STATE OF DELAWARE
DELAWARE GEOLOGICAL SURVEY
REPORT OF INVESTIGATIONS NO. 2

HIGH-CAPACITY TEST WELL DEVELOPED AT THE AIR FORCE BASE

Dover, Delaware

by

W. C. RASMUSSEN

J. J. GROOT

and

A. J. DEPMAN

Newark, Delaware
June, 1958

HIGH-CAPACITY TEST WELL DEVELOPED AT THE AIR FORCE BASE DOVER, DELAWARE

By

W. C. RASMUSSEN
District Geologist, U. S. Geological Survey

J. J. GROOT
State Geologist of Delaware

and

A. J. DEPMAN
Geologist, Corps of Engineers, U. S. Army

Prepared cooperatively by the

Geological Survey

United States Department of the Interior

the Corps of Engineers

United States Army

and the

Delaware Geological Survey

June 1958

Present knowledge of the geology of Delaware results from studies made by many persons, but until the last 5 years the chief contributors were geologists of Maryland, New Jersey, and the Federal Survey, who carried their investigations over from adjacent States. Thus, Woolman (1892, 1894, 1897, 1899, 1900, and 1902) in the annual reports of the State Geologist of New Jersey, reported on the first correlation of fossils from wells in Delaware. Darton (1896, 1905) of the U. S. Geological Survey considered the artesian-well prospects. Miller (1906; Bascom and Miller, 1920), also of the Federal Survey, did the first surface mapping on the Coastal Plain. From Maryland, Mathews (Clark, Mathews, and Berry, 1918) reported on the water resources of Delaware.

Since 1950, cooperative ground-water investigation of the U. S. Geological Survey and the Delaware Geological Survey have resulted in a review of the geology of the State (Marine and Rasmussen, 1955). Independent geological research by the Delaware Geological Survey has contributed to knowledge of the basic stratigraphy (Groot, Organist, and Richards, 1954; Groot, 1955). This broad foundation is the basis for the correlations and interpretations made in this report.

Local Logs

The log of a well is a personal or mechanical record of observations from various depths in a hole; each log has its specific value, and each its limitations.

Table 1 is the drillers' log, prepared by the two drillers, Audie Reimals and Phillip Bucher, who were in charge of alternate 12-hour work tours. This log is based on their experience with the performance of the hydraulic rotary drill, in various earth materials, gained from years of work on Long Island in similar sediments.

Table 2 is a geologists' log prepared by the writers, and by those mentioned in the Introduction who participated in the around-the-clock sampling. The geologists' tours of duty were 8 hours and the schedule was repeated every two days. This log is based upon hand-lens inspection of the cores and cuttings, and upon reports from the drillers on where they felt a change in the vibration of the drill rod in passing from a clay to a sand or vice versa.

Figure 3 is a graph of the median and quartile sand sizes in the principal water-bearing beds. Table 3 is a compilation of preliminary paleontologic identifications by R. M. Germeroth.

Table 4 is a composite log, derived from all the preceding logs, and given a stratigraphic interpretation. Plate 1, prepared by A. J. Depman and Arthur Thomas, shows this composite log symbolically compared to the electrical logs (self-potential and resistivity) and the gamma-ray log obtained with the Widco logger.

TABLE 1.—Drillers' log

The following information is a faithful copy of the drillers' log recorded by two experienced drillers of the Lauman Co., Audie Reimals and Phillip Bucher. They based their log on the feel of the hydraulic rotary tool, while drilling, on the cuttings that were washed up, and on inspection of each core shortly after it was removed from the core barrel.

Depth (feet)	
0	
	Loam and clay
10	
	Medium gray sand, some clay
20	
	Coarse brown sand, some grit
37	
	Fine brown sand, some clay
44	
	Solid gray clay
55	
	Gray sandy clay, mica
64	
	Fine gray clayey sand, grits
70	
	Fine gray sand, grit, some clay, shell fragments
76	
	Layers of fine gray sand and solid gray clay
85	
	Fine to medium-coarse gray sand, grit
93	
	Solid brownish-gray clay, mica
115	
	Solid gray clay, shell fragments
123	
	Greenish-gray sandy clay, shell fragments
145	
	Solid greenish-gray clay, mica, shell fragments
174	
	Medium-coarse gray sand, shell fragments, streaks of sandy clay
186	
	Solid greenish-gray clay, shell fragments
203	
	Layers of fine gray sand, sandy clay, shell fragments
213	
	Fine gray sand, streaks of sandy clay, shell fragments
225	
	Medium gray sand, some shells, streaks of clay
245	
	Solid brown clay, streaks of sandy clay
279	
	Solid greenish-gray clay
294	
	Fine greenish sandy clay, broken shells
305	
	Solid gray clay, some broken shells
319	
	Solid brown clay, some broken shells
336	
	Fine greenish-gray sandy clay, broken shells

Depth (feet)	
346	Fine green sand, some broken shells
358	Fine green sand, broken shells, some clay, streaks of cemented sand
404	Fine green sand, broken shells, streaks of sandy clay
425	Fine to medium-coarse green sand, some clay, broken shells, streaks of sandy clay
514	Fine green sand, some clay, broken shells, streaks of sandy clay
543	Fine to medium green sand, some clay, broken shells
566	Fine to medium green sand, some clay - very dirty, broken shells
584	Very fine greenish-gray sandy clay, broken shells
633	Solid greenish-gray clay, very hard
664	Greenish-gray clay, black specks
673	Layers of hard and medium-hard greenish clay, pieces and streaks of cemented sand
686	Solid brownish-gray clay
693	Solid greenish-gray clay, pieces of cemented silt
704	Solid greenish-gray clay, streaks of shale
735	Very fine greenish-gray sandy clay
774	Solid greenish-gray clay
784	Solid green clay
805	Solid greenish-gray clay, some small shell fragments
826	Very fine greenish-gray sandy clay, shell fragments
844	Very fine greenish-gray sandy clay, shell fragments at 927 feet, 947, and 977
1,034	Fine gray sandy clay
1,085	Fine greenish-gray sandy clay
1,102	Fine to very fine brownish-gray sand, some clay
1,116	Very fine brownish-gray sand, some clay, mica, streaks of cemented sand
1,132	Very fine brownish-gray sand, some clay, mica
1,143	Very fine greenish-gray sandy clay, mica, pieces of cemented silt
1,163	Very fine greenish-gray sandy clay, mica, pyrite.
1,172	Very fine greenish-gray sandy clay, mica, shell fragments

Depth (feet)	
1,232	
	Very fine greenish-gray sandy clay, streaks of lignite and cemented sand
1,246	
	Very fine greenish-gray sandy clay, mica, pyrite
1,277	
	Layers of solid brown clay, fine gray sandy clay, streaks of pyrite
1,285	
	Lignite, streaks of pyrite
1,294	
	Solid gray sandy clay
1,306	
	Very fine gray sand, mica, pyrite
1,334	
	Medium-coarse gray sand, streaks of fine gray sand, lignite
1,345	
	Very fine gray silt
1,356	
	Solid gray clay, streaks of pyrite
1,361	
	Multi-colored solid clay
1,394	
	Medium white sand, streaks of multi-colored clay and pyrite
1,401	
	Fine gray sand, streaks of lignite
1,417	
	Very fine silty gray clay, mica
1,422	

TABLE 2.—Geologists' log

Descriptions by the geologists and engineering aids who collected samples while the drilling was in progress.

Sample number: DS, Ditch sample.

Sample number	Depth interval (feet)	Description
DS-1	0-10	Sand, fine, clayey, buff
DS-2	10-20	Sand, coarse to very coarse, gray-brown
DS-3	20-30	Sand, medium to coarse, reddish-brown, with black fragments
DS-4	30-37	Sand, medium to coarse, with granules and gravel, reddish-brown; lignite
Core 1	37-39	Sand, fine to medium, silty, reddish-brown (recovery 9 in., 50 percent)
DS-5	37-47	Clay, gray, some orange; few gravel fragments
Core 2	47-49	Clay, dark gray, stiff
DS-6	47-57	Clay, gray, some orange, soft
Core 3	57-59	Clay, sandy, medium, gray
DS-7	57-67	Clay, gray, soft, with particles of lignite
Core 4	67-69	Sand, medium to coarse, silty, dark gray, some gravel
DS-8	67-72	Sand, medium to very coarse, quartz, silty and clayey, dark gray, some grit.
Core 5	72-74	Sand, medium to coarse, gray, lots of small shell fragments
DS-9	72-77	Sand medium to coarse, gray, with grit and many small shell fragments.
Core 6	77-79	Sand, medium and coarse, in streaks; sand, medium, silty
DS-10	77-87	Sand, medium to coarse, gray, with shell fragments and clay streaks
Core 7	87-89	Sand, medium to coarse, gray
DS-11	87	At bottom: sand, coarse, gray, with gravel
DS-12	87-97	Sand, medium to coarse, gray, some grit, shell; clay, dark gray, from 93 to 97
Core 8	97-99	Clay, dark gray, dry, small specks of mica

Sample number	Depth interval (feet)	Description
DS-13	97-107	Clay, gray, with some small fragments (shell?)
Core 9	107-109	Clay, dark gray, dry
DS-14	107-117	Clay, gray, with occasional grains of sand
Core 10	117-119	Clay, dark gray, dry, with shell fragments and occasional bits of gravel
DS-15	117-127	Shell fragments with clay (shell layers at 123)
Core 11	127-129	Clay with shell fragments and sand, very fine, gray, with silt
DS-16	127-137	Silt, gray-green, and shells. Fewer shells at bottom of sample.
Core 12	137-139m	Silt, gray-green, and sand, fine, few shells
DS-17	137-147	Silt, sandy, fine, gray-green, some shells
Core 13	147-149	Silt, gray-green, and clay
DS-18	147-157	Silt, gray-green, and clay; shells
Core 14	157-159	Clay, silty, gray-green, few shells
DS-19	157-167	Clay, silty, gray-green
Core 15	167-169	Clay, silty, gray-green, some sand, very fine; shells
DS-20	167-177	Clay, silty, gray-green, shells. Sand encountered at 176 feet (estimated)
Core 16	177-179	Sand, medium to coarse, gray-green, many shells
DS-21	177-186	Shell bed - believe out of it at 186 feet. Drilled to 187 feet.
Core 17	187-189	Clay, gray-green, and silt, shells
DS-22	187-197	Clay, silty, gray-green, some shells
Core 18	197-199	Clay, silty, gray-green
DS-23	197-207	Clay, silty, gray-green, some shells. Sand starting at 205 feet (estimated)
Core 19	207-209	Sand, medium, silty, gray-green, and shells
DS-24	207-217	Sand, gray-green, and shells
Core 20	217-219	Sand, medium, gray (made two trips with core barrel)
DS-25	217-227	Sand, gray-green, (very little in sample). Mainly shells. Driller Reimals says sand encountered at 225 feet.

Sample number	Depth interval (feet)	Description
Core 21	227–228	Sand, gray-green, and shells (made two trips with core barrel to obtain 9-inch core)
DS-26	227–237	Sand and silt, with shell and some lignite
Core 22	237–238.5	Sand, medium fine, slightly silty, greenish-gray (full recovery)
DS-27	237–247	Sand, medium fine, slightly silty, greenish-gray, with clay and streaks of sand estimated by Driller Reimals beginning at 245 feet
Core 23	247–248.5	Clay, brown, interbedded with sand, fine-grained, gray, some mica (full recovery)
DS-28	247–257	Clay, brown, with shell fragments, some mica (muscovite) flakes, and pieces of lignite
Core 24	257–258.5	Clay, brown, with some fine gray sand lenses (50 percent recovery)
DS-29	257–267	Clay, brown, shell fragments
Core 25	267–268.5	Clay, gray, to clay, micaceous, sandy, gray (full recovery)
DS-30	267–277	Clay, gray, with shell fragments
Core 26	277–278.5	Clay, brown, with sand, fine, micaceous, gray, interbedded, some small lignite pieces
DS-31	277–287	Clay, brown, and sand, fine, micaceous, gray, some shell fragments
Core 27	287–288.5	Clay, sandy, gray-green, shell fragments, and aragonite (fibrous structure), full recovery
DS-32	287–297	Clay, sandy, gray-green, shell fragments and aragonite (fibrous structure)
Core 28	297–298.5	Sand, clayey, greenish-gray, to sand, fine-grained, micaceous, much shell material (aragonite)
DS-33	297–307	Clay, sandy, very fine, gray-greenish, micaceous, shell fragments
Core 29	307–308.5	Sand, very fine, clayey, silty, grayish-green; much shell material; very compact
DS-34	307–317	Sand, very fine, clayey, grayish-green; shell fragments
Core 30	317–318.5	Clay, sandy, very fine, silty, grayish-green; shell fragments; very compact
DS-35	317–327	Clay, sandy, very fine, silty, grayish-green; shell fragments; very compact
Core 31	327–328.5	Clay, silty, sandy, very fine, brownish; much fragmented shell; some mica flakes

Sample number	Depth interval (feet)	Description
DS-36	327-337	Clay, silty, sandy, very fine; much fragmented shell; pieces of lignite
Core 32	337-338.5	Sand, very fine, ill-sorted, clayey, grayish-green, compact and dense
DS-37	337-347	Sand, very fine, clayey, grayish-green, some bright green particles
Core 33	347-348.5	Sand, medium-coarse, bright to dark green, loose; glauconite, shell fragments
DS-38	347-357	Sand, medium-coarse, bright to dark green, loose; glauconite; much shell fragments
Core 34	357-358.5	Sand, medium-coarse, glauconitic
DS-39	357-367	Sand, coarse, glauconitic, and shell
Core 35	367-368.5	Sand, medium to coarse, glauconitic, bright green, with some silt and shell fragments; shell at upper end of core
DS-40	367-377	Sand, medium to coarse, glauconitic, clayey, bright green, with shell
Core 36	377-379.5	Sand, medium, glauconitic, clayey, bright green
DS-41	377-387	Clay, sandy, bright green, and shell
Core 37	387-388.5	Sand, fine to coarse, bright green, shell
DS-42	387-397m	Sand, fine to medium, bright green, with shells
Core 38	397-397.5	Sand, fine to medium, bright green, with shells
DS-43	397-407	Do.
Core 39	407-409.5	Sand, fine, bright green
DS-44	407-417	Sand, medium, clayey, bright green, and shell
Core 40	417-418	Sand, medium, bright green, and some clay
DS-45	417-427	Sand, medium to coarse, bright green, and clay with shells
Core 41	427-428.5	Sand, fine to medium, bright green
DS-46	427-437	Sand, fine to medium, bright green, and shells
Core 42	437-438.5	Sand, fine to medium, bright green, and shell fragments
DS-47	437-447	Sand, fine to medium, bright green, and shells
Core 43	447-448.5	Do.
DS-48	447-457	Sand, fine to coarse, glauconitic, green, numerous shell fragments

Sample number	Depth interval (feet)	Description
Core 44	457-459	Sand, fine to medium, bright green
DS-49	457-467	Sand, medium to coarse, bright green, and shell
Core 45	467-468.5	Sand, fine, bright green
DS-50	467-477	Sand, medium to coarse, green, some clay, shell fragments
Core 46	477-479	Sand, medium, glauconitic, green, some clay or silt
DS-51	477-487	Sand, glauconitic, green, with abundant shell fragments
Core 47	487-489	Sand, fine to medium, glauconitic, green; little silt; a few shell fragments. (Driller reports clay streaks in most of this green sand)
DS-52	487-497	Sand, medium, glauconitic, green, shell fragments
Core 48	497-499	Sand, fine to medium, but mostly fine, glauconitic, green, some clay
DS-53	497-507	Same as DS-52
Core 49	507-509	Sand, mostly fine, some medium, green, thin streak of clay, sandy, green
DS-54	507-517	Same as DS-52
Core 50	517-519	Sand, fine, glauconitic, green, thin clay streak
DS-55	517-527	Same as DS-52
Core 51	527-529	Sand, fine, glauconitic, green, some shell fragments, some clay
DS-56	527-537	Same as DS-52
Core 52	537-539	Sand, fine, glauconitic, green
DS-57	537-547	Do.
Core 53	547-549	Sand, fine, some medium, glauconitic, green, little silt
DS-58	547-557	Same as DS-57
Core 54	557-559	Sand, fine to medium, glauconitic, green, shell fragments
DS-59	557-567	Same as DS-57
Core 55	567-569	Sand, fine to medium, green, with shell fragments
DS-60	567-577	Do.
Core 56	577-579	Sand, fine to medium, green, with some small shell fragments, becoming clayey
DS-61	577-587	Same as DS-60

Sample number	Depth interval (feet)	Description
Core 57	587–589	Sand, fine, glauconitic, clayey, green, some shell
DS-62	587–597	Sand, fine, glauconitic, clayey, green, shell fragments
Core 58	597–598	Do.
DS-63	597–607	Sand, fine, glauconitic, very clayey, green, shell fragments
Core 59	607–608	Do.
DS-64	607–617	Do.
Core 60	617–619	Clay, very sandy, fine, glauconitic, shell fragments
DS-65	617–627	Clay, sandy, very fine and silty, glauconitic, shell fragments
Core 61	627–629	Clay, sandy, glauconitic, with shell fragments
	627–637	No sample. Driller says material is clay
Core 62	637–638	Clay, tough, light green (50 percent recovery)
	637–647	No sample. Driller says material is clay. Very slow drilling.
Core 63	647–649	Clay, micaceous, tough, gray-green (100 percent recovery). Drilling about 10 feet an hour.
DS-66	647–657	Clay, gray, more plastic than Core 63 (sample badly contaminated)
Core 64	657–659	Clay, tough, gray-green
DS-67	657–667	Clay, gray-green
Core 65	667–669	Clay, light greenish-gray, with many dark minerals
DS-68	667–677	Clay, light greenish-gray, many dark minerals. Some shell at 676 (?). Hard layers. Drilling easier.
Core 66	677–679	Clay, silty, brown
DS-69	677–687	Clay, silty, brown, with some gray clay
Core 67	687–688.5	Clay, silty, brown
DS-70	687–697	Silt, sandy, brown
Core 68	697–698.5	Silty, sandy, greenish-gray, with glauconitic and other dark grains
DS-71	697–700	Clay, sandy, greenish-gray
DS-72	697–707	Clay, sandy and silty, greenish, with opaque minerals, streaks very hard approaching a shale
Core 69	707–709	Do.
DS-73	707–717	Clay, silty, greenish-gray and brown, and bits of silt and stone

Sample number	Depth interval (feet)	Description
Core 70	717–719	Streaks of clay, silty, greenish-gray, and silt, hard, greenish-gray, approaching siltstone
DS-74	717–727	Clay, silty, few shell fragments
Core 71	727–728	Clay, silty, greenish, with little fine sand and opaque minerals, layers of greenish siltstone
DS-75	727–737	Clay, sandy, greenish, with opaque minerals and shell fragments
Core 72	737–739	Clay, very sandy, glauconitic, greenish
DS-76	737–747	Clay, sandy, glauconitic, greenish-gray, with shell fragments
Core 73	747–749	Clay, greenish-gray, with little very fine sand and silt. No large quantities of glauconite as in Core 72.
DS-77	747–757	Clay, sandy, greenish-gray, hard
Core 74	757–759	Do.
DS-78	757–767	Clay, sandy, glauconitic, greenish-gray
Core 75	767–769	Clay, sandy, greenish-gray, very hard
DS-79	767–777	Clay, sandy, green
Core 76	777–779	Clay, green, hard
DS-80	777–787	Do.
Core 77	787–789	Clay, green, hard. Some very small shell fragments.
DS-81	787–797	Clay, green
Core 78	797–799	Clay, green, very hard, nearly a shale
DS-82	797–807	Clay, green, very hard
Core 79	807–809	Clay, gray-green, hard
DS-83	807–817	Do.
Core 80	817–818	Clay, gray-green, hard, with a few shell fragments
DS-84	817–827	Clay, gray-green, hard
Core 81	827–829	Clay, gray-green, hard, with small shell fragments
DS-85	827–837	Clay, gray-green, hard
Core 82	837–839	Clay, gray-green, hard, with shell fragments
DS-86	837–847	Do.
Core 83	847–849	Sand, very fine, clayey, dark gray-green

Sample number	Depth interval (feet)	Description
DS-87	847-857	Silt, gray-green (badly contaminated with sand)
Core 84	857-859	Clay, dark gray-green; some very fine sand; few shells
DS-88	857-867	Same as DS-87
Core 85	867-869	Same as Core 84
DS-89	867-877	Same as DS-87
Core 86	877-879	Same as Core 84
DS-90	877-887	Same as DS-87
Core 87	887-889	Same as Core 84 except more shell fragments
DS-91	887-897	Very little real sample, identification difficult - drills same as preceding samples
Core 88	897-898	Clay, gray, some shells
DS-92	897-907	Clay, gray
Core 89	907-909	Clay, sandy, dark gray, hard
DS-93	907-917	Clay, gray (drilling mud heavy, difficult to get good sample)
Core 90	917-919	Silt, sandy, dark gray, with clay, many opaque grains
DS-94	917-927	Sand, medium to fine, and clay (sample very poor due to thinning of drilling mud)
Core 91	927-928	Silt, sandy, gray, with large quantities of clay, shell fragments (forams)
DS-95	927-937	Clay, sandy, dark gray
Core 92	937-938	Silt, sandy, dark gray, with large quantities of clay
DS-96	937-947	Same as DS-95
Core 93	947-948	Clay, sandy and silty, dark gray, with numerous dark grains, hard
DS-97	947-957	Clay, sandy, dark gray, with abundant dark grains
Core 94	957-958	Clay, sandy, silty, dark gray, with abundant dark grains
DS-98	957-967	Same as DS-97
Core 95	967-968	Clay, sandy to silty, fine, dark gray, with some small pebbles visible on broken surface
DS-99	967-977	Clay, sandy, fine to medium, dark gray (Driller reports drilling easier indicating more sand in clay)
Core 96	977-978	Clay, silty, dark gray, and shells

Sample number	Depth interval (feet)	Description
DS-100	977-987	Clay, sandy, fine, dark gray (contaminated with small bits of gravel and shell)
Core 97	987-989	Clay, sandy, fine, dark gray, with shell and streaks of glauconite
DS-101	987-997	Clay, sandy, fine, dark gray, with shell fragments, glauconitic
Core 98	997-999	Silt, sandy, fine, glauconitic, dark gray, with clay and shell fragments (forams)
DS-102	997-1007	Clay, sandy, fine, glauconitic, dark gray
Core 99	1007-1009	Silt, sandy, fine, light gray, with some glauconite
DS-103	1007-1017	Clay, sandy, dark gray
Core 100	1017-1019	Silt, sandy, very fine, light greenish-gray; some clay and glauconite
DS-104	1017-1027	Silt, sandy, very fine, light greenish-gray. Some clay and glauconite.
Core 101	1027-1029	Silt, sandy, very fine, gray, some clay
DS-105	1027-1037	Do.
Core 102	1037-1039	Silt, sandy, very fine, gray, some clay and glauconite
DS-106	1037-1047	Silt, sandy, fine, gray, some clay
Core 103	1047-1049	Sand, very fine, silty, light gray
DS-107	1047-1057	Sand, fine, silty, gray
Core 104	1057-1059	Silt, clayey, gray, compact, dry
DS-108	1057-1067	Silt, clayey, light gray, some very fine sand
Core 105	1067-1069	Silt, clayey, gray, compact, dry
DS-109	1067-1077	Clay, sandy, gray
Core 106	1077-1078.5	Clay, sandy, glauconitic, greenish-gray, little quartz (eleven inches recovered)
DS-110	1077-1087	Clay, glauconitic, greenish-gray, little quartz
Core 107	1087-1089	Sand, fine, glauconite, and quartz
DS-111	1087-1097	Sand and clay, glauconitic
Core 108	1097-1098.5	Clay, sandy, very glauconitic, sparsely micaceous
DS-112	1097-1107	Sand, glauconitic, gritty (topped the sand at 1102)
Core 109	1107-1108.5	Sand, fine to very fine, gray-brown, quartz, some glauconite (eight inch recovery, then four inch)

Sample number	Depth interval (feet)	Description
DS-113	1107-1117	Sand, clayey
Core 110	1117-1118.5	Sand, fine, quartz, glauconitic, green-brown
DS-114	1117-1127	Sand, fine to very fine, clayey, gray (hard streaks encountered from 1124 on)
Core 111	1127-1129	Sand, fine, glauconitic, grayish-green-brown, and sandstone
DS-115	1127-1137	Sand, very fine, clayey, gray (drilling easier)
Core 112	1137-1139	Sand, very fine, dark gray-brown, mica
DS-116	1137-1147	Sand, very fine, clayey, gray (this is 20 feet drilled in one hour)
Core 113	1147-1149	Sand, fine, clayey and silty, dark gray-brown, mica and piece of hard brown siltstone
DS-117	1147-1157	Sand, very fine, clayey, gray
Core 114	1157-1159	Sand, fine, clayey, dark gray-brown, with small lumps of brown silt (soft) and mica
DS-118	1157-1167	Same as DS-117
Core 115	1167-1169	Sand, fine, clayey, dark gray, with mica and pyrite
DS-119	1167-1177	Same as DS-117
Core 116	1177-1179	Clay, sandy, micaceous, dark gray (shell fragments?)
DS-120	1177-1187	Clay, sandy, gray
Core 117	1187-1189	Clay, sandy, dark gray, some small shell fragments. Hard.
DS-121	1187-1197	Same as DS-120
Core 118	1197-1199	Clay, sandy, dark gray, with large shell fragments. Hard.
DS-122	1197-1207	Same as DS-120
Core 119	1207-1209	Clay, sandy, gray, some shell fragments
DS-123	1207-1217	Same as DS-120
Core 120	1217-1219	Silt, sandy, glauconitic, dark greenish-gray, with clay and shell
DS-124	1217-1227	Sand, greenish-gray, clay with shell fragments
Core 121	1227-1229	Silt, sandy, fine, glauconitic, greenish-gray, with clay and shell fragments
DS-125	1227-1237	Clay, sandy, greenish-gray, with shell fragments
Core 122	1237-1239	Clay, silty, sandy, fine, greenish-gray. Upper part of core contains yellowish particles which may be broken tests of forams. Bottom of core contains what appears to be a large piece of lignite.

Sample number	Depth interval (feet)	Description
DS-126	1237-1247	Same as DS-125
Core 123	1247-1249	Clay, silty, green-gray, with shells
DS-127	1247-1257	Clay, sandy, green-gray, with shell fragments
Core 124	1257-1259	Clay, silty, micaceous, greenish-gray, with shell fragments. Piece of pyrite found in bottom of core.
DS-128	1257-1267	Clay, dark gray
Core 125	1267-1269	Silt, clayey, dark gray, some very fine sand, shell fragments, and some mica
DS-129	1267-1277	Clay, some sand, very fine
Core 126	1277-1279	Silt, clayey, micaceous, very dark gray - almost black, containing much lignite, some very fine sand, heavy nodules pyrite (?), one 3/4 in. pebble
DS-130	1277-1287	Clay
Core 127	1287-1289	Lignite, black, nodules of pyrite
DS-131	1287-1297	Lignite contaminated with gray clay
Core 128	1297-1299	Clay, very silty, brownish-gray, with small spots of very fine white sand; some pyrite
DS-132	1297-1307	Clay, very silty, and fine sand (contaminated with lignite)
Core 129	1307-1309	Sand, fine, black, at top of core; at middle and bottom of core: sand, very fine, white and gray, with some lignitic material
DS-133	1307-1317	Clay, very silty, and fine sand
Core 130	1317-1319	Sand, very fine, white
DS-134	1317-1327	Clay and sand, fine
Core 131	1327-1329	Sand, fine, white
DS-135	1327-1337	Clay, gray, and sand
Core 132	1337-1338	Sand, medium to coarse, light gray (9 in. recovery)
DS-136	1337-1347	Same as DS-135
Core 133	1347-1349	Sand, very fine, silty, light gray
DS-137	1347-1357	Same as DS-135
Core 134	1357-1359	Same as Core 133
DS-138	1357-1367	Clay, sandy, gray, with lignite
Core 135	1367-1369	Clay, silty, very fine, light gray, hard, dry, soapy, nodules of pyrite

Sample number	Depth interval (feet)	Description
DS-139	1367-1377	Clay, light gray
Core 136	1377-1379	Clay, silty, very fine, varicolored (light gray, reddish-brown), hard
DS-140	1377-1387	Clay, silty, varicolored (reddish-brown and light gray); 80 percent of sample contamination of material from above
Core 137	1387-1389	Clay, varicolored, reddish-brown and light gray, hard
DS-141	1387-1397	Clay, varicolored, reddish-brown and light gray, contamination now only about 20 percent
Core 138	1397-1399	Alternating lenses of clay, varicolored reddish-brown, dark green, tan, with sand, medium, white, sand predominates; nodule of pyrite in center of core in green clay lens.
DS-142	1397-1402	Sand, fine to medium
Core 139	1402-1404	Sand, fine to medium, white
	1402-1410	No ditch sample obtained. Attempted to take core sample at 1407 feet but was unable to recover a core after 200 blows.
Core 140	1410-1412	Sand, fine to medium, white
DS-143	1410-1420	Sand, medium to coarse, white, with lignite
Core 141	1420-1422	Clay, sandy, light gray