ROMP TR9-2 "APOLLO BEACH"
WRAP #1
EXECUTIVE SUMMARY
HILLSBOROUGH COUNTY
BASIN 11/S. 22, T31S, RANGE 19E
PARCEL NO. 11-620-101

APRIL 29, 1990 **J.L. DECKER**

I. SITE LOCATION

The ROMP TR9-2 (WRAP-1) wellsite is located near Apollo Beach, Hillsborough County, Florida. The wellsite can be found by proceeding about 1.5 miles west on SR 672 (Big Bend Rd.) from I-75. Turn left onto U.S. 41S, and travel about 1.8 miles south to the first traffic light. Make a left turn onto an access road (across railroad tracks) which leads to the wellsite. The wellsite is east of Apollo Beach and within the abandoned Apollo Beach wellfield (Figure 1).

The wellsite has a 50' x 200' perpetual easement (Figure 2) with a 300' x 726' temporary construction easement. ROMP TR9-2 is located in the NE 1/4 of SE 1/4 of the SW 1/4 of Section 22, Township 31S, Range 19E at latitude 27° 45' 54"N, longitude 82° 23' 38"W.

II. GEOLOGY

The TR9-2 "Apollo Beach" wellsite lies within the physiographic province known as the Gulf Coastal Lowlands (Figure 3). The Gulf Coastal Lowlands are part of the Mid-Peninsular Zone of the Floridan Peninsula (White, 1970). The wellsite is located in Hillsborough County on the Pamlico terrace at an elevation of 13 ft. above NGVD. Ancient stands of sea level above its present level shaped the topography in the wellsite vicinity into marine terraces. The Pamlico terrace was formed during one of these ancient stands which inundated the Floridan Peninsula during Pleistocene interglacial episodes. The TR9-2 wellsite lies west of a regional slope on the terrace part of the Coastal Plain showing four flats and a sequence of three intervening scarps called the Valrico Ridge (Figure

3).

Principal surface drainage in the region is through the Alafia and Little Manatee Rivers, and Bullfrog Creek.

The wellsite is underlain by terrace deposits and sedimentary units comprising the surficial, intermediate and upper Floridan aquifer systems. Geologic formations in the vicinity of TR9-2 range from Holocene to Cretaceous age and older. The uppermost and youngest formational materials may include some fluvial deposits consisting of sand, silt, clay and organic sediments of Holocene age and terrace deposits of Pleistocene age. The youngest stratigraphic unit at the TR9-2 wellsite, based on lithologic samples retrieved during coring operations, is the Undifferentiated Surficial Deposits. These surficial deposits, extending from land surface to 38' below LSD, consist predominately of quartz sand and minor constituents which include iron, silt, heavy minerals, phosphatic sand and organics.

The Undifferentiated Surficial Deposits unconformably overlie beds of dolostone, dolosilt, quartz sand, sandstone, limestone (calcarenite, calcilutite), and chert. These siliciclastic and carbonate materials which compose the Hawthorn Group extend from 38' to 268.5' below LSD. The geologic age of these sediments range from Pliocene to lower Miocene. In the wellsite locality the Hawthorn Group is composed of Peace River and Arcadia Formations (Scott, 1988). The Peace River Formation, consisting of mostly siliciclastic material, extends from 38' to 53' below LSD. The formation has a high percentage of phosphatic sand and gravel within the clay matrix near its base. A downdip, unnamed member and updip Bone Valley Member (formerly the Bone Valley Formation) does not exist in the wellsite locality. The basal, predominately carbonate units of the lower Hawthorn Group (Arcadia Formation) extend from 53' to 268.5' below LSD. The undifferentiated upper part of the Arcadia Formation lies between 53' and 73.2' below LSD. The Tampa Member of the Arcadia Formation extends from 73.2' to 268.5' below LSD. The Tampa Member is composed of interbedded dolostone, sandstone, sand, limestone (calcilutite, calcarenite) and chert. Green clay-filled vugs and a mottled dolostone seam within a calcilutitic bed appears to represent the unconformable contact with the underlying Suwannee Formation. A summary of the Hawthorn Group stratigraphy is shown in Figure 4.

The Suwannee Formation of Oligocene age (268.5'-457.5' below LSD) lies below the Tampa Member of the Arcadia Formation. Much of the Suwannee Formation is composed of yellowish-gray fossiliferous and often recrystallized limestone (calcilutite, calcarenite). Some minor seams of

clay, dolostone, and chert exist within the Suwannee Formation. Semi-confining beds consisting of interbedded clay and calcilutite appear to separate the Suwannee Formation into two transmissive units. These aquitards are variable in porosity and permeability and extend from 374' to about 436' below LSD. The upper transmissive unit (268.5'-374' below LSD) consists of poorly consolidated, vuggy, moldic and permeable calcarenite.

The lower transmissive unit (436'-457.5' below LSD) is composed mainly of a micritic, moldic and vuggy calcarenite. Gamma ray activity in most of the Suwannee Formation is significantly lower than that of the Tampa Member of the Arcadia Formation. Gamma ray activity does increase within the interbedded clay and calcilutitic layers located in the semiconfining beds between the upper and lower transmissive units of the Suwannee Formation. Some water quality degradation and potentiometric change occurs below these semiconfining beds, indicating two hydraulically distinct transmissive units in the Suwannee Formation.

The Ocala Group (457.5'-697' below LSD) of late Eocene age is composed of three formations. The formations in descending order are the Crystal River, Williston, and Inglis. These formations were not differentiated as to depth in this report. The top of the Crystal River Formation was differentiated from the overlying Suwannee Formation on the basis of lithologic, faunal and geophysical log traces. Lithologically, the Ocala Group is a highly fossiliferous, shallow water marine limestone. The Ocala Group is composed predominantly of chalky, coquinal, foraminiferal limestone (calcilutite, calcarenite). Much of the Ocala Group consists of poorly to moderately consolidated material. Some clayey calcilutitic beds were identified near the top of the Crystal River Formation (467'-484' below LSD) and in the lower middle Ocala Group (584'-591' below LSD). The depth interval (584'-591' below LSD) probably belongs to the Williston Formation. The calcilutitic limestone near the base of the Inglis Formation becomes dolomitic and more crystallized. Calcilutitic clay, coquina and partings in the limestone were noted in the core samples near the contact with the Avon Park Formation.

The Inglis Formation of the Ocala Group is unconformably underlain by the Avon Park Formation of middle Eocene age. The top of the Avon Park Formation was identified at 697' below LSD on the basis of lithologic changes and faunal descriptions of echiniods. The formation contact was also determined on the basis of geophysical log interpretation. The Avon Park Formation is composed of alternating beds of dolomitic limestone and fractured, crystalline dolostone. Thin beds of hard, crystalline dolostone lie at the

following depths: 697'-705', 710,-713.5', 751'-766.5', 771.5'-772.5' and 776'-779.5' below LSD. The most persistent interval of fractured, crystalline dolostone lies between 803.5' and 982' below LSD. Evaporites in the form of anhydrite were first described in the drill cuttings between 1125'and 1135' below LSD. While drilling between 1165' and 1180' below LSD and intermittently to the bottom of the **Avon Park Monitor** at 1260' below LSD, evaporites were interbedded in the dolomitic limestone and dolostone.

Coring operations were completed to a depth of 872.5' below LSD. Drill cuttings were then collected to a depth of 1260' with the District's Speedstar drill rig. Core samples and drilling cuttings have been sent to the Florida Geological Survey in Tallahassee, Florida.

The stratigraphic sequence for the TR9-2 wellsite, interpreted from core samples, drill cuttings and geophysical logs is described below and charted in Figure 5.

STRATIGRAPHIC UNIT/AGE
Lithologic Description

Well Depth (Ft. below LSD)	**UNDIFFERENTIATED SURFICIAL DEPOSITS/PLEISTOCENE AGE**
LSD-38'	Sand; quartz, yellowish gray, pale to dark yellowish brown, grayish orange, grayish green, moderate greenish yellow; fine to medium grain size, subangular to subrounded, medium sphericity, occasionally frosted; unconsolidated to poorly consolidated; cement type-clay, iron, organics; accessory constituents-iron, plant remains, silt, phosphatic sand, heavy minerals; high porosity and permeability.
38'-53'	**HAWTHORN GROUP--PEACE RIVER FORMATION /PLIO-MIOCENE AGE** Clay; grayish yellow-grayish green, dark yellowish green, very pale green to green; intergranular porosity, moderately consolidated, interbedded, plastic; accessory constituents-phosphatic sand gravel, organics, micrite, silt, quartz sand; low permeability.
53'-268.5'	**HAWTHORN GROUP--ARCADIA FORMATION/MIOCENE AGE**

Dolostone; greenish gray to light gray; intergranular porosity, good consolidation, grain size-very fine to microcrystalline; mottled, brecciated, speckled, fractures-horizontal, vertical; accessory constituents-phosphatic sand and gravel, quartz sand, clay pellets; low porosity and permeability.

73.2'-268.5' **HAWTHORN GROUP--ARCADIA FORMATION (TAMPA MEMBER)/MIOCENE AGE**

Dolostone, dolosilt; very light-medium light gray, greenish gray, light brown, dark yellowish brown, yellowish gray, light bluish gray; intergranular, intercrystalline, moldic, vuggy porosity; clay-filled fractures, good induration, subhederal-anhedral, interbedded; grain size-very fine-microcrystalline; occasionally nodular, mottled, and brecciated; accessory constituents-clay, limestone, quartz and phosphatic sand, chert; fossils-molds, mollusks, organics; usually low-moderate porosity and permeability.

Limestone (calcilutite, calcarenite); yellowish gray, very pale orange, greenish-dark greenish gray, olive black; intergranular, vuggy, moldic, intercrystalline porosity; interbedded, clay-filled vugs, mottled, clay nodules; some re-crystallization of molds and mollusks; poor-good induration; accessory constituents-clay, quartz and phosphatic sand, chert, dolostone, silt; fossils-foraminifera (Sorites sp.), molds, organics, coral; low-high porosity and permeability.

Clay; grayish to dark yellowish green, moderate green, grayish green, yellowish-light greenish gray; occasionally calcareous and dolomitic; intergranular, plastic, speckled, clay-filled vugs, laminated, interbedded, mottled; accessory constituents-quartz and phosphatic sand, micrite, dolostone, silt; fossils-organics, fragments; low permeability.

Sand, sandstone; yellowish gray, grayish green-light grayish green; intergranular, some partings, interbedded; unconsolidated-moderately consolidated; very fine-fine grain size; moderate sphericity, subangular-subrounded; accessory constituents-micrite, phosphatic sand and gravel, chert; fossils-molds, organics; moderate porosity, low-moderate permeability.

268.5'-457.5' **SUWANNEE FORMATION/OLIGOCENE AGE**

Calcarenite; yellowish gray, very light gray, grayish orange pink, dark yellowish brown, pale olive; intergranular, vuggy, and moldic porosity; interclastic, skeletal, biogenic, biosparite, massive, bedded; poor-moderate induration; moderately recrystallized, calcareous, granular; accessory constituents-micrite, clay, dolostone; fossils-molds, fragments, foraminifera (Dictyconus cookei, Coskinolina floridana, Sorites sp.), mollusks, organics, milliolids, spicules, bryozoans; moderate porosity and permeability.

Calcilutite; yellowish gray, very light gray, grayish orange pink; intergranular, moldic, vuggy porosity; poor-moderate induration; chalky, low crystallinity, calcareous; accessory constituents-clay, limestone, silt; fossils-worm traces, fragments, molds; low permeability.

Clay; grayish yellow green, dusky green, yellowish gray, dark greenish gray, moderate yellowish green; intergranular, poor-moderate induration, plastic, chalky, interbedded; accessory constituents-micrite; fossils-organics; low permeability.

Chert (319'-320'); brownish gray, dark greenish gray; interbedded, high crystallinity, siliceous, good consolidation, no porosity and permeability.

457.5'-697' **OCALA GROUP/LATE EOCENE AGE**

Calcilutite; yellowish gray, very pale orange, moderate orange pink; intergranular, pin point vugular and moldic porosity, some fracture porosity; grain type-biogenic, calcilutitic; chalky, bedded, partings; accessory constituents-calcarenite, silt, clay, calcite; fossils-molds and fragments (crystallized), foraminifera (Lepidocyclina sp., Nummulites sp., Operculinoides sp.), mollusks, gastropods (Turritella), milliolids, echinoids (Neolaganum durhami, Weisbordella cubae); low-moderate porosity and permeability.

Calcarenite; yellowish gray; porosity-intergranular, vuggy, moldic; grain type-biogenic, calcilutitic, skeletal; massive, granular; accessory constituents-micrite, silt, calcite;

fossils-molds, fragments (crystallized), milliolids, mollusks, foraminifera (Lepidocyclina sp., Nummulites sp., Operculinoides sp., Gypsina globia), echinoids (Neolaganum durhami, Cassidulus ericsoni), coquina; moderate porosity and permeability.

Clay; grayish yellow green, yellowish gray; intergranular porosity, plastic, micritic, interbedded, chalky; low permeability.

697'-1260'TD **AVON PARK FORMATION/MIDDLE EOCENE AGE**

Dolostone; light-moderate brown, moderate-dark yellowish brown, grayish brown, yellowish gray; porosity-intergranular, pin point vugular, intercrystalline, fracture; grain size-very fine, microcrystalline, cryptocrystalline; massive, bedded, interbedded, occasionally very hard, laminated, mottled, sucrosic; moderate-good induration; accessory constituents-sand, limestone, anhydrite, clay, calcite, silt; fossils-organics, echinoids (Neolaganum dalli), molds, fragments (crystallized), milliolids, foraminifera (Dictyconus cookei, Dictyconus americanus, Coskinolina cookei); low-high porosity and permeability, occasionally high fracture porosity and transmissivity.

Limestone-dolomitic; (calcarenite, calcilutite); light brown, yellowish gray, very pale orange, moderate orange pink; porosity-intergranular, pin point vugular, intercrystalline; massive, bedded, interbedded, grain type-biogenic, micritic, skeletal; moderate-good induration; accessory constituents-dolostone, anhydrite, clay, sand; fossils-echinoids (Neolaganum dalli), molds, organics, foraminifera (Dictyconus cookei, Dictyconus americanus, Coskinolina floridana); low-high porosity and permeability.

Evaporites; white, very light gray; porosity-intergranular; interbedded; accessory constituents-clay, dolostone, dolomitic limestone; unfossiliferous; low porosity and permeability.

III. HYDROGEOLOGY

The surficial aquifer system, intermediate aquifer system (upper confining unit), and the upper Floridan aquifer system were identified at the TR 9-2 "Apollo Beach" (WRAP #1) wellsite (Figure 5).

A. SURFICIAL AQUIFER SYSTEM

The surficial aquifer system extends from land surface to 38' below LSD (top of the Peace River Formation-Hawthorn Group) at the TR 9-2 wellsite. Thickness of this unit is variable in Hillsborough County. Average thickness of this system is 25', but can range from as little as 3' to slightly more than 75'.

The surficial aquifer system at this wellsite includes the entire stratigraphic unit known as the Undifferentiated Surficial Deposits. These clastic, fine to medium grained deposits are unconsolidated to poorly consolidated. Composition of the deposits is mostly quartz sand. Hydraulic properties of the sediments in the surficial aquifer system appear to be variable with depth. Permeability of the quartz sand is affected by the variable content of the accessory constituents which include iron, organics, clay, and sparse amounts of heavy minerals and phosphorite.

The water table is close to land surface at the TR 9-2 wellsite. The coastal location and the unconfined nature of the Undifferentiated Surficial Deposits are the reasons for the high water table. The saturated thickness of the surficial aquifer system appeared to be approximately 33'-34' during the past year. Fluctuations in the water table appear to range between 1' and 2' over a one year time interval. Water level measurements retrieved from the **Surficial Monitor** ranged from 4.36' in June, 3.59' in August, to 4.18 ' below LSD in November of 1990. The water levels fluctuate in response to agricultural irrigation activities, seasonal rainfall and tidal influences in the wellsite locality. Local runoff from agricultural irrigation water into ditches, and rainfall contribute to the flow of water in local streams. Previous dredging to construct a network of canals in the Apollo Beach community appears to have provided more base flow to local surface water channels, while also allowing saltier water to interact with waters of the surficial aquifer system further landward.

The surficial aquifer system in the TR9-2 wellsite locality yields limited quantities of potable water due to variable intrusion of the brackish water. Specific conductivities of two water samples retrieved from a canal near the wellsite were 21,750 and 30,100 Umhos. This saline water did not appear it affect the water quality of a water sample collected at depth of 20' below LSD in the nearby TR9-2 **Surficial Monitor**. Specific conductivity of the water sample was 240 Umhos at a temperature of 25.5° C. The

chloride value was 30 mg/l, while the sulfate value was less than 50 mg/l. Literature indicates that chloride values may exceed 250 mg/l and sulfate values can range from 25 to 250 mg/l in this locality (Kelley, 1988).

B. INTERMEDIATE AQUIFER SYSTEM (UPPER CONFINING UNIT)

The intermediate aquifer system at the TR 9-2 "Apollo Beach" wellsite includes all transmissive and confining units between the overlying surficial aquifer system and the underlying upper Floridan aquifer system. The intermediate aquifer system at TR 9-2 consists of a sequence of very fine to fine grained clastic deposits interlayered with carbonate strata of the late Miocene age (Peace River and upper Arcadia Formations--Hawthorn Group). This system extends from 38' to 249.2' below LSD.

Some thin transmissive beds in the intermediate aquifer system were noted in the core samples and from interpretation of geophysical logs. The lithology of the transmissive beds consist of quartz sand, sandstone, a shell bed, limestone (calcarenite, calcilutite) and some dolostone. These units may be hydraulically isolated from each other by the confining properties of the beds above and below. Potentiometric levels measured during coring operations showed some evidence of this. Fracture-filled beds of dolostone (53'-73', 178.7'-188.5', 200.5'-215' below LSD) probably cause some leakance. Viewing the downhole video survey showed fractured features in the formational material between 118' and 249.2' below LSD. Fracture features occurring naturally or from drilling processes were noted on the caliper log between 160'-176', 200'-210' and 230'-242' below LSD.

Hydrologically, the entire thickness (211.2') of the intermediate aquifer system may be considered a confining unit. The intermediate aquifer system is composed of confining beds in the upper part and in the lower part lying directly above the upper Floridan aquifer system. The confining beds are composed of clay, minor chert, calcilutite and dolostone. These beds retard the vertical movement of water between the transmissive beds. Thin confining beds also separate small transmissive units between these upper and lower confining beds.

A confining bed in the upper part of the confining unit extends from 38' to 73.2' below LSD. The confining bed in the lower part of upper confining unit lying directly above the upper Floridan aquifer system extends from 161.7' to 249.2' below LSD. The minor transmissive units consisting of sand, sandstone, shell and limestone lying between 73.2'

and 161.7' below LSD are separated by thin beds of clay, dolostone, calcilutite, and chert which are low in permeability. The largest of these transmissive units consisting of mostly shell material extends from 118.7' to 132.3' below LSD. The small transmissive units appear to be hydraulically connected with each other even though vertical flow is retarded from above and below by the low permeability beds.

Potentiometric surface in the intermediate aquifer system varies mainly in response to seasonal fluctuations and agricultural and domestic uses. Cyclical fluctuations in potentiometric surface relating to tides, atmospheric pressure and passing trains occur in the wellsite vicinity. During the dry season a regional cone of depression in the potentiometric surface forms in south central Hillsborough County due the lack of precipitation and excessive pumping. The depressed potentiometric surface in the intermediate aquifer system along the coast near Apollo Beach is caused partly by losses in artesian pressure due to upward leakage through abandoned wells (Peek, 1959). The TR 9-2 "Apollo Beach" wellsite lies on the western edge of this cone of depression. During the wet season (June-September) a reversal in the potentiometric gradient occurs in the south-central part of Hillsborough County.

At the end of the 1988-90 dry seasons (May) potentiometric levels approximately 2 miles east of Apollo Beach location ranged between 0 and -5' below NGVD according to potentiometric maps. At the end of the 1987-90 wet seasons, potentiometric levels in the wellsite locality varied very little, ranging from slightly less than 10' above NGVD to about 10' above NGVD. A yearly fluctuation of 10'-15' in potentiometric surface appears to occur in the area of the wellsite.

Wells developed in the intermediate aquifer system (Hawthorn Group) and located in the southern half of Hillsborough County may yield as much as 500 gpm (Menke, 1961). The majority of the wells probably yield only 10-300 gpm due to aquifer properties, well configuration and length of the borehole.

Model-derived transmissivity of intermediate aquifer system's permeable deposits in the Apollo Beach locality is estimated to be about 1500 ft^2/d (Ryder, 1985). In southeastern Hillsborough County transmissivity of these permeable deposits has been determined to be about 300 ft^2/d (Ryder, 1985). Transmissivity at the Apollo Beach wellsite is probably not very high due to the clay beds and the variable thickness of these beds in the wellsite locality. Model-derived values of leakance in the uppermost

intermediate confining beds near Tampa Bay are estimated to range from 1 x 10^{-4} to 4 x 10^{-4} ft/day/ft. Storage coefficient values range from 5 x 10^{-5} to 3 x 10^{-4} (Ryder, 1985).

Water quality in the intermediate aquifer system at the TR 9-2 wellsite did not show as much degradation from saltwater intrusion from the network of canals at Apollo Beach as was expected. Water quality samples were collected during coring operations and following construction of the **Tampa Monitor**. Specific conductivity increased slightly while coring between 49' and 234' below LSD. Values of specific conductivity ranged from 443 to 630 Umhos (Figure 6). Chloride values ranged from 20 to 35 mg/l, while sulfate values increased from 10 to 119 mg/l. Total Dissolved Solids (TDS) concentration of samples collected during coring operations ranged from 285 to 426 mg/l (Figure 7). The pH values ranged from 8.57 to 7.61, with the higher values occurring at shallower depths. Specific conductivity of a thief sample collected from the **Tampa Monitor** at 148' was 720 Umhos.

Temperature values ranged between 23° C and 25° C within the intermediate aquifer system (See ROMP File).

C. UPPER FLORIDAN AQUIFER SYSTEM

The upper Floridan aquifer system is composed of a vertically continuous and horizontally extensive sequence of limestone (calcarenite, calcilutite) and dolostone of variable permeability (Miller, 1986). This system at the TR 9-2 wellsite is overlain by the surficial and intermediate aquifer systems and contains water under confined conditions. The top of the upper Floridan aquifer system was identified at 249.2' below LSD at the Apollo Beach wellsite. A change in formation material and an absence of siliciclastics was noted near the base of the Tampa Member of the Arcadia Formation (Hawthorn Group). The base of the upper Floridan aquifer system in the Avon Park Formation coincides with the vertically and horizontally persistent sequence of intergranular evaporites (anhydrites), dolostone and dolomitic limestone (Miller, 1986). Although some anhydrite was identified in the drill cuttings between 1125' and 1135' below LSD, continuous deposits of anhydrite were not described in the drill cuttings until depths lying between 1160' and 1260' below LSD. The thickness of the upper Floridan aquifer system at the TR 9-2 wellsite is about 911'.

Most of the carbonates in the upper Floridan aquifer system are moderately high in permeability and are hydraulically connected. The carbonates are composed of solution-riddled

and fractured limestones and dolostones. These chemically precipitated carbonates contain skeletal remains of foraminifera, mollusks, echinoids, bryozoan and corals (Miller, 1986). The upper Floridan aquifer system is a leaky artesian aquifer system with significant leakage occurring between the upper and lower units (Suwannee and upper Avon Park Formations). The formations in descending order are the lower portion of the Tampa Member (249.2'-268.5' of the Arcadia Formation, Suwannee, Crystal River, Williston, Inglis and Avon Park Formations. These formations range from Eocene to early Miocene in age.

The formations which compose the upper Floridan aquifer system in the Apollo Beach locality contain interaquifer confining beds which, in turn produce a multi-aquifer system (Miller, 1986). The lower Tampa Member of the Arcadia Formation (249.2'-268.5' below LSD), the Suwannee Formation (268.5-457.5' below LSD) and the upper Ocala Group (457.5'-464' below LSD) appear to be a transmissive unit consisting of two zones. The larger upper zone extends from 264' to about 374' below LSD. Note: a chert layer (319'-320' below LSD) is found within the upper part, but apparently does not separate it hydraulically as it is probably discontinuous.

A semi-confining unit consisting of interbedded clay and limestone of varying permeabilities exists between 374' and 433' below LSD. The unit separates the upper transmissive zone from the lower and smaller transmissive zone which extends from 433' at 464' below LSD. Geophysical log interpretation identifying the upper and lower units correlates fairly well with core sample descriptions. The two transmissive zones may not be in equilibrium due to slight changes in potentiometric surface, temperature and specific conductivity. Changes in temperature and specific conductivity began to occur within the lower transmissive unit about 439' below LSD during coring operations. Interpretation from potentiometric profiling was difficult because drilling activity was not continuous. Water quality and temperature changes were also noted in the geophysical log profiles within the lower Arcadia Formation and Suwannee Formation (See ROMP File).

The semi-confining beds within the transmissive unit undoubtly have an effect on vertical hydraulic conductivity and retard ground-water movement. Rapid response in the Suwannee observation well during the pumping and recovery phases during the aquifer performance test is evidence for good horizontal hydraulic conductivity in the transmissive zones which extend from 264' to 464' below LSD. Sufficient flow occurred throughout most of these zones during the aquifer performance test at the Apollo Beach

wellsite during December 1990 (See ROMP File).

Formational material, consisting of calcilutite beds and some clay layers in the upper Ocala Group (464'-593' below LSD), exhibit semi-confining properties. The third interaquifer transmissive zone consisting of permeable, fossiliferous calcarenite extends from about 593' to 639' below LSD. The lower Ocala Group (639'-697' below LSD) becomes increasingly more dolomitic and grades to a finer grained calcilutite with semi-confining properties.

Hydraulic conductivity analyses were conducted on four core samples selected from the Ocala Group. Results from three of the four samples were obtainable. Average hydraulic conductivity for the core sample (483'-484'below LSD) was 0.100E+00 ft/day. Results for the second core sample (549.2'-550.2' below LSD) were not obtainable. No flow occurred after 28 days testing, indicating hydraulic conductivity of less than 1.5 X 10^{-7} ft/day. A core sample (624.2'-625.2' below LSD) from a more permeable zone indicated an average hydraulic conductivity of 0.958E-01 ft/day. The last core sample, selected near the base of Ocala Group at 682.5' below LSD, showed an average hydraulic conductivity of 0.794E-03 ft/day (See ROMP File).

The upper Avon Park Formation (697'-803.2' below LSD) consists of rock material alternating between dolomitic limestone (calcilutite, calcarenite) and dolostone with variable porosity and permeability. While the calcarenite exhibits moldic and intergranular porosity producing some water, the finer-grained calcilutite has semi-confining properties. The calcarenite and dolostone (759'-772' below LSD) is occasionally moldic, fractured and appears to transmit some water between 759' and 772' below LSD. The caliper log's profile, showing cavities in this interval, correlates fairly well with fracture porosity descriptions of core samples. Geophysical log profiles indicate that temperature and specific conductivity values increase within the above interval. The interval from 794' to 819' below LSD also appears to be a transmissive zone. Continuous beds of intermittently fractured and sucrosic dolostone exist between 803.2' and 982' below LSD. Transmissivity in this interval is variable due to its crystalline and fracture characteristics. Interbedded anhydrite, dolostone and dolomitic limestone of substantially lower, but variable porosity and permeability was described between 982' and 1260' below LSD.

The lower hydrologic unit (upper Avon Park Formation) is not in equilibrium with the upper hydrologic unit (lower Tampa Member of the Arcadia Formation, Suwannee Formation and the upper Ocala Group). The upper unit is pumped extensively

by agricultural, municipal, and industrial interests in the Apollo Beach locality. Poor water quality and the potential threat of saltwater intrusion prohibits the use of water in the lower hydrologic unit near Apollo Beach. Under natural conditions the upper and lower hydrologic units are probably in equilibrium.

The TR 9-2 wellsite locality is an area of low potential in regard to recharge. Ground-water flow through the upper and lower transmissive units of the upper Floridan aquifer system moves southwest toward Tampa Bay from a recharge area centered in northern Polk County. Some indirect recharge from rainfall into the upper hydrologic unit occurs, but is low due the confining nature of the upper and lower confining units in the intermediate aquifer system.

Potentiometric surface in the upper Floridan aquifer system in the Apollo Beach vicinity fluctuates substantially as does that of the intermediate aquifer system. There appears to be a 5'to 10' difference in head between the two systems. The potentiometric surface is higher in the intermediate aquifer system due to high volume ground-water withdrawals in the upper Floridan aquifer system during dry seasons. The higher rates of pumpage from agricultural, industrial, and domestic users have resulted in lowering potentiometric surface in the upper Floridan aquifer system below sea level for extended intervals on an annual basis (dry season). The wellsite as indicated earlier in this report is on the northeastern edge of a depressed area of the potentiometric surface extending from southern Hillsborough County to north central Manatee County. According to potentiometric surface maps, potentiometric surface (May 1988) was 3'-5' below NGVD. During May 1989 and 1990 potentiometric surface in this locality was about 1' to 2' below NGVD (14'-15' below LSD).
A rebound in the potentiometric surface occurs in wells penetrating the upper Floridan aquifer system during the wet season. The potentiometric surface (September 1988) in the Apollo Beach locality was 10' to 12' above NGVD. In September 1989, the potentiometric surface in the upper Floridan aquifer system ranged between 13' and 14' above NGVD, but in the September 1990 the potentiometric surface was only about 9' above NGVD in the wellsite vicinity.

Recent yearly potentiometric surface fluctuations due in part to increase ground-water withdrawals appear to range from 11' to 20' in the Apollo Beach vicinity. Below normal precipitation and the increased demand for water by industrial, municipal, and agricultural interests have caused larger seasonal fluctuations in potentiometric surface.

Potentiometric surface ranged from 11.50' to slightly more then 12' below LSD while coring between the depths of 254' and 739' during the dry season. While coring through the freshwater/saltwater interface during the time period (4-17-90 to 5-8-90), the increasely higher densities of water and seasonal changes caused potentiometric surface to drop from -13.03' at 754' below LSD to -30.57' at 819' below LSD. Specific conductivity of water samples ranged from 3350 Umhos to 39,000 Umhos between the above depths. During the wet season (7-25-90 to 8-2-90) while coring from 818.5' to 872.5' below LSD, potentiometric surface ranged from -15.08' to -16.64'. Note: specific conductivity of water samples ranged from 39,900 Umhos to 48,000 Umhos between the above depths. The highly mineralized and denser water caused lower than normal potentiometric surface values in the upper Avon Park Formation.

As was noted in the Preliminary Core Memorandum, some of the saltwater contamination in the Apollo Beach locality was apparently due to residual seawater that entered the upper Floridan aquifer system during Pleistocene age. For a long period of time, mean artesian head along the coast was sufficiently high to prevent encroachment of poor quality water from Tampa Bay into the upper zones of the upper Floridan aquifer system (Menke, 1961). Heavy withdrawals of water dating back to the 1930s have caused a decline in artesian pressure head, creating the potential upward encroachment and landward movement of saltier water from the Avon Park Formation and Tampa Bay. The freshwater/saltwater interface at the TR 9-2 wellsite as indicated from water sampling during coring operations and geophysical logs is abrupt and steep due to the confining properties of the formational material. The **Avon Park** and **Ocala Monitors** were constructed at the TR 9-2 wellsite to monitor upward movement of the freshwater/saltwater interface.

The chemical quality of water within the upper Floridan aquifer systems in the wellsite locality varies with the type of rock material in which the water is in contact, the depth from which the water samples were retrieved, and the length of time the water has been circulating in the system.

Near the top of the upper Floridan aquifer system at 254' below LSD, noticeable changes in water quality were recorded while collecting water samples during coring operations. Specific conductivity increased from 630 Umhos at 234' below LSD to 790 Umhos at 254' below LSD. While chloride values increased only slightly from 35 mg/l to 40 mg/l, the sulfate values nearly doubled (119 mg/l to 207 mg/l) for this depth interval. From a depth of 254' to 414' below LSD water quality remained fairly constant (See ROMP File).

Near the base of the Suwannee Formation, within the Ocala Group and the upper Avon Park Formation, specific conductivity values began to increase. Specific conductivity varied between 1050 Umhos at 439' below LSD to 1350 Umhos while coring to the depth of 739' below LSD (Figure 8). Specific Conductivity was slightly higher in a transmissive zone extending from 609' to 639' below LSD within the Ocala Group. Chlorides ranged between 51 mg/l and 135 mg/l. Sulfates also increased, ranging from 216 mg/l to 368 mg/l (Figure 9). Specific conductivities of thief samples collected at 460' and 675' below LSD were 1100 and 1400 Umhos respectively.

The top of freshwater/saltwater interface was encountered about 754' below LSD with a specific conductivity value of 3350 Umhos. While coring from a depth of 754' to 809' below LSD, specific conductivity values of water samples collected increased rapidly to 38,000 Umhos. Chlorides increased from 790 mg/l to 14,180 Umhos, while sulfates increased from 423 mg/l to 2650 mg/l. Specific conductivity eventually reached the high of 58,200 Umhos near the bottom of the **Avon Park Monitor** at 1260' below LSD (Figure 10). Chlorides reached a high of 22,300 mg/l. These chloride concentrations are greater than seawater. The high values may be due brine which exists in the evaporites. Sulfates increased to 4800 mg/l (Figure 11). The high sulfate values can be attributed to upward movement of poor quality water and encountering evaporites (anhydrites) about 1125-1135' below LSD. There is no explanation for water quality improvement in the interval between 1080' and 1220' below LSD (Figure 10,11). Hydrogen sulfide values never exceeded 5 mg/l during drilling operations.

A geophysical temperature log showed an increase of about .5° C near the top of the upper Floridan aquifer system. Although temperature values were somewhat variable while coring between 254' and 414' below LSD, temperature values in general increased from 24° C to 25° C. While coring within the Ocala Group and the upper Avon Formation, fluid temperature values varied between 25° C and 27° C, but still increased in an upward trend. Fluid temperature values increased along with degradation of water quality below the depth of 754'. Fluid temperature values increased from 26.75° C at 754' to 29.5° C at 1260' below LSD (See ROMP File).

IV. AQUIFER TESTS

Two packer tests with pumping rates of 35.8 gpm and 52.03 gpm were conducted on the **Ocala Monitor** during construction. Drawdown on the two tests were 37.57' and 51.19'

respectively. The two packer tests of 45 minutes duration yielded specific capacities of .95 gpm/ft and 1.02 gpm/ft respectively in an interval (450'-580' below LSD) during drawdown. Specific capacities for these two tests during recovery were .945 gpm/ft and 1.01 gpm/ft respectively. Transmissivity calculated from specific capacity data for the interval (450'-580' below LSD) averaged 10,110 ft^2/day for the two tests during drawdown. The above values appear to be high due to the possibility that the packer was not sealed properly during the tests. Leakage would yield inaccurate results.

Specific conductivities of water samples collected during the two tests were 1280 Umhos and 1190 Umhos.

Two aquifer performance tests were conducted at the TR9-2 wellsite for the purpose of determining transmissivity and the degree of hydraulic connection between the Suwannee and Avon Park Formations. Prior to these tests, pretests were conducted in each of the formations. It was determined that a surficial piezometer would have to be constructed further away from the point of discharge because water levels in the **Surficial Monitor** rose during pumping due to discharge mounding. Also, drawdown exceeded expectations in the **Avon Park Monitor** during the pretest. More pump column was eventually required to conduct the aquifer performance test in this well.

Transmissivity and hydraulic coefficients (storage) from each test will be included in a regional ground-water model to characterize the flow regime in the wellsite locality. Leakance coefficient was determined for the Avon Park performance test only. Each aquifer performance test was designed with multiple wells to better understand the relationship of the pumped wells' withdrawals on the overlying and underlying flow systems.

Prior to, during, and following aquifer performance tests conducted on both the **Suwannee** and **Avon Park Monitors**, background water levels were collected with continuous data recorders located at ROMP 49 "Balm Park", ROMP 50 "Sun City" and TR 9-2 "Apollo Beach". The wells at those sites appeared to respond to seasonal downward trends and short term localized agricultural pumping. Less apparent effects such as barometric changes, tidal cycles and passing trains may have had some influence on potentiometric levels for short periods of time. Water level adjustments due to barometric pressure were calculated prior to the aquifer performance tests. Barometric efficiency was found to be 57%. Tidal efficiency was estimated to be 12%. This data was used to make corrections in water levels during the two aquifer performance tests. The calculations were based on

methodology outlined by Ferris, et. al, 1962.

Prior to the Suwannee aquifer performance test, barometric readings were retrieved from a barometer located in the recorder box on the **Tampa Monitor**. Subsequent barometer readings were obtained from the Tampa International Airport. Tidal stage elevations were recorded at the Little Manatee River in Ruskin, Florida by the USGS.

The Suwannee aquifer performance test was conducted at the TR 9-2 "Apollo Beach" wellsite between 12-17-90 and 12-20-90. District pumping equipment was utilized for the duration of the pumping phase for 45 hours and 15 minutes (2715 minutes) until a steady state condition had been achieved. A manometer tube, 6" dia. orifice plate, and polysonics flowmeter were used to determine the discharge rate. The discharge water was moved off the wellsite by irrigation pipe to a nearby ditch and subsequently into the canal system at Apollo Beach. Removal of water from the wellsite prevented a loading effect and leakage back into system being pumped.

The District's data logger, utilizing pressure transducers, steel and electric tapes were used to retrieve data from four monitors, one surficial piezometer, and three observation wells. The Suwannee observation well was constructed about 285' from the **Suwannee** pumped well. Both wells penetrated the entire thickness of the Suwannee Formation.

The average discharge rate from an open hole of the **Suwannee Monitor** during the pumping phase of 2715 minutes was about 1150 gpm. A total of about 3,122,250 gallons was pumped off the wellsite.

Average transmissivity from drawdown and recovery in the pumped well and the observation well was calculated to be about 109,000 gpd/ft. Storage coefficient was determined to be about 1.47×10^{-4} (Basso, 1991). The Jacob/Cooper and Walton methods of analysis were used to determine transmissivity and storage coefficient (Table 1).

Drawdown in the **Suwannee** pumped well using the data controller and transducers was 67.1'. Drawdown fluctuated at times after 10 hours, but continued in a downward trend until about 22 hours into the test. Slowly rising water levels in latter part of the test may be attributed to well development, a lower pumping rate and a slight rise in potentiometric surface locally. Short period fluctuations were probably due to local agricultural pumping activities. Total drawdown data retrieved from all wells during the pumping phase are shown in Table 2.

According to the flowmeter log the highest amount of flow occurred in the upper 95'(265'-360' below LSD). This figure correlates fairly well with core descriptions of the upper transmissive zone of the Suwannee Formation. Some flow was also occurring in the zone from about 408'to 422' below LSD. According to the caliper and flow log, a smaller flow zone may also exist between 440' and 450' below LSD.

Specific conductivity of water samples collected during the aquifer performance test ranged from 950 Umhos at the beginning of the pumping phase to 710 Umhos near the end of the test. Chlorides dropped slightly from 69 mg/l to 56 mg/l, while sulfates ranged between 300 mg/l and 290 mg/l. Total dissolved solids (TDS) declined from a high of 726 mg/l to low of 671 mg/l. Standard complete analyses were completed on the first and last samples retrieved during the test (See ROMP File).

The recovery phase of the Suwannee aquifer performance test began on 12-19-90 at 9:15 AM and ended 23 hours later. Recovery in most of the wells took place over a 10 hour, 43 minute (643 minutes) time period. Recovery in the Suwannee pumped well following pump shutdown was very rapid, achieving almost full recovery in about 5 hours 15 minutes (315 minutes). Water level data retrieved from all wells over the entire recovery phase are also shown in Table 2. All wells recovered to within a range of .05' to .23' of the original static water levels prior to the aquifer performance test. Transducer readings, using the data controller, correlated fairly close to electric tape measurements during the aquifer test. In all wells tidal influences, barometric pressure and/ or local agricultural pumping activities appeared to affect recovery results after 11 hours. After $1^{3}/_{4}$ hours water levels in the surficial piezometer may have responded to tidal effects.

An overall regional downward trend in potentiometric surface was occurring prior to and following the aquifer performance test. The TR 9-3 "Simmons #3" **Suwannee Monitor** located about three miles from the pump test site was used as an observation well to determine short term fluctuations in potentiometric surface. A linear regression of the data from this well determined that a slight regional upward trend of about 0.002 ft/hr occurred during the early pumping phase (Basso, 1991). An overall decline of .87' did occur between 12-17-90 and 12-19-90. Most of the decline occurred during the last six hours of the pumping phase. This rather rapid decline was probably due to nearby agricultural pumping.

The Avon Park aquifer performance test was conducted at the

TR 9-2 "Apollo Beach" wellsite between 2-4-91 and 2-7-91. Duration of the pumping phase of the test was 49 hours 39 minutes (2979 minutes). A manometer tube, 6" dia. orifice plate and a polysonics flowmeter were used to determine the average discharge rate. The poor water quality from the **Avon Park Monitor** was removed from the wellsite via irrigation pipes into a ditch which ultimately discharged into the canal system at Apollo Beach. Four monitor wells, one surficial piezometer and three observation wells were used as data collection points during the aquifer test. During this test only the District's data logger utilizing transducers was used to collect pumping and recovery water level measurements.

Average discharge rate during the pumping phase of 3180 minutes was 1098 gal/min. A total of about 3,463,000 gallons of water was removed from the wellsite.

Average transmissivity from drawdown and recovery in the pumped and observation wells was calculated to be about 550,000 gpd/ft. Storage coefficient averaged out to be 1.03 x 10^{-4}. The average leakance coefficient calculated from the 1st and 2nd Avon Park observation wells was 7.4 x 10^{-4} gpd/ft^3 (Basso, 1991). The Jacob-Cooper and Walton methods for analyses of the data were used in the Avon Park aquifer performance test (Table 3).

Drawdown in the **Avon Park** pumped well with an open hole from 714' to 1260' below LSD was 69.4'. The total amounts of drawdown from all wells over the entire pumping phase are shown in Table 4. The 1st Avon Park observation well had an open hole from 700' to 1260' below LSD and was located at a distance of 300' from the pumped well. The 2nd Avon Park observation well had an open hole from 700'-900' below LSD and was located at a distance of 600' from the pumped well. The data indicates that much of the flow came from the upper 200'.

Some of the source of flow as described in the core samples and flow log originates in the calcarenite which extends from 714' to 726' below LSD. Another zone of flow exists within the fractured dolostone and at the freshwater/saltwater interface in an interval between 759' and 772' below LSD. A zone of flow exists in the fractured dolostone between 794' and 838' below LSD. The caliper log gives evidence of the fractured characteristics in the above zones. The flow log appears to confirm the zones of flow described above. The sonic log profile from the Avon Park observation well #1 shows that the intervals between 759'-841' and 870'-904' below LSD as being zones of higher porosity. The temperature log profile from this same well indicates lithologic or hydrologic changes occurring between

775'-780' and 850'-900' below LSD. Fractured dolostone as noted from drill cuttings and the caliper log completed on the **Avon Park Monitor** continues to a depth of 982' below LSD. The sonic log profile from the Avon Park observation well #1 also showed higher porosity extending to a depth of 982' below LSD. With the large amount of drawdown (nearly 70') during the pumping phase, some upward movement of water from as deep as 982' may have occurred at the pumping rate of 1098 gpm. During the flow test at a pumping rate of 831 gpm no movement of water was observed below the depth of 870'.

Some fluctuations in drawdown during the pumping phase might be attributed to a variable pumping rate as noted from manometer and polysonics flowmeter values. Local agricultural pumping activities occurring in the above Suwannee and Ocala Group formations may have affected drawdown measurements at various times during the pump test. A liner regression of the data determined that a downward trend of about .023 ft/hr. occurred during the pumping phase. This figure was added to the observed water levels to remove its influence (Basso, 1991). It might be noted that drawdown measurements in all wells except the **Tampa Monitor** began to rise near the end of the pumping phase due to well development or a lower pumping rate as noted from the manometer and polysonics flowmeter readings.

Except for the first water sample (50,000 Umhos) retrieved after 54 minutes pumping, specific conductivity of the water samples ranged from 29,000 Umhos to 34,000 Umhos. Standard complete analyses were completed on the first and last water samples. Chloride values ranged from 9280 to 11,000 mg/l, while Sulfates varied between 2200 mg/l and 2300 mg/l. Total Dissolved Solids (TDS) ranged from 18,300 mg/l to 21,875 mg/l. Hydrogen Sulfide (H_2S) values varied between .5 and 2 ppm (See ROMP File).

Recovery began at 10:06 PM on 2-6-91. The amount of recovery in the **Avon Park** pumped well after 23 hours 51 minutes (1431 minutes) was 75.9'. The well recovered to within 4.4' of the static level prior to the aquifer performance test. Well development, changes in water quality values and density are probably responsible for this disparity. Recovery for the first 321 minutes was steadily upward. After this period of time recovery was variable due to local agricultural pumping activities. Some precipitation was reported during this period of recovery. After 17 hours and 51 minutes recovery resumed in a steady upward trend. A regional upward water level trend of .0079 ft/hr was subtracted from the observed water levels during the recovery phase (Basso, 1991). Water level data retrieved from all wells over the entire recovery phase are

shown in Table 4.

All wells, with the exception of the **Avon Park** pumped well and the surficial piezometer, recovered to within .81' to 1.00' of the static water levels measured prior to the pumping phase. Regional trends as well as precipitation and cessation of local agricultural pumping appeared to have some effect on water levels during and following recovery. Water level adjustments due to barometric pressure and tidal influences were calculated at 57% and 12% respectively. This data was used to make corrections in water levels during the Avon Park aquifer performance test. Methodology used in these calculations is outlined in Ferris, et. al, 1962.

V. REASONS FOR THE MONITORS

The monitor wells at the TR 9-2 "Apollo Beach" wellsite were constructed for the purpose of gathering hydrologic data for the ROMP program and the Manatee-South Hillsborough WRAP (Water Resource Assessment Project). Five monitor wells were constructed on the permanent easement. In addition to these wells, two Avon Park observation wells and one Suwannee observation well were constructed on the temporary construction easement for acquisition of additional data from the aquifer performance tests.

The data collected during and following coring operations and monitor well construction included: water quality, hydrostatic, lithology, identification of geologic formations, hydrologic characteristics of the aquifer systems and identification of the freshwater/saltwater interface.

It is hoped that the data collected will aid WRAP in determining optimum or safe yield of ground-water withdrawals in the south Hillsborough County/north Manatee County area. This information can also be used to develop regulatory levels for water use permitting in the area. One of WRAP's objectives was to determine values of leakance from the confining unit consisting of dolomitic limestone and evaporites below the upper Floridan aquifer system. WRAP is also interested in obtaining data relating to the upward and inland movement of the freshwater/saltwater interface due to heavy withdrawals of ground-water in the wellsite vicinity. The Southwest Florida Water Management District's Resource Projects Section determined quantitatively the hydraulic characteristics in the form of transmissivity, storage and leakance from the aquifer performance tests conducted at the wellsite (See Aquifer Test Section).

VI. WELL CONSTRUCTION

A. SURFICIAL MONITOR

The **Surficial Monitor** was designed and constructed in the Undifferentiated Surficial Deposits to monitor and record fluctuations of the water table (hydrostatic level) in the surficial aquifer system (Figure 12).

The construction of the **Surficial Monitor** was initiated by drilling a 12" dia. nominal borehole to a depth of 21' below LSD. A six inch (6") dia. PVC sediment trap (20'-21' below LSD), ten feet (10') of six inch (6") dia. (0.020" slot) well screen (10'-20' below LSD) was coupled onto thirteen feet (13') of 6" dia. PVC casing (+3' to 10' below LSD) and set into the borehole. The well's annulus from 21' to 8' below LSD was sand-packed with 6-20 type silica sand and then cement-grouted from 8' to land surface. A three foot (3') extension of 6" dia. PVC casing was left standing above ground to facilitate the later installation of a recorder box and instrumentation.

B. INTERMEDIATE MONITOR

The **Intermediate Monitor** is a modification of an existing well. The well was designed and constructed within the Tampa Member of the Arcadia Formation to monitor and record fluctuations in potentiometric surface in the intermediate aquifer system (Figure 13). The well was constructed with 8" dia. PVC casing. The casing was set and cement-grouted from 118' below LSD to land surface. An eight inch (8") nominal borehole was drilled out of the 8" dia. PVC to a depth of 255' below LSD. During August 1990, the well was cement-grouted from 255' to 118' below LSD. The present open hole interval exists from 148' to 118' below LSD. Following modification of the well, a four foot (4') extension of eight inch (8") PVC casing was left standing above the cement slab to facilitate the later installation of recorder box and instrumentation.

C. SUWANNEE MONITOR

The **Suwannee Monitor** was designed for the purpose of monitoring water quality and fluctuations in the potentiometric surface in the Suwannee Formation (Figure 14). This monitor served as one of the pumped wells during the aquifer performance tests conducted on the TR 9-2 wellsite.

The construction of the **Suwannee Monitor** was initiated by the drilling a twenty-two inch (22") nominal borehole, using mud-rotary drilling techniques, to a depth of 40' below LSD.

Eighteen inch (18") steel casing was set from (LSD-40' below LSD) and cement-grouted to land surface. A seventeen inch (17") dia. nominal borehole was then drilled out of the 18" dia. steel casing to a depth of 250' below LSD. Twelve inch (12") dia. PVC casing was then set (LSD- 247' below LSD) and cement-grouted to land surface. A twelve inch (12") dia. nominal borehole was drilled out of the 12" PVC casing to a depth of 462' below LSD. Following completion of well construction and the aquifer performance tests, a six foot (6') extension which included a 12" to 8" to 6" reducer coupling and six inch (6") dia. PVC casing was left standing above land surface to facilitate the later installation of a recorder box and instrumentation.

D. OCALA MONITOR

The **Ocala Monitor** was designed for the purpose of monitoring water quality and fluctuations in the potentiometric surface in the lower Ocala Group (Inglis Formation) of the upper Floridan Aquifer System (Figure 15). This well will also serve as a monitor of future upward movement of chlorides.

The construction of the **Ocala Monitor** was initiated by drilling a twenty-two inch (22") nominal borehole, using mud-rotary drilling techniques, to a depth of 40' below LSD. Eighteen inch (18") dia. steel casing was set (LSD-40' below LSD) and cement-grouted to land surface. A seventeen inch (17") dia. nominal borehole was then drilled out of the 18" dia. steel casing to a depth of 180' below LSD. Twelve inch (12") dia. PVC casing was then set (LSD-180' below LSD) and cement-grouted to land surface. An eleven inch (11") nominal borehole was then drilled out of the twelve (12") dia. PVC casing to a depth of 622' below LSD. Six inch (6") dia. PVC casing was set (LSD-622'below LSD) and cement-grouted to land surface. A six inch (6") dia. nominal borehole was drilled out of the 6" dia. PVC casing to a depth of 675' below LSD. Following completion of well construction, a four foot (4") extension of 6" dia. PVC was left standing above land surface to facilitate the later installation of a recorder box and instrumentation.

E. AVON PARK MONITOR

The **Avon Park Monitor** was designed and constructed to monitor and record fluctuations in potentiometric surface in the upper Floridan aquifer system (Figure 16). This monitor served as one of the pumped wells during the aquifer performance tests conducted on the TR 9-2 "Apollo Beach" wellsite.

The construction of the **Avon Park Monitor** was initiated by drilling a twenty-two inch (22") dia. nominal borehole,

using mud-rotary drilling techniques, to a depth of 40' below LSD. Eighteen inch (18") dia. steel casing was set (LSD-40'below LSD) and cement-grouted to land surface. A seventeen inch (17") dia. nominal borehole was then drilled out of the 18" dia. steel casing to a depth of 250' below LSD. Twelve inch (12") dia. PVC casing was then set (LSD-250' below LSD) and cement-grouted to land surface. This casing will effectively isolate the surficial and intermediate aquifer systems from the upper Floridan aquifer system. An eleven inch (11") dia. nominal borehole was then drilled out of the 12" dia PVC casing to a depth of 740'. Six inch (6") dia. was set (LSD'-714' below LSD) and cement-grouted to a depth of 150' below LSD. A back off male-female type threaded coupling was used on the 6" dia. PVC casing at a depth of 140' so that the upper 140' of 6" dia. PVC casing could be removed following the drilling of the six inch (6") dia. nominal borehole from 714' to 1260' below LSD. The 140' of 6" dia. PVC casing was removed prior to the aquifer performance test so that enough room was available to accommodate the pump testing apparatus (pipe column and PVC casing used for protecting the pressure transducers). Following the aquifer performance test, the 140' of 6" dia. PVC casing was set into the well and cement-grouted to land surface. The well was then cement-grouted from 1260' to 765' below LSD. Following completion of well construction, a three foot (3') extension of 6" dia. PVC casing was left standing above land surface to facilitate the later installation of a recorder box and instrumentation.

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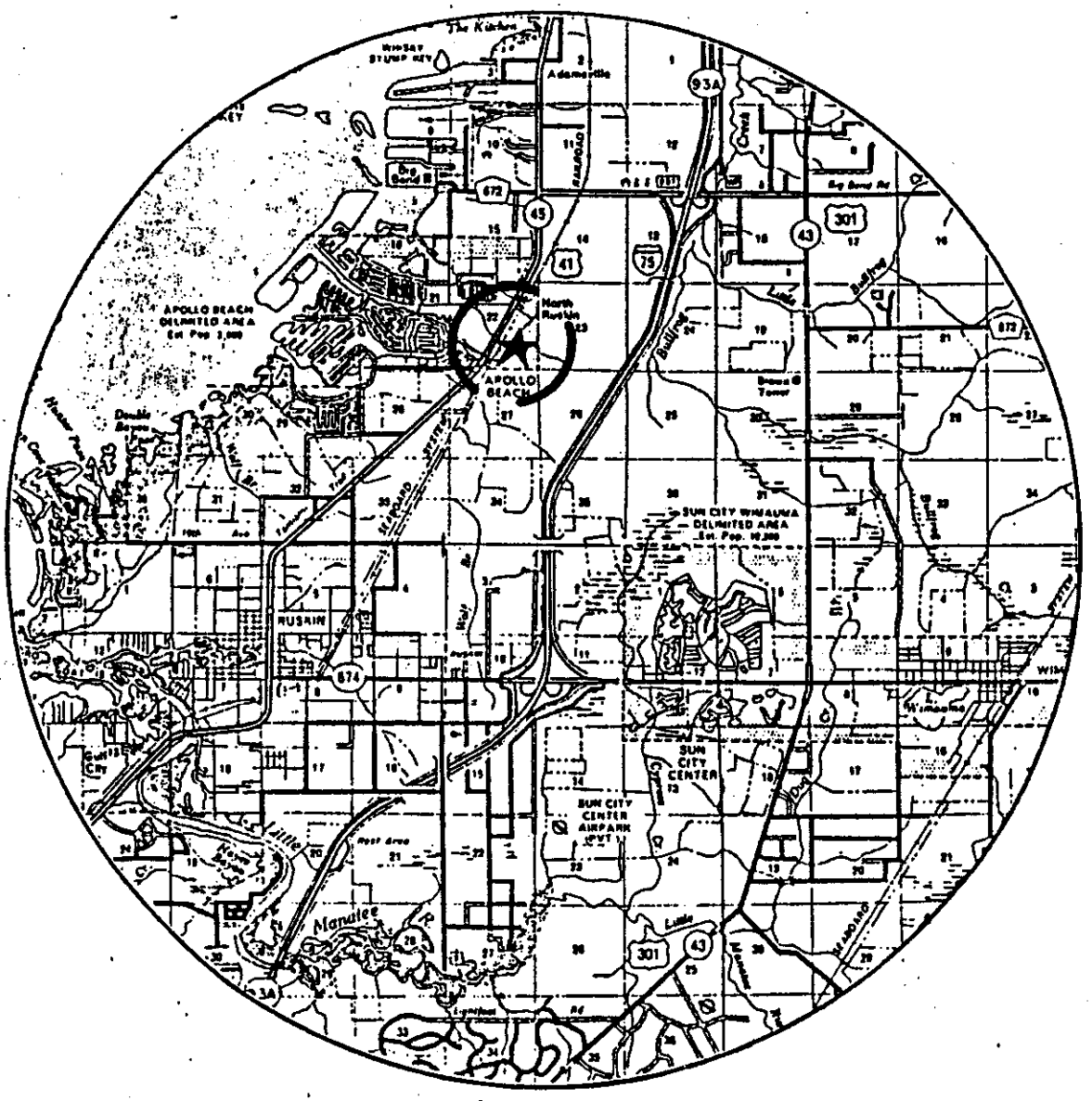

VICINITY

FIGURE 1

TR 9-2 "APOLLO BEACH" WELL PLACEMENT DIAGRAM

1-10-90

J.L. DECKER

1 W

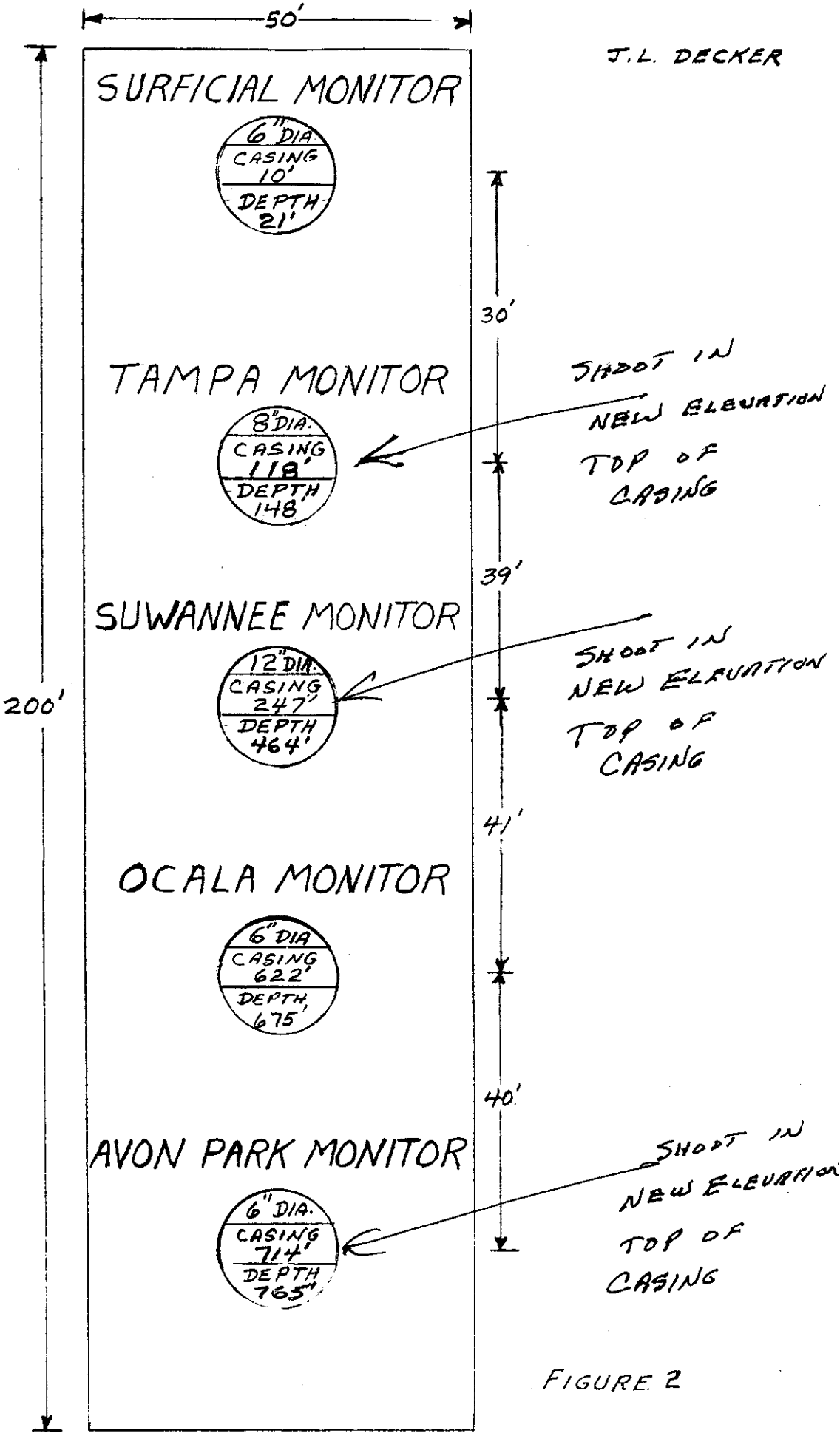

FIGURE 2

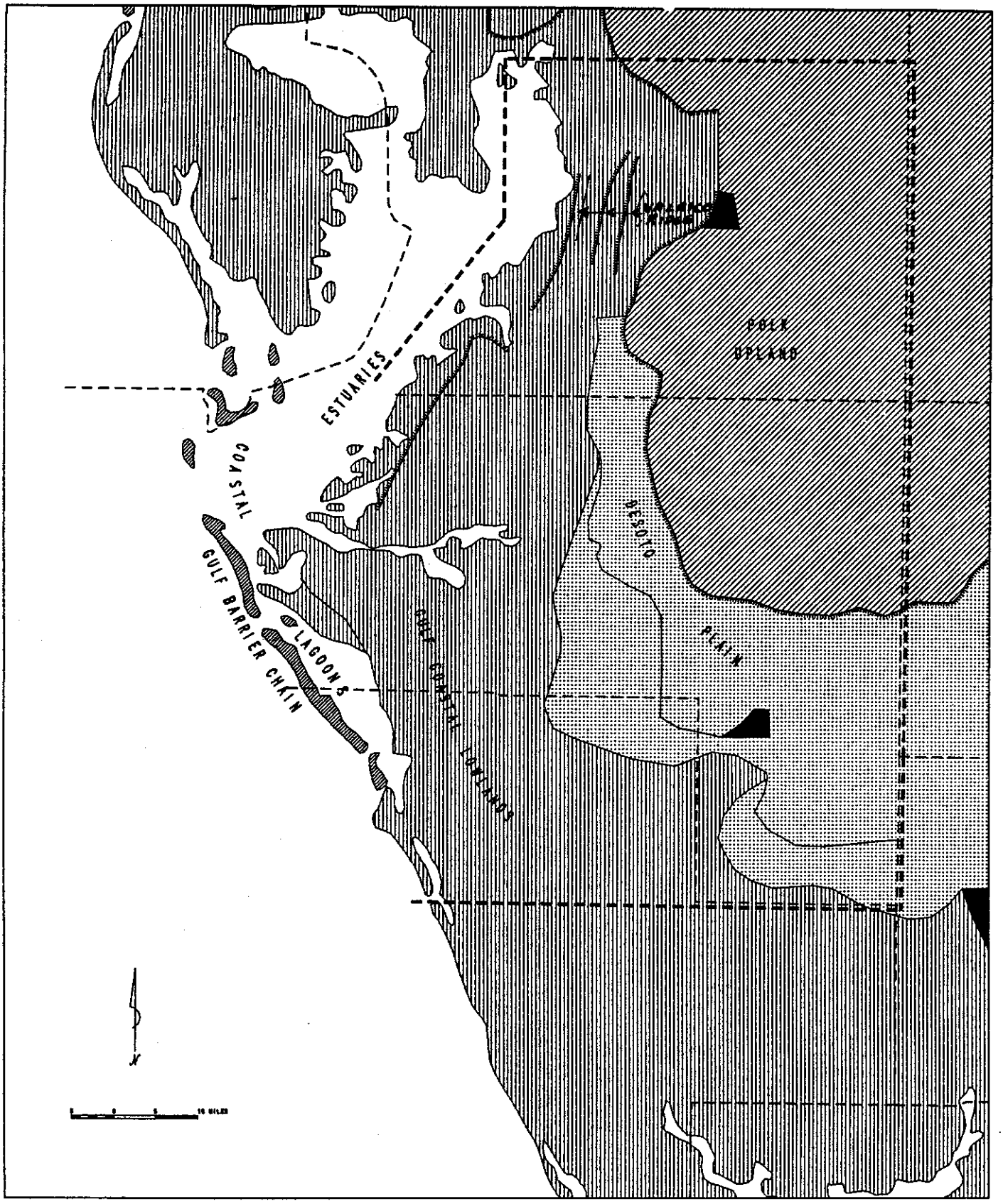
ESTUARIES
COASTAL
GULF BARRIER CHAIN
LAGOONS
GULF COASTAL LOWLANDS
DESOTO
PLAIN
POLK
UPLAND

FIGURE 3

TR9-2 "APOLLO BEACH"

4-29-91

J. L. DECKER

LITHOSTRATIGRAPHY

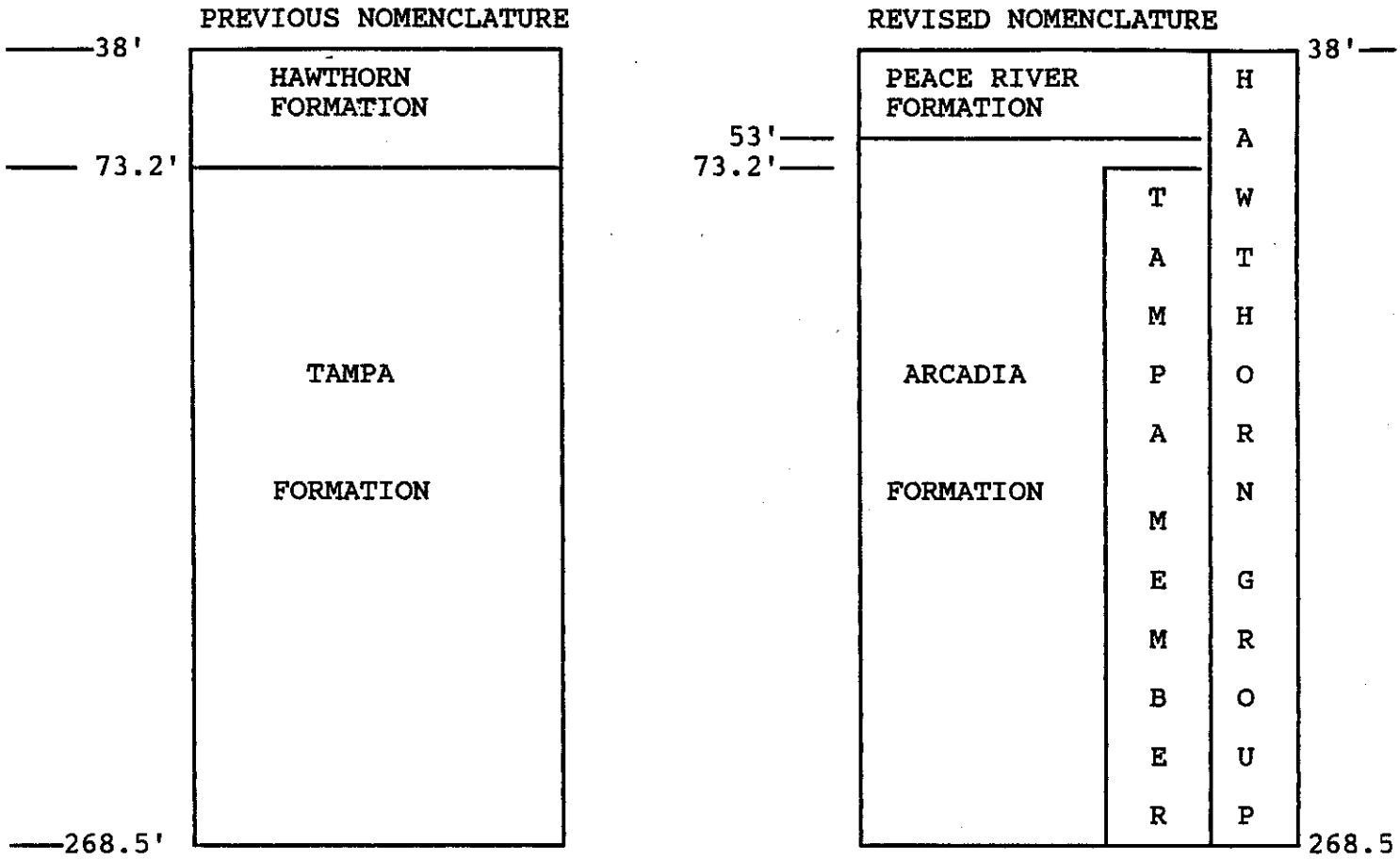

FIGURE 4 (AFTER SCOTT, 1988)

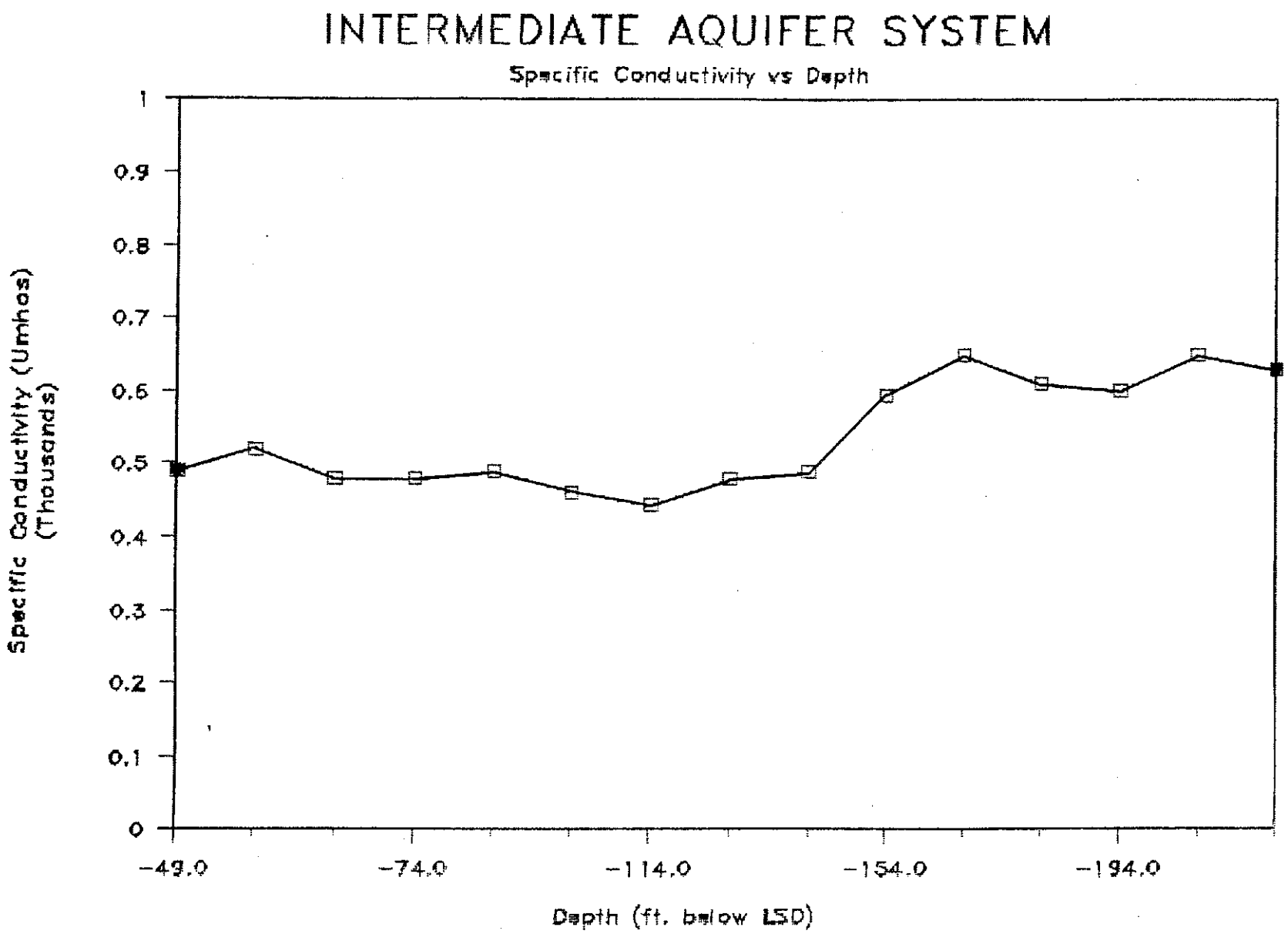
INTERMEDIATE AQUIFER SYSTEM
Specific Conductivity vs Depth
Specific Conductivity (Umhos)
(Thousands)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-43.0
-74.0
-114.0
-154.0
-194.0
Depth (ft. below LSD)

FIGURE 6

TR9-2 "APOLLO BEACH"

4-29-91

J. L. DECKER

HYDROGEOLOGY

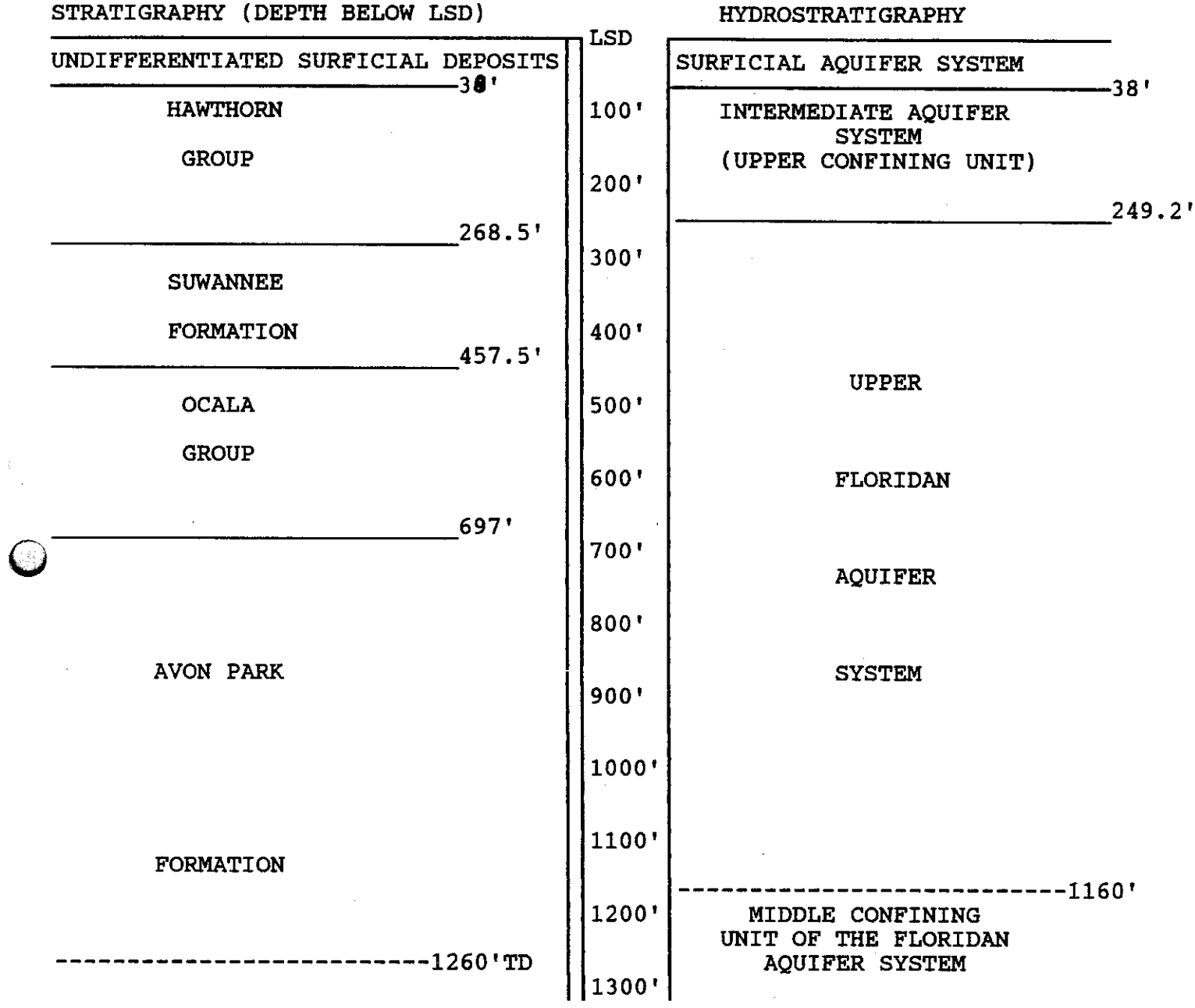

FIGURE 5

INTERMEDIATE AQUIFER SYSTEM

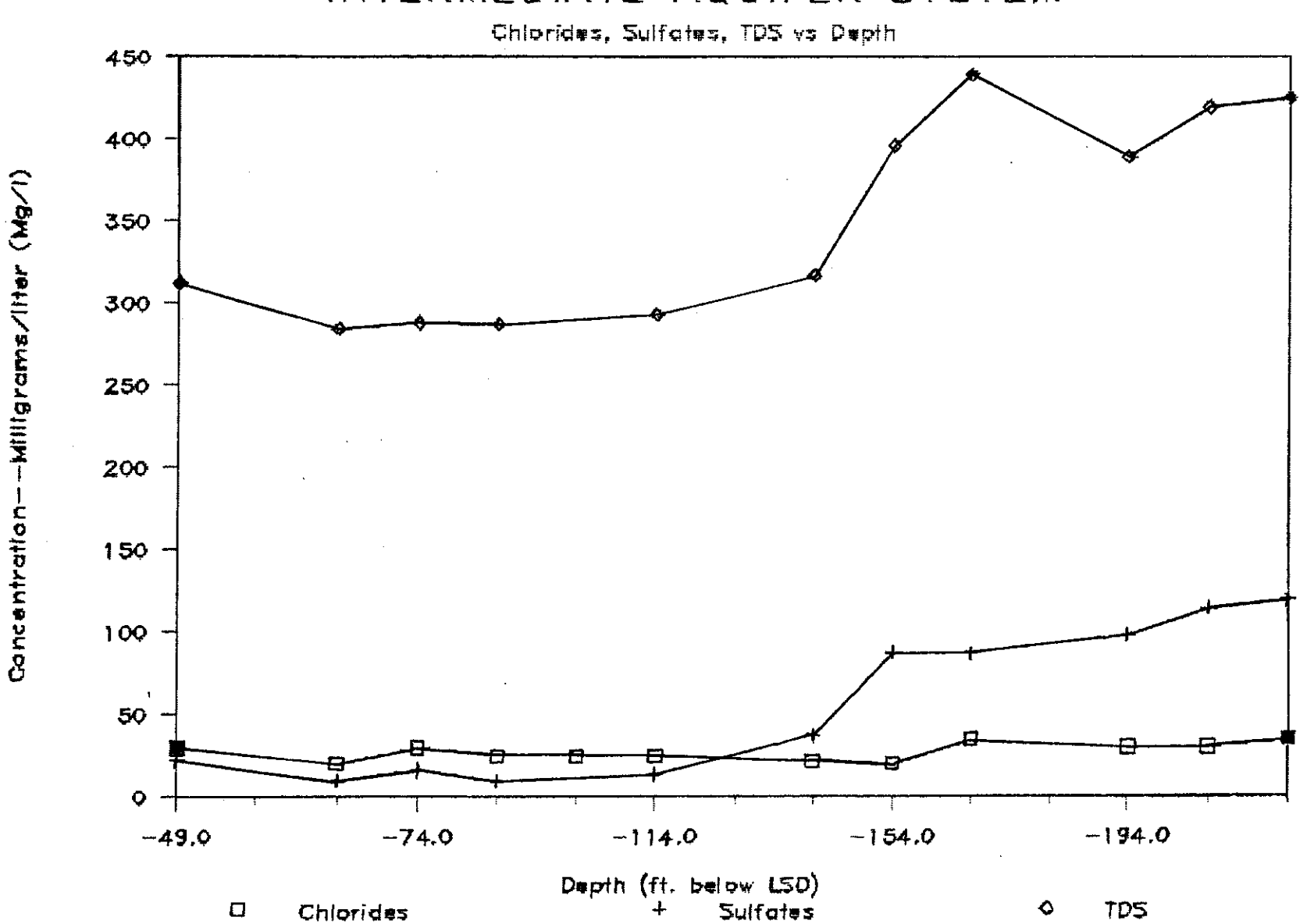

FIGURE 7

UPPER FLORIDAN AQUIFER SYSTEM

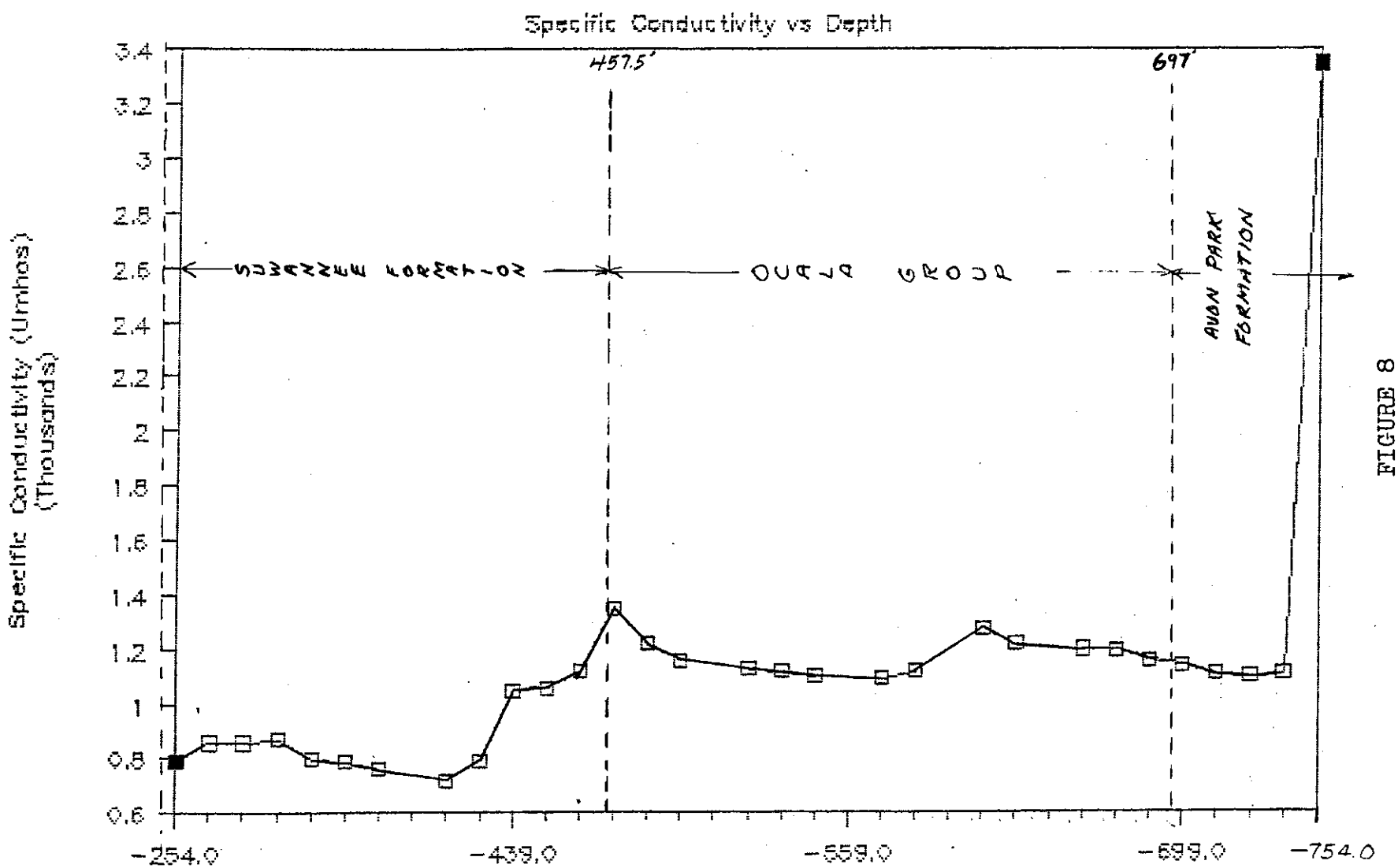

FIGURE 8

UPPER FLORIDAN AQUIFER SYSTEM

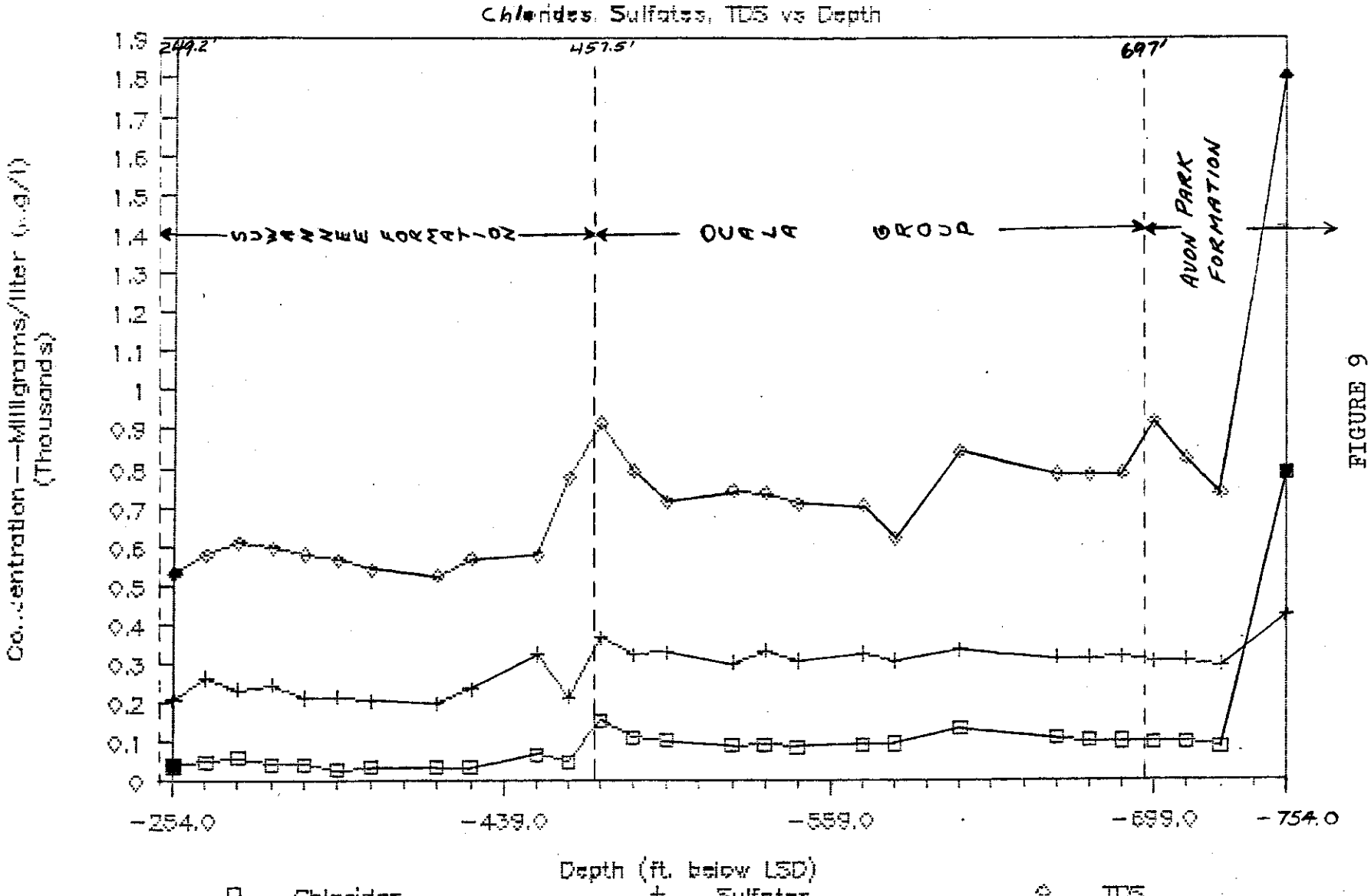

FIGURE 9

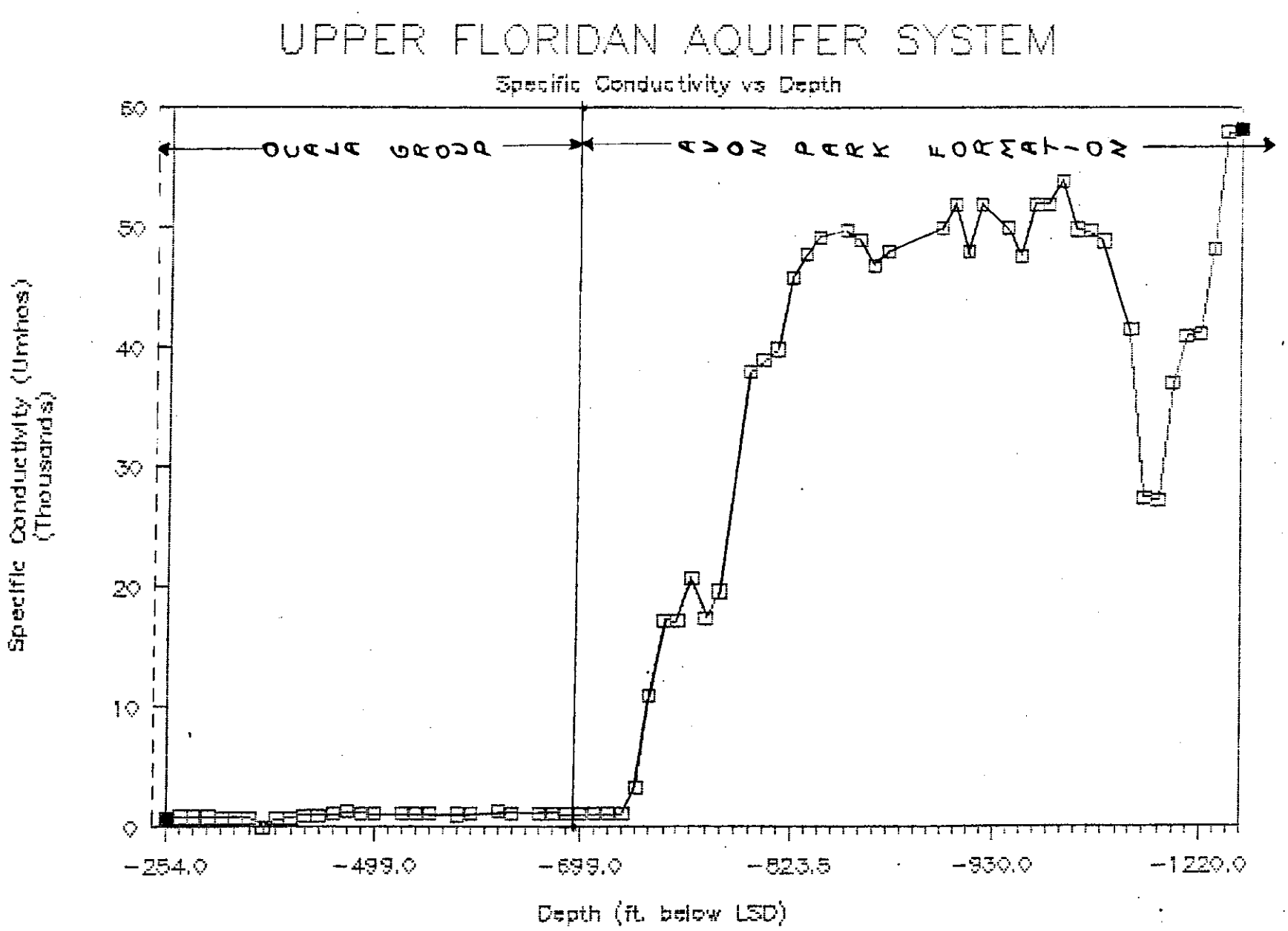
UPPER FLORIDAN AQUIFER SYSTEM
Specific Conductivity vs Depth
OCALA GROUP
AVON PARK FORMATION
Specific Conductivity (Umhos)
(Thousands)
60
50
40
30
20
10
0
-254.0
-499.0
-699.0
-823.5
-930.0
-1220.0
Depth (ft. below LSD)

FIGURE 10

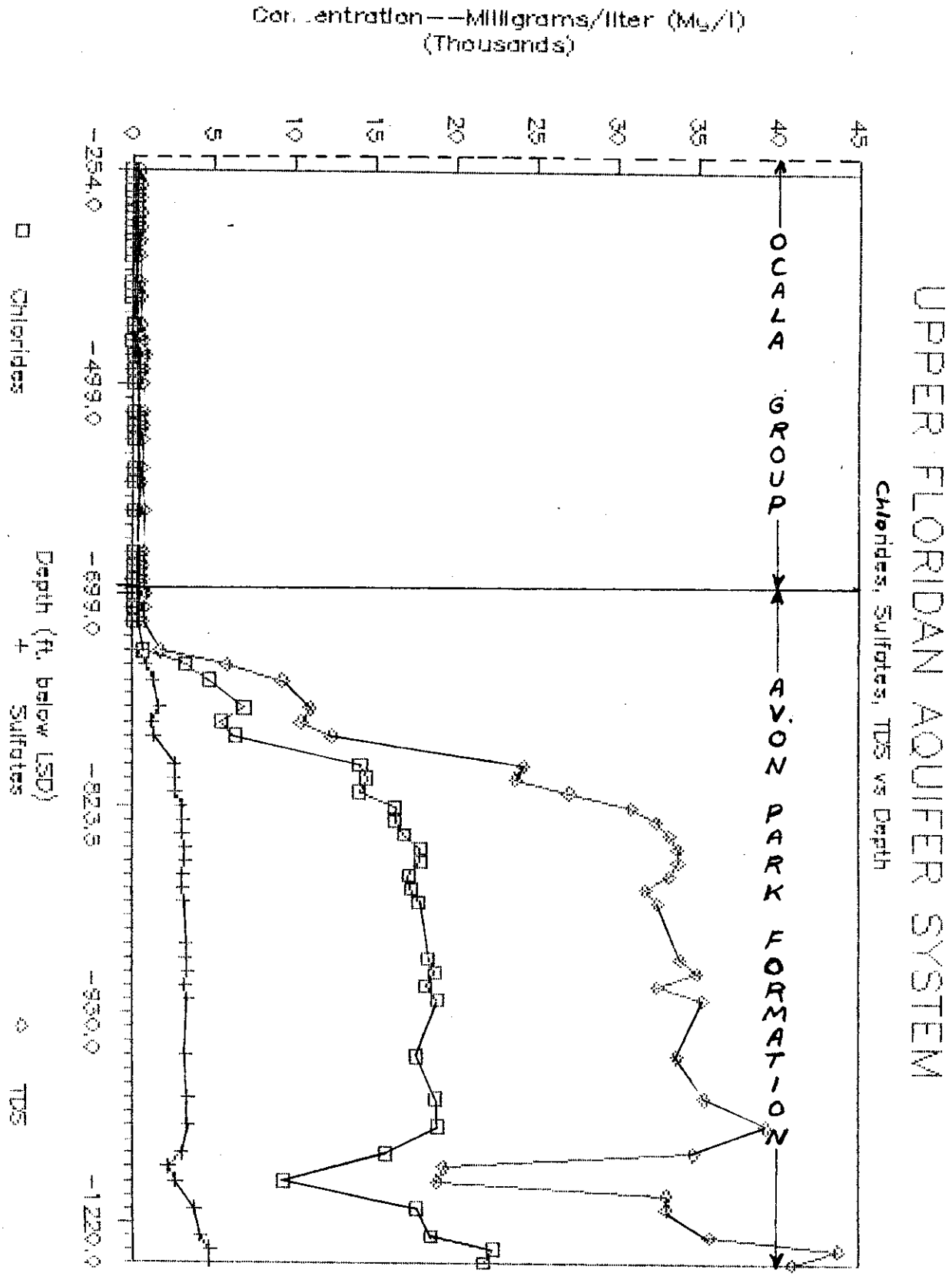
UPPER FLORIDAN AQUIFER SYSTEM
Chlorides, Sulfates, TDS vs Depth
OCALA GROUP
AVON PARK FORMATION
Concentration--Milligrams/liter (Mg/l)
(Thousands)
0
5
10
15
20
25
30
35
40
45
-254.0
-489.0
-689.0
-823.5
-930.0
-1220.0
Depth (ft. below LSD)
Chlorides
Sulfates
TDS

FIGURE 11

SUWANNEE AQUIFER PERFORMANCE TEST
TR9-2 "APOLLO BEACH"

WELL NAME	METHOD OF ANALYSIS	TRANSMISSIVITY (GPD/FT)	STORAGE COEFFICIENT
SUWANNEE MONITOR (PUMPED WELL)	JACOB/COOPER (Drawdown vs Time)	121,000	N/A
SUWANNEE OB WELL	JACOB/COOPER (Drawdown vs Time)	102,000	3.36×10^{-5}
SUWANNEE OB WELL	WALTON (Drawdown vs Time)	98,000	2.61×10^{-5}
SUWANNEE (PUMPED WELL)	JACOB/COOPER (Recovery)	117,000	N/A
SUWANNEE OB WELL	JACOB/COOPER (Recovery)	109,000	N/A
	AVERAGE	109,000	1.47×10^{-5}

TABLE 1

AVON PARK PERFORMANCE TEST
TR9-2 "APOLLO BEACH"

WELL NAME	METHOD OF ANALYSIS	TRANSMISSIVITY (GPD/FT)	STORAGE COEFFICIENT	LEAKANCE COEFFICIENT (GPD/FT^3)
AVON PARK MONITOR (PUMPED WELL)	JACOB/COOPER (Drawdown vs. Time)	480,000	N/A	N/A
AVON PARK OB WELL #1	JACOB/COOPER (Drawdown vs. Time)	500,000	4.17×10^{-5}	N/A
AVON PARK OB WELL #2	JACOB/COOPER (Drawdown vs. Time)	880,000	1.53×10^{-5}	N/A
AVON PARK OB WELL #1	WALTON (Drawdown vs. Time)	270,000	2.56×10^{-4}	1.2×10^{-3}
AVON PARK OB Well #2	WALTON (Drawdown vs. Time)	450,000	9.75×10^{-5}	2.8×10^{-4}
AVON PARK MONITOR (PUMPED WELL)	JACOB/COOPER (Recovery)	580,000	N/A	N/A
AVON PARK OB WELL #1	JACOB/COOPER (Recovery)	520,000	N/A	N/A
AVON PARK OB WELL #2	JACOB/COOPER (Recovery)	710,000	N/A	
	AVERAGE	550,000	1.03×10^{-4}	7.4×10^{-4}

TABLE 3

SUWANNEE AQUIFER PERFORMANCE TEST
TR9-2 "APOLLO BEACH"

WELL NAME	DRAWDOWN	RECOVERY
SURFICIAL PIEZOMETER	.22'	.06
INTERMEDIATE MONITOR	2.1'	2.33'
SUWANNEE MONITOR (PUMPED WELL)	67.1'	67.3'
OCALA MONITOR	1.1'	1.02'
AVON PARK MONITOR	.73'	.91'
SUWANNEE OB WELL	6.1'	6.23'
AVON PARK OB WELL #1	.88'	.93'
EXISTING WELL #61	5.51'	5.61'

TABLE 2

AVON PARK AQUIFER PERFORMANCE TEST
TR9-2 "APOLLO BEACH"

WELL NAME	DRAWDOWN	RECOVERY
SURFICIAL PIEZOMETER	.1'	.08'
INTERMEDIATE MONITOR	1.45'	.45'
SUWANNEE MONITOR	1.86'	.78'
OCALA MONITOR	3.75'	2.72'
AVON PARK MONITOR (PUMPED WELL)	69.4'	75.9'
SUWANNEE OB WELL	.78'	.77'
AVON PARK OB WELL #1	3.23'	2.37'
AVON PARK OB WELL #2	2.28'	1.45'

TABLE 4

TR 9-2 APOLLO BEACH WRAP #1

AS BUILT - WELL DESIGN

PERMANENT SURFICIAL MONITOR

4-29-91

J.L. DECKER

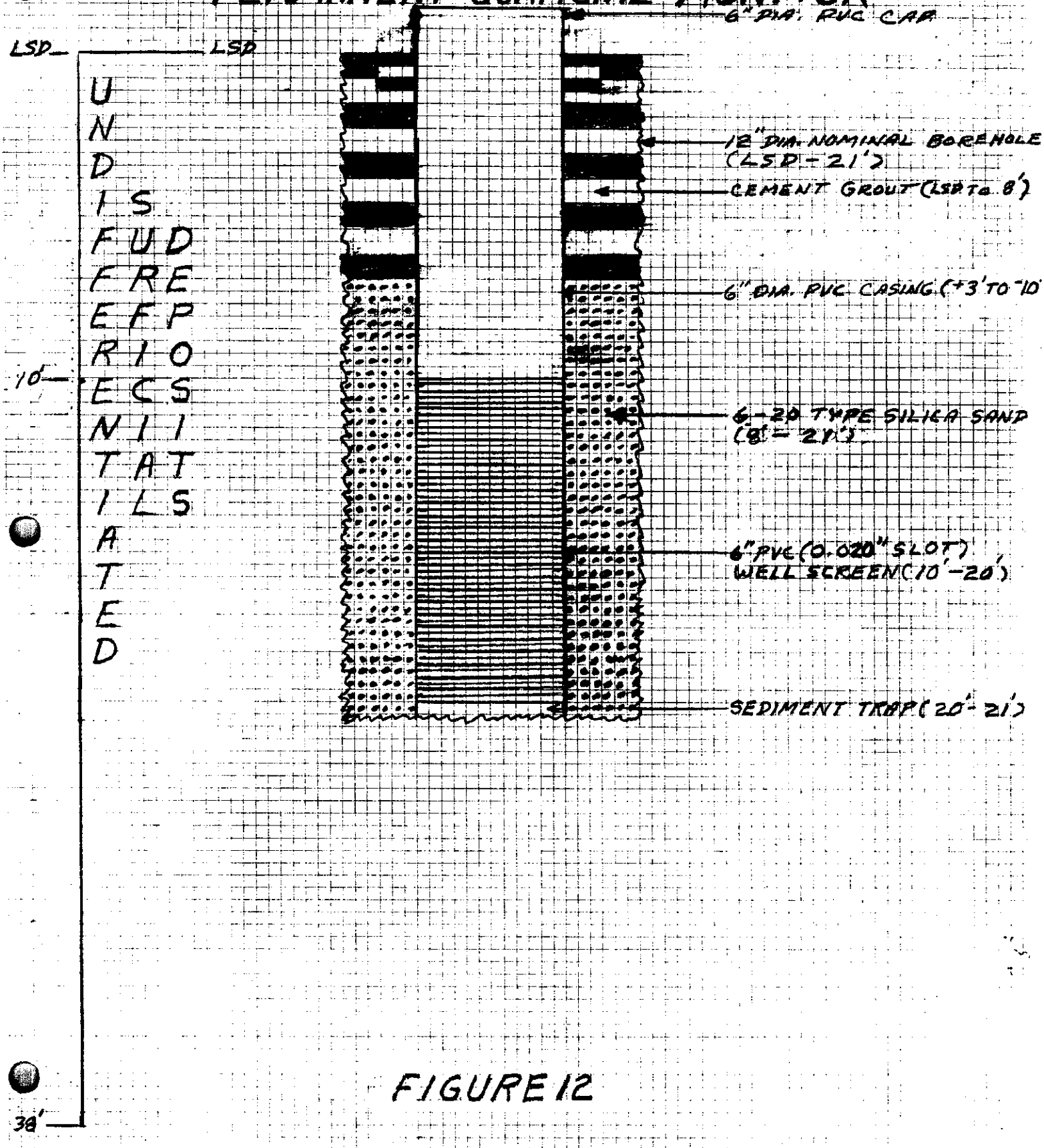

FIGURE 12

TR9-2, POLLO BEACH, WRAP #1

4-29-91 AS BUILT – WELL DESIGN J.L. DECKER

PERMANENT INTERMEDIATE MONITOR
TAMPA MEMBER-ARCADIA FORMATION
MODIFICATION OF EXISTING WELL #65

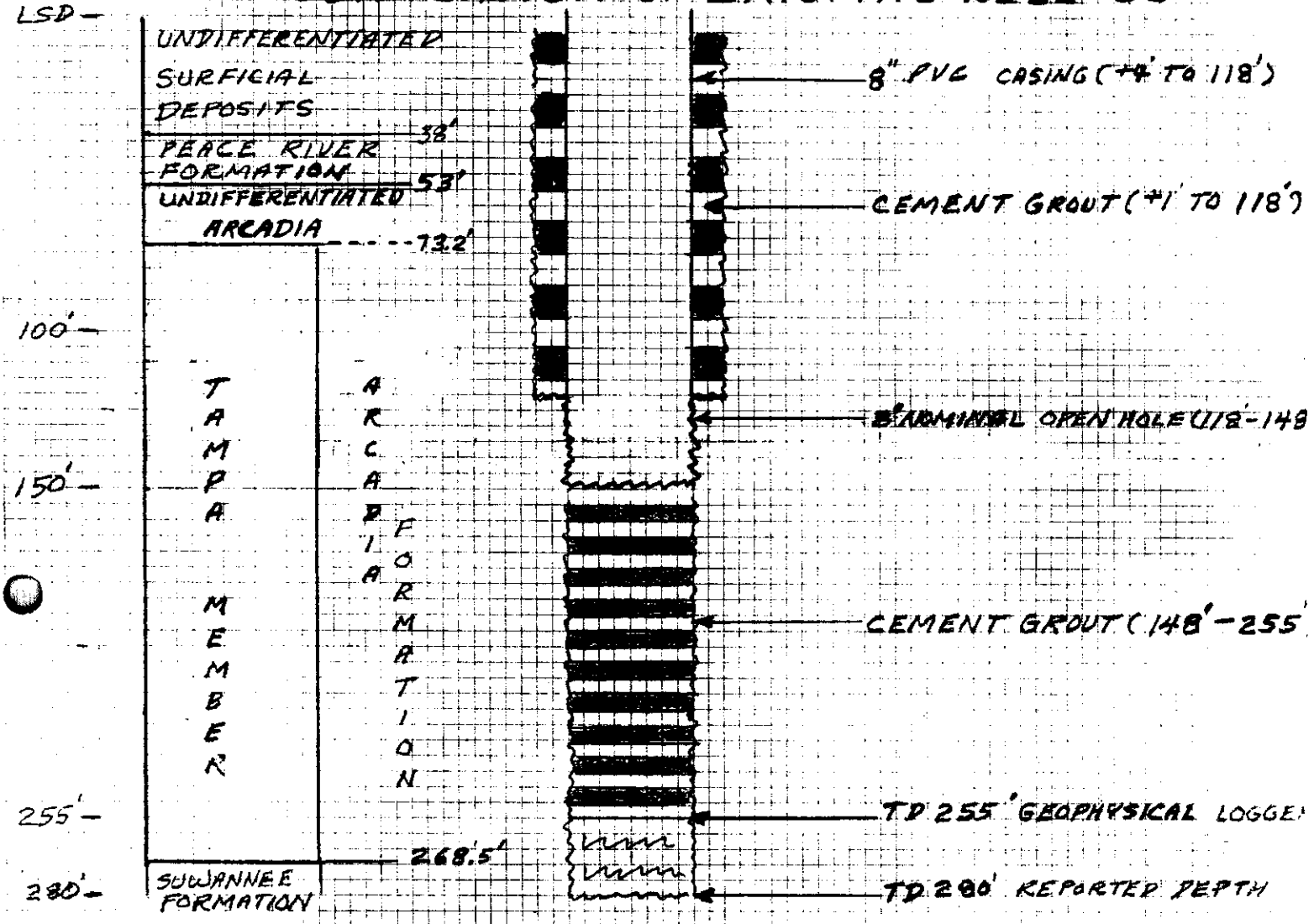

FIGURE 13

TR9-2, POLLO BEACH WRAP #1

AS BUILT -- WELL DESIGN

4-29-91 J.L. DECKER

PERMANENT SUWANNEE MONITOR

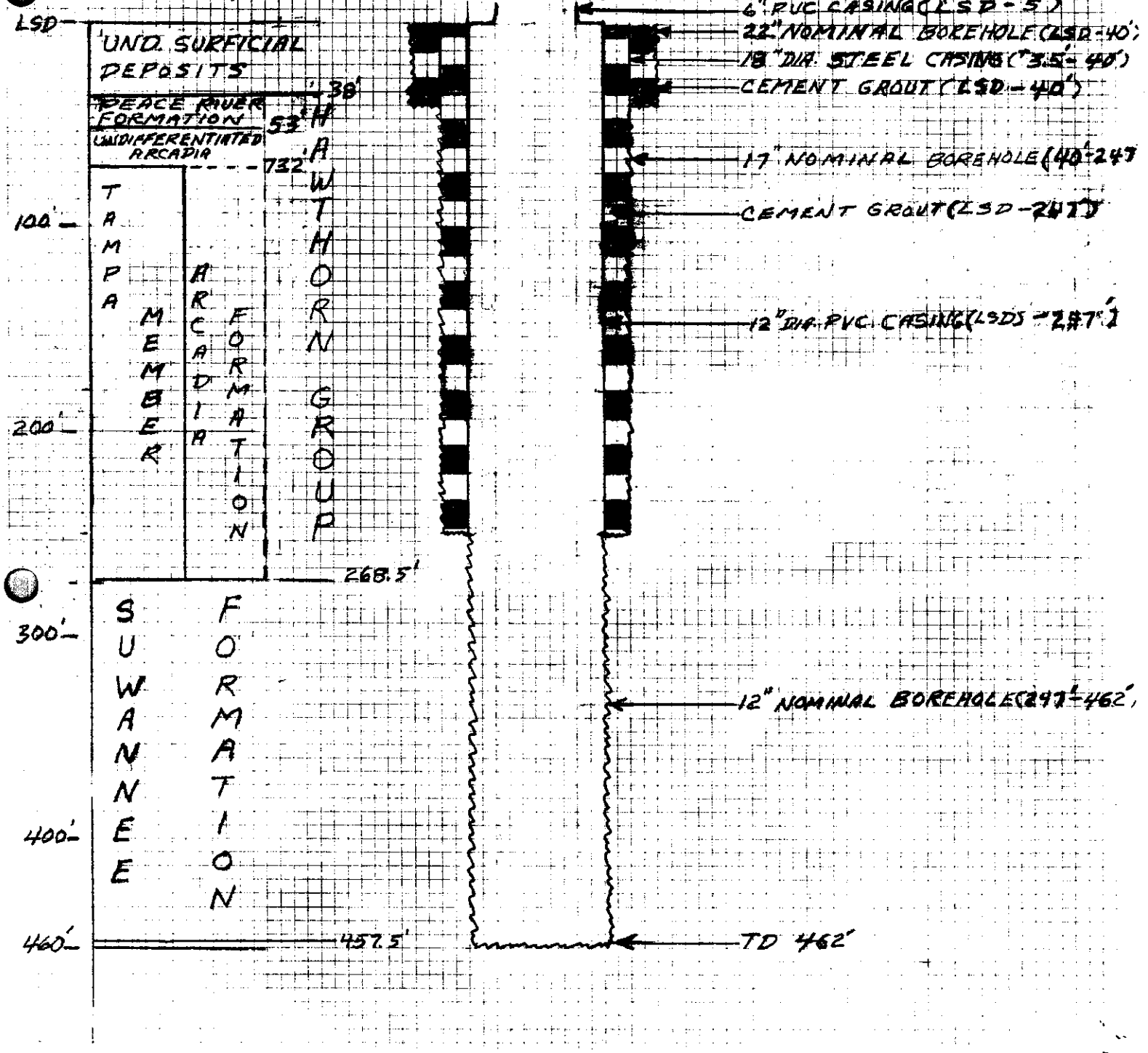

FIGURE 14

TR9-2, APOLLO BEACH WRAP #1

9-29-71 AS BUILT - WELL DESIGN J. L. DECKER

PERMANENT OCALA MONITOR

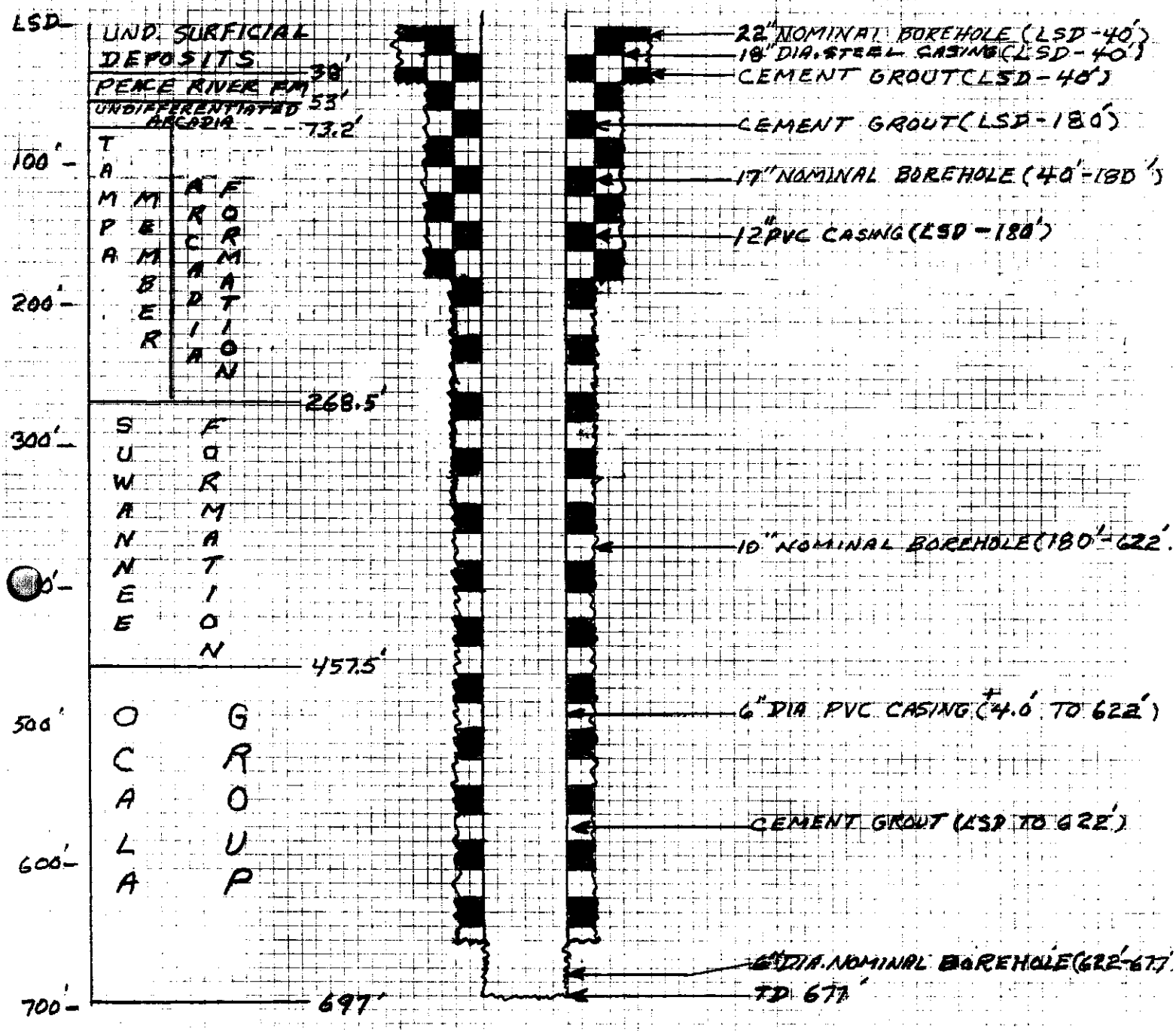

FIGURE 15

TR9-2, APOLLO BEACH WRAP #1

4-29-91 AS BUILT — WELL DESIGN J.L. DECKER

PERMANENT AVON PARK MONITOR

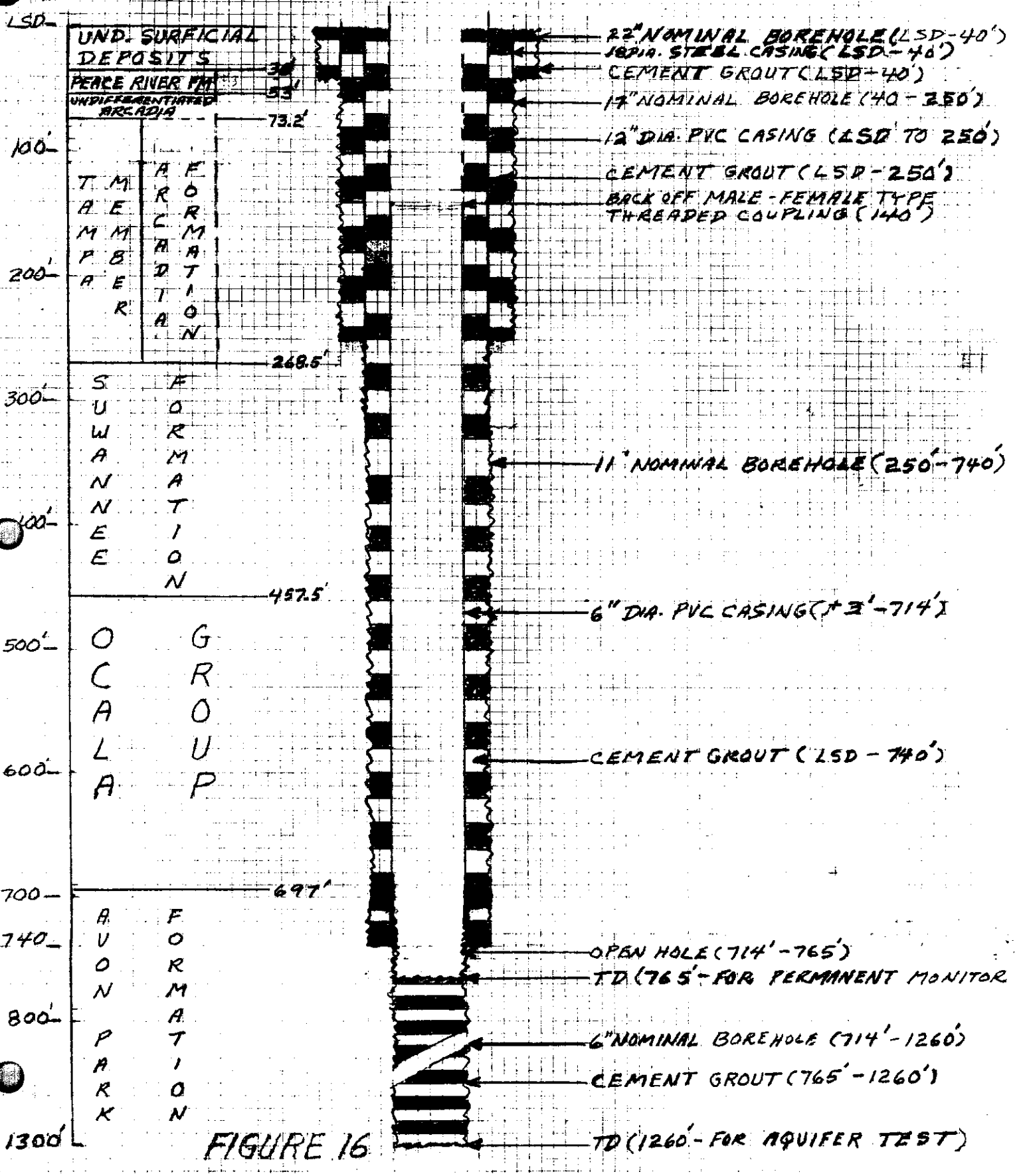

FIGURE 16

LITHOLOGIC WELL LOG PRINTOUT — SOURCE - FGS

WELL NUMBER: W- 30032 — COUNTY - HILLSBOROUGH
TOTAL DEPTH: 01260 FT. — LOCATION: T.31S R.19E S.22DC
SAMPLES - — LAT = N 27D 45M 54
— LON = W 82D 23M 38
COMPLETION DATE - 09/11/90 — ELEVATION - 013 FT
OTHER TYPES OF LOGS AVAILABLE - TEMP, SONIC, CALIPER, GAMMA-GAMMA, NEUTRON

OWNER/DRILLER: TR 9-2 APOLLO BEACH (WRAP 1) SWFWMD LLOYD JOHNSON, TOM TOY

WORKED BY: HYDROLOGIST- JOHN DECKER 2-8-90 TO 9-11-90; AVERAGE TO GOOD SAMPLES. HOLLOW STEM SAMPLES (LSD-19.5'), TRI-CONE BAG SAMPLES (19.5-38'), WIRE LINE CORE SAMPLES (38-872.5'), DRILL CUTTINGS (870-1260').

GEOPHYSICAL LOGS: TEMPERATURE, SONIC, CALIPER, GAMMA-GAMMA, NEUTRON.

ENTERED BY RICHARD GREEN FROM A CODED LOG PROVIDED BY SWFWMD.

0.	- 36.	UNDIFFERENTIATED SAND AND CLAY
36.	- 268.	HAWTHORN GROUP
36.	- 53.	PEACE RIVER FM.
53.	- 268.	ARCADIA FM.
73.	- 268.	TAMPA MEMBER OF ARCADIA FM.
268.	- 457.	SUWANNEE LIMESTONE
457.	- 697.	OCALA GROUP
697.	- 1260. TD	AVON PARK FM.

0 - 1.2 SAND; LIGHT GRAYISH BROWN TO BROWNISH GRAY; 35% POROSITY, INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM;
ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): ORGANIC MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: PLANT REMAINS- %;
OTHER FEATURES: GRANULAR, FROSTED;
FOSSILS: ORGANICS;

1.2- 2.4 SAND; MODERATE YELLOWISH BROWN TO LIGHT OLIVE BROWN; 30% POROSITY, INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM;
ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICITY; UNCONSOLIDATED;
CEMENT TYPE(S): IRON CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: IRON STAIN- %, SILT- %, PLANT REMAINS- %;
OTHER FEATURES: GRANULAR, FROSTED;
FOSSILS: ORGANICS;

2.4- 2.8 SAND; MODERATE GREENISH YELLOW TO LIGHT OLIVE BROWN; 25% POROSITY, INTERGRANULAR;
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM;
ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): IRON CEMENT, CLAY MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: IRON STAIN- %, SILT- %;
OTHER FEATURES: GRANULAR, FROSTED;

2.8- 3.6 SAND; GRAYISH ORANGE TO MODERATE YELLOWISH GREEN; 30% POROSITY, INTERGRANULAR,
POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM;
ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX, IRON CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: IRON STAIN- %, SILT- %, PLANT REMAINS- %;
OTHER FEATURES: GRANULAR, FROSTED;
FOSSILS: ORGANICS;

3.6- 5.6 SAND; YELLOWISH GRAY; 35% POROSITY, INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM;
ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: IRON STAIN- %, HEAVY MINERALS- %;
OTHER FEATURES: GRANULAR, FROSTED;
FOSSILS: ORGANICS;

5.6- 5.8 SAND; MODERATE BROWN TO MODERATE BROWN; 35% POROSITY, INTERGRANULAR,
POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM;
ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX, ORGANIC MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: IRON STAIN- %, PHOSPHATIC SAND- %, SILT- %, HEAVY MINERALS- %;
OTHER FEATURES: GRANULAR, FROSTED;
FOSSILS: ORGANICS;

5.8- 14.5 SAND; LIGHT OLIVE TO LIGHT OLIVE GRAY; 35% POROSITY, INTERGRANULAR,
POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM;
ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX, ORGANIC MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: IRON STAIN- %, PHOSPHATIC SAND- %, SILT- %, HEAVY MINERALS- %;
OTHER FEATURES: GRANULAR, FROSTED;
FOSSILS: ORGANICS;

14.5- 19.5 SAND; GRAYISH BROWN TO DARK YELLOWISH BROWN; 35% POROSITY, INTERGRANULAR,
POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: FINE; RANGE: MEDIUM TO FINE;
ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX, ORGANIC MATRIX;
ACCESSORY MINERALS: IRON STAIN- %, PHOSPHATIC SAND- %, SILT- %, HEAVY MINERALS- %;
OTHER FEATURES: GRANULAR, FROSTED;
FOSSILS: ORGANICS;
SOME SUB-ROUNDED, FROSTED, MED. GRAINED QTZ SAND, PHOS. SAND.

19.5- 36 SAND; YELLOWISH GRAY TO YELLOWISH GRAY; 35% POROSITY, INTERGRANULAR,
POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE;
ROUNDNESS: ROUNDED TO SUB-ANGULAR; MEDIUM SPHERICITY; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: IRON STAIN- %, PHOSPHATIC SAND- %, SILT- %;
OTHER FEATURES: GRANULAR, FROSTED;
FOSSILS: ORGANICS;
SOME SUB-ROUNDED COARSE GRAINED QTZ SAND LENSES (34',34.5').

36 - 38 CLAY; GRAYISH GREEN TO DARK YELLOWISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: DOLOMITE- %, PHOSPHATIC SAND- %, QUARTZ SAND- %,
PHOSPHATIC GRAVEL- %;
OTHER FEATURES: PLASTIC, DOLOMITIC;
FOSSILS: NO FOSSILS;
TOP OF PEACE RIVER FM. AT 36', NON CALCAREOUS.

38 - 43.7 CLAY; LIGHT GRAYISH GREEN TO GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: IRON STAIN- %, PHOSPHATIC SAND- %, QUARTZ SAND- %, DOLOMITE- %;
OTHER FEATURES: PLASTIC, DOLOMITIC;
FOSSILS: ORGANICS;
SOME ORGANICS.

43.7- 45.1 LIMESTONE; VERY LIGHT GREEN TO VERY LIGHT ORANGE; INTERGRANULAR, VUGULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: DOLOMITE- %, PHOSPHATIC SAND- %, CALCILUTITE- %;
OTHER FEATURES: DOLOMITIC;
FOSSILS: CORAL, FOSSIL MOLDS;

45.1- 47.2 CLAY; MODERATE GREEN; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: SILT- %, PHOSPHATIC GRAVEL- %, QUARTZ SAND- %;
OTHER FEATURES: PLASTIC;
FOSSILS: ORGANICS;

47.2- 52 SILT-SIZED DOLOMITE; LIGHT GREENISH GRAY TO VERY LIGHT GRAY; INTERGRANULAR,
LOW PERMEABILITY; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED,
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %, DOLOMITE- %;
OTHER FEATURES: DOLOMITIC, PLASTIC;
FOSSILS: NO FOSSILS;

52 - 53 CLAY; MODERATE GREEN; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, PHOSPHATIC GRAVEL- %, QUARTZ SAND- %,
DOLOMITE- %;
OTHER FEATURES: DOLOMITIC, SPECKLED;
FOSSILS: NO FOSSILS;
TOP OF ARCADIA FM.; BRN-BLK PHOS. SAND AND GRAVEL.

53 - 73.2 DOLOSTONE; GREENISH GRAY TO LIGHT GRAY; INTRAGRANULAR, VUGULAR, FRACTURE;
50-90% ALTERED; ANHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED, BRECCIATED, MASSIVE, NODULAR,
ACCESSORY MINERALS: CLAY-30%, CALCILUTITE-25%, QUARTZ SAND- %, PHOSPHATIC GRAVEL- %;
OTHER FEATURES: SPECKLED, DOLOMITIC;
FOSSILS: FOSSIL MOLDS;
VERTICAL AND HORIZONTAL FRACTURES; SOME CLAY FILLED FRACTURES AND VUGS, SOME LT GREENISH GRAY CLAY PELLETS, SOME BRECCIATION, CLAY SEAM.

73.2- 79 SANDSTONE; YELLOWISH GRAY; INTERGRANULAR, VUGULAR, PIN POINT VUGS;
GRAIN SIZE: VERY FINE; RANGE: FINE TO VERY FINE;
ROUNDNESS:SUB-ANGULAR; MEDIUM SPHERICITY; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: PHOSPHATIC GRAVEL- %, CALCILUTITE- %, PHOSPHATIC SAND- %;
OTHER FEATURES: CALCAREOUS, GRANULAR;
FOSSILS: FOSSIL MOLDS;
GREEN SANDY CLAY FILLED VUGS; TURRITELLA MOLD.

79 - 81 SAND; LIGHT GREEN TO GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE;
ROUNDNESS:SUB-ANGULAR; MEDIUM SPHERICITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CALCILUTITE-40%, PHOSPHATIC SAND- %, CHERT- %;
OTHER FEATURES: GRANULAR, PARTINGS;
FOSSILS: ORGANICS;

81 - 85 CLAY; LIGHT GREEN TO MODERATE GREEN; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: QUARTZ SAND- %, CALCILUTITE- %, PHOSPHATIC SAND- %;
OTHER FEATURES: GRANULAR, PLASTIC;
FOSSILS: NO FOSSILS;

85 - 92 SAND; LIGHT GREEN TO BLACK; INTERGRANULAR, LOW PERMEABILITY;
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE;
ROUNDNESS:SUB-ANGULAR; MEDIUM SPHERICITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX, PHOSPHATE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CLAY- %, CHERT- %, CALCILUTITE- %, PHOSPHATIC SAND- %;
OTHER FEATURES: GRANULAR, PARTINGS;
FOSSILS: ORGANICS;

BLACK ORGANIC SANDY CLAY (85'), MINOR BLACK CHERT.

92 - 92.7 CLAY; LIGHT GREEN; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, PHOSPHATE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %, CHERT- %;
OTHER FEATURES: PLASTIC;
FOSSILS: NO FOSSILS;

92.7- 94.9 CALCILUTITE; GREENISH GRAY TO DARK GREENISH GRAY; INTERGRANULAR, LOW PERMEABILITY, VUGULAR;
GRAIN TYPE: CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, BRECCIATED, NODULAR,
ACCESSORY MINERALS: CLAY-40%, PHOSPHATIC SAND- %, QUARTZ SAND- %, CHERT- %;
FOSSILS: ORGANICS;
CLAY FILLED VUGS, CLAY NODULES, BRECCIATED APPEAREANCE, BLACK CHERT.

94.9- 99 CLAY; GRAYISH GREEN TO MODERATE GREEN; INTERGRANULAR, LOW PERMEABILITY;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CALCILUTITE- %, QUARTZ SAND- %, PHOSPHATIC SAND- %;
OTHER FEATURES: PLASTIC;
FOSSILS: ORGANICS;

99 - 99.2 CALCILUTITE; GREENISH GRAY TO DARK GREENISH GRAY; INTERGRANULAR, LOW PERMEABILITY, VUGULAR;
GRAIN TYPE: CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, NODULAR, MOTTLED,
ACCESSORY MINERALS: CLAY-25%, PHOSPHATIC SAND- %, QUARTZ SAND- %;
FOSSILS: ORGANICS;

99.2- 109 CLAY; GRAYISH GREEN TO LIGHT GREEN; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %;
OTHER FEATURES: PLASTIC;
FOSSILS: ORGANICS;

109 - 114 CALCILUTITE; YELLOWISH GRAY TO PINKISH GRAY; INTERGRANULAR, LOW PERMEABILITY, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE,
ACCESSORY MINERALS: PHOSPHATIC SAND-20%, QUARTZ SAND-40%, CLAY- %, CHERT- %;
OTHER FEATURES: WEATHERED, SPECKLED;
FOSSILS: FOSSIL MOLDS;

114 - 118.7 SAND; LIGHT GREENISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN SIZE: VERY FINE; RANGE: FINE TO VERY FINE;
ROUNDNESS: SUB-ANGULAR TO ROUNDED; MEDIUM SPHERICITY; UNCONSOLIDATED;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: PHOSPHATIC SAND-15%, PHOSPHATIC GRAVEL-20%, CALCILUTITE-20%, CLAY- %;
OTHER FEATURES: GRANULAR, SPECKLED;
FOSSILS: NO FOSSILS;

118.7- 123.3 SHELL BED; YELLOWISH GRAY TO VERY LIGHT ORANGE; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY,
MOLDIC; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: PHOSPHATIC SAND-15%, QUARTZ SAND-30%, DOLOMITE-10%;
OTHER FEATURES: CALCAREOUS, WEATHERED, GRANULAR, MEDIUM RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS, MOLLUSKS;

123.3- 130 DOLOSTONE; LIGHT GRAY TO MODERATE LIGHT GRAY; POSSIBLY HIGH PERMEABILITY, MOLDIC, INTERGRANULAR; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: VERY FINE TO MICROCRYSTALLINE; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED, MOTTLED,
ACCESSORY MINERALS: LIMESTONE-35%, QUARTZ SAND- %, PHOSPHATIC SAND- %;
OTHER FEATURES: DOLOMITIC;
FOSSILS: FOSSIL MOLDS, MOLLUSKS;
RECRYSTALLIZED MOLLUSKS AND INTERNAL MOLDS, PERMEABLE 119-130'.

130 - 134.2 CALCILUTITE; YELLOWISH GRAY TO PINKISH GRAY; INTERGRANULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY;
FOSSILS: FOSSIL MOLDS;

134.2- 139 CLAY; YELLOWISH GRAY TO PINKISH GRAY; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %;
OTHER FEATURES: CALCAREOUS, CHALKY, PLASTIC;
FOSSILS: NO FOSSILS;

139 - 139.6 CALCILUTITE; YELLOWISH GRAY TO PINKISH GRAY; INTERGRANULAR, VUGULAR, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, INTERBEDDED,
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %;
OTHER FEATURES: CALCAREOUS, CHALKY;
FOSSILS: FOSSIL MOLDS;

139.6- 145 CLAY; YELLOWISH GRAY TO PINKISH GRAY; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, INTERBEDDED,
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %;
OTHER FEATURES: CALCAREOUS, CHALKY, PLASTIC;
ALTERNATING BEDS OF CALCILUTITIC CLAY AND CALCILUTITE.

145 - 156.7 CALCARENITE; YELLOWISH GRAY TO PINKISH GRAY; INTERGRANULAR, MOLDIC,
POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE,
ACCESSORY MINERALS: CLAY- %, CALCILUTITE-40%, PHOSPHATIC SAND- %, QUARTZ SAND- %;
OTHER FEATURES: COQUINA, CHALKY, GRANULAR, REEFAL, PARTINGS;
FOSSILS: CORAL, FOSSIL FRAGMENTS, FOSSIL MOLDS, MOLLUSKS, BENTHIC FORAMINIFERA;
SORITES SP., MOLLUSK MOLDS.

156.7- 161.7 CALCILUTITE; YELLOWISH GRAY TO PINKISH GRAY; INTERGRANULAR, MOLDIC, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, INTERBEDDED,
ACCESSORY MINERALS: LIMESTONE- %, CLAY- %, PHOSPHATIC SAND- %, QUARTZ SAND- %;
OTHER FEATURES: WEATHERED, CHALKY, REEFAL;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS;

161.7- 168 DOLOSTONE; DARK YELLOWISH BROWN TO LIGHT BROWN; INTERGRANULAR, VUGULAR,
LOW PERMEABILITY; 50-90% ALTERED; ANHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED, BRECCIATED,
ACCESSORY MINERALS: CLAY- %, QUARTZ SAND- %, PHOSPHATIC SAND- %;
OTHER FEATURES: DOLOMITIC, SUCROSIC;
FOSSILS: FOSSIL MOLDS, CORAL;
GRAYISH GREEN CLAY FILLED VUGS; MOTTLED; BRECCIATED.

168 - 169 CLAY; LIGHT GREENISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %, DOLOMITE- %;
OTHER FEATURES: CALCAREOUS, PLASTIC;
FOSSILS: NO FOSSILS;
GREENISH GRAY DOLOMITIC INCLUSIONS.

169 - 170.6 CLAY; GRAYISH GREEN TO GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED, MOTTLED,
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %, DOLOMITE- %;
OTHER FEATURES: CALCAREOUS, PLASTIC;
FOSSILS: ORGANICS;

170.6- 171.1 CHERT; LIGHT BLUISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY, FRACTURE;
GOOD INDURATION;
CEMENT TYPE(S): SILICIC CEMENT, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CALCILUTITE- %, QUARTZ SAND- %;
FOSSILS: NO FOSSILS;
FRACTURED CHERT BED.

171.1- 173.9 DOLOSTONE; LIGHT OLIVE TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
10-50% ALTERED; ANHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED,
ACCESSORY MINERALS: QUARTZ SAND- %;
OTHER FEATURES: DOLOMITIC, SUCROSIC;
FOSSILS: NO FOSSILS;

173.9- 178.7 CLAY; DARK YELLOWISH GREEN TO GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: QUARTZ SAND- %, DOLOMITE-20%;
OTHER FEATURES: DOLOMITIC, PLASTIC;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS;

178.7- 181 DOLOSTONE; GREENISH GRAY TO LIGHT GREENISH GRAY; INTERGRANULAR, LOW PERMEABILITY, FRACTURE;
10-50% ALTERED; ANHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, BRECCIATED, MOTTLED,
ACCESSORY MINERALS: CALCILUTITE- %, QUARTZ SAND- %;
OTHER FEATURES: DOLOMITIC;
FOSSILS: NO FOSSILS;
MICRITE FILLED FRACTURES.

181 - 188.5 DOLOSTONE; LIGHT BROWN TO GRAYISH BROWN; INTERGRANULAR, LOW PERMEABILITY,
FRACTURE; 50-90% ALTERED; ANHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED,
ACCESSORY MINERALS: CALCILUTITE- %, QUARTZ SAND- %, PHOSPHATIC SAND- %, CLAY- %;
OTHER FEATURES: DOLOMITIC, SUCROSIC;
FOSSILS: ORGANICS, FOSSIL MOLDS;
DK GREEN CLAY FILLED FRACTURES, VUGS; DK GREEN CLAY SEAM (182-182.2').

188.5- 193.5 DOLOSTONE; MODERATE BROWN TO DARK YELLOWISH BROWN; INTERGRANULAR, INTERCRYSTALLINE, VUGULAR; 50-90% ALTERED; ANHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED,
ACCESSORY MINERALS: CALCILUTITE- %, QUARTZ SAND- %, PHOSPHATIC SAND- %;
OTHER FEATURES: DOLOMITIC, SUCROSIC;
FOSSILS: FOSSIL MOLDS;

193.5- 200.5 CALCARENITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, MOLDIC, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED,
ACCESSORY MINERALS: CALCILUTITE- %, QUARTZ SAND- %, PHOSPHATIC SAND- %, DOLOMITE-15%;
OTHER FEATURES: DOLOMITIC, REEFAL;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS;

200.5- 215 DOLOSTONE; GREENISH BLACK TO LIGHT BLUISH GRAY; INTERGRANULAR, INTRAGRANULAR, FRACTURE; 50-90% ALTERED; ANHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED,
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %, CHERT- %, CLAY-07%;
OTHER FEATURES: DOLOMITIC, SUCROSIC;
FOSSILS: ORGANICS, FOSSIL MOLDS;
INTERBEDDED GREEN CLAY SEAMS, LT GRAY MARL; BLACK CHERT; INTERCLASTS, CLAY AND CALCILUTITE-FILLED VUGS, FOSSIL MOLDS AT BOTTOM OF SECTION.

215 - 218.5 DOLOSTONE; LIGHT GRAYISH GREEN TO LIGHT BLUISH GRAY; INTERGRANULAR, VUGULAR, LOW PERMEABILITY; 10-50% ALTERED; ANHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, MOTTLED,
ACCESSORY MINERALS: CLAY-40%, PHOSPHATIC SAND- %, QUARTZ SAND- %, CALCILUTITE- %;
OTHER FEATURES: DOLOMITIC;
FOSSILS: NO FOSSILS;

218.5- 221 CLAY; GRAYISH GREEN TO DARK YELLOWISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND-40%, CALCILUTITE- %, DOLOMITE- %;
OTHER FEATURES: GRANULAR, SPECKLED;
FOSSILS: NO FOSSILS;

221 - 223 CALCILUTITE; YELLOWISH GRAY; INTERGRANULAR, VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND-35%, CLAY-20%, SILT- %;
OTHER FEATURES: GRANULAR;
FOSSILS: FOSSIL MOLDS;

223 - 224.1 CLAY; MODERATE YELLOWISH GREEN TO GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND-40%;
OTHER FEATURES: PLASTIC;
FOSSILS: NO FOSSILS;

224.1- 226.6 CALCILUTITE; LIGHT GRAYISH GREEN TO LIGHT GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED, BRECCIATED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %, DOLOMITE-20%;
OTHER FEATURES: DOLOMITIC;
FOSSILS: NO FOSSILS;

226.6- 229 CLAY; LIGHT GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %, DOLOMITE- %;
OTHER FEATURES: PLASTIC, DOLOMITIC;
FOSSILS: NO FOSSILS;

229 - 233.4 CALCILUTITE; YELLOWISH GRAY TO MODERATE PINK; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %, DOLOMITE-20%, CLAY-30%;
FOSSILS: ORGANICS;

233.4- 236 CLAY; LIGHT GRAYISH GREEN TO MODERATE YELLOWISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %, DOLOMITE- %;
OTHER FEATURES: PLASTIC, DOLOMITIC;
FOSSILS: NO FOSSILS;

236 - 239 CALCILUTITE; LIGHT BROWN; INTERGRANULAR, MOLDIC, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %, DOLOMITE- %, CLAY- %;
OTHER FEATURES: DOLOMITIC;
FOSSILS: FOSSIL MOLDS, MOLLUSKS, FOSSIL FRAGMENTS;

239 - 249.2 CLAY; GRAYISH GREEN TO DARK GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %, DOLOMITE- %, CLAY- %;
OTHER FEATURES: PLASTIC, DOLOMITIC;
FOSSILS: ORGANICS;

249.2- 254.5 CALCILUTITE; MODERATE PINK TO LIGHT GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED, LAMINATED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %, CHERT- %, SILT- %;
OTHER FEATURES: CALCAREOUS;
FOSSILS: FOSSIL MOLDS;
BROWNISH BLACK CHERT, CHERT FILLED VUGS (250-251').

254.5- 256.3 CLAY; LIGHT GREEN TO LIGHT GREENISH GRAY; INTERGRANULAR, LOW PERMEABILITY; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %, SILT- %, CALCILUTITE-30%;
OTHER FEATURES: CALCAREOUS, PLASTIC;
FOSSILS: NO FOSSILS;

256.3- 260.6 LIMESTONE; YELLOWISH GRAY TO VERY LIGHT GRAY; INTERGRANULAR, LOW PERMEABILITY,
PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, MOTTLED, INTERBEDDED,
ACCESSORY MINERALS: QUARTZ SAND- %, CLAY- %, SILT- %, CALCILUTITE-40%;
OTHER FEATURES: CALCAREOUS, MEDIUM RECRYSTALLIZATION, WEATHERED;
FOSSILS: FOSSIL MOLDS;

260.6- 264 CLAY; LIGHT GREENISH GRAY; INTERGRANULAR, LOW PERMEABILITY; POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CALCILUTITE-45%, SILT- %;
OTHER FEATURES: CALCAREOUS, PLASTIC;
FOSSILS: NO FOSSILS;

264 - 268.6 CALCILUTITE; YELLOWISH GRAY TO LIGHT GREEN; INTERGRANULAR, LOW PERMEABILITY, VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MOTTLED, LAMINATED,
ACCESSORY MINERALS: CLAY-15%, SILT- %, DOLOMITE- %;
OTHER FEATURES: CALCAREOUS;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS;
GREEN CLAY-FILLED VUGS, MOTTLED, DOLOMITE SEAM (265.5').

268.6- 273.5 CALCARENITE; YELLOWISH GRAY; INTERGRANULAR, VUGULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %;
OTHER FEATURES: CALCAREOUS, REEFAL, COQUINA, MEDIUM RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS, MOLLUSKS, MILIOLIDS;
TOP OF SUWANNEE FM @ 268.6', CRYSTALLIZED INTERNAL MOLDS, MOLLUSKS.

273.5- 280 CALCILUTITE; YELLOWISH GRAY TO VERY LIGHT GRAY; INTERGRANULAR, MOLDIC, VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: LIMESTONE- %, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY;
FOSSILS: FOSSIL FRAGMENTS, WORM TRACES;

280 - 284 CALCILUTITE; YELLOWISH GRAY TO VERY LIGHT GRAY; INTERGRANULAR;
GRAIN TYPE: BIOGENIC;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CLAY-20%, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY;
FOSSILS: FOSSIL MOLDS;

284 - 289.3 CALCARENITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, MOLDIC,
POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %;
OTHER FEATURES: CALCAREOUS, REEFAL, MEDIUM RECRYSTALLIZATION, COQUINA, GRANULAR;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS, SPICULES, MOLLUSKS, CORAL;
COSKINOLINA FLORIDANA?, SORITES SP., DICTYOCONUS COOKEI?.

289.3- 294 CALCARENITE; YELLOWISH GRAY TO VERY LIGHT GRAY; INTERGRANULAR, MOLDIC, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %, CALCITE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, MEDIUM RECRYSTALLIZATION, GRANULAR;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS;

294 - 299 CALCARENITE; YELLOWISH GRAY; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
UNCONSOLIDATED;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %, CALCITE- %;
OTHER FEATURES: CALCAREOUS, REEFAL, MEDIUM RECRYSTALLIZATION, GRANULAR;
FOSSILS: FOSSIL FRAGMENTS, SPICULES;

299 - 319 CALCARENITE; YELLOWISH GRAY TO GRAYISH ORANGE PINK; INTERGRANULAR,
POSSIBLY HIGH PERMEABILITY, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE-45%, SILT- %, CLAY- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY, GRANULAR;
FOSSILS: FOSSIL MOLDS, MILIOLIDS, FOSSIL FRAGMENTS, BRYOZOA, MILIOLIDS;

319 - 320 CHERT; BROWNISH GRAY TO DARK GREENISH GRAY; NOT OBSERVED; GOOD INDURATION;
CEMENT TYPE(S): SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
OTHER FEATURES: HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

320 - 324 CALCARENITE; GRAYISH ORANGE PINK TO YELLOWISH GRAY; INTERGRANULAR, MOLDIC;
GRAIN TYPE: CALCILUTITE;
UNCONSOLIDATED;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE-40%, QUARTZ SAND- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY, LOW RECRYSTALLIZATION;

324 - 329 CALCILUTITE; GRAYISH ORANGE PINK TO YELLOWISH GRAY; INTERGRANULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: LIMESTONE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY, LOW RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS;

329 - 339 CALCARENITE; YELLOWISH GRAY; INTERGRANULAR, MOLDIC;
GRAIN TYPE: CALCILUTITE;
UNCONSOLIDATED;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE-40%, QUARTZ SAND- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY, LOW RECRYSTALLIZATION, GRANULAR;

339 - 344 CALCARENITE; YELLOWISH GRAY TO BLACK; INTERGRANULAR, MOLDIC, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE- %, CHERT- %;
OTHER FEATURES: CALCAREOUS, LOW RECRYSTALLIZATION, GRANULAR;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS, MOLLUSKS;
CHERT LENS (339-339.2'), SORITES SP.

344 - 354 CALCARENITE; GRAYISH ORANGE PINK TO PINKISH GRAY; INTERGRANULAR, MOLDIC, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE- %, SILT- %;
OTHER FEATURES: CALCAREOUS, LOW RECRYSTALLIZATION, WEATHERED, PARTINGS, GRANULAR;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS, SPICULES;

354 - 359 CALCILUTITE; YELLOWISH GRAY TO PINKISH GRAY; INTERGRANULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: LIMESTONE- %, SILT- %, CLAY- %;
OTHER FEATURES: CALCAREOUS, LOW RECRYSTALLIZATION, WEATHERED;
FOSSILS: FOSSIL FRAGMENTS;

359 - 374.3 CALCARENITE; YELLOWISH GRAY TO LIGHT BROWN; INTERGRANULAR, FRACTURE,
POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE-30%;
OTHER FEATURES: CALCAREOUS, WEATHERED, LOW RECRYSTALLIZATION, GRANULAR;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS;

374.3- 379 CLAY; YELLOWISH GRAY TO DARK GREENISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE-40%, SILT- %;
OTHER FEATURES: CALCAREOUS, PLASTIC, WEATHERED, CHALKY;
FOSSILS: NO FOSSILS;
DK GREENISH GRAY CLAY LENSES.

379 - 381 CALCARENITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE-30%, CLAY-20%, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY, GRANULAR;
FOSSILS: FOSSIL FRAGMENTS;

381 - 383.6 CLAY; YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY; POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE-40%, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, PLASTIC, CHALKY;
FOSSILS: NO FOSSILS;

383.6- 391 CALCARENITE; YELLOWISH GRAY TO MODERATE PINK; INTERGRANULAR, PIN POINT VUGS;
GRAIN TYPE: CALCILUTITE, BIOGENIC;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE-35%, SILT- %;
OTHER FEATURES: WEATHERED, CALCAREOUS, GRANULAR;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS;

391 - 393.3 CLAY; LIGHT OLIVE; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, STREAKED,
ACCESSORY MINERALS: CALCILUTITE-40%;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY;
FOSSILS: ORGANICS;

393.3- 394.5 CALCILUTITE; MODERATE GREEN TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: CALCILUTITE, BIOGENIC;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CLAY- %, DOLOMITE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS;

394.5- 399 CLAY; LIGHT GRAYISH GREEN TO DARK GREEN; INTERGRANULAR, LOW PERMEABILITY; POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %;
OTHER FEATURES: CALCAREOUS, CHALKY, PLASTIC;
FOSSILS: ORGANICS;

399 - 399.2 CALCILUTITE; LIGHT OLIVE GRAY; INTERGRANULAR, LOW PERMEABILITY, MOLDIC;
GRAIN TYPE: CALCILUTITE, BIOGENIC;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CLAY- %;
OTHER FEATURES: CALCAREOUS, WEATHERED;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS;

399.2- 400 CLAY; LIGHT GRAYISH GREEN TO MODERATE YELLOWISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %;
OTHER FEATURES: CALCAREOUS, PLASTIC, CHALKY;
FOSSILS: NO FOSSILS;

400 - 402 CALCARENITE; YELLOWISH GRAY TO DARK YELLOWISH BROWN; INTERGRANULAR, MOLDIC;
GRAIN TYPE: CALCILUTITE, BIOGENIC;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %, CLAY- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, GRANULAR;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS;

402 - 403 CLAY; MODERATE YELLOWISH GREEN TO YELLOWISH GRAY; 37% POROSITY, INTERGRANULAR,
LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %;
OTHER FEATURES: CALCAREOUS, PLASTIC, CHALKY;
FOSSILS: NO FOSSILS;

403 - 413.6 CALCARENITE; YELLOWISH GRAY TO LIGHT OLIVE; INTERGRANULAR, MOLDIC,
POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: CALCILUTITE, BIOGENIC, SKELETAL;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %, CLAY- %, DOLOMITE- %, PHOSPHATIC GRAVEL- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, GRANULAR, MEDIUM RECRYSTALLIZATION, COQUINA;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS, ORGANICS, SPICULES, MILIOLIDS;

413.6- 414 CLAY; LIGHT GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY; POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %;
OTHER FEATURES: CALCAREOUS, PLASTIC, CHALKY;
FOSSILS: NO FOSSILS;

414 - 419 CALCARENITE; YELLOWISH GRAY TO LIGHT OLIVE GRAY; INTERGRANULAR, PIN POINT VUGS, MOLDIC;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE-45%, CLAY-10%;
OTHER FEATURES: CALCAREOUS, GRANULAR;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS;

419 - 419 AS ABOVE
CALCILUTITIC CLAY LENSES (422.5-422.7' AND 423.9-424').

419 - 431 CALCILUTITE; YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: BEDDED,
ACCESSORY MINERALS: LIMESTONE-20%, CLAY-08%;
OTHER FEATURES: CHALKY, CALCAREOUS, PARTINGS;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS;

431 - 433 CLAY; YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE-45%;
OTHER FEATURES: CHALKY, CALCAREOUS, PLASTIC;
FOSSILS: NO FOSSILS;

433 - 439.2 CALCARENITE; YELLOWISH GRAY; INTERGRANULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CLAY-45%, CALCILUTITE- %;
OTHER FEATURES: CHALKY, CALCAREOUS;
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS;

439.2- 444 CLAY; YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY; POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE-30%, SILT- %;
OTHER FEATURES: CHALKY, CALCAREOUS, PLASTIC;
FOSSILS: NO FOSSILS;

444 - 449 CALCARENITE; YELLOWISH GRAY TO LIGHT BROWN; INTERGRANULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE-45%;
OTHER FEATURES: WEATHERED, CALCAREOUS, CHALKY;
FOSSILS: FOSSIL FRAGMENTS, BENTHIC FORAMINIFERA;

449 - 457.5 CALCARENITE; YELLOWISH GRAY; INTERGRANULAR, VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE-30%;
OTHER FEATURES: WEATHERED, CALCAREOUS, CHALKY;
FOSSILS: FOSSIL FRAGMENTS, MILIOLIDS, CONES, FOSSIL MOLDS, BENTHIC FORAMINIFERA;
TOP OF OCALA GROUP (CRYSTAL RIVER FM. 457.5').

457.5- 464 CALCARENITE; YELLOWISH GRAY; INTERGRANULAR, VUGULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE-20%;
OTHER FEATURES: CALCAREOUS, WEATHERED, COQUINA;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS, MILIOLIDS, SPICULES, BENTHIC FORAMINIFERA;
CRYSTALLIZED FOSSILS; GYPSINA GLOBIA, LEPIDOCYCLINA, MOLLUSKS.

464 - 467 CALCILUTITE; YELLOWISH GRAY; INTERGRANULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE,
ACCESSORY MINERALS: CLAY-30%, SILT- %, LIMESTONE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY;
FOSSILS: FOSSIL FRAGMENTS;

467 - 469 CLAY; YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, INTERBEDDED,
ACCESSORY MINERALS: CALCILUTITE-45%;
OTHER FEATURES: CALCAREOUS, CHALKY, PLASTIC;
FOSSILS: NO FOSSILS;

469 - 479 CALCILUTITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE,
ACCESSORY MINERALS: CLAY-20%, LIMESTONE- %, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY, PARTINGS;
FOSSILS: CORAL, FOSSIL MOLDS;

479 - 484 CLAY; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, INTERBEDDED,
ACCESSORY MINERALS: CALCILUTITE-40%;
OTHER FEATURES: CALCAREOUS, CHALKY, PLASTIC;
FOSSILS: NO FOSSILS;

484 - 489 CALCILUTITE; YELLOWISH GRAY; INTERGRANULAR, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
UNCONSOLIDATED;
SEDIMENTARY STRUCTURES: MASSIVE,
ACCESSORY MINERALS: LIMESTONE-30%;
OTHER FEATURES: CALCAREOUS, CHALKY;
FOSSILS: FOSSIL FRAGMENTS, BENTHIC FORAMINIFERA;

489 - 499 CALCILUTITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, VUGULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: LIMESTONE-45%, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY, PARTINGS;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS, BENTHIC FORAMINIFERA;
LEPIDOCYCLINA, TURRITELLA MOLDS, NUMMULITES (CRYSTALLIZED).

499 - 510 CALCILUTITE; YELLOWISH GRAY; INTERGRANULAR, VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: LIMESTONE-45%, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY, PARTINGS;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS, BENTHIC FORAMINIFERA, MOLLUSKS;
NUMMULITES, LEPIDOCYCLINA.

510 - 519.6 CALCILUTITE; YELLOWISH GRAY TO VERY LIGHT ORANGE; INTERGRANULAR, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: LIMESTONE-30%, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS, BENTHIC FORAMINIFERA, MOLLUSKS;
LEPIDOCYCLINA, MOLLUSKS (CRYSTALLIZED).

519.6- 524 CALCILUTITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: LIMESTONE- %, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED;
FOSSILS: FOSSIL FRAGMENTS;

524 - 531 CALCILUTITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: LIMESTONE- %, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, PARTINGS;
FOSSILS: FOSSIL FRAGMENTS, BENTHIC FORAMINIFERA;

531 - 533 CALCILUTITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR;
GRAIN TYPE: CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CLAY- %, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, PLASTIC;
FOSSILS: NO FOSSILS;

533 - 539 CALCILUTITE; YELLOWISH GRAY; INTERGRANULAR, VUGULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY;
FOSSILS: FOSSIL MOLDS, BENTHIC FORAMINIFERA;
LEPIDOCYCLINA AND NUMMULITES SP.

539 - 552 CALCARENITE; YELLOWISH GRAY; INTERGRANULAR, VUGULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE-30%;
OTHER FEATURES: CALCAREOUS, WEATHERED;
FOSSILS: FOSSIL FRAGMENTS, BENTHIC FORAMINIFERA;
FORAM HASH (ALTERED)(548-549'); LEPIDOCYCLINA, NUMMULITES SP. OPERCULINOIDES SP.

552 - 554 CALCILUTITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS;

554 - 564 CALCARENITE; VERY LIGHT ORANGE TO YELLOWISH GRAY; INTERGRANULAR, VUGULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE-30%;
OTHER FEATURES: CALCAREOUS, WEATHERED;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, ECHINOID;
CASSIDULUS ERICSONI?, LEPIDOCYCLINA, OPERCULINOIDES, NUMMULITES SP.

564 - 584.2 CALCARENITE; VERY LIGHT ORANGE TO YELLOWISH GRAY; INTERGRANULAR, VUGULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE-40%, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS;

584.2- 588 CLAY; YELLOWISH GRAY TO LIGHT GRAYISH GREEN; INTERGRANULAR; MODERATE INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE-45%, SILT- %;
OTHER FEATURES: CALCAREOUS, PLASTIC, CHALKY;
FOSSILS: NO FOSSILS;

588 - 589.5 CALCILUTITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR;
GRAIN TYPE: CALCILUTITE, BIOGENIC;
POOR INDURATION;
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CLAY- %, SILT- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS;

589.5- 591 CLAY; YELLOWISH GRAY TO LIGHT GRAYISH GREEN; INTERGRANULAR; MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE-45%, SILT- %;
OTHER FEATURES: CALCAREOUS, PLASTIC, CHALKY;
FOSSILS: NO FOSSILS;

591 - 593 CALCILUTITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, VUGULAR;
GRAIN TYPE: CALCILUTITE, BIOGENIC;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CLAY- %, SILT- %;
OTHER FEATURES: CALCAREOUS, CHALKY;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS;

593 - 601.5 CALCARENITE; LIGHT GRAY TO YELLOWISH GRAY; INTERGRANULAR, MOLDIC, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE- %, CALCITE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, SPECKLED, COQUINA, GRANULAR;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, FOSSIL MOLDS, ECHINOID, SPICULES;
MILLIOLIDS, GYPSINA GLOBULA, CASSIDULUS ERICSONI? LEPIDOCYCLINA, NUMMULITES,
OPERCULINOIDES SP.

601.5- 609 CALCARENITE; YELLOWISH GRAY TO VERY LIGHT ORANGE; INTERGRANULAR, MOLDIC, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE- %, CALCITE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, GRANULAR, COQUINA;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, FOSSIL MOLDS, MILIOLIDS;
OPERCULINOIDES, LEPIDOCYCLINA SP, GYPSINA GLOBULA.

609 - 624 CALCARENITE; VERY LIGHT ORANGE TO MODERATE ORANGE PINK; INTERGRANULAR, MOLDIC,
POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, GRANULAR, COQUINA, MEDIUM RECRYSTALLIZATION;
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, FOSSIL MOLDS, MILIOLIDS, SPICULES;

LEPEPIDOCYCLINA, OPERCULINOIDES SP, GYPSINA GLOBULA.

624 - 634 CALCARENITE; VERY LIGHT ORANGE TO MODERATE ORANGE PINK; INTERGRANULAR, MOLDIC,
POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE- %, CALCITE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, GRANULAR, COQUINA, MEDIUM RECRYSTALLIZATION;
FOSSILS: ECHINOID, FOSSIL FRAGMENTS, FOSSIL MOLDS, MILIOLIDS, ORGANICS;
ECHINOID (NEOLAGANUM DURHAMI?), LEPIDOCYCLINA SP. (ALTERED), ORGANICS.

634 - 638.7 CALCARENITE; VERY LIGHT ORANGE TO MODERATE ORANGE PINK; INTERGRANULAR, MOLDIC,
POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCILUTITE- %, CALCITE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, SUCROSIC, MEDIUM RECRYSTALLIZATION;
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, FOSSIL FRAGMENTS, ORGANICS;

638.7- 659 CALCILUTITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCITE- %, LIMESTONE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY;
FOSSILS: ECHINOID, FOSSIL FRAGMENTS, ORGANICS, BENTHIC FORAMINIFERA;
ECHINOIDS (NEOLAGANUM DURHAMI)?,LEPIDOCYCLINA SP. (ALTERED).

659 - 674 CALCILUTITE; YELLOWISH GRAY TO MODERATE ORANGE PINK; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED,
ACCESSORY MINERALS: CALCITE- %, LIMESTONE- %;
OTHER FEATURES: CALCAREOUS, WEATHERED, CHALKY;
FOSSILS: ECHINOID, FOSSIL FRAGMENTS, ORGANICS;

674 - 692.5 CALCILUTITE; YELLOWISH GRAY TO MODERATE ORANGE PINK; INTERGRANULAR, LOW PERMEABILITY, FRACTURE;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: MASSIVE, BEDDED, MOTTLED,
ACCESSORY MINERALS: LIMESTONE- %;
OTHER FEATURES: CALCAREOUS, CHALKY, PARTINGS;
FOSSILS: ECHINOID, FOSSIL FRAGMENTS, BENTHIC FORAMINIFERA;
OPERCULINOIDES, NUMMULITES SP, (NEOLAGANUM DURHAMI)?-CASTS (ALTERED).

692.5- 694 CALCILUTITE; YELLOWISH GRAY TO GRAYISH GREEN; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, CLAY MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, MOTTLED,
ACCESSORY MINERALS: LIMESTONE- %, CLAY- %;
OTHER FEATURES: CALCAREOUS, CHALKY;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS, ORGANICS;

694 - 695 CALCARENITE; LIGHT BROWN; INTERGRANULAR, MOLDIC, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
POOR INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, BIOTURBATED,
ACCESSORY MINERALS: CALCILUTITE- %, DOLOMITE- %;
OTHER FEATURES: CALCAREOUS, PARTINGS, COQUINA, GRANULAR, MEDIUM RECRYSTALLIZATION;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS, BENTHIC FORAMINIFERA;

695 - 697 CALCARENITE; VERY LIGHT ORANGE; INTERGRANULAR, VUGULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CALCILUTITE-40%, DOLOMITE- %, CLAY- %;
OTHER FEATURES: CALCAREOUS, PARTINGS, GRANULAR, MEDIUM RECRYSTALLIZATION, COQUINA;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS, ECHINOID;
ECHINOIDS- WEISBORDELLA CUBAE?, BASE OF OCALA GROUP- INGLIS FORMATION.

697 - 705.5 DOLOSTONE; MODERATE BROWN; INTERCRYSTALLINE, INTERGRANULAR, MOLDIC;
50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: VERY FINE TO MICROCRYSTALLINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: QUARTZ SAND- %;
OTHER FEATURES: DOLOMITIC, SUCROSIC, MEDIUM RECRYSTALLIZATION;
FOSSILS: ECHINOID, FOSSIL MOLDS;
AVON PK. FORMATION TOP 697', ECHINOID (NEOLAGANUM DALLI) ALTERED.

705.5- 710 CALCARENITE; VERY LIGHT ORANGE TO LIGHT BROWN; INTERGRANULAR, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, MOTTLED,
ACCESSORY MINERALS: CALCILUTITE- %, DOLOMITE- %;
OTHER FEATURES: DOLOMITIC, PARTINGS;
FOSSILS: ECHINOID, ORGANICS, FOSSIL FRAGMENTS;
NUMEROUS NEOLAGANUM DALLI CASTS AND MOLDS, ALTERED, CRYSTAL LINED.

710 - 713.7 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERGRANULAR, INTERCRYSTALLINE,
MOLDIC; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: VERY FINE TO MICROCRYSTALLINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
OTHER FEATURES: DOLOMITIC, SUCROSIC, MEDIUM RECRYSTALLIZATION;
FOSSILS: ECHINOID, FOSSIL MOLDS;

713.7- 724 CALCARENITE; VERY LIGHT ORANGE TO MODERATE ORANGE PINK; INTERGRANULAR, MOLDIC,
POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, LAMINATED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %, DOLOMITE- %;
OTHER FEATURES: PARTINGS, GRANULAR;
FOSSILS: ECHINOID, BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, FOSSIL MOLDS, ORGANICS;

724 - 726 CALCARENITE; VERY LIGHT ORANGE TO YELLOWISH GRAY; INTERGRANULAR, MOLDIC,
POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %;
OTHER FEATURES: GRANULAR;
FOSSILS: ECHINOID, FOSSIL MOLDS, FOSSIL FRAGMENTS, ORGANICS;
CRYSTAL LINED ECHINOID MOLDS.

726 - 727.3 CALCILUTITE; VERY LIGHT ORANGE TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: LIMESTONE- %, DOLOMITE- %;
OTHER FEATURES: CHALKY, WEATHERED, DOLOMITIC;

727.3- 730.5 CALCILUTITE; YELLOWISH GRAY TO LIGHT BROWN; INTERGRANULAR, LOW PERMEABILITY,
PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: LIMESTONE- %, DOLOMITE- %, CALCITE- %, QUARTZ SAND- %;
OTHER FEATURES: WEATHERED, DOLOMITIC, SUCROSIC, PARTINGS;
FOSSILS: FOSSIL FRAGMENTS;

730.5- 734 CALCILUTITE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, LAMINATED,
ACCESSORY MINERALS: LIMESTONE- %, CALCITE- %, QUARTZ SAND- %;
OTHER FEATURES: WEATHERED, DOLOMITIC, PARTINGS, CHALKY;
FOSSILS: FOSSIL FRAGMENTS;

734 - 738.6 DOLOSTONE; YELLOWISH GRAY TO LIGHT BROWN; INTERGRANULAR, LOW PERMEABILITY;
10-50% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: VERY FINE TO MICROCRYSTALLINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, MOTTLED, LAMINATED,
ACCESSORY MINERALS: CALCILUTITE-30%, QUARTZ SAND- %;
OTHER FEATURES: PARTINGS, DOLOMITIC, LOW RECRYSTALLIZATION;
FOSSILS: ECHINOID, FOSSIL MOLDS, FOSSIL FRAGMENTS;
ECHINOID MOLDS (NEOLAGANUM DALLI) LINED WITH SPAR. (CALCITE).

738.6- 739.4 DOLOSTONE; LIGHT BROWN TO LIGHT BROWN; INTERGRANULAR, LOW PERMEABILITY;
10-50% ALTERED; ANHEDRAL;
GRAIN SIZE: VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, LAMINATED,
ACCESSORY MINERALS: CALCILUTITE-45%, QUARTZ SAND- %;
OTHER FEATURES: DOLOMITIC, LOW RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

739.4- 744 DOLOSTONE; LIGHT BROWN TO VERY LIGHT ORANGE; INTERGRANULAR,
LOW PERMEABILITY; 10-50% ALTERED; ANHEDRAL;
GRAIN SIZE: VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, MOTTLED,
ACCESSORY MINERALS: CALCILUTITE-45%, CLAY- %;
OTHER FEATURES: DOLOMITIC, GRANULAR, PARTINGS;
FOSSILS: ECHINOID, FOSSIL MOLDS;
CLAY SEAM (744-744.1'), NEOLAGANUM DALLI-CRYSTALLIZED.

744 - 748.1 CALCARENITE; LIGHT BROWN TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY, MOLDIC;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, MOTTLED,
ACCESSORY MINERALS: DOLOMITE-45%;
OTHER FEATURES: DOLOMITIC, GRANULAR, PARTINGS;
FOSSILS: ECHINOID, FOSSIL MOLDS;

748.1- 751.4 CALCARENITE; YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: DOLOMITE-40%;
OTHER FEATURES: DOLOMITIC, PARTINGS;
FOSSILS: NO FOSSILS;

751.4- 752.8 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERGRANULAR, INTERCRYSTALLINE, PIN POINT VUGS;
50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, MOTTLED,
ACCESSORY MINERALS: CALCILUTITE-40%;
OTHER FEATURES: DOLOMITIC, SUCROSIC, PARTINGS;
FOSSILS: NO FOSSILS;

GRADES FROM GRANULAR TO A HARD, SUCROSIC, CRYSTALLINE DOLOMITE.

752.8- 754 DOLOSTONE; LIGHT BROWN TO DARK YELLOWISH BROWN; LOW PERMEABILITY,
INTERCRYSTALLINE; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, LAMINATED, MOTTLED,
ACCESSORY MINERALS: CALCILUTITE- %;
OTHER FEATURES: DOLOMITIC, SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

754 - 759 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERCRYSTALLINE, PIN POINT VUGS,
LOW PERMEABILITY; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, LAMINATED, MOTTLED,
ACCESSORY MINERALS: QUARTZ SAND- %;
OTHER FEATURES: DOLOMITIC, SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

759 - 766.8 DOLOSTONE; LIGHT BROWN TO DARK YELLOWISH BROWN; INTERCRYSTALLINE, FRACTURE,
LOW PERMEABILITY; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, LAMINATED, MOTTLED,
ACCESSORY MINERALS: QUARTZ SAND- %;
OTHER FEATURES: DOLOMITIC, SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: ORGANICS;
PIN-POINT VUGS, ORGANICS, SOME INTERGRANULAR POROSITY.

766.8- 771.2 CALCARENITE; VERY LIGHT ORANGE TO DARK YELLOWISH ORANGE; INTERGRANULAR, FRACTURE,
PIN POINT VUGS;
GRAIN TYPE: CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, LAMINATED,
ACCESSORY MINERALS: CALCILUTITE-20%, DOLOMITE-30%;
OTHER FEATURES: DOLOMITIC, LOW RECRYSTALLIZATION;
FOSSILS: ORGANICS;

771.2- 772.1 DOLOSTONE; GRAYISH BROWN; INTERCRYSTALLINE, PIN POINT VUGS, FRACTURE;
50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, LAMINATED,
ACCESSORY MINERALS: CALCILUTITE- %;
OTHER FEATURES: DOLOMITIC, SUCROSIC, MEDIUM RECRYSTALLIZATION;
FOSSILS: ORGANICS;
ORGANIC LAMINATIONS (ALGAL?).

772.1- 776.8 CALCARENITE; VERY LIGHT ORANGE TO YELLOWISH GRAY; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, LAMINATED,
ACCESSORY MINERALS: CALCILUTITE-20%, DOLOMITE-40%;
OTHER FEATURES: DOLOMITIC, LOW RECRYSTALLIZATION;
FOSSILS: ORGANICS, ECHINOID, FOSSIL MOLDS;
ORGANIC LAMINATIONS, GRADES TO A DOLOMITIC LS.

776.8- 779 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERCRYSTALLINE, LOW PERMEABILITY,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, MOTTLED,
ACCESSORY MINERALS: QUARTZ SAND- %;
OTHER FEATURES: DOLOMITIC, SUCROSIC, MEDIUM RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS, ECHINOID;

779 - 785.8 CALCARENITE; YELLOWISH GRAY TO LIGHT BROWN; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED,
ACCESSORY MINERALS: DOLOMITE- %, CALCITE- %;
OTHER FEATURES: DOLOMITIC;
FOSSILS: ORGANICS, ECHINOID, FOSSIL MOLDS, CONES, MILIOLIDS;
ALGAL-ORGANIC LAMINATIONS, COSKINOLINA FLORIDANA.

785.8- 788.1 DOLOSTONE; LIGHT BROWN TO LIGHT BROWN; INTERGRANULAR, LOW PERMEABILITY, PIN POINT VUGS;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CALCILUTITE- %, QUARTZ SAND- %;
OTHER FEATURES: SUCROSIC;
FOSSILS: ORGANICS;

788.1- 794.2 CALCARENITE; YELLOWISH GRAY TO LIGHT BROWN; INTERGRANULAR, LOW PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED, MASSIVE,
ACCESSORY MINERALS: DOLOMITE-40%, CALCILUTITE- %, CALCITE- %;
OTHER FEATURES: DOLOMITIC, LOW RECRYSTALLIZATION;
FOSSILS: ORGANICS, MILIOLIDS;
GRADES TO HIGHER % OF DOLOMITIC LS, CALCITE RHOMBS.

794.2- 795.6 DOLOSTONE; LIGHT BROWN TO LIGHT BROWN; INTERGRANULAR, PIN POINT VUGS,
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: CALCILUTITE- %, QUARTZ SAND- %;
OTHER FEATURES: SUCROSIC, MEDIUM RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

795.6- 803.2 CALCARENITE; YELLOWISH GRAY TO LIGHT BROWN; INTERGRANULAR;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, LAMINATED,
ACCESSORY MINERALS: DOLOMITE-40%, CALCITE- %, QUARTZ SAND- %;
OTHER FEATURES: DOLOMITIC, MEDIUM RECRYSTALLIZATION, PARTINGS;
FOSSILS: FOSSIL MOLDS, ECHINOID, BENTHIC FORAMINIFERA, CONES, MILIOLIDS;
COSKINOLINA FLORIDANA, ECHINOID MOLDS (CRYSTAL LINED), MILLIOLIDS.

803.2- 814 DOLOSTONE; LIGHT BROWN TO MODERATE YELLOWISH BROWN; INTERGRANULAR, PIN POINT VUGS,
INTERCRYSTALLINE; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: VERY FINE TO CRYPTOCRYSTALLINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: MASSIVE,
ACCESSORY MINERALS: QUARTZ SAND- %;
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS;
ECHINOID MOLDS(CRYSTAL LINED); FRACTURE POROSITY.

814 - 819 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERGRANULAR, PIN POINT VUGS,
FRACTURE; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
ACCESSORY MINERALS: QUARTZ SAND- %;
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS;
ECHINOID MOLDS. PERMEABLE.

819 - 824 DOLOSTONE; LIGHT BROWN; INTERGRANULAR, PIN POINT VUGS; 50-90% ALTERED;
SUBHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS;

824 - 828.5 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERCRYSTALLINE, PIN POINT VUGS,
FRACTURE; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, INTERBEDDED,
ACCESSORY MINERALS: LIMESTONE- %, QUARTZ SAND- %;
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS, ORGANICS;
INTERBEDDED DOLOMITIC LS AND FRACTURED, SUCROSIC DOLOSTONE.

828.5- 833.5 DOLOSTONE; DARK YELLOWISH BROWN TO MODERATE BROWN; INTERCRYSTALLINE, PIN POINT VUGS, FRACTURE; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, MOTTLED,
ACCESSORY MINERALS: QUARTZ SAND- %;
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

833.5- 838.5 DOLOSTONE; MODERATE BROWN TO GRAYISH BROWN; INTERCRYSTALLINE, PIN POINT VUGS, FRACTURE; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, LAMINATED, MOTTLED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS;

838.5- 843.5 DOLOSTONE; MODERATE BROWN TO MODERATE BROWN; INTERCRYSTALLINE, PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, LAMINATED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS, ECHINOID;

843.5- 848.5 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERCRYSTALLINE, PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, LAMINATED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: ORGANICS, FOSSIL MOLDS;

848.5- 853.5 DOLOSTONE; MODERATE BROWN TO DARK YELLOWISH BROWN; INTERCRYSTALLINE, FRACTURE, PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, LAMINATED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS;

853.5- 863.5 DOLOSTONE; MODERATE BROWN TO MODERATE BROWN; INTERCRYSTALLINE, INTERGRANULAR,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: VERY FINE TO CRYPTOCRYSTALLINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, LAMINATED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS;

CARBONATE FILLED FRACTURED DOLOMITE, FOSSIL MOLDS ARE CRYSTAL LINED, ECHINOID MOLDS, VUGS,
HIGH INTRAGRANULAR CRYSTALLINE POROSITY.

863.5- 868 DOLOSTONE; MODERATE BROWN TO MODERATE BROWN; INTERCRYSTALLINE, VUGULAR,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS;

868 - 869.5 SILT-SIZED DOLOMITE; LIGHT BROWN; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY;
POOR INDURATION;
SEDIMENTARY STRUCTURES: INTERBEDDED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;
DOLOSILT-PARTIALLY FILLED CAVITY.

869.5- 873.5 DOLOSTONE; GRAYISH BROWN TO MODERATE BROWN; INTERCRYSTALLINE, FRACTURE,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS;

873.5- 885 DOLOSTONE; MODERATE BROWN TO MODERATE BROWN; INTERCRYSTALLINE, INTERGRANULAR,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: VERY FINE TO CRYPTOCRYSTALLINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

885 - 897 DOLOSTONE; DARK YELLOWISH BROWN TO MODERATE BROWN; INTERCRYSTALLINE, INTERGRANULAR,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: VERY FINE TO CRYPTOCRYSTALLINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

897 - 904 DOLOSTONE; DARK YELLOWISH BROWN TO MODERATE BROWN; INTERCRYSTALLINE, FRACTURE,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

904 - 907 DOLOSTONE; MODERATE BROWN TO MODERATE BROWN; INTERCRYSTALLINE, FRACTURE,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED,
ACCESSORY MINERALS: CLAY- %;
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;
SOME GRAYISH WHITE CLAY.

907 - 910 DOLOSTONE; MODERATE BROWN TO GRAYISH BROWN; INTERCRYSTALLINE, FRACTURE,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

910 - 915 DOLOSTONE; MODERATE BROWN TO MODERATE BROWN; INTERCRYSTALLINE, FRACTURE,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED, LAMINATED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: ORGANICS;

915 - 930 DOLOSTONE; DARK YELLOWISH BROWN TO MODERATE BROWN; INTERCRYSTALLINE, FRACTURE,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: ORGANICS;

930 - 940 DOLOSTONE; MODERATE BROWN TO MODERATE BROWN; INTERCRYSTALLINE, FRACTURE,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;
MOTTLED, FRACTURED, WEATHERED ON FRACTURE OR CAVITY SURFACES.

940 - 945 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERCRYSTALLINE, FRACTURE,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, SILICIC CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED, LAMINATED, BRECCIATED,
ACCESSORY MINERALS: QUARTZ- %;
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;
QTZ CRYSTALS, LAMINATED, WEATHERED CAVITY SURFACES, SECONDARY POROSITY.

945 - 953 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERCRYSTALLINE, FRACTURE,
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED, BRECCIATED, LAMINATED,
ACCESSORY MINERALS: CLAY- %;
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: ORGANICS;
GREENISH BLACK ORGANIC CLAY; PIN-POINT VUGS & POROSITY.

953 - 960 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERCRYSTALLINE, FRACTURE,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

960 - 970 DOLOSTONE; MODERATE BROWN TO MODERATE BROWN; INTERCRYSTALLINE,
LOW PERMEABILITY; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

970 - 975 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERCRYSTALLINE,
LOW PERMEABILITY; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

975 - 982 DOLOSTONE; MODERATE BROWN TO MODERATE BROWN; INTERCRYSTALLINE, LOW PERMEABILITY,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: CRYPTOCRYSTALLINE; RANGE: MICROCRYSTALLINE TO CRYPTOCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: BEDDED, MASSIVE, MOTTLED,
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;
LOW POROSITY AND PERM. (953-982'), VERY HARD.

982 - 985 LIMESTONE; GRAYISH ORANGE PINK TO YELLOWISH GRAY; INTERGRANULAR, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: CLAY- %, DOLOMITE-45%, SILT- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC;
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS;
SOME STICKY GRAYISH YELLOW GREEN CLAY; DK BRN DOLOMITE.

985 - 1000 LIMESTONE; MODERATE ORANGE PINK TO YELLOWISH GRAY; INTERGRANULAR, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED,
ACCESSORY MINERALS: DOLOMITE-30%, QUARTZ SAND- %, CALCITE- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC;
FOSSILS: ORGANICS, FOSSIL FRAGMENTS, FOSSIL MOLDS;
SOME MODERATE BROWN SUCROSIC DOLOMITE, MOLLUSK MOLDS, ORGANICS, CALCITE.

1000 - 1020 LIMESTONE; MODERATE ORANGE PINK TO YELLOWISH GRAY; INTERGRANULAR, PIN POINT VUGS, POSSIBLY HIGH PERMEABILITY;
GRAIN TYPE: BIOGENIC, CALCILUTITE, SKELETAL;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED,
ACCESSORY MINERALS: DOLOMITE-30%, CALCITE- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC;
FOSSILS: ORGANICS, FOSSIL FRAGMENTS, FOSSIL MOLDS;

1020 - 1045 LIMESTONE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: DOLOMITE-30%, CALCITE- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC;
FOSSILS: FOSSIL MOLDS, ORGANICS;

1045 - 1050 LIMESTONE; YELLOWISH GRAY TO LIGHT GRAYISH GREEN; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: DOLOMITE-30%, CLAY- %, SILT- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC;
FOSSILS: FOSSIL MOLDS;

GRAYISH YELLOW GREEN CLAY SEAM, SOME MOLDIC POROSITY, CALCITE CRYSTALS.

1050 - 1080 LIMESTONE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY, PIN POINT VUGS;
GRAIN TYPE: CALCILUTITE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED,
ACCESSORY MINERALS: DOLOMITE-30%, CLAY- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC;
FOSSILS: NO FOSSILS;
DK-MODERATE BROWN SUCROSIC DOLOMITE SEAMS, OCCASIONALLY MOTTLED.

1080 - 1090 LIMESTONE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, POSSIBLY HIGH PERMEABILITY, PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
ACCESSORY MINERALS: DOLOMITE-30%;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC;
FOSSILS: FOSSIL MOLDS, ORGANICS;
DK BROWN-MODERATE BRN SUCROSIC DOLOMITE SEAMS, ORGANICS.

1090 - 1095 DOLOSTONE; YELLOWISH GRAY TO LIGHT BROWN; INTERGRANULAR, INTERCRYSTALLINE, LOW PERMEABILITY; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: VERY FINE TO MICROCRYSTALLINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, LAMINATED,
ACCESSORY MINERALS: CLAY- %, LIMESTONE-30%;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, SUCROSIC;
FOSSILS: ORGANICS;
LAMINATED, ORGANICS, CRYSTALLINE, DK BRN SUCROSIC DOLOMITE.

1095 - 1110 LIMESTONE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, PIN POINT VUGS, INTERCRYSTALLINE;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: DOLOMITE-20%;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION;
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS;
SOME DK-MODERATE BROWN SUCROSIC DOLOMITE LENSES.

1110 - 1125 DOLOSTONE; LIGHT BROWN TO YELLOWISH GRAY; INTERGRANULAR, PIN POINT VUGS, INTERCRYSTALLINE; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: VERY FINE TO MICROCRYSTALLINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: LIMESTONE-30%;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, SUCROSIC;
FOSSILS: FOSSIL FRAGMENTS;
SOME YELLOWISH GRAY DOLOMITIC LS WITH PIN-POINT VUGS; DK BROWN-MODERATE BROWN SUCROSIC DOLOMITE SEAMS.

1125 - 1135 DOLOSTONE; LIGHT BROWN TO YELLOWISH GRAY; INTERCRYSTALLINE, PIN POINT VUGS, INTERGRANULAR;
50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, BRECCIATED, MOTTLED,
ACCESSORY MINERALS: LIMESTONE-20%, ANHYDRITE- %;
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC;
FOSSILS: ORGANICS;
SPARSE ANHYDRITE, ORGANICS; SOME INTERCLASTS (BRECCIATED APPEAREANCE.)

1135 - 1145 DOLOSTONE; YELLOWISH GRAY TO DARK YELLOWISH BROWN; INTERCRYSTALLINE, INTERGRANULAR,
PIN POINT VUGS; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: VERY FINE TO MICROCRYSTALLINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: LIMESTONE-40%;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, HIGH RECRYSTALLIZATION, SUCROSIC;
FOSSILS: NO FOSSILS;
INTERBEDDED DOLOMITIC LS; DK BROWN-MODERATE BROWN SUCROSIC DOLOMITE SEAMS.

1145 - 1160 LIMESTONE; MODERATE BROWN TO YELLOWISH GRAY; INTERCRYSTALLINE, INTERGRANULAR,
PIN POINT VUGS;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, ANHYDRITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, LAMINATED,
ACCESSORY MINERALS: DOLOMITE-45%, ANHYDRITE- %, CLAY- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION;
FOSSILS: FOSSIL MOLDS, ORGANICS;
INTERBEDDED, DK-MODERATE BROWN DOLOMITE SEAMS; ORGANICS; SPARSE ANHYDRITE, LT GRAY
CALCAREOUS CLAY, DOLOMITE CRYSTALS?.

1160 - 1165 DOLOSTONE; DARK YELLOWISH BROWN TO DARK YELLOWISH BROWN; INTERCRYSTALLINE,
INTERGRANULAR; 90-100% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, LAMINATED,
ACCESSORY MINERALS: LIMESTONE-30%, CLAY- %, GYPSUM- %;
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC;
FOSSILS: NO FOSSILS;
YELLOWISH GRAY LS, ANYHDRITE, DOLOMITE CRYSTALS-RHOMBS.

1165 - 1180 LIMESTONE; YELLOWISH GRAY; INTERGRANULAR, PIN POINT VUGS, INTERCRYSTALLINE;
GRAIN TYPE: BIOGENIC, CALCILUTITE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, ANHYDRITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE, LAMINATED,
ACCESSORY MINERALS: DOLOMITE-30%, ANHYDRITE- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION;
FOSSILS: CONES;
DOLOMITE CRYSTALS, ANHYDRITE, SOME DK BROWN-MODERATE BROWN SUCROSIC DOLOMITE, FORAM: DICTYOCONUS COOKEI OR AMERICANUS?.

1180 - 1190 LIMESTONE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, PIN POINT VUGS, INTERCRYSTALLINE;
GRAIN TYPE: CALCILUTITE, BIOGENIC;
MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, ANHYDRITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: DOLOMITE-30%, ANHYDRITE-10%;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION;
FOSSILS: CONES;

1190 - 1195 LIMESTONE; LIGHT BROWN TO YELLOWISH GRAY; INTERGRANULAR, PIN POINT VUGS, INTERCRYSTALLINE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, ANHYDRITE CEMENT, CALCILUTITE MATRIX;
ACCESSORY MINERALS: DOLOMITE-30%, ANHYDRITE- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

1195 - 1200 LIMESTONE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERGRANULAR, PIN POINT VUGS, VUGULAR;
GRAIN TYPE: CALCILUTITE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, ANHYDRITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: DOLOMITE-30%, ANHYDRITE- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION;
FOSSILS: CONES;

1200 - 1205 DOLOSTONE; LIGHT BROWN TO DARK YELLOWISH BROWN; INTERCRYSTALLINE, INTERGRANULAR; 50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: LIMESTONE-45%;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION;
FOSSILS: NO FOSSILS;

1205 - 1220 LIMESTONE; LIGHT BROWN TO YELLOWISH GRAY; INTERCRYSTALLINE, INTERGRANULAR, PIN POINT VUGS;
GRAIN TYPE: CALCILUTITE, BIOGENIC;
MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: LIMESTONE-45%;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, SUCROSIC;
FOSSILS: FOSSIL MOLDS;
MODERATE BROWN SUCROSIC DOLOMITE LENSES.

1220 - 1225 DOLOSTONE; LIGHT BROWN TO MODERATE BROWN; INTERCRYSTALLINE; 50-90% ALTERED;
SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: LIMESTONE-20%, LIMESTONE- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, SUCROSIC;
FOSSILS: NO FOSSILS;

1225 - 1230 DOLOSTONE; LIGHT BROWN TO YELLOWISH GRAY; INTERCRYSTALLINE, INTERGRANULAR, PIN POINT VUGS;
50-90% ALTERED; SUBHEDRAL;
GRAIN SIZE: MICROCRYSTALLINE; RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE;
GOOD INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: LIMESTONE-45%, ANHYDRITE- %;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, SUCROSIC;
FOSSILS: CONES;
DICTYOCONUS AMERICANUS? DICTYOCONUS COOKEI.

1230 - 1260 LIMESTONE; YELLOWISH GRAY TO YELLOWISH GRAY; INTERCRYSTALLINE, INTERGRANULAR,
PIN POINT VUGS;
GRAIN TYPE: CALCILUTITE;
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION;
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX;
SEDIMENTARY STRUCTURES: INTERBEDDED, MASSIVE,
ACCESSORY MINERALS: ANHYDRITE- %, CLAY- %, DOLOMITE-45%;
OTHER FEATURES: MEDIUM RECRYSTALLIZATION;
FOSSILS: CONES, ECHINOID;
SOME INTERBEDDED ANHYDRITE, DK BROWN-MODERATE BRN SUCROSIC DOLOMITE SEAMS.

1260 TOTAL DEPTH