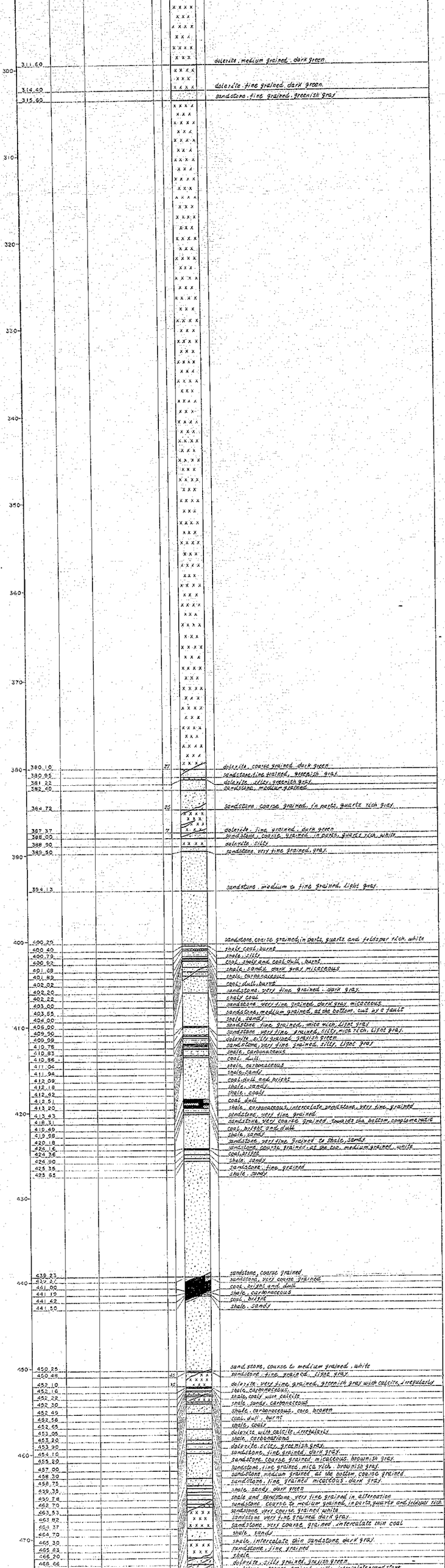
HOLE NO. : DD38
AREA : LUBUKU
DATE DRILLED : NOV.4.1981 - DEC.2.1981
TOTAL DEPTH : 499.28 m
ELEVATION : +232.0 m
COORDINATE : X = +2,939,000 Y = -80,950

JAPAN INTERNATIONAL COOPERATION AGENCY			
Borehole Log DD38			
Dwg.	41	Scale	1:200
Date	Sep. 1982	Prepared by N.Ishihara, H.Hotakayama	

Depth of Bore Hole	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description
1.00					soil
4.00					shale towards the bottom, intercalate sandstone, weathered
5.00					sandstone, medium to coarse grained
8.00					sandstone, very fine grained
(m) 10 10.00					sandstone, fine grained and coarse grained, fine grained rich
11.00					sandstone, fine grained
					shale
17.60					sandstone, very fine grained, silty, intercalate shale, weathered
18.00					sandstone, fine grained, white
20 20.00					sandstone, fine grained to medium grained, intercalate shale
21.00					sandstone, medium to coarse grained
22.00					sandstone, fine grained to medium grained, fine grained rich
25.00					sandstone fine grained and shale, sandstone rich
26.00					sandstone, medium grained
27.00					sandstone, very fine grained, silty
29.08					sandstone, medium to coarse grained, intercalate thin shale
30 31.85					sandstone, coarse grained, intercalate thick shale, white to light gray
32.25					sandstone coarse grained, white
33.20					shale with sandstone, coarse grained, dark gray
33.60					sandstone, coarse grained, intercalate shale
33.90					shale dark gray
38.35					sandstone, coarse grained to medium grained, quartz rich, white
40 41.15					shale, interbed thin sandstone, dark gray
42.85					sandstone, medium grained, intercalate thin shale, white
43.70					sandstone, very fine grained, intercalate shale irregularly, light gray
50					
60					
66.60					shale, interbed thin sandstone, dark gray
66.30					sandstone, coarse grained, in parts quartz rich, white
67.80					shale and sandstone coarse grained in alternation
69.85					sandstone, coarse to medium grained, intercalate shale, irregularly
70 70.20					sandstone very fine, grained, intercalate shale irregularly
80					
83.00					shale, interbed thin sandstone, dark gray
85.70					shale, sandy, light gray
89.45					sandstone, very fine to fine grained with shale irregularly, light gray
90 90.03					shale or shale, sandy
90.06					dolerite, silty, greenish gray
94.90					shale, sandy, dark gray
97.55					shale to shale, carbonaceous, black to dark gray
99.35					sandstone, fine grained with thin carbonaceous streaks, light gray
100 99.55					sandstone, very fine grained, shale irregularly, gray
102.25					shale, sandy, dark gray
102.55			75		shale carbonaceous, core broken
103.00					sandstone, fine grained
103.70			50		dolerite, silty greenish gray
106.03					sandstone, fine to medium grained
109.39					sandstone, fine grained, partly mica rich, light gray
110 111.70					sandstone fine to very fine grained with thin carbonaceous streaks
112.94					sandstone, coarse grained, in parts quartz and feldspar rich
115.00					shale and sandstone very fine grained in alternation
116.50					sandstone, coarse to medium grained with thin carbonaceous streaks
119.18					shale sandy to sandstone, very fine grained, carbonaceous, light gray
120 121.05					shale, sandy, intercalate sandstone, very fine grained, silty
123.94					sandstone very fine grained silty to shale sandy, light gray
124.43			60		sandstone, fine grained, intercalate shale, irregularly
126.01					dolerite, fine grained, greenish gray
126.44					sandstone fine grained, light gray
127.18			60		sandstone, coarse grained
127.43			72		dolerite, fine grained
128.50			30		sandstone, fine grained
130 130.72			20		dolerite, fine grained, dark green
131.83			12		sandstone, medium grained, white
140					
148.46					dolerite, coarse grained, dark green
150 151.22					shale, sandy to sandstone, very fine grained, mica rich, light gray
152.14			70		dolerite, fine grained, dark green
153.2					shale, intercalate sandstone
153.60					sandstone, fine grained
					shale, carbonaceous

Drilling
Non — Core

Depth	Description
130.72	dolerite fine grained, dark green
131.83	sandstone medium grained, white
148.46	dolerite coarse grained, dark green.
151.22	shale, sandy to sandstone, very fine grained, mica rich, light gray.
152.14	dolerite fine grained, dark green.
153.12	shale, intercalate sandstone
153.40	sandstone, fine grained.
154.49	shale, carbonaceous
154.94	dolerite silty greyish green
156.25	shale to shale sandy, at the bottom, shale carbonaceous, dark gray.
158.05	sandstone, medium grained, white to light gray
159.47	shale, sandy, carbonaceous
159.70	dolerite very fine grained, dark green
161.10	shale to shale, carbonaceous with thin sandstone beds, black
161.40	sandstone, fine grained.
162.10	shale with thin sandstone.
164.32	sandstone, coarse to medium grained, in parts quartz and feldspar rich, white
164.98	shale, carbonaceous.
172.25	sandstone, medium to fine grained, in parts, mica rich white to light gray.
173.85	sandstone, coarse grained, white
180.20	shale to shale, sandy, and sandstone, very fine grained in alternation
182.75	sandstone, medium grained, in parts feldspar rich, white
184.57	sandstone, fine grained, light gray.
184.85	coal, bright and dull.
184.90	shale, carbonaceous
185.22	sandstone, fine grained, light gray.
185.50	sandstone, medium grained, in parts, quartz and feldspar rich, white.
186.20	sandstone, fine grained
186.50	shale to shale, sandy, dark gray.
207.28	sandstone coarse to medium grained, in parts quartz and feldspar rich white
208.84	sandstone, fine grained with thin shale, light gray.
212.85	sandstone, coarse to medium grained
212.95	shale, carbonaceous with thin coal bands
213.85	sandstone, fine grained, micaceous, light gray.
214.13	sandstone, coarse grained, white
214.52	coal, bright and dull
214.62	shale, carbonaceous
214.72	shale, sandy
218.60	sandstone, coarse to medium grained, in parts, quartz and feldspar rich
220.10	shale, carbonaceous intercalate thin sandstone
222.05	shale sandy to sandstone, very fine grained, dark gray.
222.85	shale, carbonaceous, with thin sandstone, black.
223.37	shale, intercalate sandstone, dark gray.
230.10	sandstone, coarse grained, in parts quartz and feldspar rich, white
232.20	shale to shale, sandy, micaceous, dark gray.
233.20	shale, carbonaceous, intercalate thin sandstone, black.
233.30	coal, bright and dull coal.
233.72	shale, carbonaceous
234.90	sandstone, fine grained, light gray.
236.38	sandstone, coarse grained.
236.65	shale, with sandstone beds
236.90	sandstone, very fine grained.
236.94	shale
237.00	coal, dull banded, bright coal.
237.36	shale, carbonaceous.
237.90	shale, sandy to sandstone, very fine grained, dark gray.
240.95	sandstone, coarse to medium grained, in parts quartz and feldspar rich.
242.75	sandstone, fine grained with thin shale micaceous, light gray.
243.46	shale, carbonaceous.
243.67	coal, bright
245.05	shale, carbonaceous
245.34	sandstone fine grained
245.22	sandstone, very fine grained to shale, sandy.
245.30	coal dull and shaly coal.
245.40	shale, carbonaceous
245.75	sandstone, very fine grained
246.30	dolerite, fine grained, dark green.
262.70	dolerite, coarse grained, dark green
263.43	dolerite, fine grained, dark green.
264.00	sandstone, very fine grained, interbed thin shale light gray
265.28	dolerite, silty greyish green
268.33	sandstone fine to very fine grained, micaceous gray
268.90	shale, sandy gray.
269.20	shale, dark gray.
270.67	sandstone, coarse grained, quartz and feldspar rich white
270.70	dolerite silty, greyish gray.
270.90	sandstone, medium grained
271.60	dolerite, silty, dark green.
271.70	sandstone, fine grained, light gray
273.20	dolerite, very fine, greyish, greyish green.
274.12	sandstone, medium grained to coarse grained, white to light gray
274.70	coal dull, burnt
275.15	coal, dull and bright coal burnt
275.60	shale, carbonaceous, intercalate thin sandstone
275.90	sandstone very fine grained with thin carbonaceous streaks
276.50	sandstone, medium grained, in parts, quartz rich, white
278.30	sandstone very fine grained and shale in alternation
278.35	dolerite
278.85	sandstone fine grained, white
279.30	dolerite, very fine grained, greenish gray.
299.60	dolerite, coarse grained, dark green
311.60	dolerite medium grained, dark green.
314.40	dolerite fine grained, dark green.
315.60	sandstone fine grained, greenish gray


300
310
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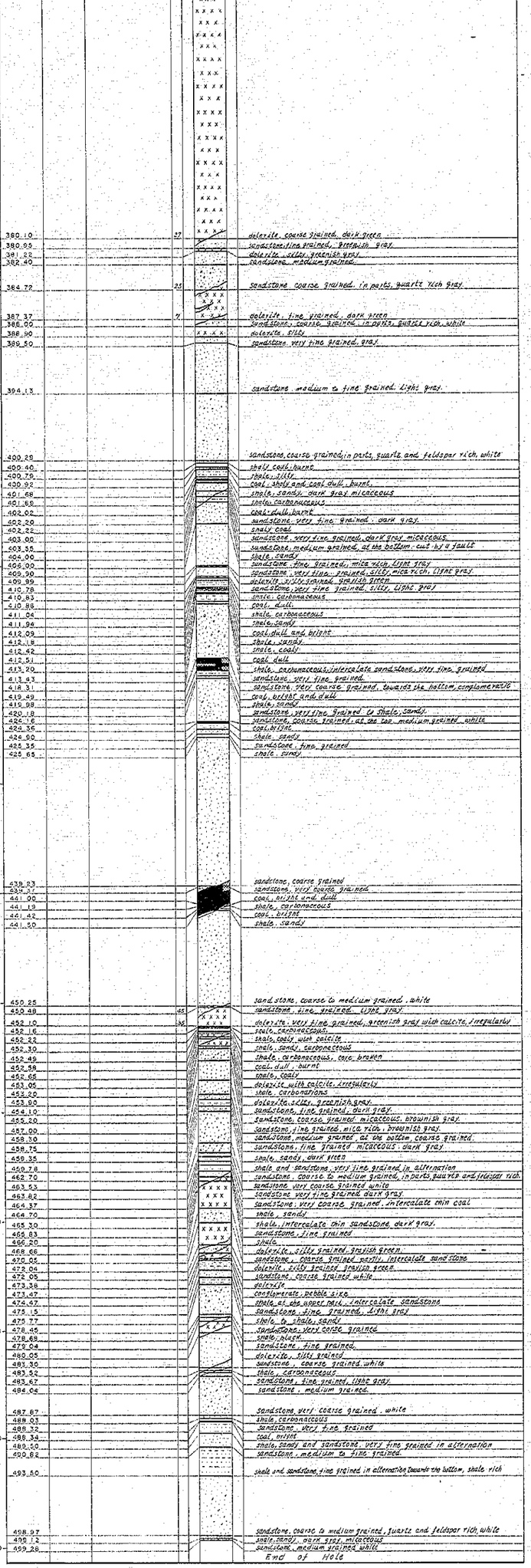
311.60 dolerite, medium grained, dark green
314.40 dolerite, fine grained, dark green
315.80 sandstone, fine grained, greenish gray
380.10 dolerite, coarse grained, dark green
380.95 sandstone, fine grained, greenish gray
381.20 dolerite, silty, greenish gray
382.40 sandstone, medium grained
384.72 sandstone coarse grained, in parts, quartz rich gray
387.37 dolerite, fine grained, dark green
388.00 sandstone, coarse grained, in parts, quartz rich, white
388.90 dolerite, silty
389.50 sandstone very fine grained, gray
394.13 sandstone, medium to fine grained, light gray
399.20 sandstone, coarse grained, in parts, quartz and feldspar rich, white
400.60 shale, coal, burnt
400.79 shale, silty
400.92 coal, shale and coal dull, burnt
401.89 shale, sandy, dark gray, micaceous
401.89 shale, carbonaceous
402.02 coal, dull, burnt
402.20 sandstone, very fine grained, dark gray
402.22 shale coal
403.00 sandstone, very fine grained, dark gray, micaceous
403.65 sandstone, medium grained, at the bottom, cut as a fault
404.00 shale, sandy
406.00 sandstone fine grained, mica rich, light gray
409.90 sandstone very fine grained, silty, mica rich, light gray
409.99 dolerite, silty grained, greenish green
410.78 sandstone, very fine grained, silty, light gray
410.83 shale, carbonaceous
410.86 coal, dull
411.06 shale, carbonaceous
411.94 shale, sandy
412.09 coal, dull and bright
412.18 shale, sandy
412.32 shale, coal
412.51 coal dull
413.20 shale, carbonaceous, intercalate sandstone, very fine grained
413.43 sandstone, very fine grained
418.31 sandstone, very coarse grained, towards the bottom, conglomeratic
419.49 coal, bright and dull
419.98 shale, sandy
420.18 sandstone, very fine grained to shale, sandy
420.16 sandstone, coarse grained at the top, medium grained, white
424.36 coal, bright
424.90 shale, sandy
425.35 sandstone fine grained
425.55 shale, sandy
438.23 sandstone, coarse grained
439.42 sandstone, very coarse grained
441.00 coal, bright and dull
441.19 shale, carbonaceous
441.42 coal, bright
441.50 shale, sandy
450.25 sandstone, coarse to medium grained, white
450.48 sandstone, fine grained, light gray
452.10 dolerite, very fine grained, greenish gray with calcite, irregularly
452.16 shale, carbonaceous
452.22 shale, coal with calcite
452.30 shale, sandy, carbonaceous
452.45 shale, carbonaceous, coal, broken
452.58 coal, dull, burnt
452.65 shale, coal
453.00 dolerite with calcite, irregularly
453.20 shale, carbonaceous
453.90 dolerite, scoria, greenish gray
454.10 sandstone, fine grained, dark gray
455.20 sandstone, coarse grained micaceous, brownish gray
457.00 sandstone, fine grained, mica rich, brownish gray
458.30 sandstone medium grained at the bottom, coarse grained
458.75 sandstone, fine grained micaceous, dark gray
459.35 shale, sandy, dark green
459.74 shale and sandstone very fine grained in alternation
462.70 sandstone, coarse to medium grained, in parts, quartz and feldspar rich
463.53 sandstone very coarse grained white
463.82 sandstone very fine grained dark gray
464.37 sandstone, very coarse grained, intercalate thin coal
464.70 shale, sandy
465.30 shale, intercalate thin sandstone dark gray
465.82 sandstone, fine grained
466.20 shale
466.46 dolerite, silty grained, greyish green



360			
370			
380	380.10	37	dolerite coarse grained, dark green
	380.95		sandstone fine grained, greenish gray
	381.22		dolerite silty greenish gray
	382.40		sandstone medium grained
	384.72	25	sandstone coarse grained, in parts, quartz rich gray
	387.37	71	dolerite fine grained, dark green
	388.00		sandstone, coarse grained, in parts, quartz rich, white
	388.90		dolerite silty
390	389.90		sandstone very fine grained gray
	394.13		sandstone medium to fine grained light gray
400	400.29		sandstone, coarse grained, in parts, quartz and feldspar rich, white
	400.40		shelly coal, burnt
	400.79		shale, silty
	400.92		coal, bright and coal dull, burnt
	401.68		shale, sandy, dark gray micaceous
	401.88		shale, carbonaceous
	402.02		coal, dull, burnt
	402.20		sandstone, very fine grained, dark gray
	402.22		shaly coal
	403.00		sandstone, very fine grained, dark gray micaceous
	403.35		sandstone, medium grained, at the bottom, cut by a fault
	404.00		shale, sandy
410	406.00		sandstone, fine grained, mica rich, light gray
	409.90		sandstone, very fine grained, silty, mica rich, light gray
	409.99		dolerite, sills, schist, greenish green
	410.78		sandstone, very fine grained, silty, light gray
	410.83		shale, carbonaceous
	410.88		coal, dull
	411.04		shale, carbonaceous
	411.94		shale, sandy
	412.09		coal, dull and bright
	412.19		shale, sandy
	412.42		shale, coaly
	412.51		coal, dull
420	413.20		shale, carbonaceous, intercalate sandstone, very fine grained
	413.43		sandstone, very fine grained
	418.31		sandstone, very coarse grained, towards the bottom, conglomeratic
	419.49		coal, bright and dull
	419.98		shale, sandy
	420.18		sandstone, very fine grained & shale, sandy
	424.16		sandstone, coarse grained at the top, medium grained, white
	424.36		coal, bright
	424.90		shale, sandy
	425.35		sandstone, fine grained
	425.65		shale, sandy
430			
440	439.93		sandstone, coarse grained
	440.21		sandstone, very coarse grained
	441.00		coal, bright and dull
	441.19		shale, carbonaceous
	441.42		coal, bright
	441.50		shale, sandy
450	450.25		sandstone, coarse to medium grained, white
	450.48	45	sandstone, fine, grained, light gray
	452.10	32	dolerite, very fine grained, greenish gray with calcite, irregularly
	452.16		shale, carbonaceous
	452.22		shale, coaly with calcite
	452.30		shale, sandy, carbonaceous
	452.49		shale, carbonaceous, coal broken
	452.58		coal, dull, burnt
	452.65		shale, coaly
	453.05		dolerite with calcite, irregularly
	453.20		shale, carbonaceous
	453.50		dolerite, silty, greenish gray
460	454.10		sandstone, fine grained, dark gray
	455.20		sandstone, coarse grained micaceous, brownish gray
	457.00		sandstone, fine grained, mica rich, brownish gray
	458.30		sandstone, medium grained at the bottom, coarse grained
	458.75		sandstone, fine grained micaceous, dark gray
	459.35		shale, sandy, dark green
	459.78		shale and sandstone, very fine grained in alternation
	462.70		sandstone, coarse to medium grained, in parts, quartz and feldspar rich
	463.53		sandstone very coarse grained white
	463.82		sandstone very fine grained dark gray
	464.37		sandstone, very coarse, grained, intercalate thin coal
	464.70		shale, sandy
470	465.30		shale, intercalate thin sandstone, dark gray
	466.83		sandstone, fine grained
	466.20		shale
	468.66		dolerite, silty grained, greyish green
	470.05		sandstone, coarse grained mostly, intercalate sandstone
	472.04		dolerite, silty grained greyish green
	472.05		sandstone, coarse grained white
	473.38		dolerite
	473.47		conglomerate, pebble size
	474.47		shale at the upper part, intercalate sandstone
	475.15		sandstone, fine, grained, light gray
	475.77		shale to shale, sandy
480	476.05		sandstone, very coarse grained
	478.69		shale, black
	479.04		sandstone, fine grained
	480.05		dolerite, silty grained
	483.30		sandstone, coarse grained white
	483.32		shale, carbonaceous
	483.67		sandstone, fine grained, light gray
	484.06		sandstone, medium grained
	487.87		sandstone very coarse grained, white
	488.03		shale, carbonaceous
	488.32		sandstone, very fine grained
490	488.34		coal, bright
	489.50		shale, sandy and sandstone, very fine grained in alternation
	490.82		sandstone, medium to fine grained
	493.50		shale and sandstone, fine grained in alternation towards the bottom, shale rich
	498.97		sandstone, coarse to medium grained, quartz and feldspar rich, white
	499.12		shale, sandy, dark gray micaceous
500	499.28		sandstone, medium grained white
			End of Hole

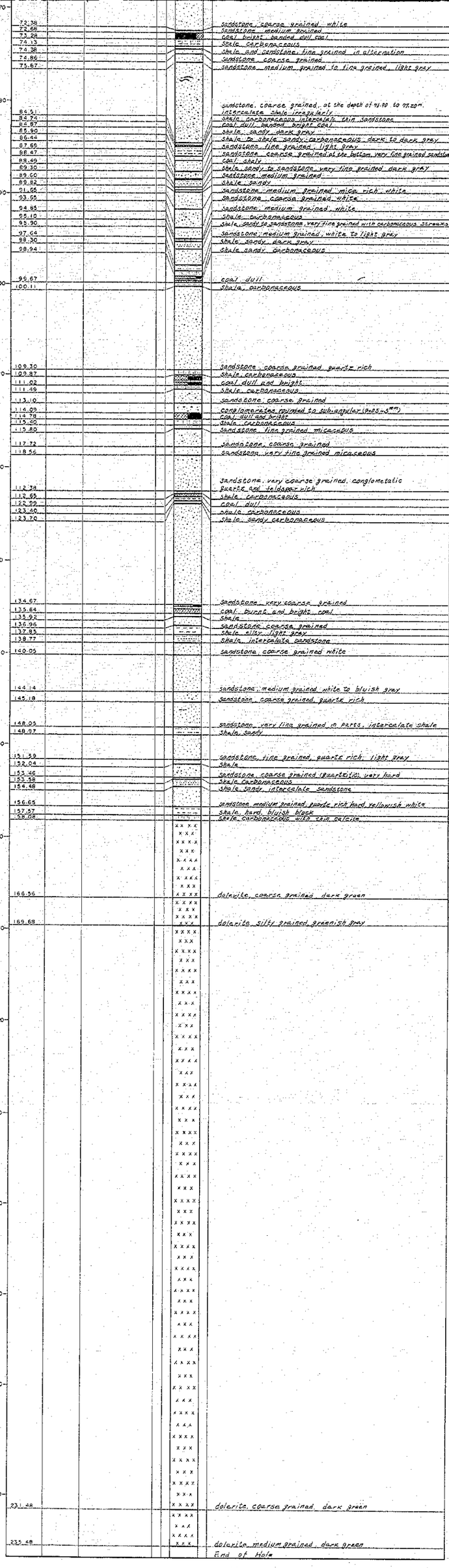
HOLE NO. : DD41
AREA : LUBHUKU
DATE DRILLED : NOV.4.1981 - DEC.4.1981
TOTAL DEPTH : 235.48m
ELEVATION : +272.3m
COORDINATE : X=+2,941,000 Y=-77,450

JAPAN INTERNATIONAL COOPERATION AGENCY

Borehole Log DD41

Dwg.	4u	Scale	1:200
Date	Sep.1982	Prepared by	K.Ishihara, H.Hasikeyama

Depth of Borehole	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	
3.00					soil	
6.00					sandstone, medium grained, weathered, reddish	
16.00					sandstone, medium to coarse grained, weathered	
24.00					dolerite, fine grained, dark green	Non-Core Drilling
25.00					sandstone, fine grained and shale, carbonaceous	
26.00					shale, carbonaceous	
28.00					shale, carbonaceous and sandstone, fine grained	
29.00					sandstone, medium grained and dolerite	
33.00					sandstone, coarse grained	
36.00					sandstone, fine grained and shale, carbonaceous	
38.00					shale, sandy, sandstone and dolerite	
40.93					shale, sandy	
41.70					coal, dull and bright	
42.17					coal, bright and dull	
41.27					shale, carbonaceous	
46.45					sandstone, fine grained, intercalate shale, white to light gray	
47.21					shale, sandy, at the top, intercalate sandstone, fine grained	
47.79					sandstone, medium grained and shale, in alternation	
48.66					sandstone, coarse grained, white	
49.19			15°		sandstone, fine grained, intercalate shale	
49.25					coal, bright	
49.40					shale, carbonaceous	
50.02					coal, bright, banded dull coal	
50.41					shale and sandstone, very fine grained, in alternation	
50.71					coal, bright, banded dull coal at the bottom, shale, carbonaceous	
51.81					sandstone, medium grained	
52.71					shale, sandy, intercalate sandstone	
52.75					shale, carbonaceous	
53.03					shale, sandy	
53.94					sandstone, coarse grained	
57.25					sandstone, very coarse grained with thin carbonaceous streaks	
57.50					sandstone, very fine grained and shale, in alternation	
63.55					sandstone, coarse grained, quartz and feldspar rich	
63.83					coal, bright and dull	
65.06					shale, sandy, sandy at the bottom, intercalate thin sandstone	
65.68					sandstone, fine grained, light gray	
67.42					sandstone, medium grained	
72.30					sandstone, coarse grained, white	
72.68					sandstone, medium grained	
73.28					coal, bright, banded dull coal	
74.13					shale, carbonaceous	
74.38					shale and sandstone, fine grained, in alternation	
74.86					sandstone, coarse grained	
75.87					sandstone, medium grained to fine grained, light gray	
84.51					sandstone, coarse grained, at the depth of 74.80 to 77.20m, intercalates shale irregularly	
84.74					shale, carbonaceous, intercalate thin sandstone	
84.87					coal, dull, banded, bright coal	
85.60					shale, sandy, dark gray	
86.44					shale or shale, sandy, carbonaceous, dark to dark gray	
87.69					sandstone, fine grained, light gray	
88.47					sandstone, coarse grained, at the bottom, very fine grained sandstone	
88.49					coal, shaly	
89.30					shale, sandy to sandstone, very fine grained, dark gray	
89.60					sandstone, medium grained	
89.82					shale, sandy	
91.63					sandstone, medium grained, mica rich, white	
93.65					sandstone, coarse grained, white	
94.85					sandstone, medium grained, white	
95.10					shale, carbonaceous	
95.90					shale, sandy to sandstone, very fine grained with carbonaceous streaks	
97.64					sandstone, medium grained, white to light gray	
98.30					shale, sandy, dark gray	
98.94					shale, sandy, carbonaceous	
99.67					coal, dull	
100.11					shale, carbonaceous	
109.30					sandstone, coarse grained, quartz rich	
109.87					shale, carbonaceous	
111.02					coal, dull and bright	
111.49					shale, carbonaceous	
113.10					sandstone, coarse grained	
114.09					conglomerates, rounded to sub-angular (2-65-5mm)	
114.78					coal, dull and bright	
115.40					shale, carbonaceous	
115.80					sandstone, fine grained, micaceous	
117.72					sandstone, coarse grained	
118.56					sandstone, very fine grained, micaceous	
122.38					sandstone, very coarse grained, conglomeratic quartz and feldspar rich	
122.65					shale, carbonaceous	
122.99					coal, dull	
123.60					shale, carbonaceous	
123.70					shale, sandy, carbonaceous	
134.67					sandstone, very coarse grained	
135.64					coal, burnt and bright coal	
135.92					shale	
136.96					sandstone, coarse grained	
137.85					shale, silty, light gray	
138.77					shale, intercalate sandstone	
140.05					sandstone, coarse grained white	
144.14					sandstone, medium grained, white to bluish gray	
145.18					sandstone, coarse grained, quartz rich	
148.05					sandstone, very fine grained in parts, intercalate shale	


70
72.38 sandstone, coarse grained, white
72.68 sandstone, medium grained
73.28 coal, bright, banded dull coal
74.13 shale, carbonaceous
74.38 shale and sandstone, fine grained, in alternation
74.86 sandstone, coarse grained
75.67 sandstone, medium grained to fine grained, light grey
80
sandstone, coarse grained, at the depth of 79.90 to 79.20m.
84.51 intercalate shale irregularly
84.74 shale carbonaceous intercalate thin sandstone
84.87 coal dull, banded bright coal
85.90 shale, sandy, mark gray
86.44 shale to shale, sandy, carbonaceous, dark to dark gray
87.65 sandstone, fine grained, light gray
88.47 sandstone, coarse grained at the bottom very fine grained sandstone
88.49 coal, shaly
89.30 shale, sandy, to sandstone, very fine grained, dark gray
89.60 sandstone, medium grained
89.82 shale, sandy
90
91.05 sandstone, medium grained, mica rich, white
93.55 sandstone, coarse grained, white
94.85 sandstone, medium grained, white
95.10 shale, carbonaceous
95.90 shale, sandy to sandstone, very fine grained with carbonaceous streaks
97.64 sandstone, medium grained, white to light grey
98.30 shale, sandy, dark gray
98.94 shale sandy, carbonaceous
99.67 coal, dull
100
100.11 shale, carbonaceous
109.30 sandstone, coarse grained, quartz rich
110
109.87 shale, carbonaceous
111.02 coal, dull and bright
111.49 shale, carbonaceous
113.10 sandstone, coarse grained
114.09 conglomerates rounded to sub-angular (2mm-3mm)
114.78 coal, dull and bright
115.60 shale, carbonaceous
115.80 sandstone, fine grained, micaceous
117.72 sandstone, coarse grained
118.56 sandstone, very fine grained, micaceous
120
sandstone, very coarse grained, conglometatic
112.38 quartz and feldspar rich
112.65 shale, carbonaceous
122.99 coal, dull
123.40 shale, carbonaceous
123.70 shale, sandy carbonaceous
130
134.67 sandstone, very coarse, grained
135.64 coal, dull and bright, coal
135.92 shale
136.96 sandstone, coarse grained
137.85 shale, silty, light gray
138.77 shale, intercalate sandstone
140
140.05 sandstone, coarse grained white
144.14 sandstone, medium grained, white to bluish gray
145.18 sandstone, coarse grained, quartz rich
148.05 sandstone, very fine grained in parts, intercalate shale
148.97 shale, sandy
150
151.39 sandstone, fine grained, quartz rich, light gray
152.04 shale
153.46 sandstone, coarse grained (quartzite), very hard
155.58 shale carbonaceous
156.48 shale sandy, intercalate sandstone
156.65 sandstone medium grained, garde rich hard yellowish white
157.57 shale, hard, bluish black
158.98 shale carbonaceous with rare calcite
160
166.56 dolerite, coarse grained, dark green
169.68 dolerite, silty grained, greenish gray
170
180
190
200
210
220
230
231.48 dolerite, coarse grained, dark green
235.48 dolerite medium grained, dark green
End of Hole

HOLE NO. : DD43
AREA : LUSHUKU
DATE DRILLED : NOV.23.1981, DEC.7.1981 - JAN.16.1981
TOTAL DEPTH : 320.13 m
ELEVATION : +280.2 m
COORDINATE : X=+2,941,000 Y=-78,790

JAPAN INTERNATIONAL COOPERATION AGENCY

Borehole Log DD43

Dwg. | 4v | Scale | 1 : 200
Date | Sep. 1982 | Prepared by N. Ishihara, H. Hatakeyama

Depth of Bore hole	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description	
2.00					soil and clay, brown	
5.00					sandstone, medium grained, weathered, brownish gray	
(m) 10 10.00					shale, weathered	
12.00					sandstone, medium grained, weathered	Non-Core Drilling
32.00					shale, dark gray	
33.00					shale and sandstone, fine grained	
35.00					shale, dark gray	
38.84						TUW BIT
38.50					shale with thin sandstone beds, weathered	
40						
49.96					shale with thin sandstone beds	
50.24					sandstone, coarse, grained with granule conglomerate	
51.33					sandstone, medium grained with carbonaceous matter, impression of the [illegible]	
52.91					sandstone, fine grained, light gray	
55.92			43		sandstone, very fine grained, micaceous with shale, irregularly slumping.	
57.70					shale with sandstone bands, at the bottom, slumping	
58.74					sandstone, medium grained, white	
59.28					shale, sandy with sandstone and fragments of dolerite, disturbed	
59.40					dolerite, silty grained, gray	
60 61.28					sandstone, fine grained, with fragments of shale, irregularly, slumping	
61.40			45		shale, coaly	
61.63					sandstone, medium grained with fragments of shale and dolerite	
66.30					sandstone, medium grained, at the bottom, with shale breccias	
66.32					shale, coaly	
68.66					sandstone, coarse grained with carbonaceous streaks, white	
69.32			40		sandstone, very fine grained, silty, bluish gray	
70 70.08					sandstone, medium grained with thin carbonaceous shale, irregularly	
70.47					sandstone, very fine grained, silty, bluish gray	
71.50			45		shale to shale, sandy	
80 80.43					sandstone, coarse grained, quartz rich, white	
80.63					shale, carbonaceous	
82.35					sandstone, coarse grained, white	
83.50					sandstone coarse grained, with shale, irregularly	
84.90					sandstone, very fine grained to shale, sandy	
85.47					sandstone, coarse grained	
86.06			45		sandstone very fine grained, light gray	
87.07			50		shale with fragments of dolerites	
87.25					sandstone, coarse grained	
90 90.30			45		sandstone, fine grained to shale, sandy with plenty of carbonaceous streaks.	
91.05			50		sandstone, coarse grained	
91.35					core loss	
93.23			40		sandstone, fine to medium grained with shale, irregularly	
94.02					sandstone coarse grained, intercalate shale, sandy, irregularly	
94.35					sandstone, fine grained, gray	
94.60					dolerite, silty grained	
95.01					shale with sandstone and dolerite, disturbed	
95.32					sandstone with fragments of shale	
96.30					sandstone, fine grained, light gray	
96.58					sandstone, medium grained	
100 96.82					shale	
97.02					sandstone, fine grained	
97.45					dolerite, silty grained, dark green	
97.83					sandstone, fine grained, carbonaceous	
99.68					dolerite, silty grained	
99.98					sandstone, coarse grained	
99.82					shale, carbonaceous	
100.67					sandstone, fine grained with plenty of carbonaceous streaks	
101.12					sandstone fine grained with fragments of shale	
102.72					shale, sandy with thin sandstone bands	
110 109.24					sandstone, medium grained, slumping, 10cm to 3cm breccias of shale and sandstone breccias	
107.45					dolerite with sandstone fragments, contact is not clear	
120						
120 121.32			35		sandstone, medium grained, slumping, shale and sandstone breccias, at the depths of 114.80, 118.43, 120.45, 120.43, and 121.7 fragments of coal	
134.86			5 35		sandstone, medium to coarse grained, mica rich, white to light gray.	
138.37			50		sandstone, medium grained, slumping with breccias of shale, sandstone	
139.10					sandstone, coarse grained, white	
139.33					sandstone, medium grained, with breccias of dolerite rock	
140 139.98			30		sandstone, medium grained, mica rich, white to light gray	
140.02					dolerite, dark green	
142.84					sandstone, fine grained, laminated	
144.22			30		sandstone, medium grained, white	
146.94					sandstone, fine grained, partly, intercalate shale, cross-bedded.	

Depth	Description
144.22	sandstone, medium grained, white
145.94	sandstone, fine grained, partly intercalate shale, cross-bedded.
150	
153.25	sandstone, coarse grained, quartz rich, white
153.40	coal, bright, banded dull coal
153.69	shale, carbonaceous with coal streaks
155.72	sandstone, sandy grained
156.68	shale, carbonaceous, at the top intercalate thin sandstone bands, at the bottom, thin coal seam
159.32	sandstone, fine grained, towards the bottom, intercalate shale, light gray
160	
163.17	shale and sandstone, fine grained in alternation, shale rich
164.97	sandstone, fine grained, partly medium grained.
168.41	sandstone, coarse grained, quartz and feldspar rich, white
170	
171.04	sandstone, fine grained, in the upper part, intercalate shale
171.11	coal, bright and shale, dusty
172.42	sandstone, coarse grained, white
172.63	core loss
173.36	sandstone, fine to medium grained, partly intercalate shale
173.79	shale, sandy and sandstone in alternation, shale sandy rich
176.38	shale, carbonaceous
174.45	shale, sandy
175.02	shale, carbonaceous
175.35	shale, sandy
177.83	sandstone, coarse to medium grained, white
178.10	sandstone, fine grained
178.37	sandstone, fine grained
178.45	sandstone, fine grained, dark green
178.67	shale
179.05	shale, coals, coal, bright and shale, carbonaceous
179.23	shale, carbonaceous
179.63	sandstone, fine grained, light gray
180.24	sandstone, coarse grained, intercalate fine grained sandstone
181.52	dolerite, fine grained, dark green
182.06	shale, carbonaceous
183.09	coal, dull and bright, shale, carbonaceous
183.66	shale, sandy
187.77	sandstone, fine grained with thin shale bands, light gray
180	
189.03	sandstone, fine grained, white
188.55	shale, sandy
162.57	dolerite, fine grained, greyish green
193.53	sandstone, coarse grained, carbonaceous
194.20	coal, shaly coal, dull and shale, carbonaceous
194.77	sandstone, fine grained, micaceous, at the bottom, disturbed
194.82	coal dull
195.12	shale carbonaceous
195.53	dolerite, silty grained
195.82	sandstone fine grained, carbonaceous
195.90	dolerite, silty grained
196.62	sandstone, fine grained, with shale, carbonaceous, irregularly
190	
196.96	shale, carbonaceous
197.53	coal, bright and dull, and coal shaly
197.85	dolerite, silty grained, with fragments of coal, shaly
198.20	shale, sandy, carbonaceous, with fragments of dolerite
199.08	core loss
199.63	dolerite, silty grained, greyish green
200.10	sandstone, fine grained with streaks of carbonaceous streaks
200.37	shale, carbonaceous
201.07	coal, dull coal, shaly and carbonaceous shale, core loss (30cm)
201.57	shale, sandy, carbonaceous
202.63	sandstone, medium grained
203.15	dolerite, silty grained, greyish green
205.63	sandstone, fine to medium grained, micaceous light gray
200	
208.06	sandstone, coarse grained, in parts quartz and feldspar rich, white
210.60	shale, sandy, carbonaceous
211.40	shale, sandy core gray
213.10	dolerite and sandstone medium grained with dolerite breccias
213.57	sandstone, medium grained with dolerite breccias
216.10	sandstone, medium grained, and dolerite
218.62	sandstone, coarse grained, quartz and feldspar rich at the bottom, dolerite breccia, white
219.40	shale, sandy, dark gray, intercalate sandstone
220	
221.25	sandstone, coarse grained, in parts quartz and feldspar rich, white
221.80	shale, sandy to sandstone, very fine grained, micaceous
221.67	shale dull, and coal dull
223.48	sandstone, very fine grained to shale, sandy micaceous gray
223.63	dolerite, silty grained
224.43	shale, sandy
224.54	dolerite
225.20	sandstone, very fine grained to shale, sandy with carbonaceous streaks
227.57	dolerite, very fine grained, greenish gray
229.00	sandstone, coarse grained, quartz rich, light gray
230	
230.26	dolerite, fine grained, greyish green
230.55	coal, burnt
230.68	dolerite, fine grained, greyish green
231.40	sandstone, coarse grained, with dolerite breccias
231.70	dolerite fine grained
231.77	coal, dull
232.15	dolerite, fine grained dark green
232.28	coal, burnt
233.40	dolerite, very fine grained, including coal and calcite, irregularly
233.70	shale carbonaceous, at the bottom dolerite breccias, rarely
237.64	sandstone, coarse grained, in parts quartz and feldspar rich, white
238.30	sandstone, very coarse grained, quartz rich white
238.75	coal, shale
238.90	coal, dull and shale, coals
239.50	coal, dull, banded, bright coal
239.80	shale, carbonaceous
244.20	sandstone, coarse grained
244.74	sandstone, very coarse grained, light gray
245.92	coal, bright and dull
246.10	shale to sandy, greenish gray
250	
250.70	sandstone, coarse grained in parts quartz and feldspar rich, white
252.27	sandstone, coarse to very coarse grained
252.53	coal, bright and dull
252.75	dolerite with shale breccias
253.35	shale to shale, sandy, carbonaceous
260	
268.41	sandstone, coarse to medium grained, in parts, quartz and feldspar rich light gray to white
269.15	coal bright and burnt coal, at the bottom, with fragments of dolerite
270	
269.65	dolerite, silty grained, greyish green
269.95	shale, carbonaceous, at the top, with thin coal, shaly
275.53	sandstone, coarse grained, partly carbonaceous, white to light gray
276.39	sandstone, medium grained, white
277.32	sandstone coarse grained, quartz rich
278.59	shale, sandy, laminate thin sandstone, core loss (10cm)
279.70	dolerite medium grained, dark green
280	
290	
291.73	dolerite, coarse grained, greyish green, towards the bottom, fine grained
292.70	sandstone, very fine grained, cross-bed shale, sandy, light gray
292.88	sandstone, medium grained
292.99	shale
293.10	coal, burnt
293.62	dolerite, silty grained dark green
293.80	coal, dull and coal, shaly
294.13	shale, black
294.75	sandstone, fine grained and shale in alternation, sandstone rich
296.37	sandstone, medium grained, micaceous, light gray
297.37	sandstone, concise, white
297.67	sandstone, fine grained, gray
300	
300.67	sandstone, coarse grained, quartz and feldspar rich, white
303.47	dolerite, fine grained, greenish gray
304.55	sandstone, medium grained, white
307.39	sandstone, coarse grained, white
308.03	sandstone, fine to medium grained, laminated
308.29	shale sandy, intercalate thin sandstone bands, bluish gray
310	
314.75	sandstone, medium grained, towards the bottom, coarse grained, white
315.16	sandstone, coarse grained, black
315.42	shale, sandy greyish black
319.12	sandstone, coarse grained, towards the bottom quartzitic
320	
320.13	dolerite, coarse grained, greyish green
	End of Hole

HOLE NO. : DD45
AREA : LUBHUKU
DATE DRILLED : NOV.19-NOV.20.1981 DEC.8.1981-JAN.16.1982
TOTAL DEPTH : 400.65m
ELEVATION : +249.1m
COORDINATE : X=+2,941,000 Y=-80,850

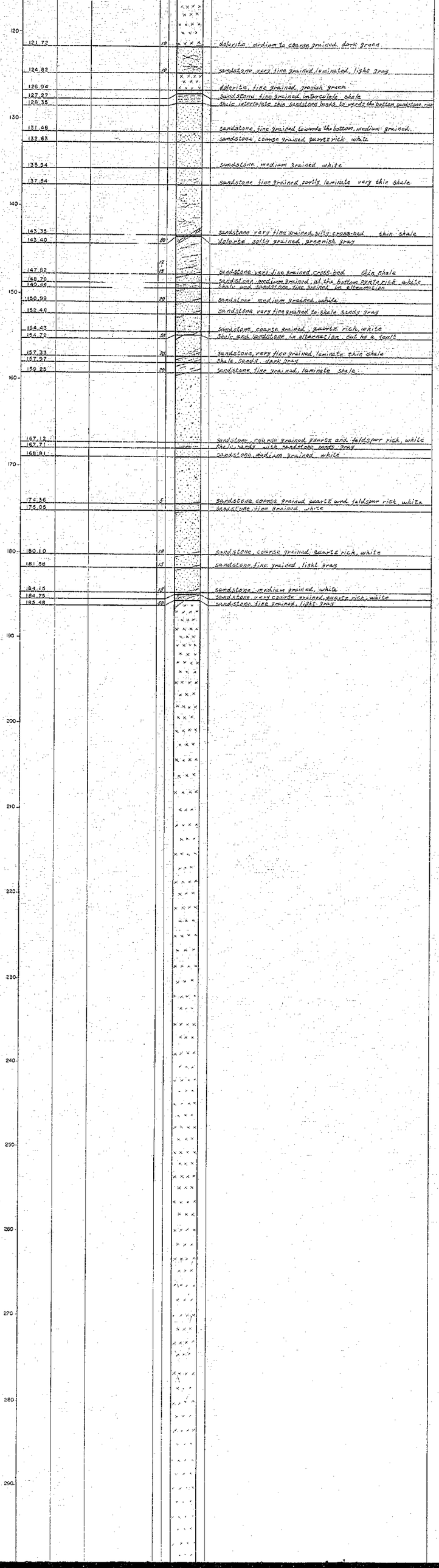
JAPAN INTERNATIONAL COOPERATION AGENCY

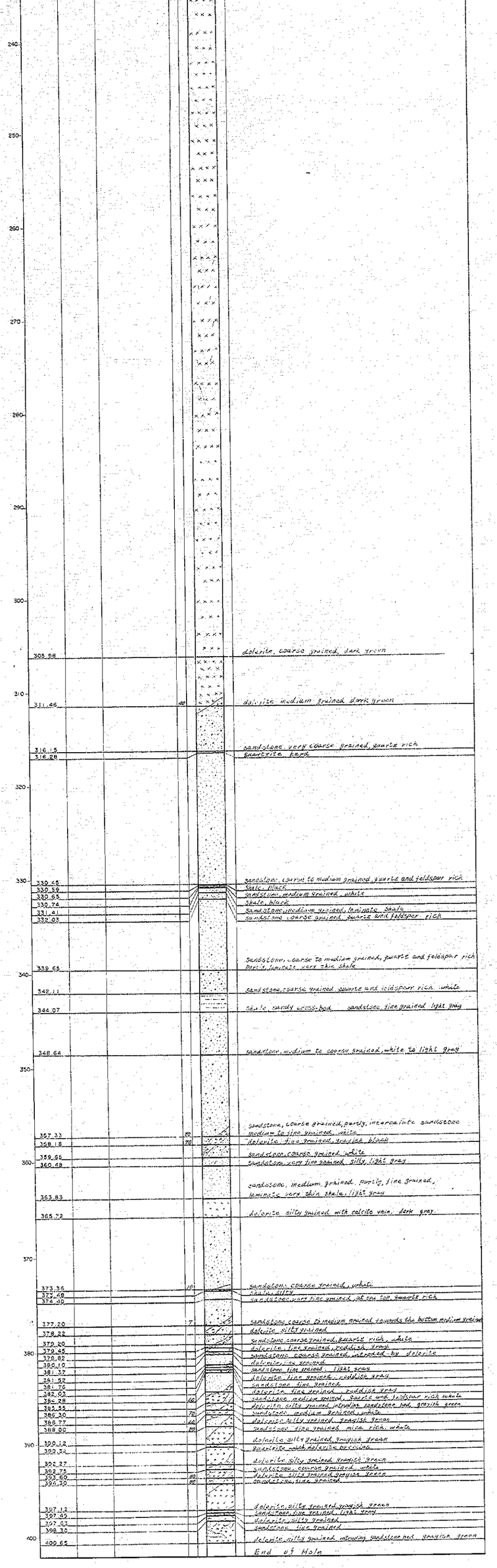
Borehole Log DD45

Dwg. 4w Scale 1:200
Date : Sep 1982 Prepared by N.Ishihara, H.Horokoyama

Depth of Bore hole	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description
1.00					soil, brown
5.00					shale, weathered
10.00					shale and sandstone, fine grained, weathered
11.50					sandstone, medium grained
22.00					sandstone, fine grained, weathered, yellowish gray
25.00					sandstone, coarse grained, weathered
26.00					sandstone, medium to coarse grained, weathered
30.00					sandstone, very fine to fine grained, brownish gray
31.00					sandstone, medium grained
32.00					sandstone, very fine grained, weathered, brown
34.00					sandstone medium to coarse grained, light gray
34.38			12		sandstone, coarse grained, weathered
35.00					sandstone coarse grained
36.00					shale, weathered, core broken, dark gray
37.14			18		sandstone, coarse to medium grained with thin carbonaceous material, brown
39.37					sandstone, fine grained with thin shale, weathered, gray
39.30					sandstone, coarse grained, quartz and feldspar rich
42.13			15		shale and sandstone in alternation, dark gray core broken
43.00					sandstone, coarse grained, in parts, quartz and feldspar rich, weathered
45.45			8		sandstone, very fine grained with thin shale, irregularly gray to light gray
47.30					shale intercalate thin sandstone dark gray
50.70			15		shale to shale, sandy, at the bottom, intercalate, dark gray
52.25			15		sandstone, medium grained, white, core broken
56.10			17		sandstone, fine grained micaceous, light gray
57.33			15		shale and sandstone, fine grained in alternation
58.70			16		shale, intercalate thin sandstone, dark gray
59.50			15		shale, sandy, at the bottom, sandstone, dark gray
60.90			15		shale and sandstone, fine grained in alternation, dark gray
61.70					sandstone, fine to very fine grained micaceous, light gray
65.05					shale to shale, sandy intercalate thin sandstone, dark gray
70.15			14		sandstone, coarse to medium grained in parts quartz and feldspar rich
70.75					shale, dark gray
71.45					shale, carbonaceous, with coal bright
71.55					sandstone, very fine grained, carbonaceous
72.65					sandstone, very fine grained to shale sandy, brownish gray
73.37					sandstone medium to coarse grained, white
77.82			45		shale, sandy to sandstone, very fine grained, micaceous, brownish gray
78.70			25		dolerite, fine grained, greyish green
79.30					shale to shale sandy at the bottom, stained to be fault
79.70					shale, core broken
80.65					shale to shale sandy intercalate thin sandstone, blackish gray to brown gray
83.98			10		sandstone coarse to medium grained, in parts quartz and feldspar rich core broken
84.65					sandstone, fine grained
84.72			17		shale, carbonaceous
85.07			15		coal bright, banded, dull coal
86.20			15		shale, sandy, dark gray
86.70			12		sandstone, fine to very fine grained micaceous, brownish gray
89.00					sandstone medium grained, white
92.90			10		sandstone, fine grained, intercalate very thin carbonaceous matter, brownish gray
94.20					sandstone, medium grained, white
102.65					sandstone, fine grained with very thin shale, light gray
104.65					sandstone, medium grained with thin shale, white to light gray
107.35					sandstone, medium to coarse grained, white
107.50					sandstone, fine grained at the top shale, gray, light gray
108.80					sandstone, medium grained, quartz and shale rich
109.08			20		sandstone very fine grained, gray
111.27					sandstone medium grained, partly coarse grained, white
112.25			15		sandstone, fine grained, light gray
112.42			10		sandstone, very fine grained, silty, gray
112.92					dolerite, fine grained, dark green
121.72			10		dolerite, medium to coarse grained, dark green
124.82			10		sandstone, very fine grained, laminated, light gray
126.04					dolerite, fine grained, greyish green
127.27					sandstone, fine grained, intercalate shale
128.35					shale, intercalate, thin sandstone bands, towards the bottom sandstone, fine
131.48					sandstone, fine grained towards the bottom, medium grained
132.63					sandstone, coarse grained, quartz rich, white
133.54					sandstone medium grained, white
137.56					sandstone, fine grained, partly laminate very thin shale
143.35			20		sandstone, very fine grained, silty, crossbedded, thin shale
143.42					dolerite, silty grained, greenish gray
147.92			12		sandstone, very fine grained, cross cut, thin shale
148.72			12		sandstone, medium grained, at the bottom, stained, dark, white
					sandstone, fine grained, intercalate

NON - Core Drilling


120
121.73 10 dolerite medium to coarse grained dark green
124.82 10 sandstone very fine grained, laminated, light gray
126.94 dolerite fine grained greyish green
127.27 sandstone fine grained interbeds shale
128.15 shale interbeds thin sandstone beds towards the bottom sandstone rich
130
131.48 sandstone fine grained towards the bottom medium grained
132.63 sandstone coarse grained quartz rich white
135.54 sandstone medium grained white
137.54 sandstone fine grained partly laminate very thin shale
140
143.35 sandstone very fine grained silty cross-bed thin shale
143.40 20 dolerite silty grained greenish gray
147.82 15 15 sandstone very fine grained cross-bed thin shale
148.79 sandstone medium grained at the bottom pyrite rich white
149.64 shale and sandstone fine grained in alternation
150
150.99 20 sandstone medium grained white
152.48 sandstone very fine grained to shale sandy gray
156.63 sandstone coarse grained quartz rich white
156.72 20 shale and sandstone in alternation cut by a fault
157.33 20 sandstone very fine grained laminate thin shale
157.97 shale shaly dark gray
159.25 20 sandstone fine grained laminate shale
160
167.12 sandstone coarse grained quartz and feldspar rich white
167.71 shale sandy with sandstone beds gray
168.41 sandstone medium grained white
170
174.36 5 sandstone coarse grained quartz and feldspar rich white
175.05 sandstone fine grained white
180
180.10 18 sandstone coarse grained quartz rich white
181.58 15 sandstone fine grained light gray
184.15 15 sandstone medium grained white
184.75 sandstone very coarse grained quartz rich white
185.48 20 sandstone fine grained light gray
190
200
210
220
230
240
250
260
270
280
290

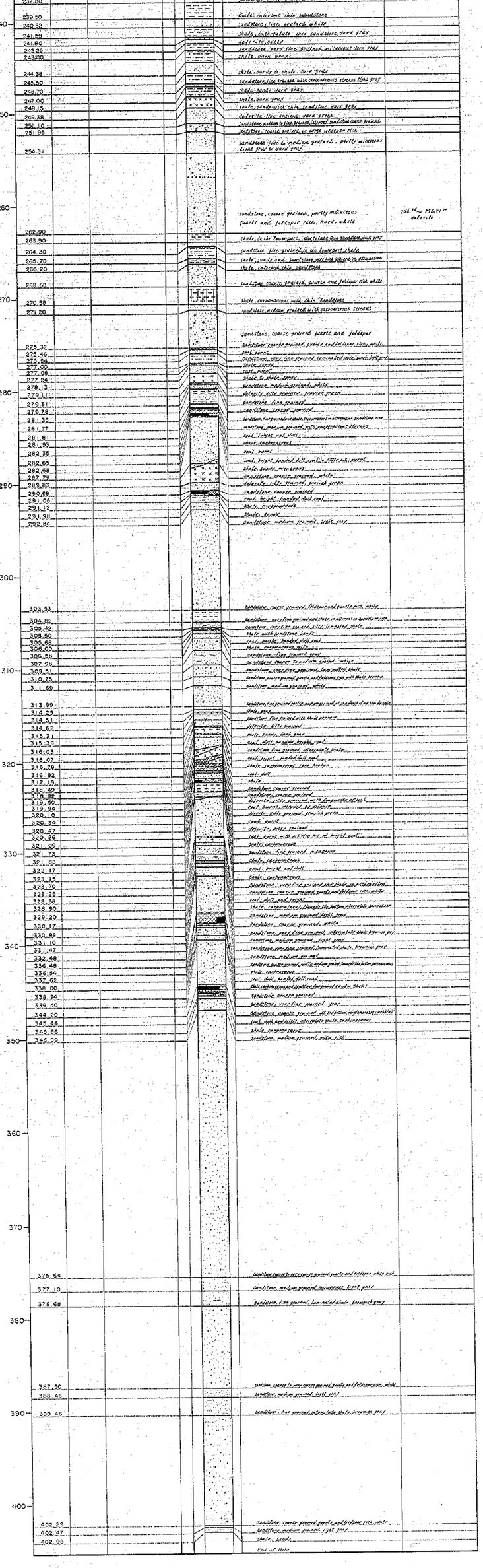

240
250
260
270
280
290
300
305.98
dolerite, coarse grained, dark green
310
311.46
dolerite, medium grained, dark green
316.15
sandstone, very coarse grained, quartz rich
316.28
quartzite, pink
320
330
330.45
sandstone, coarse to medium grained, quartz and feldspar rich
330.59
shale, black
330.65
sandstone, medium grained, white
330.74
shale, black
331.41
sandstone, medium grained, laminate shale
332.03
sandstone, coarse grained, quartz and feldspar rich
339.65
sandstone, coarse to medium grained, quartz and feldspar rich
Beds limited, very thin shale
340
342.11
sandstone, coarse grained, quartz and feldspar rich, white
344.07
shale, sandy cross-bed, sandstone, fine grained, light gray
348.64
sandstone, medium to coarse grained, white to light gray
350
357.33
sandstone, coarse grained, partly, intercalated sandstone medium to fine grained, white
358.18
dolerite, fine grained, greyish green
359.65
sandstone, coarse grained, white
360
360.49
sandstone, very fine grained, silty, light gray
363.83
sandstone, medium grained, partly, fine grained, laminate very thin shale, light gray
365.72
dolerite silty grained with calcite vein, dark gray.
370
373.35
sandstone, coarse grained, white
373.48
shale, silty
374.00
sandstone, very fine grained, at the top, quartz rich
377.20
sandstone, coarse to medium grained towards the bottom medium grained
378.22
dolerite silty grained
379.20
sandstone, coarse grained, quartz rich, white
379.45
dolerite, fine grained, reddish gray
380
378.82
sandstone, coarse grained, intercepted by dolerite
380.10
dolerite, fine grained
381.37
sandstone, fine grained, light gray
381.52
dolerite, fine grained, reddish gray
381.76
sandstone, fine grained
382.03
dolerite, fine grained, reddish gray
384.28
sandstone, medium grained, quartz and feldspar rich white
385.55
dolerite, silty grained, olive green, sandstone bed, greyish green
386.30
sandstone, medium grained, white
386.77
dolerite, silty grained, greyish green
388.00
sandstone, fine grained, mica rich, white
390
390.12
dolerite, silty grained, greyish green
390.38
quartzite with dolerite patches
392.27
dolerite, silty grained, greyish green
392.75
sandstone, coarse grained, white
393.60
dolerite, silty grained, greyish green
394.50
sandstone, fine grained
397.15
dolerite, silty grained, greyish green
397.45
sandstone, fine grained, light gray
397.63
dolerite, silty grained
398.30
sandstone, fine grained
400
400.62
dolerite, silty grained, showing sandstone bed, greyish green
End of Hole

HOLE NO. : DD48
AREA : LUBUKU
DATE DRILLED : FEB.8 - MAR.6
TOTAL DEPTH : 316.20m
ELEVATION : 275.30 m
COORDINATE : X = +2 930.841 Y = -78.541

JAPAN INTERNATIONAL COOPERATION AGENCY			
FIGURE 17			
Borehole Log DD48			
Dwg.	4x	Scale.	1 : 200
Date	May. 1981	Prepared by	H.Ishihara, M.Hatakeyama

Depth of Bore Hole	Thikness of Strata (M)	Dip of strata	column section	Rock Description	Remarks
0.47				soil	
3.70				sandstone, medium grained, partly mica rich	
6.00				sandstone, fine grained, interbed thin shale, partly pyrite	
7.00				shale, silty	
9.67				sandstone, medium grained, partly quartz rich	
10.97				shale with thin sandstone fine grained, dark gray	
15.57				sandstone, medium to coarse grained partly quartz rich, white	
18.10				shale and sandstone fine grained in alternation	
19.65				sandstone, fine grained with thin shale stream, partly quartz rich	
21.10				sandstone fine grained and shale in alternation	
24.61				sandstone, medium grained, quartz rich white gray.	
25.05				sandstone fine grained, interbed shale irregularly	
25.20				shale with thin sandstone	
25.90				sandstone, fine grained and shale in alternation	
26.84				shale gray, sandstone fine grained in alternation	
27.20				sandstone coarse grained, feldspar rich, white	
33.70				sandstone, fine to medium grained, with shale irregularly, partly laminate mica.	
34.80				shale, intercalate thin sandstone, dark gray	
35.20				shale and sandstone fine grained in alternation	
35.75				sandstone, medium grained, white	
35.90				sandstone and shale in alternation	
36.55				sandstone medium grained, white	
36.80				shale intercalate sandstone, dark gray	
38.90				sandstone fine grained, laminate mica, partly quartz rich	
46.30				shale to shale, rarely with thin sandstone dark gray	
47.66				sandstone fine grained with thin shale, white	
75.90				shale, intercalate sandstone, dark gray.	
77.15				including pyrite sandstone fine grained with thin shale intercalate limestone.	
80.83				sandstone fine grained, rare including calcite and pyrite	
81.45				sandstone fine grained with carbonaceous material, light gray	
82.90				dolerite, silty, dark green.	
83.07				sandstone fine grained with carbonaceous material dark gray	
85.25				sandstone, fine to medium grained, in the bottom, carbonaceous shale.	
86.14				sandstone fine grained, dark colored shale, partly carbonaceous	
90.90				sandstone, fine grained, light gray	
95.00				sandstone fine grained, irregularly intercalate carbonaceous material	
99.75				sandstone fine grained, partly with pyrite. light gray	
100.05				shale, carbon, light gray	
100.80				sandstone, very fine grained with thin shale	
101.20				sandstone, coarse grained, partly feldspar rich, white	
104.68				sandstone fine to medium grained with thin shale and carbonaceous stream	
105.00				sandstone medium grained, partly quartz and feldspar rich	
106.39				sandstone, medium grained, interbed carbonaceous material, white	
108.35				sandstone, fine grained, with shale irregularly, dark gray	
108.65				sandstone, coarse grained, interbed, black shale	
109.71				sandstone, coarse to medium grained with thin shale stream	
109.83				sandstone, coarse grained with shale material, white	
112.13				sandstone fine grained, interbed, thin shale, in parts, laminate mica, light gray	
112.17				shale, carbonaceous with sandstone	
112.60				sandstone fine grained intercalate shale, carbonaceous	
112.80				shale carbonaceous intercalate sandstone, laminate mica	
113.00				sandstone medium grained, partly quartz rich	
113.35				sandstone, medium grained, partly quartz rich	
114.40				shale, light gray, light gray	
115.75				sandstone fine grained with shale carbonaceous, dark gray	
116.00				sandstone fine grained, with carbonaceous shale	
116.45				sandstone, coarse grained, in the bottom shale carbonaceous	
117.02				sandstone, very fine grained and shale carbonaceous, laminate mica in medium grained, quartz rich, feldspar rich, white	
118.30				sandstone, coarse to medium grained, quartz rich	
118.88				sandstone, medium grained, intercalate shale, dark gray	
120.90				shale, dark, light gray	
121.05				shale, carbonaceous and sandstone in alternation	
122.60				shale, sandy, light gray	
126.80				shale interbed sandstone, dark gray	
129.66				sandstone, fine grained, partly quartz, feldspar rich	
131.40				sandstone, very fine grained to shale, sandy light gray with calcite	
134.55				shale, dark gray	
139.69				dolerite dark green	
140.00				shale, sandy, dark gray	
142.70				shale, sandy to sandstone, very fine grained with shale.	
143.55				shale interbed sandstone, dark gray	
144.00				sandstone, fine grained, partly quartz rich, white	
144.70				sandstone, fine grained, interbed thin shale, light gray	
145.12				sandstone fine grained, white	
146.30				sandstone fine grained with shale in alternation dark gray	
147.00				shale sandy interbed thin sandstone, dark gray	
148.70				sandstone fine grained with shale irregularly in the bottom shale stream partly in pyrite	
149.30				sandstone medium grained, in parts quartz rich, white	
149.62				shale carbonaceous	
149.94				sandstone, carbonaceous	
149.78				shale, silty, interbed sandstone	
150.00				shale carbonaceous, in the bottom shale, dark	
152.85				sandstone fine grained with laminated shale, partly quartz rich	
153.00				shale	

Depth	Description	Dip
131.40	sandstone, very fine grained to shale, sandy light gray with calcite	
134.55	shale, dark gray	
138.89	dolerite dark green	
140.00	shale, sandy, dark gray	
142.70	shale sandy to sandstone, very fine grained with shale.	
143.55	shale interbed sandstone dark gray	
144.20	sandstone fine grained, quartz poor rich, white	
144.79	sandstone fine grained interbed thin shale light gray	
145.10	sandstone fine grained, white	
146.30	sandstone fine grained and shale in alternation dark gray	
147.00	shale sandy interbed thin sandstone dark gray	
148.70	sandstone fine grained with subordinate shale, micaceous rich white	
149.00	sandstone medium grained, in parts quartz rich, white	
149.62	shale carbonaceous	
149.86	sandstone fine homogeneous	
149.79	coal dull, bedded, brittle core	
150.00	shale carbonaceous white thin coal, siderite	
152.55	sandstone fine grained with laminated shale, partly quartz rich	
153.00	shale	
153.35	sandstone fine grained with laminated shale	
154.40	shale sandy	
154.90	sandstone fine, medium grained interbed shale	
156.00	sandstone fine grained and shale homogeneous alternation dark gray	
156.30	sandstone fine grained interbed thin shale partly micaceous	
156.71	shale carbonaceous	
157.50	sandstone fine grained and shale carbonaceous homogeneous	
159.70	sandstone fine grained, interbed thin shale partly micaceous	
160.30	sandstone very fine grained and shale homogeneous in alternation	
161.55	sandstone medium grained, partly quartz rich, white	
161.95	sandstone fine grained with thin carbonaceous layers	
162.98	sandstone fine grained light gray	
163.30	sandstone fine grained with thin shale carbonaceous layers	
164.40	sandstone fine grained, lower part thin shale carbonaceous light gray	
165.30	sandstone fine grained dark gray	
166.00	sandstone fine grained with thin carbonaceous material siderite	
169.10	sandstone medium to fine grained, partly micaceous	
169.18	coal dull	
169.30	shale carbonaceous with sandy sandstone in alternation	
169.50	sandstone very fine grained light gray	
169.80	shale carbonaceous interbed sandstone	
169.90	sandstone very fine grained interbed shale	
170.50	sandstone	
170.60	dolerite dark green	
171.00	shale sandy interbed thin shale	
171.60	sandstone homogeneous shale carbonaceous	
172.10	shale sandy with thin carbonaceous bottom	
172.40	sandstone very fine grained with thin shale dark gray	
172.90	shale sandy with thin shale carbonaceous brown layer thin coal	
173.55	sandstone fine grained interbed thin shale	
173.70	shale carbonaceous	
174.10	sandstone fine grained in the bottom carbonaceous	
175.55	sandstone fine bedding, massive gray, partly with calcite	
178.15	sandstone very fine grained interbed thin shale, partly micaceous	
178.50	dolerite very fine grain, dark green	
179.00	sandstone very fine grained shale carbonaceous in alternation	
179.90	sandstone medium to coarse sandy, light gray	
180.10	sandstone fine grained with calcite interbedded, white	
181.70	sandstone very fine grained, partly quartz rich, light gray	
182.60	sandstone fine grained with thin shale	
183.15	dolerite sills	
183.20	sandstone fine grained	
184.00	dolerite sills dark green	
184.40	sandstone very fine grained interbed thin shale	
185.00	dolerite	
185.66	sandstone very fine grained with thin shale	
190.16	dolerite fine grained greenish gray	
190.25	shale sandy	
190.50	dolerite	
190.71	shale sandy	
191.85	dolerite with calcite greenish gray	
192.95	sandstone very fine grained with calcite	contact 45°
193.75	dolerite sills with calcite dark green	
194.05	sandstone fine grained, white	
197.60	dolerite sills dark green, lots of joints	
199.46	sandstone fine grained, hard with calcite, light gray	
212.92	dolerite fine to medium grained with calcite dark green	
213.14	sandstone very fine grained with thin shale light gray	
213.80	sandstone fine grained white in the bottom alternation	
216.68	sandstone coarse grained, white, in the upper part dolerite	
216.78	dolerite sills dark green	
217.60	sandstone medium grained quartz rich hard light gray	
218.80	dolerite very fine grained with calcite	
218.35	sandstone medium grained partly quartz rich hard dark gray	
219.70	dolerite sills dark green	
223.11	sandstone coarse grained in parts quartz and mica rich white	
223.70	limestone fine grained with shale white	
224.85	sandstone fine grained in the middle part some shale	
226.20	dolerite fine grained dark green	
227.12	sandstone very fine grained white	
228.47	dolerite fine grained dark green	
230.70	shale sandy to shale dark gray	
231.70	dolerite fine grained dark green	
232.00	shale interbed thin sandstone dark gray	
233.00	shale sandy dark gray	
234.90	dolerite fine grained dark green	
235.90	sandstone very fine grained with thin shale	
237.90	sandstone fine grained dark gray	
239.50	shale interbed thin sandstone	
240.52	sandstone fine grained white	
241.59	shale interbedded thin sandstone dark gray	
241.90	dolerite sills	
242.28	sandstone very fine grained micaceous dark gray	
243.00	shale dark gray	
244.38	shale sandy to shale dark gray	
245.50	sandstone fine grained with carbonaceous streaks light gray	
246.70	shale sandy dark gray	
247.00	shale dark gray	
248.15	shale sandy with thin sandstone dark gray	
249.38	dolerite fine grained dark green	
251.10	sandstone medium to fine grained interbed sandstone very fine grained	
251.95	sandstone coarse grained to pebbly siderite rich	
254.31	sandstone fine to medium grained, partly micaceous light gray to dark gray	
256.97	sandstone coarse grained, partly micaceous quartz and feldspar rich, hard, white	256.97 – 256.97 m dolerite
262.90	shale in the lower part interbedded thin sandstone dark gray	
263.90	sandstone fine grained in the lower part shale	
264.30	shale sandy and sandstone section grained in alternation	
265.70	shale interbed thin sandstone	
266.20	sandstone coarse grained, quartz and feldspar rich white	
269.68	shale carbonaceous with thin sandstone	
270.58	sandstone medium grained with carbonaceous streaks	
271.20	sandstone, coarse grained quartz and feldspar	
275.32	sandstone coarse grained quartz and feldspar rich white	
275.46	coal black	
276.30	sandstone very fine grained laminated shale dark feldspar	
277.00	shale sandy	
277.06	coal burnt	
277.24	shale to shale sandy	
278.13	sandstone medium grained white	
279.11	dolerite sills fine grained greenish green	
279.31	sandstone fine grained	
279.78	sandstone coarse grained	
281.35	sandstone fine grained shale carbonaceous alternation sandstone and	
281.77	sandstone medium grained with carbonaceous streaks	
281.81	coal bright and shale	
281.93	shale carbonaceous	
282.35	coal burnt	
282.65	coal bright banded dull coal, a little bit burnt	
282.68	shale sandy micaceous	
287.73	sandstone coarse grained white	
289.83	dolerite sills grained greenish green	
290.68	sandstone coarse grained	
291.06	coal bright banded dull coal	
291.12	shale carbonaceous	
291.58	shale sandy	
292.84	sandstone medium grained light gray	
303.53	sandstone coarse grained feldspar and quartz rich white	
304.82	sandstone medium grained subangular alternation sandstone and	
305.62	sandstone very fine grained silty laminated shale	
305.90	shale with sandstone bands	
306.66	coal noisy banded dull coal	
306.00	shale carbonaceous silty	
306.58	sandstone fine grained gray	
307.99	sandstone coarse to medium grained white	
309.51	sandstone very fine grained laminated shale	
310.75	sandstone coarse grained quartz and feldspar rich with shale streaks	
311.69	sandstone medium grained white	


237.80
239.50
240
240.52
241.29
241.80
242.35
243.00
244.38
245.50
246.70
247.00
248.15
250
249.38
251.10
251.95
254.31
260
262.90
263.90
264.30
265.70
266.20
268.69
270
270.38
271.20
272.32
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287.73
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289.83
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291.17
291.98
292.96
300
303.53
306.82
305.42
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306.58
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308.51
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315.51
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315.31
315.39
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320
316.07
316.78
316.82
317.19
318.49
318.82
319.50
319.84
320.10
320.34
320.67
320.86
321.09
330
321.73
321.88
322.17
323.13
323.70
328.20
328.38
328.90
329.20
330.17
330.88
340
331.10
331.47
332.48
336.48
336.56
337.62
338.00
338.96
339.40
344.20
345.44
345.66
350
346.59
360
370
375.64
377.10
378.68
380
387.50
388.46
390
389.46
400
402.29
402.67
402.98
shale: laminated, thin sandstone
sandstone, fine, grained, white
shale, interbedded thin sandstone, dark gray
dolerite sill
sandstone, very fine, greyback, milcaceous dark gray
shale, dark gray
shale, sandy to shale, dark gray
sandstone, fine grained with carbonaceous streaks light gray
shale, sandy, dark gray
shale, dark gray
shale, sandy with thin sandstone, dark gray
dolerite, fine grained, dark green
sandstone medium to fine grained, altered, bedding obscure pinkish
sandstone, coarse grained to very coarse rich
sandstone fine to medium grained, partly micaceous light gray to dark gray
sandstone, coarse grained, partly micaceous quartz and feldspar rich, hard, white
256.44 – 256.91 m dolerite
shale, in the lowermost, interbedded thin sandstone, dark gray
sandstone, fine grained, in the lowermost shale
shale, sandy and sandstone very fine grained, in alternation
shale, interbedded thin sandstone
sandstone coarse grained, quartz and feldspar rich white
shale, carbonaceous with thin sandstone
sandstone, medium grained with carbonaceous streaks
sandstone, coarse grained quartz and feldspar
sandstone coarse grained, quartz and feldspar rich, white
coal, seam
sandstone, very fine grained, laminated shale, pinkish gray
shale, sandy
coal, seam
shale to shale, sandy
sandstone, medium grained, white
dolerite sills grained, greenish green
sandstone, fine grained
sandstone, coarse grained
sandstone, fine grained, alternation of medium sandstone
sandstone, medium grained, with carbonaceous streaks
coal, bright and dull
shale, carbonaceous
coal, seam
coal, bright, banded dull coal, in shale, pyrite
shale, sandy, carbonaceous
sandstone, coarse grained, white
dolerite, sills grained, greenish green
sandstone, coarse grained
coal, bright, banded dull coal
shale, carbonaceous
shale, sandy
sandstone, medium grained, light gray
sandstone, coarse grained, feldspar and quartz rich, white
sandstone, coarse grained and shale, medium to sandstone rich
sandstone, coarse grained, silty, laminated shale
shale with sandstone bands
coal, pyritic, banded dull coal
shale, carbonaceous, silty
sandstone, fine grained, gray
sandstone, coarse to medium grained, white
sandstone, coarse fine grained, laminated shale
sandstone, coarse grained, quartz and feldspar rich, white, pyrite
sandstone, medium grained, white
sandstone, fine grained, partly medium grained, carbonaceous and shale, pyrite
shale, gray
sandstone, fine grained, with shale streaks
dolerite, sills grained
shale, sandy, dark gray
sandstone, fine grained, alternate shale
coal, bright, banded dull coal, pyrite
dolerite, sills grained, greenish green
coal, bright, banded dull coal
shale
sandstone, coarse grained
sandstone, coarse grained
dolerite, sills grained, with carbonaceous streaks
coal, bright, banded dull coal
coal, dull
shale
sandstone, coarse grained
sandstone, coarse grained
dolerite, sills grained
coal, bright, with a little bit of bright coal
shale, carbonaceous
sandstone, fine grained, micaceous
shale, carbonaceous
coal, bright and dull
shale, carbonaceous
sandstone, very fine grained and shale, in alternation
sandstone, coarse grained, quartz and feldspar rich, white
coal, dull, coal layers
shale, carbonaceous, towards the bottom alternate, sandstone
sandstone, medium grained, light gray
sandstone, coarse grained, white
sandstone, very fine grained, alternate shale, pinkish gray
sandstone, medium grained, light gray
sandstone, very fine grained, laminated shale, pinkish gray
sandstone, medium grained
sandstone, coarse grained, quartz and feldspar rich, white
shale, carbonaceous
coal, dull, banded dull coal
shale, carbonaceous and sandstone, fine grained (2 cm thick)
sandstone, coarse grained
sandstone, very fine grained, gray
sandstone, coarse grained, at bottom, carbonaceous, pyrite
coal, dull and bright, intercalate shale, carbonaceous
shale, carbonaceous
sandstone, medium grained, light gray
sandstone, coarse grained, quartz and feldspar rich, white
sandstone, medium grained, light gray
sandstone, fine grained, intercalate shale, pinkish gray
sandstone, coarse grained, quartz and feldspar rich, white
sandstone, medium grained, light gray
sandstone, fine grained, intercalate shale, pinkish gray
sandstone, coarse grained, quartz and feldspar rich, white
sandstone, medium grained, light gray
shale, sandy
End of Hole

HOLE NO : DD49
AREA : LUBHUKU
DATE DRILLED : JAN. 20. 1982 – JAN 29. 1982
TOTAL DEPTH : 241.99m
ELEVATION : +277.0m
COORDINATE : X=+2,931,000, Y=-77,000

JAPAN INTERNATIONAL COOPERATION AGENCY

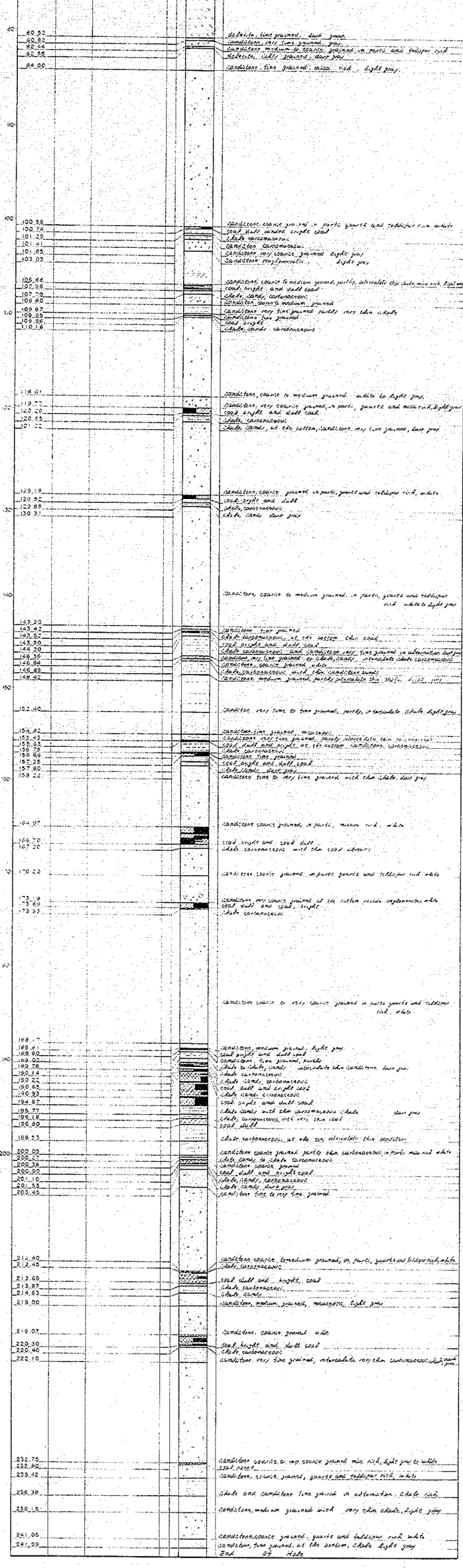
Borehole Log DD49

Dwg. 4; Scale 1:200

Date Sep. 1982 Prepared by N. Izumiya, H. Hatakeyama

Depth of Bore hole	Apparent Thickness of Strata (m)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description
2.00					soil
3.00					sandstone, coarse grained quartz and feldspar rich, white
4.00					sandstone, coarse grained and shale, sandstone rich
(m) 10 11.00					sandstone fine to medium grained and shale, micaceous shale, rich.
					sandstone, fine grained, partly intercalate shale
20 20.00 / 21.00					sandstone, coarse grained, intercalate shale
26.00					sandstone medium grained, weathered
30 32.00					sandstone medium grained, and shale
34.01					sandstone, medium grained
35.65					sandstone, medium grained (10m core loss)
35.80					hornfels, dark grained, light green
40 40.75					sandstone, fine grained, laminated thin shale
42.07					sandstone, coarse grained, quartz and feldspar rich white
44.17					sandstone, fine grained white
46.36					sandstone, very fine grained, laminate thin shale bands, mica rich white
48.12					shale, sandy, in laminate very fine grained sandstone, gray
48.50					sandstone, fine grained, cross-bedded shale
49.84					sandstone, coarse grained, white
50 49.30					shale, carbonaceous, inter-laminate sandstone sands
50.13					sandstone, fine grained, intercalate thin shale, light gray
50.18					sandstone, coarse grained
50.40					coal, bright banded, dull spots, at the bottom, shale, carbonaceous
51.1					sandstone, very coarse grained, partly intercalate shale, white
52.38					coal, bright banded, dull spot, at the bottom, shale, carbonaceous
53.66					sandstone, fine grained, partly intercalate thin shale and sandstone, coarse grained
54.45					sandstone, coarse grained, in the some parts in intercalate, shale sands
54.71					shale, sands, inter-laminate thin sandstone
54.91					coal, bright and coal shale
56.37					sandstone, fine grained, white to light gray
57.14					sandstone, fine grained with thin shale bands
58.38					shale and sandstone, very fine grained, in alternation, shale rich
59.42					shale, carbonaceous, partly with very thin sandstone
60 59.90					shale, sandy, at the bottom sandstone, medium grained
63.30					sandstone, very fine grained, micaceous, dark gray
64.61					shale to shale, sandy, intercalate thin sandstone, dark gray
65.67					sandstone, medium to fine grained, partly, shale, white
66.1					shale, dark gray
67.70					shale to shale, sandy, reddish gray to dark gray
68.57					sandstone, very fine grained to shale, sandy, dark gray
68.78					coal, shale and dull coal
70 68.98					shale to shale, sandy, carbonaceous
69.90					hornfels, dark grained, grayish green
80 80.52					hornfels, fine grained, dark green
80.82					sandstone, very fine grained, gray
82.44					sandstone, medium to coarse grained in parts, and feldspar rich
82.55					hornfels, dark grained, deep gray
84.00					sandstone, fine grained, mica rich, light gray
90					
100 100.58					sandstone, coarse grained in parts, quartz and feldspar rich white
100.74					coal, dull, bright, single coal
101.25					shale, carbonaceous
101.41					sandstone, carbonaceous
101.82					sandstone, very coarse grained, light gray
103.03					sandstone, conglomerate, light gray
106.68					sandstone, coarse to medium grained, partly, intercalate thin shale, mica rich, light gray
107.36					coal, bright and dull coal
107.70					shale, sandy, carbonaceous
108.80					sandstone, coarse medium grained
110 109.87					sandstone, very fine grained partly, very thin shale
109.96					sandstone, fine grained
109.96					coal, bright
110.16					shale, sandy, carbonaceous
116.61					sandstone, coarse to medium grained, white to light gray
119.77					sandstone, very coarse grained, in parts, quartz and mica rich, light gray
120 120.38					coal, bright and dull coal
120.55					shale, carbonaceous
121.22					shale, sandy, at the bottom, sandstone, very fine grained, dark gray
129.18					sandstone, coarse grained in parts, quartz and feldspar rich, white
129.52					coal, bright and dull
130 129.58					shale, carbonaceous
130.31					shale, sandy, dark gray
140					sandstone, coarse to medium grained, in parts, quartz and feldspar rich white to light gray
143.20					sandstone, fine grained
143.42					shale, carbonaceous, at the bottom thin coal
143.62					coal, bright and dull coal
143.80					shale, carbonaceous, and sandstone, very fine grained, in alternation, dark gray
144.20					sandstone, very fine grained to shale, sandy, intercalate shale, carbonaceous
146.39					sandstone, coarse grained, white
146.64					shale, carbonaceous, with thin sandstone sands
146.90					sandstone, medium grained, partly intercalate thin shale, light gray
148.42					
150					

Non-Core Drilling


80
80.52 dolerite fine grained, dark grey
80.82 sandstone very fine grained, grey
82.44 sandstone medium to coarse grained in parts and feldspar rich
82.58 Mudstone light grained, deep grey
84.00 sandstone fine grained, mica rich, light grey.
90
100
100.58 sandstone coarse grained in parts quartz and feldspar rich white
100.74 coal dull banded bright coal
101.25 shale carbonaceous
101.41 sandstone carbonaceous
101.85 sandstone very coarse grained light grey
103.03 sandstone conglomeratic light grey
105.64 sandstone coarse to medium grained, partly, intercalate thin shale mica rich light grey
107.38 coal bright and dull coal
107.70 shale sandy carbonaceous
108.80 sandstone coarse to medium grained
109.87
110
109.39 sandstone very fine grained partly very thin shale
109.96 sandstone fine grained
110.16 coal bright
shale sandy carbonaceous
118.01 sandstone, coarse to medium grained white to light grey.
119.22
120
119.77 sandstone, very coarse grained, in parts, quartz and mica rich, light grey
120.26 coal bright and dull coal
120.65 shale carbonaceous
121.22 shale sandy, at the bottom, sandstone very fine grained, dark grey
129.18 sandstone, coarse grained in parts, gravel and feldspar rich, white
129.52 coal bright and dull
130
120.88 shale carbonaceous
130.37 shale sandy dark grey
140 sandstone, coarse to medium grained in parts, quartz and feldspar rich white to light grey
143.20
143.42 sandstone fine grained
143.52 shale carbonaceous, at the bottom thin coal
143.80 coal bright and dull coal
144.20 shale carbonaceous and sandstone very fine grained in alternation half
146.36 sandstone very fine grained to shale sandy intercalate shale carbonaceous
146.66 sandstone coarse grained white
146.88 shale carbonaceous with thin sandstone bands
148.82 sandstone medium grained partly intercalate thin shale light grey
150
152.40 sandstone very fine to fine grained, partly, intercalate shale light grey
154.83 sandstone fine grained micaceous
155.23 sandstone very fine grained, partly intercalate thin shale
155.63 coal dull and bright at the bottom sandstone carbonaceous
156.75 shale carbonaceous
156.86 sandstone fine grained
157.25 coal bright and dull coal
157.80 shale sandy dark grey
158.22 sandstone fine to very fine grained with thin shale dark grey
160
164.87 sandstone coarse grained in parts, mica rich, white
166.70 coal bright and dull dull
167.20 shale carbonaceous with thin coal stringers
170
170.23 sandstone coarse grained in parts quartz and feldspar rich white
173.19 sandstone very coarse grained at the bottom series conglomeratic white
173.65 coal dull and coal, bright
173.83 shale carbonaceous
180
sandstone coarse to very coarse grained in parts quartz and feldspar rich, white
188.71
189.41 sandstone medium grained, light grey
189.80 coal bright and dull coal
190
189.93 sandstone fine grained, partly
189.78 shale to shale sandy intercalate thin sandstone dark grey
190.14 shale carbonaceous
190.22 shale sandy carbonaceous
190.65 coal dull and bright coal
190.93 shale sandy carbonaceous
194.97 coal bright and dull coal
195.77 shale sandy with thin carbonaceous shale dark grey
196.18 shale carbonaceous not very thin coal
196.80 coal dull
198.53 shale carbonaceous, at the top intercalate thin sandstone
200
200.05 sandstone coarse grained partly thin carbonaceous in parts mica rich white
200.22 shale sandy to shale carbonaceous
200.38 sandstone coarse grained
200.90 coal dull and bright coal
201.10 shale sandy carbonaceous
201.53 shale sandy dark grey
203.45 sandstone fine to very fine grained
212.40 sandstone coarse to medium grained, in parts, quartz and feldspar rich, white
212.45 shale carbonaceous
213.69 coal dull and bright coal
213.87 shale carbonaceous
214.53 shale sandy
216.00 sandstone, medium grained, micaceous, light grey
219.07 sandstone coarse grained white
220
220.30 coal bright and dull coal
220.40 shale carbonaceous
222.10 sandstone very fine grained, intercalate very thin carbonaceous shale dark grey
232.75 sandstone coarse to very coarse grained mica rich, light grey to white
232.90 coal vitrite
235.42 sandstone, coarse grained, quartz and feldspar rich, white
238.38 shale and sandstone fine grained in alternation. shale rich
238.15 sandstone, medium grained with very thin shale, light grey
241.05 sandstone coarse grained quartz and feldspar rich white
241.09 sandstone, fine grained at the bottom, shale light grey
End of Hole

HOLE NO. : DD50
AREA : LUBUKU
DATE DRILLED : JAN.15, 1982 – FEB.3, 1982
TOTAL DEPTH : 426.19m
ELEVATION : +251.4m
COORDINATE : X = +2,931,000, Y = -80,000

JAPAN INTERNATIONAL COOPERATION AGENCY

Borehole Log DD50

Dwg. 4.2 Scale 1:200
Date Sep. 1982 Prepared by N.Ishihara, H.Hotakeyama

Depth of Bore Hole	Apparent Thickness of Strata (M)	True Thickness of Strata (M)	Dip of Strata	Columnar Section	Rock Description
4.00					soil, weathered, brown
7.00					conglomerate, medium grained, weathered.
12.00					sandstone, coarse to medium grained weathered, brownish gray
13.00					clay, dark brown
14.00					shale weathered, brownish gray
19.00					shale, dark gray
22.00					shale, carbonaceous
24.00					shale, dark gray
26.73					shale, carbonaceous and coal bright
28.45					core loss
28.76					shale carbonaceous
29.05					coal dull, bright coal and shale carbonaceous
29.60					shale carbonaceous
29.64					coal dull and bright
30.70					shale carbonaceous
30.80					coal shale banded bright coal
31.70					shale carbonaceous
32.40					coal dull and bright coal, at the bottom coal, shale
33.62					shale carbonaceous
34.35					shale, dark gray
36.85					shale sandy dark gray
37.25					shale, dark gray
38.55					shale, sandy at the bottom, sandstone, very fine grained, dark gray
42.62					sandstone coarse grained in parts, quartz and feldspar rich, white
43.65					shale carbonaceous and coal, shale, banded bright coal
44.35					shale carbonaceous with thin bright coal
45.08					coal dull banded bright coal and shale carbonaceous
45.38					shale carbonaceous with thin coal bands
45.72					coal, shale, banded bright coal
46.23					shale carbonaceous with thin bright coal right bands
47.07					coal dull banded bright coal, and shale, carbonaceous
48.70					shale carbonaceous
49.25					shale carbonaceous with thin bright coal bands
49.38					coal dull banded bright coal
50.40					shale carbonaceous
51.04					core loss
53.30			88		shale carbonaceous
57.20			82		dolerite, very fine grained, light gray (18m core loss)
58.40					shale, carbonaceous.
59.60					shale, carbonaceous
60.61					shale carbonaceous with thin bright coal bands
60.90					coal shale
61.20					shale carbonaceous
64.00					dolerite, very fine grained, dark gray
64.93					shale carbonaceous with thin bright coal bands.
66.18					coal, dull banded bright coal and shale carbonaceous
67.70					shale sandy, micaceous, dark gray
69.00					sandstone, medium grained
77.87					sandstone, coarse grained, white
78.31					coal dull and coal shale
79.21					shale carbonaceous with thin coal shale
79.31					coal dull banded bright coal
79.34					coal, shale
80.13					shale, sandy, gray
82.85					sandstone fine grained and shale in alternation
85.88					sandstone, medium grained cross-bedded very thin shale
88.07					sandstone, medium grained and coarse grained in alternation
88.10					coal, bright
88.65					sandstone medium grained, lamnate micaceous shale
90.18					sandstone coarse grained with carbonaceous streaks
91.62					shale and sandstone, very fine grained in alternation shale rich
95.93					sandstone, medium grained, partly, intercalate shale
96.82					sandstone coarse grained white
103.04					shale, interlaminate thin shale (20m core loss)
107.47					sandstone, medium grained, white
109.32			36		shale, interlaminate thin sandstone
118.04					dolerite, fine grained, dark green
131.50					dolerite, coarse grained, dark green
133.25					shale, interbed, thin sandstone, dark gray
133.47					sandstone, medium grained, white
140.05					shale, interbed, thin sandstone, dark gray
140.55					shale and sandstone, medium grained, in alternation
141.82					sandstone, medium grained partly, intercalate, white
144.36					sandstone, medium grained with thin shale, irregularly, white

Drilling

Non-Core

Depth	Samples	Description
		dolerite, coarse grained, dark green
130		
131.50		
133.25		shale, interbed thin sandstone, dark gray
133.47		sandstone, medium grained, white
140.05		shale, interbed thin sandstone, dark gray
140.55		shale and sandstone, medium grained in alternation
141.82		sandstone, medium grained, partly, intercalate, white
144.36		sandstone, medium grained with thin shale, irregularly, white
150		
155.86	15	shale interbed thin sandstone, dark gray
156.03	10	dolerite, fine grained, dark green
158.24	70	shale, intercalate, thin sandstone
159.80	70	dolerite fine grained
157.90		sandstone, medium grained
159.50		dolerite and sandstone, intercalate shale
160		
160.24		shale and sandstone, in alternation, sandstone rich
160.57	55	sandstone coarse grained, quartz rich
162.05	65	dolerite, fine grained, dark gray
163.08	50	sandstone, medium to coarse grained, intercalate shale, irregularly
163.17		dolerite
164.05		shale, intercalate very thin sandstone
164.23		sandstone, siltaceous
167.12		shale intercalate thin sandstone
167.52		dolerite and sandstone fine grained
168.10		sandstone fine grained
168.75		dolerite fine grained
170		
169.42		sandstone, fine grained, interbed shale, irregularly
179.20	60	dolerite, fine grained, dark green
179.97	45	sandstone, fine grained, greenish gray
180		
180.73	55	dolerite fine grained, dark green
181.27	90	sandstone medium grained
181.62	45	dolerite fine grained, dark green
182.52		sandstone, medium grained, partly, with thin carbonaceous streaks, white
185.05		sandstone fine grained with carbonaceous streaks, light gray
190		
191.55		sandstone, coarse grained quartz and feldspar rich
192.90		sandstone, medium grained, partly, intercalate shale
196.51		sandstone, very fine grained, side with thin carbonaceous streaks, 240m core break
200		
201.22		sandstone, medium grained, white
203.84		shale and sandstone, fine grained in alternation, shale rich
204.22		shale carbonaceous
205.20		shale and sandstone, silty in alternation, shale rich
208.80		shale carbonaceous and sandstone, fine to medium grained in alternation
210		
210.89		sandstone fine grained and medium grained in alternation with thin carbonaceous streaks
211.89	5	sandstone, medium grained
212.20	100	dolerite, silty grained, grayish green
212.63		sandstone, fine grained, greenish gray
212.70		shale
212.85	5	shale sandy, interbed sandstone, medium grained
216.31	40	dolerite, fine grained grayish green
217.56		sandstone coarse to medium grained, cross-bed, shale
218.81		sandstone, medium grained, cross-bed, shale
219.21		shale
220		
219.62	10	sandstone medium grained
221.42	40	dolerite, fine grained, dark green
225.27		sandstone, coarse grained, quartz and feldspar rich
225.87		shale and sandstone medium grained
226.17		coal, dull and coal, bright
229.12		sandstone fine grained, intercalate thin shale, mica rich
229.70		dolerite fine grained, dark green
230		
230.76		sandstone, fine grained, micaceous, light gray
232.50		dolerite, fine grained, dark greenish gray
238.15		sandstone, fine grained and shale, carbonaceous in alternation, sandstone rich
240		
241.19	5	sandstone, medium grained with carbonaceous streaks
241.82		dolerite silty grained, dark green
242.57		sandstone coarse grained, white
244.97		sandstone, medium grained, towards the bottom, coarse grained
245.10		coal, bright, banded, dull coal
246.31		sandstone fine grained, intercalate thin shale
247.65		shale, intercalate thin sandstone
247.92		sandstone, fine grained
250		
251.09		sandstone, medium to coarse grained, white
253.44		sandstone, silty with sandy shale bands, gray
254.14		sandstone, fine grained, white to light gray
255.64		sandstone, fine to medium grained, white
259.57		sandstone, very fine grained, intercalate shale light gray
260		
260.16		sandstone, fine grained, partly, intercalate shale
261.61		shale, sandy, intercalate sandstone
268.11		sandstone, medium to coarse grained, quartz and mica rich
269.07		sandstone, medium grained, light gray
270		
271.51		sandstone, coarse grained, quartz and feldspar rich
272.34		shale sandy and sandstone fine grained in alternation, shale sandy rich
272.36		coal, shale and coal, bright
274.30		shale sandy with thin sandstone bands
277.75		shale, intercalate sandstone, fine grained at the depth of 277.67m, thin coal, 1cm thick
280		
280.51		sandstone, fine grained, mica rich, light gray
281.34		shale sandy, dark gray
281.93		sandstone, silty with carbonaceous streaks
282.16		shale, coal
283.76		sandstone fine grained with thin shale
283.82		coal, dull banded, bright coal
284.61		sandstone, very fine grained and shale in alternation
285.70		shale
287.16		sandstone coarse grained, at the bottom, medium grained
287.53		shale, intercalate thin sandstone
288.00		shale carbonaceous
288.67		shale sandy, micaceous
289		
289.25		sandstone fine grained to very fine grained with thin carbonaceous streaks
289.39		coal, dull banded, bright coal
289.93		shale carbonaceous
290.58		shale sandy to sandstone, very fine grained with thin carbonaceous streaks
300		
303.80		sandstone, coarse grained, quartz, quartz and feldspar rich, white
305.50		sandstone, very fine grained, intercalate thin carbonaceous shale, dark gray

Depth	Description
259.57	Sandstone, very fine grained, intercalate shale light gray
260.16	Sandstone, fine grained, partly intercalate shale
261.61	Shale sandy, interlaminate sandstone
268.11	Sandstone, medium to coarse grained, quartz and mica rich
269.07	Sandstone, medium grained, light gray
271.51	Sandstone coarse grained, quartz and feldspar rich
272.56	Shale sandy and sandstone fine grained in alternation shale sandy, rich
272.36	coal shale and coal bright
274.30	Shale sandy with thin sandstone bands
277.75	Shale, intercalate sandstone, fine grained at the depth of 277.67m thin coal, rich shale
280.51	Sandstone fine grained, mica rich, light gray
281.34	Shale sandy dark gray
281.93	Sandstone silty with carbonaceous streaks
282.16	Shale sandy
283.75	Sandstone fine grained with thin shale
283.82	coal dull banded light coal
284.61	Sandstone very fine grained and shale in alternation
285.70	shale
287.16	Sandstone coarse grained, at the bottom medium grained
287.98	Shale intercalate thin sandstone
288.00	shale carbonaceous
288.07	shale sandy mica rich
289.23	Sandstone fine grained to very fine grained with thin carbonaceous streaks
289.29	coal dull banded bright coal
289.95	shale carbonaceous
290.58	shale sandy to sandstone very fine grained with thin carbonaceous streaks
303.80	Sandstone coarse grained in parts quartz and feldspar rich white
304.50	Sandstone very fine grained intercalate thin carbonaceous shale dark gray
312.65	Sandstone coarse grained in parts quartz and feldspar rich white
312.87	shale sandy carbonaceous
313.77	Sandstone fine grained with very thin shale streaks
314.05	coal bright and coal shale
314.57	shale carbonaceous
315.26	coal dull and coal shale (10cm core loss)
315.70	shale sandy to sandstone very fine grained
316.73	coal bright
317.10	shale sandy with very thin carbonaceous water impregnated dark gray
318.00	shale carbonaceous with very thin sandstone streaks
318.04	coal bright and coal dull
318.90	shale carbonaceous
321.00	Sandstone fine to very fine grained interbed shale carbonaceous
321.40	shale carbonaceous micaceous sandstone
322.13	coal dull banded bright coal at the bottom shale carbonaceous
322.80	shale sandy micaceous dark gray
332.45	Sandstone coarse grained, quartz and feldspar rich, white.
332.95	coal bright banded dull coal
333.23	shale carbonaceous
333.39	Sandstone very fine grained light gray to brownish gray
333.79	Sandstone coarse grained white
335.06	Sandstone fine grained interlaminated shale in the upper and lower parts
336.96	Sandstone coarse grained at the depth of 336.97m fractured zone
339.03	Sandstone very coarse grained at the bottom conglomerate white
339.98	coal bright
340.65	shale carbonaceous
342.00	shale and sandstone fine grained in alternation shale rich
342.45	Sandstone very fine grained bands thin shale
342.63	coal bright banded dull coal at the bottom coal shale
342.97	shale sandy carbonaceous
343.94	Sandstone fine grained intercalate shale bands
345.08	Sandstone medium grained
345.48	shale and sandstone silty in alternation contact with feldspar crystals
346.57	shale carbonaceous
351.32	Sandstone medium grained light gray to white.
352.09	shale carbonaceous
352.67	Sandstone very fine grained intercalate thin shale bands
353.02	coal dull and coal bright
353.35	shale carbonaceous
353.83	Sandstone fine grained intercalate shale
359.72	Sandstone coarse grained white
360.63	coal dull
360.92	coal dull and bright
361.07	coal dull
361.25	shale sandy
361.55	tonsh clay and siderite
362.50	Sandstone medium grained micaceous gray
362.79	Sandstone coarse grained at the depth of 362.87m coal streak
363.04	Sandstone medium to fine grained micaceous gray
366.05	Sandstone coarse grained quartz and feldspar rich
366.29	Sandstone very coarse grained with pebbles
366.61	Sandstone coarse grained carbonaceous
367.04	coal bright banded dull coal
375.91	Sandstone coarse grained quartz and feldspar rich at the depth of 376.00 to 376.20m intercalate sandstone very fine grained micaceous
385.38	Sandstone medium grained at the bottom pebbles
385.52	coal dull
385.66	coal bright banded dull coal
385.90	Sandstone fine grained
386.45	Sandstone very fine grained laminate shale
386.55	shale silty very thin interbedded sandy
386.88	coal dull and bright
387.18	shale sandy carbonaceous
387.33	shale carbonaceous
388.34	coal dull and bright coal
388.60	core loss mixed coal and shale carbonaceous
389.05	shale carbonaceous
390.37	coal dull and bright coal
390.82	Sandstone very fine grained to shale sandy
391.47	shale carbonaceous
392.11	coal bright banded dull coal at the bottom shale carbonaceous
392.81	shale sandy brownish gray
393.32	Sandstone fine grained
395.53	Sandstone fine grained (core loss 15cm)
398.74	Sandstone coarse grained (core loss 2.5m)
398.89	Sandstone coarse grained
398.17	core loss mixed coal and shale carbonaceous
399.60	shale carbonaceous
399.65	coal dull
400.37	shale carbonaceous
406.35	Sandstone coarse to medium grained towards the bottom coarse grained
406.43	coal bright intercalate of siderite
410.40	siderite fine to silty grained with calcite rich greyish green
412.37	Sandstone very coarse grained conglomerate quartz and feldspar rich white
413.30	siderite fine to silty grained greyish green
414.43	Sandstone very coarse grained conglomeratic white
416.33	siderite fine to silty grained with calcite rich greyish green
417.06	Sandstone coarse grained carbonaceous (8cm core loss)
420.09	Sandstone coarse grained partly intercalate thin shale
421.04	Sandstone fine grained micaceous laminated
423.16	Sandstone coarse grained
423.79	core loss, marsh sandstone coarse grained
425.31	Sandstone fine grained laminated gray
425.97	Sandstone medium grained light gray
426.19	Sandstone fine grained
	End of Hole

HOLE NO. : DD51
AREA : LUSHUKU
DATE DRILLED : OCT. 2, 1981 - OCT. 31, 1981
TOTAL DEPTH : 441.38m
ELEVATION : +266.0m
COORDINATE : X=+2,935,000, Y=-78,001

JAPAN INTERNATIONAL COOPERATION AGENCY

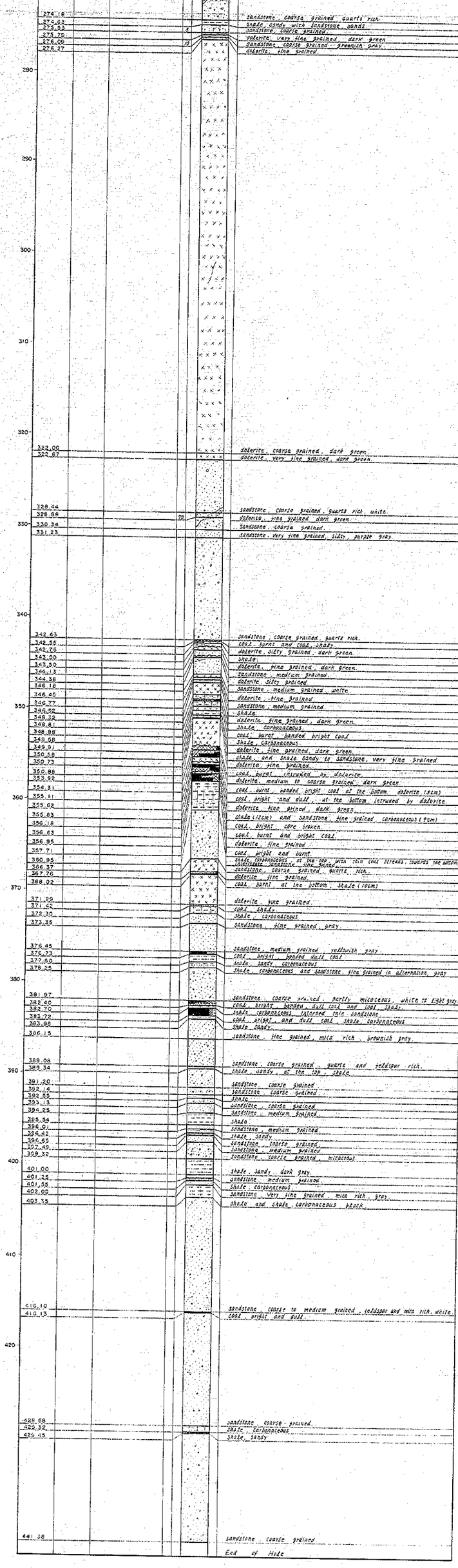
Borehole Log DD51

Dwg. 4 of Scale 1:200
Date Sep. 1982 Prepared by H. Tohnoro, H. Horikoyama

Depth of Bore Hole	Apparent Thickness of Strata (M)	Trus Thickness of Strata (M)	Dip of Strata	Column Section	Rock Description
5.00					soil
13.00					sandstone, very fine grained, silty weathered.
14.00					sandstone, medium grained, weathered.
14.90					sandstone, coarse grained.
15.80					sandstone, coarse grained, weathered.
17.60					sandstone, fine grained, weathered.
19.60					core loss
24.68					sandstone medium grained, interbed sandstone, fine grained.
24.93					shale, weathered.
25.40					shale, sandy to sandstone, very fine grained.
26.20					core loss
27.68					sandstone, medium grained with shale bands.
32.80					sandstone, course grained partly, interbed thin shale.
33.30					sandstone, fine grained with shale, dark gray.
39.05					sandstone, coarse grained, quartz rich, towards the bottom medium grained
37.04					sandstone, fine grained and shale in alternation, irregularly.
39.10					shale with thin sandstone bands, grayish black
40.25					shale, sandy to sandstone, very fine grained.
40.70					sandstone, very fine grained, silty
43.80					shale, sandy, interbedded sandstone, medium grained
44.70			45		sandstone, medium grained with shale bands, quartz rich
46.32			45		dolerite, fine grained, glassy, grayish green
46.69					sandstone, fine grained, at the top, heated by dolerite.
49.05					shale, carbonaceous.
50.97					sandstone, very fine grained and shale in alternation.
52.91					sandstone, very fine grained, silty with shale bands.
54.50					shale with sandstone bands.
56.43					sandstone, fine grained, mica rich and shale in alternation.
56.87					shale.
58.31					sandstone very fine grained with carbonaceous streaks.
59.80					shale
60.18					sandstone, very fine grained, silty.
65.70			55		dolerite, fine grained, with calcite vein, green.
67.30					sandstone, fine grained, grayish white, at the top, columnar.
68.40					sandstone, medium grained, quartz rich
70.25					sandstone, coarse grained, quartz rich white
74.20					sandstone, medium grained partly, coarse grained, white
74.50			60		dolerite, silty, grayish light green
76.88					sandstone medium grained to fine grained, mica rich, light gray.
77.37					dolerite, dark green
79.58					sandstone, fine grained, micaceous, light gray
80.80					shale, sandy with very thin sandstone beds, gray
81.69					sandstone, medium grained, quartz rich, very hard
82.05					dolerite, silty, grayish green
102.50					dolerite, fine grained to silty with calcite
111.10					dolerite medium grained glassy, dark green
117.20					dolerite, medium to course grained dark green
129.10					dolerite, very fine grained, grayish green
134.70					dolerite, course grained, dark green
136.66					dolerite, very fine grained, grayish green
139.55					dolerite course grained, dark green
141.40					dolerite, fine grained, grayish green
142.60					sandstone, medium grained, partly course grained with carbonaceous shale irregularly
142.83					dolerite, fine grained, grayish green
143.42					sandstone, fine grained, grayish white
143.90					sandstone, coarse grained, white
144.27					shale
154.55					sandstone, medium grained with shale
					dolerite, fine grained, grayish green

Non - Core Drilling

Depth	Description
102.80	dolerite, fine grained to silty with cracks
111.10	dolerite medium grained glassy, dark green.
117.20	dolerite medium to coarse grained dark green
128.10	dolerite, very fine grained, greyish green.
134.70	dolerite, coarse grained, dark green.
138.66	dolerite, very fine grained, greyish green.
139.55	dolerite, coarse grained, dark green.
141.40	dolerite, fine grained, greyish green.
142.00	sandstone, medium grained, partly coarse grained with carbonaceous shale, irregularly
142.93	dolerite, fine grained, greyish green.
143.42	sandstone, fine grained greyish white
143.99	sandstone, coarse grained, white.
144.27	shale
144.65	sandstone, medium grained with shale
145.30	dolerite, fine grained greyish green.
146.47	sandstone, medium grained, carbonaceous, mica rich
146.97	shale and sandstone, fine grained in alternation
147.05	coal, dull purple and coaly shale.
147.10	shale, carbonaceous
147.62	sandstone medium grained, carbonaceous
147.70	dolerite, fine grained greyish gray
148.11	shale and sandstone, fine grained in alternation.
148.33	dolerite, fine grained greyish gray.
148.82	shale and sandstone, fine grained in alternation.
154.30	sandstone medium grained, micaceous
156.92	dolerite, fine grained greyish green
156.54	sandstone, medium grained, micaceous
156.85	dolerite, fine grained, greyish green.
157.66	sandstone, medium grained carbonaceous mica rich
158.19	dolerite, fine grained greyish green.
160.88	sandstone, fine grained in parts medium grained with thin shale bands
161.67	dolerite silty greenish gray
163.23	sandstone, very fine grained silty with thin shale bands; mica rich
163.84	sandstone, medium to coarse grained
165.27	sandstone, very fine grained and shale in alternation, irregularly.
168.64	sandstone, coarse grained, towards the bottom, very coarse grained.
169.95	core loss
169.92	sandstone, fine grained, greenish gray.
169.82	shale and sandstone, fine grained in alternation
170.33	shale
170.38	shale, carbonaceous
170.46	coal, bright, banded dull coal
170.97	sandstone fine grained carbonaceous mica rich
171.60	dolerite fine grained greyish green
174.40	sandstone, fine grained to medium grained.
175.72	shale light greenish gray
176.04	sandstone medium grained, intercalate shale, irregulary.
177.18	shale, carbonaceous.
178.30	sandstone, medium grained, mica rich
178.75	dolerite, fine grained greyish green
182.80	sandstone, coarse grained
184.20	shale sandy
184.53	sandstone, medium grained, carbonaceous.
185.40	shale, carbonaceous
185.62	dolerite, silty greyish green
185.70	shale coaly
186.58	shale carbonaceous
187.10	sandstone very fine grained and shale in alternation
188.75	shale, carbonaceous.
190.62	sandstone, very fine grained to shale sandy.
190.94	sandstone coarse grained quartz rich
190.06	coal bright, banded dull coal
190.22	shale coaly
190.32	coal, dull banded thin bright coal
191.41	shale sandy carbonaceous
192.00	shale, sandy, intercalate sandstone very fine grained
204.23	sandstone, coarse grained, quartz rich, at the bottom thin coal matter
205.45	coal bright, banded dull coal
206.82	shale, sandy to sandstone, very fine grained, brownish gray.
208.32	sandstone very fine grained light gray
209.39	shale, sandy, at the bottom, shale.
209.82	sandstone, medium grained with carbonaceous streaks
210.24	dolerite, silty grained greyish green
212.37	sandstone, coarse grained quartz rich.
212.91	coal, dull and bright
213.25	coal, bright banded dull coal.
214.22	60 dolerite, silty grained, greyish green.
214.49	sandstone fine grained with shale.
214.81	shale carbonaceous
214.87	coal bright
216.13	sandstone fine grained micaceous dark gray
216.58	shale sandy.
217.96	sandstone, medium to fine grained
223.53	sandstone coarse grained, quartz rich, white
223.94	coal bright and dull coal
224.32	coal, bright banded coaly shale with pyrite
229.42	dolerite, silty grained, greyish green
226.62	40 shale, sandy carbonaceous
235.76	sandstone, very coarse grained, quartz rich, white
235.66	coal, dull and bright
237.61	2 dolerite, medium to fine grained, greyish green
237.95	coal, bright banded dull coal
238.35	shale, carbonaceous.
238.90	sandstone medium grained greyish white
239.39	sandstone, very fine grained, gray.
249.78	sandstone, very coarse grained, quartz rich, white
250.93	shale, carbonaceous
252.70	shale sandy with very fine grained sandstone beds
252.89	coaly shale, banded very thin bright coal
253.25	shale, carbonaceous.
253.53	dolerite, fine grained
254.03	dolerite medium grained
254.70	sandstone, very fine grained with shale bands
256.40	sandstone, coarse grained partly medium grained, white.
257.07	sandstone medium grained, gray
261.15	shale sandy to sandstone, very fine grained with shale bands.
263.69	dolerite fine grained
264.60	shale carbonaceous at the top, intercalate sandstone
266.71	coal bright banded dull coal
269.47	shale carbonaceous
267.12	45 sandstone medium grained
268.16	42 dolerite fine grained, greyish green.
270.04	42 sandstone, very coarse grained, quartz rich, white
271.18	60 dolerite, fine grained greyish green.
274.16	sandstone, coarse grained quartz rich
274.63	shale sandy with sandstone bands.
275.53	3 sandstone coarse grained
275.70	dolerite very fine grained, dark green
276.00	12 sandstone, coarse grained greenish gray
276.27	dolerite fine grained



Depth	Description
274.18	sandstone, coarse grained, quartz rich.
274.63	shale, sandy with sandstone bands
275.53	sandstone, coarse grained.
275.76	dolerite, very fine grained, dark green
276.00	sandstone, coarse grained, greenish gray
276.27	dolerite, fine grained.
280	
290	
300	
310	
320	
322.00	dolerite, coarse grained, dark green.
322.87	dolerite, very fine grained, dark green.
328.44	sandstone, coarse grained, quartz rich, white.
328.66	dolerite, med grained dark green.
330	
330.34	sandstone, coarse grained.
331.23	sandstone, very fine grained, silty, purple gray.
340	
342.63	sandstone, coarse grained, quartz rich.
342.55	coal, burnt and coal, shale
342.76	dolerite, silty grained, dark green.
343.00	shale.
343.30	dolerite, fine grained, dark green.
344.13	sandstone, medium grained.
344.38	dolerite, silty grained
345.18	sandstone, medium grained, white
346.45	dolerite, fine grained
350	
346.77	sandstone, medium grained.
346.92	shale.
348.32	dolerite, fine grained, dark green.
348.81	shale, carbonaceous
348.98	coal, burnt, banded bright coal
349.58	shale, carbonaceous
349.91	dolerite, fine grained, dark green.
350.58	shale, and shale sandy to sandstone, very fine grained
350.73	dolerite, fine grained.
350.86	coal, burnt, intruded by dolerite.
353.93	dolerite, medium to coarse grained, dark green
354.31	coal, burnt, banded bright coal at the bottom, dolerite (10cm)
360	
355.11	coal, bright and dull, at the bottom intruded by dolerite.
355.62	dolerite, fine grained, dark green.
355.83	shale (12cm) and sandstone, fine grained, carbonaceous (7cm)
356.18	coal, bright, core broken.
356.63	coal, burnt and bright coal
356.85	dolerite, fine grained
357.71	coal, bright and burnt.
360.95	shale, carbonaceous, at the top with thin coal streaks, toughes the bottom
366.37	carbonaceous shale, fine grained.
367.76	sandstone, coarse grained, quartz rich.
368.02	dolerite, fine grained
370	
368.92	coal, burnt at the bottom, shale (10cm)
371.20	dolerite, fine grained.
371.64	coal, shale.
372.30	shale, carbonaceous
373.35	sandstone, fine grained, gray.
376.45	sandstone, medium grained, reddish gray
376.73	coal, bright, banded dull coal
377.60	shale, sandy carbonaceous
378.25	shale, carbonaceous and sandstone, fine grained in alternation, gray
380	
381.97	sandstone, coarse grained, partly micaceous, white to light gray.
382.40	coal, bright, banded, dull coal and coal, shale
382.70	shale, carbonaceous, interbed fair sandstone
383.22	coal, bright, and dull coal, shale, carbonaceous
383.88	core gray.
386.15	sandstone, fine grained, mica rich, brownish gray.
389.08	sandstone, coarse grained, quartz and feldspar rich.
390	
389.34	shale, sandy, at the top, shale
391.20	sandstone, coarse grained
392.14	sandstone, coarse grained
392.55	shale
393.13	sandstone, coarse grained
394.25	sandstone, medium grained
395.54	shale
396.01	sandstone, medium grained.
396.52	shale, sandy.
396.65	sandstone, coarse grained.
397.49	sandstone, medium grained
399.32	sandstone, coarse grained, micaceous
400	
401.00	shale, sandy, dark gray.
401.25	sandstone, medium grained
401.55	shale, carbonaceous
402.00	sandstone, very fine grained, mica rich, gray.
403.15	shale and shale, carbonaceous, black
410	
410.10	sandstone, coarse to medium grained, feldspar and mica rich, white.
410.13	coal, bright and dull
420	
428.68	sandstone, coarse grained.
429.32	shale, carbonaceous
429.45	shale, sandy
441.38	sandstone, coarse grained

End of Hole