

Georgia Geological Survey well no. 1198

Camden County, Georgia

Pan American Petroleum Co., Union Camp no. B-1

Drilling Permit no. 80

TD 4685; logged to 4620, coring thereafter

Logged by Gilbert L. Treadwell, completed March 24, 1970

* at a depth indicates a microfossil slide was prepared and is in the sample envelope.

Camden County, Georgia

PanAmerican Petroleum Corp.

Permit #80

Completed 9-17-70

Total depth 4690'

Logged by G. L. Treadwell, Emory University

0-50'

no samples

SUMMARY

- 50'310' Very phosphatic, slightly fossiliferous, limy, fine-very coarse grains and granules (1/8--4 mm), poorly sorted sand. Occasional interbedded limestone.
- 310'-800' Very pure, white, very fossiliferous limestone, bottom of section contains up to 35% dolomite.
- 800-850' Phosphatic, clean, fine-very coarse grains and granules (1/8-6 mm), poorly sorted, rounded sand.
- 860-970' Fresh, hard, dark yellowish brown (10YR4/2), nonporous-vuggy, dolostone.
- 970-1300' No samples
- 1300-3730' Alternating beds of gypsiferous or anhydritic, micaceous, sometimes glauconitic limestone and dolostone. Lithologic determinations are at times difficult because of the amount of fibrous fiber in sample.
- 3730-4210' Fresh, brittle, fissile, olive gray (5Y 7/1), fossiliferous (micro forams), waxy, calcareous (10-40%) shale.
- 4210-4500' Shale as above with new glauconite, mica, well sorted, limestone-cemented, nonporous, very fine-fine grained, clayey, calcareous sandstone.
- 4500- New white/red mottling, noncalcareous shale and dense fractured, silica cemented quartzite and at 4570' fine-medium grained, subrounded, iron stained, medium sorted, silica cemented sandstone.
- 4500' probably represents first fragments of basement.

DETAILED ANALYSIS

- 0-50 No samples
- 50-60* Fresh, clear to cloudy white and gray, fine-very coarse grains and granules (1/8-3 mm), poorly sorted, very phosphatic (35%-black, shiny, rounded, 1-6 mm some sandy), limy(5%), sand.
two major sand size categories: 1) about 1/2 mm, mostly clear, subangular. 2) about 2 mm, clouded rounded. Limestone is whitish to light tan, microcrystalline, phosphatic and sandy. Some limestone encrustations on phosphate.
Slide-megafossils, shark tooth and ?
- 60-70 Little change from above, less phosphate (30%), sand size range the same but average size lower (.75 mm)
- 76' The majority of the sample is olive gray (5Y 4/1), clayey, fine sandy, porous, loosely cemented limestone. In sample are also pieces of the white microcrystalline limestone from above, phosphate and sand.
- 70-80 Like 60 to 70. very phosphatic (30 %), limy (5%); sand with two size categories.
- 80-90 Fresh, phosphatic (20%), white-very light gray (N 8), slightly fossiliferous, shell imprints, porous, microcrystalline, sandy (35%), limestone. The limestone incorporates medium sorted (.75 mm) sand, also blocky rounded phosphate of same size.
- 76-100 I see no lithologic reason for these oddly spaced, overlapping samples. The sample contains lithologies as above.
45% limestone- both white-light gray, sandy phosphatic type and darker gray to olive, porous, clayey, loosely cemented type;
35% quartz sand, clear to cloudy white-gray, average 1 mm.
20%phosphate, black, rounded, sandy, some dull gray.
- 100-130 like 50-50
- 130-150 missing
- 150-160 Fresh, cloudy white-gray to clear, phosphatic (7%), medium-very coarse grains and granules (1/4-4mm), average 2 mm, well sorted, rounded, elongate, limy (5%) sand.
- 160-170 like above (150-160) with more phosphate (12%) and limestone (10%)
- 160-190 Fresh, clean, clear to cloudy white and some gray, phosphatic (2%), medium-very coarse grains and granules (1/4-6mm) average 1 mm, well sorted, well rounded, limy (2%), sand.
- 190-200 Like 160-170

- 190-220 Fresh, cloudy white-gray to clear, phosphatic (3%), medium-very coarse grains and granules ($\frac{1}{4}$ -5 mm), average 1 mm, medium sorted, rounded, limy (5%), cherty (8%) sand. Chert, mottled, olive gray (5Y 4/1) and greenish gray (5GY 6/1), very dense, angular chips and sandy. It looks like micritic limestone but does not fizz in HCL.
- Cherty along
 210-220* Fresh, white, phosphatic (12%), microcrystalline, powdery, slightly porous, sandy (40%) limestone. Some limestone is chalklike, others are sandy with phosphate.
- 220-230 Dolomitic limestone as above with sand (15%) and phosphate (8%)
- 230-240 Like 210-220. Huge chunks of limestone (25 mm) with sand (40%) and phosphate (10%)
- 4?
 220-250 Same with less sand and phosphate
- 250-260 Fresh, clear to cloudy white-gray, phosphatic (15%), fine-very coarse grains and granules (1/8-4 mm), average 1 mm, poorly sorted, rounded, limy (15%) sand. One piece of poorly sorted, iron-cemented sandstone with phosphate and limestone.
- 260-270 little change
- 270-280 Same. a few pieces of sandstone with calcareous cement.
- 250-280 Fresh, light olive gray (5Y 6/1), phosphatic, sandy (10%), very clayey, limestone. Washing has disconsolidated most aggregates so washed sample is mostly fragments.
- 280-310 Fresh, clear to cloudy white-gray, phosphate (10%), fine-very coarse grains-granules (1/8-5 mm), average 1 mm, poorly sorted, rounded, elongate, dull-vitreous, limy (30%) sand. Some medium sorted, coarse grained, limestone cemented sandstone, with phosphate as above. The limestone cemented sandstone seems to be gradational to the sandy phosphatic limestone. As the cement percentage rises the distinction between sandstone and limestone is difficult.
- 300-310 Phosphatic (5%), limy (45%) sand. The limestone is whitish to light gray (N7) to light olive gray (5Y 6/1), microcrystalline, medium coarse, sandy and phosphatic.
- 310-320* New Limestone. Fresh, cream white to very light gray (N8), dense calcarenite, microcoquina and individual fossils, large (2 mm) flat forams and much bryozoa. Limestone dissolves in acid with little if any residue. Still some sand, phosphate and limestone different from above.
- 320-330 Same as above
- 330-340* Some limestone

- 310-340 Samples with wider intervals than 10' may represent circulated samples. The lithology in this sample is from before 310'. Microcrystalline, sandy, phosphatic limestone (50%), rounded, average coarse grained sand (40%), black rounded slightly sandy phosphate (10%).
- 340-350 Back to 100% limestone as calcarenite (sand sized limestone fragments in limestone cement), microcoquina and individual fossils may be from unconsolidated microcoquina. Also pelecypod molds and fragments.
- 350-360 same
- 360-370 Limestone as above. Also 3 large (10 mm) rounded, limestone cemented, olive gray (5Y 4/1), fine grained sandstone pieces.
- 370-380 Pure limestone as calcarenite, microcoquina and individual fossils. Heavily fossiliferous. Also sand, phosphate and limestone as cave.
- 380-390* No change
- 390-400 Same
- 370-400 Envelope marked "out of place?" Sure looks it. Very clayey, microcrystalline limestone, light olive gray (5Y 6/1)
- 400-410* Pure limestone as cream white to very light gray (N8), chalky calcarenite, microcoquina, and individual fossils.
- 410-420 No change
- 420-450 Same
- 400-430 Pure 100% cream white limestone.
- 430-440 No change
- 440-450 Same
- 450-460 Pure white limestone (100% calcarenite, microcoquina, fossils)
- 430-460 Same with some pure calcite chunks and prismatic aragonite
- 460-470 No change
- 470-480 More pelecypod fragments
- 480-490 Pure 100% limestone
- 460-490 Pure limestone as above, with light gray (N9) pelecypod fragments.
- 490-500 Pure, white limestone. A multitude of fossils, beautiful forams (mostly flat, spiral), lacy and columnar bryozoa.

- 500-510 White to very light gray (N8) pure limestone as microcoquina, calcarenite and individual fossils.
- 510-520 No change
- 490-520 No change
- 520-530 Calcarenite is denser, microcrystalline in places, may be recrystallized. The limestone and fossils are really striking. This represents an amazingly pure and uniform section. Still some bits of sand and phosphate but probably cave.
- 530-540 No change
- 540-550* Some echinoid plates
- 550-560 Same old chalky, white limestone with a multitude of fossils. Most is porous calcarenite and microcoquina. Also some dense microcrystalline pieces that may be fragments of larger fossils.
- 560-570 No change
- 570-580 Same
- 580-590 Same
- 590-600 Still same
- 600-610 No change
- 610-620* Same white, chalky limestone as calcarenite, microcoquina and individual fossils
- 620-630 no change
- 630-640 same
- 640-650 same
- 650-660 more calcarenite, porous; less microcoquina and individual fossils.
- 660-670 same
- 670-680 no change. still pure, white limestone
- 680-690* no change
- 690-700* new orbicular forams
- 700-710 no change

- 710-720 10% clean, clear, angular to round, fine to very coarse grains (1/8-2 mm), average $\frac{1}{2}$ mm, poorly sorted sand
2% phosphate, black pitted, rounded grains, average 4 mm. May be cave from above and probably is but greater amounts. The majority is still fresh, cream white to very light gray (N8), partially microcrystalline partly chalky, dense to porous, pure (100%) limestone
- 720-730 no change
- 730-740 same
- 740-750 as above, pure limestone, very light gray (N8), chalky to microcrystalline, mostly as calcarenite with micro-coquina and individual fossils. Forams are mostly orbicular or saucer-shaped, 1 mm in diameter. Also 10% sand and phosphate.
- 750-760 no change
- 760-770* New dolomite. Cream-white limestone as above, mostly calcarenite, now with finely crystalline (1/8- $\frac{1}{4}$ mm) rhombs of very pale orange (10YR 8/2), (light tan) dolomite in the limestone cement. About 15% dolomite.
- 770-780 same as above
- 780-790 Similar to above but more dolomite (35%) giving an overall darker color of pale yellowish brown (10YR 6/2), Most rhombs are in calcarenite. Some fossils seem partially recrystallized. A few pieces of pale brown (5YR 5/2), porous sucrosic, pure dolomite. No evaporite.
- 790-800 like 770-780. Less dolomite. Mostly chalky calcarenite and fossils. Dolomite 15%
- 800-810 Dominantly clear, clean, indurated coarse grained sand. Clean, clear, phosphatic (2%), fine to very coarse grains and granules (1/8 to 6 mm), average 1 mm, medium sorted, rounded, vitreous, limy (15%) sand. Limestone is like above, chalky, white calcarenite with dolomite rhombs and fossils. A few chunks of moderate yellowish brown (10YR 5/4), dense, sucrosic dolomite.
- 810-820 Sand (86%), phosphate (1%) as above. Some in micro-crystalline, limestone-cemented sandstone (coarse grained, well sorted). Also 8% chalky, white limestone and 5% moderate yellowish brown (10YR 5/4) sucrosic, dense to vuggy, finely crystalline dolomite.
- 820-830 89% quartz sand. Clean, clear, dominantly coarse grains, rounded, vitreous, phosphatic, well sorted. 6% dolomite. Some tightly packed, vuggy, sucrosic, rhombic crystalline pieces. Others are rhombs in chalky limestone cement; 5% white, chalky limestone.

- 830-840 Clean, clear, phosphatic (1%), fine to very coarse (1/8 - 2 mm), average .71 mm, well sorted, vitreous rounded, limy (3% 1 mm, white chalky fragments); dolomite (4% - mostly as moderate yellowish brown sand) quartz sand.
- 840-850 same as above
- 850-860 missing
- 860-870 Dominantly pure dolomite. Fresh, hard, dark yellowish brown (10YR 4/2), slightly fossiliferous (a 7 mm, dolomitized, echinoid shell), dull, nonporous to porous to vuggy dolostone (90%).
5% of sample is cement
5% is a strange rock with large (2 mm) angular, milky quartz grains in a calcareous, pale red (5r 6/2) clay cement. In HCl, chunks slowly dissolve and disaggregate with the clay turning bright orange. I have seen this same rock before in GGS 876 or maybe GGS 3146. It is described as a wind siltstone with large, angular inclusions. The dolomite is mostly a very dense, crystalline, sucrosic type, sometimes vuggy. It looks quite like horehound candy. The other type is finely rhombic, crystalline, porous and lighter brown in color (about light brown 5YR 6/4). Both types are essentially pure dolomite, with a very slow reaction in HCl.
- 870-880 Dolomite (dolostone) as above with more of the finely rhombic, crystalline, porous type. Also 10% of sample is cement, with cellophane; 2% is the calcareous, red clay rock. In addition is a flat, brittle, silvery, metallic mineral with white limestone intergrowth, that I have seen in another well GGS 1197 at 1100'. It may be arsenopyrite.
- 880-890 Pure dolomite like above. The dense horehound candy type and the porous, rhombic crystalline type in approximately equal proportions.
- 890-900 Still mostly dolomite but most pieces are now white, chalky limestone cemented. Some pieces of rather pure chalky limestone are present. Some pieces of the dense, crystalline dolomite but most is finely rhombic dolomite, rather tightly packed in limestone cement. Dominant color: moderate yellowish brown (10YR 5/4). About 15% limestone and 85% dolostone.
- 900-910 Fresh, hard, white (N4), dull, nonporous, chalky, powdery, dolomitic (20%) limestone.
- 910-920 Fresh, hard, dark yellowish brown (10YR 4/2), dense, some vuggy, sucrosic, resinous, nonporous, pure dolostone.

- 920-930 A rather strange conglomeration; some may be cave. Fresh, hard, moderate brown (5yr 3/4)-dark yellow brown to moderate yellow brown (all dolostone), slightly pyritic, phosphatic, resinous, dense-vuggy to porous (rhombic crystalline pieces), limy (2%), sandy (2%, round, very coarse grained), cherty (3%) dolostone.
- 930-940 same as above
- 940-950 missing
- 950-960 missing
- 960-970 no change from 920-930
- 970-1300 no samples
- 1300-1330* Fresh, soft (ls), white limestone (N9); moderate yellowish brown dolomite (10YR 5/4), slightly micaceous, fossiliferous, chalky dull limestone, resinous dolomite, slightly porous, slightly sandy (3%), dolomitic (30%) limestone.
- 1330-1360* Fresh, soft, white limestone (N9); moderate yellow brown dolomite; slightly micaceous, fossiliferous, dull limestone; resinous, chalky, slightly porous, slightly sandy (5%), gypsiferous, dolomitic (45%) limestone.
- 1360-1390 same as above with less dolomite (30%)
- 1390-1420 little change. Still gypsiferous, slightly micaceous, 30% dolomite. Limestone is less powderywhite, more cream-colored; a good many fossils.
- 1420-1450 Fresh, soft, white to cream white, slightly micaceous, chalky powdery, fossiliferous, dull, slightly porous, dolomitic limestone (15%).
- 1450-1480* Fresh, hard, cream white (5YR 8/1) to white (N9), slightly micaceous, fossiliferous, dull, nonporous, chalky, some powdery, anhydritic (a few pieces, bright white, crystalline, dolomitic (25%) limestone.
- 1480-1500 little change. More chalky, powdery white limestone than above. Gypsum present; Also some wierd fibrous stuff. probably filler or packing for sealing an aquifer.
- 1500-1510 Fresh, hardlight tan to very pale orange (10YLR 8/2), micaceous (2%), resinous, nonporous-vuggy, anhydritic (7%) dolomite. The dolostone is lighter in color in this sample. Some pieces are densely crystalline with vugs others are rhombic crystalline in white limestone cement. 10% limestone. Lots of filler.
- 1510-1520 same as above

- 1520-1530 Most of sample is the fibrous filler. What actual lithology there is is like above; also cellophane and cement.
- 1530-1540 Micaceous, anhydritic, dolomitic (30%) limestone
- 1540-1550 same
- 1550-1560 Micaceous, anhydritic, dolomitic (40%) limestone
- 1560-1570 Fresh, hard, cream white, chalky, powdery, micaceous, dull, nonporous, gypsiferous, anhydritic, dolomitic (15%) limestone
- 1570-1580 same as above
- 1580-1590* no change
- 1590-1600 through all filler, cellophane and cement, little discernible change
- 1600-1610 same as 1590-1600
- 1610-1620 no change
- 1620-1630 no change
- 1630-1640 More dolostone in sample. Actual rocks however are only a small part of sample. May not reflect actual ground lithology. Still mica and evaporite (anhydrite and gypsum). Most of sample is the fibrous junk. 40% limestone
- 1640-1650 Dolomitic (30%), limestone
- 1650-1660 same
- 1660-1670 same
- 1670-1680 same, very micaceous
- 1680-1690 no change
- 1690-1700 Half of sample is rock, the other fiber filler (?) Fresh, hard to powdery, white (N 9), micaceous (may be from the filler), some very dark green inclusions may be glauconite; slightly fossiliferous, dull, slightly porous, chalky, anhydritic, dolomitic (10%) limestone.
- 1700-1710 Same as above, white, chalky, powdery, possibly slightly glauconitic, anhydritic, micaceous, dolomitic (5%) limestone
- 1710-1720 no change; negative kick on SP curve at 1720'

- 1720-1730 Fresh, hard, white (N9), micaceous, slightly glauconitic, slightly fossiliferous, chalky, powdery, dull, nonporous, dolomitic (2%), limestone
- 1730-1740 same with gypsum
- 1740-1750 Fresh, hard, cream white to white (N9), chalky, powdery, slightly glauconitic, dull, slightly porous, very gypsiferous (10%), pure limestone (rapid reaction with little residue)
- 1750-1760 same
- 1760-1770 missing
- 1770-1780 no change /mica
- 1780-1790 no change. Still white, powdery, pure limestone/gypsum
- 1790-1800 Fresh, hard, white (N9), chalky, powdery, micaceous, slightly glauconitic, dull, nonporous to slightly porous, anhydritic (10%), gypsiferous limestone
- 1800-1830 Fresh, hard, cream-white to white (N9), chalky, slightly glauconitic, dull, nonporous to porous, gypsiferous to anhydritic, limestone. Some limestone as calcarenite with gypsum. The calcarenite is less tightly packed and thus the most porous of the limestone in the sample. Some of the dense pieces look partially finely microcrystalline and could be recrystallized.
- 1830-1860 no change
- 1860-1890 Fresh, hard, cream white to white to very light gray (N8), slightly glauconitic, dull, slightly porous to porous, anhydritic, gypsiferous, limestone. Some calcarenite but most is dense limestone with indistinguishable components.
- 1890-1920 Fresh, hard, cream white (N9), slightly glauconitic, very slightly fossiliferous, dull, slightly porous, anhydritic and gypsiferous (5%), dolomitic (10%), pale brown (10 YR 6/2), usually in finely crystalline rhombs, in calcarenite or in dolarenite), limestone.
- 1920-1950 same
- 1950-1980 Fresh, hard, cream white, dull, very slightly glauconitic, dull, slightly porous, anhydritic and gypsiferous, dolomitic (35%), limestone. Dolostone is dark yellowish brown (10YR 4/2), dense, crystalline, nonporous, vitreous. Some dolarenite with rhombs of finely crystalline dolomite in limestone cement.
- 1980-2010 same as above with 45% dolomite

- 2010-2040 Fresh, hard, dark yellowish brown (10YR 4/2), dense, sucrosic, crystalline, nonporous, resinous, anhydritic, limy (30%), dolomite.
- 2040-2100 no sample; positive kick in SP at 2050
- 2100=2130 94% dolostone. Dark yellowish brown (10YR 4/2), crystalline, sucrosic, dense, nonporous. Also some moderately yellow brown (10YR 5/4). All are white limestone coated making characteristics hard to determine without dipping in HCl. The coating could be cement but many dolostone pieces seem a bit rounded. They could have already been fragments and the coating be natural. The coating is not removed during washing.
3% limestone, white chalky, dense calcarenite
3% evaporite, mostly anhydrite
- 2130-2160 Different from above. Most of sample is light gray (N7) to very pale orange (10YR 8/2), dense, microcrystalline, hard, nonporous, dull, calcic dolomite. Some pure dolomite as above. Also mica and evaporite. Less coating than above.
- 2160-2180 same as above
- 2180-2220 no change
- 2220-2250 96% dolomite and calcic dolomite. Light gray and light tan calcic dolomite, now slightly porous. Joined now by tan, sucrosic, microcrystalline, very porous dolomite and dense, sucrosic, dark yellow brown, pure dolomite. Also mica and evaporite and limestone (2%)
- 2250-2280 Same as above
- 2280-2310 Fresh, hard, slightly chalky, slightly powdery, slightly fossiliferous (recrystallized), dull, porous to very porous, gypsiferous, anhydritic, dolomitic limestone. Some pieces are probably calcic dolomite, the distinction is difficult based on fizz rates in HCl. At any rate they exhibit characteristics of both dolomite and limestone. The porosity and texture indicate recrystallization.
- 2310-2340 Same as above. Colors are light gray (N7) to light tan to cream white.

- 2340-2370 Little change. Some pure limestone and dolomite.
- 2370-2400 Little change. Light gray to light tan, slightly chalky, mostly very porous, dull, anhydritic, dolomitic limestone. Some pieces are non porous and laminated with dark gray layers. Some very porous, sucrosic, pure dolomite. Some slightly porous chalky white limestone, micaceous
- 2400-2410* Wierd sample. Cream white, very micaceous (25%) slightly fossiliferous dull, chalky, anhydritic, dolomitic (30%) -most is medium grain sized, moderate yellow brown 10YR5/4 pieces- limestone
- 2410-2430 Samples missing.
- 2430-2460 Fresh, hard, very light gray (N8) to light gray (N9), slightly micaceous, dull, porous, partially microcrystalline, limy (10%), calcic dolomite. Looks like recrystallized limestone.
- 2460-2480 missing
- 2480-2520 Fresh, hard, light gray (N7) to very light gray (N8), micaceous, very slightly fossiliferous (faint from recrystallization), dull, porous to slightly vuggy, partially microcrystalline and sucrosic, anhydritic (2%), dolitic limy (10%), calcic dolomite (88%).
- 2520-2550 Fresh, hard, light gray (N7) to pale yellow brown (10YR 6/2), micaceous, dull, porous, partially microcrystalline and finely sucrosic, patches of resinous, light brown, dolomitic, anhydritic, calcic dolomite. Many pieces look like recrystallized calcarenite.
- 2550-2580 no change
- 2580-2610 Fresh, hard, pale yellowish brown (10YR 6/2), micaceous dull-resinous, porous, more obviously crystalline, semi-sucrosic, anhydritic, dolomite. Rather pure. Some pieces with both anhydrite and dolomite.
- 2610-2640 No change.
- 2640-2670 Fresh, hard, very pale orange 10YR 8/2. and pale yellow brown 10YR6/2, micaceous, resinous, porous-vuggy, crystalline, sucrosic, anhydritic dolomite. Rather pure. Some pieces with both anhydrite and dolomite.

- 2670-2700 Fresh, hard, pale yellow brown (10YR 6/2) to dark yellow brown (10YR 4/2), some dusky yellow brown (10YR 2/2), slightly porous to vuggy, sucrosic, dense, anhydritic (5%), dolostone. Specks in the dolomite and round chunks alone of dark black, organiz (?) unknown.
- 2700-2730 Fresh, hard, very light tan (10YR 8/2) to pale yellow brown (10YR 6/2) to dark yellow brown (10YR 4/2), micaceous, resinous, slightly porous to vuggy, anhydritic, calcic dolomitic (25% light tan portion, dull chalky, more fizz than dolomite but not like limestone), dolomite.
- 2730-2760 Fresh, hard light pale yellow brown (10YR 6/2), micaceous, sucrosic, dense, some vuggy, anhydritic (10%), dolostone.
- 2760-2790 Same dolomite, less anhydrite (2%)
- 2790-2820 Same as above except for (15%) clear-orange, angular, vitreous, fine to medium grained ($\frac{1}{8}$ to $\frac{1}{2}$ mm) sand.
- 2820-2850 Fresh, hard, tan to light pale yellowish brown (10YR 6/2), micaceous, dense, resinous, sucrosic, nonporous to slightly vuggy, gypsiferous (1%), anhydritic (3%) dolostone.
- 2850-2880 no change
- 2880-3020 missing
- 3020-3050 Fresh, hard, pale yellowish brown (10YR 6/2), micaceous, dense, sucrosic, resinous, anhydritic, dolostone. Most pieces are coated, probably with cement, that is not removable during washing. Some pieces are composed of finely crystalline, dolomite rhombs.
- 3050-3080 no change
- 3080-3110 Fresh, soft, white (N9), slightly micaceous, chalky, powdery, dull, slightly porous, anhydritic, dolitic (25%), limestone. Dolomite as dense chunks with anhydrite and as finely crystalline rhombs in limestone.

- 3110-3140 Fresh, soft, white, chalky, powdery, very slightly fossiliferous, dull, non porous, anhydritic, dolomitic (10%) limestone. Some prismatic aragonite and indistinct fossil fragments
- 3140-3240 samples missing
- 3240-3270* Fresh, hard, white N9, very slightly pyritic, slightly fossiliferous, dull, chalky, powdery, non porous, slightly anhydritic, dolomitic (15% is pale yellow brown sucrosic chunks and in finely crystalline rhombs in limestone) limestone
- 3270-3300 No change except for 20% dolomite
- 3300-3330 Little change. White, chalky, dolomitic (30%) limestone. Dolomite is in brown chunks and rhombic inclusions in limestone.
- 3330-3360 Same as above
- 3348 sidewall core: ls, wh, clastic, chky, glauco.
- 3350 sidewall core: ls, gy, chk, shy, glauco.
- 3360-3390 Fresh, soft, white N9, slightly glauconitic, slightly micaceous, powdery, chalky, dull, non porous, slightly anhydritic, dolomitic (25%) limestone.
- 3390-3420 Fresh, soft, white N9, slightly micaceous, chalky, powdery, dull, non porous, anhydritic, dolomitic (20%) limestone.
- 3420-3450 Fresh, soft, white, slightly micaceous, slightly glauconitic, slightly pyritic, chalky, powdery, dull, nonporous, anhydritic, dolomitic (10%) limestone.
- 3450-3480* Fresh, soft, white, slightly micaceous, slightly glauconitic, slightly fossiliferous, chalky, powdery, dull, nonporous, anhydritic, dolomitic (10%) limestone.
- 3478 sidewall core: ls, wh, chk
- 3480 sidewall core: ls, wh, chk
- 3480-3510 Same chalky limestone
- 3510-3540 Fresh, soft, white, slightly micaceous, chalky, powdery, dull, non porous, anhydritic, dolomitic (20%) limestone. Dolomite as dense, sucrosic, pale yellowish brown 10YR6/2 chunks and as rhombs in limestone.
- 3540-3570 Same, slightly pyritic
- 3570-3580 Sample missing
- 3580-3610 Fresh, soft, white, micaceous, slightly pyritic, chalky, dull, non porous, anhydritic, dolomitic (25%) limestone
- 3610-3640 Same micaceous, chalky, dolomitic (20%) limestone

- 3610 sidewall core: ls, wh, chk
- 3612 sidewall core: sh, gy, calc; one side of bed pl, chalk on other
- 3640-3670 Partially leached (some limonite coloration), soft, white N9 to very light gray N8, also a bluish tint on some pieces, chalky, slightly pyritic, slightly micaceous, dull, non porous, anhydritic, dolomitic (10%) limestone.
- 3670-3700 Partially leached (some limonite coating), soft, light gray N7, slightly micaceous, slightly pyritic, chalky, a bit of prismatic aragonite, dull, non porous, anhydritic, clayey (10%), dolomitic (10%) limestone
- 3700-3730 Soft, medium light gray N6, slightly micaceous, slightly pyritic, earthy, non porous, slightly anhydritic, dolomitic (5%) shaly (20%) limestone. Some pieces of the pure white chalky limestone like above.
- 3720 sidewall core: sh, gy, calc, gumbo
- 3730-3760 Fresh, soft, light gray N7 to medium light gray N6, slightly pyritic, earthy, non porous, anhydritic, dolomitic (5%) limy (40%) shale.
- 3758 sidewall core: sh, gy, calc.
- 3760-3790 Soft, light gray N7, some medium light gray N6, slightly pyritic, earthy, waxy, non porous, slightly anhydritic, limy (30%) shale. Some pieces with a brownish red, soft coating (iron origin?). Some prismatic aragonite.
- 3790-3820* No change, except for a metallic spherule with a coating of limonite inside.
- 3816 sidewall core: sh, gy, silty, calc.
- 3820-3850* Fresh, brittle, fissile, light gray N7 to olive gray 5Y4/1, pyritic, flaky, fossiliferous, waxy, calcareous (30%) shale.
- 3850-3880 Fresh, brittle, fissile, medium light gray N6, pyritic, flaky, fossiliferous, waxy, sandy (5% fine grained, angular, clear), calcareous (20%) shale
- 3880-3910 Fresh, brittle, fissile, olive gray 5Y4/1, pyritic, flaky, fossiliferous, waxy, sandy (5% fine grained, angular, clear), calcareous (20%) shale.
- 3885 sidewall core: sh, gy, calc, gumbo
- 3910-3940 Same as above
- 3933 sidewall core: sh, brn-gy, calc.

- 3940-3970* Fresh, brittle, fissile, olive gray 5Y4/1 to light gray N7, pyritic, flaky, microfossiliferous, waxy, calcareous (25%) shale. Many small (less than 1 mm) pieces of light gray shale chips, less fissile and waxy than the olive gray pieces that favor rectangular cleavage.
- 3970-4000 Fresh, brittle, fissile, olive gray 5Y4/1 to light gray N7, lenses and veins of calcite, fossiliferous, waxy, calcareous (20-30%) shale. The light gray pieces contain more lime.
- 3976 sidewall core: sh, brn-gy, calc.
- 4000-4030* Fresh, brittle, fissile, olive gray 5Y4/1, fossiliferous, waxy, calcareous (30-40% shale. Some shale chunks have been reworked. Darker gray, fissile shale and sometimes dolomite is incorporated in more calcareous, less fissile shale.
- 4024 sidewall core: sh, brn-gy, calc.
- 4030-4060 No change
- 4060-4090 No change
- 4070 sidewall core: sh, brn-gy, calc.
- 4090-4120 Fresh, brittle, fissile, olive gray 5Y4/1, fossiliferous, splintery, earthy, calcareous (20%) shale. Less reworked shale; most is uniform.
- 4100 sidewall core: sh, gy, gumbo, calc, calcite veins
- 4120-4150* No change
- 4130 sidewall core: sh, gy, gumbo, calc.
- 4150-4180 Little change, some iron staining; a pelecypod fragment
- 4162 sidewall core: sh, brn-gy, calc.
- 4180-4210 Little change; slightly silty calcareous (30%) shale.
- 4198 sidewall core: sh, gy, gumbo, dolomitic siltstone included
- 4210-4240* Change. 90% fresh, brittle, fissile, olive gray 5Y4/1, slightly pyritic, splintery, fossiliferous, earthy, waxy, slightly silty, calcareous (10%) shale. 10% new, fresh, hard, light olive gray 5Y6/1, micaceous, glauconitic, dull, well sorted, limestone cemented, non porous, angular, very fine grained (1/16-1/8 mm), clayey (25%), calcareous (20%) sandstone.
- 4217 sidewall core: sh, gy, gumbo
- 4222 sidewall core: sh, gy, gumbo
- 4228 sidewall core: siltstone, gy-grn
- 4234 sidewall core: sd, gy-grn, vf silt, calc.

4236 sidewall core: sd, gy-grn, vf silt, calc.
4240-4280 little change
4240 sidewall core: sh, gy-grn, gumbo, wh vf sd incl.
4244 sidewall core: sh, gy-grn, gumbo, wh vf sd incl.
4248 sidewall core: as above
4253 sidewall core: as above
4257 sidewall core: sh, gy-grn, gumbo
4262 sidewall core: sd, gy-grn, vf, v glauco, calc-doloc, tite
4269 sidewall core: sh, gy-grn, wh vf sd and slt incl, gumbo
4280-4310 Same as cuttings above; large shale chunks up to 2 cm
4280 sidewall core: sh, gy-grn, wh vf sd and silt incl, gumbo
4292 sidewall core: as above
4297 sidewall core: as above
4302 sidewall core: sd, vf, wh, glauco, slty, dolo and calc, tite
4310 sidewall core: as above
4310-4340 Same cuttings as above
4315 sidewall core: sd, vf, wh, glauco, slty, dolo and calc, tite
4320 sidewall core: sh, gy-grn, wh vf sd-slt incl and bands, calc
4322 sidewall core: as above
4340-4370 No change from cuttings above
4349 sidewall core: sh, gy-grn, wh vf sd-slt incl and bands, calc.
4370-4400 No change from cuttings above
4373 sidewall core: sf, vf-silt, some hard, doloc, some soft calc.
4400-4430* Little change from cuttings above
4408 sidewall core: sh, grn-gy, mica
4430-4470 No change from cuttings above
4436 sidewall core: sh, grn-gy, mica
4462 sidewall core: sh, grn-gy, mica, pyrite

- 4470-4500 No change from cuttings
- 4470 sidewall core: sh, grn-gy, mica
- 4480 sidewall core: as above
- 4490 sidewall core: as above
- 4493 sidewall core: as above
- 4500-4530 Change. Shale and sandstone as in above cuttings; new shale (7%) white with red mottling, also 2 pieces of black, hard quartzite or fine grained, silica cemented sandstone.
- 4500 sidewall core: sh, grn-gy, slty, mica
- 4505 sidewall core: sh, dk gy, soft, gumbo, mica
- 4513 sidewall core: sd, vf, brn, qtzie, shy, v hd, pyritic
- 4519 sidewall core: sh, wh, red and gy mottlg, streaks
- 4523 sidewall core: sh, wh, red and gy mottlg and streaks
- 4528 sidewall core: as above
- 4530-4560* As above cuttings, dominantly shale (88%) and glauconitic, lime cemented sandstone (5%) as above. New white, red mottled, non calcareous, waxy shale (5%), with red, globular, 1 mm inclusions (fossils?). Also 2% quartzite, dense, hard, fractured, white or black.
- 4536 sidewall core: sd, f-m, wh, pyr, tite
- 4544 sidewall core: sd, f-crs, wh, wh sh or cly matrix
- 4550 sidewall core: sd, f-crs, wh, wh cly or sh matrix, maroon mottlg
- 4557 sidewall core: sd, f-m, wh, wh cly or sh matrix, tite
- 4560-4590 More sandstone from above. Now 10% white, yellow to red stained, fractured, vitreous, well sorted, silica cemented, non porous, subrounded to subangular, fine to medium grained sandstone. Some with red inclusions as in the mottled shale.
- 4566 sidewall core: sd, f-m, wh, wh cly or sh matrix, tite
- 4570 sidewall core: sh, dk gy, sdy
- 4575 sidewall core: as above
- 4578 sidewall core: as above

- 4585 sidewall core: no recovery
- 4586 sidewall core: no recovery
- 4590-4620 last sample, same as above cuttings
- 4590 sidewall core: sd, f, bds of ylw and pnk sepearated by bds of maroon
- 4603 sidewall core: sd, vf, some pnk mottlg, shattered (sml spl)
- 4610 sidewall core: no recovery
- 4611 sidewall core: no recovery
- 4618 sidewall core: sh, blk, sdy, some wh qtz inclns.
- 4622 sidewall core: sh, blk, sdy
- 4637 sidewall core: sd, gy, f, shy
- 4638 sidewall core: sltst, blk, qtztc, shattered (sm spl)
- 4640 sidewall core: sh, blk, finely mica
- 4645 sidewall core: sltst, blk, qtztc, hard, sm spl
- 4658 sidewall core: sh, blk, mica
- 4664 sidewall core: sh, blk, mica, few floating sd grs
- 4667 sidewall core: sh, blk, mica, vf sd inclns.

Diamond core no. 1,

- 4673-4685 recovered 9.5 feet ; 2.5 ft. quartzite, black, very hard, slightly calcareous, a few veins of white calcite; 7.0 ft siltstone, black, lightly sandy with rounded grains up to coarse size, sprinkling of white quartz inclusions up to .25 in., finely micaceous