Depth (m)	Description
107.35	Sandstone, coarse grained, partly medium grained, arkosic, whitish gray
108.29	Shale, indurated, with calcite vein, gray
110.70	Shale, sandy, indurated, with calcite vein, light gray
111.27	Shale, carbonaceous, with pyrite patch and calcite vein, dark
112.50	Dolerite, very fine grained, with many calcite veins, dark gray
135.85	Dolerite, fine grained, partly with serpentinization along calcite vein, dark gray
163.25	Dolerite, medium grained, dark gray
163.90	Dolerite, very fine to fine grained, with pyrite precipitation along the quartz boundary, dark gray
164.26	Shale, carbonaceous, black
166.13	Shale, carbonaceous, with thin coal layer
167.87	Shale, sandy, gray to dark gray
167.97	Shale, carbonaceous
168.71	Shale, sandy, gray
170.96	Sandstone, very fine to fine grained, gray to light gray
173.40	Sandstone arkosic, whitish gray, core broken
174.85	Shale, sandy, light gray
175.12	Shale, indurated, dark gray
175.23	Dolerite, slaty dark gray
175.95	Sandstone, medium grained, arkosic, whitish gray
184.90	Sandstone, coarse grained, arkosic, core broken, with many cracks, whitish gray
185.80	Dolerite, very fine to fine grained, basaltic, dark gray
	Dolerite, medium grained, partly altered along crack, dark gray
	201.25 ~ 207.60m — Cracked zone
	222.85 ~ 231.25m — Partly little joint or cracked.
	240.25m — Remarkable joint (60°~70°, 30°~40°)
	245.30m — Slickenside (65°)
	247.30 ~ 247.40m — Calcite veinlet (10°~20°)
	255.40m — Slickenside (75°)
	262.95 ~ 267.90m — Partly cracked.
	269.60m — Slickenside (60°)
272.90	Dolerite, fine grained, partly medium grained, dark gray, partly little cracked, fault clay of 10mm occurs along upper boundary
282.85	

Scale: 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280

Core recovery: 100%

Depth (m)	Core loss	Description	Recovery
272.90	65%		
280		Dolerite, fine grained, partly medium grained, dark grey partly little cracked, gouge clay of 10mm occurs along upper boundary	
282.85			
290		Dolerite, medium grained, partly altered along crack, with indurated slate fragment at the lower part, dark grey 277.95m Slickenside (76°)	100%
300			
306.70			
310			100%
320			
330			100%
340			
350		Dolerite, fine to medium grained, hard, massive, dark grey, partly with calcite vein and veinlet, generally altered along calcite vein and crack within narrow zone, partly with some pyrite crystal 341.75m Calcite vein 70mm (55°) 344.05m Calcite vein 10mm (5°) 362.00~363.85m Crack rich, Slickenside (70°) Calcite veinlet (5°~20°) 363.85~377.95m Crack rich (40°~50°, 60°~80°) Slickenside, partly brown 381.10~384.95m Crack rich 390.05~396.95m Cracked, broken 396.95~405.85m Partly vertical crack 411.55m Slickenside (75°) 423.90~424.15m Cracked 425.05~425.60m Cracked	100%
360			
370			100%
380			
390			100%
400			
410			100%
420			
427.70			
428.50	65	Dolerite, fine to very fine grained, dark grey, lower part shows marginal facies	100%
430			
429.05		Sandstone, coarse grained, arkose, whitish grey, indurated at boundary of dolerite	
430.05	6'	Sandstone, fine grained, some laminated little mica included, light grey	
433.50		Sandstone, coarse grained, partly very coarse, arkose, whitish grey, thin sandy shale layer at the lowest part	
433.85	6'	Shale, bluish grey, well laminated	
434.15		Sandstone, fine grained, and shale in alternation, light brownish grey	
436.85	6'	Sandstone, fine to medium grained, partly thin shale layer and mica included, partly laminated, light grey	
437.10		Sandstone, medium to coarse grained, unworked limonite, whitish grey	
439.00		Shale, well laminated, partly thin sandstone layer included, light blackish grey	
439.20	6'	Sandstone, fine to medium grained, partly laminated, mica included, light grey	
439.85		Sandstone, coarse grained, arkose, light grey	
		End of Hole.	

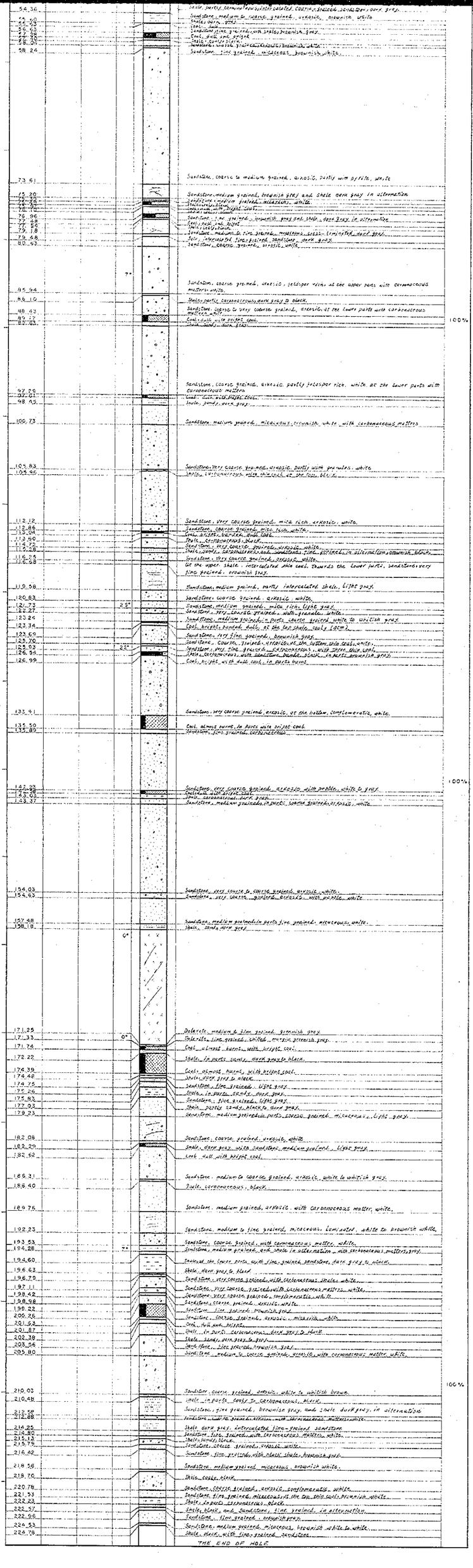
HOLE NO : LD-11
AREA : LUBHUKU
DATE DRILLED : DEC 7, 1983 - DEC 15, 1983
TOTAL DEPTH : 224.78m
ELEVATION : +268m
COORDINATE : X=+2,930,023 Y=-76,885

JAPAN INTERNATIONAL COOPERATION AGENCY
国際協力事業団
15156
図書資料室

Borehole Log LD-11

Date : 4K Scale : 1 : 200
Date : Sep. 1984 Prepared by: Ujuhara, S. Morikawa

Depth of Bore hole (m)	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	Core Recovery
1.40					Soil, hair growth	Non-Core Drilling
3.50					Soil, dark brown, coal, Sandstone, medium grained, brownish gray	
4.20					Soil, dark brown, with Sandstone, medium grained, brownish gray	
8.40					Sandstone, medium grained, brownish gray	
13.50					Shale, dark brown to brown-ish gray	
14.30					Sandstone medium grained, brownish gray	
15.58					Sandstone, medium grained, micaceous, intercalated shale, brownish white	92%
18.10					Sandstone, medium to coarse grained, arkosic, brownish white	
18.17					Coal, dust	
19.20					Sandstone, medium to fine grained, with shale, micaceous, brownish gray	
20.89			0°		Shale, Sandstone fine-grained sandstone, dark gray & gray	
23.58					Sandstone, medium to fine grained, micaceous, white to light gray	
24.58						
25.53					Sandstone, medium to fine grained, micaceous, intercalated shale, white to light gray	
28.58					Sandstone, very fine grained, intercalated thin carbonaceous shale, white to light gray	
29.58					Sandstone, medium to fine grained, laminated, micaceous, white to light gray	
30.58					Sandstone, medium to fine grained, micaceous, cross-laminated, with pyrite and copper powder, white to light gray	
					Sandstone, medium to fine grained, micaceous, brownish gray	100%
34.09					Sandstone, fine to medium grained, micaceous, cross-laminated, at the bottom intercalated grey shale, brownish gray	
34.75					Sandstone, fine to medium grained, micaceous, white	
35.25					Coal, bright and dark	
35.00					Shale, black	
36.42			0°		Sandstone, fine to medium grained, micaceous, brownish gray, intercalated thin coaly shale, black	
36.69					Coal, bright and dull	
36.79					Shale, coaly, black to brownish gray	
38.03					Sandstone, medium to coarse grained, arkosic, towards the lower part, very coarse grained, intercalated thin brownish gray coaly shale, light gray to brownish white	
38.13						
38.23					Shale, coaly, black	
					Coal, dull with bright coal	
42.04					Sandstone fine to medium grained, intercalated brownish gray shale, white to gray	
42.68					Shale, intercalated fine grained sandstone, brownish dark gray	
48.83					Shale dark gray, cross-laminated thin fine grained sandstone	
49.18					Sandstone, fine grained, intercalated shale, gray at the lower parts with pyrite, brownish gray	
49.75			0°		Shale, sandy, brownish gray	
50.05					Shale, dark gray, intercalated fine grained sandstone, light gray	
51.21					Sandstone, medium to coarse grained, arkosic, micaceous, brownish white	
51.68					Shale, carbonaceous to shale, coaly, blackish gray	
52.60					Sandstone, medium to coarse grained, arkosic, micaceous, brownish white, at the lower parts intercalated carbonaceous shales black	
53.20						
54.36					Shale, partly carbonaceous, intercalated coarse-grained sandstone, dark gray	
55.60					Sandstone, medium to coarse grained, arkosic, brownish white	
55.80					Coal, dull	
56.83					Sandstone, fine grained, with shale, brownish gray	
57.38					Coal, dull and bright	
57.75					Shale, coaly, black	
58.04					Sandstone, coarse to very coarse grained, arkosic, white	
58.54					Sandstone, fine grained, micaceous, brownish white	
					Sandstone, coarse to medium grained, arkosic, partly with pyrite, white	
73.81						
75.20					Sandstone, medium grained, brownish gray and shale dark gray in alternation	
75.38					Sandstone, medium grained, micaceous, white	
75.60					Shale, coaly, black	
76.10					Coal, dull and bright	
76.46					Sandstone, fine grained, brownish gray and shale, dark gray in alternation	
77.48					Coal, dull and bright	
77.58					Shale, coaly, black	
79.18					Sandstone, medium to fine grained, micaceous, cross-laminated, dark gray	
79.68					Shale, intercalated fine-grained sandstone, dark gray	
80.38					Sandstone, coarse grained, arkosic, white	
			7°		Sandstone, coarse grained, arkosic, feldspar rich, at the upper part with carbonaceous matter, white	
87.94						
88.10					Shale, partly carbonaceous, dark gray to black	
88.42					Sandstone, coarse to very coarse grained, arkosic at the lower parts with carbonaceous matter, white	
89.17					Coal, dull with bright coal	100%
89.28					Shale, coaly, dark gray	
					Sandstone, coarse grained, arkosic, partly feldspar rich, white, at the lower parts with carbonaceous matter	
97.29						
97.61					Coal, dull with bright coal	
98.45					Shale, coaly, dark gray	
100.73					Sandstone, medium grained, micaceous, brownish white, with carbonaceous matters	
105.83					Sandstone, very coarse grained, arkosic, partly with granules, white	
105.96					Shale, carbonaceous, alternation of coal, black	
112.12					Sandstone, very coarse grained, mica rich, arkosic, white	
113.86					Sandstone, coarse grained, mica rich, white	
113.94					Coal, dull, no bright coal	
113.96					Shale, carbonaceous, black	
115.72					Sandstone, very coarse grained, arkosic, white	
115.88					Shale, coaly, carbonaceous, and sandstone, fine grained, in alternation, brownish white	
116.25					Sandstone, very coarse grained, arkosic, white	
116.68					at the upper shale, intercalated thin coal, towards the lower part, sandstone very fine grained, brownish gray	
119.58					Sandstone, medium grained, partly intercalated shale, light gray	
120.83					Sandstone, coarse grained, arkosic, white	
121.73			8.5°		Sandstone, medium grained, mica rich, light gray	
122.27					Sandstone, very coarse grained, with granule, white	
123.24					Sandstone, medium grained, in part, coarse grained, white to yellow gray	
123.34					Coal, bright, dark dull, at the top layer, dull layer	
123.69					Sandstone, very fine grained, brownish gray	
125.70					Sandstone, coarse, grained, arkosic, at the bottom thin coal, white	
125.93			8.5°		Siltstone, very fine grained, carbonaceous, with very thin coal	
126.34					Shale, carbonaceous, with sandstone, bands, black, in part brownish gray	
126.99					Coal, bright with dull coal, in parts burnt	
133.91					Sandstone, very coarse grained, arkosic, at the bottom, conglomeratic, white	
135.50					Coal, almost burnt, in parts with bright coal	
135.85					Siltstone, fine grained, carbonaceous	
					Sandstone, very coarse grained, arkosic, with pebble, white to gray	100%
142.42					Shale, with bright coal	
142.90					Coal, carbonaceous, dark gray	
143.05					Sandstone, medium grained, in part, coarse grained, arkosic, white	
153.37						
154.03					Sandstone, very coarse to coarse grained, arkosic, white	
154.83					Sandstone, very coarse, arkosic, mica rich, white	


54.36
Shale, partly carbonaceous, calcareous, coaly, brown, dark gray.
Sandstone, medium to coarse grained, arkosic, olive to white
Shale, dark gray.
Coal, bright
Sandstone, fine grained, with shale, brownish gray.
Coal, dull and bright
Shale, carbonaceous
Sandstone, white, fine grained, brownish white
58.24
Sandstone, fine grained, micaceous, brownish white.
60
70
73.61
Sandstone, coarse to medium grained, arkosic, partly with pyrite, white
75.20
Sandstone, medium grained, bluish gray and shale dark gray in alternation
Sandstone, medium grained, micaceous, white.
Sandstone with bright coal.
76.96
Sandstone, fine grained, brownish gray and shale, dark gray in alternation
77.55
Coal, bright and dull
77.18
Shale, carbonaceous
Sandstone, medium to fine grained, micaceous, less limonite, dark gray.
79.48
Shale, intercalated fine-grained sandstone, dark gray.
80.93
Sandstone, coarse grained, arkosic, white.
7°
Sandstone, coarse grained, arkosic, feldspar rich, at the upper parts with carbonaceous matters, white.
85.94
86.10
Shale, partly carbonaceous, dark gray to black.
88.63
Sandstone, coarse to very coarse grained, arkosic, at the lower parts with carbonaceous matters, white.
89.17
Coal, dull with bright coal.
89.93
Shale, sandy, dark gray.
100%
90
Sandstone, coarse grained, arkosic, partly feldspar rich, white at the lower parts with carbonaceous matters
97.20
97.61
Coal, dull with bright coal.
98.83
Shale, sandy, dark gray.
100
100.73
Sandstone, medium grained, micaceous, brownish white with carbonaceous matters
103.83
Sandstone, very coarse grained, arkosic, partly with granules, white
104.96
Shale, carbonaceous, with chert at the top, black.
110
112.12
Sandstone, very coarse grained, mica rich, arkosic, white.
112.86
Sandstone, coarse grained, mica rich, white.
113.04
Shale, arkosic, dark gray, dull coal.
113.90
Shale, carbonaceous, black.
115.95
Sandstone, very coarse, granules, arkosic, white.
115.28
Shale, sandy, carbonaceous, and sandstone, fine, pyrite, in alternation, brownish black.
116.25
Sandstone, very coarse grained, arkosic, white.
116.58
At the upper shale, intercalated dark coal, towards the lower parts, sandstone very fine grained, brownish gray.
119.58
Sandstone, medium grained, partly intercalated shale, light gray.
120
120.83
Sandstone, coarse grained, arkosic, white.
121.73
2.5°
Sandstone, medium grained, mica rich, light gray.
122.27
Sandstone, very coarse grained, with granules, white.
123.25
Sandstone, medium grained, in parts coarse grained, white to whitish gray.
123.34
Coal, bright, in dull coal, at the top shale, coaly seam.
123.60
Sandstone, very fine grained, brownish gray.
123.70
Sandstone, coarse, granules, arkosic, at the bottom, mica rich, white.
124.53
2.5°
Sandstone, very fine grained, carbonaceous, with coarse mica coal.
124.55
Shale, carbonaceous, with sandstone, dark black, in parts brownish gray.
126.99
Coal, bright, with dull coal, in parts thick.
130
133.91
Sandstone, very coarse grained, arkosic, at the bottom, conglomeratic, white.
135.50
Coal, almost pure, in parts with bright coal.
135.89
Sandstone, fine grained, carbonaceous.
140
100%
142.93
Sandstone, very coarse grained, arkosic, with pebble, white to gray.
143.02
Coal, with bright coal.
143.37
Shale, carbonaceous, dark gray.
Sandstone, medium grained, in parts coarse grained, arkosic, white.
150
154.03
Sandstone, very coarse to coarse grained, arkosic, white.
154.63
Sandstone, very coarse, granules, arkosic, with pebble, white.
157.48
Sandstone, medium grained, in parts fine grained, micaceous, white.
158.18
Shale, sandy, dark gray.
160
6°
170
171.25
Dolerite, medium to fine grained, greenish gray.
0°
171.33
Shale, fine grained, altered, partly greenish gray.
171.74
Coal, almost pure, with bright coal.
172.22
Shale, in parts sandy, dark gray to black.
174.39
Coal, almost pure, with bright coal.
174.48
Shale, dark gray to black.
174.75
Sandstone, fine grained, light gray.
175.26
Shale, in parts sandy, dark gray.
175.63
Sandstone, fine grained, light gray.
177.93
Shale, partly sandy, black to dark gray.
179.23
Sandstone, medium grained, in parts coarse grained, micaceous, light gray.
180
182.08
Sandstone, coarse grained, arkosic, white
182.29
Shale, dark gray, with sandstone, medium grained, light gray.
182.62
Coal, dull with bright coal.
186.21
Sandstone, medium to coarse grained, arkosic, white to whitish gray.
186.40
Shale, carbonaceous, black.
190
189.75
Sandstone, medium grained, arkosic, with carbonaceous matter, white.
192.23
Sandstone, medium to fine grained, micaceous, laminated, white to brownish white.
193.53
Sandstone, coarse grained, with carbonaceous matter, white.
194.28
7°
Sandstone, medium grained, and shale in alternation, with carbonaceous matters, gray.
194.60
Shale at the lower part, with fine grained sandstone, dark gray to black.
196.63
Shale, dark gray to black
196.79
Sandstone, very coarse grained, with carbonaceous shales, white.
197.11
Sandstone, very coarse, grained with carbonaceous matters, white.
198.42
Sandstone, very coarse, arkosic, limonite, white.
200
198.98
Sandstone, coarse, grained, arkosic, white.
199.22
Sandstone, fine grained, brownish gray.
200.26
Sandstone, coarse grained, arkosic, micaceous, white.
201.53
Coal, dull and bright.
201.87
Shale, in parts, carbonaceous, dark gray to black.
202.38
Shale, sandy, dark gray to black.
203.56
Shale, fine grained, brownish gray.
203.80
Sandstone, medium to coarse grained, arkosic, with carbonaceous matter, white.
100%
210
210.03
Sandstone, coarse, grained, arkosic, white to whitish brown.
210.48
Shale, in parts, sandy to carbonaceous, black.
212.50
Sandstone, fine grained, brownish gray, and shale, dark gray, in alternation
212.88
Sandstone, with carbonaceous matters, white.
214.25
Shale, dark gray, intercalated fine-grained sandstone
214.80
Sandstone, fine grained, with carbonaceous matters, white.
215.13
Shale, sandy, black
215.75
Sandstone, coarse grained, arkosic, white.
216.42
Sandstone, fine grained, with black shale, brownish gray.
218.56
Sandstone, medium grained, micaceous, brownish white.
219.70
Shale, coaly, black.
220
220.78
Sandstone, coarse grained, arkosic, conglomeratic, white.
221.93
Sandstone, fine grained, micaceous, at the top, mica coal, brownish white.
222.23
Shale, in part carbonaceous, black.
222.37
Shale, black, and sandstone, fine grained, in alternation.
222.56
Sandstone, fine grained, brownish gray.
224.53
Sandstone, medium grained, micaceous, brownish white to white.
224.78
Shale, black, with fine-grained sandstone.
THE END OF HOLE

HOLE NO : LD12

AREA : LUBHUKU

DATE DRILLED : 18. OCT. 1984 ~ 2. NOV. 1984

TOTAL DEPTH : 310.45m

ELEVATION : +380m

COORDINATE : X=+2,930,000, Y=-78,000

国際協力事業団
15156
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JAPAN INTERNATIONAL COOPERATION AGENCY

Borehole Log LD12

Dwg	4 E	Scale	1 : 200
Date	Sep 1985	Prepared by	S. Murakami, H. Watanabe

Depth of Borehole (M)	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	Core Recovery
0						
3.40					Soil, and weathered rock	non-coring
10.30					Shale, sandy, weathered, dark brownish gray	100%
10.83					Sandstone, fine to medium grained, weathered, partly iron oxide stained	
11.23					Shale, sandy, carbonaceous, little weathered, light gray	
16.11					Sandstone, very fine grained, interbedded thin shale layer, weathered, light brown	
17.14					Sandstone, medium to coarse grained, with carbonaceous matter, weathered, brownish gray	
17.41					Sandstone, medium grained, with clay, less weathered, brown	
19.55					Sandstone, coarse grained, partly bioturbated, weathered, light brownish gray	
20						
22.02					Sandstone, medium grained, laminated, light gray	
24.98					Sandstone, medium grained, little bioturbated, arkosic, whitish gray	
25.15					Sandstone, very fine grained, laminated, gray	
25.75					Sandstone, fine to medium grained, little bioturbated, arkosic, whitish gray	
29.18					Sandstone, fine to medium grained, little laminated, arkosic, light gray	100%
30						
34.17					Sandstone, very fine to fine grained, micaceous, rhythmic laminated with thin shale layer, light gray	
34.64					Shale, sandy, carbonaceous at the lower part, dark gray	
37.00					Sandstone, coarse grained, with carbonaceous matter, light gray	
39.43					Sandstone, medium grained, bioturbated, with mica, light gray	
40						
42.27					Sandstone medium grained, partly, bioturbated, light gray	
43.85					Sandstone, fine to medium grained, well bioturbated, gray	
47.25					Sandstone, coarse grained, arkosic, with mica, white	
49.43					Sandstone fine grained, laminated, micaceous, gray	
49.70					Shale, sandy, dark gray	
50.17					Sandstone, fine to medium grained, bioturbated, with mica, gray	100%
50.66					Shale, sandy, dark gray	
51.37					Sandstone, fine to medium grained, partly bioturbated, gray	
53.86					Shale, sandy, rhythmic, partly interbedded thin sandstone layer, with small "gravel" (pebble) gray to dark gray	
54.53					Sandstone, coarse grained, arkosic, white	
55.24					Sandstone, fine grained, micaceous, light gray	
58.13					Sandstone, very fine grained, bioturbated, micaceous, gray	
59.48					Shale, partly interbedded thin sandstone layer, whitish gray	
60						
61.05					Sandstone, very fine grained, bioturbated, micaceous, gray	
61.74					Sandstone, fine to medium grained, well sorted, bioturbated, gray	
64.65					Sandstone, medium grained, partly bioturbated, light gray	
68.22					Sandstone, fine to medium grained, laminated, micaceous, gray	
70.66					Shale, sandy, nearly carbonaceous, whitish gray	100%
71.09					Sandstone, fine to medium grained, micaceous, well sorted, light gray	
72.15					Shale, partly sandy, carbonaceous at the lower part, whitish gray	
73.45					Sandstone fine to medium grained, with mica, light gray	
74.88					Sandstone very fine grained, bioturbated, micaceous, gray	
75.30			4°		Shale, sandy, partly bioturbated, dark gray	
75.90					Sandstone, coarse grained, arkosic, white	
76.60			50°		Sandstone medium grained, laminated, micaceous, gray	
77.75					Shale, partly sandy, carbonaceous, with thin coal layer	
78.84					Sandstone, fine to medium grained, laminated, micaceous, gray	
80						
82.64					Sandstone, coarse grained, arkosic, white	
84.40					Sandstone, fine grained, laminated, partly indurated, light gray	
85.62					Shale and fine grained sandstone, rhythmic laminated, gray	
86.01					Shale, sandy, dark gray	
86.37					Sandstone, fine grained, laminated, micaceous, gray	
86.83					Shale, sandy, partly coal, laminated, fracture, gray	
87.26					Shale and fine grained sandstone, rhythmic laminated, gray	
88.96					Sandstone, fine grained, bioturbated, micaceous, gray	100%
90						
91.45					Sandstone, medium grained, arkosic, partly with carbonaceous matter, fractured, whitish gray	
92.16					Sandstone, fine grained, bioturbated, with mica, light gray	
92.35					Shale sandy, carbonaceous	
93.69					Sandstone, fine grained, bioturbated, with mica, light gray	
93.26					Sandstone, coarse grained, arkosic, with mica, whitish gray	
94.45					Shale, carbonaceous, with thin coal layer	
99.32					Sandstone, fine to medium grained partly coarse grained, laminated, with mica, light gray	
100						
99.82					Sandstone, fine to medium grained, partly bioturbated, arkosic, whitish gray	
101.30					Sandstone medium grained, arkosic white	
104.81					Sandstone, medium grained, little laminated, with mica, light gray	
105.60					Sandstone, fine grained, indurated, greenish gray	
106.14					Sandstone, very fine grained, laminated, micaceous, gray	
106.54					Shale, sandy, rhythmic laminated, with thin sandstone layer, gray	
108.75					Sandstone, medium grained, little laminated, with mica, light gray	
109.58					Sandstone, fine grained, well laminated, micaceous, light gray	100%
110						
109.91					Sandstone, medium grained, little laminated, with mica, light gray	
111.32					Sandstone, very fine grained, bioturbated, micaceous, dark gray	
111.84					Sandstone, medium grained, arkosic, white	
113.05					Sandstone very fine grained, partly indurated, rythmetic, gray	
113.93					Sandstone, coarse grained, partly conglomeratic, arkosic, white	
114.17					Sandstone, very fine grained, micaceous, rythmetic, dark gray	
115.57					Sandstone, coarse grained arkosic, white	
115.66					Shale, carbonaceous, with thin coal layer	
116.42					Sandstone, coarse grained, arkosic, whitish gray	
116.61					Shale, sandy, rhythmic, with sandstone, dark gray	
116.77					Sandstone, coarse grained, arkosic, white	
117.40			35°		Sandstone, fine grained, gray	
117.73					Coal, bright, with thin sandstone layer	
118.05					Shale, carbonaceous	
118.59					Sandstone, fine to medium grained, laminated, gray	
119.36					Shale, sandy, with thin coal layer, dark gray	
120.28					Sandstone, very fine to fine grained, laminated, micaceous, gray	
120.54					Shale, sandy, carbonaceous	
120.82					Sandstone very fine grained, carbonaceous, whitish gray	
121.44					Sandstone, medium to coarse grained, with mica, gray	
122.45					Sandstone, very fine to fine grained, laminated, micaceous, gray	
124.45					Shale, carbonaceous with sandstone, one layer	
126.25					Sandstone fine to medium grained, with mica, gray	
128.75					Sandstone fine grained, bioturbated, micaceous, gray	100%
130						
132.17					Sandstone, coarse grained, arkosic, with mica, whitish gray	
132.78			5°		Shale, carbonaceous, partly pyrite rich	
133.54					Sandstone very fine grained, laminated, micaceous, gray	
134.08					Sandstone medium grained, with mica, gray	
134.83					Shale partly sandy, carbonaceous	
135.20					Shale sandy, dark gray	
135.74					Sandstone very fine grained, laminated, micaceous, dark gray	
136.44					Sandstone medium to coarse grained, arkosic, white	
136.98					Coal, bright with shale	
137.49					Sandstone very fine grained, laminated, micaceous, gray	
138.85					Sandstone very coarse grained, arkosic, white	
140.05					Sandstone fine grained, laminated, micaceous, gray	
150						100%

15156

HOLE NO. : LD13

AREA : LUBUKU

DATE DRILLED : 3. NOV. 1984 ~ 13. NOV. 1984

TOTAL DEPTH : 319.40m

ELEVATION : +264 m

COORDINATE : X = + 2,830,000, Y = - 79,000

JAPAN INTERNATIONAL COOPERATION AGENCY

Borehole Log LD13

Dwg.	4m	Scale	: 200
Date	Sep. 1985	Prepared by	S.Morikawa, H.Watanabe

(M) Depth of Borehole (M)	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	Core Recovery
0						
7.25					Soil and weathered rock.	non-coring
7.65					Shale, sandy, weathered, dark brownish gray.	
10						100%
14.06					Shale, sandy, partly little weathered, laminated, dark gray.	
20					Sandstone, coarse grained, arkosic, whitish gray, partly intercalated thin shale, little weathered along cracks.	
20.85						
23.70					Shale, sandy, dark gray.	
28.42					Sandstone, medium grained, little bioturbated, light gray.	
29.15					Sandstone, fine grained, micaceous, well bioturbated, gray.	
29.34					Shale, sandy, with fine/medium sandstone, dark gray.	
30 29.59					Sandstone, medium grained, little bioturbated, light gray.	100%
31.42					Sandstone, medium grained, cross laminated, light gray.	
31.70					Shale, sandy, pyrite rich, dark greenish gray.	
32.79					Sandstone, coarse grained, arkosic, whitish gray.	
33.90					Sandstone, medium grained, little laminated with carbonaceous, light gray.	
38.35					Sandstone, medium grained, arkosic, partly little bioturbated, whitish gray.	
40						
42.25					Sandstone medium grained, arkosic, little laminated, whitish gray.	
44.98					Sandstone fine to medium grained, well laminated, micaceous, gray.	
45.21					Sandstone, fine grained, well laminated, micaceous, gray.	
46.60					Shale and fine sandstone, rhythmic laminated.	
48.05					Sandstone, coarse grained, arkosic, whitish gray.	
49.63					Sandstone, medium grained, partly bioturbated, with mica, light gray.	
50 50.56					Sandstone, fine grained, well bioturbated, gray.	100%
52.60					Sandstone medium grained, arkosic, partly bioturbated, whitish gray.	
54.13					Sandstone, fine grained, well bioturbated, gray.	
54.89					Sandstone, medium grained, cross laminated, arkosic, whitish gray.	
59.13					Sandstone, coarse to very coarse grained, partly medium grained, arkosic, whitish gray.	
60 60.96					Sandstone, fine grained, rhythmite with shale, gray.	
61.09					Sandstone medium grained, partly with thin shale band, arkosic, whitish gray.	
63.79					Sandstone fine grained, little bioturbated, gray.	
65.09					Sandstone, fine grained, well laminated, micaceous, gray.	
66.41					Shale and fine sandstone, rhythmic laminated, micaceous, gray.	
66.90					Sandstone, medium grained, partly with thin shale, light gray.	
68.24					Sandstone, coarse grained, arkosic, whitish gray.	
69.00					Sandstone, fine grained, well bioturbated, gray.	
70 70.17					Sandstone, medium grained, arkosic, whitish gray.	100%
71.48					Sandstone, very fine to fine grained, bioturbated, gray.	
72.47					Shale, sandy, rhythmic laminated with sandstone, gray.	
74.48					Sandstone, fine grained, bioturbated, gray.	
75.15					Sandstone, medium to coarse grained, with mica, light gray.	
76.70					Sandstone, medium grained, little laminated, light gray.	
77.23			60		Sandstone, fine grained, well laminated, micaceous, gray.	
77.50			30		Dolerite, silty looks, with calcite veins, greenish gray.	
80						
81.70					Sandstone and shale, rhythmic laminated.	
82.00					Shale, carbonaceous.	
82.30					Sandstone, medium grained, with carbonaceous matter, light gray.	
83.75					Sandstone and shale rhythmic laminated.	
84.00					Sandstone, medium grained, with carbonaceous matter, light gray.	
85.30					Sandstone, fine grained, bioturbated, light gray.	
85.82					Sandstone, medium to coarse grained, little sorting, light gray.	
87.75					Sandstone, fine grained, bioturbated, partly rhythmites, gray.	
88.71					Sandstone, coarse grained, little laminated, arkosic, light gray.	
89.00					Sandstone medium grained, little sorting, micaceous, gray.	
90 89.55					Sandstone coarse grained, little laminated arkosic, light gray.	100%
90.85					Sandstone medium grained, under bedding thin shale band, gray.	
91.35					Sandstone fine grained, well bioturbated, gray to dark gray.	
91.85					Sandstone, coarse grained, arkosic, whitish gray.	
92.30					Sandstone, medium grained, bioturbated, light gray.	
93.03					Sandstone, coarse grained, arkosic, whitish gray.	
93.38					Shale, sandy well laminated, dark gray.	
94.55			0°		Coal, stuff with bright shale cross-rings.	
96.24					Sandstone fine grained, well laminated, micaceous, gray.	
96.90					Sandstone medium grained, light gray.	
98.08					Sandstone, coarse grained, grading, arkosic, whitish gray.	
100 100.00					Sandstone, fine grained, well laminated, micaceous gray.	
104.25			50		Sandstone, very fine to fine grained, well laminated, with calcite veins, gray.	
105.80			60		Dolerite, very fine grained, basaltic, dark gray.	
106.53					Shale, indurated, partly brecciated, gray.	
108.70					Sandstone, medium to coarse grained, arkosic, whitish gray.	
110 109.57					Sandstone, very fine grained, laminated, indurated, gray.	100%
110.77			30		Sandstone, medium grained, arkosic, whitish gray.	
119.85					Dolerite, silty looks, dark gray.	
120.40					Dolerite, very fine grained, basaltic, dark gray.	
120 120.48			0°		Dolerite, silty looks, dark gray.	
123.63					Sandstone, medium grained, partly laminated, light gray.	
124.17					Sandstone, fine grained, well laminated, micaceous, gray.	
125.45					Sandstone and shale, rhythmites, micaceous.	
129.20					Sandstone, medium grained, laminated, with mica, light gray.	
129.48					Sandstone and shale, rhythmic laminated.	
130.66					Sandstone, coarse grained, arkosic, light gray.	100%
130 130.85					Sandstone, fine grained, carbonaceous matter rich, dark gray.	
131.90					Sandstone, coarse grained, arkosic, whitish gray.	
132.75					Sandstone coarse grained, arkosic, intruded by dolerite, gray.	
134.95					Sandstone, coarse grained, arkosic, whitish gray.	
135.10					Sandstone, fine grained, carbonaceous matter rich, dark gray.	
139.15					Sandstone, coarse grained, arkosic, whitish gray.	
140.30					Sandstone very fine to fine grained, cross laminated, with thin coal layers, gray.	
140 141.19					Shale, sandy, carbonaceous at the lower part, dark gray.	
141.89					Sandstone, medium grained, arkosic, whitish gray.	

Depth	Description
84.00	Sandstone, medium grained, with carbonaceous matter, light gray
85.30	Sandstone, fine grained, bioturbated, light gray
85.62	Sandstone, medium to coarse grained, lit arenite, light gray
87.75	Sandstone, fine grained, bioturbated, partly rhythmites, gray
88.71	Sandstone, coarse grained, little laminated, arkosic, light gray
89.00	Sandstone medium grained, lit arenite, micaceous, gray
89.55	Sandstone, coarse grained, little laminated, arkosic, light gray
90.65	Sandstone medium grained, interbedded thin shale, gray
91.30	Sandstone, fine grained, weak bioturbated, gray to dark gray
91.85	Sandstone, coarse grained, arkosic, whitish gray
92.30	Sandstone, medium grained, bioturbated, light gray
94.05	Sandstone, coarse grained, arkosic, whitish gray
94.38	Shale, sandy, well laminated, dark gray
95.55	Coal dull with sandy shale, gypsum crust
96.24	Sandstone fine grained, well laminated, micaceous, gray
96.90	Sandstone medium grained, light gray
98.08	Sandstone coarse grained, grading arkosic, whitish gray
100.05	Sandstone, fine grained, well laminated, micaceous, gray
105.25	Sandstone, very fine to fine grained, well laminated, with calcite veins, gray
105.80	Dolerite, very fine grained, basaltic, dark gray
106.52	Shale, indurated, partly brecciated, gray
108.70	Sandstone, medium to coarse grained, arkosic, whitish gray
109.97	Sandstone, very fine grained, laminated, indurated, gray
110.77	Sandstone, medium grained, arkosic, whitish gray
110.85	Dolerite, silty base, dark gray
120.40	Dolerite, very fine grained, basaltic, dark gray
120.48	Dolerite, silty base, dark gray
123.03	Sandstone, medium grained, partly laminated, light gray
124.17	Sandstone fine grained, well laminated, micaceous, gray
125.46	Sandstone and shale, rhythmites, micaceous
129.20	Sandstone, medium grained, unimixed, with mica, light gray
129.46	Sandstone and shale, lenticular laminated
130.66	Sandstone coarse grained, arkosic, light gray
130.93	Sandstone fine grained, carbonaceous matter rich, dark gray
131.50	Sandstone, coarse grained, arkosic, whitish gray
132.75	Sandstone, coarse grained, arkosic, intruded by dolerite, gray
134.95	Sandstone, coarse grained, arkosic, whitish gray
135.10	Sandstone, fine grained, carbonaceous matter rich, dark gray
136.15	Sandstone, coarse grained, arkosic, whitish gray
140.30	Sandstone very fine to fine grained, cross laminated, with thin coal layer, gray
141.19	Shale, sandy, carbonaceous at the lower part, dark gray
141.99	Sandstone, medium grained, arkosic, whitish gray
144.90	Sandstone, very fine to fine grained, well laminated micaceous, gray
146.30	Shale, whitish gray
146.51	Sandstone, fine grained, well laminated, micaceous, gray
147.52	Sandstone, medium grained, arkosic, whitish gray
148.42	Sandstone, fine to medium grained, lithoarenite, with mica, gray
150.58	Sandstone, very fine grained, laminated, micaceous, gray
151.30	Sandstone, coarse grained, arkosic, whitish gray
152.93	Shale, sandy, carbonaceous at the upper part, dark gray
156.72	Sandstone, coarse grained, arkosic, whitish gray
157.84	Shale, carbonaceous
159.67	Sandstone coarse grained, arkosic, whitish gray
160.05	Coal dull with bright
160.19	Shale, carbonaceous
175.22	Sandstone coarse to very coarse grained, partly medium grained, arkosic, whitish gray
176.93	Sandstone medium grained, arkosic, light gray
177.94	Sandstone coarse grained, arkosic, whitish gray
179.22	Sandstone very fine grained, well laminated, micaceous, gray
179.57	Sandstone, coarse grained, arkosic whitish gray
179.86	Coal bright and dull
180.13	Shale, carbonaceous
181.65	Shale and sandstone, rhythmites, micaceous
182.98	Sandstone, very fine to fine grained, well laminated, micaceous, gray
183.44	Coal bright and dull
183.57	Shale, carbonaceous
183.67	Sandstone very fine to fine grained, light gray
184.66	Shale, sandy, rhythmites with thin coal layer, dark gray
186.20	Shale and sandstone rhythmites dark gray
186.42	Coal, bright and dull
187.00	Sandstone, fine grained, rhythmic laminated with thin shale
187.82	Sandstone coarse grained, arkosic whitish gray
188.50	Sandstone very fine to fine grained, laminated micaceous, gray
189.21	Shale carbonaceous
190.15	Coal bright and dull with shale, carbonaceous
192.00	Sandstone very fine to fine grained, well laminated, micaceous gray
198.00	Sandstone, coarse to very coarse grained, arkosic, whitish gray
199.48	Coal, bright with dull
199.68	Shale, sandy, dark gray
200.20	Sandstone medium grained, little laminated, with mica, light gray
204.42	Sandstone, coarse grained, partly conglomeratic, arkosic, whitish gray
204.60	Coal bright and dull
204.65	Shale, carbonaceous
211.22	Sandstone, coarse grained, arkosic, whitish gray
212.37	Sandstone medium to coarse grained, little laminated, arkosic whitish gray
212.63	Coal, bright with dull
213.30	Sandstone very fine to fine grained, laminated, gray
213.92	Sandstone, medium grained, laminated with mica, light gray
215.62	Sandstone, coarse grained, partly with carbonaceous matter, whitish gray
216.40	Sandstone and shale, rhythmites carbonaceous at the upper part
216.68	Coal, dull with bright
217.25	Sandstone fine grained partly with carbonaceous matter, light gray
218.72	Sandstone, medium grained, arkosic, whitish gray
220.35	Shale and sandstone rhythmites, dark gray
220.59	Coal bright and dull
221.17	Shale carbonaceous
221.48	Shale, sandy rhythmic laminated with sandstone dark gray
221.82	Sandstone fine grained, laminated, gray
222.05	Coal, dull with bright
223.40	Shale, sandy carbonaceous
225.34	Sandstone, coarse grained, arkosic, whitish gray
226.40	Sandstone medium grained, little laminated, light gray
226.78	Conglomerate, ϕ max = 3 mm, subangular quartz, feldspar rich, with little matrix
229.52	Sandstone coarse grained, arkosic, whitish gray
230.60	Coal dull with bright burnt
230.92	Shale, carbonaceous
238.00	Sandstone, coarse grained, partly conglomeratic, with mica light gray
238.14	Coal, dull burnt
238.78	Sandstone, fine grained, laminated, gray
255.90	Sandstone, coarse grained, partly conglomeratic, arkosic, whitish gray
256.51	Sandstone fine grained, laminated, micaceous gray
256.82	Coal burnt with bright
256.85	Shale, carbonaceous
257.00	Dolerite, silty base, light greenish gray
257.50	Sandstone, fine grained laminated, with mica, gray
259.44	Coal dull with bright burnt
261.90	Sandstone fine grained, well laminated, micaceous, gray
262.03	Shale, carbonaceous
262.27	Coal bright and dull
262.61	Shale, carbonaceous
263.08	Sandstone medium to coarse grained, lithoarenite dark gray
263.86	Shale, sandy carbonaceous

Depth	Description
150.58	Sandstone, very fine grained, laminated, micaceous, gray.
151.30	Sandstone, coarse grained, arkosic, whitish gray.
152.93	Shale, sandy, carbonaceous at the upper part, dark gray.
156.77	Sandstone, coarse grained, arkosic, whitish gray.
157.94	Shale, carbonaceous.
159.67	
160.05	Sandstone, coarse grained, arkosic whitish gray.
160.19	Coal dull with bright.
	Shale, carbonaceous.
176.22	Sandstone, coarse to very coarse grained, partly medium grained, arkosic whitish gray.
176.63	Sandstone, medium grained, arkosic, light gray.
177.94	Sandstone, coarse grained, arkosic, whitish gray.
179.29	Sandstone, very fine grained, well laminated, micaceous, gray.
179.57	Sandstone, coarse grained, arkosic, whitish gray.
179.86	Coal, bright and dull.
180.13	Shale, carbonaceous.
181.05	Shale and sandstone, rhythmites, micaceous.
182.38	Sandstone, very fine to fine grained, well laminated, micaceous, gray.
183.44	Coal, bright and dull.
183.57	Shale, carbonaceous.
183.67	Sandstone, very fine to fine grained, light gray.
184.86	Shale, sandy rhythmites with thin coal layer, dark gray.
186.20	Shale and sandstone, rythmites, dark gray.
186.42	Coal, bright and dull.
187.00	Sandstone, fine grained, rhythmic, laminated with thin shale.
187.82	Sandstone, coarse grained, arkosic whitish gray.
188.90	Sandstone, very fine to fine grained, rhythmites, micaceous, gray.
189.21	Shale, carbonaceous.
190.15	Coal, bright and dull with shale, carbonaceous.
192.00	Sandstone, very fine to fine grained, well laminated, micaceous, gray.
198.90	Sandstone, coarse to very coarse grained, arkosic, whitish, gray.
199.46	Coal, bright with dull.
199.88	Shale, sandy, dark gray.
200.30	Sandstone, medium grained, little laminated, with mica, light gray.
204.42	Sandstone, coarse, grained, partly conglomeratic, arkosic, whitish gray.
204.60	Coal, bright and dull.
204.83	Shale, carbonaceous.
211.29	Sandstone, coarse, grained, arkosic, whitish gray.
212.37	Sandstone medium to coarse grained, little laminated, arkosic, whitish gray.
212.63	Coal, bright with dull.
213.30	Sandstone, very fine to fine grained, laminated, gray.
213.92	Sandstone, medium grained, laminated with mica, light gray.
215.62	Sandstone, coarse, grained, partly with carbonaceous matter, whitish gray.
216.40	Sandstone and shale, rhythmites, carbonaceous at the upper part.
216.69	Coal, dull with bright.
217.25	Sandstone, fine grained, partly with carbonaceous matter, light gray.
219.72	Sandstone, medium grained, arkosic, whitish gray.
220.10	Shale and sandstone, rythmites, dark gray.
220.59	Coal, bright and dull.
221.17	Shale carbonaceous.
221.49	Shale, sandy, rhythmic, laminated with sandstone, dark gray.
221.82	Sandstone, fine grained, laminated, gray.
222.08	Coal, dull with bright.
223.40	Shale, sandy, carbonaceous.
225.64	Sandstone, coarse grained, arkosic, whitish gray.
228.40	Sandstone, medium grained, little laminated, light gray.
228.78	Conglomerate, 7 max = 5 mm, subangular, quartz, feldspar rich, with little matrix.
229.52	Sandstone, coarse grained, arkosic, whitish gray.
230.60	Coal dull with bright burnt.
230.82	Shale, carbonaceous.
238.00	Sandstone, coarse grained, partly conglomeratic, with mica light gray.
238.14	Coal, dull burns.
238.78	Sandstone, fine grained, laminated, gray.
256.90	Sandstone, coarse grained, partly conglomeratic, arkosic, whitish gray.
256.51	Sandstone, fine grained, laminated, micaceous gray.
256.82	Coal, burnt with bright.
256.85	Shale, carbonaceous.
257.00	Calcrete, hard, very hard, light greenish gray.
257.56	Sandstone, fine grained, laminated, with mica, gray.
259.44	Coal, dull with bright, burnt.
261.90	Sandstone, fine grained, well laminated, micaceous, gray.
262.03	Shale, carbonaceous.
262.27	Coal, bright and dull.
262.61	Shale, carbonaceous.
263.08	Sandstone, medium to coarse grained, lithomictic, dark gray.
263.85	Shale, sandy, carbonaceous.
264.70	Shale, carbonaceous.
266.12	Sandstone, coarse grained, partly indurated, arkosic, whitish gray.
266.35	Sandstone, coarse grained, interbedded thin shale, whitish gray.
266.63	Sandstone, coarse grained, with carbonaceous matter, light gray.
267.31	Shale, sandy, carbonaceous.
267.40	Sandstone, coarse grained, with carbonaceous matter, light gray.
268.20	Coal, dull with bright.
268.82	Sandstone, fine grained, with carbonaceous matter, dark gray.
276.33	Sandstone, coarse grained, conglomeratic at the lower part, arkosic, whitish gray.
277.34	Coal, dull with bright.
277.73	Shale, carbonaceous.
279.95	Sandstone, medium grained, micaceous, dark gray.
280.80	Conglomerate, 4 max = 10 mm, subangular, quartz, feldspar rich.
282.53	Sandstone, coarse grained, partly conglomeratic, mica rich, gray.
282.97	Coal, burnt with dull.
283.90	Sandstone, very fine to fine grained, rhythmites, micaceous, light gray.
284.50	Sandstone, medium grained, light gray.
285.97	Sandstone, coarse grained, with carbonaceous matter, gray.
286.46	Sandstone, fine grained, partly indurated, gray to dark gray.
290.40	Coarse grained, arkosic, with calcite veins, partly indurated, whitish gray.
294.40	Dolerite, fine grained, basaltic, dark gray.
319.80	Dolerite, coarse grained, partly with serpentinization slickenscracks, dark greenish gray.
	End of hole.

Depth scale: 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320

Core recovery: 100%, 100%, 100%, 100%, 100%, 100%, 100%, 100%

HOLE NO. : LD14

AREA : LUBHUKU

DATE DRILLED : 11.SEP.1984~10.OCT.1984

TOTAL DEPTH : 460.25m

ELEVATION : +260m

COORDINATE : X =+2,930,040, Y =-79,910

15156

JAPAN INTERNATIONAL COOPERATION AGENCY

Borehole Log LD14

Dwg.	4 n	Scale	1 : 200
Date : Sep. 1985	Prepared by : S. Morikawa, H. Watanabe		

Depth of Borehole (M)	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	Core Recovery
(M) 0						
3.00					Soil, brown.	non-coring
10						
20						
21.35					Sandstone, medium grained, weathered, light brownish gray	
27.10					Sandstone, coarse grained, little weathered, light brownish gray	100%
27.87					Shale, carbonaceous	
28.02					Coal, dull, easy to broke.	
29.06					Shale, dark gray, carbonaceous at the upper part, little weathered	
30 30.33					Sandstone, fine grained, little weathered, gray.	
31.35					Sandstone, medium grained, light gray.	
32.00					Sandstone, fine to medium grained, little weathered, gray	
32.56					Sandstone, medium grained, with mica, light gray.	
34.02					Sandstone, coarse grained, with mica, light gray.	
38.00					Sandstone, fine to medium grained, laminated, with mica, light gray	
38.45					Sandstone, medium grained, with carbonaceous matter, white	
40 38.85					Sandstone, fine grained, laminated, with mica, white.	
40.85					Sandstone, very fine grained, partly with thin shale, ready	
43.10					Sandstone, medium grained, arkosic, with mica, white.	
47.62					Sandstone, fine to medium grained, laminated, with mica, whitish gray	
48.18					Sandstone, very fine grained, with carbonaceous matter	
50 50.25			3°		Shale, partly with thin sandstone layer, dark gray	100%
50.70					Sandstone, medium grained, arkosic, with mica, white.	
51.06					Sandstone, fine grained, with carbonaceous matter, light gray	
52.55					Shale, sandy, rhythmic, laminated, with thin sandstone layer, gray	
57.25					Sandstone, medium grained, arkosic, with thin shale at the lower part, whitish gray	
59.20					Sandstone and shale in alternation, whitish gray	
60 62.40					Shale, interbedded thin sandstone layer, light gray	
63.40					Shale and sandstone, fine grained in alternation, light gray	
64.25					Sandstone, fine grained, with carbonaceous matter, irregularly whitish gray	
68.00					Sandstone, medium grained, partly with thin shale, whitish gray	
69.65					Sandstone medium grained, arkosic, with mica, white.	
70 70.92					Sandstone, fine grained with pyrite, light gray.	100%
72.55					Sandstone medium grained, arkosic, with mica, white.	
76.40					Sandstone, fine to medium grained, arkosic, with mica, white, laminated, shale rich at the upper part.	
80						
85.25					Shale, partly sandy, gray.	
86.20					Sandstone and shale in alternation, light gray.	
90 90.25					Sandstone, fine grained, arkosic, whitish gray.	100%
90.88					Shale, sandy, calcareous, light gray.	
93.20					Sandstone, fine grained, light gray.	
99.60					Shale, sandy, gray.	
100 100.20					Shale, sandy, calcareous, light gray.	
107.80					Shale, sandy, gray.	
107.94					Shale sandy, calcareous, light gray.	
108.40					Sandstone, medium grained, arkosic, with mica, white.	
110 109.10					Shale, with lenticular sandstone, gray.	100%
109.40					Sandstone medium grained, arkosic, white	
116.10			8°		Shale, sandy, partly with lenticular sandstone, gray.	
118.60			60°		Sandstone medium grained, arkosic, with carbonaceous matter, white	
120 120.25			0°		Breccia breccia, with shale fragments, greenish gray.	
123.85					Sandstone, medium grained, arkosic, with carbonaceous matter, white	
124.10					Sandstone, fine grained, with thin shale, light gray	
125.30					Sandstone, medium grained, arkosic, with mica, white.	
125.90					Shale, interbedded thin sandstone, light gray	
130 132.50					Sandstone, fine to medium grained, arkosic, with mica, white.	100%
138.10					Sandstone, fine to medium grained, laminated, whitish gray	
138.3					Breccia, weathered, greenish gray	
140 140.07					Sandstone fine grained, laminated, with small fault, light gray	
141.25					Sandstone, fine grained, interbedded thin shale, carbonaceous, gray.	
142.10					Sandstone coarse grained, arkosic, with mica, white.	
145.30					Sandstone, medium grained, with carbonaceous matter, light gray.	
146.27					Sandstone, medium grained, arkosic, with mica, white.	
148.30					Sandstone, medium grained, arkosic, laminated, with mica, light gray	

Depth	Dip	Description
149.27		Sandstone, medium grained, arkosic, with mica, white.
149.30		Sandstone, medium grained, arkosic, laminated with mica, light gray.
150		Quartz vein along crack
155.84		Sandstone, coarse grained, arkosic, with mica, white.
156.27		Shale, sandy and carbonaceous, in alternation, gray.
158.12		Sandstone, medium grained with carbonaceous matter, light gray.
160		
162.75		Sandstone and shale in alternation, gray to light gray.
164.60		Sandstone, medium grained, arkosic, white.
167.4		Sandstone, fine grained, with carbonaceous matter, light brownish gray.
168.12	7°	Shale, sandy, carbonaceous.
168.96		Sandstone, fine to medium grained, with siderite, light brownish gray.
170		
170.60		Sandstone, fine grained, with carbonaceous matter, light brownish gray.
171.72		Sandstone, medium grained, arkosic, with mica, white.
172.90		Sandstone, fine grained, medium, whitish gray.
172.90		Sandstone, medium grained, arkosic, with mica, white.
173.20		Sandstone, coarse grained, arkosic, with mica, white.
174.38		Sandstone, fine grained, arkosic, laminated, with mica, white.
174.42		Sandstone, very fine to fine grained, micaceous, laminated, brownish gray.
175.83		Shale, sandy, carbonaceous.
176.25		Sandstone, very fine grained and shale, sandy, in alternation.
177.15		Shale, sandy, carbonaceous.
178.65		Sandstone, fine grained, well laminated, interbedded at the bottom, light gray.
180		
182.10	0°	Diorite, very fine grained, basaltic, greenish gray.
182.30		Shale, laminated, light gray.
184.25		Shale, sandy, carbonaceous.
186.50		Shale, carbonaceous.
186.55		Sandstone, medium grained, arkosic, with mica, white.
187.70		Sandstone, fine to medium grained, arkosic, with mica, light gray.
188.60		Diorite, very fine grained, basaltic, greenish gray.
189.40		Shale, sandy, carbonaceous.
189.65		Sandstone, coarse grained, arkosic, white.
190		
192.65		Sandstone, medium grained, arkosic, brownish gray.
193.20		Shale, sandy, carbonaceous.
193.75		Sandstone, medium grained, arkosic, with mica, white.
195.20		Diorite, very fine grained, basaltic, dark greenish gray.
198.80		Sandstone, coarse grained, arkosic, with mica, white.
199.64		Shale, sandy, carbonaceous.
200		
199.85		Coal, dull with bright.
200.37		Shale, sandy, carbonaceous.
207.05		Sandstone, medium to coarse grained, arkosic, with mica, white.
207.95		Sandstone, very coarse grained, arkosic, with mica, white.
210		
211.30		Sandstone, fine grained, laminated, micaceous, gray.
211.50		Shale, sandy, partly carbonaceous, gray.
212.07		Sandstone, fine grained, laminated, with thin shale layer, light gray.
213.22		Diorite, silty toward, basaltic, yellowish gray.
216.64		Sandstone, medium grained, arkosic, with mica, white, with carbonaceous matter as one armor layer.
217.25		Sandstone, fine grained, micaceous, laminated, light gray.
220		
220.37		Sandstone, medium grained, arkosic, with mica, white.
220.51	5°	Coal, bright and dull.
221.50		Sandstone, fine grained, micaceous, well laminated, brownish gray.
223.65		Sandstone, fine grained, laminated, arkosic, with mica, brownish white.
225.20		Sandstone, medium to coarse grained, arkosic, with mica, white.
226.00		Sandstone, fine grained, laminated, arkosic, with mica, brownish white.
228.20		Sandstone, very fine grained, micaceous, with carbonaceous matter, gray.
230		
230.10		Sandstone, fine grained, micaceous, brownish gray.
232.70		Sandstone, fine grained, arkosic, with mica.
233.50		Sandstone, fine grained, laminated, micaceous, brownish white.
234.50	60°	Diorite, very fine grained, basaltic, greenish gray.
235.60		Sandstone, fine grained, laminated, micaceous, light brownish gray.
237.60		Sandstone, fine grained, arkosic, little laminated, brownish white.
238.30		Sandstone, fine grained, with bioturbation, light brownish gray.
238.65		Sandstone, fine grained, arkosic, white.
239.25		Shale, sandy, carbonaceous.
241.15		Sandstone, fine grained, arkosic, with mica, white.
245.81	7°	Sandstone, coarse grained, partly conglomeratic, arkosic, with mica, white.
246.03		Coal, bright and dull.
248.16		Sandstone, fine grained, well laminated, brownish white.
248.38		Shale, sandy, carbonaceous.
249.15		Sandstone, very fine grained, micaceous, laminated, brownish gray.
250		
250.10		Sandstone, fine grained, arkosic, little laminated, brownish white.
253.60	8°	Sandstone, very fine grained, micaceous, with bioturbation, light brownish gray.
254.70		Shale, carbonaceous, with lenticular sandstone.
256.85		Sandstone, fine grained, laminated, with mica, light brownish gray.
258.05		Sandstone, fine grained, with bioturbation, light gray.
259.20		Sandstone, fine grained, laminated, with mica, light gray.
259.60		Sandstone, fine grained, interbedded, quartzose, white.
260		
266.55		Diorite, fine grained, silty toward the margin, greenish gray.
267.25		Sandstone, fine grained, interbedded, quartzose, white.
267.40		Shale, with plant (leaves) fossil, gray.
269.05		Sandstone, medium grained, arkosic, partly with thin shale, gray.
269.21		Sandstone, coarse grained, arkosic, with mica, white.
270		
269.86		Shale, partly sandy, carbonaceous.
271.73		Sandstone, medium grained, arkosic, with mica, laminated, brownish white.
272.60		Shale, sandy, rhythmic laminated with thin sandstone, gray.
273.35		Sandstone, fine grained, laminated, with mica, brownish gray.
273.56		Diorite, very fine grained, light yellowish gray.
273.63		Coal, dull, burnt, sandstone, medium grained, with carbonaceous matter.
273.78		Diorite, very fine grained, light yellowish gray.
274.00		Sandstone, fine grained, laminated, light gray.
274.60		Coal, bright and dull.
274.85		Shale, sandy, carbonaceous.
277.92		Sandstone, medium to coarse grained, arkosic, with mica, white.
280		
280.10		Sandstone, coarse grained, arkosic, with mica, white.
280.25		Shale, carbonaceous.
280.65		Sandstone, medium grained, laminated, with mica, brownish gray.
283.10		Sandstone, coarse grained, arkosic, with mica, white.
284.50		Sandstone, medium grained, arkosic, partly laminated, with mica, white.
290		
289.90		Sandstone, coarse to very coarse grained, arkosic, with mica, white.
291.60		Sandstone, medium grained, micaceous, light brownish gray.
294.35		Sandstone, very coarse grained, conglomeratic, arkosic, white.
294.65		Coal, bright and dull, shale, sandy.
295.70		Shale, sandy, carbonaceous.
296.40		Sandstone, medium grained, well laminated, with mica, light brownish gray.
299.31		Sandstone, medium to coarse grained, arkosic, with mica, white.
300		
299.86		Coal, bright and dull.
300.40		Sandstone, fine grained, thin mica laminated, with thin shale, gray.
302.15		Shale, sandy, carbonaceous.
302.95		Shale, carbonaceous.
302.99		Coal, dull with bright.
305.40		Sandstone, fine to medium grained, laminated, micaceous, light gray.
306.30		Coal, bright and dull, shale, sandy.
306.75		Shale, sandy, carbonaceous.
307.70		Sandstone, fine grained, micaceous, light gray.
310		
311.90		Sandstone, coarse grained, arkosic, with mica, white.
312.11		Sandstone, medium grained, cemented, quartzose, hard, white.
312.90		Sandstone, coarse grained, arkosic, with mica, white.
313.95		Sandstone, fine to medium grained, laminated, with mica, brownish white.
313.96		Coal, bright with dull.
314.82		Shale, sandy, carbonaceous.
315.22		Sandstone, medium grained, with carbonaceous matter, whitish gray.
315.30		Shale, carbonaceous.
315.45		Coal, dull with bright.
316.20	70°	Sandstone, fine to medium grained, interbedded, light gray.
318.80		Diorite, basaltic, chilled margin, yellowish gray.
320		

100%

Depth	Description	Recovery
289.90	Sandstone, coarse to very coarse grained, arkosic, with mica, white	100%
291.60	Sandstone, medium grained, micaceous, light brownish gray	
294.35	Sandstone, very coarse grained, conglomeratic, arkosic, white	
294.65	Coal, bright and dull, shale, sandy	
295.70	Shale, sandy, carbonaceous	
296.40	Sandstone, medium grained, well laminated, with mica, light brownish gray	
299.51	Sandstone, medium to coarse grained, arkosic, with mica, white.	
299.85	Coal, bright and dull	
300.40	Sandstone, fine grained, thin and laminated with thin shale, gray	
302.15	Shale, sandy, carbonaceous.	
302.85	Shale, carbonaceous	
302.95	Coal, dull with bright.	
305.40	Sandstone, fine to medium grained, laminated, micaceous, light gray	
306.30	Coal, bright and dull, shale, coaly	
306.75	Shale, sandy, carbonaceous	
307.70	Sandstone, fine grained, micaceous, light gray	
311.80	Sandstone, coarse grained, arkosic, with mica, white	
312.11	Sandstone, medium grained, indurated, quartzose, hard, white	
312.50	Sandstone, coarse grained, arkosic, with mica, white	
313.65	Sandstone, fine to medium grained, laminated, with mica, brownish white	
313.96	Coal, bright with dull	
314.82	Shale, sandy, carbonaceous	
315.22	Sandstone, medium grained, with carbonaceous matter, whitish gray	
315.30	Shale, carbonaceous	
315.45	Coal, dull with bright.	
316.20	Sandstone, fine to medium grained, indurated, light gray.	
319.80	Dolerite, basaltic, chilled margin, yellowish gray	
330.50	Dolerite, medium grained, greenish gray	
333.40	Dolerite, very fine to fine grained, chilled margin, greenish gray	
333.75	Sandstone, medium grained, laminated, brownish gray	
334.14	Coal, dull with bright, shale, coaly	
334.77	Shale, carbonaceous	
335.21	Shale, sandy, partly with sandstone layer, dark gray	
337.38	Shale and sandstone in alternation, gray	
339.80	Sandstone, coarse grained, light gray	
340.12	Sandstone, fine grained, laminated, with mica, brownish gray	
340.95	Shale, carbonaceous, partly, with lenticular sandstone	
340.98	Coal, dull with bright	
341.45	Sandstone, fine to medium grained, gray	
344.45	Sandstone, medium grained, mica rich, brownish gray	
344.81	Sandstone, coarse grained, arkosic with mica, white	
345.98	Sandstone, medium to coarse grained, mica rich, light brownish gray	
347.35	Sandstone, fine grained, well laminated, micaceous, brownish gray	
348.24	Coal, dull with bright, sandstone, medium grained.	
349.42	Shale, partly sandy, carbonaceous.	
349.88	Sandstone, fine grained, with lenticular shale, gray	
351.20	Sandstone, coarse grained, arkosic, with mica, whitish gray	
352.55	Sandstone, fine to medium grained, partly laminated, white.	
353.20	Sandstone, coarse grained arkosic with mica, white.	
353.85	Conglomerate, pebble-size, quartz rich	
357.17	Sandstone, medium to coarse grained, arkosic, with mica, white	
358.32	Coal, bright and dull	
358.75	Shale, sandy, carbonaceous	
360.10	Sandstone, fine grained, laminated, micaceous, gray.	
362.70	Sandstone, medium to coarse grained, arkosic, with mica, white.	
366.70	Sandstone, coarse grained, arkosic, partly with lenticular shale, white	
366.90	Coal, bright and dull, shale, carbonaceous	
369.75	Sandstone, fine grained, laminated, micaceous, brownish gray.	
370.75	Shale, interbedded lenticular sandstone, dark gray	
372.79	Sandstone, fine grained, partly with carbonaceous matter, laminated, gray	
374.32	Sandstone, medium grained, arkosic, with mica, white	
376.42	Sandstone, medium to coarse grained, arkosic, thick laminated, white.	
379.43	Sandstone, coarse grained, arkosic, with mica, white	
380.85	Sandstone, very coarse grained, conglomeratic, arkosic, with mica, white	
381.50	Sandstone, fine to medium grained, micaceous, brownish gray	
381.73	Shale, sandy, gray	
382.76	Sandstone, coarse grained, arkosic, with lenticular shale, white	
384.77	Sandstone, medium grained, arkosic, mica rich, brownish white	
384.90	Coal, bright and dull	
385.79	Sandstone, fine grained, micaceous, brownish gray	
386.41	Sandstone, medium to coarse grained, arkosic, with mica, white	
387.53	Sandstone, fine grained, micaceous, brownish gray.	
390.35	Sandstone, medium grained, arkosic, micaceous, brownish white	
393.46	Sandstone, coarse grained, arkosic, with mica, white	
394.85	Sandstone, coarse to very coarse grained, arkosic, with mica, white	
396.16	Sandstone, medium grained, with lenticular shale, whitish gray	
396.12	Sandstone, coarse to very coarse grained, arkosic, with mica, white	
396.53	Sandstone, medium to coarse grained, arkosic, with mica, white	
398.37	Sandstone, fine grained, micaceous, brownish gray	
405.70	Sandstone, coarse grained, partly medium grained, arkosic, partly with lenticular shale, white.	
405.82	Conglomerate, pebble-size, white pebble rich.	
406.15	Shale, sandy, gray.	
406.25	Conglomerate, pebble-size, with carbonaceous matter.	
406.35	Sandstone, fine grained, indurated, greenish white	
407.03	Dolerite, fine grained, greenish gray	
408.70	Sandstone, medium to coarse grained, arkosic, with mica, white	
408.98	Coal, bright and dull.	
409.25	Shale, dark gray	
410.74	Sandstone, fine grained, laminated, micaceous, light brownish gray	
411.78	Sandstone, coarse grained, with lenticular shale and pebble veins, white	
412.40	Sandstone, fine grained, micaceous, brownish gray	
413.12	Sandstone, coarse to very coarse grained, arkosic, with mica, white.	
413.32	Sandstone, fine grained, micaceous, brownish gray	
418.05	Sandstone, coarse to very coarse grained, arkosic, with mica, white	
418.75	Sandstone, medium grained, arkosic, with mica, white.	
421.30	Sandstone, coarse grained, arkosic, with mica, white.	
423.92	Sandstone, medium grained, arkosic, with mica, white.	
430.15	Sandstone, fine to medium grained, arkosic, with carbonaceous matter, white	
431.52	Sandstone, fine grained, interbedded thin shale, with mica, brownish gray	
431.91	Shale, sandy, partly carbonaceous, bluish gray	
460.25	Sandstone, coarse grained, arkosic, with mica, partly with carbonaceous matter, white. End of hole.	

HOLE NO	LD-15
AREA	LUSHUKU
DATE DRILLED	JAN.10,1984 – FEB 20,1984
TOTAL DEPTH	450.52m
ELEVATION	+254m
COORDINATE	X=+2,930,000 Y=-81,000

15156

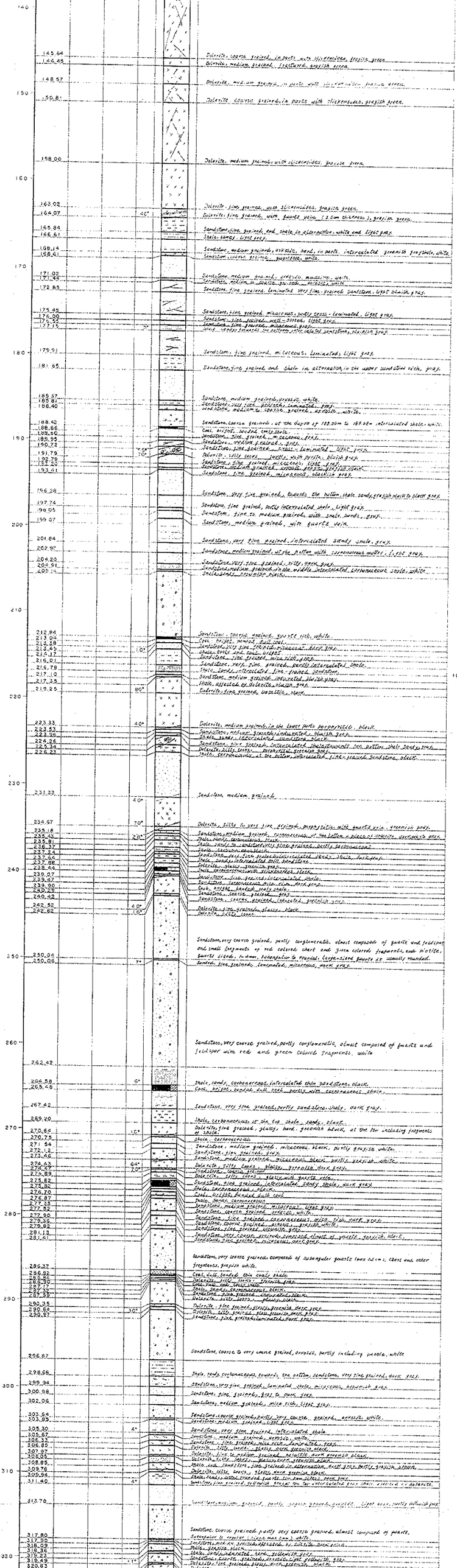
JAPAN INTERNATIONAL COOPERATION AGENCY

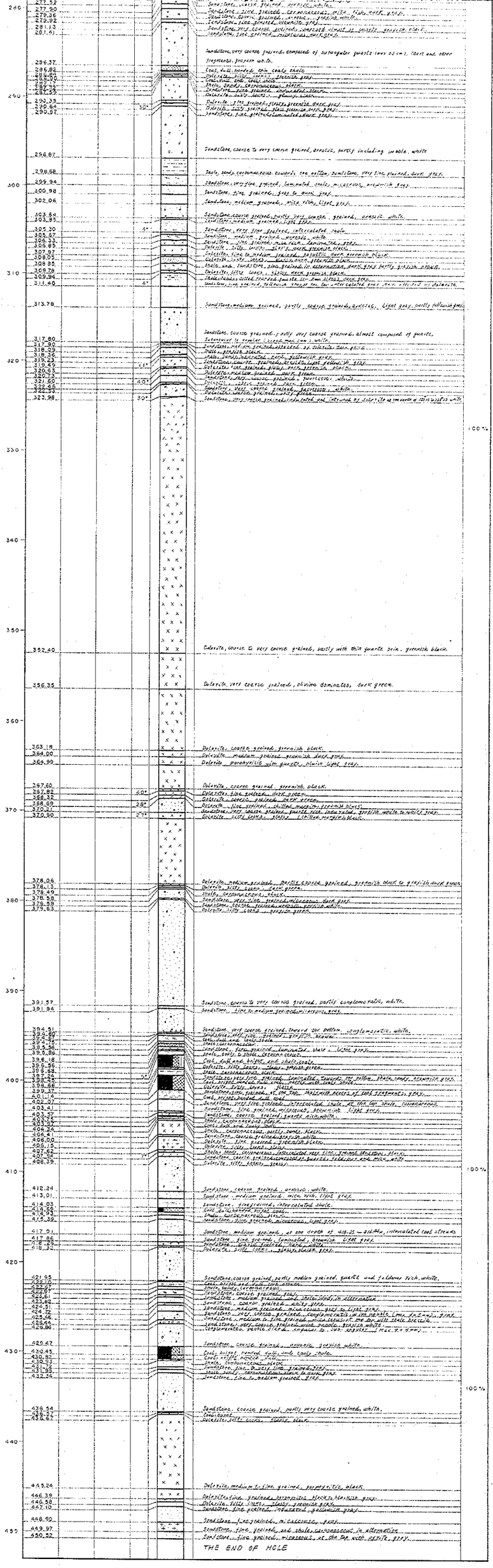
Borehole Log LD-15

Dwg. 40 Scale 1:200

Date : Sep 1984 Prepared by Y.Ishimoto, S.Morikawa

Depth of Bore hole (m)	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Column Section	Rock Description	Core Recovery
1.56					Soil	Drilling / Non-Core
2.32					Shale, weathered, brown	
5.45					Shale, weathered, yellow brown	
6.24					Sandstone, medium grained and shale, weathered, brown	
7.02					Sandstone, medium grained, weathered whitish brown	
10.92					Sandstone, coarse grained, quartz rich, brownish white to white	
15.60					Shale, weathered, brownish gray	
17.94					Shale, partly weathered, gray	
19.50					Shale, carbonaceous, black	
21.06					Shale, carbonaceous, with pieces of coal	
22.62					Shale, carbonaceous, black	
24.96					Shale, carbonaceous, with pieces of coal, black	
25.74					Shale, carbonaceous and coal	
26.06					Coal, pyrite, fractured, soft coal with pyrite	
26.43					Shale, carbonaceous, black	
26.73					Coal, dull with shale, cleavy	
31.20					Shale, carbonaceous, black	
31.58					Coal, dull bundled coal, shale	
31.70					Shale, carbonaceous, black	
31.94					Coal, dull	
32.23					Shale, carbonaceous, black	
32.57					Shale, carbonaceous, dark gray, dull, dull bundled pieces coal	
33.23					Coal, dull bundled, pieces coal	
34.31					Coal, pyrite and quartz, and shale, carbonaceous	
34.70					Shale, carbonaceous	
35.29					Coal, dull, fractured	
35.58					Shale, carbonaceous, thin coal stringers	
36.03					Shale, coal, dull, cleavy, intercalated pieces coal	
36.80					Shale, carbonaceous	
37.44					Coal, pyrite, bundled, dull coal with pyrite	
37.90					Shale, carbonaceous	
38.79					Shale, sandy, carbonaceous, with pyrite	
39.97					Sandstone, fine to medium, partly, fine to coarse white	
40.88					Sandstone, coarse, quartz, pieces and feldspar rich, white	
42.39					Shale, carbonaceous, dull coal, black	
					Shale, carbonaceous, partly calcite thin coal seams	
55.27					Sandstone, coarse grained, arkosic, partly intercalated medium- to fine-grained sandstone	
55.46					Shale, carbonaceous, intercalated thin coal bands	
55.58					Coal, pieces, bundled, dull coal	
55.90					Shale, carbonaceous, with thin coal bands	
57.82					Shale, sandy intercalated fine-grained sandstone, cross-laminated, greyish black	
58.07					Sandstone, medium grained, towards the bottom, coarse grained, at the top frequent carbonaceous	
59.77					remains, fine to medium, frequent intercalation carbonaceous shale, alternately	
61.48					Sandstone fine grained, laminated sandy shale	
64.48					Sandstone, medium grained, with calcite vein, greyish white	
67.12					Sandstone, fine to medium grained, intercalated thick shale, alternately, dark to whitish gray	
70.39					Shale, sandy intercalation thin sandstone, dark gray	
70.92					Sandstone, medium grained, carbonaceous matter, greyish white	
73.49					Sandstone, very fine grained intercalated shale, light gray	
75.24					Sandstone, medium grained, towards the bottom, intercalated shale white	100%
80.84					Sandstone, very coarse grained, quartzose, hard, white	
81.27					Sandstone, fine grained, contains pyrite lignite	
81.51					Sandstone, coarse grained, quartzose, hard, white	
83.28					Sandstone, medium grained and shale in alternation, sandstone, rich, light gray	
85.74					Sandstone, very coarse grained, arkosic, white	
95.21					Sandstone, coarse grained, arkosic, in parts, intercalated shale, white	
96.84					Sandstone, very coarse grained, white	
97.44					Sandstone, medium grained, and shale in alternation	
98.67					Shale, intercalated fine-grained sandstone, dark gray	
105.43					Sandstone medium grained, intercalated shale, white	
110.13					Shale, sandy, intercalated thin sandstone bands, dark gray	
112.75					Shale, sandy, carbonaceous, greyish black	
111.65					Shale, sandy, intercalated thin sandstone bands, dark gray	
111.93					Shale, sandy, carbonaceous, greyish black	
114.40					Shale, sandy and sandstone, coarse grained, in alternation, shale, sandy rich, gray	
117.02					Sandstone, coarse grained, arkosic, hard, white	
123.78					Shale, sandy, laminated sandstone, in parts with calcite vein	
			83°		Sandstone medium grained, contacted with upper layer through fault slipping	
127.19					85° ground fault plane, slickenslide scours and marked by fissure, white	
127.33					Shale, sandy, dark gray	
128.86			34°		Sandstone, coarse grained, quartzose, hard, with quartz, intercalated by dolerite, white	
130.49			43°		Dolerite fine grained, considerably fractured with slickensides, greyish green	
131.00			70°		Sandstone, coarse, quartz, quartzose, white	
					Shale, sandy, dark green	
145.84					Dolerite, coarse grained, in parts with slickensides, greyish green	
146.45					Dolerite, medium grained, fractured, greyish green	
148.57					Dolerite, medium grained, in parts with slickensides, greyish green	
150.81					Dolerite, coarse grained, in parts with slickensides, greyish green	
159.00					Dolerite, medium grained, with slickensides, greyish green	


140
145.64
146.49
Dolerite, coarse grained, in parts with slickensides, greyish green.
Dolerite, medium grained, fractured, greyish green.
148.57
Dolerite, medium grained, in parts with slickensides, greyish green.
150
150.81
Dolerite, coarse grained, in parts with slickensides, greyish green.
158.00
Dolerite, medium grained, with slickensides, greyish green.
160
163.02
Dolerite, fine grained, with slickensides, greyish green.
164.07
60°
Dolerite, fine grained, with quartz veins (1.5cm thickness), greyish green.
165.84
166.61
Sandstone, fine grained, red shale in alternation, white and light gray.
Shale, sandy, light gray.
168.14
168.61
Sandstone, medium grained, arkosic, hard, in parts, intercalated greenish grey shale, white.
Sandstone, coarse grained, quartzose, white.
170
171.02
171.46
Sandstone, medium grained, arkosic, moderate, white.
Siltstone, arkosic, in parts greenish, arkosic, white.
172.85
Sandstone, fine grained, laminated very fine grained sandstone, light bluish gray.
175.45
176.00
177.15
75°
Sandstone, fine grained, micaceous, hard, cross-laminated, light gray.
Siltstone, fine grained, well-bedded, light gray.
Sandstone, fine grained, micaceous, gray.
Shale, sandy, remarkable in bottom, fine intercalated sandstone, greenish gray.
180
179.91
Sandstone, fine grained, micaceous, laminated, light gray.
181.85
Sandstone, fine grained and shale in alternation, in the upper sandstone rich, gray.
185.57
185.81
186.40
Sandstone, medium grained, arkosic, white.
Siltstone, very fine grained, sandstone, gray.
Sandstone, medium to coarse grained, arkosic, white.
188.42
188.66
189.90
189.95
190.72
191.79
192.78
193.21
Sandstone, coarse grained, at the depth of 188.20m to 188.80m intercalated shale, white.
Coal, bright, middle coal seam.
Sandstone, fine grained, micaceous, gray.
190
Siltstone, medium grained, gray.
Sandstone, fine grained, hard, laminated, light gray.
Dolerite, silty cores, partly with pyrite, bluish gray.
Siltstone, fine grained, micaceous, light gray.
Sandstone, medium grained, arkosic, greyish green.
Sandstone, fine grained, micaceous, bluish gray.
196.28
Sandstone, very fine grained, towards the bottom shale, sandy, greyish black to black gray.
197.74
198.05
199.07
Sandstone, fine grained, partly intercalated shale, light gray.
Sandstone, fine to medium grained, with shale bands, gray.
Sandstone, medium grained, with quartz veins.
200
201.84
Sandstone, very fine grained, intercalated sandy shale, gray.
202.99
Sandstone, medium grained, at the bottom with carbonaceous matter, light gray.
204.20
204.94
205.14
Sandstone, very fine grained, silty, dark gray.
Sandstone, medium grained, in the middle intercalated carbonaceous shale, white.
Sandstone, fine to medium grained.
210
212.84
213.04
213.38
213.45
215.17
216.03
216.78
217.10
217.33
219.25
Sandstone, coarse grained, quartz rich, white.
Coal, bright, middle coal seam.
Sandstone, very fine grained, micaceous, dark gray.
Shale, sandy and coal, bright.
Sandstone, very fine grained, with pyrite.
Sandstone, very fine grained, partly intercalated shale.
Shale, sandy, intercalated fine grained sandstone.
Sandstone, medium grained, micaceous, bluish gray.
Shale, affected by dolerite, bluish gray.
Dolerite, fine grained, variable, black.
100%
220
223.33
223.53
223.96
224.26
225.34
226.22
Dolerite, medium grained, in the lower parts porphyritic, black.
Sandstone, medium grained, indurated, bluish gray.
Shale, sandy, intercalated sandstone, black.
Sandstone, fine coarsely, intercalated shale towards the bottom shale sandy, gray.
Dolerite, silty cores, greenish grey.
Shale, carbonaceous at the bottom, intercalated fine grained sandstone, black.
230
231.33
Sandstone, medium grained.
234.67
235.18
235.40
235.81
236.37
237.24
237.66
237.88
238.47
239.07
239.57
239.90
240.29
240.42
242.50
242.62
70°
Dolerite, silty to very fine grained, porphyritic with quartz vein, greenish gray.
Sandstone, medium grained, carbonaceous, at the bottom a piece of dolerite, greenish gray.
Shale, sandy, carbonaceous, black.
Shale, sandy, intercalated very fine grained, partly carbonaceous.
Shale, carbonaceous, black.
Sandstone, very fine grained, intercalated shale, shale, dark gray.
Shale, sandy, intercalated thin sandstone.
Dolerite, fine grained, greenish gray.
Shale, carbonaceous, blackish black.
Sandstone, fine grained, intercalated shale.
Siltstone, carbonaceous, rich fine, dark gray.
Coal, middle, broken coal seam.
Sandstone, coarse grained, gray.
Sandstone, coarse grained, indurated, greenish gray.
40°
Dolerite, fine grained, glassy, black.
Dolerite, silty cores.
250
250.04
250.06
75°
Sandstone, very coarse grained, partly conglomeratic, almost composed of quartz and feldspar and small fragments of red colored chert and green colored fragments, and hornfels.
Quartz clasts, in mass, subangular to rounded. Large-sized quartz is usually rounded.
Sandstone, fine grained, laminated, micaceous, dark gray.
260
262.42
Sandstone, very coarse grained, partly conglomeratic, almost composed of quartz and feldspar with red and green colored fragments, white.
264.58
265.46
0°
Shale, sandy, carbonaceous, intercalated thin sandstone, black.
Coal, bright, bottom coal seam, partly with carbonaceous shale.
267.42
Sandstone, very fine grained, partly sandstone, shale, dark gray.
269.40
Shale, carbonaceous, at the top shale, sandy, black.
270
270.64
270.75
15°
Dolerite, fine grained, glassy, hard, greenish black, at the top including fragments of shale.
Shale, carbonaceous.
271.54
272.12
273.46
Sandstone, medium grained, micaceous, black, partly greyish white.
Sandstone, fine grained, gray.
Sandstone, medium grained, micaceous, black, white, greyish white.
274.43
274.67
64°
70°
Dolerite, silty cores, glassy, greenish black gray.
Sandstone, coarse grained.
Dolerite, silty cores, glassy with quartz veins.
275.09
275.62
275.82
276.10
276.87
277.13
277.32
277.80
279.49
279.82
281.13
281.61
Sandstone, fine grained, intercalated sandy shale, dark gray.
Shale, carbonaceous, black.
Coal, middle, broken coal seam.
Shale, sandy, carbonaceous.
Sandstone, medium grained, micaceous, light gray.
Sandstone, coarse grained, arkosic, white.
Sandstone, fine grained, carbonaceous, white, light, dark gray.
Sandstone, coarse grained, arkosic, greyish white.
Sandstone, fine grained, greyish white.
Sandstone, very coarse grained, partly including pebbles of quartz, greyish black.
Sandstone, very coarse grained, composed of subangular quartz (max 0.5 cm), chert and other fragments, greyish white.
280
286.27
286.82
286.96
287.17
287.39
290.35
290.64
290.87
10°
Coal, bright, middle coal seam.
Shale, sandy, carbonaceous, black.
Sandstone, fine grained, cross-laminated, black.
Siltstone, silty cores, glassy, black.
Dolerite, fine grained, glassy, greenish black gray.
Siltstone, silty, greyish, greyish black gray.
Sandstone, fine grained, laminated, dark gray.
290
296.87
Sandstone, coarse to very coarse grained, arkosic, partly including pebbles, white.
298.66
Shale, sandy, carbonaceous, towards the bottom sandstone, very fine grained, dark gray.
299.94
300.98
302.06
Sandstone, very fine grained, laminated shale, micaceous, greenish gray.
300
Sandstone, fine grained, gray to dark gray.
Sandstone, medium grained, mica rich, light gray.
303.64
303.85
Sandstone, coarse grained, partly very coarse grained, arkosic, white.
Sandstone, medium grained, light gray.
305.30
305.67
306.33
306.85
307.97
308.05
308.85
309.78
309.96
311.49
6°
Sandstone, very fine grained, intercalated shale.
Sandstone, medium grained, arkosic, white.
Siltstone, fine grained, mica rich, dark gray.
Dolerite, silty cores, glassy, dark greenish black.
Dolerite, fine to medium grained, metallic dark greenish black.
Siltstone, silty cores, glassy, dark greenish black.
Shale and sandstone, fine grained in alternation, black gray, partly greyish black.
Dolerite, silty cores, glassy, dark greenish black.
Shale, sandy, intercalated fine sandstone, black gray.
Sandstone, fine grained, reddish brown to tan, intercalated thin shale, affected by dolerite.
313.78
Sandstone, medium grained, partly coarse grained, arkosic, light brown, partly reddish gray.
317.80
318.09
318.36
318.53
320.49
320.63
320
Sandstone, coarse grained, partly very coarse grained, almost composed of quartz.
Siltstone is rested, cross-laminated, white.
Sandstone, rich in fine sand, white.
Shale, greenish black.
Shale, carbonaceous, dark greenish gray.
Sandstone, coarse grained, arkosic, light greenish gray.
Siltstone, fine grained, glassy, dark greenish black.


THE END OF HOLE

JAPAN INTERNATIONAL COOPERATION AGENCY

Borehole Log LD16

Dwg 4.D | Scale 1:200

Date Sep. 1985 | Prepared by S. Morikawa, H. Watanabe

HOLE NO. : LD16

AREA : LUBHUKU

DATE DRILLED : 28. NOV. 1984~14. JAN. 1985

TOTAL DEPTH : 382.05m

ELEVATION : +272m

COORDINATE : X=+2,932,000, Y=-76,955

Depth of Borehole (M)	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	Core Recovery
					non - coring	
13.05					Soil and weathered sandstone. Sandstone, medium grained, with thin shale band, partly bioturbated, weathered, brownish light gray.	
19.92					Sandstone, fine to medium grained, little laminated, with mica, weathered, light gray.	%100
23.45					Sandstone, fine grained, partly bioturbated, with laminated, weathered, little weathered, light gray to gray.	
24.37					Sandstone, medium grained, laminated, microtopic, gray.	
24.73					Sandstone, medium grained, carbonaceous, gray.	
25.90					Debris, medium to coarse grained, dark gray.	
28.00					Debris, very fine to fine grained, dark gray.	
28.70					Sandstone, medium grained, carbonaceous, light gray.	
29.50					Sandstone, coarse grained, arkosic, whitish gray.	
31.00					Sandstone, medium grained, bioturbated, dark gray.	
32.42					Sandstone, coarse grained, arkosic, whitish gray.	
35.20					Sandstone, fine grained, bioturbated, gray to dark gray.	
36.66					Sandstone, coarse grained, arkosic, whitish gray.	
40.55					Sandstone, coarse grained, bioturbated dark gray, whitish gray.	
40.85					Sandstone, coarse grained, bioturbated dark gray, whitish gray.	
41.68					Sandstone, fine grained, microtopic, laminated with thin shale band, gray.	
43.85					Sandstone, coarse grained, arkosic, whitish gray.	
45.87					Shale, carbonaceous.	
46.37					Sandstone, medium to coarse grained, arkosic, whitish gray.	
47.50					Sandstone, medium grained, little bioturbated, light gray.	%100
52.25					Sandstone, fine grained, cyclothem with black microtopic, gray.	
53.14					Sandstone, very fine to fine grained, microtopic, gray.	
53.18					Sandstone, fine to medium grained, light gray.	
53.85					Sandstone, very fine to fine grained, microtopic, gray.	
55.43					Shale, black, dark gray.	
58.57					Sandstone, very fine to fine grained, well bioturbated, gray.	
60.81					Sandstone, medium to coarse grained, arkosic, whitish gray.	%100
65.23					Sandstone, fine grained, laminated, microtopic, gray to dark gray.	
66.85					Shale, black, laminated, dark gray.	
67.54					Shale, carbonaceous.	
68.24					Shale, black, laminated, dark gray.	
68.38					Shale, black, carbonaceous.	
68.55					Sandstone, fine to medium grained, light gray.	
69.05					Shale, carbonaceous, dark gray.	
69.17					Shale, black, laminated, gray.	
71.10					Debris, very fine grained, sandstone partly with intercalation, dark gray.	
75.54					Debris, silty shale, bioturbation, dark gray.	
77.91					Sandstone, fine to medium grained, laminated, light gray.	
78.75					Sandstone, fine to medium grained, arkosic, whitish gray.	
78.81					Shale, black, laminated, partly bioturbated, gray to light gray.	
79.47					Sandstone, fine to medium grained, partly bioturbated, gray to light gray.	%100
81.32						
83.90					Sandstone, medium grained, bioturbated, gray to light gray.	
85.91					Sandstone, medium grained, black laminated, with mica, whitish gray.	
86.46					Shale, black, laminated, black gray.	
86.61					Coal, brown, low ash, black, coaly.	
87.37					Sandstone, fine to medium grained, bioturbated, with shale.	
88.40					Debris, very fine grained, sandstone, bioturbated, dark gray.	
89.10					Sandstone, medium to coarse grained, carbonaceous, dark gray.	
89.40					Shale, carbonaceous.	
90.21					Shale, black, laminated, dark gray.	
91.06					Sandstone, fine to medium grained, laminated.	
92.69					Shale, black, laminated, dark gray.	
93.13					Sandstone, fine to medium grained, laminated with shale, gray.	
93.37					Shale, black, black gray.	
93.87					Sandstone, fine to medium grained, bioturbated, microtopic, gray.	
97.00					Sandstone, medium to coarse grained, arkosic, whitish gray.	
98.39					Sandstone, fine grained, bioturbated, microtopic, gray.	
99.18					Sandstone, fine to medium grained, laminated, microtopic, gray.	
99.95					Coal, black, with pyrite.	
102.07					Sandstone, medium to coarse grained, arkosic, little laminated, light gray.	%100
105.09					Sandstone, coarse grained, arkosic, whitish gray.	
107.06					Sandstone, fine grained, bioturbated, gray.	
110.18					Sandstone, medium grained, arkosic, little laminated, whitish gray.	
110.77					Sandstone, fine grained, lamination, microtopic, light gray.	
111.15					Sandstone, fine to medium grained, carbonaceous, light brownish gray.	
111.86					Sandstone, fine grained, microtopic, laminated, light gray.	
112.06					Sandstone, fine to medium grained, carbonaceous, light gray.	
112.65					Debris, very fine to fine grained, bioturbated, dark gray.	
123.95					Debris, medium grained, dark gray.	
126.43					Sandstone, medium grained, laminated, carbonaceous, gray to dark gray.	
127.26					Sandstone, medium grained, laminated, carbonaceous, with mica, light gray.	
130.14					Shale, black, carbonaceous.	
131.11					Sandstone, coarse grained, arkosic, whitish gray.	
131.28					Coal, black, with pyrite.	
133.86					Sandstone, medium grained, lamination, microtopic, gray.	
133.95					Sandstone, medium grained, laminated, microtopic, with mica, light gray.	
134.67					Shale, black, with thin coal layer, black gray.	
134.98					Sandstone, fine to medium grained, little laminated, light gray.	
135.16					Sandstone, very fine to fine grained, laminated, light gray.	
136.95					Sandstone, very fine to fine grained, bioturbated, light gray.	
139.08					Sandstone, fine to medium grained, laminated with thin shale, gray.	%100
139.98					Shale, carbonaceous.	
140.14					Shale, black, carbonaceous.	
146.74					Sandstone, coarse grained, arkosic, whitish gray.	
148.24					Shale, black, carbonaceous, with pyrite, with fossil, carbonaceous sandstone.	
148.85					Sandstone, very fine grained, bioturbated, microtopic, gray.	

Depth	Recovery	Description
131.28		Shale, sandy, carbonaceous.
133.06		Sandstone, coarse grained, arkosic, whitish gray.
133.79		Coal, dull with bright.
134.57		Sandstone, fine grained, laminated, micaceous, gray.
134.98		Sandstone, medium grained, cross laminated, with mica, light gray.
135.56		Shale, sandy, with thin coal layer, dark gray.
136.04		Sandstone, fine to medium grained, ripple laminated, light gray.
139.08		Sandstone very fine to fine grained, rhythmic laminated with thin
139.89		coal layer, micaceous, gray.
140.14		Shale, carbonaceous.
		Shale, sandy, carbonaceous.
148.74		Sandstone, coarse grained, arkosic, whitish gray.
148.92	10%	Shale, sandy, carbonaceous, partly with conglomerate sandstone.
149.85		Sandstone, very fine grained, laminated, micaceous gray.
150.81		Sandstone, coarse grained, arkosic, whitish gray.
151.32		Shale, carbonaceous.
151.75		Sandstone, very fine to fine grained with laminated, micaceous, gray.
152.40		Shale, sandy, carbonaceous.
153.24		Shale, carbonaceous.
154.10		Sandstone fine grained, partly medium grained, laminated, micaceous, gray.
154.90		Coal, dull with bright.
155.37		Sandstone, fine grained, carbonaceous, massive, dark gray.
155.74		Sandstone, fine grained, rhythmitic, micaceous, gray.
161.44		Sandstone, coarse grained, arkosic, whitish gray.
161.82		Dolerite, silty flaky, greenish gray.
164.38		Sandstone, coarse grained, arkosic, whitish gray.
164.47		Shale, carbonaceous.
164.58		Sandstone, medium grained, light gray.
165.05	50%	Dolerite, very fine to fine grained, dark greenish gray.
165.75		Sandstone, fine to medium grained, with mica, gray.
166.51		Dolerite, very fine to fine grained, dark greenish gray.
167.24		Sandstone, fine to medium grained, laminated, with mica, gray.
167.71		Dolerite, silty flaky, dark greenish gray.
169.34		Sandstone, fine to medium grained, laminated, micaceous, gray.
170.06	0%	Dolerite, fine grained, basaltic, dark greenish gray.
172.25		Shale, sandy, dark gray to greenish gray.
172.95		Sandstone, coarse grained, arkosic, whitish gray.
173.68	40%	Dolerite, very fine grained, basaltic, dark gray.
174.04		Sandstone, coarse grained, arkosic, whitish gray.
174.87		Dolerite, very fine to fine grained, basaltic, dark gray.
175.03		Sandstone, fine to medium grained, with carbonaceous matter, gray.
175.04		Coal, dull with bright.
176.14	0%	Shale, carbonaceous.
178.10	0%	Dolerite, very fine grained, basaltic, dark gray.
178.24		Shale, carbonaceous, dark gray.
178.96		Sandstone, medium grained, with mica, light gray.
179.60		Sandstone, fine grained, with mica, light gray.
185.82	0%	Sandstone, coarse to very coarse grained, arkosic, indurated, whitish gray.
		core broke.
		core broke.
238.60		Dolerite, coarse grained, massive, dark gray.
237.00		Dolerite, fine grained, basaltic, dark gray.
237.76	50%	Dolerite, very fine grained, basaltic, dark gray.
240.51		Sandstone, coarse grained, arkosic, indurated, whitish gray.
241.43		Dolerite, very fine grained, basaltic, dark gray.
242.60		Dolerite, medium to coarse grained, dark gray.
243.32		Dolerite, silty flaky, light greenish gray.
245.25		Sandstone, medium to coarse grained, whitish gray.
248.10		Dolerite, fine grained, basaltic, dark gray.
251.09		Sandstone, coarse grained, arkosic, whitish gray.
251.20		Dolerite, silty flaky, chilled margin, basaltic, dark gray.
252.81		Dolerite, fine grained, basaltic, dark gray.
252.96		Dolerite, silty flaky, chilled margin, basaltic, dark gray.
253.47		Sandstone, fine grained, light gray.
256.40		Sandstone, coarse to very coarse grained, arkosic, whitish gray.
257.52		Sandstone very fine to fine grained, rhythmic, micaceous, dark gray.
257.60		Coal, dull with bright.
257.84		Shale, carbonaceous.
258.97		Sandstone, medium grained, light gray.
259.45		Shale, sandy, partly carbonaceous, dark gray to blackish gray.
270.50		Sandstone, coarse grained, arkosic, whitish gray.
271.48		Sandstone, very fine to fine grained, rhythmic, micaceous, dark gray.
274.75		Sandstone, medium grained, laminated, with mica, light gray.
275.20		Sandstone very fine to fine grained, laminated, dark gray.
275.33		Shale, sandy, carbonaceous with thin coal layer.
276.38		Sandstone fine grained, with laminated, micaceous, gray.
276.51		Coal, bright and dull.
277.45		Shale, carbonaceous.
277.90		Sandstone, medium to coarse grained, with pyrite patch, gray.
278.05		Coal, bright and dull.
278.58		Sandstone, very fine grained, with carbonaceous matter, blackish gray.
285.07		Sandstone, coarse to very coarse grained, arkosic, whitish gray.
286.76		Coal, dull with bright.
287.32		Shale, sandy, carbonaceous.
294.18		Sandstone, coarse grained, arkosic, whitish gray.
294.74		Coal, dull with bright.
294.86		Sandstone, fine grained, laminated, gray.
297.75		Sandstone, coarse grained, arkosic, whitish gray.
298.18		Sandstone, fine grained, with mica, gray.
310.05	0%	Sandstone, coarse grained, partly conglomeratic, arkosic, whitish gray.
310.20		Coal, bright and dull.
311.61		Sandstone, very fine to fine grained, micaceous, gray.
311.78		Shale, carbonaceous.
312.28		Coal, dull with bright.
312.35		Shale, carbonaceous.

Recovery: 100%, 100%, 100%, 100%, 100%, 100%, 100%, 100%, 100%, 100%, 100%

Depth (m)	Description
235.60	Dolerite, coarse grained, massive, dark gray.
237.00	Dolerite, fine grained, basaltic, dark gray
237.36	Dolerite, very fine grained, basaltic, dark gray
240.61	Sandstone, coarse grained, arkosic, indurated, whitish gray.
241.53	Dolerite, very fine grained, basaltic, dark gray.
242.60	Dolerite, medium to coarse grained, dark gray
243.32	Dolerite, silty looks, light greenish gray.
245.25	Sandstone, medium to coarse grained, whitish gray
246.70	Dolerite, fine grained, basaltic, dark gray.
251.09	Sandstone, coarse grained, arkosic, whitish gray.
251.20	Dolerite, silty looks, chilled margin, basaltic, dark gray.
252.81	Dolerite, fine grained, basaltic, dark gray
252.94	Dolerite, silty looks, chilled margin, basaltic, dark gray.
253.57	Sandstone, fine grained, light gray
266.40	Sandstone, coarse to very coarse grained, arkosic, whitish gray
267.52	Sandstone, very fine to fine grained, rythmites, micaceous, dark gray
267.66	Coal, dull with bright.
267.84	Shale, carbonaceous
268.97	Sandstone, medium grained, light gray.
269.45	Shale, sandy, partly carbonaceous, dark gray to blackish gray
270.56	Sandstone, coarse grained, arkosic, whitish gray
271.48	Sandstone, very fine to fine grained, rythmites, micaceous, dark gray.
274.76	Sandstone, medium grained, laminated, with mica, light gray.
275.20	Sandstone, very fine to fine grained, laminated, dark gray.
275.33	Shale, sandy, carbonaceous with thin coal layer
276.38	Sandstone, fine grained, well laminated, micaceous, gray.
276.51	Coal, bright and dull.
277.45	Shale, carbonaceous.
277.60	Sandstone, medium to coarse grained, with pyrite patch, gray
278.05	Coal, bright and dull.
278.56	Sandstone, very fine grained, with carbonaceous matter, blackish gray.
285.07	Sandstone, coarse to very coarse grained, arkosic, whitish gray.
286.76	Coal, dull with bright.
287.32	Shale, sandy, carbonaceous.
294.16	Sandstone, coarse grained, arkosic, whitish gray.
294.74	Coal, dull with bright.
294.86	Sandstone, fine grained, laminated, gray.
297.75	Sandstone, coarse grained, arkosic, whitish gray.
298.18	Sandstone, fine grained, with mica, gray.
310.05	Sandstone, coarse grained, partly conglomeratic, arkosic, whitish gray
310.20	Coal, bright and dull.
311.41	Sandstone, very fine to fine grained, micaceous, gray.
311.78	Shale, carbonaceous
312.28	Coal, dull with bright.
312.35	Shale, carbonaceous.
312.95	Core loss, may be coal.
313.00	Coal, bright with dull.
313.05	Shale, sandy, dark gray.
313.60	Core loss, may be coal.
313.65	Coal, bright and dull.
314.11	Shale, sandy, carbonaceous
315.26	Sandstone, very fine grained, laminated, micaceous, gray.
322.05	Sandstone, coarse grained, arkosic, whitish gray.
322.85	Sandstone, coarse grained, arkosic, whitish gray.
325.05	Core loss.
325.56	Sandstone, coarse grained, arkosic, whitish gray.
326.03	Coal, dull with bright.
326.22	Shale, carbonaceous
326.70	Sandstone, coarse grained, arkosic, whitish gray
328.05	Core loss.
329.68	Sandstone, coarse grained, arkosic, whitish gray.
329.84	Coal, dull with bright.
331.04	Shale, sandy, micaceous, gray to dark gray.
338.92	Sandstone, coarse grained, little laminated, with mica, arkosic, whitish gray
339.08	Coal, dull, and clay, core broken.
339.21	Shale, brecciated, small fault?
339.80	Sandstone, medium grained, gray to light gray.
340.98	Sandstone, fine grained, laminated, micaceous, gray.
342.53	Shale, sandy, partly carbonaceous, dark gray.
344.65	Sandstone, fine grained, partly with lenticular shale, laminated, gray.
349.26	Sandstone, coarse to very coarse grained, arkosic, whitish gray.
349.45	Shale, sandy, carbonaceous
350.00	Sandstone, very fine grained, rythmites, micaceous, dark gray.
351.17	Sandstone, fine to medium grained, with mica, gray.
351.32	Shale, sandy, carbonaceous
358.35	Sandstone, coarse grained, arkosic, whitish gray.
358.73	Sandstone, fine grained, laminated, micaceous, partly brecciated, gray
367.18	Sandstone, coarse grained, arkosic, whitish gray.
368.20	Sandstone, fine grained, laminated, micaceous, gray
380.05	Sandstone, coarse grained, arkosic, whitish gray.
	End of hole.

Depth scale: 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380

Dip angles: 5°, 12°, 6°

Core recovery: 100%, 100%, 100%, 100%, 100%, 0%, 100%, 0%, 100%, 27%, 55%, 100%, 100%, 100%

国際協力事業団
15156
図書資料室蔵書

HOLE NO. : LD17

AREA : LUBHUKU

DATE DRILLED : 14. NOV 1984 ~ 26 NOV. 1984

TOTAL DEPTH : 358.45m

ELEVATION : +277m

COORDINATE : X = +2.932,000, Y = -78,000

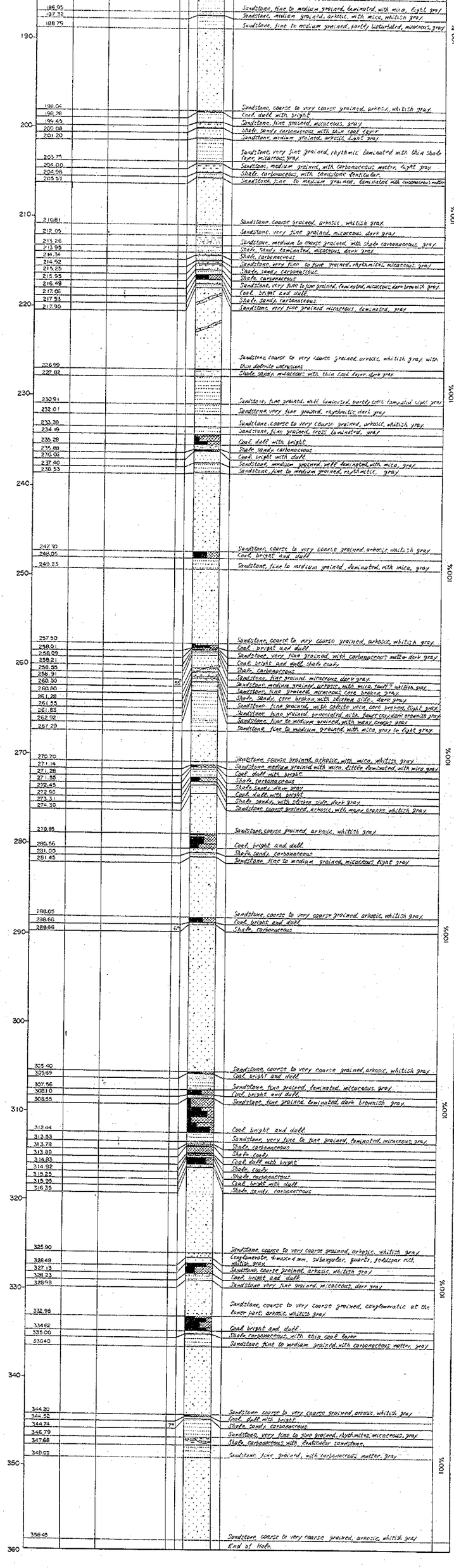
JAPAN INTERNATIONAL COOPERATION AGENCY			
Borehole Log LD17			
Dwg. 4g	Scale	1	200
Date Sep 1985	Prepared by	S. Morikawa, H. Watanabe	

Depth of Borehole (M)	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	Core Recovery
(M) 0						
6.50					Soil and weathered rock.	non-coring
7.82					Sandstone, medium grained, with mica, weathered, light brownish gray	
7.95					Shale, sandy, rich mica, weathered, brownish gray	
8.30					Sandstone, coarse grained, arkosic, weathered, light brownish gray	100%
10						
13.00					Sandstone medium grained, arkosic, weathered, light brownish gray	
17.95					Sandstone, coarse grained, arkosic, little weathered, light brownish gray	
20						
20.70					Shale and sandstone, medium grained in alternation	
22.06					Sandstone medium grained, arkosic, whitish gray	
22.70					Shale and sandstone, medium grained in alternation	
23.00					Sandstone medium grained, with calcite veins, light gray	
25.15					Shale sandy, partly with pyrite dark gray	
25.20					Sandstone, very fine grained, calcareous light gray	
28.12					Shale, sandy, dark gray	
28.15					Sandstone very fine grained, calcareous, light gray	
30						100%
35.17					Shale, sandy, dark gray	
35.35					Shale, sandy, calcareous, light gray	
40						
50						100%
54.13					Shale, sandy, dark gray	
54.44					Sandstone, medium grained arkosic, whitish gray	
58.24			5°		Shale sandy, dark gray	
58.78					Shale sandy, with sandstone medium grained dark gray	
59.18					Sandstone, medium grained, bioturbated, gray to light gray	
60 60.67					Sandstone, fine to medium grained, little bioturbated, gray	
60.68			65°		Sandstone, fine to medium grained arkosic, whitish gray	
61.39			90°		Dolerite, very fine grained, basaltic, with calcite veins, dark gray	
66.15					Sandstone, medium grained, little bioturbated, light gray	
67.77					Sandstone, fine to medium grained, little laminated with mica, light gray	
70						100%
76.00					Sandstone, fine to medium grained, well laminated, micaceous gray	
77.06					Sandstone, medium grained, partly coarse grained, laminated with mica, light gray	
78.72					Sandstone, coarse grained, arkosic, whitish gray	
79.09					Sandstone, medium grained, little bioturbated, with fossil scale, light gray	
80 80.90			0°		Dolerite, fine to medium grained, basaltic, dark greenish gray	
82.03					Sandstone, medium grained, well bioturbated, light gray	
82.19					Dolerite, silty looks, light reddish gray	
84.95					Sandstone, coarse grained, arkosic, whitish gray	
87.48			0°		Sandstone, fine grained, well bioturbated, dark gray	
89.10			0°		Dolerite very fine grained, basaltic, dark greenish gray	
89.42					Sandstone, medium grained, indurated, light greenish gray	
90 91.12					Sandstone, fine grained bioturbated, light gray to gray	100%
91.42					Sandstone, very coarse grained, conglomeratic, lodgepoling, light gray	
92.17			0°		Sandstone medium grained, laminated, with mica, light gray	
92.75			0°		Dolerite, very fine grained, basaltic, dark greenish gray	
94.21					Sandstone, fine grained, bioturbated, with mica, gray	
95.38					Sandstone, medium grained, laminated, with mica, light gray	
95.76			0°		Shale, indurated, dark gray	
96.25			0°		Dolerite, fine grained, basaltic, dark gray	
99.10					Dolerite medium grained, basaltic, dark gray	
100 100.16			0°		Dolerite, fine grained, basaltic, dark gray	
100.75					Sandstone, coarse grained, arkosic, indurated, whitish gray	
101.03					Dolerite, very fine grained, basaltic, dark gray	
101.58					Shale, carbonaceous	
103.08					Sandstone, fine grained, indurated, gray	
105.81					Dolerite, fine to medium grained, partly with calcite veins, dark gray	
106.70			45°		Dolerite, very fine grained, basaltic, dark gray	
107.47					Sandstone, coarse grained, arkosic, whitish gray	
109.61					Sandstone medium grained, bioturbated, gray to light gray	100%
110						
112.47					Sandstone coarse grained arkosic, whitish gray	
113.05					Sandstone, very fine grained, bioturbated, micaceous, gray	
113.30					Sandstone fine laminated, laminated, micaceous gray	
114.20					Sandstone medium grained, bioturbated, gray	
114.45					Sandstone medium to coarse grained, arkosic, whitish gray	
114.84					Sandstone, very fine grained, bioturbated, micaceous, greenish gray	
115.06					Sandstone, medium grained, laminated, micaceous, gray	
116.35					Shale, carbonaceous	
116.55					Sandstone fine grained, bioturbated, gray	
117.95			50°		Dolerite, silty looks, with calcite stream, light greenish gray	
120 120.85					Sandstone, fine grained, bioturbated, micaceous, gray	30%
120.95					Dolerite, fine grained, basaltic, core broken, dark gray	
121.62					Dolerite, fine grained, basaltic, core broken, dark gray	
122.50					Sandstone, fine grained, bioturbated, core broken, gray	
122.65					Shale carbonaceous	
123.60					Sandstone medium grained, with carbonaceous matter, gray	
123.85					Dolerite, silty looks light gray	
124.30					Sandstone, medium grained, little laminated, with mica, light gray	
125.95					Dolerite, fine grained, basaltic, dark gray, with sandstone fragments	
128.27					Sandstone fine to medium grained, laminated, with mica, gray with dolerite fragments	
130						100%
131.07			75°		Shale, sandy, carbonaceous, partly interbedded thin sandstone layer	
131.73					Shale, carbonaceous	
132.58					Dolerite fine to medium grained, basaltic, dark greenish gray	
132.70					Shale carbonaceous	
133.23					Sandstone, medium grained, with carbonaceous matter, gray	
134.07					Shale, sandy, carbonaceous	
134.57					Dolerite fine grained, basaltic, dark gray	
134.78					Sandstone coarse grained, with carbonaceous matter, light gray	
135.08					Shale, sandy, carbonaceous	
136.03					Sandstone, medium to coarse grained, little bioturbated light gray	
136.89					Sandstone fine grained, partly bioturbated, indurated gray	
137.69					Sandstone medium grained, bioturbated, gray	
138.65					Sandstone, very fine to fine grained, bioturbated, gray	
138.90					Shale, sandy, little bioturbated, dark gray to blackish gray	
140.00					Sandstone, coarse grained, partly indurated, light gray	
141.10					Sandstone, fine to medium grained, laminated, micaceous gray	
141.60					Sandstone, coarse grained, indurated, light gray	
141.80					Shale, sandy dark gray	
142.28					Sandstone, coarse grained, arkosic, light gray	
142.78					Sandstone, fine grained, bioturbated, gray	
143.50					Sandstone, medium to coarse grained, arkosic, indurated, light gray	
143.58					Dolerite, silty looks, dark greenish gray	
144.00			0°		Dolerite, fine grained, basaltic, dark greenish gray	100%
150						

Depth	Core %	Description
114.45		Sandstone, medium to coarse grained, arkosic, whitish gray
114.84		Sandstone, very fine grained, bioturbated, micaceous, greyish brown
115.05		Sandstone, medium grained, laminated, bioturbated, gray
115.35		Shale, carbonaceous
116.53		Sandstone fine grained, bioturbated, gray
117.95	50%	Dolomite silty dark, with calcite streaks, light greenish gray
120.85		Sandstone, fine grained, bioturbated, micaceous, gray
120.95		Dolomite fine grained, basaltic, rock broken, dark gray
121.62		Dolomite, fine grained, basaltic and broken, dark gray
122.30		Sandstone, fine grained, bioturbated over broken, gray
122.66		Shale, carbonaceous
123.60		Sandstone medium grained, with carbonaceous matter, gray
123.85		Dolomite silty light dark gray
124.30		Sandstone medium grained, little bioturbated with mica, light gray
125.25		Dolomite fine grained, basaltic, dark gray with sandstone fragments
128.27		Sandstone fine to medium grained, laminated with mica, gray with dolomite fragments
131.07	7%	Shale, sandy, carbonaceous parts, interbedded thin sandstone layer.
131.73		Shale, carbonaceous
132.56		Dolomite fine to medium grained, basaltic, dark greenish gray
132.70		Shale, carbonaceous
133.23		Sandstone medium grained, with carbonaceous matter, gray
134.07		Shale, sandy carbonaceous
134.57		Dolomite fine grained, basaltic, dark gray
134.78		Sandstone coarse grained, with carbonaceous matter, light gray
135.08		Shale, sandy, carbonaceous
136.03		Sandstone, medium to coarse grained, little bioturbated light gray
136.99		Sandstone fine grained, partly bioturbated, indurated gray.
137.69		Sandstone, medium grained, bioturbated, gray
138.65		Sandstone, very fine to fine grained, bioturbated, gray
138.90		Shale, sandy, little bioturbated dark gray to blackish gray
140.00		Sandstone coarse grained, partly indurated, light gray
141.10		Sandstone, fine to medium grained, laminated, micaceous gray
141.40		Sandstone, coarse grained, indurated, light gray
141.80		Shale sandy dark gray
142.28		Sandstone, coarse grained, arkosic, light gray
142.76		Sandstone, fine grained, bioturbated, gray
143.50		Sandstone, medium to coarse grained, arkosic, indurated, light gray
143.58		Dolomite, silty light, deep greenish gray
144.00	0%	Dolomite, fine grained, basaltic, dark greenish gray
152.15		Dolomite, medium grained, dark greenish gray
152.45	30%	Dolomite, fine grained, with pyrite, dark greenish gray
152.54		Dolomite silty, dark greenish gray
152.60		Sandstone fine grained, laminated, indurated, gray
153.10		Shale, sandy, rhythmites with sandstone, grey to dark gray
153.45		Shale, carbonaceous
153.62		Coal, bright and dull shale, coal banded
153.85		Shale, carbonaceous, partly sandy.
154.35		Sandstone, fine to medium grained, with mica, light gray to gray.
158.20		Sandstone, coarse grained arkosic whitish gray
160.70		Sandstone medium to coarse grained, arkosic whitish gray
161.75		Sandstone, coarse grained, arkosic whitish gray.
161.89		Shale, sandy, carbonaceous
162.50		Sandstone, very fine to fine grained, partly indurated, gray
162.95		Shale, sandy, carbonaceous
163.64		Sandstone, very fine grained, with carbonaceous matter, gray
163.91		Dolomite, silty dark, greenish gray.
164.15		Shale, sandy, carbonaceous
165.73		Sandstone, fine grained, laminated, micaceous
166.93		Shale, sandy, rhythmites carbonaceous at the lower part
170.03		Sandstone medium grained, partly bioturbated arkosic whitish gray
170.19	25%	Dolomite silty dark, greenish gray
170.68		Sandstone, fine to medium grained, arkosic, partly indurated light gray
171.26		Sandstone, coarse grained, arkosic, whitish gray
171.51	3%	Coal, burnt and dolomite
171.84		Sandstone fine grained, micaceous
172.49		Sandstone, medium grained, arkosic, with mica, light gray
172.97		Shale, sandy, rhythmic laminated with thin sandstone layer gray
177.06		Sandstone coarse grained, little laminated, arkosic, with mica, light gray
178.35		Sandstone very fine grained, rhythmites, micaceous, dark gray
179.20		Sandstone very fine grained, bioturbated, micaceous dark gray
180.20		Sandstone very fine grained, laminated, with mica, gray
181.06		Sandstone, fine grained, partly bioturbated, with mica, gray
183.60	8%	Shale and sandstone, fine grained, rhythmic laminated, micaceous.
185.42		Sandstone medium to coarse grained, arkosic, with mica, whitish gray
186.95		Sandstone, fine to medium grained, laminated, with mica, light gray
187.32		Sandstone, medium grained, arkosic, with mica, whitish gray
188.79		Sandstone, fine to medium grained, partly bioturbated, micaceous, gray
198.04		Sandstone, coarse to very coarse grained, arkosic, whitish gray
198.28		Coal, dull with bright
199.45		Sandstone, fine bioturbated, micaceous, gray
200.08		Shale, sandy, carbonaceous with thin coal layer
201.20		Sandstone, medium grained, arkosic, light gray
203.75		Sandstone, very fine grained, rhythmic laminated with thin shale layer, micaceous gray.
204.00		Sandstone, medium grained, with carbonaceous matter, light gray
204.98		Shale, carbonaceous, with sandstone fragments
205.53		Sandstone, fine to medium grained, laminated with carbonaceous matter
210.81		Sandstone, coarse grained, arkosic, whitish gray.
212.05		Sandstone, very fine grained, micaceous, dark gray
213.20		Sandstone, medium to coarse grained, with shale carbonaceous, gray
213.95		Shale, sandy, laminated, micaceous, dark gray
214.34		Shale, carbonaceous
214.92		Sandstone, very fine to fine grained, rhythmites, micaceous, gray
215.25		Shale, sandy, carbonaceous
215.65		Shale, carbonaceous
216.49		Sandstone, very fine to fine grained, laminated, micaceous, dark brownish gray
217.06		Coal, bright and dull
217.53		Shale, sandy, carbonaceous
217.90		Sandstone, very fine grained, micaceous, laminated, gray
226.90		Sandstone, coarse to very coarse grained, arkosic, whitish gray, with thin dolomite intrusions
227.82		Shale, sandy, micaceous, with thin coal layer dark gray
230.91		Sandstone, fine grained, well laminated, partly cross laminated light gray
232.01		Sandstone very fine grained, rhythmites, dark gray
233.39		Sandstone, coarse to very coarse grained, arkosic, whitish gray
234.19		Sandstone, fine grained, cross laminated, gray
235.28		Coal, dull with bright
235.88		Shale sandy, carbonaceous
236.06		Coal, bright with dull
237.40		Sandstone, medium grained, well laminated, with mica, gray
238.53		Sandstone, fine to medium grained, rhythmic, gray
247.50		Sandstone, coarse to very coarse grained, arkosic whitish gray
248.05		Coal, bright and dull
249.23		Sandstone, fine to medium grained, laminated, with mica, gray
257.50		Sandstone, coarse to very coarse grained, arkosic, whitish gray
258.01		Coal, bright and dull
258.09		Sandstone, very fine grained, with carbonaceous matter dark gray
259.21		Coal, bright and dull, shale coal,
258.55		Shale, carbonaceous
259.91		Sandstone, fine grained, micaceous, dark gray
260.30	50%	Sandstone medium grained, arkosic, with mica, faults? white, gray.
260.80		Sandstone, fine grained, micaceous core broken gray
261.28		Shale, sandy, core broken with calcite veins, dark gray
261.55		Sandstone fine grained, with calcite veins, core broken, light gray.
261.83		Sandstone fine grained, micaceous, with fault, slickenlines greenish gray
262.92		Sandstone fine to medium grained, with mica, core broken gray
267.29		Sandstone, fine to medium grained, with mica, gray to light gray.
270.70		Sandstone coarse grained, arkosic, with mica, whitish gray
271.14		Sandstone medium grained with mica, little laminated, with mica gray
271.28		Coal dull with bright
271.55		Shale, carbonaceous
272.45		Shale, sandy, dark gray
272.66		Coal, dull, with bright
273.31		Shale sandy, with chrome, side dark gray
274.30		Sandstone, coarse grained, arkosic, with many cracks, whitish gray
278.85		Sandstone coarse grained arkosic, whitish gray
280.56		Coal, bright and dull
281.00		Shale, sandy, carbonaceous
281.45		Sandstone, fine to medium grained, micaceous, light gray
286.05		Sandstone, coarse to very coarse grained, arkosic, whitish gray
288.66		Coal, bright and dull
289.86	6%	Shale, carbonaceous

Depth scale: 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290

Core % scale: 50%, 100%, 100%, 100%, 100%, 100%, 100%, 100%


188.95 Sandstone, fine to medium grained, laminated, with mica, light gray
187.32 Sandstone, medium gray and, arkosic, with mica, whitish gray
188.79 Sandstone, fine to medium grained, sandy, laminated, maroon, gray
190
100 %
198.06 Sandstone, coarse to very coarse grained, arkosic, whitish gray
198.28 Coal, dull with bright
194.45 Sandstone, fine grained, micaceous, gray
200.08 Shale, sandy carbonaceous with thin coal layer
201.20 Sandstone, medium grained, arkosic, light gray
203.75 Sandstone, very fine grained, rhythmic laminated with thin shale layer, micaceous gray
206.00 Sandstone, medium grained, with carbonaceous matter, light gray
204.98 Shale, carbonaceous, with sandstone lenticular
205.53 Sandstone, fine to medium grained, laminated with carbonaceous matter
200
210
100 %
210.81 Sandstone, coarse grained, arkosic, whitish gray
212.05 Sandstone, very fine grained, micaceous, dark gray
213.26 Sandstone, medium to coarse grained, with shale carbonaceous, gray
213.95 Shale, sandy laminated, micaceous, dark gray
214.34 Shale, carbonaceous
214.62 Sandstone very fine to fine grained, rhythmic, micaceous gray
215.25 Shale, sandy, carbonaceous
215.95 Shale, carbonaceous
216.49 Sandstone, very fine to fine grained, laminated, micaceous, dark brownish gray
217.06 Coal, bright and dull
217.53 Shale, sandy, carbonaceous
217.90 Sandstone, very fine grained, micaceous, laminated, gray
220
Sandstone, coarse to very coarse grained, arkosic, whitish gray, with thin dolomite intervening
226.99
227.82 Shale, sandy, micaceous with thin coal layer, dark gray
230
100 %
232.91 Sandstone, fine grained, well laminated, barely cross laminated light gray
232.01 Sandstone very fine grained, rhythmic, dark gray
233.39 Sandstone, coarse to very coarse grained, arkosic, whitish gray
234.19 Sandstone, fine grained, cross laminated, gray
235.28 Coal, dull with bright
235.88 Shale, sandy, carbonaceous
236.06 Coal, bright with dull
237.40 Sandstone, medium grained, well laminated, with mica, gray
238.53 Sandstone, fine to medium grained, rhythmic, gray
240
247.90 Sandstone, coarse to very coarse grained, arkosic, whitish gray
248.07 Coal, bright and dull
249.23 Sandstone, fine to medium grained, laminated, with mica, gray
250
100 %
257.50 Sandstone, coarse to very coarse grained, arkosic, whitish gray
258.01 Coal, bright and dull
258.09 Sandstone very fine grained, with carbonaceous matter dark gray
258.21 Coal, bright and dull, shale coal,
258.55 Shale, carbonaceous
258.91 Sandstone, fine grained, micaceous dark gray
260.30 Sandstone medium grained, arkosic, with mica, small 7 whitish gray
260.80
261.28 Sandstone, fine grained, micaceous, core broken gray
261.55 Shale, sandy, core broken with siderite side, dark gray
261.83 Sandstone fine grained, with calcite veins, core broken, light gray
262.98 Sandstone fine grained, micaceous with fourteen dark brownish gray
267.29 Sandstone, fine to medium grained, with wavy creeks gray
Sandstone, fine to medium grained, with mica, gray to light gray
270
100 %
270.70 Sandstone, coarse grained, arkosic, with mica, whitish gray
271.14 Sandstone medium grained with mica, little laminated, with mica gray
271.28 Coal, dull with bright
271.55 Shale, carbonaceous
272.45 Shale, sandy, dark gray
272.95 Coal, dull with bright
273.31 Shale, sandy, with siderite side, dark gray
274.30 Sandstone, coarse grained, arkosic, with many breaks, whitish gray
278.85 Sandstone, coarse grained, arkosic, whitish gray
280
280.56 Coal, bright and dull
281.00 Shale, sandy, carbonaceous
281.45 Sandstone, fine to medium grained, micaceous, light gray
288.05 Sandstone, coarse to very coarse grained, arkosic, whitish gray
288.66 Coal, bright and dull
289.85 6" Shale, carbonaceous
290
100 %
300
305.40 Sandstone, coarse to very coarse grained, arkosic, whitish gray
305.69 Coal, bright and dull
307.56 Sandstone, fine grained, laminated, micaceous, gray
308.10 Coal, bright and dull
308.55 Sandstone, fine grained, laminated, dark brownish gray
310
100 %
312.44 Coal, bright and dull
312.53 Sandstone, very fine to fine grained, laminated, micaceous, gray
313.78 Shale, carbonaceous
313.89 Shale, coal,
314.83 Coal, dull with bright
314.92 Shale, coal,
315.25 Shale, carbonaceous
315.95 Coal, bright with dull
316.35 Shale, sandy, carbonaceous
320
325.90 Sandstone, coarse to very coarse grained, arkosic, whitish gray
326.49 Conglomerate, 4 max 4 mm, subangular, quartz, feldspar rich whitish gray
327.13 Sandstone, coarse grained, arkosic, whitish gray
328.23 Coal, bright and dull
330
328.98 Sandstone very fine grained, micaceous, dark gray
100 %
Sandstone, coarse to very coarse grained, conglomeratic at the lower part, arkosic, whitish gray
332.98
334.62 Coal, bright and dull
335.06 Shale, carbonaceous, with thin coal layer
336.40 Sandstone, fine to medium grained, with carbonaceous matter, gray
340
344.20 Sandstone, coarse to very coarse grained, arkosic, whitish gray
344.52 Coal, dull with bright
344.74 79" Shale, sandy, carbonaceous
346.79 Sandstone, very fine to fine grained, rhythmic, micaceous, gray
347.68 Shale, carbonaceous, with lenticular sandstone,
348.05 Sandstone, fine grained, with carbonaceous matter, gray
350
100 %
358.65 Sandstone, coarse to very coarse grained, arkosic, whitish gray
End of Hole.
360

HOLE NO. : LD18

AREA : LUBHUKU

DATE DRILLED : 2. NOV.1984~17.NOV. 1984

TOTAL DEPTH : 382.45m

ELEVATION : +269 m

COORDINATE : X=+2,931,999,Y=-79,000

25156

JAPAN INTERNATIONAL COOPERATION AGENCY

Borehole Log LD18

Dwg. 4 r | Scale 1 : 200

Date | Sep 1985 | Prepared by | S. Morikawa, K. Watanabe

Depth of Borehole (M)	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	Core Recovery
0						non coring
5.00					Soil and weathered sandstone	
5.10					Sandstone, medium grained, arkosic, weathered, light brownish gray	
6.40					Shale, sandy, laminated weathered, dark brownish gray	100%
6.95					Sandstone medium grained arkosic weathered light brownish gray	
9.30					Shale, sandy, laminated, weathered, dark brownish gray	
10.00					Sandstone, medium grained, arkosic, weathered, light brownish gray	
10					Sandstone medium grained, brownish gray	non coring
12.00					Sandstone, medium grained, arkosic, weathered, light brownish gray	
12.90					Shale, sandy, little weathered, gray	100%
14.30					Sandstone, medium grained, arkosic, little weathered, whitish gray	
15.96					Sandstone, fine grained, bioturbated, little weathered, gray	
17.28					Sandstone, medium grained, arkosic, little weathered, whitish gray	
18.09					Sandstone fine grained, graywacke, gray	
18.93					Shale, sandy saturated at the lower part, brownish gray	
20						
20.57					Debris, very fine grained, basaltic, dark gray.	
20.75					Shale, sandy, bioturbated, dark gray	
22.55					Sandstone, coarse grained arkosic, partly weathered, whitish gray	
22.70					Breccia, silty clay, with calcite vein, greenish gray	
25.62					Sandstone, medium grained, partly coarse grained, arkosic, whitish gray	
26.35					Sandstone, medium grained, little bioturbated, light gray	
29.13					Shale and sandstone, rhythmic laminated	
29.70					Sandstone, medium grained, arkosic, whitish gray	100%
31.20					Shale and sandstone, rhythmic laminated	
33.79					Shale, sandy, dark gray	
33.53					Sandstone, medium grained, gray	
40						
40.68					Shale, sandy, dark gray	
40.96					Sandstone fine to medium grained laminated arkosic whitish gray	
41.16					Shale, sandy, calcareous, gray	
50						100%
60						
60.10			8°		Shale, sandy, laminated, gray to dark gray	
61.31					Sandstone, coarse grained, arkosic, with carbonaceous matter, light gray	
64.73					Shale sandy laminated gray to dark gray	
64.85					Shale, sandy, calcareous, gray	
68.88					Shale, sandy, laminated, gray to dark gray.	
70						100%
73.30					Sandstone, medium grained, bioturbated, light gray	
79.13					Sandstone, fine to medium grained, laminated, micaceous, light gray	
80						
79.86					Sandstone fine to medium grained, bioturbated micaceous, light gray	
83.40					Sandstone fine to medium grained, laminated, micaceous, partly with calcite veins, light gray	
85.75					Sandstone, medium grained, laminated with mica arkosic, whitish gray	
86.1.					Sandstone coarse grained, arkosic, whitish gray	
88.62					Sandstone medium grained, bioturbated, gray	
90						100%
91.00					Sandstone, coarse grained, arkosic, whitish gray	
93.81					Sandstone fine grained, with carbonaceous matter, gray	
93.15					Sandstone fine to medium grained, with carbonaceous matter light gray	
100						
100.91					Sandstone, fine grained, partly medium grained, with mica whitish gray	
101.94			11°		Sandstone, fine grained and Shale sandy in alternation	
102.18					Sandstone, fine grained, arkosic, with mica, whitish gray	
103.86					Sandstone, fine grained, with carbonaceous matter, gray	
106.41					Sandstone fine grained and Shale, sandy in alternation	
105.48					Sandstone, fine to medium grained, laminated, with mica, whitish gray	
106.16					Sandstone fine grained and Shale, sandy in alternation	
107.72					Sandstone, coarse grained, arkosic, with mica, white.	
110						100%
110.75					Sandstone fine grained, laminated, with mica, gray	
112.35			9°		Shale, sandy, partly interbedded thin sandstone layer, dark gray.	
117.21					Sandstone, fine grained, arkosic, with mica, whitish gray.	
120						
121.36					Shale, sandy and sandstone, fine grained, in alternation, gray	
121.91			6°		Shale, partly sandy, dark gray	
122.62					Sandstone, fine grained, arkosic with bioturbated shale, whitish gray	
124.91					Shale partly sandy and carbonaceous, dark gray.	
127.31					Sandstone, fine grained, partly medium grained, arkosic, whitish gray	
127.83					Sandstone, very fine to fine grained, laminated, light yellowish gray.	
128.37			6°		Shale, sandy, carbonaceous	
129.56					Sandstone medium to coarse grained, arkosic, whitish gray.	
130						100%
131.36					Sandstone, fine grained, gray.	
131.93					Sandstone medium grained, arkosic, whitish gray.	
132.36					Sandstone, fine grained, light gray.	
133.48					Sandstone, medium grained, arkosic, with mica, whitish gray.	
136.28					Sandstone, coarse grained, arkosic, with mica, whitish gray.	
139.17			0°		Sandstone, fine grained, laminated, partly saturated, gray, with thin debrite interbeds.	
140						
147.10					Debrite, fine grained, basaltic, greenish gray.	

Depth	Description
93.81	Sandstone, fine grained, with carbonaceous matter, gray.
95.13	Sandstone, fine to medium grained, with carbonaceous matter light gray.
100.91	Sandstone, fine grained, partly medium grained with mica whitish gray.
101.54	Sandstone, fine grained and shale, sandy in alternation.
102.19	Sandstone, fine grained, arkosic, with mica, whitish gray.
103.86	Sandstone, fine grained, with carbonaceous matter gray.
104.41	Sandstone fine grained and shale, sandy in alternation.
105.68	Sandstone fine to medium grained, laminated with mica, whitish gray.
106.16	Sandstone, fine grained and shale, sandy in alternation.
107.72	Sandstone, coarse grained, arkosic with mica, white.
110.75	Sandstone, fine grained, laminated with mica, gray.
112.35	Shale, sandy, partly interbedded thin sandstone layer, dark gray.
117.21	Sandstone, fine grained, arkosic, with mica, whitish gray.
121.35	Shale, sandy and sandstone, fine grained, in alternation, gray.
121.91	Shale, partly sandy dark gray.
122.62	Sandstone, fine grained, arkosic with tentacular seam, whitish gray.
124.91	Shale, partly sandy and carbonaceous dark gray.
127.31	Sandstone, fine grained, partly medium grained, arkosic whitish gray.
127.83	Sandstone very fine to fine grained, indurated, light yellowish gray.
128.37	Shale, sandy, carbonaceous.
128.56	Sandstone, medium to coarse grained, arkosic, whitish gray.
131.35	Sandstone, fine grained, gray.
131.93	Sandstone medium grained, arkosic, whitish gray.
132.36	Sandstone, fine grained, light gray.
133.48	Sandstone, medium grained, arkosic with mica, whitish gray.
136.28	Sandstone, coarse grained, arkosic, with mica, whitish gray.
139.17	Sandstone, fine grained, laminated, partly indurated, gray, with thin aderite intrusions.
147.10	Doleriste, fine grained, basaltic, greenish gray.
156.80	Doleriste medium grained, partly with calcite veins, greenish gray.
157.70	Doleriste, fine grained, basaltic, greenish gray.
160.85	Doleriste, medium grained, greenish gray.
161.95	Doleriste, fine grained, greenish gray.
173.12	Doleriste, medium grained, greenish gray.
175.62	Doleriste, fine grained, basaltic, greenish gray.
175.98	Shale, sandy, indurated, light gray.
178.66	Doleriste, fine grained, basaltic, greenish gray.
179.02	Sandstone, fine grained, laminated, indurated, light gray.
179.31	Doleriste, very fine grained, basaltic, greenish gray.
180.63	Sandstone, fine grained, laminated, indurated, whitish gray.
181.74	Doleriste, very fine to fine grained, greenish gray.
183.06	Sandstone, fine grained, laminated, indurated, whitish gray.
183.77	Doleriste, very fine grained, basaltic, greenish gray.
184.81	Sandstone, fine grained, laminated with mica, partly indurated whitish gray.
186.45	Doleriste very fine grained, greenish gray.
187.21	Sandstone, fine grained, laminated, with carbonaceous matter and mica carbonaceous.
188.23	Doleriste, silty dacite, greenish gray.
188.92	Sandstone fine grained, laminated with mica, whitish gray.
189.38	Doleriste, silty dacite, greenish gray.
189.77	Sandstone, fine grained, laminated, with mica, whitish gray.
190.56	Doleriste very fine grained, greenish gray.
191.17	Sandstone, fine grained, laminated, with mica, whitish gray.
191.57	Doleriste fine grained, greenish gray.
192.97	Sandstone, fine grained, interbedded thin shale, light gray.
194.28	Sandstone, medium grained, arkosic, with mica, whitish gray.
194.52	Doleriste, silty dacite, greenish gray.
197.74	Sandstone, medium grained arkosic, with mica, whitish gray.
198.70	Sandstone, medium grained, arkosic with mica, whitish gray.
200.77	Sandstone, medium to coarse grained, arkosic, with mica, whitish gray.
200.93	Coal, dull with bright.
201.11	Sandstone, fine grained, gray.
202.95	Sandstone, medium grained, laminated, with mica, whitish gray.
204.53	Sandstone, fine grained, laminated, micaceous, light brownish gray.
207.32	Sandstone, fine to medium grained, whitish gray.
207.86	Sandstone, very fine grained, micaceous, brownish gray.
208.26	Sandstone, fine grained, arkosic, with mica, brownish white.
217.06	Sandstone, fine to medium grained, arkosic, partly laminated, gray to light gray.
218.64	Sandstone, medium to coarse grained, arkosic, with mica, whitish gray.
219.05	Shale, sandy, with mica, dark gray.
226.40	Sandstone, coarse grained, arkosic, with mica, whitish gray.
226.83	Sandstone, very coarse grained, semi-conglomeratic, arkosic, with mica
227.10	coal, bright and dull.
227.91	Sandstone, coarse grained, arkosic, with mica whitish gray.
228.61	Shale, interbedded thin sandstone layer, rhythmic, dark gray.
231.97	Sandstone, fine to medium grained, arkosic, laminated, brownish white.
232.85	Sandstone and shale, sandy in alternation, light gray.
234.32	Shale, partly with tentacular sandstone, dark gray.
237.59	Sandstone, medium grained, arkosic, with mica, laminated, brownish white.
238.73	Shale, sandy, dark gray.
240.96	Sandstone, medium grained, arkosic, with mica, whitish, gray.
241.11	Coal, dull with bright.
242.09	Sandstone, very fine grained and shale, sandy in alternation.
242.70	Shale, with mica, dark gray.
243.47	Sandstone, fine grained, laminated, with mica, brownish gray.
244.74	Shale, dark gray.
245.46	Sandstone, medium to coarse grained, arkosic, with mica whitish gray.
245.76	Sandstone, fine grained, laminated, with mica, brownish gray.
246.38	Coal, bright and dull, shale seam.
247.08	Shale, sandy, carbonaceous.
247.23	Sandstone, fine grained, micaceous, dark gray.
258.27	Sandstone, coarse grained, arkosic, with mica, whitish gray.
259.81	Sandstone, fine grained, laminated, micaceous, whitish gray.
261.95	Sandstone, fine grained, arkosic, with mica, whitish gray.
263.90	Sandstone, fine grained and shale, sandy in alternation.
264.31	Sandstone, coarse grained, arkosic, with mica, whitish gray.
265.22	Sandstone, medium grained, arkosic, laminated, with mica, brownish white.
266.35	Coal, bright and dull.
267.84	Sandstone, fine grained, arkosic, laminated, brownish white.
269.21	Shale, partly sandy, with thin coal layer, dark gray.
269.41	Coal, bright and dull.
271.52	Sandstone, fine to medium grained, arkosic, partly laminated, brownish white.
272.68	Sandstone, fine grained, well laminated, brownish gray.
273.02	Sandstone, fine grained, arkosic, with carbonaceous matter, whitish gray.
274.04	Coal, bright and dull.
274.31	Shale, sandy, carbonaceous.

Core recovery: 100%, 100%, 100%,

Depth	Thickness	Description
217.06		Sandstone, fine to medium grained, arkosic, partly laminated, light gray
219.84		Sandstone, medium to coarse grained, arkosic, with mica, whitish gray
219.05		Shale, sandy, with mica, dark gray
226.40		Sandstone, coarse grained, arkosic, with mica, whitish gray
226.63		Sandstone, very coarse grained, conglomeratic, arkosic, with mica
227.10	6"	Coal, bright and dull
227.91		Sandstone, coarse grained, arkosic, with mica, whitish gray
228.61		Shale, interbedded thin sandstone, dark, carbonaceous, dark gray
231.97		Sandstone, fine to medium grained, arkosic, laminated, brownish white
232.85		Sandstone and shale, sandy in alternation, light gray
234.32		Shale, partly with freshwater sandstone, dark gray
237.59		Sandstone, medium grained, arkosic, with mica, laminated, brownish white
238.73		Shale, sandy, dark gray
241.96		Sandstone, medium grained, arkosic, with mica, whitish gray
241.11		Coal, dull with bright
242.09		Sandstone, very fine grained and shale, sandy in alternation
242.70		Shale, with mica, dark gray
243.47		Sandstone, fine grained, laminated, with mica, brownish gray
244.74		Shale, dark gray
245.46		Sandstone, medium to coarse grained, arkosic, with mica, whitish gray
245.76		Sandstone, fine grained, laminated, with mica, brownish gray
246.30		Coal, bright and dull, shale roof
247.08		Shale, sandy, carbonaceous
247.23		Sandstone, fine grained, micaceous, dark gray
258.27		Sandstone, coarse grained, arkosic, with mica, whitish gray
259.81		Sandstone, fine grained, laminated, micaceous, whitish gray
261.95		Sandstone, fine grained, arkosic, with mica, whitish gray
263.90		Sandstone, fine grained and shale, sandy in alternation
264.31		Sandstone, coarse grained, arkosic, with mica, whitish gray
265.22		Sandstone, medium grained, arkosic, laminated, with mica, brownish white
266.35		Coal, bright and dull
267.84		Sandstone, fine grained, arkosic, laminated, brownish white
269.21	2"	Shale, partly sandy, with thin coal layer, dark gray
269.41		Coal, bright and dull
271.62		Sandstone, fine to medium grained, arkosic, partly laminated, brownish white
272.68		Sandstone, fine grained, well laminated, brownish gray
273.02		Sandstone, fine grained, arkosic, with carbonaceous matter, whitish gray
274.04		Coal, bright and dull
274.81		Shale, sandy, carbonaceous
283.57		Sandstone, medium to coarse grained, arkosic, with mica, whitish gray
283.95		Coal, bright with dull
284.41		Sandstone, fine grained, micaceous, partly carbonaceous, dark gray
285.90		Sandstone, medium grained, arkosic, with mica, whitish gray
288.70		Sandstone, medium to coarse grained, arkosic, with mica, whitish gray
295.34		Sandstone, coarse to very coarse grained, with mica, whitish gray
295.95	6"	Shale, sandy, carbonaceous, with thin coal layer
297.78		Sandstone, fine grained, micaceous, brownish gray
297.90		Coal, dull with bright
298.22		Shale, sandy, carbonaceous
300.99		Sandstone, fine grained, arkosic, partly laminated, light gray
301.41		Sandstone, very fine grained, micaceous, dark gray
304.11		Sandstone, fine grained, arkosic, laminated, with mica, brownish white
304.66		Sandstone, medium grained, arkosic, partly laminated, with mica, whitish gray
308.82		Sandstone, medium to coarse grained, arkosic, with mica, whitish gray
309.09		Sandstone, fine grained, micaceous, brownish gray
309.22		Coal, bright and dull
309.02		Shale, carbonaceous
309.51		Coal, dull with bright
310.11		Shale, sandy, carbonaceous
310.69		Sandstone, very fine grained, micaceous, brownish gray
316.61		Sandstone, coarse grained, arkosic, with mica, whitish gray
318.47	5"	Coal, bright and dull
321.05		Sandstone, fine grained, arkosic, well laminated, with mica, light gray
324.80		Sandstone, coarse grained, conglomeratic, with mica, whitish gray
325.68		Coal, bright and dull
326.21		Sandstone, very fine grained, micaceous, brownish gray
327.03		Sandstone, fine grained, arkosic, laminated, with mica, brownish white
338.40		Sandstone, coarse to very coarse grained, partly conglomeratic, arkosic, with mica, whitish gray
338.63		Coal, bright and dull
338.44		Sandstone, fine grained, micaceous, brownish gray
339.52		Coal, dull
341.89		Sandstone, medium grained, arkosic, with mica, whitish gray
342.35		Coal, bright and dull
342.94		Sandstone, fine grained, micaceous, brownish gray
346.56	3"	Coal, bright and dull
347.70		Sandstone, very fine grained, micaceous, dark gray
348.61		Coal, dull, shale roof
348.90		Shale, carbonaceous
349.66		Coal, bright and dull, shale roof
350.02		Shale, sandy, carbonaceous
350.75		Sandstone, very fine grained, micaceous, dark gray
361.44		Sandstone, coarse to very coarse grained, arkosic, with mica, whitish gray
362.46		Sandstone, fine grained, micaceous, brownish gray
363.45		Shale, sandy, carbonaceous
364.01	7"	Shale, sandy
367.21		Sandstone, coarse grained, arkosic, with mica, whitish gray
367.63		Sandstone, fine grained, micaceous, brownish gray
368.34		Sandstone, coarse grained, arkosic, with mica, whitish gray
369.79		Coal, bright and dull
370.21		Sandstone, very fine grained, micaceous, dark gray
371.81		Sandstone, medium to coarse grained, arkosic, with mica, whitish gray
372.36		Sandstone, fine grained, micaceous, brownish gray
374.46		Sandstone, coarse grained, arkosic, with mica, whitish gray
374.68		Shale, sandy, carbonaceous, with thin coal layer
375.08		Sandstone, fine grained, micaceous, brownish gray
375.79		Sandstone, medium to coarse grained, arkosic, with mica, whitish gray
376.62		Sandstone, fine grained, micaceous, brownish gray
382.45		Sandstone, coarse grained, arkosic, with mica, whitish gray
		End of Hole

Depth scale: 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380

Recovery: 100%, 100%, 100%, 100%, 100%, 100%, 100%

HOLE NO. : LD19

AREA : LUSHUKU

DATE DRILLED : 10,DEC.1984 ~ 12.JAN.1985

TOTAL DEPTH : 432.85m

ELEVATION : +251m

COORDINATE : X=+2,932,000, Y=-79,998

JAPAN INTERNATIONAL COOPERATION AGENCY

Borehole Log LD19

Dwg	4s	Scale	1:200
Date	Sep 1985	Prepared by	S. Morikawa, H. Watanabe

(M) Depth of Borehole (M)	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	Core Recovery
0						
4.30					Soil	non-coring
10						
20.10					Shale, weathered, with carbonaceous matter, dark gray.	
20.50					Shale, sandy, weathered, dark gray.	
22.38					Shale, partly carbonaceous, with thin coal layer, dark gray.	100%
22.75					Coal, dull with bright.	
24.11					Shale, sandy weathered, dark brownish gray.	
24.50					Sandstone has grained and shale in alternation, fairly weathered brownish gray.	
25.20					Sandstone, medium grained, weathered, grayish brown.	
25.55			0°		Shale, carbonaceous.	
30						
32.79			0°		Dolerite, fine grained, basaltic, with pyrite along crack, blackish gray.	
36.53					Sandstone, coarse grained, little weathered, blackish gray.	
40						100%
44.03					Sandstone, coarse grained, partly conglomeratic, arkosic with mica whitish gray.	
45.11					Shale, carbonaceous, thin coal layer at the top.	
45.63					Coal, bright and dull, shale, carbonaceous.	
46.75			55°		Shale, sandy, dark gray.	
47.40					Sandstone, very fine grained, gray.	
50						
50.41					Sandstone, medium to coarse grained, arkosic, with mica, whitish gray, partly with lenticular shale.	
51.58					Shale, sandy, light gray.	
52.85					Shale, sandy, partly carbonaceous, with thin coal layer.	
53.80					Sandstone, coarse grained, arkosic, with mica, whitish gray.	
54.36					Sandstone, fine grained, laminated, with mica, brownish gray.	
54.86					Sandstone coarse grained, partly conglomeratic, arkosic with mica whitish gray.	
55.80					Sandstone very fine to fine grained, laminated, with mica, gray.	
60						
59.75					Sandstone, coarse grained, arkosic, with mica, whitish gray.	100%
61.54					Sandstone, fine grained, and shale in alternation, light gray.	
63.75					Shale, interbedded thin sandstone layer, dark gray.	
64.32					Shale, partly with thin lenticular sandstone, dark gray.	
65.32					Sandstone, fine grained, with pyrite whitish gray.	
66.36					Shale, sandy, partly with pyrite, light gray.	
70						
71.30					Sandstone, coarse grained, arkosic, with mica, whitish gray.	
72.80					Sandstone, fine grained, partly siliceous, with pyrite light gray.	
73.32					Dolerite, very fine grained, basaltic, light greenish gray.	
73.51					Sandstone, fine grained, calcareous, whitish white.	
76.90					Dolerite, very fine grained, with amygdaloid filled with calcite, greenish gray.	
77.60					Sandstone, fine grained, brecciated, with calcite vein, light gray.	
80						
80.35					Dolerite, fine grained, partly, with calcite vein, dark greenish gray.	
80.70					Sandstone, very fine grained, brecciated, with calcite veins, light gray.	
82.15					Dolerite, fine grained, partly with shale fragments and calcite veins, dark gray.	100%
84.50					Dolerite, very fine grained, with many calcite veins, dark greenish gray.	
85.15					Dolerite, fine grained, brecciated, with calcite veins, dark greenish gray.	
90						
89.65					Dolerite, coarse grained, dark greenish gray.	
93.15					Dolerite, fine grained, with amygdaloid filled with calcite, dark greenish gray.	
94.00					Dolerite, medium grained, with calcite veins, dark greenish gray.	
94.70					Dolerite, silty tuff, with calcite veins, dark greenish gray.	
100						
100.50					Dolerite, medium grained, with calcite veins, dark greenish gray.	100%
102.94					Dolerite, medium grained, brecciated, with many calcite veins, light greenish gray.	
106.15					Dolerite, very fine grained, with amygdaloid filled with calcite, dark greenish gray.	
106.75			50°		Dolerite, silty tuff, dark greenish gray.	
107.80					Shale, sandy, with lenticular sandstone, gray.	
110						
117.40			30°		Shale, sandy, laminated, dark gray.	
118.32					Dolerite, very fine grained, dark gray.	
120						
120.34					Shale, sandy, laminated, dark gray.	100%
120.64			50°		Dolerite, silty tuff, greenish gray.	
121.80					Shale, sandy laminated dark gray.	
122.11					Sandstone, medium to coarse grained, arkosic, white.	
122.70					Shale, sandy, calcareous, finely laminated, gray.	
123.80					Sandstone, medium to coarse grained, arkosic, whitish gray.	
124.40					Shale, sandy, dark gray.	
130						
131.97					Sandstone, medium to coarse grained, arkosic, whitish gray, partly intercalated thin shale layer.	
137.80			8°		Shale, partly with thin sandstone, gray.	
139.20			0°		Sandstone medium grained, arkosic, with mica, whitish gray.	
140						
141.70					Dolerite, fine to medium grained, greenish gray.	100%
143.20					Sandstone, fine grained, arkosic, with mica, interbedded brownish white.	
144.48					Dolerite, fine grained, basaltic, greenish gray.	

Depth	Dip	Description
120.34		Shale, sandy, laminated, dark gray.
120.64	10°	Dolerite, silty fabric, greenish gray.
121.80		Shale, sandy, laminated, dark gray.
122.11		Sandstone, medium to coarse grained, arkosic, white.
122.70		Shale, sandy, carbonaceous, fissile laminated, gray.
123.80		Sandstone, medium to coarse grained, arkosic, whitish gray.
124.40		Shale, sandy, dark gray.
131.97		Sandstone, medium to coarse grained, arkosic, whitish gray, partly interbedded thin shale layer.
137.80	8°	Shale, partly with thin sandstone, gray.
138.20	0°	Sandstone, medium grained, arkosic, with mica, whitish gray.
141.70		Dolerite, fine to medium grained, greenish gray.
143.29		Sandstone, fine grained, arkosic, with mica, indurated, brownish white.
144.48		Dolerite, fine grained, basaltic, greenish gray.
149.80		Dolerite, medium grained, greenish gray.
150.10		Dolerite, silty fabric, dark greenish gray.
150.80		Sandstone, coarse grained, arkosic, indurated, whitish gray.
152.91		Sandstone, medium grained, arkosic light gray.
153.90	0°	Dolerite, silty fabric, dark gray.
155.75		Sandstone, fine grained, laminated, micaceous, gray.
158.35		Sandstone, medium grained, little laminated, with mica, light gray
159.25		Dolerite, silty fabric, dark gray.
167.38		Sandstone, fine grained, partly medium grained, well laminated, micaceous, gray
167.90		Sandstone, medium grained, arkosic, whitish gray.
170.50		Sandstone, fine to medium grained, bioturbated, gray.
171.96		Sandstone, medium grained, arkosic, whitish gray.
174.17		Sandstone, fine grained, bioturbated, gray to dark gray.
175.88		Sandstone, medium to coarse grained, arkosic, with mica, whitish gray.
176.73		Sandstone, fine to medium grained, laminated, with mica, light gray.
178.25		Sandstone, medium grained, little laminated, gray.
178.55		Shale, sandy, dark gray.
178.88		Sandstone, fine to medium grained, micaceous, gray.
180.80		Dolerite, very fine grained, with calcite veins, dark gray.
181.71		Sandstone, fine to medium grained, laminated, micaceous, gray.
182.16		Sandstone, fine to medium grained, partly bioturbated, gray.
185.00		Sandstone, very fine grained, rhythmic laminated with thin shale layer, micaceous, gray.
186.06		Sandstone, coarse grained, arkosic, whitish gray.
186.47		Dolerite, silty fabric, gray.
187.21		Sandstone, medium grained, arkosic, whitish gray.
187.42		Sandstone, fine to medium grained, bioturbated, gray.
188.24		Sandstone, medium to coarse grained, arkosic, whitish gray.
190.75		Sandstone, fine to medium grained, bioturbated, gray.
192.00	10°	Shale, sandy, dark gray.
193.51		Sandstone, fine grained, bioturbated, gray to dark gray.
193.90		Sandstone, coarse grained, arkosic, whitish gray.
194.43		Sandstone, medium grained, little bioturbated, gray to light gray.
194.76		Shale, sandy, carbonaceous.
195.45		Sandstone, medium grained, little bioturbated, whitish gray.
197.25		Sandstone, medium grained, arkosic, whitish gray.
198.63		Sandstone, medium to coarse grained, arkosic, whitish gray, thin dolerite.
200.70		Sandstone, very fine to fine grained, rhythmic laminated with thin shale layer, micaceous, dark gray.
201.75		Shale, sandy, dark gray.
202.05		Shale, sandy, laminated, dark gray.
203.42	6°	Shale, carbonaceous.
203.69		Sandstone, medium grained, bad sorting, micaceous, light gray.
205.00		Shale, sandy, rhythmic with sandstone, dark gray.
205.10		Sandstone, medium grained, bad sorting, micaceous, light gray.
206.55		Shale, sandy, rhythmic with sandstone, dark gray.
207.50		Sandstone, medium grained, little bioturbated, light gray.
208.40		Sandstone, fine grained, bioturbated, light gray.
209.20		Sandstone, very fine to fine grained, micaceous, gray.
209.72		Shale, sandy, fossiliferous, dark gray.
211.03		Sandstone, coarse grained, arkosic, whitish gray.
211.87		Sandstone, fine to medium grained, laminated, gray.
212.59		Sandstone, very fine grained, cross laminated, greenish gray.
212.76		Sandstone, very fine grained, bioturbated, micaceous, gray.
216.86		Sandstone, medium grained, arkosic, little laminated, with mica, partly bioturbated, whitish gray.
216.96		Shale, sandy, carbonaceous.
216.98		Shale, coal.
217.70		Dolerite, fine grained, dark greenish gray.
217.85		Coal, burnt, shale coal.
218.76		Sandstone, fine to medium grained, little laminated, with mica, gray.
219.40		Shale, sandy, rhythmic laminated with thin sandstone layer.
221.96		Sandstone, fine grained, rhythmic with shale, micaceous, gray.
222.49		Dolerite, silty fabric, with amygdules filled with calcite, greenish gray.
225.65		Sandstone, fine grained, rhythmic laminated, with thin shale layer, micaceous, gray.
224.69		Dolerite, silty fabric, with calcite veins, dark greenish gray.
225.94		Sandstone, fine grained, shale layer with shale, micaceous, gray.
226.36		Shale, sandy, bottom two with sandstone, micaceous, gray.
226.45		Sandstone, coarse grained, arkosic, whitish gray.
226.73		Dolerite, silty fabric, dark greenish gray.
227.01		Sandstone, coarse grained, cross laminated, light gray.
227.63		Shale, sandy, dark gray.
228.24		Dolerite, very fine to fine grained, well laminated, micaceous, gray.
231.97		Sandstone, medium to coarse grained, arkosic, whitish gray.
232.20		Sandstone, medium to coarse grained, bioturbated, light gray.
232.70		Sandstone, medium grained, arkosic, whitish gray.
233.91		Sandstone, medium grained, bioturbated, light gray to gray.
235.57		Sandstone, medium to coarse grained, arkosic, whitish gray.
235.73		Coal, bright with shale.
241.77		Sandstone, medium grained, arkosic, partly laminated, with mica, whitish gray.
243.50		Sandstone, very fine grained, rhythmic laminated with thin shale layer, gray.
244.44		Sandstone, fine to medium grained, bioturbated, light gray to gray.
245.38		Sandstone, fine to medium grained, partly cross laminated, light gray.
245.80		Sandstone, fine to medium grained, little bioturbated, gray.
247.80		Sandstone, medium grained, little laminated, light gray.
251.20		Sandstone, fine grained, rhythmic laminated with thin shale layer, micaceous, gray.
251.80		Sandstone, medium to coarse grained, bioturbated, light gray.
252.18		Sandstone, coarse grained, arkosic, whitish gray.
252.98		Sandstone, fine grained, micaceous, gray.
253.50		Sandstone, coarse grained, arkosic, whitish gray.
253.81		Shale, sandy, carbonaceous.
262.06	4°	Sandstone, coarse grained, arkosic, whitish gray.
263.96		Shale, sandy, partly with tentacular sandstone and thin coal layer, dark gray.
264.25		Sandstone, coarse grained, arkosic, with mica, whitish gray.
266.41		Shale, sandy with thin coal layer, dark gray.
267.45		Sandstone, very fine grained, laminated, micaceous, brownish gray.
268.85		Shale, interbedded thin sandstone, dark gray.
271.80		Sandstone, medium grained, arkosic, with mica, whitish gray.
273.45		Sandstone, very fine to fine grained, micaceous, brownish gray.
275.15		Sandstone, medium grained, arkosic, with mica, whitish gray.
275.77		Sandstone, fine grained, micaceous, with thin coal layer, brownish gray.
276.21		Sandstone, coarse grained, arkosic, with mica, whitish gray.
276.89		Shale, dark gray.
277.12		Shale, and sandstone in alternation, dark gray.
280.95		Sandstone, medium grained, arkosic, with mica, whitish gray.
282.13		Shale, dark gray.
282.90		Shale and sandstone in alternation, gray.
283.38		Coal, shale with bright.
283.71		Shale, coal.
283.83		Shale, carbonaceous.

Scale: 100 m

Depth	Dip	Description
262.04	45°	Sandstone, coarse grained, arkosic, whitish gray.
283.95		Shale, sandy, partly with fractured sandstone and thin coal layer, dark gray.
284.22		Sandstone, coarse grained, arkosic, with mica, whitish gray.
286.41		Shale, sandy with thin coal layer, dark gray.
287.45		Sandstone, very fine grained, laminated, micaceous, brownish gray.
288.85		Shale, interbedded thin sandstone, dark gray.
271.90		Sandstone, medium grained, arkosic, with mica, whitish gray.
273.45		Sandstone, very fine to fine grained, micaceous, brownish gray.
275.15		Sandstone, medium grained, arkosic, with mica, whitish gray.
275.77		Sandstone, fine grained, micaceous, with thin coal layer, brownish gray.
276.21		Sandstone, coarse grained, arkosic, with mica, whitish gray.
276.85		Shale, dark gray.
277.12		Shale and Sandstone in alternation, dark gray.
280.95		Sandstone, medium grained, arkosic, with mica, whitish gray.
282.13		Shale, dark gray.
282.90		Shale and sandstone in alternation, gray.
283.56		Coal, dull with bright.
284.71		Shale, coal.
283.83		Shale, carbonaceous.
303.60		Sandstone, coarse grained, partly conglomeratic, arkosic with mica, whitish gray.
305.05		Shale and sandstone in alternation, gray.
306.91		Sandstone, medium grained, arkosic with mica, whitish gray.
308.45		Coal dull with bright.
308.88		Sandstone fine grained, laminated, with mica, gray.
310.55	5°	Shale sandy, carbonaceous.
310.82		Coal dull with bright.
313.05		Sandstone, fine grained, laminated, arkosic, with mica, brownish white.
315.85		Shale, sandy carbonaceous.
315.01		Coal, dull with bright.
315.30		Shale, sandy, carbonaceous.
315.08		Sandstone, fine grained, gray.
319.37		Sandstone, coarse grained, arkosic, with mica, whitish gray.
319.90		Sandstone, fine grained, arkosic, with mica, light gray.
323.28		Sandstone, coarse grained, arkosic, with mica, whitish gray.
323.72		Coal, bright with dull.
325.05		Sandstone, very fine to fine grained, dark gray.
332.86		Sandstone, coarse grained, arkosic, with mica, whitish gray.
333.12	7°	Shale, partly sandy, carbonaceous.
335.05		Sandstone, fine grained, rhythmic laminated, with thin shale layer, micaceous gray.
335.28		Coal, bright with dull.
336.23		Shale, sandy, dark gray.
336.80		Sandstone, fine grained, laminated, micaceous, gray.
339.49		Sandstone medium to coarse grained, arkosic, with mica, whitish gray.
342.55		Sandstone very fine grained, rhythmic laminated with thin shale layer, micaceous gray.
344.32		Sandstone, fine grained, arkosic, with mica, brownish white.
344.77		Sandstone very fine grained, rhythmic, with shale, micaceous gray.
345.05		Coal, bright and dull.
345.82		Shale, carbonaceous, partly with fractured sandstone.
346.17		Sandstone, very fine grained, micaceous, bluish gray.
346.49		Coal, bright and dull.
352.50		Sandstone, coarse to very coarse grained, arkosic, with mica, whitish gray.
353.65		Coal, dull with bright.
354.20		Shale, sandy, carbonaceous.
357.31		Sandstone, coarse grained, arkosic, with mica, whitish gray.
357.62		Interbed, silty, dark, yellowish gray.
360.65		Sandstone, coarse grained, arkosic, with mica, whitish gray.
361.17	45°	Coal, dull with bright.
362.85		Sandstone, very fine grained, micaceous, bluish gray.
377.02		Sandstone, coarse grained, arkosic, with mica, whitish gray.
377.33		Coal, dull with bright.
378.11		Sandstone, coarse grained, arkosic, with mica, whitish gray.
378.9		Sandstone, very fine grained, micaceous, dark gray.
379.34		Coal, bright and dull.
380.44	65°	Shale, carbonaceous.
380.94		Sandstone, very fine grained, rhythmic with shale, micaceous gray.
381.03	35°	Shale, carbonaceous.
382.42		Coal, dull with bright.
382.63		Shale, carbonaceous.
382.76		Sandstone, fine grained, dark gray.
384.74		Coal, bright and dull.
385.85		Sandstone very fine grained, micaceous, dark gray.
386.15		Shale, carbonaceous.
386.86		Coal, dull with bright.
387.28		Shale, sandy, carbonaceous.
387.88		Coal, dull with bright.
388.18		Shale, sandy, carbonaceous.
400.90		Sandstone, coarse grained, arkosic, whitish gray.
401.32		Coal, dull with bright.
401.52		Shale, carbonaceous.
403.38		Sandstone, fine grained, micaceous, gray to dark gray.
407.11		Sandstone, very coarse grained, arkosic, with mica, whitish gray.
408.56		Coal, bright and dull.
409.73		Shale, carbonaceous.
409.80		Sandstone, fine grained, micaceous, gray.
415.15		Sandstone, coarse grained, arkosic, whitish gray.
415.50		Sandstone, fine to medium grained, micaceous, gray.
416.13		Sandstone, coarse grained, with shale band, gray.
416.89		Sandstone medium grained, laminated, with mica, gray.
419.50		Sandstone coarse grained, arkosic, whitish gray.
419.57		Coal, bright and dull.
419.85		Shale, carbonaceous.
420.68		Sandstone, medium grained, laminated, with mica, gray.
420.85		Sandstone, coarse grained, arkosic, with mica, whitish gray.
422.30		Sandstone, fine to medium grained, laminated, micaceous, gray.
423.20		Sandstone fine grained, with carbonaceous matter, whitish gray.
424.73		Sandstone, medium grained, laminated, with mica, light gray.
429.30	45°	Sandstone, coarse grained, arkosic, whitish gray.
431.65		Sandstone, fine to medium grained, laminated, gray, with thin coal layer at the top.
432.39		Sandstone fine grained, with mica, gray.
432.85		Sandstone coarse grained, arkosic, whitish gray.
		End of Hole.

Depth scale: 270, 280, 290, 300, 310, 320, 330, 340, 350, 360, 370, 380, 390, 400, 410, 420, 430

Recovery: 100%, 100%, 100%, 100%, 100%, 100%

HOLE NO. : LD20

AREA : LUSHUKU

DATE DRILLED : JAN 13, 1985 - FEB 3, 1985

TOTAL DEPTH : 483.10m

ELEVATION : +242m

COORDINATE : X=+2,932,000, Y=-80,993

JAPAN INTERNATIONAL COOPERATION AGENCY
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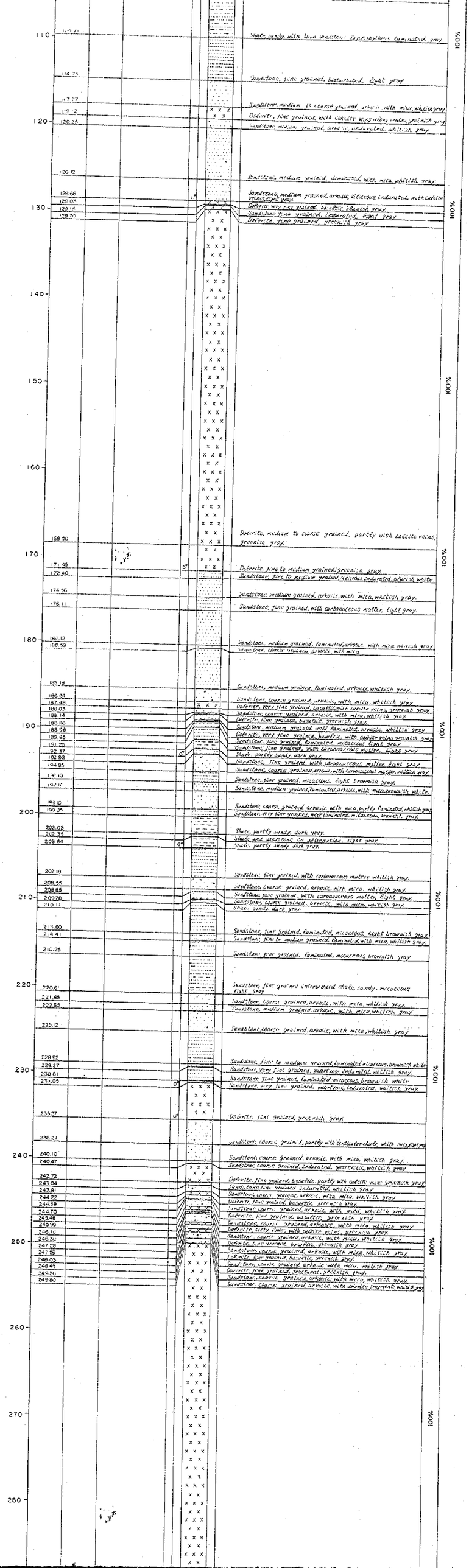
Borehole Log LD20

Dwg.	4T	Scale	1:200
Date	Sep 1985	Prepared by	G. Morikawa, H. Watanabe

Depth of Borehole (M)	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	Core Recovery
(M) 0						
6.00					Soil, brown.	non. coring
10						
18.00					Sandstone, fine to medium grained, and shale, weathered, brown.	
20						
21.00					Shale, partly carbonaceous, with sandstone, fine grained, weathered, dark brownish gray.	
21.07					Shale, carbonaceous.	
21.83					Coal, bright with dull.	
23.24					Shale, carbonaceous.	78%
24.00					Coal, dull, may be shale, carbonaceous.	
26.00					Shale, carbonaceous, partly with pyrite veinlet.	
27.00					Shale, carbonaceous, weathered, limo.	
27.43					Shale, carbonaceous.	
27.70					Shale, carbonaceous, with coal, bright.	
28.07					Shale, carbonaceous.	
30 — 29.74					Shale, carbonaceous, with black, bright.	100%
29.61					Coal, bright and dull, shale, carbonaceous.	
30.80			4°		Shale, carbonaceous.	
31.45					Coal, bright and dull, shale, carbonaceous.	
31.70					Shale, carbonaceous.	
32.13					Coal, bright and dull.	
33.15					Shale, carbonaceous.	
33.75					Sandstone, very fine grained, gray to dark gray.	
35.40					Shale, sandy, with gray to dark gray.	
36.90					Sandstone, coarse grained, arkosic, with mica, whitish gray.	
39.00					Shale, carbonaceous, with thin coal band.	
40 — 40.08					Sandstone, fine grained, Alteration, with mica, gray.	
50 — 50.79					Sandstone, medium to coarse grained, arkosic, whitish gray.	100%
52.09			9°		Shale, carbonaceous, with thin coal layer.	
53.10					Shale, dark gray.	
54.13					Shale, sandy, light gray.	
57.19					Sandstone, medium grained, arkosic, partly with carbonaceous matter, whitish gray.	
58.32			9°		Sandstone, fine grained, with shale band, light gray.	
60 — 60.31					Sandstone, medium grained, well laminated with mica, brownish white.	
60.96					Dolerite, very fine grained basaltic, gray.	
63.47					Sandstone, very fine to fine grained, well laminated, with mica, weathered with pyrite, gray to light gray.	
65.50					Shale, sandy and sandstone, in alternation, partly with pyrite, light gray.	
68.85					Sandstone, fine to medium grained, with carbonaceous matter, light gray.	
70 — 71.78					Sandstone, coarse grained, arkosic, with mica, whitish gray.	100%
74.55					Shale, sandy and sandstone, in alternation, light gray.	
77.95					Sandstone, medium grained, arkosic, with mica, whitish gray.	
78.15					Sandstone, fine to medium grained, arkosic, with mica, white to gray.	
80						
84.30					Sandstone, medium grained, arkosic, with mica, whitish gray.	
85.29					Shale, sandy, rhythmic laminated with sandstone, light gray.	
85.90					Shale, carbonaceous, whitish gray.	
86.47			63°		Shale, sandy, rhythmic laminated with sandstone, light gray.	
89.75			9°		Dolerite, fine grained, basaltic, bluish gray.	
90 — 89.93					Sandstone, fine grained, indurated, whitish gray.	100%
91.48					Dolerite, fine grained, basaltic, with calcite veins, greenish gray.	
92.71					Shale, sandy, interbedded thin sandstone layer, light gray.	
93.05					Sandstone, medium grained, arkosic, with mica, quartzose, whitish gray.	
93.85					Sandstone, fine grained, gray.	
100 — 100.10			8°		Shale, sandy, with thin sandstone layer, rhythmic laminated, gray.	
104.85					Sandstone, coarse grained, arkosic, with calcite veins along cracks, partly includes pyrite, whitish gray.	
110 — 110.21					Shale, sandy, with thin sandstone layer, rhythmic laminated, gray.	100%
114.75					Sandstone, fine grained, bioturbated, light gray.	
117.77					Sandstone, medium to coarse grained, arkosic, with mica, whitish gray.	
119.12					Dolerite, fine grained, with calcite veins along cracks, greenish gray.	
120 — 120.25					Sandstone, medium grained, arkosic, indurated, whitish gray.	
126.12					Sandstone, medium grained, laminated with mica, whitish gray.	
128.66			1°		Sandstone, medium grained, arkosic, siliceous, indurated, with calcite veins, light gray.	
129.03					Dolerite, very fine grained, basaltic, bluish gray.	
130 — 129.15					Sandstone, fine grained, indurated, light gray.	100%
129.70					Dolerite, fine grained, greenish gray.	
140						


110
Shale, sandy with thin siltstone, irregular, rhythmic laminated, gray
116.75
Sandstone, fine grained, bioturbated, light gray
117.77
Sandstone, medium to coarse grained, arkosic with mica, whitish gray
119.2
Dolomite, fine grained, with calcite veins, slightly crinkly, greenish gray
120
120.28
Sandstone, medium grained, arkosic, indurated, whitish gray
126.12
Sandstone, medium grained, limonitic with mica, whitish gray
128.68
Sandstone, medium grained, arkosic, siliceous, indurated, with calcite veins, light gray
129.03
Dolomite, very fine grained, bioturbic, bluish gray
130
129.15
Sandstone, very fine grained, cross-bedded, light gray
129.20
Dolomite, fine grained, greenish gray
140
150
160
168.30
Dolomite, medium to coarse grained, partly with calcite veins, greenish gray
170
171.45
Dolomite, fine to medium grained, greenish gray
172.40
Sandstone, fine to medium grained, siliceous, indurated, bluish white
174.56
Sandstone, medium grained, arkosic, with mica, whitish gray
176.11
Sandstone, fine grained, with carbonaceous matter, light gray
180
180.12
Sandstone, medium grained, laminated, arkosic, with mica, whitish gray
180.50
Sandstone, coarse grained, arkosic, with mica
185.18
Sandstone, medium grained, laminated, arkosic, whitish gray
186.64
Sandstone, coarse grained, arkosic, with mica, whitish gray
187.48
188.03
Dolomite, very fine grained, bioturbated, with calcite veins, greenish gray
188.14
Sandstone, coarse grained, arkosic, with mica, whitish gray
188.46
Dolomite, fine grained, bioturbic, greenish gray
190
188.98
Sandstone, medium grained, well laminated, arkosic, whitish gray
189.85
Dolomite, very fine grained, bioturbic, with calcite veins, greenish gray
191.25
Sandstone, fine grained, laminated, micaceous, light gray
192.37
Sandstone, fine grained, with carbonaceous matter, light gray
192.52
Shale, partly sandy, dark gray
194.85
Sandstone, fine grained, with carbonaceous matter, light gray
Sandstone, coarse grained, arkosic, with carbonaceous matter, whitish gray
197.13
Sandstone, fine grained, micaceous, light brownish gray
197.17
Sandstone, medium grained, laminated, arkosic, with micaceous, brownish white
199.10
Sandstone, coarse grained, arkosic, with mica, partly laminated, whitish gray
199.24
Sandstone, very fine grained, well laminated, micaceous, brownish gray
200
202.05
Shale, partly sandy, dark gray
202.35
Shale and sandstone in alternation, light gray
203.64
Shale, partly sandy, dark gray
207.18
Sandstone, fine grained, with carbonaceous matter, whitish gray
208.55
Sandstone, coarse grained, arkosic, with mica, whitish gray
208.85
Sandstone, fine grained, with carbonaceous matter, light gray
209.78
Sandstone, fine to coarse grained, arkosic, with mica, whitish gray
210
210.11
Shale, sandy, dark gray
213.60
Sandstone, fine grained, laminated, micaceous, light brownish gray
214.41
Sandstone, fine to medium grained, laminated, with mica, whitish gray
216.25
Sandstone, fine grained, laminated, micaceous, brownish gray
220
220.61
Sandstone, fine grained, interbedded shale, sandy, micaceous, light gray
221.85
Sandstone, coarse grained, arkosic, with mica, whitish gray
222.53
Sandstone, medium grained, arkosic, with mica, whitish gray
225.12
Sandstone, coarse grained, arkosic, with mica, whitish gray
228.50
Sandstone, fine to medium grained, laminated, micaceous, brownish white
229.27
230
230.81
Sandstone, very fine grained, partly indurated, whitish gray
231.05
Sandstone, fine grained, laminated, micaceous, brownish white
Sandstone, very fine grained, partly indurated, whitish gray
235.27
Dolomite, fine grained, greenish gray
238.21
Sandstone, coarse grained, partly with tentacular shale, white micaceous
240
240.10
Sandstone, coarse grained, arkosic, with mica, whitish gray
240.47
Sandstone, coarse grained, indurated, partly calcitic, whitish gray
242.72
Dolomite, fine grained, bioturbic, partly with calcite veins, greenish gray
243.04
Sandstone, fine grained, indurated, whitish gray
243.81
Sandstone, coarse grained, arkosic, with mica, whitish gray
244.22
Dolomite, fine grained, bioturbic, greenish gray
244.59
Sandstone, coarse grained, arkosic, with mica, whitish gray
244.70
Dolomite, fine grained, bioturbic, greenish gray
245.48
Sandstone, coarse grained, arkosic, with mica, whitish gray
245.90
Dolomite, very fine, with calcite veins, greenish gray
246.10
Sandstone, coarse grained, arkosic, with mica, whitish gray
246.30
250
247.28
Dolomite, fine grained, bioturbic, greenish gray
247.59
Sandstone, coarse grained, arkosic, with mica, whitish gray
248.03
Dolomite, fine grained, bioturbic, greenish gray
248.45
Sandstone, coarse grained, arkosic, with mica, whitish gray
249.20
Dolomite, fine grained, fractured, greenish gray
249.82
Sandstone, coarse grained, arkosic, with mica, whitish gray
Sandstone, coarse grained, arkosic, with dolomite fragment, whitish gray
260
270
280
100%