November 1, 1984 J. L. Decker

Executive Summary
TR14-2 "Amberlea Park"
S25, T28S, R15E

I. General Description

The TR14-2 well site is located in the Amberlea Park, adjacent to Amberlea Drive in Dunedin, Pinellas County, Florida. Amberlea Drive is approximately .5 mile north of S.R. 580 and off C.R. 1. The site is approximately 1 mile west of U.S. 19 South and approximately 2 miles east of the Gulf of Mexico. TR14-2 is in the SW 1/4 of the SE 1/4 of the NW 1/4, Section 25, Township 28 South, Range 15 East at latitude 28°01'32", longitude 82°45'28".

II. Site Easement

TR14-2 includes both a perpetual and a temporary construction easement for the purpose of drilling, modifying, and maintaining an existing well which was formally owned by the City of Dunedin. Access to the site is from Amberlea Drive.

III. Reasons for the Monitor

The primary objectives for drilling and modifying the existing well at TR14-2 is to identify the depths, thicknesses and monitor the two zones (A & B) of high transmissivity located in Tampa, upper Suwannee Formation and the upper Ocala Group (Crystal River Formation). Other objectives include: determination of the extent of upconing of saline waters, measuring differences in hydraulic head between the transmissive zones (A & B), collecting water quality and potentiometric surface water level data, describing lithology and identifying geologic formation boundaries.

IV. Geology

The TR14-2 well site is located on the Penholoway terrace, a part of the Gulf Coastal Lowlands, a division of the Coastal Plain Province. The elevation at this site is approximately 55' above MSL. Core samples indicate that consistent limestone is 66' below LSD. Two permeable zones, comprising of limestone (Zone A) and dolomite (Zone B), were identified at TR14-2. Zone A is found in the Hawthorn-Tampa Formation, while Zone B is located in the lower Suwannee-upper Crystal River Formation.

The Undifferentiated Sand Deposits, Hawthorn, Tampa, Suwannee, Crystal River Formations are described below:

Borehole Depth (ft. below LSD)	Rock Unit
LSD - 23'	Surficial Sand Formation = quartz sand - tan, dark brown, light gray - light greenish gray, very fine to fine grained, moderate - poorly sorted; bottom of section is slightly clayey with bluish-gray-black phosphatic pebbles, quartz pebbles; high-moderate porosity.

II.A

23' - 66.2'	Hawthorn Formation = clay - light gray, light greenish gray to off white, marly, sticky, organics; limestone - cream, tan; slightly dolomitic fossiliferous micrite; bluish gray - black phosphate at top of section; low porosity.
66.2' - 249.7'	Tampa Formation = limestone - cream, tan-tannish gray, fossiliferous biomicrite, chalky, sandy clay in part, some light green clayey seams; occasionally seams of dolomitic limestone; dolostone near the base of section - light bluish gray; low to high porosity.
249.7' - 410.8'	Suwannee Formation = limestone - biomicrite, light tan, tannish gray, light brown, often chalky, friable and millioloidal; some lignitic and clay seams; fossiliferous - echinoids (Cassidulus), foraminifera (Coskinolina floridana, Dictyoconus cookei); dolostone - tan, light-dark brown, light tannish gray, microcrystalline - sucrosic, fossiliferous; low - high porosity.
410.8' - 461'	Crystal River Formation (Ocala Group) = Limestone - biomicrite, cream - light tan - light tannish gray, echinoids, pelecypods - molds and casts (Chione), gastropods - molds and casts; low - high porosity; clay - light to dark brown, waxy, very low porosity; dolostone - tan, light brown - dark brown; fossiliferous; moderate - high porosity.

The contacts between the above formations are probably unconformable, which indicates an hiatus of deposition and probable erosion.

Pinellas County is on the southwest flank of a subsurface structure called the Peninsular Arch. There appears to be fracture patterns in the northern part of Pinellas County. Some evidence in the cores retrieved from TR14-2 indicate fracturing in the rock material.

V. Geohydrology

Two aquifers, identified at the TR14-2 well site, are the surficial and Floridan.

Results from coring indicate that the surficial aquifer extends from LSD to 23' below LSD. Porosity and permeability ranged from high near land surface to moderate (sandy clay) near the bottom of the Surficial Sand Formation. From 23' to 66.2' below LSD, the Hawthorn Formation, consisting of primarily clay deposits, acts as a confiner with low porosity between the Surficial Sand Formation and the Floridan aquifer. The surficial aquifer and confiner (Hawthorn Formation) are cased off in the existing well.

Consistent Limestone (top of the Tampa Formation) was encountered at 66.2' below LSD. Most of the Tampa Formation, to a depth of approximately 250' below LSD, is variable as to porosity and permeability. The top of the Tampa Formation corresponds to the top of the Floridan aquifer. Core results indicated porosity and most likely permeability to be moderate to high from

250' to 303' below LSD. Two zones from 314' to 324' and 351' - 374' below LSD were also moderate to high in porosity. It is likely that the Tampa Formation and the upper Suwannee Formation can be identified as the first permeable zone (250' - 374') in the Floridan Aquifer. The base of the lowermost producing interval, 351' - 374' below LSD, will most likely show a relative increase in gamma-ray activity. The other intervals found in the Suwannee Formation are low to moderate in porosity and probably constitute semi-confining beds.

The second permeable zone is located near the base of the Suwannee Formation. A zone of dolostone from 402.7' to 410.8' below LSD is a fairly impermeable zone. Water quality changes also verify the possibility of a confiner here instead of a second permeable zone. An interval of dolostone between 452' - 456' (near the top of the Ocala Group) does have moderate to high porosity and presumably high permeability. Both of these intervals showed a relatively high electrical resistivity on the electric log. Both of the intervals are less than the reported thickness range of 50' - 75' for the second permeable zone. Average porosity of the second permeable zone may be 28% or less. Transmissivity in this zone is usually less than the first permeable zone, unless cavities or highly fractured dolomites are encountered.

VI. Hydrology

Monitoring the first and second permeable zones were the primary objectives for modifying the existing well at the TR14-2 site. Other data: potentiometric surface levels, water quality and lithologic descriptions, and depths of formation contacts was collected at the TR14-2 site.

Potentiometric surface water levels ranged between 49' and 50' below LSD in the existing monitor well while being modified. Water levels while coring ranged from 25.3' to 49.81' below LSD. As the elevation at the well site is approximately 55' above MSL, the measurements indicated potentiometric water levels of 5' - 6' above MSL. The figures corresponded with prior data collected in the well site area.

The clay confiner in the Hawthorn Formation (23' - 66') appeared to affect water levels. A perched water table exists in the Surficial Sand Formation. Water level was measured at 4.6' below LSD. Between 74' and 104' water levels changed from 25.3' to 50.25' below LSD respectively.

Water quality degradation between 104' and 114' below LSD was noted early during coring operations. The fresh/saltwater interface was encountered at approximately 184' below LSD. Specific conductivity increased from 750 Umhos at 174' below LSD to 2650 Umhos at 184' below LSD. Chlorides increased from 121.5 mg/l to 710 mg/l, while sulfates increased from 14.2 mg/l to 78.2 mg/l at these respective depths. Water quality remained fairly constant from 184' to 219' below LSD. Between 224' and 294' below LSD, water quality degraded from 6800 Umhos to 12,500 Umhos. Chlorides increased from 1960 mg/l to 3750 mg/l and sulfates increased from 248.3 mg/l to 537 mg/l. Between 314' and 414' below LSD specific conductivity decreased. Conductivities ranged between 6,250 Umhos and 4,700 Umhos. Chlorides and sulfates also decreased with the decrease in specific conductivity. At a depth of 434', specific conductivity began to rise again (13,500 Umhos) and continued to increase until a high of 42,800 Umhos was recorded at 554' below LSD. Chlorides reached a

high of 16,438 mg/l, while sulfates increased to a level of 2, 612 mg/l at 604' below LSD. No specific conductivity was recorded at 604' below LSD. It is likely that the variation in water levels were in part due to density changes caused by saline water.

Water quality samples were again retrieved a year later in the modified monitor well. Specific conductivities at the 60', 140', 220', 390' and 456' depths were 3600, 3700, 9200, 27,000 and 33,100 Umhos respectively. Core hole water quality samples were always less than the thief samples collected in the existing modified monitor well until greater depths were attained. Upward migration of poorer water quality in the modified monitor well would be a factor to be considered as well as a possible mixing occurring during the collection process while coring. With some exceptions, higher temperatures appeared to correspond with higher saline waters.

Beds of moderate-high porosity limestone and dolomite were described in the core samples. In the upper 270' these beds correlated fairly well with geophysical logs. Porosity and presumably transmissivity was noted as being fairly high between (89'-102', 145'-148', 174'-179', 184'-186', 199'-201', 219'-302', 314'-324', 351'-374', 439'-441', 451'-456', 540'-544', 546'-579' and 582'-604' below LSD.)

There appears to be some channeling of saline water. From 94'-102', 174'-194' and 219'-302' below LSD, the limestone is moderate to high in porosity. Water quality degradation occurs within these zones. Poor quality water would either be channeled from Tampa Bay or the Gulf of Mexico. Yield increased during specific capacity tests conducted between 174'-194' and 219'-302' below LSD. Water quality degradation in these zones was quite substantial, verifying the channeling effect on water quality in Pinellas County.

A permeable zone of dolostone extends from 452' to 456' below LSD. The 400' to 410' interval appears to be more of a confiner than a transmissive zone. Water began to degrade rapidly soon after encountering the 450' depth. A bed of low porosity dolostone and clay (445'-452' below LSD appears to be a semi-confiner for poorer water quality below 452'. The bottom of the Tampa Formation (220'-250') and the top of the Suwannee Formation (250'-302') below LSD is moderate to high in porosity and likely to be a fairly high zone of permeable limestone.

A specific capacity pump test was conducted. Water level was measured at 49.95' below LSD. Pumping rate was approximately 73 gpm. Drawdown continued for approximately three (3) minutes until equilibrium was reached at 51.55' below LSD. Recovery time took approximately 3.5 minutes. It was determined that any further specific capacity test would be impractical unless a higher pumpage rate was initiated during the modification of the existing well.

VII. Well Construction

The existing well was deepened to 461' below LSD and modified. A shallow water monitor was also constructed on the TR14-2 site to a depth of 22' below LSD.

A. The existing well was 270' deep and consisted of 10" steel casing extending to a depth of 69' below LSD. A ten (10") nominal borehole was drilled to a depth of 461' below LSD. Twenty (20') feet of 4" diameter PVC well screen (0.30") from 440'-460' below LSD) was coupled to a 4" diameter PVC monitor tube (+3' to 440' below LSD) and inserted in the well. A 4" diameter monitor tube tail (460'-461' below LSD) was attached to the bottom of the screened interval to act as a sediment catch. The well's annulus from 461' to 431' below LSD was filled with 6-20 silica sand. The well was then cement grouted from 431' to 221' below LSD. Five (5') of 2" diameter PVC well screen (0.30") from 213'-218' below LSD) was coupled to a 2" diameter PVC monitor tube (+3' to 213') and inserted in the well. The well's annulus from 202'-221' below LSD was filled with 6-20 silica sand. A bentonite cement cap extends from 202' to 200' ft. below LSD. Open hole exists between 200' and the bottom of the casing at 69' below LSD.

B. The water table monitor was drilled to a depth of 22' below LSD. A 12" diameter nominal borehole accommodates a 3' section (18'-21') of 6" diameter slotted PVC well screen (.010") and 21' of 6" diameter PVC casing (+3' to 18' below LSD). The annulus was sand packed (6-20) to 2' below LSD. The borehole was then cement grouted to the surface. A one (1) foot tail section of 6" diameter PVC casing extends from 21'-11' below LSD to act as a sediment catch.

VIII. Geophysical Logs

Suites of geophysical logs were completed on the corehole and the existing monitor well (before and after the drilling to 461' below LSD). Caliper, gamma ray, electric (spontaneous potential, single point resistivity, 16" and 64" normal, deep focused resistivity, neutron (porosity), gamma gamma (density), accoustic velocity, temperature, fluid conductivity and resistivity logs were completed at the TR14-2 site.

Simplified Lithology

Borehole Depth (ft. below LSD)	Name of Rock Unit
LSD - 23'	Surficial Sand Formation
23' - 66.2'	Hawthorn Formation
66.2' - 249.7'	Tampa Formation
249.7' - 410.8'	Suwannee Formation
410.8' - 461' TD	Crystal River Formation (Ocala Group)

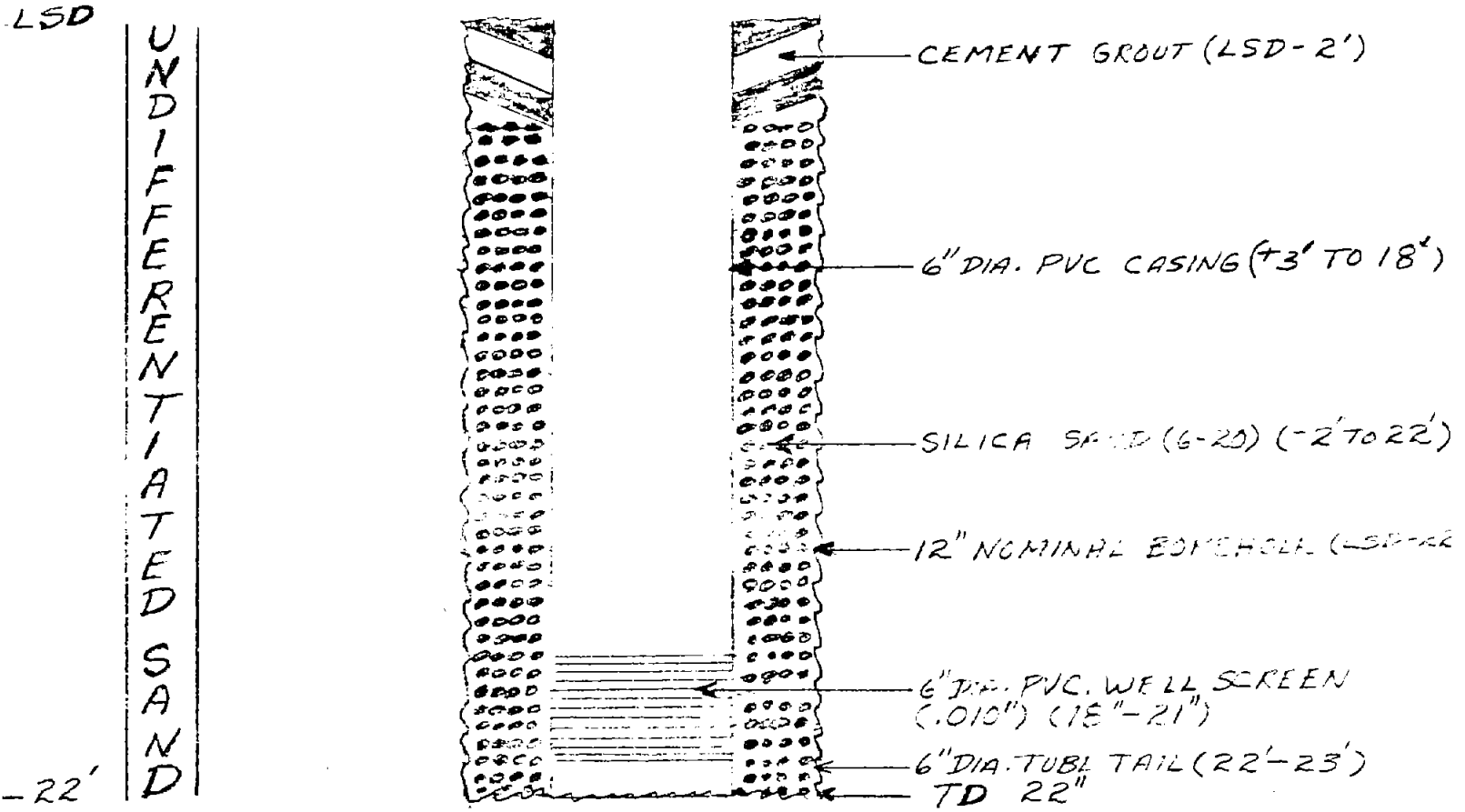
JLD:cwpmt

11-23-84

TR 14-2 "AMBERLEA PARK" J.L. DECKER

T. 28S, R. 15 E, S. 25

WATER TABLE MONITOR WELL - AS BUILT



II.B

7-14-81 G. H. New

TR 14-2 *Water Level Measurements

*Note these water levels are from land surface (l.s.d.). The approximate elevation at this site is 55' above m.s.l.

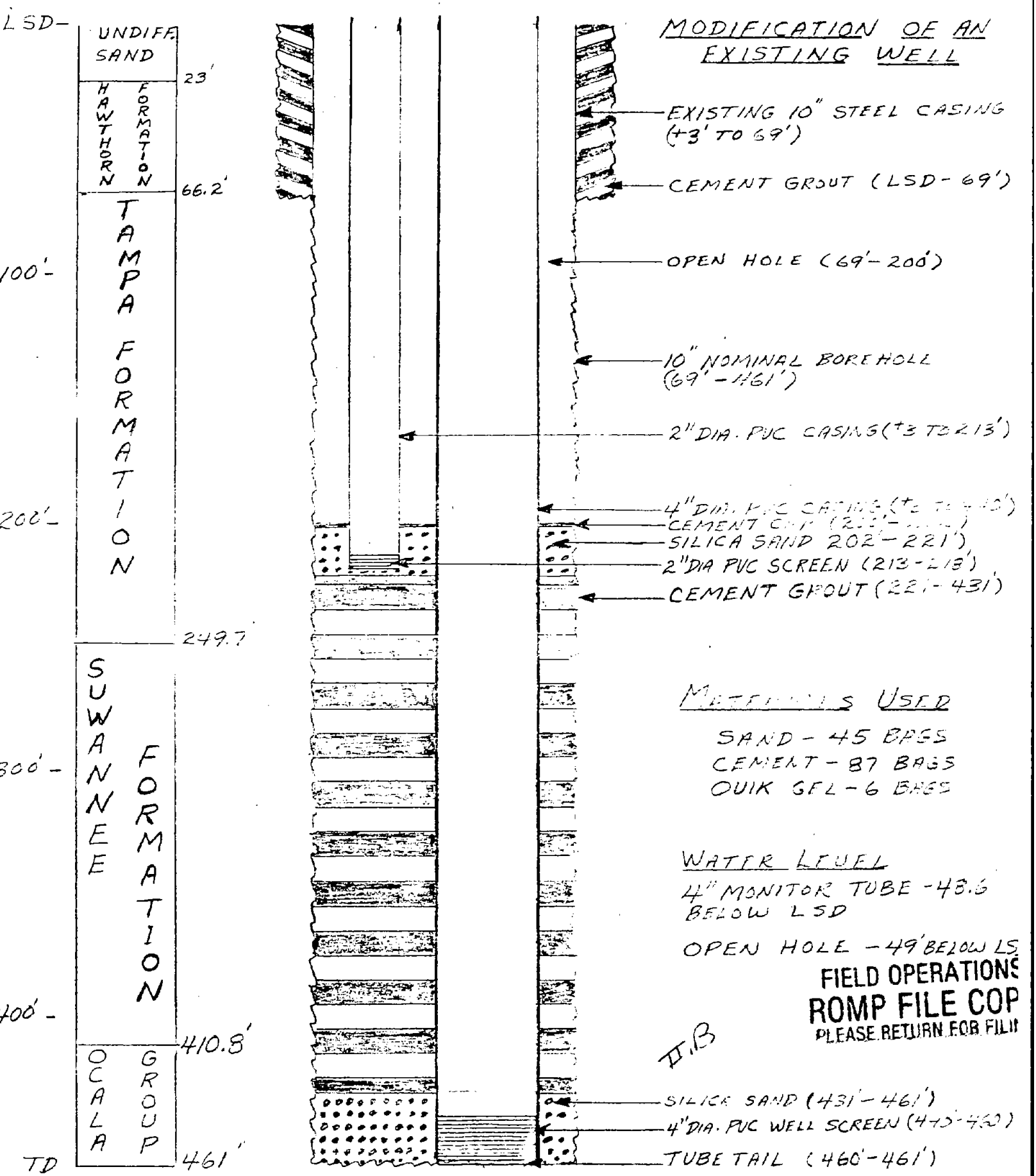
Depth (ft.)	Water Level (ft.)
74	-25.3
84	-19.85
104	-50.25
124	-49.30
144	-49.55
164	-49.4
184	-49.75
204	-49.5
224	-49.81
244	-50.8
274	-49.9
314	-50.6
324	-50.1
354	-50.85
374	-50.4
394	-50.4
414	-50.4
434	-50.6
454	-51.75
474	-52.0
494	-52.05
514	-52.05
534	-52.05
554	-53.8
599	-54.4

4(1/36) III.B

10-31-

TRI 2 "AMBERLEA PARK" J.L. DECAIR
T 28 S, RISE 5.25

MONITOR WELL DESIGN - AS BUILT



D.B

TR 14-2 DUNEDIN
CORE HOLE

WATER QUALITY DATA - FIELD & LABORATORY ANALYSIS

Water Levels (ft.)	Depth (ft.)		Cond. (UMHO'S)	Temp. (Centigrade)	Field Cl (ml/l)	SWFWMD Lab (mg/l)	Field Sulfates (mg/l)	SWFWMD Lab (mg/l)
-25.30	74		750	30.0	102	99.5	85	29.8
-19.85	84		710	27.5	104	102.0	60	27.5
	----some clay------							
	94		700	26.0	118	100.0	50	25.2
-50.25	104		1000	27.5	175	195.0	50	24.7
-49.30	114		820	24.5	170	160.0	50	21.9
	124		500	24.0	90	66.5	50	16.9
	134		580	22.0	100	83.5	45	16.5
	139 lost circulation							
-49.55	144		600	23.5	105	83.0	50	9.4
	154		700	26.5	120	100.0	50	13.7
-49.40	164		700	27.0		99.0		14.0
	174		750	23.0		121.5		14.2
----------Fresh/Saltwater Interface----------								
-49.75	184		2650	24.0		710.0		78.2
	189		2825	25.0		750.0		83.1
	194		2825	25.0		757.0		81.5
	199		3200	24.5				
-49.50	204		3275	25.0		870.0		87.9
	209		3000	25.0		720.0		72.0
	214		2500	25.0		617.0		57.3
	219		2000	24.0		455.0		51.4
-49.81	224		6800	24.0		1960.0		248.3
	229		9500	25.5	3120	2860.0	200+	406.4
	234		11,200	26.0	4090	3550.0	200+	494.2
	239		11,000	27.0	4075	3300.0	200+	462.7
	254		10,600	26.0	2560	3400.0	200+	480.0
	274		12,000	26.0	3600	3800.0	200+	524.0
	294		12,500	27.5	3560	3750.0	200+	537.0
	314		6250	27.0	1780	1620.0	200+	229.0
	334		4700	24.0	1220	1400.0	120	179.9
	354		5500	25.0	1480	1630.0	120	219.3
	374		5500	24.0	1495	1720.0	125	219.3
	394		5500	30.0	1470	1380.0	125	167.8
	414		6100	25.0	1850	1840.0	150	256.4
	434	4-29	13,500	27.5		4225.0		571.5
	454	4-30	20,025	27.0		6700.0		974.6
	474	5-4	23,000	27.5		8825.0		1261.0
	494	5-5	28,000	21.5		10,750.0		1490.0
	514	5-5	29,250	26.5		9850.0		1411.0
	534	5-5	32,250	27.0		10,750.0		1625.0
	554	5-6	42,800	26.5		14,600.0		2265.0
	574	5-6	38,000	25.5		13,500.0		1951.0
	604	5-7-81		26.0		16,438.0		2612.0

GHN
6-81

3(17/41) II.C.

ROMP TR14-2
WATER QUALITY DATA - HYDROLOGIC DATA

WELL DEPTH (ft.)	FIELD CONDUCTIVITY (mohm/cm)	LAB CHLORIDE (mg/l)	LAB SO_4 (mg/l)	Q (gals./minute)	WATER LEVEL (ft.below LSD)
74	750	99.5	29.8	2.46	25.3
84	710	102	27.5	2.46	19.85
94	700	100	25.2	2.25	-
104	1,000	195	24.7	5.12	50.25
114	820	160	21.9	5.74	-
124	550	66.5	16.9	7.79	49.30
134	580	83.5	16.5	7.38	-L.C.
144	600	83	9.4	11.48	49.55
154	700	100	13.7	12.71	-
164	700	99	13.95	10.25	49.40
174	750	121.5	14.19	17.01	-

184	2,650	710	78.2	21.93	49.75
189	2,825	750	83.1	-	-
194	2,825	757	81.5	19.47	-
204	3,275	870	87.9	14.35	49.50
209	3,000	720	72.6	-	-
214	2,500	617	57.3	13.73	-
219	2,000	455	51.4	-	-
224	6,800	1,960	248.3	21.11	49.80
229	9,500	2,860	406.4	18.45	-
234	11,200	3,550	494.2	18.45	-
239	11,000	3,300	462.7	22.55	-
254	10,600	3,400	480	18.45 (244')	50.8
274	12,000	3,800	524	18.04	49.9
294	12,500	3,750	537	16.40	-
314	6,250	1,620	229	14.35	50.6
334	4,700	1,400	179.9	15.37	-
354	5,500	1,630	219.3	14.35	50.85
374	5,500	1,720	219.3	16.40	50.40
394	5,500	1,380	167.8	-	50.40
414	6,100	1,840	256.4	11.27	50.40
434	13,500	4,225	571.5	11.27	50.60
454	20,025	6,700	974.6	7.10	51.75
474	27,000	8,825	1,261	13.32	52.00
494	28,000	10,750	1,490	12.30	52.05
514	29,250	9,850	1,411	14.35	52.05
534	32,250	10,750	1,625	14.35	52.05
554	42,800	14,600	2,265	No Geologist On Site	-
574	38,000	13,500	1,951	No Geologist On Site	-
604		16,438	2,612	No Geologist On Site	-

3 (16/41) III.C

TR 14-2 DUNEDIN

WATER QUALITY DATA - FIELD & LABORATORY ANALYSIS

Water Levels (ft.)	Depth (ft.)		Cond. (UMHO'S)	Temp. (Centigrade)	Field Cl (ml/l)	SWFWMD Lab (mg/l)	Field Sulfates (mg/l)	SWFWMD Lab (mg/l)
-25.30	74		750	30.0	102	99.5	85	29.8
-19.85	84		710	27.5	104	102.0	60	27.5
	----some clay------							
	94		700	26.0	118	100.0	50	25.2
-50.25	104		1000	27.5	175	195.0	50	24.7
-49.30	114		820	24.5	170	160.0	50	21.9
	124		500	24.0	90	66.5	50	16.9
	134		580	22.0	100	83.5	45	16.5
	139 lost circulation							
-49.55	144		600	23.5	105	83.0	50	9.4
	154		700	26.5	120	100.0	50	13.7
-49.40	164		700	27.0		99.0		14.0
	174		750	23.0		121.5		14.2
----------Fresh/Saltwater Interface----------								
-49.75	184		2650	24.0		710.0		78.2
	189		2825	25.0		750.0		83.1
	194		2825	25.0		757.0		81.5
	199		3200	24.5				
-49.50	204		3275	25.0		870.0		87.9
	209		3000	25.0		720.0		72.6
	214		2500	25.0		617.0		57.3
	219		2000	24.0		455.0		51.4
-49.81	224		6800	24.0		1960.0		248.3
	229		9500	25.5	3120	2860.0	200	406.4
	234		11,200	26.0	4090	3550.0	200	494.2
	239		11,000	27.0	4075	3300.0	200	462.7
	254		10,600	26.0	2560	3400.0	200	480.0
	274		12,000	26.0	3600	3800.0	200	524.0
	294		12,500	27.5	3560	3750.0	200	537.0
	314		6250	27.0	1780	1620.0	200	229.0
	334		4700	24.0	1220	1400.0	120	179.9
	354		5500	25.0	1480	1630.0	120	219.3
	374		5500	24.0	1495	1720.0	125	219.3
	394		5500	30.0	1470	1380.0	125	167.8
	414		6100	25.0	1850	1840.0	150	256.4
-40-46' 60'	434	4-29	13,500	27.5		4225.0		571.5
	454	4-30	20,025	27.0		6700.0		974.6
	474	5-4	23,000	27.5		8825.0		1261.0
	494	5-5	28,000	21.5		10,750.0		1490.0
	514	5-5	29,250	26.5		9850.0		1411.0
	534	5-5	32,250	27.0		10,750.0		1625.0
	554	5-6	42,800	26.5		14,600.0		2265.0
	574	5-6	38,000	25.5		13,500.0		1951.0
	604	5-7-81		26.0		16,438.0		2612.0

GHN
6-81

3 (18/41)

II @ B

6/21/81 ROMP SITE TR14-2 (Project 16-020-51) G. L. HENDERSON
DUNEDIN

WELL DEPTH (ft. below LSD)	DESCRIPTION
	----------UNDIFFERENTIABLE SANDS----------
LSD-14.0	SAND = tan-dark brown, very fine grained, moderate sorted, subangular quartz sands, organic staining throughout section, high porosity.
14.0-23.0	SAND = light gray-light greenish gray-light purplish gray in parts, very fine-fine grained, poorly sorted, well rounded-subangular, quartz sands, slightly clayey, some bluish gray-black phosphatic pebbles, some translucent-offwhite quartz pebbles also, moderate-high porosity.
	----------HAWTHORN FORMATION----------
23.0-25.0	CLAY = light gray-light greenish gray, slightly sandy, marly-sticky, some bluish gray-black phosphatic pebbles, very low porosity.
25.0-31.0	CLAY = light gray-light greenish gray, marly-sticky clay, trace of tan limestone, very low porosity.
31.0-32.0	LIMESTONE = cream-tan, hard, slightly dolomitic fossiliferous micrite, trace of unidentifiable fossil molds, low porosity.
32.0-33.0	CLAY = light gray-offwhite, very marly-sticky clay, very low porosity.
33.0-33.2	LIMESTONE = same as 31.0'-32.0'.
33.2-35.0	CLAY-LIMESTONE = light gray-offwhite, very marly-sticky clay intermixed with cream-tan, slightly dolomitic fossiliferous micrite, low porosity for limestone, very low porosity in clay.
35.0-38.0	CLAY-LIMESTONE = same as above, some light gray-light greenish gray, marly-sticky, dense clay also.
38.0-40.0	CLAY = light gray-light greenish gray, dense, marly-sticky clay, trace of very fine grained phosphatic sands, very low porosity.
40.0-52.5	CLAY = light green-light greenish gray, marly-waxy, very dense clay, some thin, cream-tan limestone seams at 48.0' and 49.5', very low porosity in clay.
52.5-55.0	CLAY = same as above, except intermixed or streaked by dark gray-black, marly, organic clay having high soluability, very low porosity in light green clay.
55.0-66.2	CLAY = light green, sandy-marly, shaly, dense clay with some lenses of dark gray, marly, organic clay having high soluability, [illegible] section, low porosity.

III A

3 (L/H)

----------TAMPA FORMATION----------

66.2-69.0 LIMESTONE = cream-tan-light gray, dense, sparse biomicrite, some pelecypod casts and molds, low-moderate porosity.

69.0-70.8 LIMESTONE = cream-tan, dense, sparse biomicrite, some pelecypod casts and molds, some light green, sandy clay seams at top and bottom of section, some light green, sandy clay infilling some fossil molds, low-moderate porosity.

70.8-74.0 LIMESTONE = cream-tan, dense, biomicrite, common pelecypod casts and molds, low-moderate porosity.

74.0-79.0 LIMESTONE = cream-tan, dense, slightly sandy, biomicrite, common pelecypod casts and molds, some gastropod casts, section streaked by some 2-4 inch light green, shaly clay seams, some fossil molds infilled by this clay also, low-moderate porosity.

79.0-84.0 LIMESTONE = cream, dense, chalky sparse biomicrite--tan, dense, slightly sandy, sparse biomicrite, some pelecypod casts and molds, some varvy, very thin, shaly, light green clay streaks throughout the section, some fossil molds infilled by this clay also, low-moderate porosity.

84.0-85.5 LIMESTONE = same as above, except no light green, shaly clay streaks.

85.5-89.0 LIMESTONE = tan, slightly chalky, biomicrite, common small fossil molds (pelecypod and gastropod molds), some varvy micrite banding at top of section, low-moderate porosity.

89.0-94.0 LIMESTONE = cream-tan, very chalky, slightly vugular, sparse biomicrite, some small fossil molds, common worm borings?, low-moderate porosity.

94.0-99.0 LIMESTONE = tan, slightly chalky, biomicrite, common small fossil molds, moderate-high porosity.

99.0-102.0 LIMESTONE = tan, very chalky, biomicrite, some coral polymp imprints, some fossil molds infilled by coralline material and brown, slightly friable dolomite, moderate-high porosity.

102.0-104.0 LIMESTONE = tan, very chalky, dense, fossiliferous micrite, low porosity.

104.0-109.0 LIMESTONE = tan, very chalky, dense, sparse biomicrite, common pelecypod molds, low porosity.

109.0-114.0 LIMESTONE = tan-light tannish gray, dense, very chalky, sparse biomicrite -- biomicrite, common small pelecypod molds, low porosity.

114.0-124.0 LIMESTONE = cream-light tannish gray, dense, chalky, fossiliferous micrite, section fractured in parts with fractures infilled by light tannish gray, dolomitic limestone, some fossil vugs infilled by light tannish gray, dolomitic limestone surrounded by weathering rinds, low porosity.

124.0-127.0 LIMESTONE = tan-light tannish gray, light brown in parts, hard, dense, slightly chalky, sparse biomicrite, section fractured or brecciated, with fractures infilled by light tannish gray, dolomitic limestone, some large pelecypod molds infilled or lined by light brown, friable dolomitic limestone, low porosity.

127.0-131.6 LIMESTONE = tan-light tannish gray, hard, dense, slightly chalky, sparse biomicrite, some small fossil molds but many infilled by light tannish gray, dolomitic limestone, trace of infilled fractures in upper half of section, low porosity.

131.6-132.3 LIMESTONE = cream-tan, dense, very chalky, sparse biomicrite, low porosity.

132.3-133.6 LIMESTONE = tan-light tannish gray, dense, slightly chalky, biomicrite, some pelecypod casts and molds, some fossil molds infilled or lined by light brown calcite crystals, some bryozoan casts also, low porosity.

133.6-134.0 LIMESTONE = tan-light tannish gray, dense, slightly chalky, sparse biomicrite, some light bluish gray, clayey micrite infilling fossil molds, low porosity.

134.0-141.5 LIMESTONE = tan-light tannish gray, clayey-slightly friable in parts, slightly vugular, sparse biomicrite, section laminated by seams of slightly phosphatic, dolomitic, light bluish gray micrite, some fossil molds infilled by this light bluish gray micrite also, moderate porosity.

141.5-144.0 LIMESTONE-CLAY = light tannish gray, clayey-slightly friable, sparse biomicrite, many fossil molds infilled by light green, sandy-earthy in part, clay, bottom half of section laminated by some light green clay seams, low-moderate porosity.

144.0-145.2 LIMESTONE = light tannish gray, clayey-slightly friable, sparse biomicrite, some fossil vugs surrounded by weathering rinds at bottom of section, low-moderate porosity.

145.2-147.8 LIMESTONE = light gray-light tannish gray, tan in parts, slightly friable, moldic, sparse biomicrite, highly indurated fossil vugs or molds surrounded by weathering rinds in bottom foot of section, moderate-high porosity.

147.8-149.0 LIMESTONE = tan, hard, dense, slightly moldic, sparse biomicrite, some pelecypod molds, trace of pyritic mottling, low porosity.

149.0-151.5 LIMESTONE = same as above, except fossil vugs infilled by light green-light bluish gray, sandy clay, low porosity.

151.5-153.3 LIMESTONE = light gray-light greenish gray, hard, dense, slightly moldic, sparse biomicrite, some light green, sandy clay seams laminating section, low-moderate porosity.

153.3-155.0 LIMESTONE = tan-light greenish gray-light tannish gray, dense, slightly moldic, sparse biomicrite, entire section variegated by fossil vugs surrounded by weathering rinds, low porosity.

155.0-157.0 LIMESTONE = tan-light tannish gray mottled in parts, dense, sparse biomicrite, low porosity.

157.0-157.6 LIMESTONE = tan-light tannish gray-light greenish gray mottled, dense, sparse biomicrite, alternating with seams of tan-light tannish gray, slightly dolomitic, sparse biomicrite, low porosity.

157.6-158.9 LIMESTONE = same as 155.0-157.0, except slightly chalky.

158.9-164.0 LIMESTONE = tan, dense, sparse biomicrite, some light tannish gray, dolomitic limestone seams laminating the section, trace of fractures, some fossil vugs infilled by light green, sandy clay at bottom of section, trace of fossil vugs surrounded by weathering rinds at bottom of section, low porosity.

164.0-174.0 LIMESTONE = cream-tan, dense, chalky-slightly marly, sparse biomicrite, some light tannish gray, dolomitic limestone seams laminating section, low-moderate porosity, core samples recovered as rock rubble.

SPECIAL NOTE:
Poor core recovery for this interval probably due to dissolution of rock while being cored or washing out of clay-filled? Fossil vugs while being cored.

174.0-179.0 LIMESTONE = offwhite-cream-tan, chalky-marly in parts, slightly friable, moldic, biomicrite, common small pelecypod and gastropod casts and molds, moderate-high porosity.

179.0-183.6 LIMESTONE = offwhite-cream, dense, chalky-marly in parts, moldic, sparse biomicrite, some light tannish gray, dolomitic limestone at top of section, some fossil molds infilled by offwhite, chalky marl, low-moderate porosity.

183.6-184.0 LIMESTONE = offwhite-cream, chalky-cherty in part, fossiliferous micrite, low porosity.

184.0-185.5? LIMESTONE = buff, slightly chalky, moldic biomicrite, moderate-high porosity.

185.5?-187.0? LIMESTONE = tan-light tannish gray, dense, slightly dolomitic, slightly moldic, sparse biomicrite, some large pelecypod casts and molds, some fossil molds surrounded by weathering rinds and infilled by light greenish gray clay, low porosity.

187.0?-188.0 LIMESTONE = light tannish gray, chalky, slightly dolomitic fossiliferous micrite, core samples recovered as rock rubble, low porosity.

SPECIAL NOTE:
Poor core recovery for this interval probably due to dissolution of rock while being cored.

188.0-189.0 LIMESTONE = tan-light greenish gray in part, dense, sparse biomicrite, entire section variegated by infilled fossil molds surrounded by weathering rinds, low porosity.

189.0-189.5? LIMESTONE = same as 187.0-188.0.

189.5?-190.0? LIMESTONE = tan-light tannish gray, dense, slightly moldic, sparse biomicrite, some pelecypod casts, low porosity.

190.0?-194.5? LIMESTONE = offwhite-cream-tan in part, very chalky-marly in part, fossiliferous micrite -- calcarenite, light bluish gray, cherty dolomite seam at 193.0', some small quartz crystals associated with the small vugs in the dolomite seam, low porosity in limestone.

194.5?-197.0? LIMESTONE = offwhite-cream, chalky, moldic, sparse biomicrite, some pelecypod casts and molds, low-moderate porosity.

197.0?-199.0 LIMESTONE = same as 190.0-194.5, except no dolomite seams.

199.0-201.2 LIMESTONE = offwhite-cream, slightly chalky, moldic, sparse biomicrite, some pelecypod casts and molds, trace of light bluish gray dolomitic limestone lenses throughout the section, moderate-high porosity.

201.2-202.8 LIMESTONE = offwhite-cream-light gray, very chalky, slightly moldic, sparse biomicrite, some fossil molds infilled by light gray-light greenish gray, waxy clay, low porosity.

202.8-205.7 LIMESTONE = offwhite-cream-light tannish gray, dense, slightly chalky, sparse biomicrite, some pelecypod and gastropod casts and molds, some fossil molds infilled by dense, light gray, waxy clay in upper foot of section, low-moderate porosity.

----------TAMPA FORMATION-SUWANNEE FORMATION----------
----------TRANSITION ZONE??----------

205.7-205.9 CLAY = offwhite-light gray, chalky, limy clay, some tan, clayey limestone pebbles (well rounded) intermixed with the clay, very low porosity.

205.9-206.7? LIMESTONE = buff-light tan, clayey, fossiliferous micrite, some pinpoint-sized fossil molds, some light gray-light greenish gray, waxy clay brecciating section, low porosity.

206.7?-209.0 LIMESTONE-CLAY = offwhite-cream, very clayey, calcarenite, light gray, waxy clay brecciating section, low porosity.

R&Q file

TR 14-2 DUNEDIN
CORE HOLE
WATER QUALITY DATA - FIELD & LABORATORY ANALYSIS

Water Levels (ft.)	Depth (ft.)		Cond. (UMHO'S)	Temp. (Centigrade)	Field Cl (ml/l)	SWFWMD Lab (mg/l)	Field Sulfates (mg/l)	SWFWMD Lab (mg/l)
-25.30	74		750	30.0	102	99.5	85	29.8
-19.85	84		710	27.5	104	102.0	60	27.5
	----some clay------							
	94		700	26.0	118	100.0	50	25.2
-50.25	104		1000	27.5	175	195.0	50	24.7
-49.30	114		820	24.5	170	160.0	50	21.9
	124		500	24.0	90	66.5	50	16.9
	134		580	22.0	100	83.5	45	16.5
	139	lost circulation						
-49.55	144		600	23.5	105	83.0	50	9.4
	154		700	26.5	120	100.0	50	13.7
-49.40	164		700	27.0		99.0		14.0
	174		750	23.0		121.5		14.2
----------Fresh/Saltwater Interface----------								
-49.75	184		2650	24.0		710.0		78.2
	189		2825	25.0		750.0		83.1
	194		2825	25.0		757.0		81.5
	199		3200	24.5				
-49.50	204		3275	25.0		870.0		87.9
	209		3000	25.0		720.0		72.6
	214		2500	25.0		617.0		57.3
	219		2000	24.0		455.0		51.4
-49.81	224		6800	24.0		1960.0		248.3
	229		9500	25.5	3120	2860.0	200	406.4
	234		11,200	26.0	4090	3550.0	200	494.2
	239		11,000	27.0	4075	3300.0	200	462.7
	254		10,600	26.0	2560	3400.0	200	480.0
	274		12,000	26.0	3600	3800.0	200	524.0
	294		12,500	27.5	3560	3750.0	200	537.0
	314		6250	27.0	1780	1620.0	200	229.0
	334		4700	24.0	1220	1400.0	120	179.9
	354		5500	25.0	1480	1630.0	120	219.3
	374		5500	24.0	1495	1720.0	125	219.3
	394		5500	30.0	1470	1380.0	125	167.8
	414		6100	25.0	1850	1840.0	150	256.4
	434	4-29	13,500	27.5		4225.0		571.5
	454	4-30	20,025	27.0		6700.0		974.6
	474	5-4	23,000	27.5		8825.0		1261.0
	494	5-5	28,000	21.5		10,750.0		1490.0
	514	5-5	29,250	26.5		9850.0		1411.0
	534	5-5	32,250	27.0		10,750.0		1625.0
	554	5-6	42,800	26.5		14,600.0		2265.0
	574	5-6	38,000	25.5		13,500.0		1951.0
	604	5-7-81		26.0		16,438.0		2612.0

GHN
6-81

3(17/41) III B

SPECIAL NOTE:
Poor core recovery for this interval probably due to dissolution of rock's matrix material (clayey calcarenite) while being cored.

209.0-210.5 LIMESTONE-CLAY = offwhite-cream, clayey, calcarenite, light greenish gray, waxy clay heavily brecciating section, some light tan, clayey limestone pebbles (well rounded) at bottom of section, low porosity.

210.5-211.0 CLAY = light green-light greenish gray, dense, waxy clay, entire section exhibits extensive (clayey calcarenite infilled) minute fracturing, very low porosity.

211.0-211.6 LIMESTONE-CLAY = cream-light tan, clayey micrite intermixed with clay as described in above section, very low porosity in clay, low-moderate porosity in limestone.

211.6-212.8 CLAY = same as 210.5-211.0.

212.8-214.8? LIMESTONE = cream-light tan, slightly chalky, fossiliferous micrite, some pinpoint-sized fossil molds, some pyritic mottling throughout section, trace of light greenish gray clay brecciating upper half of section, low-moderate porosity.

214.8?-215.6? LIMESTONE = cream-light tan, very clayey calcarenite, trace of pinpoint-sized fossil molds, trace of light greenish gray clay brecciating section, low porosity.

215.6?-219.0 LIMESTONE = cream-light tan, very chalky, fossiliferous micrite, some pinpoint-sized fossil molds, some pyritic mottling throughout section low-moderate porosity.

219.0-220.9 LIMESTONE = tan, slightly friable-slightly chalky, sparse biomicrite, some pinpoint-sized fossil molds, moderate porosity.

220.9-224.0 LIMESTONE = tan-light tannish gray, slightly friable, sparse biomicrite -- biomicrite, common-abundant pelecypod and gastropod casts and molds, moderate-high porosity.

224.0-234.0 LIMESTONE = tan-light tannish gray, highly moldic, biomicrite, common pelecypod casts and molds, some gastropod casts and molds, some light tannish gray dolomitic limestone lenses, moderate-high porosity.

234.0-236.0 LIMESTONE = same as above, except high-very high porosity.

236.0-236.5 DOLOSTONE = light bluish gray, partly recrystallized, hard, slightly vugular dolomite, no noticeable porosity.

236.5-240.0 LIMESTONE = tan, highly moldic biomicrite, common pelecypod casts and molds, some gastropod casts and molds, some light tannish gray dolomitic limestone lenses, thin one inch dolomite seam at bottom of section, moderate-high porosity.

240.0-249.7? LIMESTONE = tan-light tannish gray, finely moldic, biomicrite, common small fossil molds (pelecypod and gastropod), some light tannish gray, dolomitic limestone lenses, small lump of coral found at 249.0', moderate-high porosity.

----------SUWANNEE FORMATION----------

249.7?-259.0 LIMESTONE = tan, friable, microcoquinal, millioloidal biomicrite, moderate-high porosity, some very high porosity in parts.

259.0-264.0 LIMESTONE = tan, friable, microcoquinal, millioloidal biomicrite, some pelecypod molds, one large echinoid test crossection (Cassidulus gouldii?) found, moderate-high porosity, some light tannish gray, dolomitic limestone streaks.

264.0-274.0 LIMESTONE = tan, friable, microcoquinal, millioloidal biomicrite, some tan, calcitized large echinoid (Cassidulus?) test fragments, moderate-high porosity.

274.0-279.0 LIMESTONE = same as above, except some light bluish gray, dolomitic limestone lenses, moderate-high porosity.

279.0-284.0 LIMESTONE = tan, friable, microcoquinal, millioloidal biomicrite, some tan, calcitized echinoid test fragments, some tan, well cemented, hard limestone streaks, trace of fossil vugs, moderate-high porosity.

284.0-294.0 LIMESTONE = light tan, friable, millioloidal biomicrite -- tan, chalky, dense, well cemented, sparse biomicrite, some pelecypod and gastropod casts and molds, some light bluish gray, dolomitic limestone mottling bottom of section, low-moderate porosity in tan limestone, moderate-high porosity in light tan limestone.

294.0-302.8? LIMESTONE = cream-light tan, friable-slightly chalky, soft, millioloidal biomicrite heavily mottled by light bluish gray, hard, slightly dolomitic, fossiliferous micrite, low-moderate porosity in hard limestone, moderate-high porosity in soft limestone.

302.8?-304.0 LIMESTONE = tan, dense, well cemented, finely moldic, millioloidal biomicrite mottled by light bluish gray, hard, slightly dolomitic, fossiliferous micrite, low-moderate porosity.

304.0-309.0 LIMESTONE = tan-light brown, dense, well cemented, millioloidal sparse biomicrite, some pelecypod molds and worm borings, trace of dark brown-brownish black, lignitic (plant remains) lenses becoming more abundant toward bottom of section, some light brown, earthy-peaty, thin clay seams (speckled by lignitic lenses) laminating bottom 1.5 foot of section giving it a "varvy" appearance, low-moderate porosity.

309.0-314.0 LIMESTONE = same as above, except no clay seams, low-moderate porosity.

314.0-319.0 LIMESTONE = tan-light tannish gray, dense, well cemented, finely moldic, millioloidal biomicrite mottled by light bluish gray, hard, slightly dolomitic, fossiliferous micrite, moderate-high porosity.

319.0-324.0 LIMESTONE = same as above, except common pelecypod and gastropod casts and molds in bottom half of section, some fossil molds infilled by fossiliferous micrite, moderate-high porosity.

324.0-325.0? LIMESTONE = tan-light tannish gray, dense, hard, moldic biomicrite, common small pelecypod and gastropod molds, low-moderate porosity.

325.0?-326.0? LIMESTONE-CLAY = limestone as above, intermixed with light brown, earthy, sticky clay, some black lignitic streaks throughout section, very low porosity in clay, low porosity in limestone.

326.0?-330.5? LIMESTONE = dirty light-dark brown, clayey, slightly moldic, sparse biomicrite, entire section discolored due to abundant dark gray-black organics and brownish black lignitic (fossil plant remains) streaks, low-moderate porosity.

330.5?-338.0 LIMESTONE-CLAY = light tan-light tannish gray in parts, dense, very clayey, sparse biomicrite streaked by dark brown lignitics, intermixed with light brown, earthy, limy clay, some light gray worm boring casts at bottom of section, low porosity in limestone, very low porosity in clay.

338.0-342.0? LIMESTONE = dirty light-dark brown, chalky-slightly friable, very clayey in parts, biomicrite, some small pelecypod molds, common dark brown-black lignitic streaks, some echinoid test crossections (Cassidulus?), low-moderate porosity.

342.0?-344.0 LIMESTONE = light tan-cream in parts, dense, chalky-marly in parts, millioloidal biomicrite, some small pelecypod and gastropod molds, some of overlying limestone intertonguing into this section, low-moderate porosity.

344.0-349.0 LIMESTONE = light tan-cream in parts, dense, chalky-marly in parts, biomicrite, some small pelecypod molds, common dark brown-black lignitic streaks, some light brown, earthy-lignitic, thin clay seams, some large fossil molds (worm borings?) infilled by this clay in upper half of section, low-moderate porosity.

349.0-351.0? LIMESTONE = same as 338.0-342.0, low-moderate porosity.

351.0?-359.0 LIMESTONE = tan-light tannish gray, chalky-slightly friable, millioloidal biomicrite, some forams (some Coskinolina floridana, trace Dictyoconus cookei), trace of light bluish gray, hard, slightly dolomitic micrite infilling fossil molds, moderate-high porosity.

359.0-364.0 LIMESTONE = light tannish gray, dense, chalky, sparse biomicrite -- biomicrite, heavily mottled by light bluish gray, hard, slightly dolomitic, fossiliferous micrite, low-moderate porosity in hard, light bluish gray micrite, moderate-high porosity in light tannish gray limestone.

364.0-364.5 LIMESTONE = light tan-light tannish gray, chalky, microcoquinal, millioloidal biomicrite, moderate-high porosity.

364.5-365.0 LIMESTONE = light tan-light tannish gray, chalky, highly moldic, biomicrite, common-abundant pelecypod casts and molds, some echinoid spines, moderate porosity.

365.0-374.2? LIMESTONE = light tan-light tannish gray, friable, microcoquinal, millioloidal biomicrite, very abundant small forams, some echinoid spines and branching bryozoan fragments, moderate-high porosity.

374.2?-379.0 LIMESTONE = cream-light tan-light tannish gray in parts, dense, moldic sparse biomicrite -- biomicrite, common small pelecypod casts and molds, some light tannish gray, hard, slightly dolomitic limestone mottling the section, low-moderate porosity.

379.0-385.0 LIMESTONE = light tan-light gray-light tannish gray, dense, chalky-marly in parts, highly moldic biomicrite, common pelecypod and gastropod casts and molds, some coral imprints at top of section, some black lignitic streaks, low porosity.

385.0-399.0 LIMESTONE = tan-light tannish gray, dense, chalky, highly moldic biomicrite, common pelecypod and gastropod casts and molds, some dark brown-black lignitic streaks, low-moderate porosity.

399.0-402.7 LIMESTONE = tan-light tannish gray, dense, very chalky, highly moldic biomicrite, common pelecypod and gastropod casts and molds, some dark brown-black lignitic streaks, low-moderate porosity.

402.7-403.2 LIMESTONE = cream-light tan, very chalky, calcarenite, trace dark brown-black lignitic streaks, low porosity.

403.2-404.0 DOLOSTONE = light-dark brown, very hard, partly recrystallized (microcrystalline), fossiliferous dolomite, some pinpoint-sized fossil molds, very low-low moldic porosity.

404.0-407.5 DOLOSTONE = tan-light brown-light tannish gray, very hard, partly recrystallized (microcrystalline), fossiliferous dolomite, some small fossil molds, some lignitic or carbonaceous fossil imprints, trace of very fine grained, phosphatic sands, very low moldic porosity.

407.5-409.5 DOLOSTONE = light-dark brown-light tannish gray, very hard, partly recrystallized (slightly sucrosic), fossiliferous dolomite, some small pinpoint-sized fossil molds, trace of carbonaceous fossil imprints, very low moldic porosity.

409.5-410.8 DOLOSTONE = light-dark brown, light tannish gray in parts, very hard, partly recrystallized (sucrosic), highly moldic, fossiliferous dolomite, common fossil molds, trace of carbonaceous fossil imprints, low-moderate moldic porosity.

----------OCALA GROUP----------
----------CRYSTAL RIVER FORMATION----------

410.8-418.0 LIMESTONE = cream-light tan-light tannish gray in parts, dense, well cemented, chalky, microcoquinal millioloidal biomicrite, abundant small foraminifera, some echinoid spines and bryozoan pavement, low-moderate porosity, some infilled worm borings? near bottom of section.

418.0-419.0 LIMESTONE = light tan-light-dark tannish gray, highly moldic, micro-coquinal-coquinal biomicrite, abundant pelecypod molds and casts, common gastropod casts and molds, moderate moldic porosity.

419.0-423.8 LIMESTONE = same as 410.8-418.0.

423.8-434.0 LIMESTONE = light tannish gray-light brown, highly moldic, biomicrite, very abundant pelecypod and gastropod casts and molds, moderate moldic porosity.

434.0-439.0 LIMESTONE = light tannish gray, dense, moldic biomicrite, common small pelecypod (Chione) and gastropod casts and molds, low-moderate porosity.

439.0-441.5 LIMESTONE = light tan-light tannish gray, highly moldic biomicrite, abundant pelecypod and gastropod casts or molds (common steinkerns), moderate-high moldic porosity.

441.5-444.6 LIMESTONE = light tan-light tannish gray, dense, marly in upper half of section--slightly chalky in bottom half of section, slightly moldic biomicrite, some echinoid test crossections (Lagenum?), low-moderate porosity.

444.6-445.2 LIMESTONE = cream-light tan, marly-clayey, calcarenite, some echinoid test fragments, very low porosity.

445.2-451.8 DOLOSTONE = tan-light-dark brown, very hard, partly recrystallized (sucrosic), fossiliferous dolomite, some small fossil molds, very low moldic porosity.

451.8-451.9 CLAY = light-dark brown, earthy-waxy, organic clay, very low porosity.

451.9-454.0 DOLOSTONE = tan-light brown, friable-slightly tufaceous, soft-slightly hard, fossiliferous dolomite, some small pinpoint-sized fossil molds, moderate-high porosity.

454.0-456.2 DOLOSTONE = tan, friable-slightly tufaceous, soft-slightly hard, fossiliferous dolomitic--light-dark brown, partly recrystallized, very hard, fossiliferous dolomite, common small fossil molds (some lined by recrystallized dolomite crystals), low porosity in brown dolomite, moderate porosity in tan dolomite.

456.2-459.0 LIMESTONE = dirty cream-tan, clayey-marly in parts, dense, millioloidal biomicrite, common small forams and some echinoid spines, (one large foram, Nummulites, found), trace of light bluish gray-green clay brec-ciating section, low porosity.

459.0-459.3 LIMESTONE-CLAY = same as above, except heavily laminated by light-dark brown, waxy-peaty, clay seams, low porosity.

459.3-461.8? LIMESTONE = light tan-light bluish gray in parts, chalky, dense, millioloidal biomicrite, some large echinoid test fragments (Periarchus?), low-moderate porosity.

461.8?-465.0 LIMESTONE = light tan-light bluish gray, slightly dolomitized, hard, very dense, highly moldic biomicrite, common pelecypod and gastropod casts and molds, trace of light gray, marly limestone, low moldic porosity.

465.0-467.4 LIMESTONE = same as above, intermixed with light tan, chalky, microcoquinal millioloidal biomicrite, some large pelecypod molds and steinkerns, bottom foot of section almost entirely light bluish gray pelecypod and gastropod (Turritella) steinkerns, low moldic porosity in light bluish gray limestone, moderate porosity in light tan limestone.

467.4-469.2 LIMESTONE = light gray-light tannish gray, silty-sandy, sparse biomicrite, some lignitic streaks, low porosity.

469.2-473.4 LIMESTONE = light tan-light tannish gray, chalky-silty, dense, sparse biomicrite -- light tan, very silty, fossiliferous calcarenite in bottom half of section, low-moderate porosity.

473.4-475.8 LIMESTONE = light bluish gray, slightly dolomitic, dense, hard, sparse biomicrite, trace of worm borings, commin fossil vugs and molds infilled by light tan, microcoquinal millioloidal biomicrite, low-moderate moldic porosity.

475.8-478.8 SILTSTONE = light tan, very silty, calcareous siltstone, some pinpoint-sized fossil molds in parts, low-moderate porosity.

478.8-479.0 CLAY = light gray-light greenish gray, dense, waxy-slightly sticky, organic clay, very low porosity.

479.0-485.2 LIMESTONE = light tan, microcoquinal-coquinal, unconsolidated in parts, millioloidal biomicrite with moderate-high porosity, intermixed with light tan, slightly dolomitic, hard, dense, highly moldic (common pelecypod and gastropod casts and molds), sparse biomicrite, with low moldic porosity.

485.2-489.0 LIMESTONE-SILTSTONE = light tan, very silty, fossiliferous micrite -- light tan, calcareous siltstone, low-moderate porostiy.

489.0-491.0 LIMESTONE = light tan, very silty, fossiliferous micrite, low porosity.

491.0-491.8 LIMESTONE = light tan-light tannish gray, microcoquinal-coquinal biomicrite, common pelecypod casts and molds, some gastropod casts and molds, low-moderate porosity.

491.8-496.0? LIMESTONE = same as 489.0-491.0.

496.0?-496.3? SILTSTONE = cream-light tan, earthy-clayey, calcareous siltstone, very low porosity.

496.3?-498.7? LIMESTONE-SILTSTONE = limestone as same as 489.0-491.0 intermixed with siltstone as described in above section.

498.7?-499.0 SILTSTONE = same as 496.0-496.3.

499.0-503.7 LIMESTONE = light tan, slightly friable, silty, fossiliferous micrite, low-moderate porosity in parts.

503.7-504.0 LIMESTONE = light tan, slightly friable, silty, sparse biomicrite, some small pelecypod molds and common tan, calcitized shell fragments, some echinoid spines and echinoid test fragments?, low-moderate porosity.

504.0-510.0 LIMESTONE = cream-light tan, chalky-slightly silty, fossiliferous micrite, trace of echinoid test (Periarchus?) fragments, low-moderate porosity in parts.

----------WILLISTON FORMATION----------

510.0-514.0 LIMESTONE = light tan, microcoquinal-macrocoquinal, chalky-slightly friable, foraminiferal biomicrite, abundant forams (very abundant Operculinoides moodybranchensis), some pelecypod and gastropod casts and molds, some small echinoid tests (Laganum ocalanum) and large echinoid test fragments, some light gray, aragonitized shell fragments, low-moderate porosity.

514.0-519.5 LIMESTONE = same as above, some crab claw fragments, low-moderate porosity.

519.5-522.0 LIMESTONE = light tan-light tannish gray in parts, slightly friable, microcoquinal-macrocoquinal, foraminiferal biomicrite, abundant forams (abundant Operculinoides), common pelecypod and some gastropod casts and molds, some light tannish gray pelecypod shell fragments, some echinoid test fragments, low porosity.

522.0-524.0 LIMESTONE = light tan, slightly chalky-slightly friable, dense, microcoquinal, sparse biomicrite, some forams (common Operculinoides), some pelecypod casts and molds, some light tannish gray pelecypod shell fragments, low-moderate porosity.

524.0-529.0 LIMESTONE = light tan, chalky-marly, dense, microcoquinal sparse biomicrite, some forams (some Operculinoides), some pelecypod casts and molds, some light tannish gray pelecypod shell fragments, low-moderate porosity in parts.

529.0-534.0 LIMESTONE = light tan, chalky, dense, microcoquinal sparse biomicrite, some forams (trace Operculinoides), some pelecypod casts and molds, some light tannish gray pelecypod shell fragments, low-moderate porosity.

534.0-538.6 LIMESTONE = tan, slightly chalky-slightly friable, dense, microcoquinal biomicrite, common small forams (common milliolids, Nonion, etc., trace Operculinoides), some pelecypod and gastropod molds, some tan calcitized echinoid test (Laganum, Cassidulus?) fragments, low-moderate porosity.

538.6-540.0 LIMESTONE = tan, slightly chalky, very dense, hard, well cemented, microcoquinal biomicrite, common small forams but mainly unidentifiable due to some alteration, trace pelecypod molds, low porosity.

540.0-544.1 LIMESTONE = cream-tan, slightly chalky, micro-macrocoquinal, millioloidal biomicrite, mainly calcitized echinoid tests (Laganum?) and pelecypod or gastropod molds cemented by a matrix of microcoquinal biomicrite, common milliolids (Nonion, Spiroloculina?), some coral polyp imprints, crab claws, and branching bryozoans, high-very high moldic porosity.

544.1-545.2 LIMESTONE = tan, very chalky-marly, very dense, sparse biomicrite, some pelecypod and small gastropod casts and molds, low porosity.

545.2-546.6 LIMESTONE = tan, slightly chalky-slightly friable, dense, microcoquinal biomicrite, common small forams (common milliolids, some Operculinoides jacksonensis?), some small gastropod and pelecypod molds, some tan calcitized echinoid tests (Laganum), trace of bryozoan pavement, low-moderate porosity.

546.6-547.4 LIMESTONE = tan, slightly chalky, microcoquinal-slightly macrocoquinal, biomicrite, same as 540.0-544.1, except common Operculinoides jacksonensis, high-very high moldic porosity.

547.4-550.5 LIMESTONE = same as above, intermixed with limestone as described from 545.2-546.6.

550.5-554.8 LIMESTONE = cream-tan, silty, very friable, calcarenite--calcareous siltstone in parts, intermixed with locally abundant microcoquinal fossil seams comprised mainly of the foram Operculinoides, trace of Lepidocyclina, some branching bryozoans, moderate-high porosity in calcarenite, high-very high moldic porosity in foram seams.

554.8-559.3 LIMESTONE = tan, slightly chalky-friable, dense, microcoquinal biomicrite, common small forams (common Operculinoides), some small gastropod and pelecypod molds, some coralline material infilling larger fossil molds, moderate-high porosity.

559.3-560.4 LIMESTONE = cream-light tan, very chalky-very friable, calcarenite, high-very high porosity.

560.4-567.5 LIMESTONE = light tan, chalky-slightly friable, dense, well cemented, microcoquinal biomicrite, common small forams (heavily weathered or altered), some locally abundant fossil seams (mainly Operculinoides) laminating this section, common Operculinoides also scattered throughout section, moderate-high porosity.

567.5-571.8 LIMESTONE = cream-buff-light tan, very chalky, dense, highly indurated, microcoquinal biomicrite, common foram fossil molds replaced by chalky, white micrite, common forams (common Operculinoides, trace Lepidocyclina ocalana), high porosity.

571.8-573.6 DOLOSTONE = light brown, dense, very friable, slightly tufaceous, highly moldic, fossiliferous dolomite, high-very high moldic porosity.

573.6-574.3 DOLOSTONE = light brown, dense, very friable-slightly tufaceous, highly moldic, fossiliferous dolomite, section heavily peppered by foram fossil molds infilled by chalky, white micrite, abundant forams (common Lepidocyclina, abundant Operculinoides, common milliolids), some pelecypod molds (Pecten) also infilled or replaced by chalky, white micrite, moderate-high porosity.

574.3-577.7 DOLOSTONE = light brown-light tannish brown, dense, very friable-finely sucrosic in parts, highly moldic, fossiliferous dolomite, high porosity.

577.7-579.0 DOLOSTONE = same as 573.6-574.3.

----------INGLIS FORMATION----------

579.0-579.3 LIMESTONE = cream-light tannish gray, chalky-very clayey in parts, millioloidal sparse biomicrite, low-moderate porosity in parts.

579.3-582.7 LIMESTONE = offwhite-cream, very chalky, poorly cemented, millioloidal biomicrite, common forams (common milliolids, trace Operculinoides), trace pelecypod shell fragments and molds, trace of large gastropod molds, low-moderate porosity.

582.7-587.5 LIMESTONE = offwhite-cream-light tan, slightly chalky-slightly friable, well cemented, millioloidal biomicrite, some pelecypod and gastropod casts held together by a millioloidal biomicrite matrix, some light tan calcitized echinoid tests (Periarchus lyelli floridanus) and test fragments, moderate-high porosity.

587.5-589.0 LIMESTONE = cream-light tan, chalky, well cemented, millioloidal sparse biomicrite, millioloidal matrix material with trace of small pelecypod and gastropod casts and molds, trace of echinoid test fragments, moderate porosity.

589.0-590.2 LIMESTONE = cream-light tan, very chalky, poorly cemented, millioloidal sparse biomicrite, mainly millioloidal matrix material with trace of tan, calcitized echinoid test (Periarchus) fragments, moderate-high porosity.

590.2-592.3 LIMESTONE - same as 587.5-589.0.

592.3-600.2 LIMESTONE = light tan, slightly friable-slightly chalky, well cemented, microcoquinal, millioloidal biomicrite intermixed with light tannish gray, hard, highly moldic, dolomitic biomicrite, common milliolids (common Quinqueloculina, Spiroloculina, etc.), abundant pelecypod casts and molds, some gastropod molds, common calcitized echinoid test (Periarchus lyelli floridanus) fragments, some crab claw fragments, high moldic porosity.

600.2-601.5 LIMESTONE = light tan, very friable, millioloidal biomicrite, common milliolids (common Quinqueloculina, etc.), trace of the foram Lepidocyclina sp., trace of pelecypod molds? infilled by tan, dolomitic micrite, high-very high porosity.

601.5-604.0 (T.D.) LIMESTONE = light tan, slightly friable-slightly chalky, well cemented, microcoquinal-macrocoquinal, millioloidal biomicrite, intermixed with light tannish gray, hard, highly moldic, dolomitic biomicrite, common milliolids, very abundant pelecypod steinkerns and molds, some gastropod molds, common calcitized echinoid test (Periarchus) fragments, common crab claw fragments, some bryozoan pavement, high moldic porosity.

Definition of Formational Boundaries--SPECIAL NOTE

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

*SPECIAL NOTE -- SYMBOLS USED
"?" = denotes "questionable exact well depth of core sample."
"--" = denotes "grading to."

SIMPLIFIED LITHOLOGY

HOLE DEPTH (Ft. below LSD)	NAME OF ROCK UNIT
0 - 23	Undifferentiable Sands
23 - 66.2	Hawthorn Formation
66.2-249.7	Tampa Formation
249.7-410.8	Suwannee Formation
410.8-510	Crystal River Formation /
510 -579	Williston Formation / Ocala Group
579 -604 (T.D.)	Inglis Formation /