

APPENDIX—VII

GEOLOGICAL INVESTIGATION DATA

CONTENT

VII-1	Geologic Log of Drill Hole	VII - 1
VII-2	Permeability Test in Drill Hole	VII - 25

VII - 1 GEOLOGIC LOG OF DRILL HOLE

LIST OF DRILL HOLE

Location	Hole name	Length(m)	Elevation	Coordinates		Final size of hole	Permeability test
				X	Y		
Dam	DH-206	40m	1690.764	1046,595.330	767,991.770	N X	○
	DH-207	40m	1718.145	1046,501.832	767,970.031	N X	○
	DH-208	30m	1679.247	1046,698.464	768,068.340	N X	○
	DH-209	40m	1724.202	1046,746.121	768,137.284	N X	○
	DH-210	20m	1647.552	1046,666.218	768,004.564	N X	○
	DH-211	20m				N X	○
	DH-212	20m	1647.249	1046,694.303	767,986.028	N X	○
	DH-213	20m	1646.584	1046,616.730	768,051.461	N X	○
	DH-214	50m				N X	○
	Sub. T	280m					
Dike	DDH-101	25m	1715.173			N X	—
	DDH-201	25m	1714.995			N X	—
	DDH-202	25m	1712.161			N X	—
	Sub. T	75m					
Intake	DH - 8	50m	1698.674	1046,666.876	767,750.214	N X	—
	Sub. T	50m					
Surgetank	DH - 9	70m	1718.399			N X	—
	Sub. T	70m					
Cauca Diversion Dam	CDH- 1	30m	1764.286			N X	—
	CDH- 2	30m	1763.787			N X	—
	CDH- 3	10m	1756.253			N X	—
	CDH- 4	30m	1756.817			N X	—
	CDH- 5	30m	1755.880			N X	—
	Sub. T	130m					
Borrow Area	BDH- 1	40m	1738.059	1046,099.641	767,350.251	N X	—
	Sub. T	40m					
Quarry Site	QDH- 1	100m	1730.197			B X	—
	Sub. T	100m					
Total		745m	21 holes				

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No. DH-206, sheet 2 of 2
 LOCATION Dam site left bank. HOLE No. DH-206, sheet 1 of 2
 ELEVATION 1690.754 m. COMPLETED 14 Jul. 1979
 COORDINATE 1690.754 m. COMPLETED 3 Aug. 1979
 ANGLE FROM HORIZONTAL 90°. DRILLED BY
 BEARING OF ANGLE HOLE CORE RECOVERY LOGGED BY

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION	CASING	COLOR	WEATHERING	FRAS	CORE CUTTING	DESCRIPTION	WATER TABLE	ELEVATION
0-1	Andesite	>>>	0-100								1690.6	
1-2	Weathered andesite	>>>									1690.6	
2-3	Andesite	>>>									1687.6	
3-4	Andesite	>>>									1687.6	
4-5	Andesite	>>>									1687.6	
5-6	Andesite	>>>									1687.6	
6-7	Andesite	>>>									1687.6	
7-8	Andesite	>>>									1687.6	
8-9	Andesite	>>>									1687.6	
9-10	Andesite	>>>									1687.6	
10-11	Andesite	>>>									1687.6	
11-12	Andesite	>>>									1687.6	
12-13	Andesite	>>>									1687.6	
13-14	Andesite	>>>									1687.6	
14-15	Andesite	>>>									1687.6	
15-16	Andesite	>>>									1687.6	
16-17	Andesite	>>>									1687.6	
17-18	Andesite	>>>									1687.6	
18-19	Andesite	>>>									1687.6	
19-20	Andesite	>>>									1687.6	
20-21	Andesite	>>>									1687.6	
21-22	Andesite	>>>									1687.6	
22-23	Andesite	>>>									1687.6	
23-24	Andesite	>>>									1687.6	
24-25	Andesite	>>>									1687.6	
25-26	Andesite	>>>									1687.6	
26-27	Andesite	>>>									1687.6	
27-28	Andesite	>>>									1687.6	
28-29	Andesite	>>>									1687.6	
29-30	Andesite	>>>									1687.6	
30-31	Andesite	>>>									1687.6	
31-32	Andesite	>>>									1687.6	
32-33	Andesite	>>>									1687.6	
33-34	Andesite	>>>									1687.6	
34-35	Andesite	>>>									1687.6	
35-36	Andesite	>>>									1687.6	
36-37	Andesite	>>>									1687.6	
37-38	Andesite	>>>									1687.6	
38-39	Andesite	>>>									1687.6	
39-40	Andesite	>>>									1687.6	
40-41	Andesite	>>>									1687.6	
41-42	Andesite	>>>									1687.6	
42-43	Andesite	>>>									1687.6	
43-44	Andesite	>>>									1687.6	
44-45	Andesite	>>>									1687.6	
45-46	Andesite	>>>									1687.6	
46-47	Andesite	>>>									1687.6	
47-48	Andesite	>>>									1687.6	
48-49	Andesite	>>>									1687.6	
49-50	Andesite	>>>									1687.6	
50-51	Andesite	>>>									1687.6	
51-52	Andesite	>>>									1687.6	
52-53	Andesite	>>>									1687.6	
53-54	Andesite	>>>									1687.6	
54-55	Andesite	>>>									1687.6	
55-56	Andesite	>>>									1687.6	
56-57	Andesite	>>>									1687.6	
57-58	Andesite	>>>									1687.6	
58-59	Andesite	>>>									1687.6	
59-60	Andesite	>>>									1687.6	
60-61	Andesite	>>>									1687.6	
61-62	Andesite	>>>									1687.6	
62-63	Andesite	>>>									1687.6	
63-64	Andesite	>>>									1687.6	
64-65	Andesite	>>>									1687.6	
65-66	Andesite	>>>									1687.6	
66-67	Andesite	>>>									1687.6	
67-68	Andesite	>>>									1687.6	
68-69	Andesite	>>>									1687.6	
69-70	Andesite	>>>									1687.6	
70-71	Andesite	>>>									1687.6	
71-72	Andesite	>>>									1687.6	
72-73	Andesite	>>>									1687.6	
73-74	Andesite	>>>									1687.6	
74-75	Andesite	>>>									1687.6	
75-76	Andesite	>>>									1687.6	
76-77	Andesite	>>>									1687.6	
77-78	Andesite	>>>									1687.6	
78-79	Andesite	>>>									1687.6	
79-80	Andesite	>>>									1687.6	
80-81	Andesite	>>>									1687.6	
81-82	Andesite	>>>									1687.6	
82-83	Andesite	>>>									1687.6	
83-84	Andesite	>>>									1687.6	
84-85	Andesite	>>>									1687.6	
85-86	Andesite	>>>									1687.6	
86-87	Andesite	>>>									1687.6	
87-88	Andesite	>>>									1687.6	
88-89	Andesite	>>>									1687.6	
89-90	Andesite	>>>									1687.6	
90-91	Andesite	>>>									1687.6	
91-92	Andesite	>>>									1687.6	
92-93	Andesite	>>>									1687.6	
93-94	Andesite	>>>									1687.6	
94-95	Andesite	>>>									1687.6	
95-96	Andesite	>>>									1687.6	
96-97	Andesite	>>>									1687.6	
97-98	Andesite	>>>									1687.6	
98-99	Andesite	>>>									1687.6	
99-100	Andesite	>>>									1687.6	

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 TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

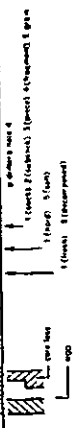
Julumito PROJECT HOLE No. DH-206, sheet 1 of 2
 LOCATION Dam site left bank. HOLE No. DH-206, sheet 2 of 2
 ELEVATION 1690.754 m. COMPLETED 14 Jul. 1979
 COORDINATE 1690.754 m. COMPLETED 3 Aug. 1979
 ANGLE FROM HORIZONTAL 90°. DRILLED BY
 BEARING OF ANGLE HOLE CORE RECOVERY LOGGED BY

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION	CASING	COLOR	WEATHERING	FRAS	CORE CUTTING	DESCRIPTION	WATER TABLE	ELEVATION
0-1	Andesite	>>>	0-100								1690.6	
1-2	Weathered andesite	>>>									1690.6	
2-3	Andesite	>>>									1687.6	
3-4	Andesite	>>>									1687.6	
4-5	Andesite	>>>									1687.6	
5-6	Andesite	>>>									1687.6	
6-7	Andesite	>>>									1687.6	
7-8	Andesite	>>>									1687.6	
8-9	Andesite	>>>									1687.6	
9-10	Andesite	>>>									1687.6	
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11-12	Andesite	>>>									1687.6	
12-13	Andesite	>>>									1687.6	
13-14	Andesite	>>>									1687.6	
14-15	Andesite	>>>									1687.6	
15-16	Andesite	>>>									1687.6	
16-17	Andesite	>>>									1687.6	
17-18	Andesite	>>>									1687.6	
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20-21	Andesite	>>>									1687.6	
21-22	Andesite	>>>									1687.6	
22-23	Andesite	>>>									1687.6	
23-24	Andesite	>>>									1687.6	
24-25	Andesite	>>>									1687.6	
25-26	Andesite	>>>									1687.6	
26-27	Andesite	>>>									1687.6	
27-28	Andesite	>>>										

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT
 LOCATION Dam site left bank HOLE No. DH-208 sheet 2 of 2
 ELEVATION 1679.247 m DEPTH OF HOLE 30.0 m COMMENCED 19 JUL 1979
 COORDINATE 1679.247 m DEPTH OF OVERBURDEN 8.0 m COMPLETED 31 JUL 1979
 ANGLE FROM HORIZONTAL 90° LENGTH OF ROCK DRILLING 22.0 m DRILLED BY
 BEARING OF ANGLE HOLE CORE RECOVERY LOGGED BY

DEPTH	ROCK NAME	L.O.D.	CORRECTION	RECOVERY	REMARKS	OBSERVATION OF CORE		DESCRIPTION	WATER TABLE	ELEVATION
						CUTTING	WATER PRESSURE TEST			
0-1	Weathered andesite	>								1679.3
1-2	Andesite	>								1683.8
2-3	Andesite	>								
3-4	Andesite	>								
4-5	Andesite	>								
5-6	Andesite	>								
6-7	Andesite	>								
7-8	Andesite	>								
8-9	Andesite	>								
9-10	Andesite	>								
10-11	Andesite	>								
11-12	Andesite	>								
12-13	Andesite	>								
13-14	Andesite	>								
14-15	Andesite	>								
15-16	Andesite	>								
16-17	Andesite	>								
17-18	Andesite	>								
18-19	Andesite	>								
19-20	Andesite	>								
20-21	Andesite	>								
21-22	Andesite	>								
22-23	Andesite	>								
23-24	Andesite	>								
24-25	Andesite	>								
25-26	Andesite	>								
26-27	Andesite	>								
27-28	Andesite	>								
28-29	Andesite	>								
29-30	Andesite	>								

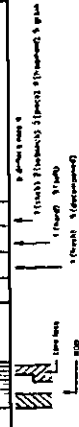


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GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT
 LOCATION Dam site left bank HOLE No. DH-208 sheet 1 of 2
 ELEVATION 1679.247 m DEPTH OF HOLE 30.0 m COMMENCED 19 JUL 1979
 COORDINATE 1679.247 m DEPTH OF OVERBURDEN 8.0 m COMPLETED 31 JUL 1979
 ANGLE FROM HORIZONTAL 90° LENGTH OF ROCK DRILLING 22.0 m DRILLED BY
 BEARING OF ANGLE HOLE CORE RECOVERY LOGGED BY

DEPTH	ROCK NAME	L.O.D.	CORRECTION	RECOVERY	REMARKS	OBSERVATION OF CORE		DESCRIPTION	WATER TABLE	ELEVATION
						CUTTING	WATER PRESSURE TEST			
0-1	Residual soil	>								1679.3
1-2	Residual soil	>								
2-3	Residual soil	>								
3-4	Residual soil	>								
4-5	Residual soil	>								
5-6	Residual soil	>								
6-7	Residual soil	>								
7-8	Residual soil	>								
8-9	Residual soil	>								
9-10	Residual soil	>								
10-11	Residual soil	>								
11-12	Residual soil	>								
12-13	Residual soil	>								
13-14	Residual soil	>								
14-15	Residual soil	>								
15-16	Residual soil	>								
16-17	Residual soil	>								
17-18	Residual soil	>								
18-19	Residual soil	>								
19-20	Residual soil	>								
20-21	Residual soil	>								
21-22	Residual soil	>								
22-23	Residual soil	>								
23-24	Residual soil	>								
24-25	Residual soil	>								
25-26	Residual soil	>								
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27-28	Residual soil	>								
28-29	Residual soil	>								
29-30	Residual soil	>								

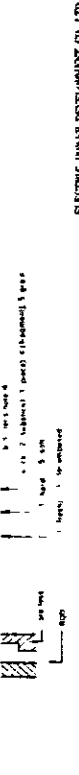


ELECTRIC POWER DEVELOPMENT CO. LTD.
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GEOLOGIC LOG OF DRILL HOLE

Juliumiyo PROJECT
 LOCATION **Dom site (right bank)** HOLE No. **DH-209** SHEET **1** OF **2**
 ELEVATION **1724.202** m DEPTH OF HOLE **40.0** m COMMENCED **25-JUL-79**
 COORDINATE **1724.202** m DEPTH OF OVERBURDEN **35.0** m COMPLETED **13-JUL-79**
 ANGLE FROM HORIZONTAL **90°** m LENGTH OF ROCK DRILLING **5.0** m DRILLED BY
 BEARING OF ANGLE HOLE **90°** m TOTAL LENGTH OF CORE _____ m LOGGED BY
 CORE RECOVERY _____ m

DEPTH	ROCK NAME	LOG	RECOVERY	CENTRA L BIT KIND OR RECOVERY	COLOR	WEATHERING	HAND SPEC	CORE CUTTING	DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	ELEVATION
0-10	Volcanic ash	X	0-100		Dark brown				Received leaching 0-37 exists 3 old 53-540 humic soil 76-79 beds 3 or more young ash layer by recent volcanic activity		1724.0
10-11	Volcanic ash	X	0-100		Dark brown						1724.0
11-12	Volcanic ash	X	0-100		Dark brown						1724.0
12-13	Volcanic ash	X	0-100		Dark brown						1724.0
13-14	Volcanic ash	X	0-100		Dark brown						1724.0
14-15	Volcanic ash	X	0-100		Dark brown						1724.0
15-16	Volcanic ash	X	0-100		Dark brown						1724.0
16-17	Volcanic ash	X	0-100		Dark brown						1724.0
17-18	Volcanic ash	X	0-100		Dark brown						1724.0
18-19	Volcanic ash	X	0-100		Dark brown						1724.0
19-20	Volcanic ash	X	0-100		Dark brown						1724.0
20-21	Volcanic ash	X	0-100		Dark brown						1724.0
21-22	Volcanic ash	X	0-100		Dark brown						1724.0
22-23	Volcanic ash	X	0-100		Dark brown						1724.0
23-24	Volcanic ash	X	0-100		Dark brown						1724.0
24-25	Volcanic ash	X	0-100		Dark brown						1724.0
25-26	Volcanic ash	X	0-100		Dark brown						1724.0
26-27	Volcanic ash	X	0-100		Dark brown						1724.0
27-28	Volcanic ash	X	0-100		Dark brown						1724.0
28-29	Volcanic ash	X	0-100		Dark brown						1724.0
29-30	Volcanic ash	X	0-100		Dark brown						1724.0
30-31	Volcanic ash	X	0-100		Dark brown						1724.0
31-32	Volcanic ash	X	0-100		Dark brown						1724.0
32-33	Volcanic ash	X	0-100		Dark brown						1724.0
33-34	Volcanic ash	X	0-100		Dark brown						1724.0
34-35	Volcanic ash	X	0-100		Dark brown						1724.0
35-36	Volcanic ash	X	0-100		Dark brown						1724.0
36-37	Volcanic ash	X	0-100		Dark brown						1724.0
37-38	Volcanic ash	X	0-100		Dark brown						1724.0
38-39	Volcanic ash	X	0-100		Dark brown						1724.0
39-40	Volcanic ash	X	0-100		Dark brown						1724.0
40-41	Volcanic ash	X	0-100		Dark brown						1724.0
41-42	Volcanic ash	X	0-100		Dark brown						1724.0
42-43	Volcanic ash	X	0-100		Dark brown						1724.0
43-44	Volcanic ash	X	0-100		Dark brown						1724.0
44-45	Volcanic ash	X	0-100		Dark brown						1724.0
45-46	Volcanic ash	X	0-100		Dark brown						1724.0
46-47	Volcanic ash	X	0-100		Dark brown						1724.0
47-48	Volcanic ash	X	0-100		Dark brown						1724.0
48-49	Volcanic ash	X	0-100		Dark brown						1724.0
49-50	Volcanic ash	X	0-100		Dark brown						1724.0
50-51	Volcanic ash	X	0-100		Dark brown						1724.0
51-52	Volcanic ash	X	0-100		Dark brown						1724.0
52-53	Volcanic ash	X	0-100		Dark brown						1724.0
53-54	Volcanic ash	X	0-100		Dark brown						1724.0
54-55	Volcanic ash	X	0-100		Dark brown						1724.0
55-56	Volcanic ash	X	0-100		Dark brown						1724.0
56-57	Volcanic ash	X	0-100		Dark brown						1724.0
57-58	Volcanic ash	X	0-100		Dark brown						1724.0
58-59	Volcanic ash	X	0-100		Dark brown						1724.0
59-60	Volcanic ash	X	0-100		Dark brown						1724.0
60-61	Volcanic ash	X	0-100		Dark brown						1724.0
61-62	Volcanic ash	X	0-100		Dark brown						1724.0
62-63	Volcanic ash	X	0-100		Dark brown						1724.0
63-64	Volcanic ash	X	0-100		Dark brown						1724.0
64-65	Volcanic ash	X	0-100		Dark brown						1724.0
65-66	Volcanic ash	X	0-100		Dark brown						1724.0
66-67	Volcanic ash	X	0-100		Dark brown						1724.0
67-68	Volcanic ash	X	0-100		Dark brown						1724.0
68-69	Volcanic ash	X	0-100		Dark brown						1724.0
69-70	Volcanic ash	X	0-100		Dark brown						1724.0
70-71	Volcanic ash	X	0-100		Dark brown						1724.0
71-72	Volcanic ash	X	0-100		Dark brown						1724.0
72-73	Volcanic ash	X	0-100		Dark brown						1724.0
73-74	Volcanic ash	X	0-100		Dark brown						1724.0
74-75	Volcanic ash	X	0-100		Dark brown						1724.0
75-76	Volcanic ash	X	0-100		Dark brown						1724.0
76-77	Volcanic ash	X	0-100		Dark brown						1724.0
77-78	Volcanic ash	X	0-100		Dark brown						1724.0
78-79	Volcanic ash	X	0-100		Dark brown						1724.0
79-80	Volcanic ash	X	0-100		Dark brown						1724.0
80-81	Volcanic ash	X	0-100		Dark brown						1724.0
81-82	Volcanic ash	X	0-100		Dark brown						1724.0
82-83	Volcanic ash	X	0-100		Dark brown						1724.0
83-84	Volcanic ash	X	0-100		Dark brown						1724.0
84-85	Volcanic ash	X	0-100		Dark brown						1724.0
85-86	Volcanic ash	X	0-100		Dark brown						1724.0
86-87	Volcanic ash	X	0-100		Dark brown						1724.0
87-88	Volcanic ash	X	0-100		Dark brown						1724.0
88-89	Volcanic ash	X	0-100		Dark brown						1724.0
89-90	Volcanic ash	X	0-100		Dark brown						1724.0
90-91	Volcanic ash	X	0-100		Dark brown						1724.0
91-92	Volcanic ash	X	0-100		Dark brown						1724.0
92-93	Volcanic ash	X	0-100		Dark brown						1724.0
93-94	Volcanic ash	X	0-100		Dark brown						1724.0
94-95	Volcanic ash	X	0-100		Dark brown						1724.0
95-96	Volcanic ash	X	0-100		Dark brown						1724.0
96-97	Volcanic ash	X	0-100		Dark brown						1724.0
97-98	Volcanic ash	X	0-100		Dark brown						1724.0
98-99	Volcanic ash	X	0-100		Dark brown						1724.0
99-100	Volcanic ash	X	0-100		Dark brown						1724.0



1 (inch) 2.54 cm
 1 (foot) 30.48 cm
 1 (meter) 100 cm

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GEOLOGIC LOG OF DRILL HOLE

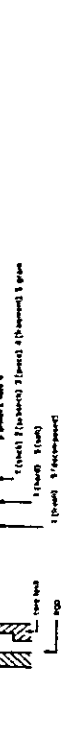
Juliumiyo PROJECT
 LOCATION **Dom site (right bank)** HOLE No. **DH-209** SHEET **2** OF **2**
 ELEVATION **1724.202** m DEPTH OF HOLE **40.0** m COMMENCED **25-JUL-79**
 COORDINATE **1724.202** m DEPTH OF OVERBURDEN **35.0** m COMPLETED **13-JUL-79**
 ANGLE FROM HORIZONTAL **90°** m LENGTH OF ROCK DRILLING **5.0** m DRILLED BY
 BEARING OF ANGLE HOLE **90°** m TOTAL LENGTH OF CORE _____ m LOGGED BY
 CORE RECOVERY _____ m

DEPTH	ROCK NAME	LOG	RECOVERY	CENTRA L BIT KIND OR RECOVERY	COLOR	WEATHERING	HAND SPEC	CORE CUTTING	DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	ELEVATION
0-1	Volcanic ash	X	0-100		Yellowish gray				Recognized coarse grain but easily can crush by fingers to fine grain		1701.7
1-2	Volcanic ash	X	0-100		Yellowish gray						1701.7
2-3	Volcanic ash	X	0-100		Yellowish gray						1701.7
3-4	Volcanic ash	X	0-100		Yellowish gray						1701.7
4-5	Volcanic ash	X	0-100		Yellowish gray						1701.7
5-6	Volcanic ash	X	0-100		Yellowish gray						1701.7
6-7	Volcanic ash	X	0-100		Yellowish gray						1701.7
7-8	Volcanic ash	X	0-100		Yellowish gray						1701.7
8-9	Volcanic ash	X	0-100		Yellowish gray						1701.7
9-10	Volcanic ash	X	0-100		Yellowish gray						1701.7
10-11	Volcanic ash	X	0-100		Yellowish gray						1701.7
11-12	Volcanic ash	X	0-100		Yellowish gray						1701.7
12-13	Volcanic ash	X	0-100		Yellowish gray						1701.7
13-14	Volcanic ash	X	0-100		Yellowish gray						1701.7
14-15	Volcanic ash	X	0-100		Yellowish gray						1701.7
15-16	Volcanic ash	X	0-100		Yellowish gray						1701.7
16-17	Volcanic ash	X	0-100		Yellowish gray						1701.7
17-18	Volcanic ash	X	0-100		Yellowish gray						1701.7
18-19	Volcanic ash	X	0-100		Yellowish gray						1701.7
19-20	Volcanic ash	X	0-100		Yellowish gray						1701.7
20-21	Volcanic ash	X	0-100		Yellowish gray						1701.7
21-22	Volcanic ash	X	0-100		Yellowish gray						1701.7
22-23	Volcanic ash	X	0-100		Yellowish gray						1701.7
23-24	Volcanic ash	X	0-100								

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT
 LOCATION Dam site - river bed HOLE No. DH-210 SHEET 1 of 1
 DEPTH OF HOLE 20.0 m COMMENCED 11-JUL-79
 DEPTH OF OVERBURDEN 0.5 m COMPLETED 19-JUL-79
 COORDINATE 1847.552 m LENGTH OF ROCK DRILLING 19.5 m DRILLED BY
 ANGLE FROM HORIZONTAL 90 ° TOTAL LENGTH OF CORE _____ m LOGGED BY
 BEARING OF ANGLE HOLE _____ ° CORE RECOVERY _____ %

DEPTH	ROCK NAME	L.O.C.	CORE RECOVERY	CEMENTA BIT RETRIEVED	CASING BIT RETRIEVED	COLOR	WEATHER ING	HARD NESS	OBSERVATION OF CORE DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	ELEVATION
0.0	Andesite	✓	100								1847.5
0.5	Andesite	✓	100								1847.1
1.0	Andesite	✓	100								1846.7
1.5	Andesite	✓	100								1846.3
2.0	Andesite	✓	100								1845.9
2.5	Andesite	✓	100								1845.5
3.0	Andesite	✓	100								1845.1
3.5	Andesite	✓	100								1844.7
4.0	Andesite	✓	100								1844.3
4.5	Andesite	✓	100								1843.9
5.0	Andesite	✓	100								1843.5
5.5	Andesite	✓	100								1843.1
6.0	Andesite	✓	100								1842.7
6.5	Andesite	✓	100								1842.3
7.0	Andesite	✓	100								1841.9
7.5	Andesite	✓	100								1841.5
8.0	Andesite	✓	100								1841.1
8.5	Andesite	✓	100								1840.7
9.0	Andesite	✓	100								1840.3
9.5	Andesite	✓	100								1839.9
10.0	Andesite	✓	100								1839.5
10.5	Andesite	✓	100								1839.1
11.0	Andesite	✓	100								1838.7
11.5	Andesite	✓	100								1838.3
12.0	Andesite	✓	100								1837.9
12.5	Andesite	✓	100								1837.5
13.0	Andesite	✓	100								1837.1
13.5	Andesite	✓	100								1836.7
14.0	Andesite	✓	100								1836.3
14.5	Andesite	✓	100								1835.9
15.0	Andesite	✓	100								1835.5
15.5	Andesite	✓	100								1835.1
16.0	Andesite	✓	100								1834.7
16.5	Andesite	✓	100								1834.3
17.0	Andesite	✓	100								1833.9
17.5	Andesite	✓	100								1833.5
18.0	Andesite	✓	100								1833.1
18.5	Andesite	✓	100								1832.7
19.0	Andesite	✓	100								1832.3
19.5	Andesite	✓	100								1831.9
20.0	Bottom of hole										1831.5

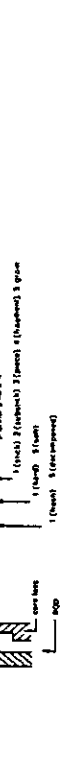


ELECTRIC POWER DEVELOPMENT CO. LTD.
TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT
 LOCATION Dam site HOLE No. DH-211 SHEET 1 of 1
 DEPTH OF HOLE 20.0 m COMMENCED _____
 DEPTH OF OVERBURDEN 1.7 m COMPLETED _____
 COORDINATE _____ m LENGTH OF ROCK DRILLING 18.3 m DRILLED BY
 ANGLE FROM HORIZONTAL _____ ° TOTAL LENGTH OF CORE _____ m LOGGED BY
 BEARING OF ANGLE HOLE _____ ° CORE RECOVERY _____ %

DEPTH	ROCK NAME	L.O.C.	CORE RECOVERY	CEMENTA BIT RETRIEVED	CASING BIT RETRIEVED	COLOR	WEATHER ING	HARD NESS	OBSERVATION OF CORE DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	ELEVATION
0.0	Andesite	✓	100								1847.5
0.5	Andesite	✓	100								1847.1
1.0	Andesite	✓	100								1846.7
1.5	Andesite	✓	100								1846.3
2.0	Andesite	✓	100								1845.9
2.5	Andesite	✓	100								1845.5
3.0	Andesite	✓	100								1845.1
3.5	Andesite	✓	100								1844.7
4.0	Andesite	✓	100								1844.3
4.5	Andesite	✓	100								1843.9
5.0	Andesite	✓	100								1843.5
5.5	Andesite	✓	100								1843.1
6.0	Andesite	✓	100								1842.7
6.5	Andesite	✓	100								1842.3
7.0	Andesite	✓	100								1841.9
7.5	Andesite	✓	100								1841.5
8.0	Andesite	✓	100								1841.1
8.5	Andesite	✓	100								1840.7
9.0	Andesite	✓	100								1840.3
9.5	Andesite	✓	100								1839.9
10.0	Andesite	✓	100								1839.5
10.5	Andesite	✓	100								1839.1
11.0	Andesite	✓	100								1838.7
11.5	Andesite	✓	100								1838.3
12.0	Andesite	✓	100								1837.9
12.5	Andesite	✓	100								1837.5
13.0	Andesite	✓	100								1837.1
13.5	Andesite	✓	100								1836.7
14.0	Andesite	✓	100								1836.3
14.5	Andesite	✓	100								1835.9
15.0	Andesite	✓	100								1835.5
15.5	Andesite	✓	100								1835.1
16.0	Andesite	✓	100								1834.7
16.5	Andesite	✓	100								1834.3
17.0	Andesite	✓	100								1833.9
17.5	Andesite	✓	100								1833.5
18.0	Andesite	✓	100								1833.1
18.5	Andesite	✓	100								1832.7
19.0	Andesite	✓	100								1832.3
19.5	Andesite	✓	100								1831.9
20.0	Bottom of hole										1831.5



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GEOLOGIC LOG OF DRILL HOLE

Jufumito PROJECT HOLE No. DH-212 sheet 1 of 1
 LOCATION Dam site ELEVATION 1647.249 m DEPTH OF HOLE 20.0 m COMMENCED 17 Aug-79
 COORDINATE 1646.564 m DEPTH OF OVERBURDEN 14.8 m COMPLETED 31 Aug-79
 ANGLE FROM HORIZONTAL 90° LENGTH OF ROCK DRILLING 5.2 m DRILLED BY
 BEARING OF ANGLE HOLE CORE RECOVERY LOGGED BY

DEPTH	ROCK NAME	LOG	CEMENTA RECOVERY	CORING	COLOR	WEATHERING	HARDNESS	CORE CUTTING	OBSERVATION OF CORE	DESCRIPTION	LOG COR	ELEVATION	WATER TABLE	
													WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER
0-1	Top soil				Black							1647.32		
1-2					Brownish gray				Colluvial soil			1644.4		
2-3									Core recovery is poor					
3-4									Slightly obtained andesite gravel					
4-5									Gravel size 10-20 cm					
5-6	River bed gravel								Poor recovery.					
6-7														
7-8	Andesite				Pale purplish gray				No core			1632.5		
8-9									Slightly weathered rock crackface is brown					
9-10									Good rock					
10-11									Bottom of hole					

ELECTRIC WATER DEVELOPMENT CO. LTD. TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Jufumito PROJECT HOLE No. DH-213 sheet 1 of 1
 LOCATION Dam site ELEVATION 1646.564 m DEPTH OF HOLE 20.0 m COMMENCED
 COORDINATE 1646.564 m DEPTH OF OVERBURDEN 11.9 m COMPLETED
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE 8.1 m DRILLED BY
 BEARING OF ANGLE HOLE CORE RECOVERY LOGGED BY

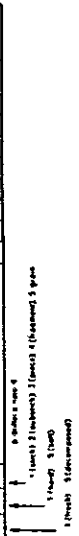
DEPTH	ROCK NAME	LOG	CEMENTA RECOVERY	CORING	COLOR	WEATHERING	HARDNESS	CORE CUTTING	OBSERVATION OF CORE	DESCRIPTION	LOG COR	ELEVATION	WATER TABLE	
													WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER
0-1	Top soil				Dark brown							1646.6		
1-2									Humic soil					
2-3									Sandy silt					
3-4									Contained organic material					
4-5									Pebble and sand					
5-6									Core recovery is poor					
6-7									Non recovery					
7-8									φ 20cm andinite bolder					
8-9									Non recovery					
9-10									Bolder					
10-11									Non recovery					
11-12									Bolder					
12-13									Sand and gravel					
13-14									Core recovery is poor					
14-15									decomposed					
15-16									Core recovery is poor					
16-17									Obtained stick core					
17-18									Core recovery is about 80%					
18-19									Cracked horizontally					
19-20									Cannot be seen vertical joints					
20-21									Bottom of hole					

ELECTRIC WATER DEVELOPMENT CO. LTD. TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT
 LOCATION Dom. site left bank HOLE No DH-214 sheet 1 of 3
 ELEVATION 50 m DEPTH OF HOLE 50 m COMMENCED _____ COMPLETED _____
 COORDINATE _____ m DEPTH OF OVERBURDEN _____ m DRILLED BY _____
 ANGLE FROM HORIZONTAL 90 ° TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ ° CORE RECOVERY _____ %

DEPTH m	ROCK NAME	L.O.D.	CORE RECOVERY	CERAMIC BIT KIND OF RECOVERY	COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	OBSERVATION OF CORE	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER LOGICION	ELEVATION
0-10	Volcanic ash	X	100%	100%	Brown		5	5	Humic soil			50
10-15	Volcanic ash	X	100%	100%	Brown		5	5	Silty clay			45
15-20	Volcanic ash	X	100%	100%	Brown		5	5	Soft			40
20-25	Volcanic ash	X	100%	100%	Brown		5	5	Weathered volcanic ash received leaching			35
25-30	Volcanic ash	X	100%	100%	Brown		5	5	Soft fine grain			30
30-35	Volcanic ash	X	100%	100%	Yellowish brown		5	5	Silt			25
35-40	Volcanic ash	X	100%	100%	Yellowish brown		5	5	Silty clay			20
40-45	Volcanic ash	X	100%	100%	Brown		5	5	Brown			15



ELECTRIC POWER DEVELOPMENT CO., LTD.
 TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT
 LOCATION Dom. site left bank HOLE No DH-214 sheet 2 of 3
 ELEVATION 50 m DEPTH OF HOLE 50 m COMMENCED _____ COMPLETED _____
 COORDINATE _____ m DEPTH OF OVERBURDEN _____ m DRILLED BY _____
 ANGLE FROM HORIZONTAL 90 ° TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ ° CORE RECOVERY _____ %

DEPTH m	ROCK NAME	L.O.D.	CORE RECOVERY	CERAMIC BIT KIND OF RECOVERY	COLOR	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	OBSERVATION OF CORE	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER LOGICION	ELEVATION
0-10	Volcanic ash	X	100%	100%	Brown		5	5	Sandy silt			50
10-15	Volcanic ash	X	100%	100%	Brown		5	5	Weathered andeitic andeite recognized fine mica frag- ment	23.0		45
15-20	Volcanic ash	X	100%	100%	Yellowish gray		4	5	Decomposed andeite Yellowish reddish gray poor core recovery	26.0		40
20-25	Volcanic ash	X	100%	100%	Yellowish gray		4	5	poor core recovery			35
25-30	Volcanic ash	X	100%	100%	Yellowish gray		4	5	poor core recovery			30
30-35	Volcanic ash	X	100%	100%	Yellowish gray		4	5	poor core recovery			25
35-40	Volcanic ash	X	100%	100%	Yellowish gray		4	5	poor core recovery			20
40-45	Volcanic ash	X	100%	100%	Yellowish gray		4	5	poor core recovery			15
45-50	Volcanic ash	X	100%	100%	Yellowish gray		4	5	poor core recovery			10



ELECTRIC POWER DEVELOPMENT CO., LTD.
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GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No. DH-214 sheet 3 of 3
 LOCATION Dgn site left bank HOLE No. DH-8 sheet 1 of 3
 ELEVATION 1698.674 m DEPTH OF HOLE 50.0 m COMMENCED 3 Jul-79
 COORDINATE 1698.674 m DEPTH OF OVERBURDEN 7.5 m COMPLETED 13 Jul-79
 ANGLE FROM HORIZONTAL 90 m LENGTH OF ROCK DRILLING 42.5 m DRILLED BY
 BEARING OF ANGLE HOLE 90 m TOTAL LENGTH OF CORE _____ m LOGGED BY
 CORE RECOVERY _____ m

DEPTH m	ROCK NAME	L.O.D.	CORE RECOVERY	CEMENTA TION	CLASMS	COLOR	WEATHER ING	HARD NESS	CUTTING MATERIAL	OBSERVATION OF CORE DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER LOCATION	ELEVATION
0	Andesite	>										1698.72
1	Andesite	>										1698.71
2	Andesite	>										1698.70
3	Andesite	>										1698.69
4	Andesite	>										1698.68
5	Andesite	>										1698.67
6	Andesite	>										1698.66
7	Andesite	>										1698.65
8	Andesite	>										1698.64
9	Andesite	>										1698.63
10	Andesite	>										1698.62
11	Andesite	>										1698.61
12	Andesite	>										1698.60
13	Andesite	>										1698.59
14	Andesite	>										1698.58
15	Andesite	>										1698.57
16	Andesite	>										1698.56
17	Andesite	>										1698.55
18	Andesite	>										1698.54
19	Andesite	>										1698.53
20	Andesite	>										1698.52
21	Andesite	>										1698.51
22	Andesite	>										1698.50
23	Andesite	>										1698.49
24	Andesite	>										1698.48
25	Andesite	>										1698.47
26	Andesite	>										1698.46
27	Andesite	>										1698.45
28	Andesite	>										1698.44
29	Andesite	>										1698.43
30	Andesite	>										1698.42
31	Andesite	>										1698.41
32	Andesite	>										1698.40
33	Andesite	>										1698.39
34	Andesite	>										1698.38
35	Andesite	>										1698.37
36	Andesite	>										1698.36
37	Andesite	>										1698.35
38	Andesite	>										1698.34
39	Andesite	>										1698.33
40	Andesite	>										1698.32
41	Andesite	>										1698.31
42	Andesite	>										1698.30
43	Andesite	>										1698.29
44	Andesite	>										1698.28
45	Andesite	>										1698.27
46	Andesite	>										1698.26
47	Andesite	>										1698.25
48	Andesite	>										1698.24
49	Andesite	>										1698.23
50	Andesite	>										1698.22
51	Andesite	>										1698.21
52	Andesite	>										1698.20
53	Andesite	>										1698.19
54	Andesite	>										1698.18
55	Andesite	>										1698.17
56	Andesite	>										1698.16
57	Andesite	>										1698.15
58	Andesite	>										1698.14
59	Andesite	>										1698.13
60	Andesite	>										1698.12
61	Andesite	>										1698.11
62	Andesite	>										1698.10
63	Andesite	>										1698.09
64	Andesite	>										1698.08
65	Andesite	>										1698.07
66	Andesite	>										1698.06
67	Andesite	>										1698.05
68	Andesite	>										1698.04
69	Andesite	>										1698.03
70	Andesite	>										1698.02
71	Andesite	>										1698.01
72	Andesite	>										1698.00
73	Andesite	>										1697.99
74	Andesite	>										1697.98
75	Andesite	>										1697.97
76	Andesite	>										1697.96
77	Andesite	>										1697.95
78	Andesite	>										1697.94
79	Andesite	>										1697.93
80	Andesite	>										1697.92
81	Andesite	>										1697.91
82	Andesite	>										1697.90
83	Andesite	>										1697.89
84	Andesite	>										1697.88
85	Andesite	>										1697.87
86	Andesite	>										1697.86
87	Andesite	>										1697.85
88	Andesite	>										1697.84
89	Andesite	>										1697.83
90	Andesite	>										1697.82
91	Andesite	>										1697.81
92	Andesite	>										1697.80
93	Andesite	>										1697.79
94	Andesite	>										1697.78
95	Andesite	>										1697.77
96	Andesite	>										1697.76
97	Andesite	>										1697.75
98	Andesite	>										1697.74
99	Andesite	>										1697.73
100	Andesite	>										1697.72

1 (1) 1 (2) 1 (3) 1 (4) 1 (5) 1 (6) 1 (7) 1 (8) 1 (9) 1 (10) 1 (11) 1 (12) 1 (13) 1 (14) 1 (15) 1 (16) 1 (17) 1 (18) 1 (19) 1 (20) 1 (21) 1 (22) 1 (23) 1 (24) 1 (25) 1 (26) 1 (27) 1 (28) 1 (29) 1 (30) 1 (31) 1 (32) 1 (33) 1 (34) 1 (35) 1 (36) 1 (37) 1 (38) 1 (39) 1 (40) 1 (41) 1 (42) 1 (43) 1 (44) 1 (45) 1 (46) 1 (47) 1 (48) 1 (49) 1 (50) 1 (51) 1 (52) 1 (53) 1 (54) 1 (55) 1 (56) 1 (57) 1 (58) 1 (59) 1 (60) 1 (61) 1 (62) 1 (63) 1 (64) 1 (65) 1 (66) 1 (67) 1 (68) 1 (69) 1 (70) 1 (71) 1 (72) 1 (73) 1 (74) 1 (75) 1 (76) 1 (77) 1 (78) 1 (79) 1 (80) 1 (81) 1 (82) 1 (83) 1 (84) 1 (85) 1 (86) 1 (87) 1 (88) 1 (89) 1 (90) 1 (91) 1 (92) 1 (93) 1 (94) 1 (95) 1 (96) 1 (97) 1 (98) 1 (99) 1 (100)

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GEOLOGIC LOG OF DRILL HOLE

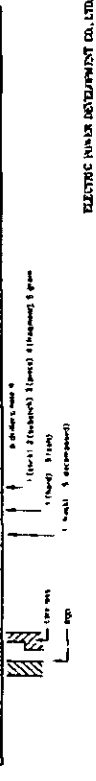
Julumito PROJECT HOLE No. DH-8 sheet 1 of 3
 LOCATION Dgn site left bank HOLE No. DH-8 sheet 1 of 3
 ELEVATION 1698.674 m DEPTH OF HOLE 50.0 m COMMENCED 3 Jul-79
 COORDINATE 1698.674 m DEPTH OF OVERBURDEN 7.5 m COMPLETED 13 Jul-79
 ANGLE FROM HORIZONTAL 90 m LENGTH OF ROCK DRILLING 42.5 m DRILLED BY
 BEARING OF ANGLE HOLE 90 m TOTAL LENGTH OF CORE _____ m LOGGED BY
 CORE RECOVERY _____ m

DEPTH m	ROCK NAME	L.O.D.	CORE RECOVERY	CEMENTA TION	CLASMS	COLOR	WEATHER ING	HARD NESS	CUTTING MATERIAL	OBSERVATION OF CORE DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER LOCATION	ELEVATION
0	Andesite	>										1698.72
1	Andesite	>										1698.71
2	Andesite	>										1698.70
3	Andesite	>										1698.69
4	Andesite	>										1698.68
5	Andesite	>										1698.67
6	Andesite	>										1698.66
7	Andesite	>										1698.65
8	Andesite	>										1698.64
9	Andesite	>										1698.63
10	Andesite	>										1698.62
11	Andesite	>										1698.61
12	Andesite	>										1698.60
13	Andesite	>										1698.59
14	Andesite	>										1698.58
15	Andesite	>										1698.57
16	Andesite	>										

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No. DH-9 SHEET 1 of 4
LOCATION Suruga-Izumi DEPTH OF HOLE 70.0 m COMMENCED 5-Jun-79
ELEVATION 1718.399 m DEPTH OF OVERBURDEN 32.7 m COMPLETED 25-Jun-79
COORDINATE 1718.399 m LENGTH OF ROCK DRILLING 37.3 m DRILLED BY
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE m LOGGED BY
 BEARING OF ANGLE HOLE ° CORE RECOVERY %

DEPTH	ROCK NAME	LOG	RECOVERY	GRAIN SIZE	WEATHERING	COLOUR	DESCRIPTION	WATER TABLE	ELEVATION
0-1	Volcanic ash	X							1718.45
1-2		X							
2-3		X							
3-4		X							
4-5		X							
5-6		X							
6-7		X							
7-8		X							
8-9		X							
9-10		X							
10-11		X							
11-12		X							
12-13		X							
13-14		X							
14-15		X							
15-16		X							
16-17		X							
17-18		X							
18-19		X							
19-20		X							
20-21		X							
21-22		X							
22-23		X							
23-24		X							
24-25		X							
25-26		X							
26-27		X							
27-28		X							
28-29		X							
29-30		X							
30-31		X							
31-32		X							
32-33		X							
33-34		X							
34-35		X							
35-36		X							
36-37		X							
37-38		X							
38-39		X							
39-40		X							
40-41		X							
41-42		X							
42-43		X							
43-44		X							
44-45		X							
45-46		X							
46-47		X							
47-48		X							
48-49		X							
49-50		X							
50-51		X							
51-52		X							
52-53		X							
53-54		X							
54-55		X							
55-56		X							
56-57		X							
57-58		X							
58-59		X							
59-60		X							
60-61		X							
61-62		X							
62-63		X							
63-64		X							
64-65		X							
65-66		X							
66-67		X							
67-68		X							
68-69		X							
69-70		X							
70-71		X							

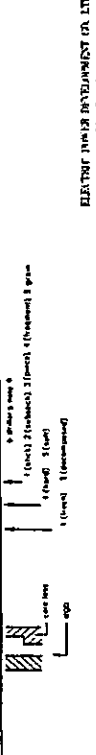


ELECTRIC INVAZOR INVESTMENT CO. LTD. TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No. DH-9 SHEET 2 of 4
LOCATION Suruga-Izumi DEPTH OF HOLE 70.0 m COMMENCED 5-Jun-79
ELEVATION 1718.399 m DEPTH OF OVERBURDEN 32.7 m COMPLETED 25-Jun-79
COORDINATE 1718.399 m LENGTH OF ROCK DRILLING 37.3 m DRILLED BY
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE m LOGGED BY
 BEARING OF ANGLE HOLE ° CORE RECOVERY %

DEPTH	ROCK NAME	LOG	RECOVERY	GRAIN SIZE	WEATHERING	COLOUR	DESCRIPTION	WATER TABLE	ELEVATION
0-1	Volcanic ash	X							1718.45
1-2		X							
2-3		X							
3-4		X							
4-5		X							
5-6		X							
6-7		X							
7-8		X							
8-9		X							
9-10		X							
10-11		X							
11-12		X							
12-13		X							
13-14		X							
14-15		X							
15-16		X							
16-17		X							
17-18		X							
18-19		X							
19-20		X							
20-21		X							
21-22		X							
22-23		X							
23-24		X							
24-25		X							
25-26		X							
26-27		X							
27-28		X							
28-29		X							
29-30		X							
30-31		X							
31-32		X							
32-33		X							
33-34		X							
34-35		X							
35-36		X							
36-37		X							
37-38		X							
38-39		X							
39-40		X							
40-41		X							
41-42		X							
42-43		X							
43-44		X							
44-45		X							
45-46		X							
46-47		X							
47-48		X							
48-49		X							
49-50		X							
50-51		X							
51-52		X							
52-53		X							
53-54		X							
54-55		X							
55-56		X							
56-57		X							
57-58		X							
58-59		X							
59-60		X							
60-61		X							
61-62		X							
62-63		X							
63-64		X							
64-65		X							
65-66		X							
66-67		X							
67-68		X							
68-69		X							
69-70		X							
70-71		X							

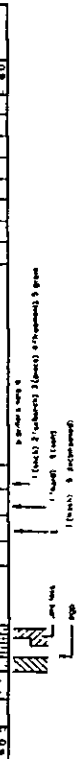


ELECTRIC INVAZOR INVESTMENT CO. LTD. TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT
 LOCATION Surge-Ionk HOLE No. DH-9 SHEET 3 of 4
 ELEVATION 1718.399 m DEPTH OF HOLE 70.0 m COMMENCED 5-Jun-179
 COORDINATE 1718.399 m DEPTH OF OVERBURDEN 32.7 m COMPLETED 25-Jun-179
 ANGLE FROM HORIZONTAL 90 ° LENGTH OF ROCK DRILLING 37.3 m DRILLED BY _____
 BEARING OF ANGLE HOLE _____ m TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 CORE RECOVERY _____ m

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENT BIT FOR RECOVERY	CORON	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	OBSERVATION OF CORE	WATER TABLE	ELEVATION
0	Andesite lava flow	>										1675.7
1	Andesite lava flow	>										1675.7
2	Andesite lava flow	>										1675.7
3	Andesite lava flow	>										1675.7
4	Andesite lava flow	>										1675.7
5	Andesite lava flow	>										1675.7
6	Andesite lava flow	>										1675.7
7	Andesite lava flow	>										1675.7
8	Andesite lava flow	>										1675.7
9	Andesite lava flow	>										1675.7
10	Andesite lava flow	>										1675.7
11	Andesite lava flow	>										1675.7
12	Andesite lava flow	>										1675.7
13	Andesite lava flow	>										1675.7
14	Andesite lava flow	>										1675.7
15	Andesite lava flow	>										1675.7
16	Andesite lava flow	>										1675.7
17	Andesite lava flow	>										1675.7
18	Andesite lava flow	>										1675.7
19	Andesite lava flow	>										1675.7
20	Andesite lava flow	>										1675.7
21	Andesite lava flow	>										1675.7
22	Andesite lava flow	>										1675.7
23	Andesite lava flow	>										1675.7
24	Andesite lava flow	>										1675.7
25	Andesite lava flow	>										1675.7
26	Andesite lava flow	>										1675.7
27	Andesite lava flow	>										1675.7
28	Andesite lava flow	>										1675.7
29	Andesite lava flow	>										1675.7
30	Andesite lava flow	>										1675.7
31	Andesite lava flow	>										1675.7
32	Andesite lava flow	>										1675.7
33	Andesite lava flow	>										1675.7
34	Andesite lava flow	>										1675.7
35	Andesite lava flow	>										1675.7
36	Andesite lava flow	>										1675.7
37	Andesite lava flow	>										1675.7
38	Andesite lava flow	>										1675.7
39	Andesite lava flow	>										1675.7
40	Andesite lava flow	>										1675.7
41	Andesite lava flow	>										1675.7
42	Andesite lava flow	>										1675.7
43	Andesite lava flow	>										1675.7
44	Andesite lava flow	>										1675.7
45	Andesite lava flow	>										1675.7
46	Andesite lava flow	>										1675.7
47	Andesite lava flow	>										1675.7
48	Andesite lava flow	>										1675.7
49	Andesite lava flow	>										1675.7
50	Andesite lava flow	>										1675.7
51	Andesite lava flow	>										1675.7
52	Andesite lava flow	>										1675.7
53	Andesite lava flow	>										1675.7
54	Andesite lava flow	>										1675.7
55	Andesite lava flow	>										1675.7
56	Andesite lava flow	>										1675.7
57	Andesite lava flow	>										1675.7
58	Andesite lava flow	>										1675.7
59	Andesite lava flow	>										1675.7
60	Andesite lava flow	>										1675.7
61	Andesite lava flow	>										1675.7
62	Andesite lava flow	>										1675.7
63	Andesite lava flow	>										1675.7
64	Andesite lava flow	>										1675.7
65	Andesite lava flow	>										1675.7
66	Andesite lava flow	>										1675.7
67	Andesite lava flow	>										1675.7
68	Andesite lava flow	>										1675.7
69	Andesite lava flow	>										1675.7
70	Andesite lava flow	>										1675.7



ELECTRIC POWER DEVELOPMENT CO., LTD.
TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT
 LOCATION Surge-Ionk HOLE No. DH-9 SHEET 4 of 4
 ELEVATION 1718.399 m DEPTH OF HOLE 70.0 m COMMENCED 5-Jun-179
 COORDINATE 1718.399 m DEPTH OF OVERBURDEN 32.7 m COMPLETED 25-Jun-179
 ANGLE FROM HORIZONTAL 90 ° LENGTH OF ROCK DRILLING 37.3 m DRILLED BY _____
 BEARING OF ANGLE HOLE _____ m TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 CORE RECOVERY _____ m

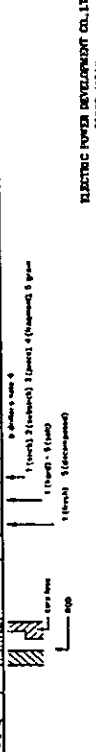
DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENT BIT FOR RECOVERY	CORON	WEATHERING	HARDNESS	CORE CUTTING	DESCRIPTION	OBSERVATION OF CORE	WATER TABLE	ELEVATION
0	Andesite lava flow	>										1648.4
1	Andesite lava flow	>										1648.4
2	Andesite lava flow	>										1648.4
3	Andesite lava flow	>										1648.4
4	Andesite lava flow	>										1648.4
5	Andesite lava flow	>										1648.4
6	Andesite lava flow	>										1648.4
7	Andesite lava flow	>										1648.4
8	Andesite lava flow	>										1648.4
9	Andesite lava flow	>										1648.4
10	Andesite lava flow	>										1648.4
11	Andesite lava flow	>										1648.4
12	Andesite lava flow	>										1648.4
13	Andesite lava flow	>										1648.4
14	Andesite lava flow	>										1648.4
15	Andesite lava flow	>										1648.4
16	Andesite lava flow	>										1648.4
17	Andesite lava flow	>										1648.4
18	Andesite lava flow	>										1648.4
19	Andesite lava flow	>										1648.4
20	Andesite lava flow	>										1648.4
21	Andesite lava flow	>										1648.4
22	Andesite lava flow	>										1648.4
23	Andesite lava flow	>										1648.4
24	Andesite lava flow	>										1648.4
25	Andesite lava flow	>										1648.4
26	Andesite lava flow	>										1648.4
27	Andesite lava flow	>										1648.4
28	Andesite lava flow	>										1648.4
29	Andesite lava flow	>										1648.4
30	Andesite lava flow	>										1648.4
31	Andesite lava flow	>										1648.4
32	Andesite lava flow	>										1648.4
33	Andesite lava flow	>										1648.4
34	Andesite lava flow	>										1648.4
35	Andesite lava flow	>										1648.4
36	Andesite lava flow	>										1648.4
37	Andesite lava flow	>										1648.4
38	Andesite lava flow	>										1648.4
39	Andesite lava flow	>										1648.4
40	Andesite lava flow	>										1648.4
41	Andesite lava flow	>										1648.4
42	Andesite lava flow	>										1648.4
43	Andesite lava flow	>										1648.4
44	Andesite lava flow	>										1648.4
45	Andesite lava flow	>										1648.4
46	Andesite lava flow	>										1648.4
47	Andesite lava flow	>										1648.4
48	Andesite lava flow	>										1648.4
49	Andesite lava flow	>										1648.4
50	Andesite lava flow	>										1648.4
51	Andesite lava flow	>										

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No DDH-102 sheet 1 of 2
 LOCATION Dike DEPTH OF HOLE 25.0 m COMMENCED 24 May '79
 ELEVATION 1714.995 m DEPTH OF OVERBURDEN 25.0 m COMPLETED 29 May '79
 COORDINATE _____ LENGTH OF ROCK DRILLING 0 m DRILLED BY _____
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ ° CORE RECOVERY _____ %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION	CLASNG	COLOR	WEATHERING	HARDNESS	CORE CUTTING	OBSERVATION OF CORE	DESCRIPTION	WATER TABLE	ELEVATION	DEPTH
0	Volcanic ash	X	100									1713.00	0	
1		X	100							Humic soil			1	
2		X	100							Humic soil			2	
3		X	100							Humic soil			3	
4		X	100							3 times volcanic activity			4	
5		X	100							Clayey silt			5	
6		X	100							Silty clay			6	
7		X	100										7	
8		X	100										8	
9		X	100										9	
10		X	100										10	
11		X	100										11	
12		X	100										12	
13		X	100										13	
14		X	100										14	
15		X	100										15	
16		X	100										16	
17		X	100										17	
18		X	100										18	
19		X	100										19	
20		X	100										20	

Water level of GW
 12.80m

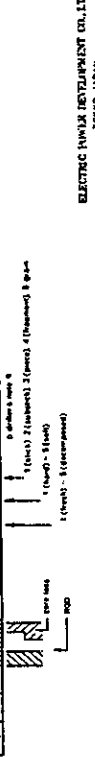


ELECTRIC POWER DEVELOPMENT CO., LTD.
 TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No DDH-102 sheet 2 of 2
 LOCATION Dike DEPTH OF HOLE 25.0 m COMMENCED 24 May '79
 ELEVATION 1714.992 m DEPTH OF OVERBURDEN 25.0 m COMPLETED 29 May '79
 COORDINATE _____ LENGTH OF ROCK DRILLING 0 m DRILLED BY _____
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ ° CORE RECOVERY _____ %

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION	CLASNG	COLOR	WEATHERING	HARDNESS	CORE CUTTING	OBSERVATION OF CORE	DESCRIPTION	WATER TABLE	ELEVATION	DEPTH
0	Residual soil	X	100									1690.0	0	
1		X	100										1	
2		X	100										2	
3		X	100										3	
4		X	100										4	
5		X	100										5	
6		X	100										6	
7		X	100										7	
8		X	100										8	
9		X	100										9	
10		X	100										10	
11		X	100										11	
12		X	100										12	
13		X	100										13	
14		X	100										14	
15		X	100										15	
16		X	100										16	
17		X	100										17	
18		X	100										18	
19		X	100										19	
20		X	100										20	

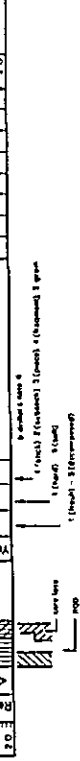


ELECTRIC POWER DEVELOPMENT CO., LTD.
 TOKYO, JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumilo PROJECT
 LOCATION Caico Division Dam HOLE No. CDH-1 SHEET 1 of 2
 ELEVATION 1764.286 m DEPTH OF HOLE 30.0 m COMMENCED 20 Jul. 79
 COORDINATE _____ DEPTH OF OVERBURDEN 30.0 m COMPLETED 4 Aug. 79
 ANGLE FROM HORIZONTAL 90 ° LENGTH OF ROCK DRILLING 0 m DRILLED BY _____
 BEARING OF ANGLE HOLE _____ TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 CORE RECOVERY _____ %

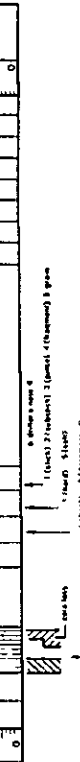
DEPTH	ROCK MARK	L.O.D.	CORE RECOVERY	CENTERS AND OR CLASMS	COLOR	WEATHERING	HARDNESS	CORE CUTTING	OBSERVATION OF CORE	DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	ELEVATION
0	<											1764.3
1	<											1764.3
2	<											1764.3
3	<											1764.3
4	<											1764.3
5	<											1764.3
6	<											1764.3
7	<											1764.3
8	<											1764.3
9	<											1764.3
10	<											1764.3
11	<											1764.3
12	<											1764.3
13	<											1764.3
14	<											1764.3
15	<											1764.3
16	<											1764.3
17	<											1764.3
18	<											1764.3
19	<											1764.3
20	<											1764.3
21	<											1764.3
22	<											1764.3
23	<											1764.3
24	<											1764.3
25	<											1764.3
26	<											1764.3
27	<											1764.3
28	<											1764.3
29	<											1764.3
30	<											1764.3



GEOLOGIC LOG OF DRILL HOLE

Julumilo PROJECT
 LOCATION Caico Division Dam HOLE No. CDH-1 SHEET 2 of 2
 ELEVATION 1764.286 m DEPTH OF HOLE 30.0 m COMMENCED 20 Jul. 79
 COORDINATE _____ DEPTH OF OVERBURDEN 30.0 m COMPLETED 4 Aug. 79
 ANGLE FROM HORIZONTAL 90 ° LENGTH OF ROCK DRILLING 0 m DRILLED BY _____
 BEARING OF ANGLE HOLE _____ TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 CORE RECOVERY _____ %

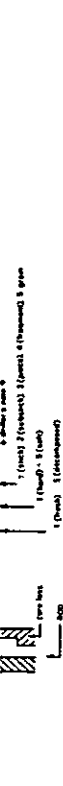
DEPTH	ROCK MARK	L.O.D.	CORE RECOVERY	CENTERS AND OR CLASMS	COLOR	WEATHERING	HARDNESS	CORE CUTTING	OBSERVATION OF CORE	DESCRIPTION	WATER TABLE WATER PRESSURE TEST LEAKAGE OF DRILLING WATER	ELEVATION
0	<											1764.3
1	<											1764.3
2	<											1764.3
3	<											1764.3
4	<											1764.3
5	<											1764.3
6	<											1764.3
7	<											1764.3
8	<											1764.3
9	<											1764.3
10	<											1764.3
11	<											1764.3
12	<											1764.3
13	<											1764.3
14	<											1764.3
15	<											1764.3
16	<											1764.3
17	<											1764.3
18	<											1764.3
19	<											1764.3
20	<											1764.3
21	<											1764.3
22	<											1764.3
23	<											1764.3
24	<											1764.3
25	<											1764.3
26	<											1764.3
27	<											1764.3
28	<											1764.3
29	<											1764.3
30	<											1764.3



GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No CDH-2 sheet 1 of 2
 LOCATION Caved Diversion Dam HOLE No CDH-2 sheet 1 of 2
 ELEVATION 1763.787 m COMPLETED 13 Jul. 1979
 COORDINATE 1763.787 m COMPLETED 6 Jul. 1979
 ANGLE FROM HORIZONTAL 90° DRILLED BY _____
 BEARING OF ANGLE HOLE _____ LOGGED BY _____
 DEPTH OF HOLE 30.0 m
 DEPTH OF OVERBURDEN 30.0 m
 LENGTH OF ROCK DRILLING 0 m
 TOTAL LENGTH OF CORE _____ m
 CORE RECOVERY _____ %

DEPTH	ROCK NAME	CORRECTION	GENERAL REMARKS OR RECOVERY	CORRECTION	WEATHERING	HARDNESS	CORE CUTTING	OBSERVATION OF CORE		WATER TABLE	DEPTH	ELEVATION
								DESCRIPTION	REMARKS			
0	River bed deposits											1763.82
1	Sandy silt											1763.5
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
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23												
24												
25												
26												
27												
28												
29												
30												

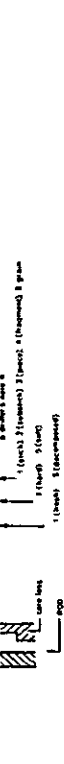


ELECTRIC POWER DEVELOPMENT CO., LTD.
TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No CDH-2 sheet 2 of 2
 LOCATION Caved Diversion Dam HOLE No CDH-2 sheet 2 of 2
 ELEVATION 1763.787 m COMPLETED 13 Jul. 1979
 COORDINATE 1763.787 m COMPLETED 6 Jul. 1979
 ANGLE FROM HORIZONTAL 90° DRILLED BY _____
 BEARING OF ANGLE HOLE _____ LOGGED BY _____
 DEPTH OF HOLE 30.0 m
 DEPTH OF OVERBURDEN 30.0 m
 LENGTH OF ROCK DRILLING 0 m
 TOTAL LENGTH OF CORE _____ m
 CORE RECOVERY _____ %

DEPTH	ROCK NAME	CORRECTION	GENERAL REMARKS OR RECOVERY	CORRECTION	WEATHERING	HARDNESS	CORE CUTTING	OBSERVATION OF CORE		WATER TABLE	DEPTH	ELEVATION
								DESCRIPTION	REMARKS			
0	River bed deposits											1763.8
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
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26												
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28												
29												
30												

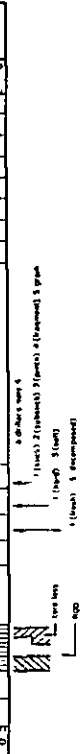


ELECTRIC POWER DEVELOPMENT CO., LTD.
TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No. CDH - 3 sheet 1 of 1
LOCATION Cauca Diversion Dam **DEPTH OF HOLE** 10.0 m COMMENCED 6 Aug - 179
ELEVATION 1756.253 m **DEPTH OF OVERBURDEN** 10.0 m COMPLETED 17 Aug - 179
COORDINATE 1756.817 m **LENGTH OF ROCK DRILLING** 0 m DRILLED BY _____
ANGLE FROM HORIZONTAL 90° **TOTAL LENGTH OF CORE** _____ m LOGGED BY _____
BEARING OF ANGLE HOLE _____ ° **CORE RECOVERY** _____ %

DEPTH	ROCK NAME	L.O.G.	CORE RECOVERY	CEMENTATION	COLOR	WEATHERING	HEAD AND TESS	OBSERVATION OF CORE	DESCRIPTION	WATER TABLE	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER	LOG COR	ELEVATION
0	Sandy silt				Yellowish		5		Flood plane deposits					1756.30
1									all sandy silt					
2							4		Andesite boulder					
3							3		Andesite boulder					
4							4		Gravel layer with boulder					
5							3		Gravel layer with boulder					
6							4		Gravels interlocked each other					
7							2		Almost andesite gravel					
8							4		Gravel ϕ 5-15 cm					
9									boulder - cobbles size					
10									Bottom of hole					1746.3



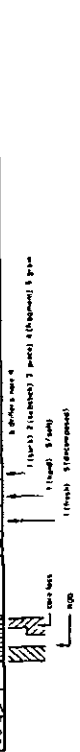
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ELECTRIC POWER DEVELOPMENT CO. LTD.
 TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No. CDH - 4 sheet 1 of 2
LOCATION Cauca Diversion Dam **DEPTH OF HOLE** 30.0 m COMMENCED 23 Aug - 179
ELEVATION 1756.817 m **DEPTH OF OVERBURDEN** 30.0 m COMPLETED 30 Jun - 179
COORDINATE 1756.817 m **LENGTH OF ROCK DRILLING** 0 m DRILLED BY _____
ANGLE FROM HORIZONTAL 90° **TOTAL LENGTH OF CORE** _____ m LOGGED BY _____
BEARING OF ANGLE HOLE _____ ° **CORE RECOVERY** _____ %

DEPTH	ROCK NAME	L.O.G.	CORE RECOVERY	CEMENTATION	COLOR	WEATHERING	HEAD AND TESS	OBSERVATION OF CORE	DESCRIPTION	WATER TABLE	WATER PRESSURE TEST	LEAKAGE OF DRILLING WATER	LOG COR	ELEVATION
0	Volcanic ash				Brown		5		Silt and sand					1756.3
1									Gravel					
2									Core recovery is very bad					
3									Sample					
4									Sample ϕ 10-15 cm gravel					
5														
6														
7														
8														
9														
10														
11									Poor core recovery					
12														
13														
14														
15														
16														
17														
18														
19									Slightly obtained few ϕ 5-15 cm gravel					
20									exists humic layer					1737.7



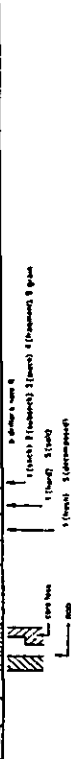
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ELECTRIC POWER DEVELOPMENT CO. LTD.
 TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No. CDH-4 sheet 2 of 2
LOCATION Cauca Division Dm. HOLE No. CDH-5 sheet 1 of 2
ELEVATION 1756.817 m **DEPTH OF HOLE** 30.0 m **COMMENCED** 25 May 1979
COORDINATE 1755.980 m **DEPTH OF OVERBURDEN** 30.0 m **COMPLETED** 21 Aug 1979
ANGLE FROM HORIZONTAL 90° **LENGTH OF ROCK DRILLING** 0 m **DRILLED BY**
BEARING OF ANGLE HOLE CORE RECOVERY LOGGED BY

DEPTH	ROCK NAME	L.O.D.	CORE RECOVERY	CEMENTA TION	CLON	WATER TABLE	OBSERVATION OF CORE	WATER TABLE	DEPTH
0-1	Volcanic ash	X							1735.7
1-2	Black	X							1735.7
2-3	Brownish gray	X							1735.7
3-4		X							1735.7
4-5		X							1735.7
5-6		X							1735.7
6-7	Residual soil	X							1735.7
7-8	Residual soil of andesite silty sand	X							1735.7
8-9		X							1735.7
9-10	Bottom of hole	X							1735.7
10-11		X							1735.7
11-12		X							1735.7
12-13		X							1735.7
13-14		X							1735.7
14-15		X							1735.7
15-16		X							1735.7
16-17		X							1735.7
17-18		X							1735.7
18-19		X							1735.7
19-20		X							1735.7
20-21		X							1735.7
21-22		X							1735.7
22-23		X							1735.7
23-24		X							1735.7
24-25		X							1735.7
25-26		X							1735.7
26-27		X							1735.7
27-28		X							1735.7
28-29		X							1735.7
29-30		X							1735.7

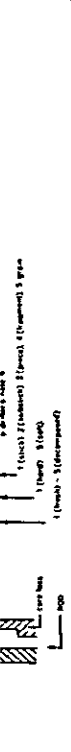


ELECTRIC POWER DEVELOPMENT CO. LTD.
TOKYO JAPAN

GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No. CDH-5 sheet 1 of 2
LOCATION Cauca Division Dm. HOLE No. CDH-4 sheet 2 of 2
ELEVATION 1755.980 m **DEPTH OF HOLE** 30.0 m **COMMENCED** 3 Aug 1979
COORDINATE 1755.980 m **DEPTH OF OVERBURDEN** 30.0 m **COMPLETED** 21 Aug 1979
ANGLE FROM HORIZONTAL 90° **LENGTH OF ROCK DRILLING** 0 m **DRILLED BY**
BEARING OF ANGLE HOLE CORE RECOVERY LOGGED BY

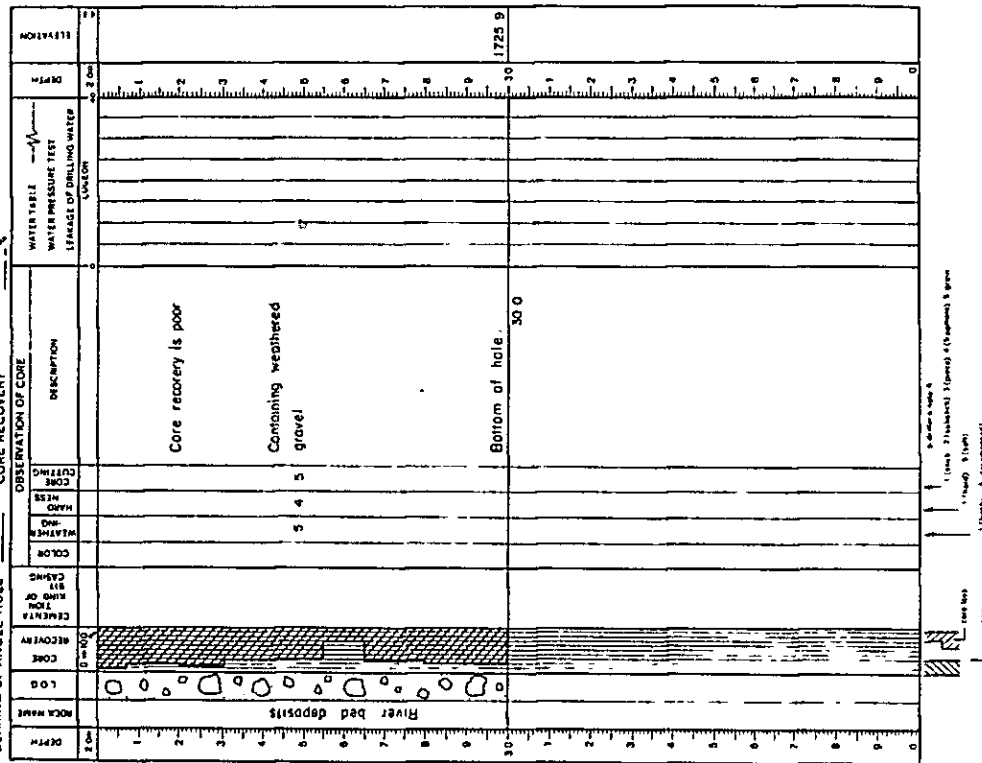
DEPTH	ROCK NAME	L.O.D.	CORE RECOVERY	CEMENTA TION	CLON	WATER TABLE	OBSERVATION OF CORE	WATER TABLE	DEPTH
0-1	River bed deposits	X							1740.9
1-2	Volcanic ash	X							1740.9
2-3	River bed deposits	X							1740.9
3-4	Yellowish brown	X							1740.9
4-5		X							1740.9
5-6		X							1740.9
6-7		X							1740.9
7-8		X							1740.9
8-9		X							1740.9
9-10		X							1740.9
10-11		X							1740.9
11-12		X							1740.9
12-13		X							1740.9
13-14		X							1740.9
14-15		X							1740.9
15-16		X							1740.9
16-17		X							1740.9
17-18		X							1740.9
18-19		X							1740.9
19-20		X							1740.9
20-21		X							1740.9
21-22		X							1740.9
22-23		X							1740.9
23-24		X							1740.9
24-25		X							1740.9
25-26		X							1740.9
26-27		X							1740.9
27-28		X							1740.9
28-29		X							1740.9
29-30		X							1740.9



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GEOLOGIC LOG OF DRILL HOLE

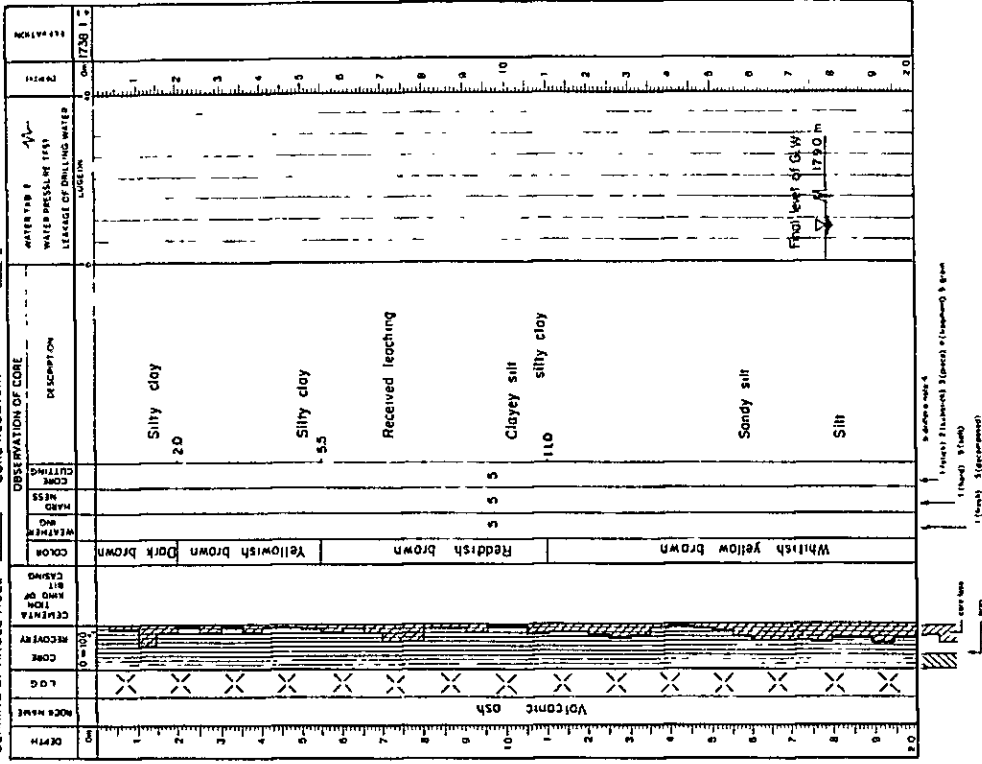
PROJECT **Jutumito** HOLE No. CDH-5 sheet 2 of 2
 LOCATION **Concha** DISTRICT **Don** DEPTH OF HOLE **30.0** m COMMENCED **3 Aug-79**
 ELEVATION **1755.890** m DEPTH OF OVERBURDEN **30.0** m COMPLETED **12 Aug-79**
 COORDINATE _____ LENGTH OF ROCK DRILLING **0** m DRILLED BY _____
 ANGLE FROM HORIZONTAL **90**° TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____° CORE RECOVERY _____%



ELECTRIC POWER DEVELOPMENT CO., LTD.
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GEOLOGIC LOG OF DRILL HOLE

PROJECT **Jutumito** HOLE No. BDH-1 sheet 1 of 2
 LOCATION **Boxow** DISTRICT **Don** DEPTH OF HOLE **40.0** m COMMENCED **3 Aug-79**
 ELEVATION **1738.059** m DEPTH OF OVERBURDEN **34.0** m COMPLETED **12 Aug-79**
 COORDINATE _____ LENGTH OF ROCK DRILLING **5.0** m DRILLED BY _____
 ANGLE FROM HORIZONTAL **90**° TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____° CORE RECOVERY _____%



ELECTRIC POWER DEVELOPMENT CO., LTD.
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GEOLOGIC LOG OF DRILL HOLE

Julumito PROJECT HOLE No ODH-1 SHEET 2 of 5
 LOCATION Quarry site DEPTH OF HOLE 100.0 m COMMENCED 26-Jul-179
 ELEVATION 1730.197 m DEPTH OF OVERBURDEN 26.0 m COMPLETED 31-Aug-179
 COORDINATE _____ LENGTH OF ROCK DRILLING 74.0 m DRILLED BY _____
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ m CORE RECOVERY _____ m

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION	COLOR	WEATHERING	HAZARD	CORE CUTTING	DESCRIPTION	WATER TABLE	ELEVATION
0-1	Volcanic ash	X									1730.197
1-2	Weathered andesite	>									
2-3	Weathered andesite	>									
3-4	Weathered andesite	>			Gray				No recovery		
4-5	Weathered andesite	>							Obtained only slime		
5-6	Weathered andesite	>							Obtained only slime		
6-7	Weathered andesite	>							Obtained only slime		
7-8	Weathered andesite	>							Obtained only slime		
8-9	Weathered andesite	>							Obtained only slime		
9-10	Weathered andesite	>							Obtained only slime		
10-11	Weathered andesite	>							Obtained only slime		
11-12	Weathered andesite	>							Obtained only slime		
12-13	Weathered andesite	>							Obtained only slime		
13-14	Weathered andesite	>							Obtained only slime		
14-15	Weathered andesite	>							Obtained only slime		
15-16	Weathered andesite	>							Obtained only slime		
16-17	Weathered andesite	>							Obtained only slime		
17-18	Weathered andesite	>							Obtained only slime		
18-19	Weathered andesite	>							Obtained only slime		
19-20	Weathered andesite	>							Obtained only slime		
20-21	Weathered andesite	>							Obtained only slime		
21-22	Weathered andesite	>							Obtained only slime		
22-23	Weathered andesite	>							Obtained only slime		
23-24	Weathered andesite	>							Obtained only slime		
24-25	Weathered andesite	>							Obtained only slime		
25-26	Weathered andesite	>							Obtained only slime		
26-27	Weathered andesite	>							Obtained only slime		
27-28	Weathered andesite	>							Obtained only slime		
28-29	Weathered andesite	>							Obtained only slime		
29-30	Weathered andesite	>							Obtained only slime		
30-31	Weathered andesite	>							Obtained only slime		
31-32	Weathered andesite	>							Obtained only slime		
32-33	Weathered andesite	>							Obtained only slime		
33-34	Weathered andesite	>							Obtained only slime		
34-35	Weathered andesite	>							Obtained only slime		
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44-45	Weathered andesite	>							Obtained only slime		
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46-47	Weathered andesite	>							Obtained only slime		
47-48	Weathered andesite	>							Obtained only slime		
48-49	Weathered andesite	>							Obtained only slime		
49-50	Weathered andesite	>							Obtained only slime		
50-51	Weathered andesite	>							Obtained only slime		
51-52	Weathered andesite	>							Obtained only slime		
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68-69	Weathered andesite	>							Obtained only slime		
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70-71	Weathered andesite	>							Obtained only slime		
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72-73	Weathered andesite	>							Obtained only slime		
73-74	Weathered andesite	>							Obtained only slime		
74-75	Weathered andesite	>							Obtained only slime		
75-76	Weathered andesite	>							Obtained only slime		
76-77	Weathered andesite	>							Obtained only slime		
77-78	Weathered andesite	>							Obtained only slime		
78-79	Weathered andesite	>							Obtained only slime		
79-80	Weathered andesite	>							Obtained only slime		
80-81	Weathered andesite	>							Obtained only slime		
81-82	Weathered andesite	>							Obtained only slime		
82-83	Weathered andesite	>							Obtained only slime		
83-84	Weathered andesite	>							Obtained only slime		
84-85	Weathered andesite	>							Obtained only slime		
85-86	Weathered andesite	>							Obtained only slime		
86-87	Weathered andesite	>							Obtained only slime		
87-88	Weathered andesite	>							Obtained only slime		
88-89	Weathered andesite	>							Obtained only slime		
89-90	Weathered andesite	>							Obtained only slime		
90-91	Weathered andesite	>							Obtained only slime		
91-92	Weathered andesite	>							Obtained only slime		
92-93	Weathered andesite	>							Obtained only slime		
93-94	Weathered andesite	>							Obtained only slime		
94-95	Weathered andesite	>							Obtained only slime		
95-96	Weathered andesite	>							Obtained only slime		
96-97	Weathered andesite	>							Obtained only slime		
97-98	Weathered andesite	>							Obtained only slime		
98-99	Weathered andesite	>							Obtained only slime		
99-100	Weathered andesite	>							Obtained only slime		

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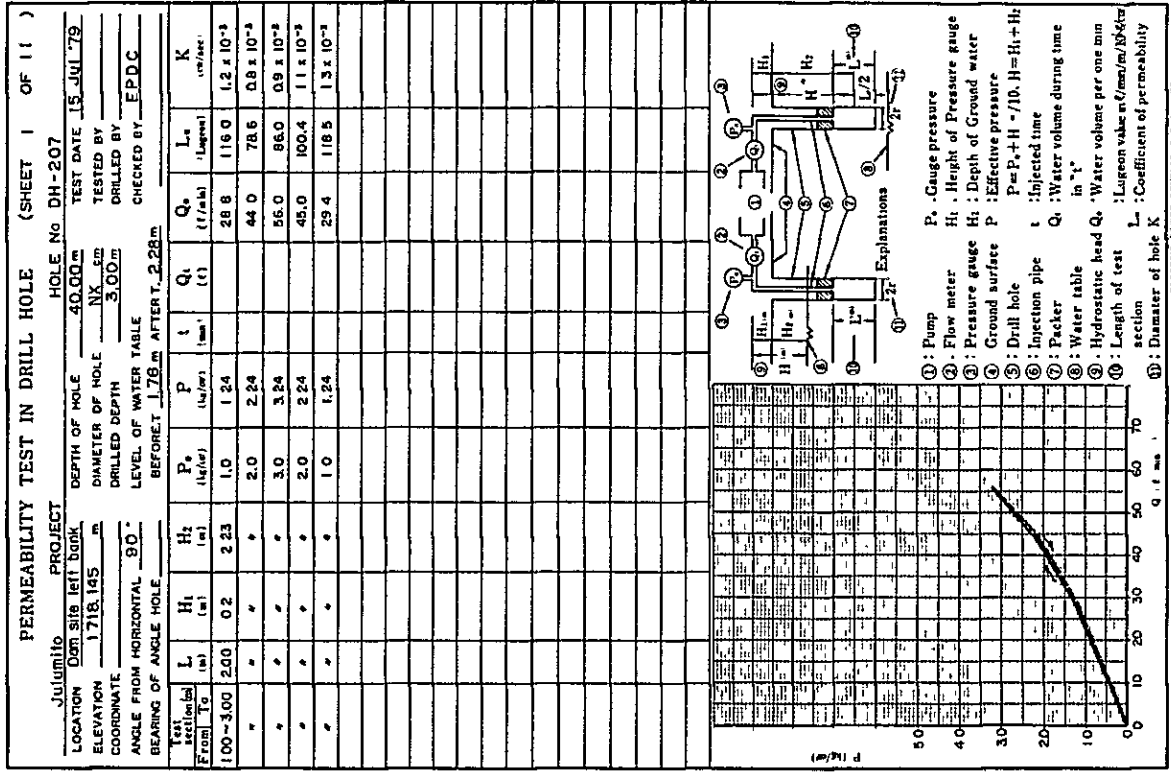
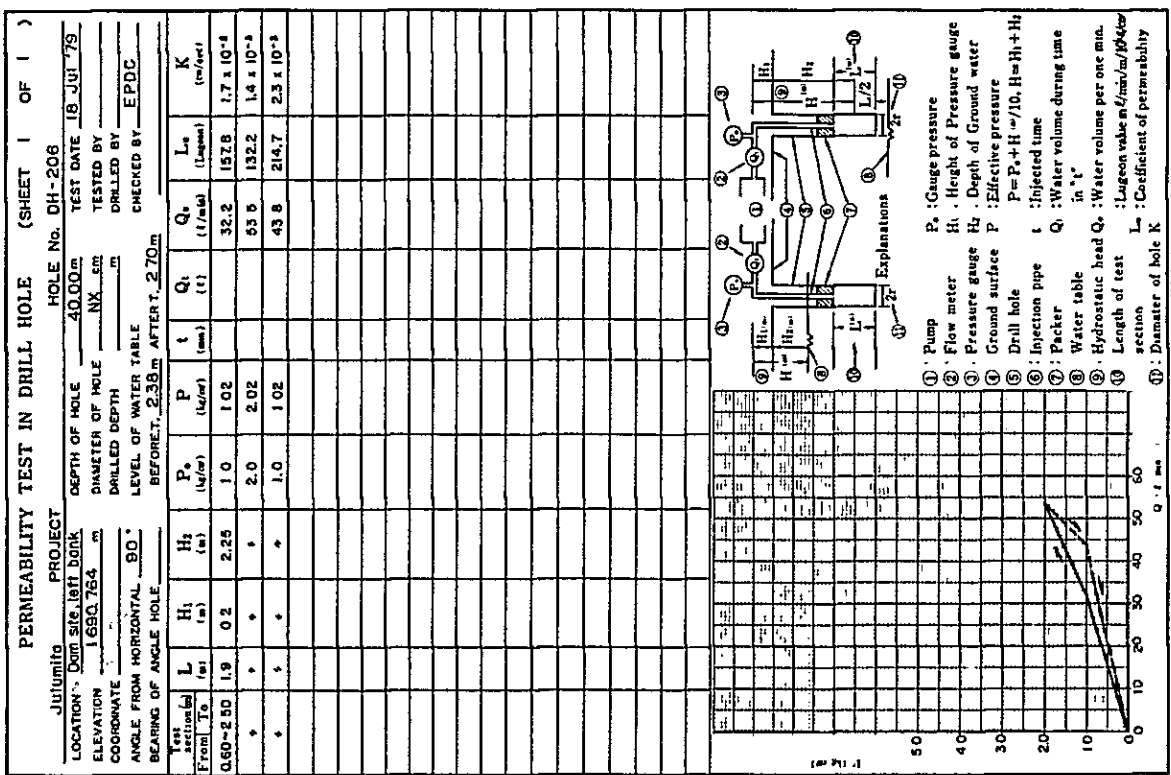
GEOLOGIC LOG OF DRILL HOLE

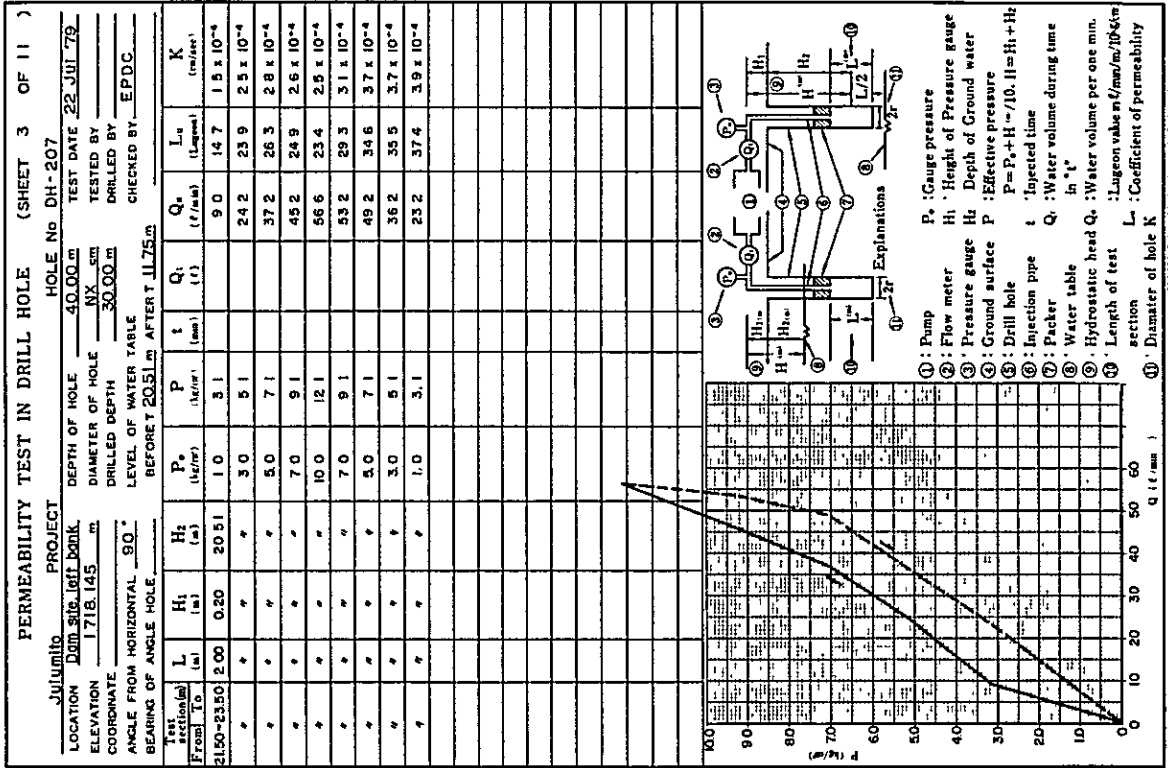
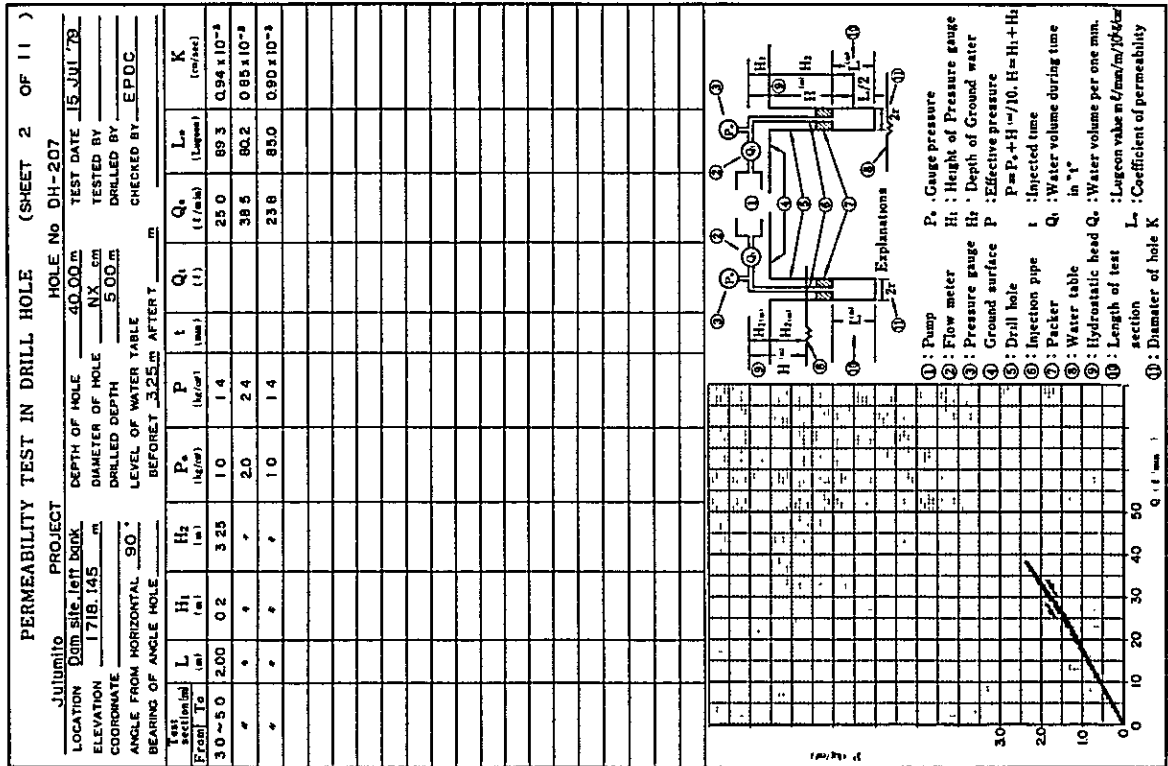
Julumito PROJECT HOLE No ODH-1 SHEET 3 of 5
 LOCATION Quarry site DEPTH OF HOLE 100.0 m COMMENCED 26-Jul-179
 ELEVATION 1730.197 m DEPTH OF OVERBURDEN 26.0 m COMPLETED 31-Aug-179
 COORDINATE _____ LENGTH OF ROCK DRILLING 74.0 m DRILLED BY _____
 ANGLE FROM HORIZONTAL 90° TOTAL LENGTH OF CORE _____ m LOGGED BY _____
 BEARING OF ANGLE HOLE _____ m CORE RECOVERY _____ m

DEPTH	ROCK NAME	LOG	CORE RECOVERY	CEMENTATION	COLOR	WEATHERING	HAZARD	CORE CUTTING	DESCRIPTION	WATER TABLE	ELEVATION
0-1	Weathered andesite	>									1730.197
1-2	Weathered andesite	>									
2-3	Weathered andesite	>									
3-4	Weathered andesite	>									
4-5	Weathered andesite	>									
5-6	Weathered andesite	>									
6-7	Weathered andesite	>									
7-8	Weathered andesite	>									
8-9	Weathered andesite	>									
9-10	Weathered andesite	>									
10-11	Weathered andesite	>									
11-12	Weathered andesite	>									
12-13	Weathered andesite	>									
13-14	Weathered andesite	>									
14-15	Weathered andesite	>									
15-16	Weathered andesite	>									
16-17	Weathered andesite	>									
17-18	Weathered andesite	>									
18-19	Weathered andesite	>									
19-20	Weathered andesite	>									
20-21	Weathered andesite	>									
21-22	Weathered andesite	>									
22-23	Weathered andesite	>									
23-24	Weathered andesite	>									
24-25	Weathered andesite	>									
25-26	Weathered andesite	>									
26-27	Weathered andesite	>									
27-28	Weathered andesite	>									
28-29	Weathered andesite	>									
29-30	Weathered andesite	>									
30-31	Weathered andesite	>									
31-32	Weathered andesite	>									
32-33	Weathered andesite	>									
33-34	Weathered andesite										

VII - 2 PERMEABILITY TEST IN DRILL HOLE

1. The first part of the document is a list of names and titles.

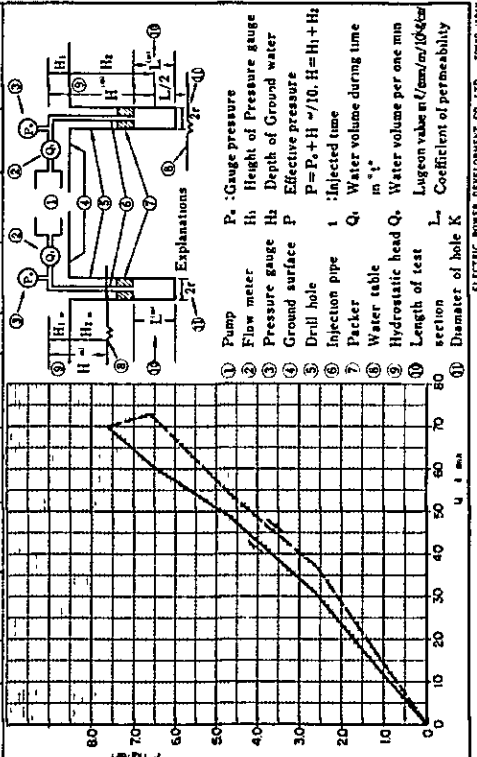




PERMEABILITY TEST IN DRILL HOLE (SHEET 4 OF 11)

Julumito PROJECT HOLE No. DH-207
 LOCATION Dom Sigs 1st Bank DEPTH OF HOLE 40.00 m TEST DATE 25 JUL 79
 ELEVATION 1718.145 m DIAMETER OF HOLE NX cm TESTED BY
 COORDINATE DRILLED DEPTH 40.00 m DRILLED BY
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE CHECKED BY EPDC
 BEARING OF ANGLE HOLE BEFORE 1649m

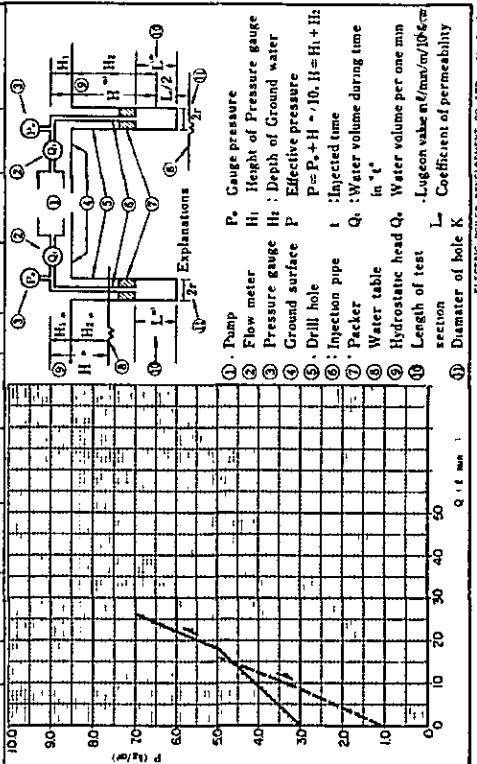
Test section From To	L (m)	H ₁ (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q ₁ (l)	Q ₂ (l/min)	L ₀ (m)	K (m/sec)
1	23.50-25.50	2.00	0.20	16.49	1.0	2.6	31.0	48.2	89.6	6.3 x 10 ⁻⁴
2				3.0	4.6			60.8	46.0	4.9 x 10 ⁻⁴
3				5.0	6.6			69.6	45.9	4.8 x 10 ⁻⁴
4				6.0	7.6			72.6	65.0	3.8 x 10 ⁻⁴
5				3.0	4.6			53.8	58.4	6.2 x 10 ⁻⁴
6				1.0	2.6			37.2	71.5	7.6 x 10 ⁻⁴

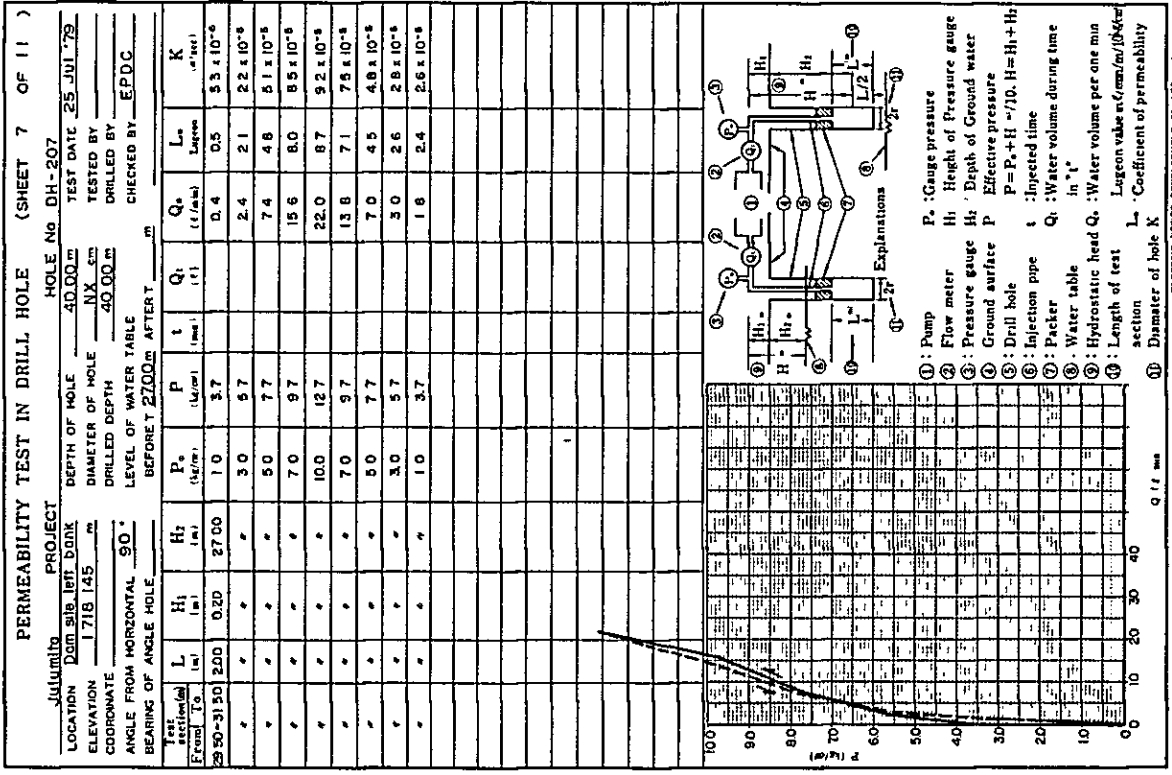
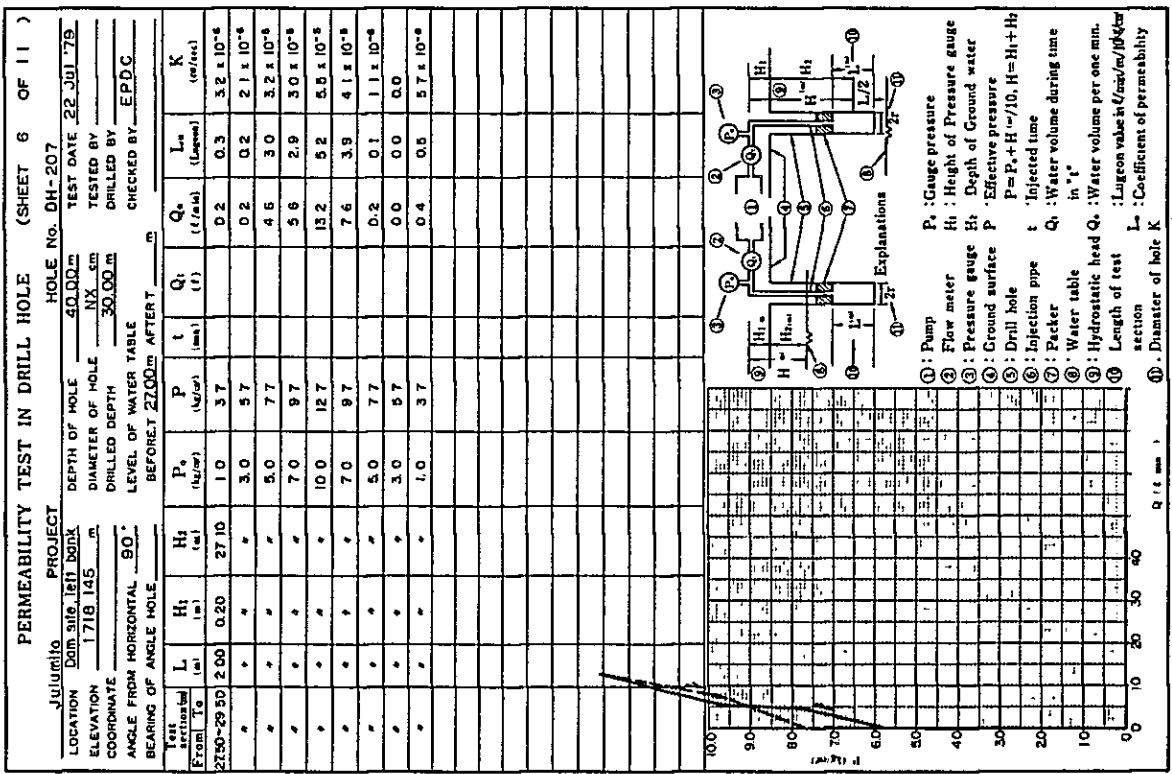


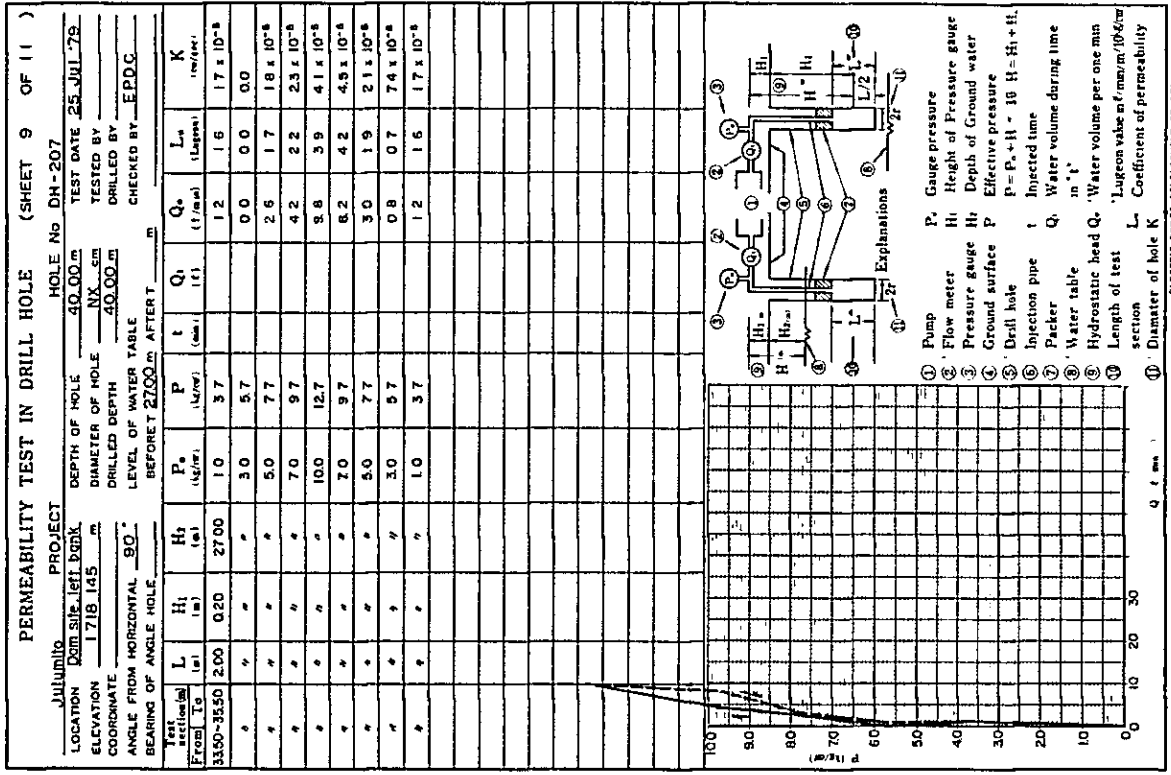
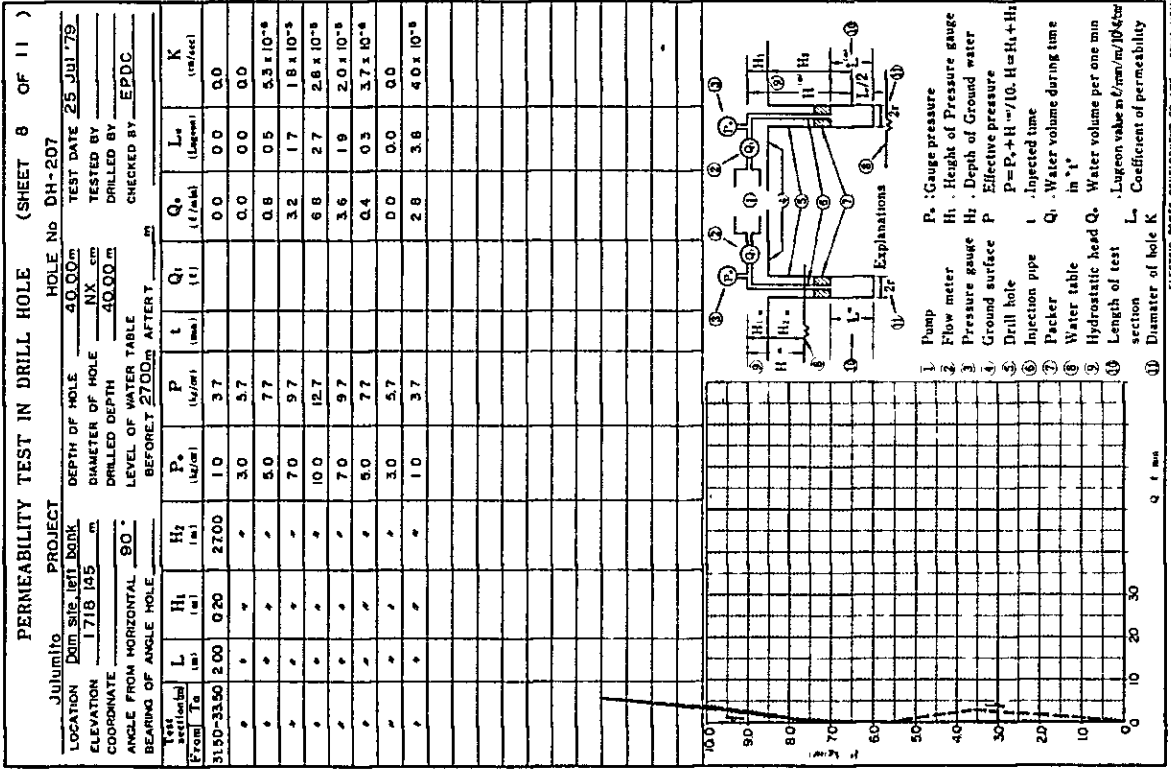
PERMEABILITY TEST IN DRILL HOLE (SHEET 5 OF 11)

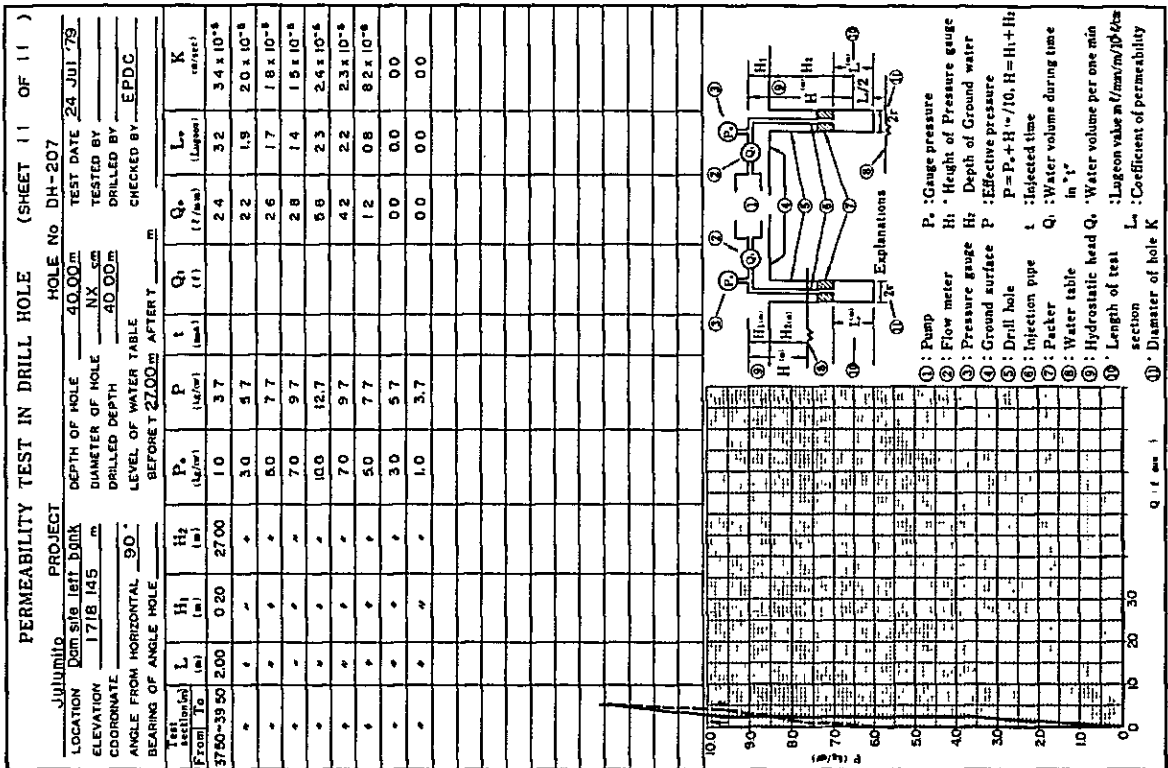
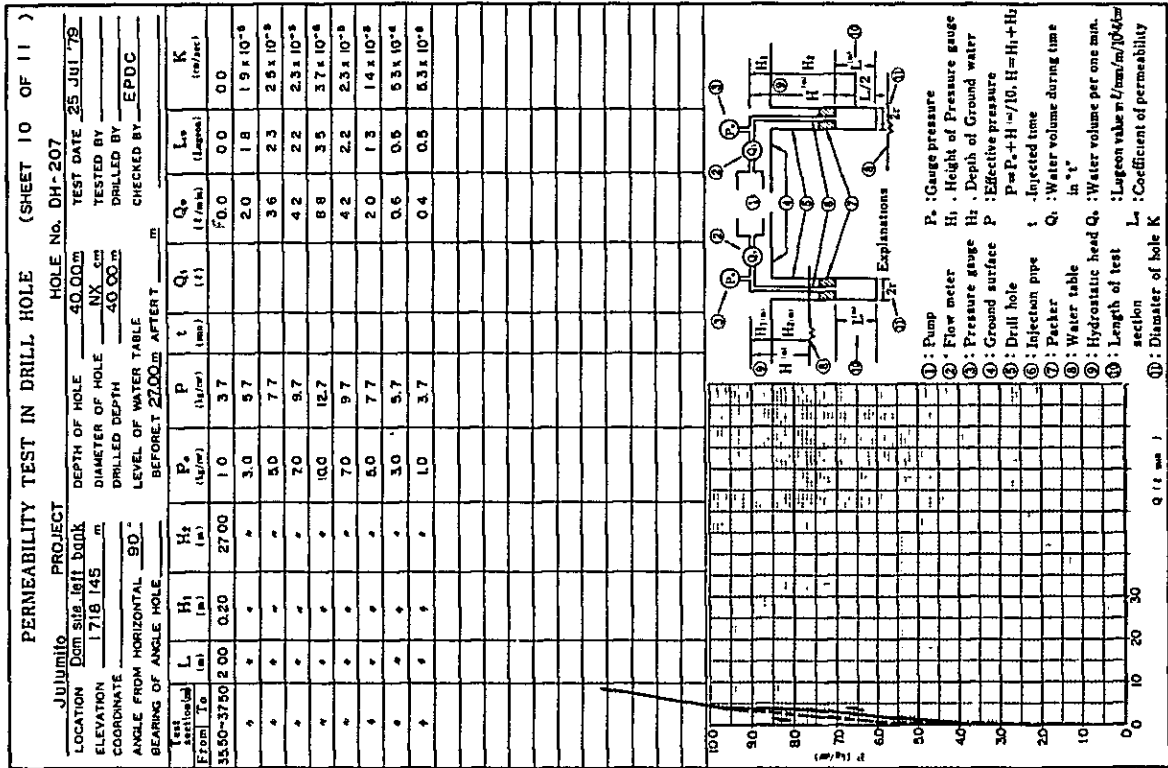
Julumito PROJECT HOLE No. DH-207
 LOCATION Dom Sigs 1st Bank DEPTH OF HOLE 40.00 m TEST DATE 22 JUL 79
 ELEVATION 1718.145 m DIAMETER OF HOLE NX cm TESTED BY
 COORDINATE DRILLED DEPTH 30.00 m DRILLED BY
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE CHECKED BY EPDC
 BEARING OF ANGLE HOLE BEFORE 015m AFTER 015m

Test section From To	L (m)	H ₁ (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q ₁ (l)	Q ₂ (l/min)	L ₀ (m)	K (m/sec)
1	25.50-27.50	2.00	0.15	1.0	1.0			0.2	1.0	1.1 x 10 ⁻⁸
2				3.0	3.0			0.0	0.0	0.0
3				5.0	5.0			18.2	18.2	1.9 x 10 ⁻⁴
4				7.0	7.0			26.0	18.6	2.0 x 10 ⁻⁴
5				10.0	10.0					
6				7.0	7.0					
7				5.0	5.0			15.8	15.8	1.7 x 10 ⁻⁴
8				3.0	3.0			9.0	15.0	1.6 x 10 ⁻⁴
9				1.0	1.0			0.0	0.0	0.0





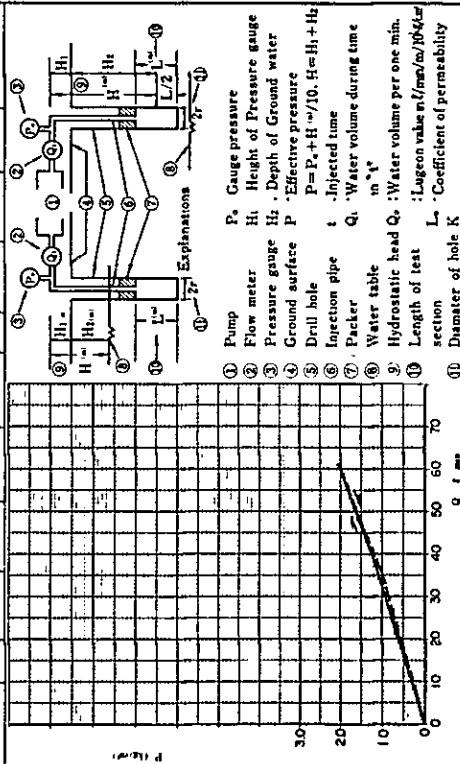




PERMEABILITY TEST IN DRILL HOLE (SHEET 1 OF 17)

JULUMITO PROJECT HOLE No. DH-208
 LOCATION Dam site right bank DEPTH OF HOLE 30.00 m TEST DATE 20 JUL 79
 ELEVATION 1 679 247 m DIAMETER OF HOLE NX 50 TESTED BY
 COORDINATE DRILLED DEPTH 3.00 m DRILLED BY
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE BEFORE 0.40 m AFTER 2.70 m CHECKED BY EPDC
 BEARING OF ANGLE HOLE

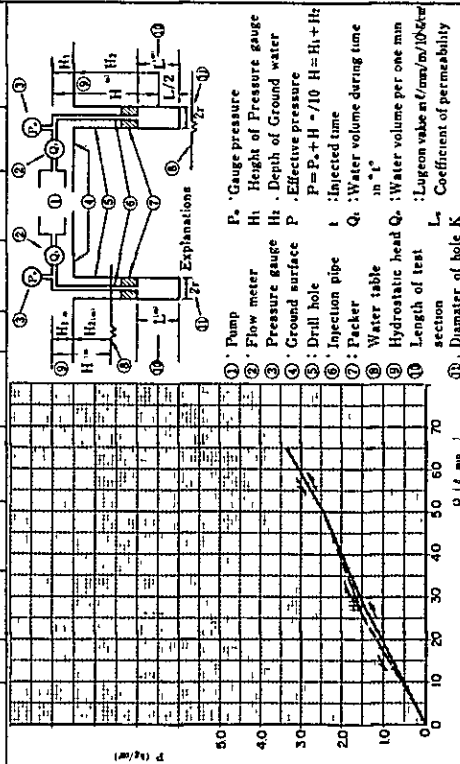
Test section (m)	L (m)	H ₁ (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q ₁ (l)	Q ₀ (l/min)	L ₀ (Laplace)	K (cm/sec)
From To	2.50 2.00	0.7	0.4	1.0	1.1	5	178	35.6	161.8	1.71 x 10 ⁻³
	+	+	+	2.0	2.1	5	310	62.0	147.6	1.56 x 10 ⁻³
	+	+	+	1.0	1.1	5	188	37.6	170.9	1.80 x 10 ⁻³



PERMEABILITY TEST IN DRILL HOLE (SHEET 2 OF 17)

JULUMITO PROJECT HOLE No. DH-208
 LOCATION Dam site right bank DEPTH OF HOLE 30.00 m TEST DATE 21 JUL 79
 ELEVATION 1 679 247 m DIAMETER OF HOLE NX 50 TESTED BY
 COORDINATE DRILLED DEPTH 3.00 m DRILLED BY
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE BEFORE 3.5 m AFTER 4.5 m CHECKED BY EPDC
 BEARING OF ANGLE HOLE

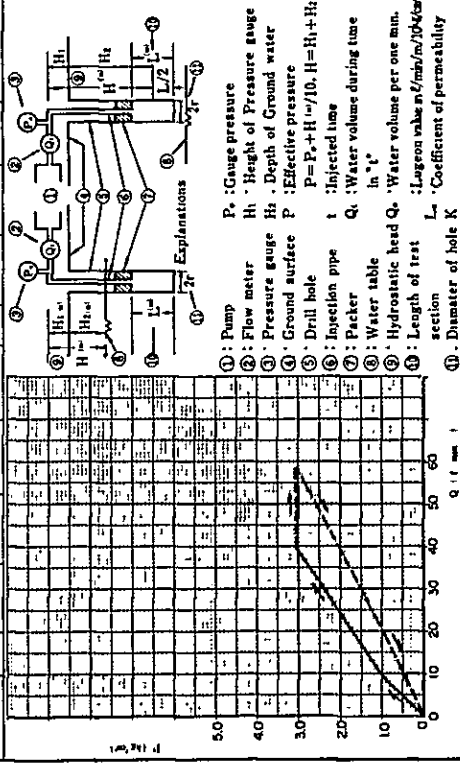
Test section (m)	L (m)	H ₁ (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q ₁ (l)	Q ₀ (l/min)	L ₀ (Laplace)	K (cm/sec)
From To	2.50 2.00	0	3.5	1.0	1.4	5	138	27.6	78.8	8.79 x 10 ⁻⁴
	+	+	+	2.0	2.4	5	283	50.6	84.3	9.37 x 10 ⁻⁴
	+	+	+	3.0	3.4	5	329	65.8	77.4	8.62 x 10 ⁻⁴
	+	+	+	2.0	2.4	5	254	50.8	84.6	9.46 x 10 ⁻⁴
	+	+	+	1.0	1.4	5	123	24.6	70.3	7.93 x 10 ⁻⁴



PERMEABILITY TEST IN DRILL HOLE (SHEET 3 OF 17)

JULIUMIHO PROJECT HOLE No. DH-208
 LOCATION 8200 SITE FIRM DONG DEPTH OF HOLE 30.00m TEST DATE 7 JUL 79
 ELEVATION 1579.247 m DIAMETER OF HOLE NX cm TESTED BY
 COORDINATE DRILLED DEPTH 8.50m
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE CHECKED BY EPDC
 BEARING OF ANGLE HOLE BEFORE 2.00m AFTER 2.00m

Test Section From To	L (m)	H ₁ (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q _i (l)	Q ₀ (l/min)	L ₀ (Lugon)	K (m/sec)
6.00-8.00	2.00	0	2.0	1	1.02	5	4.7	9.4	46.1	4.9 x 10 ⁻⁴
		*	*	3	3.02	5	20.2	40.4	66.9	7.06 x 10 ⁻⁴
		*	*	3	3.02	5	29.2	58.4	96.7	1.02 x 10 ⁻³
		*	*	1	1.02	5	10.5	21.0	102.9	1.09 x 10 ⁻³

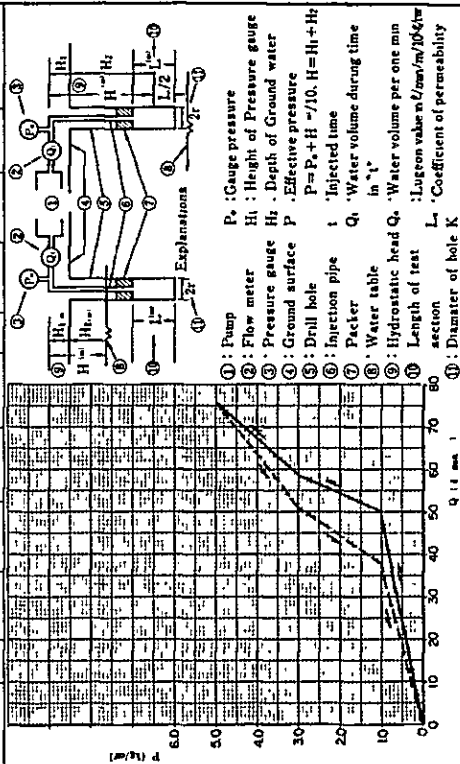


1: Pump P₀: Gauge pressure
 2: Flow meter H₁: Height of Pressure gauge
 3: Pressure gauge H₂: Depth of Ground water
 4: Ground surface P: Effective pressure
 5: Drill hole P = P₀ + H / 10, H = H₁ + H₂
 6: Injection pipe t: Injected time
 7: Packer Q_i: Water volume during time
 8: Water table in "t"
 9: Hydrostatic head Q₀: Water volume per one min.
 10: Length of test Lugon value m³/m³/m³/day
 11: Diameter of hole K: Coefficient of permeability

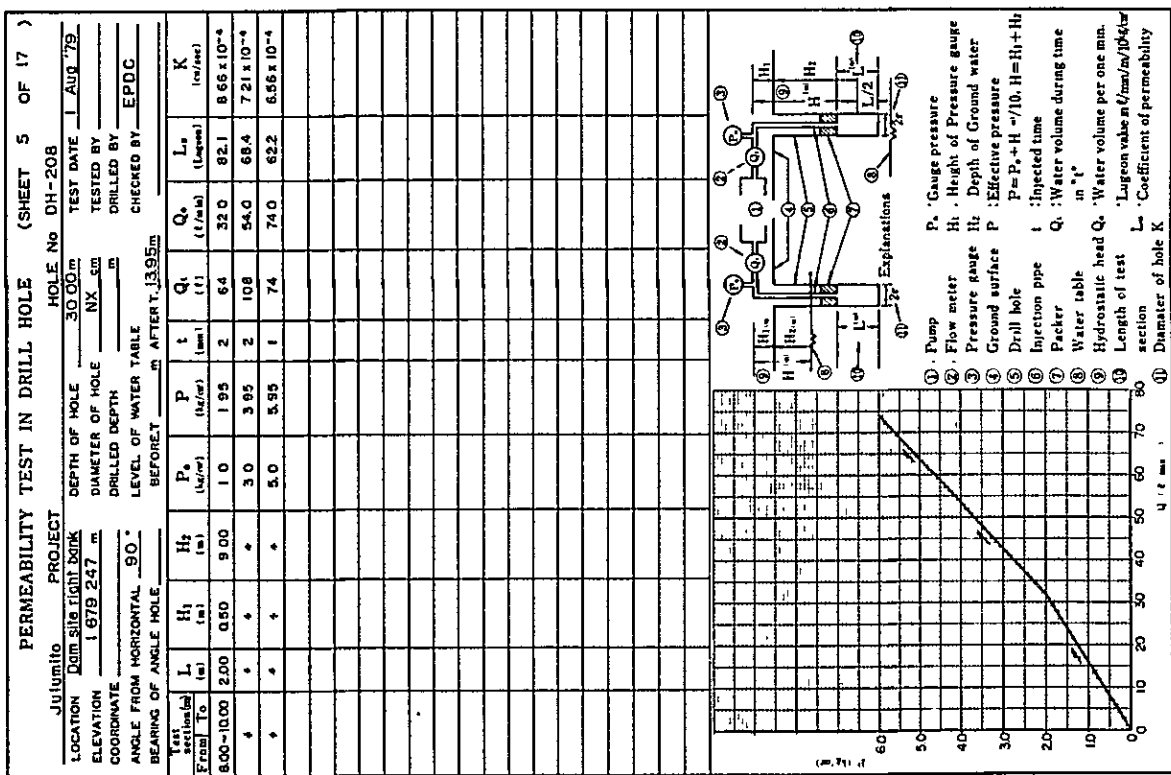
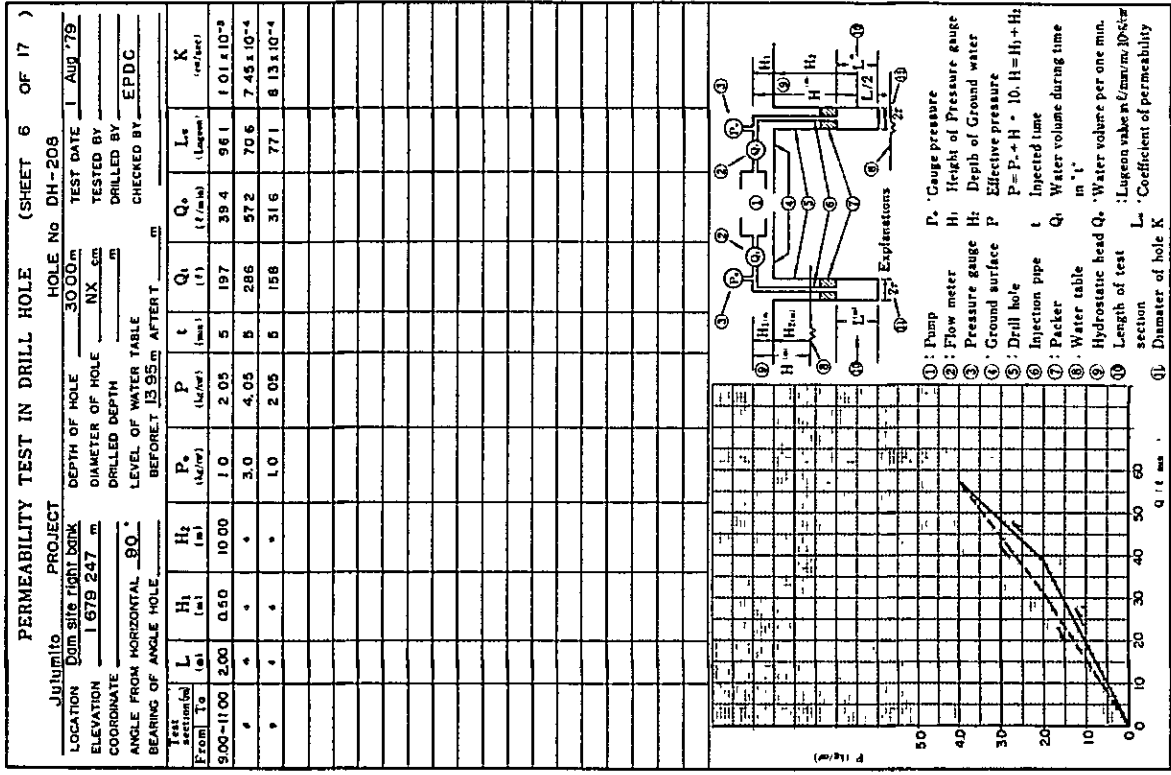
PERMEABILITY TEST IN DRILL HOLE (SHEET 4 OF 17)

JULIUMIHO PROJECT HOLE No. DH-208
 LOCATION 8200 SITE FIRM DONG DEPTH OF HOLE 30.00m TEST DATE 24 JUN 79
 ELEVATION 1579.247 m DIAMETER OF HOLE NX cm TESTED BY
 COORDINATE DRILLED DEPTH 9.00m
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE CHECKED BY EPDC
 BEARING OF ANGLE HOLE BEFORE 3.35m AFTER 3.35m

Test Section From To	L (m)	H ₁ (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q _i (l)	Q ₀ (l/min)	L ₀ (Lugon)	K (m/sec)
7.00-9.00	2.00	0	3.35	1.0	1.03	5	2.52	50.4	244.7	2.98 x 10 ⁻³
		*	*	3.0	3.03	5	29.5	59.0	97.4	1.03 x 10 ⁻³
		*	*	5.0	5.03	5	38.2	76.4	75.9	8.02 x 10 ⁻⁴
		*	*	3.0	3.03	5	2.55	51.0	84.6	8.88 x 10 ⁻⁴
		*	*	1.0	1.03	5	1.92	36.4	186.4	1.97 x 10 ⁻³



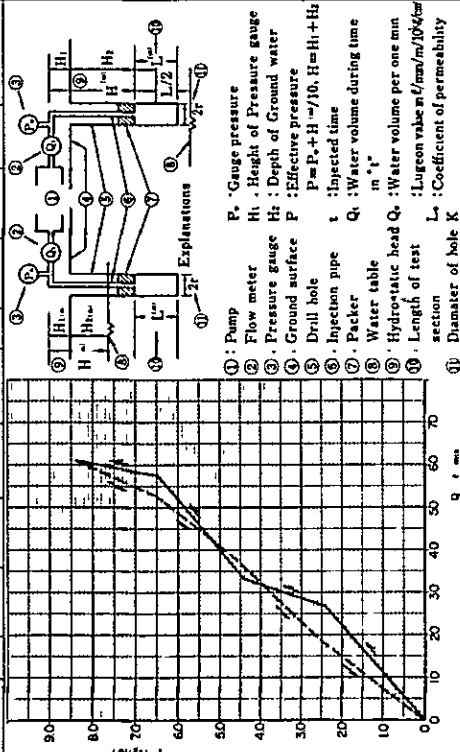
1: Pump P₀: Gauge pressure
 2: Flow meter H₁: Height of Pressure gauge
 3: Pressure gauge H₂: Depth of Ground water
 4: Ground surface P: Effective pressure
 5: Drill hole P = P₀ + H / 10, H = H₁ + H₂
 6: Injection pipe t: Injected time
 7: Packer Q_i: Water volume during time
 8: Water table in "t"
 9: Hydrostatic head Q₀: Water volume per one min.
 10: Length of test Lugon value m³/m³/m³/day
 11: Diameter of hole K: Coefficient of permeability



PERMEABILITY TEST IN DRILL HOLE (SHEET 9 OF 17)

JULIUMITO PROJECT HOLE No. DH-208
 LOCATION DDM SINGHRI BUNK DEPTH OF HOLE 30.00m TEST DATE 1 AUG 79
 ELEVATION 1679.247 m NX cm TESTED BY
 COORDINATE DRILLED DEPTH m
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE BEFORE 13.95m AFTER 13.95m CHECKED BY EPDC
 BEARING OF ANGLE HOLE

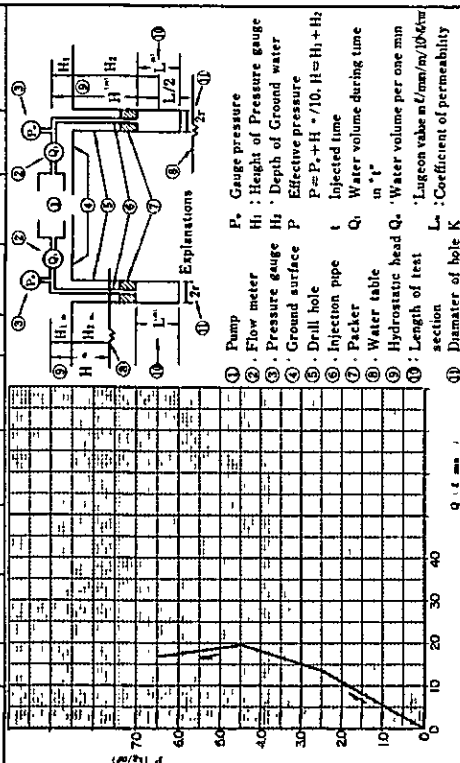
Test section From To	L (m)	H ₁ (m)	H ₂ (m)	P _e (kg/cm ²)	P (kg/cm ²)	t (min)	Q _i (l)	Q _e (l/min)	L _a (logues)	K (cm/sec)
16.00-18.00	2.00	0.50	13.95	1.0	2.45	5	13.5	27.0	5.51	5.82 x 10 ⁻⁴
	*	*	*	3.0	4.45	5	16.7	33.4	37.5	3.96 x 10 ⁻⁴
	*	*	*	5.0	6.45	5	28.7	57.4	44.5	4.70 x 10 ⁻⁴
	*	*	*	7.0	8.45	5	30.4	60.8	36.0	3.80 x 10 ⁻⁴
	*	*	*	5.0	6.45	5	26.2	52.4	40.6	4.28 x 10 ⁻⁴
	*	*	*	3.0	4.45	5	18.3	36.6	41.1	4.34 x 10 ⁻⁴
	*	*	*	1.0	2.45	5	9.0	18.0	36.7	3.87 x 10 ⁻⁴

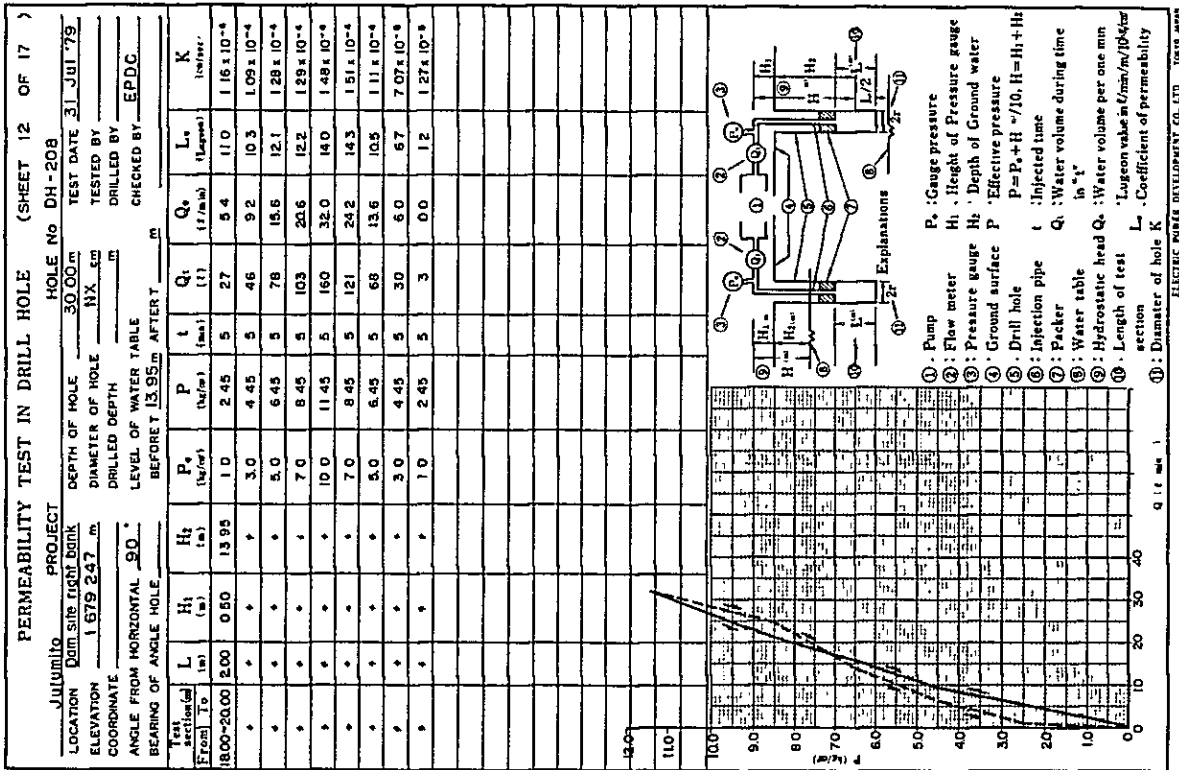
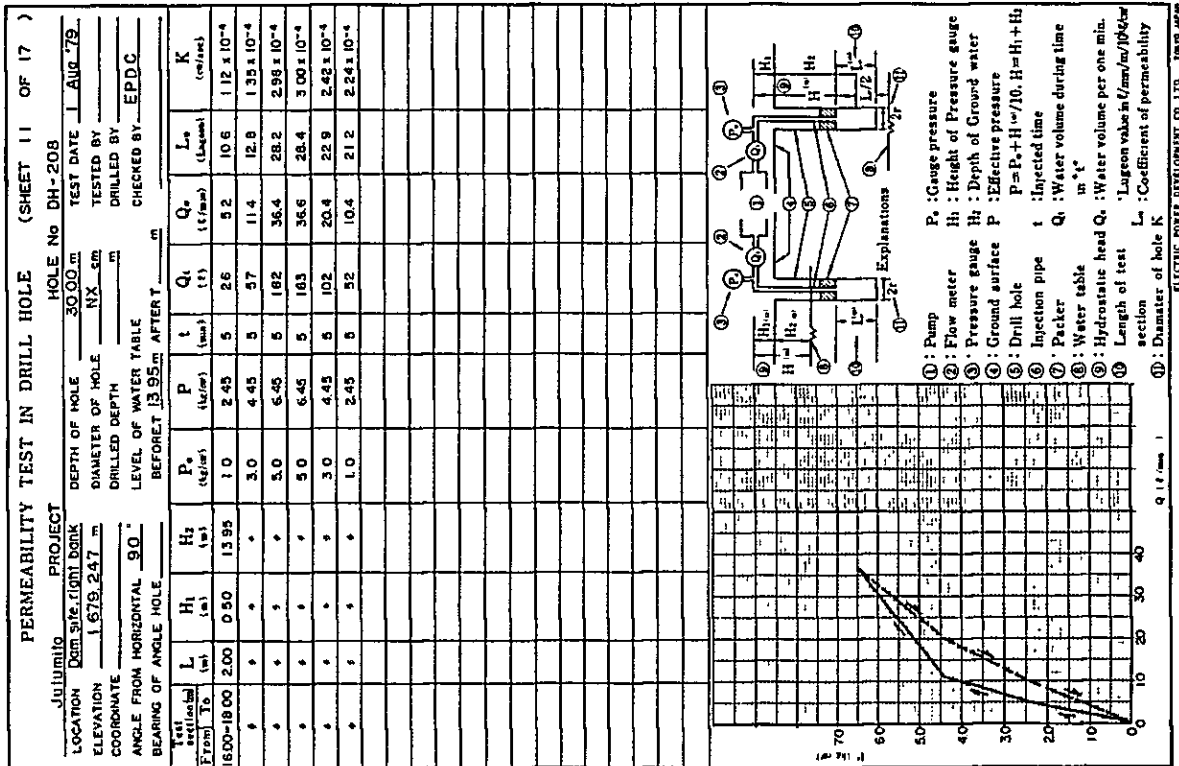


PERMEABILITY TEST IN DRILL HOLE (SHEET 10 OF 17)

JULIUMITO PROJECT HOLE No. DH-208
 LOCATION DDM SINGHRI BUNK DEPTH OF HOLE 30.00m TEST DATE 31 JUL 79
 ELEVATION 1679.247 m NX cm TESTED BY
 COORDINATE DRILLED DEPTH m
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE BEFORE 13.95m AFTER 13.95m CHECKED BY EPDC
 BEARING OF ANGLE HOLE

Test section From To	L (m)	H ₁ (m)	H ₂ (m)	P _e (kg/cm ²)	P (kg/cm ²)	t (min)	Q _i (l)	Q _e (l/min)	L _a (logues)	K (cm/sec)
16.00-18.00	2.00	0.50	13.95	1.0	2.45	5	6.9	13.8	28.2	2.98 x 10 ⁻⁴
	*	*	*	3.0	4.45	5	9.8	19.6	22.0	2.32 x 10 ⁻⁴
	*	*	*	5.0	6.45	1	17.0	13.2	1.39 x 10 ⁻⁴	

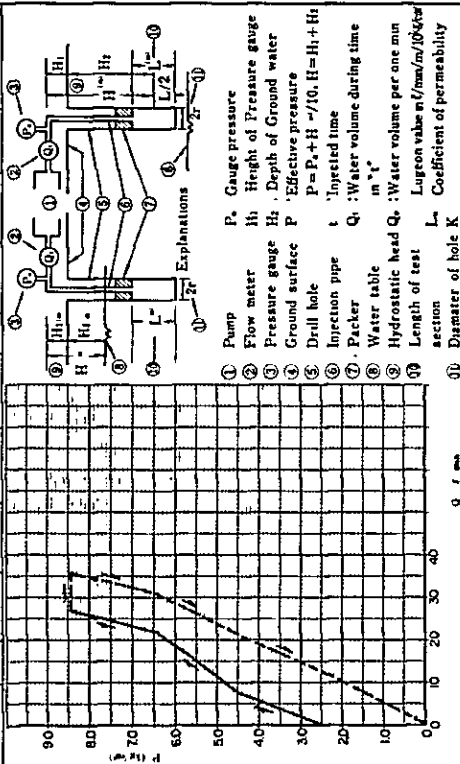




PERMEABILITY TEST IN DRILL HOLE (SHEET 13 OF 17)

Jujumilo PROJECT HOLE No. DH-208
 LOCATION Don Sib. Light Bank DEPTH OF HOLE 30.00 m TEST DATE 31 JUL '79
 ELEVATION 1679 247 m DIAMETER OF HOLE NX 50 TESTED BY
 COORDINATE DRILLED DEPTH
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE
 BEARING OF ANGLE HOLE BEFORE 13.95 m AFTER 13.95 m CHECKED BY EPDC

Test section From To	L (m)	H ₁ (m)	H ₂ (m)	P ₁ (kg/cm ²)	P (kg/cm ²)	t (min)	Q ₁ (l)	Q ₂ (l/min)	L ₀ (Lapson)	K (cm/sec)
20.00-22.00	2.00	0.50	13.95	1.0	2.45	5	0	0	0	0.0
	*	*	*	3.0	4.45	5	3.6	6.1	0.55 x 10 ⁻⁴	
	*	*	*	5.0	6.45	5	10.8	21.6	16.7	1.66 x 10 ⁻⁴
	*	*	*	7.0	8.45	5	13.3	26.5	15.7	1.66 x 10 ⁻⁴
	*	*	*	7.0	8.45	5	17.7	35.4	20.9	2.21 x 10 ⁻⁴
	*	*	*	5.0	6.45	5	15.3	30.6	23.7	2.50 x 10 ⁻⁴
	*	*	*	3.0	4.45	5	10.3	20.6	23.1	2.44 x 10 ⁻⁴
	*	*	*	1.0	2.45	5	6.4	12.8	26.1	2.75 x 10 ⁻⁴

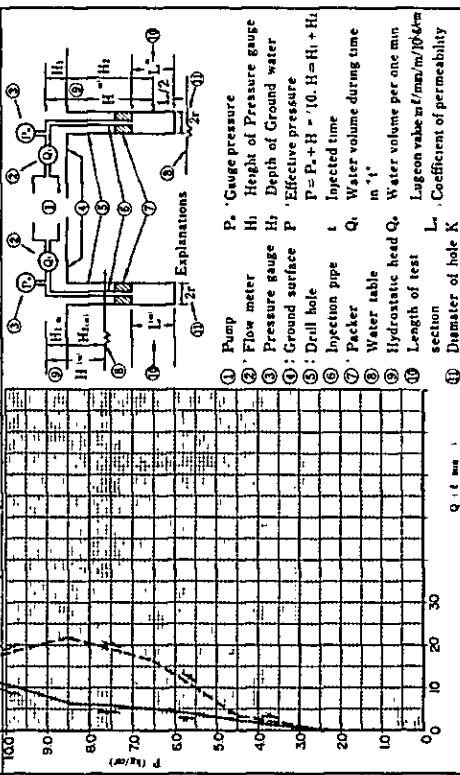


1 Pump
 2 Flow meter
 3 Pressure gauge
 4 Pressure gauge
 5 Ground surface
 6 Drill hole
 7 Injection pipe
 8 Packer
 9 Water table
 10 Hydrostatic head
 11 Length of test section
 12 Diameter of hole
 13 Gauge pressure
 14 Height of Pressure gauge
 15 Depth of Ground water
 16 Effective pressure
 $P = P_0 + H = \rho \cdot g \cdot (H_1 + H_2)$
 17 Injected time
 18 Water volume during time
 19 Water volume per one min
 20 Logon value $m^3/m/m/10^6 \text{ cm}^2 \text{ sec}$
 21 Coefficient of permeability

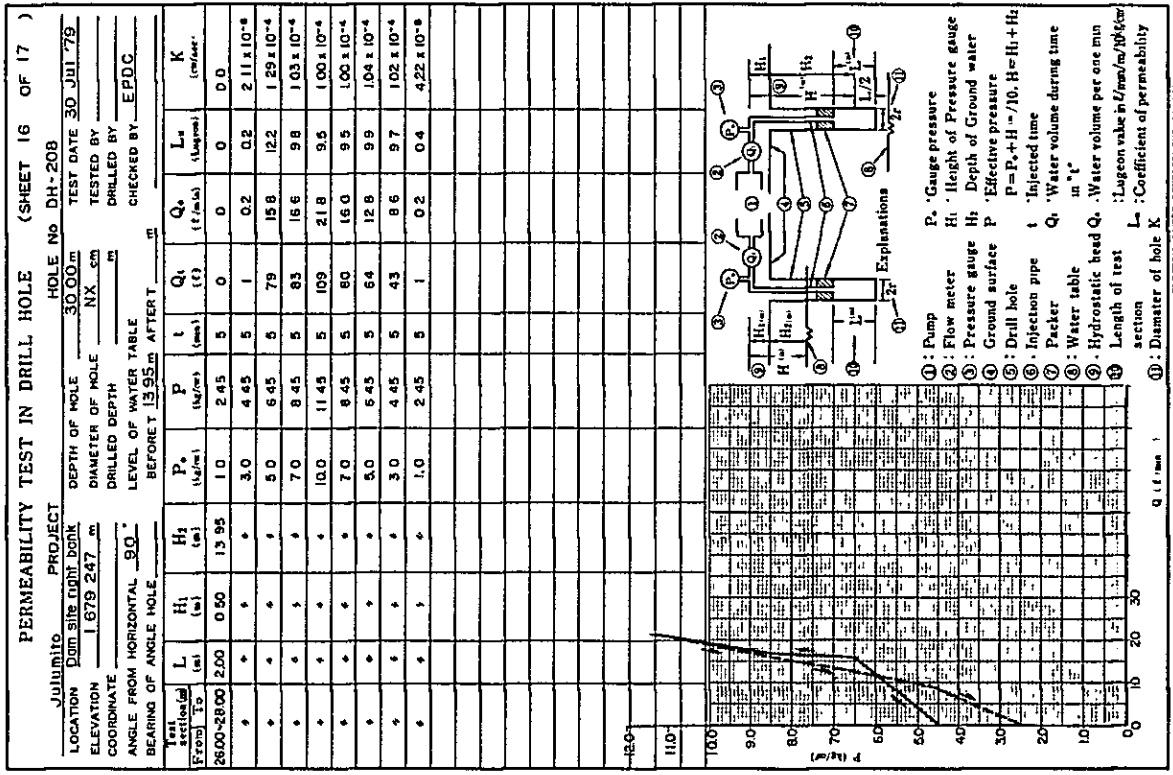
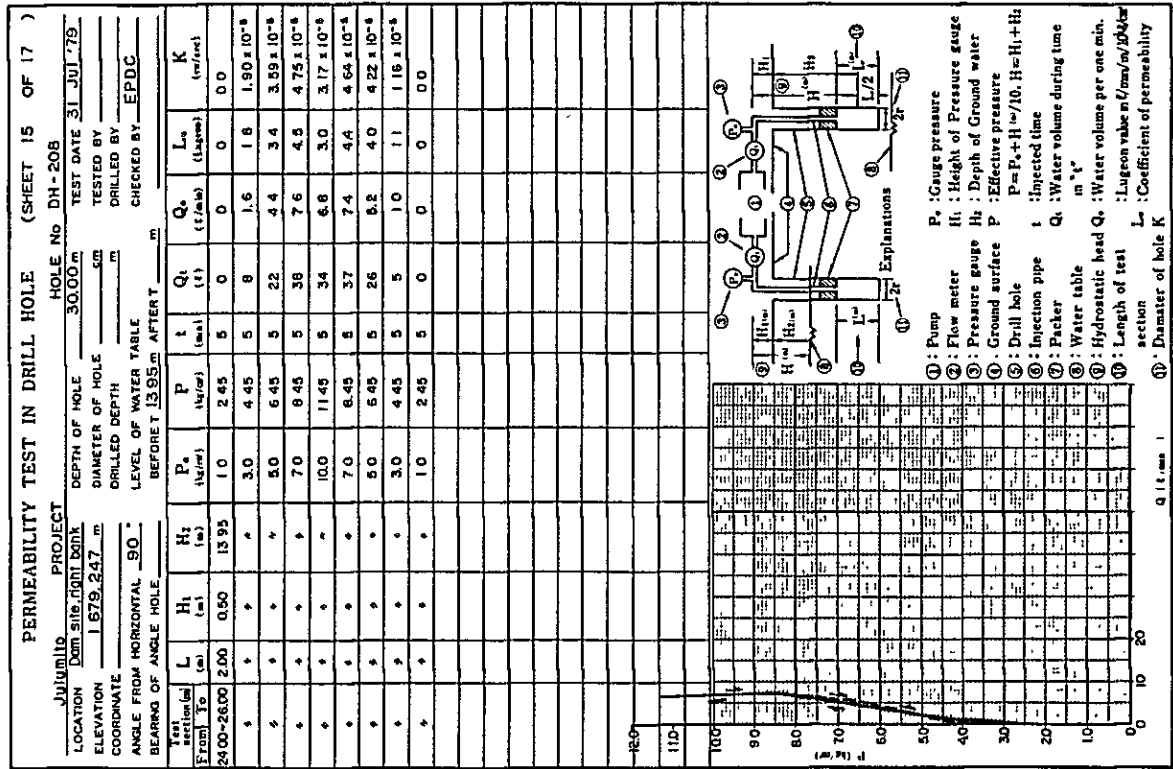
PERMEABILITY TEST IN DRILL HOLE (SHEET 14 OF 17)

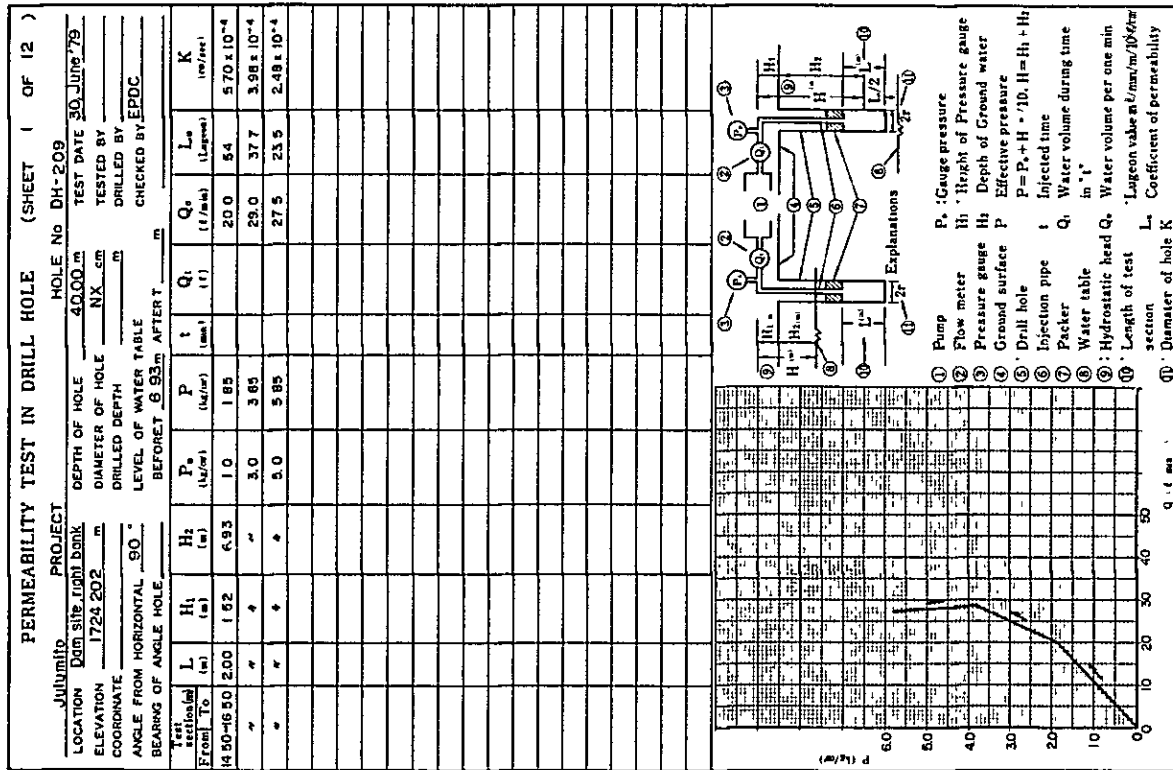
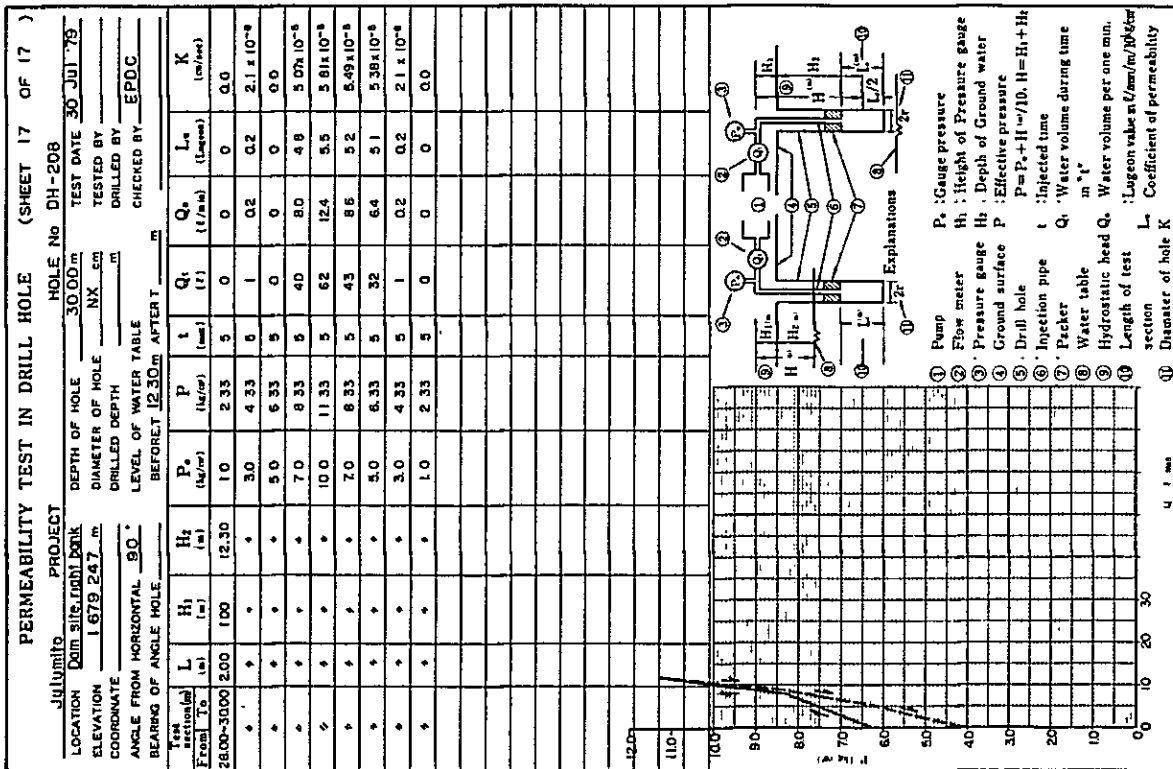
Jujumilo PROJECT HOLE No. DH-208
 LOCATION Don Sib. Light Bank DEPTH OF HOLE 30.00 m TEST DATE 31 JUL '79
 ELEVATION 1679 247 m DIAMETER OF HOLE NX 50 TESTED BY
 COORDINATE DRILLED DEPTH
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE
 BEARING OF ANGLE HOLE BEFORE 13.95 m AFTER 13.95 m CHECKED BY EPDC

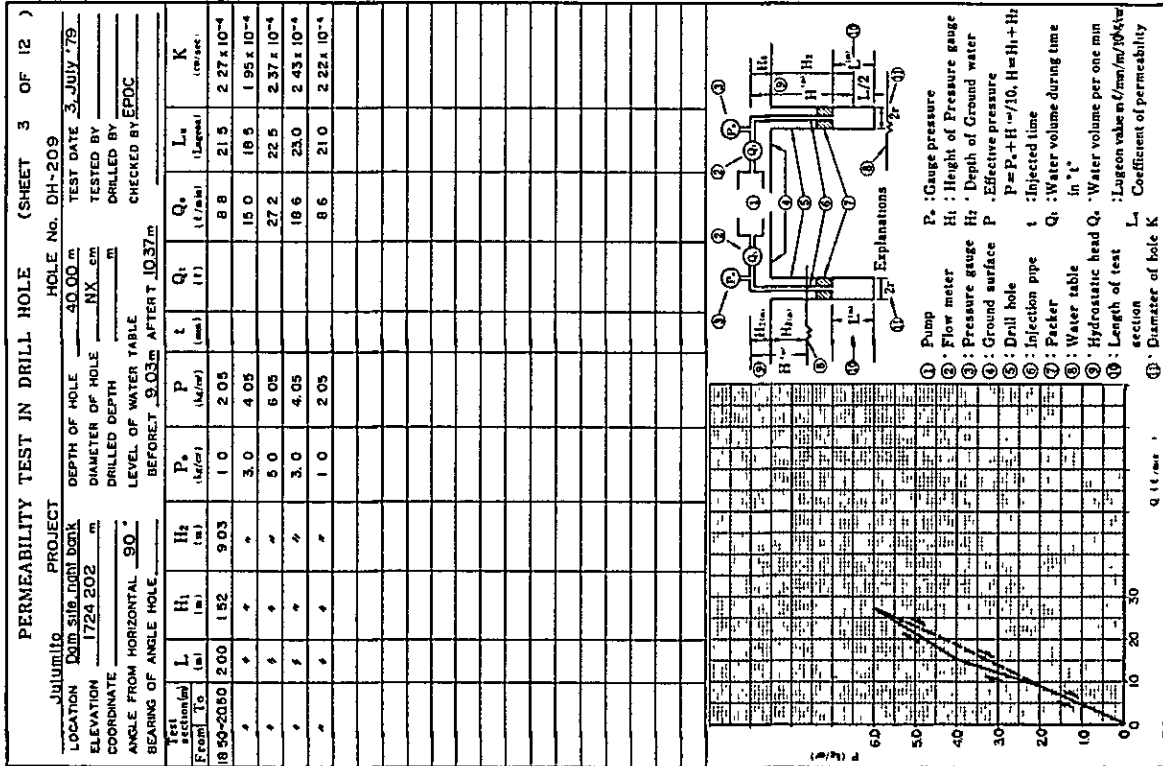
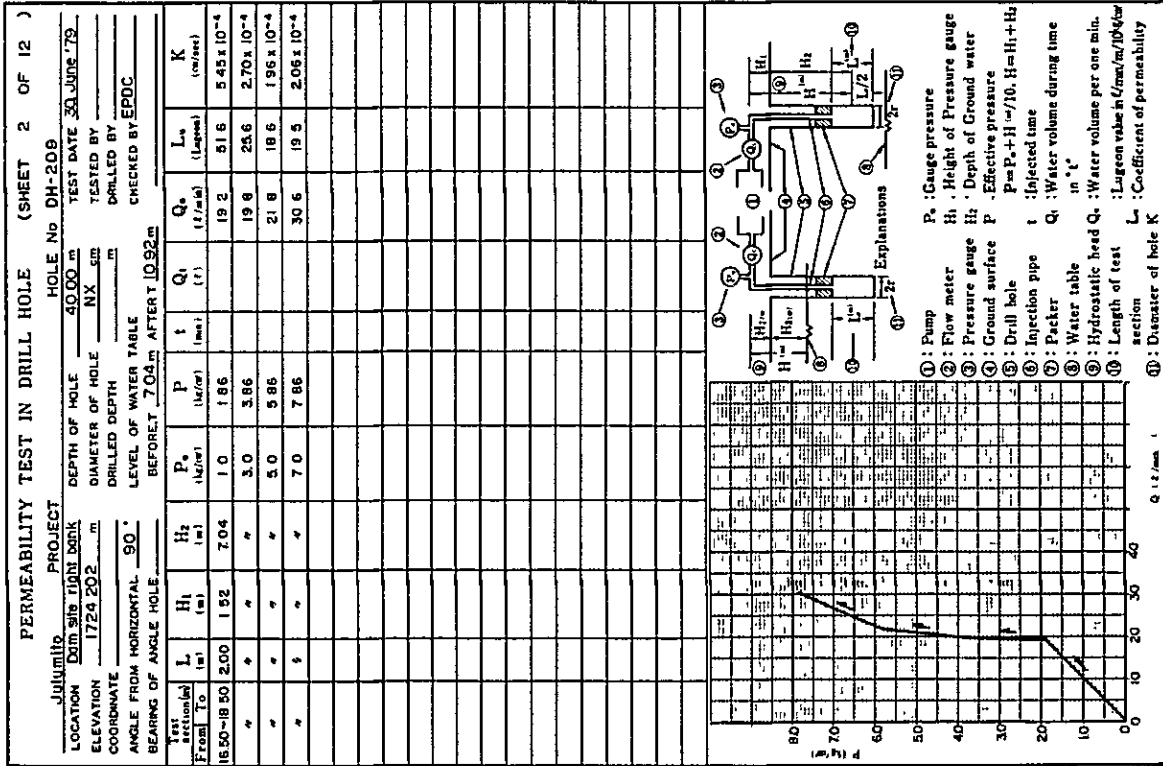
Test section From To	L (m)	H ₁ (m)	H ₂ (m)	P ₁ (kg/cm ²)	P (kg/cm ²)	t (min)	Q ₁ (l)	Q ₂ (l/min)	L ₀ (Lapson)	K (cm/sec)
22.00-24.00	2.00	0.50	13.95	1.0	2.45	5	0	0	0	0.0
	*	*	*	3.0	4.45	5	1.2	2.4	2.7	2.85 x 10 ⁻⁴
	*	*	*	5.0	6.45	5	2.5	5.0	3.9	4.12 x 10 ⁻⁴
	*	*	*	7.0	8.45	5	3.2	6.4	3.8	4.01 x 10 ⁻⁴
	*	*	*	10.0	11.45	5	7.3	14.6	6.4	6.76 x 10 ⁻⁴
	*	*	*	7.0	8.45	5	10.7	21.4	12.7	1.34 x 10 ⁻⁴
	*	*	*	5.0	6.45	5	8.0	16.0	12.4	1.31 x 10 ⁻⁴
	*	*	*	3.0	4.45	5	1.8	3.6	4.0	4.22 x 10 ⁻⁴
	*	*	*	1.0	2.45	5	2	0.4	0.8	8.44 x 10 ⁻⁴

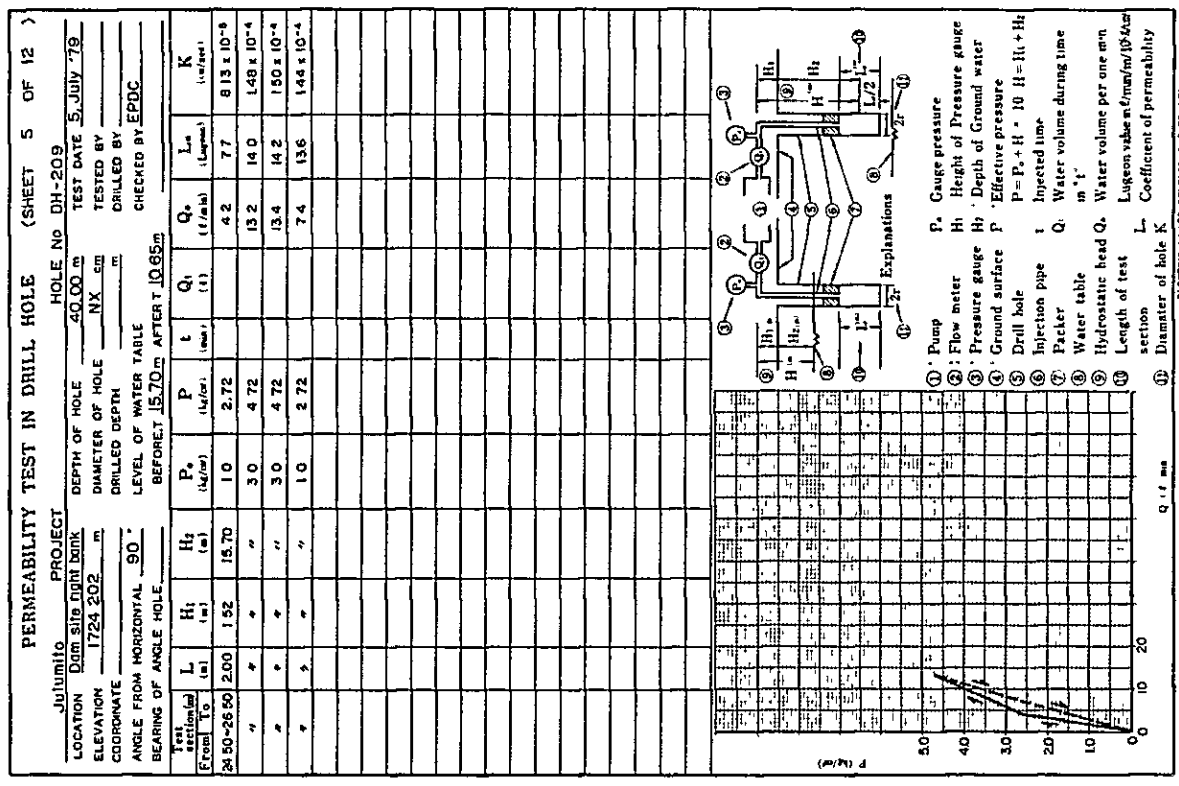
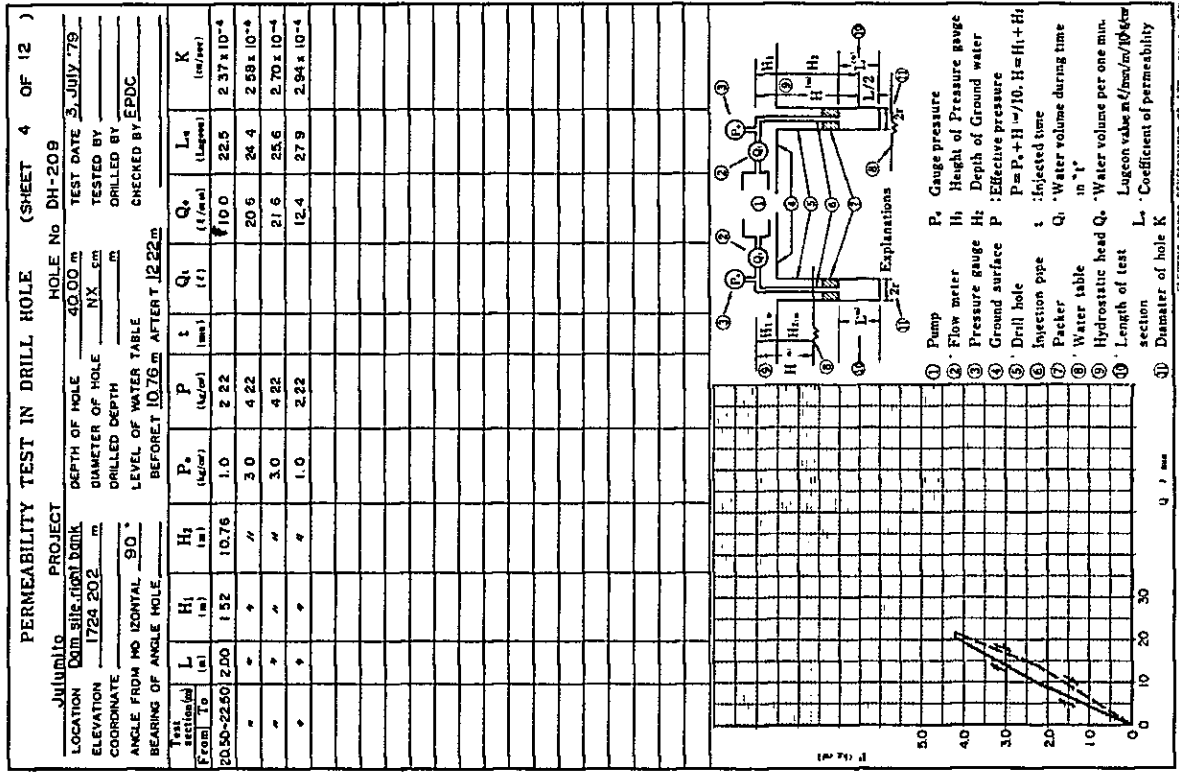


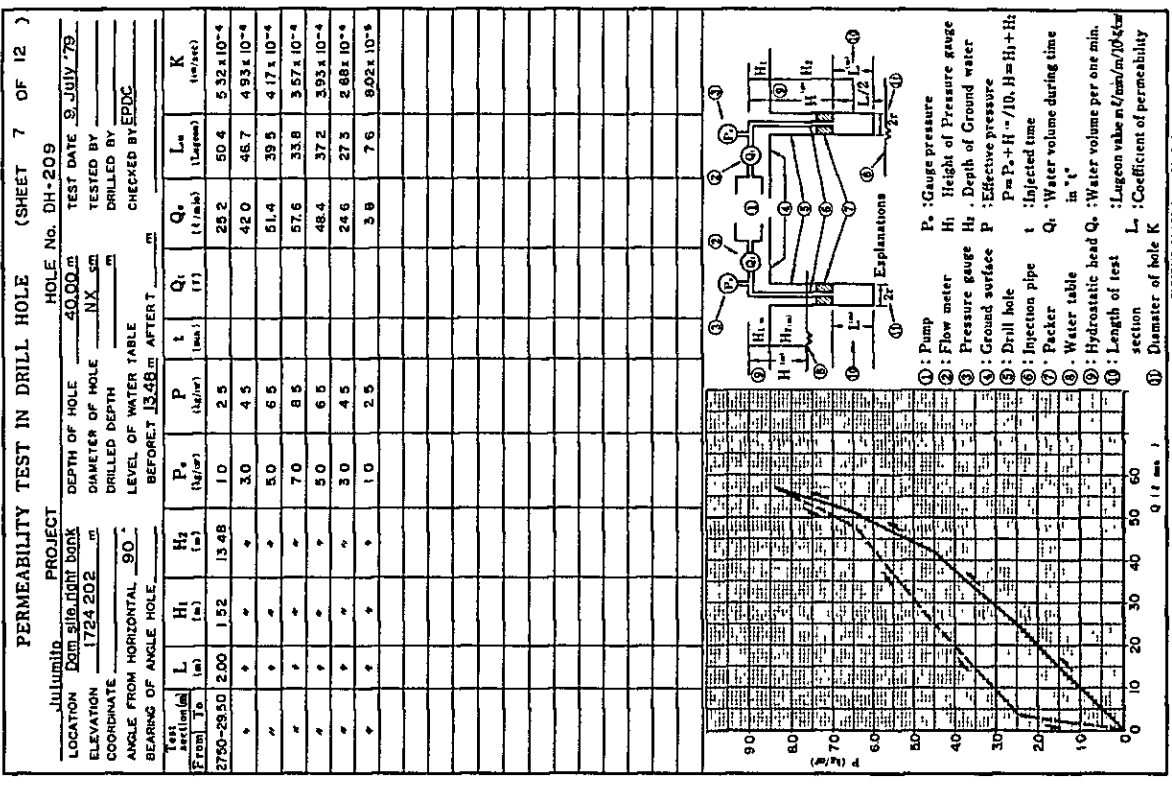
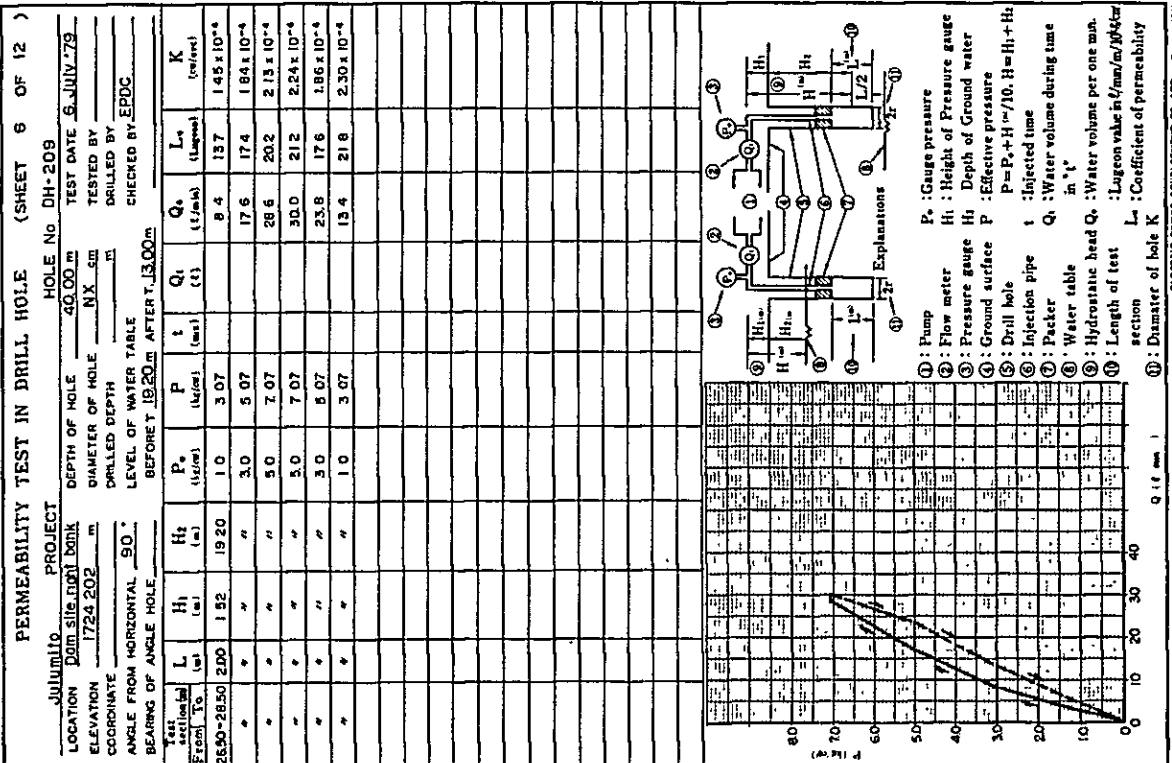
1 Pump
 2 Flow meter
 3 Pressure gauge
 4 Pressure gauge
 5 Ground surface
 6 Drill hole
 7 Injection pipe
 8 Packer
 9 Water table
 10 Hydrostatic head
 11 Length of test section
 12 Diameter of hole
 13 Gauge pressure
 14 Height of Pressure gauge
 15 Depth of Ground water
 16 Effective pressure
 $P = P_0 + H = \rho \cdot g \cdot (H_1 + H_2)$
 17 Injected time
 18 Water volume during time
 19 Water volume per one min
 20 Logon value $m^3/m/m/10^6 \text{ cm}^2 \text{ sec}$
 21 Coefficient of permeability

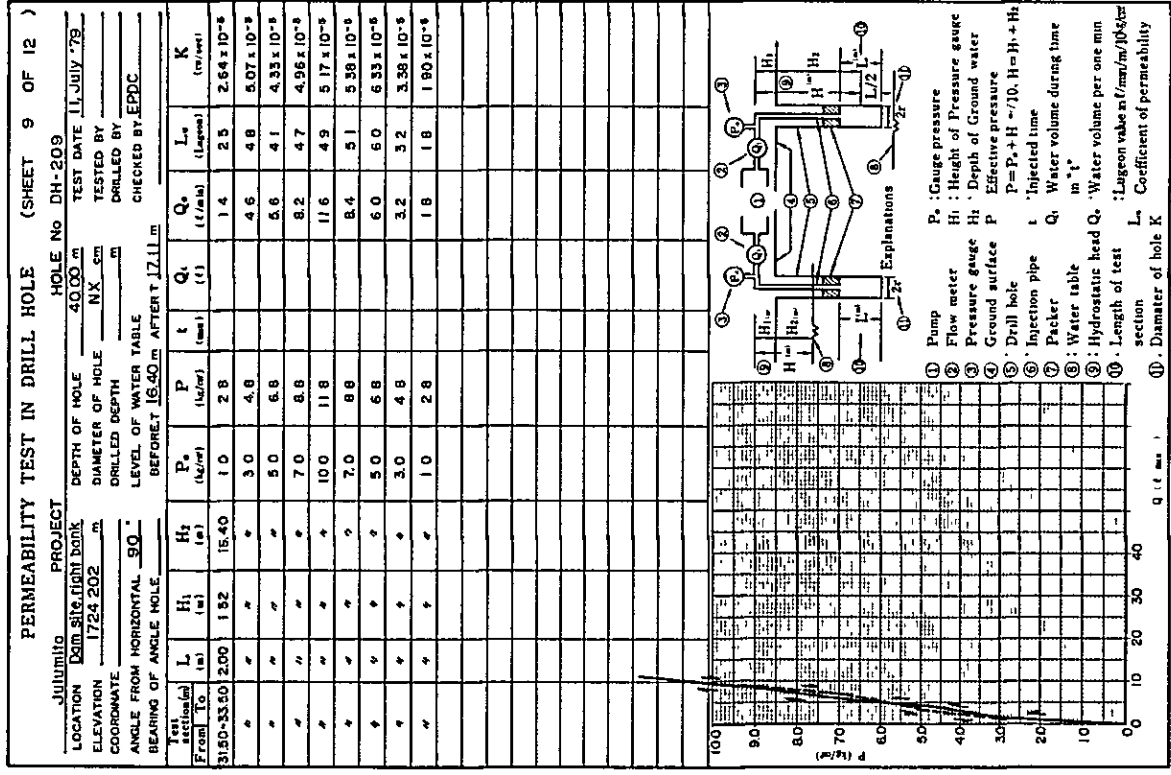
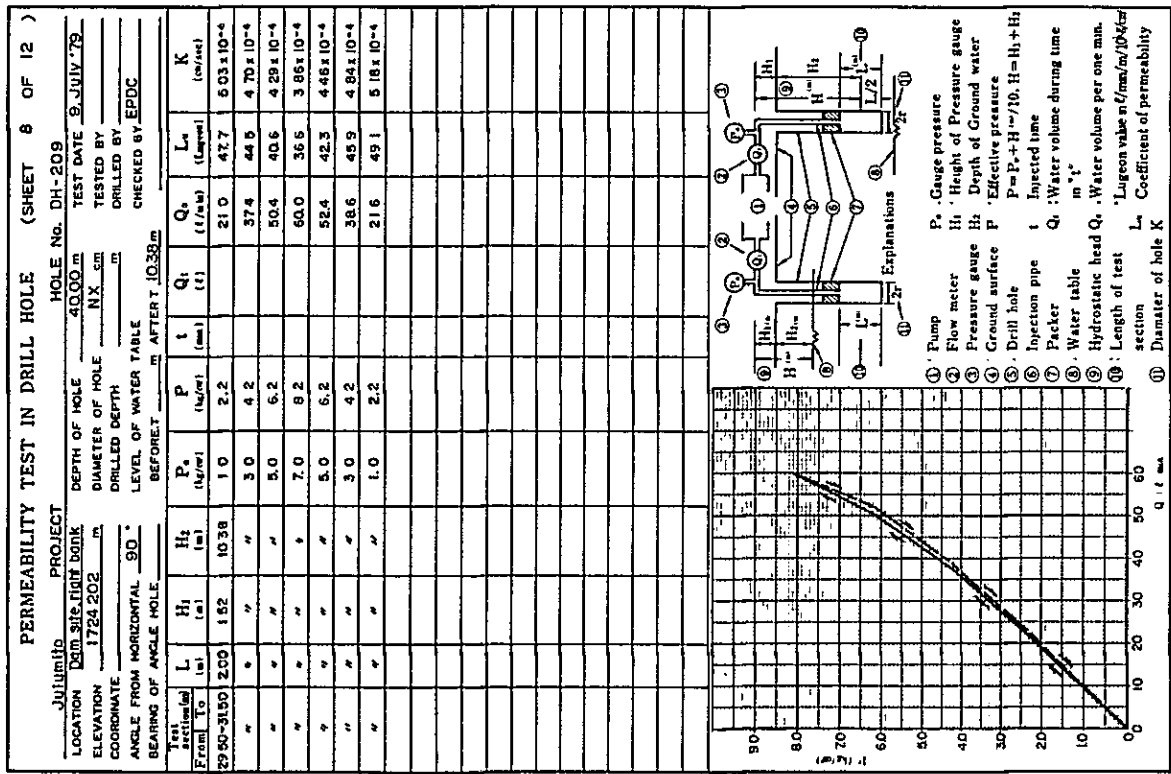








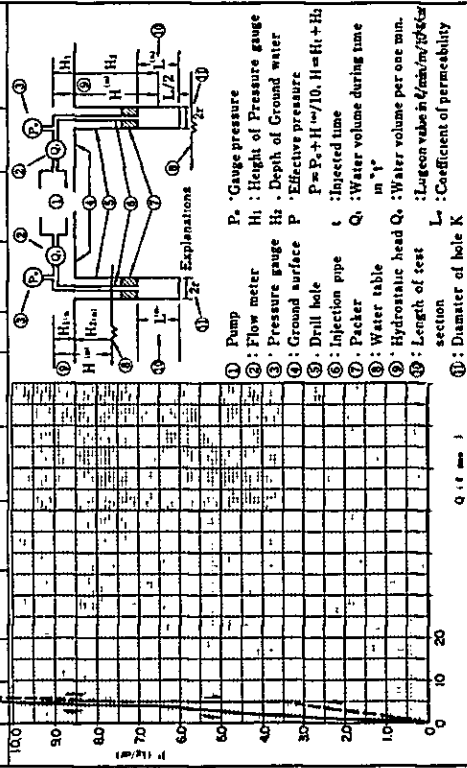




PERMEABILITY TEST IN DRILL HOLE (SHEET 10 OF 12)

JULIUMIHO PROJECT HOLE No. DH-209
 LOCATION DDM SITE RIGHT BANK DEPTH OF HOLE 40.00 m TEST DATE 12 JULY '79
 ELEVATION 1724.202 m DIAMETER OF HOLE NX cm TESTED BY
 COORDINATE DRILLED DEPTH m DRILLED BY
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE m CHECKED BY EPDC
 BEARING OF ANGLE HOLE m AFTER 23.50 m

Test section (m)	L (m)	H _i (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q _i (l/min)	Q ₀ (l/min)	L ₀ (log m)	K (m/sec)
From To	33.50-34.50	2.00	1.52	23.80	1.0	3.5	1.6	2.3	2.4 x 10 ⁻⁸	
"	"	"	"	3.0	5.5	7.5	3.0	2.7	2.8 x 10 ⁻⁸	
"	"	"	"	5.0	7.5	9.5	4.2	2.8	3.0 x 10 ⁻⁸	
"	"	"	"	7.0	9.5	12.5	4.2	2.2	2.3 x 10 ⁻⁸	
"	"	"	"	10.0	12.5	15.5	6.2	2.5	2.6 x 10 ⁻⁸	
"	"	"	"	7.0	9.5	12.5	5.8	3.0	3.2 x 10 ⁻⁸	
"	"	"	"	5.0	7.5	9.5	4.4	2.9	3.1 x 10 ⁻⁸	
"	"	"	"	3.0	5.5	7.5	4.6	3.3	3.5 x 10 ⁻⁸	
"	"	"	"	1.0	3.5	5.5	5.0	7.1	7.5 x 10 ⁻⁸	

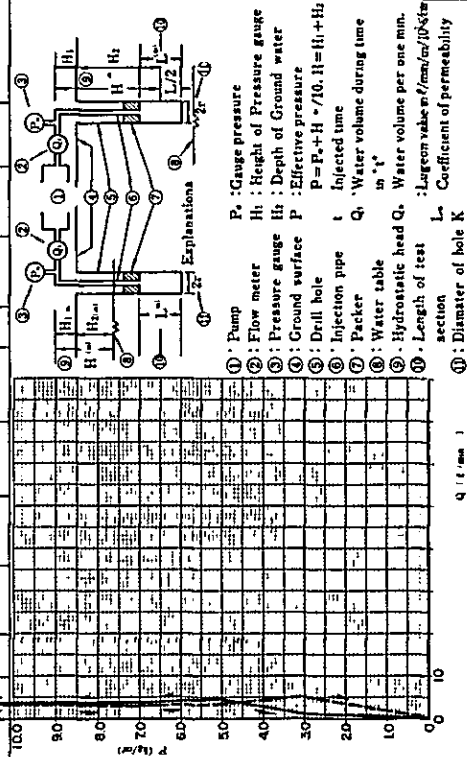


Q (l/min) section Diameter of hole K
 ELECTRIC POWER DEVELOPMENT CO. LTD. TAVO JAPAN

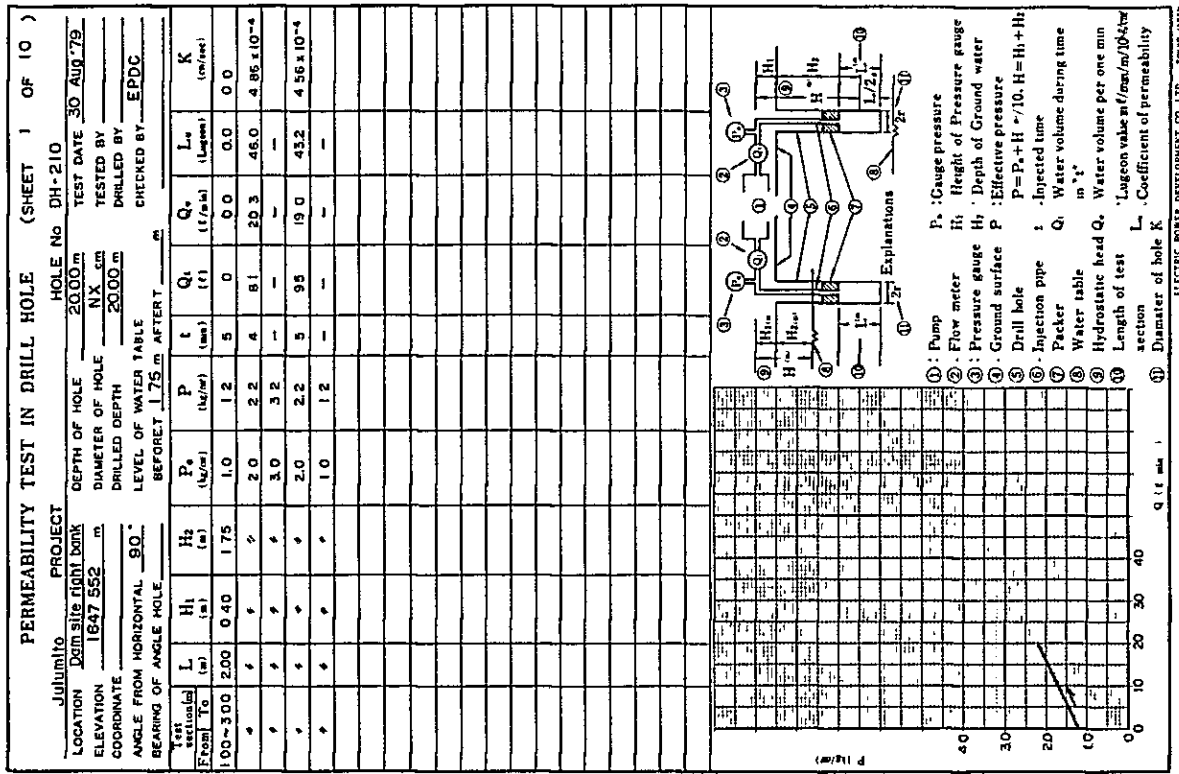
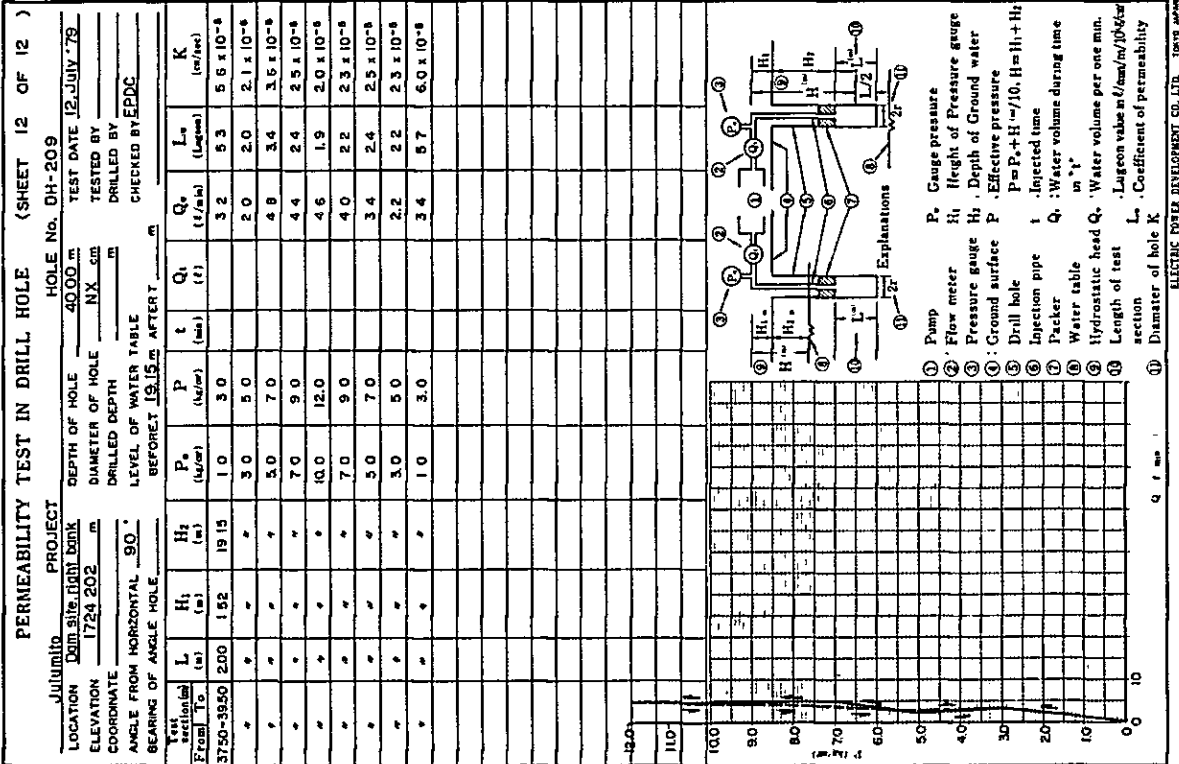
PERMEABILITY TEST IN DRILL HOLE (SHEET 11 OF 12)

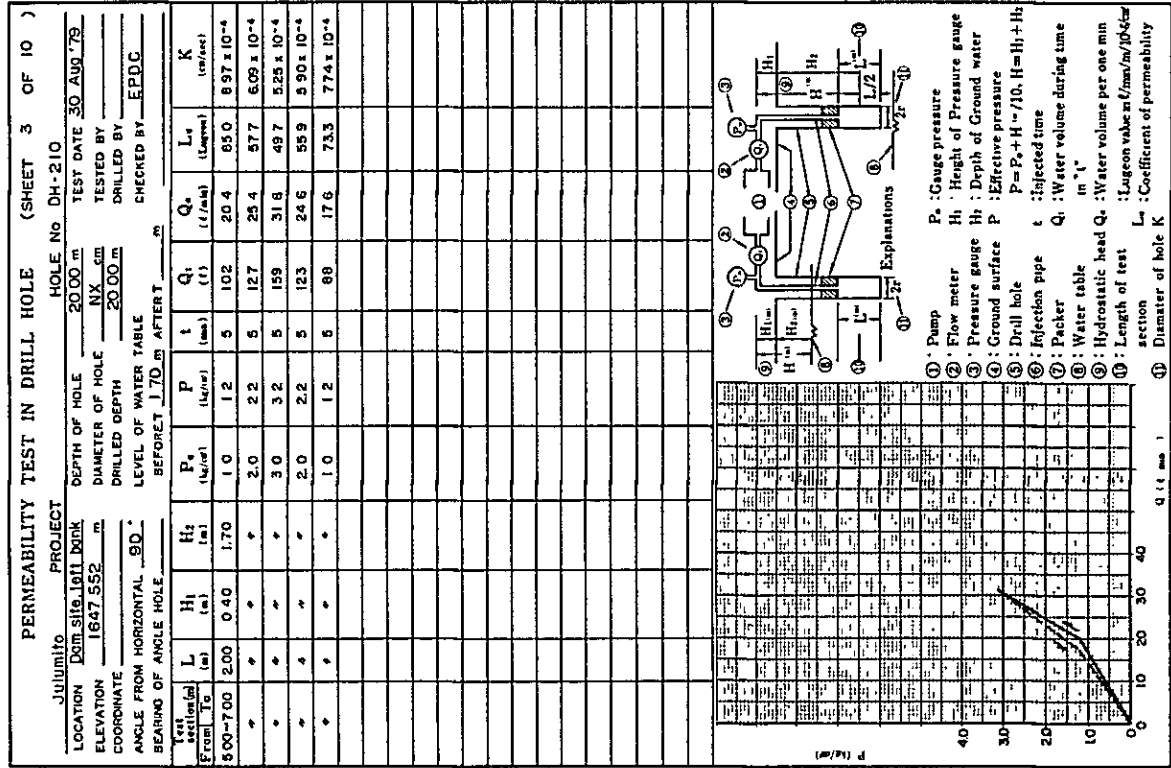
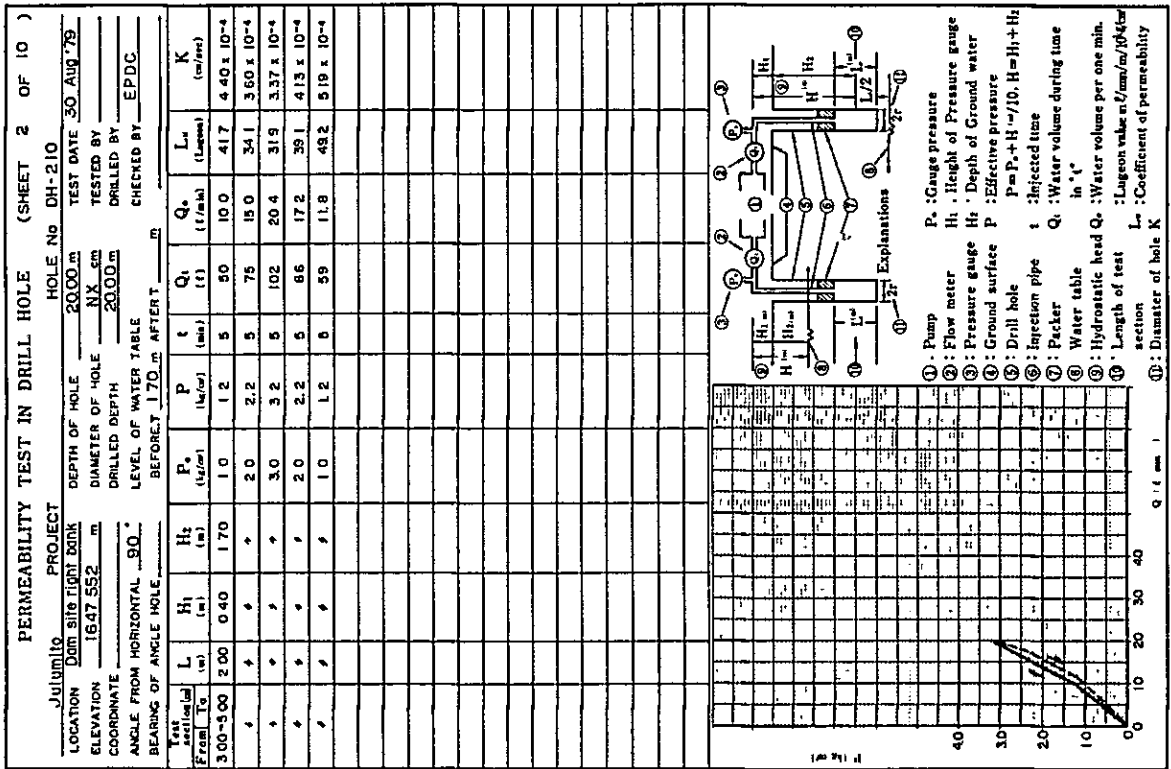
JULIUMIHO PROJECT HOLE No. DH-209
 LOCATION DDM SITE RIGHT BANK DEPTH OF HOLE 40.00 m TEST DATE 12 JULY '79
 ELEVATION 1724.202 m DIAMETER OF HOLE NX cm TESTED BY
 COORDINATE DRILLED DEPTH m DRILLED BY
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE m CHECKED BY EPDC
 BEARING OF ANGLE HOLE m AFTER 19.15 m

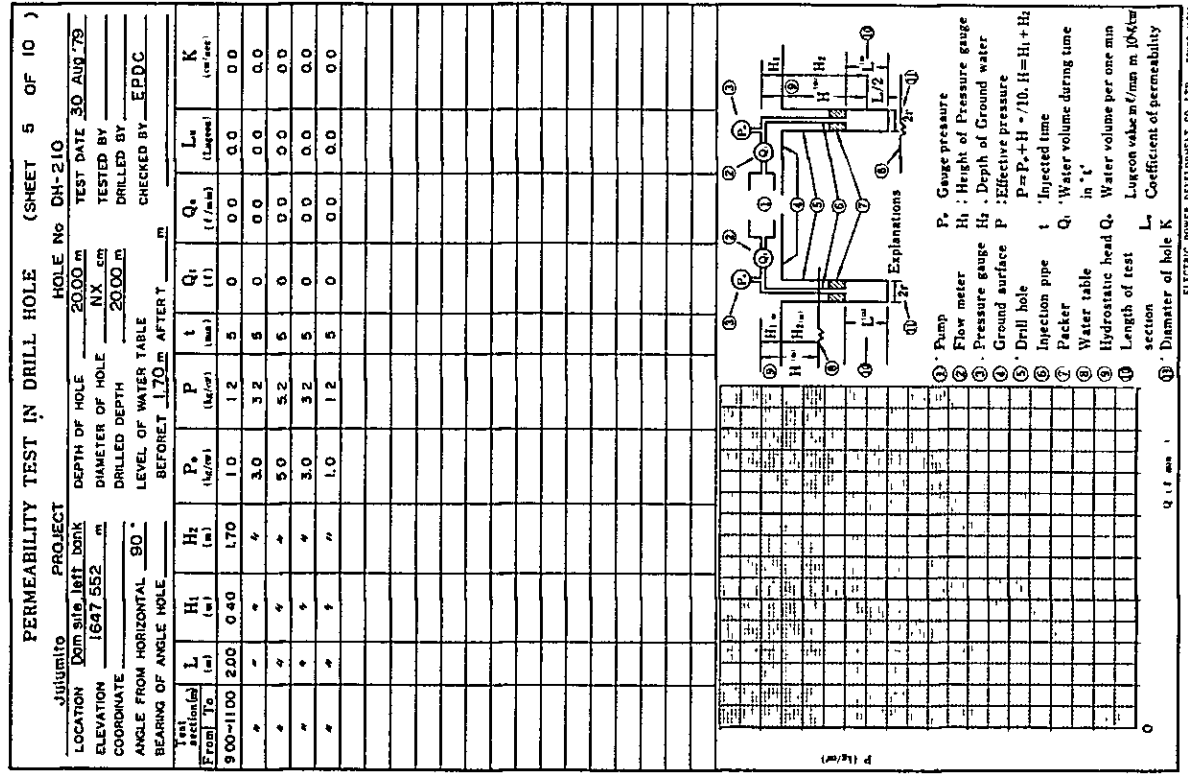
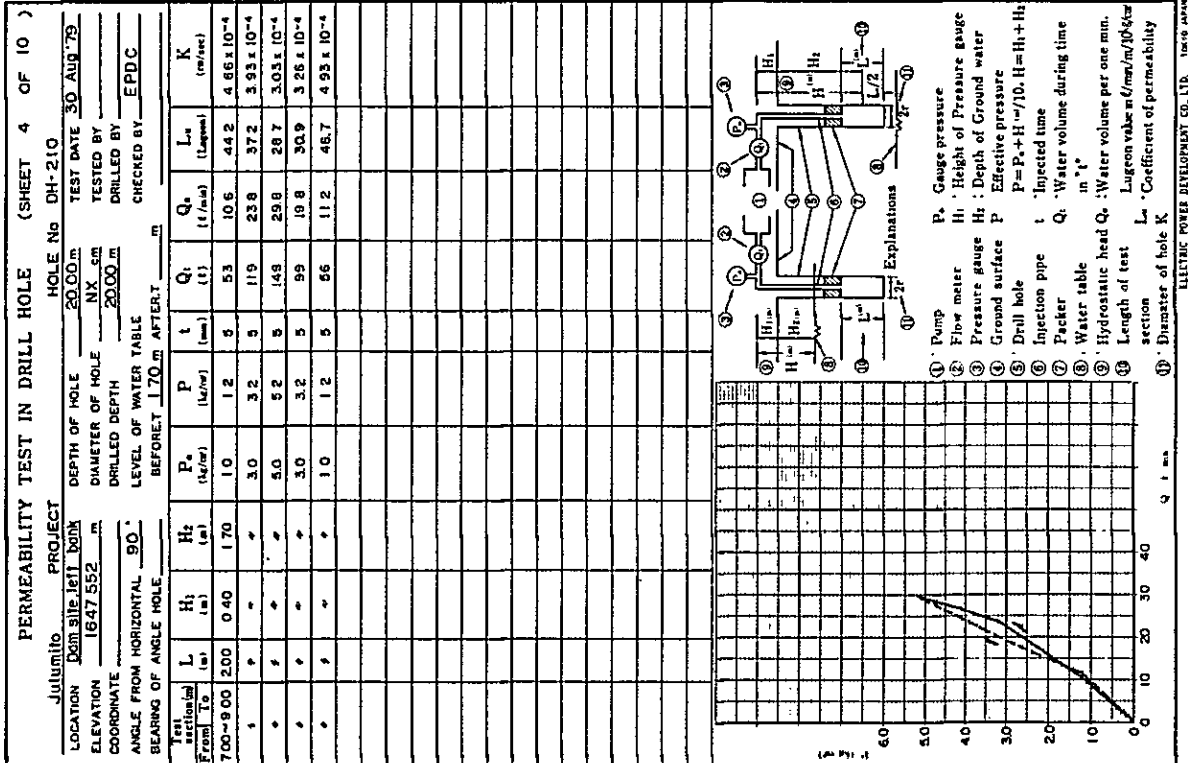
Test section (m)	L (m)	H _i (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q _i (l/min)	Q ₀ (l/min)	L ₀ (log m)	K (m/sec)
From To	33.50-37.50	2.00	1.52	19.15	1.0	3.0	1.0	1.7	1.8 x 10 ⁻⁸	
"	"	"	"	3.0	5.0	4.4	4.4	4.4	4.6 x 10 ⁻⁸	
"	"	"	"	5.0	7.0	3.2	3.2	2.3	2.4 x 10 ⁻⁸	
"	"	"	"	7.0	9.0	3.2	3.2	1.8	1.9 x 10 ⁻⁸	
"	"	"	"	10.0	12.0	3.2	3.2	1.3	1.4 x 10 ⁻⁸	
"	"	"	"	7.0	9.0	2.4	2.4	1.3	1.4 x 10 ⁻⁸	
"	"	"	"	5.0	7.0	2.6	2.6	1.9	2.0 x 10 ⁻⁸	
"	"	"	"	3.0	5.0	3.4	3.4	3.4	3.6 x 10 ⁻⁸	
"	"	"	"	1.0	3.0	5.2	5.2	8.7	9.2 x 10 ⁻⁸	



Q (l/min) section Diameter of hole K
 ELECTRIC POWER DEVELOPMENT CO. LTD. TAVO JAPAN



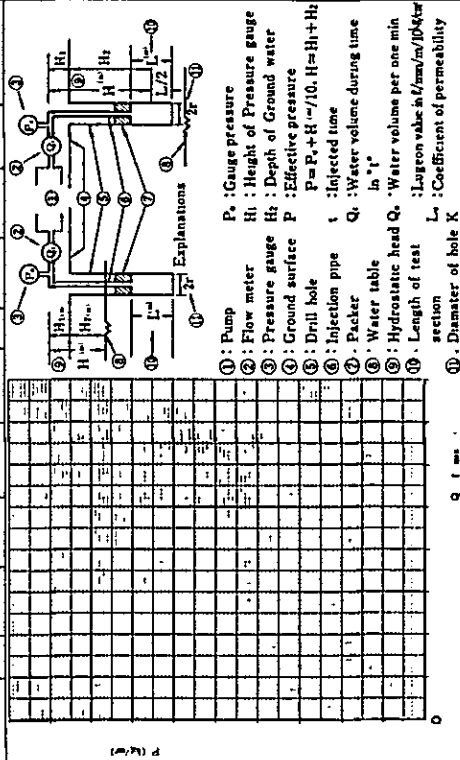




PERMEABILITY TEST IN DRILL HOLE (SHEET 6 OF 10)

Julumilo PROJECT HOLE No. DH-210
 LOCATION Dom Site 1811 BODK DEPTH OF HOLE 2000 m TEST DATE 30 AUG '79
 ELEVATION 1647.552 m NX cm TESTED BY
 COORDINATE DRILLED DEPTH 2000 m DRILLED BY
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE CHECKED BY EPDC
 BEARING OF ANGLE HOLE BEFORE 170.00 AFTER 220

Test section (m)	L (m)	H ₁ (m)	H ₂ (m)	P _e (kg/cm ²)	P (kg/cm ²)	t (min)	Q _t (l/min)	Q ₀ (l/min)	L ₀ (m)	K (m/sec)
1100-1300	2.00	0.40	1.70	1.0	1.2	5	0	0.0	0.0	0.0
"	"	"	"	3.0	3.2	5	0	0.0	0.0	0.0
"	"	"	"	5.0	5.2	5	0	0.0	0.0	0.0
"	"	"	"	3.0	3.2	5	0	0.0	0.0	0.0
"	"	"	"	1.0	1.2	5	0	0.0	0.0	0.0

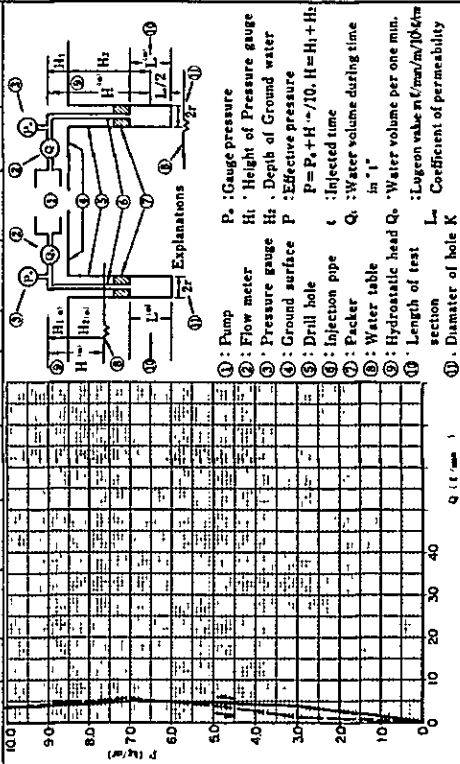


11. Diameter of hole K section

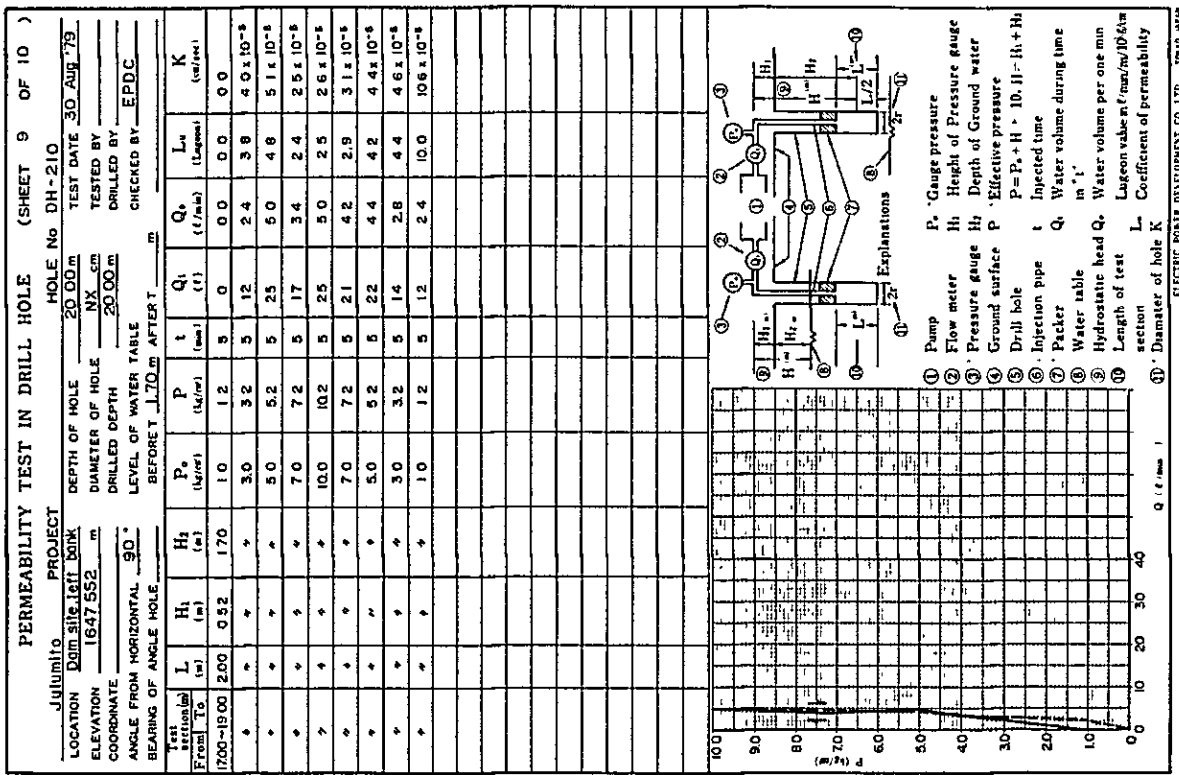
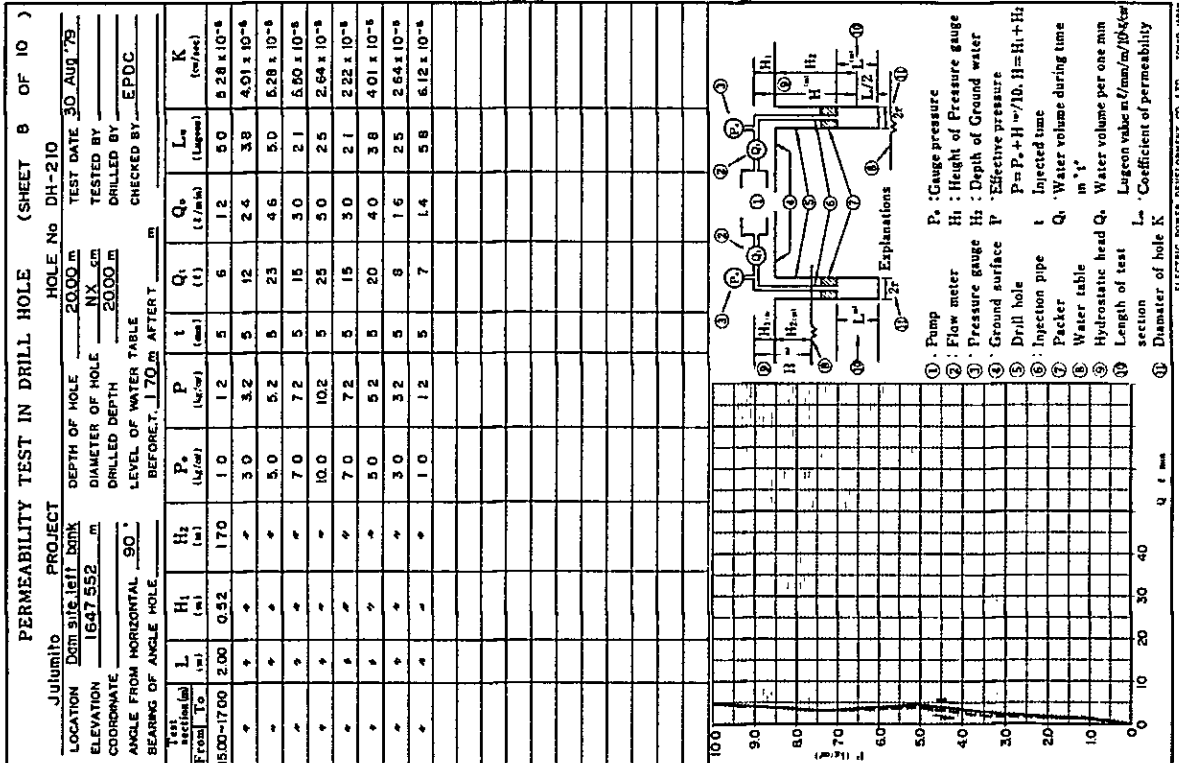
PERMEABILITY TEST IN DRILL HOLE (SHEET 7 OF 10)

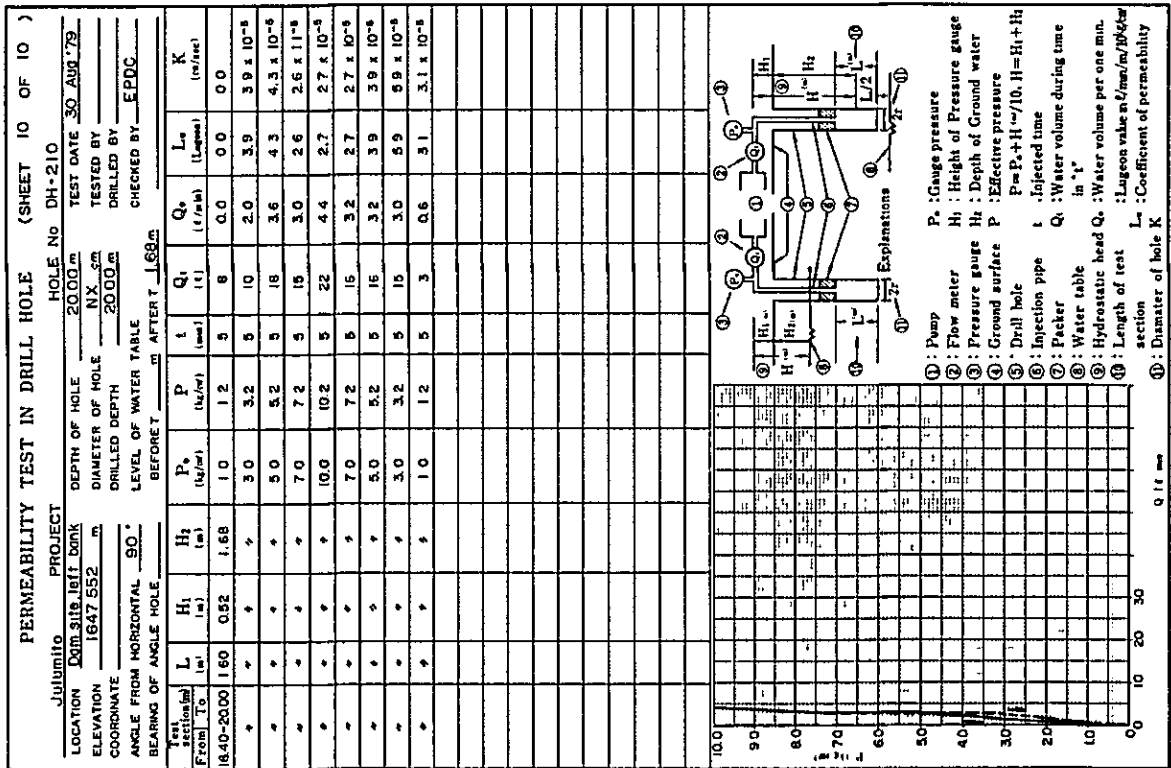
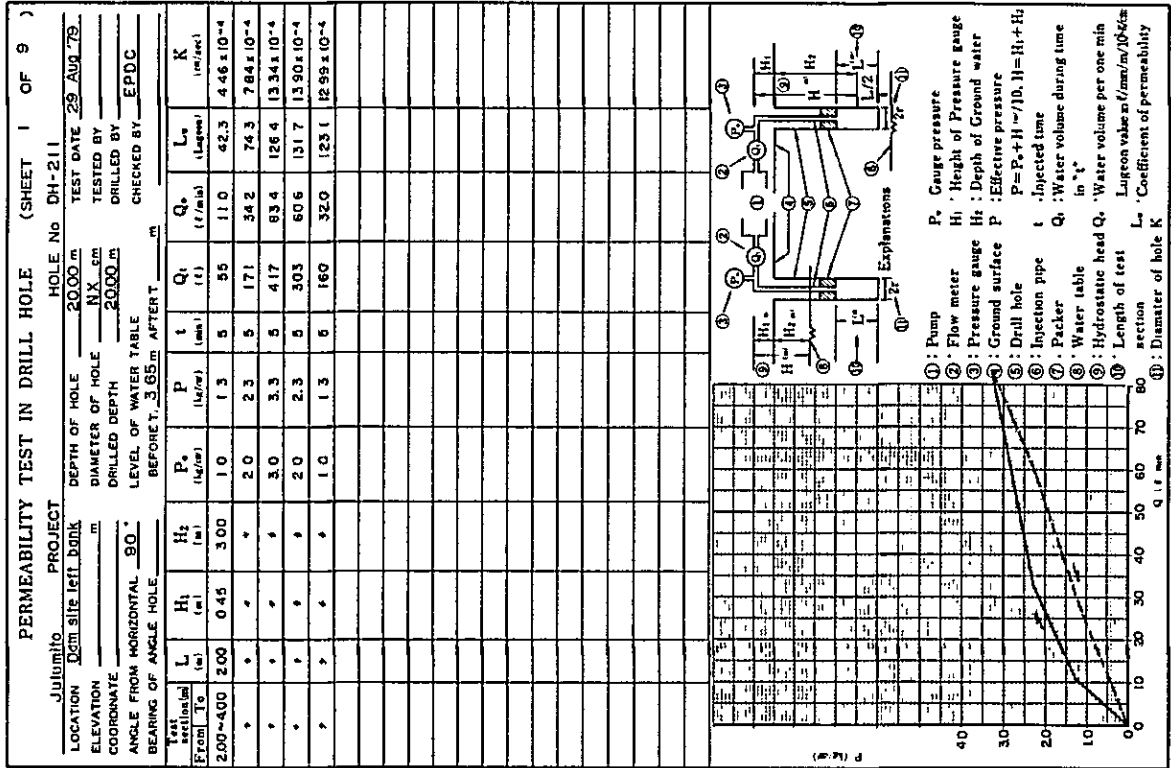
Julumilo PROJECT HOLE No. DH-210
 LOCATION Dom Site 1811 BODK DEPTH OF HOLE 2000 m TEST DATE 30 AUG '79
 ELEVATION 1647.552 m NX cm TESTED BY
 COORDINATE DRILLED DEPTH 2000 m DRILLED BY
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE CHECKED BY EPDC
 BEARING OF ANGLE HOLE BEFORE 170.00 AFTER 220

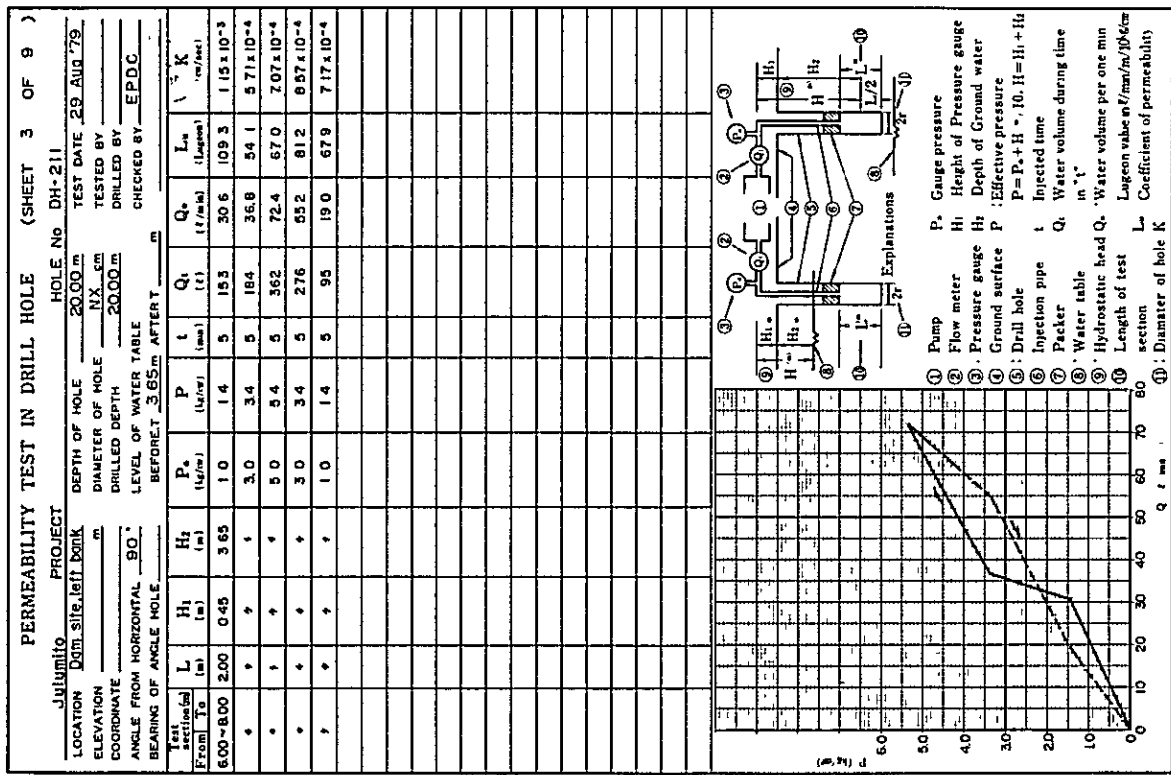
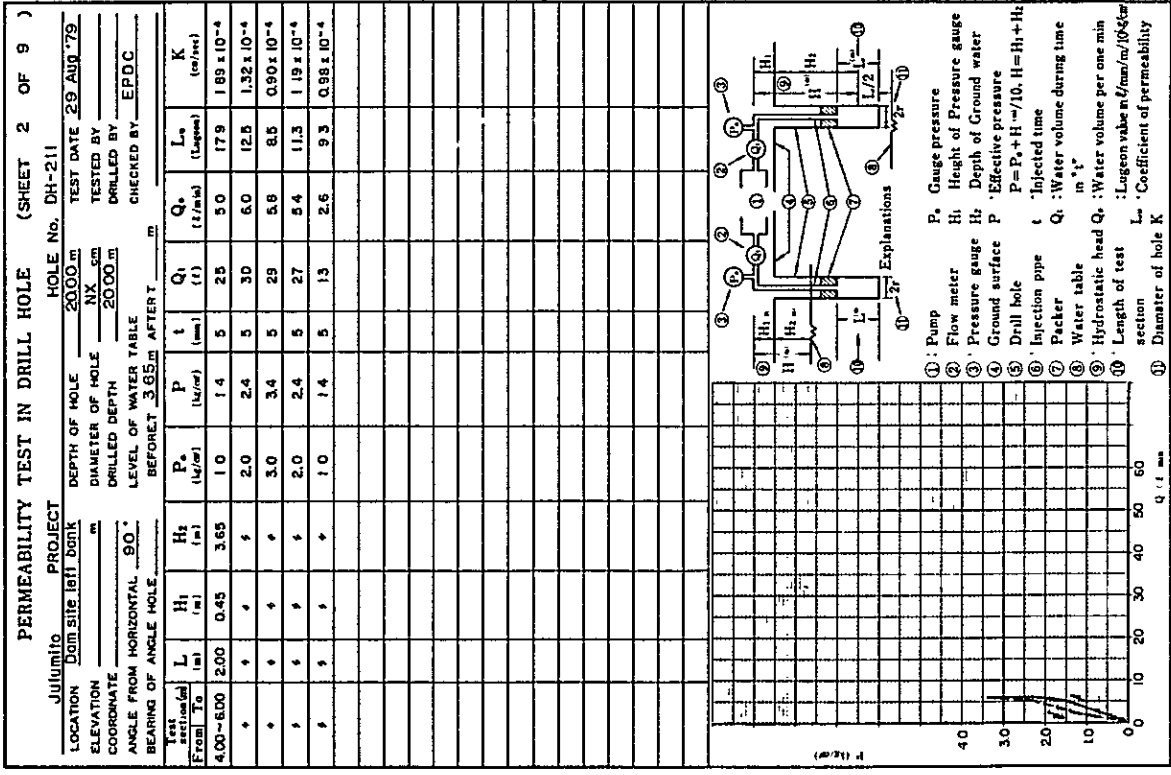
Test section (m)	L (m)	H ₁ (m)	H ₂ (m)	P _e (kg/cm ²)	P (kg/cm ²)	t (min)	Q _t (l/min)	Q ₀ (l/min)	L ₀ (m)	K (m/sec)
1300-1500	2.00	0.52	1.70	1.0	1.2	5	9	1.8	7.5	7.92 x 10 ⁻⁴
"	"	"	"	3.0	3.2	5	23	4.6	7.2	7.60 x 10 ⁻⁴
"	"	"	"	5.0	5.2	5	25	5.0	4.8	5.07 x 10 ⁻⁴
"	"	"	"	7.0	7.2	5	23	4.6	3.2	3.98 x 10 ⁻⁴
"	"	"	"	10.0	10.2	5	18	3.6	1.8	1.90 x 10 ⁻⁴
"	"	"	"	7.0	7.2	5	28	5.6	3.9	4.12 x 10 ⁻⁴
"	"	"	"	5.0	5.2	5	21	4.2	4.0	4.22 x 10 ⁻⁴
"	"	"	"	3.0	3.2	5	9	1.8	2.8	2.96 x 10 ⁻⁴
"	"	"	"	1.0	1.2	5	4	0.8	3.3	3.48 x 10 ⁻⁴



11. Diameter of hole K section



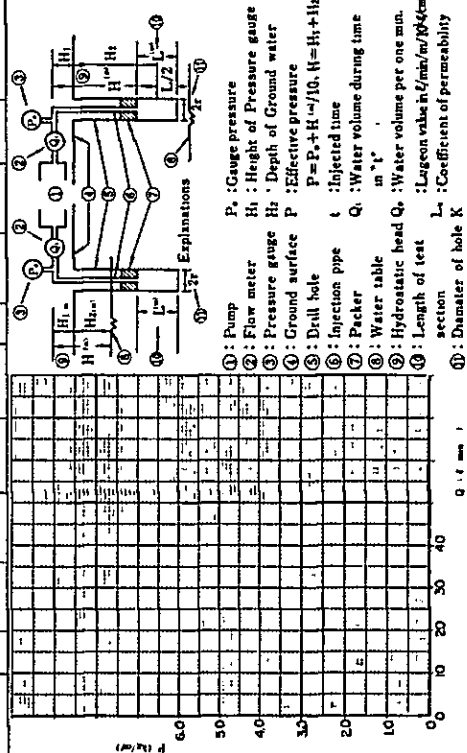




PERMEABILITY TEST IN DRILL HOLE (SHEET 4 OF 9)

JULIUMBO PROJECT HOLE No. DH-211
 LOCATION Dam site left bank 2000 m TEST DATE 29 Aug 79
 ELEVATION m DIAMETER OF HOLE 1X 5m TESTED BY
 COORDINATE m DRILLED DEPTH 2000 m DRILLED BY
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE CHECKED BY EPDC
 BEARING OF ANGLE HOLE m BEFORE 3.65 m AFTER 3.65 m

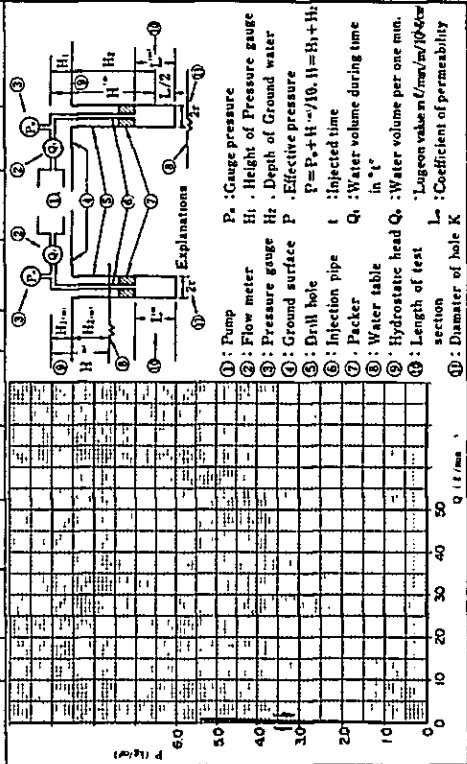
Test section (From To)	L (m)	H ₁ (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q _i (l/min)	L _w (log/cm)	K (m/yr)
800-1000	200	0.45	3.65	1.0	1.4	5	0	0.0	0.0
1000-1200	200	+	+	3.0	3.4	5	0	0.0	0.0
1200-1400	200	+	+	5.0	5.4	5	0	0.0	0.0
1400-1600	200	+	+	3.0	3.4	5	0	0.0	0.0
1600-1800	200	+	+	1.0	1.4	5	0	0.0	0.0

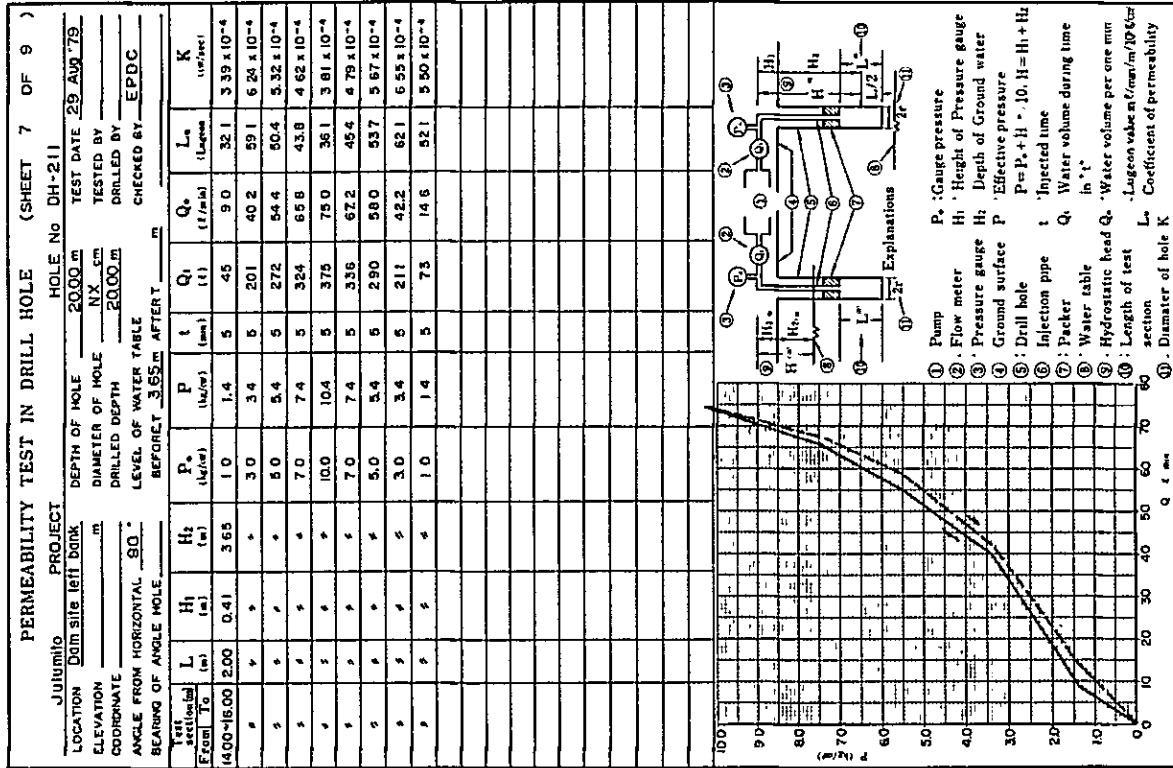
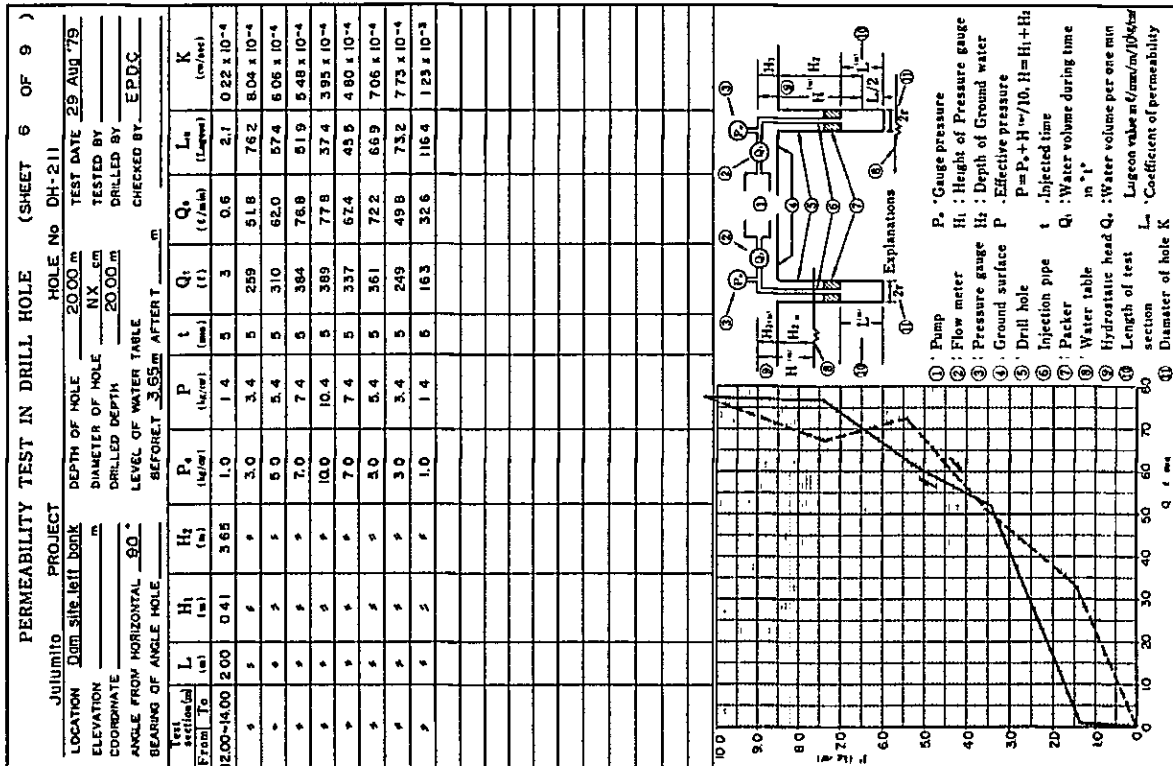


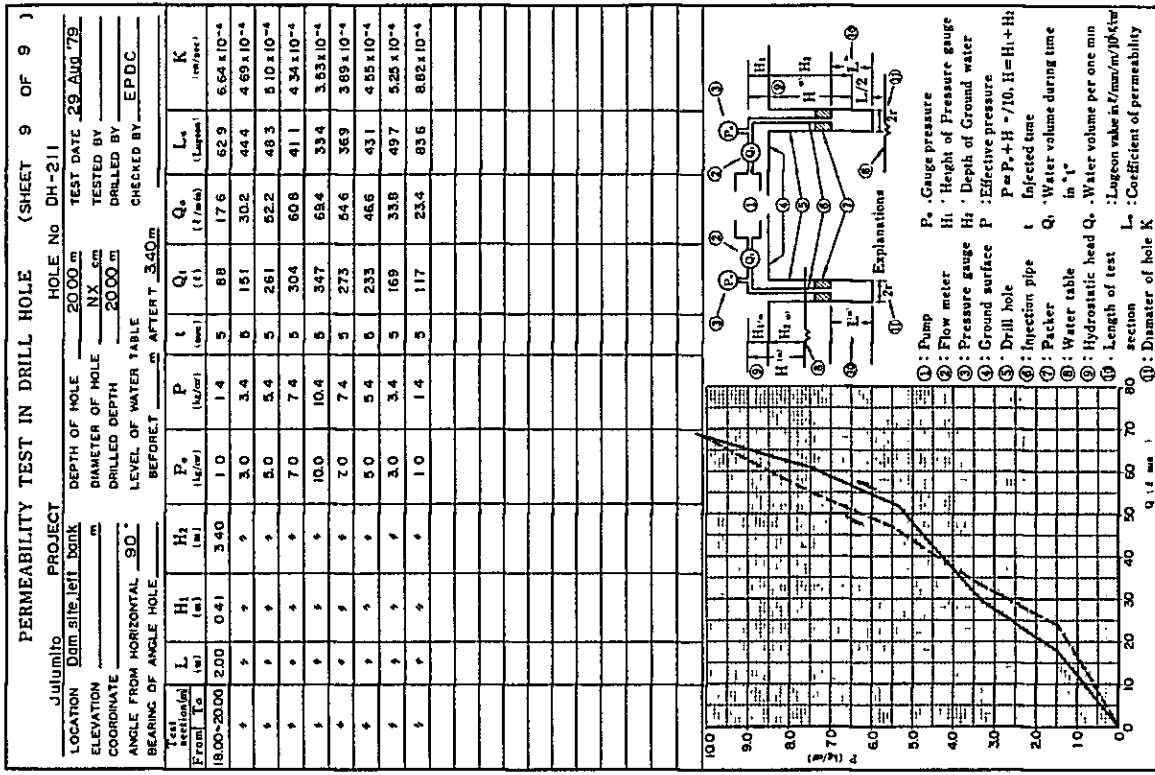
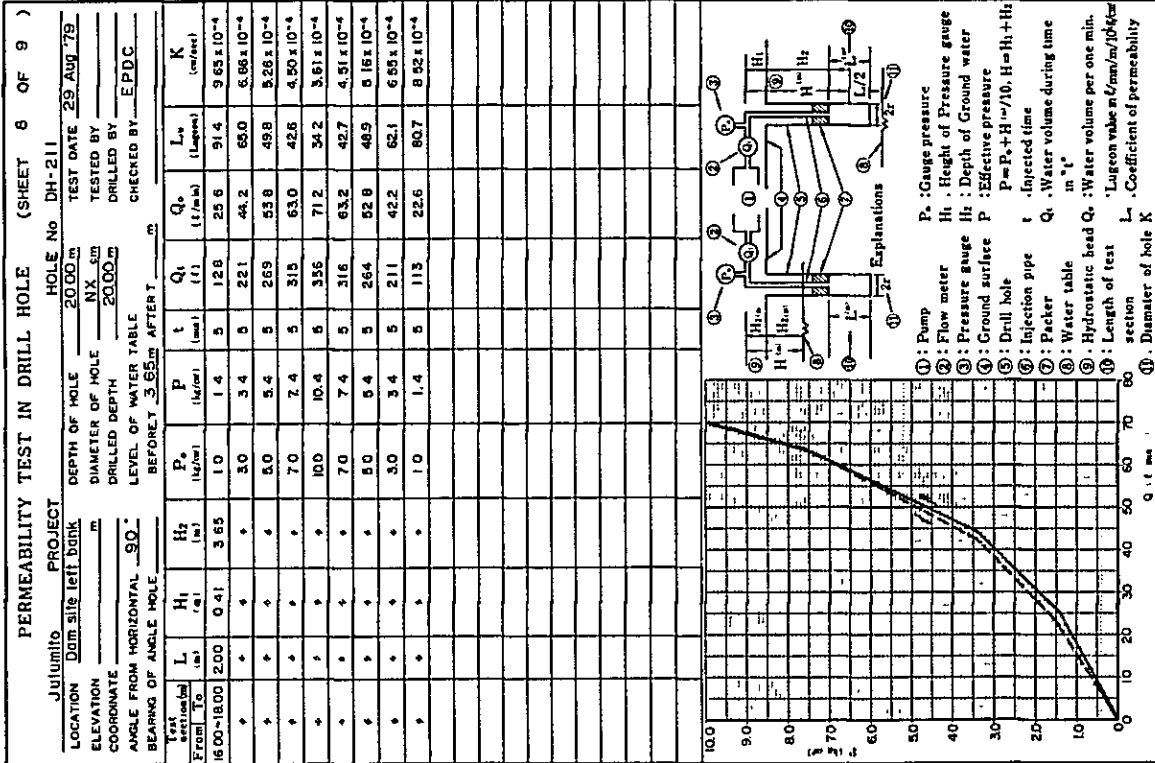
PERMEABILITY TEST IN DRILL HOLE (SHEET 5 OF 9)

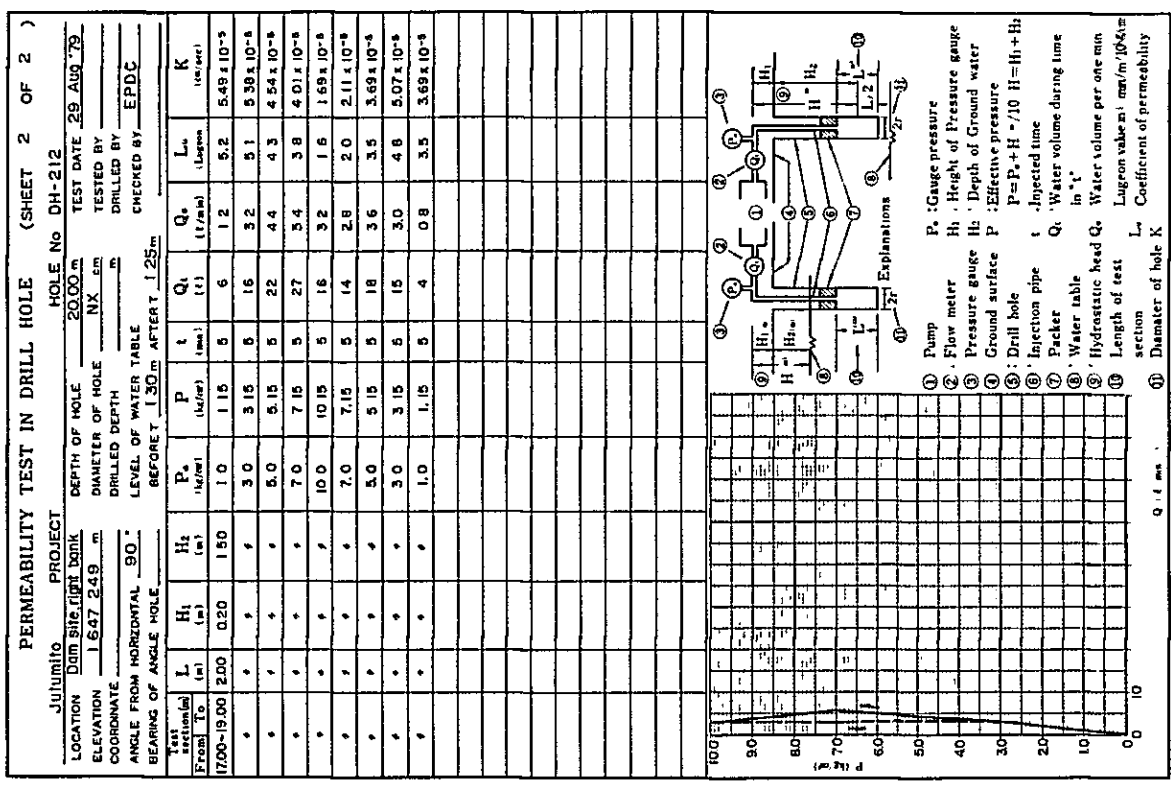
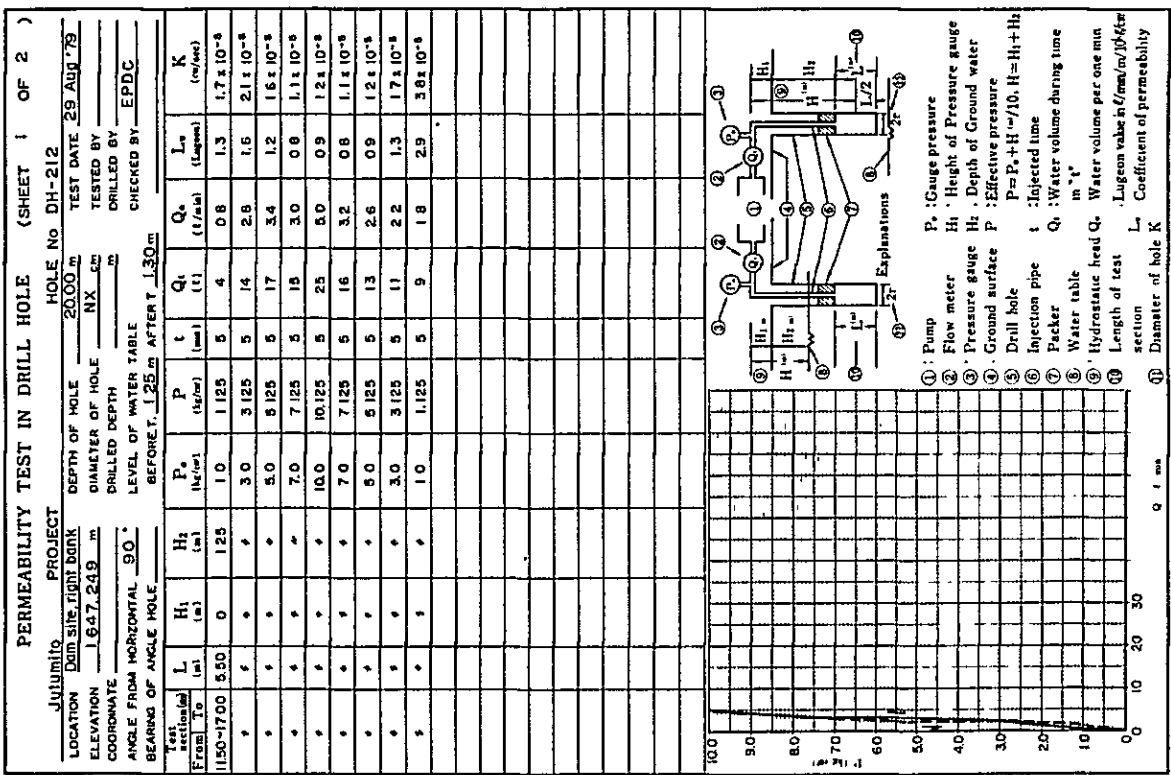
JULIUMBO PROJECT HOLE No. DH-211
 LOCATION Dam site left bank 2000 m TEST DATE 29 Aug 79
 ELEVATION m DIAMETER OF HOLE 1X 5m TESTED BY
 COORDINATE m DRILLED DEPTH 2000 m DRILLED BY
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE CHECKED BY EPDC
 BEARING OF ANGLE HOLE m BEFORE 3.65 m AFTER 3.65 m

Test section (From To)	L (m)	H ₁ (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q _i (l/min)	L _w (log/cm)	K (m/yr)
1000-1200	200	0.45	3.65	1.0	1.4	5	1	0.2	7.4×10^{-8}
1200-1400	200	+	+	3.0	3.4	5	3	0.6	9.5×10^{-8}
1400-1600	200	+	+	5.0	5.4	5	5	1.0	9.5×10^{-8}
1600-1800	200	+	+	3.0	3.4	5	3	0.6	9.5×10^{-8}
1800-2000	200	+	+	1.0	1.4	5	0	0.0	0.0





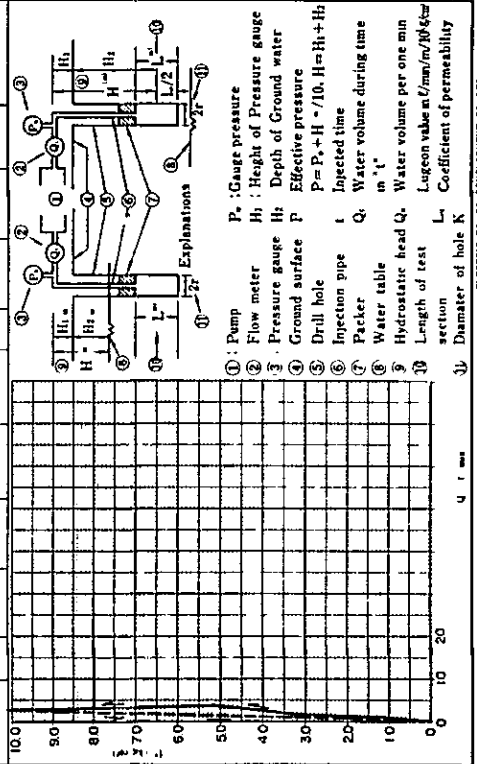




PERMEABILITY TEST IN DRILL HOLE (SHEET 3 OF 4)

July 1976 PROJECT HOLE No. DH-213
 LOCATION Don Site Light Bank DEPTH OF HOLE 20.00 m TEST DATE 30 Aug 79
 ELEVATION 1646.584 m DIAMETER OF HOLE NX cm TESTED BY
 COORDINATE DRILLED DEPTH
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE BEFORE, 1.80 m AFTER, m CHECKED BY EPDC
 BEARING OF ANGLE HOLE

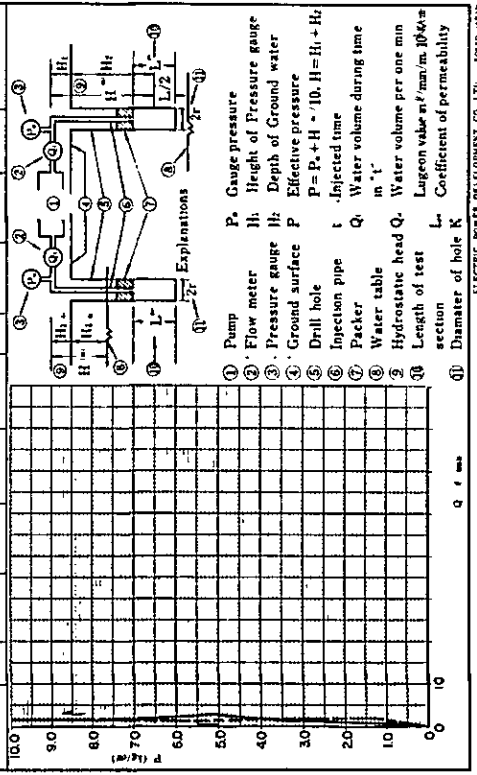
Test section (m)	L (m)	H ₁ (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q ₁ (l)	Q ₂ (l/m ² s)	L ₀ (log set)	K (cm/sec)
From To	2.00	0.80	1.80	1.0	1.26	5	6	1.2	4.8	5.07 x 10 ⁻⁸
"	"	"	"	3.0	3.26	5	7	1.4	2.1	2.22 x 10 ⁻⁸
"	"	"	"	5.0	5.26	5	19	3.6	3.6	3.80 x 10 ⁻⁸
"	"	"	"	7.0	7.26	5	14	2.8	1.9	2.01 x 10 ⁻⁸
"	"	"	"	10.0	10.26	5	13	2.8	1.3	1.37 x 10 ⁻⁸
"	"	"	"	7.0	7.26	5	10	2.0	1.4	1.48 x 10 ⁻⁸
"	"	"	"	5.0	5.26	5	5	1.6	1.5	1.58 x 10 ⁻⁸
"	"	"	"	3.0	3.26	5	5	1.0	1.5	1.58 x 10 ⁻⁸
"	"	"	"	1.0	1.26	5	4	0.8	3.2	3.38 x 10 ⁻⁸



PERMEABILITY TEST IN DRILL HOLE (SHEET 4 OF 4)

July 1976 PROJECT HOLE No. DH-213
 LOCATION Don Site Light Bank DEPTH OF HOLE 20.00 m TEST DATE 30 Aug 79
 ELEVATION 1646.584 m DIAMETER OF HOLE NX cm TESTED BY
 COORDINATE DRILLED DEPTH
 ANGLE FROM HORIZONTAL 90° LEVEL OF WATER TABLE BEFORE, 1.80 m AFTER, m CHECKED BY EPDC
 BEARING OF ANGLE HOLE

Test section (m)	L (m)	H ₁ (m)	H ₂ (m)	P ₀ (kg/cm ²)	P (kg/cm ²)	t (min)	Q ₁ (l)	Q ₂ (l/m ² s)	L ₀ (log set)	K (cm/sec)
From To	2.00	0.80	1.80	1.0	1.26	5	6	1.2	4.8	5.07 x 10 ⁻⁸
"	"	"	"	3.0	3.26	5	8	1.6	2.5	2.64 x 10 ⁻⁸
"	"	"	"	5.0	5.26	5	14	2.8	2.7	2.85 x 10 ⁻⁸
"	"	"	"	7.0	7.26	5	8	1.6	1.1	1.16 x 10 ⁻⁸
"	"	"	"	10.0	10.26	5	9	1.8	0.9	0.95 x 10 ⁻⁸
"	"	"	"	7.0	7.26	5	7	1.4	1.0	1.05 x 10 ⁻⁸
"	"	"	"	5.0	5.26	5	5	1.6	1.5	1.58 x 10 ⁻⁸
"	"	"	"	3.0	3.26	5	9	1.6	2.5	2.64 x 10 ⁻⁸
"	"	"	"	1.0	1.26	5	10	2.0	7.9	8.34 x 10 ⁻⁸



1. The first part of the document discusses the importance of maintaining accurate records of all transactions.

2. It is essential to ensure that all entries are clearly legible and dated.

3. The second part of the document outlines the various methods used to collect and analyze data.

4. These methods include direct observation, interviews, and the use of specialized equipment.

5. The results of these studies have shown that there is a significant correlation between the variables studied.

6. This finding is supported by the data presented in the following tables and graphs.

7. The data indicates that the majority of subjects in the study exhibited the expected behavior.

8. It is concluded that the findings of this study have important implications for the field.

9. Further research is needed to explore the underlying mechanisms of the observed effects.

10. The authors would like to thank the funding agency for their support of this research.