HYDROGEOLOGY OF THE ROMP 74X DAVENPORT MONITOR WELL SITE POLK COUNTY, FLORIDA

PHASE ONE

CORE DRILLING AND TESTING

Resource Data Section

Resource Conservation and Development Department

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2379 Broad Street

Brooksville, Florida 34604-6899

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The geological evaluations and interpretations contained in the *Hydrogeology of the ROMP 74X Davenport Monitor Well Site, Polk County, Florida, Phase One – Core Drilling and Testing* have been prepared by or approved by a licensed Professional Geologist in the State of Florida, in accordance with Chapter 492, Florida Statutes.

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Phase One

Core Drilling and Testing

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1.0 INTRODUCTION

The Regional Observation and Monitor-well Program (ROMP) 74X Davenport site was obtained to construct monitor wells for a hydrogeologic investigation in Polk County. The ROMP 74X well site is located on the eastern side of the Lake Wales Ridge, in an area with little available hydrogeologic data. The well site will provide much needed information on the hydrogeologic framework and ground-water quality in the extreme northeastern corner of the Southwest Florida Water Management District (District).

Drilling, testing, and monitor well construction at the ROMP 74X well site is planned in three phases: (1) Core drilling and Testing, (2) Deep Exploratory Drilling and Monitor Well Construction, and (3) Aquifer Performance Testing. This report presents the data collected during the first phase, core drilling and testing from land surface to 1,560 feet below land surface (BLS). Wire-line core drilling began in October 2002 and was completed in June 2003.

2.0 SITE LOCATION

The ROMP 74X well site is located in Northeast Polk County, on the Lake Wales Ridge (Figure 1). The well site is located east of Highway 17 just outside the city of Davenport (Figure 2). The temporary easement for the well site measures 150 feet x 275 feet. The permanent well site measures 20 feet x 80 feet. The well site is located on a 130-acre parcel of land owned by the District. The 130-acre District parcel is located within the 7,000-acre Lake Marion Creek Management Area owned by the South Florida Water Management District (SFWMD). The Lake Marion Creek Management Area is managed by the Florida Fish and Wildlife Conservation Commission as a Wildlife Management Area.

The well site is located in the NW ¼ of the NE ¼ of Section 12, Township 27 South, Range 27 East at latitude: 28° 09' 25.96" longitude: 81° 33' 55.28" at a surface elevation of 85 feet above the National Geodetic Vertical Datum of 1929 (NGVD) (Figure 3). The ROMP 74X monitor well site diagram is presented in Figure 4.

3.0 DATA COLLECTION METHODS

Hollow-stem auger, wire-line coring, mud-rotary and reverse-air drilling methods were used to collect lithologic and aqueous samples with depth. The hollow-stem auger method was used initially in the unconsolidated sediments. The wire-line coring method was employed after encountering competent limestone or clay. The reverse-air and mud-rotary methods were used to drill and ream the open hole for installing casing at various depths in order to advance the core-hole. An off-bottom packer was used to isolate the borehole for collection of ground-water samples and for hydraulic testing.

3.1 LITHOLOGIC SAMPLING

The District-owned Central Mine Exploration (CME) 85 drill rig was used to perform the wire-line coring at ROMP 74X. Two-inch diameter core was collected in five-foot intervals from land surface to 1,560 ft below land surface (BLS) from August 2002 to June 2003. Figure 5 presents a diagram of the wire-line coring apparatus. Prior to the start of coring, a 6-inch surficial monitor well was installed on the permanent easement to provide water for the coring process. Figure 6 presents the well construction diagram for the surficial water supply well. This well will be used as a partially-penetrating observation well for the surficial aquifer performance test (APT) to be performed during Phase Three of the project.

Drilling began in August 2002 with 10-inch hollow-stem augers and a six-inch split spoon sampler in the unconsolidated quartz sands. Lithologic samples were collected from land surface to 37 feet BLS while augering the borehole for installation of the 6-inch polyvinyl-chloride (PVC) well. The location of the auger-hole and the 6-inch surficial water supply well are shown in Figure 4.

Lithologic sampling resumed in October 2002 at a new borehole location (corehole #1) on the east side of the permanent easement (Figure 4). Drilling and lithologic sample collection was begun with new 4-inch diameter solid-core augers. One of the augers broke at a weld while drilling at 40 feet BLS. The augers were removed and drilling continued below 40 feet BLS using the mud-rotary method. Lithologic samples of the unconsolidated sediments were collected from drilling discharge line and from the hydraulic shaker installed in-line with the mud-rotary system. Mud-rotary drilling continued in the unconsolidated sediments to a depth of 265 feet BLS where a clay lens was encountered.

The mud-rotary bit and drill rods were removed from the borehole and four-inch diameter HW steel casing was drilled five feet into the clay to total depth of 270 feet BLS. Wire-line coring began at 270 feet BLS using 2.75-inch outside diameter (OD) NQ core rods to collect the 2-inch core. The 4-inch diameter HW casing was advanced several times while coring between 270 feet BLS and 338 feet BLS, due to the HW casing sliding down the borehole while advancing the corehole. Coring through this interval was difficult due to the large amount of quartz sand that continued to enter the sample interval from above. Periodic pumping of the corehole was required between core runs to ensure the core rods or wire-line core barrel did not become stuck. Mud-rotary drilling was again used below 338 feet BLS. The decision to use mud rotary was made to ensure the corehole was not located in a relict sinkhole feature. Mud-rotary drilling was to continue until reaching limestone or dolostone. Limestone was encountered near 380 feet BLS and mud-rotary drilling continued to 408 feet BLS.

In November 2002, Diversified Drilling Corporation, under contract to the District, drilled a new 23-inch borehole and installed and grouted 18-inch diameter steel surface casing to 148 feet BLS. A 17.5-inch borehole was then drilled from 148 to 245 feet BLS and 12-inch diameter steel casing was installed and grouted. The new borehole (corehole # 2) was located approximately 100 feet NW of corehole # 1 (Figure 4). In December 2002, wire-line coring resumed at a depth of 245 feet BLS inside the 18-inch steel casing. Wire-line coring continued from 245 feet BLS in limestone and clay until unconsolidated sediments were encountered again at 295 feet BLS. Several core runs were attempted with no recovery before resorting to mud-rotary drilling. Mud-rotary drilling was used in the unconsolidated sediments from 295 feet BLS to 379 feet BLS. Wire-line coring was attempted from 379 to 381 BLS after encountering a thin limestone lens at 379 feet BLS. Unconsolidated sediments below 381feet BLS necessitated the use of the mud-rotary drilling again from 381 feet BLS to 410 feet BLS. The 4-inch diameter HW steel casing was advanced to 410 feet BLS and wire-line coring resumed at 410 feet BLS. The 4-inch diameter HW steel casing was periodically advanced while wire-line coring from 410 feet BLS to 576 feet BLS. Wire-line coring was stopped at 576 feet BLS while coring in highly fractured dolostone that prevented further advancement of the corehole.

In February 2003, Diversified Drilling Corporation drilled an 11.5-inch borehole from 245 feet BSL to 450 feet BLS inside the 12-inch steel casing. Eight-inch diameter steel casing was installed and grouted to 450 feet BLS. Diversified Drilling Corporation then began reverse-air drilling a 6-inch diameter borehole inside the 8-inch steel casing from 450 feet BLS to 610 feet BLS where a hard lens of limestone was encountered. Wire-line coring resumed at 610 feet BLS after installing the 4-inch diameter HW steel casing to 610 feet BLS. The HW steel casing was periodically advanced and the wire-line coring continued from 610 feet BLS to 1,560 feet BLS. Wire-line coring was terminated while drilling in the evaporite sediments of the Oldsmar Formation. Figures 7 and 8 present the configuration of coreholes No.1 and No. 2 during the coring process.

3.2 GROUND-WATER SAMPLING

Ground-water samples were collected from selected intervals while wire-line coring below the unconsolidated surficial sediments. The samples were collected from the discharge line while pumping the intervals using the air-lifting method. Most samples were collected from zones isolated with an off-bottom packer. Figure 9 presents a diagram of the off-bottom packer. The ground-water samples were split and one sample was analyzed in the field for temperature, specific conductance, pH, chloride, sulfate, and density, while the other sample was delivered to the District Environmental Chemistry Laboratory for more extensive analyses. Chain-of-Custody forms were used to track the samples. Table 1 presents the results of the field analyses and Table 2 presents the laboratory analyses. Results of the ground-water sample analyses are discussed in Section 6.0.

3.3 HYDRAULIC TESTING

Measurements of the corehole and HW casing water levels were taken daily while

coring. Packer isolated water levels were also measured during off-bottom packer testing. The daily core hole water level and packer water level measurements are presented in Table 3. Figure 10 presents a graph of the core hole water level measurements.
Slug tests were performed at various intervals while core drilling to collect hydraulic values for portions of the borehole. The off-bottom packer was used to isolate specific intervals of the core hole for testing. With the packer installed, a slug of water was introduced into the core hole and the resulting change in water level was measured with a pressure transducer and recorded on a data logger. The water level recovery curves were then analyzed with aquifer testing software to determine the horizontal hydraulic conductivity. The hydraulic results are discussed in Section 7.0. Table 4 presents the hydraulic values calculated for each zone tested.

3.4 GEOPHYSICAL LOGGING

Borehole geophysical logs were collected using the District-owned Century® geophysical logging equipment. The borehole was logged while core drilling from 0 to 1,560 feet BLS at the ROMP 74X well site. The geophysical logs were collected using the 9074C caliper and 8043 multi geophysical tools.

The first set of logs were collected in February 2003 prior to installing the 8-inch steel casing to 450 feet BLS. The 9074C tool was used to collect a caliper log of the borehole. The 8043 tool was used to collect natural gamma (GAM(NAT)), single-point resistance (SP), resistivity (RES), short normal resistivity (RES(16N)), long-normal resistivity (RES(64N)), temperature (TEMP), and specific conductance (SP COND) logs. The tools were run from land surface to 450 feet BLS. The open-hole interval of the well begins below the 12-inch steel casing installed to 243 feet BLS. Figure 11 presents the logs run from 0 to 450 feet BLS. In addition to the geophysical logs collected, a down-hole video camera was used to collect analog video of the borehole from land surface to 450 feet BLS.

A second logging phase was performed after terminating the core hole at 1,560 feet BLS. The 9060 slim-line electric-gamma log tool was run inside the NQ core rods installed to

1,560 feet BLS to ensure the core hole did not collapse before or during logging. The gamma log was the only useable log due to logging through the steel NQ rods. Following collection of the gamma log to 1,560 feet BLS an attempt was made to collect additional logs after removing the NQ rods. During this attempt the 9060 geophysical log tool became stuck in the core hole. The tool was recovered but no geophysical logs were collected. The gamma log from 1,560 feet BLS is displayed in Figure 12. Additional logs will be collected during the monitor well construction phase of the project.

4.0 GEOLOGY

The ROMP 74X well site is located on the Lake Wales Ridge, a long narrow ridge that extends from Highlands County in the north to Lake County in the south. White (1970) describes the Lake Wales Ridge as the most prominent of several ridges that exist in the Central Highlands physiographic province. White also states that the Lake Wales Ridge is a relict shoreline that has been above sea level since formation.

The elevation at the ROMP 74X site is approximately 85 feet above land surface. Holocene to Miocene age unconsolidated sediments overly Eocene age sedimentary rocks. The well site is within the District's Peace River Hydrologic Basin and is located less than ½ mile northeast of Horse Creek (Figure 3). The ROMP 74X stratigraphy was defined from lithologic descriptions of core samples collected while wire-line coring from land surface to 1,560 feet BLS. Figure 12 presents the stratigraphy and hydrogeology of the ROMP 74X well site. The lithologic log for ROMP 74X is presented as Appendix A.

4.1 UNDIFFERENTIATED SURFICIAL DEPOSITS

The Holocene to Pliocene age undifferentiated surficial deposits are the uppermost geologic unit at the ROMP 74X well site. The surficial deposits are comprised of unconsolidated medium to very coarse-grained quartz sand and some silt. The undifferentiated surficial deposits extend from land surface to approximately 225 feet BLS.

4.2 HAWTHORN GROUP

The Hawthorn Group underlies the undifferentiated surficial deposits. Stiff green clay interbedded with sand, silt, soft clayey limestone and some hard limestone fragments extend from 225 to 245 feet BLS. Past erosional processes appear to have removed much of the previously deposited sediments and reworked the remaining sediments. The clay and limestone present are probably Peace River Formation sediments. The clay is indicated on the GAMMA log between 230 and 245 feet BLS in Figure 11. The Hawthorn Group appears to unconformably overlie the Ocala Limestone due to the absence of the Suwannee Limestone.

4.3 OCALA LIMESTONE

Much of the Eocene age Ocala Limestone at the ROMP 74X site has been removed by past erosion. Stewart (1966) reports that in the extreme northeastern part of Polk County the lower part of the Ocala limestone is the uppermost limestone present due to past erosion. In adjacent Osceola County, Schiner (1993) reports the absence of the Ocala Limestone in parts of northwestern and north-central Osceola County.

The remaining portion of the Ocala Limestone at ROMP 74X has been weathered to a very soft, clayey, white limestone. Some very thin lenses of hard, fossiliferous limestone are also present. Thick sequences of quartz sand, silt, and clay lenses appear to be infilled cavities within the highly weathered Ocala Limestone. The interbedding of sands, clays, silts and limestone is indicative of a paleokarst surface. The Ocala Limestone extends from 245 to 445 feet BLS.

4.4 AVON PARK LIMESTONE

The Avon Park Formation is Eocene in age and extends from 445 feet BLS to 1,350 feet BLS at the ROMP 74X well site. A thin clayey organic layer located approximately 445 feet BLS marks the top of the Avon Park Formation. In this part of Polk County the lithologic character of the Avon Park Formation is highly variable (Murray and Halford, 1996).

The uppermost part of the Avon Park Formation is comprised of hard, dense, dolomite with some quartz sand and clay present in fractures. The zone from 445 to 575 is highly permeable due to the numerous fractures and voids in the dolomite. A down-hole video log run in this zone revealed large fractures and solution features capable of transmitting large volumes of water. The portion of the Avon Park Formation from 575 to 740 feet BLS is characterized by layers of hard, fractured, moldic dolomite separated by lenses of soft clayey, unconsolidated silt-sized dolomite. The porosity and permeability of this section of the Avon Park is markedly less than the overlying fractured dolomite zone. The permeable section of Avon Park Formation from 445 to 740 feet BLS forms the Upper Floridan aquifer.

Below 740 feet BLS alternating layers of hard dense dolomite and soft clayey nearly unconsolidated dolomite characterize the Avon Park. These alternating layers extend from 740 to 1,100 feet BLS and form the middle semi-confining unit between the Upper and Lower Floridan aquifers.

Evaporite sediments begin to appear in the Avon Park Formation below 1,100 feet BLS at ROMP 74X. Hard dense dolomite with large voids and fractures completely filled with gypsum extends from 1,100 to 1,250 feet BLS. The evaporite sediments mark the top of the middle confining unit, that along with the semi-confining unit, separate the Upper and Lower Floridan aquifers in this part of Florida (O'Reilly and others, 2002).

Hard, moldic and fractured dolomite occurs from 1,250 to 1,400 feet BLS. The porosity of the unit was characterized by the absence of gypsum in the numerous fossil molds and fractures. Numerous dolomite and some small quartz crystals were present along fracture planes. This permeable zone is located within the Lower Floridan aquifer at the ROMP 74X site.

4.5 OLDSMAR FORMATION

The Oldsmar Formation is Eocene in age and extends from 1,350 feet BLS to more than 1,560 feet BLS (the end of coring). The Oldsmar Formation is characterized by a dark brown, dense, very hard, crystalline dolomite with numerous fossil molds, fractures and large voids infilled with gypsum. Stewart (1966) identifies the Oldsmar formation by the change in lithology and changes in the electric and gamma ray logs. A decrease in the gamma ray below 1,350 feet BLS is shown in Figure 12.

5.0 HYDROLOGY

The ROMP 74X well site hydrogeology was defined during initial wire-line coring. Aquifer systems were delineated from lithologic descriptions, hydraulic testing, potentiometric levels, geophysical log data, and water quality data collected during drilling.

5.1 SURFICIAL AQUIFER

The surficial aquifer at ROMP 74X is unconfined and extends from land surface to approximately 225 feet BLS. Medium to very coarse-grained quartz sand and silt of the undifferentiated surficial deposits form the surficial aquifer. The base of the surficial aquifer is formed by layers of clay and limestone of the Hawthorn Group. The water level in the surficial aquifer ranged from 0.5 to 2.5 feet BLS while wire-line coring from December 2002 to June 2003. A 6-inch diameter surficial well screened from 5 to 30 feet BLS to supply water for core drilling had a specific capacity of 10 gallon per minute/foot (GPM/FT).

5.2 INTERMEDIATE CONFINING UNIT

The intermediate confining unit underlies the surficial aquifer system in the area of ROMP 74X. The intermediate confining unit is comprised of low permeability clay and limestone sediments of the Hawthorn Group. The intermediate confining unit extends from 225 to 245 feet BLS. The intermediate confining unit helps to retard vertical movement of water between the overlying surficial aquifer system and the underlying Upper Floridan aquifer.

In parts of Polk County permeable zones may occur in the sand beds and permeable limestone formations within the Hawthorn Group. At the ROMP 74X site, no permeable zones were delineated within Hawthorn Group. The clay lenses are identified by the gamma response in Figures 11 and 12.

5.3 FLORIDAN AQUIFER SYSTEM

The Floridan aquifer system underlies the intermediate confining unit and low permeable sediments of the Ocala Limestone and is comprised of limestone and dolomite rocks of Eocene to Late Paleocene age. The Floridan aquifer is approximately 2,300 feet thick in the area of the wellsite and consists of the Avon Park Formation, Oldsmar Formation, and part of the Cedar Keys Formation (O'Reilly and others, 2002). In the area of ROMP 74X the Floridan aquifer system contains two permeable zones, the Upper and Lower Floridan aquifers separated by a thick sequence of low permeability sediments termed the middle semi-confining unit and the middle confining unit. Table 2 presents the water level measurements with depth while core drilling. A water level graph is presented as Figure 10.

The top of the Upper Floridan aquifer (UFA) occurs near the contact between the Ocala Limestone and Avon Park Formation at ROMP 74X. The highly weathered clayey limestone of the Ocala Limestone and clays of the Hawthorn Group form a thick confining unit between the surficial and Upper Floridan aquifers. The UFA extends from 445 to 740 feet BLS in a permeable section of the Avon Park Formation. The most permeable section occurs from 450 feet BLS to 570 feet BLS in a highly fractured dolomite. Moderate permeability beds of hard, moldic dolomite and soft, weathered clayey limestone characterize the remainder of the UFA from 570 to 740 feet BLS. The potentiometric surface of the UFA ranged from 1 to 3 feet above land surface (approximately 86 to 88 feet above sea level) while coring from 450 to 740 feet BLS. Figures 13 and 14 present potentiometric maps of the UFA for May and September 2000, respectively.

The middle semi-confining unit previously termed confining unit I by Miller (1986), extends from 740 to approximately 1,100 feet BLS (655 to 1,015 feet below sea level) in the Avon Park Formation. This unit is comprised of thin alternating beds of soft, clayey, weathered dolomite and hard, dense dolomite lenses of low permeability.

The top of the middle-confining unit, previously termed confining unit II by Miller (1986) occurs at 1,100 feet BLS (1,015 feet below sea level) in the Avon Park Formation. This unit is comprised of hard, dense, dolomite with gypsum filled fractures, molds and cavities.

A permeable unit delineated as part of the Lower Floridan aquifer (LFA) was encountered at 1,250 feet BLS (1,165 feet below sea level) in the Avon Park Formation. The permeable unit consists of a hard, fractured and moldic dolomite without the presence of gypsum. The permeable unit extends from 1,250 to 1,400 feet BLS (1,315 feet below sea level). A major change in water level was noted after penetrating the permeable dolomite in the LFA. The potentiometric surface ranged from 40 to 43 feet BLS (45 to 42 feet above sea level) while coring from 1,250 to 1,550 feet BLS. Hard, dense dolostone with gypsum filled molds, fractures, and voids was again encountered while core drilling from 1,400 to 1,550 feet BLS. The full extent of the LFA has not yet been defined at ROMP 74X.

6.0 <u>GROUND-WATER QUALITY</u>

Ground-water samples were collected periodically while core drilling from 436 feet BLS to 1,486 feet BLS in the Floridan aquifer system. The field analyses and laboratory analyses of the ground-water samples are presented in Tables 1 and 2, respectively. Figure 15 presents a graph of the chloride and sulfate concentrations and specific conductance measurements of the ground-water samples collected while core drilling from land surface to 1,486 feet BLS.

6.1 SURFICIAL AQUIFER

One ground-water sample was collected from the surficial water supply well (screened interval 5 to 35 feet BLS) with a centrifugal pump in October 2003. Water quality in the surficial aquifer for most parameters is within secondary drinking water standards. The chloride concentration was 4 milligrams/liter (mg/L), sulfate was 2 mg/L, and specific conductance was 129 umhos/centimeter.

6.2 UPPER FLORIDAN AQUIFER

Ground-water samples were collected from isolated intervals using the off-bottom packer while core drilling in the Upper Floridan aquifer. Several ground-water samples were collected while coring in the permeable zone from 450 to 740 feet BLS. All constituents were within secondary drinking water standards. Chloride concentrations ranged from 10 mg/L at the 436-461 feet BLS sample interval to 5 mg/L at the 720-786 feet BLS sample interval. Sulfate concentrations ranged from 23 mg/L at the 436-461sample interval to 7 mg/L at the 720-786 feet BLS sample interval. Total dissolved solids (TDS) ranged from 146 mg/L at the 436-461 feet BLS sample interval to 115 mg/L at the 720-786 feet BLS sample interval.

6.3 LOWER FLORIDAN AQUIFER

Ground-water samples were collected while coring in the Lower Floridan aquifer permeable zone (1,250 to 1,400 feet BLS). Secondary drinking water standards were exceeded for several constituents. Chloride concentrations ranged from 7 mg/L at the 1,256-1,286 feet BLS sample interval to 9 mg/L at the 1,351-1,381 feet BLS sample interval. Sulfate concentrations ranged from 320 mg/L at the 1,256-1,286 feet BLS sample interval to 1,340 mg/L at the 1,351-1,381 feet BLS sample interval. TDS ranged from 615 mg/L at the 1,256-1,286 feet BLS sample interval to 2,220 mg/L at the 1,351-1,381 feet BLS sample interval.

7.0 HYDRAULIC DATA

Slug tests were performed on isolated borehole intervals during core drilling. The slug tests were performed using an off-bottom packer installed through the NQ rods. Slug tests were performed in both permeable and confining units of the Floridan aquifer system. During the slug tests the water level changes were measured with a pressure transducer installed in the core rods and recorded with a data-logger. A second transducer installed in the annulus between the NQ rods and the HW casing was used to detect water level changes caused by a poor seal between the packer and the borehole wall.

The slug tests give an estimate of the hydraulic conductivity (K) of the tested intervals. The data from the slug tests, when compared, can be used to qualify permeable versus confining zones. The hydraulic conductivity values obtained with the NQ packer in zones of expected low permeability are within published ranges. However, hydraulic conductivity values obtained with the NQ packer in zones of expected high permeability are lower than expected. During slug tests the water from the slug moves through the NQ core rods (2.38-inch inside diameter (I.D.)) until reaching the off-bottom packer, then moves through the 0.51-inch inside diameter packer before reaching the 2.99-inch diameter open hole test interval (Figure 9). The under predicted values obtained in high K zones are attributed to the restrictions of the flow and the resulting increase in velocity of the water moving through the NQ packer.

The slug test data was analyzed with AQTESOLVE® for Windows® Professional Version 3.50 software (Hydrosolve, 1996-200). The KGS (Hyder et al., 1994) and Butler (1998) analytical models were used to obtain the horizontal hydraulic conductivity values. The horizontal hydraulic conductivity values ranged from 0.01 to 13.32 feet/day. **Note**: the values for the permeable zones are under predicted and therefore should only be used for comparative purposes only. The curve matches for the slug tests are presented in Appendix B. Table 4 presents the hydraulic values. Figure 16 presents a graph of the hydraulic conductivity versus depth.

8.0 SUMMARY

Core drilling and testing, the first phase of a three phase hydrogeologic investigation was conducted at the ROMP 74X Davenport monitor well site in Polk County from October 2002 to June 2003. The wire-line coring method was used to collect core samples from land surface to 1,560 ft BLS for lithologic description and stratigraphic correlation. Ground-water samples were collected periodically while coring to characterize the water quality in the surficial, Upper, and Lower Floridan aquifers. During coring, water levels were measured daily to aid in delineating aquifer systems and permeable zones.

The results of the coring investigation indicate the ROMP 74X well site is underlain by an unconfined surficial aquifer (land surface to ~225 feet BLS), an intermediate confining unit with no measurable permeable zones (225 feet BLS to 245 feet BLS), a confined Upper Floridan aquifer (450 feet BLS to ~740 ft BLS), and a confined Lower Floridan aquifer (1,250 feet BLS to 1,400 feet BLS). The Upper and Lower Floridan aquifers are separated by 500 feet of low to non-permeable sediments termed the middle semi-confining unit and the middle confining unit. Ground-water quality in the surficial and Upper Floridan aquifers is generally within secondary drinking water standards. Ground-water quality in the LFA exceeds secondary drinking water standards for sulfate and total dissolved solids. Distinct water levels were identified in each aquifer penetrated during coring. The surficial aquifer water level was 1 to 2 feet BLS. The UFA water level varied from 1 to 2 feet ALS, and the LFA was 40 to 43 feet BLS.

The data collected during wire-line coring was used to design monitor wells for the site. Permanent and temporary monitor wells will be constructed during the second phase of the project. The temporary monitor wells are designed to accommodate a specific pump to be used during the third phase of the project, aquifer performance testing (APT). The permanent wells are used as observation wells during the APT. Following all testing, the permanent wells are equipped with automatic water level recorders and are sampled periodically for water quality changes. Monitor well construction began in July 2003 and is expected to be complete in Spring 2004. Additional drilling below the current depth of 1,500 feet BLS to define the Lower Floridan Aquifer may be performed in 2004 or 2005.

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TABLES

Table 1. Field Analyses of ROMP 74X Ground Water Samples Collected During Coring*

UID 2865-2209

Date (M/D/Y)	Time	Casing Depth (feet bls)	Sample Depth[1] (feet bls)	Specific Cond (umhos)	H_2O Temp (Celcius)	Chloride	Sulfate	pH	Sample Collection Method	Sent to District Lab
12/16/2002	1435	436	436-461	232	23.2	40	<50	7.66	Off-bottom packer/RA[1]	Yes
1/9/2003	1325	436	512-541	246	25.6	40	<50	8.13	Off-bottom packer/RA	Yes
1/22/2003	1520	436	542-566	235	25.7	NA	NA	8.23	Off-bottom packer/RA	Yes
3/20/2003	1030	610	610-651	202	26.4	40	<50	7.14	Open Hole RA	Yes
3/25/2003	1115	610	670-686	199	25.9	NA	NA	8.20	Off-bottom packer/RA	No
3/26/2003	1345	610	706-726	199	25.7	NA	NA	8.18	Off-bottom packer/RA	No
3/27/2003	1330	610	710-736	184	26.3	40	<50	8.28	Off-bottom packer/RA	Yes
4/2/2003	1215	610	720-786	180	25.7	40	<50	8.25	Off-bottom packer/RA	Yes
4/8/2003	1550	610	853-886	350	27.1	60	75	8.09	Off-bottom packer/RA	Yes
4/11/2003	1225	610	926-956	404	25.8	60	150	7.92	Off-bottom packer/RA	Yes
4/15/2003	1545	632	981-1011	338	26.2	40	80	8.16	Off-bottom packer/RA	Yes
4/18/2003	1530	632	1021-1051	397	27.2	60	90	8.21	Off-bottom packer/RA	Yes
4/22/2003	1240	632	1040-1071	813	27.2	60	300	8.00	Off-bottom packer/RA	Yes
4/29/2003	1515	632	1100-1136	804	30.9	60	300	8.15	Off-bottom packer/RA	Yes
5/12/2003	1245	632	1256-1286	775	27.0	40	500	7.81	Off-bottom packer/RA	Yes
5/21/2003	1300	632	1351-1381	2080	27.2	80	1000	7.72	Off-bottom packer/RA	Yes
5/30/2003	1200	632	1456-1486	2880	27.1	80	1000	7.74	Off-bottom packer/RA	Yes

* All concentrations reported in mg/L unless otherwise noted

R74x..\core_wq.xls

NA - Not Analyzed

[1] RA - Reverse Air

Table 2. Laboratory Analyses of ROMP 74X Ground Water Samples Collected During Coring* UID 2865-2209

Date (M/D/Y)	Time	Casing Depth (feet bls)	Sample Depth (feet bls)	Specific Cond. (umhos)	CL	SO_4	pH	TDS	Ca	Mg	Alkalinity as ($CaCO_3$)	K	Na	Si	Fe (ug/l)	Strontium	ION Balance %	Sample Method
10/30/2003	1230	5	30	129	4	2	7.11	76	17	4.3	55.9	0.57	2.85	8.8	14	0.29	NA	Pumped from surf well
12/16/2002	1435	436	436-461	238	10	23	7.64	146	30	5.6	80.6	0.72	5.65	8.90	40	<0.25	NA	Off-bottom packer/RA[1]
1/9/2003	1325	436	512-541	260	12	29	7.53	160	34	6.5	77.2	1.46	5.92	8.20	<30	<0.25	0.74	Off-bottom packer/RA
1/22/2003	1520	436	542-566	249	12	27	7.61	146	34	6.8	80.4	1.31	5.84	8.10	30	<0.25	0.67	Off-bottom packer/RA
3/20/2003	1030	610	610-651	194	8	15	7.48	119	26	5.5	71.2	0.82	4.76	8.70	<13	0.32	NA	Open-hole/RA
3/27/2003	1330	610	710-736	175	5	7	7.52	112	25	5.7	76.4	0.71	3.69	9.60	<12.5	0.39	NA	Off-bottom packer/RA
4/2/2003	1215	610	720-786	171	5	7	7.53	115	23	5.8	75.6	0.57	3.43	9.70	<13	0.42	NA	Off-bottom packer/RA
4/8/2003	1550	610	853-886	334	8	62	8.09	217	43	14.5	96.4	0.98	5.44	11.20	19	2.79	NA	Off-bottom packer/RA
4/11/2003	1225	610	926-956	392	9	80	8.04	265	44	15.3	102.0	1.26	6.00	12.10	18	22.70	NA	Off-bottom packer/RA
4/15/2003	1545	632	981-1011	333	9	54	8.14	213	36	12.1	105.0	1.47	5.87	12.00	14	15.30	NA	Off-bottom packer/RA
4/18/2003	1530	632	1021-1051	398	9	66	8.20	267	42	13.8	125.0	1.54	5.57	15.80	16	25.30	NA	Off-bottom packer/RA
4/22/2003	1240	632	1040-1071	827	9	314	8.05	638	108	35.3	114.0	1.88	5.48	15.60	37	25.20	NA	Off-bottom packer/RA
4/29/2003	1515	632	1100-1136	809	6	341	8.03	619	145	16.5	74.9	1.13	4.44	5.40	<13	7.76	NA	Off-bottom packer/RA
5/12/2003	1245	632	1256-1286	792	7	320	7.89	615	129	24.8	84.8	1.20	4.82	10.70	<13	7.05	NA	Off-bottom packer/RA
5/21/2003	1300	632	1351-1381	2280	9	1340	7.91	2220	468	87.2	103.0	1.99	7.60	13.20	498	8.87	NA	Off-bottom packer/RA
5/30/2003	1200	632	1456-1486	3360	14	2210	7.84	3460	613	221.0	119.0	9.90	20.40	16.50	71	12.30	NA	Off-bottom packer/RA

*All concentrations in mg/L unless otherwise noted

R74X..\core_wq.xls

*NA= Not Analyzed

[1] RA - Reverse Air used as pumping method

Table 3. Daily Core Hole Water Levels at ROMP 74X

Date	Time	HW Casing Depth (feet bls)	HW Water Level (feet bls)	Open Hole Depth (feet bls)	Core Hole Water Level (feet above or (-) below land surface)	Core Hole Approximate Water Level (Feet NGVD)	Comments
12/16/2002	1130	436	0.77	461	1.10	83.90	Site Elevation ~85 feet
12/17/2002	0915	436	1.05	461	1.10	83.90	
12/18/2002	0900	436	0.14	481	1.00	84.00	
1/6/2003	1245	436	6.55	491	1.76	83.24	
1/8/2003	0900	436	0.95	531	1.07	83.93	
1/9/2003	0900	436	2.69	541	NR	NR	
1/9/2003	1300	436	NR	512-541	2.88	82.12	packer installed
1/13/2003	1145	436	2.80	541	2.80	82.20	
1/14/2003	0800	436	2.74	551	NR	NR	
1/16/2003	0800	436	2.59	556	NR	NR	
1/20/2003	0900	436	1.20	561	NR	NR	
1/21/2003	0730	436	2.27	561	NR	NR	
1/22/2003	0800	436	1.57	566	NR	NR	
1/22/2003	1500	436	2.39	542-566	1.62	83.38	packer installed
1/23/2003	0700	436	2.50	566	NR	NR	
3/19/2003	0900	608	1.15	608	NR	NR	elevation datum change
3/20/2003	0850	610	1.15	651	1.17	83.83	
3/24/2003	0915	610	1.52	676	1.40	83.60	
3/25/2003	0915	610	1.55	686	1.37	83.63	
3/25/2003	1100	610	NR	670-686	1.25	83.75	packer installed
3/26/2003	0920	610	1.54	706	1.39	83.61	
3/27/2003	0905	610	1.61	736	1.42	83.58	
3/27/2003	1330	610	NR	710-736	2.45	82.55	packer installed
3/31/2003	1015	610	1.25	736	1.15	83.85	
4/1/2003	0900	610	1.20	756	1.10	83.90	
4/2/2003	0915	610	1.18	786	1.17	83.83	
4/2/2003	1200	610	1.15	720-786	1.17	83.83	packer installed
4/3/2003	0900	610	1.20	786	1.13	83.87	
4/7/2003	925	610	1.25	826	1.12	83.88	
4/8/2003	0905	610	1.13	866	0.96	84.04	
4/8/2003	1500	610	0.97	853-886	0.96	84.04	packer installed
4/10/2003	0905	610	1.01	926	0.89	84.11	
4/11/2003	0905	610	1.04	956	0.83	84.17	
4/11/2003	1200	610	NR	926-956	0.66	84.34	packer installed
4/14/2003	0905	610	0.91	966	0.70	84.30	added 22' of HW casing
4/15/2003	0900	632	0.65	991	0.58	84.42	
4/16/2003	0900	632	0.67	981-1011	0.08	84.92	packer installed
4/17/2003	0920	632	0.49	1031	0.38	84.62	
4/18/2003	0910	632	0.49	1031	0.37	84.63	
4/21/2003	1005	632	0.68	1021-1051	0.45	84.55	packer installed
4/22/2003	1000	632	0.46	1071	0.09	84.91	
4/22/2003	1310	632	-1.10	1040-1071	-3.07	81.93	packer installed
4/23/2003	0910	632	0.28	1076	-0.17	84.83	NQ rods at 1000'bls
4/24/2003	0850	632	0.17	1081	NR	NR	NQ was tripped out
4/25/2003	0900	632	0.22	1081	-0.54	84.46	NQ is still 3' off bottom
4/28/2003	0920	632	0.40	1096	-0.97	84.03	
4/29/2003	0920	632	0.41	1116	-0.53	84.47	
4/30/2003	0920	632	0.36	1100-1136	-8.61	76.39	packer installed
5/1/2003	0915	632	0.34	1166	-1.58	83.42	
5/2/2003	0945	632	0.42	1186	-0.98	84.02	
5/5/2003	0955	632	0.27	1206	-0.79	84.21	
5/6/2003	0915	632	0.14	1226	-1.02	83.98	
5/7/2003	0900	632	-0.07	1196-1226	-18.67	66.33	packer installed
5/8/2003	0920	632	-0.11	1246	NR	NR	
5/9/2003	0900	632	-0.34	1266	-14.01	70.99	LFA
5/12/2003	0935	632	-0.49	1286	-40.67	44.33	
5/12/2003	1200	632	-0.31	1256-1286	-39.49	45.51	packer installed
5/13/2003	0920	632	-0.64	1286	-39.75	45.25	
5/14/2003	0900	632	-0.58	1306	-40.61	44.39	
5/15/2003	0905	632	-0.74	1326	-41.22	43.78	
5/19/2003	0940	632	-0.52	1346	-41.63	43.37	
5/20/2003	0900	632	-0.37	1366	-41.41	43.59	
5/21/2003	0915	632	-0.39	1381	-42.92	42.08	
5/21/2003	1200	632	-0.39	1351-1381	-42.37	42.63	packer installed
5/22/2003	0910	632	-0.40	1381	-43.05	41.95	
5/26/2003	0850	632	-0.28	1401	-42.78	42.22	HW casing slipped 1'
5/27/2003	0915	633	-0.36	1416	-42.71	42.29	
5/28/2003	1025	633	-0.41	1446	-43.42	41.58	
5/29/2003	0900	633	-0.39	1466	-42.58	42.42	
5/30/2003	0915	633	-0.50	1486	-43.37	41.63	
5/30/2003	1100	633	-0.48	1456-1486	-43.51	41.49	packer installed
6/2/2003	915	633	-0.79	1496	-43.32	41.68	
6/3/2003	900	633	-0.98	1516	-43.20	41.80	
6/4/2003	915	633	-0.02	1556	-42.59	42.41	

**NR=Not Recorded*

*HW=4" casing

Table 4. ROMP 74X Corehole Slug Test Results using Off-Bottom Packer

Date	Test No.	Test Interval (feet bls)	Interval Thicknes (feet bls)	Airlift Rate (gpm)	Airline Length (feet)	Viual Lithologic Characterization	Hydrogeologic Zone	Analytical Method	Horizontal Hydraulic Conductivity[1] (K) (feet/day)	Notes
12/11/2002	1	415-436	21	NR	200	Clay-Soft	Intermediate confining unit	NR	NR	Test Failed,Open Hole may have caved in
12/16/2002	2	436-461	25	NR	200	Confining Clay & Dolostone	confining unit/UFA	KGS	**7.51***	Good Packer Set
12/18/2002	3	455-481	26	NR	200	Fractured Dolostone	UFA	Butler	**5.73***	Slight Drawdown in HW casing annulus
1/9/2003	4	512-541	29	25	200	Fractured Dolostone & Clay	UFA	Butler	**10.18***	Slight Drawdown in HW casing annulus
1/22/2003	5	542-566	24	20	200	Fractured Dolostone	UFA	Butler	**7.90***	
3/25/2003	6	670-686	16	17	200	Permeable Granular Dolostone & Clay	UFA	Butler	**13.32***	Slight Drawdown in HW during Airlifting
3/27/2003	7	710-736	26	14	200	Fossiliferous Dolostone	UFA	Butler	**7.10***	Slight Drawdown in HW casing annulus
4/2/2003	8	720-786	66	21	200	Dolostone with Dolosilt lenses	UFA/confining unit	Butltler	**2.58***	Good Packer Set
4/8/2003	9	853-886	33	12	200	Dolosilt,soft	mid semi-confining unit	KGS	1.68	Hole not making much water
4/11/2003	10	926-956	30	15	200	Dolostone with Dolosilt lenses	mid semi-confining unit	WQ	WQ	Good Packer Set
4/15/2003	11	981-1011	30	5	200	Dolosilt, clayey	mid semi-confining unit	WQ	WQ	
4/17/2003	12	1000-1031	31	7	200	Dolostone & Dolosilt	mid semi-confining unit	KGS	0.67	Good Packer Set
4/18/2003	13	1021-1051	30	7	200	Dolostone-Crystals in fractures	mid semi-confining unit	WQ	WQ	Good Packer Set
4/22/2003	14	1040-1071	31	13	200	Hard Dolostone	mid semi-confining unit	KGS	0.71	Good Packer Set
4/29/2003	15	1100-1136	36	0.6	200	Dolostone & Evaporites	middle confing unit	KGS	0.04	Good Packer Set, Very Low Pump rate
5/6/2003	16	1196-1226	30	<0.5	200	Dolostone & Evaporites	middle confing unit	KGS	0.01	Good Packer Set-after it was repaired
5/12/2003	17	1256-1286	30	15	200	Permeable Dolostone	LFA	Butltler	**2.86***	Good Packer Set
5/21/2003	18	1351-1381	30	18	200	Fractured Dolostone, Hard, Dense	LFA	Butler	**2.54***	Good Packer Set
5/30/2003	19	1456-1486	30	8	240	Hard, Dense, Tight, Dolostone & Evaporites	confining unit	KGS	0.84	Good Packer Set

hydraulilc.xls

[1] Values obtained from AQTESOLV slug test analysis

NR=Not Recorded

WQ=Only water quality sample was taken, No slug test was performed

*** hydraulic conductivity values for high-*K* zones are underpredicted with NQ packer**

FIGURES

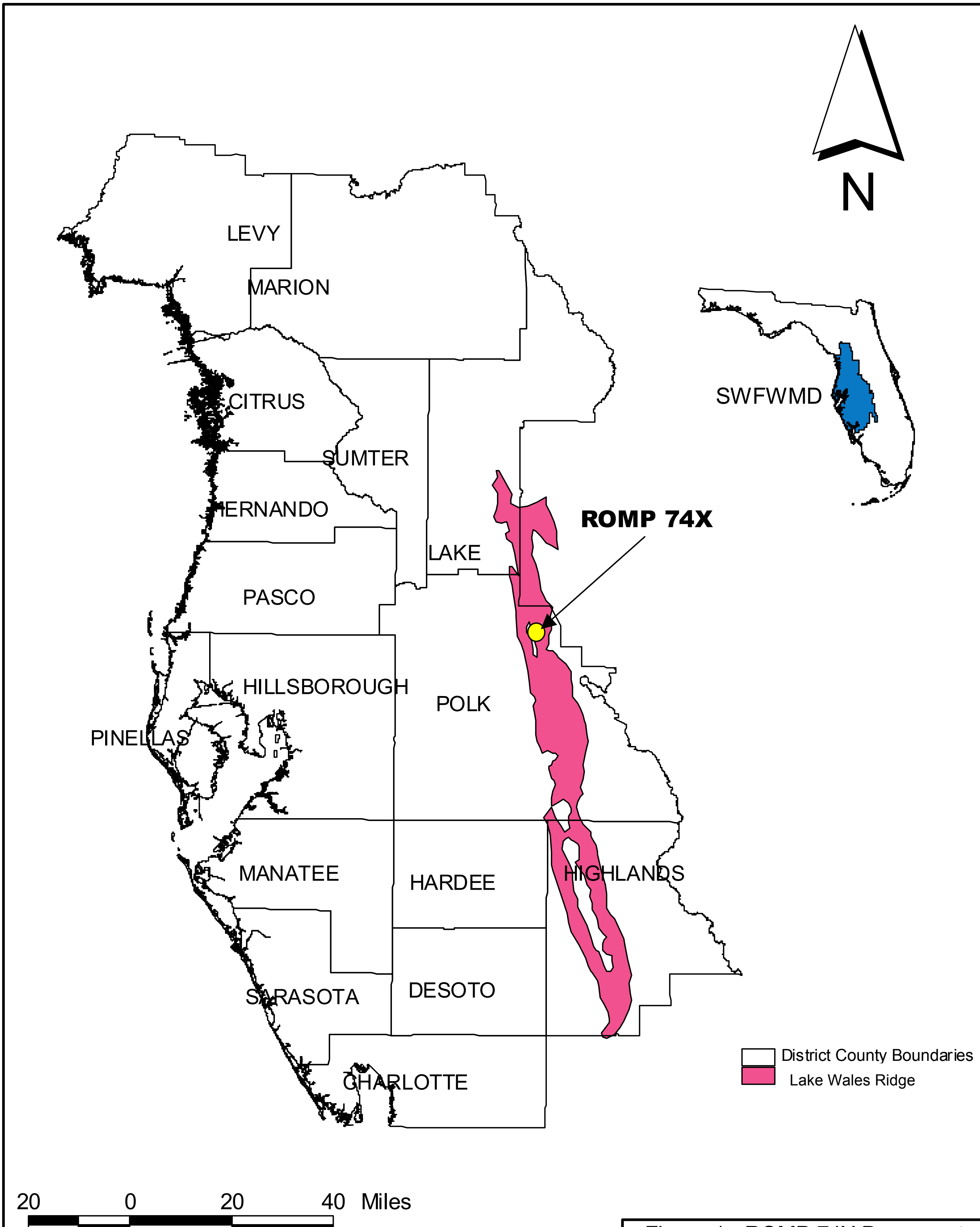
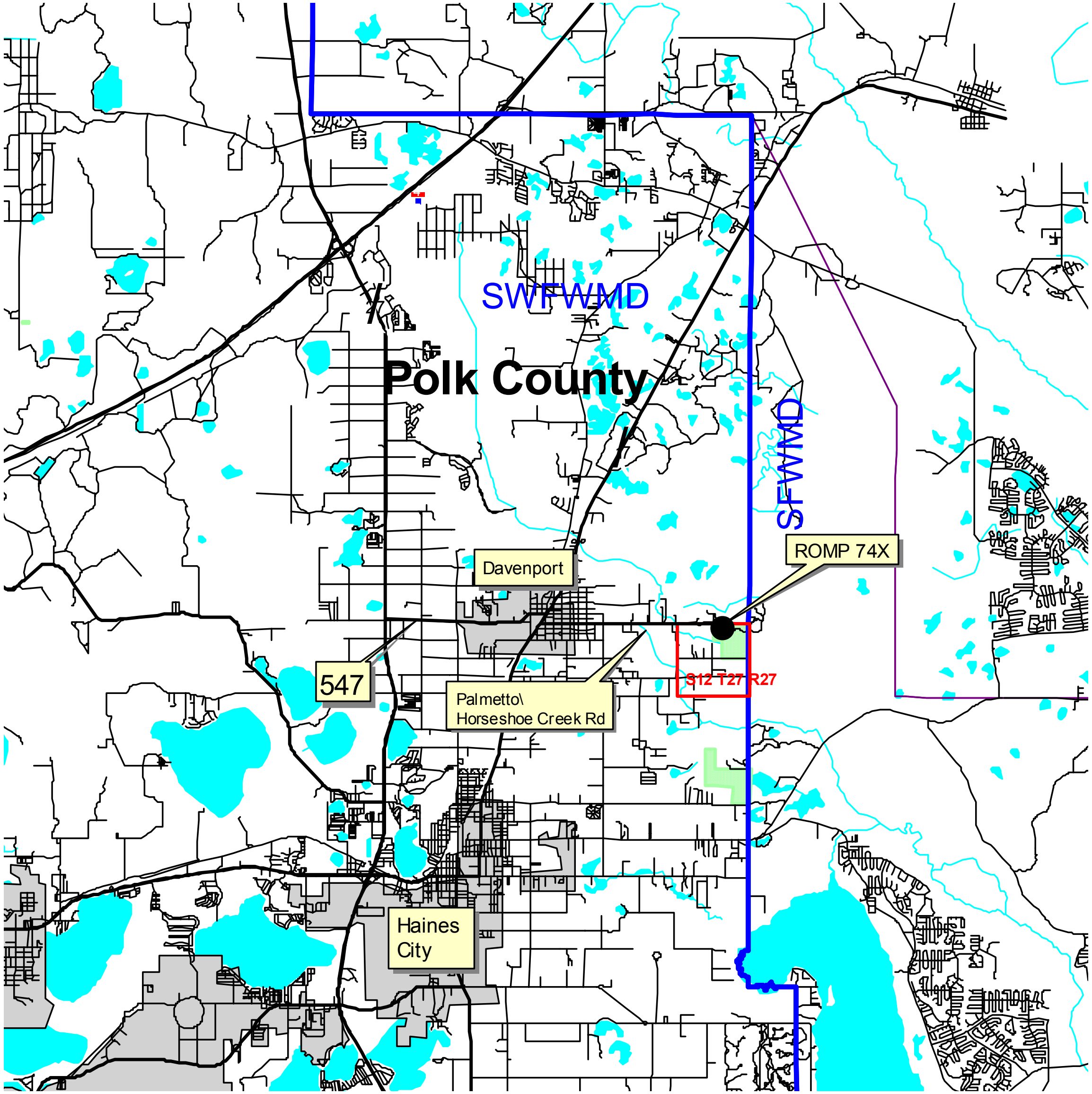
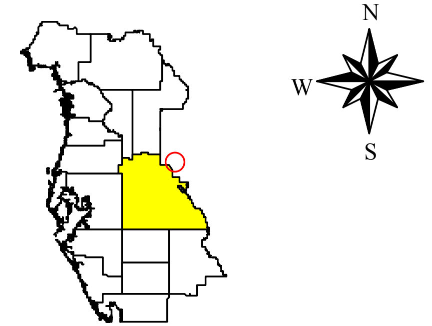


Figure1.ppt

Figure 1. ROMP 74X Davenport

General Location Map





Section: NW 1/4 of the NE 1/4 of S 12
Township: 27 South
Range: 27 East
Elevation: ~85 feet NGVD
Lattitude: 28 09 25.96
Longitude: 81 35 55.28
Davenport Quadrangle

LWDT

Water Management Districts
Major Roads
Water Management Districts
Detailed Roads
City Boundaries
State County Boundaries
Distlands-Owned Lands - Fee
1:100,000 Streams
1:100,000 Lakes

Directions: From I-4 go south on Hwy 27 to State Rd 547. Go east on 547 to Hwy 17 in the city of Davenport. Go south on Hwy 17 ~2 blocks to Palmetto St. Go East on Palmetto (Palmetto becomes Horshoe Creek Rd) for approximately 3 miles to the Lake Marion Creek Wildlife Management Area (WMA). Wellsite is located just inside the Lake Marion Creek WMA gate.

3 0 3 6 Miles

figure2.apr *Figure2.ppt*

Figure 2. ROMP 74X Davenport

Project Location Map

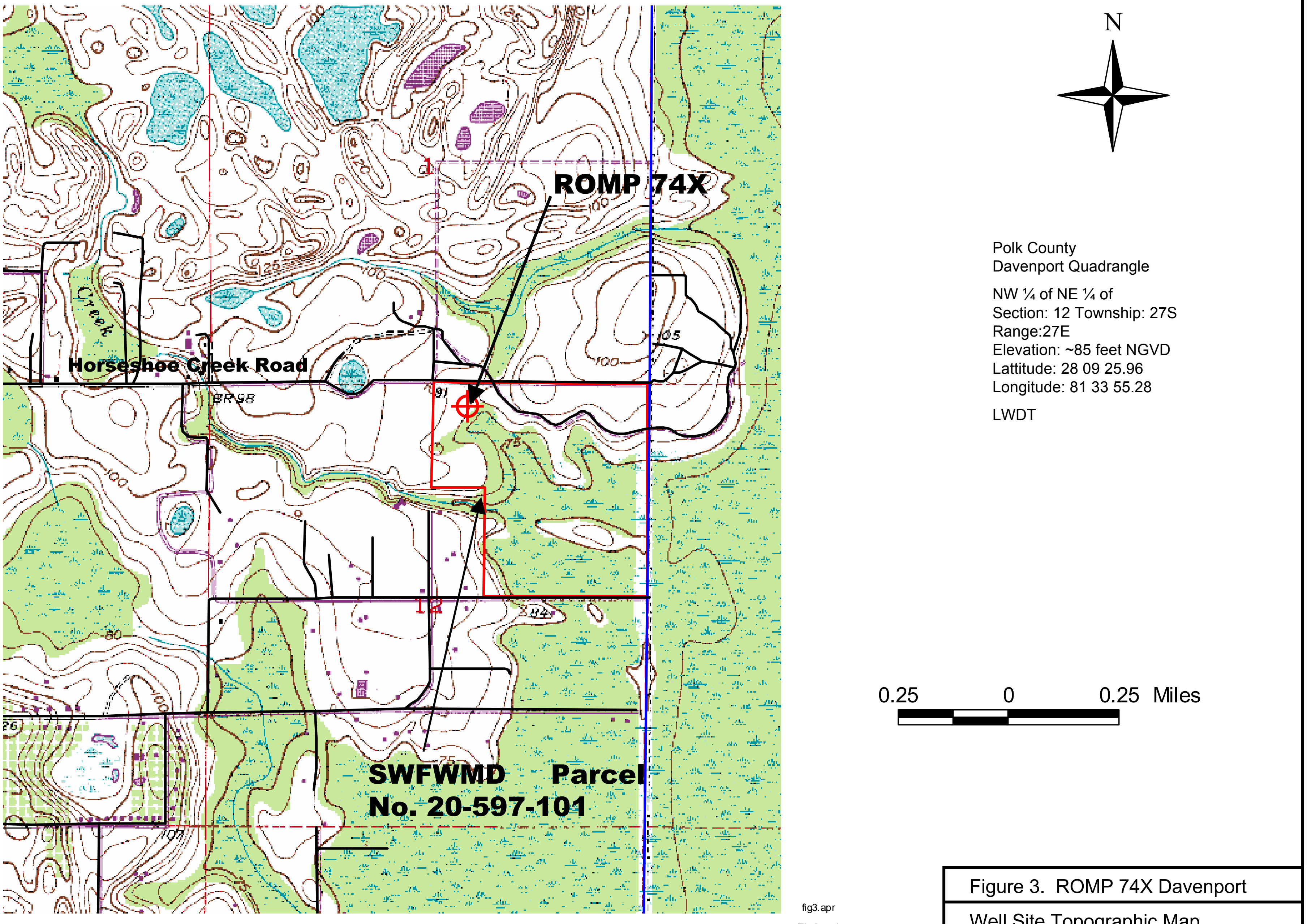
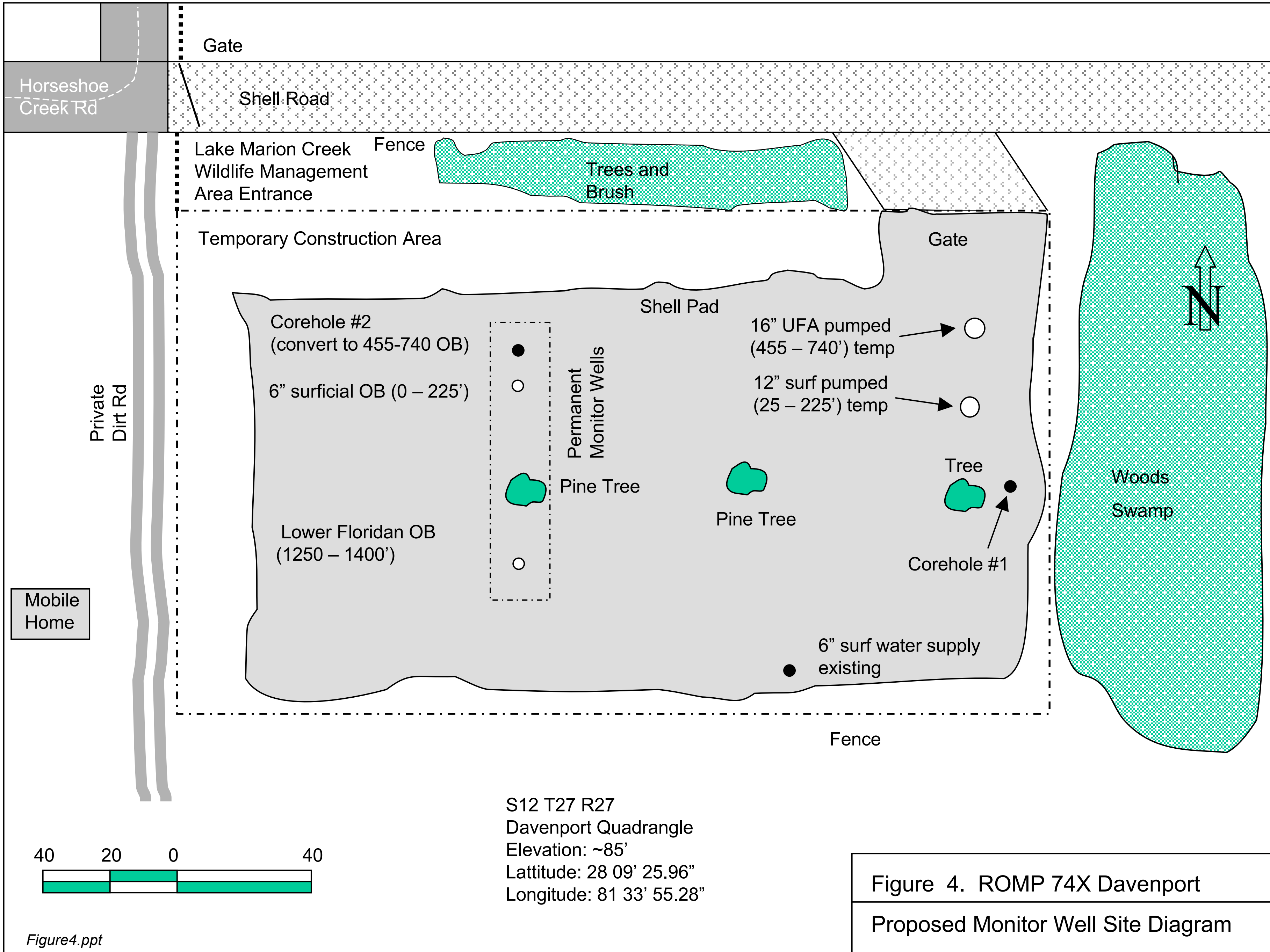


Figure 3. ROMP 74X Davenport

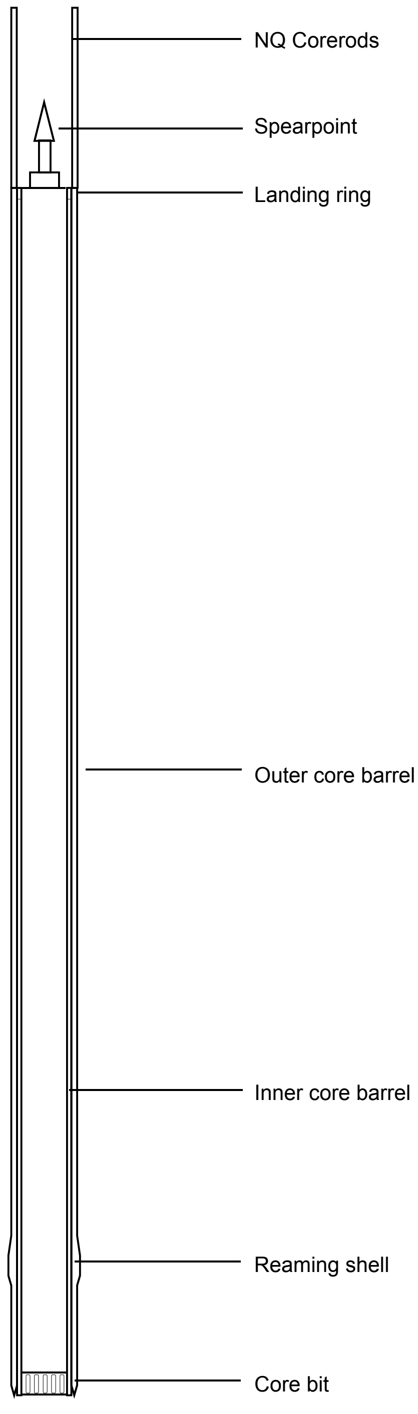
Well Site Topographic Map



S12 T27 R27
Davenport Quadrangle
Elevation: ~85'
Lattitude: 28 09' 25.96"
Longitude: 81 33' 55.28"

Figure 4. ROMP 74X Davenport

Proposed Monitor Well Site Diagram



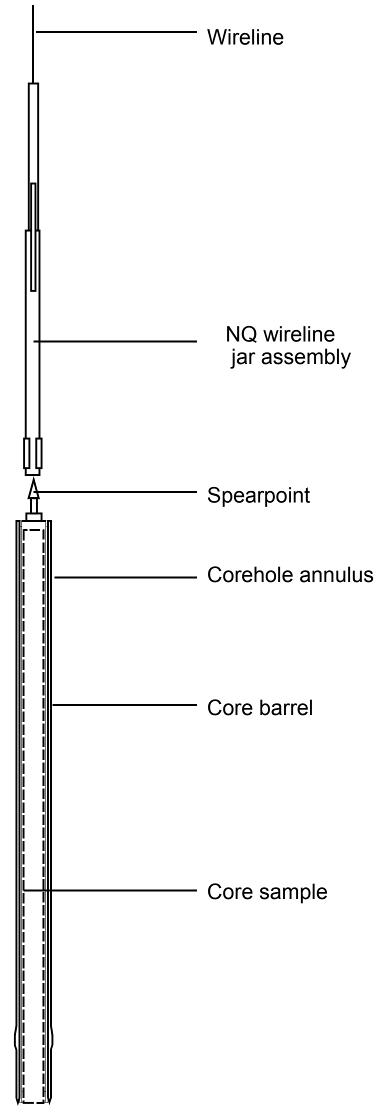


Figure 5. ROMP 74X Davenport

Wire-line Coring Apparatus

Coringapparatus-mtg.wpg

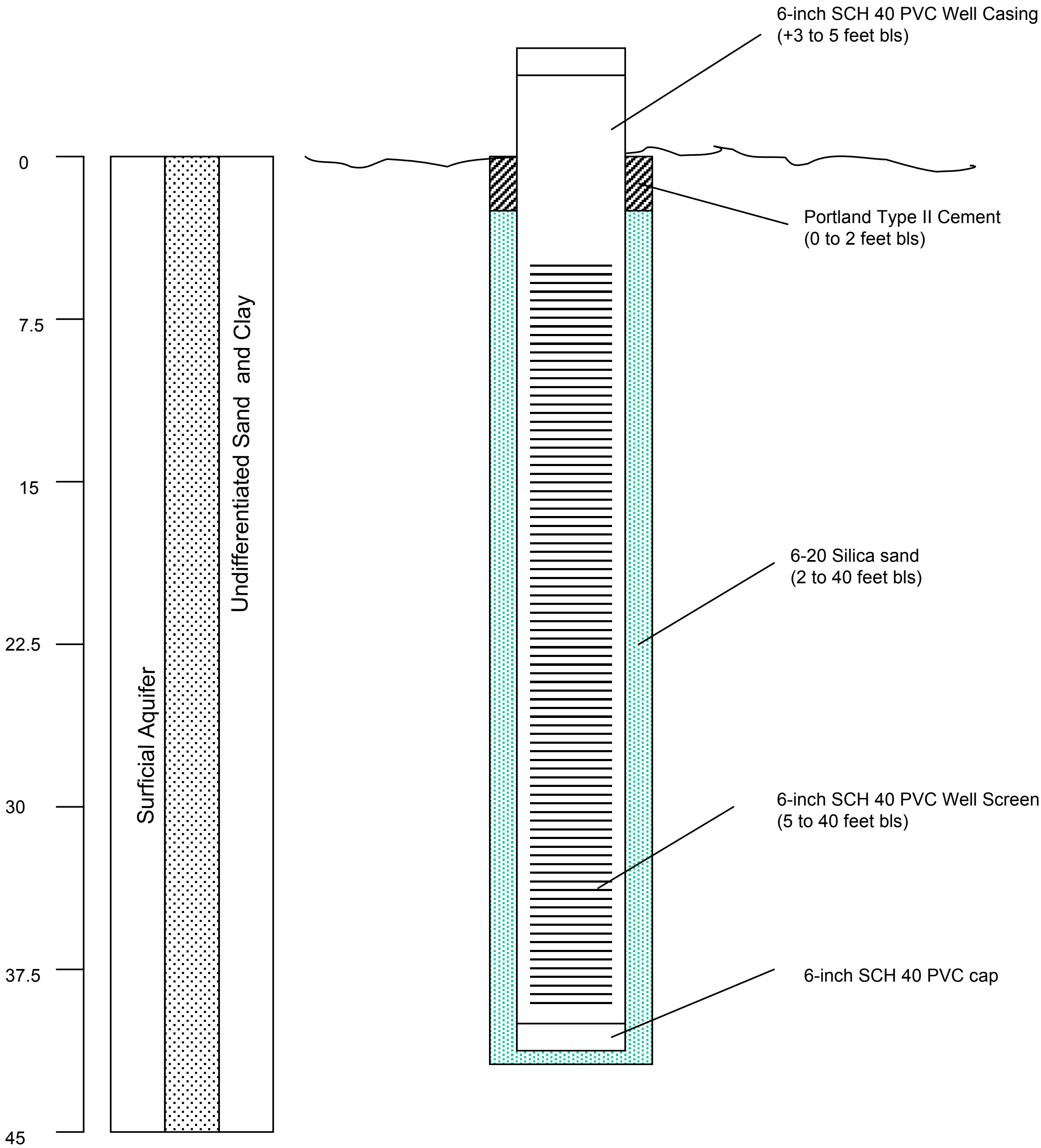
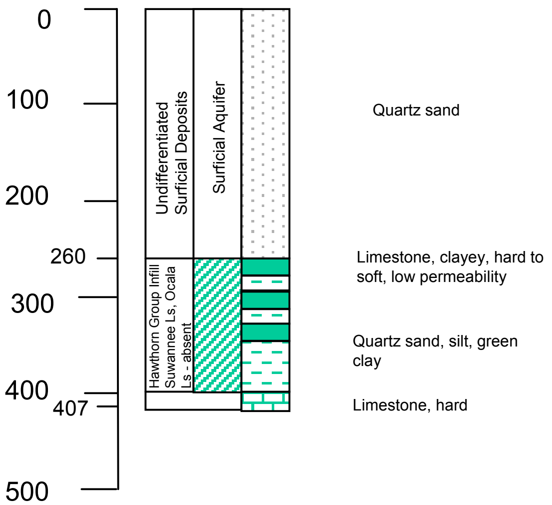


Figure 6. ROMP 74X Davenport

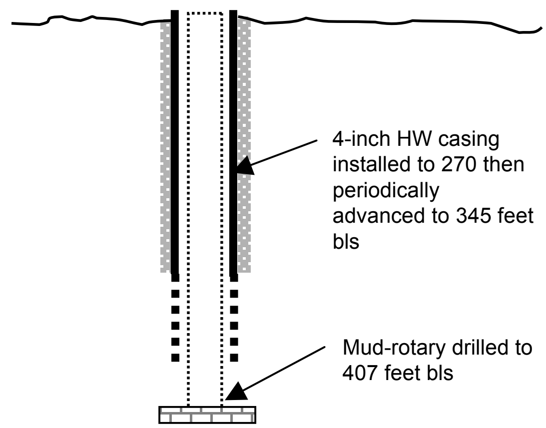
Surficial Water Supply Well As-Built

Figure6.ppt

December 23, 2003



Corehole #1 (East side of easement)



Note:

Split spoon samples collected from 0 - 40 feet BLS
Drill cuttings collected from 40 - 270 feet BLS
Core collected from 270 - 338 feet BLS
Drill cuttings collected from 338 - 407 feet BLS

S/T/R: 12/27/27

Lattitude: 28 09 25.96

Longitude: 81 35 55.28

WCP#: 673702.02

Figure7.ppt
12/23/2003

Figure 7. ROMP 74X Davenport

Core-hole No. 1 Configuration

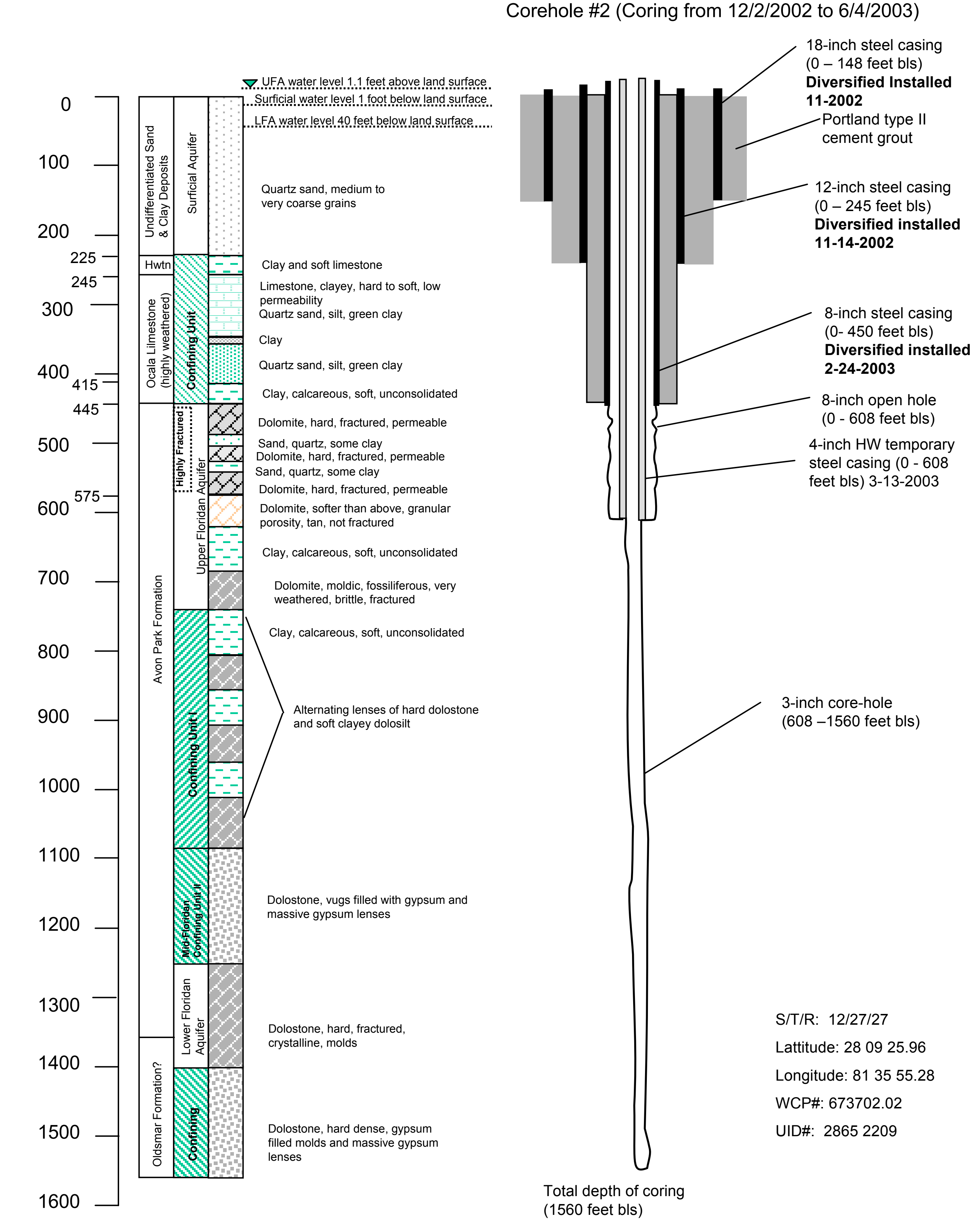


Figure 8. ROMP 74X Davenport

Core-hole No. 2 Configuration

Figure8.ppt

Updated: 12/23/2003

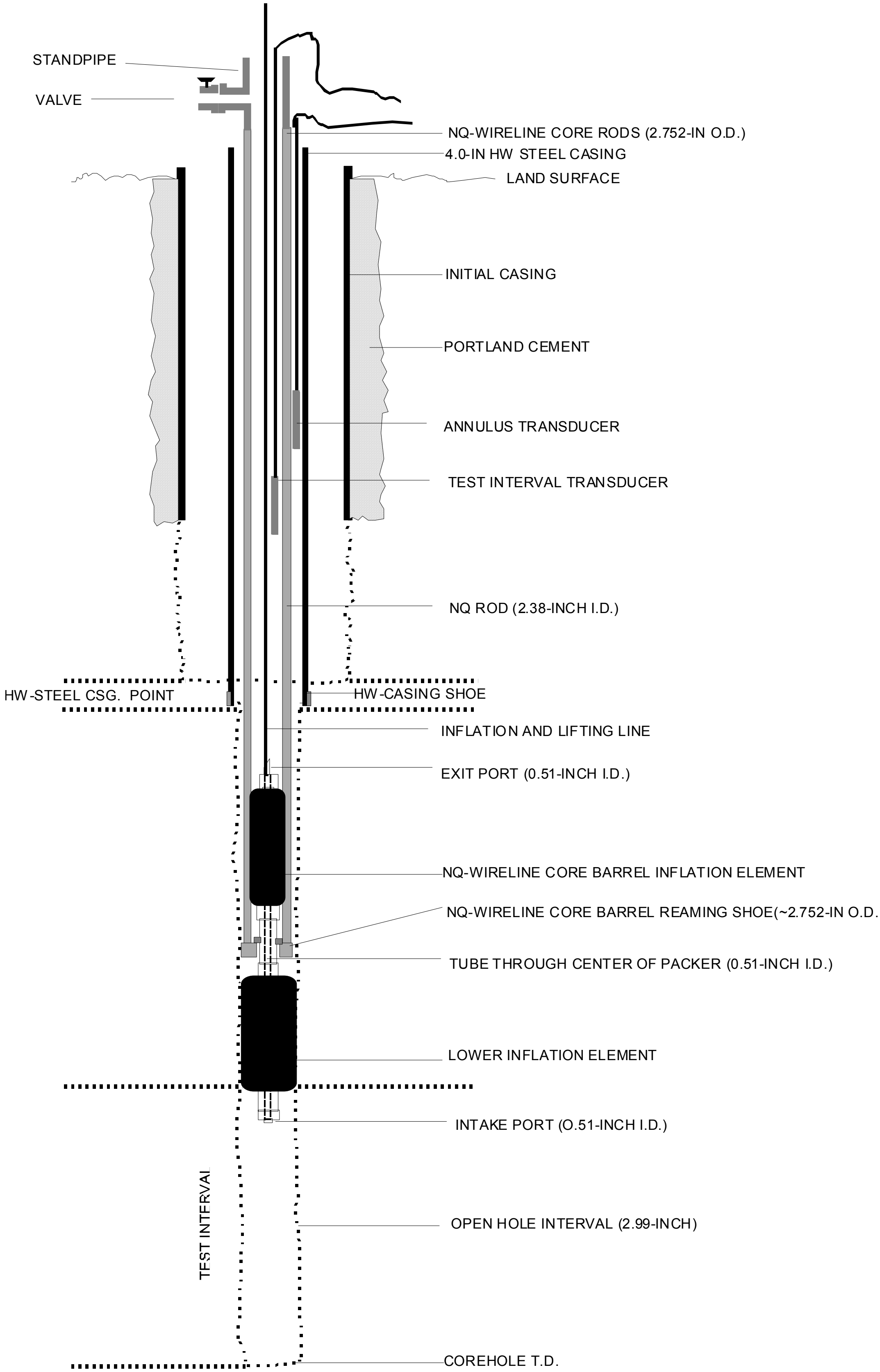
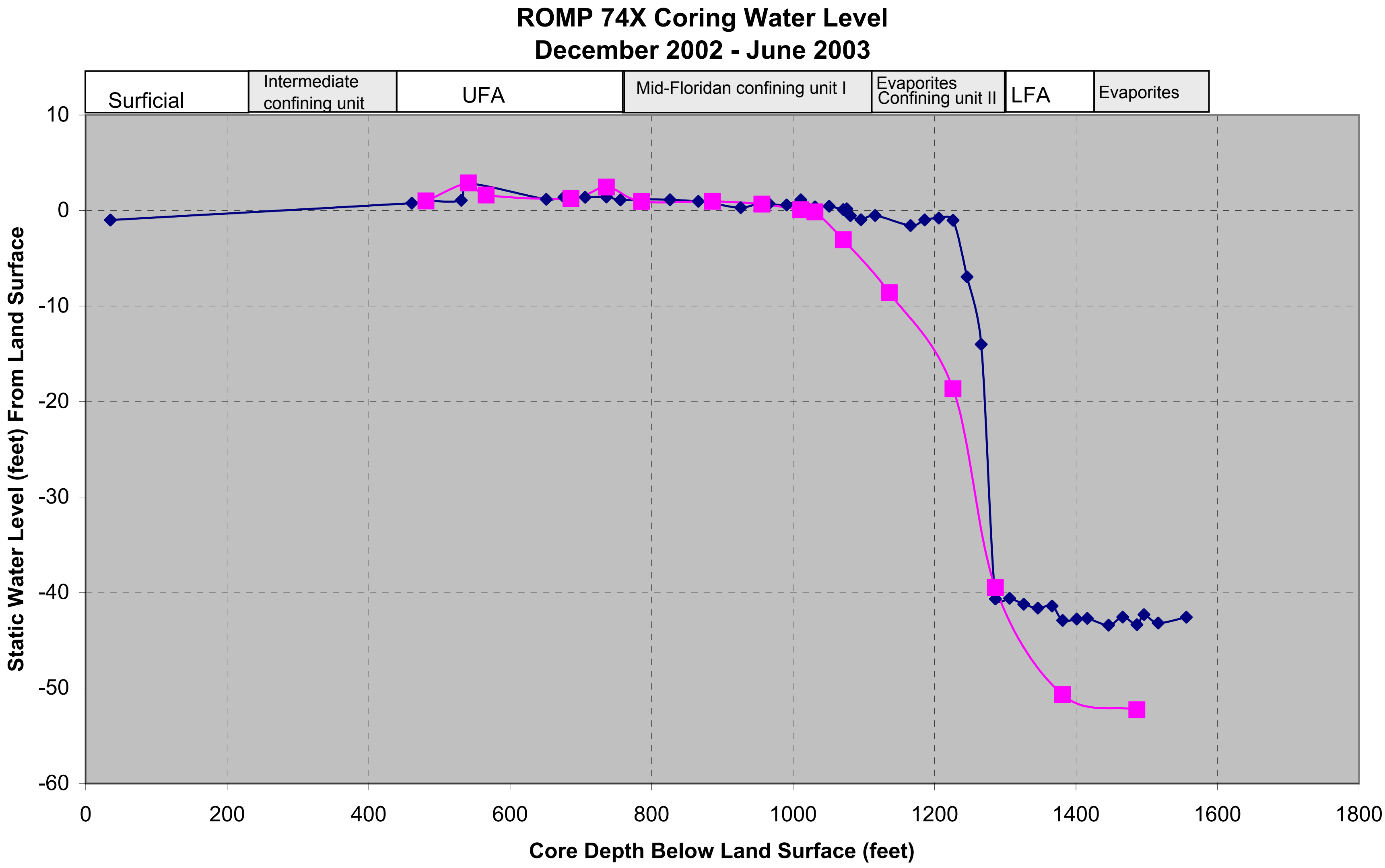


Figure 9. ROMP 74X Davenport

Wire-line NQ Packer Diagram

Nqpacker.ppt



core_wl.xls

Figure 10. ROMP 74X Davenport
Corehole Water Level Graph

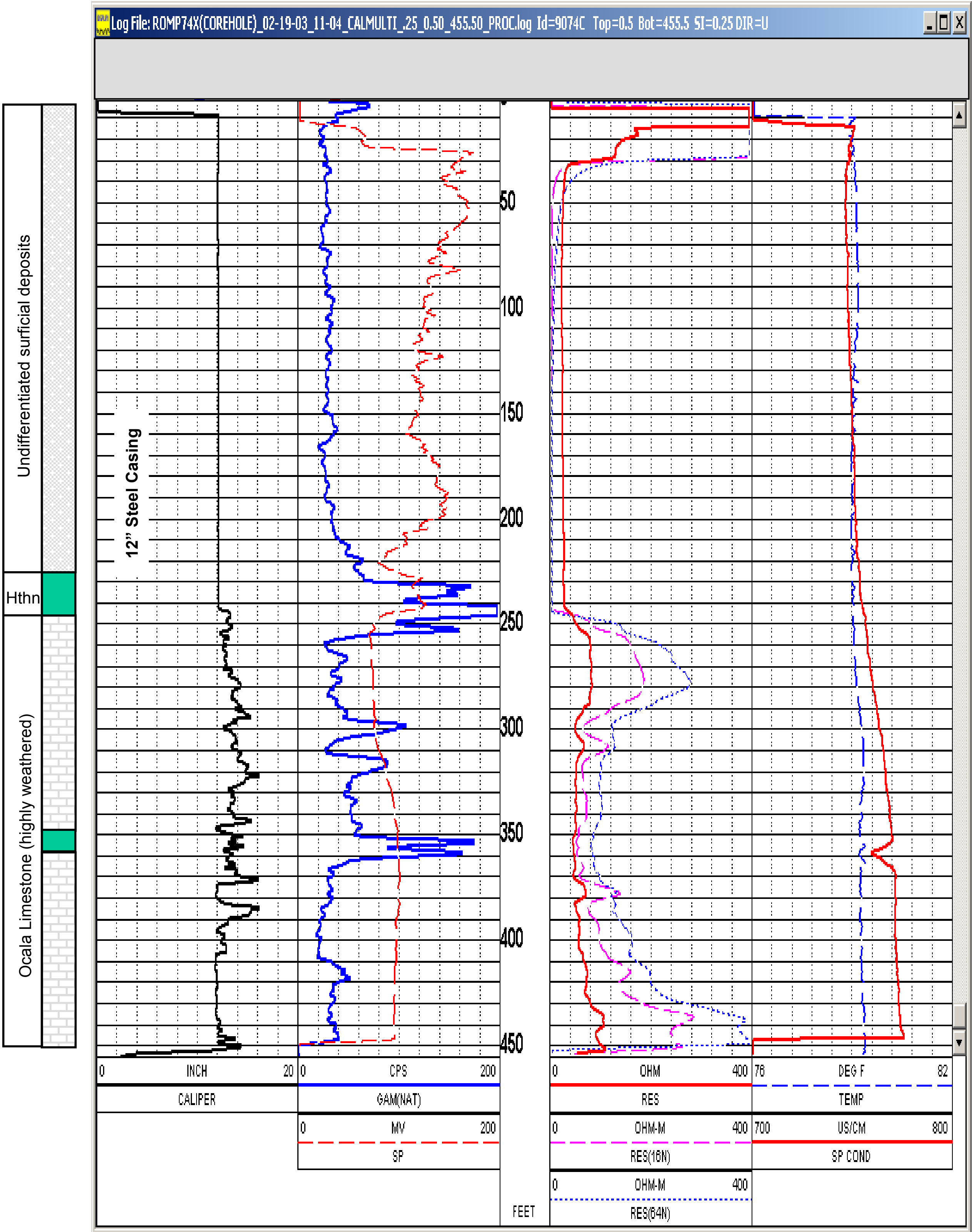


Figure 11. ROMP 74X Davenport Geophysical Logs (0 – 450 Feet bls)

R74X…\figure11.ppt

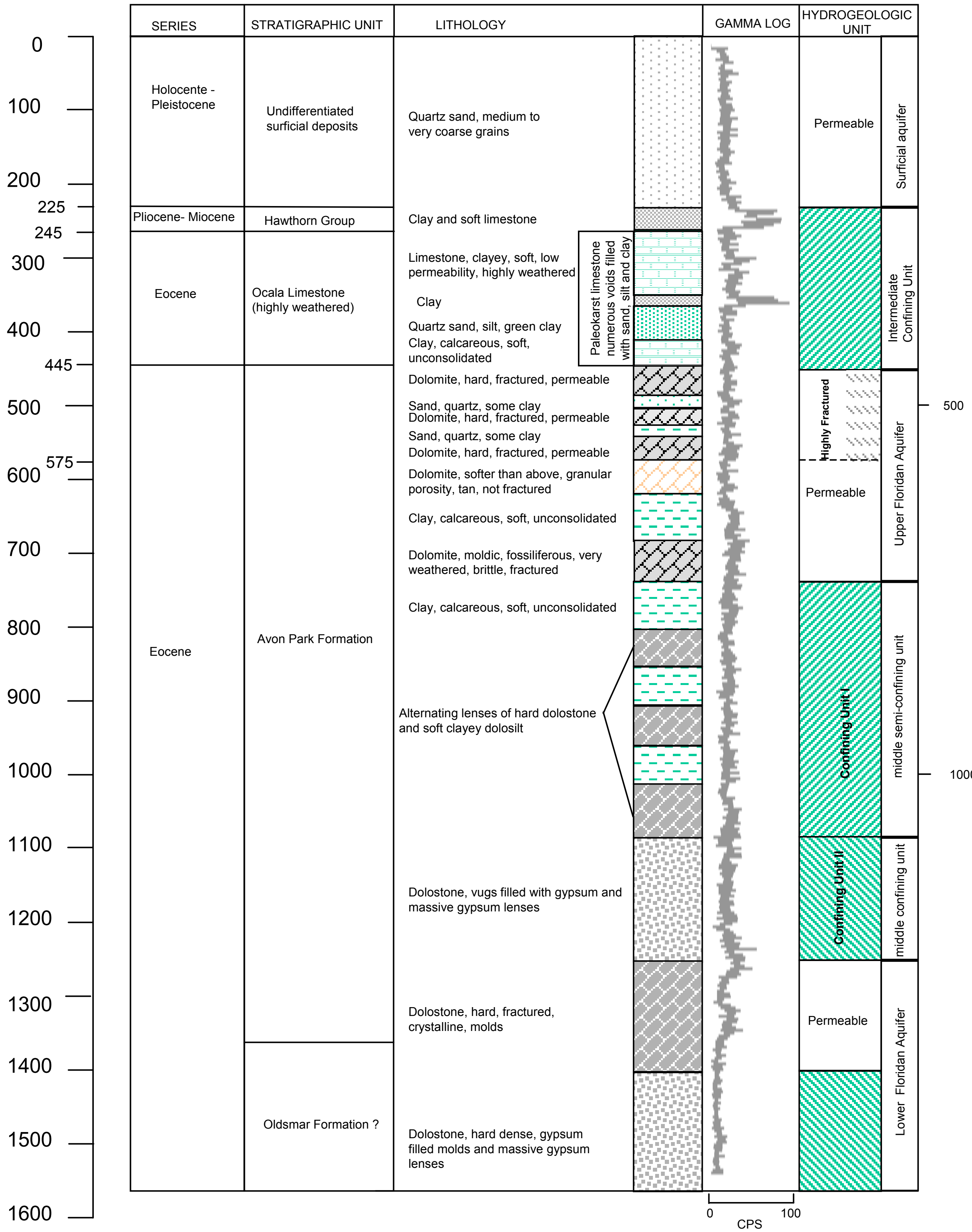
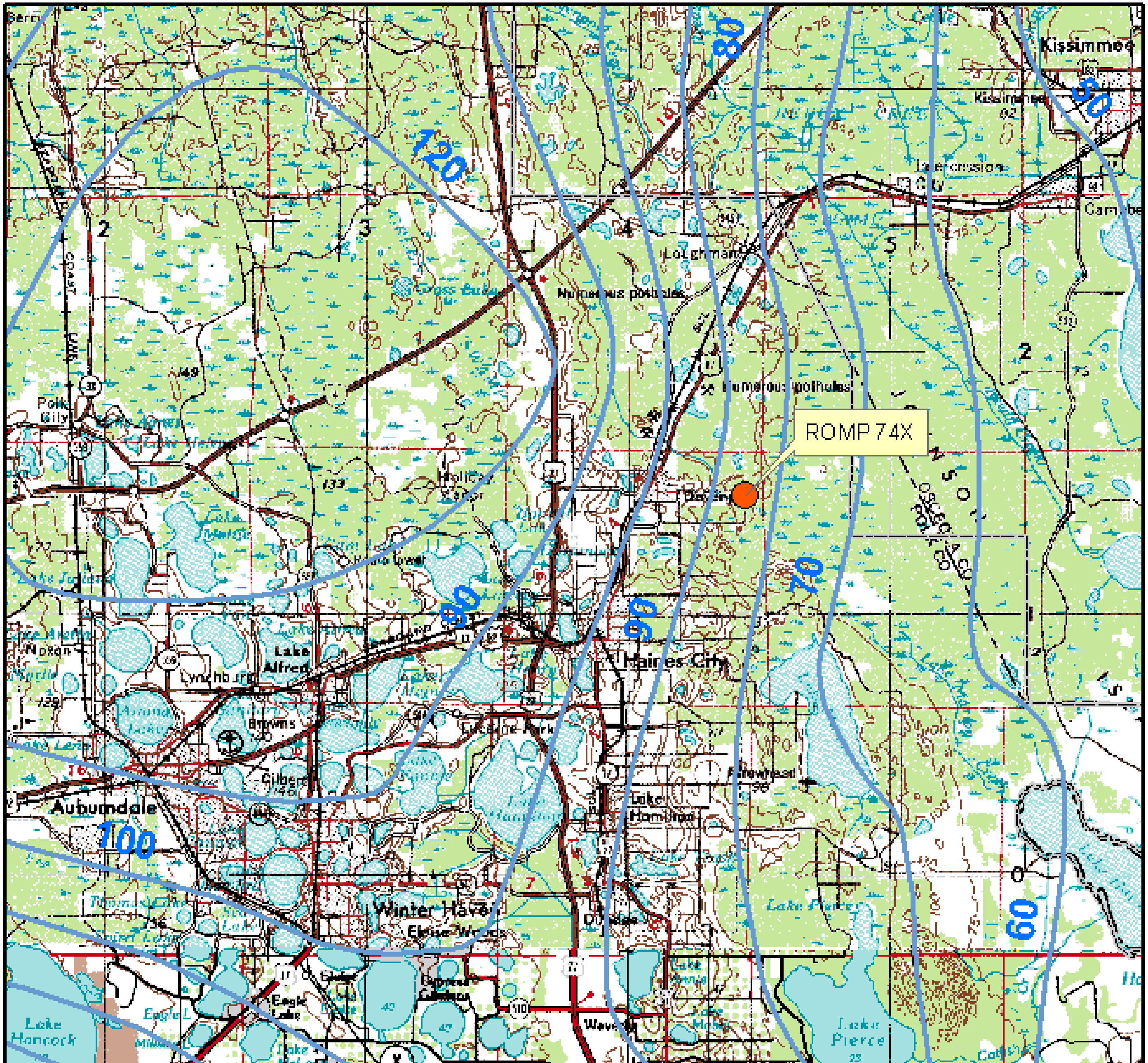


Figure 12. ROMP 74X Davenport

Hydrogeology

Figure12.ppt

Updated: 12/23/2003



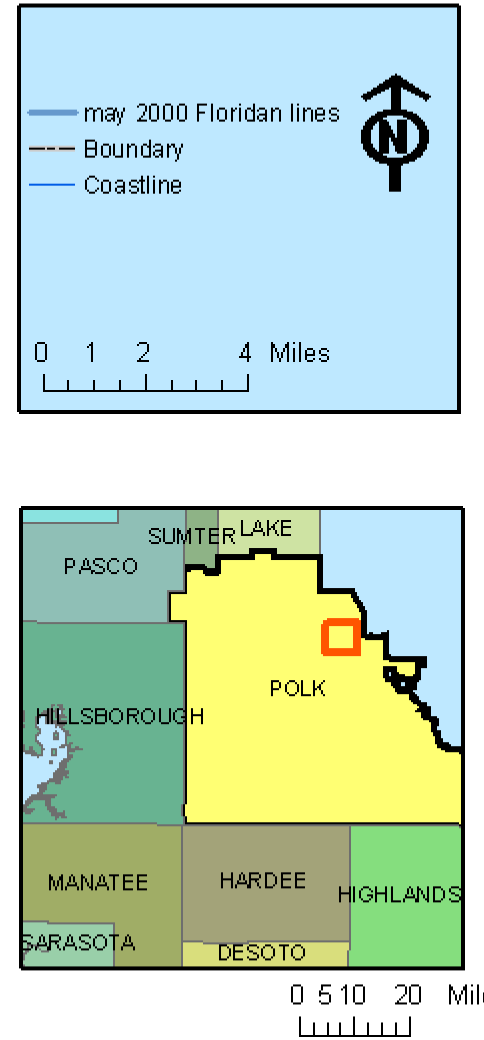
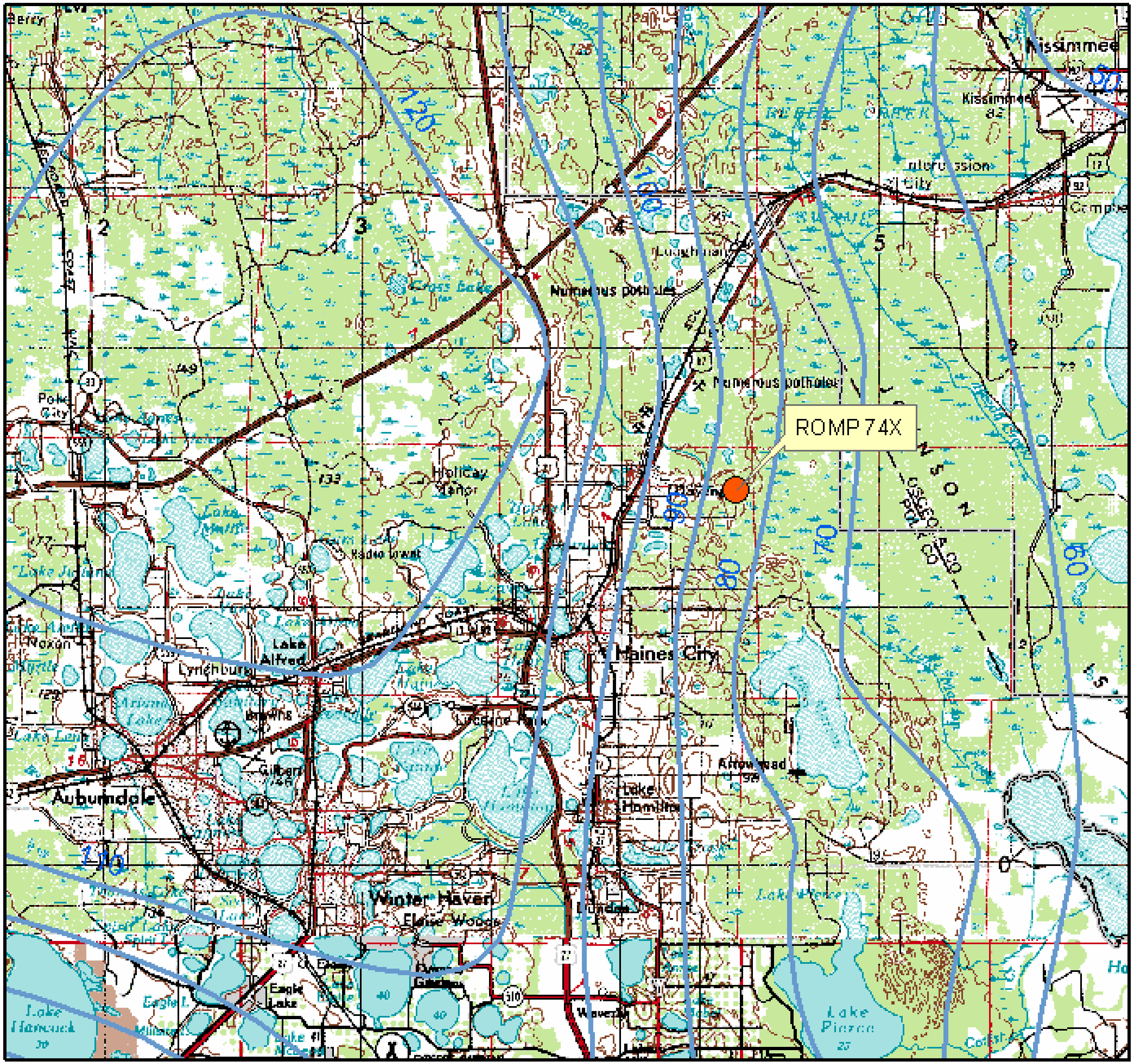
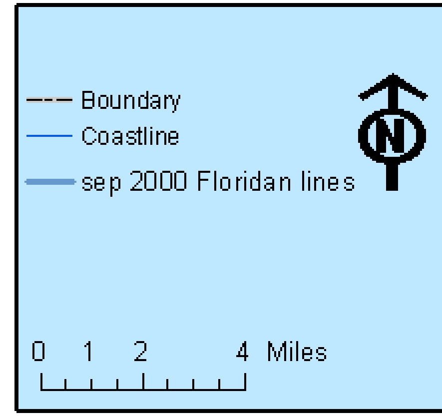


Figure 13. ROMP 74X Davenport

Potentiometric Surface of the UFA for May 2000.





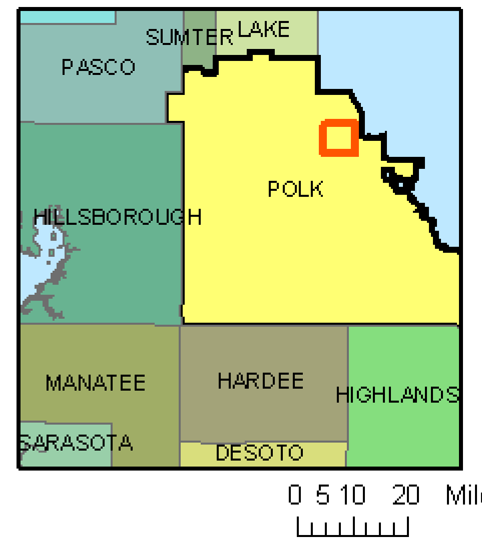
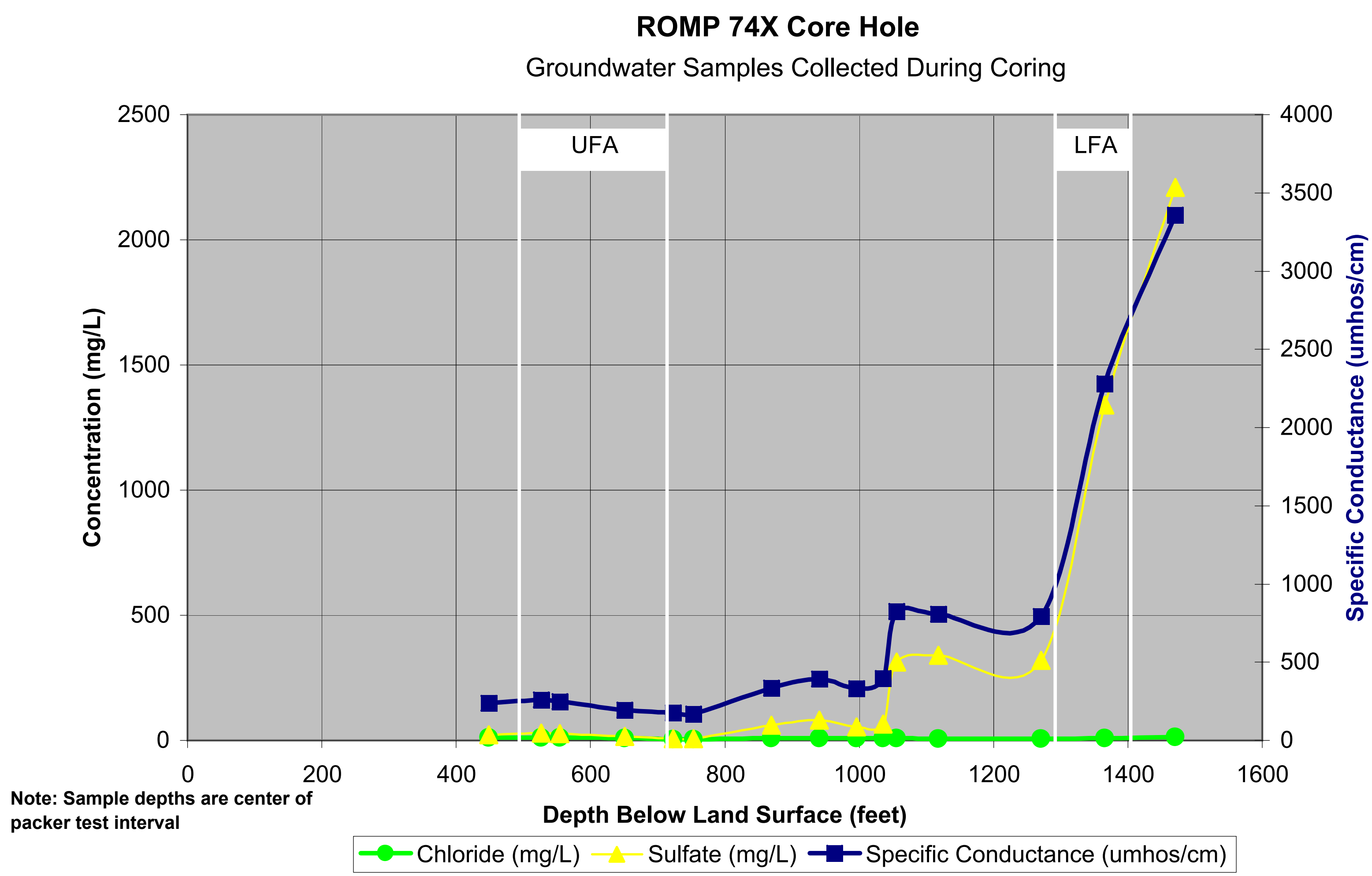


Figure 14. ROMP 74X Davenport

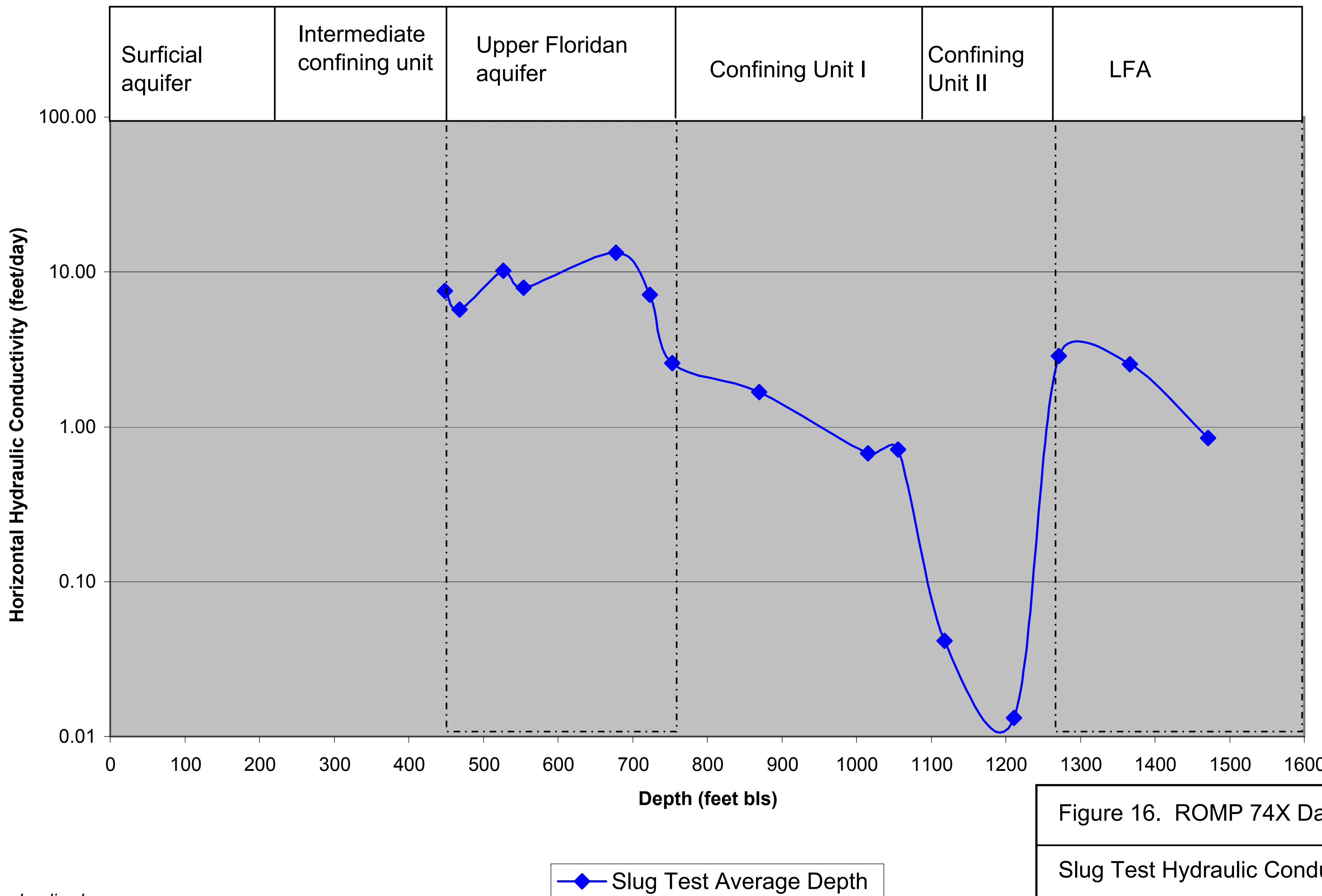
Potentiometric Surface of the UFA for September 2000.



Note: Sample depths are center of packer test interval

core_wq.xls

Figure 15. ROMP 74X Davenport
Chloride, Sulfate, Specific Conductance Graph



hydraulic.xls

Figure 16. ROMP 74X Davenport

Slug Test Hydraulic Conductivity Graph

APPENDIX A
Lithologic Log

S or N	E or W	ELEV. (Feet)	No.	From	DATE of COMPLETION (Year / Month / Day)	CORE	GEOPHYSICAL LOGS

1 — 1560P0275 27E12 NW NE 2809 25 813555 1560 85 0 1560 03 06 04 CU

WELL NUMBER Owner-No. (Driller)

W-

2 — ROMP74X DAVENPORT LWDT

REMARKS (For example: Geologist's name, date worked, sample quality, etc.)

W-

3 — GEOLOGIST: TED GATES - SWFWMD; SCOTT KUTZA - SWFWMD; CAROL SMITH - SWFWMD

DRILLERS: EARL YOUNG, GEORGE DEGROOT

DRILL METHOD: WIRE-LINE CONTINUOUS CORING; HOLLOW-STEM AUGER 0- FT BLS

START DATE: 8-13-2002 END OF CORING: 6-04-2003

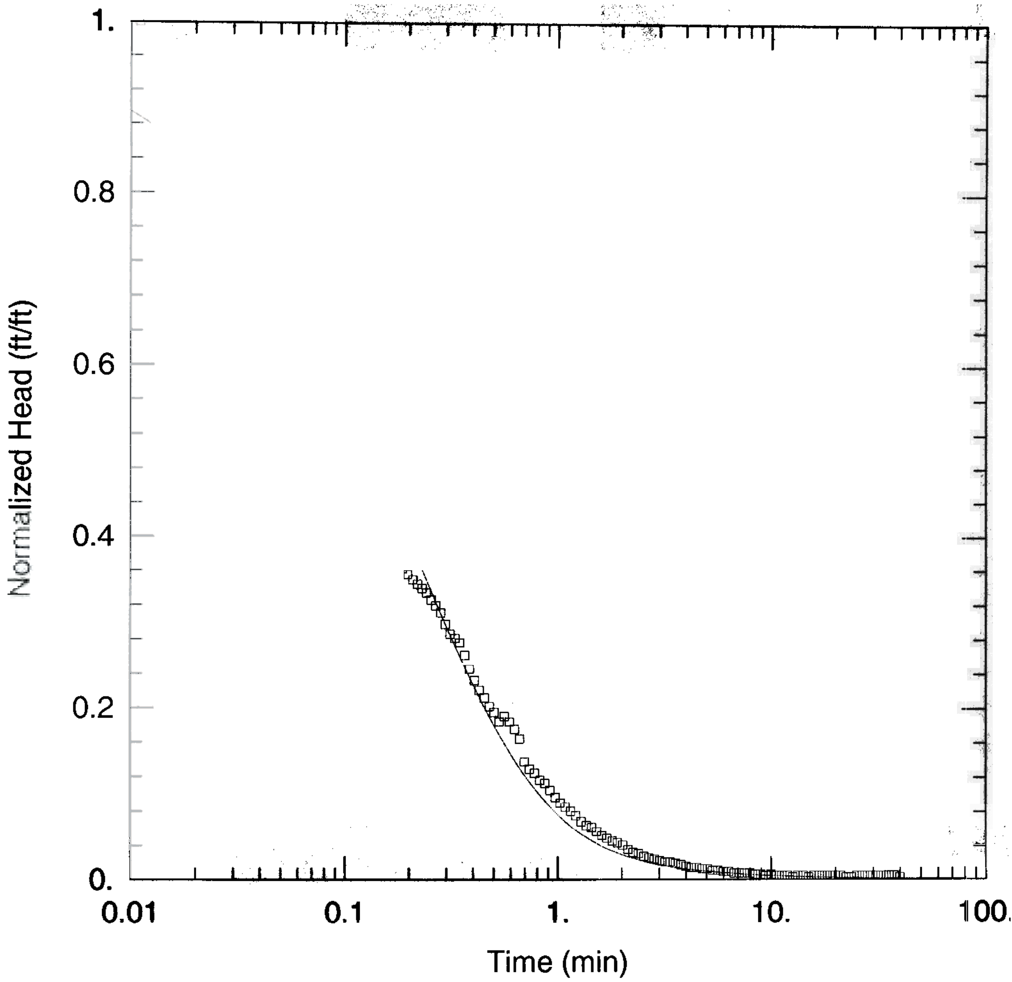
PROPERTY LOCATION: LAKE MARION CREEK ~~WATER MANAGEMENT~~ WILDLIFE MANAGEMENT AREA

4 —

090UDSC	00-	2250	Undifferentiated sand and clay
122HTRN	2250-	2450	Hawthorn Formation
124OCAL	2450-	4450	Ocala Limestone
124AVPK	4450-	13500	Avon Park Formation
	13500-		Oldsmar Formation

APPENDIX B

Slug Test Curve Analyses



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt436-461.aqt
Date: 11/13/03 Time: 08:48:43

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT436-461
Test Date: 12/16/2002

AQUIFER DATA

Saturated Thickness: 290. ft

WELL DATA (PT436-461)

Initial Displacement: 4.383 ft
Total Well Penetration Depth: 11. ft
Casing Radius: 0.099 ft

Static Water Column Height: 461. ft
Screen Length: 21. ft
Wellbore Radius: 0.12 ft

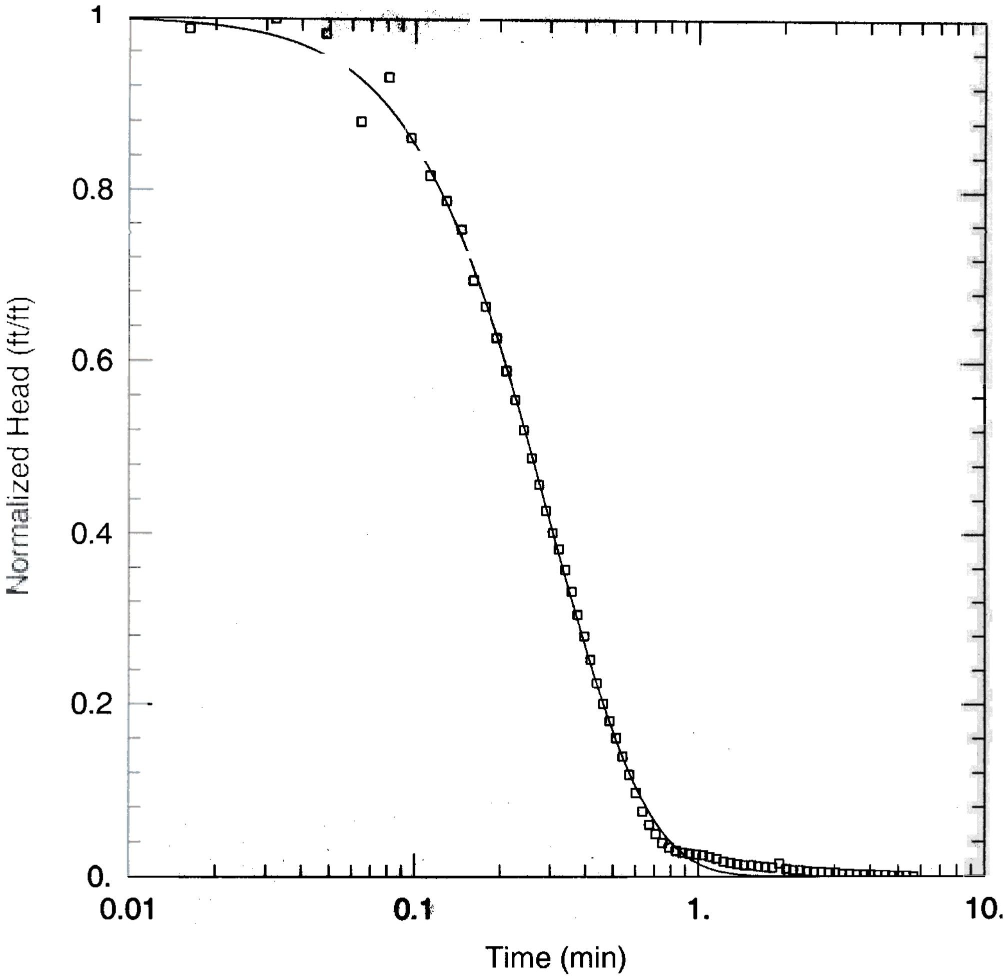
SOLUTION

Aquifer Model: Confined

Kr = 7.508 ft/day
Kz/Kr = 0.1

Solution Method: KGS Model

Ss = 0.000953 ft^{-1}



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt455-481.aqt
Date: 11/13/03 Time: 08:50:43

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT455-481
Test Date: 12/18/2002

AQUIFER DATA

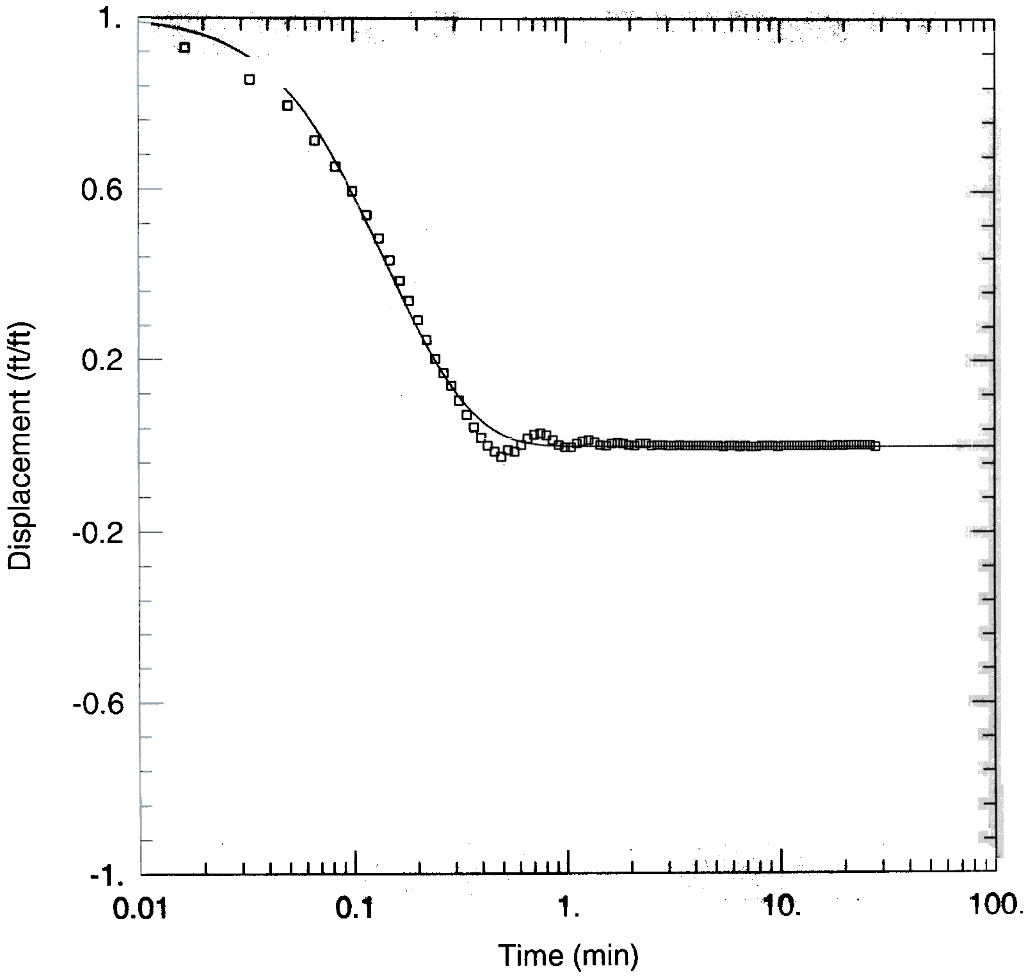
Saturated Thickness: 290. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (PT455-481)

Initial Displacement: 9.229 ft
Total Well Penetration Depth: 31. ft
Casing Radius: 0.099 ft
Static Water Column Height: 481. ft
Screen Length: 26. ft
Wellbore Radius: 0.12 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler
K = 5.727 ft/day
C(D) = 1.046



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt512-541.aqt
Date: 11/13/03 Time: 08:52:19

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT512-541
Test Date: 1/09/2003

AQUIFER DATA

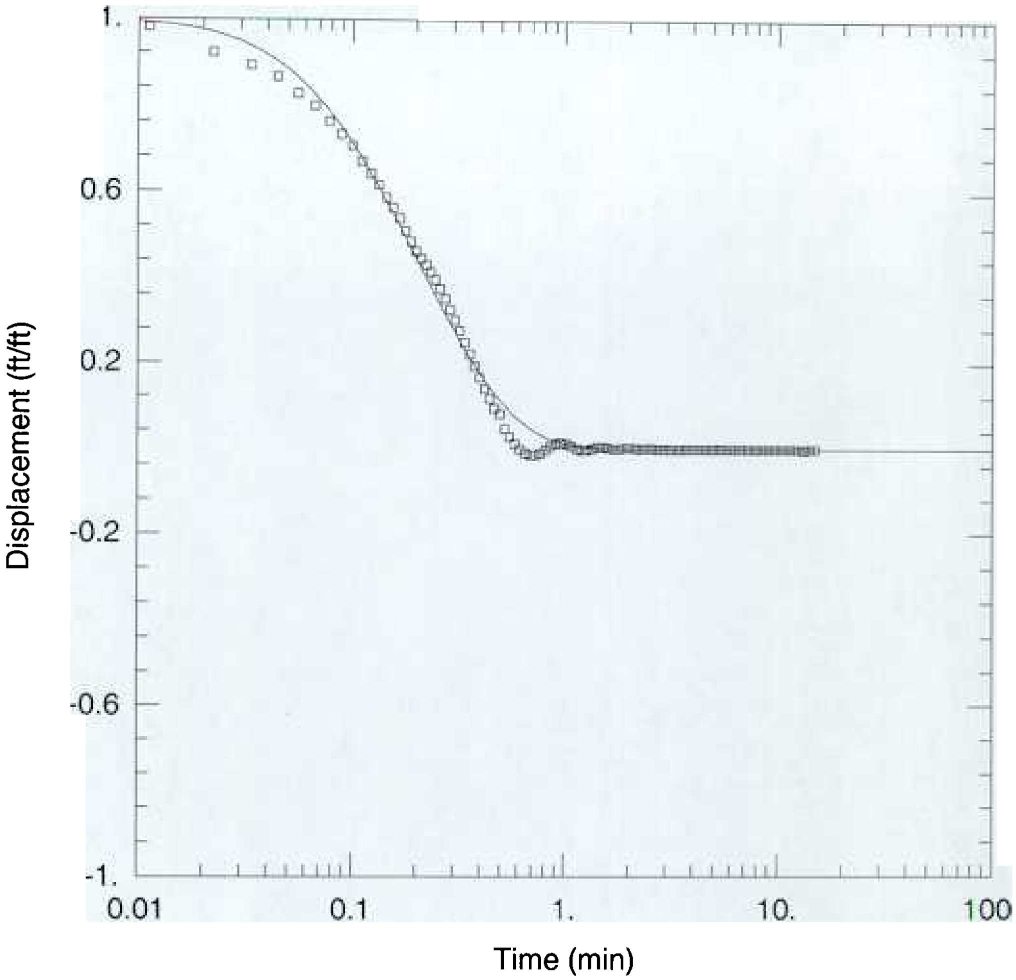
Saturated Thickness: 290. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (PT512-541)

Initial Displacement: 4.2 ft
Total Well Penetration Depth: 91. ft
Casing Radius: 0.099 ft
Static Water Column Height: 541. ft
Screen Length: 29. ft
Wellbore Radius: 0.12 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler
K = 10.18 ft/day
C(D) = 1.282



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt542-566.aqt
Date: 11/13/03 Time: 08:53:26

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT542-566
Test Date: 01/22/2003

AQUIFER DATA

Saturated Thickness: 290. ft
Anisotropy Ratio (Kz/Kr): 0.1

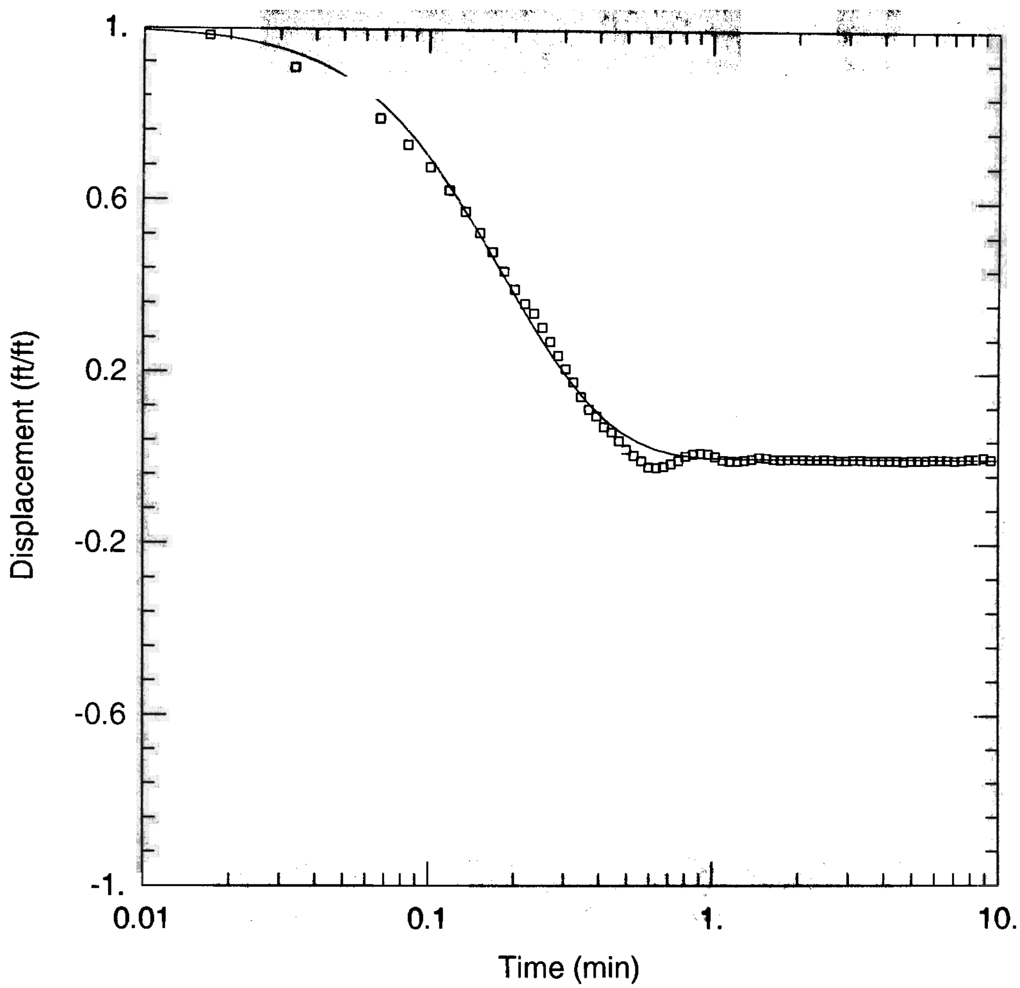
WELL DATA (PT542-566)

Initial Displacement: 8.526 ft
Total Well Penetration Depth: 116. ft
Casing Radius: 0.099 ft
Static Water Column Height: 566. ft
Screen Length: 24. ft
Wellbore Radius: 0.12 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 7.896 ft/day
C(D) = 1.579



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt670-686.aqt
Date: 11/13/03 Time: 08:55:01

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT670-686
Test Date: 3/25/2003

AQUIFER DATA

Saturated Thickness: 290. ft
Anisotropy Ratio (Kz/Kr): 0.1

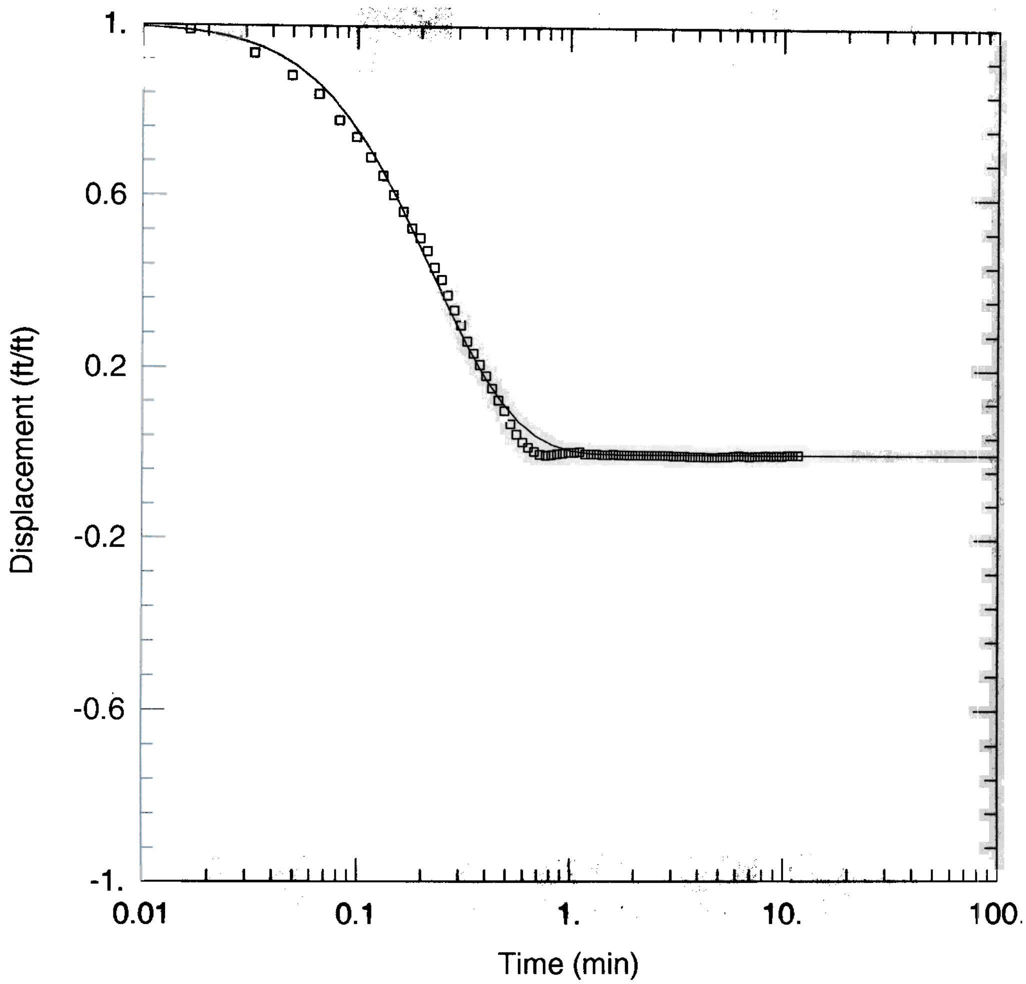
WELL DATA (PT542-566)

Initial Displacement: 5.6 ft
Total Well Penetration Depth: 116. ft
Casing Radius: 0.099 ft
Static Water Column Height: 566. ft
Screen Length: 16. ft
Wellbore Radius: 0.12 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 13.32 ft/day
C(D) = 1.164



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt710-736.aqt
Date: 11/13/03 Time: 08:56:30

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT710-736
Test Date: 3/27/2003

AQUIFER DATA

Saturated Thickness: 290. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (PT710-736)

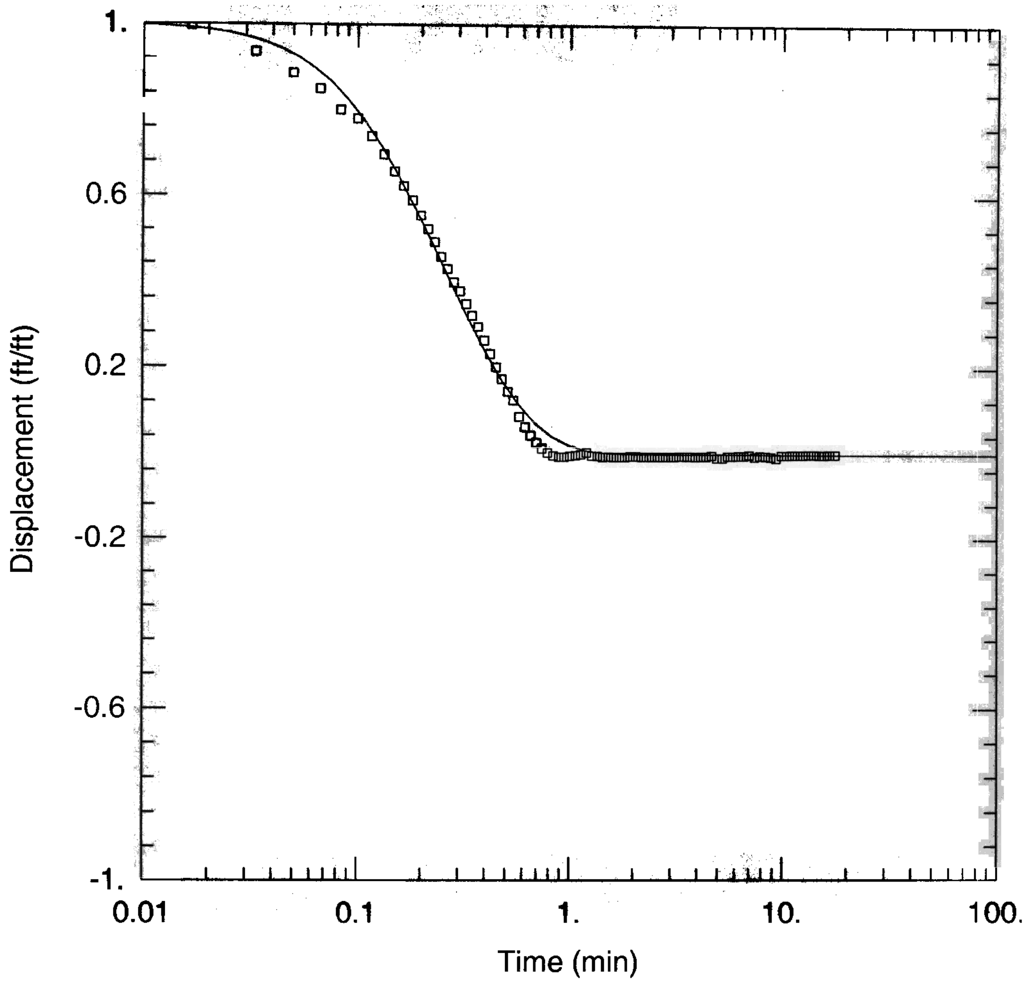
Initial Displacement: 5.9 ft
Total Well Penetration Depth: 286. ft
Casing Radius: 0.099 ft

Static Water Column Height: 736. ft
Screen Length: 26. ft
Wellbore Radius: 0.12 ft

SOLUTION

Aquifer Model: Confined
K = 7.102 ft/day

Solution Method: Butler
C(D) = 1.296



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt720-786.aqt
Date: 11/13/03 Time: 08:57:45

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT720-786
Test Date: 4/02/2003

AQUIFER DATA

Saturated Thickness: 66. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (PT720-786)

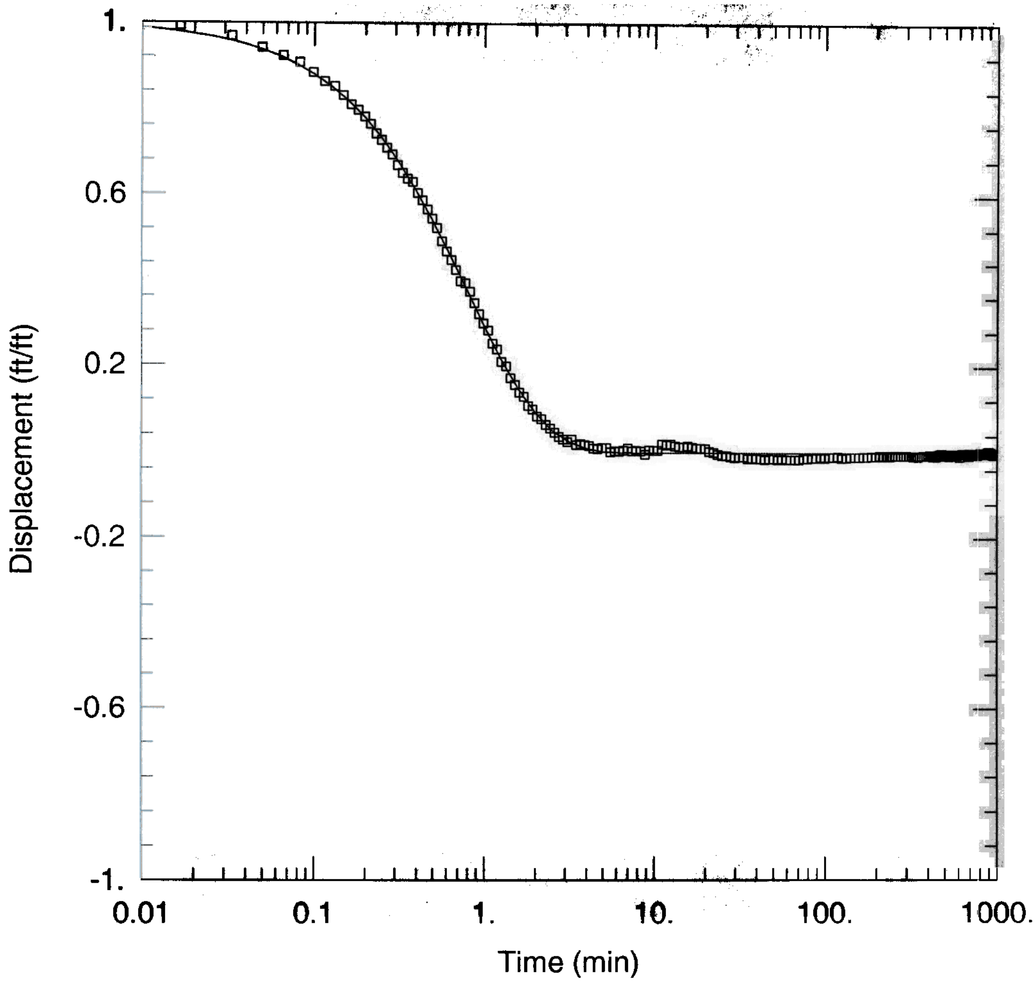
Initial Displacement: 9.5 ft
Total Well Penetration Depth: 66. ft
Casing Radius: 0.099 ft

Static Water Column Height: 786. ft
Screen Length: 66. ft
Wellbore Radius: 0.12 ft

SOLUTION

Aquifer Model: Confined
K = 2.578 ft/day

Solution Method: Butler
C(D) = 1.32



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt853-886.aqt
Date: 11/13/03 Time: 09:02:21

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT853-886
Test Date: 4/08/2003

AQUIFER DATA

Saturated Thickness: 510. ft

WELL DATA (PT853-886)

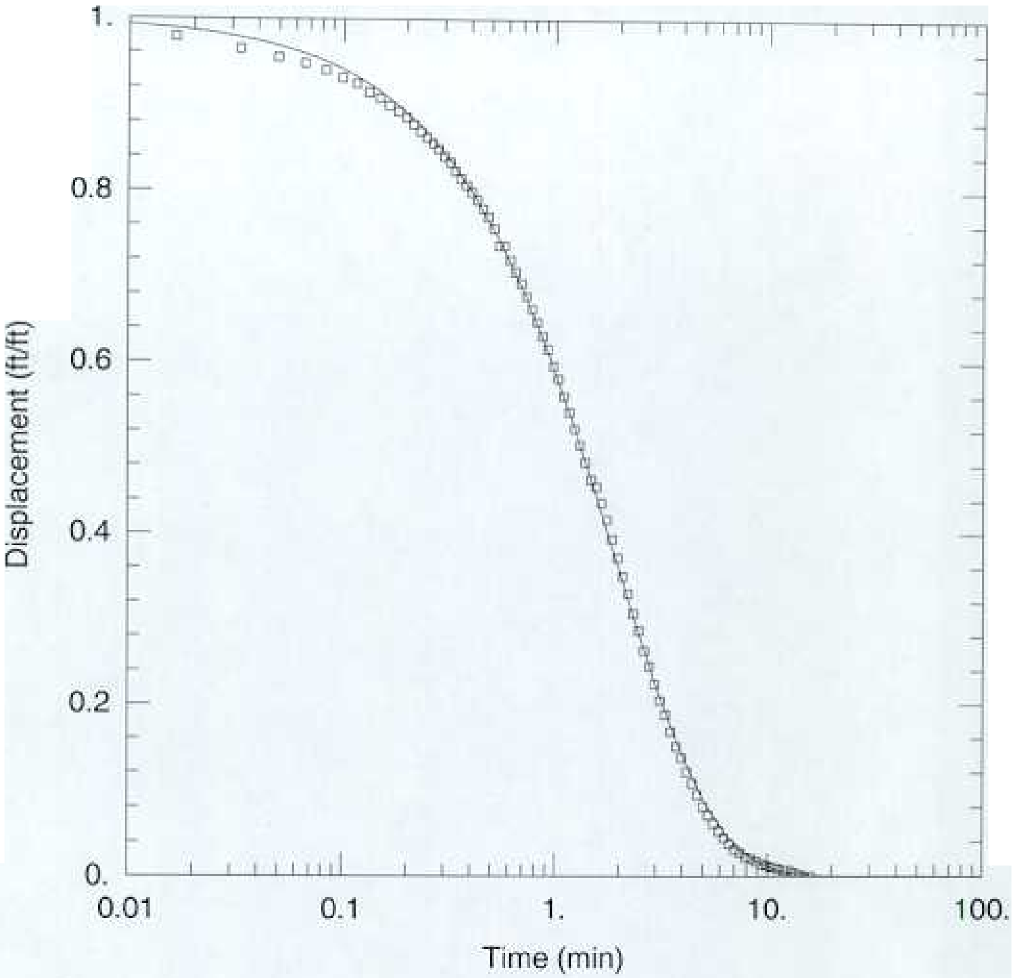
Initial Displacement: 6.8 ft
Total Well Penetration Depth: 146. ft
Casing Radius: 0.099 ft

Static Water Column Height: 886. ft
Screen Length: 33. ft
Wellbore Radius: 0.12 ft

SOLUTION

Aquifer Model: Confined
Kr = 1.68 ft/day
Kz/Kr = 0.1

Solution Method: KGS Model
Ss = 3.246E-09 ft^{-1}



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt1000-1031.aqt
Date: 11/13/03 Time: 09:03:49

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT1000-1031
Test Date: 4/17/2003

AQUIFER DATA

Saturated Thickness: 510. ft

WELL DATA (PT1000-1031)

Initial Displacement: 8.6 ft
Total Well Penetration Depth: 146. ft
Casing Radius: 0.099 ft

Static Water Column Height: 1031. ft
Screen Length: 33. ft
Wellbore Radius: 0.12 ft

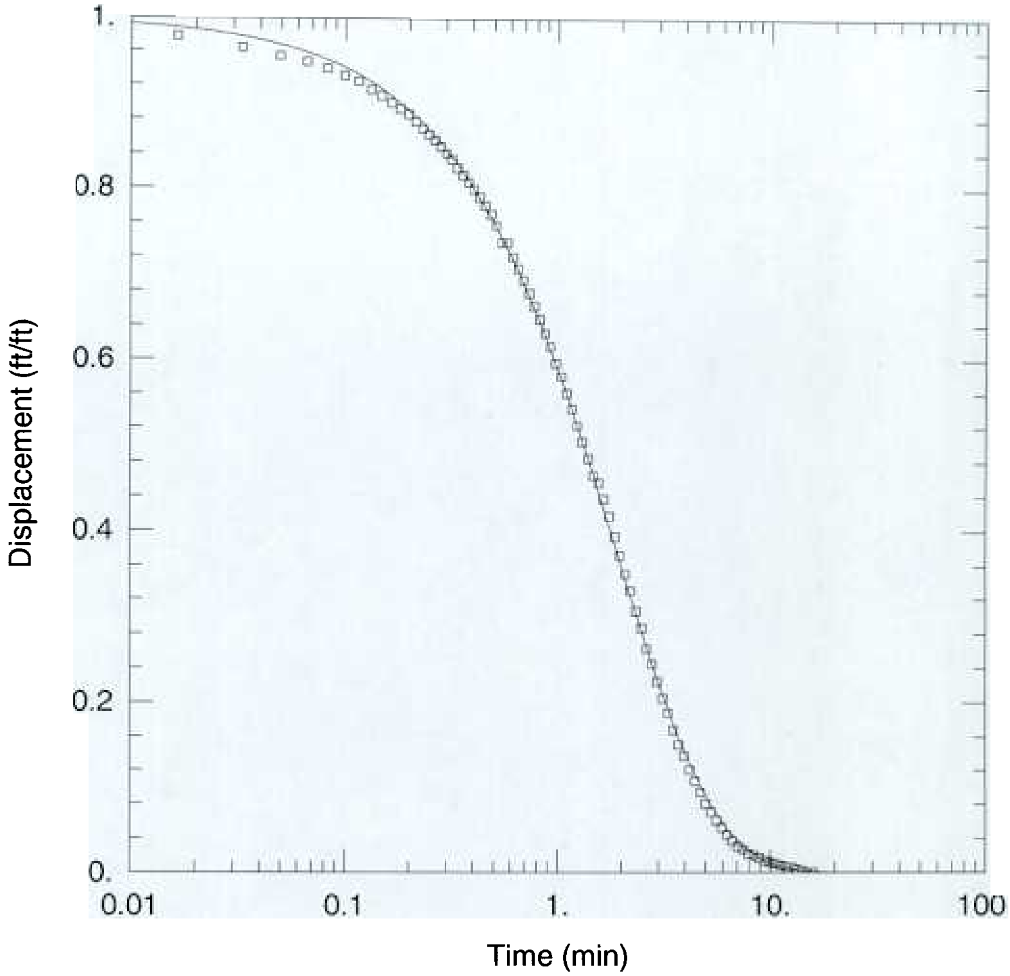
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.6746 ft/day
Kz/Kr = 0.1

Ss = 5.65E-08 ft^{-1}



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt1040-1071.aqt
Date: 11/13/03 Time: 09:05:15

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT1040-1071
Test Date: 4/22/2003

AQUIFER DATA

Saturated Thickness: 510. ft

WELL DATA (PT1040-1071)

Initial Displacement: 8.6 ft
Total Well Penetration Depth: 331. ft
Casing Radius: 0.099 ft

Static Water Column Height: 1071. ft
Screen Length: 31. ft
Wellbore Radius: 0.12 ft

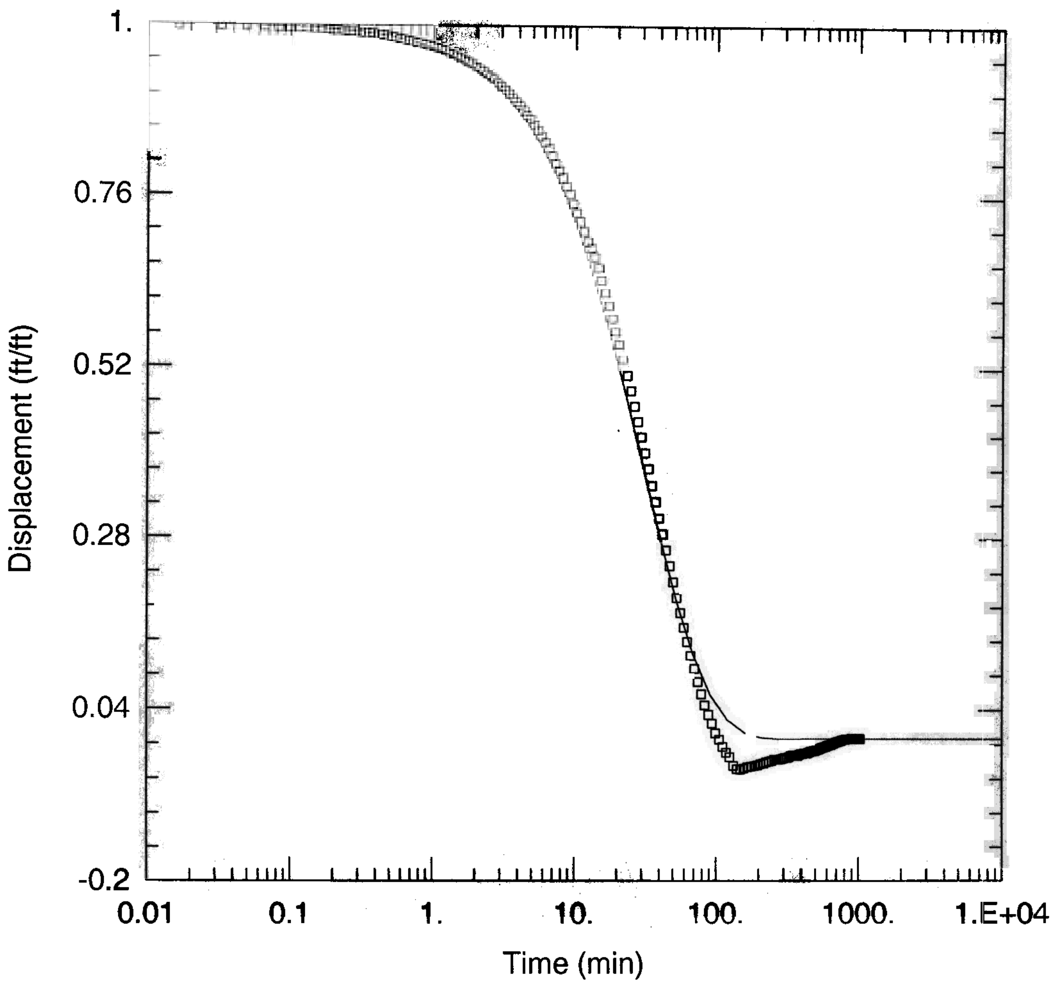
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.711 ft/day
Kz/Kr = 0.1

Ss = 6.599E-08 ft^{-1}



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt1100-1136_kgs.aqt
Date: 11/13/03 Time: 09:09:33

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT1100-1136
Test Date: 4/29/2003

AQUIFER DATA

Saturated Thickness: 510. ft

WELL DATA (PT1100-1136)

Initial Displacement: 16.45 ft
Total Well Penetration Depth: 396. ft
Casing Radius: 0.099 ft

Static Water Column Height: 1136. ft
Screen Length: 36. ft
Wellbore Radius: 0.12 ft

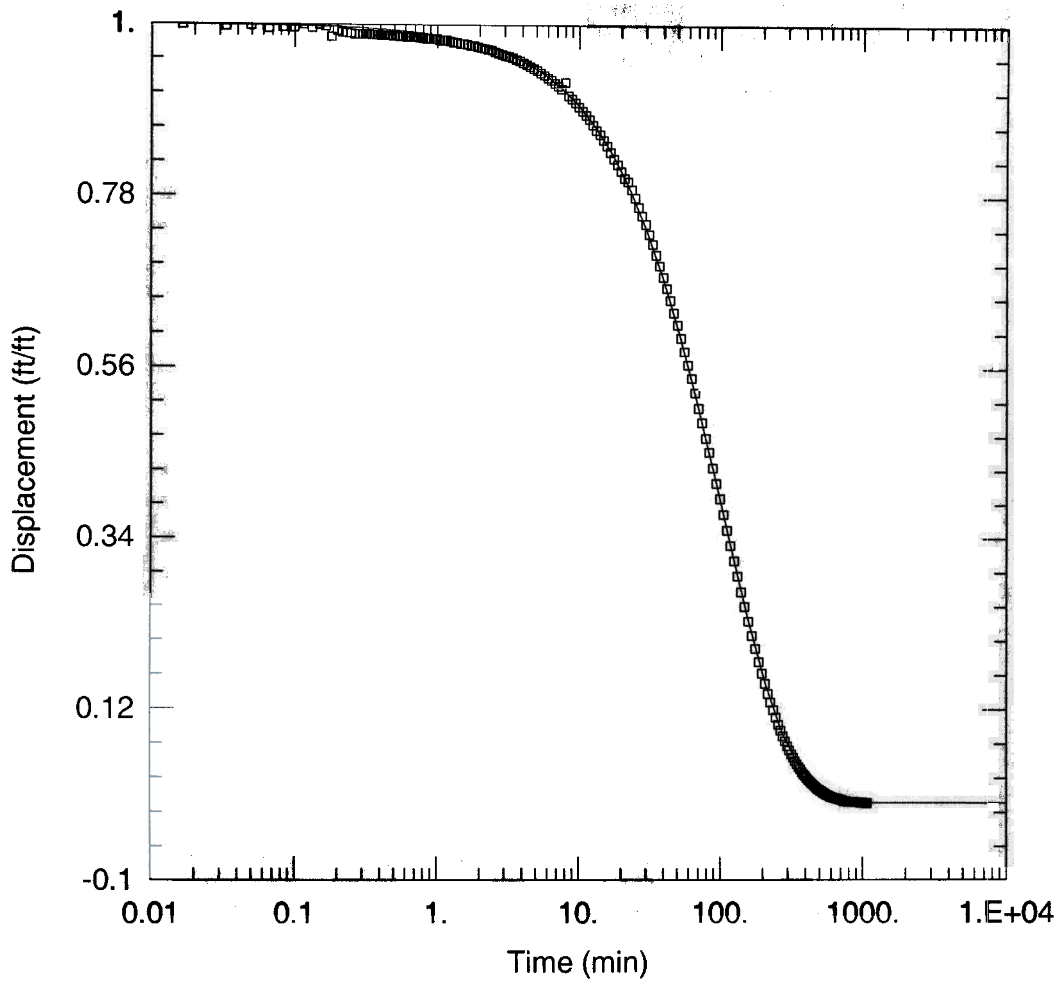
SOLUTION

Aquifer Model: Confined

Kr = 0.04155 ft/day
Kz/Kr = 0.1

Solution Method: KGS Model

Ss = 4.185E-12 ft^{-1}



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt1196-1226_kgs.aqt
Date: 11/13/03 Time: 09:13:32

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT1196-1226
Test Date: 5/06/2003

AQUIFER DATA

Saturated Thickness: 510. ft

WELL DATA (PT1196-1226)

Initial Displacement: 27. ft
Total Well Penetration Depth: 386. ft
Casing Radius: 0.099 ft

Static Water Column Height: 1226. ft
Screen Length: 30. ft
Wellbore Radius: 0.12 ft

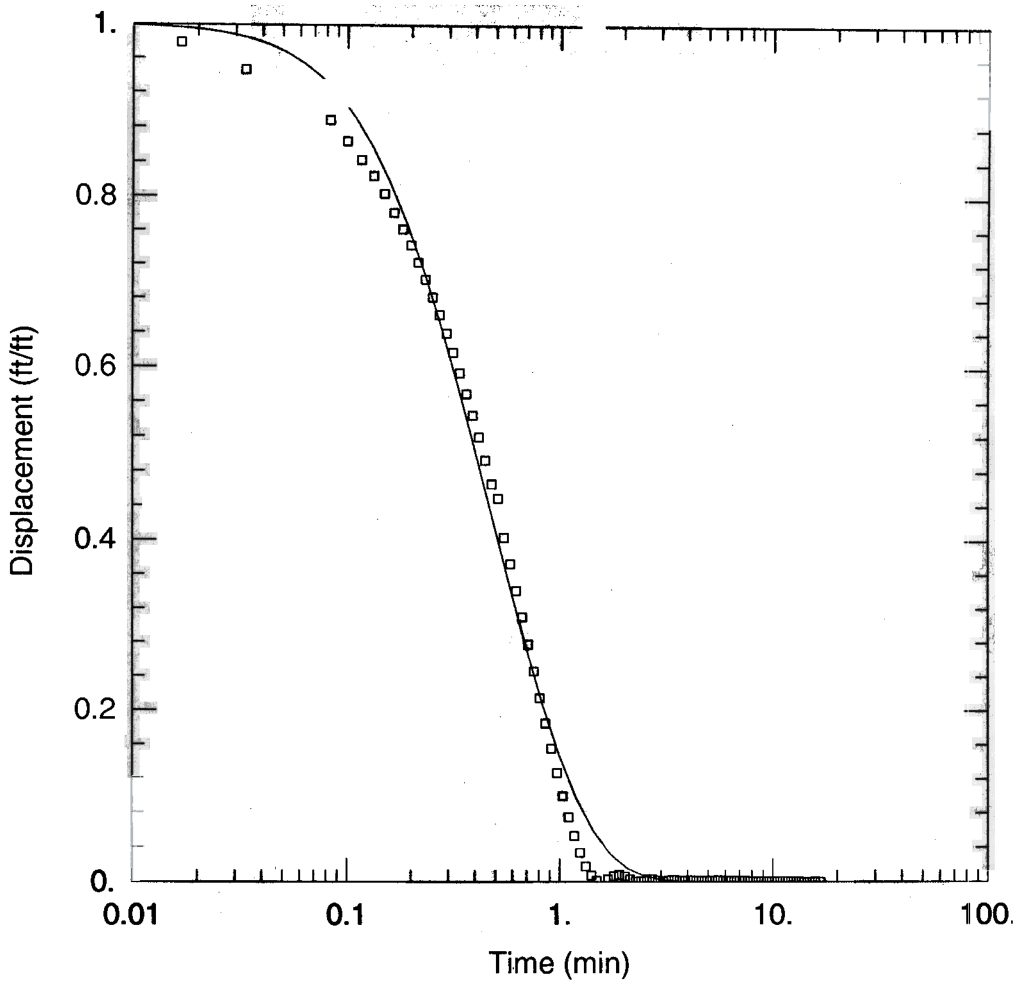
SOLUTION

Aquifer Model: Confined

Kr = 0.01323 ft/day
Kz/Kr = 0.1

Solution Method: KGS Model

Ss = 1.024E-07 ft^{-1}



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt1256-1286_butler.aqt
Date: 11/13/03 Time: 09:14:40

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT1256-1286
Test Date: 5/12/2003

AQUIFER DATA

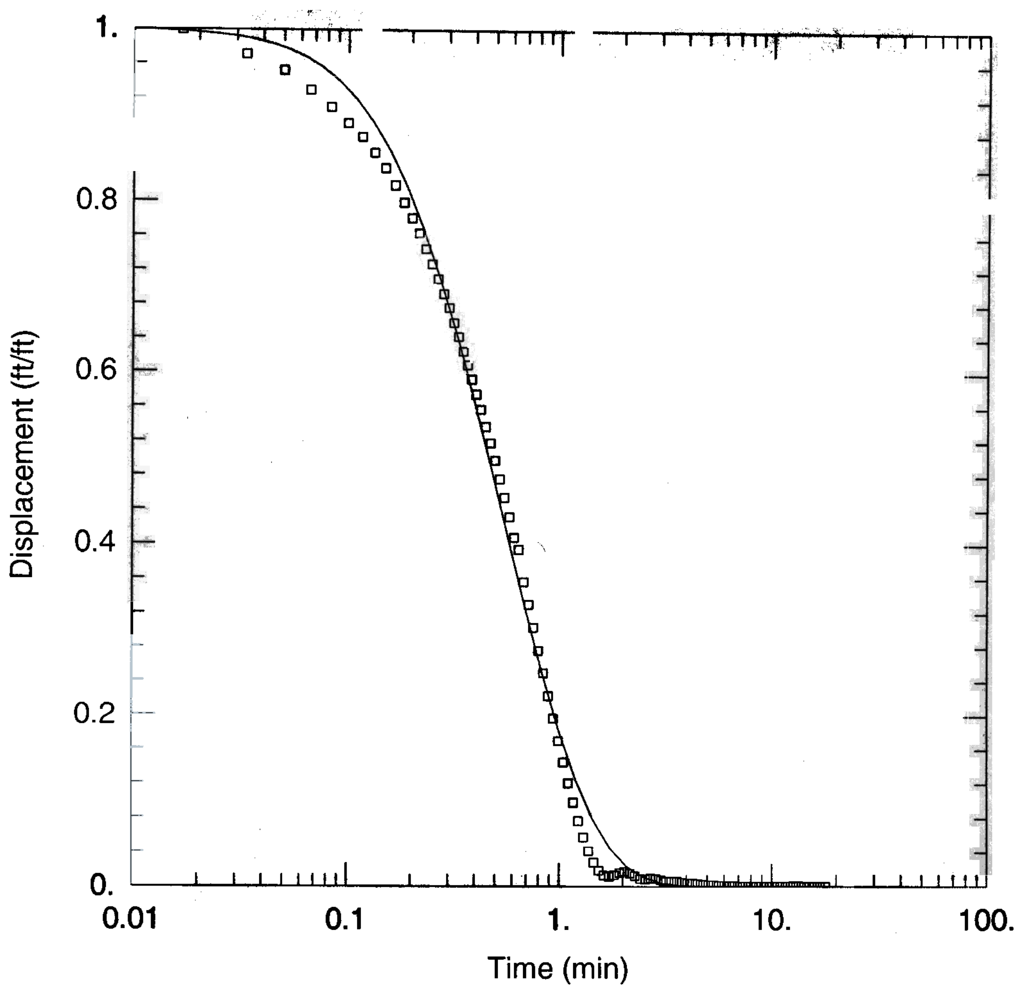
Saturated Thickness: 150. ft
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (PT1256-1286)

Initial Displacement: 40.5 ft
Total Well Penetration Depth: 36. ft
Casing Radius: 0.099 ft
Static Water Column Height: 1246. ft
Screen Length: 30. ft
Wellbore Radius: 0.12 ft

SOLUTION

Aquifer Model: Confined
K = 2.864 ft/day
Solution Method: Butler
C(D) = 1.555



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt1351-1381_butler.aqt
Date: 11/13/03 Time: 09:17:40

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT1351-1381
Test Date: 5/21/2003

AQUIFER DATA

Saturated Thickness: 150. ft
Anisotropy Ratio (Kz/Kr): 0.

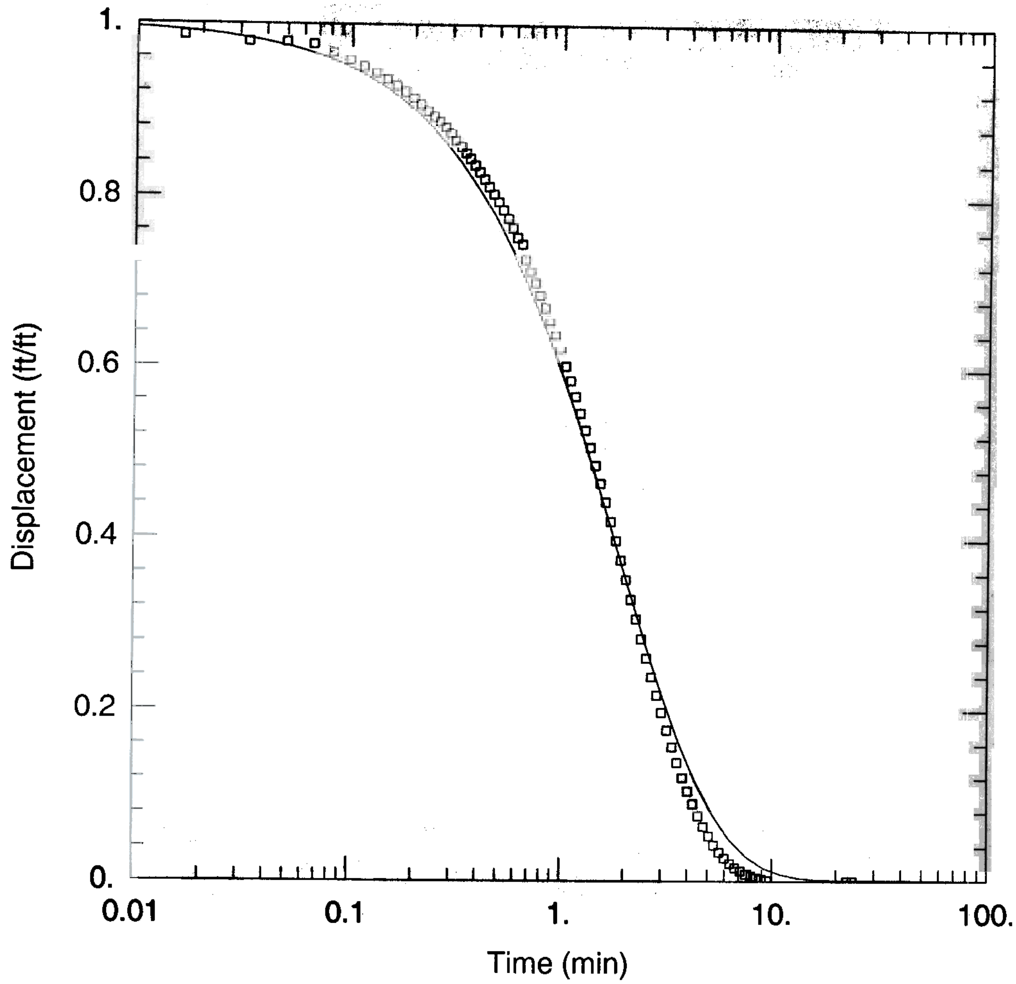
WELL DATA (PT1351-1381)

Initial Displacement: 47.6 ft
Total Well Penetration Depth: 131. ft
Casing Radius: 0.099 ft
Static Water Column Height: 1341. ft
Screen Length: 30. ft
Wellbore Radius: 0.12 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler

K = 2.535 ft/day
C(D) = 1.415



WELL TEST ANALYSIS

Data Set: D:\MyFiles\Project Files\ROMP 74X\CME Packer Tests\pt1456-1486_kgs.aqt
Date: 11/13/03 Time: 09:19:17

PROJECT INFORMATION

Company: SWFWMD
Project: ROMP 74X
Location: Davenport, FL
Test Well: PT1456-1486
Test Date: 5/30/2003

AQUIFER DATA

Saturated Thickness: 160. ft

WELL DATA (PT1456-1486)

Initial Displacement: 51.2 ft
Total Well Penetration Depth: 86. ft
Casing Radius: 0.099 ft

Static Water Column Height: 1446. ft
Screen Length: 30. ft
Wellbore Radius: 0.12 ft

SOLUTION

Aquifer Model: Confined

Kr = 0.8443 ft/day
Kz/Kr = 0.1

Solution Method: KGS Model

Ss = 3.923E-12 ft^{-1}