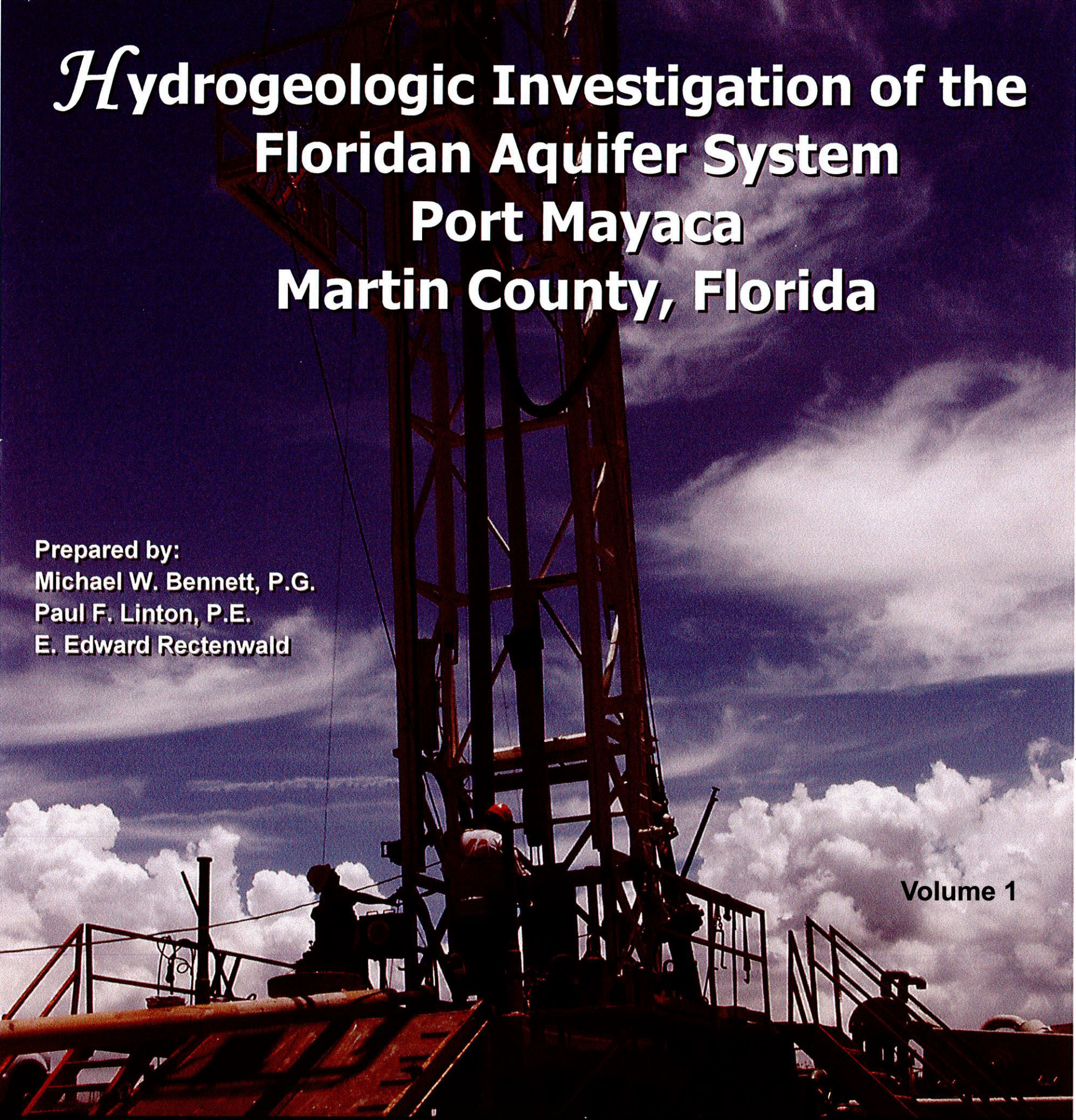
Hydrogeologic Investigation of the Floridan Aquifer System Port Mayaca Martin County, Florida



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Michael W. Bennett, P.G.
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E. Edward Rectenwald

Volume 1

Hydrogeologic Investigation of the Floridan Aquifer System Port Mayaca Martin County, Florida

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South Florida Water Management District
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SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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July 30, 2004

Mr. Joseph R. May, P.G.
UIC Program Manager
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Mr. May:

Subject: Completion Report for the Exploratory Well EXPM-1, South Florida Water Management District – Port Mayaca Site.
FDEP UIC Permit Number 0196441-001-UC

It is with great satisfaction that we submit the Well Completion Report, which covers the construction and testing of an exploratory well identified as EXPM-1 at the Port Mayaca Site.

The Well Completion Report titled "Investigation of the Floridan Aquifer System at the Port Mayaca Site Martin County, Florida" includes the data collected during the construction and testing of an exploratory well at the above reference location. This well was constructed in accordance with the specific conditions of the Construction and Testing Permit Number 0196441-001-UC, issued by the Florida Department of Environmental Protection on February 3, 2003. A copy of the Construction Permit and their provisions are included in Appendix A of the report.

Sincerely,

Michael W. Bennett, P.G.

Michael W. Bennett, P.G.
Project Manager

MWB/nk

Completion Report for the Exploratory Well EXPM-1
South Florida Water Management District
Lake Okeechobee ASR Pilot Project
Port Mayaca Site.
FDEP UIC Permit Number 0196441-001-UC

Contained herein is the Well Completion Report titled "Hydrogeologic Investigation of the Floridan Aquifer System, Port Mayaca Martin County, Florida" which includes the data collected during the construction and testing of an exploratory well identified as EXPM-1 at the above reference site. This well was constructed in accordance with the specific conditions of the Construction and Testing Permit Number 0196441-001-UC, issued by the Florida Department of Environmental Protection on February 2, 2003. A copy of the Construction Permit and their provisions are included in Appendix A of the report.

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Executive Summary

The purpose of this project is to provide site-specific hydrogeologic information to address storage zone selection, well capacity, confinement, and hydraulic character of the Floridan Aquifer System (FAS) at the Port Mayaca site in Martin County, Florida. Data collected from the testing and monitoring of the constructed exploratory well will be instrumental in the appropriate design of the pumping and treatment facilities necessary to operate in the future as part of a functional ASR system.

This report primarily describes the drilling, construction, and testing of the 24-inch diameter Class V exploratory well identified as EXPM-1 at the Western Hillsboro Site. It summarizes and presents data obtained during drilling and testing operations and analyses conducted. Well EXPM-1 is the designation assigned by the Florida Department of Environmental Protection (FDEP) under Permit Number 0196441-001-UC. The exploratory well (EXPM-1) was constructed on SFWMD-owned land near the confluence of the L-65 Canal and St. Lucie River in the northwest quarter of Section 14 of Township 40 South, Range 37 East.

The scope of the investigation consisted of constructing and testing FDEP permitted exploratory well. The exploratory well (EXPM-1) was drilled to a total depth of 1,380 feet below land surface (bls). It was completed into a single distinct hydrogeologic zone within the upper Floridan aquifer between 800 and 1,040 feet bls.

The main findings of the exploratory drilling and testing program at this site are as follows:

- Lithologic information obtained from drill cuttings from EXPM-1 indicates that the Hawthorn Group sediments consist predominately of soft non-indurated detritial clays, silts and poorly to moderately indurated mudstones/wackestone with minor amounts of sand and shell material predominate from 146 to 755 feet bls. These low permeable sediments act as confining units separating the Floridan Aquifer System (FAS) from the Surficial Aquifer System (SAS).

- The top of the FAS was identified at a depth of approximately 755 feet bls, as defined by the Southeastern Geological Society AdHoc Committee on Florida Hydrostratigraphic Unit Definition (1986).

- Lithologic and geophysical logs, packer test results, and specific capacity results indicate moderate to good production capacity of the upper Floridan aquifer from 800 to 1,040 feet bls with a measured value of 52 gpm/ft/dd at the design injection/withdrawal rate of 5 mgd.

- A productive horizon in the upper Floridan aquifer from 800 to 1,040 feet bls yielded a transmissivity value of 95,000 gallons/day/foot based on a confined aquifer model.

- Composite water quality sampling of EXPM-1 (Specific Capacity Test #3) indicate that chloride and total dissolved solids (TDS) values exceed potable drinking water standards with chloride and TDS concentrations of 726 and 1,826 mg/L, respectively.

- The fluid-type logs (e.g., flow and temperature logs) indicate good production from flow zones between 800 and 900 feet bls and 925 to 1,030 feet bls. Below 1,030 feet bls, the productive capacity is limited (as indicated by the fluid-type logs) suggesting lower permeable–semi-confining units near the base of the proposed storage horizon.

Acknowledgements

The authors gratefully acknowledge the many people that aided in the successful completion of this project. We would like to thank the technical and professional staff of the South Florida Water Management District who reviewed the manuscript or lent technical expertise to the writing of the report. They include Mr. John Lukasiewicz, Mr. Peter Kwiatkowski, Mr. Richard Nevulis, and Mr. Robert Verrastro.

Introduction

Background

The Comprehensive Everglades Restoration Plan (CERP) – jointly being conducted by the U.S. Army Corps of Engineers (USACE) and South Florida Water Management District (SFWMD) – is focused on storing available water currently lost to tide. The Aquifer Storage and Recovery (ASR) technology has been identified as a major storage option, particularly in the vicinity of Lake Okeechobee, where available water has been identified. The Lake Okeechobee ASR Pilot Project was designed to address some of the technical and regulatory uncertainties of storing treated surface water via ASR systems. Hydrogeologic testing of large diameter exploratory wells was identified as one of the first tasks in evaluating ASR potential proximal to Lake Okeechobee.

The purpose of this project is to provide site-specific hydrogeologic information to address storage zone selection, well capacity, confinement, and hydraulic character of the Floridan Aquifer System (FAS) at the Port Mayaca site in Martin County, Florida. Data collected from the testing and monitoring of the constructed exploratory well will be instrumental in the appropriate design of the pumping and treatment facilities necessary to operate in the future as part of a functional ASR system.

Scope

On February 3, 2003, the Florida Department of Environment Protection (FDEP) issued Permit Number 0196441-001-UC to the SFWMD. This permit allowed for the construction of one Class V, Group 9, 24-inch outside diameter exploratory well at the Port Mayaca Site. A copy of the permit is provided in **Appendix A**.

This report primarily describes the drilling, construction, and testing of a 24-inch diameter exploratory well identified as EXPM-1 at the Port Mayaca site. Also the report summarizes and presents data obtained during drilling and testing operations and analyses conducted.

Project Description

The Port Mayaca site is approximate 30 miles west of the Atlantic Ocean and approximately 1 mile east of the eastern boundary of Lake Okeechobee in unincorporated Martin County near the town of Port Mayaca, Florida. The exploratory well (EXPM-1) was constructed on SFWMD-owned land near the confluence of the L-65 Canal and St. Lucie River in the northwest quarter of Section 14 of Township 40 South, Range 37 East (**Figure 1**). The geographic coordinates of the exploratory well are latitude 26° 59'17" N and longitude 80° 36' 20" W (North American Datum of 1983 – NAD, 83). Land surface (well pad elevation) was determined by a closed-loop survey at +22.20 feet relative to the National Geodetic Vertical Datum of 1929 (NGVD, 29).

SFWMD issued a notice to proceed to Diversified Drilling Corp (DDC) on May 2, 2003 to drill and construct the first of two 24-inch diameter exploratory wells at separate locations proximal to Lake Okeechobee. On May 15 2003, construction began on the first exploratory well identified as EXPM-1. Drilling, testing and construction activities related to EXPM-1 continued for approximately six months and were completed on November 20, 2003.

Exploratory Drilling and Well Construction

DDC began site preparation during early May 2003. After minor clearing and rough grading of the site, the ground surface beneath the compacted lime-rock drilling pad was lined with a buried impermeable high-density polyethylene (HDPE) liner (e.g., 30-mil geomembrane). A two-foot thick temporary drilling pad was then constructed using crushed limestone. An earthen berm, two-feet in height above pad level surrounded the perimeter of the rig and settling tanks. This earthen berm was constructed to contain drilling fluids and/or formation waters produced during well drilling, testing, and well construction activities **(Figure 2)**.

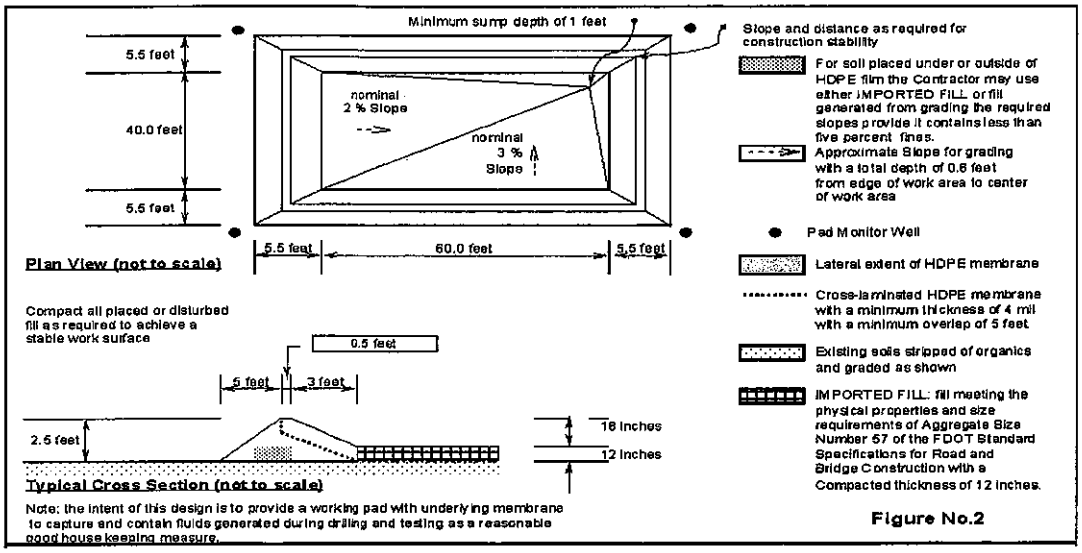

Figure 2. Well Pad Schematic.

DDC installed four pad monitor wells at the corners of the temporary drilling pad prior to the start of drilling operations. SFWMD's onsite field representatives monitored the water quality of these wells on a weekly basis to ensure no releases of brackish water occurred at surface during construction.

Formation samples (well cuttings) and borehole geophysical log data were used to determine the actual casing setting depths. The pilot-hole was reamed to specified diameters and casing installed. Three concentric steel casings (42-, 34-, and 24-inch-diameter) were used in the construction of EXPM-1. **Figure 3** summarizes the construction details of EXPM-1

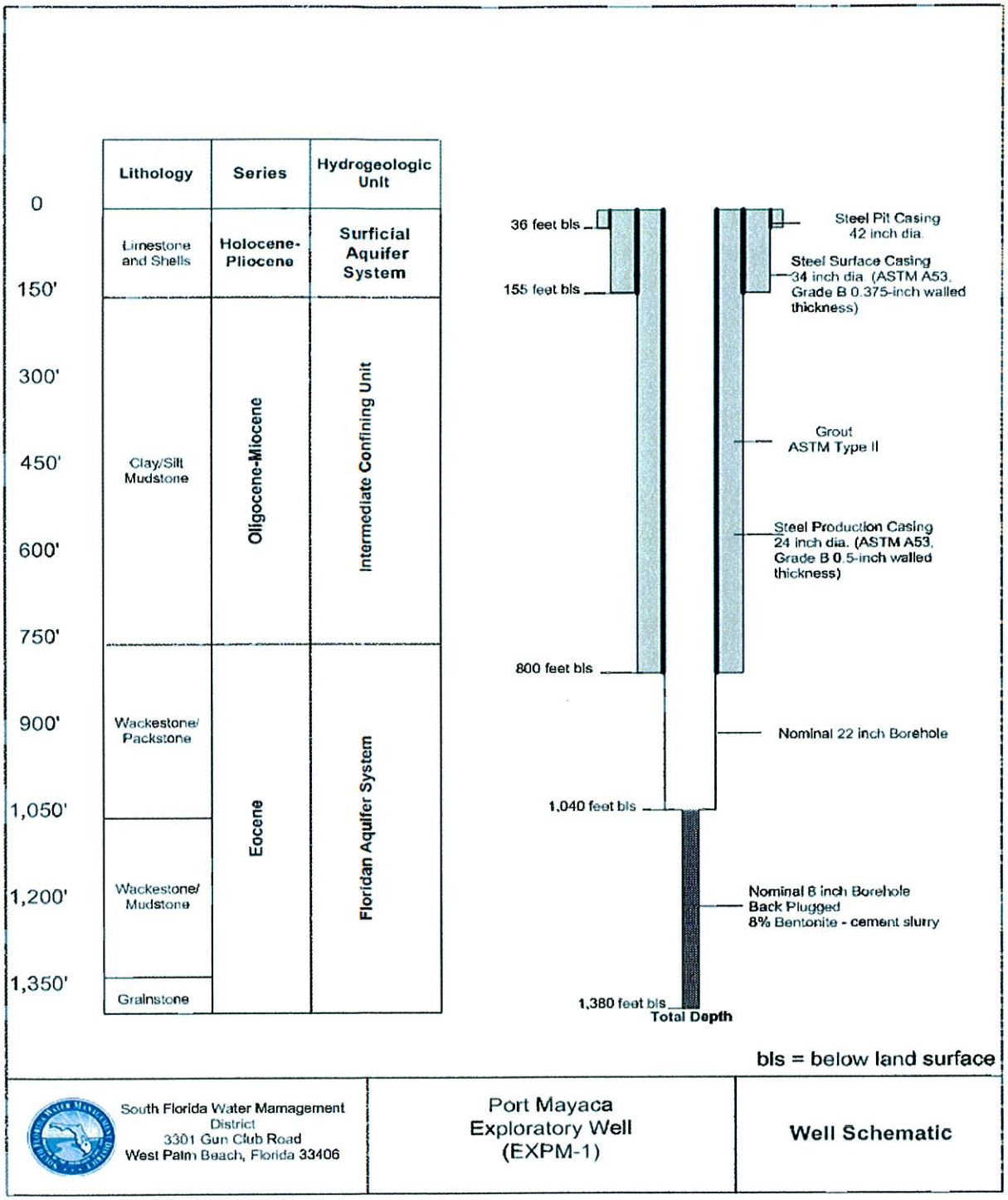

Figure 3. Well Schematic – EXPM-1.

DDC initiated drilling activities for EXPM-1 on May 13, 2003. Drilling operations began by advancing a 48-inch diameter borehole to a depth of 40 feet below land surface (bls) via the mud rotary method. That same day, DDC installed the nominal 42-inch diameter, steel pit casing (ASTM A53, Grade B, and 0.375-inch wall thickness) in the nominal 48-inch diameter borehole to a depth of 36 feet bls. The annulus was pressure grouted to land surface using 130 cubic feet

(ft^3) of ASTM Type II, Portland cement (15.6 lbs/gal). A factory mill certificate for the 42-inch diameter steel pit casing is provided in **Appendix B.**

After installing the 42-inch diameter pit casing, DDC drilled-out the cement plug at the base of the pit casing to full gauge, then reconfigured their drilling assembly and began drilling a nominal 12-inch diameter pilot-hole via mud rotary method. On May 27, 2003, DDC advanced the pilot-hole through the Pleistocene-Pliocene aged sediments and into the Miocene-aged, Hawthorn Group to a depth of 230 feet bls. On May 28, 2003, MV Geophysical Surveys, Inc. of Ft. Myers, Florida, geophysically logged the pilot-hole from land surface to 223 feet bls without incident. The logging suite consisted of the following logs: 4-arm caliper, natural gamma ray, spontaneous potential (SP), borehole compensated sonic (BHC) and dual induction/laterolog(3) combination. Field copies from Geophysical Log Run No. 1 are presented in **Appendix C-1.**

Using well cuttings and geophysical log data, the base of the Surficial Aquifer System (SAS) was identified at approximately 146 feet bls, where a greenish-gray phosphatic, silty clay unit was encountered. In addition, the natural gamma log noted an increase in natural gamma ray emissions, which corresponded to the lower permeable silty, phosphatic clays found at similar depth. On June 10, 2003, DDC reamed the nominal 12-inch diameter pilot-hole to 158 feet bls using a nominal 40-inch diameter staged bit reamer. The nominal 40-inch borehole was geophysically logged (caliper and natural gamma ray) to verify depths and to calculate cement volumes for subsequent cement grouting operations. The caliper log showed no unusual borehole conditions that would prohibit proper installation of the 34-inch diameter surface casing (see Geophysical Log Run No. 2 in **Appendix C-2).** DDC then installed the 34-inch diameter, steel casing (ASTM A53, Grade B, and 0.375-inch wall thickness) in the nominal 40-inch diameter borehole to a depth of 155 feet bls. Once installed, the 34-inch diameter steel pipe was pressure grouted using 646 ft^3 of ASTM Type II cement. An additional 85 ft^3 of ASTM Type II cement was installed via the tremie method to bring cement levels in the annulus to surface, completing surface casing installation on June 11, 2003.

The purpose of the surface casing is to isolate the SAS from brackish water contamination and to provide drill rig stability during continued drilling operations. A factory mill certificate for the 34-inch diameter surface casing is provided in **Appendix B**.

With the surface casing installed, DDC advanced a nominal 10-inch diameter pilot-hole via the closed circulation mud rotary method. On June 25, 2003, DDC completed pilot-hole drilling operations through the unconsolidated to semi-consolidated sediments of the Miocene-aged Hawthorn Group. Drilling operations continued into the upper Eocene-aged carbonates of the upper Floridan aquifer to a depth of 875 feet bls. During drilling operations, two 4-inch diameter conventional cores were collected from the Hawthorn Group from the following depth intervals: 617 to 637 feet bls, and 637 to 648 feet bls. During coring operations, minimal lengths of core were retrieved to surface with a core recovery efficiency of thirty-four percent (see ***"Hydrogeologic Testing"*** section for further details)

On July 21, 2003, MV Geophysical Surveys, Inc. conducted and completed geophysical logging operations within the nominal 10-inch diameter pilot-hole from 155 to 875 feet bls without incident. The geophysical logging suite included the following logs: 4-arm caliper, SP, natural

gamma ray, dual induction with shallow laterlog-3, and borehole compensated sonic. Field copies from Geophysical Run No. 3 are provided in **Appendix C-3.**

Review of the geophysical logs (**Appendix C-3**) and lithologic data (provided in **Appendix E**) from the subject borehole indicates that the top of the FAS occurs at a depth of 755 feet bls. However, the final 24-inch steel production casing was set at a depth of 800 feet bls for reasons listed below:

1. Seal off overlying clays of the Hawthorn Group and carbonate mud stringers and fine quartz and phosphatic sands within the lower portion of the Arcadia Formation.
2. Facilitate reverse-air-drilling operations through the underlying permeable horizons of the FAS to the anticipated depth of 1,400 feet bls.
3. Locate the casing in a competent, well-indurated rock unit to reduce undermining (erosion) at its base as a result of natural and induced high velocity upward flow.
4. Evaluate flow characteristics of the FAS within the anticipated open-hole interval of 800 to 1,400 feet bls.
5. Avoid non-productive, phosphate-bearing silt/sand from approximately 700 feet to 765 feet bls – as evidenced by the drill cuttings and peaks on the natural gamma ray log trace, which may pose impacts to FAS water quality and further drilling operations.
6. Lack of evidence of permeable zones from 755 to 800 feet bls based on the invasion profile evidenced by the dual induction log and lower log-derived sonic porosity values.

Therefore, on June 30, 2003, the nominal 10-inch diameter pilot-hole was temporarily back-filled with 3/8-inch diameter crushed limestone gravel to approximately 790 feet bls. These measures prohibited the low permeability, clay-rich sediments of the Hawthorn Group from entering the previously drilled pilot-hole during reaming operations, reducing the potential for formation damage to the permeable carbonates. DDC began to ream the nominal 10-inch diameter pilot-hole using a nominal 33-inch diameter staged bit reamer. On July 21, 2003, DDC circulated and geophysically logged (caliper and natural gamma ray) the nominal 33-inch diameter borehole to its total depth without incident. The caliper log trace showed no unusual borehole conditions that would prohibit proper installation of the 24-inch outside diameter casing to 800 feet bls (Geophysical Log Run No. 4 provided in **Appendix C-4**). The 24-inch outside diameter casing was installed (ASTM A53, Grade B, and 0.500-inch wall thickness) to a depth of 800 feet bls. The factory mill certificate and the casing installation log for the 24-inch diameter steel casing are provided in **Appendix B.** Once the casing was installed to a depth of 800 feet bls, it was rotated and reciprocated to discern if it was free within the borehole for subsequent cement grouting. DDC then circulated approximately 10,000 gallons of water through the annular space to displace heavy drilling mud that was previously required for borehole stabilization. This post-conditioning water flush reduces the potential mixing of grout and drilling mud (of similar densities) during grouting operations, reducing the risk of mud channels (annular voids) within the cement sheath.

After the post-conditioning water flush, pressure-grouting operations began by installing tremie pipe (2.875-inch diameter) to 767 feet bls. A volume of 1,200 ft^3 (1,000 bags @ 94 lbs/bag) of ASTM C-150 Type II neat cement was then pumped during pressure grouting operations. A temperature/gamma survey was conducted eight hours after cementing operations ceased. This

survey was used to identify the top of the cement within the annulus as a result of pressure-grouting. A significant shift in the temperature gradient log and corresponding deflection in the temperature differential log occurred at 340 feet bls (see Geophysical Log Run No. 5 in **Appendix C-5** for the temperature-gamma log), which suggests that the top of the first stage is located at that depth. Steel tubing was then used to physically locate (hard tag) the cement level within the annulus. The physical tag indicated the cement level at 342 feet bls, which was in close agreement to that suggested by the temperature log. An additional 756 ft^3 of ASTM Type II neat cement was pumped on July 22 and 23, 2003 by the tremie method, filling the annular space and causing cement returns at land surface. Actual cement volumes pumped during casing installation were in close agreement to theoretical volumes (approximately 95 % of theoretical) based on a nominal 33-inch diameter borehole and 24-inch diameter steel casing. A cement bond log (CBL) was conducted to evaluate the bond quality between the annular cement, the 24-inch diameter production casing and rock formations. The recorded amplitude curve infers that the 24-inch diameter casing is supported (cemented – good cement bond to casing and rock formations) with no discernable voids within the annular space (see Geophysical Log Run No. 6 in **Appendix C-6** for the CBL).

Once grouting operations were completed, a temporary well header was installed on the 24-inch diameter steel casing in preparation of mechanical integrity (pressure) testing operations. Next, the well was filled with water and pressurized to approximately 100 pound per square inch (psi) using a high-pressure water pump. Several preliminary 1-hour pressure tests were conducted from July 28 to August 5, 2003. During these tests, internal casing pressure decreased by 8 to 20 psi - an 8 to 20% reduction, which exceeded the specified test tolerance limit of +/- 5%. DDC then made appropriate adjustments to the well head configuration isolating surface leaks and circulated-out heavier completion fluids to dissipate residual heat from cementing operations.

Once properly sealed and with the residual heat dissipated, SFWMD notified FDEP of the official pressure test date for the 24-inch diameter steel casing. The formal pressure test was conducted and successfully completed on August 6 2003, witness by a FDEP representative. During the course of the 60-minute pressure test, total pressure within the 24-inch diameter casing decreased 0.2 psi, representing a 0.2 % decline – well within the test tolerance limit of +/- 5% **(Table 1.)**

Table 1.

Official Pressure Test on 24-inch Steel Casing
EXPM-1 UIC Permit # 0196441-001UC

Date	Time Hour	Elasped Time (min)	Pressure Reading psi	Delta Pressure psi	Remarks	Recorded By
08/06/03	8:36	0	100.3	0.0	Start of Pressure Test	RS
08/06/03	8:41	5	100.1	0.2		RS
08/06/03	8:46	10	100.1	0.0		RS
08/06/03	8:51	15	100.1	0.0		RS
08/06/03	8:56	20	100.1	0.0		RS
08/06/03	9:01	25	100.1	0.0		RS
08/06/03	9:06	30	100.1	0.0		RS
08/06/03	9:11	35	100.1	0.0		RS
08/06/03	9:16	40	100.1	0.0		RS
08/06/03	9:21	45	100.1	0.0		RS
08/06/03	9:26	50	100.1	0.0		RS
08/06/03	9:31	55	100.1	0.0		RS
08/06/03	9:36	60	100.1	0.0	End of Pressure Test Total Pressure Change 0.2psi	RS

Witnessed by Paul Linton, SFWMD (Engineer of Record)
Mark Silverman, FDEP

Recorded By: Roger Simon, BFA/CH2MHill

DDC reconfigured the drilling equipment and site to accommodate open-circulation, reverse-air drilling operations. In addition, SFWMD personnel installed water quality probes into the St. Lucie (C-44) Canal equipped with sondes used to measure and record temperature, pH, specific conductance, dissolved oxygen, and turbidity levels. These probes were deployed 100 meters upstream from the point of discharge (POD), 100 meters downstream from the POD, and 800 meters downstream from the POD. During reverse-air drilling operations, formation water was diverted through a series of 7,500-gallon settling tanks and filtration system then discharged into the C-44 Canal via a 12-inch diameter PVC pipe. A SFWMD representative collected water quality data (3 times daily) from the water quality sondes in the C-44 Canal during formation water discharges in compliance with FDEP-issued National Pollutant Discharge Elimination System (NPDES) permit monitoring requirements.

On August 13, 2003, DDC drilled out the cement-plug (a result of pressure grouting) at the base of the final casing string with a nominal 22-inch diameter bit. DDC tripped back in with a nominal 10-inch bit and began to drill out the temporary backfill material (3/8-inch diameter crushed limestone) from the original pilot-hole via reverse-air rotary technique to 875 feet bls. The nominal 10-inch pilot-hole was then completed to a total depth of 1,380 feet bls on September 1, 2003. During drilling operations, several 4-inch diameter conventional cores were collected from Eocene-aged carbonates of the upper part of the FAS. Conventional cores were obtained from the following depth intervals: 900 to 920 feet bls, 920 to 940 feet bls, 1,050 to 1,070 feet bls, and 1,340 to 1,348 feet bls. During coring operations, rock cores were retrieved

to surface with a core recovery efficiency of fifty percent. Once the pilot-hole was completed it was developed via the reverse-air method and prepared for geophysical logging operations.

On September 2, 2003, Schlumberger Wireline Services (SWS) provided conventional and specialty geophysical logging services at EXPM-1. During the next four days, SWS conducted and completed geophysical logging operations within the nominal 10-inch diameter pilot-hole from 800 to 1,380 feet bls without incident. The geophysical logging suite included the following logs:

- caliper (cal),
- Spontaneous Potential (SP),
- natural gamma ray spectrometry (NGS),
- elemental capture spectroscopy (ECS),
- high resolution array induction (AITH),
- dual induction log (DIL),
- dipole sonic imager (DSI),
- long-spaced sonic (LSS),
- compensated density with photoelectric effect (PEF),
- compensated neutron, nuclear magnetic resonance (MRIL),
- modular dynamic formation tester (MDT), and
- full-bore formation micro-imager (FMI).

Field copies of the formation evaluation geophysical logs exempt from post-processing obtained during Geophysical Log Run No. 7 are provided in **Appendix C-7**.

On September 6, 2003, MV Geophysical Surveys, Inc. geophyscially logged the nominal 10-inch diameter pilot-hole from 800 to 1,380 feet bls. The logging suite consisted of the following:

- x-y caliper,
- natural gamma ray,
- flow meter,
- fluid resistivity, and
- high-resolution temperature logs conducted under both static (non-flowing) and dynamic (artesian flow) conditions.

Field copies provided by MV Geophysical Surveys, Inc., are provided in **Appendix C-8.**

Specific capacity test intervals were selected using the information provided by analysis of the geophysical logs and lithologic data. The purpose of these tests was to characterize the water quality and production capacities of specific intervals and to identify an acceptable ASR horizon within the upper Floridan aquifer.

Based on this information, the nominal 10-inch diameter pilot-hole was modified in the following manner:

- DDC permanently back-plugged it from 1,040 feet to 1,380 feet bls using ASTM Type II cement.

- DDC installed pea-gravel as a temporary back-fill material from 905 feet to 1,040 feet bls.
- A five5-foot cement plug was installed from 900 feet to 905 feet bls.

DDC then set a single temporary packer at 840 bls to test an interval from 800 to 840 feet bls. After successful completion of the packer test in the nominal 10-inch diameter borehole, DDC began to over drill the pilot-hole from 800 to 900 feet bls, which increased the borehole diameter to a minimum of 22 inches. A high capacity interval test was completed with the open hole section from 800 to 900 feet bls on October 13, 2003. Based on well productivity data from the first interval test, the 22-inch diameter borehole was extended to 1,040 feet bls and a second specific capacity test conducted (see the ***"Interval-Packer Test"*** section of this report for a description of the methods and a summary of the results). Based on acceptable specific capacity results of approximately 25 gallons per minute per foot of drawdown (gpm/ft/dd), the nominal 22-inch diameter borehole was not advanced below 1,040 feet bls.

On October 17, 2003, SWS conducted geophysical logging operations in the nominal 22-inch diameter borehole from 800 to 1,040 feet bls. Conventional and specialty logs were conducted including:

- caliper,
- SP,
- natural gamma ray spectrometry (NGS),
- high resolution array induction (AITH),
- dual induction log (DIL),
- dipole sonic imager (DSI),
- long-spaced sonic (LSS),
- compensated density with photoelectric effect (PEF), and
- compensated neutron.

Field copies exempt from post-processing during Geophysical Log Run No. 9 are provided in **Appendix C-9**. The same logging suite as those conducted during geophysical log run no 7 were conducted to compare quality of the resisitivity and sonic log data obtained from a large (22-inch diameter) versus small diameter (10-inch diameter) borehole. The results of the comparative analysis will provide the basis for future geophysical logging alternatives.

Based on geophysical log data and in conjunction with specific capacity results, SFWMD instructed DDC to acidize the open hole section (800 to 1,040 feet bls) of EXPM-1. On October 22, 2003, HydroChem Industrial Services rigged up to the acid line on the well header of EXPM-1 and DDC prepared to pump the necessary volume of water. The open borehole section of EXPM-1 was then acidified with 4,200 gallons of 18-Baume muriatic acid (28% hydrochloric acid) without incident. Well acidization operations were completed within six hours with minor positive pressure increases recorded at the well head. After 24 hours, the acid was developed out by flushing the well with fresh water, which continued from October 23 through 30, 2003. All produced waters were neutralized with soda ash whereby the pH was adjusted to 6 standard units (s.u.) and then passed through an onsite filtration system before being discharged to the St. Lucie Canal in accordance with NPDES permit requirements.

A third step-drawdown test was then conducted on November 3, 2003 to determine the effect of acidization on well productivity. During the step-drawdown test, EXPM-1 was pumped at successive increments of 600 gpm, ranging between 2,200 and 4,200 gpm. The results from the step-drawdown test indicate that the production capacity of EXPM-1 increased from 24 gpm/ft of head to 50 gpm/ft of head at a pumping rate of 3,200 gpm as a result of the well acidization.

On November 11, 2003, MV Geophysical Surveys, Inc. geophyscially logged the nominal 22-inch diameter pilot-hole from 800 to 1,040 feet bls Field copies provided by MV Geophysical Surveys, Inc., are in **Appendix C-10.**

The specific capacity test and geoohysical logging was followed by a 24-hour constant rate drawdown test to determine longer term specific capacity results at the projected withdrawal/injection rate of 5 million gallons per day (mgd) (3,475 gpm).

After the constant rate test, DDC installed the permanent wellhead, constructed a 6-foot by 6-foot concrete pad and installed 4-foot high steel corner posts **(Figure 4)** completing well construction activities at this site. Well construction and testing activities related to EXPM-1 are summarized in **Appendix B, Table 1.**

After construction was completed, EXPM-1 was surveyed relative to permanent reference points by a Florida registered land surveyor, and located on a site plan map by latitude and longitude, and recorded in the public record **(Appendix D)**.

Figure 4. Completed Wellhead – Exploratory Well (EXPM-1).

Hydrogeologic Framework

Two major aquifer systems underlie this site - the Surficial Aquifer System (SAS), and the Floridan Aquifer System (FAS) separated by an Intermediate Confining Unit (Hawthorn Group). The FAS is the focus of this exploratory well program and is composed of multiple, discrete flow zones separated by low permeable "confining" units that occur throughout this Eocene-aged sequence. **Figure 5** shows a hydrogeologic section underlying the Port Mayaca site.

Surficial Aquifer System

The SAS extends from land surface (top of the water table) to a depth of 146 feet bls. It consists of Holocene and Pliocene-Pleistocene aged sediments. The undifferentiated Holocene sediments occur from land surface to a depth of 10 feet bls, and consist of unconsolidated orange to light gray, very fine to coarse grained quartz sands and shell fragments within a calcilutite matrix. The sediments from 10 to 146 feet bls are composed primarily of yellowish gray, moderately indurated limestone with intermittent shell beds - 5 to 10 feet thick. Low permeability, arenaceous calcilutite at 146 feet bls forms the base of the SAS at this site. A significant increase in the natural gamma ray activity below a depth of 170 feet bls suggests an increase in clay content and phosphate percentages with emissions above 30 American Petroleum Institute (API) units.

Intermediate Confining Unit

Below the SAS lies the Intermediate Confining Unit and extends from 146 to 755 feet bls at this location. The Peace River and Arcadia Formations of the Miocene-Pliocene aged Hawthorn Group (Scott, 1988) act as confining units separating the FAS from the SAS. Lithologic information obtained from drill cuttings from EXPM-1 indicates that the Hawthorn Group sediments consist predominately of soft non-indurated detritial clays, silts and poorly to moderately indurated mudstones/wackestone with minor amounts of sand and shell material (see lithologic descriptions in **Appendix E-1 and E-2**).

The signature of the natural gamma ray log from 155 to approximately 430 feet bls indicates a clayey silt unit (interpreted to be the Peace River Formation) with values ranging from 40 to 100 API units. The signature of the photoelectric absorption index (PEFZ) log from the proximal test/monitor well (MF-37) located 1,200 feet north of EXPM-1 indicates a clayey silt to fine-grained quartz sand unit with a minor carbonate component with average values of 2 barnes per electron (b/e) through this interval.

A change in lithology from a clay-silt unit to predominantly high porosity, moderately indurated carbonate units occurs below 430 feet bls. This interval was identified as the Arcadia Formation. The natural gamma log below 430 feet bls produces thin, intermittent, gamma radiation peaks, associated primarily with intervals of significant phosphate sand/silt content with thin, intermittent moderately indurated limestone unit identified by positive spikes in the resistivity and sonic log traces. Reese (2003) identified the top of the basal Hawthorn unit at 715 feet bls in the proximal test/monitor well (MF-37) however it was identified slightly deeper in EXPM-1 at a depth of 725 feet bls. The basal Hawthorn unit from 725 to 755 feet bls consists of a yellowish-gray, packstone with significant carbonate mud content, which limits this interval's vertical and horizontal permeability. These low permeable units form the lower boundary of the Intermediate Confining Unit.

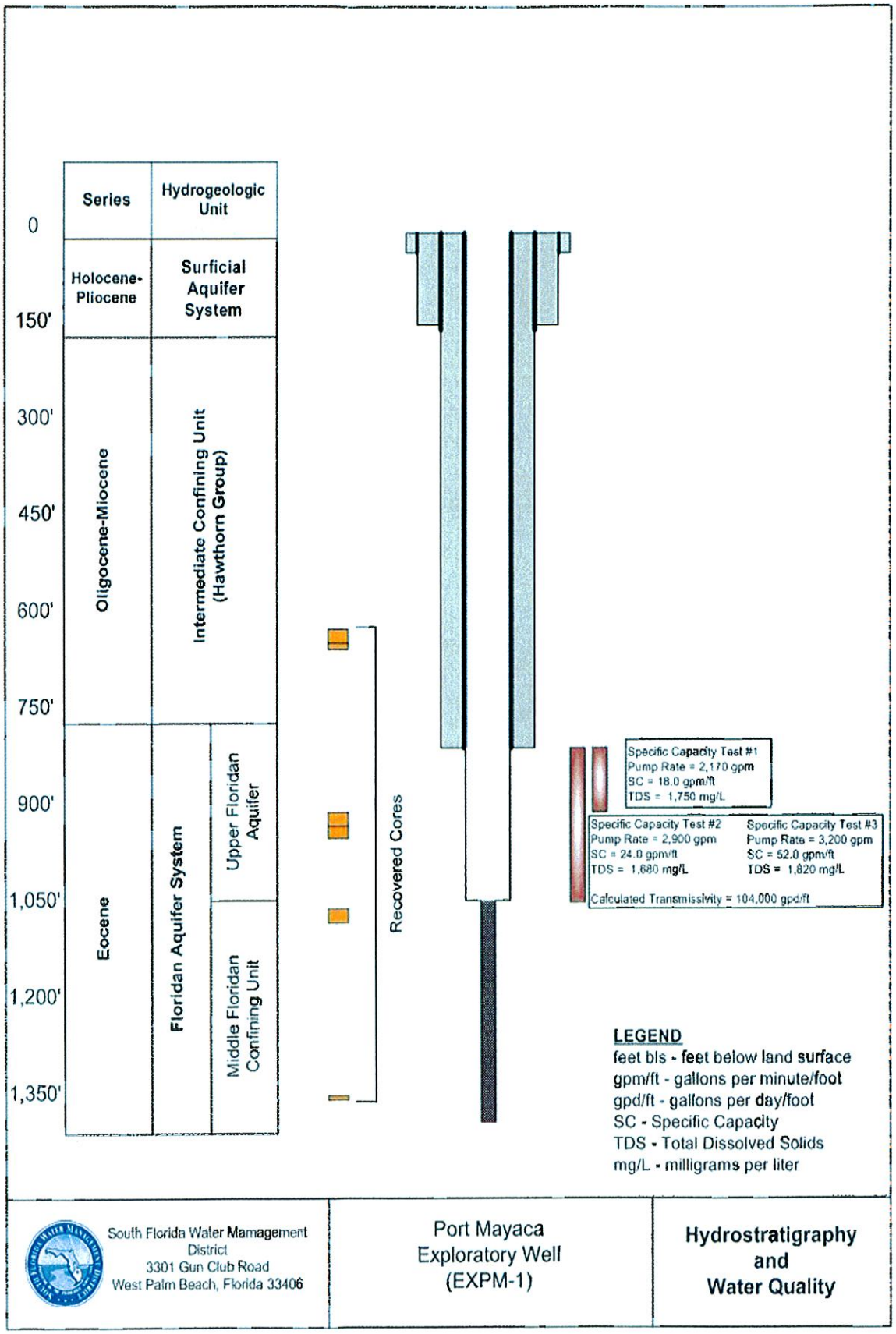

Figure 5. Hydrogeologic Section for the Port Mayaca Site.

Floridan Aquifer System

The FAS consists of a series of Tertiary limestone and dolostone units. The system includes sediments of the lower Arcadia Formation, Suwannee and Ocala Limestones, Avon Park Formation, and the Oldsmar Formation. The Paleocene-age Cedar Keys Formation with evaporitic gypsum and anhydrite forms the lower boundary of the FAS (Miller, 1986).

Upper Floridan Aquifer

The top of the FAS, as defined by the Southeastern Geological Society AdHoc Committee on Florida Hydrostratigraphic Unit Definition (1986) coincides with the top of a vertically continuous permeable early Miocene to Oligocene-aged carbonate sequence. The upper Floridan aquifer (UFA) consists of thin, high permeability water-bearing horizons interspersed with thick, low permeability units of early Miocene to middle-Eocene age sediments, including the basal Arcadia Formation, Suwannee and Ocala Limestones, and the Avon Park Formation. At this site, the top of the FAS occurs at a depth of 755 feet bls, which coincides with the basal Hawthorn Unit (Reese, 2003), part of the Arcadia Formation.

The Arcadia Formation from 755 to 790 feet bls is composed primarily of moderately indurated packstone and grainstone units containing approximately 5-10% shell fragments and 5-7% phosphatic sands and silts. The dual induction, sonic and caliper logs all indicate a competent, low porosity unit at 755 feet that continues to 790 feet bls. The resistivity values increase from 12 to 40 ohm-meter (ohm-m) and the caliper log shows a relatively gauged borehole (i.e. similar to the diameter of the drill bit).

The sharp formation contact between the Miocene-aged Arcadia Formation (Hawthorn Group) and the underlying Oligocene-aged Suwannee Limestone at a depth of 790 feet bls is identified by a change in lithology from a dark gray, well-indurated wackestone to a yellowish-gray packstone, which continues to 825 feet bls. This discontinuity at 790 feet bls is evidenced by a significant attenuation of the natural gamma activity, and a decrease in the formation resistivity and sonic transit time.

A slight change in lithology from a yellowish-gray, wackestone to light orange-gray, friable, moderately indurated wackestone-packstone identifies the upper boundary of the Ocala Limestone at a depth of 825 feet bls. This formation boundary coincides with a slight attenuation of natural gamma activity, a slight increase in sonic travel times, a spiked signature of the resistivity log trace and an enlarged borehole (see Geophysical Log Run No. 4 in **Appendix C-4**)

Generally, two predominant permeable zones exist within the UFA with the uppermost typically encountered between 700 and 1,200 feet bls. The most transmissive part usually occurs near the top, coincident with an unconformity at the top of the Oligocene or Eocene-aged formations (Miller, 1986). Well cuttings and production-type geophysical logs suggest that moderate productive horizons exist within the UFA at this site resulting in modest to high productive capacities. A slight deflection in the temperature differential log trace at 825 feet bls suggests the presence of a minor flow zone. A specific capacity test on an interval from 800 to 900 feet bls that straddled the Suwannee-Ocala formation contact yielded 18 gpm/ft of drawdown when pumped at a rate of 2,100 gpm. Brown (1980) noted similar production potential of the UFA

along the eastern boundary of Lake Okeechobee in Martin County. Within this area, transmissivity values ranged between 25,000 and 50,000 gallons per day per foot (gpd/ft).

Based on lithologic and geophysical log data, the Ocala Limestone occurs from 825 feet to 905 feet bls and consists of low to moderate permeability, orangish-gray moderately indurated wackestones, and packstones, inter-bedded with light-gray micrite. This unit was evident on the geophysical logs by a positive shift in the resistivity and a decrease in sonic transit times (than above) (**Appendix C-8**). The top of the Avon Park Formation occurs at a depth of 905 feet bls marked by an increase in electrical resistivity and a decrease in sonic transit times and by a gauged borehole (similar in diameter to the drill bit). The upper portion of the Avon Park Formation from 905 to 1,040 feet bls consists of packstone/grainstone units, which vary in log-derived porosity values and induration, as noted by the spiked nature of the neutron-density and miro-resistivity log traces (**Appendix C-8**). Step-drawdown test results indicate modest to good production with a specific capacity of 52 gpm/ft-of-head at the design injection rate of 3,500 gpm (5 mgd). The 24-hour aquifer performance test (APT) yielded a specific capacity of 52 gpm/ft of head with a calculated transmissivity of 104,000 gpd/ft (Driscoll, 1989).

Middle Floridan Confining Unit

The Avon Park Formation from 1,040 to 1,384 feet bls forms an inter-aquifer confining unit within the FAS at this site. This interval consists of low permeable mudstones and wackestones. There was little evidence of significant water production discerned during drilling operations, and formation samples from this interval do not show evidence of large-scale secondary porosity development (e.g., good pinhole or moldic porosity). A packer test conducted in the test/monitor well (MF-37) from 1,241 to 1,288 feet bls yielded a specific capacity of 2 gpm/ft of head. In addition, the production type geophysical logs traces (e.g., temperature and flowmeter logs) from EXPM-1 indicate no significant water producing horizons, as seen by smooth log traces in both the temperature and flowmeter logs, which support the presence of low permeability sediments and the overall confining nature of this interval.

Hydrogeologic Testing

Specific data was collected during the drilling program to determine the lithologic, hydraulic and water quality characteristics of the FAS at the Port Mayaca site. These data were to be used in the final design of EXPM-1.

Formation Sampling

Geologic formation samples (well cuttings) were collected, washed, and described (using the Dunham, 1962 classification scheme) on-site during the drilling of the pilot-hole. Formation samples were collected at 5-foot intervals. The field lithologic descriptions for EXPM-1 are provided in **Appendix E-1**. Representative formation samples were sent to the Florida Geological Survey (FGS) for detailed analysis and long-term storage.

During drilling of EXPM-1, DDC obtained conventional cores using a 4-inch diameter, 20-foot long, diamond-tipped core barrel. Six rock cores of various lengths were recovered from the FAS between 617 and 1,348 feet bls with core recoveries of 0 to 100 percent. The six cores were sent to Core Laboratories (Midland, Texas) to determine the following parameters: horizontal and vertical permeability, porosity, grain density, elastic, mechanical and acoustic properties, and lithologic character.

Formation Fluid Sampling

During reverse-air drilling of the pilot-hole, samples were taken from circulated return fluids (composite formation water) at 30-foot intervals (average length of drill rod) from 890 feet bls to 1,384 feet bls. A Hydrolab® multi-parameter probe measured field parameters on each sample, which included temperature, specific conductance, and pH. **Figure 6** shows field-determined specific conductance values and calculated total dissolved solids (TDS) concentrations (Hem, 1994) with respect to depth. Between 890 feet to 1,030 feet bls, specific conductance values and TDS concentrations averaged 2,541 micromhos per centimeter (umhos/cm) and 1,575 milligrams per liter (mg/L), respectively. Between 1,050 feet and 1,240 feet bls, specific conductance readings decrease with an average value of 2,348 micro-umhos per centimeter (umhos/cm). Specific conductance values of the formation water, however gradually increased between 1,270 and 1,340 feet bls to a maximum value of 1,727 umhos/cm.

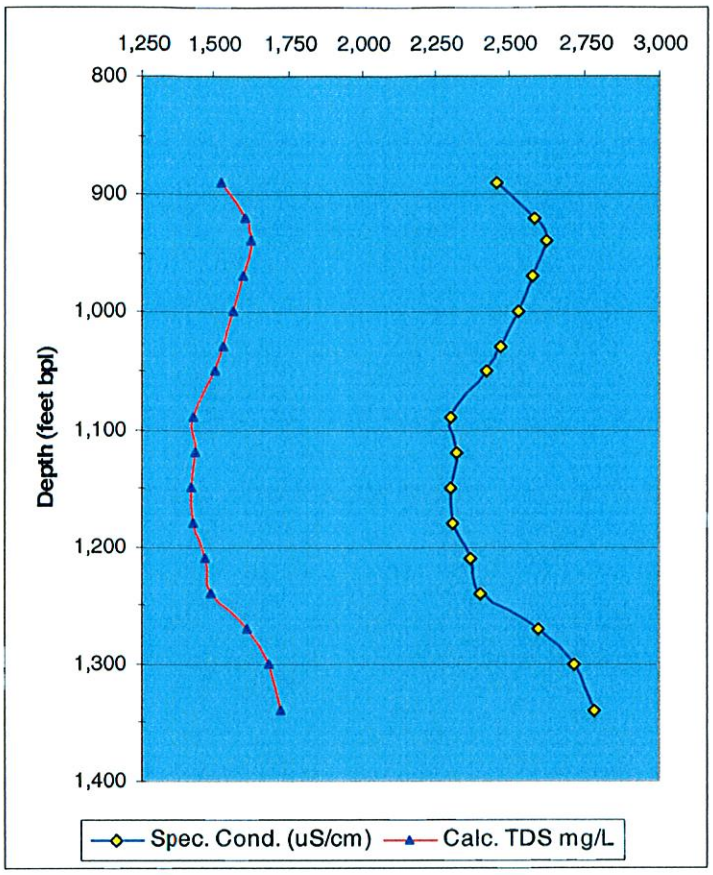

Figure 6. Water Quality with Depth -- Reverse-Air Returns.

Geophysical Logging

Geophysical logs were conducted in the pilot-hole after each stage of drilling and before casing installation. These logs were conducted to provide a continuous record of the physical properties of the subsurface formations and their contained fluids. These logs were later used to assist in the interpretation of lithology, to provide estimates of permeability, porosity, bulk density, and resistivity of the aquifer, and to determine the salinity of the ground water (using Archie's equation, [Archie, 1942]). In addition, the extent and degree of confinement of specific intervals can be discerned from the individual logs. The geophysical logs also provided data to determine the desired casing setting depths on the exploratory well. A cement bond log (CBL) was conducted to assess the quality of the cement sheath surrounding the 24-diameter steel casing of EXPM-1.

The geophysical logging contractor downloaded all geophysical log data directly from their onsite logging processor in log ASCII standard (LAS) version 1.2 or 2.0 format. The neutron and density porosity values calculated as part of geophysical log runs no.4 and 8 were derived using a limestone matrix with a density of 2.71 grams per cubic centimeter (gm/cm^3).

The geophysical log traces from log runs no. 1 through 10 are presented in **Appendix C-1 through C-10**. The original geophysical logs and video surveys are archived and available for review at SFWMD headquarters located in West Palm Beach, Florida. **Table 2** provides a

summary of conventional geophysical logging operations conducted by MV Geophysical Services, Inc. at this site.

Table 2. Conventional Geophysical Logs.

Summary of Geophysical Logging Program -- EXPM-1													
Run #	Date	Logging Company	Logged Interval (ft.) bls	Caliper	Natural Gamma	SP	DIL	Sonic	Flow-Meter	Temp	Fluid Res.	Cement Bond Log	Video
1	05/28/03	MVG	0-230	x	x	x	x	x					
2	06/10/03	MVG	0-164	x	x								
3	06/11/03	MVG	0-150		x					x			
4	06/26/03	MVG	0-880	x	x	x	x	x					
5	07/21/03	MVG	0-800	x	x								
6	07/22/03	MVG	0-800							x		x	
8	09/06/03	MVG	725-1380	x	x				x	x	x		x
10	11/11/03	MVG	725-1040	x	x				x	x	x		x
MVG = MV Geophysical Services Inc.													

Specialty logging operations conducted by Schlumberger Wireline Services are summarizes in **Table 3**.

Table 3. Specialty Geophysical Logs.

Summary of Specialty Geophysical Logging Program -- EXPM -1										
Run #	Date	Logging Company	Logged Interval (ft.) bls	Spectal Gamma Ray	Array Induction Imager	Comp. Density/ Neutron/PEF	Electron Capture Spectro	Dipole Sonic Imager	Long Spaced Sonic	Formation Micro Imager
7	09/02/03	SWS	725-1380	x	x	x	x	x	x	x
9	10/17/03	SWS	725-1040	x	x	x	x	x	x	x
SWS = Schlumberger Wireline Services										

Water samples where obtained from specific depths via the modular dynamic tester (MDT) in pressurized vessels. The laboratory determined results of inorganic analyses of MDT samples are summarized in **Table 4.**

Table 4. Inorganic Water Quality Results from Modular Dynamic Tester.

Inorganic Water Quality Data from EXPM-1, Port Mayaca Site, Martin County, Florida.												
		Cations				Anions				Field Parameters		
Identifier	Depth (ft. bls)	Na^+ mg/L	K^+ mg/L	Ca^{2+} mg/L	Mg^{2+} mg/L	Cl^- mg/L	Alka as $CaCO_3$ mg/L	SO_4^{2-} mg/L	TDS mg/L	Specific Conduct. umhos/cm	Temp °C	pH s.u.
EXPM1_MDT1	920	364	41	112	77	811	130	238	1,850	3,125	20.80	7.70
EXPM1_MDT2	1007	185	34	75	55	411	128	190	1,190	1,842	20.80	7.76
EXPM1_MDT3	1101	284	36	87	75	656	136	180	1,520	2,590	20.60	8.08
EXPM1_MDT4	1217	508	40	118	93	1040	130	253	2,340	3,984	20.50	7.98
EXPM1_MDT5	1318	497	43	119	91	1040	129	251	2,400	3,952	20.9	7.64

mg/L = milligrams per liter
umhos/cm = microumhos per centimeter
TDS = Total Dissolved Solids
ft. bls = feet below land surface
s.u = standard unit
o C = degree Celsius
Alka = Alkalinity

In addition, formation pressures where obtained from specific depths via the MDT. These data were used to derive a linear pressure gradient in relationship to depth at the Port Mayaca site (**Figure 7**). These data indicate a normal pressure gradient of 0.4355 pounds per square inch per foot of depth with no abnormal (neither high nor low) pressure zones identified.

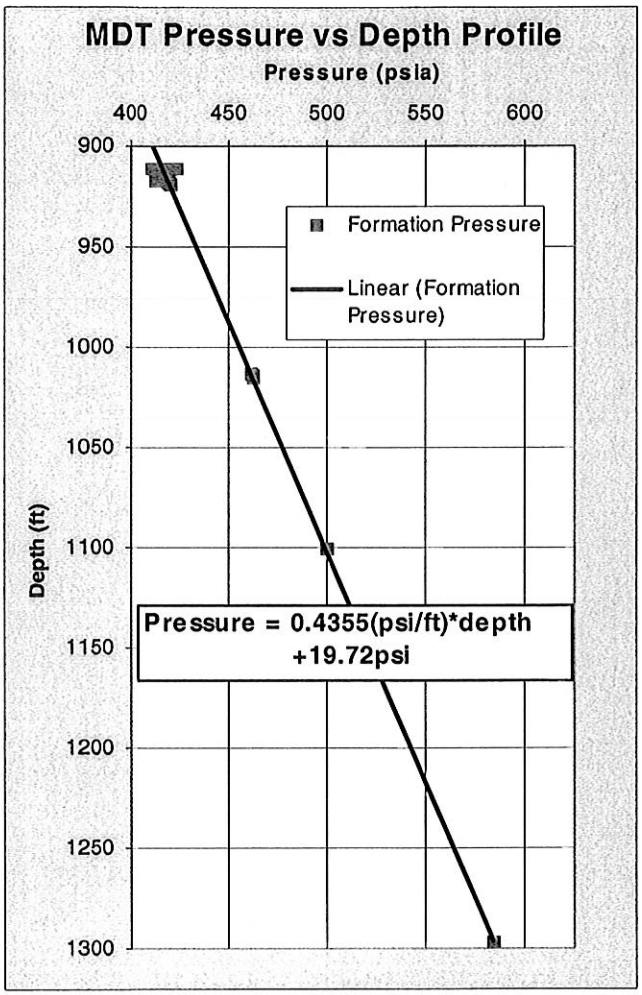

Figure 7. Formation Pressure Gradient – EXPM-1.

Petrophysical Data and Analyses

During drilling of EXPM-1, DDC obtained conventional cores using a 4-inch diameter, 20-foot long, diamond-tipped core barrel. DDC retrieved six rock cores from the FAS between 617 and 1,348 feet bls with core recoveries between 0 and 100 percent. Table 5 is a summary of the full-diameter coring program conducted at this site.

Table 5. Summary of Full Diameter Coring Operations (EXPM-1).

Core No.	Core Interval (feet bls)	Core Footage (feet)	Core Recovered (feet)	Percent Recovery
1	617-637	20	0.0	0.0
2	637-648	11	11.0	100.0
3	900-920	20	6.0	30.0
4	920-940	20	12.5	62.5
5	1050-1070	20	12.0	60.0
6	1340-1348	8	8.0	100.0
Totals:		**99**	**49.5**	**50.0**

SFWMD sent recoverd rock cores to Core Laboratories (CL) to determine the following parameters: horizontal and vertical permeability, porosity, grain density, and lithologic characteristics. Upon arrival, CL recorded a spectral gamma log on each core for downhole correlation with the geophysical logs. Full diameter and plug samples (when core conditions necessitated) were selected for core analyses and fluid removal was achieved by convection oven drying.

CL determined full diameter porosity by direct pore volume measurement using the Boyle's Law Helium Expansion Method. Once the samples were cleaned and dried, CL determined bulk volume by Archimedes Principle with grain density calculated from the dry weight, bulk volume and pore volume measurements using Equation No. 1 (American Petroleum Institute, 1998).

Grain Density = Dry Weight / (Bulk Volume – Pore Volume) **(Equation 1)**

Porosity as a percent was calculated using bulk volume and grain volume measurements using Equation No. 2.

Porosity = ((Bulk Volume – Grain Volume)/ Bulk Volume) x 100 **(Equation 2)**

After cleaning, CL measured bulk volume on the individual samples by Archimedes Principle with porosity calculated using Equation No. 2. Steady-state air permeability was measured on the full diameter core samples in two horizontal directions and vertically while confined in a Hassler rubber sleeve at a net confining stress of 400 psi. Appendix F, Table 2 lists the results of the petrophysical analyses. Figure 8 shows a semi-log cross-plot of laboratory derived horizontal permeability versus (helium) porosity. The equation of the fitted linear regression model, which describes the relationship between the $\log_{10}$ transformed horizontal permeability (y) and porosity (x) is $\log_{10}(y) = 0.0994(x) - 1.2713$. The correlation coefficient equals 0.4 (a value of 1.0 suggests a strong positive relationship), indicating a weak relationship between the two variables.

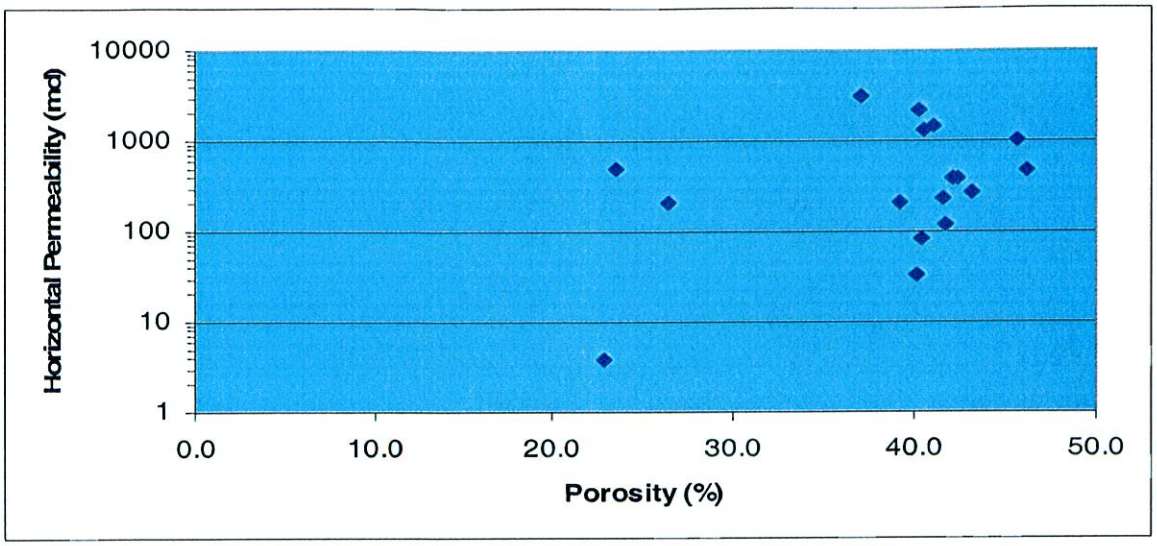

Figure 8. Cross-Plot of Laboratory Derived Horizontal Permeability and Porosity.

SFWMD used the petrophysical data to determine a horizontal permeablity anistropy ratio for each sample by dividing the two laboratory determined horizontal permeability values. A maximum horizontal permeability value (K_{max}) was determined for the sample, then a second horizontal value was measured perpendicular to K_{max}, noted as K_{90}. An average horizontal anistropy ratio of 0.85 was calcuated from the 17 core samples obtained from 916 to 1,358 feet in depth. In addition, a horizontal to vertical permeablity anistropy ratio of 0.48 was determined from the same sample set.

After CL completed the petrophysical analyses, they slabbed and boxed the rock cores prior to photographing them under natural and ultraviolet light. CL then scanned the negatives of the core photographs and stored them on a compact disc. These photographs are reproduced in Figures 1 to 3 listed in Appendix E. In addition, mechanical/engineering rock properties were determined on rock/sediment samples obtained from the overlying confining unit (Hawthorn Group) to determine its fracture potential as a result of injection/withdrawal operations at an anticipated volume of 5 mgd. **Appendix E** contains the results of the mechanical/engineering tests, which are sumarized in table form and scatter plots.

Interval-Packer Tests

Three interval tests were conducted in the FAS from 800 to 1,040 feet bls at this site. The purpose of these tests was to gain water quality and production capacity data on incrementally larger intervals within the UFA.

The procedures listed below were used to conduct individual interval tests in well EXPM-1 at the Port Mayaca site:

1) Select interval for testing based on geophysical logs and lithologic data.
2) Drill a nominal 22-inch diameter borehole to specified depths.
3) Install a 275-horsepower submersible pump to depth of 80 to 120 feet below the drill floor with a pumping capacity of 500 to 5,000 gpm.

4) Install two 100-psig-pressure transducers inside the 24-inch diameter casing connected to a Hermit® 3000 Data Logger to measure and record water-level changes during testing operations.
5) Purge a minimum of three casing/borehole volumes.
6) Perform step-drawdown test (3 to 4 - one hour steps).
8) Collect formation water samples for laboratory water quality analyses following SFWMD QA/QC sampling protocol.
9) Record recovery data until water levels return to static conditions.

A low capacity packer test (800 to 840 feet bls) was performed via a single packer set at 840 feet bls with the 24-inch diameter casing serving as the upper limit of the test. SFWMD completed this test on October 7, 2003 with the primary objective of obtaining a water sample in the uppermost section of the proposed ASR horizon. The laboratory results and measured field parameters on water samples obtained during the packer test are summarized in **Table 6**.

A high-volume, specific capacity test was completed within a nominal 22-inch diameter borehole from 800 to 900 feet bls. The objective was to determine the production capacity and water quality characteristics of the uppermost 100 feet of the proposed ASR horizon. The results of the step-drawdown test are displayed in **Figure 9** with water quality data provided in **Table 6**.

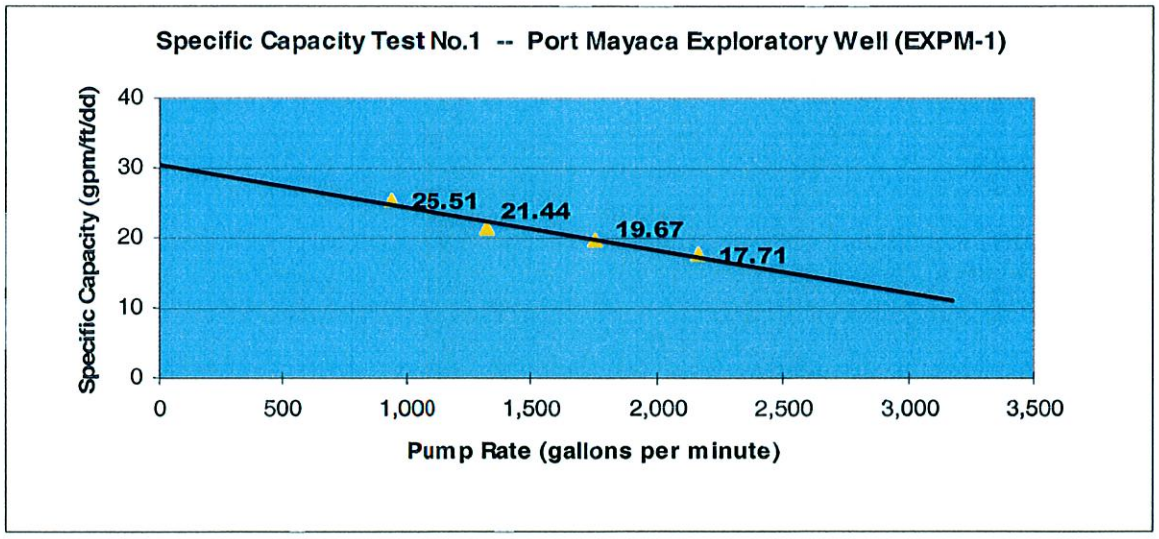

Figure 9. Specific Capacity Test No. 1 Results – EXPM-1 (800 to 900 feet bls).

Based on lower than expected production capacity determined from the step-drawdown test and that the geophysical and lithologic data indicated water production below 900 feet bls, the nominal 22-inch diameter borehole was advanced to 1,040 bls.

The second specific capacity test (800 to 1,040 feet bls) was completed on October 15, 2003. The results of the second step-drawdown test are displayed in **Figure 10** with water quality data summarized in **Table 6**.

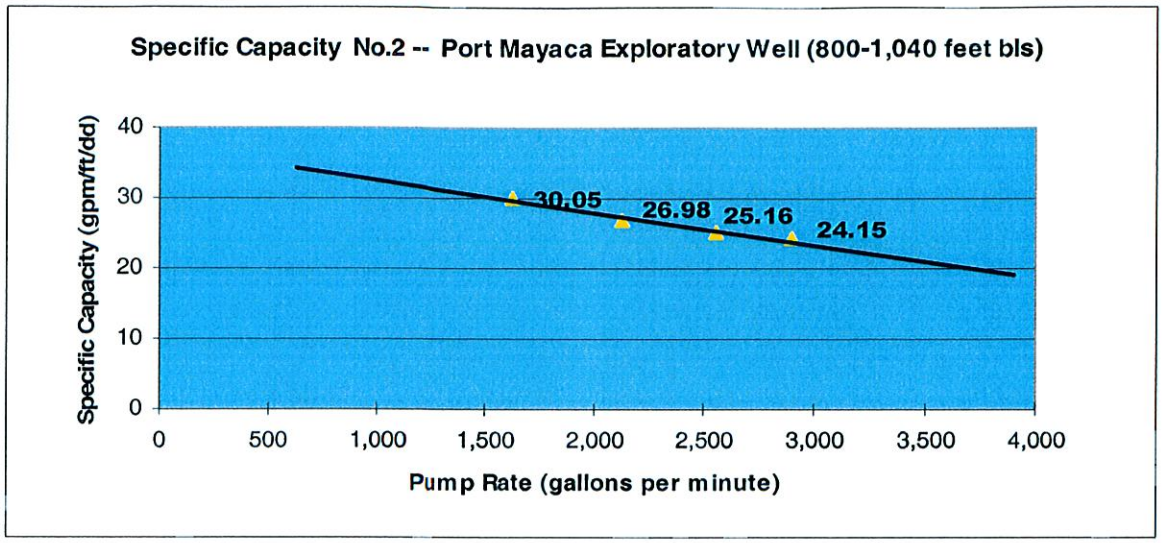

Figure 10. Specific Capacity Test No. 2 Results – EXPM-1 (800 to 1,040 feet bls).

The result of advancing the 22-inch diameter borehole an additional 140 feet was an increase in the attainable yield from 2,170 to 2,900 gpm (within the same limits of the pump setting depth). In addition, the specific capacity increased from 17.7 to 27.0 gpm/ft/dd at a pump rate of 2,175 gpm, and the predicted specific capacity increased from 13.7 to 21.9 gpm/ft/dd at the design injection/withdrawal rate of 5 mgd. The design specific capacity of 40 to 50 gpm/ft/dd, however, was not achieved and SFWMD directed DDC to acidify the open-hole section (800 to 1,040 feet bls) as a measure to increase well production.

On November 3, 2003, DDC acidized the open-hole section using 4,200 gallons of 18-Baume hydrochloric acid. After allowing sufficient time for the acid to react with the limestone units, the acidified water was removed and treated. The borehole was then developed via air and over-pumping methods. A third specific capacity was conducted to determine the effects of well acidization related to well productivity. The results of the post-acidization (third) step-drawdown test are displayed in **Figure 11** with water quality data summarized in **Table 6.**

The net effect of acidizing the open-hole section was a two-fold increase in well productivity. The post-acidization specific capacity increased from a predicted value of 22 gpm/ft/dd to a measured value of 52 gpm/ft/dd at the design injection/withdrawal rate of 5 mgd. Based on the favorable specific capacity results no further acidization was conducted. A 24-hour aquifer performance test was then conducted to determine long-term yields and hydraulic characteristics of the proposed ASR horizon.

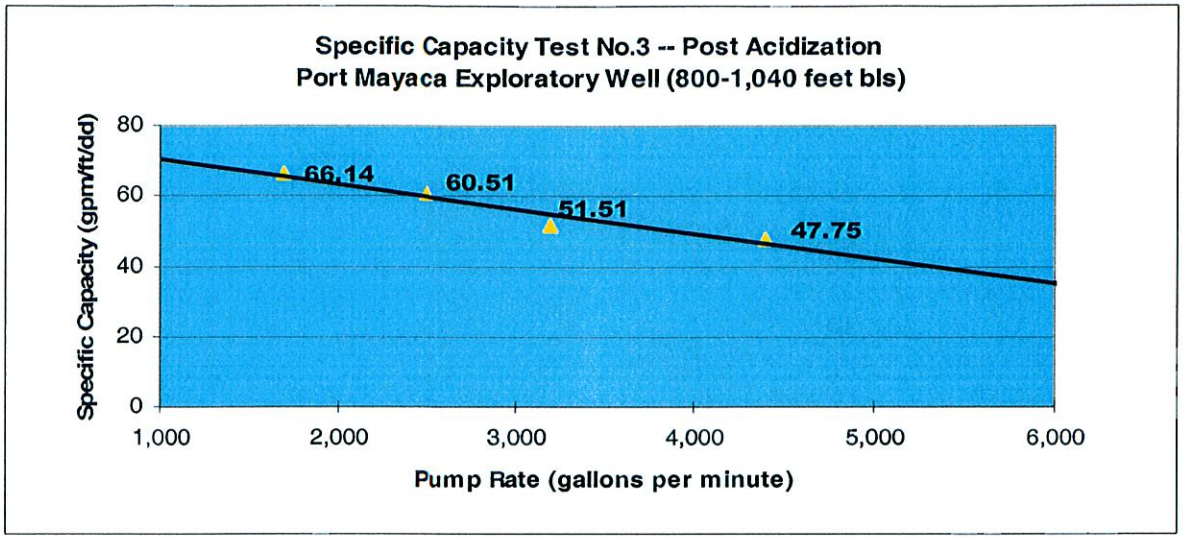

Figure 11. Specific Capacity Test No. 3 Results – EXPM-1 (800 to 1,040 feet bls).

Inorganic Water Quality

Before ground water sampling, the intervals were purged until three borehole volumes were evacuated, or until field parameters of samples collected from the discharge port had stabilized. A limit of +/-5% variation in consecutive field parameter readings was used to determine chemical stability. Field parameters including temperature, specific conductance, and pH were determined on each sample using a Hydrolab® multi-parameter probe. Chloride concentrations were also determined using a field titration method (Hach® Kit). The water flow from the discharge point was adjusted to minimize aeration and disturbance of the samples. Unfiltered and filtered samples were collected directly from the discharge point by SFWMD staff into a clean plastic bucket. Equipment blanks were obtained prior to sampling to qualify sampling procedures. Replicate samples were also collected from consecutive bailers in accordance with the SFWMD Comprehensive Quality Assurance Plan (SFWMD, Comprehensive Quality Assurance Plan, 2000).

Once samples were collected, the bottles were preserved and immediately placed on ice in a closed container. The composite samples were submitted to the SFWMD Water Quality Laboratory and analyzed for major cation and anions using EPA and/or Standard Method procedures (SFWMD, Comprehensive Quality Assurance Plan, 2000).

The analytical results for the samples obtained during the interval/packer tests are reported in **Table 6.**

Table 6. Inorganic Water Quality Data – EXPM-1.

Inorganic Water Quality Data from EXPM-1, Port Mayaca Site, Martin County, Florida.												
		Cations				Anions				Field Parameters		
Identifier	Depth Interval (ft. bls)	Na^+ mg/L	K^+ mg/L	Ca^{2+} mg/L	Mg^{2+} mg/L	Cl^- mg/L	Alka as $CaCO_3$ mg/L	SO_4^{2-} mg/L	TDS mg/L	Specific Conduct. umhos/cm	Temp °C	pH s.u.
EXPM-1_PT-1	800-840	310	10	92	61	700	99	260	1,755	2,700	26.75	7.51
EXPM-1_SC-1	800-900	350	10	98	76	702	126	271	1,680	2,858	26.77	7.62
EXPM-1_SC-2	800-1040	338	10	96	76	640	125	246	1,640	3,180	27.25	8.91
*EXPM-1_SC-3	800-1040	346	11	153	79	726	174	242	1,820	3,138	26.86	6.77

mg/L = milligrams per liter
umhos/cm = microumhos per centimeter
° C = degree Celsius
s.u = standard unit
ft. bls = feet below land surface

PT = Packer Test
SC = Specific Capacity Test
* Note: EXPM-1_SC-3 sample was taken as part of the 24-hour Aquifer Performance Test

Aquifer Performance Test

SFWMD conducted an aquifer performance test (APT) to determine the aquifer characteristics of the proposed ASR horizon, located in the UFA from 800 to 1,040 feet bls. This interval is within the Suwannee and Ocala Limestones and upper portion of the Avon Park Formation. The principle factors of aquifer performance, such as transmissivity, can be calculated from the drawdown and/or recovery data obtained from a single well.

The drawdown phase consisted of pumping the EXPM-1 at a constant rate of 3,250 gpm for 24 hours while recording water level changes. The drawdown phase was followed by a 24-hour recovery period, where pumping stopped and water levels were allowed to return to background condition.

The well head appurtenances consisted of a shut-off valve, discharge pressure gauge, and wellhead pressure transducer. A 12-inch diameter circular orifice weir with a 9-inch diameter orifice plate was used to measure discharge rates, verified by an in-line flowmeter. SFWMD personnel installed a pressure transducer on the orifice weir to record discharge rates during the APT at 2-minute intervals. Additional pressure transducers were installed in EXPM-1 connected to a Hermit® 2000 (Insitu, Inc.) data logger via electronic cables. The transducers and data logger were used to measure and record water-level changes at pre-determined intervals during testing operations.

On November 5, 2003, the drawdown phase of the APT started by pumping EXPM-1 at a rate of 3,250 gpm. SFWMD maintained the installed electronic devices, which continuously measured and recorded water levels and flow rates during the drawdown phase. Figure 12 is a semi-log plot of the drawdown data for EXPM-1 and discharge rates (manometer readings) during the pumping phase of the APT. Maximum drawdown in EXPM-1 was 61.2 feet (26.5 psi) with flow rates varying about 6% during the test after the first several minutes of pumping.

Before EXPM-1 was shut-in, SFWMD reconfigured the various data loggers to record the recovery data. DDC manually closed the discharge port and water levels slowly recovered to static conditions. The recovery phase of the APT continued for 24 hours, ending on November 7, 2003. Figure 13 is a semi-log plot of the recovery data for the proposed ASR horizon. Electronic copies of the original drawdown, recovery and orifice weir (flow rate) data for the APT are archived and available for review at the SFWMD's headquarters in West Palm Beach, Florida.

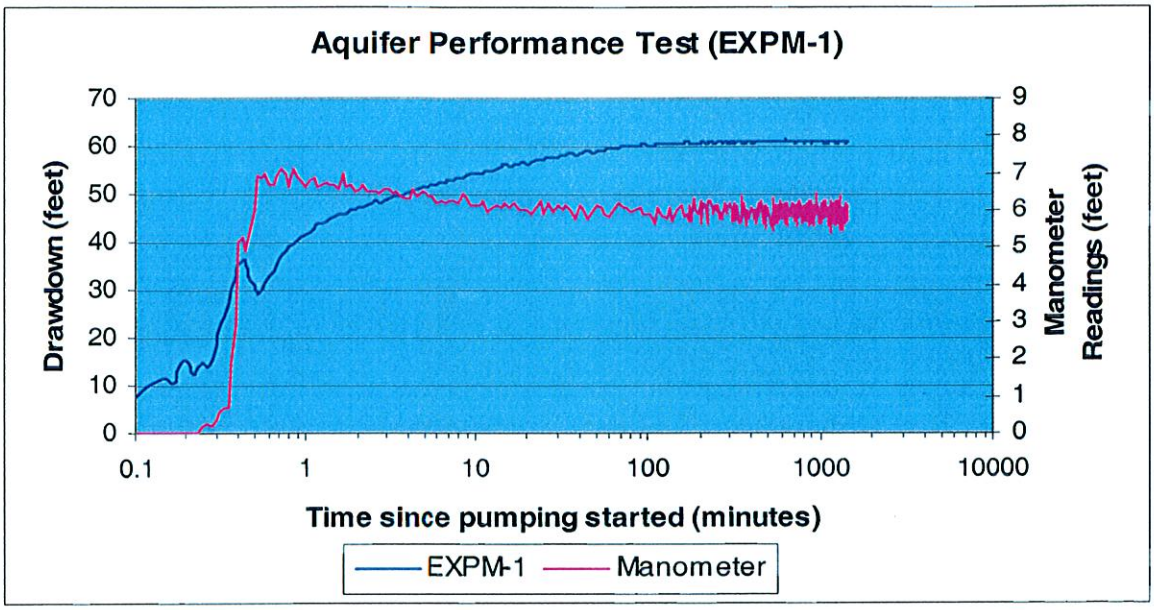

Figure 12. Semi-log Plot of Drawdown and Orifice Weir Values.

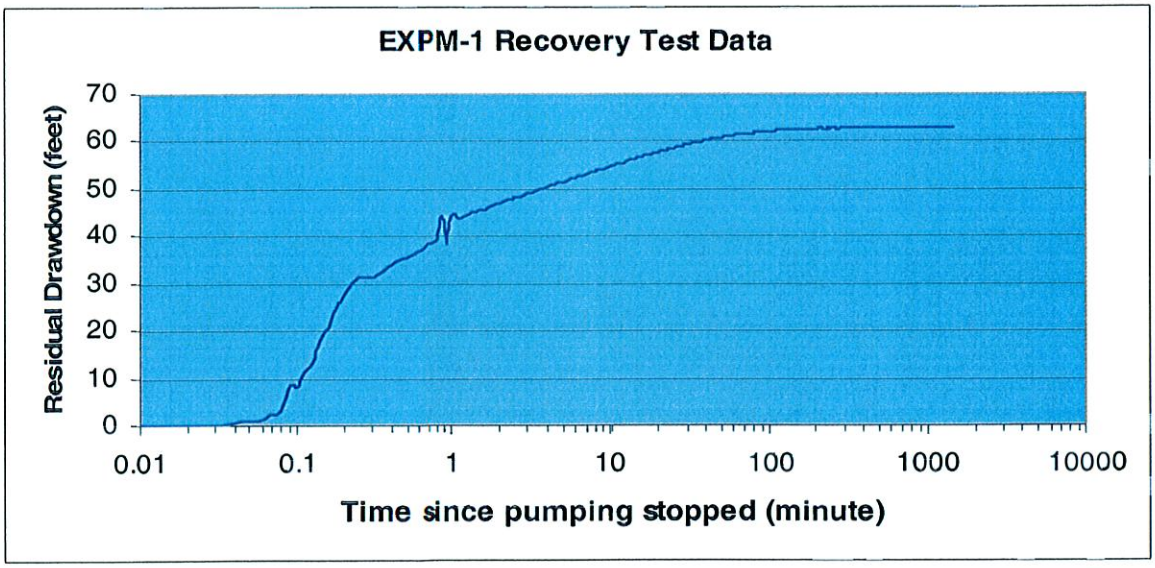

Figure 13. Semi-log Plot of Recovery Data (EXPM-1).

SFWMD applied the Theis residual drawdown analytical solution to the recovery data collected during the APT to determine the hydraulic properties of the UFA at this site. This analytical solution produced a transimissivity value of 95,000 gpd/ft. A storage coffiecent cannot be obtained from a single well test.

Following the 24-hour recovery phase, background water level data was collected for three days (11/07/03 to 11/10/03) from EXPM-1 to discern tidal and barometric effects. A time-series plot of background water level data from EXPM-1 and barometric pressure are included in Figure 14.

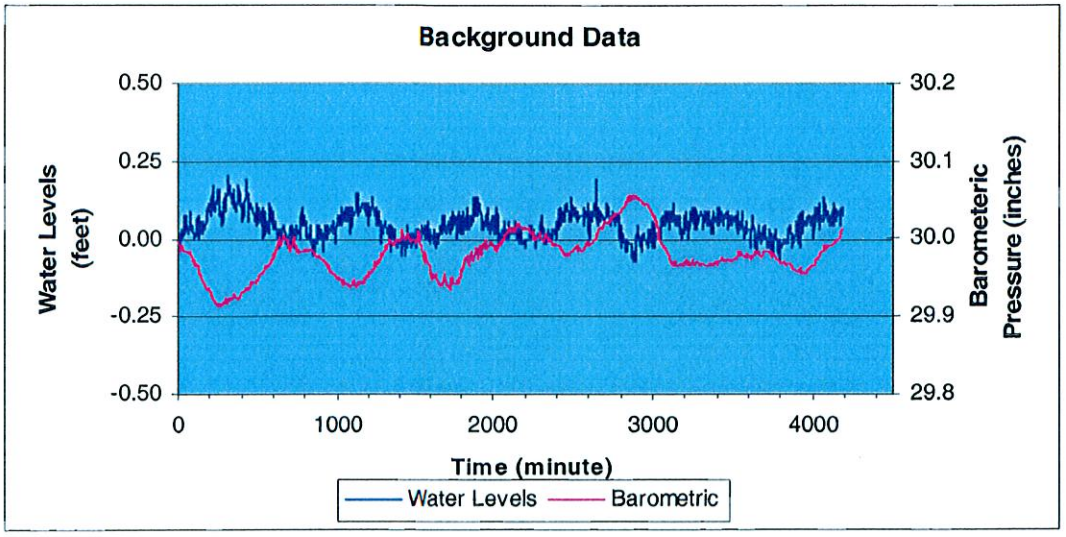

Figure 14. Background Water Level and Barometric Pressure Data.

Primary/Secondary Drinking Water Quality Data

Upon completion of well construction of EXPM-1, background water quality samples were collected and analyzed to determine basic water quality characteristics (e.g., temperature, pH, and specific conductance) as well as primary and secondary drinking water standards (Chapter 62-550, FAC) and minimum criteria parameters (Chapter 62-520, FAC).

On November 16, 2003, EXPM-1 was purged until three borehole volumes were evacuated, or until field parameters of samples collected from the discharge pipe had stabilized. A limit of +/- 5% variation in consecutive field parameter readings was used to determine chemical stability. The flow of water from the discharge point was adjusted to minimize the aeration and disturbance of the samples. United States Army Corps of Engineers (USACE) representatives collected unfiltered and filtered samples directly from the discharge point into a clean plastic bucket. Equipment blanks were obtained prior to sampling to qualify sampling procedures. A Teflon bailer was then placed on a bailer stand where the sample bottles were filled slowly to minimize aeration. Replicate samples were collected from consecutive bailers (SFWMD, Comprehensive Quality Assurance Plan, 2000).

Once the samples were collected, the bottles were preserved (if necessary) and immediately placed on ice in a closed container and transported to the SFWMD's water quality laboratory.

The samples were then shipped to a laboratory operated by ELAB, Inc. (Ormond Beach, Florida). The samples were analyzed for primary and secondary drinking water standards and minimum criteria parameters using EPA and/or Standard Method Procedures. The results of these analyses are presented in **Appendix G.**

Stable Isotope and ^{14}Carbon Data

Stable isotope data complements inorganic geochemistry and physical hydrogeology investigations. SFWMD plans to use the isotopic data collected at this site in a regional investigation to better understand ground water circulation patterns of the FAS (Kohout, 1965, 1967) and to identify recharge and discharge areas. If an interval has a particular isotopic signature, it may be used to identify and map the lateral extent of an ASR zones within the upper Floridan aquifer. Radiocarbon data often complements stable isotope and inorganic data. These data have been used to estimate regional flow velocities within the Floridan aquifer (Hanshaw et al., 1964).

Water samples collected during interval tests from well EXPM-1 were sent to the University of Waterloo Environmental Isotope Laboratory (EIL) for stable isotope determinations. The analytical services included the determination of the stable isotope compositions for the following parameters: $\delta^{18}O$, $\delta^{2}H$ or δD (deuterium), $\delta^{13}C$, and $\delta^{34}S$ however, the results of these analyses are incomplete at this time. The complete set of results will be forwarded to the Department upon completion.

Table 7. Stable Isotope Data – EXPM-1

Identifier	Sample Interval ft. bls	Sample Date	d ^{18}O ‰ SMOW	d ^{2}H ‰ SMOW	d ^{13}C ‰ PDB
EXPM-1_SC-1	800-900	10/07/03	-1.81	-8.15	-1.40
EXPM-1_SC-2	800-1040	10/15/03	-1.81	-5.93	-1.54
EXPM-1_SC-3	800-1040	11/03/03	-1.79	-5.95	-3.48

ft. bls - feet below land surface
‰ - per mil
SMOW - Standard Mean Ocean Water Standard
PDB - Pee Dee Belemnitella Standard
SC = Specific Capacity Test

Summary

A 24-inch outer diameter Class V, Group 9 exploratory well (EXPM-1) was successfully constructed and tested in accordance with FDEP Permit Number 0196441-001-UC at the Port Mayaca site.

Lithologic information and geophysical logs obtained from EXPM-1 indicate that soft non-indurated detritial clays, silts and poorly indurated mudstones of the Hawthorn Group predominate from 155 to 755 feet bls. These low permeable sediments act as a confining unit separating the Floridan Aquifer System from the Surficial Aquifer System.

The top of the FAS was identified at a depth of approximately 755 feet bls, as defined by the Southeastern Geological Society AdHoc Committee on Florida Hydrostratigraphic Unit Definition (1986). Low permeability sediments of basal Hawthorn unit/Suwannee Limestone, however, continue from 755 to 800 feet bls as evidenced by the formation evaluation logs.

Lithologic and geophysical logs, packer test results, and specific capacity, results indicate moderate to good production capacity of the upper Floridan aquifer from 800 to 1,040 feet bls with a measured value of 52 gpm/ft/dd at the design injection/withdrawal rate of 5 mgd.

A productive horizon in the upper Floridan aquifer from 800 to 1,040 feet bls yielded a transmissivity value of 95,000 gallons/day/foot based on a confined aquifer model.

Composite water quality sampling of EXPM-1 (800 to 1,040 feet bls) indicate that chloride and total dissolved solids (TDS) values exceed potable drinking water standards with chloride and TDS concentrations of 726 and 1,820 mg/L, respectively.

The fluid-type logs (e.g., flow and temperature logs) indicate good production from flow zones between 800 and 900 feet bls and 925 to 1,030 feet bls. Below 1,030 feet bls, the productive capacity is limited (as indicated by the fluid-type logs) suggesting lower permeable – semi-confining units near the base of the proposed storage horizon.

Conclusions and Recommendations

1. An acceptable ASR horizon exists within the upper Floridan Aquifer System (800 to 1,040 feet bls) based on lithlogic and geophysical log data plus hydraulic test results.

2. If the Port Mayaca site is further developed into an ASR system as part of the Lake Okeechobee ASR Pilot Project, the test/monitor well (MF-37) will need to be modified to accommodate monitor zone(s) consistent with the ASR wells.

3. Once the test/monitor well (MF-37) is converted to a dual-zone monitor well, a long term APT should be conducted to determine field-scale hydraulic parameters such as transmissivity and storage of the anticipated storage zone and leakance through the underlying confining unit.

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Appendix A

Department of Environmental Protection

Jeb Bush
Governor

Southeast District
400 N. Congress Avenue, Suite 200
West Palm Beach, Florida 33401

David B. Struhs
Secretary

February 3, 2003

NOTICE OF PERMIT

Henry Dean
Executive Director
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406-4680

MARTIN COUNTY
UIC - PORT MAYACA EXPLORATORY WELL
FILE: 0196441-001-UC
(EXPLORATORY WELL EXPM-1)

Dear Mr. Dean:

Enclosed is Permit Number 0196441-001-UC, to construct and test one Class V, Group 9 exploratory well, EXPM-1, to be located near the confluence of the L-65 Canal and the St. Lucie River (in proximity to SFWMD's S-153 water control structure) in Port Mayaca, Martin County, Florida. This permit is issued pursuant to Section(s) 403.087, Florida Statutes and Florida Administrative Codes 62-4, 62-520, 62-522, 62-528 and 62-550.

Any party to this Order (permit) has the right to seek judicial review of the permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, Mail Stop 35, 3900 Commonwealth Blvd., Tallahassee, Florida 32399-3000; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Should you have any questions, please contact Mark A. Silverman, P.G., or Joseph R. May, P.G., of this office at (561) 681-6778 or (561) 681-6691, respectively.

Executed in West Palm Beach, Florida.

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Melissa L. Meeker — 02/03/03
Melissa L. Meeker — Date
Director of District Management
Southeast District

MLM/GLC/LAH/JRM/mas
Copies furnished to:

Jack Maloy, SFWMD/WPB
Peter Kwiatkowski, SFWMD/WPB
Michael Bennett, SFWMD/WPB
Paul Linton, SFWMD/WPB
Steve Anderson, SFWMD/WPB
Glenn Landers/USACE/JAX
Richard Deuerling, FDEP/TLH
George Heuler, FDEP/TLH
Jose Calas, FDEP/WPB
Joseph May, FDEP/WPB
Jonathan Arthur, FGS/TLH
Will Evans, FGS/TLH
Nancy Marsh, USEPA/ATL
Shawn Komlos, USEPA/WPB
Ron Reese, USGS/MIA
Bob Renken, USGS/MIA
Bart Bibler, FDOH/TLH

CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF PERMIT and all copies were mailed before the close of business on 2/3/03 to the listed persons.
Clerk Stamp

FILING AND ACKNOWLEDGMENT FILED, on this date, pursuant to the §120.52, Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Clerk — 2/3/03
Date

Department of
Environmental Protection

Jeb Bush
Governor

Southeast District
400 N. Congress Avenue, Suite 200
West Palm Beach, Florida 33401

David B. Struhs
Secretary

February 3, 2003

PERMITTEE:
Henry Dean
Executive Director
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406-4680

PERMIT/CERTIFICATION NUMBER: 0196441-001-UC
DATE OF ISSUANCE: February 3, 2003
EXPIRATION DATE: February 2, 2008
COUNTY: Martin
POSITION: 26° 59' 28" N / 80° 36' 28" W
PROJECT: PORT MAYACA CLASS V, GROUP 9 EXPLORATORY WELL EXPM-1, ASSOCIATED WITH THE LAKE OKEECHOBEE ASR PILOT PROJECT

PROJECT: Exploratory well permit to construct and test a Class V, Group 9 exploratory well, EXPM-1, near the S-153 Water Control Structure in Port Mayaca, Florida.

This permit is issued under the provisions of Chapter 403.087, Florida Statutes, and Florida Administrative Code (F.A.C.) Rules 62-4, 62-520, 62-522, 62-528 and 62-550. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

TO CONSTRUCT AND TEST: One Class V, Group 9 exploratory well, EXPM-1. Well EXPM-1 shall be completed into the upper Floridan aquifer. This exploratory well shall be constructed with 24-inch outside diameter (O.D.) carbon steel casing extending to a depth of approximately 775 feet below land surface (bls). A nominal 23-inch open borehole shall be drilled to approximately 1,450 feet bls. Depending on the results of testing, the 23-inch open borehole may be partially plugged back. A request for approval of a preliminary uncased storage zone interval may be considered under this exploratory well permit (# 0196441-001-UC) or be addressed when a subsequent construction and testing permit is issued. If a preliminary uncased storage zone interval is approved under this exploratory well permit, then the injection of fluids into EXPM-1 may be authorized, as part of this permit, for a limited injection test using potable water. The objective of such a test would be to measure well hydraulics and facilitate the design of the recharge and recovery pumps for a prospective ASR system, pursuant to Specific Conditions (S.C.s) **2.t.** and **2.u.**

Under the exploratory well permit, the purpose of the proposed exploratory well construction and testing program is to obtain sufficient data to make an initial determination concerning the feasibility of aquifer storage and recovery (ASR) at the site location. The projected future of use of Exploratory Well EXPM-1 is as an ASR well. The Port Mayaca exploratory well is part of the Lake Okeechobee ASR Pilot Project component of the Comprehensive Everglades Restoration Plan (CERP).

IN ACCORDANCE WITH: Application to Construct a Class V exploratory well received February 28, 2002; Request for Information (RFI) dated March 29, 2002; response to RFI received April 18, 2002; RFI dated May 17, 2002; response to RFI received June 18, 2002; RFI dated July 17, 2002; response to RFI received September 30, 2002; comments from the Underground Injection Control - Technical Advisory Committee (UIC-TAC); publication of the Notice of Draft Permit 0196441-001-UC in the Palm Beach Post on November 1, 2002; in consideration of receipt of public comment received as a result of a public meeting held on December 2, 2002; and publication of the Notice of Intent to Issue Permit 0196441-001-UC in the in the Palm Beach Post on December 14, 2002.

LOCATED AT: Proximal to the SFWMD's S-153 water control structure on the L-65 Canal; near the confluence of the L-65 Canal and the St. Lucie River; in Port Mayaca, Martin County, Florida.

SUBJECT TO: General Conditions 1-24 and Specific Conditions 1-8.

GENERAL CONDITIONS:

The following **General Conditions** are referenced in Florida Administrative Code Rule 62-528.307.

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are "permit conditions" and are binding and enforceable pursuant to Section 403.141, F.S.

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action.

3. As provided in Subsection 403.087(7), F.S., the issuance of this permit does not convey any vested rights or exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in this permit.

4. This permit conveys no title to land, water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

5. This permit does not relieve the permittee from liability for harm to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefrom; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

6. The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed and used by the permittee to achieve compliance with the conditions of this permit, or are required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

7. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at reasonable times, access to the premises where the permitted activity is located or conducted to:

   a. Have access to and copy any records that must be kept under conditions of this permit;
   b. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and
   c. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

   Reasonable time will depend on the nature of the concern being investigated.

8. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

   a. A description of and cause of noncompliance; and
   b. The period of noncompliance, including dates and times; or, if not corrected the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent the recurrence of the noncompliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

GENERAL CONDITIONS:

9. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is proscribed by Sections 403.111 and 403.73, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Rules 62-4.120 and 62-528.350, F.A.C. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

12. This permit or a copy thereof shall be kept at the work site of the permitted activity.

13. The permittee shall comply with the following:

    a. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records shall be extended automatically unless the Department determines that the records are no longer required.
    b. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
    c. Records of monitoring information shall include:

        1) the date, exact place, and time of sampling or measurements;
        2) the person responsible for performing the sampling or measurements;
        3) the dates analyses were performed;
        4) the person responsible for performing the analyses;
        5) the analytical techniques or methods used
        6) the results of such analyses

    d. The permittee shall furnish to the Department, within the time requested in writing, any information which the Department requests to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.
    e. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

14. All applications, reports, or information required by the Department shall be certified as being true, accurate, and complete.

15. Reports of compliance or noncompliance with, or any progress reports on, requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each scheduled date.

16. Any permit noncompliance constitutes a violation of the Safe Drinking Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

GENERAL CONDITIONS:

17. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

18. The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

19. This permit may be modified, revoked and reissued, or terminated for cause, as provided in 40 C.F.R. Sections 144.39(a), 144.40(a), and 144.41 (1998). The filing of a request by the permittee for a permit modification, revocation or reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

20. The permittee shall retain all records of all monitoring information concerning the nature and composition of injected fluid until five years after completion of any plugging and abandonment procedures specified under Rule 62-528.435, F.A.C. The permittee shall deliver the records to the Department office that issued the permit at the conclusion of the retention period unless the permittee elects to continue retention of the records.

21. All reports and other submittals required to comply with this permit shall be signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C. All reports shall contain the certification required in Rule 62-528.340(4), F.A.C.

22. The permittee shall notify the Department as soon as possible of any planned physical alterations or additions to the permitted facility. In addition, prior approval is required for activities described in Rule 62-528.410(1)(h).

23. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or injection activity which may result in noncompliance with permit requirements.

24. The permittee shall report any noncompliance which may endanger health or the environment including:

    a. Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water; or
    b. Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

    All information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

SPECIFIC CONDITIONS:

1. General Requirements

   a. This permit is to construct and test a Class V, Group 9 exploratory well, referred to herein as Well EXPM-1. The exploratory well system will include the existing SFWMD Test Well MF-37 for monitoring during the performance of an aquifer performance test (APT). This permit allows only for the construction and testing of EXPM-1 as an exploratory well in accordance with Chapter 62-528, F.A.C. A request for approval of a preliminary uncased storage zone interval may be considered under this exploratory well permit or be addressed when a subsequent construction and testing permit is issued. If a preliminary uncased storage zone interval is approved under this exploratory well permit, then the injection of fluids into EXPM-1 may be authorized, as part of this permit, for a limited injection test using potable water (see Specific Condition [S.C.] **4.h.**). The objective of such a test would be to measure well hydraulics and facilitate the design of the recharge and recovery pumps for a prospective ASR system, pursuant to S.C.s **2.t.** and **2.u.** Any modification of this exploratory well system to accept/inject waters — other than a limited injection test — must be accomplished through the regulatory process and will require an application for issuance of a new permit from the Department.

   b. The permittee shall be subject to all requirements and regulations of Martin County and the South Florida Water Management District regarding the construction and testing of this exploratory well.

   c. Four permanent surficial aquifer monitor wells, identified as Pad Monitor Wells (PMWs), shall be located near the corners of the pad to be constructed for Well EXPM-1, and shall be identified by location number and pad location, i.e. NW, NE, SW, and SE. If located in a traffic area the well head(s) must be protected by traffic bearing enclosure(s) and cover(s). Each cover must lock and be specifically marked to identify the well and its purpose. The PMWs shall be sampled as follows:

      1) During the construction and associated testing phases, the PMWs shall be sampled weekly for chlorides (mg/L), specific conductance (µmho/cm or µS/cm), temperature and water level (relative to the North American Vertical Datum of 1988 [NAVD 88]).
      2) The PMWs shall be sampled 48 hours prior to any maintenance, testing (including mechanical integrity testing) or repairs to the system which represent an increased potential for accidental discharge to the surficial aquifer.
      3) Samples shall also be analyzed for total dissolved solids (mg/L) during the first four weeks following the onset of drilling activities for the exploratory well; during events as described under Item **2)** above; and at all times when specifically requested by the Department (to supplement the parameters included under Item **1)** above).

      The results of the PMW analyses shall be submitted to the Department within 30 days of the completion of the activity. A summary sheet from the FDEP Southeast District is attached for your use when reporting the above information. The PMWs may be retained in service for subsequent sampling, which would be required once a construction permit is granted (for potential additional construction or operational testing).

   d. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures.

2. Construction and Testing Requirements

   a. Blow-out preventers shall be installed on the exploratory well prior to penetration of the Floridan Aquifer.

   b. The measurement points for drilling and logging operations shall be surveyed and referenced to NAVD 88 prior to the onset of drilling activities for the exploratory well.

SPECIFIC CONDITIONS:

c. No drilling operations shall begin without an approved disposal site for drilling fluids, cuttings, or waste. It shall be the permittee's responsibility to obtain the necessary approval(s) for disposal prior to the start of construction. Any formation waters discharged to surface or surficial aquifer waters during aquifer performance test shall require an Industrial Wastewater permit from the Department.

d. The Department shall be notified within 48 hours after work has commenced.

e. Hurricane Preparedness - Upon the issuance of a "Hurricane Watch" by the National Weather Service, the preparations to be made include but are not necessarily limited to the following:

1) Secure all on-site salt and stockpiled additive materials to prevent surface and/or groundwater contamination.

2) Properly secure drilling equipment and rig(s) to prevent damage to well(s) and on-site treatment process equipment.

f. Waters spilled during construction or testing of the exploratory well shall be contained and properly disposed.

g. Department approval and UIC-TAC review is required prior to the following stages of construction:

1) Spud date
2) Exploratory well (EXPM-1) final casing seat
3) Plugging back open hole in Exploratory Well EXPM-1 (if proposed under this permit)
4) Exploratory well (EXPM-1) preliminary uncased storage zone interval (if proposed under this permit)

h. Department notification is required prior to the following stages of construction and testing:

1) Selection of interval-test intervals based upon testing at MF-37 and EXPM-1
2) Selection of core intervals based upon testing at Test Well MF-37

i. The geophysical logging program, during the drilling of Exploratory Well EXPM-1, shall at a minimum include:

1) Pilot-hole from approximately 40 feet to 225 feet bls (base of surficial aquifer):

- Caliper
- Natural gamma
- Dual induction
- Spontaneous potential
- Borehole compensated sonic

2) Pilot-hole from approximately 180 feet to 850 feet bls:

- Caliper
- Natural gamma
- Dual induction
- Spontaneous potential
- Borehole compensated sonic

— continued on next page —

SPECIFIC CONDITIONS:

3) Pilot-hole — as well as reamed hole — below the final casing to a maximum depth of approximately 1,450 feet bls (These logs shall be completed in at least two intervals that encompass the entire section from the base of the final casing to 1,450 ft bls):

- Caliper
- Natural gamma
- Dual induction
- Spontaneous potential
- Borehole compensated sonic with VDL display
- Fluid resistivity
- Downhole video survey with rotating lens
- Temperature
- Flowmeter (run under pumping and static conditions)

4) Completed well:

- Downhole video survey with rotating lens
- Cement Bond Log

j. Caliper and natural gamma logs shall be run on all reamed holes.

k. Temperature and natural gamma logs shall be run after each stage of cementing on all casings to identify the top of the cement.

l. Upon completion of well construction, background water quality sampling shall be performed to determine water quality characteristics (chlorides, conductivity, total dissolved solids, temperature and pH). If a preliminary uncased storage zone interval has been approved under this exploratory well permit, then the background water quality sampling shall also include the water quality parameters listed on Table B-3 of the exploratory well permit application document received February 28, 2002. [See S.C. **4.h.5)**]

m. Hydrogeologic testing of the upper Floridan aquifer (from approximately 775 to 1,450 feet bls) shall include:

1) Interval tests to be performed to determine the characteristics of the anticipated flow zones. A flow test shall be performed for each interval test and a water quality sample collected to determine the hydraulic and water quality characteristics of the tested intervals. Samples shall be analyzed for chlorides, temperature adjusted specific conductance, TDS, major cations and anions, SiO_2, trace metals (including arsenic), and stable isotopes (including ^{18}O and deuterium). The flow test shall be of sufficient duration to achieve stabilization of water levels and water quality. Pre- and post-test monitoring shall be performed to achieve stabilization of water levels.

2) Preliminary aquifer performance testing (APT) to include monitoring during:

a) 7-day background phase.

b) 24-hour constant rate discharge phase.

c) 12-hour recovery phase

n. Towards the evaluation of the potential for upconing of poorer quality water, water quality samples shall be collected at the beginning, middle and end of the constant rate discharge phase of the APT. These samples shall be analyzed for chlorides (mg/L), pH, specific conductance (µmho/cm or µS/cm), temperature, and total dissolved solids (TDS), at a minimum.

o. The Department shall be notified at least seventy-two (72) hours prior to all testing for mechanical integrity.

p. All testing for mechanical integrity must be initiated during normal business hours, Monday through Friday.

SPECIFIC CONDITIONS:

q. A pressure test for the final casing shall be performed. The final casing must be tested for sixty (60) minutes with a fluid-filled casing at 1.5 times the maximum expected operating pressure with a test tolerance of + or - 5%. A Certificate of Calibration of the pressure gauge must be provided to the Department staff witnessing the test, prior to commencement of the test, and with the final test reports.

r. UIC-TAC meetings are scheduled on the 2nd and 4th Tuesday of each month subject to a 5-working day prior notice and timely receipt of critical data by all UIC-TAC members and the USEPA, Region IV, Atlanta. Emergency meetings may be arranged when justified to avoid undue construction delays.

s. Department approval at a scheduled UIC-TAC meeting shall be based on the permittee's presentation that shows compliance with Department rules and this permit.

t. No fluids shall be injected without prior written authorization from the Department.

u. The only source of injectate shall be water meeting all Primary and Secondary drinking water quality standards and minimum criteria parameters unless otherwise exempted. All parameters that are not exempted under a water quality criteria exemption, variance or waiver, as appropriate, shall meet the appropriate standard at all times.

3. Quality Assurance/Quality Control Requirements

a. Pursuant to Rule 62-528.440(5)(b), F.A.C., the Professional Engineer(s) of Record shall certify all documents related to the completion of the exploratory well. The Department shall be notified immediately of any change of the Engineer(s) of Record.

b. In accordance with Section 492, Florida Statutes, all documents prepared for the geological/hydrogeological evaluation of the exploratory well shall be signed and sealed by a Florida Licensed Professional Geologist or qualified Florida Licensed Professional Engineer.

c. Continuous on-site supervision by qualified personnel (engineer or geologist) is required during all pilot-hole drilling, testing, geophysical logging, casing installation and cementing operations.

4. Reporting Requirements

a. All reports and surveys required by this permit shall be submitted concurrently to all members of the UIC-TAC as well as to the Atlanta and West Palm Beach offices of USEPA, Region IV (see attached list). The UIC-TAC shall consist of representatives of the following agencies:

- Department of Environmental Protection, West Palm Beach and Tallahassee
- Florida Geological Survey, Tallahassee
- United States Geological Survey (USGS), Miami

b. Prior to site preparation for the exploratory well (EXPM-1), the following items shall be submitted to the Department, all members of the UIC-TAC and to the Atlanta and West Palm Beach offices of USEPA, Region IV:

1) A drilling and construction schedule.
2) Contract documents
3) Site drawing(s) produced at a scale that shows well locations (including EXPM-1 and SFWMD Test Well MF-37 and all surface features of the exploratory well system).

SPECIFIC CONDITIONS:

c. Weekly progress reports — certified by a Florida Licensed Professional Geologist or qualified Florida Licensed Professional Engineer, pursuant to S.C.s **3.b.** and **7.a.** — shall be submitted throughout the construction period, and shall include at a minimum the following information:

1) A cover letter summary of the daily engineer report, driller's log and a projection for activities in the next reporting period.
2) Daily engineers report and driller's log with detailed descriptions of all drilling progress, cementing, testing, logging, and casing installation activities.
3) Lithologic and geophysical logs, hydrogeologic/specific capacity and APT results, and water quality test results.
4) Well development records.
5) Interpretations included with all test results, logs and well development activities submitted under Items **2)**, **3)** and **4)** above.
6) Detailed description of any unusual construction-related events that occur during the reporting period.
7) Weekly water quality analysis and water levels for the four PMWs.

d. The Department and other applicable agencies must be notified of any unusual or abnormal events occurring during construction, and in the event the Permittee is temporarily unable to comply with the provisions of the permit (e.g., on-site spills, artesian flows, large volume circulation losses, equipment damage due to: fire, wind and drilling difficulties, etc.). Any information shall be provided orally within 24 hours from the time that the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time that the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

e. Per Rules 62-528.410(4)(c) and 62-528.605(2), F.A.C., the Department must approve the selection of the specific final casing seat. In order to obtain an approval, the permittee shall submit a request to the Department. Each request shall be submitted concurrently to all members of the UIC-TAC and to the Atlanta and West Palm Beach offices of USEPA, Region IV. To the extent possible, the casing seat request shall be accompanied by technical justification, including but not limited to, the following items:

1) Lithologic and geophysical logs with interpretations, as the interpretations relate to the casing seat.
2) Water quality data.
3) Identification of confining unit(s), including hydrogeologic data and interpretations.
4) Identification of monitoring zone.
5) Casing depth evaluation (mechanically secure formation, potential for grout seal).
6) Lithologic drilling rate and weight on bit data, with interpretations (related to the casing seat).

f. A submittal requesting a preliminary uncased storage zone interval for the exploratory well (EXPM-1) — if proposed under this permit — shall include, but not necessarily be limited to, the following:

1) Lithologic and geophysical logs with interpretations, as the interpretations relate to the requested storage zone.
2) Water quality of proposed storage zone.
3) Identification of confining unit(s), including hydrogeologic data and interpretations.
4) Transmissivity or specific capacity of proposed storage zone.

SPECIFIC CONDITIONS:

g. A submittal for a request for approval to plug back the exploratory well open hole to modify the storage zone — if proposed under this permit — shall include:

1) Withdrawal test data for the storage zone, with interpretations and evaluation.
2) Water quality reports.
3) Geophysical log interpretations including flow analysis, as the interpretations relate to the request.
4) Identification of storage zone boundaries and characteristics.
5) Demonstration of confinement and evaluation of potential for upconing of poorer quality water.

h. A request to perform a limited injection test (of short duration, in order to measure well hydraulics and facilitate the design of the recharge and recovery pumps of a prospective ASR system, pursuant to S.C. **2.u.**) shall include:

1) Cement bond logs and interpretation.
2) Final downhole television survey with interpretation.
3) Demonstration of mechanical integrity.
4) Planned injection procedures, including but not limited to duration of testing, and planned injection and recovery flow rates.
5) Background water quality results from the storage zone of Well EXPM-1, for the water quality parameters listed on Table B-3 of the exploratory well permit application document received February 28, 2002. [See S.C. **2.l.**]
6) Water quality results for the proposed potable water to be used for the limited injection test, sampled within six months of submission of the limited injection test request, for dissolved oxygen and total trihalomethanes.

i. An interpretation of all test results must be submitted with all submittals.

j. Upon completion of analysis of cores and sample cuttings, the permittee shall contact the UIC Section of the Department of Environmental Protection in Tallahassee to arrange their transfer to the Florida State Geologic Survey.

k. The Florida Geological Survey (FGS) is currently involved in a study that is investigating the effects of ASR on the storage aquifers. For this reason, it is requested that at least one five (5)-gallon sample of ambient ground water be collected from the storage zone intervals where the interval/packer tests will be conducted for FGS analyses. Dr. Jon Arthur at the FGS will arrange for the samples to be collected. He can be contacted at the Florida Geological Survey at 903 West Tennessee Street, Tallahassee FL 32304-7700, phone number (850) 488-9380.

l. A 5-gallon sample of formation fluid shall be collected from the completed well after development but before injection begins. Samples should be labeled as to well number, depth, and type of sample. The samples shall be shipped to Florida State University, Department of Geological Sciences, 108 Carraway Building, Tallahassee, FL 32306-4100.

— continued on next page —

SPECIFIC CONDITIONS:

m. Upon completion of construction and testing of the exploratory well, a final report shall be submitted to the Department, the UIC-TAC and to the Atlanta and West Palm Beach offices of USEPA, Region IV. The report shall include, but not be limited to, all information and data collected under Rules 62-528.605, 62-528.615, and 62-528.635, F.A.C., with appropriate interpretations. To the extent possible, the report should include:

1) Transmissivity test data for intervals tested in the upper Floridan aquifer, with evaluation.
2) Evaluation of the maximum ASR capacity within safe pressure limits (if an ASR well open interval/storage zone is proposed and tested).
3) Detailed results and analysis of aquifer performance testing.
4) Evaluation of confinement and potential for upconing of poorer quality water.
5) Record (as-built) drawings of the exploratory well (EXPM-1) and surface equipment, certified by the engineer of record.
6) Well location (EXPM-1) surveyed relative to permanent reference points by a Florida registered land surveyor, and located on a site plan by latitude and longitude.
7) Factory mill certificates for all casing pipe (EXPM-1).
8) Summary of all water quality, water level and well testing data collected, with conclusions and recommendations.

5. Surface Equipment

a. The exploratory well surface equipment and piping shall be kept free of corrosion at all times.

b. Spillage onto the exploratory well pad during construction activities, and any waters spilled during mechanical integrity testing, other maintenance, testing or repairs to the system shall be contained by an impermeable wall around the edge of the pad and disposed of via approved and permitted methods.

c. The four surficial aquifer monitor wells installed at the corners of the well pad shall be secured, maintained, and retained in service.

6. Plugging and Abandonment

a. The permittee shall unconditionally obligate themselves to plug and abandon the exploratory well, EXPM-1 (with the appropriate Department permit), should the well become a threat to the waters of the State, if the well is no longer used or usable for its intended purpose or other purpose as approved by the Department, per Rule 62-528.645(1), F.A.C.

b. In the event the exploratory well must be plugged and abandoned, the permittee shall obtain an FDEP permit, as required by Rule 62-528.645, F.A.C.

7. Signatories

a. All reports and other submittals required to comply with this permit shall be signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C.

SPECIFIC CONDITIONS:

b. In accordance with Rule 62-528.340(4), F.A.C., all reports and submittals shall contain the following certification signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C. or be included under such certification as may have been previously provided (i.e., responses to a Request for Information (RFI) which are simple clarifications are thereby certified):

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

8. Permit Extension(s) and Renewal(s)

a. Pursuant to Rule 62-4.080(3), a permittee may request that a permit be extended as a modification of an existing permit. A request for an extension is the responsibility of the permittee and shall be submitted to the Department before the expiration of the permit. In accordance with Rule 62-4.070(4), F.A.C., a permit cannot be extended beyond the maximum 5-year statutory limit.

b. If construction or testing of this well is to continue beyond the expiration date of this permit the permittee shall apply for, and obtain, a new exploratory well or construction permit.

c. Testing of this exploratory well shall cease upon expiration of this permit, unless a new permit is issued by the Department, or a timely renewal application (Rules 62-4.090, F.A.C. and 62-528.307(2)(a), F.A.C.) for an exploratory well permit has been submitted to the Department.

Issued this 3rd day of February, 2003

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Melissa L. Meeker
Director of District Management
Southeast District

MLM/JLC/LAH/JRM/mas

SOUTHEAST DISTRICT UIC SECTION
SURFICIAL AQUIFER MONITORING WELL (SAMW) REPORT

FACILITY NAME _____

REPORT MONTH/YR. _____

OPERATOR NAME _____ LICENSE # _____

INJECTION WELL # _____ PERMIT # _____

SAMPLING DATE _____ TIME _____

	SAMW #1	SAMW #2	SAMW #3	SAMW #4
LOCATION	NE CORNER	NW CORNER	SE CORNER	SW CORNER
ELEVATION OF TOC* (NAVD)				
DEPTH TO WATER (TOC*)				
WATER LEVEL (NAVD)				
CHLORIDE (mg/l)				
CONDUCTIVITY(µmhos/cm)				
TOTAL DISOLV. SOLIDS (mg/l)				
TEMPERATURE (° F.)				

* TOC: indicates the "top of the casing" of the Surficial Aquifer Monitoring Well

ANALYZED BY _____ SAMPLED BY _____

PHONE # _____ TITLE _____

SITE PLAN OF SAMW LOCATIONS

Appendix B

Construction Progress Summary
EXPM-1, St. Lucie Canal Site

Date	Description of Activities
4/12/2003	Project Initiation (Notice to Proceed)
5/12/2003	Site preparation and mobilzation
5/13/2003	Drill a 48-inch diameter hole to 34 feet bpl.
5/13/2003	Install pit casing (30 ft; 42-inch steel)
5/28/2003	Drill a 12 1/4-inch diameter pilot hole to 230 feet bpl.
5/28/2003	Conduct geophysical logging on pilot hole to 230 feet bpl (natural gamma, X-Y caliper, DIL).
6/10/2003	Ream pilot hole with a 40-inch diameter bit to 158 feet bpl.
6/10/2003	Conduct geophysical logging on reamed pilot hole (natural gamma and X-Y caliper)
6/10/2003	Install surface casing (155 ft; 34-inch steel)
6/20/2003	Drill a 9 7/8-inch diameter pilot hole to 617 feet bpl.
6/24/2003	Core from 617 to 637 feet bpl. (no recovery)
6/24/2003	Core from 637 to 648 feet bpl. (11 feet of recovery)
6/25/2003	Drill a 9 7/8-inch diameter pilot hole to 875 feet bpl.
6/26/2003	Conduct geophysical logging on pilot hole to 875 feet bpl (natural gamma, X-Y caliper, DIL, DT)
7/21/2003	Ream pilot hole with 34-inch diameter bit to 803 feet bpl.
7/21/2003	Conduct geophysical logging on pilot hole to 803 feet bpl. (caliper and natural gamma)
7/22/2003	Installed 24-inch steel production casing to 800 feet bpl.
7/22/2003	Pressure grout 1,000 sacks of neat cement.
7/22/2003	Run temperature survey to verify top of cement
7/22/2003	Second stage of grouting (500 sacks of neat cement) completed to land surface.
7/23/2003	Run temperature survey and CBL to verify top of cement and the integrity
7/23/2003	Third stage of grouting (100 sacks of neat cement) completed to land surface.
8/6/2003	Conduct 100-psi pressure test of 24-inch casing.
8/6/2003	Drillers switch to reverse air method.
8/12/2003	Drill out cement plug (as a result of pressure grouting) with 33-inch diameter bit.
8/18/2003	Drill a 7 7/8-inch diameter pilot hole to 900 feet bpl.
8/19/2003	Coring from 900 to 920 feet bpl (6 feet Recovery)
8/21/2003	Coring from 920 to 940 feet bpl (12.5 feet of Recovery)
8/26/2003	Drill a 7 7/8-inch diameter pilot hole to 1,050 feet bpl
8/26/2003	Coring from 1,050 to 1,070 feet bpl (12 feet of Recovery)
8/28/2003	Drill a 7 7/8-inch diameter pilot hole to 1,340 feet bpl.
8/29/2003	Coring from 1,340 to 1,348 feet bpl (8 feet of Recovery, bit plugged at 1,348 feet bpl.)
9/1/2003	Drill a 7 7/8-inch diameter pilot hole to 1,380 feet bpl.
9/5/2003	Conduct geophysical logging on pilot hole to 2046 feet bpl (caliper, spectral natural gamma, HRIL, sonic, compensated density, compensated nuetron, PE, and formation microscanner.
9/6/2003	Conduct geophysical logging and a video survey on pilot hole to 1500 feet bpl. (fluid resistivity, temperature, flow, and borehole video survey)
9/12/2003	Back plug nominal 8-inch diameter pilot hole to 1,073 feet bpl. with Type II neat cement
9/16/2003	Packer test was conducted from 800 to 845 feet bpl.
9/23/2003	Back plug nominal 8-inch diameter pilot hole to 900 feet bpl. with Type II neat cement
9/25/2003	Ream pilot hole with 23-inch diameter bit to 900 feet bpl.
10/7/2003	Conduct Specific Capacity Test
10/13/2003	Ream pilot hole with 23-inch diameter bit to 1,040 feet bpl.
10/15/2003	Conduct Specific Capacity Test
10/18/2003	Conduct geophysical logging on pilot hole to 2046 feet bpl (caliper, spectral natural gamma, HRIL, sonic, compensated density, compensated nuetron, PE, and formation microscanner.
10/22/2003	Well acidization was conducted to the open hole section of EXPM-1.
11/3/2003	Conduct Specific Capacity Test
11/5/2003	Conduct 24-hour Pump Test
11/13/2003	Site restoration and demobilization

DIVERSIFIED DRILLING CORPORATION

P.O. Box 290699 • Tampa Florida 33687-0699
Phone 813-988-1132 • Fax 813-985-6636

Exploration Wells for the ASR Pilot Projects

South Florida Water Management District
Port Mayaca Site

Submittal Number: 11
42" x 0.375" Steel Casing

DEVIATIONS: **NONE** ✓ ; **AS LISTED** _____

REFERENCE SPECIFICATION NUMBER _____

REFERENCE DRAWING NUMBER _____

CONTRACTOR HAS REVIEWED AND SUBMITTED FOR REVIEW

SIGNATURE _____ **DATE** 5-28-03
DIVERSIFIED DRILLING CORPORATION

SA PES USA, Inc
PO Box 2349
Baytown, TX. 77522-2349

Metallurgical and Pipe Test Report

Page 1

Date:	PO Number:	This is to certify that the product described herein was manufactured, sampled and tested in accordance with the specifications and requirements in such specifications.	MTR NUMBER
1/22/02	TBR-5181		28239

Approved	Date:
	5/01/02

Customer:
THOMAS PIPE & STEEL
1444 HIGHLAND RD.
BATON ROUGE, LA 70809

Weld seam inspected by fluoroscopic NDE method.

Ship to Address:
THOMAS PIPE & STEEL

CUSTOMER PICK-UP

API 5L January 2000 42nd Ed.

Diameter	Wall	Grade	Heat Number
42	.375	B/X42 PSL1	5G7820

Hydrotest Results

HYDRO PSI:	HYDRO TIME:
680	10 Seconds (Min)

Physical Testing Results

Trans Body Tensile

Yield PSI	Tensile PSI	Elongation-%	C Width
58344	76576	39	1.486

Weld Tensile		Guided Bend (weld)	
Tensile PSI	C Width	Root	Face
75903	1.489	OK	OK

Weld Tensile Fracture location:
Base Metal

Comments

MEETS NACE MR 0175;
SR 15 AND SR 18

DSAW MATERIAL

CERTIFIED COPY

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 21294
BARTOW STEEL REF. # 26430

Chemical Analysis Results

Heat	C:	Mn:	P:	S:	Si:	Cu:	Ni:	Cr:	Mo:	Al:	V:	Ti:	Nb:	CE
5G7820	0.16	1.09	0.014	0.0069	0.276	0.01	0	0.01	0	0.042	0.002	0	0.001	0.34
Product 1	0.17	1.09	0.013	0.008	0.27	0.006	0.005	0.012	0	0.051	0.002	0.002	0.001	0.36
Product 2	0.18	1.11	0.013	0.008	0.27	0.007	0.005	0.012	0	0.051	0.002	0.002	0.001	0.37

DIVERSIFIED DRILLING CORPORATION

P.O. Box 290699 • Tampa Florida 33687-0699
Phone 813-988-1132 • Fax 813-985-6636

Exploration Wells for the ASR Pilot Projects

South Florida Water Management District
Port Mayaca Site

Submittal Number: 12
34" x 0.375" Steel Casing

DEVIATIONS: **NONE** ✓ ; **AS LISTED** _____

REFERENCE SPECIFICATION NUMBER _____

REFERENCE DRAWING NUMBER _____

CONTRACTOR HAS REVIEWED AND SUBMITTED FOR REVIEW

SIGNATURE _____ **DATE** 6-3-05
DIVERSIFIED DRILLING CORPORATION

VASS PIPE & STEEL CO., INC.

A DEPENDABLE SOURCE YOU CAN COUNT ON

158 THIRD STREET · P.O. BOX 583 · MINEOLA · NY 11501 · TEL: 516.741.8398 · FAX: 516.741.8210

ATTN: JOE

DATE: 5/16/03

COMPANY: DIVERSIFIED DRILLING CORP.

FROM:JENNY REYES

FAX #813-917-5563

PIPE TALLY / PACKING SLIP

P.O.#21284 RELEASE#28675

321.6	8 PCS X 40.2' 34" BPE API5LB .375W DSAW	8 X	40.2		

NKK 日本鋼管株式会社 NKK CORPORATION

検査証明書
INSPECTION CERTIFICATE

本　社：〒100-8202 東京都千代田区丸の内1丁目1番2号
Head Office : 1-1-2, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8202 JAPAN

需要家 Purchaser :

証明書番号 Certificate No. : UE-01-0273- 1/ 1

日付 Date : JUL.23,2001

需要家管理番号 Purchaser's Order No. : PT-5764

注文者 Trading Co., : ITOCHU CORPORATION

注文者照合番号 Reference No. : 002438 78970A++

品名 Commodity : SUBMERGED ARC WELDED STEEL PIPE (U.O.E)

船番 Ship's No. :

規格 Specification : API 5L-X42-PSL2/B-PSL2 & CUSTOMER'S SPEC.

工事番号 Construction No. :

寸法 Size(ODxwT): 34INDX0.375IN

MPS No. :

需要家管理番号 Purchaser's Order No.	契約番号・行番 Contract No.	長さ Length	本数 Number of Pieces	延長さ Total Length	質量 Mass(Kgs)
	U047111-004	40FT	26		63,596
		TOTAL	26		63,596

※AL:ladle分析 Ladle Analysis
P:製品分析 Product Analysis
W:溶着部 Deposited Metal
B:母材部 Base Metal
O:外面 Outside
I:内面 Inside

化学成分 (Chemical Composition) (%)

製造番号 Mf. No.	溶解番号 Heat No.			C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Cb Nb	V	Ti	Al	B	N
			L	Min														
				Max														
			PB	Min														
				Max														
		※A	※1		X100		X1000				X100			X1000	X10000			

引張試験 (Tensile Test)

		※1	※B	※C	※3	耐力 Y.S	引張強さ T.S	伸び El %	降伏比 YR%
製造番号 Mf. No. (鋼番 Heat No.)	Min.								
	Max.								
	Min.								
	Max.								
	Min.								
	Max.								
	Min.								
	Max.								

曲げ試験 (Bend Test)

※D:曲げ性 A= Dimension

製造番号 Mf. No. (鋼番 Heat No.)	※1	※3	内面 FB	裏面 RB	側面 SB	自由 FR

硬度試験 (Hardness Test)

試験Method: 荷重Load :

製造番号 Mf. No. (鋼番 Heat No.)	※1	※3	※G		母材部 Body	溶接熱影響部 H. A. Z	溶接部 Weld
				Min.			
				Max.			
			O				
			I				
			O				
			I				

※B 位置 Position T:横方向 Transverse L:縦方向 Longitudinal
S:母材部 Base Metal W:溶着部 Weld D:全溶着金属 All Weld Metal
※C 単位 Unit B:Psi K:kgf/mm² M:MPa N:N/mm² S:ksi
※3 位置 Position O:外面 Outside C:中央 Center I:内面 Inside
Bend Test FB:Face Bend RB:Root Bend SB:Side Bend
FR:Free Bend G:合格 Good

衝撃試験 (Charpy Impact Test) [寸法 Size:]

※F 位置 Pos. ( )
試験温度 Temperature

製造番号 Mf. No. (鋼番 Heat No.)	※1	※E	※3	Energy	SA%	Energy	SA%	Energy	SA%	Energy	SA%
			Min.								
			Ave.								
			1								
			2								
			3								
			Ave								
			1								
			2								
			3								
			Ave								

落重試験 (Drop Weight Tear Test)

試験温度 Temperature :
単位 Unit:

製造番号 Mf. No. (鋼番 Heat No.)	※1	※3	位置 Pos.		Energy	SA%
				Min.		
				Ave.		
				Min.		
				Ave.		
				1		
				2		
				3		
				Ave.		
				1		
				2		
				3		
				Ave.		

※E 単位 Unit FB:Ft-lbs J:Joules JC:Joules/cm² KM:Kgf-m KC:Kgf-m/cm² NM:N-m NC:N-m/cm² M:mm L:mils

※1:頻度 Sampling Frequency :

検査結果 Inspection Results [G-GOOD]

外観・寸法 Visual & Dimension	水圧試験 Hydrostatic Test	※2 NDI UT	RT	MT	PT	超音波探傷 Coating Test
	830 PSI					
G	10 SEC.	G	G			

※2:Non Destructive Inspection
UT:Ultrasonic Inspection
RT:Radiographic Inspection
MT:Magnetic Particle Inspection
PT:Dye Penetrant Inspection

試験 Test (※R:Results)	※R	Page No.
CHEMICAL COMPOSITION	G	1 - 1
TENSILE TEST	G	2 - 4
BEND TEST	G	5 - 5
CHARPY IMPACT TEST	G	6 - 6
HARDNESS TEST	G	7 - 7

HARDNESS AS PER NACE MR01-75

上記商品は検査の結果指定の規格に合格していることを証明いたします。
We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

T. Ikemoto
Manager

化学成分
Chemical Composition

証明書番号
Certificate No. : UE-01-0273

BASE METAL

頻度
Sampling Frequency : 2/ 1HEAT

Page : 1

製造番号 Manufacture No.					17-00064	17-00066			
鋼番 管理Code-Heat No.					1-7528	1-7528			
			Min.	Max.					
C	%	L		0.22	0.14	0.14			
		P		0.22	0.13	0.13			
Si	%	L		-	0.29	0.29			
		P		-	0.27	0.28			
Mn	%	L		1.20	1.16	1.16			
		P		1.20	1.15	1.16			
P	%	L		0.025	0.017	0.017			
		P		0.025	0.018	0.018			
S	%	L		0.015	0.009	0.009			
		P		0.015	0.010	0.010			
Cu	%	L		-	0.01	0.01			
		P		-	0.01	0.01			
Ni	%	L		-	0.02	0.02			
		P		-	0.02	0.02			
Cr	%	L		-	0.04	0.04			
		P		-	0.04	0.04			
Mo	%	L		-	0.00	0.00			
		P		-	0.00	0.00			
V	%	L		-	0.006	0.006			
		P		-	0.006	0.006			
Nb	%	L		-	0.000	0.000			
		P		-	0.000	0.000			
Ti	%	L		-	0.000	0.000			
		P		-	0.000	0.000			
B	%	L		-	0.0000	0.0000			
		P		-	0.0000	0.0000			
Nb+V +Ti	%	L		0.15	0.01	0.01			
		P		0.15	0.01	0.01			
Ceq. 78	%	L							
		P		0.43	0.33	0.33			
Pcm.	%	L							
		P		0.25	0.20	0.20			
		L							
		P							
		L							
		P							
		L							
		P							
		L							
		P							
		L							
		P							
		L							
		P							
		L							
		P							
		L							
		P							

Note L: Ladle Analysis – とりべ分析
P: Product Analysis – 製品分析

Ceq.78= C+Mn/6+(Cu+Ni)/15+(Cr+Mo+V)/5
Pcm. = C+Si/30+(Mn+Cu+Cr)/20+Ni/60+Mo/15+V/10+5B

引 張 試 験 Tensile Test

証明書番号
Certificate No. :UE-01-0273

Testing Frequency :1/ 100P/HEAT
単位
Unit : KSI

Page :2

試片記号 Spec. Mark		耐 力 Yield Strength	引張強さ Tensile Strength	伸 び Elongation(%)	降伏比 Yield Ratio(%)
	Min.	42.0	60.0	28	
TS	Max.	72.0	110.0		93
	Min.				
	Max.				
	Min.				
	Max.				
	Min.				
	Max.				

製造番号 Manufacture No.	鋼番 管理 Code-Heat No.	試片記号 Spec. Mark	耐 力 Yield Strength	引張強さ Tensile Strength	伸 び Elongation	降伏比 Yield Ratio
17-00066	1-7528	TS	63.1	80.4	31	78

e Spec. Mark:試片記号
TS:Transverse Stock 横材横方向
LS:Longitudinal Stock 横材縦方向
TW:Transverse in Weld 溶接横方向
LW:Longitudinal in Weld 溶接縦方向

TS: Strip (W=38.1mm)

引 張 試 験 Tensile Test

証明書番号
Certificate No. :UE-01-0273

Page :3

Testing Frequency :1/ 100P
単 位
Unit : KSI

試片記号 Spec. Mark		耐 力 Yield Strength	引張強さ Tensile Strength	伸 び Elongation(%)	降伏比 Yield Ratio(%)	
TW	Min.		60.0			
	Max.		110.0			
	Min.					
	Max.					
	Min.					
	Max.					
	Min.					
	Max.					

製造番号 Manufacture No.	鋼番 管理 Code-Heat No.	試片記号 Spec. Mark	耐 力 Yield Strength	引張強さ Tensile Strength	伸 び Elongation	降伏比 Yield Ratio
17-00064	1-7528	TW		85.4		

N: Spec. Mark:
TS: Transverse Stock
LS:Longitudinal Stock
TW:Transverse In Weld
LW:Longitudinal In Weld

引 張 試 験 Tensile Test

証明書番号
Certificate No. :UE-01-0273

£ (CONTROL)
Sampling Frequency :1/ 1HEAT

Page :4

単 位
Unit : KSI

試片記号 Spec. Mark		耐 力 Yield Strength	引張強さ Tensile Strength	伸 び Elongation(%)	降伏比 Yield Ratio(%)
	Min.	42.0	60.0	28	
TS	Max.	72.0	110.0		93
	Min.				
	Max.				
	Min.				
	Max.				
	Min.				
	Max.				

製造番号 Manufacture No.	鋼 番 管理 Code-Heat No.	試片記号 Spec. Mark	耐 力 Yield Strength	引張強さ Tensile Strength	伸 び Elongation	降伏比 Yield Ratio
17-00064	1-7528	TS	63.2	80.8	31	78

Spec. Mark:試付記号
TS:Transverse Stock 幅材横取り TS: Strip (W=38.1mm)
LS:Longitudinal Stock 幅材縦取り
Tw:Transverse in weld 溶接横取り
Lw:Longitudinal in weld 溶接縦取り

曲 げ 試 験 Bend Test

証明書番号
Certificate No. : UE-01-0273

頻 度
Sampling Frequency : 1/ 50P

製造番号 Manufacture No.	鋼 番 管理 - Heat Code No.	Bend Test A= 2.6 IN Face	Root		製造番号 Manufacture No.	鋼 番 管理 - Heat Code No.	Bend Test Face	Root	
17-00064	1-7528	GOOD	GOOD						

シャルピー衝撃試験　Charpy Impact Test

証明書番号
Certificate No. : UE-01-0273

Page : 6

頻度
Testing Frequency : 1/ 100P/HEAT

単位
Unit : FT-LBS

	Test Temperature	Energy Min.	Energy Ave.	Fracture(%) Min.	Fracture(%) Ave.	試片寸法 Specimen Size
TRANSVERSE BODY	14.0°F	-	-			10 X 6.7 2mm V Notch

製造番号 Manufacture No.		17-00066									
鋼番 管理Code-Heat No.		1-7528									
		E	F	E	F	E	F	E	F	E	F
TRANSVERSE BODY (CENTER) 14.0°F	1	21.0									
	2	22.0									
	3	22.0									
	Ave.	22.0									
	1										
	2										
	3										
	Ave.										
	1										
	2										
	3										
	Ave.										
	1										
	2										
	3										
	Ave.										
	1										
	2										
	3										
	Ave.										
	1										
	2										
	3										
	Ave.										

E: Energy
F: Fracture

DIVERSIFIED DRILLING CORPORATION

P.O. Box 290699 • Tampa Florida 33687-0699
Phone 813-988-1132 • Fax 813-985-6636

Exploration Wells for the ASR Pilot Projects

South Florida Water Management District
Port Mayaca Site

Submittal Number: 13
24" x 0.500" Steel Casing

DEVIATIONS: **NONE** ✓ ; **AS LISTED** _____

REFERENCE SPECIFICATION NUMBER _____

REFERENCE DRAWING NUMBER _____

CONTRACTOR HAS REVIEWED AND SUBMITTED FOR REVIEW

SIGNATURE _____ **DATE** 7/10/03
DIVERSIFIED DRILLING CORPORATION

BARTOW STEEL

3595 Highway 60 West
(2.7 miles east of HWY-37, Mulberry)
Bartow, Florida 33830
800-282-7819
863-869-9716
863-869-8520 (fax)

To:	Diversified Drilling	**From:**	David Thurner
Fax:	813-985-6636	**Date:**	July 9, 2003
Phone:	813-988-1132	**Pages:**	1
Re:	Port Mayaca Job #2082	**CC:**	Paul Petrey

☐ **Urgent** ☑ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

Mr. Paul Petrey,

Here is all of the paperwork that I believe you need for your records. I have cross-referenced all of the tag numbers (our inventory control numbers) with the Heat numbers for each piece of pipe that we shipped to the job site at Port Mayaca. Your purchase order number for this material was 21955.

All of this pipe was new and never used. Unfortunately, it has been stored outside in Florida for some time has become rusty. Standard operating procedures allow us to recondition our pipe to preserve the value of our inventory. Bartow Steel, Inc. is a member of the NASPD (National Association of Steel Pipe Distributors) and we have been granted permission to re-stencil the pipe with factory information whenever reconditioning is required.

Prior to shipping this pipe to your job site we blasted the pipe bare and repainted it with a water-based, black lacquer. This procedure obliterated the factory markings. Normally, after painting, we re-stencil the pipe with the appropriate information such as Manufacturer, size, grade and Heat number. Regrettably, my yard personnel were dealing with inclement weather that day and inadvertently forgot to re-stencil this pipe. I have researched this order and to the best of my knowledge have correlated the tag numbers with the appropriate heat numbers.

I trust this will resolve any issues that have arisen due to our oversight. I apologize for the inconvenience.

Sincerely,

David Thurner
Industrial Sales
Bartow Steel, Inc

Diversifed Drilling Mill Test Reports (MTRs) for Port Mayaca Job #2082, Bartow Steel Sales Order #BLK-67247
New Carbon Steel Pipe: 24" OD x .500" Wall x DRL (40-42' long)

Purchase Order Number	Bill of Lading	Tag Number	Heat Number	Certificate Number	Invoice Number
21955 - Port Mayaca #2082	BLK-27138	LK21613	A09662	E-7-04-286	BLK-IV-024327
21955 - Port Mayaca #2082	BLK-27138	LK21614	A09662	E-7-04-287	BLK-IV-024327
21955 - Port Mayaca #2082	BLK-27138	LK21618	A08861	E-7-04-288	BLK-IV-024327
21955 - Port Mayaca #2082	BLK-27138	LK21621	A09662	E-7-04-289	BLK-IV-024327
21955 - Port Mayaca #2082	BLK-27138	LK21630	A08861	E-7-04-290	BLK-IV-024327
21955 - Port Mayaca #2082	BLK-27138	LK21631	A08861	E-7-04-291	BLK-IV-024327
21955 - Port Mayaca #2082	BLK-27138	LK21632	A08861	E-7-04-292	BLK-IV-024327
21955 - Port Mayaca #2082	BLK-27138	LK89324	A40566	E-8-10-439	BLK-IV-024327
21955 - Port Mayaca #2082	BLK-27138	LK89325	A40566	E-8-10-439	BLK-IV-024327
21955 - Port Mayaca #2082	BLK-27195	LK21587	A08861	E-7-04-286	BLK-IV-024368
21955 - Port Mayaca #2082	BLK-27195	LK21592	A08861	E-7-04-286	BLK-IV-024368
21955 - Port Mayaca #2082	BLK-27229	LK21633	A08861	E-7-04-286	BLK-IV-024399
21955 - Port Mayaca #2082	BLK-27229	LK22094	A09662	E-7-04-286	BLK-IV-024399
21955 - Port Mayaca #2082	BLK-27229	LKD4684	A46793	E34115	BLK-IV-024399
21955 - Port Mayaca #2082	BLK-27229	LKD4685	A46795	E34115	BLK-IV-024399
21955 - Port Mayaca #2082	BLK-27229	LKD4686	A46795	E34115	BLK-IV-024399
21955 - Port Mayaca #2082	BLK-27229	LKD4687	A46797	E34115	BLK-IV-024399
21955 - Port Mayaca #2082	BLK-27229	LKD4688	A46795	E34115	BLK-IV-024399
21955 - Port Mayaca #2082	BLK-27229	LKD4689	A46795	E34115	BLK-IV-024399
21955 - Port Mayaca #2082	BLK-27229	LKD4691	A46795	E34115	BLK-IV-024399

DAVID A. THURNER
INDUSTRIAL SALES
BARTOW STEEL, INC.
800-282-7819
FAX 863-869-8520

I N V O I C E

No: BLK IV-024327
Date:25Jun03
Due:25Jul03

Sold By:
Bartow Steel, Inc.
An Edgen Company
3595 Hwy 60 W
Bartow, FL 33830
Tel: 863 869-9716 Fax: 863 869-8520

Remit to:
Bartow Steel, Inc.
P.O. Box 538139
Atlanta, GA 30353-8138

Sold To: (5647)
DIVERSIFIED DRILLING
8801 MAISLIN DR
P O BOX 290699
TAMPA, FL 33687-0699

Shipped To: (001)
DIVERSIFIED DRILLING
JOB NAME: PORT MAYACA - JOB #2082
** SEE MAP ** TONYA 813-917-5560
JOE 813-917-5563
PORT MAYACA, FL 34956

Shp Dt 24Jun03 Ord Dt 17Jun03 SO No ST-067247 **B/L BLK 27138**
Trm 1/2% 10, NET 30 **PO/Rel 21955**
Frt INCLUDED Via SORRELLS PACKIN FOB DELIVERED
Slp David Thurner Pbl 67247-400

1	Carbon Steel Pipe ERW API 5L B 24" OD X .500 WALL X 42'			9 PCS	360 FT 45,180 LBS
MATERIAL		360 FT	@ 36.5000	FT	13,140.00

Material	Processing	Freight	Other	Taxes	TOTAL DUE
13,140.00				788.40	13928.40

Discount: 65.70 if paid by 05Jul03

B I L L O F L A D I N G

No: BLK 27138

m:
Steel, Inc.
en Company
dwy 60 W
ow, FL 33830
: 863 869-9716 Fax: 863 869-8520

Ship Date 24Jun03 at 9:25 From LKF
Probill 67247-400
Via SORRELLS PACKIN
FOB DELIVERED
Frt INCLUDED
Route 0- 0 Manifest
Vhcle Trailer
Slp David Thurner

Consigned To: (001)
DIVERSIFIED DRILLING
JOB NAME: PORT MAYACA - JOB #2082
** SEE MAP ** TONYA 813-917-5560
JOE 813-917-5563
PORT MAYACA, FL 34956
Tel: 813 988-1132 Fax: 813 985-6636

Sold To: (5647)
DIVERSIFIED DRILLING
8801 MAISLIN DR
P O BOX 290699
TAMPA, FL 33687-0699

W.O. Not attached

==========

B I L L O F L A D I N G

1) Our Order BLK- 67247- 1 Your PO # 21955
Carbon Steel Pipe ERW API 5L B
24" OD X .500 WALL X 42'

Heat Number	Tag No	Quantity	PCS	Wt LBS
A09662	-LK21613	40 FT	1	5020
A09662	-LK21614	40 FT	1	5020
A08861	-LK21618	40 FT	1	5020
A09662	-LK21621	40 FT	1	5020
A08861	-LK21630	40 FT	1	5020
A08861	-LK21631	40 FT	1	5020
A08861	-LK21632	40 FT	1	5020
A40566	-LK89324	40 FT	1	5020
A40566	-LK89325	40 FT	1	5020
	Total:	360 FT	9	45180

	Tags	Pcs	LBS
TOTAL:	9	9	45180

** WE NEED TO HIRE 2 TRUCKS **

** PROJECT DRILLER - WILLY GRIFFA 813-917-4480 **

** ENTERED BY RON FOR DAVE. **
** CUSTOMER NEEDS ALL PIPE DELIVERED NO LATER **
** THAN MONDAY 6/23/03 **
** CUSTOMER NEEDS TOTAL OF 780FT DRL'S **
** ABOUT 20PCS. **

****

Subject to Section 7 of Conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.		CARRIER	FREIGHT Prepaid ☐ Collect ☐
SIGNATURE OF CONSIGNOR X		AGENT PER (Driver's Signature) X	
If charges are to be prepaid, write or stamp here, "To be Prepaid."	RECEIVED $ To apply in payment of the charge on the property described hereon.	AGENT OR CASHIER (The signature here acknowledges only the amount prepaid.)	CHARGES ADVANCED $

검 사 증 명 서 (A)
MILL INSPECTION CERTIFICATE

현 대 강 관 주 식 회 사
HYUNDAI PIPE CO.,LTD.
*본 사 · 공 장 경남 울산시 중구 염포동 265번지 (682-050)
ULSAN PLANT : # 265,YUMPO-DONG, JUNG-KU,ULSAN, KOREA
TEL : 87-2101~9 FAX : (0522)87-8916
TLX : HDPIPE K 53776
*서울사무소 서울특별시 중구 무교동 77번지 (100-170)
SEOUL OFFICE : # 77,MUKYO-DONG, JUNG-KU, SEOUL, KOREA
TEL : 773-0522 FAX : 775-7095
TLX : HDPIPE K 24656, K 22956

성적서번호 CERTIFICATE NO : E-7-04-286 페이지 PAGE : 1
발행일자 DATE OF ISSUE : MAY. 7. 1997. E4702800
계약번호 CONTRACT P/O NO :
품명 COMMODITY : E.R.W. STEEL PIPE
제품규격 SPECIFICATION : API 5LB/ASTM A53B
수요가 CUSTOMER

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 21955
BARTOW STEEL REF. # 67247

G : GOOD

관종 TYPE OF PIPE END ※1	※2	치수 DIMENSION 외경 · 두께 · 길이 (OUTDIA. · THICK. · LENGTH) ※3 ※4	수량 QUANTITY (PCS)	중량 WEIGHT (KG)	수압시험 HYDROSTATIC TEST Mpa kg/cm² PSI	※5	6 VISUAL & DIMENSION TEST	7 FLATTENING & BENDING TEST	8 WELD DUCTILITY TEST	9	10 DRIFT TEST	11 FLARING TEST	12 CRUSH TEST	13 REVERSE FLATTENING TEST	도막시험 COATING TEST 아연부착량 WEIGHT OF ZINC COAT g/m²	균일성 DIP TEST Tin/Min ※5		제강번호 HEAT NO	항복강도 YIELD STRENGTH	인장강도 TENSILE STRENGTH B ※14	W ※15	연신율 ELONGATION %	※16	C ×100	Si	Mn	P ×1000	S	Cu ×100	Ni	Cr	Mo	V	충격시험 IMPACT 흡수에너지 ENERGY JOULE	연성파면율 %	비고 REMARK
BPEB	OD	8-5/8" x .250" x42.000'	1	428	86	G	G	G	G	G								A08245	27.7	46.9	49.0	38		14	Tr	69	20	8	6	1	2	1	Tr			
		(219.1mm x 6.35mm x 12.802M)			1220														39400	66700	69700															
BPEB	OD	24" x .500" x40.000'	73	166,206	62	G	G	G	G	G								A08861	32.5	49.2	52.6	40		17	Tr	78	14	8	6	1	2	1	Tr			-
		(610.0mm x12.70mm x 12.192M)			880														46200	70000	74800															
																		A09258	31.8	48.2	51.6	43		17	1	75	16	7	6	1	2	1	Tr			
																			45200	68600	73400															
																		A09062	31.1	48.8	51.4	40		17	1	76	14	8	6	1	2	1	Tr			
																			44200	69400	73100															
		TOTAL ->	74	166,632																																

참고--NOTES ※1 Type of pipe End 관종

BPE :Black Plain End Square-cut	GPE :Galvanized Plain End Square-cut
BPEB : Black Plain End Beveled	GPEB :Galvanized Plain End Beveled
BTC :Black Threaded & Coupled	GTC :Galvanized Threaded & Coupled
BVJ :Black Victaulic Joint	GVJ :Galvanized Victaulic Joint
ETC :Enameled Threaded & Coupled	

※2 NB : Nominal Bore호칭경, OD : Outside Diameter
※3 Unit 단위(M : mm, I : Inch)
※4 Unit 단위(M : Meter, F : Feet, I : Inch)
※5 G : Good
※6 Visual & Dimension Test 육안 및 치수검사
※7 Flattening or Bending Test 편평 또는 굽힘시험
※8 Weld Ductility Test 용접부 연성시험
※9 Nondestructive Test 비파괴검사
※10 Drift Test 관통시험
※11 Flaring Test 압착시험
※12 Crush Test 충압시험
※13 Reverse Flattening Test 전개시험
※14 B : Base Metal 모재부
※15 W : Weld Part 용접부
※16 H : Heat (Ladle) Analysis 일인분석, P : Product Analysis 제품분석

본 제품은 관련규격에 합격되었음을 보증합니다.

SURVE

WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN ACCEPTED IN ACCORDANCE WITH THE PRESCRIBED SPECIFICATION AND ORDER.

INSPECTION MANAGER

HPS-B331-019-QLT

350 · 280

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

현 대 강 관 주 식 회 사
HYUNDAI PIPE CO.,LTD.
* 본사·공장 : 울산광역시 북구 염포동 285번지 ☎(052)230-0114
HEAD OFFICE : # 285, YUMPO-DONG, BUK-KU, ULSAN, KOREA
(ULSAN PLANT) TEL:230-0114 FAX:(052)287-8916
TLX:HDPIPE K 53778
* 서울사무소 : 서울특별시 중구 무교동 77번지 ☎(02)775-7095
SEOUL OFFICE : # 77, MUGYO-DONG, JOONG-KU, SEOUL, KOREA
TEL:3455-0500 FAX:775-7095

성적서번호 CERTIFICATE NO : E-6-10-439 페이지 PAGE : 1
발행일자 DATE OF ISSUE : OCT. 28. 1998. S4859202
계약번호 CONTRACT (P/O) NO :
품명 COMMODITY : E.R.W. STEEL PIPE
제품규격 SPECIFICATION : API 5L X42/API 5LB/ASTM A53B

THESE MILL TEST REPORTS APPLY TO
수요가 CUSTOMER YOUR P.O. # 21955
BARTOW STEEL REF. # 6747

G:GOOD

관종 TYPE OF PIPE END ※1	치수 DIMENSION 외경 × 두께 × 길이 (OUTDIA × THICK × LENGTH) ※2 ※3 ※4	수량 QUANTITY (PCS)	중량 WEIGHT (KG)	수압시험 HYDROSTATIC TEST MPa / kg/cm² / PSI	※5	※6 VISUAL & DIMENSION TEST	※7 FLATTENING TEST	※8 WELD DUCTILITY TEST	※9 NONDESTRUCTIVE TEST	※10 DRIFT TEST	※11 FLARING TEST	※12 CRUSH TEST	※13 REVERSE FLATTENING TEST	※14 HEAT TREATMENT	도막시험 COATING TEST 아연부착량 WEIGHT OF ZINC COAT g/m² / OZ/Ft²	굽힘성 DIP TEST ※15 B ※16 W	경도 HARDNESS HRB HV	제강번호 HEAT NO.	인장시험 TENSILE TEST 항복강도 YIELD STRENGTH	인장강도 TENSILE STRENGTH	연신율 ELONGATION % ※17	화학성분(%) CHEMICAL COMPOSITION C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Al	Ceq	충격시험 IMPACT 흡수에너지 Absorbed ENGY. JOULE	전단면적 SHEAR AREA %
BVBE	OD 10-3/4" x .365" x42.000'	17	13,123	171	G	G	G	G	G					G				371670	32.5	47.8	50.2	36	15	1	68	16	10	6	1	2	1	Tr				
	(273.1mm x 9.27mm x 12.802M)			2430															46200	68000	71400															
																		372333	32.3	49.4	52.5	33	16	1	76	16	6	6	1	2	1	Tr				
																			45900	70300	74700															
BVBE	OD 24" x .500" x40.000'	8	18,214	111	G	G	G	G	G					G				440586	30.5	47.6	50.5	38	17	1	73	18	6	6	1	2	Tr	1				
	(610.0mm x12.70mm x 12.192M)			1580															43400	67700	71800															
																		444075	32.5	48.7	51.5	40	15	1	68	16	8	6	1	2	1	Tr				
																			46200	69300	72300															
																		444402	31.9	48.8	51.8	38	17	Tr	76	17	9	6	1	2	1	Tr				
																			45400	69400	73700															
	TOTAL ->	25	31,337																																	

비고 REMARK

주기 NOTES

※1 Type of pipe End 관종
- X
  - B : Black
  - G : Galvanized
  - E : Enameled
- X
  - V : Varnish
  - R : Removal Varnish
  - O : Oiling Coating
  - F : PE Coating
  - C : Coaltar Coating
  - A : Asphalt Coating
- XX
  - PE : Plain End
  - BE : Bevel End
  - TE : Thread End
  - TC : Thread Coupling
  - BL : Bell End
  - SE : Swaging End
  - VJ : Victaulic Joint

※2 NB : Nominal Bore 호칭경, OD : Outside Diameter
※3 Unit 단위 (M : mm, I : Inch)
※4 Unit 단위 (M : Meter, F : Feet, I : Inch)
※5 G : Good
※6 Visual & Dimension Test 육안 및 치수검사
※7 Flattening or Bending Test 편평 또는 굽힘시험
※8 Weld Ductility Test 용접부 연성시험
※9 Nondestructive Test 비파괴검사 ( )
※10 Drift Test 관통시험
※11 Flaring Test 압착시험
※12 Crush Test 충압시험
※13 Reverse Flattening Test 잔개시험
※14 Heat Treatment 열처리
※15 B : Base Metal 모재부
※16 W : Weld Part 용접부
※17 H : Heat(Ladle)Analysis 열분분석, P : Product Analysis 제품분석

SURVEYOR

본 제품은 관련규격에 합격되었음을 보증합니다.
WE CERTIFY THAT THE DESCRIBED MATERIAL HAS HEREIN BEEN ACCEPTED IN ACCORDANCE WITH THE PRESCRIBED SPECIFICATION AND ORDER.

QUALITY ASSURANCE TEAM GENERAL MGR.

HPS - B 301 - 63 - 0 - DLT

HYUNDAI PIPE CO., LTD.

(350 × 260)

I N V O I C E

No: BLK IV-024368
Date:26Jun03
Due:26Jul03

Sold By:
Bartow Steel, Inc.
An Edgen Company
3595 Hwy 60 W
Bartow, FL 33830
Tel: 863 869-9716 Fax: 863 869-8520

Remit to:
Bartow Steel, Inc.
P.O. Box 538139
Atlanta, GA 30353-8138

Sold To: (5647)
DIVERSIFIED DRILLING
8801 MAISLIN DR
P O BOX 290699
TAMPA, FL 33687-0699

Shipped To: (001)
DIVERSIFIED DRILLING
JOB NAME: PORT MAYACA - JOB #2082
** SEE MAP ** TONYA 813-917-5560
JOE 813-917-5563
PORT MAYACA, FL 34956

Shp Dt 25Jun03 Ord Dt 17Jun03 SO No ST-067247 **B/L BLK 27195**
Trm 1/2% 10, NET 30 **PO/Rel 21955**
Frt INCLUDED Via OUR TRUCK FOB DELIVERED
Slp David Thurner Pbl

1	Carbon Steel Pipe ERW API 5L B 24" OD X .500 WALL X 42'			2 PCS	80 FT 10,040 LBS
MATERIAL		80 FT	@ 36.5000	FT	2,920.00

Material	Processing	Freight	Other	Taxes	TOTAL DUE
2,920.00				175.20	3095.20

Discount: 14.60 if paid by 06Jul03

B I L L O F L A D I N G

No: BLK 27195

From:
ow Steel, Inc.
Edgen Company
595 Hwy 60 W
rtow, FL 33830
el: 863 869-9716 Fax: 863 869-8520

Ship Date 25Jun03 at 15:09 From LKF
Probill
Via OUR TRUCK
FOB DELIVERED
Frt INCLUDED
Route 0- 0 Manifest
Vhcle Trailer
Slp David Thurner
Sold To: (5647)
DIVERSIFIED DRILLING
8801 MAISLIN DR
P O BOX 290699
TAMPA, FL 33687-0699

Consigned To: (001)
DIVERSIFIED DRILLING
JOB NAME: PORT MAYACA - JOB #2082
** SEE MAP ** TONYA 813-917-5560
JOE 813-917-5563
PORT MAYACA, FL 34956
Tel: 813 988-1132 Fax: 813 985-6636

MTR'S W/SHIPMENT

==========

B I L L O F L A D I N G

3) Our Order BLK- 67247- 1 Your PO # 21955
Carbon Steel Pipe ERW API 5L B
24" OD X .500 WALL X 42'

Heat Number	Tag No	Quantity	PCS	Wt LBS
A08861	LK21587	40 FT	1	5020
A08861	LK21592	40 FT	1	5020
	Total:	80 FT	2	10040

	Tags	Pcs	LBS
TOTAL:	2	2	10040

** . NEED TO HIRE 2 TRUCKS **

** PROJECT DRILLER - WILLY GRIFFA 813-917-4480 **

** ENTERED BY RON FOR DAVE. **
** CUSTOMER NEEDS ALL PIPE DELIVERED NO LATER **
** THAN MONDAY 6/23/03 **
** CUSTOMER NEEDS TOTAL OF 780FT DRL'S **
** ABOUT 20PCS. **

****
****
OTE: PRODUCT MAY CONTAIN AN ID OR OD BAR CODE
IDENTIFICATION LABEL
****
****

Page: 1 .... Last

The property described above, in apparent good order, except as noted (contents and condition of contents of packages unknown), marked consigned, and destined as indicated below, which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession under the contract) agrees to carry to its usual place of deliver at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed, as to each carrier of all or any said property over all or any portion of said route to destination, and as each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (1) in Official, Southern, Western and Illinois Freight Classifications in effect on the date hereof, if this is a rail or a rail-water shipment, or (2) in the applicable motor carrier classification or tariff if this is a carrier shipment.
Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Subject to Section 7 of Conditions of applicable bill of lading, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.		CARRIER	FREIGHT Prepaid ☐ Collect ☐
SIGNATURE OF CONSIGNOR X		AGENT PER (Driver's Signature) X	
If charges are to be prepaid, write or stamp here, "To be Prepaid."	RECEIVED $ To apply in payment of the charge on the property described hereon.	AGENT OR CASHIER (The signature here acknowledges only the amount prepaid.)	CHARGES ADVANCED $

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

현 대 강 관 주 식 회 사
HYUNDAI PIPE CO.,LTD.
*본 사·공 장 경남 울산시 중구 염포동 265번지 ☎(052)-231-0500
ULSAN PLANT : # 265,YUMPO-DONG, JUNG-KU,ULSAN,KOREA
TEL : 87-2101~9 FAX : (0522)87-8916
TLX : HDPIPE K 53776
*서울사무소 서울특별시 중구 무교동 77번지 ☎(02)-773-0522
SEOUL OFFICE : # 77, MUKYO-DONG, JUNG-KU, SEOUL, KOREA
TEL : 773-0522 FAX : 775-7095
TLX : HDPIPE K 24656, K 22956

성적서번호 CERTIFICATE NO : E-7-04-288 페이지 PAGE : 1
발행일자 DATE OF ISSUE : MAY. 7. 1997. B4702800
계약번호 CONTRACT P/O NO :
품명 COMMODITY : E.R.W. STEEL PIPE
제품규격 SPECIFICATION : API 5LB/ASTM A53B

수요가 CUSTOMER

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 21955
BARTOW STEEL REF. # 67247

G : GOOD

관종 TYPE OF PIPE END *1	치수 DIMENSION 외경×두께×길이 OUTDIA. × THICK. × LENGTH *2 *3 *4	수량 QUANTITY (PCS)	중량 WEIGHT (KG)	수압시험 HYDRO-STATIC TEST Mpa kg/cm² PSI	*6 VISUAL & DIMENSION TEST	*7 FLATTENING or BEND TEST	*8 WELD DUCTILITY TEST	*9 —	*10 ORDT TEST	*11 FLARING TEST	*12 CRUSH TEST	*13 FLATTENING TEST	도막시험 COATING TEST 아연부착량 WEIGHT OF ZINC COAT g/m² Oz/Ft²	굽힘성 BEND TEST Dir. *14 W	*15 B	재강번호 HEAT NO	인장시험 TENSILE TEST 항복강도 YIELD STRENGTH PSI	인장강도 TENSILE STRENGTH B *14 kg/mm²	W *15 N/mm²	연신율 ELONGATION %	*16	화학성분(%) CHEMICAL COMPOSITION C ·100	Si	Mn ·1000	P	S	Cu	Ni	Cr	Mo ·100	V	충격시험 IMPACT 흡수에너지 ABSORBED ENERGY J	전단파면율 SHEAR AREA %	비고 REMARK
BPEB	OD 8-5/8" x .250" x42.000'	1	426	86	G	G	G	G	G							A08245	27.7	46.9	48.0	38		14	Tr	69	20	8	6	1	2	1	Tr			
	(219.1mm x 6.35mm x 12.802M)			1220													39400	66700	69700															
BPEB	OD 24" x .500" x40.000'	73	166,206	62	G	G	G	G	G							A08861	32.5	49.2	52.6	40		17	Tr	78	14	8	6	1	2	1	Tr			
	(610.0mm x12.70mm x 12.192M)			880													46200	70000	74800															
																A09258	31.8	48.2	51.6	43		17	1	75	16	7	6	1	2	1	Tr			
																	45200	68600	73400															
																A09562	31.1	48.8	51.4	40		17	1	78	14	8	6	1	2	1	Tr			
																	44200	69400	73100															
	TOTAL. ->	74	166,632																															

참고--NOTES *1 Type of pipe End 관종

BPE :Black Plain End Square-cut	GPE :Galvanized Plain End Square-cut
BPEB :Black Plain End Beveled	GPEB :Galvanized Plain End Beveled
BTC :Black Threaded & Coupled	GTC :Galvanized Threaded & Coupled
BVJ :Black Victaulic Joint	GVJ :Galvanized Victaulic Joint
ETC :Enameled Threaded & Coupled	

*2 NB : Nominal Bore호칭경, OD : Outside Diameter
*3 Unit 단위 M : Meter, F : Feet, I : Inch
*4 Unit 단위 M : m/m, I : Inch
*5 G : Good
*6 Visual & Dimension Test육안 및 치수검사
*7 Flattening or Bending Test 편평 또는 굽힘시험
*8 Weld Ductility Test 용접부 연성시험
*9 Nondestructive Test 비파괴검사
*10 Ordt Test관등시험
*11 Flaring Test 입확시험
*12 Crush Test 좀압시험
*13 Reverse Flattening Test전개시험
*14 B : Base Metal모재부
*15 W : Weld Part 용접부
*16 H : Heat (Ladle) Analysis용언분석, P : Product Analysis 제품분석

본 제품은 관련규격에 합격되었음을 보증합니다.

WE HEREBY CERTIFY THAT THE MATERIAL [illegible] ABED HEREIN HAS BEEN ACCEPTED IN ACCORDANCE WITH THE PRESCR[illegible] SPECIFICATION AND ORDER.

SURVE)

INSPECTION M. [illegible]

HDS - B331 - 019 - OLT

© HYUNDAI PIPE CO.,LTD.

I N V O I C E

No: BLK IV-024399
Date:30Jun03
Due:30Jul03

Sold By:
Bartow Steel, Inc.
An Edgen Company
3595 Hwy 60 W
Bartow, FL 33830
Tel: 863 869-9716 Fax: 863 869-8520

Remit to:
Bartow Steel, Inc.
P.O. Box 538139
Atlanta, GA 30353-8138

Sold To: (5647)
DIVERSIFIED DRILLING
8801 MAISLIN DR
P O BOX 290699
TAMPA, FL 33687-0699

Shipped To: (001)
DIVERSIFIED DRILLING
JOB NAME: PORT MAYACA - JOB #2082
** SEE MAP ** TONYA 813-917-5560
JOE 813-917-5563
PORT MAYACA, FL 34956

Shp Dt 27Jun03 Ord Dt 17Jun03 SO No ST-067247 B/L BLK 27229
Trm 1/2% 10, NET 30 PO/Rel 21955
Frt INCLUDED Via SORRELLS PACKIN FOB DELIVERED
Slp David Thurner Pbl 67247-400

1	Carbon Steel Pipe ERW API 5L B 24" OD X .500 WALL X 42'				2 PCS	80 FT 10,040 LBS
MATERIAL		80 FT	@	36.5000	FT	2,920.00
2	Carbon Steel Pipe ERW API 5L B X42 24" OD X .500 WALL X 42'				7 PCS	294 FT 36,897 LBS
MATERIAL		294 FT	@	36.5000	FT	10,731.00
Total Shipped:		9 PCS			46,937	LBS

Material	Processing	Freight	Other	Taxes	TOTAL DUE
13,651.00				819.06	14470.06

Discount: 68.26 if paid by 10Jul03

B I L L O F L A D I N G

No: BLK 27229

Ship From:
rtow Steel, Inc.
n Edgen Company
3595 Hwy 60 W
rtow, FL 33830
el: 863 869-9716 Fax: 863 869-8520

Ship Date 27Jun03 at 8:26 From LKF
Probill
Via ~~OUR TRUCK~~ SORRELLS
FOB ~~DELIVERED~~ 400.00
Frt INCLUDED
Route 0- 0 Manifest
Vhcle Trailer
Slp David Thurner

Consigned To: (001)
DIVERSIFIED DRILLING
JOB NAME: PORT MAYACA - JOB #2082
** SEE MAP ** TONYA 813-917-5560
JOE 813-917-5563
PORT MAYACA, FL 34956
Tel: 813 988-1132 Fax: 813 985-6636

Sold To: (5647)
DIVERSIFIED DRILLING
8801 MAISLIN DR
P O BOX 290699
TAMPA, FL 33687-0699

==========

B I L L O F L A D I N G

1) Our Order BLK- 67247- 1 Your PO # 21955
Carbon Steel Pipe ERW API 5L B
24" OD X .500 WALL X 42'

Heat Number	Tag No	Quantity	PCS	Wt LBS
A08861	LK21633	40 FT	1	5020
A09962	LK22094	40 FT	1	5020
	Total:	80 FT	2	10040

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2) Our Order BLK- 67247- 2 Your PO # 21955
Carbon Steel Pipe ERW API 5L B X42
24" OD X .500 WALL X 42'

Heat Number	Tag No	Quantity	PCS	Wt LBS
A46793	LKD4684	42 FT	1	5271
A46795	LKD4685	42 FT	1	5271
A46795	LKD4686	42 FT	1	5271
A46797	LKD4687	42 FT	1	5271
A46795	LKD4688	42 FT	1	5271
A46795	LKD4689	42 FT	1	5271
A46795	LKD4691	42 FT	1	5271
	Total:	294 FT	7	36897

	Tags	Pcs	LBS
TOTAL:	9	9	46937

** WE NEED TO HIRE 2 TRUCKS **

** PROJECT DRILLER - WILLY GRIFFA 813-917-4480 **

** ENTERED BY RON FOR DAVE. **

Page: 1 ....Continued

Section 7 of Conditions of applicable bill of lading, if this shipment is to be delivered to the consignee wi... recourse on the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.		CARRIER	FREIGHT Prepaid ☐ Collect ☐
SIGNATURE OF CONSIGNOR X Didn't Sign left w/out signing		AGENT PER (Driver's Signature) X	
charges are to be prepaid, write or stamp here, "To be Prepaid."	RECEIVED $ To apply in payment of the charge on the property described hereon.	AGENT OR CASHIER (The signature here acknowledges only the amount prepaid.)	CHARGES ADVANCED $

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

현 대 강 관 주 식 회 사
HYUNDAI PIPE CO.,LTD.
*본 사·공 장 경남 울산시 중구 염포동 265번지 680-050
ULSAN PLANT : # 265, YUMPO-DONG, JUNG-KU, ULSAN, KOREA
TEL : 87-2101~9 FAX : (0522) 87-8916
TLX : HDPIPE K 53776
*서울사무소 서울특별시 중구 무교동 77번지 100-170
SEOUL OFFICE : #77, MUKYO-DONG, JUNG-KU, SEOUL, KOREA
TEL : 773-0522 FAX : 775-7095
TLX : HDPIPE K 24656, K 22956

실 적 서 번 호 CERTIFICATE NO : E-7-04-286 페이지 PAGE : 1
발 행 일 자 DATE OF ISSUE : MAY. 7. 1997. E4702800
계 약 번 호 CONTRACT·P/O·NO :
품 명 COMMODITY : E.R.W. STEEL PIPE
제 품 규 격 SPECIFICATION : API 5LB/ASTM A53B

수 요 가 CUSTOMER

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 21955
BARTOW STEEL REF. # 67247

G : GOOD

관종 TYPE OF PIPE END *1	치수 DIMENSION 외경 × 두께 × 길이 OUTDIA. × THICK. × LENGTH' *2 *3 *4	수량 QUANTITY PCS	중량 WEIGHT KG	수압시험 HYDRO-STATIC TEST Mpa kg/cm² PSI	수 *5	6 MATERIAL & DIMENSION TEST	7 FLATTENING or BENDING TEST	8 WELD PART TEST	9	10	11 DRIFT TEST	12 FLARING TEST	13 REVERSE FLATTENING TEST	도장시험 COATING TEST 아연부착량 WEIGHT OF ZINC COAT g/m² oz/ft²	균일성 DIP TEST 회수 Times	수 *5	제강번호 HEAT NO	인장시험 TENSILE TEST 항복강도 YIELD STRENGTH PSI	인장강도 TENSILE STRENGTH B *14 kg/mm² N/mm²	W *15	연신율 ELONGATION %	수 *16	화학성분 (%) CHEMICAL COMPOSITION C ×100	Si	Mn ×1000	P	S	Cu ×100	Ni	Cr	Mo	V	충격시험 IMPACT 흡수에너지 ENERGY 최소평균값 MINIMUM VALUE	%	비고 REMARK
BPEB	OD 8-5/8" x .250" x42.000'	1	426	86	G	G	G	G	G								A09245	27.7	46.9	49.0	38		14	Tr	69	20	8	6	1	2	1	Tr			
	(219.1mm x 6.35mm x 12.802M)			1220														39400	66700	69700															
BPEB	OD 24" x .500" x40.000'	73	166.206	02	G	G	G	G	G								A08861	32.5	49.2	52.6	40		17	Tr	78	14	8	6	1	2	1	Tr			-
	(610.0mm x12.70mm x 12.192M)			880														46209	70000	74800															
																	A09258	31.8	48.2	51.6	43		17	1	75	18	7	6	1	2	1	Tr			
																		45200	68600	73400															
																	A09662	31.1	48.8	51.4	40		17	1	76	14	8	6	1	2	1	Tr			
																		44200	69400	73100															
	TOTAL ->	74	166.632																																

참고 --NOTES *1 Type of pipe End 관종

BPE	:Black Plain End Square-cut	GPE	:Galvanized Plain End Square-cut
BPEB	:Black Plain End Beveled	GPEB	:Galvanized Plain End Beveled
BTC	:Black Threaded & Coupled	GTC	:Galvanized Threaded & Coupled
BVJ	:Black Victaulic Joint	GVJ	:Galvanized Victaulic Joint
ETC	:Enameled Threaded & Coupled		

*2 NB : Nominal Bore호칭경, OD : Outside Diameter
*3 Unit 단위 : M : Meter, F : Feet, I : Inch
*4 Unit 단위 : M : mm, I : Inch
*5 G : Good
*6 Visual & Dimension Test육안 및 치수검사
*7 Flattening or Bending Test 편평 또는 굽힘시험
*8 Weld Ductility Test 용접부 연성시험
*9 Nondestructive Test 비파괴검사
*10 Drift Test관통시험
*11 Flaring Test 압확시험
*12 Crush Test 충압시험
*13 Reverse Flattening Test 진개시험
*14 B : Base Metal 모재부
*15 W : Weld Part 용접부
*16 H : Heat (Ladle) Analysis 일련분석, P : Product Analysis 제품분석

본 제품은 관련규격에 합격되었음을 보증합니다.

SURVEYOR

WE HEREBY CERTIFY THAT THE MATERIAL DESCRIBED HEREIN HAS BEEN ACCEPTED IN ACCORDANCE WITH THE PRESCRIBED SPECIFICATION AND ORDER

INSPECTION

HPS B331-019-C

HYUNDAI PIPE CO.,LTD.

350 · 280

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

HYUNDAI HYSCO

CERTIFICATE NO: E34115 PAGE: 1
DATE OF ISSUE: APR. 22. 2003. B4264507
CONTRACT (P/O) NO:
COMMODITY: E.R.W. STEEL PIPE
SPECIFICATION: API 5L X42/API 5LB PSL1/ASTM A53B/ASME SA53B

CUSTOMER: YOUR P.O.# 21955

THESE MILL TEST REPORTS APPLY TO
BARTOW STEEL REF.# 67247

• 본사·공장 : 울산광역시 북구 염포동 265번지 682-791
HEAD OFFICE #265, Yeompo-dong, Buk-gu, Ulsan, Korea
(ULSAN PLANT) TEL.(052)280-0114 FAX.(052)287-8916

• 서울사무소 : 서울특별시 종로구 계동 140-2번지 110-743
SEOUL OFFICE 140-2, Kye-dong, Chongro-gu, Seoul, Korea
TEL.(02) 746-1114 FAX.(02) 775-7095

G:GOOD

TYPE OF PIPE NO	DIMENSION (OUTDIA. × THICK. × LENGTH)	QUANTITY (PCS)	WEIGHT (KG)	HYDROSTATIC TEST MPa / kg f/cm² / PSI	※5 S	※6 VISUAL & DIMENSION TEST G	※7 FLATTENING (D) TEST G	※8 WELD DUCTILITY TEST G	※9 T	※9 N.D.	※10 D.	※10 DRIFT TEST	※12 FLARING TEST	※13 CRUSH TEST	※15 RE-FLATTENING TEST	※14 HEAT TREATMENT G	COATING TEST: WEIGHT OF ZINC COAT g/m² OZ/FT²	COATING TEST: DIP TEST Th MES	※5 S	HARDNESS HRB HV	HEAT NO.	TENSILE TEST: YIELD STRENGTH PSI	TENSILE STRENGTH kg f/mm² N/mm²	※15 B	※16 W	ELONGATION %	※17	CHEMICAL COMPOSITION (%): C × 100	Si	Mn × 1000	P	S	Cu	Ni	Cr	Mo	V	Nb × 1000	Al	Ceq	IMPACT: 흡수에너지 Absorbed ENGY J/cm²	전단파면율 SHEAR AREA %
※1	※2 ※3 ※4	(PCS)	(KG)	MPa / kg f/cm² / PSI	※5 S	G	G	G	T	N	D.	DRIFT TEST	FLARING TEST	CRUSH TEST	RE-FLATTENING TEST	HEAT TREATMENT	OZ/FT²	MES	S	HRB HV	HEAT NO.	PSI	kg f/mm² N/mm²	B ※15	W ※16	%	※17	C × 100	Si	Mn × 1000	P	S	Cu	Ni	Cr	Mo	V	Nb × 1000	Al	Ceq	J/cm²	%
SB	24" × .500" × 42.000'	19	45.502	111	G																A46793	31.5	48.9	51.4	38		17	2	81	17	10	2	1	2	2	Tr					
	(610.0mm × 12.70mm × 12.802M)			1580																		44800	69600	73100																	
																					A46795	34.1	51.1	53.6	38		18	1	76	14	8	2	1	1	1	Tr					
																						48500	72700	76200																	
																					A46797	35.0	51.9	54.6	37		18	1	78	14	8	2	3	1	2	Tr					
																						49800	73800	77700																	
	TOTAL. ->	19	45.502																																						

REMARK
* RESIDUAL MAGNETISM TEST : GOOD

NOTES
※1 Type of pipe End 관종
X: B : Black / G. Galvanized / E : Enameled
X: V : Varnish / R : Removal Varnish / O. Oiling Coating / F : PE Coating / C : Coaltar Coating / A : Asphalt Coating
XX: PE : Plain End / BE : Bevel End / TE : Thread End / TC : Thread Coupling / BL : Bell End / SE : Swaging End / VJ : Victaulic Joint
※2 NB : Nominal Bore 호칭경, OD: Outside Diameter
※3 Unit 단위 (M : mm, I : Inch)
※4 Unit 단위 (M : Meter, F : Feet, I : Inch)
※5 G : Good
※6 Visual & Dimension Test 육안 및 치수검사
※7 Flattening or Bending Test 편평 또는 굽힘시험
※8 Weld Ductility Test 용접부 연성시험
※9 Nondestructive Test 비파괴검사 ( )
※10 Drift Test 관통시험
※11 Flaring Test 압확시험
※12 Crush Test 충압시험
※13 Reverse Flattening Test 전개시험
※14 Heat Treatment 열처리
※15 B : Base Metal 모재부
※16 W : Weld Part 용접부
※17 H : Heat(Ladle)Analysis 용연분석, P:Product Analysis 제품분석

본 제품은 관련규격에 합격되었음을 보증합니다.
WE CERTIFY THAT THE DESCRIBED MATERIAL HAS HEREIN BEEN ACCEPTED IN ACCORDANCE WITH THE PRESCRIBED SPECIFICATION AND ORDER.

SURVEYOR

H. G. Lee
QUALITY ASSURANCE TEAM GENERAL MGR.

S-301-631-0-01

HYUNDAI HYSCO

(350×280)

검 사 증 명 서 (A)

MILL INSPECTION CERTIFICATE

HYUNDAI HYSCO

• 본사 · 공장 : 울산광역시 북구 염포동 265번지 (우 683-800)
HEAD OFFICE (ULSAN PLANT): #265, Yeonpo-dong, Buk-gu, Ulsan, Korea TEL.:(052)288-0114 FAX:(052)287-9916

• 서울사무소 : 서울특별시 종로구 계동 140-2번지 (우 110-052)
SEOUL OFFICE: 140-2, Kye-dong, Chongro-gu, Seoul, Korea TEL.:(02) 746-1114 FAX:(02) 175-7895

증서번호 CERTIFICATE NO: 534115 페이지 PAGE: 1
발행일자 DATE OF ISSUE: APR. 22. 2003. 1600/4507
계약번호 CONTRACT (P/O) NO:
품명 COMMODITY: E.R.W. STEEL PIPE
제품규격 SPECIFICATION: API 5L X42/API 5LW PSL1/KSTM A538/KSME SM538
수요가 CUSTOMER:

G:GOOD

호칭 TYPE OF PIPE AND SIZE	치수 DIMENSION 외경 × 두께 × 길이 (OUTDIA. × THICK. × LENGTH)	수량 QUANTITY (PCS)	중량 WEIGHT (KG)	수압시험 HYDRO-STATIC TEST	도막시험 COATING TEST	경도 HARDNESS	제강번호 HEAT NO.	인장시험 TENSILE TEST	화학성분(%) CHEMICAL COMPOSITION	충격시험 IMPACT
								YIELD STRENGTH / TENSILE STRENGTH / ELONGATION	C Si Mn P S Cu Ni Cr Mo V Nb Al Ceq	
406.4mm	24" × .500" × 12.000' (406.4mm × 12.7mm × 12.192m)	19	45,932	1500 PSI			446795	51.5 68.9 71.4 38	17 2 81 17 10 2 1 3 2 tr	
								44800 69000 73000		
							446795	54.1 72.1 73.4 38	18 1 76 14 8 2 1 1 1 tr	
								48900 72700 75200		
							446794	55.0 73.9 74.8 37	18 1 78 14 8 2 5 1 2 tr	
								48900 75800 77700		
	TOTAL →	19	45,932							

REMARK

* RESIDUAL MAGNETISM TEST : GOOD

NOTES

[1] Type of pipe End 관단

X: B : Black, G : Galvanized, E : Enameled

X: V : Varnish, R : Removed Varnish, O : Oiling Coating, F : PE Coating, C : Coater Coating, A : Asphalt Coating

XX: PE : Plain End, BE : Bevel End, TE : Thread End, TC : Thread Coupling, BL : Belt End, SE : Swaging End, VJ : Victaulic Joint

[2] 사이즈 : Nominal Size 호칭경, OD: Outside Diameter
[3] 중 : Good
[4] Weld Quality Test 용접부 판질시험
[5] Flaring Test 확관시험
[6] Heat Treatment 열처리
[7] R : Heat Lot(s) Analysis 성분분석, P Product Analysis 제품분석
[8] Yield point (M : mm, I : inch)
[9] Tensile & Elongation Test 인장 및 신장시험
[10] Manufacturer Test 제조자검사 (
[11] Crush Test 압궤시험
[12] G : Base Metal 모재부
[13] Width or Thickness 폭 또는 두께
[14] Flattening or Bending Test 편평 또는 굴곡시험
[15] Bulge Test 팽창시험
[16] Reverse Flattening Test 역편평시험
[17] W : Weld Part 용접부

본 제품은 관련규격에 합격되었음을 보증합니다.
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H. G. Lee
QUALITY ASSURANCE TEAM GENERAL MGR.

SURVEYOR

S-8301-631-0-GLT

HYUNDAI HYSCO

(350×280)

Appendix C

Appendix D

WELLHEAD

AS-BUILT

PORT MAYACA

1. ELEVATIONS SHOWN ARE ON THE BASIS OF NATIONAL GEODETIC VERTICAL DATUM (N.G.V.D.) (1929)

2. BENCH MARK: ELEVATION= 32.65' NGVD 29
B.M. IS A SOUTH FLORIDA WATER MANAGEMENT DISTRICT (SFWMD)
ALUMINUM DISK SET IN THE CONCRETE STEP OF THE ENTRANCE TO
THE UPSTREAM AND DOWNSTREAM RECORDER BUILDING AND IS
STAMPED "B.M. S-153 1995"
DESIGNATION - BMS153
STATE/COUNTY-FL/MARTIN
NAD 83(1999) -
LAT.=26°59'20"(N),
LONG.= 080°36'18"(W)

ELEV.= ELEVATION
X 0.00 = ELEVATION
LAT. = LATITUDE
LONG.= LONGITUDE
NAD = NORTH AMERICAN DATUM
SEC. = SECTION
TWP = TOWNSHIP
RNG = RANGE
TYP. = TYPICAL
NGVD = NATIONAL GEODETIC VERTICAL DATUM

N

B . E . C .

SCALE: 1"=600'

± 0.4 MILES

U.S. 98 / U.S. 441

L-65 CANAL

S-153

WELL
LAT. =26°59'17"(N)
LONG.=080°36'20"(W)

± 0.8 MILES

ST. LUCIE CANAL

BRIDGE

LAKE OKEECHOBEE

STATE ROAD 76 (KANNER HWY)

GRAPHIC SCALE
0 300 600 1200
(FEET)
1 inch = 600 ft.

LOCATION SKETCH

MARTIN COUNTY

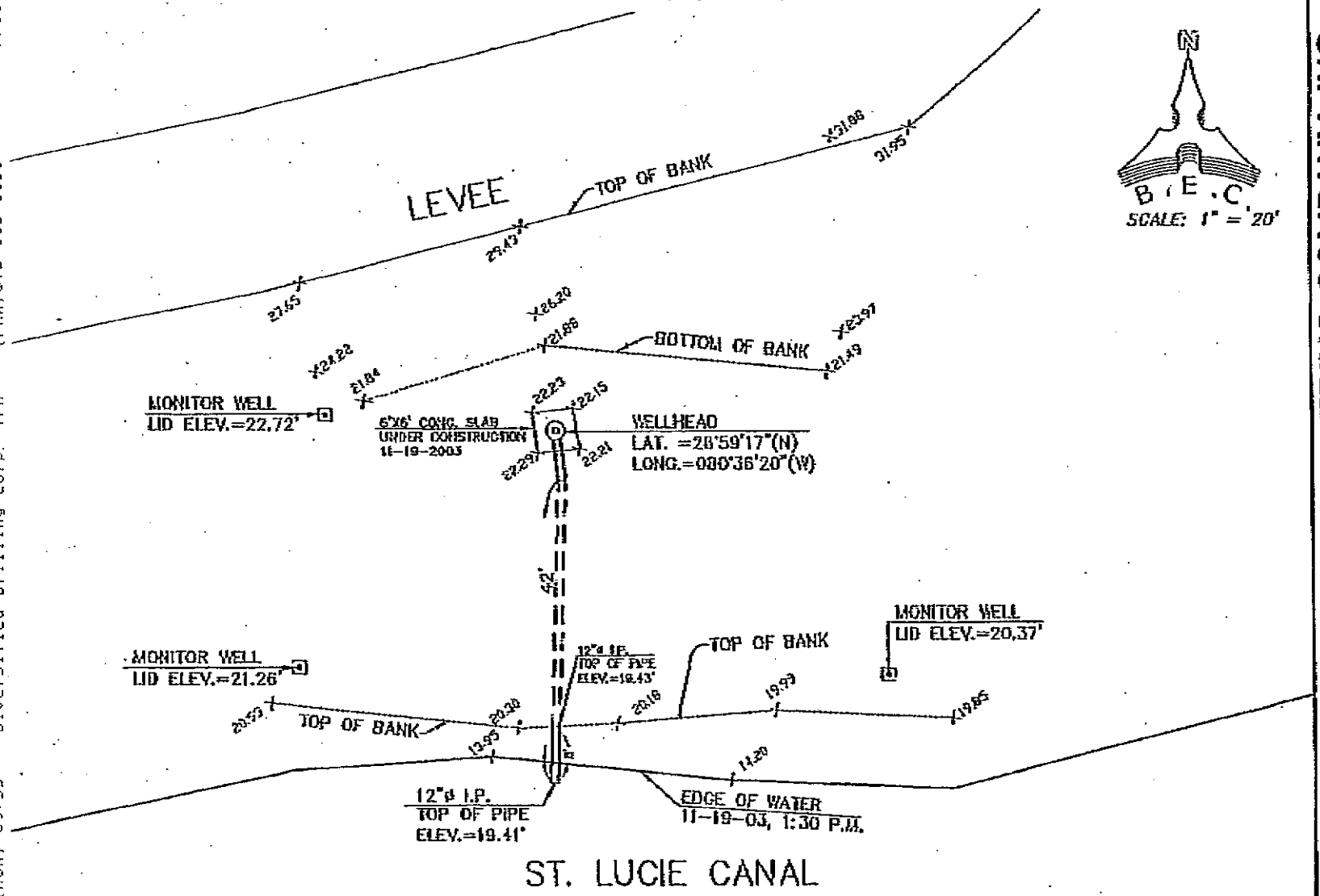
IN S.E. 1/4 OF SEC. | TWP 40 RNG 37

ORDER No.	03-77123
FIELD BOOK No.	2407-76
DATE:	11-19-03
FOR: DIVERSIFIED DRILLING CO.	

BISCAYNE ENGINEERING COMPANY, INC.
Consulting Engineers · Planners · Surveyors
FT. LAUDERDALE
6581 SUNSET STRIP
SUNRISE, FLORIDA 33313
PH: (954) 587-1060
FAX: (305) 749-8626
WEB SITE: www.biscayneengineering.com
E-MAIL: info@biscayneengineering.com
MIAMI
359 WEST FLAGLER STREET
FLORIDA 33130
PH: (305) 324-7921
FAX: (305) 324-0069

SHEET 1 OF 7

WELLHEAD
AS-BUILT
PORT MAYACA



SCALE: 1" = 20'

GRAPHIC SCALE
0 10 20 40
(FEET)
1 inch = 20 ft.

SITE PLAN SKETCH
MARTIN COUNTY
IN S.E. 1/4 OF SEC. (TWP 40 RNG 37

ORDER No.	03-77123
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DATE:	11-19-03
FOR: DIVERSIFIED DRILLING CO.	

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Consulting Engineers · Planners · Surveyors
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6581 SUNSET STRIP
SUNRISE, FLORIDA 33313
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FAX: (305) 749-5429
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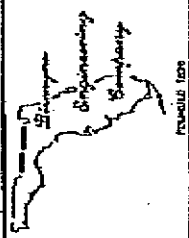
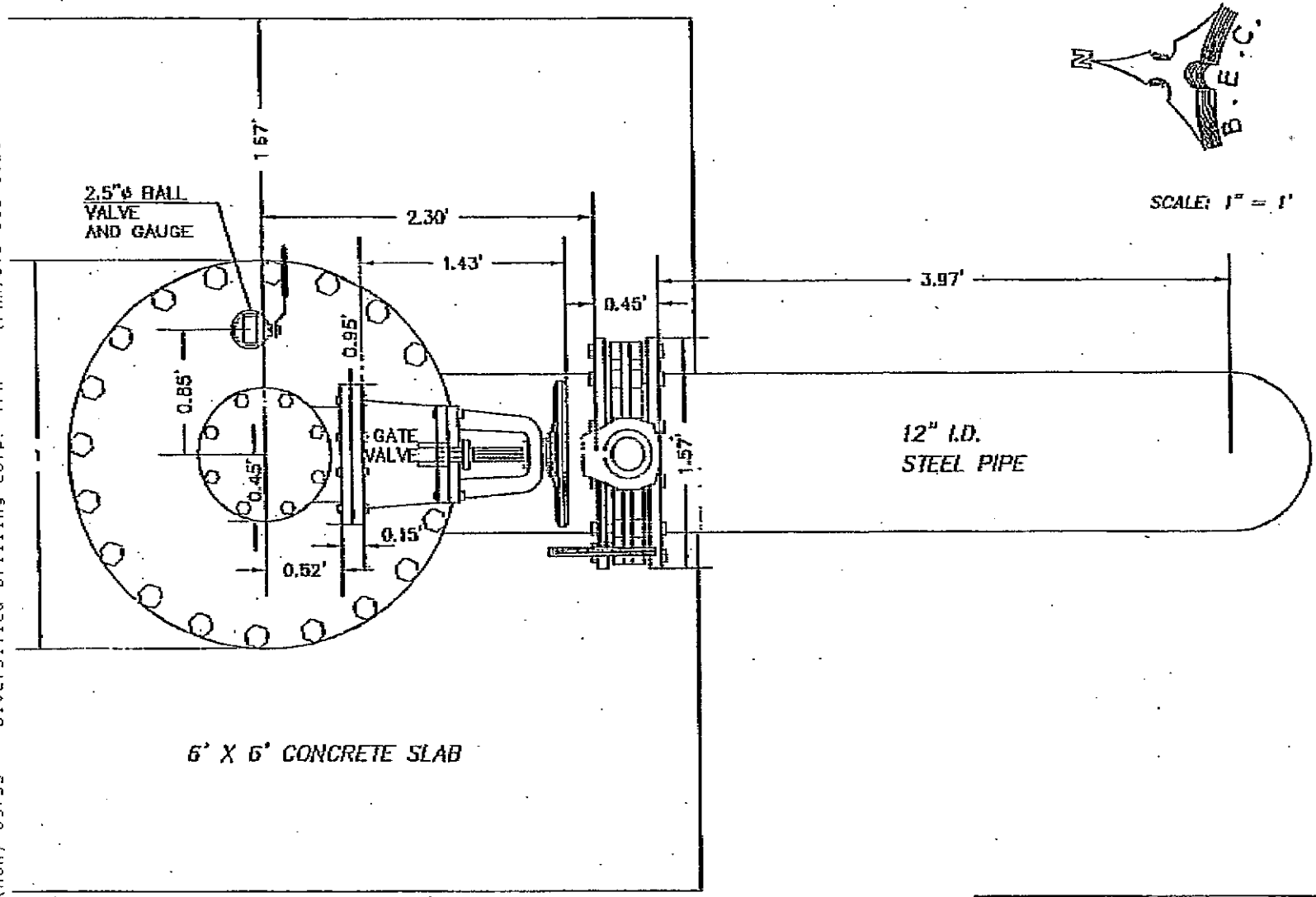
PH: (305) 324-7171
FAX: (305) 324-0589
WEB SITE: www.biscayneengineering.com
E-MAIL: miamibiscayne@aol.com



SHEET 2 OF 7

WELLHEAD
AS-BUILT
PORT MAYACA



SCALE: 1" = 1'

GRAPHIC SCALE
0 0.5 1 2
(FEET)
1 inch = 1 ft.

TOP VIEW SKETCH
MARTIN COUNTY
IN S.E. 1/4 OF SEC. \ TWP 40 RNG 37

ORDER No.	03-77123
FIELD BOOK No.	2407-76
DATE:	11-19-03
FOR: DIVERSIFIED DRILLING CO.	

BISCAYNE ENGINEERING COMPANY, INC.
Consulting Engineers · Planners · Surveyors
FT. LAUDERDALE
6081 SUNSET STRIP
SUNRISE, FLORIDA 33313
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FAX: (954) 748-9559
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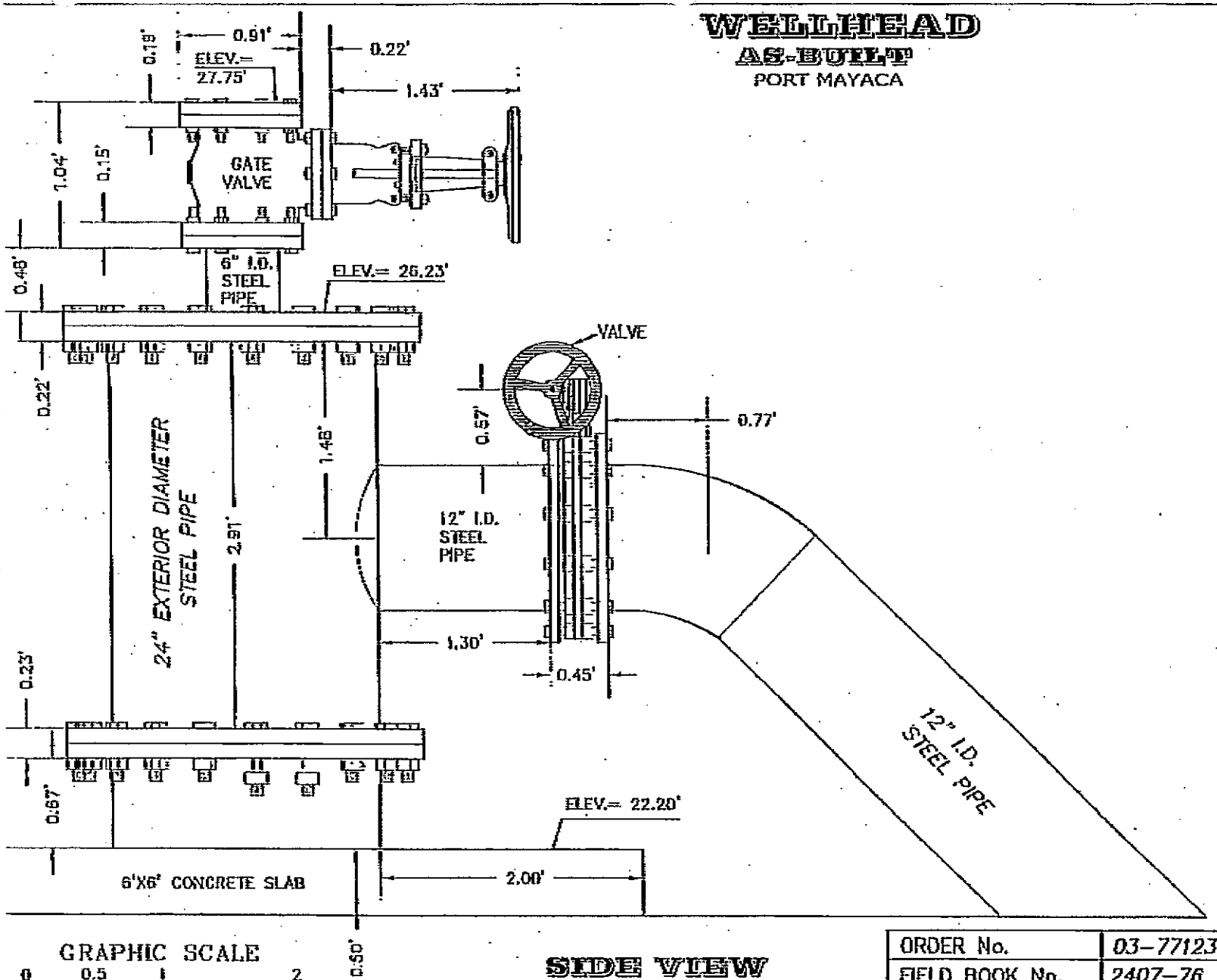
609 WEST FLAGLER STREET
FLORIDA, 33130
PH: (305) 371-7471
FAX: (305) 371-6878

SHEET 3 OF 7

WELLHEAD
AS-BUILT
PORT MAYACA



GRAPHIC SCALE
0 0.5 1 2
(1" FEET)
1 inch 1 ft.

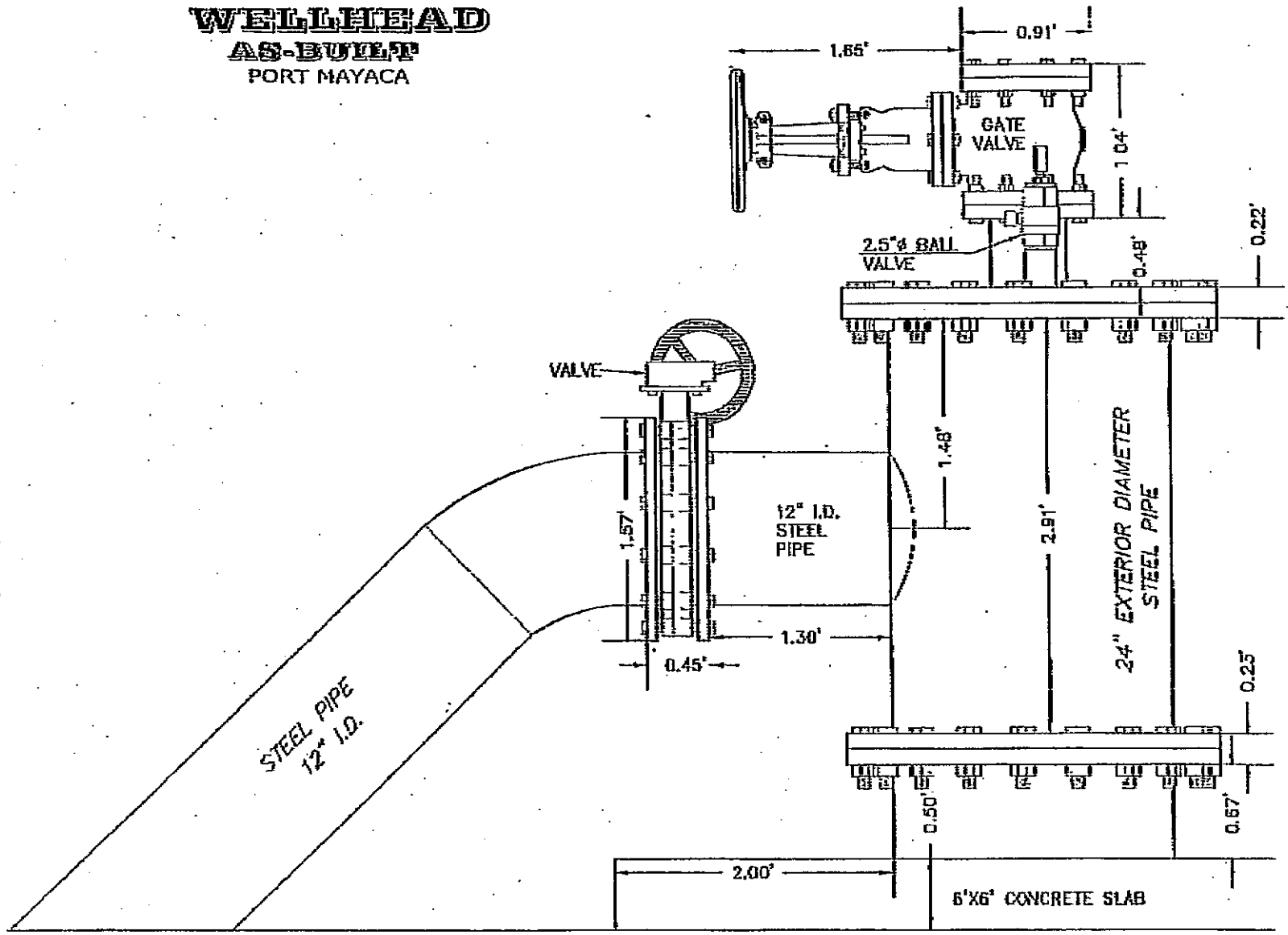
SIDE VIEW SKETCH
MARTIN COUNTY
IN S.E. 1/4 OF SEC. (TWP 40 RNG 37

ORDER No.	03-77123
FIELD BOOK No.	2407-76
DATE:	11-19-03
FOR: DIVERSIFIED DRILLING CO.	

BISCAYNE ENGINEERING COMPANY, INC.
Consulting Engineers - Planners - Surveyors
MIAMI
FT. LAUDERDALE

SHEET 4 OF 7

WELLHEAD
AS-BUILT
PORT MAYACA



GRAPHIC SCALE
0 0.5 1 2
(1 inch = 1 FEET)

SIDE VIEW SKETCH
MARTIN COUNTY
IN S.E. 1/4 OF SEC. 1 TWP 40 RNG 37

ORDER No.	03-77123
FIELD BOOK No.	2407-76
DATE:	11-19-03
FOR: DIVERSIFIED DRILLING CO.	

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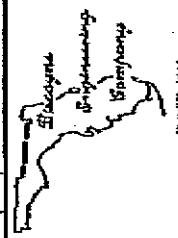
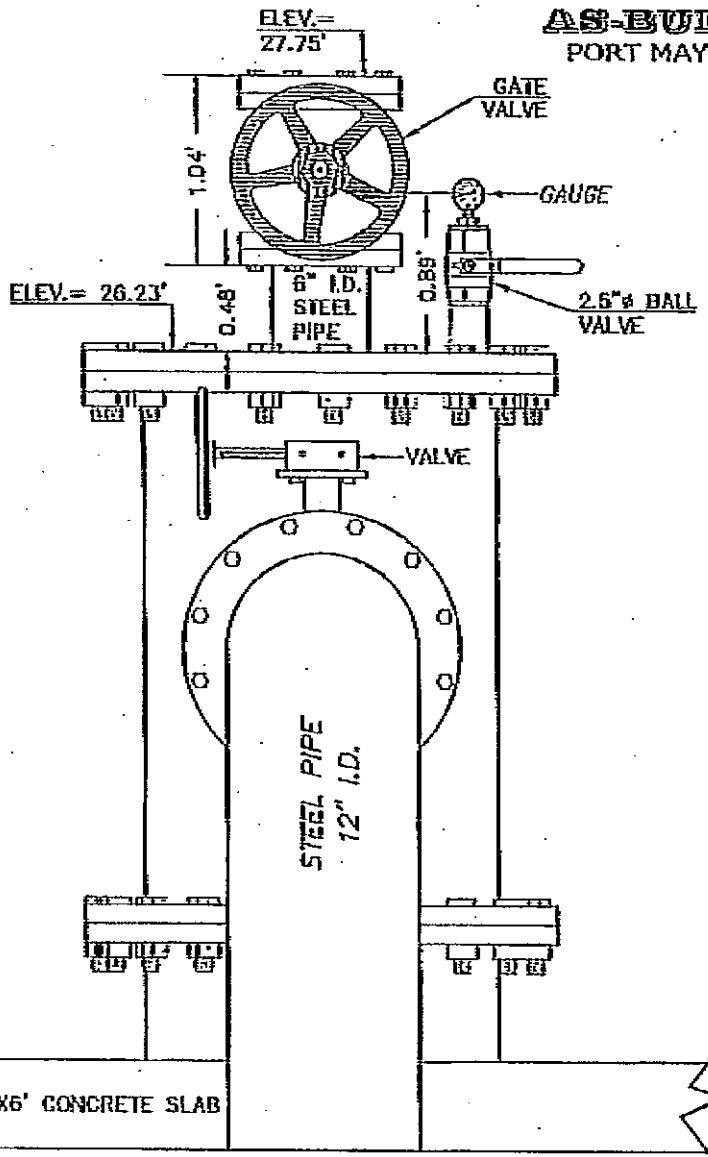
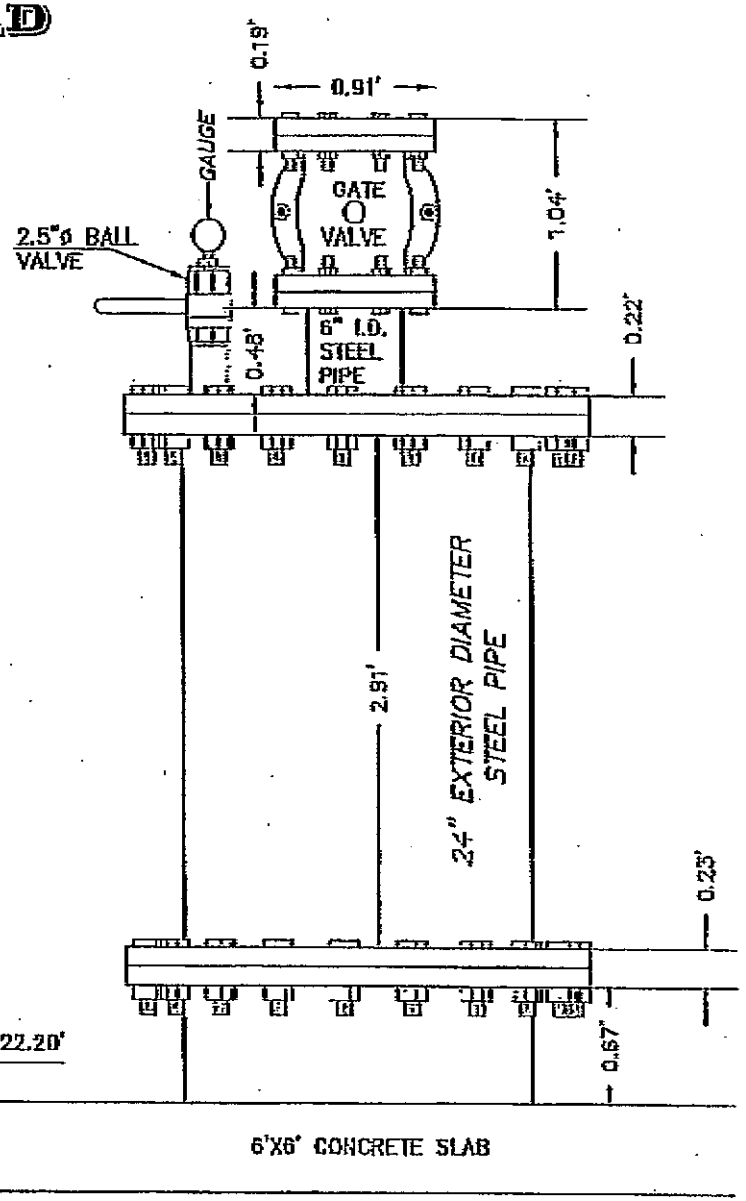


SHEET 5 OF 7

WELLHEAD
AS-BUILT
PORT MAYACA





GRAPHIC SCALE
0 0.5 1 2
(FEET)
1 inch = 1 ft

SIDE VIEW SKETCH
MARTIN COUNTY
IN S.E. 1/4 OF SEC. 1 TWP 40 RNG 37

ORDER No.	03-77123
FIELD BOOK No.	2407-76
DATE:	11-19-03
FOR: DIVERSIFIED DRILLING CO.	

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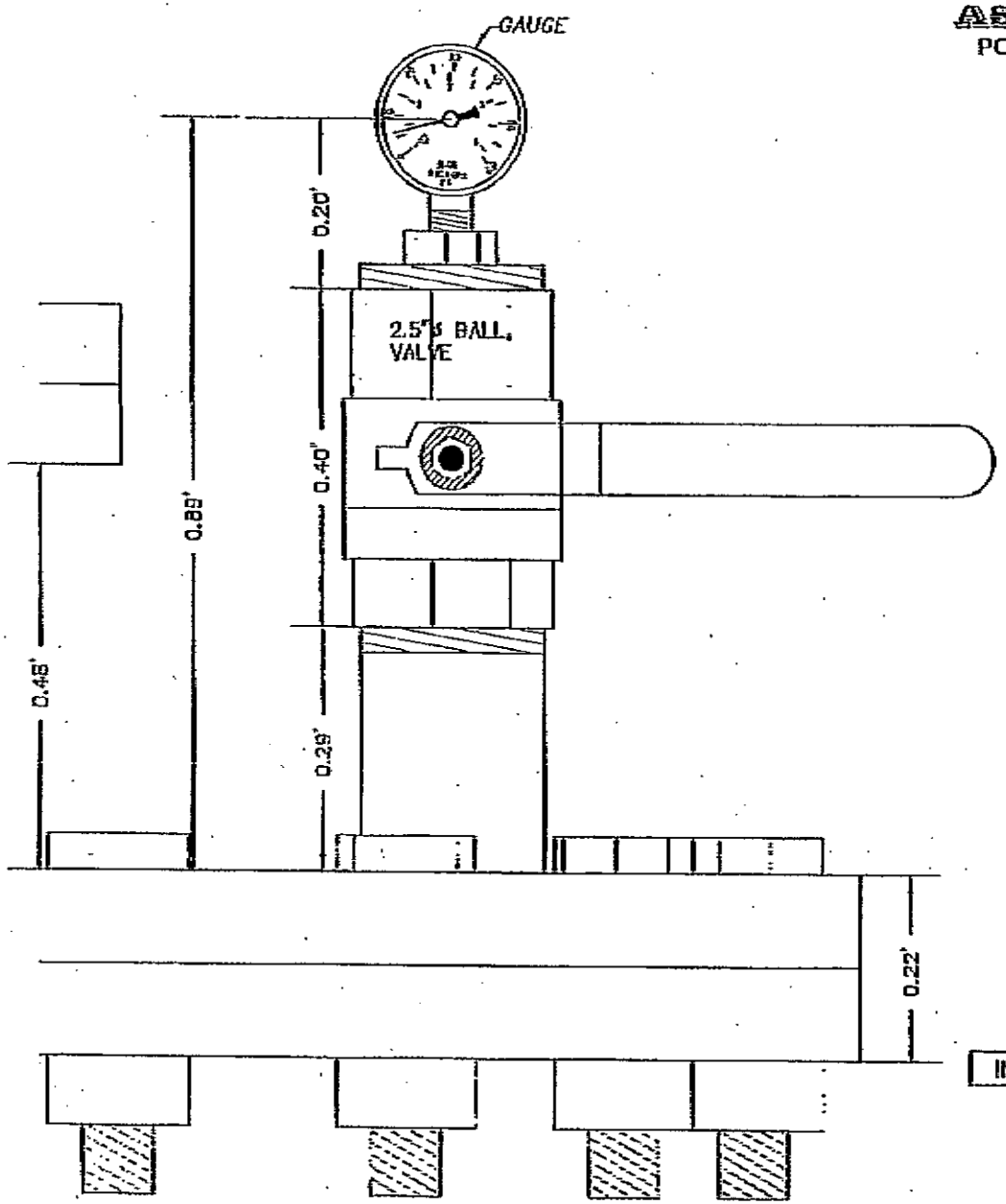
MIAMI, FLORIDA 33130
PH: (305) 374-7071
FAX: (305) 374-0589

SHEET 6 OF 7

WELLHEAD
AS-BUILT
PORT MAYACA



GRAPHIC SCALE
0 0.1 0.2 0.4
(IN FEET)
1 inch = 0.20ft.

SIDE VIEW

MARTIN COUNTY
IN S.E. 1/4 OF SEC. 14 TWP 40 RNG 37

ORDER No.	03-77123
FIELD BOOK No.	2407-76
DATE:	11-19-03
FOR: DIVERSIFIED DRILLING CO.	

BISCAYNE ENGINEERING COMPANY, INC.
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FAX: (305) 324-2889
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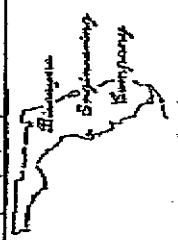
E-MAIL: info@biscayneengineering.com



SHEET 7 OF 7

STATE OF FLORIDA PERMIT APPLICATION TO CONSTRUCT, REPAIR, MODIFY, OR ABANDON A WELL

Permit No. 48-37-3346
Florida Unique I.D.
Permit Stipulations Required (See attached)
62-524 well ☐
CUP/WUP Application No.
ABOVE THIS LINE FOR OFFICIAL USE ONLY

☐ Southwest
☐ Northwest
☐ St. Johns River
☒ South Florida
☐ Suwannee River
CHECK BOX FOR APPROPRIATE DISTRICT. ADDRESS ON BACK OF PERMIT FORM.

THIS FORM MUST BE FILLED OUT COMPLETELY.
The water well contractor is responsible for completing this form and forwarding the permit to the appropriate delegated county where applicable.

1. South Florida WMD | 3301 Gun Club Rd. | West Palm Beach, FL | 33406 | 561-686-8800
Owner, Legal Name of Entity if Corporation | Address | City | Zip | Telephone Number

2. St. Lucie Spillway
Well Location Address, Road Name or Number, City

3. Diversified Drilling Corp. | William McCarty 9273 | 813-988-1132
Well Drilling Contractor | License No. | Telephone No.

P.O. Box 290699
Address

Tampa, FL 33687
City | State | Zip

4. SE (smallest) 1/4 of SW (biggest) 1/4 of Section 14

5. Township 40S Range 37E

(Indicate Well on Chart)

NW | NE | SW | SE

6. Martin | Subdivision Name | Lot | Block | Unit
County

Is this a Domestic and/or Irrigation Well?

7. Number of proposed wells 1 Check the use of well: (See back of permit for additional choices) ____ Domestic Monitor (type) ____
____ Irrigation (type) (See Back) Public Water Supply (type) ____ (See Back) List Other ASR Well (Exploration)
Distance from septic system ____ ft. Description of facility ____ Estimated start of construction date ____

8. Application for: X New Construction ____ Repair/Modify ____ Abandonment ____ (Reason for Abandonment)

Date Stamp

9. Estimated: Well Depth 1450 Casing Depth 775 Screen Interval from ____ to ____
Casing Material: Blk-Steel / Gal / PVC Casing Diameter 24 Seal Material ____

If applicable: Proposed Grouting Interval From 0 to 775 Seal Material neat cement
From ____ to ____ Seal Material ____
From ____ to ____ Seal Material ____

Draw a map of well location and indicate well site with an "X". Identify known roads and landmarks; provide distances between well and landmarks.

North

SEE ATTACHED

Port Mayaka Site

South

11. Telescope Casing ____ or Liner ____ (check one) Diameter ____
Blk-Steel / Galvanized / PVC Other (specify): ____

12. Method of Construction: X Rotary ____ Cable Tool ____ Combination
____ Auger ____ Other (specify:) ____

13. Indicate total No. of wells on site ____ List number of unused wells on site ____

14. Is this well or any other well or water withdrawal on the owner's contiguous property covered under a Consumptive/Water Use Permit (CUP/WUP) or CUP/WUP Application? X No ____ Yes
(If yes, complete the following) CUP/WUP No. ____
District well I.D. No. EXPM-1
Latitude ____ Longitude ____
Data obtained from GPS ____ or map ____ or survey ____ (map datum NAD 27 ____ NAD 83 ____)

15. I hereby certify that I will comply with the applicable rules of Title 40, Florida Administrative Code, and that a water use permit or artificial recharge permit, if required, has been or will be obtained prior to commencement of well construction. I further certify that all information provided on this application is accurate and that I will obtain necessary approval from other federal, state, or local governments, if applicable, I agree to provide a well completion report to the District within 30 days after drilling or the permit expiration, whichever occurs first.

Signature of Contractor | 9273 License No.

I certify that I am the owner of the property, that the information provided is accurate, and that I am aware of my responsibilities under Chapter 373, Florida Statutes, to maintain or properly abandon this well; or, I certify that I am the agent for the owner, that the information provided is accurate, and that I have informed the owner of his responsibilities as stated above. Owner consents to personnel of the WMD or a representative access to the well site.

Owner's or Agent's Signature | 04-25-03 Date

DO NOT WRITE BELOW THIS LINE — FOR OFFICIAL USE ONLY

Approval Granted By: Michelle Friedrich Issue Date: 5/7/03 exp Hydrologist Approval 11/5/03 Initials

Owner Number: ____ Fee Received: $ 315 Receipt No.: ____ Check No.: ____

THIS PERMIT NOT VALID UNTIL PROPERLY SIGNED BY AN AUTHORIZED OFFICER OR REPRESENTATIVE OF THE WMD. IT SHALL BE AVAILABLE AT THE WELL SITE DURING ALL DRILLING OPERATIONS. *This permit is valid for 90 days from date of issue.*

WHITE: ORIGINAL FILE
YELLOW: DRILLING CONTRACTOR
PINK: OWNER

FORM 41.70 — 418 (1) REV. 4/95

WELL COMPLETION REPORT

PERMIT # 4357-5346 CUP/WUP # _____ DID # _____

If permit is for multiple wells indicate the number of wells drilled - _____
Indicate remaining wells to be cancelled - _____

WATER WELL CONTRACTOR'S SIGNATURE: _____ License # 9273

I certify that the information provided in this report is accurate and true.

GROUT	NO. OF BAGS	FROM(FT)	TO(FT)
CEMENT	24" 1545	800	0
CEMENT	34" 618	155	0
Cement	42" 100	37	0
Cement			
30/45 SAND			

WELL LOCATION: County Martin

1/4 of	1/4 of	SEC:	TWP:	RGE:
SE	SW	14	40	37

Latitude: Longitude:

DATE STAMP

Official Use Only

Sketch of well location on property

N
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CHEMICAL ANALYSIS WHEN REQUIRED
Iron: pp Sulfate: ppm
Chloride: ppm
( )Lab Test ( )Field Test Kit
Pump Type
( )Centrifuge ( )Jet ( )Submersible ( )Turbine
Horsepower _____ Capacity _____ GPM _____
Pump Depth _____ Ft. Intake Depth _____ Ft.

OWNER'S NAME SFWMD EXPL-1
COMPLETION DATE 11/19/03 FLORIDA UNIQUE I.D. _____
WELL USE DEP/Public _____ Irrigation _____ Domestic _____
HRS Limited _____ Monitor _____ Injection _____ ASR X
DRILL METHOD: X Rotary _____ Cable Tool _____
_____ Jet _____ Auger _____ Other

Measured Static Water Level 21 Measured Pumping Water Level _____
After _____ HRs at _____ GPM Measuring Pt. _____
Which is _____ Ft. Above _____ Below _____ Land Surface
CASING: X Black Steel _____ Galv _____ PVC

X Open Hole
_____ Screen

Casing Diameter & Depth (FL)		From	To	Color	Grain Size	Type of Material
Diameter	24" BLK	0	1376	See atach log		
From	2					
To	800					
Diameter	34" BLK			Poll hole drilled to 1376'		
From	0			Backed plug to 1040 W/ 206 sk cement		
To	155					
Screen (or) Casing						
Diameter	42" BLK					
From	0					
To	37'					

Depth (FL)

DRILLER'S NAME: Tom Toy H. _____

Appendix
E-1

Lithologic Log
SFWMD Port Mayaca Exploratory Well
Martin County, Florida

Depth in Feet (bls)

From	To	Lithologic Description Port Mayaca Exploratory Well (EXPM-1)
0	34	No Samples
35	45	Shell bed, 10% limestone, Grey to white, moderately hard
45	50	Same as Above
50	55	Same as Above
55	60	Same as Above
60	65	Shell bed, < 5% limestone, Grey , mod. Hard
65	111	Shell bed, greenish grey, shell fragments, 20% phosphate
111	156	Greenish grey wackestone, sticky, 20% phosphate, < 5% limestone
156	165	Greenish grey wackestone, v. sticky, 30% phosphate
165	190	Greenish wackestone, slighty sticky, 30% phosphate
190	208	Greenish wakestone, v. sticky, 30% phosphate
208	230	Greenish mudstone, v. sticky, 20% phosphate and limestone
		Pilot Hole drilled to 230 ft. Borehole prepared for geophysical logging.
230	250	Mudstone; Olive green, 10y 6/2, 40% allochems, fossils (brac), limestone,
250	280	Mudstone; pale olive, 10y 4/2, 10 % allochems, < 5 % phosphate, fine grain quartz sand, 20 % porosity
280	310	Mudstone; olive gray, 5y 3/2, 20%allochems, some quartz sand grains, trace phosphate.
310	410	Mudstone; greenish gray, 10y 4/2, some quartz grains, , 10% allochems, limestone, trace phosphate

Lithologic Log
SFWMD Port Mayaca Exploratory Well
Martin County, Florida

Depth in Feet (bls)

410	450	Wakestone; greenish gray, 10y 4/2, 5% allochems, trace phosphate, med grain quartz sand, 20 % porosity
450	470	Wakestone; greenish yellow, 5gy 5/2, 20% phosphate, 10 % allochems, limestone, med quartz sand
470	485	Mudstone; greenish yellow, 5gy 5/2, , 20 % allochems, 10% phosphate, limestone
485	525	Wakestone; pale olive, 10y 6/2, 20 % phosphate, limestone, 20 % allochems
525	570	Mudstone; pale olive, 10y 6/2, 20% allochems, limestone, 10% phosphate,
570	610	Mudstone; pale olive 10y 6/2, < 5% phosphate, limestone, 20 % allochems
610	615	Wakestone; pale olive 10y 6/2, 20 % allochems, limestone, quartz sand grains, trace phosphate,
620	625	Wakestone; pale olive, 10y 6/2, med. plasticity, quartz sand, fine grain, limestone (yellowish gray 5y 7/2), interbedded clay, (grayish olive green 5gy 3/2), high plasticity, 10 % allochems,
645	650	Mudstone; dusty yellow green, 5gy 5/2, med plasticity, < 10 % allochems, limestone, quartz grains, 10% phosphate
650	655	Wakestone; pale olive 10y 6/2, 5% allochems, trace shell fragments, 10 % phosphate, limestone, 10 % porosity
700	705	Wakestone; pale olive 10y 6/2, med plasticity, some limestone, 5 % phosphate, trace shell fragments, <20% porosity, sticky, med plasticity, clay interbedded 5gy 3/2.
705	753	Packstone; yellowish gray, 5y 7/2, clay, med plasticity, 50 % phosphate, trace shell fragments, 20 % porosity
753	785	Grainstone (limestone); pale olive 10y 6/2, 40 % phosphate, unconsolidated, 10 % porosity,
785	875	Grainstone (limestone) pale yellowish brown, 10yr 6/2, unconsolidated, < 10 % phosphate, < 5 % allochems, slightly angular, interangular porosity.
		Pilot Hole TD 875 ft. Borehole prepared for geophysical logging.

Lithologic Log
SFWMD Port Mayaca Exploratory Well
Martin County, Florida

Depth in Feet (bls)

875	885	Grainstone, (Limestone), grayish yellow, (5y8/4), very fine grained, fine crystalline sparry calcite, poorly indurated, fine vug porosity, 20 % allochems.
885	900	Grainstone (limestone) same as above, trace cement,
900	925	Grainstone (limestone), yellowish gray, (5y 7/2), fine grained, well indurate, moldic porosity.
925	935	Grainstone (limestone) grayish yellow, (5y 7/2), fine grained, fine crystalline sparry calcite, well indurated, small vugs, secondary porosity, estimated at 20%.
935	940	Grainstone (dolomitic limestone), yellowish gray (5y 7/2), med grained, well indurated, micritic, low porosity
940	950	Grainstone (Limestone) grayish yellow (5y8/4), fine crystalline sparry calcite, well indurated, moderate porosity
950	960	Grainstone (limestone) yellowish gray (5y 7/2), very fine grained, well indurated, fine vug porosity, < 10% allochems
960	975	Grainstone (limestone) grayish yellow (5y 8/2), very fine grained, fine crystalline sparry calcite, medium indurated 50% porosity.
975	995	Packstone (Limestone), pale brown (5yr 5/2) fine crystalline, well indurated, few isolated vugs, micritic, low porosity
995	1,005	Grainstone (limestone) pale yellowish brown, (10yr 6/2), fine to med. grained, well indurated, small vugs, secondary porosity
1,005	1,015	Grainstone (limestone) light olive gray (5y6/1), micritic, well indurated, 10-15 % dolomite, low porosity.
1,015	1,025	Grainstone (limestone) light olive gray (5y5/2), fine crystalline, well indurated, 30 % allochems, fossiliferous, low porosity
1,025	1,045	same as above, <10 % allochems, <20% dolomite.

Lithologic Log
SFWMD Port Mayaca Exploratory Well
Martin County, Florida

Depth in Feet (bls)

1,045	1,050	Grainstone (limestone), yellowish gray (5y8/1), fine grained sparry calcite, poorly indurated, small vugs secondary porosity
1,070	1,120	Grainstone (limestone) pale yellowish brown, (10yr6/2), fine grained, moderately indurated, good interangular porosity.
1,120	1,130	Grainstone (limestone) yellowish gray (5y8/1), fine to med. grained, med indurated, 5 % micritic limestone, moderate porosity.
1,130	1,155	Grainstone (packstone) yellowish gray (5y8/1), fine to med. Grained, moderately indurated, micritic interpartical porosity.
1,155	1,195	Grainstone (limestone), light olive gray (5y 5/2), very fine crystalline, moderately indurated, micritic, low porosity
1,195	1,225	Grainstone (limestone) same as above, 5% dolomite, well indurated, low porosity.
1,225	1,280	Packstone (limestone), light olive gray, (5y 5/2), fine crystalline, few vugs, micritic,10 % dolomite, low porosity.
1,280	1,310	Grainstone (limestone) yellowish gray (5y 8/1), fine crystalline, micritic well indurated, low porosity.
1,310	1,325	Mudstone (limestone) pale yellowish brown (10 yr 6/2), friable, few vugs, moderately indurated, dark dark brown clayey material present.
1,325	1,330	Grainstone, same as above at 1155- 1195.
1,330	1,340	Wakestone (limestone) medium gray (N5), well indurated, low porosity, 60 % hard micritic dolomized limestone.
1,340	1,370	Same as above, < 10% hard micritic dolomized limestone, fine crystalline, poorly indurated moderate porosity.
1,370	1,380	Grainstone (limestone) pale yellowish brown (10yr 6/2), fine crystalline sparry calcite, medium porosity, 5% Dolc

Appendix
E-2

LITHOLOGIC WELL LOG PRINTOUT

SOURCE - FGS

WELL NUMBER: W-18463
TOTAL DEPTH: 1380 FT.
SAMPLES - NONE

COUNTY - MARTIN
LOCATION: T.40S R.37E S.14
LAT = 26D 59M 17S
LON = 80D 30M 20S

COMPLETION DATE: N/A
ELEVATION: 25 FT
OTHER TYPES OF LOGS AVAILABLE - NONE

OWNER/DRILLER:SFWMD/DIVERSIFIED DRILLING CORP

WORKED BY:E. DORN 2004
section ddc
Port Mayaca/ EXPM-1

0.	-	30.	000NOSM	NO SAMPLES
30.	-	208.	121PCPC	PLIOCENE-PLEISTOCENE
208.	-	460.	122PCRV	PEACE RIVER FM.
460.	-	790.	122ARCA	ARCADIA FM.
790.	-	895.	124OCAL	OCALA GROUP
895.	-	910.	000NOSM	NO SAMPLES
910.	-	1380.	124AVPK	AVON PARK FM.

0 - 30 NO SAMPLES

30 - 35 SHELL BED; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-15%
FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA, BARNACLES BRYOZOA

35 - 40 NO SAMPLES

40 - 45 SHELL BED; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-05%
FOSSILS: MOLLUSKS, BENTHIC FORAMINIFERA, BARNACLES BRYOZOA, CORAL

45 - 50 AS ABOVE

50 - 55 SHELL BED; VERY LIGHT ORANGE TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-02%, CLAY- T%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, CORAL FOSSIL FRAGMENTS

55 - 60 SHELL BED; VERY LIGHT ORANGE TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE- T%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, CORAL FOSSIL FRAGMENTS

60 - 65 SHELL BED; VERY LIGHT ORANGE TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-01%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, CORAL

FOSSIL FRAGMENTS

65 - 70 AS ABOVE

70 - 75 SHELL BED; VERY LIGHT ORANGE TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE- T%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, CORAL
FOSSIL FRAGMENTS

75 - 80 SHELL BED; VERY LIGHT ORANGE TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, CORAL
FOSSIL FRAGMENTS

80 - 85 AS ABOVE

85 - 90 SHELL BED; VERY LIGHT ORANGE TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, CORAL
FOSSIL FRAGMENTS

90 - 95 SHELL BED; VERY LIGHT ORANGE TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, CORAL
FOSSIL FRAGMENTS

95 - 101 AS ABOVE

101 - 106 SHELL BED; VERY LIGHT ORANGE TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, ECHINOID
FOSSIL FRAGMENTS

106 - 111 SHELL BED; VERY LIGHT ORANGE TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-05%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, ECHINOID
FOSSIL FRAGMENTS

111 - 116 SHELL BED; YELLOWISH GRAY TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-35%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, ECHINOID
FOSSIL FRAGMENTS

116 - 121 SHELL BED; YELLOWISH GRAY TO MODERATE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-25%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, ECHINOID
FOSSIL FRAGMENTS

121 - 126 WACKESTONE; YELLOWISH GRAY TO MODERATE GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE

MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-45%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, ECHINOID FOSSIL FRAGMENTS

126 - 131 WACKESTONE; YELLOWISH GRAY TO MODERATE GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-40%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, ECHINOID FOSSIL FRAGMENTS

131 - 136 SHELL BED; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-15%, CLAY- T%
PHOSPHATIC SAND-01%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, ECHINOID FOSSIL FRAGMENTS

136 - 141 SHELL BED; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-10%, CLAY-01%
PHOSPHATIC SAND-05%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, ECHINOID FOSSIL FRAGMENTS

141 - 146 WACKESTONE; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
20% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-30%, CLAY-01%
PHOSPHATIC SAND-03%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, ECHINOID FOSSIL FRAGMENTS

146 - 151 WACKESTONE; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
20% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-25%, CLAY-01%
PHOSPHATIC SAND-03%
FOSSILS: MOLLUSKS, BARNACLES, BRYOZOA, ECHINOID FOSSIL FRAGMENTS

151 - 156 WACKESTONE; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR

GRAIN TYPE: CALCILUTITE, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE
POOR INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-20%, CLAY-01%
PHOSPHATIC SAND-01%
FOSSILS: MOLLUSKS, BARNACLES, ECHINOID, FOSSIL FRAGMENTS

156 - 161 WACKESTONE; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-20%, CLAY-02%
PHOSPHATIC SAND-02%
FOSSILS: BARNACLES, MOLLUSKS, FOSSIL FRAGMENTS

161 - 167 WACKESTONE; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-15%, CLAY-03%
PHOSPHATIC SAND-01%
FOSSILS: BARNACLES, MOLLUSKS, FOSSIL FRAGMENTS

167 - 172 WACKESTONE; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, SKELETAL
20% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-30%, CLAY-02%
PHOSPHATIC SAND- T%
FOSSILS: BARNACLES, MOLLUSKS, FOSSIL FRAGMENTS

172 - 178 MUDSTONE; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-40%, CLAY-02%
FOSSILS: BARNACLES, MOLLUSKS, FOSSIL FRAGMENTS

178 - 183 MUDSTONE; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
10% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-35%, CLAY-02%
FOSSILS: BARNACLES, MOLLUSKS, FOSSIL FRAGMENTS

183 - 188 SHELL BED; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-10%, CLAY-03%
FOSSILS: FOSSIL FRAGMENTS, BARNACLES, MOLLUSKS

188 - 193 SHELL BED; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-10%, CLAY-02%
FOSSILS: FOSSIL FRAGMENTS, BARNACLES, MOLLUSKS

193 - 198 WACKESTONE; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SHELL-30%, CLAY-03%
FOSSILS: FOSSIL FRAGMENTS, BARNACLES, MOLLUSKS

198 - 203 SHELL BED; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-40%, CLAY- T%
FOSSILS: FOSSIL FRAGMENTS, BARNACLES, MOLLUSKS

203 - 208 SHELL BED; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; UNCONSOLIDATED
ACCESSORY MINERALS: LIMESTONE-30%, CLAY-03%
FOSSILS: FOSSIL FRAGMENTS, BARNACLES, MOLLUSKS

208 - 213 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: QUARTZ SAND-07%, SHELL-01%
FOSSILS: FOSSIL FRAGMENTS

213 - 218 AS ABOVE

218 - 223 AS ABOVE

223 - 228 AS ABOVE

228 - 235 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-01%, QUARTZ SAND- T%
PHOSPHATIC SAND-01%

FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

235 - 240 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-01%, PHOSPHATIC SAND- T%
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS

240 - 245 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-01%
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS, BARNACLES

245 - 255 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-05%, PHOSPHATIC SAND-01%
FOSSILS: MOLLUSKS, FOSSIL FRAGMENTS, BARNACLES

255 - 260 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-15%, PHOSPHATIC SAND- T%
FOSSILS: SHARKS TEETH, FOSSIL FRAGMENTS, MOLLUSKS
BARNACLES

260 - 270 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-15%, PHOSPHATIC SAND- T%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS, BARNACLES

270 - 275 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
10% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-15%, PHOSPHATIC SAND- T%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS, BARNACLES

275 - 280 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-30%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS, BARNACLES
SHARKS TEETH
Sample consists of clay mixed with micrite

280 - 285 AS ABOVE

285 - 290 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-20%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

290 - 295 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-30%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

295 - 300 AS ABOVE

300 - 305 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-20%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

305 - 310 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-30%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

310 - 315 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-40%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

315 - 320 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-40%

FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

320 - 325 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-40%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

325 - 330 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-30%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

330 - 340 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-20%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS.
Sample consists of clay mixed with micrite

340 - 350 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-15%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

350 - 365 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION

CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-15%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

365 - 370 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

370 - 375 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

375 - 380 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

Sample consists of clay mixed with micrite

380 - 385 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

385 - 390 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

390 - 395 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS
Sample consists of clay mixed with micrite

395 - 400 AS ABOVE

400 - 405 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-15%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

405 - 410 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-15%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

410 - 415 CLAY; LIGHT OLIVE GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-30%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

415 - 420 CLAY; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%, QUARTZ SAND- T%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

420 - 425 AS ABOVE

425 - 430 CLAY; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%, QUARTZ SAND-01%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

430 - 435 CLAY; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%, QUARTZ SAND-01%
PHOSPHATIC SAND- T%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

435 - 440 CLAY; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%, LIMESTONE-05%
PHOSPHATIC SAND-10%, QUARTZ SAND-01%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

440 - 445 CLAY; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%, PHOSPHATIC SAND-10%
QUARTZ SAND-01%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

445 - 450 AS ABOVE

450 - 455 CLAY; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%, PHOSPHATIC SAND-10%
QUARTZ SAND-01%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

455 - 460 CLAY; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR; POOR INDURATION
CEMENT TYPE(S): CLAY MATRIX
ACCESSORY MINERALS: CALCILUTITE-10%, PHOSPHATIC SAND-03%
QUARTZ SAND-01%
FOSSILS: FOSSIL FRAGMENTS, MOLLUSKS

460 - 465 MUDSTONE; YELLOWISH GRAY TO LIGHT OLIVE GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-15%, PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS

465 - 470 MUDSTONE; YELLOWISH GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
07% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-05%, CLAY- T%
FOSSILS: FOSSIL FRAGMENTS

470 - 480 MUDSTONE; YELLOWISH GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-05%, CLAY-01%
FOSSILS: FOSSIL FRAGMENTS

480 - 485 MUDSTONE; YELLOWISH GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-07%, CLAY-01%
FOSSILS: FOSSIL FRAGMENTS

485 - 490 MUDSTONE; YELLOWISH GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-05%, CLAY- T%
FOSSILS: FOSSIL MOLDS, BARNACLES

490 - 495 AS ABOVE

495 - 500 MUDSTONE; YELLOWISH GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-03%, CLAY- T%
FOSSILS: FOSSIL MOLDS, BARNACLES

500 - 505 MUDSTONE; YELLOWISH GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-05%, CLAY- T%
FOSSILS: FOSSIL MOLDS

505 - 510 MUDSTONE; YELLOWISH GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-03%, CLAY- T%
FOSSILS: FOSSIL MOLDS

510 - 515 MUDSTONE; YELLOWISH GRAY TO YELLOWISH GRAY

POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-03%, CLAY- T%
FOSSILS: FOSSIL FRAGMENTS

515 - 520 MUDSTONE; YELLOWISH GRAY TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-03%, CLAY- T%
FOSSILS: FOSSIL FRAGMENTS

520 - 525 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-02%
FOSSILS: FOSSIL FRAGMENTS

525 - 530 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-02%
FOSSILS: FOSSIL FRAGMENTS

530 - 540 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-05%, CLAY-02%
FOSSILS: FOSSIL FRAGMENTS

540 - 545 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
20% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-07%
FOSSILS: FOSSIL FRAGMENTS

545 - 550 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-10%
FOSSILS: FOSSIL FRAGMENTS

550 - 555 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-05%, CLAY-05%
FOSSILS: FOSSIL FRAGMENTS

555 - 560 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-05%
FOSSILS: FOSSIL FRAGMENTS

560 - 565 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-07%
FOSSILS: FOSSIL FRAGMENTS

565 - 570 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-07%
FOSSILS: FOSSIL FRAGMENTS

570 - 575 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-07%
FOSSILS: FOSSIL FRAGMENTS

575 - 580 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-10%
FOSSILS: FOSSIL FRAGMENTS

580 - 585 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-10%, CLAY- T%
FOSSILS: FOSSIL FRAGMENTS

585 - 590 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-07%, CLAY-02%
GYPSUM- T%
FOSSILS: FOSSIL FRAGMENTS, BARNACLES, MOLLUSKS

590 - 595 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-05%, CLAY-05%
GYPSUM- T%
FOSSILS: FOSSIL FRAGMENTS, BARNACLES, MOLLUSKS

595 - 600 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 10% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-03%, CLAY-05%
FOSSILS: FOSSIL FRAGMENTS

600 - 605 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR

GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-10%, CLAY-03%
FOSSILS: FOSSIL FRAGMENTS

605 - 610 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-15%, CLAY-03%
FOSSILS: FOSSIL FRAGMENTS

610 - 615 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-10%, CLAY- T%
FOSSILS: FOSSIL FRAGMENTS

615 - 620 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-10%, CLAY-05%
FOSSILS: FOSSIL FRAGMENTS

620 - 625 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-07%, CLAY-05%
FOSSILS: FOSSIL FRAGMENTS

625 - 630 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-10%, CLAY-07%
FOSSILS: FOSSIL FRAGMENTS

630 - 635 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE

POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-15%, CLAY-05%
FOSSILS: FOSSIL FRAGMENTS

635 - 640 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-07%, CLAY-03%
FOSSILS: FOSSIL FRAGMENTS

640 - 645 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-05%, CLAY-01%
FOSSILS: FOSSIL FRAGMENTS

645 - 650 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-10%, CLAY-03%
FOSSILS: FOSSIL FRAGMENTS

650 - 655 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-10%, CLAY-03%
FOSSILS: FOSSIL FRAGMENTS

655 - 660 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-03%, CLAY-07%
FOSSILS: FOSSIL FRAGMENTS

660 - 665 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX

ACCESSORY MINERALS: CLAY-30%, PHOSPHATIC SAND-02%
FOSSILS: FOSSIL FRAGMENTS

665 - 670 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-30%, PHOSPHATIC SAND-02%
FOSSILS: FOSSIL FRAGMENTS

670 - 675 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-10%, PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS

675 - 680 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY- T%, PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS

680 - 685 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE

POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY- T%, PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS

685 - 690 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY- T%, PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS

690 - 695 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY- T%, PHOSPHATIC SAND-01%

FOSSILS: FOSSIL FRAGMENTS

695 - 700 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-05%, PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS

700 - 705 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS

705 - 710 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS

710 - 715 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS

715 - 720 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-05%, PHOSPHATIC SAND- T%
FOSSILS: FOSSIL FRAGMENTS

720 - 725 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE

POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: CLAY-01%, PHOSPHATIC SAND- T%
FOSSILS: FOSSIL FRAGMENTS

725 - 730 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND- T%
FOSSILS: FOSSIL FRAGMENTS

730 - 735 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS

735 - 740 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND- T%
FOSSILS: FOSSIL FRAGMENTS

740 - 745 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-02%
FOSSILS: FOSSIL FRAGMENTS

745 - 750 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-07%, CLAY-01%
FOSSILS: FOSSIL FRAGMENTS

750 - 755 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE; 05% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-15%, CLAY-01%
FOSSILS: FOSSIL FRAGMENTS

755 - 760 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-15%, CLAY-02%
FOSSILS: FOSSIL FRAGMENTS

760 - 765 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-15%, CLAY-02%
FOSSILS: FOSSIL FRAGMENTS, ECHINOID

765 - 770 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-15%, CLAY-02%
FOSSILS: FOSSIL FRAGMENTS, ECHINOID

770 - 775 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-20%, QUARTZ SAND-20%
CLAY-03%
FOSSILS: FOSSIL FRAGMENTS, ECHINOID

775 - 780 MUDSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS
05% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-20%, QUARTZ SAND-10%
CLAY-03%
FOSSILS: FOSSIL FRAGMENTS, ECHINOID

780 - 785 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
POOR INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-20%, QUARTZ SAND-15%
CLAY-05%
FOSSILS: FOSSIL FRAGMENTS

785 - 790 AS ABOVE

790 - 795 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: CALCILUTITE, CRYSTALS, SKELTAL CAST
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-15%, QUARTZ SAND-05%
CLAY-03%
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS

795 - 800 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-15%, QUARTZ SAND-05%
CLAY-01%
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS

800 - 805 AS ABOVE

805 - 810 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
20% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-02%, CLAY- T%
FOSSILS: FOSSIL FRAGMENTS

810 - 815 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-02%
FOSSILS: FOSSIL FRAGMENTS

815 - 820 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM

GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND- T%
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, FOSSIL FRAGMENTS
some sand - probably cavings

820 - 825 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-03%
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS

825 - 830 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: QUARTZ SAND-20%, CLAY-05%
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS

830 - 840 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
30% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-02%
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS

840 - 845 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-02%, QUARTZ SAND-05%
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS

845 - 850 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
25% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS

850 - 855 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
35% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND-01%
FOSSILS: FOSSIL FRAGMENTS, ECHINOID
Driller's mud - 5%

855 - 860 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: PHOSPHATIC SAND- T%
FOSSILS: FOSSIL FRAGMENTS, ECHINOID

860 - 865 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: QUARTZ SAND- T%, PHOSPHATIC SAND- T%
FOSSILS: FOSSIL FRAGMENTS, ECHINOID

865 - 870 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

870 - 875 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

875 - 880 NO SAMPLES

880 - 885 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
Nummulites, Lepidocyclina

885 - 890 AS ABOVE

890 - 892 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, FOSSIL FRAGMENTS
BRYOZOA
Nummulites, Lepidocyclina, Sphaerogypsin globula

892 - 895 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, FOSSIL FRAGMENTS
BRYOZOA

895 - 900 NO SAMPLES

900 - 905 NO SAMPLES

905 - 910 NO SAMPLES

910 - 915 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR, VUGULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: MEDIUM RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, FOSSIL FRAGMENTS

915 - 920 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR, VUGULAR
GRAIN TYPE: PELLET, SKELETAL, CRYSTALS
65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, CONES

Dictyconus americanus

920 - 925 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR, VUGULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, CONES
Dictyconus americanus, Cibrobulimina (Valvulina) cushmani
Lituonella floridana 25% Driller's mud

925 - 930 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR, VUGULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, CONES
30% Driller's mud

930 - 935 LIMESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR, VUGULAR, INTERCRYSTALLINE
GRAIN TYPE: CRYSTALS, CALCILUTITE, SKELETAL
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: CONES, BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS
Too recrystallized to see original texture

935 - 940 LIMESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERCRYSTALLINE, VUGULAR, INTERGRANULAR
GRAIN TYPE: CRYSTALS, CALCILUTITE
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

940 - 945 PACKSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR, INTERCRYSTALLINE
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: CONES, BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

945 - 950 LIMESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR, VUGULAR, INTERCRYSTALLINE

GRAIN TYPE: CRYSTALS, CALCILUTITE, PELLET
20% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR- T%
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

950 - 955 LIMESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR, VUGULAR, INTERCRYSTALLINE
GRAIN TYPE: CRYSTALS, CALCILUTITE, PELLET
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, DOLOMITE CEMENT
ACCESSORY MINERALS: SPAR- T%
OTHER FEATURES: HIGH RECRYSTALLIZATION, DOLOMITIC
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

955 - 960 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR, VUGULAR, INTERCRYSTALLINE
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-01%
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS
FOSSIL MOLDS, ECHINOID

960 - 965 PACKSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE

65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

965 - 970 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: CONES, BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

970 - 975 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

975 - 980 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR, VUGULAR, INTERCRYSTALLINE
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-01%
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

980 - 985 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
65% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-03%
FOSSILS: ECHINOID, FOSSIL FRAGMENTS

985 - 990 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-02%
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: ECHINOID, FOSSIL FRAGMENTS

990 - 995 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

995 - 1000 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
80% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: MEDIUM; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX

1000 - 1005 DOLOSTONE; GRAYISH BROWN TO GRAYISH ORANGE
POROSITY: INTERCRYSTALLINE, VUGULAR, INTERGRANULAR
50-90% ALTERED; ANHEDRAL
GRAIN SIZE: CRYPTOCRYSTALLINE

RANGE: CRYPTOCRYSTALLINE TO MEDIUM; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: LIMESTONE-01%
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: NO FOSSILS

1005 - 1010 DOLOSTONE; GRAYISH BROWN TO GRAYISH ORANGE
POROSITY: INTERCRYSTALLINE, VUGULAR, INTERGRANULAR
50-90% ALTERED; ANHEDRAL
GRAIN SIZE: CRYPTOCRYSTALLINE
RANGE: CRYPTOCRYSTALLINE TO MEDIUM; GOOD INDURATION
CEMENT TYPE(S): DOLOMITE CEMENT
ACCESSORY MINERALS: LIMESTONE-05%
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: NO FOSSILS

1010 - 1015 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, INTRACLASTS
35% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: DOLOMITE-02%
FOSSILS: NO FOSSILS

1015 - 1020 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: DOLOMITE-01%
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL MOLDS

1020 - 1025 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: DOLOMITE- T%
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, FOSSIL FRAGMENTS
FOSSIL MOLDS

1025 - 1030 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: DOLOMITE- T%
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1030 - 1035 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR, POSSIBLY HIGH PERMEABILITY
GRAIN TYPE: CALCILUTITE, PELLET
30% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: DOLOMITE-01%
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: FOSSIL MOLDS

1035 - 1040 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: DOLOMITE-01%
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, FOSSIL FRAGMENTS
CONES

1040 - 1045 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET
20% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, FOSSIL FRAGMENTS

1045 - 1050 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-05%
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, FOSSIL FRAGMENTS

1050 - 1055 NO SAMPLES

1055 - 1060 NO SAMPLES

1060 - 1065 NO SAMPLES

1065 - 1070 NO SAMPLES

1070 - 1075 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, CALCILUTITE, SKELETAL
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-01%

FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1075 - 1080 AS ABOVE

1080 - 1085 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
40% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1085 - 1090 PACKSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1090 - 1095 AS ABOVE

1095 - 1100 PACKSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
55% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: DOLOMITE-01%, SPAR-01%
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1100 - 1105 PACKSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
55% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX, SPARRY CALCITE CEMENT
ACCESSORY MINERALS: SPAR-02%
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1105 - 1110 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1110 - 1115 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
50% ALLOCHEMICAL CONSTITUENTS

GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR- T%
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1115 - 1120 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY

POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR- T%
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1120 - 1125 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
35% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1125 - 1130 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR- T%
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1130 - 1135 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR- T%
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, FOSSIL FRAGMENTS

1135 - 1140 AS ABOVE

1140 - 1145 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
25% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR- T%

FOSSILS: BENTHIC FORAMINIFERA, CONES, ECHINOID
FOSSIL FRAGMENTS

1145 - 1150 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
30% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR- T%
FOSSILS: BENTHIC FORAMINIFERA, CONES, ECHINOID
FOSSIL FRAGMENTS

1150 - 1155 PACKSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-01%
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS
ECHINOID

1155 - 1160 AS ABOVE

1160 - 1165 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-01%
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, ECHINOID

1165 - 1170 PACKSTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-01%
FOSSILS: BENTHIC FORAMINIFERA, CONES, ECHINOID
FOSSIL FRAGMENTS

1170 - 1175 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-01%
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1175 - 1180 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
30% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-01%
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, ECHINOID

1180 - 1185 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR- T%
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1185 - 1190 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, ECHINOID

1190 - 1195 LIMESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CRYSTALS, CALCILUTITE, PELLET
15% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
GOOD INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR- T%
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS, CONES

1195 - 1200 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
75% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1200 - 1205 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
75% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX

FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1205 - 1210 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR-01%
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1210 - 1215 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1215 - 1220 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: SPAR- T%
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1220 - 1225 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: MEDIUM RECRYSTALLIZATION
FOSSILS: NO FOSSILS

1225 - 1230 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET
35% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: NO FOSSILS

1230 - 1235 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
35% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX

OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: FOSSIL FRAGMENTS

1235 - 1240 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1240 - 1245 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, CONES, ECHINOID
FOSSIL FRAGMENTS

1245 - 1250 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
40% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO COARSE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1250 - 1255 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO MEDIUM

MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, CONES

1255 - 1260 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, SKELETAL, PELLET
30% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: MEDIUM RECRYSTALLIZATION
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS

1260 - 1265 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION

CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: HIGH RECRYSTALLIZATION
FOSSILS: FOSSIL FRAGMENTS, FOSSIL MOLDS

1265 - 1270 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: MILIOLIDS

1270 - 1275 AS ABOVE

1275 - 1280 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX

1280 - 1285 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
30% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: NO FOSSILS

1285 - 1290 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1290 - 1295 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
55% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS

1295 - 1300 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
70% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX

SEDIMENTARY STRUCTURES: LAMINATED
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1300 - 1305 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
30% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, FOSSIL FRAGMENTS

1305 - 1310 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: FOSSIL FRAGMENTS

1310 - 1315 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: ORGANICS-10%
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, CONES

1315 - 1320 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
ACCESSORY MINERALS: ORGANICS-01%
FOSSILS: FOSSIL FRAGMENTS, ECHINOID

1320 - 1325 PACKSTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: PELLET, SKELETAL, CALCILUTITE
60% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: FOSSIL FRAGMENTS

1325 - 1330 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
40% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE

MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: LOW RECRYSTALLIZATION
FOSSILS: NO FOSSILS

1330 - 1335 WACKESTONE; VERY LIGHT ORANGE TO YELLOWISH GRAY
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, CRYSTALS
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: NO FOSSILS

1335 - 1340 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, CRYSTALS
45% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: NO FOSSILS

1340 - 1345 NO SAMPLES

1345 - 1350 NO SAMPLES

1350 - 1355 NO SAMPLES

1355 - 1360 NO SAMPLES

1360 - 1365 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
30% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
OTHER FEATURES: MEDIUM RECRYSTALLIZATION
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS
ECHINOID

1365 - 1370 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
35% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, CONES, FOSSIL FRAGMENTS
ECHINOID

1370 - 1375 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, CRYSTALS, PELLET
40% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE

MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: BENTHIC FORAMINIFERA, ECHINOID, CONES
FOSSIL FRAGMENTS

1375 - 1380 WACKESTONE; YELLOWISH GRAY TO VERY LIGHT ORANGE
POROSITY: INTERGRANULAR
GRAIN TYPE: CALCILUTITE, PELLET, SKELETAL
50% ALLOCHEMICAL CONSTITUENTS
GRAIN SIZE: VERY FINE; RANGE: VERY FINE TO FINE
MODERATE INDURATION
CEMENT TYPE(S): CALCILUTITE MATRIX
FOSSILS: FOSSIL FRAGMENTS

1380 TOTAL DEPTH

Appendix F

South Florida Water Management District
EXPM 1
Martin County, Florida
File 57181-18707
22-Jan-04

Sample Number	Top Depth (ft)	Bottom Depth (ft)	Horizontal Permeability Kh_{max} (md)	Horizontal Permeabiltiy Kh_{90} (md)	Vertical Permeabiltiy K_v (md)	Anisotopy Ratio Kh_{90}/Kh_{max}	Anisotopy Ratio Kv/Kh	Porosity (% of pv)	Grain Density (gm/cc)	Desciption
18	637.4	37.8	616.5	319.9	25.9	0.52	0.08	37.6	2.65	Lim, sli foss, clay, dessication frac
19	638.7	39.3	199.1	10.0	2.0	0.05	0.20	41.3	2.55	Mudstone, lmy, dessication frac
20	640.2	41.2	3010.2	203.6	0.0	0.07	0.00	46.3	2.46	Mudstone, lmy, dessication frac
21	641.2	42.0	0.1	0.1	0.0	2.00	0.00	50.9	2.40	Mudstone, lmy, dessication frac
22	642.0	42.9	3.2	2.7	0.0	0.85	0.00	49.1	2.48	Mudstone, lmy, dessication frac
23	643.9	44.4	0.9	0.8	0.0	0.87	0.00	41.5	2.60	Lim, clay, dessication frac
24	644.4	44.8	0.4	0.4	0.6	1.00	1.34	40.0	2.59	Lim, clay, dessication frac
1	916.3	16.9	3651.8	3089.3	1588.9	0.85	0.51	37.1	2.71	Lim, foss, sli moldic, chalk
2	917.7	17.7	498.7	468.7	361.5	0.94	0.77	46.1	2.70	Lim, foss, chalk
3	920.0	20.4	114.8	114.8	76.6	1.00	0.67	41.7	2.70	Lim, foss, chalk
4	925.7	26.2	228.4	228.4	228.0	1.00	1.00	41.6	2.71	Lim, foss, chalk
5	927.9	28.3	693.1	499.0	189.2	0.72	0.38	23.6	2.70	Lim, foss, sli chalk
6	931.3	31.7	33.9	31.7	3.1	0.93	0.10	40.1	2.70	Lim, foss, chalk
7	932.2	32.8	301.9	208.3	5.9	0.69	0.03	26.4	2.73	Lim, foss, rootlet, chalk
8	934.0	34.4	4.3	3.8	9.0	0.88	2.34	22.9	2.72	Lim, foss, sli chalk
9	1056.4	56.8	1557.1	1397.3	283.8	0.90	0.20	41.0	2.70	Lim, foss, chalk
10	1057.6	58.1	1052.4	989.2	285.9	0.94	0.29	45.7	2.70	Lim, foss, chalk
11	1059.7	60.1	124.2	81.3	19.1	0.65	0.24	40.4	2.68	Lim, foss, chalk, sli kerogen
12	1060.3	60.7	272.4	257.9	36.1	0.95	0.14	43.1	2.70	Lim, foss, chalk, sli kerogen
13	1064.0	64.3	3182.1	2175.0	16.2	0.68	0.01	40.2	2.71	Lim, foss, ool
14	1065.4	65.8	1336.7	1312.5	305.3	0.98	0.23	40.5	2.71	Lim, foss, ool
15	1350.5	50.9		381.5	437.0		1.15	42.1	2.72	Lim, foss, ool
16	1352.7	53.1	578.7	383.7	16.7	0.66	0.04	42.3	2.68	Lim, foss, chalk, sli kerogen
17	1354.0	54.4	251.5	206.2	26.4	0.82	0.13	39.1	2.68	Lim, foss, chalk, tr kerogen
						0.85	0.48			

LITHOLOGICAL ABBREVIATIONS

Anhy, anhy	Anhydrite (-ic)
Ark, ark	arkos (-ic)
bnd	band (-ed)
brec	breccia
Calc, calc	calcite (-ic)
carb	carbonaceous
crs gr	course grained
Chk, chky	chalk (-y)
Cht, cht	chert (-y)
Cgl, cgl	conglomerate (-ic)
crs xln	coursely crystalline
dns	dense
Dol, dol	dolomite (-ic)
Frac	randomly oriented fractures
frac	slightly fractured
f gr	fine grained
foss	fossil (-iferous)
f xln	finely crystalline
Gil, gil	gilsonite
Glauc, clauc	glauconite (-itic)
Grt	granite
Gyp, gyp	gypsum (-iferous)
hor frac	perdominantly horizontally fractured
incl	inclusion (-ded)
intbd	interbedded
lam	lamina (-tions,-ated)
Lim, lim	limestone
med gr	medium grain
Mtrx	matrix
NA	interval not analyzed
Nod, nod	nodules (-ar)
Ool, ool	oolite (-itic)
Piso, piso	pisolite (-itic)
pp	pin-point (porosity)
Pyr, pyr	pyrite (-itized, itic)
Sd, sdy	sand (-y)
Shr	solid hydrocarbon residue
sli/	slightly
Sltstn, slty	siltstone, silty
styl	stylolite (-itic)
suc	sucrosic
Su, su	sulphur, sulphurous
TBFA	TOO BROKEN FOR ANALYSIS
Trip, trip	tripolitic
v/	very
vert frac	perdominantly vertically fractured
vug	vuggy
xbd	crossbedded
xln	medium crystalline
xtl	crystal

THE FIRST WORD IN THE DESCIPTION COLUMN OF THE CORE ANALYSIS REPORT DESCIBES THE ROCK TYPE. FOLLOWING ARE ROCK MODIFIERS IN DECREASING ABUNDANCE AND MISCELLANEOUS DESCRIPTIVE TERMS.

Core Lab
RESERVOIR OPTIMIZATION

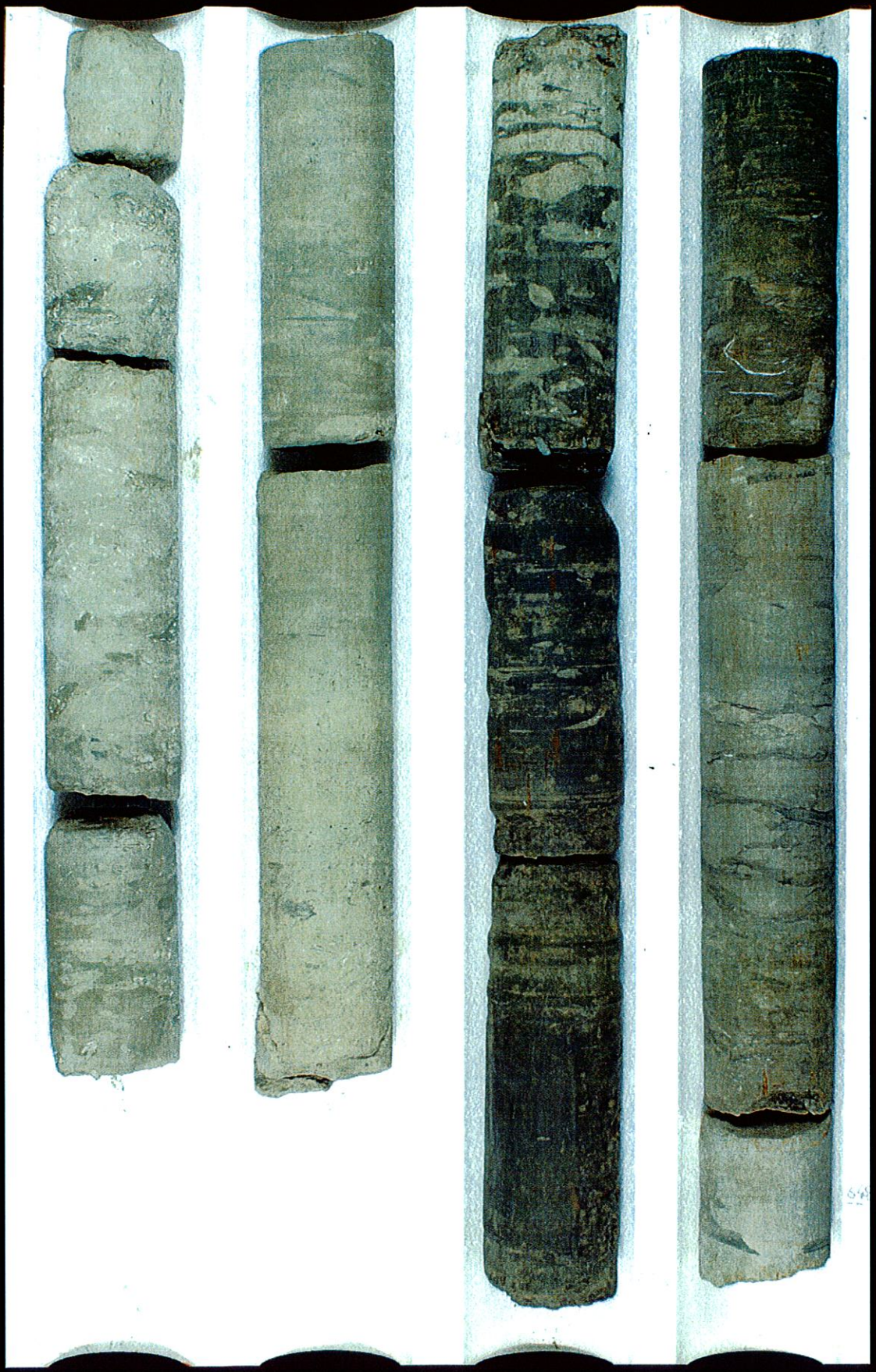
South Florida Water Management

EXPM-1

637.0' - 648.0'

Lake Okeechobee ASR Pilot Project
Martin County, Florida

Core 1



Job No.- HOU-030624

Core Lab
RESERVOIR OPTIMIZATION

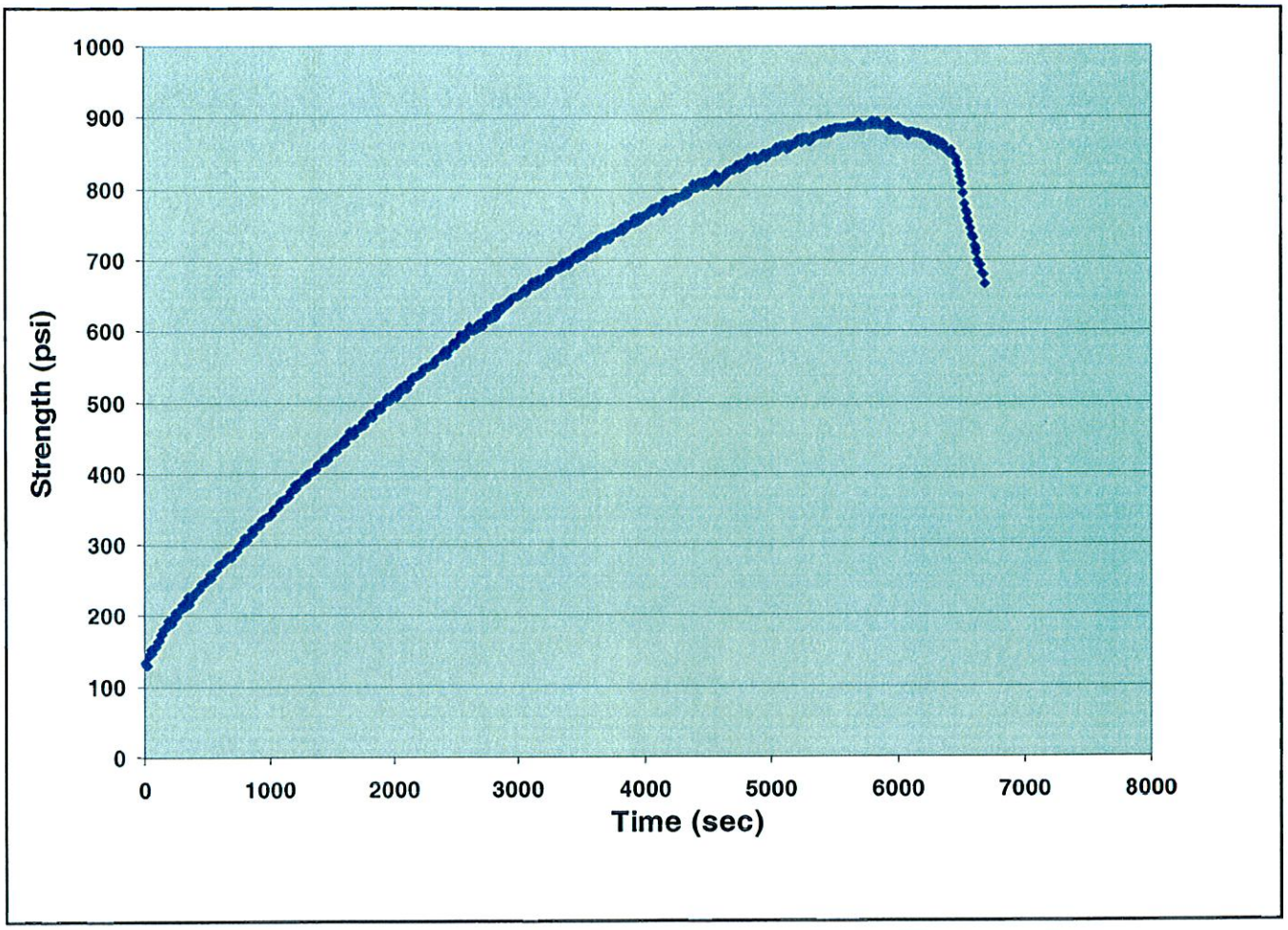
UNCONFINED COMPRESSIVE TEST RESULTS

Company	**South Florida Water Management**	Date	**Sept. 2003**
Well Name	**Expm-1/Exbry-1**	Job No.	**HOU-030601**
Field Name		Saturation Fluid	**Fresh Water**
Location		Rock Type	

Sample Number	Depth (ft)	Zone	Confining Pressure (psi)	Bulk Density (gm/cm^3)	Compressive Strength (psi)	Young's Modulus (10^6 psi)	Poisson's Ratio
637C	637.40	EXPM-1	0	2.10	895		

Results of Triaxial Test

Company	**South Florida Water Management**	Date	**Sept. 2003**
Well Name	**Expm-1**	Job No.	**HOU-030601**
Field Name		Saturation Fluid	**Fresh Water**
Location		Rock Type	



Sample	637C
Depth (ft)	637.4
Diameter (in)	0.9869
Length (in)	1.794
Mass (g)	47.29
Saturation Fluid	Fresh Water
Bulk Density (g/cc)	2.10
Confining Pressure (psi)	0
Pore Pressure (psi)	0
Static Young's Modulus ($X10^6$ psi)	
Static Poisson's Ratio	
Unconfined Compressive Strength (psi)	895

Core Laboratories

SUMMARY OF LIQUID PERMEABILITY MEASUREMENTS

Net Confining Stress: Various Temperature: 70° F

Fluid: Deionized Water

South Florida Water Management
Various Wells

File: HOU - 030601

Sample Number	Well Name	Depth Interval, feet	Net Confining Stress, psi	Length, cm	Area, cm^2	Viscosity, cp	Specific Permeability to Fluid, millidarcys
637.4 B	Expm-1	637.40	320	3.61	4.99	1.00	0.011

SUMMARY OF CORE ANALYSES MEASUREMENTS

South Florida Water Management

File: HOU-030601

Sample Number	Well Name	Depth, feet	Confining Stress, psi	Bulk Density g/cc	Porosity, fraction	Grain Density, g/cc	Moisture Content, percent
637A	Expm-1	637					12.5
637E	Expm-1	637	Ambient	1.668	0.385	2.56	

		mass sat	**49.66**
Company	**South Florida Water Management Dist.**	mass dry	
diameter sample =	**0.9833** inch	Test #	**D**
Length of the sample =	**1.8871** inch	Depth (ft)	**637.0**
Initial Volume of sample	**1.4330** in^3		
Initial Chord Length =	**1.0185** inch	Well	**EXPM-1**
Sin(Theta0/2) =	0.559831 unitless	Density	2.11
Theta0 =	1.188363 radians	Job #	**030601**
Thickness of rubber	**0.138** inches	Satura. Fluid	**Water**
Test Type	**Uniaxial Compaction**		

Time (min)	Radial Pressure (psi)	Axial Pressure (psi)	Axial LVDT (mm)	Radial LVDT mm	Steel Corrective Strain	delta L axial (mm)	axial strain dL/L	TRUE Axial Strain mm/mm	Axial stress (psi)	radial stress (psi)	Devitory Stress (psi)
0.0	30.83	2.5	1.883	3.5198	2.96E-07	0	0.000E+00	-2.961E-07	32	31	1
2.5	24.48	3.18	1.8884	3.5196	5.55E-06	0.0054	1.127E-04	1.071E-04	40	24	16
5.0	30.83	3.86	1.8929	3.5201	6.34E-06	0.0099	2.065E-04	2.002E-04	49	31	18
7.5	24.4	4.53	1.8986	3.5199	1.16E-05	0.0156	3.255E-04	3.139E-04	57	24	33
10.0	31.33	5.22	1.9067	3.5199	1.22E-05	0.0237	4.944E-04	4.822E-04	66	31	35
12.5	31.33	5.9	1.9097	3.5199	1.52E-05	0.0267	5.570E-04	5.418E-04	75	31	43
15.0	31.92	6.57	1.917	3.5199	1.80E-05	0.034	7.093E-04	6.913E-04	83	32	51
17.5	31.25	7.26	1.9278	3.5199	2.13E-05	0.0448	9.347E-04	9.133E-04	92	31	61
20.0	37.1	7.94	1.9314	3.5199	2.23E-05	0.0484	1.010E-03	9.875E-04	101	37	63
22.5	37.68	10.2	1.9378	3.5199	3.21E-05	0.0548	1.143E-03	1.111E-03	129	38	92
25.0	38.27	10.88	1.9495	3.5199	3.49E-05	0.0665	1.387E-03	1.352E-03	138	38	100
27.5	37.1	11.56	1.9557	3.5199	3.84E-05	0.0727	1.517E-03	1.478E-03	146	37	109
30.0	37.68	12.24	1.9592	3.5199	4.12E-05	0.0762	1.590E-03	1.549E-03	155	38	117
32.5	37.1	12.92	1.9703	3.5199	4.44E-05	0.0873	1.821E-03	1.777E-03	164	37	127
35.0	37.68	13.59	1.9789	3.5199	4.72E-05	0.0959	2.001E-03	1.954E-03	172	38	135
37.5	37.18	14.28	1.9824	3.5199	5.04E-05	0.0994	2.074E-03	2.023E-03	181	37	144
40.0	43.4	14.96	1.992	3.5199	5.13E-05	0.109	2.274E-03	2.223E-03	190	43	146
42.5	43.65	15.63	2.0023	3.5199	5.42E-05	0.1193	2.489E-03	2.435E-03	198	44	154
45.0	43.4	16.32	2.0062	3.5199	5.73E-05	0.1232	2.570E-03	2.513E-03	207	43	163
47.5	43.4	16.99	2.0156	3.5199	6.03E-05	0.1326	2.766E-03	2.706E-03	215	43	172
50.0	43.9	17.67	2.026	3.5199	6.31E-05	0.143	2.983E-03	2.920E-03	224	44	180
52.5	42.9	18.35	2.0303	3.5199	6.65E-05	0.1473	3.073E-03	3.007E-03	232	43	190
55.0	43.4	20.62	2.0378	3.5199	7.64E-05	0.1548	3.230E-03	3.153E-03	261	43	218

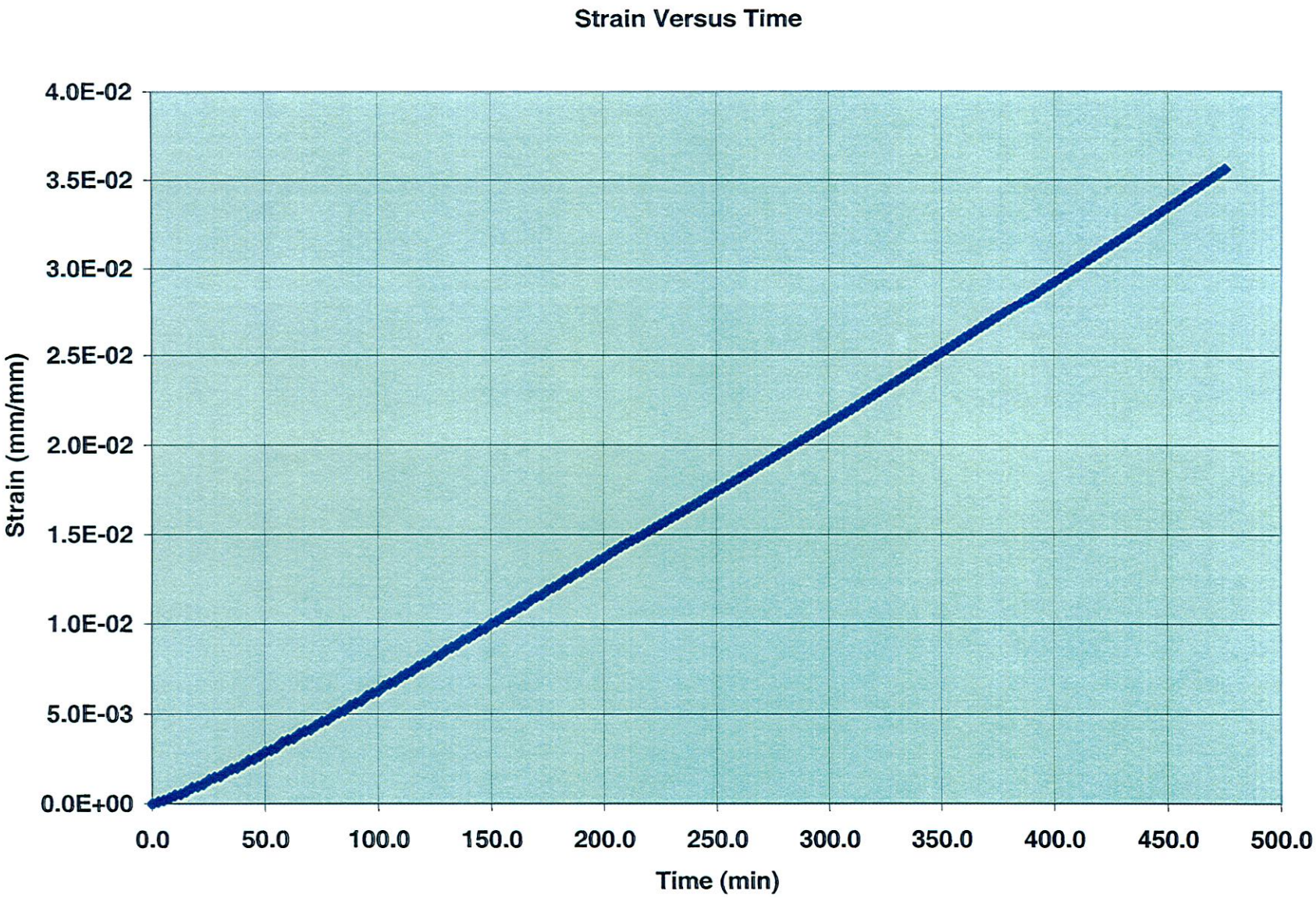
57.5	43.9	21.3	2.052	3.5199	7.93E-05	0.169	3.526E-03	3.447E-03	270	44	226
60.0	43.4	21.98	2.0583	3.5199	8.25E-05	0.1753	3.657E-03	3.575E-03	278	43	235
62.5	50.25	22.65	2.0621	3.5201	8.30E-05	0.1791	3.737E-03	3.653E-03	287	50	237
65.0	49.25	21.75	2.0745	3.5201	7.94E-05	0.1915	3.995E-03	3.916E-03	276	49	226
67.5	50.25	24.01	2.0824	3.5199	8.91E-05	0.1994	4.160E-03	4.071E-03	304	50	254
70.0	50.08	24.69	2.0866	3.5199	9.22E-05	0.2036	4.248E-03	4.155E-03	313	50	263
72.5	50.25	25.38	2.0981	3.5201	9.52E-05	0.2151	4.488E-03	4.392E-03	322	50	271
75.0	49.83	26.05	2.1074	3.5201	9.83E-05	0.2244	4.682E-03	4.583E-03	330	50	280
77.5	49.75	26.73	2.1125	3.5201	1.01E-04	0.2295	4.788E-03	4.687E-03	339	50	289
80.0	49.75	29	2.125	3.5201	1.11E-04	0.242	5.049E-03	4.937E-03	367	50	318
82.5	56.1	28.09	2.1327	3.5201	1.05E-04	0.2497	5.209E-03	5.104E-03	356	56	300
85.0	54.92	30.36	2.1385	3.5198	1.16E-04	0.2555	5.330E-03	5.215E-03	385	55	330
87.5	61.27	29.44	2.1507	3.5196	1.09E-04	0.2677	5.585E-03	5.476E-03	373	61	312
90.0	61.86	31.71	2.1576	3.5196	1.19E-04	0.2746	5.729E-03	5.610E-03	402	62	340
92.5	61.27	32.4	2.1638	3.5196	1.23E-04	0.2808	5.858E-03	5.736E-03	410	61	349
95.0	61.27	33.07	2.1773	3.5196	1.25E-04	0.2943	6.140E-03	6.014E-03	419	61	358
97.5	61.02	33.75	2.1845	3.5196	1.29E-04	0.3015	6.290E-03	6.162E-03	428	61	367
100.0	61.69	34.44	2.1901	3.5198	1.31E-04	0.3071	6.407E-03	6.276E-03	436	62	375
102.5	67.99	35.11	2.2033	3.5196	1.32E-04	0.3203	6.682E-03	6.550E-03	445	68	377
105.0	67.99	35.79	2.2111	3.5196	1.35E-04	0.3281	6.845E-03	6.710E-03	453	68	385
107.5	66.99	36.47	2.2165	3.5196	1.39E-04	0.3335	6.958E-03	6.819E-03	462	67	395
110.0	67.57	37.15	2.2288	3.5196	1.41E-04	0.3458	7.214E-03	7.073E-03	471	68	403
112.5	67.57	39.41	2.2373	3.5198	1.51E-04	0.3543	7.392E-03	7.240E-03	499	68	432
115.0	67.82	40.08	2.2442	3.5198	1.54E-04	0.3612	7.536E-03	7.381E-03	508	68	440
117.5	66.99	40.76	2.2563	3.5198	1.58E-04	0.3733	7.788E-03	7.630E-03	516	67	449
120.0	67.99	41.44	2.2632	3.5198	1.60E-04	0.3802	7.932E-03	7.772E-03	525	68	457
122.5	67.07	42.12	2.2709	3.5198	1.64E-04	0.3879	8.093E-03	7.929E-03	534	67	467
125.0	74.51	42.8	2.2829	3.5198	1.64E-04	0.3999	8.343E-03	8.179E-03	542	75	468
127.5	74.84	45.06	2.2886	3.5198	1.74E-04	0.4056	8.462E-03	8.288E-03	571	75	496
130.0	75.01	44.16	2.3001	3.5198	1.70E-04	0.4171	8.702E-03	8.532E-03	559	75	484
132.5	74.34	44.84	2.3078	3.5199	1.73E-04	0.4248	8.862E-03	8.689E-03	568	74	494
135.0	73.92	47.1	2.3161	3.5199	1.83E-04	0.4331	9.036E-03	8.852E-03	597	74	523
137.5	74.34	46.2	2.3282	3.5199	1.79E-04	0.4452	9.288E-03	9.109E-03	585	74	511
140.0	74.34	46.88	2.3336	3.5199	1.82E-04	0.4506	9.401E-03	9.218E-03	594	74	520
142.5	74.59	49.14	2.3438	3.5199	1.92E-04	0.4608	9.614E-03	9.421E-03	623	75	548
145.0	80.69	48.23	2.3535	3.5199	1.86E-04	0.4705	9.816E-03	9.630E-03	611	81	530
147.5	80.6	48.91	2.3593	3.5201	1.89E-04	0.4763	9.937E-03	9.748E-03	620	81	539

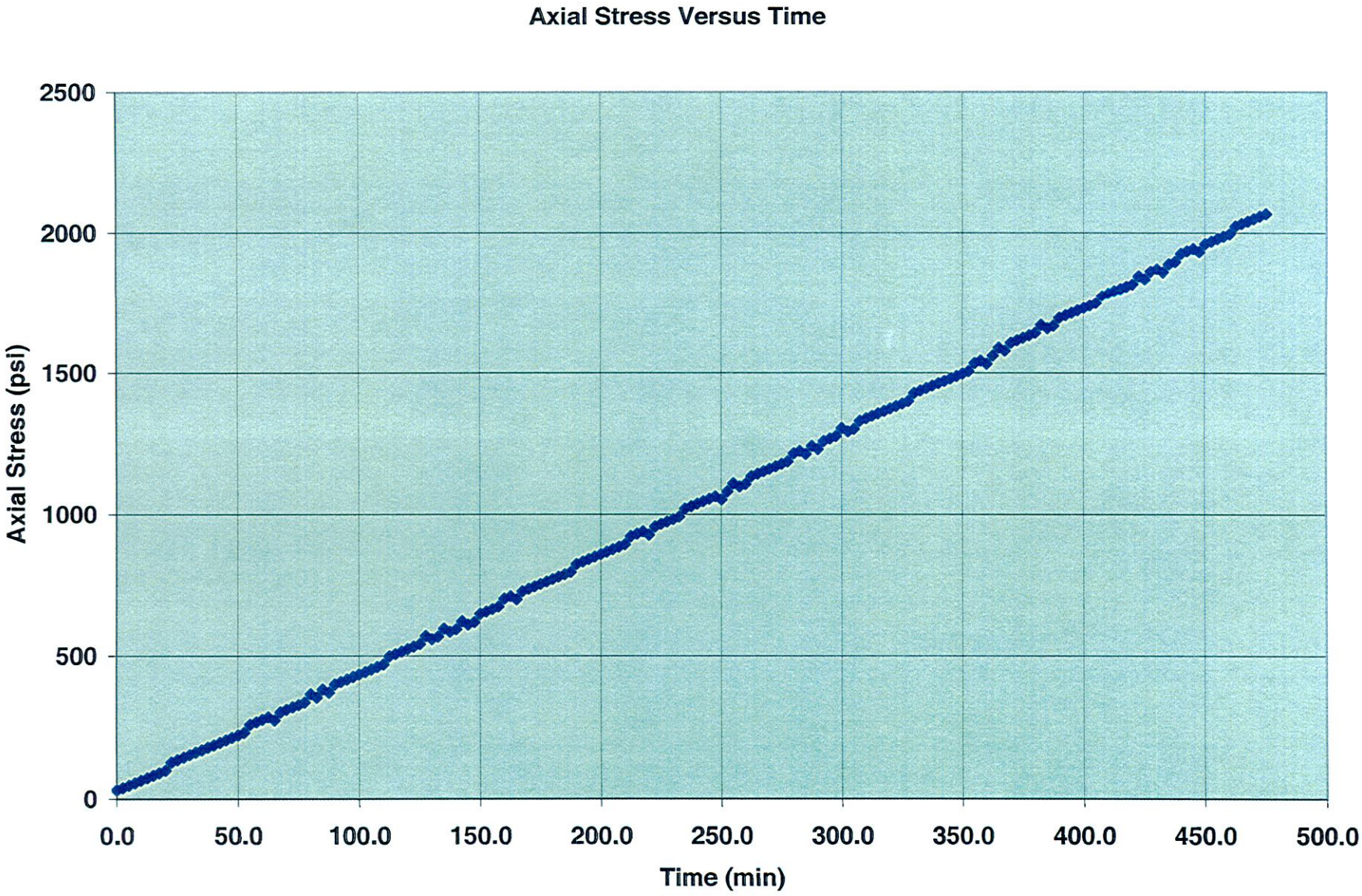
150.0	81.19	51.18	2.3727	3.5201	1.99E-04	0.4897	1.022E-02	1.002E-02	648	81	567
152.5	81.36	51.86	2.3792	3.5201	2.02E-04	0.4962	1.035E-02	1.015E-02	657	81	576
155.0	86.36	52.53	2.3894	3.5198	2.03E-04	0.5064	1.056E-02	1.036E-02	666	86	579
157.5	86.36	53.22	2.3991	3.5198	2.06E-04	0.5161	1.077E-02	1.056E-02	674	86	588
160.0	85.78	55.49	2.4065	3.5196	2.17E-04	0.5235	1.092E-02	1.071E-02	703	86	617
162.5	85.86	56.16	2.4177	3.5196	2.19E-04	0.5347	1.116E-02	1.094E-02	712	86	626
165.0	92.08	55.26	2.4233	3.5196	2.13E-04	0.5403	1.127E-02	1.106E-02	700	92	608
167.5	92.08	57.52	2.4362	3.5196	2.23E-04	0.5532	1.154E-02	1.132E-02	729	92	637
170.0	92.58	58.2	2.4456	3.5196	2.26E-04	0.5626	1.174E-02	1.151E-02	737	93	645
172.5	91.58	58.88	2.4511	3.5196	2.30E-04	0.5681	1.185E-02	1.162E-02	746	92	654
175.0	91.58	59.56	2.464	3.5196	2.33E-04	0.581	1.212E-02	1.189E-02	755	92	663
177.5	91.74	60.24	2.4715	3.5196	2.36E-04	0.5885	1.228E-02	1.204E-02	763	92	671
180.0	86.99	60.92	2.4799	3.5199	2.40E-04	0.5969	1.245E-02	1.221E-02	772	87	685
182.5	86.07	61.59	2.4916	3.5201	2.44E-04	0.6086	1.270E-02	1.245E-02	780	86	694
185.0	86.57	62.28	2.4981	3.5201	2.46E-04	0.6151	1.283E-02	1.259E-02	789	87	702
187.5	92.34	62.95	2.5094	3.5201	2.47E-04	0.6264	1.307E-02	1.282E-02	798	92	705
190.0	97.34	65.21	2.516	3.5198	2.56E-04	0.633	1.321E-02	1.295E-02	826	97	729
192.5	97.51	65.89	2.5277	3.5198	2.59E-04	0.6447	1.345E-02	1.319E-02	835	98	737
195.0	98.09	66.56	2.5343	3.5198	2.61E-04	0.6513	1.359E-02	1.333E-02	843	98	745
197.5	97.34	67.25	2.546	3.5198	2.65E-04	0.663	1.383E-02	1.357E-02	852	97	755
200.0	97.51	67.93	2.5526	3.5199	2.68E-04	0.6696	1.397E-02	1.370E-02	861	98	763
202.5	97.09	68.6	2.5646	3.5199	2.71E-04	0.6816	1.422E-02	1.395E-02	869	97	772
205.0	97.34	69.29	2.5731	3.5199	2.74E-04	0.6901	1.440E-02	1.412E-02	878	97	781
207.5	103.86	69.96	2.583	3.5199	2.75E-04	0.7	1.460E-02	1.433E-02	886	104	783
210.0	104.69	70.64	2.5919	3.5199	2.77E-04	0.7089	1.479E-02	1.451E-02	895	105	790
212.5	103.27	72.91	2.6008	3.5201	2.88E-04	0.7178	1.498E-02	1.469E-02	924	103	820
215.0	103.27	73.59	2.6084	3.5201	2.91E-04	0.7254	1.513E-02	1.484E-02	932	103	829
217.5	103.27	74.27	2.6174	3.5201	2.94E-04	0.7344	1.532E-02	1.503E-02	941	103	838
220.0	108.53	73.36	2.6263	3.5198	2.88E-04	0.7433	1.551E-02	1.522E-02	929	109	821
222.5	109.45	75.62	2.6352	3.5198	2.98E-04	0.7522	1.569E-02	1.540E-02	958	109	849
225.0	108.86	76.31	2.6441	3.5196	3.01E-04	0.7611	1.588E-02	1.558E-02	967	109	858
227.5	108.78	76.98	2.6531	3.5198	3.04E-04	0.7701	1.607E-02	1.576E-02	975	109	867
230.0	115.21	77.66	2.662	3.5196	3.05E-04	0.779	1.625E-02	1.595E-02	984	115	869
232.5	114.8	78.35	2.671	3.5196	3.08E-04	0.788	1.644E-02	1.613E-02	993	115	878
235.0	114.88	80.61	2.6799	3.5198	3.18E-04	0.7969	1.663E-02	1.631E-02	1021	115	906
237.5	115.21	81.29	2.6889	3.5198	3.21E-04	0.8059	1.681E-02	1.649E-02	1030	115	915
240.0	114.88	81.97	2.698	3.5198	3.24E-04	0.815	1.700E-02	1.668E-02	1039	115	924

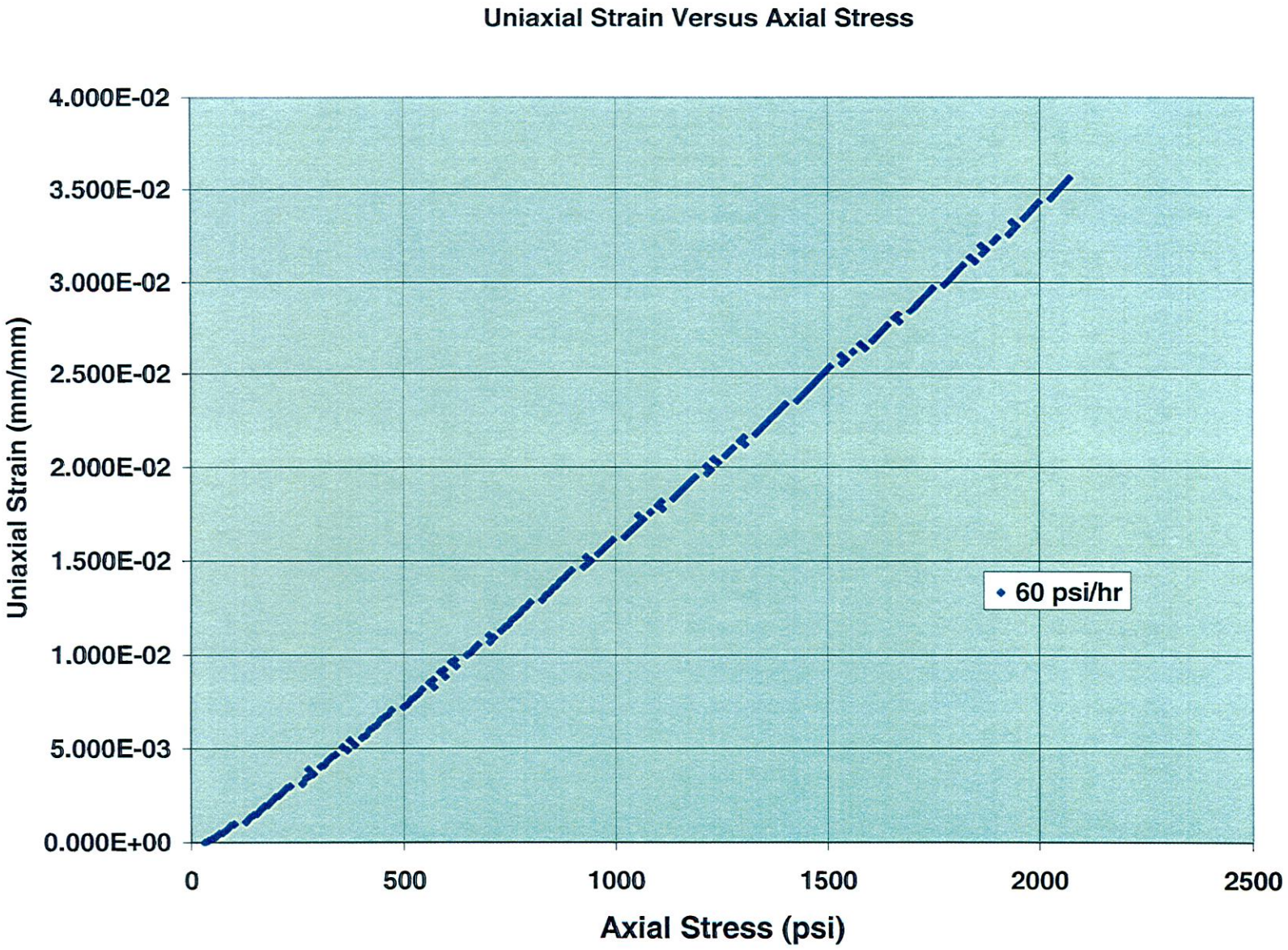
242.5	115.38	82.65	2.707	3.5198	3.27E-04	0.824	1.719E-02	1.686E-02	1047	115	932
245.0	114.8	83.33	2.716	3.5198	3.30E-04	0.833	1.738E-02	1.705E-02	1056	115	941
247.5	121.18	84	2.725	3.5198	3.31E-04	0.842	1.757E-02	1.724E-02	1064	121	943
250.0	114.88	83.1	2.734	3.5198	3.29E-04	0.851	1.775E-02	1.743E-02	1053	115	938
252.5	115.38	85.37	2.7432	3.5199	3.39E-04	0.8602	1.795E-02	1.761E-02	1082	115	966
255.0	121.51	87.62	2.7522	3.5199	3.47E-04	0.8692	1.813E-02	1.779E-02	1110	122	989
257.5	121.68	86.72	2.7614	3.5199	3.43E-04	0.8784	1.833E-02	1.798E-02	1099	122	977
260.0	121.68	87.41	2.7706	3.5201	3.46E-04	0.8876	1.852E-02	1.817E-02	1107	122	986
262.5	121.18	89.65	2.7798	3.5201	3.56E-04	0.8968	1.871E-02	1.835E-02	1136	121	1015
265.0	126.93	90.34	2.7889	3.5198	3.57E-04	0.9059	1.890E-02	1.854E-02	1145	127	1018
267.5	126.6	91.01	2.7982	3.5198	3.60E-04	0.9152	1.909E-02	1.873E-02	1153	127	1026
270.0	132.45	91.69	2.8074	3.5198	3.61E-04	0.9244	1.929E-02	1.892E-02	1162	132	1029
272.5	131.95	92.38	2.8168	3.5196	3.64E-04	0.9338	1.948E-02	1.912E-02	1170	132	1038
275.0	131.87	93.05	2.826	3.5196	3.67E-04	0.943	1.967E-02	1.931E-02	1179	132	1047
277.5	132.45	93.73	2.8353	3.5196	3.70E-04	0.9523	1.987E-02	1.950E-02	1188	132	1055
280.0	132.45	96	2.8447	3.5196	3.80E-04	0.9617	2.006E-02	1.968E-02	1216	132	1084
282.5	131.95	96.68	2.854	3.5196	3.83E-04	0.971	2.026E-02	1.987E-02	1225	132	1093
285.0	132.95	95.77	2.8633	3.5196	3.79E-04	0.9803	2.045E-02	2.007E-02	1213	133	1080
287.5	132.45	98.03	2.8727	3.5196	3.89E-04	0.9897	2.065E-02	2.026E-02	1242	132	1110
290.0	138.8	97.13	2.882	3.5198	3.83E-04	0.999	2.084E-02	2.046E-02	1231	139	1092
292.5	132.53	99.4	2.8914	3.5198	3.95E-04	1.0084	2.104E-02	2.064E-02	1259	133	1127
295.0	132.45	100.07	2.9009	3.5198	3.98E-04	1.0179	2.124E-02	2.084E-02	1268	132	1135
297.5	138.8	100.75	2.9103	3.5199	3.99E-04	1.0273	2.143E-02	2.103E-02	1276	139	1138
300.0	138.72	103.02	2.9197	3.5199	4.09E-04	1.0367	2.163E-02	2.122E-02	1305	139	1167
302.5	138.8	102.11	2.9292	3.5199	4.05E-04	1.0462	2.183E-02	2.142E-02	1294	139	1155
305.0	138.22	102.79	2.9386	3.5201	4.08E-04	1.0556	2.202E-02	2.161E-02	1302	138	1164
307.5	138.8	105.05	2.948	3.5201	4.18E-04	1.065	2.222E-02	2.180E-02	1331	139	1192
310.0	141.89	105.74	2.9576	3.5199	4.20E-04	1.0746	2.242E-02	2.200E-02	1340	142	1198
312.5	143.39	106.42	2.9672	3.5198	4.23E-04	1.0842	2.262E-02	2.220E-02	1348	143	1205
315.0	144.22	107.09	2.9768	3.5196	4.25E-04	1.0938	2.282E-02	2.239E-02	1357	144	1213
317.5	150.27	107.77	2.9863	3.5196	4.26E-04	1.1033	2.302E-02	2.259E-02	1365	150	1215
320.0	150.27	108.46	2.996	3.5196	4.29E-04	1.113	2.322E-02	2.279E-02	1374	150	1224
322.5	150.1	109.13	3.0056	3.5196	4.32E-04	1.1226	2.342E-02	2.299E-02	1383	150	1233
325.0	149.69	109.81	3.0152	3.5196	4.36E-04	1.1322	2.362E-02	2.319E-02	1391	150	1242
327.5	150.77	110.49	3.0249	3.5196	4.38E-04	1.1419	2.382E-02	2.338E-02	1400	151	1249
330.0	149.77	112.76	3.0345	3.5196	4.49E-04	1.1515	2.402E-02	2.357E-02	1429	150	1279
332.5	150.27	113.44	3.0442	3.5196	4.51E-04	1.1612	2.423E-02	2.377E-02	1437	150	1287

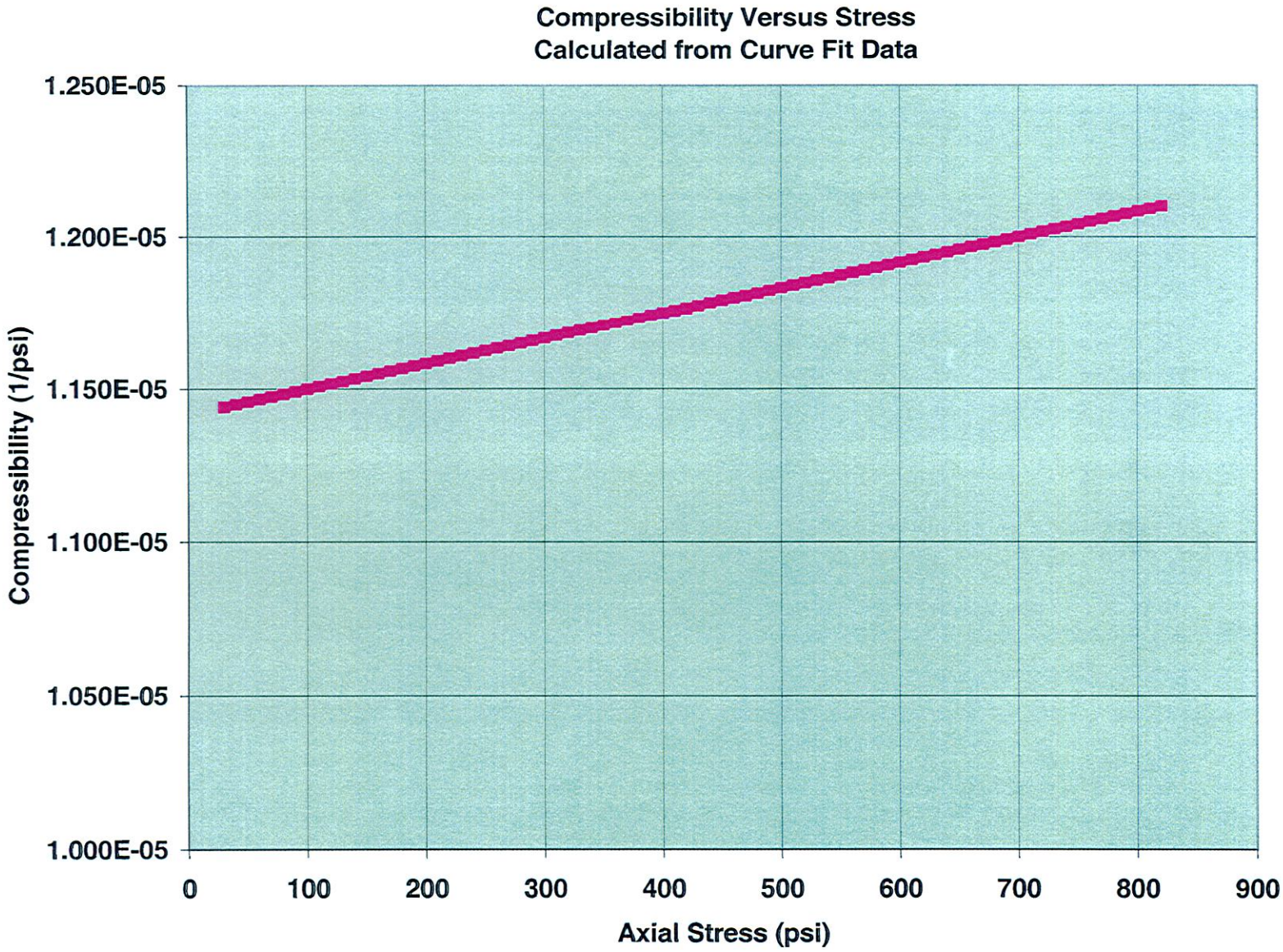
335.0	156.62	114.11	3.0539	3.5196	4.52E-04	1.1709	2.443E-02	2.398E-02	1446	157	1289
337.5	156.62	114.8	3.0635	3.5196	4.55E-04	1.1805	2.463E-02	2.417E-02	1454	157	1298
340.0	150.27	115.48	3.0733	3.5198	4.61E-04	1.1903	2.483E-02	2.437E-02	1463	150	1313
342.5	156.45	116.15	3.083	3.5198	4.61E-04	1.2	2.504E-02	2.457E-02	1472	156	1315
345.0	156.45	116.83	3.0929	3.5199	4.64E-04	1.2099	2.524E-02	2.478E-02	1480	156	1324
347.5	155.79	117.51	3.1027	3.5199	4.68E-04	1.2197	2.545E-02	2.498E-02	1489	156	1333
350.0	156.87	118.19	3.1125	3.5199	4.70E-04	1.2295	2.565E-02	2.518E-02	1497	157	1341
352.5	156.62	118.87	3.1223	3.5201	4.73E-04	1.2393	2.586E-02	2.538E-02	1506	157	1349
355.0	156.62	121.12	3.132	3.5199	4.83E-04	1.249	2.606E-02	2.557E-02	1535	157	1378
357.5	157.54	121.8	3.1419	3.5201	4.86E-04	1.2589	2.626E-02	2.578E-02	1543	158	1386
360.0	168.23	120.91	3.1518	3.5198	4.78E-04	1.2688	2.647E-02	2.599E-02	1532	168	1364
362.5	167.89	123.16	3.1616	3.5199	4.88E-04	1.2786	2.668E-02	2.619E-02	1560	168	1393
365.0	167.98	125.43	3.1715	3.5199	4.99E-04	1.2885	2.688E-02	2.638E-02	1589	168	1421
367.5	168.48	124.52	3.1814	3.5199	4.94E-04	1.2984	2.709E-02	2.659E-02	1578	168	1409
370.0	167.98	126.79	3.1914	3.5201	5.05E-04	1.3084	2.730E-02	2.679E-02	1606	168	1438
372.5	167.39	127.47	3.2013	3.5202	5.08E-04	1.3183	2.750E-02	2.700E-02	1615	167	1448
375.0	170.48	128.14	3.2112	3.5199	5.10E-04	1.3282	2.771E-02	2.720E-02	1623	170	1453
377.5	169.98	128.83	3.2211	3.5199	5.13E-04	1.3381	2.792E-02	2.740E-02	1632	170	1462
380.0	170.81	129.51	3.2311	3.5201	5.16E-04	1.3481	2.813E-02	2.761E-02	1641	171	1470
382.5	181.78	131.77	3.2411	3.5198	5.22E-04	1.3581	2.833E-02	2.781E-02	1669	182	1488
385.0	182.37	130.86	3.251	3.5198	5.18E-04	1.368	2.854E-02	2.802E-02	1658	182	1476
387.5	181.45	131.54	3.2612	3.5198	5.21E-04	1.3782	2.875E-02	2.823E-02	1667	181	1485
390.0	181.78	133.81	3.2712	3.5199	5.31E-04	1.3882	2.896E-02	2.843E-02	1695	182	1514
392.5	181.62	134.49	3.2813	3.5199	5.34E-04	1.3983	2.917E-02	2.864E-02	1704	182	1522
395.0	192.89	135.16	3.2914	3.5199	5.33E-04	1.4084	2.938E-02	2.885E-02	1712	193	1520
397.5	186.54	135.85	3.3014	3.5198	5.38E-04	1.4184	2.959E-02	2.905E-02	1721	187	1535
400.0	186.62	136.53	3.3114	3.5196	5.41E-04	1.4284	2.980E-02	2.926E-02	1730	187	1543
402.5	193.3	137.2	3.3215	3.5198	5.42E-04	1.4385	3.001E-02	2.947E-02	1738	193	1545
405.0	193.47	137.89	3.3317	3.5198	5.45E-04	1.4487	3.022E-02	2.968E-02	1747	193	1554
407.5	192.97	140.13	3.3419	3.5199	5.55E-04	1.4589	3.044E-02	2.988E-02	1775	193	1582
410.0	192.97	140.82	3.352	3.5201	5.58E-04	1.469	3.065E-02	3.009E-02	1784	193	1591
412.5	198.97	141.5	3.3622	3.5198	5.59E-04	1.4792	3.086E-02	3.030E-02	1793	199	1594
415.0	197.89	142.17	3.3724	3.5198	5.62E-04	1.4894	3.107E-02	3.051E-02	1801	198	1603
417.5	197.97	142.86	3.3826	3.5196	5.65E-04	1.4996	3.129E-02	3.072E-02	1810	198	1612
420.0	204.32	143.54	3.3928	3.5198	5.66E-04	1.5098	3.150E-02	3.093E-02	1819	204	1614
422.5	203.74	145.8	3.4031	3.5198	5.77E-04	1.5201	3.171E-02	3.114E-02	1847	204	1643
425.0	204.99	144.89	3.4133	3.5199	5.72E-04	1.5303	3.193E-02	3.135E-02	1836	205	1631

427.5	209.41	147.16	3.4236	3.5198	5.81E-04	1.5406	3.214E-02	3.156E-02	1864	209	1655
430.0	209.91	147.84	3.4338	3.5198	5.83E-04	1.5508	3.235E-02	3.177E-02	1873	210	1663
432.5	208.58	146.93	3.4441	3.5198	5.80E-04	1.5611	3.257E-02	3.199E-02	1862	209	1653
435.0	208.91	149.19	3.4545	3.5198	5.90E-04	1.5715	3.279E-02	3.220E-02	1890	209	1681
437.5	208.91	149.88	3.4647	3.5198	5.93E-04	1.5817	3.300E-02	3.241E-02	1899	209	1690
440.0	209.41	152.15	3.475	3.5201	6.03E-04	1.592	3.321E-02	3.261E-02	1928	209	1718
442.5	215	152.82	3.4854	3.5198	6.04E-04	1.6024	3.343E-02	3.283E-02	1936	215	1721
445.0	214.58	153.5	3.4957	3.5198	6.07E-04	1.6127	3.365E-02	3.304E-02	1945	215	1730
447.5	219.85	152.59	3.5061	3.5198	6.01E-04	1.6231	3.386E-02	3.326E-02	1933	220	1713
450.0	220.77	154.86	3.5165	3.5198	6.11E-04	1.6335	3.408E-02	3.347E-02	1962	221	1741
452.5	219.85	155.54	3.5269	3.5199	6.14E-04	1.6439	3.430E-02	3.368E-02	1971	220	1751
455.0	220.35	156.22	3.5372	3.5201	6.17E-04	1.6542	3.451E-02	3.389E-02	1979	220	1759
457.5	231.07	156.9	3.5477	3.5198	6.16E-04	1.6647	3.473E-02	3.411E-02	1988	231	1757
460.0	225.35	157.58	3.5581	3.5198	6.21E-04	1.6751	3.495E-02	3.433E-02	1996	225	1771
462.5	224.77	159.83	3.5685	3.5198	6.32E-04	1.6855	3.516E-02	3.453E-02	2025	225	1800
465.0	231.24	160.51	3.579	3.5198	6.32E-04	1.696	3.538E-02	3.475E-02	2034	231	1802
467.5	225.35	161.19	3.5895	3.5199	6.37E-04	1.7065	3.560E-02	3.496E-02	2042	225	1817
470.0	231.99	161.87	3.6	3.5201	6.38E-04	1.717	3.582E-02	3.518E-02	2051	232	1819
472.5	235.91	162.55	3.6103	3.5198	6.40E-04	1.7273	3.604E-02	3.540E-02	2059	236	1824
475.0	236.41	163.24	3.6208	3.5198	6.43E-04	1.7378	3.626E-02	3.561E-02	2068	236	1832


Strain Versus Time
4.0E-02
3.5E-02
3.0E-02
2.5E-02
2.0E-02
1.5E-02
1.0E-02
5.0E-03
0.0E+00
Strain (mm/mm)
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
Time (min)


Axial Stress Versus Time
Axial Stress (psi)
2500
2000
1500
1000
500
0
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
Time (min)


Uniaxial Strain Versus Axial Stress
4.000E-02
3.500E-02
3.000E-02
2.500E-02
2.000E-02
1.500E-02
1.000E-02
5.000E-03
0.000E+00
Uniaxial Strain (mm/mm)
0
500
1000
1500
2000
2500
Axial Stress (psi)
60 psi/hr


Compressibility Versus Stress
Calculated from Curve Fit Data
1.250E-05
1.200E-05
1.150E-05
1.100E-05
1.050E-05
1.000E-05
Compressibility (1/psi)
0
100
200
300
400
500
600
700
800
900
Axial Stress (psi)

Rate Type Compaction Test (RTCT)
Company: South Florida Water Management Dist.
Well: EXPM-1
Sample: D
Depth: 637
Calculated Compressibility Based Up On Curve Fit

Axial Stress Pa (psi)	Compressibility (1/psi)
30	1.144E-05
40	1.145E-05
50	1.146E-05
60	1.147E-05
70	1.147E-05
80	1.148E-05
90	1.149E-05
100	1.150E-05
110	1.151E-05
120	1.152E-05
130	1.152E-05
140	1.153E-05
150	1.154E-05
160	1.155E-05
170	1.156E-05
180	1.157E-05
190	1.157E-05
200	1.158E-05
210	1.159E-05
220	1.160E-05
230	1.161E-05
240	1.162E-05
250	1.162E-05
260	1.163E-05
270	1.164E-05
280	1.165E-05
290	1.166E-05
300	1.167E-05
310	1.167E-05
320	1.168E-05
330	1.169E-05
340	1.170E-05
350	1.171E-05
360	1.172E-05
370	1.173E-05
380	1.173E-05
390	1.174E-05
400	1.175E-05
410	1.176E-05
420	1.177E-05
430	1.178E-05
440	1.178E-05

450	1.179E-05
460	1.180E-05
470	1.181E-05
480	1.182E-05
490	1.183E-05
500	1.183E-05
510	1.184E-05
520	1.185E-05
530	1.186E-05
540	1.187E-05
550	1.188E-05
560	1.188E-05
570	1.189E-05
580	1.190E-05
590	1.191E-05
600	1.192E-05
610	1.193E-05
620	1.193E-05
630	1.194E-05
640	1.195E-05
650	1.196E-05
660	1.197E-05
670	1.198E-05
680	1.198E-05
690	1.199E-05
700	1.200E-05
710	1.201E-05
720	1.202E-05
730	1.203E-05
740	1.203E-05
750	1.204E-05
760	1.205E-05
770	1.206E-05
780	1.207E-05
790	1.208E-05
800	1.208E-05
810	1.209E-05
820	1.210E-05

Appendix G

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	Source	Latitude	Longitude	F.Turb NTU	F.CL MG/L	TEMP Deg C
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	EAL	265917	803620			
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	EVER	265917	803620			
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	FGS	265917	803620			
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	HBEL	265917	803620			
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	RICH	265917	803620			
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	SAV	265917	803620			
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	WMD	265917	803620	0.37	780	27.3
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC	WMD	265917	803620	0.37	780	27.3
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF	RICH	265917	803620			
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF	SAV	265917	803620			
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF	WMD	265917	803620	0.37	780	27.3

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SOUTH FLORIDA WATER MANAGEMENT DISTRICT
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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	D.O. mg/L	SP COND uS/cm	PH UNITS	COLOR PCU	T.SUS.SD mg/L	NO2 mg/L	NH4 mg/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW					5	-5	-0.05	0.34
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	0.19	2836	7.29				
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC	0.19	2836	7.29				
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF	0.19	28.36	7.29				

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	TKN mg/L	OPO4 mg/L	TPO4 mg/L	K mg/L	CA mg/L	MG mg/L	CL mg/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW					12	100	72
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	0.44		0.023				740
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF		-0.05					
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	SO4 mg/L	TOTAL FE ug/L	F MG/L	SULFIDE mg/L	BOD-5 mg/L	OX/RED P mv	TOTAL AL ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW		48					-50
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	260		0.78	2.9	-2		
LOASR	EXPM-1	20031110	13:15	EXPM-1GW						-206.7	
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC						-206.7	

LOASR	EXPM-1	20031110	13:15	EXPM-1GWF	
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF	
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF	-206.7

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	ALKALNYA mg/L	TOTAL CR ug/L	NO3 mg/L	TOTAL N MG N/L	FLUOR-D MG/L	TOTSE ug/L	ODOR TON
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW		-2				-10	
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	130		-0.1	0.44			2
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF					0.73		
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	TDORGC mg/L	ASBESTOS MF/L	BICARBON MG/L CACO3	CARBONAT MG/L CACO3	TOTAL AG ug/L	T.DS.SOL MG/L	TOTAL HG ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW		-0.1			-1		-0.5
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							

LOASR	EXPM-1	20031110	13:15	EXPM-1GW				130	-1		1500	
LOASR	EXPM-1	20031110	13:15	EXPM-1GW								
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC								
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF								
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF	1.4							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF								

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	TOTAL CD ug/L	TOTAL CU ug/L	TOTAL ZN ug/L	TOTAL AS ug/L	TOTAL PB ug/L	TOTAL BA ug/L	TOTAL CO ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	-1	-2	-50	-10	-3	24	-2
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	TOTAL MN ug/L	TOTAL SR ug/L	TOTAL NI ug/L	TOT.COLI MPN/100mL	FEC.COLI MPN/100ML	TOT.ANTY ug/L	TOT.BERY ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW				-2	-2		

LOASR	EXPM-1	20031110	13:15	EXPM-1GW								
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	-10	18000	-5				-10	-0.5
LOASR	EXPM-1	20031110	13:15	EXPM-1GW								
LOASR	EXPM-1	20031110	13:15	EXPM-1GW								
LOASR	EXPM-1	20031110	13:15	EXPM-1GW								
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC								
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF								
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF								
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF								

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	TOT.THAL ug/L	TOT.M.HG ng/L	TOTAL HG ng/L	ALPHA-T PCI/L	GALPHA-D PCI/L	URANIUM UG/L	RAD228 PCI/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW		-0.004	0.15				
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	2.3						
LOASR	EXPM-1	20031110	13:15	EXPM-1GW				31.9		0.108	0.869
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF					19.1		
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	RAD228 D PCI/L	RAD226 PCI/L	RAD226-D PCI/L	RADON222 PCI/L	TRITIUM PCI/L	COLIPH-M PFU/100ML	COLIPH-S PFU/100ML

LOASR	EXPM-1	20031110	13:15	EXPM-1GW							-1	-1
LOASR	EXPM-1	20031110	13:15	EXPM-1GW								
LOASR	EXPM-1	20031110	13:15	EXPM-1GW								
LOASR	EXPM-1	20031110	13:15	EXPM-1GW								
LOASR	EXPM-1	20031110	13:15	EXPM-1GW		5.44			2220	-25.6		
LOASR	EXPM-1	20031110	13:15	EXPM-1GW								
LOASR	EXPM-1	20031110	13:15	EXPM-1GW								
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC								
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF	-0.551			5.15				
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF								
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF								

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	CRYPTOSP CRYPTO/10	GIARDIAL IARDIA/100L	CFC-12 UG/L	2,4,5-TP ug/L	2,4-D ug/L	ALACHLOR ug/L	ATRAZINE ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	-9	-9					
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW			-0.28	-0.52	-0.62	-0.63	-0.49
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	CARBOFUR ug/L	DIQUAT ug/L	GLYPHOSA ug/L	METOLACH ug/L	OXAMYL ug/L	SIMAZINE ug/L	ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	-1	-4.8	-26	-0.082	-1	-0.65	-0.21
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	1,1,1-TR ug/L	1,1,2,2- ug/L	1,1,2-TR ug/L	1,1-DICH ug/L	1,2-DICH ug/L	1,2-DICH ug/L	1,2-DICH ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	-0.21	-0.47	-0.44	-0.23	-0.21	-0.29	-0.4
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	BENZENE ug/L	BROMODIC ug/L	BROMOFOR ug/L	CARBON T ug/L	CHLOROBE ug/L	CHLOROFO ug/L	CHLOROME ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	-0.2	-0.25	-0.41	-0.24	-0.3	-0.25	-0.4
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	CIS-1,2- ug/L	DIBROMOC ug/L	ETHYLBEN ug/L	METHYLEN ug/L	TETRACHL ug/L	TOLUENE ug/L	TRANS-1, ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	-0.21	-0.3	-0.21	-0.23	-0.24	-0.22	-0.35
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	TRICHLOR ug/L	TRICHLOR ug/L	VINYL CH ug/L	XYLENES ug/L	1,2,4-TR ug/L	2,4-DINI ug/L	BENZO(A) ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	-0.36	-0.22	-0.32	-0.46	-0.41	-0.13	-0.072
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF							

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Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	BIS(2-ET ug/L	HEXACHLO ug/L	1,4-DICH ug/L	VANADIUM ug/L	UG/L	1,2DBRET UG/L	ENDOTHAL UG/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	-0.87	-0.31	-0.23	-4	-0.0019	-0.0044	-2.8
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GW							
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC							

LOASR	EXPM-1	20031110	13:15	EXPM-1GWF
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
CROSS TAB REPORT
26-MAY-2004

Project Code	Station Id	Date YYYYMMDD	Time HR:MI	Sample Id	CYANIDE MG/L	CYAN-D MG/L	PCB ug/L	BIS(ADIP ug/L
LOASR	EXPM-1	20031110	13:15	EXPM-1GW				
LOASR	EXPM-1	20031110	13:15	EXPM-1GW				
LOASR	EXPM-1	20031110	13:15	EXPM-1GW				
LOASR	EXPM-1	20031110	13:15	EXPM-1GW			-0.2	-0.7
LOASR	EXPM-1	20031110	13:15	EXPM-1GW				
LOASR	EXPM-1	20031110	13:15	EXPM-1GW	-0.01			
LOASR	EXPM-1	20031110	13:15	EXPM-1GW				
LOASR	EXPM-1	20031110	13:15	EXPM-1GWC				
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF				
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF		-0.01		
LOASR	EXPM-1	20031110	13:15	EXPM-1GWF				

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
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Type	F.Turb NTU	F.CL MG/L	TEMP Deg C	D.O. mg/L	SP COND uS/cm	PH UNITS	COLOR PCU	T.SUS.SD mg/L	NO2 mg/L	NH4 mg/L
Count	3	3	3	3	3	3	1	1	1	1
Average	0.37	780	27.3	0.19	1900.12	7.29	5	5	0.05	0.34
Std Dev	0	0	0	0	1620.992	0	0	0	0	0
Min Val	0.37	780	27.3	0.19	28.36	7.29	5	5	0.05	0.34
Max Val	0.37	780	27.3	0.19	2836	7.29	5	5	0.05	0.34

Type	TKN mg/L	OPO4 mg/L	TPO4 mg/L	K mg/L	CA mg/L	MG mg/L	CL mg/L	SO4 mg/L	TOTAL FE ug/L	F MG/L
Count	1	1	1	1	1	1	1	1	1	1
Average	0.44	0.05	0.023	12	100	72	740	260	48	0.78
Std Dev	0	0	0	0	0	0	0	0	0	0
Min Val	0.44	0.05	0.023	12	100	72	740	260	48	0.78
Max Val	0.44	0.05	0.023	12	100	72	740	260	48	0.78

Type	SULFIDE mg/L	BOD-5 mg/L	OX/RED P mv	TOTAL AL ug/L	ALKALNYA mg/L	TOTAL CR ug/L	NO3 mg/L	TOTAL N MG N/L	FLUOR-D MG/L	TOTSE ug/L
Count	1	1	3	1	1	1	1	1	1	1
Average	2.9	2	206.7	50	130	2	0.1	0.44	0.73	10
Std Dev	0	0	0	0	0	0	0	0	0	0
Min Val	2.9	2	206.7	50	130	2	0.1	0.44	0.73	10
Max Val	2.9	2	206.7	50	130	2	0.1	0.44	0.73	10

Type	ODOR TON	TDORGC mg/L	ASBESTOS MF/L	BICARBON MG/L CACO3	CARBONAT MG/L CACO	TOTAL AG ug/L	T.DS.SOL MG/L	TOTAL HG ug/L	TOTAL CD ug/L	TOTAL CU ug/L
Count	1	1	1	1	1	1	1	1	1	1
Average	2	1.4	0.1	130	1	1	1500	0.5	1	2
Std Dev	0	0	0	0	0	0	0	0	0	0
Min Val	2	1.4	0.1	130	1	1	1500	0.5	1	2
Max Val	2	1.4	0.1	130	1	1	1500	0.5	1	2

Type	TOTAL ZN ug/L	TOTAL AS ug/L	TOTAL PB ug/L	TOTAL BA ug/L	TOTAL CO ug/L	TOTAL MN ug/L	TOTAL SR ug/L	TOTAL NI ug/L	TOT.COLI MPN/100mL	FEC.COLI MPN/100ML
Count	1	1	1	1	1	1	1	1	1	1
Average	50	10	3	24	2	10	18000	5	2	2
Std Dev	0	0	0	0	0	0	0	0	0	0
Min Val	50	10	3	24	2	10	18000	5	2	2
Max Val	50	10	3	24	2	10	18000	5	2	2

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Type	TOT.ANTY ug/L	TOT.BERY ug/L	TOT.THAL ug/L	TOT.M.HG ng/L	TOTAL HG ng/L	ALPHA-T PCI/L	GALPHA-D PCI/L	URANIUM UG/L	RAD228 PCI/L	RAD228 D PCI/L
Count	1	1	1	1	1	1	1	1	1	1
Average	10	0.5	2.3	0.004	0.15	31.9	19.1	0.108	0.869	0.551
Std Dev	0	0	0	0	0	0	0	0	0	0
Min Val	10	0.5	2.3	0.004	0.15	31.9	19.1	0.108	0.869	0.551
Max Val	10	0.5	2.3	0.004	0.15	31.9	19.1	0.108	0.869	0.551

Type	RAD226 PCI/L	RAD226-D PCI/L	RADON22: PCI/L	TRITIUM PCI/L	COLIPH-M PFU/100ML	COLIPH-S PFU/100ML	CRYPTOSP CRYPTO/100L	GIARDIAL IARDIA/100L	CFC-12 UG/L	2,4,5-TP ug/L
Count	1	1	1	1	1	1	1	1	1	1
Average	5.44	5.15	2220	25.6	1	1	9	9	0.28	0.52
Std Dev	0	0	0	0	0	0	0	0	0	0
Min Val	5.44	5.15	2220	25.6	1	1	9	9	0.28	0.52
Max Val	5.44	5.15	2220	25.6	1	1	9	9	0.28	0.52

Type	2,4-D ug/L	ALACHLOR ug/L	ATRAZINE ug/L	CARBOFUR ug/L	DIQUAT ug/L	GLYPHOSA ug/L	METOLACH ug/L	OXAMYL ug/L	SIMAZINE ug/L	ug/L
Count	1	1	1	1	1	1	1	1	1	1
Average	0.62	0.63	0.49	1	4.8	26	0.082	1	0.65	0.21
Std Dev	0	0	0	0	0	0	0	0	0	0
Min Val	0.62	0.63	0.49	1	4.8	26	0.082	1	0.65	0.21
Max Val	0.62	0.63	0.49	1	4.8	26	0.082	1	0.65	0.21

Type	1,1,1-TR ug/L	1,1,2,2- ug/L	1,1,2-TR ug/L	1,1-DICH ug/L	1,2-DICH ug/L	1,2-DICH ug/L	1,2-DICH ug/L	BENZENE ug/L	BROMODIC ug/L	BROMOFOR ug/L
Count	1	1	1	1	1	1	1	1	1	1
Average	0.21	0.47	0.44	0.23	0.21	0.29	0.4	0.2	0.25	0.41
Std Dev	0	0	0	0	0	0	0	0	0	0
Min Val	0.21	0.47	0.44	0.23	0.21	0.29	0.4	0.2	0.25	0.41
Max Val	0.21	0.47	0.44	0.23	0.21	0.29	0.4	0.2	0.25	0.41

Type	CARBON T ug/L	CHLOROBE ug/L	CHLOROF ug/L	CHLOROME ug/L	CIS-1,2- ug/L	DIBROMOC ug/L	ETHYLBEN ug/L	METHYLEN ug/L	TETRACHL ug/L	TOLUENE ug/L
Count	1	1	1	1	1	1	1	1	1	1
Average	0.24	0.3	0.25	0.4	0.21	0.3	0.21	0.23	0.24	0.22
Std Dev	0	0	0	0	0	0	0	0	0	0
Min Val	0.24	0.3	0.25	0.4	0.21	0.3	0.21	0.23	0.24	0.22
Max Val	0.24	0.3	0.25	0.4	0.21	0.3	0.21	0.23	0.24	0.22

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Type	TRANS-1, ug/L	TRICHLOR ug/L	TRICHLOR ug/L	VINYL CH ug/L	XYLENES ug/L	1,2,4-TR ug/L	2,4-DINI ug/L	BENZO(A) ug/L	BIS(2-ET ug/L	HEXACHLO ug/L
Count	1	1	1	1	1	1	1	1	1	1
Average	0.35	0.36	0.22	0.32	0.46	0.41	0.13	0.072	0.87	0.31
Std Dev	0	0	0	0	0	0	0	0	0	0
Min Val	0.35	0.36	0.22	0.32	0.46	0.41	0.13	0.072	0.87	0.31
Max Val	0.35	0.36	0.22	0.32	0.46	0.41	0.13	0.072	0.87	0.31

Type	1,4-DICH ug/L	VANADIUM ug/L	UG/L	1,2DBRET UG/L	ENDOTHAL UG/L	CYANIDE MG/L	CYAN-D MG/L	PCB ug/L	BIS(ADIP ug/L
Count	1	1	1	1	1	1	1	1	1
Average	0.23	4	0.002	0.004	2.8	0.01	0.01	0.2	0.7
Std Dev	0	0	0	0	0	0	0	0	0
Min Val	0.23	4	0.0019	0.0044	2.8	0.01	0.01	0.2	0.7
Max Val	0.23	4	0.0019	0.0044	2.8	0.01	0.01	0.2	0.7