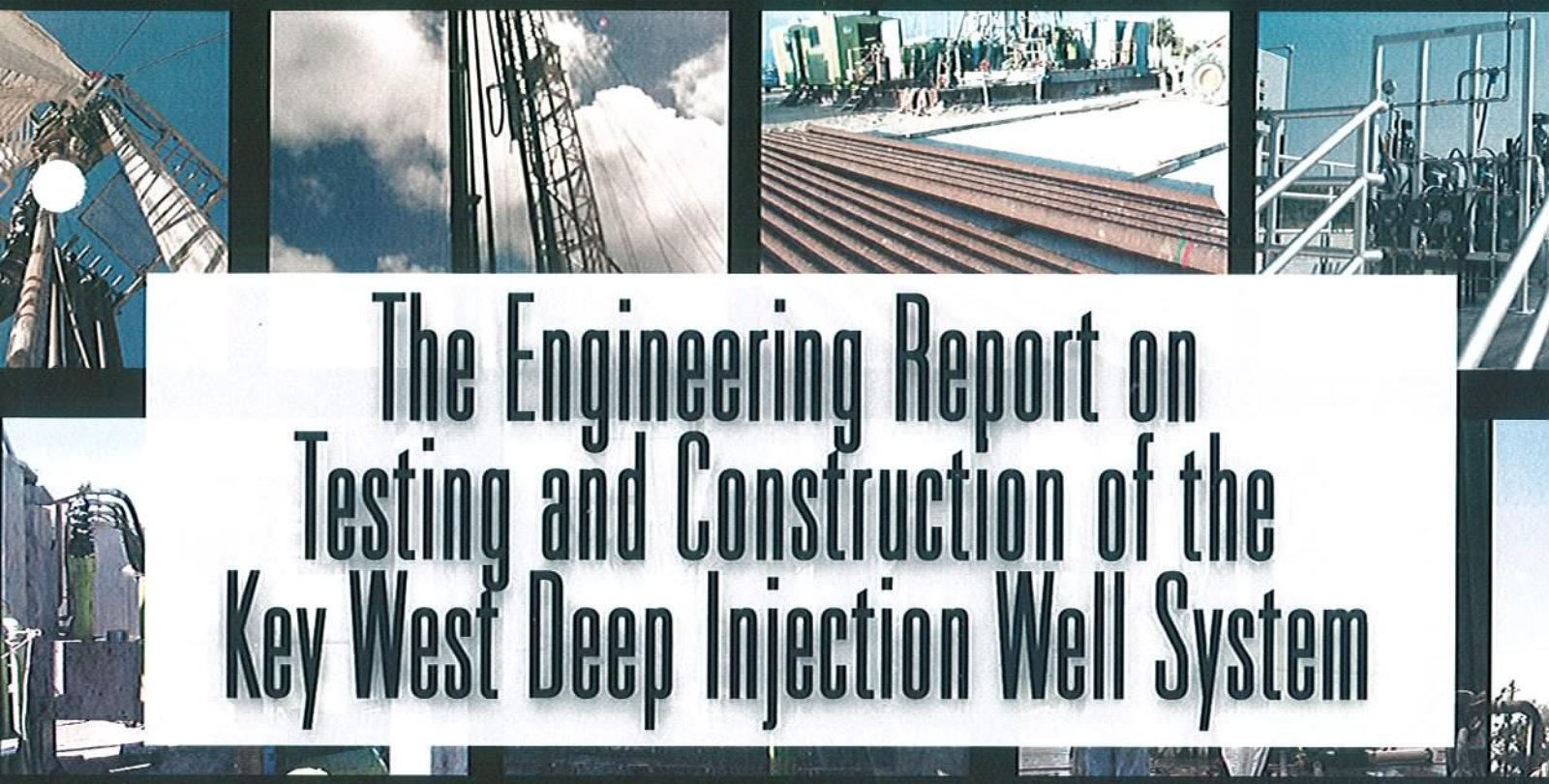
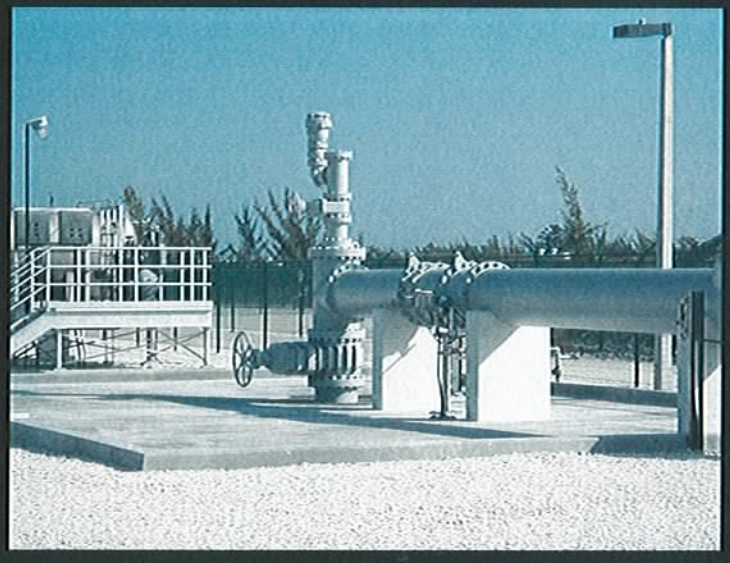


The Engineering Report on Testing and Construction of the Key West Deep Injection Well System

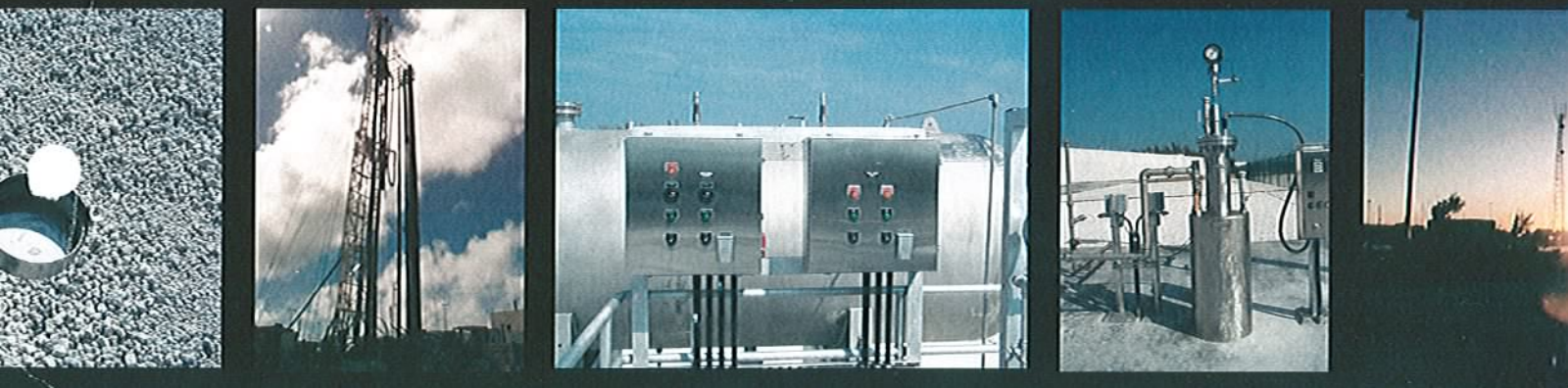


Prepared for
City of Key West

Prepared by
CH2MHILL

Volume I
Report and Appendices A through F, H through N

November 2000



The Engineering Report on Testing and Construction of the Key West Deep-Injection Well System

Volume I
Report and Appendices A through F, H through N

Prepared for
City of Key West

November 2000

CH2MHILL

Contents

Attachment

Exhibit

SECTION 1

Introduction

1.1 Background

The City of Key West, Florida owns the Richard A. Heyman Environmental Protection Facility wastewater treatment plant (WWTP). The WWTP is a conventional secondary activated sludge treatment facility with basic level disinfection and dechlorination. Alum has been added over the past year for phosphorus removal. The WWTP has a permitted maximum 3-month annual average flow capacity of 10 million gallons per day (mgd). The WWTP currently disposes secondary treated effluent via an ocean outfall. The facility is located at Trumbo Point Annex in Key West. A site location map is provided as Exhibit 1-1, and a site plan of the WWTP is provided in Exhibit 1-2.

Exhibit 1-3 summarizes plant effluent data over the past year compared to secondary and AWT effluent requirements. Although the plant was constructed as a secondary treatment plant, the average effluent quality over the past year has been 2/8/4.3/<1 (BOD/TSS/TN/P), which significantly exceeds secondary treatment standards and approaches or exceeds advanced waste treatment (AWT) standards.

Despite the exemplary performance of the WWTP and the installation of a deep injection well to discontinue use of the ocean outfall in the future, the City is currently proceeding with construction to upgrade the WWTP to consistently provide AWT effluent quality. This upgrade includes the addition of new alum addition facilities, the incorporation of a secondary anoxic zone to further reduce effluent nitrogen, and effluent filters to reduce effluent TSS. The AWT facilities should be fully operational before the end of 2001, well before the 2010 deadline adopted by the Florida Legislature for upgrade of this facility to AWT standards.

To eliminate the environmental impact of the discharge on the surrounding ocean and reef environment, the City has constructed a 24-inch-diameter Class V exploratory well (EW-1) and associated monitor wells. These wells will help investigate the feasibility of operating a deep injection well (DIW) system to replace the ocean outfall as the primary method of effluent disposal. The exploratory well will be converted to a Class V injection well through the Florida Department of Environmental Protection (FDEP) permitting process in the near future. EW-1 was built to Class I injection well construction standards in accordance with Rule 62-528, Florida Administrative Code (FAC), and the conditions of FDEP Exploratory Well Permit No. 128630-001-UC. A copy of the Exploratory Well Permit is provided in Attachment A.

A Class V shallow disposal well (DSP-1) was also constructed at the site for disposal of water produced in association with the construction of the wells and piping. DSP-1 was constructed in accordance with Rule 62-528, FAC, and the conditions of FDEP Class V injection well construction permit No. 128630-002-UC. A copy of the Class V injection well construction permit is provided in Attachment A.

10-27-00

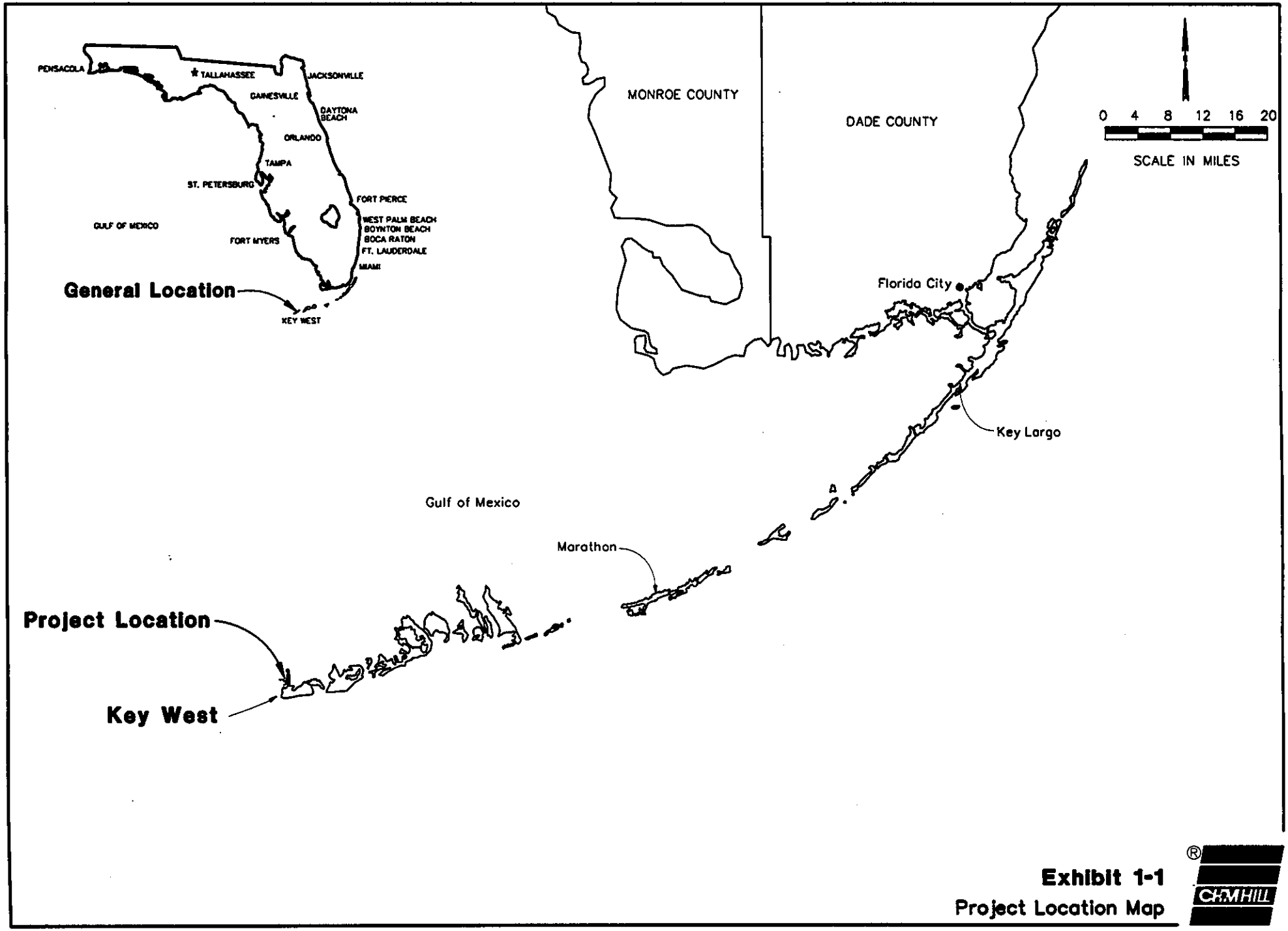


Exhibit 1-1
Project Location Map

CH2MHILL

154057.PT\7390DSF2.DWG 1=1.0

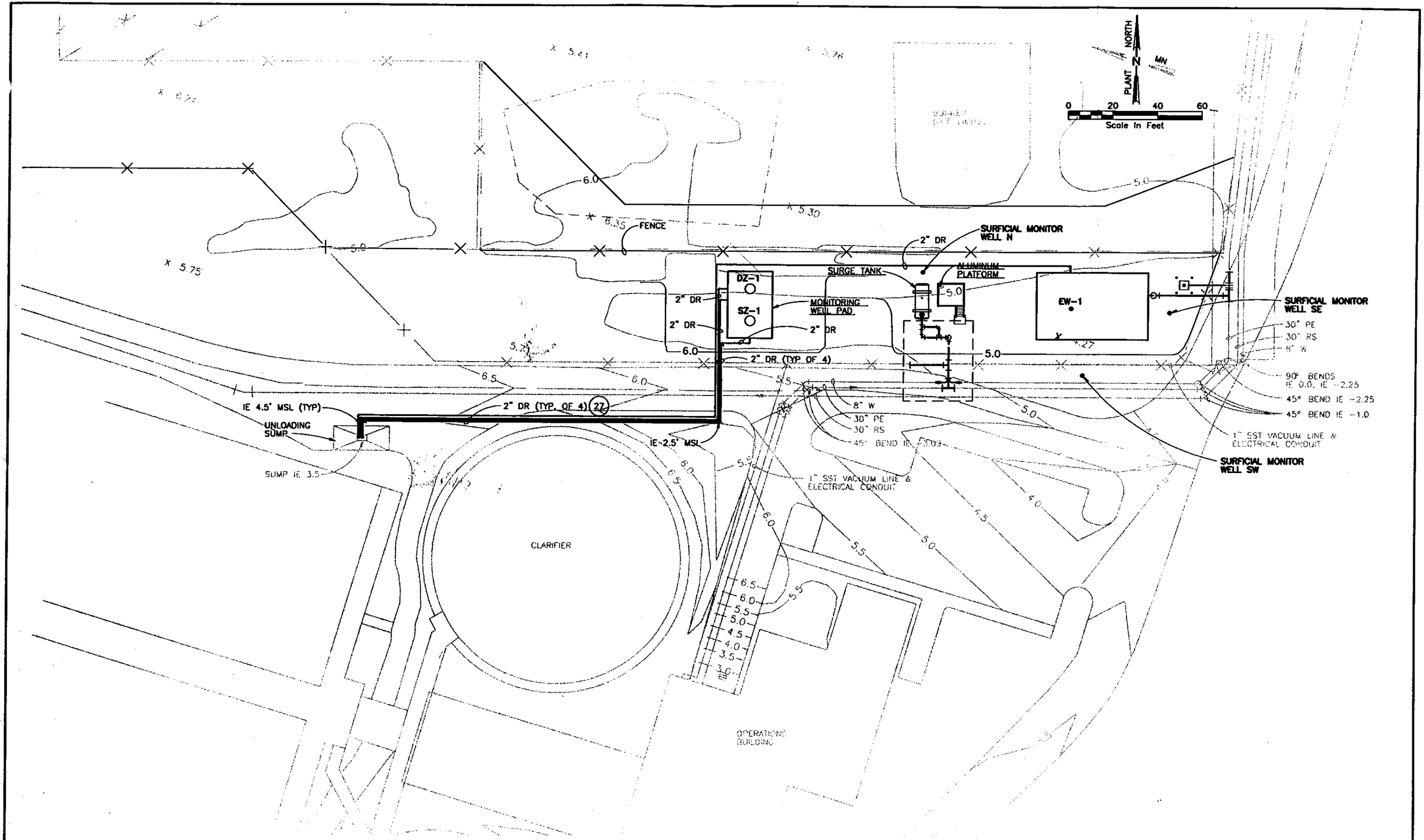


Exhibit 1-2

Site Plan

11-20-00 154057.PT\7390yp02_dlv.dwg

CH2MHILL

EXHIBIT 1-3
Average Effluent Quality and Standards

Parameter	Average Effluent Quality	Secondary Effluent Standards	AWT Effluent Standards
BOD, mg/L	2	10	5
TSS, mg/L	8	10	5
Total Nitrogen, mg/L	4.3	20	3
Phosphorus, mg/L	<1	2.7	1

1.2 Scope

This report summarizes the construction and testing of exploratory well EW-1, dual-zone monitor well DZ-1, and single-zone monitor well SZ-1 at the Richard A. Heyman Environmental Protection Facility WWTP. Well construction and testing was performed in accordance with Rule 62-528, FAC, the recommendations of the FDEP Technical Advisory Committee (TAC), and provisions of FDEP construction permit 128630-001-UC. The wells and appurtenances were constructed following the contract documents for the "Construction of Deep Injection Well System at the Richard A. Heyman Environmental Protection Facility (CH2M HILL, 1998)."

1.3 Project Description

CH2M HILL served as the engineer of record for the design, permitting, and construction activities for exploratory well EW-1 and monitor wells DZ-1 and SZ-1. Youngquist Brothers, Inc., selected as the low bid contractor to construct the wells, was issued a Notice to Proceed on May 24, 1999.

Construction activities at the project site included installation of a temporary drilling pad and shallow pad monitor wells, drilling of the exploratory well, drilling of the dual-zone and single-zone monitor wells, installation of permanent exploratory and monitor-well pads, and the installation of wellhead piping and instrumentation.

The FDEP TAC coordinated the actions of local, state, and federal agencies, including FDEP's state and local representatives, the South Florida Water Management District (SFWMD), the U.S. Environmental Protection Agency (EPA), and the United States Geological Survey (USGS). A tabulated summary of well construction activities for each well and weekly summaries of the construction progress are presented in Appendices B and C, respectively.

SECTION 2

Construction Phase

The following section describes the construction, drilling, and testing details associated with the construction of the surficial monitor wells, shallow disposal well DSP-1, EW-1, SZ-1, and DZ-1.

2.1 Surficial Monitor Wells

As required by the exploratory well construction permit, surficial monitor wells were installed at the northeast, southeast, and southwest corners of the drilling pad to monitor for groundwater contamination during construction. Each of the wells were constructed to a depth of 20 feet below pad level (bpl) with 2-inch-diameter schedule 40 polyvinyl chloride (PVC) casing and a 10-foot-long, 2-inch-diameter 20-slot PVC screen. The surficial monitor wellheads are encased by a stainless-steel cover to protect the wells from damage. Following installation of the surficial monitor wells, samples were collected from each well and analyzed to establish background water quality data prior to beginning construction of EW-1. A typical surficial monitor well diagram is presented in Exhibit 2-1. Water quality data from the surficial monitor wells is discussed in Section 4 of this report.

2.2 Shallow Disposal Well DSP-1

Shallow disposal well DSP-1 was constructed and operated in accordance with Rule 62-528, FAC, and the conditions of FDEP construction permit 128630-002-UC. The drilling schedule and casing setting depth were designed to conform to the hydrogeological features observed at the site, as well as various regulatory agency requirements. The well was constructed for disposal of fluids generated during the reverse-air open circulation drilling of EW-1 and DZ-1.

Construction of DSP-1 began with vibrating 24-inch-diameter steel casing to a depth of 43.5 feet bpl. A nominal 18.5-inch-diameter borehole was then drilled to a depth of 61 feet bpl prior to installing 12-inch-diameter steel casing to a depth of 60 feet bpl. The casing was then cemented in place to land surface. Construction continued with drilling of a nominal 12-inch-diameter borehole to a depth of 100 feet bpl. The drilling mud was then developed from the well prior to the disposal of any fluids during the construction of EW-1 and DZ-1.

Water was allowed to settle to ensure that total suspended solids (TSS) was less than 30 milligrams per liter (mg/L) prior to disposal via DSP-1. A totalizing flowmeter was used to determine the weekly amount of water disposed via DSP-1. These data were provided to FDEP in the weekly construction reports for the project.

Upon completion of well construction, a blind flange was installed on the DSP-1 wellhead flange to protect the well. Exhibit 2-2 provides a completion diagram of DSP-1.

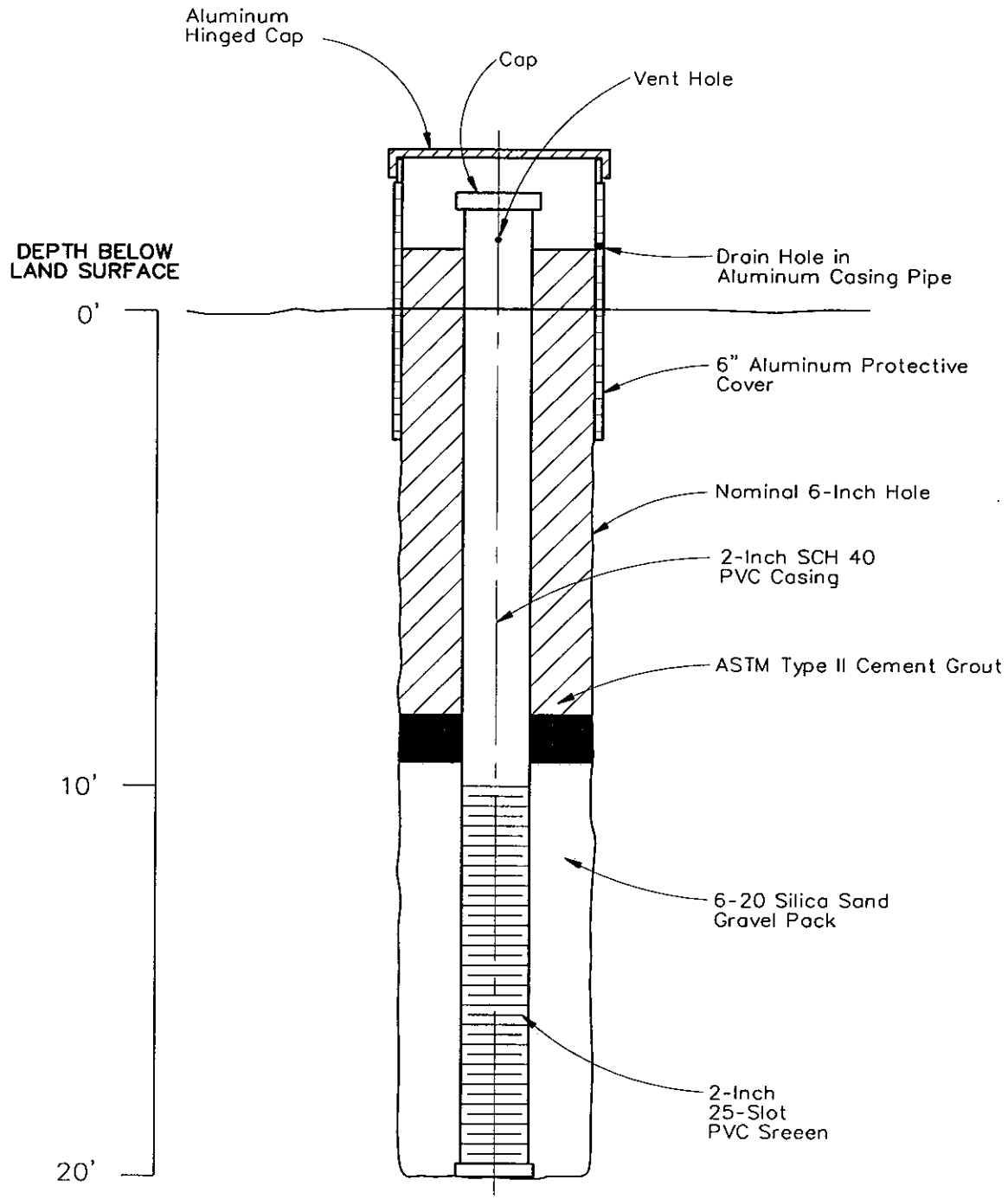


Exhibit 2-1

SURFICAL MONITORING WELL
COMPLETION DIAGRAM

154057.PT\4057PT15.DWG 1=1.0

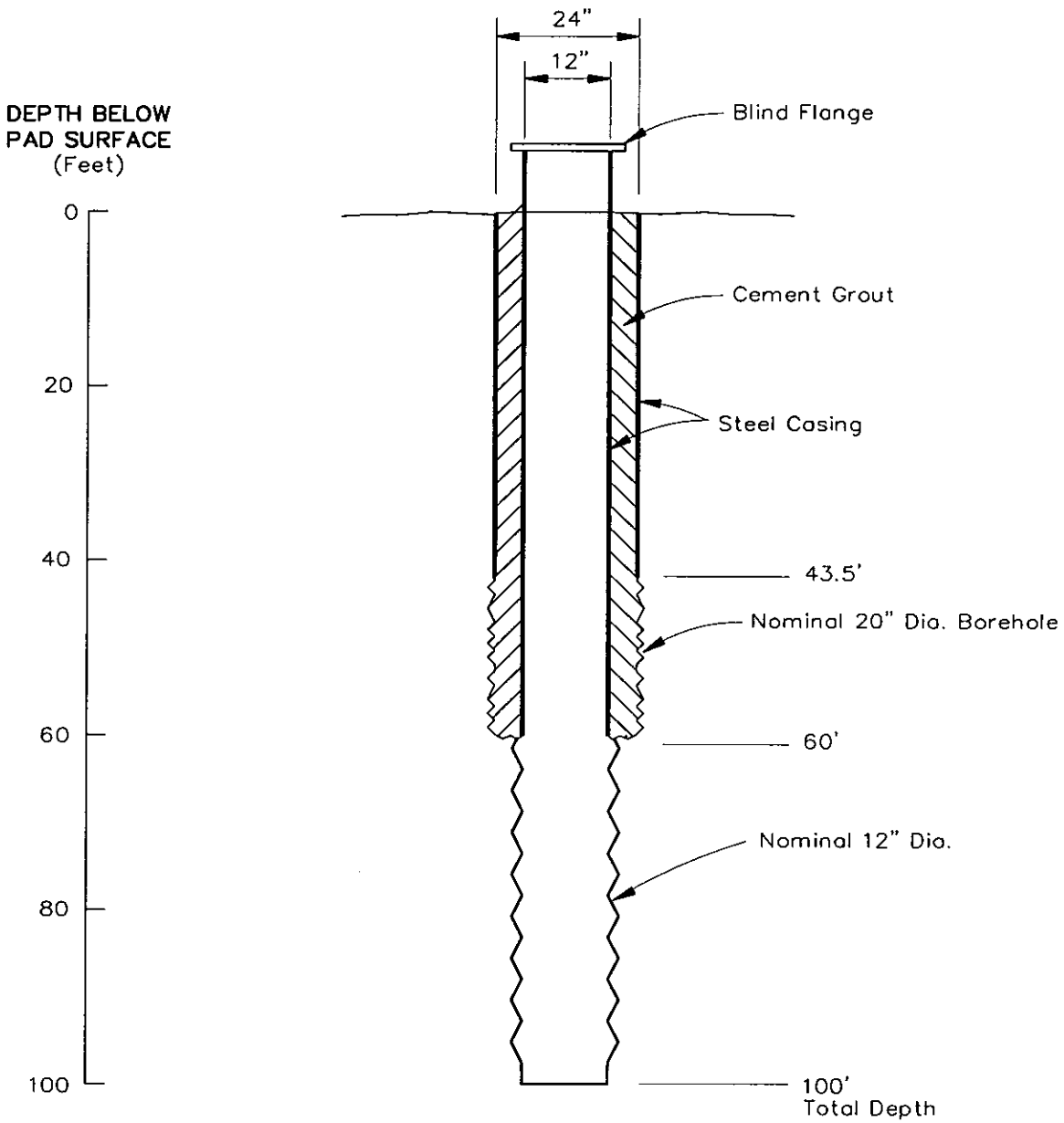


Exhibit 2-2
Shallow Disposal Well DSP-1
Completion Diagram

CH2MHILL

154057.PT\4057PTF4.DWG 1=1.0

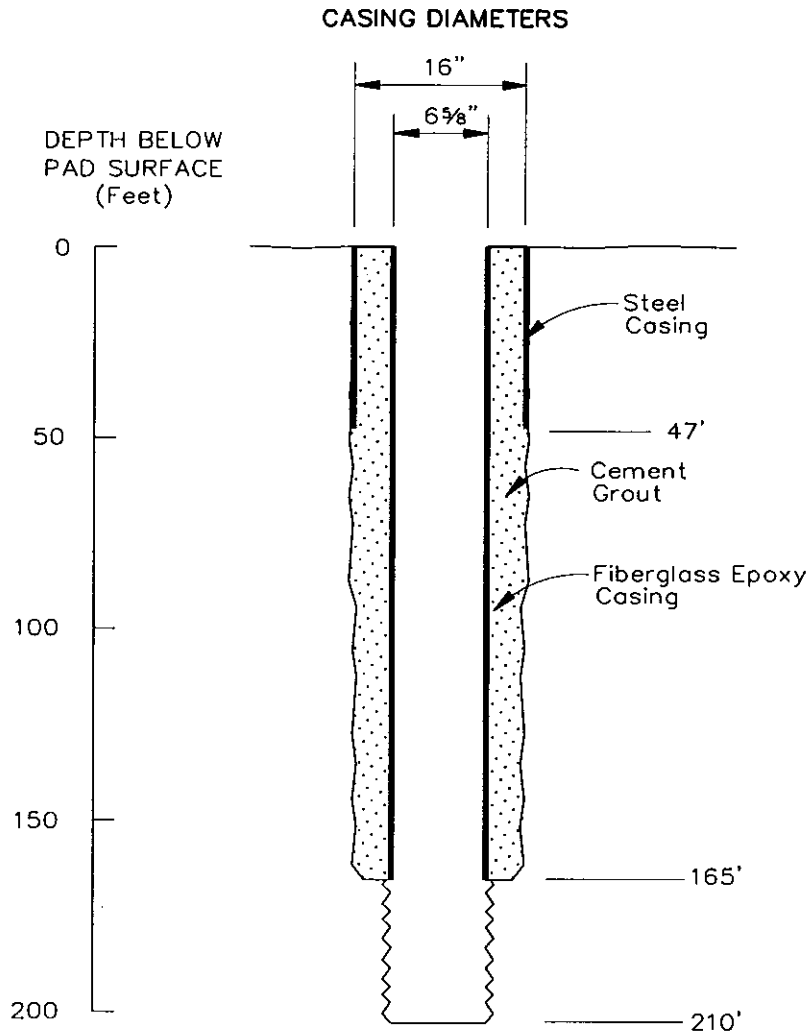


Exhibit 2-3

Single-Zone
Monitor Well SZ-1
Completion Diagram

CH2M HILL

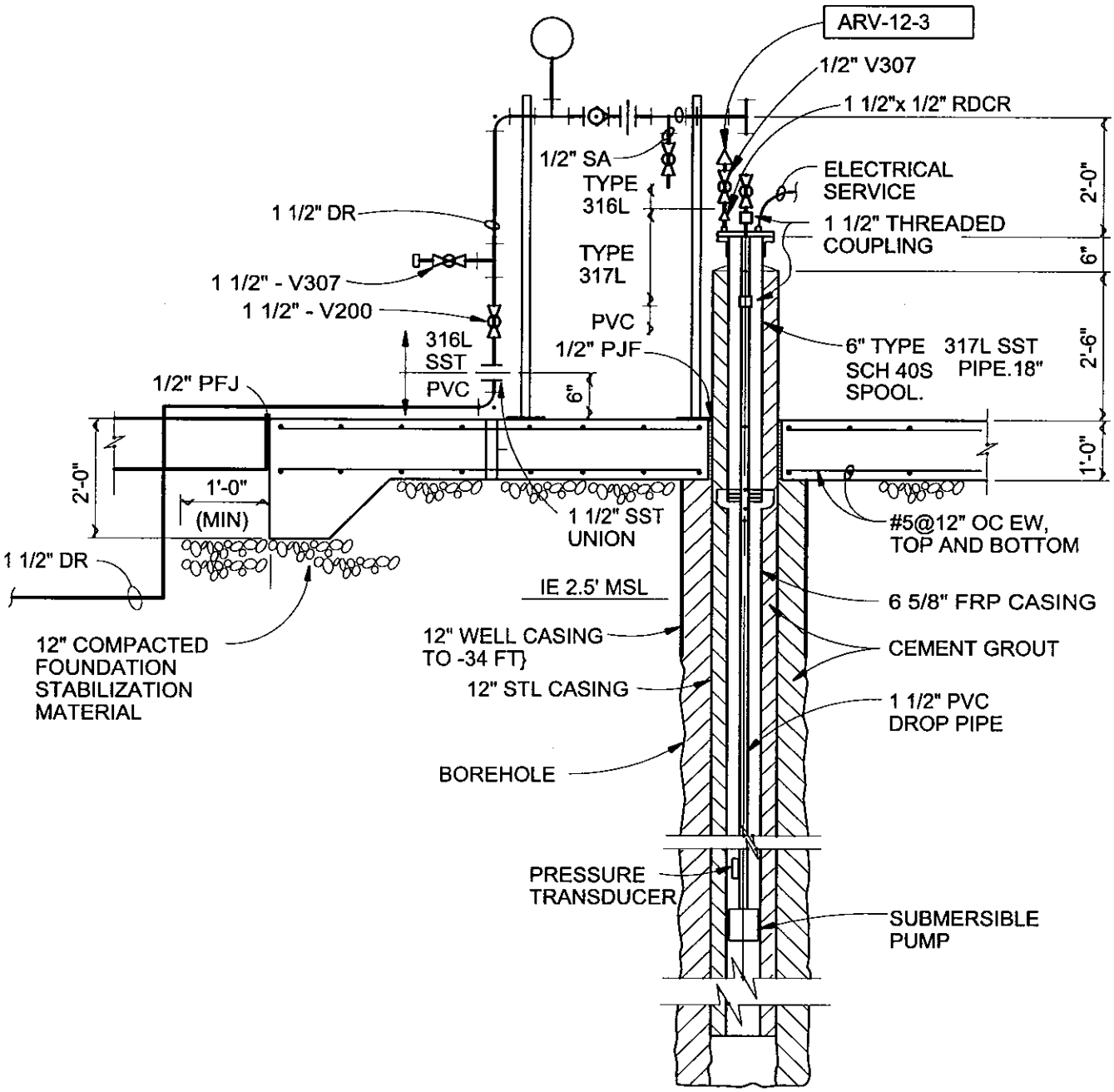


Exhibit 2-4
Monitor Well SZ-1
Wellhead Diagram

CH2MHILL

2.3 Single-Zone Monitor Well SZ-1

As required by the exploratory well construction permit, single-zone monitor well SZ-1 was constructed and sampled prior to the disposing water via DSP-1. The drilling schedule and casing setting depth were designed to conform to the hydrogeological features observed at the site and to regulatory agency requirements. Geologic formation samples were collected at 10-foot intervals during the drilling of the pilot hole. Data from the pilot hole interval (formation samples [cuttings] and geophysical logs) were evaluated to provide the basis for describing the geologic formations encountered, to assist in selection of the casing setting depth, and to interpret the site lithology and hydrogeology. The pilot hole was then reamed to the specified diameter to the selected casing setting depth as approved by FDEP.

Construction of SZ-1 began with the drilling of a nominal $10^{5}/_{8}$-inch-diameter pilot hole to a depth of 160 feet bpl. Drilling continued from 160 to 200 feet bpl, with a nominal $7^{7}/_{8}$-inch-diameter pilot hole. The pilot hole was then geophysically logged (caliper, gamma ray, spontaneous potential, and long-short normal electric logs) and reamed to a nominal $14^{3}/_{4}$-inch diameter to a depth of 165 feet bpl. The original $7^{7}/_{8}$-inch pilot hole was then cleaned out prior to the installation of the $6^{5}/_{8}$-inch-diameter fiberglass-reinforced pipe (FRP) casing to the depth of 165 feet bpl. A cement basket was installed at the base of the casing to allow the casing to be cemented in place and not disturb the open borehole below 165 feet bpl. Casing depths and the types and quantities of cement used for the construction of SZ-1 are summarized in Appendix D. Copies of casing mill certificates for each of the casings used during construction are presented in Appendix E. Exhibit 2-3 provides a completion diagram of SZ-1.

Upon completion of installation of the $6^{5}/_{8}$-inch-diameter FRP casing, the wellhead, submersible sample pump, and pressure transducer were installed. The pressure transducer was installed to a depth of 30.28 feet bpl (-24.05 feet National Geodetic Vertical Datum [NGVD]). The top of the submersible pump was installed to a depth of 32.32 feet bpl (-26.09 feet NGVD). Exhibit 2-4 provides a wellhead completion diagram for SZ-1.

SZ-1 was sampled to establish background conditions prior to disposing of water via DSP-1. The well was then sampled weekly during the construction of EZ-1 and DZ-1. The water quality data from SZ-1 sampling is discussed in Section 4.

2.4 Exploratory Well EW-1 KWIW-1

Drilling of exploratory well EW-1 began October 6, 1999. Mud rotary drilling techniques were used to drill to a depth of 1,200 feet bpl. An open circulation reverse air system was used to drill the interval from 1,200 to 3,004 feet bpl to collect representative water samples. Water produced while drilling on reverse air was discharged to DSP-1 after being pumped to a settling tank.

The drilling schedule and casing setting depths were designed to conform to the hydrogeological features observed at the site and to regulatory agency requirements. Geologic formation samples were collected and described at 10-foot intervals during the drilling of the pilot hole. Data from the pilot hole interval (formation samples [cuttings], water

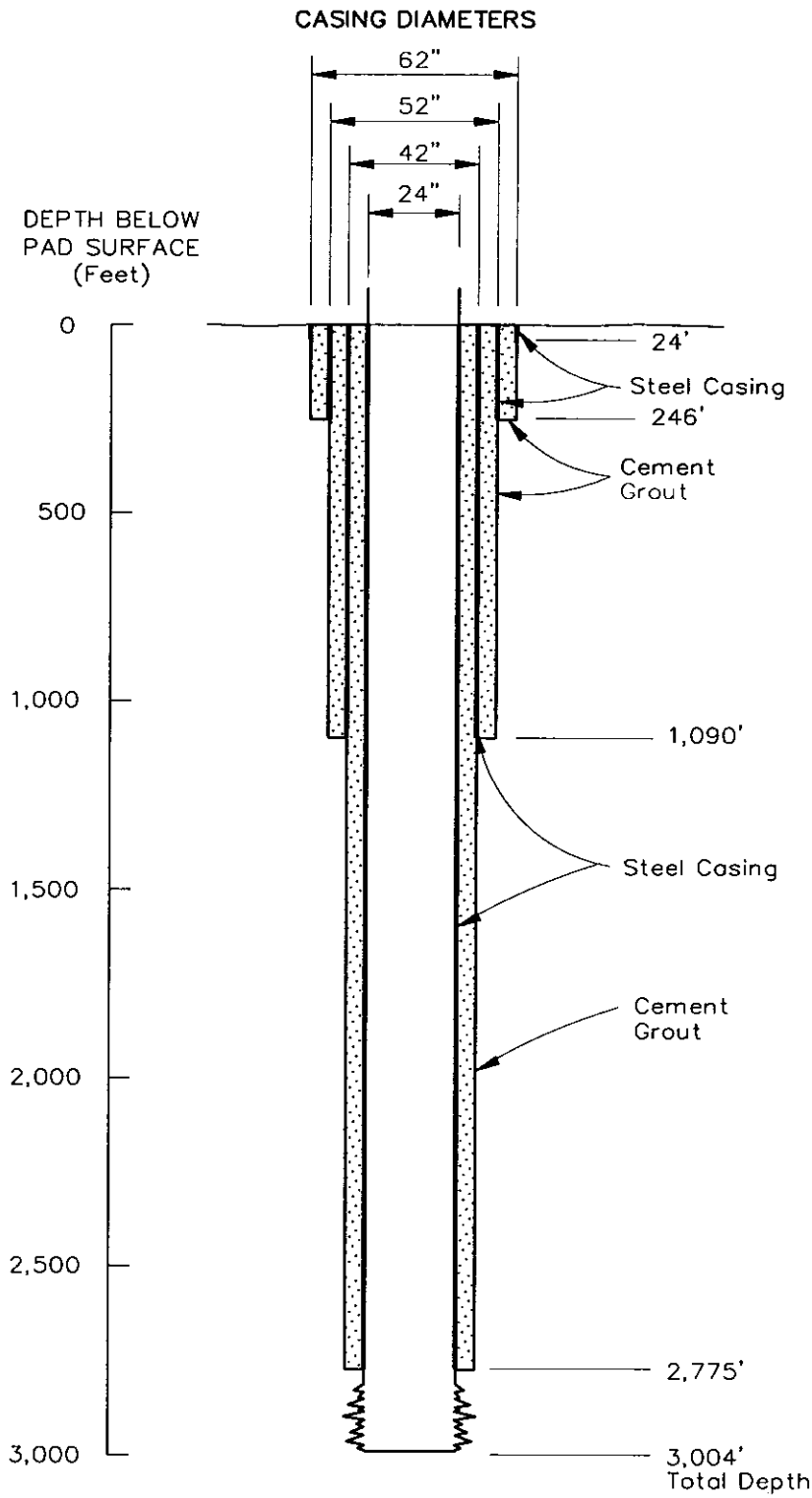


Exhibit 2-5

Exploratory Well EW-1
Completion Diagram

CH2MHILL

154057.PT\4057PTF2.DWG 1=1.0

samples, packer tests, and geophysical logs) were evaluated to provide information regarding the geologic formations encountered, to assist in selection of the casing setting depths, and to interpret the site lithology and hydrogeology. The pilot hole was then reamed to the appropriate diameter in preparation for casing installation. FDEP approval of the recommended casing setting depths was obtained prior to installing the intermediate and final casing strings of EW-1.

Construction of EW-1 took place with four concentric steel casings (62-, 52-, 42-, and 24-inch outside diameters). The cementing program was specifically tailored for each casing installed. Casing depths and the types and quantities of cement used for the construction of EW-1 are summarized in Appendix D. Copies of casing mill certificates for each of the casings used during construction are presented in Appendix E. Exhibit 2-5 depicts the completion diagram of EW-1.

Construction of EW-1 began with vibrating the 62-inch-diameter pit casing to a depth of 24 feet bpl. A nominal 12.25-inch-diameter pilot hole, centered inside the 62-inch-diameter casing, was then drilled to a depth of 300 feet bpl. The pilot hole was then geophysically logged (caliper, gamma ray, spontaneous potential, and dual induction electric logs) and reamed to a nominal 60-inch-diameter to a depth of 260 feet bpl. A caliper log was then performed on the reamed hole, and a 52-inch-diameter casing was installed to a depth of 246 feet bpl and cemented to land surface.

Below the 52-inch-diameter casing, drilling of the 12.25-inch-diameter pilot hole continued to a depth of 1,200 feet bpl. The pilot hole was then geophysically logged (caliper, gamma ray, spontaneous potential, long-short normal electric, dual induction electric, and sonic logs). Three drill stem packer tests were conducted on the intervals of 680 to 730, 845 to 895, and 1,070 to 1,120 feet bpl. The results of drill stem packer testing are discussed in Section 4. Following the drill stem packer testing, the pilot hole was backplugged with 12 percent bentonite cement from 1,200 to 246 feet bpl, and reamed to a nominal 52-inch diameter to a depth of 1,095 feet bpl. A caliper log was then performed on the reamed hole. The 42-inch-diameter casing was then installed to a depth of 1,090 feet bpl and cemented to land surface following FDEP approval of the casing seat recommendation.

The pilot hole was then advanced to a depth of 1,920 feet bpl, where core sampling began. A total of ten 4-inch-diameter cores were collected from the interval of 1,920 to 2,774 feet bpl during this phase of pilot hole drilling. Between the cored intervals, the pilot hole was advanced with the 12.25-inch-diameter drill bit. Core analyses and descriptions are discussed in Section 4. Caliper, gamma ray, spontaneous potential, long-short normal, temperature, fluid resistivity, dual induction, and borehole-compensated sonic logs were conducted after pilot hole drilling reached a depth of 3,004 feet bpl. Five drill stem packer tests were then conducted on the intervals of 1,374 to 1,387, 2,018 to 2,030, 2,404 to 2,416, 2,513 to 2,526, and 2,767 to 2,780 feet bpl. The results of drill stem packer testing are discussed in Section 4.

Following completion of the drill stem packer test, a video log was conducted on the pilot hole. A drillable bridge plug was then set at 2,790 feet bpl, and the pilot hole was backplugged with 12 percent bentonite cement to a depth of 1,087 feet bpl, which is just above the base of the 42-inch-diameter casing.

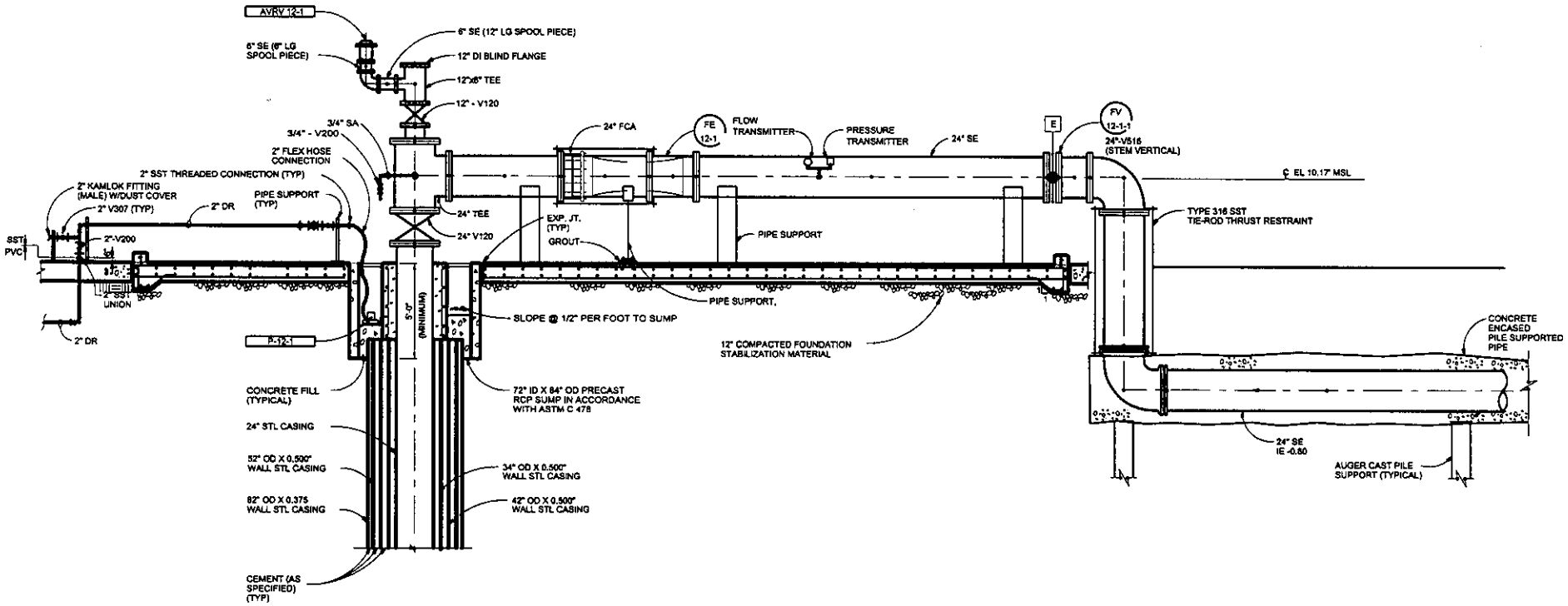


Exhibit 2-6
Injection Wellhead Section

CH2MHILL

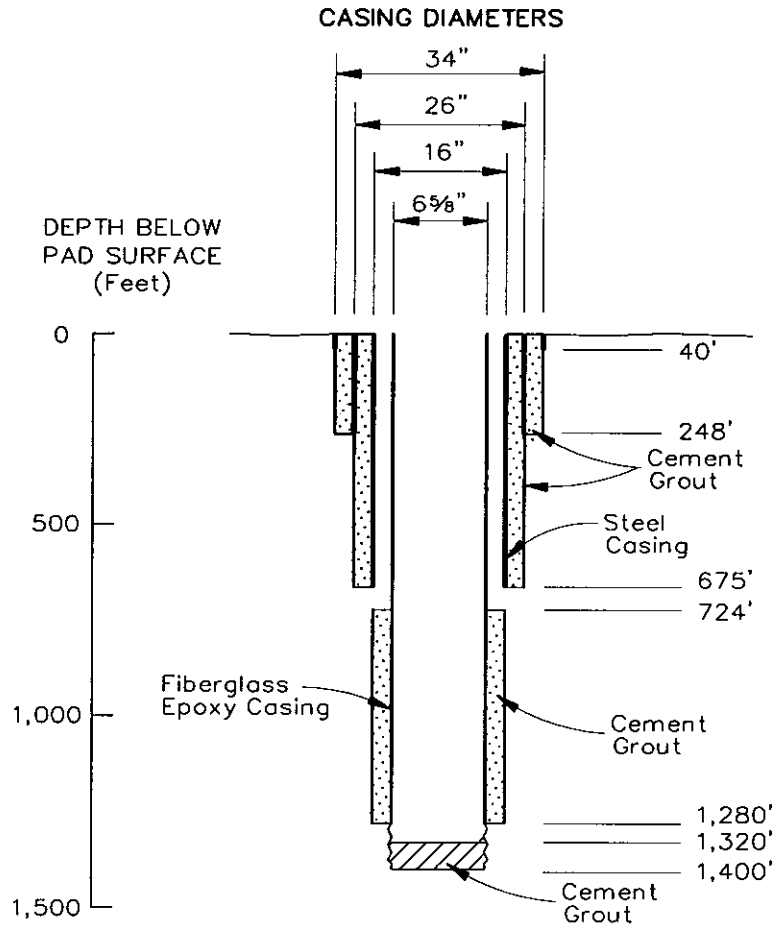


Exhibit 2-7

Dual-Zone
Monitor Well DZ-1
Completion Diagram

154057.PT\4057PTF1.DWG 1=1.0

Based on the results of packer testing, coring, geophysical logging, and formation sample analyses, a 24-inch-diameter casing setting depth of 2,775 feet bpl was recommended to and approved by the FDEP and TAC. After drilling a 32.5-inch-diameter hole to a depth of 2,778 feet bpl, a caliper log was performed over the reamed hole interval prior to installing the 24-inch-diameter casing.

A casing pressure test was conducted after installing the 24-inch-diameter casing to a depth of 2,775 feet bpl and cementing the casing to land surface. The bridge plug was then drilled out, and the pilot hole was reamed to a nominal 24-inch-diameter borehole to a depth of 3,004 feet bpl. Upon completion of reaming, a video survey was conducted to examine the condition of the final casing string and observe the open hole interval. A Cement Bond Log (CBL) was then conducted to evaluate the quality of the cement bond on the 24-inch-diameter casing.

The EW-1 wellhead was then installed and wellhead piping was connected to the WWTP effluent disposal piping. Instrumentation (pressure transducer and flowmeter) at the wellhead was circuited to the WWTP control room to allow monitoring and recording of wellhead pressure and flowrate. Exhibit 2-6 provides a completion diagram of the EW-1 wellhead.

2.5 Dual-Zone Monitor Well

Dual-zone monitor well DZ-1 was installed to monitor for vertical fluid migration in two separate zones above the injection zone. Drilling of DZ-1 began on February 14, 2000. Mud rotary drilling techniques were used to drill to a depth of 758 feet bpl. Reverse air drilling techniques were used during subsequent drilling to a total depth of 1,400 feet bpl to remove drill cuttings from the borehole and to collect water samples at 30-foot intervals. An open circulation reverse air system was used throughout the interval to collect representative water samples. Water produced while drilling on reverse air was discharged to DSP-1 after allowing suspended solids to settle out in a settling tank.

Geologic formation samples were collected and described at 10-foot intervals during the drilling of the pilot hole. Data from the pilot hole interval (formation samples [cuttings], water samples, packer tests, and geophysical logs) were evaluated to provide the information on the geologic formations encountered, to assist in selection of the casing setting depths, and to interpret the site lithology and hydrogeology. The pilot hole was then reamed to the specified diameter to the selected casing setting depth as approved by FDEP.

Construction of DZ-1 took place with three concentric steel casings (34-, 26-, and 16-inch outside diameters), and an FRP, $6^{5}/_{8}$-inch outside diameter casing. The cementing program was specifically tailored for each casing installed. Casing depths and the types and quantities of cement used in the construction of DZ-1 are summarized in Appendix D. Copies of casing mill certificates for each of the casings used during construction are presented in Appendix E. Exhibit 2-7 presents the completion diagram of DZ-1.

Construction of DZ-1 began with the drilling of a nominal 12.25-inch-diameter pilot hole to a depth of 328 feet bpl. The pilot hole was then geophysically logged (caliper, gamma ray, spontaneous potential, and long-short normal electric logs) and reamed to a nominal 34-inch diameter to 258 feet bpl. A caliper log was then performed on the reamed hole, and

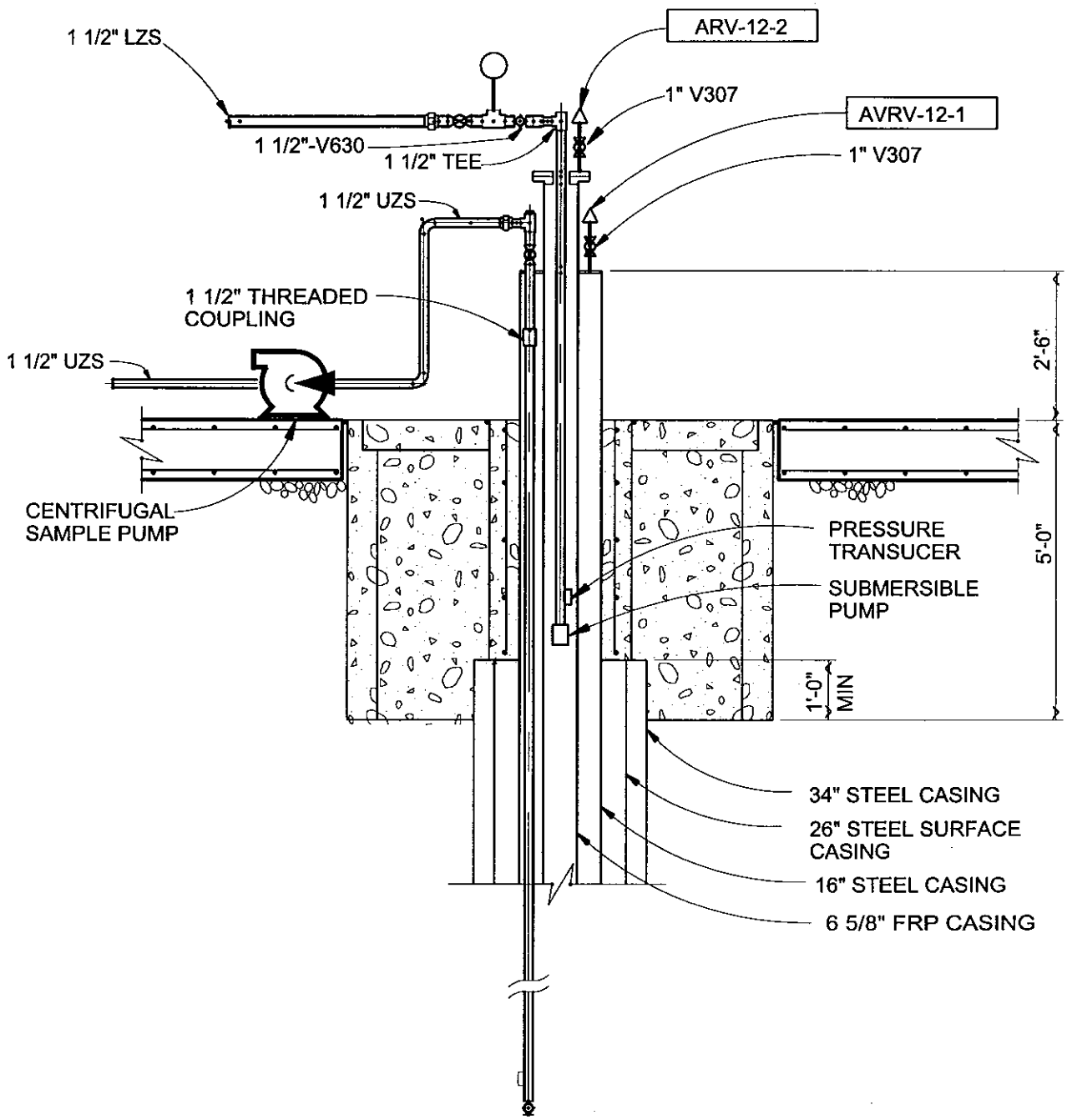


Exhibit 2-8

Monitor Well DZ-1
Wellhead Diagram

CH2MHILL

a 26-inch-diameter casing was installed and cemented through the surficial aquifer to a depth of 248 feet bpl.

Below the 26-inch-diameter casing, drilling of the 12.25-inch-diameter pilot hole continued to a depth of 758 feet bpl. The pilot hole was then geophysically logged (caliper, gamma ray, spontaneous potential, and long-short normal electric logs). Following the geophysical logging, two drill stem packer tests were conducted on the intervals of 629 to 681 and 675 to 727 feet bpl.

Based on the results of packer testing, geophysical logging, and formation sample analysis, a 16-inch-diameter casing setting depth of 675 feet bpl was recommended to and approved by FDEP and the TAC. After drilling a nominal 26-inch-diameter borehole to a depth of 680 feet bpl, a caliper log was performed over the open hole interval prior to installing the 16-inch-diameter casing. The casing was then cemented to the land surface.

After installing the 16-inch-diameter casing to a depth of 675 feet bpl, the pilot hole was advanced to a depth of 777 feet bpl, where core sampling was conducted. One 4-inch-diameter core was collected from the interval of 777 to 792 feet bpl. Upon completion of the core sampling, the pilot hole was advanced to 1,400 feet bpl and geophysically logged (caliper, gamma ray, spontaneous potential, and long-short normal electric logs). A drill stem packer test was then conducted on the interval of 1,279 to 1,320 feet bpl.

Based on the results of packer testing, geophysical logging, and core and formation sample analysis, a $6^5/_8$-inch-diameter casing setting depth of 1,280 feet bpl was recommended to and approved by FDEP and the TAC. After drilling a nominal 16-inch-diameter hole to a depth of 1,400 feet bpl, a caliper log was performed over the open hole interval prior to installing the $6^5/_8$-inch-diameter FRP casing.

A disposable packer was installed at the base of the casing to allow the casing to be cemented in place and not disturb the open borehole below 1,280 feet bpl. The $6^5/_8$-inch-diameter FRP was then installed to a depth of 1,280 feet bpl and cemented to the depth of 724 feet bpl. The interval from 724 feet bpl to land surface was not cemented to establish the upper monitor zone of DZ-1. A casing pressure test was then conducted on the $6^5/_8$-inch-diameter casing.

After conducting the casing pressure test, the open borehole below the $6^5/_8$-inch-diameter casing was backplugged from 1,400 to 1,320 feet bpl and then geophysically logged (CBL and video logs).

Upon completion of installation of the $6^5/_8$-inch-diameter FRP casing, the wellhead, sample pumps, and pressure transducers were installed. The upper monitor zone was completed with a centrifugal sample pump and a pressure transducer installed to a depth of 31.18 feet bpl (-24.97 feet NGVD). The lower monitor zone was completed with a pressure transducer set to a depth of 86.26 feet bpl (-80.05 feet NGVD) and the top of the sample submersible pump set to a depth of 98.43 feet bpl (-92.22 feet NGVD). Exhibit 2-8 provides a wellhead completion diagram for DZ-1.

SECTION 3

Geologic Framework

3.1 Geology

3.1.1 Formation Sampling

Formation cutting samples from EW-1 and DZ-1 were collected at 10-foot intervals from land surface to total depth, and were characterized for rock type, color, consolidation, porosity, and fossils. At the completion of construction, one set of samples was sent to SFWMD for analysis. The samples will be forwarded to the Florida Bureau of Geology in Tallahassee, Florida, upon completion of SFWMD's analysis. Detailed lithologic descriptions of samples from EW-1 and DZ-1 are provided in Appendix F.

3.2 Geophysical Logging

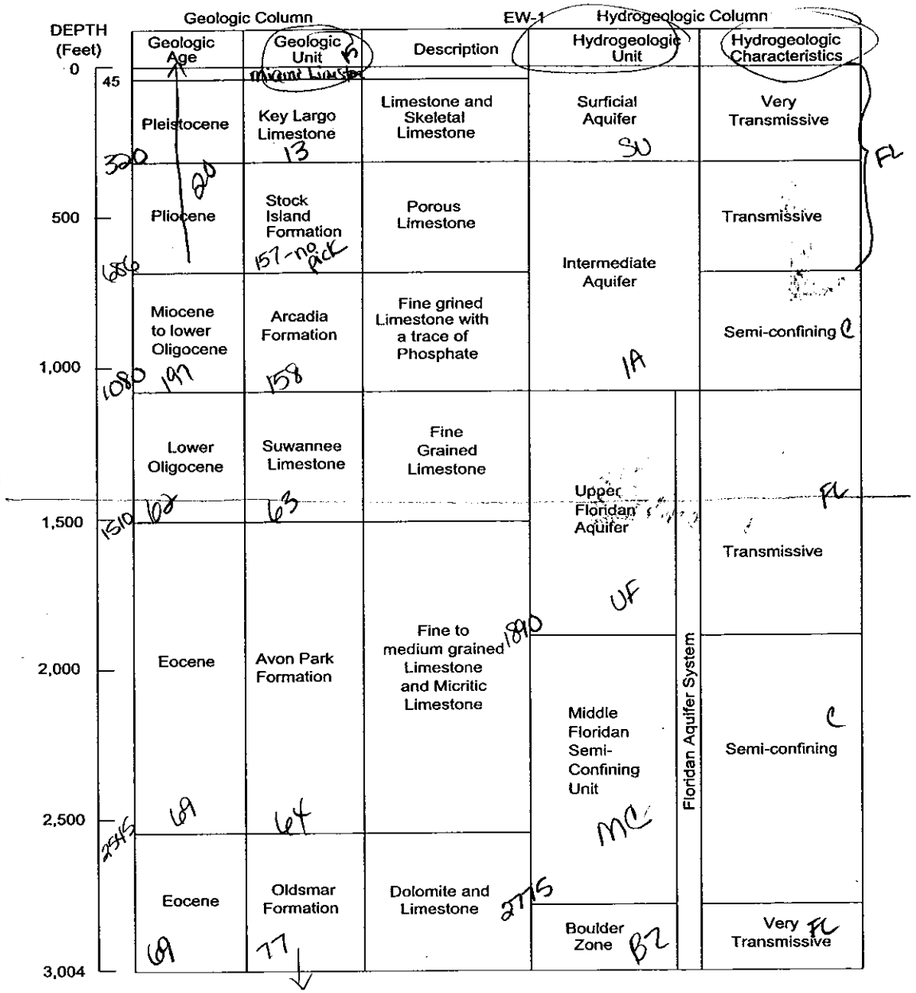
Geophysical logs were performed in the pilot hole of EW-1 and DZ-1 to correlate formation samples collected during drilling, to identify formation boundaries, to aid in the selection of straddle packer testing intervals and to obtain specific data pertaining to the subsurface formations. These data were then used to assist in the selection of the optimum casing setting depths. Copies of the geophysical logs performed during construction of the wells are presented in Appendix G.

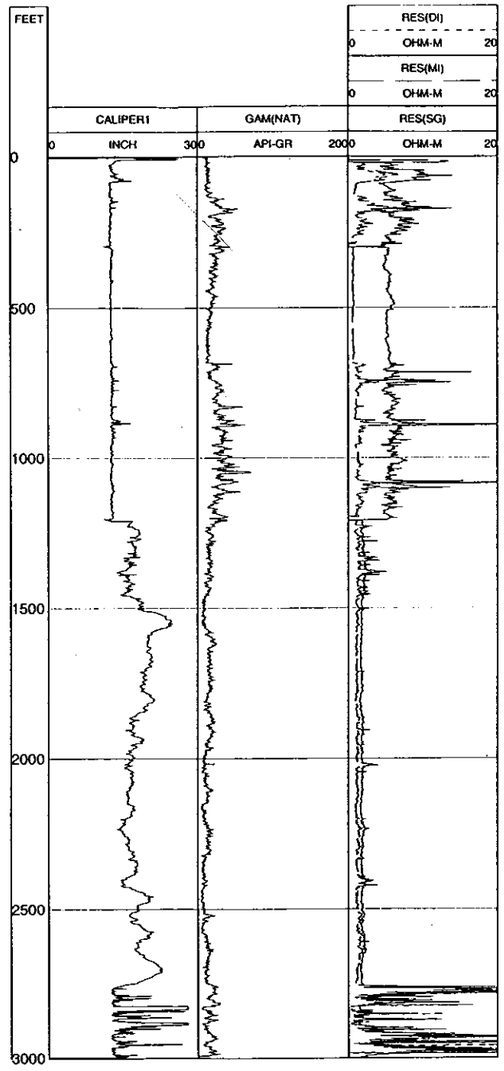
A stratigraphic profile of the site was derived from the correlation of formation samples with geophysical logs performed during pilot hole drilling. Strata encountered during construction of the exploratory well ranged in age from Pleistocene to Eocene Age deposits. The stratigraphic units and their respective ages are as follows: Miami Limestone and Key Largo Limestone of Pleistocene Age; the Stock Island Formation of late Miocene to Pliocene Age; the Arcadia Formation of Oligocene to Miocene Age; the Suwannee Limestone of Oligocene Age; the Avon Park Formation of Eocene Age; and the Oldsmar Formation of Eocene Age. Exhibit 3-1 provides a generalized geologic and hydrogeologic interpretation of the lithologic and geophysical log data for EW-1.

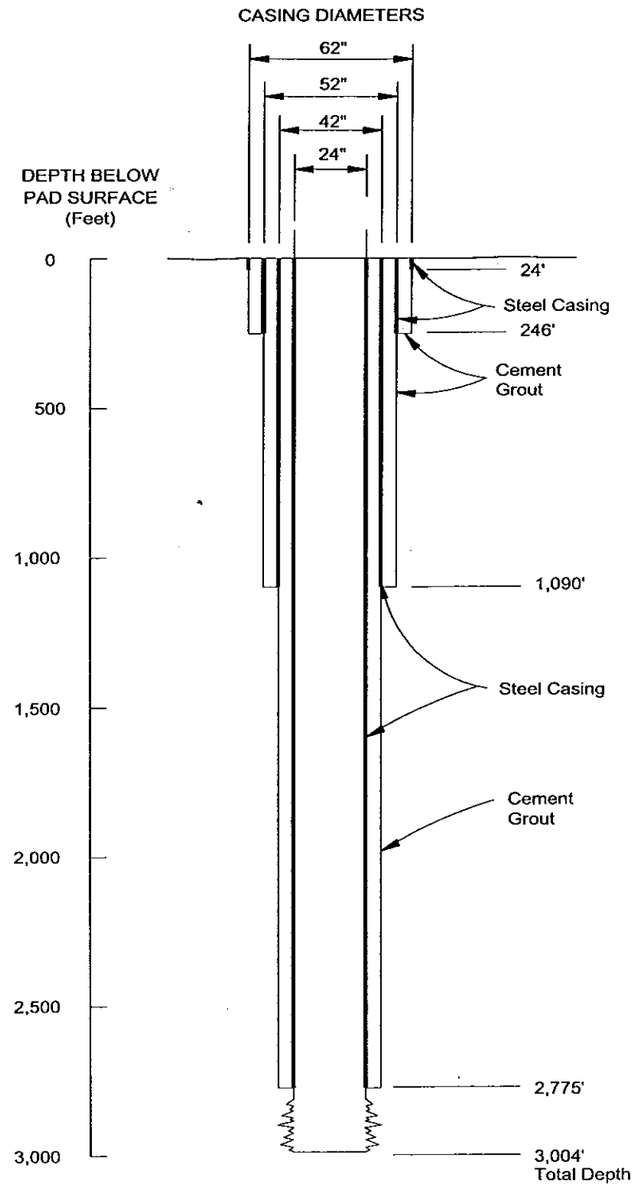
3.3 Lithostratigraphic Descriptions

3.3.1 Miami Limestone

The Miami Limestone of the Pleistocene Age is present at the project site from land surface to a depth of approximately 45 feet bpl. It consists primarily of white, medium-sand-grained, low porosity, well consolidated, oolitic limestone. The Miami Limestone comprises a portion of the surficial aquifer.







Geology and Hydrogeology in the Area of the Project Site

Exhibit 3-1
Exploratory Well EW-1
Completion Diagram

CH2MHILL

08-31-00 154057.PT\4057PT16.DWG

3.3.2 Key Largo Limestone

The Key Largo Limestone consists primarily of yellowish-gray, fine-to coarse-sand-grained, moderate to high porosity, limestone and skeletal limestone. It is characterized geophysically by low gamma ray activity, low resistivity, and slow sonic travel time. However, the formation has higher gamma ray activity and resistivity and a longer sonic travel time than the underlying formation. This indicates that the Key Largo Limestone contains more gamma ray-emitting components and has a lower porosity than the underlying formation. The low resistivity of the formation indicates that the pore-filling fluid is saline water. The formation is present at the project site from approximately 45 feet bpl to 320 feet bpl and is of the Pleistocene Age. The Key Largo Limestone also comprises a portion of the surficial aquifer.

3.3.3 Stock Island Formation

The Stock Island Formation consists of a yellowish-gray, medium-to coarse-sand-grained, highly porous, and poorly consolidated limestone and is of late Miocene to Pliocene Age. It is present between the depths of approximately 320 and 686 feet bpl at the project site. The formation is characterized by decreased gamma ray activity, a relatively low resistivity, and longer sonic travel time than the formations above and below it. The geophysical characteristics are the result of low phosphate concentration and high porosity when compared to the Key Largo Limestone and the Arcadia Formation. The low resistivity of the formation indicates that the fluid within the formation has a similar salinity to that of seawater.

3.3.4 Arcadia Formation

The Arcadia Formation is present at the project site between depths of approximately 686 to 1,080 feet bpl. It is of the Oligocene to Miocene Age and consists of yellowish-gray and olive-gray, fine-sand-grained, moderately porous limestone. It is characterized by moderate to high gamma ray activity, moderate resistivity, and fast sonic travel time in comparison to the Stock Island Formation.

3.3.5 Suwannee Limestone

The Suwannee Limestone of the Oligocene Age occurs from a depth of approximately 1,080 to 1,510 feet bpl and is characterized by yellowish-gray to very pale orange, fine-sand-grained, moderately porous limestone. The base of the Suwannee Limestone is difficult to distinguish from the top of the Avon Park Formation at the project site. The formation is characterized by low gamma ray activity, low but variable resistivity, and relatively short, but highly variable sonic travel time. The Suwannee Limestone is part of the upper Floridan Aquifer System, and characteristically exhibits high permeability.

3.3.6 Avon Park Formation

The Avon Park Formation of the Eocene Age occurs from a depth of 1,510 to 2,545 feet bpl. The upper portion of the Avon Park Formation consists primarily of very pale orange, fine-sand-grained, moderately porous limestone. The lower portion of the formation (below 1,890 feet bpl) consists of pinkish-gray, fine-to medium-sand-grained, moderate to high porosity limestone interbedded with low porosity recrystallized limestone and micritic limestone. The upper portion of the Avon Park Formation is characterized by low gamma

ray activity, low and fairly stable resistivity, and moderate to low sonic travel time. The lower portion of the formation is characterized by low gamma ray activity, low and less stable resistivity, and low and less stable sonic travel time when compared to the upper portion of the formation.

3.3.7 Oldsmar Formation

The Oldsmar Formation of the Eocene Age occurs from a depth of 2,545 feet bpl to below the total depth of the well. The lithology of the Oldsmar Formation at this site is predominantly dolomite and interbedded limestone. The Oldsmar Formation contains highly transmissive, fractured, and cavernous intervals known as the "Boulder Zone". Injected effluent will exit the borehole in the "Boulder Zone" after EW-1 is converted to an injection well and placed into service.

SECTION 4

Hydrogeologic Testing

4.1 Surficial Monitor Wells and SZ-1

Prior to the start of and during construction of EW-1, water samples were collected weekly from the 3 surficial pad monitor wells and single-zone monitor well SZ-1. Samples were analyzed for conductivity, chlorides, temperature, and pH. Water level measurements were also taken weekly. Because the site is located on a small island and is surrounded by seawater, samples from the wells were very saline, and water levels fluctuated with tides. Occasional chloride values of less than 10,000 mg/L at the north pad monitor well were related to rain events. Analytical data from each of the shallow monitor well locations and SZ-1 are presented in Appendix H.

4.2 Pilot Hole Water Quality

Water samples were collected at approximately 30-foot intervals during reverse air drilling of EW-1 and DZ-1 to provide a generalized profile of water quality changes with respect to depth. The samples underwent analyses for conductivity, chlorides, temperature, and pH. Open circulation reverse air drilling techniques were used during pilot hole drilling of the interval from the base of the 42-inch-diameter casing (1,090 feet bpl) to a depth of 3,004 feet bpl at EW-1, and below the base of the 16-inch-diameter casing (675 feet bpl) to a depth of 1,400 feet bpl at DZ-1. Pilot hole water quality demonstrates that seawater is the native fluid within these intervals. Pilot hole water quality data for EW-1 and DZ-1 are provided in Appendix I.

4.3 Formation Sampling

Formation cutting samples were collected at 10-foot intervals from the surface to total depth while drilling EW-1, DZ-1, and SZ-1. Cutting samples from EW-1 and DZ-1 were characterized for rock type, color, consolidation, porosity, and fossils. At the completion of construction, one set of samples was sent to SFWMD for analysis. The samples will be forwarded to the Florida Bureau of Geology in Tallahassee, Florida, upon completion of SFWMD's analysis. Lithologic descriptions of strata encountered during drilling of the injection well system are discussed in Section 3. Detailed lithologic descriptions of samples from EW-1 and DZ-1 are provided in Appendix F.

4.4 Coring and Analyses

While drilling the pilot hole of EW-1 and DZ-1, core samples were collected to determine hydraulic characteristics of the cored intervals. A total of 12 cores between the depths of 1,920 and 2,774 feet bpl were collected during pilot hole drilling of EW-1. An additional core was collected from the interval of 777 to 792 feet bpl during pilot hole drilling of DZ-1.

Cores were obtained using a 4-inch-diameter core bit on a 20-foot-long core barrel. Generalized descriptions of the cores are provided in Exhibit 4-1. Detailed lithologic descriptions of the cores are presented in Appendix J.

EXHIBIT 4-1
Generalized Core Descriptions

Cored Interval (feet bpl)	Generalized Description
777 – 792	Limestone, fine sand grained, high porosity
1,920 – 1,935	Limestone, fine to medium sand grained, moderate porosity
1,973 – 1,988	Limestone, fine to medium sand grained, moderate to high porosity with a thin bed of low porosity micrite
2,000 – 2,015	Limestone, medium sand grained, moderate to high porosity interbedded with low to high porosity micrite
2,045 – 2,060	Limestone, fine to medium sand grained, moderate porosity
2,140 – 2,155	Limestone, fine to medium sand grained, low to high porosity
2,217 – 2,232	Limestone, fine to medium sand grained, low to moderate porosity
2,300 – 2,315	Limestone, fine sand grained, moderate porosity
2,390 – 2,400	Limestone, fine to coarse sand grained, low to high porosity
2,401 – 2,411	Limestone, fine sand grained, low to moderate porosity
2,420 – 2,430	Limestone, fine to medium sand grained, low to moderate porosity
2,535 – 2,545	Limestone, fine to medium sand grained, low porosity
2,764 – 2,774	Dolomite, microcrystalline, moderate porosity

For cores consisting of 4-inch long or longer intact core sections, 2 samples were shipped to a testing laboratory for horizontal and vertical permeability and porosity analyses. Ardamann & Associates, Inc. of Orlando, Florida, was selected to determine the vertical and horizontal permeability and total porosity of core samples from 7 intervals. Each core sample was encased in a cylindrical, latex membrane with porous stones and blocks on the top and bottom. The encased sample was then enclosed in a triaxial cell and permeated under a differential head with water to determine both vertical and horizontal Conductivity. Exhibit 4-2 summarizes the laboratory results from the core analyses. The complete core analytical results are provided in Appendix J.

Results on the vertical permeability tests indicated values that ranged from 6.3×10^{-4} centimeters per second (cm/s) at 2,140.0 feet bpl to 3.9×10^{-8} cm/s at 2,764.5 feet bpl. These values represent moderate to low permeabilities and indicate the presence of at least thin beds with moderate to good confining characteristics.

At the end of construction, the cores were sent to SFWMD. The core samples will be sent to the Florida Bureau of Geology in Tallahassee, Florida, upon completion of SFWMD's analysis.

EXHIBIT 4-2
Core Analytical Results

Cored Interval (feet bpl)	Sample Depth (feet bpl)	Vertical Hydraulic Conductivity (cm/s)	Horizontal Hydraulic Conductivity (cm/s)	Total Porosity (%)
1,920 – 1,935	1,920.0 – 1,920.75	1.2×10^{-4}	1.2×10^{-4}	41
2,000 – 2,015	2,000.0 – 2,000.7	1.2×10^{-5}	Not Available	28
2,140 – 2,155	2,140.0 – 2,140.55	6.3×10^{-4}	4.1×10^{-4}	44
2,390 – 2,400	2,390.0 – 2,390.45	4.1×10^{-6}	Not Available	25
2,401 – 2,411	2,401.8 – 2,402.4	2.3×10^{-7}	1.6×10^{-7}	16
2,535 – 2,545	2,536.6 – 2,537.0	7.4×10^{-7}	2.7×10^{-7}	22
2,764 – 2,774	2,764.55 – 2,764.9	3.9×10^{-8}	2.4×10^{-9}	3

4.5 Geophysical Logging

Geophysical logs were performed on the pilot hole intervals to correlate formation samples taken during drilling, to identify formation boundaries, and to obtain specific data pertaining to the underground formations. The geophysical logs also provided data for determining optimum casing setting depths at the injection well. Copies of each of the logs performed are provided in Appendix G. Exhibit 4-3 provides a summary of the geophysical logs performed during the construction of the injection well system.

4.6 Packer Tests

Packer tests were conducted to determine water quality and hydrogeologic characteristics of the tested intervals. Straddle packer testing was conducted on eight intervals between 680 and 2,780 feet bpl during the construction of EW-1. An additional three straddle packer tests were performed during the construction of DZ-1 to assist in the selection of appropriate monitor zones. Field conductivity measurements were taken during straddle packer testing to demonstrate that the quality of water produced from the test intervals had stabilized prior to collecting samples for water quality analysis. Water samples from packer tests conducted at EW-1 were sent to Sanders Laboratories and analyzed for chloride, total dissolved solids (TDS), and conductivity. Water samples from packer tests conducted at DZ-1 underwent field analysis for chlorides and conductivity. Results of these analyses and analyses of pilot hole water samples were used to demonstrate the absence of an Underground Source of Drinking Water (USDW) at the site. The water quality data demonstrates the test intervals are not located within a USDW. Exhibit 4-4 provides a summary of packer testing data and water quality data.

Exhibit 4-3
Richard A. Heyman Environmental Protection Facility
City of Key West, Florida
Geophysical Log Summary

Logging Event	Date	Well Name	Logs Performed[1]
1	8/25/99	SZ-1	C, GR, SP, LSN
2	10/8/99	EW-1	C, GR, SP, DI
3	10/20/99	EW-1	C
4	10/21/99	EW-1	T
5	10/26/99	EW-1	C, GR, SP, LSN, T, FR, DI, S
6	11/6/99	EW-1	C
7	11/7/99	EW-1	T
8	12/15/99	EW-1	C, GR, SP, DI, S
9	12/16/99	EW-1	BHTV, LSN, T, FR
10	1/3/00	EW-1	V
11	1/18/00	EW-1	C
12	1/21/00	EW-1	T
13	1/22/00	EW-1	T
14	1/23/00	EW-1	T
15	1/24/00	EW-1	T
16	1/25/00	EW-1	T
17	2/2/00	EW-1	CBL, V
18	3/15/00	EW-1	RTS
19	2/16/00	DZ-1	C, GR, SP, LSN
20	2/18/00	DZ-1	C
21	2/20/00	DZ-1	C, GR, SP, LSN
22	2/23/00	DZ-1	C
23	2/29/00	DZ-1	C, GR, SP, LSN
24	3/2/00	DZ-1	C
25	3/7/00	DZ-1	T
26	3/8/00	DZ-1	T
27	3/16/00	DZ-1	CBL, V

[1]Legend
C - Caliper, GR - Gamma Ray, SP - Spontaneous Potential, LSN - long-short normal electric, DI - Dual Induction, T - Temperature, FR - Fluid Resistivity, S - Borehole Compensated Sonic, BHTV - Borehole Televiewer, V - Video Survey , CBL - Cement Bond Log, RTS - Radioactive Tracer Survey

EXHIBIT 4-4
Packer Testing Summary

Date	Well	Test Interval (feet bpl)	Chloride (mg/L)	TDS (mg/L)	Conductivity (µmhos/cm)	Pumping Rate (gpm)	Drawdown (feet)	Specific Capacity (gpm/ft)
10/28/1999	EW-1	1,070 - 1,120	19,100	33,350	59,300	50	4.09	12.2
10/28/1999	EW-1	845 - 895	20,200	32,200	69,700	130	4.82	27.0
10/29/1999	EW-1	680 - 730	18,500	29,200	64,600	75	23.55	3.2
12/28/1999	EW-1	2,767 - 2,780	19,119	36,950	44,200	75	10.04	7.5
12/29/1999	EW-1	2,513 - 2,526	21,493	37,100	43,200	10	86.34	0.12
12/29/1999	EW-1	2,404 - 2,416	21,493	36,600	43,800	75	13.58	5.5
12/30/1999	EW-1	2,018 - 2,030	20,244	37,400	44,100	75	12.40	6.0
12/30/1999	EW-1	1,374 - 1,387	20,494	39,700	44,000	75	1.14	65.8
02/20/2000	DZ-1	629 - 681	20,800	N/A	48,500	5	14.03	0.36
02/20/2000	DZ-1	675 - 727	22,400	N/A	51,500	63	17.38	3.6
03/01/2000	DZ-1	1,279 - 1,320	21,760	N/A	48,000	98	5.59	17.5

N/A = not analyzed

4.7 Background Water Quality Sampling

Background water quality samples were collected from each of the monitor wells and the exploratory well at the end of construction. Samples from EW1 and both monitor zones of DZ-1 underwent analysis for primary and secondary drinking water standards and minimum criteria. SZ-1 underwent analysis for conductivity, chloride, temperature, and pH in accordance with specific condition 2.e. of the exploratory well construction permit. A copy of the background water quality analytical results for each of the wells is provided in Appendix K.

SECTION 5

Mechanical Integrity Testing

Mechanical integrity testing (MIT) of exploratory well EW-1 and monitor wells DZ-1 and SZ-1 was performed to evaluate the mechanical integrity of the wells in accordance with standards set forth in Chapter 62-528, FAC. Testing of exploratory well EW-1 included a video survey of the casing and wellbore, temperature and cement bond logs, a casing pressure test, and radioactive tracer testing. Testing of monitor well DZ-1 included a video survey, cement bond log, and a casing pressure test. Testing of monitor well SZ-1 included a casing pressure test. Results of testing demonstrated that each of the wells meet the requirements for both internal and external mechanical integrity testing as set forth in Rule 62-528.300(6), FAC.

5.1 Exploratory Well EW-1

5.1.1 Casing Pressure Test

On February 4, 2000, a casing pressure test was successfully conducted on the 24-inch-diameter casing of EW-1. The pressure test was conducted with an inflatable packer installed inside the 24-inch-diameter casing to a depth of 2,750 feet bpl. The casing was pressurized to 150 pounds per square inch (psi) with a high pressure pump. Precaution was taken to bleed air from the well after pressurizing the casing. The pressure was then monitored for a 2-hour period with a 200-psi calibrated pressure gauge. A copy of the calibration certificate for the pressure gauge is provided in Appendix L. Pressure readings were recorded throughout the 2-hour test. At the conclusion of the 2-hour test, the pressure was recorded at 155 psi. The 5 psi gain was well within the 5 percent limit (7.5 psi) specified by FDEP for a 1-hour pressure test. The casing pressure test was observed by Nancy Brooking (FDEP) and Mark Schilling (CH2M HILL). A total of 47 gallons of water were drained from the casing while pressure was released. A summary of the casing pressure test data is provided in Appendix M.

5.1.2 Video Survey

A color camera video survey was conducted at EW-1 on February 2, 2000, by Florida Geophysical, Inc., after completely purging more than 100,000 gallons of water from the well. The camera assembly was equipped with centralizers to keep it centered in the well, and its elevation was "zeroed" at pad level. The video survey was conducted to a depth of 2,996 feet bpl.

The survey showed no inconsistencies, and the casing appeared in good condition. The base of the 24-inch-diameter casing was identified at a depth of 2,776 feet bpl. The video survey was terminated when the top of sediment in the borehole was encountered at a depth of 2,996 feet bpl. A copy of the video-taped survey and summary report is provided in Appendix N.

5.1.3 Geophysical Logging

Cement bond and high resolution temperature logs were performed on exploratory well EW-1 by Florida Geophysical, Inc., on February 2 and March 14, 2000, respectively. Copies of the logs are provided in Appendix G.

The cement bond log was conducted to assess the quality of the cement-to-casing bond of the final casing of EW-1. The log was performed prior to cementing the upper 300 feet of casing to land surface to allow the tool to be calibrated to uncemented casing (above 300 feet bpl) and cemented casing (below 300 feet bpl). The cement bond log demonstrates an adequate cement bond around the final 24-inch-diameter casing from 300 to the base of the 24-inch-diameter casing. Above a depth of 300 feet bpl, the cement bond log shows that the casing is uncemented. The interval from land surface to 300 feet bpl was cemented following completion of the cement bond log.

The temperature log (run from land surface to a total depth of 2,996 feet bpl) indicated a temperature of between 76.2°F and 73.5°F from pad level to 2,720 feet bpl. Between 2,720 and 2,800 feet bpl, the temperature decreased from 73.6°F to approximately 60.9°F. The temperature remained between approximately 60.9°F and 60.5°F between 2,800 feet bpl and the bottom of the logged interval at 2,996 feet bpl. Results of temperature logging give no indication of leaks in the 24-inch-diameter casing.

5.1.4 Radioactive Tracer Survey

5.1.4.1 Background

On March 15, 2000, a radioactive tracer survey (RTS) was performed on EW-1 after pumping more than 500,000 gallons of potable water into the well. The RTS was conducted by Florida Geophysical Logging, Inc., in the presence of Mr. Jack Myers (FDEP), Mr. Joe Haberfeld (FDEP), and Mr. David McNabb (CH2M HILL).

A background gamma ray log was conducted on March 14, 2000, from the total depth of the well to land surface to establish background conditions on the entire well. Using the casing collar locator (CCL), the base of the 24-inch-diameter casing was delineated and verified at 2,775 feet bpl.

Two static, 2 low-flow rate dynamic, and 1 high-flow rate dynamic tests were performed. A total of 10 mCi of tracer fluid (Iodine 131) was placed in a tool equipped with an ejector, upper, middle, and lower gamma ray detectors, and a CCL. The upper gamma ray detector (GRT) is located 10 feet above the ejector on the tool. The middle (GRM) and lower (GRB) gamma ray detectors are located 3.1 feet and 12.3 feet, respectively, below the ejector. Exhibit 5-1 presents a schematic diagram of the radioactive tracer tool that was used during the test.

During the static test, the ejector was located 1 foot below the base of the casing (2,776 feet bpl). For the dynamic tests, the ejector was positioned 5 feet above the base of the casing at a depth of 2,770 feet bpl. For each test, the RTS tool was placed in time drive for 1 minute prior to ejecting tracer to ensure the detectors were functioning properly. Following the 1-minute detector test, a total radiation level of 1 mCi of tracer was ejected under both static and low-flow rate dynamic conditions. A radiation level of 2 mCi of tracer was ejected for the high-flow rate dynamic test. Gamma ray activity was monitored for 1 hour after release

Misc. 8/00 DFB

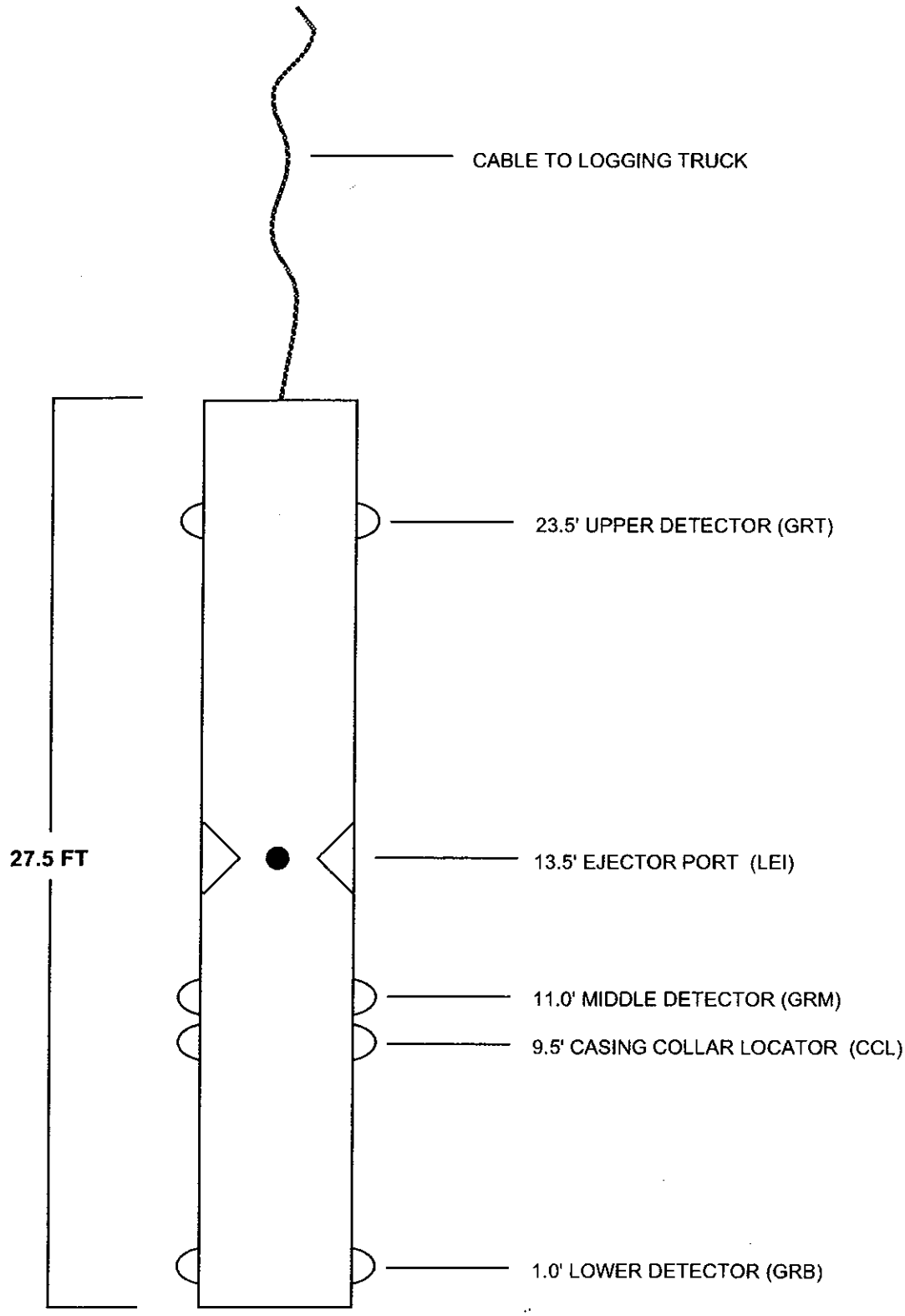


EXHIBIT 5-1
Florida Geophysical Radioactive Tracer Tool

CH2MHILL

of tracer during each of the tests. Following each of the monitoring periods, a log out of position to 200 feet above the highest point at which elevated gamma counts were detected was performed. This was followed by a flush of potable water to flush tracer and any associated tracer stains from the casing. After the potable water flush, the tool was lowered and a log after flush log out of position to 200 feet above the highest point at which elevated gamma counts were detected was performed. The low-flow rate dynamic tests were performed at an injection rate of 95 gallons per minute (gpm) of potable water. The high-flow rate dynamic test was performed at an injection rate of 125 gpm of potable water.

The background gamma log that runs from the pad level to a total depth of 2,996 feet bpl is identified at the top of the RTS log sheet as BACKGROUND GAMMA RAY. After the background gamma log, a log was performed to verify the base of casing at 2,775 feet bpl. This log pass is identified at the top of the log sheet as CASING TIE-IN. The log verified the base of casing at 2,775 feet bpl. The log sheet shows 4 logs across the page from left to right, as follows:

- GRT (top detector, 10 feet above ejector)
- CCL (casing collar locator, 3.9 feet below ejector)
- GRB (bottom detector, 12.3 feet above ejector)
- GRM (middle detector, 3.1 feet below ejector)

The CCL is displayed on the right side of the GRT track. A copy of the RTS log is provided in Appendix G.

5.1.4.2 Ejection No. 1 (First Static Test)

The first static test began by positioning the ejector 1 foot below the base of the 24-inch-diameter casing at a depth of 2,776 feet bpl. After 1 minute of time drive logging to ensure that the detectors were functioning properly, 1 mCi of tracer was ejected. The output of the three gamma detectors during the 1-minute test on the detectors and the 1-hour monitoring period following ejection of 1 mCi of tracer is displayed in log file STATIC TEST #1. For this log, the vertical scale represents time and the horizontal scale represents the gamma ray count. Reading the log upwards, approximately 3 inches of the vertical scale represents 5 minutes of time. Increased gamma ray activity was evident after approximately 7 minutes following the release of tracer at the middle detector, 3.1 feet below the ejector port.

Tracer was not detected at the bottom or top detectors during the 1-hour monitoring period. A log out of position was conducted after the 1-hour monitoring period. The output of the three gamma detectors and the CCL during the log out of position is displayed in the log file titled LOG OUT OF POSITION. Elevated gamma activity related to the presence of the ejected tracer is evident at each of the detectors on the log out of position. Residual staining on the middle and bottom detectors was evident during the log out of position. Gamma ray activity at the top detector is similar to the background gamma ray log above a depth of 2,762 feet bpl. The casing was then flushed with approximately 8,200 gallons of potable water before lowering the radioactive tracer tool to the base of the casing.

As shown on log file titled LOG AFTER FLUSH #1, the log after flushing the casing indicates the residual tracer and associated staining in the casing and on the middle and bottom detectors was removed by the casing flush. The middle and bottom detectors did detect increased gamma ray activity in the logged interval during the log out of position.

This increased gamma activity was not detected at the top detector, indicating the increase gamma activity is related to a slight tracer leak in the RTS tool.

A second log out of position after the potable water flush was performed because the RTS tool was leaking during the first after flush log out of position. The RTS tool continued to leak during the second log after flush, as shown in the log file titled LOG AFTER FLUSH #2. A third log after flush was then conducted (LOG AFTER FLUSH #3) and the leak appeared to have stopped. A slight residual stain is apparent on the middle and the bottom detectors during the third log after flush. The top detector output during each of the logs after flush was similar to background.

The results of the first static test gives no indication of upward movement of tracer on the outside of the 24-inch-diameter casing.

5.1.4.3 Ejection No. 2 (Second Static Test)

The second static test began by positioning the ejector 1 foot below the base of the 24-inch-casing at a depth of 2,776 feet bpl. After 1 minute of time drive logging to ensure the detectors were functioning properly, 1 mCi of tracer was ejected. The output of the three gamma detectors during the 1-minute test on the detectors and the 1-hour monitoring period following ejection of 1 mCi of tracer is displayed in log file STATIC TEST #2. Increased gamma ray activity was evident at the middle and bottom detectors in less than 1 minute. Elevated gamma ray activity was evident at the top detector approximately 14 minutes after release of the tracer.

A log out of position was conducted after the 1-hour monitoring period. The output of the three gamma detectors and the CCL during the log out of position is displayed in the log file titled LOG OUT OF POSITION. Elevated gamma activity related to the presence of the ejected tracer is evident at each of the detectors on the log out of position up to a depth of approximately 2,750 feet bpl. Residual staining on the middle and bottom detectors was evident during the log out of position. Gamma ray activity at the top detector is similar to the background gamma ray log above a depth of approximately 2,750 feet bpl. The casing was then flushed with approximately 4,000 gallons of potable water before lowering the radioactive tracer tool to the base of the casing.

As shown on log file titled LOG AFTER FLUSH #1, the log after flushing the casing indicates the residual tracer and associated staining on the middle and bottom detectors was removed by the casing flush. The tracer stain on the casing was also greatly reduced. The middle and bottom detectors did detect increased gamma ray activity in the logged interval during the log out of position. This increased gamma activity was not detected at the top detector, indicating the increase gamma activity is related to a slight tracer leak in the RTS tool.

The results of the second static test give no indication of upward movement of tracer on the outside of the 24-inch-diameter casing.

5.1.4.4 Ejection No. 3 (First Dynamic Test)

The third ejection was conducted under dynamic conditions to verify the integrity of the grout seal around the base of the 24-inch-diameter casing. Potable water was pumped into the well at a rate of 95 gpm during the test. The ejector of the tool was positioned 5 feet

above the base of the casing (2,770 feet bpl), and 1 mCi of tracer was released after 1 minute of time drive logging. The gamma ray response from each detector is shown on log file DYNAMIC TEST #1.

An increased gamma ray response was evident at the middle and bottom detectors almost immediately after release of the tracer. Elevated gamma response was not detected at the upper detector during the first dynamic test conducted for 60 minutes.

After the first dynamic test, the tool was logged out of position while continuing to inject at 95 gpm. The output of the three gamma detectors and the CCL during the log out of position is displayed in the log file titled LOG OUT OF POSITION. The log out of position shows that the middle detector and base of casing have residual tracer staining. Increased gamma ray activity was not encountered above a depth of 2,760 feet bpl at the top and bottom detectors. The casing was then flushed with more than 4,800 gallons of water before lowering the radioactive tracer tool to the base of the casing.

As shown on log file titled LOG AFTER FLUSH #1, the log out of position following the casing flush indicates the residual stain was reduced on the middle detector and the casing. Gamma ray activity at the upper detector is similar to the background gamma ray log above a depth of 2,760 feet bpl. A small increase in gamma ray activity did occur at the middle and bottom detectors during the log after flush. This increase is from a small leak of tracer from the RTS tool during the log after flush.

The results of the first dynamic test indicate no upward migration of radioactive tracer.

5.1.4.5 Ejection No. 4 (Second Dynamic Test)

The fourth ejection was conducted under dynamic conditions to verify the results of the first dynamic test. Potable water was pumped into the well at a rate of 95 gpm. The ejector of the tool was positioned 5 feet above the base of the casing (2,770 feet bpl), and 1 mCi of tracer was released after 1 minute of time drive logging. The gamma ray response from each detector is shown on log file DYNAMIC TEST #2. An increased gamma ray response was evident at the middle detector almost immediately following the release of the tracer. The tracer was then detected at the lower detector after approximately 2 minutes. Elevated gamma response was not detected at the upper detector during the second dynamic test conducted for 60 minutes.

Following the second dynamic test, the tool was logged out of position while continuing to inject at 95 gpm. The output of the three gamma detectors and the CCL during the log out of position is displayed in the log file titled LOG OUT OF POSITION. The log out of position shows that the base of casing and the middle and bottom detectors have residual tracer staining. Increased gamma ray activity at the top detector was not encountered above a depth of 2,755 feet bpl during the log out of position. The casing was then flushed with more than 5,000 gallons of potable water before lowering the radioactive tracer tool to the base of the casing.

As shown on log file titled LOG AFTER FLUSH #1, the log out of position following the casing flush indicates the residual stain was reduced on the casing and removed from the middle and bottom detectors. Gamma ray activity at each of the detectors is similar to the background gamma ray log above a depth of 2,760 feet bpl.

The results of the second dynamic test indicate no upward migration of radioactive tracer.

5.1.4.6 Ejection No. 5 (Third Dynamic Test)

The fifth ejection was conducted under high-flow rate dynamic conditions. Potable water was pumped into the well at a rate of 125 gpm. The ejector of the tool was positioned 5 feet above the base of the casing (2,770 feet bpl) and 2 mCi of tracer was released after 1 minute of time drive logging. The gamma ray response from each detector is shown on log file DYNAMIC TEST #3. An increased gamma ray response was evident at the middle detector almost immediately following the release of the tracer. The tracer was then detected at the lower detector after approximately 1.5 minutes. Elevated gamma response was not detected at the upper detector during the second dynamic test conducted for 30 minutes.

After the third dynamic test, the tool was logged out of position while continuing to inject at 125 gpm. The output of the three gamma detectors and the CCL during the log out of position is displayed in the log file titled LOG OUT OF POSITION. The log out of position shows the presence of a small residual casing stain at the base of casing. Increased gamma ray activity at the each of the detectors was not encountered above a depth of 2,760 feet bpl during the log out of position. The casing was then flushed with potable water at a rate of 300 gpm while lowering the RTS into the open hole interval. The RTS tool was emptied of remaining tracer at a depth of 2,820 feet bpl prior to lowering the tool to the bottom of the well.

As shown on log file titled FINAL GAMMA RAY, the log out of position and final gamma ray log following the casing flush and dumping of the excess tracer indicates the presence of tracer in the borehole between the depths of 2,800 and 2,830 feet bpl. Residual stain of the casing below 2,765 feet bpl is also evident. Gamma ray activity at each of the detectors is similar to the background gamma ray log above a depth of 2,765 feet bpl. The gamma ray log was performed from the total depth of the well to land surface.

The results of the third dynamic test and the entire radioactive tracer survey indicate no upward migration of radioactive tracer inside or outside of casing.

5.2 Monitor Well DZ-1

5.2.1 Casing Pressure Test

On March 15, 2000, a casing pressure test was successfully conducted on the $6^5/_8$-inch FRP casing of DZ-1. The pressure test was conducted after cementing the casing in place with a blow-out plug at the base of the casing at 1,280 feet bpl. The pressure test was witnessed by Mr. Jack Myers (FDEP), Mr. Joe Haberfeld (FDEP), and Mr. David McNabb (CH2M HILL). The casing was pressurized with a high pressure pump. Precaution was taken to bleed air from the well after pressurizing the casing. The pressure test began with a pressure of 101.75 psi and was monitored for a 2-hour period with a 200-psi calibrated pressure gauge. A copy of the calibration certificate for the pressure gauge is provided in Appendix L. One hour after establishing the initial pressure at 101.75 psi, the pressure was recorded at 99.75 psi. The 2-psi loss was within the 5 percent limit specified by FDEP for a 1-hour test. A total of 17 gallons of water were released from the casing when the pressure was released from the casing. A summary of the casing pressure test data is provided in Appendix M.

5.2.2 Video Survey

A color camera video survey was conducted at DZ-1 on March 16, 2000, by Florida Geophysical, Inc., after pumping approximately 4,100 gallons of water from the well. The camera assembly was equipped with centralizers to keep it centered in the well, and its elevation was "zeroed" at pad level. The video survey was conducted to a depth of 1,315 feet bpl.

The survey showed no inconsistencies, and the casing appeared in good condition. The base of the 6$^5/_8$-inch casing was identified at a depth of 1,279 feet bpl. The video survey was terminated when the top of cement in the borehole was encountered at a depth of 1,315 feet bpl. A report of the video survey is provided in Appendix N.

5.2.3 Geophysical Logging

A cement bond log (CBL) was performed on monitor well DZ-1 by Florida Geophysical, Inc. on March 16, 2000. A copy of the cement bond log is provided in Appendix G.

The CBL was conducted to assess the quality of the cement-to-casing bond of the final FRP casing of DZ-1. The log was performed after cementing the final casing from 1,280 to 724 feet bpl. Because most tools are calibrated using steel casing, it is not possible to provide a typical quantitative wave train analysis for fiberglass materials. Therefore, the CBL for the well provides a qualitative image of the cement behind the casing. The CBL demonstrates an adequate cement bond around the 6$^5/_8$-inch-diameter casing from approximately 715 to 1,280 feet bpl. Above 715 feet bpl, the log shows the open hole interval and uncemented casing. Casing joints, at 30-foot intervals, are also evident in the uncemented portion of the log.

5.3 Monitor Well SZ-1

5.3.1 Casing Pressure Test

On September 15, 1999, a casing pressure test was successfully conducted on the 6$^5/_8$-inch-diameter casing of SZ-1. The pressure test was conducted with an inflatable packer installed inside the 6$^5/_8$-inch-diameter casing to a depth of 159 feet bpl. The casing was pressurized to 108 psi with a high pressure pump. Precaution was taken to bleed air from the well after pressurizing the casing. The pressure was then monitored for 2 hours with a 200-psi calibrated pressure gauge. A copy of the calibration certificate for the pressure gauge is provided in Appendix L. Pressure readings were recorded throughout the 2-hour test. At the conclusion of the 2-hour test, the pressure was recorded at 103 psi. The 5 psi loss was within the 5 percent limit (5.4 psi) specified by FDEP for a 1-hour pressure test. The casing pressure test was observed by Mark Schilling (CH2M HILL). A summary of the casing pressure test data is provided in Appendix M.

SECTION 6

Summary and Conclusions

A 24-inch-diameter Class V exploratory well (EW-1) and associated monitor wells have been constructed at the Richard A. Heyman Environmental Protection Facility in Key West, Florida, to investigate the viability of operating a deep injection well (DIW) system to serve as the primary method of effluent disposal. Testing conducted during the construction of the exploratory well has successfully demonstrated that deep well injection is feasible at the project site. The exploratory well and associated monitor wells will be converted to a Class V injection well system through the Florida of Environmental Protection (FDEP) permitting process in the near future.

Construction activities at project site included the installation of a temporary drilling pad and shallow pad monitor wells, drilling of the exploratory well, drilling of the dual-zone and single-zone monitor wells, installation of permanent exploratory and monitor well pads, and the installation of wellhead piping and instrumentation.

Construction of the exploratory well system began on August 17, 1999 and was completed on March 16, 2000. Exploratory well EW-1 was constructed with the final 24-inch diameter casing string set to a depth of 2,775 feet bpl and an open hole interval to a total depth of 3,004 feet bpl. Dual-zone monitor well DZ-1 was constructed to monitor the intervals from 675 to 724 feet bpl and 1,280 to 1,320 feet bpl. Single-zone monitor well SZ-1 was constructed to monitor within the Surficial Aquifer from 165 to 210 feet bpl. Construction and testing were conducted in accordance with FDEP construction permit 128630-001-UC, the applicable sections of Chapter 62-528, F.A.C., and the construction contract documents prepared by CH2M HILL.

The testing program was approved by the FDEP and TAC prior to the issuance of the construction permit. A comprehensive testing program was conducted during construction of the exploratory well system to evaluate the site hydrogeology and assist in selection of the casing setting depths. The testing program consisted of collecting formation samples, cores, pilot hole water samples, geophysical logging, packer tests, and collection of background water quality samples. Data generated from the testing program demonstrated the absence of a USDW at the site.

The testing program identified the top of the injection zone at 2,780 feet bpl. The injection zone is characterized by extremely high transmissivity, highly fractured and cavernous dolomite with intervals of lower transmissivity limestone.

Geophysical logging, pressure testing, a video survey, and a radioactive tracer survey were performed to demonstrate mechanical integrity of the exploratory well. Mechanical integrity of the 6-5/8-inch-diameter FRP casing of monitor well DZ-1 was conducted by performing geophysical logging, pressure testing, and a video survey. Mechanical integrity of the 6-5/8-inch-diameter FRP casing of monitor well SZ-1 was demonstrated via pressure testing. Each of the tests confirmed that the final casing of each of the wells demonstrated mechanical integrity and met the standards established in Chapter 62.528, F.A.C.

APPENDIX A

Construction Permits Nos. 128630-001-UC and 128630-002-UC

Department of Environmental Protection

Lawton Chiles
Governor

South District
P.O. Box 2549
Fort Myers, Florida 33902-2549

941-332-6975

Virginia B. Wetherell
Secretary

PERMIT

PERMITTEE:

City of Key West
5701 W. College Road
Key West, Florida 33040

I.D. No: 5244M06172
Permit/Certification
Number: 128630-001-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003
County: Monroe
Latitude: 24° 34' 00" N
Longitude: 81° 47' 45" W
Section/Town/Range: 67S/25E
Project: City of Key West
EW-1 Exploratory Well

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Rules 62-4, 62-520, 62-601, 62-620, 62-550, 62-600 and 62-528. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents, attached hereto or on file with the Department and made a part hereof and specifically described as follows:

Construct a nominal 24 inch diameter Class V, Group 8, Exploratory Well (EW-1) with cemented steel casing to approximately 2,500 feet below land surface (bls) and an approximate total depth of 3,000 feet bls to test the feasibility of a deep injection well system for the disposal of treated domestic effluent from the Richard A. Heyman Environmental Protection Facility Wastewater Treatment Plant (WWTP). The DZ-1 dual zone Floridan aquifer monitor well and SZ-1 single-zone surficial aquifer monitor well will also be constructed.

The application to construct a Class I, III, or V Injection Well System, DER Form 17-1.209(9), was received June 18, 1997 with supporting documents and additional information last received December 3, 1997. Project is located at the Richard A. Heyman Environmental Protection Facility WWTP on Fleming Key, City of Key West, Florida.

Subject to General Conditions 1-16 and Specific Conditions 1-7.

PERMITTEE:

City of Key West

I.D. No.: 5244M06172
Permit/Cert. No.: 128630-001-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "permit conditions" and are binding and enforceable pursuant to Sections 403.141, 403.727, or 403.859 through 403.861, F.S. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

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

3. As provided in Subsections 403.087(6) and 403.722(5) F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

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

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

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

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

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

PERMITTEE:

City of Key West

I.D. No.: 5244M06172
Permit/Cert. No.: 128630-001-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

GENERAL CONDITIONS:

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

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

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

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

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-3.051, shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard.

11. This permit is transferable only upon department approval in accordance with F.A.C. Rules 62-4.120 and 62-30.300, F.A.C. as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

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

13. This permit also constitutes:

(a) Determination of Best Available Control Technology (BACT)
(b) Determination of Prevention of Significant Deterioration (PSD)
(c) Certification of compliance with State Water Quality Standards (Section 401, PL 92-500)
(d) Compliance with New Source Performance Standards

PERMITTEE:

City of Key West

I.D. No.: 5244M06172
Permit/Cert. No.: 128630-001-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

GENERAL CONDITIONS:

14. The permittee shall comply with the following:

(a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically, unless otherwise stipulated by the Department.

(b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.

(c) Records of monitoring information shall include:

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

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware the relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

16. In the case of an underground injection control permit, the following permit conditions also shall apply:

(a) All reports or information required by the Department shall be certified as being true, accurate and complete.

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

(c) Notification of any noncompliance which may endanger health or the environment shall be reported verbally to the Department within 24 hours and again within 72 hours, and a final written report provided within two weeks.

GENERAL CONDITIONS:

1. The verbal reports shall contain any monitoring or other information which indicate that any contaminant may endanger an underground source of drinking water and any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources drinking water.
2. The written submission shall contain a description of an a discussion of the cause of the noncompliance and, if it has not been corrected, the anticipated time the noncompliance is expected to continue, the steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance and all information required by Rule 62-528.415(4)(b), F.A.C.

(d) The Department shall be notified at least 180 days before conversion or abandonment of an injection well, unless abandonment within a lesser period of time is necessary to protect waters of the State.

SPECIFIC CONDITIONS:

1. General Criteria

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

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

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

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

e. This permit may be modified, revoked and reissued, or terminated for cause. he filing of a request by the permittee for a permit modification, revocation or reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

f. When requested by the Department, the permittee shall furnish, within the time specified, any information needed to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.

PERMITTEE:

City of Key West

I.D. No.: 5244M06172
Permit/Cert. No.: 128630-001-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

SPECIFIC CONDITIONS:

g. Signatories and Certification Requirements

1. All reports and other submittals required to comply with this permit shall be signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C.
2. In accordance with Rule 62-528.340(4), F.A.C., all reports shall contain the following certification:
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

h. The permittee shall notify the Department and obtain approval or to any physical alterations or additions to the injection or monitor well, including removal of the well head.

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

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

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

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

k. No underground injection is allowed that causes or allows movement of fluid into an underground source of drinking water.

PERMITTEE:

City of Key West

I.D. No.: 5244M06172
Permit/Cert. No.: 128630-001-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

SPECIFIC CONDITIONS:

2. Site Requirements

a. A drilling pad shall be provided to collect spillage of contaminants and to support the heaviest load that will be encountered during drilling.
b. The disposal of drilling fluids, cuttings, formation water or waste shall be in a sound environmental manner that avoids violation of surface and ground water quality standards. The disposal method shall be approved by the Department prior to start of construction.

c. Provide specific temporary drilling pad dimensions and design drawings for Department approval prior to commencing construction and shortly after selection of drilling contractor. Pad construction shall conform to the technical specifications in Attachment A of the December 2, 1997 submittal.

d. The three water table monitoring wells shall be sampled and analyzed prior to drilling this injection well and then weekly thereafter. Sampling shall include specific conductance, ph, chloride, temperature and water level.
e. Monitor well SZ-1 shall be constructed prior to the use of the on-site shallow disposal well for formation water disposal. SZ-1 shall be sampled and analyzed prior to the use of the shallow disposal well and weekly thereafter. Sampling shall be for the same parameters as in d. above.

3. Construction and Testing Requirements

a. The permittee shall contact the TAC chairman so that he may schedule progress review meetings at appropriate times with the TAC and permittee for the purpose of reviewing the results of tests, geophysical logging, surveys, drilling records and construction problems.

b. All drilling shall be inside a blow out preventer upon penetration of the Floridan Aquifer.

c. Mechanical integrity testing is a two part demonstration which includes a pressure test to demonstrate that no leaks are present in the casing and a temperature or noise log and radioactive tracer survey to demonstrate the absence of fluid movement behind the casing. Verification of pressure gauge calibration must be provided at the scheduled tests.

d. Department approval and Technical Advisory Committee (TAC) review pursuant to F.A.C. Rule 62-528 is required for the following stages of construction:

(1) Intermediate casing seat selection (injection and monitor wells).
(2) Final casing seat selection (injection and monitor wells).

PERMITTEE:

City of Key West

I.D. No.: 5244M06172
Permit/Cert. No.: 128630-001-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

SPECIFIC CONDITIONS:

e. The cementing program, as required in Section 62-528.410(5), Florida Administrative Code, shall be submitted to the Department and the Technical Advisory Committee for review. Cementing shall not commence prior to approval being granted.

f. All temperature surveys (except for mechanical integrity demonstration) shall be run within 48 hours after cementing.

g. TAC meetings are scheduled on the 1st Tuesday of each month subject to a 5 working day prior notice and timely receipt of critical data by all TAC members. Emergency meetings may be arranged when justified to avoid undue construction delay.

h. The Engineer of Record shall insure that safe internal pressures are maintained during the cementing of all casings.

I. The background water quality of the injection zone and monitor zones shall be established prior to commencement of any injection testing. Parameters to be measured are contained on Table 3-5 in the June, 1997 construction permit application.

j. The injection and monitor well(s) at the site shall be abandoned when no longer usable for their intended purpose, or when posing a potential threat to the quality of the waters of the State. Within 180 days of well abandonment, the permittee shall submit to the Department and the TAC the proposed plugging method, pursuant to Rule 62-528.435, F.A.C.

k. All salt used in well drilling shall be stored in an environmentally sound manner. Accurate records shall be kept on the amount of salt used.

l. All dual induction, sonic and caliper geophysical logs run on the pilot holes of all injection and monitor wells shall be submitted with scales of one inch equals one hundred feet (1"=100'), two inches equals one hundred feet (2"=100') and five inches equals one hundred feet (5"=100').

m. An approximate 24 hour injection test using water from the channel shall be conducted on the completed exploratory well as described on page 10 of the September 29, 1997 submittal.

4. Quality Assurance/Quality Control Requirements

a. This permit approval is based upon evaluation of the data contained in the application dated June 18, 1997, and the plans and/or specifications submitted in support of the application. Any changes in the

SPECIFIC CONDITIONS:

plans and/or technical specifications, except as provided elsewhere in this permit, must be approved by the Department before being implemented.

b. A professional engineer registered pursuant to Chapter 471, Florida Statutes shall be retained throughout the construction period to be responsible for the construction operation and to certify the application, specifications, completion report and other related documents. The Department shall be notified immediately of any change of engineer.

c. Where required by Chapter 471 (P.E.) or Chapter 492 (P.G.) F.S., applicable portions of permit applications and supporting documents which are submitted to the Department for public record shall be signed and sealed by the professional(s) who approved or prepared them.

d. The Department shall be notified immediately of any problems that may seriously hinder compliance with this permit, construction progress, or good construction practice. The Department may require a detailed written report describing the problem, remedial measures taken to assure compliance and measures taken to prevent recurrence of the problem.

e. Issuance of a Class V Exploratory well permit does not obligate the Department to authorize operational testing of the injection or monitor wells, unless the wells qualify for a construction and testing permit applied for by the permittee and issued by the Department.

5. Reporting Requirements

a. All reports and surveys required by this permit must be submitted concurrently to all the members of the TAC and to the U.S. EPA. The TAC consists of representatives from these agencies:

Florida Department of Environmental Protection
South District
P.O. Box 2549
Fort Myers, FL 33902-2549

Florida Department of Environmental Protection
Bureau of Water Facilities Regulation
UIC Program
2600 Blair Stone Rd.
Tallahassee, FL 32399-2400

PERMITTEE:

City of Key West

I.D. No.: 5244M06172
Permit/Cert. No.: 128630-001-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

SPECIFIC CONDITIONS:

South Florida Water Management District
Well Construction Permitting
P.O. Box 24860
West Palm Beach, FL 33416-4860

United States Geological Survey
9100 NW 36th Street , Suite 107
Miami, FL 33178

In addition, all reports and surveys required by this permit shall be sent to:

United States Environmental Protection Agency, Region IV
UIC Section
Atlanta Federal Center
61 Forsyth Street
Atlanta, Georgia 30303-3104

b. Members of the TAC and the U.S. EPA shall receive a weekly summary of the daily log kept by the contractor. The weekly reporting period shall run Friday through Thursday and reports shall be mailed each Friday. The report shallinclude but is not limited to the following:

(1) Description of daily footage drilled by diameter of bit or size of hole opener or reamer being used;
(2) Description of formation and depth encountered; and specific conductance of water samples collected during drilling. Description of work during installation and cementing of casings; include amounts of casing and actual cement used versus calculated volume required.
(3) Lithological description of drill cuttings collected every ten (10) feet or at every change in formation. Description of work and type of testing accomplished, geophysical logging, pumping tests, and coring results.
(4) Description of any construction problems that develop and their status to include a description of what is being done or has been done to correct the problem.
(5) Description of the amount of salt used.
(6) Results of any water quality analyses performed as required by this permit.
(7) Copies of the driller's log are to be submitted with the weekly summary.
(8) Volume of formation and development water (gallons) disposed of in the shallow disposal well (permit no. 128630-002-UC).

c. The Department must be notified seventy-two (72) hours prior to all testing for mechanical integrity on the injection well and pressure testing on the monitor wells. Testing should begin during daylight hours Monday through Friday.

PERMITTEE:

City of Key West

I.D. No.: 5244M06172
Permit/Cert. No.: 128630-001-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

SPECIFIC CONDITIONS:

d. Annotated copies of geophysical logs, lithologic descriptions and logs and water quality data (from drilling and packer tests) must be submitted to TAC and the U.S. EPA for intermediate and final casing seat selection approvals by the Department.

e. An evaluation of all test results and geophysical logs must be submitted with all test data.

f. After completion of construction and testing, a final report shall be submitted to the Department and the TAC and the U.S. EPA. The report shall include, but not be limited to, all construction and testing information and data with appropriate interpretations. Mill certificates for the casing(s) shall be included in this report. To the extent possible, the transmissivity of the injection zone and maximum capacity within safe pressure limits shall be estimated.

6. Financial Responsibility

Pursuant to Rule 528.435(9), F.A.C., the permittee shall submit documentation to obtain a Certificate of Demonstration of Financial Responsibility prior to the issuance of a construction and testing permit.

7. The permittee is reminded of the necessity to comply with the pertinent regulations of any other regulatory agency, as well as any county, municipal, and federal regulations applicable to the project. These regulations may include, but not limited to, those of the Federal Emergency Management Agency in implementing flood control measures. This permit should not be construed to imply compliance with the rules and regulations of other regulatory agencies.

Note: In the event of an emergency the permittee shall contact the Department by calling (850)413-9911. During normal business hours, the permittee shall call (941)332-6975.

Issued this 18th day of September 1998.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Margaret F. Highsmith
Director of
District Management

MFH/JBM/klm

Lawton Chiles
Governor

Department of
Environmental Protection

South District
P.O. Box 2549
Fort Myers, Florida 33902-2549
941-332-6975

Virginia B. Wetherell
Secretary

PERMIT

PERMITTEE:

City of Key West
5701 W. College Road
Key West, Florida 33040

I.D. No: 5244M06172
Permit/Certification
No: 128630-002-UC
Date of Issue: September 17,1998
Expiration Date: September 16, 2003
County: Monroe
Latitude: 24°34'03"N
Longitude: 81°47'48"W
Section/Town/Range: 67S/25E
Project: City of Key West
Exploratory Well EW-1
Water Disposal Well

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and Florida Administrative Code (F.A.C.) Rules 62-4 and 62-528. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents, attached hereto or on file with the Department and made a part hereof and specifically described as follows:

Construct one (1) Class V, Group 8, injection well as described on the application for Class V well construction, DEP Form 62-528.900(1), and other information submitted in support of this application. Well will consist of 60'± of twelve (12) inch steel casing and open interval to 100'±.

Project well is located at Richard A. Heyman Environmental Protection Facility on Fleming Key in Key West.

Subject to General Conditions 1-16 and Specific Conditions 1-9.

PERMITTEE:

City of Key West

Permit No: 128630-002-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

GENERAL CONDITIONS:

1. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are "permit conditions" and are binding and enforceable pursuant to Sections 403.141, 403.727, or 403.859 through 403.861, F.S. The permittee is placed on notice that the Department will review this permit periodically and may initiate enforcement action for any violation of these conditions.

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

3. As provided in Subsections 403.087(6) and 403.722(5) F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in the permit.

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

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

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

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

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

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

GENERAL CONDITIONS:

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

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

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

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

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

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance, provided however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-3.051, shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard.

11. This permit is transferable only upon Department approval in accordance with F.A.C. Rules 62-4.120 and 62-30.300, F.A.C. as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

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

13. This permit also constitutes:
(a) Determination of Best Available Control Technology (BACT)
(b) Determination of Prevention of Significant Deterioration (PSD)
(c) Certification of compliance with State Water Quality Standards (Section 401, PL 92-500)

GENERAL CONDITIONS:

(d) Compliance with New Source Performance Standards

14. The permittee shall comply with the following:

(a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically, unless otherwise stipulated by the Department.

(b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation), required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report or application unless otherwise specified by Department rule.

(c) Records of monitoring information shall include:
1. the date, exact place, and time of sampling or measurements;
2. the person responsible for performing the sampling or measurements;
3. the dates analyses were performed;
4. the person responsible for performing the analyses;
5. the analytical techniques or methods used;
6. the results of such analyses.

15. When requested by the Department, the permittee shall within a reasonable time furnish any information required by law which is needed to determine compliance with the permit. If the permittee becomes aware the relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

16. In the case of an underground injection control permit, the following permit conditions also shall apply:

(a) All reports or information required by the Department shall be certified as being true, accurate and complete.
(b) Reports of compliance or noncompliance with, or any progress reports on, requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.
(c) Notification of any noncompliance which may endanger health or the environment shall be reported

GENERAL CONDITIONS:

verbally to the Department within 24 hours and again within 72 hours, and a final written report provided within two weeks.

1. The verbal reports shall contain any monitoring or other information which indicate that any contaminant may endanger an underground source of drinking water and any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

2. The written submission shall contain a description of an a discussion of the cause of the non compliance and, if it has not been corrected, the anticipated time the noncompliance is expected to continue, the steps being taken to reduce, eliminate, and prevent recurrence of the non compliance and all information required by Rule 62-28.415(4)(b), F.A.C.

(d) The Department shall be notified at least 180 days before conversion or abandonment of an injection well, unless abandonment within a lesser period of time is necessary to protect waters of the State.

SPECIFIC CONDITIONS:

1. General Criteria

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

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

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

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

e. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation or reissuance, or termination,

SPECIFIC CONDITIONS:

or a modification of planned changes or anticipated noncompliance, does not stay any permit condition.

f. When requested by the Department, the permittee shall furnish, within the time specified, any information needed to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.

g. Signatories and Certification Requirements

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

2. In accordance with Rule 62-528.340(4), F.A.C., all reports shall contain the following certification:
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

h. The permittee shall notify the Department and obtain approval or to any physical alterations or additions to the injection or monitor well, including removal of the well head.

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

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

1. Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water; or

2. Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

PERMITTEE:

City of Key West

Permit No: 128630-002-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

SPECIFIC CONDITIONS:

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

2. Drawings, plans, documents or specifications submitted by the Permittee, not attached hereto, but retained on file at the South Florida District Office, are made a part hereof.

3. The Certification of Class V well Construction Completion, DEP Form 62-528.900(4) and the Well Completion Report from the appropriate Water Management District shall be submitted by the licensed well driller within two days after completion of construction or abandonment.

4. Copies of well completion report are to be mailed to the following:

a. Department of Environmental Protection, South Florida District, 2295 Victoria Avenue Fort Myers, Florida 33901
b. South Florida Water Management District, Water Use Division, Post Office Box 24680, West Palm Beach, Florida 33416-4680.
c. Florida Geological Survey 903 W. Tennessee Street, Tallahassee, Florida 32304.

5. In the event a well must be plugged or abandoned, the permittee shall obtain a permit from the Department as required by Sections 62-528.625 and 62-528.645, F.A.C.

6. The permittee is reminded of the necessity to comply with the pertinent regulations of any other regulatory agency, as well as any county, municipal, and federal regulations applicable to the project. these regulations may include, but are not limited to, those of the Federal Emergency Management Agency in implementing flood control measures. This permit should not be construed to imply compliance with the rules and regulations of other regulatory agencies.

7. The permittee shall notify the Department's Marathon branch office at (305) 289-2310, 48 hours prior to any annular space cementing of the Class V wells which may be deemed necessary during construction.

8. The disposal of water produced during the construction of the exploratory well system shall not take place until monitor well SZ-1 is constructed, sampled and analyzed as per permit no. 128630-001-UC.

PERMITTEE:

City of Key West

Permit No: 128630-002-UC
Date of Issue: September 17, 1998
Expiration Date: September 16, 2003

SPECIAL CONDITIONS:

9. The volume of injected water (gallons) shall be recorded and reported under specific condition 5.b. of permit 128630-001-UC.

Note: In the event of an emergency the permittee shall contact the Department by calling (850)413-9911. During normal business hours, the permittee shall call (941)332-6975.

Issued this 18th day of September, 1998.
STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Margaret F. Highsmith
Director of
District Management

MFH/JBM/klm

APPENDIX B

Summary of Well Construction Activity

Richard A. Heyman Environmental Protection Facility
City of Key West, Florida
Exploratory Well EW-1
Construction Summary

Date	Milestone
10/6/99	Began drilling 12-1/4-inch diameter pilot hole.
10/7/99	Completed drilling pilot hole to a depth of 300 feet bpl.
10/8/99	Conducted geophysical logging of the pilot hole. Logs conducted include caliper, gamma ray, spontaneous potential, and dual induction.
10/11/99	Began reaming the pilot hole to a nominal 60-inch diameter.
10/19/99	Completed reaming the pilot hole to a depth of 259 feet bpl.
10/20/99	Conducted a caliper log of the reamed hole. Installed 52-inch diameter casing to a depth of 246 feet bpl. Began cementing the 52-inch diameter casing in place.
10/21/99	Completed cementing the 52-inch diameter casing to land surface.
10/22/99	Began pilot hole drilling from 246 feet bpl.
10/26/99	Completed pilot hole drilling to a depth of 1,211 feet bpl. Conducted geophysical logging of the pilot hole. Logs conducted include caliper, gamma ray, spontaneous potential, long and short normal electric, temperature, fluid resistivity, dual induction, and borehole compensated sonic.
10/28/99	Conducted a straddle packer test on the intervals from 1,070 to 1,120 and 845 to 895 feet bpl.
10/29/99	Conducted a straddle packer test on the interval from 680 to 730 feet bpl.
10/30/99	Began backplugging the pilot hole with cement from 1,211 feet bpl.
10/31/99	Completed backplugging the pilot hole with cement to a depth of 246 feet bpl.
11/1/99	Began drilling out the backplugged pilot hole to a nominal 52-inch diameter.
11/5/99	Completed drilling a nominal 52-inch diameter hole to a depth of 1,095 feet bpl.
11/6/99	Conducted a caliper log of the reamed hole. Installed 42-inch diameter casing to a depth of 1,090 feet bpl.
11/7/99	Began cementing the 42-inch diameter casing in place.
11/12/99	Completed cementing the 42-inch diameter casing to surface.
11/17/99	Began pilot hole drilling from 1,090 feet bpl.
11/20/99	Cored the interval from 1,920 to 1,935 feet bpl, recovered 6 feet of core.
11/21/99	Cored the interval from 1,949 to 1,964 feet bpl, did not recover any core.
11/22/99	Cored the interval from 1,973 to 1,988 feet bpl, recovered 2 feet of core.
11/23/99	Cored the interval from 2,000 to 2,015 feet bpl, recovered 10 feet of core.
11/24/99	Cored the interval from 2,045 to 2,060 feet bpl, recovered 2 feet of core.
11/29/99	Cored the interval from 2,140 to 2,155 feet bpl, recovered 3 feet of core.
11/30/99	Cored the intervals from 2,200 to 2,217 and 2,217 to 2,232 feet bpl.
12/1/99	Cored the intervals from 2,300 to 2,315; 2,340 to 2,355 and 2,355 to 2,365 feet bpl.
12/2/99	Cored the intervals from 2,390 to 2,400 and 2,401 to 2,411 feet bpl.
12/3/99	Cored the intervals from 2,420 to 2,430 and 2,460 to 2,470 feet bpl.
12/6/99	Cored the interval from 2,484 to 2,495 feet bpl.
12/11/99	Cored the interval from 2,535 to 2,545 feet bpl.
12/12/99	Cored the interval from 2,764 to 2,774 feet bpl.
12/15/99	Finished pilot hole drilling to a depth of 3,000 feet bpl. Performed geophysical logging. Logs performed include caliper, gamma ray, spontaneous potential, dual induction electric, and sonic logs.
12/16/99	Conducted geophysical logging. Logs performed include borehole televiewer, long-short normal electric, temperature, and fluid resistivity logs.
12/28/99	Conducted straddle-packer tests on the intervals from 2,767 to 2,780, and from 2,513 to 2,526 feet bpl.
12/29/99	Conducted straddle-packer tests on the intervals from 2,404 to 2,416, and from 2,018 to 2,030 feet bpl.
12/30/99	Conducted straddle-packer test on the interval from 1,374 to 1,387 feet bpl.

Richard A. Heyman Environmental Protection Facility
City of Key West, Florida
Exploratory Well EW-1
Construction Summary

Date	Milestone
1/3/00	Conducted a video log of the pilot hole.
1/4/00	Began backplugging the pilot hole with cement
1/9/00	Finished backplugging the pilot hole with cement to the base of the 42-inch diameter casing at 1,087 feet bpl.
1/10/00	Began reaming the pilot hole to a nominal 32-inch diameter.
1/17/00	Finished drilling the nominal 32-inch diameter hole to a depth of 2,778 feet bpl.
1/18/00	Conducted a caliper log on the 32-inch diameter hole. Began installing the 24-inch casing.
1/20/00	Finished installing the 24-inch diameter casing to a depth of 2,775 feet bpl.
1/21/00	Began cementing the 24-inch diameter casing in place.
1/25/00	Finished cementing the 24-inch diameter casing from the base of casing to 300 feet bpl.
1/27/00	Begin drilling nominal 24-inch diameter borehole.
2/2/00	Finished drilling the nominal 24-inch diameter hole to a depth of 2,996 feet bpl. Conducted geophysical logging. Logs performed include the CBL and video logs.
2/3/00	Conducted the casing pressure test. Finished cementing the 24-inch diameter casing in place from 300 feet bpl to pad level.
2/8/00	Drill rig mobilized off of the well.
3/15/00	Conducted radioactive tracer survey.

bpl = below pad level

Key West WWTP
Dual-Zone Monitor Well (DZ-1)
Summary of Construction Activities

Date	Milestone
2/14/00	Began drilling 12.25-inch diameter pilot hole.
2/16/00	Finished drilling 12.25-inch diameter pilot hole to 328 feet bpl. Performed geophysical logging from 338 feet bpl to surface. Logs performed include caliper, gamma ray, spontaneous potential, and long-short normal electric logs.
2/17/00	Began and finished reaming the pilot hole to a nominal 34-inch diameter, to a depth of 258 feet bpl.
2/18/00	Performed a caliper log on the reamed hole. Installed and cemented in place the 26-inch diameter casing to a depth of 248 feet bpl.
2/19/00	Began drilling 12.25-inch diameter pilot hole.
2/20/00	Finished drilling 12.25-inch diameter pilot hole to 758 feet bpl. Performed geophysical logging. Logs performed include caliper, gamma ray, spontaneous potential, and long-short normal electric logs. Conducted straddle packer tests on the intervals from 629 to 681, and from 675 to 727 feet bpl.
2/22/00	Began reaming the pilot hole to a nominal 26-inch diameter.
2/23/00	Finished drilling nominal 26-inch diameter hole to a depth of 680 feet bpl. Performed a caliper log on the reamed pilot hole. Installed the 16-inch diameter casing to a depth of 675 feet bpl. Started cementing the 16-inch diameter casing in place.
2/24/00	Finished cementing 16-inch diameter casing in place.
2/27/00	Began drilling 12.25-inch diameter pilot hole.
2/28/00	Cored the interval from 777 to 792 feet bpl.
2/29/00	Finished drilling 12.25-inch diameter pilot hole to 1,400 feet bpl. Performed geophysical logging. Logs performed include caliper, gamma ray, spontaneous potential, and long-short normal electric logs.
3/1/00	Conducted straddle packer test on the interval from 1,279 to 1,320 feet bpl. Began reaming the pilot hole to a nominal 16-inch diameter.
3/2/00	Finished drilling nominal 16-inch diameter hole to a depth of 1,400 feet bpl. Performed a caliper log on the reamed pilot hole.
3/6/00	Installed the 6.675-inch diameter FRP casing to a depth of 1,280 feet bpl. Started cementing the 6.675-inch casing in place.
3/8/00	Finished cementing 6.675-inch diameter casing in place to a depth of 724 feet bpl.
3/15/00	Conducted casing pressure test.
3/16/00	Began and finished backplugging the nominal 16-inch borehole from 1,400 to 1,321 feet bpl. Performed geophysical logging. Logs performed include video and CBL logs.
3/20/00	Removed the drill rig from the site.

bpl = below pad level

Key West WWTP
Single-Zone Monitor Well (SZ-1)
Summary of Construction Activities

Date	Milestone
8/17/99	Began drilling 10.625-inch diameter pilot hole.
8/24/99	Drilling of 10.625-inch pilot diameter pilot hole reaches a depth of 160 feet bpl. Switch to an 8-inch diameter pilot hole.
8/25/99	Finished drilling 8-inch diameter pilot hole to 200 feet bpl. Performed geophysical logging from 200 feet bpl to surface. Logs performed include caliper, gamma ray, spontaneous potential, and long-short normal electric.
8/26/99	Began reaming the pilot hole to a nominal 16-inch diameter.
8/31/99	Finished drilling nominal 16-inch diameter borehole to a depth of 165 feet bpl.
9/1/99	Installed 6.675-inch FRP casing to a depth of 165 feet bpl.
9/3/99	Conducted preliminary casing pressure test and started cementing the casing in place.
9/10/99	Finished cementing the 6.675-inch casing in place.
9/15/99	Conducted casing pressure test.

bpl = below pad level

Key West WWTP
Shallow Disposal Well
Summary of Construction Activities

Date	Milestone
9/11/99	Began and completed drilling 18.5-inch diameter borehole to a depth of 60 feet bpl. Installed and cemented 12-inch casing to 60 feet bpl.
9/12/99	Began and completed drilling 11.625-inch diameter borehole to a depth of 100 feet bpl.

bpl = below pad level

APPENDIX C

Weekly Summaries

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West, Jack Myers/FDEP, Steve Anderson/SFWMD, Joe Haberfeld/FDEP, Ron Reese/USGS, Nancy Marsh/USEPA, Ken Williams/CH2M HILL, David McNabb/CH2M HILL

FROM: Mark Schilling/CH2M HILL

DATE: August 20, 1999

SUBJECT: Weekly Summary No. 1
August 13 through August 19, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

There was no activity at the site until Tuesday, August 17th. On that date, the drilling of the Single-Zone Monitor Well (SZ-1) was started, using the mud rotary method with a 5-inch drag bit The drilling progessed to a depth of 60 feet below pad level (bpl) by the end of the workday on August 17th. Upon the start-up of the drilling on Wednesday, August 18th, the borehole had filled in to a depth of 40 feet bpl. Due to lost circulation at the same depth, the Driller switched from the mud rotary method to the straight air rotary method and also switched from a 5-inch drag bit to a 10.625-inch tri-cone bit. The drilling using this method was started at pad level and reached a depth of 18 feet bpl. Due to the large amount of drilling fluids generated during the straight air rotary drilling and the lack of available storage space, the Driller stopped work, while awaiting the delivery of a larger storage tank. The only lithology encountered was of limestone. There were no unusual construction-related events that occurred and no kill material of any kind was used during this reporting period.

During the next reporting period, it is anticipated that SZ-1 will be completed, with the 6.625-inch FRP casing installed and the Shallow Disposal Well drilling will be started.

Attachments: Engineer's Daily Reports
Driller's Daily Reports

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
David McNabb/CH2M HILL

FROM: Mark Schilling/CH2M HILL

DATE: August 27, 1999

SUBJECT: Weekly Summary No. 2
August 20 through August 26, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

The drilling of the pilot hole for the Single-Zone Monitor Well (SZ-1) was resumed at 18 feet below pad level (bpl) on Friday, August 20th. The drilling method used was straight air rotary with a 10.625-inch tri-cone bit. The drilling of the pilot hole reached a depth of 160 feet bpl on Tuesday, August 24th. The drill bit was replaced with a 7.875-inch tri-cone bit for drilling below 160 feet bpl. The total depth of 200 feet bpl was reached on Wednesday, August 25th, and geophysical logging was conducted to the total depth of the pilot hole. The logs conducted were the Caliper, Natural Gamma Ray, Spontaneous Potential, and Long & Short Normal Electric Resistivity logs. Copies of the geophysical logs were submitted to the TAC on August 26, 1999. On Thursday, August 26th, reaming of the pilot hole, using a 14.75-inch reaming bit began. A depth of 155 feet bpl was reached on this date. The only lithology encountered was of limestone, with the exception of a sand layer from 95 to 98 feet bpl. There were no unusual construction-related events that occurred and no kill material of any kind was used during this reporting period.

During the next reporting period, it is anticipated that SZ-1 will be completed, with the 6.625-inch FRP casing installed and the Shallow Disposal Well drilling will also be completed.

Attachments: Engineer's Daily Reports
Driller's Daily Reports

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
David McNabb/CH2M HILL

FROM: Mark Schilling/CH2M HILL

DATE: August 27, 1999

SUBJECT: Weekly Summary No. 3
August 27 through September 2, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

The third week of construction at the Key West injection well facility construction site ended on September 2, 1999. There was no drilling activity at the site on August 28th and 29th. Reaming of the pilot hole for the Single-Zone Monitor Well (SZ-1) to 165 feet below pad level (bpl) using a 14.75-inch bit was completed on Monday, August 30th. The pilot hole below 165 feet bpl was then cleaned of cuttings using a 7.875-inch tri-cone bit. The original pilot hole was cleaned to 200 feet bpl and then drilled another 10 feet to 210 feet bpl, in order to allow for some fill-in of the borehole. The 6.625-inch FRP casing was installed on Wednesday, September 1st to a depth of 165 feet bpl. The rest of the week was spent preparing for the preliminary casing pressure test prior to the cementing of the casing in place. There were no unusual construction-related events that occurred and no kill material of any kind was used during this reporting period. A temperature log was conducted during last week's logging event, however, it was inadvertently not provided in the previous weekly summary. The temperature log is provided in this weekly summary.

During the next reporting period, it is anticipated that the casing in SZ-1 will be pressure tested and cemented to land surface. The Shallow Disposal Well drilling should also be completed.

Attachments: Engineer's Daily Reports
Driller's Daily Reports
Geophysical Logs

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West, Steve Anderson/SFWMD, Ron Reese/USGS, Ken Williams/CH2M HILL, Jack Myers/FDEP, Joe Haberfeld/FDEP, Nancy Marsh/USEPA, David McNabb/CH2M HILL

FROM: Mark Schilling/CH2M HILL

DATE: September 10, 1999

SUBJECT: Weekly Summary No. 4
September 3 through September 9, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

On Friday, September 3rd, the preliminary casing pressure test, on the 6.625-inch FRP casing in the Single-Zone Monitor Well, was successfully completed. The casing lost 1.25 psi over a one hour period. The only other activity that occurred on that day was a cement seal was placed on top of the cement basket at the bottom of the casing. There was no activity at the site for Saturday - September 4th, Sunday – September 5th , and Monday – September 6th, due to the Labor Day holiday. Work resumed on Tuesday, September 7th and the 1st stage of cementing of the 6.625-inch casing was completed, using 80 sacks of neat cement. This resulted in a fill-up of 27 feet, from 157 to 130 feet below pad level (bpl). A temperature geophysical log was also conducted. On Wednesday, September 8th, the 2nd stage of cementing was conducted, using 40 sacks of 12% cement, and a temperature geophysical log was conducted. The fill-up on for the 2nd stage was 32 feet, from 130 feet to 98 feet bpl. On Thursday, September 9th, the 3rd and 4th stages of cementing were conducted. The 3rd stage used 40 sacks of 12% cement, with a fill-up of 29 feet, from 98 feet to 69 feet bpl. A total of 20 sacks of 12% and 20 sacks of neat cement was pumped during the 4th stage, resulting in a fill-up of 27 feet, from 69 feet to 42 feet bpl. A temperature geophysical log was conducted on each of these stages. There were no unusual construction-related events that occurred and no kill material of any kind was used during this reporting period.

During the next reporting period, it is anticipated that the cementing of the casing in SZ-1 will be completed. The Shallow Disposal Well drilling should also be constructed.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Geophysical Logs

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
David McNabb/CH2M HILL

FROM: Mark Schilling/CH2M HILL

DATE: September 17, 1999

SUBJECT: Weekly Summary No. 5
September 10 through September 16, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

On Friday, September 10th, cementing of the 6.625-inch FRP casing in the Single-Zone Monitor Well was completed. On Saturday, September 11th, drilling of the Shallow Disposal Well began. The borehole was drilled to a depth of 61 feet bpl. The 12-inch steel casing was then installed, to a depth of 60 feet bpl, and the 1st stage of cementing was conducted. On Sunday, September 12th, the drilling of the open-hole portion of the Shallow Disposal Well was started and completed from 60 to 100 feet bpl. Cementing of the Shallow Disposal Well casing was then completed and the well was then developed. The drilling and completion of the three shallow drilling pad monitor wells was started and completed on Tuesday, September 14th. On Wednesday, September 15th, the final casing pressure test of the 6.625-inch FRP casing in SZ-1 was successfully conducted. The test was conducted for two hours, with a loss of 5 psi, from 108 psi to 103 psi, over the time period. No further drilling activity was conducted for the remainder of the week, however throughout the reporting period, the Driller has been mobilizing and constructing the equipment necessary to begin the drilling of the Deep Exploratory Injection Well.

During the next reporting period, it is anticipated that the mobilization and construction of the equipment for the Deep Exploratory Injection Well will continue.

Attachments: Engineer's Daily Reports
Driller's Daily Reports

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: September 29, 1999

SUBJECT: Weekly Summary No. 6
September 17 through September 23, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the sixth weekly summary for the construction of the City of Key West deep injection well system. The reporting period for this weekly summary is September 17 through September 23, 1999.. There was no construction activity at the site during this reporting period. The Contractor spent the week mobilizing equipment to the site and rigging up to begin construction of the deep injection well.

It is anticipated that mobilization and rigging up for drilling the deep injection well will continue throughout next week.

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: September 29, 1999

SUBJECT: Weekly Summary No. 7
September 24 through September 30, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the seventh weekly summary for the construction of the City of Key West deep injection well system. The reporting period for this weekly summary is September 24 through September 30, 1999.. There was no construction activity at the site during this reporting period. The Contractor spent the week mobilizing equipment to the site and rigging up to begin construction of the deep injection well.

It is anticipated that construction of the deep injection well will begin next week.

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West, Steve Anderson/SFWMD, Ron Reese/USGS, Ken Williams/CH2M HILL, Jack Myers/FDEP, Joe Haberfeld/FDEP, Nancy Marsh/USEPA, Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: September 17, 1999

SUBJECT: Weekly Summary No. 8
October 1 through October 7, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the eighth weekly summary for the construction of the City of Key West deep injection well system. The reporting period for this weekly summary is October 1 through October 7, 1999. The first part of the week was spent rigging up to begin construction of Exploratory Well EW-1. Prior to beginning drilling of EW-1, monitor well SZ-1, shallow disposal well DSP-1, and the pad monitor wells were sampled for conductivity, pH, chloride, temperature, and water level. Laboratory results for the samples collected from SZ-1 and DSP-1 are not yet available and will be included in the next weekly summary. Laboratory results for the pad monitor wells are attached. Pilot hole drilling of EW-1, using a 12-1/4 inch drill bit, began on October 6, 1999 and had reached a depth of 300 feet below pad level (bpl) by the end of the reporting period. The mud rotary drilling technique was used during pilot hole drilling. Salt was not used in the well and no fluids were disposed of down the shallow disposal well during this week. A summary description of the formation encountered during pilot hole drilling is provided below.

0 – 40 feet bpl	Limestone, coarse grained, high porosity, moderately consolidated
40 – 70 feet bpl	Limestone, fine grained, low porosity, well consolidated
70 – 140 feet bpl	Limestone, medium grained, moderate porosity, moderately consolidated
140 – 300 feet bpl	Limestone, fine grained, low porosity, phosphatic, moderately consolidated

It is anticipated that the pilot hole of EW-1 will be geophysically logged and reamed next week. The 52-inch casing of EW-1 is also anticipated to be installed next week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Pad Monitor Wells Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: September 17, 1999

SUBJECT: Weekly Summary No. 9
October 8 through October 14, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the ninth weekly summary for the construction of the City of Key West deep injection well system. The reporting period for this weekly summary is October 8 through October 14, 1999. The week was spent conducting geophysical logging of the 300-foot pilot hole of Exploratory Well EW-1 and reaming the pilot hole in preparation for the installation of the 52-inch diameter casing. Geophysical logs conducted include caliper, gamma ray, dual-induction, and spontaneous potential. Copies of the geophysical logs are attached Reaming of the pilot hole began following completion of geophysical logging and had reached a depth of 243 feet below pad level (bpl) before work stopped due to equipment problems and severe weather related to Hurricane Irene.

Laboratory results from background sampling at SZ-1 and shallow disposal well DSP-1 conducted during the previous reporting period are attached. The pad monitor wells and SZ-1 were sampled during the week, however, as a result of Hurricane Irene, the laboratory results are not yet available. Several Engineer's and Driller's daily reports are missing from this weekly summary as a result of the evacuation of the construction site due to Hurricane Irene. The missing daily reports and water quality data from the pad monitor wells and SZ-1 will be included in the next weekly summary.

Salt was not used in the well and no fluids were disposed of down the shallow disposal well during this week. There were no unusual construction related events during the reporting period.

It is anticipated that reaming of the pilot hole of EW-1 will be completed and the 52-inch casing will be installed next week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data
Geophysical Logs

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: October 22, 1999

SUBJECT: Weekly Summary No. 10
October 15 through October 21, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the tenth weekly summary for the construction of the City of Key West deep injection well system. The reporting period for this weekly summary is October 15 through October 21, 1999. There was no construction activity at the site on October 15 through 17 due to Hurricane Irene. The remainder of week was spent completing reaming of the pilot hole to 260 feet below pad level (bpl), conducting a caliper log of the reamed hole, and installing the 52-inch casing to a depth of 246 feet bpl. The 52-inch casing was cemented in place following installation of the casing. A temperature log was performed after the first stage of cementing. Copies of the reamed hole caliper and the temperature log are attached. Several Engineer's and Driller's daily reports missing from the previous weekly summary are also attached. It was determined this week that the geolograph was not operating properly last week and the reported reaming depth of 243 feet bpl was inaccurate. The actual reaming depth achieved last week was 178 feet bpl.

Salt was not used in the well and no fluids were disposed of down the shallow disposal well during this week. There were no unusual construction related events during the reporting period.

It is anticipated that pilot hole drilling of the base of the 52-inch casing to 1,200 feet bpl will begin next week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data
Geophysical Logs

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: October 29, 1999

SUBJECT: Weekly Summary No. 11
October 22 through October 28, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the eleventh weekly summary for the construction of the City of Key West deep injection well system. The reporting period for this weekly summary is October 22 through October 28, 1999. There was no construction activity at the site on Saturday and Sunday, October 23 and 24. The remainder of reporting period was spent drilling pilot hole over the interval from 241 to1,211 feet below pad level (bpl), conducting geophysical logs, and straddle packer testing the intervals from 845 to 895 feet bpl and 1,070 to 1,120 feet bpl. Geophysical logs conducted on the pilot hole include caliper, gamma ray, spontaneous potential, long and short normal electric, temperature, fluid resistivity, dual induction, and sonic. Copies of the geophysical logs are attached. Field water quality measurements from both intervals which underwent straddle packer testing indicate the test intervals are not located within an Underground Source of Drinking Water. A description of drill cuttings from pilot hole drilling will be included with the casing seat recommendation for the 42-inch casing, which will be sent to you in the next few days.

Salt was not used in the well and no fluids were disposed of down the shallow disposal well during this week. There were no unusual construction related events during the reporting period.

It is anticipated that the pilot hole will be backplugged with cement and then drilled to a nominal 50-inch diameter week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data
Geophysical Logs

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: November 8, 1999

SUBJECT: Weekly Summary No. 12
October 29 through November 4, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twelfth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is October 29 through November 4, 1999. Work was conducted at the Exploratory Well (EW-1) and the cistern well (USGS well no. MO-117) during the reporting period. Work conducted at EW-1 included straddle packer testing the interval from 680 to 730 feet below pad level (bpl), backplugging the pilot hole to 235 feet bpl, and drilling a nominal 52-inch diameter hole to a depth of 1,081 feet bpl. The cistern well was backplugged to a depth of 381 feet bpl. Field water quality measurements from the straddle packer test interval indicates the test interval is not located within an Underground Source of Drinking Water.

Salt was not used in the well and approximately 12,000 gallons of formation water produced during straddle packer testing were disposed of down the shallow disposal well during this week. There were no unusual construction related events during the reporting period.

It is anticipated that the nominal 52-inch diameter hole will be completed to approximately 1,200 feet bpl and the 42-inch casing will be installed and cemented in place at EW-1 next week. Backplugging of the cistern well to approximately 320 feet below the floor of the cistern will also be completed next week.

Attachments: Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: November 19, 1999

SUBJECT: Weekly Summary No. 13
November 5 through November 11, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the thirteenth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is November 5 through November 11, 1999. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The nominal 52-inch diameter hole was completed to a depth of 1,095 feet below pad level (bpl) and caliper logged. The 42-inch diameter casing was then installed to a depth of 1,090 feet bpl and pressure grouted in place (first cement stage). A temperature log was conducted approximately 8 hours after the first cement stage. While installing cement tubing in preparation to complete cementing the 42-inch casing to surface, it was determined that the formation had collapsed against the casing, preventing the Contractor from installing the cement tubing to the top of cement. The cement plug at the bottom of the 42-inch casing was then drilled out with a 38.5-inch diameter drill bit to a depth of 1,091 feet bpl and a pressure test was successfully conducted to demonstrate that a complete cement seal had been established at the base of the 42-inch diameter casing. The remainder of the week was spent jetting the collapsed formation from the borehole-casing annulus in preparation for cementing the 42-inch casing to surface. Copies of the geophysical logs conducted during the week are attached.

Salt was not used in the well and water was not disposed of down the shallow disposal well during this week.

It is anticipated that the borehole-casing annulus will be jetted free of formation material and the 42-inch diameter casing will be cemented to surface next week. The remainder of the week will be used to rig up for reverse air drilling.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data
Geophysical Logs

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: November 19, 1999

SUBJECT: Weekly Summary No. 14
November 12 through November 18, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the fourteenth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is November 12 through November 18, 1999. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent completing cementing the 42-inch diameter casing to surface, rigging up for reverse-air drilling, and drilling pilot hole from the base of the 42-inch casing to a depth of 1,704 feet below pad level (bpl). The lithology over the interval from 1,200 to 1,704 feet bpl is soft limestone with infrequent thin beds of hard limestone.

Salt was not used in the well and a total of 811,000 gallons of water were disposed of down the shallow disposal well during this week.

It is anticipated that several cores will be collected during pilot hole drilling next week. It the pilot hole drilling is completed next week, geophysical logging of the pilot hole will be conducted.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West, Steve Anderson/SFWMD, Ron Reese/USGS, Ken Williams/CH2M HILL, Jack Myers/FDEP, Joe Haberfeld/FDEP, Nancy Marsh/USEPA, Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: November 29, 1999

SUBJECT: Weekly Summary No. 15
November 19 through November 25, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the fifteenth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is November 19 through November 25, 1999. Work did not take place on November 25, 1999 in observance of the Thanksgiving holiday. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent pilot hole drilling and collecting cores. Pilot hole drilling reached a depth of 2,045 feet below pad level (bpl) by the end of the reporting period. The intervals from 1,920 to 1,935, 1,949 to 1,964, 1,973 to 1,988, 2,000 to 2,015, and 2,045 to 2,065 feet bpl underwent coring. Core recovery ranged from 0-66%. The lithology over the interval from 1,704 to 2,045 feet bpl is soft limestone with infrequent thin beds of hard limestone.

Salt was not used in the well and a total of 695,100 gallons of water were disposed of down the shallow disposal well during this week.

It is anticipated that several more cores will be collected during pilot hole drilling next week. If the pilot hole drilling is completed next week, geophysical logging of the pilot hole will be conducted.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: December 6, 1999

SUBJECT: Weekly Summary No. 16
November 26 through December 2, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the sixteenth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is November 26 through December 2, 1999. Work did not take place on November 26 through November 28, 1999 in observance of the Thanksgiving holiday weekend. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent pilot hole drilling and collecting cores. Pilot hole drilling reached a depth of 2,420 feet below pad level (bpl) by the end of the reporting period. The intervals from 2,140 to 2,155, 2,200 to 2,217, 2,217 to 2,232, 2,300 to 2,315, 2,340 to 2,355, 2,355 to 2,365, 2,390 to 2,400, and 2,401 to 2,411 feet bpl underwent coring. Core recovery ranged from 0-100%. The lithology over the interval from 2,045 to 2,420 feet bpl is soft limestone with beds of hard micritic limestone.

Salt was not used in the well and a total of 569,900 gallons of water were disposed of down the shallow disposal well during this week.

It is anticipated that several more cores will be collected during pilot hole drilling next week. If the pilot hole drilling is completed next week, geophysical logging of the pilot hole will be conducted.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: December 13, 1999

SUBJECT: Weekly Summary No. 17
December 3 through December 9, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the seventeenth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is December 3 through December 9, 1999. Work did not take place on the weekend (December 4 and 5, 1999). Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent pilot hole drilling and collecting cores. Pilot hole drilling reached a depth of 2,495 feet below pad level (bpl) by the end of the reporting period. The intervals from 2,420 to 2,430, 2,460 to 2,470, and 2,484 to 2,495 feet bpl underwent coring. Core recovery ranged from 0-75%. The hydraulic pump on the drill rig broke down on December 6, 1999 and the remainder of the week was spent making repairs to the pump. The lithology over the interval from 2,420 to 2,495 feet bpl is soft limestone with beds of hard micritic limestone.

Salt was not used in the well and a total of 89,300 gallons of water were disposed of down the shallow disposal well during this week.

It is anticipated that at least one more core will be collected during pilot hole drilling next week. If the pilot hole drilling is completed next week, geophysical logging of the pilot hole will be conducted.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: December 17, 1999

SUBJECT: Weekly Summary No. 18
December 10 through December 16, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the eighteenth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is December 10 through December 16, 1999. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent pilot hole drilling, collecting cores, and conducting geophysical logging on the pilot hole. Pilot hole drilling was completed to a depth of 3,004 feet below pad level (bpl) by the end of the reporting period. The intervals from 2,535 to 2,545, and 2,764 to 2,774 feet bpl underwent coring. Core recovery ranged from 20-100%. The pilot hole underwent geophysical logging on December 15 and 16, 1999. Logs performed on the pilot hole include caliper, gamma ray, spontaneous potential, dual induction, sonic, temperature, fluid resistivity, and long short normal electric. The contractor elected to perform a borehole televiewer over the interval from 1,900 to 3,000 feet bpl. Copies of the geophysical logs are not yet available for distribution, however, will be included with the next weekly summary or the final casing seat recommendation. The lithology over the interval from 2,495 to 3,000 feet bpl is soft limestone with beds of hard micritic limestone and dolomite.

Salt was not used in the well and a total of 1,050,400 gallons of water were disposed of down the shallow disposal well during this week.

It is anticipated that packer testing of the pilot hole will be conducted next week.

Attachments: Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

a

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: December 23, 1999

SUBJECT: Weekly Summary No. 19
December 17 through December 23, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the nineteenth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is December 17 through December 23, 1999. There was no construction at the site during the reporting period. Copies of the geophysical logs performed during the previous week are attached. Water quality data from sampling of the pad monitor wells and monitor well SZ-1 are not yet available. These data will be reported in the next weekly summary.

Salt was not used in the well and no water was disposed of down the shallow disposal well during this week.

It is anticipated that packer testing of the pilot hole will be conducted next week.

Attachments: Geophysical Logs

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: January 3, 1999

SUBJECT: Weekly Summary No. 20
December 24 through December 30, 1999

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twentieth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is December 24 through December 30, 1999. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent conducting packer testing on the intervals from 1,374 to 1,387, 2,018 to 2,030, 2,404 to 2,417, 2,513 to 2,526, and 2,767 to 2,780 feet below pad level.

Salt was not used in the well and no water was disposed of down the shallow disposal well during this week.

It is anticipated that a video survey of the pilot hole will be conducted next week prior to backplugging the pilot hole.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: January 7, 1999

SUBJECT: Weekly Summary No. 21
December 31, 1999 through January 6, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twenty-first weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is December 31, 1999 through January 6, 2000. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent performing a video survey of the open borehole from the base of the 42-inch casing at 1,090 feet below pad level (bpl) to the total depth of the well at 3,000 feet bpl, installing a drillable bridge plug at a depth of 2,790 feet bpl and backplugging the pilot hole with cement. Backplugging of the pilot hole had reached a depth of 2,753 feet bpl by the end of the reporting period. Verbal approval to set the 24-inch diameter casing to a depth of 2,775 feet bpl was received from FDEP on January 4, 2000.

Salt was not used in the well and no water was disposed of down the shallow disposal well during this week.

Backplugging of the pilot hole up to 1,090 feet bpl should be completed and drilling of the 34-inch diameter hole should begin next week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: January 17, 1999

SUBJECT: Weekly Summary No. 22
January 7 through January 13, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twenty-second weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is January 7 through January 13, 2000. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent completing backplugging of the pilot hole with cement to inside the 42-inch diameter casing and drilling the nominal 34-inch diameter hole to a depth of 1,695 feet below pad level (bpl).

Salt was not used in the well and 1,486,000 gallons of water were disposed of down the shallow disposal well during this week.

Completion of drilling the 34-inch diameter hole and installation of the 24-inch diameter casing are anticipated to occur next week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: January 24, 1999

SUBJECT: Weekly Summary No. 23
January 14 through January 20, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twenty-third weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is January 14 through January 20, 2000. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent completing the drilling of the nominal 34-inch diameter hole to a depth of 2,778 feet below pad level (bpl) and installing the 24-inch casing to a depth of 2,775 feet bpl. A caliper log of the nominal 34-inch diameter hole was performed prior to installing the 24-inch casing. Copies of the caliper log are attached for your records.

Salt was not used in the well and 2,143,300 gallons of water were disposed of down the shallow disposal well during this week.

It is anticipated that the 24-inch casing will be cemented in place next week. Cement bond logging and a casing pressure test may also take place next week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data
Geophysical Logs

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: January 31, 2000

SUBJECT: Weekly Summary No. 24
January 21 through January 27, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twenty-fourth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is January 21 through January 27, 2000. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent cementing the 24-inch diameter casing in place to a depth of 300 feet below pad level (bpl), rigging up for reaming, and reaming the open hole interval to a nominal 24-inch diameter. Reaming had reached a depth of 2,792 feet bpl by the end of the reporting period.

Salt was not used in the well and 280,700 gallons of water were disposed of down the shallow disposal well during this week.

It is anticipated that reaming of the open hole interval will be completed and cement bond logging will take place next week. The 24-inch casing may also undergo pressure testing next week.

Attachments: Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: February 7, 2000

SUBJECT: Weekly Summary No. 25
January 28 through February 3, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twenty-fifth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is January 28 through February 3, 2000. Work was conducted at the Exploratory Well (EW-1) during the reporting period. The week was spent completing the reaming of the open hole interval to a nominal 24-inch diameter to a depth of 3,000 feet below pad level (bpl) and performing a cement bond log (CBL) and video survey of the well. A copy of the CBL is attached. The 24-inch casing was cemented in place from 300 feet bpl to land surface following completion of the CBL. An inflatable packer was installed to a depth of 2,765 feet bpl in preparation for pressure testing the casing next week.

Salt was not used in the well and 1,457,000 gallons of water were disposed of down the shallow disposal well during this week.

It is anticipated that the 24-inch casing will undergo pressure testing and the Contractor will mobilize to the dual-zone monitor well next week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data
CBL

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: February 14, 2000

SUBJECT: Weekly Summary No. 26
February 4 through February 10, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twenty-sixth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is February 4 through February 10, 2000. Work was conducted at the Exploratory Well (EW-1) during the reporting period. Most of the week was spent mobilizing the drilling rig and pad to the location of the dual zone monitor well (DZ-1). A pressure test was successfully performed on the final casing string of EW-1. The pressure test was conducted with a starting pressure of 150 psi and an ending pressure of 155 psi at the end of the 2 hour monitoring period. The pressure test was witnessed by Ms. Nancy Brooking (FDEP).

Salt was not used in the well and water was not disposed of down the shallow disposal well during this week.

It is anticipated that drilling of DZ-1 will begin next week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: February 21, 2000

SUBJECT: Weekly Summary No. 27
February 11 through February 17, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twenty-seventh weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is February 11 through February 17, 2000. Work was conducted at the Dual-Zone Monitor Well (DZ-1) during the reporting period. The week was spent drilling the pilot hole from land surface to a depth of 328 feet below pad level (bpl), conducting geophysical logs on the pilot hole, and reaming the pilot hole to a depth of 258 feet bpl in preparation for installing the 26-inch casing. Geophysical logs performed on the pilot hole include caliper, gamma ray, spontaneous potential, and long-short normal electric (LSN).

Salt was not used in the well and water was not disposed of down the shallow disposal well during this week.

It is anticipated that a caliper log will be performed on the reamed hole and the 26-inch casing will be installed and cemented in place next week. Pilot hole drilling will then resume.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data
Geophysical Logs

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: February 28, 2000

SUBJECT: Weekly Summary No. 28
February 18 through February 24, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twenty-eighth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is February 18 through February 24, 2000. Work was conducted at the Dual-Zone Monitor Well (DZ-1) during the reporting period. The week was spent performing a caliper log on the reamed hole prior to installing the 26-inch casing to a depth of 248 feet below pad level (bpl). A pilot hole was then drilled to 758 feet bpl and geophysically logged. Logs performed include caliper, gamma ray, spontaneous potential, and long-short normal electric (LSN). The intervals from 629 to 681 and 675 to 727 feet bpl underwent straddle packer testing prior to reaming the pilot hole to a nominal 26-inch diameter to a depth of 680 feet bpl in preparation for performing a caliper log and installation of the 16-inch diameter casing to a depth of 675 feet bpl. The casing was then cemented to land surface. Copies of the pilot hole geophysical logs were provided in the 16-inch casing seat request. Copies of the reamed hole calipers are not yet available and will be provided with the next weekly summary.

Salt was not used in the well and water was not disposed of down the shallow disposal well during this week.

It is anticipated that the pilot hole will be drilled to a depth of 1,400 feet bpl next week. A core will be collected during pilot hole drilling. The pilot hole will then be geophysically logged and reamed next week in preparation for installing the final casing of DZ-1.

Attachments: Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West, Steve Anderson/SFWMD, Ron Reese/USGS, Ken Williams/CH2M HILL, Jack Myers/FDEP, Joe Haberfeld/FDEP, Nancy Marsh/USEPA, Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: March 6, 2000

SUBJECT: Weekly Summary No. 29
February 25 through March 2, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the twenty-ninth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is February 25 through March 2, 2000. Work was conducted at the Dual-Zone Monitor Well (DZ-1) during the reporting period. During this week the pilot hole was drilled to a depth of 1,400 feet below pad level (bpl). The interval from 777 to 792 feet bpl underwent coring during pilot hole drilling. The completed pilot hole underwent geophysical logging on February 29, 2000. Logs performed include caliper, gamma ray, spontaneous potential, long-short normal electric (LSN), temperature, and fluid resistivity. Copies of the pilot hole logs, lithologic log, and pilot hole water quality data were provided with the final casing seat recommendation submitted to the TAC of March 2, 2000. The interval from 1,279 to 1,320 feet bpl underwent straddle packer testing prior to reaming the pilot hole to a nominal 16-inch diameter to a depth of 1,400 feet bpl. The reamed hole then underwent caliper logging. Copies of the reamed hole caliper and the reamed hole caliper log performed last week are attached. Verbal approval of the final casing seat recommendation was received from Jack Myers (FDEP) on March 2, 2000.

Salt was not used in the well and 282,500 gallons of water were disposed of down the shallow disposal well during this week.

It is anticipated that the 6-5/8 inch diameter casing will be installed to a depth of 1,280 feet bpl and the interval from 1,320 to 1,400 feet bpl will be backplugged with cement to provide a lower monitoring zone from 1,280 to 1,320 feet bpl next week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Geophysical Logs
Water Quality Data

a

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West
Steve Anderson/SFWMD
Ron Reese/USGS
Ken Williams/CH2M HILL
Jack Myers/FDEP
Joe Haberfeld/FDEP
Nancy Marsh/USEPA
Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: March 13, 2000

SUBJECT: Weekly Summary No. 30
March 3 through March 9, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the thirtieth weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is March 3 through March 9, 2000. Work was conducted at the Dual-Zone Monitor Well (DZ-1) during the reporting period. The 6-5/8 inch diameter final casing of DZ-1 was installed to a depth of 1,280 feet below pad level (bpl) and cemented to a depth of 724 feet bpl this week. The resulting monitor well has an upper monitor zone from 675 to 724 feet bpl.

Salt was not used in the well and water was not disposed of down the shallow disposal well during this week.

It is anticipated that the interval from 1,320 to 1,400 feet bpl will be backplugged with cement and the exploratory well will undergo radioactive tracer testing next week.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Water Quality Data

MEMORANDUM

CH2MHILL

TO: David Fernandez/City of Key West, Steve Anderson/SFWMD, Ron Reese/USGS, Ken Williams/CH2M HILL, Jack Myers/FDEP, Joe Haberfeld/FDEP, Nancy Marsh/USEPA, Mark Schilling/CH2M HILL

FROM: David McNabb/CH2M HILL

DATE: March 20, 2000

SUBJECT: Weekly Summary No. 31
March 10 through March 16, 2000

PROJECT: ***City of Key West Deep Injection System***
FDEP UIC Permit Number 1286300-0001-UC

Summary of Engineer's/Driller's Log

This is the thirty-first weekly summary for the construction of the City of Key West exploratory well project. The reporting period for this weekly summary is March 10 through March 16, 2000. Work was conducted at the Exploratory Well (EW-1) and Dual-Zone Monitor Well (DZ-1) during the reporting period. A Radioactive Tracer Survey (RTS) was performed on EW-1 on March 15, 2000. The RTS was witnessed by Jack Myers (FDEP) and Joe Haberfeld (FDEP). The final casing of DZ-1 underwent pressure testing on that same day. The casing pressure decreased from 101.75 psi to 99.75 psi during the 2 hour test. The interval from 1,321 to 1,400 feet below pad level (bpl) at DZ-1 was backplugged with cement, resulting in a lower monitor zone of 1,280 to 1,321 feet bpl. DZ-1 also underwent video logging and cement bond logging. Copies of the logs are not yet available and will be included as part of the engineering report. There were no Driller's Daily Reports generated this week since no well drilling took place. The Driller has spent the week demobilizing from the site.

Salt was not used in the well and water was not disposed of down the shallow disposal well during this week.

Drilling of EW-1 and the associated monitor wells is now complete. Only surface work remains to be completed.

Attachments: Engineer's Daily Reports
Water Quality Data

APPENDIX D

Summary of Casing Setting Depths and Cement Quantities

Richard A. Heyman Environmental Protection Facility
Exploratory Well EW-1
Summary of Casing Setting Depths and Cement Quantities

Casing	Casing Material	Outside Diameter (inches)	Inside Diameter (inches)	Casing Thickness (inches)	Casing Depth (feet bpl)	Date	Cement Stage	Type of Cement	Quantity of Cement (sacks)	Remarks
Surface	Steel	61.88	61.00	0.438	24	7/16/99	NA	NA	NA	Surface casing vibrated in place.
Shallow	Steel	52.00	51.25	0.375	246	10/20/99	#1	neat	1352	Pressure grout from bottom of casing
						10/21/99	#2	neat	410	Tremied into annulus from 88 feet bpl
Intermediate	Steel	42.00	41.25	0.375	1090	11/7/99	#1	neat	1038	Pressure grout from bottom of casing
								4% bentonite	757	
						11/12/99	#2	12% bentonite	1902	Tremied into annulus from 775 feet bpl
Final	Steel	24.00	23.00	0.500	2775	1/21/00	#1	neat	954	Pressure grout from bottom of casing
						1/22/00	#2	neat	617	Tremied into annulus from 2,711 feet bpl
						1/22/00	#3	4% bentonite	1403	Tremied into annulus from 2,555 feet bpl
						1/22/00	#4	4% bentonite	1403	Tremied into annulus from 2,230 feet bpl
						1/23/00	#5	4% bentonite	1122	Tremied into annulus from 1,955 feet bpl
						1/23/00	#6	4% bentonite	1403	Tremied into annulus from 1,750 feet bpl
						1/24/00	#7	4% bentonite	1403	Tremied into annulus from 1,492 feet bpl
						1/24/00	#8	4% bentonite	1823	Tremied into annulus from 1,324 feet bpl
						1/24/00	#9	4% bentonite	1902	Tremied into annulus from 977 feet bpl
						1/25/00	#10	4% bentonite	2137	Tremied into annulus from 667 feet bpl
						2/4/00	#11	4% bentonite	1722	Tremied into annulus from 297 feet bpl
									14318	
								Total Neat:	**4371**	
								Total 4%:	**15075**	
								Total 12%:	**1902**	

bpl = below pad level

Richard A. Heyman Environmental Protection Facility
Dual-Zone Monitor Well DZ-1
Summary of Casing Setting Depths and Cement Quantities

Casing	Casing Material	Outside Diameter (inches)	Inside Diameter (inches)	Casing Thickness (inches)	Casing Depth (feet bpl)	Date	Cement Stage	Type of Cement	Quantity of Cement (cubit ft)	Remarks
Surface	Steel	34.00	33.25	0.375	40	7/16/99	NA	NA	NA	Surface casing vibrated in place.
Shallow	Steel	26.00	25.25	0.375	248	2/18/00	#1	neat	835	Pressure grout from bottom of casing
Intermediate	Steel	16.00	15.25	0.375	675	2/23/00	#1	neat	561	Pressure grout from bottom of casing
								4% bentonite	522	
							#2	neat	84	Tremied into annulus from 43 feet bpl
Final	FRP	6.85	5.44	0.710	1280	3/7/00	#1	neat	269	Pressure grout from bottom of casing
						3/7/00	#2	neat	174	Tremied into annulus from 1,150 feet bpl
						3/7/00	#3	4% bentonite	421	Tremied into annulus from 1,014 feet bpl
						3/8/00	#4	4% bentonite	252	Tremied into annulus from 878 feet bpl
						3/8/00	#5	4% bentonite	84	Tremied into annulus from 790 feet bpl
								Total Neat:	**1923**	
								Total 12%:	**1279**	

bpl = below pad level

Richard A. Heyman Environmental Protection Facility
Single-Zone Monitor Well SZ-1
Summary of Casing Setting Depths and Cement Quantities

Casing	Casing Material	Outside Diameter (inches)	Inside Diameter (inches)	Casing Thickness (inches)	Casing Depth (feet bpl)	Date	Cement Stage	Type of Cement	Quantity of Cement (cubit ft)	Remarks
Surface	Steel	16.00	15.25	0.375	47	7/16/99	NA	NA	NA	Surface casing vibrated in place.
Final	FRP	6.85	5.44	0.710	165	9/7/99	#1	neat	94	Pressure grout from bottom of casing
						9/8/99	#2	12% bentonite	101	Tremied into annulus from 130 feet bpl
						9/9/99	#3	12% bentonite	101	Tremied into annulus from 98 feet bpl
						9/9/99	#4	neat	24	Tremied into annulus from 69 feet bpl
						9/10/99	#5	neat	44	Tremied into annulus from 42 feet bpl
								Total Neat:	**162**	
								Total 12%:	**202**	

bpl = below pad level

Richard A. Heyman Environmental Protection Facility
Shallow Disposal Well DSP-1
Summary of Casing Setting Depths and Cement Quantities

Casing	Casing Material	Outside Diameter (inches)	Inside Diameter (inches)	Casing Thickness (inches)	Casing Depth (feet bpl)	Date	Cement Stage	Type of Cement	Quantity of Cement (cubit ft)	Remarks
Surface	Steel	24.00	23.25	0.375	43	7/16/99	NA	NA	NA	Surface casing vibrated in place.
Final	Steel	12.75	0.38	12.000	60	9/11/99	#1	neat	60	Pressure grout from bottom of casing
						9/13/99	#2	neat	59	Tremied into annulus from 21 feet bpl
								Total Neat:	**119**	

bpl = below pad level

File: Cement_summary.xls

APPENDIX E

EW-1, DZ-1 and SZ-1 Casing Mill Certificates

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF 1645751 ONTARIO LIMITED
289 HORNER AVENUE
ETOBICOKE, ONTARIO,
CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE July 12/99

CUSTOMER

SPECIFICATION A139B

CUSTOMER'S P.O

DIA. & WALL 12 3/4 x 375 24 x 375
16 x 375, 61 7/8 x 438

PHOENIX REF.#

HYDROTEST 620 PSI FOR 2Min.

PHYSICAL PROPERTIES

SIZE	PIPE NO.	LONGITUDINAL TEST YIELD	TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
12 3/4X375		78100	89100	37.5	92200	PM
16 x 375		46000	75900	37.5	79300	PM
24 x 375		47800	78200	37.5	81300	PM
> 61 7/8 x 438		64400	82200	30.0	85200	PM

LADLE ANALYSIS **CHEMICAL COMPOSITION**

SIZE	C	MN	S	P	SI	CR	NI	CU	MO	AL
12 3/4x375	.07	1.23	.005	.010	.046	.02	.01	.02	.007	.026
16x375	.18	1.06	.006	.008	.24	.03	.01	.02	.02	.036
24 x 375	.19	1.09	.006	.009	.24	.02	.01	.01	.01	.031
> 61 7/8x438	.19	1.08	.011	.013	.24	.02		.01		.039

The material listed on this report has been tested in accordance with the specification shown above.

Authorized Approval

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF 1045781 ONTARIO LIMITED
288 HORNER AVENUE
ETOBICOKE, ONTARIO,
CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Aug 7/99

CUSTOMER

SPECIFICATION A1398

CUSTOMER'S P.O 6165

DIA. & WALL 52" O.D. X .500 WT

PHOENIX REF.# 99-3466

HYDROTEST 540 PSI FOR 10 Sec.

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST YIELD	TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
111606	3	54700	73800	37.5	77100	PM

LADLE ANALYSIS

CHEMICAL COMPOSITION

HEAT NO	C	MN	S	P	SI	CR	NI	CU	MO	AL
111606	.21	.99	.010	.010	.032	.01	.05	.18	.015	.038

The material listed on this report has been tested in accordance with the specification shown above.

Authorized Approval

YOUNGQUIST BROTHERS, INC.
Has reviewed this Shop Drawing/Submittal
YBI / Section No. # 02674-04A
Transmittal No. # Date: 10/20
Signature

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF TENARIS CANADA LIMITED
239 HORNER AVENUE
ETOBICOKE, ONTARIO,
CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Aug 9/99

CUSTOMER

SPECIFICATION A139B

CUSTOMER'S P.O 6165

DIA. & WALL 42" O.D. X .500 WT

PHOENIX REF.# 99-3466A

HYDROTEST 670 PSI FOR 10 Sec.

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST YIELD	TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
111607	12	63000	73900	35	77900	PM
111394	3	70200	74400	33.5	76900	PM

LADLE ANALYSIS CHEMICAL COMPOSITION

HEAT NO	C	MN	S	P	SI	CR	NI	CU	MO	AL
111607	.22	1.00	.010	.010	.22	.09	.06	.14	.016	.039
111394	.20	.99	.005	.008	.032	.08	.05	.17	.014	.043

The material listed on this report has been tested in accordance with the specification shown above.

Authorized Approval

[illegible] ASSOCIATES INC

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF 1065761 ONTARIO LIMITED
289 HORNER AVENUE
ETOBICOKE, ONTARIO,
CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Aug 10/99

CUSTOMER

SPECIFICATION A1398

CUSTOMER'S P.O 6165

DIA. & WALL 42" O.D. X .500 WT

PHOENIX REF.# 99-3466A

HYDROTEST 670 PSI FOR 10 Sec.

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST YIELD	TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
111606	1	54800	73700	37.5	76900	PM
111395	15	70700	74300	30.0	78000	PM

LADLE ANALYSIS CHEMICAL COMPOSITION

HEAT NO	C	MN	S	P	SI	CR	NI	CU	MO	AL
111606	.21	.99	.010	.010	.032	.10	.05	.18	.015	.038
111335	.22	1.01	.005	.007	.034	.07	.05	.13	.014	.042

The material listed on this report has been tested in accordance with the specification shown above.

Authorized Approval

YOUNGQUIST BROTHERS, INC.
Has reviewed this Shop Drawing/Submittal
YBI / Section No. # 02674-05A
Transmittal No. # Date: 10/20
Signature

U. S. STEEL GROUP
A division of USX Corporation

TUBULAR PRODUCTS
CERTIFIED TEST REPORT
(TYPE B - IN ACCORDANCE WITH ISO 10474 / EN10204 / DIN50049)

DATE: 09/28/
TIME: 06:19:58

USX™
USS, USX, USX are trademarks of USX Corporation

MILL ORDER/ITEM NO.	SHIPPER'S NO.	P.O. NUMBER	VEHICLE I.D.	
0R01945 01	R39630	47011976	LT8391	

SOLD TO ADDRESS	MAIL TO ADDRESS	VENDOR
		USS TUBULAR PRODUCTS 2199 EAST 28TH ST. LORAIN, OH 44055

SPECIFICATION AND GRADE

PIPE CARBON SMLS STD PIPE API 5L-*41ST EDITION DTD 4/1/95 GRADE B AND GRADE X42 ASTM A53-*98 ASTM A106-*97A GRADE B QUAD STENCIL ASME SA53-*1998 EDITION 1998 ADDENDUM ASME SA106-*1998 EDITION 1998 ADDENDUM GRADE B BLK BARE PE BEV 30 DEG MEETING ALL THE APPLICABLE REQUIREMENTS OF NACE STANDARD MR-01-75

MATERIAL COND: AS ROLLED

O.D.: 24.000(609.600) in (mm) WALL: 0.500 (12.700) in (mm)

PRODUCT IDENTIFICATION	TENSILE TEST TYPE / ORIENTATION	TEST COND	GAUGE WIDTH IN	YIELD PSI	EXT % .50	TENSILE PSI	Y/T	ELONG % (IN 2")	HARDNESS SCALE: HRB	MIN HYDRO PSI	SHELL (SEC)
				MIN: 42000 MAX		MIN: 60000 MAX	MAX:	MIN: 29.5	MIN: MAX 100.0	1500	5
AB2895	STRIP/T/B	AR	1.500	49700	.50	81000	0.62	40.0	B 83.0	1580	5
AB2900	STRIP/T/B	AR	1.500	48000	.50	81000	0.60	42.0	B 85.7	1580	5
		** END OF DATA THIS SHEET **									

LEGEND: L - LONGITUDINAL, U - UPSET; T - TRANSVERSE, N - NORMALIZED; QT - QUENCHED & TEMPERED, SR - STRESS RELIEVED; AR - AS ROLLED, AQ - AS QUENCHED; B - BODY; W - WELD

PRODUCT IDENTIFICATION	TYPE		C	MN	P	S	SI	CU	NI	CR	MO	AL	N	V	B	TI	CB	CO				C.E.*
																						MAX .50
AB2895	HEAT		23	90	013	005	25	02	02	07	01	031		003			001					.40
AB2895	PROD		24	90	012	004	26	02	02	07	01	032		000			001					.41
AB2895	PROD		24	90	012	004	25	02	02	07	01	035		000			001					.41
AB2900	HEAT		24	92	011	004	26	02	02	06	01	026		003			001					.42
AB2900	PROD		24	90	011	002	24	02	02	06	01	028		000			001					.41
AB2900	PROD		25	91	011	003	25	02	02	06	01	032		001			001					.42
			** END OF DATA THIS SHEET **																			

*C.E. IS BASED ON THE FOLLOWING EQUATION(S): C.E.=C+(MN/6)+(CR+MO+V)/5+(NI+CU)/15

JAN 06 '00 12:35PM VASS PIPE

U. S. STEEL GROUP
A division of USX Corporation

TUBULAR PRODUCTS
CERTIFIED TEST REPORT
(TYPE B - IN ACCORDANCE WITH ISO 10474 / EN10204 / DIN50049)

DATE: 09/28/99
TIME: 06:19:35

USX

USS, USX, USX are trademarks of USX Corporation

MILL ORDER/ITEM NO.	SHIPPERS NO.	P.O. NUMBER	
DR01945 01	R39630	47011976	0014569

MATERIAL COND: AS ROLLED

OD: 24.000(609.600) in (mm) WALL: 0.500 (12.700) in (mm)

PRODUCT IDENTIFICATION	FLAT	BEND	GRAIN SIZE	MIN COLLAPSE	CHARPY V-NOTCH IMPACT TESTING											
					ORI	TEST LOC.	TEMP	SIZE	TEST COND.	FT-LBS 1	FT-LBS 2	FT-LBS 3	FT-LBS AVG	% SHEAR 1	% SHEAR 2	% SHEAR 3	% SHEAR AVG
							DEG										
A82895	OK																
A82900	OK																
			** END OF DATA		THIS	SHEET	**										

LEGEND: L - LONGITUDINAL T - TRANSVERSE B - BODY W - WELD HAZ - HEAT AFFECTED ZONE

TESTING / INSPECTION INFORMATION

TEST / INSPECTION	YES	RESULTS / COMMENTS
FULL LENGTH VISUAL	X	
FULL LENGTH EMI	X	OD X ODID ____ L X L/T 10.0% NOTCH
FULL LENGTH MPI		
FULL LENGTH UT		OD ____ ODID ____ L ____ L/T ____
END AREA INSPECTION (PLAIN END)		MPI ____ UT ____
SPECIAL END AREA (SEA) INSP.		MPI ____ UT ____
FULL LENGTH DRIFT		DRIFT MANDREL SIZE:

ADDITIONAL NOTES/COMMENTS

ALL MELTING AND MANUFACTURING TOOK PLACE IN THE USA. NO REPAIRS BY WELDING. NO MERCURY OR MERCURY COMPOUNDS ARE ADDED TO THE STEEL AND ALL MERCURY BEARING EQUIPMENT IS PROTECTED BY A DOUBLE BOUNDARY OF CONTAINMENT.

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

PREPARED BY THE OFFICE OF: J. NIKULSKI MGR. MET. & Q.A. USS TUBULAR PRODUCTS

DATE 09/28/99

Dalmine
PLANT:
DALMINE

INSPECTION CERTIFICATE
(UNI EN 10204 3.1.B)

N. 99/18263
Page 1

CUSTOMER'S ORDER P.O. n. D6794

MILL ORDER / ITEM 1903671/010
EXP REFERENCE c/17026SH8296 CARDIGAN
BL 1 USA

PRODUCT SEAMLESS STEEL PIPES FOR HIGH TEMPERATURE SERVICE TO ASTM A 106,ASME SA 106 ASTM ASME A/SA 53 API 5L AND NACE MR 01.75 STEEL GRADE B/C ASTM/ASME SA 106 GRX42 API 5L C. 0,22% MAX E. EQ. 0,4% MAX, BLACK INSIDE, OILED OUTSIDE, BEVELLED ENDS TO API.

DIMENSIONS:	SCH	Lg. From	Lg. To	O.D. mm	O.D.Inch	W.T. mm	W.T.Inch
	XS	11000	12800	609.600	24"	12,700	0,500 0000

SHIPPING NOTE : E1200972
QUANTITY : Nr 9

TEST N. L1397 HEAT N. 994795

TENSION TEST + 20,0°C
TEST SPEC. : LONGITUDINAL WIDTH 25,00 THICK. 13,00 SECTION 325,0 mm2

YIELD POINT 0,5% (KSI	): requir min	42		result 48,4
TENSILE STRENGTH (KSI	): requir min	70		result 74,8
ELONGATION	: CALIBRATED ON 2"		50,0 mm	
	(%): requir.min	27,0		
HARDNESS HRC	requ.	max 22,0	result	47,0
HARDNESS HRB	requ.	max 100,0	result	0,0

TECHNOLOGICAL TESTS PERFORMED WITH SATISFACTORY RESULTS: 82,6
FLATTENING TEST : TEST PERFORMED AT ONE END OF 1 PIPE OF THE LOT

TEST N. L1397/10 HEAT N. 994795

TENSION TEST + 20,0°C
TEST SPEC. : LONGITUDINAL WIDTH 25,20 THICK. 12,90 SECTION 325,1 mm2

YIELD POINT 0,5% (KSI	): requir min	42		result 48,8
TENSILE STRENGTH (KSI	): requir min	70		result 75,0
ELONGATION	: CALIBRATED ON 2"		50,0 mm	
	(%): requir.min	27,0		
HARDNESS HRC	requ.	max 22,0	result	46,0
HARDNESS HRB	requ.	max 100,0	result	0,0

TECHNOLOGICAL TESTS PERFORMED WITH SATISFACTORY RESULTS: 82,8
FLATTENING TEST : TEST PERFORMED AT ONE END OF 1 PIPE OF THE LOT

TEST N. L1397/20 HEAT N. 994795

TENSION TEST + 20,0°C
TEST SPEC. : TRANSVERSAL WIDTH 37,60 THICK. 13,00 SECTION 488,8 mm2

YIELD POINT 0,5% (KSI	): requir min	42		result 49,0
TENSILE STRENGTH (KSI	): requir min	70		result 74,4
ELONGATION	: CALIBRATED ON 2"		50,8 mm	
	(%): requir.min	29,5		
				result 44,7

CHIEF OF QUALITY
CERTIFICATION DPT
Marco BELLOLI

QUALITY
SERVICE MANAGER
Angelo CIANCIOSI

Dalmine
PLANT:
DALMINE

INSPECTION CERTIFICATE
(UNI EN 10204 3.1.B)

N. 99/18263
Page 2

HARDNESS HRC requ. max 22,0 result 0,0
HARDNESS HRB requ. max 100,0 result 82,1

TEST N. L1399 HEAT N. 994796

TENSION TEST + 20,0°C
TEST SPEC. : LONGITUDINAL WIDTH 25,00 THICK. 12,90 SECTION 322,5 mm2
YIELD POINT 0,5% (KSI): requir min 42 result 47,6
TENSILE STRENGTH (KSI): requir min 70 result 75,8
ELONGATION : CALIBRATED ON 2" 50,0 mm
(%): requir.min 27,0 result 46,0
HARDNESS HRC requ. max 22,0 result 0,0
HARDNESS HRB requ. max 100,0 result 83,0
TECHNOLOGICAL TESTS PERFORMED WITH SATISFACTORY RESULTS:
FLATTENING TEST : TEST PERFORMED AT ONE END OF 1 PIPE OF THE LOT

TEST N. L1399/10 HEAT N. 994796

TENSION TEST + 20,0°C
TEST SPEC. : LONGITUDINAL WIDTH 25,10 THICK. 12,90 SECTION 323,8 mm2
YIELD POINT 0,5% (KSI): requir min 42 result 48,2
TENSILE STRENGTH (KSI): requir min 70 result 74,6
ELONGATION : CALIBRATED ON 2" 50,0 mm
(%): requir.min 27,0 result 47,0
HARDNESS HRC requ. max 22,0 result 0,0
HARDNESS HRB requ. max 100,0 result 82,4
TECHNOLOGICAL TESTS PERFORMED WITH SATISFACTORY RESULTS:
FLATTENING TEST : TEST PERFORMED AT ONE END OF 1 PIPE OF THE LOT

TEST N. L1399/20 HEAT N. 994796

TENSION TEST + 20,0°C
TEST SPEC. : TRANSVERSAL WIDTH 37,80 THICK. 13,00 SECTION 491,4 mm2
YIELD POINT 0,5% (KSI): requir min 42 result 48,9
TENSILE STRENGTH (KSI): requir min 70 result 75,3
ELONGATION : CALIBRATED ON 2" 50,8 mm
(%): requir.min 29,5 result 45,7
HARDNESS HRC requ. max 22,0 result 0,0
HARDNESS HRB requ. max 100,0 result 82,5

HEAT N. 994795

HEAT ANALYSIS %

C	0,13	Mn	1,05	Si	0,24	P	0,010	S	0,002	Cu	0,11
Ni	0,07	Cr	0,09	Mo	0,03	V	0,06				

(V +Ni+Cr+Mo+Cu)= 0,363
CARBON EQUIVALENT : L.F. (C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15) 0,35

CHIEF OF QUALITY
CERTIFICATION DPT
Marco BELLOLI

QUALITY
SERVICE MANAGER
Angelo CIANCIOSI

Dalmine PLANT: DALMINE	INSPECTION CERTIFICATE (UNI EN 10204 3.1.B)	N. 99/18263 Page 3

PRODUCT ANALYSIS %

C	0,15	Mn	1,04	Si	0,25	P	0,010	S	0,004	Cu 0,09
Ni	0,08	Cr	0,11	Mo	0,03	V	0,06			
(V +Ni+Cr+Mo+Cu)=				0,367						
CARBON EQUIVALENT				: L.F. (C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15)						0,37

TEST N. L1397

PRODUCT ANALYSIS %

C	0,15	Mn	1,03	Si	0,24	P	0,010	S	0,004	Cu 0,09
Ni	0,08	Cr	0,11	Mo	0,03	V	0,06			
(V +Ni+Cr+Mo+Cu)=				0,367						
CARBON EQUIVALENT				: L.F. (C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15)						0,37

TEST N. L1398

HEAT N. 994796

HEAT ANALYSIS %

C	0,14	Mn	1,05	Si	0,26	P	0,011	S	0,003	Cu 0,12
Ni	0,08	Cr	0,12	Mo	0,03	V	0,06			
(V +Ni+Cr+Mo+Cu)=				0,414						
CARBON EQUIVALENT				: L.F. (C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15)						0,37

PRODUCT ANALYSIS %

C	0,15	Mn	1,04	Si	0,24	P	0,009	S	0,004	Cu 0,09
Ni	0,08	Cr	0,11	Mo	0,03	V	0,06			
(V +Ni+Cr+Mo+Cu)=				0,367						
CARBON EQUIVALENT				: L.F. (C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15)						0,37

TEST N. L1399

PRODUCT ANALYSIS %

C	0,15	Mn	1,04	Si	0,24	P	0,010	S	0,004	Cu 0,09
Ni	0,08	Cr	0,11	Mo	0,03	V	0,06			
(V +Ni+Cr+Mo+Cu)=				0,368						
CARBON EQUIVALENT				: L.F. (C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15)						0,37

TEST N. L1400

LEAK-TIGHTNESS TEST PERFORMED WITH SATISFACTORY RESULTS BY
HYDRAULIC TEST PRESSURE 1600,0 PSI FOR 5 Sec

VISUAL AND DIMENSIONAL CONTROL HAS BEEN CARRIED OUT WITH SATISFACTORY RESULT

STEEL IS FULLY KILLED AND PRODUCED BY ELECTRIC FURNACE

REMARKS:

WE HEREBY DECLARE THE TUBES ARE ACCORDING TO ASTM A 106/97a A 53/97
ASME SA 106 /53/98 API 5L 95 - STEEL GR. B/C AND X42
" AT NO TIME DURING THE MANUFACTURE OF THIS REFERENCED PIPE WERE ANY
WELDING PROCEDURES PERFORMED "
HARDNESS DOES NOT EXCEED HRC 22, ACCORDING TO NACE MR-01-75 Ed.95.
"MATERIALS MERCURY FREE"
WE CERTIFY THAT OUR MATERIALS ARE FREE FROM OZONE.
DEPLETING CHEMICALS AND FULLY COMPLY IN ALL RESPECTS TO THE PACKAGE
REQUIREMENTS FOR HEAVY METALS OF THE CONEG MODEL LEGISLATION.

CHIEF OF QUALITY
CERTIFICATION DPT
Marco BELLOLI

QUALITY
SERVICE MANAGER
Angelo CIANCIOSI

Dalmine PLANT: DALMINE	INSPECTION CERTIFICATE (UNI EN 10204 3.1.B)	N. 99/18263 Page 4

* CERTIFIED FACTORY UNI EN ISO 9001: I.G.Q. Nr. 8603 *

CHIEF OF QUALITY
CERTIFICATION DPT
Marco BELLOLI

QUALITY
SERVICE MANAGER

Dalmine PLANT: DALMINE	INSPECTION CERTIFICATE (UNI EN 10204 3.1.B)	N. 99/15971 Page 1

CUSTOMER'S ORDER #D6609 SH8281 JONAS

MILL ORDER / ITEM 1903476/012 BL 1
EXP REFERENCE c/16965

PRODUCT SEAMLESS STEEL PIPES FOR HIGH TEMPERATURE SERVICE TO ASTM A 106,ASME SA 106 ASTM ASME A/SA 53 API 5L AND MACE MR 01.75 STEEL GRADE B/C ASTM/ASME SA 106 GRX42 API 5L C. 0,22% MAX E. EQ. 0,4% MAX, BLACK INSIDE, OILED OUTSIDE, BEVELLED ENDS TO API.

DIMENSIONS:	SCH	Lg. From	Lg. To	O.D. mm	O.D.Inch	W.T. mm	W.T.Inch
	XS	11600	12800	609,600	24"	12,700	0,500

SHIPPING NOTE : E1200773 DATE 24/09/1999
QUANTITY : Nr 20 Mt 244,58 Kg 47024 Pt 802' 5" Lbs 103670

TEST N. L0110 HEAT N. 994025

TENSION TEST + 20,0°C
TEST SPEC. : LONGITUDINAL WIDTH 25,10 THICK. 13,00 SECTION 326,3 mm2

YIELD POINT 0,5% (KSI):	requir min	42	result	48,6
TENSILE STRENGTH (KSI):	requir min	70	result	73,0
ELONGATION	: CALIBRATED ON 2"	50,0 mm		
(%):	requir.min	27,5	result	46,0
HARDNESS HRC requ.	max	22,0 result	0,0	
HARDNESS HRB requ.	max	100,0 result	81,0	

TECHNOLOGICAL TESTS PERFORMED WITH SATISFACTORY RESULTS:
FLATTENING TEST : TEST PERFORMED AT ONE END OF 1 PIPE OF THE LOT

TEST N. L0110/10 HEAT N. 994025

TENSION TEST + 20,0°C
TEST SPEC. : LONGITUDINAL WIDTH 25,00 THICK. 13,00 SECTION 325,0 mm2

YIELD POINT 0,5% (KSI):	requir min	42	result	47,5
TENSILE STRENGTH (KSI):	requir min	70	result	74,5
ELONGATION	: CALIBRATED ON 2"	50,0 mm		
(%):	requir.min	27,5	result	46,0
HARDNESS HRC requ.	max	22,0 result	0,0	
HARDNESS HRB requ.	max	100,0 result	82,3	

TECHNOLOGICAL TESTS PERFORMED WITH SATISFACTORY RESULTS:
FLATTENING TEST : TEST PERFORMED AT ONE END OF 1 PIPE OF THE LOT

TEST N. L0110/20 HEAT N. 994025

TENSION TEST + 20,0°C
TEST SPEC. : TRANSVERSAL WIDTH 38,00 THICK. 13,10 SECTION 497,8 mm2

YIELD POINT 0,5% (KSI):	requir min	42	result	47,9
TENSILE STRENGTH (KSI):	requir min	70	result	73,1
ELONGATION	: CALIBRATED ON 2"	50,8 mm		
(%):	requir.min	29,5	result	45,7

DATE	CHIEF OF QUALITY CERTIFICATION DPT	QUALITY SERVICE MANAGER
27/09/1999	Marco BELLOLI	Angelo CIANCIOSI

Cont'd

Follows

Dalmine PLANT: DALMINE	INSPECTION CERTIFICATE (UNI EN 10204 3.1.B)	N. 99/15971 Page 2

HARDNESS HRC requ. max 22,0 result 0,0
HARDNESS HRB requ. max 100,0 result 81,2

HEAT N. 994025

HEAT ANALYSIS %

C	0,12	Mn	1,08	Si	0,25	P	0,009	S	0,004	Cu	0,13
Ni	0,09	Cr	0,08	Mo	0,04	V	0,07				

(V +Ni+Cr+Mo+Cu)= 0,405
CARBON EQUIVALENT : L.P. (C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15) 0,35

PRODUCT ANALYSIS % TEST N. L0110

C	0,13	Mn	1,07	Si	0,24	P	0,010	S	0,007	Cu	0,12
Ni	0,09	Cr	0,08	Mo	0,04	V	0,06				

(V +Ni+Cr+Mo+Cu)= 0,388
CARBON EQUIVALENT : L.P. (C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15) 0,36

PRODUCT ANALYSIS % TEST N. L0111

C	0,13	Mn	1,07	Si	0,24	P	0,010	S	0,007	Cu	0,12
Ni	0,09	Cr	0,08	Mo	0,04	V	0,06				

(V +Ni+Cr+Mo+Cu)= 0,387
CARBON EQUIVALENT : L.P. (C+Mn/6+(Cr+Mo+V)/5+(Ni+Cu)/15) 0,36

LEAK-TIGHTNESS TEST PERFORMED WITH SATISFACTORY RESULTS BY HYDRAULIC TEST PRESSURE 1600,0 PSI FOR 5 Sec

VISUAL AND DIMENSIONAL CONTROL HAS BEEN CARRIED OUT WITH SATISFACTORY RESULT

STEEL IS FULLY KILLED AND PRODUCED BY ELECTRIC FURNACE

REMARKS:

WE HEREBY DECLARE THE TUBES ARE ACCORDING TO ASTM A 106/97a A 53/97 ASME SA 106 /53/98 API 5L 95 - STEEL GR. B/C AND X42
" AT NO TIME DURING THE MANUFACTURE OF THIS REFERENCED PIPE WERE ANY WELDING PROCEDURES PERFORMED "
HARDNESS DOES NOT EXCEED HRC 22, ACCORDING TO NACE MR-01-75 Ed.95.
"MATERIALS MERCURY FREE"
WE CERTIFY THAT OUR MATERIALS ARE FREE FROM OZONE.
DEPLETING CHEMICALS AND FULLY COMPLY IN ALL RESPECTS TO THE PACKAGE REQUIREMENTS FOR HEAVY METALS OF THE CONEG MODEL LEGISLATION.

* CERTIFIED FACTORY UNI EN ISO 9001: I.G.Q. Nr. 8603 *

DATE	CHIEF OF QUALITY CERTIFICATION DPT	QUALITY SERVICE MANAGER
27/09/1999	Marco BELLOLI	Angelo CIANCIOSI

End

Dalmine PLANT: DALMINE	INSPECTION CERTIFICATE	N. 99/15971 Page 1

CUSTOMER'S ORDER #D6609

MILL ORDER / ITEM 1903476/012
EXP REFERENCE c/16965

PRODUCT SEAMLESS STEEL PIPES FOR HIGH TEMPERATURE SERVICE TO ASTM A 106,ASME SA 106 ASTM ASME A/SA 53 API 5L AND NACE MR 01.75 STEEL GRADE B/C ASTM/ASME SA 106 GRX42 API 5L C. 0,22% MAX C. EQ. 0,4% MAX, BLACK INSIDE, OILED OUTSIDE, BEVELLED ENDS TO API.

DIMENSIONS:	SCH	Lg. From	Lg. To	O.D. mm	O.D.Inch	W.T. mm	W.T.Inch
	XS	11600	12800	609,600	24"	12,700	0,500

SHIPPING NOTE : EL200773 DATE 24/09/1999
QUANTITY : Nr 20 Mt 244,58 Kg 47024 Ft 802' 5" Lbs 103670

REMARKS:
P.O. T3831-99 STOCK

D A T E	CHIEF OF QUALITY CERTIFICATION DPT	QUALITY SERVICE MANAGER
27/09/1999	Marco BELLOLI	Angelo CIANCIOSI

End

DZ-1

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF 1045761 ONTARIO LIMITED
289 HORNER AVENUE
ETOBICOKE, ONTARIO,
CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Nov 25/98

CUSTOMER

SPECIFICATION A139B

CUSTOMER'S P.O 6020

DIA. & WALL 34" O.D. X .375 WT

PHOENIX REF.# 98-3413A

HYDROTEST 620 PSI FOR 2 Min.

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST YIELD	TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
109276	4	51400	74600	37.5	78800	PM
108255	1	57100	72100	34.0	75600	PM
108423	18	55200	75400	37.5	78600	PM

LADLE ANALYSIS CHEMICAL COMPOSITION

HEAT NO	C	MN	S	P	SI	CR	NI	CU	MO	Al
109276	.20	.96	.006	.007	.041	.06	.05	.12	.011	.035
108255	.20	.99	.012	.018	.037	.11	.07	.14	.018	.041
108423	.21	.99	.011	.010	.036	.14	.06	.07	.013	.033

The material listed on this report has been tested in accordance with the specification shown above.

M. Plaskamus

Authorized Approval

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF [illegible] ONTARIO LIMITED
289 HORNER AVENUE
ETOBICOKE, ONTARIO,
CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Aug. 10/99

CUSTOMER

SPECIFICATION A1398

CUSTOMER'S P.O. 6165

DIA. & WALL 26" O.D. X .500 WT

PHOENIX REF.# 99-3466B

HYDROTEST 1075 PSI FOR 10 Sec

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST YIELD	TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
111609	2	56100	72800	31.0	76100	PM

LADLE ANALYSIS CHEMICAL COMPOSITION

HEAT NO	C	MN	S	P	SI	CR	NI	CU	MO	AL
111609	.21	.98	.009	.011	.036	.10	.06	.13	.020	.036

The material listed on this report has been tested in accordance with the specification shown above.

Authorized Approval

YOUNGQUIST BROTHERS, INC.
Has reviewed this Shop Drawing/Submittal
YBI / Section No. # 02.74-08A
Transmittal No. #
Date: 10/29/99
Signature

증명서번호 CERTIFICATE NO. B-9808-0017

발행년월일 DATE OF ISSUE 98.09.02

주문번호 FILE-NO. BE9808002

계약번호 PURCHASE ORDER NO DLA-983/16

품명 COMMODITY E.R.W. STEEL PIPE

적용규격 SPECIFICATION ASTM A53 GR.B/API 5LB.

수요자 CUSTOMER VASS

취급상사 SHIPPER

검사증명서
INSPECTION CERTIFICATE

동부제강주식회사
DONGBU STEEL CO., LTD
- HEAD OFFICE : KYUNGAM BLDG. 157-27 SAMSUNG-DONG, KANGNAM-GU SEOUL, 135-090 KOREA
- INCHEON WORKS : 590-1, KAJWA-DONG SEO-KU, INCHEON 403-251, KOREA
- SEOUL WORKS : 123, ORYU-DONG, GURO-GU, SEOUL 152-102, KOREA
- BUSAN WORKS : 725-4, HAKJANG-DONG, BUK-GU, BUSAN 616-020, KOREA

ITEM NO.	관종 TYPE	주문치수 ORDER SIZE	량 QUANTITY 본수 PIECES	총길이 TOTAL LENGTH	중량 kg WEIGHT	수압시험 HYDROSTATIC TEST MPa PSI, kg/㎠	비파괴시험 N.D.T E C S T	U T	S T	기계시험 M.T F T	L T	B T	W T/D	제강번호 HEAT NO.	인장시험 TENSILE TEST 항복강도 Y.S or Y.P N/㎟, PSI, kg/㎟	인장강도 T.S	연신율 EL %	충격 IMPACT TEST joule	경도 HARDNESS	화학성분 CHEMICAL COMPOSITION % C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	아연도금시험 ZINC COATING TEST 부착량 WGT OZ/㎡	Cu 침지 IMMERSION	감량률 WEIGHT LOSS	도복장 COATING or ASPHALT COATING 두께 THICKNESS IN	OUT	검사 INSP.
																				× 100		× 1000												
1	BBE	6"XSCH.40X42'	189		68,380	1780 G	G	G	G	G	G	G	G	A40574	44.802	68.554	37			15	1	67	17	6										
2	BBE	8"XSCH.40X42'	59		32,137	1570 G	G	G	G	G	G	G	G	A65949	45.513	67.558	36			16	1	69	15	4										
3	BBE	10"X0.365"X42'	57		43,993	1430 G	G	G	G	G	G	G	G	A66696	42.953	68.269	39			18	1	76	12	9										
4	BBE	12"X0.375"X42'	105		99,173	1240 G	G	G	G	G	G	G	G	A63115	45.655	68.127	38			16	1	78	15	9										
5	BBE					1240 G	G	G	G	G	G	G	G	A66860	45.939	68.411	39			17	1	75	16	8										
6	BBE	14"X0.375"X42'	21		21,844	980 G	G	G	G	G	G	G	G	B62919	44.233	68.554	39			17	1	76	16	8										
7	BBE	16"X0.375"X42'	113		134,786	660 G	G	G	G	G	G	G	G	B63683	46.651	67.131	39			18	2	74	16	8										
8	BBE	16"X0.250"X42'	20		16,038	580 G	G	G	G	G	G	G	G	A43072	42.810	64.571	39			15	1	68	19	7										
9	BBE	18"X0.250"X42'	63		56,939	660 G	G	G	G	G	G	G	G	A38114	39.824	64.002	38			15	1	66	18	8										
10	BBE	20"X0.250"X42'	59		59,330	660 G	G	G	G	G	G	G	G	A36422	42.953	68.554	40			17	1	74	15	7										
11	BBE					660 G	G	G	G	G	G	G	G	A35448	47.219	65.709	39			14	1	61	18	8										
12	BBE					660 G	G	G	G	G	G	G	G	A39569	47.362	67.700	40			15	2	69	17	10										
13	BBE	18"X0.375"X42'	67		90,236	880 G	G	G	G	G	G	G	G	A38841	44.802	67.985	38			16	1	71	17	7										
14	BBE	20"X0.375"X42'	131		196,264	790 G	G	G	G	G	G	G	G	A38173	44.802	66.136	38			17	1	76	15	9										
15	BBE	16"X0.500"X42'	42		66,297	1310 G	G	G	G	G	G	G	G	ZH3068	43.095	66.420	39			16	1	69	16	5										
16	BBE	18"X0.500"X42'	30		53,466	1170 G	G	G	G	G	G	G	G	A38841	44.802	67.985	38			16	1	71	17	7										
17	BBE	20"X0.500"X42'	39		77,446	1050 G	G	G	G	G	G	G	G	A30556	41.957	71.540	36			19	1	86	14	7										
18	BBE					1050 G	G	G	G	G	G	G	G	A41150	45.086	69.691	38			14	1	65	15	9										
		*** TOTAL ***	995		1,016,329																													

LAST PAGE

*G : GOOD
FLT : FLATTENING
BND : BENDING
W.D : WELD DUCTILITY (용접부연성)
W.D.Z : WEIGHT OF ZINC
C.S : COPPER SALPHATE (황산동침적, DIPS)
UNIF : UNIFORMITY (균일성)
ALK : ALKALIMITY
P.D : PINHOLE DETECTOR
S.I.T : SALT IMMERSION TEST (1HOUR)

STANDARD	MIN	35,000	60,000	#		
	MAX				26	1154050

비고 REMARKS #1:24.5,2:27.0, 3-6:28.0,7-12:26.0, 13,14:28.0, 15-18:29.5

상기 강관은 지정된 규격의 시험을 행하여 합격하였음을 증명합니다.
We hereby certify that the material herein has been made and tested in accordance with the above specification and also with the requirements called for by the above order.

Surveyor to.

검 사 증 명 서 (A)
MILL INSPECTION CERTIFICATE

현 대 강 관 주 식 회 사
HYUNDAI PIPE CO., LTD.
• 본사 · 공장: 울산광역시 동구 염포동 265번지 (681-040)
ULSAN PLANT: #265, YUMPO-DONG, DONG-KU, ULSAN METROPOLITAN, KOREA
TEL:(052)287-2101~9 FAX:(052)287-8916
TLX:HDPIPE K 53776

*서울사무소 서울특별시 중구 무교동 77번지 (100-170)
SEOUL OFFICE : #77, MUKYO-DONG, JUNG-KU, SEOUL, KOREA
TEL : 773-0522 FAX : 775-7095
TLX : HDPIPE K 24656, K 22956

성적서번호 CERTIFICATE NO : E-8-05-445 페이지 PAGE : 1
발행일자 DATE OF ISSUE : MAY. 23. 1998. E4810302
계약번호 CONTRACT(P/O)NO :
품명 COMMODITY : E.R.W. STEEL PIPE
제품규격 SPECIFICATION : API 5LB/ASTM A53B
수요가 CUSTOMER :

(※6–※13: 0 : GOOD)

관종 TYPE OF PIPE END ※1	※2	치수 DIMENSION 외경 × 두께 × 길이 (OUTDIA. × THICK. × LENGTH) ※3 ※4	수량 QUANTITY (PCS)	중량 WEIGHT (KG)	수압시험 HYDROSTATIC TEST Mpa kg/cm² PSI	※5	※6 VISUAL & DIMENSION TEST	※7 FLATTENING (B) TEST	※8 WELD DUCTILITY TEST	※9 N.D.T.	※10 DRIFT TEST	※11 FLARING TEST	※12 CRUSH TEST	※13 R-FLATTENING TEST	도막시험 COATING TEST: 아연부착량 WEIGHT OF ZINC COAT g/m² OZ/Ft²	균일성 DIP TEST Times	※5		재강번호 HEAT NO.	항복강도 YIELD STRENGTH	인장강도 TENSILE STRENGTH B ※14	W ※15	연신율 ELONGATION %	※16	C ×100	Si ×100	Mn ×100	P ×1000	S ×1000	Cu ×100	Ni ×100	Cr ×100	Mo ×100	V ×100	충격시험 IMPACT ENERGY JOULE	SHEAR VALUE %	비고 REMARK
																				kg/mm² / PSI	kg/mm² / PSI	kg/mm² / N/mm²															
BPEB	OD	16" x .375" x42.000' (406.4mm x 9.53mm x 12.802M)	146	173,781	60 / 980	G	G	G	G	G									A34612	29.8 / 42400	46.9 / 66700	49.8 / 70800	41		17	1	80	17	9	5	1	1	1	Tr			
																			A34722	30.5 / 43400	47.8 / 68000	50.2 / 71400	38		17	1	78	20	7	6	1	2	1	Tr			
BPEB	OD	16" x .500" x42.000' (406.4mm x12.70mm x 12.802M)	44	69,448	92 / 1310	G	G	G	G	G								✓	A33975	32.0 / 45500	49.1 / 69800	52.4 / 74500	34		17	2	71	15	8	6	1	1	1	Tr			
																		✓	A33078	30.3 / 43100	48.3 / 68700	51.5 / 73300	42		17	1	75	17	9	6	1	2	1	Tr			
																		✓	A34612	29.8 / 42400	46.9 / 66700	49.8 / 70800	41		17	1	80	17	9	5	1	1	1	Tr			
BPEB	OD	18" x .375" x42.000' (457.0mm x 9.53mm x 12.802M)	32	42,954	62 / 880	G	G	G	G	G									A35022	31.3 / 44500	49.1 / 69300	52.3 / 74400	38		17	2	73	12	9	6	1	2	1	Tr			
BPEB	OD	18" x .500" x42.000' (457.0mm x12.70mm x 12.802M)	7	12,469	82 / 1170	G	G	G	G	G									A35100	30.6 / 43500	48.8 / 89400	52.1 / 74100	41		18	1	77	20	10	6	1	2	1	Tr			
		TOTAL ->	220	208,652																																	

참고—NOTES ※1 Type of pipe End 관종

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

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

본 제품은 관련규격에 합격되었음을 보증합니다.

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

△ HYUNDAI PIPE CO., LTD.

SURVEYOR

H. G. Lee
INSPECTION MANAGER

HPS-B 301-019-QLT (350 × 280)

FLM-005-7

PROCARSA, S.A. DE C.V.

CERTIFICADO DE CALIDAD DE PRUEBAS FISICAS-QUIMICAS

QUALITY CERTIFICATE OF TEST PHYSICALS-CHEMICAL

CLIENTE: / CUSTOMER:

PEDIDO CLIENTE /P.O. A 1450

PEDIDO INTERNO / I.O.

PARTIDA (S) / ITEMS XY578-I

NUMERO / NUMBER PTM-280-98

FECHA / DATE MARZO 31, 1998

DIAMETRO / DIAMETER 16"

ESPESOR DE PARED / WALL THICKNESS 0.500"

GRADO / GRADE API 5L X-42

PRESION HIDROSTATICA: / HIDROSTATIC TEST: 2230 PSI

TENSILE TEST

ANALISIS QUIMICO % EN PESO

CHEMICAL ANALYSES PERCENT WEIGHT

NUM. PROBETA	COLADA	LIMITE ELASTICO YIELD STRENGTH (P.S.I.)	ULTIMA TENSION TENSILE STRENGTH (P.S.I.)	% ELONG. 2"	LRR/LT Y.S/T.S	C	Mn	P	S	Cb	V	Ti	Si	Cu	Al	Ca	Cr	Ni	Mo	N	Ceq
25-5 Tc	281539	46 414	67 144	42	0 69	0 15	0.93	0.019	0.008	–	–	–	0 172	0.012	0.039	0.0024	0 014	0 022	–	–	
Ts			72 965																		
17-9 Tc	281541	53 461	67 870	36	0.78	0.148	0.98	0.020	0.005	–	–	–	0 165	0 016	0.037	0.0032	0.017	0.022	–	–	
Ts			74 084																		
11-7 Tc	281542	47 425	64 769	42	0.73	0 142	0.96	0 015	0 006	–	–	–	0 186	0.011	0.051	0.0027	0.013	0.023	–	–	
Ts			71 951																		
6-5 Tc	281537	54 216	70 147	41	0.77	0 157	0.95	0 018	0 009	–	–	–	0.178	0.013	0.037	0.0016	0 014	0.023	–	–	
Ts			73 350																		

CERTIFICAMOS QUE LA TUBERIA AQUÍ DESCRITA CUMPLE Y HA SIDO FABRICADA, MUESTREADA, PROBADA E INSPECCIONADA DE ACUERDO CON LOS REQUISITOS APLICABLES DE LA ESPECIFICACION:

WE CERTIFY THE PIPE ABOVE MENTIONED ACCOMPLISH AND HAS BEEN MANUFACTURED, SAMPLED, TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF SPECIFICATIONS:

API 5L

ING. FERNANDO OSORIO PEREZ
GERENTE DE ASEGURAMIENTO DE CALIDAD

FLM-005-7

PROCARSA, S.A. DE C.V.

CERTIFICADO DE CALIDAD DE PRUEBAS FISICAS-QUIMICAS

QUALITY CERTIFICATE OF TEST PHYSICALS-CHEMICAL

CLIENTE:
CUSTOMER:

NUMERO / NUMBER: PTM-311-98

PEDIDO CLIENTE /P.O. A 1450
PEDIDO INTERNO / I.O.
PARTIDA (S) XY578-4
ITEMS

FECHA / DATE: ABRIL 6, 1998

METRO / METER: 16"

ESPESOR DE PARED / WALL THICKNESS: 0.500"

GRADO / GRADE: API 5L X-42

PRESION HIDROSTATICA: / HIDROSTATIC TEST: 2,230 PSI

TENSILE TEST

ANALISIS QUIMICO % EN PESO
CHEMICAL ANALYSES PERCENT WEIGHT

M.PROBETA / DESCRIPTION	COLADA / HEAT	LIMITE ELASTICO / YIELD STRENGTH (P.S.I.)	ULTIMA TENSION / TENSILE STRENGTH (P.S.I.)	% ELONG. 2"	LEQ.T Y.S/T.S	C	Mn	P	S	Cb	V	Ti	Si	Cu	Al	Cn	Cr	Ni	Mo	N	Ceq
10-5 Tc	281540	52516	67096	42	0.78	0.144	0.91	0.019	0.006	--	--	--	0.184	0.013	0.053	0.0034	0.024	0.023	--	--	--
Ts			72 158																		

IFICAMOS QUE LA TUBERIA AQUÍ DESCRITA CUMPLE Y HA SIDO ICADA, MUESTREADA, PROBADA E INSPECCIONADA DE ACUERDO LOS REQUISITOS APLICABLES DE LA ESPECIFICACION:

WE CERTIFY THE PIPE ABOVE MENTIONED ACCOMPLISH AND HAS BEEN MANUFACTURED, SAMPLED, TESTED AND INSPECTED IN ACCORDANCE WITH APPLICABLE REQUIREMENTS OF SPECIFICATIONS:

API 5L

ING. FERNANDO OSORIO PEREZ
GERENTE DE ASEGURAMIENTO DE CALIDAD
QUALITY ASSURANCE MANAGER

ESTE CERTIFICADO ES COMPLEMENTO DEL PTM-280-98

TUBULAR FIBERGLASS CORPORATION
11811 Proctor Road • Houston, Texas 77038
Phone: (281) 847-2987 • Fax: (281) 847-1931
Email: tfc@tubularfiberglass.com
website: www.tubularfiberglass.com

ISO 9001 CERTIFIED FIRM

API 15HR Q1

INSPECTION CERTIFICATE
No. 99059-001

Dec 27, 1999

Purchaser: Youngquist Brothers, Inc.
Fort Myers, Florida

Purchase Order No.: 20574
TFC Job No.: 5673.0

Product: 6-5/8" RED BOX 2500 fiberglass
a/ downhole tubing
b/ downhole tubing w/roughcoat exterior

Terms: F.O.B. factory
Houston, Texas

Quantity: a/ 1,080 linear feet (36 joints @ 30 ft. each)
b/ 720 linear feet (24 joints @ 30 ft. each)

Raw Materials:

Glass fiber:	E-type (Vetrotex CertainTeed)
Resin:	Epoxy (Shell Chemical)
Curing Agent:	Aromatic Amine (Quadrant Chemical)

Nominal Dimensions:

Outside Diameter:	6.85 inches
Inside Diameter:	5.44 inches
Wall Thickness:	0.71 inches
Weight:	11.2 lbs/ft
Thread:	6-5/8" 8Rd LTC, IJ

Mechanical Performance Ratings:

Internal Pressure:	2,500 psi
Axial Tension:	73,600 psi
Axial Tension (min):	30,000 lbs
Temperature:	200 deg.F

We hereby certify that the materials described above have been tested and that they comply with the terms of the Purchase Order.

QUALITY CONTROL
APPROVED
DATE 12/27/99 BY
TUBULAR FIBERGLASS CORPORATION

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF 1645761 ONTARIO LIMITED
289 HORNER AVENUE
ETOBICOKE, ONTARIO,
CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE July 12/99

CUSTOMER

SPECIFICATION A139B

CUSTOMER'S P.O

DIA. & WALL 12 3/4 x 375 24 x 375 16 x 375, 61 7/8 x 438

PHOENIX REF.#

HYDROTEST 620 PSI FOR 2Min.

PHYSICAL PROPERTIES

SIZE	PIPE NO.	LONGITUDINAL TEST YIELD	TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
12 3/4X375		78100	89100	37.5	92200	PM
16 x 375		46000	75900	37.5	79300	PM
x 375		47800	78200	37.5	81300	PM
61 7/8 x 438		64400	82200	30.0	85200	PM

LADLE ANALYSIS **CHEMICAL COMPOSITION**

SIZE	C	MN	S	P	SI	CR	NI	CU	MO	AL
123/4x375	.07	1.23	.005	.010	.046	.02	.01	.02	.007	.026
16x375	.18	1.06	.006	.008	.24	.03	.01	.02	.02	.036
24 x 375	.19	1.09	.006	.009	.24	.02	.01	.01	.01	.031
1 7/8x438	.19	1.08	.011	.013	.24	.02		.01		.039

The material listed on this report has been tested in accordance with the specification shown above.

Authorized Approval

TUBULAR FIBERGLASS CORPORATION
11811 Proctor Road • Houston, Texas 77038
Phone: (281) 847-2987 • Fax: (281) 847-1931
Email: tfc@tubularfiberglass.com
website: www.tubularfiberglass.com

ISO 9001 CERTIFIED FIRM

LSHR Q1

INSPECTION CERTIFICATE
No. 99059-001

Dec 27, 1999

Purchaser: Youngquist Brothers, Inc.
Fort Myers, Florida

Purchase Order No.: 20574
TFC Job No.: 5673.0

Product: 6-5/8" RED BOX 2500 fiberglass
a/ downhole tubing
b/ downhole tubing w/roughcoat exterior

Terms: F.O.B. factory
Houston, Texas

Quantity: a/ 1,080 linear feet (36 joints @ 30 ft. each)
b/ 720 linear feet (24 joints @ 30 ft. each)

Raw Materials:

Glass fiber:	E-type (Vetrotex CertainTeed)
Resin:	Epoxy (Shell Chemical)
Curing Agent:	Aromatic Amine (Quadrant Chemical)

Nominal Dimensions:

Outside Diameter:	6.85 inches
Inside Diameter:	5.44 inches
Wall Thickness:	0.71 inches
Weight:	11.2 lbs/ft
Thread:	6-5/8" 8Rd LTC, IJ

Mechanical Performance Ratings:

Internal Pressure:	2,500 psi
Axial Tension:	73,600 psi
Axial Tension (min):	30,000 lbs
Temperature:	200 deg.F

We hereby certify that the materials described above have been tested and that they comply with the terms of the Purchase Order.

QUALITY CONTROL
APPROVED
DATE 12/27/99 BY: _____
TUBULAR FIBERGLASS CORPORATION

APPENDIX F

Lithologic Logs for EW-1 and DZ-1

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
10/6/99	0	10	Oolitic Limestone, white (N 9), medium sand grained, very low porosity, well consolidated
10/6/99	10	20	Limestone, white (N 9), very fine sand to medium sand grained, low to moderate porosity, well consolidated
10/6/99	20	30	Oolitic Limestone, white (N 9), medium sand grained, low porosity, well consolidated
10/6/99	30	40	Same as above
10/6/99	40	50	Skeletal Limestone (60%), white (N 9), medium sand to coarse sand grained, moderate to high porosity, well consolidated; recrystallized skeletal limestone (40%), light gray (N 7), medium sand to coarse sand grained, low porosity, well consolidated
10/6/99	50	60	Same as above, increase recrystallized skeletal limestone to 70%
10/6/99	60	70	Limestone, white (N 9), fine sand grained, high porosity, moderately consolidated
10/6/99	70	80	Same as above, with recrystallized lime mudstone (50%), low porosity, well consolidated
10/6/99	80	90	Limestone, white (N 9), fine sand grained, high porosity, moderately consolidated
10/6/99	90	100	Same as above
10/6/99	100	110	Same as above, except moderate porosity
10/7/99	110	120	Limestone, white (N 9), fine sand grained, trace of phosphate, moderate porosity, moderately consolidated
10/7/99	120	130	Same as above
10/7/99	130	140	Same as above
10/7/99	140	150	Same as above
10/7/99	150	160	Same as above
10/7/99	160	170	Same as above, except high porosity
10/7/99	170	180	Limestone, yellowish gray (5 Y 8/1),medium sand to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
10/7/99	180	190	Same as above
10/7/99	190	200	Same as above, with skeletal limestone (10%), white, medium sand to coarse sand grained, moderate porosity, moderately consolidated
10/7/99	200	210	Limestone, yellowish gray (5 Y 8/1),medium sand to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
10/7/99	210	220	Limestone, pinkish gray (5 YR 8/1), fine sand to medium sand grained, high porosity, well consolidated
10/7/99	220	230	Same as above
10/7/99	230	240	Limestone, yellowish gray (5 Y 8/1),medium sand to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
10/7/99	240	250	Same as above
10/7/99	250	260	Same as above
10/7/99	260	270	Limestone, pinkish gray (5 YR 8/1), fine sand to medium sand grained, high porosity, well consolidated
10/7/99	270	280	Same as above
10/7/99	280	290	Same as above
10/7/99	290	300	Same as above
10/22/99	300	310	Same as above
10/22/99	310	320	Same as above
10/22/99	320	330	Same as above, except moderately consolidated

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
10/26/99	1100	1110	Limestone, yellowish gray (5 Y 8/1), fine sand grained, moderate porosity, trace of phosphate, poor to moderately consolidated
10/26/99	1110	1120	Limestone (70%), yellowish gray (5 Y 8/1), fine sand grained, moderate porosity, trace of phosphate, poor to moderately consolidated; dolomite (30%), dark yellowish brown (10 YR 4/2), low porosity, well consolidated
10/26/99	1120	1130	Same as above
10/26/99	1130	1140	Same as above
10/26/99	1140	1150	Limestone, yellowish gray (5 Y 8/1), fine sand grained, moderate porosity, trace of phosphate, poorly consolidated
10/26/99	1150	1160	Same as above
10/26/99	1160	1170	Same as above
10/26/99	1170	1180	Limestone, yellowish gray (5 Y 7/2), recrystallized, low porosity, well consolidated
10/26/99	1180	1190	Same as above
10/26/99	1190	1200	Limestone (90%), yellowish gray (5 Y 7/2), fine sand grained, low porosity, moderately consolidated; dolomite (10%), dark yellowish brown (10 YR 4/2), low porosity, well consolidated
10/26/99	1200	1210	Same as above
11/18/99	1210	1220	No sample
11/18/99	1220	1230	No sample
11/18/99	1230	1240	Limestone, very pale orange (10 YR 8/2), silt to fine sand grained with frequent larger sized shell fragments, moderate porosity, well consolidated
11/18/99	1240	1250	Same as above, except moderate to high porosity
11/18/99	1250	1260	Same as above
11/18/99	1260	1270	Limestone, yellowish gray (5 Y 7/2), silt to very fine sand grained with abundant larger sized gastropod casts, frequent gastropod molds, moderate porosity, well consolidated
11/18/99	1270	1280	Same as above
11/18/99	1280	1290	Same as above
11/18/99	1290	1300	Limestone, very pale orange (10 YR 8/2), skeletal fragments range in size from fine to coarse sand, sparry cement, frequent foraminifera, moderate porosity, poor to moderately consolidated
11/18/99	1300	1310	Same as above, except poorly consolidated
11/18/99	1310	1320	Limestone, very pale orange (10 YR 8/2), silt sized grains with occasional foraminifera and shell fragments, low to high porosity, poor to moderately consolidated
11/18/99	1320	1330	Same as above
11/18/99	1330	1340	Same as above
11/18/99	1340	1350	Same as above
11/18/99	1350	1360	Same as above
11/18/99	1360	1370	Same as above
11/18/99	1370	1380	Same as above
11/18/99	1380	1390	Same as above
11/18/99	1390	1400	Same as above
11/18/99	1400	1410	Same as above
11/18/99	1410	1420	Same as above
11/18/99	1420	1430	Same as above, except moderately consolidated
11/18/99	1430	1440	Micritic Limestone, very pale orange (10 YR 8/2), occasional shell fragment, low to moderate porosity, poor to moderately consolidated
11/18/99	1440	1450	Same as above

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
10/22/99	330	340	Limestone, yellowish gray (5 Y 8/1),medium sand to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
10/22/99	340	350	Limestone (80%), yellowish gray (5 Y 8/1), fine sand to medium sand grained, high porosity, poor to moderately consolidated; calcareous sandstone (20%), yellowish gray (5 Y 8/1), medium to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
10/22/99	350	360	Limestone, yellowish gray (5 Y 8/1),medium sand to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
10/22/99	360	370	Same as above
10/22/99	370	380	Same as above
10/22/99	380	390	Same as above
10/22/99	390	400	Same as above
10/22/99	400	410	Same as above
10/22/99	410	420	Same as above
10/22/99	420	430	Same as above
10/22/99	430	440	Same as above
10/22/99	440	450	Limestone, yellowish gray (5 Y 7/2), medium sand grained, moderate to high porosity, trace of phosphate and clay, poorly consolidated
10/22/99	450	460	Same as above
10/22/99	460	470	Same as above
10/22/99	470	480	Same as above
10/22/99	480	490	Same as above
10/22/99	490	500	Same as above
10/23/99	500	510	Same as above
10/23/99	510	520	Same as above
10/23/99	520	530	Limestone, yellowish gray (5 Y 7/2), medium sand grained, moderate to high porosity, trace of phosphate, about 5% clay, poorly consolidated
10/23/99	530	540	Same as above
10/23/99	540	550	Limestone, yellowish gray (5 Y 7/2), medium sand grained, high porosity, trace of phosphate, poorly consolidated
10/23/99	550	560	Same as above
10/23/99	560	570	Same as above
10/23/99	570	580	Limestone, yellowish gray (5 Y 7/2), medium sand grained, high porosity, trace of phosphate, poorly consolidated
10/23/99	580	590	Same as above
10/23/99	590	600	Limestone, yellowish gray (5 Y 7/2), medium sand grained, high porosity, trace of phosphate and clay, poorly consolidated
10/23/99	600	610	Limestone, yellowish gray (5 Y 7/2),fine sand grained, high porosity, trace of phosphate, poorly consolidated
10/23/99	610	620	Same as above
10/23/99	620	630	Same as above
10/23/99	630	640	Same as above
10/23/99	640	650	Same as above
10/23/99	650	660	Same as above
10/23/99	660	670	Same as above
10/23/99	670	680	Same as above
10/23/99	680	690	Same as above
10/23/99	690	700	Limestone, yellowish gray (5 Y 7/2), fine sand grained, moderate porosity, slight trace of phosphate, poor to moderately consolidated
10/23/99	700	710	Same as above

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
10/23/99	710	720	Same as above
10/23/99	720	730	Same as above
10/23/99	730	740	Same as above
10/23/99	740	750	Same as above
10/23/99	750	760	Limestone, yellowish gray (5 Y 7/2), fine sand grained, moderate porosity, slight trace of phosphate, poor to moderately consolidated
10/23/99	760	770	Limestone, yellowish gray (5 Y 7/2), fine sand grained, moderate porosity, slight trace of phosphate, poor to moderately consolidated
10/23/99	770	780	Same as above
10/23/99	780	790	Same as above
10/23/99	790	800	Same as above
10/23/99	800	810	Same as above
10/23/99	810	820	Same as above
10/23/99	820	830	Same as above
10/23/99	830	840	Same as above
10/23/99	840	850	Limestone, pinkish gray (5 YR 8/1), fine sand to medium sand grained, moderate porosity, well consolidated
10/23/99	850	860	Same as above
10/23/99	860	870	Same as above
10/23/99	870	880	Limestone, yellowish gray (5 Y 7/2), fine sand to medium sand grained, moderate porosity, trace of phosphate, poor to moderately consolidated
10/23/99	880	890	Same as above
10/23/99	890	900	Same as above
10/23/99	900	910	Same as above
10/23/99	910	920	Same as above
10/23/99	920	930	Same as above
10/23/99	930	940	Limestone, olive gray (5 Y 4/1), fine sand to coarse sand grained, 20% phosphate, poorly consolidated
10/23/99	940	950	Same as above
10/23/99	950	960	Same as above
10/23/99	960	970	Limestone, olive gray (5 Y 4/1), fine sand grained, moderate porosity, 5% phosphate, poor to moderately consolidated
10/23/99	970	980	Same as above
10/23/99	980	990	Limestone, olive gray (5 Y 4/1), fine sand to coarse sand grained, moderate to high porosity, 15% phosphate, poor to moderately consolidated
10/23/99	990	1000	Same as above
10/23/99	1000	1010	Same as above
10/26/99	1010	1020	Same as above
10/26/99	1020	1030	Limestone, light olive gray (5 Y 5/2), fine sand grained, moderate porosity, trace of phosphate, poor to moderately consolidated
10/26/99	1030	1040	Same as above
10/26/99	1040	1050	Limestone, yellowish gray (5 Y 7/2), recrystallized, low porosity, slight trace of phosphate, well consolidated
10/26/99	1050	1060	Limestone, yellowish gray (5 Y 8/1), fine sand grained, moderate porosity, trace of phosphate, poor to moderately consolidated
10/26/99	1060	1070	Same as above
10/26/99	1070	1080	Same as above
10/26/99	1080	1090	Same as above
10/26/99	1090	1100	Limestone, yellowish gray (5 Y 7/2), recrystallized, low porosity, well consolidated

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
11/18/99	1450	1460	Same as above
11/18/99	1460	1470	Same as above
11/18/99	1470	1480	Limestone, yellowish gray (5 Y 7/2), fine to medium sand grained, frequent foraminifera, moderate porosity, poorly consolidated
11/18/99	1480	1490	Same as above
11/18/99	1490	1500	Limestone, very pale orange (10 YR 8/2), fine to medium sand grained, frequent foraminifera, moderate porosity, well consolidated
11/18/99	1500	1510	Micritic Limestone, pinkish gray (5 YR 8/1), occasional fossil mold, low porosity, well consolidated
11/18/99	1510	1520	Same as above
11/18/99	1520	1530	Limestone, very pale orange (10 YR 8/2), fine to medium sand grained, abundant foraminifera, moderate porosity, poorly consolidated
11/18/99	1530	1540	Same as above
11/18/99	1540	1550	Limestone, very light gray (N 6), fine to medium sand grained, frequent foraminfera, moderate porosity, poorly consolidated
11/18/99	1550	1560	Same as above, except moderately consolidated
11/18/99	1560	1570	Recrystallized Limestone, light gray (N 7), abundant medium sand grain sized planktonic foraminfera, low porosity, well consolidated
11/18/99	1570	1580	Recrystallized Limestone (50%), light gray (N 7), abundant medium sand grain sized planktonic foraminfera, low porosity, well consolidated; limestone (50%), pinkish gray (5 YR 8/1), fine to medium sand grained, abundant foraminfera, moderate porosity, poor to moderately consolidated
11/18/99	1580	1590	Limestone, very pale orange (10 YR 8/2), fine sand grained, moderate porosity, moderately consolidated
11/18/99	1590	1600	Limestone, pinkish gray (5 YR 8/1), fine sand grained, moderate to high porosity, well consolidated
11/18/99	1600	1610	Limestone, very pale orange (10 YR 8/2), fine to medium sand grained with larger foraminifera, moderate porosity, poorly consolidated
11/18/99	1610	1620	Same as above, except moderately consolidated
11/18/99	1620	1630	Limestone, very pale orange (10 YR 8/2), fine to medium sand grained with larger foraminifera, moderate porosity, poorly consolidated
11/18/99	1630	1640	Limestone 60%), very pale orange (10 YR 8/2), fine to medium sand grained with larger foraminifera, moderate porosity, poorly consolidated; limestone (40%), light olive gray (5 Y 6/1), medium sand grained, high porosity, well consolidated
11/18/99	1640	1650	Same as above
11/18/99	1650	1660	Same as above
11/18/99	1660	1670	Same as above
11/18/99	1670	1680	Limestone, very pale orange (10 YR 8/2), fine sand grained, moderate porosity, moderately consolidated
11/18/99	1680	1690	Same as above
11/18/99	1690	1700	Same as above
11/19/99	1700	1710	Same as above
11/19/99	1710	1720	Same as above
11/19/99	1720	1730	Limestone, very pale orange (10 YR 8/2), fine sand grained, moderate porosity, moderately to well consolidated
11/19/99	1730	1740	Same as above
11/19/99	1740	1750	Same as above
11/19/99	1750	1760	Same as above
11/19/99	1760	1770	Same as above

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
11/19/99	1770	1780	Same as above
11/19/99	1780	1790	Limestone, very pale orange (10 YR 8/2), fine sand grained, moderate porosity, moderately consolidated
11/19/99	1790	1800	Same as above
11/19/99	1800	1810	Limestone, very pale orange (10 YR 8/2), fine sand grained, low to moderate porosity, moderately consolidated
11/19/99	1810	1820	Same as above
11/19/99	1820	1830	Limestone, very pale orange (10 YR 8/2), fine sand grained, low to moderate porosity, well consolidated
11/19/99	1830	1840	Same as above
11/19/99	1840	1850	Same as above, except moderately consolidated
11/19/99	1850	1860	Limestone, very pale orange (10 YR 8/2), fine sand grained, moderate porosity, poorly consolidated
11/19/99	1860	1870	Same as above
11/19/99	1870	1880	Same as above
11/19/99	1880	1890	Limestone (80%), very pale orange (10 YR 8/2), fine sand grained, moderate porosity, poorly consolidated; micritic limestone (20%), pinkish gray (5 YR 8/1), low to moderate porosity
11/19/99	1890	1900	Same as above, except decrease micritic limestone to 10%
11/19/99	1900	1910	Limestone, pinkish gray (5 YR 8/1), fine sand grained, moderate to high porosity, moderately consolidated
11/19/99	1910	1920	Same as above
11/20/99	1920	1930	Same as above
11/21/99	1930	1940	Same as above
11/21/99	1940	1950	Same as above
11/22/99	1950	1960	Same as above
11/22/99	1960	1970	Same as above
11/23/99	1970	1980	Same as above
11/23/99	1980	1990	Same as above
11/23/99	1990	2000	Same as above
11/23/99	2000	2010	Limestone (90%), pinkish gray (5 YR 8/1), fine sand grained, moderate to high porosity, well consolidated; micritic limestone (10%), pinkish gray (5 YR 8/1), low porosity, well consolidated
11/23/99	2010	2020	Same as above, except increase micritic limestone to 20%
11/23/99	2020	2030	Same as above
11/23/99	2030	2040	Same as above
11/29/99	2040	2050	Micritic Limestone, pinkish gray (5 YR 8/1), occasional foraminifera mold, low porosity, well consolidated
11/29/99	2050	2060	Limestone, pinkish gray (5 YR 8/1), fine sand grained, moderate to high porosity, moderately consolidated
11/29/99	2060	2070	Same as above
11/29/99	2070	2080	Same as above, except well consolidated
11/29/99	2080	2090	Limestone, pinkish gray (5 YR 8/1), fine sand grained, moderate to high porosity, moderately consolidated
11/29/99	2090	2100	Same as above
11/29/99	2100	2110	Same as above
11/29/99	2110	2120	Limestone, pinkish gray (5 YR 8/1), fine sand grained, moderate to high porosity, poorly consolidated
11/29/99	2120	2130	Same as above

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
11/29/99	2130	2140	Limestone (60%), pinkish gray (5 YR 8/1), fine to medium sand grained, high porosity, well consolidated; limestone (40%), medium gray (N 5), moderate porosity, well consolidated
11/29/99	2140	2150	Limestone, light olive gray (5 Y 5/2), medium sand grained, abundant foraminifera, moderate to high porosity, moderately consolidated
11/29/99	2150	2160	Limestone (60%), pinkish gray (5 YR 8/1), fine to medium sand grained, high porosity, well consolidated; dolomitic limestone (40%), medium gray (N 5), moderate porosity, well consolidated
11/29/99	2160	2170	Limestone, pinkish gray (5 YR 8/1), fine sand grained, moderate porosity, moderately consolidated
11/29/99	2170	2180	Same as above
11/29/99	2180	2190	Same as above
11/29/99	2190	2200	Same as above
11/30/99	2200	2210	Limestone (70%), pinkish gray (5 YR 8/1), fine sand grained, moderate porosity, moderately consolidated; recrystallized limestone (30%), light gray (N 7), very fine grained, very low porosity, well consolidated
11/30/99	2210	2220	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, moderate porosity, moderately consolidated
11/30/99	2220	2230	Limestone, pinkish gray (5 YR 8/1), fine sand grained, low to moderate porosity, moderately consolidated
11/30/99	2230	2240	Limestone (80%), pinkish gray (5 YR 8/1), fine sand grained, low to moderate porosity, moderately consolidated; micritic limestone (20%), light olive gray (5 Y 6/1), very low porosity, well consolidated
11/30/99	2240	2250	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, moderate porosity, moderately consolidated
11/30/99	2250	2260	Same as above
11/30/99	2260	2270	Same as above
11/30/99	2270	2280	Same as above
11/30/99	2280	2290	Same as above
11/30/99	2290	2300	Limestone, pinkish gray (5 YR 8/1), fine sand grained, low to moderate porosity, moderately to well consolidated
12/1/99	2300	2310	Same as above
12/1/99	2310	2320	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, high porosity, poorly consolidated
12/1/99	2320	2330	Same as above
12/1/99	2330	2340	Same as above
12/1/99	2340	2350	Limestone (80%), pinkish gray (5 YR 8/1), fine to medium sand grained, high porosity, poorly consolidated; micritic limestone (20%), pinkish gray (5 YR 8/1), low porosity, well consolidated
12/1/99	2350	2360	Limestone, pinkish gray (5 YR 8/1), medium sand grained, high porosity, poorly consolidated
12/1/99	2360	2370	Same as above
12/1/99	2370	2380	Limestone, pinkish gray (5 YR 8/1), fine sand grained, high porosity, well consolidated
12/1/99	2380	2390	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, high porosity, well to poorly consolidated
12/2/99	2390	2400	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, high porosity, poorly consolidated
12/2/99	2400	2410	Micritic Limestone, white (N 9), low porosity, well consolidated
12/2/99	2410	2420	Same as above

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
12/3/99	2420	2430	Micritic Limestone, medium light gray (N 6), low porosity, well consolidated
12/3/99	2430	2440	Limestone (60%), pinkish gray (5 YR 8/1), medium sand grained, high porosity, poorly consolidated; micritic limestone (40%), medium light gray (N 6), low porosity, well consolidated
12/3/99	2440	2450	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, high porosity, poorly consolidated
12/3/99	2450	2460	Same as above
12/3/99	2460	2470	Same as above
12/3/99	2470	2480	Same as above
12/11/99	2480	2490	Same as above
12/11/99	2490	2500	Same as above
12/11/99	2500	2510	Same as above
12/11/99	2510	2520	Limestone (90%), pinkish gray (5 YR 8/1), fine to medium sand grained, high porosity, poorly consolidated; micritic limestone (10%), low porosity, well consolidated
12/11/99	2520	2530	Same as above
12/12/99	2530	2540	Same as above, except increase micritic limestone to 30%
12/12/99	2540	2550	Micritic Limestone (60%), pinkish gray (5 YR 8/1), low porosity, well consolidated; limestone (40%), pinkish gray (5 YR 8/1), medium sand grained, high porosity, moderately consolidated
12/12/99	2550	2560	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, high porosity, poorly consolidated
12/12/99	2560	2570	Same as above
12/12/99	2570	2580	Same as above
12/12/99	2580	2590	Same as above
12/12/99	2590	2600	Same as above
12/12/99	2600	2610	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, moderate porosity, poorly consolidated
12/12/99	2610	2620	Same as above
12/12/99	2620	2630	Same as above
12/12/99	2630	2640	Same as above
12/12/99	2640	2650	Same as above
12/12/99	2650	2660	Same as above
12/12/99	2660	2670	Same as above
12/12/99	2670	2680	Same as above
12/12/99	2680	2690	Same as above
12/12/99	2690	2700	Same as above
12/12/99	2700	2710	Same as above
12/12/99	2710	2720	Same as above
12/12/99	2720	2730	Same as above
12/12/99	2730	2740	Same as above
12/12/99	2740	2750	Same as above
12/12/99	2750	2760	Dolomite (90%), dark yellowish brown (10 YR 4/2), microcrystalline to medium sand grained, low to high porosity, moderately to well consolidated; limestone (10%), pinkish gray (5 YR 8/1), fine to medium sand grained, moderate porosity, moderately consolidated
12/13/99	2760	2770	Dolomite, dark yellowish brown (10 YR 4/2), microcrystalline, low porosity, well consolidated
12/14/99	2770	2780	Same as above
12/14/99	2780	2790	Same as above

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
12/14/99	2790	2800	Dolomite (90%), dark yellowish brown (10 YR 4/2), medium sand grained, sucrosic, high porosity, well consolidated, brittle; limestone (10%), white (N 9), fine sand grained, low porosity, moderately consolidated
12/14/99	2800	2810	Same as above, except 50% dolomite and 50% limestone
12/14/99	2810	2820	Dolomite, dark yellowish brown (10 YR 4/2), microcrystalline, low porosity, well consolidated
12/14/99	2820	2830	Same as above
12/14/99	2830	2840	Same as above
12/14/99	2840	2850	Same as above
12/14/99	2850	2860	Same as above
12/14/99	2860	2870	Dolomite (90%), dark yellowish brown (10 YR 4/2) to dusky yellowish brown (10 YR 2/2), microcrystalline, low porosity, well consolidated; dolomite (10%), pale yellowish brown (10 YR 6/2), medium sand grained, sucrosic, high porosity, well consolidated
12/14/99	2870	2880	Dolomite, dark yellowish brown (10 YR 4/2), microcrystalline, low porosity, well consolidated
12/14/99	2880	2890	Dolomite (60%), dark yellowish brown (10 YR 4/2) to dusky yellowish brown (10 YR 2/2), microcrystalline, low porosity, well consolidated; dolomite (40%), pale yellowish brown (10 YR 6/2), medium sand grained, sucrosic, high porosity, well consolidated
12/14/99	2890	2900	Dolomite, dark yellowish brown (10 YR 4/2), microcrystalline, low porosity, well consolidated
12/14/99	2900	2910	Dolomite (60%), pale yellowish brown (10 YR 6/2), medium sand grained, sucrosic, high porosity, well consolidated; dolomite, dark yellowish brown (10 YR 4/2), microcrystalline, low vugular porosity, well consolidated
12/14/99	2910	2920	Same as above
12/14/99	2920	2930	Dolomite, dark yellowish brown (10 YR 4/2), microcrystalline, low porosity, well consolidated
12/14/99	2930	2940	Same as above
12/14/99	2940	2950	Same as above
12/14/99	2950	2960	Same as above
12/14/99	2960	2970	Dolomite, pale yellowish brown (10 YR 6/2), medium sand grained, sucrosic, high porosity, well consolidated
12/15/99	2970	2980	Dolomite, dark yellowish brown (10 YR 4/2), microcrystalline, moderate vugular porosity, well consolidated
12/15/99	2980	2990	Same as above
12/15/99	2990	3000	Same as above

ft. bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Dual-Zone Monitor Well DZ-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
2/14/00	0	10	Oolitic Limestone, white (N 9), medium sand grained, very low porosity, well consolidated
2/14/00	10	20	Same as above
2/14/00	20	30	Same as above
2/14/00	30	40	Same as above
2/14/00	40	50	Skeletal Limestone (60%), white (N 9), medium sand to coarse sand grained, moderate to high porosity, well consolidated; recrystallized skeletal limestone (40%), light gray (N 7), medium sand to coarse sand grained, low porosity, well consolidated
2/14/00	50	60	Same as above, increase recrystallized skeletal limestone to 80%
2/14/00	60	70	Limestone, white (N 9), fine sand grained, high porosity, moderately consolidated
2/14/00	70	80	Same as above, with recrystallized lime mudstone (50%), low porosity, well consolidated
2/15/00	80	90	Limestone, white (N 9), fine sand grained, high porosity, moderately consolidated
2/15/00	90	100	Same as above
2/15/00	100	110	Same as above
2/15/00	110	120	Limestone, white (N 9), fine sand grained, trace of phosphate, moderate porosity, moderately consolidated
2/15/00	120	130	Same as above
2/15/00	130	140	Same as above
2/15/00	140	150	Same as above
2/15/00	150	160	Same as above
2/15/00	160	170	Same as above, except high porosity
2/15/00	170	180	Limestone, yellowish gray (5 Y 8/1),medium sand to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
2/15/00	180	190	Same as above
2/15/00	190	200	Same as above, with skeletal limestone (10%), white, medium sand to coarse sand grained, moderate porosity, moderately consolidated
2/15/00	200	210	Limestone, yellowish gray (5 Y 8/1),medium sand to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
2/16/00	210	220	Limestone, pinkish gray (5 YR 8/1), fine sand to medium sand grained, high porosity, well consolidated
2/16/00	220	230	Same as above
2/16/00	230	240	Limestone, yellowish gray (5 Y 8/1),medium sand to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
2/16/00	240	250	Same as above
2/16/00	250	260	Same as above
2/16/00	260	270	Limestone, pinkish gray (5 YR 8/1), fine sand to medium sand grained, high porosity, well consolidated
2/16/00	270	280	Same as above
2/16/00	280	290	Same as above
2/16/00	290	300	Same as above
2/16/00	300	310	Same as above
2/16/00	310	320	Same as above
2/19/00	320	330	Same as above, except moderately consolidated
2/19/00	330	340	Limestone, yellowish gray (5 Y 8/1),medium sand to coarse sand grained, high porosity, trace of phosphate, poorly consolidated

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Dual-Zone Monitor Well DZ-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
2/19/00	340	350	Limestone (80%), yellowish gray (5 Y 8/1), fine sand to medium sand grained, high porosity, poor to moderately consolidated; calcareous sandstone (20%), yellowish gray (5 Y 8/1), medium to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
2/19/00	350	360	Limestone, yellowish gray (5 Y 8/1),medium sand to coarse sand grained, high porosity, trace of phosphate, poorly consolidated
2/19/00	360	370	Same as above
2/19/00	370	380	Same as above
2/19/00	380	390	Same as above
2/19/00	390	400	Same as above
2/19/00	400	410	Same as above
2/19/00	410	420	Same as above
2/19/00	420	430	Same as above
2/19/00	430	440	Same as above
2/19/00	440	450	Limestone, yellowish gray (5 Y 7/2), medium sand grained, moderate to high porosity, trace of phosphate and clay, poorly consolidated
2/19/00	450	460	Same as above
2/19/00	460	470	Same as above
2/19/00	470	480	Same as above
2/19/00	480	490	Same as above
2/19/00	490	500	Same as above
2/19/00	500	510	Same as above
2/19/00	510	520	Same as above
2/19/00	520	530	Limestone, yellowish gray (5 Y 7/2), medium sand grained, moderate to high porosity, trace of phosphate, about 5% clay, poorly consolidated
2/19/00	530	540	Same as above
2/19/00	540	550	Limestone, yellowish gray (5 Y 7/2), medium sand grained, high porosity, trace of phosphate, poorly consolidated
2/19/00	550	560	Same as above
2/19/00	560	570	Same as above
2/19/00	570	580	Limestone, yellowish gray (5 Y 7/2), medium sand grained, high porosity, trace of phosphate, poorly consolidated
2/19/00	580	590	Same as above
2/19/00	590	600	Limestone, yellowish gray (5 Y 7/2), medium sand grained, high porosity, trace of phosphate and clay, poorly consolidated
2/19/00	600	610	Limestone, yellowish gray (5 Y 7/2),fine sand grained, high porosity, trace of phosphate, poorly consolidated
2/19/00	610	620	Same as above
2/19/00	620	630	Same as above
2/19/00	630	640	Same as above
2/19/00	640	650	Same as above
2/19/00	650	660	Same as above
2/19/00	660	670	Same as above
2/19/00	670	680	Same as above
2/19/00	680	690	Limestone (60%), yellowish gray (5 Y 7/2),fine sand grained, high porosity, trace of phosphate, poorly consolidated; limestone (40%), yellowish gray (5 Y 7/2), fine sand grained, moderate porosity, slight trace of phosphate, poor to moderately consolidated
2/19/00	690	700	Limestone, yellowish gray (5 Y 7/2), fine sand grained, moderate porosity, slight trace of phosphate, poor to moderately consolidated

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Dual-Zone Monitor Well DZ-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
2/19/00	700	710	Same as above
2/19/00	710	720	Same as above
2/19/00	720	730	Same as above
2/19/00	730	740	Same as above
2/19/00	740	750	Same as above
2/28/00	750	760	Limestone, yellowish gray (5 Y 7/2), fine sand grained, moderate porosity, slight trace of phosphate, poor to moderately consolidated
2/28/00	760	770	Limestone, yellowish gray (5 Y 7/2), fine sand grained, moderate porosity, slight trace of phosphate, poor to moderately consolidated
2/28/00	770	780	Same as above
2/28/00	780	790	Same as above
2/28/00	790	800	Same as above
2/28/00	800	810	Same as above
2/28/00	810	820	Same as above
2/28/00	820	830	Same as above
2/28/00	830	840	Same as above
2/28/00	840	850	Limestone, pinkish gray (5 YR 8/1), fine sand to medium sand grained, moderate porosity, well consolidated
2/28/00	850	860	Same as above
2/28/00	860	870	Same as above
2/28/00	870	880	Limestone, yellowish gray (5 Y 7/2), fine sand to medium sand grained, moderate porosity, trace of phosphate, poor to moderately consolidated
2/28/00	880	890	Same as above
2/28/00	890	900	Same as above
2/28/00	900	910	Same as above
2/28/00	910	920	Same as above
2/29/00	920	930	Same as above
2/29/00	930	940	Limestone, olive gray (5 Y 4/1), fine sand to coarse sand grained, 20% phosphate, poorly consolidated
2/29/00	940	950	Same as above
2/29/00	950	960	Same as above
2/29/00	960	970	Limestone, olive gray (5 Y 4/1), fine sand grained, moderate porosity, 5% phosphate, poor to moderately consolidated
2/29/00	970	980	Same as above
2/29/00	980	990	Limestone, olive gray (5 Y 4/1), fine sand to coarse sand grained, moderate to high porosity, 15% phosphate, poor to moderately consolidated
2/29/00	990	1000	Same as above
2/29/00	1000	1010	Same as above
2/29/00	1010	1020	Same as above
2/29/00	1020	1030	Limestone, light olive gray (5 Y 5/2), fine sand grained, moderate porosity, trace of phosphate, poor to moderately consolidated
2/29/00	1030	1040	Same as above
2/29/00	1040	1050	Limestone, yellowish gray (5 Y 7/2), recrystallized, low porosity, slight trace of phosphate, well consolidated
2/29/00	1050	1060	Limestone, yellowish gray (5 Y 8/1), fine sand grained, moderate porosity, trace of phosphate, poor to moderately consolidated
2/29/00	1060	1070	Same as above
2/29/00	1070	1080	Same as above
2/29/00	1080	1090	Same as above

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Dual-Zone Monitor Well DZ-1
Lithologic Description

Date	Depth (ft. bpl) From	To	Observer's Description
2/29/00	1090	1100	Limestone, yellowish gray (5 Y 7/2), recrystallized, low porosity, well consolidated
2/29/00	1100	1110	Limestone, yellowish gray (5 Y 8/1), fine sand grained, moderate porosity, trace of phosphate, poor to moderately consolidated
2/29/00	1110	1120	Limestone (70%), yellowish gray (5 Y 8/1), fine sand grained, moderate porosity, trace of phosphate, poor to moderately consolidated; dolomite (30%), dark yellowish brown (10 YR 4/2), low porosity, well consolidated
2/29/00	1120	1130	Same as above
2/29/00	1130	1140	Same as above
2/29/00	1140	1150	Limestone, yellowish gray (5 Y 8/1), fine sand grained, moderate porosity, trace of phosphate, poorly consolidated
2/29/00	1150	1160	Same as above
2/29/00	1160	1170	Same as above
2/29/00	1170	1180	Limestone, yellowish gray (5 Y 7/2), recrystallized, low porosity, well consolidated
2/29/00	1180	1190	Same as above
2/29/00	1190	1200	Limestone (90%), yellowish gray (5 Y 7/2), fine sand grained, low porosity, moderately consolidated; dolomite (10%), dark yellowish brown (10 YR 4/2), low porosity, well consolidated
2/29/00	1200	1210	Same as above
2/29/00	1210	1220	Same as above
2/29/00	1220	1230	Same as above
2/29/00	1230	1240	Limestone, very pale orange (10 YR 8/2), silt to fine sand grained with frequent larger sized shell fragments, moderate porosity, well consolidated
2/29/00	1240	1250	Same as above, except moderate to high porosity
2/29/00	1250	1260	Same as above
2/29/00	1260	1270	Limestone, yellowish gray (5 Y 7/2), silt to very fine sand grained with abundant larger sized gastropod casts, frequent gastropod molds, moderate porosity, well consolidated
2/29/00	1270	1280	Same as above
2/29/00	1280	1290	Same as above
2/29/00	1290	1300	Limestone, very pale orange (10 YR 8/2), skeletal fragments range in size from fine to coarse sand, sparry cement, frequent foraminifera, moderate porosity, poor to moderately consolidated
2/29/00	1300	1310	Same as above, except poorly consolidated
2/29/00	1310	1320	Limestone, very pale orange (10 YR 8/2), silt sized grains with occasional foraminifera and shell fragments, low to high porosity, poor to moderately consolidated
2/29/00	1320	1330	Same as above
2/29/00	1330	1340	Same as above
2/29/00	1340	1350	Same as above
2/29/00	1350	1360	Same as above
2/29/00	1360	1370	Same as above
2/29/00	1370	1380	Same as above
2/29/00	1380	1390	Same as above
2/29/00	1390	1400	Same as above

ft. bpl = feet below pad level

APPENDIX H

Surficial Monitor Well Water Quality Data

Project: Key West Wastewater Treatment Plant Injection Well System

Surficial Monitor Well Water Quality Data
Southeast Pad Monitor Well

Date	Time (hours)	Depth to Water (ft-btoc)	Conductivity (umhos/cm)	Chloride (mg/L)	Temperature (degrees C)	pH (S.U.)	Remarks	Sampled By
10/6/99	1050	6.10	39,000	16,360	28	8	Initial sampling before drilling begins.	D. McNabb
10/12/99	1600	4.80	25,500	18,260	25	8		D. Schuman
10/21/99	1458	5.77	22,800	14,300	25.5	7		M. Schilling
10/28/99	1415	5.68	37,250	16,360	24	7		M. Schilling
11/3/99	1420	5.85	39,000	15,720	25	7		D. McNabb
11/11/99	2322	4..90	48,100	19,000	25	7		C. Weeden
11/18/99	1544	5.31	44,000	16,400	25	7		M. Schilling
11/24/99	0807	5.95	39,000	16,560	23	7		M. Schilling
11/30/99	1735	5.20	45,000	19,800	23	7		D. McNabb
12/7/99	1010	5.60	44,000	19,000	24	7		M. Schilling
12/15/99	1315	5.81	43,500	19,280	24	7		M. Schilling
12/17/99	0810	5.90	45,000	20,800	24	7		M. Schilling
12/30/99	2240	6.12	47,000	21,040	24	7		D. McNabb
1/6/00	0859	6.19	48,000	21,280	25	7		M. Schilling
1/15/00	1022	6.29	48,000	18,000	25	7		M. Schilling
1/25/00	1018	6.23	51,000	19,200	24	7		M. Schilling
2/3/00	0931	6.08	50,000	18,400	25	7		M. Schilling
2/4/00	1410	6.23	50,250	18,880	25	7		M. Schilling
2/14/00	0821	5.89	56,000	20,240	24	7		M. Schilling
2/24/00	0747	6.52	46,000	18,560	23	7		M. Schilling
3/2/00	0920	6.09	43,000	19,360	20	7		M. Schilling
3/9/00	0749	6.20	46,000	18,880	21	7		M. Schilling
3/16/00	0905	6.66	44,000	19,280	23	7	Last sample, construction complete.	D. McNabb

ft-btoc:	feet below top of casing
umhos/cm:	micromhos per centimeter
mg/L:	milligrams per liter
C:	Celsius
S.U.:	standard units
TOC:	Top of Casing

Project: Key West Wastewater Treatment Plant Injection Well System

Surficial Monitor Well Water Quality Data
Southwest Pad Monitor Well

Date	Time (hours)	Depth to Water (ft-btoc)	Conductivity (umhos/cm)	Chloride (mg/L)	Temperature (degrees C)	pH (S.U.)	Remarks	Sampled By
10/6/99	1045	6.10	40,500	17,880	28	8	Initial sampling before drilling begins.	D. McNabb
10/12/99	1615	6.30	22,000	14,070	25	8		D. Schuman
10/21/99	1500	6.58	23,500	13,600	26	7		M. Schilling
10/28/99	1425	6.43	39,750	13,860	25	7		M. Schilling
11/3/99	1430	6.70	40,000	16,080	25	7		D. McNabb
11/11/99	2351	5.91	47,900	19,680	25	7		C. Weeden
11/18/99	1542	6.23	47,000	19,600	25	7		M. Schilling
11/24/99	0807	6.82	38,000	13,760	24	7		M. Schilling
11/30/99	1745	6.20	42,000	18,560	23	7		D. McNabb
12/7/99	1020	6.67	44,000	19,600	24	7		M. Schilling
12/15/99	1310	6.54	44,500	19,360	24	7		M. Schilling
12/17/99	0815	6.63	44,500	20,360	24	7		M. Schilling
12/30/99	2245	7.04	45,000	21,000	24	7		D. McNabb
1/6/00	0900	7.15	41,000	19,240	25	7		M. Schilling
1/15/00	1024	7.04	43,500	15,680	25	7		M. Schilling
1/25/00	1020	7.10	39,500	14,800	24	7		M. Schilling
2/3/00	0932	7.01	40,500	15,200	25	7		M. Schilling
2/4/00	1411	7.00	42,000	15,200	24	7		M. Schilling
2/14/00	0820	6.82	49,000	17,440	25	7		M. Schilling
2/24/00	0748	7.33	40,500	16,400	24	7		M. Schilling
3/2/00	0921	7.09	36,500	15,360	20	7		M. Schilling
3/9/00	0751	7.09	47,000	18,560	22	7		M. Schilling
3/16/00	0915	7.21	43,000	15,280	23	7	Last sample, construction complete.	D. McNabb

ft-btoc:	feet below top of casing
umhos/cm:	micromhos per centimeter
mg/L:	milligrams per liter
C:	Celsius
S.U.:	standard units
TOC:	Top of Casing

Project: Key West Wastewater Treatment Plant Injection Well System

Surficial Monitor Well Water Quality Data
North Pad Monitor Well

Date	Time (hours)	Depth to Water (ft-btoc)	Conductivity (umhos/cm)	Chloride (mg/L)	Temperature (degrees C)	pH (S.U.)	Remarks	Sampled By
10/6/99	0755	5.30	30,250	11,780	28	8	Initial sampling before drilling begins.	D. McNabb
10/12/99	1610	4.30	18,500	9,640	25	8		D. Schuman
10/21/99	1455	6.39	17,500	7,420	27	7		M. Schilling
10/28/99	1420	6.15	30,500	8,380	26	7		M. Schilling
11/3/99	1410	6.65	39,000	15,640	25	7		D. McNabb
11/11/99	2223	6.10	43,000	15,680	25	7		C. Weeden
11/18/99	1540	6.22	38,000	15,000	25	7		M. Schilling
11/24/99	0802	6.71	25,200	9,360	23	7		M. Schilling
11/30/99	1740	6.25	33,000	12,560	23	7		D. McNabb
12/7/99	1005	6.29	41,000	16,280	24	7		M. Schilling
12/15/99	1305	6.62	36,000	14,380	24	7		M. Schilling
12/17/99	0805	6.67	38,000	16,280	24	7		M. Schilling
12/30/99	2235	6.95	45,000	16,320	24	7		D. McNabb
1/6/00	0857	7.16	36,500	14,860	25	7		M. Schilling
1/15/00	1018	7.08	39,000	14,560	23	7		M. Schilling
1/25/00	1017	7.10	46,000	13,600	23	7		M. Schilling
2/3/00	0929	7.01	38,000	14,000	24	7		M. Schilling
2/4/00	1408	7.02	38,500	14,200	24	7		M. Schilling
2/14/00	0823	6.79	38,500	14,960	25	7		M. Schilling
2/24/00	0745	7.26	33,000	14,720	23	7		M. Schilling
3/2/00	0919	7.09	36,000	15,280	20	7		M. Schilling
3/9/00	0748	7.06	34,500	14,960	22	7		M. Schilling
3/16/00	0910	7.19	38,000	14,960	23	7	Last sample, construction complete.	D. McNabb

ft-btoc: feet below top of casing
umhos/cm: micromhos per centimeter
mg/L: milligrams per liter
C: Celsius
S.U.: standard units
TOC: Top of Casing

Project: Key West Wastewater Treatment Plant Injection Well System

Water Quality Data
Single Zone Monitor Well SZ-1

Date	Time (hours)	Depth to Water (ft-btoc)	Conductivity (umhos/cm)	Chloride (mg/L)	Temperature (degrees C)	pH (S.U.)	Remarks	Sampled By
10/5/99	0700	5.80	50,500	21,743	25	7.84	Initial sampling before drilling begins.	W. Dromgoole
10/12/99	1605	4.90	24,500	16,320	25	8		D. Schuman
10/21/99	1505	5.46	20,000	19,740	24	7		M. Schilling
10/28/99	1450	5.39	47,500	18,280	24	7		M. Schilling
11/3/99	1400	6.90	44,000	20,160	25	7		D. McNabb
11/11/99	2140	6.98	49,000	20,040	26	7		C. Weeden
11/18/99	1538	6.09	50,000	20,000	24	7		M. Schilling
11/24/99	0800	6.97	51,500	21,680	24	7		M. Schilling
11/30/99	1730	6.24	49,000	21,560	24	7		D. McNabb
12/7/99	1000	6.57	50,000	21,800	25	7		M. Schilling
12/15/99	1300	6.46	49,500	20,880	24	7		M. Schilling
12/17/99	0800	6.59	49,000	21,240	24	7		M. Schilling
12/30/99	2230	7.20	50,500	20,040	24	7		D. McNabb
1/6/00	0855	7.23	51,500	21,800	24	7		M. Schilling
1/15/00	1015	7.43	55,000	19,200	22	7		M. Schilling
1/25/00	1013	7.10	56,000	22,800	24	7		M. Schilling
2/3/00	0925	6.76	56,000	18,800	24	7		M. Schilling
2/4/00	1430	6.67	56,500	19,240	24	7		M. Schilling
2/14/00	0818	6.33	56,500	21,360	21	7		M. Schilling
2/24/00	0750	5.96	48,250	18,320	24	7		M. Schilling
3/2/00	0925	5.77	45,500	19,840	19	7		M. Schilling
3/9/00	0756	5.89	51,500	21,240	24	7		M. Schilling
3/16/00	0920	6.54	46,000	19,200	23	7	Last sample, construction complete.	D. McNabb

ft-btoc:	feet below top of casing
umhos/cm:	micromhos per centimeter
mg/L:	milligrams per liter
C:	Celsius
S.U.:	standard units
TOC:	Top of Casing

Richard A. Heyman Environmental Protection Facility
City of Key West, Florida
Exploratory Well EW-1
Pilot Hole Water Quality

11/29/99	2170	7	42,000	20,920	22	No make-up water used.
11/29/99	2200	7	42,000	20,680	21	No make-up water used.
11/30/99	2230	7	43,000	21,280	20.5	No make-up water used.
11/30/99	2260	7	42,500	20,760	21	No make-up water used.
11/30/99	2290	7	42,000	20,760	21	No make-up water used.
12/1/99	2310	7	47,500	22,000	20	No make-up water used.
12/1/99	2340	7	45,000	20,800	20	No make-up water used.
12/1/99	2370	7	45,000	22,400	20	No make-up water used.
12/2/99	2400	7	46,000	19,200	20.5	No make-up water used.
12/3/99	2430	7	46,500	18,400	21	No make-up water used.
12/3/99	2460	7	47,000	21,200	21	No make-up water used.
12/11/99	2490	7	47,000	21,440	21.5	No make-up water used.
12/11/99	2520	7	48,500	21,040	21.5	No make-up water used.
12/12/99	2550	7	49,500	20,160	22	No make-up water used.
12/12/99	2580	7	49,500	19,760	22	No make-up water used.
12/12/99	2610	7	49,000	20,480	22	No make-up water used.
12/12/99	2640	7	48,000	19,480	22.5	No make-up water used.
12/14/99	2670	7	46,000	18,640	20	No make-up water used.
12/14/99	2700	7	46,000	19,760	19.5	No make-up water used.
12/14/99	2730	7	45,000	20,160	20	No make-up water used.
12/14/99	2760	7	45,000	20,880	20	No make-up water used.
12/14/99	2790	7	48,000	20,320	20	No make-up water used.
12/14/99	2820	7	48,000	19,760	20	No make-up water used.
12/14/99	2850	7	46,000	20,960	20	No make-up water used.
12/14/99	2880	7	46,000	21,360	20	No make-up water used.
12/14/99	2910	7	46,000	22,000	20	No make-up water used.
12/14/99	2940	7	46,000	20,160	20	No make-up water used.
12/14/99	2970	7	46,000	19,920	20	No make-up water used.
12/15/99	3000	7	47,000	21,760	22	No make-up water used.

ft. bpl = feet below pad level

APPENDIX I

Pilot Hole Water Quality

Richard A. Heyman Environmental Protection Facility
City of Key West, Florida
Dual-Zone Monitor Well DZ-1
Pilot Hole Water Quality

Date	Depth of Drill Column (ft bpl)	pH	Conductivity (*u*mhos)	Chlorides (mg/L)	Temperature (°C)	Comments
2/27/00	675					Base of 16-inch casing/No sample collected
2/27/00	690					No sample collected
2/28/00	720	7	45,000	17,600	20	Make-up water being added from SZ-1
2/28/00	750	7	33,000	13,760	20.5	Make-up water being added from SZ-1
2/28/00	780	7	44,000	18,480	20.5	Make-up water being added from SZ-1
2/28/00	810	7	44,000	18,000	20	Make-up water being added from SZ-1
2/28/00	840	7	42,500	18,320	20	Make-up water being added from SZ-1
2/28/00	870	7	43,000	17,040	20	Make-up water being added from SZ-1
2/28/00	900	7	45,000	18,720	20	Make-up water being added from SZ-1
2/29/00	930	7	45,500	20,080	20.5	Make-up water being added from SZ-1
2/29/00	960	7	48,000	18,880	21	No make-up water used.
2/29/00	990	7	46,500	20,480	21	No make-up water used.
2/29/00	1020	7	46,000	19,920	21	No make-up water used.
2/29/00	1050	7	46,000	19,440	21	No make-up water used.
2/29/00	1080	7	47,000	21,120	21	No make-up water used.
2/29/00	1110	7	57,000	19,680	26	No make-up water used.
2/29/00	1140	7	58,000	20,800	26	No make-up water used.
2/29/00	1170	7	58,000	20,080	26	No make-up water used.
2/29/00	1200	7	47,000	18,400	21	No make-up water used.
2/29/00	1230	7	47,000	19,760	21	No make-up water used.
2/29/00	1260	7	47,500	20,960	21	No make-up water used.
2/29/00	1290	7	47,500	19,200	21.5	No make-up water used.
2/29/00	1320	7	47,000	19,760	21.5	No make-up water used.
2/29/00	1350	7	46,500	20,960	21	No make-up water used.
2/29/00	1380	7	47,000	19,440	21	No make-up water used.
2/29/00	1400	7	46,500	20,080	21	No make-up water used.

ft. bpl = feet below pad level

Richard A. Heyman Environmental Protection Facility
City of Key West, Florida
Exploratory Well EW-1
Pilot Hole Water Quality

Date	Depth of Drill Column (ft bpl)	pH	Conductivity (*u*mhos)	Chlorides (mg/L)	Temperature (°C)	Comments
11/18/99	1200					No sample collected
11/18/99	1230					No sample collected
11/18/99	1260	7	41,500	17,800	21	Make-up water being added from SZ-1
11/18/99	1290	7	46,000	19,800	20	No make-up water used.
11/18/99	1320	7	46,000	20,200	20	No make-up water used.
11/18/99	1350					No sample collected
11/18/99	1380	7	50,000	20,000	22	No make-up water used.
11/18/99	1410	7	45,000	19,600	22	No make-up water used.
11/18/99	1440	7	45,000	21,200	21	No make-up water used.
11/18/99	1470	7	46,500	20,640	21	No make-up water used.
11/18/99	1500	7	45,500	21,840	21	No make-up water used.
11/18/99	1530	7	46,000	22,160	21	No make-up water used.
11/18/99	1560	7	46,500	18,800	21	No make-up water used.
11/18/99	1590	7	46,000	16,400	21	No make-up water used.
11/18/99	1620	7	46,000	18,800	21	No make-up water used.
11/18/99	1650	7	46,000	20,160	21	No make-up water used.
11/18/99	1680	7	45,500	20,880	21	No make-up water used.
11/18/99	1710	7	45,500	19,040	21	No make-up water used.
11/18/99	1740	7	45,500	18,880	21	No make-up water used.
11/18/99	1770	7	44,500	19,600	19	No make-up water used.
11/18/99	1800	7	46,000	19,360	19	No make-up water used.
11/18/99	1830	7	46,000	19,600	19	No make-up water used.
11/19/99	1860	7	44,000	20,000	19	No make-up water used.
11/19/99	1890	7	44,000	22,000	19	No make-up water used.
11/21/99	1920	7	46,500	21,200	19	No make-up water used.
11/21/99	1950	7	46,500	20,960	20	No make-up water used.
11/23/99	1980	7	47,000	20,400	21.5	No make-up water used.
11/23/99	2000	7	47,000	19,440	23	No make-up water used.
11/23/99	2030	7	47,500	20,560	22	No make-up water used.
11/29/99	2060	7	42,250	21,360	21	No make-up water used.
11/29/99	2090	7	42,000	20,600	22	No make-up water used.
11/29/99	2120	7	42,500	20,600	21	No make-up water used.
11/29/99	2140	7	42,000	20,560	23	No make-up water used.

APPENDIX J

Core Descriptions

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #:	1
Date Recovered:	11/20/99
Interval Cored:	1,920 to 1,935 feet bpl
Amount Recovered:	5.9 feet
Recovery Percentage:	39%

Depth Interval (feet bpl) From	To	Observer's Description
1,920.0	1,925.5	Limestone, grayish orange (10 YR 7/4), fine to medium sand grained, moderate interparticle porosity, poorly consolidated
1,925.5	1,925.9	Micritic Limestone, pinkish gray (5 YR 8/1), moderaate porosity consisting of 1 - 5 millimeter vugs, well consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #: 2

Date Recovered: 11/22/99

Interval Cored: 1,973 to 1,988 feet bpl

Amount Recovered: 2.6 feet

Recovery Percentage: 17%

Depth Interval (feet bpl) From	To	Observer's Description
1,973.0	1,973.5	Limestone, yellowish gray (5 Y 7/2), fine sand grained, high interparticle and moldic porosity, well consolidated
1,973.5	1,974.1	Limestone, grayish orange (10 YR 7/4), fine to medium sand grained, moderate interparticle porosity, poorly consolidated
1,974.1	1,974.5	Micritic Limestone, medium light gray (N 6), low porosity consisting of 1 - 2 millimeter vugs, well consolidated
1,974.5	1,975.6	Limestone, yellowish gray (5 Y 7/2), fine to medium sand grained, moderate interpartical and moldic porosity, moderately consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #: 3

Date Recovered: 11/23/99

Interval Cored: 2,000 to 2,015 feet bpl

Amount Recovered: 10.8 feet

Recovery Percentage: 72%

Depth Interval (feet bpl) From	To	Observer's Description
2,000.0	2,000.4	Limestone, very pale orange (10 YR 8/2), fine to medium sand grained, high interparticle and vuggy porosity, poor to moderately consolidated
2,000.4	2,000.7	Micritic Limestone, yellowish gray (5 Y 7/2), low vuggy porosity, well consolidated
2,000.7	2,002.1	Limestone, very pale orange (10 YR 8/2), fine sand grained, moderate interparticle porosity, poorly consolidated
2,001.1	2,003.7	Limestone, grayish orange (5 Y 8/4), medium sand grained with shell gragments up to 5 millimeters in diameter, high interparticle and vuggy porosity, poorly consolidated
2,003.7	2,004.3	Micritic Limestone, very light gray (N 8), high porosity consisting of vugs up to 10 millimeters in diameter, well consolidated
2,004.3	2,008.4	Limestone, very pale orange (10 YR 8/2), medium sand grained with occassional 10 millimeter diameter pelycypod shell fragments, high interparticle porosity, poorly consolidated
2,008.4	2,008.9	Micritic Limestone, very light gray (N 8), high porosity consisting of vugs up to 10 millimeters in diameter, well consolidated
2,008.9	2,010.8	Limestone, very pale orange (10 YR 8/2), medium sand grained with occassional foraminifera and shell fragments up to 5 millimeters in diameter, high porosity, poorly consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #:	4
Date Recovered:	11/24/99
Interval Cored:	2,045 to 2,060 feet bpl
Amount Recovered:	2.1 feet
Recovery Percentage:	14%

Depth Interval (feet bpl) From	To	Observer's Description
2,045.0	2,046.3	Limestone, very pale orange (10 YR 8/2), fine sand grained with stringers up to 5 millimeters thick of medium sand, moderate interparticle porosity, poor to moderately consolidated
2,046.3	2,047.1	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, moderate interparticle porosity, well consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #:	5
Date Recovered:	11/29/99
Interval Cored:	2,140 to 2,155 feet bpl
Amount Recovered:	3.4 feet
Recovery Percentage:	23%

Depth Interval (feet bpl) From	To	Observer's Description
2,140.0	2,142.2	Limestone, grayish orange (10 YR 7/4), fine to medium sand grained, moderate to high interparticle porosity, well consolidated
2,142.2	2,142.7	Limestone, olive gray (5 Y 4/1) with 1 millimeter wide black stringers containing what appears to be organic material, fine sand grained with abundant 2 millimeter diameter foraminifera, low interparticle and intraparticle porosity, well consolidated
2,142.7	2,143.4	Limestone, grayish orange (10 YR 7/4), fine to medium sand grained, low to moderate interparticle porosity, well consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #:	6
Date Recovered:	11/30/99
Interval Cored:	2,217 to 2,232 feet bpl
Amount Recovered:	3.5 feet
Recovery Percentage:	23%

Depth Interval (feet bpl) From	To	Observer's Description
2,217.0	2,217.9	Limestone, very pale orange (10 YR 8/2), very fine sand grained, low to moderate interparticle porosity, well consolidated
2,217.9	2,218.4	Limestone, light olive gray (5 Y 6/1), fine sand grained with abundant 2 millimeter diameter foraminifera, low interparticle and intraparticle porosity, well consolidated, trace of organic matter
2,218.4	2,220.5	Limestone, grayish orange (10 YR 7/4) with up to 2 millimeter thick stringers of what appears to be organic matter, fine to medium sand grained, moderate interparticle porosity, well consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #:	7
Date Recovered:	12/1/99
Interval Cored:	2,300 to 2,315 feet bpl
Amount Recovered:	0.9 feet
Recovery Percentage:	6%

Depth Interval (feet bpl) From	To	Observer's Description
2,300.0	2,300.9	Limestone, very pale orange (10 YR 8/2), fine sand grained, moderate interparticle porosity, poorly consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #: 8

Date Recovered: 12/2/99

Interval Cored: 2,390 to 2,400 feet bpl

Amount Recovered: 10 feet

Recovery Percentage: 100%

Depth Interval (feet bpl) From	To	Observer's Description
2,390.0	2,391.3	Limestone, pinkish gray (5 YR 8/1), fine sand grained, low interparticle and vugular porosity, well consolidated
2,391.3	2,393.3	Limestone, pinkish gray (5 YR 8/1), medium sand grained, high interparticle porosity, well consolidated
2,393.3	2,394.0	Limestone, pinkish gray (5 YR 8/1), medium to coarse sand grained, high interparticle and vuggy porosity, well consolidated
2,394.0	2,396.0	Limestone, pinkish gray (5 YR 8/1), fine sand grained, high interparticle porosity, well consolidated
2,396.0	2,397.2	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, low interparticle porosity, high vugular porosity, well consolidated
2,397.2	2,398.0	Limestone, pinkish gray (5 YR 8/1), fine sand grained, low interparticle porosity, moderate vugular porosity, well consolidated
2,398.0	2,398.8	Micritic Limestone, pinkish gray (5 YR 8/1), low porosity, well consolidated
2,398.8	2,400.0	Limestone, pinkish gray (5 YR 8/1), fine sand grained, low interparticle porosity, moderate vugular porosity, well consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #:	9
Date Recovered:	12/2/99
Interval Cored:	2,401 to 2,411 feet bpl
Amount Recovered:	3.5 feet
Recovery Percentage:	35%

Depth Interval (feet bpl)		
From	To	Observer's Description
2,401.0	2,404.5	Limestone, pinkish gray (5 YR 8/1), fine sand grained, low to moderate interparticle porosity, well consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #:	10
Date Recovered:	12/3/99
Interval Cored:	2,420 to 2,430 feet bpl
Amount Recovered:	7.2 feet
Recovery Percentage:	72%

Depth Interval (feet bpl) From	To	Observer's Description
2,420.0	2,422.2	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, low interparticle porosity, high vugular porosity, well consolidated
2,422.2	2,427.2	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained, high interparticle porosity, poorly consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #:	11
Date Recovered:	12/12/99
Interval Cored:	2,535 to 2,545 feet bpl
Amount Recovered:	2 feet
Recovery Percentage:	20%

Depth Interval (feet bpl) From	To	Observer's Description
2,535.0	2,536.1	Limestone, pinkish gray (5 YR 8/1), fine sand grained, micritic cement, low porosity, well consolidated
2,536.1	2,537.0	Limestone, pinkish gray (5 YR 8/1), fine to medium sand grained micritic cement, low porosity, well consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #:	12
Date Recovered:	12/14/99
Interval Cored:	2,764 to 2,774 feet bpl
Amount Recovered:	10 feet
Recovery Percentage:	100%

Depth Interval (feet bpl)		
From	To	Observer's Description
2,764.0	2,774.0	Dolomite, dark yellowish brown (10 YR 4/2), microcrystalline, moderate vugular porosity, well consolidated

feet bpl = feet below pad level

Richard A. Heyman Wastewater Treatment Plant
City of Key West, Florida
Exploratory Well EW-1
Lithologic Description

Core #:	13
Date Recovered:	2/28/00
Interval Cored:	777 to 792 feet bpl
Amount Recovered:	3.5 feet
Recovery Percentage:	35%

Depth Interval (feet bpl)		
From	To	Observer's Description
777.0	780.5	Limestone, yellowish-gray (5 Y 7/2), fine sand grained, high interparticle porosity, moderate to well consolidated

feet bpl = feet below pad level

APPENDIX K

Background Water Quality Data

Sanders Laboratories
Environmental Testing Services

Date: October 7, 1999

Client: Youngquist
ProjectName: Key West Injection Well
Location: Single Zone Monitoring Well
Date collected: October 5, 1999

Field Data and Results:

Ph	7.84
Conductivity	50,500
Salinity	32.2%
Temp	25.1
Dissolved Oxygen	0.89mg/L
Hydrogen Sulfide	0.0
Chloride	21,743

Sincerely,

Will Dromgoole

1060 Endeavor Ct. • Nokomis, FL 34275 • Phone (941) 486-8103 • (800) 255-3108 • Fax (941) 484-8774

INTAKE #: 535576

Sanders Laboratories
Environmental Testing Services

Project Name:	Dual Zone, Key West
Project Location:	MW-Upper Zone
Sample Supply:	Ground Water
Collector:	Will Dromgoole
Sample Received Date/Time:	6/16/00 22:45

Date *12-Jul-00*

Youngquist Brothers, Inc.
15465 Pine Ridge Road

Fort Myers, FL 33908-

Inorganic Analysis
62-550.310(1)
PWS030

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
1005	Arsenic (0.05)	N007786	<0.0028	mg/L	EPA 200.7	6/21/00	0.0028	E84380	ua
1010	Barium (2)	N007786	<0.0001	mg/L	EPA 200.7	6/21/00	0.0001	E84380	ua
1015	Cadmium (0.005)	N007786	<0.0002	mg/L	EPA 200.7	6/21/00	0.0002	E84380	ua
1020	Chromium (0.1)	N007786	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1024	Cyanide (0.2)	N007786	<0.020	mg/L	SM4500CNE	6/27/00	0.020	E83012	ua
1025	Fluoride (4.0)	N007786	1.1	mg/L	SM4500FC	6/19/00	0.1	E84380	ua
1030	Lead (0.015)	N007786	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1035	Mercury (0.002)	N007786	<0.001	mg/L	SM3112B	6/22/00	0.001	E84380	ua
1036	Nickel (0.1)	N007786	0.002	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1040	Nitrate (10)	N007786	<0.01	mg/L	SM4500NO3E	6/19/00	0.01	E84380	ua
1041	Nitrite (1)	N007786	<0.01	mg/L	SM4500NO3E	6/16/00	0.01	E84380	ua
1045	Selenium (0.05)	N007786	<0.0016	mg/L	EPA 200.7	6/21/00	0.0016	E84380	ua
1052	Sodium (160)	N007786	12,000	mg/L	EPA 200.7	6/29/00	0.350	E84380	ua
1074	Antimony (0.006)	N007786	<0.0022	mg/L	EPA 200.7	6/21/00	0.0022	E84380	ua
1075	Beryllium (0.004)	N007786	0.0018	mg/L	EPA 200.7	6/21/00	0.0008	E84380	ua
1085	Thallium (0.002)	N007786	<0.0035	mg/L	EPA 200.7	6/21/00	0.0035	E84380	ua

Secondary Chemical Analysis
62-550.320
PWS031

1002	Aluminum (0.2)	N007786	<0.020	mg/L	EPA 200.7	6/21/00	0.020	E84380	ua
1017	Chloride (250)	N007786	21,243	mg/L	SM 4500Cl-B	6/21/00	1	E84380	ua
1022	Copper (1.0)	N007786	<0.0012	mg/L	EPA 200.7	6/21/00	0.0012	E84380	ua
1025	Fluoride (2.0)	N007786	1.1	mg/L	SM4500FC	6/19/00	0.1	E84380	ua
1028	Iron (0.3)	N007786	<0.030	mg/L	EPA 200.7	6/21/00	0.030	E84380	ua
1032	Manganese (0.05)	N007786	0.0079	mg/L	EPA 200.7	6/21/00	0.0001	E84380	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

1050 Endeavor Ct. • Nokomis, FL 34275 • Phone (941) 488-8102 • (800) 365-3108 • Fax (941) 484-9774

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D.L.	LabID	Analyst
1050	Silver (0.1)	N007786	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1055	Sulfate (250)	N007786	3,045	mg/L	EPA 375.4	6/20/00	1	E84380	ua
1095	Zinc (5.0)	N007786	<0.002	mg/L	EPA 200.7	6/21/00	0.0002	E84380	ua
1905	Color (15.0)	N007786	31	PtCo units	SM2120B	6/17/00	1	E84380	ua
1920	Odor (3.0)	N007786	<1	TON	SM2150B	6/26/00	1	E84380	ua
1925	pH (6.5-8.5)	N007786	7.69	std units	EPA 150.1	6/29/00	n/a	E84380	ua
1930	Total Dissolved Solids (500)	N007786	38,600	mg/L	EPA 160.1	6/19/00	7	E84380	ua
2905	Foaming Agents (0.5)	N007786	0.02	mg/L	SM5540C	6/21/00	0.02	E83012	ua

Pesticide/PCB Chemical Analysis

62-550.310(2)(c)

PWS029

2005	Endrin (2)	N007786	<0.0263	ug/L	EPA 508	6/26/00	0.0263	E83012	ua
2010	Lindane (0.2)	N007786	<0.0253	ug/L	EPA 508	6/26/00	0.0253	E83012	ua
2015	Methoxychlor (40)	N007786	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
2020	Toxaphene (3)	N007786	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua
2031	Dalapon (200)	N007786	<0.844	ug/L	EPA 515.1	6/30/00	0.844	E83012	ua
2032	Diquat (20)	N007786	2.48	ug/L	EPA 549.1	7/12/00	4.00	E83012	ua
2033	Endothall (100)	N007786	<5.00	ug/L	EPA 548	6/26/00	5.00	E83012	ua
2034	Glyphosate (700)	N007786	<3.77	ug/L	EPA 548	6/26/00	3.77	E83012	ua
2035	Di(2-ethylhexyl) adipate (400)	N007786	<0.800	ug/L	EPA 525.1	6/26/00	0.800	E83012	ua
2036	Oxamyl (Vydate) (200)	N007786	<1.13	ug/L	EPA 531.1	7/12/00	1.13	E83012	ua
2037	Simazine (4)	N007786	<0.185	ug/L	EPA 507	6/26/00	0.185	E83012	ua
2039	Di(2-ethylhexyl) phthalate (6)	N007786	<1.76	ug/L	EPA 525.1	6/26/00	1.76	E83012	ua
2040	Picloram (500)	N007786	<0.263	ug/L	EPA 515.1	6/30/00	0.263	E83012	ua
2041	Dinoseb (7)	N007786	<0.132	ug/L	EPA 515.1	6/30/00	0.132	E83012	ua
2042	Hexachlorocyclopentadiene(50)	N007786	<0.02105	ug/L	EPA 508	6/26/00	0.02105	E83012	ua
2046	Carbofuran (40)	N007786	<0.900	ug/L	EPA 531.1	7/12/00	0.900	E83012	ua
2050	Atrazine (3)	N007786	<0.658	ug/L	EPA 507	6/26/00	0.658	E83012	ua
2051	Alachlor (2)	N007786	<0.0658	ug/L	EPA 507	6/26/00	0.0658	E83012	ua
2065	Heptachlor (0.4)	N007786	<0.0568	ug/L	EPA 508	6/26/00	0.0568	E83012	ua
2067	Heptachlor Epoxide (0.2)	N007786	<0.0258	ug/L	EPA 508	6/26/00	0.0258	E83012	ua
2105	2,4-D (70)	N007786	<0.381	ug/L	EPA 515.1	6/30/00	0.381	E83012	ua
2110	2,4,5-TP (Silvex) (50)	N007786	<0.0263	ug/L	EPA 515.1	6/30/00	0.0263	E83012	ua
2274	Hexachlorobenzene (1)	N007786	<0.0105	ug/L	EPA 525.2	6/27/00	0.0105	E83012	ua
2306	Benzo(a)pyrene (.2)	N007786	<0.0533	ug/L	EPA 525.2	6/27/00	0.0533	E83012	ua
2326	Pentachlorophenol (1)	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
2383	PCB (0.5)	N007786	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
2931	Dibromochloropropane (.2)	N007786	<0.020	ug/L	EPA 504	6/23/00	0.020	E83012	ua
2946	Ethylene Dibromide (0.02)	N007786	<0.010	ug/L	EPA 504	6/23/00	0.010	E83012	ua
2959	Chlordane (2)	N007786	<1.00	ug/L	EPA 508	6/26/00	1.00	E83012	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Volatile Organic Analysis								
	62-550.310(2)(b)								
	PWS028								
2378	1,2,4-Trichlorobenzene (70)	N007786	<0.220	ug/L	EPA 524.2	6/23/00	0.220	E83012	ua
2380	Cis-1,2-Dichloroethylene (70)	N007786	<0.030	ug/L	EPA 524.2	6/23/00	0.030	E83012	ua
2955	Xylenes (Total) (10,000)	N007786	<0.240	ug/L	EPA 524.2	6/23/00	0.240	E83012	ua
2964	Dichloromethane (5)	N007786	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
2968	O-Dichlorobenzene (600)	N007786	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
2969	Para-Dichlorobenzene (75)	N007786	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2976	Vinyl Chloride (1)	N007786	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2977	1,1-Dichloroethylene (7)	N007786	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2979	Trans-1,2-Dichloroethylene(100)	N007786	<0.120	ug/L	EPA 524.2	6/23/00	0.120	E83012	ua
2980	1,2-Dichloroethane (3)	N007786	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2981	1,1,1-Trichloroethane (200)	N007786	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
2982	Carbon Tetrachloride (3)	N007786	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2983	1,2-Dichloropropane (5)	N007786	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
2984	Trichloroethylene (3)	N007786	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2985	1,1,2-Trichloroethane (5)	N007786	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
2987	Tetrachloroethylene (3)	N007786	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
2989	Monochlorobenzene (100)	N007786	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
2990	Benzene (1)	N007786	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
2991	Toluene (1000)	N007786	<0.410	ug/L	EPA 524.2	6/23/00	0.410	E83012	ua
2992	Ethylbenzene (700)	N007786	<0.470	ug/L	EPA 524.2	6/23/00	0.470	E83012	ua
2996	Styrene (100)	N007786	<0.470	ug/L	EPA 524.2	6/23/00	0.470	E83012	ua
	Trihalomethane Analysis								
	62-550.310(2)(a)								
	PWS027								
2950	Total THM's (0.10)	N007786	0.00048	mg/L	EPA 524.2	6/23/00	0.00036	E83012	ua
	Radiochemical Analysis								
	62-550.310(5)								
	PWS033								
4000	Gross Alpha	N007786	15.9	pCi/L	EPA 900.0	6/27/00	3.4	E83033	ua
4020	Radium 226	N007786	8.8	pCi/L	EPA 903.1	6/30/00	0.2	E83033	ua
4030	Radium 228	N007786	1.0	pCi/L	Brks/Blnchrd	6/30/00	0.9	E83033	ua
	Unregulated Group I Analysis								
	62-550.405								
	PWS035								
2021	Carbaryl	N007786	<0.599	ug/L	EPA 531.1	7/12/00	0.599	E83012	ua
2022	Methomyl	N007786	<0.254	ug/L	EPA 531.1	7/12/00	0.254	E83012	ua
2043	Aldicarb Sulfoxide	N007786	<0.850	ug/L	EPA 531.1	7/12/00	0.850	E83012	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
2044	Aldicarb Sulfone	N007786	<0.647	ug/L	EPA 531.1	7/12/00	0.647	E83012	ua
2045	Metolachlor	N007786	<0.526	ug/L	EPA 507	6/26/00	0.526	E83012	ua
2047	Aldicarb	N007786	<1.04	ug/L	EPA 531.1	7/12/00	1.04	E83012	ua
2066	3-Hydroxycarbofuran	N007786	<1.13	ug/L	EPA 531.1	7/12/00	1.13	E83012	ua
2077	Propachlor	N007786	<0.40	ug/L	EPA 508	6/26/00	0.40	E83012	ua
2356	Aldrin	N007786	<0.055	ug/L	EPA 508	6/26/00	0.055	E83012	ua
2364	Dieldrin	N007786	<0.02842	ug/L	EPA 508	6/26/00	0.02842	E83012	ua
2440	Dicamba	N007786	<0.0263	ug/L	EPA 515.1	6/30/00	0.0263	E83012	ua
2595	Metribuzin	N007786	<0.126	ug/L	EPA 507	6/26/00	0.126	E83012	ua
2076	Butachlor	N007786	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua

Unregulated Group II Analysis

62-550.410

PWS034

2210	Chloromethane	N007786	<0.350	ug/L	EPA 524.2	6/23/00	0.350	E83012	ua
2212	Dichlorodiflouromethane	N007786	<0.50	ug/L	EPA 524.2	6/23/00	0.50	E83012	ua
2214	Bromomethane	N007786	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2216	Chloroethane	N007786	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2218	Trichlorofluoromethane	N007786	<0.280	ug/L	EPA 524.2	6/23/00	0.280	E83012	ua
2251	Methyl-Tert-Butyl-Ether	N007786	<0.270	ug/L	EPA 524.2	6/23/00	0.270	E83012	ua
2408	Dibromomethane	N007786	<0.030	ug/L	EPA 524.2	6/23/00	0.030	E83012	ua
2410	1,1-Dichloropropylene	N007786	<0.060	ug/L	EPA 524.2	6/23/00	0.060	E83012	ua
2412	1,3-Dichloropropane	N007786	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
2413	1,3-Dichloropropene	N007786	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
2414	1,2,3-Trichloropropane	N007786	<0.390	ug/L	EPA 524.2	6/23/00	0.390	E83012	ua
2416	2,2-Dichloropropane	N007786	<0.380	ug/L	EPA 524.2	6/23/00	0.380	E83012	ua
2941	Chloroform	N007786	0.480	ug/L	EPA 524.2	6/23/00	0.160	E83012	ua
2942	Bromoform	N007786	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
2943	Bromodichloromethane	N007786	<0.360	ug/L	EPA 524.2	6/23/00	0.360	E83012	ua
2944	Dibromochloromethane	N007786	<0.270	ug/L	EPA 524.2	6/23/00	0.270	E83012	ua
2965	O-Chlorotoluene	N007786	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
2966	P-Chlorotoluene	N007786	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2967	M-Dichlorobenzene	N007786	<0.200	ug/L	EPA 524.2	6/23/00	0.200	E83012	ua
2978	1,1-Dichloroethane	N007786	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2986	1,1,1,2-Tetrachloroethane	N007786	<0.130	ug/L	EPA 524.2	6/23/00	0.130	E83012	ua
2988	1,1,2,2-Tetrachloroethane	N007786	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
2993	Bromobenzene	N007786	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua

Unregulated Group III Analysis

62-550.415

PWS036 & 037

2262	Isophorone	N007786	<7.45	ug/L	EPA 625	6/23/00	7.45	E83012	ua
2270	2,4-Dinitrotoluene	N007786	<4.90	ug/L	EPA 625	6/23/00	4.90	E83012	ua
2282	Dimethylphthalate	N007786	<9.71	ug/L	EPA 625	6/23/00	9.71	E83012	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
2284	Diethylphthalate	N007786	<5.09	ug/L	EPA 625	6/23/00	5.09	E83012	ua
2290	Di-n-Butylphthalate	N007786	<4.11	ug/L	EPA 625	6/23/00	4.11	E83012	ua
2294	Butyl benzyl phthalate	N007786	<2.62	ug/L	EPA 625	6/23/00	2.62	E83012	ua
9089	Di-n-octylphthalate	N007786	<2.10	ug/L	EPA 625	6/23/00	2.10	E83012	ua
9108	2-Chlorophenol	N007786	<4.21	ug/L	EPA 625	6/23/00	4.21	E83012	ua
9112	2-Methyl-4,6-dinitophenol	N007786	<4.10	ug/L	EPA 625	6/23/00	4.10	E83012	ua
9115	Phenol	N007786	<2.24	ug/L	EPA 625	6/23/00	2.24	E83012	ua
9116	2,4,6-Trichlorophenol	N007786	<4.57	ug/L	EPA 625	6/23/00	4.57	E83012	ua

EPA 608

A-BHC	N007786	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
B-BHC	N007786	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
D-BHC	N007786	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
G-BHC (Lindane)	N007786	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
Heptachlor	N007786	<0.0568	ug/L	EPA 608	6/26/00	0.0568	E83012	ua
Aldrin	N007786	<0.055	ug/L	EPA 608	6/26/00	0.055	E83012	ua
Heptachlor Epoxide	N007786	<0.0258	ug/L	EPA 608	6/26/00	0.0258	E83012	ua
Endosulfan I	N007786	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
4,4-DDE	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Dieldrin	N007786	<0.02842	ug/L	EPA 508	6/26/00	0.02842	E83012	ua
Endrin	N007786	<0.0263	ug/L	EPA 608	6/26/00	0.0263	E83012	ua
4,4-DDD	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Endosulfan II	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
4,4-DDT	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Endrin Aldehyde	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Endosulfan Sulfate	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Chlordane	N007786	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua
Toxaphene	N007786	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua
PCB-1016	N007786	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1221	N007786	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1232	N007786	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1242	N007786	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1248	N007786	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1254	N007786	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1260	N007786	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
Methoxychlor	N007786	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua

EPA 624 - Purgeable Organics

Chloromethane	N007786	<0.350	ug/L	EPA 524.2	6/23/00	0.350	E83012	ua
Vinyl Chloride	N007786	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Bromomethane	N007786	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
	Chloroethane	N007786	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
	Trichlorofluoromethane	N007786	<0.280	ug/L	EPA 524.2	6/23/00	0.280	E83012	ua
	1,1-Dichloroethene	N007786	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
	Methylene Chloride	N007786	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
	Trans-1,2-Dichloroethene	N007786	<0.120	ug/L	EPA 524.2	6/23/00	0.120	E83012	ua
	1,1-Dichloroethane	N007786	<1.00	ug/L	EPA 524.2	6/23/00	1.00	E83012	ua
	Chloroform	N007786	0.480	ug/L	EPA 524.2	6/23/00	0.160	E83012	ua
	1,1,1-Trichloroethane	N007786	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
	Carbon Tetrachloride	N007786	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
	1,2-Dichloroethane	N007786	<1.00	ug/L	EPA 524.2	6/23/00	1.00	E83012	ua
	Benzene	N007786	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
	Trichloroethene	N007786	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
	1,2-Dichloropropane	N007786	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
	Bromodichloromethane	N007786	<0.360	ug/L	EPA 524.2	6/23/00	0.360	E83012	ua
	2-Chloroethylvinyl Ether	N007786	<10.0	ug/L	EPA 624	6/21/00	10.0	E83012	ua
	Cis-1,3-dichloropropene	N007786	<1.00	ug/L	EPA 524.2	6/23/00	1.00	E83012	ua
	Toluene	N007786	<0.410	ug/L	EPA 524.2	6/23/00	0.410	E83012	ua
	Trans-1,3-Dichloropropene	N007786	<0.500	ug/L	EPA 524.2	6/23/00	0.500	E83012	ua
	1,1,2-Trichloroethane	N007786	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
	Tetrachloroethene	N007786	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
	Dibromochloromethane	N007786	<0.270	ug/L	EPA 524.2	6/23/00	0.270	E83012	ua
	Chlorobenzene	N007786	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
	Ethylbenzene	N007786	<0.470	ug/L	EPA 524.2	6/23/00	0.470	E83012	ua
	Bromoform	N007786	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
	1,1,2,2-Tetrachloroethane	N007786	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
	1,3-Dichlorobenzene	N007786	<0.200	ug/L	EPA 524.2	6/23/00	0.200	E83012	ua
	1,4-Dichlorobenzene	N007786	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
	1,2-Dichlorobenzene	N007786	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua

EPA 625 - Semivolatile Organics

N-Nitrosodimethylamine	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
Phenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
Bis(2-Chloroethyl)Ether	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
2-Chlorophenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
1,3-Dichlorobenzene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
1,4-Dichlorobenzene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
1,2-Dichlorobenzene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
Bis(2-Chloroisopropyl)ether	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
N-Nitroso-di-n-propylamine	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
Hexachloroethane	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
Nitrobenzene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	2-Nitrophenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	2,4-Dimethylphenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Bis(2-Chloroethoxy)Methane	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	2,4-Dichlorophenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	1,2,4-Trichlorobenzene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Naphthalene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Hexachlorobutadiene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	4-Chloro-3-Methylphenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	2-Methylnaphthalene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	1-Methylnaphthalene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Hexachlorocyclopentadiene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	2,4,6-Trichlorophenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	2-Chloronaphthalene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Dimethylphthalate	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Acenaphthene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Acenaphthylene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	2,4-Dinitrophenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	4-Nitrophenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	2,4-Dinitrotoluene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	2,6-Dinitrotoluene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Diethylphthalate	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	4-Chlorophenyl-phenyl ether	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Fluorene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	4,6-Dinitro-2-Methylphenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	N-Nitrosodiphenylamine	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	4-Bromophenyl-phenyl ether	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Hexachlorobenzene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	B-BHC	N007786	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Pentachlorophenol	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Phenanthrene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Anthracene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	D-BHC	N007786	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Heptachlor	N007786	<0.0568	ug/L	EPA 608	6/23/00	0.0568	E83012	ua
	Di-n-Butylphthalate	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Aldrin	N007786	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Heptachlor Epoxide	N007786	<0.0258	ug/L	EPA 508	6/23/00	0.0258	E83012	ua
	Fluoranthene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Benzidine	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Pyrene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Endosulfan I	N007786	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	4,4-DDE	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Dieldrin	N007786	<0.02842	ug/L	EPA 508	6/23/00	0.02842	E83012	ua
	Endrin	N007786	<0.0263	ug/L	EPA 508	6/23/00	0.0263	E83012	ua
	4,4-DDD	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Endosulfan II	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Butylbenzylphthalate	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	4,4-DDT	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Endosulfan Sulfate	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	3,3-Dichlorobenzidine	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Benzo(a)Anthracene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Bis(2-Ethylhexyl)Phthalate	N007786	<1.76	ug/L	EPA 525.2	6/23/00	1.76	E83012	ua
	Chrysene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Di-n-octylophthalate	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Benzo(d)Fluoranthene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Benzo(k)Fluoranthene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Benzo(a)Pyrene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Indeno(1,2,3-cd)Pyrene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Dibenzo(a,h)Anthracene	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Benzo(g,h,i)Perylene	N007786	<5.1282	ug/L	EPA 625	6/23/00	5.1282	E83012	ua
	Chlordane	N007786	<0.526	ug/L	EPA 508	6/23/00	0.526	E83012	ua
	Endrin Aldehyde	N007786	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Isophorone	N007786	<10.256	ug/L	EPA 625	6/23/00	10.256	E83012	ua
	Toxaphene	N007786	<1.00	ug/L	EPA 608	6/26/00	1.00	E83012	ua
	PCB 1016	N007786	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1221	N007786	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1232	N007786	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1242	N007786	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1248	N007786	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1254	N007786	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1260	N007786	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	Dioxin Screen	N007786	<10.0	ug/L	EPA 8270C	6/23/00	10.0	E83012	ua
	BOD	N007786	<1	mg/L	EPA 405.1	6/17/00	14:00 1	E84380	ua
	Chemical Oxygen Demand	N007786	16.2	mg/L	EPA 410.4	6/19/00	5.5	E84380	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Ammonia-N	N007786	<0.05	mg/L	EPA 350.3	6/20/00	0.05	E84380	ua
	Ortho-phosphate	N007786	<0.003	mg/L	EPA 365.2	6/17/00	0.003	E84380	ua
	Phosphorus, Total	N007786	0.031	mg/L	EPA6010B	6/21/00	0.010	E84380	ua
	Nitrogen, Organic	N007786	<0.1	mg/L	EPA 351.2	6/20/00	0.1	E84380	ua
	Nitrogen, Total Kjeldahl	N007786	<0.1	mg/L	EPA 351.2	6/20/00	0.1	E84380	ua
	Total Coliform	N007786	<1	col/100ml	SM9222B	6/17/00	15:40 1	E84380	ua
	Hardness, Total	N007786	6,850	mg/L	EPA 130.2	6/28/00	1.0	E84380	ua
	Non-Carb. Hardness	N007786	6,736	mg/L	Cal.	6/28/00		E84380	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Alkalinity	N007786	114	mg/L	EPA 310.1	6/28/00	3.0	E84380	ua
	Calcium	N007786	365	mg/L	EPA 200.7	6/21/00	0.0023	E84380	ua
	Magnesium	N007786	770	mg/L	EPA 200.7	6/21/00	0.0056	E84380	ua
	Potassium	N007786	436	mg/L	EPA 200.7	6/21/00	0.055	E84380	ua

Field Data

pH, Field	N007786	7.89	std unit	EPA 150.1	6/16/00	n/a	E84380	ua
Conductivity, Field	N007786	51,540	umhos/cm	EPA 120.1	6/16/00	1.0	E84380	ua
Water Temperature	N007786	24.2	°C	EPA 170.1	6/16/00	0.1	E84380	ua
Dissolved Oxygen, Field	N007786	4.44	mg/L	EPA 360.1	6/16/00	0.10	E84380	ua
Salinity, Field	N007786	36.2	%	SM2520B	6/16/00		E84380	ua
Turbidity, Field	N007786	0.84	NTU	EPA 180.1	6/16/00	0.10	E84380	ua
Hydrogen Sulfide, Field	N007786	0.0	mg/L	HACH	6/16/00	0.0	E84380	ua

Approved by:

Debra Sanders
Laboratory Director

Comments:

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

INTAKE #: 535577

Sanders Laboratories
Environmental Testing Services

Date *12-Jul-00*

Project Name:	Dual Zone, Key West	
Project Location:	MW-Lower Zone	
Sample Supply:	Ground Water	
Collector:	Will Dromgoole	
Sample Received Date/Time:	6/16/00	22:45

Youngquist Brothers, Inc.
15465 Pine Ridge Road

Fort Myers, FL 33908-

Inorganic Analysis

62-550.310(1)

PWS030

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
1005	Arsenic (0.05)	N007787	<0.0028	mg/L	EPA 200.7	6/21/00	0.0022	E84380	ua
1010	Barium (2)	N007787	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1015	Cadmium (0.005)	N007787	<0.0002	mg/L	EPA 200.7	6/21/00	0.0002	E84380	ua
1020	Chromium (0.1)	N007787	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1024	Cyanide (0.2)	N007787	<0.020	mg/L	SM4500CNE	6/27/00	0.020	E83012	ua
1025	Fluoride (4.0)	N007787	1.1	mg/L	SM4500FC	6/19/00	0.1	E84380	ua
1030	Lead (0.015)	N007787	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1035	Mercury (0.002)	N007787	<0.001	mg/L	SM3112B	6/22/00	0.001	E84380	ua
1036	Nickel (0.1)	N007787	0.002	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1040	Nitrate (10)	N007787	<0.01	mg/L	SM4500NO3E	6/19/00	0.01	E84380	ua
1041	Nitrite (1)	N007787	<0.01	mg/L	SM4500NO3E	6/16/00	0.01	E84380	ua
1045	Selenium (0.05)	N007787	<0.0016	mg/L	EPA 200.7	6/21/00	0.0016	E84380	ua
1052	Sodium (160)	N007787	12,000	mg/L	EPA 200.7	6/29/00	0.350	E84380	ua
1074	Antimony (0.006)	N007787	<0.0022	mg/L	EPA 200.7	6/21/00	0.0022	E84380	ua
1075	Beryllium (0.004)	N007787	0.0019	mg/L	EPA 200.7	6/21/00	0.0008	E84380	ua
1085	Thallium (0.002)	N007787	<0.0035	mg/L	EPA 200.7	6/21/00	0.0035	E84380	ua

Secondary Chemical Analysis

62-550.320

PWS031

1002	Aluminum (0.2)	N007787	<0.020	mg/L	EPA 200.7	6/21/00	0.020	E84380	ua
1017	Chloride (250)	N007787	21,493	mg/L	SM4500Cl-B	6/19/00	1	E84380	ua
1022	Copper (1.0)	N007787	<0.0012	mg/L	EPA 200.7	6/21/00	0.0012	E84380	ua
1025	Fluoride (2.0)	N007787	1.1	mg/L	SM4500FC	6/19/00	0.1	E84380	ua
1028	Iron (0.3)	N007787	<0.030	mg/L	EPA 200.7	6/21/00	0.030	E84380	ua
1032	Manganese (0.05)	N007787	0.0015	mg/L	EPA 200.7	6/21/00	0.0001	E84380	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

1050 Endeavor Ct. • Nokomis, FL 34275 • Phone: (941) 488-8103 • (800) 255-3108 • Fax: (941) 484-6774

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
1050	Silver (0.1)	N007787	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1055	Sulfate (250)	N007787	2,965	mg/L	EPA 375.4	6/20/00	1	E84380	ua
1095	Zinc (5.0)	N007787	<0.002	mg/L	EPA 200.7	6/21/00	0.002	E84380	ua
1905	Color (15.0)	N007787	3	PtCo units	SM2120B	6/17/00	1	E84380	ua
1920	Odor (3.0)	N007787	<1	TON	SM2150B	6/20/00	1	E84380	ua
1925	pH (6.5-8.5)	N007787	7.74	std units	EPA 150.1	6/29/00	n/a	E84380	ua
1930	Total Dissolved Solids (500)	N007787	37,750	mg/L	EPA 160.1	6/19/00	7	E84380	ua
2905	Foaming Agents (0.5)	N007787	0.020	mg/L	SM5540C	6/21/00	0.020	E83012	ua

Pesticide/PCB Chemical Analysis

62-550.310(2)(c)

PWS029

2005	Endrin (2)	N007787	<0.0263	ug/L	EPA 508	6/26/00	0.0263	E83012	ua
2010	Lindane (0.2)	N007787	<0.0253	ug/L	EPA 508	6/26/00	0.0253	E83012	ua
2015	Methoxychlor (40)	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
2020	Toxaphene (3)	N007787	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua
2031	Dalapon (200)	N007787	<0.844	ug/L	EPA 515.1	6/30/00	0.844	E83012	ua
2032	Diquat (20)	N007787	1.71	ug/L	EPA 549.1	7/12/00	4.00	E83012	ua
2033	Endothall (100)	N007787	<5.00	ug/L	EPA 548	6/22/00	5.00	E83012	ua
2034	Glyphosate (700)	N007787	<3.77	ug/L	EPA 547	6/27/00	3.77	E83012	ua
2035	Di(2-ethylhexyl) adipate (400)	N007787	<0.600	ug/L	EPA 525.2	6/27/00	0.600	E83012	ua
2036	Oxamyl (Vydate) (200)	N007787	<1.13	ug/L	EPA 531.1	7/12/00	1.13	E83012	ua
2037	Simazine (4)	N007787	<0.185	ug/L	EPA 507	6/26/00	0.185	E83012	ua
2039	Di(2-ethylhexyl) phthalate (6)	N007787	<1.32	ug/L	EPA 525.2	6/27/00	1.32	E83012	ua
2040	Picloram (500)	N007787	<0.263	ug/L	EPA 515.1	6/30/00	0.263	E83012	ua
2041	Dinoseb (7)	N007787	<0.132	ug/L	EPA 515.1	6/30/00	0.132	E83012	ua
2042	Hexachlorocyclopentadiene(50)	N007787	<0.02105	ug/L	EPA 508	6/23/00	0.02105	E83012	ua
2046	Carbofuran (40)	N007787	<0.900	ug/L	EPA 531.1	7/12/00	0.900	E83012	ua
2050	Atrazine (3)	N007787	<0.658	ug/L	EPA 507	6/26/00	0.658	E83012	ua
2051	Alachlor (2)	N007787	<0.0658	ug/L	EPA 507	6/26/00	0.0658	E83012	ua
2065	Heptachlor (0.4)	N007787	<0.0568	ug/L	EPA 508	6/26/00	0.0568	E83012	ua
2067	Heptachlor Epoxide (0.2)	N007787	<0.0258	ug/L	EPA 508	6/26/00	0.0258	E83012	ua
2105	2,4-D (70)	N007787	<0.381	ug/L	EPA 515.1	6/30/00	0.381	E83012	ua
2110	2,4,5-TP (Silvex) (50)	N007787	<0.0263	ug/L	EPA 515.1	6/30/00	0.0263	E83012	ua
2274	Hexachlorobenzene (1)	N007787	<0.0105	ug/L	EPA 525.2	6/27/00	0.0105	E83012	ua
2306	Benzo(a)pyrene (.2)	N007787	<0.0533	ug/L	EPA 525.2	6/27/00	0.0533	E83012	ua
2326	Pentachlorophenol (1)	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
2383	PCB (0.5)	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
2931	Dibromochloropropane (.2)	N007787	<0.020	ug/L	EPA 504	6/23/00	0.020	E83012	ua
2946	Ethylene Dibromide (0.02)	N007787	<0.010	ug/L	EPA 504	6/23/00	0.010	E83012	ua
2959	Chlordane (2)	N007787	<1.00	ug/L	EPA 608	6/23/00	1.00	E83012	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Volatile Organic Analysis								
	62-550.310(2)(b)								
	PWS028								
2378	1,2,4-Trichlorobenzene (70)	N007787	<0.220	ug/L	EPA 524.2	6/23/00	0.220	E83012	ua
2380	Cis-1,2-Dichloroethylene (70)	N007787	<0.030	ug/L	EPA 524.2	6/23/00	0.030	E83012	ua
2955	Xylenes (Total) (10,000)	N007787	<0.240	ug/L	EPA 524.2	6/23/00	0.240	E83012	ua
2964	Dichloromethane (5)	N007787	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
2968	O-Dichlorobenzene (600)	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
2969	Para-Dichlorobenzene (75)	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2976	Vinyl Chloride (1)	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2977	1,1-Dichloroethylene (7)	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2979	Trans-1,2-Dichloroethylene(100)	N007787	<0.120	ug/L	EPA 524.2	6/23/00	0.120	E83012	ua
2980	1,2-Dichloroethane (3)	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2981	1,1,1-Trichloroethane (200)	N007787	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
2982	Carbon Tetrachloride (3)	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2983	1,2-Dichloropropane (5)	N007787	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
2984	Trichloroethylene (3)	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2985	1,1,2-Trichloroethane (5)	N007787	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
2987	Tetrachloroethylene (3)	N007787	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
2989	Monochlorobenzene (100)	N007787	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
2990	Benzene (1)	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
2991	Toluene (1000)	N007787	0.510	ug/L	EPA 524.2	6/21/00	0.410	E83012	ua
2992	Ethylbenzene (700)	N007787	<0.470	ug/L	EPA 524.2	6/23/00	0.470	E83012	ua
2996	Styrene (100)	N007787	<0.470	ug/L	EPA 524.2	6/23/00	0.470	E83012	ua
	Trihalomethane Analysis								
	62-550.310(2)(a)								
	PWS027								
2950	Total THM's (0.10)	N007787	<0.00036	mg/L	EPA 524.2	6/23/00	0.00036	E83012	ua
	Radiochemical Analysis								
	62-550.310(5)								
	PWS033								
4000	Gross Alpha	N007787	36.0	pCi/L	EPA 900.0	6/27/00	3.7	E83033	ua
4020	Radium 226	N007787	19.8	pCi/L	EPA 903.1	6/30/00	0.1	E83033	ua
4030	Radium 228	N007787	0.9	pCi/L	Brks/Blnchrd	6/30/00	0.9	E83033	ua
	Unregulated Group I Analysis								
	62-550.405								
	PWS035								
2021	Carbaryl	N007787	<0.599	ug/L	EPA 531.1	7/12/00	0.599	E83012	ua
2022	Methomyl	N007787	<0.254	ug/L	EPA 531.1	7/12/00	0.254	E83012	ua
2043	Aldicarb Sulfoxide	N007787	<0.850	ug/L	EPA 531.1	7/12/00	0.850	E83012	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
2044	Aldicarb Sulfone	N007787	<0.647	ug/L	EPA 531.1	7/12/00	0.647	E83012	ua
2045	Metolachlor	N007787	<0.526	ug/L	EPA 507	6/26/00	0.526	E83012	ua
2047	Aldicarb	N007787	<1.04	ug/L	EPA 531.1	7/12/00	1.04	E83012	ua
2066	3-Hydroxycarbofuran	N007787	<1.13	ug/L	EPA 531.1	7/12/00	1.13	E83012	ua
2077	Propachlor	N007787	<0.40	ug/L	EPA 508	6/26/00	0.40	E83012	ua
2356	Aldrin	N007787	<0.055	ug/L	EPA 508	6/26/00	0.055	E83012	ua
2364	Dieldrin	N007787	<0.02842	ug/L	EPA 508	6/26/00	0.02842	E83012	ua
2440	Dicamba	N007787	<0.0263	ug/L	EPA 515.1	6/30/00	0.0263	E83012	ua
2595	Metribuzin	N007787	<0.126	ug/L	EPA 507	6/26/00	0.126	E83012	ua
2076	Butachlor	N007787	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua

Unregulated Group II Analysis

62-550.410

PWS034

2210	Chloromethane	N007787	<0.350	ug/L	EPA 524.2	6/23/00	0.350	E83012	ua
2212	Dichlorodiflouromethane	N007787	<0.500	ug/L	EPA 524.2	6/23/00	0.500	E83012	ua
2214	Bromomethane	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2216	Chloroethane	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2218	Trichlorofluoromethane	N007787	<0.280	ug/L	EPA 524.2	6/23/00	0.280	E83012	ua
2251	Methyl-Tert-Butyl-Ether	N007787	<0.270	ug/L	EPA 524.2	6/23/00	0.270	E83012	ua
2408	Dibromomethane	N007787	<0.030	ug/L	EPA 524.2	6/23/00	0.030	E83012	ua
2410	1,1-Dichloropropylene	N007787	<0.060	ug/L	EPA 524.2	6/23/00	0.060	E83012	ua
2412	1,3-Dichloropropane	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
2413	1,3-Dichloropropene	N007787	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
2414	1,2,3-Trichloropropane	N007787	<0.390	ug/L	EPA 524.2	6/23/00	0.390	E83012	ua
2416	2,2-Dichloropropane	N007787	<0.380	ug/L	EPA 524.2	6/23/00	0.380	E83012	ua
2941	Chloroform	N007787	<0.160	ug/L	EPA 524.2	6/23/00	0.160	E83012	ua
2942	Bromoform	N007787	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
2943	Bromodichloromethane	N007787	<0.360	ug/L	EPA 524.2	6/23/00	0.360	E83012	ua
2944	Dibromochloromethane	N007787	<0.270	ug/L	EPA 524.2	6/23/00	0.270	E83012	ua
2965	O-Chlorotoluene	N007787	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
2966	P-Chlorotoluene	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2967	M-Dichlorobenzene	N007787	<0.200	ug/L	EPA 524.2	6/23/00	0.200	E83012	ua
2978	1,1-Dichloroethane	N007787	<0.100	ug/L	EPA 524.2	6/23/00	0.100	E83012	ua
2986	1,1,1,2-Tetrachloroethane	N007787	<0.130	ug/L	EPA 524.2	6/23/00	0.130	E83012	ua
2988	1,1,2,2-Tetrachloroethane	N007787	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
2993	Bromobenzene	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua

Unregulated Group III Analysis

62-550.415

PWS036 & 037

2262	Isophorone	N007787	<7.26	ug/L	EPA 625	6/23/00	7.26	E83012	ua
2270	2,4-Dinitrotoluene	N007787	<4.78	ug/L	EPA 625	6/23/00	4.78	E83012	ua
2282	Dimethylphthalate	N007787	<9.47	ug/L	EPA 625	6/23/00	9.47	E83012	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
2284	Diethylphthalate	N007787	<4.96	ug/L	EPA 625	6/23/00	4.96	E83012	ua
2290	Di-n-Butylphthalate	N007787	<4.01	ug/L	EPA 625	6/23/00	4.01	E83012	ua
2294	Butyl benzyl phthalate	N007787	<2.55	ug/L	EPA 625	6/23/00	2.55	E83012	ua
9089	Di-n-octylphthalate	N007787	<2.05	ug/L	EPA 625	6/23/00	2.05	E83012	ua
9108	2-Chlorophenol	N007787	<4.10	ug/L	EPA 625	6/23/00	4.10	E83012	ua
9112	2-Methyl-4,6-dinitophenol	N007787	<4.00	ug/L	EPA 625	6/23/00	4.00	E83012	ua
9115	Phenol	N007787	<2.18	ug/L	EPA 625	6/23/00	2.18	E83012	ua
9116	2,4,6-Trichlorophenol	N007787	<4.46	ug/L	EPA 625	6/23/00	4.46	E83012	ua

EPA 608

A-BHC	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
B-BHC	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
D-BHC	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
G-BHC (Lindane)	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
Heptachlor	N007787	<0.0568	ug/L	EPA 608	6/26/00	0.0568	E83012	ua
Aldrin	N007787	<0.055	ug/L	EPA 608	6/26/00	0.055	E83012	ua
Heptachlor Epoxide	N007787	<0.0258	ug/L	EPA 608	6/26/00	0.0258	E83012	ua
Endosulfan I	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
4,4-DDE	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Dieldrin	N007787	<0.02842	ug/L	EPA 508	6/26/00	0.02842	E83012	ua
Endrin	N007787	<0.0263	ug/L	EPA 608	6/26/00	0.0263	E83012	ua
4,4-DDD	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Endosulfan II	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
4,4-DDT	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Endrin Aldehyde	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Endosulfan Sulfate	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Chlordane	N007787	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua
Toxaphene	N007787	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua
PCB-1016	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1221	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1232	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1242	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1248	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1254	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1260	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
Methoxychlor	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua

EPA 624 - Purgeable Organics

Chloromethane	N007787	<0.350	ug/L	EPA 524.2	6/23/00	0.350	E83012	ua
Vinyl Chloride	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Bromomethane	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
	Chloroethane	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
	Trichlorofluoromethane	N007787	<0.280	ug/L	EPA 524.2	6/23/00	0.280	E83012	ua
	1,1-Dichloroethene	N007787	<0.020	ug/L	EPA 524.2	6/21/00	0.020	E83012	ua
	Methylene Chloride	N007787	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
	Trans-1,2-Dichloroethene	N007787	<0.120	ug/L	EPA 524.2	6/23/00	0.120	E83012	ua
	1,1-Dichloroethane	N007787	<1.00	ug/L	EPA 524.2	6/23/00	1.00	E83012	ua
	Chloroform	N007787	<0.160	ug/L	EPA 524.2	6/23/00	0.160	E83012	ua
	1,1,1-Trichloroethane	N007787	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
	Carbon Tetrachloride	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
	1,2-Dichloroethane	N007787	<1.00	ug/L	EPA 524.2	6/23/00	1.00	E83012	ua
	Benzene	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
	Trichloroethene	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
	1,2-Dichloropropane	N007787	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
	Bromodichloromethane	N007787	<0.360	ug/L	EPA 524.2	6/23/00	0.360	E83012	ua
	2-Chloroethylvinyl Ether	N007787	<10.0	ug/L	EPA 624	6/21/00	10.0	E83012	ua
	Cis-1,3-dichloropropene	N007787	<1.00	ug/L	EPA 524.2	6/23/00	1.00	E83012	ua
	Toluene	N007787	0.510	ug/L	EPA 524.2	6/23/00	0.410	E83012	ua
	Trans-1,3-Dichloropropene	N007787	<0.500	ug/L	EPA 524.2	6/23/00	0.500	E83012	ua
	1,1,2-Trichloroethane	N007787	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
	Tetrachloroethene	N007787	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
	Dibromochloromethane	N007787	<0.270	ug/L	EPA 524.2	6/23/00	0.270	E83012	ua
	Chlorobenzene	N007787	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
	Ethylbenzene	N007787	<0.470	ug/L	EPA 524.2	6/23/00	0.470	E83012	ua
	Bromoform	N007787	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
	1,1,2,2-Tetrachloroethane	N007787	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
	1,3-Dichlorobenzene	N007787	<0.200	ug/L	EPA 524.2	6/23/00	0.200	E83012	ua
	1,4-Dichlorobenzene	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
	1,2-Dichlorobenzene	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua

EPA 625 - Semivolatile Organics

N-Nitrosodimethylamine	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
Phenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
Bis(2-Chloroethyl)Ether	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
2-Chlorophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
1,3-Dichlorobenzene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
1,4-Dichlorobenzene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
1,2-Dichlorobenzene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
Bis(2-Chloroisopropyl)ether	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
N-Nitroso-di-n-propylamine	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
Hexachloroethane	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
Nitrobenzene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	2-Nitrophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2,4-Dimethylphenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Bis(2-Chloroethoxy)Methane	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2,4-Dichlorophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	1,2,4-Trichlorobenzene	N007787	<0.220	ug/L	EPA 625	6/23/00	0.220	E83012	ua
	Naphthalene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Hexachlorobutadiene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	4-Chloro-3-Methylphenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2-Methylnaphthalene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	1-Methylnaphthalene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Hexachlorocyclopentadiene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2,4,6-Trichlorophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2-Chloronaphthalene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Dimethylphthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Acenaphthene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Acenaphthylene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	2,4-Dinitrophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	4-Nitrophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2,4-Dinitrotoluene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2,6-Dinitrotoluene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Diethylphthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	4-Chlorophenyl-phenyl ether	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Fluorene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	4,6-Dinitro-2-Methylphenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	N-Nitrosodiphenylamine	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	4-Bromophenyl-phenyl ether	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Hexachlorobenzene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	B-BHC	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Pentachlorophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Phenanthrene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Anthracene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	D-BHC	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Heptachlor	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Di-n-Butylphthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Aldrin	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Heptachlor Epoxide	N007787	<0.0258	ug/L	EPA 508	6/23/00	0.0258	E83012	ua
	Fluoranthene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Benzidine	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Pyrene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Endosulfan I	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	4,4-DDE	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Dieldrin	N007787	<0.02842	ug/L	EPA 508	6/23/00	0.02842	E83012	ua
	Endrin	N007787	<0.0263	ug/L	EPA 508	6/23/00	0.0263	E83012	ua
	4,4-DDD	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Endosulfan II	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Butylbenzylphthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	4,4-DDT	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Endosulfan Sulfate	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	3,3-Dichlorobenzidine	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Benzo(a)Anthracene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Bis(2-Ethylhexyl)Phthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Chrysene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Di-n-octylophthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Benzo(d)Fluoranthene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Benzo(k)Fluoranthene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Benzo(a)Pyrene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Indeno(1,2,3-cd)Pyrene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Dibenzo(a,h)Anthracene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Benzo(g,h,i)Perylene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Chlordane	N007787	<1.00	ug/L	EPA 608	6/23/00	1.00	E83012	ua
	Endrin Aldehyde	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Isophorone	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Toxaphene	N007787	<1.00	ug/L	EPA 608	6/23/00	1.00	E83012	ua
	PCB 1016	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1221	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1232	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1242	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1248	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1254	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1260	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	Dioxin Screen	N007787	<10.0	ug/L	EPA 8270C	6/23/00	10	E83012	ua
	BOD	N007787	<1	mg/L	EPA 405.1	6/17/00 14:00	1	E84380	ua
	Chemical Oxygen Demand	N007787	19.2	mg/L	EPA 410.4	6/19/00	5.5	E84380	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Ammonia-N	N007787	<0.05	mg/L	EPA 350.3	6/20/00	0.05	E84380	ua
	Ortho-phosphate	N007787	<0.003	mg/L	EPA 365.2	6/17/00	0.003	E84380	ua
	Phosphorus, Total	N007787	0.047	mg/L	EPA 6010B	6/21/00	0.010	E84380	ua
	Nitrogen, Organic	N007787	<0.1	mg/L	EPA 351.2	6/20/00	0.1	E84380	ua
	Nitrogen, Total Kjeldahl	N007787	<0.1	mg/L	EPA 351.2	6/20/00	0.1	E84380	ua
	Total Coliform	N007787	<1	col/100ml	SM9222B	6/17/00	15:40 1	E84380	ua
	Hardness, Total	N007787	6,825	mg/L	EPA 130.2	6/28/00	1.0	E84380	ua
	Non-Carb. Hardness	N007787	6,714	mg/L	Cal.	6/28/00		E84380	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Alkalinity	N007787	111	mg/L	EPA 310.1	6/28/00	3.0	E84380	ua
	Calcium	N007787	332	mg/L	EPA 200.7	6/21/00	0.0023	E84380	ua
	Magnesium	N007787	808	mg/L	EPA 200.7	6/21/00	0.0056	E84380	ua
	Potassium	N007787	440	mg/L	EPA 200.7	6/21/00	0.055	E84380	ua

Field Data

pH, Field	N007787	7.66	std unit	EPA 150.1	6/16/00	n/a	E84380	ua
Conductivity, Field	N007787	50,320	umhos/cm	EPA 120.1	6/16/00	1.0	E84380	ua
Water Temperature	N007787	22.4	°C	EPA 170.1	6/16/00	0.1	E84380	ua
Dissolved Oxygen, Field	N007787	3.96	mg/L	EPA 360.1	6/16/00	0.10	E84380	ua
Salinity, Field	N007787	33.6	%	SM2520B	6/16/00		E84380	ua
Turbidity, Field	N007787	0.43	NTU	EPA 180.1	6/16/00	0.10	E84380	ua
Hydrogen Sulfide, Field	N007787	0.1	mg/L	HACH	6/16/00	0.0	E84380	ua

Approved by:

Comments:

Debra Sanders
Laboratory Director

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUS DY RECORD

PROJECT # 235576.7

Page 1 of 1

Client: Youngquist Bros. Well Drilling
Address:
Phone: Fax:

Report To: Craig Brueggeman
Bill To:
P.O. #:
Project Name: Dual Zone Sampling
Project Location: Key West Injection Well

Sample Supply: G.W.
Customer Type:
Field Report #:
Kit #:
REQUESTED DUE DATE:

Sampled By (PRINT): Will Duomyoke
Sampler Signature:

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL	ANALYSES REQUEST: Para/Sec Inorganics	Pest/PCBs	THM, Gross Alpha	Rad 226+228	Uranium	Gen. Chem. 1	Gen. Chem. 2	Diokin Screen	BOD, COD, Nitr, OP	TP, Tot P, TKN	Total C	(Field) Temp, pH, Cond, Turb, H2S, Salinity	Sample ID #
1	DZMW - Upper Zone	6/16/00	1000	G	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	W007786
2	DZMW - Lower Zone	6/16/00	1030	G	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	W007787

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED / DATE	VIA	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
					6/16/00	2245		6/16/00	2245

COMMENTS:

COOLER #

COOLER SEAL INTACT Yes No

1050 Endeavor Ct., Nokomis, FL 34275-3623 • (941)488-8103 • FAX 484-6774
16880 Gator Road, Fort Myers, FL 33912 • (941) 590-0337 • FAX (941) 590-0536

INTAKE #: 535577

Sanders Laboratories
Environmental Testing Services

Project Name:	Dual Zone, Key West
Project Location:	MW-Lower Zone
Sample Supply:	Ground Water
Collector:	Will Dromgoole
Sample Received Date/Time:	6/16/00 22:45

Date *12-Jul-00*

Youngquist Brothers, Inc.
15465 Pine Ridge Road

Fort Myers, FL 33908-

Inorganic Analysis

62-550.310(1)

PWS030

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
1005	Arsenic (0.05)	N007787	<0.0028	mg/L	EPA 200.7	6/21/00	0.0022	E84380	ua
1010	Barium (2)	N007787	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1015	Cadmium (0.005)	N007787	<0.0002	mg/L	EPA 200.7	6/21/00	0.0002	E84380	ua
1020	Chromium (0.1)	N007787	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1024	Cyanide (0.2)	N007787	<0.020	mg/L	SM4500CNE	6/27/00	0.020	E83012	ua
1025	Fluoride (4.0)	N007787	1.1	mg/L	SM4500FC	6/19/00	0.1	E84380	ua
1030	Lead (0.015)	N007787	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1035	Mercury (0.002)	N007787	<0.001	mg/L	SM3112B	6/22/00	0.001	E84380	ua
1036	Nickel (0.1)	N007787	0.002	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1040	Nitrate (10)	N007787	<0.01	mg/L	SM4500NO3E	6/19/00	0.01	E84380	ua
1041	Nitrite (1)	N007787	<0.01	mg/L	SM4500NO3E	6/16/00	0.01	E84380	ua
1045	Selenium (0.05)	N007787	<0.0016	mg/L	EPA 200.7	6/21/00	0.0016	E84380	ua
1052	Sodium (160)	N007787	12,000	mg/L	EPA 200.7	6/29/00	0.350	E84380	ua
1074	Antimony (0.006)	N007787	<0.0022	mg/L	EPA 200.7	6/21/00	0.0022	E84380	ua
1075	Beryllium (0.004)	N007787	0.0019	mg/L	EPA 200.7	6/21/00	0.0008	E84380	ua
1085	Thallium (0.002)	N007787	<0.0035	mg/L	EPA 200.7	6/21/00	0.0035	E84380	ua

Secondary Chemical Analysis

62-550.320

PWS031

1002	Aluminum (0.2)	N007787	<0.020	mg/L	EPA 200.7	6/21/00	0.020	E84380	ua
1017	Chloride (250)	N007787	21,493	mg/L	SM4500Cl-B	6/19/00	1	E84380	ua
1022	Copper (1.0)	N007787	<0.0012	mg/L	EPA 200.7	6/21/00	0.0012	E84380	ua
1025	Fluoride (2.0)	N007787	1.1	mg/L	SM4500FC	6/19/00	0.1	E84380	ua
1028	Iron (0.3)	N007787	<0.030	mg/L	EPA 200.7	6/21/00	0.030	E84380	ua
1032	Manganese (0.05)	N007787	0.0015	mg/L	EPA 200.7	6/21/00	0.0001	E84380	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

1050 Endeavor Ct. • Nokomis, FL 34275 • Phone: (941) 488-8103 • (800) 255-3108 • Fax: (941) 484-6774

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
1050	Silver (0.1)	N007787	<0.001	mg/L	EPA 200.7	6/21/00	0.001	E84380	ua
1055	Sulfate (250)	N007787	2,965	mg/L	EPA 375.4	6/20/00	1	E84380	ua
,095	Zinc (5.0)	N007787	<0.002	mg/L	EPA 200.7	6/21/00	0.002	E84380	ua
1905	Color (15.0)	N007787	3	PtCo units	SM2120B	6/17/00	1	E84380	ua
1920	Odor (3.0)	N007787	<1	TON	SM2150B	6/20/00	1	E84380	ua
1925	pH (6.5-8.5)	N007787	7.74	std units	EPA 150.1	6/29/00	n/a	E84380	ua
1930	Total Dissolved Solids (500)	N007787	37,750	mg/L	EPA 160.1	6/19/00	7	E84380	ua
2905	Foaming Agents (0.5)	N007787	0.020	mg/L	SM5540C	6/21/00	0.020	E83012	ua

Pesticide/PCB Chemical Analysis

62-550.310(2)(c)

PWS029

2005	Endrin (2)	N007787	<0.0263	ug/L	EPA 508	6/26/00	0.0263	E83012	ua
2010	Lindane (0.2)	N007787	<0.0253	ug/L	EPA 508	6/26/00	0.0253	E83012	ua
2015	Methoxychlor (40)	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
2020	Toxaphene (3)	N007787	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua
2031	Dalapon (200)	N007787	<0.844	ug/L	EPA 515.1	6/30/00	0.844	E83012	ua
2032	Diquat (20)	N007787	1.71	ug/L	EPA 549.1	7/12/00	4.00	E83012	ua
2033	Endothall (100)	N007787	<5.00	ug/L	EPA 548	6/22/00	5.00	E83012	ua
2034	Glyphosate (700)	N007787	<3.77	ug/L	EPA 547	6/27/00	3.77	E83012	ua
2035	Di(2-ethylhexyl) adipate (400)	N007787	<0.600	ug/L	EPA 525.2	6/27/00	0.600	E83012	ua
2036	Oxamyl (Vydate) (200)	N007787	<1.13	ug/L	EPA 531.1	7/12/00	1.13	E83012	ua
?037	Simazine (4)	N007787	<0.185	ug/L	EPA 507	6/26/00	0.185	E83012	ua
2039	Di(2-ethylhexyl) phthalate (6)	N007787	<1.32	ug/L	EPA 525.2	6/27/00	1.32	E83012	ua
2040	Picloram (500)	N007787	<0.263	ug/L	EPA 515.1	6/30/00	0.263	E83012	ua
2041	Dinoseb (7)	N007787	<0.132	ug/L	EPA 515.1	6/30/00	0.132	E83012	ua
2042	Hexachlorocyclopentadiene(50)	N007787	<0.02105	ug/L	EPA 508	6/23/00	0.02105	E83012	ua
2046	Carbofuran (40)	N007787	<0.900	ug/L	EPA 531.1	7/12/00	0.900	E83012	ua
2050	Atrazine (3)	N007787	<0.658	ug/L	EPA 507	6/26/00	0.658	E83012	ua
2051	Alachlor (2)	N007787	<0.0658	ug/L	EPA 507	6/26/00	0.0658	E83012	ua
2065	Heptachlor (0.4)	N007787	<0.0568	ug/L	EPA 508	6/26/00	0.0568	E83012	ua
2067	Heptachlor Epoxide (0.2)	N007787	<0.0258	ug/L	EPA 508	6/26/00	0.0258	E83012	ua
2105	2,4-D (70)	N007787	<0.381	ug/L	EPA 515.1	6/30/00	0.381	E83012	ua
2110	2,4,5-TP (Silvex) (50)	N007787	<0.0263	ug/L	EPA 515.1	6/30/00	0.0263	E83012	ua
2274	Hexachlorobenzene (1)	N007787	<0.0105	ug/L	EPA 525.2	6/27/00	0.0105	E83012	ua
2306	Benzo(a)pyrene (.2)	N007787	<0.0533	ug/L	EPA 525.2	6/27/00	0.0533	E83012	ua
2326	Pentachlorophenol (1)	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
2383	PCB (0.5)	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
2931	Dibromochloropropane (.2)	N007787	<0.020	ug/L	EPA 504	6/23/00	0.020	E83012	ua
2946	Ethylene Dibromide (0.02)	N007787	<0.010	ug/L	EPA 504	6/23/00	0.010	E83012	ua
2959	Chlordane (2)	N007787	<1.00	ug/L	EPA 608	6/23/00	1.00	E83012	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Volatile Organic Analysis								
	62-550.310(2)(b)								
	PWS028								
2378	1,2,4-Trichlorobenzene (70)	N007787	<0.220	ug/L	EPA 524.2	6/23/00	0.220	E83012	ua
2380	Cis-1,2-Dichloroethylene (70)	N007787	<0.030	ug/L	EPA 524.2	6/23/00	0.030	E83012	ua
2955	Xylenes (Total) (10,000)	N007787	<0.240	ug/L	EPA 524.2	6/23/00	0.240	E83012	ua
2964	Dichloromethane (5)	N007787	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
2968	O-Dichlorobenzene (600)	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
2969	Para-Dichlorobenzene (75)	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2976	Vinyl Chloride (1)	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2977	1,1-Dichloroethylene (7)	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2979	Trans-1,2-Dichloroethylene(100)	N007787	<0.120	ug/L	EPA 524.2	6/23/00	0.120	E83012	ua
2980	1,2-Dichloroethane (3)	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2981	1,1,1-Trichloroethane (200)	N007787	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
2982	Carbon Tetrachloride (3)	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2983	1,2-Dichloropropane (5)	N007787	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
2984	Trichloroethylene (3)	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
2985	1,1,2-Trichloroethane (5)	N007787	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
2987	Tetrachloroethylene (3)	N007787	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
2989	Monochlorobenzene (100)	N007787	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
2990	Benzene (1)	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
2991	Toluene (1000)	N007787	0.510	ug/L	EPA 524.2	6/21/00	0.410	E83012	ua
2992	Ethylbenzene (700)	N007787	<0.470	ug/L	EPA 524.2	6/23/00	0.470	E83012	ua
2996	Styrene (100)	N007787	<0.470	ug/L	EPA 524.2	6/23/00	0.470	E83012	ua
	Trihalomethane Analysis								
	62-550.310(2)(a)								
	PWS027								
2950	Total THM's (0.10)	N007787	<0.00036	mg/L	EPA 524.2	6/23/00	0.00036	E83012	ua
	Radiochemical Analysis								
	62-550.310(5)								
	PWS033								
4000	Gross Alpha	N007787	36.0	pCi/L	EPA 900.0	6/27/00	3.7	E83033	ua
4020	Radium 226	N007787	19.8	pCi/L	EPA 903.1	6/30/00	0.1	E83033	ua
4030	Radium 228	N007787	0.9	pCi/L	Brks/Blnchrd	6/30/00	0.9	E83033	ua
	Unregulated Group I Analysis								
	62-550.405								
	PWS035								
2021	Carbaryl	N007787	<0.599	ug/L	EPA 531.1	7/12/00	0.599	E83012	ua
2022	Methomyl	N007787	<0.254	ug/L	EPA 531.1	7/12/00	0.254	E83012	ua
2043	Aldicarb Sulfoxide	N007787	<0.850	ug/L	EPA 531.1	7/12/00	0.850	E83012	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
2044	Aldicarb Sulfone	N007787	<0.647	ug/L	EPA 531.1	7/12/00	0.647	E83012	ua
2045	Metolachlor	N007787	<0.526	ug/L	EPA 507	6/26/00	0.526	E83012	ua
047	Aldicarb	N007787	<1.04	ug/L	EPA 531.1	7/12/00	1.04	E83012	ua
2066	3-Hydroxycarbofuran	N007787	<1.13	ug/L	EPA 531.1	7/12/00	1.13	E83012	ua
2077	Propachlor	N007787	<0.40	ug/L	EPA 508	6/26/00	0.40	E83012	ua
2356	Aldrin	N007787	<0.055	ug/L	EPA 508	6/26/00	0.055	E83012	ua
2364	Dieldrin	N007787	<0.02842	ug/L	EPA 508	6/26/00	0.02842	E83012	ua
2440	Dicamba	N007787	<0.0263	ug/L	EPA 515.1	6/30/00	0.0263	E83012	ua
2595	Metribuzin	N007787	<0.126	ug/L	EPA 507	6/26/00	0.126	E83012	ua
2076	Butachlor	N007787	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua

Unregulated Group II Analysis

62-550.410

PWS034

2210	Chloromethane	N007787	<0.350	ug/L	EPA 524.2	6/23/00	0.350	E83012	ua
2212	Dichlorodiflouromethane	N007787	<0.500	ug/L	EPA 524.2	6/23/00	0.500	E83012	ua
2214	Bromomethane	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2216	Chloroethane	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2218	Trichlorofluoromethane	N007787	<0.280	ug/L	EPA 524.2	6/23/00	0.280	E83012	ua
2251	Methyl-Tert-Butyl-Ether	N007787	<0.270	ug/L	EPA 524.2	6/23/00	0.270	E83012	ua
2408	Dibromomethane	N007787	<0.030	ug/L	EPA 524.2	6/23/00	0.030	E83012	ua
2410	1,1-Dichloropropylene	N007787	<0.060	ug/L	EPA 524.2	6/23/00	0.060	E83012	ua
2412	1,3-Dichloropropane	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
2413	1,3-Dichloropropene	N007787	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
2414	1,2,3-Trichloropropane	N007787	<0.390	ug/L	EPA 524.2	6/23/00	0.390	E83012	ua
2416	2,2-Dichloropropane	N007787	<0.380	ug/L	EPA 524.2	6/23/00	0.380	E83012	ua
2941	Chloroform	N007787	<0.160	ug/L	EPA 524.2	6/23/00	0.160	E83012	ua
2942	Bromoform	N007787	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
2943	Bromodichloromethane	N007787	<0.360	ug/L	EPA 524.2	6/23/00	0.360	E83012	ua
2944	Dibromochloromethane	N007787	<0.270	ug/L	EPA 524.2	6/23/00	0.270	E83012	ua
2965	O-Chlorotoluene	N007787	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
2966	P-Chlorotoluene	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
2967	M-Dichlorobenzene	N007787	<0.200	ug/L	EPA 524.2	6/23/00	0.200	E83012	ua
2978	1,1-Dichloroethane	N007787	<0.100	ug/L	EPA 524.2	6/23/00	0.100	E83012	ua
2986	1,1,1,2-Tetrachloroethane	N007787	<0.130	ug/L	EPA 524.2	6/23/00	0.130	E83012	ua
2988	1,1,2,2-Tetrachloroethane	N007787	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
2993	Bromobenzene	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua

Unregulated Group III Analysis

62-550.415

PWS036 & 037

2262	Isophorone	N007787	<7.26	ug/L	EPA 625	6/23/00	7.26	E83012	ua
2270	2,4-Dinitrotoluene	N007787	<4.78	ug/L	EPA 625	6/23/00	4.78	E83012	ua
2282	Dimethylphthalate	N007787	<9.47	ug/L	EPA 625	6/23/00	9.47	E83012	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
2284	Diethylphthalate	N007787	<4.96	ug/L	EPA 625	6/23/00	4.96	E83012	ua
2290	Di-n-Butylphthalate	N007787	<4.01	ug/L	EPA 625	6/23/00	4.01	E83012	ua
2294	Butyl benzyl phthalate	N007787	<2.55	ug/L	EPA 625	6/23/00	2.55	E83012	ua
9089	Di-n-octylphthalate	N007787	<2.05	ug/L	EPA 625	6/23/00	2.05	E83012	ua
9108	2-Chlorophenol	N007787	<4.10	ug/L	EPA 625	6/23/00	4.10	E83012	ua
9112	2-Methyl-4,6-dinitophenol	N007787	<4.00	ug/L	EPA 625	6/23/00	4.00	E83012	ua
9115	Phenol	N007787	<2.18	ug/L	EPA 625	6/23/00	2.18	E83012	ua
9116	2,4,6-Trichlorophenol	N007787	<4.46	ug/L	EPA 625	6/23/00	4.46	E83012	ua

EPA 608

A-BHC	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
B-BHC	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
D-BHC	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
G-BHC (Lindane)	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
Heptachlor	N007787	<0.0568	ug/L	EPA 608	6/26/00	0.0568	E83012	ua
Aldrin	N007787	<0.055	ug/L	EPA 608	6/26/00	0.055	E83012	ua
Heptachlor Epoxide	N007787	<0.0258	ug/L	EPA 608	6/26/00	0.0258	E83012	ua
Endosulfan I	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
4,4-DDE	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Dieldrin	N007787	<0.02842	ug/L	EPA 508	6/26/00	0.02842	E83012	ua
Endrin	N007787	<0.0263	ug/L	EPA 608	6/26/00	0.0263	E83012	ua
4,4-DDD	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Endosulfan II	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
4,4-DDT	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Endrin Aldehyde	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Endosulfan Sulfate	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
Chlordane	N007787	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua
Toxaphene	N007787	<0.526	ug/L	EPA 508	6/26/00	0.526	E83012	ua
PCB-1016	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1221	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1232	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1242	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1248	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1254	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
PCB-1260	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua
Methoxychlor	N007787	<0.263	ug/L	EPA 508	6/26/00	0.263	E83012	ua

EPA 624 - Purgeable Organics

Chloromethane	N007787	<0.350	ug/L	EPA 524.2	6/23/00	0.350	E83012	ua
Vinyl Chloride	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Bromomethane	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
	Chloroethane	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
	Trichlorofluoromethane	N007787	<0.280	ug/L	EPA 524.2	6/23/00	0.280	E83012	ua
	1,1-Dichloroethene	N007787	<0.020	ug/L	EPA 524.2	6/21/00	0.020	E83012	ua
	Methylene Chloride	N007787	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
	Trans-1,2-Dichloroethene	N007787	<0.120	ug/L	EPA 524.2	6/23/00	0.120	E83012	ua
	1,1-Dichloroethane	N007787	<1.00	ug/L	EPA 524.2	6/23/00	1.00	E83012	ua
	Chloroform	N007787	<0.160	ug/L	EPA 524.2	6/23/00	0.160	E83012	ua
	1,1,1-Trichloroethane	N007787	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
	Carbon Tetrachloride	N007787	<0.290	ug/L	EPA 524.2	6/23/00	0.290	E83012	ua
	1,2-Dichloroethane	N007787	<1.00	ug/L	EPA 524.2	6/23/00	1.00	E83012	ua
	Benzene	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua
	Trichloroethene	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
	1,2-Dichloropropane	N007787	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
	Bromodichloromethane	N007787	<0.360	ug/L	EPA 524.2	6/23/00	0.360	E83012	ua
	2-Chloroethylvinyl Ether	N007787	<10.0	ug/L	EPA 624	6/21/00	10.0	E83012	ua
	Cis-1,3-dichloropropene	N007787	<1.00	ug/L	EPA 524.2	6/23/00	1.00	E83012	ua
	Toluene	N007787	0.510	ug/L	EPA 524.2	6/23/00	0.410	E83012	ua
	Trans-1,3-Dichloropropene	N007787	<0.500	ug/L	EPA 524.2	6/23/00	0.500	E83012	ua
	1,1,2-Trichloroethane	N007787	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
	Tetrachloroethene	N007787	<0.210	ug/L	EPA 524.2	6/23/00	0.210	E83012	ua
	Dibromochloromethane	N007787	<0.270	ug/L	EPA 524.2	6/23/00	0.270	E83012	ua
	Chlorobenzene	N007787	<0.230	ug/L	EPA 524.2	6/23/00	0.230	E83012	ua
	Ethylbenzene	N007787	<0.470	ug/L	EPA 524.2	6/23/00	0.470	E83012	ua
	Bromoform	N007787	<0.310	ug/L	EPA 524.2	6/23/00	0.310	E83012	ua
	1,1,2,2-Tetrachloroethane	N007787	<0.330	ug/L	EPA 524.2	6/23/00	0.330	E83012	ua
	1,3-Dichlorobenzene	N007787	<0.200	ug/L	EPA 524.2	6/23/00	0.200	E83012	ua
	1,4-Dichlorobenzene	N007787	<0.020	ug/L	EPA 524.2	6/23/00	0.020	E83012	ua
	1,2-Dichlorobenzene	N007787	<0.050	ug/L	EPA 524.2	6/23/00	0.050	E83012	ua

EPA 625 - Semivolatile Organics

N-Nitrosodimethylamine	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
Phenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
Bis(2-Chloroethyl)Ether	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
2-Chlorophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
1,3-Dichlorobenzene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
1,4-Dichlorobenzene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
1,2-Dichlorobenzene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
Bis(2-Chloroisopropyl)ether	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
N-Nitroso-di-n-propylamine	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
Hexachloroethane	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
Nitrobenzene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	2-Nitrophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2,4-Dimethylphenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Bis(2-Chloroethoxy)Methane	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2,4-Dichlorophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	1,2,4-Trichlorobenzene	N007787	<0.220	ug/L	EPA 625	6/23/00	0.220	E83012	ua
	Naphthalene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Hexachlorobutadiene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	4-Chloro-3-Methylphenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2-Methylnaphthalene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	1-Methylnaphthalene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Hexachlorocyclopentadiene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2,4,6-Trichlorophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2-Chloronaphthalene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Dimethylphthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Acenaphthene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Acenaphthylene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	2,4-Dinitrophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	4-Nitrophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2,4-Dinitrotoluene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	2,6-Dinitrotoluene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Diethylphthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	4-Chlorophenyl-phenyl ether	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Fluorene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	4,6-Dinitro-2-Methylphenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	N-Nitrosodiphenylamine	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	4-Bromophenyl-phenyl ether	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Hexachlorobenzene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	B-BHC	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Pentachlorophenol	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Phenanthrene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Anthracene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	D-BHC	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Heptachlor	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Di-n-Butylphthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Aldrin	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	Heptachlor Epoxide	N007787	<0.0258	ug/L	EPA 508	6/23/00	0.0258	E83012	ua
	Fluoranthene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Benzidine	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Pyrene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Endosulfan I	N007787	<0.050	ug/L	EPA 608	6/23/00	0.050	E83012	ua
	4,4-DDE	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Dieldrin	N007787	<0.02842	ug/L	EPA 508	6/23/00	0.02842	E83012	ua
	Endrin	N007787	<0.0263	ug/L	EPA 508	6/23/00	0.0263	E83012	ua
	4,4-DDD	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Endosulfan II	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Butylbenzylphthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	4,4-DDT	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Endosulfan Sulfate	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	3,3-Dichlorobenzidine	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Benzo(a)Anthracene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Bis(2-Ethylhexyl)Phthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Chrysene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Di-n-octylophthalate	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Benzo(d)Fluoranthene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Benzo(k)Fluoranthene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Benzo(a)Pyrene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Indeno(1,2,3-cd)Pyrene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Dibenzo(a,h)Anthracene	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Benzo(g,h,i)Perylene	N007787	<5.00	ug/L	EPA 625	6/23/00	5.00	E83012	ua
	Chlordane	N007787	<1.00	ug/L	EPA 608	6/23/00	1.00	E83012	ua
	Endrin Aldehyde	N007787	<0.100	ug/L	EPA 608	6/23/00	0.100	E83012	ua
	Isophorone	N007787	<10.0	ug/L	EPA 625	6/23/00	10.0	E83012	ua
	Toxaphene	N007787	<1.00	ug/L	EPA 608	6/23/00	1.00	E83012	ua
	PCB 1016	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1221	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1232	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1242	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1248	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1254	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	PCB 1260	N007787	<0.50	ug/L	EPA 608	6/23/00	0.50	E83012	ua
	Dioxin Screen	N007787	<10.0	ug/L	EPA 8270C	6/23/00	10	E83012	ua
	BOD	N007787	<1	mg/L	EPA 405.1	6/17/00 14:00	1	E84380	ua
	Chemical Oxygen Demand	N007787	19.2	mg/L	EPA 410.4	6/19/00	5.5	E84380	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Ammonia-N	N007787	<0.05	mg/L	EPA 350.3	6/20/00	0.05	E84380	ua
	Ortho-phosphate	N007787	<0.003	mg/L	EPA 365.2	6/17/00	0.003	E84380	ua
	Phosphorus, Total	N007787	0.047	mg/L	EPA 6010B	6/21/00	0.010	E84380	ua
	Nitrogen, Organic	N007787	<0.1	mg/L	EPA 351.2	6/20/00	0.1	E84380	ua
	Nitrogen, Total Kjeldahl	N007787	<0.1	mg/L	EPA 351.2	6/20/00	0.1	E84380	ua
	Total Coliform	N007787	<1	col/100ml	SM9222B	6/17/00 15:40	1	E84380	ua
	Hardness, Total	N007787	6,825	mg/L	EPA 130.2	6/28/00	1.0	E84380	ua
	Non-Carb. Hardness	N007787	6,714	mg/L	Cal.	6/28/00		E84380	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Alkalinity	N007787	111	mg/L	EPA 310.1	6/28/00	3.0	E84380	ua
	Calcium	N007787	332	mg/L	EPA 200.7	6/21/00	0.0023	E84380	ua
	Magnesium	N007787	808	mg/L	EPA 200.7	6/21/00	0.0056	E84380	ua
	Potassium	N007787	440	mg/L	EPA 200.7	6/21/00	0.055	E84380	ua

Field Data

pH, Field	N007787	7.66	std unit	EPA 150.1	6/16/00	n/a	E84380	ua
Conductivity, Field	N007787	50,320	umhos/cm	EPA 120.1	6/16/00	1.0	E84380	ua
Water Temperature	N007787	22.4	°C	EPA 170.1	6/16/00	0.1	E84380	ua
Dissolved Oxygen, Field	N007787	3.96	mg/L	EPA 360.1	6/16/00	0.10	E84380	ua
Salinity, Field	N007787	33.6	%	SM2520B	6/16/00		E84380	ua
Turbidity, Field	N007787	0.43	NTU	EPA 180.1	6/16/00	0.10	E84380	ua
Hydrogen Sulfide, Field	N007787	0.1	mg/L	HACH	6/16/00	0.0	E84380	ua

Approved by:

Comments:

Debra Sanders
Laboratory Director

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUST Y RECORD

PROJECT # S355762 .7

Page 1 of 1

Client Weaver Bros. Well Drilling
Address
Phone Fax

Report To: Craig Brugger
Bill To:
P.O. #
Project Name Deep Zone Sampling
Project Location: Key West Injection Well

Sample Supply: G.W.
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE:

Sampled By (PRINT) Will Thompson
Sampler Signature

Bottle #	SAMPLE DESCRIPTION	Sample DATE	TIME	TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL	ANALYSES REQUEST: Par&Sec Inorganics	Pest&PCBS, etc	TTHM, Gross Alpha	Rad 226 & 228	Uranium	Comp. 1, 11, III	624, 625	Dioxin Screen	BOD, COD, NH3, OP	TP, Dual TKN	Total C.	(Field) D.O. Temp Cond. pH H2S Turb Salinity	Sample ID #
1	DZMW - Upper Zone	6/16/00	1000	G	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	N007786
2	DZMW - Lower Zone	6/16/00	1030	G	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	N007787

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED / DATE	VIA	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
					6/16/00	2245		6/16/00	2245

COMMENTS:

COOLER #

COOLER SEAL INTACT Yes No

1050 Endeavor Ct., Nokomis, FL 34275-3623 • (941)488-8103 • FAX 484-6774
16880 Gator Road Fort Myers, FL 33912 • (941) 590-0337 • FAX (941) 590-0536

INTAKE #: 531384

Sanders Laboratories
Environmental Testing Services

Date *13-Mar-00*

Project Name:	Injection Well
Project Location:	Key West
Sample Supply:	[redacted]
Collector:	Client
Sample Received Date/Time:	2/7/00 8:15

Youngquist Brothers, Inc.
15465 Pine Ridge Road

Fort Myers, FL 33908-

CH2M HILL/DFB

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
Inorganic Analysis									
62-550.310(1)									
PWS030									
1005	Arsenic (0.05)	N001815	<0.003	mg/L	EPA 200.7	2/21/00	0.003	84352	ua
1010	Barium (2)	N001815	<0.0001	mg/L	EPA 200.7	2/21/00	0.0001	84352	ua
1015	Cadmium (0.005)	N001815	<0.0002	mg/L	EPA 200.7	2/21/00	0.0002	84352	ua
1020	Chromium (0.1)	N001815	0.001	mg/L	EPA 200.7	2/21/00	0.001	84352	ua
'024	Cyanide (0.2)	N001815	<0.0033	mg/L	SM4500CN	2/4/00	0.0033	83139	ua
1025	Fluoride (4.0)	N001815	0.8	mg/L	EPA 340.2	2/24/00	0.1	84352	ua
1030	Lead (0.015)	N001815	0.001	mg/L	EPA 200.7	2/21/00	0.001	84352	ua
1035	Mercury (0.002)	N001815	<0.001	mg/L	EPA 245.1	2/7/00	0.001	84352	ua
1036	Nickel (0.1)	N001815	0.001	mg/L	EPA 200.7	2/21/00	0.001	84352	ua
1040	Nitrate (10)	N001815	0.05	mg/L	EPA 353.2	2/9/00	0.01	84352	ua
1041	Nitrite (1)	N001815	<0.01	mg/L	EPA 354.1	2/9/00	0.01	84352	ua
1045	Selenium (0.05)	N001815	<0.002	mg/L	EPA 200.7	2/21/00	0.002	84352	ua
1052	Sodium (160)	N001815	7,251	mg/L	EPA 200.7	2/21/00	0.003	84352	ua
1074	Antimony (0.006)	N001815	0.00088	mg/L	EPA 200.8	2/17/00	0.00022	83139	ua
1075	Beryllium (0.004)	N001815	<0.00028	mg/L	EPA 200.8	2/17/00	0.00028	83139	ua
1085	Thallium (0.002)	N001815	0.00002	mg/L	EPA 200.8	2/17/00	0.00001	83139	ua
Secondary Chemical Analysis									
62-550.320									
PWS031									
1002	Aluminum (0.2)	N001815	<0.020	mg/L	EPA 200.7	2/21/00	0.020	84352	ua
1017	Chloride (250)	N001815	18,944	mg/L	SM4500Cl-B	2/17/00	1	84352	ua
1022	Copper (1.0)	N001815	<0.0016	mg/L	EPA 200.7	2/21/00	0.0016	84352	ua
1025	Fluoride (2.0)	N001815	0.8	mg/L	EPA 340.2	2/24/00	0.1	84352	ua
1028	Iron (0.3)	N001815	0.503	mg/L	EPA 200.7	2/21/00	0.030	84352	ua
1032	Manganese (0.05)	N001815	0.013	mg/L	EPA 200.7	2/21/00	0.002	84352	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

1050 Endeavor Ct. • Nokomis, FL 34275 • Phone: (941) 488-8103 • (800) 255-3108 • Fax: (941) 484-6774

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
1050	Silver (0.1)	N001815	<0.001	mg/L	EPA 200.7	2/21/00	0.001	84352	ua
1055	Sulfate (250)	N001815	3,083	mg/L	EPA 375.4	2/18/00	1	84352	ua
)95	Zinc (5.0)	N001815	0.003	mg/L	EPA 200	2/21/00	0.002	84352	ua
1905	Color (15.0)	N001815	130	PtCo units	EPA 110.3	2/8/00	1	84352	ua
1920	Odor (3.0)	N001815	<1	TON	EPA 140.1	2/7/00	1	84352	ua
1925	pH (6.5-8.5)	N001815	7.83	std units	EPA 150.1	2/9/00	n/a	84352	ua
1930	Total Dissolved Solids (500)	N001815	35,200	mg/L	EPA 160.1	2/18/00	7	84352	ua
2905	Foaming Agents (1.5)	N001815	<0.159	mg/L	EPA 425.1	2/9/00	0.159	83139	ua

Trihalomethane Analysis

62-550.310(2)(a)

PWS027

	Chloroform	N001815	<0.00022	mg/L	EPA 502.2	2/8/00	0.00022	83139	ua
	Bromodichloromethane	N001815	<0.00021	mg/L	EPA 502.2	2/8/00	0.00021	83139	ua
	Dibromochloromethane	N001815	<0.00014	mg/L	EPA 502.2	2/8/00	0.00014	83139	ua
	Bromoform	N001815	<0.00005	mg/L	EPA 502.2	2/8/00	0.00005	83139	ua
	Total TTHMs	N001815	<0.00022	mg/L	EPA 502.2	2/8/00	0.00022	83139	ua

Volatile Organic Analysis

62-550.310(2)(b)

PWS028

2378	1,2,4-Trichlorobenzene (70)	N001815	<0.406	ug/L	EPA 502.2	2/8/00	0.406	83139	ua
380	Cis-1,2-Dichloroethylene (70)	N001815	<0.250	ug/L	EPA 502.2	2/8/00	0.250	83139	ua
2955	Xylenes (Total) (10,000)	N001815	<0.382	ug/L	EPA 502.2	2/8/00	0.382	83139	ua
2964	Dichloromethane (5)	N001815	<0.389	ug/L	EPA 502.2	2/8/00	0.389	83139	ua
2968	O-Dichlorobenzene (600)	N001815	<0.346	ug/L	EPA 502.2	2/8/00	0.346	83139	ua
2969	Para-Dichlorobenzene (75)	N001815	<0.394	ug/L	EPA 502.2	2/8/00	0.394	83139	ua
2976	Vinyl Chloride (1)	N001815	<0.239	ug/L	EPA 502.2	2/8/00	0.239	83139	ua
2977	1,1-Dichloroethylene (7)	N001815	<0.291	ug/L	EPA 502.2	2/8/00	0.291	83139	ua
2979	Trans-1,2-Dichloroethylene(100)	N001815	<0.315	ug/L	EPA 502.2	2/8/00	0.315	83139	ua
2980	1,2-Dichloroethane (3)	N001815	<0.272	ug/L	EPA 502.2	2/8/00	0.272	83139	ua
2981	1,1,1-Trichloroethane (200)	N001815	<0.347	ug/L	EPA 502.2	2/8/00	0.347	83139	ua
2982	Carbon Tetrachloride (3)	N001815	<0.375	ug/L	EPA 502.2	2/8/00	0.375	83139	ua
2983	1,2-Dichloropropane (5)	N001815	<0.231	ug/L	EPA 502.2	2/8/00	0.231	83139	ua
2984	Trichloroethylene (3)	N001815	<0.291	ug/L	EPA 502.2	2/8/00	0.291	83139	ua
2985	1,1,2-Trichloroethane (5)	N001815	<0.248	ug/L	EPA 502.2	2/8/00	0.248	83139	ua
2987	Tetrachloroethylene (3)	N001815	<0.303	ug/L	EPA 502.2	2/8/00	0.303	83139	ua
2989	Monochlorobenzene (100)	N001815	<0.186	ug/L	EPA 502.2	2/8/00	0.186	83139	ua
2990	Benzene (1)	N001815	<0.186	ug/L	EPA 502.2	2/8/00	0.186	83139	ua
2991	Toluene (1000)	N001815	<0.279	ug/L	EPA 502.2	2/8/00	0.279	83139	ua
2992	Ethylbenzene (700)	N001815	<0.200	ug/L	EPA 502.2	2/8/00	0.200	83139	ua
2996	Styrene (100)	N001815	<0.188	ug/L	EPA 502.2	2/8/00	0.188	83139	ua

Pesticide/PCB Chemical Analysis

62-550.310(2)(c)

PWS029

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
2005	Endrin (2)	N001815	<0.00042	ug/L	EPA 505	2/15/00	0.00042	83139	ua
2010	Lindane (0.2)	N001815	<0.0005	ug/L	EPA 505	2/15/00	0.0005	83139	ua
2015	Methoxychlor (40)	N001815	<0.0044	ug/L	EPA 505	2/15/00	0.0044	83139	ua
2020	Toxaphene (3)	N001815	<0.0085	ug/L	EPA 505	2/15/00	0.0085	83139	ua
2031	Dalapon (200)	N001815	<0.001	ug/L	EPA 515.1	2/25/00	0.001	83139	ua
2032	Diquat (20)	N001815	<0.199	ug/L	EPA 549.1	2/25/00	0.199	83139	ua
2033	Endothall (100)	N001815	<9.0	ug/L	EPA 548	2/21/00	9.0	83139	ua
2034	Glyphosate (700)	N001815	<6.0	ug/L	EPA 547	2/27/00	6.0	83139	ua
2035	Di(2-ethylhexyl) adipate (400)	N001815	<0.6	ug/L	EPA 525.2	2/28/00	0.6	83139	ua
2036	Oxamyl (Vydate) (200)	N001815	<2.0	ug/L	EPA 531.1	2/23/00	2.0	83139	ua
2037	Simazine (4)	N001815	<0.729	ug/L	EPA 505	2/15/00	0.729	83139	ua
2039	Di(2-ethylhexyl) phthalate (6)	N001815	<0.6	ug/L	EPA 525.2	2/28/00	0.6	83139	ua
2040	Picloram (500)	N001815	<0.0477	ug/L	EPA 515.1	2/25/00	0.0477	83139	ua
2041	Dinoseb (7)	N001815	<0.01	ug/L	EPA 515.1	2/25/00	0.01	83139	ua
2042	Hexachlorocyclopentadiene(50)	N001815	<0.1	ug/L	EPA 505	2/15/00	0.1	83139	ua
2046	Carbofuran (40)	N001815	<0.9	ug/L	EPA 531.1	2/23/00	0.9	83139	ua
2050	Atrazine (3)	N001815	<0.1	ug/L	EPA 505	2/15/00	0.1	83139	ua
2051	Alachlor (2)	N001815	<0.0059	ug/L	EPA 505	2/15/00	0.0059	83139	ua
?065	Heptachlor (0.4)	N001815	<0.00044	ug/L	EPA 505	2/15/00	0.00044	83139	ua
J67	Heptachlor Epoxide (0.2)	N001815	<0.00225	ug/L	EPA 505	2/15/00	0.00225	83139	ua
2105	2,4-D (70)	N001815	<0.05	ug/L	EPA 515.1	2/25/00	0.05	83139	ua
2110	2,4,5-TP (Silvex) (50)	N001815	<0.02	ug/L	EPA 515.1	2/25/00	0.02	83139	ua
2274	Hexachlorobenzene (1)	N001815	<0.1	ug/L	EPA 505	2/25/00	0.1	83139	ua
2306	Benzo(a)pyrene (.2)	N001815	<0.02	ug/L	EPA 550	2/15/00	0.02	83139	ua
2326	Pentachlorophenol (1)	N001815	<0.0257	ug/L	EPA 515.1	2/15/00	0.0257	83139	ua
2383	PCB (0.5)	N001815	<0.1	ug/L	EPA 505	2/15/00	0.1	83139	ua
2931	Dibromochloropropane (.2)	N001815	<0.01	ug/L	EPA 504	2/17/00	0.01	83139	ua
2946	Ethylene Dibromide (0.02)	N001815	<0.01	ug/L	EPA 504	2/15/00	0.01	83139	ua
2959	Chlordane (2)	N001815	<0.00083	ug/L	EPA 505	2/15/00	0.00083	83139	ua

Unregulated Group I Analysis

62-550.405

PWS035

2021	Carbaryl	N001815	<2.0	ug/L	EPA 531.1	2/23/00	2.0	83139	ua
2022	Methomyl	N001815	<2.0	ug/L	EPA 531.1	2/23/00	2.0	83139	ua
2043	Aldicarb Sulfoxide	N001815	<2.0	ug/L	EPA 531.1	2/23/00	2.0	83139	ua
2044	Aldicarb Sulfone	N001815	<2.0	ug/L	EPA 531.1	2/23/00	2.0	83139	ua
2045	Metolachlor	N001815	<0.15	ug/L	EPA 507	2/23/00	0.15	83139	ua
2047	Aldicarb	N001815	<1.0	ug/L	EPA 531.1	2/21/00	1.0	83139	ua
'66	3-Hydroxycarbofuran	N001815	<2.0	ug/L	EPA 531.1	2/23/00	2.0	83139	ua

IIRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
2077	Propachlor	N001815	<0.5	ug/L	EPA 508	2/21/00	0.5	83139	ua
2356	Aldrin	N001815	<0.00043	ug/L	EPA 508	2/21/00	0.00043	83139	ua
64	Dieldrin	N001815	<0.00034	ug/L	EPA 508	2/21/00	0.00034	83139	ua
2440	Dicamba	N001815	<0.08	ug/L	EPA 515.1	2/25/00	0.08	83139	ua
2595	Metribuzin	N001815	<0.15	ug/L	EPA 507	2/21/00	0.15	83139	ua
2076	Butachlor	N001815	<0.4	ug/L	EPA 507	2/21/00	0.4	83139	ua

Unregulated Group II Analysis

62-550.410

PWS034

2210	Chloromethane	N001815	<0.223	ug/L	EPA 502.2	2/8/00	0.223	83139	ua
2212	Dichlorodiflouromethane	N001815	<0.294	ug/L	EPA 502.2	2/8/00	0.294	83139	ua
2214	Bromomethane	N001815	<0.374	ug/L	EPA 502.2	2/8/00	0.374	83139	ua
2216	Chloroethane	N001815	<0.223	ug/L	EPA 502.2	2/8/00	0.223	83139	ua
2218	Trichlorofluoromethane	N001815	<0.325	ug/L	EPA 502.2	2/8/00	0.325	83139	ua
2251	Methyl-Tert-Butyl-Ether	N001815	<0.253	ug/L	EPA 502.2	2/8/00	0.253	83139	ua
2408	Dibromomethane	N001815	<0.136	ug/L	EPA 502.2	2/8/00	0.136	83139	ua
2410	1,1-Dichloropropylene	N001815	<0.314	ug/L	EPA 502.2	2/8/00	0.314	83139	ua
2412	1,3-Dichloropropane	N001815	<0.135	ug/L	EPA 502.2	2/8/00	0.135	83139	ua
2413	1,3-Dichloropropene	N001815	<0.5	ug/L	EPA 502.2	2/8/00	0.5	83139	ua
2414	1,2,3-Trichloropropane	N001815	<0.137	ug/L	EPA 502.2	2/8/00	0.137	83139	ua
2416	2,2-Dichloropropane	N001815	<0.435	ug/L	EPA 502.2	2/8/00	0.435	83139	ua
41	Chloroform	N001815	<0.218	ug/L	EPA 502.2	2/8/00	0.218	83139	ua
2942	Bromoform	N001815	<0.052	ug/L	EPA 502.2	2/8/00	0.052	83139	ua
2943	Bromodichloromethane	N001815	<0.211	ug/L	EPA 502.2	2/8/00	0.211	83139	ua
2944	Dibromochloromethane	N001815	<0.141	ug/L	EPA 502.2	2/8/00	0.141	83139	ua
2965	O-Chlorotoluene	N001815	<0.39	ug/L	EPA 502.2	2/8/00	0.39	83139	ua
2966	P-Chlorotoluene	N001815	<0.224	ug/L	EPA 502.2	2/8/00	0.224	83139	ua
2967	M-Dichlorobenzene	N001815	<0.304	ug/L	EPA 502.2	2/8/00	0.304	83139	ua
2978	1,1-Dichloroethane	N001815	<0.271	ug/L	EPA 502.2	2/8/00	0.271	83139	ua
2986	1,1,1,2-Tetrachloroethane	N001815	<0.325	ug/L	EPA 502.2	2/8/00	0.325	83139	ua
2988	1,1,2,2-Tetrachloroethane	N001815	<0.369	ug/L	EPA 502.2	2/8/00	0.369	83139	ua
2993	Bromobenzene	N001815	<0.38	ug/L	EPA 502.2	2/8/00	0.38	83139	ua

Unregulated Group III Analysis

62-550.415

PWS036 & 037

2262	Isophorone	N001815	<0.479	ug/L	EPA 625	2/15/00	0.479	83139	ua
2270	2,4-Dinitrotoluene	N001815	<0.194	ug/L	EPA 625	2/15/00	0.194	83139	ua
2282	Dimethylphthalate	N001815	<0.399	ug/L	EPA 625	2/15/00	0.399	83139	ua
2284	Diethylphthalate	N001815	<0.328	ug/L	EPA 625	2/15/00	0.328	83139	ua
2290	Di-n-Butylphthalate	N001815	<0.252	ug/L	EPA 625	2/15/00	0.252	83139	ua
2294	Butyl benzyl phthalate	N001815	<0.265	ug/L	EPA 625	2/15/00	0.265	83139	ua
389	Di-n-octylphthalate	N001815	<0.214	ug/L	EPA 625	2/15/00	0.214	83139	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
9108	2-Chlorophenol	N001815	<0.303	ug/L	EPA 625	2/15/00	0.303	83139	ua
9112	2-Methyl-4,6-dinitophenol	N001815	<1.532	ug/L	EPA 625	2/15/00	1.532	83139	ua
9115	Phenol	N001815	<0.357	ug/L	EPA 625	2/15/00	0.357	83139	ua
9116	2,4,6-Trichlorophenol	N001815	<0.246	ug/L	EPA 625	2/15/00	0.246	83139	ua

Radiochemical Analysis

62-550.310(5)

PWS033

4000	Gross Alpha	N001815	20.4	pCi/L	EPA 900.0	2/16/00	+/-5.6	83141	ua
4020	Radium 226	N001815	16.1	pCi/L	EPA 903.1	2/18/00	+/-0.7	83141	ua
4030	Radium 228	N001815	1.2	pCi/L	Brks/Blnchrd	2/18/00	+/-0.5	83141	ua

608 - Organochlorine Pesticides

A-BHC	N001815	<0.00056	ug/L	EPA 608	2/21/00	0.00056	83139	ua
B-BHC	N001815	<0.00102	ug/L	EPA 608	2/21/00	0.00102	83139	ua
D-BHC	N001815	<0.00245	ug/L	EPA 608	2/21/00	0.00245	83139	ua
G-BHC (Lindane)	N001815	<0.00031	ug/L	EPA 608	2/21/00	0.00031	83139	ua
Heptachlor	N001815	<0.00044	ug/L	EPA 608	2/21/00	0.00044	83139	ua
Aldrin	N001815	<0.00043	ug/L	EPA 608	2/21/00	0.00043	83139	ua
Heptachlor Epoxide	N001815	<0.00225	ug/L	EPA 608	2/21/00	0.00225	83139	ua
Endosulfan I	N001815	<0.00050	ug/L	EPA 608	2/21/00	0.00050	83139	ua
4,4-DDE	N001815	<0.00312	ug/L	EPA 608	2/21/00	0.00312	83139	ua
Dieldrin	N001815	<0.00034	ug/L	EPA 608	2/21/00	0.00034	83139	ua
Endrin	N001815	<0.00042	ug/L	EPA 608	2/21/00	0.00042	83139	ua
4,4-DDD	N001815	<0.00866	ug/L	EPA 608	2/21/00	0.00866	83139	ua
Endosulfan II	N001815	<0.00068	ug/L	EPA 608	2/21/00	0.00068	83139	ua
4,4-DDT	N001815	<0.00876	ug/L	EPA 608	2/21/00	0.00876	83139	ua
Endrin Aldehyde	N001815	<0.00204	ug/L	EPA 608	2/21/00	0.00204	83139	ua
Endosulfan Sulfate	N001815	<0.00402	ug/L	EPA 608	2/21/00	0.00402	83139	ua
Chlordane	N001815	<0.00083	ug/L	EPA 608	2/21/00	0.00083	83139	ua
Toxaphene	N001815	<0.0085	ug/L	EPA 608	2/21/00	0.0085	83139	ua
PCB-1016	N001815	<0.0475	ug/L	EPA 608	2/21/00	0.0475	83139	ua
PCB-1221	N001815	<0.0305	ug/L	EPA 608	2/21/00	0.0305	83139	ua
PCB-1232	N001815	<0.0525	ug/L	EPA 608	2/21/00	0.0525	83139	ua
PCB-1242	N001815	<0.038	ug/L	EPA 608	2/21/00	0.038	83139	ua
PCB-1248	N001815	<0.0373	ug/L	EPA 608	2/21/00	0.0373	83139	ua
PCB-1254	N001815	<0.0223	ug/L	EPA 608	2/21/00	0.0223	83139	ua
PCB-1260	N001815	<0.0217	ug/L	EPA 608	2/21/00	0.0217	83139	ua
Methoxychlor	N001815	<0.0044	ug/L	EPA 608	2/21/00	0.0044	83139	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst

608 - Organochlorine Pesticides

Chloromethane	N001815	<0.537	ug/L	EPA 624	2/15/00	0.537	83139	ua
Vinyl Chloride	N001815	<0.459	ug/L	EPA 624	2/15/00	0.459	83139	ua
Bromomethane	N001815	<0.504	ug/L	EPA 624	2/15/00	0.504	83139	ua
Chloroethane	N001815	<0.305	ug/L	EPA 624	2/15/00	0.305	83139	ua
Trichlorofluoromethane	N001815	<0.421	ug/L	EPA 624	2/15/00	0.421	83139	ua
1,1-Dichloroethene	N001815	<0.535	ug/L	EPA 624	2/15/00	0.535	83139	ua
Methylene Chloride	N001815	<0.241	ug/L	EPA 624	2/15/00	0.241	83139	ua
Trans-1,2-Dichloroethene	N001815	<0.315	ug/L	EPA 624	2/15/00	0.315	83139	ua
1,1-Dichloroethane	N001815	<0.271	ug/L	EPA 624	2/15/00	0.271	83139	ua
Chloroform	N001815	<0.218	ug/L	EPA 624	2/15/00	0.218	83139	ua
1,1,1-Trichloroethane	N001815	<0.347	ug/L	EPA 624	2/15/00	0.347	83139	ua
Carbon Tetrachloride	N001815	<0.39	ug/L	EPA 624	2/15/00	0.39	83139	ua
1,2-Dichloroethane	N001815	<0.202	ug/L	EPA 624	2/15/00	0.202	83139	ua
Benzene	N001815	<0.252	ug/L	EPA 624	2/15/00	0.252	83139	ua
Trichloroethene	N001815	<0.537	ug/L	EPA 624	2/15/00	0.537	83139	ua
1,2-Dichloropropane	N001815	<0.434	ug/L	EPA 624	2/15/00	0.434	83139	ua
Bromodichloromethane	N001815	<0.211	ug/L	EPA 624	2/15/00	0.211	83139	ua
2-Chloroethylvinyl Ether	N001815	<0.593	ug/L	EPA 624	2/15/00	0.593	83139	ua
Cis-1,3-dichloropropene	N001815	<0.433	ug/L	EPA 624	2/15/00	0.433	83139	ua
Toluene	N001815	<0.457	ug/L	EPA 624	2/15/00	0.457	83139	ua
Trans-1,3-Dichloropropene	N001815	<0.544	ug/L	EPA 624	2/15/00	0.544	83139	ua
1,1,2-Trichloroethane	N001815	<0.443	ug/L	EPA 624	2/15/00	0.443	83139	ua
Tetrachloroethene	N001815	<0.458	ug/L	EPA 624	2/15/00	0.458	83139	ua
Dibromochloromethane	N001815	<0.141	ug/L	EPA 624	2/15/00	0.141	83139	ua
Chlorobenzene	N001815	<0.449	ug/L	EPA 624	2/15/00	0.449	83139	ua
Ethylbenzene	N001815	<0.452	ug/L	EPA 624	2/15/00	0.452	83139	ua
Bromoform	N001815	<0.052	ug/L	EPA 624	2/15/00	0.052	83139	ua
1,1,2,2-Tetrachloroethane	N001815	<0.499	ug/L	EPA 624	2/15/00	0.499	83139	ua
1,3-Dichlorobenzene	N001815	<0.249	ug/L	EPA 624	2/15/00	0.249	83139	ua
1,4-Dichlorobenzene	N001815	<0.375	ug/L	EPA 624	2/15/00	0.375	83139	ua
1,2-Dichlorobenzene	N001815	<0.212	ug/L	EPA 624	2/15/00	0.212	83139	ua

EPA 625 - Semivolatile Organics

N-Nitrosodimethylamine	N001815	<1.0	ug/L	EPA 625	2/15/00	1.0	83139	ua
Phenol	N001815	<0.357	ug/L	EPA 625	2/15/00	0.357	83139	ua
Bis(2-Chloroethyl)Ether	N001815	<0.264	ug/L	EPA 625	2/15/00	0.264	83139	ua
2-Chlorophenol	N001815	<0.303	ug/L	EPA 625	2/15/00	0.303	83139	ua
1,3-Dichlorobenzene	N001815	<0.257	ug/L	EPA 625	2/15/00	0.257	83139	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	1,4-Dichlorobenzene	N001815	<0.326	ug/L	EPA 625	2/15/00	0.326	83139	ua
	1,2-Dichlorobenzene	N001815	<0.302	ug/L	EPA 625	2/15/00	0.302	83139	ua
	Bis(2-Chloroisopropyl)ether	N001815	<0.288	ug/L	EPA 625	2/15/00	0.288	83139	ua
	N-Nitroso-di-n-propylamine	N001815	<0.294	ug/L	EPA 625	2/15/00	0.294	83139	ua
	Hexachloroethane	N001815	<0.295	ug/L	EPA 625	2/15/00	0.295	83139	ua
	Nitrobenzene	N001815	<0.296	ug/L	EPA 625	2/15/00	0.296	83139	ua
	2-Nitrophenol	N001815	<0.399	ug/L	EPA 625	2/15/00	0.399	83139	ua
	2,4-Dimethylphenol	N001815	<0.927	ug/L	EPA 625	2/15/00	0.927	83139	ua
	Bis(2-Chloroethoxy)Methane	N001815	<0.547	ug/L	EPA 625	2/15/00	0.547	83139	ua
	2,4-Dichlorophenol	N001815	<0.75	ug/L	EPA 625	2/15/00	0.75	83139	ua
	1,2,4-Trichlorobenzene	N001815	<0.315	ug/L	EPA 625	2/15/00	0.315	83139	ua
	Naphthalene	N001815	<0.283	ug/L	EPA 625	2/15/00	0.283	83139	ua
	Hexachlorobutadiene	N001815	<0.363	ug/L	EPA 625	2/15/00	0.363	83139	ua
	4-Chloro-3-Methylphenol	N001815	<0.65	ug/L	EPA 625	2/15/00	0.65	83139	ua
	2-Methylnaphthalene	N001815	<0.385	ug/L	EPA 625	2/15/00	0.385	83139	ua
	1-Methylnaphthalene	N001815	<0.415	ug/L	EPA 625	2/15/00	0.415	83139	ua
	Hexachlorocyclopentadiene	N001815	<0.265	ug/L	EPA 625	2/15/00	0.265	83139	ua
	2,4,6-Trichlorophenol	N001815	<0.246	ug/L	EPA 625	2/15/00	0.246	83139	ua
	2-Chloronaphthalene	N001815	<0.506	ug/L	EPA 625	2/15/00	0.506	83139	ua
	Dimethylphthalate	N001815	<0.399	ug/L	EPA 625	2/15/00	0.399	83139	ua
	Acenaphthene	N001815	<0.291	ug/L	EPA 625	2/15/00	0.291	83139	ua
	Acenaphthylene	N001815	<0.262	ug/L	EPA 625	2/15/00	0.262	83139	ua
	2,4-Dinitrophenol	N001815	<0.958	ug/L	EPA 625	2/15/00	0.958	83139	ua
	4-Nitrophenol	N001815	<3.112	ug/L	EPA 625	2/15/00	3.112	83139	ua
	2,4-Dinitrotoluene	N001815	<0.194	ug/L	EPA 625	2/15/00	0.194	83139	ua
	2,6-Dinitrotoluene	N001815	<0.425	ug/L	EPA 625	2/15/00	0.425	83139	ua
	Diethylphthalate	N001815	<0.328	ug/L	EPA 625	2/15/00	0.328	83139	ua
	4-Chlorophenyl-phenyl ether	N001815	<0.305	ug/L	EPA 625	2/15/00	0.305	83139	ua
	Fluorene	N001815	<0.308	ug/L	EPA 625	2/15/00	0.308	83139	ua
	4,6-Dinitro-2-Methylphenol	N001815	<1.532	ug/L	EPA 625	2/15/00	1.532	83139	ua
	N-Nitrosodiphenylamine	N001815	<0.251	ug/L	EPA 625	2/15/00	0.251	83139	ua
	4-Bromophenyl-phenyl ether	N001815	<0.264	ug/L	EPA 625	2/15/00	0.264	83139	ua
	Hexachlorobenzene	N001815	<0.272	ug/L	EPA 625	2/15/00	0.272	83139	ua
	B-BHC	N001815	<0.0010	ug/L	EPA 608	2/21/00	0.0010	83139	ua
	Pentachlorophenol	N001815	<1.08	ug/L	EPA 625	2/15/00	1.08	83139	ua
	Phenanthrene	N001815	<0.28	ug/L	EPA 625	2/15/00	0.28	83139	ua
	Anthracene	N001815	<0.095	ug/L	EPA 625	2/15/00	0.095	83139	ua
	D-BHC	N001815	<0.00245	ug/L	EPA 608	2/21/00	0.00245	83139	ua
	Heptachlor	N001815	<0.00044	ug/L	EPA 608	2/15/00	0.00044	83139	ua
	Di-n-Butylphthalate	N001815	<0.252	ug/L	EPA 625	2/15/00	0.252	83139	ua
	Aldrin	N001815	<0.00043	ug/L	EPA 608	2/21/00	0.00043	83139	ua
	Heptachlor Epoxide	N001815	<0.00023	ug/L	EPA 608	2/21/00	0.00023	83139	ua
	Fluoranthene	N001815	<0.252	ug/L	EPA 625	2/15/00	0.252	83139	ua
	Benzidine	N001815	<0.753	ug/L	EPA 625	2/15/00	0.753	83139	ua

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Pyrene	N001815	<0.342	ug/L	EPA 625	2/15/00	0.342	83139	ua
	Endosulfan I	N001815	<0.0005	ug/L	EPA 608	2/21/00	0.0005	83139	ua
	4,4-DDE	N001815	<0.00312	ug/L	EPA 608	2/21/00	0.00312	83139	ua
	Dieldrin	N001815	<0.00034	ug/L	EPA 608	2/21/00	0.00034	83139	ua
	Endrin	N001815	<0.00042	ug/L	EPA 608	2/21/00	0.00042	83139	ua
	4,4-DDD	N001815	<0.00866	ug/L	EPA 608	2/21/00	0.00866	83139	ua
	Endosulfan II	N001815	<0.00068	ug/L	EPA 608	2/21/00	0.00068	83139	ua
	Butylbenzylphthalate	N001815	<0.265	ug/L	EPA 625	2/15/00	0.265	83139	ua
	4,4-DDT	N001815	<0.00876	ug/L	EPA 608	2/21/00	0.00876	83139	ua
	Endosulfan Sulfate	N001815	<0.00402	ug/L	EPA 608	2/21/00	0.00402	83139	ua
	3,3-Dichlorobenzidine	N001815	<0.309	ug/L	EPA 625	2/15/00	0.309	83139	ua
	Benzo(a)Anthracene	N001815	<0.287	ug/L	EPA 625	2/15/00	0.287	83139	ua
	Bis(2-Ethylhexyl)Phthalate	N001815	<0.242	ug/L	EPA 625	2/28/00	0.242	83139	ua
	Chrysene	N001815	<0.268	ug/L	EPA 625	2/15/00	0.268	83139	ua
	Di-n-octylophthalate	N001815	<0.214	ug/L	EPA 625	2/15/00	0.214	83139	ua
	Benzo(b)Fluoranthene	N001815	<0.454	ug/L	EPA 625	2/15/00	0.454	83139	ua
	Benzo(k)Fluoranthene	N001815	<0.451	ug/L	EPA 625	2/15/00	0.451	83139	ua
	Benzo(a)Pyrene	N001815	<0.244	ug/L	EPA 625	2/15/00	0.244	83139	ua
	Indeno(1,2,3-cd)Pyrene	N001815	<0.311	ug/L	EPA 625	2/15/00	0.311	83139	ua
	Dibenzo(a,h)Anthracene	N001815	<0.603	ug/L	EPA 625	2/15/00	0.603	83139	ua
	Benzo(g,h,i)Perylene	N001815	<0.46	ug/L	EPA 625	2/15/00	0.46	83139	ua
	Chlordane	N001815	<0.00083	ug/L	EPA 608	2/21/00	0.00083	83139	ua
	Endrin Aldehyde	N001815	<0.00204	ug/L	EPA 608	2/21/00	0.00204	83139	ua
	Isophorone	N001815	<0.479	ug/L	EPA 625	2/15/00	0.479	83139	ua
	Toxaphene	N001815	<0.0085	ug/L	EPA 608	2/21/00	0.0085	83139	ua
	PCB 1016	N001815	<0.0475	ug/L	EPA 608	2/21/00	0.0475	83139	ua
	PCB 1221	N001815	<0.0305	ug/L	EPA 608	2/21/00	0.0305	83139	ua
	PCB 1232	N001815	<0.0525	ug/L	EPA 608	2/21/00	0.0525	83139	ua
	PCB 1242	N001815	<0.038	ug/L	EPA 608	2/21/00	0.038	83139	ua
	PCB 1248	N001815	<0.0373	ug/L	EPA 608	2/21/00	0.0373	83139	ua
	PCB 1254	N001815	<0.0223	ug/L	EPA 608	2/21/00	0.0223	83139	ua
	PCB 1260	N001815	<0.0217	ug/L	EPA 608	2/21/00	0.0217	83139	ua
	Dioxin Screen	N001815	<20.0	ug/L	EPA 8270C	2/15/00	20.0	83331	ua
	BOD	N001815	<1	mg/L	EPA 405.1	2/7/00 10:00 1		84352	ua

HRS Certification#'s 84352 and E84380(Nokomis) 85449 and E85457(Ft. Myers)

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst
	Ammonia-N	N001815	<0.05	mg/L	EPA 350.3	2/7/00	0.05	84352	ua
	Ortho-phosphate	N001815	<0.003	mg/L	EPA 365.2	2/9/00	0.003	84352	ua
	Phosphorus, Total	N001815	<0.003	mg/L	EPA 365.2	2/11/00	0.003	84352	ua
	Nitrogen, Organic	N001815	0.3	mg/L	EPA 351.2	2/10/00	0.1	84352	ua
	Nitrogen, Total Kjeldahl	N001815	0.3	mg/L	EPA 351.2	2/10/00	0.1	84352	ua
	Total Coliform	N001815	<1	col/100ml	SM9222B	2/7/00	11:30 1	84352	ua
	Conductivity	N001815	43,700	umhos/cm	EPA 120.1	2/7/00	1.0	84352	ua
	pH, Lab	N001815	7.83	std units	EPA 150.1	2/9/00	n/a	84352	ua

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUS. ODY RECORD

PROJECT # S31384

Page 1 of 1

Client Youngquist Bros

Address

Phone Fax

Report To: Ed McCallers

Bill To:

P.O. #

Project Name Injection Well

Project Location: Key West, FL

Sample Supply: City

Customer Type: Drinking

Field Report #: Water

Kit # Standards

REQUESTED DUE DATE:

Sampled By (PRINT) Client

Sampler Signature

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCl	NaOH	ANALYSES REQUESTED Pri. & Sec. List	TTHM (EPA 524.2)	G.R. Rad 226 & 228	Rad 226 & 228	Unregulated III	Unregulated II	500 (Cond, pH, Alk, Ca, Hard, TDS)	Alk, Cl, pH, TDS	Cond, TDS	TKN	Total Cl2	502.2, 524.2, 625	Sample ID #
1	Injection Well	2/6/00	0800	G	3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	N100185

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED / DATE	VIA	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
					2/7/00	0815		2/7/00	0815

COMMENTS:
Drinking Water Standards

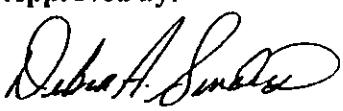
COOLER #

COOLER SEAL INTACT Yes No

1050 Endeavor Ct., Nokomis, FL 34275-3623 • (941)488-8103 • FAX 484-6774

Parameter ID	Analysis	Sample ID	Result	Unit	Method	Analysis Date/Time	D. L.	LabID	Analyst

Approved by:



Debra Sanders
Laboratory Director

Comments:

APPENDIX L

Pressure Gauge Calibration Certificates

KELI

Kimball Electronic Laboratory, Inc.

Precision Measurement Equipment Specialists

Certificate of Calibration

SZ-1

Customer: YOUNGQUIST BROTHERS, INC.
Certificate # 0000063668
Manufacturer: MCDANIEL
Model Number: 300 PSI
Nomenclature: PRESSURE TEST GAUGE
Serial/I.D. # BA0483
Specifications: +/- 0.25%FS
Cal. Procedure: MP03/C1-NAV
KELI Control # BAR-37617

The accuracy and calibration of this instrument is traceable to the National Institute of Standards and Technology through certified standards maintained in the laboratories of KELI Inc. or derived by the ratio type of self-calibration techniques and is guaranteed to meet published specifications. The metrology procedures utilized satisfy the requirements set forth in ANSI/NCSL Z540-1.

In Tolerance When Received? N Cal. Tech:012 Relative Humidity: 51% Temperature: 74 Deg. F

In-House [Y] Cal. Cycle: 12 Mos. Calibration Date: 04/19/1999 Calibration Due: 04/19/2000

Remarks: **ADJUSTED TO MEET MANUFACTURERS SPECIFICATIONS

I.D. #	Standards Used	Cal. Date	Cal. Due
331	AMETEK T-150 DEAD WEIGHT TESTER	07/22/1997	07/22/1999

Quality Assurance

8081 West 21st Lane, Hialeah, Fl. 33016 • Ph (305) 822-3792 • Fax (305) 362-3125

Kimball Electronic Laboratory, Inc.

Precision Measurement Equipment Specialists

Certificate of Calibration

DZ-1

Customer: YOUNGQUIST BROTHERS, INC.
Certificate # 0000071982
Manufacturer: WIKA
Model Number: 300 PSI
Nomenclature: PRESSURE GAUGE
Serial/I.D. # 2708412
Specifications: +/- 0.25% FS
Cal. Procedure: MP06/C1-NAV
KELI Control # YOU-45138

The accuracy and calibration of this instrument is traceable to the National Institute of Standards and Technology through certified standards maintained in the laboratories of KELI Inc. or derived by the ratio type of self-calibration techniques and is guaranteed to meet published specifications. The metrology procedures utilized satisfy the requirements set forth in ANSI/NCSL Z540-1.

In Tolerance When Received? Y Cal. Tech:045 Relative Humidity: 51% Temperature: 73 Deg. F

In-House [Y] Cal. Cycle: 12 Mos. Calibration Date: 12/08/1999 Calibration Due: 12/08/2000

Remarks: ROUTINE CALIBRATION/CERTIFICATION/PREVENTIVE MAINTENANCE.

Standards Used

I.D. #		Cal. Date	Cal. Due
391	EATON UPS 3000BAA PRESSURE INDICATOR	11/09/1999	11/09/2000

Fred King
Quality Assurance

milcert 8/99

8081 West 21st Lane, Hialeah, Fl. 33016 • Ph (305) 822-5792 • Fax (305) 362-3125

Kimball Electronic Laboratory, Inc.

Precision Measurement Equipment Specialists

Certificate of Calibration

EW-1

Customer:	YOUNGQUIST BROTHERS, INC.
Certificate #	0000073707
Manufacturer:	MCDANIEL
Model Number:	2000 PSI
Nomenclature:	PRESSURE GAUGE
Serial/I.D. #	7868119
Specifications:	+/- 0.25% FS
Cal. Procedure:	MP03/C1-NAV
KELI Control #	YOU-45006

The accuracy and calibration of this instrument is traceable to the National Institute of Standards and Technology through certified standards maintained in the laboratories of KELI Inc. or derived by the ratio type of self-calibration techniques and is guaranteed to meet published specifications. The metrology procedures utilized satisfy the requirements set forth in ANSI/NCSL Z540-1.

In Tolerance When Received? Y Cal. Tech:012 Relative Humidity: 50% Temperature: 74 Deg. F

In-House [Y] Cal. Cycle: 12 Mos. Calibration Date: 01/24/2000 Calibration Due: 01/24/2001

Remarks: ADJUSTED TO MEET MANUFACTURERS SPECIFICATIONS

Standards Used

I.D. #		Cal. Date	Cal. Due
331	AMETEK T-150 DEAD WEIGHT TESTER	09/07/1999	09/06/2001

Fred King
Quality Assurance

milcert 9/99

8081 West 21st Lane, Hialeah, Fl. 33016 • Ph (305) 822-5792 • Fax (305) 362-3125

APPENDIX M

Pressure Test Data Sheets

Richard A. Heyman Environmental Protection Facility
City of Key West Florida
DZ-1 6-5/8-Inch Casing Pressure Test

Client: City of Key West

Well Name: DZ-1

Date: 15-Mar-00

Observers: Jack Myers/FDEP
Joe Haberfeld/FDEP
David McNabb/CH2M HILL

Packer Depth: 1,280 feet bpl

Time	Lapse Time (minutes)	Casing Pressure (psi)	Comments
1116	0	101.75	Start Test
1126	10	101.50	
1136	20	101.25	
1146	30	101.00	
1156	40	100.30	
1206	50	100.50	
1216	60	100.75	
1226	70	100.50	
1236	80	100.00	
1306	110	99.75	
1316	120	99.75	Test Complete

Note: 17 gallons of water were released during pressure bleed-off.
feet bpl = feet below pad level

Richard A. Heyman Environmental Protection Facility
City of Key West Florida
EW-1 24-Inch Casing Pressure Summary

Client: City of Key West

Well Name: EW-1

Date: 4-Feb-00

Observers: Nancy Brooking/FDEP
Mark Schilling/CH2M HILL

Packer Depth: 2,750 feet bpl

Time	Lapse Time (minutes)	Casing Pressure (psi)	Comments
0908	0	150.00	Start Test
0918	10	150.75	
0928	20	151.00	
0938	30	151.50	
1008	60	153.00	
1038	90	154.00	
1108	120	155.00	Test Complete

Note: 47 gallons of water were released during pressure bleed-off.
feet bpl = feet below pad level

Richard A. Heyman Environmental Protection Facility
City of Key West Florida
SZ-1 6-5/8-Inch Casing Pressure Test

Client: City of Key West

Well Name: SZ-1

Date: 15-Sep-99

Observers: Mark Schilling/CH2M HILL

Packer Depth: 159 feet bpl

Time	Lapse Time (minutes)	Casing Pressure (psi)	Comments
0835	0	108.0	Start Test
0850	15	107.0	
0905	30	107.0	
0920	45	106.0	
0935	60	106.0	
0950	75	105.0	
1005	90	104.5	
1020	105	104.0	
1035	120	103.0	Test Complete

feet bpl = feet below pad level

APPENDIX N

Video Survey Summary

Richard A. Heyman Environmental Protection Facility
Dual Zone Monitor Well DZ-1
Video Survey Summary

Date: 16-Mar-00
Observer: Mark Schilling
Reviewer: David McNabb

Depth in feet below pad level		Observations
From	To	
0	100	Cloudy water 0 to 23 feet bpl. Casing joint at 29, 59 and 88 feet bpl.
100	200	Casing joint at 118, 147 and 177 feet bpl.
200	300	Casing joint at 206, 236, 266, and 295 feet bpl.
300	400	Casing joint at 325, 354 and 384 feet bpl.
400	500	Casing joint at 413, 443 and 473 feet bpl.
500	600	Casing joint at 502, 532, 561, and 591 feet bpl.
600	700	Casing joint at 620, 650 and 679 feet bpl.
700	800	Casing joint at 709, 738, 768, and 798 feet bpl.
800	900	Casing joint at 828, 857, and 887 feet bpl.
900	1000	Casing joint at 916, 946 and 975 feet bpl.
1000	1100	Casing joint at 1,005, 1,034, 1,064 and 1,093 feet bpl.
1100	1200	Casing joint at 1,123, 1,153 and 1,182 feet bp..
1200	1271	Casing joint at 1,212 and 1,242 feet bpl.
1271	1279	Cement packer
1279	1314	Porous limestone. Total depth at 1,314 feet bpl.

bpl = below pad level

Richard A. Heyman Environmental Protection Facility
Exploratory Well EW-1
Video Survey Summary

Date: 2-Feb-00
Observer: Mark Schilling
Reviewer: David McNabb

Depth in feet below pad level		Observations
From	To	
0	100	Casing joint at 36 and 75 feet bpl.
100	200	Casing joint at 115, 144, and 196 feet bpl.
200	300	Casing joint at 235 and 276 feet bpl.
300	400	Casing joint at 316, 357 and 396 feet bpl.
400	500	Casing joint at 435 and 474 feet bpl.
500	600	Casing joint at 513, 554, and 594 feet bpl.
600	700	Casing joint at 635 and 687 feet bpl.
700	800	Casing joint at 728 and 798 feet bpl.
800	900	Casing joint at 840 and 881 feet bpl.
900	1000	Casing joint at 920 and 995 feet bpl.
1000	1100	Casing joint at 1,037 and 1,079 feet bpl.
1100	1200	Casing joint at 1,114 , 1,149 and 1,188 feet bpl.
1200	1300	Casign joint at 1,228 and 1,263 feet bpl.
1300	1400	Casing jiont at 1,305, 1,346, and 1,388 feet bpl.
1400	1500	Casing joint at 1,426 and 1,467 feet bpl.
1500	1600	Casing joint at 1,501, 1,539 and 1,577 feet bpl.
1600	1700	Casing joint at 1,617, and 1,658 and 1,695 feet bpl.
1700	1800	Casing joint at 1,736 and 1,776 feet bpl.
1800	1900	Casing joint at 1,817 and 1,857 feet bpl.
1900	2000	Casing joint at 1,900, 1,940 and 1,981 feet bpl.
2000	2100	Casing joint at 2,022 and 2,063 feet bpl.
2100	2200	Casing joint at 2,104, 2,145, and 2,186 feet bpl.
2200	2300	Casing joint at 2,226 and 2,265 feet bpl.
2300	2400	Casing joint at 2,304, 2,344, and 2,379 feet bpl.
2400	2500	Casing joint at 2,419, 2,458 and 2,494 feet bpl.
2500	2600	Casing joint at 2,534 and 2,573 feet bpl.
2600	2700	Casing joint at 2,612, and 2,650 and 2,692 feet bpl.
2700	2772	Casing joint at 2,732 feet bpl.
2772	2776	Cement inside casing. Base of casing at 2,776 feet bpl.
2776	2818	Fractured and cevernous..
2818	2838	Large cavern.
2838	2987	Fractured and cevernous.
2987	2996	Large cavern, total depth of well at 2,996 feet bpl.

bpl = below pad level