CDM

City of Cape Coral
Department of Public Works
1015 Cultural Park Boulevard
Cape Coral, Florida 33990

City of Cape Coral
Well 225 Completion Report

December 2003

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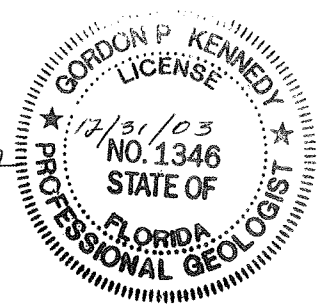
Gordon P. Kennedy

Gordon P. Kennedy, P.G.
Professional Geologist No. 1346



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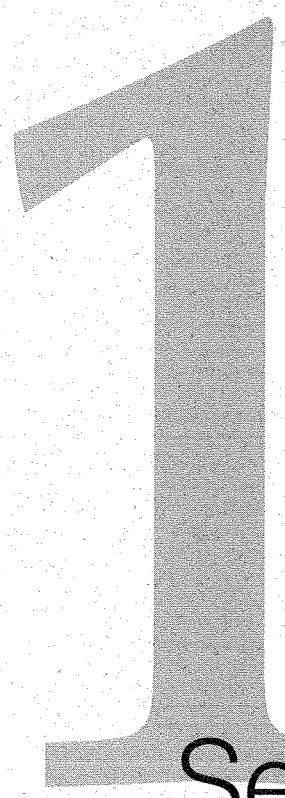


Section One

Section 1
Executive Summary

Expansion of the City of Cape Coral Reverse Osmosis Plant wellfield was completed with the addition of one new 12-inch diameter production well, Well Number 225. The following summarizes the results of the well and pipeline construction project.

- One new production well (Well #225) tapping the Lower Hawthorn Aquifer was installed at the City of Cape Coral Wellfield. The well was constructed with 12-inch diameter Burgess Fiberglass casing and completed with an open hole section in the limestone aquifer. The cased depth of the new well is 440 feet below land surface (bls). Total depth of the well is 715 feet bls.

- The well has a high productive capacity based on the results of the step-drawdown test conducted on the well. The well was test pumped at rates that varied from 413 gallons per minute (gpm) to 1258 gpm. Specific capacity values calculated for the well range from approximately 24 gpm/ft to 27 gpm/ft .

- Water quality in the well is generally similar to other wells in the wellfield. The dissolved chloride concentration of water samples obtained after developing and pump testing the well was approximately 880 mg/L. The reverse osmosis (RO) water treatment method used by the City will be adequate to produce water that meets the current state and federal drinking water standards.

- Water use permit No. 36-00046-W obtained from the South Florida Water Management District (SFWMD) includes annual and maximum daily withdrawal amounts of 6180 and 24.4 million gallons (mg), respectively, from the Lower Hawthorn aquifer. The permit was modified previously to include the new withdrawal facility. The new well provides back up supply capacity and increases the reliability of the wellfield as a whole.

- The new production well is capable of producing in excess of 1,200 gpm. However, in order to minimize the stress on the aquifer, the recommended pumping rate for the well is in the range from 550 to 700 gpm.

- The pump intake setting depth is 120 feet below land surface (bls). This setting depth is conservative in that pumping water levels are not expected to exceed 40 feet bls in the new well at the proposed maximum pumping rate of 700 gpm.

- In order to improve the reliability of the wellfield serving Plant 2, installation of an additional well should be considered. Well #226, which has a proposed location west of Well #211 on Trafalger Parkway, is already permitted by the South Florida Water Management District .

- Static and pumping water levels in the production well should be measured on a regular basis to assess well yields. Acidification to remove calcium carbonate deposition near the well bore should be conducted if the specific capacity of the well declines by 25% or more from the initial values listed in this report.

- Monthly measurement of dissolved chloride concentrations in each production well is required by the SFWMD. All water quality data should be reviewed periodically to assess wellfield performance and identify potential problems.

- Rotating pumpage so that all of the wells in the wellfield are used periodically will distribute drawdown over a larger area and lessen the potential for adverse drawdown impacts.

- The final total contract cost for the well and pipeline was $349,621, or $6,025 below the contract amounts approved by the City Council.

2 Section Two

Section 2
Introduction

2.1 Authorization

CDM Missimer was authorized by the City of Cape Coral to design, permit, and supervise the construction and testing of one new Lower Hawthorn Aquifer production well in the Cape Coral RO Wellfield. The project also included the installation of a submersible pump, well vault, and approximately 1,800 linear feet of raw water transmission main. This report documents the methods and procedures used during installation of the well and associated equipment.

The new well provides additional supply capacity to the Cape Coral wellfield, which now consists of 26 Lower Hawthorn Aquifer production wells. Construction of the new well began on July 3, 2003 and was completed on July 23, 2003. The well construction work was completed by Diversified Drilling Company of Tampa, Florida. The raw water transmission main work was conducted under a separate contract by Cabana Construction Company of Fort Myers, Florida. Bacterial clearance of the well and pipeline was completed on December 15, 2003.

A map showing the location of the new and existing production wells is given in **Figure 2-1**. The wellfield supplies raw water to the City of Cape Coral Reverse Osmosis (RO) Water Treatment Plant that produces potable water for public supply purposes. The withdrawals are authorized by the South Florida Water Management District (SFWMD) under water use permit No. 36-00046-W.

2.2 Scope of Services

The scope of services provided during the wellfield expansion project included design of the facilities, development of technical specifications for the construction and testing of the new production well, assistance in the bidding process, on-site supervision of well construction and testing, and the collection and analysis of formation and water samples during drilling. Observation services were also provided during the installation and testing of the submersible pump, wellhead piping, and other appurtenances. This report summarizes the construction and testing of the well and documents the hydrogeologic information gathered as a result of the project. Additionally, conclusions and recommendations regarding operation of the new well are presented.

Figure 1
Map Showing Location of Well No. 225

3 Section Three

Section 3
Well Construction and Testing

3.1 Well Construction

Construction, development and testing of the new production well (Well #225) were completed by Diversified Drilling Company of Tampa, Florida. The methods and materials used by the contractor were in accordance with the standards of the American Water Works Association (AWWA A100-97) and the technical specifications outlined in the contract documents. Construction of the new production well began on July 3, 2003 and was completed on July 23, 2003. A CDM Missimer hydrogeologist supervised the drilling operation and selected cased and total depth for the well based on field analysis of formation samples collected during drilling. A geologist's log of the sediments encountered during drilling are included in Appendix A.

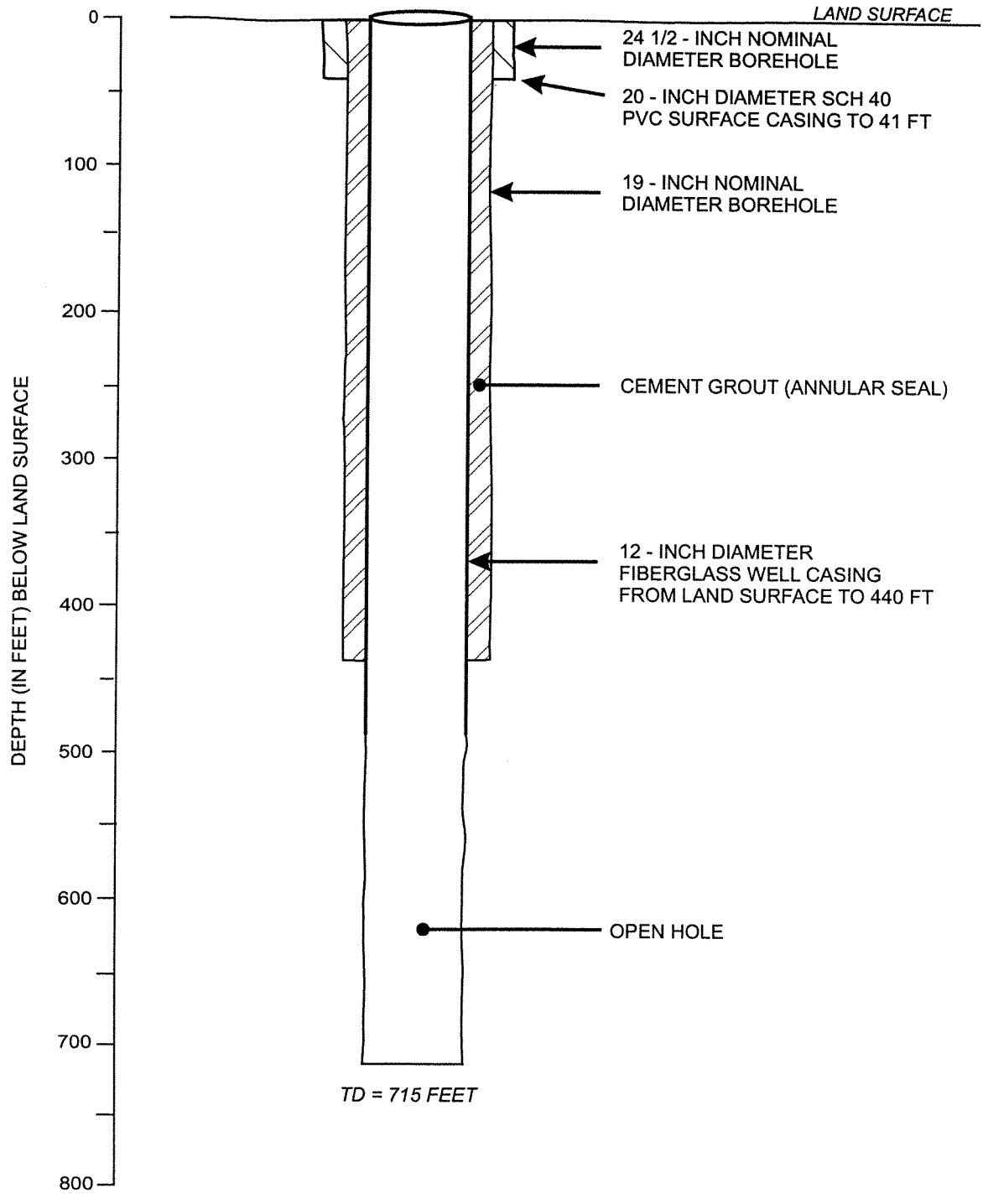
Construction details of the new production well are given in **Table 3-1** and a schematic diagram illustrating the well construction is shown in **Figure 3-1**. The upper portion of the well was drilled using the mud rotary method. A nominal 24-inch diameter borehole was drilled from land surface to 42 feet below land surface. A section of 20-inch diameter PVC surface casing was installed from land surface to 41 feet. The surface casing was pressure grouted with 36 sacks of neat cement. The surface casing grout was allowed to cure for 3 days over the July 4th holiday weekend. The surface casing annulus was topped off with 5 sacks of neat cement.

Table 3-1 Well Construction Details – Cape Coral Well 225

Well Number	Casing Diameter/ Type	Casing Depth (ft bls)*	Total Depth (ft bls)*
# 225 (ML-5201)	12-inch diameter, 0.375 wall thickness, corrugated reinforced Fiberglass	440	715

*Feet below land surface (ft bls)

The surface casing cement was tagged inside the casing at 39 feet. An 8-inch diameter pilot hole was then drilled using the mud-rotary method from 42 to 529 feet bls. A suite of geophysical logs, including caliper, natural gamma, spontaneous potential, and resistivity, were run on the pilot hole to assist in identifying the hydrostratigraphic units encountered, and to aid in determining the production casing setting depth. The borehole was then reamed to a diameter of 19 inches from 42 to 447 feet.



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CDM Missimer

Figure 3-1
Schematic Diagram of Cape Coral Well 225

A string of 12-inch diameter, filament-wound, fiberglass casing (Burgess-type) was set from land surface to the total depth of 440 feet. Casing centralizers were installed approximately five feet above the base, and at a spacing of approximately every 40 feet up the casing string to ensure even distribution of the annular grout.

The annular space between the well casing and borehole wall was pressure grouted with neat Portland cement. Equipment used for this procedure included placing a 2-inch diameter Schedule 40 PVC tremie pipe inside the casing, attaching a temporary flange with 2-inch diameter fittings and a gate valve on top of the 12-inch diameter casing, and placing a high pressure hose from the gate valve to the air driven cement pump. The cement was pumped under pressure down the tremie pipe and up the annulus. The cement was grouted in three stages, with subsequent stages pumped through a tremie pipe on the outside of the casing. A summary of the production casing cementing activities is provided in **Table 3-2**. The cement grout was allowed to cure for a minimum of 18 hours before subsequent cement stages were pumped. The level of the cement in the casing annulus was tagged with the tremie pipe prior to pumping subsequent stages of cement.

Table 3-2 Production Casing Cementing Summary – Cape Coral Well 225

Date	Stage	Sacks of Cement	Cement Type	Tag Depth	Feet of Fill
7/15/2003	1	171	Neat	266	174
7/16/2003	2	100	Neat	88	178
7/17/2003	3	86	Neat	7	81
Totals:		357			

The nominal 12-inch diameter open hole portion of the well was drilled using the reverse-air method. The production portion of the well was completed on July 22, 2003 after drilling to the total depth of 715 feet bls. A second suite of geophysical logs, including caliper, natural gamma, spontaneous potential, fluid resistivity and flowmeter logs, was run on the open hole.

Construction of the raw water transmission main began on September 6, 2003 and was completed in mid-November. The Well #225 wellhead equipment was installed during October. The submersible pump was installed on October 20th, and installation was witnessed by representatives from the City, CDM and Diversified Drilling Corp. Bacterial clearance of the well and pipeline was completed on December 15, 2003.

3.2 Well Development

Upon completion, the well was developed using a variety of methods to insure that the completed well was essentially free of sediment and of acceptable quality for Reverse Osmosis treatment. This was evaluated qualitatively by visual inspection of the produced water, and evaluated quantitatively by performing Silt Density Index (SDI) testing on the produced water while under pumping conditions.

The well was initially developed using reverse air and straight air pumping. The well was developed using reverse air from near the bottom of the hole on July 22nd and 23rd for 5 hours. After tripping out of the hole, the well was developed using straight air for 2 hours with the air line at 85 feet bls. The well was surged approximately every 20 minutes during development.

Silt Density Index testing during the step drawdown test indicated higher SDI results than desired at high pumping rates, so additional development was conducted using the high capacity test pump. The well was developed by overpumping the well at a rate of 1,062 gpm for 5 hours, and at a rate of 943 gpm for 1 hour using the test pumping equipment. Acceptable SDI levels (< 1) were obtained following the overpumping development. The SDI testing results are summarized in **Table 3-3**.

Table 3-3 Silt Density Index Testing – Cape Coral Well 225

Sample Date	Pumping Condition	Pumping Rate (gpm)	SDI
7/30/2003	Step Drawdown Test	413	5.2
7/30/2003	Step Drawdown Test	910	3.5
7/30/2003	Step Drawdown Test	1,258	6.0
7/31/2003	Over-pumping Development	1,062	4.0
7/31/2003	Over-pumping Development	943	0.7

3.3 Step-Drawdown Testing

A Step-drawdown test was conducted to evaluate the well yield and to determine operating pumping rates and pump setting depths. The well was pumped at five discrete pumping rates (steps) for a period of 60 minutes per step. The well was pumped using a submersible pump. The pumping rates were increased incrementally, and ranged from approximately 400 to 1250 gpm. Water levels were measured at 5-minute intervals throughout the test. The complete data from the step-drawdown test are presented in Appendix B. A summary of the test results, including drawdown and specific capacity values for each step is included in **Table 3-4**. Specific capacity is expressed in gallons per minute per foot of drawdown (gpm/ft), and is an indicator of well productivity.

The step drawdown test indicates that the well is one of the better producing wells in the Cape Coral wellfield, with a specific capacity of approximately 26 gpm/ft, at the planned well pumping rate. The expected drawdown, at the maximum recommended pumping rate is discussed in Section V, "Wellfield Operation-Pumping Rates, Scheduling, and Water Levels."

Table 3-4 . Specific Capacities of Well 225 at Various Pumping Rates

Step	Pumping Rate (gpm)	Drawdown (feet)	Specific Capacity (gpm/ft)
1	413	15.3	26.9
2	604	23.0	26.2
3	795	30.9	25.8
4	910	35.3	25.8
5	1258	52.3	24.1

4

Section Four

Section 4
Hydrogeology

4.1 Hydrogeology

The geology of Lee County has been described in reports by the Florida Geological Survey (Sproul et al., 1972; Missimer, T.M. and Banks, R.S.; Missimer, T.M. and Scott, T.M. 2001) the United States Geological Survey (Boggess, D.H., 1974; Boggess et al., 1976; Fitzpatrick, D.J., 1986), and the South Florida Water Management District (Wedderburn et al., 1982; Bower et al.,1990). Detailed descriptions of the subsurface geology of Cape Coral are available in consultant reports previously submitted to the City of Cape Coral Utilities Department (Missimer & Associates, 1985 and 1989). A stratigraphic column showing the general locations of the formations and aquifers in the subsurface of Lee County is provided in **Figure 4-1**.

Raw water production for the Cape Coral R.O. wellfield is from the Lower Hawthorn and Upper Suwannee (Zone I) Aquifers. The recently constructed well was completed in the Lower Hawthorn Aquifer (Scott, T.M., 1988). The Lower Hawthorn Aquifer was encountered at a depth of 435 feet in well #225. Depth to the top of the aquifer is variable and ranges from approximately 400 to 600 feet below land surface in Western Lee County. The well #225 location therefore represents a shallow occurrence of the aquifer in the Cape Coral wellfield area. As indicated in the attached geologist's log (Appendix A), the Lower Hawthorn aquifer limestone was of consistently good quality to the total depth of the well. The open-hole production interval thickness in well #225 is 275 feet.

Drilling operations were terminated upon reaching the top of the Suwannee Aquifer, as determined from drill cuttings. Confinement between the two aquifers varies considerably in the region, both in thickness and composition of the beds, and in the degree of hydraulic connection. The total depth of the production well open hole was limited to 715 feet in order to reduce the potential for future upconing of poorer quality water from below.

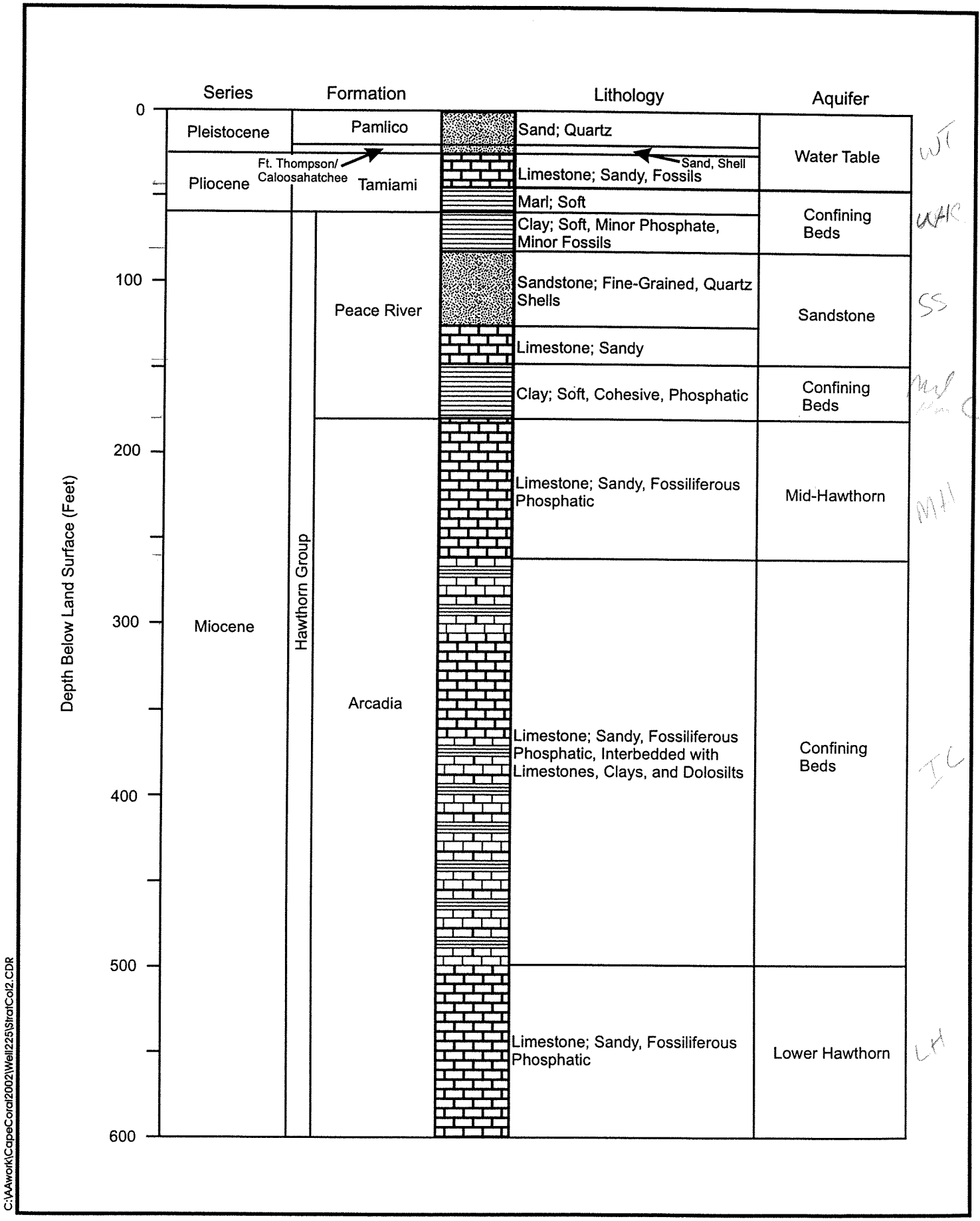

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Figure 4-1
Generalized Hydrostratigraphic Column for Lee County

CDM

The flowmeter log conducted on the open hole indicates that most of the water production occurs between 540 and 670 feet. Specifically, the majority of the flow occurs between 540 and 620 feet. Less than 15% of the total well flow occurs below 670 feet, based on the flowmeter log. The well could likely be plugged below 670 feet without a significant loss of production. This option could be considered in the future if the need arises due to water quality concerns.

The Step Drawdown Test results (see Section 3.3) indicate that specific capacities ranged from 24 to 27 gpd/ft in well #225. The specific capacity of well #225 at a production rate of 600 gpm was 26 gpm/ft. With the exception of well RO-23, initial specific capacity values from other R.O. wells on the Trafalgar Parkway alignment ranged from 11 gpm/ft to 37 gpm/ft at the same flow rate. Well #225 has a similar specific capacity to well RO-24 (#224) and will yield a quantity of water comparable to other wells in the Trafalgar Parkway alignment. The best well in the alignment, Well RO-23 (#223) was an exceptional well, with a specific capacity of 93 gpm/ft at 600 gpm.

An aquifer parameter that can be estimated from step-drawdown test data is the Transmissivity (T) of the aquifer, as measured in gallons per day per foot (gpd/ft). Walton's (1970) estimate of T is based on the relationship between specific capacity and T according to the formula:

$$Q/s = T/((264*(\log((Tt)/(r*r*2693*S)))-65.5)$$

Where,

Q/s	=	Specific Capacity or Pumping Rate/drawdown (gpm/ft)
T	=	Transmissivity (gpm/ft)
t	=	time of pumping (min)
r	=	well radius (feet)
S	=	Storage (dimensionless)

Using a storage coefficient measured at a nearby aquifer test site (3.3 x 10-4), the calculated T value for the Lower Hawthorn aquifer at the well #225 well site is approximately 47,000 gpd/ft based on the pumping rate of 795 gpm. This value is within the range of previously established values for T in the Lower Hawthorn aquifer in the Cape Coral area.

T = 6365.6 ft²/day

4.2 Water Quality

Water samples were collected from the new production well during construction, testing and well development. Water samples were analyzed for dissolved chloride concentration and specific conductance as indicators of water quality. The water quality data are presented in **Tables 4-1** and **4-2**. The water quality of well #225, as measured by chloride concentration, is about average for the Cape Coral wellfield, with chloride concentrations of produced water at 880 mg/l .

Additional water samples were obtained from the new production well at the end of step drawdown testing for primary and secondary drinking water analysis. Photocopies of the laboratory analytical reports for primary and secondary testing are provided in Appendix C. Water quality in the new well is similar to others in the Cape Coral wellfield, with potable standards being exceeded for certain parameters, such as chlorides and total dissolved solids (TDS), which is characteristic of brackish water aquifers. The reverse osmosis treatment method used by the City, however, results in water that meets all applicable drinking water standards.

During reverse air drilling the chloride concentration of bottom hole samples (air line samples) increased from 840 mg/l at 652 feet to 900 mg/l at 715 feet (Table 4-1). The drilling data and Fluid Resistivity log indicates that there is some water quality decline in the bottom 50 feet of hole. However, very little flow is originating from this depth, so water from this zone does not likely contribute much to the produced water quality. Although the current water quality does not warrant a plug back at this time, this option should be considered if there is a substantial decline in water quality in the future.

Table 4-1. Cape Coral Well #225 Water Quality Data During Drilling

Sample Source	Depth (feet)	Specific Conductance (umhos/cm)	Dissolved Chloride Concentration (mg/l)
Air line	499	1981	540
Air line	530	2146	560
Air line	561	2634	680
Air line	591	2846	740
Well flow	591	2919	740
Air line	622	3115	820
Well flow	622	2892	720
Air line	652	3156	840
Well flow	652	2815	740
Air line	682	3328	860
Well flow	682	2840	740
Air line	715	3483	900
Well flow	715	3150	820
Air line*	715	3444	920
Well flow*	715	3356	880
Well flow**	715	3258	900

*Samples collected after two hours of development
**Sample collected after seven hours of development

Table 4-2. Cape Coral Well #225 Water Quality Data During Testing & Development

Sample Source	Pumping Rate (gpm)	Specific Conductance (umhos/cm)	Dissolved Chloride Concentration (mg/l)
Submersible pump	604	3365	880
Submersible pump	795	3353	880
Submersible pump	910	3358	880
Submersible pump	1,258	3369	880
Submersible pump	943	3371	880

5 Section Five

Section 5
Well Operation

5.1 Well Pumping Equipment & Pumping Rates

A submersible well pump manufactured by Crown Pump Corporation, model #8M-700 was installed in the new production well. The pump is equipped with a 50 horsepower (hp) electric motor and is set on 6-inch diameter certa-lok PVC column pipe. The operating range for the pump is from approximately 400 to 800 gpm. The maximum recommended pumping rate for well #225 is 700 gpm. Although step drawdown testing indicates that the well is capable of producing at much higher rates, a production rate in the range of 550 to 700 gpm is recommended in order to operate the pump at maximum efficiency and to minimize the potential for upconing of poorer quality water from deeper aquifers. The pump setting and recommended pumping rate is summarized in **Table 5-1.**

Table 5-1. Recommended Pump Settings and Pumping Rates for Well #225

Well Number	Casing Depth (ft)	Pump Setting Depth (ft)	Recommended Maximum Pumping Rate (gpm)	Maximum Estimated Pumping Water Level (ft bls)
225	440	120	700	40

A summary of the well pumping equipment, including serial numbers for the pump and motor, is listed in **Table 5-2.** Detailed information on the pumping equipment is provided in the attached Operation and Maintenance (O&M) Manual (Appendix D). The maximum anticipated pumping water level in well #225 while pumping at 700 gpm is estimated to be 40 feet below land surface. This level was estimated based on pumping rates, specific capacity values, anticipated seasonal low water levels, and interference drawdown effects from other wells. The pump setting depth of 120 feet is similar to other wells in the wellfield and is a conservative setting depth in that the actual pumping water level is not anticipated to exceed approximately 40 feet bls. The conservative pump setting depth allows for potential regional declines in the potentiometric level of the aquifer, and potential well yield deterioration over time due to precipitation of calcium carbonate or biofouling near the well bore.

Table 5-2. Well Pumping & Wellhead Equipment Summary

Item/Part	Manufacturer	Part/Model Number	Serial Number	Material	Size
Submersible Pump	Crown	8M-700	#15143	316 SS	6 " discharge 8.5 " max OD
Submersible Pump Motor	Crown (Hitachi)	114-05034 2886211	KUO 429	SS	50 HP, 460 V, 3 Ph 8" motor
Pump Column Drop Pipe	Certa-Lok	66525	NA	PVC	6" (6.625 OD)
Flowmeter	McCrometer/ Water Specialties	ML-04 W/ TR 16 Meter	NA	316 SS	6"

5.2 Wellfield Operation

The City of Cape Coral RO water treatment plant has a finished water capacity of 15 MGD. Of this total, Plant 1 has a capacity of 6 MGD and Plant 2 has a capacity of 9 MGD. Well #225 brings to fifteen (15) the number of wells supplying water to Plant 2. At capacity, Plant 2 has a raw water requirement of 10.6 MGD (85% efficiency). Completion of well #225 will provide an additional 1 MGD at the maximum recommended production rate to help meet the raw water needs of Plant 2. Distributing pumpage among all of the wells on a rotational basis will lessen impacts at any one location.

In order to improve the reliability of the wellfield serving Plant 2, installation of an additional well should be considered. Well #226, which has a proposed location west of Well #211 on Trafalger Parkway, is already permitted by the South Florida Water Management District (SFWMD) in the City's water use permit. The City should investigate obtaining property or an easement for a future well in the vicinity of Trafalgar Parkway and the soccer field access road.

The water use permit issued to Cape Coral by the SFWMD (No. 36-00046-W) for the RO Wellfield allows a maximum daily allocation of 24.4 MG from the Lower Hawthorn Aquifer. Monitoring of well pumpage and groundwater quality is required by limiting conditions #17, #24 and #31 of the water use permit. Water levels and water quality data should continue to be measured in monitor wells and production wells. Review of the monitoring and pumping data will allow a continuing evaluation of wellfield performance.

Pumping water level data collected from the production wells will be useful in assessing potential well yield deterioration with time. Well yields can decrease due to calcium carbonate precipitation, biofouling, and other problems. Acidification and redevelopment or other rehabilitation work should be conducted if the specific capacity of the well declines by 25% or more from the initial values documented in this report. The acidification procedure, if required, is typically very effective in restoring the productive capacity of an affected well.

5.3 Well and Pipeline Costs

The total contract amount approved by the Cape Coral City Council for installation of Well #225 and the associated raw water transmission main was $355,646 ($268,646 for the well project and $87,000 for the transmission main project). Change Order #1, executed in November, 2003 reflected the final contract cost changes on the well construction project completion. The net contract decrease for Change Order #1 was $6,025. The final total contract cost for the well and pipeline was $349,621, or $6,025 below the contract amounts approved by the City Council.

6 Section Six

Section 6
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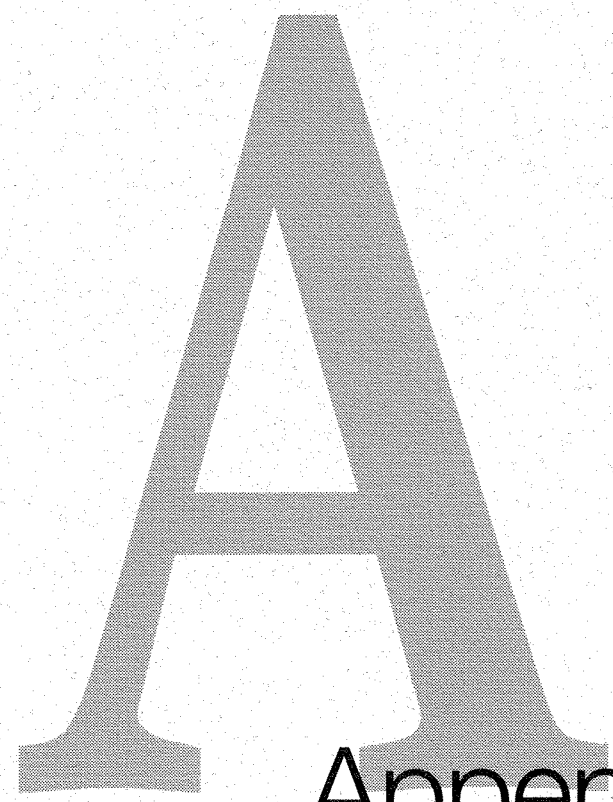


Appendix A

Appendix A
Geologist's Log

GEOLOGIST'S LOG OF
CITY OF CAPE CORAL WELL #225
(Well ML-5201)

Depth (ft)	Lithology
0 – 4	Sand, dark yellowish brown (10YR 4/2), quartz, fine, well sorted, subrounded, <5% silt.
4 – 8	Shell (65%), white (N9), bivalves, unconsolidated; Sandstone (35%), light olive brown (5Y 5/6), quartz, fine grained, moderately well sorted, well rounded.
8 – 13	Shell, white (N9), bivalves, gastropods, echinoids, unconsolidated.
13 – 30	Limestone, yellowish gray (5Y 7/2), grainstone, moderately hard, moderate intergranular macroporosity, very sandy, mollusks, trace of very fine grained phosphate.
30 – 42	Clay (80%), pale olive (10Y 6/2), soft, silty; Limestone (20%), yellowish gray (5Y 7/2), grainstone, moderately hard, moderate intergranular macroporosity, very sandy, mollusks, trace of very fine grained phosphate.
42 – 105	Clay, grayish olive (10Y 4/2), soft, sticky, slightly silty.
105 – 135	Limestone, light olive gray (5Y 7/2), wackestone, moderately hard to hard, moderate vuggy macroporosity, mollusks, approximately 5% coarse grained phosphate, sand.
135 – 150	Limestone, yellowish gray (5Y 7/2), wackestone, hard, low to moderate vuggy macroporosity, mollusks, sand, fine grained phosphate.
150 – 170	Limestone, yellowish gray (5Y 7/2), wackestone to grainstone, moderately hard, low intergranular macroporosity, mollusks, sand, peloids, phosphate.
170 – 202	Limestone, yellowish gray (5Y 7/2), wackestone to grainstone, moderately hard, low intergranular macroporosity, marl, mollusks, sand, peloids, phosphate.
202 – 207	Clay (70%), olive gray (5Y 4/1), stiff, gummy; Limestone (30%), yellowish gray (5Y 7/2), wackestone to grainstone, moderately hard, low intergranular macroporosity, marl, mollusks, sand, peloids, phosphate.

GEOLOGIST'S LOG OF
CITY OF CAPE CORAL WELL #225
(Well ML-5201)
(Continued)

207 – 228	Clay (80%), dusky yellow (5Y 6/4), soft, very sandy; Limestone (20%), yellowish gray (5Y 8/1), wackestone, soft, low macroporosity, mollusks.
228 – 246	Limestone, pale greenish yellow (10Y 8/2), wackestone, moderately hard, low vuggy macroporosity, marl, sand, mollusks, fine grained phosphate.
246 – 250	Limestone, very light gray (N8), grainstone, soft to moderately hard, low intergranular macroporosity, marl, silt, clay, peloids, sand, fine grained phosphate.
250 – 272	Limestone, very pale orange (10YR 8/2), wackestone, moderately hard to hard, moderate vuggy macroporosity, sand, mollusks, very fine grained phosphate.
272 – 290	Limestone, yellowish gray (5Y 7/2), grainstone, soft, low to moderate intergranular macroporosity, marl, clay, peloids, mollusks, echinoids, very fine grained phosphate.
290 – 309	Clay, light olive gray (5Y 5/2), soft, sticky, silty, marly, very fine grained phosphate.
309 – 320	Clay (90%), , light olive gray (5Y 5/2), soft, sticky, silty, marly, very fine grained phosphate; Dolomite (10%), yellowish gray (5Y 7/2), finely crystalline to microcrystalline, moderately hard, low macroporosity.
320 – 335	Clay, dusky yellow green (5GY 5/2), stiff, silty, phosphate.
335 – 350	Clay, dusky yellow green (5GY 5/2), stiff, silty, phosphate, <5% limestone fragments.
350 – 363	Clay (60%), yellowish gray (5Y 7/2), soft, silty, phosphate; Dolomite (40%), yellowish gray (5Y 7/2), hard, finely crystalline, low to moderate macroporosity, phosphate.
363 – 366	Dolomite, yellowish gray (5Y 7/2), hard, finely crystalline, low to moderate macroporosity, phosphate.
366 – 368	Clay (40%), pale olive (10Y 6/2), soft, sticky; Marl (20%), very light gray (N8), phosphate; Limestone (20%), very light gray (N8), mudstone to wackestone, moderately hard, moderate moldic

	macroporosity, phosphate, mollusks; Dolomite, yellowish gray (5Y 7/2), hard, finely crystalline, low to moderate macroporosity, phosphate.
368 – 380	Dolomite (80%), very pale orange (10YR 8/2), hard, finely crystalline, moderate to high moldic and vuggy macroporosity; Clay (20%), light olive gray (5Y 5/2), soft.
380 – 410	Limestone (60%), yellowish gray (5Y 8/1), wackestone, moderately hard, moderate moldic and vuggy macroporosity, mollusks, forams; Clay (40%), light olive gray (5Y 5/2), soft.
410 – 416	Limestone, yellowish gray (5Y 8/1), wackestone, moderately hard, moderate moldic and vuggy macroporosity, mollusks, forams.
416 – 425	Marl, white (N9), soft, fragments of limestone, yellowish gray (5Y 8/1), wackestone, moderately hard, moderate moldic and vuggy macroporosity, mollusks, forams.
425 – 435	Marl (50%), white (N9), soft; Limestone (50%), yellowish gray (5Y 8/1), wackestone, moderately hard, moderate moldic and vuggy macroporosity, mollusks, forams.
435 – 495	Limestone, yellowish gray (5Y 7/2) to yellowish gray (5Y 8/1), wackestone, moderately hard, moderate vuggy and moldic macroporosity, sandy, phosphate, gastropods.
495 – 529	Limestone, yellowish gray (5Y 8/1), grainstone, moderately hard, moderate vuggy macroporosity, <5% marl, peloids, mollusks, very fine grained phosphate.
529 – 532	Dolomite, light olive gray (5Y6/1), hard, very finely crystalline, moderate vuggy macroporosity.
532 – 535	Dolomite (90%), light olive gray (5Y6/1), hard, very finely crystalline, moderate vuggy macroporosity; Limestone (10%), yellowish gray (5Y 7/2), wackestone, moderately hard, low macroporosity, mollusks, sand.
535 – 536	Dolomite (50%), light olive gray (5Y6/1), hard, very finely crystalline, moderate vuggy macroporosity; Clay (50%), pale olive (10Y 6/2), very silty, sandy, soft.

GEOLOGIST'S LOG OF
CITY OF CAPE CORAL WELL #225
(Well ML-5201)
(Continued)

536 – 541	Dolomite, yellowish gray (5Y 7/2), moderately hard, low vuggy macroporosity, very finely crystalline, <2% very fine grained phosphate.
541 – 542	Dolomite (80%), yellowish gray (5Y 7/2), moderately hard, low vuggy macroporosity, very finely crystalline, <2% very fine grained phosphate; Clay (20%), yellowish gray (5Y 7/2), soft.
542 – 544	Marl (75%), yellowish gray (5Y 8/1) gummy, silty; Dolomite (25%), yellowish gray (5Y 7/2), moderately hard, low vuggy macroporosity, very finely crystalline, <2% very fine grained phosphate.
544 – 556	Dolomite (50%), yellowish gray (5Y 7/2) to grayish yellow green (5GY 7/2), hard, finely crystalline to microcrystalline, moderate vuggy macroporosity; Marl (75%), yellowish gray (5Y 8/1) gummy, silty, < 5% medium grained phosphate.
556 – 582	Limestone, grayish yellow (5Y 8/4), wackestone, soft, moderate to high vuggy and moldic macroporosity, peloids, mollusks.
582 – 591	Limestone, grayish yellow (5Y 8/4), grainstone to wackestone, soft, high intergranular and vuggy macroporosity, peloids, mollusks.
591 – 610	Limestone yellowish gray (5Y 8/1), grainstone, soft, moderate intergranular macroporosity, peloids, mollusks.
610 – 618	Limestone yellowish gray (5Y 8/1), grainstone, soft, moderate intergranular macroporosity, peloids, mollusks, slightly marly.
618 – 624	Limestone yellowish gray (5Y 8/1), grainstone, soft, moderate intergranular macroporosity, peloids, mollusks.
624 – 634	Limestone, very pale orange (10 YR 8/2), wackestone, moderately hard, low macroporosity, mollusks.
634 – 645	Limestone, yellowish gray (5Y 8/1), grainstone, soft to moderately hard, moderate intergranular macroporosity, peloids.
645 – 655	Limestone (90%), yellowish gray (5Y 8/1), grainstone, soft to moderately hard, moderate intergranular macroporosity, peloids; Limestone (10%), yellowish gray (5Y 7/2), mudstone, hard, low macroporosity.

GEOLOGIST'S LOG OF
CITY OF CAPE CORAL WELL #225
(Well ML-5201)
(Continued)

655 – 668	Limestone, yellowish gray (5Y 7/2), wackestone to grainstone, moderately hard, high vuggy macroporosity, peloids, sand, gastropods.
668 – 677	Limestone, yellowish gray (5Y 7/2), wackestone to grainstone, moderately hard, high vuggy macroporosity, peloids, sand, gastropods, < 2% marl.
677 – 685	Limestone, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), wackestone, moderately hard, high vuggy macroporosity, peloids, mollusks, echinoids, < 5% marl.
685 – 695	Limestone, yellowish gray (5Y 8/1), grainstone, soft, moderate intergranular macroporosity, peloids.
695 – 715	Limestone, yellowish gray (5Y 8/1), grainstone, soft, moderate intergranular macroporosity, peloids, approximately 10% marl.

Total Depth of Well: 715 feet

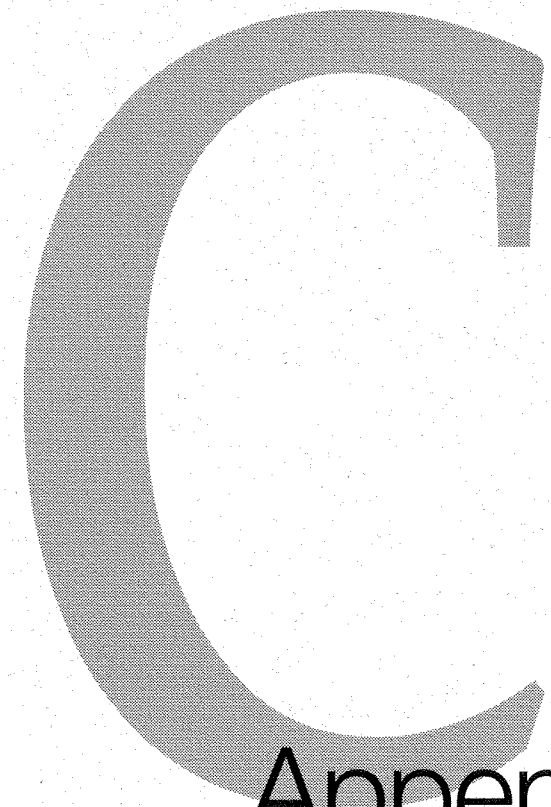
Appendix B

Appendix B
Step-Drawdown Test Data

Table B-1. Step-Drawdown Test Results for City of Cape Coral Well #225

Test Date: July 30, 2003
Recorded by: Rick Stross
Static Water Level: 2.0 feet above top of casing = 2.0 feet above land surface.

Pumping Rate (GPM)	Time (Minutes)	Drawdown (Feet)	Specific Capacity (GPM/Ft)
413	0 5 10 20 30 40 50	0.01 13.22 13.35 13.88 13.47 14.06 15.34	26.9
604	5 10 20 30 40 50 60	21.80 22.19 22.37 23.27 23.21 23.22 23.02	26.2
795	5 10 20 30 40 50 60	31.92 31.99 32.49 31.76 31.20 31.12 30.86	25.8
910	5 10 20 30 40 50 60	35.75 35.89 36.34 35.93 36.03 35.58 35.26	25.8
1258	5 10 20 30 40 50 60	49.77 50.53 51.69 52.21 51.63 52.19 52.28	24.1



Appendix C

Appendix C
Primary & Secondary Testing Results

Client Project: Cape Coral
Lab Project: N0307403
Report Date: 08/14/03

Sanders Laboratories, Inc.
Environmental Testing Services

Laboratory Results

Diversified Drilling Corp.
5620 Lee Street
Lehigh Acres, FL 33971

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time
N0307403-01	well 225 grab	Ground Water	7/31/03 13:15	7/31/03 11:15

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Air Temperature-field	170.1	30.4		0.1	C	7/31/03 11:15	NO	E84380
Aluminum	200.7	< 0.005		0.005	mg/L	8/6/03 15:22	JPW	E84380
Antimony	200.7	< 0.003		0.003	mg/L	8/6/03 15:22	JPW	E84380
Arsenic	200.7	0.002		0.001	mg/L	8/6/03 15:22	JPW	E84380
Barium	200.7	< 0.003		0.003	mg/L	8/6/03 15:22	JPW	E84380
Cadmium	200.7	< 0.001		0.001	mg/L	8/6/03 15:22	JPW	E84380
Chloride	4500Cl-B	950		200	mg/L	8/5/03 14:00	JL	E84380
Chromium	200.7	< 0.001		0.001	mg/L	8/6/03 15:22	JPW	E84380
Color	2120B	< 1		1	PtCo units	8/1/03 9:00	EW	E84380
Copper	200.7	< 0.001		0.001	mg/L	8/6/03 15:22	JPW	E84380
Iron	200.7	< 0.006		0.006	mg/L	8/6/03 15:22	JPW	E84380
Lead	200.7	< 0.001		0.001	mg/L	8/6/03 15:22	JPW	E84380
Manganese	200.7	< 0.001		0.001	mg/L	8/6/03 15:22	JPW	E84380
Mercury	245.1	< 0.001		0.001	mg/L	8/13/03 14:14	JPW	E84380
Nickel	200.7	0.002		0.002	mg/L	8/6/03 15:22	JPW	E84380
Nitrate-N	353.2	< 0.01		0.01	mg/L	8/1/03 10:48	CC	E84380
Nitrite-N	353.2	< 0.01		0.01	mg/L	8/1/03 10:21	CC	E84380
Odor	SM2150B	140		1	TON	7/31/03 17:00	EW	E84380

Client Project: Cape Coral
Lab Project: N0307403
Report Date: 08/14/03

Laboratory Results

Note: 6034 is Diversified Drilling, Inc. project number

Lab ID	Sample Description	Sample Source	Received Date/Time	Sample Date/Time
N0307403-01	well ~~6034~~ 225 grab	Ground Water	7/31/03 13:15	7/31/03 11:15

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
pH-field	150.1	7.61		0.01	pH units	7/31/03 11:15	NO	E84380
See attached results	Subcontract				NONE	8/4/03 0:00	SUB	
Selenium	200.7	< 0.001		0.001	mg/L	8/6/03 15:22	JPW	E84380
Silver	200.7	< 0.001		0.001	mg/L	8/6/03 15:22	JPW	E84380
Sodium	200.7	480		0.200	mg/L	8/6/03 15:22	JPW	E84380
Specific Conductance-field	120.1	3460		0.1	umhos/cm	7/31/03 11:15	NO	E84380
Sulfate	375.4	197		10	mg/L	8/6/03 14:30	EW	E84380
Thallium	200.7	0.006		0.002	mg/L	8/6/03 15:22	JPW	E84380
Total Coliform, MF	9222B	Present		1	col/100ml	7/31/03 13:45	JL	E84380
Total Dissolved Solids	160.1	2020		10	mg/L	8/4/03 15:30	EW	E84380
Water Temperature-field	170.1	29.2		0.1	C	7/31/03 11:15	NO	E84380
Weather-field	DEPSOP	p. cloudy		n/a	none	7/31/03 11:15	NO	E84380
Zinc	200.7	0.006		0.002	mg/L	8/6/03 15:22	JPW	E84380

Approved by:

Comments:

Andrew Konopacki/Lab Supervisor
Laura Sullivan/QA Officer
Kathrine Bartkiewicz/Lab Supervisor

Test Results meet all the requirements of the NELAC

EMSL Analytical, Inc.

08/11/03

19595 NE 10th Ave., Bay C
North Miami Beach, FL 99179
Phone (305) 650-0577 FAX (305)650-0578

Sanders Laboratories
1050 Endeaver Ct.
Nokomis, FL 34275-3623

Project ID: N0307403
Attn: Tami Bright
Reference Number: 170301110
Date/Time of Filtration August 01,2003@ 10:00AM

Asbestos Analysis in Water by Transmission Electron Microscopy (TEM) Performed by Method EPA/600/R-94 - (100.2) "Determination of Asbestos Structures Over 10um in Length in Drinking Water"; by Brackett, Clark & Millette

Sample Id	# Asbestos Structures	Type(s) of Asbestos	Concentration of Asbestos Structures (Millions/Liter)	Detection Limit (Millions/Liter)	95% Confidence Limits (Upper-Lower) (Millions/Liter)
N0307403-01E	None Detected	None Detected	BDL	0.20	0.72

Analyst

Approved Signatory

Date Analyzed: 8/11/03

ACCREDITATIONS: HRS # E86795 BDL = Below Detection Limit

Comment: Results meet all requirements of NELAC standards.
Any Questions please contact Kim Wallace at EMSL Miami.

Florida Radiochemistry Services, Inc.

Sample Login

Client:	**Sanders Laboratories**	**Date / Time Received**	**Work order #**
		08/01/03 09:25	**0308006**
Client Contact:	**Tami Bright**		
Client P.O.			
Project I.D.	**N0307403**		

Lab Sample I.D.	Client Sample I.D.	Sample Date/Time	Analysis Requested
0308006-01	N0307403-01	07/31/03 11:150	Ga, Ra226, Ra228

Analysis Results

Gross Alpha	**14.3 ****		
Error +/-	**5.2**		
MDL	**7.4**		
EPA Method	**900.0**		
Prep Date	**08/11/03**		
Analysis Date	**08/12/03**		
Analyst	**MJN**		
Radium 226	**4.3**	**Radium 228**	**<0.9**
Error +/-	**0.3**	**Error +/-**	**0.6**
MDL	**0.1**	**MDL**	**0.9**
EPA Method	**903.1**	**EPA Method**	**Ra-05**
Prep Date	**08/18/03**	**Prep Date**	**08/18/03**
Analysis Date	**08/25/03**	**Analysis Date**	**08/25/03**
Analyst	**MJN**	**Analyst**	**KLN**
Units	**pCi/l**	**Units**	**pCi/l**

** See Case Narrative

Florida Radiochemistry Services, Inc.

QA Page

Analyte	Sample #	Date Analyzed	Sample Result	Amount Spiked	Spike Result	Spike /Dup Result	Spike % Rec.	Spike Dup % Rpd
Gross Alpha	0307334-01	08/12/03	<0.8	10.2	8.9	9.5	87	6.5
Radium 226	0308015-01	08/25/03	9.8	23.5	30.0	32.4	86	7.7
Radium 228	0308015-01	08/25/03	5.7	7.0	11.5	10.7	83	7.2

	Quality Control Limits	
	% RPD	% Rec.
Gross Alpha	15.8	65-125
Radium 226	18.3	70-118
Radium 228	19.1	77-115

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Sanders Laboratories
N0307403

August 15, 2003
Project No: 36892

Sample ID: N0307403-01E

Trihalomethane Analysis
62-550.310(3)
(PWS027)

Parameter ID and Name		MCL	Sample Number	Analysis Result	Units	Analytical Method	Analysis Date	Detection Limit	Lab ID
2941	Chloroform		36892.01	0.42	ug/l	EPA 502.2	08/03/03	0.2	E84129
2942	Bromoform		36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2943	Bromodichloromethane		36892.01	0.3 U	ug/l	EPA 502.2	08/03/03	0.3	E84129
2944	Dibromochloromethane		36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2950	Total Trihalomethanes	0.08	36892.01	0.00042	mg/l	EPA 502.2	08/03/03	0.0002	E84129

Footnotes:

U Analyte was not detected; indicated concentration is method detection limit.

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Sanders Laboratories
N0307403

August 15, 2003
Project No: 36892

Sample ID: N0307403-01E

Volatile Organic Analysis
62-550.310(4)a
(PWS028)

Parameter ID and Name		MCL	Sample Number	Analysis Result	Units	Analytical Method	Analysis Date	Detection Limit	Lab ID
2378	1,2,4 Trichlorobenzene	70	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2380	cis-1,2-Dichloroethene	70	36892.01	0.2 U	ug/l	EPA 502.2	08/03/03	0.2	E84129
2955	o-xylene		36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2955	m/p-xylenes		36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2955	Xylenes (Total)	10000	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2964	Methylene Chloride	5	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2968	o-Dichlorobenzene	600	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2969	p-Dichlorobenzene	75	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2976	Vinyl chloride	1	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2977	1,1-Dichloroethene	7	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2979	trans-1,2-Dichloroethene	100	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2980	1,2-Dichloroethane	3	36892.01	0.2 U	ug/l	EPA 502.2	08/03/03	0.2	E84129
2981	1,1,1-Trichloroethane	200	36892.01	0.3 U	ug/l	EPA 502.2	08/03/03	0.3	E84129
2982	Carbon tetrachloride	3	36892.01	0.3 U	ug/l	EPA 502.2	08/03/03	0.3	E84129
2983	1,2-Dichloropropane	5	36892.01	0.3 U	ug/l	EPA 502.2	08/03/03	0.3	E84129
2984	Trichloroethene	3	36892.01	0.2 U	ug/l	EPA 502.2	08/03/03	0.2	E84129
2985	1,1,2-Trichloroethane	5	36892.01	0.3 U	ug/l	EPA 502.2	08/03/03	0.3	E84129
2987	Tetrachloroethene	3	36892.01	0.2 U	ug/l	EPA 502.2	08/03/03	0.2	E84129
2989	Chlorobenzene	100	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2990	Benzene	1	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2991	Toluene	1000	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2992	Ethylbenzene	700	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129
2996	Styrene	100	36892.01	0.5 U	ug/l	EPA 502.2	08/03/03	0.5	E84129

Footnotes:

U Analyte was not detected; indicated concentration is method detection limit.

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Sanders Laboratories
N0307403

August 15, 2003
Project No: 36892

Sample ID: N0307403-01E

Pesticide/PCB Analysis
62-550.310(4)b
(PWS029)

Parameter ID and Name		MCL	Sample Number	Analysis Result	Units	Analytical Method	Analysis Date	Detection Limit	Lab ID
2005	Endrin	2	36892.01	0.1 U	ug/l	EPA 525.2	08/08/03	0.1	E84129
2010	gamma-BHC (Lindane)	0.2	36892.01	0.06 U	ug/l	EPA 525.2	08/08/03	0.06	E84129
2015	Methoxychlor	40	36892.01	0.05 U	ug/l	EPA 525.2	08/08/03	0.05	E84129
2020	Toxaphene	3	36892.01	0.5 U	ug/l	EPA 508.1	08/08/03	0.5	E84129
2031	Dalapon	200	36892.01	1 U	ug/l	EPA 515.3	08/07/03	1	E84129
2032	Diquat	20	36892.01	1 U	ug/l	EPA 549.2	08/11/03	1	E84129
2033	Endothall	100	36892.01	20 U	ug/l	EPA 548.1	08/12/03	20	E84129
2034	Glyphosate	700	36892.01	10 U	ug/l	EPA 547	08/13/03	10	E84129
2035	Di(2-ethylhexyl)adipate	400	36892.01	0.3 U	ug/l	EPA 525.2	08/08/03	0.3	E84129
2036	Oxamyl (Vydate)	200	36892.01	0.5 U	ug/l	EPA 531.1	08/09/03	0.5	E84129
2037	Simazine	4	36892.01	0.07 U	ug/l	EPA 525.2	08/08/03	0.07	E84129
2039	Di(2-ethylhexyl)phthalate	6	36892.01	1.0 U	ug/l	EPA 525.2	08/08/03	1.0	E84129
2040	Picloram	500	36892.01	0.75 U	ug/l	EPA 515.3	08/07/03	0.75	E84129
2041	Dinoseb	7	36892.01	0.5 U	ug/l	EPA 515.3	08/07/03	0.5	E84129
2042	Hexachlorocyclopentadiene	50	36892.01	0.2 U	ug/l	EPA 525.2	08/08/03	0.2	E84129
2046	Carbofuran	40	36892.01	0.5 U	ug/l	EPA 531.1	08/09/03	0.5	E84129
2050	Atrazine	3	36892.01	0.06 U	ug/l	EPA 525.2	08/08/03	0.06	E84129
2051	Alachlor	2	36892.01	0.2 U	ug/l	EPA 525.2	08/08/03	0.2	E84129
2065	Heptachlor	0.4	36892.01	0.08 U	ug/l	EPA 525.2	08/08/03	0.08	E84129
2067	Heptachlor Epoxide	0.2	36892.01	0.1 U	ug/l	EPA 525.2	08/08/03	0.1	E84129
2105	2,4-D	70	36892.01	1 U	ug/l	EPA 515.3	08/07/03	1	E84129
2110	2,4,5-TP (Silvex)	50	36892.01	0.25 U	ug/l	EPA 515.3	08/07/03	0.25	E84129
2274	Hexachlorobenzene	1	36892.01	0.05 U	ug/l	EPA 525.2	08/08/03	0.05	E84129
2306	Benzo(a)pyrene	0.2	36892.01	0.1 U	ug/l	EPA 525.2	08/08/03	0.1	E84129
2326	Pentachlorophenol	1	36892.01	0.1 U	ug/l	EPA 515.3	08/07/03	0.1	E84129
2383	PCBs	0.5	36892.01	0.2 U	ug/l	EPA 508.1	08/08/03	0.2	E84129
2931	Dibromochloropropane	0.2	36892.01	0.005 U	ug/l	EPA 504.1	08/08/03	0.005	E84129
2946	Ethylene dibromide	0.02	36892.01	0.005 U	ug/l	EPA 504.1	08/08/03	0.005	E84129
2959	Chlordane	2	36892.01	0.05 U	ug/l	EPA 508.1	08/08/03	0.05	E84129
504.1	Date Extracted		36892.01	08/04/03		EPA 504.1			E84129
508.1	Date Extracted		36892.01	08/07/03		EPA 508.1			E84129
515.3	Date Extracted		36892.01	08/05/03		EPA 515.3			E84129
525.2	Date Extracted		36892.01	08/07/03		EPA 525.2			E84129
548.1	Date Extracted		36892.01	08/05/03		EPA 548.1			E84129
549.2	Date Extracted		36892.01	08/06/03		EPA 549.2			E84129

Footnotes:

U Analyte was not detected; indicated concentration is method detection limit.

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Sanders Laboratories
N0307403

August 15, 2003
Project No: 36892

Sample ID: N0307403-01E

Inorganic Analysis
62-550.310(1)
(PWS030)

Parameter ID and Name		MCL	Sample Number	Analysis Result	Units	Analytical Method	Analysis Date	Detection Limit	Lab ID
1024	Cyanide	0.2	36892.01	0.005 U	mg/l	SM 4500 CN E	08/05/03	0.005	E84129
1025	Fluoride	4	36892.01	1.5	mg/l	EPA 300.0	08/02/03	0.003	E84129
1075	Beryllium	0.004	36892.01	0.002 U	mg/l	EPA 200.7	08/13/03	0.002	E84129

Footnotes:

U Analyte was not detected; indicated concentration is method detection limit.

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Sanders Laboratories
N0307403

August 15, 2003
Project No: 36892

Sample ID: N0307403-01E

Secondary Analysis
62-550.320
(PWS031)

Parameter ID and Name		MCL	Sample Number	Analysis Result	Units	Analytical Method	Analysis Date	Detection Limit	Lab ID
2905	Foaming Agents (LAS, mol wt 342)	0.5	36892.01	0.05 U	mg/l	SM 5540 C	08/01/03	0.05	E84129

Footnotes:

U Analyte was not detected; indicated concentration is method detection limit.

Lab Project Summary

Lab Project Num: N0307403

Total Pages: 60

Client: Diversified Well Drilling
17174 Jean St

Fort Myers FL 33912

Phone: 941-267-1020
Fax: 941-267-0440
E-mail:
Client Project Name: Cape Coral
Laboratory Contact: Andy Konopacki

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* A statement of estimated uncertainty of results is available upon re
* Laboratory report shall not be reproduced except in full, without the written approval of Sanders Lab
* Sanders Laboratories follows DEP standard operating procedures for field sampling.

Appendix D

Appendix D
Pump & Wellhead Equipment
(see attached O&M Manual)