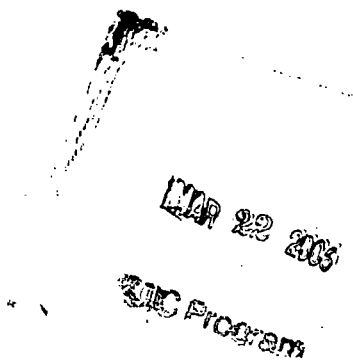
Well Construction Report
City of Cocoa Exploratory Well
Jerry Sellers Water Reclamation Facility
Well ID-BR1863

March 13, 2006



Drawings are Exempt from s.119.07 and s. 24(a), Art. 1 of the State Constitution

These figures have been moved to the Plans and Specifications Profile in the UIC Restricted Catalog.

Professional Certification

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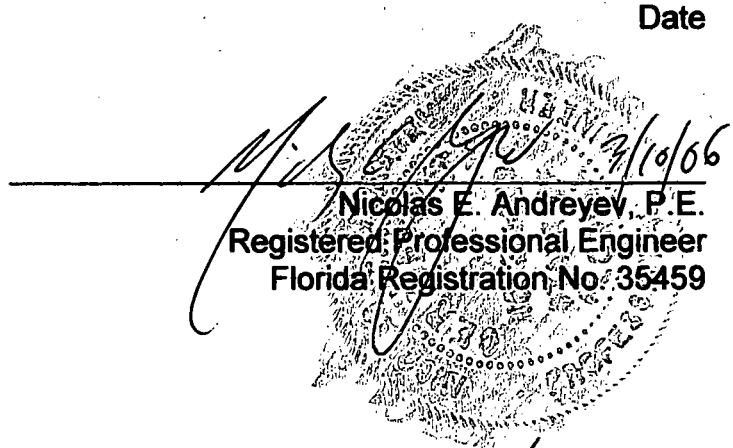
H. Cliff Harrison, P.G.
Registered Professional Geologist
Florida Registration No. 1926

3/13/06
Date



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Date

Table of Contents

Appendices

List of Figures

List of Tables

1.0 Introduction/Background

The City of Cocoa initiated the current Aquifer Storage and Recovery (ASR) Construction and Testing Demonstration Project to explore the potential for raw water ASR at the Jerry Sellars Water Reclamation Facility (WRF) site. The first phase of the investigation process was to drill an exploratory well to determine the lithology, water quality, and other parameters required for the assessment of the suitability of the Floridan Aquifer beneath the site for installation and operation of a full scale ASR well. At the request of the City, the SJRWMD constructed the exploratory well as part of the SJRWMD's ongoing aquifer characterization program.

The Jerry Sellars WRF was chosen as the site for the construction of the ASR exploratory well due to its proximity to the potable water treatment facilities and reuse distribution facilities. The Cocoa ASR Exploratory Well (SJRWMD Well #BR-1863) is located approximately 600 ft north-northwest of the intersection of State Road 520 and US Highway 1 in Cocoa, Florida (**Figure 1**) at N28°21'38"/W80°45'04". The well was drilled by Southern Well Services of Clearwater, Florida, under contract to the St. Johns River Water Management District (SJRWMD) for the purpose of investigating the hydrogeology of the Floridan Aquifer with respect to suitability for use in an ASR system. A map depicting the details of the site is provided as **Figure 2**.

To be considered suitable for ASR, the storage interval chosen should display hydraulic properties and water quality parameters within a range that is favorable for high recovery efficiency. These characteristics include: storage zone native water chloride concentrations of less than 1,500 ml/L; storage zone transmissivity that will efficiently accept the target well capacity; and adequate confinement above and below the proposed storage zone.

The target storage rate for the Cocoa ASR System is 2.5 million gallons per day (mgd); the ASR operational program is envisioned to include injection cycles of up to 30 days, resulting in a target storage volume of 75 mg. The targeted recovered water quality will meet drinking water standards (<200 mg/L chloride concentration), and will require minimal treatment (disinfection) prior to distribution through the City's potable water supply network.

2.0 Well Construction

The exploratory well was constructed with a 24-in diameter steel surface casing set to 160 ft below land surface (bls), an 18-in diameter steel intermediate casing set to 216 ft bls, and a 12-in diameter steel inner casing set at a depth of 503 ft bls. The open-hole portion of the well was initially drilled to a total depth of 1300 ft bls, but was back-plugged to 566 ft bls. The construction details of the well are presented in **Figure 3**.

Work in preparation of the drilling of the exploratory well began during the week of August 7, 2004, with the completion of the drilling pad and liner and the mobilization of the drilling rig to the site. The drilling pad was constructed of compacted earth overlain with a plastic liner. The pad was constructed according to the design specifications presented in **Figure 4**. The sides of the pad terminated in 2-ft high berms, which were also covered by the plastic liner. The design of the pad, liner, and berms was such that the system would capture and retain any drilling fluids or saline water spilled during the construction and testing of the well. The plastic liner was then covered with a layer of crushed limestone to protect the liner from damage during the drilling and testing activities.

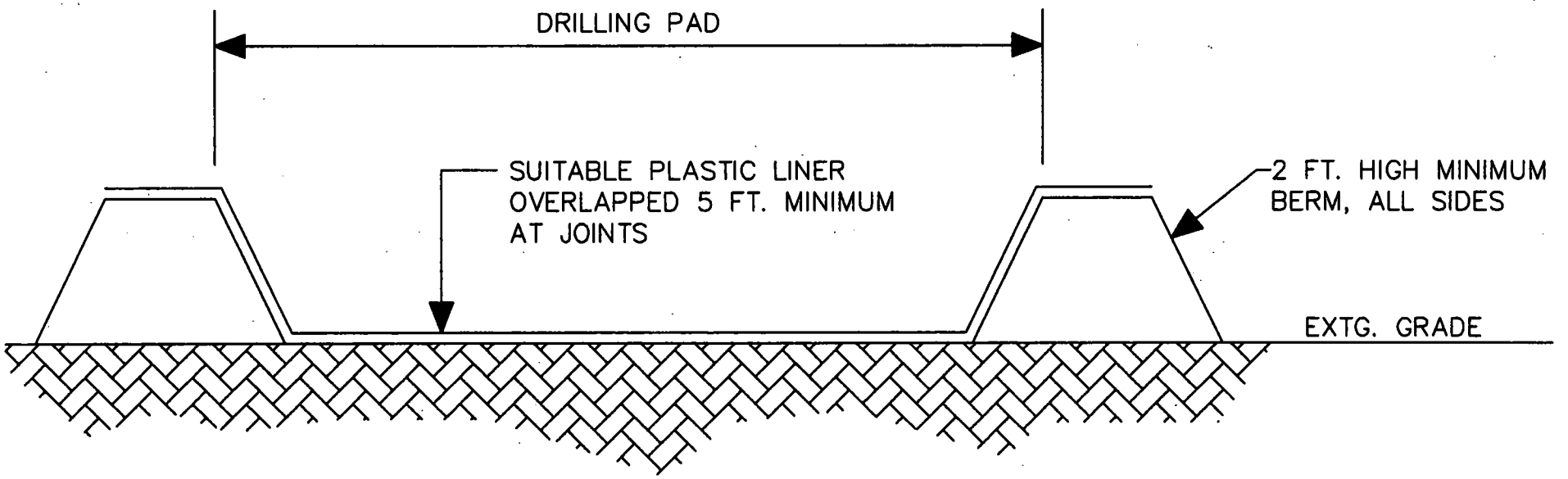
Three surficial aquifer monitoring wells were installed around the drilling pad. These wells were constructed of 2-in diameter Schedule 40 PVC with 0.010-in slotted well screen; two of the wells were completed with the screen from 28-45 ft bls, while the third was screened from 25-45 ft bls. Construction details for the monitoring wells are presented in **Figure 5** and **Table 1.** Groundwater samples from the monitoring wells were collected before, during, and after drilling activities to monitor for the presence of saline water or other contaminants related to the drilling activities. None of the samples collected from the monitoring wells contained elevated levels of chloride ions or other contaminants. After two months of hurricane-related delays, the installation of the 24-in diameter steel surface casing commenced on October 7, 2004.

Table 1 – Surficial Aquifer Monitoring Wells – Construction Details

Well ID	Cased Depth (ft bls)	Screened Interval (ft bls)
MW-1	28	28 – 45
MW-2	28	28 – 45
MW-3	25	25 – 45

2.1 Drilling Methods

Three methods of drilling were utilized in the construction of the exploratory well. Initially, the 24-in diameter steel surface (conductor) casing was advanced by a combination of pneumatically driving the casing and drilling ahead of the casing using the mud rotary method to facilitate the advancement of the casing to refusal (top of rock) at 160 ft below land surface (bls). Next, the borehole for the installation of the 18-inch diameter intermediate casing was advanced to 223 ft bls using the mud rotary method of drilling. An 18-inch diameter steel casing 216 ft long was pressure grouted into place using a combination of the Modified Halliburton Method of pressure grouting for the first stage of grouting, followed by tremie grouting to land surface.



Andreyev Engineering, Inc.

DRILLING PAD DETAIL

CITY OF COCOA

ASR EXPLORATORY WELL

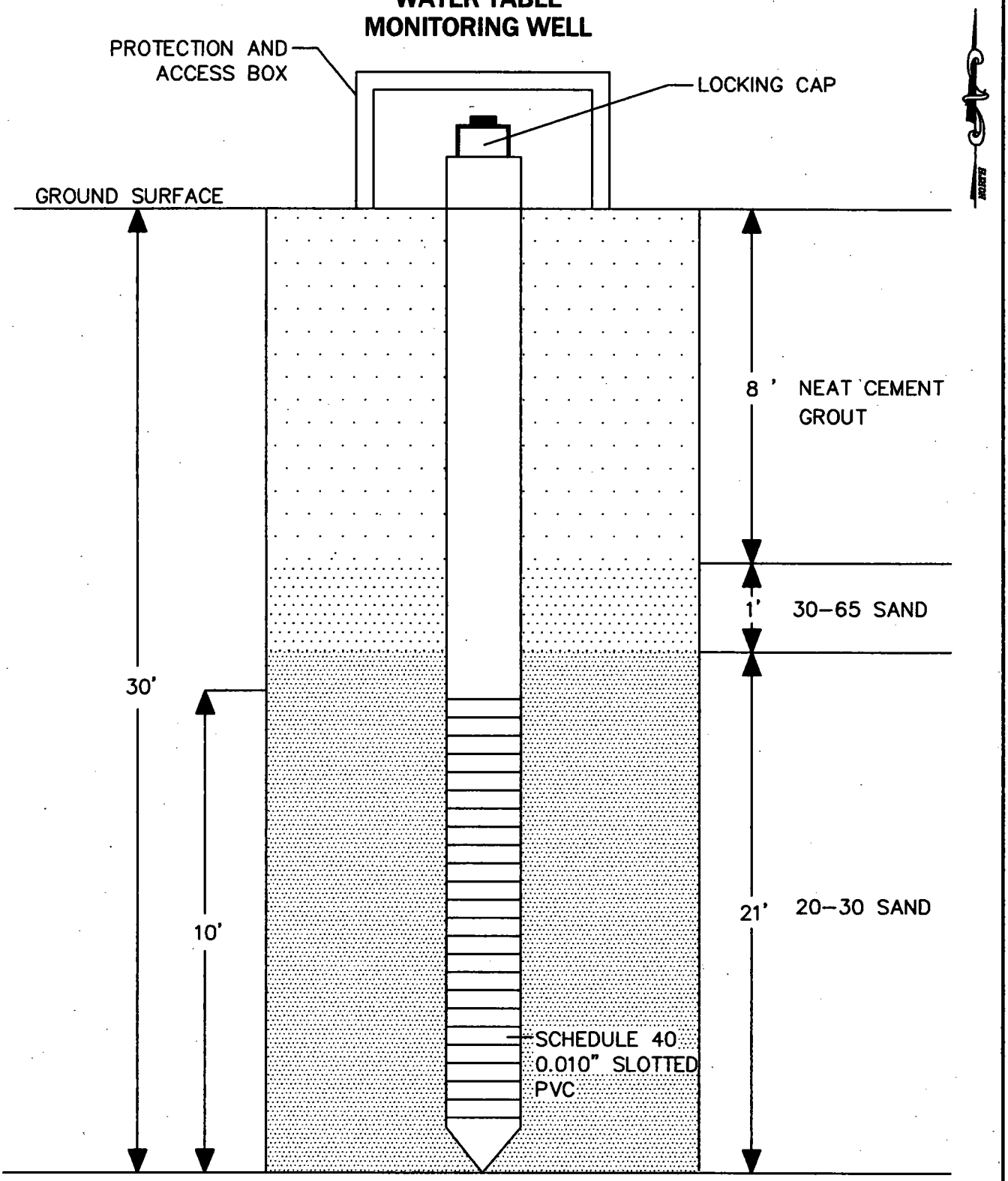
BREVARD COUNTY, FLORIDA

APPROXIMATE SCALE:	DATE: 9/19/05	ENGINEER: CH
N.T.S.	PN:MGGW-03-258	DRAWN BY: TA

DRILLING PAD CONSTRUCTION DETAILS

FIGURE 4

WATER TABLE MONITORING WELL



Andreyev Engineering, Inc.			WATER TABLE MONITORING WELL **CITY OF COCOA** ASR EXPLORATORY WELL BREVARD COUNTY, FLORIDA
APPROXIMATE SCALE: N.T.S.	DATE: 9/19/05 PN:MGGW–03–258	ENGINEER: CH DRAWN BY: TA	SURFICIAL AQUIFER MONITORING WELL CONSTRUCTION DETAILS FIGURE 5

The borehole for the 12-inch diameter steel inner casing was initially advanced using the reverse-air method; the presence of micritic limestone and lime mud below 345 ft bls caused repeated plugging of the reverse-air circulation system, so the drilling contractor switched back to mud rotary drilling until 505 ft bls prior to setting 503 ft of 12-in diameter steel casing. The 12-inch diameter inner casing was then pressure grouted into place using a combination of the Modified Halliburton Method of pressure grouting for the first stage of grouting, followed by tremie grouting to land surface.

The remainder of the borehole of the exploratory well from just below the 12-in diameter inner casing to the total depth of 1300 ft bls was drilled using the reverse-air method of drilling. Five 4-in diameter cores were retrieved during the advancement of the borehole using a 20-ft long diamond-bit core barrel. During the drilling, five single-stem packer tests were performed to determine initial aquifer hydraulic parameters for the intervals penetrated by the exploratory well. Following the completion of the borehole to the total depth of 1300 ft bls, the well was back-plugged with a combination of neat cement and gravel to the depth of 566 ft bls.

Final well development, open hole interval between 503 – 566 ft bls, was conducting using air-lift developing method first, pumping at a rate of about 60 gpm for approximately 8 hours, and then by direct pumping the well at 450 gpm for 4 hours using a submersible pump.

2.2 Casing Advancement

Three casings were installed during the construction of the exploratory well. The surface (pit) casing was constructed of 24-in O.D., 0.375-in wall steel well casing driven to a depth of 160 ft bls. The intermediate casing was constructed of 216 ft of 18-in O.D., 0.375-in wall steel well casing. The inner (final) casing was constructed of 503 ft of 12-in O.D., 0.375-in wall steel well casing.

All casing joints were joined using solid, continuous fillet welds to join the beveled ends of the joints. Centralizers were fitted at 0, 90, 180, and 270 degrees around the intermediate and final casings prior to their installation and grouting. The centralizers were located as follows: 1) at five ft above the bottom end of the casing; 2) at 20 ft above the bottom end of the casing; 3) at 100-ft intervals above the second set of centralizers; and 4) at 20 ft below land surface.

The 24-in diameter surface casing was advanced by a combination of drilling and driving from land surface to the depth of 160 ft bls over the period of October 7 – 21, 2004. The 216-ft long 18-in diameter intermediate casing was set into the borehole and grouted into place over the period of October 27 - November 3, 2004. Finally, the 503-ft long 12-in diameter inner casing was set

into the borehole and grouted into place over the period of December 22 – 28, 2004.

2.3 Casing Grouting

The 24-in diameter surface casing was not grouted in place. Rather, it was driven into the ground to the depth of 160 ft bls using a pneumatic casing hammer between intervals of mud rotary drilling in advance of the casing.

The 216-ft length of 18-in diameter steel intermediate casing was grouted in six stages. The first stage was accomplished using the Modified Halliburton method of pressure grouting. 230 sacks of neat Portland cement were mixed and pumped into the annulus surrounding the casing, accomplishing a lift of approximately 28% of the theoretical return. The second 230-sack stage of cement, introduced through a tremie pipe in the annulus, only gained one foot against a theoretical return of 184 ft. The lost-circulation zone was bridged by introducing 192 sacks of bentonite hole plug into the borehole. The hole plug was allowed to hydrate and was topped with 25 sacks of neat Portland cement. The next day, following the setting of the cement cap, the remainder of the annulus was tremie grouted in two final stages unitl cement returns were observed at land surface. The procedures and volumes of materials used in the grouting of the 18-in diameter steel intermediate casing are summarized in **Table 2**, below.

Table 2 – Cementing Details – 18-in Intermediate Casing

Date	Tag Depth (ft bls)	Tremie Depth (ft bls)	Grout/Hole Plug Volume	Return Theoretical (ft)	Return Actual (ft)	Comments
10/27/04	223	NA	230 sks	175	49	Pressure grout 216-ft of 18" dia. steel casing
10/28/04	174	NR	230 sks	184	1	Grout through tremie pipe
10/29/04	173	NR	-	-	-	Tag only
11/01/04	173	NR	192 sks	-	-	Hole plug used in zone with poor cement return
11/01/04	166	NR	25 sks			Grout through tremie pipe
11/02/04	157	NR	180 sks	144	127	Grout through tremie pipe
11/03/04	30	NR	30 sks	24	30	18" dia. casing grouted to surface

NA = not applicable (pressure grouting); NR = not recorded

The 503 ft of 12-in diameter steel inner casing was grouted in three stages. The first stage was accomplished using the Modified Halliburton method

of pressure grouting. 211 sacks of neat Portland cement were mixed and pumped into the annulus surrounding the casing, accomplishing a lift of approximately 60% of the theoretical return. The second stage of cement, 235 sacks of cement introduced through a tremie pipe in the annulus, gained 224 feet, 195% of the theoretical lift of 115 ft. The remainder of the annulus was tremie grouted in one final stage consisting of 132 sacks unitl cement returns were observed at land surface. The procedures and volumes of materials used in the grouting of the 12-in diameter steel inner casing are summarized in **Table 3**, below.

Temperature logs were run within 12 hours following each cementing lift to verify the actual height of the cement in the annular space; copies of the temperature logs are included in Appendix C.

Table 3 – Cementing Details – 12-in Inner Casing

Date	Tag Depth (ft bls)	Tremie Depth (ft bls)	Grout/Hole Plug Volume	Return Theoretical (ft)	Return Actual (ft)	Comments
12/22/04	508	440	211 sks	236	140	Pressure grout 505-ft of 12" dia. steel casing
12/27/04	368	348	235 sks	115	224	Grout through tremie pipe
12/28/04	144	134	132 sks	-	-	12" dia. Casing grouted to surface

2.4 Open Hole Drilling, Coring, and Packer Testing

Following the completion of the grouting of the 12-inch diameter inner casing, the cement plug was drilled out and an 11-3/4-inch diamerter borehole was advanced using the reverse-air method of drilling. Drilling continued to the depth of 903 ft bls. Two 4-inch diameter cores were collected from this interval at the following depths:

Core #1: 594 – 614 ft bls
Core #2: 841 – 861 ft bls

Borehole advancement was halted at the depth of 903 ft bls, at which point a series of four single-stem packer tests were conducted. The packer tests were conducted by setting a single-stem packer at intervals of approximately 100 ft; the specific packer setting depths were chosen based upon lithology and the profile of the borehole as determined by the caliper log.

Packer test depths and the intervals tested are presented in **Table 4**. The groundwater quality results and drawdown information from the packer tests are

presented in **Section 4.3 - *Single Stem Packer Testing***. Prior to advancing the borehole past the 903-ft depth, a constant rate pumping test was also performed. During the constant rate test, the well was pumped at the rate of 1,450 gpm for a period of approximately 3-1/2 hours. Following the completion of the constant rate test, the borehole was advanced to the depth of 1100 ft bls, at which point a seventh packer test was performed. Finally, following the advancement of the borehole to the total depth of 1300 ft bls, an eighth and final packer test was performed. Three more core samples were collected from this interval at the following depths:

Core #3: 957 – 967 ft bls
Core #4: 1050 – 1065 ft bls
Core #5: 1203 – 1223 ft bls.

Table 4 – Packer Test Intervals

Test #	Date	Packer Seal Centerline (ft bls)	Interval Tested (ft bls)	Pumping Rate (gpm)
1	2/11/05	517.5	519 - 903	320
2	2/16/05	613.5	615 – 903	235
3	2/18/05	706.5	708 – 903	295
3A	2/18/05	687.5	689 - 903	300
4	2/21/05	796	797.5 – 903	52
4A	2/21/05	796	797.5 – 903	300
5	3/29/05	912.5	914 – 1100	280
6	4/20/05	1111.5	1115 - 1300	280

2.5 Backplugging of Well

Following the final well logging and the completion of the series of packer tests, the borehole was backplugged to 566 ft bls. This target depth was chosen based upon water quality and lithologic data collected during drilling, the packer test data, and review of the geophysical logs of the well. Backplugging was accomplished in 14 stages of neat cement grout, with two intervals of pea gravel to bridge lost circulation zones. The volumes of grout or pea gravel used, theoretical volumes, and actual volumes are presented in **Table 5**. The backplugging activities resulted in the well being completed with a 61-ft open hole test interval from 503 – 566 ft bls.

Table 5 – Cementing Details – Backplugging

Date	Tag Depth (ft bls)	Grout/Hole Plug Volume	Return Theoretical (ft)	Return Actual (ft)	Comments
4/25/05	1,300	110 sks	80	24	
4/26/05	1,276	110 sks	95	58	
4/27/05	1,218	3 yds (pea gravel)			Pea gravel used to fill voids
4/27/05	1,181	25 sks	33	21	
4/28/05	1,160	110 sks	106	90	
4/29/05	1,070	154 sks	150	95	
5/2/05	975	154 sks	140	125	
5/3/05	850	154 sks	92	105	
5/4/05	745	8 yds (pea gravel)			Pea gravel used to fill large wash out
5/4/05	700	25 sks	21	12	
5/5/05	688	25 sks	23	11	Grout pump breaks down
5/7/05	677	50 sks	42	17	
5/9/05	660	50 sks	42	30	
5/10/05	630	35 sks	38	36	
5/11/05	594	-			Stop for packer test
5/17/05	594	35 sks	17	13	
5/18/05	581	15 sks	8	7	
5/19/05	574	8 sks	4	8	
5/23/05	566				Final tag, stop backplugging

3.0 Drilling Data

During the drilling process, data was collected on various parameters of importance for the assessment of the suitability of the formations encountered to accept injected water. The types of data collected include groundwater levels during drilling, well drawdown during the reverse-air phase of the drilling, and water quality during single-stem packer testing and constant rate pump testing. Additionally, water quality data was obtained during final well development. The integrity of the inner casing was tested via a casing pressure test. The data collected and the outcomes of these tests are described below.

3.1 Groundwater Levels

During drilling and testing operations, static groundwater levels were collected from both the casing and from the interior of the drill rods at the beginning of each day of drilling. During the activities prior to the installation of the 12-inch diameter final casing, the static water levels within the drill rods remained nearly constant (20.88 – 21.00 ft bmp). Static water levels within the casing were nearly identical; except for two measurements (27.00 and 27.74 ft bmp) water levels ranged from 20.85 – 21.40 ft bmp.

From the time that the 12-inch casing was set at 503 ft bls until the conclusion of the drilling and testing activities, the static water levels within the 12-inch casing remained within a narrow range of depths, from a high level of 18.55 ft bmp to a low of 21.02 ft bmp. Water levels within the drill rods, however, showed lower static water levels with increasing depth below 1100 ft bls. Discounting occasional significant drops in water level at times related to packer testing or other pumping activities, the static water levels within the drill rods ranged from 18.55 – 21.85 ft bmp until the borehole reached 1100 ft bls. From 1100 ft bls to TD at 1300 ft bls, static water levels inside the drill rods were measured at 20.30 – 28.6 ft bls. Groundwater level data collected during drilling and testing activities is summarized in **Appendix A.**

3.2 Drawdown After Rod Advancement

During reverse-air drilling following the setting of the surface casing, short-term specific capacity testing was performed at each rod break (every 30 ft). At the completion of a 30-ft drilling interval, and prior to breaking the rods to make the next connection, the reverse-air discharge rate and the depth to water during reverse-air pumping were measured. The pumping water level was compared to the static water level recorded at the beginning of the day, and the resultant drawdown was divided into the pumping rate to calculate a specific capacity value, expressed in gallons per minute per foot of drawdown (gpm/ft).

From the time that the intermediate casing was set at 216 ft bls until the final casing was set at 503 ft bls, the reverse-air discharge was being routed through a four-inch diameter discharge line that had been left in place during the mud-rotary drilling. This small diameter discharge line restricted the reverse-air discharge flow to less than 80 gpm, with a maximum of 0.73 ft of drawdown. The resultant specific capacity (107 gpm/ft) is not considered to be a representative value for the Floridan Aquifer.

Below the 503-ft bls setting depth of the 12-inch final casing, the high transmissivity of the aquifer versus the friction-associated head loss in the drill stem resulted in specific capacity values that are questionable at best. The reverse-air discharge rate, which dropped slightly from 200 gpm to 188 gpm by the time the well had been advanced to 957 ft bls, never caused more than 0.50 ft of drawdown in the well. Calculated specific capacity values ranged from 400 gpm/ft at the depth of 655 ft bls to almost 970 gpm/ft at the depth of 903 ft bls. Below the 903 ft bls the reported drawdowns were negative to negligible. Therefore, meaningful calculation of specific capacity values was **not possible** from the data collected during reverse-air drilling. The specific capacity data collected during reverse-air drilling is presented in **Appendix A.**

3.3 Single Stem Packer Testing

Single stem packer tests were conducted at six intervals, as indicated in **Table 5**, which also contains a summary of the water quality data collected during the tests. These tests were carried out to determine the specific capacity of the individual zones tested, thus allowing an estimate of the water-storage capacity of the zones. Following the completion of the borehole to the depth of 903 ft bls, a series of four packer tests were run. The packer setting depths for these tests were spaced at approximately 100-ft intervals, with each successive test drawing from a shorter interval than the previous test. Two additional tests were performed as the borehole was being advanced to the final depth of 1300 ft bls. Each of the two final tests drew water from an interval of approximately 200 ft in thickness.

Water quality and drawdown data collected during the single stem packer tests are summarized in **Tables 6 & 7**; complete analytical results of all water samples collected are included in **Appendix A**.

Table 6 – Packer Test Water Quality

Test #	Date	Packer Seal Centerline (ft bls)	Interval Tested (ft bls)	Chloride (mg/l)	Conductivity (uS/cm)
1	2/11/05	517.5	519 – 903	1,270	5,020
2	2/16/05	613.5	615 – 903	1,255	5,000
3	2/18/05	706.5	708 – 903	940	4,299
3A	2/18/05	687.5	689 – 903	1,510	6,790
4	2/21/05	796	797.5 – 903	-	6,500
4A	2/21/05	796	797.5 – 903	-	-
5	3/29/05	912.5	914 – 1100	-	16,360
6	4/20/05	1111.5	1115 – 1300	-	30,530

During the single stem packer tests, water level changes within the borehole were recorded using electronic pressure transducers attached to a digital datalogger. Drawdown from static conditions within the borehole was measured, and the average drawdown distance was divided into the pumping rate to reach a calculated specific capacity for each of the packer test zones. The specific capacity (gpm./ft) of each of the zones tested is provided in **Table 7**. During Test #4, insufficient drawdown resulted due to the low pumping rate; therefore, it was not possible to calculate a specific capacity from the results of this test. Additionally, during Test #6 (the final test), the packer appeared to have leaked, resulting in less drawdown than would have otherwise occurred. This results in the higher-than-average specific capacity value for the final test.

Table 7 – Packer Test Specific Capacity Testing

Test #	Date	Packer Seal Centerline (ft bls)	Interval Tested (ft bls)	Pumping Rate (gpm)	Drawdown (ft)	Specific Capacity (gpm/ft)
1	2/11/05	517.5	519 - 903	320	31.1	10.3
2	2/16/05	613.5	615 – 903	235	52.8	4.4
3	2/18/05	706.5	708 – 903	295	25.0	11.8
3A	2/18/05	687.5	689 - 903	300	24.6	12.2
4	2/21/05	796	797.5 – 903	52	n/a	n/a
4A	2/21/05	796	797.5 – 903	300	25.6	11.7
5	3/29/05	912.5	914 – 1100	280	31.7	8.8
6	4/20/05	1111.5	1115 - 1300	280	8.1	34.6

n/a – test did not produce sufficient drawdown for analysis

The information gathered during the packer testing (specific capacity estimates and water quality data) was used in the selection of the storage zone in that Test #2 (615-903 ft bls) exhibited a significantly lower than did Test #1 (519-903 ft bls), indicating that the zone from 519-615 ft bls exhibits a higher transmissivity than the underlying zone.

3.4 Constant Rate Testing

A constant rate pumping test was performed on the entire open borehole prior to advancing past the depth of 903 ft bls. A 60-hp submersible pump was set at 40 ft bls, and the well was pumped at the rate of 1,450 gpm for 3-1/2 hours. The total volume purged during the constant rate test was 292,929 gallons. Well drawdown stabilized at approximately 10 ft below the static water level, indicating a specific capacity value of 145 gpm/ft. During the constant rate test, the specific conductivity of the discharged water increased slightly from 6,340 uS/cm to 7,010 uS/cm. Chloride concentration also increased slightly from 1,840 mg/l to 1,970 mg/l. A summary of the data collected during the constant rate test, including graphs of water levels collected during the drawdown and recovery phases, is included in **Appendix A**.

3.5 Final Development

After the completion of the backplugging, the well was developed a final time by reverse-air development at approximately 60 gpm through the drill stem for six and a half hours on the first day and for one and a half hours on the second day. Subsequently, the drill stem was pulled from the well and the well was further developed using a submersible pump at approximately 450 gpm for 4 hours. A graph depicting the water levels during the final development is included in **Appendix A**.

Water quality samples were collected during the final development and were analyzed for the field parameters of pH, temperature, chloride

concentration, and specific conductivity. The water quality data collected during final development is presented in **Table 8.**

Table 8 – Groundwater Quality during Final Development

Date/ Time	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)
6/10/05 1200					
6/10/05 1202	564	6.85	27.2	-	10,080
6/10/05 1230	564	7.46	27.5	-	10,070
6/10/05 1330	564	7.40	27.1	-	7,950
6/10/05 1430	564	7.22	26.8	-	7,930
6/10/05 1530	564	7.60	26.7	-	8,000
6/10/05 1630	564	7.35	26.6	-	7,990
6/10/05 1730	564	7.74	26.6	-	7,990
6/10/05 1830	564	7.81	26.6	1,600	7,970
6/11/05 0740	540	6.35	25.7	-	7,830
6/11/05 0905	540	6.96	25.8	-	7,910
6/11/05 1203	-	-	-	-	-
6/11/05 1215	504-566	7.28	26.7	-	7,810
6/11/05 1300	504-566	7.40	26.7	-	7,870
6/11/05 1400	504-566	7.64	26.9	-	7,910
6/11/05 1500	504-566	7.44	26.9	-	7,920
6/11/05 1600	504-566	7.60	27.1	1,660	7,920
6/11/05 1633	504-566	-	-	-	-

3.6 Casing Pressure Test

Following the final development of the well, the casing was pressure tested by inflating a packer at the bottom of the casing, then filling the casing with water and pressurizing the inside of the casing to 55 psi. The packer was first set with 400 psi of pressure just above the bottom of the casing at 500 ft bls. Subsequently, the casing was pressurized to 55 psi and the inlet valve was shut down. When the casing was first pressurized, the pressure within the casing was observed to gradually increase from 55 to 62 psi (assumed to be due to temperature stabilization). The pressure was then monitored for 70 minutes, during which time the pressure drifted from +4.8% to -1.6%. Within the period of one hour, the casing pressure gained, then lost, three psi, or less than the 5% pass/fail threshold. The casing, therefore, passed the pressure test.

Table 9 – Casing Pressure Test Data

Time	Wellhead Pressure (psi)	Pressure Gain/Loss (psi)	Pressure Gain/Loss (%)
1012	62	0	0.0 %
1022	63	+1	+1.6 %
1032	65	+3	+4.8 %
1042	65	+3	+4.8 %
1052	64	+2	+3.2 %
1102	61	-1	-1.6 %
1112	61	-1	-1.6 %
1122	62	0	0.0 %

3.7 Wellhead Completion

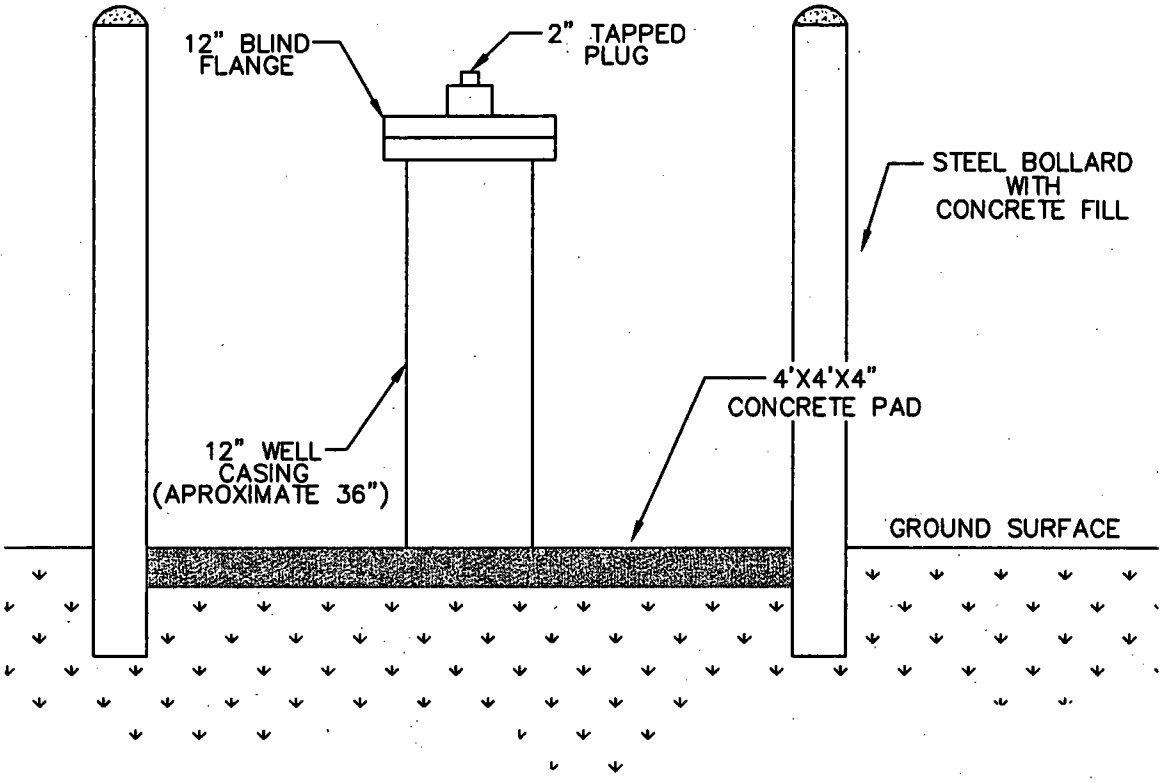
The final wellhead was completed above grade using a 12-inch diameter spool flanged to the top of the 12-inch final casing. The spool was extended about 30 inches above land surface, and topped with a blind flange. The well casing is protected with a four foot by four foot, four-inch thick, concrete slab. Protective steel bollards filled with concrete are mounted at the corners of the slab. The wellhead construction details are depicted in **Figure 6**.

4.0 Lithology

4.1 Geologist's Log

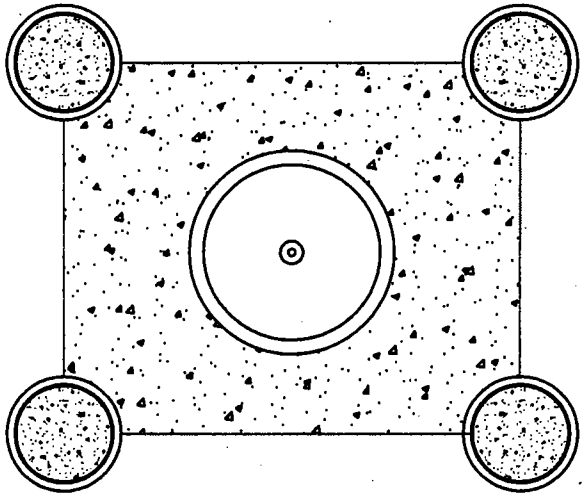
Following the installation of the intermediate casing to the depth of 216 ft bls, cuttings were collected on a continual basis during reverse-air drilling. Cuttings were collected from both the reverse-air discharge point prior to the mud screen apparatus (including fine size fraction) and also from the cuttings

PROFILE VIEW



TOP VIEW

SEE PROFILE VIEW FOR DETAILS



Andreyev Engineering, Inc.			FLORIDAN AQUIFER EXPLORATORY WELL **CITY OF COCOA** ASR EXPLORATORY WELL BREVARD COUNTY, FLORIDA
APPROXIMATE SCALE: N.TS.	DATE: 9/19/05 PN:MGGW-03-258	ENGINEER: CH DRAWN BY: TA	WELLHEAD CONSTRUCTION DETAILS FIGURE 6

discharged from the shale shaker screen (larger than sand-sized fraction). Samples were examined and the composition of the rock was described for each distinct lithologic unit. The complete Geologist's Log prepared by the SJRWMD is provided in **Appendix A**; a summary of the Geologist's Log is presented in **Figure 7**.

From approximately 216 to 474 ft bls in the upper portion of the Upper Floridan Aquifer, drilling continued in soft fossiliferous limestone; the final 25 ft displayed an increasing concentration of dolomitic limestone. The induration of the interbedded limestone/dolostone increased with depth through this first dolomitic interval to 510 ft bls. The middle and lower portions of the Upper Floridan Aquifer from 510 to 936 ft bls consisted of a variable series of limestone, dolomitic limestone, and dolostone. Indurations ranged from poor to moderate, and porosity was variable.

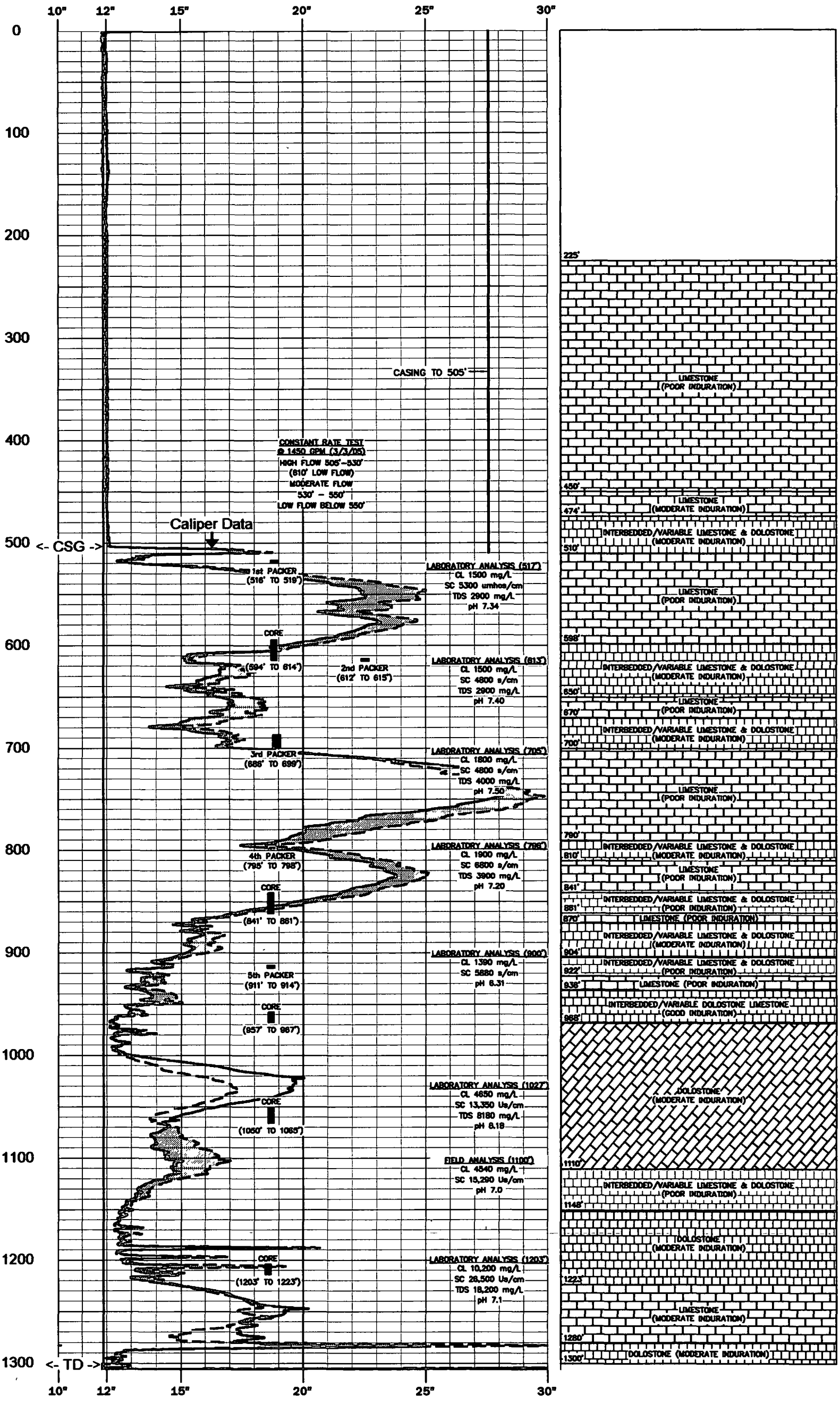
At 936 ft bls well indurated dolomite and dolomitic limestone of the Mid-Floridan Semi-Confining Unit (MFSCU) was encountered. Rock structure became microcrystalline; dolomitic limestone layers displayed micritic texture, while the dolostone that was encountered had a sucrosic texture. Below 936 ft bls, the MFSCU consisted of low-porosity, extensively recrystallized and well indurated, interbedded limestone and dolostone to 968 ft bls, at which depth it gave way to more consistent crystalline dolomitic limestone and dolostone extending to 1110 ft bls.

The top of the Lower Floridan Aquifer was marked by the appearance of poorly-indurated interbedded limestone and dolomitic limestone from 1110 to 1148 ft bls. From 1148 to 1223 ft bls, an interval of microcrystalline dolostone was encountered; this interval displayed porosity types including fine, pin-point pores, intergranular to intercrystalline porosity, and moldic to vugular porosity. Peat and/or lignite layers were encountered in the interval between 1183 and 1194 ft bls.

A poorly-indurated fossiliferous limestone was encountered in the interval from 1221 to 1280 ft bls in the Lower Floridan Aquifer. The limestone gave way to a moderately-indurated dolomitic limestone for the last 20 ft of the borehole to the depth of 1300 ft bls.

4.2 Mineralogical Analyses

Eight samples from the cores collected during drilling were submitted to an analytical laboratory for mineralogical analyses. The samples were analyzed for arsenic, gross alpha radionucleides, iron, magnesium, manganese, strontium, and uranium. The results of these analyses are presented in **Table 10**.



WATER QUALITY DURING FINAL WELL DEVELOPMENT

6.5 HOURS INTO DEVELOPMENT		28 HOURS INTO DEVELOPMENT	
pH	6.85	pH	7.60
SC	7970 umhos/cm	SC	7920 umhos/cm
Cl	1600 mg/L	Cl	1600 mg/L

Andreyev Engineering, Inc.

LOWER FLORIDAN AQUIFER OF WELL

CITY OF COCOA

ASR EXPLORATORY WELL

BREVARD COUNTY, FLORIDA

LITHOLOGY & CALIPER LOG

APPROXIMATE SCALE:	DATE: 9/19/05	ENGINEER: CH
N.T.S.	PN: MCGW-03-258	DRAWN BY: TA

FIGURE 7

Table 10 – Mineralogical Analyses of Core Samples

Sample Depth (ft bls)	Arsenic (mg/kg)	Iron (mg/kg)	Magnesium (mg/kg)	Manganese (mg/kg)	Strontium (mg/kg)	Gross Alpha (pCi/g)	Uranium (pCi/g)
510	2.2	150	61400	5.2	465	<0.9 (+/- 0.8)	<1.0 (+/- 0.7)
550	ND @ RL=0.5	2030	8250	28.9	370	<3.4 (+/- 2.0)	1.8 (+/- 1.0)
600	ND @ RL=0.6	655	3760	7.0	760	7.11 (+/- 1.7)	2.7 (+/- 0.0)
604	2.0	195	66200	4.5	415	<0.8 (+/- 0.7)	<0.9 (+/- 0.5)
841	2.0	76.6	60800	3.2	525	<1.1 (+/- 0.8)	<0.9 (+/- 0.6)
965	2.8	50.0	74220	3.4	570	5.6 (+/- 1.2)	2.5 (+/- 0.0)
1063	3.9	145	78220	3.3	495	4.1 (+/- 1.4)	1.2 (+/- 0.0)
1215	3.3	190	78760	4.1	470	5.6 (+/- 1.1)	1.4 (+/- 0.0)

Within the final open hole portion of the well (503 – 566 ft bls) the arsenic content of the rock is relatively low, from non-detectable to 2.2 mg/kg. The ranges of iron, magnesium, and manganese content, however, are greater, reflecting the varying composition of the interbedded limestone and dolostone.

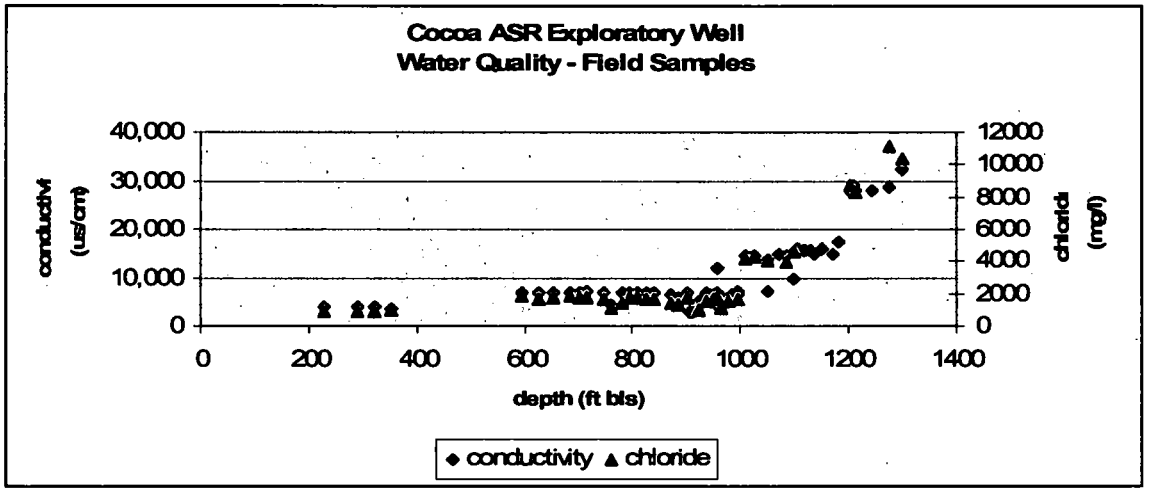
5.0 Groundwater Quality

Water samples were collected at various times during the drilling and testing activities, and were analyzed both in the field and by a certified environmental laboratory. During reverse air drilling activities, samples were collected from the reverse air discharge for field analysis at each rod change and several times during the advancement of each rod. Samples were also collected for laboratory analysis during the single-stem packer tests and the constant rate pump tests.

5.1 Field Samples

Field measurements were taken of pH, temperature, chloride ion concentration, and specific conductivity. **Figure 8** presents the chloride and specific conductivity profile; the complete set of water quality results from the field analyses is provided in **Appendix A.**

Figure 8 –Water Quality – Field Samples



The chloride concentration appears to be relatively low in the Upper Floridan aquifer and noticeably increases in the Lower Floridan aquifer. The chloride concentrations increased from 1,660 mg/l at 995 ft bls to 4,140 mg/l at 1010 ft bls; the specific conductivity of the groundwater also increased from 7,110 to 14,400 us/cm in this interval. The increasing chloride concentration generally follows the saltwater interface transition zone, expected at these depths.

5.2 Laboratory Analytical Results

Groundwater samples were collected for laboratory analyses during the single-stem packer tests from the following depth intervals:

519 - 903 ft bls
615 - 903 ft bls
705 - 903 ft bls
797 - 903 ft bls
914 - 1100 ft bls
1115 - 1300 ft bls

The sampes were analyzed for pH, specific conductance, chloride, total dissolved solids (TDS), sulfate, carbonate alkalinity, bicarbonate, sulfide, total coliform, arsenic, barium, calcium, magnesium, manganese, potassium, sodium, vanadium, gross alpha, gross beta, radium-226, radium-228, and strontium-90. The results of these analyses are presented in **Table 11**.

Table 11 – Water Quality – Laboratory Samples

Sample Interval (ft bls)	pH	Spec. Cond.	Cl	TDS	SO4	Carb Alkalin (CaCO3)	Bicarb (HCO3)	S-	Total Colif. (P/A)	As	Ba	Ca	Mg	Mn	K	Na	V
519-903 Packer	7.34	5300	1500	2900	190	nd	nd	3.2	P	nd	0.094	170	100	nr	24	790	nd
615-903 Packer	7.4	4800	1500	2900	230	130	nd	2.9	P	nd	0.066	150	110	nr	26	770	nd
705-903 Packer	7.5	6900	1800	4000	300	120	nd	2.7	P	nd	0.16	190	130	nr	40	1100	nd
797-903 Packer	7.2	6800	1900	3900	250	nd	nd	1.8	P	nd	0.16	190	130	nr	40	1100	nd
797-903 CRTest	6.2	6700	2300	3700	260	nd	110	1.9	P	nd	0.17	200	140	nr	45	1100	nd
797-903 CRTest (3hrs)	7.46	6100	2000	3300	230	nd	120	1.9	P	nd	0.14	180	120	nr	38	1400	nd
914-1100	7.29	15000	5600	8000	600	nd	130	3.2	A	nd	0.13	340	300	nr	82	3000	ns
1115-1300	6.98	28000	9800	1900	1400	ns	ns	2.6	A	nd	0.11	480	580	nr	140	5400	ns

nd = not detected
ns = not sampled
nr = not reported (results were below reporting limit)

Table 11 – Water Quality – Laboratory Samples (continued)

Sample Interval (ft bls)	Gross Alpha	Gross Beta	Ra-226	Ra-228	Sr-90
519-903 Packer	4.17 +/- 1.89	13.3 +/- 12.9	3.96 +/- 1.03	3.69 +/- 0.964	Nd
615-903 Packer	7.53 +/- 2.74	13.7 +/- 9.91	4.11 +/- 1.27	2.37 +/- 0.591	Nd
705-903 Packer	9.29 +/-3.09	16.1 +/-11.7	6.96 +/-2.2	1.06 +/-0.392	Nd
797-903 Packer	12.2 +/- 3.85	34.8 +/- 13.5	6.83 +/-2.18	1.61 +/- 0.547	Nd
797-903 CRTest	9.67 +/- 3.29	36.4 +/- 14.1	7.54 +/-2.39	0.863 +/-0.552	Nd
797-903 CRTest (3hrs)	14.4 +/- 4.29	28.8 +/-29.2	8.68 +/-2.8	0.364 +/-0.218	Nd
914-1100	12.2 +/- 3.89	68.4 +/- 30.5	7.17 +/- 2.26	1.44 +/- 0.413	Nd
1115-1300	12.9 +/- 3.93	205 +/- 74.3	10.4 +/- 3.15	1.34 +/- 0.399	Nd

nd = not detected

6.0 Proposed Short-term Injection/Recovery Testing Plan

Pending approval by the FDEP of a UIC Exploratory Well Permit, the City proposes to conduct a short-term injection/recovery test on the ASR test well. The purpose of the injection test are: 1) to determine if the aquifer will receive water at an adequate rate (a function of aquifer transmissivity), 2) to evaluate the geochemical effects of the injectate on the formation, and 3) to evaluate the percentage of injected water recovery. This data will be used to model the full scale ASR well proposed to be installed and operated in the vicinity of the test well.

Experience in ASR development has shown that recovery generally increases with each cycle of injection/recovery. Recovery efficiency is dependant upon zone selection, differences in water quality between injected and formation water, the desired limiting water quality in the recovered water, native water quality, volume of water injected, and formation dispersivity. If at all possible, injectate should approximate the quality of water that will ultimately be stored in the well. This will allow evaluation of the effects on the formation and potential release of metals from the formation, such as arsenic. Injectate water should be subjected to a full spectrum of tests.

The following guidelines are proposed to conduct the injection/recovery testing, with modification to be made during the execution of the test, as needed:

1. Prior to start of the injection test, groundwater samples shall be collected from the test well to establish pre-test background conditions. Sampling will be conducted in accordance with the schedule presented in Section 7.1. This will require that the well be purged by pumping until the field parameters of pH, temperature, and conductivity have stabilized. Based on the results of these analyses, a method for identifying the fraction of native and injected water in the recovered water will be developed prior to starting the test.
2. The injection phase of the test is proposed to be conducted at the target rate of 2000 gpm. Injection is proposed to last for 10 days
3. Following 10-day injection, a 30-day resting period is proposed to allow assessment of the stability of the fresh water bubble. During the resting period, water samples will be collected from the well according to the schedule presented in Section 7.1.
4. The subsequent recovery phase is proposed to be conducted at the maximum rate possible until the total injected volume is recovered. During the recovery phase, water samples from the discharge stream will be collected for analysis according to the schedule presented in Section 7.1.
5. Measure injection pressure, rate of flow, and daily total volume of injected water. A water level transducer will be installed in the well to record pressure during the final 24 hours of injection and for 48 hours after the well is shut-in. Fall-off data collected after the well is shut-in will be used to determine the formation transmissivity. Rate of flow and injection pressure will be monitored to detect either plugging of the formation or clearing/stimulation of the well.
6. Shut-in well for 30 days between injection and recovery.
7. The recovery phase will be started at a constant rate. Pressure (drawdown), flow rate, and total volume recovered each day should be recorded. A minimum of 24 hours before shut-in, a water level transducer/pressure recorder will be monitoring drawdown. The monitoring should continue for 48 hours after the recovery has ended. The analysis of pressure recovery data can be compared with the analysis of the pressure-fall-off data for an evaluation of aquifer transmissivity.
8. Frequent sampling, according to the plan presented in Section 7.1, is recommended and should be conducted to determine percent of injectate versus native water recovered. Differences in key parameters (such as chloride) between the native formation water and the injectate will be determined through field testing as well as laboratory analyses.
9. Bench tests shall be conducted prior to injection to establish, if possible, the relationship between percent mixture of groundwater and injectate and the resulting water quality.
10. Simulate the injection and recovery of the injected water by calibrating a flow and solute transport model using the ASR cycle testing data to estimate formation dispersivity future cycle recovery efficiencies

11. Prepare a summary report for the injection and recovery test and provide recommendations for the full scale ASR well installation and initial cyclic injection and recovery.

6.1 Water Quality Testing

The following is a summary of the proposed water quality testing for the short term injection and recovery test at the City of Cocoa ASR test well:

1. Prior to the initiation of injection cycle testing, one set of water samples will be collected from the ASR test well and from the injectate source. These samples will be analyzed for the following:

    - field parameters (pH, Cl, temperature, specific conductance, D.O., free chlorine, and oxidation/reduction potential (ORP)) on well water samples only
    - Primary and Secondary Drinking Water Standard parameters
    - tri-linear major cations and anions (Na, K, Ca, Mg, Cl, SO_4, HCO_3, CO_3)
    - trace metals - other elements of toxic, radionuclide, or microbiologic concern: at a minimum As, Ba, Fe, Mn, Sr, U, gross alpha, beta, combined radium 226 and 228, total coliform bacteria, hydrogen sulfide, and total sulfides. Special attention should be utilized in properly collecting and analyzing sulfide samples

2. During the 10 day injection period:
    - collect ORP and D.O. readings from the injectate (source water) every day
    - collect and test 2 samples of the injectate (source water), one sampling event on day 5 and one sampling event on day 10 of injection:
        - field parameters (pH, Cl, temperature, specific conductance)
        - Secondary Drinking Water Standard parameters, including THM analysis
        - trace metals - other elements of toxic, radionuclide, or microbiologic concern: at a minimum As, Ba, Fe, Mn, Sr, U, gross alpha, beta, combined radium 226 and 228, total coliform bacteria, hydrogen sulfide, and total sulfides. Special attention should be utilized in properly collecting and analyzing sulfide samples

3. During the 30 day resting period, collect and test 4 sets of groundwater samples, approximately 1 per week. Purge and develop the well by extracting a minimum of 3 well volumes of water prior to sampling:
    - field parameters (pH, Cl, temperature, specific conductance, D.O. and ORP)
    - tri-linear major cations and anions (Na, K, Ca, Mg, Cl, SO_4, HCO_3, CO_3)

- trace metals - other elements of toxic, radionuclide, or microbiologic concern: at a minimum As, Ba, Fe, Mn, Sr, U, gross alpha, beta, combined radium 226 and 228, total coliform bacteria, hydrogen sulfide, and total sulfides. Special attention should be utilized in properly collecting and analyzing sulfide samples

4. During 1st day of recovery period, collect and test one groundwater sample, about 6 hours into the recovery period. Samples shall be collected from the discharge pipe of the recovery pump; an appropriate sample port shall be set up so that recovered water samples can be collected from a pressurized flow line:
    - field parameters (pH, Cl, temperature, specific conductance, D.O. and ORP)
    - Secondary Drinking Water Standard parameters, including THM analysis
    - tri-linear major cations and anions (Na, K, Ca, Mg, Cl, SO_4, HCO_3, CO_3)
    - trace metals - other elements of toxic, radionuclide, or microbiologic concern: at a minimum As, Ba, Fe, Mn, Sr, U, gross alpha, beta, combined radium 226 and 228, total coliform bacteria, hydrogen sulfide, and total sulfides. Special attention should be utilized in properly collecting and analyzing sulfide samples

5. During 1st day of recovery period, collect and test 4 groundwater samples every 6 hours. Samples shall be collected from the discharge pipe of the recovery pump:
    - field parameters (pH, Cl, temperature, specific conductance, D.O., and ORP)
    - As, Fe, and total sulfides. Special attention should be utilized in properly collecting and analyzing sulfide samples

6. During remaining 9 days of recovery period, collect and test groundwater samples as follows:
    - Daily: field field parameters (pH, Cl, temperature, specific conductance, D.O., and ORP)
    - Daily: As, Fe, and total sulfides. Special attention should be utilized in properly collecting and analyzing sulfide samples
    - Every 3rd day: Cl, SO4, TDS, As, Ba, Mn, Sr, U, gross alpha, beta, combined radium 226 and 228, total coliform, hydrogen sulfide and bacteria.
    - On the 5th day and 10th day: Primary and Secondary Drinking Water Standard parameters

The sampling plan is summarized in **Table 1**, below:

Table 12 – Water Quality Sampling Plan Summary

PARAMETER GROUP	PRIOR TO INJECTION	INJECTION PHASE (10 days)		RESTING PHASE (30 days)	RECOVERY PHASE (10 days)		
	Single Sample Event	Daily Sampling Events	Day 5 & Day 10 Sampling Events	Weekly Sampling Events	1st day – Sample Event @ 6 hours into recovery	1st Day – Sampling Events every 6 hours	Remaining 9 Days – Daily Sampling Events
Field Parameters (pH, Cl, temp, spec. cond., DO, ORP)	◙	◙	◙	◙	◙	◙	◙
Primary DW Standards	◙						
Secondary DW Standards	◙		◙	◙	◙		
THMs	◙		◙	◙	◙		
Na, K, Ca, Mg, Cl, SO_4, HCO_3, CO_3 and total sulfides	◙		◙	◙	◙		
As, Ba, Fe, Mn, Sr, U, gross alpha, beta, combined radium 226 and 228, total coliform, hydrogen sulfide, total sulfides, and fecal coliform bacteria	◙		◙	◙	◙	◙ (As, Fe, total sulfides)	◙ (As, Fe, total sulfides)

7.0 Summary

This report presents the methods and results for the City of Cocoa ASR Exploratory Well drilling, testing and evaluation. The Exploratory Well was drilled and finalized in conformance with the plans and specifications developed by AEI and approved by SJRWMD and City of Cocoa. The Exploratory Well was drilled to a maximum depth of 1300 feet bls. After testing various intervals of the potential injection zones/formations and assessment of injection capacity and groundwater quality, it was determined to backplug the well to a candidate

injection zone between 503 and 566 feet bls. This target injection zone was determined to exhibit desirable ASR-zone characteristics, such as adequately high transmissivity within a short interval and low chloride concentration,that indicate that the target zone may function as an efficient ASR storage zone.

8.0 Recommendations

1. To evaluate the effectiveness of the selected injection zone, it is recommended that a minimum 1-cycle (short duration) injection and recovery test be conducted at the ASR exploratory well. This shall include the testing plan specified in Section 7.1.

2. The injection and recovery data collected from the short term test will be very useful for the assessment of the formation, as to its ability to accept injectate and its ability to release reuse-quality water. Although the test will only allow 1-cycle of storage and recovery, the data can be used to calibrate a numerical or an analytical model for the short duration and injection, resting and recovery. The calibrated model can then be used to better predict the storage and recovery capacity of a full scale ASR well.

APPENDIX A – SJRWMD FIELD DATA

APPENDIX B – LABORATORY ANALYTICAL REPORTS

APPENDIX C – GEOPHYSICAL LOGS

APPENDIX D – FEASIBILITY REPORT

The Logs and Laboratory Data that came with this document are to be filed in OCULUS as follows:

Catalog **Underground Injection Control**
Profile **Permitting_Authorization**
County **BREVARD**
District **CD**
Facility-Site ID **98942 – COCOA JERRY SELLERS ASR**
Document Date **03-13-2006**
Received Date **03-22-2006**
Document Type **ENGINEERING REPORTS**
Contractor ID
PSD Number
Permit Type **CONSTRUCTION**
Facility Type **CLASS V ASR**
Application Number
Permit Number

Document Subject ***Log Type Log Date or Lab Data*** **ENG Rpt 2006**

SJRWMD FIELD LOGS

JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 1

DRILLING DATA

Date (yymmdd)	From (ft, bls)	To (ft, bls)	Method	Bit Size (inch)	Time (min)	Rate (ft/hr)	Inclination (degree from vertical)	Comments
10/07/04	0	30	Mud	26	-	-		Losing circulation at 30-ft
10/07/04	0	40	Drive	-	-	-		Drive 24-inch steel casing
10/08/04	40	80	Drive	24	-	-		Drive 24-inch steel casing
10/18/04	80	85	Drive	24	-	-		Drive 24-inch steel casing
10/18/04	30	85	Mud	24	-	-		Drill out
10/19/04	85	126	Drive	24	-	-		Drive 24-inch steel casing
10/19/04	85	134	Mud	24	-	-		Drill out
10/20/04	126	148	Drive	24	-	-		Drive 24-inch steel casing
10/21/04	148	160	Mud	24	-	-		Drill out, lost circulation at 158-ft
10/21/04	148	160	Drive	24	-	-		Drive 24-inch steel casing
10/25/04	160	165	Mud	24	-	-		
10/26/04	165	223	Mud	24	-	-		Prep to set 18-inch steel casing
11/18/04	216	223	Mud	18	-	-		Drill out cement plug
11/18/04	223	225	Mud	18	NR	NR		
11/18/04	225	230	RA	18	31	10		
11/19/04	230	261	RA	18	75	25		
11/19/04	261	275	RA	18	46	18		
11/22/04	275	291	RA	18	58	17		
11/22/04	291	321	RA	18	50	36		
11/23/04	321	321	-	-	-	-	0	Tool depth 265-ft
11/23/04	321	345	RA	18	55	26		

Date (yymmdd)	From (ft, bls)	To (ft, bls)	Method	Bit Size (inch)	Time (min)	Rate (ft/hr)	Inclination (degree from vertical)	Comments
11/23/04	345	348	RA	18	-	-		Drill stem plugs up several times with micritic limestone
11/24/04	348	351	RA	18	-	-		Drill stem plugs up several times with micritic limestone
11/29/04	351	351	RA	18	-	-		Drill stem plugs up several times with micritic limestone
11/30/04	351	351	RA	18	-	-		Drill stem plugs up several times Trip bit out
12/01/04	351	351	RA	18	-	-		Drill stem plugged up with micritic limestone
12/02/04	351	351	RA	18	-	-		Drill stem plugged up with micritic limestone-returning to Mud Rotary
12/09/04	351	383	Mud	18	-	-		Mud pump breaks
12/09/04	360	360	-	-	-	-	0	Tool depth 300-ft
12/13/04	383	383	Mud	18	-	-		Fill coming in, used 45 bgs of gel. Large hole forming in ~350 zone. Leave to get more gel.
12/14/04	383	414	Mud	18	-	-		Fill coming in, used 65 bgs of gel.
12/15/04	414	425	Mud	18	-	-		Used 23 bgs of gel
12/16/04	425	508	Mud	18	-	-		Used 47 bgs of gel
12/16/04	460	460	-	-	-	-	0	Tool depth 400 -ft
01/05/05	500	508	RA*	12	20	24		Drill out cement plug and clear mud in casing *water being added
01/05/05	508	532	RA*	12	24	11.52		Discharge line leaks, brief stop to secure, pin on rack table coming out, brief stop to tighten, cement still in cuttings
01/05/05	532	563	RA*	12	37	50.3		*water being added, decided to go one more rod before QW sampling, cement still in cuttings
01/05/05	563	594	RA	12	39	47.7		Develop for QW, cement still in cuttings
01/07/05	594	614	-	5	35	34.3		Core
01/05/05	560*	560	-	-	-	-	0	Tool depth 500-ft rods pulled up *
01/11/05	594	625	RA	12	60	*31		*Drill back through core interval
01/11/05	655	600	-	-	-	-	0	Tool depth 600-ft

Date (yymmdd)	From (ft, bls)	To (ft, bls)	Method	Bit Size (inch)	Time (min)	Rate (ft/hr)	Inclination (degree from vertical)	Comments
01/11/05	625	655	RA	12	75	24		Cutting container emptied to reduce turbid discharge into water plant
01/11/05	655	686	RA	12	70	26.6		
01/11/05	686	700	RA	12	32	26.25		Cutting container full again , mostly micritic limestone
01/19/05	700	717	RA	12	27	37.77		
01/20/05	717	748	RA	12	64	29.06		Cutting container emptied to reduce turbid discharge into water plant
01/21/05	748	780	RA	12	52	36.92		
01/21/05	760	760	-	-	-	-	0	Tool depth 760-ft rods pulled up *
01/21/05	780	811	RA	12	65	28.61		
01/21/05	811	841	RA	12	45	27.69		
01/26/05	841	872	RA	12	65	28.61		*Drill back through core interval
01/26/05	860	860	-	-	-	-	0	Tool depth 860-ft rods pulled up *
01/26/05	872	903	RA	12	90	20.66		
050308	905	936	RA	12	83	22.4		
050308	936	950	RA	12	30	28.0		
050308	950	957	RA	12	38	11.05		
050309	957	967	Core	5	-	-		Core – barrel began clogging @ 7 ft stopped @ 10
050311	957	965	RA	12	35	13.71		*Drill back through core interval
050311	960	960					0	Tool depth 960-ft rods pulled up *
050311	965	995	RA	12	114	15.79		
050315	995	1027	RA	12	80	24.00		
050315	1027	1050	RA	12	23	39.40		
050315	1050	1050	-	-	-	-	0	Tool depth 1050-ft
050322	1050	1065	Core	5	22	40.9		Core – outer barrel broke at center sliding up onto upper half. Inner barrel dropped down to bit and clogged.
050323	1050	1087	RA	12	97	22.88		
050323	1087	1100	RA	12	35	22.28		
050331	1100	1120	RA	12	54	22.22		

Date (yymmdd)	From (ft, bls)	To (ft, bls)	Method	Bit Size (inch)	Time (min)	Rate (ft/hr)	Inclination (degree from vertical)	Comments
050331	1120	1150	RA	12	110	16.36		
050331	1150	1181	RA	12	110	16.91		
050331	1181	1189	RA	12	130	3.69		RA line clogs with fines and peat, drilling intermittent while water is added to rod
050401	1189	1203	RA	12	90	9.33		
050401	1160	1160					0	Tool depth 1160-ft rods pulled up *
050412	1203	1223	Core	5	160	7.50		Core – drills soft bottom ~3 ft, Limestone falls out ahead of bit– 10 feet of return
050413	1203	1213	RA	12	32	18.75		*Drill back through core interval
050413	1213	1244	RA	12	31	51.66		
050413	1244	1265	RA	12	21	31.50		RA line clogs with fines – compressor stops, we wait for replacement parts
050414	1265	1265	RA	12	-	-		0650 – 1000 RA line still clogs with fines, circulation intermittent while water is added to rod
050414	1265	1265	RA	12			0	Tool depth 1265-ft
050414	1265	1274	RA	12	9	21.60		Multiple stops to clear fines
050414	1274	1300	RA	12	157	9.96		Dredging ~1289 ft to TD, in hard fractured Dolomite. Micritic limestone falls in from above

SJRWMD FIELD LOGS

JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 2

GROUNDWATER LEVELS

Static ✓	Date/Time	Raw Data (ft)				Corrected (ft bmp)		Bore depth (ft)	Cased depth (ft)	Comments
		Casing	Rod	Stump	Stick up	Casing	Rod			
✓	111904/0700	27.00	28.80	3.8	4.0	27.00	21.00			MP top of 18" flange
✓	112204/1030	-	NR	-	-	21.00	NR	275		Flange 24.0 inches
	112204/1545	27.74	28.00	3.0	4.0	27.74	21.00	291		
✓	112304/0710	-	27.20	2.2	4.0	21.00	21.00	321		
✓	112404/0650	-	NR	-	-	20.85	NR	348		Rods plugged
✓	112904/1250	-	27.18	2.3	4.0	20.97	20.88	351		
✓	113004/0700	-	NR	-	-	21.40	NR	351		Rods plugged
✓	120104/0700	-	NR	-	-	21.28	NR	351		Rods out of hole
	120204/0700	-	-	-	-	-	-	351		Rods plugged, no WL taken
	010505/1800	-	-	-	-	-	-	594	504	4" line to cutting tub still in place, will switch to 6" line tomorrow
✓	011005/1420	18.7	NR	-	4.6					MP top of 12" flange
✓	011105/0630	18.55	25.2	2.05	4.6	18.55	18.55	594	504	Flange 16.75 inches
	011105/1145	18.65	27.3	2.3	4.6	18.65	20.40	625	504	
	011105/1500	18.75	27.3	2.6	4.6	18.75	20.13	655	504	
	011105/1705	18.85	27.35	2.1	4.6	18.85	20.65	686	504	
✓	011305/1808	18.75	-	-	-	-	-	700	504	Prior to pump test, equipment in borehole
✓	011805/1212	18.70						700	504	

Static ✓	Date/Time	Raw Data (ft)				Corrected (ft bmp)		Bore depth (ft)	Cased depth (ft)	Comments
		Casing	Rod	Stump	Stick up	Casing	Rod			
✓	012005/0710	19.30						717	504	
	012005/0955	-	26.4	2.05	4.6	-	19.75	717	504	
	012005/1142	19.80	-	-	-	-	-	748	504	
✓	012105/0700	19.20						748	504	
	012105/1020		26.90	1.95	4.6	-	20.35	748	504	
✓	012505/0700	19.30	26.0	2.0	4.6	19.30	19.40	841	504	Core barrel in borehole
✓	012605/0710	19.20				19.20				Rods tripped in
	012605/0925		28.00	2.35	4.6		21.05	841	504	
	012605/1242	19.15	26.10	2.0	4.6	19.15	19.50	872	504	
✓	013105/1000	19.00				19.00		903	504	Rods out of hole
✓	021005/1040	19.00				19.00		903	504	
✓	021105/0745	18.90	26.80	2.7	4.6	18.90	19.50	903	504	Packer Test 1 @ start
✓	021605/0720	19.55	26.40	1.9	4.6	19.55	19.90	903	504	Packer Test 1 [next morning]
✓	021605/2007	20.30	26.05	1.9	4.6	20.30	19.55	903	504	Packer Test 2 @ start
✓	021705/1430	19.80	24.50	0.7	4.6	19.80	19.20	903	504	Packer Test 3 @ start
✓	021805/0715	19.55	26.40	1.6	4.6	19.55	20.20	903	504	Packer Test 3a @ start
✓	022105/1503	20.17	31.60	2.23	4.6	20.17	24.77	903	504	Packer Test 4 @ start
✓	022105/1813	20.04	27.77	2.23	4.6	20.04	20.94	903	504	Packer Test 4 @ end
✓	030305/0650	20.70				20.70		903	504	Pump Test
✓	030805/0730	20.20				20.20		903	504	
✓	031005/0800	20.35				20.35		957	504	
✓	031105/0730	20.35				20.35		967	504	After 10 ft Core
✓	031505/1115	20.30	26.5	2.8	4.6	20.30	19.10	995	504	
	031505/1455		27.45	2.2	4.6		20.65	1027	504	
✓	032105/1600	20.55				20.55		1050	504	
✓	032205/0730	20.45				20.45		1050	504	
✓	032305/0750	20.475				20.475		1065	504	After 15 ft Core
	032305/1525		29.1	2.65	4.6		21.85	1087	504	
✓	032805/0820	20.38				20.38		1100	504	

Static ✓	Date/Time	Raw Data (ft)				Corrected (ft bmp)		Bore depth (ft)	Cased depth (ft)	Comments
		Casing	Rod	Stump	Stick up	Casing	Rod			
✓	032905/1225	20.45	28.8	2.75	4.6	20.45	23.45	1100	504	135.5 ft of 7-inch and 785.69 of 4-inch rods in borehole prior to packer inflation
✓	032905/1615	20.50	27.65	2.75	4.6	20.50	20.30	1100	504	after packer inflation Packer Test 5 @ start
	032905/1631	20.72	59.70	2.75	4.6	20.72	52.35	1100	504	During Packer test
	032905/1653	20.67	59.2	2.75	4.6	20.67	51.85	1100	504	During Packer test
✓	033105/0715	20.70	28.4	2.65	4.6	20.70	21.15	1100	504	
	033105/0959		28.75	2.35	4.6		21.80	1120	504	
	033105/1215		28.85	2.65	4.6		21.60	1150	504	
	033105/1445		29.20	2.25	4.6		22.35	1181	504	
✓	040105/1040	19.65	31.65	2.55	4.6	19.65	24.50	1203	504	
✓	041105/1420	20.44				20.44		1203	504	Rods out of hole
✓	041305/0700	20.45				20.45		1213	504	Bit and rods in hole
	041305/1122	20.70	33.15	2.45	4.6	20.70	26.00	1213	504	
	041305/1225	20.82	35.4	2.55	4.6	20.82	28.25	1244	504	
✓	041405/0650	19.96						1265	504	
✓	041405/1055		35.75	2.55	4.6		28.6	1274	504	
	041905/							1300	504	
✓	042005/1150	20.80	30.03	4.35	4.6	20.80	21.35	1300	504	187.0 ft of 7-inch and 943.0 of 4-inch rods in borehole prior to packer inflation
✓	042005/1220	20.95	29.70	4.35	4.6	20.95	20.75	1300	504	after packer inflation Packer Test 6 @ start
	042005/1233	21.02	37.83	4.35	4.6	21.02	28.88	1300	504	During Packer test
	042005/1303	20.97	37.60	4.35	4.6	20.97	28.65	1300	504	During Packer test
✓	042105/------	20.80	31.25	4.35	4.6	20.80	22.30	1300	504	Packer Test 6 @ end

SJRWMD FIELD LOGS

JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 3

GROUNDWATER QUALITY/FIELD SAMPLES

Lab ✓	Date/Time	Sampler	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)	Comments
	111804/1715	LN	229	8.8	-	880	4,045	Sample iced, parameters ran 111904/0700
✓	112204/1310	RB	290	8.07	25.2	875	3,870	
	112204/1705	RB	321	7.78	24.3	925	3,850	Filter for field parameters
	112304/1110	RB	351	8.75	27.1	950	3,621	Very silty, filter for field parameters
✓	010505/1715	LN	594	7.23	25.4	1,820	6,740	Strong sulfur smell
	011105/1045	LN	625	7.58	25.7	1,670	6,980	Sample filtered for field parameters,
	011105/1420	LN	655	8.1	26.1	1,800	6,890	
	011105/1640	LN	686	*9.33	25.5	1,860	6,940	PH meter may not have submerged below temp. meter
	011105/1800	LN	700	8.38	25.6	1,750	6,960	
	011905/1755	LN	717	6.75*	2.3*	1,790	7,110	Sample iced, parameters ran 012005/0710
	012005/1205	LN	748	8.8	23.6	1,630	6,980	
	012105/1205	LN	762	*7.78	*22.4	1,050	4,359	*Sample collected mid rod at 1118
	012105/1205	LN	780	7.74	25.7	1,450	6,980	
	012105/1450	LN	795	8.57	25.0	1,790	6,880	*Sample collected mid rod at 1404
	012105/1450	LN	810	6.87	26.5	1,760	7,000	
	012105/1625	LN	825	8.12	24.0	1,620	6,830	*Sample collected mid rod at 1515
	012105/1625	LN	841	7.62	25.2	1,680	7,070	
	012605/1132	LN	872	7.60	25.7	1,390	6,720	
	012605/1535	LN	885	8.40	23.6	1,320	5,970	*Sample collected mid rod at 1330

Lab ✓	Date/Time	Sampler	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)	Comments
	012605/1535	LN	903	7.94	25.6	1,740	7,090	
	030805/0917	LN	905	7.73	26.0	-	2,855	Sample from discharge while drilling
	030805/0928	LN	910	7.86	26.3	-	2,796	Sample from discharge while drilling
	030805/------	LN	912	7.95	26.5	-	2,936	Sample from discharge while drilling
	030805/------	LN	915	8.05	26.5	-	3,936	Sample from discharge while drilling
	030805/------	LN	918	7.98	26.7	-	4,259	Sample from discharge while drilling
	030805/0956	LN	922	8.01	26.8	970	4,810	Mid Rod sample
	030805/------	LN	925	7.97	26.9	-	5,560	Sample from discharge while drilling
	030805/------	LN	933	7.94	26.9	-	5,980	Sample from discharge while drilling
	030805/1038	LN	936	8.09	26.7	-	6,800	Sample from discharge while drilling
	030805/1104	LN	936	8.23	26.8	1,500	6,510	End Rod Sample Gray tint
	030805/------	LN	940	8.38	26.6	-	6,350	Brown discharge
	030805/------	LN	942	8.20	26.3	-	6,450	Sample from discharge while drilling
	030805/------	LN	945	8.48	26.7	-	6,230	Sample from discharge while drilling
	030805/1235	LN	950	8.29	26.7	-	6,390	Sample from discharge while drilling
	030805/1310	LN	950	8.33	26.2	1,610	6,660	Stop drilling and develop until core interval decided
	030805/1425	LN	957	8.39	26.5	1,760	6,800	Development – Core interval
	031105/0900	LN	957	6.97	23.6	-	11,840	Sample from discharge while drilling
	031105/------	LN	960	7.95	24.6	-	3,936	Sample from discharge while drilling
	031105/------	LN	964	8.19	26.0	-	4,111	Sample from discharge while drilling
	031105/------	LN	965	8.40	26.6	-	4,234	Sample from discharge while drilling
	031105/0955	LN	965	8.26	26.8	1,090	4,850	End Rod Sample
	031105/1106	LN	965	8.18	26.1	-	5,950	Sample from discharge while drilling
	031105/1150	LN	970	8.25	26.5	-	5,600	Sample from discharge while drilling, discharge brown
	031105/-----	LN	979	8.13	26.8	1,490	5,920	Mid Rod sample
	031105/-----	LN	985	8.18	27.2	-	6,440	Sample from discharge while drilling
	031105/1318	LN	995	8.35	25.1	1,660	7,110	End Rod Sample
	031505/1205	LN	995	7.01	25.5	-	6,560	Sample from discharge during initial blow off
	031505/1221	LN	-	7.2	25.2	-	8,080	Sample from discharge while drilling
	031505/1224	LN	-	7.3	25.9	-	12,070	Sample from discharge while drilling

Lab ✓	Date/Time	Sampler	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)	Comments
	031505/1226	LN	-	7.35	26.0	-	15,660	Sample from discharge while drilling
	031505/1228	LN	-	7.7	26.2	-	15,680	Sample from discharge while drilling
	031505/1230	LN	-	7.85	26.2	-	15,750	Sample from discharge while drilling
	031505/1234	LN	-	7.98	26.4	-	15,470	Sample from discharge while drilling
	031505/1239	LN	-	8.02	26.2	-	14,950	Sample from discharge while drilling
	031505/1246	LN	-	8.10	26.3	-	14,830	Sample from discharge while drilling
	031505/1306	LN	-	8.15	27.4	-	14,590	Sample from discharge while drilling
	031505/1313	LN	1010	8.15	27.5	4,140	14,400	Mid Rod sample
	031505/1325	LN	1015	8.27	27.5	-	14,350	Sample from discharge while drilling
✓	031505/1430	LN	1027	8.18	27.0	4,240	14,450	End Rod Sample
	031505/1605	LN	-	9.2	27.2	-	14,190	Sample from discharge while drilling
	031505/1700	LN	1050	8.0	26.7	4,000	13,980	End Drilling Development – Core interval
	032305/1337	LN	1050	7.0	25.3	-	7,420	Sample from discharge while drilling
	032305/1342	LN	-	7.0	25.4	-	15,860	Sample from discharge while drilling
	032305/1355	LN	-	7.0	26.1	-	15,430	Sample from discharge while drilling
	032305/1444	LN	1073	7.0	27.6	-	14,860	Sample from discharge while drilling
	032305/1525	LN	1087	7.0	27.9	3,940	14,640	End Rod Sample
	032305/1606	LN		7.0	26.4	-	15,250	Sample from discharge while drilling
	032305/1650	LN	1100	7.0	27.5	4,540	15,290	End Drilling Sample – Stop for packer test
	033105/0837	LN	1100	6.06	25.0	-	9,820	Sample from discharge while drilling
	033105/0642	LN	-	6.63	26.2	-	17,290	Sample from discharge while drilling
	033105/0855	LN	-	7.04	26.6	-	17,180	Sample from discharge while drilling
	033105/0855	LN	1105	7.53	27.0	-	16,140	Sample from discharge while drilling
	033105/0915	LN	1118	7.81	27.4	-	15,570	Sample from discharge while drilling
	033105/0939	LN	1120	7.86	26.8		15,580	End Rod Sample
	033105/1012	LN	-	7.76	27.8	-	17,280	Sample from discharge while drilling
	033105/1114	LN	1132	8.31	27.9	-	15,520	Sample from discharge while drilling
	033105/-----	LN	1138	8.36	28.1	-	15,060	Sample from discharge while drilling
	033105/1215	LN	1150	8.0	28.5		15,930	End Rod Sample
	033105/1248	LN	-	7.82	28.1	-	19,760	Sample from discharge while drilling
	033105/1251	LN	-	7.89	28.1	-	18,330	Sample from discharge while drilling
	033105/1346	LN	1171	8.08	28.3	-	14,950	Sample from discharge while drilling

Lab ✓	Date/Time	Sampler	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)	Comments
	033105/1445	LN	1181	7.89	28.5		17,390	End Rod Sample
	033105/1520	LN	-	7.84	27.9	-	17,510	Sample from discharge while drilling
	033105/1523	LN	-	7.90	27.9	-	16,320	Sample from discharge while drilling
	033105/1524	LN	-	7.92	27.9	-	15,500	Sample from discharge while drilling
	033105/1526	LN	-	7.74	27.9	-	29,980	Sample from discharge while drilling
	033105/1527	LN	-	7.77	28.0	-	27,270	Sample from discharge while drilling
	033105/1528	LN	-	7.91	28.0	-	24,380	Sample from discharge while drilling
✓	040105/1030	LN	1203	7.10	27.7	8,780	27,820	End Drilling Development – Core interval
	041305/1014	LN	-		28.6		11,210	Sample from discharge while drilling
	041305/1016	LN	-		28.1		27,730	Sample from discharge while drilling
	041305/1019	LN	-		28.0		33,030	Sample from discharge while drilling
	041305/1030	LN	1210		27.5		28,960	Sample from discharge while drilling
	041305/1059	LN	1213	7.16	28.2	8,260	28,170	End Rod Sample
	041305/1126	LN	-	7.60	27.0		22,080	Sample from discharge while drilling
	041305/1130	LN	-	7.37	27.2		27,180	Sample from discharge while drilling
	041305/1225	LN	1244	7.55	28.2		28,140	End Rod Sample
	041305/1240	LN	-	7.60	28.5	8,900	29,330	Sample from discharge while drilling
								RA line clogged 1265 – 1274, surface water added
	041405/1055	LN	1274	7.66	29.1	11,120	28,780	End Rod Sample
✓	041405/1545	LN	1300	7.63	27.2	10,340	32,190	TD - End Drilling Sample – Stop for packer test

SJRWMD FIELD LOGS

JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 4

GROUNDWATER QUALITY DURING PACKER TESTS

Lab ✓	Date/Time	Sampler	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)	Comments
	021105/0815	TS	519 - 903	7.59	26.2	1,270	5,020	*Samples collected during Packer Test 1 – 340 gpm Packer Seal 516 - 519
	021105/0830	TS	519 - 903	7.51	26.3	1,200	3,955	
	021105/0845	TS	519 - 903	7.58	24.8	1,230	3,997	
	021105/0900	TS	519 - 903	7.57	26.3	1,140	4,085	
	021105/0915	TS	519 - 903	7.46	26.1	1,240	4,205	
✓	021105/0930	TS	519 - 903	7.53	26.4	1,320	4,325	
	021605/2025	LN	615 - 903	6.55	26.8	1,255	5,000	*Samples collected during Packer Test 2 – 240 gpm Packer Seal 612 - 615
	021605/2045	LN	615 - 903	7.49	26.8	1,310	5,090	
✓	021605/2108	LN	615 - 903	7.31	26.8	1,435	5,090	
	021705/1705	LN	705 - 903	-	-	940	4,299	*Samples collected during Packer Test 3 – 300 gpm Packer Seal 702 – 705 • pH meter had cracks in line, possible data errors • Temp not recorded on chilled samples
	021705/1708	LN	705 - 903	-	-	1,050	4,884	

Lab ✓	Date/Time	Sampler	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)	Comments
	021705/1709	LN	705 - 903	6.90	26.7	-	3,215	
	021705/1710	LN	705 - 903	-	-	410	2,104	
	021705/1712	LN	705 - 903	-	27.0	-	3,033	
	021705/1716	LN	705 - 903	6.39	27.5	870	4,045	
	021705/1722	LN	705 - 903	-	-	1,320	5,990	
	021705/1730	LN	705 - 903	6.63	26.7	-	6,250	
	021705/1732	LN	705 - 903	-	-	1,560	6,470	
	021705/1750	LN	705 - 903	6.42	26.1	1,399	6,520	
✓	021705/1805	LN	705 - 903	6.50	26.4	-	6,920	
	021805/0916	LN	705 - 903	6.60	25.4	1,510	6,790	*Samples collected during Packer Test 3a – 300 gpm Packer Seal 702 – 705 *Temp not recorded on chilled samples
	021805/0918	LN	705 - 903	7.30	-	500	2,577	
	021805/0921	LN	705 - 903	7.27	26.7		3,898	
	021805/0924	LN	705 - 903	7.36	-	870	4,214	
	021805/0925	LN	705 - 903	7.36	26.9		4,327	
	021805/0928	LN	705 - 903	-	-	1,050	4,553	
	021805/0930	LN	705 - 903	7.28	26.7		4,920	
	021805/0935	LN	705 - 903	7.27	26.3	1,480	6,580	
	021805/0946	LN	705 - 903	6.96	26.4	1,420	6,690	
	021805/1002	LN	705 - 903	6.96	26.3	-	6,970	
✓	021805/1010	LN	705 - 903	7.37	25.8	-	7,030	
	022105/1550	RB	797.5 - 903	7.54	26.8	-	6,500	*Samples collected during Packer Test 4 – 300 gpm and 52 gpm Packer Seal 794.5 – 797.5
	022105/1554	RB	797.5 - 903	7.53	26.8	-	6,670	
	022105/1617	RB	797.5 - 903	7.55	26.2	-	6,790	
✓	022105/1710	RB	797.5 - 903	7.68	25.7	1,650	6,600	
	022105/1748	RB	797.5 - 903	-	26.6	-	6,090	

Lab ✓	Date/Time	Sampler	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)	Comments
	032905/1625	LN	914 - 1100	6.46	-	-	16,360	*Samples collected during Packer Test 5 – 280 gpm Packer Seal 911 – 914 using 912.5 as center. My calculation indicates 911.84 as center
	032905/1635	LN	914 - 1100	6.86	28.0	-	15,920	
	032905/1650	LN	914 - 1100	7.08-	28.0	-	15,360	
✓	032905/1705	LN	914 - 1100	7.09	28.1	4,340	15,450	
	042005/1245	LN	1300	6.66	28.6		30,530	*Samples collected during Packer Test 6 – 280(start) –260(end) gpm Packer Seal 1111.0 – 1114.5 using 1112.5 as center.
	042005/1300	LN	1300	6.50	28.6		28,880	
✓	042005/1329	LN	1300	6.36	28.6	9,160	28,800	

SJRWMD FIELD LOGS

JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 5

GROUNDWATER QUALITY DURING CONSTANT RATE TESTS

Lab ✓	Date/Time	Sampler	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)	Comments
	011805/1238	LN	504-700	8.23	21.3	1,580	6140	* During Constant Rate
	011805/1240	LN	504-700	8.06	21.2	1420	6460	
	011805/1259	LN	504-700	7.81	22.1	1700	6,600	
	011805/1430	LN	504-700	7.7	20.7	1660	6,940	
✓	011805/1510	LN	504-700	7.6	23.1	1,790	6,830	
✓	030305/0915	RB	797.5 - 903	7.54	26.0	1,840	6,340	* During TFR Static
	030305/0935	RB	797.5 - 903	7.53	26.1	-	6,740	* During Constant Rate
	030305/0950	RB	797.5 - 903	7.55	26.2	-	6,800	
	030305/1015	RB	797.5 - 903	7.53	26.2	-	6,890	
	030305/1055	RB	797.5 - 903	7.53	26.3	-	6,930	
	030305/1130	RB	797.5 - 903	7.54	26.2	-	7,000	
✓	030305/1215	RB	797.5 - 903	7.54	26.1	1,970	7,010	

SJRWMD FIELD LOGS

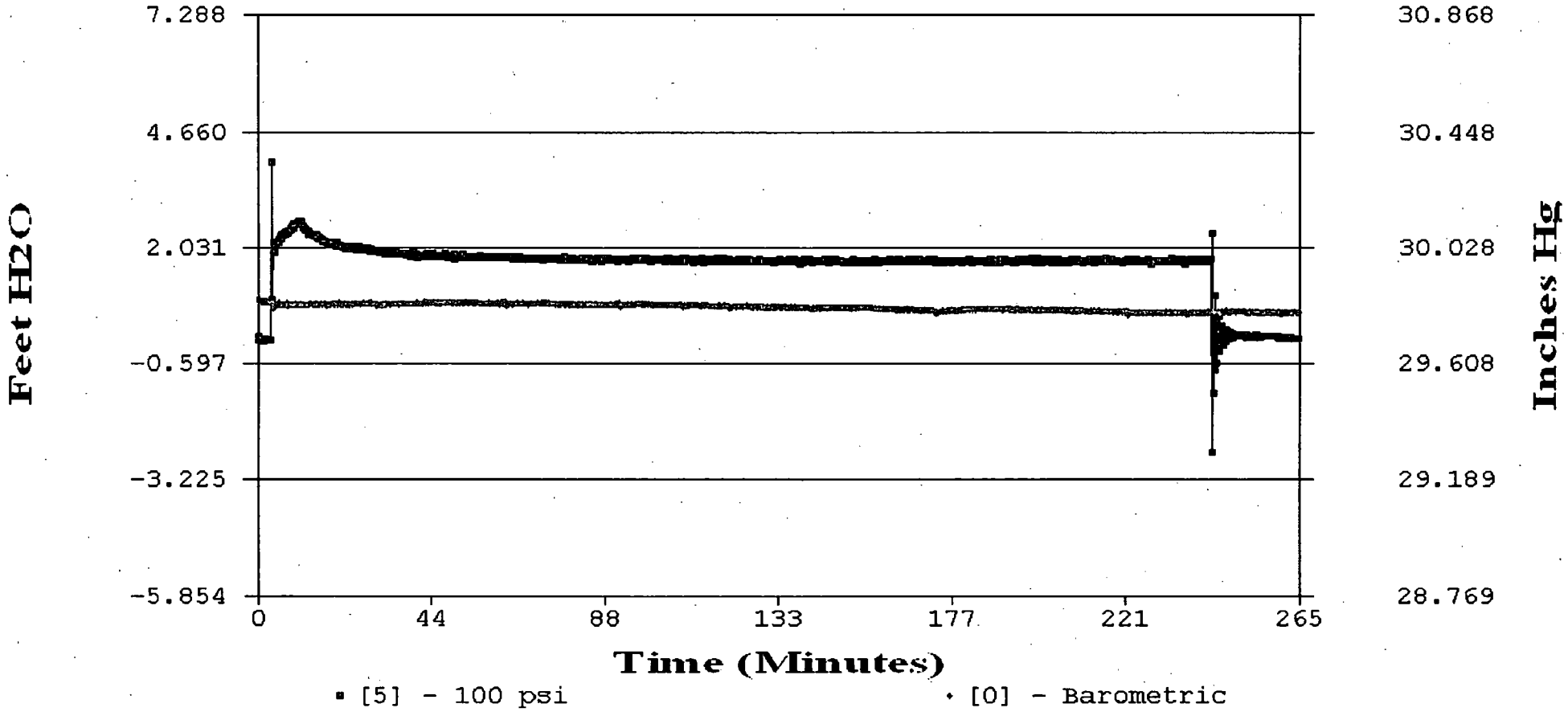
JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 5

GROUNDWATER QUALITY DURING FINAL WELL DEVELOPMENT

Lab ✓	Date/Time	Sampler	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)	Comments
	061005/1200							Development started using reverse air @~564 ft bls [TD 566 ft bls] 60 gpm
	061005/1202	Driller	564	6.85	27.2	-	10,080	Development water grayish
	061005/1230	Driller	564	7.46	27.5	-	10,070	Development water clear
	061005/1330	Driller	564	7.40	27.1	-	7,950	Development water clear
	061005/1430	L Nelms	564	7.22	26.8	-	7,930	Development water clear
	061005/1530	L Nelms	564	7.60	26.7	-	8,000	Development water clear
	061005/1630	L Nelms	564	7.35	26.6	-	7,990	Development water clear
	061005/1730	L Nelms	564	7.74	26.6	-	7,990	Development water clear
	061005/1830	L Nelms	564	7.81	26.6	1,600	7,970	Development water clear, Development stopped
	061105/0740	L Nelms	540	6.35	25.7	-	7,830	Development started using reverse air @~540 ft bls [TD 566 ft bls] 60 gpm
	061105/0905	L Nelms	540	6.96	25.8	-	7,910	Development stopped
	061105/1203	L Nelms	-	-	-	-	-	Development started using submersible pump @~42 ft bls [TD 566 ft bls, Static WL 20.75] 450 gpm [100 psi Transducer set @ 36 ft bls records WL and drawdown]
	061105/1215	L Nelms	504-566	7.28	26.7	-	7,810	Development water gray/ cloudy
	061105/1300	L Nelms	504-566	7.40	26.7	-	7,870	Development water clear
	061105/1400	L Nelms	504-566	7.64	26.9	-	7,910	Development water clear
	061105/1500	L Nelms	504-566	7.44	26.9	-	7,920	Development water clear
✓	061105/1600	L Nelms	504-566	7.60	27.1	1,660	7,920	Development water clear, Development stopped [100 psi Transducer set @ 35 ft bls records WL and recovery]
	061105/1633	L Nelms	504-566	-	-	-	-	Recovery stopped [Development and Recovery Data included]

BR1863 Final Dev



SJRWMD FIELD LOGS

JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 6

GROUNDWATER QUALITY FOR THIEF SAMPLES

Lab ✓	Date/Time	Sampler	Sample Depth (ft, bls)	pH	Temp (Deg C)	Chlorides (mg/L)	Specific Conductivity (us/cm)	Comments
✓	011305/1538	LN	600	6.96	25.4	930	4072	
✓	011305/1630	LN	690	7.91	24.2	110	1067	HNO3 preserved sample very cloudy, pH doesn't go below 2 even after 3 ml of acid added
✓	011805/1345	LN	690	7.07	4.1	210	1376	HNO3 preserved sample captured first, is clear, and ph < 2, remainder of sample iced to help drop heavy lime mud out
✓	013105/1550	LN	902	6.31	21.4	1,390	5,860	Color orange but almost clear, reddish seds at bottom of sample bottles

SJRWMD FIELD LOGS

JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 7

DRAWDOWN DATA AFTER ROD ADVANCEMENT

Date/ Time	Cased Depth (ft)	Bore Depth (ft)	Discharge (gpm)	Discharge Offsite (gpd)	Drawdown (ft)	SpecificCapacity (gpm/ft)	Comments
112204	216	290	62.5		1.2	52.1	Pgwl 22.2 ft, Sgwl 21.0 ft
112304	216	321	69		0.75	92.0	Pgwl 21.75 ft, Sgwl 21.0 ft
112904	216	351	78		0.73	107	Pgwl 21.7 ft, Sgwl 20.97 ft
	351	504	* Return to Mud Rotary drilling, no data				
010505	504	594	* RA - 4" discharge line still in from mud rotary, will resume with gwl's when 6"discharge line in, no data				
011105/1400	504	655	200		0.45	444.4	Pgwl 19.2 ft, Sgwl 18.75 ft
011105/1610	504	686	200		0.50	400	Pgwl 19.35 ft, Sgwl 18.85 ft
011105/1740	504	700	-	78,400	-		
012005/1142	504	748	-	-	0.50	400	Pgwl 19.8 ft, Sgwl 19.30 ft
012105/1142	504	780	-	-	0.40	500	Pgwl 19.6 ft, Sgwl 19.20 ft
012105/1435	504	810	200	-	0.30	666.6	Pgwl 19.5 ft, Sgwl 19.20 ft
012105/1600	504	841	-		0.40	-	Pgwl 19.6 ft, Sgwl 19.20 ft
012605/1049	504	872	-		0.10	-	Pgwl 19.3 ft, Sgwl 19.20 ft
012605/1530	504	903	193.75		0.20	968.75	Pgwl 19.4 ft, Sgwl 19.20 ft
030805/1104	504	936			-0.50	-	Pgwl 20.7 ft, Sgwl 20.20 ft
030805/1235	504	950					Develop well until Core interval decided
030805/1400	504	957	188		-0.65		Pgwl 20.85 ft, Sgwl 20.20 ft
031105/0956	504	965			-0.45		Pgwl 20.80 ft, Sgwl 20.35 ft

Date/ Time	Cased Depth (ft)	Bore Depth (ft)	Discharge (gpm)	Discharge Offsite (gpd)	Drawdown (ft)	SpecificCapacity (gpm/ft)	Comments
031105/1318	504	995			-0.15		Pgwl 20.50 ft, Sgwl 20.35 ft
031505/1433	504	1027			0.05		Pgwl 20.25 ft, Sgwl 20.30 ft
031505/1700	504	1050			0		Pgwl 20.30 ft, Sgwl 20.30 ft
032305/1525	504	1087			0.075		Pgwl 20.40 ft, Sgwl 20.475 ft
032305/1650	504	1100			0.175		Pgwl 20.30 ft, Sgwl 20.475 ft
033105/0931	504	1120			0.06		Pgwl 20.64 ft, Sgwl 20.70 ft
033105/1215	504	1150			0.35		Pgwl 20.35 ft, Sgwl 20.70 ft
033105/1445	504	1181			0.11		Pgwl 20.59 ft, Sgwl 20.70 ft
040105/0930	504	1203					Pgwl 19.72 ft, Sgwl 19.65 ft
041305/1059	504	1213			-		Pgwl 19.82 ft, Sgwl 20.70 ft
041305/1200	504	1244					Pgwl 20.00 ft, Sgwl 20.70 ft
041405/1035	504	1274					Pgwl 19.71 ft, Sgwl 19.96 ft
041405/1425	504	1300					Pgwl 19.55 ft, Sgwl 19.96 ft

*Pgwl = pumping groundwater level *Sgwl = Static groundwater level *Offsite Discharge = discharge gpm x total drilling plus development time*Specific Capacity = discharge/drawdown

SJRWMD FIELD LOGS

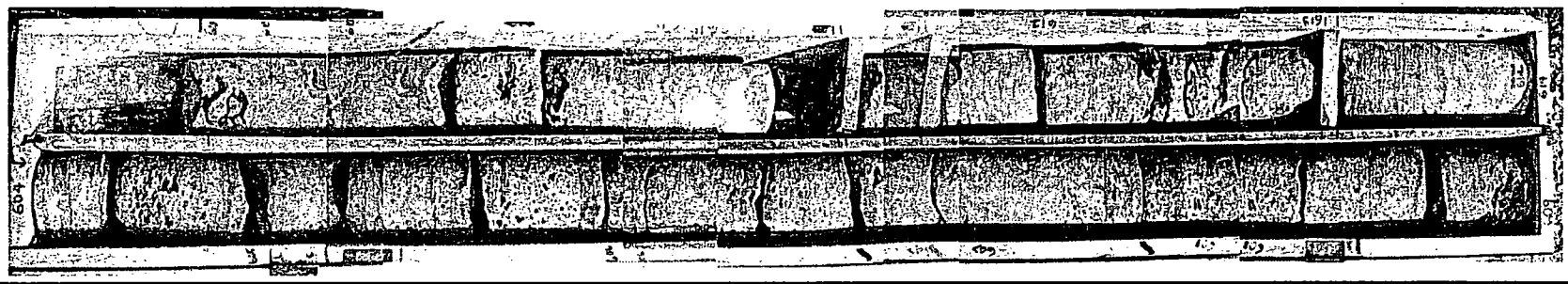
JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 8

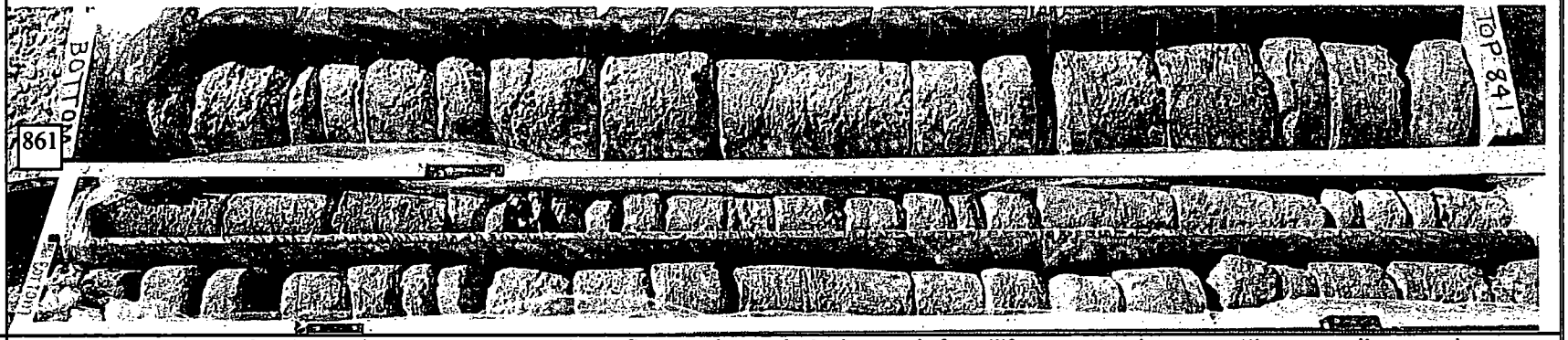
LITHOLOGIC DESCRIPTIONS

From (ft)	To (ft)	Lithology
225	229	**Limestone**, pale yellowish brown, fossiliferous, fossil molds, some black mottling
229	235	**Limestone**, pale yellowish brown, fossiliferous, echinoids, fossil molds
235	240	**Limestone**, very pale yellowish brown, fossiliferous, echinoids, fossil molds
240	245	**Limestone**, very pale yellowish brown-orange, indurated, minor fossil molds
245	260	**Limestone**, very pale yellowish brown-orange, indurated, fossiliferous, minor dictyconus, minor fossil molds
260	270	**Limestone**, pale orange, fossiliferous, dictyconus, some dark gray blebs of clay, silty
270	280	**Limestone**, very pale orange, soft, silty
280	300	**Limestone**, pale orange, soft, fossils: dictyoconus and echinoids
300	310	**Limestone**, pale orange, soft, fossils: dictyoconus
310	320	**Limestone**, pale orange, soft, silty
320	330	**Limestone**, pale orange, soft fossils: echinoids
330	340	**Limestone**, very pale orange, soft, silty, some light mottling
340	345	**Limestone**, pale orange, soft, silty, fossils: dictyoconus and echinoids
345	350	**Limestone**, very light gray, poor induration, micritic paste
350	360	**Limestone**, very light gray/ pale orange, some gray mottling, poor induration, micritic to fine, fossil molds and fragments
360	370	**Limestone**, very light gray/ pale orange, some gray mottling, poor induration, fine, increasing fossils and fossil molds
370	380	**Limestone**, very light gray/ pale orange, some gray mottling, poor induration, fine, increasing fossils and fossil molds, some echinoids
380	390	**Limestone**, very light gray/ pale orange, some gray mottling, poor induration, cuttings fine to micritic, fossiliferous, dictyoconus, lituonella
390	400	**Limestone**, very light gray/ pale orange, some gray mottling, poor induration, cuttings fine to micritic, fossiliferous, dictyoconus, lituonella

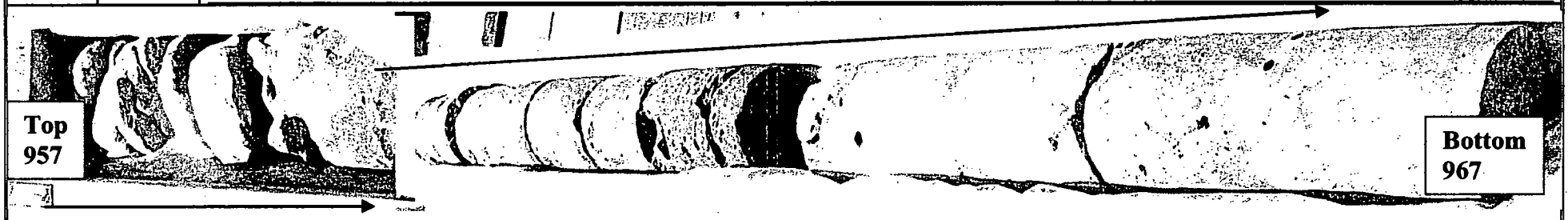
From (ft)	To (ft)	Lithology
400	410	**Limestone,** pale orange, yellowish gray mottling, poor induration, cuttings fine to micritic, abundant benthic foraminifera, dictyoconus, spirolina, echinoids
410	420	**Limestone,** pale orange, yellowish gray mottling, poor induration, cuttings fine, abundant benthic foraminifera, dictyoconus, spirolina, echinoids
420	430	**Limestone,** pale orange, yellowish gray mottling, poor induration, cuttings fine, abundant benthic foraminifera, dictyoconus, spirolina, echinoids
430	440	**Limestone,** pale orange, yellowish gray mottling, poor induration, cuttings fine, abundant benthic foraminifera, dictyoconus, spirolina, echinoids
440	450	**Limestone,** pale orange, yellowish gray mottling, poor induration, cuttings fine, abundant benthic foraminifera, dictyoconus, spirolina, echinoids
450	460	**Limestone,** pale orange, yellowish gray, increasing induration, cuttings fine to medium, abundant benthic foraminifera, dictyoconus
460	470	**Limestone,** pale orange, yellowish gray, some dark mottling, moderate induration, cuttings medium, fossils and fossil molds, dictyoconus
470	474	**Limestone,** pale orange, yellowish gray, some dark mottling, moderate induration, grain size microcrystalline to fine, cuttings medium, fossils and fossil molds, dictyoconus, moderate to vigorous reaction to HCL 10%
474	480	**Limestone/ Dolomitic limestone [mix],** pale brown/ very pale orange/ yellowish gray, some dark mottling, moderate induration, grain size microcrystalline to fine, cuttings small to medium, dolomitic portion subangular, limestone micritic and skeletal, fossils and fossil molds, dictyoconus, moderate to vigorous reaction to HCL 10%
480	490	**Dolomitic limestone/ Limestone [mix],** pale brown/ very pale orange/ yellowish gray, some dark mottling, portions sucrosic, poor to moderate induration, grain size microcrystalline to fine, cuttings small to medium, dolomitic portion subangular, limestone skeletal, fossils and fossil molds, dictyoconus, moderate to vigorous reaction to HCL 10%
490	500	**Limestone/ Dolomitic limestone [mix],** pale brown/ very pale orange/ yellowish gray, some dark mottling, portions sucrosic, poor to moderate induration, grain size microcrystalline to fine, cuttings small, dolomitic portion subangular, limestone skeletal, fossils and fossil molds, dictyoconus, Fossil percentage higher than previous interval, moderate to vigorous reaction to HCL 10%
500	510	Drilled through cement plug by 508, no samples 500-510
510	520	**Dolomite,** pale yellowish brown/ pale orange, sucrosic, moderate induration, pinpoint/ moldic porosity, vuggy, cuttings fine, some limestone mix, pale orange, yellowish gray, moderate induration, fossils and fossil molds, dictyoconus, poor induration, cuttings medium
520	530	**Limestone,** pale orange/ brown, poor induration, cuttings fine to medium, abundant benthic foraminifera/ dictyoconus
530	540	**Limestone,** pale brown, poor induration, cuttings fine, decreasing benthic foraminifera/ dictyoconus
540	550	**Limestone,** pale brown, moderate induration, pinpoint porosity, cuttings fine, minor fossils
550	560	**Limestone,** pale orange, moderate induration, pinpoint porosity, cuttings fine, fossil absent

From (ft)	To (ft)	Lithology
560	570	**Limestone,** pale brown, poor induration, cuttings fine, abundant benthic foraminifera/ dictyoconus
570	580	**Limestone,** pale brown, poor induration, cuttings fine, abundant benthic foraminifera/ dictyoconus
580	594	**Limestone,** pale orange, poor/ moderate induration, cuttings fine, minor fossils/ dictyoconus
594	598	**[Core] Limestone**, micritic, pale orange [cuttings at 598] benthic foraminifera, poor induration
598	614	**[Core] Dolomitic limestone**, tan/ brown, good induration, portions sucrosic, two lenses of peat, grain size microcrystalline to fine, [cuttings 600 – 614] medium to large, angular, pinpoint and vugular porosity, mild to moderate reaction to HCL 10%
		
610	620	**Dolomitic limestone**, brown, good induration, portions sucrosic, cuttings medium to large, angular, grain size microcrystalline to fine, pinpoint and vugular porosity, moderate reaction to HCL 10%
620	630	**Limestone**, pale gray, poorly to moderately indurated, benthic foraminifera, dictyoconus, cuttings small to medium, rounded, vigorous reaction to HCL 10%, @622 a thin lense of gray/black limestone, fossil casts
630	640	**Limestone**, cream/ pale tan, poorly indurated, fossiliferous, abundant benthic foraminifera, dictyconus, cuttings small to large, rounded, vigorous reaction to HCL 10%
640	645	**Dolomitic limestone**, brown, sucrosic, moderately indurated, , cuttings small to medium, sharp, moderate reaction to HCL 10% , minor limestone, cream, benthic foraminifera, dictyoconus
645	650	**Dolomitic limestone**, tan/ brown, limestone, cream, moderately indurated, minor benthic foraminifera, dictyconus, cuttings small to medium, vigorous reaction to HCL 10%
650	655	**Limestone**, cream/ light tan, Dolomitic limestone, tan, sucrosic, poorly indurated, benthic foraminifera, dictyconus, cuttings small to medium, rounded, vigorous reaction to HCL 10%
655	665	**Limestone**, cream, poorly indurated, fossiliferous, abundant benthic foraminifera, dictyconus, cuttings small to medium, rounded, vigorous reaction to HCL 10% @660 a thin lense of dark brown dolomitic limestone
665	670	**Limestone**, light tan, poorly indurated, fossiliferous, benthic foraminifera, dictyconus, cuttings small, rounded, vigorous reaction to HCL 10% @622 a thin lense of gray/black limestone, fossil casts @670 a thin lense of dark brown dolomitic limestone
670	678	**Dolomitic limestone**, gray brown/ tan, mix of limestone, cream, vuggy, portions sucrosic, portions well indurated, foraminifera fossils and fossil casts, cuttings small to large, rounded, vigorous reaction to HCL 10%

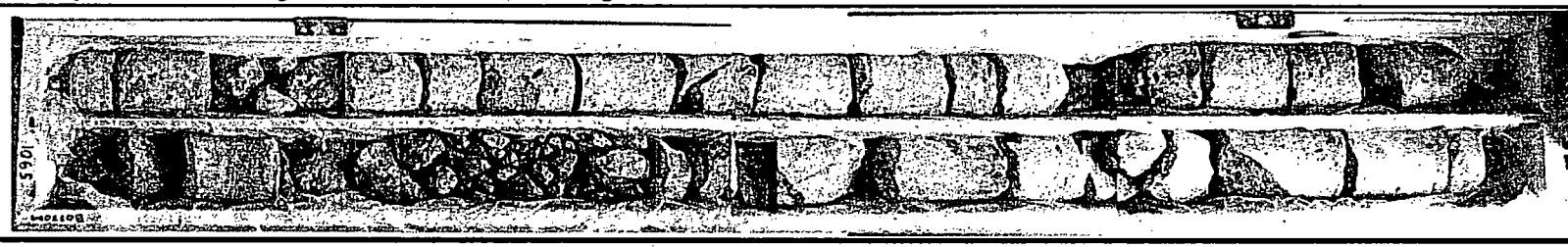
From (ft)	To (ft)	Lithology
678	685	**Dolomitic limestone**, gray brown/ tan, vuggy, well indurated, cuttings medium to large, sharp, some wafer shaped, moderate reaction to HCL 10%
686		**Dolomitic limestone**, brown/ dark gray, pinpoint porosity, vuggy [some large], well indurated, cuttings medium to large, sharp, moderate reaction to HCL 10%
687	690	**Limestone**, cream/ tan, poorly indurated, chalky, fossiliferous, benthic foraminifera, dictyconus, cuttings medium rounded
690	692	**Limestone**, cream/ pale tan, poorly indurated, chalky, some benthic foraminifera, dictyconus, cuttings medium rounded
692	698	**Dolomitic limestone**, tan with dark gray black mottling, pinpoint porosity, vuggy, moderate induration, cuttings small to large, moderate reaction to HCL 10%
698	700	**Dolomitic limestone**, gray brown, well indurated, cuttings medium wafer shaped, minor foraminifera
700	701	**Limestone**, cream/ white, poorly indurated, cuttings small to medium rounded, chalky, some benthic foraminifera, dictyconus
701	710	**Limestone**, pale tan, poorly indurated, cuttings small, rounded, fossiliferous, benthic foraminifera, dictyconus, minor dark brown laminations
710	722	**Limestone**, pale tan, minor pale gray, moderately indurated, cuttings small to medium, rounded, fossiliferous, benthic foraminifera, dictyconus, minor dark brown laminations
722	730	**Limestone**, pale gray/ tan, poorly to moderately indurated, cuttings small, rounded, fossiliferous, benthic foraminifera, dictyconus
730	740	**Limestone**, pale tan/ minor gray, brown laminations, poorly indurated, cuttings small, rounded, benthic foraminifera, dictyconus
740	742	**Limestone**, tan, mottled dark tan, poor to moderately indurated, cuttings small to medium, lime mud in discharge, decrease in fossils
742	748	**Limestone,** tan, poorly indurated, cuttings small to medium, rounded, fossiliferous, benthic foraminifera, dictyconus, minor dark brown laminations @~746, lime mud in discharge
748	758	**Limestone,** tan, poorly indurated, cuttings small to medium, rounded, fossiliferous, benthic foraminifera, dictyconus, minor dark brown laminations @~746, lime mud in discharge
758	766	**Limestone**, pale orange/ tan, poorly indurated, fossiliferous, abundant dictyconus and foraminifera, cuttings small, vigorous reaction to HCL 10%
767	777	**Limestone**, pale orange/ tan, poorly indurated, fossiliferous, abundant dictyconus and foraminifera, cuttings small, vigorous reaction to HCL 10%
778	788	**Limestone**, pale tan, poorly indurated, fossiliferous, dictyconus, vigorous reaction to HCL 10%
788	790	**Limestone**, cream/ white, moderately indurated, cuttings medium, vigorous reaction to HCL 10%
790	796	**Limestone**, pale tan/ cream, poorly indurated, fossiliferous, dictyconus, micritic lime mud, cuttings small, vigorous reaction to HCL 10%
796	799	**Dolomitic limestone**, tan/ brown, minor vugs, moderate to well indurated, cuttings small to large, some wafer shaped, moderate reaction to HCL 10%
799		**Dolomitic limestone**, brown, minor vugs, moderate induration, cuttings medium, moderate reaction to HCL 10%

From (ft)	To (ft)	Lithology
800	808	**Limestone**, (mix) pale gray/gray/pale tan, poorly indurated, cuttings small to medium, rounded, micritic lime mud, fossiliferous, dictyconus, vigorous reaction to HCL 10%
808	811	**Limestone**, cream/ pale orange, poorly indurated, cuttings small, rounded, micritic lime mud, fossiliferous, abundant dictyconus, vigorous reaction to HCL 10%
811	822	**Limestone**, cream/ pale orange, poorly indurated, cuttings small, rounded, micritic lime mud, fossiliferous, abundant dictyconus, vigorous reaction to HCL 10%
822	835	**Limestone**, pale orange, poorly indurated, cuttings small, rounded, micritic lime mud, fossiliferous, abundant dictyconus, vigorous reaction to HCL 10%
835	838	**Limestone**, pale orange/ pale tan, poorly indurated, cuttings small, rounded, micritic lime mud, fossiliferous, abundant dictyconus, vigorous reaction to HCL 10%
838	841	**Dolomitic limestone**, brown, mottled with cream/ white fossil casts, vuggy, moderate induration, cuttings small to large, moderate to vigorous reaction to HCL 10%
841	861	**[Core] Limestone**, pale orange/ pale tan, multiple dark brown laminations showing bedding, poor to moderate induration, core breaks narrow, **Dolomitic Limestone** sections, tan, vuggy, well indurated, vigorous reaction to HCL 10% throughout core
		
861	870	**Limestone**, cream/ pale tan/ gray, cream cuttings fine and poorly indurated, fossiliferous, tan/ gray cuttings medium and moderately indurated, dictyconus, vigorous reaction to HCL 10%
870	873	**Dolomitic limestone**, tan, well indurated, cuttings small to medium, moderate reaction to HCL 10%, mixed with limestone, cream/ pale orange, cuttings small and poorly indurated, fossiliferous, dictyconus, vigorous reaction to HCL 10%
873	880	**Dolomitic Limestone**, tan/ brown, cuttings medium to large and well indurated, wafer shaped, some fractured, moderate reaction to HCL 10%
880	890	**Limestone**, cream/ pale orange/ tan, fossiliferous, dictyconus, cuttings very fine and poorly indurated except the tan cuttings moderately indurated, fossiliferous, tan/ gray cuttings medium and moderately indurated, vigorous reaction to HCL 10%
890	891	**Dolomitic Limestone and Dolomite**, brown/ dark brown, well indurated, cuttings medium to large, some fractured, some wafer shaped, moderate to minor reaction to HCL 10%

From (ft)	To (ft)	Lithology
891	900	**Limestone**, cream/ pale orange/ tan, small cuttings poorly indurated, except the tan cuttings medium and moderately indurated, fossiliferous, dictyconus, vigorous reaction to HCL 10%
900	903	**Limestone,** pale tan/ mottled gray, very small cuttings poorly indurated, fossiliferous, dictyconus, vigorous reaction to HCL 10%
905	907	**Limestone,** light orange, pale tan/ mottled gray, grain size fine to medium, poorly indurated, fossiliferous, abundant dictyconus, benthic foraminifera, minor lignite lenses, vigorous reaction to HCL 10%
907	910	**Dolomitic Limestone and Dolomite**, medium brown/ gray, grain size microcrystalline to medium, intercrystalline and vugular porosity, potions sucrosic, Limestone fossiliferous, benthic foraminifera, dictyconus, minor blebs of granular white mudstone, vigorous reaction to HCL 10%
910	915	**Limestone,** light orange, tan, gray, grain size fine to medium, poorly indurated, fossiliferous, benthic foraminifera, abundant dictyconus, minor blebs of granular white mudstone , vigorous reaction to HCL 10%
915	918	**Dolomitic Limestone and Dolomite**, medium brown, grain fine to large, recrystallization in molds, subhedral fractures, portions sucrosic, vuggy, portions exhibit good induration , mild to moderate reaction to HCL 10% Limestone, light gray, tan, grain size microcrystalline to medium, fossiliferous, benthic foraminifera, dictyconus, minor blebs of granular white mudstone, vigorous reaction to HCL 10%
918	922	**Dolomitic Limestone and Dolomite**, light tan, good induration, grain size small to large, good induration, moldic, recrystallization in molds, Limestone, light orange, tan, good induration grain size microcrystalization, fossiliferous, benthic foraminifera, dictyconus, vigorous reaction to HCL 10%
922	925	**Limestone,** light orange, pale tan, mottled gray, grain size fine to medium, poorly indurated, fossiliferous, abundant dictyconus, benthic foraminifera, minor lignite lenses, minor blebs of granular white mudstone , vigorous reaction to HCL 10%
925	930	**Limestone,** light orange, tan, gray, grain size fine to medium, poorly indurated, fossiliferous, benthic foraminifera, abundant dictyconus, minor blebs of granular white mudstone and lignite veins , vigorous reaction to HCL 10%
930	933	**Limestone,** light orange, pale tan, mottled gray, grain size fine, medium to large, poorly indurated, fossiliferous, abundant dictyconus, benthic foraminifera, minor lignite lenses, minor blebs of granular white mudstone , vigorous reaction to HCL 10%
933	935	**Limestone,** light gray, tan, brown, grain size small to medium, some dolomitization, moderate induration, benthic foraminifera, dictyconus
936	942	**Dolomite and Dolomitic Limestone**, light orange, tan, brown, grain size small to medium, good induration , mild to moderate reaction to HCL 10%, Limestone, fossiliferous, benthic foraminifera, dictyconus, grain size small to large, good induration, vigorous reaction to HCL 10%
942	944	**Dolomitic Limestone**, light orange, tan, gray, brown, gray dolomitic, grain size large, moderate induration, benthic foraminifera, dictyconus, moderate reaction to HCL 10%
944	948	**Limestone**, very pale orange, micritic, grain size microcrystalline to small, abundant benthic foraminifera, dictyconus
948	950	**Limestone**, very pale orange, micritic, grain size microcrystalline to small, abundant large benthic foraminifera, dictyconus
952		**Dolomite**, pale brown, mix of sucrosic and fractured, well indurated with pinpoint vugs, grain size medium to coarse [50%]

From (ft)	To (ft)	Lithology
953		**Limestone**, light orange, brown, mix of quartz grains or remnant recrystilization, grain size small, benthic foraminifera
955		**Dolomite**, pale brown, tan, mix of sucrosic and fractured, well indurated with pinpoint vugs, grain size medium to coarse [50%]
956		**Dolomite**, pale brown, brown, light orange, grain size small, Limestone laminations, benthic foraminifera
957		**Dolomite**, pale brown, tan, mix of sucrosic and fractured, well indurated with pinpoint vugs, grain size medium to coarse [50%]
957	967	**Core [top ~1 ft] Limestone**, micritic, very pale orange **[~0.5 ft] Dolomitic Limestone**, very pale orange, tan, micritic, grain size increases in dolomitic portion **[~2.0 ft] Dolomite**, Sucrosic, medium brown, vugular porosity **[bottom ~2 ft] Dolomite,** grayish pale brown, well indurated, minor vugs, recrystallization in vugs, very low porosity **Cuttings** 957 – 962 **Dolomitic Limestone**, grayish orange, very pale orange, moderate induration, microcrystalline to medium grain size, benthic foraminifera, cones, heavy fines, moderate reaction to HCL 10% **Cuttings** 962 – 964 **Limestone**, pale brown, grayish brown, very pale orange, microcrystalline to fine grain size, benthic foraminifera, dictyconus, heavy fines, moderate reaction to HCL 10% **Cuttings** 965 – 968 **Dolomite**, brown, pale gray/ brown, good induration, pin point vugs, crystalline to fine grain size, no reaction to HCL 10%, hard formation
		
968	970	**Dolomitic Limestone**, dark grayish brown, moderate induration, very pale orange, benthic foraminifera, dictyconus, crystalline to medium grain size, fines, moderate to vigorous reaction to HCL 10%
970	972	**Dolomitic Limestone**, brown, moderate induration, sucrosic, crystalline to medium grain size, very pale orange, benthic foraminifera, dictyconus, fines, moderate to vigorous reaction to HCL 10%
972	973	**Dolomitic Limestone**, pale brown, moderate induration, sucrosic, crystalline to medium grain size, very pale orange, benthic foraminifera, dictyconus, fines, mild to moderate reaction to HCL 10%
973	978	**Dolomitic Limestone**, pale brown, moderate induration, sucrosic, crystalline to fine grain size, very pale orange, benthic foraminifera, dictyconus, heavy fines, moderate reaction to HCL 10%
978	980	**Dolomitic Limestone**, pale brown, dark grayish brown, moderate induration, sucrosic, crystalline to medium grain size, very pale orange, benthic foraminifera, dictyconus, fines, moderate to vigorous reaction to HCL 10%

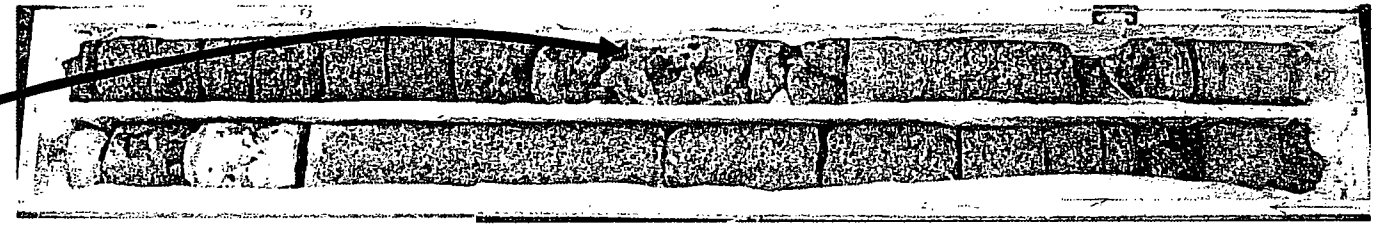
From (ft)	To (ft)	Lithology
980	984	**Dolomitic Limestone**, pale brown/ gray brown, dark grayish brown, moderate induration, sucrosic, crystalline to medium grain size, very pale orange, benthic foraminifera, dictyconus, fines, moderate to vigorous reaction to HCL 10%
984	988	**Dolomitic Limestone**, pale brown, moderate induration, **Limestone**, very pale orange, white, microcrystalline to fine grain size, fines, abundant benthic foraminifera, dictyconus, skeletal, mild to moderate reaction to HCL 10%
988		**Dolomitic Limestone**, light gray/ tan, good induration, microcrystalline grain size, minor vugs, mild reaction to HCL 10%
989	992	**Dolomitic Limestone**, pale brown, moldic and pin point vugular porosity, moderate induration, sucrosic, crystalline to medium grain size, mild reaction to HCL 10%
992	995	**Dolomitic Limestone**, pale brown, moderate induration, moldic, **Limestone**, very pale orange, fossiliferous, benthic foraminifera, cones, crystalline to medium grain size, mild to moderate reaction to HCL 10%
995	1000	**Dolomite**, light yellowish brown, moderate induration, sucrosic, moldic and vugular porosity, grain size crystalline to medium, minor peat, none to mild reaction to HCL 10%
1000	1003	**Dolomite**, yellowish brown, good induration, portions sucrosic, moldic and pin point porosity, grain size crystalline to medium, minor peat, no reaction to HCL 10%, hard formation
1003	1007	**Dolomitic Limestone**, yellowish brown, pale yellowish brown, moderate induration, Limestone, very pale orange, fossiliferous, benthic foraminifera, portions intergranular porosity, grain size crystalline to medium, mild to vigorous reaction to HCL 10%
1007	1010	**Dolomite**, yellowish brown, good induration, moldic and vugular porosity, grain size crystalline to medium, none to mild reaction to HCL 10%, hard formation
1010	1015	**Dolomite**, yellowish brown, good induration, moldic and vugular porosity, grain size crystalline to medium, none to mild reaction to HCL 10%, hard formation
1015	1020	**Dolomite**, yellowish brown, good induration, moldic and vugular porosity, grain size crystalline to medium, none to mild reaction to HCL 10%, hard formation
1020	1023	**Dolomitic Limestone**, yellowish brown, pale brown, brown, moderate induration, moldic, vugular, and intergranular porosity, grain size crystalline to medium, mild reaction to HCL 10%
1023	1027	**Dolomitic Limestone**, pale brown, moderate induration, moldic, vugular, and intergranular porosity, grain size crystalline to medium, mild reaction to HCL 10% , minor lignite veins
1027	1035	**Dolomitic Limestone**, pale brown, pale gray, yellowish brown, moderate induration, moldic, vugular, and intergranular porosity, grain size crystalline to medium, mild reaction to HCL 10% , minor lignite veins
1035	1038	**Dolomite**, yellowish brown, moderate induration, moldic porosity, grain size crystalline to medium, none to mild reaction to HCL 10%
1038	1040	**Dolomite**, pale brown, yellowish brown, moderate induration, moldic porosity, grain size crystalline to medium, none to mild reaction to HCL 10%
1040	1042	**Dolomitic Limestone**, dark gray brown, yellowish brown, white, pale brown, mix of lithology with intergranular porosity, mild induration, grain size fine to medium, mild to moderate reaction to HCL 10%
1042	1048	**Dolomite**, pale brown, moderate induration, moldic porosity, grain size crystalline to medium, mild reaction to HCL 10%

From (ft)	To (ft)	Lithology
1048	1049	**Dolomite**, pale brown, pale gray, moderate induration, moldic porosity, grain size crystalline to medium, mild reaction to HCL 10%
1050		**Dolomite**, pale brown, yellowish brown, moderate induration, moldic porosity, grain size crystalline to medium, mild reaction to HCL 10%
1050	1065	**Core [top ~ 5 ft] Limestone**, light yellowish brown/ very pale brown, moldic, vugular and intergranular porosity, good induration, microcrystalline to fine grain size, remnant fossil molds, mild to vigorous reaction to HCL 10% **Core [~ 2 ft] Limestone**, light yellowish brown/ light brownish gray laminations, pin point, moldic, and vugular porosity, good induration, microcrystalline to fine grain size, recrystalization in molds, mild to vigorous reaction to HCL 10% **Core [~ 3 ft] Limestone**, yellowish brown/ gray mottling, good induration, vugular and moldic porosity, remnant fossil molds, microcrystalline to fine grain size, moderate to vigorous reaction to HCL 10% **Core [~ 5 ft] Limestone**, light yellowish brown, pinpoint and moldic porosity, minor intergranular porosity, good induration, microcrystalline to fine grain size, moderate to vigorous reaction to HCL 
1050	1065	**Cuttings** 1050 - 1055 **Limestone**, light yellowish brown, moldic, vugular and intergranular porosity, moderate induration, microcrystalline to fine grain size, benthic foraminifera, dictyoconus, lignite veins, mild to vigorous reaction to HCL 10% **Cuttings** 1055 - 1058 **Limestone**, light yellowish brown, moldic, vugular and intergranular porosity, good induration, good induration, microcrystalline to fine grain size, benthic foraminifera, dictyoconus, mild to vigorous reaction to HCL 10% **Cuttings** 1058 - 1061 **Limestone**, light yellowish brown, good induration, microcrystalline to fine grain size, minor reaction to HCL 10%, drills hard **Cuttings** 1061 – 1065 **Dolomitic Limestone,** brown, good induration, portions sucrosic, vugular, and pin point porosity, grain size microcrystalline to fine, ligite veins, mild reaction to HCL 10%
1065	1067	**Dolomitic Limestone,** brown, dark gray mottling, moderate induration, vugular, grain size microcrystalline to fine, fossil molds, benthic foraminifera [possible cavings]mild reaction to HCL 10%
1067	1069	**Dolomitic Limestone,** light yellowish brown, moderate induration, grain size microcrystalline to fine, cuttings small, drills soft, mild reaction to HCL 10%
1069	1071	**Dolomite**, very pale brown, gray mottling, good induration, minor pin point vugs, grain size microcrystalline, drills hard, mild reaction to HCL 10%

From (ft)	To (ft)	Lithology
1071	1074	**Dolomite**, light yellowish brown, moderate induration, grain size microcrystalline to medium, peat, very dark brown, none to mild reaction to HCL 10%
1074	1079	**Dolomitic Limestone,** light yellowish brown, vugular, moldic, intergranular porosity, portions sucrosic, moderate induration, grain size microcrystalline to fine, abundant fossil molds, mild reaction to HCL 10%
1079	1082	**Limestone**, very pale brown, gray with dark gray brown mottling, moldic and vugular porosity, moderate induration, microcrystalline to fine grain size, fossil molds, moderate to vigorous reaction to HCL 10%
1082	1087	**Dolomite**, light yellowish brown, good induration, grain size microcrystalline, mild reaction to HCL 10%
1087	1089	**Dolomite**, grayish brown, brown, dark gray mottling, moderate induration, grain size microcrystalline to fine, moldic, vugular, and pin point porosity, fossil molds, mild reaction to HCL 10%
1089	1092	**Dolomite**, light yellowish brown, moderate induration, moldic and vugular porosity, portions sucrosic, mild reaction to HCL10%
1092	1093	**Dolomite**, light brownish gray, good induration, pin point and vugular porosity, grain size microcrystalline to fine, mild reaction to HCL10%
1093	1095	**Dolomite**, light yellowish brown, moderate induration, pin point, moldic and vugular porosity, fossil molds, mild reaction to HCL10%
1095	1098	**Dolomite**, light yellowish brown, dark gray veining, good induration, pin point, moldic and vugular porosity, fossil molds, mild reaction to HCL10%
1098	1100	**Dolomite**, light yellowish brown, dark gray veining, moderate induration, pin point, moldic and vugular porosity, fossil molds, mild reaction to HCL10%
1100		**Dolomite**, dark gray, moderate induration, grain size microcrystalline to fine, pin point vugs, mild reaction to HCL 10%
1100	1107	**Dolomitic Limestone**, light gray/ pale yellowish brown, good induration, fossil molds and remnant foaails, vuggy, recrystallization in molds, grain size microcrystalline to medium, intergranular porosity, mild to vigorous reaction to HCL 10%
1107	1110	**Dolomitic Limestone**, dark yellowish brown, some grayish orange/ pale yellowish brown from previous interval, moderate induration, fossil molds and mold casts, portions sucrosic, vugular and intergranular porosity, mold casts, minor lignite veining, grain size microcrystalline to medium, mild reaction to HCL 10%
1110	1112	**Limestone**, light brownish gray/ pale brown, vugular and intergranular porosity, microcrystalline to medium grain size, moderate induration, fossil molds, dictyoconus, fossil plant remains, vigorous reaction to HCL 10%
1112	1117	**Limestone**, moderate brown/ dark yellowish brown, vugular and intergranular porosity, microcrystalline to medium grain size, moderate induration, fossil molds and casts, fossil plant remains and peat, mild to vigorous reaction to HCL 10%
1117	1119	**Limestone,** [bedding transition mix of above], moderate brown/ light brownish gray/ grayish orange, vugular and intergranular porosity, microcrystalline to fine grain size, cuttings fine, poor to moderate induration, remnant fossil molds, fossil plant remains and minor lignite veining, mild to vigorous reaction to HCL 10%

From (ft)	To (ft)	Lithology
1119	1120	**Limestone,** [still some mixing] light brownish gray, vugular and intergranular porosity, microcrystalline to fine grain size, cuttings fine, poor to moderate induration, remnant fossil molds, fossil plant remains and minor lignite veining, mild to vigorous reaction to HCL 10%
1120	1128	**Dolomitic Limestone**, yellowish brown, poor to moderate induration, remnant fossil molds, vugular and intergranular porosity, grain size microcrystalline to fine, cuttings fine to medium, mild reaction to HCL 10%
1128		**Dolomitic Limestone**, yellowish brown/ grayish brown, poor to moderate induration, remnant fossil molds, vugular and intergranular porosity, grain size microcrystalline to fine, cuttings fine to medium, mild reaction to HCL 10%
1129		**Limestone**, light yellowish brown, poorly indurated, fossil molds, vugular and intergranular porosity, microcrystalline to fine grain size, cuttings small, rounded, moderate to vigorous reaction to HCL 10%
1130		**Limestone**, light yellowish brown, moderate induration, fossil molds, vugular and intergranular porosity, microcrystalline to fine grain size, cuttings small to medium, moderate to vigorous reaction to HCL 10%
1131		**Limestone**, [bedding transition mix of above], light gray, good induration, minor fossil molds and replacements, pin point porosity, microcrystalline to fine grain size, cuttings small to medium, angular, vigorous reaction to HCL 10%
1132	1135	**Dolomitic Limestone**, brown, good induration, vugular [minor] and pinpoint porosity, grain size microcrystalline to fine, cuttings platy, small to medium, mild reaction to HCL 10%
1135	1139	**Dolomitic Limestone**, light yellowish brown, good induration, vugular and intergranular porosity, grain size microcrystalline to fine, cuttings angular to platy, medium, moderate reaction to HCL 10%
1139	1141	**Dolomitic Limestone**, light gray to pale orange, minor fossils and fossil molds, moderate induration, vugular and intergranular porosity, grain size microcrystalline, cuttings angular to rounded, small, moderate reaction to HCL 10%
1141		**Dolomite/ Limestone**, [bedding transition mix of above], yellowish brown, minor fossils and fossil molds, poor to moderate induration, vugular and intergranular porosity, grain size microcrystalline, cuttings angular to rounded, small, mild to vigorous reaction to HCL 10%
1142	1144	**Limestone**, dark yellowish brown, poor to moderate induration, intercrystalline porosity, grain size microcrystalline to medium, cuttings subangular to rounded, small, mild to vigorous reaction to HCL 10%
1144	1145	**Dolomitic Limestone**, [marked bedding change] light yellowish brown, good induration, vugular and intergranular porosity, grain size microcrystalline, cuttings angular to platy, small to medium, moderate reaction to HCL 10%
1146		**Dolomitic Limestone**, light brownish gray/ yellowish brown, minor fossil molds and casts, good induration, intergranular porosity, grain size microcrystalline to fine, cuttings angular to platy, small to medium, visible calcite veining, moderate reaction to HCL 10%
1147		**Limestone**, yellowish brown, poor to moderate induration, vugular and intergranular porosity, grain size microcrystalline to medium, cuttings subangular to rounded, small to medium, moderate to vigorous reaction to HCL 10%
1148		**Limestone**, [bedding transition mix from above], grayish brown, good induration, pinpoint porosity, grain size microcrystalline to fine, cuttings angular to platy, medium, moderate to vigorous reaction to HCL 10%

From (ft)	To (ft)	Lithology
1149	1150	**Dolomite**, pale brown, good induration, pinpoint porosity, grain size microcrystalline to fine, cuttings angular to platy, small to medium, minor fossil molds with recrystallization, slow/ minor reaction to HCL 10%
1150	1152	**Dolomite,** yellowish brown, sucrosic, poor to moderate induration, intergranular porosity, grain size microcrystalline, cuttings rounded, small, slow/ minor reaction to HCL 10%
1152	1155	**Dolomite**, pale brown, sucrosic, good induration, vugular and intergranular porosity, grain size microcrystalline to fine, cuttings angular, small to medium, slow/ minor reaction to HCL 10%
1155	1157	**Dolomite**, gray with black mottling, good induration, grain size microcrystalline, minor pinpoint porosity, cuttings angular to platy, medium size, minor reaction to HCL 10%
1157	1159	**Dolomite** [bedding transition mix from above], grayish brown, sucrosic, moderate to good induration, grain size microcrystalline - fine, vugular and intergranular porosity, cuttings angular to platy, medium size, slow minor reaction to HCL 10%
1159		**Dolomite**, brown/ very dark brown, sucrosic, moderate to good induration, grain size microcrystalline - fine, vugular and intergranular porosity, cuttings rounded to subangular, medium size, dark brown weathered surface on cuttings, slow minor reaction to HCL 10%
1160		**Dolomite**, pale brown, good induration, grain size microcrystalline - fine, pinpoint and vugular porosity, cuttings angular, medium size, slow minor reaction to HCL 10%
1161		**Dolomite**, pale brown/ light gray brown, good induration, grain size microcrystalline - fine, moldic, vugular and intercrystalline porosity, cuttings angular, small to medium size, recrystallization in molds, slow minor reaction to HCL 10%
1162	1167	**Dolomite**, dark yellowish brown, good induration, dark laminations present, grain size microcrystalline - fine, moldic, vugular and intercrystalline porosity, cuttings angular, small to large size, recrystallization in molds, slow minor reaction to HCL 10%
1167	1170	**Dolomitic limestone**, light brownish gray, good induration, grain size microcrystalline - fine, moldic, vugular and pinpoint porosity, cuttings angular, small to medium size, recrystallization in molds, moderate reaction to HCL 10%
1170	1172	**Dolomitic limestone**, dark yellowish brown, good induration, portions sucrosic, grain size microcrystalline - fine, moldic and vugular porosity, cuttings sub rounded to angular, medium size, moderate reaction to HCL 10%
1172	1177	**Dolomitic limestone**, light gray, good induration, grain size microcrystalline - fine, pinpoint porosity, minor vugs and molds with recrystallization, cuttings angular to platy, medium size, moderate reaction to HCL 10%
1177	1179	**Dolomite**, dark yellowish brown, good induration, grain size microcrystalline, intercrystalline porosity, lignite laminations, cuttings angular, medium to large size, slow minor reaction to HCL 10%, porosity increases with depth
1179	1183	**Dolomite**, dark yellowish brown, sucrosic, good induration, grain size microcrystalline - fine, moldic and vugular porosity, recrystallization in molds, cuttings angular, medium to large size, slow minor reaction to HCL 10%, vugular porosity decreases with depth
1183	1186	Void or very soft, drill stem drops through interval, peat bed, brown discharge
1186	1194	**Dolomite/ Limestone** mix, light yellowish brown to black, poor induration, dolomite sucrosic, peat laminations, fossiliferous, dictyoconus, moderate reaction to HCL 10%
1194	1197	**Dolomite**, light yellowish brown/ yellowish brown, sucrosic, good induration, grain size microcrystalline - fine, moldic and

From (ft)	To (ft)	Lithology
		vugular porosity, cuttings angular, medium size, slow minor reaction to HCL 10%
1197	1199	**Dolomite**, very dark grayish brown, good induration, portions sucrosic, grain size microcrystalline - fine, moldic and vugular porosity, recrystallization in molds, cuttings angular, small to medium size, slow minor reaction to HCL 10%
1199	1200	**Dolomite**, light yellowish brown, sucrosic, good induration, moldic, vugular and intercrystalline porosity, recrystallization in molds, grain size microcrystalline - fine, cuttings angular, small to large size, limestone in fines, possible cavings, mild to moderate reaction to HCL 10%
1200	1203	**Dolomite**, [bedding transition mix from above], light yellowish brown/ dark grayish brown, sucrosic, good induration, moldic and vugular porosity, grain size microcrystalline - fine, cuttings rounded to subangular, small to medium size, slow minor reaction to HCL 10%
1203	1220	**Core [top ~ 17 ft] Dolomitic limestone,** brown/ grayish orange, good induration, moldic, vugular and intergranular porosity, recrystallization in molds, microcrystalline to medium grain size, remnant fossil molds, dark laminations and multiple large solution cavities present, mild to vigorous reaction to HCL 10%
		Core [bottom ~ 3 ft] Limestone, micritic, pale brown/ grayish orange, intergranular porosity, poor induration, microcrystalline grain size, moderate to vigorous reaction to HCL
		
1203	1223	Cuttings 1203 – 1213 **Dolomitic limestone,** brown/ grayish orange, sucrosic, good induration, moldic, vugular and intergranular porosity, recrystallization in molds, microcrystalline to medium grain size, cuttings sub-angular to angular, medium to large, mild to vigorous reaction to HCL 10%
		Cuttings 1213 – 1220 **Dolomite,** brown, sucrosic, good induration, moldic, vugular and intergranular porosity, grain size microcrystalline to medium, cuttings sub-rounded, medium to large, mild reaction to HCL 10%
		Cuttings 1220 **Dolomite**, brown/ very dark brown, SAA [bedding change, mix], **Limestone**, [wackstone] micritic, light gray/ pale brown, poor induration, fossiliferous, dictyoconus, vigorous reaction to HCL10%
1221	1230	**Limestone**, [packstone] pale brown, poor induration, fossiliferous, dictyoconus, echinoids, intergranular porosity, skeletal benthic foraminifera, poorly cemented, vigorous reaction to HCL10%
1230	1240	**Limestone**, [packstone] pale brown, poor induration, fossiliferous, dictyoconus, echinoids, skeletal benthic foraminifera, smaller than previous interval, intergranular porosity, poorly cemented, vigorous reaction to HCL10%
1240	1244	**Limestone**, [packstone] pale brown/ very pale orange, moderate induration, fossiliferous, skeletal benthic foraminifera, fossil replacement and recrystallization, cuttings small, loose, poorly cemented to large, well cemented in calcilutite matrix,

From (ft)	To (ft)	Lithology
		intergranular porosity, vigorous reaction to HCL10%
1244	1254	**Limestone**, [packstone] pale brown/ very pale orange, poor induration, fossiliferous, skeletal benthic foraminifera, dictyoconus, echinoids, fossil replacement and recrystallization increase, cuttings small, loose, poorly cemented to large, well cemented in calcilutite matrix, intergranular porosity, vigorous reaction to HCL10%
1254	1260	**Limestone**, [wackstone] light grayish brown, moderate induration, fossil fragments exhibit replacement and recrystallization in molds, grain size microcrystalline, cuttings medium to large, rounded to subangular, well cemented in calcilutite matrix, intergranular porosity, vigorous reaction to HCL10%
1260	1270	**Limestone**, [bedding transition mix from above], light grayish brown, moderate induration, fossiliferous, benthic foraminifera, echinoids, dictyoconus, fossil and fossil molds, corals and coral with calcite recrystallization, grain size microcrystalline to fine, cuttings small, intergranular porosity, vigorous reaction to HCL10%, Dolomitic cavings, dark brown, sucrosic, appearance of wethered surfaces, at bedding change, poor to moderate induration, cuttings small to medium, loose, dredge zone
1270	1280	**Limestone**, very pale orange/ pale gray, chalky, moderate induration, fossiliferous, corals and coral with calcite recrystallization, grain size microcrystalline to fine, cuttings small to large, intergranular porosity, vigorous reaction to HCL10%,
1280	1285	**Dolomitic limestone**, brown, good induration, moldic and vugular porosity, fossil remnants in remain in molds, grain size crystalline to medium, cuttings angular, medium size, moderate reaction to HCL10%
1285	1290	**Dolomitic limestone**, brown, sucrosic, good induration, minor fossil remnants and molds, pinpoint and vugular porosity, grain size crystalline to medium, cuttings angular, medium to large size, moderate reaction to HCL10%
1290	1300	**Dolomitic limestone**, brown/ yellowish brown, sucrosic, good induration, moldic and vugular porosity, grain size crystalline to medium, cuttings angular, medium to large size, mild to moderate reaction to HCL10%, @1300 cuttings smaller, fossil cavings

SJRWMD FIELD LOGS

JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 9

GROUTING DATA

Date/Time	GWL	Tag Depth (ft bls)	Tremie Depth (ft bls)	Grout Volume	Return Theoretical (ft)	Return Actual (ft)	Comments
102704/----	-	223	NA	230 bags	175	49	Pressure grout 216-ft of 18" dia. steel casing
102804/----	-	174	NR	230 bags	184	1	Grout through tremie pipe
102904/----	-	173	NR	-	-	-	Tag only
110104/----	-	173	NR	192 bags	-	-	Hole plug used in zone with poor cement return
110104/----	-	166	NR	25 bags			Grout through tremie pipe
110204/----	-	157	NR	180 bags	144	127	Grout through tremie pipe
110304/----	-	30	NR	30 bags	24	30	18" dia. casing grouted to surface
122204/1200		508	440	211 bags	236	140	Pressure grout 505-ft of 12" dia. steel casing Grout weight 14.7 lb/gal
122704/1645	-	368	348	235 bags	115	224	Grout through tremie pipe Grout weight 14.8 lb/gal
122804/1030	-	144	134	132 bags			12" dia. casing grouted to surface
042505/----	-	1,300		110 bags	80	24	
042605/----	-	1,276		110 bags	95	58	
042705/----	-	1,218		3 yds (pea-gravel)			Pea-gravel used to fill voids
042705/----	-	1,181		25 bags	33	21	
042805/----	-	1,160		110 bags	106	90	
042905/----	-	1,070		154 bags	150	95	
050205/----	-	975		154 bags	140	125	
050305/----	-	850		154 bags	92	105	

Date/Time	GWL	Tag Depth (ft bls)	Tremie Depth (ft bls)	Grout Volume	Return Theoretical (ft)	Return Actual (ft)	Comments
050405/----	-	745		8 yds (pea-gravel			Pea-gravel used to fill large wash out
050405/----	-	700		25 bags	21	12	
050505/----	-	688		25 bags	23	11	Grout pump breaks down
050705/----	-	677		50 bags	42	17	
050905/----	-	660		50 bags	42	30	
051005/----	-	630		35 bags	38	36	
051105/----	-	594		-			Stop for packer test
051705/----	-	594		35 bags	17	13	
051805/----	-	581		15 bags	8	7	
051905/----	-	574		8 bags	4	8	
052305/----	-	566					Final tag, stop back plugging

SJRWMD FIELD LOGS

JERRY SELLARS WWTP – EXPLORATION ASR WELL LOCATION (WELL ID-BAR1863)

TABLE 10

SJRWMD LABORATORY GROUNDWATER QUALITY DATA

Analysis: Columbia Analytical Services

Well ID: BR1863													
Sample Date/ Time	11220 -1310	010505 - 1715	011305 - 1538	011305 - 1630	011805 - 1120	011805 - 1510	13105 - 1550	021105 - 0930	021605 - 2108	021705 - 1805	021805 - 1010	022105 - 1710	030305 - 0915
Casing Depth (ft bls)			504	504	504	504	504	504	504	504	504	504	504
Well Depth (ft bls)	290	594	600	690	690	700	902	903	613	703	687	797.5	903
Water Temp (deg C)	25.2	25.4	25.4	24.2	18.8	23.1	21.4	26.4	26.8	26.4	25.8	25.7	26.0
Conductivity-Field	3840	6740	4072	1067	1014	6830	5860	4325	5090	6920	7030	6600	6340
Conductivity (umhos/cm)	4250	6950	4140	1050	1148	7250	6160	5200	5140	6700	6970	6320	6140
pH-Field (std units)	8.07	7.23	6.96	7.91	7.78	7.6	6.31	7.53	7.31	6.15	7.37	7.68	7.54
Alkalinity (mg/l)	119	128	193	268	131	117	*3	127	135	123	115	135	130
Ca-T (mg/l)	140.5	200	163	14458	85.91	197	154	162	146	183	192	171.7	173
Mg-T (mg/l)	73.66	125	87.4	911	43.81	129	91.3	92.3	104	126	130	117.6	123
Na-T (mg/l)	547	963	564	107	91.7	1060	907	730	672.2	994.8	1046	1010	922
K-T(mg/l)	11.96	22.3	12.7	25.9	3.2	23.8	19150	12.7	14.1	21.3	23.1	20.9	18.98

Analysis: Columbia Analytical Services

Cl (mg/l)	1015	1960	1110	241	221	1880	1750	1540	1390	1910	1990	1850	1880
SO4 (mg/l)	184.61	310	187	39.8	37.7	291	232	226	222	294	278	264	287
F (mg/l)	0.299	0.315	0.444	0.462	0.51	0.333	0.368	0.328	0.404	0.347	0.341	0.343	0.311
Si-T (mg/l)	12.7	15.2	14.7	17.7	11.8	11.9	8.2	13.2	15.8	16	15.8	16.8	13.3
Ba-T (ug/l)	101	222	66.8	1235	37.6	163	119	103	68.8	167	164	186	139
Fe-T (ug/l)	2128	1015	2463	210000	744	309	42000	259	254	558	390	2681	462
Sr-T (ug/l)	8545	12910	7054	38460	2998	12600	9375	8350	7440	11780	11260	12820	2160
TDS (mg/l)	2854	4950	2600	589	575	4480	3270	3220	2700	3940	4150	3770	3960
Sample Date/ Time	030305 - 1215	031505 - 1430	032905 - 1705	040105 - 1030									
Casing Depth (ft bls)	504	504	504	504	504								
Well Depth (ft bls)	903	1027	917	1203									
Water Temp (deg C)	26.1	27.0	28.1	27.7									
Conductivity-Field (umhos/cm)	7010	14450	15450	27820									
Conductivity (umhos/cm)	6770	13350	14100	26500									
pH-Field (std units)	7.54	8.18	7.09	7.1									
Alkalinity (mg/l)	120	456	139	151									
Ca-T (mg/l)	181	457	334	597.4									
Mg-T (mg/l)	123	270	266	549.4									
Na-T (mg/l)	995	2188	2550	4888									
K-T(mg/l)	21.4	55.31	56.8	106.8									

Analysis: Columbia Analytical Services

Cl (mg/l)	2090	4650	5240	10200									
SO4 (mg/l)	307	69.8	704	1200									
F (mg/l)	0.315	0.36	0.315	0.31									
Si-T (mg/l)	15.5	13.2	13.5	11.3									
Ba-T (ug/l)	167	149	119	125.18									
Fe-T (ug/l)	283	4794	1392	4220									
Sr-T (ug/l)	12240	16120	18460	27790									
TDS (mg/l)	4250	8180	10400	18200									

Andreyev Engineering, Inc.

SANFORD OFFICE
4055 St. John's Parkway
Sanford, Florida 32771
407-330-7763
Fax: 407-330-7765

▼ Groundwater ▼ Environmental ▼ Geotechnical ▼ Construction Materials Testing

COPY

March 8, 2001
Project GGW-00-203

TO: Quentin L. Hampton Associates, Inc.
P.O. Drawer 240247
Port Orange, Florida 32129-6810

Attention: Mr. Richard W. Fernandez, P.E.

Subject: City of Cocoa ASR, Interim Report, Geologic and Hydrogeologic Conditions, Brevard County, Florida

Dear Mr. Fernandez:

Andreyev Engineering, Inc. has researched available information for the proposed aquifer storage and recovery wells for the City of Cocoa and presents herein the information available to date.

Aquifer storage and recovery is proposed for seasonal storage of reclaimed water during periods of low irrigation demand and recovery of water during periods of high demand. Recovered water is to be used as reuse irrigation supply. ASR location is proposed to be in the near vicinity of the wastewater treatment plant in the City of Cocoa. We understand that it is desired to install an ASR well into the lower portion of the upper Floridan aquifer. The ASR recharge water is proposed to be treated to drinking water standards.

GEOLOGY

The geomorphology of Brevard County, located on the Atlantic coastline of central peninsular Florida, consists of the Atlantic Coastal Ridge on the east and the Eastern Valley on the west. The City of Cocoa lies just to the east of the Atlantic Coastal Ridge in the Eastern Valley. Surficial soils consist of undifferentiated shell beds and variably lithified coquina of shells and sands and unlithified fossiliferous sand (Scott, 1993).

The surficial soils are underlain by unconsolidated beds of Late Miocene or Pliocene Age deposits, which in turn are underlain by the confining clayey deposits of the Hawthorn Formation. The deposits of Late Miocene or Pliocene Age and the Hawthorn Formation are of relatively low permeability which serve to confine water under pressure in the underlying limestone formations.

The underlying limestone and dolostone formations, which form the Floridan aquifer system, extend from an elevation of about -120 feet NGVD at the City of Cocoa to a sub-confining unit at an elevation of approximately -2800 feet NGVD. These formation consist of, from top to bottom, the Ocala Limestone, Avon Park Formation, and Oldsmar Formation.

A middle confining unit of lower permeability separates the Upper Floridan from the Lower Floridan aquifer system and consists of dense dolostone with interbedded limestones. This middle confining

A middle confining unit of lower permeability separates the Upper Floridan from the Lower Floridan aquifer system and consists of dense dolostone with interbedded limestones. This middle confining unit is characterized as leaky. A subzone of the lower Floridan aquifer system is termed the "Boulder Zone" and is the primary injection horizon for injection disposal wells.

HYDROGEOLOGY

Aquifers underlying the City of Cocoa vicinity consist of a surficial aquifer, an upper Floridan aquifer and a lower Floridan aquifer. Separating the surficial and upper Floridan aquifers is an upper confining unit consisting primarily of the Hawthorn formation. The upper Floridan and lower Floridan aquifers are separated by a middle confining unit consisting primarily of dense dolostone.

Elevation of the top of the upper Floridan aquifer is approximately -120 feet NGVD in the vicinity of the City of Cocoa. Upper Floridan aquifer thickness is about 700 feet. Middle confining unit thickness, underlying the upper Floridan aquifer is about 300 feet. Top of the lower Floridan aquifer is at approximate elevation of -1100 feet NGVD, and the thickness is about 1600 feet. A geologic cross section is included in the Appendix along with a map showing the location of the cross section (Tibbals, 1990).

The upper confining unit, separating the surficial aquifer from the upper Floridan aquifer, has a very low permeability, with an estimated leakance of $1X10^{-5}$ to $1X10^{-6}$ per day. The artesian nature of the upper Floridan aquifer indicates the upper confining unit (Hawthorn formation) tends to be impermeable and non-leaky. Potentiometric level of the upper Floridan aquifer is +25 to +30 feet NGVD, approximately 10 to 20 feet above ground surface, at the City of Cocoa.

The middle confining unit, separating the upper from the lower Floridan aquifers, is characterized as leaky. Groundwater chemistry trends for several injection wells indicate that injected waste liquids are migrating upward through the confining unit, probably moving vertically along fractures in the dolostone (Duncan, 1994).

Injection wells are located on Merritt Island, approximately 5 miles east-northeast of the City of Cocoa proposed ASR site. Disposal depth of the injection wells is about 2500 feet BLS, into the Oldsmar Formation. It is unlikely that these wells will cause contamination of the upper Floridan aquifer at the City of Cocoa vicinity due to the difference in depths and due to the potentiometric gradient to the northeast.

Upper Floridan aquifer transmissivity is estimated to be 35,000 to 100,000 ft^2/day, and hydraulic conductivity 50 to 140 feet per day. For the lower Floridan aquifer the transmissivity is estimated to be 60,000 ft^2/day, with hydraulic conductivity of about 35 to 40 feet per day.

Potentiometric level of the upper Floridan aquifer was +27 feet NGVD in September 1997 and +28 feet NGVD in May 1998, as interpolated from nearby monitor wells. Groundwater gradient is to the northeast at about 0.03%. Based on lithologic logs from Florida Geological Survey, porosity of the upper Floridan aquifer is approximately 20 percent.

Rate of groundwater movement in the upper Floridan aquifer is estimated to be 27 to 77 feet per year, based upon hydraulic conductivity of 50 to 140 feet per day, head gradient of 0.03%, and porosity of 20%.

Available lithologic logs from nearby wells are provided in the Appendix.

AQUIFER WATER QUALITY

Published information of water quality indicate chloride concentration in the upper Floridan aquifer to be approximately 1,000 mg/L in the vicinity of the City of Cocoa. Total dissolved solids concentration is about 2,000 mg/L, hardness concentration is 500 to 1,000 mg/L as $CaCO_3$, and sulfate concentration is 250 mg/L (Shampine, 1965). Current sampling will be required to better characterize the water quality at specific depth intervals of the Floridan aquifer. Chloride concentrations in the lower Floridan aquifer have been measured at 19,200 mg/L and total dissolved solids concentration at 35,000 mg/L. These measurements were taken at a depth of 1500 feet at Merritt Island, approximately 5 miles NNE of the City of Cocoa (Duncan, 1994).

It is recommended that a test well be installed in the vicinity of the proposed ASR well to allow site-specific characterization of the water quality at depth intervals. This test well can be converted to a monitoring well during initial phases of ASR well testing. Specific well installation specifications shalll be developed for the test well to allow discrete sampling of water quality and complete the well as a permanent monitoring well.

ASR ZONE OPTIONS

Hydrogeologically, it will be possible to utilize the lower portion of the upper Floridan aquifer for the reclaimed water ASR. However, water quality and permit criteria must be considered. We could not find specific water quality data for the proposed ASR zone. Furthermore, this zone would not be hydraulically separated from the upper portion of the aquifer.

As a result, the lower portion of the upper Floridan aquifer can not be considered as feasible at this stage of the investigation. However, the proposed testing during Phase II may determine that this zone has the required water quality and the hydrogeologic conditions to be an effective zone for ASR. In addition, the proposed high level of reclaimed water treatment may facilitate permitting to utilize the upper Floridan aquifer.

Based on the preliminary data collected to date, the best zone for an ASR would be the upper portion of the lower Floridan aquifer. Potential ASR well casing depth would be about 1200 feet with an open hole section of 300 to 400 feet.

WATER SUPPLY AND DEMAND

Monthly water supply and irrigation demand were estimated for the year 2020 in order to estimate the monthly aquifer storage and monthly aquifer recovery rates. Water supply will be provided by treated waste water, shallow wells, and captured stormwater. Seasonal supply was estimated based upon the actual flows for the period November 1999 to October 2000. Demand was assumed to be non-seasonal, with equal demand in all months. **Table 1**, summarizing these calculations, is presented in the Appendix. These calculations are intended

as preliminary estimates and are expected to change with refinements to seasonal fluctuations estimates and revisions of aquifer storage requirements.

Total irrigation supply for the year 2020 was estimated to be 5.89 MGD, or 2,150 million gallons. Supply was estimated to vary from 127 million gallons in February to 228 million gallons in August. Total demand for 2020 was estimated to be 5.94 MGD, or 2,168 million gallons. Monthly demand was estimated to be 181 million gallons per month.

Aquifer recharge was calculated to be a total of 206 million gallons during the months of May through October, and aquifer recovery was calculated to be a total of 176 million gallons during the months of November through April. Maximum monthly recharge rate of 1.86 MGD occurred during the month of August. Maximum recovery rate of 1.62 MGD occurred during the month of May. Actual percent recovery will be estimated from full-scale testing during Phase II. At this time, an effective recovery of 85 percent was assumed.

These initial estimates are intended primarily as a presentation of methodology and not as actual estimates of recharge and recovery rates. Further information is necessary, particularly seasonal fluctuations in supply and demand, in order to refine the estimates.

OTHER CONSIDERATIONS

A number of issues are to be addressed in order to proceed with full-scale testing. Among these are:

- Quality of recharge water, particularly total suspended solids, to minimize plugging.
- Retention/disposal of discharge to waste water prior to recharge and during recovery pumping.
- Site selection, including operation economics, source of test water, disposal of potential brackish water.
- Regulatory issues, pre-application meetings with FDEP.
- Detailed design of test ASR well and monitoring wells. A diagram of test wells as used at the Dyal plant is included in the Appendix. Test wells for this application will be similar.
- Detailed design of well head and pump.
- Detailed testing procedures, including recharge and recovery rates and times. These should approximate the expected production cycles.

As additional data are collected, we will refine our assessment of the ASR well and develop final conclusions as to the feasibility of an ASR at the selected site, the most likely zone of storage and recovery, and recommendations for Phase II work.

We appreciate the opportunity to provide our services and trust that this report will inform you of the current status of the project. If you have questions or comments, please do not hesitate to call our office.

We appreciate the opportunity to provide our services and trust that this report will inform you of the current status of the project. If you have questions or comments, please do not hesitate to call our office.

Sincerely,

ANDREYEV ENGINEERING, INC.

COPY

Marty Sullivan, P.E.
Project Engineer
Florida Registration No. 54689

Nicolas E. Andreyev, P.E.
President
Florida Registration No. 35459

REFERENCES

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Duncan, J. G., Evans, W. L. III, Taylor, K. L., "Geologic Framework of the Lower Floridan Aquifer System, Brevard County, Florida," Florida Geological Survey Bulletin No. 64, Tallahassee, 1994.

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Tibbals, C.H., "Hydrology of the Floridan Aquifer System in East-Central Florida," U.S. Geological Survey Professional Paper 1403-E, Washington, 1990.

U.S. Geological Survey, "Potentiometric Surface of the Upper Floridan Aquifer in the St. Johns River Water Management District and Vicinity, Florida." September 1997, May 1998.

TABLE

TABLE 1

City of Cocoa Aquifer Storage and Recovery
Seasonal Calculations

Year 2020:
Total water supply 2150 million gallons
Total water demand 2168 million gallons

	Supply MG	Projected ASR Loss (20%) MG	Demand MG	Difference (incl loss) MG	Aquifer Storage MG	Recharge or Recovery
Jan	136	4.0	181	-41	148	Recovery
Feb	127	4.0	181	-50	98	Recovery
Mar	162	4.0	181	-14	83	Recovery
Apr	172	4.0	181	-5	48	Recharge
May	224	4.0	181	47	95	Recharge
Jun	189	4.0	181	13	108	Recharge
Jul	194	4.0	181	17	125	Recharge
Aug	228	4.0	181	52	177	Recharge
Sep	220	4.0	181	44	220	Recharge
Oct	210	4.0	181	34	254	Recharge
Nov	151	4.0	181	-25	229	Recovery
Dec	136	4.0	181	-40	188	Recovery
Total	2150	48	2168	30		

Max ASR Storage (Oct)	254	MG
Min ASR Storage (Apr)	48	MG
Total ASR Storage (May-Oct)	206	MG
Total ASR Recovery (Nov-Apr)	176	MG
Max ASR Recharge Rate (Aug)	1.86	MGD
Max ASR Recovery Rate (May)	1.62	MGD

	1999-2000 Supply					1999-2000 Demand
	Influent MG	Bracco MG	ABW MG	Rockpond MG	Total Supply MG	Reuse MG
Jan 2000	54.46	0	0.19	0	54.65	42.92
Feb 2000	47.37	2.105	0.372	1.015	50.862	46.92
Mar 2000	50.14	13.176	1.097	0.766	65.179	61.58
Apr 2000	46.2	21.966	0.489	0.288	68.943	66.8
May 2000	45.89	34.94	4.45	4.587	89.867	88.89
Jun 2000	43.68	25.812	3.995	2.595	76.082	76.17
Jul 2000	48.83	24.893	3.521	0.653	77.897	73.19
Aug 2000	47.42	39.768	2.449	2.151	91.788	88.5
Sep 2000	55.5	31.55	0.901	0.612	88.563	60.68
Oct 2000	67.91	13.693	2.041	0.824	84.468	65.96
Nov 1999	60.82	0	0	0	60.82	44.32
Dec 1999	54.77	0	0	0	54.77	43.4
Total	622.99	207.903	19.505	13.491	863.889	759.33

APPENDIX
GEOLOGIC CROSS SECTION
(Tibbals, 1990)

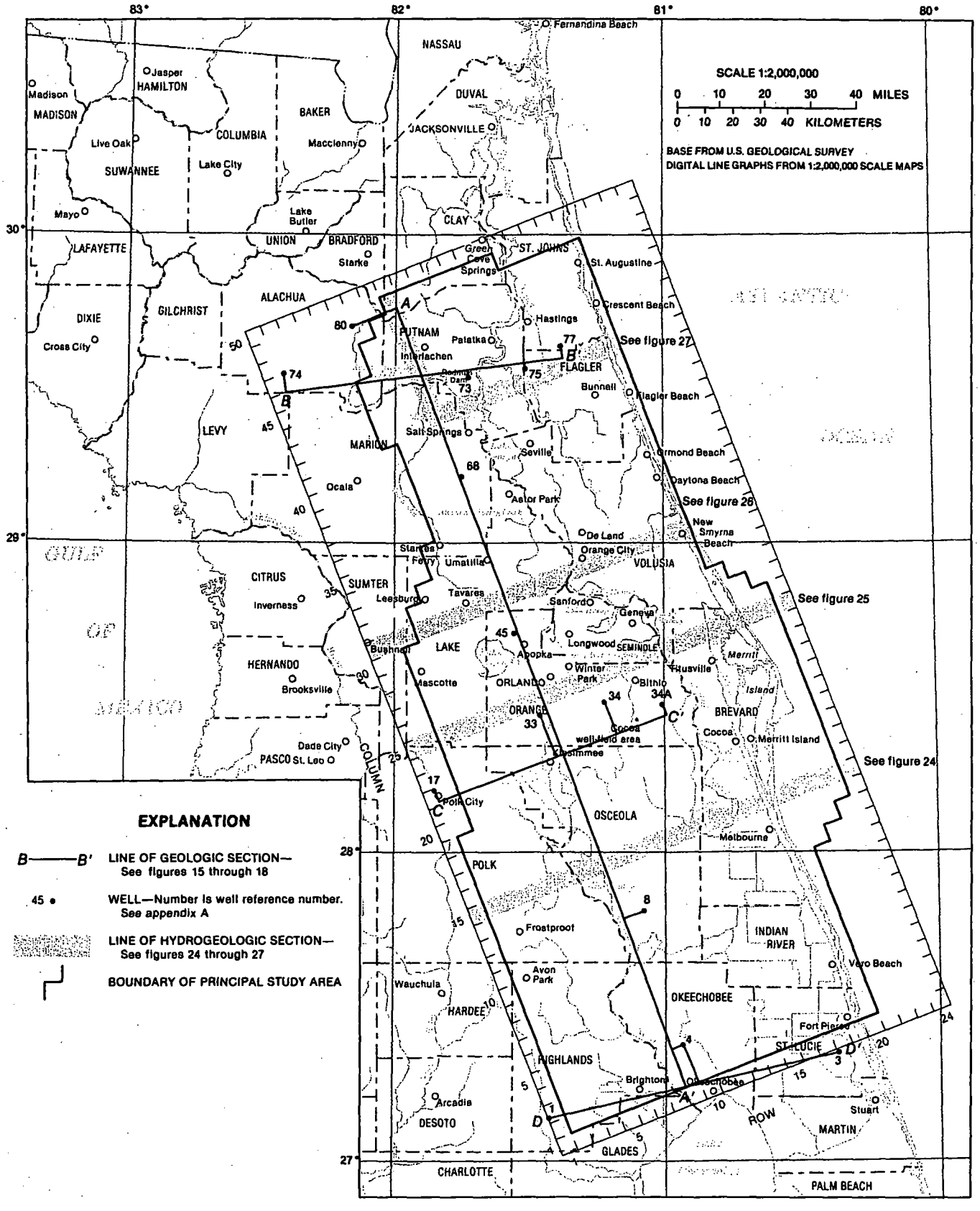

FIGURE 14.—Location of geologic and hydrogeologic sections.

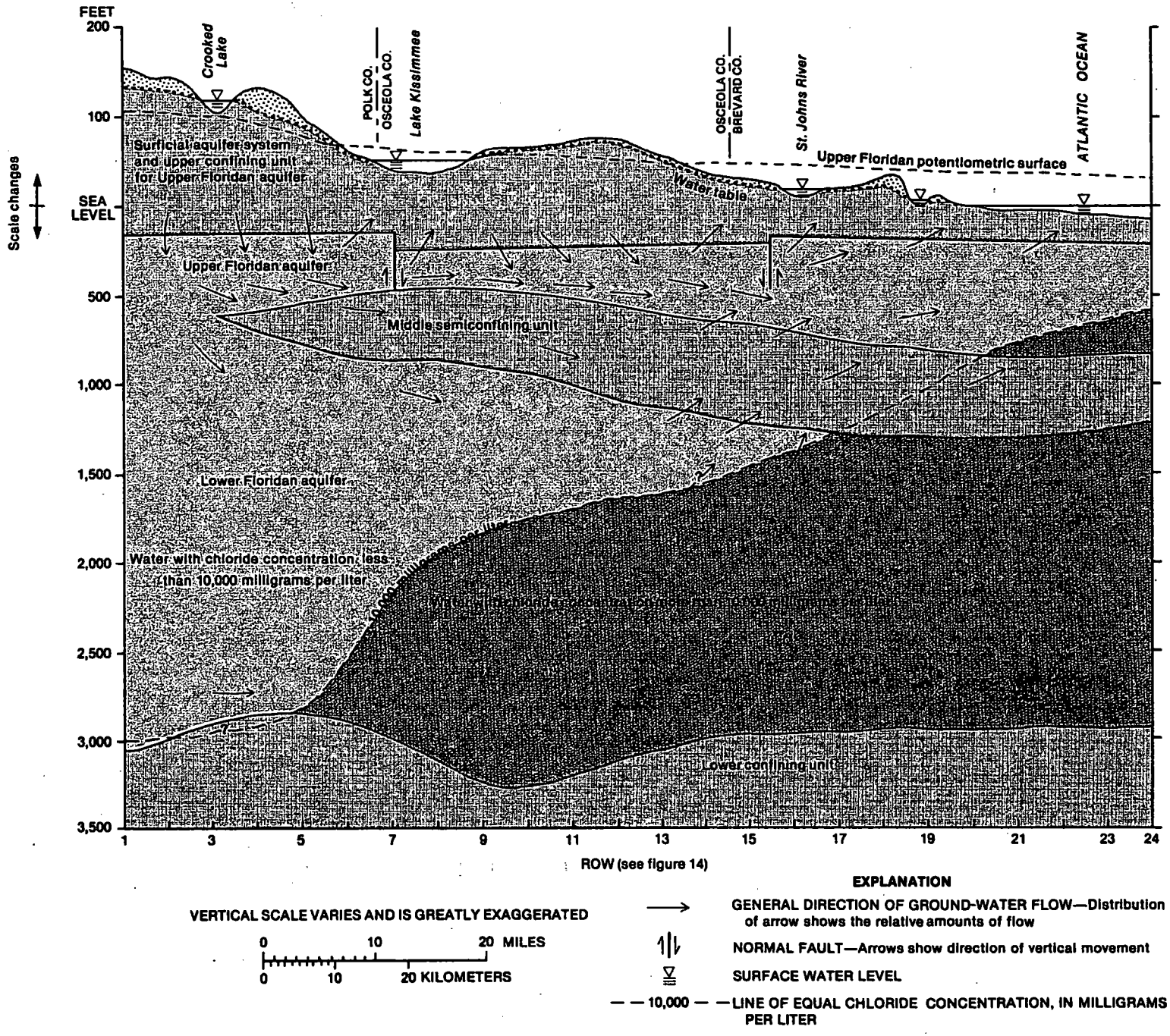

FIGURE 24.—Hydrogeologic units and ground-water flow along model column 15. Trace of section shown in figure 14.

APPENDIX
DYAL FACILITY TEST WELLS
(Pyne, 1995)

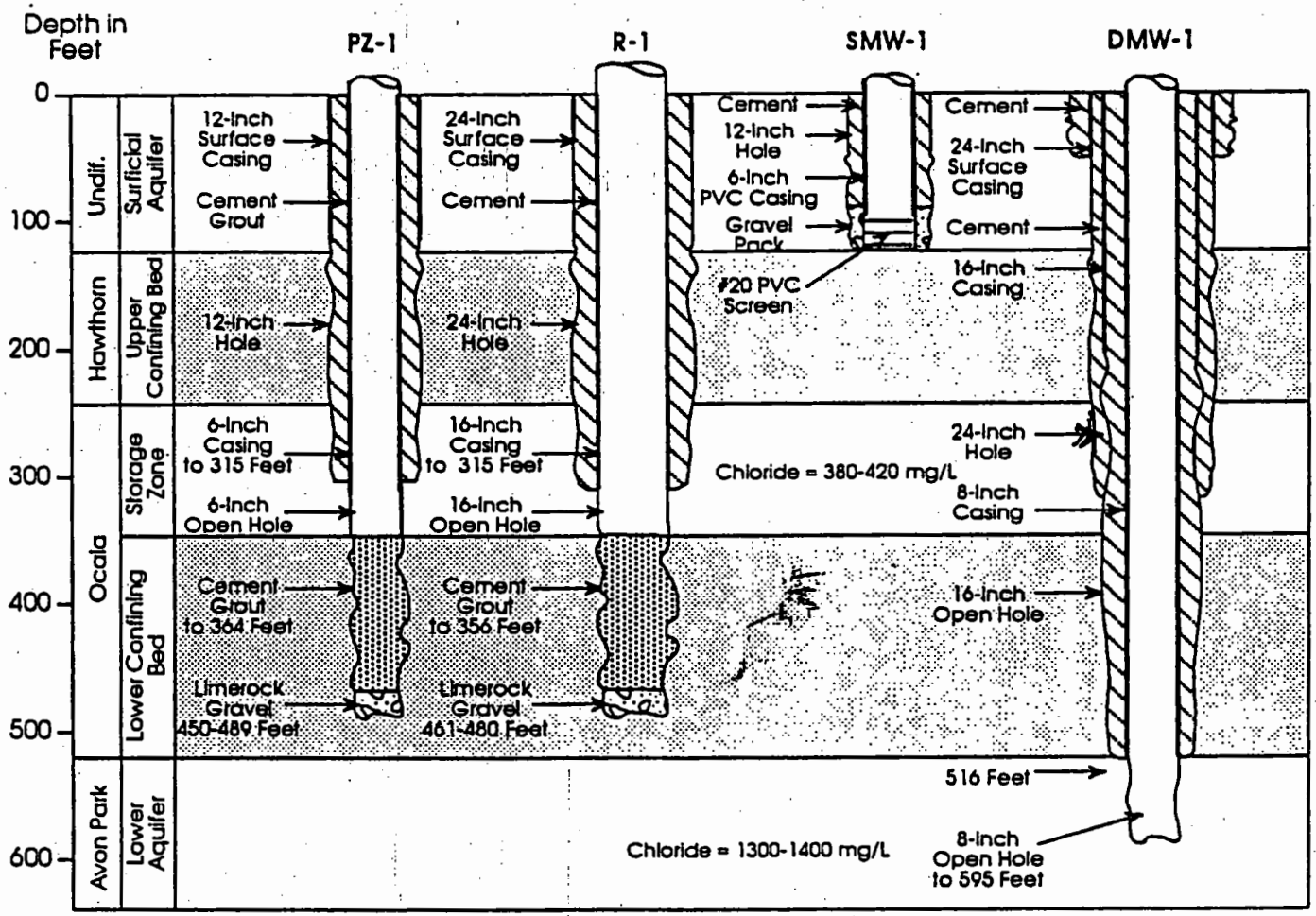

Figure 2.4 ASR initial test facilities and storage zone, Cocoa, Florida.

APPENDIX
LITHOLOGIC LOGS

LITHOLOGIC WELL LOG PRINTOUT

SOURCE - FGS

WELL NUMBER: W-604

COUNTY - BREVARD

TOTAL DEPTH: 186 FT.

LOCATION: T.24S R. 37E S.31 AA

3 SAMPLES FROM 108 TO 186 FT.

LAT = 28 D 21M 33S

LON = 80 D 42M 22S

COMPLETION DATE: 19/05/41

ELEVATION: 2 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: FLORIDA STATE ROADS DEPT. DRILLER: H.E.HARRIS

WORKED BY:R.O. VERNON

0.	-	108.	000NOSM	NO SAMPLES
108.	-	145.	122HTRN	HAWTHORN GROUP
145.	-	186.	124OCAL	OCALA GROUP

0 - 108 NO SAMPLES

108 - 145 CLAY; GREENISH GRAY

POROSITY: LOW PERMEABILITY

OTHER FEATURES: CALCAREOUS

CONTAINS PHOSPHORITIC RADIOLARIAN CASTS

145 - 186 LIMESTONE; LIGHT BROWN

POROSITY: LOW PERMEABILITY

GOOD INDURATION

OTHER FEATURES: CHALKY, COQUINA

FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, BRYOZOA

LEPICOCYCLINA,CAMERINA,OPERCULINOIDES

186 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-929 COUNTY - BREVARD

TOTAL DEPTH: 00245 FT. LOCATION: T.24S R. 36E S.14 CB
10 SAMPLES FROM 0 TO 245 FT. LAT = 28 D 23M 58S
LON = 80 D 41M 55S
COMPLETION DATE: 01/06/45 ELEVATION: 2 FT

OTHER TYPES OF LOGS AVAILABLE - NONE

OWNER/DRILLER:OWNER: J.E. FIELDS DRILLER: ADGER SMITH

WORKED BY:E. CALDWELL (SHELL OIL) (84-103') AND R.O. VERNON (103-245')

84.	-	160.	122HTRN	HAWTHORN GROUP
160.	-	245.	124OCAL	OCALA GROUP

0	-	103	SAND; WHITE ACCESSORY MINERALS: PHOSPHATIC SAND- %, LIMESTONE - % FOSSILS: FOSSIL FRAGMENTS, BRYOZOA, BENTHIC FORAMINIFERA OSTRACODS, ECHINOID PEBBLE SIZE PHOSPHATE
103	-	109	LIMESTONE; LIGHT GREENISH GRAY TO MODERATE GRAY GOOD INDURATION

ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SA
ND- %
FOSSILS: FOSSIL MOLDS

109 - 137 LIMESTONE; DARK GRAY TO GREENISH GRAY
GOOD INDURATION
ACCESSORY MINERALS: CLAY- %, PHOSPHATIC SAND-%
RADIOLARIANS, WITH SOME PHOSPHATIZED

137 - 146 GYPSUM; MODERATE GREEN
SEDIMENTARY STRUCTURES: NODULAR
ACCESSORY MINERALS: CLAY- %, PHOSPHATIC SAND-%
SAMPLE CONSISTS ALMOST ENTIRELY OF GREEN CRYSTALLI
NE GYPSUM
NODULES;ALSO RADIOLARIAN WITH SOME PHOSPHATIZED.

146 - 155 LIMESTONE; DARK GRAY
GOOD INDURATION
SEDIMENTARY STRUCTURES: STREAKED
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SA
ND- %
OTHER FEATURES: SPECKLED
ALSO FRAGMENTS OF OVERLYING LITHOLOGY FROM 137-146
FT.

155 - 156 MARL: LIGHT
GREENISH-GRAY,CRYSTALLINE,PHOSPHATIC, & POORLY IND
URATED
RADIOLARIAN AND PHOSPHATE

156 - 160 LIMESTONE; MODERATE BROWN TO WHITE
GOOD INDURATION
ACCESSORY MINERALS: PHOSPHATIC SAND- %
OTHER FEATURES: SPECKLED
FOSSILS: FOSSIL MOLDS
RARE PHOSPHATIZED BONE

160 - 191 LIMESTONE; WHITE
GRAIN TYPE: SKELETAL
MODERATE INDURATION
OTHER FEATURES: CHALKY
FOSSILS: BENTHIC FORAMINIFERA
LEPIDOCYCLINA & OPERCULINOIDES

191 - 206 LIMESTONE; LIGHT GRAY
GRAIN TYPE: SKELETAL
MODERATE INDURATION
SEDIMENTARY STRUCTURES: MASSIVE
OTHER FEATURES: GRANULAR
FOSSILS: BENTHIC FORAMINIFERA
POROUS;FORAMS AS ABOVE.

206 - 245 LIMESTONE; WHITE

GRAIN TYPE: SKELETAL

MODERATE INDURATION

OTHER FEATURES: GRANULAR, FOSSILIFEROUS

FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, CRUSTACEA ECHINOID

LOWER JACKSON GROUP-PERIARCHUS BED:PERIARCHUS LYELLI VAR. FRAGMENT;AMPHESTIGINA PINARENSIS COMMON;ALSO MESSELINA SP.A.

245 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-934 COUNTY - BREVARD

TOTAL DEPTH: 261 FT. LOCATION: T.24S R. 36E S.11
11 SAMPLES FROM 91 TO 261 FT. LAT = 28 D 24M 44S
LON = 80 D 42M 03S
COMPLETION DATE: 20/06/45 ELEVATION: 4 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: W.S. BELL DRILLER: ADGER L. SMITH

WORKED BY:R.O. VERNON

0.	-	91.	000NOSM	NO SAMPLES
91.	-	144.	122HTRN	HAWTHORN GROUP
144.	-	261.	124OCAL	OCALA GROUP

0	-	91	NO SAMPLES

91	-	101	LIMESTONE; LIGHT BROWN

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR

GRAIN TYPE: CRYSTALS

ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: BENTHIC FORAMINIFERA

101 - 106 LIMESTONE; LIGHT BROWN TO MODERATE GRAY
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
GOOD INDURATION
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND-%

106 - 110 AS ABOVE

110 - 110 CLAY; LIGHT GREEN
POROSITY: LOW PERMEABILITY, INTERGRANULAR; UNCONSOLIDATED

110 - 123 CLAY; LIGHT BROWN
POROSITY: LOW PERMEABILITY, INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: QUARTZ SAND- %
OTHER FEATURES: CALCAREOUS
RADIOLARIAN

123 - 131 LIMESTONE; LIGHT BROWN TO MODERATE GRAY
GRAIN TYPE: PELLET CAST, INTRACLASTS
GOOD INDURATION
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND-%

131 - 131 CLAY; LIGHT GREEN

POROSITY: LOW PERMEABILITY, INTERGRANULAR; UNCONSO
LIDATED
ACCESSORY MINERALS: PHOSPHATIC SAND- %
OTHER FEATURES: CALCAREOUS
FOSSILS: SHARKS TEETH, BENTHIC FORAMINIFERA

131 - 143 RADILARIAN

143 - 144 CLAY; LIGHT GREENISH GRAY
POROSITY: LOW PERMEABILITY, INTERGRANULAR; UNCONSO
LIDATED
ACCESSORY MINERALS: PHOSPHATIC SAND- %
OTHER FEATURES: CALCAREOUS

144 - 147 LIMESTONE; LIGHT BROWN TO LIGHT BROWN
GRAIN TYPE: PELLET CAST, INTRACLASTS
GOOD INDURATION
FOSSILS: FOSSIL MOLDS, BENTHIC FORAMINIFERA

147 - 148 LIMESTONE; LIGHT GRAY TO LIGHT BROWN
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
INTRAGRANULAR
GOOD INDURATION
OTHER FEATURES: COQUINA
FOSSILS: BENTHIC FORAMINIFERA

148 - 179 AS ABOVE

179 - 203 LIMESTONE; LIGHT BROWN TO LIGHT GRAY
POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
INTRAGRANULAR
GOOD INDURATION
OTHER FEATURES: CHALKY, COQUINA
FOSSILS: BENTHIC FORAMINIFERA

203 - 261 LIMESTONE; LIGHT BROWN
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
INTRAGRANULAR
GOOD INDURATION
FOSSILS: BENTHIC FORAMINIFERA

261 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1380 COUNTY - BREVARD

TOTAL DEPTH: 335 FT. LOCATION: T.24S R. 36E S. 3 A
29 SAMPLES FROM 0 TO 330 FT. LAT = 28 D 25M 35S
LON = 80 D 43M 02S
COMPLETION DATE: 03/09/46 ELEVATION: 2 FT

OTHER TYPES OF LOGS AVAILABLE - NONE

OWNER/DRILLER:OWNER: DEERFIELD GROVE CO. [U.S.G.S. BR-70]

WORKED BY:M. FILEWICZ

0.	-	70.	000NOSM	NO SAMPLES
70.	-	110.	122HTRN	HAWTHORN GROUP
110.	-	221.	124OCAL	OCALA GROUP
221.	-	330.	124AVPK	AVON PARK FM.

0 - 70 NO SAMPLES

70 - 80 SAND; VERY LIGHT ORANGE TO YELLOWISH GRAY
32% POROSITY
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM
ROUNDNESS: SUB-ANGULAR TO ANGULAR; LOW SPHERICITY

UNCONSOLIDATED

ACCESSORY MINERALS: PHOSPHATIC SAND-01%

FOSSILS: MOLLUSKS

80 - 94 SHELL BED; LIGHT GRAY TO LIGHT OLIVE GRAY

30% POROSITY, POOR INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX

ACCESSORY MINERALS: SPAR-01%, PHOSPHATIC SAND-01%

FOSSILS: MOLLUSKS

94 - 100 AS ABOVE

100 - 110 CALCILUTITE; LIGHT OLIVE GRAY TO GREENISH GRAY

18% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS

GRAIN TYPE: CALCILUTITE, CRYSTALS

50% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: MICROCRYSTALLINE

RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE

POOR INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX

ACCESSORY MINERALS: SPAR-30%, PHOSPHATIC SAND-03%

QUARTZ SAND-05%

FOSSILS: MOLLUSKS

110 - 120 CALCARENITE; VERY LIGHT ORANGE TO VERY LIGHT GRAY
10% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: BIOGENIC, SKELETAL
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; POOR IN
DURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA

120 - 130 AS ABOVE

130 - 147 CALCARENITE; VERY LIGHT ORANGE TO VERY LIGHT GRAY
10% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: BIOGENIC, SKELETAL
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; POOR IN
DURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA, ECHINOID

147 - 178 AS ABOVE

178 - 189 CALCARENITE; VERY LIGHT ORANGE TO VERY LIGHT GRAY
08% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: BIOGENIC, SKELETAL
70% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE
MODERATE INDURATION
FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA, ECHINOID

189 - 200 AS ABOVE

200 - 210 CALCARENITE; VERY LIGHT ORANGE TO VERY LIGHT GRAY
10% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: BIOGENIC, SKELETAL
85% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE
MODERATE INDURATION
FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA, ECHINOID

210 - 221 CALCARENITE; VERY LIGHT ORANGE TO VERY LIGHT GRAY
10% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: BIOGENIC, SKELETAL
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; GOOD IN
DURATION
FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA, ECHINOID

221 - 231 CALCARENITE; WHITE TO VERY LIGHT GRAY
10% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: BIOGENIC, SKELETAL

80% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; GOOD IN DURATION

CEMENT TYPE(S): CALCILUTITE MATRIX

FOSSILS: BENTHIC FORAMINIFERA, CONES, MOLLUSKS

FIRST DICTYOCONUS

231 - 242 CALCARENITE; WHITE TO VERY LIGHT GRAY

12% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUGS

GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE

70% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM

POOR INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX

FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS

242 - 252 CALCARENITE; WHITE TO VERY LIGHT GRAY

12% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUGS

GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE

70% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM

POOR INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX

FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, ECHINOID

252 - 263 CALCARENITE; WHITE TO VERY LIGHT GRAY
12% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE
MODERATE INDURATION
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, ECHINOID

263 - 273 AS ABOVE

273 - 284 CALCARENITE; WHITE TO VERY LIGHT GRAY
12% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE
MODERATE INDURATION
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, ECHINOID,
CONES

284 - 294 CALCARENITE; WHITE TO VERY LIGHT GRAY
12% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: BIOGENIC, SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE
MODERATE INDURATION

FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, ECHINOID, CONES

294 - 330 AS ABOVE

330 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1381 COUNTY - BREVARD

TOTAL DEPTH: 190 FT. LOCATION: T.24S R. 36E S.32 C
38 SAMPLES FROM 0 TO 190 FT. LAT = 28 D 21M 23S
LON = 80 D 45M 11S
COMPLETION DATE: 11/09/46 ELEVATION: 80 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: W.W. MOORE DRILLER: BREVARD DRILLING

WORKED BY:R.O. VERNON

0.	-	40.	112PLSC	PLEISTOCENE SANDS
40.	-	140.	122MOCN	MIOCENE
140.	-	180.	124OCALL	OCALA LIMESTONE LOWER MEMBER
180.	-	190.	124JKSN	124JKSN

0 - 20 SAND;
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
RANGE: FINE TO COARSE; UNCONSOLIDATED

20 - 40 AS ABOVE

40 - 40 SHELL BED;

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
INTRAGRANULAR; UNCONSOLIDATED

ACCESSORY MINERALS: CLAY- %, QUARTZ SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA

40 - 50 SAND;

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
UNCONSOLIDATED

FOSSILS: MOLLUSKS

50 - 50 CLAY; LIGHT GRAY

ACCESSORY MINERALS: QUARTZ SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: BRYOZOA, BENTHIC FORAMINIFERA

ELPHIDIUM POEYANUM; ELPHPIDIUM ADVENUM

50 - 60 AS ABOVE

60 - 60 CLAY; YELLOWISH GRAY

OTHER FEATURES: CALCAREOUS

FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, BRYOZOA

FOSSIL FRAGMENTS

60 - 65 AS ABOVE

65 - 65 CLAY; LIGHT GRAY
ACCESSORY MINERALS: QUARTZ SAND- %
OTHER FEATURES: CALCAREOUS
FOSSILS: BRYOZOA, BENTHIC FORAMINIFERA

65 - 70 AS ABOVE

70 - 70 CLAY; YELLOWISH GRAY
OTHER FEATURES: CALCAREOUS
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, BRYOZOA
FOSSIL FRAGMENTS

70 - 75 SAND;

75 - 75 CLAY;
UNCONSOLIDATED
ACCESSORY MINERALS: QUARTZ SAND- %
OTHER FEATURES: CALCAREOUS
FOSSILS: MOLLUSKS, ECHINOID, BENTHIC FORAMINIFERA
ELPHIDIUM SAGRUM

75 - 80 AS ABOVE

80 - 80 SAND;

80 - 85 AS ABOVE

85 - 85 CLAY;
UNCONSOLIDATED
ACCESSORY MINERALS: QUARTZ SAND- %
OTHER FEATURES: CALCAREOUS
FOSSILS: MOLLUSKS, ECHINOID, BENTHIC FORAMINIFERA

85 - 93 CLAY; LIGHT GRAY TO LIGHT BROWN
OTHER FEATURES: CALCAREOUS, CHALKY
FOSSILS: BENTHIC FORAMINIFERA

93 - 100 AS ABOVE

100 - 105 LIMESTONE; LIGHT GREENISH GRAY
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SA
ND- %
CLAY- %
OTHER FEATURES: CALCAREOUS
FOSSILS: BENTHIC FORAMINIFERA
AMPHISTEGINA LESSONII; TEXTULARIR ARTICULATA

105 - 110 LIMESTONE; LIGHT GRAY TO LIGHT GREENISH GRAY
UNCONSOLIDATED
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SA
ND- %
FOSSILS: FOSSIL MOLDS, MOLLUSKS

110 - 120 AS ABOVE

120 - 125 CLAY; GREENISH GRAY
UNCONSOLIDATED
CEMENT TYPE(S):
ACCESSORY MINERALS: PHOSPHATIC SAND- %
OTHER FEATURES: CALCAREOUS

125 - 130 SAND;
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
UNCONSOLIDATED
ACCESSORY MINERALS: PHOSPHATIC SAND- %
RADIOLARIANS PRESENT

130 - 135 LIMESTONE; LIGHT GRAY
GRAIN SIZE: FINE; GOOD INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT
ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SA
ND-%

135 - 138 AS ABOVE

138 - 140 LIMESTONE; LIGHT BROWN
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
UNCONSOLIDATED
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA
VERY FOSSILIFEROUS

140 - 150 CALCARENITE; LIGHT BROWN
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
INTRAGRANULAR
UNCONSOLIDATED
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: COQUINA
FOSSILS: BENTHIC FORAMINIFERA, BRACHIOPOD

150 - 160 AS ABOVE

160 - 165 LIMESTONE; LIGHT BROWN TO LIGHT GRAY
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
UNCONSOLIDATED
CEMENT TYPE(S): CALCILUTITE MATRIX

OTHER FEATURES: CHALKY

FOSSILS: BENTHIC FORAMINIFERA

165 - 175 AS ABOVE

175 - 180 LIMESTONE; LIGHT GRAY TO LIGHT BROWN

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R

GRAIN TYPE: CRYSTALS

GOOD INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX

FOSSILS: BENTHIC FORAMINIFERA

180 - 190 AS ABOVE

190 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT

SOURCE - FGS

WELL NUMBER: W-1382

COUNTY - BREVARD

TOTAL DEPTH: 325 FT.

LOCATION: T.24S R. 36E S.03 DA

45 SAMPLES FROM 20 TO 325 FT.

LAT = 28 D 25M 40S

LON = 80 D 42M 40S

COMPLETION DATE: 26/08/46

ELEVATION: 3 FT

OTHER TYPES OF LOGS AVAILABLE - NONE

OWNER/DRILLER:OWNER: DEERFIELD GROVE CO.

WORKED BY:M.H. SHAFIE (6-7-78)

0.	-	20.	000NOSM	NO SAMPLES
20.	-	105.	090UDSC	UNDIFFERENTIATED SAND AND CLAY
105.	-	114.	122HTRN	HAWTHORN GROUP
114.	-	136.	124CLRV	CRYSTAL RIVER FM.
136.	-	220.	124WLSN	WILLISTON FM.
220.	-	325.	124AVPK	AVON PARK FM.

0 - 20 SHELL BED; WHITE

26% POROSITY: MOLDIC, INTERGRANULAR; POOR INDURATION

CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX

ACCESSORY MINERALS: CLAY- %, CALCILUTITE- %

QUARTZ SAND-20%

FOSSILS: MOLLUSKS

20 - 55 AS ABOVE

55 - 60 AS ABOVE

60 - 70 SAND; VERY LIGHT ORANGE

27% POROSITY: INTERGRANULAR, MOLDIC

GRAIN SIZE: MEDIUM; RANGE: MEDIUM TO FINE

ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICITY

POOR INDURATION

CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX

ACCESSORY MINERALS: CLAY- %, CALCILUTITE- %

HEAVY MINERALS-03%

FOSSILS: MOLLUSKS

70 - 75 SHELL BED; VERY LIGHT ORANGE

22% POROSITY: MOLDIC, INTERGRANULAR; POOR INDURATION

CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX

ACCESSORY MINERALS: CLAY- %, CALCILUTITE- %

QUARTZ SAND-10%

75 - 81 AS ABOVE

81 - 91 SAND; VERY LIGHT ORANGE

22% POROSITY: MOLDIC, INTERGRANULAR

GRAIN SIZE: MEDIUM; RANGE: COARSE TO FINE

ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICITY

POOR INDURATION

CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX

ACCESSORY MINERALS: CLAY- %, CALCILUTITE- %

FOSSILS: MOLLUSKS

91 - 96 AS ABOVE

96 - 105 CALCARENITE; VERY LIGHT ORANGE

10% POROSITY: INTERGRANULAR, MOLDIC

GRAIN TYPE: BIOGENIC, SKELETAL

73% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: VERY FINE; RANGE: FINE TO CRYPTOCRYSTALLINE

GOOD INDURATION

CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX

ACCESSORY MINERALS: QUARTZ SAND-15%, PHOSPHATIC SAND-05%

FOSSILS: MOLLUSKS

105 - 110 SAND; VERY LIGHT ORANGE

18% POROSITY: INTERGRANULAR, MOLDIC, INTERCRYSTALLINE

GRAIN SIZE: MEDIUM; RANGE: COARSE TO FINE

ROUNDNESS: SUB-ANGULAR TO ANGULAR; MEDIUM SPHERICI
TY

MODERATE INDURATION

CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRI
X

ACCESSORY MINERALS: DOLOMITE- %, CALCILUTITE- %

PHOSPHATIC SAND-07%

FOSSILS: MOLLUSKS

110 - 114 DOLOSTONE; VERY LIGHT ORANGE

12% POROSITY: INTERCRYSTALLINE, INTERGRANULAR

50-90% ALTERED; SUBHEDRAL

GRAIN SIZE: VERY FINE; RANGE: FINE TO MICROCRYSTAL
LINE

GOOD INDURATION

CEMENT TYPE(S): DOLOMITE CEMENT

ACCESSORY MINERALS: QUARTZ SAND-18%, PHOSPHATIC SA
ND-12%

CHERT-02%

FOSSILS: MOLLUSKS

114 - 117 LIMESTONE; VERY LIGHT ORANGE

13% POROSITY: INTERGRANULAR, MOLDIC

GRAIN TYPE: BIOGENIC, SKELETAL

76% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: FINE; RANGE: VERY COARSE TO CRYPTOCRYS
TALLINE

MODERATE INDURATION

			CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
			FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS
			LEPIDOCYCLANA
117	-	120	AS ABOVE
120	-	125	LIMESTONE; VERY LIGHT ORANGE
			15% POROSITY: INTERGRANULAR, MOLDIC
			GRAIN TYPE: BIOGENIC, SKELETAL
			80% ALLOCHEMICAL CONSTITUENTS
			GRAIN SIZE: FINE; RANGE: VERY COARSE TO CRYPTOCRYSTALLINE
			MODERATE INDURATION
			CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
			FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS
125	-	127	LIMESTONE; VERY LIGHT ORANGE
			10% POROSITY: INTERGRANULAR, MOLDIC
			GRAIN TYPE: BIOGENIC, SKELETAL
			75% ALLOCHEMICAL CONSTITUENTS
			GRAIN SIZE: FINE; RANGE: VERY COARSE TO CRYPTOCRYSTALLINE
			GOOD INDURATION
			CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
			FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS

127 - 136 AS ABOVE

136 - 141 LIMESTONE; VERY LIGHT ORANGE
15% POROSITY: INTERGRANULAR, MOLDIC
GRAIN TYPE: BIOGENIC, SKELETAL
82% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: COARSE
RANGE: VERY COARSE TO CRYPTOCRYSTALLINE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-15%
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS
AMPHESTIGINA

141 - 157 AS ABOVE

157 - 168 LIMESTONE; VERY LIGHT ORANGE
13% POROSITY: INTERGRANULAR, MOLDIC
GRAIN TYPE: BIOGENIC, SKELETAL
79% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: COARSE TO CRYPTOCRYSTAL LINE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-05%

FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS

168 - 175 LIMESTONE; VERY LIGHT ORANGE

14% POROSITY: INTERGRANULAR, MOLDIC

GRAIN TYPE: BIOGENIC, SKELETAL

80% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: MEDIUM; RANGE: COARSE TO CRYPTOCRYSTAL

LINE

MODERATE INDURATION

CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE

MATRIX

ACCESSORY MINERALS: SPAR-05%

FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS

175 - 180 AS ABOVE

180 - 189 LIMESTONE; VERY LIGHT ORANGE

13% POROSITY: INTERGRANULAR, MOLDIC

GRAIN TYPE: BIOGENIC, SKELETAL

78% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: MEDIUM; RANGE: COARSE TO CRYPTOCRYSTAL

LINE

MODERATE INDURATION

CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE

MATRIX

ACCESSORY MINERALS: SPAR-10%

FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS

189 - 210 AS ABOVE

210 - 220 LIMESTONE; VERY LIGHT ORANGE
09% POROSITY: INTERGRANULAR, MOLDIC, INTERCRYSTALLINE
GRAIN TYPE: BIOGENIC, SKELETAL, CRYSTALS
72% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: COARSE TO CRYPTOCRYSTALLINE
GOOD INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-15%
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS

220 - 226 LIMESTONE; VERY LIGHT ORANGE
12% POROSITY: INTERGRANULAR, MOLDIC
GRAIN TYPE: BIOGENIC, SKELETAL
76% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: COARSE TO CRYPTOCRYSTALLINE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, CONES
DICTYOCONUS COOKEI

226 - 231 LIMESTONE; VERY LIGHT ORANGE
10% POROSITY: INTERGRANULAR, MOLDIC

GRAIN TYPE: BIOGENIC, SKELETAL

75% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: VERY FINE; RANGE: FINE TO CRYPTOCRYSTA
LLINE

MODERATE INDURATION

CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX

FOSSILS: BENTHIC FORAMINIFERA

231 - 241 LIMESTONE; VERY LIGHT ORANGE

15% POROSITY: INTERGRANULAR, MOLDIC

GRAIN TYPE: BIOGENIC, SKELETAL

82% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: COARSE

RANGE: VERY COARSE TO CRYPTOCRYSTALLINE

MODERATE INDURATION

CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX

FOSSILS: BENTHIC FORAMINIFERA, CONES

241 - 252 LIMESTONE; VERY LIGHT ORANGE

12% POROSITY: INTERGRANULAR, MOLDIC

GRAIN TYPE: BIOGENIC, SKELETAL

76% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: FINE; RANGE: COARSE TO CRYPTOCRYSTALLI
NE

MODERATE INDURATION

CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX

FOSSILS: BENTHIC FORAMINIFERA, CONES

252 - 263 AS ABOVE

263 - 273 LIMESTONE; VERY LIGHT ORANGE
13% POROSITY: INTERGRANULAR, MOLDIC
GRAIN TYPE: BIOGENIC, SKELETAL
78% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: COARSE TO CRYPTOCRYSTALLI
NE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
FOSSILS: BENTHIC FORAMINIFERA, CONES

273 - 285 LIMESTONE; VERY LIGHT ORANGE
12% POROSITY: INTERGRANULAR, MOLDIC
GRAIN TYPE: BIOGENIC, SKELETAL
76% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: COARSE TO CRYPTOCRYSTALLI
NE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
FOSSILS: BENTHIC FORAMINIFERA, CONES

285 - 305 LIMESTONE; VERY LIGHT ORANGE
11% POROSITY: INTERGRANULAR, MOLDIC

GRAIN TYPE: BIOGENIC, SKELETAL

73% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: VERY FINE; RANGE: MEDIUM TO CRYPTOCRYS
TALLINE

MODERATE INDURATION

CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX

305 - 305 DOLOSTONE; VERY LIGHT ORANGE TO LIGHT YELLOWISH OR
ANGE

08% POROSITY: INTERCRYSTALLINE; 50-90% ALTERED; AN
HEDRAL

GRAIN SIZE: VERY FINE

RANGE: VERY FINE TO MICROCRYSTALLINE; GOOD INDURAT
ION

CEMENT TYPE(S): DOLOMITE CEMENT

305 - 315 AS ABOVE

315 - 325 LIMESTONE; VERY LIGHT ORANGE

11% POROSITY: INTERGRANULAR, MOLDIC

GRAIN TYPE: BIOGENIC, SKELETAL

73% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: VERY FINE; RANGE: MEDIUM TO CRYPTOCRYS
TALLINE

MODERATE INDURATION

CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX

FOSSILS: BENTHIC FORAMINIFERA

325 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1672 COUNTY - BREVARD

TOTAL DEPTH: 00180 FT. LOCATION: T.24S R. 35E S.34 DD
15 SAMPLES FROM 0 TO 170 FT. LAT = 28 D 20M 50S
LON = 80 D 48M 25S
COMPLETION DATE: 27/11/46 ELEVATION: 16 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: C.K. KIDD DRILLER: BREVARD DRILLING CO.

WORKED BY:R.O. VERNON

0.	-	40.	090UDSC	UNDIFFERENTIATED SAND AND CLAY
40.	-	90.	122MOCN	MIOCENE
90.	-	100.	122HTRN	HAWTHORN GROUP
100.	-	170.	124OCAL	OCALA GROUP

0 - 10 SAND;
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
RANGE: FINE TO COARSE; UNCONSOLIDATED
FOSSILS: MOLLUSKS

10 - 20 AS ABOVE

20 - 30 SHELL BED;

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR

UNCONSOLIDATED

ACCESSORY MINERALS: QUARTZ SAND- %

OTHER FEATURES: COQUINA

FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

30 - 40 AS ABOVE

40 - 50 CLAY; LIGHT GREENISH GRAY

POROSITY: LOW PERMEABILITY, INTERGRANULAR; UNCONSOLIDATED

ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

50 - 70 AS ABOVE

70 - 80 CLAY; LIGHT GREENISH GRAY

POROSITY: LOW PERMEABILITY, INTERGRANULAR; UNCONSOLIDATED

ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

80 - 90 AS ABOVE

90 - 100 CLAY; LIGHT GREENISH GRAY
POROSITY: LOW PERMEABILITY, INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: PHOSPHATIC SAND- %, QUARTZ SAND- %
OTHER FEATURES: CALCAREOUS
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL MOLDS

100 - 120 CALCARENITE; LIGHT BROWN
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
UNCONSOLIDATED
OTHER FEATURES: COQUINA
FOSSILS: BENTHIC FORAMINIFERA
LEPOCYCLINA; OPERCULINOIDES

120 - 150 AS ABOVE

150 - 160 LIMESTONE; LIGHT BROWN
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
GRAIN TYPE: CRYSTALS
FOSSILS: BENTHIC FORAMINIFERA

160 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1674 COUNTY - BREVARD

TOTAL DEPTH: 58 FT. LOCATION: T.24S R. 36E S.30 DD
7 SAMPLES FROM 0 TO 58 FT. LAT = 28 D 21M 43S
LON = 80 D 45M 11S
COMPLETION DATE: /08/46 ELEVATION: 26 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: H.S. THOMPSON

WORKED BY:R.O. VERNON

0.	-	47.	112PLSC	PLEISTOCENE SANDS
47.	-	58.	122MOCN	MIOCENE

0	-	3	SAND; POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR RANGE: FINE TO MEDIUM; UNCONSOLIDATED
3	-	28	AS ABOVE
28	-	47	SAND; POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR

RANGE: FINE TO COARSE; UNCONSOLIDATED

ACCESSORY MINERALS: IRON STAIN-%

47 - 580 CLAY; LIGHT GRAY

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R

ACCESSORY MINERALS: QUARTZ SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA

58 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT

SOURCE - FGS

WELL NUMBER: W-1675

COUNTY - BREVARD

TOTAL DEPTH: 54 FT.

LOCATION: T.24S R. 36E S.29 CD

9 SAMPLES FROM 0 TO 54 FT.

LAT = 28 D 21M 44S

LON = 80 D 44M 42S

COMPLETION DATE: /08/46

ELEVATION: 32 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: RANNEY WATER COLLECTOR CO.

WORKED BY:E.R. VERNON (5/12/48)

0.	-	50.	090UDSC	UNDIFFERENTIATED SAND AND CLAY
50.	-	54.	122MOCN	MIOCENE

0 - 10 SAND;

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR

RANGE: FINE TO COARSE; UNCONSOLIDATED

ACCESSORY MINERALS: CLAY-%

10 - 13 SAND;

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR

RANGE: FINE TO COARSE; UNCONSOLIDATED

ACCESSORY MINERALS: CLAY- %, IRON STAIN- %

FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

13 - 26 AS ABOVE

26 - 36 SAND;

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR

RANGE: FINE TO COARSE; UNCONSOLIDATED

ACCESSORY MINERALS: CLAY-%

36 - 53 CLAY; LIGHT GREENISH GRAY

UNCONSOLIDATED

ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: BENTHIC FORAMINIFERA

53 - 54 AS ABOVE

54 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1676 COUNTY - BREVARD

TOTAL DEPTH: 52 FT. LOCATION: T.24S R. 36E S.29 DD
7 SAMPLES FROM 0 TO 52 FT. LAT = 28 D 21M 43S
LON = 80 D 44M 26S
COMPLETION DATE: /10/46 ELEVATION: 24 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: RANNEY WATER COLLECTOR CO.

WORKED BY:R.O. VERNON

0.	-	51.	112PLSC	PLEISTOCENE SANDS
51.	-	52.	122MOCN	MIOCENE

0	-	11	SAND; POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR RANGE: FINE TO MEDIUM; UNCONSOLIDATED
11	-	30	AS ABOVE
30	-	45	SAND; POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR

RANGE: FINE TO MEDIUM; UNCONSOLIDATED

ACCESSORY MINERALS: CLAY-%

45 - 51 AS ABOVE

51 - 52 CLAY;

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R

ACCESSORY MINERALS: QUARTZ SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: BENTHIC FORAMINIFERA

52 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1677 COUNTY - BREVARD

TOTAL DEPTH: 43 FT. LOCATION: T.24S R. 36E S.21 AC
5 SAMPLES FROM 1 TO 40 FT. LAT = 28 D 22M 47S
LON = 80 D 44M 11S
COMPLETION DATE: /09/46 ELEVATION: 2 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: RANNEY WATER COLLECTOR CO.

WORKED BY:R.O. VERNON

0.	-	33.	112PLSC	PLEISTOCENE SANDS
33.	-	40.	122MOCN	MIOCENE

0 - 10 SAND;
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
RANGE: FINE TO COARSE; UNCONSOLIDATED

10 - 21 SAND;
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
RANGE: FINE TO COARSE; UNCONSOLIDATED
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

21 - 22 SAND; LIGHT BROWN

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R

RANGE: FINE TO COARSE; UNCONSOLIDATED

FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

22 - 33 SAND; TRANSPARENT

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R

RANGE: FINE TO COARSE; UNCONSOLIDATED

FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

33 - 40 CLAY; LIGHT GREENISH GRAY

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R

UNCONSOLIDATED

ACCESSORY MINERALS: PHOSPHATIC SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

40 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1680 COUNTY - BREVARD

TOTAL DEPTH: 94 FT. LOCATION: T.24S R. 36E S.28 AA
8 SAMPLES FROM 0 TO 92 FT. LAT = 28 D 22M 22S
LON = 80 D 44M 12S
COMPLETION DATE: /10/46 ELEVATION: 15 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: RANNEY WATER COLLECTOR CORP.

WORKED BY:R.O. VERNON (5/17/48)

0.	-	36.	112PLSC	PLEISTOCENE SANDS
36.	-	92.	122MOCN	MIOCENE

0	-	4	SAND; POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR RANGE: FINE TO MEDIUM; UNCONSOLIDATED ACCESSORY MINERALS: CLAY-%
4	-	11	AS ABOVE
11	-	12	SAND; LIGHT BROWN

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
RANGE: FINE TO MEDIUM; UNCONSOLIDATED
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

12 - 31 CALCARENITE;
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
INTRAGRANULAR
ACCESSORY MINERALS: QUARTZ SAND- %
OTHER FEATURES: COQUINA
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

31 - 36 SAND;
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
UNCONSOLIDATED
OTHER FEATURES: COQUINA
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

36 - 49 SHELL BED;
POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
UNCONSOLIDATED
FOSSILS: MOLLUSKS

49 - 49 CLAY;
UNCONSOLIDATED

ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: MOLLUSKS

49 - 49 LIMESTONE; LIGHT BROWN

GRAIN TYPE: CRYSTALS

GOOD INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT

49 - 92 NO SAMPLES

92 - 92 CLAY; LIGHT GREENISH GRAY

ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: BENTHIC FORAMINIFERA

92 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1681 COUNTY - BREVARD

TOTAL DEPTH: 31 FT. LOCATION: T.24S R. 36E S.20 AA
4 SAMPLES FROM 0 TO 31 FT. LAT = 28 D 23M 21S
LON = 80 D 45M 19S
COMPLETION DATE: /11/46 ELEVATION: 36 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: RANNEY WATER COLLECTOR CORP.

WORKED BY:R.O. VERNON (5/17/48)

0. - 31. 112PLSC PLEISTOCENE SANDS

0 - 2.7 SAND;

2.7- 3.8 AS ABOVE

3.8- 8.5 NO SAMPLES

8.5- 8.5 SAND;

8.5- 16.4 NO SAMPLES

16.4- 30.9 SAND;

30. TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1682 COUNTY - BREVARD

TOTAL DEPTH: 49 FT. LOCATION: T.24S R. 36E S.28 DC
5 SAMPLES FROM 2 TO 49 FT. LAT = 28 D 21M 43S
LON = 80 D 43M 58S
COMPLETION DATE: /10/46 ELEVATION: 24 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: RANNEY WATER COLLECTOR CORP.

WORKED BY:R.O. VERNON (5/17/48)

0.	-	2.	000NOSM	NO SAMPLES
2.	-	12.	112PLSC	PLEISTOCENE SANDS
12.	-	49.	000NOSM	NO SAMPLES
49.	-	50.	090UDSS	UNDIFFERENTIATED SAND, CLAY, AND SHELLS

0 - 2 NO SAMPLES

2 - 4 SAND; TRANSPARENT TO WHITE

POROSITY: INTERGRANULAR

GRAIN SIZE: FINE

ROUNDNESS: ANGULAR TO SUB-ANGULAR; UNCONSOLIDATED

4 - 8 NO SAMPLES

8 - 8 SAND; TRANSPARENT TO WHITE
POROSITY: INTERGRANULAR
GRAIN SIZE: FINE
ROUNDNESS: ANGULAR TO SUB-ANGULAR; UNCONSOLIDATED

8 - 10.4 SAND; TRANSPARENT TO MODERATE BROWN
POROSITY: INTERGRANULAR
GRAIN SIZE: FINE
ROUNDNESS: ANGULAR TO SUB-ANGULAR; UNCONSOLIDATED
FOSSILS: FOSSIL FRAGMENTS

10.4- 11.6 SHELL BED; LIGHT BROWN
POROSITY: INTERGRANULAR; UNCONSOLIDATED
OTHER FEATURES: COQUINA
FOSSILS: MOLLUSKS

11.6- 48.8 NO SAMPLES

48.8- 49.4 SHELL BED; GREENISH GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: CLAY- %, QUARTZ SAND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS

MULINIA ; MACOMA FRAGMENTS OF SHELL MARL

49. TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1683 COUNTY - BREVARD

TOTAL DEPTH: 103 FT. LOCATION: T.24S R. 36E S.29 BD
12 SAMPLES FROM 3 TO 98 FT. LAT = 28 D 21M 56S
LON = 80 D 44M 26S
COMPLETION DATE: G/09/60 ELEVATION: 23 FT

OTHER TYPES OF LOGS AVAILABLE - NONE

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: RANNEY WATER COLLECTOR CORP.

WORKED BY:R.O. VERNON (5-17-48)

0.	-	2.	000NOSM	NO SAMPLES
2.	-	41.	112PLSC	PLEISTOCENE SANDS
41.	-	49.	000NOSM	NO SAMPLES
49.	-	66.	090UDSC	UNDIFFERENTIATED SAND AND CLAY
66.	-	78.	090UDSS	UNDIFFERENTIATED SAND, CLAY, AND SHELLS

0 - 2 NO SAMPLES

2 - 8 SAND; TRANSPARENT TO WHITE

POROSITY: INTERGRANULAR

GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; UNCONSOLIDATED

ACCESSORY MINERALS: CLAY- %, IRON STAIN- %

PLANT REMAINS- %

FOSSILS: ORGANICS

8 - 11 NO SAMPLES

11 - 11 SAND; TRANSPARENT TO WHITE

POROSITY: INTERGRANULAR

GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; UNCONSOLIDATED

ACCESSORY MINERALS: CLAY- %, IRON STAIN- %

PLANT REMAINS- %

FOSSILS: ORGANICS

11 - 15 NO SAMPLES

15 - 15 SAND; TRANSPARENT TO WHITE

POROSITY: INTERGRANULAR

GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; UNCONSOLIDATED

ACCESSORY MINERALS: CLAY- %, IRON STAIN- %

PLANT REMAINS- %

FOSSILS: ORGANICS

15 - 30 NO SAMPLES

30 - 30 SAND; TRANSPARENT TO WHITE
POROSITY: INTERGRANULAR
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; UNCONSO
LIDATED
ACCESSORY MINERALS: CLAY- %, IRON STAIN- %
PLANT REMAINS- %
FOSSILS: ORGANICS

30 - 32 NO SAMPLES

32 - 32 SAND; TRANSPARENT TO WHITE
POROSITY: INTERGRANULAR
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; UNCONSO
LIDATED
ACCESSORY MINERALS: CLAY- %, IRON STAIN- %
PLANT REMAINS- %
FOSSILS: ORGANICS

32 - 41 NO SAMPLES

41 - 41 SAND; TRANSPARENT TO WHITE
POROSITY: INTERGRANULAR
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; UNCONSO
LIDATED
ACCESSORY MINERALS: CLAY- %, IRON STAIN- %
PLANT REMAINS- %
FOSSILS: ORGANICS

41 - 49 NO SAMPLES

49 - 55 SAND; DARK GRAY
POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX, ORGANIC MATRIX
ACCESSORY MINERALS: CLAY- %, PLANT REMAINS- %
PHOSPHATIC SAND- %
FOSSILS: ORGANICS
SAND IN A DARK GRAY, CARBONACEOUS CLAY MATRIX

55 - 58 NO SAMPLES

58 - 66 SAND; DARK GRAY
POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX, ORGANIC MATRIX
ACCESSORY MINERALS: CLAY- %, PLANT REMAINS- %
PHOSPHATIC SAND- %
FOSSILS: ORGANICS
SAND IN A DARK GRAY, CARBONACEOUS CLAY MATRIX

66 - 86 NO SAMPLES

86 - 86 CLAY; LIGHT GRAY TO LIGHT BROWN

GOOD INDURATION

ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SA
ND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: BENTHIC FORAMINIFERA

AMPHISTEGINA LESSONII; CIBICIDES FLORIDANA; ROTALI
A

BELLARII

86 - 91 NO SAMPLES

91 - 91 CLAY; LIGHT GRAY TO LIGHT BROWN

GOOD INDURATION

ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SA
ND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: BENTHIC FORAMINIFERA

AMPHISTEGINA LESSONII; CIBICIDES FLORIDANA; ROTALI
A

BECCARII

91 - 97 NO SAMPLES

97 - 97 CLAY; LIGHT GRAY TO LIGHT BROWN

GOOD INDURATION

ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SA
ND- %

OTHER FEATURES: CALCAREOUS

FOSSILS: BENTHIC FORAMINIFERA

AMPHISTEGINA LESSONII; CIBICIDES FLORIDANA; ROTALI
A
BECCARII

97 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1684 COUNTY - BREVARD

TOTAL DEPTH: 58 FT. LOCATION: T.24S R. 36E S.29 DC
5 SAMPLES FROM 5 TO 56 FT. LAT = 28 D 21M 44S
LON = 80 D 44M 42S
COMPLETION DATE: /11/46 ELEVATION: 24 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: RANNEY WATER COLLECTOR CORP.

WORKED BY:R.O. VERNON (5/17/48)

0.	-	4.	000NOSM	NO SAMPLES
4.	-	44.	112PLSC	PLEISTOCENE SANDS
44.	-	52.	000NOSM	NO SAMPLES
52.	-	56.	090UDSC	UNDIFFERENTIATED SAND AND CLAY

0 - 4.6 NO SAMPLES

4.6- 4.6 SAND; LIGHT REDDISH BROWN TO DARK GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: IRON STAIN- %
FOSSILS: ORGANICS

4.6- 18.4 NO SAMPLES

18.4- 22.3 SAND; LIGHT REDDISH BROWN TO GRAYISH BROWN
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: IRON STAIN- %
FOSSILS: ORGANICS

22.3- 23.4 NO SAMPLES

23.4- 23.4 SAND; LIGHT REDDISH BROWN TO GRAYISH BROWN
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: IRON STAIN- %
FOSSILS: ORGANICS

23.4- 25.4 NO SAMPLES

25.4- 43.6 SAND; LIGHT REDDISH BROWN TO GRAYISH BROWN
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: IRON STAIN- %
FOSSILS: ORGANICS

43.6- 51.7 NO SAMPLES

51.7- 55.7 CLAY; DARK GREENISH GRAY

POROSITY: INTERGRANULAR

ACCESSORY MINERALS: QUARTZ SAND- %, MICA-%

55. TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT

SOURCE - FGS

WELL NUMBER: W-1685

COUNTY - BREVARD

TOTAL DEPTH: 52 FT.

LOCATION: T.24S R. 36E S.32 AD

6 SAMPLES FROM 0 TO 42 FT.

LAT = 28 D 21M 17S

LON = 80 D 44M 56S

COMPLETION DATE: /01/47

ELEVATION: 21 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: RANNY WATER COLLECTOR CO.

WORKED BY:R.O. VERNON

0.	-	28.	112PLSC	PLEISTOCENE SANDS
28.	-	42.	122MOCN	MIOCENE

0 - 3 SAND;

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR

UNCONSOLIDATED

ACCESSORY MINERALS: IRON STAIN-%

3 - 28 AS ABOVE

28 - 42 SHELL BED;

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULA
R
UNCONSOLIDATED

ACCESSORY MINERALS: QUARTZ SAND- %, PHOSPHATIC SA
ND- %

FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS, BENTHIC FORAM
INIFERA
ROTALIA BECCARII

42 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-1688 COUNTY - BREVARD

TOTAL DEPTH: 00054 FT. LOCATION: T.24S R. 36E S.29 CD
9 SAMPLES FROM 0 TO 54 FT. LAT = 28 D 21M 44S
LON = 80 D 44M 41S
COMPLETION DATE: /11/46 ELEVATION: 32 FT

OTHER TYPES OF LOGS AVAILABLE - GEOLOGIST

OWNER/DRILLER:OWNER: CITY OF COCOA DRILLER: RANNEY WATER COLLECTION CO.

WORKED BY:R.O. VERNON

0.	-	44.	112PLSC	PLEISTOCENE SANDS
44.	-	54.	122MOCN	MIOCENE

0	-	3	SAND; POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR UNCONSOLIDATED
3	-	43	AS ABOVE
43	-	54	CALCARENITE; POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR

INTRAGRANULAR

ACCESSORY MINERALS: QUARTZ SAND- %

OTHER FEATURES: COQUINA

FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA, FOSSIL FR
AGMENTS
PHACOIDES TUOMEYI; ROTALIA BECCARI

54 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT

SOURCE - FGS

WELL NUMBER: W-3557

COUNTY - BREVARD

TOTAL DEPTH: 554 FT.

LOCATION: T.24S R. 35E S.30 DB

96 SAMPLES FROM 18 TO 554 FT.

LAT = 28 D 22M 08S

LON = 80 D 45M 27S

COMPLETION DATE: 20/05/55

ELEVATION: 17 FT

OTHER TYPES OF LOGS AVAILABLE - NONE

OWNER/DRILLER:U.S.G.S. [USGS #822-051-1]

WORKED BY:TOM SCOTT (SEPT 5, 1974)

19.	-	93.	112CLSCR	CALOOSAHATCHEE FM.
93.	-	103.	122HTRN	HAWTHORN GROUP
103.	-	133.	124CLRV	CRYSTAL RIVER FM.
133.	-	160.	124WLSN	WILLISTON FM.
160.	-	230.	124IGLS	INGLIS FM.
230.	-	538.	124AVPK	AVON PARK FM.
538.	-	554.	124LKCT	LAKE CITY LIMESTONE

0 - 19 SAND; GRAYISH BROWN

25% POROSITY: INTERGRANULAR

GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM

ROUNDNESS: SUB-ANGULAR TO ANGULAR; POOR INDURATION

CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX

ACCESSORY MINERALS: CLAY-02%, SILT- %

OTHER FEATURES: CALCAREOUS

FOSSILS: MOLLUSKS

19 - 28 SAND; GRAYISH BROWN TO BROWNISH GRAY

15% POROSITY: INTERGRANULAR

GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM

ROUNDNESS: SUB-ANGULAR TO ANGULAR; MODERATE INDURATION

CEMENT TYPE(S): CLAY MATRIX

ACCESSORY MINERALS: CLAY-15%, SILT- %

FOSSILS: MOLLUSKS

28 - 32 SAND; GRAYISH BROWN

20% POROSITY: INTERGRANULAR

GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE

ROUNDNESS: SUB-ANGULAR TO ANGULAR; POOR INDURATION

CEMENT TYPE(S): CLAY MATRIX

ACCESSORY MINERALS: CLAY-03%, SILT- %

FOSSILS: MOLLUSKS

32 - 44 SAND; YELLOWISH GRAY

20% POROSITY: INTERGRANULAR

GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
ROUNDNESS: SUB-ANGULAR TO ANGULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CLAY-03%, SILT- %
FOSSILS: MOLLUSKS

44 - 47 SAND; TRANSPARENT
30% POROSITY: INTERGRANULAR
GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE
ROUNDNESS: SUB-ANGULAR TO ANGULAR; POOR INDURATION
ACCESSORY MINERALS: SILT-15%, HEAVY MINERALS-01%

47 - 53 AS ABOVE

53 - 57 SAND; LIGHT OLIVE GRAY
25% POROSITY: INTERGRANULAR
GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE
ROUNDNESS: SUB-ANGULAR TO ANGULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX, CALCILUTITE MATRIX
ACCESSORY MINERALS: SILT-20%, HEAVY MINERALS-01%
OTHER FEATURES: CALCAREOUS
FOSSILS: MOLLUSKS

57 - 61 SAND; TRANSPARENT

30% POROSITY: INTERGRANULAR

GRAIN SIZE: MEDIUM; RANGE: FINE TO MEDIUM

ROUNDNESS: SUB-ANGULAR TO ROUNDED; UNCONSOLIDATED

ACCESSORY MINERALS: HEAVY MINERALS-01%, SILT-02%

61 - 64 SAND; TRANSPARENT

30% POROSITY: INTERGRANULAR

GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE

ROUNDNESS: SUB-ANGULAR TO ANGULAR; POOR INDURATION

ACCESSORY MINERALS: SILT-15%, HEAVY MINERALS-01%

64 - 80 AS ABOVE

80 - 85 SAND; TRANSPARENT

35% POROSITY: INTERGRANULAR

GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE

ROUNDNESS: SUB-ANGULAR TO ROUNDED; UNCONSOLIDATED

ACCESSORY MINERALS: HEAVY MINERALS-01%, SILT-01%

85 - 90 SAND; PINKISH GRAY

25% POROSITY: INTERGRANULAR

GRAIN SIZE: MEDIUM; RANGE: FINE TO MEDIUM

ROUNDNESS: SUB-ANGULAR TO ROUNDED; POOR INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX

OTHER FEATURES: CALCAREOUS

FOSSILS: BENTHIC FORAMINIFERA

90 - 93 AS ABOVE

93 - 96 DOLOSTONE; YELLOWISH GRAY

POROSITY: POSSIBLY HIGH PERMEABILITY, INTERCRYSTAL LINE

MOLDIC; 50-90% ALTERED; EUHEDRAL

GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE

POOR INDURATION

CEMENT TYPE(S): DOLOMITE CEMENT

ACCESSORY MINERALS: PHOSPHATIC SAND-07%, QUARTZ SAND-10%

96 - 103 AS ABOVE

103 - 110 CALCARENITE; WHITE TO VERY LIGHT GRAY

30% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUGS

GRAIN TYPE: SKELETAL, BIOGENIC

95% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: VERY COARSE; RANGE: MEDIUM TO GRAVEL

POOR INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT

OTHER FEATURES: CHALKY, COQUINA

FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, BRYOZOA

110 - 133 AS ABOVE

133 - 137 CALCARENITE; WHITE TO VERY LIGHT GRAY
30% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUGS
GRAIN TYPE: SKELETAL, BIOGENIC, PELLET
95% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: COARSE; RANGE: FINE TO COARSE; POOR IN DURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT
OTHER FEATURES: COQUINA
FOSSILS: BENTHIC FORAMINIFERA, BRYOZOA

137 - 139 AS ABOVE

139 - 145 CALCARENITE; WHITE TO VERY LIGHT GRAY
30% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUGS
GRAIN TYPE: SKELETAL, BIOGENIC, PELLET
95% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: COARSE; RANGE: FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
OTHER FEATURES: COQUINA
FOSSILS: BENTHIC FORAMINIFERA, BRYOZOA

145 - 160 AS ABOVE

160 - 169 CALCARENITE; VERY LIGHT ORANGE TO VERY LIGHT GRAY
10% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: SKELETAL, BIOGENIC, PELLET
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; GOOD IN
DURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT
OTHER FEATURES: CHALKY, COQUINA
FOSSILS: BENTHIC FORAMINIFERA, BRYOZOA, ECHINOID,
MOLLUSKS
ALGAE

169 - 210 AS ABOVE

210 - 220 CALCARENITE; VERY LIGHT ORANGE TO VERY LIGHT GRAY
10% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: SKELETAL, BIOGENIC, PELLET
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: FINE TO MEDIUM; GOOD IN
DURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT
OTHER FEATURES: CHALKY, COQUINA
FOSSILS: BENTHIC FORAMINIFERA, BRYOZOA, ECHINOID,
MOLLUSKS
ALGAE

220 - 230 CALCARENITE; VERY LIGHT ORANGE TO VERY LIGHT GRAY
10% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: SKELETAL, BIOGENIC, PELLET
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE; GOOD IN
DURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT
OTHER FEATURES: CHALKY, COQUINA
FOSSILS: BENTHIC FORAMINIFERA, BRYOZOA, ECHINOID,
MOLLUSKS
ALGAE

230 - 240 LIMESTONE; WHITE
05% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S
GRAIN TYPE: SKELETAL, BIOGENIC, CALCILUTITE
75% ALLOCHEMICAL CONSTITUENTS
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT
OTHER FEATURES: CHALKY, MEDIUM RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA

240 - 250 AS ABOVE

250 - 260 NO SAMPLES

260 - 290 AS ABOVE

290 - 300 LIMESTONE; WHITE

05% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S

GRAIN TYPE: SKELETAL, BIOGENIC, CALCILUTITE

80% ALLOCHEMICAL CONSTITUENTS

MODERATE INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT

OTHER FEATURES: CHALKY, MEDIUM RECRYSTALLIZATION

FOSSILS: BENTHIC FORAMINIFERA

300 - 305 CALCARENITE; WHITE

10% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S

GRAIN TYPE: SKELETAL, BIOGENIC

85% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: MEDIUM; RANGE: MEDIUM TO COARSE

MODERATE INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT

OTHER FEATURES: CHALKY

FOSSILS: BENTHIC FORAMINIFERA, BRYOZOA, ECHINOID,
ALGAE

305 - 360 AS ABOVE

360 - 368 LIMESTONE; WHITE

05% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUG
S

GRAIN TYPE: SKELETAL, BIOGENIC, CALCILUTITE

75% ALLOCHEMICAL CONSTITUENTS

MODERATE INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT

OTHER FEATURES: CHALKY, MEDIUM RECRYSTALLIZATION

FOSSILS: BENTHIC FORAMINIFERA, ECHINOID

368 - 389 AS ABOVE

389 - 399 LIMESTONE; WHITE

05% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUGS

GRAIN TYPE: SKELETAL, BIOGENIC, CALCILUTITE

60% ALLOCHEMICAL CONSTITUENTS

MODERATE INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT

OTHER FEATURES: CHALKY, MEDIUM RECRYSTALLIZATION

FOSSILS: BENTHIC FORAMINIFERA, ECHINOID

399 - 407 LIMESTONE; WHITE

05% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUGS

GRAIN TYPE: SKELETAL, BIOGENIC, CALCILUTITE

60% ALLOCHEMICAL CONSTITUENTS

MODERATE INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT

OTHER FEATURES: DOLOMITIC

407 - 414 AS ABOVE

414 - 417 DOLOSTONE; VERY LIGHT ORANGE
05% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS
10-50% ALTERED; EUHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
OTHER FEATURES: CALCAREOUS
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID
APPEARS AS A DOLOMITIZED VERSION OF 360 FEET

417 - 418 DOLOSTONE; VERY LIGHT ORANGE
10% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS
50-90% ALTERED

418 - 425 DOLOSTONE; VERY LIGHT ORANGE
15% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS
50-90% ALTERED

425 - 431 POOR SAMPLES

431 - 435 DOLOSTONE; GRAYISH ORANGE
05% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT

435 - 440 AS ABOVE

440 - 447 DOLOSTONE; GRAYISH ORANGE
03% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT

447 - 452 DOLOSTONE; GRAYISH ORANGE
07% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT

452 - 470 AS ABOVE

470 - 475 DOLOSTONE; GRAYISH ORANGE

02% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS

50-90% ALTERED; SUBHEDRAL

GRAIN SIZE: MICROCRYSTALLINE

RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION

CEMENT TYPE(S): DOLOMITE CEMENT

475 - 484 AS ABOVE

WITH ABUNDANT CAVED MATERIAL

484 - 490 CALCARENITE; VERY LIGHT ORANGE

05% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUGS

GRAIN TYPE: SKELETAL, BIOGENIC, CALCILUTITE

MODERATE INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT

OTHER FEATURES: DOLOMITIC, CHALKY

490 - 492 DOLOSTONE; GRAYISH ORANGE

07% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS

50-90% ALTERED; SUBHEDRAL

GRAIN SIZE: MICROCRYSTALLINE

RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION

CEMENT TYPE(S): DOLOMITE CEMENT

492 - 497 AS ABOVE

497 - 502 DOLOSTONE; GRAYISH ORANGE
15% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT

502 - 509 AS ABOVE

509 - 525 DOLOSTONE; GRAYISH ORANGE
05% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT

525 - 525 AS ABOVE

525 - 528 DOLOSTONE; GRAYISH ORANGE
20% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS
50-90% ALTERED; SUBHEDRAL

GRAIN SIZE: MICROCRYSTALLINE

RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION

CEMENT TYPE(S): DOLOMITE CEMENT

528 - 533 DOLOSTONE; MODERATE YELLOWISH BROWN

15% POROSITY: INTERCRYSTALLINE, MOLDIC, VUGULAR

533 - 538 CALCARENITE; VERY LIGHT ORANGE

15% POROSITY: INTERGRANULAR, MOLDIC, PIN POINT VUGS

GRAIN TYPE: SKELETAL, BIOGENIC

90% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM

MODERATE INDURATION

CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX

SEDIMENTARY STRUCTURES: STREAKED

FOSSILS: BENTHIC FORAMINIFERA, ALGAE

538 - 554 AS ABOVE

554 TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-3918 COUNTY - BREVARD

TOTAL DEPTH: 00079 FT. LOCATION: T.24S R. 36E S.29
17 SAMPLES FROM 0 TO 79 FT. LAT = 28 D 22M 02S
LON = 80 D 44M 51S
COMPLETION DATE: 03/06/55 ELEVATION: 27 FT

OTHER TYPES OF LOGS AVAILABLE - NONE

WORKED BY:CODED FROM DRILLERS LOG

0. - 78. 090UDSS UNDIFFERENTIATED SAND, CLAY, AND SHELLS

0 - 3.5 SAND; TRANSPARENT TO MODERATE BROWN
RANGE: FINE TO MEDIUM
ACCESSORY MINERALS: ORGANICS-%

3.5- 13.5 AS ABOVE
A FEW HEAVY MINERAL GRAINS

13.5- 33.5 AS ABOVE

33.5- 38.5 SAND; TRANSPARENT TO MODERATE BROWN
RANGE: FINE TO MEDIUM

ROUNDNESS: ROUNDED TO SUB-ANGULAR

ACCESSORY MINERALS: HEAVY MINERALS-%

38.5- 43.5 AS ABOVE

43.5- 53.5 SAND; TRANSPARENT TO MODERATE BROWN

RANGE: FINE TO MEDIUM

ROUNDNESS: ROUNDED TO ANGULAR

53.5- 58.5 AS ABOVE

A FEW HEAVY MINERAL GRAINS

58.5- 63.5 AS ABOVE

NO HEAVY MINERALS

63.5- 73.5 AS ABOVE

SOME HEAVY MINERALS PRESENT;BIT SAMPLE AT 73.5= SA
ND: MED
TO V.F. CLEAR QUARTZ SAND, ROUNDED TO ANGULAR; 30%
CLAY

73.5- 78.5 SAND; BROWNISH GRAY

RANGE: VERY FINE TO MEDIUM

ROUNDNESS: ROUNDED TO SUB-ANGULAR

ACCESSORY MINERALS: SHELL- %

FOSSILS: FOSSIL FRAGMENTS

78. TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT SOURCE - FGS

WELL NUMBER: W-3949 COUNTY - BREVARD

TOTAL DEPTH: 00079 FT. LOCATION: T.24S R. 36E S.20
17 SAMPLES FROM 0 TO 79 FT. LAT = 28 D 22M 56S
LON = 80 D 44M 50S
COMPLETION DATE: 06/06/55 ELEVATION: 23 FT

OTHER TYPES OF LOGS AVAILABLE - NONE

OWNER/DRILLER:U.S.G.S. [USGS #822-044-6] (D.W. BROWN & L. MILLS)

WORKED BY:CODED FROM DRILLERS LOG

0. - 78.5 090UDSS UNDIFFERENTIATED SAND, CLAY, AND SHELLS

0 - 3.5 SAND;
RANGE: FINE TO COARSE
BROWNISH ORANGE STAIN

3.5- 8.5 SAND; DARK YELLOWISH ORANGE
RANGE: FINE TO COARSE
ACCESSORY MINERALS: SHELL- %, HEAVY MINERALS- %
FOSSILS: FOSSIL FRAGMENTS
STAINED RUST ORANGE

8.5- 13.5 SHELL BED;

ACCESSORY MINERALS: QUARTZ SAND-15%, SHELL- %

FOSSILS: FOSSIL FRAGMENTS

SAND STAINED BROWNISH ORANGE

13.5- 18.5 SHELL BED;

ACCESSORY MINERALS: QUARTZ SAND-10%, SHELL- %

FOSSILS: FOSSIL FRAGMENTS

SAND STAINED BROWNISH YELLOW,COARSE TO VERY COARSE

18.5- 23.5 SHELL BED;

ACCESSORY MINERALS: QUARTZ SAND-20%, SHELL- %

FOSSILS: FOSSIL FRAGMENTS

SAND AS ABOVE,FN TO VERY COARSE GRAINED,WELL ROUND
ED

23.5- 28.5 AS ABOVE

28.5- 33.5 SHELL BED;

ACCESSORY MINERALS: QUARTZ SAND-35%, SHELL- %

FOSSILS: FOSSIL FRAGMENTS

SAND: FROSTED,WELL ROUNDED TO SUBANGULAR

33.5- 38.5 SAND;

RANGE: FINE TO VERY COARSE

ROUNDNESS: ROUNDED TO SUB-ANGULAR

ACCESSORY MINERALS: SHELL-05%

OTHER FEATURES: FROSTED

FOSSILS: FOSSIL FRAGMENTS

38.5- 48.5 AS ABOVE

A FEW HEAVEY MINERAL GRAINS

48.5- 53.5 AS ABOVE

53.5- 58.5 SAND; LIGHT BROWN

RANGE: FINE TO COARSE

ROUNDNESS: ROUNDED TO SUB-ANGULAR

ACCESSORY MINERALS: SHELL-05%, HEAVY MINERALS- %

FOSSILS: FOSSIL FRAGMENTS

58.5- 60 SAND;

RANGE: FINE TO VERY COARSE

ROUNDNESS: ROUNDED TO SUB-ANGULAR

ACCESSORY MINERALS: SHELL-05%, HEAVY MINERALS- %

FOSSILS: FOSSIL FRAGMENTS

60 - 63.5 AS ABOVE

FROSTED SAND GRAINS

63.5- 68.5 AS ABOVE

68.5- 73.5 SAND; MODERATE GRAY

RANGE: VERY FINE TO VERY COARSE

ROUNDNESS: ROUNDED TO SUB-ANGULAR

ACCESSORY MINERALS: SHELL- %, HEAVY MINERALS- %

FOSSILS: FOSSIL FRAGMENTS

73.5- 78.5 SAND; MODERATE GRAY

RANGE: FINE TO VERY COARSE

ROUNDNESS: ROUNDED TO SUB-ANGULAR

ACCESSORY MINERALS: SHELL- %, HEAVY MINERALS- %

FOSSILS: FOSSIL FRAGMENTS

78. TOTAL DEPTH

LITHOLOGIC WELL LOG PRINTOUT

SOURCE - FGS

WELL NUMBER: W-16226
TOTAL DEPTH: 02510 FT.
S.02 AC
SAMPLES - NONE
33S

22S
COMPLETION DATE: 07/01/92

COUNTY - BREVARD
LOCATION: T.24S R.36E

LAT = 28D 25M

LON = 80D 42M

ELEVATION: 6 FT

OTHER TYPES OF LOGS AVAILABLE - SONIC, GAMMA, INDUCTION, CALIPER

OWNER/DRILLER:MERRITT ISLAND INJECTION WELLS AND TEST WELL.

WORKED BY:CLAY KELLY (CUTTINGS); TOMMY SEAL (CORE); (7/91)
THE FOLLOWING ABBREVIATIONS ARE USED IN THIS DESCRIPTION:
TW-1=TEST WELL #1; IW-1=INJECTION WELL #1; IW-2=INJECTION WELL #2
1670 = TOP OF OLDSMAR BASED ON GEOPHYSICAL LOGS

0.	-	95.	090UDSC	UNDIFFERENTIATED SAND AND CLAY
95.	-	117.	122HTRN	HAWTHORN GROUP
117.	-	250.	124OCAL	OCALA GROUP
250.	-	1670.	124AVPK	AVON PARK FM.
1670.	-	.	124OLDM	OLDSMAR LIMESTONE

0 - 10 SAND; GRAYISH ORANGE TO WHITE
40% POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
GRAIN SIZE: MEDIUM; RANGE: FINE TO MEDIUM
ROUNDNESS: SUB-ANGULAR TO SUB-ROUNDED; MEDIUM SPHERICITY
UNCONSOLIDATED
ACCESSORY MINERALS: SHELL-10%
FOSSILS: MOLLUSKS

10 - 13 SAND; DARK YELLOWISH BROWN TO WHITE
40% POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
GRAIN SIZE: MEDIUM; RANGE: FINE TO GRANULE
ROUNDNESS: SUB-ANGULAR TO SUB-ROUNDED; MEDIUM SPHERICITY
UNCONSOLIDATED
ACCESSORY MINERALS: SHELL-20%
FOSSILS: MOLLUSKS

13 - 21 SAND; GRAYISH BROWN TO WHITE
40% POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
GRAIN SIZE: MEDIUM; RANGE: MEDIUM TO GRANULE
ROUNDNESS: ANGULAR TO SUB-ANGULAR; LOW SPHERICITY
UNCONSOLIDATED
ACCESSORY MINERALS: SHELL-40%
FOSSILS: MOLLUSKS

21 - 36 SHELL BED; WHITE TO YELLOWISH GRAY
40% POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
UNCONSOLIDATED
ACCESSORY MINERALS: QUARTZ SAND-03%
FOSSILS: MOLLUSKS

36 - 67 SAND; LIGHT GRAY TO WHITE
40% POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM
ROUNDNESS: SUB-ANGULAR TO SUB-ROUNDED; MEDIUM SPHERICITY
UNCONSOLIDATED

ACCESSORY MINERALS: HEAVY MINERALS-01%, SHELL-05%
FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA

67 - 95 SHELL BED; VERY LIGHT ORANGE TO WHITE
40% POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
UNCONSOLIDATED
ACCESSORY MINERALS: QUARTZ SAND-04%
FOSSILS: MOLLUSKS

95 - 117 SAND; YELLOWISH GRAY TO WHITE
30% POROSITY: POSSIBLY HIGH PERMEABILITY, INTERGRANULAR
GRAIN SIZE: MEDIUM; RANGE: FINE TO COARSE
ROUNDNESS: ANGULAR TO SUB-ANGULAR; MEDIUM SPHERICITY
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SILICIC CEMENT
ACCESSORY MINERALS: SHELL-02%, PHOSPHATIC SAND-04%
FOSSILS: MOLLUSKS

117 - 123 PACKSTONE; YELLOWISH GRAY
20% POROSITY: INTERGRANULAR, MOLDIC
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: COARSE; RANGE: MICROCRYSTALLINE TO GRANULE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
ACCESSORY MINERALS: SPAR-10%
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, MOLLUSKS
FOSSIL MOLDS
INDEX FOSSILS ARE THE FOLLOWING BENTHIC FORAMS :
NUMMULITES
MOODYBRANCHENSIS, LEPIDOCYCLINA OCALANA, AMPHISTEGINA
PINARENSIS COSDENI. TOP OF THE OCALA GROUP.

123 - 141 PACKSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
20% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
INTRAGRANULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY COARSE
RANGE: MICROCRYSTALLINE TO GRANULE; MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
ACCESSORY MINERALS: SPAR-15%
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, CORAL,
MILIOLIDS

141 - 170 PACKSTONE; VERY LIGHT ORANGE
30% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRANULE
POOR INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
OTHER FEATURES: MEDIUM RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS

AMPHISTEGINA PINARERSIS COSDENI. THIS IS A FORAM SAND.

170 - 190 PACKSTONE; VERY LIGHT ORANGE
25% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO VERY COARSE
POOR INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, ECHINOID
ABUNDANT ECHINOID FRAGMENTS. GYPSINA SP. PRESENT.

190 - 250 PACKSTONE; VERY LIGHT ORANGE
20% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRANULE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: ECHINOID, BENTHIC FORAMINIFERA, CRUSTACEA BRYOZOA
TOP OF CONES. TOP OF THE AVON PARK FORMATION.

250 - 290 PACKSTONE; WHITE TO VERY LIGHT ORANGE
20% POROSITY: INTERGRANULAR, MOLDIC
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION, CHALKY
FOSSILS: BENTHIC FORAMINIFERA, CRUSTACEA, MILIOLIDS, CONES
ECHINOID
BENTHIC FORAM LITUONELLA FLORIDANA PRESENT. GASTROPOD STEINKERNS PRESENT.

290 - 310 PACKSTONE; WHITE TO VERY LIGHT ORANGE
20% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO VERY COARSE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, CONES
ABUNDANT CONES.

310 - 330 PACKSTONE; VERY LIGHT ORANGE
15% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE

70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT
SEDIMENTARY STRUCTURES: INTERBEDDED
ACCESSORY MINERALS: DOLOMITE-10%
OTHER FEATURES: HIGH RECRYSTALLIZATION, CHALKY,
DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, CRUSTACEA, ECHINOID,
CONES
MILIOLIDS
SLIGHTLY DOLOMITIC PACKSTONE INTERBEDDED WITH
WACKESTONE.

330 - 350 PACKSTONE; VERY LIGHT GRAY TO VERY LIGHT ORANGE
15% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
SPARRY CALCITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, MOLLUSKS
ECHINOID, CONES
PATCHY DOLOMITIZATION. LITUONELLA, DICTYOCONUS, AND
FABULARIA SP.

350 - 354 DOLOSTONE; LIGHT GRAY TO GRAYISH ORANGE
10% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE, MOLDIC
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: FINE; RANGE: MEDIUM TO MICROCRYSTALLINE
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
SPARRY CALCITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: MILIOLIDS, BENTHIC FORAMINIFERA, FOSSIL MOLDS

354 - 360 PACKSTONE; VERY LIGHT GRAY TO GRAYISH ORANGE
10% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, INTRACLASTS, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, SPARRY CALCITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: MILIOLIDS, BENTHIC FORAMINIFERA, CONES
VARIABLE DOLOMITIZATION (10-50%).

360 - 370 PACKSTONE; VERY LIGHT ORANGE TO VERY LIGHT GRAY
15% POROSITY: INTERGRANULAR, INTRAGRANULAR
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO GRANULE
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, SPARRY CALCITE CEMENT
CALCILUTITE MATRIX
SEDIMENTARY STRUCTURES: INTERBEDDED

OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, ECHINOID, CONES
BENTHIC FORAM FABULARIA VAUGHANI PRESENT. DOLOMITIZATION IS
LOW (10%). THIN LAYER OF DOLOSTONE INTERBEDDED WITHIN PACKSTONE.

370 - 392 PACKSTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
15% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO GRANULE
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, SPARRY CALCITE CEMENT
CALCILUTITE MATRIX
SEDIMENTARY STRUCTURES: MOTTLED, LAMINATED, INTERBEDDED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, ECHINOID, CONES
DOLOMITIC (10-50%) PACKSTONE MOTTLED WITH BROWN, SUCROSIC
DOLOSTONE.

392 - 411 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
25% POROSITY: INTERGRANULAR, MOLDIC
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
85% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, DOLOMITE CEMENT
CALCILUTITE MATRIX
SEDIMENTARY STRUCTURES: MOTTLED, INTERBEDDED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, MILIOLIDS, CONES
FOSSIL MOLDS
DOLOMITIC (10-50%) PACKSTONE INTERBEDDED WITH A TAN MICROCRYSTALLINE DOLOSTONE.

411 - 421 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
15% POROSITY: INTERGRANULAR, MOLDIC
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
40% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO GRANULE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
SPARRY CALCITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, CONES, MILIOLIDS
FOSSIL MOLDS

421 - 427 DOLOSTONE; VERY LIGHT ORANGE TO DARK YELLOWISH BROWN
15% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; SUBHEDRAL

GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: ECHINOID, BENTHIC FORAMINIFERA, FOSSIL MOLDS

427 - 434 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT GRAY
10% POROSITY: PIN POINT VUGS, MOLDIC, LOW PERMEABILITY
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: FOSSIL MOLDS, ECHINOID
DOLOSTONE INTERBEDDED WITH THIN LAYERS OF DOLOMITIC
PACKSTONE.

434 - 444 DOLOSTONE; GRAYISH BROWN TO LIGHT GRAY
15% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: FOSSIL MOLDS

444 - 450 PACKSTONE; WHITE TO MODERATE YELLOWISH BROWN
15% POROSITY: INTERGRANULAR, MOLDIC
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
75% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
SPARRY CALCITE CEMENT
SEDIMENTARY STRUCTURES: INTERBEDDED
ACCESSORY MINERALS: DOLOMITE-20%
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, ECHINOID
FOSSIL MOLDS
BROWN DOLOSTONES INTERBEDDED WITHIN DOLOMITIC PACKSTONE.

450 - 455 DOLOSTONE; VERY LIGHT ORANGE TO MODERATE YELLOWISH BROWN
05% POROSITY: INTERCRYSTALLINE, LOW PERMEABILITY
PIN POINT VUGS; 90-100% ALTERED; FIBROUS
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE
GOOD INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC

455 - 470 WACKESTONE; WHITE TO VERY LIGHT ORANGE
15% POROSITY: INTERGRANULAR, MOLDIC, LOW PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO GRANULE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT

SEDIMENTARY STRUCTURES: LAMINATED, INTERBEDDED
ACCESSORY MINERALS: DOLOMITE-05%
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL MOLDS
MOLLUSKS, MILIOLIDS
INTERBEDDED WITH POROUS (~20%) PACKSTONE.

470 - 473 PACKSTONE; WHITE TO VERY LIGHT ORANGE
10% POROSITY: PIN POINT VUGS, MOLDIC, INTERGRANULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
85% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO VERY COARSE
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
SPARRY CALCITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MOLLUSKS, MILIOLIDS,
CONES
VARIABLE DOLOMITIZATION (10-50%).

473 - 495 DOLOSTONE; GRAYISH BROWN TO LIGHT GRAY
10% POROSITY: PIN POINT VUGS, MOLDIC, LOW PERMEABILITY
90-100% ALTERED; EUHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: FOSSIL MOLDS
INTERVAL 485-495' IS DOLOSTONE, BUT WITHOUT LAMINAE.

495 - 497 WACKESTONE; WHITE TO VERY LIGHT GRAY
05% POROSITY: INTERGRANULAR, PIN POINT VUGS,
INTRAGRANULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
OTHER FEATURES: DOLOMITIC
FOSSILS: MILIOLIDS, BENTHIC FORAMINIFERA, CONES
VARIABLE DOLOMITIZATION (10-50%).

497 - 507 PACKSTONE; VERY LIGHT ORANGE TO WHITE
10% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
SPARRY CALCITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: MILIOLIDS, BENTHIC FORAMINIFERA, CONES

507 - 510 WACKESTONE; VERY LIGHT ORANGE TO WHITE
05% POROSITY: INTERGRANULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION

CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
SPARRY CALCITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: MILIOLIDS, BENTHIC FORAMINIFERA, CONES

510 - 520 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
15% POROSITY: INTERGRANULAR, LOW PERMEABILITY
10-50% ALTERED; ANHEDRAL
GRAIN SIZE: VERY FINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED
OTHER FEATURES: DOLOMITIC, MEDIUM RECRYSTALLIZATION
FOSSILS: ORGANICS

520 - 523 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
25% POROSITY: INTERGRANULAR, MOLDIC, VUGULAR
10-50% ALTERED; ANHEDRAL
GRAIN SIZE: VERY FINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED, BEDDED
OTHER FEATURES: DOLOMITIC, MEDIUM RECRYSTALLIZATION
STROMATAL
FOSSILS: FOSSIL MOLDS, MOLLUSKS
520-523 IS CORED INTERVAL FOR TW-1. INCREASE IN POROSITY
LOWER IN INTERVAL; SOME RECOGNIZABLE MOLLUSK MOLDS
"POCKETS" OF HIGHER POROSITY DUE TO BIOTURBATION.

523 - 532 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
15% POROSITY: VUGULAR, PIN POINT VUGS
POSSIBLY HIGH PERMEABILITY; 90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
POROSITY VARIABLE (10-20%).

532 - 557 PACKSTONE; WHITE TO VERY LIGHT ORANGE
20% POROSITY: PIN POINT VUGS, INTERGRANULAR
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, CONES
10-50% DOLOMITE.

557 - 577 WACKESTONE; WHITE
10% POROSITY: PIN POINT VUGS, INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
40% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO VERY COARSE
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX

OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
POOR SAMPLE
FOSSILS: MILIOLIDS, CONES, BENTHIC FORAMINIFERA

577 - 587 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
20% POROSITY: PIN POINT VUGS, POSSIBLY HIGH PERMEABILITY
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC

587 - 591 MUDSTONE; WHITE TO GRAYISH ORANGE
10% POROSITY: VUGULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: CALCILUTITE, SKELETAL
09% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
SPARRY CALCITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED
DOLOMITIC
FOSSILS: CONES, BENTHIC FORAMINIFERA

591 - 612 DOLOSTONE; GRAYISH ORANGE TO LIGHT GRAY
20% POROSITY: PIN POINT VUGS, VUGULAR
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
VUGS FILLED WITH BROWN DOLOMITE CRYSTALS.

612 - 622 WACKESTONE; WHITE TO VERY LIGHT ORANGE
10% POROSITY: PIN POINT VUGS, INTERGRANULAR
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, POOR SAMPLE
DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, CONES
10-50% DOLOMITIZATION.

622 - 633 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
15% POROSITY: PIN POINT VUGS, POSSIBLY HIGH PERMEABILITY
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC

633 - 638 DOLOSTONE; VERY LIGHT ORANGE TO WHITE
15% POROSITY: PIN POINT VUGS, POSSIBLY HIGH PERMEABILITY
VUGULAR; 50-90% ALTERED; EUHEDRAL

GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED, INTERBEDDED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC

638 - 644 DOLOSTONE; VERY LIGHT GRAY
05% POROSITY: VUGULAR, LOW PERMEABILITY; 90-100% ALTERED
EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION

644 - 664 PACKSTONE; VERY LIGHT ORANGE TO WHITE
10% POROSITY: MOLDIC, INTERGRANULAR
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: CONES, ECHINOID, MILIOLIDS, FOSSIL MOLDS

664 - 666 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
05% POROSITY: VUGULAR, PIN POINT VUGS, MOLDIC
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC

666 - 680 WACKESTONE; WHITE TO GRAYISH BROWN
10% POROSITY: PIN POINT VUGS, VUGULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO GRAVEL
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
LITHOLOGY VARIES FROM WHITE WACKESTONE TO CARAMEL BROWN
DOLOSTONE.

680 - 682 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
15% POROSITY: MOLDIC, VUGULAR, POSSIBLY HIGH
PERMEABILITY
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
SPARRY CALCITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC,
SPECKLED
FOSSILS: CONES, BENTHIC FORAMINIFERA
BROWN DOLOMITE SURROUNDING PIECES OF WHITE MUDSTONE.

682 - 706 PACKSTONE; VERY LIGHT ORANGE TO WHITE
15% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO GRAVEL
GOOD INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED, INTERBEDDED
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: CONES, BENTHIC FORAMINIFERA
10-50% DOLOMITIZATION; SOME CHIPS ARE LAMINATED.

706 - 708 MUDSTONE; WHITE TO VERY LIGHT ORANGE
10% POROSITY: PIN POINT VUGS
GRAIN TYPE: CALCILUTITE, SKELETAL
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO GRAVEL; GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED
DOLOMITIC
FOSSILS: CONES, BENTHIC FORAMINIFERA
VUGULAR WHITE MUDSTONE SPECKLED WITH BROWN DOLOMITE. 10-
50%
BROWN DOLOMITE.

708 - 711 DOLOSTONE; VERY LIGHT ORANGE TO WHITE
05% POROSITY: PIN POINT VUGS, MOLDIC; 50-90% ALTERED
SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION

711 - 721 PACKSTONE; VERY LIGHT ORANGE TO WHITE
15% POROSITY: PIN POINT VUGS, INTRAGRANULAR, MOLDIC
GRAIN TYPE: SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRAVEL
GOOD INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: CONES, BENTHIC FORAMINIFERA, MILIOLIDS

721 - 731 WACKESTONE; VERY LIGHT ORANGE TO WHITE
10% POROSITY: MOLDIC, INTERCRYSTALLINE, PIN POINT VUGS
GRAIN TYPE: SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO GRANULE
GOOD INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED, INTERBEDDED

OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, CONES, MILIOLIDS
FOSSIL MOLDS

731 - 741 DOLOSTONE; VERY LIGHT ORANGE
10% POROSITY: MOLDIC, INTERCRYSTALLINE; 50-90% ALTERED
SUBHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED
FOSSILS: FOSSIL MOLDS, CONES, BENTHIC FORAMINIFERA
MILIOLIDS
TAN DOLOMITE W/ WHITE CALCITE SPECKS (MILIOLIDS & CONES)

741 - 761 PACKSTONE; VERY LIGHT ORANGE TO WHITE
15% POROSITY: INTERGRANULAR, MOLDIC
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
85% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE
CEMENT
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: CONES, BENTHIC FORAMINIFERA, MILIOLIDS
FOSSIL MOLDS

761 - 770 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
05% POROSITY: MOLDIC, INTERCRYSTALLINE, VUGULAR
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO GRAVEL; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED, INTERBEDDED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: CONES, BENTHIC FORAMINIFERA
GRAVEL-SIZED CONES RETAIN THEIR CALCITE COMPOSITION.

770 - 780 PACKSTONE; WHITE TO VERY LIGHT ORANGE
20% POROSITY: MOLDIC, INTERGRANULAR
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: CONES, BENTHIC FORAMINIFERA

780 - 790 MUDSTONE; WHITE TO VERY LIGHT GRAY
05% POROSITY: PIN POINT VUGS, VUGULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO GRAVEL; GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE

CEMENT

DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED, INTERBEDDED
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: CONES, BENTHIC FORAMINIFERA
DOLOMITE CRYSTALS PRESENT IN VUGS.

790 - 839 DOLOSTONE; VERY LIGHT ORANGE TO WHITE
10% POROSITY: MOLDIC, INTERCRYSTALLINE, VUGULAR
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO GRAVEL
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC,
SPECKLED
FOSSILS: CONES, BENTHIC FORAMINIFERA, MILIOLIDS
FOSSIL MOLDS
FORAM GHOSTS.

839 - 865 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
25% POROSITY: VUGULAR, MOLDIC, POSSIBLY HIGH
PERMEABILITY
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC,
SPECKLED
FOSSILS: CONES, BENTHIC FORAMINIFERA, MILIOLIDS
FOSSIL MOLDS

865 - 875 MUDSTONE; WHITE TO VERY LIGHT ORANGE
05% POROSITY: PIN POINT VUGS, MOLDIC
GRAIN TYPE: CALCILUTITE, SKELETAL
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: GRAVEL TO MICROCRYSTALLINE; GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: CONES, BENTHIC FORAMINIFERA
ROCK TEXTURE DIAGENEICALLY ALTERED WITH MOST ALLOCHEMS
BEING OBLITERATED EXCEPT FOR LARGE CONES.

875 - 899 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
15% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED,
SUCROSIC
FOSSILS: FOSSIL MOLDS, ECHINOID, CONES
BENTHIC FORAMINIFERA
WHITE FORAM TESTS SET IN A BROWN DOLOMITE MATRIX.

899 - 907 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
05% POROSITY: LOW PERMEABILITY, PIN POINT VUGS
90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION

CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC

907 - 917 PACKSTONE; VERY LIGHT ORANGE TO WHITE
20% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CRYSTALS, CALCILUTITE
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, SPARRY CALCITE CEMENT
CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: CONES, BENTHIC FORAMINIFERA

917 - 938 DOLOSTONE; GRAYISH ORANGE TO MODERATE GRAY
20% POROSITY: PIN POINT VUGS, POSSIBLY HIGH PERMEABILITY
VUGULAR; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS
POROSITY VARIABLE (10-20%) DUE TO VUGS.

938 - 944 MUDSTONE; WHITE TO GRAYISH ORANGE
25% POROSITY: VUGULAR, PIN POINT VUGS, MOLDIC
GRAIN TYPE: SKELETAL, CALCILUTITE
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO MEDIUM; GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED
DOLOMITIC
FOSSILS: CONES, BENTHIC FORAMINIFERA
GHOSTS OF FORAMS. LARGE VUGS IN THE WHITE MUDSTONE WITH
EUHEDRAL CARAMEL BROWN DOLOMITE CRYSTALS INSIDE.

944 - 979 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
25% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: FOSSIL MOLDS
POROSITY IS HIGHLY VARIABLE (05 - 25%) THROUGHOUT.

979 - 985 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
25% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: FOSSIL MOLDS

985 - 995 DOLOSTONE; GRAYISH ORANGE TO MODERATE YELLOWISH BROWN
25% POROSITY: INTERCRYSTALLINE, VUGULAR, MOLDIC
50-90% ALTERED; SUBHEDRAL

GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED
OTHER FEATURES: SUCROSIC, HIGH RECRYSTALLIZATION
FOSSILS: FOSSIL MOLDS, MOLLUSKS, ORGANICS
CORED INTERVAL (985-995) FROM TW-1; VUGGY POROSITY; SOME GASTROPOD MOLDS IDENTIFIED; MOLDIC AND VUGULAR POROSITY IS
HIGHLY VARIABLE (10-25%).

995 - 999 DOLOSTONE; GRAYISH BROWN TO VERY LIGHT ORANGE
25% POROSITY: MOLDIC, PIN POINT VUGS
POSSIBLY HIGH PERMEABILITY; 90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: FOSSIL MOLDS

999 - 1008 DOLOSTONE; VERY LIGHT ORANGE TO PINKISH GRAY
20% POROSITY: PIN POINT VUGS, MOLDIC; 90-100% ALTERED
SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION

1008 - 1018 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
15% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 90-100% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: PLANT REMAINS
POROSITY IN THIS DOLOSTONE IS HIGHLY VARIABLE; DARK ORGANIC
DEBRIS PRESENT, POSSIBLE LEAF IMPRESSIONS.

1018 - 1027 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
20% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC, SPECKLED
FOSSILS: FOSSIL MOLDS

1027 - 1031 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
05% POROSITY: LOW PERMEABILITY; 90-100% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO MICROCRYSTALLINE
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, PLATY

1031 - 1073 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
20% POROSITY: PIN POINT VUGS, POSSIBLY HIGH PERMEABILITY
MOLDIC; 90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: FOSSIL MOLDS
VARIABLE POROSITY (15-30%). MOLDS OF MOLLUSKS.

1073 - 1086 DOLOSTONE; VERY LIGHT ORANGE TO MODERATE GRAY
20% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: FOSSIL MOLDS
MOLLUSK MOLDS.

1086 - 1096 DOLOSTONE; MODERATE YELLOWISH BROWN TO VERY LIGHT GRAY
20% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED, INTERBEDDED
OTHER FEATURES: HIGH RECRYSTALLIZATION
POROSITY VARIABLE 10-30%.

1096 - 1102 DOLOSTONE; MODERATE YELLOWISH BROWN TO LIGHT GRAY
35% POROSITY: PIN POINT VUGS, POSSIBLY HIGH PERMEABILITY
90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: NO FOSSILS
SOME OF THE VUGS IN THE ASHEN-GRAY DOLOMITE ARE INFILLED WITH CARAMEL BROWN DOLOMITE CRYSTALS; BROWN DOLOMITE HAS HIGH POROSITY (35%) AND GRAY DOLOMITE IS MUCH LOWER (10%).

1102 - 1115 DOLOSTONE; MODERATE YELLOWISH BROWN TO GRAYISH ORANGE
15% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: FOSSIL MOLDS

1115 - 1136 DOLOSTONE; GRAYISH BROWN TO MODERATE DARK GRAY
10% POROSITY: PIN POINT VUGS, LOW PERMEABILITY
90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT

OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS
VARIABLE POROSITY (05 -15%).

1136 - 1144 DOLOSTONE; DARK YELLOWISH BROWN
30% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY; 90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: VERY FINE TO MICROCRYSTALLINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS

1144 - 1146 PACKSTONE; WHITE TO VERY LIGHT ORANGE
35% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CRYSTALS, CALCILUTITE
85% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MEDIUM TO VERY FINE
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, SPARRY CALCITE CEMENT
CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS

1146 - 1156 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
25% POROSITY: MOLDIC, PIN POINT VUGS
POSSIBLY HIGH PERMEABILITY; 90-100% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, POOR SAMPLE
FOSSILS: FOSSIL MOLDS

1156 - 1159 DOLOSTONE; GRAYISH ORANGE TO GRAYISH BROWN
15% POROSITY: INTERCRYSTALLINE, VUGULAR, PIN POINT VUGS
50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: VERY FINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: LAMINATED, MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: FOSSIL MOLDS
CORED INTERVAL FROM 1155-1159 FOR TW-1; SOME LAMINATIONS STILL APPARENT; A VERTICAL FRACTURE AT LEAST 6" LONG IS PRESENT AT 1157; MANY OF THE VUGS ARE LINED WITH YELLOWISH-
BROWN DRUSY DOLOMITE CRYSTALS.

1159 - 1172 PACKSTONE; WHITE TO VERY LIGHT ORANGE
20% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CRYSTALS, CALCILUTITE
85% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, SPARRY CALCITE CEMENT
CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS
VARIABLE DOLOMITIZATION 10-50%.

1172 - 1175 PACKSTONE; VERY LIGHT ORANGE
25% POROSITY: INTERGRANULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: CHALKY, LOW RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, MILIOLIDS

CORED INTERVAL FROM 1170-1175 FOR IW-1; MILLIOLID-RICH FOSSIL HASH; THE RECOVERED INTERVAL CONSISTS OF FAIRLY HOMOGENOUS PACKSTONE; THIN ZONE OF VUGGY POROSITY; SOME INCLINED BEDDING OBSERVED; KEYSTONE VUGS, INDICATIVE OF INTERTIDAL "SWASH" ZONE OBSERVED IN THIS INTERVAL.

1175 - 1193 PACKSTONE; WHITE TO VERY LIGHT ORANGE
25% POROSITY: INTERGRANULAR, INTRAGRANULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, CHALKY
FOSSILS: ECHINOID, FOSSIL FRAGMENTS, BENTHIC FORAMINIFERA

1193 - 1204 PACKSTONE; WHITE TO VERY LIGHT ORANGE
20% POROSITY: INTERGRANULAR, INTRAGRANULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, CHALKY
FOSSILS: ECHINOID, FOSSIL FRAGMENTS, BENTHIC FORAMINIFERA

CORED INTERVAL FROM 1193-1204 FOR TW-1; GRADES FROM A WACKESTONE TO A PACKSTONE; VERY HOMOGENOUS INTERVAL.

1204 - 1230 PACKSTONE; WHITE TO VERY LIGHT ORANGE
35% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CRYSTALS, CALCILUTITE
93% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, SPARRY CALCITE CEMENT
CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION, CHALKY, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, CONES

1230 - 1232 PACKSTONE; VERY LIGHT ORANGE TO WHITE
35% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
95% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
POOR INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE MATRIX

DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, CHALKY,
DOLOMITIC

FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, MILIOLIDS
POORLY INDURATED, CHALKY, CARBONATE (FORAMINIFERAL) SAND
HELICOSTEGINA GYRALIS IDENTIFIED.

1232 - 1240 PACKSTONE; VERY LIGHT ORANGE TO WHITE
35% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
97% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, DOLOMITE CEMENT
CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, CONES,
ECHINOID

1240 - 1249 WACKESTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
20% POROSITY: INTERGRANULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
40% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE
RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE
INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: INTERBEDDED
OTHER FEATURES: LOW RECRYSTALLIZATION, CHALKY, DOLOMITIC
FOSSILS: FOSSIL MOLDS, MOLLUSKS, MILIOLIDS
BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS
CORED INTERVAL FROM 1243-1249; SOME OF THIS INTERVAL IS
A
PACKSTONE; SOME SPARRY DOLOMITE CEMENT OBSERVED
WELL-PRESERVED ECHINOID IMPRESSION (CAST) OBSERVED

1249 - 1260 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
25% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS

1260 - 1270 DOLOSTONE; GRAYISH ORANGE
25% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: FOSSIL MOLDS

1270 - 1290 DOLOSTONE; WHITE TO VERY LIGHT ORANGE
15% POROSITY: INTERGRANULAR; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, SPARRY CALCITE CEMENT
CALCILUTITE MATRIX

OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, CONES
DECREASED DOLOMITIZATION RELATIVE TO ABOVE SAMPLE
GRAVEL-SIZED CALCITIC, BENTHIC FORAMS (CONES) PRESENT

1290 - 1313 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
20% POROSITY: INTERCRYSTALLINE, MOLDIC
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL MOLDS
GHOSTS OF DICTYOCONUS; POROSITY VARIABLE (20-30%);
MOLDIC
POROSITY OBSERVED IN INTERVAL 1300-1313'.

1313 - 1318 DOLOSTONE; GRAYISH ORANGE TO MODERATE YELLOWISH BROWN
05% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC

1318 - 1333 DOLOSTONE; VERY LIGHT ORANGE TO WHITE
10% POROSITY: INTERGRANULAR, PIN POINT VUGS
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS
PARTIAL DOLOMITIZATION RESULTS IN BROWN DOLOMITE MATRIX
WITH WHITE ALLOCHEMS (PROBABLY LOW-MAG CALCITIC FORAMS)
SPECKLED THROUGHOUT. TOP OF THE NUMMULITES
(=OPERCULINA)
COOKEI(?) ASSEMBLAGE AT APPROXIMATELY 1323 FEET.

1333 - 1360 PACKSTONE; VERY LIGHT ORANGE
30% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM; GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS
FOSSIL MOLDS, MOLLUSKS, ECHINOID
CORED INTERVAL FROM 1350-1360 FOR IW-2; THIS INTERVAL IS
A
VERY HOMOGENOUS FORAM-SKELETAL FRAGMENT HASH; INTERVAL
1339-1350' APPROACHING A GRAINSTONE (LESS MUD).

1360 - 1359 WACKESTONE; VERY LIGHT ORANGE
25% POROSITY: INTERGRANULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: FINE TO MEDIUM; GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: LOW RECRYSTALLIZATION, VARVED

FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS
FOSSIL MOLDS, MOLLUSKS

1359 - 1370 PACKSTONE; WHITE TO VERY LIGHT ORANGE
30% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE, CRYSTALS
93% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, CONES,
MOLLUSKS
ECHINOID

1370 - 1380 DOLOSTONE; GRAYISH ORANGE TO VERY LIGHT ORANGE
20% POROSITY: PIN POINT VUGS, INTERGRANULAR
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC

1380 - 1390 DOLOSTONE; GRAYISH BROWN TO WHITE
20% POROSITY: PIN POINT VUGS, INTERGRANULAR
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED,
SUCROSIC
BROWN DOLOSTONE SPECKLED W/ WHITE ALLOCHEMS.

1390 - 1433 DOLOSTONE; GRAYISH ORANGE TO GRAYISH BROWN
25% POROSITY: VUGULAR, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
INTERVAL 1410-1420': VUGGY, HIGHLY POROUS DOLOSTONE
INTERBEDDED WITH A DARKER, DENSE DOLOSTONE.

1433 - 1468 DOLOSTONE; GRAYISH ORANGE TO DARK YELLOWISH BROWN
05% POROSITY: PIN POINT VUGS, INTERGRANULAR
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FEW DARK GRAY TO BLACK DOLOSTONE CHIPS.

1468 - 1478 DOLOSTONE; GRAYISH ORANGE TO MODERATE DARK GRAY
10% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION

CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
LITHOLOGY MOTTLED BETWEEN DENSE, MICROCRYSTALLINE AND CARAMEL-BROWN, POROUS DOLOSTONES.

1478 - 1498 DOLOSTONE; GRAYISH ORANGE TO BROWNISH GRAY
20% POROSITY: INTERCRYSTALLINE, MOLDIC, PIN POINT VUGS
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
ACCESSORY MINERALS: CHERT-05%
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: FOSSIL MOLDS
LITHOLOGY MOTTLED BETWEEN DENSE, MICROCRYSTALLINE AND CARAMEL-BROWN, POROUS DOLOSTONES. COLOR IS YELLOWISH-BROWN
IN THE LOWER HALF OF THIS INTERVAL.

1498 - 1518 DOLOSTONE; MODERATE YELLOWISH BROWN TO MODERATE GRAY
25% POROSITY: PIN POINT VUGS, INTERGRANULAR
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: CHERT-10%
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: BENTHIC FORAMINIFERA
GHOSTS OF BENTHIC FORAMS.

1518 - 1530 DOLOSTONE; GRAYISH BROWN TO MODERATE YELLOWISH BROWN
10% POROSITY: INTERGRANULAR, PIN POINT VUGS
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: CHERT-10%
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: BENTHIC FORAMINIFERA
SMALL CLUSTERS OF WHITE QUARTZ CRYSTALS. FORAM GHOSTS.

1530 - 1580 DOLOSTONE; MODERATE YELLOWISH BROWN TO VERY LIGHT ORANGE
30% POROSITY: VUGULAR, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
ACCESSORY MINERALS: CHERT-15%
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: BENTHIC FORAMINIFERA
LITHOLOGY MOTTLED BETWEEN TAN MICROCRYSTALLINE DOLOSTONE TO CARAMEL BROWN, SUCROSIC, POROUS DOLOSTONE.

1580 - 1588 DOLOSTONE; LIGHT GRAYISH BROWN TO DARK YELLOWISH BROWN
35% POROSITY: VUGULAR, INTERCRYSTALLINE, MOLDIC
90-100% ALTERED; SUBHEDRAL

GRAIN SIZE: VERY FINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: CHERT-02%
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS
CORED INTERVAL FROM 1578-1588 FOR TW-1; SOME OF THE INTERVAL HAS A WELL-DEVELOPED VUGULAR POROSITY, BUT OTHER
SECTIONS ARE VERY TIGHT DOLOSTONE WITH VERY LOW PERMEABILITY; FRACTURED IN PART; CHERT FRAGMENT IN DOLOSTONE (COLLAPSE BRECCIA).

1588 - 1599 DOLOSTONE; MODERATE YELLOWISH BROWN TO DARK YELLOWISH BROWN
30% POROSITY: VUGULAR, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
ACCESSORY MINERALS: CHERT-10%
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
PROBABLE VUGS (SONIC LOG GOES OFF SCALE). CHERT CONTENT VARIABLE 10-20%.

1599 - 1602 DOLOSTONE; GRAYISH BROWN TO DARK YELLOWISH BROWN
15% POROSITY: INTERGRANULAR, INTERCRYSTALLINE
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC

1602 - 1612 DOLOSTONE; MODERATE YELLOWISH BROWN TO LIGHT GRAY
20% POROSITY: INTERCRYSTALLINE, VUGULAR; 50-90% ALTERED EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: CHERT-10%
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
WHITE DOLOSTONE/CHERT WITH BLACK SPECKS. EXTREMELY DENSE LITHOLOGY.

1612 - 1616 WACKESTONE; VERY LIGHT ORANGE TO LIGHT GRAY
20% POROSITY: INTERGRANULAR, INTERCRYSTALLINE
GRAIN TYPE: SKELETAL, CALCILUTITE, CRYSTALS
20% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT
ACCESSORY MINERALS: CHERT-10%
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC

1616 - 1618 DOLOSTONE; WHITE TO LIGHT GRAY
10% POROSITY: INTERGRANULAR, INTERCRYSTALLINE
LOW PERMEABILITY; 50-90% ALTERED; SUBHEDRAL
GRAIN SIZE: MICROCRYSTALLINE

RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: CHERT-05%
OTHER FEATURES: HIGH RECRYSTALLIZATION

1618 - 1650 MUDSTONE; VERY LIGHT ORANGE
15% POROSITY: INTERGRANULAR, LOW PERMEABILITY
GRAIN TYPE: CALCILUTITE; 15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE
RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
ACCESSORY MINERALS: CHERT-05%
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1650 - 1655 MUDSTONE; VERY LIGHT ORANGE
10% POROSITY: INTERGRANULAR, LOW PERMEABILITY
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE
RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
ACCESSORY MINERALS: CHERT-05%
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA
CORED INTERVAL FROM 1650-1655 FOR IW-2; EXTREMELY FINE-GRAINED MUDSTONE; BECOMES INCREASINGLY DOLOMITIC WITH
DEPTH; BURROWS PRESENT AT BASE OF INTERVAL; DOLOMITE AT BOTTOM OF INTERVAL APPARENTLY HAS BEEN SILICIFIED AS EVIDENCED BY A WELL- DEVELOPED CONCHOIDAL FRACTURE

1655 - 1666 WACKESTONE; VERY LIGHT ORANGE TO LIGHT GRAY
25% POROSITY: INTERGRANULAR, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE, CRYSTALS
30% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT
ACCESSORY MINERALS: CHERT-10%
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA
CHERT CONTENT VARIABLE (5-10%); VARIABLE POROSITY 25-30%.

1666 - 1678 DOLOSTONE; GRAYISH BROWN TO LIGHT GRAY
10% POROSITY: INTERGRANULAR, INTERCRYSTALLINE
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: CHERT-05%, GLAUCONITE-03%
OTHER FEATURES: HIGH RECRYSTALLIZATION
FIRST OCCURRENCE OF GLAUCONITE, POSSIBLE OLDSMAR LIMESTONE.

1678 - 1685 DOLOSTONE; WHITE TO VERY LIGHT GRAY
10% POROSITY: INTERGRANULAR, INTERCRYSTALLINE
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: GLAUCONITE-05%
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS

1685 - 1695 DOLOSTONE; GRAYISH BROWN TO MODERATE LIGHT GRAY
10% POROSITY: INTERGRANULAR, INTERCRYSTALLINE
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: CHERT-05%
OTHER FEATURES: HIGH RECRYSTALLIZATION

1695 - 1704 WACKESTONE; WHITE TO DARK YELLOWISH BROWN
15% POROSITY: INTERGRANULAR, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE, CRYSTALS
22% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
ACCESSORY MINERALS: CHERT-30%, GLAUCONITE-03%
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: FOSSIL FRAGMENTS
VARIABLE DOLOMITIZATION (10-50%).

1704 - 1720 WACKESTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
20% POROSITY: INTERGRANULAR, FRACTURE
GRAIN TYPE: SKELETAL, CALCILUTITE, BIOGENIC
55% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
SEDIMENTARY STRUCTURES: MOTTLED
ACCESSORY MINERALS: SPAR-05%, DOLOMITE-05%
OTHER FEATURES: MEDIUM RECRYSTALLIZATION
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS
BENTHIC FORAMINIFERA

1720 - 1723 WACKESTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
20% POROSITY: INTERGRANULAR, FRACTURE
GRAIN TYPE: SKELETAL, CALCILUTITE, BIOGENIC
65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
SEDIMENTARY STRUCTURES: MOTTLED
ACCESSORY MINERALS: SPAR-03%, DOLOMITE-03%
OTHER FEATURES: MEDIUM RECRYSTALLIZATION
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS
BENTHIC FORAMINIFERA

CORED INTERVAL FROM 1720-1723; SOME OPEN FRACTURES WHICH ARE LINED WITH SPAR. BURROWS ARE INFILLED WITH DOLOMUDSTONE

CONTAINING BENTHIC FORAM FRAGMENTS.

1723 - 1724 GRAINSTONE; VERY LIGHT ORANGE TO LIGHT GRAY
25% POROSITY: INTERGRANULAR, INTRAGRANULAR
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CRYSTALS
99% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, DOLOMITE CEMENT
ACCESSORY MINERALS: GLAUCONITE-01%, CHERT-02%
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, CORAL, ECHINOID, MILIOLIDS

CONES
CORAL IS SILICIFIED.

1724 - 1768 PACKSTONE; VERY LIGHT ORANGE TO WHITE
25% POROSITY: INTERGRANULAR, PIN POINT VUGS
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRAVEL
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT

DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, CONES, MILIOLIDS, ECHINOID

1768 - 1772 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
05% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
ACCESSORY MINERALS: CHERT-05%
OTHER FEATURES: MEDIUM RECRYSTALLIZATION
FOSSILS: NO FOSSILS

1772 - 1780 WACKESTONE; VERY LIGHT ORANGE TO WHITE
25% POROSITY: MOLDIC, PIN POINT VUGS
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT

DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: FOSSIL MOLDS, MOLLUSKS, BENTHIC FORAMINIFERA MILIOLIDS
VARIABLE (10-50%) DOLOMITIZATION.

1780 - 1789 WACKESTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
25% POROSITY: INTERGRANULAR, MOLDIC, INTRAGRANULAR
GRAIN TYPE: SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE
RANGE: MICROCRYSTALLINE TO VERY FINE; MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC
FOSSILS: FOSSIL MOLDS, FOSSIL FRAGMENTS
BENTHIC FORAMINIFERA, MILIOLIDS
CORED INTERVAL FROM 1780-1789 FOR IW-1; GRADES INTO A PACKSTONE; SOME HIGHLY LEACHED FOSSIL MOLDS, BUT THESE MOLDS DO NOT CONTRIBUTE SIGNIFICANTLY TO THE POROSITY OF THIS INTERVAL; INTRAGRANULAR POROSITY DEVELOPED THROUGH FORAM SKELETONS.

1789 - 1795 PACKSTONE; VERY LIGHT ORANGE TO WHITE
25% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CRYSTALS, CALCILUTITE
95% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: MICROCRYSTALLINE TO GRANULE
MODERATE INDURATION
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, CONES
VARIABLE (10-50%) DOLOMITIZATION.

1795 - 1804 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
10% POROSITY: MOLDIC, INTERCRYSTALLINE
GRAIN TYPE: SKELETAL, CRYSTALS, CALCILUTITE
20% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS

1804 - 1808 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
25% POROSITY: MOLDIC, INTERGRANULAR
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
75% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, FOSSIL MOLDS

1808 - 1816 MUDSTONE; VERY LIGHT ORANGE TO WHITE
10% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
LOW PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE, CRYSTALS
09% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS

1816 - 1823 WACKESTONE; VERY LIGHT ORANGE TO MODERATE YELLOWISH BROWN

15% POROSITY: INTERGRANULAR, INTERCRYSTALLINE
GRAIN TYPE: SKELETAL, CALCILUTITE
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED, LAMINATED, INTERBEDDED
ACCESSORY MINERALS: DOLOMITE-15%
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC
FOSSILS: FOSSIL MOLDS, BENTHIC FORAMINIFERA, MOLLUSKS FOSSIL FRAGMENTS
CORED INTERVAL FROM 1820 - 1830 FOR IW-2. DOLOSTONE INTERBEDDED WITH WACKESTONE. FRACTURES INFILLED WITH YELLOWISH-BROWN DOLOSPAR PRESENT. BURROWS APPEAR TO BE PREFERENTIALLY DOLOMITIZED; AT APPROXIMATELY 1821', A BRECCIATED TEXTURE IS PRESENT.

1823 - 1829 DOLOSTONE; GRAYISH ORANGE TO MODERATE YELLOWISH BROWN
15% POROSITY: INTERCRYSTALLINE, INTERGRANULAR
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
SEDIMENTARY STRUCTURES: LAMINATED, INTERBEDDED
ACCESSORY MINERALS: LIMESTONE-15%
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC
FOSSILS: FOSSIL MOLDS, BENTHIC FORAMINIFERA, MOLLUSKS FOSSIL FRAGMENTS
A LAMINATED DOLOSTONE INTERBEDDED WITH PACKSTONE; MANGROVE ROOT TRACES FILLED WITH DOLOSPAR; ABRUPT UNCONFORMABLE CONTACT WITH PACKSTONE ON TOP OF LAMINATED DOLOSTONE IS INTERPRETED TO REPRESENT A TIDAL FLAT WITH SUBAERIALLY EXPOSED SURFACE.

1829 - 1830 PACKSTONE; VERY LIGHT ORANGE TO MODERATE YELLOWISH BROWN
15% POROSITY: INTERGRANULAR, INTERCRYSTALLINE
PIN POINT VUGS
GRAIN TYPE: SKELETAL, CALCILUTITE, CRYSTALS
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
ACCESSORY MINERALS: DOLOMITE-15%, CHERT-01%
OTHER FEATURES: MEDIUM RECRYSTALLIZATION, DOLOMITIC
FOSSILS: FOSSIL MOLDS, BENTHIC FORAMINIFERA, MOLLUSKS FOSSIL FRAGMENTS, CONES
CORED INTERVAL FROM 1820-1830 FOR IW-2; STRIKING HIATUS WITHIN THIS INTERVAL (SEE THIN SECTIONS); FRACTURES INFILLED WITH YELLOWISH BROWN DOLOSPAR; SOME OF THE BURROWS APPEAR TO BE PREFERENTIALLY DOLOMITIZED; THE INTERVAL BECOMES MORE DOLOMITIC WITH DEPTH; SOME POCKETS OF PALE ORANGE WACKESTONE STILL PRESENT.

1830 - 1832 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN

30% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: FOSSIL MOLDS

1832 - 1840 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH ORANGE
10% POROSITY: PIN POINT VUGS, LOW PERMEABILITY
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS

1840 - 1855 DOLOSTONE; GRAYISH BROWN TO DARK GRAY
20% POROSITY: MOLDIC, PIN POINT VUGS
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, FOSSIL MOLDS
FORAM GHOSTS.

1855 - 1862 MUDSTONE; GRAYISH BROWN TO VERY LIGHT ORANGE
20% POROSITY: INTERGRANULAR, PIN POINT VUGS
GRAIN TYPE: CALCILUTITE, SKELETAL
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO FINE
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: CROSS-BEDDED, LAMINATED
INTERBEDDED
OTHER FEATURES: DOLOMITIC, MEDIUM RECRYSTALLIZATION
FOSSILS: ORGANICS, FOSSIL MOLDS
CORED INTERVAL FROM 1855-1862 FOR IW-1; POSSIBLE CROSS
BEDS
OBSERVED; PIN POINT VUGS WELL-DEVELOPED IN SOME
INTERVALS
SOME PARTS OF THIS INTERVAL ARE COMPOSED OF
DOLOMUDSTONES
WHICH CONTAIN ORGANIC LAMINAE.

1862 - 1876 PACKSTONE; VERY LIGHT ORANGE TO WHITE
30% POROSITY: INTERGRANULAR, MOLDIC
POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
75% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): SPARRY CALCITE CEMENT, CALCILUTITE
MATRIX
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: FOSSIL MOLDS, BENTHIC FORAMINIFERA, MILIOLIDS
VARIABLE (10-50%) DOLOMITIZATION.

1876 - 1893 DOLOSTONE; MODERATE YELLOWISH BROWN TO GRAYISH BROWN
25% POROSITY: PIN POINT VUGS, MOLDIC
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC

1893 - 1902 DOLOSTONE; MODERATE YELLOWISH BROWN TO YELLOWISH GRAY
05% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO MEDIUM; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED, SUCROSIC
FOSSILS: BENTHIC FORAMINIFERA, CONES, MILIOLIDS
POROSITY VARIABLE (5-10%).

1902 - 1922 DOLOSTONE; MODERATE YELLOWISH BROWN TO GRAYISH BROWN
25% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: CHERT-01%
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS

1922 - 1937 DOLOSTONE; MODERATE YELLOWISH BROWN TO GRAYISH BROWN
25% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS
POROSITY VARIABLE (15-25%).

1937 - 1939 MUDSTONE; WHITE TO YELLOWISH GRAY
15% POROSITY: INTERCRYSTALLINE
GRAIN TYPE: CALCILUTITE, SKELETAL
09% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO MEDIUM; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA
GHOSTS OF FORAMS (PROBABLY CONES). ABUNDANT FINE BROWN DOLOMITE CRYSTALS. 10-50% DOLOMITIZATION.

1939 - 1964 DOLOSTONE; GRAYISH BROWN TO GRAYISH ORANGE
20% POROSITY: PIN POINT VUGS; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: MILIOLIDS

VARIABLE POROSITY (10 - 20%).

1964 - 1965 MUDSTONE; WHITE TO GRAYISH BROWN
10% POROSITY: INTERCRYSTALLINE, LOW PERMEABILITY
GRAIN TYPE: CALCILUTITE; 02% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED, MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: NO FOSSILS
DOLOMITIZATION IS HIGHLY VARIABLE (10-50%) WITH FINE BROWN
DOLOMITE CRYSTALS.

1965 - 1972 DOLOSTONE; DARK YELLOWISH BROWN TO GRAYISH BROWN
10% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: NO FOSSILS

1972 - 1975 MUDSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
10% POROSITY: INTRAGRANULAR, LOW PERMEABILITY
GRAIN TYPE: CALCILUTITE, SKELETAL
09% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA

1975 - 1993 DOLOSTONE; DARK YELLOWISH BROWN TO DARK GRAY
05% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT, CALCILUTITE MATRIX
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS

1993 - 2003 PACKSTONE; VERY LIGHT ORANGE TO WHITE
25% POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: SKELETAL, CALCILUTITE
90% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT
DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS, CONES
MODERATELY DOLOMITIZED (10-50%).

2003 - 2028 DOLOSTONE; GRAYISH ORANGE TO MODERATE YELLOWISH BROWN
05% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL

GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS
LOWER 10 FEET IS DARK YELLOWISH BROWN TO BLACK.

2028 - 2048 DOLOSTONE; GRAYISH BROWN TO GRAYISH ORANGE
05% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO MICROCRYSTALLINE
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: NO FOSSILS
OCCASIONAL VUGS.

2048 - 2068 DOLOSTONE; VERY LIGHT ORANGE TO MODERATE YELLOWISH BROWN
05% POROSITY: PIN POINT VUGS, INTERGRANULAR
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, CORAL
OCCASIONAL VUGS.

2068 - 2078 DOLOSTONE; MODERATE YELLOWISH BROWN TO GRAYISH ORANGE
15% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: BENTHIC FORAMINIFERA, MILIOLIDS
POROSITY VARIABLE DUE TO DIFFERENTIAL DISSOLUTION.

2078 - 2118 DOLOSTONE; VERY LIGHT ORANGE TO MODERATE YELLOWISH BROWN
10% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: NO FOSSILS

2118 - 2138 DOLOSTONE; VERY LIGHT GRAY TO GRAYISH ORANGE
05% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SPECKLED
FEW FORAM GHOSTS. PARTIALLY SPECKLED WITH WHITE
ALLOCHEMS.

2138 - 2218 DOLOSTONE; GRAYISH ORANGE TO GRAYISH BROWN
05% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS

2218 - 2228 DOLOSTONE; DARK YELLOWISH BROWN TO DARK GRAY
20% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS
POROSITY IS HIGHLY VARIABLE.

2228 - 2244 DOLOSTONE; GRAYISH BROWN TO MODERATE YELLOWISH BROWN
10% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: VERY FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS
POROSITY VARIABLE (10-20%).

2244 - 2265 DOLOSTONE; MODERATE DARK GRAY TO GRAYISH BROWN
05% POROSITY: INTERCRYSTALLINE, LOW PERMEABILITY
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: NO FOSSILS
POROSITY VARIABLE (5-10%).

2265 - 2325 DOLOSTONE; MODERATE GRAY TO GRAYISH BROWN
10% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS

2325 - 2335 DOLOSTONE; GRAYISH BROWN TO DARK YELLOWISH BROWN
15% POROSITY: INTERCRYSTALLINE, INTERGRANULAR
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: FINE; RANGE: MICROCRYSTALLINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION

FOSSILS: NO FOSSILS

2335 - 2361 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
25% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS

2361 - 2378 DOLOSTONE; GRAYISH BROWN TO DARK GRAY
10% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS

2378 - 2412 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
25% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS
VARIABLE POROSITY (15 - 25%).

2412 - 2418 DOLOSTONE; GRAYISH BROWN TO MODERATE LIGHT GRAY
15% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS

2418 - 2425 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
20% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS

2425 - 2436 DOLOSTONE; MODERATE LIGHT GRAY TO GRAYISH BROWN
05% POROSITY: INTERCRYSTALLINE, PIN POINT VUGS
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: FOSSIL MOLDS
MOLDIC POROSITY IN LOWER 6 FEET.

2436 - 2446 DOLOSTONE; LIGHT GRAY TO GRAYISH BROWN

15% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: NO FOSSILS
DARK GRAY PATCHES MIXED IN WITH LIGHT GRAY DOLOMITE.

2446 - 2485 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
05% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
LOW PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO MICROCRYSTALLINE
GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: NO FOSSILS
DENSE, IMPERMEABLE DOLOSTONE WITH VARYING COLOR (GRAY TO VERY PALE ORANGE).

2485 - 2488 DOLOSTONE; VERY LIGHT ORANGE TO VERY LIGHT GRAY
15% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: INTERBEDDED, LAMINATED, MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: NO FOSSILS

2488 - 2496 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
10% POROSITY: PIN POINT VUGS, INTERGRANULAR, MOLDIC
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: FOSSIL MOLDS

2496 - 2502 DOLOSTONE; VERY LIGHT ORANGE TO GRAYISH BROWN
20% POROSITY: PIN POINT VUGS, INTERCRYSTALLINE
POSSIBLY HIGH PERMEABILITY; 50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED, LAMINATED, INTERBEDDED
OTHER FEATURES: HIGH RECRYSTALLIZATION, SUCROSIC
FOSSILS: NO FOSSILS

2502 - 2510 DOLOSTONE; LIGHT GRAY TO VERY LIGHT ORANGE
15% POROSITY: PIN POINT VUGS, INTERGRANULAR
50-90% ALTERED; EUHEDRAL
GRAIN SIZE: MICROCRYSTALLINE
RANGE: MICROCRYSTALLINE TO VERY FINE; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
SEDIMENTARY STRUCTURES: MOTTLED
OTHER FEATURES: HIGH RECRYSTALLIZATION

FOSSILS: NO FOSSILS

2510 TOTAL DEPTH