U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

LITHOLOGIC DESCRIPTION OF A SEDIMENT CORE FROM BUTTE VALLEY, SISKIYOU COUNTY, CALIFORNIA

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Introduction

As part of a series of investigations designed to study the Quaternary climatic histories of the western U.S. and the adjacent northeastern Pacific Ocean, a 102-meter sediment core was collected from Butte Valley, Siskiyou County, California, in the fall of 1991. This report presents basic data concerning the Butte Valley site, as well as lithologic descriptions of the recovered sediments. The drilling methods, core sampling, and curation techniques used are described by Adam (1993).

Acknowledgement

Coring at Butte Valley was made possible by the cooperation of the U.S. Forest Service, which manages the Butte Valley National Grassland.

Site description

Butte Valley, a broad open valley about 25 km long and 8-15 km wide, lies at an elevation of about 1290 meters just south of the California-Oregon border (Figure 1). The basin is topographically closed but would overflow to the northwest once water reached a depth of 8-9 meters. Regional bedrock consists of basalt and basaltic andesites of Pliocene and upper Miocene age (Williams, 1949; Wood, 1960). The eastern rim of the basin consists of a prominent linear horst oriented NNW-SSE and referred to by Wood (1960) as the Mahogany Mountain ridge. To the north and west, the basin is bounded by older [Pliocene to Pleistocene?] volcanic rocks of the "High Cascades" (Wood, 1960). The southeastern edge of the basin is formed by the Butte Valley basalt of Wood (1960), who mapped a lobe of the basalt beneath the valley floor on the basis of well logs.

The basin is tectonically active. Prominent fault scarps, generally parallel to the Mahogany Mountain ridge, are common throughout the area, and many of these features offset not only the younger volcanic rocks around the margins of the basin, but also the lacustrine deposits.

Portions of the upper Butte Creek drainage were glaciated at times during the Pleistocene (Williams, 1949), and outwash from the glaciers flowed into Butte Valley. Well logs reported by Wood (1960) indicate a thick sequence of lacustrine deposits beneath the present valley floor.

Northwest of the basin, the Klamath River has incised a youthful gorge about 500 meters into the underlying volcanic rocks (Figure 1). Landslide scarps are common along the steep walls of the canyon, and it is likely that the deepening of the canyon through time has affected the regional groundwater table in the Butte Valley area.

Private land in Butte Valley is primarily used for farming and ranching; in addition, a large part of the valley bottom around Meiss Lake is occupied by the Butte Valley National Grassland.

Drilling operations

The core location (Figure 1) was selected to be away from the edge of the basin, and also far enough north to avoid the subsurface tongue of Butte Valley basalt mapped by Wood (1960, Pl. 2). One core was drilled from October 13-18, 1991. Drilling was halted because of lack of funds to drill deeper.

Core description

The core reached a maximum depth of 101.82 meters. Shelby tubes were used to sample the top 4.88 meters of the core. Below 4.88 meters, cores were taken using a conventional rotary drill rig and drilling mud, as described by Adam (1993). Each trip of the coring device down

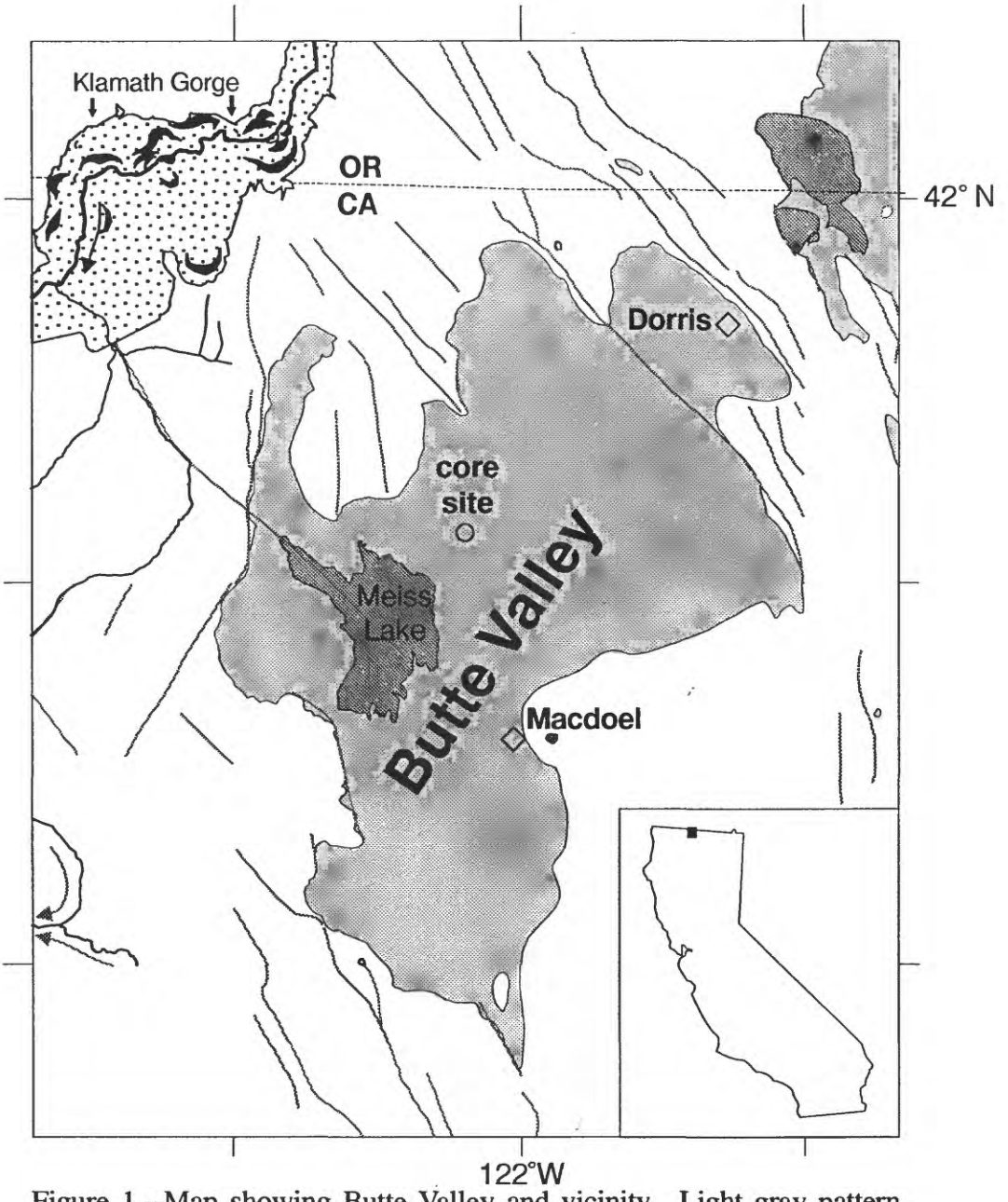

Figure 1.--Map showing Butte Valley and vicinity. Light gray pattern shows distribution of valley-bottom lake sediments; dark gray shows lakes. Coarse pattern shows Klamath River gorge, with landslide scarps shown by arcs. Streams are shown in black; lighter lines are lineaments interpreted from topographic maps.

the hole is referred to below as a *drive*; drives were numbered sequentially from top to bottom. Each drive was packaged for storage as one or more *slugs*; slugs were designated A, B, and C from top to bottom within each drive.

Core recovery and depth adjustments

The depth interval drilled for each drive and the percent recovery are shown in Figure 2 and Table 1. The two left-hand columns of Figure 2 show a graphical representation of the interval cored for each drive, how much sediment was recovered, how the drive was split into slugs, and the effect of any necessary depth corrections (explained below). Even-numbered drives are shown on the left and odd-numbered drives on the right to minimize overlap. Each drive is represented by a three-part symbol. The left-hand box contains the drive number; the vertical extent of that box represents the driller's depths for the interval penetrated during the drive. The shaded box immediately to the right of the numbered box represents the amount of core recovered during the drive, plotted using the convention that a short recovery represents the top part of the cored interval. The labeled boxes (A, B, C) at the right side of the symbol show how the recovered interval was split into slugs for storage after correcting the depths (if necessary) to adjust for drilling irregularities such as >100% core recovery. Corrected depths for drives are plotted using a vertical offset that compensates for apparent overlap between drives. The data used, including any offsets, are shown in Table 1.

The third column in Figure 2, labeled "Drives", shows an unlabeled, shaded box for each drive recovered. The upper and lower boundaries represent the depths at which drilling began and ended for that drive as reported by the driller. These boxes are offset in an alternating pattern to facilitate comparison of the bottom of one drive with the top of the next drive. The data are the same as for the numbered boxes in the first two columns. Immediately to the right of the "Drives" column, the "Slugs" column displays similar but labeled boxes that identify the drive and the slugs (A, and sometimes B and C) into which the drive was divided for storage. The depths plotted in the "Slugs" column include the depth corrections shown as "Offset" in Table 1.

As an example, consider drives 58 and 59. Drilling for drive 58 extended from 79.34 to 83.61 m, or a total of 3.27 m, but only 1.30 m of sediment was recovered. Drive 59 was drilled from 83.61 m (the base of the previous drive) to 85.14 m, or a total of 1.53 m, but core recovery was 3.3 m. The simplest explanation is that part of drive 58 stayed in the hole when we attempted to remove it at the end of drive 58 but was recovered along with the depth interval sampled by drive 59. The depth offset used for drive 59 (-2.97 m, Table 1) was calculated so as to place the top of the interval recovered as drive 59 at the base of the interval recovered as drive 58. It is apparent from Figure 2 that not all of the interval sampled by the two drives was recovered; a smaller offset could have been used to place drive 59 anywhere within the available interval.

Dating

Age control for the cores is derived from the tephra layers identified in Table 2 and from paleomagnetic reversal data (Roberts and others, 1993; Table 3). The section extends from the present back into the Jaramillo Subchron, with an apparent maximum age of about 1 million years.

Lithology

A very generalized lithology of the section is shown in Figure 3; detailed lithologic logs

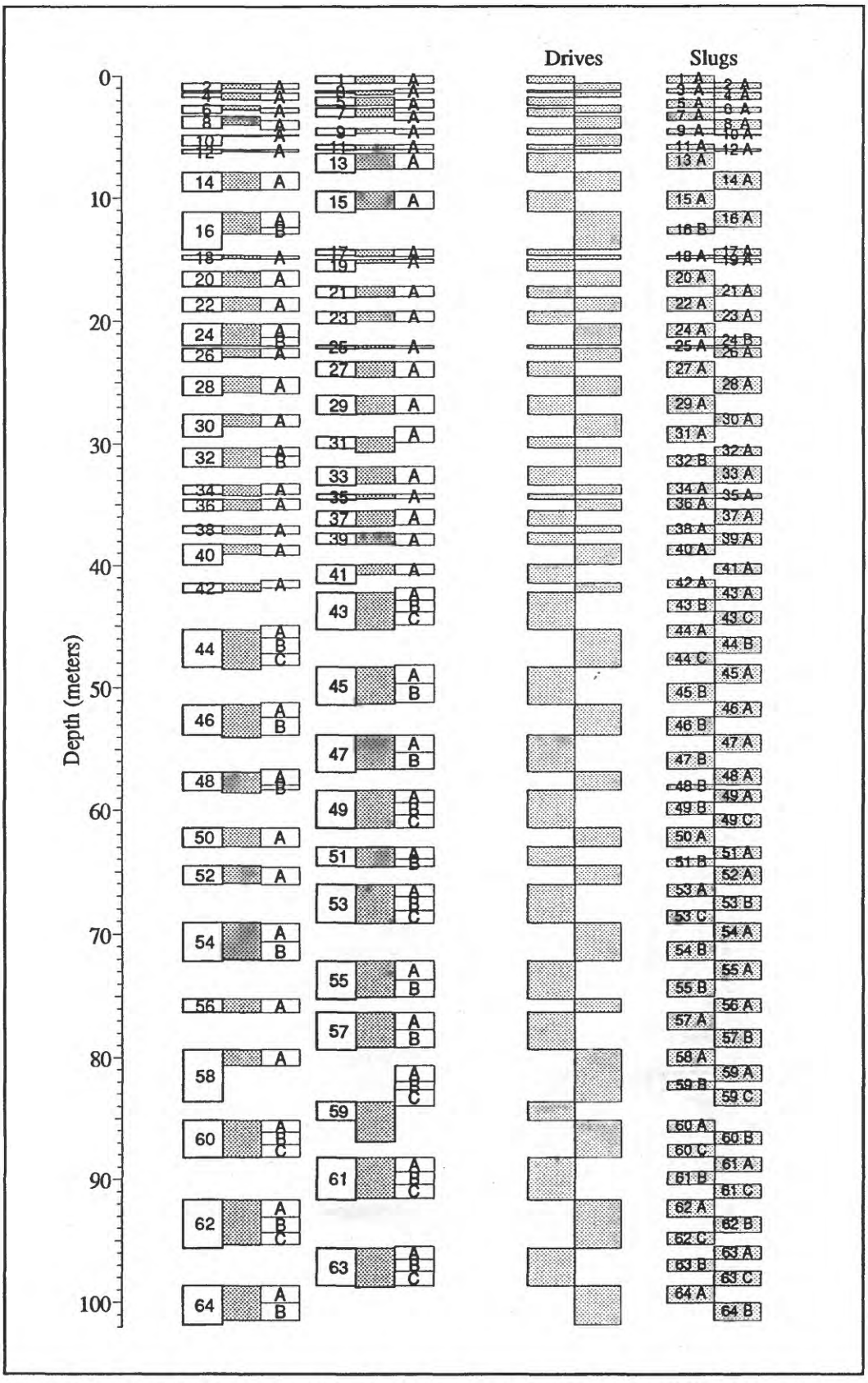

Figure 2.--Graphical representation of core recovery for Butte Valley Core 1. See text for explanation.

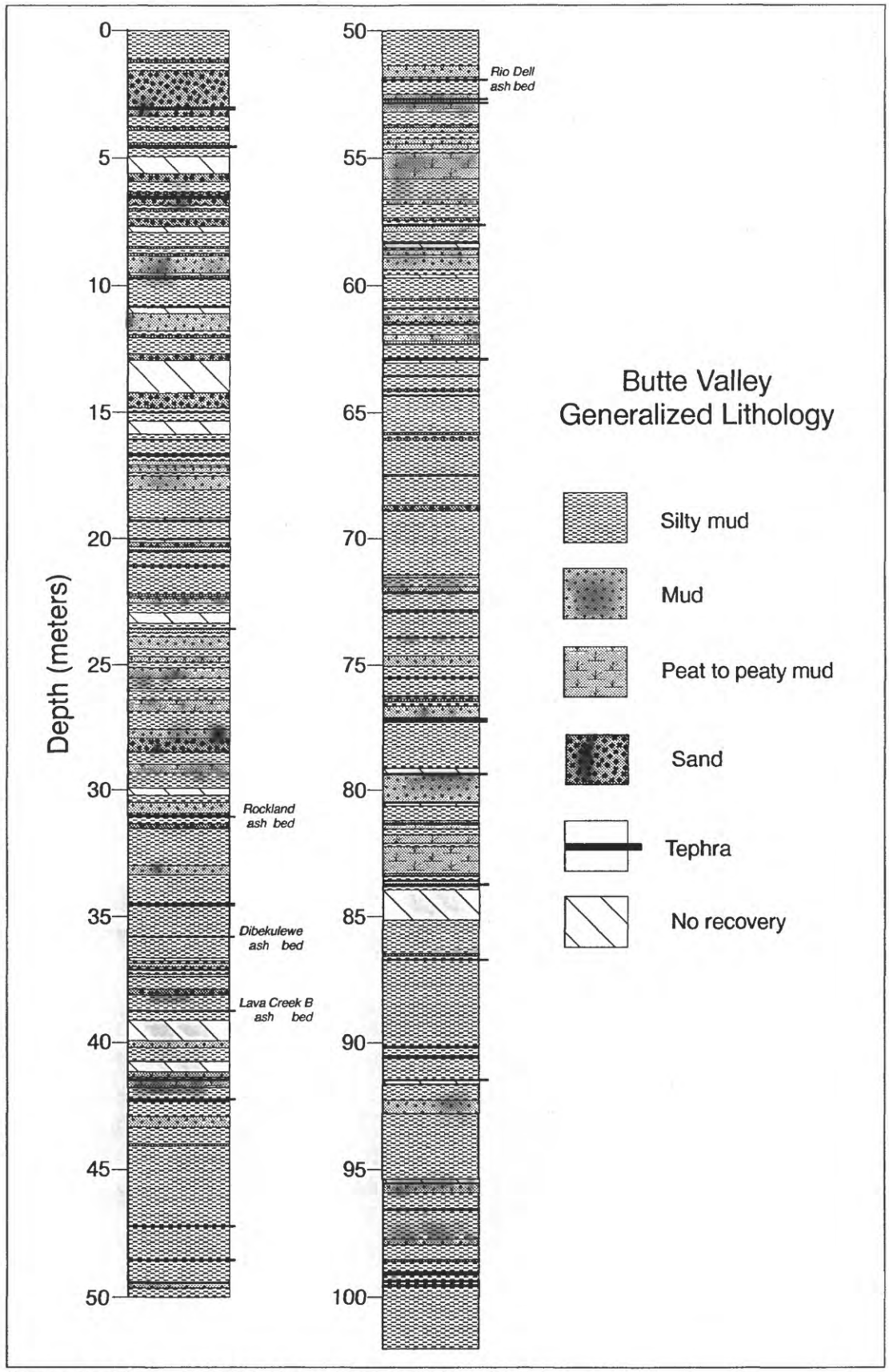

Figure 3.--Generalized lithology for Butte Valley Core 1.

are shown in Appendix B, using the patterns shown in Appendix A. Depths are shown in meters from the ground surface. Each stratigraphic unit is described to the right of the stratigraphic column. Most descriptions were taken from the fresh cores in the field, but some further descriptions were done in the laboratory. Color codes are taken from the Rock Color Chart distributed by the Geological Society of America (Rock Color Chart Committee, 1948).

Discussion

The Butte Valley core provides an opportunity to document the past one million years of environmental changes at a site presently in the rain shadow of the southern Cascades. The generalized lithologic section (Figure 3) indicates that long-term open-water lake conditions were more common prior to about 400 ka (the age of the Rockland ash bed) than they have been since that time. Possible causes of the observed changes include global climate changes associated with the waxing and waning of glacial conditions, changes in the rain shadow effect resulting from volcanic and tectonic processes in the southern Cascade Range, and long-term drawdown of the Butte Valley water table as a result of the incision of the Klamath River gorge. Detailed study of the Butte Valley core and comparison with nearby long records to the north and east may help to resolve these questions.

Table 1.--Drive data for Butte Valley Core 1						
Drive Number	Driller's Depth (m)		Recovery		Offset	Calculated depth for top of drive (m)
	Top	Bottom	meters	percent		
1	0.00	0.61	0.60	98.4	0.00	0.00
2	0.61	1.22	0.47	77.1	0.01	0.62
3	1.22	1.40	0.34	191.2	-0.13	1.09
4	1.40	1.75	0.55	154.6	0.03	1.43
5	1.75	2.44	0.69	100.6	0.23	1.98
6	2.44	3.05	0.36	59.0	0.23	2.67
7	2.69	3.35	0.66	99.9	0.34	3.03
8	3.33	4.34	0.74	72.8	0.36	3.69
9	4.34	4.88	0.40	75.0	0.07	4.41
10	4.88	5.79	0.09	9.8	0.00	4.88
11	5.72	6.10	0.37	97.1	0.00	5.72
12	6.10	6.40	0.15	49.2	0.00	6.10
13	6.40	7.93	1.27	83.8	0.01	6.41
14	7.93	9.45	1.42	93.2	0.00	7.93
15	9.45	11.13	1.44	85.9	0.00	9.45
16	11.13	14.18	1.76	57.7	0.00	11.13
17	14.18	14.63	0.53	115.9	0.00	14.18
18	14.63	14.99	0.28	78.7	0.03	14.66
19	14.99	15.93	0.28	29.8	0.00	14.99
20	15.93	17.15	1.27	104.1	-0.05	15.88
21	17.15	18.06	0.87	95.1	0.00	17.15
22	18.06	19.21	1.12	98.0	0.01	18.07
23	19.21	20.20	0.82	82.8	0.00	19.21
24	20.20	21.95	1.78	101.5	0.00	20.20

Table 1.--Drive data for Butte Valley Core 1						
Drive Number	Driller's Depth (m)		Recovery		Offset	Calculated depth for top of drive (m)
	Top	Bottom	meters	percent		
25	21.95	22.21	0.23	90.6	0.03	21.98
26	22.21	23.30	0.75	68.6	0.00	22.21
27	23.30	24.52	1.29	105.8	0.00	23.30
28	24.52	26.07	1.3	83.9	0.07	24.59
29	26.07	27.59	1.47	96.4	0.00	26.07
30	27.59	29.42	1.00	54.7	0.00	27.59
31	29.42	30.34	1.26	137.8	-0.83	28.59
32	30.34	31.86	1.60	105.0	-0.08	30.26
33	31.86	33.38	1.40	91.8	0.00	31.86
34	33.38	34.15	0.90	118.1	-0.12	33.26
35	34.15	34.58	0.36	83.4	0.01	34.16
36	34.58	35.52	0.90	95.7	-0.06	34.52
37	35.52	36.74	1.25	102.5	-0.10	35.42
38	36.74	37.35	0.70	114.8	0.00	36.74
39	37.35	38.26	0.90	98.4	0.09	37.44
40	38.26	39.94	0.83	49.5	0.08	38.34
41	39.94	41.46	0.79	51.8	0.00	39.94
42	41.46	42.23	0.65	85.3	-0.26	41.20
43	42.23	45.27	3.07	100.7	-0.38	41.85
44	45.27	48.32	3.25	106.6	-0.35	44.92
45	48.32	51.37	3.00	98.4	-0.15	48.17
46	51.37	53.81	2.64	108.2	-0.20	51.17
47	53.81	56.86	2.82	92.5	0.00	53.81
48	56.86	58.38	1.72	112.8	-0.23	56.63

Table 1.--Drive data for Butte Valley Core 1						
Drive Number	Driller's Depth (m)		Recovery		Offset	Calculated depth for top of drive (m)
	Top	Bottom	meters	percent		
49	58.38	61.43	3.04	99.7	0.00	58.38
50	61.43	62.98	1.53	98.7	0.00	61.43
51	62.98	64.51	1.61	105.6	0.00	62.98
52	64.51	66.06	1.45	93.6	0.10	64.61
53	66.06	69.11	3.11	102.0	0.00	66.06
54	69.11	72.15	2.93	96.1	0.06	69.17
55	72.15	75.20	2.90	95.12	0.00	72.15
56	75.20	76.27	1.09	102.1	0.00	75.20
57	76.27	79.34	2.86	93.0	0.02	76.29
58	79.34	83.61	1.30	30.4	0.00	79.34
59	83.61	85.14	3.30	216.5	-2.97	80.64
60	85.14	88.21	3.05	99.2	0.00	85.14
61	88.21	91.64	3.32	96.8	0.00	88.21
62	91.64	95.6	3.68	92.9	0.00	91.64
63	95.60	98.65	3.17	104.0	-0.12	95.48
64	98.65	101.83	2.82	88.8	0.00	98.65

Table 2.--Tephra from Butte Valley core.

Sample number	Tephra layer	Depth (m)	Age (kyr)
3517	Paoha Island sample 3A	8.69 - 8.76	155 - 160
3522	Rockland Ash bed	31.00 - 31.03	400 - 470
3523	Correlates with Tulelake sample T1240, which occurs interbedded with the Dibekulewe ash bed	34.47 - 34.52	?
3524	Dibekulewe ash bed	35.83 - 35.84	470 - 665 (best guess, ~500)
3525	Lava Creek B ash bed	38.73 - 38.75	665
3526	Lava Creek B ash bed	39.17 - 39.20	665
3527	not yet analysed	42.32 - 42.35	?
3528	not yet analysed	42.35 - 42.37	?
3529	Resembles the andesite tuff of Medicine Lake, but is stratigraphically too low	47.23 - 47.24	
3530	Resembles Mazama Ash, but stratigraphically too low	47.24 - 47.26	
3531	no good correlatives	48.54 - 48.56	
3533	Correlates with Sample 3536 at Buck Lake, Oregon	51.92 - 51.96	
3534	No clear correlatives. May be a match for ASW-61086-10, in the upper section at the south side of Lower Klamath Lake	52.65 - 52.67	
3343	no clear correlatives	52.82 - 52.84	
3401	May correlate with sample ASW-61085-19 at the south side of Lower Klamath Lake	77.21 - 77.22	

3402	Resembles Mazama Ash, but presumably is much older	77.22 - 77.23	
3407	Correlates with Samples 3A and 3B from Lake Britton	91.50 - 91.53	
7567	Similar to Bend Pumice/Loleta ash bed (300-400 ka) and to the Lawlor Tuff (4.1 Ma), but unlikely to be either one	92.14 - 92.15	?

Table 3.--Magnetic polarity intervals in the Butte Valley core

Interval	Depth Range (m)	Age Range (ka)
Brunhes Normal Chron	0 - 65	0 - 780
Matuyama Reversed Chron	65 - 88	780 - 984
Jaramillo Normal Subchron of the Matuyama Reversed Chron	88 - 102	984 - 1049

References Cited

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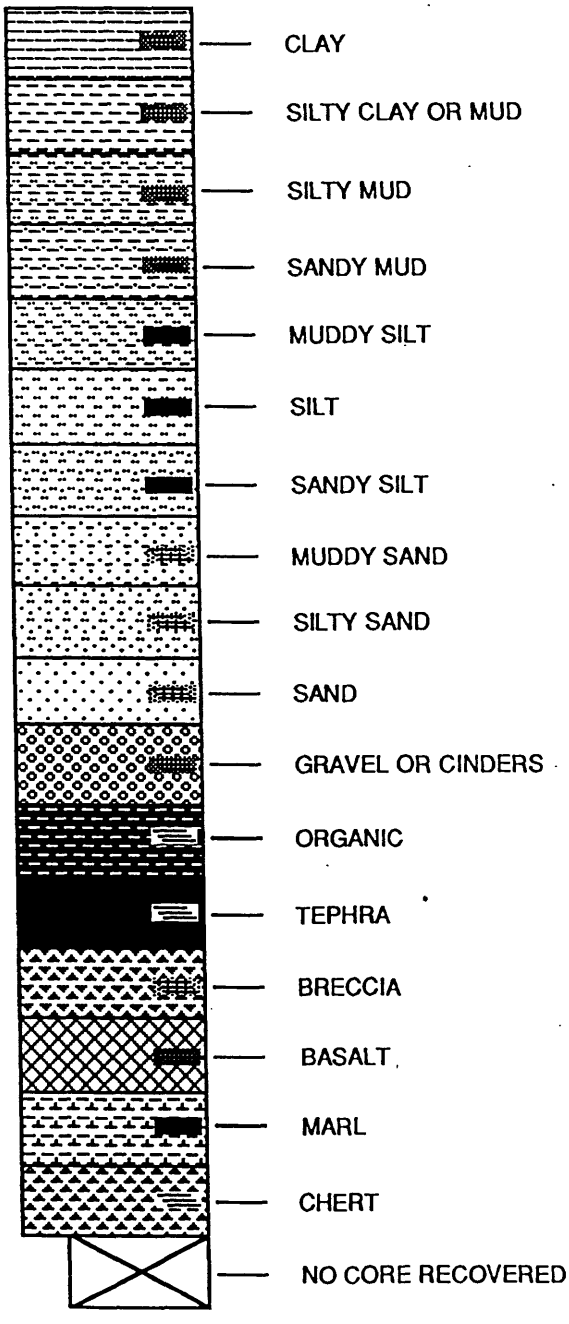
Wood, P.R., 1960, Geology and ground-water features of the Butte Valley region, Siskiyou County, California: U.S. Geological Survey Water-Supply Paper 1491, 151 p.

Williams, Howel, 1949, Geology of the Macdoel Quadrangle: California Division of Mines and Geology Bulletin 151, p. 5-60 + 2 maps, scale 1:62,500.

Appendix A
Legend showing patterns used for Lithologic Logs

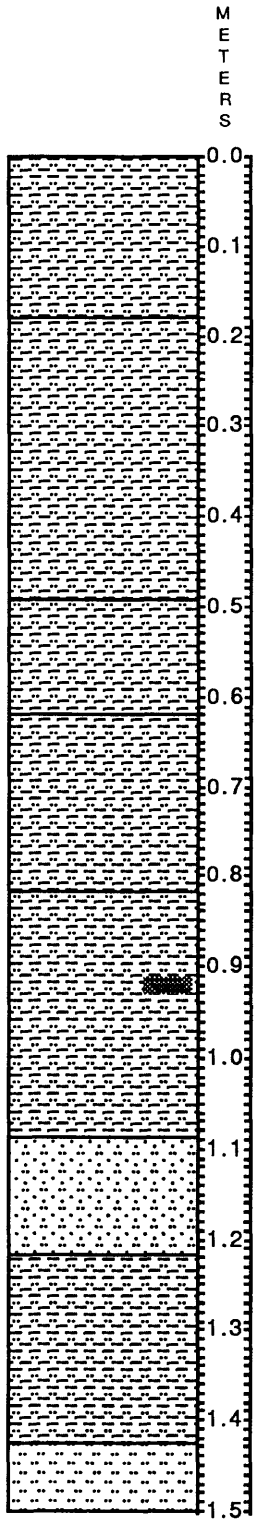
Small box inset within each pattern is used to indicate laminations within the unit (see written descriptions for more detail).

KEY TO LITHOLOGIES AND LAMINATION SYMBOL



Appendix B
Core 1 Lithologic Log

Butte Valley, Core 1
Siskiyou County, California



Start of Drive 1 [0.00-0.62 m].

MUD TO SILT [0.00-0.18 m]; pinkish gray (5YR8/1); powdery at surface; unconsolidated from 0.00-0.12 m, consolidated from 0.12-0.18 m; gradational lower contact.

GRITTY MUD [0.18-0.50 m]; grayish brown (5YR3/2); fractures easily; massive; gradational lower contact.

GRITTY MUD WITH LIGHT-COLORED BLEBS [0.50-0.62 m]; grayish brown (5YR3/2); fractures easily; massive.

Start of Drive 2 [0.62-1.09 m].

SILTY MUD [0.62-0.82 m]; yellowish brown (10YR5/2; dry core) from 0.62-0.75 m and moderate brown (5YR3/4) from 0.75-0.82 m; massive; may have few laminae lost because of drying of the core; very dry and hard from 0.62-0.75 m, with just slightly more water in the remainder of the drive (0.75-1.09 m).

MUD, SLIGHTLY ON SILTY SIDE [0.82-1.09 m]; laminated on mm-scale; laminae are pale yellowish brown (10YR6/2), dark yellowish brown (10YR4/2), and moderate brown (5YR3/4).

Start of Drive 3 [1.09-1.43 m].

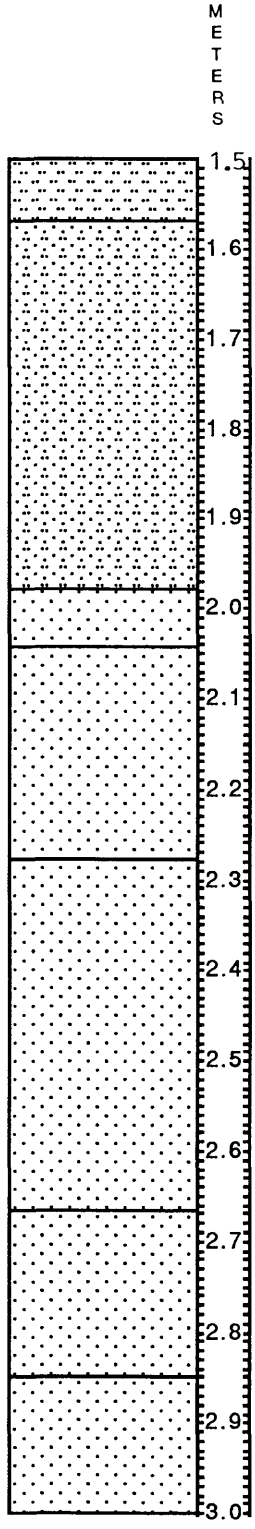
VERY FINE SAND TO SILT [1.09-1.22 m]; pink to light brownish gray (5YR7/1); unconsolidated; gradational lower contact.

GRITTY MUD [1.22-1.43 m]; dark yellowish brown (10YR4/2); massive; easily fractures.

Start of Drive 4 [1.43-1.98 m].

SILT [1.43-1.57 m]; pale yellowish brown (10YR6/2); unconsolidated, powdery.

Butte Valley, Core 1
Siskiyou County, California



SILT [1.43-1.57 m]; pale yellowish brown (10YR6/2); unconsolidated, powdery; gradational lower contact.

VERY FINE SAND TO SILT [1.57-1.98 m]; dark yellowish brown (10YR4/2); masssive; fractures easily.

Start of Drive 5 [1.98-2.67 m].

FINE SAND [1.98-2.05 m]; grayish brown (5YR3/2); massive; gradational lower contact.

FINE SAND [2.05-2.28 m]; dark yellowish brown (10YR4/2); massive; gradational lower contact.

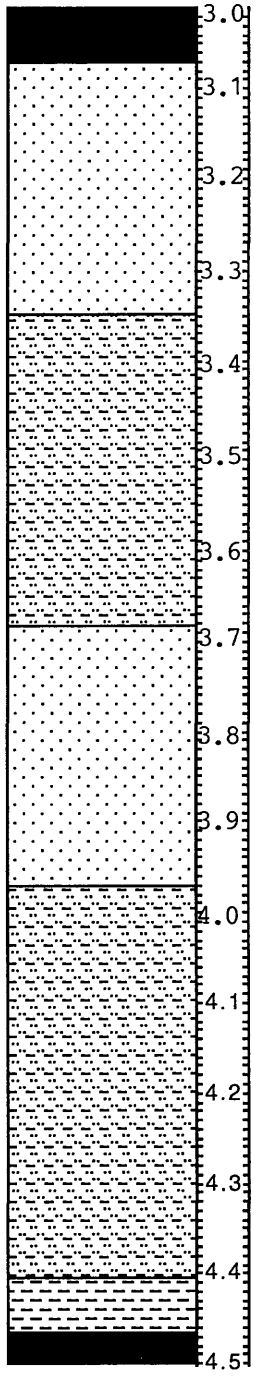
MEDIUM TO FINE SAND [2.28-2.67 m]; dark yellowish brown (10YR4/2) with a touch more green; massive; pebble (8 x 4 mm) at 2.44 m and rare coarse sand grains at approximately 2.63 m.

Start of Drive 6 [2.67-3.03 m].

FINE TO MEDIUM SAND (MOSTLY FINE) [2.67-2.85 m]; dark yellowish brown (10YR4/2) with a touch more green; unconsolidated from 2.67-2.77 m, massive from 2.77-2.85 m; gradational lower contact.

FINE TO MEDIUM SAND WITH BLACK TEPHRA [2.85-3.00 m] dispersed throughout but increasing downward; dusky yellowish brown (10YR2/2) with a touch more green; massive; gradational lower contact.

Butte Valley, Core 1
Siskiyou County, California



Start of Drive 7 [3.03-3.69 m].

BLACK TEPHRA WITH QUARTZ AND RED SCORIACEOUS FRAGMENTS [3.00-3.06 m]; dusky yellowish brown (10YR2/2); massive from 3.00-3.03 m, unconsolidated from 3.03-3.06 m; gradational lower contact.

MEDIUM SAND TO FINE SAND WITH BLACK TEPHRA DISPERSED THROUGHOUT [3.06-3.34 m]; dark yellowish brown (10YR4/2) with a touch more green to dusky yellowish brown (10YR2/2) with a touch more green (the latter, darker color if more tephra is present); sand of quartz and red scoriaceous fragments; massive; gradational lower contact.

MUDDY SILT [3.34-3.69 m] WITH A LITTLE DISPERSED FINE AND MEDIUM SAND, especially from approximately 3.34-3.43 m; dark yellowish brown (10YR4/2) with a touch more green; massive.

Start of Drive 8 [3.69-4.41 m].

MEDIUM TO FINE SAND WITH BLACK TEPHRA DISPERSED THROUGHOUT [3.69-3.97 m]; dusky yellowish brown (10YR2/2); sand of quartz, olivine and red scoriaceous fragments; massive; tephra abundance decreases downward to 3.97 m; irregular lower contact.

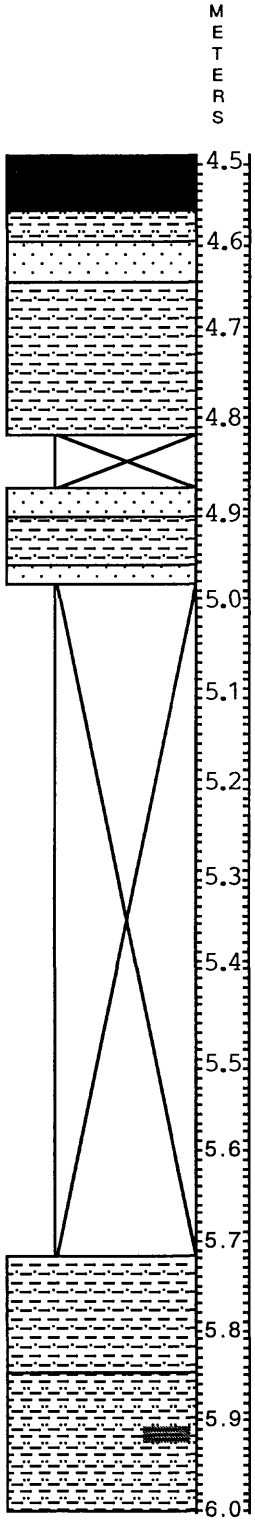
MUDDY SILT WITH A LITTLE DISPERSED FINE AND MEDIUM SAND [3.97-4.41 m]; dark yellowish brown (10YR4/2) with a touch more green; massive.

Start of Drive 9 [4.41-4.81 m].

MUD (drilling mud?) [4.41-4.47 m]; light olive gray (5Y5/2); massive; gradational lower contact.

BLACK TEPHRA [4.47-4.56 m]; see full description, next page.

Butte Valley, Core 1
Siskiyou County, California



BLACK TEPHRA WITH QUARTZ AND RED SCORIACEOUS FRAGMENTS [4.47-4.56 m]; dusky yellowish brown (10YR2/2); more tephra downward, dispersed above; massive; gradational lower contact.

MUD WITH FINE TO MEDIUM SAND [4.56-4.60 m]; dark yellowish brown (10YR4/2) with a touch more green, with lighter mottling throughout; massive; irregular lower contact.

FINE SAND [4.60-4.64 m] of quartz, olivine, amphibole and red scoriaceous fragments; dark-dusky yellowish brown (10YR3/2); massive; irregular lower contact.

MUD WITH FINE TO MEDIUM SAND [4.64-4.81 m]; dark yellowish brown (10YR4/2) with a touch more green; yellowish brown (10YR5/2) mottling dispersed throughout; massive.

No core recovered [4.81-4.88 m].

Start of Drive 10 [4.88-4.97 m].

FINE SAND WITH BLACK TEPHRA DISPERSED THROUGHOUT [4.88-4.895 m]; dark-dusky yellowish brown (10YR3/2); sand of quartz, olivine and red scoriaceous fragments; massive; gradational lower contact.

MUD WITH FINE DISPERSED SAND [4.895-4.96 m]; dark yellowish brown (10YR4/2) with a touch more green; sand of quartz, olivine and red scoriaceous fragments; massive; sharp lower contact.

MEDIUM SAND [4.96-4.97 m]; dark-dusky yellowish brown (10YR3/2); sand of quartz, olivine and red scoriaceous fragments; massive.

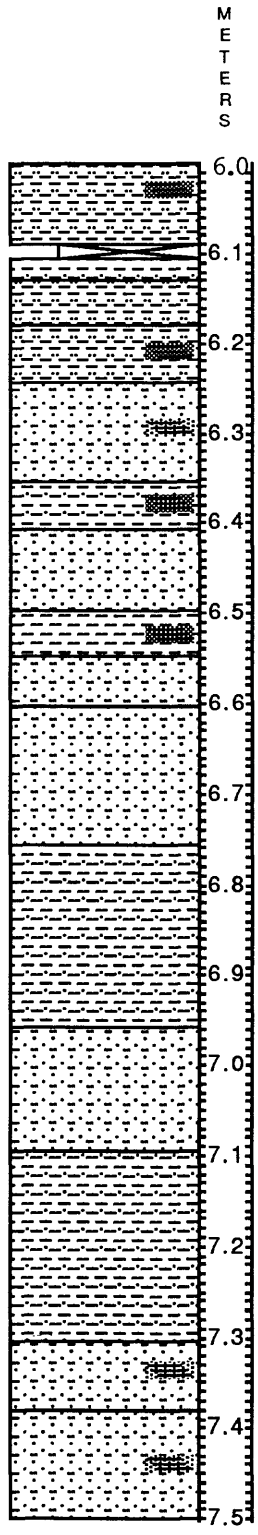
No core recovered [4.97-5.72 m].

Start of Drive **11** [5.72-6.09 m].

SANDY MUD AND MEDIUM SAND [5.72-5.85 m]; mud is pale brown (5YR5/2); volcanic grains and quartz predominantly; one clay clast (1 cm in diameter) present in unit; vertical contact of sand pocket in sandy mud.

MUD, SLIGHTLY ON SILTY SIDE [5.85-6.00 m]; pale brown (5YR5/2); non-calcareous; faint laminae; gradational lower contact.

Butte Valley, Core 1
Siskiyou County, California



SILTY MUD [6.00-6.09 m]; pale brown (5YR5/2); faint laminae, platy when scraped.

No core recovered [6.09-6.10 m].

Start of Drive 12 [6.10-6.41 m].

SANDY MUD WITH MUD CLASTS (>2 cm) [6.10-6.13 m]; pale brown (5YR5/2); indistinct lower contact.

SILTY MUD [6.13-6.18 m]; sharp lower contact.

SILTY MUD WITH VERTICAL SAND STRINGERS [6.18-6.25 m]; pale brown (5YR5/2) with darker sand stringers; platy muds; sand stringers are probably upward-injected sands from below; sharp irregular lower contact.

SLIGHTLY MUDDY FINE SAND [6.25-6.36 m]; light olive gray (5Y5/2); mafic volcanic grains, few grains up to medium size; very faint mm-scale bedding.

SLIGHTLY SANDY MUD [6.36-6.41 m]; platy structure.

Start of Drive 13 [6.41-7.68 m].

SLIGHTLY MUDDY VOLCANIC SAND [6.41-6.50 m]; gradational lower contact.

MUD [6.50-6.55 m]; dark yellowish brown (10YR4/2); faint mm-scale bedding; gradational lower contact; penetrometer reading = 2.8 (fractured).

"TRANSITION" OF MUDDY SAND [6.55-6.61 m]; faint cm-scale bedding; bioturbation in lower part of unit; gradational lower contact.

MUDDY FINE TO MEDIUM SAND [6.61-6.76 m]; olive gray (5Y4/1); lower contact gradational over a few centimeters.

SANDY MUD WITH MUD CLASTS (mm-sized) in lower part of unit [6.76-6.96 m]; olive gray (5Y4/1) with greenish mud clasts; gradational lower contact.

MUDDY SAND [6.96-7.10 m] with rare volcanic grains up to coarse-sized.

SLIGHTLY SANDY CLAY [7.10-7.31 m] with dispersed medium sand grains; dark greenish gray (5GY4/1); mud clasts (1-2 mm) in upper few cm of unit; massive.

FINE TO MEDIUM VOLCANIC SAND with a few muddier beds [7.31-7.38 m]; cm-scale bedding suggested by mud content.

MUDDY FINE TO MEDIUM SAND [7.38-7.68 m]; dark greenish gray (5GY4/1); faint cm-scale bedding based on grain size; mm-blebs, "white", sand-sized particles at approximately 7.45 m.

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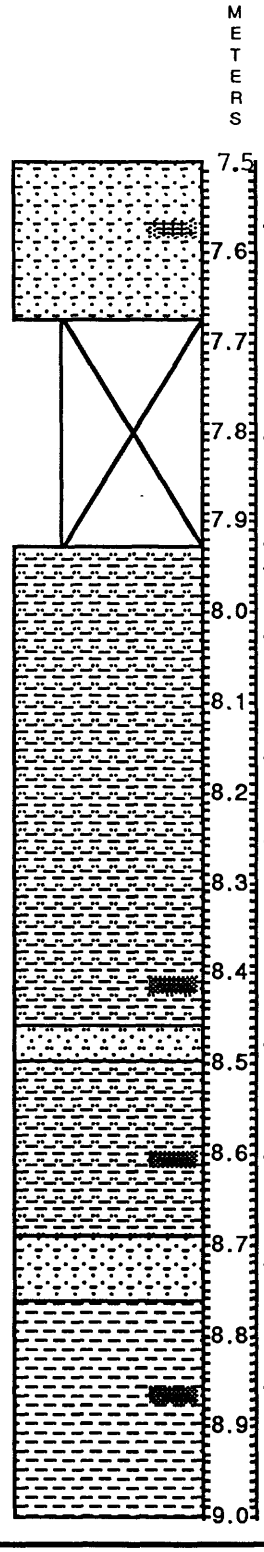

MUDDY FINE TO MEDIUM SAND [7.38-7.68 m]; dark greenish gray (5GY4/1); faint cm-scale bedding based on grain size; muddier near base of unit.

No core recovered [7.68-7.93 m].

Start of Drive 14 [7.93-9.35 m].

VERY MUDDY, VERY FINE SAND at top of unit.

Fractured from 7.98-8.05 m; lithologic contact at fracture?

Fractured from 8.17-8.23 m.

VERY FINE SANDY, SILTY MUD WITH ABUNDANT MUD CLASTS (up to 4 mm) [7.93-8.46 m]; medium olive gray (5Y5/1); massive and firm; very faint cm-scale bedding near bottom of unit; gradational lower contact.

MUDDY SILTY VERY FINE SAND [8.46-8.50 m]; sharp irregular contact.

SILTY SIDE OF MUD [8.50-8.69 m]; olive gray (5Y4/1); firm; faint 0.5-1 mm laminae.

SLIGHTLY MUDDY VOLCANIC SAND [8.69-8.76 m] with quartzose coarse to small granules; white sand-sized grains in olive gray (5Y4/1) muddy sand; massive but very poorly consolidated; PUMICE LAPILLI?

MUD [8.76-9.13 m]; olive gray (5Y4/1); non-calcareous; hard; very faint mm-scale bedding to massive with a few mud clasts near base.

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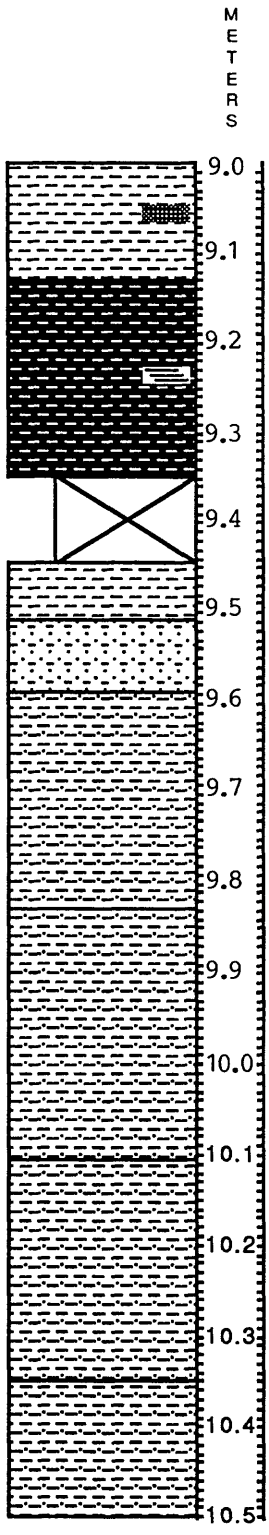

MUD [8.76-9.13 m]; olive gray (5Y4/1); non-calcareous; hard; very faint mm-scale bedding to massive with a few mud clasts near base.

ORGANIC (?) MUD [9.13-9.35 m]; olive gray but slightly darker than above; moderately calcareous; firm; faint irregular laminations; abundant ostracodes, particularly near base of unit.

No core recovered [9.35-9.45 m].

Start of Drive 15 [9.45-10.89 m].

MUDDY MUSH WITH MUD CLASTS (up to 2 cm) [9.45-9.51 m]; strength = 0; coring break at lower contact.

MUDDY SAND WITH VOLCANIC LITHIC FRAGMENTS (sand-, granule- and even small pebble-sized) [9.51-9.59 m]; calcareous; very soft; lower contact gradational over <1 cm.

VERY SANDY MUD WITH DISPERSED GRAINS (up to granule-sized) AND MUD CLASTS [9.59-9.83 m]; calcareous; massive; slight color change at lower contact.

VERY SANDY MUD WITH DISPERSED GRAINS (up to granule-sized) AND MUD CLASTS [9.83-10.11 m]; calcareous; massive; color slightly different from unit above.

SANDY MUD WITH DISPERSED GRAINS (up to granule-sized) AND MUD CLASTS [10.11-10.35 m]; calcareous; massive; carbonate mottling.

SANDY MUD WITH DISPERSED GRAINS (up to granule-sized) AND ABUNDANT MUD CLASTS (mm-sized) [10.35-10.78 m]; calcareous; massive.

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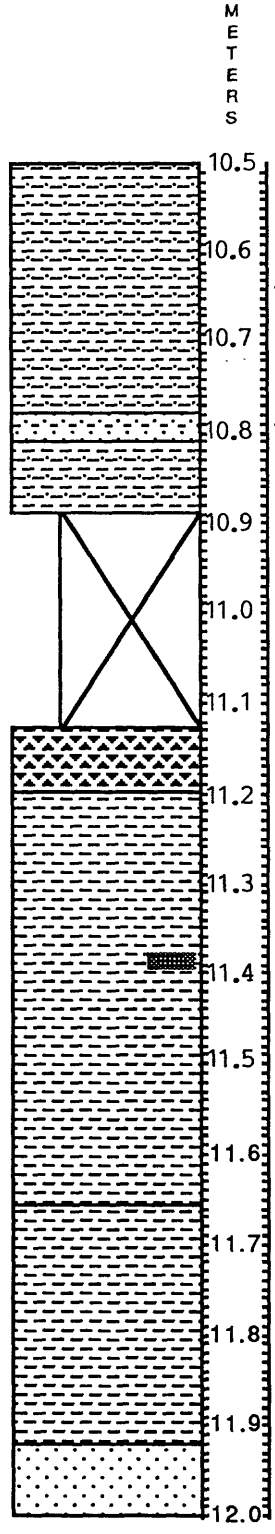

SANDY MUD WITH DISPERSED GRAINS (up to granule-sized) AND ABUNDANT MUD CLASTS (mm-sized) [10.35-10.78 m]; calcareous; massive.

MUDDY DARK SAND [10.78-10.81 m].

SANDY MUD [10.81-10.89 m]; calcareous.

No core recovered [10.89-11.13 m].

Start of Drive 16 [11.13-12.89 m].

MUD CLAST BRECCIA [11.13-11.20 m]; gradational lower contact.

MUD WITH FEW MUD CLASTS (1 mm-sized) [11.20-11.66 m]; medium olive gray (5Y3/1); faint regular cm-scale bedding; gradational lower contact.

SILTY CLAY [11.66-11.92 m]; olive gray (5Y4/1) mottled with greenish black; massive with faint bioturbation in zones; sharp, irregular lower contact.

MEDIUM VOLCANIC SAND [11.92-12.08 m]; greenish black (5G2/1); massive; grading down into unit below.

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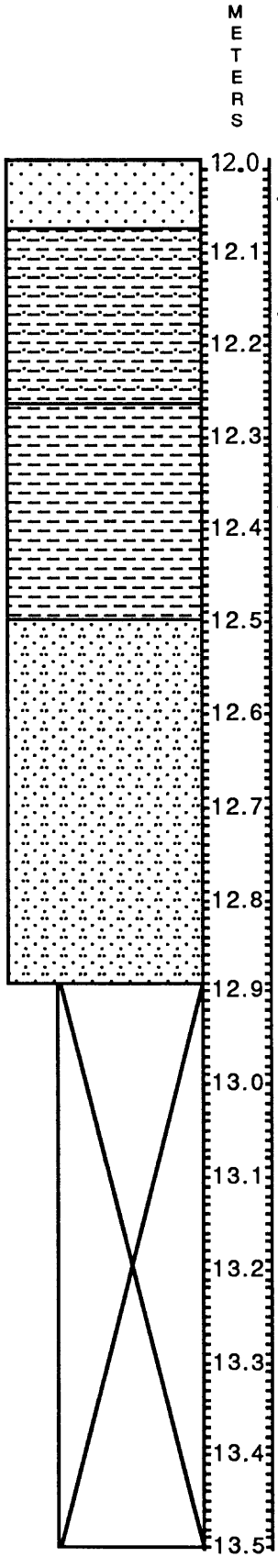

MEDIUM VOLCANIC SAND [11.92-12.08 m]; greenish black (5G2/1); massive; grading down into unit below; lower contact gradational over 10 cm.

SANDY MUD WITH ABUNDANT SILT CLASTS [12.08-12.27 m]; dark greenish gray (5GY4/1); massive; sharp irregular lower contact.

SILTY CLAY [12.27-12.50 m]; mottled olive gray (5Y4/1); calcareous; massive, bioturbated.

SILTY FINE VOLCANIC SAND [12.50-12.89 m]; greenish black (5GY2/1); massive.

No core recovered [12.89-14.18 m].

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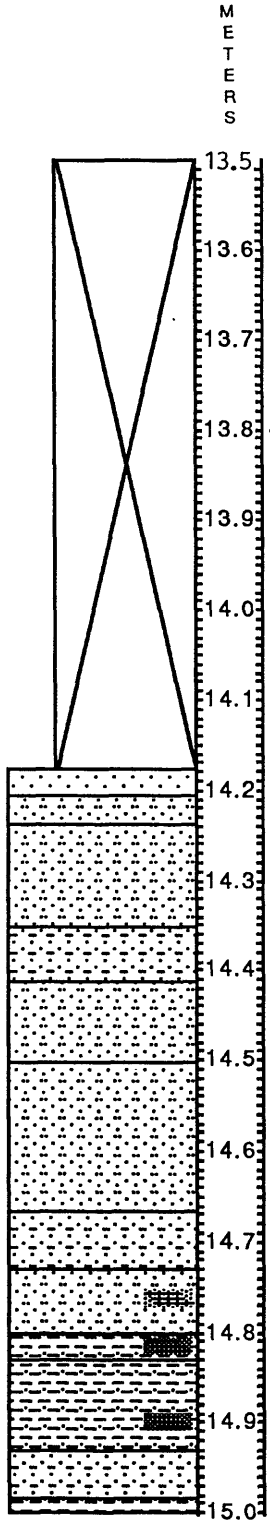

No core recovered [12.89-14.18 m].

Start of Drive 17 [14.18-14.71 m].

FINE TO MEDIUM SAND [14.18-14.21 m]; olive black (5Y2/1); faint gradational lower contact.

SILTY FINE SAND [14.21-14.24 m]; olive black (5Y2/1); faint gradational lower contact.

SLIGHTLY SILTY MEDIUM SAND [14.24-14.35 m]; olive black (5Y2/1); calcareous; faint gradational lower contact.

MUDDY FINE VOLCANIC SAND [14.35-14.41 m]; olive black (5Y2/1); faint gradational lower contact.

SLIGHTLY SILTY, COARSE TO MEDIUM VOLCANIC SAND [14.41-14.50 m]; olive black (5Y2/1); calcareous; gradational lower contact.

SLIGHTLY SILTY MEDIUM SAND [14.50-14.67 m]; olive black (5Y2/1); calcareous; gradational lower contact.

MUDDY FINE SAND [14.67-14.73 m]; olive black (5Y2/1); calcareous; ostracodes; gradational lower contact. Start of Drive 18 [14.71-14.99 m].

SLIGHTLY SILTY MEDIUM SAND [14.73-14.80 m]; dark greenish gray (5GY3/1); cm-scale bedding; gradational lower contact.

TWO UNITS OF FINE SANDY MUD [14.80-14.83 m; 14.83-93 m]; dark greenish gray (5GY4/1); cm-scale bedding; gradational lower contact.

TWO UNITS: MUDDY FINE SAND [14.93-14.99 m]; dark greenish gray (5GY3/1); cm-scale bedding; ostracodes. V. FINE SANDY MUD [14.99-15.27 m], see next page. Start of Drive 19 [14.99-15.27 m].

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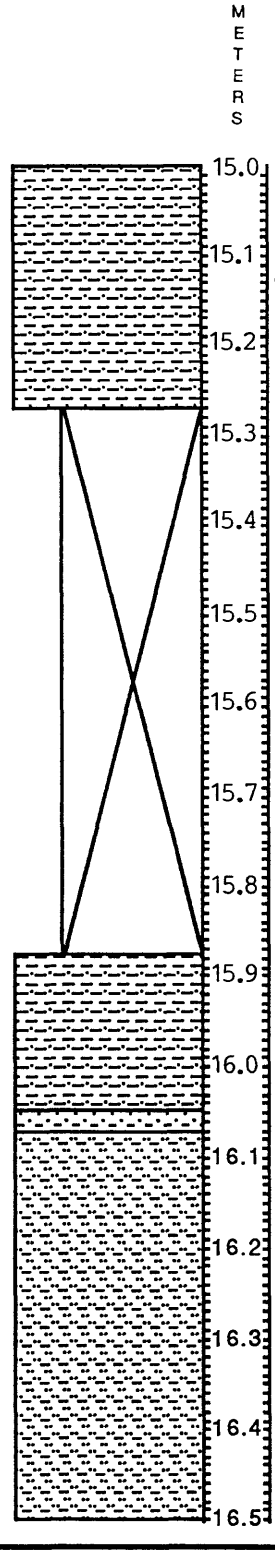

VERY FINE SANDY MUD [14.99-15.27 m], with some muddy sand pieces and cm intervals; olive black (5Y2/1) to brownish black (5YR2/1) at base of unit; core disturbed, but appears to have been massive; strength = 0.

No core recovered [15.27-15.88 m].

Start of Drive 20 [15.88-17.15 m].

SANDY MUD [15.88-16.05 m]; brownish black (5YR2/1); gradational lower contact.

MUDDY SAND [16.05-16.07 m]; brownish black (5YR2/1); gradational lower contact.

MUDDY SILT TO MUDDY VERY FINE SAND, GRADING INTO MUDDY SILT AT BOTTOM OF UNIT [16.07-16.60 m]; brownish black (5YR2/1).

Basaltic granules from 16.38-16.48 m.

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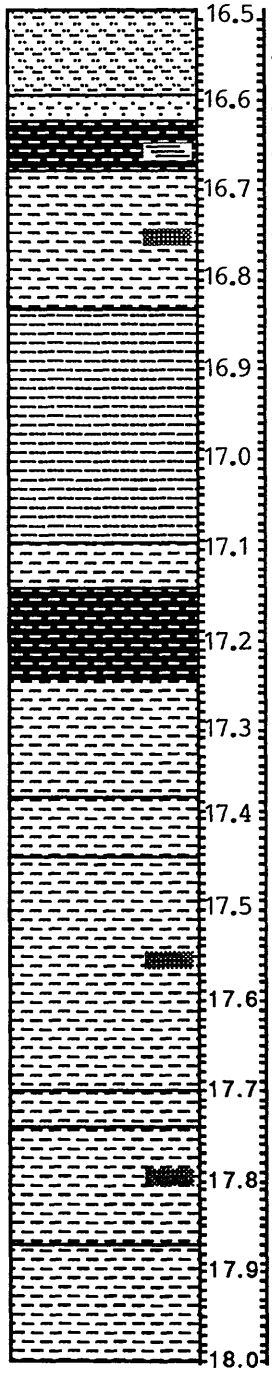

MUDDY SILT TO MUDDY VERY FINE SAND, GRADING INTO MUDDY SILT AT BOTTOM OF UNIT [16.07-16.60 m]; brownish black (5YR2/1).

MUDDY MEDIUM TO FINE SAND [16.60-16.63 m]; brownish black (5YR2/1); wavy irregular lower contact.

ORGANIC MUD [16.63-16.68 m]; olive gray (5Y4/1); organic flecks; platy laminations; gradational lower contact.

SILTY CLAY [16.68-16.84 m]; dark greenish gray (5GY4/1); platy; gradational lower contact.

CLAY [16.84-17.10 m]; dark greenish gray (5GY4/1) but some mottling present; massive.

Plant material at 17.00 m.

SILTY CLAY [17.10-17.15 m]; dark greenish gray (5GY4/1).

Start of Drive 21 [17.15-18.07 m].

ORGANIC MUD [17.15-17.24 m]; generally olive gray (5Y3/2) but mottled; calcareous; massive and bioturbated; plant fragments at 17.20 m.

MUD [17.24-17.38 m]; generally olive gray (5Y3/2) but mottled; massive and bioturbated.

SLIGHTLY SILTY CLAY [17.38-17.44 m]; slightly darker than olive gray (5Y3/2); massive and bioturbated.

MUD [17.44-17.70 m]; generally olive gray (5Y3/2) but mottled and streaked; wavy, approximately 1 mm laminations.

MUD [17.70-17.74 m]; generally olive gray (5Y3/2) but mottled and streaked, with lighter yellowish blebs; bioturbated.

MUD [17.74-17.87 m]; generally olive gray (5Y3/2) but mottled and streaked; wavy 1 mm laminations.

MUD [17.87-18.07 m]; generally olive gray (5Y3/2) but mottled and streaked; massive.

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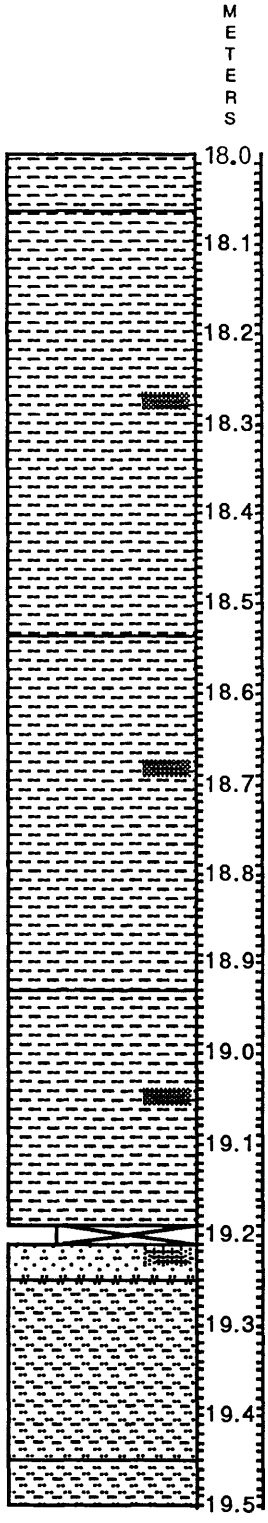

MUD [17.87-18.07 m]; generally olive gray (5Y3/2) but mottled and streaked; massive; shell fragments and ostracodes from 18.02-18.07 m.

Start of Drive 22 [18.07-19.19 m].

SILTY CLAY [18.07-18.54 m]; dark greenish gray (5GY4/1) but mottled; calcareous; firm; very faint wavy laminae and bioturbated in places; wavy, irregular, diffuse, and gradational lower contact.

Bedding plane at 18.59 m; trace of organic material (fish scale fragments?).

Bedding plane at 18.63 m.

SILTY CLAY [18.54-18.93 m]; olive black (5Y2/1); calcareous; cm- to dm-scale bedding; firm; lower contact a gradual transition over approximately 5 cm.

Bedding plane at 18.75 m.

Bedding plane at 18.83 m.

SILTY CLAY [18.93-19.19 m]; olive black (5Y2/1); calcareous; soft; platy laminated structure; shell fragments at 19.12 m.

No core recovered [19.19-19.21 m].

Start of Drive 23 [19.21-20.03 m].

SILTY FINE SAND [19.21-19.25 m]; olive black (5Y2/1); calcareous; platy laminated structure.

CLAYEY SILT [19.25-19.45 m]; olive gray (5Y4/1) and mottled; generally browner than unit below; calcareous; bioturbated.

CLAYEY SILT [19.45-19.81 m]; olive gray (5Y3/2) and mottled with lighter speckles; generally greener than unit above; calcareous; bioturbated from 19.45-19.50 m.

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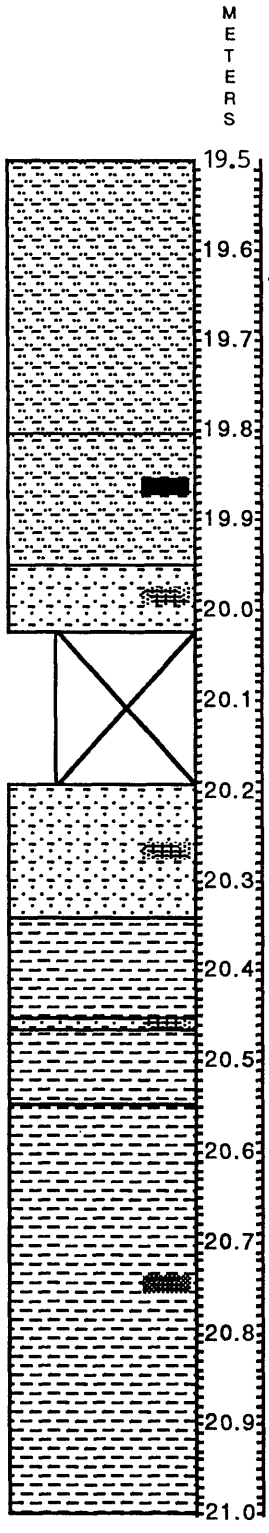

CLAYEY SILT [19.45-19.81 m]; olive gray (5Y3/2) and mottled with lighter speckles; generally greener than unit above; calcareous; massive from 19.50-19.81 m; gradational lower contact.

CLAYEY SILT [19.81-19.95 m]; olive gray (5Y3/2) with no mottling; calcareous; platy laminations; gradational lower contact over 3 cm.

MUDDY VERY FINE SAND [19.95-20.03 m]; olive gray (5Y3/2) with no mottling; platy laminations.

No core recovered [20.03-20.20 m].

Start of Drive 24 [20.20-21.98 m].

INTERBEDDED MUDDY VERY FINE SAND AND MUD [20.20-20.34 m]; wavy mm- to cm- scale bedding; sharp wavy lower contact.

MUD [20.34-20.45 m]; moderately calcareous at 20.40 m; massive; gradational lower contact.

MUDDY SAND [20.45-20.47 m]; darker than above unit; inclined wavy bed; gradational lower contact.

MUD [20.47-20.55 m]; lighter in color than above unit; massive; gradational lower contact.

SLIGHTLY SILTY CLAY [20.55-21.02 m]; dark greenish gray (5GY4/1); platy lamination.

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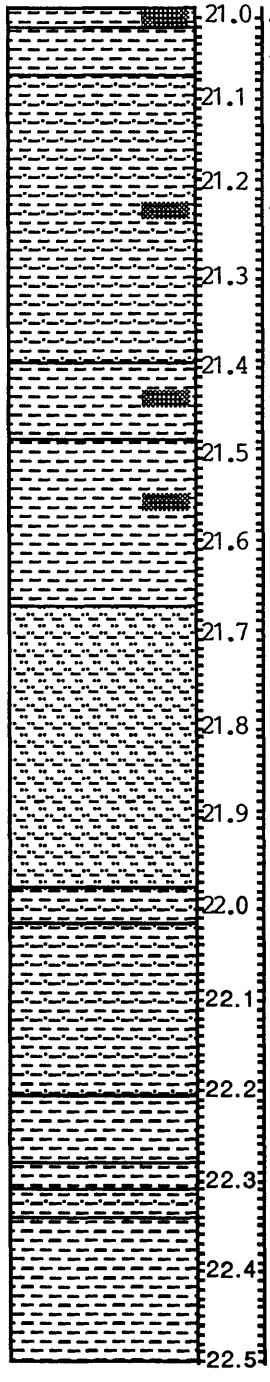

SLIGHTLY SILTY CLAY [20.55-21.02 m]; dark greenish gray (5GY4/1); platy lamination; gradational lower contact.

MUD [21.02-21.08 m]; gradational lower contact.

VERY FINE SANDY MUD [21.08-21.40 m]; platy lamination.

SILTY CLAY [21.40-21.48 m]; platy lamination.

SILTY CLAY [21.48-21.67 m]; calcareous; cm-scale bedding with lighter colored bands.

CLAYEY SILT [21.67-21.98 m]; calcareous; darker, predominantly olive black (5Y2/1).

Start of Drive 25 [21.98-22.21 m].

SANDY MUD [21.98-22.02 m] WITH DISPERSED PUMICE FRAGMENTS at very top of unit (21.98-21.99 m); greenish-black (5G2/1); calcareous; sharp but bioturbated lower contact.

SLIGHTLY SANDY CLAY WITH DISPERSED PUMICE GRAINS THROUGHOUT [22.02-22.205 m]; dark greenish gray (5GY4/1); calcareous; lower contact obscured.

CLAY WITH CLAY CLASTS [22.205-22.21 m].

Start of Drive 26 [22.21-22.96 m].

MUD WITH PUMICE FRAGMENTS [22.21-22.28 m] which may be out of place; massive.

CLAY CLASTS IN MUD [22.28-22.31 m]; hard clasts in soft matrix.

SANDY MUD [22.31-22.34 m]; coarsening upward.

MUD [22.34-22.52 m]; massive.

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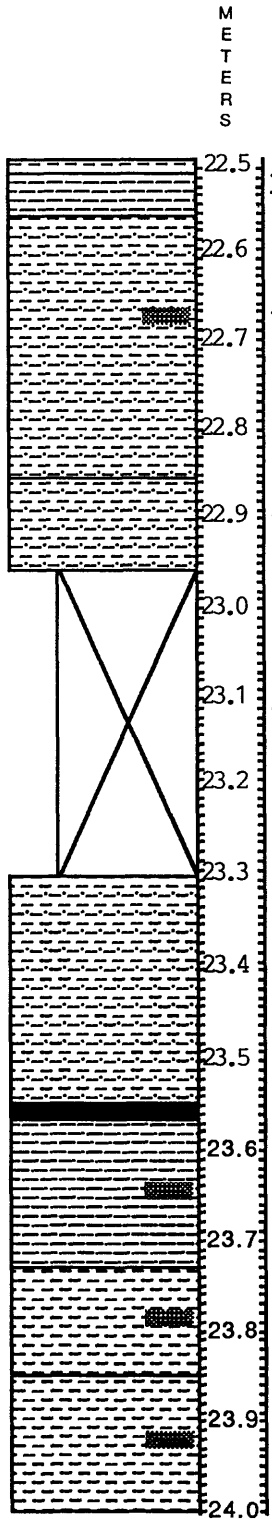

MUD [22.34-22.52 m]; massive.

CLAY CLASTS (mm-sized) [22.52-22.57 m]; granular texture; soft.

VERY FINE SANDY MUD [22.57-22.86 m]; banded (lighter bands); cm-scale bedding; granular texture.

VERY FINE SANDY MUD WITH MUD CLASTS (mm-sized) [22.86-22.96 m]; massive with granular texture.

No core recovered [22.96-23.30 m].

Start of Drive 27 [23.30-24.59 m].

VERY FINE SANDY (SILTY) MUD [23.30-23.55 m]; dusky green (5G3/2), banded; sharp lower contact.

TEPHRA [23.55-23.565 m]; sharp lower contact.

MUD CLASTS IN CLAY MATRIX [23.565-23.73 m]; dusky yellowish green (10GY3/2) with 5 cm mottles; faint laminae; gradational lower contact.

SILTY CLAY [23.73-23.85 m]; olive gray (5Y4/1), mottled; disturbed platy laminations; gradational lower contact.

MUD [23.85-24.02 m]; dusky green (5G3/2) with 3-10 cm mottling; disrupted bedding, bioturbation (?).

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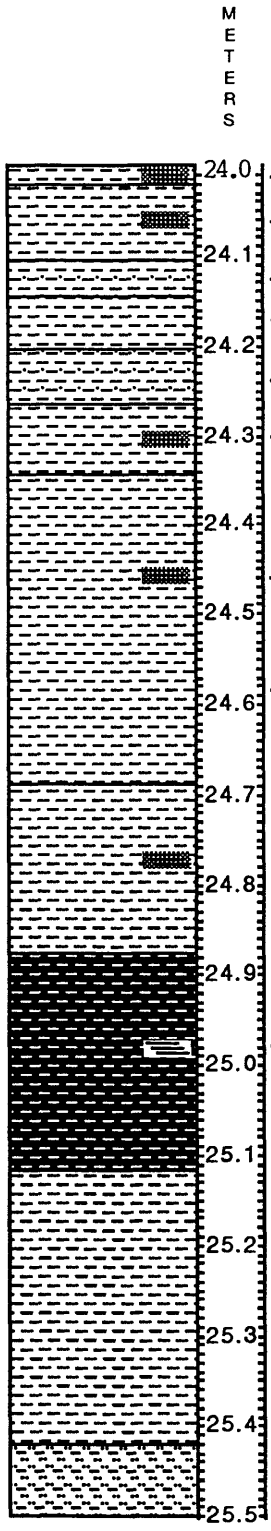

MUD [23.85-24.02 m]; dusky green (5G3/2) with 3-10 cm mottling; disrupted bedding, bioturbation (?); gradational, irregular lower contact.

MUD [24.02-24.11 m], mottled; disturbed bedding; gradational, irregular lower contact.

VERY FINE SANDY MUD [24.11-24.15 m]; irregular lower contact.

MUD CLASTS (1-2 mm) IN MUD MATRIX [24.15-24.21 m]; granular texture; irregular, deformed lower contact.

IRREGULAR BLEB OF COARSE SAND (TEPHRA?) IN SANDY MUD [24.21-24.27 m]; granular texture; irregular lower contact.

BLEBS (cm-sized) OF SAND (TEPHRA?) IN LAMINATED MUD [24.27-24.35 m]; disrupted beds; dispersed tephra (?); sharp, irregular lower contact.

SILTY CLAY [24.35-24.69 m]; dark greenish gray (5GY4/1); non-calcareous; wavy mm-scale bedding; contains little tiny specks of translucent brown stuff (?); sharp lower contact.

Start of Drive 28 [24.59-25.89 m].

MUD CLASTS (mm-sized) IN MUD MATRIX [24.69-24.88 m]; dark greenish gray (5GY4/1) with faint mottling; disrupted lamination; non-calcareous; 2-3 cm mud clasts near base of unit; sharp irregular lower contact.

SILTY CLAY WITH DARK "ORGANIC" BLEBS [24.88-25.12 m]; dark greenish gray (5GY4/1), mottled with mm-scale darker blebs; non-calcareous; very faint cm-scale bedding, bioturbated; gradational lower contact.

MUD WITH MUD CLASTS (mm-sized) [25.12-25.42 m]; dark greenish gray (5GY4/1) with faint mottling; non-calcareous; massive, bioturbated; wavy diffuse lower contact.

CLAYEY SILT [25.42-25.50 m]; browner than above unit, olive gray (5Y4/1); non-calcareous; diffuse, gradational lower contact.

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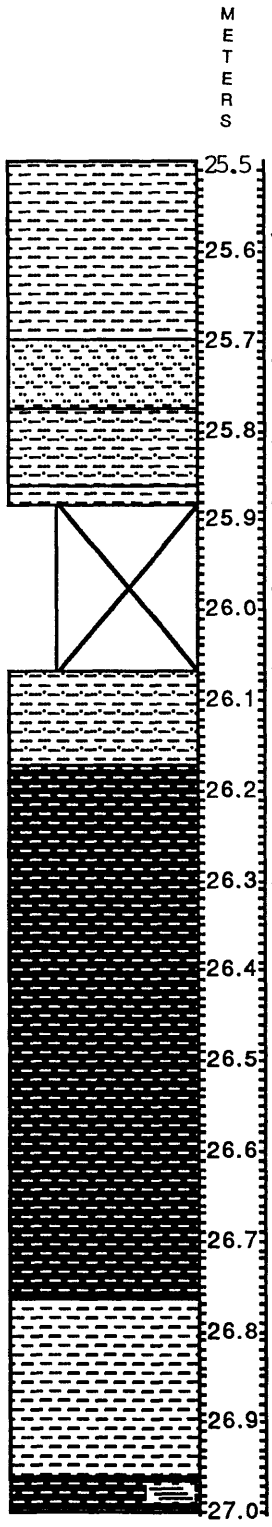

SILTY CLAY [25.50-25.70 m]; mottled olive gray (5Y4/1); non-calcareous; core broken at 25.55 m; massive, bioturbated; sharp inclined (15°) lower contact.

CLAYEY SILT [25.70-25.78 m]; olive black (5Y2/1); non-calcareous; massive; the unit below and this one are coupled together in a fining upward sequence; dispersed pumice grains (<2 mm) down to approximately 25.86 m; lower contact inclined 15°.

SANDY PUMICEOUS MUD [25.78-25.87 m]; fines upward and continues fining in unit above; dispersed pumice grains (<2 mm) down to approximately 25.86 m; massive.

MUD WITH MUD CLASTS [25.87-25.89 m]; granular texture.

No core recovered [25.89-26.07 m].

Start of Drive 29 [26.07-27.54 m].

SLIGHTLY SANDY MUD WITH MUD CLASTS (<mm-sized) [26.07-26.18 m]; massive, granular texture; gelatinous, soft; sand may be out of place in mush; pumice (?) may be only surface smear from above; plant material at lower contact; sharp wavy lower contact.

SILTY CLAY WITH DARK ORGANIC (?) STRINGERS [26.18-26.45 m]; grayish olive (10Y4/2) mottled with dark gray blebs and stringers; moderately calcareous; plant material; massive, bioturbated; gradational, bioturbated, deformed lower contact.

SLIGHTLY SANDY ORGANIC CLAY WITH DISPERSED VOLCANIC SAND GRAINS [26.45-26.77 m]; mottled light olive gray (5Y5/2); moderately calcareous, firm; plant material; massive, bioturbated; gradational, deformed lower contact.

SLIGHTLY SILTY CLAY [26.77-26.96 m]; olive black (5Y2/1); ostracodes (?); moderately calcareous; wavy, irregular, deformed, sharp lower contact.

SILTY CLAY WITH "ORGANIC" STREAKS AND MOTTLES [26.96-27.54 m]; see full description, next page.

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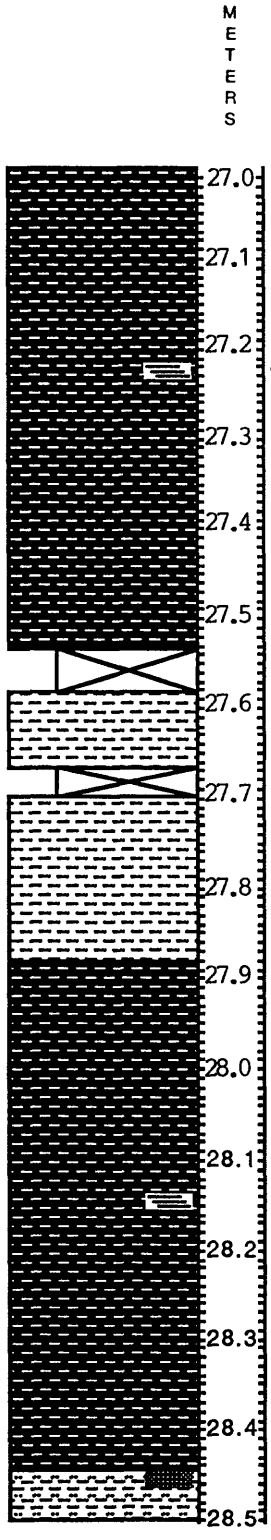

SILTY CLAY WITH "ORGANIC" STREAKS AND MOTTLES [26.96-27.54 m]; generally olive gray, mottled; moderately calcareous; massive, bioturbated, with faint deformed dm-scale bands of lighter and darker colors; firm.

No core recovered [27.54-27.59 m].

Start of Drive 30 [27.59-28.59 m].

MUD [27.59-27.67 m]; light olive gray (5Y5/2) mottled; Fe-staining?; trace of black sand (1 mm) at base of unit.

Break (gap) in core [27.67-27.70 m].

MUD [27.70-27.88 m]; light olive gray (5Y5/2) mottled; Fe-staining?; wavy, disturbed lower contact.

BLEBS OF PUMICE (TEPHRA) up to 2 cm from 27.85-27.88 m.

SANDY ORGANIC MUD WITH ABUNDANT PUMICE (TEPHRA) FRAGMENTS DISPERSED THROUGHOUT [27.88-28.45 m]; mottled, upward overall color change darker to lighter at top; plant fragments throughout; disturbed, deformed bedding; lower contact gradational over approximately 3 cm.

SILTY CLAY GRADES DOWN INTO MUDDY SILT [28.45-28.59 m]; olive gray (5Y3/2); very faint laminae; fish bone fragments and gastropods.

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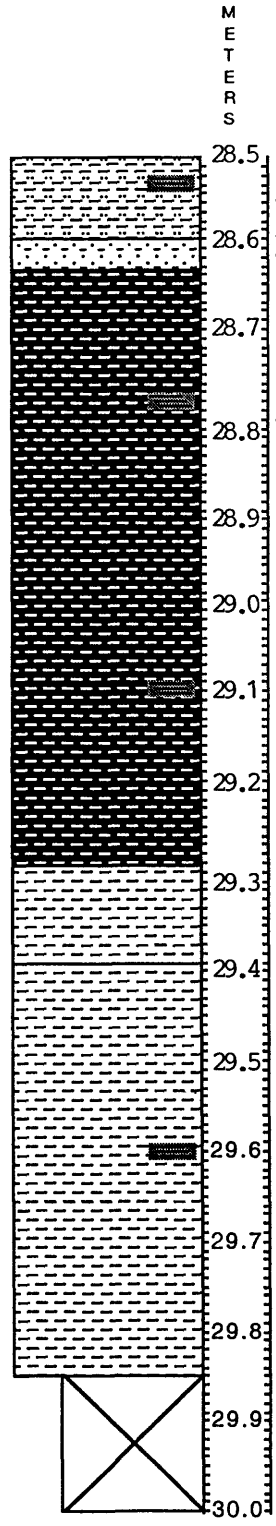

SILTY CLAY GRADES DOWN INTO MUDDY SILT [28.45-28.59 m]; olive gray (5Y3/2); very faint laminae; fish bone fragments and gastropods.

Start of Drive 31 [28.59-29.85 m].

MUDDY FINE SAND [28.59-28.63 m]; black; massive; soupy at very top of unit which is the top of the slug and may be out of place.

SLIGHTLY SILTY CLAY WITH ORGANIC FLECKS THROUGHOUT [28.63-28.95 m]; olive gray (5Y4/1); traces of dispersed sand; very slightly calcareous; very faint laminae in cm-scale beds, based on firmness of sediment; fish remains (?); deformed, gradational lower contact.

ORGANIC CLAY WITH ORGANIC STREAKS, BLEBS AND FLECKS THROUGHOUT [28.95-29.28 m]; dark mottles and streaks grayish olive (10Y4/2) to darker at base of unit; slightly calcareous; fish fragments in upper half of unit; bioturbated and deformed platy laminations; deformed, gradational lower contact.

SLIGHTLY SILTY CLAY [29.28-29.39 m]; browner than the grayish olive (10Y4/2) unit below; very slightly calcareous; sharp, slightly deformed lower contact which displays a break in color and reaction to dilute HCl between this and the unit below.

SLIGHTLY SILTY CLAY [29.39-29.85 m]; grayish olive (10Y4/2); non-calcareous; wavy, irregular, platy laminae; Cladocera ephippia beetle parts.

No core recovered [29.85-30.26 m].

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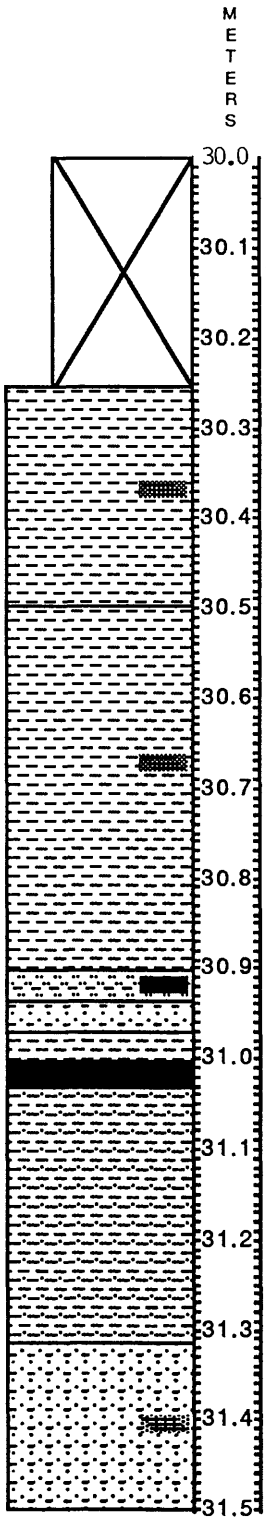

No core recovered [29.85-30.26m].

Start of Drive 32 [30.26-31.86 m].

SILTY CLAY [30.26-30.50 m]; olive gray (5Y4/1); firm; platy laminations, otherwise massive.

MUD [30.50-30.90 m]; olive gray (5Y4/1); 2-3 mm wavy bedding, regular; gastropod shell recovered at approximately 30.86 m.

MUDDY SILT [30.90-30.94 m]; olive gray (5Y3/1); color grades lighter upward from base of slug at 31.00 m (2 units below) to top of this unit at 30.90 m; 2-3 mm wavy bedding, regular.

MUDDY VERY FINE SAND [30.94-30.97 m]; color grades between olive black (5Y2/1) in unit below to olive gray (5Y3/1) in unit above.

MUD (?) [30.97-31.00 m]; olive black (5Y2/1); color grades lighter upward from base of slug (this unit) at 31.00 m to the upper contact of two units above at 30.90 m; abundant fish scales on bedding plane at the base of this unit.

MUDDY TEPHRA [31.00-31.03 m].

SANDY MUD (?) [31.03-31.32 m]; non-calcareous.

MUDDY SAND [31.32-31.86 m]; cm-scale bands of dark gray (N3) and olive black (5Y2/1); cm-scale bedding.

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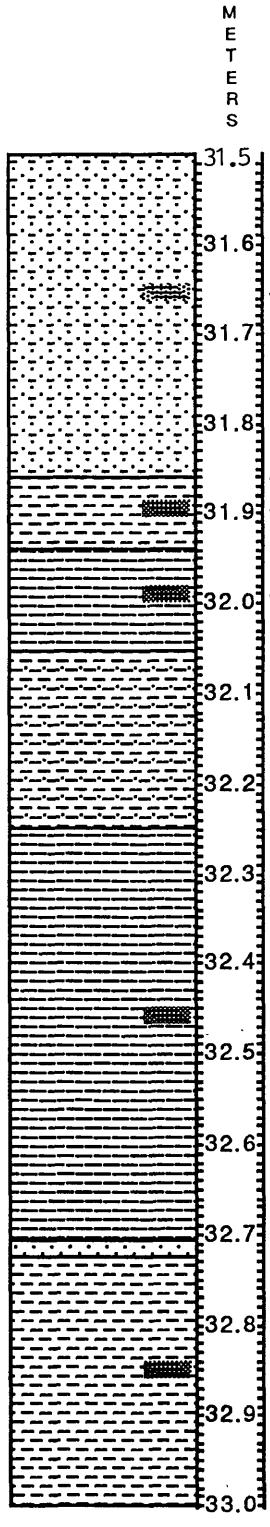

MUDDY SAND [31.32-31.86 m] WITH SLIGHTLY SANDY MUD (?) near base of unit; cm-scale bedding; cm-scale bands of dark gray (N3) and olive black (5Y2/1).

Start of Drive 33 [31.86-33.26 m].

SLIGHTLY SILTY CLAY [31.86-31.94 m]; slightly calcareous; wavy laminae; gradational lower contact.

CLAY [31.94-32.06 m]; slightly calcareous; wavy laminae; bioturbation and some deformation.

SLIGHTLY SANDY CLAY WITH DISPERSED FINE SAND GRAINS [32.06-32.25 m]; olive black (5Y2/1); slightly calcareous; appears massive; lower contact gradational over 3 cm.

CLAY [32.25-32.71 m]; olive black (5Y4/1); slightly calcareous; platy lamination.

MUDDY FINE SAND (PUMICE?) from 32.71-32.73 m; non-calcareous.

SLIGHTLY SILTY CLAY [32.73-33.01 m]; very gradual color change from olive black (5Y4/1) in units above to olive black (5Y2/1) in units below; cm-scale bedding, based on firmness and slight color change.

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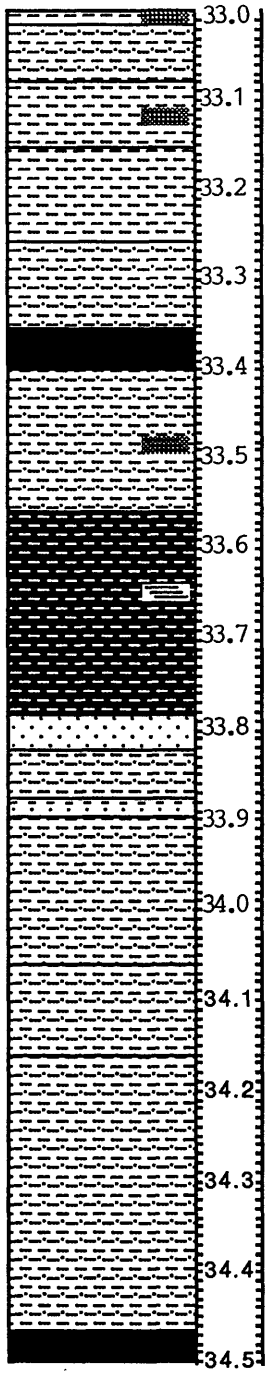

SLIGHTLY SILTY CLAY [32.73-33.01 m]; very gradual color change from olive black (5Y4/1) in units above to olive black (5Y2/1) in units below; cm-scale bedding, based on firmness and slight color change.

SANDY MUD WITH DISPERSED PUMICE GRAINS [33.01-33.08 m]; very gradual color change from olive black (5Y4/1) in units above to olive black (5Y2/1) in units below; slightly calcareous.

MUD [33.08-33.16]; very gradual color change from olive black (5Y4/1) in units above to olive black (5Y2/1) in the unit below; platy laminations.

MUD [33.16-33.26 m]; olive black (5Y2/1); calcareous; rare, tiny brown flecks; massive.

Start of Drive 34 [33.26-34.16 m].

SLIGHTLY SANDY MUD [33.26-33.36 m]; light color; slightly calcareous; mushy structure.

PUMICEOUS (TEPHRA) SAND [33.36-33.40 m]; salt and pepper color; slightly calcareous (?); massive (mushed); core broken at this tephra.

VERY FINE SLIGHTLY SANDY MUD [33.40-33.56 m]; olive gray (5Y3/2); slightly calcareous and firm; faint mm-scale bedding.

PEDIASTRUM (?) MUD AND SLIGHTLY SILTY CLAY [33.56-33.79 m]; light olive gray (5Y5/2); slightly calcareous; very faintly mm- to cm-scale stratified; sharp lower contact.

MEDIUM VOLCANIC (BASALTIC) SAND (PUMICEOUS?) [33.79-33.82 m]; dark gray; slightly calcareous (?); sharp lower contact.

FINE SANDY MUD [33.82-33.88 m]; olive black (5Y2/1); slightly calcareous; massive, firm; sharp lower contact.

MUDDY MEDIUM SAND [33.88-33.89 m]; olive black (5Y2/1); slightly calcareous; sharp lower contact.

FINE SANDY MUD [33.88-34.06 m]; olive black (5Y2/1); massive, firm; slightly calcareous; questionable plant fragments at 33.96 m; abundant plant remains (roots?) at 34.06 m; sharp, horizontal lower contact.

SANDY MUD [34.06-34.16 m]; olive black (5Y2/1); slightly calcareous; massive.

Start of Drive 35 [34.16-34.52 m].

SANDY MUD WITH REWORKED TEPHRA GRAINS AND GRANULES FROM BELOW [34.16-34.47 m]; generally olive black (5Y2/1), mottled; sandy mud of clay- to granule-size; sandier at 34.34 m; slightly calcareous; massive, disrupted and deformed.

TEPHRA (mostly) [34.47-34.52 m]; salt and pepper colored; slightly calcareous (?); massive, disrupted and deformed.

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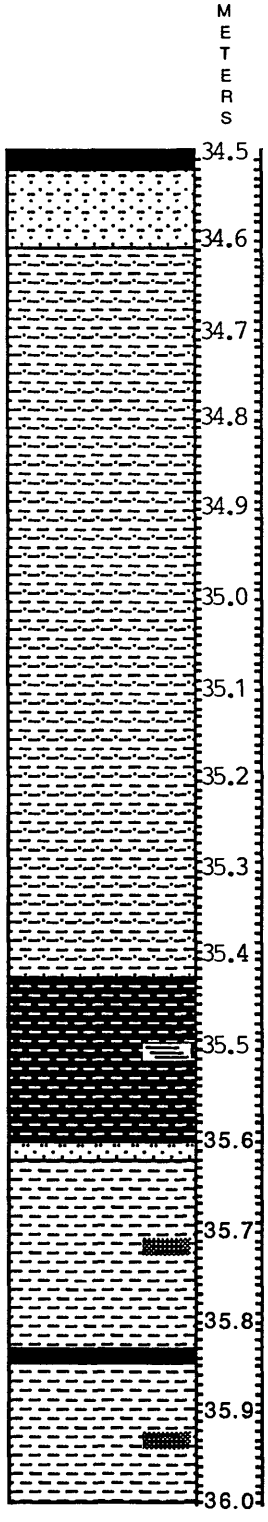

Start of Drive 36 [34.52-35.42 m].

TEPHRA (mostly) [34.47-34.52 m]; salt and pepper colored; slightly calcareous (?); massive, disrupted and deformed.

PUMICEOUS (TEPHRA) MUDDY SAND [34.52-34.61 m] with angular pebbles and "chunks" up to 2 cm; mushed structure at top of unit; sharp lower contact.

SLIGHTLY SANDY MUD WITH DISPERSED VERY FINE SAND GRAINS THROUGHOUT AND DARK BLEBS OF SLIGHTLY SILTY CLAY [34.61-35.42 m]; generally fines downward to silty clay at base of unit; mottled, generally olive (?) with black streaks and blebs up to 10 cm; very, very slightly calcareous (?); massive, disturbed.

Start of Drive 37 [35.42-36.67 m].

SLIGHTLY SILTY CLAY WITH BLACK "ORGANIC" STRINGERS [35.42-35.60 m]; olive gray (5Y4/1); soft; platy laminae; sharp lower contact.

SILTY VERY FINE SAND [35.60-35.62 m]; diffuse lower contact.

SLIGHTLY SILTY CLAY [35.62-35.83 m]; light olive gray (5Y5/2); bioturbated (?), almost massive; firm; very faint wavy laminae in cm-beds.

TEPHRA [approximately 35.83-35.835 m].

SLIGHTLY SILTY CLAY [approximately 35.835-36.10 m]; light olive gray (5Y5/2); firm; very faint wavy laminae, disrupted and bioturbated.

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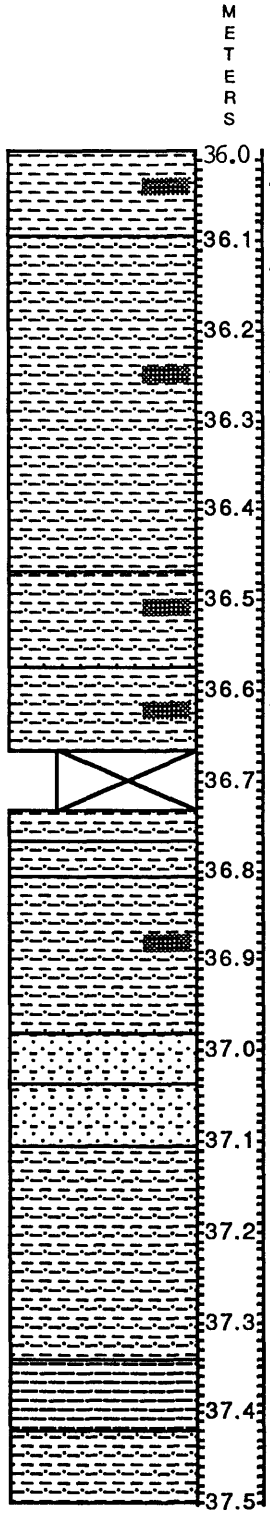

SLIGHTLY SILTY CLAY [approximately 35.835-36.10 m]; light olive gray (5Y5/2); firm; very faint wavy laminae, disrupted and bioturbated.

Black sandy bed approximately 0.5 cm at 36.13 m.

SLIGHTLY SANDY CLAY WITH ONLY A TRACE OF VERY FINE SAND [36.10-36.47 m]; light olive gray (5Y4/1); firm; pebble at 36.20 m; cm-scale bedding in top 10 cm of unit and platy lamination throughout the rest of the unit; diffuse lower contact.

VERY FINE SANDY MUD [36.47-36.58 m]; olive black (5Y2/1); firm; cm-scale bedding; diffuse, gradational lower contact.

SLIGHTLY VERY FINE SANDY MUD [36.58-36.67 m]; olive gray (5Y3/2); firm; platy laminations.

No core recovered [36.67-36.74 m].

Start of Drive 38 [36.74-37.44 m].

SLIGHTLY SANDY MUD WITH DISPERSED PUMICE GRAINS (LAPILLI) [36.74-36.77 m]; very soft; probably redrilled from last drive.

SLIGHTLY SANDY MUD WITH MUD CLASTS (mm-sized) [36.77-36.81 m]; olive gray (5Y4/1); very soft; fish scales; probably redrilled from last drive.

MUD WITH FINE TO MEDIUM SAND GRAINS [36.81-36.98 m]; olive gray (5Y4/1); firm; mildly calcareous; bedding break from 36.86-36.87 m (based on hardness?); faint, platy laminations.

SLIGHTLY MUDDY FINE SAND [36.98-37.04 m] with some grains to med. size; olive black (5Y2/1), mottled; mildly calcareous; shell frags.

SLIGHTLY MUDDY MEDIUM VOLCANIC SAND WITH DISPERSED PUMICE GRAINS (fine to medium sand-sized) [37.04-37.11 m]; olive black (5Y2/1), mottled; mildly calcareous; fines upward within unit; gradational lower contact over mm (slightly mixed?).

SLIGHTLY SANDY MUD WITH DISPERSED PUMICE GRAINS (fine to medium sand-sized) [37.11-37.34 m]; greenish gray (5GY5/1) from 37.11-37.24 m and mottled from 37.24-37.34 m; mildly calcareous and firm; disturbed, transitional contact at 37.24 m based mostly on color and questionable bioturbation; sharp lower contact.

TWO UNITS: CLAY WITH DISPERSED PUMICE GRAINS (fine to medium sand-sized) [37.34-37.42 m]; olive gray (5Y5/1); firm. SLIGHTLY SANDY MUD WITH MUD CLASTS [37.42-37.52 m]; see description, next page. Start of Drive 39 [37.44-38.34 m].

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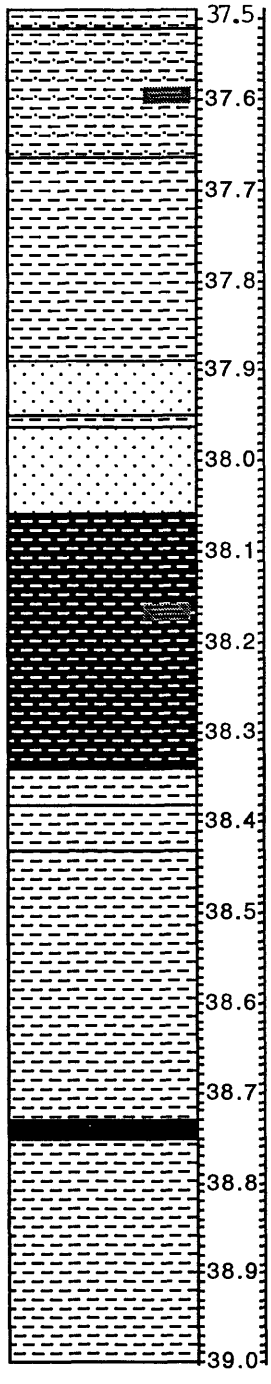

SLIGHTLY SANDY MUD WITH MUD CLASTS (up to approximately 1 mm) [37.42-37.52 m]; slightly calcareous; granular texture.

SANDY MUD, FINING UPWARD TO SLIGHTLY SANDY CLAY AT TOP OF UNIT [37.52-37.67 m]; olive gray; slightly calcareous; regular wavy 1 mm laminations; disturbed contact, mottled.

SILTY CLAY [37.67-37.89 m]; olive black (5Y2/1); mottled from 37.77-37.83 m; slightly calcareous and firm; sharp lower contact.

MEDIUM VOLCANIC SAND [37.89-37.95 m]; olive black (5Y2/1); slightly calcareous and firm; sharp lower contact.

MUD [37.95-37.96 m]; olive black (5Y2/1); sharp lower contact.

MEDIUM VOLCANIC SAND WITH A FEW GRANULES [37.96-38.06 m]; olive black (5Y2/1); slightly calcareous and firm; sharp lower contact, inclined at 10°.

FINE SANDY CLAY WITH ORGANIC FLECKS [38.06-38.34 m]; greenish gray (5GY5/1); highly calcareous and firm; shell fragments throughout and a seed recovered near base of unit; cm-scale bedding; granular texture.

Start of Drive 40 [38.34-39.17 m].

MUSHY SILTY CLAY WITH DISPERSED PUMICE [38.34-38.38 m]; olive gray (5Y4/1); soft; material from top of drive (out of place?).

SILTY CLAY WITH DISPERSED PUMICE [38.38-38.43 m]; greenish gray (5GY5/1); firm; massive.

SLIGHTLY SILTY CLAY [38.43-38.73 m]; greenish gray (5GY5/1); soft; massive; sharp but disturbed lower contact.

TEPHRA [38.73-38.75 m]; discontinuous (?); hard; sharp, but disturbed lower contact.

SILTY CLAY [38.75-39.17 m]; mottled and disturbed brownish gray (5YR3/1) with greenish gray (5GY5/1) overlying; hard ("dry"); massive, disturbed by coring and extraction.

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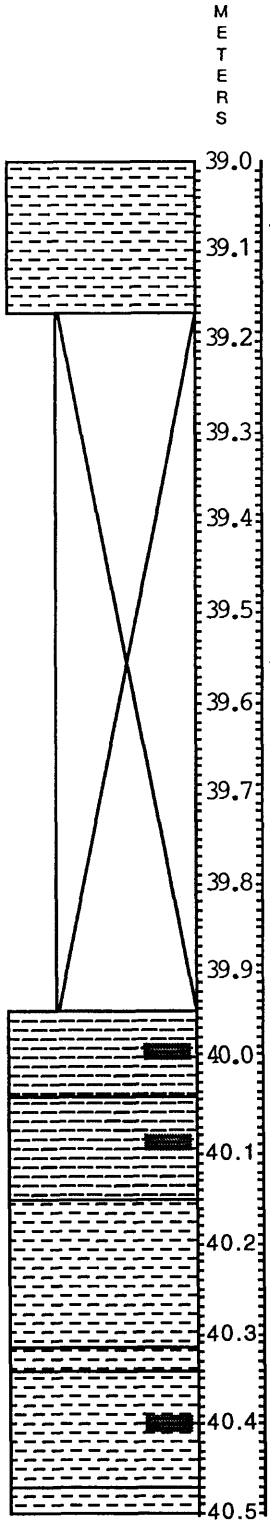

SILTY CLAY [38.75-39.17 m]; mottled and disturbed brownish gray (5YR3/1) with greenish gray (5GY5/1) overlying; hard ("dry"); massive, disturbed by coring and extraction.

No core recovered [39.17-39.94 m].

Start of Drive 41 [39.94-40.73 m].

CLAY WITH INTERBEDS OF GREENISH MUD CLASTS [39.94-40.04 m]; medium brownish gray (5YR5/1); firm; rootlets (?); mm-scale bedding.

CLAY [40.04-40.15 m]; medium brownish gray (5YR5/1); firm; rootlets (?); regular, faint 3-5 mm bedding; core break at base of unit (40.15 m) with traces of volcanic sand (lost loose sand?).

SILTY CLAY [40.15-40.32 m]; medium brownish gray (5YR5/1); massive.

SILTY CLAY [40.32-40.34 m]; core break at base of unit (40.34 m).

SLIGHTLY SILTY CLAY [40.34-40.47 m]; medium brownish gray (5YR5/1); wavy irregular laminations.

SLIGHTLY SILTY CLAY [40.47-40.53 m]; bed of greenish olive gray (5Y4/1).

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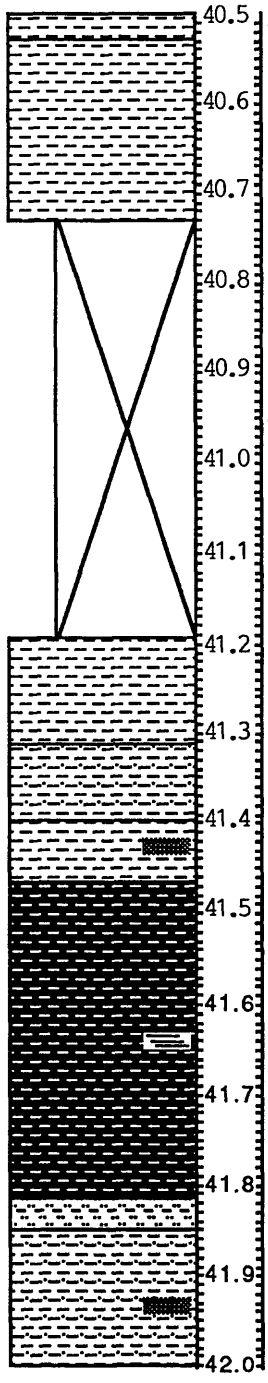

SLIGHTLY SILTY CLAY [40.47-40.53 m]; bed of greenish olive gray (5Y4/1).

VERY SLIGHTLY SILTY CLAY TO SLIGHTLY SILTY CLAY AT BASE OF UNIT [40.53-40.73 m]; mottled medium brownish gray (5YR5/1); mottled, massive, bioturbated; core broken at 40.64 m.

No core recovered [40.73-41.20 m].

Start of Drive 42 [41.20-41.85 m].

MUD (APPROXIMATELY SILT AND CLAY) [41.20-41.31 m]; olive gray (5Y4/1); non-calcareous and firm; disturbed lower contact over approximately 5 cm.

SLIGHTLY (VERY FINE TO FINE) SANDY MUD WITH CLAY CLASTS (up to 1 cm) [41.31-41.40 m]; dark greenish gray (5G4/1); firm; granular texture; massive; gradational lower contact.

MUD [41.40-41.47 m]; dark greenish blackish (5GY3/1); non-calcareous; platy lamination; gradational lower contact.

ORGANIC MUD (POSSIBLY PEDIASTRUM-TYPE) [41.47-41.82 m]; olive gray (5Y4/2), mottled and streaked grayish olive (10Y3/2); non-calcareous and firm; wavy, disturbed cm-scale bedding with mm-scale platy laminations; sharp lower contact.

CLAYEY SILT WITH MUD CLASTS [41.82-41.85 m]; dusky green (5G3/2) with olive black (5Y2/1) at base of unit (41.85 m); very slightly calcareous.

Start of Drive 43 [41.85-44.92 m].

VERY FINE SANDY MUD [41.85-42.07 m]; light olive gray (5Y5/2) with black streaks; non-calcareous; platy laminations.

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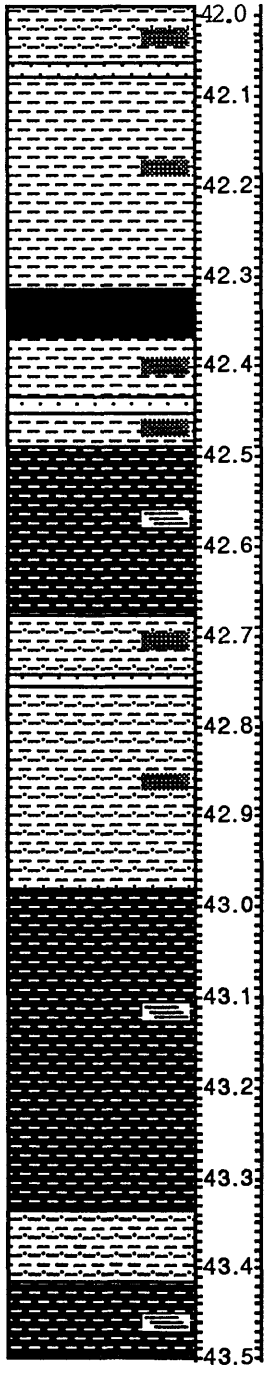

VERY FINE SANDY MUD [41.85-42.07 m]; light olive gray (5Y5/2) with black streaks; non-calcareous; platy laminations.

SAND [42.07-42.08 m]; tephra?

SILTY CLAY [42.08-42.32 m]; non-calcareous; platy laminations.

MUDDY TEPHRA [42.32-42.37 m].

SILTY CLAY (?) [42.37-42.44 m]; non-calcareous; platy lamination.

MEDIUM SAND [42.44-42.46 m]; blackish; tephra?

SILTY CLAY (?) [42.46-42.49 m]; non-calcareous; platy lamination.

ORGANIC (?) SLIGHTLY SILTY CLAY [42.49-42.68 m]; medium olive gray (5Y3/1); non-calcareous; mm-scale wavy bedding.

SANDY MUD [42.68-42.75 m]; medium olive gray (5Y3/1); pumice sand (?); non-calcareous; platy lamination.

PUMICEOUS SAND [42.75-42.76 m]; tephra?

SANDY MUD [42.76-42.98 m]; medium olive gray (5Y3/1); pumice sand (?); non-calcareous; platy lamination.

ORGANIC (?) CLAY [42.98-43.34 m]; medium olive gray (5Y3/1); wavy, irregular lamination.

SLIGHTLY FINE SANDY MUD [43.34-43.42 m]; massive.

ORGANIC (?) SILTY CLAY [43.42-44.03 m]; mildly calcareous; wavy, irregular mm-scale (platy) bedding and mildly bioturbated throughout.

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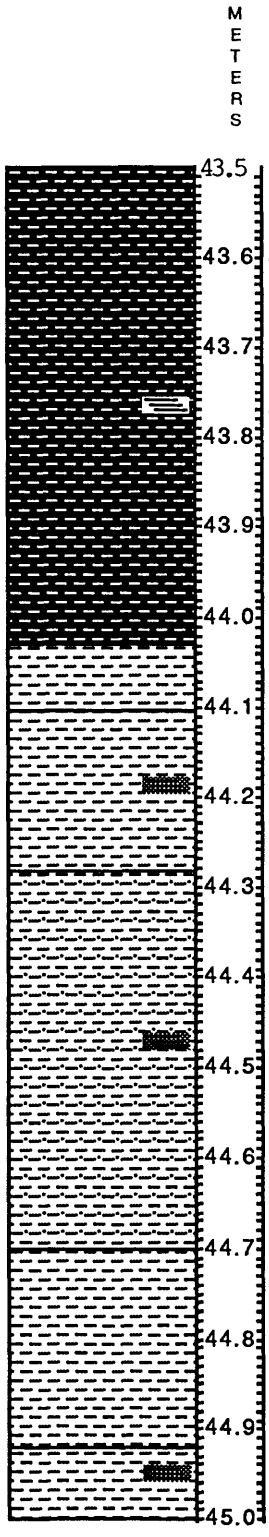

Reddish bleb of cindery sediment (TEPHRA?) at 43.60 m.

ORGANIC (?) SILTY CLAY [43.42-44.03 m]; mildly calcareous; wavy, irregular mm-scale (platy) bedding and mildly bioturbated throughout.

MUD [44.03-44.11 m]; olive gray (5Y4/1); non-calcareous.

SLIGHTLY SILTY CLAY [44.11-44.28 m]; platy lamination.

SLIGHTLY SANDY CLAY [44.28-44.70 m]; olive gray (5Y4/1); non-calcareous; platy, cm-scale bedding.

VERY SLIGHTLY SILTY CLAY [44.70-44.92 m]; olive gray (5Y4/1); massive.

Start of Drive 44 [44.92-48.17 m].

SLIGHTLY SILTY CLAY [44.92-45.20 m]; brownish gray (5YR4/1); wavy 2-3 mm bedding; slight bioturbation in places.

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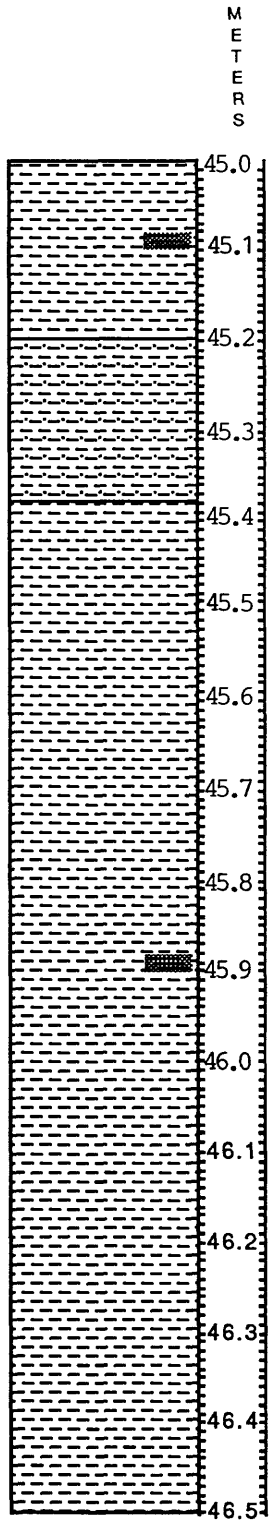

SLIGHTLY SILTY CLAY [44.92-45.20 m]; brownish gray (5YR4/1); wavy 2-3 mm bedding; slight bioturbation in places.

SLIGHTLY SANDY CLAY [45.20-45.38 m]; coarser; massive; core broken at 45.32 m, small gap?

SLIGHTLY SILTY CLAY [45.38-46.87 m]; brownish gray (5YR4/1); regular, slightly wavy, 2-3 mm bedding.

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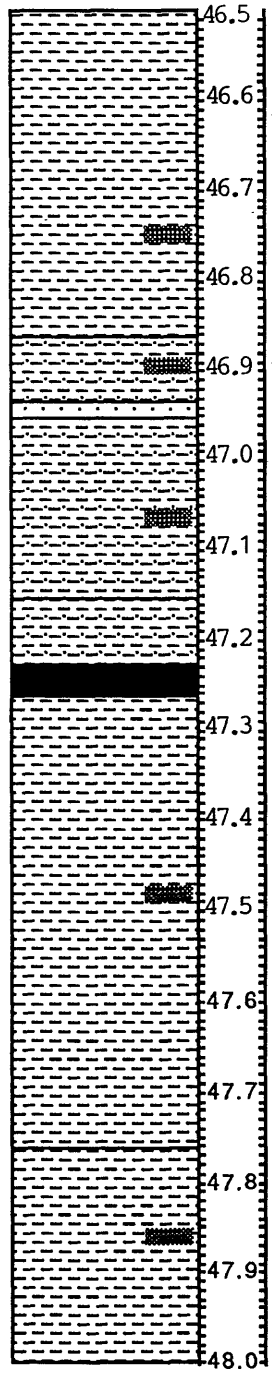

Interbeds of tiny greenish mud clasts (<1 mm thick) around 46.62 m.

SLIGHTLY SILTY CLAY [45.38-46.87 m]; brownish gray (5YR4/1); regular, slightly wavy, 2-3 mm bedding; beds slightly thicker toward base of unit; lower contact transitional over approximately 10 cm.

VERY FINE SANDY MUD [46.87-46.94 m]; olive gray (5Y4/1); 2-5 mm bedding.

VERY FINE SAND INTERBED [46.94-46.95 m].

VERY FINE SANDY MUD [46.95-47.16 m]; olive gray (5Y4/1); 2-5 mm bedding.

VERY FINE SANDY MUD WITH REWORKED TEPHRA [47.16-47.23 m]; massive.

MUDDY TEPHRA (up to coarse sand-size) [47.23-47.26 m]; massive.

SILTY CLAY [47.26-47.77 m]; light olive gray (5Y5/2) grading into olive gray (5Y4/1) in lower half of unit; platy lamination in 5 mm beds; sharp lower contact.

SILTY CLAY [47.77-48.13 m]; olive black (5Y2/1); faint 5 cm bedding.

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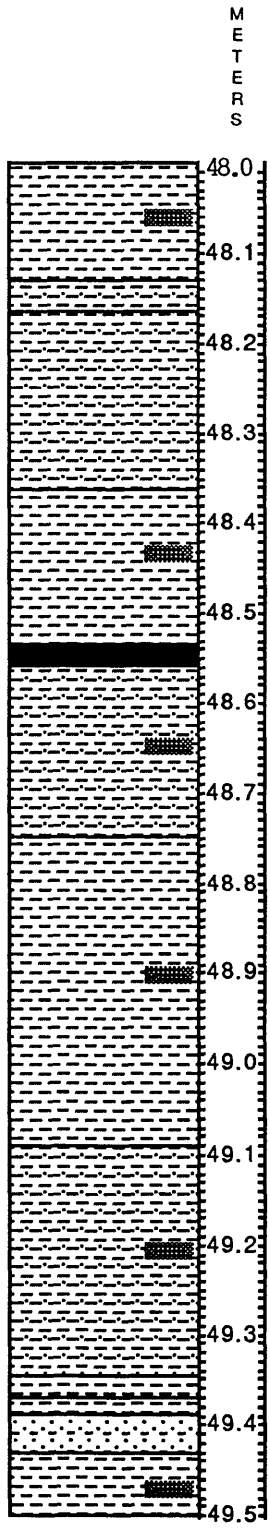

SILTY CLAY [47.77-48.13 m]; olive black (5Y2/1); faint 5 cm bedding; gradational lower contact.

SANDY CLAY [48.13-48.17 m]; olive black (5Y2/1).

Start of Drive 45 [48.17-51.17 m].

SLIGHTLY SANDY MUD [48.17-48.37 m]; medium olive gray (5Y5/1); gradational lower contact.

SILTY CLAY [48.37-48.54 m]; faint banding of brownish gray (5YR4/1); massive; gradational lower contact.

MUDDY PUMICEOUS TEPHRA [48.54-48.56 m].

VERY FINE SLIGHTLY SANDY MUD [48.56-48.75 m]; brownish black (5YR2/1); faint cm-scale bedding to massive.

SLIGHTLY SILTY CLAY NEAR TOP OF UNIT TO CLAY NEAR BASE [48.75-49.09 m]; faint color banding with bedding; faint cm-scale bedding; faint bioturbation in places; gradational lower contact.

SLIGHTLY SANDY MUD [49.09-49.35 m]; olive gray (5Y4/1) cm-scale color banding; 5-8 mm bedding; gradational lower contact.

SILTY CLAY (TEPHRA?) [49.35-49.37 m]; med. olive gray (5Y5/1).

SILTY CLAY (?) [49.37-49.39 m]; gradational lower contact.

MUDDY FINE VOLCANIC SAND (TEPHRA?) [49.39-49.43 m]; olive black; gradational lower contact.

CLAY TO SLIGHTLY SILTY CLAY [49.43-50.89 m]; see next page.

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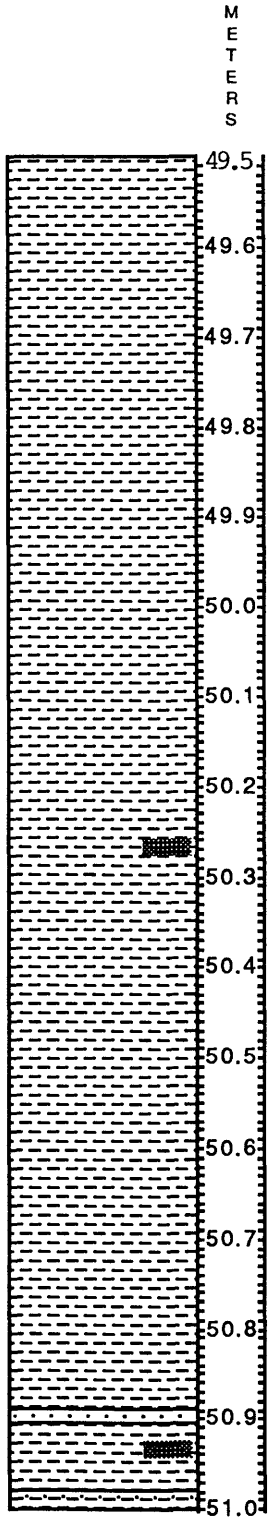

Bioturbated, slightly deformed bedding from 49.89-50.01 m.

CLAY, QUICKLY GRADING DOWN INTO SLIGHTLY SILTY CLAY [49.43-50.89 m]; brownish gray (5YR4/1) in faint cm-scale banding; regular 3-5 mm bedding; gradational, disturbed lower contact.

MUDDY FINE SAND [50.89-50.90 m]; plant fragments.

SILTY CLAY [50.90-50.99 m]; medium olive gray (5Y4/2); plant fragments; very faint, irregular, cm-scale bedding.

FINE SANDY MUD [50.99-51.01 m]; olive gray (5Y4/1).

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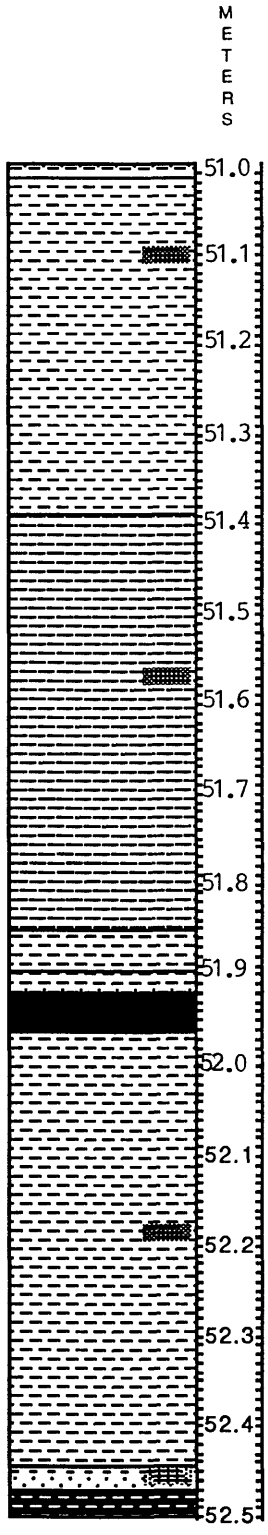

FINE SANDY MUD [50.99-51.01 m]; olive gray (5Y4/1); gradational, disturbed lower contact.

SILTY CLAY [51.01-51.39 m]; olive gray (5Y4/1); platy lamination; gradational lower contact.

Start of Drive 46 [51.17-53.81 m].

CLAY [51.39-51.85 m]; regular 3-5 mm bedding.

SLIGHTLY SILTY CLAY [51.85-51.895 m].

SANDY MUD WITH REWORKED TEPHRA [51.895-51.92 m].

AIRFALL TEPHRA (coarse sand-sized) [51.92-51.96 m]; very light gray (N8); massive.

SLIGHTLY SILTY CLAY [51.96-52.45 m]; olive gray (5Y4/1) from 51.96-52.37 m and olive gray (5Y3/2) from 52.37-52.45 m; regular 3-5 mm bedding; gradational lower contact.

SLIGHTLY MUDDY MEDIUM SAND [52.45-52.47 m]; olive gray (5Y3/2); cm-scale bedding; sharp lower contact. Unit below is ORGANIC (PEATY) MUD [52.47-52.65 m]; see description, next page.

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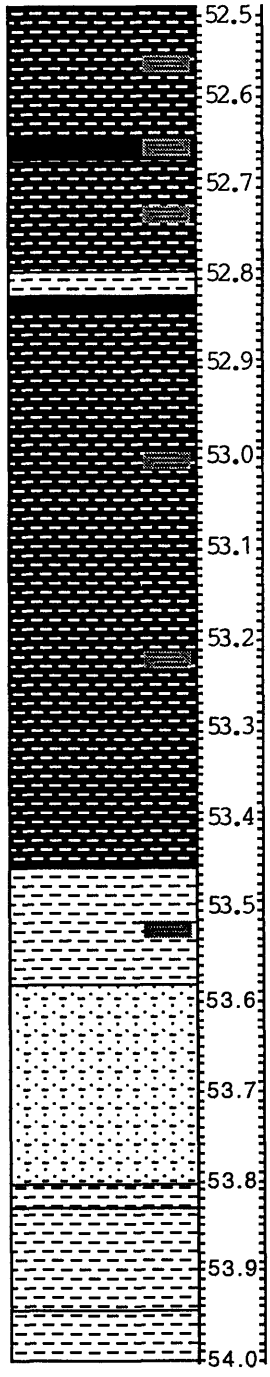

ORGANIC (PEATY) MUD [52.47-52.65 m]; olive gray (5Y3/2); cm-scale bedding.

MUDDY TEPHRA [52.65-52.67 m]; cm-scale bedding.

ORGANIC (PEATY) MUD [52.67-52.80 m]; olive gray (5Y3/2); cm-scale bedding; gradational lower contact.

MUD WITH REWORKED TEPHRA [52.80-52.82 m]; gradational lower contact.

MUDDY TEPHRA [52.82-52.84 m]; sharp lower contact.

ORGANIC (PEATY) CLAY [52.84-53.23 m]; brownish black (5YR2/1) at top of unit to light olive gray (5Y5/2) at base of unit; regular 2-4 mm bedding of platy laminations; lower contact transitional over approximately 5 cm.

ORGANIC (PEATY) SILTY CLAY [53.23-53.45 m]; medium olive brown (5Y4/6) at top of unit to grayish olive (10Y4/2) at base; calcareous; regular 2-4 mm bedding of platy laminations; sharp lower contact.

SILTY CLAY [53.45-53.58 m]; olive gray (5Y3/2); slightly calcareous; faint irregular wavy laminae; lower contact gradational over approximately 5 cm.

CALCAREOUS MUDDY MEDIUM SAND [grayish black (N2)] AT BASE OF UNIT FINES UPWARD INTO INTERBEDDED MUDDY SAND AND SANDY MUD NEAR CENTER OF UNIT INTO SLIGHTLY SANDY MUD AT TOP OF UNIT [53.58-53.81 m]; plant fragments, shell material and fish scales recovered at base of unit.

Start of Drive 47 [53.81-56.63 m].

Drilling mud [53.81-53.83 m].

MUD [53.83-53.95 m]; greenish black (5G2/1); grad. lower contact.

SLIGHTLY SILTY CLAY [53.95-54.25 m]; dark greenish gray (5GY4/1).

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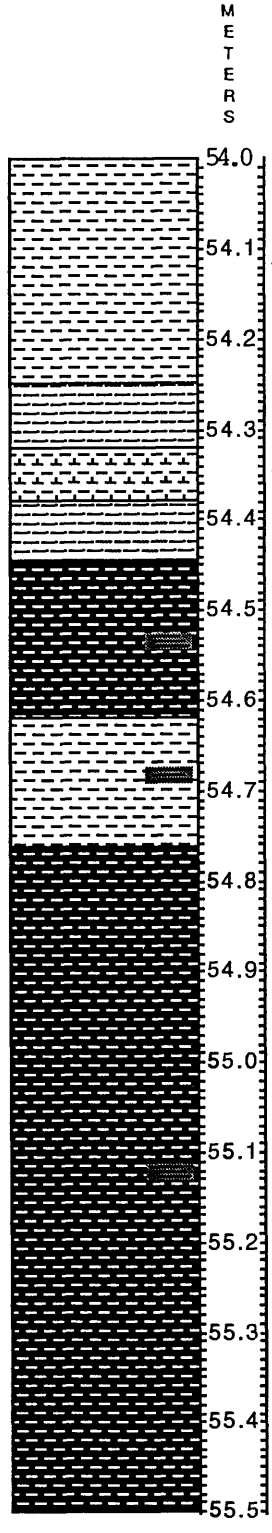

SLIGHTLY SILTY CLAY [53.95-54.25 m]; dark greenish gray (5GY4/1); sharp lower contact.

CLAY [54.25-54.32 m]; mottled black (N1); highly calcareous; deformed; disturbed lower contact.

MARLY BLOB [54.32-54.38 m]; dusky yellow green (5GY5/2); highly calcareous; disturbed lower contact.

CLAY [54.38-54.45 m]; mottled black (N1); deformed; sharp lower contact.

ORGANIC SILTY CLAY [54.45-54.62 m]; olive gray (5Y3/2); massive near top of unit, with platy laminations in 3-4 mm beds below.

SILTY CLAY [54.62-54.76 m]; olive gray (5Y3/2); platy laminations in 3-4 mm beds; gradational lower contact.

SLIGHTLY SILTY ORGANIC CLAY [54.76-55.82 m]; olive gray (5Y3/2) from 54.76-55.21 m and olive gray (5Y4/1) from 55.21-55.82 m; very regular 3-5 mm bedding.

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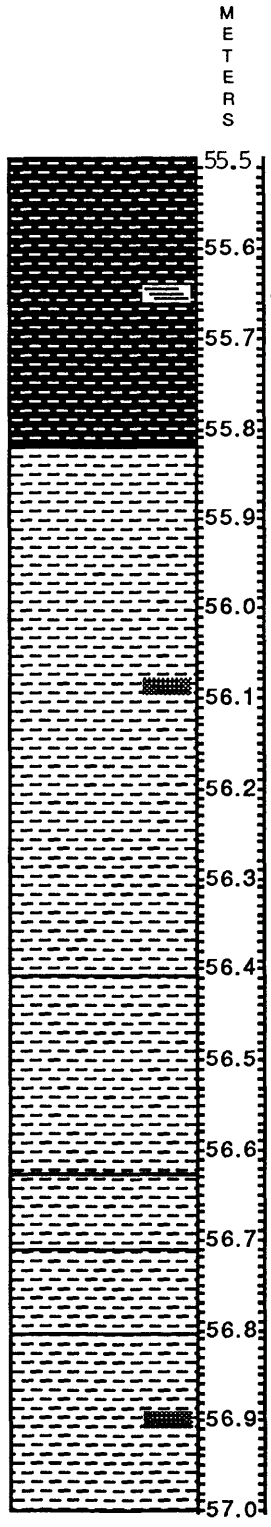

SLIGHTLY SILTY ORGANIC CLAY [54.76-55.82 m]; olive gray (5Y3/2) from 54.76-55.21 m and olive gray (5Y4/1) from 55.21-55.82 m; very regular 3-5 mm bedding; sharp, but faint, lower contact.

SILTY CLAY [55.82-56.41 m]; olive gray (5Y4/1); brittle fractures; regular 3-5 mm bedding; faint, gradational lower contact.

VERY SLIGHTLY SILTY CLAY [56.41-56.63 m]; olive gray (5Y4/1); massive.

Start of Drive 48 [56.63-58.35 m].

MUD [56.63-56.71 m]; non-calcareous; massive; gradational lower contact.

MUD MATRIX WITH MUD CLASTS (< mm size) [56.71-56.81 m]; non-calcareous; massive; sharp lower contact.

SILTY CLAY [56.81-57.38 m]; olive gray (5Y4/1); non-calcareous; regular 3-5 mm bedding.

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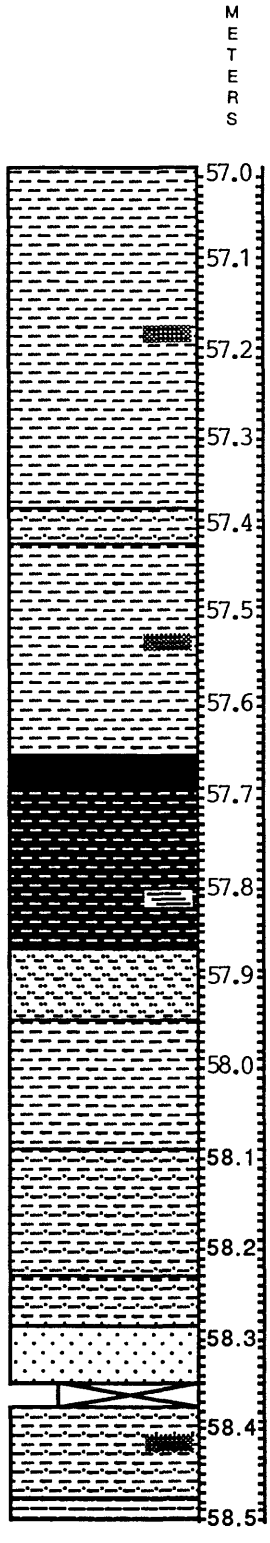

SILTY CLAY [56.81-57.38 m]; olive gray (5Y4/1); non-calcareous; regular 3-5 mm bedding; gradational lower contact.

VOLCANIC SANDY MUD AND FINE SAND BED (5 mm thick) [57.38-57.42 m]; brownish black (5YR2/1); non-calcareous; gradational lower contact.

SILTY CLAY [57.42-57.66 m]; olive gray (5Y4/1); non-calcareous; regular 3-5 mm bedding; gradational lower contact.

MUDDY TEPHRA [57.66-57.69 m]; slightly calcareous; clean at base; sharp lower contact.

Very fine sand layer (1 mm thick) at 57.70 m.

ORGANIC (ALGAL?) CLAY [57.69-57.87 m]; moderate olive brown (5Y4/4); slightly calcareous; platy lamination.

CLAYEY SILT [57.87-57.95 m]; slightly calcareous.

SILTY CLAY [57.95-58.09 m]; olive gray (5Y4/1); calcareous; massive, bioturbated; gradational lower contact.

SANDY MUD [58.09-58.23 m]; black (N1); gradational lower contact.

SANDY MUD CLASTS IN MUD [58.23-58.29 m]; black (N1); sharp lower contact.

FINE TO MEDIUM VOLCANIC SAND [58.29-58.35 m]; black (N1); massive; shell fragments and gastropods.

No core recovered [58.35-58.38 m].
Start of Drive 49 [58.38-61.42 m].

TWO UNITS: SANDY MUD WITH MUD CLASTS [58.38-58.49 m]; olive black (5Y2/1); calcareous; platy lamination; gradational lower contact. CLAY [58.49-58.74 m]; see description, next page.

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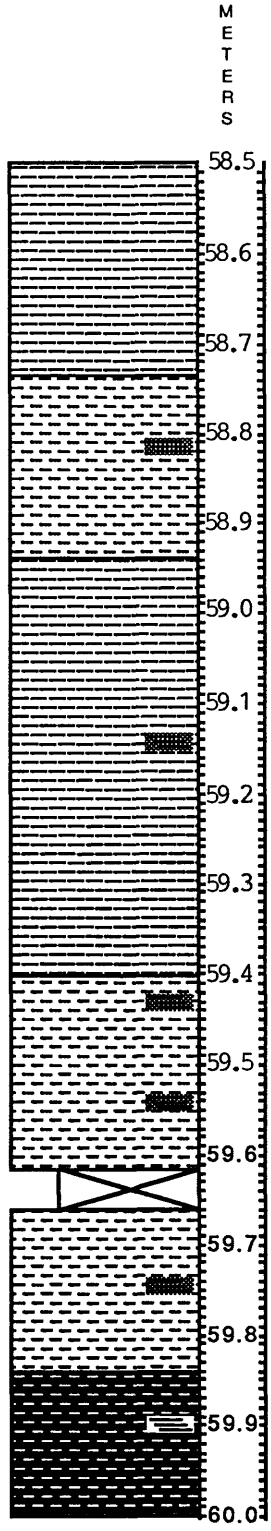

CLAY [58.49-58.74 m]; olive gray (5Y4/1); calcareous; massive, bioturbated; gradational lower contact.

SILTY CLAY [58.74-58.94 m]; faint regular 3-5 mm bedding; gradational lower contact.

CLAY WITH RARE BLACK STRINGERS AND BLEBS [58.94-59.40 m]; massive, bioturbated; maybe extremely faint cm-scale bedding in lower part of unit.

CLAY TO VERY SLIGHTLY SILTY CLAY [59.40-59.62 m]; olive gray (5Y3/1); faint 1-2 cm beds of platy lamination; lumps of plant material; lower contact destroyed in coring.

Very fine sand layer (1 mm thick) at 59.53 m.

Core broken [59.62-59.66 m]; destroyed in coring.

VERY SLIGHTLY SILTY CLAY [59.66-59.84 m]; regular 3-5 cm beds; gradational lower contact.

ORGANIC (ALGAL?) SILTY CLAY [59.84-60.59 m]; medium olive gray (5Y4/2) from 59.84-60.07 m; slightly calcareous; platy lamination in regular 3-5 mm beds.

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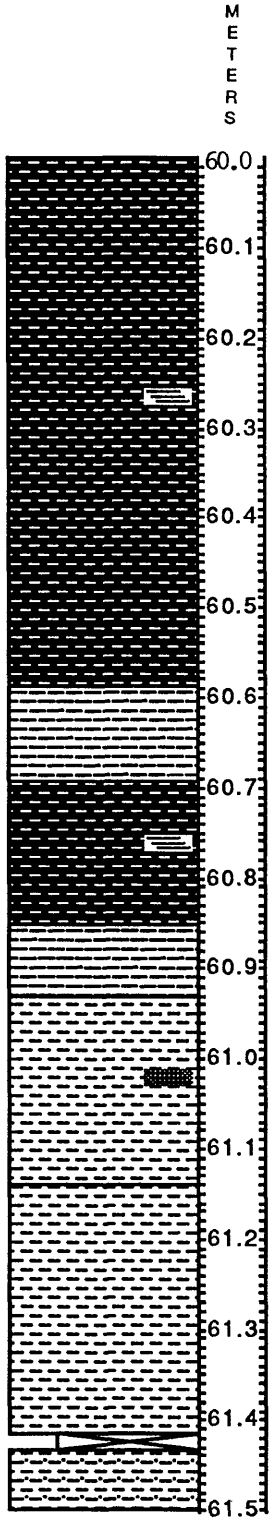

ORGANIC (ALGAL?) SILTY CLAY [59.84-60.59 m]; medium olive gray (5Y4/2) from 59.84-60.07 m, olive gray (5Y3/1) from 60.07-60.37 m, and olive gray (5Y4/1) from 60.37-60.59 m; slightly calcareous; platy lamination in regular 3-5 mm beds; gradational lower contact.

CLAY [60.59-60.70 m]; olive gray (5Y4/1); slightly calcareous in upper half of unit, non-calcareous in lower half; massive; gradational lower contact.

ORGANIC (ALGAL?) SILTY CLAY [60.70-60.85 m]; olive gray (5Y4/1); non-calcareous; regular 3-5 mm laminations; gradational lower contact.

CLAY [60.85-60.93 m]; olive gray (5Y4/1); non-calcareous; massive.

SILTY CLAY [60.93-61.14 m]; olive gray (5Y4/1); non-calcareous; regular 3-5 mm bedding; broad, transitional lower contact over 10-15 cm.

MOSTLY CLAY WITH SOME VERY SLIGHTLY SILTY CLAY [61.14-61.42 m]; olive gray (5Y4/1); non-calcareous; bioturbated.

No core recovered [61.42-61.43 m].
Start of Drive 50 [61.43-62.96 m].

SLIGHTLY SANDY CLAY [61.43-61.57 m]; mottled medium olive gray (5Y4/2); very soft; massive, disturbed.

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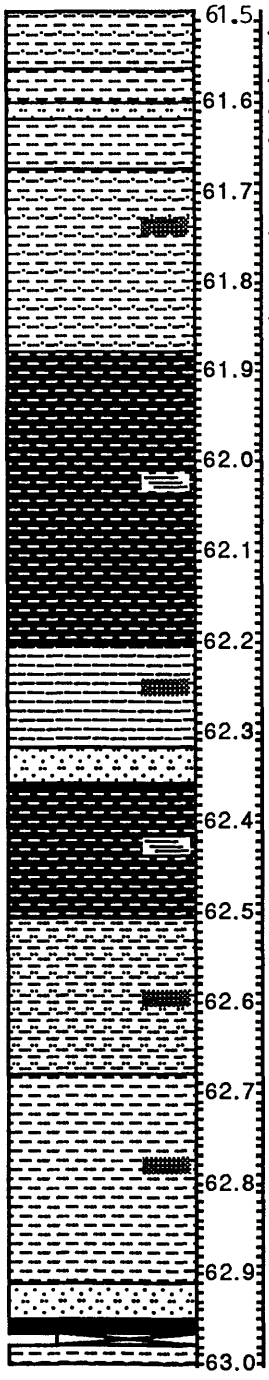

SLIGHTLY SANDY CLAY [61.43-61.57 m]; mottled medium olive gray (5Y4/2); very soft; massive, disturbed.

MUD CLASTS IN MUD MATRIX [61.57-61.60 m]; olive gray (5Y4/1); crumbly; sharp lower contact.

SILTY FINE SAND [61.60-61.62 m]; olive gray (5Y4/1); sharp lower contact.

SLIGHTLY SILTY CLAY [61.62-61.68 m]; olive gray (5Y4/1); gradational lower contact.

SANDY MUD [61.68-61.88 m]; olive gray (5Y4/1); platy laminations, otherwise massive; plant material and questionable fish fragments; gradational lower contact.

Tephra clast (approximately 1 cm) in core at 61.84 m.

ORGANIC (ALGAL?) SILTY CLAY [61.88-62.21 m]; olive gray (5Y4/1); regular 3-5 mm beds; gradational lower contact.

CLAY [62.21-62.32 m]; olive gray (5Y4/1); very faint 3-5 mm beds; bioturbated; lower contact gradational and mixed.

SILTY FINE SAND [62.32-62.36 m]; deformed; lower contact gradational and mixed.

SILTY ORGANIC (ALGAL?) CLAY [62.36-62.51 m]; olive gray (5Y3/2); non-calcareous; faint, irregular and wavy, platy laminations; bioturbated; sharp lower contact.

VERY SLIGHTLY SILTY CLAY GRADING DOWN INTO FINE SANDY MUD [62.51-62.68 m]; olive gray (5Y3/2) grading down into dusky yellowish brown (10YR2/2); 1-4 cm beds; bioturbated, disturbed; lower contact gradational and mixed.

SLIGHTLY SILTY CLAY [62.68-62.91 m]; dark greenish gray (5GY4/1); platy laminations, otherwise massive; sharp, slightly deformed lower contact.

TWO UNITS: SILTY VERY FINE SAND [62.91-62.95 m]. MUDDY PUMICEOUS TEPHRA (LAPILLI) [62.95-62.96 m].

No core recovered [62.96-62.98 m]. Start of Drive 51 [62.98-64.59 m]. For unit below, see next page.

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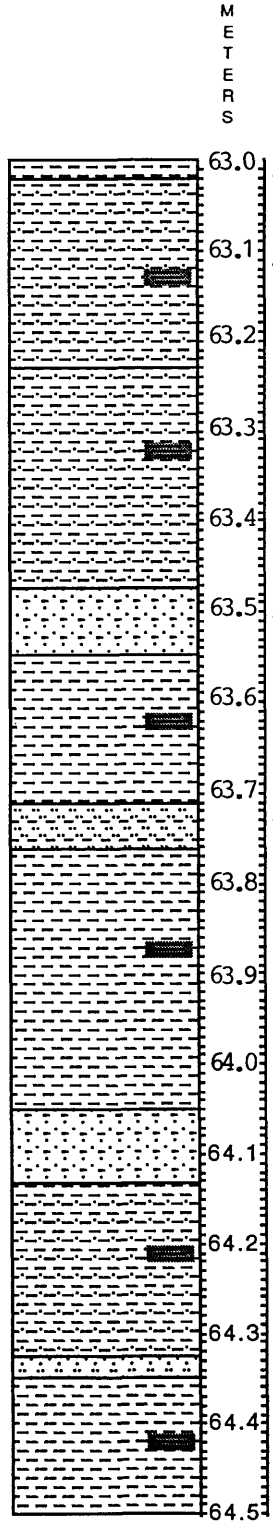

STRANGE CLASTS IN MUD AND DRILLING MUD [62.98-63.02 m]; olive gray (5Y4/1); lower contact destroyed.

VERY FINE SANDY MUD [63.02-63.23 m]; olive gray (5Y4/1); non-calcareous; platy laminations in cm-scale beds; plant fragments.

SLIGHTLY VERY FINE SANDY MUD [63.23-63.48 m]; olive gray (5Y4/1); non-calcareous; cm-scale bedding; gradational lower contact.

MUDDY FINE SAND [63.48-63.55 m]; olive gray (5Y4/1); faint mm-scale bedding; sharp lower contact.

SILTY CLAY [63.55-63.72 m]; olive gray (5Y4/1); platy, massive; deformed, gradational lower contact.

CLAYEY SILT [63.72-63.76 m]; olive black (5Y2/1); calcareous; deformed structure; deformed, gradational lower contact.

SILTY CLAY [63.76-64.05 m]; olive gray (5Y3/2); calcareous; platy, massive; broken shell fragments; deformed, gradational lower contact.

SAND, MUDDY SAND, MUDDY PUMICEOUS TEPHRA (?) [64.05-64.13 m]; olive black (5Y2/1); weakly calcareous; finer sand at base of unit, coarse sand in middle, and finer sand again at top; deformed (mixed), gradational lower contact.

VERY FINE SANDY CLAY [64.13-64.33 m]; medium greenish gray (5GY5/1); highly calcareous; massive, bioturbated, deformed laminae.

MEDIUM SAND, SILTY, WITH MUD CLASTS [64.33-64.35 m]; may be discontinuous bleb of sand; shells present in sand; sharp lower contact, gradationally deformed into underlying unit.

SILTY CLAY [64.35-64.59 m]; dark greenish gray (5GY4/1); mildly calcareous; platy; veins and faint mottles near base of unit.

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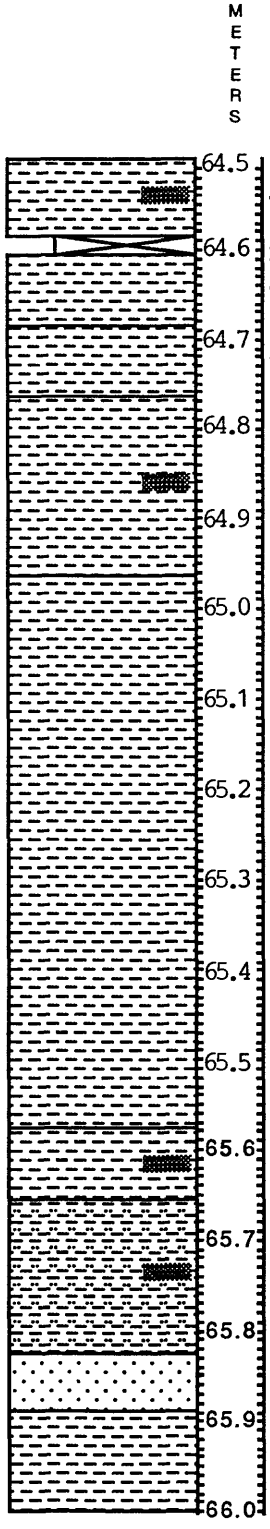

SILTY CLAY [64.35-64.59 m]; dark greenish gray (5GY4/1); mildly calcareous; platy; veins and faint mottles near base of unit.

No core recovered [64.59-64.61 m].

Start of Drive 52 [64.61-66.03 m].

SILTY CLAY [64.61-64.69 m]; dark greenish gray (5GY4/1); mildly calcareous.

SILTY CLAY [64.69-64.77 m]; non-calcareous; massive.

SLIGHTLY SILTY CLAY (SILTY CLAY CLASTS IN SILTY CLAY MATRIX) [64.77-64.96 m]; mottled; non-calcareous; disturbed bedding; crumbly texture; gradual transition between lithology of this and underlying unit; gradational, diffuse lower contact, disturbed and faint.

SILTY CLAY (MUD CLASTS IN MUD MATRIX) [64.96-65.58 m]; olive gray (5Y4/1), mottled in some places near middle and base of unit; non-calcareous; crumbly texture; gradational lower contact.

VERY SLIGHTLY SILTY CLAY [65.58-65.66 m]; olive gray (5Y4/1); non-calcareous; wavy, irregular laminae; one fining upward sequence from 65.89-65.58 m.

SILTY CLAY TO VERY FINE SANDY MUD at base of unit [65.66-65.83 m]; non-calcareous; laminae in faint cm-scale beds; one fining upward sequence from 65.89-65.58 m.

VERY FINE TO FINE SAND [65.83-65.89 m]; brownish black (5YR2/1); non-calcareous; one fining upward sequence from 65.89-65.58 m; sharp lower contact.

SILTY CLAY [65.89-66.03 m]; medium olive gray (5Y4/2); non-calcareous; crumbly, massive.

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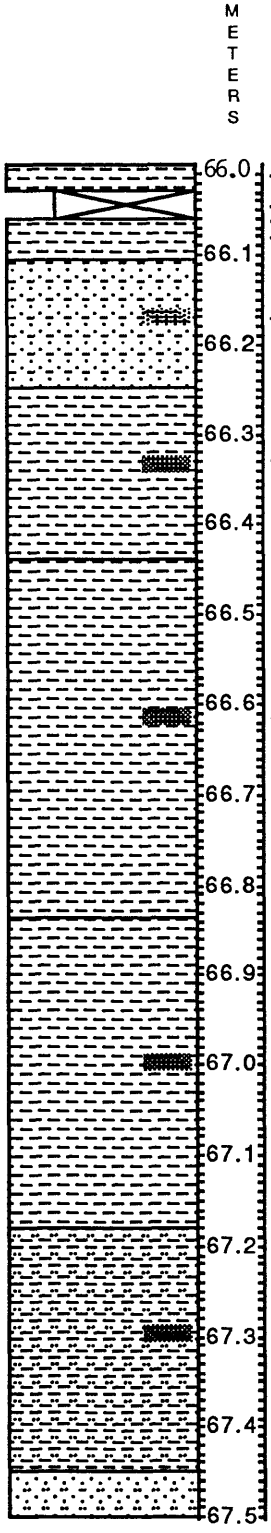

SILTY CLAY [65.89-66.03 m]; medium olive gray (5Y4/2); non-calcareous; crumbly, massive.

No core recovered [66.03-66.06 m].

Start of Drive 53 [66.06-69.17 m].

MUD CLASTS IN MUD [66.06-66.11 m] with some drilling mud; grayish olive green (5GY3/2); mushy; granular texture; gastropod and shell fragments.

MUDDY SAND AND FINE SANDY MUD [66.11-66.25 m]; soft; cm-scale bedding; gradational lower contact.

SILTY CLAY [66.25-66.44 m]; olive gray (5Y4/1); faint, wavy deformed laminations in 2-3 cm beds; gradational lower contact.

SILTY CLAY [66.44-66.84 m]; olive gray (5Y4/1); faint 2-5 cm beds; gradational lower contact.

VERY SLIGHTLY SILTY CLAY [66.84-67.18 m]; olive gray (5Y4/1); non-calcareous; faint 8-12 cm bedding (strongly deformed but faint in appearance due to very similar lithologies); gradational lower contact.

SILTY CLAY GRADING DOWN INTO SLIGHTLY SANDY MUD [67.18-67.45 m]; olive gray (5Y4/1); non-calcareous; 5 mm beds; gradational lower contact.

SILTY FINE VOLCANIC SAND [67.45-67.56 m]; olive black (5Y2/1); non-calcareous.

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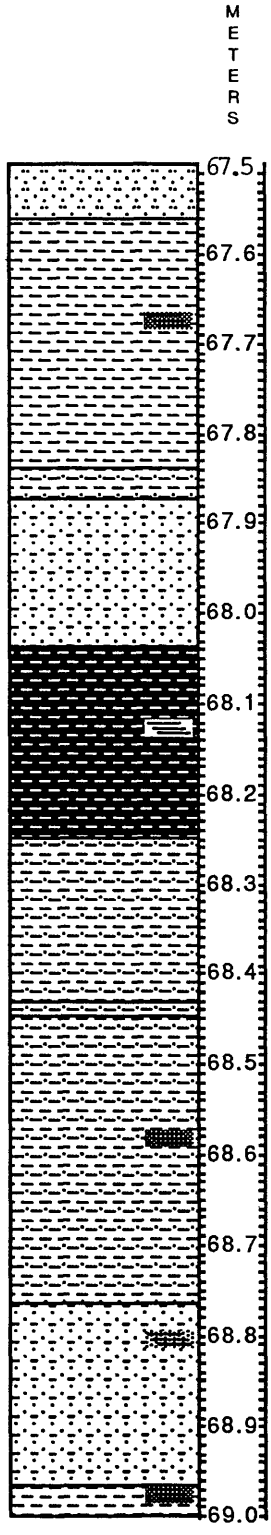

SILTY FINE VOLCANIC SAND [67.45-67.56 m]; olive black (5Y2/1); non-calcareous; lower contact sharp and conformable.

SLIGHTLY SILTY CLAY [67.56-67.84 m]; olive gray (5Y4/1); non-calcareous; faint laminae in 1.5-2 cm bedding; sharp lower contact.

SANDY MUD [67.84-67.88 m]; olive gray (5Y4/1); non-calcareous; generally fining upward from 68.04-67.84 m; gradational lower contact.

MUD CLASTS IN MEDIUM MUDDY SAND AT BASE OF UNIT, GRADING INTO MUDDY SAND WITH TINY RED GRAINS IN MIDDLE, AND MUDDY FINE SAND (VOLCANIC SANDS, BASALTIC) NEAR TOP OF UNIT [67.88-68.04 m]; olive gray (5Y4/1) except at base where the sand is olive black (5Y2/1) with rusty grains; non-calcareous; generally fines upward from 68.04-67.84 m; sharp, deformed lower contact.

ORGANIC (?) SLIGHTLY SILTY CLAY [68.04-68.25 m]; olive gray (5Y4/1); non-calcareous; platy laminations.

SLIGHTLY FINE SANDY MUD [68.25-68.43 m]; olive gray (5Y4/1); massive.

SANDIER UNIT [68.43-68.44 m]; olive gray (5Y4/1).

SILTY FINE SANDY MUD [68.44-68.77 m]; olive gray (5Y4/1); non-calcareous; cm-scale bedding with 1-3 mm sandy mud interbeds; gradational lower contact.

MUDDY FINE SAND WITH FINE SANDY INTERBEDS [68.77-68.97 m]; olive gray (5Y4/1); 1-2 mm interbeds with well preserved bedding but core fragile and broken; plant material, ostracodes and shell fragments at 68.79 m; gradational lower contact.

SILTY CLAY [68.97-69.17 m]; olive gray (5Y4/1); calcareous; platy laminations.

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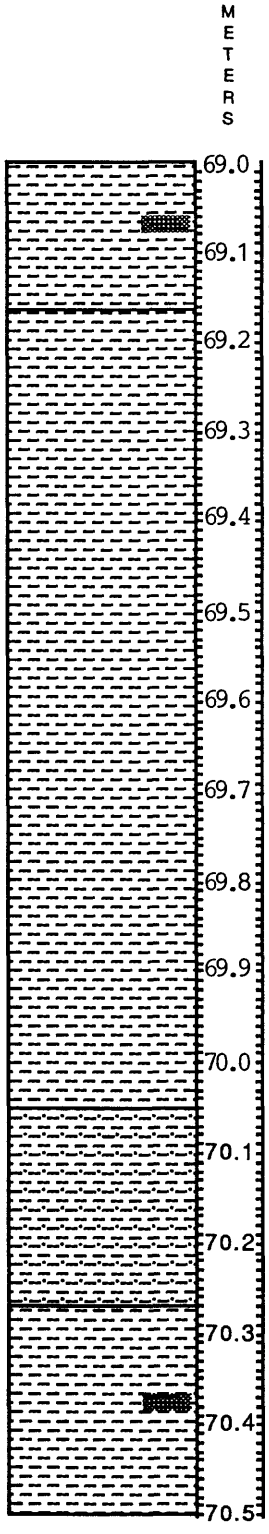

SILTY CLAY [68.97-69.17 m]; olive gray (5Y4/1); calcareous; platy laminations.

Start of Drive 54 [69.17-72.10 m].

SILTY CLAY [69.17-70.05 m]; olive gray (5Y4/1); non-calcareous; brittle fracture; core badly broken in lower part of unit; gradational lower contact.

VERY FINE SANDY MUD WITH THIN VERY FINE MUDDY SAND INTERBEDS (< 1mm) [70.05-70.27 m]; olive gray (5Y4/1); calcareous.

SILTY CLAY [70.27-70.70 m]; olive gray (5Y4/1); calcareous; wavy, irregular micro-laminae; shells (bivalve).

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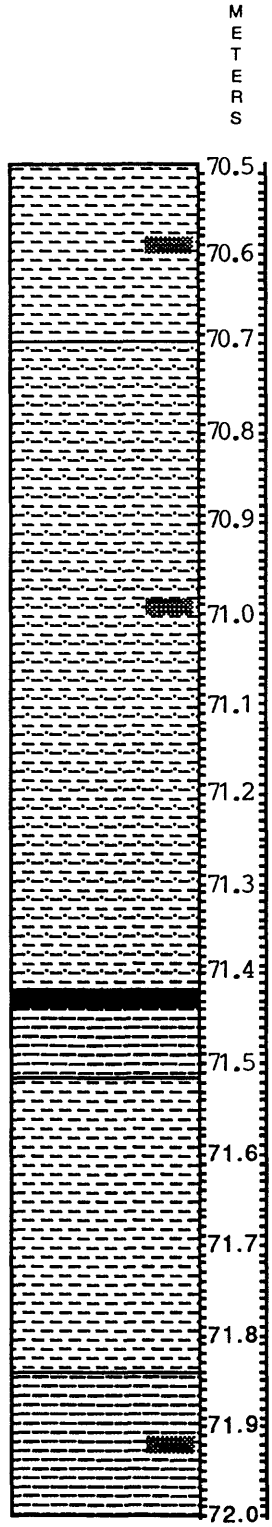

SILTY CLAY [70.27-70.70 m]; olive gray (5Y4/1); calcareous; wavy, irregular micro-laminae; shells (bivalve); sharp lower contact at fine sand horizon.

VERY FINE SANDY MUD [70.70-71.42 m]; slightly darker olive gray; slightly calcareous; faintly laminated to massive.

TEPHRA [71.42-71.43 m].

CLAY [71.43-71.52 m]; olive black (5Y2/1); calcareous; diffuse lower contact.

SILTY CLAY [71.52-71.84 m]; olive gray (5Y4/1); slightly calcareous.

CLAY [71.84-72.10 m]; olive gray (5Y4/1); slightly calcareous; faint bioturbation; wavy, disrupted laminations.

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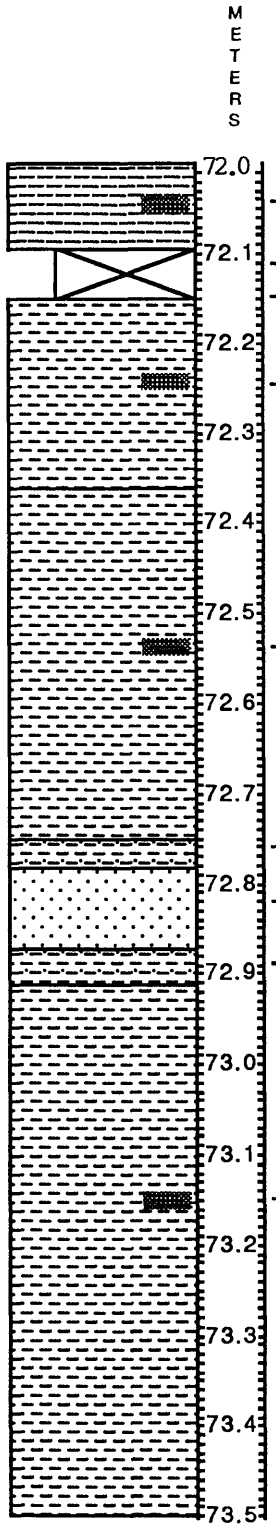

CLAY [71.84-72.10 m]; olive gray (5Y4/1); slightly calcareous; faint bioturbation; wavy, disrupted laminations.

No core recovered [72.10-72.15 m].

Start of Drive 55 [72.15-75.05 m].

SILTY CLAY [72.15-72.37 m]; medium olive gray (5Y4/2); broken pieces but similar to [unit?] below; faint, gradational lower contact over 5-10 cm.

VERY SLIGHTLY SILTY CLAY [72.37-72.75 m]; medium olive gray (5Y4/2); non-calcareous; faint platy laminae in 5 mm-2 cm beds.

SANDY MUD [72.75-72.78 m]; dusky yellowish brown (10YR2/2); non-calcareous.

FINE SAND [72.78-72.87 m]; dusky yellowish brown (10YR2/2); non-calcareous; plant material; sharp lower contact.

SANDY MUD [72.87-72.91 m]; dusky yellowish brown (10YR2/2); non-calcareous; sharp lower contact.

SILTY CLAY [72.91-73.64 m]; olive gray (5Y4/1) grading down into medium olive gray (5Y4/2); calcareous; regular 5-10 mm bedding, platy laminations.

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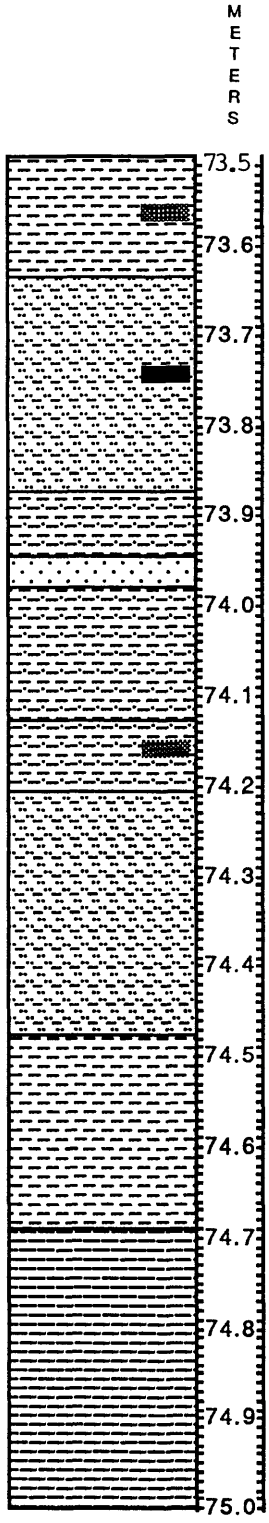

SILTY CLAY [72.91-73.64 m]; olive gray (5Y4/1) grading down into medium olive gray (5Y4/2); calcareous; regular 5-10 mm bedding, platy laminations; gradational lower contact.

CLAYEY SILT [73.64-73.88 m]; olive gray (5Y4/1); calcareous; wavy, irregular disturbed laminae, platy.

VERY FINE SANDY MUD [73.88-73.95 m]; sharp, deformed lower contact.

SILTY FINE VOLCANIC SAND [73.95-73.98 m]; brownish black (5YR2/1); non-calcareous; airfall material (?); fish vertebrae; sharp, deformed lower contact.

VERY FINE SANDY MUD [73.98-74.13 m]; medium greenish gray (5GY5/1); calcareous; sharp lower contact.

SILTY SANDY CLAY [74.13-74.21 m] with sand layers (mm-scale beds) at top of unit and sand layer at bottom; fish bone fragments; sharp lower contact.

CLAYEY SILT WITH LARGE CLASTS OF UNDERLYING CLAY GRADING UP INTO VERY FINE SANDY MUD at top of unit [74.21-74.48 m]; clayey silt at bottom is black, color of remaining unit not described; massive, disturbed, crumbly; shell fragments at 74.41 m; sharp, deformed, mixed lower contact.

VERY SLIGHTLY SILTY CLAY [74.48-74.69 m]; crumbly, granular; gradational lower contact.

CLAY [74.69-75.05 m]; dark greenish gray (5GY4/1); mildly calcareous; massive; gastropod recovered at 74.70 m.

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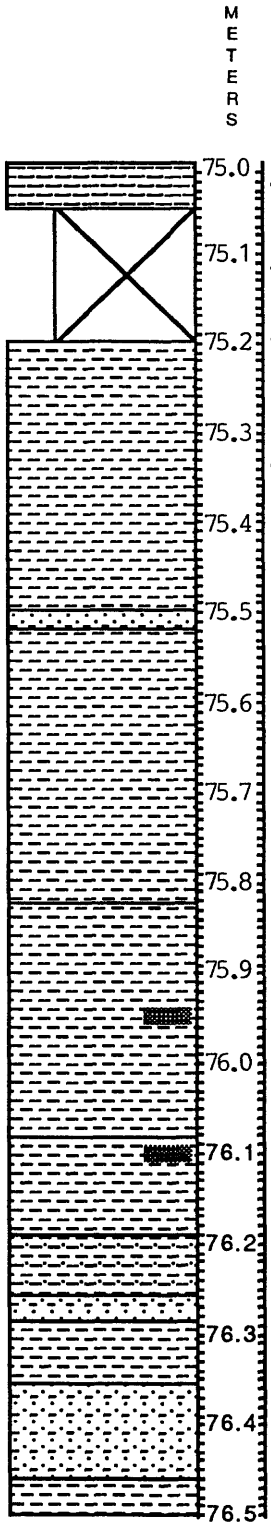

CLAY [74.69-75.05 m]; dark greenish gray (5GY4/1); mildly calcareous; massive.

No core recovered [75.05-75.20 m].

Start of Drive 56 [75.20-76.29 m].

SLIGHTLY SILTY CLAY [75.20-75.50 m]; medium greenish gray (5GY5/1); calcareous; massive; granular texture; sharp, deformed lower contact.

MUDDY FINE SAND [75.50-75.52 m]; sharp, deformed lower contact.

SILTY CLAY [75.52-75.82 m] WITH RARE, DISPERSED PUMICE (TEPHRA?) GRAINS (sand-sized) in lower half of unit; mottled, grayish olive green (5GY4/2); calcareous; bioturbated (?); gradational lower contact just below core break; plant fragments on lower bedding plane break.

SILTY CLAY WITH MUD CLASTS IN MUD MATRIX [75.82-76.08 m]; mottled, grayish olive green (5GY4/2); faint cm-scale bedding of mud clasts; shell fragments throughout; fish fragment recovered at 76.05 m; gradational, deformed lower contact.

SILTY CLAY [76.08-76.19 m]; mottled, grayish olive green (5GY4/2); calcareous; faint, disturbed cm-scale bedding; sharp, deformed lower contact.

VERY FINE SANDY MUD [76.19-76.26 m]; greenish black (5GY2/1); massive.

MUDDY FINE SAND [76.26-76.29 m]; greenish black (5GY2/1); non-calcareous.

Start of Drive 57 [76.29-79.15 m].

SLIGHTLY SILTY CLAY [76.29-76.36 m]; mushed.

MUDDY FINE SAND [76.36-76.46 m]; greenish black (5GY2/1); slightly calcareous; massive.

VERY SLIGHTLY SILTY CLAY [76.46-76.65 m]; see next page.

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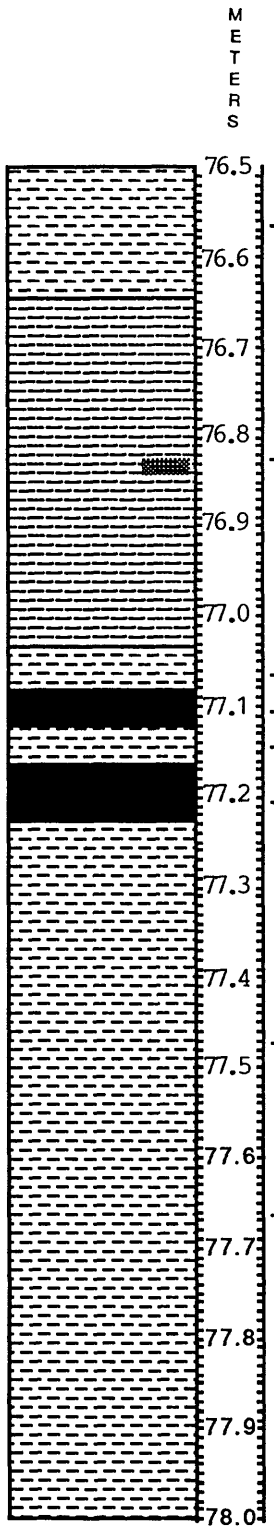

VERY SLIGHTLY SILTY CLAY [76.46-76.65 m]; grayish olive green (5GY3/2); calcareous; platy, massive.

CLAY [76.65-77.04 m]; grayish olive green (5GY3/2); disturbed bedding, mushed.

VERY SLIGHTLY SILTY CLAY [77.04-77.09 m]; grayish olive green (5GY3/2); platy, massive.

REWORKED MUDDY TEPHRA (?) [77.09-77.13 m]; lighter color; platy, massive.

VERY SLIGHTLY SILTY CLAY [77.13-77.17 m]; grayish olive green (5GY3/2); platy, massive.

SLIGHTLY CLAYEY TEPHRA [77.17-77.23 m]; light olive gray (5Y6/1).

Thin sandy interbed [77.47 m].

VERY SLIGHTLY SILTY CLAY [77.23-78.24 m]; medium greenish gray (5GY5/1) grading into greenish gray (5GY6/1) with faint mottling; mottled blob at approximately 77.79 m; mildly calcareous; massive, platy.

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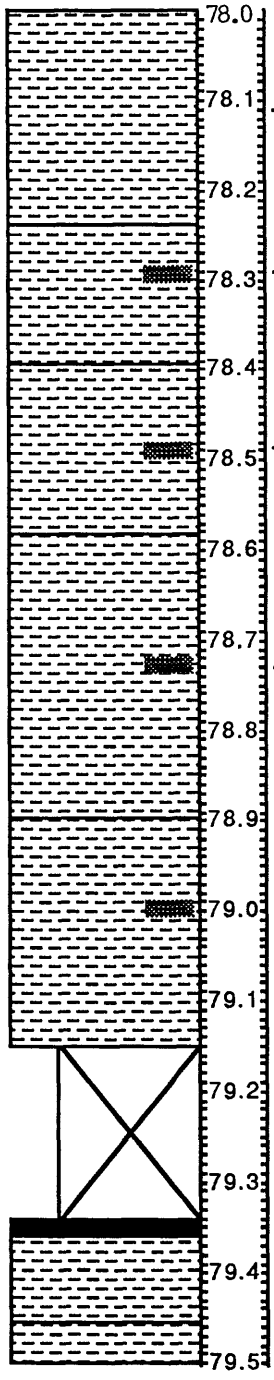

VERY SLIGHTLY SILTY CLAY [77.23-78.24 m]; medium greenish gray (5GY5/1) grading into greenish gray (5GY6/1) with faint mottling; mildly calcareous; massive, platy.

SLIGHTLY SILTY CLAY WITH SANDY INTERBEDS [78.24-78.40 m]; greenish gray (5GY6/1); cm-scale bedding.

SILTY CLAY [78.40-78.59 m]; greenish gray (5GY6/1); platy lamination, otherwise massive; mm-scale sand interbed at base of unit (78.59 m).

SILTY CLAY [78.59-78.90 m]; dark greenish gray (5GY4/1); platy lamination, otherwise massive.

SILTY CLAY [78.90-79.15 m]; olive gray (5Y4/1); platy lamination, otherwise massive.

No core recovered [79.15-79.34 m].

Start of Drive 58 [79.34-80.64 m].

TEPHRA DISPERSED IN MUSHY MUD [79.34-79.36 m]; may be out of place.

MUD [79.36-79.46 m]; core broken at base of unit; material lost?

MUD [79.46-79.70 m].

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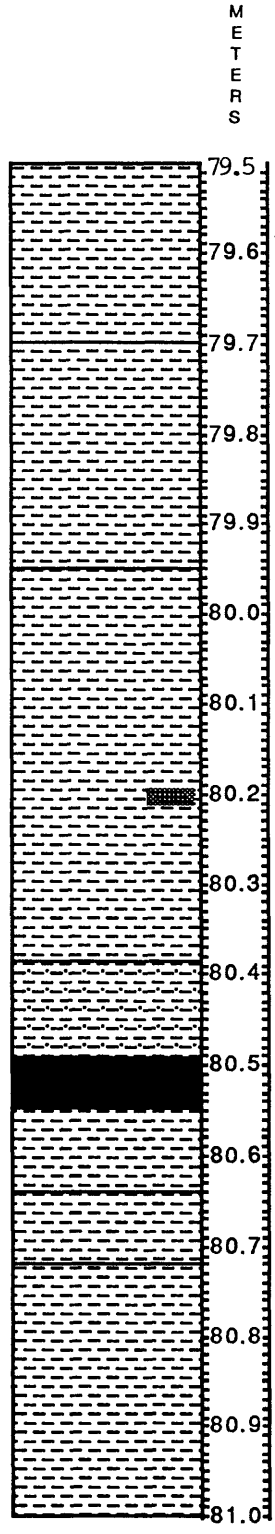

MUD [79.46-79.70 m].

MUD [79.70-79.95 m].

MUD [79.95-80.39 m].

Regular cm-scale bedding from 80.17-80.27 m.

SANDY MUD [80.39-80.49 m]; deformed lower contact.

DISPERSED TEPHRA [80.49-80.55 m]; darker color than surrounding units; deformed, gradational lower contact.

SILTY CLAY [80.55-80.64 m].

Start of Drive 59 [80.64-83.94 m].

SILTY CLAY MATRIX WITH CLAY CLASTS (< 1mm) [80.64-80.72 m]; mottled, greenish black (5G2/1); calcareous; disturbed by coring.

SILTY CLAY WITH RARE BLEBS OF VOLCANIC VERY FINE SILTY SAND (up to 1 cm) [80.72-81.20 m]; dark greenish gray (5G4/1); calcareous; massive.

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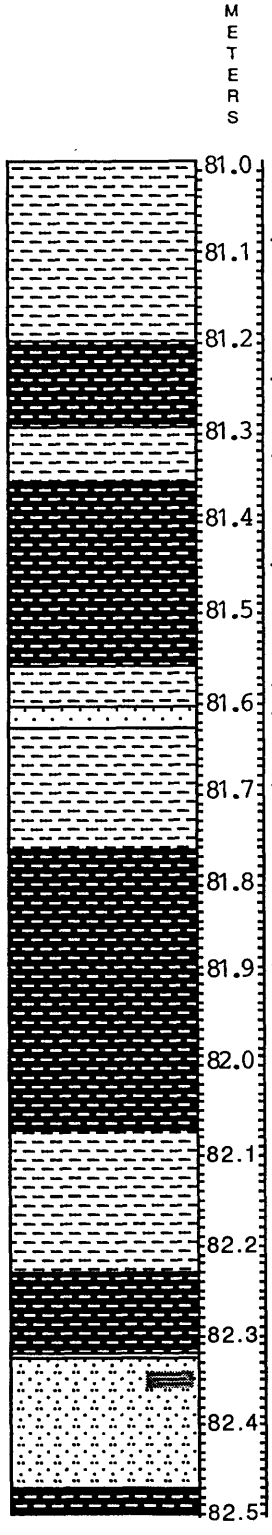

SILTY CLAY WITH RARE BLEBS OF VOLCANIC VERY FINE SILTY SAND (up to 1 cm) [80.72-81.20 m]; dark greenish gray (5GY4/1); calcareous; massive; deformed, gradational lower contact.

ORGANIC-RICH (?) CLAY WITH RARE BLEBS OF VOLCANIC SAND [81.20-81.30 m]; grayish olive (10Y4/2), almost translucent in thin slices; calcareous; brittle; massive; deformed lower contact.

PIECE (?) OF OVERLYING "GRAY" SILTY CLAY [81.30-81.36 m]; dark greenish gray (5GY4/1); calcareous; deformed, blebs of very fine sand.

ORGANIC (?) CLAY WITH RARE BLEBS OF SAND (up to 1 cm) [81.36-81.56 m]; grayish olive (10Y4/2), almost translucent in thin slices; calcareous; brittle; platy, massive, deformed (?); deformed, gradational lower contact.

SILTY CLAY [81.56-81.61 m]; medium greenish gray (5GY5/1); calcareous; deformed lower contact.

VOLCANIC SAND (TEPHRA?) [81.61-81.62 m]; almost black in color; calcareous; deformed lower contact.

SILTY CLAY [81.62-81.76 m]; medium greenish gray (5GY5/1); calcareous; deformed, gradational (?) lower contact.

ORGANIC (?) CLAY WITH RARE BLEBS OF VOLCANIC SAND (up to 1 cm, as at 81.24 and 81.44 m) [81.76-82.07 m]; grayish olive ((10Y4/2); calcareous; brittle, but drills easily; platy, massive, deformed (?); deformed, sharp lower contact.

BIG BLOB OF VERY SLIGHTLY SILTY CLAY (CONTAINING BLEBS OF OSTRACODE SAND) [82.07-82.23 m], like at 81.71 m and in over- and underlying units (only half of core cylinder shows this); calcareous; deformed lower contact.

ORGANIC CLAY [82.23-82.32 m]; calcareous; massive.

STRINGERS OF VERY FINE SILTY VOLCANIC SAND [82.32-82.47 m]; mottled, deformed mm- to cm-scale bedding; calcareous; deformed, sharp lower contact.

ORGANIC (?) CLAY [82.47-83.26 m]; light olive (10Y5/4), almost translucent in thin slices; calcareous; massive.

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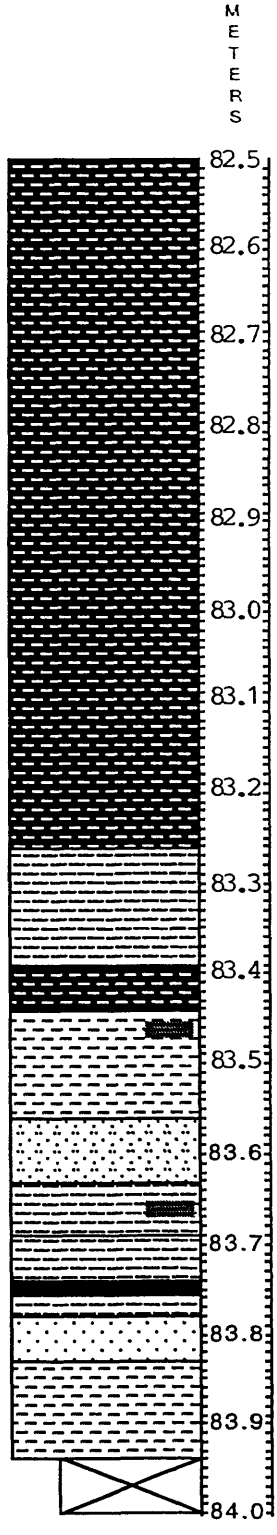

ORGANIC (?) CLAY [82.47-83.26 m]; light olive (10Y5/4), almost translucent in thin slices; calcareous; massive; gradational lower contact.

CLAY (same grain size as above unit but different color) [83.26-83.39 m]; light olive brown (5Y4/6); calcareous; massive; gradational lower contact.

ORGANIC (?) CLAY [83.39-83.44 m]; light olive (10Y5/4); calcareous.

SILTY CLAY [83.44-83.56 m]; dark greenish gray (5GY3/1); highly calcareous; laminations to 1 cm beds, deformed; very abundant ostracodes.

CHIPS OF CALCIUM CARBONATE IN SILTY VERY FINE SAND [83.56-83.63 m]; generally gray; loaded with shell fragments and ostracodes.

TWO UNITS: CLAY [83.63-83.69 m]; banded light olive brown (5Y4/6); calcareous; faint cm-scale beds. CLAY [83.69-83.74 m]; dark gray (N3); calcareous; sharp lower contact.

SANDY TEPHRA [83.74-83.75 m]; calcareous; sharp lower contact.

CLAY [83.75-83.78 m]; grayish olive (10Y4/2); calcareous; massive.

VOLCANIC VERY FINE SAND [83.78-83.83 m]; black; calcareous; massive; loaded with shells, ostracodes and fish; sharp lower contact.

SLIGHTLY SILTY CLAY [83.83-83.94 m]; medium greenish gray (5G5/1); calcareous; massive. No core recovered [83.94-85.14 m].

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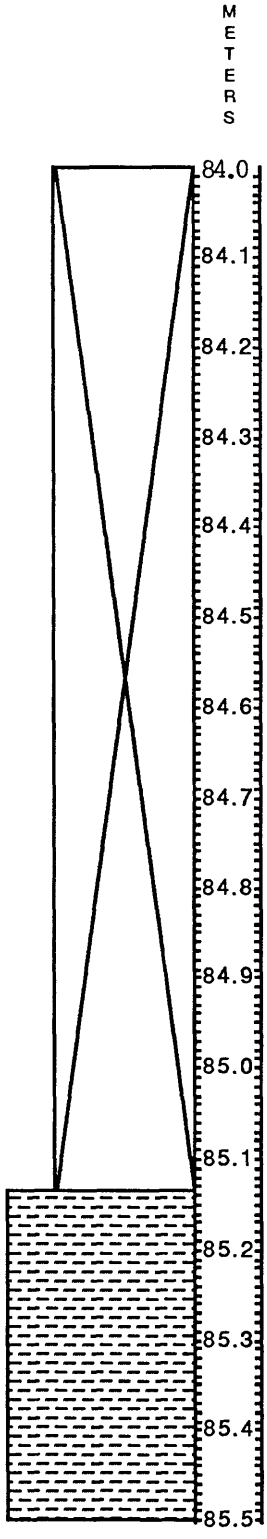

No core recovered [83.94-85.14 m].

Start of Drive 60 [85.14-88.19 m].

VERY SLIGHTLY SILTY CLAY [85.14-85.53 m]; banded, medium greenish gray (5G5/1); non-calcareous; massive.

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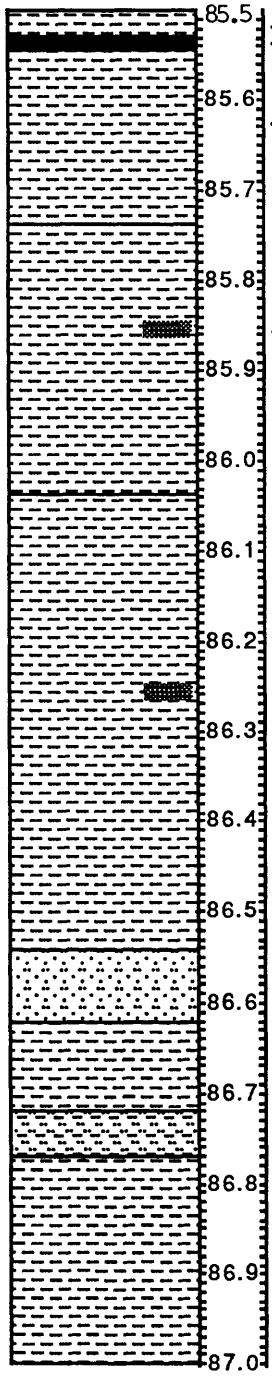

VERY SLIGHTLY SILTY CLAY [85.14-85.53 m]; banded, medium greenish gray (5G5/1); non-calcareous; massive.

SANDY MUD, TEPHRA (?) [85.53-85.54 m].

VERY SLIGHTLY SILTY CLAY [85.54-85.74 m]; banded, medium greenish gray (5G5/1); non-calcareous; massive, but bioturbated in places.

VERY SLIGHTLY SILTY CLAY [85.74-86.04 m]; banded, medium greenish gray (5G5/1); non-calcareous; disturbed laminations to mm-scale bedding.

VERY SLIGHTLY SILTY CLAY [86.04-86.54 m]; darker than medium greenish gray (5G5/1); mildly calcareous; disturbed laminations to mm-scale bedding; gradational lower contact.

SILTY VOLCANIC SAND, PUMICEOUS (TEPHRA?) [86.54-86.62 m]; mildly calcareous; wavy, deformed, sharp lower contact.

SLIGHTLY SILTY CLAY [86.62-86.72 m]; medium greenish gray (5G5/1); gradational lower contact.

CLAYEY SILT (DIATOMITE OR TEPHRA?) [86.72-86.77 m]; light olive gray (5Y6/1); gradational lower contact.

SLIGHTLY SILTY CLAY [86.77-87.17 m]; medium greenish gray (5G5/1).

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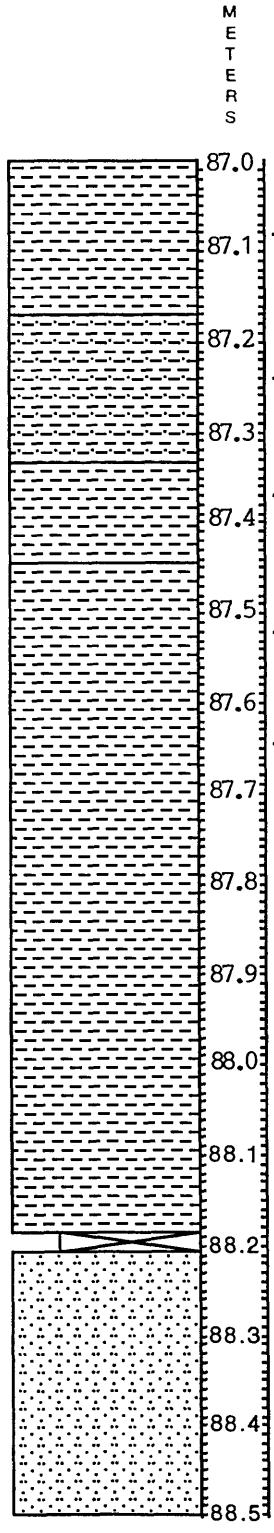

SLIGHTLY SILTY CLAY [86.77-87.17 m]; medium greenish gray (5G5/1); deformed, gradational lower contact.

BLOBBY SANDY CLAY IN SILTY CLAY [87.17-87.34 m], with a sandy clay blob extending down into unit below (to 87.37 m); swirled gray sandy clay and green silty clay; sandy clay calcareous, silty clay non-calcareous; deformed structure; deformed, gradational lower contact.

SILTY CLAY WITH VERTICAL MUDDY SAND STRINGER CONTINUING UP FROM UNIT BELOW [87.34-87.45 m]; gray; circular cross-section of muddy sand stringer.

Vertical muddy sand stringer from 87.34-87.60 m; circular in cross-section.

SILTY CLAY WITH VERTICAL MUDDY SAND STRINGERS [87.45-88.19 m]; massive.

Vertical muddy sand stringer from 87.65-88.14 m; circular in cross-section.

No core recovered [88.19-88.21 m].

Start of Drive 61 [88.21-91.53 m].

FINE SILTY SAND [88.21-88.61 m]; medium green gray (5G5/1); massive.

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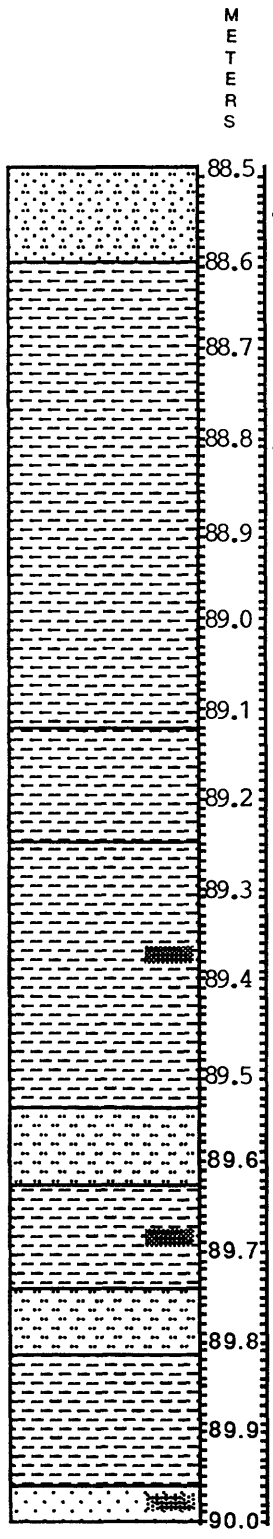

FINE SILTY SAND [88.21-88.61 m]; medium green gray (5G5/1); massive; irregular lower contact with fish bones.

SLIGHTLY SILTY CLAY [88.61-89.13 m]; grayish olive (10Y4/2) at 88.71 m, banded light olive (10Y5/4) at 88.88 m, and moderate olive brown (5Y4/4) at 89.03 m; gradational lower contact.

SLIGHTLY SILTY CLAY (1-2 mm size) [89.13-89.25 m], fining upward in unit; broken shell fragments and questionable fish or plant remains; load casts at lower contact.

SLIGHTLY SILTY CLAY [89.25-89.54 m]; grayish olive green (5GY3/2); cm-scale bedding; highly calcareous.

SILT [89.54-89.63 m]; very dark grayish olive green (5GY2/2); massive.

SLIGHTLY SILTY CLAY [89.63-89.74 m]; olive gray (5Y3/2); mm- to cm-scale bedding.

SILT [89.74-89.82 m]; very dark grayish olive green (5GY2/2); massive.

SILTY CLAY [89.82-89.96 m]; grayish olive green (5GY3/2); massive.

FINE TO VERY FINE SAND TO SILT [89.96-90.13 m]; dusky yellow green (5GY5/2) grading down into grayish olive (10Y4/2); 2-4 cm bedding.

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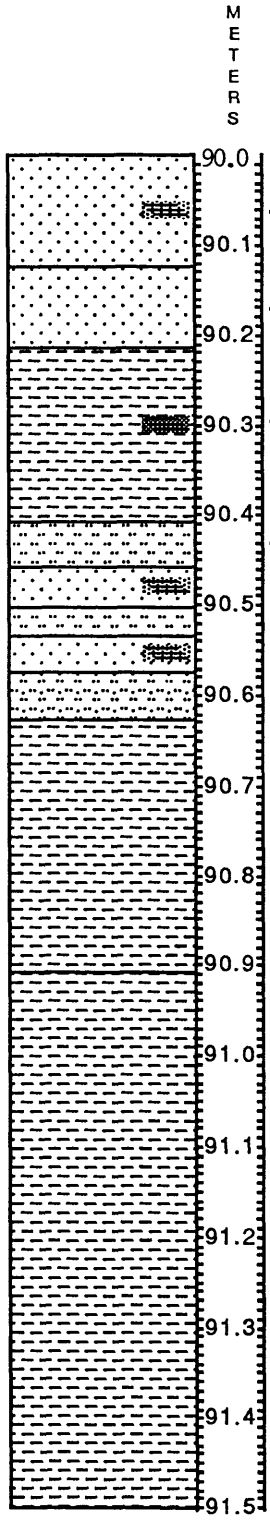

FINE TO VERY FINE SAND TO SILT [89.96-90.13 m]; dusky yellow green (5GY5/2) grading down into grayish olive (10Y4/2); 2-4 cm bedding.

FINE SAND [90.13-90.22 m]; olive gray (5Y3/2); massive.

SLIGHTLY SILTY CLAY WITH FINE SAND INTERBED [90.22-90.41 m]; grayish olive green (5GY3/2); 3-4 cm bedding; very fine sand interbed from 90.32-90.37 m.

SILT [90.41-90.46 m]; grayish olive green (5GY3/2).

VERY FINE SAND [90.46-90.51 m]; grayish olive green (5GY3/2); bedded.

SILT [90.51-90.54 m]; grayish olive green (5GY3/2); bedded.

VERY FINE SAND [90.54-90.58 m]; grayish olive green (5GY3/2); bedded.

SANDY SILT [90.58-90.63 m]; grayish olive green (5GY3/2); bedded; shell fragments at 90.62 m.

Broken shell layer [90.75-90.77 m].

SLIGHTLY SILTY CLAY WITH FINE SAND INTERBEDS [90.63-90.91 m]; medium olive gray (5Y5/1); very fine sand interbed from 90.65-90.67 m, fining upward, load casting.

SILTY CLAY [90.91-91.50 m]; dark greenish gray (5GY4/1); massive.

Fine sand layer at 91.43 m; calcareous; shells?

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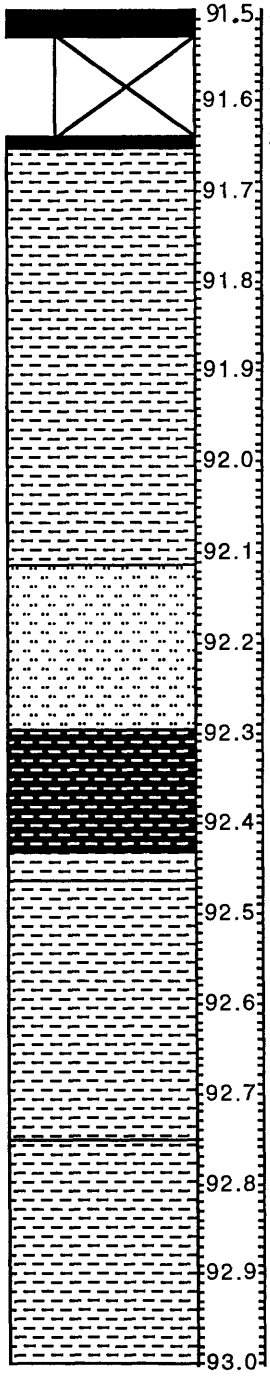

PUMICE (TEPHRA) [91.50-91.53 m], generally 3-5 mm but a few cm-sized.

No core recovered [91.53-91.64 m].

Start of Drive 62 [91.64-95.32 m].

TEPHRA WITH DRILLING MUD [91.64-91.65 m].

SLIGHTLY SILTY CLAY [91.65-92.12 m]; moderate greenish gray (5GY5/1) from 91.65-91.08 m, grayish olive (10Y4/2) from 92.08-92.12 m; non-calcareous from 91.65-91.99 m, calcareous at 92.04 m; massive.

Abundant ostracodes [92.11-92.13 m] in layer which straddles both units; fish scale at 92.14 m.

SILT [92.12-92.30 m]; brownish black (5YR2/1); massive.

Abundant ostracodes [92.29-92.32 m] in layer which straddles both units.

ALGAL (?) MUD [92.30-92.43 m]; grayish olive (10Y4/2); massive; scattered ostracodes throughout.

MUD [92.43-92.46 m]; grayish olive (10Y4/2); scattered ostracodes throughout.

MUD [92.46-92.75 m]; moderate olive brown (5Y4/4); massive; scattered ostracodes throughout.

Ostracode layer at 92.61 m.

Ostracode layer from 92.69-92.70 m.

SLIGHTLY SILTY CLAY [92.75-93.30 m]; grayish olive (10Y4/2); slightly calcareous from 92.84-93.11 m; massive.

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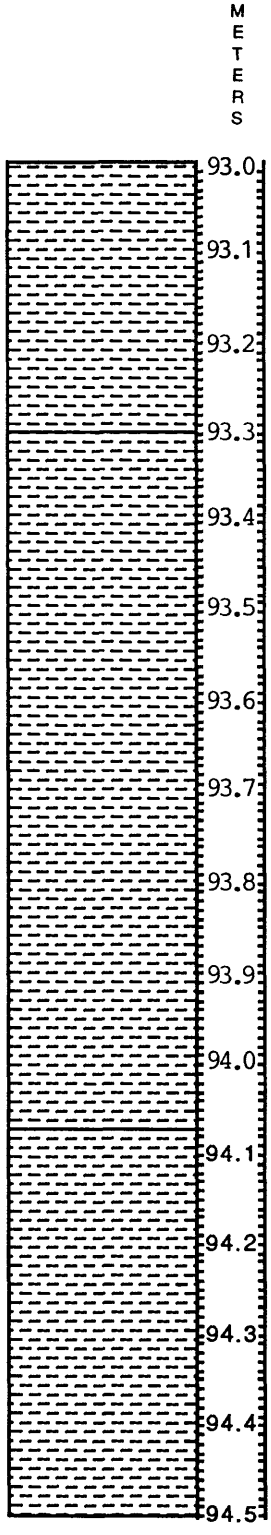

SLIGHTLY SILTY CLAY [92.75-93.30 m]; grayish olive (10Y4/2); slightly calcareous from 92.84-93.11 m, very slightly calcareous in remainder of unit below; massive.

SLIGHTLY SILTY CLAY [93.30-94.07 m]; variable colors, as listed below; very slightly calcareous; massive.

Dark greenish gray (5GY4/1) at 93.39 m.

Medium olive gray (5Y4/2) at 93.57 m.

Grayish black (N2) at 93.71 m.

Olive black (5Y2/1) at 93.88 m.

Ostracodes (?) at 94.16 m and a thin laminae of very fine sand at 94.17 m.

SLIGHTLY SILTY CLAY [94.07-94.53 m]; olive gray (5Y4/1); highly calcareous; massive.

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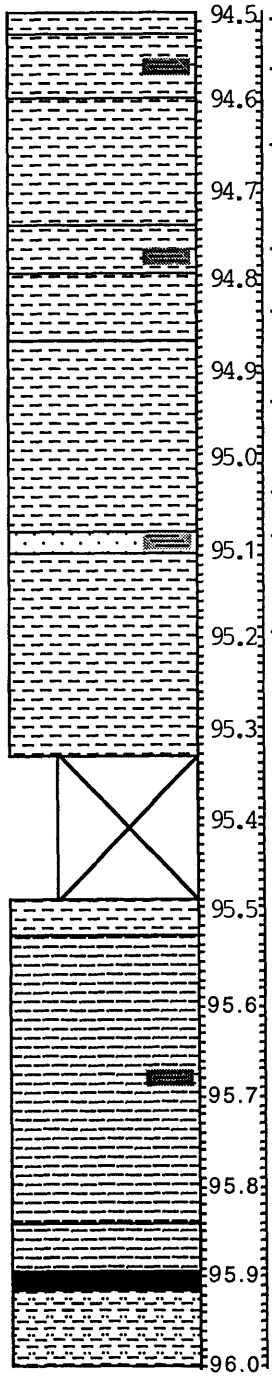

SLIGHTLY SILTY CLAY [94.07-94.53 m]; olive gray (5Y4/1); highly calcareous; massive.

SLIGHTLY SILTY CLAY [94.53-94.60 m]; mottled, brownish gray (5YR4/1); non-calcareous; bedding.

SLIGHTLY SILTY CLAY [94.60-94.74 m]; olive gray (5Y4/1); mildly calcareous; massive.

SLIGHTLY SILTY CLAY [94.74-94.80 m]; mottled, brownish gray (5YR4/1); bedding.

SLIGHTLY SILTY CLAY [94.80-94.87 m]; massive.

SILTY CLAY [94.87-95.08 m]; grayish olive (10Y4/2); mildly calcareous; massive.

Ostracodes at base of unit (95.01-95.08 m).

VERY FINE SAND TO SILT [95.08-95.09 m]; mm-sized laminae; mildly calcareous.

SLIGHTLY SILTY CLAY [95.09-95.32 m]; olive gray (5Y4/1); mildly calcareous; massive.

No core recovered [95.32-95.48 m].

Start of Drive 63 [95.48-98.65 m].

SILTY CLAY [95.48-95.52 m]; medium olive gray (5Y4/2); mushy.

CLAY [95.52-95.84 m]; medium olive gray (5Y4/2); calcareous; platy laminations, otherwise massive; mottled near bottom of unit; gradational lower contact.

CLAY WITH OSTRACODE VALVES [95.84-95.90 m]; medium olive gray (5Y4/2); calcareous; ostracodes and shell fragments (?); gradational lower contact.

SANDY MUD, MUDDY SAND, AND PUMICE (?) [95.90-95.92 m]; medium olive gray (5Y4/2); calcareous; lower contact is deformed, irregular and gradational. Unit below [95.92-96.07 m], see next page.

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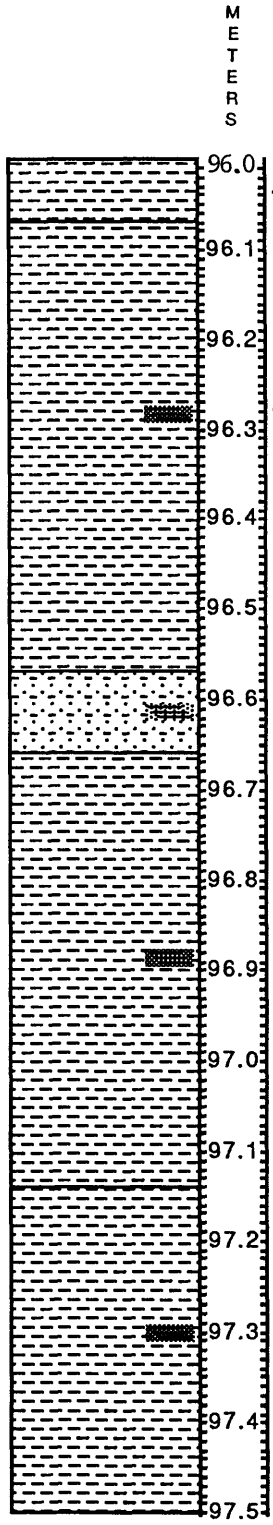

SLIGHTLY SILTY CLAY [95.92-96.07 m]; medium olive gray (5Y4/2); transitional between units above and below (?); calcareous; gradational lower contact.

SILTY CLAY [96.07-96.57 m]; olive gray (5Y3/1) with faint cm-scale banding and strong mottling; non-calcareous; very strongly bioturbated; disrupted, cm-scale bedding; gradational lower contact.

MUDDY SAND AND SANDY MUD WITH PUMICE (?) FRAGMENTS AT BASE OF UNIT [96.57-96.66 m]; almost black in color; non-calcareous; 2-3 cm fining upward beds; gradational lower contact.

VERY SLIGHTLY SILTY CLAY WITH INTERBEDS (mm-scale) OF SILTY CLAY AND VOLCANIC SILT [96.66-97.14 m]; olive gray (5Y3/1) with black volcanic silt; non-calcareous; mm-scale sets of wavy, irregular laminations in cm-scale beds disrupted by bioturbation in places.

VERY SLIGHTLY SILTY CLAY [97.14-97.55 m]; olive gray (5Y3/1); non-calcareous; wavy, irregular laminations.

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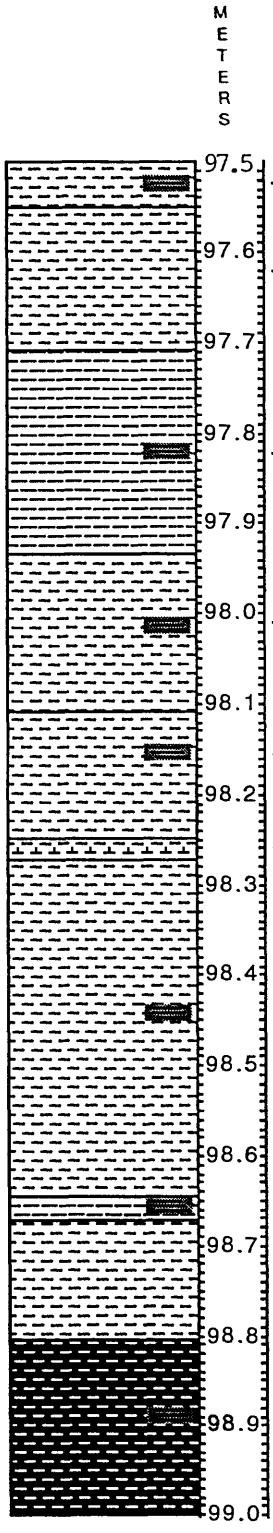

VERY SLIGHTLY SILTY CLAY [97.14-97.55 m]; olive gray (5Y3/1); non-calcareous; wavy, irregular laminations.

TRANSITIONAL BETWEEN CLAY AND VERY SLIGHTLY SILTY CLAY [97.55-97.71 m]; olive black (5Y2/1); non-calcareous from 97.55-97.61 m, calcareous to highly calcareous from 97.61-97.71 m; gradational lower contact.

CLAY [97.71-97.94 m]; black (N1); calcareous to highly calcareous; platy laminations, otherwise massive; gradational lower contact.

SLIGHTLY SILTY CLAY WITH OSTRACODE (?) VALVES [97.94-98.11 m]; transitional between units above and below; calcareous to highly calcareous; platy laminations; gradational lower contact.

SLIGHTLY SILTY CLAY WITH SAND-SIZED OSTRACODE (?) VALVES [98.11-98.25 m]; grayish olive (10Y3/2); calcareous to highly calcareous; cm-scale beds; ostracodes; gradational lower contact.

MARL (?) [98.25-98.27 m]; yellowish gray (5Y7/2); highly calcareous; ostracodes; gradational lower contact.

SLIGHTLY SILTY CLAY WITH SAND-SIZED OSTRACODE (?) VALVES [98.27-98.65 m]; grayish olive (10Y3/2) with bands of light olive gray (5Y4/2); calcareous to highly calcareous; 3-10 cm bedding with platy laminations in most beds; ostracodes.

Start of Drive 64 [98.65-101.47 m].

CLAY [98.65-98.67 m]; laminations; sharp lower contact.

SILTY CLAY [98.67-98.81 m]; olive gray (5Y3/2); calcareous; deformed, sharp lower contact.

SLIGHTLY SILTY CLAY (ALGAL?) [98.81-99.41 m]; moderate olive brown (5Y4/4); calcareous; loaded with ostracodes and some shell fragments; platy laminations, otherwise massive except for sand interbeds (listed below).

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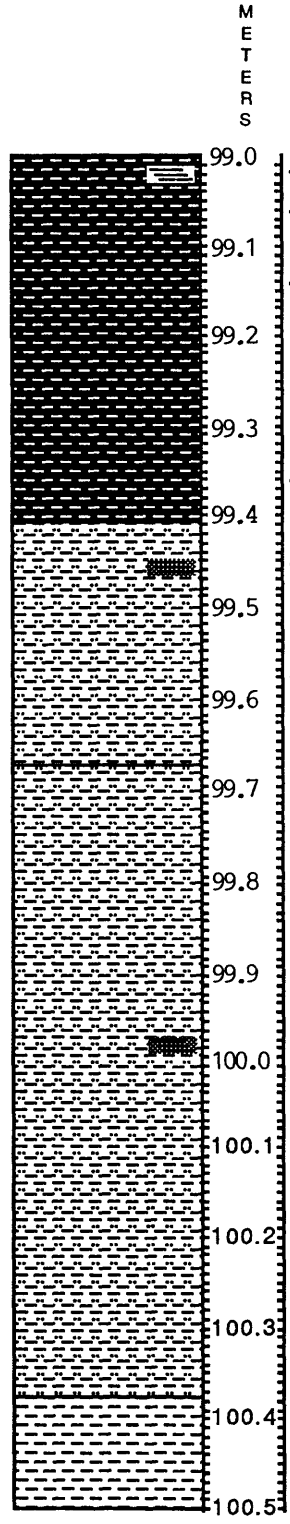

SLIGHTLY SILTY CLAY (ALGAL?) [98.81-99.41 m]; moderate olive brown (5Y4/4); calcareous; loaded with ostracodes and some shell fragments; platy laminations, otherwise massive except for sand interbeds (listed below); wavy, gradational lower contact.

Black sand interbed from 99.03-99.05 m.

Black sand interbed from 99.12-99.16 m.

Black sand interbed from 99.29-99.41 m.

SLIGHTLY SILTY CLAY AT TOP OF UNIT GRADING DOWN INTO MUDDY SANDS AT BOTTOM [99.41-99.68 m]; light olive gray (5Y5/2); calcareous; abundant ostracodes and some shell fragments from 99.41-99.57 m; platy laminations to cm-scale bedding; sharp lower contact.

Muddy sand interbed with coarse sand from 99.57-99.60 m.

SILTY CLAY WITH MINOR MUDDY FINE SAND AND SANDY CLAY INTERBEDS (mm-scale) [99.68-100.38 m]; brownish gray (5YR4/1); non-calcareous; cm-scale bedding; gradational lower contact.

SILTY CLAY [100.38-100.50 m]; olive black (5Y2/1); non-calcareous; gradational lower contact.

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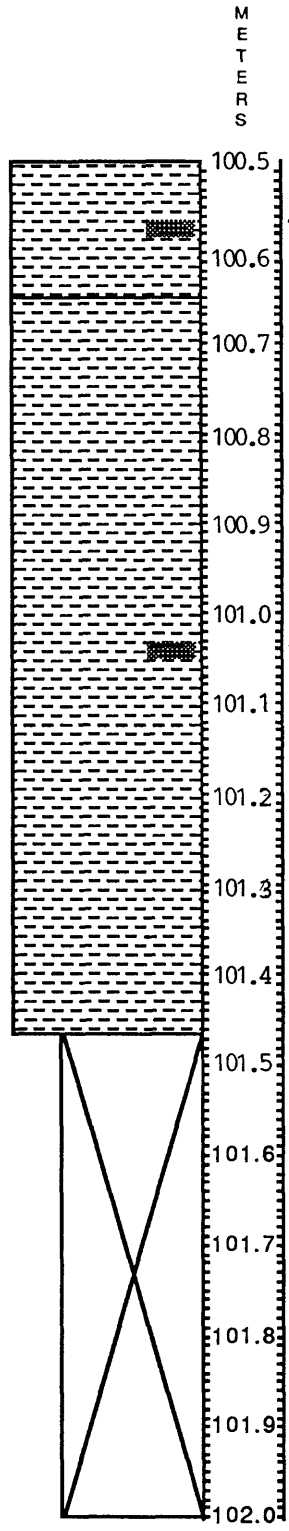

SILTY CLAY [100.50-100.65 m]; light olive gray (5Y5/2); non-calcareous; faint cm-scale bedding; gradational lower contact.

SILTY CLAY [100.65-101.47 m]; black (N1); mildly calcareous; faint wavy lamination in 1-2 cm beds; noticeably fetid.

Base of core at 101.47 m.