

July 7, 1982

EXECUTIVE SUMMARY
ROMP #119 - "Marion Oaks"
S 8, T 17 S, R 21 E
Floridan Aquifer Potentiometric and
Sulfate Monitor Well
19-020-5191

J. L. Decker

General Description

The ROMP #119 site is located in tract "N" of Marion Oaks Unit Eight, lying south of the proposed Cross Florida Barge Canal, and south of the right-of-way, S.R. 484 in Marion County, Florida. The site is in the NW $\frac{1}{4}$ of NW $\frac{1}{4}$ of SW $\frac{1}{4}$ of Section 8, Township 17 South, Range 21 East at latitude $29^{\circ}01'33''$, longitude $82^{\circ}14'09''$. It is approximately 4.5 miles east of S.R. 200 and approximately 14 miles southwest of Ocala.

Site Easement

The site was obtained from the Deltona Corporation for the sum of \$1 (one dollar). The temporary construction easement at this site is 50'x100' and contains a perpetual easement which is 20'x20'.

Geology

The ROMP #119 site is located at an elevation of 73' above m.s.l. in the Sumter Upland physiographic subdivision of the Central Highlands physiographic division in the Withlacoochee Drainage Basin. The region is near the southern flank of the Ocala Uplift which has a northwest-southwest trend. Fractures in the immediate area have both a northeast-southwest and northwest-southeast trend.

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The following is a brief summary of the lithology which was obtained from the description of drill cuttings taken from land surface to a total depth of 501.5'.*

- LSD - 24' Undifferentiable deposits and Alachua Formation- quartz sand, light brown- light gray; clay, light reddish orange; chert-off-white, sucrosic-chalcedonic.
- 24' - 80'* Williston Formation? (Ocala Group) - limestone, biomicrite-micrite, off-white-yellow, tan, mostly unconsolidated; fossiliferous-foraminifera (Nummulites, Operculinoides, Lepidocyclina); translucent quartz sands, minor tannish green clay and black organic material; moderate to high porosity.
- 80'* - 100' Inglis Formation (Ocala Group) - limestone, biomicrite-offwhite, yellowish (iron staining), buff, light tan; some recrystallized and siliceous dolomitic limestone, weathered; fossiliferous-foraminifera (Nummulites, Operculinoides), gastropod and pelecypod fragments, coquinoid chunks; some dark grayish green clay, waxy brownish black organic material and quartz sand; low-high porosity.
- 100' - 490'* Avon Park Formation - limestone and dolomitic limestone, biomicrite, white, cream, tan-tannish brown, soft and chalky, hard, siliceous and crystalline, vuggy, weathered; sparse brown-black lignitic organic material and grayish green clay; fossils-foraminifera (Coskinolina floridana, Dictyoconus cookei), pelecypod, gastropod and echinoid fragments, coquinoid chunks, quartz sand and crystals; low-high porosity.
- 490' - 501.5'* TD
(Tentative) Lake City Formation - limestone and dolomitic limestone, and dolomitic limestone, sparse biomicrite, off-white, cream-light tan; dark brownish gray chert; massive quartz aggregates, soft, white kaolin, low-moderate porosity.

Hydrology and Water Quality

ROMP #119 was drilled for the purpose of monitoring the potentiometric surface and the sulfate zone in the Floridan Aquifer in the Ocala area. The level at which the water table was first encountered during drilling was approximately 23.1' below l.s.d. or 50' above m.s.l. The static water level in the well both during and after drilling was the same level (approximately

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23.1' below l.s.d. or 50' above m.s.l.). The potentiometric surface probably varies according to the season. Recharge occurs by percolation from rainfall in the drilling area. There may be a lag in response to water level changes due to the zones of clay and chert near the surface. Below 24' the hydrology consists of one continuous aquifer, the Floridan which includes the Ocala group through the Lake City formation and deeper. At this location, the Floridan Aquifer is in the upside of a fault block, and is unconfined in a structural high.

Although a high sulfate zone was encountered while drilling, a fresh/saltwater interface was not encountered while drilling to 501.5'.

Chlorides remained fairly constant during drilling operations. The chlorides ranged from 6 mg/l at 210' to 13 mg/l at 500'. Increase in sulfates were noted soon after 340'. The sulfates increased from 33 mg/l at 210' to 88 mg/l at 340'. Between 360' and 500', the sulfates increased from 200 mg/l to 604 mg/l. Conductivities ranged from 210 umhos to 340 umhos between the depths of 220' and 340'. Between 360' and 500', the conductivities increased from 650 umhos to 1220 umhos.

Approximately two weeks following the completion of drilling operations, nine water samples were retrieved with the geophysical logger from specific depths selected from the analysis of the fluid conductivity log. Significant changes in respect to depth verses sulfate increases occurred during the two weeks time period. Upward movement of water in the borehole appears to be occurring. The water appears to be moving up the borehole to a depth of approximately 127' (cavity zone) and then flows laterally into the formation. Conductivity increased from 240 umhos at 110' to 775 umhos at 125'. Between 125' and 135' the conductivity of the water samples increased from 775 umhos to 1175 umhos. From 135' to 500' conductivities varied between 1175 umhos and or 1205 umhos. Chlorides ranged from 3 mg/l to 9 mg/l between the depths of 110' and 125'.

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Between 125' and 135' chlorides increased from 9 mg/l to 13 mg/l. From 135' to 460' the chlorides remained fairly constant (13-14 mg/l). At a depth of 500' the chloride content dropped to 7 mg/l.

The sulfates increased from 37 mg/l to 296 mg/l between the depths of 110' and 125'. From 125' to 135' the sulfates increased from 276 mg/l to 550 mg/l. From 135' to 500' the sulfates remained fairly constant ranging from 550 mg/l to 566 mg/l at various depths.

An air lift pump technique to determine increases or decreases in discharge of water was performed usually at 20' intervals. From the correlation with drill cuttings and geophysical logs, zones of high and low transmissivity were located. Gallons/minute discharge between 220' and 500' ranged from 28 gallons/minute to 65 gallons/minute.

Higher specific capacities are due to increased porosity, permeability, fractures, and cavities which occur naturally in the geologic formations. Lithologic descriptions of drill cuttings, results from the electric and caliper geophysical logs appear to verify to some degree the specific capacity tests.

Well Construction

ROMP #119 was constructed during May and June 1982. The design was based on the information obtained from studies completed for the Cross Florida Barge Canal, and geological studies compiled by the U.S.G.S. The total depth of the well is 501.5'. The well was cased with 106' of 8" diameter PVC well casing.

ROMP #119 was constructed in the following steps:

- (A) An 18' nominal borehole was drilled, using mud rotary drilling techniques, to a depth of 15'. A 16" steel casing was sealed and cement grouted from bottom to top. The 16" steel sand casing was used to prevent undifferentiated clastic surficial

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deposits and clay from closing off the borehole during the initial stages of drilling operations.

- (B) A 15" bit was then used to drill out of the 16" steel casing to a depth of 60'. A combination of mud rotary drilling techniques and air foam techniques were utilized for drilling to 60'. A 12" diameter steel well casing was seated and cement grouted from bottom to top.
- (C) Drilling from 60' to 106' was completed by using an 11" bit, mud rotary and reverse-air drilling techniques. One hundred six feet (106') of 8" diameter I.D. PVC well casing was seated at 106' and cement grouted to the surface.
- (D) From 106' - 140' mud rotary drilling techniques were again utilized. A 7 5/8" drill bit was used to drill an 8" nominal borehole to a depth of 501.5'. At a depth 140' the driller converted to reverse-air drilling techniques to drill the remainder of the well.

Three notable cavities and washout zones were encountered during drilling operations.

Drill cuttings were collected every 5' for analysis and interpretations. Water samples were collected usually at intervals of 20'. A technique of direct air to clear the well of cuttings and mixed water, followed by collecting the first three water samples on reverse air to obtain a representative sample at a certain depth was utilized.

The well was developed upon completion by pumping until the water became clear. The well was then disinfected by using a solution of HTH (5% chlorine).

The top of the 8" diameter PVC casing extends 3.5 feet above land surface for the purpose of monitor installation. A 3' piece of steel casing

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was welded to the 12" diameter steel well casing to serve as protection around the 8" diameter I.D. PVC well casing.

Type of Monitor

ROMP #119 was designed to be a potentiometric surface monitor of the Floridan aquifer. The potentiometric surface varies as to the season, and rainfall cycles. The monitor well was also constructed for the purpose of determining ground water quality zones (specifically sulfates) and specific capacity data in the Floridan aquifer.

Geophysical Logs

A suite of geophysical logs included: a caliper, gamma ray, electric (spontaneous potential and resistivity), temperature (gradient), fluid conductivity and flowmeter were run after completion of the well. The geophysical logs were used to determine proper construction of the well's borehole characteristics, correlation of lithology and geological formational boundaries with drill cuttings, temperature, water quality and flow changes.

USGS Notification

The Technical Support Section was notified in August, 1982 that ROMP #119 is complete and ready for monitoring by the U.S. Geological Survey.

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Definition of Formational Boundaries--SPECIAL NOTE

The specific definition of formations penetrated at this well site was done partially on the basis of biostratigraphic evidence and partially on the basis of lithologic evidence. Additional correlating evidence (geophysical well logs and/or hydrologic data) was also utilized in the delineation of these formation boundaries. Therefore, the chosen formational boundaries are tentative at best, according to standard stratigraphic methods.

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*****SIMPLIFIED LITHOLOGY*****

BOREHOLE DEPTH (ft. below L.S.D.)	NAME OF ROCK UNIT
LSD - 24'	Undifferentiable Plio-Pleistocene Sands and Clay and Alachua Formation
24' - 80'*	Ocala Group - Williston Formation?
80'* - 100'	Ocala Group - Inglis Formation
100' - 490'*	Avon Park Formation
490' - 501.5'* T.D.	Lake City Formation

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LITHOLOGIC WELL LOG PRINTOUT

SOURCE - FGS

WELL NUMBER: W- 15643

COUNTY - MARION

TOTAL DEPTH: 00500 FT.

LOCATION: T.17S R.21E S.08 A

SAMPLES - NONE

LAT = N 29D 01M 33

LON = W 82D 14M 09

COMPLETION DATE - N/A

ELEVATION - 073 FT

OTHER TYPES OF LOGS AVAILABLE - GAMMA, CALIPER, ELECTRIC

OWNER/DRILLER: DELTONA CORPORATION.; SWFWMD.

WORKED BY: DECKER; CODED AND ENTERED BY RICHARD GREEN 10/90 FROM
A GEOLOGIST'S LOG PROVIDED BY SWFWMD.

THIS IS ROMP # 119. DESCRIPTION IS FROM DRILL CUTTINGS.

-----SPECIAL NOTE: DEFINITION OF FORMATIONAL BOUNDARIES.

THE SPECIFIC DEFINITION OF FORMATIONS PENETRATED AT THIS WELL SITE
WAS DONE PARTIALLY ON THE BASIS OF BIOSTRAT. EVIDENCE AND
PARTIALLY ON THE BASIS OF LITHOLOGIC EVIDENCE. ADDITIONAL
CORRELATING EVIDENCE (GEOPHYSICAL WELL LOGS AND/OR HYDROLOGIC
DATA) WAS ALSO UTILIZED IN THE DELINEATION OF THESE FORMATIONAL
BOUNDARIES. THEREFORE, THE CHOSEN FORMATIONAL BOUNDARIES ARE
TENTATIVE AT BEST, ACCORDING TO STANDARD STRATIGRAPHIC METHODS.

- | | | | |
|------|---|------|--------------------------------------|
| 0. | - | 24. | UNDIFFERENTIATED SAND AND CLAY |
| 24. | - | 80. | WILLISTON FM. } <i>scalen Group</i> |
| 80. | - | 100. | INGLIS FM. } |
| 100. | - | 490. | AVON PARK FM. } <i>Avon Park Fm.</i> |
| 490. | - | 501. | LAKE CITY LIMESTONE } |
-
- | | | | |
|-------|---|------|---|
| 0 | - | 3 | SAND; LIGHT BROWN TO LIGHT GRAY; POSSIBLY HIGH PERMEABILITY, INTERGRANULAR;
GRAIN SIZE: MEDIUM; UNCONSOLIDATED;
STAINED BY ORGANICS. MOD-HIGH PERMEABILITY. |
| 3 | - | 14.5 | CLAY; LIGHT REDDISH ORANGE TO LIGHT RED; LOW PERMEABILITY;
ACCESSORY MINERALS: QUARTZ SAND-%;
SOFT, DENSE, STICKY. |
| 14.5- | | 15 | CHERT; WHITE; LOW PERMEABILITY, FRACTURE; GOOD INDURATION;
OTHER FEATURES: SUCROSIC;
SUCROSIC-CHALCEDONIC, SLIGHTLY CALCARENITE CHERT. |
| 15 | - | 24 | CLAY; REDDISH ORANGE;
ACCESSORY MINERALS: QUARTZ SAND-%;
BOTTOM OF SECTION; POSSIBLE FRACTURE OR CAVITY IN UPPER PART OF SECTION. |

- 24 - 40 LIMESTONE; LIGHT TAN TO TAN;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
RANGE: FINE TO MEDIUM; POOR INDURATION;
FOSSILS: BENTHIC FORAMINIFERA;
BIOMICRITE, SOFT, FRIABLE, SOME THIN, HARD LENSES OF OFF-WHITE LS; NUMEROUS NUMMULITES,
OPERCULINOIDES, SPARSE LEPIDOCYCLINA; MODERATE POROSITY.
- 40 - 54 LIMESTONE; CREAM; POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: CALCILUTITE;
GRAIN SIZE: FINE; UNCONSOLIDATED;
ACCESSORY MINERALS: SILT-%;
SOFT, SILTY; CAVITY OR FRACTURE FILLED ZONE; MOD-HIGH POROSITY.
- 54 - 59 LIMESTONE; CREAM;
GRAIN TYPE: CALCILUTITE;
GRAIN SIZE: VERY FINE;
ACCESSORY MINERALS: QUARTZ SAND- %;
OTHER FEATURES: FROSTED;
V.F. UNCONSOLIDATED CALCITIC, SILTY SAND INTERMIXED WITH FINE, TRANSLUCENT FROSTY QTZ
SAND. CAVITY FILLED OR FRACTURE FILLED ZONE. MODERATE POROSITY.
- 59 - 60 NO SAMPLES
- 60 - 65 LIMESTONE; WHITE TO CREAM; LOW PERMEABILITY;
GRAIN TYPE: CALCILUTITE;
ACCESSORY MINERALS: CLAY- %, QUARTZ SAND- %, ORGANICS-%;
HARD MICRITE INTERMIXED W/ CALCITIC CLAY=TANNISH-GREEN , SANDY WITH SOME BLACK ORGANICS;
LOW-MOD. POROSITY.
- 65 - 70 LIMESTONE; CREAM;
GRAIN TYPE: CALCILUTITE;
UNCONSOLIDATED;
ACCESSORY MINERALS: QUARTZ SAND- %;
OTHER FEATURES: CHALKY, WEATHERED;
SOFT, SILTY, HIGHLY WEATHERED; MODERATE POROSITY.
- 70 - 80 AS ABOVE
- 80 - 85 LIMESTONE; WHITE TO CREAM; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
ACCESSORY MINERALS: CLAY- %;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: BRYOZOA, MOLLUSKS, FOSSIL FRAGMENTS;
BIOMICRITE, HIGHLY WEATHERED; SOME ALTERED OR CRYSTALLINE DOLOMITIC LS INTERMIXED W/
GRAYISH GREEN CLAY; L-M POROSITY.
- 85 - 90 LIMESTONE; ;
SIMILAR TO ABOVE WITH MINOR PYRITE, PHOSPHATE GRANULES, QTZ SAND AND COQUINOID CHUNKS.

- 90 - 95 LIMESTONE; CREAM TO BUFF; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
ACCESSORY MINERALS: LIMESTONE- %, CLAY- %, ORGANICS- %;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, FOSSIL FRAGMENTS;
SPARSE BIOMICRITE, HIGHLY WEATHERED; SOME ALTERED YELLOWISH CRYSTALLINE DOLOMITIC LS.;
SOME DK GRAYISH GREEN CLAY, WAXY BROWNISH BLACK LIGNITIC MATERIAL AND COQUINOID CHUNKS;
NUMMULITES, OPERCULINOIDES; L-MOD. POROSITY.
- 95 - 100 LIMESTONE; CREAM TO BUFF; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
ACCESSORY MINERALS: DOLOMITE- %, ORGANICS- %, CLAY- %;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, FOSSIL FRAGMENTS;
SPARSE BIOMICRITE; HIGHLY WEATHERED; SOME ALTERED CRYSTALLINE DOLOMITE, SPARSE BROWNISH
BLACK CLAYEY ORGANIC MATERIAL AND COQUINOID CHUNKS; DICTYOCONUS COOKEI, LOW-MOD. POROSITY.
- 100 - 105 AS ABOVE
NOT AS WEATHERED AS ABOVE. MODERATE POROSITY
- 105 - 110 AS ABOVE
LESS ORGANIC CALCITIC CLAY, BLACK LIGNITE, ORGANIC PLANT MATERIAL AND SOME COQUINOID
CHUNKS.
- 110 - 115 AS ABOVE
- 115 - 120 LIMESTONE; BUFF TO LIGHT BROWN; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
POOR INDURATION;
ACCESSORY MINERALS: CLAY- %, QUARTZ SAND- %, ORGANICS- %;
OTHER FEATURES: CHALKY;
FOSSILS: BENTHIC FORAMINIFERA;
SPARSE BIOMICRITE, SOFT; ORGANIC GRAYISH GREEN SANDY CLAY CHUNKS, BLACK LIGNITIC FRAGMENTS
AND PLANT MATERIAL. FEWER COQUINOID CHUNKS; SOME OFF-WHITE LS; DICTY. COOKEI; LOW-MODERATE
POROSITY.
- 120 - 125 LIMESTONE; CREAM TO BUFF; VUGULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
ACCESSORY MINERALS: CLAY- %, DOLOMITE- %;
OTHER FEATURES: SUCROSIC;
FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA, FOSSIL MOLDS;
SPARSE BIOMICRITE, VUGGY, SUBROUNDED-UPPER SECTION; DOLOMITE= LIGHT TAN, YELLOWISH TAN,
GRAYISH BROWN, VUGGY, SUCROSIC; SOME GRAYISH GREEN SANDY CALCITIC CLAY CHUNKS, SOFT
OFF-WHITE SPECKLED LS, AND COQUINOID CHUNKS; BROWNISH BLACK LIGNITIC AND ORGANIC PLANT
MATERIAL, DICTY. COOKEI, MOLLUSK MOLDS AND CASTS, LOW-MOD. POROSITY; CAVITY 123-125' BELOW
TOP OF CASING.

- 125 - 130 LIMESTONE; BUFF TO LIGHT BROWN; VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
ACCESSORY MINERALS: QUARTZ SAND- %, CLAY- %, ORGANICS- %, LIMESTONE- %;
FOSSILS: BRYOZOA, CORAL, MOLLUSKS, FOSSIL FRAGMENTS;
BIOMICRITE; SPARSE GRAYISH GREEN, SANDY, CALCITIC, CLAY CHUNKS, BROWN PEATY LENSES;
SPARSE, SOFT WHITE SPECKLED LS; COQUINA CHUNKS; MODERATE POROSITY. BIOMICRITE IS
DOLOMITIC.
- 130 - 135 AS ABOVE
- 135 - 140 AS ABOVE
- 140 - 145 LIMESTONE; BUFF TO TAN;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
ACCESSORY MINERALS: QUARTZ SAND- %, ORGANICS- %, DOLOMITE- %;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: BENTHIC FORAMINIFERA;
BIOMICRITE; SOME YELLOWISH TAN-TAN DOLOMITE; QTZ SAND, DK BROWN ORGANIC MATERIAL;
OFF-WHITE, SOFT, SPECKLED LS; NUMMULITES VANDERSTOKI (CAVINGS?); MODERATE POROSITY.
- 145 - 150 LIMESTONE; TAN;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
ACCESSORY MINERALS: QUARTZ SAND- %, LIMESTONE- %;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: MOLLUSKS, FOSSIL MOLDS, ECHINOID, BENTHIC FORAMINIFERA;
BIOMICRITE; OFF-WHITE SPECKLED LS; LEPIDOCYCLINA-- CAVINGS?, MODERATE POROSITY; PELECYPOD
MOLDS.
- 150 - 155 LIMESTONE; CREAM TO LIGHT TAN; POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: CALCILUTITE;
POOR INDURATION;
ACCESSORY MINERALS: SPAR- %, QUARTZ SAND- %;
OTHER FEATURES: CHALKY, WEATHERED;
HIGHLY WEATHERED, SPARSE TRANSLUCENT QTZ SAND; MODERATE-HIGH POROSITY.
- 155 - 160 LIMESTONE; CREAM TO LIGHT TAN; POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
POOR INDURATION;
ACCESSORY MINERALS: SPAR- %, DOLOMITE- %, QUARTZ SAND- %, PHOSPHATIC SAND- %;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: BENTHIC FORAMINIFERA;
SPARSE BIOMICRITE; HIGHLY WEATHERED, FRIABLE; SOME BLACK PHOSPHATE, MORE QTZ SAND, SPARSE
BUFF SUCROSIC DOLOMITE. COSKINOLINA FLORIDANA. MODERATE-HIGH POROSITY.

- 160 - 165 LIMESTONE; CREAM TO LIGHT TAN; POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
POOR INDURATION;
ACCESSORY MINERALS: SPAR- %, QUARTZ SAND- %, PHOSPHATIC SAND- %, ORGANICS- %;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID;
BIOMICRITE, HIGHLY WEATHERED; SPARSE TANNISH GRAY SUCROSIC DOLOMITIC LS ,QTZ SAND, AND
BLACK PHOSPHATE. DICTYOCONUS COOKEI. MODERATE TO HIGH POROSITY.
- 165 - 170 AS ABOVE
VUGGY.
- 170 - 175 LIMESTONE; LIGHT TAN TO TAN; POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
POOR INDURATION;
ACCESSORY MINERALS: SPAR- %;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: BENTHIC FORAMINIFERA;
BIOMICRITE. SLIGHTLY CHALKY, WEATHERED, FRIABLE, ABUNDANT SECONDARY REPLACED CRYSTALLINE
CALCITE; LT BRN-BRN SUCROSIC DOLOMITIC LS; QTZ SAND AND SOFT, WHITE LS; COSKINOLINA
FLORIDANA. MOD-HIGH POROSITY.
- 175 - 180 AS ABOVE
LESS SPARRY CALCITE. NUMEROUS COSKINOLINA FLORIDANA, DICTY. COOKEI. GASTROPOD FRAGMENT,
ECHINOID TEST.
- 180 - 185 LIMESTONE; CREAM TO LIGHT TAN; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GRAIN SIZE: FINE;
ACCESSORY MINERALS: SPAR- %, QUARTZ SAND- %, DOLOMITE- %;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, FOSSIL FRAGMENTS;
BIOMICRITE, HIGHLY WEATHERED; BUFF-DK TANNISH GRAY CRYSTALLINE DOLOMITE, QTZ SAND,
COSKINOLINA FLORIDANA, LOW-MODERATE POROSITY.
- 185 - 190 AS ABOVE
- 190 - 195 AS ABOVE
SOME LT BRN SUCROSIC DOLOMITIC LS, SPECKLED, SOFT, WHITE LS.
- 195 - 200 LIMESTONE; LIGHT BROWN TO LIGHT BROWNISH GRAY; LOW PERMEABILITY;
GRAIN SIZE: MEDIUM; GOOD INDURATION;
OTHER FEATURES: DOLOMITIC;
LOW-MODERATE POROSITY.
- 200 - 205 LIMESTONE; TAN TO BROWN; VUGULAR;
OTHER FEATURES: SUCROSIC, DOLOMITIC;
SOME SPARSE, SOFT, SPECKLED WHITE LS.; MODERATE POROSITY.

- 205 - 210 NO SAMPLES
- 210 - 215 LIMESTONE; TAN TO LIGHT BROWNISH GRAY; VUGULAR;
OTHER FEATURES: SUCROSIC, DOLOMITIC;
COMMENTS AS ABOVE.
- 215 - 220 AS ABOVE
MIXED W/ A BIOMICRITE, CREAM TO LT TAN; SPARSE, SOFT, SPECKLED LS; BRYOZOAN PAVEMENT;
MODERATE POROSITY.
- 220 - 225 LIMESTONE; LIGHT TAN TO TAN;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
OTHER FEATURES: DOLOMITIC;
SPARSE BIOMICRITE, SOFT-MODERATELY HARD. MODERATE POROSITY.
- 225 - 230 LIMESTONE; CREAM TO LIGHT TAN;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
RANGE: FINE TO MEDIUM; MODERATE INDURATION;
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID;
DOLOMITIC BIOMICRITE. MIXED WITH TAN-LT BRN, DOLOMITIC LS; SPARSE BLACK PHOSPHATE.
MODERATE POROSITY.
- 230 - 235 LIMESTONE; TAN TO LIGHT BROWN; LOW PERMEABILITY;
OTHER FEATURES: SUCROSIC;
DOLOMITIC LS MIXED WITH CREAM-TAN SPARSE BIOMICRITE, SOFT-MODERATELY HARD, F-M GRAINED,
LOW-MOD. POROSITY.
- 235 - 240 AS ABOVE
SUCROSIC, VUGGY.
- 240 - 245 LIMESTONE; LIGHT TAN TO LIGHT BROWN; VUGULAR;
OTHER FEATURES: SUCROSIC, DOLOMITIC;
MODERATE POROSITY.
- 245 - 250 LIMESTONE; LIGHT TAN;
RANGE: FINE TO MEDIUM;
OTHER FEATURES: CHALKY;
MIXED WITH A DOLOMITIC LS- LT BRN, SUCROSIC; MOD. POROSITY.
- 250 - 255 LIMESTONE; CREAM TO TAN; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
RANGE: FINE TO MEDIUM; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
OTHER FEATURES: CHALKY;
SPARSE BIOMICRITE; SOME DOLOMITIC LS- LT TAN, LT BROWNISH GRAY-BROWN, SUCROSIC;
LOW-MODERATE POROSITY.

- 255 - 260 LIMESTONE; CREAM TO LIGHT TAN; LOW PERMEABILITY;
OTHER FEATURES: CHALKY, WEATHERED;
MIXED WITH DOLOMITE, LT TANNISH GRAY-LT BRN; L-M POROSITY.
- 260 - 265 AS ABOVE
- 265 - 270 LIMESTONE; CREAM TO LIGHT TAN;
OTHER FEATURES: CHALKY, WEATHERED;
MODERATE POROSITY.
- 270 - 275 AS ABOVE
EXCEPT FOR SOME DOLOMITIC LS- TAN TO LT BRN, SUCROSIC.
- 275 - 280 LIMESTONE; CREAM TO LIGHT TAN; VUGULAR;
POOR INDURATION;
OTHER FEATURES: CHALKY, WEATHERED;
SLIGHTLY SILICIFIED, SOFT, ; SOME DOLOMITIC LS AS ABOVE; LOW-MODERATE POROSITY.
- 280 - 285 AS ABOVE
EXCEPT FOR SOME TANNISH GRAY, HARD DOLOMITE.
- 285 - 290 LIMESTONE; ;
LS AS ABOVE, MIXED WITH DOLOMITE AS IN 270' AND 285'.
- 290 - 295 LIMESTONE; CREAM TO LIGHT TAN; VUGULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
GRAIN SIZE: MEDIUM;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS;
SPARSE BIOMICRITE, SILICIFIED, SLIGHTLY CHALKY; SOME DOLOMITIC LS- LT BRN, SUCROSIC; MINOR
LAMINATED LT TAN TO TANNISH GRAY DOLOMITE; LOW-MOD. POROSITY.
- 295 - 300 AS ABOVE
SOME BROWNISH BLACK LIGNITE.
- 300 - 305 AS ABOVE
LARGER AND MORE ABUNDANT VUGS THAN ABOVE. FOSSILS ARE UNIDENTIFIABLE; LESS DOLOMITE.
- 305 - 310 LIMESTONE; CREAM TO LIGHT TAN; LOW PERMEABILITY, VUGULAR;
GRAIN SIZE: MEDIUM;
OTHER FEATURES: DOLOMITIC;
SILICIFIED; QTZ SAND GRANULES; SPARSE CHALKY WHITE LS AND TAN-TANNISH GRAY, SILICIFIED
DOLOMITE. LOW-MOD. POROSITY.
- 310 - 315 AS ABOVE
EXCEPT FOR LESS QTZ SAND, F-MED. GRAINED. SLIGHTLY MORE CHALKY.

- 315 - 320 LIMESTONE; CREAM TO LIGHT TAN; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
RANGE: FINE TO MEDIUM;
FOSSILS: BENTHIC FORAMINIFERA;
SPARSE BIOMICRITE, SILICIFIED; DOLOMITIC LS- LT BRN, SUCROSIC, ; SPARSE CHALKY WHITE LS
AND TANNISH GRAY, SILICEOUS DOLOMITE; FORAMS: COSKINOLINA FLORIDANA; LOW-MOD. POROSITY,
- 320 - 325 AS ABOVE
VUGGY; QTZ SAND, ORGANICS, ALTERED NUMMULITES- CAVINGS?
- 325 - 330 AS ABOVE
LESS WHITE CHALKY LS THAN ABOVE.
- 330 - 335 LIMESTONE; WHITE TO CREAM;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
RANGE: FINE TO MEDIUM;
OTHER FEATURES: CHALKY;
FOSSILS: ECHINOID;
SPARSE BIOMICRITE; MIXED WITH DOLOMITE- TAN, SILICIFIED; SOME DOLOMITIC LS- LT BRN,
SUCROSIC; MODERATE POROSITY.
- 335 - 340 AS ABOVE
NO SILICIFIED DOLOMITE. LOW-MODERATE POROSITY. QTZ SAND AND DOUBLY TERMINATED QTZ
CRYSTALS.
- 340 - 345 LIMESTONE; WHITE TO CREAM; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
RANGE: FINE TO MEDIUM;
FOSSILS: ECHINOID;
SPARSE BIOMICRITE; ABUNDANT DOLOMITIC LS- TAN TO LT BRN. SILICIFIED, SLIGHTLY VUGGY; QTZ
SAND; LOW-MOD. POROSITY.
- 345 - 350 AS ABOVE
EXCEPT FOR BEING MORE CHALKY AND FINER GRAINED. HIGHER POROSITY.
- 350 - 355 LIMESTONE; TAN TO LIGHT BROWN; VUGULAR, LOW PERMEABILITY;
OTHER FEATURES: DOLOMITIC, SUCROSIC;
SOME CREAM DOLOMITIC LS, YELLOWISH, SLIGHTLY CHALKY. LOW-MODERATE POROSITY.
- 355 - 360 LIMESTONE; ;

SUCROSIC, WEATHERED, AND CREAM-YELLOWISH DOLOMITE. LOW TO MODERATE POROSITY.
- 360 - 365 LIMESTONE; WHITE TO CREAM;
OTHER FEATURES: CHALKY;
SOME DOLOMITIC LS, TAN-TANNISH GRAY, SUCROSIC, MINOR PHOSPHORITE AND BRN CHERT; LOW-MOD.
POROSITY.

- 365 - 370 LIMESTONE; CREAM TO BROWNISH GRAY; LOW PERMEABILITY, VUGULAR;
GOOD INDURATION;
OTHER FEATURES: SUCROSIC, DOLOMITIC;
SLIGHTLY VUGGY, SILICEOUS, IN PART; CONFINER AT 366'; LOW POROSITY.
- 370 - 375 LIMESTONE; CREAM TO LIGHT BROWNISH GRAY; LOW PERMEABILITY, VUGULAR;
MODERATE INDURATION;
OTHER FEATURES: WEATHERED, DOLOMITIC;
MORE WEATHERED THAN ABOVE, SILICEOUS; MINOR DOLOMITE- CREAM; LOW-MOD. POROSITY.
- 375 - 380 LIMESTONE; CREAM TO LIGHT BROWNISH GRAY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
OTHER FEATURES: WEATHERED, DOLOMITIC;
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, FOSSIL MOLDS;
SPARSE BIOMICRITE; SOME COQUINA CHUNKS; MINOR DOLOMITE LT TAN; LEPIDOCYCLINA?, PELECYPOD
MOLDS; MOD. POROSITY.
- 380 - 385 LIMESTONE; CREAM TO LIGHT BROWNISH GRAY; VUGULAR;
OTHER FEATURES: WEATHERED, CHALKY;
DOLOMITIC; SPARSE COQUINA CHUNKS, FAIRLY SOFT, DK BRN-BLK WAXY ORGANIC MATERIAL; MODERATE
POROSITY.
- 385 - 390 AS ABOVE
SOME LT BRN DOLOMITIC LS, SUCROSIC; SPARSE TANNISH GRAY DOLOMITE. LOW-MOD. POROSITY.
- 390 - 395 LIMESTONE; CREAM TO TAN; VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
ACCESSORY MINERALS: QUARTZ- %, ORGANICS- %, DOLOMITE- %;
OTHER FEATURES: WEATHERED, CHALKY;
FOSSILS: FOSSIL MOLDS, MOLLUSKS;
BIOMICRITE, HIGHLY WEATHERED, SLIGHTLY VUGGY, SPARSE SILICEOUS, TANNISH GRAY DOLOMITE;
ABUNDANT QTZ XLS. BRN-BLK WAXY ORGANIC MATERIAL; MODERATE POROSITY.
- 395 - 400 LIMESTONE; CREAM TO LIGHT TAN; VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
OTHER FEATURES: CHALKY, WEATHERED;
SPARSE BIOMICRITE, HIGHLY WEATHERED, SLIGHTLY CHALKY. SPARSE SILICEOUS TANNISH GRAY
DOLOMITE AND QTZ XLS; PELECYPOD MOLD; MODERATE POROSITY.
- 400 - 405 LIMESTONE; CREAM TO LIGHT BROWNISH GRAY; VUGULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
FOSSILS: MOLLUSKS, FOSSIL MOLDS;
SPARSE BIOMICRITE, SOFT WITH THIN MODERATELY HARD LENSES. SPARSE INORGANIC GREEN CLAY AND
COQUINA CHUNKS; LT TANNISH GRAY DOLOMITE; LOW-MOD. POROSITY.

- 405 - 410 LIMESTONE; CREAM TO LIGHT BROWNISH GRAY; VUGULAR;
OTHER FEATURES: CHALKY, DOLOMITIC;
SOFT GREEN-DK GREEN, ORGANIC, CALCITIC CLAY; SPARSE LT BRN SUCROSIC DOLOMITIC LS; MODERATE POROSITY.
- 410 - 415 LIMESTONE; CREAM TO LIGHT BROWNISH GRAY;
OTHER FEATURES: WEATHERED;
HIGHLY WEATHERED; SPARSE LIMONITE? FRAGMENTS AND HARD TAN DOLOMITIC LS; BROWNISH BLACK LIGNITE; MOD. POROSITY.
- 415 - 420 LIMESTONE; CREAM TO LIGHT BROWNISH GRAY; VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
OTHER FEATURES: WEATHERED;
FOSSILS: BENTHIC FORAMINIFERA;
SPARSE BIOMICRITE; SPARSE TAN DOLOMITIC LS; ALTERED COSKINOLINA FLORIDANA?; MODERATE POROSITY.
- 420 - 425 LIMESTONE; CREAM TO TAN; VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
GRAIN SIZE: MEDIUM;
OTHER FEATURES: WEATHERED, CHALKY;
FOSSILS: MOLLUSKS, FOSSIL MOLDS;
SPARSE BIOMICRITE, HIGHLY WEATHERED; SPARSE BLACK LIGNITIC MATERIAL; MODERATE POROSITY.
- 425 - 430 LIMESTONE; CREAM TO TAN; VUGULAR;
GRAIN SIZE: MEDIUM;
OTHER FEATURES: CHALKY;
SLIGHTLY VUGGY; SPARSE LT BRN SUCROSIC DOLOMITIC LS.
- 430 - 435 LIMESTONE; CREAM TO LIGHT BROWN; VUGULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
OTHER FEATURES: CHALKY, WEATHERED;
FOSSILS: CORAL, BRYOZOA, MOLLUSKS, FOSSIL FRAGMENTS;
DOLOMITIC SPARSE BIOMICRITE; NUMEROUS SMALL VUGS; SPARSE BRN SUCROSIC DOLOMITIC LS AND LT BROWNISH GRAY CHERT; LOW-MODERATE POROSITY.
- 435 - 440 AS ABOVE
HIGHLY DOLOMITIC; SOME DK GREEN ORGANIC CLAY; CORAL FRAGMENTS; LOW-MODERATE POROSITY.
- 440 - 445 LIMESTONE; CREAM TO LIGHT BROWN; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
OTHER FEATURES: WEATHERED, DOLOMITIC;
FOSSILS: MOLLUSKS, FOSSIL MOLDS;
SPARSE BIOMICRITE; SOME TANNISH GRAY-GRAY SILICEOUS DOLOMITE; LOW-MOD. POROSITY.

- 445 - 450 LIMESTONE; CREAM TO TAN; VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
OTHER FEATURES: WEATHERED, DOLOMITIC;
SPARSE BIOMICRITE, SOFT-MODERATELY HARD, SLIGHTLY VUGGY; SOME LT BRN SUCROSIC DOLOMITIC
LS, TANNISH GRAY SILICEOUS DOLOMITE AND QTZ SAND. MODERATE POROSITY.
- 450 - 455 LIMESTONE; CREAM TO TAN; VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
OTHER FEATURES: DOLOMITIC, WEATHERED;
FOSSILS: FOSSIL MOLDS, MOLLUSKS;
BIOMICRITE; SOME TANNISH GRAY SILICEOUS DOLOMITE; TURRITELLA MOLDS?, MODERATE POROSITY.
- 455 - 460 AS ABOVE
SOMEWHAT SILICEOUS; MINOR ORGANIC LIGNITIC MATERIAL; PELECYPOD MOLD; MODERATE POROSITY.
- 460 - 465 LIMESTONE; CREAM TO LIGHT TAN;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GRAIN SIZE: MEDIUM;
OTHER FEATURES: CHALKY;
BIOMICRITE, SPARSE TANNISH GRAY SILICEOUS DOLOMITE. MODERATE POROSITY.
- 465 - 470 LIMESTONE; CREAM TO LIGHT TAN;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
OTHER FEATURES: DOLOMITIC, CHALKY;
FOSSILS: CORAL;
BIOMICRITE, SLIGHTLY DOLOMITIC AND CHALKY; SPARSE DOLOMITE AS ABOVE; CORAL? FRAGMENTS;
MOD. POROSITY.
- 470 - 475 LIMESTONE; CREAM TO LIGHT TAN; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
OTHER FEATURES: CHALKY, DOLOMITIC;
BIOMICRITE; SPARSE DOLOMITE AS ABOVE; SOME GREEN CLAY AND PYRITE? FRAGMENTS; LOW-MOD.
POROSITY.
- 475 - 480 LIMESTONE; CREAM TO LIGHT TAN; VUGULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
OTHER FEATURES: DOLOMITIC;
HIGHLY DOLOMITIC BIOMICRITE; SOME LT BRN SUCROSIC DOLOMITE LS AND HARD, TANNISH GRAY
DOLOMITE; LOW-MOD. POROSITY.
- 480 - 485 LIMESTONE; CREAM TO LIGHT TAN;
OTHER FEATURES: CHALKY, DOLOMITIC;
NUMEROUS TRANSLUCENT AND TRANSPARENT QTZ CRYSTALS, MINOR WAXY, THIN LAYERED, DARK ORGANIC
MATERIAL; L-M POROSITY,

- 485 - 490 LIMESTONE; CREAM TO LIGHT TAN;
OTHER FEATURES: CHALKY;
SOME LT TANNISH GRAY SUCROSIIC DOLOMITE; QTZ XLS AS ABOVE; SPARSE BROWN ORGANIC MATERIAL;
MOD. POROSITY.
- 490 - 495 LIMESTONE; CREAM TO LIGHT TAN;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
OTHER FEATURES: DOLOMITIC;
SPARSE BIOMICRITE; NUMEROUS QTZ CRYSTAL AGGREGATES- CAVITY FORMED; DK BROWNISH GRAY CHERT,
UNIDENTIFIABLE FOSSIL FRAGS.; LOW-MODERATE POROSITY.
- 495 - 500 LIMESTONE; CREAM TO LIGHT TAN; LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
RANGE: FINE TO MEDIUM;
OTHER FEATURES: DOLOMITIC;
FOSSILS: MOLLUSKS, FOSSIL MOLDS;
SPARSE BIOMICRITE; SPARSE DK BRN, CLAYEY, LIGNITIC MATERIAL, ABUNDANT WHITE KAOLIN; AND
DARK BROWNISH GRAY CHERT; SOME TANNISH GRAY SILICEOUS DOLOMITE; LOW-MOD. POROSITY.
- 500 TOTAL DEPTH