores longer than 10 cm)/(Total drill length) x 100%
※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Landslide Area			HOLE NO.	SK-220
LATITUDE	9165.13	LONGITUDE	5701.12	ELEVATION	748.78m
DATE	Jun.3 - Sep.15, 1989			DEPTH	150.00m
ANGLE	150° 60° DOWN 0° — 90° 0.00°	DIRECTION	270° W 180° — 0° N 90° E S — SLOPE 0.00°	HORIZON 90° — 0° 0.00°	

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST X Value Lugeon Value K Value : cm/sec
31							Mostly rock fragments of chalky limestone. Debris of landslide. White-light yellow.						
32							Joint: Stained brown, with slickensides.	15-Jun (32.00)					
33													
34										21/6 (34.50)			
35								17-Jun (36.00)					
36													
37													
38													
39								21-Jun (40.00)					
40													
41													
42													
43								26-Jun (43.00)					
44													
45			Ermenek formation	Chalky limestone		C-Cz-Lf			08.89mm				
46								27-Jun (46.00)					
47													
48													
49													
50								29-Jun (50.00)					
51													
52													
53								1-Jul (53.00)					
54													
55													
56													
57								4-Jul (57.00)					
58													
59								5-Jul (59.00)					
60	60.00	688.78											

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※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Landslide Area			HOLE NO.	SK-220
LATITUDE	9165.13	LONGITUDE	5701.12	ELEVATION	748.78m
DATE	Jun.3 - Sep.15, 1989			DEPTH	150.00m
ANGLE	UP 180° / DOWN 0° / 90° / 0.00°	DIRECTION	N 0° / W 270° / E 90° / S 180° / 0.00°	SLOPE	HORIZON 0° / 90° / 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT Ø DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value, Lugeon Value, K Value : cm/sec
61–90	80.00	668.78	Ermenek formation	Chalky limestone		C-CH-CM	Mostly rock fragments of chalky limestone. Debris of landslide. White-light yellow. Joint: Stained brown, with slickensides. 68.00-74.00m: Highly crashed, fragments only. 68.00m: 60deg. slickenside. Mostly rock fragments of chalky limestone. Debris of landslide. White-light yellow. Joint: Stained brown, with slickensides. 80.00-84.40m: Highly crashed, with brown silt-clay.	6-Jul (62.90) 7-Jul (63.00) 17-Jul (66.00) 19-Jul (69.00) 20-Jul (72.00) 21-Jul (74.00) 25-Jul (78.00) 26-Jul (80.00) 27-Jul (82.50) 28-Jul (85.00) 29-Jul (87.00)	66.66mm				

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*DEPTH and ELEVATION are in meter
*DIAMETER is in millimeter

DRILL LOG

SITE	Landslide Area		HOLE NO. SK-220
LATITUDE	9165.13	LONGITUDE 5701.12	ELEVATION 748.78m
DATE	Jun.3 - Sep.15, 1989		DEPTH 150.00m
ANGLE	DIRECTION	SLOPE	

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT Ø DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value / Lugeon Value / K Value : cm/sec
91–120	107.00	641.78	Emeanek formation	Chalky limestone		C-Da-cr	Mostly rock fragments of chalky limestone. Debris of landslide. White-light yellow. Joint: Stained brown, with slickensides. 98.60-102.00m: Highly crushed, with brown silt-clay. 107.00-114.80m: Mainly fragments. 114.80-115.00m: Light yellow sand.	31-Jul (90.60) 1-Aug (93.60) 2-Aug (95.60) 3-Aug (98.60) 4-Aug (100.00) 5-Aug (102.00) 7-Aug (105.00) 8-Aug (107.00)	115.00mm	1/9 (97.00)			
107–115	115.00	633.78	Gomeel formation	Marl		C-Da	Mostly rock fragments of chalky limestone. Debris of landslide. White-light yellow. Joint: Stained brown, with slickensides. 107.00-114.80m: Mainly fragments. 114.80-115.00m: Light yellow sandy clay. Fractured zone. Light grey in general. With many slickensides irregularly.	31/8 (110.00) 17-Aug (110.60) 15/9 (111.30) 18-Aug (112.00) 29/8 (113.00) 22-Aug (115.00) 25/8 (115.00) 23-Aug (117.00) 24-Aug (119.00)	89.76mm				Upper Depth : 116.00 Lower Depth : 119.00 Lugeon Value: 0.00 K Value : 0.000000

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※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SITE	Landslide Area	HOLE NO.	SK-220
LATITUDE	9165.13	LONGITUDE 5701.12	ELEVATION 748.78m
DATE	Jun.3 - Sep.15, 1989		DEPTH 150.00m
ANGLE	180° UP 90° DOWN 0° 0.00°	DIRECTION 270° W 0° N 90° E 180° S 0.00°	SLOPE HORIZON 90° 0° 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value Lugeon Value K Value : cm/sec
121			Gomel Formation	Marl		C-Da	Fractured zone. Light grey in general. With many slickensides irregularly. Black coal layers: 121.00-121.10m 122.90-123.00m 128.90-129.10m 125.80-125.90m	25-Aug (121.00)					0 50 100
122								26-Aug (122.00)					0 50 100
123													
124								29-Aug (124.00)					0 50 100
125													
126								31-Aug (126.00)					0 50 100
127													Upper Depth : 124.50 Lower Depth : 127.50 Lugeon Value : 0.00 K Value : 0.000000
128								1-Sep (128.50)					
129	129.50	619.28											
130	130.60	618.18		Sandstone		B-Ca	129.50-150.00m: Matrix of Melange. 129.50-130.60m: Conglomeratic sandstone; light brown.	2-Sep (130.50)					Upper Depth : 127.50 Lower Depth : 130.50 Lugeon Value : 0.00 K Value : 0.000000
131													
132							130.60-137.50m: Sandstone.						
133								4-Sep (133.50)					Upper Depth : 130.50 Lower Depth : 133.50 Lugeon Value : 0.00 K Value : 0.000000
134						D-Ea	137.50-138.50m, 144.00-146.20m & 147.30-147.55m: Limestone; light gray, partly reddish light brown.						
135									89.75mm				
136							149.30-150.00m: Sandy limestone.						Upper Depth : 133.50 Lower Depth : 136.50 Lugeon Value : 0.00 K Value : 0.000000
137	137.50	611.28					138.50-144.00m, 147.55-147.80m & 146.00-149.30m: Siltstone; reddish brown; with schistosity weakly. contain some limestone & sandstone gravels.						
138	138.50	610.28		Limestone		A-Ba		6-Sep (138.50)					
139													
140							146.20-146.30m, 147.00-147.30m & 147.80-148.00m: Marl.	7-Sep (140.50)					
141				Siltstone		D-Ea							
142								8-Sep (142.50)					
143													
144	144.00	604.78						9-Sep (144.00)					
145				Limestone		A-Ba		11-Sep (145.50)					
146	146.30	603.98											
147	147.00	601.78		Limestone		A-Ba		12-Sep (145.50)					
	147.30	601.48		Marl		C-Da							
	147.55	601.23		Limestone		Ba							
	147.80	600.98		Siltstone		D-Ea		13-Sep (149.00)					
148	148.00	600.78		Marl		C3							
				Siltstone		D-Ea		14-Sep (149.00)					
149	149.30	599.48											
150	150.00	598.78		Limestone		A3		15-Sep (150.00)					

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※DIAMETER is in millimeter

DRILL LOG

SHEET NO. 1 OF 3

SITE	Landslide Area	HOLE NO.	SK-221
LATITUDE	0465.5	LONGITUDE	6032.73
ELEVATION	628.26m		
DATE	Jun.5 - Jul.27, 1989	DEPTH	78.00m
ANGLE	90°	DIRECTION	SLOPE 0°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL
	0.30	627.96	Alluvium	Top soil					NC.116	
1	1.15	627.11					Highly weathered rock.	5-Jun (1.50)		
2						e	1.20-3.00m & 3.60-4.50m: cores are fragaents only.			
3	3.00	625.26						6-Jun (3.00)	NC.101	15-Jun (3.10)
4	4.50	623.76				c-d		7-Jun (4.50)		
5	5.60	622.66					Moderately weathered rock.			
6							Moderately weathered rock. Cores are mostly fragaents.	9-Jun (6.00)	NC.86	
7							Joints: 60-70deg., mostly open, with greenish gray to brown clay.	12-Jun (7.50)		20-Jun (7.30)
8						d-e				
9	9.30	618.96						14-Jun (9.00)		
10	10.06	618.20					Moderately weathered rock.			
	10.40	617.86				e	10.30-11.60 & 12.40-14.60m: Cores are fragaents only, with green to brownclay in joints.	15-Jun (10.50)		
11						d-e	13.30-13.40m: 10cm brown-grey clay.			
12	11.70	616.56				e	Othe parts are relatively good.	16-Jun (12.00)		
	12.40	615.86								
13						d-e				
14	14.06	613.76						19-Jun (14.00)		
15	15.05	613.01	Nagire formation	Limestone		Ad-eIII	Slightly weathered rocks, with 40deg. joint, brown stained.			
16	15.50	611.76				Ad-eV	Moderately weathered rock. Cores are mostly fragaents. Joints are filled by clay. 16.40-16.50m: 10cm greenish brown clay.	20-Jun (15.50)		
	16.60	611.66				Ad-eIII				
17	17.00	611.26				Ac-dIII	Moderately to slightly weathered rock until 38.90m. Cores are partly fragments. Joints are stained brown, with thin clay partly. Solution are seen rarely.			
	17.30	610.96				Ac-dIV				
18	18.02	610.24				Ac-dIII				
	18.75	609.51							08.86	
19							17.70-17.80m: Fragaents only. 19.50-19.65m: 30deg. open joint, with brown clay.	21-Jun (19.50)		
20	20.00	608.26				Ac-dIV	20.00-20.40m: Fragaents, with green clay (5cm in max.) in vertical joint. 20.60-20.95m: Mainly fragaents, with thin clay. 21.50-22.30m: Light gray clay (20cm thick) in 70deg. joint. 23.90-24.00m: Brown clay in 30deg. joint.	22-Jun (20.50)		1-Jul (20.00)
21	21.45	606.81								
22						Ac-dIII				
23	22.85	605.41				Ac-dIV				
	23.25	605.01								
	23.70	604.56				AeIV				
24	23.90	604.36					24.20-24.70m: Fragaents, Green-brown clay (1-2cm, max.5cm) in 50-70deg. joints. 25.10-25.55m: Fragaents, with clay (5cm in max.) in vertical joint. 25.90-27.10m: Reddish brown clay (hard, 5cm in max.) in 30-40 & 70deg. joint.	23-Jun (24.00)		10-Jul (24.50)
25										
26	25.90	602.36								
27						AdIV	25.90-27.10m: Reddish brown clay (hard, 5cm in max.) in 30-40 & 70deg. joints. 27.20-27.40m, 28.15-28.35m & 29.00-29.60m: Fragaents with brown clay. 29.80-29.90m: greenish gray clay (10cm thick).	24-Jun (27.10)		
28										28-Jul (28.00)
29	29.35	598.91								
30	29.97	598.29				EeIV		26-Jun (30.00)		

WATER PRESSURE TEST
N Value
Lugeon Value
K Value : cm/sec

CORE RECOVERY % (m) 0 50 100
R.Q.D % (m) 0 50 100
WATER PRESSURE TEST 0 10 20 30 40 50

Upper Depth : 28.00
Lower Depth : 30.00
Lugeon Value: 0.40
K Value : 0.000000

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※DIAMETER is in millimeter

DRILL LOG

SITE	Landslide Area			HOLE NO.	SK-221
LATITUDE	8465.5	LONGITUDE	6032.73	ELEVATION	620.26m
DATE	Jun.5 ~ Jul.27, 1989			DEPTH	78.00m
ANGLE	180° UP / DOWN 0° / 90° / 0.00°	DIRECTION	N 0° / W 270° / E 90° / S 180° / 0.00°	SLOPE	HORIZON 0° / 90° / 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value / Lugeon Value / K Value : cm/sec
31	31.15	592.11	Kadire formation	Limestone		AdIV	Same as above in general.						
	31.50	592.76				EeIV	30.00-30.20m: 60deg. joint with thin green clay.						Upper Depth : 30.00 Lower Depth : 32.00 Lugeon Value : 0.99 K Value : 0.000003
32							30.60-30.80m: Fragments with clay.	27-Jun (32.00)					
						Ac-dIV	31.15-31.45m: Brown clay in 30deg. joint.						
33							33.60-34.00m & 36.30-37.50m: Mostly fragments with thin brown-green clay in joints.						Upper Depth : 32.00 Lower Depth : 34.00 Lugeon Value : 0.10 K Value : 0.000000
	33.60	594.66				Ac-dV							
34	34.00	594.26				Ac-dIII							
	35.00	593.26						28-Jun (35.00)					
36													
37						Ac-dIV							Upper Depth : 36.00 Lower Depth : 38.00 Lugeon Value : 0.30 K Value : 0.000000
	37.50	592.76					Vertical joint with 1-3cm gray clay. 38.00-38.40m: Fragments.	29-Jun (38.00)					
38													
	39.50	589.36					Slightly weathered rocks up to 78.00m. Joints are brown stained, partly with thin clay, and solution are seen rarely.						
39													Upper Depth : 38.00 Lower Depth : 40.00 Lugeon Value : 0.08 K Value : 0.000000
40						Ac-dIII	40.00-40.50m: Gray clay.						
							41.20-41.30m: Brown clay(1-2cm) in 30deg. joint.	30-Jun (41.00)					
41	41.00	587.26					41.90-42.00m: Gray clay(2-3cm) in 70deg. joint.			21-Jul (42.00)			Upper Depth : 40.00 Lower Depth : 42.00 Lugeon Value : 0.00 K Value : 0.000000
42													
	43.30	584.96											Upper Depth : 42.00 Lower Depth : 44.00 Lugeon Value : 0.40 K Value : 0.000000
43							43.30-43.40m: Green-brown clay(1cm) in 30 & 60deg. joints.	1-Jul (44.00)					
44						Ac-dIV	44.00-44.30m: Fragments only.						
	45.45	582.85							08.86				Upper Depth : 44.00 Lower Depth : 46.00 Lugeon Value : 0.20 K Value : 0.000000
45							46.00-46.20m, 46.55-47.50m & 47.70-47.80m: Clay(1-3cm) in vertical and 30deg. joints.			29-Jul (45.75)			
46													
							48.10-48.15m: Green clay in 50deg. joint.	3-Jul (47.00)					Upper Depth : 46.00 Lower Depth : 48.00 Lugeon Value : 13.50 K Value : 0.000000
47													
							48.60-49.00m: Fragments only.						
48	49.00	579.26								17-Jul (48.50)			
49													Upper Depth : 48.00 Lower Depth : 50.00 Lugeon Value : 11.80 K Value : 0.000000
	49.60	570.65					49.60-49.70m: Fragments with thin clay in 30deg. joint.	4-Jul (50.00)					
50							53.60-53.70m: Clay(1-3cm) in vertical joint.						
51							54.65m: Opening, filled by green clay (1-3cm).						Upper Depth : 50.00 Lower Depth : 52.00 Lugeon Value : 1.50 K Value : 0.000000
52						Ab-cIV		5-Jul (52.00)					
53													Upper Depth : 52.00 Lower Depth : 54.00 Lugeon Value : 1.10 K Value : 0.000000
54													
	54.60	573.61											
55							Slightly weathered rock. Joints are brown stained, partly with thin clay, and solution are seen rarely.						Upper Depth : 54.00 Lower Depth : 56.00 Lugeon Value : 0.40 K Value : 0.000000
	56.00	572.26						6-Jul (56.00)					
56							58.80-59.00m: Green clay (1-2cm) in 60deg. joint.						
57													Upper Depth : 56.00 Lower Depth : 58.00 Lugeon Value : 0.20 K Value : 0.000000
								7-Jul (58.00)					
58						Ab-cIII							
59													Upper Depth : 58.00 Lower Depth : 60.00 Lugeon Value : 0.20 K Value : 0.000000
60	60.00	560.26											

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※LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
※DEPTH and ELEVATION are in meter
※DIAMETER is in millimeter

DRILL LOG

SHEET NO. 3 OF 3

SITE	Landslide Area	HOLE NO.	SK-221
LATITUDE	8465.5	LONGITUDE 6032.73	ELEVATION 628.26m
DATE	Jun.5 - Jul.27, 1989		DEPTH 78.00m
ANGLE	180° up / down 0° / 90° / 0.00°	DIRECTION 270° W / 0° N / 90° E / 180° S	SLOPE HORIZON 90° / 0° / 0.00°

SCALE (m)	DEPTH	ELEVATION	GEOLOGICAL AGE	ROCK TYPE	COLUMN SECTION	ROCK CLASS	DESCRIPTION	DATE	BIT & DIAMETER	GROUND WATER LEVEL	CORE RECOVERY % (m)	R.Q.D % (m)	WATER PRESSURE TEST N Value / Lugeon Value / k Value : cm/sec
61							Slightly weathered rock. Joints are brown stained, partly with thin clay, and solution are seen rarely. 61.00-61.20m, 66.02-66.30m & 66.40-66.50m: Gray clay(t-3cm) in 60deg. joints. 67.70-67.90m & 69.00-69.40m: Green clay (1-2cm) in 60-90deg. joints.	17-Jul (62.00)					
62													
63													
64													
65								18-Jul (66.00)					
66													
67						Ab-cIV							
68													
69	69.45	558.85	Hagiwara formation	Limestone					08.66				
70							Slightly weathered rock. Joints are brown stained, partly with thin clay, and solution are seen rarely. 69.70-69.90m: Green clay(5cm) in 60deg. joint. 73.00-73.10m: Clay(t-3cm) in 60deg. joint. 73.60-73.90m: Green clay(3-5cm) in 50deg. joint.	(70.00)					
71													
72								20-Jul (72.00)					
73													
74	74.00	554.26											
	74.80	553.46				Ab-cIII							
	75.00	553.26						21-Jul (75.00)					
75						Ab-cIV	Slightly weathered rock. Joints are brown stained, partly with thin clay, and solution are seen rarely.						
	75.50	552.76											
76							74.80-75.40m: Fragments with thin clay.						
77						ADIV	75.00-76.40m: Vertical thin opening, filled by clay.						
78	78.00	550.26						24-Jul (78.00)					
79													
80													
81													
82													
83													
84													
85													
86													
87													
88													
89													
90													

*R.Q.D is Rock Quality Designation, R.Q.D=(total length of cylindric cores longer than 10 cm)/(total drill length) x 100%
*LUGEON VALUE is l/min/m under injection water pressure of 10kg/cm2
*DEPTH and ELEVATION are in meter
*DIAMETER is in millimeter