— DRAFT — (LACKS FIGURES & BIBLIOGRAPHY) & GRAMMAR EDITS

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EXECUTIVE SUMMARY - ROMP LP-6
"COLEMAN" / HANOVER SHOE PROPERTY
SUMTER COUNTY / BASIN 19 / PARCEL #19-020-036
S27 - T19S - R22E

DECEMBER 1991 DOUGLAS H. RAPPUHN, P.G.

I. SITE LOCATION

The LP-6 wellsite is located in northwestern Sumter County, Florida, approximately one mile east of central Lake Panasoffkee. From the intersection of I-75 and S.R. 470, south of Lake Panasoffkee, the wellsite can be found by proceeding approximately 2.8 miles east on S.R. 470 to U.S. 301; 3.5 miles north on U.S. 301 to Warm Springs Avenue (S.R. 514) in the town of Coleman; and 1.3 miles west on Warm Springs Avenue (across the Interstate 75 overpass). The wellsite is on the north side of Warm Springs Avenue, just inside and to the west of a locked gate (Figure 1).

Two monitor wells were completed on the 30´x30´ permanent easement situated to the north of the roadside ditch. A 100´x100´ construction easement encompassing the 30´x30´ parcel, and access-way was provided by the Hanover Shoe Company. (Note: The encompassing tract, owned by the Hanover Shoe Company, has been targeted by the Southwest Florida Water Management District (SWFWMD) for future purchase for protection of floodplain and upland habitat).

The LP-6 wellsite is located in the SW 1/4 of the SW 1/4 of the SE 1/4 of Section 27, Township 19 South, Range 22 East; at latitude 28x47´59" North, longitude 82x05´41" West (Figure 2). Land elevation at the site is approximately 54´ NGVD.

II. WELLSITE OBJECTIVES AND PURPOSE OF MONITORS

Wellsite Objectives

The LP-6 wellsite was designed and constructed to fulfil objectives of the Districts Resource Project Department Lake Panasoffkee Hydrologic Study, and the Regional Observation Monitor-well Program (ROMP) network of wells. The LP series of monitor sites (LP-2, -3, -4, -5, -6) consists of a perimeter network of fairly shallow (less than 300') wells encircling Lake Panasoffkee (Figure 3), whereas ROMP 111 and ROMP 112 (formerly designated LP-1) are located 2-5 miles distant from Lake Panasoffkee in locations more consistent with the ROMP grid of wellsites.

Specific objectives of the LP wells included determination of the local extent of the confinement of the Floridan aquifer, and the determination of the presence/absence of elevated sulfate concentration in the upper 150' of the hydrogeologic column.

Objectives common to the LP and ROMP networks included detailed description of the lithology of the geologic units penetrated, geophysical logging and correlation with other regional monitors, and water quality profiling. Additionally, a short duration aquifer performance test was conducted at ROMP 111, pumping the 63-184' BLS interval (parts of the Ocala Group, Avon Park Formation). Future aquifer testing is scheduled at ROMP 112, which as of this writing has been only cored to 704' BLS.

Purpose of Monitors

Monitor wells were completed into both of the discernable aquifers present at the site. The Surficial Aquifer Monitor (well screen open to 18-23.5' BLS) will monitor the water table aquifer. It is recognized that proximity to the roadside ditch (approximately 35' to the south) may influence water levels registered in the well. Any effect will be dependent on the vertical and lateral continuity of the clayey sands in the upper 20' of sediments, whether the ditch water is imported from upgradient, and the degree the water is transmitted past the site or impounded locally by the ditch.

The Upper Floridan Aquifer Monitor (well bore open to 42-154'BLS), in addition to providing water quality profiling and core samples for the 44-154' BLS zone (lithologic samples from LSD to 44' BLS were provided by initial hollow stem augering) will monitor the commonly pumped Upper Floridan aquifer. Since elevated sulfate concentration was never detected in this well during coring or subsequent purging, any eventual detection of increased sulfate in samples from this well would indicate the upwelling of poor-quality waters. Sulfate concentration in excess of potable standards (250 mg/l) was detected at LP-4, west of Lake Panasoffkee, at 140'BLS / -87.5' NGVD, and unusually high TDS concentrations have been documented by USGS in the area south-southeast of Lake Panasoffkee (Sprinkle, 1982).

Period-of-record water level data from the two completed monitors will provide a reliable indication of aquifer response to meteorological trends and regional usage, as well as indicate pattern of hydraulic gradient between aquifers. Initial data indicates that the potentiometric surface of the confined Floridan aquifer ranged 1.5-2.5' above the water table in late 1988 and early 1989.

III. GEOLOGICAL SETTING

Physiography

Sumter County is divided by White (1970) into five physiographic units (Figure ___), all subunits of the Central Highlands province. The LP-6 wellsite is located along the eastern edge of the Tsala Apopka Plain, a division of the Western Valley lowlands. The Central Highlands, once a regional upland covering much of central Florida, displays many relict topographic beach ridge features sub-paralleling Florida's present Atlantic coast. Many of the ridges display prominent elevation differences along their lengths, apparently the results of solution processes that both dissected the original highland and caused the ridges to sag along their length (White, 1970).

The Western Valley, although somewhat irregularly shaped, roughly parallels the axis of the Floridian peninsula. It encompasses the bulk of Sumter County and stretches from northern Hillsborough County to well into northern Florida. The low flat floor of it's sub-unit, the Tsala Apopka Plain, provides indications that it once contained a large lake, of which present Lakes Tsala Apopka and Panasoffkee are thought to be remnants (White, 1970). The Tsala Apopka Plain also contains the north-flowing Withlacoochee River.

Structure

The LP series of borings indicate substantial local deviations in unit thickness and structural top for both the Hawthorn and Ocala Group sediments (Figure ___). Scott (1988) discerned a lack of Hawthorn sediments present over most of Sumter County. A review of Chen's (1965) isopach map of the Ocala Group indicates the LP study area to be within an east/west beltway of some of the thinnest sections (0-100') of the Ocala Group in peninsular Florida (a north/south belt along the southeast coast also similar thinning).

A large positive geologic feature, the northwest/southeast aligned Ocala Platform, appears to have exerted depositional control on post-Eocene sediment accumulations and unit geometry

(Scott, 1988) in central Florida (Figure ____). Consequentially, subaerial erosion would contribute to thinning of the Eocene beds (Ocala Group) where the platform remained above sea level. Scott's findings do not specify a tectonic aspect to the elevation of the platform as does Vernon (1951), who describes the "Ocala Uplift" as a gentle southeast-trending anticline, approximately 230 miles long and 70 miles wide. The positive nature of this landform resulted in the lapping of Oligocene and Miocene units onto its edges (Scott, 1988). At the LP-6 wellsite, substantial unconformities are indicated by the lack of Oligocene units (i.e., "Suwannee" Limestone), as well as extremely thin Hawthorn and moderately thin Ocala units.

From the central Sumter County area, stratigraphic units are found to generally dip and thicken to the south (incorporating lapping units not encountered at LP-6), as well as variably dip and thicken to the west (Gilboy, 1985; Figure ___). With little to no overlying siliciclastics of the Hawthorn to confine the Upper Floridan aquifer within the Eocene carbonates, the potentiometric surface drops off rather predictably in wide-spaced contours to the west (where unaffected by topographic highs or localized groundwater discharge).

As an indication of the region's exposure to periods of subaerial weathering, it is noted that drilling results at LP-2 (approximately 1/2 mile west of LP-6) displayed organic clay and marl to depths of 110' BLS, with quartz sands to approximately 150' BLS. This anomaly in encountering the Ocala Group sediments may indicate drilling within an infilled solution feature.

Stratigraphy

The lithologic sequence presented by drilling at the LP-6 site reflects typical stratigraphy for most of Sumter County. Limestones of the Upper Eocene Ocala Group lie at or near land surface throughout most of the county, often less than 30' below land surface. Recent to Pleistocene sediments, and remnant Miocene Hawthorn siliciclastic sediments provide the cover where it exists (Oligocene units appear to be absent from the geologic column throughout the county).

The Ocala Group represents the uppermost vertically extensive sequence of carbonates in the section. At LP-6, the unconformity at the Hawthorn / Ocala contact is marked by the descending transition from variegated, slightly phosphatic sandy-clay to a gummy calcareous clay containing limestone fragments, quartz sand, and fragments of white kaolinite or tripoli. Immediately below this 2.5' layer of apparent weathering residuum, the typical pale orange fossiliferous calcarenite of the Ocala Group is encountered.

The 70' section of Ocala Group sediments at LP-6 is underlain by the Avon Park Formation. This contact zone is locally characterized by porous beds of the Ocala calcarenite/packstone atop a sequence of well-indurated (probably dolomitic) limestones. A characteristic gamma log spike, in sharp contrast to the flat gamma response typical to the "clean" limestones of the Ocala Group, was noted in the uppermost Avon Park. The gamma activity appears associated with the presence of dolomitic limestone and/or the occurrence of radioactive elements preserved in a reducing environment characterized by traces of pyrite and organic debris. Only 50' of the Avon Park sediments were penetrated due to the planned scope of the LP project.

Results from other wells (Chen, 1965) indicate the Avon Park Formation reaches thicknesses of 1000-1200' in the region. Its lower sub-unit (the former Lake City Limestone) has been noted to contain enough intergranular, vugular, and bedded evaporite minerals (gypsum, anhydrite) to produce both a substantial decrease in unit transmissivity (essentially confining the bottom of the Upper Floridan aquifer) and a degradation of water quality. Including deeper carbonates, approximately 2700' of Tertiary section is believed to exist in the area (Chen, 1965).

SUMMARY DESCRIPTION OF LITHOLOGIES PENETRATED AT LP-6:

DEPTH	STRATIGRAPHIC UNIT (AGE) Lithologic Description
LSD-24'	<u>UNDIFFERENTIATED SURFICIAL DEPOSITS (PLEISTOCENE-RECENT)</u> **Quartz sand and clayey quartz sand**; gray-brown, gray-orange, yellow-gray, generally fine-medium grained, subrounded-rounded, unconsolidated-poorly consolidated with clay cement, intergranular porosity; accessory constituents- clay 5-40%, iron stain, phosphatic sand.
<u>24-34'</u>	<u>HAWTHORN GROUP - UNDIFFERENTIATED (MIOCENE)</u> **Clayey quartz sand**; yellowish/greenish-gray, generally fine grained, subrounded, moderately consolidated with clay cement, intergranular porosity, accessory constituents- clay 10-45%, phosphatic sand. Clay; light olive, poorly-moderately indurated, sandy partings, mollusc fragments; accessory constituents- quartz sand 25-35%, kaolinite or tripoli (lenses @ 27-27.5' & 28-28.5'), phosphatic sand, basal calcareous clasts.
<u>34-104'</u>	<u>OCALA GROUP (UPPER EOCENE)</u> **Calcarenite**; pale orange-white, generally very fine-medium grained, poorly-moderately indurated with calcilutite cement, intergranular and moldic porosity, fossiliferous (molluscs, foraminifera (Nummulites, Lepidocyclina), coral); accessory constituents- calcilutite

25-35%, trace euhedral pyrite @ 84´, rubbly calcareous clay residuum @ 34-36.5´.

104-TD **AVON PARK FORMATION (MIDDLE EOCENE)**
(154´) Calcarenite & limestone; yellowish gray-white, generally very fine-medium grained, moderate-well indurated with dolomite & calcilutite cement, intergranular and moldic porosity, pelletal, fossiliferous (foraminifera (Dictyoconus), molluscs); accessory constituents- dolomite 10-15%, trace euhedral pyrite @ 115-120´.

Calcilutite; yellowish gray/olive, moderate-well indurated, intergranular and moldic porosity, carbonaceous shards and specks, burrows, rootlet molds containing peaty remains, accessory constituents- dolomite 10%.

IV. HYDROGEOLOGY AND WATER QUALITY

Hydrology

Although much of Sumter County exhibits karstic terrane features consistant with limestone bedrock near land surface, two distinguishable aquifers were identified during drilling at the LP-6 site; the surficial and the Upper Floridan. Much of the county is poorly drained with numerous wetland areas. Indications of an extensive system of internal drainage are quite evident: even the 420 square mile Lake Panasoffkee watershed provides only 60 square miles of direct runoff to the lake, the remaining 360 square miles draining to the subsurface (Taylor, 1977).

Numerous springs exist in Sumter County in a portion of the Western Valley province east of Lake Panasoffkee. Location of this belt appears to reflect breaches in the upper confining beds of the Upper Floridan aquifer in the area just downhill of the topographic highs to the east (Figures___, ___). Discharge from these springs in the area of Warm Springs Hammock is shown to substantially deflect the Floridan aquifer potentiometric surface upgradient as aquifer head is released. In some presentations this reentrant effect is seen to extend into the area of the Lake Harris Cross Valley physiographic unit (Lake Deaton / Okahumpka area) (Figure ___).

Lake Panasoffkee, the Withlacoochee River, and Lake Tsala Apopka represent the dominant interactive groundwater/surface water features in Sumter and eastern Citrus County. In general, Figure___ shows a surficial aquifer to be present around Lakes Tsala Apopka and Panasoffkee, therefore the Floridan exists under confined conditions at those locations.

Rutledge (1977), in comparing lake levels of Tsala Apopka with Floridan aquifer potentiometric readings concluded that Lake

Tsala Apopka provides net recharge to the Upper Floridan aquifer (lake levels usually higher than that of the Floridan potentiometric surface).Taylor (1977), by development of a water budget for the area concluded that the Floridan aquifer provides net discharge (approximately 103 MGD) to Lake Panasoffkee (lake levels usually lower than that of the Floridan potentiometric surface).

Although Panasoffkee recieves discharge from the Floridan, and Tsala Apopka recharges the Floridan, water levels in both the lakes have been determined to reflect surface expressions of the local water table aquifers (Kimrey and Anderson, 1987).

As Figure __ also shows, the path of the Withlacoochee River crosses areas in Sumter and Citrus Counties along west-central Sumter where there is no local surficial aquifer, therefore the river's water level reflects the potentiometric surface of the Floridan. Also, the paths of the Withlacoochee in northwest Sumter County (northwest of its confluence with the Lake Panasofkee Outlet River), and those of the Little Withlacoochee and the Withlacoochee southeast and south of their confluence cross areas where surficial aquifers exist, therefore the rivers there are expressions of the local water tables.

V. WELL DESIGN AND CONSTRUCTION

Surficial Aquifer Monitor

The Surficial Aquifer Monitor (Figure ______) was designed and constructed to monitor fluctuations in the water table. Actual monitor construction followed hollow stem augering to 43.5' BLS elsewhere on the permanent easement to determine a specific transmissive target zone. The District's CME 75 rig (Lloyd Johnson, Senior Driller) was used for constructing this monitor.

The construction of the Surficial Aquifer Monitor was initiated by drilling a 12" nominal borehole (mud rotary) to 24.5' BLS. A 1' section of 6" PVC "tailpipe" (23.5-24.5' BLS), coupled to 5.5' of 6" PVC well-screen (.030" slot; 18-23.5' BLS), coupled to 20' of 6" PVC Sch 40 casing (+2-18' BLS) was installed in the drill-hole. The annulus was flushed with clear water, and the annulus about the well-screen was sand-packed with 6-20 graded silica sand from 15-24.5' BLS. Neat cement grout was pressure pumped by tremie from 15' BLS to near land surface. The upper 2' of earth surrounding the 6" casing was dug out and a 5' section (+3-2' BLS) of 12" steel casing with locking lid was installed about the wellhead for security purposes. Remaining open annular spaces were grouted. The well was developed by air-lifting 2 days after grouting the 6" casing. At the time of installation, the water table was approximately 7.9' BLS (45.8' NGVD). Construction was completed July 29, 1988.

Upper Floridan Aquifer Monitor

The Upper Floridan Aquifer Monitor (Figure _____) was designed and constructed to monitor potentiometric fluctuations in the upper Floridan aquifer. Actual monitor construction followed hollow stem augering to 43.5' BLS elsewhere on the permanent easement, to determine an appropriate casing seat for this well. The District's CME 75 rig (Lloyd Johnson, Senior Driller) was used for constructing this monitor.

The construction of the Upper Floridan Aquifer Monitor was initiated by drilling a 10" nominal borehole (mud rotary) to 43' BLS. Forty-four feet (44') of 6" PVC Sch 40 casing (+2-42' BLS) was set and cemented by pressure grouting, displacing the cement with water. After letting the grout cure for 24 hours, the 44-154' BLS interval was wireline cored (3" bit) over the following two days. Coring was accomplished using clean water as the drilling fluid, thus allowing routine water sampling (once purged) and regular checks of gross potentiometric head (once stabilized). The corehole, from 42-154' BLS was never reamed, therefore the completed open bore reflects washouts from drilling with the 3" O.D. coring bit. The well was developed by air-lifting. The upper 2' of earth surrounding the 6" casing was dug out and a 5' section (+2-3' BLS) of 12" steel casing with locking lid was installed about the wellhead for security purposes. Remaining annular spaces were grouted. At the time of installation, potentiometric level was approximately 5.9' BLS (47.5' NGVD). Construction was completed July 29, 1988.

VI. GEOPHYSICAL LOGS

Several geophysical logging runs were made on the Upper Floridan Aquifer Monitor due to equipment malfunctions, therefore a detailed review of actual logs on file at SWFWMD may indicate a variety of logging dates. Regardless of date logged, well configuration was always in the "as-built" state (as depicted by the caliper log, Figure ___).

All logs included in Figure ___ were run by ROMP personnel, on either Mineral Logging Systems (7/29/88) or Mount Sopris (12/7/88, 4/20/89) equipment. Digital (raw) data records exist as "Crosstalk" files for many of those logs run on the Mount Sopris equipment. Available geophysical logs include caliper (three-arm), natural gamma, spontaneous potential, single point resistance, 16" normal, 64" normal, neutron porosity (AmBe 241 source), gamma-gamma density (Ce 137 source), fluid resistance, and fluid temperature.

Since the well was thoroughly purged by air-lifting immediately prior to 7/29/88 logging, the fluid resistance and fluid temperature logs may reflect response not yet in equilibrium with natural downhole conditions, but are included as part of Figure ___ for the sake of comparison.

Competent beds ("ledges") indicated at 50-65', and 102-112' BLS on the caliper log align closely with signal spikes found on the single point, 16" normal and 64" normal resistance logs, as well as on the neutron and gamma-gamma logs. Enhanced signal response due to the close proximity of sonde and surrounding borehole wall is partly responsible for the correspondence, although natural enhancement of these traces is typical in dolomitic or recrystallized zones.. The lower borehole constriction is associated with the Ocala Group / Avon Park Formation contact (approximately 104' BLS).

Note: Both neutron and gamma-gamma probes used for logs in Figure ___ were neither decentralized or compensated tools as are more typically used for water resource investigations. Therefore, further processing of these logs must occur for viable use.

WP6EXSUM.WP 4.2

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W- 16644
TOTAL DEPTH: 00154 FT.
SAMPLES - NONE

COUNTY - SUMTER
LOCATION: T.19S R.22E S.27CD
LAT = N 28D 47M 59
LON = W 82D 05M 41

COMPLETION DATE - 07/29/88
ELEVATION - 052 FT
OTHER TYPES OF LOGS AVAILABLE - GAMMA, ELECTRIC, TEMP, FLUID COND

OWNER/DRILLER: SWFMD; SITE LP-6; DRILLER-LLOYD JOHNSON

WORKED BY: FINISHED SITE CONSISTS OF THE FOLLOWING POTENTIOMETRIC MONITORS:
SURFICIAL AQUIFER MONITOR - CASING DEPTH = 18'; SCREENED DEPTH = 24'
FLORIDAN AQUIFER MONITOR - CASING DEPTH = 42'
SITE GEOLOGIST = DOUGLAS H. RAPPUHN (SWFWMD); SAMPLE COLLECTION BY
HOLLOW-STEM AUGER FROM 0-43.5 AND BY WIRELINE CORING FROM 42-154
WIRELINE CORING ACCOMPLISHED BY USING PLAIN WATER AS DRILLING FLUID,
ALLOWING ROUTINE POTENTIOMETRIC PROFILING AND WATER SAMPLING DURING THE
CORING PROCESS. DETAILED INFORMATION AVAILABLE FROM SWFWMD GEOHYDROLOGIC
DATA SECTION
CORE SAMPLES REDESCRIBED BY RICHARD GREEN 5/91.

0. -	24.	UNDIFFERENTIATED SAND AND CLAY
24. -	34.	HAWTHORN GROUP
34. -	104.	OCALA GROUP
104. -	.	AVON PARK FM.

0 - .6 SAND; GRAYISH BROWN; INTERGRANULAR;
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE;
ROUNDNESS: SUB-ANGULAR TO ROUNDED; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): ORGANIC MATRIX;
ACCESSORY MINERALS: PLANT REMAINS-15%, CLAY-02%, IRON STAIN-01%;
FOSSILS: NO FOSSILS;

.6- 1 SAND; GRAYISH ORANGE; INTERGRANULAR;
GRAIN SIZE: MEDIUM; RANGE: FINE TO VERY COARSE;
ROUNDNESS: ROUNDED TO SUB-ANGULAR; MEDIUM SPHERICITY; UNCONSOLIDATED;
ACCESSORY MINERALS: PLANT REMAINS-06%, CLAY-02%, IRON STAIN-01%;
FOSSILS: NO FOSSILS;

1 - 3 SAND; GRAYISH BROWN; INTERGRANULAR;
GRAIN SIZE: MEDIUM; RANGE: FINE TO VERY COARSE;
ROUNDNESS: ROUNDED TO SUB-ANGULAR; MEDIUM SPHERICITY; UNCONSOLIDATED;
ACCESSORY MINERALS: CLAY-02%, PLANT REMAINS-01%, IRON STAIN-01%;
OTHER FEATURES: FROSTED;
FOSSILS: NO FOSSILS;

3 - 5 SAND; GRAYISH ORANGE PINK; INTERGRANULAR;
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE;
ROUNDNESS: ROUNDED TO SUB-ANGULAR; MEDIUM SPHERICITY; UNCONSOLIDATED;
ACCESSORY MINERALS: CLAY-02%, IRON STAIN-01%;
OTHER FEATURES: FROSTED;
FOSSILS: NO FOSSILS;

5 - 6 SAND; DARK YELLOWISH BROWN; INTERGRANULAR;
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE;
ROUNDNESS: ROUNDED TO SUB-ANGULAR; MEDIUM SPHERICITY; UNCONSOLIDATED;
ACCESSORY MINERALS: CLAY-05%, IRON STAIN-02%;
OTHER FEATURES: FROSTED;
FOSSILS: NO FOSSILS;

6 - 8.5 SAND; GRAYISH BROWN; INTERGRANULAR;
GRAIN SIZE: MEDIUM; RANGE: FINE TO MEDIUM;
ROUNDNESS:SUB-ANGULAR; MEDIUM SPHERICITY; UNCONSOLIDATED;
ACCESSORY MINERALS: CLAY-02%, IRON STAIN-01%;
FOSSILS: NO FOSSILS;

8.5- 15.5 SAND; VERY LIGHT GRAY; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: MEDIUM; RANGE: FINE TO MEDIUM;
ROUNDNESS:SUB-ANGULAR; MEDIUM SPHERICITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX;
SEDIMENTARY STRUCTURES: MOTTLED,
ACCESSORY MINERALS: CLAY-40%, PHOSPHATIC SAND-02%, PLANT REMAINS-01%;
OTHER FEATURES: CHALKY, PARTINGS;
FOSSILS: NO FOSSILS;
CLAY CONTENT DECREASES WITH DEPTH TO APPROXIMATELY 20%, SOME PARTINGS ALONG SANDIER LAYERS, AND PLANT REMAINS.

15.5- 24 SAND; YELLOWISH GRAY TO PINKISH GRAY; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO MEDIUM;
ROUNDNESS: SUB-ANGULAR TO ROUNDED; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CLAY-15%, PHOSPHATIC SAND-02%;
FOSSILS: NO FOSSILS;
INTERBEDS OF CLEAN QUARTZ SAND AND SOMEWHAT CLAYEY (20%) SAND.

24 - 28 SAND; YELLOWISH GRAY TO GREENISH GRAY; INTERGRANULAR;
GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM;
ROUNDNESS:SUB-ANGULAR; MEDIUM SPHERICITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, STREAKED,
ACCESSORY MINERALS: CLAY-45%, PHOSPHATIC SAND-01%;
OTHER FEATURES: VARIEGATED, PLASTIC;
FOSSILS: NO FOSSILS;
INTERBEDDED CLAYEY (15-35%) SAND AND RELATIVELY CLEAN CLAY LENSES (CLAY IS GREENISH GRAY)
MINOR CLEAN QUARTZ SAND PARTINGS.

28 - 29.5 SAND; WHITE TO YELLOWISH GRAY; INTERGRANULAR;
GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM;
ROUNDNESS:SUB-ANGULAR; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CLAY-13%, PHOSPHATIC SAND-02%;
OTHER FEATURES: CHALKY;
FOSSILS: FOSSIL MOLDS;
INTERBED OF CLAYEY SAND BETWEEN TWO LENSES OF BRIGHT WHITE, FOSSILIFEROUS, NONCALCAREOUS,
POROUS MATERIAL. TRACES OF MOLLUSK FOSSILS. CLAYEY SAND CONTAINS CLASTS (TO 8MM) OF THE
WHITE MATERIAL. (WHITE MATERIAL MAY BE KAOLINITE?)

29.5- 34 SAND; LIGHT OLIVE GRAY TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM;
ROUNDNESS: ROUNDED TO SUB-ANGULAR; MEDIUM SPHERICITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX;
SEDIMENTARY STRUCTURES: MOTTLED, STREAKED,
ACCESSORY MINERALS: CLAY-20%;
OTHER FEATURES: CALCAREOUS, WEATHERED;
CLASTS OF WHITE MATERIAL (2MM-2CM) DISSEMINATED THROUGHOUT; CALCAREOUS CLASTS ALSO AT
BOTTOM OF SECTION.

34 - 36.5 CLAY; GRAYISH BROWN TO VERY LIGHT ORANGE; INTERGRANULAR; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX;
SEDIMENTARY STRUCTURES: NODULAR, MOTTLED,
ACCESSORY MINERALS: LIMESTONE-15%, QUARTZ SAND-10%;
OTHER FEATURES: CALCAREOUS, GRANULAR, VARIEGATED;
FOSSILS: NO FOSSILS;
EXTREMELY RUBBLY CONGLOMERATION OF QUARTZ SAND AND CALCAREOUS AND NONCALCAREOUS (WHITE
MATERIAL) CLASTS IN A CLAY MATRIX; TOP OF OCALA GROUP APPEARS TO BE AT 34', WITH THIS
INTERVAL AN APPARENT RESIDUUM.

36.5- 43.5 CALCARENITE; VERY LIGHT ORANGE; INTERGRANULAR, MOLDIC;
GRAIN TYPE: SKELETAL, CALCILUTITE, BIOGENIC; 65% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE; POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CALCILUTITE-35%;
OTHER FEATURES: CHALKY;
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, ECHINOID, FOSSIL FRAGMENTS;
CHALKY FINE GRAINED CALCARENITE INTERBEDDED WITH THIN POROUS BEDS OF LEPIDOCYCLINA AND MOLLUSK SHELL FRAGMENTS. (38.5-40', AND 41-42').

43.5- 49 LIMESTONE; VERY LIGHT ORANGE; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE; 70% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
FOSSILS: FOSSIL FRAGMENTS, BENTHIC FORAMINIFERA, BRYOZOA;
2" OF CORE RECOVERED.

49 - 54 LIMESTONE; VERY LIGHT ORANGE; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE; 70% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
OTHER FEATURES: GRANULAR;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, BRYOZOA, MOLLUSKS;
LEPIDOCYCLINA NOTED. 20% RECOVERY.

54 - 64 LIMESTONE; VERY LIGHT ORANGE; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY, MOLDIC;
GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE; 80% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO VERY COARSE; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, GRANULAR;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, MOLLUSKS, FOSSIL MOLDS;
AMPHISTEGINA, LEPIDOCYCLINA NOTED. MOLLUSK MOLDS COMMON. VARIABLE POROSITY AND PERMEABILITY. 85% RECOVERY.

64 - 69 LIMESTONE; VERY LIGHT ORANGE; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE; 95% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
ACCESSORY MINERALS: CALCILUTITE-05%;
OTHER FEATURES: GRANULAR;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS;
20% RECOVERY. PROBABLY A POORLY INDURATED GRAINSTONE/PACKSTONE LOST DURING DRILLING.

69 - 74 LIMESTONE; VERY LIGHT ORANGE; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE; 60% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: FINE; RANGE: MEDIUM TO FINE; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS;
10% RECOVERY.

74 - 104 CALCARENITE; WHITE; INTERGRANULAR, MOLDIC, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: PELLET, BIOGENIC, CALCILUTITE; 75% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO COARSE; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
ACCESSORY MINERALS: CALCILUTITE-25%, SPAR- %;
OTHER FEATURES: GRANULAR;
FOSSILS: MOLLUSKS, SPICULES, CORAL, ECHINOID;
FEWER FOSSILS THAN OVERLYING SECTION; VERY FEW RECOGNIZABLE FORAMS; TOP OF AVON PARK FM PROBABLY IN POOR RECOVERY ZONE AT APPROXIMATELY 104'. 30% RECOVERY.

104 - 114 LIMESTONE; WHITE; MOLDIC, VUGULAR;
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET; 55% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO MEDIUM; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BIOTURBATED,
ACCESSORY MINERALS: SILT- %, SPAR- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION;
FOSSILS: MOLLUSKS, ECHINOID, BENTHIC FORAMINIFERA, BRYOZOA;
DENSE, HARD LIMESTONE CONTAINING BURROWS FILLED WITH COARSE FOSSIL FRAGMENTS, FORAMS, PELLETS, AND MICRITE; POOR RECOVERY 104-109' (20%).

114 - 120 CALCARENITE; YELLOWISH GRAY TO LIGHT OLIVE GRAY; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: SKELETAL, PELLET, BIOGENIC; 90% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO COARSE; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT;
ACCESSORY MINERALS: PYRITE- %, SPAR- %;
OTHER FEATURES: GRANULAR, DOLOMITIC;
FOSSILS: BENTHIC FORAMINIFERA;
GRAINSTONE/PACKSTONE. SLIGHTLY DOLOMITIC; TRACE PYRITE.

120 - 126.5 LIMESTONE; YELLOWISH GRAY; MOLDIC, INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE; 55% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT;
OTHER FEATURES: DOLOMITIC;
FOSSILS: MOLLUSKS, FOSSIL MOLDS, BRYOZOA, BENTHIC FORAMINIFERA;

126.5- 130 CALCILUTITE; YELLOWISH GRAY TO LIGHT OLIVE GRAY; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: CALCILUTITE, SKELETAL; 65% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: STREAKED,
ACCESSORY MINERALS: CLAY-02%;
OTHER FEATURES: VARVED, DOLOMITIC;
FOSSILS: FOSSIL FRAGMENTS, WORM TRACES, BRYOZOA, MOLLUSKS;
CARBONACEOUS FRAGMENTS (TO 15MM).

130 - 134 LIMESTONE; YELLOWISH GRAY; INTERGRANULAR, MOLDIC, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: SKELETAL, BIOGENIC, CALCILUTITE; 60% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
OTHER FEATURES: GRANULAR, DOLOMITIC, MEDIUM RECRYSTALLIZATION;
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS, BENTHIC FORAMINIFERA, CORAL, BRYOZOA;

134 - 139 LIMESTONE; WHITE TO YELLOWISH GRAY; VUGULAR, MOLDIC;
GRAIN TYPE: CALCILUTITE, SKELETAL; 35% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE,
ACCESSORY MINERALS: PEAT-01%;
OTHER FEATURES: DOLOMITIC;
FOSSILS: BENTHIC FORAMINIFERA, PLANT REMAINS;
GRANULAR CALCAREOUS FILLED BURROWS IN FINE CALCAREOUS HOST ROCK; MOLDS OF PLANT ROOTLETS, CONTAINING PEATY REMAINS.

139 - 147.5 LIMESTONE; YELLOWISH GRAY; INTERGRANULAR, MOLDIC;
GRAIN TYPE: SKELETAL, BIOGENIC, CALCILUTITE; 45% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
ACCESSORY MINERALS: PEAT- %, PLANT REMAINS- %;
OTHER FEATURES: GRANULAR, DOLOMITIC, MEDIUM RECRYSTALLIZATION, HIGH RECRYSTALLIZATION;
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS, BENTHIC FORAMINIFERA, MILIOLIDS;
ABUNDANT MILIOLIDS.

147.5- 154 CALCARENITE; YELLOWISH GRAY; PIN POINT VUGS, MOLDIC, INTERGRANULAR;
GRAIN TYPE: SKELETAL, BIOGENIC, CALCILUTITE; 55% ALLOCHEMICAL CONSTITUENTS;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
ACCESSORY MINERALS: PLANT REMAINS-03%;
OTHER FEATURES: DOLOMITIC;
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, FOSSIL FRAGMENTS;

154 TOTAL DEPTH