CONSTRUCTION AND TESTING OF INJECTION WELL SYSTEM #2 CORAL SPRINGS IMPROVEMENT DISTRICT WASTEWATER TREATMENT PLANT

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Environmental Services

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INTRODUCTION

In June 1989, the Florida Department of Environmental Regulation (FDER) issued a construction permit (Certification No. V006-159268) for one 24-inch-diameter, Class I Injection Well and one Multi-Horizon Monitor Well to be installed at the Coral Springs Improvement District (CSID) Wastewater Treatment Plant site in Coral Springs, Florida. The general site location is shown in Figure 1. On March 7, 1989, contract documents and specifications prepared by Gee & Jenson, Inc., project engineers, and Geraghty & Miller, Inc., subconsultants, were made available to qualified contractors for bidding on the well construction project. A pre-bid conference took place on March 14, 1989. Bids were received by Gee & Jenson, Inc., on March 29, 1989. The contract was awarded to Youngquist Brothers, Inc., a drilling company from Fort Myers, Florida, on April 26, 1989, subsequent to approval by Gee & Jenson, Inc., and Geraghty & Miller, Inc.

The specifications contained provisions for drilling and testing one 24-inch-diameter injection well to a total depth of 3500 feet; constructing, testing, and completing one multi-horizon deep monitor well; conducting pumping tests in discrete zones in the bore hole; collecting well cores to determine adequate confinement; conducting an injection test to demonstrate that the injection zone could accept the effluent; and conducting pressure tests and a radioactive tracer survey to demonstrate mechanical integrity. Copies of various geophysical logs, geologic logs, cement records, water-quality analyses, mill certificates, mechanical integrity testing data, and core test data are included in the appendices.

Youngquist Brothers, Inc., mobilized manpower and equipment to the Coral Springs Improvement District Wastewater Treatment Plant in late July 1989. The monitor well was completed to a total depth of 1650 feet on November 7, 1989, and the injection well was completed to a total depth of 3,500 feet on December 1, 1989. Final testing of the injection well, including geophysical logging, injection testing, and radioactive tracer survey testing was completed by April 1, 1990.

As a condition of the permit, the FDER requested that, upon completion of drilling and testing, a final report summarizing the information obtained during the program be submitted along with an application to operate well.

This report documents the results of the well-construction program and contains the various test data used to evaluate the injection zone and confining sequence. Conclusions are presented regarding the capability of the injection zone to accept treated effluent and the integrity of the confining sequence. The monitoring program required by the Florida Administrative Code (FAC), Section 17.28.25, is presented along with operation and maintenance procedures for the wells and a plugging and abandonment program.

FINDINGS

1. The data demonstrate the existence of an extremely-transmissive injection zone saturated with saline water (water containing more than 10,000 mg/L TDS).

2. The injection zone has a transmissivity which is estimated to be greater than 3 million gallons per day per foot (mgd/ft).

3. The injection well is capable of accepting a flow rate of 15 million gallons per day in accordance with State regulations.

4. The top of the injection zone occurs at approximately 3100 feet below land surface and the base of the injection zone occurring at 3500 feet, for a total thickness of approximately 400 feet.

5. The contact between potable and non-potable (greater than 10,000 mg/L of TDS) is gradational and occurs in the interval between 1130 and 1180 feet below land surface.

6. The horizontal permeability of the confining sequence as determined from core tests ranges from 0.00000413 to 0.000963 centimeters per second (cm/sec.).

7. The vertical permeability of the confining sequence as determined from core tests ranges from 0.0000011 to 0.0012 cm/sec.

8. Two monitor zones were selected for the monitoring well. The lower zone is from 1500 to 1650 feet and the upper zone is from 1000 to 1115 feet below land surface.

9. The presence of a) a highly-transmissive injection zone filled with water having greater than 10,000 mg/L of TDS, b) suitable overlying confining sequences, and c) an efficient monitor-well system will permit the operation of this injection well in compliance with State and Federal Underground Injection Control Regulations.

RECOMMENDATIONS

The following recommendations are requirements of Chapter 17-29 FAC for the safe operation of an injection well. These procedures should be carried out conscientiously to ensure regulatory compliance and the successful operation of the well.

1. Well-head injection pressures should be monitored and recorded continuously. Monthly averages as well as maximum and minimum values should be reported to the Broward County Environmental Quality Control Board (BCEQCB) and the FDER on a monthly basis.

2. The flow rate into the well should be monitored and recorded continuously. Average daily flow rates as well as the total volume of effluent pumped into the well should be reported to the BCEQCB and the FDER on a monthly basis.

3. Water samples from both monitor zones should be analyzed weekly until the issuance of an operating permit for specific conductivity, pH, and temperature. This information should be reported to the BCEQCB and the FDER on a monthly basis.

4. Samples from the monitor zones should be collected and analyzed weekly for turbidity, total dissolved solids, chloride, nitrate, and total coliform until the issuance of an operating permit. The results of these analyses should be submitted to the BCEQCB and the FDER on a monthly basis.

5. A specific injectivity test should be performed monthly. Flow rates and well-head pressures should be recorded during this period. Test

results should be reported to the BCEQCB and the FDER in gpm per specific well-head pressure (psig).

6. The well should be tested for mechanical integrity every five years. Mechanical integrity may be confirmed by conducting a hydrostatic pressure test on the injection casing, a television survey, a temperature log and a radioactive tracer survey. Other test methods may be used subject to approval by the FDER.

DATA COLLECTION

During the construction of the injection well, data were collected by a variety of methods. These methods along with comments on the application and usefulness of each, are discussed in this section.

A log of drilling and related activities (Daily Log) was maintained by the project staff, who were present on a 24-hour basis. This log contains items related to each well's construction and testing; various work tasks such as geophysical logging, coring, inclination surveys, and related incidents and daily activities at the site. A separate construction log was maintained to record materials used during construction, time spent on contract items, and footages drilled. Items detailed in the construction log also were noted in the Daily Log. Copies of the Daily Logs were furnished on a weekly basis to the members of the Technical Advisory Committee (TAC).

Additional, raw field data were provided to the TAC on a weekly basis. These data included copies of the driller's log, geologic log, summary lithologic log, and weekly water-quality analyses and water levels for the four surficial-aquifer wells.

Formation cuttings were collected from the pilot holes in both the injection well and the monitor well. Lag time for the cuttings (time required for the cuttings to circulate from the bottom of the hole to the surface) was calculated regularly to ensure that accurate sample depths were recorded. The samples were washed, dried, and examined microscopically, and a geologic log was prepared by a Geraghty & Miller geologist. A set of samples from each well was sent to the Florida Bureau of Geology in Tallahassee, Florida. Copies of the geologic logs are presented in Appendix A. Geraghty & Miller geologist also prepared a continuous summary log correlating lithology, weight on bit, penetration rate, and a concise geologic description. This log was prepared using a vertical scale of 20 feet per inch to facilitate correlation with all the geophysical logs.

During the drilling of the pilot hole in the injection well, cores were collected using a core barrel and a 4-inch-diameter core bit. The core intervals averaged approximately 10 feet in length. The cores were photographed, and core sections were sent to a laboratory where they were tested to determine horizontal and vertical permeability, porosity, unconfined compressive strength, and specific gravity. Photographs of the cores are contained in Appendix B.

Single-shot inclination surveys were run every 60 feet during drilling of the pilot and ream holes. During the entire drilling operation, the holes never deviated greater than 1/4 of a degree from vertical.

Various geophysical logs were conducted in the pilot holes to collect data on the presence and nature of the injection zone, the confining sequence, and the suitability of monitor zones. Dual-induction (a shallow, medium, and deep investigation borehole tool), temperature, caliper, natural gamma-ray, and borehole-compensated sonic/VDL logs were performed. Copies of the various logs are contained in Appendix C.

The dual-induction log was used to differentiate between the limestone and dolomite beds and, along with the gamma-ray log, was used to aid in the correlation of lithologic units in the hole. The "porosity" log (borehole-compensated sonic) was useful not only in identifying the injection zone, monitor zones, and the confining sequence but also as an aid in locating zones that could cause problems during cementing.

Inflatable straddle-packers were used to conduct pumping tests at various intervals in Injection Well #2 (IW-2). The packers were leased by Youngquist Brothers from TAM International. Five pumping tests were performed in order to obtain hydraulic conductivity and water-quality data. The tests were performed at a constant pumping rate using a submersible pump set in the drill pipe. Drawdown and recovery measurements were recorded and representative formation water samples were obtained. The transmissivity and hydraulic conductivity values calculated from the packer tests are presented in Table 1. The water-quality results from the samples collected during the straddle-packer tests are discussed in a later section (see Appendix D).

After setting and cementing the 24-inch-diameter injection casing, a hydrostatic pressure test was conducted on the casing prior to the injection test. Pressure testing of IW-2 was performed on three separate occasions. During the first test, a pressure decline of 1 psi every five minutes was observed. Based on a test pressure of 150 psi, the allowable pressure drop is 7.5 psi per hour or 0.625 psi every five minutes. The pressure loss was attributed to the heat of dehydration from the setting cement, a phenomenon that has been observed in several other installations. To correct this problem, the well was circulated for 12 hours to help cool the casing. Additionally, a 10-foot cement plug was set near the casing seat. The second test showed virtually the same results and the cement plug at the bottom of the casing was suspected as being the problem. Cement and fine-grained sand were then used to help seal the bottom casing plug. The third test showed a pressure decline of 6.0 psi over an hour, which complies with the regulatory requirement. A copy of the final pressure-test data is presented in Appendix E.

After completion of the injection well, the injection zone was developed to obtain water samples, and the shallow and deep monitor zones were sampled. The samples were analyzed for various constituents to establish the "natural" or background quality of the water in the injection zone and in both monitor zones prior to disposal of treated effluent. Copies of the laboratory reports of the analyses are contained in Appendix D.

Following the injection and monitor-well sampling, 24 hours of background temperature and pressure data were collected on the injection zone prior to beginning the injection test. The injection test was conducted for a three-hour period, during which approximately 1.3 million gallons of water was pumped into the well. The test was aborted after three-hours of pumping due to a lowering of the water level is the canal from which the injection water was being taken. Twelve hours of post-injection-test recovery then was recorded. Data were collected at 30-second intervals near the start of the test and the sampling interval was gradually increased to five minutes as the test progressed. The test results and interpretations are discussed later in this report.

After the injection test, fresh water was pumped into the injection well before surveying with the video camera. The favorable picture quality obtained during the survey provided visual data on the condition of the injection casings and the nature of the injection zone. Video copies have been supplied to those members of the Technical Advisory Committee requesting the information.

A Radioactive Tracer Survey (RTS) was conducted after the video survey. Five logging events were conducted which consisted of moving a logging tool with gamma-ray detectors through an interval where a known amount of the radioactive isotope Iodine 131 was released. These tests, detailed later in this report, were performed to ensure the mechanical integrity of the injection well. A copy of the original log is included in Appendix C.

WELL DRILLING AND CONSTRUCTION

In July 1989, Youngquist Brothers constructed the drilling pad for IW-2 and for the deep monitor well. In August 1989, drilling commenced on IW-2 and the deep monitor well.

Injection Well #2

Construction of the injection well began in August 1989 with the drilling of a nominal 70-inch-diameter hole to a depth of 50 feet using the mud-rotary method of drilling. Pit casing (62-inch-diameter) was installed to a depth of 50 feet and cemented in place using ASTM Type II neat cement. Next, a nominal 60-inch-diameter hole was drilled to a depth of 170 feet. A string of 54-inch-diameter conductor casing then was installed and cemented to a depth of 170 feet using ASTM Type II cement with 12-percent bentonite.

Following the cementing of the conductor casing, a temperature log was conducted. A 52-inch-diameter pilot hole then was drilled to 1001 feet. A caliper/gamma-ray log was conducted prior to setting and cementing 44-inch-diameter surface casing at 1000 feet using ASTM Type II cement with 12-percent bentonite. Temperature logs were conducted after each stage of cementing.

After cementing of the 44-inch-diameter surface casing, the drilling method was changed from mud-rotary to reverse-air. A 12-1/4-inch-diameter pilot hole was drilled to 1800 feet, and geophysical logging (dual-induction, temperature, natural gamma-ray, borehole-compensated sonic/VDL, and X-Y caliper) was conducted. Straddle-packer testing was conducted over the intervals from 1090 to 1130 feet and 1180 to 1220 feet. Upon completion of the testing program in the pilot hole, the hole was reamed out to a nominal 44-inch diameter down to a depth of 1800 feet. Following the reaming of the hole, a gamma ray/X-Y caliper log was conducted. Subsequently, a 34-inch-diameter intermediate casing string was set at 1800 feet. Cementing of the 34-inch-diameter casing required six stages.

After the 34-inch-casing was cemented in place, drilling of the 12-1/4-inch-diameter pilot hole continued to a depth of 3000 feet. During drilling of the 12-1/4-inch-diameter pilot hole, six 4-inch-diameter cores were taken from the following intervals: 2350 to 2360 feet, 2450 to 2460 feet, 2850 to 2560 feet, 2600 to 2610 feet, 2700 to 2710 feet, and 2820 to 2830. The results of the laboratory analysis of the cores are presented in Table 2. Upon completion of the pilot hole, a suite of geophysical logs was conducted. Three straddle-packer tests were performed over the intervals from 2300 to 2340 feet, 2450 to 2490 feet, and 2600 to 2640 feet. Next, the hole was reamed to a nominal diameter of 34 inches, and 24-inch-diameter injection casing was installed to a depth of 2900 feet. Cementing of the 24-inch-diameter casing required ten stages and a total cement volume of 8360 cubic feet. Temperature logs were recorded after every stage, and a cement bond log was conducted on the entire length of the casing after the cement job was completed. A copy of the cement bond log appears in Appendix C with other geophysical logs. After the cement bond log was completed, a hydrostatic pressure test was successfully performed. Following the pressure test, the cement plug was drilled out and the injection zone was drilled to the final depth of 3500 feet using a 22-inch-diameter bit. Water samples were taken from the injection zone were taken (see section entitled "Water Quality") and geophysical logs were conducted in the open hole from 2900 to 3510 feet.

The injection test for IW-2 began after a 24-hour pre-injection-test monitoring period; the 24-hour injection test was aborted after three hours due to a lack of supply water. After the injection test, a 12-hour post-injection monitoring was conducted for 12 hours. A TV survey and a radioactive tracer survey completed the testing of the well.

Review of the cementing records, pressure-test results, injection-test data, and radioactive tracer survey indicates that the injection casing is properly cemented and that isolation between the injection horizon and overlying sources of drinking water has been achieved.

The conductor, surface, and intermediate casings were all 0.375-inch-wall API Grade B pipe. The final injection casing was 24-inch-diameter Grade B pipe with a 0.500-inch wall thickness. Copies of the mill certificates are found in Appendix G. Complete construction details are shown on Figure 2.

Dual-Zone Monitor Well

The monitor well construction began with the drilling of a nominal 35-inch-diameter hole to 20 feet, followed by setting and cementing 30-inch-diameter casing. A nominal 28-inch-diameter hole then was drilled to a depth of 170 feet, followed by setting and cementing 24-inch-diameter casing at 170 feet using ASTM Type II neat cement and ASTM Type II cement with 12-percent bentonite. Following cementing, a temperature log was conducted. A nominal 22-1/2-inch-diameter hole was drilled to 1007 feet. During the drilling, inclination surveys were conducted every 60 feet. A gamma ray/caliper log was then conducted, and 16-inch-diameter casing was installed at a depth of 1000 feet. The casing was cemented in place in two stages using ASTM Type II cement. Temperature logs were conducted after each cementing stage. A cement bond log was run on the 16-inch-diameter casing from 1000 feet to surface, and a hydrostatic pressure test was successfully completed. After the pressure test, a nominal 16-inch-diameter hole was drilled to 1510 feet, and a caliper/gamma-ray log was conducted in the open hole.

The final 6-5/8-inch-diameter coated casing string was installed from 1510 to surface. The casing string was left uncemented from 1100 feet to surface for annular monitoring purposes (the upper monitoring zone). A cement bond log was conducted, and a pressure test was successfully performed on the 6-5/8-inch-diameter casing. Next a nominal 6-inch-diameter hole was drilled from 1500 to 1650 feet to serve as the lower monitoring zone. Both the shallow (1000 to 1100 feet) and deep (1510 to 1650 feet) monitoring zones were disinfected, developed, and sampled. Water samples were analyzed for primary and secondary drinking water standards including EPA Test Methods 608, 624, and 625 (see Appendix D for laboratory results). Construction details of the monitor well are shown on Figure 3.

SUBSURFACE CONDITIONS

Background

The final design of the injection well was based on the information collected during drilling and testing of the pilot holes, and the drilling and testing program was established to provide flexibility in well-completion procedures as dictated by local geologic conditions. Specifications for the program were based and on regional geologic conditions and data from existing injection wells in the area. This section on subsurface conditions is presented at this point in the report so that the reader will obtain a good understanding of local geologic conditions and the rationale for the final design of the well.

Geologic Setting

A well-defined, areally-extensive sequence of carbonate sediments is present at the CSID site and throughout the area. The geologic units found during the construction of the well satisfied the requirements of Chapter 17-28 FAC. The injection zone is capable of receiving the required volume of effluent (15 million gallons per day, maximum injection rate), and disposal of the effluent into this zone should not result in contamination of any Underground Source of Drinking Water (USDW). A brief description of the various geologic units follows.

As shown in Figure 4, the sediments from land surface to approximately 200 feet in depth, are comprised of sandstone, limestone, and clay with varying amounts of shell. The sandstone is generally light gray to light olive brown, comprised of quartz and phosphatic minerals, with a fine-to medium-grained texture. The limestone is a light gray to dark gray micrite which is sparsely located within the sandstone sequence. Various amounts of sand and shell also are present within these sediments. Solution features common in the upper 200 feet of sediment give this unit the high permeability characteristic of the Biscayne aquifer. These sediments are Pleistocene to Miocene in age and correspond to descriptions of the Anastasia and Tamiami Formations.

Below 200 feet, the sediment is predominantly composed of an olive gray, plastic clay with various (usually small) amounts of sand. From 600 feet to about 1000 feet, the sediment is predominantly carbonate mud (marl). The marl is generally pale olive gray, soft, and composed of sand with interbedded layers of limestone present throughout the interval. The limestone varies from light gray to pale orange to yellowish gray micrites and biomicrites. Various amounts of sand and shell are present within both sediment types. The sediments in the interval between 200 and 1000 feet are Miocene to late Eocene in age and correspond with descriptions of the Hawthorn Formation.

Between 1000 feet and 1600 feet, the limestone is typically a pale orange to grayish orange, fine- to medium-grained, sandy, soft biomicrite. The limestone is this sequence is upper to middle Eocene in age and is delineated as the Avon Park Formation. The late Floridan aquifer is contained within this section.

In the interval from 1600 feet to 2100 feet, the limestone consists of light gray to pinkish gray, fine- to medium-grained, hard, vuggy biosparites and micrites. The sonic and neutron logs indicate a decrease in formation porosity in this interval. This section is comprised of middle to early Eocene-age sediments of the lower Avon Park and Lake City Limestone formations.

At approximately 2100 feet, dolomite is first encountered. The interval between 2100 feet and 3000 feet consists of alternating layers of dolomite and limestone. Below 3000 feet, the rock is composed almost entirely of dolomite. The dolomite in the upper part of this interval is predominantly light brown to moderate brown, massive, and dense with some dissolution features. The interbedded limestone in this interval consists of pale orange to gray, fine- to medium-grained, hard biosparite. The porosity is irregular in the interval between 2300 and 2900 feet. Core samples taken from various locations within this interval revealed total porosities ranging between 43.5% and 17.3%. This section contains early Eocene-age sediments of the lower Lake City Limestone and Upper Oldsmar Limestone formations.

The injection zone extends from approximately 3100 feet to 3500 feet in depth in the lower section of the Oldsmar Formation. Results from the television survey indicate that the dolomite in this zone exhibits extensive dissolution cavities and fracturing. Open-spaced crystal growth is commonly apparent in the vugs of dolomite in the well cuttings.

Hydrogeologic Setting

Subsurface conditions were determined by evaluation of the drill cuttings, laboratory tests conducted on cores, straddle-packer pumping tests, and geophysical logs. The straddle-packer tests provided information on the hydraulic conductivity of the confining sequences and on water quality. Core testing conducted in the laboratory yielded additional information on the vertical permeability of the rock comprising the confining sequence. Geophysical logs were useful in measuring the relative porosities and the vertical extent of individual units. Evidence from each of these sources is used in the following text to describe hydrogeologic properties of the various confining sequences and water-bearing zones encountered during the drilling of the injection well.

The upper 200 feet of sediments beneath the site are Pleistocene, Pliocene, and late Miocene-age sand, silt, limestone, and shell. These sediments contain the surficial aquifer which is used as a source of drinking water throughout the county.

Underlying the surficial aquifer are approximately 800 feet of Miocene clay and marl forming a confining bed between the surficial aquifer and the Oligocene- to Eocene-age limestones and dolomites of the Floridan aquifer. This confining bed is called the Hawthorn Formation. Water quality in the Floridan aquifer is poor in comparison to the surficial aquifer, and water from the Floridan aquifer in this area contains concentrations of dissolved solids which exceed drinking-water standards. The aquifer generally is not used as a source of drinking water in the county because of the additional treatment required to meet potable standards. The Floridan aquifer exists under artesian conditions with a potentiometric level above land surface. The dense Miocene clays of the overlying Hawthorn Formation provide good confinement for this aquifer.

Confining Sequence

Based on interpretation of the various data, the injection zone is overlain by a confining sequence in the interval between 2100 and 3100 feet. The most significant section of the confining sequence occurs between 2700 feet and 3000 feet. The limestone that comprises this sequence is a very fine-grained biomicritic rock interbedded with fine to coarse crystalline dolomite.

Within the confining sequence, three straddle-packer tests were conducted. Figure 5 shows a typical straddle-packer assembly. The recovery data from the packer tests were analyzed using a method described by Schafer (1980) for low-yield formations. The values of hydraulic conductivity determined from these tests (Table 1) ranged from 0.000259 cm/sec to 0.000133 cm/sec. Laboratory tests conducted on the cores taken from this interval showed vertical permeabilities ranging from 0.00112 cm/sec to 0.0000011 cm/sec. From the core data shown in Table 2, it can be seen that the porosities for the limestone in the confining sequence range from approximately 17.3 to 43.5 percent. These porosities are at the high end of generally-expected porosity values for limestone. The vertical permeability of the limestone cores averages 0.000042 cm/sec. Given these low values of permeability, it can be concluded that not all the pore spaces are interconnected and the effective porosity must be lower than the values obtained from the laboratory analyses.

Injection Zone

The presence of an injection zone was indicated during drilling by a constant chattering of the drill string, which is characteristic of a highly-fractured dolomite formation. Confirmation of the presence of the injection zone was made from the cuttings, geophysical logs, TV survey, and injection test. The results of the injection test are presented in a subsequent section of this report. Evidence gathered during drilling and testing confirmed that the injection zone consists of a fractured and cavernous dolomite. The depth to the top of the zone is approximately 3100 feet. The bottom of the zone was encountered at a depth of approximately 3500 feet.

The injection zone and the occurrence of dolomite are shown clearly on the dual-induction and borehole-compensated-sonic logs presented in Appendix C. The resistivity profile shown on the dual-induction log varies considerably within the injection zone (3100 to 3500 feet). This variation is due to the presence of massive, dense dolomite (higher resistivity) along with fractures and cavities containing salt water (low resistivity). On the borehole-compensated sonic log, the faster transit velocities and cycle skipping seen between 3100 feet and 3500 feet confirm the presence of dolomite containing large cavities. The presence of large cavities and fractures also can be seen on the television survey.

Water Quality

Water samples were collected from the injection well during each straddle-packer pumping test for analysis of selected major ions to establish the 10,000 mg/L of TDS interface and background water quality. Laboratory test results are given in Appendix D. After the monitor zones were developed, water samples were collected and analyzed for selected ions to establish background water quality. These analyses are presented in Appendix D.

During the straddle-packer tests, a 40-foot section of the pilot hole was isolated using inflatable packers provided and installed by TAM International. Each zone was pumped for a four-hour period using a ubmersible pump. Temperature and conductivity readings of the water pumped from the isolated zones were taken periodically throughout the tests. Just prior to the end of the pumping portion of the straddle-packer tests, samples were collected from each zone for laboratory analysis.

Two straddle-packer tests were conducted in the interval between 1090 and 1220 feet. Water-quality analyses from these tests are presented in Table 3. The upper straddle-packer test yielded water with 9,367 mg/L of TDS, whereas the lower straddle-packer test yielded water with 10,658 mg/L of TDS. These straddle-packer tests "bracket" the 10,000 mg/L TDS horizon, which for regulatory purposes will be reported at 1150 feet. The TDS value eventually reaches 30,000 mg/L in the interval between 2300 and 2340 feet. The water-quality data obtained from the injection zone in IW-2 shows that it contains formation waters with 35,100 mg/L of TDS and that the zone can be used for disposal of treated wastewater in compliance with Chapter 17-28 FAC.

RADIOACTIVE TRACER SURVEY

On January 13, 1990, a Radioactive Tracer Survey (RTS) was conducted on IW-2. Figure 6 displays a typical Radioactive Tracer tool configuration.

The test began with Schlumberger conducting a background gamma-ray log (GRL) from 3500 feet to 1400 feet. Next, the ejector was positioned at 2896 feet (two feet below the casing seat). A two-millicurie (MCI) slug of Iodine 131 was released under static conditions, and time-drive monitoring was conducted for 70 minutes after the release. A second GRL was conducted from 2900 feet to 2000 feet. Following the second GRL, the casing was flushed for one hour using fresh water at a rate of 130 gallons per minute (gpm). A third GRL was conducted from 2950 feet to

2000 feet. The tool was repositioned at 2889 feet (five feet above the casing seat). A two-MCI slug was ejected while injecting fresh water into the well at 130 gpm. Time-drive monitoring proceeded for the next 61 minutes. A fourth GRL was conducted from 2900 feet to 2000 feet. Once again, the casing was flushed with fresh water for one hour at 130 gpm. A fifth GRL was conducted from 2950 feet to 1400 feet.

The results of the RTS are presented on the enclosed log in Appendix C. Starting from the back section of the log, the various surveys are presented in the same sequence as discussed above. Figure 7 displays the log presentation of a typical RTS. Descriptions of the multiple logging measurements recorded are presented below.

Measurement	Description
GR	Upper gamma-ray detector
GR [1]	Upper gamma-ray detector (background data previously recorded)
CCL	Casing collar locator
GRSG	Lower gamma-ray detector
GRSG [1]	Lower gamma-ray detector (background data previously recorded)
GRTE	Middle gamma-ray detector

The initial background GRL shows high readings in the open-hole section between 2900 feet and 3500 feet. These readings were influenced by slugs released during operational tool testing conducted 12 hours prior to the survey. The cased-hole section of the log reflects a typical background response. Naturally, the middle detector (GRTE) measures much higher radiation levels because of its proximity to the source material. Following the background survey, time-drive monitoring data of the first release of tracer material is presented. The thick blue mark on the right side of the time (center) track indicates the time at which the tracer slug was ejected. Near the 10-minute mark, the middle detector (located two feet below the ejector) shows evidence of the slug dispersing outward from the ejector. At the 12-minute mark, the middle detector readings decrease, indicating that the slug has dispersed beyond the middle detector. Between 23 and 29 minutes, readings from the lower detector (GRSG) increase from 20 to 40 API units, while readings from the upper detector (GR) show no change. Given that the distances between the ejector and both the lower and upper detectors are 15.3 feet and 9.8 feet, respectively, the rate of dispersion downward is obviously greater than that for upward dispersion. The slug is first detected by the upper detector at approximately 30 minutes. Readings from the upper detector increase from 20 to 100 API units over the next 10 minutes and remain fairly constant until the 58-minute mark. Over the next five minutes, readings from the upper detector increase to a maximum of 165 API units and basically remain constant until the cessation of time-drive monitoring at approximately 70 minutes. These results are indicative of the relatively slow upward dispersion of the slug. Conversely, the lower detector reveals a higher rate of dispersion over the same time interval. Readings quickly increase to a maximum of 115 API units near the 36-minute mark, followed by a rapid decrease to 80 API units at 38 minutes, indicating the rapid rate of dispersion.

Following the time-drive monitoring data, the second GRL results are presented. Background logs are included on the log for easy reference. With the exception of the stained portion of the casing between 2870 and 2900 feet, the log correlates favorably with the background data. Minor variations are undoubtedly due to stains on the detectors.

The third GRL results are presented next. This log was conducted after flushing the casing, and can serve as updated background data for the dynamic test to follow.

Time-drive monitoring data from the dynamic test are shown in the next log segment. The slug first reaches the middle detector only a few seconds after release. At the three-minute mark, the slug encounters the lower detector. The slug is completely displaced below the lower detector within the next 15 minutes. Further pumping over the next 30 minutes cleanses the detector, thereby reducing the readings down to the initial level. Readings from the upper detector remain basically unchanged throughout the monitoring period (61 minutes). These results provide tangible evidence of the casing integrity because of the lack of any upward migration of the slug at a relatively slow pumping rate (130 gpm).

The fourth GRL is presented in the next section. Again, except for the stained area near the casing seat, the log results closely resemble the original background data.

In the final section, the fifth GRL is presented. Occasional minor fluctuations from background data, revealed on the fourth GRL, have been suppressed as a result of the additional flushing performed prior to conducting the fifth GRL.

The results of the RTS testing indicate that there is no leak inside the casing or in the cement sheath behind the casing. The survey has also shown that there is significant permeability in the formation immediately below the casing seat. This fact is also demonstrated by geophysical logs conducted in the open hole over this interval.

OPERATION AND MAINTENANCE

When the injection well is operating during long-term injection testing and through the operational life of the well, a variety of data will be collected to satisfy statutory/permit requirements and to assist in managing the system. This section discusses the basic requirements for data collection to aid in permit compliance during the initial testing period and during the operation of the system.

Injection-Well Data Collection

The well-head pressure and the injection rate will be monitored continuously to ensure that the maximum pressure at the well head does not exceed 96 pounds per square inch gauge (psig) and the velocity down the well does not exceed 8 feet per second. Values of the daily maximum flow in millions of gallons per day (mgd) and total daily flow (mgd) will be recorded on a daily basis and submitted monthly to the Florida Department of Environmental Regulation (FDER). Daily measurements of the maximum injection pressure (psig) and average injection pressure (psig) also will be reported monthly to the FDER. Monthly averages for the daily maximum flow (mgd), daily maximum injection pressure (psig), and daily average injection pressure (psig) will be calculated for monthly reporting to the FDER. Measurements of the injection pressure and rate should be made at the same time and recorded so that correlations between these two values can be made.

It is essential that performance data be collected from the start in order to establish baseline information to satisfy regulatory requirements and to serve as a benchmark for future data comparison and analysis of performance. These records will be maintained permanently. The lead plant operator or higher official must sign and date each submittal. A sample form for recording the above-mentioned measurements and calculations is included in Appendix I.

Dual-Monitor-Well Data Collection

The purpose of monitor-well data collection is to detect changes in water quality in the monitor zones that could be attributed to the injection of treated effluent. The constituents established for analysis are chloride, specific conductance, fecal coliform, total kjeldahl nitrogen (TKN), total dissolved solids (TDS), pH, temperature, and ammonia. Analysis for these constituents will be conducted weekly and reported to the FDER monthly. The lead plant operator or higher official must sign and date each submittal.

In order to collect the monitor-zone water samples, each monitor zone has been equipped with a sampling pump. At least three well volumes will be pumped from the monitor zones before samples are taken. The water from the monitor zones will be discharged into the treated-effluent wet well and disposed into the injection well.

The integrity of the monitor-zone sampling systems is to be maintained at all times. Sampling lines and equipment shall be kept free of contamination through the use of independent discharges and no interconnections with any other lines. Because both monitor zones will flow due to artesian pressure, the height of the water column in each monitor zone will be the same as the total depth of that monitor zone; i.e., the water column in the shallow monitor zone will be 1,115 feet and the water column in the deep monitor zone will be 1,650 feet. The volume of water in the shallow-monitor-zone water column is approximately 9,650 gallons, and the volume in the deep monitor zone water column is approximately 2,425 gallons. Multiplying these volume by 3 will determine the minimum volume of water required to be pumped from the respective monitor zones prior to sampling. Therefore, a minimum of 28,950 gallons of water must be pumped from the shallow monitor zone and a minimum of 7,275 gallons of water must be pumped from the deep monitor zone. Assuming the sampling pumps have a pumping rate of 75 gallons per minute (gpm), the deep monitor zone should be pumped for a minimum of 1.7 hours (7,275 gallons divided by 75 gpm/60) and the shallow monitor zone should be pumped for a minimum of 6.5 hours (28,950 gallons divided by 75 gpm/60). Should a higher or lower pumping rate be determined, the pumping time can be adjusted accordingly.

Monitor-zone pressure data should be recorded prior to purging and submitted to the DER with the monthly reports. Also, daily measurements of maximum, minimum, and average monitor-zone pressures must be recorded. It is recommended that a 7-day, wind-up, 2-pen, pressure recorder be employed for this task. This gauge can record both monitor-zone pressures simultaneously and will not require any electrical service at the well head. Forms have been provided in Appendix I.

Injectivity Testing

A well's injectivity is a function of (1) friction loss in the casing; (2) the bottom-hole driving pressure; and (3) the density differential between treated effluent and the formation water in the injection zone. The latter is a constant as long as the temperature and density of the injection fluid remain constant. Friction loss in the casing and bottom-hole driving pressure can vary as a result of changes in the flow rate, plugging of the injection zone, and the physical condition of the pipe. In general, pressures build slowly with time (for a given pumping rate) as the casing "ages." Similarly, plugging of the injection zone can cause a gradual pressure buildup with respect to time;

this is not expected at Coral Springs because of the cavernous nature of the injection zone.

Periodic determination of a well's injectivity can be used as a measure of a well's efficiency, and it is recommended as a management tool for the injection-well system. Performing the test is relatively simple; it involves injecting into a well at two or more injection rates and recording the surface injection pressure for each rate. The injectivity is calculated by dividing the injection rate by the required surface injection pressure (injection pressure minus static pressure). The result is expressed as gallons per minute per psi of pressure. As noted, testing should be conducted consistently at two distinct rates so that future comparisons can be made. The high injection rate should approach the maximum design flow or an injection rate as high as can be sustained for the injectivity testing period.

As soon as the wells are placed in operation, a procedure for injectivity testing should be established to collect baseline operating data. The procedure should be easily repeatable so that injectivities can be computed for the same injection rates. Testing should be done bi-weekly for the life of the well. The lead plant operator or higher official must sign and date each submittal.

Monitor-zone pressures must be recorded prior to, during, and after each test and submitted to the DER with the test results. A form for providing this information is included in Appendix I.

Mechanical Integrity

An injection well has mechanical integrity if there is no leak in the casing and no fluid movement into any underground source of drinking water through channels adjacent to the injection-well bore. In accordance with FAC 17-28.13(6) and 17-28.25(1), the mechanical integrity of all injection wells must be demonstrated every five years. A video TV survey is required for the injection well and injection zone. The injection casing must be pressure tested, or tested by an approved method to demonstrate absence of leaks. A temperature and/or noise log and monitoring of overlying aquifers will be conducted to demonstrate absence of fluid movement through channels adjacent to the injection well bore. A radioactive tracer survey (RTS) also is required every five years.

Plugging and Abandonment Plan

Section 28.27(2) of Chapter 17-28 FAC states that "an applicant for an Underground Injection Control permit shall be required to submit a plan for plugging and abandonment which may include post-closure monitoring of the injection operation." The DER can order the plugging of an injection well when it has been abandoned or has been "determined to be a threat to the waters of the State." Additionally, the P&A (plugging and abandonment) plan should be included in the Operation and Maintenance manual for the treatment facility so that it can be implemented promptly in the unlikely event it is ever needed. The objective of the P&A plan is to effectively plug or seal the borehole through the confining bed and prevent the upward migration of injected treated effluent and the circulation of ground water of different qualities. The program described in this section will accomplish that objective.

The plugging program will require the services of a qualified contractor with equipment capable of installing drill pipe to a depth of approximately 3,000 feet, pumping ASTM Type II neat cement, and mixing and pumping drilling fluid to suppress flow, as well as the capability of providing some form of blow-out prevention equipment. In the event the Coral Springs Improvement District IW #2 has to abandoned, the following program would be followed.

The initial step in the program will be to mix a solution of "weight" material and pump it into the well to suppress flow. Sufficient weight material should be added to the well to depress the fluid level to approximately 20 feet below pad level. A supply of previously-mixed drilling fluid should be kept on-site as weight material and may have to be added periodically to maintain the desired fluid level in the well. Following the addition of the weight material, the well-head assembly will be removed to permit easy access into the well. A blow-out preventor will be installed at this time.

The bridge plug will consist of 2-inch-diameter threaded tubing and two cement baskets assembled on location and lowered into the well on a string of drill pipe. A careful tally of pipe lengths should be kept to permit setting of the plug with the cement baskets about 5 feet above the bottom of the injection casing. The 2-inch-diameter casing will have a bottom plug and two sets of left-hand-threaded couplings at levels about 80 to 140 feet above the bottom of the injection casing. A series of cement ports will be cut into the 2-inch-diameter tubing above the cement baskets.

The cement baskets will be expanded and set by adding crushed limestone to the well and allowing it to settle. A mixture of ASTM Type II neat cement will be pumped into the well through the drill pipe and the cement ports above the limestone fill. The quantity of cement pumped should be equivalent to the volume of slurry required to fill the casing from the top of the limestone to one foot below the lowermost left-hand-threaded coupling.

The cement will be allowed to set for at least 24 hours, then "tagged" with a wire line to determine if fill-up has been achieved. If not, additional crushed limestone will be added and another stage of cement will be pumped (a single stage of cement usually is sufficient to build the first portion of the bridge plug). A strain of no more than 1,000 pounds above drill-string weight will be exerted. If no movement occurs (other than pipe stretching), the plug is deemed set and the Contractor will proceed with disconnecting the assembly by rotating and "backing off" the drill pipe (right-hand rotation will unscrew the pipe from the left-hand-threaded couplings). Two successive small stages consisting of no more than 100 feet of cement fill-up will be pumped. The remainder of the casing will be filled with neat cement after the two smaller cement stages are set.

The monitor well also will be plugged in the event the injection well is abandoned. However, the FDER may require sampling of the monitor zones for some period of time after abandonment and plugging of the injection wells for post-closure monitoring of the system. The 6-5/8-inch-diameter tubing for the deep monitor zone can be plugged from the surface by pumping sufficient ASTM Type II neat cement to displace the fluid in the tubing. The upper monitor zone will require installation of a tremie line to fill the hole from 1,147 feet to the surface. Cementing of this zone should only require a single cementing stage.

ACKNOWLEDGEMENTS

The success of this program was due largely to the cooperative efforts of a number of individuals on the staffs of the Coral Springs Improvement District, Gee & Jenson, the South Florida Water Management

District, the U. S. Geological Survey, and the Florida Department of Environmental Regulation. All parties worked together to complete this project that will enable the City of Coral Springs to dispose of treated effluent safely and to protect the local environment. Special thanks are due to the following individuals for their assistance, guidance, and cooperation.

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Greg Rawl

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Joe Harden, Jr.
Jim Andrews
Victor Howard

City of Coral Springs
Warren Gilbert
Noel Chin

CLOSING COMMENTS

We thank the staff of Gee & Jenson for allowing Geraghty & Miller, Inc., to participate in this program.

Respectfully submitted,
GERAGHTY & MILLER, INC.

Kent J. Veron, P.E.
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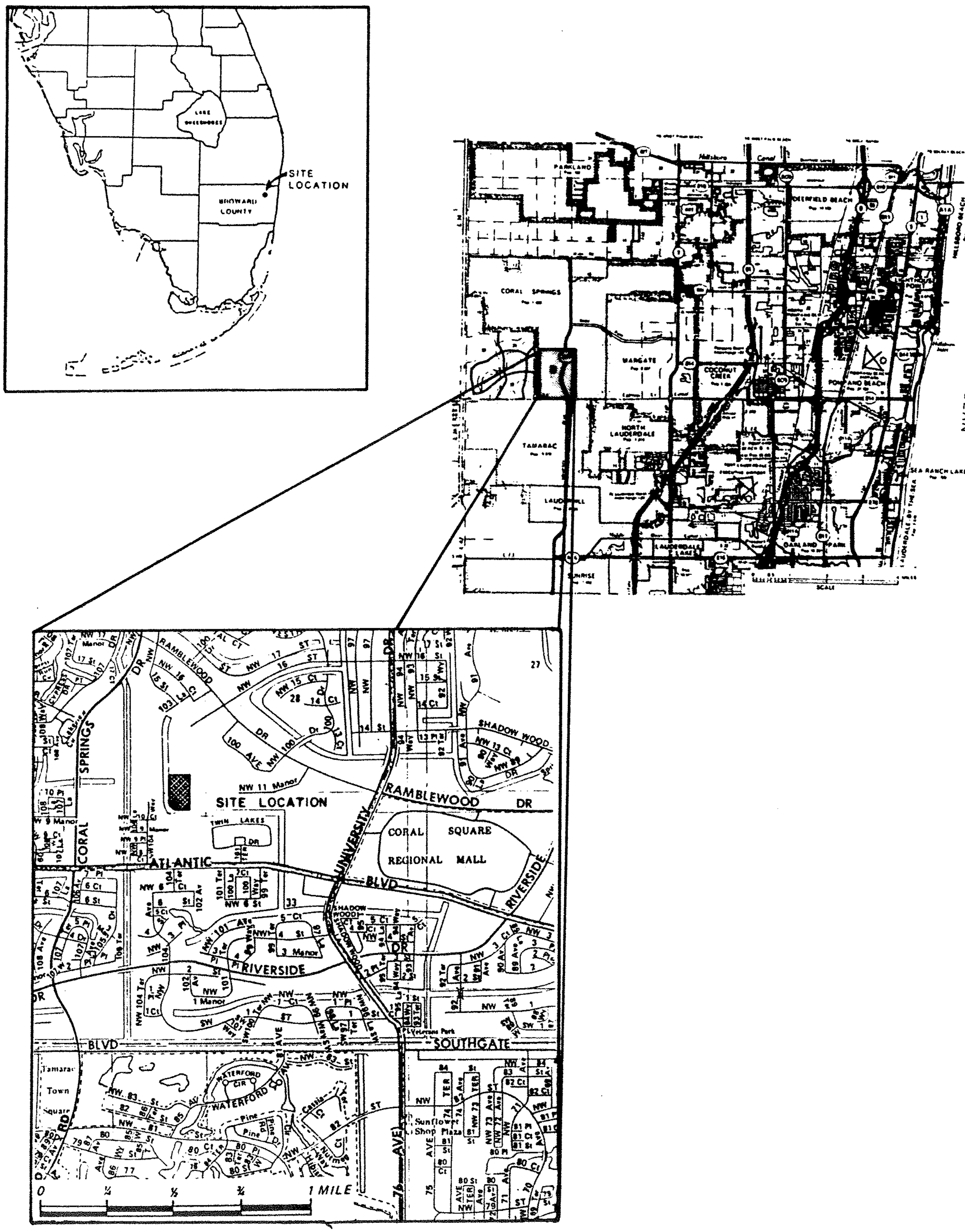
KTV/RTV/JAW:lt

FIGURES

GERAGHTY & MILLER, INC. Ground-Water Services	COMPILED BY: R.VERRASTRO	DATE: JUL 90	SCALE: SHOWN	PREPARED FOR: GEE & JENSON CORAL SPRINGS IMPROVEMENT DISTRICT
	PREPARED BY: S.SCZYMANSKI	FILE NO: PF01003		
	PROJECT MGR.: J.WHEATLEY			

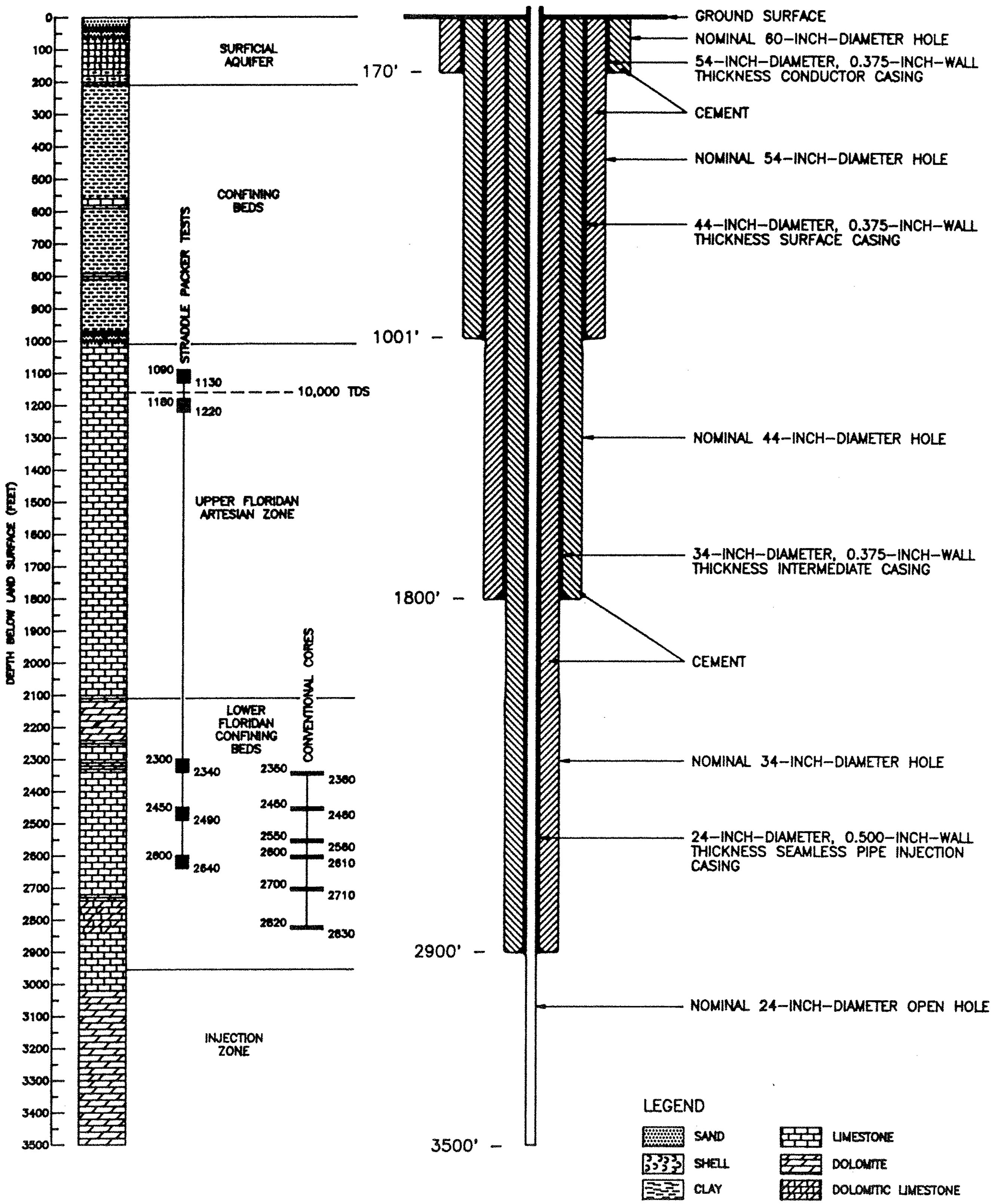


SUBJECT:

SITE LOCATION MAP

FIGURE: 1

GERAGHTY & MILLER, INC. Environmental Services	COMPILED BY: K. VERON	DATE: JUL 90	SCALE: NONE	PREPARED FOR: GEE & JENSON CORAL SPRINGS IMPROVEMENT DISTRICT
	PREPARED BY: B. OLIVA	FILE NO: PF01003		
	PROJECT MGR.: J. WHEATLEY			



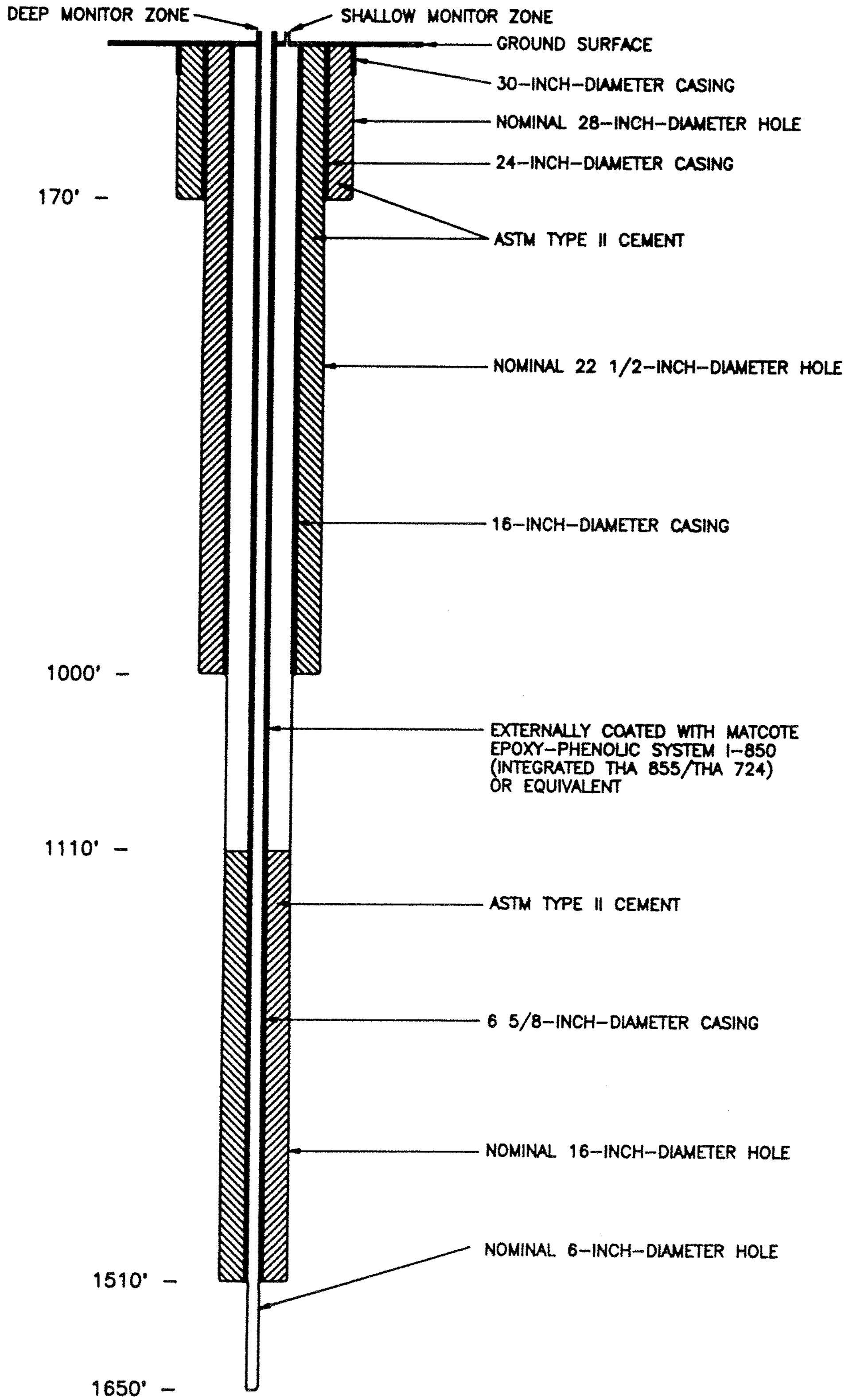
SUBJECT:

FINAL COMPLETION CONSTRUCTION DETAILS
INJECTION WELL #2

FIGURE 2

GERAGHTY & MILLER, INC. Environmental Services

COMPILED BY: K. VERON	DATE: JUL 90	SCALE: NONE	PREPARED FOR:	GEE & JENSON
PREPARED BY: B. OLIVA	FILE NO: PF01003			CORAL SPRINGS IMPROVEMENT DISTRICT
PROJECT MGR.: J. WHEATLEY				

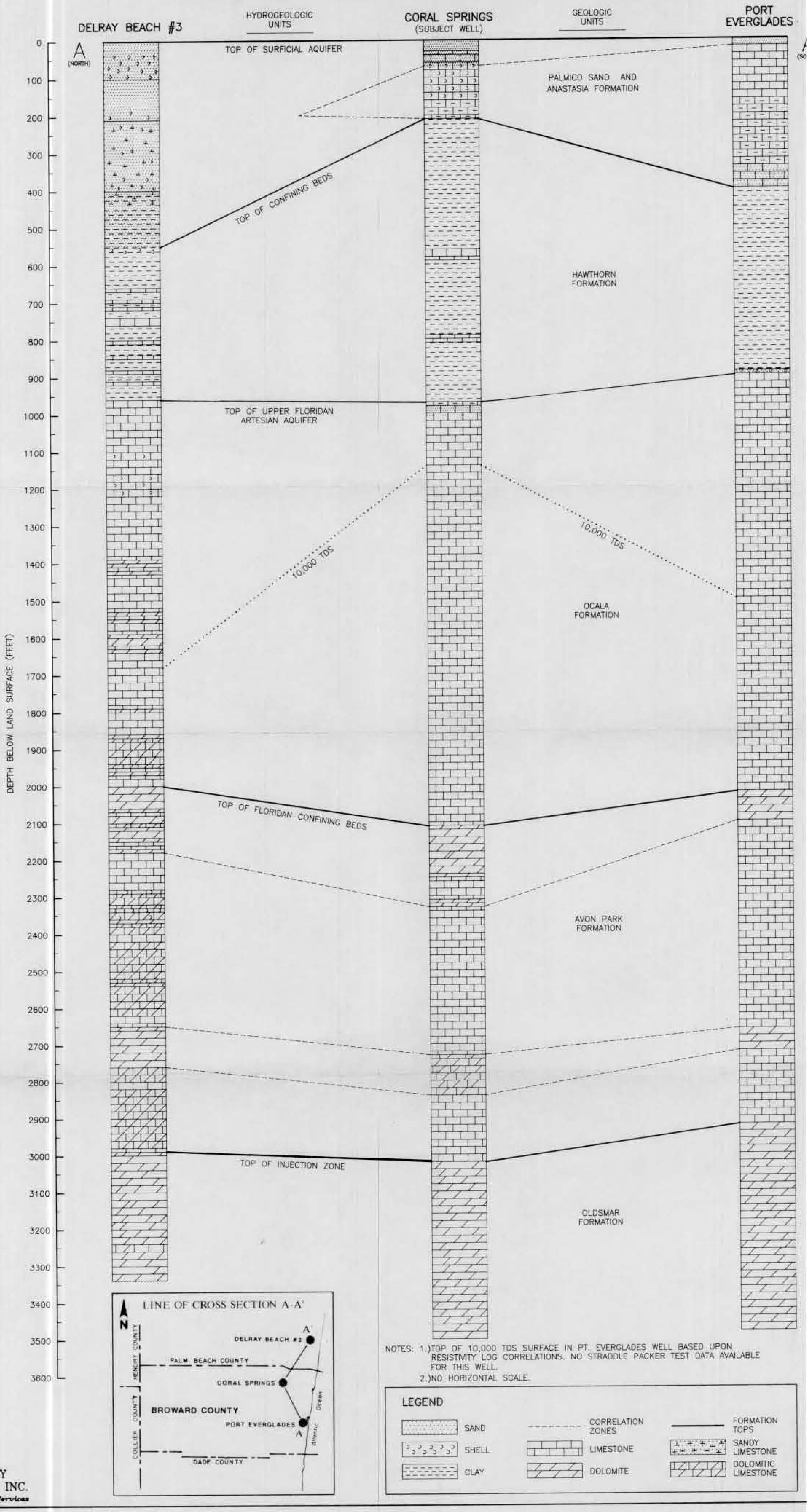


SUBJECT:

FINAL COMPLETION CONSTRUCTION DETAILS
DUAL MONITOR WELL #2

FIGURE 3

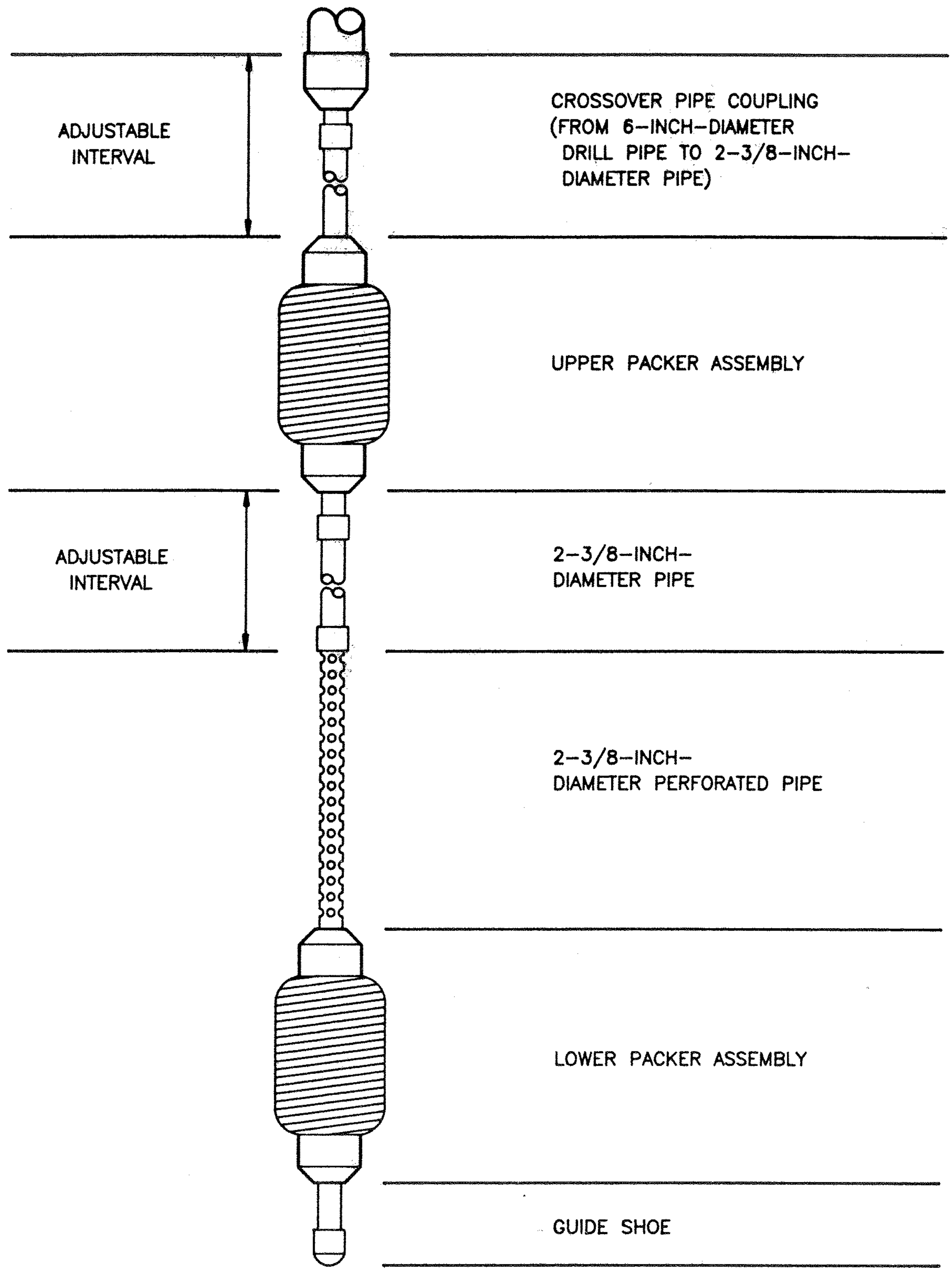
NORTH–SOUTH STRATIGRAPHIC CROSS SECTION SHOWING MAJOR GEOLOGIC AND HYDROGEOLOGIC UNITS



GERAGHTY & MILLER, INC.
Environmental Services

FIGURE 4

GERAGHTY & MILLER, INC. *Environmental Services*	COMPILED BY: R. VERRASTRO	DATE: JUL 90	SCALE: NONE	PREPARED FOR: GEE & JENSON CORAL SPRINGS IMPROVEMENT DISTRICT
	PREPARED BY: B. OLIVA	FILE NO: PF01003		
	PROJECT MGR: J. WHEATLEY			



NOTE: DRAWING NOT TO SCALE.

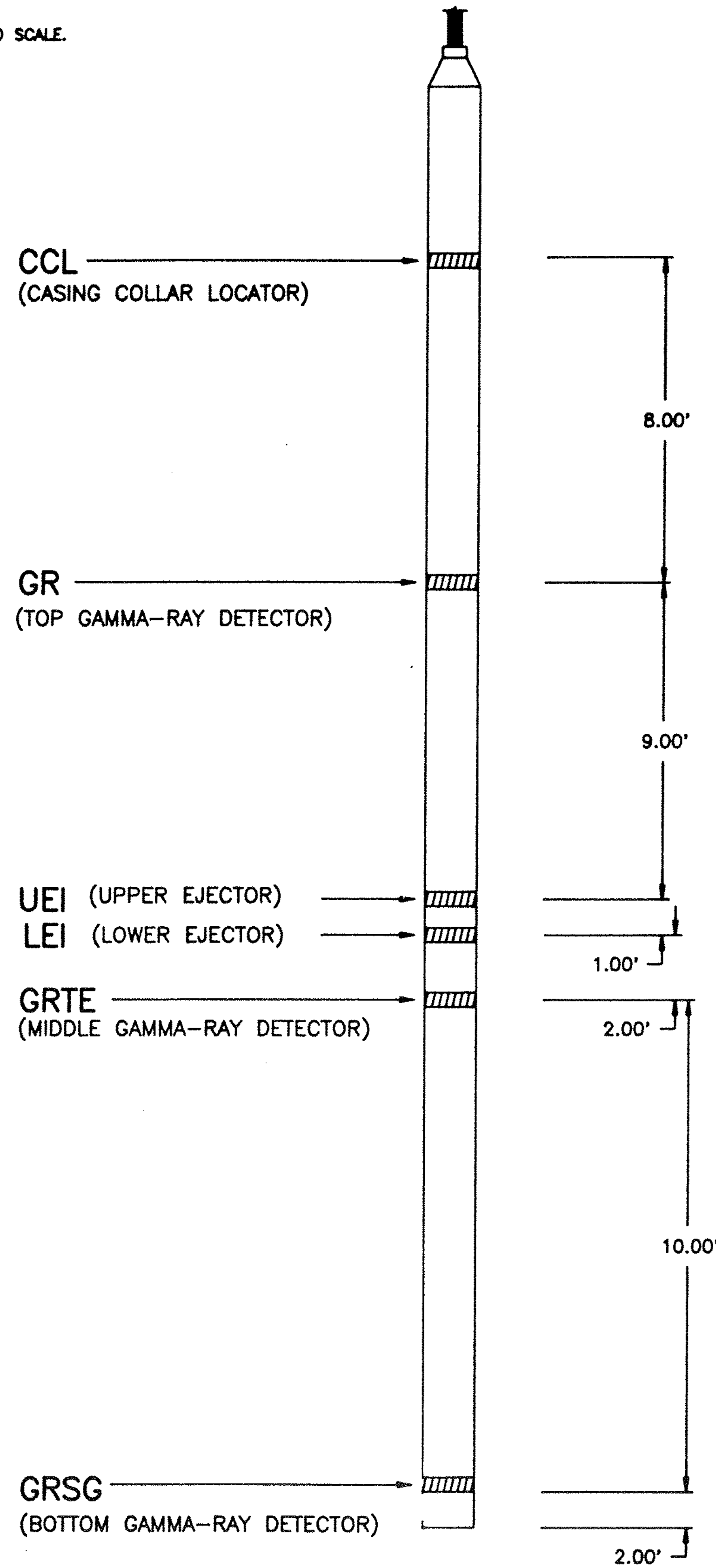
SUBJECT: TYPICAL STRADDLE-PACKER ASSEMBLY

FIGURE 5

GERAGHTY & MILLER, INC.
Environmental Services

COMPILED BY:	PREPARED BY:	PROJECT MGR.:	DATE:	SCALE:	FILE NO:	PREPARED FOR:
R. VERRASTRO	B. OLIVA	J. WHEATLEY	JUL 90	NONE	PF01003	GEE & JENSON CORAL SPRINGS IMPROVEMENT DISTRICT

NOTE: DRAWING NOT TO SCALE.

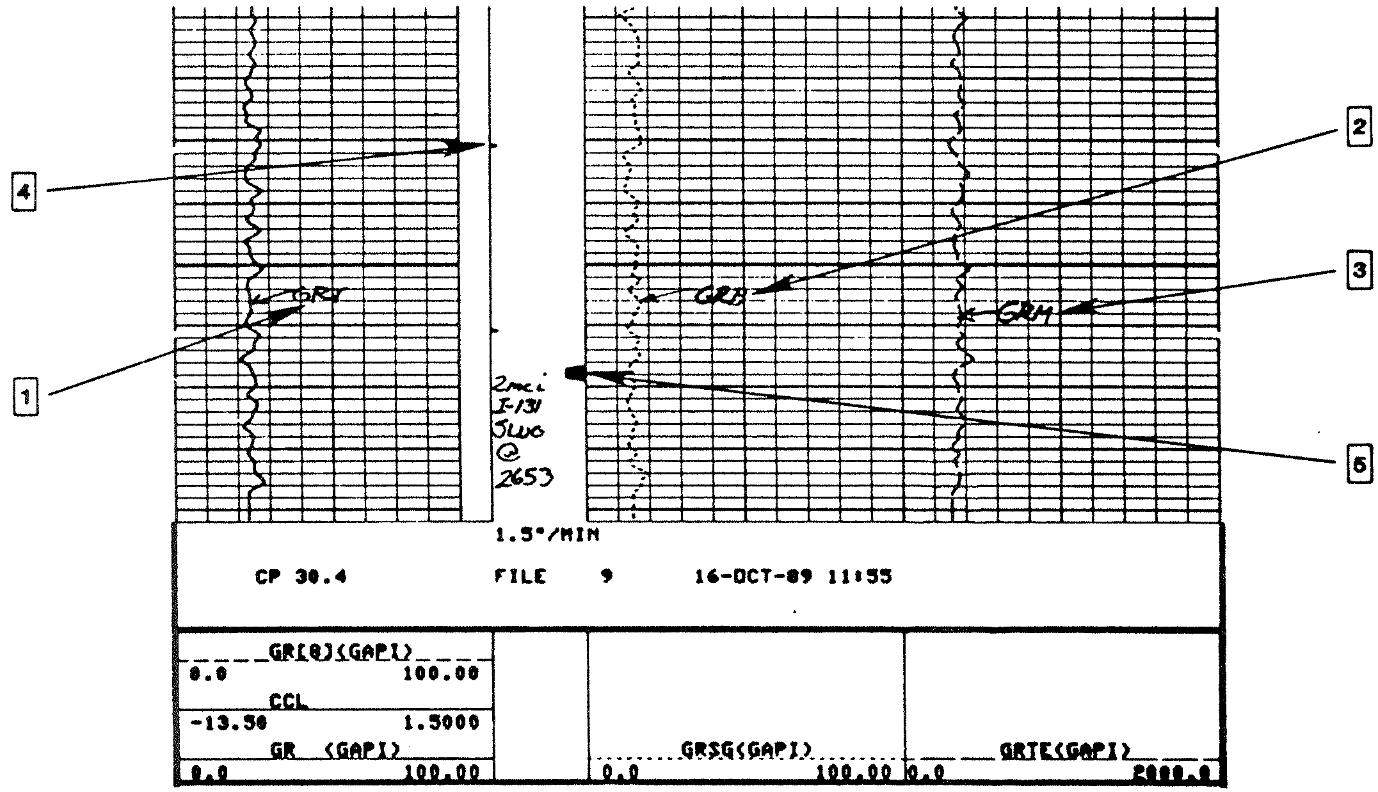


SUBJECT:

DIAGRAM OF TYPICAL RADIOACTIVE TRACER SURVEY LOGGING TOOL

FIGURE 6

GERAGHTY & MILLER, INC. *Environmental Services*	COMPILED BY: J. WHEATLEY PREPARED BY: B. OLIVA PROJECT MGR.: J. WHEATLEY	DATE: JUL 90	SCALE: NONE	PREPARED FOR: **GEE & JENSON** **CORAL SPRINGS IMPROVEMENT DISTRICT**
		FILE NO: PF01003		



LEGEND

1. GRT═GR═TOP OF GAMMA-RAY DETECTOR
2. GRB═GRSG═BOTTOM GAMMA-RAY DETECTOR
3. GRM═GRTE═MIDDLE GAMMA-RAY DETECTOR
4. REPRESENTS ONE MINUTE ELAPSED TIME
5. REPRESENTS RELEASE OF RADIOACTIVE MATERIAL

SUBJECT:

TYPICAL LOG PRESENTATION OF A RADIOACTIVE TRACER SURVEY

FIGURE **7**

TABLES

Table 1. Summary of Straddle-Packer Transmissivity Data, Coral Springs Improvement District Injection Well #2

Test #	Interval ft	Data Source	Calculated Transmissivity ft	Hydraulic Conductivity ft^2	Hydraulic Conductivity cm/sec
1	1180-1220	Recovery (t/t')	494	12.35	0.000582
2	1090-1130	Recovery (t/t')	416	10.40	0.000490
3	2300-2340	Recovery (t/t')	198	4.95	0.000233
4	2450-2490	Recovery (t/t')	220	5.50	0.000259
5	2600-2640	Recovery (t/t')	113	2.83	0.000133

Table 2. Summary of Core Permeability and Porosity Data, Coral Springs Improvement District Injection Well #2

Core #	Depth (ft)	Horizontal Permeability (cm/sec)	Vertical Permeability (cm/sec)	Porosity %
1A	2358.4-2358.9	7.00×10^{-5}	4.60×10^{-5}	30.6
1B	2352.9-2353.7	1.14×10^{-4}	1.71×10^{-4}	27.6
1C	2351.3-2351.9	2.54×10^{-5}	8.45×10^{-4}	26.3
2A	2457.9-2458.4	2.46×10^{-5}	6.80×10^{-5}	34.1
2B	2455.0-2456.0	1.66×10^{-4}	1.82×10^{-4}	29.0
2C	2450.7-2451.5	3.60×10^{-4}	3.64×10^{-4}	34.9
3A	2558.5-2559.0	4.04×10^{-5}	5.89×10^{-6}	33.3
3B	2555.2-2555.8	5.77×10^{-5}	6.42×10^{-5}	28.5
3C	2549.0-2549.6	4.13×10^{-6}	7.51×10^{-5}	34.3
4A	2609.4-2610.0	5.64×10^{-5}	5.73×10^{-5}	28.0
4B	2606.4-2607.0	6.62×10^{-5}	2.31×10^{-5}	34.0
4C	2602.0-2602.6	5.53×10^{-4}	6.01×10^{-5}	34.1
5A	2707.5-2708.0	6.69×10^{-5}	2.50×10^{-5}	17.6
5B	2706.5-2707.0	2.34×10^{-5}	1.10×10^{-6}	18.1
5C	2703.1-2704.0	4.53×10^{-5}	4.62×10^{-6}	17.3
6A	2829.8-2830.4	7.43×10^{-4}	3.49×10^{-4}	42.7
6B	2826.2-2826.8	9.63×10^{-4}	1.12×10^{-3}	43.5
6C	2824.3-2824.8	1.34×10^{-4}	2.76×10^{-4}	25.9

Table 3. Summary of Water Quality Analysis, Coral Springs Improvement District Injection Well #2

Too shallow for these values

Source	Interval (ft)	TDS (mg/L)	Chloride (mg/l)	Specific Conductance micromhos/cm	Sulfate (mg/L)
Straddle-Packer Test	1,090-1,130	9,367	5,400	15,170	1,030
Straddle Packer Test	1,180-1,220	10,658	5,800	16,800	1,472
Straddle-Packer Test	2,300-2,340	30,000	17,500	6,810	2,395
Straddle-Packer Test	2,450-2,490	34,800	19,800	7,880	2,088
Straddle-Packer Test	2,600-2,640	39,446	16,900	6,930	3,860
Lower Monitor Zone	1,500-1,650	4,432	2,333	NR	124
Upper Monitor Zone	1,000-1,115	11,514	6,550	NR	1,970
Injection Zone	2,900-3,510	35,100	24,650	4,110	2,464

Note: NR abbreviates Not Reported

APPENDIX A

Injection Well #2
Geologic Log

GEOLOGIC LOG
OF
CORAL SPRINGS IW-2
CORAL SPRINGS, FLORIDA

Depth Interval (feet)	Thickness (feet)	Sample Description
0 - 10	10	SAND, SANDY LIMESTONE, SHELL, AND FILL - Sand, 30%, colorless, quartz, medium-grained, sub-rounded; Sandy Limestone, 30%, very pale orange, micritic with some quartz, 20%, moderately well-cemented, medium hardness; Shell, 20%, very pale orange, small to large fragments, mostly angular weathered to unweathered; Fill, 20%, pale orange to tan, limestone and sandstone, gravel- to cobble-sized material.
10 - 30	20	SANDSTONE, SANDY LIMESTONE, AND SHELL - Sandstone, 45%, pale orange to yellowish gray, quartz, medium- to coarse-grained, sub-angular to sub-rounded, moderately well-cemented, medium hard to soft; Sandy Limestone, 45%, pale orange to yellowish gray, micritic with quartz sand, moderately well-cemented, soft; Shell, 10%, very pale orange to white, small to large fragments, mostly angular, weathered.
30 - 60	30	PHOSPHATIC LIMESTONE, SANDSTONE, AND SHELL - Phosphatic Limestone, 65%, light to medium gray, micritic with quartz sand and phosphate, moderately well-cemented, soft to medium hard; Sandstone, 30%, light to medium gray, quartz, medium-grained with some very coarse, frosted grains, sub-angular to rounded, moderately well-cemented, hard to soft; Shell, 5%, very pale orange to white, medium-sized fragments, mostly angular, weathered.

Depth Interval (feet)	Thickness (feet)	Sample Description
60 - 70	10	PHOSPHATIC LIMESTONE AND PHOSPHATIC SANDSTONE - Phosphatic limestone 70%, light to medium gray, micritic with quartz sand (30-40%) and phosphate nodules, moderately well- to well-cemented, medium hard; Phosphatic Sandstone, 30%, light to medium gray, quartz, medium- to coarse-grained, mostly sub-rounded, mostly well-cemented, medium hard; Shell, trace, pale orange to tan.
70 - 80	10	SHELL, PHOSPHATIC LIMESTONE, AND PHOSPHATIC SANDSTONE - Shell, 70%, mostly pale orange, angular fragments and whole shells, unweathered; Phosphatic limestone, 20%, light to medium gray, micritic with quartz sand (30-40%) and phosphate nodules, moderately-well- to well-cemented, medium hard; Phosphatic sandstone, 10%, light to medium gray, quartz, medium- to coarse-grained, mostly sub-rounded, mostly well-cemented, medium hard.
80 - 106	26	PHOSPHATIC LIMESTONE WITH SHELL- Phosphatic Limestone with Shell, 100%, mostly medium gray with some very pale orange, micritic with quartz, shell and phosphate, moderately well-cemented, medium hard.
106 - 120	14	SHELL AND LIMESTONE - Shell, 75%, very pale orange to white, mostly small to medium-sized fragments, mostly angular, unweathered; Limestone, 25%, very light gray to light gray, micritic with some quartz, phosphate and mostly shell, poor- to moderately-well-cemented, mostly soft.

Depth Interval (feet)	Thickness (feet)	Sample Description
120 - 160	40	LIMESTONE AND SHELL - Limestone, 100%, slightly phosphatic (10%), mostly white to very pale olive, clear to frosted appearances, sparitic with calcite, little quartz, moderately hard, well-cemented; Shell, 5%, white to light gray, sub-angular, weathered.
160 - 170	10	CLAYEY LIMESTONE - Limestone with Shell, 100%, white to grayish olive, small phosphatic fraction, but mostly small- to medium-sized fragments, clayey (in textural terms, grain size), moderately-hard, well-cemented with Shell, 10%, pale orange to light gray, sub-angular, weathered.
170 - 210	40	SANDY CLAY, PHOSPHATIC LIMESTONE, AND SHELL - Sandy Clay, 80%, pale olive to greenish gray, quartz sand, clear, fine-grained; Clay Fraction, 70%, soft, non-plastic; Phosphatic Limestone, 15%, light to dark gray, micritic, small fragments, moderately hard; Shell, 5%, white to pale orange, small- to medium-sized fragments, sub-angular, weathered.
210 - 220	10	CLAY - Clay, 90%, pale olive to grayish green, some quartz, clear, fine-grained, mostly soft plastic clay; Phosphatic Limestone, 5%, small- to very-small fragments, dark gray, micritic; Shell, 5%, white to light gray, small fragments, sub-rounded, quite weathered.
220 - 560	340	CLAY - Clay, 100%, grayish olive green, soft; phosphatic limestone, trace; Shell, trace; plastic.

Depth Interval (feet)	Thickness (feet)	Sample Description
560 - 590	30	LIMESTONE - Limestone, 97%, white to pale olive; Clay, 3%, light pale olive; slightly phosphatic.
590 - 600	10	CLAY - Clay, 100%, light pale olive, soft, plastic; Limestone, fragments.
600 - 610	10	LIMESTONE - Limestone, 97%, white to pale olive; Clay, 3%, light pale olive, soft, plastic; Phosphatic limestone, trace.
610 - 680	70	CLAY - Clay, 100%, pale olive, soft, plastic; Phosphatic limestone, trace.
680 - 690	10	LIMESTONE - Limestone, 99%, white to pale olive; Clay, 1%, pale olive, soft, plastic, shell fragments.
690 - 710	20	CLAY - Clay, 100%, pale olive, soft, plastic; Phosphatic limestone, trace.
710 - 720	10	CLAY - Clay, 50%, pale olive, soft, plastic; Limestone, 50%, white to olive gray; phosphatic limestone, trace.
720 - 790	70	CLAY - Clay, 90%, pale olive, soft, plastic; Limestone, 10%, white to pale olive; Phosphatic limestone, trace.
790 - 810	20	LIMESTONE - Limestone, 90%, white to pale olive; Clay, 10%, pale olive, soft, plastic; Phosphatic limestone, trace.
810 - 840	30	CLAY - Clay, 100%, pale olive, soft, plastic; Phosphatic limestone, trace.
840 - 970	130	CLAY - Clay, 90%, moderate olive brown, soft, plastic; Limestone, 10%, white to moderate olive brown; Phosphatic limestone, trace.

Depth Interval (feet)	Thickness (feet)	Sample Description
970 - 990	20	LIMESTONE MARL - Marl, 90%, pale olive, soft; Limestone, 30%, pale olive, hard; Phosphatic, fine-grained, sub-angular to rounded.
990 -1000	10	SANDY LIMESTONE - Limestone, 70%, pale olive, fine-grained, biomicrite, hard; Sand, 30%, clear to black, quartz, phosphatic, very fine-grained, sub-angular to sub-rounded.
1000 -1010	10	MARL LIMESTONE - Limestone, 80%, yellowish-gray, fine- to medium-grained, biomicrite, hard; Marl, 20%, pale olive, soft, plastic; Phosphatic limestone, very fine-grained.
1010 -1020	10	LIMESTONE AND SANDSTONE - Limestone, 85%, very pale orange to very light gray, micritic with shell, moderately well-cemented, medium hard to soft; Sandstone, 15%, dusky yellow green to light gray, quartz with some clay, fine- to medium-grained, mostly sub-angular, poorly-cemented, friable and soft.
1020 -1250	230	LIMESTONE - Limestone, 100%, very pale orange to pinkish gray, micritic with some shell, occasionally very sandy, moderately well-cemented, hard to soft; Phosphate, trace, black to amber, small granules.
1250 -1470	220	LIMESTONE - Limestone, 100%, very pale orange to very light gray in places, micritic with rounded calcareous grains, shell, forams and occasional sand, poor- to moderately-well-cemented with occasional well-cemented and hard lenses, mostly soft, very porous; Clay, trace, yellowish gray, calcareous.

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Depth Interval (feet)	Thickness (feet)	Sample Description
1470 -1710	240	LIMESTONE - Limestone, 100%, very pale orange to light gray, micritic with forams and some echinoids, poor- to moderately-well-cemented, soft to medium hard, very hard in places, porous and vuggy in places; Shell, trace, very pale orange; Clay, trace, white, calcareous, plastic.
1710 -1830	120	LIMESTONE - Limestone, 100%, very pale orange to very light gray, micritic with forams, occasional echinoids, poor- to moderately-well-cemented, soft- to medium-hard, porous; Phosphate, occasional traces, black, granules.
1830 -1970	140	LIMESTONE - Limestone, 70%, very pale orange, micritic with forams, poorly-cemented, soft, very porous; Limestone, 30%, light gray, micritic with fossils, well-cemented, hard, vuggy.
1970 -2020	50	LIMESTONE - Limestone, 100%, white, micritic with some forams, moderately-well- to well-cemented, medium-hard, chalky; Clay, trace, white, calcareous.
2020 -2026	6	LIMESTONE AND CLAY - Limestone, 95%, very pale orange, micritic with some forams, poorly-cemented, soft; Clay, 5%, yellowish gray, calcareous, sticky.
2026 -2060	34	LIMESTONE - Limestone, 100%, white, micritic, poorly-cemented, mostly soft but well-cemented and medium hard in places, very porous; Clay, trace, white to yellowish gray.

See more detailed descriptions in well file

Depth Interval (feet)	Thickness (feet)	Sample Description
2060 -2070	10	LIMESTONE AND CLAY - Limestone, 95%, very pale orange to white, micritic, poorly-cemented to moderately-well-cemented in places, mostly soft, very porous; Clay, 5%, yellowish gray, calcareous.
2070 -2090	20	LIMESTONE - Limestone, 100%, very pale orange to medium light gray, micritic, moderately-well-cemented to well-cemented, medium hard to very hard, very porous and vuggy.
2090 -2130	40	LIMESTONE - Limestone, 90%, very pale orange, micritic with forams, poorly-cemented, very soft, very porous; Limestone, 10%, medium light gray, moderately well-cemented, medium hard, porous.
2130 -2150	20	LIMESTONE AND DOLOMITE - Limestone, 70%, very pale orange to yellowish gray, micritic containing sparse dolomite crystals, poorly to moderately-well-cemented, soft to medium hard, porous; Dolomite, 30%, moderate brown to moderate yellowish brown, crystalline dolomite, well-cemented, very hard, vuggy; Clay, trace, yellowish gray, calcareous.
2150 -2160	10	DOLOMITE AND LIMESTONE - Dolomite, 90%, moderate brown to moderate yellowish brown, crystalline dolomite, well-cemented, very hard, vuggy; Limestone, 10%, very pale orange, micritic, poorly to moderately-well-cemented, soft to medium hard, porous.
2160 -2250	90	DOLOMITE AND LIMESTONE - Dolomite, 90%, black to moderate yellow brown, crystalline, well-cemented, very hard, vuggy; Limestone, 10%, very pale orange to very light gray.

Depth Interval (feet)	Thickness (feet)	Sample Description
2250 -2310	60	LIMESTONE - Limestone, 100%, very pale orange to gray, fine- to medium-grained, vuggy; Dolomite, trace.
2310 -2330	20	LIMESTONE AND DOLOMITE - Limestone, 50%, very pale orange, micritic, poorly-cemented, soft; Dolomite, 50%, dark yellowish brown, poorly to moderately-well-cemented, medium hard to soft.
2330 -2360	30	FORAMINIFERAL LIMESTONE- Foraminiferal limestone, 100%, very pale orange, micritic, poorly-cemented, soft.
2360 -2370	10	LIMESTONE AND DOLOMITE - Limestone 55%, very pale orange, micritic with forams, poorly cemented, soft; Dolomite, 45%, dark yellowish brown, medium hard to soft, moderately well-cemented.
2370 -2450	80	LIMESTONE - Limestone, 100%, very pale orange, micritic with forams and some shell, poorly-cemented to moderately well-cemented, soft to hard.
2450 -2680	230	LIMESTONE - Limestone, 100%, very pale orange, medium-grained, micritic, soft; Phosphatic limestone, trace.
2680 -2700	20	LIMESTONE - Limestone, 100%, very pale orange, medium-grained, micritic, hard; Dolomite, trace.
2700 - 2710	10	DOLOMITE - Dolomite, 100%, dark yellowish brown, medium-grained, hard; Limestone, trace.

Depth Interval (feet)	Thickness (feet)	Sample Description
2710 -2720	10	LIMESTONE AND DOLOMITE - Limestone, 90%, very pale orange, fine- to coarse-grained, soft to hard; Dolomite, 10%, dark yellowish brown, medium-grained, hard.
2720 -2730	10	LIMESTONE - Limestone, 100%, very pale orange, fine-grained, micritic, soft; Dolomite, trace.
2730 -2740	10	DOLOMITE - dolomite, 100%, dark yellowish brown, medium-grained, hard; Limestone, trace.
2740 -2750	10	DOLOMITIC LIMESTONE - Dolomite, 60%, dark yellowish brown, medium- to coarse-grained, hard; Limestone, 40%, very pale orange, fine- to medium-grained, micritic, soft.
2750 -2790	40	DOLOMITIC LIMESTONE - Dolomite, 50%, dark yellowish brown, medium- to coarse-grained, hard; Limestone, 50%, very pale orange, fine-grained, micritic, poorly-cemented, soft.
2790 -2810	20	DOLOMITIC LIMESTONE - Dolomite, 90%, dark yellowish brown to light brown, medium- to coarse-grained, hard; Limestone, 10%, white to very pale orange, medium-grained, micritic, poorly-cemented, soft to hard.
2810 -2820	10	LIMESTONE - Limestone, 98%, white to very pale orange, medium- to coarse-grained, micritic, soft to hard; Dolomite, trace.

Depth Interval (feet)	Thickness (feet)	Sample Description
2820 -2830	10	DOLOMITIC LIMESTONE - Dolomite, 90%, dark yellowish brown to medium gray, fine- to medium-grained, solution cavities, hard; Limestone, 10%, white to very pale orange, medium-grained, micritic, poorly-cemented, soft.
2830 -2840	10	DOLOMITIC LIMESTONE -Dolomite, 50%, medium gray to black, medium-grained, hard; Limestone, 50%, white to very pale orange, fine- to medium-grained, micritic, poorly-cemented, soft.
2840 -2850	10	LIMESTONE - Limestone, 95%, very pale orange, fine-grained, micritic, poorly-cemented, soft; Dolomite, 5%, dark yellowish brown to black, medium- to coarse-grained, hard.
2850 -2910	60	LIMESTONE - Limestone, 100%, very pale orange, medium- to coarse-grained, micritic, poorly-cemented, soft; Dolomite, trace, medium gray to black, medium- to coarse-grained, hard.
2910 -3000	90	LIMESTONE - Limestone, 100%, very pale orange, medium-grained, micritic, poorly-cemented, hard; Phosphatic limestone, trace.
3000 -3020	20	LIMESTONE - Limestone, 80%, yellowish gray, micritic, moderately-well-cemented to poorly-cemented, soft, fossils, foraminifera, trace; Clay, 20%, yellowish gray, calcareous, semi-plastic.
3030 -3073	43	LIMESTONE - Limestone, 100%, micritic, very pale orange to white, poorly- to moderately-well-cemented, soft to moderately hard, brittle, slightly porous, foraminiferal, trace; Clay, trace, calcareous, yellowish gray.

Depth Interval (feet)	Thickness (feet)	Sample Description
3073 -3085	12	LIMESTONE - Limestone, 70%, very pale orange to white, very fine-grained poorly- to moderately-well-cemented, soft to moderately hard, saccharoidal, solution cavities, vuggy, foraminiferal; Dolomitic Limestone, 15%, very light gray, microcrystalline, hard to very hard; Dolomite, 10%, medium yellowish gray, micritic, hard, vuggy; Dolomitic shale, 5%, grayish black, microcrystalline, very hard.
3085 -3120	35	LIMESTONE - Limestone, 60%, very pale orange to white, fine-grained, poorly- to moderately-well-cemented, soft to moderately hard, vuggy, saccharoidal, solution cavities, foraminiferal; Dolomite, 40%, medium yellowish gray to dark gray, micritic, moderately hard to very hard, vuggy.
3120 -3130	10	DOLOMITE - Dolomite, 80%, dark yellowish brown to grayish black, microcrystalline, hard to very hard, solution cavities; Limestone, 20%, very pale orange, fine-grained, poorly-cemented, soft to moderately hard, saccharoidal, vuggy.
3130 -3140	10	DOLOMITE - Dolomite, 70%, dark yellowish brown to grayish black, microcrystalline, moderately hard to hard, solution cavities; Limestone, 30%, very pale orange to white, fine-grained, poorly- to moderately-well-cemented, soft to moderately hard, vuggy.

Depth Interval (feet)	Thickness (feet)	Sample Description
3140 -3150	10	DOLOMITE - Dolomite, 95%, microcrystalline, olive gray to light olive gray, hard to very hard, cavernous; Limestone, 5%, white, fine-grained, poorly- to moderately-well-cemented, soft to moderately hard, vuggy, foraminiferal.
3150 -3170	20	DOLOMITE - Dolomite, 100%, microcrystalline, light olive gray to grayish black, hard to very hard, partly porous; Limestone, trace, white to very pale orange, soft, brittle, vuggy.
3170 -3180	10	DOLOMITE -Dolomite, 95%, microcrystalline, light olive gray to dark yellowish brown, moderately hard to very hard, partly porous; Limestone, 5%, white to very pale orange, soft, vuggy.
3180 -3190	10	DOLOMITE - Dolomite, 100%, microcrystalline, very light gray to light gray, moderately hard to very hard, dense, some solution cavities; Limestone, trace, white, soft, porous, micritic.
3190 -3200	10	DOLOMITE - Dolomite, 95%, microcrystalline, light olive gray to olive gray, hard to very hard, dense, some solution cavities; Limestone, 5%, micritic, white, soft, porous.
3200 -3230	30	DOLOMITE - Dolomite, 100%, microcrystalline, light olive gray to olive gray, hard to very hard; Limestone, trace, white, soft to very soft, slightly porous.

Depth Interval (feet)	Thickness (feet)	Sample Description
3230 -3420	190	DOLOMITE - Dolomite, 100%, microcrystalline, very light gray to dark gray, moderately hard to very hard; limestone, trace, white to pale orange, soft to very soft, slightly porous.
3420 -3500	80+	DOLOMITE - Dolomite, 100%, very fine crystalline, calcitic, moderate yellowish brown to black, moderately hard to very hard; Limestone, trace, very pale orange, soft.

TOTAL DEPTH: 3500

DEEP MONITOR WELL #2

Geologic Log

GEOLOGIC LOGS
OF
CORAL SPRINGS DMW-#2
CORAL SPRINGS, FLORIDA

Depth Interval (feet)	Thickness (feet)	Sample Description
0 - 10	10	SHELL, SANDY LIMESTONE, SAND, AND FILL - Shell, 50%, very pale orange, medium fragments, angular, weathered; Sandy limestone, 30%, very pale orange, medium hardness, vuggy; Sand, 10%, colorless, quartz; Fill, 10%, pale orange to gray, limestone and sandstone, medium-grained, angular, material.
10 - 20	10	SHELL, SANDY LIMESTONE - Shell, 50%, very pale orange, medium fragments, angular; Sandy limestone, 50%, very pale orange to yellowish gray, micrite with quartz sand, medium hard, well-cemented.
20 - 40	20	LIMESTONE, SANDSTONE - Limestone, 50%, yellowish gray, fine-grained with angular pebbles; Sandstone, 50%, very pale orange, quartz, fine- to medium-grained, very angular, vuggy.
40 - 70	30	LIMESTONE, SANDSTONE - Limestone, 80%, yellowish gray, medium-grained, angular; Sandstone, 20%, yellowish gray, medium-grained, angular; Marl, trace, yellowish gray; Phosphatic limestone, trace.
70 - 80	10	SHELL, LIMESTONE - Shell, 80%, yellowish orange, medium fragments, angular; Limestone, 20%, yellowish gray, medium-grained, angular, vuggy.

Depth Interval (feet)	Thickness (feet)	Sample Description
80 - 110	30	LIMESTONE, SHELL - Limestone 80%, yellowish gray, medium-grained, angular, vuggy; Shell, 20%, yellowish orange, medium fragments, angular; marl, trace.
110 - 140	30	SHELL, SAND, MARL - Shell, 90%, yellowish orange, medium fragments, angular; Sand, 5%, clear, fine- to medium-grained, angular; Marl, 5%, yellowish gray; Phosphatic limestone, trace.
140 - 150	10	SHELL, SAND - Shell, 90%, yellowish orange, medium fragments, angular; Sand, 10%, clear, fine- to medium-grained, angular; Phosphatic limestone, trace.
150 - 160	10	LIMESTONE AND SHELL - Limestone, 100%, white to pale olive, little quartz, fine- to medium-grained, angular; Shell, trace.
160 - 170	10	CLAYEY LIMESTONE - Limestone, 90%, white to pale olive, fine- to medium-grained, angular; clayey with shell fragments, 10%; Phosphatic limestone, trace.
170 - 180	10	SANDY LIMESTONE, SHELL - Sandy Limestone, 80%, pale olive to greenish gray, quartz sand, clear, fine-grained; Shell, 20%, pale orange, small to medium fragments, sub-angular; Phosphatic limestone, trace.
180 - 220	40	NO SAMPLE - Cement cutting only due to poor circulation. Presumably clay.
220 - 370	150	CLAY - Clay, 100%, grayish olive to grayish olive green, plastic to sticky.

Depth Interval (feet)	Thickness (feet)	Sample Description
370 - 550	180	CLAY - Clay, 100%, light pale olive, soft, plastic; Phosphatic limestone, trace.
550 - 560	10	CLAY - Clay, 90%, pale olive to light olive gray, soft, plastic; Phosphatic limestone, 10%, black, soft.
560 - 600	40	CLAY - Clay, 100%, grayish olive, soft, plastic; Phosphatic limestone, trace.
600 - 620	20	CLAY AND LIMESTONE - Clay, 95%, pale olive, sticky; Limestone, 5%, very pale orange to white, soft and poorly-cemented.
620 - 720	100	CLAY - Clay, 100%, pale olive, sticky; Limestone, trace, very pale orange to white.
720 - 760	40	CLAY AND LIMESTONE - Clay, 90%, pale olive, sticky; Limestone, 10%, very pale orange to white, poorly,cemented and soft; Phosphate, trace, black, small flecks.
760 - 810	50	CLAY - Clay, 100%, yellowish gray, sticky; Limestone, trace, very pale orange to white.
810 - 830	20	CLAY AND LIMESTONE - Clay, 95%, yellowish gray, sticky to plastic; limestone, 5%, very pale orange to yellowish gray, poorly-cemented and soft.
830 - 946	116	CLAY - Clay, 100%, yellowish gray to pale olive, sticky to plastic, contains streaks of grayish olive colored clay; Limestone, trace, very pale orange to yellowish gray.

Depth Interval (feet)	Thickness (feet)	Sample Description
946 - 970	24	CLAY AND LIMESTONE - Clay, 90%, mostly pale olive, sticky to plastic; Limestone, 10%, very pale orange, poorly-cemented, soft.
970 -1000	30	CLAY AND LIMESTONE - Clay, 55%, pale olive, sticky; Limestone, 45%, very pale orange to yellowish gray, phosphatic with shell, poorly-cemented, soft.
1000 -1010	10	LIMESTONE - Limestone, 100%, very pale orange to yellowish gray, phosphatic with shell, poorly-cemented, soft.
1010 -1210	200	LIMESTONE - Limestone, 100%, pale orange, coarse-grained, micritic with forams and occasional shell fragments, poorly to moderately-well-cemented, mostly soft, porous.
1210 -1220	10	LIMESTONE WITH SHELL - Limestone with shell, 100%, very light gray, micritic with shell, forams and coral, medium-grained, moderately well-cemented, soft to medium hard.
1220 -1410	190	LIMESTONE - Limestone, 100%, very pale orange, micritic with extremely abundant forams, medium- to coarse-grained, poorly-cemented, soft, porous with foram content varying in places.
1410 - 1430	20	LIMESTONE AND PHOSPHATIC LIMESTONE-Limestone, 75%, very pale orange, micritic with extremely abundant forams, medium- to coarse-grained, poorly-cemented, soft; Phosphatic limestone, 25%, light gray, micritic with forams, coarse-grained, moderately well-cemented, medium hard.

Depth Interval (feet)	Thickness (feet)	Sample Description
1430 -1450	20	LIMESTONE AND PHOSPHATIC LIMESTONE- Limestone, 95%, very pale orange, micritic with forams medium- to coarse-grained, moderately well-cemented, soft to medium-hard; Phosphatic limestone, 5%, light gray, micritic with forams, medium- to coarse-grained, moderately well-cemented, soft to medium hard.
1450 -1460	10	LIMESTONE - Limestone, 100%, very pale orange, micritic with forams, fine- to coarse-grained, moderately well-cemented, medium hard to soft, porous to tight.
1460 -1470	10	LIMESTONE - Limestone, 80%, light gray, micritic with forams, medium- to coarse-grained, poorly-cemented, soft, porous; Limestone, 20%, very pale orange, micritic with forams, medium- to coarse-grained, poorly-cemented, soft, porous.
1470 -1500	30	LIMESTONE - Limestone, 60%, very pale orange to white, micritic with forams, medium- to coarse-grained, poorly-cemented, soft, porous; Limestone, 40%, light gray, micritic with forams, medium- to coarse-grained, poorly-cemented, soft, porous.
1500 -1530	30	LIMESTONE - Limestone, 80%, micritic, very pale orange to white, poorly-cemented, soft, foraminiferal; Limestone, 20%, micritic, light gray, poorly-cemented, soft, foraminiferal.
1530 -1650	120+	LIMESTONE - Limestone, 100%, micritic, very pale orange to light gray, poor- to moderately-well-cemented, medium hard to soft, porous, foraminiferal.

TOTAL DEPTH: 1650

APPENDIX B

Core Photographs


CORAL SPRINGS
IW-2
CORE # 2
DATE: 10/1/89
INTERVAL:
2450 FT → 2460 FT


CORAL SPRINGS
IW-2
CORE # 1
DATE: 9/30/89
INTERVAL:
2350' - 2360'
2360

CORAL SPRINGS
IW 2
CORE # 1
DATE 9/30/97
INTERVAL
2350' - 2360'
2355
2350


CORAL SPRINGS
IW-2
CORE #3
DATE: 10-3-89
INTERVAL: 2549'-2559'

CORAL SPRINGS
IW-2
CORE #3
DATE: 10-3-89
INTERVAL: 2549'-2559'
2554
2549


CORAL SPRINGS
IW-2
CORE #3
DATE 10-3-89
INTERVAL 2549'-255
2554


CORAL SPRINGS
IW-2
CORE # 2
DATE: 10/1/89
INTERVAL:
2450' → 2460'


CORAL SPRINGS
IW-2
CORE # 2
DATE: 10/1/89
INTERVAL:
2450' → 2460'
2455
2450


2832
T
6A
B
CSID-DW#2.

2704
core 5C
Top
2703.1
Bottom
2704.0
2709
core 5A
Bottom
2708.0


CORAL SPRINGS
IW-2
CORE #4
DATE: 10-4-89
INTERVAL: 2600'-2610'
2610
2605


CORAL SPRINGS
IW-2
CORE *4
DATE: 10-4-89
INTERVAL: 2600'-2610'
2605
2600


CORAL SPRINGS
IW-2
CORE #6
DATE:
INTERVAL:
2822—2832


CORAL SPRINGS
IW-2
CORE #6
DATE: 10/6/89
INTERVAL:
2822 — 2832
#6
2827
2832'


CORAL SPRI
IW-2
CORE #5
DATE 10-5-89
INTERVAL 2699'-270


CORAL SPRINGS
IW-2
CORE #5
DATE: 10-5-89
INTERVAL: 2699'-2709'
2704
2709

APPENDIX C

Geophysical Logs

Under Separate Cover - Volume II

APPENDIX D

Analyses of Water Samples From Straddle-Packer Tests, Injection Zone, Monitor Zones, and Effluent

STRADDLE-PACKER TEST WATER QUALITY

[illegible] LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS. 1185-1225'

SOURCE INJECTION WELL 2
LAB. NUMBER 89-6314
GROUND WATER CLASS Straddle PKR #1
SAMPLED BY S.H./GEE JENSEN ENG.
NO. WELL CASING VOL. PURGED

SAMPLE DATE 9/5/89
SAMPLE TIME 12:26
COMPLETION DATE 9/6/89
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
0300	T D S	160.1	10,658	MG/L	9/6	E. BEROLDI
00940	CHLORIDES	407A	5800	MG/L	9/11	G. MEYER
0095	CONDUCTIVITY	120.1	16,800	UMHOS/CM	9/6	G. MEYER
0945	SULFATE	426C	1472	MG/L	9/6	R. KULB

REMARKS: * AMENDED 9/11/89

REVIEWED BY: G. MEYER

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS. S.P.T. #2

SOURCE CORAL SPRINGS IW-2
LAB. NUMBER 89-6446
GROUND WATER CLASS Depth 1090 - 1130
SAMPLED BY D.H.
NO. WELL CASING VOL. PURGED

SAMPLE DATE 9/7/89
SAMPLE TIME 2:12 PM
COMPLETION DATE 9/11/89
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
0300	T D S	160.1	9367	MG/L	9/9	G. MEYER
00940	CHLORIDE	407A	5400	MG/L	9/11	G. MEYER
0095	CONDUCTIVITY	120.1	15,170	UMHOS/CM	9/8	G. MEYER
1945	SULFATE	426C	1030	MG/L	9/9	G. MEYER

REMARKS:

776 7238

REVIEWED BY: F. HOBLE

BROWARD TESTING LAB...
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT: YOUNGQUIST BROS. S.P.T. #3

SOURCE: CORAL SPRINGS IW #2 (2300-2340)
LAB. NUMBER: 89-7063 A
GROUND WATER CLASS:
SAMPLED BY: CLIENT
NO. WELL CASING VOL. PURGED:

SAMPLE DATE: 10/11/89
SAMPLE TIME: 11:35 AM
COMPLETION DATE: 11/1/89
SAMPLE TYPE:
( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
70300	TDS	160.1	30,000	MG/L	11/1	E. BEROLDI
00945	SULFATE	426C	2395	MG/L	11/1	DAVE
00095	CONDUCTIVITY	120.1	6810	UMHOS/CM	11/1	E. BEROLDI
00940	CHLORIDE	407A	17,500	MG/L	11/1	E. BEROLDI

REMARKS:

REVIEWED BY: F. HOBLE

BTL

BROWARD TESTING LABORATORY, INC.

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS. S.P.T. #4

SOURCE CORAL SPRINGS IW #2 (2450-2490)
LAB. NUMBER 89-7063B
GROUND WATER CLASS
SAMPLED BY CLIENT
NO. WELL CASING VOL. PURGED

SAMPLE DATE 10/12/89
SAMPLE TIME 4:10 PM
COMPLETION DATE 11/1/89
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
70300	TDS	160.1	34,800	MG/L	11/1	E. BEROLDI
00945	SULFATE	426C	2088	MG/L	11/1	DAVE
00095	CONDUCTIVITY	120.1	7,880	UMHOS/CM	11/1	E. BEROLDI
00940	CHLORIDE	407A	19,800	MG/L	11/1	E. BEROLDI

REMARKS:

REVIEWED BY: F. HOBLE

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROTHERS , INC. SPT #5

SOURCE CORAL SPRINGS IW #2
LAB. NUMBER 89-7063
GROUND WATER CLASS 2600 - 2640'
SAMPLED BY CLIENT
NO. WELL CASING VOL. PURGED

SAMPLE DATE 10/13/89
SAMPLE TIME 9:12 PM
COMPLETION DATE 10/31/89
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
70300	TDS	160.1	39,446	MG/L	10/31	E. BEROLDI
00945	SULFATE	426C	3,860	MG/L	10/31	E. GOLEM
00095	CONDUCTIVITY	120.1	6,930	MG/L	10/17	E.BEROLDI
00940	CHLORIDE	407A	16,900	MG/L	10/31	F. HOBLE

REMARKS:

REVIEWED BY: G. MEYER

INJECTION-ZONE WATER QUALITY

BTL
BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

ORGANOCHLORINE PESTICIDES AND PCB'S
METHOD - 608
LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE CORAL SPRINGS WELL #2
LAB. NUMBER 89-7657
GROUND WATER CLASS
SAMPLED BY CLIENT
NO. WELL CASING VOL. PURGED

SAMPLE DATE 11/28/89
SAMPLE TIME 6:55 AM
COMPLETION DATE 12/29/89
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
39330	ALDRIN	608	<1.0	UG/L	12/15	C. AMON
39337	A-BHC	608	<1.0	UG/L	"	"
39338	B-BHC	608	<1.0	UG/L	"	"
34259	D-BHC	608	<1.0	UG/L	"	"
39340	Y-BHC	608	<1.0	UG/L	"	"
39350	CHLORDANE	608	<1.0	UG/L	"	"
39310	4,4'-DDD	608	<1.0	UG/L	"	"
39320	4,4'-DDE	608	<1.0	UG/L	"	"
39300	4,4'-DDT	608	<1.0	UG/L	"	"
39380	DIELDRIN	608	<1.0	UG/L	"	"
34361	ENDOSULFAN I	608	<1.0	UG/L	"	"
34356	ENDOSULFAN II	608	<1.0	UG/L	"	"
34351	ENDOSULFAN SULFATE	608	<1.0	UG/L	"	"
39390	ENDRIN	608	<1.0	UG/L	"	"
34366	ENDRIN ALDEHYDE	608	<1.0	UG/L	"	"
39410	HEPTACHLOR	608	<1.0	UG/L	"	"
39420	HEPTACHLOR EPOXIDE	608	<1.0	UG/L	"	"
39400	TOXAPHENE	608	<1.0	UG/L	"	"
34671	PCB-1016	608	<1.0	UG/L	"	"
39488	PCB-1221	608	<1.0	UG/L	"	"
39492	PCB-1232	608	<1.0	UG/L	"	"
39496	PCB-1242	608	<1.0	UG/L	"	"
39500	PCB-1248	608	<1.0	UG/L	"	"
39504	PCB-1254	608	<1.0	UG/L	"	"
39508	PCB-1260	608	<1.0	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYER

BTL

BROWARD TESTING LABORATORY, INC.

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE CORAL SPRINGS WELL #2
LAB. NUMBER 89-7657
GROUND WATER CLASS
SAMPLED BY CLIENT
NO. WELL CASING VOL. PURGED

SAMPLE DATE 11/28/89
SAMPLE TIME 6:55 AM
COMPLETION DATE 12/29/89
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
70507	ORTHOPHOSPHATE	365.4	<0.20	MG/L	12/5	E. BEROLD
00625	TOTAL NITROGEN	351.2	0.555	MG/L	12/5	E. BEROLD
01046	IRON	236.1	2.26	MG/L	12/6	E. BEROLD
01095	ANTIMONY	204.2	<0.005	MG/L	11/30	K. VAGI
01080	STRONTIUM	303A	8.10	MG/L	11/30	K. VAGI
00935	POTASSIUM	258.1	434	MG/L	11/30	K. VAGI
00945	SULFATE	426C	2.464	MG/L	11/30	E. BEROLD
00950	FLUORIDE	340.2	0.23	MG/L	12/1	E. GOLEM
00940	CHLORIDE	407A	24,650	MG/L	11/30	E. BEROLD
00681	TOC	415.1	2.80	MG/L	12/4	E. GOLEM
00840	COD	410.4	995	MG/L	12/5	E. GOLEM
78170	BROMIDE	405	77.1	MG/L	12/6	D. MEHL
01020	BORON	AA FURN.	0.0555	MG/L	11/30	K. VAGI
00930	SODIUM	273.1	10,000	MG/L	11/30	K. VAGI
00746	HYDROGEN SULFIDE	427	0.06	MG/L	11/29	E. BEROLD

REMARKS:

REVIEWED BY: G. MEYER

BTL

BROWARD TESTING LABORATORY, INC.

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

RECEIVED
JAN 22 1990
Geraghty & Miller, Inc.

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE CORAL SPRINGS WELL #2
LAB. NUMBER 89-7657
GROUND WATER CLASS
SAMPLED BY CLIENT
NO. WELL CASING VOL. PURGED

SAMPLE DATE 11/28/89
SAMPLE TIME 6:55 AM
COMPLETION DATE 12/29/89
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
	608					
	624	SEE ATTACHED SHEETS				
	625					
80110	SPECIFIC GRAVITY	213E	1.025	G/ML	11/29	E. BEROLD
00437	ACIDITY	402	0.0	MG/L	12/6	D. MEHL / BEROLD
80110	TEMP		64° F	IN FIELD		
00403	PH	150.1	7.98	UNITS	11/29	E. BEROLD
00080	COLOR	110.3	90	UNITS	11/29	E. BEROLD
00076	TURBIDITY	180.1	8.90	NTU	11/29	E. BEROLD
70300	TOTAL DISSOLVED SOLIDS	160.1	35,100	MG/L	12/5	E. GOLEM
00530	TOTAL SUSPENDED SOLIDS	160.2	298	MG/L	12/6	E. GOLEM
00900	TOTAL HARDNESS	130.2	3300	MG/L	11/29	E. BEROLD
00410	ALKALINITY	403	140	MG/L	11/29	E. BEROLD
00902	NCH-NON CARBONATE	130.2	3160	MG/L	12/5	E. BEROLD
71830	OH-HYDROXIDE	406C	0.0	MG/L	12/5	E. BEROLD
00410	BICARBONATE	406C	85.4	MG/L	12/5	E. BEROLD
00095	CONDUCTIVITY	120.1	4110	UMHOS/CM	11/29	E. BEROLD
00910	CA-CALCIUM	406C	264.5	MG/L	11/29	E. BEROLD
00927	MG-MAGNESIUM	242.2	641.5	MG/L	12/5	E. BEROLD
00405	CO_2- CARBON DIOXIDE	406C	2.9	MG/L	12/5	E. BEROLD
00445	CO3- CARBONATE	406C	0.0	MG/L	12/5	E. BEROLD
00299	DO-DISSOLVED OXYGEN	360.1	9.6	MG/L	11/28	D. MEHL
00630	NO3-NITRATE	353.2	0.30	MG/L	11/29	E. BEROLD
00615	NO2-NITRITE	353.2	<0.04	MG/L	11/29	E. BEROLD
00625	TKN	351.2	0.254	MG/L	12/5	E. BEROLD
00610	NH3-AMMONIA	351.2	0.254	MG/L	12/5	E. BEROLD
00625	ORGANIC NITROGEN	351.2	0.0	MG/L	12/5	E. BEROLD
00665	TP TOTAL PHOSPHATE	365.4	<0.20	MG/L	12/5	E. BEROLD

REMARKS:

REVIEWED BY: G. MEYER

BTL

BROWARD TESTING LABORATORY, INC.

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137

ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE CORAL SPRINGS WELL #2

LAB. NUMBER 89-7657

GROUND WATER CLASS

SAMPLED BY CLIENT

NO. WELL CASING VOL. PURGED

SAMPLE DATE 11/28/89

SAMPLE TIME 6:55

COMPLETION DATE 12/29/89

SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
	BENZENE	624	<1.0	UG/L	12/4	ABC R
	BROMODICHLOROMETHANE	624	<1.0	UG/L	"	"
	BROMOFORM	624	<1.0	UG/L	"	"
	BROMOMETHANE	624	<1.0	UG/L	"	"
	CARBON TETRACHLORIDE	624	<1.0	UG/L	"	"
	CHLOROBENZENE	624	<1.0	UG/L	"	"
	CHLOROETHANE	624	<1.0	UG/L	"	"
	CHLOROFORM	624	<1.0	UG/L	"	"
	CHLOROMETHANE	624	<1.0	UG/L	"	"
	DIBROMOCHLOROMETHANE	624	<1.0	UG/L	"	"
	DICHLORODIFLUOROMETHANE	624	<1.0	UG/L	"	"
	1,2-DICHLOROBENZENE	624	<1.0	UG/L	"	"
	1,3-DICHLOROBENZENE	624	<1.0	UG/L	"	"
	1,4-DICHLOROBENZENE	624	<1.0	UG/L	"	"
	1,1-DICHLOROETHANE	624	<1.0	UG/L	"	"
	1,2-DICHLOROETHANE	624	<1.0	UG/L	"	"
	1,1-DICHLOROETHENE	624	<1.0	UG/L	"	"
	TRANS-1,2-DICHLOROETHENE	624	<1.0	UG/L	"	"
	1,2-DICHLOROPROPANE	624	<1.0	UG/L	"	"
	CIS-1,3-DICHLOROPROPENE	624	<1.0	UG/L	"	"
	TRANS-1,3-DICHLOROPROPENE	624	<1.0	UG/L	"	"
	ETHYL BENZENE	624	<1.0	UG/L	"	"
	METHYLENE CHLORIDE	624	10	UG/L	"	"
	1,1,2,2-TETRACHLOROETHANE	624	<1.0	UG/L	"	"
	TETRACHLOROETHENE	624	<1.0	UG/L	"	"
	TOLUENE	624	<2.0	UG/L	"	"
	1,1,1-TRICHLOROETHANE	624	<1.0	UG/L	"	"
	1,1,2-TRICHLOROETHANE	624	<1.0	UG/L	"	"
	TRICHLOROETHENE	624	<1.0	UG/L	"	"
	TRICHLOROFLUOROMETHANE	624	<1.0	UG/L	"	"
	VINYL CHLORIDE	624	<1.0	UG/L	"	"
	2-CHLOROETHYLVINYLETHER	624	<1.0	UG/L	"	"
	ACROLEIN	624	50	UG/L	"	"
	ACRYLONITRILE	624	50	UG/L	"	"

REMARKS:

REVIEWED BY: G.MEYER

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

EPA METHOD 625 SECT. 17
SCREEN FOR 2,3,7,8-TCDD

PROJECT YOUNGQUIST BROS.
SAMPLE DATE 11/28/89
MONITORING SITE CORAL SPRINGS WELL2
SAMPLE TIME 6:55
SAMPLED BY CLIENT
SAMPLE TYPE: ( ) BACKGROUND ( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	Presence	
		indicated	not indicated
34675	2,3,7,8-Tetra chlorodibenzo-p-dioxin		X

BROWARD TESTING LABORATORY, INC.

LABORATORY CERTIFICATION NUMBER 86137
E-86035

METHOD 625 - ACIDS

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE CORAL SPRINGS WELL #2
LAB. NUMBER 89-7657
GROUND WATER CLASS
SAMPLED BY CLIENT
NO. WELL CASING VOL. PURGED

SAMPLE DATE 12/15/89
SAMPLE TIME 6:55
COMPLETION DATE 12/29/89
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
34452	4-CHLORO-3-METHYLPHENOL	625	<3.0	UG/L	12/15	E. BURR
34586	2-CHLOROPHENOL	625	<3.3	UG/L	"	"
34601	2,4-DICHLOROPHENOL	625	<2.7	UG/L	"	"
34606	2,4-DIMETHYLPHENOL	625	<2.7	UG/L	"	"
34616	2,4-DINITROPHENOL	625	<42	UG/L	"	"
34657	2-MET'-4,6-DINITROPHENOL	625	<24	UG/L	"	"
34591	2-NITROPHENOL	625	<3.6	UG/L	"	"
34646	4-NITROPHENOL	625	<2.4	UG/L	"	"
39032	PENTACHLOROPHENOL	625	<3.6	UG/L	"	"
34694	PHENOL	625	<1.5	UG/L	"	"
34621	2,4,6-TRICHLOROPHENOL	625	<2.7	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYER

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 625 - BASE NEUTRALS

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE CORAL SPRINGS WELL #2
LAB. NUMBER 89-7657
GROUND WATER CLASS
SAMPLED BY CLIENT
NO. WELL CASING VOL. PURGED

SAMPLE DATE 11/28/89
SAMPLE TIME 6:55
COMPLETION DATE 12/29/89
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
34341	DIMETHYLPHTHALATE	625	<1.6	UG/L	12/11	C. AMON
34611	2,4-DINITROTOLUENE	625	<5.7	UG/L	"	"
34626	2,6-DINITROTOLUENE	625	<1.9	UG/L	"	"
34596	DI-N-OCTYLPHTHALATE	625	<4.8	UG/L	"	"
34361	ENDROSULFAN I	625	<5.0	UG/L	"	"
34356	ENDROSULFAN II	625	<7.5	UG/L	"	"
34531	ENDROSULFAN SULFATE	625	<5.6	UG/L	"	"
39390	ENDRIN	625	<4.5	UG/L	"	"
34366	ENDRIN ALDEHYDE	625	<5.0	UG/L	"	"
34376	FLUORANTHENE	625	<2.2	UG/L	"	"
34381	FLUORENE	625	<1.9	UG/L	"	"
39410	HEPTACHLOR	625	<1.9	UG/L	"	"
39420	HEPTCHLOR EPOXIDE	625	<2.2	UG/L	"	"
39700	HEXACHLOROBENZENE	625	<1.9	UG/L	"	"
34391	HEXACHLOROBUTADIENE	625	<1.0	UG/L	"	"
34396	HEXACHLOROETHANE	625	<1.6	UG/L	"	"
34386	HEXACHLOROCYLOPENTADIENE	625	<10.0	UG/L	"	"
34403	INDENO(1,2,3-CD)PYRENE	625	<3.7	UG/L	"	"
34408	ISOPHORONE	625	<2.2	UG/L	"	"
34696	NAPHTHALENE	625	<1.6	UG/L	"	"
34447	NITROBENZENE	625	<1.9	UG/L	"	"
34338	N-NITROSODIMETHYLAMINE	625	<8.0	UG/L	"	"
34433	N-NITROSODIPHENYLAMINE	625	<1.9	UG/L	"	"
34428	N-NITROSODI-N-PROPYLAMINE	625	<10.0	UG/L	"	"
34671	PCB-1016	625	<30.0	UG/L	"	"
39488	PCB-1221	625	<50.0	UG/L	"	"
39492	PCB-1232	625	<50.0	UG/L	"	"
39496	PCB-1242	625	<30.0	UG/L	"	"
39500	PCB-1248	625	<40.0	UG/L	"	"
39504	PCB-1254	625	<30.5	UG/L	"	"
39508	PCB-1260	625	<30.5	UG/L	"	"
34461	PHENANTHRENE	625	<5.4	UG/L	"	"
34469	PYRENE	625	<1.9	UG/L	"	"
39400	TOXAPHENE	625	<20.0	UG/L	"	"
34551	1,2,4-TRICHLOROBENZENE	625	<1.4	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYER

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 625 - BASE NEUTRALS

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE CORAL SPRINGS WELL #2
LAB. NUMBER 89-7657
GROUND WATER CLASS
SAMPLED BY CLIENT
NO. WELL CASING VOL. PURGED

SAMPLE DATE 11/28/89
SAMPLE TIME 6:55
COMPLETION DATE 12/29/89
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
34205	ACENAPHTHENE	625	<1.9	UG/L	12/11	C. AMON
34200	ACENAPHTHYLENE	625	<3.5	UG/L	"	"
34220	ANTHRACENE	625	<1.9	UG/L	"	"
39330	ALDRIN	625	<1.9	UG/L	"	"
39120	BENZIDINE	625	<44	UG/L	"	"
34526	BENZO(A)ANTHRACENE	625	<3.7	UG/L	"	"
34230	BENZO(B)FLUORANTHENE	625	<2.5	UG/L	"	"
34242	BENZO(K)FLUORANTHENE	625	<2.5	UG/L	"	"
34247	BENZO(A)PYRENE	625	<3.7	UG/L	"	"
34521	BENZO(GHI)PERYLENE	625	<4.1	UG/L	"	"
34292	BENZYLBUTYLPHTHALATE	625	<2.5	UG/L	"	"
39337	A-BHC	625	<4.2	UG/L	"	"
39338	B-BHC	625	<10.0	UG/L	"	"
34259	D-BHC	625	<10.0	UG/L	"	"
39340	G-BHC	625	<3.1	UG/L	"	"
34273	BIS(2-CHLOROETHYL)ETHER	625	<5.6	UG/L	"	"
34278	BIS(2-CHLOROETHOXY)METHANE	625	<5.3	UG/L	"	"
39100	BIS(2-ETHYLHEXYL) PHTHALATE	625	<2.5	UG/L	"	"
34283	BIS(2-CHLOROISOPROPYL)ETHER	625	<5.7	UG/L	"	"
34636	4-BROMOPHENYLPHENYLETHER	625	<1.9	UG/L	"	"
39350	CHLORDANE	625	<10.0	UG/L	"	"
34581	2-CHLORONAPHTHALENE	625	<1.9	UG/L	"	"
34641	4-CHLOROPHENYLPHENYLETHER	625	<4.2	UG/L	"	"
34320	CHRYSENE	625	<2.5	UG/L	"	"
39310	4,4'-DDD	625	<2.8	UG/L	"	"
39320	4,4'-DDE	625	<5.6	UG/L	"	"
39300	4,4'-DDT	625	<4.7	UG/L	"	"
34556	DIBENZO(A,H)ANTHRACENE	625	<2.5	UG/L	"	"
39110	DI-N-BUTYLPHTHALATE	625	<2.5	UG/L	"	"
34566	1,3-DICHLOROBENZENE	625	<1.9	UG/L	"	"
34536	1,2-DICHLOROBENZENE	625	<1.9	UG/L	"	"
34571	1,4-DICHLOROBENZENE	625	<4.4	UG/L	"	"
34631	3,3'DICHLOROBENZIDINE	625	<16.5	UG/L	"	"
39380	DIELDRIN	625	<2.5	UG/L	"	"
34336	DIETHYLPHTHALATE	625	<1.9	UG/L	"	"

Remarks:

REVIEWED BY: G. MEYER

MONITOR-WELL WATER QUALITY

SHALLOW MONITOR ZONE

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #1 SHALLOW ZONE
LAB. NUMBER 90-1204
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 12:41
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

Shallow Monitor
CS-M2

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
00746	HYDROGEN SULFIDE	427C	0.034	MG/L	3/19	E. BEROL
00610	AMMONIA	351.2	0.612	MG/L	3/26	E. BEROL
38260	MBAS	512B	<0.10	MG/L	3/22	E. BEROL
00403	PH	150.1	8.94	UNIT	3/15	R. SHARO
00010	TEMPERATURE	170.1	24.3	°C	3/15	R. SHARO
00299	DISSOLVED OXYGEN	360.1	2.1	MG/L	3/15	R. SHARO
50060	TOTAL CHLORINE	330.5	0.0	MG/L	3/15	R. SHARO
01000	ARSENIC	206.2	<0.003	MG/L	3/27	K. VAGI
01005	BARIUM	208.1	<0.03	MG/L	3/22	K. VAGI
01025	CADMIUM	213.2	<0.0005	MG/L	3/29	K. VAGI
01030	CHROMIUM	218.2	0.0123	MG/L	3/26	K. VAGI
01049	LEAD	239.2	0.0066	MG/L	3/26	K. VAGI
71890	MERCURY	245.5	0.0005	MG/L	4/10	K. VAGI
01145	SELENIUM	270.2	0.0891	MG/L	4/28	K. VAGI
01075	SILVER	272.2	0.0064	MG/L	4/9	K. VAGI
00930	SODIUM	273.1	3180	MG/L	4/21	K. VAGI
01040	COPPER	220.1	<0.03	MG/L	3/19	K. VAGI
01046	IRON	236.1	<0.1	MG/L	3/19	K. VAGI
01090	ZINC	289.1	<0.03	MG/L	3/19	K. VAGI
01056	MANGANESE	243.2	0.0822	MG/L	3/29	K. VAGI
01095	ANTIMONY	204.2	<0.005	MG/L	4/20	K. VAGI
00925	MAGNESIUM	242.2	649.4	MG/L	4/19	E.BEROLD
00935	POTASSIUM	258.1	155	MG/L	4/19	K. VAGI
	CONTINUED ON NEXT PAGE					

REMARKS:

REVIEWED BY: G. MEYER

BROWARD TESTING LABORATORY, INC.

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #1 SHALLOW ZONE
LAB. NUMBER 90-1204
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 12:41
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

Shallow Monitor

CS-M2

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
00910	CALCIUM	406C	258.1	MG/L	3/29	E. BEROL
01080	STRONTIUM	303A	25.7	MG/L	4/23	K. VAGI
80110	SPECIFIC GRAVITY	213E	1.0037	G/ML	3/29	E. BEROL
00950	FLOURIDE	340.2	1.02	MG/L	3/21	M. HILL
00630	NITRATE	353.2	2.06	MG/L	3/27	E. BEROL
00080	COLOR	110.3	0	UNITS	3/16	E. BEROL
00941	CHLORIDES	4500CLC	6550	MG/L	3/22	M. HILL
00900	TOTAL HARDNESS	130.2	2154	MG/L	3/29	E. BEROL
00410	ALKALINITY	403	56	MG/L	3/16	E. BEROL
00901	CALCIUM HARDNESS	215.2	644	MG/L	3/29	E. BEROL
00310	BOD	405.1	<2.0	MG/L	3/21	M. HILL
00076	TURBIDITY	180.1	1.60	NTU	3/27	M. HILL
00085	ODOR	140.1	1	TON	3/16	E. BEROL
00945	SULFATE	426 C	1970	MG/L	4/4	E. GOLEM
70300	TOTAL DISSOLVED SOLID	160.1	11,514	MG/L	3/22	M. HILL
00665	TOTAL PHOSPHATE	365.4	<0.20	MG/L	3/26	E. BEROL
70507	ORTHO PHOSPHATE	365.4	<0.20	MG/L	3/26	E. BEROL
00625	TKN	351.2	0.75	MG/L	3/26	E. BEROL
00440	BICARBONATE	406C	34.2	MG/L	4/19	E. BEROL
00681	TOTAL ORGANIC CARBON	415.1	4.04	MG/L	3/23	E. GOLEM
00530	TOTAL SUSPENDED SOLIDS	160.2	36	MG/L	3/16	M. HILL
01020	BORON	212.3	<0.5	MG/L	4/23	K. VAGI
	625 SCAN					
	608 SCAN					
	504 SCAN	SEE ATTACHED SHEETS				
	502.2 SCAN					
	GROSS ALPHA					

REMARKS:

REVIEWED BY: G. MEYER

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 504 EDB AND DBCP: MICROEXTRACTION/ECGC

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #1 SHALLOW ZONE
LAB. NUMBER 90-1204
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 12:41
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

CAS NO.	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
106-93-4	1,2-DIBROMOETHANE (EDB)	504	<0.02	UG/L	3/15	C. AMON
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	504	<0.02	UG/L	"	"

Remarks:

REVIEWED BY: G. MEYER

BTL

BROWARD TESTING LABORATORY, INC.

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 502.2. VOLATILE ORGANIC COMPOUNDS IN WATER BY PURGE AND TRAP CAPILLARY COLUMN GAS CHROMATOGRAPHY WITH PHOTOIONIZATION AND ELECTROLYTIC CONDUCTIVITY DETECTORS IN SERIES

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE # 1 SHALLOW ZONE
LAB. NUMBER 90-1204
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 12:41
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

CAS NO.	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
71-43-2	BENZENE	502.2	<1.0	UG/L	3/19	C. AMON
108-86-1	BROMOBENZENE	502.2	<1.0	UG/L	"	"
74-97-5	BROMOCHLOROMETHANE	502.2	<1.0	UG/L	"	"
75-27-4	BROMODICHLOROMETHANE	502.2	<1.0	UG/L	"	"
75-25-2	BROMOFORM	502.2	<1.6	UG/L	"	"
74-83-9	BROMOMETHANE	502.2	<1.1	UG/L	"	"
104-51-8	n-BUTYLBENZENE	502.2	<1.0	UG/L	"	"
135-98-8	sec-BUTYLBENZENE	502.2	<1.0	UG/L	"	"
98-06-6	tert-BUTYLBENZENE	502.2	<1.0	UG/L	"	"
56-23-5	CARBON TETRACHLORIDE	502.2	<1.0	UG/L	"	"
108-90-7	CHLOROBENZENE	502.2	<1.0	UG/L	"	"
75-00-3	CHLOROETHANE	502.2	<1.0	UG/L	"	"
67-66-3	CHLOROFORM	502.2	<1.0	UG/L	"	"
74-87-3	CHLOROMETHANE	502.2	<1.0	UG/L	"	"
95-49-8	2-CHLOROTOLUENE	502.2	<1.0	UG/L	"	"
106-43-4	4-CHLOROTOLUENE	502.2	<1.0	UG/L	"	"
124-48-1	DIBROMOCHLOROMEHTANE	502.2	<2.0	UG/L	"	"
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	502.2	<3.0	UG/L	"	"
106-93-4	1,2-DIBROMOETHANE	502.2	<0.8	UG/L	"	"
74-95-3	DIBROMOMETHANE	502.2	<2.2	UG/L	"	"
95-50-1	1,2-DICHLOROBENZENE	502.2	<1.0	UG/L	"	"
541-73-1	1,3-DICHLOROBENZENE	502.2	<1.0	UG/L	"	"
106-46-7	1,4-DICHLOROBENZENE	502.2	<1.0	UG/L	"	"
75-71-8	DICHLORODIFLUOROMETHANE	502.2	<1.0	UG/L	"	"
75-34-3	1,1-DICHLOROETHANE	502.2	<1.0	UG/L	"	"
107-06-2	1,2-DICHLOROETHANE	502.2	<1.0	UG/L	"	"
75-35-4	1,1-DICHLOROETHENE	502.2	<1.0	UG/L	"	"
156-59-4	cis-1,2-DICHLOROETHENE	502.2	<1.0	UG/L	"	"
156-60-5	trans-1,2-DICHLOROETHENE	502.2	<1.0	UG/L	"	"
78-87-5	1,2-DICHLOROPROPANE	502.2	<1.0	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYER

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 502.2. VOLATILE ORGANIC COMPOUNDS IN WATER BY PURGE AND TRAP CAPILLARY COLUMN GAS CHROMATOGRAPHY WITH PHOTOIONIZATION AND ELECTROLYTIC CONDUCTIVITY DETECTORS IN SERIES

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #1 SHALLOW ZONE
LAB. NUMBER 90-1204
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 12:41
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

CAS NO.	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYS
142-28-9	1,3-DICHLOROPROPANE	502.2	<1.0	UG/L	3/19	C. AMON
590-20-7	2,2-DICHLOROPROPANE	502.2	<1.0	UG/L	"	"
563-58-6	1,1-DICHLOROPROPENE	502.2	<1.0	UG/L	"	"
100-41-4	ETHYLBENZENE	502.2	<1.0	UG/L	"	"
87-68-3	HEXACHLOROBUTADIENE	502.2	<1.0	UG/L	"	"
98-82-8	ISOPROPYLBENZENE	502.2	<1.0	UG/L	"	"
99-87-6	p-ISOPROPYLTOLUENE	502.2	<1.0	UG/L	"	"
75-09-2	METHYLENE CHLORIDE	502.2	<1.0	UG/L	"	"
91-20-3	NAPHTHALENE	502.2	<1.0	UG/L	"	"
103-65-1	n-PROPYLBENZENE	502.2	<1.0	UG/L	"	"
100-42-5	STYRENE	502.2	<1.0	UG/L	"	"
630-20-6	1,1,1,2-TETRACHLOROETHANE	502.2	<1.0	UG/L	"	"
79-34-5	1,1,2,2-TETRACHLOROETHANE	502.2	<1.0	UG/L	"	"
127-18-4	TETRACHLOROETHENE	502.2	<1.0	UG/L	"	"
108-88-3	TOLUENE	502.2	<1.0	UG/L	"	"
87-61-6	1,2,3-TRICHLOROBENZENE	502.2	<1.0	UG/L	"	"
120-82-1	1,2,4-TRICHLOROBENZENE	502.2	<1.0	UG/L	"	"
71-55-6	1,1,1-TRICHLOROETHANE	502.2	<1.0	UG/L	"	"
79-00-5	1,1,2-TRICHLOROETHANE	502.2	<1.0	UG/L	"	"
79-01-6	TRICHLOROETHENE	502.2	<1.0	UG/L	"	"
75-69-4	TRICHLOROFLUOROMETHANE	502.2	<1.0	UG/L	"	"
96-18-4	1,2,3-TRICHLOROPROPANE	502.2	<1.0	UG/L	"	"
95-63-6	1,2,4-TRIMETHYLBENZENE	502.2	<1.0	UG/L	"	"
108-67-8	1,3,5-TRIMETHYLBENZENE	502.2	<1.0	UG/L	"	"
75-01-4	VINYL CHLORIDE	502.2	<1.0	UG/L	"	"
95-47-6	o-XYLENE	502.2	<1.0	UG/L	"	"
108-38-3	m-XYLENE	502.2	<1.0	UG/L	"	"
106-42-3	p-XYLENE	502.2	<1.0	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYER

BROWARD TESTING LABORATORY, INC.

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

ORGANOCHLORINE PESTICIDES AND PCB'S
METHOD - 608

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #1 SHALLOW ZONE
LAB. NUMBER 90-1204
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 12:41
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
39330	ALDRIN	608	<1.0	UG/L	4/3	C. AMON
39337	A-BHC	608	<1.0	UG/L	"	"
39338	B-BHC	608	<1.0	UG/L	"	"
34259	D-BHC	608	<1.0	UG/L	"	"
39340	Y-BHC	608	<1.0	UG/L	"	"
39350	CHLORDANE	608	<1.0	UG/L	"	"
39310	4,4'-DDD	608	<1.0	UG/L	"	"
39320	4,4'-DDE	608	<1.0	UG/L	"	"
39300	4,4'-DDT	608	<1.0	UG/L	"	"
39380	DIELDRIN	608	<1.0	UG/L	"	"
34361	ENDOSULFAN I	608	<1.0	UG/L	"	"
34356	ENDOSULFAN II	608	<1.0	UG/L	"	"
34351	ENDOSULFAN SULFATE	608	<1.0	UG/L	"	"
39390	ENDRIN	608	<1.0	UG/L	"	"
34366	ENDRIN ALDEHYDE	608	<1.0	UG/L	"	"
39410	HEPTACHLOR	608	<1.0	UG/L	"	"
39420	HEPTACHLOR EPOXIDE	608	<1.0	UG/L	"	"
39400	TOXAPHENE	608	<1.0	UG/L	"	"
34671	PCB-1016	608	<1.0	UG/L	"	"
39488	PCB-1221	608	<1.0	UG/L	"	"
39492	PCB-1232	608	<1.0	UG/L	"	"
39496	PCB-1242	608	<1.0	UG/L	"	"
39500	PCB-1248	608	<1.0	UG/L	"	"
39504	PCB-1254	608	<1.0	UG/L	"	"
39508	PCB-1260	608	<1.0	UG/L	"	"
39480	METHOXYCHLOR	608	<1.0	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYR

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 625 - BASE NEUTRALS

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #1 SHALLOW ZONE
LAB. NUMBER 90-1204
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 12:41
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
34205	ACENAPHTHENE	625	<1.9	UG/L	4/3/90	E. BURR
34200	ACENAPHTHYLENE	625	<3.5	UG/L	"	"
34220	ANTHRACENE	625	<1.9	UG/L	"	"
39330	ALDRIN	625	<1.9	UG/L	"	"
39120	BENZIDINE	625	<44	UG/L	"	"
34526	BENZO(A)ANTHRACENE	625	<3.7	UG/L	"	"
34230	BENZO(B)FLUORANTHENE	625	<2.5	UG/L	"	"
34242	BENZO(K)FLUORANTHENE	625	<2.5	UG/L	"	"
34247	BENZO(A)PYRENE	625	<3.7	UG/L	"	"
34521	BENZO(GHI)PERYLENE	625	<4.1	UG/L	"	"
34292	BENZYLBUTYLPHTHALATE	625	<2.5	UG/L	"	"
39337	A-BHC	625	<4.2	UG/L	"	"
39338	B-BHC	625	<10.0	UG/L	"	"
34259	D-BHC	625	<10.0	UG/L	"	"
39340	G-BHC	625	<3.1	UG/L	"	"
34273	BIS(2-CHLOROETHYL)ETHER	625	<5.6	UG/L	"	"
34278	BIS(2-CHLOROETHOXY)METHANE	625	<5.3	UG/L	"	"
39100	BIS(2-ETHYLHEXYL) PHTHALATE	625	<2.5	UG/L	"	"
34283	BIS(2-CHLOROISOPROPYL)ETHER	625	<5.7	UG/L	"	"
34636	4-BROMOPHENYLPHENYLETHER	625	<1.9	UG/L	"	"
39350	CHLORDANE	625	<10.0	UG/L	"	"
34581	2-CHLORONAPHTHALENE	625	<1.9	UG/L	"	"
34641	4-CHLOROPHENYLPHENYLETHER	625	<4.2	UG/L	"	"
34320	CHRYSENE	625	<2.5	UG/L	"	"
39310	4,4'-DDD	625	<2.8	UG/L	"	"
39320	4,4'-DDE	625	<5.6	UG/L	"	"
39300	4,4'-DDT	625	<4.7	UG/L	"	"
34556	DIBENZO(A,H)ANTHRACENE	625	<2.5	UG/L	"	"
39110	DI-N-BUTYLPHTHALATE	625	<2.5	UG/L	"	"
34566	1,3-DICHLOROBENZENE	625	<1.9	UG/L	"	"
34536	1,2-DICHLOROBENZENE	625	<1.9	UG/L	"	"
34571	1,4-DICHLOROBENZENE	625	<4.4	UG/L	"	"
34631	3,3'DICHLOROBENZIDINE	625	<16.5	UG/L	"	"
39380	DIELDRIN	625	<2.5	UG/L	"	"
34336	DIETHYLPHTHALATE	625	<1.9	UG/L	"	"

Remarks:

REVIEWED BY: G. MEYER

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 625 - BASE NEUTRALS

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #1 SHALLOW ZONE
LAB. NUMBER 90-1204
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 12:41
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYS
34341	DIMETHYLPHTHALATE	625	<1.6	UG/L	4/3	E.BURR
34611	2,4-DINITROTOLUENE	625	<5.7	UG/L	"	"
34626	2,6-DINITROTOLUENE	625	<1.9	UG/L	"	"
34596	DI-N-OCTYLPHTHALATE	625	<4.8	UG/L	"	"
34361	ENDROSULFAN I	625	<5.0	UG/L	"	"
34356	ENDROSULFAN II	625	<7.5	UG/L	"	"
34531	ENDROSULFAN SULFATE	625	<5.6	UG/L	"	"
39390	ENDRIN	625	<4.5	UG/L	"	"
34366	ENDRIN ALDEHYDE	625	<5.0	UG/L	"	"
34376	FLUORANTHENE	625	<2.2	UG/L	"	"
34381	FLUORENE	625	<1.9	UG/L	"	"
39410	HEPTACHLOR	625	<1.9	UG/L	"	"
39420	HEPTCHLOR EPOXIDE	625	<2.2	UG/L	"	"
39700	HEXACHLOROBENZENE	625	<1.9	UG/L	"	"
34391	HEXACHLOROBUTADIENE	625	<1.0	UG/L	"	"
34396	HEXACHLOROETHANE	625	<1.6	UG/L	"	"
34386	HEXACHLOROCYLOPENTADIENE	625	<10.0	UG/L	"	"
34403	INDENO(1,2,3-CD)PYRENE	625	<3.7	UG/L	"	"
34408	ISOPHORONE	625	<2.2	UG/L	"	"
34696	NAPHTHALENE	625	<1.6	UG/L	"	"
34447	NITROBENZENE	625	<1.9	UG/L	"	"
34338	N-NITROSODIMETHYLAMINE	625	<8.0	UG/L	"	"
34433	N-NITROSODIPHENYLAMINE	625	<1.9	UG/L	"	"
34428	N-NITROSODI-N-PROPYLAMINE	625	<10.0	UG/L	"	"
34671	PCB-1016	625	<30.0	UG/L	"	"
39488	PCB-1221	625	<50.0	UG/L	"	"
39492	PCB-1232	625	<50.0	UG/L	"	"
39496	PCB-1242	625	<30.0	UG/L	"	"
39500	PCB-1248	625	<40.0	UG/L	"	"
39504	PCB-1254	625	<30.5	UG/L	"	"
39508	PCB-1260	625	<30.5	UG/L	"	"
34461	PHENANTHRENE	625	<5.4	UG/L	"	"
34469	PYRENE	625	<1.9	UG/L	"	"
39400	TOXAPHENE	625	<20.0	UG/L	"	"
34551	1,2,4-TRICHLOROBENZENE	625	<1.4	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYER

BROWARD TESTING LABORATORY, INC.
LABORATORY CERTIFICATION NUMBER 86137
E-86035

METHOD 625 - ACIDS

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS .

SOURCE #1 SHALLOW ZONE
LAB. NUMBER 90-1204
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 12:41
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
34452	4-CHLORO-3-METHYLPHENOL	625	<3.0	UG/L	4/3	E. BURR
34586	2-CHLOROPHENOL	625	<3.3	UG/L	"	"
34601	2,4-DICHLOROPHENOL	625	<2.7	UG/L	"	"
34606	2,4-DIMETHYLPHENOL	625	<2.7	UG/L	"	"
34616	2,4-DINITROPHENOL	625	<42	UG/L	"	"
34657	2-MET'-4,6-DINITROPHENOL	625	<24	UG/L	"	"
34591	2-NITROPHENOL	625	<3.6	UG/L	"	"
34646	4-NITROPHENOL	625	<2.4	UG/L	"	"
39032	PENTACHLOROPHENOL	625	<3.6	UG/L	"	"
34694	PHENOL	625	<1.5	UG/L	"	"
34621	2,4,6-TRICHLOROPHENOL	625	<2.7	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYER

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

EPA METHOD 625 SECT. 17
SCREEN FOR 2,3,7,8-TCDD

PROJECT YOUNGQUIST BROS.
MONITORING SITE #1 SHALLOW WELL
SAMPLED BY R. SHARON

SAMPLE DATE 3/15/90
SAMPLE TIME 12:41
SAMPLE TYPE: ( ) BACKGROUND
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	Presence	
		indicated	not indicat
34675	2,3,7,8-Tetra chlorodibenzo-p-dioxin		X

BTL

BROWARD TESTING LABORATORY, INC.

POST OFFICE BOX 23541 FORT LAUDERDALE, FLORIDA 33307 TELEPHONE: (305) 776-7238 FAX: (305) 776-0689

CLIENT: YOONGQUIST BROS.	REPORT NO: ______ LAB ID NO: 86137
	PWS ID NO: 87240
	SAMPLE SITE: #1 SHALLOW ZONE
DATE SAMPLED: 3/15/90	TIME SAMPLED: 12:41
DATE RECEIVED AT LAB: ______	TIME RECEIVED AT LAB: ______

ANALYTICAL SERIES: FLORIDA SAFE DRINKING WATER COMPLIANCE.
RADIOLOGICAL ANALYSIS 17-550.310(5). (PWS033)
ALL VALUES IN pCi/L UNLESS OTHERWISE NOTED.

LAB # 90-1204

PARAMETER	REPORTED VALUE	
RADIONUCLIDES:	0+/-5	PCI/L

RANK D. HOBLE, DIRECTOR
ROWARD TESTING LABORATORY, INC.

DEEP MONITOR ZONE

Deep Monitor
CS - M2

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #2 DEEP ZONE
LAB. NUMBER 90-1205
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 1:00
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
00746	HYDROGEN SULFIDE	427C	0.034	MG/L	3/19	E. BEROL
00610	AMMONIA	351.2	1.22	MG/L	3/26	E. BEROL
38260	MBAS	512B	<0.10	MG/L	3/22	E. BEROL
00403	PH	150.1	8.0	UNIT	3/15	R. SHARO
00010	TEMPERATURE	170.1	23.4	°C	3/15	R. SHARO
00299	DISSOLVED OXYGEN	360.1	1.5	MG/L	3/15	R. SHARO
50060	TOTAL CHLORINE	330.5	0.0	MG/L	3/15	R. SHARO
01000	ARSENIC	206.2	<0.003	MG/L	3/27	K. VAGI
01005	BARIUM	208.1	<0.3	MG/L	3/22	K. VAGI
01025	CADMIUM	213.2	<0.0005	MG/L	3/29	K. VAGI
01030	CHROMIUM	218.2	0.0105	MG/L	3/26	K. VAGI
01049	LEAD	239.2	<0.002	MG/L	3/26	K. VAGI
71890	MERCURY	245.5	<0.0005	MG/L	4/10	K. VAGI
01145	SELENIUM	270.2	0.0342	MG/L	4/28	K. VAGI
01075	SILVER	272.2	0.0042	MG/L	4/9	K. VAGI
00930	SODIUM	273.1	3170	MG/L	4/21	K. VAGI
01040	COPPER	220.1	<0.03	MG/L	3/19	K. VAGI
01046	IRON	236.1	0.45	MG/L	3/19	K. VAGI
01090	ZINC	289.1	<0.03	MG/L	3/19	K. VAGI
01056	MANGANESE	243.2	0.0197	MG/L	3/29	K. VAGI
01095	ANTIMONY	204.2	<0.005	MG/L	4/20	K. VAGI
00925	MAGNESIUM	242.2	361.0	MG/L	4/19	E.BEROLDI
00935	POTASSIUM	258.1	56.8	MG/L	4/19	K. VAGI
	CONTINUED ON NEXT PAGE					

REMARKS:

REVIEWED BY: G. MEYER

BTL

BROWARD TESTING LABORATORY, INC.

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #2 DEEP ZONE
LAB. NUMBER 90-1205
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 1:00
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

Deep Monitor
CS-M2

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
00910	CALCIUM	406C	153	MG/L	3/29	E. BEROLD
01080	STRONTIUM	303A	38.6	MG/L	4/23	K. VAGI
80110	SPECIFIC GRAVITY	213E	1.0001	G/ML	3/29	E. BEROLD
00950	FLOURIDE	340.2	1.20	MG/L	3/21	M. HILL
00630	NITRATE	353.2	0.850	MG/L	3/27	E. BEROLD
00080	COLOR	110.3	0	UNITS	3/16	E. BEROLD
00941	CHLORIDES	4500CLC	2333	MG/L	3/22	M. HILL
00900	TOTAL HARDNESS	130.2	1222	MG/L	3/29	E. BEROLD
00410	ALKALINITY	403	140	MG/L	3/16	E. BEROLD
00901	CALCIUM HARDNESS	215.2	382	MG/L	3/29	E. BEROLD
00310	BOD	405.1	<2.0	MG/L	3/21	M. HILL
00076	TURBIDITY	180.1	2.30	NTU	3/27	M. HILL
00085	ODOR	140.1	1	TON	3/16	E. BEROLD
00945	SULFATE	426 C	124	MG/L	4/4	E. GOLEM
70300	TOTAL DISSOLVED SOLID	160.1	4432	MG/L	3/22	M. HILL
00665	TOTAL PHOSPHATE	365.4	<0.20	MG/L	3/26	E. BEROLD
70507	ORTHO PHOSPHATE	365.4	<0.20	MG/L	3/26	E. BEROLD
00625	TKN	351.2	1.68	MG/L	3/26	E. BEROLD
00440	BOCARBONATE	406C	85.4	MG/L	4/19	E. BEROLD
00681	TOTAL ORGANIC CARBON	415.1	1.46	MG/L	3/23	E. GOLEM
00530	TOTAL SUSPENDED SOLIDS	160.2	10	MG/L	3/16	M. HILL
01020	BORON	212.3	<0.5	MG/L	4/23	K. VAGI
	625 SCAN					
	608 SCAN					
	504 SCAN	SEE ATTACHED SHEETS				
	502.2 SCAN					
	GROSS ALPHA					

REMARKS:

REVIEWED BY: G. MEYER

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 504 EDB AND DBCP: MICROEXTRACTION/ECGC

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #2 DEEP ZONE
LAB. NUMBER 90-1205
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 1:00
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDA
( ) INTERMEDIAT
( ) COMPLIANCE

CAS NO.	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANAL
106-93-4	1,2-DIBROMOETHANE (EDB)	504	<0.02	UG/L	3/15	C. AM
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	504	<0.02	UG/L	"	"

Remarks:

REVIEWED BY: G. MEYER

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 502.2. VOLATILE ORGANIC COMPOUNDS IN WATER BY PURGE AND TRAP CAPILLARY COLUMN GAS CHROMATOGRAPHY WITH PHOTOIONIZATION AND ELECTROLYTIC CONDUCTIVITY DETECTORS IN SERIES

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #2 DEEP ZONE
LAB. NUMBER 90-1205
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 1:00
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

CAS NO.	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
71-43-2	BENZENE	502.2	<1.0	UG/L	3/19	C. AMON
108-86-1	BROMOBENZENE	502.2	<1.0	UG/L	"	"
74-97-5	BROMOCHLOROMETHANE	502.2	<1.0	UG/L	"	"
75-27-4	BROMODICHLOROMETHANE	502.2	<1.0	UG/L	"	"
75-25-2	BROMOFORM	502.2	<1.6	UG/L	"	"
74-83-9	BROMOMETHANE	502.2	<1.1	UG/L	"	"
104-51-8	n-BUTYLBENZENE	502.2	<1.0	UG/L	"	"
135-98-8	sec-BUTYLBENZENE	502.2	<1.0	UG/L	"	"
98-06-6	tert-BUTYLBENZENE	502.2	<1.0	UG/L	"	"
56-23-5	CARBON TETRACHLORIDE	502.2	<1.0	UG/L	"	"
108-90-7	CHLOROBENZENE	502.2	<1.0	UG/L	"	"
75-00-3	CHLOROETHANE	502.2	<1.0	UG/L	"	"
67-66-3	CHLOROFORM	502.2	<1.0	UG/L	"	"
74-87-3	CHLOROMETHANE	502.2	<1.0	UG/L	"	"
95-49-8	2-CHLOROTOLUENE	502.2	<1.0	UG/L	"	"
106-43-4	4-CHLOROTOLUENE	502.2	<1.0	UG/L	"	"
124-48-1	DIBROMOCHLOROMEHTANE	502.2	<2.0	UG/L	"	"
96-12-8	1,2-DIBROMO-3-CHLOROPROPANE	502.2	<3.0	UG/L	"	"
106-93-4	1,2-DIBROMOETHANE	502.2	<0.8	UG/L	"	"
74-95-3	DIBROMOMETHANE	502.2	<2.2	UG/L	"	"
95-50-1	1,2-DICHLOROBENZENE	502.2	<1.0	UG/L	"	"
541-73-1	1,3-DICHLOROBENZENE	502.2	<1.0	UG/L	"	"
106-46-7	1,4-DICHLOROBENZENE	502.2	<1.0	UG/L	"	"
75-71-8	DICHLORODIFLUOROMETHANE	502.2	<1.0	UG/L	"	"
75-34-3	1,1-DICHLOROETHANE	502.2	<1.0	UG/L	"	"
107-06-2	1,2-DICHLOROETHANE	502.2	<1.0	UG/L	"	"
75-35-4	1,1-DICHLOROETHENE	502.2	<1.0	UG/L	"	"
156-59-4	cis-1,2-DICHLOROETHENE	502.2	<1.0	UG/L	"	"
156-60-5	trans-1,2-DICHLOROETHENE	502.2	<1.0	UG/L	"	"
78-87-5	1,2-DICHLOROPROPANE	502.2	<1.0	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYER

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 502.2, VOLATILE ORGANIC COMPOUNDS IN WATER BY PURGE AND TRAP CAPILLARY COLUMN GAS CHROMATOGRAPHY WITH PHOTOIONIZATION AND ELECTROLYTIC CONDUCTIVITY DETECTORS IN SERIES

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #2 DEEP ZONE
LAB. NUMBER 90-1205
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 1:00
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUND
( ) INTERMEDIA
( ) COMPLIANCE

CAS NO.	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANAL
142-28-9	1,3-DICHLOROPROPANE	502.2	<1.0	UG/L	3/19	C. AM
590-20-7	2,2-DICHLOROPROPANE	502.2	<1.0	UG/L	"	"
563-58-6	1,1-DICHLOROPROPENE	502.2	<1.0	UG/L	"	"
100-41-4	ETHYLBENZENE	502.2	292	UG/L	"	"
87-68-3	HEXACHLOROBUTADIENE	502.2	<1.0	UG/L	"	"
98-82-8	ISOPROPYLBENZENE	502.2	<1.0	UG/L	"	"
99-87-6	p-ISOPROPYLTOLUENE	502.2	<1.0	UG/L	"	"
75-09-2	METHYLENE CHLORIDE	502.2	<1.0	UG/L	"	"
91-20-3	NAPHTHALENE	502.2	<1.0	UG/L	"	"
103-65-1	n-PROPYLBENZENE	502.2	<1.0	UG/L	"	"
100-42-5	STYRENE	502.2	<1.0	UG/L	"	"
630-20-6	1,1,1,2-TETRACHLOROETHANE	502.2	<1.0	UG/L	"	"
79-34-5	1,1,2,2-TETRACHLOROETHANE	502.2	<1.0	UG/L	"	"
127-18-4	TETRACHLOROETHENE	502.2	<1.0	UG/L	"	"
108-88-3	TOLUENE	502.2	5.35	UG/L	"	"
87-61-6	1,2,3-TRICHLOROBENZENE	502.2	<1.0	UG/L	"	"
120-82-1	1,2,4-TRICHLOROBENZENE	502.2	<1.0	UG/L	"	"
71-55-6	1,1,1-TRICHLOROETHANE	502.2	<1.0	UG/L	"	"
79-00-5	1,1,2-TRICHLOROETHANE	502.2	<1.0	UG/L	"	"
79-01-6	TRICHLOROETHENE	502.2	<1.0	UG/L	"	"
75-69-4	TRICHLOROFLUOROMETHANE	502.2	<1.0	UG/L	"	"
96-18-4	1,2,3-TRICHLOROPROPANE	502.2	<1.0	UG/L	"	"
95-63-6	1,2,4-TRIMETHYLBENZENE	502.2	<1.0	UG/L	"	"
108-67-8	1,3,5-TRIMETHYLBENZENE	502.2	<1.0	UG/L	"	"
75-01-4	VINYL CHLORIDE	502.2	<1.0	UG/L	"	"
95-47-6	o-XYLENE	502.2	<1.0	UG/L	"	"
108-38-3	m-XYLENE	502.2	<1.0	UG/L	"	"
106-42-3	p-XYLENE	502.2	<1.0	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYER

BTL

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

ORGANOCHLORINE PESTICIDES AND PCB'S
METHOD - 608

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #2 DEEP ZONE
LAB. NUMBER 90-1205
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 1:00
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
39330	ALDRIN	608	<1.0	UG/L	4/3	C. AMON
39337	A-BHC	608	<1.0	UG/L	"	"
39338	B-BHC	608	<1.0	UG/L	"	"
34259	D-BHC	608	<1.0	UG/L	"	"
39340	Y-BHC	608	<1.0	UG/L	"	"
39350	CHLORDANE	608	<1.0	UG/L	"	"
39310	4,4'-DDD	608	<1.0	UG/L	"	"
39320	4,4'-DDE	608	<1.0	UG/L	"	"
39300	4,4'-DDT	608	<1.0	UG/L	"	"
39380	DIELDRIN	608	<1.0	UG/L	"	"
34361	ENDOSULFAN I	608	<1.0	UG/L	"	"
34356	ENDOSULFAN II	608	<1.0	UG/L	"	"
34351	ENDOSULFAN SULFATE	608	<1.0	UG/L	"	"
39390	ENDRIN	608	<1.0	UG/L	"	"
34366	ENDRIN ALDEHYDE	608	<1.0	UG/L	"	"
39410	HEPTACHLOR	608	<1.0	UG/L	"	"
39420	HEPTACHLOR EPOXIDE	608	<1.0	UG/L	"	"
39400	TOXAPHENE	608	<1.0	UG/L	"	"
34671	PCB-1016	608	<1.0	UG/L	"	"
39488	PCB-1221	608	<1.0	UG/L	"	"
39492	PCB-1232	608	<1.0	UG/L	"	"
39496	PCB-1242	608	<1.0	UG/L	"	"
39500	PCB-1248	608	<1.0	UG/L	"	"
39504	PCB-1254	608	<1.0	UG/L	"	"
39508	PCB-1260	608	<1.0	UG/L	"	"
39480	METHOXYCHLOR	608	<1.0	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYR

BROWARD TESTING LABORATORY, INC.
POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 625 - BASE NEUTRALS

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #2 DEEP ZONE
LAB. NUMBER 90-1205
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 1:00
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
34205	ACENAPHTHENE	625	<1.9	UG/L	4/9/90	E. BURR
34200	ACENAPHTHYLENE	625	<3.5	UG/L	"	"
34220	ANTHRACENE	625	<1.9	UG/L	"	"
39330	ALDRIN	625	<1.9	UG/L	"	"
39120	BENZIDINE	625	<44	UG/L	"	"
34526	BENZO(A)ANTHRACENE	625	<3.7	UG/L	"	"
34230	BENZO(B)FLUORANTHENE	625	<2.5	UG/L	"	"
34242	BENZO(K)FLUORANTHENE	625	<2.5	UG/L	"	"
34247	BENZO(A)PYRENE	625	<3.7	UG/L	"	"
34521	BENZO(GHI)PERYLENE	625	<4.1	UG/L	"	"
34292	BENZYLBUTYLPHTHALATE	625	<2.5	UG/L	"	"
39337	A-BHC	625	<4.2	UG/L	"	"
39338	B-BHC	625	<10.0	UG/L	"	"
34259	D-BHC	625	<10.0	UG/L	"	"
39340	G-BHC	625	<3.1	UG/L	"	"
34273	BIS(2-CHLOROETHYL)ETHER	625	<5.6	UG/L	"	"
34278	BIS(2-CHLOROETHOXY)METHANE	625	<5.3	UG/L	"	"
39100	BIS(2-ETHYLHEXYL) PHTHALATE	625	<2.5	UG/L	"	"
34283	BIS(2-CHLOROISOPROPYL)ETHER	625	<5.7	UG/L	"	"
34636	4-BROMOPHENYLPHENYLETHER	625	<1.9	UG/L	"	"
39350	CHLORDANE	625	<10.0	UG/L	"	"
34581	2-CHLORONAPHTHALENE	625	<1.9	UG/L	"	"
34641	4-CHLOROPHENYLPHENYLETHER	625	<4.2	UG/L	"	"
34320	CHRYSENE	625	<2.5	UG/L	"	"
39310	4,4'-DDD	625	<2.8	UG/L	"	"
39320	4,4'-DDE	625	<5.6	UG/L	"	"
39300	4,4'-DDT	625	<4.7	UG/L	"	"
34556	DIBENZO(A,H)ANTHRACENE	625	<2.5	UG/L	"	"
39110	DI-N-BUTYLPHTHALATE	625	<2.5	UG/L	"	"
34566	1,3-DICHLOROBENZENE	625	<1.9	UG/L	"	"
34536	1,2-DICHLOROBENZENE	625	<1.9	UG/L	"	"
34571	1,4-DICHLOROBENZENE	625	<4.4	UG/L	"	"
34631	3,3'DICHLOROBENZIDINE	625	<16.5	UG/L	"	"
39380	DIELDRIN	625	<2.5	UG/L	"	"
34336	DIETHYLPHTHALATE	625	<1.9	UG/L	"	"

Remarks:

REVIEWED BY:
G. MEYER

POTABLE WATER LABORATORY CERTIFICATION NUMBER 86137
ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

METHOD 625 - BASE NEUTRALS

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS.

SOURCE #2 DEEP ZONE
LAB. NUMBER 90-1205
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 1:00
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUND
( ) INTERMEDIA
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANAL
34341	DIMETHYLPHTHALATE	625	<1.6	UG/L	4/9	E.BU
34611	2,4-DINITROTOLUENE	625	<5.7	UG/L	"	"
34626	2,6-DINITROTOLUENE	625	<1.9	UG/L	"	"
34596	DI-N-OCTYLPHTHALATE	625	<4.8	UG/L	"	"
34361	ENDROSULFAN I	625	<5.0	UG/L	"	"
34356	ENDROSULFAN II	625	<7.5	UG/L	"	"
34531	ENDROSULFAN SULFATE	625	<5.6	UG/L	"	"
39390	ENDRIN	625	<4.5	UG/L	"	"
34366	ENDRIN ALDEHYDE	625	<5.0	UG/L	"	"
34376	FLUORANTHENE	625	<2.2	UG/L	"	"
34381	FLUORENE	625	<1.9	UG/L	"	"
39410	HEPTACHLOR	625	<1.9	UG/L	"	"
39420	HEPTCHLOR EPOXIDE	625	<2.2	UG/L	"	"
39700	HEXACHLOROBENZENE	625	<1.9	UG/L	"	"
34391	HEXACHLOROBUTADIENE	625	<1.0	UG/L	"	"
34396	HEXACHLOROETHANE	625	<1.6	UG/L	"	"
34386	HEXACHLOROCYLOPENTADIENE	625	<10.0	UG/L	"	"
34403	INDENO(1,2,3-CD)PYRENE	625	<3.7	UG/L	"	"
34408	ISOPHORONE	625	<2.2	UG/L	"	"
34696	NAPHTHALENE	625	<1.6	UG/L	"	"
34447	NITROBENZENE	625	<1.9	UG/L	"	"
34338	N-NITROSODIMETHYLAMINE	625	<8.0	UG/L	"	"
34433	N-NITROSODIPHENYLAMINE	625	<1.9	UG/L	"	"
34428	N-NITROSODI-N-PROPYLAMINE	625	<10.0	UG/L	"	"
34671	PCB-1016	625	<30.0	UG/L	"	"
39488	PCB-1221	625	<50.0	UG/L	"	"
39492	PCB-1232	625	<50.0	UG/L	"	"
39496	PCB-1242	625	<30.0	UG/L	"	"
39500	PCB-1248	625	<40.0	UG/L	"	"
39504	PCB-1254	625	<30.5	UG/L	"	"
39508	PCB-1260	625	<30.5	UG/L	"	"
34461	PHENANTHRENE	625	<5.4	UG/L	"	"
34469	PYRENE	625	<1.9	UG/L	"	"
39400	TOXAPHENE	625	<20.0	UG/L	"	"
34551	1,2,4-TRICHLOROBENZENE	625	<1.4	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEY

BROWARD TESTING LABORATORY, INC.
LABORATORY CERTIFICATION NUMBER 86137
E-86035

METHOD 625 - ACIDS

LABORATORY PARAMETER ANALYSIS REPORT

PROJECT YOUNGQUIST BROS .

SOURCE #2 DEEP ZONE
LAB. NUMBER 90-1205
GROUND WATER CLASS
SAMPLED BY R. SHARON
NO. WELL CASING VOL. PURGED

SAMPLE DATE 3/15/90
SAMPLE TIME 1:00
COMPLETION DATE 4/26/90
SAMPLE TYPE ( ) BACKGROUND
( ) SITE BOUNDRY
( ) INTERMEDIATE
( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	ANALYSIS METHOD	ANALYSIS RESULT	UNIT	DATE	ANALYST
34452	4-CHLORO-3-METHYLPHENOL	625	<3.0	UG/L	4/9	E. BURR
34586	2-CHLOROPHENOL	625	<3.3	UG/L	"	"
34601	2,4-DICHLOROPHENOL	625	<2.7	UG/L	"	"
34606	2,4-DIMETHYLPHENOL	625	<2.7	UG/L	"	"
34616	2,4-DINITROPHENOL	625	<42	UG/L	"	"
34657	2-MET'-4,6-DINITROPHENOL	625	<24	UG/L	"	"
34591	2-NITROPHENOL	625	<3.6	UG/L	"	"
34646	4-NITROPHENOL	625	<2.4	UG/L	"	"
39032	PENTACHLOROPHENOL	625	<3.6	UG/L	"	"
34694	PHENOL	625	<1.5	UG/L	"	"
34621	2,4,6-TRICHLOROPHENOL	625	<2.7	UG/L	"	"

REMARKS:

REVIEWED BY: G. MEYER

ENVIRONMENTAL LABORATORY CERTIFICATION NUMBER 86035

EPA METHOD 625 SECT. 17
SCREEN FOR 2,3,7,8-TCDD

PROJECT YOUNGQUIST BROS. SAMPLE DATE 3/15/90
MONITORING SITE #2 DEEP ZONE SAMPLE TIME 12:41
SAMPLED BY R. SHARON SAMPLE TYPE: ( ) BACKGROUND ( ) COMPLIANCE

STORET CODE	PARAMETER MONITORED	Presence	
		indicated	not indicate
34675	2,3,7,8-Tetra chlorodibenzo-p-dioxin		X

BROWARD TESTING LABORATORY, INC.
POST OFFICE BOX 23541 FORT LAUDERDALE, FLORIDA 33307 TELEPHONE: (305) 778-7238 FAX: (305) 778-06

CLIENT: YOUNGQUIST BROS.

REPORT NO: ________ LAB ID NO: 86137
PWS ID NO: ________
SAMPLE SITE: #1 DEEP WELL

DATE SAMPLED: 3/15/90 TIME SAMPLED: 12:41
DATE RECEIVED AT LAB: ________ TIME RECEIVED AT LAB: ________

ANALYTICAL SERIES: FLORIDA SAFE DRINKING WATER COMPLIANCE.
RADIOLOGICAL ANALYSIS 17-550.310(5). (PWS033)
ALL VALUES IN pCi/L UNLESS OTHERWISE NOTED.
LAB # 90-1205

PARAMETER	REPORTED VALUE	
RADIONUCLIDES:	0.3+/-1.3	PCI/L

Frank D Hoble

FRANK D. HOBLE, DIRECTOR
BROWARD TESTING LABORATORY, INC.

EFFLUENT ANALYSIS

ENVIROPACT

11579
CORAL SPRINGS IMPROVEMENT DIST
10300 NW 11 TH MANOR
CORAL SPRINGS, FL 33071

December 7, 1989
Report 32339-01
LAB ID. 86119

ATT: MR. RON DIRAMIO

Sample Description: 10300 N.W. 11 MANOR

SAMPLE ID.: EFFLUENT
COLLECTED: 11/01/89
RECEIVED: 11/02/89
COLLECTED BY:GARY BEVINS

PARAMETER	RESULT	UNIT	METHOD	METHOD DET. LIMIT	DATE EXTRACTED	DATE ANALYZED	ANALYST
CHLORINE RESIDUAL,FREE (LAB)	BDL	mg/l	330.3	0.01	N/A	11/07/89	TG
SOLIDS, TOTAL SUSPENDED	10	mg/l	160.2	2	N/A	11/08/89	TG
COLIFORM, FECAL	13,900	CFU/100ml	31909L	1	N/A	11/02/89	JB
AMMONIA, AS N	BDL	mg/l	350.1	0.07	N/A	11/06/89	JB
NITROGEN, TOTAL KJELDAHL	1.87	mg/l	351.2	0.1	N/A	11/17/89	JX
NITROGEN, TOTAL	9.39	mg/l	CALCULATION	0.1	N/A	11/21/89	TD
PHOSPHORUS, TOTAL	2.76	mg/l	365.1	0.1	N/A	11/15/89	TD
pH	6.5		150.1	0.1	N/A	11/01/89	RP

* BDL = Below Detection Limit

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods or other approved methods.
All rush analyses are reported as Estimated pending QA/QC review.
C.C. JOHN PETTY

Respectfully Submitted,

Jeffrey S. Glass
Laboratory Supervisor
Envîropact Services, Inc.

ENVIROPACT, INC.
MIAMI DIVISION
4790 N.W. 157th STREET
MIAMI, FL 33014-6421
305-620-1700

Rec'd 12-20

ENVIROPACT

11579

CORAL SPRINGS IMPROVEMENT DIST
10300 N.W. 11TH MANOR
CORAL SPRINGS, FLORIDA 33071

November 29, 1989
Report 32101-01
LAB I.D. 86119

Sample ID.: Effluent
Sample Received: 11/02/89

Collected: 11/01/89
Collected by: Gary Bevins

Sample Description: 10300 N.W. 11 Manor

	RESULT	UNIT	METHOD	METHOD DET. LIMIT	DATE EXTRACTED	DATE ANALYZED	ANALYST
ARSENIC	BDL	mg/l	206.3	0.01	11/03/89	11/08/89	JK
CADMIUM	BDL	mg/l	213.2	0.1	11/03/89	11/09/89	MS
CHROMIUM, TOTAL	BDL	mg/l	218.1	0.1	11/03/89	11/07/89	JK
COPPER	BDL	mg/l	220.1	0.1	11/03/89	11/06/89	MS
LEAD	BDL	mg/l	239.2	0.005	11/03/89	11/08/89	MS
MERCURY	BDL	mg/l	245.2	0.001	11/03/89	11/03/89	JK
NICKEL	BDL	mg/l	249.1	0.1	11/03/89	11/06/89	MS
SELENIUM	BDL	mg/l	270.3	0.01	11/03/89	11/10/89	JK
SILVER	BDL	mg/l	272.2	0.005	11/03/89	11/13/89	MS
ZINC	BDL	mg/l	289.1	0.1	11/03/89	11/03/89	JK

ok

ENVIROPACT, INC.
MIAMI DIVISION
4790 N.W. 157th STREET
MIAMI, FL 33014-6421
305-620-1700

11579

CORAL SPRINGS IMPROVEMENT DIST
10300 N.W. 11TH MANOR
CORAL SPRINGS, FLORIDA 33071

November 29, 1989
Report 32101-01
LAB I.D. 86119

Sample ID.: Effluent
Sample Received: 11/02/89

Collected: 11/01/89
Collected by: Gary Bevins

Sample Description: 10300 N.W. 11 Manor

	RESULT	UNIT	METHOD	METHOD DET. LIMIT	DATE EXTRACTED	DATE ANALYZED	ANALYST
OIL/GREASE	4.42	mg/l	413.1	3	N/A	11/06/89	TG
CHLORINE RESIDUAL, FREE (LAB)	BDL	mg/l	330.3	0.01	N/A	11/07/89	TG
CHROMIUM, HEXAVALENT	BDL	mg/l	7196	0.01	N/A	11/06/89	TG
ODOR	1	TON	140.1	1	N/A	11/07/89	TG
OXYGEN DEMAND, CHEMICAL	141	mg/l	410.4	7	N/A	11/06/89	TG
SOLIDS, TOTAL SUSPENDED	10	mg/l	160.2	2	N/A	11/08/89	TG
SOLIDS, TOTAL DISSOLVED	488	mg/l	160.1	2	N/A	11/08/89	TG
TURBIDITY	0.56	NTU	180.1	0.01	N/A	11/07/89	TG
M.B.A.S	2.80	mg/l	425.1	0.03	11/09/89	11/10/89	TD
PHENOL, TOTAL	0.064	mg/l	420.2	0.002	N/A	11/07/89	JB
AMMONIA, AS N	BDL	mg/l	350.1	0.07	N/A	11/06/89	JB
CYANIDE, TOTAL	BDL	mg/l	335.3	0.002	N/A	11/03/89	JB
NITROGEN, TOTAL	9.39	mg/l	CALCULATION	0.1	N/A	11/21/89	TD
pH	6.5					11/01/89	
TEMPERATURE (FIELD)	36.2	F	NBS	0.10	N/A	11/01/89	GB
PHOSPHATE ~~ORTHO~~	2.65	mg/l	365.1	0.10	N/A	11/15/89	TD
GROSS BETA	11 ± 2	pci/l	900	0 ± 2	N/A	11/28/89	JX
COLIFORM, FECAL	13,900	CFU/100ml	ST909C	100	N/A	11/02/89	JB
COLIFORM, TOTAL	>20,000	CFU/100ml	ST909A	1	N/A	11/02/89	JB

11579

CORAL SPRINGS IMPROVEMENT DIST
10300 N.W. 11TH MANOR
CORAL SPRINGS, FLORIDA 33071

November 29, 1989
Report 32101-01
LAB I.D. 86119

Sample ID.: Effluent
Sample Received: 11/02/89

Collected: 11/01/89
Collected by: Gary Bevins

Sample Description: 10300 N.W. 11 Manor

	RESULT	UNIT	METHOD	METHOD DET. LIMIT	DATE EXTRACTED	DATE ANALYZED	ANALYST
1,2-DICHLOROETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
1,3-DICHOLORBENZEN	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
DIBROMOCHLOROMETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
1,1,2,2-TETRACHLOROETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
BROMODICHLOROMETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
TETRACHLOROETHENE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
1,2-DICHLOROPROPANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
1,1,2-TRICHLOROETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
CARBON TETRACHLORIDE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
1,1,1-TRICHLOROETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
1,4-DICHLOROBENZENE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
CHLOROBENZENE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
CIS-1,3-DICHLOROPROPENE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
1,2-DICHLOROBENZENE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
TRANS-1,3-DICHLOROPROPENE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
2-CHLOROETHYLVINYL ETHER	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
TRICHLOROETHENE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
BROMOFORM	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
METHYLENE CHLORIDE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
1,1-DICHLOROETHENE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
TRICHLOROFLUOROMETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
CHLOROMETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
BROMOMETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
CHLOROFORM	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
DICHLORODIFLUOROMETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
VINYL CHLORIDE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
CHLOROETHANE	BDL	ug/l	5030/8021	0.5	N/A	11/09/89	RL
ALPHA BHC	BDL	ug/l	EPA 608	0.005 [1]	11/08/89	11/20/89	JT

DK

11579

CORAL SPRINGS IMPROVEMENT DIST
10300 N.W. 11TH MANOR
CORAL SPRINGS, FLORIDA 33071

November 29, 1989
Report 32101-01
LAB I.D. 86119

Sample ID.: Effluent
Sample Received: 11/02/89

Collected: 11/01/89
Collected by: Gary Bevins

Sample Description: 10300 N.W. 11 Manor

	RESULT	UNIT	METHOD	METHOD DET. LIMIT	DATE EXTRACTED	DATE ANALYZED	ANALYST
PCB-1242	BDL	ug/l	EPA 608	0.01	11/08/89	11/14/89	JT
PCB-1248	BDL	ug/l	EPA 608	0.01	11/08/89	11/14/89	JT
PCB-1254	BDL	ug/l	EPA 608	0.01	11/08/89	11/14/89	JT
PCB-1260	BDL	ug/l	EPA 608	0.01	11/08/89	11/14/89	JT
BETA BHC	BDL	ug/l	EPA 608	0.005	11/08/89	11/20/89	JT
FENTHION	BDL	ug/l	EPA 614	1.0	11/08/89	11/20/89	JT
GAMMA BHC	BDL	ug/l	EPA 608	0.005	11/08/89	11/20/89	JT
DELTA BHC	BDL	ug/l	EPA 608	0.005	11/08/89	11/20/89	JT
ENDOSULFAN SULFATE	BDL	ug/l	EPA 608	0.005	11/08/89	11/20/89	JT
CHLORDANE	BDL	ug/l	EPA 608	0.1	11/08/89	11/20/89	JT
MALATHION	BDL	ug/l	EPA 608	1.0	11/08/89	11/20/89	JT
DURSBAN (CHLORSPYRIFOS)	BDL	ug/l	EPA 608	1.0	11/08/89	11/20/89	JT
4,4'-DDD	BDL	ug/l	EPA 608	0.005	11/08/89	11/14/89	JT
4,4'-DDE	BDL	ug/l	EPA 608	0.005	11/08/89	11/14/89	JT
4,4'-DDT	BDL	ug/l	EPA 608	0.005	11/08/89	11/14/89	JT
ENDOSULFAN-I	BDL	ug/l	EPA 608	0.005	11/08/89	11/14/89	JT
ENDOSULFAN-II	BDL	ug/l	EPA 608	0.005	11/08/89	11/14/89	JT
HEPTACHLOR	BDL	ug/l	EPA 608	0.005	11/08/89	11/20/89	JT
GUTHION	BDL	ug/l	EPA 614	1.0	11/08/89	11/20/89	JT
ALDRIN	0.18	ug/l	EPA 608	0.005	11/08/89	11/20/89	JT
ETHION	BDL	ug/l	EPA 614	1.0	11/08/89	11/20/89	JT
DIAZINON	BDL	ug/l	EPA 614	1.0	11/08/89	11/20/89	JT
HEPTACHLOR-EPOXIDE	BDL	ug/l	EPA 608	0.005	11/08/89	11/20/89	JT
PCB-1016	BDL	ug/l	EPA 608	0.1	11/08/89	11/20/89	JT
DIELDRIN	BDL	ug/l	EPA 608	0.005	11/08/89	11/20/89	JT
PCB-1221	BDL	ug/l	EPA 608	0.01	11/08/89	11/14/89	JT
ENDRIN ALDEHYDE	BDL	ug/l	EPA 608	0.005	11/08/89	11/20/89	JT
PCB-1232	BDL	ug/l	EPA 608	0.01	11/08/89	11/14/89	JT
2,4-D	BDL	ug/l	EPA 615	0.2	11/08/89	11/22/89	JT
ENDRIN	BDL	ug/l	EPA 608	0.003	11/08/89	11/14/89	JT
LINDANE	BDL	ug/l	EPA 508	0.005	11/08/89	11/14/89	JT
METHOXYCHLOR	BDL	ug/l	EPA 508	0.025	11/08/89	11/14/89	JT
PARATHION	BDL	ug/l	EPA 614	1.0	11/08/89	11/20/89	JT
POLYCHLORINATED BIPHENYLS	BDL	ug/l	EPA 608	1.0	11/08/89	11/14/89	JT
TOXAPHENE	BDL	ug/l	EPA 608	0.1	11/08/89	11/14/89	JT
2,4,5 TP (SILVEX)	BDL	ug/l	EPA 615	0.02	11/08/89	11/22/89	JT

✓

11579

CORAL SPRINGS IMPROVEMENT DIST
10300 N.W. 11TH MANOR
CORAL SPRINGS, FLORIDA 33071

November 29, 1989
Report 32101-01
LAB I.D. 86119

Sample ID.: Effluent
Sample Received: 11/02/89

Collected: 11/01/89
Collected by: Gary Bevins

Sample Description: 10300 N.W. 11 Manor

	RESULT	UNIT	METHOD	METHOD DET. LIMIT	DATE EXTRACTED	DATE ANALYZED	ANALYST
EPA METHOD 508	QA/QC SET # 65A31289A						
ORGANOPHOSPHATE PESTICIDES	QA/QC SET # 65A32489A						
EPA METHOD 608	QA/QC SET # 35A31289A						
EPA METHOD 615	QA/QC SET # 60A32689A						
PCB EXPERIMENT	QA/QC SET # 65A31289A						
EPA METHOD 5030/8021	QA/QC SET # 34C31089A						

BDL - Below Detection Limit

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods or other approved methods. All rush analyses are reported as estimated pending QA/QC review.

Respectfully submitted,

ENVIROPACT, INC.

Jeffrey S. Glass
Laboratory Supervisor

cc: John Petty

APPENDIX E

Pressure-Test Data

CORAL SPRINGS IMPROVEMENT DISTRICT
HYDROSTATIC PRESSURE TEST
INJECTION WELL #2
24-INCH-DIAMETER CASING
NOVEMBER 10, 1989

Time	Delta Time, Minutes	Surface Test Pressure, PSIG
14:13	0	151.0
14:18	5	150.0
14:23	10	150.0
14:28	15	150.0
14:33	20	149.0
14:38	25	148.0
14:43	30	147.0
14:48	35	147.0
14:53	40	146.0
14:58	45	145.0
15:03	50	145.0
15:08	55	144.0
15:13	60	144.0

I, Kent J. Veron, certify that the above data is true and accurate.

Signed: Kent J. Veron

CORAL SPRINGS IMPROVEMENT DISTRICT
HYDROSTATIC PRESSURE TEST
DUAL MONITOR WELL #2
16-INCH-DIAMETER CASING
OCTOBER 11, 1989

Time	Delta Time, Minutes	Surface Test Pressure, PSIG
15:25	0	150.0
15:30	5	150.0
15:35	10	149.0
15:40	15	149.0
15:45	20	147.0
15.50	25	147.0
15:55	30	146.0
16:00	35	146.0
16:05	40	145.0
16:10	45	144.0
16:15	50	144.0
16:20	55	143.0
16:25	60	143.0

I, Kent J. Veron, certify that the above data is true and accurate.

Signed: Kent J. Veron

CORAL SPRINGS IMPROVEMENT DISTRICT
HYDROSTATIC PRESSURE TEST
DUAL MONITOR WELL #2
6-5/8-INCH-DIAMETER CASING
NOVEMBER 3, 1989

Time	Delta Time, Minutes	Surface Test Pressure, PSIG
12:40	0	177.0
12:45	5	176.0
12:50	10	175.0
12:55	15	175.0
13:00	20	175.0
13:05	25	175.0
13:10	30	175.0
13:15	35	175.0
13:20	40	175.0
13:25	45	174.0
13:30	50	174.0
13:35	55	173.0
13:40	60	173.0

I, Kent J. Veron, certify that the above data is true and accurate.

Signed: Kent J. Veron

BARFIELD INSTRUMENT CORPORATION
4101 N.W. 29th Street
P.O. Box 420-537
Miami, Florida 33142

RECORD OF INSTRUMENT CALIBRATION COMPARISON

For: Youngquist Brothers BIC W.O.:

Mfr: Span Model: 0-300 PSI.

Type: Pressure Gauge S/N: 92579 BIC

BIC TEST UNIT	CUSTOMER UNIT
0	0
25	25
50	50
75	75
100	100
125	125
150	150
175	175
200	200
225	225
250	250
275	275
300	300

The above calibration comparison was made by BARFIELD INSTRUMENT CORPORATION Miami, Florida using an approved BIC Test Unit.

Date: 10-4-89

Temperature: 24°C

Tested By: M. Ross

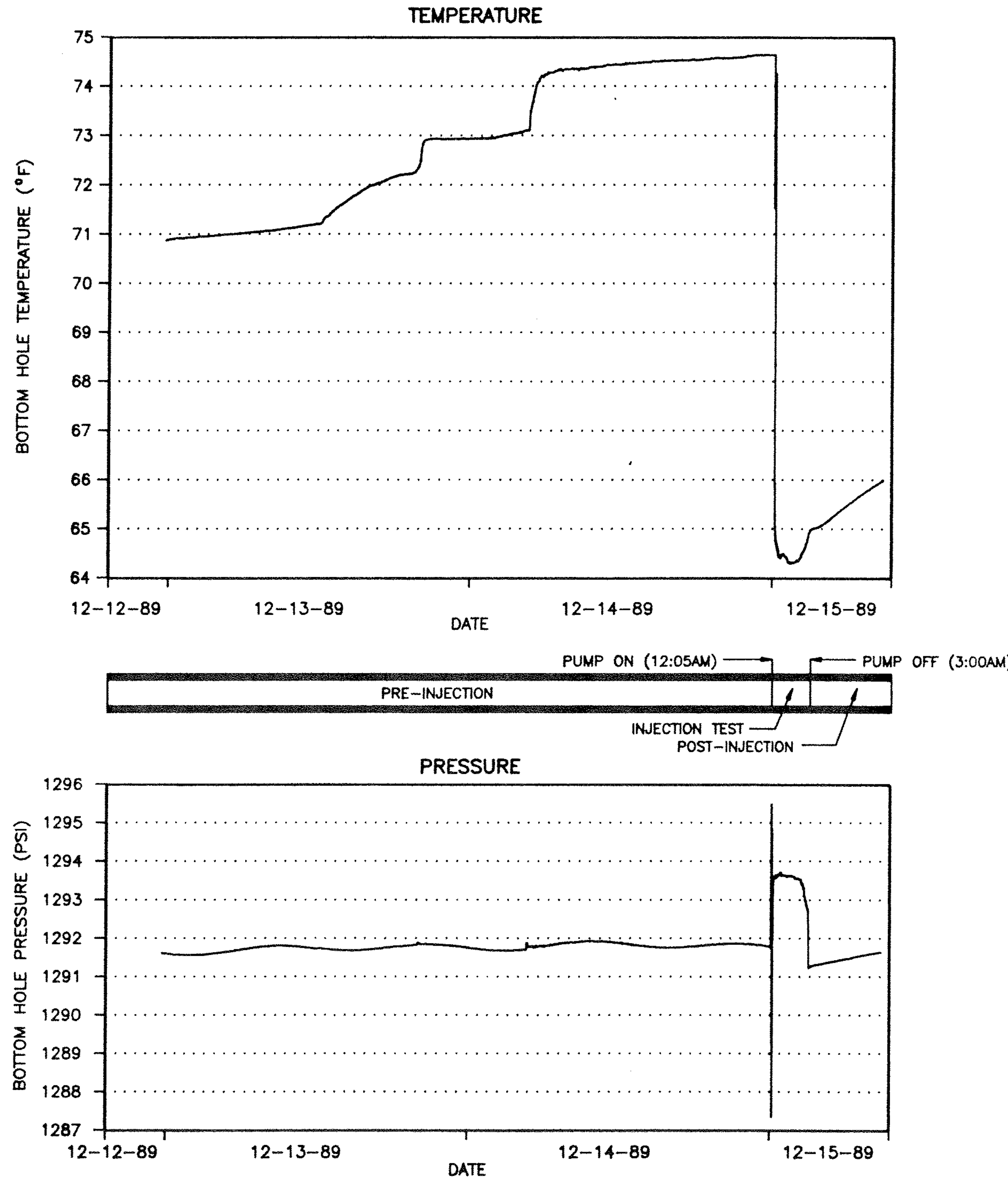
Inspected By: [signature]

Form No. 13 (Rev. 2/21/85)

APPENDIX F

Injection-Test Data

GERAGHTY & MILLER, INC. Environmental Services	COMPILED BY: R. VERRASTRO	DATE: JUN 90	SCALE: NONE	PREPARED FOR: GEE & JENSON
	PREPARED BY: B. OLIVA	FILE NO: PF01003		CORAL SPRINGS IMPROVEMENT DISTRICT
	PROJECT MGR: J. WHEATLEY			



SUBJECT:

INJECTION TEST DATA

FIGURE

APPENDIX G

Well Casing Mill Certificates

INJECTION WELL #2

TELEPHONE (416) 259-11
TELEX 06-9677

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGETAN INVESTMENTS LIMITED

289 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE June 29/89
SPECIFICATION A139 B
O.D. AND GAUGE 44" O.D. x .375
HYDROTEST 480 P.S.I. FOR 2 MIN.

CUSTOMER BARTOW STEEL
ADDRESS BARTOW, FL 33830
CUSTOMER'S P.O. NO. 1246
OUR MILL ORDER NO. 89-2500

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
5053M	12	45026	68026	31.0	71096	PM	
131184	3	42037	66183	33.0	69224	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS C	Mn	P	S	Si	AL	CHECK ANALYSIS C	Mn	P	S
5053M	.19	.92	.019	.020	.22	.039				
131184	.23	.82	.010	.013						

WE HEREBY CERTIFY THAT ABOVE ORDER WAS TESTED ACCORDANCE WITH THE OR SPECIFICATION

APPROVED BY M. Nakamu

DATE June 29

SENT BY: XEROX Telecopier 7017; 7-13-89 ; 11:56 ; CDN. PHOENIX STEEL→ 8134255860;# 2

IW-2

TELEPHONE (416) 259-
TELEX 06-967

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGETAN INVESTMENTS LIMITED

289 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE July 4/89
SPECIFICATION A139 B
O.D. AND GAUGE 54" O.D. x .375
HYDROTEST 390 P.S.I. FOR 2 MIN.

CUSTOMER Bartow Steel
ADDRESS Bartow, FL. 3383[illegible]
CUSTOMER'S P.O. NO. 1246
OUR MILL ORDER NO. 89-250[illegible]

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMAR[KS]
247235	4	41037	65993	31.0	69886	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS C	Mn	P	S	CHECK ANALYSIS C	Mn	P	S
247235	.22	.83	.008	.010				

WE HEREBY CERTIFY THA[T] ABOVE ORDER WAS TESTE[D] ACCORDANCE WITH THE O[...] SPECIFICATION

APPROVED BY M. Na[illegible]

DATE July 4/[illegible]

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGSTAN INVESTMENTS LIMITED

289 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

TE July 4/89

ECIFICATE A139-B

. AND GAUGE 54" O.D X .375"

ROTEST 390 P.S.I. FOR 2 MIN.

CUSTOMER BARTOW STEEL

ADDRESS BARTOW FL 33830

CUSTOMER'S P.O. NO. 1246

OUR MILL ORDER NO. 89-2500

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
31184	1	42222	66465	33.0	69284	P.M.	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS C	Mn	P	S	CHECK ANALYSIS C	Mn	P	S
31184	.23	.82	.010	.013				

WE HEREBY CERTIFY THAT THE ABOVE ORDER WAS TESTED IN ACCORDANCE WITH THE ORDERE SPECIFICATION

APPROVED BY

DATE July 4/89

TELEPHONE (416) 259-111

TELEX 06-96777

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGETAN INVESTMENTS LIMITED

289 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE June 29/89

SPECIFICATION A139 B

O.D. AND GAUGE 44" O.D. x .375

HYDROTEST 480 P.S.I. FOR 2 MIN.

CUSTOMER BARTOW STEEL

ADDRESS BARTOW, FL. 33830

CUSTOMER'S P.O. NO. 1246

OUR MILL ORDER NO. 89-2500

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
5053M	12	45026	68026	31.0	71096	PM	
131184	3	42037	66183	33.0	69224	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS C	Mn	P	S	SI	AL	CHECK ANALYSIS C	Mn	P	S
5053M	.19	.92	.019	.020	.22	.039				
131184	.23	.82	.010	.013						

WE HEREBY CERTIFY THAT
ABOVE ORDER WAS TESTED
ACCORDANCE WITH THE ORD
SPECIFICATION

APPROVED BY M. [signature]

DATE June 29/

TELEPHONE (416) 259-1113

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGETAN INVESTMENTS LIMITED

280 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE June 30/89

SPECIFICATION A 139 B

O.D. AND GAUGE 44" O.D. x .375

HYDROTEST 480 P.S.I. FOR 2 MIN.

CUSTOMER Bartow Steel

ADDRESS Bartow, FL. 33830

CUSTOMER'S P.O. NO. 1246

OUR MILL ORDER NO. 89-2500

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
246361	1	38876	64025	33.0	66987	PM	

CHEMICAL PROPERTIES

HEAT	LADLE ANALYSIS				CHECK ANALYSIS			
NO.	C	Mn	P	S	C	Mn	P	S
246361	.24	.70	.013	.010				

WE HEREBY CERTIFY THAT T[HE] ABOVE ORDER WAS TESTED I[N] ACCORDANCE WITH THE ORDE[R] SPECIFICATION

APPROVED BY M. Nakamura

DATE June 30/89

TELEX 06-967775

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGETAN INVESTMENTS LIMITED

289 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Aug. 16/89

SPECIFICATION A139-B

O.D. AND GAUGE 34" O.D. x .375

HYDROTEST 620 P.S.I. FOR 2 MIN.

CUSTOMER BARTOW STEEL INC

ADDRESS BARTOW, FL 33830

CUSTOMER'S P.O. NO. 1257

OUR MILL ORDER NO. 89-2506

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
1[illegible]184		42488	66397	33.0	70026	PM	
132408		40327	64398	32.0	67897	PM	
247235		41875	65973	31.0	69375	PM	
132414		39325	64026	32.0	66979	PM	
247326		43294	67023	32.0	70326	PM	
134123		40027	65396	32.0	68297	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS C	LADLE ANALYSIS Mn	LADLE ANALYSIS P	LADLE ANALYSIS S	CHECK ANALYSIS C	CHECK ANALYSIS Mn	CHECK ANALYSIS P	CHECK ANALYSIS S
131184	.23	.82	.010	.013				
132408	.19	.82	.008	.018				
247235	.22	.83	.008	.010				
[illegible]2414	.19	.79	.008	.009				
247326	.23	.83	.007	.011				
134123	.19	.79	.013	.015				

WE HEREBY CERTIFY THAT T
ABOVE ORDER WAS TESTED I
ACCORDANCE WITH THE ORDE
SPECIFICATION

APPROVED BY M. Nakamur

DATE Aug. 16/89

TELEX 06-967775

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGETAN INVESTMENTS LIMITED

289 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Aug. 16/89
SPECIFICATION A139-B
O.D. AND GAUGE 34" O.D. x .375
HYDROTEST 620 P.S.I. FOR 2 MIN.

CUSTOMER Bartow Steel Inc
ADDRESS Bartow, FL 33830
CUSTOMER'S P.O. NO. 1257
OUR MILL ORDER NO. 89-2506

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
131184		42488	66397	33.0	70026	PM	
132408		41327	64398	32.0	67897	PM	
247235		41875	65973	31.0	69375	PM	
132414		39325	64026	32.0	66979	PM	
247326		43294	67023	32.0	70326	PM	
134123		40027	65396	32.0	68297	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS C	Mn	P	S	CHECK ANALYSIS C	Mn	P	S
131184	.23	.82	.010	.013				
132408	.19	.82	.008	.018				
247235	.22	.83	.008	.010				
132414	.19	.79	.008	.009				
247326	.23	.83	.007	.011				
134123	.19	.79	.013	.015				

WE HEREBY CERTIFY THAT THE ABOVE ORDER WAS TESTED IN ACCORDANCE WITH THE ORDER SPECIFICATION

APPROVED BY M. Nakamura

DATE Aug. 16/89

TELEX 06-967775

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGETAN INVESTMENTS LIMITED

289 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Aug. 16/89

SPECIFICATION A139-B

O.D. AND GAUGE 34" O.D. X .375

HYDROTEST 620 P.S.I. FOR 2 MIN.

CUSTOMER Bartow Steel Inc

ADDRESS Bartow, FL 33830

CUSTOMER'S P.O. NO. 1257

OUR MILL ORDER NO. 89-2506

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
131184		42408	66397	33.0	70026	PM	
132408		40327	64398	32.0	67897	PM	
247235		41875	65973	31.0	69375	PM	
132414		39325	64026	32.0	66979	PM	
247326		43294	67023	32.0	70326	PM	
134123		40027	65396	32.0	68297	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS C	Mn	P	S	CHECK ANALYSIS C	Mn	P	S
131184	.23	.82	.010	.013				
132408	.19	.82	.008	.018				
247235	.22	.83	.008	.010				
132414	.19	.79	.008	.009				
247326	.23	.83	.007	.011				
134123	.19	.79	.013	.015				

WE HEREBY CERTIFY THAT TH[E] ABOVE ORDER WAS TESTED I[N] ACCORDANCE WITH THE ORDE[R] SPECIFICATION

APPROVED BY M. Nakamur[a]

DATE Aug. 16/89

TELEX 06-967775

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGETAN INVESTMENTS LIMITED

289 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Aug. 16/89

SPECIFICATION A139-B

I.D. AND GAUGE 34" O.D. X .375

HYDROTEST 620 P.S.I. FOR 2 MIN.

CUSTOMER BARTOW STEEL INC

ADDRESS BARTOW, FL 33830

CUSTOMER'S P.O. NO. 1257

OUR MILL ORDER NO. 89-2506

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
131184		42488	66397	33.0	70026	PM	
[illegible]2408		40327	64398	32.0	67897	PM	
247235		41875	65973	31.0	69375	PM	
132414		39325	64026	32.0	66979	PM	
247326		43244	67023	32.0	70326	PM	
134123		40027	65396	32.0	68297	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS				CHECK ANALYSIS			
	C	Mn	P	S	C	Mn	P	S
131184	.23	.82	.010	.013				
132408	.19	.82	.008	.018				
247235	.22	.83	.008	.010				
132414	.19	.79	.008	.009				
247326	.23	.83	.007	.011				
134123	.19	.79	.013	.015				

WE HEREBY CERTIFY THAT T
ABOVE ORDER WAS TESTED I
ACCORDANCE WITH THE ORDE
SPECIFICATION

APPROVED BY M. Nakamur

DATE Aug. 16/8

TELEX 06-967775

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGETAN INVESTMENTS LIMITED

289 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Aug. 16/89

SPECIFICATION A139-B

.D. AND GAUGE 34" O.D. X .375

YDROTEST 620 P.S.I. FOR 2 MIN.

CUSTOMER BARTOW STEEL INC

ADDRESS BARTOW, FL 33830

CUSTOMER'S P.O. NO. 1257

OUR MILL ORDER NO. 89-2506

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
131184		42488	66397	33.0	70026	PM	
132408		40327	64398	32.0	67897	PM	
247235		41875	65973	31.0	69375	PM	
132414		39325	64026	32.0	66979	PM	
247326		43294	67023	32.0	70326	PM	
134123		40027	65396	32.0	68297	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS C	LADLE ANALYSIS Mn	LADLE ANALYSIS P	LADLE ANALYSIS S	CHECK ANALYSIS C	CHECK ANALYSIS Mn	CHECK ANALYSIS P	CHECK ANALYSIS S
131184	.23	.82	.010	.013				
132408	.19	.82	.008	.018				
247235	.22	.83	.008	.010				
132414	.19	.79	.008	.009				
247326	.23	.83	.007	.011				
134123	.19	.79	.013	.015				

WE HEREBY CERTIFY THAT T
ABOVE ORDER WAS TESTED I
ACCORDANCE WITH THE ORDE
SPECIFICATION

APPROVED BY M. Nakamur

DATE Aug. 16/89

TELEX 06-967775

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF BRIDGETAN INVESTMENTS LIMITED

289 HORNER AVENUE
TORONTO, ONTARIO, CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Aug. 16/89

SPECIFICATION A139-B

O.D. AND GAUGE 34" O.D. X .375

HYDROTEST 620 P.S.I. FOR 2 MIN.

CUSTOMER Bartow Steel Inc

ADDRESS Bartow, FL 33830

CUSTOMER'S P.O. NO. 1257

OUR MILL ORDER NO. 89-2506

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	YIELD STRENGTH	TENSILE STRENGTH	ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
131184		[illegible]	66397	33.0	70026	PM	
132408		40327	64398	32.0	67897	PM	
247235		41875	65973	31.0	69375	PM	
132414		39325	64026	32.0	66979	PM	
247326		43294	67023	32.0	70326	PM	
134123		40027	65396	32.0	68297	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS C	Mn	P	S	CHECK ANALYSIS C	Mn	P	S
131184	.23	.82	.010	.013				
132408	.19	.82	.008	.018				
247235	.22	.83	.008	.010				
132414	.19	.79	.008	.009				
247326	.23	.83	.007	.011				
134123	.19	.79	.013	.015				

WE HEREBY CERTIFY THAT THE ABOVE ORDER WAS TESTED IN ACCORDANCE WITH THE ORDER SPECIFICATION

APPROVED BY M. Nakamura

DATE Aug. 16/89

USS A division of USX Corporation

TUBULAR PRODUCTS

METALLURGICAL TEST REPORT

JOB, CONTRACT NO.

USS TUBULAR PRODUCTS

P.O. DATE

PURCHASE ORDER NO. 1252

SHIPPERS NO.

MILL ORDER NO. D859460

INVOICE NO.

VEHICLE IDENTITY 08/15/89

BARTOW STEEL INC
P O BOX 1789
BARTOW FL 33330

MAIL TO 3
BARTOW STEEL INC
P O BOX 1789
BARTOW FL 33830

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MFGD., SAMPLED, TESTED, AND/OR INSPD. IN ACCORDANCE WITH THE SPECIFICATION AND FULFILLS REQUIREMENTS IN SUCH RESPECTS.
APPROVED BY THE OFFICE OF:
D.S. DABKOWSKI MGR. MET. & Q.A. USS TUBULAR PRODUCTS.

DATE 08/15/89

M NO.	MATERIAL DESCRIPTION: SIZE	WALL	SPECIFICATION & GRADE	MATL.	HEAT/ LOT NO.	MIN. HYDRO PSI	YIELD STR. PSI	TENSILE STR. PSI	ELONG. % IN 2"	GAGE WIDTH IN.	FLAT	BEND
24	OD	.500	ASTMA5388AGRBASMESA53GRB86	SMLS	N87249	1090	41700	73000	41.0	1 1/2	OK	
	1988ADD	ASTMA1	0688AGRBASMESA106GRB86ED19	88ADD	API5LGRB	37TH ED	5/88					
24	OD	.500	ASTMA5388AGRBASMESA53GRB86	SMLS	N87250	1090	40800	71600	48.0	1 1/2	OK	
	1988ADD	ASTMA1	0688AGRBASMESA106GRB86ED19	88ADD	API5LGRB	37TH ED	5/88					

M NO.	HEAT NO.	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	SN	AL	N	V	B	TI	CB	CO	
	N87249	HEAT	24	64	010	007	250	02	02	06	02				**					**LESS THAN .01
	N87249	PROD	22	65	011	008	230													
	N87250	HEAT	25	65	010	007	240	02	02	05	01				**					**LESS THAN .01
	N87250	PROD	26	68	011	009	240													

END OF DATA THIS SHEET ***

USS
A division of USX Corporation

TUBULAR PRODUCTS

METALLURGICAL TEST REPORT

JOB, CONTRACT NO.	P.O. DATE	PURCHASE ORDER NO.		
USS TUBULAR PRODUCTS		1252		
	SHIPPERS NO.	MILL ORDER NO.	INVOICE NO.	
		DR59460		
	VEHICLE IDENTITY		08/15/89	

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MFGD., SAMPLED, TESTED, AND/OR INSPD. IN ACCORDANCE WITH THE SPECIFICATION AND FULFILLS REQUIREMENTS IN SUCH RESPECTS.
APPROVED BY THE OFFICE OF:
D.S. DABKOWSKI MGR. MET. & Q.A. USS TUBULAR PRODUCTS.

DATE 08/17/89

BARTOW STEEL INC
P O BOX 1789
BARTOW FL 33830

MAIL TO 3

BARTOW STEEL INC
P O BOX 1789
BARTOW FL 33830

ITEM NO.	SIZE	WALL	SPECIFICATION & GRADE	MATL.	HEAT/LOT NO.	MIN. HYDRO PSI	YIELD STR. PSI	TENSILE STR. PSI	ELONG. % IN 2"	GAGE WIDTH IN.	FLAT	BEND
	24 OD	.500	ASTMA5388AGRBASMESA53GRB86	SMLS	L82685	1090	46300	73600	39.0	1 1/2	OK	
	ED1988ADDASTMA10688AGRBASMESA106GRB86ED1988ADDAPI5LGRB37TH ED 5/88											

ITEM NO.	HEAT NO.	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	SN	AL	N	V	B	TI	CB	CO	
1	L82685	HEAT	24	66	008	010	230	02	03	06	02				**					**LESS THAN .01
1	L82685	PROD	24	65	009	012	210													

END OF DATA THIS SHEET ***

DEEP MONITOR WELL #2

L. B. FOSTER COMPANY
P. O. BOX 7796
GARDEN CITY, GA 31418-7796

STANDARD CERTIFIED TEST REPORT
TUBULAR PRODUCTS

CUSTOMER — Name	YOUNGQUIST BROS INC
Address	RURAL ROUTE 34 BOX 502
	FT MYERS FL
City & State	

Date JUNE 7 1989

PHONE-

Customer's Order No. 23H010-049525

LBF Invoice No.

Material 24" & 16" O D X 375

Grade ASTM A-139 GR B

Heat No.	Size O.D.	Wt/Ft. or Wall Thick.	Min. Hydro. Test Pres. P.S.I.	MECHANICAL PROPERTIES			CHEMICAL ANALYSIS (%)				
				Yield Strength P.S.I. Point	Tensile Strength P.S.I.	Elong. In 2" %	C	Mn	P	S	Si
~~512898~~	~~24"~~	~~375~~	~~660~~	~~38900~~	~~77700~~	~~30~~	~~.22~~	~~.76~~	~~.008~~	~~.020~~	
[illegible]004	16"	375	990	40400	74200	34	.24	.86	.008	.027	
96D019	16"	375	990	40200	70700	36	.23	.81	.015	.026	

RECEIVED AUG 17 1989

The undersigned, in behalf of The L. B. Foster Company, hereby certifies that the above materials have been inspected and tested in accordance with the methods prescribed in the applicable specifications and the results of such inspection and tests shown above. In determining properties or characteristics for which no methods of inspecting or testing are prescribed by said specifications, the standard mill inspection and testing practices of The L. B. Foster Company have been applied. Unless it appears otherwise in the results of such inspection and tests shown above, the undersigned agent of The L. B. Foster Company believes that said materials conform to said specifications.

Subscribed and sworn to before me this 8th day of June 19__

Robert G. Stevenson
Notary Public

ROBERT G. STEVENSON
Notary Public, Effingham County, Ga.
MY Commission Expires May 10, 1993

Otis R Kessler
OTIS R KESSLER PLANT MGR
Agents' Name & Title

L B FOSTER CO
COMPANY

Form No. - SW 4-69

United States Steel Corporation

01.000.0798 (REV. 7-78)

TUBULAR PRODUCTS

METALLURGICAL TEST REPORT

O., JOB, CONTRACT NO.	P.O. DATE	PURCHASE ORDER NO.		
		17566		
	SHIPPERS NO.	MILL ORDER NO.	INVOICE NO.	
	P 18250	DR26706	488-22833	
	VEHICLE IDENTITY NW99923			05/16/88

VENDOR:
FAIRFIELD WORKS
P. O. BOX 599
FAIRFIELD, AL 35064

SOLD TO:
VALLEY STEEL PRODUCTS CO
P O BOX 503
ST LOUIS MO 63166

MAIL TO:
VALLEY STEEL PRODUCTS CO
SPARTA ILL

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MFGD., SAMPLED, TESTED, AND/OR INSPD. IN ACCORDANCE WITH THE SPECIFICATION AND FULFILLS REQUIREMENTS IN SUCH RESPECTS.

PREPARED BY THE OFFICE OF:
F.W. MOORE MGR Q.A.

DATE 05/26/88

SPEC. & INSP. PSAA PIPE CARBON SMLS STD PIPE API 5L/ASTM A53/ASTM A106 GRADE B TRIPLE
SEE PRIOR PAGE FOR FULL SPEC INFORMATION

VALLEY STEEL PRODUCTS
HEAVY WALL DEPT.
By KMM Date 6/15/88

INSP 01 MILL CERTIFIED T/R

ITEM NO.	SIZE	WALL	SPECIFICATION & GRADE	MATL.	HEAT/ LOT NO.	MIN. HYDRO PSI	YIELD STR. PSI	TENSILE STR. PSI	ELONG. % IN 2"	GAGE WIDTH IN.	FLAT	BEND
004	6.6250	0.5620		SMLS	A61688	4450 05SEC	47,700	76,900	40.6	1.5	OK	
					B65913	4450 05SEC	48,800	76,600	43.1	1.5	OK	
					B65914	4450 05SEC	47,000	77,300	41.4	1.5	OK	
						END OF DATA						

MEETS THE REQUIREMENTS OF ASTM A53-84A & A106-85,
ASME SA53 & SA106 & API 5L DTD MAY 31, 1985
LONGITUDINAL STRIP TENSILE SPECIMENS UNLESS NOTED
YIELD STRENGTH @ .005 EXT.

ITEM NO.	HEAT NO.	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	SN	AL	N	V	B	TI	CB	CO
004	A61688	HEAT	.26	.88	.007	.011	.25	.02	.02	.05	.01								
		PROD	.27	.89	.007	.010	.24	.02	.02	.05	.02								
		PROD	.26	.89	.007	.009	.24	.02	.02	.05	.02								
	B65913	HEAT	.23	.94	.009	.007	.23	.05	.06	.04	.03								
		PROD	.26	.91	.008	.007	.23	.05	.06	.04	.03								
		PROD	.26	.91	.009	.007	.23	.05	.06	.04	.03								
	B65914	HEAT	.25	.91	.012	.009	.23	.02	.03	.06	.02								
		PROD	.26	.91	.013	.007	.24	.02	.03	.05	.02								
		PROD	.26	.92	.013	.007	.24	.02	.03	.05	.02								

Corporation

TUBULAR PRODUCTS

METALLURGICAL TEST REPORT

REQ., JOB, CONTRACT NO.

P.O. DATE	PURCHASE ORDER NO.		
	19698 04/27/89		
SHIPPERS NO.	MILL ORDER NO.	INVOICE NO.	
P 13847	DR47685	488-40546	
VEHICLE IDENTITY	NW99525		02/22/89

VENDOR
FAIRFIELD WORKS
P. O. BOX 599
FAIRFIELD, AL 35064

SOLD TO
VALLEY STEEL PRODUCTS CO
P O BOX 503
ST LOUIS MO 63166

MAIL TO
VALLEY STEEL PRODUCTS CO
SPARTA ILL

THIS IS TO CERTIFY THAT THE PRODUCT DESCRIBED HEREIN WAS MFGD., SAMPLED, TESTED, AND/OR INSPD. IN ACCORDANCE WITH THE SPECIFICATION AND FULFILLS REQUIREMENTS IN SUCH RESPECTS.

PREPARED BY THE OFFICE OF:
F.W. MOORE MGR Q.A.

DATE 02/24/89 [signature]

SPEC. & SP.
PSAA PIPE CARBON SMLS STD PIPE API 5L/ASTM A53-87B/ASTM A106-87A GRADE
B TRIPLE STENCIL BLK REG MILL COAT PE SC SPEC REV NAME 37TH
EDITION DTD 5/88 SPEC DATE 87/87

INSP 01 MILL
CERTIFIED T/R

VALLEY STEEL PRODUCTS
HEAVY WALL DEPT.
By KMM Date 3/1/89

ITEM NO.	SIZE	WALL	SPECIFICATION & GRADE	MATL.	HEAT/LOT NO.	MIN. HYDRO PSI	YIELD STR. PSI	TENSILE STR. PSI	ELONG. % IN 2"	GAGE WIDTH IN.	FLAT	BEND
01	6.6250	0.5620		SMLS	C86517	4450	49,600	80,600	40.9	1.5	OK	
					X83745	4450	49,200	78,500	43.6	1.5	OK	
						END OF DATA						

MEETS THE REQUIREMENTS OF ASTM A53-87B & A106-87A
ASME SA53 - 1986 A87 & SA106 - 1986 A87 &
API 5L DTD MAY 31, 1988
LONGITUDINAL STRIP TENSILE SPECIMENS UNLESS NOTED
YIELD STRENGTH @ .005 EXT.

ITEM NO.	HEAT NO.	TYPE	C	MN	P	S	SI	CU	NI	CR	MO	SN	AL	N	V	B	TI	CB	CO
01	C86517	HEAT	.25	.96	006	005	.22	.01	.01	.02	.01				.00				
		PROD	.27	.98	007	007	.22	.01	.01	.02	.01				.00				
		PROD	.27	.97	007	008	.22	.01	.01	.02	.01				.00				
	X83745	HEAT	.25	.94	.012	008	.21	.01	.01	.02	.01				.00				
		PROD	.25	.97	011	009	.20	.02	.01	.03	.01				.00				
		PROD	.24	.97	011	009	.20	.01	.01	.03	.01				.00				
				END OF DATA															

APPENDIX H

Cement Records

INJECTION WELL #2 CEMENT RECORD

Coral Springs Improvement District, Injection Well #2, Cement Record

Casing Size (inches)	Date	Stage Number	Cement Additives	Volume Pumped (cu.ft)	Fill Interval (feet)
54	8/14/89	1	Neat & Pozzolan	606.3	180- 60
54	8/15/89	2	12% Bentonite	168.4	39-surface
44	8/25/89	1	12% Bentonite	1886	
44	8/25/89	1	Neat	415.49	1001- 460
44	8/26/89	2	12% Bentonite	628.85	460- 230
44	8/27/89	3	12% Bentonite	791.68	230-surface
34	9/22/89	1	12% Bentonite	988.2	
34	9/22/89	1	Neat	645.7	1800-1395
34	9/22/89	2	12% Bentonite	954.5	1395-1042
34	9/23/89	3	12% Bentonite	870	1042- 840
34	9/24/89	4	12% Bentonite	1089	840- 560
34	9/24/89	5	12% Bentonite	1089	560- 280
34	9/25/89	6	12% Bentonite	1066	280-surface
24	10/27/89	1	12% Bentonite	1044.2	
24	10/27/89	1	12% Bentonite	522.1	2910-2471
24	10/28/89	2	12% Bentonite & Celloflake	544.6	2471-2278
24	10/29/89	3	12% Bentonite & Celloflake	786	2278-2017
24	10/29/89	4	12% Bentonite & Celloflake	926.4	2017-1838

Casing Size (inches)	Date	Stage Number	Cement Additives	Volume Pumped (cu.ft)	Fill Interval (feet)
24	10/30/89	5	12% Bentonite & Celloflake	864.6	1838-1615
24	10/30/89	6	12% Bentonite & Celloflake	1010.5	1615-1308
24	10/31/89	7	12% Bentonite	1179.1	1308- 900
24	10/31/89	8	12% Bentonite	1179.1	900- 495
24	11/1/89	9	12% Bentonite	926.4	495- 195
24	11/10/89	10	12% Bentonite	420.7	195-surface

Coral Springs Improvement District, Deep Monitor Well #2, Cement Record

Casing Size (inches)	Date	Stage Number	Cement Additives	Volume Pumped (cu.ft)	Fill Interval (feet)
24	9/10/89	1	12% Bentonite	449.1	
24	9/10/89	1	Neat	134.7	170- 28
24	9/11/89	2	12% Bentonite	67.37	28-surface
16	9/29/89	1	6% Bentonite	409.82	1007- 807
16	9/29/89	1	Neat	275.09	807- 507
16	9/29/89	2	6% Bentonite	465.96	507-surface
6-5/8	10/26/89	1	6% Bentonite	202.1	
6-5/8	10/26/89	1	Neat	202.1	1510-1260
6-5/8	10/27/89	2	6% Bentonite and Celloflake	168.4	1260-1165
6-5/8	10/28/89	3	6% Bentonite and Celloflake	140.4	1165-1115

APPENDIX I

Operation and Maintenance Forms

CORAL SPRINGS IMPROVEMENT DISTRICT
WASTEWATER TREATMENT PLANT
I.D. # 5006M10371

SPECIFIC INJECTIVITY TEST

DATE: ______________

	INJECTION RATE (GPM)	÷ [WELL-HEAD PRESSURE (PSIG)	– SHUT-IN PRESSURE (PSIG)]	= SPECIFIC INJECTIVITY (GPM/PSIG)
TEST 1				
TEST 2				

MONITOR WELL DATA

	PRESSURE PRIOR TO TESTS (PSIG)		PRESSURE DURING TESTS (PSIG)	PRESSURE AFTER TESTS (PSIG)
SHALLOW ZONE		TEST 1		
		TEST 2		
DEEP ZONE		TEST 1		
		TEST 2		

COMMENTS: ______________

DRAFTING DEPT.
DRAFT COPY ONLY

SIGNATURE: ______________

CORAL SPRINGS IMPROVEMENT DISTRICT
WASTEWATER TREATMENT PLANT
I.D. # 5006M10371

MONITOR WELL WATER QUALITY DATA

MONTH:______________ YEAR:_______

PARAMETER	WEEK BEGINNING				
DATE OF SAMPLING					
SHALLOW MONITOR ZONE (1000 FT. TO 1115 FT.)					
PRESSURE PRIOR TO SAMPLING (PSIG)					
TEMPERATURE (°F)					
pH					
SPECIFIC CONDUCTIVITY (μmhos/cm)					
CHLORIDES (mg/L)					
TOTAL DISSOLVED SOLIDS (mg/L)					
AMMONIA (mg/L)					
FECAL COLIFORM (colonies/100ml)					
TKN (mg/L)					
DEEP MONITOR ZONE (1500 FT. TO 1650 FT.)					
PRESSURE PRIOR TO SAMPLING (PSIG)					
TEMPERATURE (°F)					
pH					
SPECIFIC CONDUCTIVITY (μmhos/cm)					
CHLORIDES (mg/L)					
TOTAL DISSOLVED SOLIDS (mg/L)					
AMMONIA (mg/L)					
FECAL COLIFORM (colonies/100ml)					
TKN (mg/L)					

DRAFTING DEPT.
DRAFT COPY ONLY

COMMENTS:____

____

SIGNATURE: ______________________________

GEE & JENSON

October 19, 1990

Alfred Mueller, Jr., P.G., P.E.
Florida Department of Environmental
Regulation
Bureau of Groundwater Protection - UIC
1900 South Congress Avenue, Suite A
West Palm Beach, Florida 33406

Re: Coral Springs Improvement District
Application to Operate
Injection Well No. 2

Dear Mr. Mueller:

Transmitted herewith are the following for the referenced project:

1. Four (4) copies of the Application to Operate Injection Well No. 2 of the Coral Springs Improvement District.

2. Four (4) copies of the Final Report on Construction and Testing of Injection Well No. 2 (Two Volumes) as prepared by Geraghty & Miller, Inc.

3. Application fee of $1,000.00.

Copies of the Certification of Financial Responsibility have previously been provided to you under separate cover. The originals of the Certifications were sent to Ms. Mary Woodworth at DER/Tallahassee.

Members of the Technical Advisory Committee, as shown on the enclosed distribution list, are also being forwarded copies of this submittal package.

Please call should you have any questions.

Very truly yours,

John F. McKune, P.E.
Vice President

JFMcK:cme
cc: Attached Distribution List
Gary Moyer w/complete package
Bob Verrastro w/letter
88-229.2

One Harvard Circle • West Palm Beach, Florida 33409-1923 • 407/683-3301 • FAX 407/686-7446

FINAL REPORT DISTRIBUTION LIST

	Number of Copies
Mr. Steve Burton U. S. Environmental Protection Agency 345 Courtland Street Atlanta, Georgia 30365	1
Mr. Mike Merritt U. S. Geological Survey Water Resources Division 9100 N. W. 36th Street Suite 106 & 107 Miami, Florida 33178	1
Mr. Greg Rawl South Florida Water Management District P. O. Box 24680 West Palm Beach, Florida 33416-4680	1
Ms. Cathy Conrardy Florida Department of Environmental Regulation Bureau of Groundwater Protection - UIC 2600 Blair Stone Road Tallahassee, Florida 32301	1
Mr. Victor Howard Broward County Environmental Quality Control Board 500 S.W. 14th Court Ft. Lauderdale, Florida 33315	1

STATE OF FLORIDA

DEPARTMENT OF ENVIRONMENTAL REGULATION

TWIN TOWERS OFFICE BUILDING
2600 BLAIR STONE ROAD
TALLAHASSEE, FLORIDA 32301

BOB GRAH
GOVERN

VICTORIA J. TSCHINK
SECRETA

APPLICATION TO CONSTRUCT/OPERATE/ABANDON CLASS I, III, OR V INJECTION WELL SYSTEMS

PART I. Directions

A. All applicable items must be completed in full in order to avoid delay in processing this application. Where attached sheets or other technical documentation are utilized in lieu of the blank space provided, indicate appropriate cross-reference in the space and provide copies to the department in accordance with (C) below. Where certain items do not appear applicable to the project, indicate N/A in the appropriate spaces. When this form is used in conjunction with DER Form 17-1.205(1), duplicative information requests need to be completed only once.

B. All information is to be typed or printed in ink.

C. Four (4) copies of this application and four (4) copies of supporting information such as plans, reports, drawings and other documents shall be submitted to the appropriate District/Subdistrict office. An engineering report is also required to be submitted to support this application pursuant to the applicable sections of Florida Administrative Code Rule 17-28. The attached lists* shall be used to determine completeness of supporting data submitted or previously received. A check for the application fee in accordance with Florida Administrative Code Rule 17-4.05 made payable to the Department shall accompany the application.

D. For projects involving construction, this application is to be accompanied by four (4) sets of engineering drawings, specifications and design data as prepared by a Professional Engineer registered in Florida, where required by Chapter 471, Florida Statutes.

E. Attach 8 1/2" x 11" USGS site location map indicating township, range and section and latitude/longitude for the project.

PART II. General Information

A. Applicant: Name Gary L. Moyer Title Superintendent

Address 10300 N.W. 11th Manor

City Coral Springs, Florida Zip 33071

Telephone Number (305) 753-0380

B. Project Status: [X] New [ ] Existing

[ ] Modification (specify) ______

*"Engineering and Hydrogeologic Data Required for Support of Application to Construct, Operate and Abandon Class I, III, or V Injection Wells"

C. Well Type:

( ) Exploratory Well ( ) Test/Injection Well

D. Type of Permit Application:

( ) Class I Exploratory Well Construction and Testing Permit

( ) Class I Test/Injection Well Construction and Testing Permit

(x) Class I Well Operating Permit

( ) Class I Well Plugging and Abandonment Permit

( ) Class III Well Construction/Operation/Plugging and Abandonment Permit

( ) Class V well Construction Permit

( ) Class V Well Operating Permit

( ) Class V Well Plugging and Abandonment Permit

E. Facility Identification:

Name: CSID WWTP Coral Springs Improvement District Wastewater Treatment Plant

Facility Location: Street: 10300 N.W. 11th Manor

City: Coral Springs, County: Broward

SIC Code: ____

F. Proposed facility located on Indian Lands: Yes ____ No X

G. Well Identification:

Well No. 2 of 2 Wells (total #)

Purpose (Proposed Use): Effluent Injection

Well Location: Latitude: 26° 14' 30" N Longitude 80° 15' 30" W

(attach separate sheet, if necessary, for multiple wells.)

Subpart B. General Projection Description:

(1) Describe the nature, extent and schedule of the injection well project. Refer to existing and/or future pollution control facilities, expected improvement in performance of the facilities and state whether the project will result in full compliance with the requirements of Chapter 403, Florida Statutes, and all rules and regulations of the Department. Attach additional sheet(s) if necessary or cross-reference the engineering report.

The injection well will be used to dispose of 15 million gallons per day (maximum peak hour design capacity) of non-hazardous, secondarily-treated domestic wastewater effluent.

PART III Statement by Applicant and Engineer

A. Applicant

I, the owner/authorized representative* of CSID, certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. I understand that this certification also applies to all subsequent reports submitted pursuant to this permit. Where construction is involved, I agree to retain the design engineer, or other professional engineer registered in Florida, to provide inspection of construction in accordance with Florida Administrative Code Rule 17-28.34(1)(c).

Signed: [signature] Date: 10.18.90

Gary L. Moyer, Superindendant CSID — Name and Title (Please Type)

(305) 753-0380 — Telephone Number

*Attach a Letter of Authorization.

B. Professional Engineer Registered in Florida

This is to certify that the engineering features of this injection well have been designed/examined by me and found to be in conformity with modern engineering principles applicable to the disposal of pollutants characterized in the permit application. There is reasonable assurance, in my professional judgement, that the well, when properly maintained and operated, will discharge the effluent in compliance with all applicable statutes of the State of Florida and the rules and regulations of the Department. It is also agreed that the undersigned will furnish the applicant a set of instructions for proper maintenance and operation of the well.

Signed: [signature]

Kent J. Veron, P.E.
Name (Please Type)

Geraghty & Miller, Inc.
Company Name (Please Type)

(Please Affix Seal)

11382 Prosperity Farms Road, Suite 125
Mailing Address (Please Type)
Palm Beach Gardens, Florida 33410

FLORIDA REGISTRATION NUMBER 41786 Date: 10-11-90 Phone No. 504-292-1004

ENGINEERING AND HYDROLOGIC DATA REQUIRED FOR SUPPORT OF APPLICATION TO CONSTRUCT, OPERATE, AND ABANDON CLASS I, III, OR V INJECTION WELL SYSTEMS

The following information shall be provided for each type of permit application.

(A) CLASS I EXPLORATORY WELL CONSTRUCTION AND TESTING PERMIT

(1) Conceptual plan of the injection project. Include number of injection wells, proposed injection zone, nature and volume of injection fluid, and proposed monitoring program.

(2) Preliminary Area of Review Study. Include the proposed radius of the area of review with justification for that radius. Provide a map showing the location of the proposed injection well or well field area for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number or name, and location of all producing wells, injection wells, abandoned wells, dry holes, surfacebodies of water, springs, public water systems, mines (surface and subsurface), quarries, water wells and other pertinent surface features including residences and roads. The map should also show faults, if known or suspected. Only information of public record and pertinent information known to the applicant is required to be included on this map.

(3) Proposed other uses of the exploratory well.

(4) Drilling and testing plan for the exploratory well. The drilling plan mu: specify the proposed drilling program, sampling, coring, and testing procedures.

(5) Abandonment Plan.

(B) CLASS I TEST/INJECTION WELL CONSTRUCTION AND TESTING PERMIT

(1) A map showing the location of the proposed injection wells or well field area for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number or name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, public water systems, mines (surface and subsurface), quarries, water wells and other pertinent surface features including residences and roads. The map should also show faults, if known or suspected. Only information of public record and pertinent information known to the applicant is required to be included on this map.

(2) A tabulation of data on all wells within the area of review which penetrate into the proposed injection zone, confining zone, or proposed monitoring zone. Such data shall include a description of each well's type, construction, data drilled, location, depth, record of plugging and/or completion, and any additional information the Department may require.

(3) Maps and cross sections indicating the general vertical and lateral limits within the area of review of all underground sources of drinking water, their position relative to the injection formation and the direction of water movement, where known, in each underground source of drinking water which may be affected by the proposed injection.

(4) Maps and cross sections detailing the hydrology and geologic structures of the local area.

(5) Generalized maps and cross sections illustrating the regional geologic setting.

(6) Proposed operating data.

a. Average and maximum daily rate and volume of the fluid to be injected;
b. Average and maximum injection pressure; and,
c. Source and an anlysis of the chemical, physical, radiological and biological characteristics of injection fluids.

(7) Proposed formation testing program to obtain an analysis of the chemical, physical and radiological characteristics of and other information on the injection zone.

(8) Proposed stimulation program.

(9) Proposed injection procedure.

(10) Engineering drawings of the surface and subsurface construction details of the system.

(11) Contingency plans to cope with all shut-ins or well failures, so as to protect the quality of the waters of the State as defined in Florida Administrative Code Rule 17-3, including alternate or emergency discharge provisions.

(12) Plans (including maps) and proposed monitoring data to be reported for meeting the monitoring requirements in Florida Administrative Code Rule 17-28.25.

(13) For wells within the area of review which penetrate the injection zone but are not properly completed or plugged, the corrective action proposed to be taken under Florida Administrative Code Rule 17-28.13(5).

(14) Construction procedures including a cementing and casing program, logging procedures, deviation checks, proposed methods for isolating drilling fluids from surficial aquifers, proposed blowout protection (if necessary), and a drilling, testing and coring program.

(15) A certification that the applicant has ensured, through a performance bond or other appropriate means, the resources necessary to close, plug or abandon the well as required by Florida Administrative Code Rule 17-28.27(9).

(C) CLASS I INJECTION WELL OPERATING PERMIT

(1) A report shall be submitted with each application for a Class I well operation permit, which shall include, but not be limited to, the following information:

a. Results of the information obtained under the construction permit described in (B)-CLASS I TEST/INJECTION WELL CONSTRUCTION AND TESTING PERMIT, including:

1. All available logging and testing program data and construction data on the well or well field;

2. A satisfactory demonstration of mechanical integrity for all new wells pursuant to Florida Administrative Code Rule 17-28.13(6)(b);

3. The actual operating data, including injection pressures versus pumping rates where feasible, or the anticipated maximum pressure and flow rate at which the permittee will operate, if approved by the Department;

4. The actual injection procedure;

5. The compatibility of injected waste with fluids in the injection zone and minerals in both the injection zone and the confining zone; and,

6. The status of corrective action on defective wells in the area of review.

b. Record drawings, based upon inspections by the engineer or persons under his direct supervision, with all deviations noted;

c. Certification of completion submitted by the engineer of record;

d. If requested by the Department, operation manual including emergency procedures;

e. Proposed monitoring program and data to be submitted;

f. Proof that the existence of the well has been recorded on the surveyor's plan at the county courthouse.

g. Proposed plugging and abandonment plan pursuant to Florida Administrative Code Rule 17-28.27(2).

(D) CLASS I WELL PLUGGING AND ABANDONMENT PERMIT

(1) The reasons for abandonment.

(2) A proposed plan for plugging and abandonment describing the preferred and alternate methods, and justification for use.

a. The type and number of plugs to be used;

b. The placement of each plug including the elevation of the top and bottom;

c. The type and grade and quantity of cement or any other approved plugging material to be used;

d. The method for placement of the plugs.

(3) The procedure to be used to meet the requirements of Rule 17-28.27.

(E) CLASS III WELL CONSTRUCTION/OPERATION/PLUGGING AND ABANDONMENT PERMIT

Construction Phase

(1) A map showing the location of the proposed injection wells or well field area for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number or name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, public water systems, mines (surface and subsurface), quarries, water wells and other pertinent surface features including residences and roads. The map should also show faults, if known or suspected. Only information of public record and pertinent information known to the applicant is required to be included on this map.

(2) A tabulation of data on all wells within the area of review which penetrate into the proposed injection zone, confining zone, or proposed monitoring zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Department may required.

(3) Maps and cross sections indicating the general vertical and lateral limits within the area of review of all underground sources of drinking water, their position relative to the injection formation and the direction of water movement, where known, in each underground source of drinking water which may be affected by the proposed injection.

(4) Maps and cross sections detailing the hydrology and geologic structures of the local area.

(5) Generalized maps and cross sections illustrating the regional geologic setting.

(6) Proposed operating data:

a. Average and maximum daily rate and volume of the fluid to be injected;

b. Average and maximum injection pressure; and,

c. Source and an analysis of the chemical, physical, radiological and biological characteristics of injection fluids, including any additives.

(7) Proposed formation testing program to obtain an analysis of the chemical, physical and radiological characteristics of and other information on the injection zone.

(8) Proposed stimulation program.

(9) Proposed injection procedure.

(10) Engineering drawings of the surface and subsurface construction details of the system.

(11) Contingency plans to cope with all shut-ins or well failures or catastrophic collapse, so as to protect the quality of the waters of the state as defined in Florida Administrative Code Rule 17-3, including alternate or emergency discharge provisions.

(12) Plans (including maps) and proposed monitoring data to be reported for meeting the monitoring requirements in Florida Administrative Code Rule 17-28.25.

(13) For wells within the area of review which penetrate the injection zone but are not properly completed or plugged, the corrective action proposed to be taken under Florida Administrative Code Rule 17-28.13(5).

(14) Construction procedures including a cementing and casing program, logging procedures, deviation checks, proposed methods for isolating drilling fluids form surficial aquifers, and a drilling, testing and coring program.

(15) A certificate that the applicant has ensured, through a performance bond or other appropriate means, the resources necessary to close, plug or abandon the well as required by Florida Administrative Code Rule 17-28.27(9).

(16) Expected changes in pressure, native fluid displacement, direction of movement of injection fluid.

(17) A proposed monitoring plan, which includes a plan for detecting migration of fluids into underground sources of drinking water, a plan to detect water quality violation in the monitoring wells, and the proposed monitoring data to be submitted.

Operation Phase

(1) The following information shall be provided to the Department prior to granting approval for the operation of the well or well field:

a. All available logging and testing program data and construction data on the well or well field;

b. A satisfactory demonstration of mechanical integrity for all new wells pursuant to Florida Administrative Code Rule 17-28.13(6)(b);

c. The actual operating data, including injection pressure versus pumping rate where feasible, or the anticipated maximum pressure and flow rate at which the permittee will operate, if approved by the Department;

d. The results of the formation testing program;

e. The actual injection procedure;

f. The status of corrective action on defective wells in the area of review.

Plugging and Abandonment Phase

(1) The justification for abandonment.

(2) A proposed plan for plugging and abandonment describing the preferred and alternate methods.

a. The type and number of plugs to be used;

b. The placement of each plug including the elevation of the top and bottom;

c. The type and grade and quantity of cement or any other approved plugging material to be used;

d. The method for placement of the plugs.

(3) The procedure to be used to meet the requirements of Florida Administrative Code Rule 17-28.27.

(F) CLASS V WELL CONSTRUCTION PERMIT. (This form should be used for Class V wells instead of Form 17-1.209(1) when there is a need for a Technial Advisory Committee and an engineering report.)

(1) Type and number of proposed Class V Wells:

Wells Receiving Domestic Waste	____	Salt-water Intrusion Barrier Wells	____
Cooling Water Return Flow Wells, Open-looped System	____	Subsidence Control Wells	____
		Sand Backfill Wells	____

Experimental Technology Wells ____

Radioactive Waste Disposal Wells* ____

Other non-hazardous Industrial or Commercial Disposal Wells (explain) ____________________

Wells used to inject spent brine after halogen recovery ____

Borehole Slurry Mining Wells ____

Other (explain) ____________________

*Provided the concentrations of the waste do not exceed drinking water standards contained in Chapter 17-22, F.A.C.

(2) Project Description:

a. Description and use of proposed injection system;

b. Nature and volume of injected fluid (The Department may require an analysis (including bacteriological analysis) in accordance with Florida Administrative Code Rule 17-4.27(2)(c));

c. Proposed pretreatment.

(3) Water well contractor's name, title, state license number, address, phone number and signature.

(4) Well Design and Construction Details. (For multi-casing configurations or unusual construction provisions, an elevation drawing of the proposed well should be attached.)

a. Proposed total depth;

b. Proposed depth and type of casing(s);

c. Diameter of well;

d. Cement type, depth, thickness;

e. Injection pumps (if applicable): ____gpm @ ____psi
Controls: ____________________
____
____

(5) Water Supply Wells - When required by Florida Administrative Code Rule 17-4.27, attach a map section showing the locations of all water supply wells within a one (1) mile radius of the proposed well. The well depths and casing depths should be included. When required by Rule 17-4.27(2)(g), results of bacteriological examinations of water from all water supply wells within one (1) mile and drilled to approximate depth of proposed well should be attached.

(6) Area of Review (may be required at Department's discretion).

Include the proposed radius of the area of review with justification for that radius. Provide a map showing the location of the proposed injection well or well field area for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number or name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, public water systems, mines (surface and subsurface), quarries, water wells and other pertinent surface features including residences and roads. The map should also show faults, if known or suspected. Only information of public record and pertinent information known to the applicant is required to be included on this map.

(G) CLASS V WELL OPERATION PERMIT (Final report of the construction that includes the following information may be submitted with the application to operate.)

(1) Permit Number of Class V Construction Permit: ____________________

(2) Owner's Name: ____________________

(3) Type of Well: ____________________

(4) Construction and Testing Summary:

a. Actual Dimensions:

Diameter ______ inches; Well Depth ________ feet; Casing Depth _______ feet.

______ ________ _______

______ ________ _______

b. Results of Initial Testing.

(5) Proposed Operating Data:

a. Injection Rate (GPM);

b. Description of injected waste;

c. Injection pressure and pump controls.

(6) Proposed Monitoring Plan (If any):

a. Number of monitoring wells;

b. Depth(s);

c. Parameters;

d. Frequency of sampling;

e. Instrumentation (if applicable) Flow ____________________

Pressure ____________________

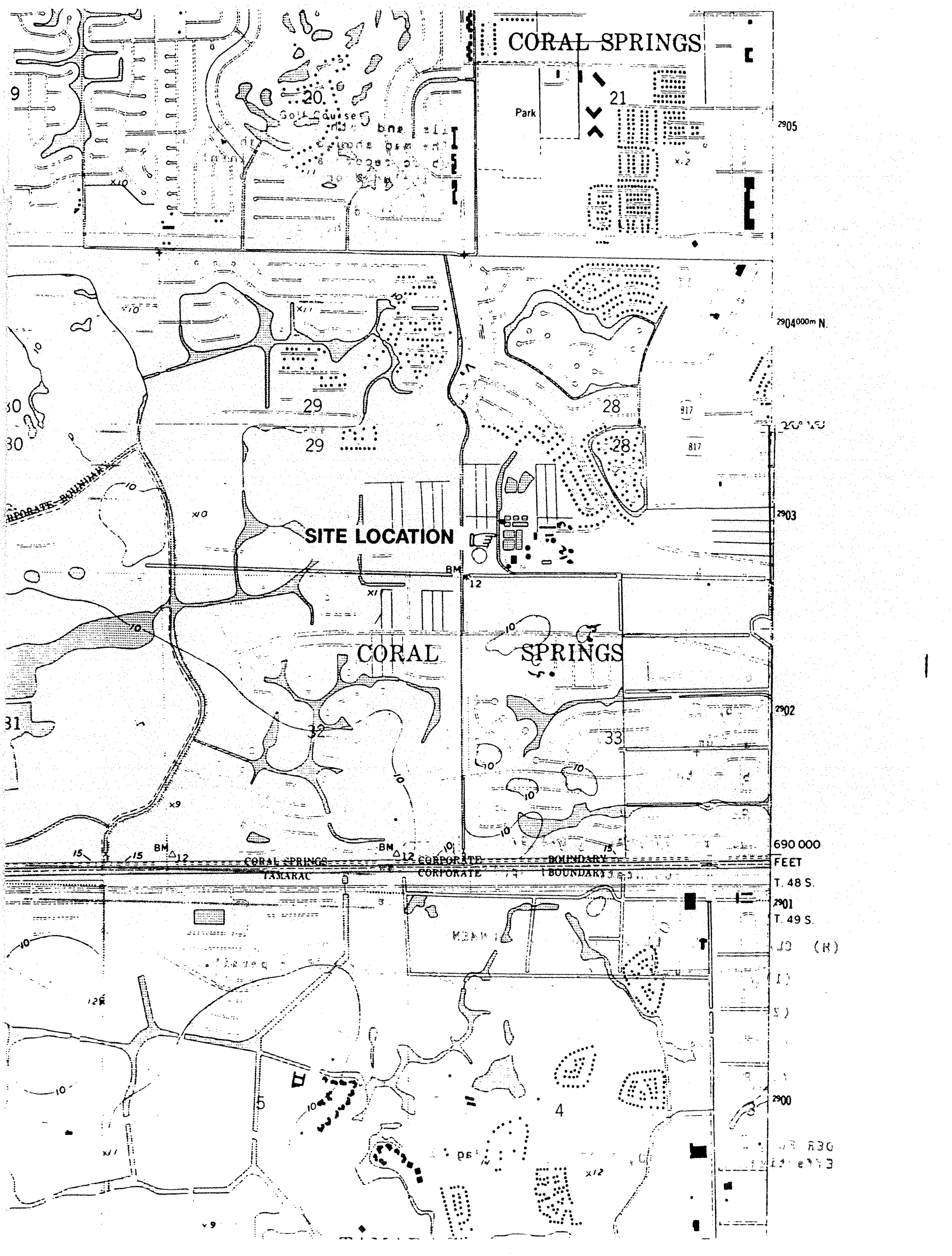
(H) CLASS V WELL PLUGGING AND ABANDONMENT PERMIT

(1) Permit number of Class V construction or operating permit.

(2) Type of well.

(3) Proposed plugging procedures, plans and specifications.

(4) Reasons for abandonment.


CORAL SPRINGS
Park
21
20
Golf Course
2905
2904000m N.
29
28
817
2903
SITE LOCATION
BM
12
CORAL
SPRINGS
2902
32
33
CORPORATE BOUNDARY
690 000
FEET
CORAL SPRINGS
TAMARAC
CORPORATE
BOUNDARY
T. 48 S.
2901
T. 49 S.
2900
5
4
3