

GGS ~~540~~
509GEORGIA
COFFEE COUNTY

GEOLOGIC LOG

Operator: Carpenter Oil Company

GGS. Nos. 468, 509 & 508

Landowner: Composite log of C.T.Thurman
wells land 2 and J.H.Knightwell 1
1/Elevation: 317 ft.(derrick
floor. Thurman well 1)

Location: See footnote 1

Total depth: 4130 ft.
(Thurman well 1)

Completed: 1955-1956

Summary of Stratigraphy

		Depth to top (feet)	Thickness (feet)
Tertiary			
Miocene <u>2/</u>	undifferentiated	surface	360
middle	Hawthorn Formation	360	80
Oligocene	undifferentiated	440	620
Eocene			
upper,	Ocala limestone, upper member	1060	200
middle(?) or upper(?)		1260	100
lower and middle,	undifferentiated	1360	470
Paleocene	absent?		
Cretaceous			
Gulf			
	Beds of Navarro	1830	430
	Beds of Taylor age	2260	755
	Beds of Austin age	3015(?)	235
	Tuscaloosa Formation	3250	500
Comanche(?)	undifferentiated	3750(?)	360
Pre-Cretaceous			
	Granite <u>3/</u>	To total depth 4110	20

 / Footnotes are on pages 2 and 3.

Composite Log

(footnote 1/ continued from page 2)

The decision to prepare a composite log rather than an individual log of each well is based, chiefly on the following considerations:

a) no single well provides a complete and continuous sequence of samples; b) the quality of the samples from the different wells is not uniform, and varies at different depths in a single well; c) the electric logs that are available for each of the three wells aid in the correlation of the samples.

2/ MacNeil, F.S., 1947, Geologic map of Tertiary and Quaternary formations of Georgia: U.S. Geologic Survey, Oil and Gas Inv., Prelim. Map 72. The outcropping rocks in Coffee County are classified on the map as chiefly, the undifferentiated Duplin Marl and Hawthorn Formation of the Miocene Series.

3/ Rock determination is by R.L. Griggs, U.S. Geological Survey (written communication to P.L. Applin, 1961), on the basis of petrographic examination of selected fragments of cuttings from the sample at 4120-4130 ft. in the Turman well 1.

Lithologic and paleontologic description of cuttings and cores. Samples are cuttings unless otherwise stated.

Depth (feet)	Description
	Tertiary
	Miocene Series undifferentiated
Surface 10	Sand, quartz, fine to very coarse grained and pebbles of sandy limonite.
10-20	Sand, clear quartz, fine to coarse-grained, angular to subangular, pitted or rough-textured; a few nodules of limonite.
20-30	Sand, quartz, fine to very coarse grained, like sample at at 10-20 ft.; a few nodules of white sandy clay.
30-40	Sand, fine to very coarse grained, like sample at 20-30 ft., and a few pebbles of sandy limonite. The coarse grains of sand seem to be derived from coarse-grained, poorly-sorted, quartzitic sandstone that was eroded, worn, transported and redeposited at its present site.
40-50	Sand, like sample at 30-40 ft. The sand is yellow-stained from the matrix of deep-yellow clay in which it seems to be embedded. The sample contains a few nodules of limonite.
50-60	Sand, like sample at 40-50 ft., but somewhat finer grained.
60-70	Sand, fine to coarse-grained, and a few pebbles of limonite, as in the preceding samples.
70-80	Sand, clear quartz, fine to medium-grained, subangular.

Depth (feet)	Description
80-90	Sand, fine to very coarse grained, and about 20 percent fragments of light greenish-white, waxy, bentonitic(?) clay that is sparsely to highly sandy. The sand in the clay is extremely fine to medium-grained and poorly sorted.
90-100	Clay, like sample at 80-90 ft., and very coarse grains of sand that may be caving from higher levels.
100-110	Sand, quartz, white, fine to very fine grained, subangular; a few coarse grains; a few nodular fragments of white sandy clay.
110-120	Like sample at 100-110 ft., and a few fragments of white sandy, tubular bodies with branching centers that seem to be casts of worm-borings or sand-coated plant stems. The sandy bodies occur, also in samples from the Knight well 1 at 100-110 ft.; in the Thurman well 1 at 130-150 ft., and in the wall well 1 at 160-170 ft.
120-130	Like sample at 110-120 ft.
130-140	Like sample at 110-120 ft. The inner part of the tubular bodies is partially coated with a light-brown crystalline substance.
140-150	Sand, like sample at 100-110 ft., and about 25 percent small fragments of light-greenish-yellow, soapy-textured sandy clay that seems to be the matrix containing the sand.

Depth (feet)	Description
150-160	Like sample at 140-150 ft. The sand and the fragments of clay are each about 50 percent of the washed concentrate. Another sample from the same depth is composed of fine-grained subangular sand; many small, black, phosphatic nodules and a few brown, polished, phosphatic nodules; a few broken and worn fragments of white and gray limestone showing traces of fossils. This sample may be out of place.
160-170	Sand and clay, like the first sample described at 150-160 ft.
170-180	Like sample at 160-170 ft., sand is about 75 percent of the sample, and clay is 25 percent.
180-190	Sand, clear quartz, well-sorted, fine-grained, angular to subangular; a few fragments of greenish-yellow clay; sparse flakes of colorless mica.
190-200	Sand, fine-grained and about 10 percent flaky fragments of light yellowish-tan shaly clay. Scattered fragments of the clay contain specimens of diatoms.
200-210	Sand, fine-grained, containing small particles of magnetite; about 5 percent of the sample is light greenish-yellow soapy-textured clay.
210-220	Sand, fine-grained, containing a trace of colorless mica and a trace of magnetite; small fragments of greenish-yellow clay compose about 20 percent of the sample.
220-230	Sand, like sample at 210-220 ft., and about 1 percent fragments of greenish-yellow clay.
230-240	Like sample at 220-230 ft.

Depth (feet)	Description
240-250	Sand and a few fragments of clay, like the sample at 220-230 ft., and in addition, many small, hard, rounded, nodular fragments of greenish-yellow clay.
250-260	Sand, mainly fine-grained, and a few medium to coarse grains. The sample contains a few fragments and nodules of clay like the sample at 240-250 ft.; a trace of mica; and a few black phosphatic nodules.
260-270	Like sample at 250-260 ft., but showing an increase in the amount of small, black to gray phosphatic nodules.
270-280	Sand, clear quartz, fine to medium-grained. About 5 percent of the sample is composed of fragments of light-cream irregularly sandy and silty clay, and a few hard nodules of clay.
280-290	Sand, mainly fine to medium-grained, but containing many coarse grains. About 5 percent of the sample is composed of fragments of sandy clay like the sample at 270-280 ft. A very few black phosphatic nodules are present.
290-300	Sand, clear quartz, fine-grained, angular; about 5 percent of the sample is composed of small fragments of greenish-yellow clay.
300-310	Sand, clear quartz, fine to medium-grained, about 50 percent; fragments of light yellowish-gray clay, about 50 percent.
310-320	Like sample at 290-300 ft.

Depth (feet)	Description
400-410	Like sample at 390-400 ft., and in addition, a few fragments of light-gray, soft, flaky, Bentonitic(?) shale.
410-420	Sand, phosphatic, like the immediately preceding samples, and a very little white fossiliferous limestone and light-gray, bentontic(?) shale.
420-430	Sand, like sample at 410-420 ft., and about 25 percent light-gray Bentonitic(?) shale that seems to be irregularly sandy (fine-grained sand); phosphatic nodules are less abundant than in the preceding samples. The sample contains debris of gray, worn and broken molds of fossil shells, and a few fragments of rather thick-shelled fossil bivalves.
430-440	Like sample at 420-430 ft. A fragment of light-gray limestone contains a mold of a broken specimen of <u>Archais</u> sp. Oligocene Series undifferentiated
440-450	Sand, fine to medium-grained, containing a few phosphatic nodules, about 50 percent of sample; cream, argillaceous, moderately hard limestone is about 50 percent. The cream limestone, which is somewhat spotted with light-gray areas, contains traces of fossil shells, among which are fragments of bivalves, <u>Archais</u> sp., and a mold of an ostracode. The sample contains a few fragments of cream, finely granular, dolomitic (?) limestone.

Depth (feet)	Description
450-470	Limestone, cream, chalky, about 75 percent of sample; about 25 percent is sand and a few phosphatic nodules. The cuttings of limestone contain broken shells of fossils, among which are fragments of bivalves, Bryozoan fragments, small fragments of <u>Archais</u> cf. <u>A. compressus</u> , specimens of <u>Miogypsina</u> sp., fragments and specimens of <u>M. antillea</u> (Cushman) and <u>M. gunteri</u> Cole add a few specimens of ostracodes.
470-480	Like sample at 450-470 ft.
480-490	Clay, light-cream, chalky, about 75 percent of sample; about 25 percent fine-grained, angular, clear quartz sand. Sample contains Bryozoan fragments and traces of other fragmentary fossils.
490-500	Sand, clear quartz, fine-grained, angular; about 1 percent small black phosphatic nodules; about 10 percent chalky clay like sample at 480-490 ft.; a few shell fragments, Bryozoan fragments, and a phosphatic mold of a specimen of <u>Elphidium leonensis</u> Applin and Jordan.
500-510	Mainly sand like sample at 490-500 ft.; a few phosphatic nodules and a little chalky clay; a few specimens of <u>Elphidium leonensis</u> .
510-520	Sand, clear quartz, fine-grained, angular to subangular; about 5 percent chalky clay shale; a few black phosphatic nodules; and a little fossil shell debris.
520-530	No sample.
530-540	Like sample at 510-520 ft. About 10 percent of the sample is composed of chalky clay shale; shell fragments are common.

Depth (feet)	Description
540-550	No sample
550-560	Like sample at 530-540 ft.
560-570	Clay, shaly, calcareous, and fragments of white to light-gray, moderately hard, chalky to granular limestone, showing traces of bryozoan fragments in a few chips. Some limestone fragments seem to be dolomitic, and some are nodular and sandy (fine-grained sand). The sample contains a few dolomite molds of immature bivalves.
570-580	Limestone, irregularly cream and gray, irregularly highly sandy (fine-grained sand).
580-590	Sand, fine-grained, angular, 50 percent; small fragments of chalky limestone, 50 percent.
590-600	Limestone, chalky, finely porous, spongy, 75 percent; foraminiferal specimens 25 percent. Specimens are, chiefly, <u>Streblus mexicanus mecatepecensis</u> (Nuttall); a few other species of Foraminifera common in the Oligocene are also present.
600-610	Like sample at 590-600 ft.
610-620	No change.
620-630	Like sample at 590-600 ft., but containing little recognizable fossil material.
630-640	Like sample at 620-630 ft. specimens of <u>Streblus</u> are fairly common.

Depth (feet)	Description
640-650	Limestone, cream, chalky, containing abundant specimens of <u>Streblus</u> cf. <u>S. Mexicanus Mecatepecensis</u> , and small tubular bodies of nearly uniform size that are possibly of nearly uniform size that are possibly of algal origin.
650-660	Like sample 640-650 ft. The sample is composed, mainly, of specimens of <u>Streblus</u> , a few of the small tubular bodies mentioned in the preceding sample, a few bryozoan fragments, and a few small fragments of <u>Lepidocyclina</u> cf. <u>L.(Eylepidina) undosa</u> Cushman.
660-670	Similar to sample 650-660 ft., but contains no fragments of <u>Lepidocyclina</u> .
670-680	Limestone, cream, soft, containing abundant specimens of <u>Streblus mexicanus mecatepecensis</u> , a few small tubular bodies, and a few bryozoan fragments. A little light-brown very fine, grained dolomite also occurs in the sample.
680-690	Limestone, light-cream, microfossiliferous, containing many fragments of <u>Streblus</u> , 50 percent; light-brown, very finely crystalline and very highly porous dolomite, 50 percent.
690-700	Sand, clear quartz, fine-grained, angular, is about one-third of sample; dolomite, ^{like} the sample at 680-690 ft., is about one-third of sample; cream, microfossiliferous limestone like sample at 670-680 ft., is about one-third of sample.
700-710	Like sample at 690-700 ft., and in addition, a few fragments of very light cream coquinoid limestone and a few fragmental specimens of <u>Lepidocyclina (Eulepidina) undosa</u> and <u>Operculina dia</u> .

Depth
(feet)
710-720

Sand, fine-grained, dolomite like sample at 680-690 ft., about 10 percent; cream, probably water-worn limestone like samples beginning at 590-600 ft., 50 percent. One small fragment of Operculina dia Cole and Ponton was observed in the sample.

720-730

Sand, fine to coarse-grained; about 5 percent small fragments of cream limestone; a few fragments of light-cream coquinoid limestone, like sample at 700-710 ft.; add a few fragments of Operculina sp.

730-740

Sand, like sample at 720-730 ft., but coarse grains are relatively rare; about 50 percent small fragments of cream, porous limestone containing many specimens of Streblus sp.

740-750

Like sample 730-740 ft.

750-760

Sand, like sample at 720-730 ft., and about 50 percent fragments of cream, moderately hard, finely porous, chalky limestone that seems to be water-worn. The sample contains a few fragments of Operculina sp., and a few poorly preserved specimens of Streblus that may be coming from higher levels.

760-770

Like sample at 750-760 ft.

770-780

Sand and about 75 percent small fragments of cream, irregularly and finely dolomite limestone, like sample at 750-760 ft. The sample contains a few specimens of Operculina dia that seem to be indigenous in the limestone, a few specimens of Eponides byramensis, and a fragmental section of Lepidoxyclina sp.

Depth (feet)	Description
780-790	Like sample 770-780 ft.
790-800	Limestone, dolomitic in part, somewhat fossiliferous, like limestone in sample at 770-780 ft. The limestone contains few determinable fossils, but several specimens of <u>Operculina dia</u> and <u>Streblus</u> seem to be indigenous.
800-810	Limestone, cream, chalky, partly dolomitic, like sample at 790-800 ft., and about 25 percent fine-grained sand which may be caving.
810-820	Dolomite, light-brown, microsucrosic, highly and finely porous.
820-830	Like sample at 810-820 ft.
830-840	No change.
840-850	Sand, clear quartz, fine-grained, angular and about 5 percent fragments of dolomite like sample at 810-820 ft. A few fragments of chalky, fossiliferous limestone from several higher levels.
850-860	Limestone, light-cream, finely porous, chalky, calcitic, irregularly sandy (fine-grained sand). the limestone contains much poorly-preserved, usually fragmental fossil material. Identifiable material includes molds of specimens of <u>Quinqueloculina Discorbis</u> sp., a few fragments of <u>Lepidocyclina</u> sp., a few specimens of ostracodes, and a few echinoid spines.
860-870	Limestone, chalky, calcitic, highly porous, like sample at 850-860 ft., but rarely sandy. Some fragments of the limestone contain traces of fossils.

Depth (feet)	Description
870-880	Like sample at 860-870 ft. and a few worn fragments of <u>Lepidocyclina</u> sp.
880-890	Like sample at 870-880 ft. The sample contains a few specimens of smaller Foraminifera that are probably indigenous, a few small fragments of <u>Lepidocyclina</u> sp., and specimens of <u>Streblus</u> that are probably caving.
890-900	No change.
900-910	Material and fauna like sample at 880-890 ft. Many specimens of <u>Streblus</u> seem to be definitely embedded in the limestone.
910-920	Like sample at 900-910 ft. The limestone cuttings contain a specimen of <u>Dictyoconus floridanus</u> .
920-930	No change.
930-940	No change. The limestone contains a trace of glauconite.
940-950	Like sample at 930-940 ft. Worn, broken and calcitized fossil debris is abundant; fragments of <u>Lepidocyclina</u> (<u>Eulepidina</u>) <u>Suwanneensis</u> Cushman are somewhat more common than in the preceding samples. fragments of <u>Operculina dia</u> and a poorly-preserved specimen of <u>Gypsina</u> sp. are present.
950-960	Like sample at 940-950 ft. Several specimens of <u>Dictyoconus floridanus</u> occur in the limestone.
960-970	Similar to sample at 950-960 ft., but containing few specimens of <u>D. floridanus</u> .

Depth (feet),	Description
970-980	The cuttings of limestone in this sample are softer, more chalky, and less calcitic than the limestone in the immediately preceding samples; the fauna is more abundant and somewhat better preserved. The sample contains many specimens of <u>Streblus</u> cf. <u>byramensis</u> , small fragments of <u>Lepidocyclina</u> sp., small fragments of chalk and fossil debris composed of unidentified shell fragments. About 50 percent of the washed concentrate consists of specimens of <u>Streblus</u> .
980-990	Like sample at 970-980 ft.
990-1000	No change.
1000-1010	No change.
1010-1020	Similar to samples beginning at 970-980 ft., but fragments of nodular chalk are common, and molds and fragments of molds of microfossils are less abundant.
1020-1030	Chalk, white, in finely cut fragments, and a few specimens of microfossils like those in the immediately preceding samples. About 25 percent of this sample consists of small fragments of grayish-brown, very finely crystalline dolomite.
1030-1040	/Like sample at 1020-1030 ft. The nodules of chalk suggest an algal deposit.
1040-1050	No change.
1050-1060	Limestone, chalky, finely porous, containing worn and comminuted fossil debris. No marked change in fauna; the sample contains a little glauconite.

Depth (feet)	Description		
	Eocene	Series	
	Upper Eocene	Ocala Limestone	Upper Member
1060-1070	Limestone, cream, like sample at 1050-1060 ft., and about 50 percent fragments of white limestone containing abundant bryozoan fragments.		
1070-1080	Limestone, white, porous, coquinoïd, containing calcitic areas and a trace of glauconite. The limestone is composed mainly, of fragments of <u>Lepidocyclina</u> (<u>Pliolepidina</u>) <u>pustulosa</u> Douville', many fragments of <u>Operculina</u> <u>floridensis</u> (Heilprin), and a few fragments of <u>Sphaerogypsina</u> <u>globula</u> and <u>Eponides</u> sp., other fossils in the sample are specimens of <u>Asterocyclina</u> <u>nassauensis</u> and <u>Helicostegina</u> <u>polygyralis</u> . The microfauna indicates a very young late Eocene age of the limestone.		
1080-1090	Like sample at 1070-1080 ft.		
1090-1100	No change.		
1100-1110	No change.		
1110-1120	Like the immediately preceding samples, but more calcitic.		
1120-1130	Like sample at 1110-1120 ft., but about 50 percent of the washed residue is composed of finely crystalline, dolomitic chalk.		
1130-1140	Like sample at 1120-1130 ft.		
1140-1150	The sample is lithologically and faunally similar to the preceding upper Eocene samples, but fragmentary specimens of <u>Lepidocyclina</u> <u>ocalana</u> and fragments of <u>Asterocyclina</u> sp. are much more common; a few specimens of <u>Sphaerogypsina</u> sp. are present. The sample is typical of the Ocala Limestone/		

Composite log

Depth (feet)	Description
1150-1160	Like sample at 1140-1150 ft.
1160-1170	No change.
1170-1190	No change.
1190-1200	Limestone, chalky, highly dolomitic, calcitic, coquinoid, like sample at 1140-1150 ft., but containing little determinable fossil material.
1200-1210	Like sample at 1190-1200 ft.
1210-1230	No change.
1230-1240	Dolomite, chalky, glauconitic, fossiliferous, composes about two-thirds of the sample. About one-third of the sample is composed of fine-grained quartz sand and many nodules of dark-green glauconite. The fauna in the chalky dolomite is like that in the samples beginning at 1140-1150 ft.
1240-1250	Limestone, white, chalky, weakly glauconitic; about 50 percent of the sample is fine-grained, subangular, clear quartz sand; about 5 percent of the sample is composed of nodules of glauconite and a little chalky dolomite that may be caving. The small amount of fossiliferous material in the chalky limestone in this sample is composed, mainly, of a few molds of ostracodes and a few fragments of <u>Operculina(?)</u> .

Depth
(feet)

Description

- 1250-1260 Sand, clear quartz, fine-grained, subangular, composes about 50 percent of the sample and about 50 percent is composed of white, chalky limestone that is irregularly sandy, irregularly dolomitic, and weakly glauconitic. The size of the crystals of dolomite is not uniform and their color ranges from light brown to gray. The limestone contains many very small fragments of fossil shells, few of which are identifiable. Fragments of white-shelled fossil bivalves and a fragment of Pseudophragmina(?) were observed.
- Middle(?) Eocene or Upper(?) Eocene
- 1260-1270 Sand, clear quartz, fine to medium-grained, subangular, composes about 75 percent of the sample; about 25 percent is composed of dark-green, rounded but irregular-shaped nodules of glauconite. The sample contains a few fragments of chalky limestone like that in the sample at 1250-1260 ft.
- 1279-1280 Like sample at 1260-1270 ft., but the sand grains are slightly coarser. This sample contains a few fish teeth.
- 1280-1290 Sand, clear quartz, fine to coarse-grained, subangular to rounded, and about 40 percent nodules of dark-green glauconite.
- 1290-1300 Like sample at 1280-1290 ft.
- 1300-1310 Sand, clear quartz, fine to medium-grained, subangular, and about 10 percent nodules of dark-green glauconite.
- 1310-1320 Like sample at 1300-1310 ft.
- 1320-1340 No change.

Depth (feet)	Description
1340-1350	Sand, clear quartz, fine to medium-grained, and about 50 percent nodules of dark-green glauconite.
1350-1360	Like sample at 1340-1350 ft.
	Lower Eocene and middle Eocene undifferentiated
1360-1370	Like sample at 1340-1350 ft., and in addition a few fragments of white, chalky, glauconitic, fossiliferous limestone.
1370-1380	Clay, light greenish-gray, highly sandy (fine-grained sand), very finely glauconitic, slightly calcareous, soapy textured, containing a few sections of small chalky specimens of Foraminifera. About 75 percent of the sample is sand and glauconite, like samples from 1260 to 1360 ft., and small fragments of white, chalky fossiliferous limestone like that in samples above the glauconitic sand. This sample also contains a few fragments of light-gray clay that is not sandy.
1380-1390	Like sample at 1370-1380 ft.
1390-1400	No change.
1400-1410	Sample is about 50 percent fine to coarse-grained sand, and 50 percent glauconitic nodules. The sample contains a few fragments of sandy, glauconitic clay, like the samples at 1370-1380 ft., and a few molds of echinoid spines that seem to be indigenous in the clay.
1410-1420	Like sample at 1400-1410 ft.

Depth (feet)	Description
1420-1430	Like sample at 1400-1410 ft., and containing a few fragments of <u>Robulus</u> sp, presumably indigenous in beds near the depth represented by this sample.
1430-1440	Sand and glauconite, like many of the preceding samples, and in addition a few fragments of light-green, silty, very finely micaceous, very finely glauconitic clay.
1440-1450	Like sample at 1430-1440 ft. Samples are much smaller than at higher levels, suggesting clay is penetrated at this depth, although sand and glauconite compose much of the sample.
1450-1460	Sand, fine to coarse-grained, and about 50 percent fragments of light-gray, moderately hard, highly silty, finely micaceous, slightly glauconitic clay that was observed, first, in the sample at 1430-1440 ft.
1460-1470	Clay, highly silty, which is perhaps better described as micaceous, glauconite siltstone, composes about two-thirds of the cuttings in this sample; about one-third of the cuttings are fine-grained quartz sand.
1470-1480	Like sample at 1460-1470 ft., but containing much less fine-grained quartz sand.
1480-1490	The relatively small washed sample is composed of a few fragments of soft gray clay, and many fragments of white to light-gray moderately hard limestone showing traces of fragmental fossil debris and a few broken calcite molds of small gastropods.

Depth (feet)	Description
1490-1500	Like sample at 1480-1490 ft.
1500-1510	Limestone, very light gray, moderately hard, like that in the samples at 1480-1500 ft. The limestone contains faint traces of a highly fragmented fossil content, but little of the material is generically indentifiable. The fossil material consists of bryozoan fragments, fragments of molds of small gastropods and pelecypods, and a few fragments of echinoids.
1510-1520	Like sample at 1500-1510 ft.
1520-1530	Like sample at 1500-1510 ft., with the addition of a few fragments of sandstone, a little fine-grained sand, and many small fragments of shells of fossil bivalves.
1530-1540	Sand, quartz, fine to very coarse grained, and many worn and broken shell fragments. The shell fragments usually have attached sand grains, or form nodules with sand grains, and form calcite nodules.
1540--1550	Sand, clear quartz, fine to medium grained, and about 20 percent shell fragments and sandy calcite nodules, like the sample at 1530-1540 ft.
1550-1560	Shell fragments, worn, broken, sandy, and a few limy calcite nodules about 75 percent of the sample; 25 percent of the sample is sand, like the sample at 1540-1550 ft.
1560-1570	Shell fragments 50 percent and sand 50 percent, like the sample at 1550-1560 ft.
1570-1580	Like sample at 1560-1570 ft.

Depth (feet)	Description
1580-1590	No change.
1590-1600	About 75 percent of the washed concentrate consists of loose shell fragments, and fragments of white and gray, sandy, phosphatic coquina composed of fragmental and partly calcitized shells, molds of small bivalves, gastropods, and ostracodes, and traces of other fossil debris.
1600-1610	Sand, fine to medium-grained, about 75 percent of sample; 25 percent is fragments of coquina, like other sample at 1590-1600 ft. The sample contains a few phosphatic nodules, molds of ostracodes, bryozoan fragments, fragments of molds and shells of macrofossils, and a little soft, brownish-gray to greenish-gray clay.
1610-1620	Like sample at 1600-1610 ft.
1620-1630	Sand, fine to very coarse grained, and about 10 percent shell fragments and small calcareous sandy nodules.
1630-1640	Sand, clear quartz, fine-grained, composes most of the sample; about 1 percent is shell fragments, sandstone nodules, and soft, gray, shaly clay. Soft clay or sandy clay is probably the material penetrated at this depth.
1640-1650	Sand, fine to medium-grained, and about 1 percent shell fragments, sand stone fragments and fragments of gray shaly clay.
1650-1660	Like sample at 1640-1650 ft.

Depth (feet)	Description
1660-1670	Sand, shell fragments, and other material caving from higher levels. This small sample contains a few fragments of two kinds of gray and grayish-green, soft, platy shale.
1670-1680	Sand, clear quartz, fine-grained, well-sorted, nodular, and a very small amount of shell and sandstone nodules.
1680-1690	Sand, fine to very coarse grained. The sample also contains a few shell fragments, nodules of sandstone and sandy limestone, a few fragments of gray clay shale, and a few small phosphatic nodules.
1690-1700	Like sample at 1680-1690 ft.
1700-1710	No change.
1710-1720	Sand and a few shell fragments; shell and sand nodules like those in the sample at 1680-1690 ft., and other higher samples; a few fragments of several types of soft, gray, shaly clay. Several fragments of clay contain poorly-preserved specimens of very small Foraminifera; a fragment of a cup-coral is embedded in one fragment of sandy clay.
1720-1730	Like sample at 1710-1720 ft.
1730-1740	Sand and about 5 percent sandy shell fragments. The sample contains several phosphatic molds of ostracodes. A specimen of <u>Loxoconcha</u> cf. <u>L. creolensis</u> , indicative of beds of middle Eocene age, is attached to a small fragment of shell.
1750-1760	Like sample at 1730-1740 ft.

Depth (feet)	Description
1760-1770	Sand, clear quartz, fine to medium-grained, angular to subangular; about 10 percent of the sample is composed of fragments of poorly-preserved shells of <i>Ostrea(?)</i> sp., and a few nodules of shells add sand.
1770-1780	Sand, fine to very coarse grained, a few shell fragments, and a few cavings of material from higher levels.
1780-1790	Like sample at 1770-1780 ft., and many cavings.
1790-1800	Sand, clear quartz, fine to medium-grained, angular to subangular; a few shell fragments and a few cavings.
1800-1810	Sand, fine to very coarse grained, a few shell fragments and a few cavings.
1810-1820	Like sample at 1800-1810 ft.; a small sample; cavings are common.
1820-1830	Like sample at 1810-1820 ft.

Paleocene Series

The samples from the three wells that are the basis for this composite log contained no faunal evidence for beds of Paleocene age.

Cretaceous

Gulf Series

Beds of Navarro Age

1830-1840	Sand, fine to medium-grained and about 10 percent small fragments of hard, cream limestone and cavings. The sample contains a few specimens of <u>Robulus</u> sp. and a few poorly-preserved specimens of other species of Foraminifers, and a few specimens of Ostracoda.
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Depth (feet)	Description
1840-1850	Sand, like sample at 1830-1840 ft., about 50 percent; about 50 percent light-cream, moderately soft, irregularly sandy limestone, containing traces and and few fragments of fossils. This material closely resembles the material in samples at higher levels and may be caving. A few fragments of several types of light-gray clay are also in the sample.
1850-1860	Sand, very fine grained and about 1 percent small fragments of limestone like that in the sample at 1840-1850 ft. The sample contains a few small fragments of shell and a little mica.
1860-1870	Sand, like sample at 1850-1860 ft., and about 5 percent mica; a few cavings from higher levels; a few fragments of several types of gray clay.
1870-1880	Like sample at 1860-1870 ft.
1880-1890	No change.
1890-1900	Sand and mica like sample at 1860-1870 ft., a few fragments of gray clay and a few cavings. The sample contains a few specimens of <u>Robulus</u> sp.
1900-1910	Sand, quartz, fine to coarse-grained, a few fragments of gray, soft, micaceous clay; a few fragments of materials and fossils caving from higher levels.
1910-1920	Like sample at 1900-1910 ft. This sample contains molds of several species of ostracodes, a fragment of <u>Nodosaria affinis</u> , a fragment of <u>Marginulina lineara</u> , and a few fragments of <u>Robulus navarroensis</u> .

Composite log

Depth (feet)	Description
1920-1930	Like sample at 1910-1920 ft., and several specimens of species of smaller Foraminifera, including <u>Robulus navarroensis</u> , <u>Anomalinoides pinguis</u> , <u>Planulina correcta</u> , <u>Dorothia bulleta</u> , and <u>Gaudryina rudita</u> .
1930-1940	Sand, like immediately preceding samples, about 50 percent; about 50 percent small fragments of several types of siltstone, clay and sandy clay, similar to material in samples at higher levels, and all probably caving. This sample contains many specimens of <u>Robulus</u> sp., <u>Anomalina</u> sp. and other species of smaller Foraminifera which occurred, also in samples beginning at 1830-1840 ft.
1940-1950	Like sample at 1930-1940 ft.
1950-1960	No change.
1960-1970	Like sample at 1930-1940 ft., but specimens of ostracodes occur in the microfauna.
1970-1980	No change.
1980-2000	No change.
2000-2010	Sand, clear quartz, fine to coarse-grained, subangular, composes most of the large sample. About 5 percent of the sample is composed of small fragments of shell, and fragments of gray clay, sandy clay, siltstone, phosphatic fragments, and a few glauconite nodules. Specimens of species of Foraminifera and Ostracoda are like those in samples beginning at 1830-1840 ft.

Depth (feet)	Description
2010-2020	Sand, clear quartz, fine to medium-grained, subangular; also a few fragments of clay and of fossil debris similar to that in the immediately preceding samples. This sample contains a few black, phosphatic fragments, a trace of glauconite, and a trace of mica.
2020-2030	Like sample at 2010-2020 ft.
2030-2060	No change.
2060-2070	Sand, clear quartz, fine-grained, angular to subangular. About 1 percent of the large sample is composed of small irregular-shaped nodules of very dark green glauconite, and a few brownish-black phosphatic fragments. The sample contains a few fragments of light-gray, soft clay, and a very few fragments of caved material and fossil debris.
2070-2080	Like sample at 2060-2070 ft., but containing some very coarse grains of quartz and about 5 percent cavings.
2080-2090	Sand, clear quartz, very fine grained, angular, composes mostly the sample. Also present are a little glauconite, phosphatic material and cavings.
2090-2100	Like sample at 2080-2090 ft.
2100-2110	Like sample at 2080-2090 ft., and a small amount of colorless mica.
2110-2120	Like sample at 2100-2110 ft.
2120-2130	Sand, clear quartz, fine to medium-grained. About 5 percent of the sample is composed of small fragments of shells, small nodules of glauconite, and a few fragments of clay, fossil debris, and other material like that in samples at higher levels.

Composite log

Depth (feet)	Description
2130-2140	Like sample at 2120-2130 ft., but showing an increase in the amount of cavings. A few black phosphatic fragments are present.
2140-2150	Sand, clear quartz, fine-grained, angular. About 1 percent of the sample is composed of cavings, small black phosphatic fragments, nodules of glauconite, and mica.
2150-2160	Like sample at 2140-2150 ft.
2160-2170	No marked change in material or fauna. The fauna is composed, chiefly, of specimens of a small <u>Robulus</u> sp., <u>Anomalina</u> sp., and shell fragments.
2170-2180	No sample.
2180-2190	Like sample at 2160-2170 ft.
2190-2200	No change.
2200-2210	Sand, clear quartz, very fine to coarse-grained. About 5 percent of the sample is composed of fragments of several kinds of gray clay and sandy clay, a few small fragments of shell material, a very few specimens of micro-fossils, a few nodules of glauconite, a few nodules of pyrite, and a few small fragments of phosphatic material. A few specimens of <u>Robulus</u> sp. are in the sample.

Depth (feet)	Description
2210-2220	Sand, like sample at 2200-2210 ft. About 20 percent of the sample is composed of several kinds of gray and brownish-gray, soft, micaceous, in part silty clay; a few shell fragments; a few specimens of species of Foraminifera already mentioned in the samples beginning at 1830-1840 ft.; a few fragments of light-gray, soft, very fine-grained, high micaceous sandstone; a few nodules of glauconite, a few of pyrite, and a few phosphatic nodules.
2220-2230	Sand, clear quartz, fine to medium-grained, and about 1 percent fragments of clay, shells, and other material like that in the sample at 2210-2220 ft.
2230-2240	Sand, fine-grained, angular, and about 1 percent small fragments of brownish-gray clay, mica, glauconite, phosphatic material and shell fragments; specimens of species of Foraminifera are like those in the samples beginning at 1830-1840 ft.
2240-2250	Sand, fine to coarse-grained, and about 1 percent fragments of materials and fossils like those in the immediately preceding samples.
2250-2260	Like sample at 2240-2250 ft. In addition, this sample contains a few fragments of dark brownish-gray, weakly micaceous clay; very little glauconite and phosphatic material occur in the sample.

Beds of Taylor Age

The tops of the beds of Taylor age in the Thurman well 2 is placed at 2260 ft. on the basis of samples and electric log correlation.

Composite log

Depth (feet)	Description
2260-2270	Like sample at 2250-2260 ft.
2270-2280	Like sample at 2250-2260 ft., but this sample contains more of the dark brownish-gray soft clay. Small particles of mica and glauconite, and a few very small specimens of Foraminifera are embedded in the clay.
2280-2290	Sand, fine to coarse-grained. About 10 percent of the sample is composed of small nodules of very dark green glauconite, fragments of dark brownish-gray clay and a few fragments of very light yellowish-green clay. About 15 percent of the sample is composed of very small fragments of other kinds of clay and other material caving from higher levels.
2290-2300	Like sample at 2280-2290 ft. Glauconite is about 25 percent of this sample.
2300-2310	Sand, clear quartz, fine to coarse-grained. About 10 percent of the sample is composed of nodules of dark-green glauconite, fragments of light yellowish-green clay like sample at 2280-2290 ft., fragments of dark brownish-gray clay, like sample beginning at 2250-2260 ft., and other material that is probably caving. A few specimens of small Foraminifera are also probably cavings.
2310-2320	Sand, fine to coarse-grained, about 50 percent of the sample. About 50 percent of the sample is composed of glauconite, small fragments of dark brownish-gray clay that contains specimens of very small microfossils, fragments of light yellowish-green clay, and a few cavings.

Depth (feet)	Description
2320-2330	Glauconite, green, fine to coarse-grained. Sand, like sample at 2310-2320 ft., and about 25 percent fragments of several kinds and colors of clay and sandy clay; a few shell fragments and some cavings.
2330-2340	Like sample at 2320-2330 ft. Fragments of light yellowish-green clay is the most common kind of clay in this sample.
2348	Circulating. Sand, clear, quartz, fine to medium-grained, subangular, and about 40 percent small, rounded, nodules of very dark green glauconite.
2355-2360	Like sample at 2348 ft.
2360-2365	Sand, clear quartz, fine to coarse-grained, subangular, and about 50 percent nodules of dark green glauconite that are somewhat larger than those in the sample at 2355-2360. ft.
2365-2370	Sand, fine to medium-grained, glauconitic.
2370-2375	Sand, like the sample at 2365-2370 ft., a few fragments of dark brownish-gray clay, and a few <u>Inoceramus</u> fragments.
2375-2380	Sand, fine to coarse-grained; about 20 percent of the sample is glauconite; a few fragments of gray clay.
2380-2385	Like sample at 2375-2380 ft.
2385-2390	Like sample at 2375-2380 ft., but smaller and contains relatively less glauconite.

Depth (feet)	Description
2390-2395	Sand, fine to coarse-grained, and a few fragments of light-cream, soft, shaly, sandy (fine-grained sand) clay.
2395-2400	Sand and a few fragments of clay.
2400-2405	Like sample at 2395-2400 ft. Sample contains fragments of light-colored sandy clay (or argillaceous sand) that was observed first in the sample at 2390-2395 ft.
2405-2410	Sand, fine to very coarse-grained, 50 percent; 50 percent fragments of light-cream, sandy, chalky clay.
2410	Circulating. Sand, quartz, medium-grained, subangular, and a few fragments of cream, sandy clay like sample at 2405-2410 ft.
2410-2450	No samples.
2450	Circulating. Like sample at 2410 ft.
2450-2490	No samples.
2490-2495	Sand, clear quartz. fine-grained, and about 1 percent small nodules of glauconite.
2495-2500	Sand, fine to medium-grained; a very little glauconite.
2500-2505	Like sample at 2495-2500 ft.
2505-2525	No change.

Depth
(feet)Description

- 2525-2530 Sand, quartz, fine to medium-grained. The sample contains a little coarse-grained sand, a few nodules of glauconite and a few fragments of brownish-gray, somewhat silty clay. A few very minute specimens of Foraminifera and a few shell fragments occur in the clay.
- 2530-2535 Like sample at 2525-2530 ft.
- 2535-2550 No change.
- 2550-2555 Sand, clear quartz, fine to medium-grained. Small nodules of dark-green glauconite compose about 1 percent of the sample.
- 2555-2560 Similar to sample 2550-2555 ft., but contains some coarse grains of sand.
- 2560-2570 No change.
- 2570-2575 Sand, clear quartz, fine to moderately coarse-grained, subangular. The sample contains a few nodules of glauconite and a few fragments of an Ostrea-like bivalve.
- 2575-2580 Sand and a little glauconite, like the sample at 2570-2575 ft.; also a few shell fragments and a trace of mica.
- 2580-2585 Like sample at 2575-2580 ft.
- 2585-2605 No change.
- 2605-2610 Sand, fine to medium-grained; a trace of glauconite, a few shell fragments, and a few specimens of Robulus Navarroensis, Citharina wadei, Clarulinoides insignis and several species of ostracodes.

Depth (feet)	Description
2610-2615	Sand, clear quartz, fine to medium-grained; a few nodules of glauconite, phosphatic nodules, shell fragments and specimens of ostracodes.
2615-2620	Like sample at 2610-2615 ft., and a few fragments of soft, gray, shaly clay.
2620-2625	Like sample at 2610-2615 ft., and in addition, a few fragments of white, hard, sandy limestone. The sample contains a few specimens of Cretaceous species of Foraminifera.
2625-2630	No change.
2630-2650	No change.
2650-2655	Sand, clear quartz, fine to coarse-grained, subangular. About 5 percent of the sample is composed of small amounts of shell fragments, fragments of gray, soft, micaceous clay, white, hard, sandy limestone, nodules of glauconite, and phosphatic fragments.
2655-2660	Sand and other materials like the sample at 2650-2655 ft., but coarse grains of sand are rare.
2660-2665	Like sample at 2650-2655 ft., but this sample is smaller and contains many specimens of ostracodes and many fragments of dark brownish-gray clay.

Depth (feet)	Description
2665-2670	Sand, clear quartz, fine to coarse-grained, and about 10 percent worn, broken, sandy fragments of <u>Ostrea</u> -like bivalves; fragments of light-gray, moderately hard, highly sandy limestone; a few fragments of dark brownish-gray flaky shale; a few fragments of phosphatic material; a few nodules of glauconite; and rare specimens of Cretaceous species of Foraminifera, among which are specimens of <u>Kyphopyxa christneri</u> .
2670	Circulating. Like sample at 2665-2670 ft.
2670-2720	No samples.
2720-2725	Sand, clear quartz, fine to coarse-grained, subangular, in a relatively small sample. The sample also contains about 1 percent shell fragments and a few fragments of clay and sandy limestone; a little glauconite and phosphatic material; and a few specimens of Foraminifera. Worn specimens of <u>Robulus navarroensis</u> and <u>Planulina correcta</u> are fairly common in the fauna; other specimens are <u>Globigerina saratogaensis</u> <u>Gaudryinella pseudoserrata</u> , and specimens of Ostracodes.
2725-2730	Sand, fine to coarse-grained. About 50 percent of the sample is composed of fragments of several other materials that are chiefly fragments of dark brownish-gray, soft clay shale, containing specimens of minute Foraminifera and very finely fragmented fossil shells; fragments of several kinds of very sandy light-gray limestone; a few shell fragments. The sample contains a few specimens of Foraminifera that are probably caving.

Depth (feet)	Description
2730-2735	Sand, shell and other materials like the sample at 2725-2730 ft. The sample contains a few specimens of species of Foraminifera characteristic of the beds of Taylor age, among which are <u>Stensiöina americana</u> and <u>Planulina Taylorensis</u> ; a few specimens of ostracodes also occur.
2735-2740	Like sample at 2730-2735 ft.
2740-2750	No change.
2750-2755	A small washed sample is composed chiefly of fine to coarse-grained quartz sand. The sample contains cuttings of slightly glauconitic, sandy (fine-grained sand) limestone (or calcareous, fine-grained sandstone), and cuttings of sandy limestone in which fragments of <u>Inoceramus</u> are embedded. The limestone(?) may, in fact, be calcareous nodules in sandy clay. A few shell fragments and a few nodules of glauconite also occur in the sample.
2755-2760	Sand, fine to coarse-grained composes the largest part of the sample. The sample contains about 5 percent nodules of dark-green glauconite, and in addition, a few shell fragments and a few specimens of Foraminifera. The fossils are, in part, Cretaceous species (<u>Globigerina</u> sp.) and, in part, coming from post-Cretaceous beds.
2760-2765	Like sample at 2755-2760 ft.
2765-2770	Sand, fine to medium-grained, and about 5 percent nodules of dark-green glauconite. The sample contains, also, a trace of mica, a few shell fragments, and fragments of several kinds of clay and sandstone.

Composite log

Depth (feet)	Description
2770-2775	Like sample at 2765-2770 ft., mainly sand, but less glauconite.
2775-2780	No sample.
2780-2785	Sand, fine to coarse-grained; about 5 percent glauconite; a trace of mica; a few shell fragments; a few specimens of <u>Robulus</u> sp. and a few ostracodes.
2785-2790	Sand, fine-grained; a little glauconite; a trace of mica; a few specimens of Foraminifera that are caving from higher levels.
2790-2795	Like sample at 2785-2790 ft.; a few shell fragments and a few fragments of <u>Inoceramus</u> .
2795-2800	Like sample at 2790-2795 ft.
2800-2805	Sand, fine to coarse-grained; a little glauconite; a few shell fragments; a few specimens of <u>Robulus</u> sp., and a few ostracodes.
2805-2810	Sand, glauconite, and a few specimens of <u>Robulus</u> sp., like sample at 2800-2805 ft.
2810	Circulating. Like sample at 2805-2810 ft., a few shell fragments including fragments of <u>Inoceramus</u> .
2810-2850	No samples.
2850-2855	Sand, mainly fine to coarse-grained; about 1 percent glauconite; a few small fragments of worn shells.
2855-2860	Like sample at 2850-2855 ft.
2860-2865	No change.

Deep (feet)	Description
2865-2870	Sand, mostly fine-grained, and a few coarse grains; about 10 percent glauconite; a few phosphatic fragments of clay and sandstone; a few very small fragments of shells.
2870-2875	Sand, fine to coarse-grained; about 1 percent glauconite; a few very small fragments of shells; a few nodules of several kinds of calcareous sandstone.
2875-2880	Sand, clear quartz, mainly fine to medium-grained; about 5 percent nodules of glauconite; a few fragments of sandstone.
2880-2885	Sand, clear quartz, fine to medium-grained, subangular; about 1 percent glauconite; a few phosphatic fragments; a few fragments of different kinds of sandstone; a few fragments of brownish-gray shale; a few very small fragments of shells.
2885-2890	Sand, clear quartz, fine-grained, angular; about 1 percent glauconite; a trace of mica; a few fragments of sandstone and a few fragments of shells.
2890-2895	Like sample at 2885-2890 ft.
2895-2900	Sand and other material like the immediately preceding sample; coarse grains of sand are somewhat more common.
2900-2905	Sand, fine to coarse-grained; about 5 percent glauconite; a few shell fragments of several kinds of calcareous sandstone.

Depth (feet)	Description
2905-2910	Small sample composed of material like the sample at 2900-2905 ft. A few specimens of <u>Robulus</u> sp. occur in this sample.
2910-2915	Sand, fine to coarse-grained; about 1 percent glauconite; many fragments of several kinds of sandy limestone and several kinds of shaly clay that are obviously caving; relatively few fragments of worn shells. This sample is fairly large.
2915-2920	Sand, fine to medium-grained; about 1 percent glauconite; a few fragments of sandstone and a few of shaly clay; a few specimens of ostracodes and Foraminifera (<u>Robulus</u> sp. and some very small Foraminifera).
2920-2925	Materials like the sample at 2915-2920 ft. A few specimens of Cretaceous species of Foraminifera which seem to be indigenous, are: <u>Globotruncana</u> spp., <u>Globigerina</u> sp. and <u>Gumbelina globulosa</u> . Other specimens of species indicative of the Taylor age of the beds are: <u>Planulina Taylorensis</u> , <u>Marginulina directa</u> , <u>Loxostoma cushmani</u> , and the ostracode <u>Cythereis rugosissima</u> .
2925-2930	The small, washed concentrate is composed mainly of fine to coarse-grained quartz sand; about 1 percent glauconite; a trace of mica and a little lignite. Other materials in the washed sample are, a few fragments of several kinds of calcareous, micaceous sandstone; a few fragments of gray and brownish-gray, soft, shaly clay; a few specimens of <u>Globotruncana</u> spp. and <u>Globigenna</u> sp. are probably indigenous, like the specimens in the sample at 2920-2925 ft. Other foraminiferal specimens are present, but may be caving.

Depth (feet)	Description
2930	Circulating. Like sample at 2925-2930 ft.
2930-2935	Sand, fine to medium-grained; fine-grained sand predominates in this fairly large sample. The sample also contains about 5 percent glauconite; a very few shell fragments; a few fragments of dark brownish-gray, micaceous, shaly clay containing a few small pieces of fossil shells. The microfauna is like that in the sample at 2925-2930 ft.
2935-2940	A small sample that is like the sample at 2930-2935 ft., and in addition contains a little carbonaceous material.
2940-2945	No change.
2945-2950	No change.
2954	Circulating. Sand, clear quartz, fine to coarse-grained; about 5 percent glauconite; a few shell fragments; a few fragments of light and dark-gray, flaky, clay shale; specimens of species of Foraminifera and Ostracoda that seem to be caving from several higher levels.
2950-2955	No change.
2955-3005	No change.
3005-3010	Sand and other materials and a few forams as in the immediately preceding samples; a few specimens of <u>Planulina Taylorensis</u> are possibly indigenous in the bedspenetrated near this depth.

Depth (feet)	Description
3010-3015	Sand, fine to coarse-grained; about 1 percent small nodules of glauconite; a few fragments of <u>Ostrea</u> -like bivalves; a few fragments of several kinds of gray and brownish-gray shale; a few fragments of sandstone and siltstone; a few specimens of Cretaceous Foraminifera but none are narrowly restricted forms.
Beds of Austin age	
3015-3020	A small sample like sample at 3010-3015 ft. in gray, character and fauna, but contains many fragments of gray, flaky, micaceous shale. This may be the material penetrated at this depth.
3020-3025	Like sample at 3015-3020 ft.
3025-3030	No change. The gray flaky shale contains fragments of carbonaceous material.
3030-3035	Sand, fine to coarse-grained; about 1 percent glauconite; many fragments of gray, slightly micaceous, irregularly carbonaceous shale containing a few poorly-preserved specimens of Cretaceous Foraminifera.
3035-3040	Like sample at 3030-3035 ft.
3040-3045	No change.
3034-3050	Sand, like the preceding samples; a little glauconite; about 50 percent fragments of gray, slightly micaceous, irregularly carbonaceous shale; a few fragments of extremely fine grained, finely glauconitic, calcareous sandstone, one fragment of which contains a well-preserved part of a specimen of <u>Citharina texana</u> .

Depth (feet)	Description
3050-3055	Shale, gray, soft, and sand like sample at 3045-3050 ft. The sample contains, in addition, fragments of light greenish-gray, extremely fine-grained, argillaceous, calcareous sandstone, and a few specimens of Cretaceous Foraminifera.
3055-3060	Mainly sand and glauconite, but relatively little shale. The fauna is sparse and composed of specimens of Cretaceous Foraminifera that are not narrowly restricted stratigraphically.
3060-3065	Like sample at 3055-3060 ft.
3065-3070	Sand, fine to coarse-grained; about 25 percent fragments of gray flaky shale; a few fragments of extremely fine-grained, argillaceous, calcareous sandstone; a few specimens of Cretaceous Foraminifera.
3070-3075	Like sample at 3065-3070 ft., but showing an increase in the percentage of fragments of gray, shale, which is more thinly flaky than in the preceding sample. The fauna contains a few specimens of <u>Planulina austiniana</u> .
3075-3080	Like sample at 3070-3075 ft.; a few specimens of <u>Planulina austiniana</u> .
3080	Sample is composed of about 70 percent fine to coarse-grained sand; about 5 percent glauconite; and about 25 percent fragments of gray, flaky shale, a few fragments of extremely fine grained sandstone, and a few specimens of Cretaceous Foraminifera.
3085-3095	No samples.

Depth (feet)	Description
3095-3100	Like sample at 3080 ft.
3100-3105	No change.
3105-3110	Sand, glauconite, and a little mica, as described in samples beginning at 3015-3020 ft. The sample contains, in addition, many fragments of several kinds of gray shale, a few fragments of extremely fine grained, argillaceous, calcareous, micaceous sandstone, a few fragments of <u>Inoceramus</u> , and a few specimens of Cretaceous Foraminifera.
3110-3115	Like sample at 3105-3110 ft.
3115-3120	No change.
3120-3125	Gray shale, sand, glauconite, and a few shell fragments like the sample at 3105-3110 ft.; also a few specimens of Cretaceous Foraminifera and Ostracoda.
3125-3130	Shale and sand, like sample at 3120-3125 ft.; very little glauconite; very few specimens of Foraminifera.
3130-3135	Like sample at 3125-3130 ft.
3135-3140	Material and fauna similar to the immediately preceding samples, but very coarse grains of sand are common at this depth.

Depth (feet)	Description
3140-3145	Sand, quartz, fine to very coarse grained, a little glauconite, and a little mica, compose about 50 percent of the sample. About 50 percent is composed of fragments of gray, soft, thinly flaky, slightly micaceous shale; a few fragments of very finely granular limestone; a little argillaceous, calcareous, micaceous, glauconitic sandstone; a few fragments of phosphatic material; and a few worn fragments of fossil shells.
3145-3150	Like sample at 3140-3145 ft.
3150-3155	Sand, fine to coarse-grained and a little glauconite compose about 50 percent of the sample. About 50 percent is composed of fragments of gray, soft, flaky shale; a few shell fragments; and a few specimens of Foraminifera, among which are fragments of <u>Citharina texana</u> . The gray shale contains irregularly distributed small flakes of mica, minute fragments of fossil shells, and sparse small fragments of carbonaceous material.
3155-3160	Like sample at 3150-3155 ft.
3160-3170	No change.
3170-3175	Sand, clear quartz, fine to coarse-grained and a little glauconite compose about 75 percent of the sample. About 25 percent is composed of fragments of gray and dark-brownish-gray, argillaceous, micaceous siltstone, and very fine-grained sandstone, some of which is finely glauconitic. The sample also contains a few shell fragments and a few specimens of Cretaceous Foraminifera and Ostracoda.

Depth (feet)	Description
3175-3180	Like sample at 3170-3175 ft. A chip of gray marly shale contains an embedded fragment of a small bivalve.
3180-3185	Like sample at 3170-3175 ft. Specimens of <u>Robulus</u> sp. are common in the microfauna.
3185-3250	No change.
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3250-3260	Sand, clear quartz, fine to coarse-grained (coarse grains fairly common), and a little glauconite. The sample contains a few fragments of several kinds of gray clay; a few fragments of siltstone; a few shell fragments; several specimens of Foraminifera and Ostracoda.
3260-3265	Sand, quartz, fine to coarse-grained, subangular; some cavings from higher levels.
3265-3270	Like sample at 3260-3265 ft. Many of the sand grains are more angular than in the preceding sample, and many grains are slightly etched.
3270-3275	Like sample at 3265-3270 ft., and a trace of lignite.
3275-3280	No change.
3280-3285	No change; coarse grains of sand are common.
3285-3290	No change.
3290-3300	Sand, quartz, fine to coarse-grained (medium grains strongly dominant), like the samples beginning at 3265-3270 ft.; a few fragments of lignite; fragments of several kinds of material caving from higher levels.

Depth (feet)	Description
3300-3310	Like sample at 3290-3300 ft.
3310-3315	Like sample at 3290-3300 ft.; a few sand grains are tinted yellow and pink.
3315-3320	Like sample at 3290-3300 ft.; a few fragments of lignite, and a few larger flakes of colorless mica.
3320-3325	Like sample at 3315-3320 ft.
3325-3335	No change.
3335-3340	Like sample at 3315-3320 ft., and sparse nodules of siderite.
3340-3350	Sand, like sample at 3335-3340 ft., but no siderite.
3350-3360	Sand, like sample at 3340-3350 ft., and a trace of mica.
3360-3370	Sand, mainly quartz, and a few grains of white feldspar.
3370-3375	No change.
3375-3380	Sand, clear quartz, fine to coarse-grained; a few spherules of siderite; a trace of lignite; a few cavings.
3380-3385	No change.
3385-3420	No change.
3420-3425	Sand, like sample at 3375-3380 ft., but this sample contains more siderite spherules and more fragments of white feldspar.
3425-3430	No change.

Depth (feet)	Description
3430-3435	Sand, quartz, fine to coarse-grained (medium grains dominant); a few grains of white feldspar, and a few siderite spherules.
3435-3440	Sand, white, quartz, fine to coarse-grained (coarse grains common). The sample contains a trace of mica; a few quartz grains tinted yellow and pink; a few grains of white feldspar; and a few nodules of siderite.
3440-3450	Like sample at 3435-3440 ft.
3450-3460	Sand, similar to sample at 3435-3440 ft., but fine grains are dominant. The sample contains a little glauconite that is probably caving.
3460-3465	Sand, fine to coarse-grained; a few grains of white feldspar; a few nodules of siderite; a few cavings.
3465-3470	Like sample at 3460-3465 ft.
3470-3500	No change.
3500-3505	Sand, quartz, fine to coarse-grained, subangular and a little white feldspar.
3505-3510	Sand, like sample at 3500-3505 ft.; a few quartz grains are tinted pink. The sample contains a few nodules of siderite.
3510-3520	No change.
3520-3590	No change.
3590-3600	Similar to sample at 3505-3510 ft.; a trace of white feldspar.

Depth (feet)	Description
3600-3610	No change.
3610-3620	sand, coarse-grained; pink-tinted grains are fairly common; a few nodules of siderite.
3620-3630	Sand, clear quartz, fine to coarse-grained (coarse grains strongly dominant); a few grains of white feldspar; a few nodules of siderite. Some quartz grains are tinted pink.
3630-3670	Like sample at 3620-3630 ft.
3670-3680	Sand, clear quartz, and a few pink grains; the sand is somewhat finer grained than in the sample at 3620-3630 ft. The sample contains a few nodules of siderite, a few grains of white feldspar, and a few small grains of obsidian(?).
3680-3690	Like sample at 3670-3680 ft.; obsidian(?) is rare.
3690-3700	Sand, clear quartz, coarse to very coarse grained; a few grains of pink-tinted quartz; a few grains of white feldspar.
3700-3710	Like sample at 3690-3700 ft.
3710-3750	No change.
Comanche Series (?) undifferentiated	
3750-3760	Sand, like immediately preceding samples. The sample contains, in addition, a few nodules of siderite, and a few fragments of red, yellow, and gray mottled, micaceous silty mudstone.

The unfossiliferous mudstone is lithologically similar to rocks that have been classified as Comanche in many wells in the southeastern Gulf Coast region. On the basis of the highest occurrence of the mudstone in the Knight well 1, supported by electric log characteristics, the top of the Comanche(?) is placed at 3750 ft.

Depth (feet)	Description
3760-3770	Like sample at 3750-3760 ft.
3770-3810	No change.
3810-3820	Sand, clear quartz, coarse to very coarse-grained; a few grains of white feldspar. A few of the quartz grains are tinted pink.
3820-3850	Like sample at 3810-3820 ft.
3850-3860	Like sample at 3810-3820 ft., but this sample contains more white feldspar.
3860-3870	Sand, coarse to very coarse grained; a few pink-tinted grains of quartz; a few grains of white feldspar; a few grains of obsidian (?); and a few moderately large nodules of siderite.
3870-3880	Sand and other materials like sample at 3860-3870 ft., and in addition, fragments of light yellowish-green clay and red, finely micaceous clay.
3880-3890	Sand, white, very coarse grained; a few grains of white feldspar. A few quartz grains are tinted pink.
3890-3900	Sand, similar to the sample at 3880-3890 ft., but coarser grained; grains of white feldspar and fairly common.
3900-3910	Like sample at 3890-3900 ft., and in addition, a few fragments of red and greenish-yellow mottled micaceous clay.
3910-3920	Like sample 3900-3910 ft., but contains no mottled clay.

Depth (feet)	Description
3920-3930	Sand, quartz, fine to very coarse-grained, and a little white feldspar. The sample contains, in addition, a few nodules of siderite, fragments of red, gray and greenish-yellow mottled, finely micaceous clay, and cavings of other materials
3930-3940	Like sample at 3920-3930 ft.
3940-3950	Like sample at 3920-3930 ft., but contains more coarse grains of sand.
3950-3960	Sand, fine to very coarse grained; a few nodules of sandy siderite; a little limonite; many fragments of dark-red micaceous shale, greenish-yellow and gray mottled shale, and red and light-raspberry mottled shale. This sample contains other materials that are caving from higher levels.
3960-3970	Sand, fine to very coarse, like samples at 3950-3960 ft., and a very small amount of the vari-colored shale.
3970-3980	Like sample at 3960-3970 ft.
3980-3990	Sand, fine to very coarse grained (coarse grains compose about 50 percent), and a little varicolored shale; a few nodules of siderite and cavings of various materials are components of the sample.
3990-4000	Like sample at 3980-3990 ft.
4000-4030	No change.

Depth (feet)	Description
4030-4040	Sand, like sample at 3980-3990 ft., yellow-tinted grains are fairly common. The sample contains a little yellow feldspar.
4040-4050	Like sample at 4030-4040 ft. and a few fragments of bluish-gray, weakly sandy (very fine grained sand) shaly clay.
4050-4060	Like sample at 4040-4050 ft., but fragments of the shaly clay are much more abundant.
4060-4070	No change.
4070-4080	No change.
4080-4090	Sand, yellow and red, fine to very coarse grained, the coarse grains being dominant; a few grains of feldspar; a trace of mica; and a few fragments of brick-red clay.
4090-4100	Sand, like sample at 4080-4090 ft.; grains of feldspar of various colors are common in the sand. The sample contains a few fragments of red and white mottled, sandy, micaceous clay.
4100-4110	Sand, like sample at 4090-4100 ft., but the grains are slightly coarser. The sample contains a trace of red, sandy, micaceous clay.
Pre-Cretaceous rocks	
4110-4130 T.D.	Sand, like sample at 4100-4110 ft., and fragments of granite. The top of the granite in the Turman well 1, is placed at 4110 ft. on the basis of electric log correlation and the petrographic determination of selected fragments of cuttings.