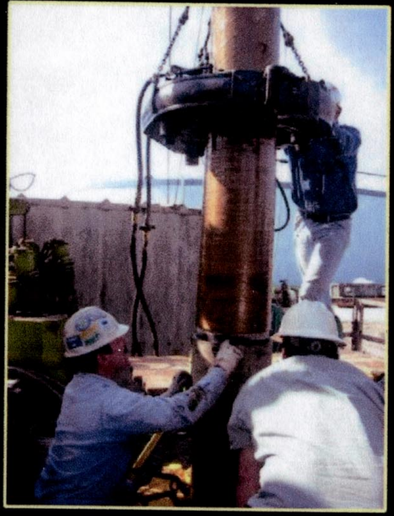
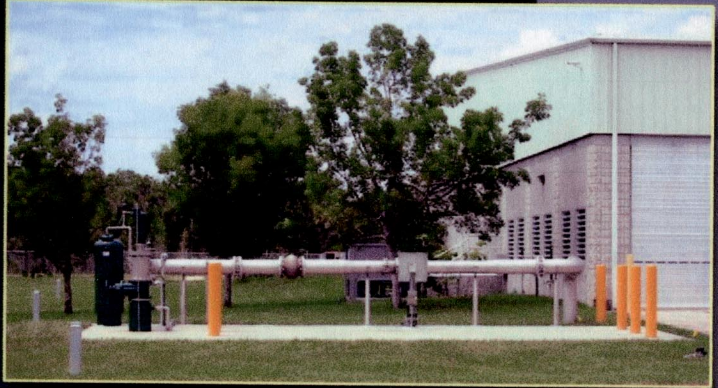
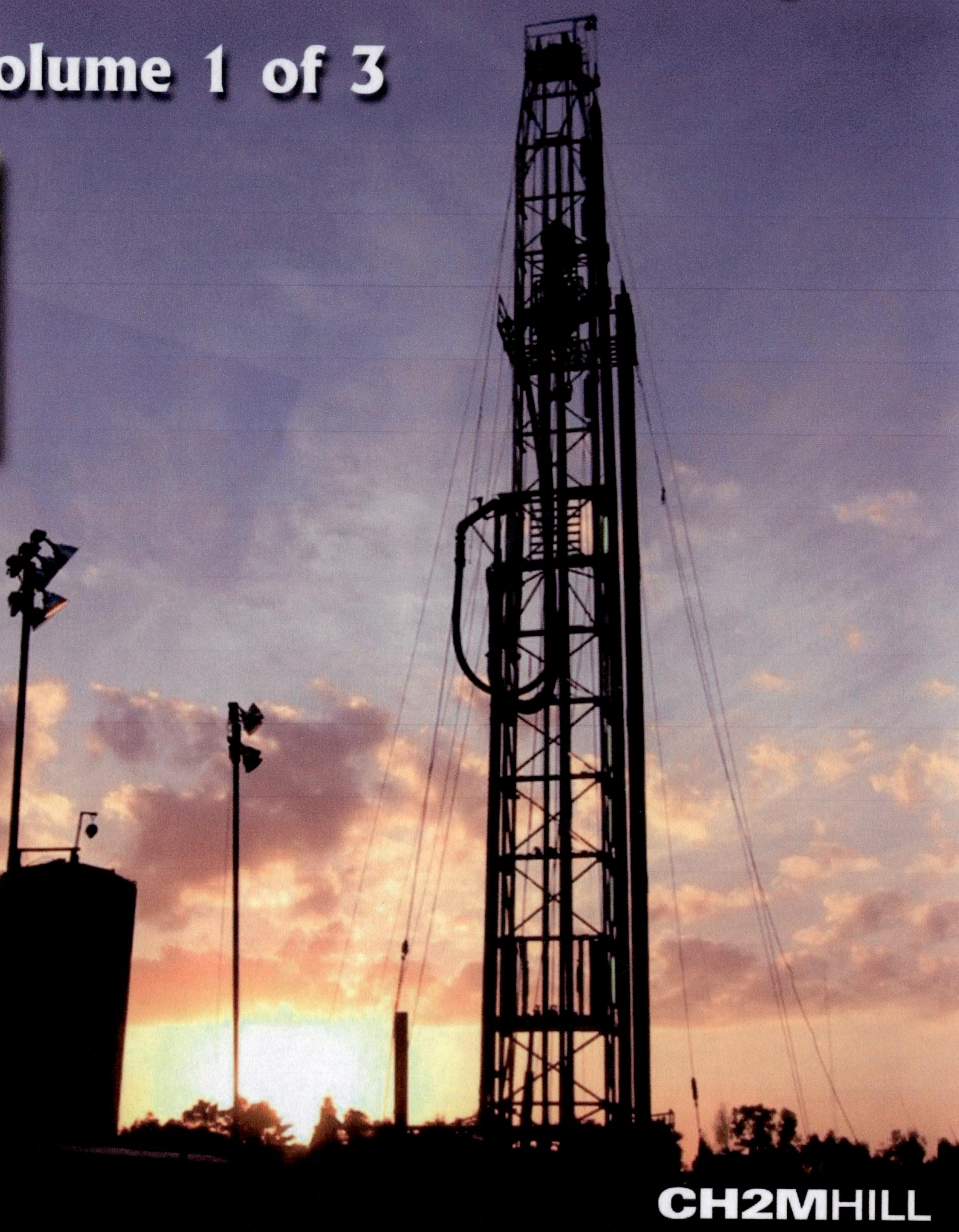


Reverse Osmosis WTP Deep Injection Well and Facilities Completion Report

Volume 1 of 3





W082002002TPA

Prepared for:

CITY OF
FORT MYERS
FLORIDA

CH2MHILL
March 2003
155336

FTM-IW1

City of Fort Myers

Reverse Osmosis Water Treatment Plant
Deep Injection Well
and
Facilities Completion Report

Prepared by

CH2MHILL

4350 W. Cypress St., Ste. 600
Tampa, FL 33607-4155

January 2003

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List of Acronyms

bls	below land surface
CBL	cement bond log
CCL	Casing Colar Locator
DZMW	deep zone monitoring well
EPA	U.S. Environmental Protection Agency
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FRP	fiberglass reinforced plastic
GRB	lower (bottom)
GRM	middle
GRT	gamma ray detector
I^{-131}	Iodine 131
IW	injection well
MCi	microCurie
MGD	Million Gallons per Day
mg/L	milligrams per liter
MIT	Mechanical Integrity Testing
O&M	Operation and Maintenance
PSP	Positive Seal Packer
ROWTP	Reverse Osmosis Water Treatment Plant
RTS	radioactive tracer survey
SFWMD	South Florida Water Management District
TAC	Technical Advisory Committee
TDS	total dissolved solids
toc	top of casing
UIC	Underground Injection Control
USDW	Underground Source of Drinking Water
USGS	U.S. Geological Survey

SECTION 1

Introduction

1.1 Background Information

A deep injection well was constructed to serve as a disposal mechanism for brine concentrate produced at the City of Fort Myers Reverse Osmosis Water Treatment Plant (ROWTP). The ROWTP is located in eastern Fort Myers at the intersection of Canal and Jacksonville Streets. (Figure 1-1). Potable water produced at the ROWTP and the lime softening WTP supplies Fort Myers customers in Lee County. Figure 1-2 presents a site plan of the injection well location and connection to the existing reverse osmosis reject discharge line.

A permit application for the construction of a reverse osmosis (RO) injection well (IW-1) and one dual zone monitoring well, consisting of the deep zone monitoring well (DZMW-1) and the shallow zone monitoring well (SZMW-1), was submitted to the Florida Department of Environmental Protection (FDEP) in January, 2000. The nomenclature of SZMW and DZMW for these monitored intervals is commonly used by FDEP. An FDEP Underground Injection Control (UIC) permit (Construction Permit 165628-001-UC) was issued on April 5, 2001. This permit allowed construction of IW-1, the dual zone monitoring well and necessary facilities for operation approval. The permit also required the construction of five water table monitoring wells positioned around the injection well construction site to monitor potential construction and operation activities impacts on the water table aquifer. The injection well facilities construction permit is provided as Appendix A.1.

The injection well facilities construction was completed at the end of June 2002. An operational testing permit was obtained from FDEP on July 5, 2002. The injection well facilities were started up on July 11, 2002, and has been in operation since then. The injection well facilities operational testing permit is provided as Appendix A.2.

1.2 Scope

This report summarizes the construction and testing of injection well IW-1, and the dual monitor well, for the Fort Myers ROWTP. Construction and testing of the wells were performed in accordance with Chapter 62-528, Florida Administrative Code (FAC), the recommendations of the FDEP Technical Advisory Committee (TAC), and the provisions of the FDEP construction permit. The wells and appurtenances were constructed following the contract documents for the "Construction of the Deep Injection Well Design" (CH2M HILL, 2001).

1.3 Project Description

Youngquist Brothers, Inc., of Fort Myers, Florida, was the selected contractor for construction of the injection well system, which included the injection well, dual zone monitoring well, and associated appurtenances. The Notice-to-Proceed was issued on September 27, 2001.

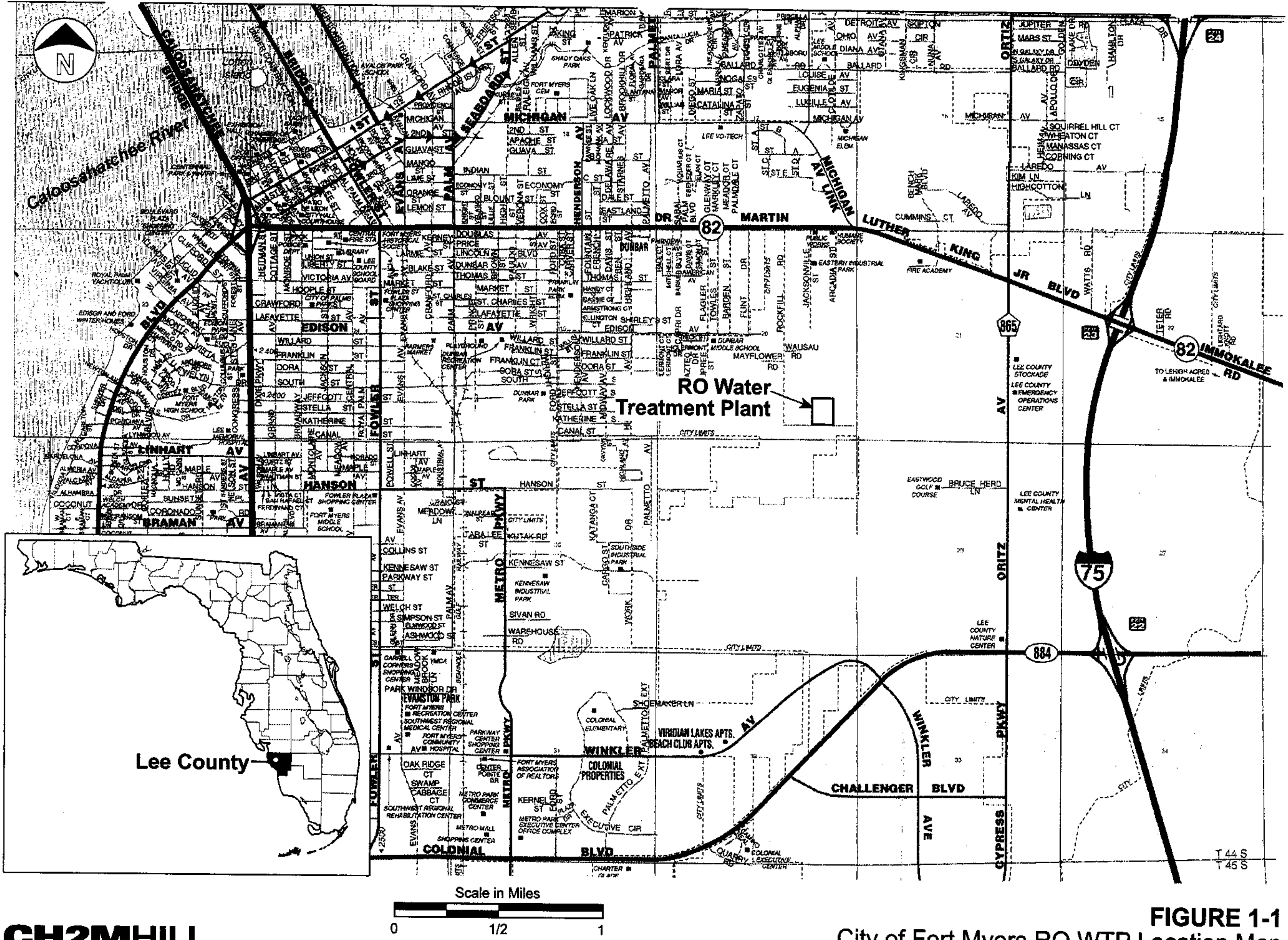

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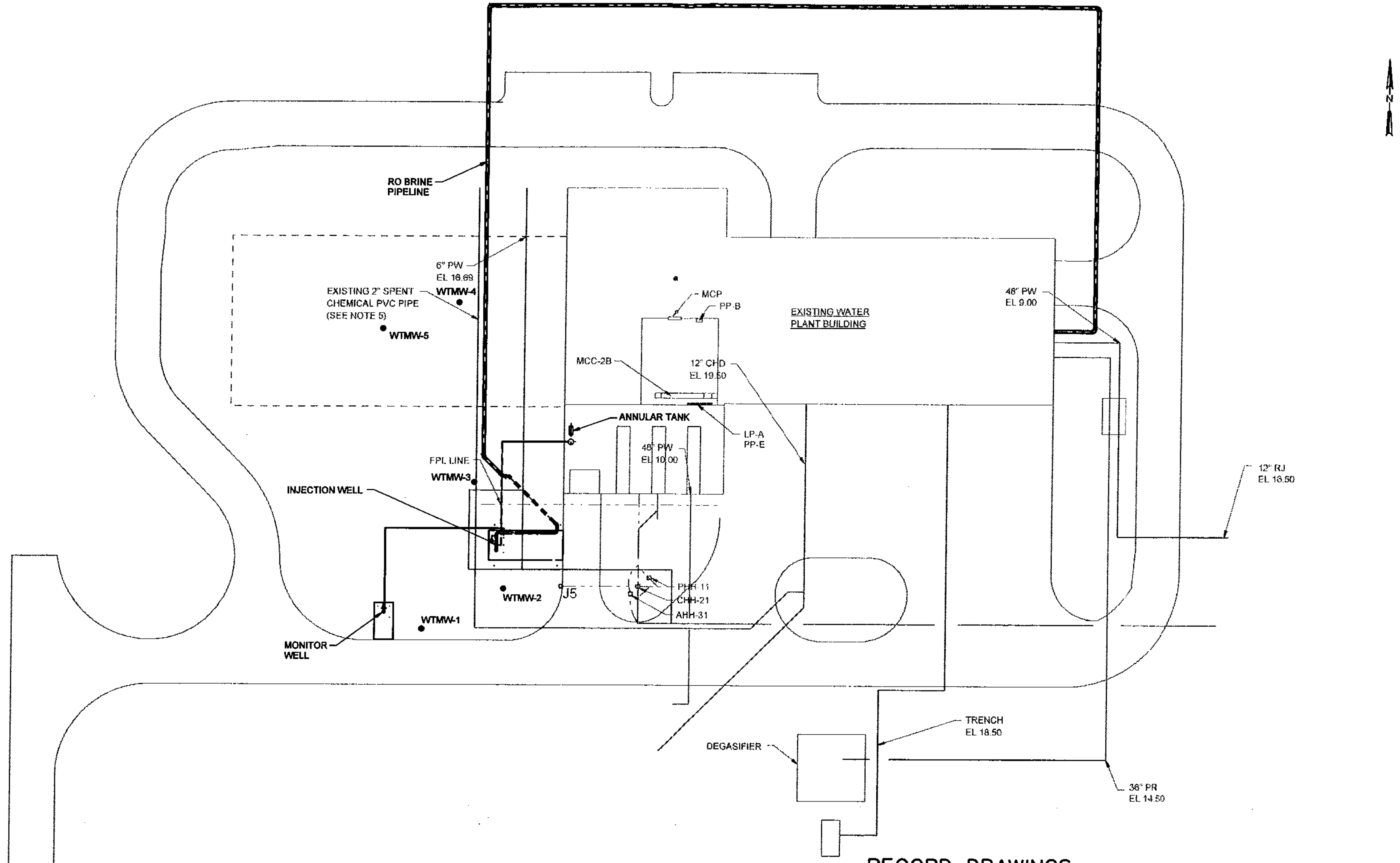
FIGURE 1-1
City of Fort Myers RO WTP Location Map



PLAN

1"=30'

RECORD DRAWINGS

Revisions Drawn By RS Date 07/12/02

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

FIGURE 1-2

RO IW-1 SITE AND FACILITIES LAYOUT

DSGN O. DUARTE						
DR P SANTOS						
CHK T. INNISS						
APVD W. BEDDOW	NO.	DATE	REVISION	BY	APVD	

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL

INJECTION WELL FACILITIES LAYOUT

SHEET M-1
DWG
DATE JULY 2001
PROJ 155336.IW

02-OCT-2002 12:45:30 5336m01c.dgn

BID DOCUMENT

Construction activities of the deep injection well system included installation of a temporary steel drilling pad, construction of five shallow pad monitoring wells, construction of the injection well, construction of the dual zone monitoring well, installation of wellhead piping including surge tank, annular tank with compressor, instrumentation, and addition of software screens to the control room computer.

The FDEP TAC coordinated the actions of local, state, and federal agencies, including FDEP-state and local representatives, the South Florida Water Management District (SFWMD), the U.S. Environmental Protection Agency (EPA), and the U.S. Geological Survey (USGS).

SECTION 2

Construction

Construction of the injection well system included construction of five water table monitor wells, a deep injection well, and a dual zone monitor well. Prior to beginning drilling activities, a temporary steel drilling pad and mud/water containment system was constructed around the injection well and the mud tank system. Figure 2-1 provides a diagram of the temporary steel drilling pad. This steel pad was later removed and a smaller, permanent 16 ft x 40 ft concrete pad was constructed around the injection well. The DZMW has 10 ft x 20 ft final concrete pad.

This section describes the construction, drilling, and testing activities and collected data associated with the construction of IW-1, and the DZMW. A summary of the construction activities for each well is provided in Appendix B. The weekly construction summaries for the entire project are included as Appendix C.

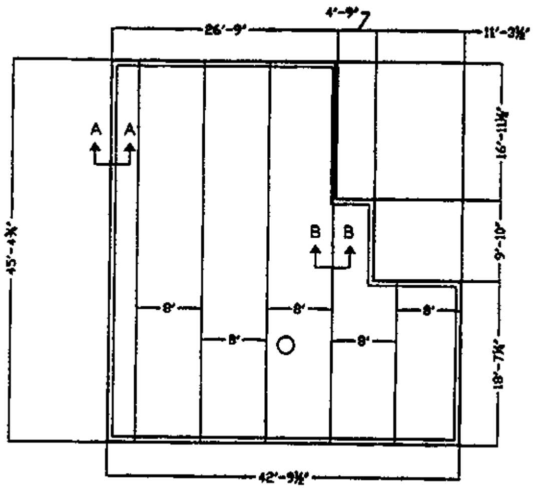
2.1 Water Table Monitor Wells

As required by the FDEP construction permit, five Water Table Monitor Wells were installed and sampled before the start of construction at IW-1. Water Table Monitor Wells were installed at locations surrounding the well construction area to monitor for groundwater contamination during construction. Following installation of the water table monitor wells, and prior to IW-1 drilling activities samples were collected from each well and analyzed to establish background water quality data. Figure 2-2 presents a typical water table monitor well diagram. Water quality data from the Water Table Monitor Wells is discussed in Section 4 of this report.

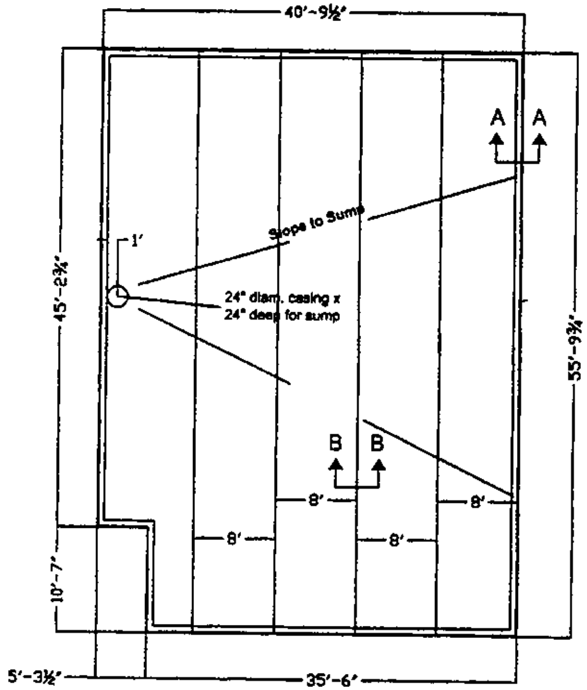
2.2 Injection Well (IW-1)

Drilling of the IW began on November 5, 2001. Mud rotary drilling techniques were used to drill through the surficial aquifer and clay intervals that make up the Hawthorn Group. Reverse air drilling techniques were used during subsequent drilling to a total depth of 3,040 ft below land surface (bls) to remove drill cuttings from the borehole, collect water samples, and conduct specific capacity tests. A closed drilling fluid circulation system was used during reverse-air drilling in order contain all fluids.

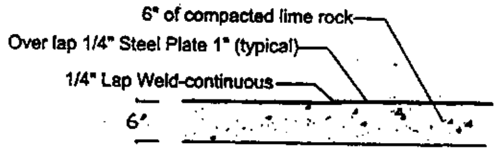
The drilling schedule and casing-setting depths were designed to conform to the hydrogeological features observed at the site, as well as to regulatory agency requirements. Geologic formation samples were collected and described at 10-foot intervals during the drilling of the pilot hole. Data from the pilot hole interval (formation samples, water samples, air-lift specific capacity tests, packer tests, an injection test, and geophysical logs) were evaluated to assist in selection of the casing setting depths, and to interpret the site lithology and hydrogeology.



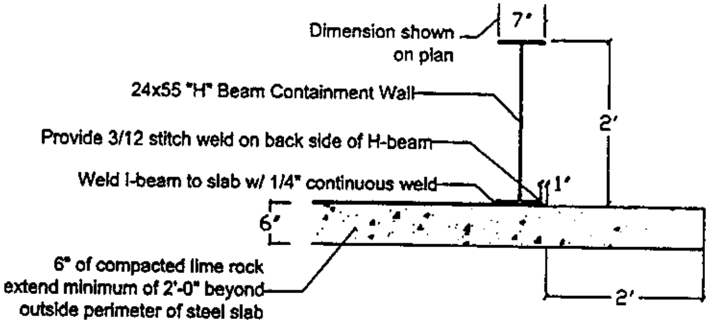
Steel Drilling Pad



Mud System Pad



Section B-B
Typical Lap Joint



Section A-A
Typical Wall Section

NTS

General Notes:

1)The drilling pad shall be constructed of continuous 1/4" thick ASTM A36 steel plate. All welding for the steel drilling pad and containment wall to be 1/4" continuous in accordance with the American Welding Society Structural Welding Code which shall be watertight.
2) Any required stabilization shall be in accordance with FDOT Standard Specification Section 160.
3) The steel drilling pad shall pitch to the sump constructed in such fashion as to be in accordance with FDOT Standard Specification Section 200.

Prepared by:

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15465 Pine Ridge Rd.
Ft. Myers, Fl. 33908
941-489-4444

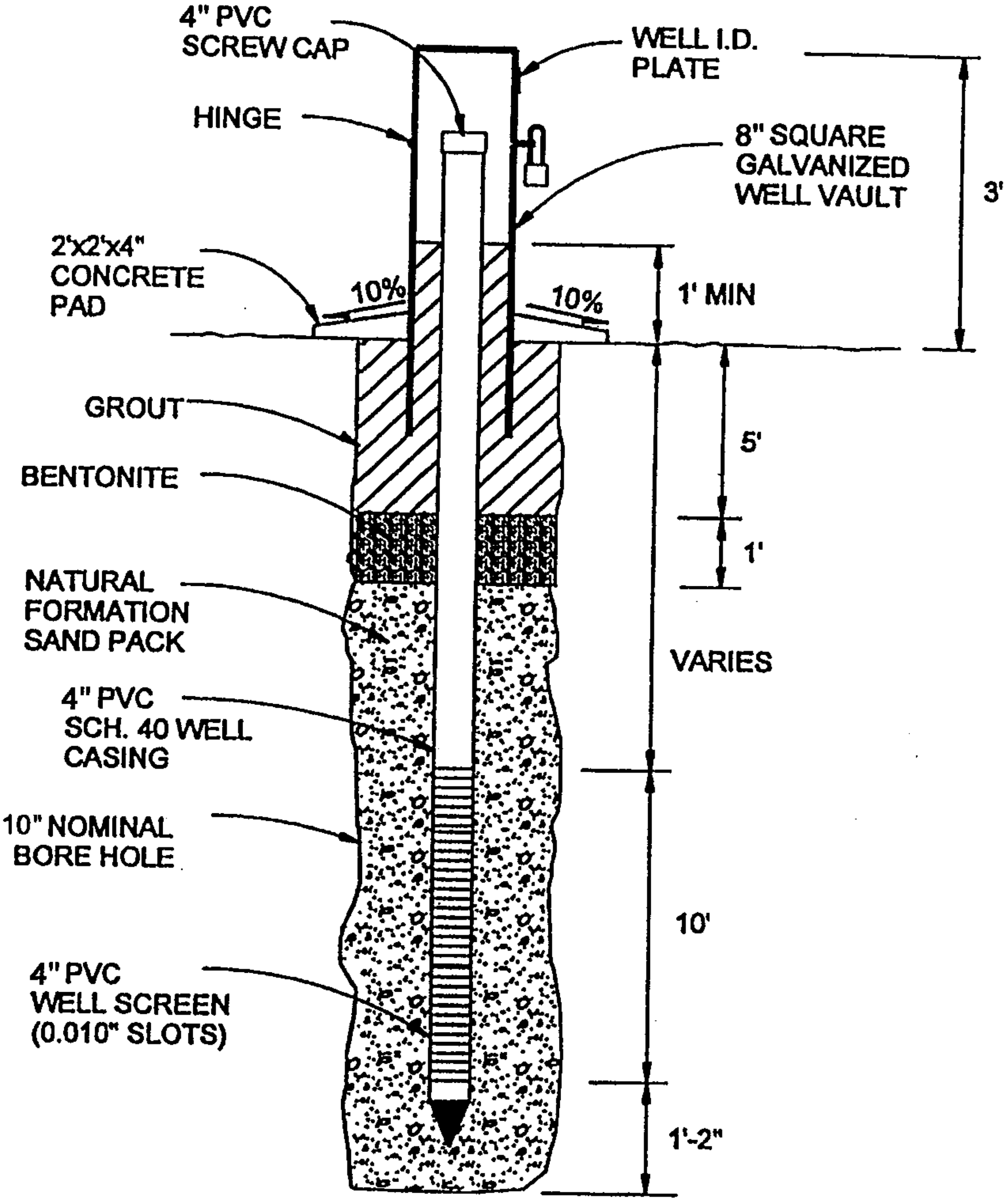
10-2-01

TKW
CONSULTING ENGINEERS, INC
environmental • civil • structural

Youngquist Brothers, Inc.	**City of Fort Myers W.T.P. Deep Injection Well**	**Sheet**
15465 Pine Ridge Road	Steel Drilling/Mud Slab	1 of 1
Ft. Myers, FL. 33908	Date: October 02, 2001	

CH2MHILL

FIGURE 2-1
Drilling Pad Construction Details



Typical Well Depth is 25 Feet

CH2MHILL

FIGURE 2-2
Typical Water Table Monitoring Well Details

Three concentric steel casings were used to construct IW-1 (36-inch, 28-inch, and 18-inch outside diameters). Table 2-1 summarizes the casing depths and the types and quantities of cement used during the construction of IW-1. Figure 2-3 depicts the completion details diagram of IW-1. The casing mill certificates for each of the casing strings are provided in Appendix D.

TABLE 2-1
Summary of Casing Setting Depths and Cement Quantities; Deep Injection Well (IW-1)
City of Fort Myers ROWTP Deep Injection Well and Facilities Completion Report

Casing	Casing Material	Outside Diameter (in)	Inside Diameter (in)	Casing Thickness (in)	Casing Depth (ft bls)	Date	Cement Stage	Type of Cement	Quantity of Cement (ft3)
Shallow	Steel	36.00	25.25	0.375	450	11/10/2001	#1	Neat	645
						Remarks	Pressure grout from bottom of casing		
						11/10/2001	#1	6% bentonite	701
						Remarks	Pressure grout from bottom of casing		
						11/10/2001	#2	6% bentonite	320
						Remarks	Tremied into annulus from 90 ft bls		
Intermediate	Steel	28.00	27.00	0.500	1,650	12/20/2001	#1	Neat	315
						Remarks	Pressure grout from bottom of casing		
						12/20/2001	#1	4% bentonite	805
						Remarks	Pressure grout from bottom of casing		
						12/21/2001	#2	4% bentonite	1,570
						Remarks	Tremied into annulus from 1,270 ft bls		
						12/21/2001	#3	4% bentonite	1,465
						Remarks	Tremied into annulus from 834 ft bls		
						12/21/2001	#4	4% bentonite	1,492
						Remarks	Tremied into annulus from 473 ft bls		
Final	Steel	18.00	17.00	0.500	2,305	02/15/2002	#1	Neat	224
						Remarks	Tremied into annulus from 2,305 ft bls		
						02/15/2002	#2	4% bentonite	353
						Remarks	Tremied into annulus from 2,202 ft bls		
						02/16/2002	#3	4% bentonite	314
						Remarks	Tremied into annulus from 2,190 ft bls.		
						02/16/2002	#4	4% bentonite	174
						Remarks	Tremied into annulus from 2,131 ft bls.		
						02/16/2002	#5	8% bentonite	303

TABLE 2-1
Summary of Casing Setting Depths and Cement Quantities; Deep Injection Well (IW-1)
City of Fort Myers ROWTP Deep Injection Well and Facilities Completion Report

Casing	Casing Material	Outside Diameter (in)	Inside Diameter (in)	Casing Thickness (in)	Casing Depth (ft bls)	Date	Cement Stage	Type of Cement	Quantity of Cement (ft3)
Final	Steel	18.00	17.00	0.500	2,305	Remarks	Tremied into annulus from 2,113 ft bls.		
						02/17/2002	#6	4% bentonite	392
						Remarks	Tremied into annulus from 2,068 ft bls.		
						02/17/2002	#7	4% bentonite	448
						Remarks	Tremied into annulus from 2,040 ft bls		
						02/17/2002	#8	4% bentonite	730
						Remarks	Tremied into annulus from 1,894 ft bls.		
						02/18/2002	#9	4% bentonite	880
						Remarks	Tremied into annulus from 1,633 ft bls.		
						02/18/2002	#10	4% bentonite	953
						Remarks	Tremied into annulus from 1,249 ft bls.		
						02/18/2002	#11	4% bentonite	1,015
						Remarks	Tremied into annulus from 836 ft bls.		
						02/21/2002	#12	4% bentonite	143
						Remarks	Tremied into annulus from 373 ft bls.		
Final Tubing	FRP	13.21	12.00	0.605	2298	02/26/2002	N/A	N/A	N/A
						Remarks	FRP tubing was installed by representatives of Tubular Fiberglass.		
							Total Volume Neat:		1,184 ft3
							Total Volume 4%:		10,734 ft3
							Total Volume 6%:		1,021 ft3
							Total Volume 8%:		730 ft3

Notes:
in = inches
ft - feet
bls = below land surface
FRP = Fiberglass Reinforced Plastic

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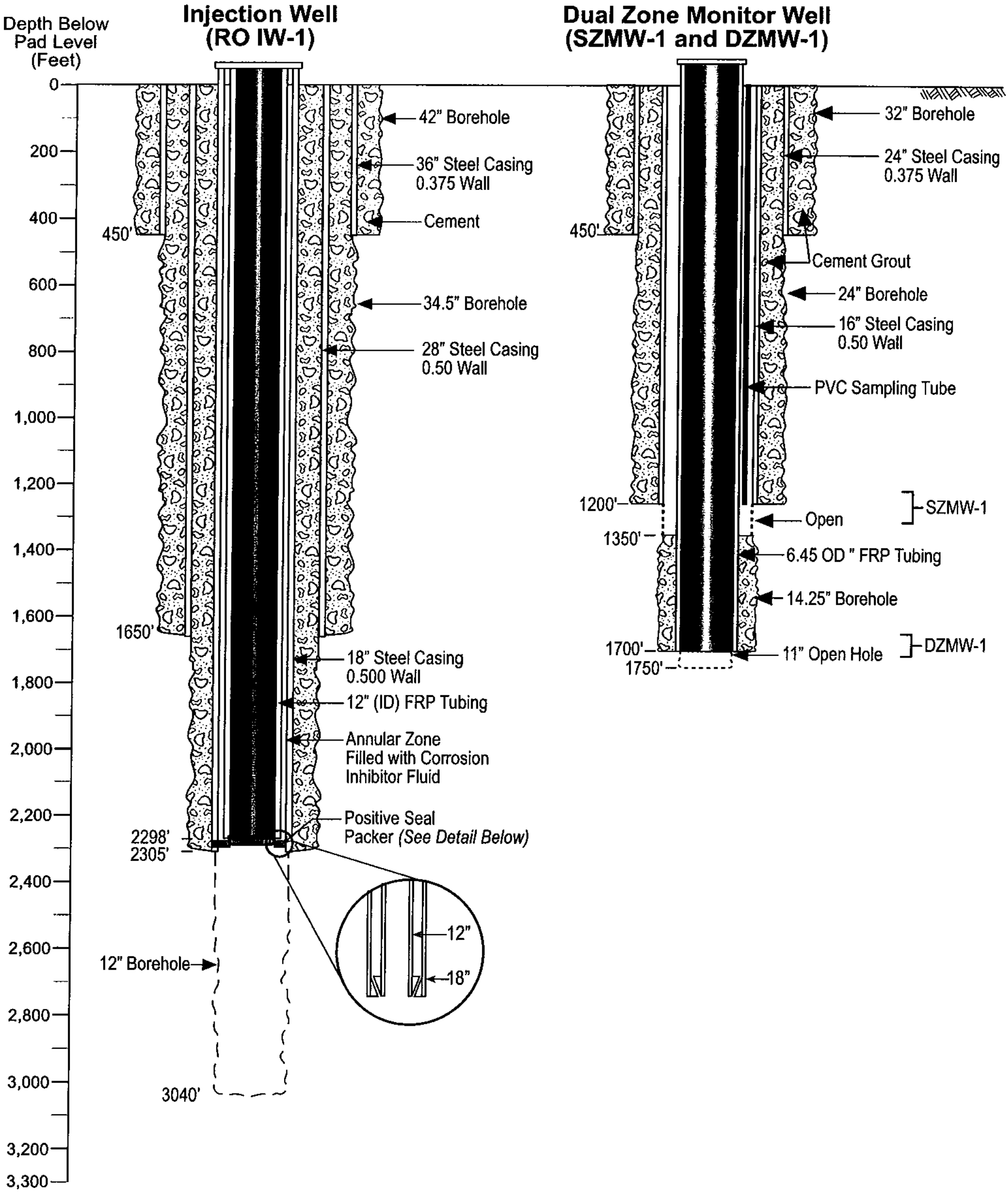

CH2MHILL

FIGURE 2-3
Injection Well and Monitoring Well Completion Details

Construction of IW-1 began with the mud drilling of a nominal 12.25-inch-diameter pilot hole to a depth of 450 ft bls. The pilot hole was then geophysically logged (caliper, gamma ray, spontaneous potential, and dual induction logs) and reamed to a nominal 42-inch-diameter to a depth of 455 ft bls. Caliper and natural gamma logs were then performed on the reamed hole and a 36-inch-diameter casing was installed and cemented through the surficial and intermediate aquifers to a depth of 450 ft bls. The first stage of cement was pressure grouted and the subsequent stages were pumped using the tremie pipe method.

The pilot hole was then advanced with reverse-air drilling techniques to a depth of 1,800 ft bls. Five 4-inch diameter cores were attempted from the interval of 1,393 ft to 1,800 ft bls during this phase of pilot hole drilling. Of these five coring attempts, the interval from 1,750 to 1,760 was selected for a detailed laboratory analysis. The intervals analyzed were selected based on lithology and sample size. Core analyses and descriptions are discussed in Section 4 of this report. Caliper, gamma ray, spontaneous potential, dual induction, borehole compensated sonic, temperature, fluid conductivity, and flowmeter logs were then conducted on the open hole interval. Four straddle packer tests were performed between the interval of 450 ft and 1,800 ft bls in order to provide confining characteristics of the tested intervals and identify the base of the Underground Source of Drinking Water (USDW) unit, defined as water with a total dissolved solids (TDS) concentration less than 10,000 milligrams per liter (mg/L). The water quality and testing data is presented in Section 4.

Based on the results of packer testing, coring, geophysical logging, and formation sample analyses, a 28-inch diameter intermediate casing-setting depth of 1,650 ft bls was recommended to and approved by the FDEP and the TAC. The pilot hole was then backplugged with cement and reamed to a nominal 36-inch-diameter to a depth of 1,655 ft bls. A caliper log was then run on the reamed hole and the 28-inch-diameter steel intermediate casing was installed below the base of the USDW to a depth of 1,650 ft bls.

The pilot hole was then advanced to a depth of 3,040 ft bls. Four 4-inch diameter cores were collected from the interval of 1,800 to 2,350 ft bls during this phase of pilot hole drilling. Of these four coring attempts, three intervals were sent for laboratory analysis. Section 4 of this report presents core analyses, including detailed descriptions. Caliper, gamma ray, spontaneous potential, dual induction, borehole compensated sonic, temperature, fluid conductivity, video, and flowmeter logs were then conducted on the entire open hole interval. Four packer tests were then conducted between the interval of 1,750 and 3,040 ft bls to determine the confining characteristics and water quality of the tested intervals.

Based on flow results of packer testing, coring, geophysical logging, and formation sample analyses, a 18-inch diameter final casing setting depth of 2,305 ft bls was recommended to and approved by the FDEP and TAC. A drillable bridge plug was installed at 2,305 ft bls and the borehole was backplugged with 12 percent bentonite grout from 2,305 ft to 1,780 ft bls prior to reaming the pilot hole to a nominal 26.5-inch diameter.

Reaming of the pilot hole began at 1,650 ft bls with the 26.5-inch diameter drill bit. The bentonite grout that was used to backplug the well was encountered at 1,780 ft bls. Reaming continued to the casing setting depth of 2,305 ft bls. When reaming reached 2,305 ft, the bridge plug that had been installed was not encountered. It was concluded that the reamed hole had deviated from the original pilot hole between 1,780 and 2,305 ft bls, although all deviation measurements of the reamed hole were consistently within the required limits. After reaming, the borehole was then cleaned out to 3,040 ft bls with a 12-inch bit. Caliper and video logs were conducted on the open borehole from 1,650 ft to 3,040 ft bls to determine the reamed hole characteristics and at which depth the reamed hole deviated from the pilot hole. The video log confirmed that the reamed borehole deviated from the pilot hole at approximately 1,910 ft bls by identifying tracking of the cement backplug.

Following caliper and video logging, the final casing (18-inch-diameter) and the stainless steel Positive Seal Packer (PSP) hanger (female portion) and external casing plug were installed to a depth of 2,305 ft bls. The external casing plug was installed 5 ft below the PSP hanger. The purpose of the external plug is to seal the casing to the borehole wall preventing the leakage of cement below the bottom of the reamed interval into the open borehole during grouting operations. The final casing was then cemented, using the tremie method, from 2,305 ft to 373 ft bls. Following a 24-hour waiting period, a cement bond log (CBL) was run from 2,305 ft bls to land surface. This CBL provided evidence of adequate cement behind the final 18-inch casing.

A pressure test was then conducted on the final 18-inch diameter casing string before cementing the casing to land surface. FDEP was onsite to witness a pressure test conducted on the final casing. The casing was pressurized to 113 psi and showed a 3.2 percent decrease during the first 60 minutes. The test was continued for an additional 60 minutes and ended with a total pressure decrease of 4.9 percent over the 120-minute period. The 12-inch diameter fiberglass reinforced plastic (FRP) injection tubing was then installed to 2,298 ft bls with the PSP (male portion) attached to the base of the tubing. Prior to seating the PSP, approximately 10,000 gallons of Baracor 100 corrosion inhibitor fluid was pumped into the annulus. The FRP casing and PSP were then lowered into the PSP hanger located at 2,298 ft bls.

Two pressure tests were conducted on the annular zone and the FRP casing. The annulus was pressurized to 107 psi and showed a 4.7 percent increase over the 60-minute test. The final pressure test was conducted on the inside of the FRP. Within the FRP, a temporary packer was installed to a depth of 2,285 ft bls and the FRP was pressurized to 110 psi. This test showed a pressure increase of 4.5 percent during the 120-minute testing interval.

A final video log was conducted on April 12, 2002 before performing a radioactive tracer survey (RTS) to assess the external mechanical integrity of IW-1. The successful RTS test was conducted on April 15, 2002. Following the RTS test, an 8-hour injection test was conducted as described in Section 4.

Prior to the injection test, construction of the well head was completed with 12-inch-diameter stainless steel piping and valves. The well was fitted with a 10-inch magnetic flowmeter, pressure transducer, pressure gauge, a 4-inch vacuum release valve, and 2-inch air release valve. The wellhead allows for sampling of the RO brine injectate and the injection of monitor well purge water during required sampling. Appendix E.1 presents the record drawings for the IW-1 wellhead.

2.3 Dual Zone Monitor Well (SZMW-1 and DZMW-1)

Construction of the Dual Zone Monitor Well began on March 11, 2001, with the mud drilling of a 32-inch-diameter borehole from land surface to 458 ft. The borehole was then geophysically logged from land surface to 458 ft bls. Geophysical logs included caliper, gamma ray, spontaneous potential, dual induction logs. After geophysical logging of the borehole, 24-inch diameter steel casing is set and cement into place to 450 feet bls. A 12-inch diameter pilot hole was then drilled to a depth of 1,250 ft bls. Geophysical logs consisting of caliper, gamma ray, spontaneous potential, dual induction, borehole compensated sonic, temperature, fluid conductivity, and flowmeter logs were then conducted on the open hole interval. The borehole was reamed to a 24-inch diameter and caliper and gamma radiation logs were conducted to verify the reamed hole characteristics. The final 16-inch steel casing was then installed to 1,250 ft bls and cemented to land surface. Following a 24-hour waiting period after the last cement stage, an 11-inch borehole was continued to 1,750 ft bls. Geophysical logs consisting of caliper, gamma radiation, spontaneous potential, dual induction, borehole compensated sonic, temperature, fluid conductivity, and flowmeter logs were then conducted on the open hole interval. The borehole was then reamed to 14.25-inch diameter to a depth of 1,700 ft bls. The borehole was then cleaned out with an 11-inch bit from 1,700 to 1,750 feet bls and 6-inch FRP tubing with an external casing plug was installed to 1,700 ft bls. The annular zone was cemented from 1,700 ft to 1,350 ft bls using a tremmie method. The FRP tubing has an outside diameter of 6.45 inches with a wall thickness of 0.51 inches; however, the tubing joints have an outside diameter of 8 inches. For the remainder of this report the FRP tubing for the Dual Zone Monitor Well will be designated as 6 inches. The individual monitoring zones for the Dual Zone Monitor Well are SZMW-1 (1,250 ft to 1,350 ft) and DZMW-1 (1,700 ft to 1,750 ft).

Table 2-2 summarizes the casing depths and the types and quantities of cement used for construction of the Dual Zone Monitor Well. Figure 2-3 (presented previously) also includes the Dual Zone Monitor Well completion details.

After the cement had cured, a one-hour pressure test was conducted on the Dual Zone Monitor Well using an inflatable packer assembly on the inside of the 6-inch diameter FRP casing of DZMW-1. The packer was installed at 1,685 ft bls and the FRP was pressurized to 70 psi. Over the 1-hour test, a pressure increase of 0.5 psi (or 0.1 percent increase) was observed during the pressure test which demonstrated that the well was adequately constructed. Following the pressure test, the deep zone was geophysically logged. The final well characteristics were verified with caliper, gamma radiation, and video logs.

TABLE 2-2
Summary of Casing Setting Depths and Cement Quantities; Dual Zone Monitor Well (SZMW-1 and DZMW-1)
City of Fort Myers – RO Injection Well and Facilities Completion Report

Casing	Casing Material	Outside Diameter (in)	Inside Diameter (in)	Casing Thickness (in)	Casing Depth (ft bls)	Date	Cement Stage	Type of Cement	Quantity of Cement (ft^3)
Surface	Steel	24.00	23.25	0.375	450	3/13/2002	#1	Neat	471
						Remarks	Pressure grouted from 450 ft bls		
							#1	6% Bentonite	1,122
						Remarks	Pressure grouted from 450 ft bls		
Intermediate	Steel	16.00	15.00	0.500	1250	3/23/2002	#1	Neat	286
						Remarks	Pressure grouted from 1,250 ft bls		
							#1	4% Bentonite	1,570
						Remarks	Pressure grouted from 1,250 ft bls		
						3/23/2002	#2	4% Bentonite	533
						Remarks	Tremied into annulus from 383 ft bls		
Final	FRP	6.45	5.43	0.51	1700	4/3/2002	#1	Neat	5.6
						Remarks	Tremied into annulus		
						4/3/2002	#2	Neat	5.6
						Remarks	Tremied into annulus		
						4/3/2002	#3	Neat	84
						Remarks	Tremied into annulus		
						4/3/2002	#4	Neat	253
						Remarks	Tremied into annulus		
						4/4/2002	#5	Neat	107
						Remarks	Tremied into annulus		

Total Volume Neat:	1,212 ft3
Total Volume 6%:	1,122 ft3
Total Volume 4%:	2,103 ft3

Notes:
in = inches
ft = feet
bls = below land surface

Following pressure testing activities the Dual Zone Monitor Well wellhead construction was finalized. The wellhead is completed with a 16-inch stainless steel flange 1.2 ft above pad level. The SZMW is completed with a 4-inch stainless steel pipe extending 0.5 ft above the flange. The DZMW is completed with 6-inch stainless stain pipe 1.6 ft above the flange. Both monitor zones are fitted with a submersible pump with 2-inch stainless steel piping originating from each zone. Each respective zone is fitted with a 1-inch vacuum/air release valve, a magnetic flowmeter, a pressure transducer, and a pressure gauge. The wellhead allows for sampling of the individual monitor zones from a ½-inch port and directs water generated during purging to the injection well via a 2-inch line from each monitor zone. Appendix E.2 presents the Dual Zone Wellhead record drawings.

SECTION 3

Geology and Hydrogeology

Groundwater in Lee County's aquifer systems are developed within a thick carbonate platform which overlies the Early Jurassic (150 to 195 million years old) basement rocks. Sediments within the carbonate platform range in age from Eocene to Recent. The sediments consist primarily of carbonates and Miocene age siliciclastics. The aquifer systems in Lee County are contained within sediments ranging in age from late Paleocene (55 million years old) to Holocene (recent) and include the Floridan Aquifer System, the Intermediate Aquifer System, and the Surficial Aquifer System.

In general, groundwater at the City of Fort Myers ROWTP injection well location becomes more mineralized with depth. Potable groundwater is found only in limited quantities within the surficial aquifer and the very upper portions of the Intermediate Aquifer System. A brief description of the geologic and hydrogeologic units encountered during construction is provided below.

3.1 Lithologic Descriptions

Sediments encountered during the construction of IW-1 and The Dual Zone Monitor Well range in age from Eocene to Holocene. A brief discussion of Holocene to Eocene age sediments and their relationship to the hydrostratigraphy of the site follows. Figure 3-1 provides a stratigraphic and hydrostratigraphic column of the site. The nomenclature utilized in Figure 3-1 and discussed below is based on SFWMD Technical Publication 84-10.

3.1.1 Undifferentiated Holocene and Pleistocene Series

Quartz sand, shell beds, clay, and limestone of varying thickness make up the surficial undifferentiated Holocene and Pleistocene sediments at the site. These sediments, which comprise the Surficial Aquifer System, extend to a depth of approximately 10 ft bls.

3.1.2 Miocene Series

Hawthorn Group. In Lee County, the Hawthorn Group is divided into two members. The upper member is the Peace River Formation, which is made up primarily of olive gray and phosphatic clay with interbedded sandy limestone at the site. The top of the Peace River Formation was encountered at a depth of approximately 10 ft bls and is approximately 40 ft thick at the site. The Sandstone Aquifer was present at the site between approximately 50 ft and 80 ft bls. A confining portion of the Peace River formation underlies the Sandstone Aquifer and extends from 80 ft bls to approximately 180 ft bls. The lower member of the Hawthorn Group is the Arcadia Formation, which is a predominantly carbonate formation consisting of limestone and phosphatic limestone with interbedded phosphatic clay. The Arcadia Formation consists primarily of interbedded phosphatic limestone, clay, and fine-grained limestone at the site. The top of the Arcadia Formation was encountered at a depth of 180 ft bls.

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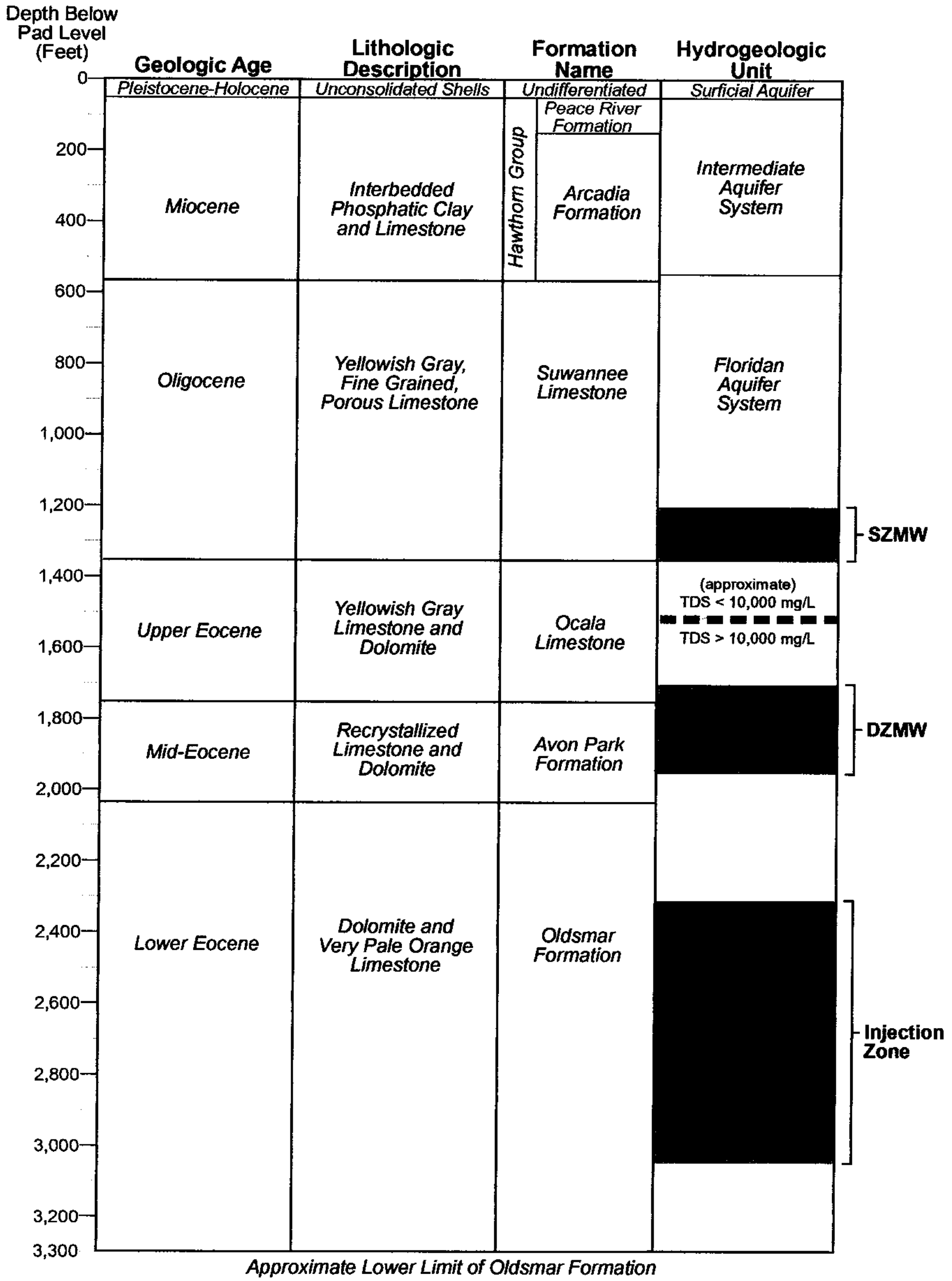

Miller, 1986 - Hydrogeologic Framework of the Floridan Aquifer System in Florida and parts of Georgia, Alabama, and South Carolina. U.S.G.S. Professional Paper no. 1403-B 91p.

FIGURE 3-1
General Site Hydrogeology

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The Arcadia Formation is approximately 380 ft thick and is characterized by a moderate to high gamma ray signature (30 to 200 API units). Aquifers within the Hawthorn Group are collectively referred to as the Intermediate Aquifer System.

The Upper Floridan aquifer includes the permeable strata in the lower part of the Arcadia Formation and the underlying Suwannee Limestone and the upper portion of the Ocala Limestone. The permeable portion of the Arcadia Formation is referred to locally as the Lower Hawthorn Aquifer.

3.1.3 Oligocene Series

Suwannee Limestone. The Oligocene aged Suwannee Limestone is characterized by a yellowish gray, fine grained, porous limestone. The Suwannee Limestone is part of the upper Floridan Aquifer System, and characteristically exhibits relatively high permeability and artesian pressure. The top of the Suwannee Limestone was found at 560 ft bls and was approximately 790 ft thick at the site. The 10,000 mg/L TDS boundary was found near the contact of the Lower Hawthorn Aquifer and Suwannee Limestone, at approximately 1,500 ft bls.

3.1.4 Eocene Series

Ocala Limestone. The Upper Eocene Ocala Limestone consists of two units. The upper unit is generally composed of white to gray foraminiferal and molluscan limestones. The lower unit is partially dolomitized and often forms an unconformable boundary with the underlying Avon Park Formation. The lower unit of the Ocala Limestone generally serves as a confining unit between the Upper Floridan and Lower Floridan aquifers. The Ocala Limestone was encountered at a depth of 1,350 ft bls and was 396 ft thick at the site.

Avon Park Formation. The Mid-Eocene Avon Park Formation occurs from a depth of approximately 1,746 ft bls to 2,010 ft bls. The Avon Park is characterized by yellowish-gray limestone and highly permeable dolomitic sections. The upper portion of the Avon Park Formation typically exhibits permeability. The lower portion of the formation is often finer grained, has a lower porosity than the upper portion, and typically is confining in nature.

Oldsmar Formation. The Eocene Oldsmar Formation occurs from a depth of approximately 2,010 ft bls and was present through the total depth of the well to 3,040 ft bls. The Oldsmar Formation is predominately characterized by dolomite and interbedded recrystallized limestone. The Oldsmar Formation contains highly transmissive, fractured, and cavernous intervals often referred to as the "Boulder Zone." The Boulder Zone is utilized for wastewater injection in South Florida and comprises the injection zone for the City of Fort Myers RO brine concentrate.

SECTION 4

Testing During Construction

Testing during the construction of the injection well system included lithology sampling, reverse-air drilling water sampling, specific capacity testing, geophysical logging, coring, packer testing, and injection testing. Results of the testing were used to determine the lithologic and hydraulic characteristics of the geologic strata intercepted by the borehole, determine the location of the base of the USDW, determine confining strata, and select an adequate injection zone for brine disposal. This section presents the results of testing during construction of the City of Fort Myers ROWTP injection system.

4.1 Water Table Monitor Well Water Quality

Throughout construction, water samples were collected on a weekly basis from the five surficial water table aquifer Monitor Wells surrounding the well construction area to demonstrate that the surficial aquifer was not impacted by construction activities. Location of these monitor wells can be found in Figure 1-2 IW-1 Site and Facilities Layout. Water samples were field-analyzed for chlorides and conductivity. The water level at each well was recorded weekly during construction activities. Table 4-1 presents chloride concentrations, conductivity and water level measurements for all five water table wells during construction of the injection and Monitor Wells.

Water quality and water levels at each monitor well varied throughout the construction period. Conductivity and Chloride concentration of the Water Table Monitor Wells ranged from 780 μS/cm to 1090 μS/cm and 80 mg/L to 140 mg/L respectively. Background Water level of the wells pre-construction averaged 4.65 feet below top of casing (toc). Water level changes in the monitor wells fluctuated from 4.4 feet below toc to 6.23 feet below toc and averaged approximately 4.7 feet below toc. No adverse impacts to the surficial aquifer system were observed during the well construction activities at the site.

4.2 Lithology Sampling

Formation samples from IW-1 and the Dual Zone Monitor Well were collected every 10 ft from land surface to the total depth of each well and were characterized for lithology type, color, consolidation, porosity, and fossil occurrence. Table 4-2 provides a generalized summary of the geologic formations encountered during construction of the wells. Detailed lithology descriptions for the wells are presented in Appendix F.

Table 4-1

Surficial Aquifer Monitoring Well Water Quality Summary

City of Fort Myers – IW-1 and Facilities Engineering Report

Date	Well #1			Well #2			Well #3			Well #4			Well #5		
	Chloride (mg/L)	Conductivity (µS/cm)	Water Level (feet bls)	Chloride (mg/L)	Conductivity (µS/cm)	Water Level (feet bls)	Chloride (mg/L)	Conductivity (µS/cm)	Water Level (feet bls)	Chloride (mg/L)	Conductivity (µS/cm)	Water Level (feet bls)	Chloride (mg/L)	Conductivity (µS/cm)	Water Level (feet bls)
10/30/2001	115	810	2.10	115	882	2.00	85	829	2.30	92	973	2.25	82	854	2.15
11/06/2001	135	877	1.95	125	963	1.90	90	898	2.10	99	1060	2.15	88	990	2.05
11/15/2001	135	800	4.50**	124	860	4.80**	105	1000	4.60**	108	1090	4.6**	110	1060	3.85**
11/20/2001	140	830	4.50	119	780	4.80	99	960	4.50	102	1050	4.60	111	1060	3.70
11/27/2001	118	820	4.67	98	790	4.78	92	940	4.62	94	980	4.75	95	960	3.87
12/04/2001	120	820	4.70	97	780	4.85	100	1000	5.70	97	990	4.75	95	970	4.00
12/12/2001	120	820	4.62	115	830	4.78	98	970	5.63	95	970	4.85	98	980	3.88
12/18/2001	115	810	4.65	124	860	4.76	92	940	5.67	94	950	4.77	94	950	3.90
12/28/2001	122	830	4.47	125	840	4.58	93	950	5.55	91	910	4.69	88	930	3.82
01/03/2002	126	960	4.52	128	940	4.08	97	990	4.98	98	1000	4.07	99	1020	3.99
01/08/2002	105	820	4.17	100	800	4.27	85	840	5.14	89	950	4.27	89	940	3.43
01/16/2002	122	990	3.39	115	950	3.46	100	970	4.31	104	1060	3.35	110	1060	2.65
01/22/2002	125	1000	3.87	122	980	3.88	103	960	4.73	107	1050	3.82	115	1040	3.02
01/30/2002	115	810	4.10	115	830	4.17	95	890	5.02	95	910	4.16	93	900	3.40
02/06/2002	122	830	4.20	115	850	4.30	98	920	5.15	96	915	4.30	96	940	3.54
02/14/2002	120	830	4.20	114	840	4.20	100	930	5.20	99	925	4.20	96	940	3.40
02/22/2002	120	835	4.75	114	850	4.34	100	910	5.45	93	900	4.49	92	940	3.63
02/28/2002	126	850	5.05	125	1000	4.76	105	1000	5.62	98	1010	4.86	101	1020	3.98
03/06/2002	130	890	5.20	128	1030	4.95	103	1010	5.75	103	1020	4.95	103	1025	4.10
03/14/2002	121	840	5.35	124	1010	5.10	99	990	5.90	100	1000	5.10	99	1010	4.20
03/19/2002	123	850	5.45	120	1000	5.15	98	1000	5.95	102	1010	5.20	98	1020	4.35
03/26/2002	118	825	5.65	113	920	5.40	96	940	6.03	96	915	5.45	98	980	4.70
04/03/2002	117	820	5.72	115	920	4.46	92	880	6.10	90	920	5.52	100	1000	4.80
04/11/2002	119	828	5.81	119	935	5.58	96	940	6.18	92	930	5.60	96	950	4.88
04/16/2002	115	810	6.01	115	830	5.92	91	860	6.23	90	905	5.76	92	925	4.98
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

**Measured from new datum - top of casing

TABLE 4-2
Geologic Formations Encountered
City of Fort Myers – IW-1 and Facilities Completion Report

Depth Interval (ft bls)	Description	Formation	Geologic Age
0 – 10	Limestone, Shell Fragments	Undifferentiated	Holocene to Pleistocene
10 – 180	Clay, Phosphatic Clay	Peace River (Hawthorn Group)	Miocene
180 – 560	Limestone, Phosphatic Limestone, and Interbedded Clay	Arcadia (Hawthorn Group)	Miocene
560 – 1,350	Limestone, some Clay, Phosphate	Suwannee	Oligocene
1,350 – 1,746	Limestone, Dolomite	Ocala	Upper Eocene
1,746 – 2,010	Yellowish Gray Limestone, Dolomite	Avon Park	Mid-Eocene
2,010 – 3,040	Dolomite, Recrystallized Limestone	Oldsmar	Eocene

Note:
ft bls = feet below land surface

4.3 Pilot Hole Water Quality

Water samples were collected at approximately 30-foot intervals during reverse-air drilling of IW-1 and the Dual Zone Monitor Well to provide a generalized profile of water quality changes with respect to depth. The samples were analyzed for TDS, chlorides, and conductivity. Closed circulation reverse-air drilling techniques were used during pilot hole drilling below a depth of approximately 450 ft bls in the wells. Closed circulation reverse-air drilling was used to contain the fluids generated from the well.

In all closed circulation systems, pilot hole water quality reflects a mixture of formation fluids for the entire open borehole interval including any fresh water which may have been used to begin reverse-air drilling. The mixing of pilot hole water from multiple zones results in diluted changes in water quality with depth, and does not necessarily accurately represent the water quality near the bottom of the borehole.

Analytical results from the water quality testing of IW-1 and the Dual Zone Monitor Well showed an increase in concentration with depth for most parameters. Pilot hole water quality data for IW-1 is presented in Table 4-3. The reverse-air water quality laboratory analytical reports are provided in Appendix G.

TABLE 4-3
City of Fort Myers Deep Injection Well IW-1 Pilot Hole Water Quality
City of Fort Myers – IW-1 and Facilities Completion Report

Pilot Hole Depth (ft bls)	Chloride (mg/L)	TDS (mg/L)	Conductivity (μmhos/cm)
490	145	592	1,410
520	145	516	1,100
550	160	440	1,020
580	180	568	1,120
610	215	560	1,070
640	205	632	1,150
670	205	564	1,200
700	240	648	1,150
730	255	668	1,260
780	255	680	1,200
810	265	672	1,250
840	305	760	1,380
870	315	828	1,360
910	370	996	1,370
940	380	940	1,520
970	385	932	1,560
1,010	405	936	1,650
1,040	430	1,100	1,670
1,100	440	1,110	1,770
1,130	455	1,100	1,710
1,160	490	1,170	1,600
1,190	470	1100	1,730
1,220	480	1,160	1,690
1,250	510	1,180	1,780
1,280	510	1,240	1,780
1,310	550	1,320	1,860
1,340	550	1,310	1,860
1,370	550	1,390	1,780
1,400	540	1,340	1,850
1,430	530	1,280	1,710
1,460	540	1,310	1,820
1,490	570	1,360	1,860
1,520	620	1,480	2,150
1,550	660	1,520	2,200
1,580	680	1,470	1,970
1,610	700	1,520	2,250
1,630	770	1,910	2,320
1,660	640	1,520	2,080
1,690	660	1,650	2,220
1,710	680	1,740	2,330
1,730	680	1,590	2,180
1,760	580	1,420	2,020
1,790	620	1,460	2,010
1,830	410	2,180	4,090
1,860	660	2,740	4,380
1,890	780	2,930	4,760
1,910	3,300	8,040	12,400
1,940	2,750	6,400	9,700
1,970	2,450	5,620	9,040
1,980	8,000	15,000	17,800
2,000	2,550	5,220	8,960
2,030	7,250	15,800	25,000

Notes:
ft bls = feet below land surface
mg/L = milligrams per liter
μmhos/cm = micromhos per centimeter

4.4 Air-Lift Specific Capacity Tests

Air-lift specific capacity tests were conducted at approximately 90-foot intervals from 630 to 3,040 ft bls in IW-1 to provide information on the specific capacity of the open hole interval of the well. In the Dual Zone Monitor Well, specific capacity tests were conducted in 90-foot intervals from 585 ft to 1,750 ft bls. Each test was conducted for a duration of approximately 15 minutes, during which time water level and approximate flow rate measurements were taken to provide data for specific capacity calculations. Tables 4-4 and 4-5 summarize of the air-lift specific capacity data for IW-1 and the Dual Zone Monitor Well, respectively. Figures 4-1 through 4-2 present the air-lift specific capacity and normalized air-lift specific capacity data with respect to depth for each well. The normalized air-lift specific capacity data were derived by calculating the specific capacity of the given interval divided by length of the of the test interval. This data allows an evaluation of the productivity of the borehole which is unbiased by the amount of open borehole during testing.

TABLE 4-4
IW-1 Air-Lift Specific Capacity Tests
City of Fort Myers – IW-1 and Facilities Completion Report

Test Date	Test Interval (ft bls)	Pumping Rate (gpm)	Drawdown (ft)	Specific Capacity (gpm/ft)	Pumping Duration (minutes)
11/13/01	450-630	550	12.30	45.0	5.0
11/14/01	450-720	500	11.36	44.0	10.0
11/14/01	450-810	410	21.25	19.3	14.0
11/14/01	450-900	450	26.50	17.0	15.5
11/14/01	450-990	435	23.50	18.5	14.5
11/14/01	450-1080	411	20.00	20.5	17.0
11/14/01	450-1170	160	49.80	3.5	18.0
11/15/01	450-1288	533	8.00	66.7	21.0
11/16/01	450-1470	583	2.00	292.0	12.0
11/19/01	450-1530	350	0.85	400.0	10.0
11/19/01	450-1620	443	6.30	71.0	15.0
11/19/01	450-1710	565	5.00	113.0	26.0
12/26/01	1650-1890	560	1.50	373.0	20.0
12/28/01	1650-1980	500	4.00	125.0	20.0
1/02/02	1650-2070	141	41.00	3.4	17.8
1/04/02	1650-2160	425	81.00	5.3	11.8
1/04/02	1650-2250	408	8.10	50.4	15.0
1/05/02	1650-2340	414	0.00	4,000.0	16.0
1/07/02	1650-2430	400	3.70	100.0	15.0
1/08/02	1650-2520	428	2.00	214.0	15.0
1/08/02	1650-2610	408	15.00	27.2	15.0
1/09/02	1650-2700	400	14.50	27.5	15.0
1/09/02	1650-2790	437	0.20	2,000.0	14.0
1/10/02	1650-2880	433	0.20	2,000.0	15.0
1/11/02	1650-2970	433	0.90	481.0	15.0
1/11/02	1650-3040	382	0.20	1,910.0	16.0

Notes:
ft bls = feet below land surface
gpm = gallons per minute
gpm/ft = gallons per minute per foot of drawdown

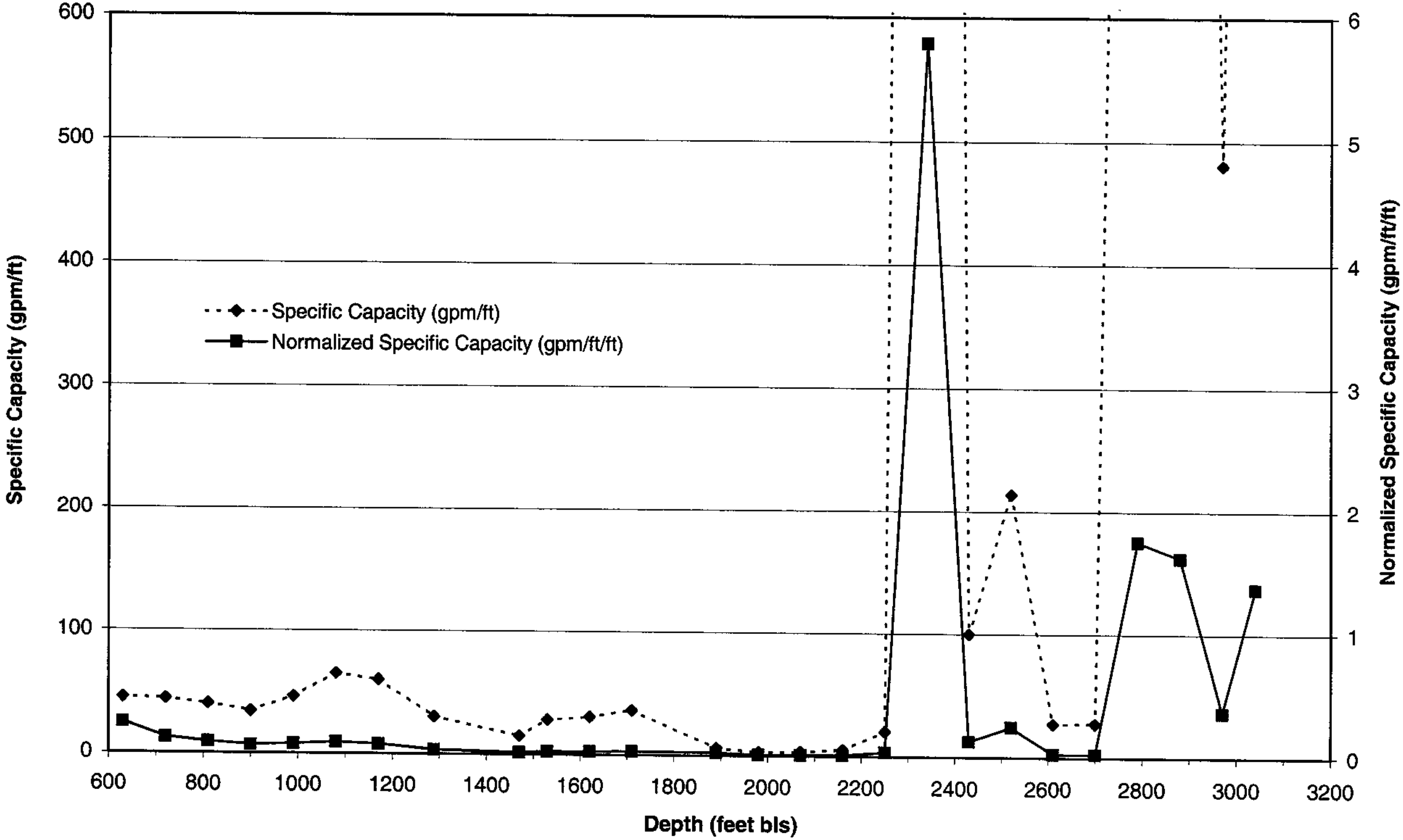

Figure 4-1
IW-1 Reverse-Air Specific Capacity Data
November 13, 2001 to January 11, 2002
City of Fort Myers IW-1 Engineering and Facilities Report

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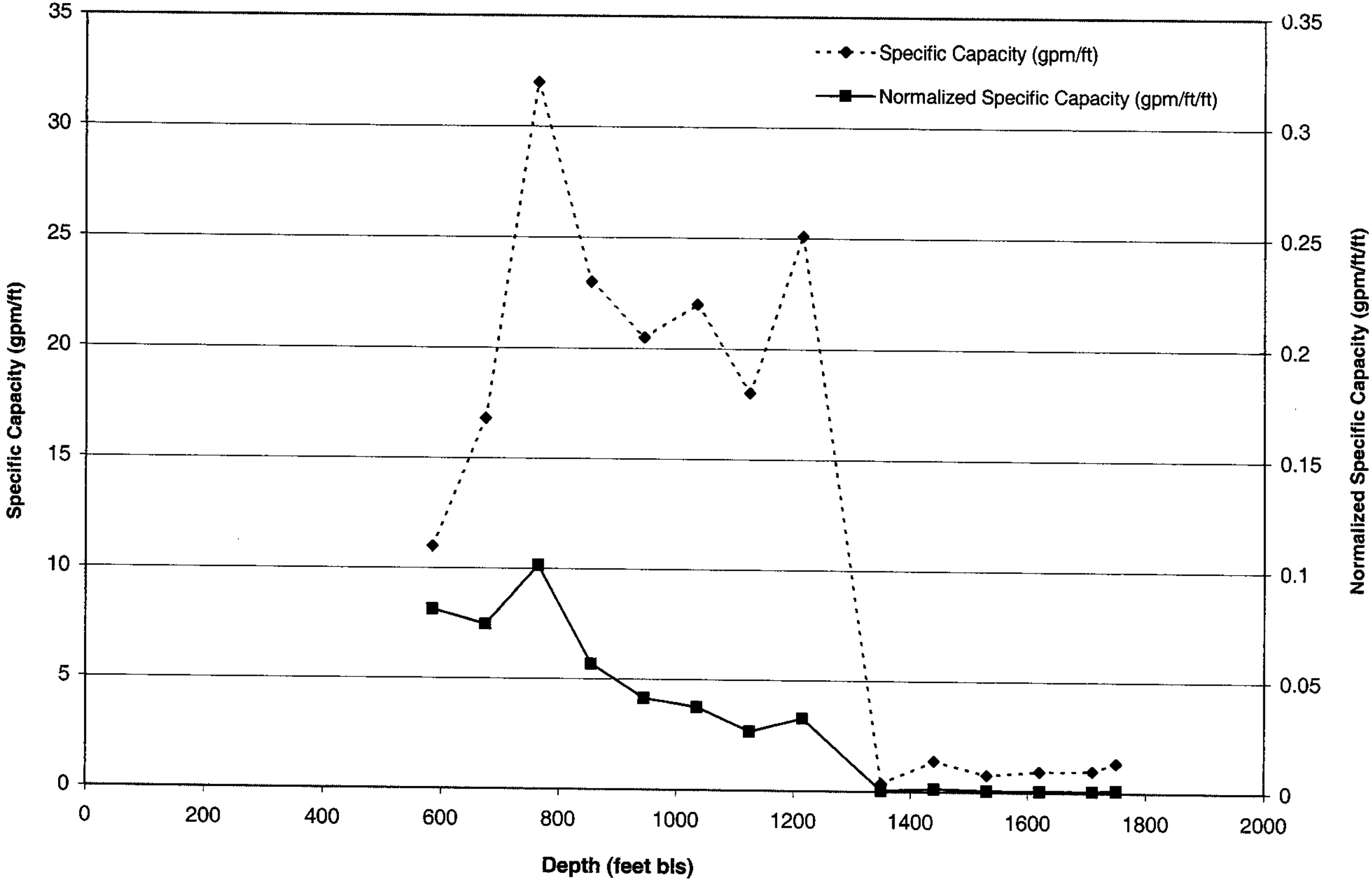

Figure 4-2
Dual Zone Monitor Well Reverse-Air Specific Capacity Data
March 15, 2002 to March 26, 2002
City of Fort Myers IW-1 Engineering and Facilities Report

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TABLE 4-5
Dual Zone Monitor Well Air-Lift Specific Capacity Tests
City of Fort Myers – IW-1 and Facilities Completion Report

Test Date	Test Interval (ft bls)	Pumping Rate (gpm)	Drawdown (ft)	Specific Capacity (gpm/ft)	Pumping Duration (minutes)
3/15/02	450-585	448	40.9	11.0	16.5
3/15/02	450-675	439	26.1	16.8	15.3
3/15/02	450-765	485	15.3	32.0	16.5
3/15/02	450-855	440	19.3	23.0	14.5
3/15/02	450-945	414	20.2	20.5	14.5
3/15/02	450-1,035	448	20.0	22.0	14.5
3/15/02	450-1,125	413	22.9	18.0	11.5
3/18/02	450-1,215	457	18.2	25.1	17.5
3/25/02	1,250-1,350	100	<200	>0.35	20.0
3/25/02	1,250-1,440	151	108.0	1.4	14.0
3/26/02	1,250-1,530	151	197.5	0.77	21.0
3/26/02	1,250-1,620	179	188.5	0.94	21.0
3/26/02	1,250-1,710	178.5	182.0	0.98	21.0
3/26/02	1,250-1,750	273	205.0	1.33	16.0

Notes:
ft bls = feet below land surface
gpm = gallons per minute
gpm/ft = gallons per minute per foot of drawdown

In IW-1, an increase in specific capacity occurred between the intervals of 2,250 to 2,520 ft bls, and 2,700 to 3,040 ft bls, as shown in Table 4-4 and Figure 4-1, suggesting that these intervals are highly productive zones.

In the Dual Zone Monitor Well, an increase in specific capacity occurred at a depth of 765 ft bls and changed little between 765 and 1,250 ft bls, as shown in Table 4-5 and Figure 4-2, suggesting that a productive interval was encountered between 675 ft and 765 ft bls. Following the installation of 16-inch casing to 1,250 ft bls, the specific capacity of the well remained very low between 1,250 and 1,750 ft bls (0.35 to 1.4 gpm/ft).

4.5 Formation Coring

Core samples were collected at selected intervals while drilling the injection well pilot hole to correlate with drill cuttings and geophysical logs, and to more thoroughly determine the hydrogeological properties of the formation. The core samples are typically collected in geological zones of suspected low permeability. Samples were obtained by a 4-inch diameter, 10-foot long core barrel. A total of nine cores were attempted between 1,390 and 2,350 ft bls. A generalized description of each core is presented in Table 4-6.

TABLE 4-6
IW-1 Generalized Core Descriptions
City of Fort Myers – IW-1 and Facilities Completion Report

Cored Interval (ft bls)	Generalized Geology Description
1,393 ft – 1,403 ft	Limestone, white (N9), very fine grained, well consolidated, low porosity, echinoids, at 1,400 ft Limestone is crystallized and very dense.
1,510 ft – 1,520 ft	Limestone, yellowish gray (5Y 8/1), very fine grained, sandy , well consolidated, low porosity, top 6" chalky, white (N9), low density
1,620 ft – 1,630 ft	Limestone, yellowish gray (5Y 8/1), very fine grained, sandy, well consolidated, low porosity
1,725 ft – 1,735 ft	Limestone, yellowish gray (5Y 8/1), very fine grained, well consolidated, low porosity
1,750 ft – 1,760 ft	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
1,889 ft – 1,899 ft	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
2,010 ft – 2,020 ft	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
2,075 ft – 2,085 ft	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
2,340 ft – 2,350 ft	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline

Note:
ft bls = feet below land surface

The cores were first examined and described on site. Selected intervals were chosen and analyzed for a detailed geotechnical and hydrogeological analysis by the testing laboratory, Ardaman & Associates, Inc. of Orlando, Florida. Cores were analyzed based on lithology (dolomitic regions indicating high degree of confinement) and sample size. Samples to be analyzed were required to be 9 inches in length by Ardaman & Associates. Of the cores intervals that transversed the dolomitic confining regions of interest, one coring interval (2,010 ft bls to 2,020 ft bls) did not contain sections of adequate length and thus were not analyzed by the laboratory. Two representative core samples from each of the intervals of 1,750 ft to 1,760 ft, 1,889 ft to 1,899 ft bls, 2,075 ft to 2,085 ft bls and 2,340 ft to 2,350 ft bls were analyzed to determine the specific gravity, total and effective porosity, and vertical and horizontal permeability.

Results of the laboratory hydraulic conductivity and porosity analyses conducted by Ardaman are summarized in Table 4-7. The analysis reports are provided in Appendix H. In general, the cores demonstrated varying degrees of confining characteristics. The laboratory analysis reports indicated that the cores varied in vertical hydraulic conductivity from 1.1 x 10^{-4} cm/sec to 5.6 x 10^{-10} cm/sec. All of the core samples sent to the laboratory exhibited low permeability. Appendix H contains a detailed description of the cores and laboratory methods used for hydraulic conductivity and porosity determinations, along with the laboratory results. Results of hydraulic conductivity laboratory analyses demonstrate varying degrees of confining characteristics throughout the intervals tested.

TABLE 4-7
Generalized Core Laboratory Analyses
City of Fort Myers – IW-1 and Facilities Completion Report

Core Depth (ft)	Test Specimen Orientation	Specific Gravity	Total Porosity (%)	Effective Porosity (%)	Hydraulic Conductivity (cm/sec)	
1,760	Vertical	2.76	0.18	0.18	4.7x10-5	.16198
	Horizontal		0.18		2.4x10-5	.06803
1,897	Vertical	2.71	0.29	0.29	5.5x10-7	.00156
	Horizontal		0.28		7.4x10-7	.00210
2,085	Vertical	2.83	0.04	0.02	5.6x10-10	1.59×10^{-6}
	Horizontal		0.03		4.0x10-9	1.13×10^{-5}
2,343	Vertical	2.86	0.15	0.03	1.1x10-4	.31181
	Horizontal		0.13		2.3x10-6	.00652

Notes:
ft = feet
cm/sec = centimeters per second

4.6 Packer Tests

Once the IW-1 pilot hole was completed, seven straddle packer tests and two single packer tests were conducted in the interval between 1,500 and 2,350 ft bls to determine water quality and hydraulic characteristics of the previously mentioned cored formation intervals. A straddle packer test consists of two inflatable packers with the tested zone of the formation between the packers. A single packer test, typically known as an off-bottom packer test, consists of a single inflatable packer in the borehole with the tested zone of the formation below the packer to the bottom of the borehole. Each packer test consisted of pumping the tested interval at a predetermined rate and recording water level changes (drawdown) over time. Preliminary pumping tests were conducted to determine the optimal pumping rate for each interval. Since these zones were selected due to a low permeability characteristic, the pumping rates are relatively low. The testing periods were long enough to observe the drawdowns become near steady state (small water level changes) or, at a minimum, long enough to evacuate three well volumes. This was done to make sure the selected formation interval is influenced and a representative water sample was collected.

Drawdown data from each packer test was used to determine the specific capacity, transmissivity, and storativity of the test interval. Water level recovery measurements were taken immediately following the pumping period to provide data for transmissivity. Water levels during the packer tests and recovery periods were measured using a submersible pressure transducer and were recorded by an In-Situ Hermit 3000 series data logger. An absolute pressure transducer/data logger referred to as a "memory gauge" was also placed under the bottom packer to monitor pressures which might indicate that the packers were not sealing properly against the formation and water is leaking past them, indicated by a pressure change below the packers. Manual water levels were also collected in the annular space between the well casing and the pump drop pipe to determine if the upper packers were leaking, indicated by a water level change in the annular space above the packers. Table 4-8 summarizes packer test flow rates, drawdown, calculated specific capacity, transmissivity, and storativity. Packer test water level data for the test interval and annular zone is presented in Appendix I. These figures also present the memory gauge data recorded at the packer seating depth during each test.

Water quality data was also collected from the packer tests conducted between 1,500 ft and 2,350 ft bls. Water samples were collected throughout the pumping portion of the packer tests and field analyzed for conductivity and chloride concentration to demonstrate that water quality had stabilized before collecting a final water sample for laboratory analysis. Final water samples were then collected at the end of each pumping period to evaluate water quality within the test interval to help identify the base of the USDW. Water quality data from the straddle packer tests demonstrated that the base of the USDW is located within the interval from 1,535 ft to 1,584 ft bls. Below this interval, water quality degrades quickly to TDS concentrations of approximately 30,000 mg/L. The water quality data obtained from the packer test closely correlate to the geophysical log interpretations. Table 4-9 summarizes packer testing water quality data for samples collected between 1,500 ft and 1,897 ft bls. The packer test water quality laboratory analytical reports are provided in Appendix G.

TABLE 4-8
Summary of Packer Test Results
City of Fort Myers – IW-1 and Facilities Engineering Report

Packer Test Interval	Test Duration (hours)	Discharge (gpm)	Drawdown (feet)	Specific Capacity (gpm/ft)	Trasmissivity (gpd/ft)	Trasmissivity (ft2/d)	Storativity	Analysis Method
1500 to 1535 feet	0.88	6	33	0.18	224	30	0.042	CJ
					180	24		R
1535 to 1584 feet	5.3	13	124	0.1	165	22	0.012	CJ
					150	20		R
1584 to 1620 feet	8.1	1	159	0.006	7	1	0.028	CJ
					1.5	0.2		R
1755 to 1897 feet	2	75	73	1	277	37	0.026	CJ
					337	45		R
1756 to 1898 feet	0.6	75	69	1.1	344	46	0.02	CJ
					262	35		R
1760 to 1790 feet	NA	0.25	170	0.001	NA	NA	NA	CJ
					0.12	0.016		R
1908 to 1932 feet	4.7	1.2	155	0.008	NA	NA	NA	CJ
					1.8	0.24		R
2265 to 3,040 feet	0.8	240	>1	<240				

CJ	Cooper-Jacob Method (straight line method)	gpm	gallons per minute	NA	No pumping data recorded
R	Theis Recovery Method	ft2/d	square feet per day	gpm/ft	gallons per minute per foot
ND	Value canot be determined from data	gpd/ft	gallons per day per foot		

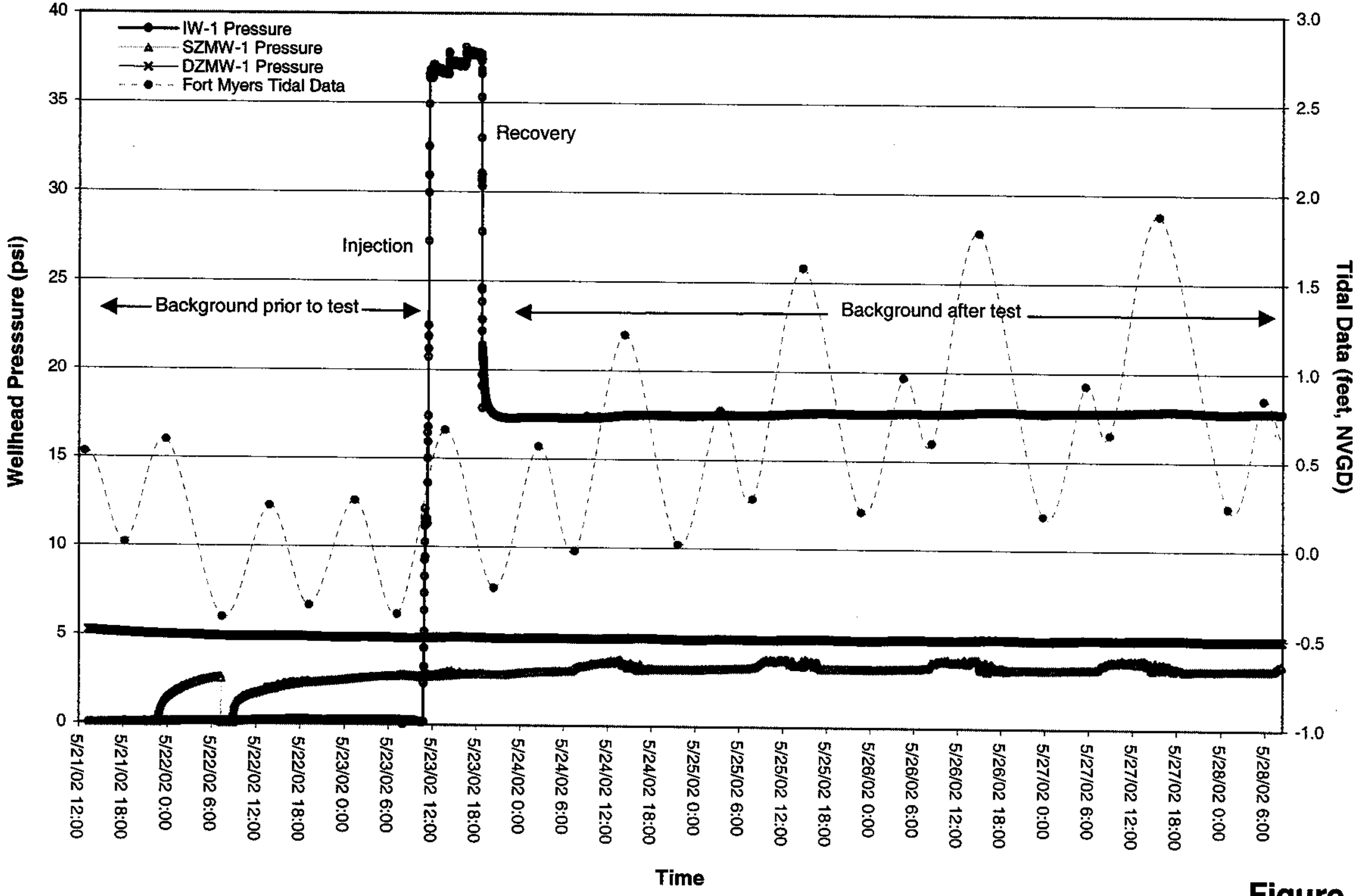

Figure 4-3

IW-1 Injection Test - IW and Monitor Well Data

City of Fort Myers - RO IW-1 Engineering and Facilities Report

TABLE 4-9
IW-1 Packer Test Water Quality
City of Fort Myers – IW-1 and Facilities Completion Report

Packer Test Interval (ft bls)	Chloride (mg/L)	TDS (mg/L)	Conductivity (µmhos/cm)
1,500 to 1,535	4,050	8,480	10,100
1,535 to 1,584	6,500	14,000	15,700
1,584 to 1,620		No Sample Collected*	
1,755 to 1,897	17,700	29,300	41,200

Notes:
ft bls = feet below land surface
mg/L = milligrams per liter
µmhos/cm = micromhos per centimeter
*Packer intervals produced only ~1 gpm. Flow was too low to collect representative sample.

4.7 Geophysical Logging

Geophysical logs were performed in the pilot hole intervals of IW-1 and the Dual Zone Monitor Well to correlate data obtained by different mechanisms and to provide additional geologic water quality information from the boreholes. The geophysical logs were compared to the formation lithology samples taken during drilling to identify formation boundaries, as well as to obtain specific geologic and hydrogeologic data pertaining to the geologic formations. This geophysical data was then utilized in the evaluation of cores and packer testing intervals, identification of specific water-producing geologic zones, and in determining the optimum casing setting depths for each well. Reamed borehole caliper logs were also performed prior to casing installation to confirm borehole size and appropriate casing setting depths. The geophysical logs are provided in Appendix J.

4.7.1 Injection Well (IW-1)

During construction of IW-1, geophysical logging below 450 ft bls took place in two stages. The interval from 450 ft to 1,800 ft bls underwent geophysical logging on November 27, 2001. The interval of 1,800 ft to 3,040 ft bls underwent geophysical logging on January 14, 2002. The geophysical logging events included static caliper, gamma ray, spontaneous potential, dual induction, borehole compensated sonic, flowmeter, fluid conductivity, temperature logs, and video. Flowmeter, fluid conductivity, and temperature logs were also conducted under flowing conditions. Table 4-10 summarizes geophysical logging conducted during the construction of the injection well. Video log summaries are provided as Appendix K.1-5. Four video survey tapes for the injection well are provided in Appendix L.

TABLE 4-10
IW-1 Geophysical Logging Activities
City of Fort Myers IW-1 Facilities Completion Report

Logging Event	Date	Well Progress and Casing Depth	Type of Log[1]	Purpose
1	November 6, 2001	12.25-inch pilot hole to 450 ft bls	C, GR, DI, SP	Determine shallow casing setting depth
2	November 9, 2001	42-inch reamed hole to 450 ft bls	C, GR	Confirm reamed hole characteristics
3	November 27-28, 2001	12.25-inch pilot hole to 1,800 ft bls	C, GR, SSP, SDI, SFT, SFC, SFM, BCS, DFT, DFM, DFR, Video	Determine intermediate casing setting depth
4	December 19, 2001	34.5-inch reamed hole to 1,655 ft bls; Intermediate casing to 1,650 ft bls	C,GR	Confirm reamed hole characteristics
5	January 14-15, and January 18, 2002	12.25-inch borehole to 3,040 ft bls	C, GR, SSP, SDI, SFT, SFC, SFM, BCS, DFT, DFM, DFR, Video	Determine final casing setting depth
6	February 11, 2002	28-inch reamed hole to 2,305 ft bls; 12.25-inch borehole to 3,040 ft bls	C, GR	Confirm reamed hole characteristics
7	February 12, 2002	28-inch reamed hole to 2,305 ft bls; 12.25-inch borehole to 3,040 ft bls	C, GR, Video	Confirm reamed hole characteristics with smaller caliper arms
8	February 15, 2002	Final casing to 2,305 ft bls; 12.25-inch borehole to 3,040 ft bls	SFT	Logs were run following each cement stage to determine lift and water temperature
9	February 19, 2002	Final casing to 2,305 ft bls; 12.25-inch borehole to 3,040 ft bls	CBL	Determine cement bond quality
10	March 4, 2002 April 12, 2002	Final FRP tubing to 2,305 ft bls; 12.25-inch borehole to 3,040 ft bls	C, Video	Examine final well characteristics and casing quality
11	April 15, 2002	Final FRP tubing to 2,305 ft bls; 12.25-inch borehole to 3,040 ft bls	RTS, HRT	Examine final well mechanical integrity

Notes:
[1]The following are abbreviations for geophysical logs:
C= Caliper,
GR= Gamma Radiation
DI= Dual Induction
SP= Spontaneous Potential
FC= Fluid Conductivity
FT= Fluid Temperature
CBL= Cement Bond Log
FM= Flow Meter
BCS= Borehole Compensated Sonic
Prefix D = Dynamic Logging
Prefix S = Static Logging
RTS = Radioactive Tracer Survey
HRT = High Resolution Temperature

In general, the geophysical logs correlate well to each other and to the drill cuttings, formation cores, and packer test data. Evaluation of the geophysical logs suggests that the interval below the intermediate casing (at 1,650 ft) to the total depth of the injection well of 3,040 ft bls can be divided into seven zones. Table 4-11 presents a hydrogeological interpretation of these seven zones.

TABLE 4-11
Hydrogeological Interpretation of Lithology Encountered
City of Fort Myers – IW-1 and Facilities Completion Report

Interval (ft bls)	Comments
1,535 ft to 2,010 ft	Confining, does not contain any major fluid producing zones. Geophysical logs and data collected from extensive packer testing and coring establish this interval as the first prominent confining unit below the base of the USDW. As presented in the intermediate casing depth request letter dated December 12, 2001, the dual induction geophysical survey interpretation curve provided by Youngquist Brothers, Inc. shows that 10,000 mg/L TDS water is encountered at 1,510 ft bls, and at 1,550 ft bls. The TDS concentration is approximately 20,000 mg/L. Therefore, the base of the USDW is estimated to be approximately 1,510 ft bls. The dual induction interpretation curve indicates water within the intermediate casing depth of 1,650 ft to 2,010 ft bls interval is below the USDW.
2,010 ft to 2,100 ft	Transmissive zone, heavily fractured dolomitic zone with substantial flow at 2,100 ft that dominates the flow log. The fluid conductivity log confirms that the water quality within this region is below the USDW.
2,100 ft to 2,310 ft	Second confining zone below the base of the USDW. Final casing is set at the base of this unit which is comprised of well consolidated dolomite. No evidence of significant flow from this interval.
2,310 ft to 2,440 ft	Slightly transmissive, dolomitic zone with small void and fractured flow. Flow log indicates no flow due to the dominating flow zone at 2,100 ft; however, reverse-air specific capacity testing suggests that production increases through this interval. The fluid conductivity log confirms that water generated from this region continues to be below the USDW.
2,440 ft to 2,610 ft	Confining, with no evidence of significant flow. Well-consolidated limestone unit with interspersed layers of lignite in the upper portion of this interval from 2,440ft to 2,480 ft.
2,610 ft to 2,690 ft	Transmissive zone comprised of hard limestone with a fractured dolomitic interval from 2,610 ft to 2,630 ft. The fluid conductivity log confirms that water quality within this interval remains below the USDW.
2,690 ft to 3,040 ft	Highly transmissive interval with substantial fracturing and cavernous zones. The dynamic flow log showed minor flow due to the dominating effects of the 2,100-foot flow zone. The reverse-air specific capacity results show significant water production comparable to the 2,100 ft interval, and the video survey confirmed a highly fractured zone. The fluid conductivity log confirms that water quality within this interval remains below the USDW.

Interpretation of the geophysical logs indicate that the interval below the base of the USDW from 1,535 ft to 2,610 ft is predominately confining with two interspersed transmissive zones. Caliper and flow logs indicate fractured zones with flow from 2,010 to 2,100 feet bls and 2,310 to 2,440 feet bls. A confining zone is present from 2,440 to 2,610 feet bls before a highly transmissive region is encountered that extends to the total depth of the well.

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 well ranged in age from Holocene to Mid-Eocene Age deposits (as presented in Table 4-2). The Surficial, Intermediate, and Floridan aquifer systems were penetrated by all wells.

4.7.2 Dual Zone Monitor Well Geophysical Logging

In general, the geophysical logs correlate well to the other logs for the injection well and to the drill cuttings from land surface to 1,750 ft. Table 4-12 summarizes geophysical logging conducted during the construction of the Dual Zone Monitor Well. Full scale geophysical logs for the Dual Zone Monitor Well are provided in Appendix J. A video log summary is provided in Appendix K. The final video for the Dual Zone Monitor Well is provided in Appendix L.

TABLE 4-12
Dual Zone Monitor Well Geophysical Logging Activity Summary
City of Fort Myers IW-1 Facilities Completion Report

Logging Event	Date	Well Progress and Casing Depth	Type of Log Run[1]	Purpose
1	March 13, 2002	32-inch borehole to 450 ft bls	C, GR, DI, SP	Determine shallow casing setting depth
2	March 20, 2002	11-inch pilot hole to 1,250 ft bls	C, GR, SSP, SDI, SFT, SFC, SFM, BCS, DFT, DFM, DFR	Confirm properties of shallow monitoring zone
3	March 22, 2002	22-inch reamed hole to 1,250 ft bls; Surface casing to 450 ft bls	C,GR	Confirm reamed hole characteristics
4	March 28, 2002	11-inch borehole to 1,750 ft bls	C, GR, SSP, SDI, SFT, SFC, SFM, BCS, DFT, DFM, DFR	Confirm properties of deep monitoring zone
5	April 1, 2002	14.5-inch reamed hole to 1,699 ft bls; 11-inch borehole to 1,750 ft bls	C, GR	Confirm reamed hole characteristics
6	April 8, 2002	11-inch borehole to 1,750 ft bls; 6.625-inch FRP to 1,700 ft bls	C, GR, Video	Confirm final deep zone characteristics

Notes:
[1]The following are abbreviations for geophysical logs:

C= Caliper,
GR= Gamma Radiation
DI= Dual Induction
SP= Spontaneous Potential
FC= Fluid Conductivity
FT= Fluid Temperature
CBL= Cement Bond Log
FM= Flow Meter
BCS= Borehole Compensated Sonic
Prefix D = Dynamic Logging
Prefix S = Static Logging
RTS = Radioactive Tracer Survey
HRT = High Resolution Temperature

4.8 Summary of the USDW Location

The reverse-air water quality samples, the packer test water quality samples and the resistivity and dual induction geophysical logs were used to determine the location of the base of the USDW, as mentioned previously. Waters with concentrations less than 10,000 mg/L TDS are defined as a USDW by state and federal regulations, and are provided protection for their potential as a future source of drinking water.

The packer test water quality suggested that the USDW existed between 1,535 ft and 1,584 ft bls. A combination of the resistivity and dual induction geophysical logs were also utilized to locate the USDW. Interpretation of the logs identify the USDW at a depth of 1,510 ft bls. A plot of this combination log is provided in Appendix M.

4.9 Selection of Injection and Monitoring Zones

All of the data collected were used to determine the final casing setting depths of all wells. As the injection zone was identified, the shallow and deep monitoring zones were also identified which satisfied FDEP's UIC construction permit requirements. All of the selected formation injection and monitoring zones were approved by FDEP prior to cementing any final casings in place.

4.9.1 Injection Zone of IW-1

During the pilot borehole drilling, two potential injection zones were identified. An increase in water production, as determined by reverse-air specific capacity testing, occurred between the intervals of 2,000 ft to 2,150 ft bls, and from 2,800 ft to 3,040 ft bls. These production zones also correlate with large fractures detected in the caliper logs at 2,010 ft and 2,100 ft and 2,830 ft and 3,040 ft bls. Once all the data collected were considered, the advantages of utilizing the lower production interval as the injection zone were recognized which offers the most confinement and vertical distance between the USDW and the lowermost injection zone. It was decided to set the casing at a depth of 2,305 ft bls.

4.9.2 Deep Monitoring Interval (DZMW-1)

The FDEP construction permit requires that the deep monitoring zone be completed into the first permeable zone below the base of the USDW. Since the base of the USDW was determined to be at approximately 1,510 ft, the first permeable zone was located at approximately 1,700 ft bls. Well DZMW-1 was completed with an open interval between 1,700 ft to 1,750 ft bls. The water quality of this zone can be seen in the geophysical dual induction and resistivity combination log presented in Appendix M.

4.9.3 Shallow Monitoring Interval (SZMW-1)

The FDEP construction permit requires that for the shallow monitoring zone be completed into the lowermost permeable zone above the base of the USDW. Since the USDW was detected at 1,510 ft, the lowermost permeable zone within the USDW was located at approximately 1,250 ft bls. Well SZMW-1 was therefore completed with an upper open interval between 1,250 ft bls to a depth of 1,350 ft bls. The water quality located above and below of this zone can be seen in the geophysical dual induction and resistivity combination log presented in Appendix M.

4.10 Ambient Water Quality Sampling

Background water quality sampling was conducted on all of the new wells after all well construction activities were completed. Appendix N contains the certified laboratory results final report for each well.

4.10.1 Injection Well (IW-1) Ambient Water Quality

After construction was completed, IW-1 was sampled for background water quality on March 26, 2002 after fully developing the well to establish true background conditions. The water sample was analyzed for all primary and secondary drinking water standards and FDEP's minimum criteria. The background sample had a TDS concentration of 37,800 mg/L, demonstrating that the injection zone is located far below the base of the USDW. Table 4-13 summarizes ambient water quality data for IW-1. Appendix N.1 contains the certified laboratory results final report.

TABLE 4-13
Ambient Water Quality Data
City of Fort Myers – IW-1 and Facilities Completion Report

State Primary Drinking Water Standards: Inorganic

Parameter	MCL1 (mg/L)	IW-1	DZMW-1	SZMW-1
Antimony	0.006	<0.0022	<0.020	0.069
Arsenic	0.05	<0.0028	<0.030	<0.030
Barium	2	<0.0001	<0.003	<0.003
Beryllium	0.004	<0.0008	0.0170	0.0100
Cadmium	0.005	<0.0002	<0.003	0.0040
Chromium	0.1	0.074	<0.010	<0.010
Cyanide	0.2	<0.006	<0.005	<0.005
Fluoride	4	<10	<35.0	<7.0
Lead	0.015	0.029	0.011	<0.010
Mercury	0.002	<0.001	<0.001	<0.001
Nickel	0.1	0.049	<0.010	0.021
Nitrate (as N)	10	<0.05	0.02	<0.02
Nitrite (as N)	1	<0.05	<0.02	<0.02
Selenium	0.05	<0.0016	<0.020	<0.020
Sodium	160	9600	6140	1350
Thallium	0.002	<0.0035	<0.020	<0.020

State Primary Drinking Water Standards: Volatile Organics

Parameter	MCL1 (μg/L)	IW-1	DZMW-1	SZMW-1
1,1-Dichloroethene	7	<0.02	NA	NA
1,1,1-Trichloroethane	200	<.021	<0.0003	<0.0003
1,1,2-Trichloroethane	5	<0.23	<0.0003	<0.0003
1,2-Dichloroethane	3	<0.10	<0.0002	<0.0002
1,2-Dichloropropane	5	<0.33	<0.0003	<0.0003
1,2,4-Trichlorobenzene	70	<0.22	<0.0005	<0.0005
Benzene	1	<0.05	<0.0005	<0.0005
Carbon Tetrachloride	3	<0.29	<0.0003	<0.0003
Cis-1,2-Dichloroethylene	70	<0.03	<0.0002	<0.0002
Dichloromethane (Methylene Chloride)	5	<0.31	<0.0005	<0.0005
Ethylbenzene	700	<0.47	<0.0005	<0.0005
Monochlorobenzene (Chlorobenzene)	100	<0.23	<0.0005	<0.0005

TABLE 4-13
Ambient Water Quality Data
City of Fort Myers – IW-1 and Facilities Completion Report

State Primary Drinking Water Standards: Volatile Organics (continued)

Parameter	MCL1 (µg/L)	IW-1	DZMW-1	SZMW-1
o-Dichlorobenzene (1,2-Dichlorobenzene)	600	<0.05	<0.0005	<0.0005
p-Dichlorobenzene (1,4-Dichlorobenzene)	75	<0.02	<0.0005	<0.0005
Styrene	100	<0.47	<0.0005	<0.0005
Tetrachloroethylene	3	<0.21	<0.0002	<0.0002
Toluene	1,000	<0.41	<0.0005	0.78
Trans-1,2-Dichloroethylene	100	<0.12	<0.0005	<0.0005
Trichloroethylene	3	<0.02	<0.0002	<0.0002
Vinyl Chloride	1	<0.29	<0.0005	<0.0005
Xylenes (Total)	10,000	<0.24	<0.001	2.6

State Primary Drinking Water Standards: Pesticides and PCB's

Parameter	MCL1 (µg/L)	IW-1	DZMW-1	SZMW-1
2,4,5-TP (Silvex)	50	<0.200	<0.00005	<0.00005
2,4-D	70	<0.100	<0.0005	<0.0005
Alachlor	2	<0.0625	<0.0003	<0.0003
Atrazine	3	0.635	<0.0001	<0.0001
Benzo(a)pyrene	0.2	<0.0400	<0.00001	<0.00001
Carbofuran	40	<0.900	<0.0005	<0.0005
Chlordane	2	<0.500	<0.00005	<0.00005
Dalapon	200	<1.00	<0.001	<0.001
Di(2-ethylhexyl)adipate	400	<0.600	<0.001	<0.001
Di(2-ethylhexyl)phthalate (bis(2-ethylhexyl)phthalate)	6	3.9	<0.001	<0.001
Dibromochloropropane	0.2	<0.02	<0.000005	<0.000005
Dinoseb	7	<0.125	<0.0002	<0.0002
Dioxin	0.00000003	<0.000000023	<6.0	<5.6
Diquat	20	<0.960	<0.001	<0.001
Endothall	100	<4.17	<0.020	<0.020
Endrin	2	<0.010	<0.00001	<0.00001
1,2-Dibromoethane (Ethylene Dibromide – EDB)	0.02	<0.010	<0.000005	<0.000005
Parameter	**MCL1 (µg/L)**	**IW-1**	**DZMW-1**	**SZMW-1**
Glyphosate (Roundup)	700	<2.40	<0.010	<0.010
Heptachlor	0.4	<0.0540	<0.00001	<0.00001
Heptachlor Epoxide	0.2	<0.0245	<0.00001	<0.00001
Hexachlorobenzene	1	<0.100	<0.00001	<0.00001
Hexachlorocyclopentadiene	50	<0.100	<0.0001	<0.0001
Lindane (G-BHC)	0.2	<0.0240	<0.00001	<0.00001
Methyoxychlor	40	<0.250	<0.00002	<0.00002
Oxamyl (Vydate)	200	<1.13	<0.0005	<0.0005
Pentachlorophenol	1	<0.0400	<0.00005	<0.00005
Picloram	500	<0.250	<0.0002	<0.0002
Polychlorinated Biphenyl (PCB)	0.5	<0.250	<0.00005	<0.00005
Simazine	4	<0.176	<0.0001	<0.0001
Toxaphene	3	<0.500	<0.0002	<0.0002

State Primary Drinking Water Standards: Radionuclides

Parameter	MCL1 (pCi/L)	IW-1	DZMW-1	SZMW-1
Radium 226	5 pCi/L2	81.6	53.5	2.5
Radium 228		4.7	3.4	<1.1
Gross Alpha	15 pCi/L	85.9	114	<12.1

TABLE 4-13
Ambient Water Quality Data
City of Fort Myers – IW-1 and Facilities Completion Report

State Secondary Drinking Water Standards				
Parameter	**MCL1 (mg/L)**	**IW-1**	**DZMW-1**	**SZMW-1**
Aluminum	0.2	<0.020	0.448	0.716
Chloride	250	19700	10200	2350
Copper	1	0.0018	<0.010	0.090
Fluoride	2	<10	<35.0	<7.0
Iron	0.3	0.406	<0.120	0.161
Manganese	0.05	0.0130	<0.010	<0.010
Silver	0.1	<0.001	<0.010	0.038
Sulfate	250	2650	2780	474
Zinc	5	0.056	<0.020	<0.020
Color	15 PCU	10	3	3
Odor	3 TON	17	35	140
pH	6.5-8.5	7.19	7.10	8.94
Total Dissolved Solids (TDS)	500	37800	36300	4800
Foaming Agents (MBAS)	0.5	<0.05	0.17	<0.05
Microbiological				
Parameter	**MCL1 (CFU)**	**IW-1**	**DZMW-1**	**SZMW-1**
Total Coliform	<5% positive	<1	<1	<1
Fecal Coliform		N/A	<1	<1

Notes:
1. Maximum Contaminant Level (MCL) per Rules 62-550.310, FAC.
2. The MCL for Radium 226 and Radium 228 combined is 5 pCi/L
3. Concentrations expressed in milligrams/liter (mg/L) or micrograms/liter (µg/L) unless otherwise indicated.
4. Abbreviations:

pCi/L:	Picacurries/liter	TON:	Threshold Odor Number
MDL:	Minimum Detection Limit	PCU:	Platinum Cobal Units
MFL:	Million Fibers/Liter > 10 um.	CFU:	Colony Forming Units/100 mL
µg/L:	Micrograms/Liter	ND:	Non Detect

4.10.2 Dual Zone Monitor Well Ambient Water Quality

Both zones of the Dual Zone Monitor Well (SZMW-1 and DZMW-1) were sampled for background water quality analyses on May 21, 2002. Before sampling, both zones were fully developed. The samples were analyzed for primary and secondary drinking water standards and FDEP's minimum criteria. The background sample for the SZMW-1 monitoring zone had a TDS concentration of 4,800 mg/L, demonstrating that the monitoring zone is above the base of the USDW. The TDS concentration of the DZMW-1 monitoring zone sample was 36,300 mg/L, demonstrating that the lower monitoring zone is located below the base of the USDW. Table 4-13 summarizes water quality data for SZMW-1 and DZMW-1. Appendix N.2 and M.3 contain the certified laboratory results final reports for DZMW-1 and SZMW-1, respectively.

4.11 IW-1 Injection Testing

Once the injection well wellhead was completed, an eight-hour injection test was conducted on May 23, 2002. The injection test was conducted at an average flow rate of approximately 2,820 gpm of brackish water from the RO wellfield. Flowrate and injection pressure at IW-1 and the water level pressure in both zones of the dual zone monitoring well were monitored and recorded for the 2-day background period, 8-hour injection test, and a 3.5-day recovery/background period. Figure 4-3 represents the associated aquifer water pressures of the injection well and monitoring wells for the period from approximately 2 days prior to starting the injection test through approximately 3.5 days after completion of the injection test.

Prior to injection testing the injection well wellhead was not under pressure. The injection test was initially started; however, flowmeter discrepancies required the test to be temporarily shut down to confirm that that the flowmeter was operating properly. The recorded wellhead pressure in IW-1 was approximately 11 psi prior to restarting the injection test. To acquire the target injection flow rate of approximately 2,820 gpm (4.06 MGD), individual RO production wells were started until a steady flow rate of 2,820 gpm was achieved. A generally constant flowrate of 2,820 gpm was maintained for approximately 6 hours, after which the rate was increased to approximately 2,900 gpm for 2 hours to monitor the injection well pressures at the maximum rate in the construction permit restricted at 2,917 gpm (4.2 MGD).

During the test, the maximum injection pressure was approximately 37.5 psi during the 2,820 gpm flow rate portion of the injection test. During the 2,900 gpm flow rate portion of the injection test, the maximum injection pressure was approximately 37.7 psi. Wellhead pressure returned to approximately 17.3 psi very quickly during the recovery period following completion of the injection period. No noticeable pressure changes were evident at any of the monitoring zones of DZMW-1 or SZMW-1 during the injection test. Figure 4-3 (presented previously) provides barometric data superimposed on wellhead pressure data for all wells.

SECTION 5

Mechanical Integrity Testing

Mechanical Integrity Testing (MIT) was conducted during the construction of the injection well and the Monitor Wells. Testing of IW-1 was performed to evaluate the mechanical integrity of the well in accordance with standards set forth in Chapter 62-528, FAC. The MIT conducted on IW-1 included casing pressure tests, a video survey of the casing and borehole, temperature and cement bond geophysical logs, and radioactive tracer testing. The MIT conducted on DZMW-1 included a casing pressure test and a video survey of the final casing and borehole. Testing results demonstrated that both wells meet the requirements for internal and external MIT as set forth in Chapter 62-528.300(6), FAC. The pressure test data is provided in Appendix O.

5.1 MIT Results for the Injection Well (IW-1)

5.1.1 Casing Pressure Tests

A total of three pressure tests were conducted on the injection well final 18-inch diameter casing string, annular zone, and 12-inch diameter FRP tubing of IW-1. The test results are discussed below and the pressure data sheets are provided in Appendix O.1.

5.1.1.1 Final 18-inch Diameter Steel Casing Pressure Test

The first pressure test was conducted on February 21, 2002, on the final 18-inch diameter steel casing prior to installing the FRP tubing. The pressure test began at 113.5 psi and dropped to 107.9 psi after the 120-minute testing period. Jack Myers/FDEP was onsite to witness the first 60 minutes of the testing period. After 60 minutes, the pressure dropped to 110 psi, a change of 3.1 percent, below the 5 percent loss over a 60-minute period allowable by FDEP. The pressure test continued for an additional 60 minutes. At the conclusion of the 120-minute test, the pressure dropped to 107.9 psi. The pressure loss of 5.6 psi resulted in a change of 4.9 percent over the entire 120-minute testing period.

5.1.1.2 Annular Zone Pressure Test

On February 28, 2002, a pressure test was successfully conducted on the annular zone of IW-1 following the installation of the YBI packer and FRP tubing. The wellhead pressure was monitored for a 120-minute period with a calibrated 300 psi pressure gauge. Pressure readings were recorded manually every 1 minute during the 60-minute test. During the test, the pressure increased from 107 psi to 112 psi. The 5 psi gain (a gain of 4.7 percent) over 120 minutes was within the 5 percent pressure loss limit allowed by FDEP for a 60-minute pressure test.

5.1.1.3 Installed 12-inch Diameter FRP Injection Tubing Pressure Test

On April 9, 2002, a pressure test was successfully conducted on the installed FRP injection tubing. The pressure test was conducted with an inflatable packer set at 2,385 ft bls. The casing was pressurized with water to 110 psi using a high-pressure pump. During the test, the pressure increased from 110 psi to 115 psi during the 60-minute test. The 5 psi gain (a gain of 4.5 percent) was within the 5 percent limit allowed by FDEP for a 60-minute pressure test.

5.1.2 Video Survey

A color camera video survey was conducted on the completed injection well (IW-1) on April 12, 2002, by Youngquist Brothers, Inc., after completely flushing the well with more than 50,000 gallons of potable water. The video survey was conducted to a depth of 3,040 ft bls. The video log summary sheets are provided in Appendix K.

The survey showed no inconsistencies, and the FRP tubing appeared to be in good condition. The base of the 18-inch casing was identified at a depth of 2,312 ft bls. The YBI packer was encountered at a depth of 2,305 ft bls. The video survey was terminated when the at the bottom of the completed borehole at a depth of 3,040 ft bls.

5.1.3 Geophysical Logging

Cement bond and high resolution temperature logs were performed on injection well IW-1 by Youngquist Brothers, Inc., on February 19 and April 15, 2002, respectively.

The CBL was conducted to assess the quality of the cement-to-casing bond of the final casing of IW-1. The log was performed before cementing the upper 373 ft of the 18-inch diameter casing to allow the tool to be calibrated to uncemented casing (above 373 ft bls) and cemented casing (below 373 ft bls). The CBL demonstrated an adequate cement bond exists around the final 18-inch casing from 373 ft bls to the base of the logged interval. Above 373 ft bls, the cement bond log confirms that the casing was uncemented at the time of the logging event. The interval from land surface to 373 ft bls was cemented following completion of the cement bond log. The cement bond log is provided in Appendix J.1.

The temperature log (run from land surface to a total depth of 3,040 ft bls) indicated a temperature between 74.7°F and 99.3°F from 10 ft to 3,040 ft bls. Results of temperature logging give no indication of leaks in the 18-inch diameter casing.

5.1.4 Radioactive Tracer Survey

5.1.4.1 Background

On April 15,2002, an external RTS was performed on IW-1 after pumping 30,000 gallons of potable water into the well. The survey was conducted by Youngquist Brothers, Inc., in the presence of Mr. Randy Dean (CH2M HILL).

In preparation for RTS logging, a gamma ray log was conducted to establish background conditions on the entire well. Using the Casing Colar Locator (CCL), the base of the 12-inch diameter FRP was delineated at 2,299 ft bls. The base of casing was identified by using the CCL during each logging run throughout the RTS.

One static test and two dynamic tests were performed. The tracer fluid (Iodine 131[I^{131}]) was placed in an RTS tool equipped with an ejector, upper, middle, and lower gamma ray detectors, and a CCL. The upper (top) gamma ray detector (GRT) is located 9.80 ft above the ejector on the tool. The middle (GRM) and lower (bottom) (GRB) gamma ray detectors are located 2.75 ft and 12.3 ft, respectively, below the ejector. Figure 5-1 presents a schematic diagram of the radioactive tracer tool used during the test.

During the static test, the ejector was located 1 foot below the base of the FRP. For the dynamic tests, the ejector was positioned 5 ft above the base of the casing at a depth of 2,294 ft bls. 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 one-minute detector test, 1 microCurie (mCi) of I^{-131} was ejected under both static and dynamic conditions. Gamma ray activity was monitored for 60 minutes after release of the tracer during the static and first dynamic test. Gamma ray activity was monitored for 30 minutes during the second dynamic test. Following each monitoring period, a log out of position was performed to 200 ft above the highest point at which elevated gamma counts were detected. This was followed by a flush of at least one well volume of potable water. The two dynamic tests were performed at injection rates of 29 gpm and 24 gpm, respectively, of potable water.

The background gamma log that was run from ground level to a total depth of 3,040 ft bls is identified at the top of the RTS log sheet as BACKGROUND GAMMA RAY. Following the background gamma log, a log was performed to verify the base of the FRP at 2,299 ft bls. This log pass is identified at the top of the log sheet as CASING COLLAR TIE-IN. The log verified the base of the FRP at 2,299 ft bls.

5.1.4.2 Ejection No. 1 (Static Test)

The first static test began by positioning the ejector 1 foot below the base of the 12-inch-casing at a depth of 2,300 ft bls. 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 background monitoring and the hour following ejection of 1 mCi of tracer is displayed in log file STATIC PASS. Increased gamma ray activity was not evident at any of the three detectors indicating no movement of the $I\text{-}^{131}$ in the casing.

After the first static test, a log out of position was conducted. 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 staining of the casing is evident on the log out of position. Slight Residual staining is evident on the middle and bottom detectors. Gamma ray activity is similar to the background gamma ray log above a depth of 2,100 ft bls.

As shown on log file titled LOG AFTER FLUSH, the log out of position following the casing flush indicates that little residual stain from the I^{-131} was present on the middle and bottom detectors.

5.1.4. Ejection No. 2 (First Dynamic Test)

The second ejection was conducted under dynamic conditions to verify the integrity of the grout seal around the base of the 18-inch casing. Potable water was pumped into the well at a rate of 29 gpm (5 ft per minute). The ejector of the tool was positioned 5 ft above the base of the casing (2,294 ft bls) and 1 mCi of tracer was released following 1 minute of time drive logging. The gamma ray response from each detector is shown on log file DYNAMIC #1. An increased gamma ray response was evident at the middle detector approximately .3 minutes 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 first dynamic test conducted for a duration of 60 minutes.

Following the first dynamic test, the tool was logged out of position while continuing to inject at 29 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 had some residual tracer staining. Increased gamma ray activity was not encountered above a depth of 2,150 ft bls at the top and bottom detectors. The casing was then flushed with more than 15,000 gallons of water before lowering the RTS tool to the base of the casing.

As shown on log file titled LOG AFTER FLUSH, the log out of position following the casing flush indicates that residual stain from the I^{131} was present on the middle and bottom detectors.

The results of the first dynamic test indicate no upward migration of radioactive tracer, therefore, confirming external mechanical integrity.

5.1.4.4 Ejection No. 3 (Second Dynamic Test)

The third 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 24 gpm (4 fpm). The ejector of the tool was positioned 5 ft above the base of the casing (2,294 ft bls) and 1 mCi of tracer was released following 1 minute of time drive logging. The gamma ray response from each detector is shown on log file DYNAMIC #2. An increased gamma ray response was evident at the middle detector approximately 10 seconds 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 a duration of 30 minutes.

Following the second dynamic test, the tool was logged out of position while continuing to inject at 24 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 showed that there was no residual staining. Increased gamma ray activity was not encountered above a depth of 2,100 ft bls at either of the detectors during the log out of position. The casing was then flushed with more than 15,000 gallons of water before lowering the RTS tool to a depth of 2,820 ft bls and ejecting the remaining tracer into the open borehole. The tool was then raised to 2,800 ft bls and cycled with water to flush out any remaining I^{131} from the ejector.

Following the water cycling through the ejector port, the well was logged to ground level as shown on log file titled FINAL BACKGROUND, the log out of position following the casing flush indicates the residual tracer stain in the casing and on the casing was reduced by the casing flush. Gamma ray activity at the top and bottom detectors is similar to the background gamma ray log above the packer depth of 2,305 ft bls.

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

5.2 Deep Zone Monitor Well (DZMW-1)

5.2.1 Casing Pressure Test

On April 5, 2002, a casing pressure test was successfully conducted on the final 6-inch diameter casing of DZMW-1. The pressure test was conducted with an inflatable packer set at 1,735 ft bls after cementing to 1,350 ft bls. The wellhead pressure was monitored for a 60-minute period with a calibrated 100-psi pressure gauge. Pressure readings were recorded manually every 1 minute during the 60-minute test. During the test, the pressure increased from 70 psi to 70.5 psi. The 0.5 psi loss was within the FDEP allowable 5 percent limit for a 60-minute pressure test. The test results are discussed below and the pressure data sheets are provided in Appendix O.2

5.2.2 Video Survey

A color camera video survey was conducted on DZMW-1 on April 8, 2002, by Youngquist Brothers, Inc., after completely flushing the well with potable water. The video survey was conducted to a depth of 1,750 ft bls. The video log summary sheet is provided in Appendix K.5.

The survey showed no inconsistencies, and the casing appeared to be in good condition.

SECTION 6

Summary and Conclusions

A deep injection well system was constructed for the City of Fort Myers to serve their ROWTP. The injection well system is the disposal mechanism for the RO brine concentrate disposal and the existing surface water discharge to Billy's Creek was discontinued. Construction of the injection well facilities began on November 5, 2001, and was substantially completed on June 29, 2002. Final completion of the project, including system startup, occurred on July 11, 2002.

The injection well IW-1 was constructed with a final 18-inch diameter steel casing string set to a depth of 2,305 feet bls, and a 735-foot open hole interval down, to a total depth of 3,040 feet bls. The well is completed with a 12-inch inside diameter FRP tubing with a stainless steel packer assembly. The annulus between the final 18-inch steel casing and the 12-inch FRP is filled with a corrosion inhibitor fluid and is pressurized.

One dual zone monitoring well were constructed as part of the injection well facilities. The deep zone monitoring well, DZMW-1, was constructed as a 6-inch inside diameter FRP well with an open borehole interval between 1,700 feet to 1,750 feet bls. The shallow zone monitoring well, SZMW-1, was constructed as the annulus zone between the 16-inch diameter steel casing and the 6-inch FRP with an open borehole interval from 1,250 feet to 1,350 feet bls. Construction and testing were conducted in accordance with FDEP construction permit 165628-001-UC, the applicable sections of Chapter 62-528, FAC, and the construction contract documents prepared by CH2M HILL.

The construction testing program was approved by the FDEP and the TAC before issuance of the construction permit. A comprehensive testing program was conducted during construction of the injection well system to evaluate the site hydrogeology and assist in selection of the casing-setting depths. The testing program consisted of collecting formation lithology samples, cores, pilot hole water samples, geophysical logging, air-lift specific capacity tests, packer tests, an injection test, and background water quality samples.

Packer tests identified the base of the USDW (identified as water with >10,000 mg/L of total dissolved solids [TDS]) between 1,535 feet and 1,584 feet bls. Interpretation of the geophysical logs correlates with the data obtained during packer testing and suggests that the base of the USDW is located at approximately 1,510 feet bls. These data were used to ensure that the deep zone monitoring well, DZMW-1, was constructed below the base of the USDW and SZMW-1 was constructed just above the base of the USDW.

The testing program identified the top of the injection zone at 2,610 feet bls. The injection zone is characterized by extremely high transmissivity, highly fractured and cavernous dolomite with intervals of lower transmissivity limestone. Confining units were identified above the injection zone over the interval from 1,535 to 2,610 feet bls. Several minor production intervals are present within the confining units. Additional confinement is present above 1,535 feet bls.

Geophysical logging, pressure testing, a video survey, and an RTS survey were performed to demonstrate mechanical integrity of the final casing of IW-1. Mechanical integrity of the of the 6-inch diameter FRP final casing of DZMW-1 was verified through geophysical logging, pressure testing, and video surveys. All testing confirmed that the final casing of both wells demonstrated mechanical integrity and met the standards established in Chapter 62-528, FAC. An 8-hour injection test was conducted with raw water from the RO wellfield. The well IW-1 was tested at a consistent target flow rate of 2,820 gpm with a maximum flow rate of 2,900 gpm. The resulting wellhead pressure due to this 2,820 gpm flow rate was approximately 37.5 psi.

Operational testing permission was granted from FDEP on July 5, 2002, after a site inspection. The wellhead facilities and modifications to the existing ROWTP program logic controller were completed by July 11, 2002. The completed injection well system was started on July 11, 2002, and the Fort Myers ROWTP has not been discharging to Billy's Creek since the start of operational testing. At the time of startup, the initial brine flow to the injection well is approximately 1,700 gpm and the resulting increase in wellhead pressures from injection activities is approximately 23 psi.

An Operation and Maintenance (O&M) Manual was completed to satisfy the conditions of the operational permit to be applied for after this operational testing phase. This O&M Manual is provided as Appendix P. This manual will be updated as needed to remain current on the operational procedures of this system.

SECTION 7

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APPENDIX A

Injection Well Permits

APPENDIX A.1

FDEP IW-1 Construction Permit

155336

Department of
Environmental Protection

COPY

Jeb Bush
Governor

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

David B. Struhs
Secretary

CH2M HILL

CERTIFIED MAIL NO.: 7000 1670 0005 5300 4363
<u>RETURN RECEIPT REQUESTED</u>

In the Matter of an
Application for Permit by:

Emmette P. Waite, Jr., Public Works Director
City of Fort Myers
2200 Second Street
Fort Myers, Florida 33902
_______________________________/

Lee – UIC/IW
FDEP File No. 165628-001-UC
City of Fort Myers Water Treatment Plant
IW-1 Class I Injection Well

NOTICE OF PERMIT ISSUANCE

Enclosed is Permit Number 165628-001-UC to construct a Class I Injection Well (IW-1) system, issued pursuant to Section(s) 403.087, Florida Statutes.

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

Executed in Fort Myers, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Richard W. Cantrell

Richard W. Cantrell
Director of
District Management

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this PERMIT and all copies were mailed before the close of business on APRIL 5, 2001 to the listed persons.

Clerk Stamp

FILING AND ACKNOWLEDGMENT

FILED, on this date, pursuant to S.120.52(11), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Janice L. Ingram 4/5/01
Clerk Date

RWC/JBM/cap

Enclosures

Copies furnished to:
  Charles Davault – FDEP Fort Myers
  William D. Beddow, P.E. – CH2M Hill - Tampa ✓
  TAC

Department of
Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

PERMIT

PERMITTEE:

City of Fort Myers
2200 Second Street
Fort Myers, Florida 33902

Permit/Certification
Number: 165628-001-UC
Date of Issue: April 5, 2001
Expiration Date: April 4, 2006
County: Lee
Latitude: 26° 37' 36" N
Longitude: 81° 49' 40" W
Section/Town/Range: 20/44S/25E
Project: City of Fort Myers WTP
IW-1 Class I Injection 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, 62-528, 62-550, and 62-660. 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 12 inch diameter tubing and packer Class I injection well (IW-1), with cemented 18" steel casing to approximately 2,400 feet below land surface (bls) and a total depth of approximately 2,900 feet bls. Injection is into the Oldsmar Formation for the primary means of disposal of non-hazardous, reverse osmosis concentrate from the City of Fort Myers Water Treatment Plant (WTP), for a maximum disposal of 4.2 million gallons per day (MGD). The maximum injection rate shall not exceed 2917 gpm. The IW-1 dual zone monitoring well (DZMW-1) will be completed from approximately 1175 to 1225 feet bls and from approximately 1700 to 1750 feet bls.

The Application to Construct/Operate/Abandon Class I, III, or V Injection well System, DEP Form 62-528.900(1), was received February 4, 2000, with supporting documents and additional information last received October 24, 2000. The Certificate of Demonstration of Financial Responsibility was issued January 10, 2001. Project is located at 2751 Jacksonville Street, Fort Myers, Florida.

Subject to Specific Conditions 1-13.

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 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, 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.

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 prior 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:

SPECIFIC CONDITIONS:

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.

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

m. If injection is to continue beyond the expiration date of this permit the permittee shall apply for, and obtain an operation permit. If necessary to complete the two-year operational testing period, the permittee shall apply for renewal of the construction permit at least 60 days prior to the expiration date of this permit.

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. Specific drilling pad dimensions and design details shall be provided to and approved by the Department prior to commencing construction (and shortly after selection of drilling contractor).

d. The four water table monitoring wells surrounding the injection well pad 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. Pursuant to Rule 62-528.455(1)(c)6., F.A.C., a survey indicating the exact location in metes and bounds of all wells authorized by this permit shall be provided prior to issuance of an operating permit.

SPECIFIC CONDITIONS:

3. Construction and Testing Requirements

a. The permittee shall contact the Technical Advisory Committee (TAC) chairman so that he may schedule progress review meetings at appropriate times with the TAC, the U.S. Environmental Protection Agency (USEPA), 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, tubing or packer and a temperature or noise log and radioactive tracer survey to demonstrate the absence of leaks behind the casing. Verification of pressure gauge calibration must be provided at the scheduled tests.

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

(1) Intermediate casing seat selection for injection and monitor wells.
(2) Final casing seat selection for injection and monitor wells.
(3) Prior to operational (long term) testing with effluent.

The permittee shall submit all necessary supporting documentation/data, with interpretation, to the TAC and USEPA for review.

e. The cementing program, as required in Section 62-528.410(5), Florida Administrative Code, shall be submitted to the Department, the USEPA, 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 and the USEPA. Emergency meetings may be arranged when justified to avoid undue construction delay.

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

i. The background water quality of the injection zone and monitoring zones shall be established prior to commencement of any injection testing. Parameters to be measured are the primary and secondary drinking water standards (except asbestos). These parameters are contained on Pages 5 to 8, Section 02311 in the January, 2000 technical specifications.

j. The injection and monitor well(s) at the site shall be abandoned when no longer usable for their intended purpose, or when posing potential threat to the quality of the waters of the State. Within 180 days of well abandonment, the permittee shall submit to the Department, the USEPA, 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.

SPECIFIC CONDITIONS:

l. All dual induction, sonic and caliper geophysical logs run on the pilot holes of the injection well 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').

4. Quality Assurance/Quality Control Requirements

a. This permit approval is based upon evaluation of the data contained in the application dated February 4, 2000, and the plans and/or specifications submitted in support of the application. Any proposed modifications to this permit shall be submitted in writing to the Underground Injection Control program manager, the TAC, and USEPA for review and clearance prior to implementation. Changes of negligible impact to the environment and staff time will be reviewed by the program manager, cleared when appropriate and incorporated into this permit. Changes or modifications other than those described above will require submission of a completed application and appropriate processing fee as per Rule 62-4.050, F.A.C.

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 I Test/Injection well construction and testing permit does not obligate the Department to authorize operation of the injection well system, unless the wells qualify for an operation permit applied for by the permittee and issued by the Department.

SPECIFIC CONDITIONS:

5. Reporting Requirements

a. All reports and surveys required by this permit must be submitted concurrently to all the members of the TAC and the USEPA. The TAC and USEPA 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, MS 3530
2600 Blair Stone Rd.
Tallahassee, FL 32399-2400

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

United States Environmental Protection Agency, Region IV
UIC Section
61 Forsythe Street, SW
Atlanta, Georgia 30303-8909

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

b. Members of the TAC and the USEPA 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 shall include 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, including pad monitor wells
(7) Copies of the driller's log are to be submitted with the weekly summary.

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

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 USEPA, with interpretation, for intermediate and final casing seat selection approvals by the Department.

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

f. After completion of construction and testing, a final report shall be submitted to the Department, the TAC, and the USEPA. The report shall include, but not be limited to, all information and data collected under Rule 62-528.450(2) and Rule 62-528.450(3), F.A.C., 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 injection rate within safe pressure limits shall be estimated.

6. The construction permit includes a period of temporary injection operation for the purposes of long term testing. Prior to commencement of operational testing:
   a. Construction of the injection well shall be complete and the permittee shall submit a notice of completion of construction to the Department.
   b. Each well shall first be tested for integrity of construction, and shall be followed by a short-term injection test of such duration to allow for the prediction of the operating pressure.
   c. The permittee shall submit the following information to each member of the Technical Advisory Committee:
      1) A copy of the borehole television survey(s),
      2) Geophysical logs,
      3) Mechanical integrity test data,
      4) Data obtained during the short term injection testing conducted pursuant to Rules 62-528.405(3)(a) and 62-528.410(7)(e), and 62-528.450(3)(a)2., F.A.C., above,
      5) Confining zone data,
      6) Background water quality data for the injection and monitor zones,
      7) Wastestream analysis,
      8) As-built well construction specifications,
      9) Draft operation and maintenance manual with emergency procedures, and
      10) Other data obtained during well construction needed by the Department to evaluate whether the well will operate in compliance with Department rules.
   d. The emergency discharge method shall be fully operational and no emergency discharge shall occur until the permittee has obtained all necessary permits.
   e. Any corrective action required under Rule 62-528,300(5)(c)2., F.A.C., has been completed.
   f. Written authorization shall be obtained from the Department. Authorization shall be for up to two years or the expiration date of the construction permit, whichever is less, and is nonrenewable. The authorization shall specify the conditions under which operational testing is approved. The authorization shall include:
      1) Injection pressure limitation,
      2) Injection flow rate limitation,
      3) Monthly specific injectivity testing,
      4) Reporting requirements, and
      5) An expiration date for the operational testing period not to exceed two years.
   g. Before authorizing operational testing the Department shall conduct an inspection of the facility to determine if the conditions of the permit have been met.

7. Operational Testing Requirements

(a). Operational Testing Conditions - Injection Well System

The injection system shall be monitored in accordance with rule 62-528.425(1)(g) and 62-528.430(2), F.A.C.

SPECIFIC CONDITIONS:

The following injection well performance data shall be recorded and reported at the frequency indicated from the injection well instrumentation in the Monthly Operating Report as indicated below. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
The permittee shall use continuous indicating and recording devices to monitor injection flow rate and injection pressure and annular pressure. In the case of operational failure of any of these instruments for a period of more than 48 hours, the permittee shall report to the Department in writing the remedial action to be taken and the date when the failure will be corrected.

INJECTION WELL IW-I

The proposed specifications for the injection well are as follows:

Casing Diameter (OD)	Depth (bls) Cased/Total	Open Hole (bls)
34"Steel	450'	
28"Steel	1800'	
18" Steel	2400'	
12" FRP Tbg	2380'	2400-2900'

Parameters	Reporting Frequency
Injection Pressure (p.s.i)	Daily/Monthly
Maximum Injection Pressure	Daily/Monthly
Minimum Injection Pressure	Daily/Monthly
Average Injection Pressure	Daily/Monthly
Flow Rate (g.p.m.)	Daily/Monthly
Maximum Flow Rate	Daily/Monthly
Average Flow Rate	Daily/Monthly
Minimum Flow Rate	Daily/Monthly
Annular Pressure (p.s.i.)	Daily/Monthly
Maximum Annular Pressure	Daily/Monthly
Minimum Annular Pressure	Daily/Monthly
Average Annular Pressure	Daily/Monthly
Annular Fluid added/removed (gallons)	Daily/Monthly
Annular Pressure added/removed (p.s.i.)	Daily/Monthly
Total Volume WTP Concentrate Injected (gallons)	Daily
Total Volume WTP Concentrate Injected (gallons)	Monthly

SPECIFIC CONDITIONS:

WTP Concentrate Water Quality

TKN (mg/L)	Monthly
pH (std. units)	Monthly
Specific Conductivity (µmhos/cm)	Monthly
Chloride (mg/L)	Monthly
Sulfate (mg/L)	Monthly
Field Temperature (deg. C)	Monthly
Total Dissolved Solids (mg/L)	Monthly
Sodium (mg/L)	Monthly
Calcium (mg/L)	Monthly
Potassium (mg/L)	Monthly
Magnesium (mg/L)	Monthly
Iron (mg/L)	Monthly
Carbonate (mg/L)	Monthly
Bicarbonate (mg/L)	Monthly
Gross Alpha	Monthly
Radium 226	Monthly
Radium 228	Monthly

(b). Operational Testing Conditions - Monitor Well System

The monitor well system will consist of one Dual Zone Monitor Well as described below:

Well Number	Casing Dia. (OD)	Depth (bls) Cased/Total	Open Hole
DZMW-1	24" Steel	450'	
	16" Steel	1175'	1175-1225'
	6" FRP	1700'/1750'	1700-1750'

All monitor wells shall be monitored in accordance with rule 62-528.615, F.A.C. The following monitor well performance data shall be recorded and reported at the frequency indicated from the monitor well instrumentation in the Monthly Operating Report as indicated below. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The permittee shall use continuous indicating and recording devices to monitor the monitor zone pressures or water levels. In the case of operational failure of any of these instruments for a period of more than 48 hours, the permittee shall report to the Department in writing the remedial action to be taken and the date when the failure will be corrected.

SPECIFIC CONDITIONS:

DZMW-1 Parameters	Reporting Frequency
Maximum Water Level/Pressure	Daily/Weekly
Minimum Water Level/Pressure	Daily/Weekly
Average Water Level/Pressure	Daily/Weekly
Water Quality	
TKN (mg/L)	Weekly
Specific Conductivity (µmhos/cm)	Weekly
Total Dissolved Solids (mg/L)	Weekly
pH (std. units)	Weekly
Chloride (mg/L)	Weekly
Sulfate (mg/L)	Weekly
Field Temperature (°C)	Weekly
Sodium (mg/L)	Monthly
Calcium (mg/L)	Monthly
Potassium (mg/L)	Monthly
Magnesium (mg/L)	Monthly
Iron (mg/L)	Monthly
Carbonate (mg/L)	Monthly
Bicarbonate (mg/L)	Monthly
Gross Alpha	Monthly (deep monitor zone only)
Radium 226	Monthly (deep monitor zone only)
Radium 228	Monthly (deep monitor zone only)

Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.

(c). The permittee shall calibrate all pressure gauge(s), flow meter(s), chart recorder(s), and other related equipment associated with the injection well system on a semi-annual basis. The permittee shall maintain all monitoring equipment and shall ensure that the monitoring equipment is calibrated and in proper operating condition at all times. Laboratory equipment, methods, and quality control will follow EPA guidelines as expressed in Standard Methods for the Examination of Water and Wastewater. The pressure gauge(s), flow meter(s), and chart recorder(s) shall be calibrated using standard engineering methods.

(d). The permittee shall submit monthly to the Department the results of all injection well and monitor well data required by this permit no later than the last day of the month immediately following the month of record. The results shall be sent to the Department of Environmental Protection, P.O. Box 2549, Fort Myers, Florida 33902-2549. A copy of this report shall also be sent to the Department of Environmental Protection, Underground Injection Control Program, MS 3530, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

SPECIFIC CONDITIONS:

(e). The Engineer of Record or designated qualified representative must be present for the start-up operations and the Department must be notified in writing of the date operational testing commenced for the well.

8. Abnormal Events

a. In the event the permittee is temporarily unable to comply with any conditions of this permit due to breakdown of equipment, power outages, destruction by hazard of fire, wind, or by other cause, the permittee shall notify the Department. Notification shall be made in person, by telephone or by telegraph within 24 hours of breakdown or malfunction to the UIC Program staff, South District office.

b. A written report of any noncompliance referenced in 1) above shall be submitted to the South District office within five days after its occurrence. The report shall describe the nature and cause of the breakdown or malfunction, the steps being taken or planned to be taken to correct the problem and prevent its reoccurrence, emergency procedures in use pending correction of the problem, and the time when the facility will again be operating in accordance with permit conditions.

9. Emergency Disposal

a. All applicable federal, state and local permits must be in place to allow for any alternate discharges due to emergency or planned outage conditions.

b. Any changes in emergency disposal methods must be submitted for Technical Advisory Committee (TAC) and USEPA review and Department approval.

c. The permittee shall notify the Department within 24 hours whenever an emergency discharge has occurred (Rule 62-528.415(4)(c)1., F.A.C.). Written notification shall be provided to the Department within 5 days after each occurrence. The Permittee shall indicate the location and duration of the discharge and the volume of fluid discharged.

10. Financial Responsibility

a. The permittee shall maintain the resources necessary to close, plug and abandon the injection and associated monitor wells, at all times (Rule 62-528.435(9), F.A.C.).

b. The permittee shall review annually the plugging and abandonment cost estimates. The permittee shall resubmit documentation necessary to demonstrate financial responsibility using the revised cost estimates on or before March 31 of each year.

c. In the event that the mechanism used to demonstrate financial responsibility should become invalid for any reason, the permittee shall notify the Department of Environmental Protection in writing within 14 days of such invalidation. The permittee shall, within 30 days of said notification, submit to the Department for approval, new financial documentation in order to comply with Rule 62-528.435(9), F.A.C., and the conditions of this permit.

11. Mechanical Integrity

a. Injection is prohibited until the permittee affirmatively demonstrates that the well has mechanical integrity. Prior to operational testing the permittee shall establish, and thereafter maintain, mechanical integrity of the well at all times.

SPECIFIC CONDITIONS:

b. If the Department determines that the injection well lacks mechanical integrity, written notice shall be given to the permittee.

c. Unless the Department requires the immediate cessation of injection, within 48 hours of receiving written notice from the department that the well lacks mechanical integrity the permittee shall cease injection into the well unless the Department allows continued injection pursuant to (d) below.

d. The Department may allow the permittee to continue operation of a well that lacks mechanical integrity if the permittee demonstrates that fluid movement into or between underground sources of drinking water is not occurring.

12. 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.

13. The permittee shall be aware of and operate under the general conditions in Rule 62-528.307(1)(a) through (x) and Rule 62-528.307(2)(a) through (f), F.A.C. These general conditions are binding upon the permittee and enforceable pursuant to Chaper 403 of the Florida Statutes.

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 5th day of April, 2001.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Richard W. Cantrell

Richard W. Cantrell
Director of
District Management

RWC/JBM/cap

APPENDIX A.2

IW-1 Operational Testing Permit

Department of Environmental Protection

COPY

Jeb Bush
Governor

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

David B. Struhs
Secretary

July 5, 2002

CERTIFIED MAIL NO: 7001 2510 0001 0872 2709
<u>RETURN RECEIPT REQUESTED</u>

In the Matter of an
Application for Permit by:

Emmette P. Waite, Jr., Public Works Director
City of Fort Myers
2200 Second Street
Fort Myers, FL 33902

<u>Lee – UIC/IW</u>
FDEP File No. 165628-001-UC
City of Fort Myers Water Treatment Plant
IW-1 Class I Injection Well

Dear Mr. Waite:

The Department has received and hereby approves the request by the City of Fort Myers Water Treatment Plant to begin operational testing of injection well IW-1 for the Reverse Osmosis Water Treatment Plant. The City of Fort Myers Water Treatment Plant may commence operational testing in accordance with specific condition 7 of construction permit 165628-001-UC and the specific testing and reporting conditions listed below.

Operational Testing Conditions

a. A qualified representative of the Engineer of Record must be present for the start-up operations and the Department must be notified in writing of the date operation began for the subject well.

b. Only non-hazardous reverse osmosis concentrate from the City of Fort Myers Water Treatment Plant may be injected.

c. Continuous recording of water levels in monitor well DZMW-1 shall begin at least 48 hours prior to the start of operational testing.

d. Flow to the injection well shall be monitored at all times to ensure the maximum sustained pressure at the wellhead does not exceed 76 psi on the final casing and a maximum injection rate of 2820 gpm (4.06 MGD).

e. The permittee shall calibrate all pressure gauge(s), flow meter(s), chart recorder(s), and other related equipment associated with the injection well system on a semiannual basis. The permittee shall maintain all monitoring equipment and shall ensure that the monitoring equipment is calibrated and in proper operating condition at all times. Laboratory equipment, methods, and quality control will follow EPA guidelines as expressed in standard methods for the examination of water and wastewater. The pressure gauge(s), flow meter(s), and chart recorder(s) shall be calibrated using standard engineering methods.

f. Injection Well IW - I

The specifications for the injection well are as follows:

Casing Diameter (OD)	Depth (bls) Cased/Total	Open Hole (bls)
36"Steel	450'	
28"Steel	1650'	
18" Steel	2305'	2305-3040'
12" FRP Tbg	2298'	

The injection well shall be monitored in accordance with the parameters and frequency listed below. The permitee shall submit a Summary of the Monthly Monitoring Data developed from the injection well instrumentation. Injection pressure and injection flow rate shall be monitored continuously and reported at the frequency indicated below. The report shall include the following data:

Parameters	Reporting Frequency
Injection Pressure (p.s.i)	Daily/Monthly
Maximum Injection Pressure	Daily/Monthly
Minimum Injection Pressure	Daily/Monthly
Average Injection Pressure	Daily/Monthly
Flow Rate (g.p.m.)	Daily/Monthly
Maximum Flow Rate	Daily/Monthly
Average Flow Rate	Daily/Monthly
Minimum Flow Rate	Daily/Monthly
Annular Pressure (p.s.i.)	Daily/Monthly
Maximum Annular Pressure	Daily/Monthly
Minimum Annular Pressure	Daily/Monthly
Average Annular Pressure	Daily/Monthly
Annular Fluid added/removed (gallons)	Daily/Monthly
Annular Pressure added/removed (p.s.i.)	Daily/Monthly
Total Volume WTP Concentrate Injected (gallons)	Daily
Total Volume WTP Concentrate Injected (gallons)	Monthly
WTP Concentrate Water Quality	
TKN (mg/L)	Monthly
pH (std. units)	Monthly
Specific Conductivity (μmhos/cm)	Monthly
Chloride (mg/L)	Monthly
Sulfate (mg/L)	Monthly
Field Temperature (deg. C)	Monthly
Total Dissolved Solids (mg/L)	Monthly

Sodium (mg/L)	Monthly
Calcium (mg/L)	Monthly
Potassium (mg/L)	Monthly
Magnesium (mg/L)	Monthly
Iron (mg/L)	Monthly
Carbonate (mg/L)	Monthly
Bicarbonate (mg/L)	Monthly
Gross Alpha	Monthly
Radium 226	Monthly
Radium 228	Monthly

Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.

g. Monitor Well System

The monitor well system consists of one dual zone monitor well as described below:

Well Number	Casing Dia. (OD)	Depth (bls) Cased/Total
DZMW-1	24" Steel	450'
	16" Steel	1200'/1350'
	6" FRP Tbg	1700'/1750'

All monitor wells shall be monitored in accordance with rule 62-528.615, F.A.C. The following monitor well performance data shall be recorded and reported at the frequency indicated from the monitor well instrumentation in the Monthly Operating Report as indicated below. Samples and measurements taken forth purpose of monitoring shall be representative of the monitored activity. The permittee shall use continuous indicating and recording devices to monitor the monitor zone pressures or water levels. In the case of operational failure of any of these instruments for a period of more than 48 hours, the permittee shall report to the Department in writing the remedial action to be taken and the date when the failure will be corrected.

DZMW-1

Parameters	Reporting Frequency
Maximum Water Level/Pressure	Daily/Monthly
Minimum Water Level/Pressure	Daily/Monthly
Average Water Level/Pressure	Daily/Monthly
Water Quality	
TKN (mg/L)	Weekly
Specific Conductivity (μmhos/cm)	Weekly
Total Dissolved Solids (mg/L)	Weekly
pH (std. units)	Weekly
Chloride (mg/L)	Weekly
Sulfate (mg/L)	Weekly
Field Temperature (°C)	Weekly

Sodium (mg/L)	Monthly
Calcium (mg/L)	Monthly
Potassium (mg/L)	Monthly
Magnesium (mg/L)	Monthly
Iron (mg/L)	Monthly
Carbonate (mg/L)	Monthly
Bicarbonate (mg/L)	Monthly
Gross Alpha **(Deep Zone Only)**	Monthly
Radium 226 **(Deep Zone Only)**	Monthly
Radium 228 **(Deep Zone Only)**	Monthly

Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.

h. A specific injectivity test shall be performed monthly on the injection well as required by Rule 62-528.430(2)(b)1.b., F.A.C. Pursuant to Rule 62-528.430(2)(d), F.A.C., the specific injectivity test shall be performed with the pumping rate to the well set at a predetermined level and reported as the specific injectivity index (gallons per minute/specific pressure). The pumping rate to be used shall be based on the expected flow, the design of the pump types, and the type of pump control used. As part of this test, the well shall be shut-in for a period of time necessary to conduct a valid observation of pressure fall-off. The specific injectivity test data shall be submitted along with the monitoring results of the injection and monitoring well data.

i. The permittee shall submit monthly to the Department the results of all injection well and monitor well data required by this permit no later than the last day of the month immediately following the month of record. The results shall be sent to the Department of Environmental Protection, P.O. Box2549, Fort Myers, Florida 33902-2549. A copy of this report shall also be sent to the Department of Environmental Protection, Underground Injection Control Program, MS 3530, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

j. Operational testing of this injection well system shall cease upon expiration of this permit, unless the Department has issued an intent to issue an operation permit, or a timely renewal application (Rule 6204.090. F.A.C.) for this construction permit has been submitted to the Department. However, under no circumstances shall the duration of the operational testing period exceed two years as specified in Rule 62-528.450(3)(e), F.A.C.

k. Financial responsibility must be maintained in accordance with specific condition 10 of construction permit.

l. Abnormal Events

a. In the event the permittee is temporarily unable to comply with any conditions of this permit due to breakdown of equipment, power outages, destruction by hazard of fire, wind, or by other cause, the permittee shall notify the Department. Notification shall be made in person, by telephone or by telegraph within 24 hours of breakdown or malfunction to the UIC Program staff, South District office.

b. A written report of any noncompliance referenced in 1) above shall be submitted to the South District office within five days after its occurrence. The report shall describe the nature and cause of the breakdown or malfunction, the steps being taken or planned to be taken to correct the problem and

c. prevent its reoccurrence, emergency procedures in use pending correction of the problem, and the time when the facility will again be operating in accordance with permit conditions.

m. Emergency Disposal

a. All applicable federal, state and local permits must be in place to allow for any alternate discharges due to emergency or planned outage conditions.

b. Any changes in emergency disposal methods must be submitted for Technical Advisory Committee (TAC) and USEPA review and Department approval.

c. The permittee shall notify the Department within 24 hours whenever an emergency discharge has occurred (Rule 62-528.415(4)(c)1., F.A.C.). Written notification shall be provided to the Department within 5 days after each occurrence. The Permittee shall indicate the location and duration of the discharge and the volume of fluid discharged.

n. Certification

Reports required by this permit and applications should contain the proper signatories and certification language contained in Rule 62-528.340, F.A.C. (see specific condition 1.g. of the construction permit).

This letter must be attached to your permit and becomes a part of that permit.

Sincerely,

Richard W. Cantrell
Director of
District Management

RWC/JBM/mjf

Copies furnished to:

William D. Beddow, P.E. – CH2M Hill – Tampa
Charles Davault – FDEP Fort Myers
TAC

APPENDIX B

Summary of Construction Activity IW-1 and Dual Zone Monitor Well

City of Fort Myers
Summary of Construction Activities

Date	Deep Injection Well IW-1 Construction Activity
11/5/01	Drilling of pilot hole began.
11/6/01	The 12.25-inch pilot hole was drilled to 460 feet below land surface (bls). The hole was geophysically logged with x-y caliper, natural gamma ray, SP electric, and dual induction logs run to the total depth of the well. Began reaming of the hole to a 42-inch diameter and depth of 452 feet bls.
11/7/01	Continued with reaming of the hole.
11/8/01	Continued with reaming of the hole.
11/9/01	Continued with reaming of the hole.
11/10/01	Well was geophysically logged with caliper and natural gamma ray logs to confirm reamed hole characteristics. Following logging, 450 feet of 36-inch casing was installed in the well. Casing was cemented in with 125 bbls of cement followed by 115 of neat cement. The upper 90 feet was cemented with 150 bbls of 6% bentonite.
11/13/01	Reverse-air drilling began at 450 feet bls. Drilling continued to 538 feet bls.
11/14/01	Drilling continued to 630 feet bls. Specific capacity at 630 feet was approximately 45 gpm/ft. Drilling continued to 720 feet bls. Specific capacity at 720 feet bls was approximately 44 gpm/ft. Drilling continued to 810 feet bls. Specific capacity at 810 feet bls was approximately 40 gpm/ft. Drilling continued to 900 feet bls. Specific capacity at 900 feet bls was approximately 34 gpm/ft. Drilling continued to 990 feet bls. Specific capacity at 990 feet was approximately 46 gpm/ft.
11/15/01	Specific capacity test was conducted at 1,080 feet and was approximately 65 gpm/ft. The hole was continued from 1,080 feet and included specific capacity tests at 1,170 feet and 1,288 feet bls, with capacities of 60 gpm/ft and 30 gpm/ft, respectively.
11/16/01	A core sample is collected at 1,393 feet bls. Drilling continued from 1,393 feet to 1,468 feet. Specific capacity test at 1,468 feet was approximately 292 gpm/ft . A core was recovered from 1,510 to 1,520 feet bls and contained dense limestone.
11/19/01	The pilot hole was advanced from 1,520 feet bls to 1,530 feet bls. A specific capacity test conducted at 1,530 feet and was approximately 400 gpm/ft. Drilling continued to 1,620 feet bls. A specific capacity test was conducted at 1,620 feet and was approximately 71 gpm/ft. A core sample is collected from 1,625 to 1,635 feet bls and contained dense limestone.
11/20/01	Drilling continued from 1,620 feet to 1,710 feet bls. A specific capacity test was conducted at 1,710 feet and was approximately 113 gpm/ft. A core sample is collected from 1,725 to 1,735 feet bls. A second core sample is collected at 1,750 to 1,760 feet.
11/21/01	The pilot hole is advanced to 1,753 feet bls and continues to 1,800 feet bls.
11/27/01	Static and dynamic logs were conducted to 1800 feet bls. Static logs included temperature/conductivity, X-Y caliper/natural gamma, dual induction/SP electric, borehole compensated sonic, and flowmeter logs. Video logging began, however, the well is very cloudy. Driller will try to pump well clear and retry video.
11/28/01	Driller is still trying to clear the well. A straddle packer is set at 1,462 feet bls. Video logging begins at 1,463 feet bls and continues to 1,762 feet bls. A straddle packer is set at 800 feet bls and well is pumped. Video camera is lowered to 865 feet, however, there is no visibility and driller must continue to pump well.
11/29/01	Driller continues to pump below straddle packer to clear well. Video logging is attempted from 800 fee bls and is accepted from 800 feet to 1,050 feet bls.

City of Fort Myers
Summary of Construction Activities

Date	Deep Injection Well IW-1 Construction Activity
11/30/01	Video logging is attempted from 1,050 feet to 1,460 feet bls, however, is only visible from 1,050 feet to 1,250 feet bls.
12/3/01	Driller begins air development of packer interval, pumping 4,000 gallons. A preliminary packer test is started and concluded on 12/4/01.
12/4/01	A final packer test is conducted. Specific capacity at 1500-1535 feet bls is 0.18 gpm/ft and TDS is 14,000 mg/L. Air development of packer interval of 1,535 to 1,584 feet bls is completed and approximately 5,500 gallons is pumped. Specific capacity at this interval is 0.10 gpm/ft and TDS concentration is 8,480 mg/L
12/5/01	Recovery is completed with packer test and a total volume of 10,500 gallons is pumped. Air development of the packer zone 1584-1620 feet bls begins. Specific capacity at this interval is 0.006 gpm/ft. This zone is producing approximately 1 gpm.
12/6/01	Air development is concluded and the recording of the recovery data begins. Water level is over 230 feet bls.
12/10/01	Next packer interval of 1760 – 1790 feet bls. Specific capacity is 0.001. Pilot hole filled with sediment at 1730 feet bls.
12/11/01	Packer interval producing less than 1 gpm.
12/13/01	With Jack Myers/FDEP approval, the pilot hole was backplugged with 12" bentonite grout. 103 bbl of grout were pumped from 1,800 feet to 1,356 feet bpl. Packer testing recording ends.
12/14/01	The driller reams the hole to 34.5-inch diameter to a depth of 580 feet bls.
12/16/01	Drilling continues to 777 feet bls.
12/18/01	Drilling continues to 1,208 feet bls.
12/19/01	Drilling continues to 1,640 feet bls. Water samples are collected from the monitor wells. The well was geophysically logged with caliper and natural gamma logs. Following the logging, 1,650 feet of 28-inch diameter, 0.5-inch thick steel casing is installed.
12/20/01	The casing is then pressure grouted with 805 cf of 4% bentonite and 315 cf of neat cement at the bottom of the casing.
12/21/01- 12/22/01	Three additional stages of cement totaling 4527 cf is pumped in the annular space between the 28" casing and borehole.
12/26/01	The well is drilled out from 1,645 feet to 1,800 feet bls. Lithology samples continue to be collected at 10 foot intervals, water quality samples at 30 foot intervals and specific capacity testing at 90 foot intervals.
12/27/01	The well was advanced to 1,889 feet bls. A core sample was collected at this depth. Approximately 80% of the core is recovered.
12/28/01	Drilling continues of the 12-inch hole from 1,889 feet to 1,935 feet bls. Specific capacity test was conducted at 1,980 feet bls and was approximately 2.85 gpm/ft. Drilling continues to 2,000 feet bls – drilling though limestone and dolomite. Drilling reaches 2,010 feet and becomes very hard – a core sample is requested.
1/2/02	Drilling continues to 2,070 feet bls and a specific capacity test is conducted. The specific capacity is 11.5 gpm/ft. Drilling resumes to 2,075 bls and a core sample is requested.
1/3/02	Drilling resumes from 2,075 feet bls and reaches 2,160 feet. A specific capacity test is conducted and was approximately 5.31 gpm/ft.
1/4/02	Drilling continues to 2,250 feet bls. A specific capacity test is conducted and is approximately 50.4 gpm/ft.
1/5/02	Specific capacity test is conducted at 2,340 feet bls and is +4,000 gpm/ft
1/7/02	A core sample is requested.

City of Fort Myers
Summary of Construction Activities

Date	Deep Injection Well IW-1 Construction Activity
1/8/02	Drilling continues to 2,430 feet bpl, 2,520 feet bls, and 2,610 feet bls. Specific capacity is 100 gpm/ft, 214 gpm/ft, and 27.2 gpm/ft, respectively. Specific capacity tests are conducted at 2,700 feet bls = 27.5 gpm/ft and 2,790 feet bls = +2,000 gpm/ft.
1/11/02	Specific capacity tests are conducted at 2,880 and 2,970 feet bls and is +2,000 and 481 gpm/ft, respectively. A 3 foot fracture is noted at 3,005 feet bls.
1/12/02	Specific capacity tests is conducted at 3,040 feet bls and is +1,900 gpm/ft.
1/14/02	Dynamic logging begins. FTR is hung at 2,720 feet, 2,850 feet and 2,975 feet bls.
1/15/02	Video logging begins. Pilot hole is blocked at 2,840 feet bls by boulders. Driller will complete video, begin straddle packer testing, clear pilot hole an complete off-bottom packer testing.
1/16/02	Driller is instructed to stop development and prepare for packer test. Water is being produced at such a low rate that a water sample will not be collected from this zone.
1/17/02	Packer test from 1,908 to 1,932 feet is concluded. Driller will clear well at 2,840 feet prior to beginning off-bottom packer testing.
1/18/02	Driller clears well to a total depth of well - 3,040 feet bpl. Video logging to total depth is completed.
1/21/02	An off-bottom packer test was completed with the packer set at 2,265 feet bpl. The flow during the packer test was 240 gpm. At this rate, a drawdown of approximately 12 feet from static was observed. The Driller removes the packer assembly following the final packer test.
1/22/02	No activity on site today as waiting final casing depth approval from TAC.
1/24/02	Final casing depth approval of 2,300 feet bpl is received from Jack Myers/FDEP. Driller begins installing cement basket to set bridge plug at 2,305 feet bpl.
1/25/02	Driller places 1.75 bbl in a cement basket to be used as a bridge plug. Driller begins pumping 40 bbl of 12% bentonite for pilot hole plug.
1/27/02	Driller tags cement at 2,157 feet bpl and continues cementing – Stage 1: 40 bbl of 12% bentonite, Stage 2: 41 bbl of 12% bentonite, Stage 3: 57 bbl of 12% bentonite, Stage 4: 54 bbl of 12% bentonite and Stage 5: 75 bbl bentonite. Total pumped for backplug is 267 bbl at a depth of 1,780 feet bpl.
1/28/02	Drilling begins reaming of 28-inch diameter for final casing at 1,650 feet bls. Jack Myers/FDEP approves back plug final depth of 1,780 feet bpl.
1/29/02	Reaming continues from 1,770 feet bls.
1/30/02	Reaming continues from 1,990 feet bls.
1/31/02	Reaming continues from 2,070 feet bls.
2/1/02	Reaming continues from 2,210 feet bls.
2/5/02	Reaming continues from 2,280 feet bls. Drilling has reached a depth of 2,315 feet bls. The bridge plug and previously drilled 12-inch pilot hole were not encounterd at 2,305 feet bls. Driller continues to drill with 12-inch pilot hole to original depth of 3,040 feet bls.
2/6/02	Drilling continues from 2,400 feet bls.
2/7/02	Drilling continues from 2,550 feet bls and reaches a depth of 2,830 feet bls.
2/9/02	Drilling has reached 3,040 feet bls.

City of Fort Myers
Summary of Construction Activities

Date	Deep Injection Well IW-1 Construction Activity
2/11/02	Caliper and video logging begins. There is trouble advancing beyond 2,840 feet bls. Caliper log is completed, however, it is noted that the caliper arms are 56-inches in length to obtain volume calculations of borehole for setting of casing. Original pilot hole was run using 28-inch arms. Well development begins to improve clarity of the well for video logging.
2/12/02	Video logging to a depth of 3,040 feet bls is completed without problems. Packer assembly is set at 2,350 feet bls.
2/13/02	Installation of 18-inch diameter, 0.5-inch thick steel casing begins
2/14/02	Driller set external casing plug into well at 2,305 feet bls and begin cementing with 2 bbl neat cement. Driller begins pumping 4 bbl neat cement to seal annular zone at bottom of casing.
2/15/02	Driller has pumped 34 bbl neat cement to create 100 feet of neat cement at bottom of casing. Cement top identified at 2,205 feet bpl with temperature log. Driller pumps 63 bbl of 4% bentonite.
2/16/02	Logger identifies cement top at 2,187 feet bls. Driller pumps 56 bbl 4% bentonite.
2/19/02	Driller tags cement at 373 feet bls. Logger identifies cement top at 370 feet bls. Logger begins cement bond log.
2/20/02	Preliminary pressure test @ 107 psi. Final pressure is 108.5 psi. A 1.4% change.
2/21/02	FDEP arrives and pressures test begins at 113.5 psi. Well passes FDEP regulated pressure test. Final pressure is recorded as 107.9 psi. Pressure change is 4.9% after 120 minutes.
2/25/02	Driller lowers Positive Seal Packer and FRP tubing into well.
2/26/02	Driller resumes installing FRP tubing and tags top of packer hanger at 2,298 feet bls.
2/27/02	Per FDEP's approval, potable water is pumped into the well prior to seating the packer. This water will be removed prior to final water quality testing. Driller begins pumping 20,000 gallons into the annular zone and 13,000 gallons into the FRP tubing. Driller begins pumping 10,000 gallons of Baracor into the annular zone. Packer is seated just as 10,000 gallons of Baracor have been pumped.
2/28/02	Conduct final pressure test of annular zone. Initial pressure is 107 psi and final pressure is 112 psi for an increase of 4.5% in 120 minutes.
3/1 - 3/8/02	Drillers demobilize the rig to DZMW. No construction or testing activity occurred during this week.
4/9/02	Conduct pressure test of FRP tubing. Pressure increases from 110 psi to 115 psi over 120 minutes.
4/12/02	A final video log was conducted to 3,040 feet prior to RTS testing.
4/15/02	RTS testing was conducted. Three I-131 ejects were done during the testing: static, dynamic at 29 gpm, and dynamic at 24 gpm. Test results indicated the well has mechanical integrity.

bls – below land surface
gpm/ft – gallons per minute per foot of drawdown
bbls – barrels
cf – cubic feet
FRP – fiber reinforced plastic
psi – pounds per square inch
PSP – positive seal packer

City of Fort Myers
Summary of Construction Activities

Date	Dual Zone Monitor Well (DZMW) Construction Activity
3/8/02	Diller begins mobilizing rig to DZMW location.
3/11/02	Drilling begins with a 32-inch bit using standard mud rotary drilling technique.
3/13/02	The 32-inch borehole is completed to 458 feet bls and geophysical logging of the borehole is completed. Logs included caliper, dual induction, and gamma radiation. Steal 24-inch diameter casing is set to 450 feet bls and grouted into place using 200 bbls of cement with a 6% gel mixture and 87 bbls of neat cement around the base of the casing.
3/14/02	Drilling of the 11-inch diameter pilot hole begins using reverse-air drilling technique. Air-lift specific capacity testing is completed every 90 feet.
3/18/02	Drilling of the pilot hole is completed to 1250 feet bls.
3/20/02	Geophysical logging of the pilot hole is completed. Static logs included caliper, dual induction, spotaneous potential, gamma radiation, fluid temperature, fluid resistivity, fluid velocity, and borehole compensated sonic. Dynamic logs included fluid temperature, fluid resistivity, and fluid velocity.
3/21/02	FDEP approves casing setting depth of 1250 feet bls. Reaming of the 24-inch borehole is completed to 1257 feet bls.
3/22/02	Completed caliper and gamma radiation log on reamed borehole. Begin installing 16-inch diameter casing.
3/23/02	Installation of the 16-inch diameter casing is completed to 1250 feet bls and grouted into place in two stages using a total of 375 bbls of cement with 4% gel mixture and 51 bbls of neat cement around the base of the casing.
3/25/02	Reverse-air drilling of the 11-inch diameter pilot hole resumes. Air-lift specific capacity testing is completed every 90 feet.
3/26/02	Pilot hole is completed to 1750 feet bls.
3/28/02	Geophysical logging of the pilot hole to 1750 feet bls is completed. Static logs included caliper, dual induction, spotaneous potential, gamma radiation, fluid temperature, fluid resistivity, fluid velocity, and borehole compensated sonic. Dynamic logs included fluid temperature, fluid resistivity, and fluid velocity.
3/29/02	Reaming of the pilot hole to 14.25-inch diameter is completed to 1700 feet bls.
4/1/02	A caliper and gamma radiation log is completed on the borehole.
4/2/02	Video survey of the borehole is completed. Install 6-inch diameter FRP tubing to 1700 feet bls.
4/4/02	The FRP tubing is grouted into place from 1700 feet to 1350.5 feet bls using 81 bbls of cement in 5 stages.
4/5/02	A pressure test is completed. Pressure increases from 70 psi to 70.5 psi in 61 minutes.
4/8/02	A caliper log and video survey is completed.
4/9/02	Development of the well is completed. Conductivity is 54,000 µS/cm.
4/10/02	Demobilization from the site begins.

bls – below land surface
bbls – barrels
cf – cubic feet
FRP – fiber reinforced plastic
psi – pounds per square inch
PSP – positive seal packer

APPENDIX C

Construction Weekly Summaries

MEMORANDUM

CH2MHILL

TO: Joe Haberfeld/FDEP
Jack Myers/FDEP
Ron Reese/USGS
Nancy Marsh/USEPA
Steve Anderson/SFWMD
Bill Beddow/CH2M HILL
MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: November 9, 2001

SUBJECT: Weekly Summary No. 1
November 2 through November 8, 2001

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

Drilling of the pilot hole began on November 5 with a 12.25-inch bit. Drilling was completed to 460 feet below land surface (bls) on November 6. The pilot hole was then logged with xy-caliper, natural gamma, dual-induction, and SP logs. Reaming of the 42-inch hole began on November 6 and continued through November 8. The first casing string, 36-inches, will be set as planned at 450 feet bls on November 9.

Initial water samples from the pad monitor wells were collected on October 30, 2001. The results from the initial sampling and Week 1 samples are attached.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Lithologic Descriptions of Well Cuttings
Well Pad Monitor Well Water Quality
Drilling Deviation Survey Results

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL
FROM:	Randy Dean/CH2M HILL	
DATE:	November 16, 2001	
SUBJECT:	Weekly Summary No. 2 November 9 through November 15, 2001	
PROJECT:	*City of Fort Myers WTP IW-1 Class I Injection Well System* *FDEP UIC Permit Number 165628-001-UC*	

Summary of Engineer's/Driller's Log

Pilot hole reaming for the 36-inch casing continuted until Saturday, November 10. On November 10, the well was logged with caliper and gamma logs prior to setting the casing. The 36-inch casing was set at 450 feet. 125 barrels (bbls) of 6% bentonite were pressure grouted and chased with 115 bbl Neat cement. A second stage of 6% bentonite was pumped from 90 ft. bls to bring the cement to land surface. Reverse-air drilling began at 450 feet bls on November 13. Reverse-air drilling continued through November 15 with deviation surveys and specific capacity tests conducted at 90-foot intervals. At the end of November 15, drilling had reached a depth of 1393 feet and a core was collected from the interval of 1393 – 1403 feet bls.

Attachments:
- Engineer's Daily Reports
- Driller's Daily Reports
- Lithologic Descriptions of Well Cuttings
- Well Pad Monitor Well Water Quality
- Drilling Deviation Survey Results

MEMORANDUM

CH2MHILL

TO: Joe Haberfeld/FDEP
Jack Myers/FDEP
Ron Reese/USGS
Nancy Marsh/USEPA
Steve Anderson/SFWMD
Bill Beddow/CH2M HILL
MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: November 23, 2001

SUBJECT: Weekly Summary No. 3
November 16 through November 22, 2001

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

Pilot hole drilling continued on November 16 to a depth of 1510 feet bls where a core was collected from 1510 to 1520 feet bls. On Monday, November 19, pilot hole drilling resumed to a depth of 1620 where another core was collected. Drilling then resumed to 1625 feet bls where dolomite was encountered. A core was collected from 1625 to 1635 feet bls. Another core was collected after advancing the pilot hole to 1650 feet bls. Following the core collected from 1650 to 1660 feet bls, the pilot hole was advanced to 1800 feet bls and drilling stopped. Static and dynamic logging will take place on Tuesday November 27, 2001.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Lithologic Descriptions of Well Cuttings
Well Pad Monitor Well Water Quality
Drilling Deviation Survey Results

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: December 7, 2001

SUBJECT: Weekly Summary No. 5
November 30 through December 6, 2001

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

Continued attempts to clear the turbidity from the well to complete the video log were conducted through Friday, November 30. After over 3 days of trying to clear the well, a request was made to Jack Myers and Joe Haberfeld to abandon further efforts to complete the video. The video was nearly completed to the total well depth of 1800 feet bls. An interval of 40 feet was missing from the bottom of the well in addition to the interval from approximately 1,200 feet bls to 1460 feet bls. The request was granted and the video was abandoned.

Packer testing began on Monday, December 3 to identify the USDW and test confining intervals below the USDW. The first zone tested was 1500 to 1535 feet bls. Water samples collected from this zone had a TDS concentration of 8,480 mg/L. The specific capacity of this zone was 0.2 gpm/ft. A second packer test was completed on the interval of 1535 to 1584 feet bls. Water samples collected from this zone had a TDS concentration of 14,000 mg/L. The specific capacity of this zone was 0.1 gpm/ft. On Wednesday, a third packer test began on the interval from 1584 to 1620 feet bls. This zone has a specific capacity of approximately 0.005 gpm/ft. Water is only produced at a rate of 1 gpm with a drawdown of over 200 feet. This packer test is expected to be completed on Friday, December 7.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO: Joe Haberfeld/FDEP
Jack Myers/FDEP
Ron Reese/USGS
Nancy Marsh/USEPA
Steve Anderson/SFWMD
Bill Beddow/CH2M HILL
MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: December 14, 2001

SUBJECT: Weekly Summary No. 6
December 7 through December 13, 2001

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

The packer test on the interval of 1584 feet to 1620 feet was completed on Friday, December 7, 2001. A fourth packer test was attempted on Monday, December 10. The packer interval was 1760 feet to 1790 feet bpl. Drawdown was stabilized during this packer test at approximately 170 feet bpl at a rate of 0.25 gpm. This resulted in a specific capacity of 0.001 gpm/ft. A representative water sample from this zone was not collected as a result of the extremely low pumping rate. This packer test was completed on Thursday, December 13, 2001. Following completion of the fourth packer test, the pilot hole was backplugged with 12% bentonite grout to a depth of 1356 feet bls. Approval to backplug the was granted from Jack Myers/FDEP prior to initiating the cementing activity.

Laboratory results from the first two packer tests were received on December 7. The uppermost zone of 1500 feet to 1535 feet bpl returned a TDS concentration of 8420 mg/L. The zone from 1535 feet to 1584 feet bpl returned a TDS concentration of 14000 mg/L. Following these packer tests, the USDW limit is contained within this interval.

On Thursday, December 13, a request was presented to TAC to set the intermediate casing at a depth of 1650 feet bpl. This request was approved.

Attachments:
- Engineer's Daily Reports
- Driller's Daily Reports
- Well Pad Monitor Well Water Quality
- Laboratory Results – Packer Test Water Quality

MEMORANDUM

CH2MHILL

TO:

Joe Haberfeld/FDEP
Jack Myers/FDEP
Ron Reese/USGS
Nancy Marsh/USEPA
Steve Anderson/SFWMD
Bill Beddow/CH2M HILL
MikeWeatherby/CH2M HILL

FROM: Pete Larkin/CH2M HILL

DATE: December 21, 2001

SUBJECT: Weekly Summary No. 7
December 14 through December 20, 2001

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

Reaming of the pilot hole to 34.5-inches in diameter began on Friday, December 14. The pilot hole was reamed open using reverse-air drilling technique in preparation for the setting of the 28-inch diameter intermediate casing string. Reaming operations were completed on Wednesday, December 19 to a depth of 1661 feet bls. The reamed hole was then geophysically logged including Caliper and Gamma Radiation logs. Installation of the 28-inch diameter casing began on Wednesday, December 19 and was completed on Thursday, December 20 to a depth of 1650 feet bls. The casing was pressure grouted into place on Thursday, December 20 using 808 cubic feet of cement with a 4% bentonite gel mixture (523 sks) and 314 cubic feet of Neat cement (266 sks) around the base of the casing. The first stage of cement produced a lift of 380 feet. The second stage of cement was pumped 12 hours after the end of the first stage with tremie pipe placed on the outside of the 28-inch casing. A total of 1572 cubic feet of cement with a 4% bentonite gel mixture was placed around the casing during the second stage. The theoretical lift for this stage is 490 feet based on the Caliper log but is anticipated to be less due to a fracture within the cement target range. The cement will be tagged and a third stage will be pumped during the next reporting period on Friday, December 21.

Attachments:

Engineer's Daily Reports
Driller's Daily Reports
Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL

FROM: Pete Larkin/CH2M HILL

DATE: December 28, 2001

SUBJECT: Weekly Summary No. 8
December 21 through December 27, 2001

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

Cementing of the 28-inch diameter intermediate casing continued on Friday, December 21 with the pumping of the third stage of cement using 1466 cubic feet of cement with a 4% bentonite gel mixture. Cement was placed through tremie pipe inserted on the outside of the 28-inch casing. On Saturday, December 22 the fourth and final stage of cement was pumped around the casing using 1494 cubic feet of cement with a 4% bentonite mixture. Cement was placed through tremie pipe inserted on the outside of the 28-inch casing. The total amount of cement placed around the casing in four stages was 314 cubic feet of neat and 5340 cubic feet of cement with 4% bentonite. No significant cement losses were noticed as the actual cement used for each stage was between 112 % to 120% of the theoretical estimates calculated using volume measurements from the caliper log of the reamed borehole. On Wednesday, December 26 construction resumed with the drilling of the 12-inch diameter pilot hole. The pilot hole was completed to 1935 feet bls at the end of the reporting period. A core was collected from 1889-1899 feet bls. Specific capacity testing continued at every rod connection (90 feet) starting at 1890 feet bls. Reverse-air water samples were collected every 30 feet and lithology samples were collected every 10 feet. Deviation surveys continued at every rod connection (90 feet).

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO:

Joe Haberfeld/FDEP
Jack Myers/FDEP
Ron Reese/USGS
Nancy Marsh/USEPA
Steve Anderson/SFWMD
Bill Beddow/CH2M HILL
MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: January 4, 2002

SUBJECT: Weekly Summary No. 9
December 28, 2001 through January 3, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

On December 28, 2001, pilot hole drilling continued from 1935 feet bpl. When drilling reached 2010 feet, a core was attempted. A core was collected from 2010 feet to 2016 feet bls and 6 feet of vuggy, hard, dolomite was retrieved. No activity took place on December 31, 2001 or January 1, 2002. On January 2, drilling resumed from 2010 feet and continued to 2075 where another core was attempted. This core returned 10 feet of solid, dense, dolomite. Drilling resumed from 2075 to 2225 by the end of the day on January 3.

Reverse-air water samples were collected every 30 feet and lithology samples were collected every 10 feet. Deviation surveys continued at every rod connection (90 feet).

Attachments:

Engineer's Daily Reports
Driller's Daily Reports
Well Pad Monitor Well Water Quality

CH2MHILL

MEMORANDUM

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: January 11, 2001

SUBJECT: Weekly Summary No. 10
January 4 through January 10, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

On Friday, January 4, drilling continued at reached a depth of 2340 feet bpl by the end of the day. On Monday, January 7, a core was collected from 2340 to 2350 feet bpl. The core was dense dolomite. Drilling resumed and continued for the remainder of the week. The ending depth on Thursday, January 10 was 2925 feet bpl. Small fractures were encountered between 2300 and 2700 feet bpl, most measuring 1 – 2 feet in depth. Between 2755 and 2775, large fractures were encountered which significantly increased the specific capacity of the well. Pilot hole drilling is expected to be completed on Friday, January 11. Geophysical logging is expected to be conducted on January 14.

Reverse-air water samples were collected every 30 feet and lithology samples were collected every 10 feet. Deviation surveys continued at every rod connection (90 feet).

Attachments:
- Engineer's Daily Reports
- Driller's Daily Reports
- Well Pad Monitor Well Water Quality
- Lithologic Descriptions

MEMORANDUM

CH2MHILL

TO:
Joe Haberfeld/FDEP
Jack Myers/FDEP
Ron Reese/USGS
Nancy Marsh/USEPA
Steve Anderson/SFWMD
Bill Beddow/CH2M HILL
MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: January 18, 2002

SUBJECT: Weekly Summary No. 11
January 11 through January 17, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

Pilot hole drilling was completed at 3040 feet bpl on Friday, January 11, 2002. Specific capacity of the well was determined to be greater that 1900 gpm/ft at 400 gpm. Geophysical logging began on the well on Monday, January 14. All logs were completed to the total depth of the well except for the video log. The video log confirmed that the borehole was blocked at 2840 feet bpl. CH2M HILL allowed the Driller to proceed with straddle packer testing above 2840 prior to clearing the well. Packer testing began on January 15 with a packer interval from 1755 to 1897. The packed off interval had a specific capacity of 1.02 gpm/ft at 75 gpm. The packers were reseated 16-inches lower with the same results. A second packer test was completed on Wednesday, January 16. The packed off interval of 1908 to 1932 had a specific capacity of 0.007 gpm/ft at a rate of 1.2 gpm. The Driller attempted to clear the pilot hole on Thursday, January 17. A video log on January 18 confirmed that the well was still blocked at 2850 feet bpl. The Driller will continue to clear the well.

Reverse-air water samples were collected every 30 feet and lithology samples were collected every 10 feet. Deviation surveys continued at every rod connection (90 feet).

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Well Pad Monitor Well Water Quality
Lithologic Description and logs

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: January 25, 2001

SUBJECT: Weekly Summary No. 12
January 18 through January 24, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

The well was cleared on Friday night and the video log was completed to the total depth of the well, 3040 feet bpl. On Monday, January 21, the Driller completed an off-bottom packer test at 2265 feet bpl. Drawdown at 240 gpm was measured at 12 feet below static. The packer was then deflated and pumping was resumed. Drawdown was the same at 12 feet bpl. On Tuesday, January 22, CH2M HILL's final casing depth recommendation letter was delivered to Jack Myers and Joe Haberfeld with a depth of 2265 feet bpl. On Thursday, January 24, Jack Myers notified Randy Dean with verbal approval to set the casing at 2300 feet bpl. A bridge plug was set at 2305 feet bpl on Thursday, January 24 with 1 bbl of cement pumped. One additional bbl will be pumped for the bridge plug and then the the Driller will proceed with backplugging the pilot hole throught the confining zones prior to reaming.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: February 1, 2001

SUBJECT: Weekly Summary No. 13
January 25 through January 31, 2002

PROJECT: *City of Fort Myers WTP IW-1 Class I Injection Well System*
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

On Friday, January 25, a total of 1.75 bbl was placed in a cement basket to be used as a bridge plug at a depth of 2305 feet bls. After the bridge plug was set in place, the Driller began plugging back the pilot hole prior to reaming to a 28-inch diameter for the final casing. The first stage consisted of 40 bbl of 12% bentonite. On Sunday, January 27, a total of 227 bbl of 12% bentonite was pumped into the borehole and brought the final depth of the plugback to 1780 feet bls. Following notification of this depth to Jack Myers/FDEP, the Driller proceeded with reaming the 28-inch diameter hole on Monday, January 28. Reaming continued through Thursday, January 31 and reached a depth of 2210 feet bls.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL
FROM:	Randy Dean/CH2M HILL	
DATE:	February 8, 2002	
SUBJECT:	Weekly Summary No. 14 February 1 through February 7, 2002	
PROJECT:	***City of Fort Myers WTP IW-1 Class I Injection Well System*** ***FDEP UIC Permit Number 165628-001-UC***	

Summary of Engineer's/Driller's Log

On Friday February 1, reaming for the final casing continued towards the casing depth of 2,305 feet bls. On February 2, it was determined that the Driller had not reamed out the original borehole. The cement basket and existing pilot hole were not encountered below 2,305 feet bls. Drilling of a second pilot hole began on February 5. The pilot hole reached a depth of 2,880 feet bls by Friday, February 8.

In addition to the caliper log that will be run prior to installing the final casing, a video log has been added to the logging schedule. The video log will be run to document the condition of the borehole and the depth where the reamed hole deviated from the backplugged pilot hole.

Attachments:	Engineer's Daily Reports Driller's Daily Reports Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: February 15, 2002

SUBJECT: Weekly Summary No. 15
February 8 through February 14, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

On Friday, February 8, drilling of the final borehole reached 3040 feet bls. On Monday, February 11, a caliper and video log were run on the final borehole to confirm similarities between original and final boreholes. On February 12, an off-bottom packer test was run to confirm the final specific capacity of the injection zone. On February 13, installation of the final casing began and was stopped due to rain at approximately 1620 feet bls. Casing installation resumed on February 14 and was completed to a depth of 2305 feet bls. Cementing of the final casing began at 100 feet of neat cement was placed in the annular zone.

Cementing will continue through the weekend until the top of the cement has reached approximately 250 feet bls.

Attachments:	Engineer's Daily Reports Driller's Daily Reports Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL
FROM:	Randy Dean/CH2M HILL	
DATE:	March 1, 2002	
SUBJECT:	Weekly Summary No. 17 February 22 through February 28, 2002	
PROJECT:	***City of Fort Myers WTP IW-1 Class I Injection Well System*** ***FDEP UIC Permit Number 165628-001-UC***	

Summary of Engineer's/Driller's Log

Installation of the 12-inch FRP tubing began on Monday, February 25. Installation of the FRP was completed on February 26. The annular fluid was pumped into the injection well annulus just prior to seating the Positive Seal Packer on February 27. A pressure test was conducted on the annular zone at 107 psi on February 28. The pressure test was completed with a 4.5% change in the annulus zone pressure after 120 minutes.

The Driller has begun demobilization of the drilling rig and will move it to the DZMW site next week. Drilling of the DZMW may commence near the end of next week.

Attachments:	Engineer's Daily Reports Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO: Joe Haberfeld/FDEP
Jack Myers/FDEP
Ron Reese/USGS
Nancy Marsh/USEPA
Steve Anderson/SFWMD
Bill Beddow/CH2M HILL
MikeWeatherby/CH2M HILL

FROM: Pete Larkin/CH2M HILL

DATE: March 8, 2002

SUBJECT: Weekly Summary No. 18
March 1 through March 7, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

Demobilization of the drilling rig to DZMW continued through the week. No construction or testing activity occurred during the reporting period. It is anticipated that a pressure test of the FRP tubing at IW-1 will be completed and commencement of drilling operations at DZMW will begin within the following reporting period.

Attachments: None

MEMORANDUM

CH2MHILL

TO:

Joe Haberfeld/FDEP
Jack Myers/FDEP
Ron Reese/USGS
Nancy Marsh/USEPA

Steve Anderson/SFWMD
Bill Beddow/CH2M HILL
MikeWeatherby/CH2M HILL
Randy Dean/CH2M HILL

FROM: Pete Larkin/CH2M HILL

DATE: March 15, 2002

SUBJECT: Weekly Summary No. 19
March 8 through March 14, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

Drilling of the Dual Zone Monitor Well (DZMW) began on Monday, March 11. A 32-inch diameter borehole was drilled to 458 feet bls and 450 feet of 24-inch diameter .375-inch thick steel casing was set and pressure grouted into place. The cement was brought to surface in one stage using 200 bbls of cement with a 6% gel mixture and 87 bbls of neat cement around the base of the casing. Drilling of the 12-inch diameter pilot hole using reverse-air drilling techniques began on Thursday, March 14 and was advanced to 540 feet bls at the end of the reporting day.

Pressure testing of the FRP tubing at IW-1 and background water quality sampling of IW-1 is anticipated to be completed the following reporting period.

Attachments:

Driller's Reports
Daily Summaries

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: March 22, 2001

SUBJECT: Weekly Summary No. 20
March 15 through March 21, 2002

PROJECT: *City of Fort Myers WTP IW-1 Class I Injection Well System*
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

On Friday, March 15, drilling continued from 540 feet bls and reached a depth of 1150 feet bls. Drilling resumed from 1150 feet on Monday, March 18 and continued to 1250 feet bls. Geophysical logging of the pilot hole was conducted on Tuesday and Wednesday. On Thursday, March 21, approval of the upper monitoring zone was given and reaming began in preparation of installation of the 16-inch casing.

Attachments:
Engineer's Daily Reports
Driller's Daily Reports
Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: March 29, 2001

SUBJECT: Weekly Summary No. 21
March 22 through March 28, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

The 16-inch casing for the DZMW was installed and cemented from March 22-23, 2002 to a depth of 1250 feet bls. On Monday, March 25, pilot hole drilling continued from 1250 feet and was completed to 1750 feet bls on March 27. The well was static for 24 hours and geophysical logging was conducted on March 28. Installation of the 6-inch FRP tubing is expected to occur on April 2, 2002.

Attachments: Engineer's Daily Reports
Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO:	Joe Haberfeld/FDEP Jack Myers/FDEP Ron Reese/USGS Nancy Marsh/USEPA	Steve Anderson/SFWMD Bill Beddow/CH2M HILL MikeWeatherby/CH2M HILL

FROM: Randy Dean/Pete Larkin/CH2M HILL

DATE: April 5, 2002

SUBJECT: Weekly Summary No. 22
March 29 through April 4, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

Construction of DZMW continued with the reaming of the borehole to 14.25-inch for the setting of the final FRP tubing. Reaming was completed to 1700 feet bls and a caliper log was run on Monday April 1. The following day a video survey was completed to assure the proper seating of the grout plug installed at the base of the FRP tubing. FRP tubing was installed to 1700 feet bls and grouted into place using 81 bbls of cement in 5 stages. It is anticipated that a pressure test of the FRP tubing at both the DZMW and DIW will be completed the following reporting period.

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

MEMORANDUM

CH2MHILL

TO: Joe Haberfeld/FDEP
Jack Myers/FDEP
Ron Reese/USGS
Nancy Marsh/USEPA
Steve Anderson/SFWMD
Bill Beddow/CH2M HILL
MikeWeatherby/CH2M HILL
Pete Larkin/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: April 12, 2002

SUBJECT: Weekly Summary No. 23
April 5 through April 11, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

On Friday, April 5, the pressure test was conducted on the final casing of the DZMW. The pressure test began at 70 psi and increased 0.7% over 60 minutes. On Monday, April 8, the final video log and caliper logs were completed on the DZMW. A pressure test was attempted on the IW, however the pressure increased greater than 5% in 33 minutes. On Tuesday, April 9 the last pressure test was retried on the FRP in the injection well. The tubing was pressurized to 110 psi and demonstrated an increase of 4.5% over a 2-hour period. Demobilization from the site continued on Wednesday and Thursday.

The RTS testing is planned for Monday, April 15. Following the RTS test, no well activity is planned for a few weeks while the Driller continues demobilization and surface facilities are constructed.

Attachments: Engineer's Daily Reports
Well Pad Monitor Well Water Quality

MEMORANDUM

CH2MHILL

TO:

Joe Haberfeld/FDEP
Jack Myers/FDEP
Ron Reese/USGS
Nancy Marsh/USEPA
Steve Anderson/SFWMD
Bill Beddow/CH2M HILL
MikeWeatherby/CH2M HILL

FROM: Randy Dean/CH2M HILL

DATE: April 19, 2002

SUBJECT: Weekly Summary No. 24
April 12 through April 18, 2002

PROJECT: ***City of Fort Myers WTP IW-1 Class I Injection Well System***
FDEP UIC Permit Number 165628-001-UC

Summary of Engineer's/Driller's Log

On Friday, April 12, a final video log was conducted to 3,040 feet in the IW prior to RTS testing. On Monday, April 15, RTS testing was conducted on the IW. Three I-131 ejects were done during the testing: static, dynamic at 29 gpm, and dynamic at 24, gpm. The test results indicated the well has mechanical integrity.

On Tuesday and Wednesday, the Driller continued demobilization from the site. On Thursday, a sampling tube was installed in the upper zone of DZMW to a depth of 1250 feet bls.

Attachments: Engineer's Daily Reports
Well Pad Monitor Well Water Quality

APPENDIX D

Well Casing Mill Certificates and FRP Specifications

16-inch Casing

Shipper:

REVISED ** *
Attn- Kathy

Date Shipped 3-18

F.O.B. Point Ft. Myers, FL.

Sales Person S

Terms 30 days

VASS PIPE & STEEL CO., INC.

158 Third Street
Mineola, NY 11501
Phone 516 741 8398
Toll Free 800 272 8277
Fax 516 741 8210

OF LADING - PACKING LIST

Ref # 24318 HT

Ref Date 3-14-02

Released by Ricky

Freight ☒ Prepaid ☐ Collect

Invoice Date

P.O.#

To: **Youngquist Bros.**
Injection Well Site
City of Ft. Myers—WTP
2751 Jacksonville St.
Ft. Meyers, Fl. 941-560-4902
Call 24hrs Ahead 940-560-4531

Shipped via [illegible]

Freight

Miles

ISSUED FOR ACCOUNT OF VASS PIPE & STEEL AS SPECIFIED

Quantity	DESCRIPTION OF PIPE TO BE RELEASED				~~B/L #~~ MILL	Ship Name	Specific Instructions	Unit Price	Total
	Bundles	Pcs/Bundle	Length S/R or D/R	Size and Type					
** 32	–	~~30~~	40.2'	16" BPE XH(.500w) A106B Smls	CHENGDU	TAI KANG HAI			
1286.4									
*	–	3	Truck loads						
				14 pcs each to go on	2 Trucks	} Load # 1 & 2			
**				4 ~~2~~ pcs to go on		} Load # 3			

Special Instructions:

Received in good condition by ____________ PRINT NAME ____________ SIGNATURE ____________ DATE

SIGNED BILL OF LADING MUST ACCOMPANY FREIGHT INVOICE FOR PROMPT PAYMENT

HOUSTON TUBULARS INC.

10497 TOWN & COUNTRY WAY
SUITE 350
HOUSTON, TEXAS 77024
TEL: 713-465-6334
FAX: 713-465-0587

DATE: 3-14-02

SHIPPER NO.: 83000

RELEASE NO.: 24318

FROM: VASS

ADDRESS:

TO: VAS

ADDRESS:

SHIPPED FROM:
E-23
TAi KANG HAi

SIZE: 16" x 500 WEIGHT: 82.77 GRADE: A106B COUPLING:

RANGE: 3 THREAD: MAKE: TYPE:

	TIER NO.		TIER NO.		TIER NO.		TIER NO.		TIER NO.
1	40.	2	282608						
2	x		018267						
3	14								
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
TL	562	8							

TALLIES PROVIDED BY
VASS PIPE & STEEL CO.

TALLIED BY

TOTAL JOINTS 14

TOTAL FOOTAGE 562 8

REMARKS:

TRUCK NO.:

DRIVER:

HTI 001

HOUSTON TUBULARS INC

HTI

10497 TOWN & COUNTRY WAY
SUITE 350
HOUSTON, TEXAS 77024
TEL: 713-465-6334
FAX: 713-465-0587

DATE: 3.18.02

RELEASE NO.: 24318

SHIPPER NO.: B3094

FROM: VASS

ADDRESS:

TO: VASS

ADDRESS:

SHIPPED FROM:
TAi KAng
HAi
E23

SIZE: 16X500 WEIGHT: 8277 GRADE: A106 COUPLING:

RANGE: 3 THREAD: PEB MAKE: TYPE:

	TIER NO.		TIER NO.		TIER NO.		TIER NO.		TIER NO.
1	40	2	0182608						
2			"						
3			"						
4	40	2	0182570						
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
TL									

TALLIES PROVIDED BY
VASS PIPE & STEEL CO.

TALLIED BY

TOTAL JOINTS 4

TOTAL FOOTAGE 160.8

REMARKS:

HOUSTON TUBULARS INC
HTI

10497 TOWN & COUNTRY WAY
SUITE 350
HOUSTON, TEXAS 77024
TEL: 713-465-6334
FAX: 713-465-0587

DATE: 3/15/02
SHIPPER NO.: 83049
RELEASE NO.: 24318
FROM: VASS
ADDRESS:
SHIPPED FROM: TAI KANG HA.
E-23
TO: VASS
ADDRESS:
SIZE: 16X500 WEIGHT: 8277 GRADE: A106 COUPLING:
RANGE: 3 THREAD: PEB MAKE: TYPE:

	TIER NO.		TIER NO.	TIER NO.	TIER NO.	TIER NO.
1	40	2	0182608			
2			0182567			
3			0182567			
4			0182607			
5			0182567			
6			0182608			
7			0182608			
8			0182608			
9			0182567			
10			0182609			
11			0182567			
12			0182609			
13			0182608			
14	40	2	0182607			
15						
16						
17						
18						
19						
20						
TL	5623					

TALLIES PROVIDED BY VASS PIPE & STEEL CO.

TALLIED BY
TOTAL JOINTS 14
TOTAL FOOTAGE 562.3

REMARKS:

DRIVER:

TRUCK NO.:

HTI 001

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02674-06-A
Transmittal No. # 073 **Date:** 3/20/02
Signature

Commodity: SEAMLESS STEEL PIPE
CUSTOMER:
L/C NO. : 1315756

MILL TEST CERTIFICATE

EN 10204/3.1.B

Certificate No.: 2001141001-2

SPECIFICATIONS: ASTM-A53/ASME SA 53/ASME SA106/API 5L, B/X42 TOLERANCE TO A53, NACE MR0175, HRC-22.

Pangang Group Chengdu Seamless Steel Tube Co., Ltd.

Date: Sept.5,2001

LOT NO. 1 Total: 1165 Pcs., 46600.00 Feet, 869094 Kgs

Heat No.	Size	Quantity			Test Piece No.	Mechanical Properties			Workmanship Test					Chemical Analysis (%)									
		Pcs.	Length(Feet)	Weight(Kg)		Y.S.(Mpa)	T.S.(Mpa)	EL.(%)	1	2	3	4	5	C	Si	Mn	S	P	Cr	Ni	Mo	Cu	V
0182952	5-9/16"xSTDx40'	38	1520.00	10086	131080294 A	405	580	34	G			G		0.15	0.43	1.02	0.016	0.013	0.02	0.04	0.010	0.080	0.01
					131080294 B	385	545	35															
0182975	6-5/8"xSTDx40'	35	1400.00	12060	111080259 A	360	520	32	G			G		0.16	0.43	1.05	0.016	0.013	0.04	0.04	0.010	0.080	0.01
					111080259 B	395	530	34															
0182980	6-5/8"xSTDx40'	77	3080.00	26532	141080256 A	350	515	31	G			G		0.14	0.41	1.06	0.016	0.013	0.02	0.05	0.020	0.090	0.01
					141080256 B	350	515	29															
0182985	6-5/8"xSTDx40'	84	3360.00	28944	141080268 A	365	525	34	G			G		0.17	0.46	1.05	0.018	0.018	0.04	0.06	0.020	0.080	0.01
					141080268 B	350	510	36															
0183001	5-9/16"xXHYx40'	5	200.00	1886	111080289 A	385	530	38	G			G		0.14	0.40	1.09	0.011	0.014	0.03	0.06	0.020	0.110	0.01
					111080289 B	365	530	39															
S0121194	16"xSTDx40'	24	960.00	27264	641070125 A	360	490	30	G			G		0.21	0.32	0.61	0.010	0.016	0.08	0.1	0.020	0.140	0.01
					641070125 B	365	515	36															
S0121202	16"xSTDx40'	5	200.00	5680	631070136 A	350	495	35	G			G		0.21	0.21	0.57	0.011	0.017	0.06	0.08	0.010	0.100	0.01
					631070136 B	335	490	35															
S0121207	16"xSTDx40'	24	960.00	27264	641070220 A	360	500	38	G			G		0.17	0.27	0.53	0.007	0.019	0.06	0.08	0.010	0.140	0.01
					641070220 B	365	490	38															
0182570	16"xXHYx40'	20	800.00	30060	231070724 A	350	520	41	G			G		0.17	0.44	1.07	0.018	0.016	0.03	0.04	0.010	0.070	0.01
					231070724 B	340	520	42															
0182608	16"xXHYx40'	100	4000.00	150300	231070723 A	330	500	44	G			G		0.15	0.44	1.06	0.008	0.014	0.04	0.04	0.020	0.100	0.01
					231070723 B	340	515	45															
0182616	12-3/4"xSCH80x40'	31	1240.00	49910	241080151 A	345	545	35	G			G		0.17	0.48	1.20	0.012	0.020	0.04	0.05	0.010	0.100	0.01
					241080151 B	330	500	36															
0182864	8-5/8"xSTDx40'	30	1200.00	15564	121080135 A	380	530	41	G			G		0.16	0.42	1.07	0.019	0.012	0.02	0.06	0.010	0.080	0.01
					121080135 B	355	500	38															
0182864	8-5/8"xSTDx40'	65	2600.00	33722	131080136 A	370	520	38	G			G		0.16	0.42	1.07	0.019	0.012	0.02	0.06	0.010	0.080	0.01
					131080136 B	375	535	36															
0182869	8-5/8"xSTDx40'	100	4000.00	51880	121080134 A	360	520	41	G			G		0.16	0.45	1.08	0.013	0.014	0.02	0.06	0.030	0.120	0.01
					121080134 B	370	510	41															

攀钢集团成都无缝钢管有限责任公司

Commodity: SEAMLESS STEEL PIPE
CUSTOMER:
L/C NO. : I315756

MILL TEST CERTIFICATE

EN 10204/3.I.B.

Pangang Group Chengdu Seamless Steel Tube Co., Ltd.

Certificate No.: 2001141003-1

SPECIFICATIONS: ASTM-A53/ASME SA 53/ASME SA106 /API 5L, B/X42 TOLERANCE TO A53 ONLY IN SIZES 16" AND ABOVE WITH ALL OTHERS TO API.

Date: Sept.5.2001

LOT NO. 3

Total: 1450 Pcs., 58000.00Feet, 982240 Kgs

Heat No.	Size	Quantity			Test Piece No.	Mechanical Properties			Workmanship Test					Chemical Analysis (%)									
		Pcs.	Length(Feet)	Weight(Kg)		Y.S.(Mpa)	T.S.(Mpa)	EL.(%)	1	2	3	4	6	C	Si	Mn	S	P	Cr	Ni	Mo	Cu	V
0170655	14"xXHYx40'	25	1000.00	32725	231080369 A	335	510	45	G			G		0.14	0.49	1.15	0.012	0.023	0.02	0.04	0.020	0.060	0.01
					231080369 B	310	505	45															
0182248	14"xSTDx40'	86	3440.00	85226	231070275 A	305	460	43	G			G		0.21	0.20	0.53	0.021	0.016	0.03	0.06	0.010	0.100	0.01
					231070275 B	305	490	40															
0182336	8-5/8"xSTDx40'	85	3400.00	44098	131080137 A	365	520	40	G			G		0.13	0.42	1.26	0.018	0.012	0.02	0.04	0.010	0.100	0.01
					131080137 B	350	520	39															
0182461	10-3/4"xSTDx40'	6	240.00	4410	131070185 A	355	510	34	G			G		0.15	0.42	1.10	0.017	0.014	0.03	0.05	0.040	0.120	0.01
					131070185 B	365	505	32															
0182462	10-3/4"xSTDx40'	96	3840.00	70560	131070186 A	350	520	33	G			G		0.15	0.42	1.11	0.011	0.015	0.02	0.05	0.020	0.100	0.01
					131070186 B	355	510	32															
0182466	10-3/4"xXHYx40'	72	2880.00	71568	141070199 A	310	500	40	G			G		0.16	0.42	1.10	0.019	0.013	0.03	0.1	0.010	0.120	0.01
					141070199 B	340	515	39															
0182500	12-3/4"xSTDx40'	50	2000.00	45000	241080123 A	345	495	40	G			G		0.20	0.23	0.54	0.021	0.016	0.04	0.05	0.030	0.130	0.01
					241080123 B	325	490	38															
0182520	10-3/4"xXHYx40'	33	1320.00	32802	131070211 A	330	500	43	G			G		0.15	0.40	1.02	0.015	0.017	0.02	0.04	0.020	0.110	0.01
					131070211 B	325	500	44															
✓ 0182567	16"xXHYx40'	38	1520.00	57114	211070718 A	340	510	42	G			G		0.16	0.44	1.05	0.008	0.012	0.02	0.04	0.010	0.070	0.01
					211070718 B	340	505	42															
0182863	8-5/8"xXHYx40'	75	3000.00	59100	111080178 A	350	525	45	G			G		0.14	0.46	1.13	0.013	0.013	0.02	0.05	0.030	0.120	0.01
					111080178 B	350	535	44															
0182868	8-5/8"xSTDx40'	85	3400.00	44098	121080144 A	355	515	41	G			G		0.16	0.40	1.06	0.018	0.014	0.02	0.05	0.010	0.090	0.01
					121080144 B	385	530	38															
0182876	8-5/8"xSTDx40'	125	5000.00	64850	141080139 A	365	525	37	G			G		0.15	0.43	1.07	0.017	0.013	0.03	0.04	0.020	0.090	0.01
					141080139 B	365	530	42															
0182945	6-5/8"xXHYx40'	135	5400.00	70065	121080235 A	345	510	38	G			G		0.14	0.41	1.09	0.012	0.013	0.02	0.03	0.010	0.080	0.01
					121080235 B	350	520	35															
0182965	6-5/8"xSTDx40'	182	7280.00	62712	121080263 A	350	515	39	G			G		0.15	0.42	1.05	0.020	0.013	0.02	0.05	0.010	0.070	0.01
					121080263 B	370	525	33															

攀钢集团成都无缝钢管有限责任公司

PANGANG GROUP CHENGDU SEAMLESS
STEEL TUBE CO.,LTD.

0182975	6-5/8"xSTDx40'	182	7280.00	62712	141080258 A	355	510	30	G			G		0.16	0.43	1.05	0.016	0.013	0.04	0.04	0.010	0.080	0.01
					141080258 B	365	520	32															
S0120983	16"xSTDx40'	26	1040.00	29536	631070012 A	370	485	35	G			G		0.20	0.26	0.44	0.014	0.012	0.08	0.11	0.020	0.180	0.01
					631070012 B	365	485	36															
S0121057	12-3/4"xSTDx40'	100	4000.00	90000	231080116 A	310	460	40	G			G		0.19	0.24	0.46	0.024	0.017	0.04	0.08	0.010	0.100	0.01
					231080116 B	315	465	41															
S0121206	16"xSTDx40'	26	1040.00	29536	641070221 A	380	505	40	G			G		0.20	0.23	0.51	0.010	0.015	0.05	0.06	0.010	0.100	0.01
					641070221 B	350	485	39															
S0121211	16"xSTDx40'	23	920.00	26128	641070253 A	335	495	38	G			G		0.20	0.25	0.53	0.011	0.018	0.06	0.07	0.010	0.130	0.01
					641070253 B	370	500	42															
			58000. 00																				

Notes:

1. Flattening test
2. Bending test
3. Pipe flaring test
4. Hydrostatic test
5. Non-destructive test

Remarks:

1. Condition of supply: hot rolled
2. Tubes deliveried in theoretical weight
3. G----------------Good

Inspector: Cheng Yu

WE CONFIRM THAT THE MATERIAL MEETS THE SPECIFICATIONS STIPULATED IN TRANSACTION NO. ST-PH 0067 DATED JUNE 1, 2001.

攀钢集团成都无缝钢管有限责任公司
PANGANG GROUP CHENGDU SEAMLESS
STEEL TUBE CO.,LTD.

24-inch Casing

VASS PIPE & STEEL CO., INC.

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

TOLL FREE PHONE:800-272-8277PHONE:516-741-8398FAX:516-741-8210Email :v.vass@worldnet.att.net

ATTN: ED McCULLER

COMPANY: YOUNGQUIST BROS.

FAX #941-489-4545

DATE: 1/22/02

FROM:JENNY REYES

PIPE TALLY / PACKING SLIP

P.O.#218013-2 RELEASE#23606

	LOAD #1				
185.1	5 PCS X D/R 24" BPE A106B .500W SMLS	37.2 37.3	36.8 36.4	37.4	S0121039 S0121200
	LOAD #2				
347.1	10 PCS X D/R 24" BPE A106B .500W SMLS	33.1 35.2	33.0 35.5	32.9 35.5	S0121200 S0121444
		33.1	39.0	33.1	S0121039
		36.7			
	LOAD #3				
357.9	10 PCS X D/R 24" BPE A106B .500W SMLS	34.7 33.0	37.6 36.3	33.3 32.9	S0121039 S0121200
		37.0	38.2	37.1	S0121444
		37.8			
	LOAD #4				
279.1	8 PCS X D/R 24" BPE A106B .500W SMLS	35.8 33.1	33.3 33.9	37.6 36.9	S0121444 S0121200
		34.9	33.6		S0121039
	LOAD #5				
278.8	8 PCS X D/R 24" BPE A106B .500W SMLS	36.4 32.9	33.3 34.9	33.1 35.3	S0121444 S0121200
		37.6	35.3		S0121039

RECEIVED JAN 2 4 2002

Commodity: SEAMLESS STEEL PIPE
CUSTOMER: ________________
L/C NO. : I315756

MILL TEST CERTIFICATE

EN 10204/3.1.B.

Certificate No.: 2001141002-1

SPECIFICATIONS: ASTM-A53/ASME SA 53/ASME SA106/API 5L , GR B TOLERANCE TO A53

Pangang Group Chengdu Seamless Steel Tube Co., Ltd.

Date: Sept 5,2001

LOT NO. 2

Total: 111 Pcs., 4229.07Feet, 181691 Kgs

Heat No.	Size	Quantity			Test Piece No.	Mechanical Properties			Workmanship Test					Chemical Analysis (%)									
		Pcs.	Length(m)	Weight(Kg)		Y.S.(Mpa)	T.S.(Mpa)	EL.(%)	1	2	3	4	5	C	Si	Mn	S	P	Cr	Ni	Mo	Cu	V
S0121039	24"xXHYxDRL	15	540.98	30825	641070209 A	285	475	44	G			G		0.21	0.27	0.58	0.018	0.018	0.08	0.09	0.020	0.170	0.01
					641070209 B	275	480	41															
S0121200	24"xXHYxDRL	13	460.10	26215	621070290 A	305	475	42	G			G		0.19	0.24	0.56	0.009	0.002	0.06	0.07	0.010	0.130	0.01
					621070290 B	260	445	42															
S0121444	24"xXHYxDRL	13	445.67	25394	621080268 A	345	485	42	G			G		0.19	0.25	0.52	0.021	0.026	0.06	0.11	0.020	0.110	0.01
					621080268 B	320	475	42															
0182093	20"xSTDxDRL	22	879.99	31394	631070103 A	340	485	35	G			G		0.18	0.24	0.46	0.016	0.010	0.02	0.03	0.010	0.110	0.01
					631070103 B	365	485	35															
S0121210	20"xSTDxDRL	18	720.01	25686	641070198 A	360	475	39	G			G		0.17	0.27	0.51	0.015	0.017	0.07	0.06	0.020	0.120	0.01
					641070198 B	355	480	39															
S0121193	20"xSTDxDRL	21	839.99	29967	631070196 A	355	470	38	G			G		0.17	0.26	0.45	0.008	0.019	0.08	0.09	0.020	0.130	0.01
					631070196 B	365	480	36															
S0121201	20"xSTDxDRL	9	342.32	12210	641070199 A	360	470	40	G			G		0.17	0.33	0.43	0.013	0.011	0.08	0.09	0.010	0.120	0.01
					641070199 B	360	475	41															

4229. 07

Notes:

1. Flattening test
2. Bending test
3. Pipe flaring test
4. Hydrostatic test
5. Non-destructive test

Remarks:

1. Condition of supply: hot rolled
2. Tubes deliveried in theoretical weight
3. DRL:10-12M
4. G-----------------Good

攀钢集团成都无缝钢管有限责任公司
PANGANG GROUP CHENGDU SEAMLESS
STEEL TUBE CO.,LTD.

Inspector: Cheng Yu

WE CONFIRM THAT THE MATERIAL MEETS THE SPECIFICATIONS STIPULATED IN TRANSACTION NO. ST-PH 0067 DATED JUNE 1, 2001.

18-inch Casing

VASS PIPE & STEEL CO., INC.

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TOLL FREE PHONE:800-272-8277PHONE:516-741-8398FAX:516-741-8210Email :v.vass@worldnet.att.net

ATTN.: Ed McCulley

COMPANY: Youngquist Bros

FAX #: 941 489 4545

DATE: Nov 30 01

FROM:ROGER

TOTAL PAGES: 22 pages

PIPE TALLY / PACKING SLIP/ MTRs

P.O. #: 218019-02 **RELEASE #** 23237

TOTAL FOOTAGE	DESCRIPTION	NO. OF PCS			HEAT #
		Load #1			
1447.7	36 PC X D/R 18" BPE XH	40.1	40.4	40.3	809029
	(.500W) A106 B SMLS	40.9	40.1	40.5	808976
		40.2	40.4	40.7	809007
		40.6	40.1	38.2	809063
					809057
		Load	#2		809043
		40.8	40.5	40.2	808984
		41.1	40.5	39.2	809048
		40.3	40.9	40.7	809455
		40.7	40.8	40.0	808189
					809162
		Load	#3		
		40.5	40.8	40.1	
		40.2	37.6	40.5	
		40.5	40.4	40.9	
		39.5	39.1	39.4	

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02674-04-A
Transmittal No. # 035 Date: 12/3/01
Signature

Roger

Huta
"BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1737/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ
Mill's Quality Certificate acc.to EN 10204/3.1.B
/nr normy/

Zamawiający
Le client - Ordered by – Besteller - Заказчик: STALEXPORT S.A. - Katowice

Adres wysyłkowy
Adresse – Address – Versandadresse – Адрес получателя:

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagon No Car No Wagon No № вагона
PL/271936361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Specification de la commande – Order Specification – Spizifikation der Bestellung – Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical treatement etc.) Gegenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimesions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pièces Pieces Stück Штук	mb. c. mtr. c. mtr. 1. M. пог. м	Theore-tical weight kg кг
	Black seamless steel pipes acc.to ASTM A106, Grade B, tolerance acc.to ASTM A53 B, bevelled ends acc.to DIN 2559/22, the height of sill flange from 0-2mm with sill gap 0-4mm, angle of bevelling: 30 degrees, outside dia tolerance +/-1%, outside surface of pipes single covered by-Florin, material in random lenghts: 10-13m.	⌀18"x0,500"x 10 - 13m (457,2x12,70mm)	B	809455	3	35,86	4992

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.
Le contrôle technique de la commande a été exécuté par le Service de Controle. Les resultats des essais sont indiqués ci-après.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянугого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

1. SKŁAD CHEMICZNY – ANALYSE CHIMIQUE - CHEMICAL COMPOSITION – CHEMISCHE ZUSAMMENSETZUNG – ХИМИЧЕСКИЙ СОСТАВ

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V			
809455	0,14	0,62	0,31	0,009	0,010	0,06	0,10	0,21	0,03	0,00			

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES – MECHANICAL TESTS – MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'éprouvette Heat No or. tests No Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm²	Twardość Dureté Hardness Härte Твердость
809455/29846		307	441	49,6			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS – TECHNOLOGISCHE PRÜFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa-positive results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRESOBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnię i wymiary zbadano w 100% - Surface et dimensions ont éte controlés et 100% - Surface and dimensions tested at 100% - Oberfläche und Abmessungen geprüft zu 100% - Наружный осмотр и проверка измерений произведены в 100%

Materiał oznaczono - la material est margué - Material marked - Das Material wurde bezeichnet - Материал обозначен

marked:POLAND, Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/Size x Wall Thickness (in inches)/Lenght(in ft)/Heat no/mill mark/preasure MPa/Houston 10006307

Na podstawie wyżej przeprowadzonych prób materiał zwolniono

Sur base des essais cu-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышеименованных испытаний, признан годным.

Kontrola Jakości Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management Hütten – Direktion Дирекция завода	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur Roch Libor	PEŁNOMOCNIK ZARZĄDU Z-CA KIER. DZ. KONTROLI JAKOŚCI mgr inż. M. ŻUŻEWICZ	dn. 21.12 19 99 r.

Huta "BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1607/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ

Mill's Quality Certificate acc.to EN 10204/3.1.B
/nr normy/

Zamawiający
Le client - Ordered by – Besteller - Заказчик
STALEXPORT S.A. - Katowice

Adres wysyłkowy
Adresse – Address – Versandadresse – Адрес получателя

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagon No Car No Wagon No № вагона
PL/271936361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Spécification de la commande – Order Specification – Spezifikation der Bestellung – Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical treatement etc.) Gagenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimesions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pièces Pieces Stück Штук	mb. c. mtr c. mtr. l. M. пог. м	Theore-tical weight kg кг
				✓			
	Black seamless steel pipes acc.to ASTM A106,Grade B, tolerances acc.to ASTM A53 B,bevelled ends acc.to DIN 2559/22, the height of sill flange from 0-2mm with sill gap 0-4mm, angle of bevelling: 30 degrees,outside dia tolerance +/-1%, outside surface of pipes single covered by-Florin, material in random lenghts:10 - 13m.	Ø18"x0,500"x 10 - 13m /457,2x12,70mm/	B	809162	10	121,92	16971

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.
Le contrôle technique de la commande a été exécuté par le Service de Controle. Les resultats des essais sont indiqués ci-après.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянугого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

I. SKŁAD CHEMICZNY – ANALYSE CHIMIQUE – CHEMICAL COMPOSITION – CHEMISCHE ZUSAMMENSETZUNG – ХИМИЧЕСКИЙ СОСТАВ

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V			
809162	0,15	0,62	0,27	0,015	0,018	0,07	0,10	0,21	0,03	0,00			

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES - MECHANICAL TESTS - MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'eprouvette Heat No or. tests No Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm²	Twardość Dureté Hardness Härte Твердость
✓ 809162/27941		296	448	41,7			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS– TECHNOLOGISCHE PRÜFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa-positive results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRESOBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnię i wymiary zbadano w 100% - Surface et dimensions ont été controlés et 100% - Surface and dimensions tested at 100% Oberfläche und Abmessungen geprüft zu 100% - Наружный осмотр и проверка измерений произведены в 100%

Materiał oznaczono - la material est marqué - Material marked - Das Material wurde bezeichnet - Материал обозначен

B

marked:POLAND,Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/Size x Wall Thickness
/in inches//Length /in ft/ /Heat no/mill mark/presure MPa/Houston 10006307

Na podstawie wyżej przeprowadzonych prób materiał zwolniono
Sur base des essais ci-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышеменованных испытаний, признан годным.

Kontrola Jakości Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management Hütten-Direktion Дирекция Завода PEŁNOMOCNIK ZARZĄDU Z-CA KIER. DZ. KONTROLI JAKO…	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur Roch L…	inż. Z. ZUZEWICZ	dn. 3.12. 1999 r.

Huta
"BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1606/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ

Mill s Quality Certificate acc.to EN 10204/3.1.B
/nr normy/

Zamawiający
Le client - Ordered by – Besteller - Заказчик
STALEXPORT S.A. - Katowice

Adres wysyłkowy
Adresse – Address – Versandadresse – Адрес получателя

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagen No Car No Wagon No № вагона
PL/27193 6361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Spécification de la commande – Order Specification – Spizifikation der Bestellung – Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical treatement etc.) Gagenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimesions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pièces Pieces Stück Штук	mb. c. mtr. c. mtr. l. M. пог. м	Theoretical weight kg кг
	Black seamless steel pipes acc.to ASTM A106,Grade B, tolerance acc.to ASTM A53 B,bevelled ends acc.to DIN 2559/22, the height of sill flange from 0-2mm with sill gap 0-4mm, 30 degrees,outside dia tolerance +/-1%, Outside surface of pipes single covered by-Florin, material in random lenghts: 10 - 13m	Ø 18"x0,500"x 10 - 13m /457,2x12,70mm/	B	809189	7	85,38	11884

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.

Le controle technique de la commande a été exécute par le Service de Controle. Les résultats des essais sont indiqués ci-après.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянутого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

1. SKŁAD CHEMICZNY – ANALYSE CHIMIQUE – CHEMICAL COMPOSITION – CHEMISCHE ZUSAMMENSETZUNG – ХИМИЧЕСКИЙ СОСТАВ

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V		
809189	0,15	0,60	0,28	0,012	0,007	0,07	0,09	0,19	0,03	0,00		

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES – MECHANICAL TESTS – MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'eprouvette Heat No or. tests No Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm²	Twardość Dureté Hardness Härte Твердость
809189/27	934	304	440	43,7			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS – TECHNOLOGISCHE PRÜFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa - positive results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRESOBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnię i wymiary zbadano w 100% - Surface et dimensions ont été controlés et 100% - Surface and dimensions tested at 100% Oberfläche und Abmessungen geprüft zu 100% - Наружный осмотр и проверка измерений произведены в 100%

KJ
21/035

Materiał oznaczono - la material est margué - Material marked - Das Material wurde bezeichnet - Материал обозначен

marked:POLAND,Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/Size x Wall Thickness /in inches//Length /in ft//Heat no/mill mark/pressure MPa/Houston 10006307

Na podstawie wyżej przeprowadzonych prób materiał zwolniono
Sur base des essais ci-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышеменованных испытаний, признан годным.

Kontrola Jakości. Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management Hütten – Direktion Дирекция завода	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur Roch Libor	PEŁNOMOCNIK ZARZĄDU Z-CA KIER. DZ. KONTROLI JAKOŚCI, mgr inż. M. [illegible]	dn. 3.12. 1999 r.

Huta
"BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1602/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ

Mill's Quality Certificate acc.to EN 10204/3.1.B
/wg normy/

Zamawiający
Le client - Ordered by - Besteller - Заказчик: STALEXPORT S.A. - Katowice

Adres wysyłkowy
Adresse - Address - Versandadresse - Адрес получателя:

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagon No Car No Wagon No № вагона
PL/271936361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Specification de la commande - Order Specification - Spizifikation der Bestellung - Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical treatement etc.) Gegenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimesions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pièces Pieces Stück Штук	mb. c. mtr. c. mtr. l. M. пог. м	Theore-tical weight kg кг
	Black seamless steel pipes acc.to ASTM A106, Grade B, tolerance acc.to ASTM A53 B, bevelled ends acc.to DIN 2559/22, the height of sill flange from 0-2mm with sill gap 0-4mm, angle of bevelling: 30 degrees, outside dia tolerance +/-1%, outside surface of pipes single covered by-Florin, material in random lenghts: 10-13m.	Ø18"x0,500"x 10 - 13m (457,2x12,70mm)	B	808976	10	121,56	16920

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.
Le controle technique de la commande a été exécute par le Service de Controle. Les resultats des essais sont indiqués ci-après.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянутого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

1. SKŁAD CHEMICZNY – ANALYSE CHIMIQUE – CHEMICAL COMPOSITION – CHEMISCHE ZUSAMMENSETZUNG – ХИМИЧЕСКИЙ СОСТАВ

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V			
808976	0,20	0,61	0,32	0,012	0,007	0,06	0,07	0,17	0,03	0,00			

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES – MECHANICAL TESTS – MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'éprouvette Heat No or. tests No Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm²	Twardość Dureté Hardness Härte Твердость
808976/27899		303	496	43,7			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS – TECHNOLOGISCHE PRUFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa-positive results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRESOBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnię i wymiary zbadano w 100% - Surface et dimensions ont étc controlés et 100% - Surface and dimensions tested at 100% - Oberfläche und Abmessungen geprüft zu 100% - Наружный осмотр и проверка измерений произведены в 100%

Materiał oznaczono - la material est margué - Material marked - Das Material wurde bezeichnet - Материал обозначен

Kd 21/98E

marked:POLAND,Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/Size x Wall Thickness (in inches)/Length(in ft)/Heat no/mill mark/preasure MPa/Houston 10006307

Na podstawie wyżej przeprowadzonych prób materiał zwolniono
Sur base des essais cu-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышенменованных испытаний, признан годным.

Kontrola Jakości Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management Hütten Direktion Дирекция завода	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur Roch Libor	PEŁNOMOCNIK ZARZĄDU Z-CA KIER. DZ. KONTROLI JAKOŚCI Inż. M. ŻUŻEWICZ	dn. 3.12 1999 r.

Huta
"BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1601/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ

Mill's Quality Certificate acc.to EN 10204/3.1.B
/w normy/

Zamawiający
Le client - Ordered by – Besteller - Заказчик: STALEXPORT S.A. - Katowice

Adres wysyłkowy
Adresse – Address – Versandadresse – Адрес получателя

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagen No Car No Wagon No № вагона
PL/271936361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Specification de la commande – Order Specification – Spizifikation der Bestellung – Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical treatement etc.) Gagenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimesions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pièces Pieces Stück Штук	mb. c. mtr. c. mtr. l. M. пог. м	Theoretical weight kg кг
	Black seamless steel pipes acc.to ASTM A106,Grade B, tolerance acc.to ASTM A53 B,bevelled ends acc.to DIN 2559/22, the height of sill flange from 0-2mm with sill gap 0-4mm, angle of bevelling: 30 degrees,outside dia tolerance +/-1%, outside surface of pipes single covered by-Florin, material in random lenghts: 10-13m.	Ø18"x0,500"x 10 - 13m (457,2x12,70mm)	B	809031	10	123,29	17162

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.

Le controle technique de la commande a été exécute par le Service de Controle. Les resultats des essais sont indiqués ci-aprés.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянугого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

1. SKŁAD CHEMICZNY – ANALYSE CHIMIQUE – CHEMICAL COMPOSITION – CHEMISCHE ZUSAMMENSETZUNG – ХИМИЧЕСКИЙ СОСТАВ :

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V			
809031	0,18	0,67	0,26	0,018	0,005	0,14	0,09	0,14	0,03	0,00			

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES – MECHANICAL TESTS – MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'eprouvette Heat No or. tests No Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm^2	Twardość Dureté Hardness Härte Твердость
809031/27889		339	493	39,7			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS – TECHNOLOGISCHE PRÜFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa-positive results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRESOBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnię i wymiary zbadano w 100% - Surface et dimensions ont ète controlés et 100% - Surface and dimensions tested at 100% - Oberfläche und Abmessungen geprüft zu 100% - Наружный осмотр и проверка измерений произведены в 100%

Materiał oznaczono - la material est margué - Material marked - Das Material wurde bezeichnet - Материал обозначен

marked:POLAND, Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/Size x Wall Thickness (in inches)/Length(in ft)/Heat no/mill mark/presure MPa/Houston 10006307

Na podstawie wyżej przeprowadzonych prób materiał zwolniono

Sur base des essais cu-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышеименованных испытаний, признан годным.

Kontrola Jakości Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management Hütten Direktion Дирекция Завода	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur Roch Libor	PEŁNOMOCNIK ZARZĄDU Z-CA KIER. DZ. KONTROLI JAKOŚCI mgr inż. M. ŻUŻEWICZ	dn. 3.12 19 99 r.

Huta
"BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1598/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ

Mill s Quality Certificate acc.to EN 10204/3.1.B
/nr normy/

Zamawiający
Le client - Ordered by – Besteller - Заказчик: STALEXPORT S.A. - Katowice

Adres wysyłkowy
Adresse – Address – Versandadresse – Адрес получателя:

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagen No Car No Wagon No № вагона
PL/271936361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Specification de la commande – Order Specification – Spizifikation der Bestellung – Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical treatement etc.) Gegenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimesions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pièces Pieces Stück Штук	mb. c. mtr. c. mtr. l. M. пог. м	Theore-tical weight kg кг
	Black seamless steel pipes acc.to ASTM A106,Grade B, tolerance acc.to ASTM A53 B,bevelled ends acc.to DIN 2559/22, the height of sill flange from 0-2mm with sill gap 0-4mm, angle of bevelling: 30 degrees,outside dia tolerance +/-1%, outside surface of pipes single covered by-Florin, material in random lenghts:10 - 13m.	Ø18"x0,500"x 10 - 13m /457,2x12,70mm/	B	809043	10	120,48	16772

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.

Le controle technique de la commande a été exécuté par le Service de Controle. Les resultats des essais sont indiqués ci-aprés.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянугого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

1. SKLAD CHEMICZNY – ANALYSE CHIMIQUE – CHEMICAL COMPOSITION – CHEMISCHE ZUSAMMENSETZUNG – ХИМИЧЕСКИЙ СОСТАВ

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V			
809043	0,18	0,65	0,25	0,024	0,009	0,06	0,10	0,23	0,03	0,00			

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES – MECHANICAL TESTS – MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'eprouvette Heat No or. tests No Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm²	Twardość Dureté Hardness Härte Твердость
809043/27865		321	482	39,7			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS – TECHNOLOGISCHE PRÜFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa - positive-results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRESOBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnię i wymiary zbadano w 100% – Surface et dimensions ont été controlés et 100% - Surface and dimensions tested at 100% - Oberfläche und Abmessungen geprüft zu 100% - Наружный осмотр и проверка измерений произведены в 100%

Materiał oznaczono – la material est margué - Material marked - Das Material wurde bezeichnet - Материал обозначен

B

KJ 21/92E

marked:POLAND,Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/Size x Wall Thickness
/in inches//Length /in ft//Heat no/mill mark/pressure MPa/Houston 10006307

Na podstawie wyżej przeprowadzonych prób materiał zwolniono
Sur base des essais cu-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышеименованных испытаний, признан годным.

Kontrola Jakości Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management Hütten - Direktion Дирекция завода	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur	PEŁNOMOCNIK ZARZĄDU Z-CA KIER. DZ. KONTROLI JAKOŚCI mgr inż. M. ŻUŻEWICZ	dn. 3.12. 19 99 r.

Huta
"BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1600/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ

Mill´s Quality Certificate acc.to EN 10204/3.1.B
/wg normy/

Zamawiający
Le client - Ordered by – Besteller - Заказчик: STALEXPORT S.A. - Katowice

Adres wysyłkowy
Adresse – Address – Versandadresse – Адрес получателя

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagon No Car No Wagon No № вагона
PL/271936361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Spécification de la commande – Order Specification – Spizifikation der Bestellung – Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical trentement etc.) Gegenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimesions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pièces Pieces Stück Штук	mb. c. mtr. c. mtr. l. M. пог. м	Theoretical weight kg кг
	Black seamless steel pipes acc.to ASTM A106,Grade B, tolerance acc.to ASTM A53 B,bevelled ends acc.to DIN 2559/22, the height of sill flange from 0-2mm with sill gap 0-4mm, angle of bevelling: 30 degrees,outside dia tolerance +/-1%, outside surface of pipes single covered by-Florin, material in random lenghts: 10-13m.	Ø18"x0,500"x 10 - 13m (457,2x12,70mm)	B	809007	10	121,35	16892

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.
Le controle technique de la commande a été exécute par le Service de Controle. Les résultats des essais sont indiqués ci-aprés.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянутого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

1. SKŁAD CHEMICZNY – ANALYSE CHIMIQUE – CHEMICAL COMPOSITION – CHEMISCHE ZUSAMMENSETZUNG – ХИМИЧЕСКИЙ СОСТАВ

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V			
809007	0,18	0,64	0,23	0,017	0,016	0,10	0,13	0,18	0,03	0,00			

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES – MECHANICAL TESTS – MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'eprouvette Heat No or. tests No. Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm²	Twardość Dureté Hardness Härte Твердость
809007/27879		347	481	41,7			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS – TECHNOLOGISCHE PRÜFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa-positive results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRESOBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnię i wymiary zbadano w 100% - Surface et dimensions ont été controlés et 100% - Surface and dimensions tested at 100% - Oberfläche und Abmessungen geprüft zu 100% - Наружный осмотр и проверка измерений произведены в 100%

KJ
21/[illegible]

Materiał oznaczono - la material est margue - Material marked - Das Material wurde bezeichnet - Материал обозначен

marked:POLAND, Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/Size x Wall Thickness (in inches)/Length(in ft)/Heat no/mill mark/preasure MPa/Houston 10006307

Na podstawie wyżej przeprowadzonych prób materiał zwolniono
Sur base des essais cu-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышеименованных испытаний, признан годным.

Kontrola Jakości Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management Hütten - Direktion Дирекция Завода	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur Roch Libor	PEŁNOMOCNIK ZARZĄDU ZCA [illegible] KONTROLI JAKOŚCI [illegible] inż. M. ŻUŻEWICZ	dn. 3.12 1999 r.

Huta "BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1599/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ

Mills Quality Certificate acc.to EN 10204/3.1.B
/nr normy/

Zamawiający
Le client - Ordered by – Besteller - Заказчик: STALEXPORT S.A. - Katowice

Adres wysyłkowy
Adresse – Address – Versandadresse – Адрес получателя:

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagen No Car No Wagon No № вагона
PL/271936361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Specification de la commande – Order Specification – Spizifikation der Bestellung – Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical treatement etc.) Gegenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimesions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pieces Pieces Stück Штук	mb. c. mtr. c. mtr. l. M. пог. м	Theoretical weight kg кг
	Black seamless steel pipes acc.to ASTM A106,Grade B, tolerance acc.to ASTM A53 B,bevelled ends acc.to DIN 2559/22., the heigth of sill flange from 0-2 mm with sill gap 0-4mm , angle of bevelling: 30 degrees,outside dia tolerance +/-1%, outside surface of pipes single covered by-Florin, material in random lenghts:10-13m.	Ø18"x0,500"x 10 - 13m (457,2x12,70mm)	B	808984	4	48,75	6786

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.
Le controle technique de la commande a été exécute par le Service de Controle. Les resultats des essais sont indiqués ci-aprés.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянутого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

I. SKŁAD CHEMICZNY – ANALYSE CHIMIQUE – CHEMICAL COMPOSITION – CHEMISCHE ZUSAMMENSETZUNG – ХИМИЧЕСКИЙ СОСТАВ

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V			
808984	0,18	0,61	0,27	0,015	0,015	0,09	0,16	0,24	0,04	0,00			

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES – MECHANICAL TESTS – MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'eprouvette Heat No or. tests No Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm^2	Twardość Dureté Hardness Härte Твердость
808984/27875		336	491	45,6			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS – TECHNOLOGISCHE PRÜFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa-positive results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRESOBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnie i wymiary zbadano w 100% – Surface et dimensions ont ete controlés et 100% – Surface and dimensions tested at 100% – Oberfläche und Abmessungen geprüft zu 100% – Наружный осмотр и проверка измерений произведены в 100%

Materiał oznaczono – la material est margué – Material marked – Das Material wurde bezeichnet – Материал обозначен

marked:POLAND,Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/Size x Wall Thicknes (in inches)/Length(in ft)/Heat no/mill mark/preasure MPa/Houston 10006307

6

KJ 21/R3E

Na podstawie wyżej przeprowadzonych prób materiał zwolniono
Sur base des essais au-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышеименованных испытаний, признан годным.

Kontrola Jakości Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management Hütten-Direktion Дирекция Завода	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur	PEŁNOMOCNIK ZARZĄDU KIER. DZ. KONTROLI JAKOŚCI inż. A. ZUBKIEWICZ	dn. 3.12 19 99 r.

Huta
"BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1603/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ

Mill´s Quality Certificate acc.to EN 10204/3.1.B
/nr normy/

Zamawiający Le client - Ordered by - Besteller - Заказчик	STALEXPORT S.A. - Katowice
Adres wysyłkowy Adresse - Address - Versandadresse - Адрес получателя	

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagen No Car No Wagon No № вагона
PL/271936361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Spécification de la commande – Order Specification – Spizifikation der Bestellung – Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical treatement etc.) Gagenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimensions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pièces Pieces Stück Штук	mb. c. mtr. c. mtr. l. M. пог. м	Theoretical weight kg кг
	Black seamless steel pipes acc.to ASTM A106,Grade B, tolerance acc.to ASTM A53 B,bevelled ends acc.to DIN 2559/22, the height of sill flange from 0-2mm with sill gap 0-4mm, angle of bevelling: 30 degrees,outside dia tolerance +/-1%, outside surface of pipes single covered by-Florin, material in random lenghts: 10-13m.	Ø18"x0,500"x 10-13m (457,2x12,70mm)	B	809029	5	61,47	8557

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.
Le contrôle technique de la commande a été exécute par le Service de Controle. Les resultats des essais sont indiqués ci-après.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянугого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

1. SKŁAD CHEMICZNY – ANALYSE CHIMIQUE – CHEMICAL COMPOSITION – CHEMISCHE ZUSAMMENSETZUNG – ХИМИЧЕСКИЙ СОСТАВ

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V			
809029	0,18	0,58	0,28	0,015	0,007	0,07	0,09	0,15	0,03	0,00			

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES – MECHANICAL TESTS – MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'eprouvette Heat No or. tests No Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm²	Twardość Dureté Hardness Härte Твердость
809029/27909		331	476	41,7			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS – TECHNOLOGISCHE PRÜFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa-positive results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRES OBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnię i wymiary zbadano w 100% - Surface et dimensions ont éte controlés et 100% - Surface and dimensions tested at 100% - Oberfläche und Abmessungen geprüft zu 100% - Наружный осмотр и проверка измерений произведены в 100%

Materiał oznaczono - la material est margué - Material marked - Das Material wurde bezeichnet - Материал обозначен

KJ
21/[illegible]

marked:POLAND,Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/SizexWall Thickness
(in inches)/Lenght (in ft)/Heat no/mill mark/preasure MPa/Houston 10006307

Na podstawie wyżej przeprowadzonych prób materiał zwolniono

Sur base des essais cu-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышенменованных испытаний, признан годным.

Kontrola Jakości Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management Hütten - Direktion Дирекция Завода	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur Roch Libor	PEŁNOMOCNIK ZARZĄDU KIER. DZ. KONTROLI JAKOŚCI mgr inż. M. ŻUŻEWICZ	dn. 3.12 1999 r.

Huta
"BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1604/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ

Mill's Quality Certificate acc.to EN 10204/3.1.B /nr normy/

Zamawiający
Le client - Ordered by - Besteller - Заказчик
STALEXPORT S.A. - Katowice

Adres wysyłkowy
Adresse - Address - Versandadresse - Адрес получателя

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagen No Car No Wagon No № вагона
PL/271936361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Spécification de la commande - Order Specification - Spizifikation der Bestellung - Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical treatement etc.) Gagenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimesions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pièces Pieces Stück Штук	mb. c. mtr. c. mtr. l. M. пог. м	Theoretical weight kg кг
	Black seamless steel pipes acc.to ASTM A106, Grade B, tolerance acc.to ASTM A53 B, bevelled ends acc.to DIN 2559/22, the height of sill flange from 0-2mm with sill gap 0-4mm, angle of bevelling: 30 degrees, outside dia tolerance +/-1%, outside surface of pipes single covered by-Florin, material in random lenghts: 10-13m.	Ø 18"x0,500"x 10 - 13m (457,2x12,70mm)	B	809048	10	121,25	16877

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.
Le controle technique de la commande a été exécute par le Service de Controle. Les resultats des essais sont indiqués ci-aprés.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянугого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

I. SKŁAD CHEMICZNY - ANALYSE CHIMIQUE - CHEMICAL COMPOSITION - CHEMISCHE ZUSAMMENSETZUNG - ХИМИЧЕСКИЙ СОСТАВ

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V			
809048	0,18	0,60	0,28	0,013	0,006	0,03	0,10	0,22	0,04	0,00			

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES – MECHANICAL TESTS – MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'eprouvette Heat No or. tests No Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm²	Twardość Dureté Hardness Härte Твердость
809063/27924		319	492	41,7			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS – TECHNOLOGISCHE PRÜFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa-positive results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRESOBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnię i wymiary zbadano w 100% - Surface et dimensions ont été controlés et 100% - Surface and dimensions tested at 100% - Oberfläche und Abmessungen geprüft zu 100% - Наружный осмотр и проверка измерений произведены в 100%

Materiał oznaczono - la material est margué - Material marked - Das Material wurde bezeichnet - Материал обозначен

B

marked:POLAND,Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/Size x Wall Thickness (in inches)/Length(in ft)/Heat no/mill mark/preasure MPa/Houston 10006307/
NACE MR-01-75

Na podstawie wyżej przeprowadzonych prób materiał zwolniono

Sur base des essais ci-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышеименованных испытаний, признан годным.

Kontrola Jakości Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management Hütten Direktion Дирекция завода	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur	Inż. M. ŻUŻEWICZ	dn. 3.12 1999 r.

Huta
"BATORY" S.A.
ul. Dyrekcyjna 6
41-506 Chorzów
POLAND

ŚWIADECTWO ODBIORU № 1605/EXP/R/99

CERTIFICAT DE RECEPTION INSPECTION CERTIFICATE
ABNAHMEPRÜFZEUGNIS СЕРТИФИКАТ

Mill's Quality Certificate acc.to EN10204/3.1.B
/nr normy/

Zamawiający
Le client - Ordered by – Besteller - Заказчик: STALEXPORT S.A. - Katowice

Adres wysyłkowy
Adresse – Address – Versandadresse – Адрес получателя

Nr i data zamówienia klienta No et date de la commande Order No and date No und Datum der Bestellung № и число заказа	Nr zlecenia Ordre No Manuf. Order No Auftrag No № наряда	Nr awizu Avis No Advice No Versandanzeige No № извещения	Nr wagonu Wagen No Car No Wagon No № вагона
PL/271936361/69/1094	4248503/99		

Wyszczególnienie zamówienia:
Specification de la commande – Order Specification – Spizifikation der Bestellung – Спецификация заказа

Poz. Pos. Pos. № п/п	Przedmiot i wykonanie (stan obr. termicz., mech. itp.) L'objet et l'exection (traitement thermique et l'usinage) Item and specification (Heat and mechanical treatement etc.) Gegenstand und Ausführung (therm und mechan. Bearbeitung usw.) Предмет и исполнение (состояние терм. и механобраб. и пр.)	Wymiar lub rysunek Dimesion ou dessin Dimesions or drawing Abmessung oder Zeichnung Размер или чертеж	Marka Marque Steel type Marke Марка	Wytop Coulée Heat Abstich Плавка	Sztuk Pièces Pieces Stück Штук	mb. c. mtr. c. mtr. l. M. пог. м	Theoretical weight kg кг
	Black seamless steel pipes acc.to ASTM A106,Grade B, tolerance acc.to ASTM A53 B,bevelled ends acc.to DIN 2559/22, the height of sill flange from 0-2mm with sill gap 0-4mm, angle of bevelling: 30 degrees,outside dia tolerance +/-1%, outside surface of pipes single covered by-Florin, material in random lenghts: 10-13m.	Ø18"x0,500"x 10 - 13m (457,2x12,70mm)	B	809063	10	121,08	16855

Kontrolę techniczną powyższego zamówienia przeprowadził Oddział Technicznej Kontroli. Wyniki badań podano niżej.
Le controle technique de la commande a été exécute par le Service de Controle. Les resultats des essais sont indiqués ci-après.
The technical investigation of this order has been executed by the Works Control. Results of tests are as fellows.
Die technische Prüfung obiger Bestellung wurde von der Fabrikationskontrolle durchgeführt. Die Ergebnisse der Proben sind nachstehend angeführt.
Технический контроль вышеупомянугого заказа произвел Отдел Технического Контроля. Результат испытания представлен ниже.

1. SKŁAD CHEMICZNY – ANALYSE CHIMIQUE – CHEMICAL COMPOSITION – CHEMISCHE ZUSAMMENSETZUNG – ХИМИЧЕСКИЙ СОСТАВ

Wytop Coulée Heat Abstich Плавка	C	Mn	Si	P	S	Cr	Ni	Cu	Mo	V			
809063	0,19	0,65	0,27	0,022	0,011	0,07	0,08	0,22	0,02	0,00			

2. BADANIA MECHANICZNE – ESSAIS MECANIQUES – MECHANICAL TESTS – MECHANISCHE UNTERSUCHUNGEN – МЕХАНИЧЕСКИЕ ИСПЫТАНИЯ

Nr wytopu lub próby No de la coulée ou de l'eprouvette Heat No or. tests No Abstich oder Probe No № плавки или пробы	Stan obróbki termicznej Traitement thermique Heat treatement Therm. Bearbeitung Термич. обработка	Re MPa	Rm MPa	A % 2"	Z %	U J/cm²	Twardość Dureté Hardness Härte Твердость
809048/27914		339	494	43,7			

3. BADANIA TECHNOLOGICZNE – ESSAIS TECHNOLOGIQUES – TECHNOLOGICAL TESTS – TECHNOLOGISCHE PRÜFUNGEN

Flattening test - positive results

4. BADANIA METALOGRAFICZNE – ESSAIS METALLOGRAPHIQUES – METALLOGRAPHIC TESTS – METALLOGRAPHISCHE UNTERSUCHUNGEN – МЕТАЛЛОГРАФИЧЕСКИЕ ИСПЫТАНИЯ

5. INNE BADANIA – AUTRES ESSAIS – OTHER TESTS – ANDERE UNTERSUCHUNGEN – ДРУГИЕ ИСПЫТАНИЯ

Each pipe hydrostatically tested by pressure 8,1 MPa-positive results

6. UWAGI DODATKOWE – ADDITIONAL REMARKS – AUTRESOBSERVATIONS – ANDERE BEMERUNGEN

Powierzchnię i wymiary zbadano w 100% - Surface et dimensions ont été controlés et 100% - Surface and dimensions tested at 100% - Oberfläche und Abmessungen geprüft zu 100% - Наружный осмотр и проверка измерений произведены в 100%

Materiał oznaczono - la material est margué - Material marked - Das Material wurde bezeichnet - Материал обозначен

B

marked:POLAND,Quality Control Mark
stencilling:ASTM A53 GR B/ASTM A106 GR B/Seamless/Size x Wall Thickness (in inches)/Lenght(in ft)/Heat no/mill mark/preasure MPa/Houston 10006307

Na podstawie wyżej przeprowadzonych prób materiał zwolniono

Sur base des essais cu-dessus le material est délivré – According to the carried ont tests the material released – Auf Grund der oben durchgeführten Untersuchungen wurde das Material freigegeben – На основании вышеименованных испытаний, признан годным.

Kontrola Jakości Contrôle de Fabrikation Control of Manufacture Fabrikationskontrolle Технический контроль	Dyrekcja Huty Direction de l'Usine Works Management	
Huta "BATORY" S.A. Kierownik Wydz. Kontroli Jakości Wydz. Walcowni Rur Roch Zibor	PEŁNOMOCNIK ZARZĄDU Z-CA KIER. DZ[illegible] JAKOŚCI mgr inż. M. ŻUŻEWICZ,	dn. 3.12 1999 r.

28-inch Casing

VASS PIPE & STEEL CO., INC.

A DEPENDABLE SOURCE YOU CAN COUNT ON

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

TOLL FREE PHONE:800-272-8277PHONE:516-741-8398FAX:516-741-8210Email :v.vass@worldnet.att.net

ATTN: EDWARD McCULLERS

COMPANY: YOUNGQUIST BROS.

FAX #941-489-4545

DATE: 12/5/01

FROM:JENNY REYES

PIPE TALLY / PACKING SLIP

P.O.#218019-02 RELEASE#23184

Ft Myers

1632.4	35 PCS X TR 28" BPE API5LB .500W DSAW				

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02674-037-A
Transmittal No. # 039 **Date:** 12/6/01
Signature _______________

Submittal Type: ☐ Shop Drawing
☐ Sample

Review is only for limited purposes set forth in the Contract Documents.
APPROVED: (For Incorporation in the Work)
☐ Approved as Submitted
☐ Approved as Noted
DISAPPROVED: (Resubmittal Required)
☐ Make Corrections
☐ As Noted. Develop Replacement
INCOMPLETE: (Resubmittal Required)
☐ Complete and Resubmit
☐ Submit Missing Portions

CH2M HILL DATE

VASS PIPE & STEEL CO., INC.

A DEPENDABLE SOURCE YOU CAN COUNT ON

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

TOLL FREE PHONE:800-272-8277PHONE:516-741-8398FAX:516-741-8210Email :v.vass@worldnet.att.net

ATTN.: Ed mc Cully

DATE: Dec 6 01

COMPANY: Youngquist Bros

FROM:ROGER

FAX # : 941 489 4545

TOTAL PAGES: 2 pages

PIPE TALLY / PACKING SLIP/ MTRs

P.O. #: 218019-02 **RELEASE #** 23184.

TOTAL FOOTAGE	DESCRIPTION	NO. OF PCS			HEAT #
		LOAD #1			
1633'	35 PCS X T/R 28' BPE	7	PCS X	46.2	
	.500 W API5LB DSAW	=	323.	4'	
		LOAD #2			
		7	PCS X	46.2	
		=	323.	4'	
		LOAD #3			
		7	PCS X	46.2	
		=	323.	4'	
		LOAD #4			
		7	PCS X	46.2	
		=	323.	4'	
		LOAD #5			
		3	PCS X	46.2	
	Roger	4	PCS X	50.2	
		=	339.	4'	

TELEPHONE: (416) [illegible]-1113
FAX: (416) [illegible]

CANADIAN PHOENIX STEEL PRODUCTS

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

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Nov 30/01

CUSTOMER

SPECIFICATION A139B

CUSTOMER'S P.O. 6739

DIA. & WALL 28" O.D. X .500 WT

PHOENIX REF.# 01-37410

HYDROTEST 1000 PSI FOR 10 Sec

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST YIELD	LONGITUDINAL TEST TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
8454T	3	53600	75100	30.0	78900	PM
8452T	7	52700	74200	30.0	77900	PM

LADLE ANALYSIS **CHEMICAL COMPOSITION**

HEAT NO	C	MN	S	P	SI	CR	NI	CU	MO	AL
8454T	.19	.86	.006	.015	.21	.02	.01	.02	.01	.039
8452T	.19	.84	.007	.014	.22	.03	.01	.02	.01	.041

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

Authorized Approval

36-inch Casing

검 사 증 명 서

MILL INSPECTION CERTIFICATE

현 대 강 관 주 식 회 사
HYUNDAI PIPE CO., LTD.

•본사 · 공장 울산광역시 북구 염포동 265번지 [illegible]
ULSAN PLANT : #265, YUMPO-DONG, BUK-KU, ULSAN, KOREA
TEL : (052)280-0114
FAX : (052)287-8916

•서울 사무소 서울특별시 중구 무교동 77번지 100-170
SEOUL OFFICE : #77, MUKYO-DONG, CHUNG-KU, SEOUL, KOREA
TEL : (02)3455-0500
FAX : (02)775-7095

성적서 번호 CERTIFICATE NO : E-1-07-006　　페이지 PAGE : 3 of 4

발행일자 DATE OF ISSUE : JUL. 12. 2001.　　E4128500

계약번호 CONTRACT(P/O)NO :

품명 COMMODITY : S.A.W. STEEL PIPE

제품규격 SPECIFICATION : API 5L X42 PSL2

수요가 CUSTOMER :

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 Kgf/cm²	※5	제강번호 HEAT NO.	인장시험 TENSILE TEST 항복강도 YIELD STRENGTH	인장강도 TENSILE STRENGTH B ※6	W ※7	연신율 (EL)	화학성분(%) CHEMICAL COMPOSITION	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Ti	CEQ	경도 HARDNESS	충격시험 IMPACT TEST (0℃) 흡수에너지 ENERGY	전단파단율 SHEAR-VALUE	비고 REMARK
								kgf/㎟			%	※8	×100			×1000									×1000	HV	JOULE	%	
							Y13170	41.4	54.6		43	H	16	30	117	15	8									180	66		
												P	17	29	118	17	10									184	69		
												P	17	31	118	16	10									187	74		
BVBE	NB	36" × 375" × 40.000'	27	69.757	56	10	Y13625	43.6	56.1		34	H	16	27	112	12	9									182	51		
								41.8	55.2	58.0	35.8	P	18	29	113	14	10									186	52		
								42.3	54.9	57.8	35.4	P	17	29	113	14	10									179	50		
BVBE	NB	36" × .500" × 40.000'	84	289.094	74	10	Y13740	42.8	56.3		36	H	16	30	119	15	7									188	74		
								40.6	54.9	57.5	37.9	P	18	31	120	17	8									178	78		
												P	17	31	120	16	9									183	76		
							Y13810	44.4	56.9		34	H	17	33	126	15	7									181	61		
												P	18	32	127	17	8									185	60		
												P	18	33	127	16	8									179	62		

※9 HEAT TREATMENT (WELD SEAM)	※10 VISUAL & DIMENSION TEST	※11 FLATTENING (B) TEST	※12 WELD DUCTILITY TEST	※13 NONDESTRUCTIVE TEST (R.T)	※14 RNT	※15 FLARING TEST	※16 CRUSH TEST	※17 REVERSE FLATTENING TEST
	GOOD	GOOD		GOOD	GOOD			

NOTE 1 ※1 Type of pipe End 관종

B:Black	V:Varnish	PE:Plain End	VJ:Vicaulic Joint
G:Galvanized	R:RemovalVarnish	BE:Bevel End	
E:Enameled	O:Oiling Coating	TE:Thread End	
	F:PE Coating	TC:Thread Coupling	
	A:Asphalt Coating	SE:Swaging End	

※ 2 NB:Norminal Bore 호칭경, OD:Outside Diameter
※ 3 Unit 단위(M:mm, I:Inch)
※ 4 Unit 단위(M:Meter, F:Feet, I:Inch)
※ 5 Holding Time:sec
※ 6 B:Base Metal 모재부
※ 7 W : Weld Part 용접부
※ 8 H:Heat (Ladle) Analysis 용연분석, P:Product Analytics 제품분석
※ 9 Heat Treatment 열처리
※10 Visual & Dimension Test 육안 및 치수검사
※11 Flattening or Bending Test 편평 또는 굽힘시험
※12 Weld Ductility Test 용접부 연성시험
※13 Nondestructive Test 비파괴검사
※14 Residual Magnetism Test 잔류자장
※15 Flaring Test 압확시험
※16 Crush Test 종압시험
※17 Reverse Flattening Test 전개시험

NOTE 2

ORIGINAL

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

SURVEYOR

H. G. Lee
INSPECTION MANAGER

HPS - 8301 - 022 - QLT

HYUNDAI PIPE CO., LTD.

(350×280)

TELEPHONE: (41[illegible]) [illegible]-1113
FAX (41[illegible]) [illegible]-6561

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF 1046761 ONTARIO LIMITED
289 HORNER AVENUE
ETOBICOKE, ONTARIO,
CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE Nov.3/01

SPECIFICATION A139S

DIA. & WALL 36" O.D. X .375 WT

HYDROTEST 500 PSI FOR 10 Sec.

CUSTOMER

CUSTOMER'S P.O 6739

PHOENIX REF.# 01-37[illegible]

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST YIELD	LONGITUDINAL TEST TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
190050	3	52300	73500	37.5	76700	PM

LADLE ANALYSIS

CHEMICAL COMPOSITION

HEAT NO	C	MN	S	P	SI	CR	NI	CU	MO	AL
190050	.17	.81	.006	.009	.23	.01	.01	.01	.01	.039

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

Authorized Approval

TELEPHONE: (416) [illegible]-1113
FAX: (416) [illegible]

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF 1046781 ONTARIO LIMITED
289 HORNER AVENUE
ETOBICOKE, ONTARIO,
CANADA
M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE May 6/00

CUSTOMER

SPECIFICATION A139B

CUSTOMER'S P.O 6382

DIA. & WALL 36" O.D. X .375 WT

PHOENIX REF.# 00-3568

HYDROTEST 585 PSI FOR 10 Sec.

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST YIELD	LONGITUDINAL TEST TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
8163M	2	51400	76600	37.5	80300	PM
8162M	5	56300	77100	37.5	80200	PM

LADLE ANALYSIS

CHEMICAL COMPOSITION

HEAT NO	C	MN	S	P	SI	CR	Nb	CU	MO	AL
8163M	.18	.86	.004	.011	.22	.02	.01	.01	.01	.045
8162M	.18	.86	.004	.011	.22	.02	.01	.01	.01	.042

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

Authorized Approval

TELEPHONE: (416) 259-1113
FAX: (416) 259-[illegible]

CANADIAN PHOENIX STEEL PRODUCTS

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

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE June 26/00

CUSTOMER

SPECIFICATION A139B

CUSTOMER'S P.O 6420

DIA & WALL 36" O.D. X .375 WT

PHOENIX REF.# 00-3587

HYDROTEST 585 PSI FOR 10 Sec.

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST YIELD	LONGITUDINAL TEST TENSILE	% ELONGATION	TRANSVERSE WELD TENSILE	BREAK LOCATION
4724M	26	63300	80100	37.5	84100	PM
190080	6	60100	105200	23.0	108100	PM
205048	33	56800	100300	23.0	103400	PM

LADLE ANALYSIS CHEMICAL COMPOSITION

HEAT NO	C	MN	S	P	SI	CR	NI	CU	MO	AL
4724M	.18	.85	.006	.012	.21	.02	.01	.01	---	.049
190080	.30	1.00	.007	.009	.213	.045	.041	.078	.009	.038
205048	.30	1.00	.004	.009	.160	.039	.047	.087	.024	.030

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

Authorized Approval

FRP Tubing

January 29, 2002

The subject **13-3/8" RED BOX 1250 fiberglass casing**, intended for installation under the **"City of Ft. Myers Water Treatment Plant, Deep Water Injection Project"** contract by Youngquist Brothers, Inc. of Ft. Myers, Florida; was manufactured by Tubular Fiberglass Corporation of Houston, Texas under TFC Job Numbers 8171 and 8174, during the months of November and December 2001.

The 13-3/8" RED BOX 1250 casing is new and unused fiberglass reinforced epoxy resin composite, manufactured by the filament-winding method. The epoxy resin is an aromatic amine cured system. The casing is manufactured in nominal 30 ft. overall lengths . Every joint is male x female, with threaded & coupled connections. Threads are 13-3/8" size 8-round casing-short threads, in accordance with API Specification 5B, 14th Edition, Table 6 (L4 dimension is minimum). Male threads and coupling threads are precision lathe cut. Every joint of casing is furnished with thread protectors for safe shipping, storage and handling. Pressure rating of the casing is 1250 psi. Every joint of casing has been factory mill pressure tested to 1550 psi for a minimum of 2 minutes prior to shipping. No leakage was allowed. Additional dimensional specifications and allowable operating performance ratings are shown below:

Casing has the following nominal dimensions:

Diameters (ID/OD)	Wall thickness	Coupling OD	Weight/ft	Weight/joint
12.00"/13.21"	0.60"	16.0" max.	21.6 lbs	649 lbs

Casing has the following operating performance ratings:

Internal Pressure	Collapse Pressure	Axial Tension	Max. Temperature
1250 psi	600 psi	166,500 lbs	210 deg. F

Submittal Type: ☐ Shop Drawing ☒ Sample

✓

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02674-01-B
Transmittal No. # 655 **Date:** 1/30/02
Signature

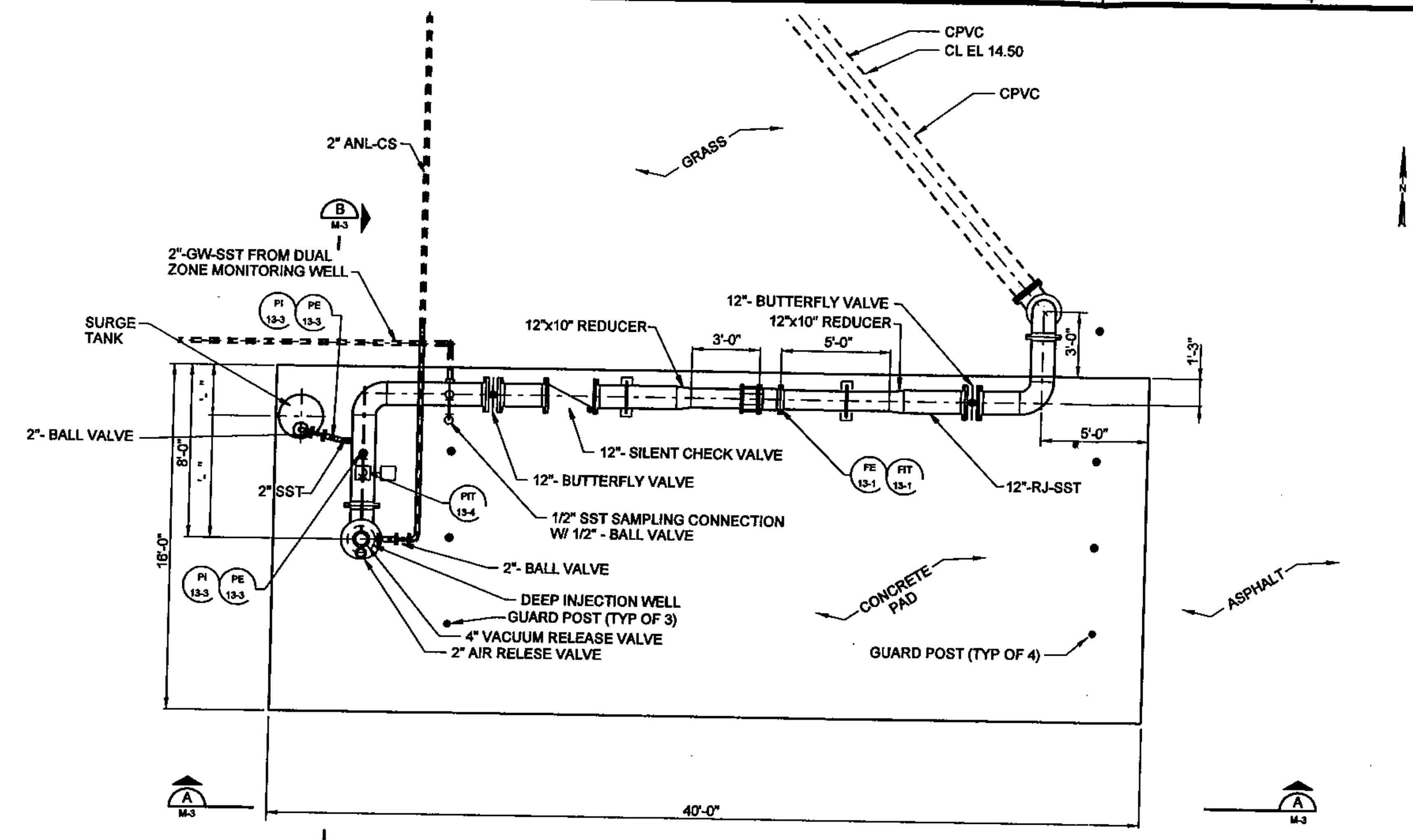
Kjones for RAlan 0131 02

APPENDIX E

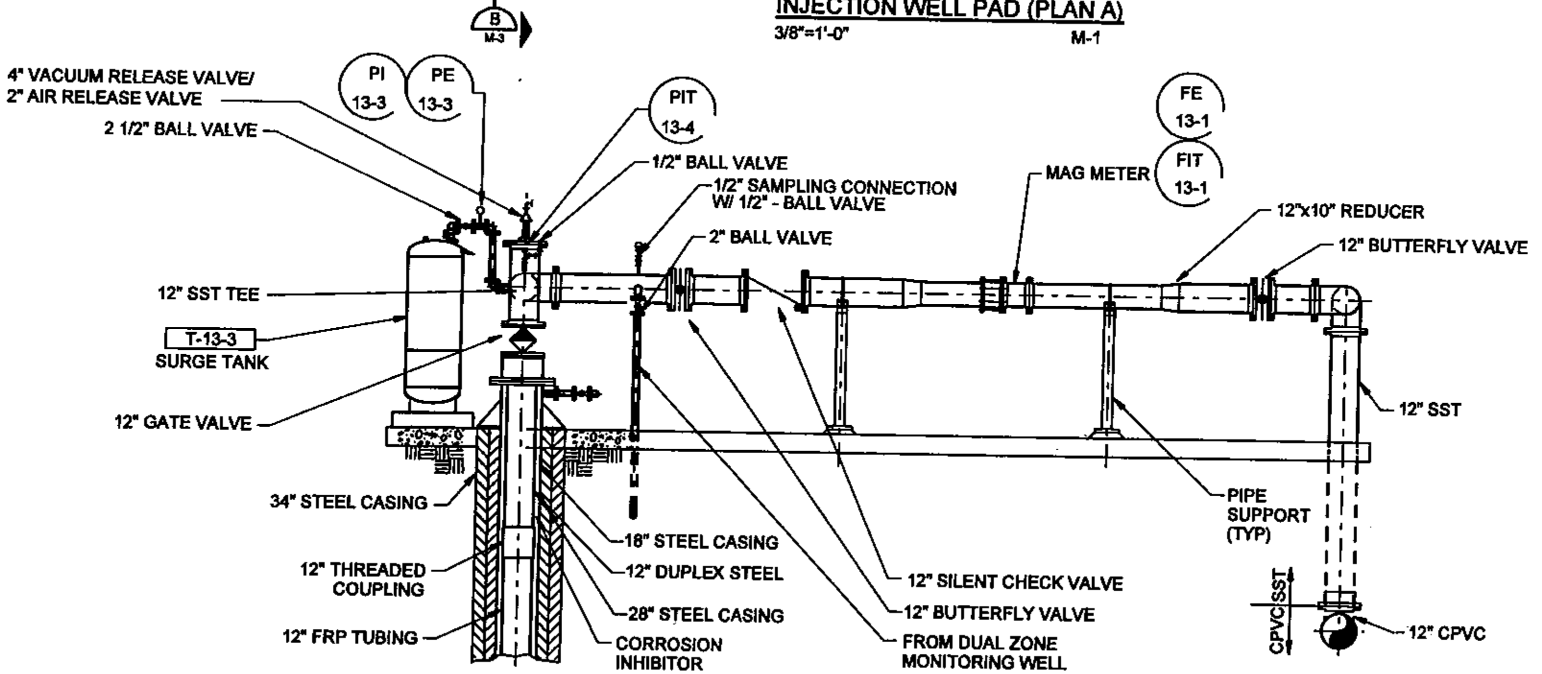
Injection Well System Record Drawings

APPENDIX E.1

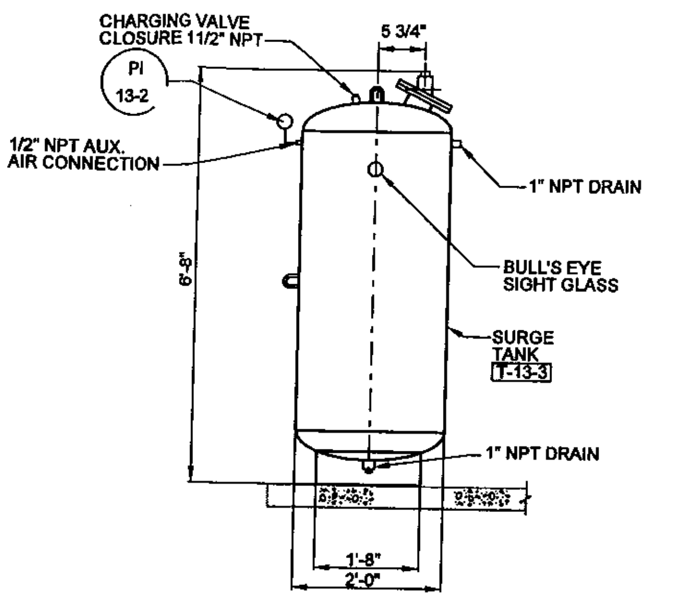
IW-1 Wellhead Record Drawings



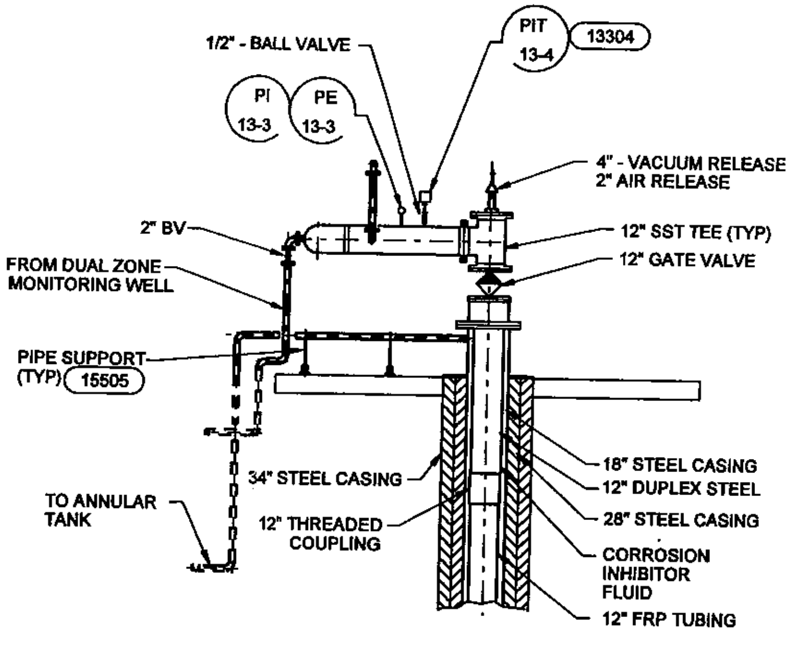
INJECTION WELL PAD (PLAN A)
3/8"=1'-0" M-1



SECTION A
1/4"=1'-0" M-2



SURGE TANK
NTS



SECTION B
1/4"=1'-0" M-2

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

APPENDIX E-1
RO IW-1 WELLHEAD
RECORD DRAWINGS

DSGN O. DUARTE
DR E CABALE
CHK T. INNISS
APVD W. BEDDOW

NO.	DATE	REVISION	BY	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL
DEEP INJECTION WELL
ENLARGED PLAN AND DETAIL

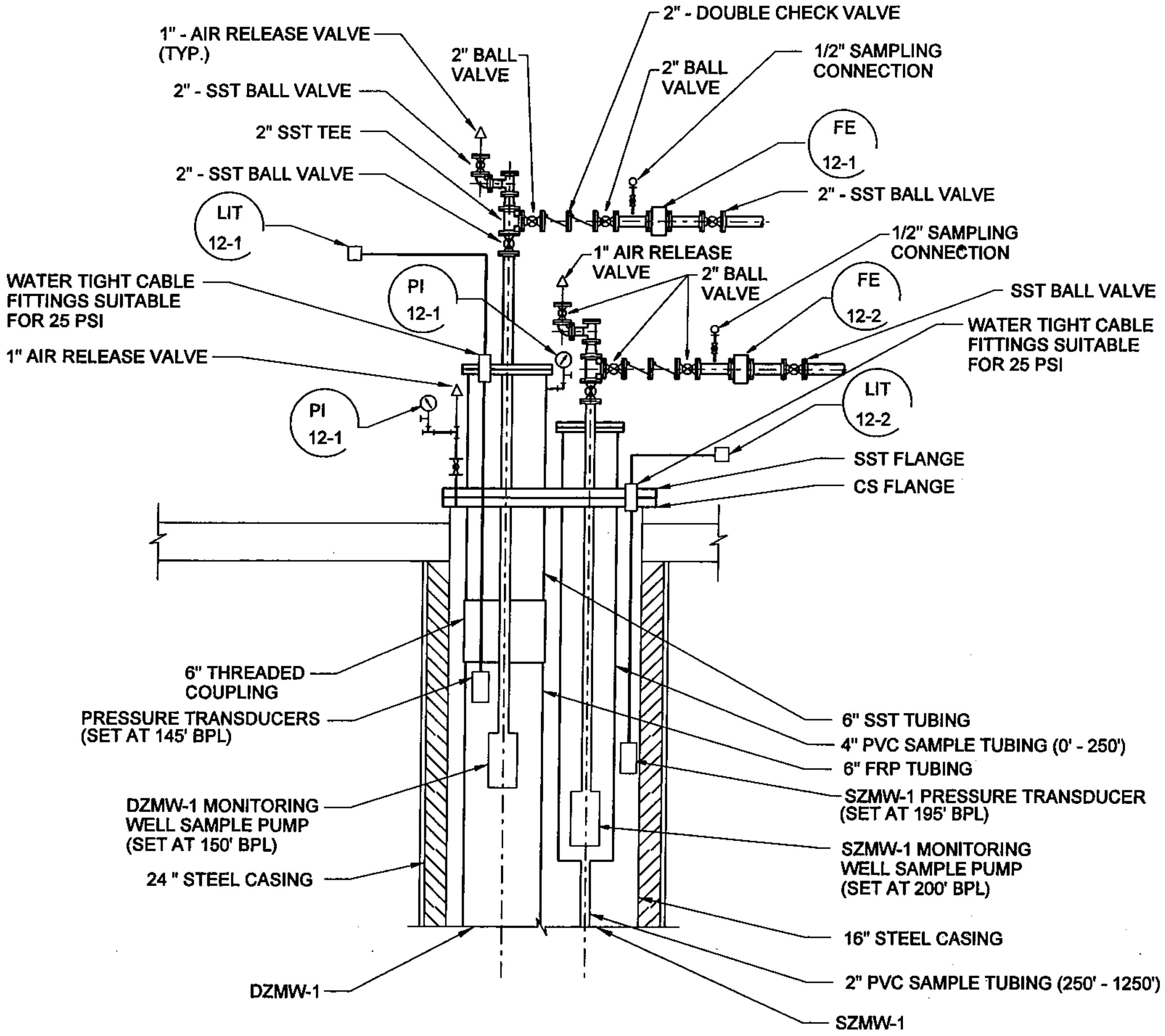
SHEET
DWG M-2A
DATE JULY 2001
PROJ 155336.IW

02-OCT-2002 15:57:22 5336m02db.dgn

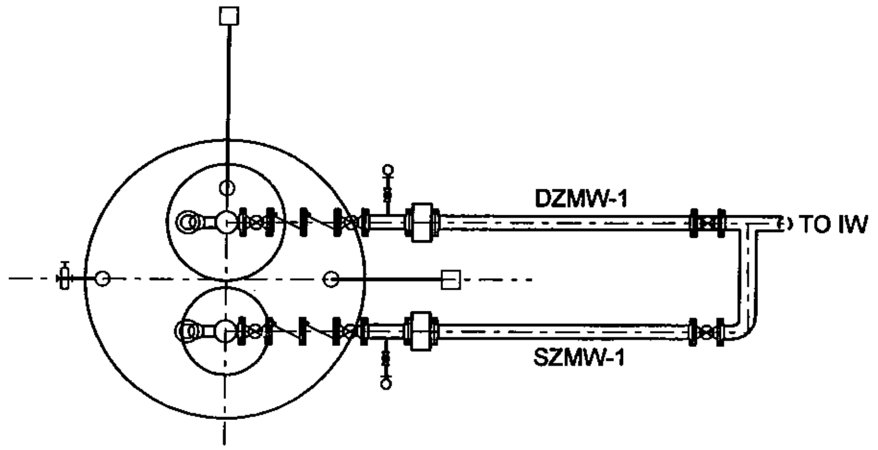
BID DOCUMENT

APPENDIX E.2

Dual Zone Wellhead Record Drawings



SIDE VIEW
NTS M-2



OVERHEAD VIEW
NTS

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

APPENDIX E-2
DUAL ZONE WELLHEAD RECORD DRAWINGS

DSGN O. DUARTE
DR E CABALE
CHK T. INNISS
APVD W. BEDDOW

NO.	DATE	REVISION	BY	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL

MONITORING WELL
ENLARGED PLAN AND DETAIL

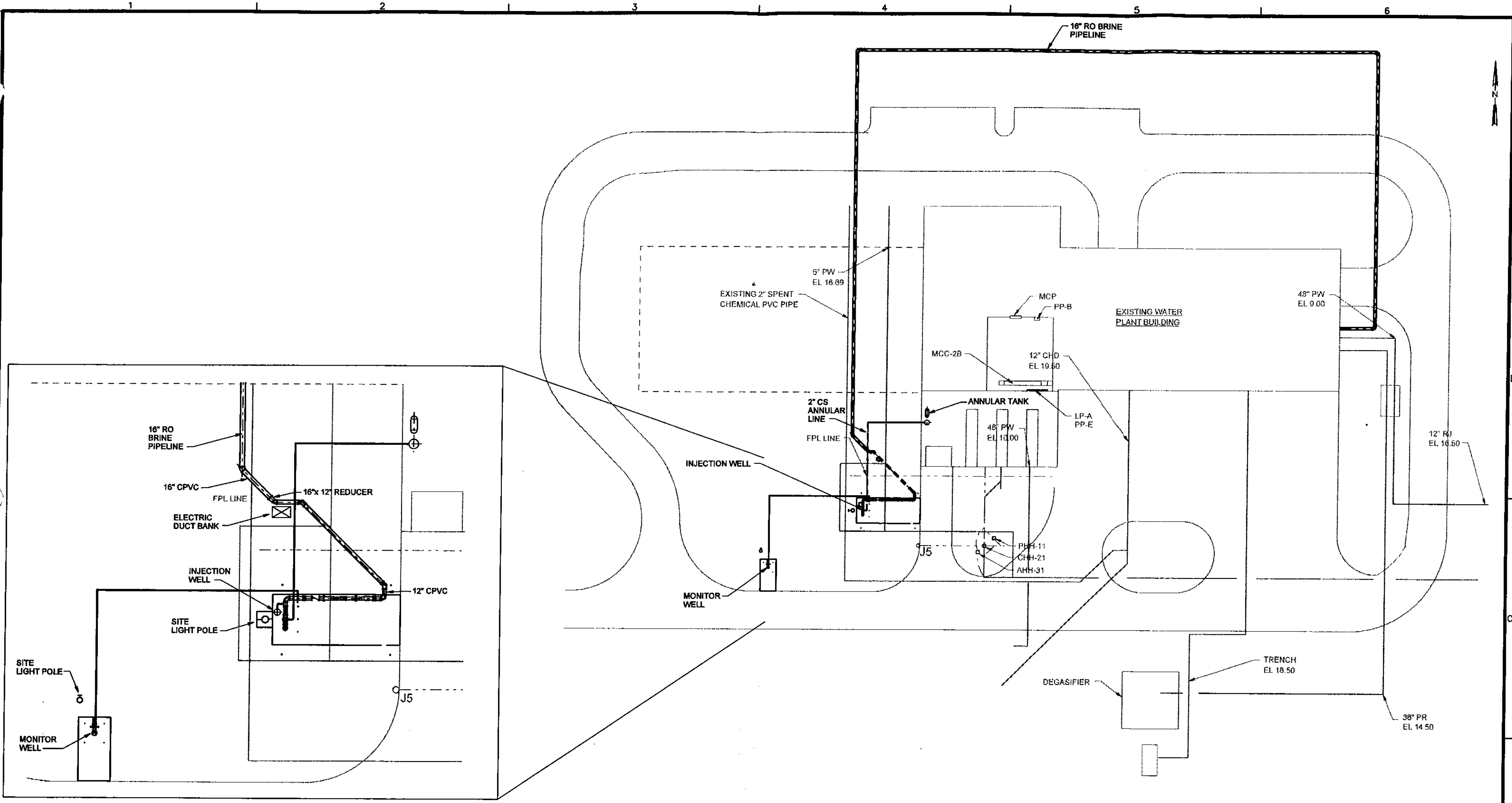
SHEET
DWG
DATE JULY 2001
PROJ 155336.IW

02-OCT-2002 14:23:19 5336m02dc.dgn

BID DOCUMENT

APPENDIX E.3

RO Brine Pipeline Connection Record Drawings



DETAIL

1"=15'

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

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APPENDIX E-3
RO BRINE PIPELINE CONNECTION
RECORD DRAWINGS

DSGN O. DUARTE						
DR P SANTOS						
CHK T. INNISS						
APVD W. BEDDOW	NO.	DATE	REVISION	BY	APVD	

VERIFY SCALE
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DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL

BRINE CONCENTRATE PIPING

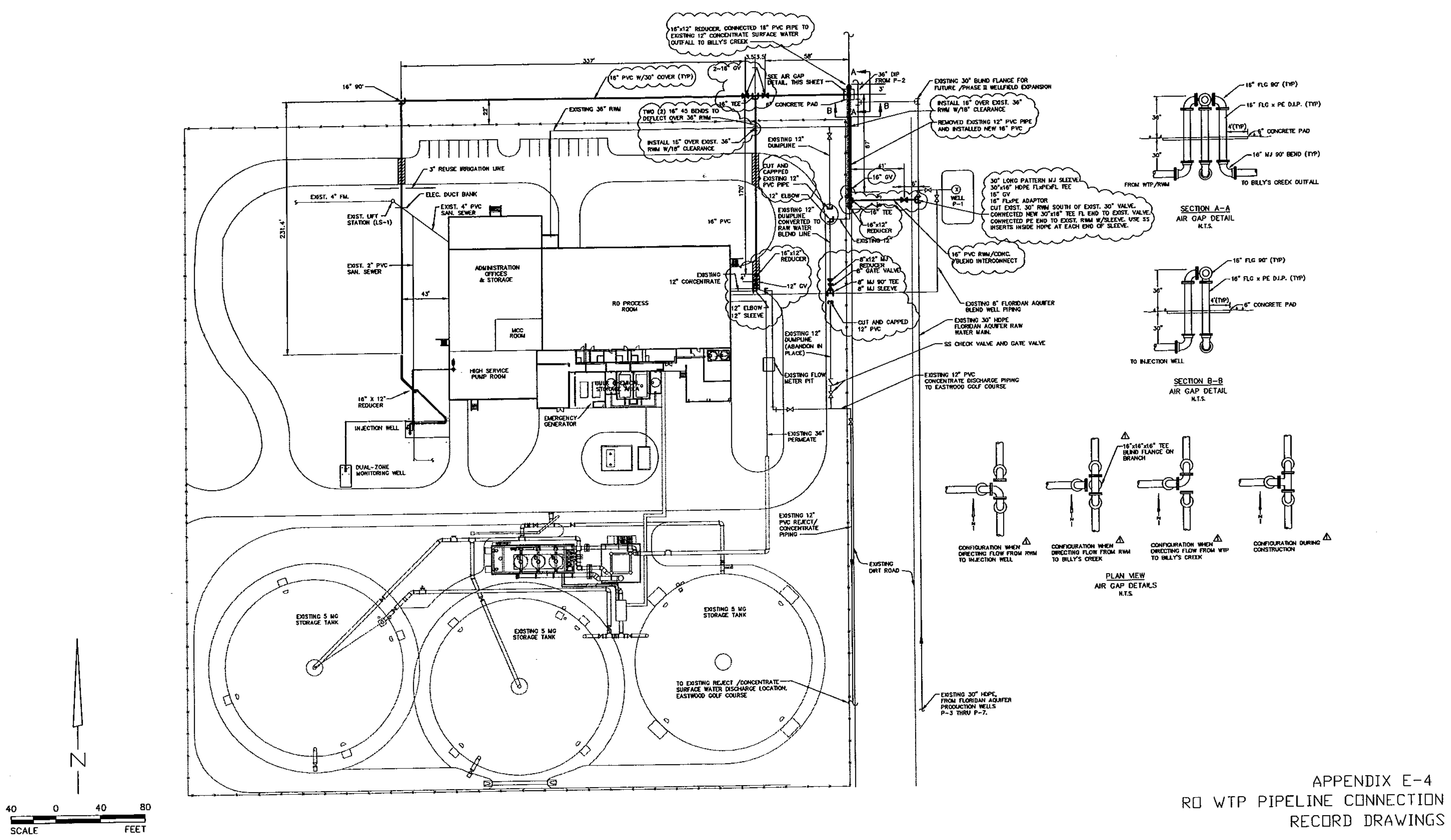
SHEET M-1
DWG
DATE JULY 2001
PROJ 155336.IW

03-OCT-2002 17:08:12 5336m01d.dgn

BID DOCUMENT

APPENDIX E.4

RO WTP Pipeline Connection Record Drawings



APPENDIX E-4
RO WTP PIPELINE CONNECTION
RECORD DRAWINGS

DSGN
DR S. HANEY/TPA
CHK M. WEATHERBY/TPA
APVD

NO.	DATE	REVISION	BY	APVD

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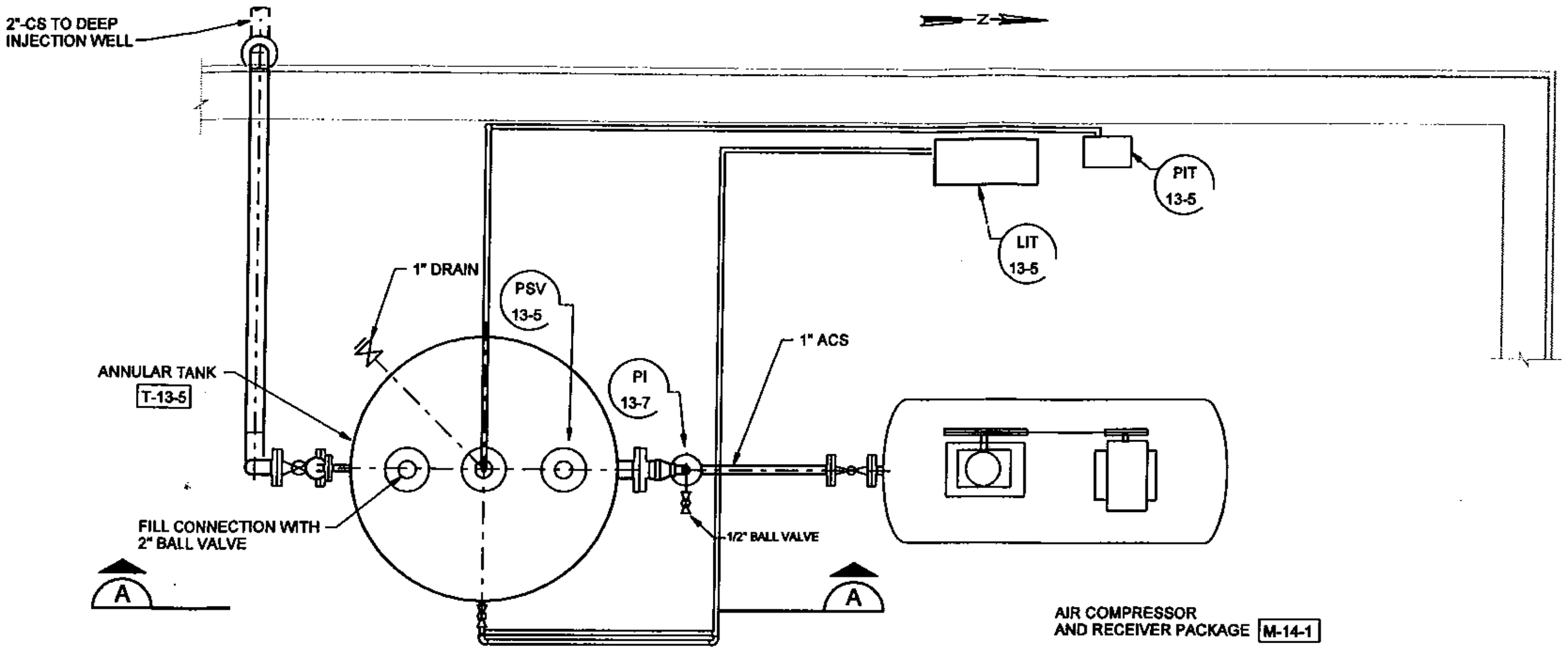
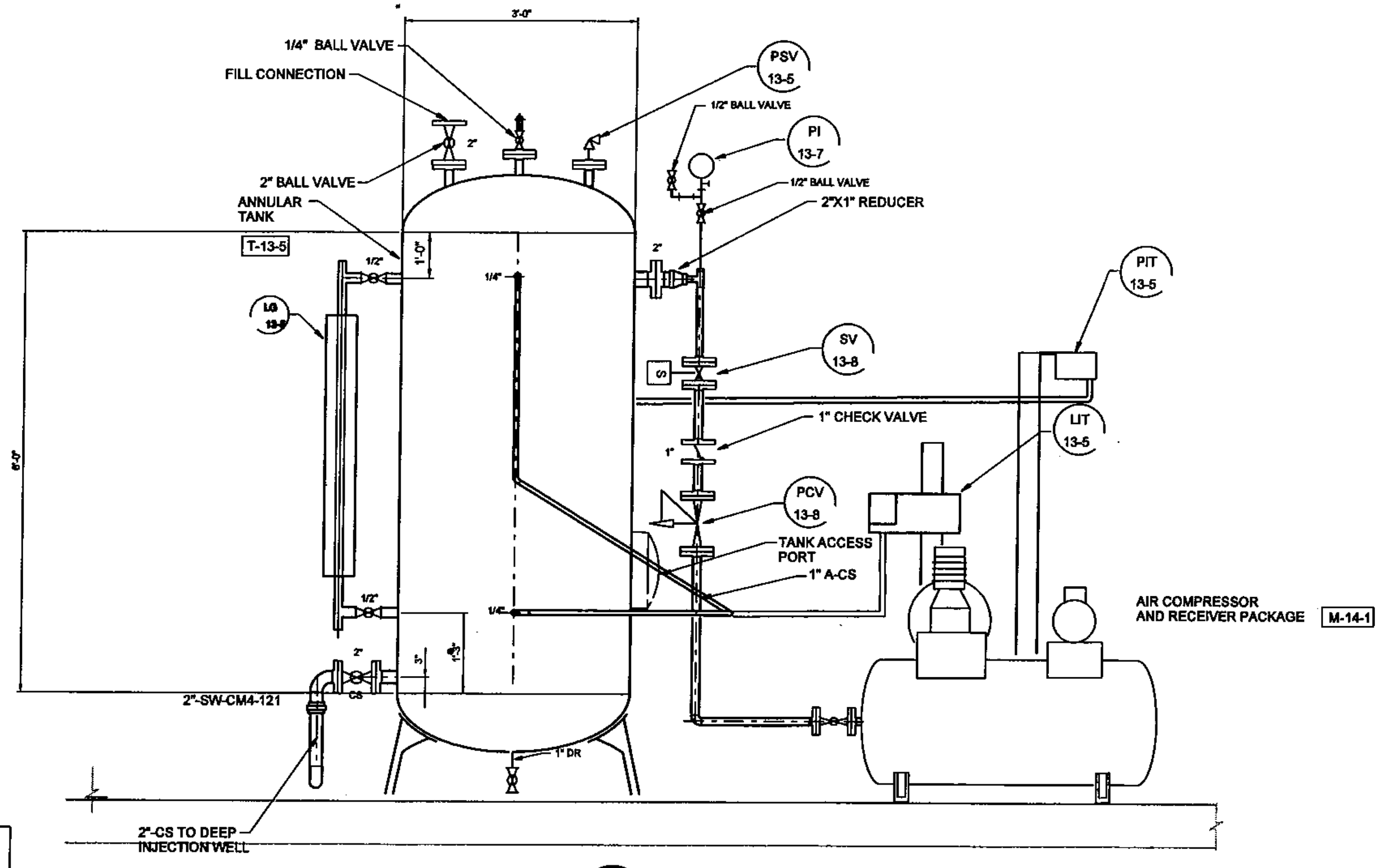
DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

SHEET
DWG
DATE JULY 2002
PROJ 155336.IW

APPENDIX E.5

Annular Tank Facilities Record Drawings





SECTION (A)

RECORD DRAWINGS

Revisions Drawn By RS Date 07/12/02

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APPENDIX E-5
ANNULAR TANK FACILITIES
RECORD DRAWINGS

DSGN O. DUARTE
DR P. SANTOS
CHK T. INNISS
APVD W. BEDDOW

NO.	DATE	REVISION	BY	APVD

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DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL
ANNULAR TANK SYSTEM
PLAN AND DETAIL

SHEET
DWG M-4
DATE JULY 2001
PROJ 155336.IW

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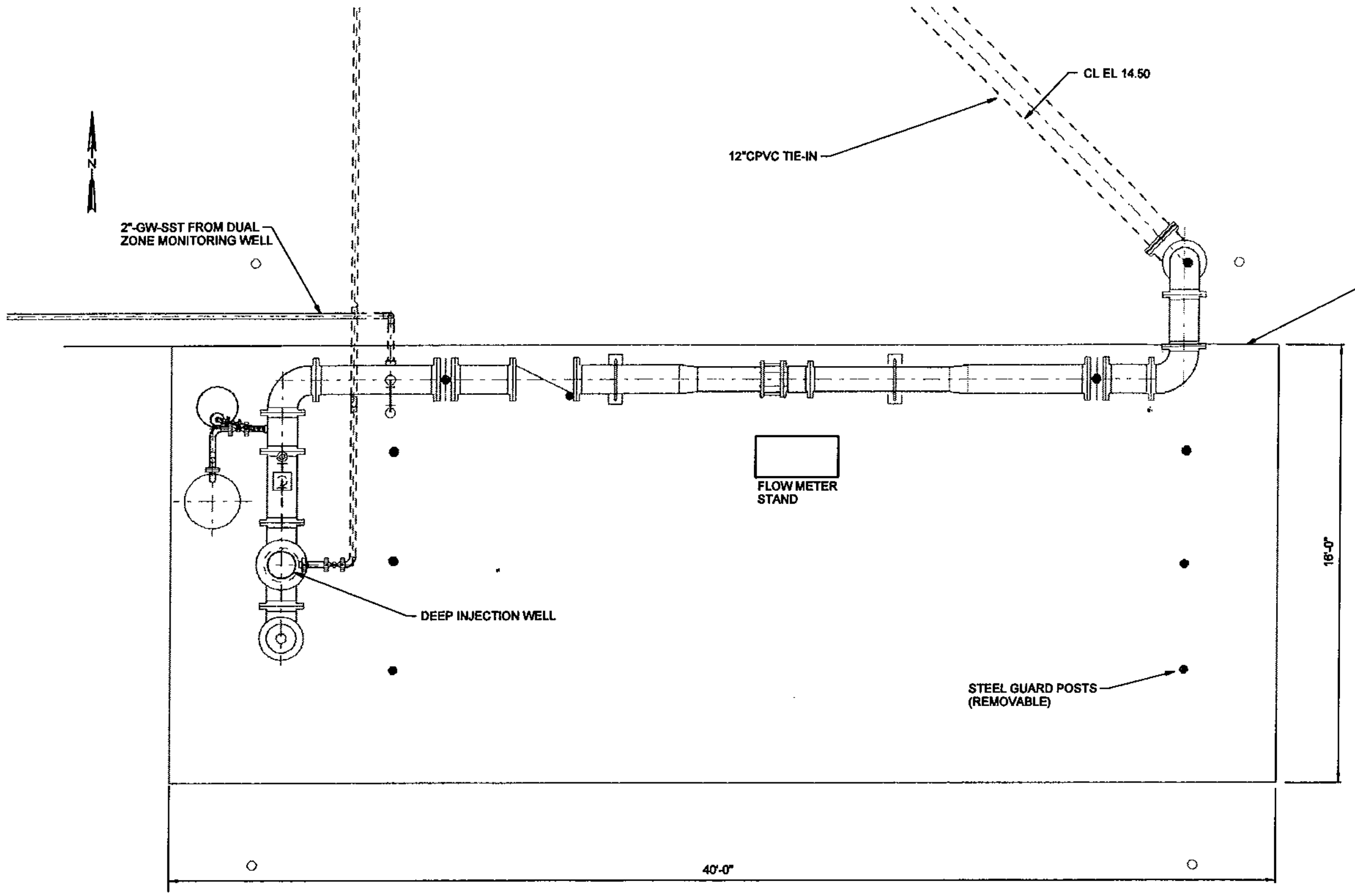
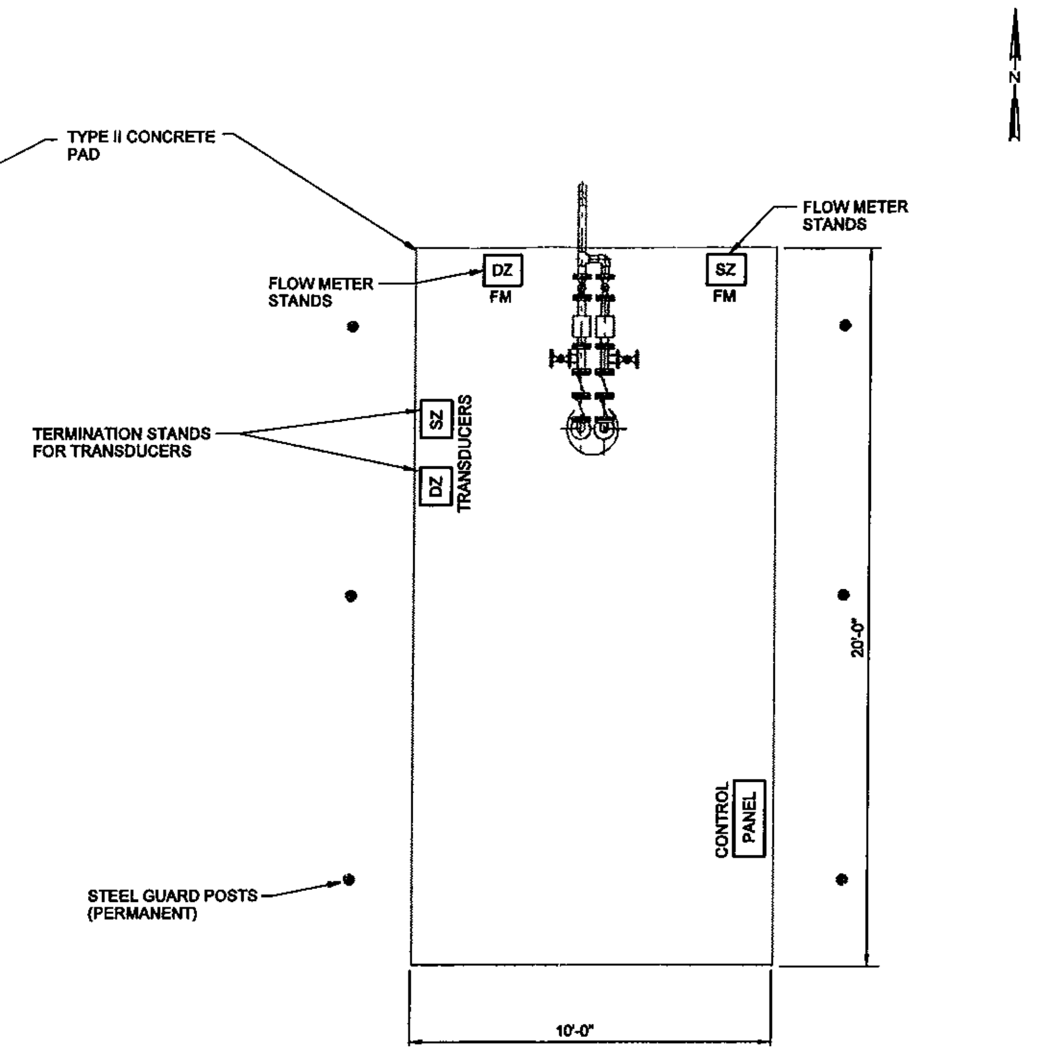
APPENDIX E.6

Control Panel Locations



INJECTION WELL PAD

3/8"=1'-0"



DUAL ZONE MONITORING WELL PAD (PLAN B)

3/8"=1'-0"
M-1

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

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APPENDIX E-6
CONTROL PANEL LOCATIONS

DSGN O. DUARTE
DR P. SANTOS
CHK T. INNISS
APVD W. BEDDOW

NO.	DATE	REVISION	BY	APVD

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DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL
DEEP INJECTION WELL AND
MONITORING WELL PANEL LOCATION
ENLARGED PLAN AND DETAIL

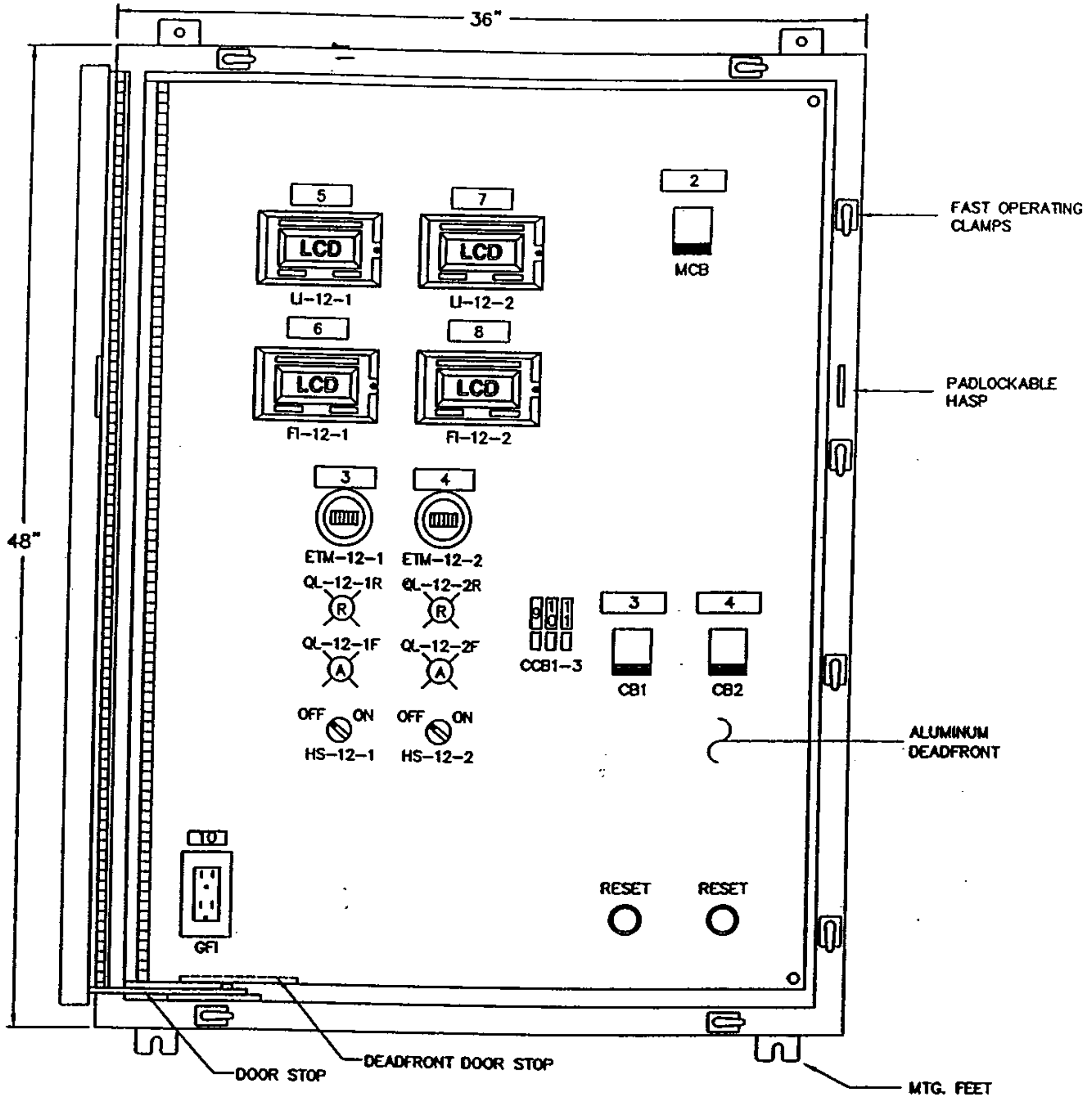
SHEET
DWG M-2
DATE JULY 2001
PROJ 155336.IW

04-OCT-2002 14:25:23 5336m02d.dgn

BID DOCUMENT

APPENDIX E.7

Dual Zone Monitor Well Control Panel Layout



DEADFRONT VIEW
(DOOR SHOWN OPEN)

NAMEPLATE SCHEDULE

1	1 X 3	MONITORING WELL PUMPS CONTROL PANEL CP-12
RED — 2	1 X 3	MAIN DISCONNECT
3	1 X 3	DZMW-1 PUMP
4	1 X 3	SZMW-1 PUMP
5	1 X 3	LI-12-1 DZMW-1 WATER LEVEL RANGE: 0-231 FT.
6	1 X 3	FI-12-1 DZMW-1 FLOW RANGE: 0-25 GPM
7	1 X 3	LI-12-2 SZMW-1 WATER LEVEL RANGE: 0-231 FT.
8	1 X 3	FI-12-2 SZMW-1 FLOW RANGE: 0-25 GPM
9	1/2 X 1 1/2	CONTROL
10	1/2 X 1 1/2	G.F.I.
11	1/2 X 1 1/2	PANEL LIGHT
RED — 12	1 1/2 X 3	CAUTION: TO REDUCE THE RISK OF FIRE REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE.
QL-12-1R,2R	RING	RUNNING
QL-12-1F,2F	RING	FAIL
HS-12-1,HS-12-2	RING	OFF - ON

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

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Appendix E-7
Dual Zone Monitor Well Control Panel Layout

DSGN O. DUARTE	NO.	DATE	REVISION	BY	APVD	VERIFY SCALE BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.
DR P. SANTOS						
CHK T. INNISS						
APVD W. BEDDOW						

CH2MHILL
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DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL

DUAL MONITOR WELL
CONTROL PANEL

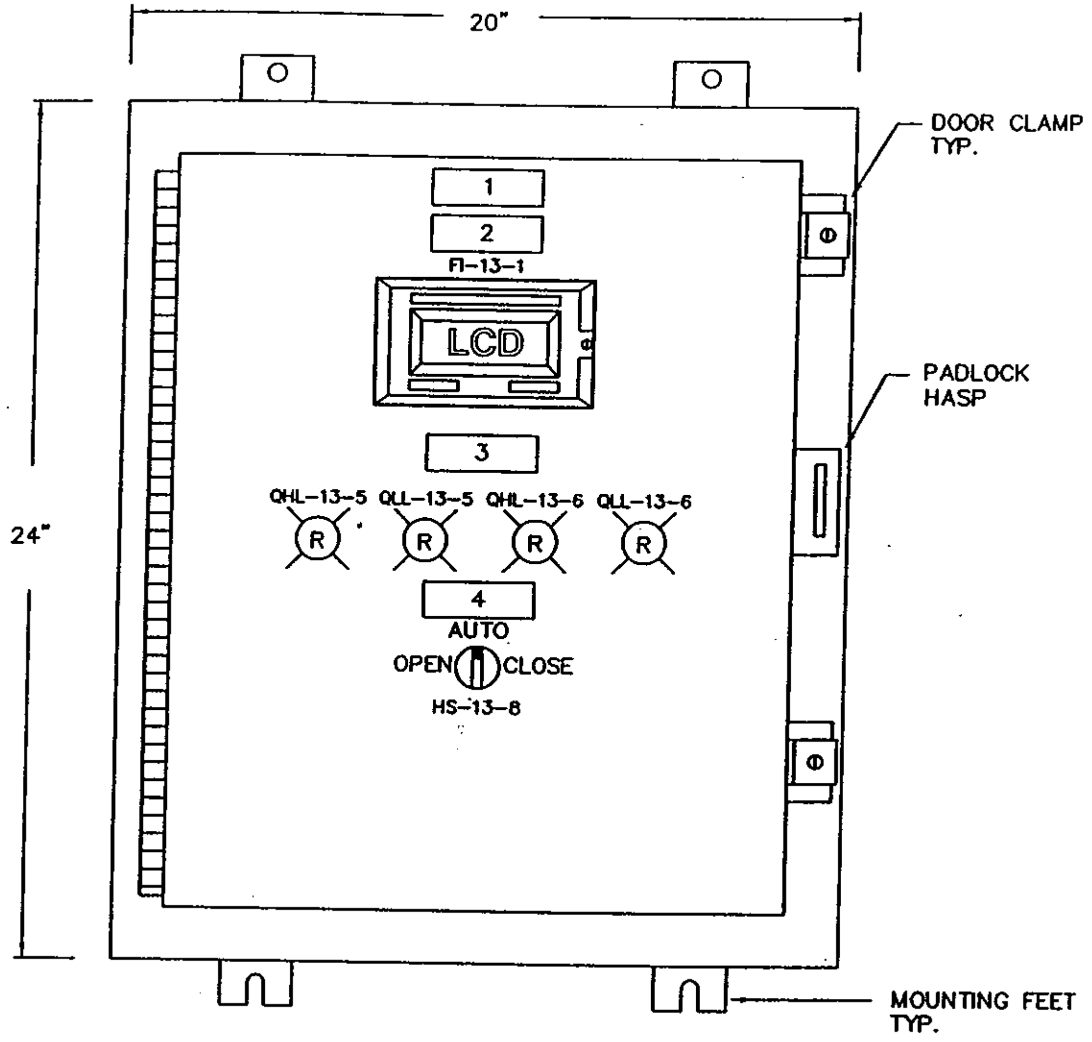
SHEET
DWG
DATE JULY 2001
PROJ 155336.IW

11-JUL-2002 17:06:01 5336m02dd.dgn

BID DOCUMENT

APPENDIX E.8

Annular Tank Facilities Control Panel Layout



FRONT VIEW

NAME PLATE SCHEDULE

1	1 X 3	CP-13
2	1 X 3	DEEP INJECTION WELL FLOW RANGE: 0-3000 GPM
3	1 X 3	ANNULAR TANK T-13-5
4	1 X 3	SV-13-8 ANNULAR AIR VALVE
QHL-13-5	RING	HIGH LEVEL
QLL-13-5	RING	LOW LEVEL
QHL-13-6	RING	HIGH PRESSURE
QLL-13-6	RING	LOW PRESSURE
HS-13-8	RING	OPEN - AUTO - CLOSE
5	LABEL	CAUTION: TO REDUCE THE RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

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Appendix E-8
Annular Tank Facilities Control Panel Layout

DSGN O. DUARTE
DR P. SANTOS
CHK T. INNISS
APVD W. BEDDOW

NO.	DATE	REVISION	BY	APVD

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BAR IS ONE INCH ON ORIGINAL DRAWING.
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DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL
ANNULAR TANK
CONTROL PANEL

SHEET
DWG
DATE JULY 2001
PROJ 155336.IW

11-JUL-2002 17:06:01 5336m02de.dgn

APPENDIX F

Well Lithologic Descriptions

APPENDIX F.1

IW-1 Lithologic Descriptions

City of Fort Myers RO WTP Injection Well Facilities
Deep Injection Well (IW-1)
Lithologic Description

Depth (ft. bpl)		Observer's Description
From	To	
0	10	Shells and shell fragments, unconsolidated
10	20	Same as above
20	30	Clayey Sand, fine to medium quartz sand with approximately 20% olive gray, phosphatic clay
30	40	Sandy Clay, olive gray, low porosity, trace of phosphate, with approximately 20% fine quartz sand
40	50	Clay, olive gray, low porosity, moderate plasticity, trace of fine grained quartz sand
50	60	Same as above
60	70	Same as above
70	80	Same as above, with sandy limestone (20%), medium sand grained, sparry cement, low to moderate porosity, moderately consolidated, some fossil fragments
80	90	Sandy Limestone (90%), fine to medium sand grained, phosphatic, sparry cement, moderate porosity, moderately consolidated, some shell fragments; clay (10%), light gray
90	100	Same as above, with sandy limestone (20%), medium sand grained, sparry cement, low to moderate porosity, moderately consolidated, some fossil fragments
100	110	Clayey Sand, fine to medium quartz sand with approximately 20% olive gray clay
110	120	Sandy Clay, olive gray, low porosity, trace of phosphate, with approximately 20% fine quartz sand
120	130	Clay, olive gray, low porosity, moderate plasticity, trace of fine grained quartz sand
130	140	Clay, olive gray, low porosity, moderate plasticity, trace of fine grained quartz sand
140	150	Phosphatic Clay, olive gray, low porosity, high plasticity
150	160	Same as above, with limestone (40%), dark yellowish brown to light gray, fine sand grained, high porosity, trace of phosphate, well consolidated; shell fragments (10%), fine gravel sized, unconsolidated
160	170	Phosphatic Clay (60%), light gray to olive gray, low porosity, moderate to high plasticity; phosphatic limestone (40%), light gray, fine sand grained, moderate porosity, moderately consolidated
170	180	Same as above
180	190	Phosphastic Limestone, medium gray (salt and pepper), fine sand grained, 10% fine grained quartz sand, sparry cement, moderate porosity, poorly consolidated
190	200	Same as above, with 5% fine gravel sized shell fragments
200	210	Phosphatic Limestone (80%), medium gray (salt and pepper), fine sand grained, 10% fine grained quartz sand, sparry cement, moderate porosity, poorly consolidated; phosphatic clay (20%), light gray, low porosity
210	220	Clay (80%), light olive gray, low porosity, phosphatic; phosphatic limestone (20%), yellowish gray, very fine to fine sand grained, pelycypod and gastropod molds, moderate porosity, well consolidated
220	230	Same as above
230	240	Phosphastic Limestone, medium gray (salt and pepper), fine sand grained, 10% fine grained quartz sand, sparry cement, moderate porosity, poorly consolidated
240	250	Phosphatic Clay, olive gray to light gray, low porosity, moderate to high plasticity
250	260	Clay, grayish olive, low porosity, high plasticity

City of Fort Myers RO WTP Injection Well Facilities
Deep Injection Well (IW-1)
Lithologic Description

Depth (ft. bpl) From	To	Observer's Description
260	270	Phosphatic Clay, light gray to grayish olive, low porosity, moderate plasticity
270	280	Same as above
280	290	Same as above
290	300	Clay, greenish gray, phosphatic, low porosity, high plasticity
300	310	Clay (90%), very light gray, phosphatic, low porosity, moderate plasticity; micrite (10%), light gray, low porosity, well consolidated
310	320	Phosphatic Clay (90%), light gray, low porosity, moderate plasticity; limestone (10%), fine sand grained, abundant fossil casts, phosphatic, high porosity, well consolidated
320	330	Same as above
330	340	Phosphatic Clay, light gray, low porosity, moderate plasticity
340	350	Same as above
350	360	Same as above
360	370	Same as above
370	380	Clay, dark greenish gray to light gray, low porosity, moderate to high plasticity
380	390	Clay, dark greenish gray, low porosity, moderate to high plasticity
390	400	Clay (90%), very light gray, phosphatic, low porosity, moderate plasticity; micrite (10%), medium gray, phosphatic, moderate porosity, well consolidated
400	410	Clay (50%), very light gray, phosphatic, low porosity, moderate plasticity; micrite (50%), medium gray, phosphatic, moderate porosity, well consolidated
410	420	Clay (80%), very light gray, phosphatic, low porosity, moderate plasticity; micrite (20%), medium gray, phosphatic, moderate porosity, well consolidated
420	430	Micrite, light to medium gray, low porosity, poorly to moderately consolidated
430	440	Same as above
440	450	Micrite (80%), light to medium gray, low porosity, poorly to moderately consolidated; clay, light gray, low porosity
450	460	Limestone, very light gray, fine sand grained, abundant fossil molds, micritic cement, moderate porosity, well consolidated
460	470	Limestone, very light gray, fine sand grained, micritic cement, moderate porosity, well consolidated
470	480	Same as above
480	490	Same as above
490	500	Same as above
500	510	Same as above
510	520	Same as above
520	530	Same as above
530	540	Same as above
540	550	Clay, light greenish gray (5G 8/1), low porosity, high plasticity
550	560	Clay, bluish white (5B 9/1), low porosity, medium plasticity
560	570	Limestone, very pale orange (10YR 8/2), high porosity, moderately consolidated, medium grained
570	580	Same as above
580	590	Same as above
590	600	Same as above
600	610	Clay, bluish white (5B 9/1), low porosity, medium plasticity
610	620	Limestone, very pale orange (10YR 8/2), high porosity, moderately consolidated, medium grained
620	630	Same as above
630	640	Same as above
640	650	Same as above, well consolidated
650	660	Same as above

City of Fort Myers RO WTP Injection Well Facilities
Deep Injection Well (IW-1)
Lithologic Description

Depth (ft. bpl) From	To	Observer's Description
660	670	Same as above
670	680	Same as above, moderately consolidated
680	690	Same as above
690	700	Same as above, well consolidated
700	710	Same as above
710	720	Same as above, moderately consolidated
720	730	Same as above
730	740	Same as above
740	750	Same as above
750	760	Same as above
760	770	Same as above
770	780	Limestone, yellowish gray (5Y 8/1), very fine grained, well consolidated, low porosity
780	790	Clay, yellowish orange (10YR 7/6), low porosity, high plasticity
790	800	Limestone, very pale orange (10YR 8/2), medium porosity, moderately to well consolidated, medium grained
800	810	Same as above
810	820	Same as above
820	830	Same as above
830	840	Same as above
840	850	Same as above
850	860	Same as above
860	870	Same as above
870	880	Same as above
880	890	Same as above
890	900	Same as above
900	910	Same as above
910	920	Same as above
920	930	Same as above
930	940	Same as above
940	950	Same as above
950	960	Same as above
960	970	Same as above
970	980	Same as above
980	990	Same as above
990	1000	Same as above
1000	1010	Same as above
1010	1020	Same as above
1020	1030	Same as above
1030	1040	Same as above
1040	1050	Same as above
1050	1060	Same as above
1060	1070	Same as above
1070	1080	Same as above
1080	1090	Same as above
1090	1100	Same as above
1100	1110	Same as above
1110	1120	Same as above
1120	1130	Same as above
1130	1140	Same as above
1140	1150	Same as above
1150	1160	Same as above

City of Fort Myers RO WTP Injection Well Facilities
Deep Injection Well (IW-1)
Lithologic Description

Depth (ft. bpl) From	To	Observer's Description
1160	1170	Same as above
1170	1180	Same as above
1180	1190	Same as above
1190	1200	Same as above
1200	1210	Same as above
1210	1220	Same as above
1220	1230	Same as above
1230	1240	Same as above
1240	1250	Same as above
1250	1260	Same as above
1260	1270	Same as above
1270	1280	Same as above
1280	1290	Same as above
1290	1300	Same as above
1300	1310	Same as above
1310	1320	Same as above
1320	1330	Same as above
1330	1340	Limestone, yellowish gray (5Y 8/1), very fine grained, well consolidated, low porosity, forams (5%)
1340	1350	Same as above
1350	1360	Same as above, forams abundant
1360	1370	Same as above
1370	1380	Same as above
1380	1390	Same as above
1390	1400	Same as above
1400	1410	Same as above
1410	1420	Same as above
1420	1430	Same as above
1430	1440	Same as above
1440	1450	Same as above
1450	1460	Same as above
1460	1470	Same as above
1470	1480	Same as above
1480	1490	Same as above
1490	1500	Same as above
1500	1510	Same as above
1510	1520	Same as above
1520	1530	Same as above
1530	1540	Same as above
1540	1550	Same as above
1550	1560	Same as above
1560	1570	Same as above
1570	1580	Same as above
1580	1590	Same as above
1590	1600	Same as above
1600	1610	Same as above
1610	1620	Same as above
1620	1630	Same as above
1630	1640	Same as above
1640	1650	Same as above
1650	1660	Same as above
1660	1670	Same as above

City of Fort Myers RO WTP Injection Well Facilities
Deep Injection Well (IW-1)
Lithologic Description

Depth (ft. bpl)		Observer's Description
From	To	
1670	1680	Same as above
1680	1690	Same as above
1690	1700	Same as above
1700	1710	Same as above
1710	1720	Limestone (50%), yellowish gray (5Y 8/1), very fine grained, well consolidated, low porosity, forams; Dolomite (50%) dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
1720	1730	Same as above
1730	1740	Limestone, yellowish gray (5Y 8/1), very fine grained, well consolidated, low porosity
1740	1750	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
1750	1760	Same as above
1760	1770	Same as above
1770	1780	Limestone, yellowish gray (5Y 8/1), very fine grained, well consolidated, low porosity
1780	1790	Same as above
1790	1800	Same as above
1800	1810	Limestone, yellowish gray (5Y 8/1), medium grained, moderately consolidated, low porosity
1810	1820	Same as above
1820	1830	Same as above
1830	1840	Same as above
1840	1850	Limestone, yellowish gray (5Y 8/1), fine grained, well consolidated, low porosity
1850	1860	Limestone (75%), yellowish gray (5Y 8/1), fine grained, well consolidated, low porosity, Dolomite (25%) dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
1860	1870	Same as above
1870	1880	Same as above, reduce limestone to 25%, increase dolomite to 75%
1880	1890	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
1890	1900	Same as above
1900	1910	Same as above
1910	1920	Same as above
1920	1930	Same as above
1930	1940	Same as above
1940	1950	Same as above
1950	1960	Limestone, yellowish gray (5Y 8/1), medium grained, poorly consolidated, low porosity
1960	1970	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
1970	1980	Same as above
1980	1990	Same as above
1990	2000	Limestone, yellowish gray (5Y 8/1), fine grained, well consolidated, low porosity
2000	2010	Same as above
2010	2020	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
2020	2030	Same as above
2030	2040	Same as above
2040	2050	Same as above

City of Fort Myers RO WTP Injection Well Facilities
Deep Injection Well (IW-1)
Lithologic Description

Depth (ft. bpl)		Observer's Description
From	To	
2050	2060	Same as above
2060	2070	Same as above
2070	2080	Same as above
2080	2090	Same as above
2090	2100	Same as above
2100	2110	Same as above
2110	2120	Same as above
2120	2130	Same as above
2130	2140	Same as above
2140	2150	Same as above
2150	2160	Same as above
2160	2170	Same as above
2170	2180	Same as above
2180	2190	Same as above
2190	2200	Same as above
2200	2210	Same as above
2210	2220	Same as above
2220	2230	Same as above
2230	2240	Same as above
2240	2250	Same as above
2250	2260	Same as above
2260	2270	Same as above
2270	2280	Same as above
2280	2290	Same as above
2290	2300	Same as above
2300	2310	Same as above
2310	2320	Same as above
2320	2330	Same as above
2330	2340	Same as above
2340	2350	Same as above
2350	2360	Same as above
2360	2370	Same as above
2370	2380	Same as above
2380	2390	Same as above
2390	2400	Same as above
2400	2410	Same as above, change color to Grayish orange (10YR 7/4)
2410	2420	Same as above, change color to Dark yellowish brown, (10Y 4/2)
2420	2430	Same as above
2430	2440	Same as above
2440	2450	Lignite, black (N1), very fine grained, poorly consolidated, low porosity, glossy luster, 180 degree cleavage
2450	2460	Same as above
2460	2470	Same as above
2470	2480	Same as above
2480	2490	Lignite (50%), black (N1), very fine grained, poorly consolidated, low porosity, glossy luster, 180 degree cleavage; Limestone,
2490	2500	Limestone, pale yellowish brown, (10YR 6/2), very well consolidated, low porosity, fine grained
2500	2510	Same as above
2510	2520	Same as above, moderately consolidated, medium grained
2520	2530	Same as above
2530	2540	Same as above

City of Fort Myers RO WTP Injection Well Facilities
Deep Injection Well (IW-1)
Lithologic Description

Depth (ft. bpl)		Observer's Description
From	To	
2540	2550	Same as above
2550	2560	Same as above
2560	2570	Same as above
2570	2580	Same as above
2580	2590	Same as above
2590	2600	Same as above
2600	2610	Same as above
2610	2620	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
2620	2630	Same as above, light brown (5YR 5/6)
2630	2640	Limestone, yellowish gray (5Y 8/1), fine grained, moderately consolidated, low porosity
2640	2650	Same as above
2650	2660	Same as above
2660	2670	Same as above
2670	2680	Same as above
2680	2690	Same as above
2690	2700	Dolomite, light brown, (5Y 8/1), very well consolidated, low porosity, microcrystalline
2700	2710	Same as above
2710	2720	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
2720	2730	Dolomite, light brown, (5Y 8/1), very well consolidated, low porosity, microcrystalline
2730	2740	Same as above
2740	2750	Same as above
2750	2760	Same as above
2760	2770	Same as above
2770	2780	Same as above
2780	2790	Same as above
2790	2800	Same as above
2800	2810	Same as above
2810	2820	Same as above
2820	2830	Same as above
2830	2840	Same as above
2840	2850	Same as above
2850	2860	Same as above
2860	2870	Same as above
2870	2880	Same as above
2880	2890	Same as above
2890	2900	Same as above
2900	2910	Same as above
2910	2920	Same as above
2920	2930	Same as above
2930	2940	Same as above
2940	2950	Same as above
2950	2960	Same as above
2960	2970	Same as above
2970	2980	Same as above
2980	2990	Same as above
2990	3000	Same as above
3000	3010	Same as above

City of Fort Myers RO WTP Injection Well Facilities
Deep Injection Well (IW-1)
Lithologic Description

Depth (ft. bpl)		Observer's Description
From	To	
3010	3020	Same as above
3020	3030	Same as above
3030	3040	Same as above
		End of Borehole

APPENDIX F.2

Dual Zone Monitor Well Lithologic Descriptions

City of Fort Myers RO WTP Injection Well Facilities
Dual Zone Monitoring Well
Lithologic Description

Depth (ft. bpl) From	To	Observer's Description
0	10	Shells and shell fragments, unconsolidated
10	20	Same as above
20	30	No Sample
30	40	Sandy Clay, olive gray, low porosity, trace of phosphate, with approximately 20% fine quartz sand
40	50	Shell; and sandy clay, olive gray.
50	60	Same as above
60	70	Same as above
70	80	Same as above, with sandy limestone (20%), medium sand grained, sparry cement, low to moderate porosity, moderately consolidated.
80	90	Same as above
90	100	Same as above
100	110	Same as above
110	120	Same as above
120	130	Clay, olive gray, low porosity, moderate plasticity; some shell fragments; trace of fine grained quartz sand
130	140	No Samples
140	150	Clay, olive gray, low porosity, moderate plasticity; some shell fragments; trace of fine grained quartz sand
150	160	Same as above, with limestone (40%), dark yellowish brown to light gray, fine sand grained, high porosity, trace of phosphate, well consolidated; shell fragments (10%), fine gravel sized, unconsolidated
160	170	Same as above
170	180	Same as above
180	190	Phosphastic Limestone, medium gray (salt and pepper), fine sand grained, 10% fine grained quartz sand, sparry cement, moderate porosity, poorly consolidated
190	200	Same as above, with 5% fine gravel sized shell fragments
200	210	Phosphatic Limestone (80%), medium gray (salt and pepper), fine sand grained, 10% fine grained quartz sand, sparry cement, moderate porosity, poorly consolidated; phosphatic clay (20%), light gray, low porosity
210	220	Same as above
220	230	Same as above
230	240	Clay, grayish olive, low porosity, high plasticity
240	250	Phosphatic Clay, olive gray to light gray, low porosity, moderate to high plasticity; some phosphatic limestone
250	260	Phosphatic Clay, light gray to grayish olive, low porosity, moderate plasticity
260	270	Same as above
270	280	Same as above
280	290	Same as above
290	300	Same as above
300	310	Clay (90%), very light gray, phosphatic, low porosity, moderate plasticity; micrite (10%), light gray, low porosity, well consolidated
310	320	Phosphatic Clay, light gray and dark olive green, low porosity, moderate plasticity
320	330	Same as above
330	340	Clay, dark greenish gray, low porosity, moderate to high plasticity
340	350	Same as above
350	360	Same as above
360	370	Same as above
370	380	Same as above

City of Fort Myers RO WTP Injection Well Facilities
Dual Zone Monitoring Well
Lithologic Description

Depth (ft. bpl)		Observer's Description
From	To	
380	390	Same as above
390	400	Clay (90%), very light gray, phosphatic, low porosity, moderate plasticity; micrite (10%), medium gray, phosphatic, moderate porosity, well consolidated
400	410	Clay/marl, very light gray, phosphatic, low porosity, moderate plasticity; medium gray, phosphatic, moderate porosity, well consolidated
410	420	Same as above
420	430	Same as above
430	440	Same as above
440	450	Micrite (80%), light to medium gray, low porosity, poorly to moderately consolidated; clay, light gray, low porosity
450	460	Limestone, very light gray, fine sand grained, abundant fossil molds, micritic cement, moderate porosity, well consolidated
460	470	Limestone, very light gray, fine sand grained, micritic cement, moderate porosity, well consolidated
470	480	Same as above
480	490	Same as above
490	500	Same as above, abundant fossil casts and molds
500	510	Same as above
510	520	Same as above
520	530	Same as above, phosphatic
530	540	Same as above
540	550	Same as above, little light bluish gray limestone
550	560	Same as above, very pale orange limestone
560	570	Clay, bluish white (5B 9/1), low porosity, medium plasticity
570	580	Limestone, very pale orange (10YR 8/2), high porosity, moderately consolidated, large fragments, medium grained
580	590	Same as above
590	600	Limestone, fine grained white to very pale orange, moderate to low porosity
600	610	Limestone, very pale orange (10YR 8/2), high porosity, moderately consolidated, medium grained
610	620	Same as above
620	630	Same as above
630	640	Same as above
640	650	Same as above
650	660	Same as above
660	670	Same as above
670	680	Clay, light tan, moderate plasticity, and limestone as above
680	690	Limestone, very pale orange (10YR 8/2), lower porosity, well consolidated, medium grained
690	700	Same as above
700	710	Same as above; and clay, light tan, moderated plasticity
710	720	Limestone, very pale orange (10YR 8/2), moderate to low porosity, well consolidated, medium grained
720	730	Same as above
730	740	Same as above
740	750	Clay, light yellowish gray, moderate plasticity, low porosity, some limestone as above
750	760	Limestone, light gray, well consolidated, more angular larger fragments, low porosity, little clay as above
760	770	Same as above

City of Fort Myers RO WTP Injection Well Facilities
Dual Zone Monitoring Well
Lithologic Description

Depth (ft. bpl)		Observer's Description
From	To	
770	780	Same as above
780	790	Same as above
790	800	Limestone/marl, light yellowish gray, fine grained,low porosity
800	810	Clay, light yellowish gray, moderate plasticity, low porosity, some limestone as above
810	820	Limestone, very pale orange to light tan, fine grained, moderately soft, sandy
820	830	Same as above
830	840	Same as above
840	850	Same as above
850	860	Same as above
860	870	Same as above, some clay olive green low plastisity
870	880	Limestone, very pale orange to light tan, fine grained, moderately soft, sandy
880	890	Same as above
890	900	Same as above
900	910	Same as above
910	920	Same as above
920	930	Same as above
930	940	Same as above, more consolidated, some fossil casts and molds
940	950	Limestone, very pale orange to light tan, fine grained, moderately soft, sandy
950	960	Same as above
960	970	Same as above
970	980	Same as above
980	990	Same as above
990	1000	Same as above
1000	1010	Limestone, light gray, well consolidated, larger fragments, low porosity
1010	1020	Same as above, less consolidated
1020	1030	Limestone, very pale orange to light tan, fine grained, moderately soft
1030	1040	Same as above
1040	1050	Same as above
1050	1060	Same as above, sandy
1060	1070	Same as above
1070	1080	Same as above
1080	1090	Same as above
1090	1100	Same as above
1100	1110	Forams and limestone, light gray to white
1110	1120	Limestone, white to very light gray, very fine grained, moderately soft; some forams.
1120	1130	Same as above
1130	1140	Same as above
1140	1150	Same as above
1150	1160	Same as above
1160	1170	Same as above
1170	1180	Same as above
1180	1190	Same as above
1190	1200	Same as above
1200	1210	Same as above
1210	1220	Same as above
1220	1230	Same as above
1230	1240	Same as above
1240	1250	Same as above
1250	1260	Same as above

City of Fort Myers RO WTP Injection Well Facilities
Dual Zone Monitoring Well
Lithologic Description

Depth (ft. bpl) From	To	Observer's Description
1260	1270	Same as above
1270	1280	Same as above
1280	1290	Same as above
1290	1300	Same as above
1300	1310	Same as above
1310	1320	Same as above
1320	1330	Same as above
1330	1340	Limestone, yellowish gray (5Y 8/1), very fine grained, well consolidated, low porosity, forams (5%)
1340	1350	Same as above
1350	1360	Same as above, forams abundant
1360	1370	Same as above
1370	1380	Same as above
1380	1390	Same as above
1390	1400	Same as above
1400	1410	Same as above
1410	1420	Same as above
1420	1430	Same as above
1430	1440	Same as above
1440	1450	Same as above
1450	1460	Same as above
1460	1470	Same as above
1470	1480	Same as above
1480	1490	Same as above
1490	1500	Same as above
1500	1510	Same as above
1510	1520	Same as above
1520	1530	Same as above
1530	1540	Same as above
1540	1550	Same as above
1550	1560	Same as above
1560	1570	Same as above
1570	1580	Same as above
1580	1590	Same as above
1590	1600	Same as above
1600	1610	Same as above
1610	1620	Same as above
1620	1630	Same as above
1630	1640	Same as above
1640	1650	Same as above
1650	1660	Same as above
1660	1670	Same as above
1670	1680	Same as above
1680	1690	Same as above
1690	1700	Same as above
1700	1710	Same as above
1710	1720	Limestone (50%), yellowish gray (5Y 8/1), very fine grained, well consolidated, low porosity, forams; Dolomite (50%) dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
1720	1730	Same as above

City of Fort Myers RO WTP Injection Well Facilities
Dual Zone Monitoring Well
Lithologic Description

Depth (ft. bpl)		Observer's Description
From	To	
1730	1740	Limestone, yellowish gray (5Y 8/1), very fine grained, well consolidated, low porosity
1740	1750	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline

End of Borehole

APPENDIX G

Water Quality Laboratory Results During Reverse-Air Drilling and Packer Tests

APPENDIX G.1

RO-IW Reverse-Air Drilling Water Quality

Client Project: City of Fort Myers
Lab Project: N0112188
Report Date: 12/07/01

Sanders Laboratories
Environmental Testing Services

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02311-02-A-001
Transmittal No. # 49 **Date:** 1/9/02
Signature

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

RECEIVED DEC 1 2 2001

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-01	pilot hole 490' grab	Ground Water	11/13/01 22:24

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	145		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1410		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	592	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-02	pilot hole 520' grab	Ground Water	11/13/01 23:50

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	145		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1100		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	516	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-03	pilot hole 550 grab	Ground Water	11/14/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	160		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1020		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	440	Q	5	mg/L	12/5/01 17:00	EW

ID	Sample Description	Sample Source	Sample Date/Time

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-04	pilot hole 580' grab	Ground Water	11/14/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	180		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1120		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	568	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-05	pilot hole 610' grab	Ground Water	11/14/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
ide	4500Cl-B	215		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1070		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	560	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-06	pilot hole 640' grab	Ground Water	11/14/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	205		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1150		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	632	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-07	pilot hole 670' grab	Ground Water	11/14/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	205		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1200		0.1	umhos/cm	12/6/01 11:54	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-07	pilot hole 670' grab	Ground Water	11/14/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Total Dissolved Solids	160.1	564	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-08	pilot hole 700' grab	Ground Water	11/14/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	240		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1150		0.1	umhos/cm	12/6/01 11:54	EW
Dissolved Solids	160.1	648	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-09	pilot hole 730' grab	Ground Water	11/14/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	255		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1260		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	668	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-10	pilot hole 780' grab	Ground Water	11/14/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	255		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1200		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	680	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**

Client Project: City of Fort Myers
Lab Project: N0112188
Report Date: 12/07/01

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-11	pilot hole 810' grab	Ground Water	11/14/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	265		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1250		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	672	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-12	pilot hole 840' grab	Ground Water	11/14/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
ide	4500Cl-B	305		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1380		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	760	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-13	pilot hole 870' grab	Ground Water	11/14/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	315		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1360		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	828	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-14	pilot hole 910' grab	Ground Water	11/14/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	370		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1370		0.1	umhos/cm	12/6/01 11:54	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-14	pilot hole 910' grab	Ground Water	11/14/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Total Dissolved Solids	160.1	996	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-15	pilot hole 940' grab	Ground Water	11/14/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	380		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1520		0.1	umhos/cm	12/6/01 11:54	EW
' Dissolved Solids	160.1	940	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-16	pilot hole 970' grab	Ground Water	11/14/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	385		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1560		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	932	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-17	pilot hole 1010' grab	Ground Water	11/14/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	405		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1650		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	936	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-18	pilot hole 1040' grab	Ground Water	11/15/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	430		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1670		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1100	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-19	pilot hole 1100' grab	Ground Water	11/15/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
ide	4500Cl-B	440		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1770		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1110	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-20	pilot hole 1130' grab	Ground Water	11/15/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	455		10	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1710		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1100	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-21	pilot hole 1160' grab	Ground Water	11/15/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	490		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1600		0.1	umhos/cm	12/6/01 11:54	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-21	pilot hole 1160' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Total Dissolved Solids	160.1	1170	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-22	pilot hole 1190' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	470		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1730		0.1	umhos/cm	12/6/01 11:54	EW
Dissolved Solids	160.1	1100	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-23	pilot hole 1220' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	480		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1690		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1160	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-24	pilot hole 1250' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	510		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1780		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1180	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-25	pilot hole 1280' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	510		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1780		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1240	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-26	pilot hole 1310' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
ide	4500Cl-B	550		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1860		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1320	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-27	pilot hole 1340' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	550		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1860		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1310	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-28	pilot hole 1370' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	550		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1780		0.1	umhos/cm	12/6/01 11:54	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-28	pilot hole 1370' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Total Dissolved Solids	160.1	1390	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-29	pilot hole 1400' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	540		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1850		0.1	umhos/cm	12/6/01 11:54	EW
Dissolved Solids	160.1	1340	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-30	pilot hole 1430' grab	Ground Water	11/15/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	530		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1710		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1280	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112188-31	pilot hole 1460' grab	Ground Water	11/16/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	540		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1820		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1310	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-32	pilot hole 1490' grab	Ground Water	11/16/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	570		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1860		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1360	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-33	pilot hole 1520' grab	Ground Water	11/19/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
ide	4500Cl-B	620		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	2150		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1480	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-34	pilot hole 1550' grab	Ground Water	11/19/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	660		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	2200		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1520	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-35	pilot hole 1580' grab	Ground Water	11/19/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	680		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	1970		0.1	umhos/cm	12/6/01 11:54	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-35	pilot hole 1580' grab	Ground Water	11/19/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Total Dissolved Solids	160.1	1470	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-36	pilot hole 1610' grab	Ground Water	11/19/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	700		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	2250		0.1	umhos/cm	12/6/01 11:54	EW
Dissolved Solids	160.1	1520	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-37	pilot hole 1630' grab	Ground Water	11/20/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	770		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	2320		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1910	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-38	pilot hole 1660' grab	Ground Water	11/20/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	640		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	2080		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1520	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-39	pilot hole 1690' grab	Ground Water	11/20/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	660		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	2220		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1650	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-40	pilot hole 1710' grab	Ground Water	11/20/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
ide	4500Cl-B	680		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	2330		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1740	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-41	pilot hole 1730' grab	Ground Water	11/20/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	680		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	2180		0.1	umhos/cm	12/6/01 11:54	EW
Total Dissolved Solids	160.1	1590	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-42	pilot hole 1760' grab	Ground Water	11/21/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	580		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	2020		0.1	umhos/cm	12/6/01 11:54	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-42	pilot hole 1760' grab	Ground Water	11/21/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Total Dissolved Solids	160.1	1420	Q	5	mg/L	12/5/01 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0112188-43	pilot hole 1790' grab	Ground Water	11/21/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	620		20	mg/L	12/6/01 6:00	RB
Conductivity	120.1	2010		0.1	umhos/cm	12/6/01 11:54	EW
Dissolved Solids	160.1	1460	Q	5	mg/L	12/5/01 17:00	EW

Approved by:

Craig Toler/Lab Director
Laura Sullivan/QA Officer
Kathrine Bartkiewicz/Lab Supervisor

Comments:

*Qualifier code Q: Sample analyzed beyond accepted hold time. This, in addition to temperature differences at the time of analysis accounts for differences in laboratory conductivity results and field conductivity results.

Client Project: City of Fort Myers
Lab Project: N0201094
Report Date: 01/04/02

Sanders Laboratories
Environmental Testing Services

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02311-02-A
Transmittal No. # 050 **Date:** 1/14/02
Signature

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0201094-01	iw1-1830 grab	Ground Water	12/26/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	410		20	mg/L	1/4/02 9:30	EC
Conductivity	120.1	4090		0.1	umhos/cm	1/4/02 13:30	EW
Total Dissolved Solids	160.1	2180	Q	5	mg/L	1/3/02 17:15	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0201094-02	iw1-1860 grab	Ground Water	12/26/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	660		20	mg/L	1/4/02 9:30	EC
Conductivity	120.1	4380		0.1	umhos/cm	1/4/02 13:30	EW
Total Dissolved Solids	160.1	2740	Q	5	mg/L	1/3/02 17:15	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0201094-03	iw1-1890 grab	Ground Water	12/26/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	780		20	mg/L	1/4/02 9:30	EC
Conductivity	120.1	4760		0.1	umhos/cm	1/4/02 13:30	EW
Total Dissolved Solids	160.1	2930	Q	5	mg/L	1/3/02 17:15	EW

ID	Sample Description	Sample Source	Sample Date/Time

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0201094-04	iw1-1910 grab	Ground Water	12/27/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	3300		100	mg/L	1/4/02 9:30	EC
Conductivity	120.1	12400		0.1	umhos/cm	1/4/02 13:30	EW
Total Dissolved Solids	160.1	8040		5	mg/L	1/3/02 17:15	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0201094-05	iw1-1940 grab	Ground Water	12/28/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
ide	4500Cl-B	2750		100	mg/L	1/4/02 9:30	EC
Conductivity	120.1	9700		0.1	umhos/cm	1/4/02 13:30	EW
Total Dissolved Solids	160.1	6400		5	mg/L	1/3/02 17:15	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0201094-06	iw1-1970 grab	Ground Water	12/28/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	2450		100	mg/L	1/4/02 9:30	EC
Conductivity	120.1	9040		0.1	umhos/cm	1/4/02 13:30	EW
Total Dissolved Solids	160.1	5620		5	mg/L	1/3/02 17:15	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0201094-07	iw1-1980 grab	Ground Water	12/28/01 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	8000		500	mg/L	1/4/02 9:30	EC
Conductivity	120.1	17800		0.1	umhos/cm	1/4/02 13:30	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0201094-07	iw1-1980 grab	Ground Water	12/28/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Total Dissolved Solids	160.1	15000		5	mg/L	1/3/02 17:15	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0201094-08	iw1-2000 grab	Ground Water	12/28/01 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	2550		100	mg/L	1/4/02 9:30	EC
Conductivity	120.1	8960		0.1	umhos/cm	1/4/02 13:30	EW
Dissolved Solids	160.1	5220		5	mg/L	1/3/02 17:15	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0201094-09	iw1-2030 grab	Ground Water	1/2/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	7250		500	mg/L	1/4/02 9:30	EC
Conductivity	120.1	25000		0.1	umhos/cm	1/4/02 18:00	KB
Total Dissolved Solids	160.1	15800		5	mg/L	1/3/02 17:15	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0201094-10	iw1-2060 grab	Ground Water	1/2/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	14200		500	mg/L	1/4/02 9:30	EC
Conductivity	120.1	35400		0.1	umhos/cm	1/4/02 13:30	EW
Total Dissolved Solids	160.1	30700		5	mg/L	1/3/02 17:15	EW

APPENDIX G.2

Dual Zone Monitor Well Reverse-Air Drilling Water Quality

Page: 1 of 8

Client Project: City of Fort Myers
Lab Project: N0203393
Report Date: 03/19/02

Sanders Laboratories
Environmental Testing Services

Submittal Type: ☐ Shop Drawing ☐ Sample

Review is only for [illegible]

✓

☐ Make Corrections
☐ As Noted: Develop Replacements
INCOMPLETE: (Resubmittal Required)
☐ Complete and Resubmit
☐ Submit Missing Portions

By: Kjones for M Weatherby
03 21 02

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02311-03-A
Transmittal No. # 072 **Date:** 3/20/02
Signature

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0203393-01	d2mw 480' grab	Ground Water	3/15/02 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	400		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2180		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1160		5	mg/L	3/18/02 16:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0203393-02	d2mw 510' grab	Ground Water	3/15/02 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	340		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	1970		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1020		5	mg/L	3/18/02 16:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0203393-03	d2mw 540' grab	Ground Water	3/15/02 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	380		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	1940		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1020		5	mg/L	3/18/02 16:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**

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Client Project: City of Fort Myers
Lab Project: N0203393
Report Date: 03/19/02

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-04	d2mw 570' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	430		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	1950		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1070		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-05	d2mw 600' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
ride	4500Cl-B	460		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2010		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1190		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-06	d2mw 630' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	480		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2000		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1230		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-08	d2mw 690' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	500		40	mg/L	3/18/02 15:15	SR
luctivity	120 1	2070		0.1	umhos/cm	3/18/02 14:30	DA

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Client Project: City of Fort Myers
Lab Project: N0203393
Report Date: 03/19/02

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-08	d2mw 690' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Total Dissolved Solids	160.1	1260		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-09	d2mw 720' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	440		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2060		0.1	umhos/cm	3/18/02 14:30	DA
Dissolved Solids	160.1	1310		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-10	d2mw 750' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	520		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2050		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1230		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-11	d2mw 780' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	540		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2120		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1280		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time

Client Project: City of Fort Myers
Lab Project: N0203393
Report Date: 03/19/02

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-12	d2mw 810' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	520		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2040		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1260		5	mg/L	3/18/02 16:00	EW

[redacted]	Sample Description	Sample Source	[redacted]
N0203393-13	d2mw 840' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
oride	4500Cl-B	540		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2070		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1300		5	mg/L	3/18/02 16:00	EW

[redacted]	Sample Description	Sample Source	[redacted]
N0203393-14	d2mw 870' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	530		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2070		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1290		5	mg/L	3/18/02 16:00	EW

[redacted]	Sample Description	Sample Source	[redacted]
N0203393-15	d2mw 900' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	550		40	mg/L	3/18/02 15:15	SR
ductivity	120.1	2090		0.1	umhos/cm	3/18/02 14:30	DA

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-15	d2mw 900' grab	Ground Water	3/15/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Total Dissolved Solids	160.1	1330		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-16	d2mw 930' grab	Ground Water	3/16/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	540		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2120		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1260		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-17	d2mw 960' grab	Ground Water	3/16/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	540		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2140		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1320		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-18	d2mw 990' grab	Ground Water	3/16/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	560		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2200		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1310		5	mg/L	3/18/02 16:00	EW

ID	Sample Description	Sample Source	Sample Date/Time

Client Project: City of Fort Myers
Lab Project: N0203393
Report Date: 03/19/02

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-19	d2mw 1020' grab	Ground Water	3/16/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	550		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2210		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1310		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-20	d2mw 1050' grab	Ground Water	3/16/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
ride	4500Cl-B	570		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2300		0.1	umhos/cm	3/18/02 14:30	DA
Total Dissolved Solids	160.1	1410		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-21	d2mw 1080' grab	Ground Water	3/16/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	590		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2280		0.1	umhos/cm	3/18/02 14:50	DA
Total Dissolved Solids	160.1	1410		5	mg/L	3/18/02 16:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-22	d2mw 1110' grab	Ground Water	3/16/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	590		40	mg/L	3/18/02 15:15	SR
luctivity	120.1	2230		0.1	umhos/cm	3/18/02 14:50	DA

Client Project: City of Fort Myers
Lab Project: N0203393
Report Date: 03/19/02

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203393-22	d2mw 1110' grab	Ground Water	3/16/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Total Dissolved Solids	160.1	1416		5	mg/L	3/18/02 18:00	EW

[redacted]	Sample Description	Sample Source	[redacted]
N0203393-23	d2mw 1140' grab	Ground Water	3/16/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	630		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2380		0.1	umhos/cm	3/18/02 14:50	DA
l Dissolved Solids	160.1	1560		5	mg/L	3/18/02 18:00	EW

[redacted]	Sample Description	Sample Source	[redacted]
N0203393-24	d2mw 1170' grab	Ground Water	3/18/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	630		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2410		0.1	umhos/cm	3/18/02 14:50	DA
Total Dissolved Solids	160.1	1620		5	mg/L	3/18/02 18:00	EW

[redacted]	Sample Description	Sample Source	[redacted]
N0203393-25	d2mw 1200' grab	Ground Water	3/18/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	630		40	mg/L	3/18/02 15:15	SR
Conductivity	120.1	2440		0.1	umhos/cm	3/18/02 14:50	DA
Total Dissolved Solids	160.1	1580		5	mg/L	3/18/02 18:00	EW

Client Project: City of Fort Myers
Lab Project: N0203393
Report Date: 03/19/02

Approved by:

Laura Sullivan

Laura Sullivan/QA Officer
Kathrine Bartkiewicz/Lab Supervisor

Comments:

no sample recieved for 660'

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-C TODY RECORD

PROJECT # N020339

Page ______ of ______

Client Y/Q
Address

Phone ______ Fax ______

Report To: Jay
Bill To:
P.O. #
Project Name DZmw
Project Location: FT Myers Water Plant

Sample Supply: GW
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: 3/18/02

Sampled By (PRINT) Randy Dean
Sampler Signature

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL	ANALYSES REQUEST Cl⁻, Cond, TDS	Sample ID #
	DZmw - 480'	3/15/02		G	1	1				1	1A
	" - 510'				1	1				1	2A
	" - 540'				1	1				1	3A
	" - 570'				1	1				1	4A
	" - 600'				1	1				1	5A
	" - 630'				1	1				1	6A
	" - 690'				1	1				1	8A
	" " 720'				1	1				1	9A

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA

COMMENTS:
660 - 7A
* No sample received

COOLER #

COOLER SEAL INTACT
Yes No

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Randy Dean / CH2MHill	3/18/02	1135		3/18/02	1135
	3/18/02	1405		3/18/02	1405

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD

PROJECT # NC20335

Page ____ of ____

Client YQ

Address

Phone ____ Fax ____

Report To: Jay

Bill To:

P.O. #

Project Name D2mw

Project Location: FT Myers WaterPlant

Sample Supply: Gw

Customer Type:

Field Report #:

Kit #

REQUESTED DUE DATE: 3/18/02

Sampled By (PRINT) Randy Dean

Sampler Signature

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL	ANALYSES REQUEST: CT:Cond TDS	Sample ID #
	D2mw - 750'	3/15/02		G	1	1				1	10A
	" - 780'	↓		↓	1	1				1	11A
	" - 810'				1	1				1	12A
	" - 840'				1	1				1	13A
	" - 870'				1	1				1	14A
	" - 900'				1	1				1	15A
	" - 930'	3/16/02			1	1				1	16A
	" - 960'				1	1				1	17A

Bottle Lot #	OUT DATE	SHIPMENT METHOD RETURNED DATE	VIA	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
				Randy Dean / Consultant	3/18/02	1135		3/18/02	1135
					3/18/02	1405		3/18/02	1405

COMMENTS:

COOLER #

COOLER SEAL INTACT
Yes No

Sanders Laboratories, Inc.

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

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD

PROJECT #: N020 3393

Page ____ of ____

Client: YQ
Address:

Phone: Fax:

Report To: Jay
Bill To:
P.O. #:
Project Name: DZmw
Project Location: FT. Myers Water Plant

Sample Supply: GW
Customer Type:
Field Report #:
Kit #:
REQUESTED DUE DATE: 3/18/02

Sampled By (PRINT): Randy Dean
Sampler Signature: Randy Dean

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	ICE	UNPRESERVED	H_2SO_4	HNO_3	HCL	CL Cond TDS	Sample ID #
	DZmw - 990'	3/16/02		G	1	1				1	18A
	" ~1020'	↓		↓	1	1				1	19A
	" ~1050'	↓		↓	1	1				1	20A
	" ~1080'	↓		↓	1	1				1	2 A
	" ~1110'	↓		↓	1	1				1	22A
	" ~1140'	↓		↓	1	1				1	23A
	" ~1170'	3/18/02		↓	1	1				1	24A
	" ~1200'	↓		↓	1	1				1	25A

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA

RELINQUISHED BY AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Randy Dean / CH2MHill	3/18/02	1135		3/18/02	1135
	3/18/02	1405		3/18/02	1405

COMMENTS:

COOLER #

COOLER SEAL INTACT
Yes No

Sanders Laboratories, Inc.

Page: 1 of 4

Client Project: City of Fort Myers
Lab Project: N0203589
Report Date: 03/27/02

Sanders Laboratories
Environmental Testing Services

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02311-03-A
Transmittal No. # 029 Date: 3/28/02
Signature

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203589-01	1280 grab	Ground Water	3/26/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	240		40	mg/L	3/26/02 16:15	SR
Conductivity	120.1	2370		0.1	umhos/cm	3/26/02 16:30	EW
Total Dissolved Solids	160.1	840		5	mg/L	3/26/02 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203589-02	1310 grab	Ground Water	3/26/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	370		40	mg/L	3/26/02 16:15	SR
Conductivity	120.1	5500		0.1	umhos/cm	3/26/02 16:30	EW
Total Dissolved Solids	160.1	2030		5	mg/L	3/26/02 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203589-03	1340 grab	Ground Water	3/26/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	360		40	mg/L	3/26/02 16:15	SR
Conductivity	120.1	5150		0.1	umhos/cm	3/26/02 16:30	EW
Total Dissolved Solids	160.1	1730		5	mg/L	3/26/02 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0203589-04	1350 grab	Ground Water	3/26/02 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	370		40	mg/L	3/26/02 16:15	SR
Conductivity	120.1	3960		0.1	umhos/cm	3/26/02 16:30	EW
Total Dissolved Solids	160.1	1470		5	mg/L	3/26/02 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0203589-05	1400 grab	Ground Water	3/26/02 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	370		40	mg/L	3/26/02 16:15	SR
Conductivity	120.1	4050		0.1	umhos/cm	3/26/02 16:30	EW
Total Dissolved Solids	160.1	2410		5	mg/L	3/26/02 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0203589-06	1430 grab	Ground Water	3/26/02 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	360		40	mg/L	3/26/02 16:15	SR
Conductivity	120.1	3250		0.1	umhos/cm	3/26/02 16:30	EW
Total Dissolved Solids	160.1	1260		5	mg/L	3/26/02 17:00	EW

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0203589-07	1460 grab	Ground Water	3/26/02 0:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	390		40	mg/L	3/26/02 16:15	SR
Conductivity	120.1	3150		0.1	umhos/cm	3/26/02 16:30	EW

Client Project: City of Fort Myers
Lab Project: N0203589
Report Date: 03/27/02

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203589-07	1460 grab	Ground Water	3/26/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Total Dissolved Solids	160.1	1180		5	mg/L	3/26/02 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203589-08	1490 grab	Ground Water	3/26/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	530		40	mg/L	3/26/02 16:15	SR
Conductivity	120.1	3060		0.1	umhos/cm	3/26/02 16:30	EW
Total Dissolved Solids	160.1	1380		5	mg/L	3/26/02 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203589-09	1520 grab	Ground Water	3/26/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	600		40	mg/L	3/26/02 16:15	SR
Conductivity	120.1	3160		0.1	umhos/cm	3/26/02 16:30	EW
Total Dissolved Solids	160.1	2120		5	mg/L	3/26/02 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203589-10	1550 grab	Ground Water	3/26/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	1030		40	mg/L	3/26/02 16:15	SR
Conductivity	120.1	4070		0.1	umhos/cm	3/26/02 16:30	EW
Total Dissolved Solids	160.1	2430		5	mg/L	3/26/02 17:00	EW

Lab ID	Sample Description	Sample Source	Sample Date/Time

Client Project: City of Fort Myers
Lab Project: N0203589
Report Date: 03/27/02

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203589-11	1580 grab	Ground Water	3/26/02 0:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Chloride	4500Cl-B	1350		100	mg/L	3/26/02 16:15	SR
Conductivity	120.1	4850		0.1	umhos/cm	3/26/02 16:30	EW
Total Dissolved Solids	160.1	3040		5	mg/L	3/26/02 17:00	EW

Approved by:

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

Comments:

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD

PROJECT # N0203584

Page ____ of ____

Client Y/Q
Address
Phone Fax

Report To: Jay
Bill To:
P.O. #
Project Name MW
Project Location: City of FM

Sample Supply: GW
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: 3/29/02

Sampled By (PRINT) Randy Dean
Sampler Signature Randy D

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL	ANALYSES REQUEST Cond Cl 5										Sample ID #
	1280	3/26/02		G	1	1				1										1A
	1310	↓		↓	1	1				1										2A
	1340				1	1				1										3A
	1350				1	1				1										4A
	1400				1	1				1										5A
	1430				1	1				1										6A
	1460				1	1				1										7A
	1490				1	1				1										8A

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA

COMMENTS:

COOLER #

COOLER SEAL INTACT
Yes No

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Randy Dean / CH2MHILL	3/26/02	1400		3/26/02	1400
	3/26	1535	B Goodrich	3/26	1535

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-C TODY RECORD

PROJECT # N0203584

Page ______ of ______

Client: YQ
Address: ____________
Phone: ____________ Fax: ____________

Report To: Jay
Bill To: ____________
P.O. #: ____________
Project Name: MW
Project Location: City of FM

Sample Supply: GW
Customer Type: ____________
Field Report #: ____________
Kit #: ____________
REQUESTED DUE DATE: 3/29/02

Sampled By (PRINT): Randy Dean
Sampler Signature: Randy D

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL	ANALYSES REQUEST: Cond, Cl, TDS	Sample ID #
	1520	3/26/02		G	1	1				1	9A
	1550	↓		↓	1	1				1	10A
	1580				1	1				1	11A

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
				Randy Dean / CH2M Hill	3/26/02	1400		3/26/02	1400
					3/26	1535	Goodrich	3/26	1535

COMMENTS:

COOLER #

COOLER SEAL INTACT
Yes No

APPENDIX G.3

RO-IW-1 Packer Test Water Quality

Page: 1 of 1

Client Project: City of Fort Myers
Lab Project: N0112189
Report Date: 12/07/01

Sanders Laboratories
Environmental Testing Services

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02311-03-A-002
Transmittal No. # 49 **Date:** 1/9/02
Signature

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

RECEIVED DEC 12 2001

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112189-01	straddle packer 1535'-1584' grab	Ground Water	12/5/01 11:00

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	6500		1000	mg/L	12/6/01 6:00	RB
Conductivity	120.1	15700		0.1	umhos/cm	12/6/01 11:54	EW
pH	150.1	7.37		0.01	pH units	12/6/01 9:15	DA
te	375.4	358		10	mg/L	12/6/01 14:00	RB
Total Dissolved Solids	160.1	14000		5	mg/L	12/7/01 8:45	DA

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0112189-02	straddle packer 1500'-1535' grab	Ground Water	12/4/01 3:40

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Chloride	4500Cl-B	4050		100	mg/L	12/6/01 6:00	RB
Conductivity	120.1	10100		0.1	umhos/cm	12/6/01 11:54	EW
pH	150.1	7.36		0.01	pH units	12/6/01 9:15	DA
Sulfate	375.4	465		20	mg/L	12/6/01 14:00	RB
Total Dissolved Solids	160.1	8480		5	mg/L	12/7/01 8:45	DA

Approved by:

Craig Toler/Lab Director
aura Sullivan/QA Officer
Kathrine Bartkiewicz/Lab Supervisor

Comments:

Differences in laboratory conductivity results and field conductivity results are due to temperature differences at the time of analysis.

Page: 1 of 1

Client Project: City of Fort Myers
Lab Project: N0201368
Report Date: 01/17/02

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0201368-01	1755'-1897' Packer Test grab	Ground Water	1/16/02 4:00

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Ammonia-N	350.3	0.10		0.05	mg/L	1/17/02 14:45	MA
Chloride	4500Cl-B	17700		500	mg/L	1/17/02 10:30	MA
Conductivity	120.1	41200		0.1	umhos/cm	1/17/02 15:00	RB
Nitrogen, Total Kjeldahl	351.2	1.34		0.05	mg/L	1/17/02 14:58	CC
Sulfate	375.4	2640		100	mg/L	1/17/02 14:00	RB
Total Dissolved Solids	160.1	29300		5	mg/L	1/16/02 19:35	DW

Approved by:

Comments:

Craig Toler/Lab Director
Laura Sullivan/QA Officer
Kathrine Bartkiewicz/Lab Supervisor

V

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02311-02-A
Transmittal No. # 067 **Date:** 3/7/02
Signature

Kjones for RDean 032902

APPENDIX H

Core Descriptions and Laboratory Results

APPENDIX H

IW-1 Generalized Core Descriptions

City of Fort Myers – IW-1 and Facilities Engineering Report

Cored Interval (feet bls)	Generalized Geology Description
1,393 ft – 1,403 ft	Limestone, white (N9), very fine grained, well consolidated, low porosity, echinoids, at 1,400 feet Limestone is crystallized and very dense.
1,510 ft – 1,520 ft	Limestone, yellowish gray (5Y 8/1), very fine grained, sandy , well consolidated, low porosity, top 6" chalky, white (N9), low density
1,620 ft – 1,630 ft	Limestone, yellowish gray (5Y 8/1), very fine grained, sandy, well consolidated, low porosity
1,725 ft – 1,735 ft	Limestone, yellowish gray (5Y 8/1), very fine grained, well consolidated, low porosity
1,750 ft – 1,760 ft	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
1,889 ft – 1,899 ft	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
2,010 ft – 2,020 ft	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
2,075 ft – 2,085 ft	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline
2,340 ft – 2,350 ft	Dolomite, dark yellowish brown, (10Y 4/2), very well consolidated, low porosity, microcrystalline

Ardaman & Associates, Inc.

Geotechnical, Environmental and
Materials Consultants

April 29, 2002
File Number 02-008

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Fort Myers, Florida 33908

Attention: Mr. Edward McCullers

Subject: Laboratory Testing of Rock Core Samples from Ft. Myers Deep Injection Well

Gentlemen:

As requested, permeability, effective porosity and specific gravity tests have been completed on four rock core samples provided for testing by your firm from the Ft. Myers Deep Injection Well. The permeability tests were performed in general accordance with ASTM Standard D 5084 "Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible-Wall Permeameter" using the constant-head method (Method A). The specific gravity was determined in general accordance with ASTM Standard D 854 "Specific Gravity of Soils". Unconfined compression tests were requested, but could not be performed because of insufficient sample length. As specified, priority was given to obtaining specimens from the samples for the vertical and horizontal permeability tests.

Permeability Tests

The permeability test results are presented in Table 1. The vertical permeability tests were performed first on specimens maintained at the as-received diameter and cut to lengths of 8.1 to 9.5 cm. After completing the vertical permeability tests, the horizontal permeability test specimens were obtained by coring 5.0 cm diameter cylinders from the vertical specimens. The horizontal specimens were then trimmed to lengths of 7.8 to 8.3 cm to provide flat, parallel ends. Since the vertical permeability test specimens were cored upon completion of testing to obtain the horizontal permeability test specimens, the final moisture contents of the vertical test specimens were not measured. The dry density and degree of saturation of the vertical permeability test specimens, therefore, were estimated using the final moisture contents from the horizontal permeability test specimens.

The vertical permeability test specimens were air-dried, deaired under vacuum, and then saturated with deaired tap water from the bottom upward while still under vacuum. After testing, the vertical specimens were maintained submerged in water until cored for the horizontal specimens and retested for measurement of horizontal hydraulic conductivity. Each specimen was mounted in a triaxial-type permeameter and encased within a latex membrane. The specimens were confined using an average isotropic effective confining stress of 30 lb/in^2 and permeated with deaired tap water under a back-pressure of 70 or 160 lb/in^2. Satisfactory saturation was verified by a B-factor equal to or greater than 95 percent, or a B-factor that remained relatively constant for two consecutive increments of applied cell pressure. The inflow to and outflow from each specimen were monitored with time, and the hydraulic conductivity was calculated for each recorded flow increment. The tests were continued until steady-state flow conditions were obtained, as evidenced by an outflow/inflow ratio between 0.75 and 1.25, and until stable values of hydraulic conductivity were measured.

The final degree of saturation was calculated upon completion of testing using the final dry mass, moisture content and volume, and the measured specific gravity. Although some of the calculated final degrees of saturation are low, the B-factors indicate satisfactory saturation. The calculated final degrees of saturation are potentially affected by occluded voids within the specimens, surface irregularities, and the use of final moisture contents for the vertical permeability specimens from the corresponding horizontal permeability specimens.

Specific Gravity Tests

The specific gravity of each sample was determined on a representative approximately 100 gram specimen ground to pass the U.S. Standard No. 40 sieve. The specific gravity measured on each sample is presented in Table 1.

Total Porosity

The total porosity, n, of each permeability test specimen was calculated using the measured dry density, γ_d, and measured specific gravity, G_s, from the equation: $n = 1 - [\gamma_d/(G_s)(\gamma_w)]$ where γ_w = unit weight of water. The calculated total porosities are presented in Table 1.

Effective Porosity

The effective porosity (i.e., the portion of the pore space effective in transmitting flow) of each sample was estimated by flowing a salt (NaCl) solution through the vertical permeability test specimen and monitoring the increase in conductivity of the outflow as the pore water in the specimen was displaced by the high conductivity (40,000 μmhos) salt solution. Assuming no reaction between the salt solution and the specimen, the arrival time and corresponding volume of flow when the outflow conductivity equals 50% of the solution conductivity can be used to estimate effective porosity from advective transport theory. The effective porosities of the vertical permeability test specimens estimated by this technique are tabulated below.

Core Depth (feet)	Porosity	
	Total	Effective
1760	0.18	0.18
1897	0.29	0.29
2085	0.04	0.02
2343	0.15	0.03

If you have any questions or require additional testing services, please contact us.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.

Shawkat Ali
Shawkat Ali, Ph.D., P.E.
Quality Control Manager

Thomas S. Ingra, P.E.
Laboratory Director
Florida Registration No. 31987

SA/TSI/sa

[illegible]

Youngquist Brothers, Inc
File Number 02-008
April 29, 2002

Table 1
PERMEABILITY TEST RESULTS
FT. MYERS DEEP INJECTION WELL

Core Depth (feet)	D-5084 Test Method*	Test Specimen Orientation	G_s	Initial Conditions					$\bar{\sigma}_c$ (lb/in^2)	u_b (lb/in^2)	B Factor (%)	Average Hydraulic Gradient	Final Conditions			Hydraulic Conductivity k_{20} (cm/sec)
				Length (cm)	Diameter (cm)	w_c (%)	γ_d (lb/ft^3)	n					w_c (%)	γ_d (lb/ft^3)	S (%)	
1760	A	Vertical	2.76	9.02	10.05	7.6	141.7	0.18	30	70	96	18	7.7†	141.7	99	4.7×10^{-6}
	A	Horizontal		7.98	5.04	7.7	142.0	0.18	30	160	97	25	7.7	142.0	100	2.4×10^{-6}
1897	A	Vertical	2.71	9.51	9.83	14.5	119.7	0.29	30	70	93**	15	14.5†	119.7	95	5.5×10^{-7}
	A	Horizontal		7.77	5.04	14.5	121.0	0.28	30	160	92**	34	14.5	121.0	99	7.4×10^{-7}
2085	A	Vertical	2.83	9.53	10.10	0.9	169.6	0.04	30	70	73**	257	0.9†	169.6	63	5.6×10^{-10}
	A	Horizontal		8.34	5.04	0.9	172.1	0.03	30	160	99	35	0.9	172.1	100	4.0×10^{-8}
2343	A	Vertical	2.86	8.12	10.09	5.2	152.1	0.15	30	70	89**	4	5.2†	152.1	86	1.1×10^{-4}
	A	Horizontal		8.27	5.04	5.2	154.4	0.13	30	160	91**	30	5.2	154.4	96	2.3×10^{-6}

Where: w_c = Moisture content; γ_d = Dry density; G_s = Specific gravity; n = Total Porosity; $\bar{\sigma}_c$ = Average Isotropic effective confining stress; u_b = Back-pressure; and S = Calculated degree of saturation using measured specific gravity.

* Method A = Constant-head test.

** B-Factor remained relatively constant for two consecutive increments of applied cell pressure.

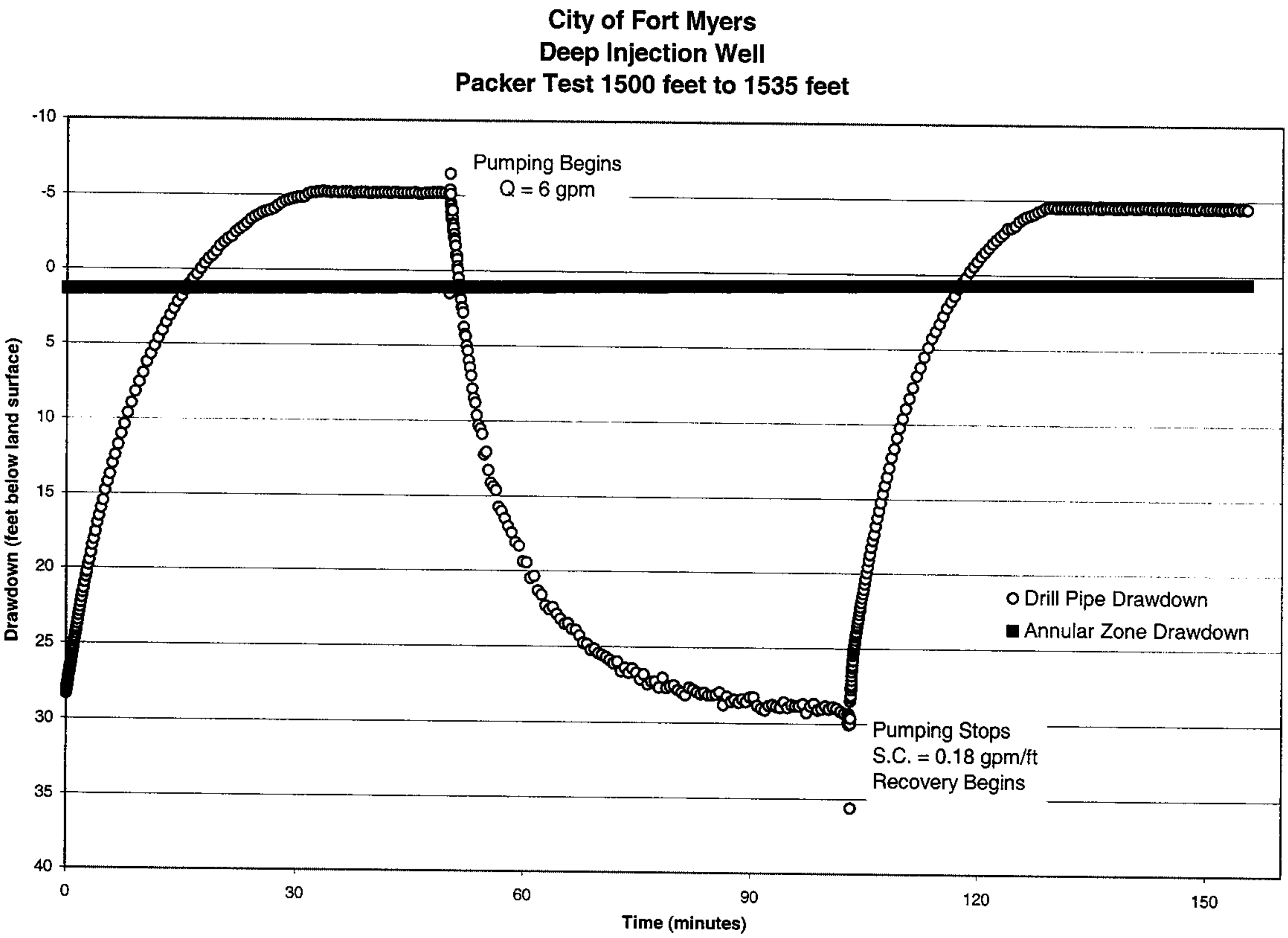
† Vertical permeability test specimen was cored upon completion of testing to obtain horizontal permeability test specimen. The final moisture content of the vertical test specimen was not measured, and was assumed to be the same as the horizontal permeability test specimen.

APPENDIX I

Packer Testing Data Plots

APPENDIX I.1

IW-1 Packer Test Drawdown Figure Interval of 1,500 ft to 1,535 ft bls



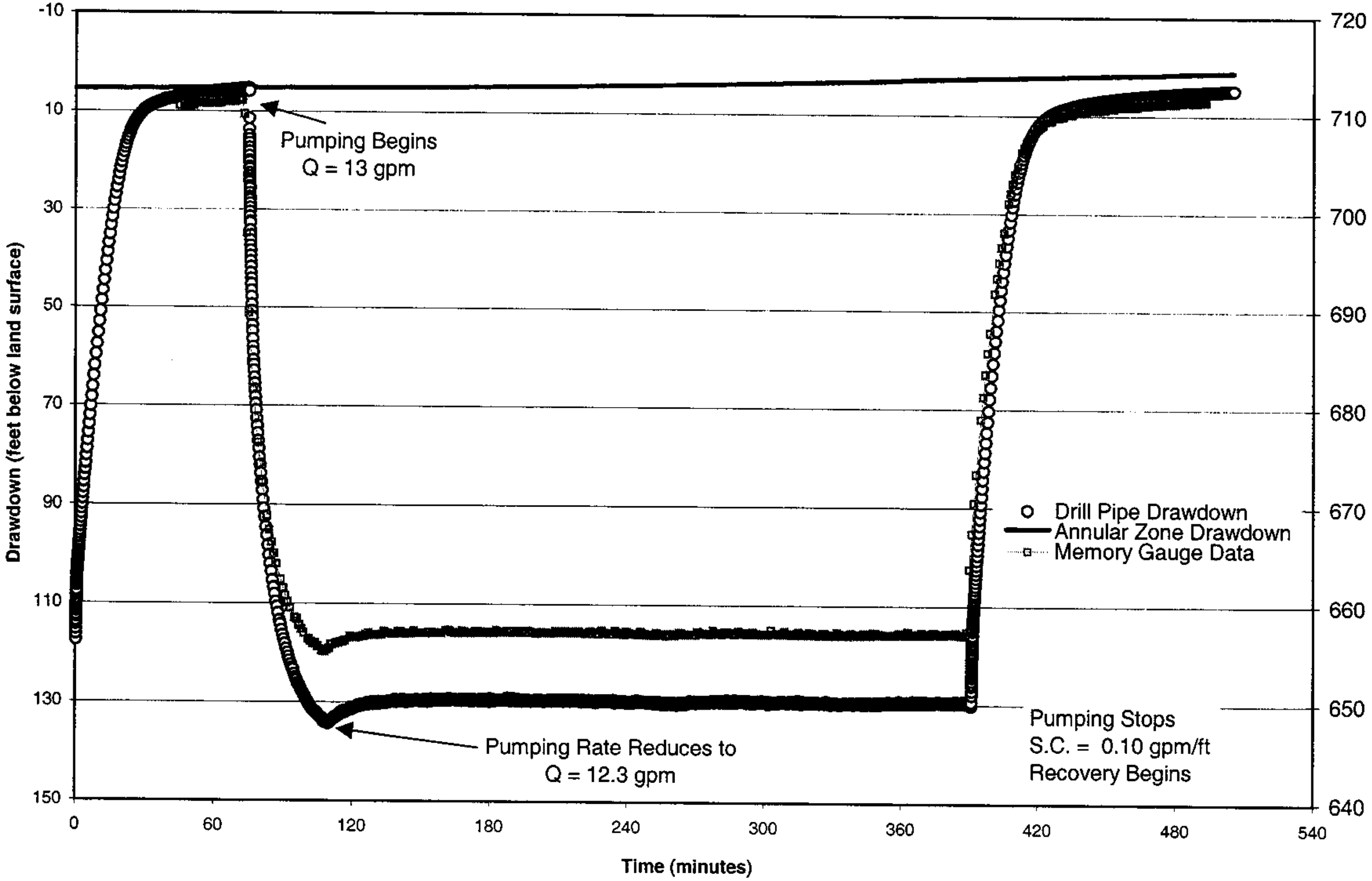
CH2MHILL

IW-1 Packer Test Drawdown Data
Interval of 1500 feet to 1535 feet bls

APENDIX I.2

IW-1 Packer Test Drawdown Figure Interval of 1,535 ft to 1,584 ft bls

City of Fort Myers
Deep Injection Well
Packer Test 1535 feet to 1584 feet



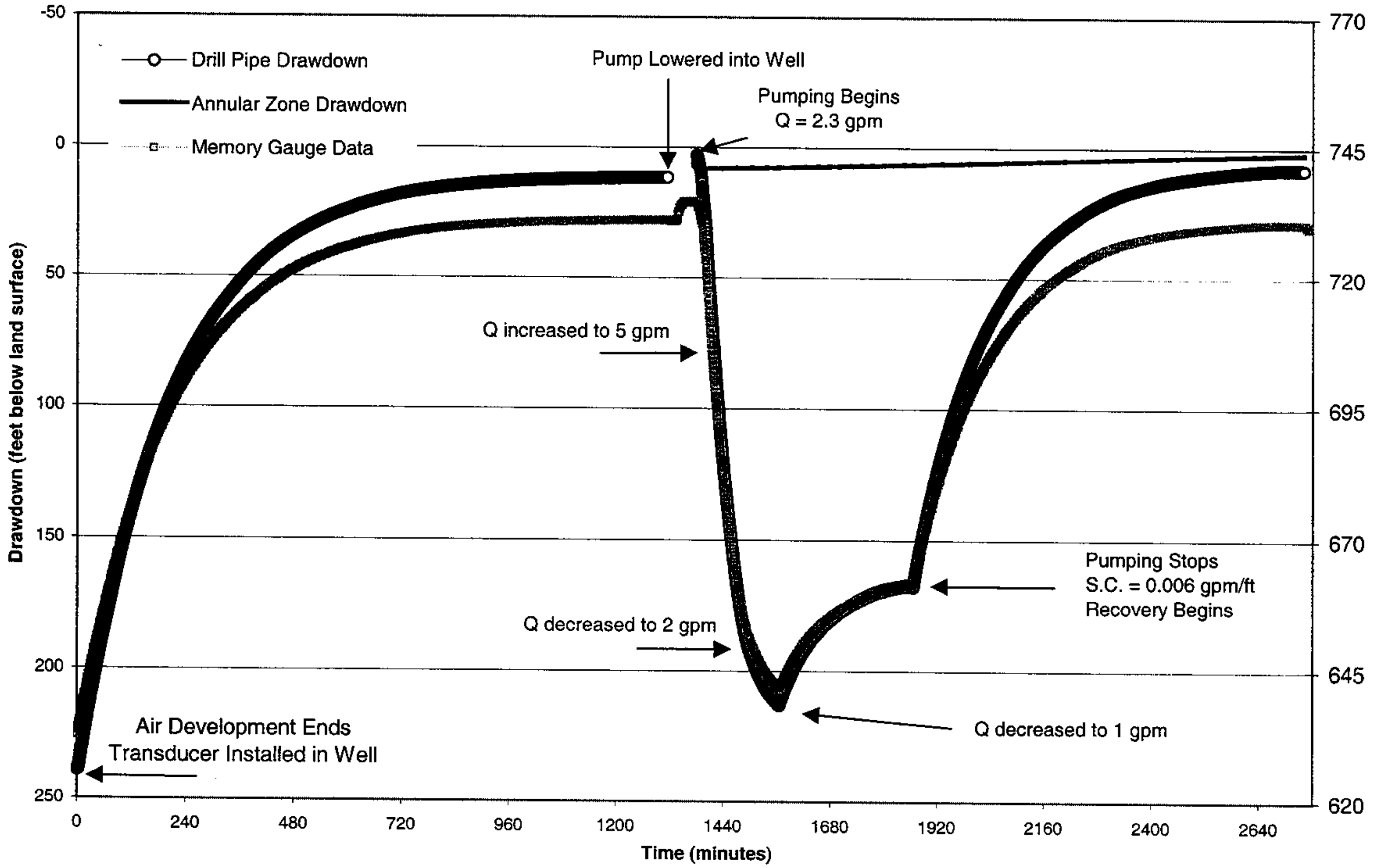
CH2MHILL

IW-1 Packer Test Drawdown Data
Interval of 1535 feet to 1584 feet bls

APPENDIX I.3

IW-1 Packer Test Drawdown Figure Interval of 1,584 ft to 1,620 ft bls

City of Fort Myers
Deep Injection Well
Packer Test 1584 feet to 1620 feet



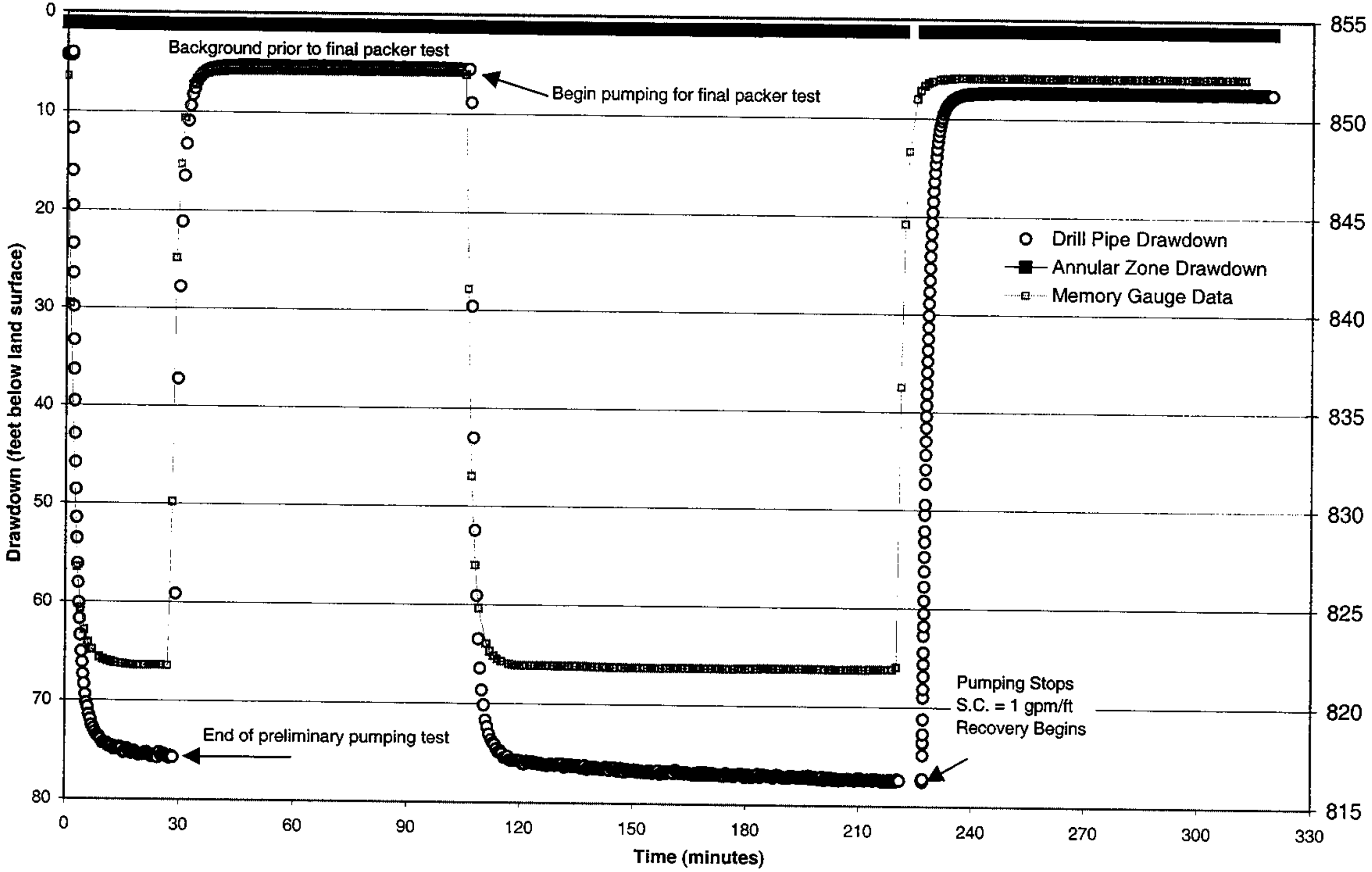
CH2MHILL

IW-1 Packer Test Drawdown Data
Interval of 1584 feet to 1620 feet bls

APPENDIX I.4

IW-1 Packer Test Drawdown Figure Interval of 1,755 ft to 1,897 ft bls

City of Fort Myers
Deep Injection Well
Packer Test 1755 feet to 1897 feet

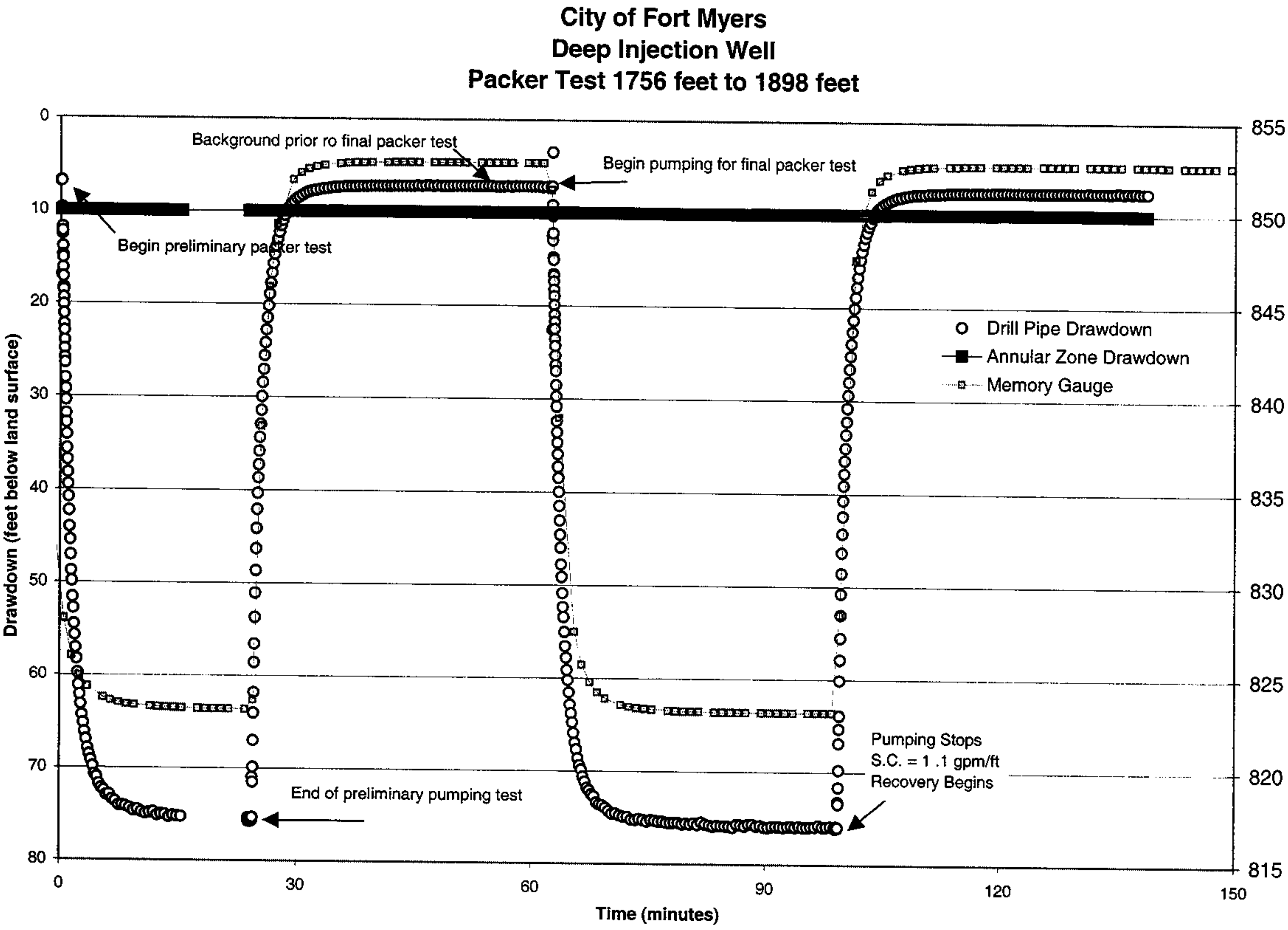


CH2MHILL

IW-1 Packer Test Water Level Data
Interval of 1755 feet to 1897 feet bls

APPENDIX I.5

IW-1 Packer Test Drawdown Figure Interval of 1,756 ft to 1,898 ft bls

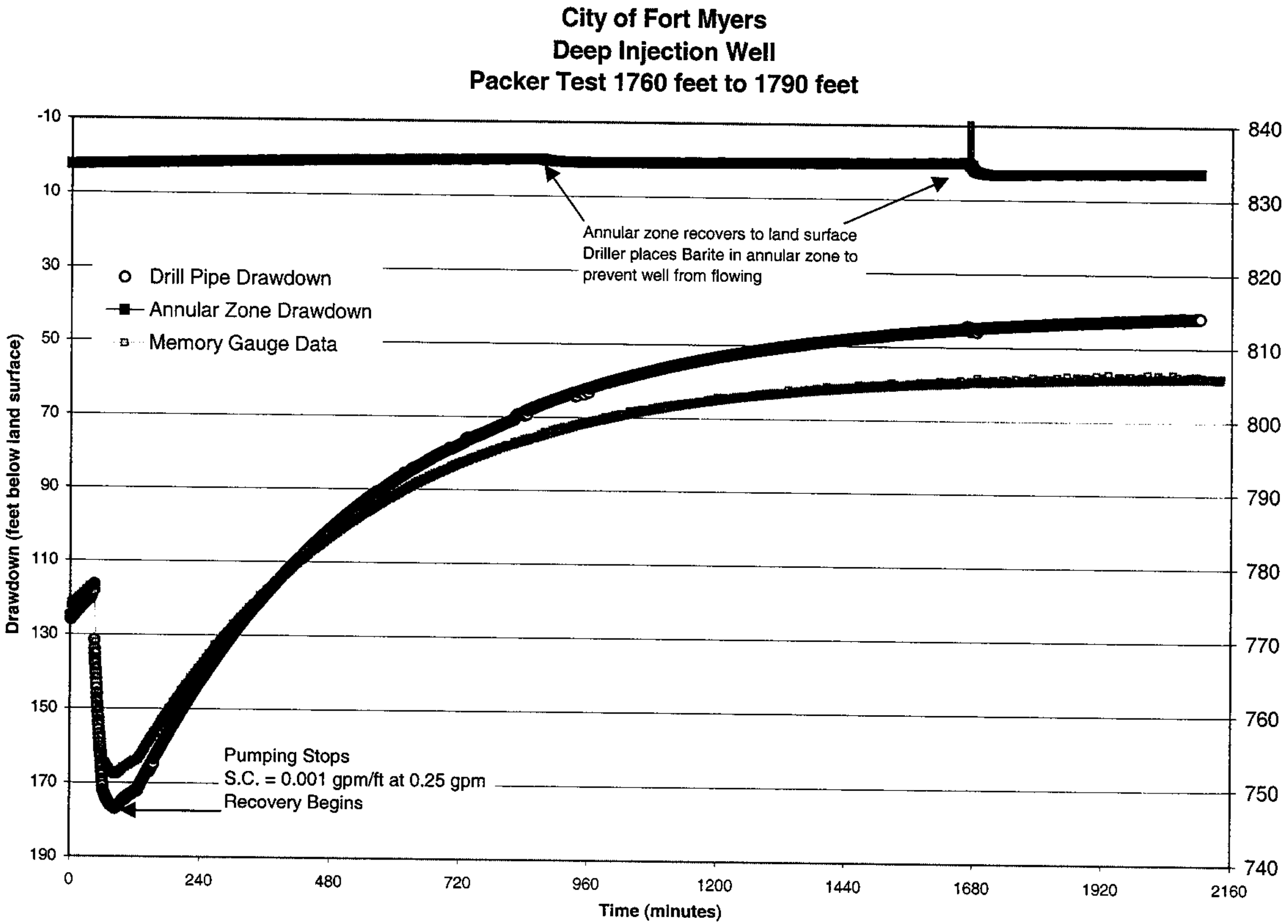


CH2MHILL

IW-1 Packer Test Water Level Data
Interval of 1756 feet to 1898 feet bls

APPENDIX I.6

IW-1 Packer Test Drawdown Figure Interval of 1,760 ft to 1,790 ft bls

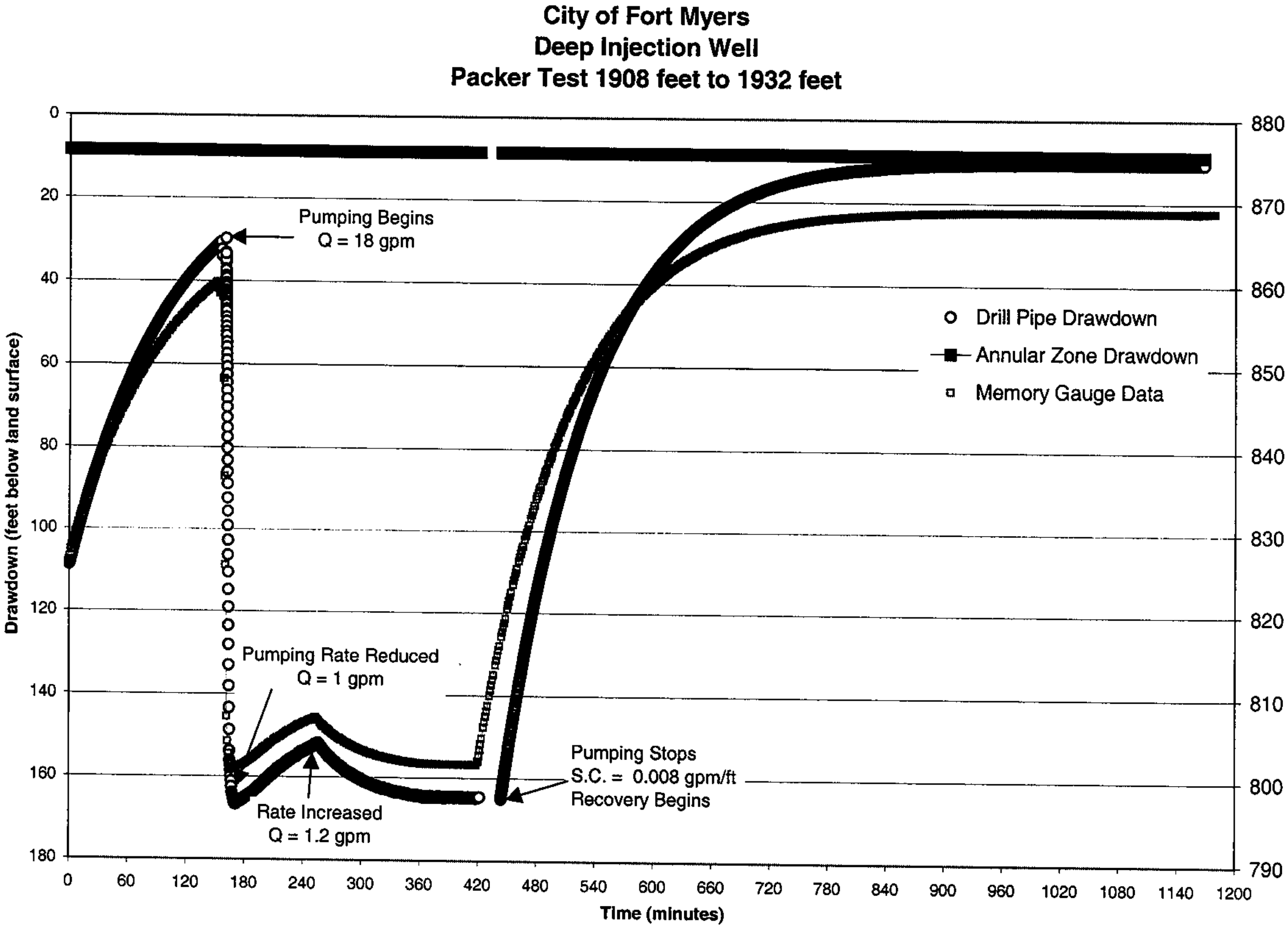


CH2MHILL

IW-1 Packer Test Water Level Data
Interval of 1760 feet to 1790 feet bls

APPENDIX I.7

IW-1 Packer Test Drawdown Figure Interval of 1,908 ft to 1,932 ft bls



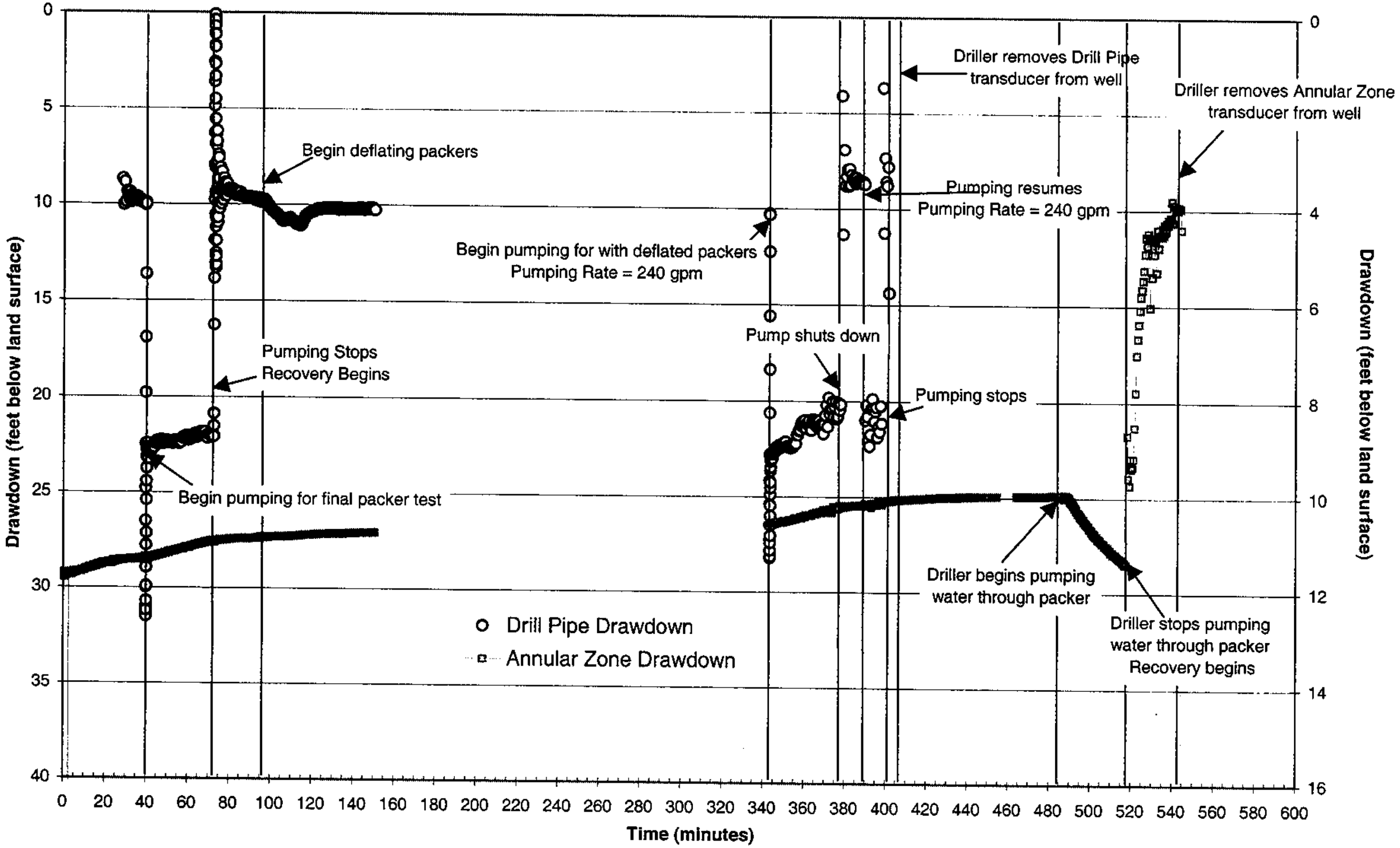
CH2MHILL

IW-1 Packer Test Drawdown Data
Interval of 1908 feet to 1932 feet bls

APENDIX I.8

IW-1 Packer Test Drawdown Figure Interval of 2,265 ft to 3,040 ft bls

City of Fort Myers
Deep Injection Well
Packer Test 2265 feet



IW-1 Packer Test Water Level Data
Off-Bottom Packer at 2265 feet bls

Appendix J – Full Scale Geophysical Logs

This Appendix is provided in Volume 2 of 3

APPENDIX K

Video Log Survey Summaries

APPENDIX K.1

IW-1 12.25-inch Borehole to 1,758 feet bls

CH2MHILL

Record of Underwater TV Survey

Project: City of Fort Myers Deep Injection Well
Well: IW-1
Survey By: Florida Geophysical, Inc.

Survey Date: 11/28/2001
Witnessed By: Randy Dean / CH2M HILL

Reviewed By: Niel Postlethwait/CH2M HILL
Remarks: All depths referenced to land surface
Date: 05/16/2002

Well Depth: 1758 feet bls
Survey Interval: 100-1758 feet bls
Casing: 36-inch steel to 450 ft
Borehole: 12.25-inch to 1758 ft

Depth In Feet		Observations
From	To	
100	126.7	casing joint, no problems noted
126' 7	126.7	casing wall, no problems noted
126.7	147.8	casing joint, no problems noted
147.8	147.8	casing wall, no problems noted
147.8	167.8	casing joint, no problems noted
167.8	167.8	casing wall, no problems noted
167.8	207.8	casing joint, no problems noted
207.8	207.8	casing wall, no problems noted
207.8	247.8	casing joint, no problems noted
247.8	247.8	casing wall, no problems noted
247.8	297.8	casing joint, no problems noted
297.8	297.8	casing wall, no problems noted
334.7	334.7	casing joint, no problems noted
334.7	383.7	casing wall, no problems noted
383.7	383.7	casing joint, no problems noted
383.7	422.7	casing wall, no problems noted
422.7	422.7	casing joint, no problems noted
422.7	452.1	casing wall, no problems noted
455.6	455.6	dual borehole, camera forced off center
455.6	459.7	tight gauge borehole
459.7	459.7	smooth limestone present along the sidewalls
459.7	461.2	note horizontal fracture of limestone
461.2	463.4	note vertical fracture of existing limestone formation
463.4	474.6	gauged borehole small vugs, tight formation, fairly low porosity
474.6	475	Vertical fracture
475	507	small to medium size vug region
507	514	tightly gauged borrehole and low porosity

Depth (feet)		
From	To	Observations
514	519	small size vug
519	561	gauged borehole and occasional small vuggy regions
561	566	large cavernous region
566	572	tightly gauged borehole and low porosity
572	576	water quality deteriation and breakout area along to sidewall
576	592	gauged borehole with small breakout area. Low visibility and low porosity
592	592	small observed breakout area
592	602	gauged borehole
602	610	small size vuggy region
610	656	poor visibility water quality murky and sidewalls of the borehole
		poorly defined
656	705	tightly gauged borehole with occasional small vugs
705	750	tightly gauged borehole with low porosity
750	758	small vugs
758	758	horizontal fracture
758	775	gauged borehole and occasional small vuggy regions
775	775	horizontal fracture
778	778	vertical fracture
778	801	few horizontal fractures and small vug region
801	805	tightly gauged borehole and low porosity
805	850	small sized vuggy region
850	877	small vug region and water quality very murky
877	891	region with small vugs
891	891	horizontal fracture
891	900	poor visibility water quality murky and sidewalls of the borehole
900	914	poor visibility water quality murky and sidewalls of the borehole
914	916	small breakout along the sidewall of the borehole
916	923	small breakout region with small to medium size vugs
923	967	small size vug region this section of the borehole
967	970	breakout region and small size vug region
970	999	small vuggy region
999	999	horizontal fracture
999	1002	small cavernous zone
1002	1015	small vug region and water quality very murky
1015	1015	horizontal fracture
1015	1025	water quality contiunes to detriate and difficult to determine physical
		features of the borehole sidewalls
1025	1050	murky and salty appearance borehole appears as small size vugs
1050	1758	murky and salty appearance cannot view the sidewall of borehole

End of Video

APPENDIX K.2

IW-1 12.25-inch Borehole to 3,040 feet bls

CH2MHILL

Record of Underwater TV Survey

Project: City of Fort Myers Deep Injection Well
Well: IW-1
Survey By: Florida Geophysical, Inc.

Survey Date: 1/15/2002 and 1/18/2002
Witnessed By: Randy Dean / CH2M HILL

Reviewed By: Randy Dean / CH2M HILL
Remarks: All depths referenced to land surface
Date: 01/20/2002

Well Depth: 3040 feet bls
Survey Interval: 1640-3040 feet bls
Casing: 28-inch Steel to 1,640 ft
Borehole: 12.25-inch to 3040 ft

Depth in Feet		Observations
From	To	
1640	1740	Bottom of casing at 1,650 feet. Cement in pilot hole from borehole plugback from 1,656 feet to 1,663 feet bpl. Egg shaped borehole from 1,615 feet to 1,700 feet bpl. Small cavities between 1,690 and 1,700 feet.
1740	1800	Smooth borehole with occasional irregularities.
1800	1880	Larger, smooth borehole to 22-inches.
1880	2030	Gauge borehole with occasional small cavities and irregularities.
2030	2105	Extremely fractured interval with small cavernous zones.
2105	2310	Smooth borehole with occasional fractures and small cavities.
2310	2410	Heavily fractured interval with many medium cavities and vertical fractures.
2410	2450	Fractured interval with occasional minor cavities.
2450	2605	Smooth borehole with occasional small cavities. Fracture present at 2,480 feet.
2605	2620	Fractured and cavernous interval.
2620	2700	Smooth borehole with occasional minor cavities.
2700	2775	Heavily fractured interval with many medium cavities and vertical fractures.
2775	2820	Nearly gauge borehole. Interval has extensive vertical fracturing.
2820	3043	Extremely fractured interval with extensive vertical fractures and large cavernous zones.

End of Video

APPENDIX K.3

IW-1 28-inch Reamed Hole to 2,305 feet bls, 12.25-inch Borehole to 3,040 feet bls

CH2MHILL

Record of Underwater TV Survey

Project: City of Fort Myers Deep Injection Well
Well: IW-1
Survey By: Florida Geophysical, Inc.

Survey Date: 02/11/2002
Witnessed By: Pete Larkin / CH2M HILL

Reviewed By: Niel Postlethwait / CH2M HILL
Remarks: All depths referenced to land surface
Date: 05/20/2002

Well Depth: 3040 feet bls
Survey Interval: 1640-3040 feet bls
Casing: 28-inch Steel to 1,640 ft
Borehole: 28-inch from 1640 feet to 2305 ft and 12.25-inch to 3040 feet bls

Depth in Feet		Observations
From	To	
1640	1651	suspended solids and vuggy region: medium size vugs
1651	1657	small/medium size cavernous region
1657	1660	tightly gauged borehole
1660	1683	vuggy region and small breakout region along the left camera sidewall medium sized vuggy region along this section
1683	1685	small cavernous zone and small vugs and fractures
1685	1689	small breakout zone just before small cavernous area
1689	1692	the horizontal fracture and small vertical fracture
1692	1711	medium sized vuggy region along this section
1711	1711	small fracture fracture observed
1711	1730	large vuggy region and a few areas of breakout
1730	1737	casing joint, no problems noted
1737	1737	horizontal fracture present
1737	1759	three vertical fracture present and area appears porous
1759	1762	gauged borehole and not porous
1762	1765	gauged borehole
1765	1765	breakout area observed along borehole sidewall
1765	1776	tightly gauged borehole and low porosity
1776	1794	gauged borehole and breakout area and small vugged region
1794	1808	dual borehole, camera forced off center
1808	1812	horizontal fracture
1812	1828	tightly gauged borehole
1828	1834	small to medium size vug region
1834	1850	small to medium size vug region and horizontal and fractures present
1850	1863	gauged borehole, tight formation, fairly low porosity
1863	1866	small breakout region along the borehole sidewall
1866	1870	breakout of region and large vuggy region

Depth in Feet		
From	To	Observations
1870	1884	vuggy region and small breakout region along the left camera sidewall
1884	1884	vuggy region, fairly high porosity
1884	1906	tightly gauged borehole
1906	1906	horizontal fracture present
1906	1915	small sized vuggy region
1915	1935	tightly gauged and occasional breakout or small vug
1935	1940	small vugs
1940	1942	larger vuggy region
1942	1960	tightly gauged with occasional small vugs
1960	1970	tightly gauged and occasional vugs or vuggy region
1970	1972	tightly gauged borehole
1972	2002	tightly gauged borehole with occasional small vugs
2002	2002	small cavernous region
2002	2022	small vuggy region and vertical fracture at 2017 foot
2022	2030	small cavernous region with occasional vugs and fairly high porosity
2030	2046	small to medium sized vug within the region
2046	2065	small vuggy region and few vertical fractures
2065	2102	few cavernous regions and small vug region
2102	2135	small vuggy region and few horizontal fractures
2135	2137	tightly gauged borehole and low porosity
2137	2139	small cavernous region
2139	2142	small vug
2142	2160	tightly gauged borehole with few small vug regions
2160	2195	small vuggy regions and occasional tightly gauged borehole
2195	2207	small and medium size vugs and small cavernous region observed
2207	2215	observed vertical fracture
2215	2244	medium sized vuggy region along this section
2244	2246	between these two depths two horizontal fractures present
2246	2260	small size vug region this section of the borehole and small breakout region
2260	2300	small vuggy region and occasional breakout area and small cavernous
2300	2313	small size vug region
2313	2316	horizontal fracture
2316	2317	probe off-center against the left sidewall of the borehole
2317	2324	small size vug region
2324	2345	small cavern and larger vuggy region
2345	2350	tightly gauged borehole
2350	2375	vuggy region
2375	2381	cavernous region and large vugs along the borehole sidewalls
2381	2395	medium sized vugs and vertical and horizontal fractures throughout this section of borehole
2395	2420	many fractures along this section with small to medium size vugs

Depth (feet)		
From	To	Observations
2420	2439	large cavernous region
2439	2455	tightly gauged borehole with occasional small vugs and small cavernous region. A couple of fractures also observed
2455	2462	vertical fracture and small vugs
2462	2472	tightly gauged borehole
2472	2480	cavernous region
2480	2530	tightly gauged with small fractures and small vugs
2530	2533	medium to large size vugs
2533	2614	tightly gauged borehole
2614	2620	large vuggy region and a few areas of breakout. Fractures were also observed
2620	2631	small vugs
2637	2670	tightly gauged borehole
2672	2679	porous and small and medium size vugs
2679	2688	tightly gauged borehole
2688	2696	small and medium size vugs and breakout area observed
2696	2700	breakout along the gauged borehole
2700	2713	tightly gauged borehole
2713	2715	small cavernous region
2715	2725	small to medium sized vuggy region
2725	2750	gauged borehole
2750	2756	large size vugs observed
2756	2769	vuggy region and couple of fractures present
2769	2785	vuggy region with occasional breakout area present
2785	2786	horizontal fracture present
2786	2795	medium size vugs present and large vertical fractures
2795	2805	horizontal fractured region
2005	2817	breakout area observed along borehole sidewall small size vug region with observed vertical fracture
2817	2834	fractured region
2834	2837	cavernous section
2837	2847	large vuggy region
2847	2853	small vuggy region and gauged borehole
2853	2860	horizontal fracture present
2860	2861	small cavernous region
2861	2868	horizontal fracture present
2868	2877	large vuggy region and horizontal fracture presnt
2877	2884	vertical and horizontal fractures present
2884	2891	small cavernous region
2891	2893	horizontal fracture
2893	2900	small vuggy region
2900	2917	horizontal and vertical fractures

[illegible]	[illegible]	[illegible]
2925	2940	tightly gauged borehole and occusional small sized vugs
2940	2945	small cavernous region
2945	2947	small to medium sized vugs and small breakout area along the side of the borehole
2947	2955	cavernous region
2956	2957	borehole small vugs
2957	2959	horizontal fracture present
2960	2962	small cavernous section
2962	2970	small vuggy region with small cavernous region
2970	2975	cavernous area
2975	2984	cavernous area
2984	2992	small cavernous area
2992	2992	horizontal fracture present
2992	2996	small cavernous region
2996	2999	small vuggy region with small cavernous regions
3000	3006	cavnerous region and poorly defined borehole and small vugs
3006	3017	cavernous region
3017	3018	vuggy area
3018	3020	cavernous region
3024	3031	cavernous region
3034	3034	horizontal fracture
3034	3036	gauged borehole
3037	3040	small cavernous section and small and some large vugs

End of Video

APPENDIX K.4

IW-1 Completed Well – FRP Tubing

CH2MHILL

Record of Underwater TV Survey

Project: City of Fort Myers Deep Injection Well
Well: IW-1
Survey By: Florida Geophysical, Inc.

Survey Date: 04/12/2002
Witnessed By: Mike Weatherby / CH2M HILL

Reviewed By: Niel Postlethwait / CH2M HILL
Remarks: All depths referenced to land surface
Date: 05/20/2002

Well Depth: 3040 feet bls
Survey Interval: 3 - 3042 feet bls
Casing: 18-inch Steel to 2,312 ft
Borehole: 12.25-inch to 3040 ft

Depth in Feet		Observations
From	To	
3.3	32	casing joint, no problems noted
32	61.4	casing joint, no problems noted
61.4	90.3	casing joint, no problems noted
90.3	119.5	casing joint, no problems noted
119.5	148.7	casing joint, no problems noted
148.7	177.8	casing joint, no problems noted
177.8	207.1	casing joint, no problems noted
207.1	236.4	casing joint, no problems noted
236.4	265.7	casing joint, no problems noted
265.7	297	casing joint, no problems noted
297	324.3	casing joint, no problems noted
324.3	353.6	casing joint, no problems noted
353.6	282.7	casing joint, no problems noted
282.7	412	casing joint, no problems noted
412	441.3	casing joint, no problems noted
441.3	470.4	casing joint, no problems noted
470.4	499.8	casing joint, no problems noted
499.8	528.58	casing joint, no problems noted
528.58	557.5	casing joint, no problems noted
557.5	586.7	casing joint, no problems noted
586.7	616.1	casing joint, no problems noted
616.1	645.3	casing joint, no problems noted
645.3	674	casing joint, no problems noted
674	703.2	casing joint, no problems noted
703.2	732.5	casing joint, no problems noted
732.5	761.7	casing joint, no problems noted
761.7	791	casing joint, no problems noted
791	820.3	casing joint, no problems noted
820.3	849.5	casing joint, no problems noted
849.5	878.6	casing joint, no problems noted
878.6	907.7	casing joint, no problems noted
907.7	936.5	casing joint, no problems noted

Depth in Feet		Observations
From	To	
936.5	965.5	casing joint, no problems noted
965.5	994.3	casing joint, no problems noted
994.3	1023.4	casing joint, no problems noted
1023.4	1052.7	casing joint, no problems noted
1052.7	1081.9	casing joint, no problems noted
1081.9	1111.1	casing joint, no problems noted
1111.1	1140.2	casing joint, no problems noted
1140.2	1169.4	casing joint, no problems noted
1169.4	1198.8	casing joint, no problems noted
1198.8	1227.8	casing joint, no problems noted
1227.8	1257	casing joint, no problems noted
1257	1286.2	casing joint, no problems noted
1286.2	1315.4	casing joint, no problems noted
1315.4	1343.7	casing joint, no problems noted
1343.7	1373	casing joint, no problems noted
1373	1402.1	casing joint, no problems noted
1402.1	1430.8	casing joint, no problems noted
1430.8	1459.9	casing joint, no problems noted
1459.9	1489	casing joint, no problems noted
1489	1518.2	casing joint, no problems noted
1518.2	1547.4	casing joint, no problems noted
1547.4	1576.5	casing joint, no problems noted
1576.5	1605.6	casing joint, no problems noted
1605.6	1634.4	casing joint, no problems noted
1634.4	1663.3	casing joint, no problems noted
1663.3	1692.2	casing joint, no problems noted
1692.2	1720.8	casing joint, no problems noted
1720.8	1749.8	casing joint, no problems noted
1749.8	1778.7	casing joint, no problems noted
1778.7	1807.7	casing joint, no problems noted
1807.7	1836.8	casing joint, no problems noted
1836.8	1866	casing joint, no problems noted
1866	1895.3	casing joint, no problems noted
1895.3	1924.5	casing joint, no problems noted
1924.5	1953.7	casing joint, no problems noted
1953.7	1983	casing joint, no problems noted
1983	2012.1	casing joint, no problems noted
2012.1	2041.2	casing joint, no problems noted
2041.2	2070.6	casing joint, no problems noted
2070.6	2099.6	casing joint, no problems noted
2099.6	2128.4	casing joint, no problems noted
2128.4	2157.5	casing joint, no problems noted
2157.5	2186.6	casing joint, no problems noted
2186.6	2215.6	casing joint, no problems noted
2215.6	2244.8	casing joint, no problems noted
2244.8	2274	casing joint, no problems noted
2274	2304	casing joint, no problems noted

Depth in feet		
From	To	Observations
2304	2312.2	casing joint, no problems noted
2312	2314	concrete and gauged borehole
2314	2320	gauged borehole and vertical fracture
2320	2322	vertical fracture observed
2322	2329	small vuggy region and ocasional small caverns
2329	2331	cavernous region and vuggy
2331	2342	medium size vugs and small cavernous regions present
2342	2349	tightly gauged borehole
2349	2361	gauged borehole and occasional small/medium sized vugs
2361	2362	small cavernous region
2362	2381	gauged borehole with small vugs and occasional fractures present along the borehole sidewall
2381	2384	cavernous region with large vugs
2384	2389	vertical fracture observed
2389	2399	tightly gauged borehole
2399	2410	vertical and horizontal fractures present
2410	2419	tightly gauged borehole with occasional small vugs
2419	2425	small vuggy sidewall of borehole
2425	2427	samll vuggy region and small cavernous section
2427	2429	gauged borehole
2429	2440	small vug region and fractures present
2440	2442	small cavernous region
2442	2459	tightly gauged borehole
2459	2469	small vug region and vertical fracture present
2469	2478	gagued borehole with occasional small sized vugs
2478	2480	small sized vugs and occasional small cavernous section
2480	2482	cavernous section
2482	2484	cavernous section
2484	2489	small vuggy section
2489	2490	vertical fracture observed
2490	2526	small vuggy borehole characteristics and water quality deteriation increase in suspended solids and borehole side walls not clearly defined
2526	2550	tightly gauged borehole and occusional small sized vugs
2550	2605	gauged borehole and occasional small/medium sized vugs
2605	2617	tightly gauged borehole with occasional vugs and small breakout area along the side of the borehole
2617	2625	vuggy region with occasional vertical and horizontal fractures present
2625	2626	small cavernous section
2626	2535	large vuggy region observed along the borehole sidewalls
2535	2649	small vuggy region
2649	2650	small vuggy region with small cavernous region
2650	2652	gauged borehole with occasional fractures and vugs
2652	2668	tightly gauged borehole
2668	2682	small and medium sized vugs and fractures also observed
2682	2693	horizontal fracture present
2693	2708	small/medium size vugs with occasional large vugs present
2708	2710	cavernous region

Depth Range		
From	[illegible]	Video Observations
2710	2742	small vuggy borehole sidewall
2742	2759	small vugs and occasion fracture observed
2759	2778	increase in suspended solids and borehole side walls not clearly defined murky water quality, small vug present
2778	2797	small/medium size vugs
2797	2815	small vuggy region
2815	2829	small vuggy region and some horizontal and vertical fractures present along the borehole sidewall
2829	2833	large vertical faractures and borehole wall structure large vuggy region (rocky)
2833	2841	small vuggy region
2841	2842	small vuggy region with occasional cavernous region
2842	2848	rocky borehole sidewall
2848	2853	cavernous region
2853	2872	large vuggy region observed along the borehole sidewalls and small cavernous region
2872	2873	large vuggy vegion
2873	2889	cavernous region
2889	2896	small cavernous region
2896	2922	small vuggy region
2922	2944	small vuggy region with horizontal and vertical fractures
2944	2955	small vuggy region with fractures and small caverns present
2955	2957	small cavernous region with small size vug borehole sidewalls
2957	2963	cavernous region
2963	2989	small vuggy region
2989	3000	small/medium size vugs
3000	3003	small/medium size vugs and occasional breakout areas
3003	3009	small size vugs present along borehole walls and small cavernous section
3009	3015	large vuggy region
3015	3018	gauged borehole
3018	3042	small cavernous section and small and some large vugs

End of Video

APPENDIX K.5

DZMW-1 Video Log Survey Summary

CH2MHILL

Record of Underwater TV Survey

Project: City of Fort Myers Deep Injection Well
Well: Dual Zone Monitor Well (Deep Zone)
Survey By: Florida Geophysical, Inc.

Survey Date: April 8, 2002
Witnessed By: Mike Weatherby / CH2M HILL
Reviewed By: Pete Larkin / CH2M HILL
Remarks: All depths referenced to land surface

Total Depth: 1750 feet bls
Casing: 6.45-inch (OD) FRP
Casing Depth: 1704 feet bls

Depth in Feet		
From	To	Observations
23	1704	Begin survey at 23 feet bls. Submerged in water inside 6-inch diameter casing. Casing joints every 30 feet. No problems noted.
1704	1706	Base of casing at 1704 feet bls, joined to plug extending to 1706 feet bls.
1706	1720	Enter 11-inch diameter borehole, low visibility, gauged borehole with small vugs.
1720	1750	Gauged borehole slightly more vuggy.
1750	1750	TD of well. Gauged to TD with no fracturing or formation instability at base of
		well.

APPENDIX L

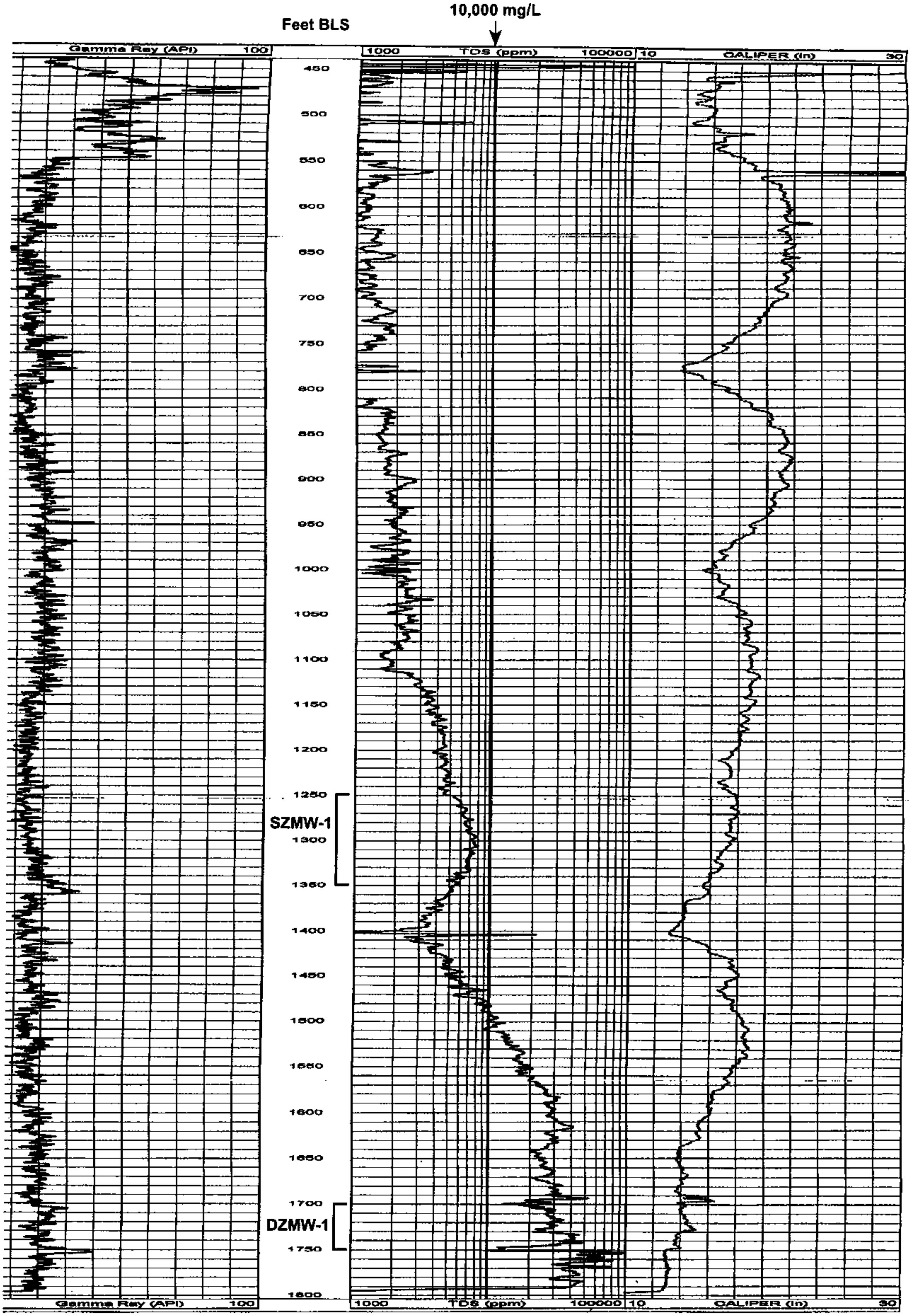
Video Survey – Video Tapes

Appendix L Video Survey - Video Tapes

This Appendix is provided in Volume 3 of 3
and consists of 6 video tapes in VHS format

APPENDIX M

Geophysical Combination Log



FIGURE

Geophysical Logging Event Determining USDW Location
City of Fort Myers RO IW-1 Engineering and Facilites Report

CH2MHILL

APPENDIX N

Ambient Water Quality Data - FDEP Primary and Secondary Drinking Water Quality Standards

APPENDIX N.1

IW-1 Ambient Water Quality Data

Sanders
Laboratories
Environmental Testing Services

May 2, 2002

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Fort Myers, FL 33908

Reference: Analysis Certification Letter
Sanders Laboratory Report: N0203567

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or person who manages the system or those person 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 there are significant penalties for submitted false information, including the possibility of fine and imprisonment for knowing violation."

Andy Konopacki
Laboratory Supervisor

Sanders Laboratories
Environmental Testing Services

Laboratory Results

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0203567-01	injection well grab	Ground Water	3/26/02 13:40

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**
Air Temperature-field	170.1	34.8		0.1	C	3/26/02 13:40	JC
Aluminum	200.7	< 0.020		0.020	mg/L	4/4/02 14:40	JPW
Ammonia-N	350.3	0.50		0.05	mg/L	3/27/02 10:30	SR
nony	200.7	< 0.0022		0.0022	mg/L	4/4/02 14:40	JPW
Arsenic	200.7	< 0.0028		0.0028	mg/L	4/4/02 14:40	JPW
Barium	200.7	< 0.0001		0.0001	mg/L	4/4/02 14:40	JPW
Beryllium	200.7	< 0.0008		0.0008	mg/L	4/4/02 14:40	JPW
Biochemical Oxygen Demand (5)	405.1	< 2		2	mg/L	3/27/02 15:00	RG
Cadmium	200.7	< 0.0002		0.0002	mg/L	4/4/02 14:40	JPW
Chemical Oxygen Demand	410.4	2080		50	mg/L	3/28/02 10:00	DA
Chloride	300.0	19700		30.0	mg/L	3/27/02 17:22	MA
Chromium	200.7	0.074		0.001	mg/L	4/4/02 14:40	JPW
Color	2120B	10		1	PtCo units	3/27/02 11:15	DA
Copper	200.7	0.0018		0.0012	mg/L	4/4/02 14:40	JPW
Dissolved Oxygen-field	360.1	1.78		0.01	mg/L	3/26/02 13:40	JC
Fluoride	300.0	< 10.0	*	10.0	mg/L	3/27/02 17:22	MA
	200.7	0.406		0.030	mg/L	4/4/02 14:40	JPW
Lead	200.7	0.029		0.001	mg/L	4/4/02 14:40	JPW

Laboratory Results

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203567-01	injection well grab	Ground Water	3/26/02 13:40

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Manganese	200.7	0.0130		0.0001	mg/L	4/4/02 14:40	JPW
Mercury	245.1	< 0.001		0.001	mg/L	3/28/02 11:36	JPW
Nickel	200.7	0.049		0.001	mg/L	4/4/02 14:40	JPW
Nitrate+Nitrite-N	353.2	< 0.05		0.05	mg/L	3/26/02 16:31	CC
Nitrate-N	353.2	< 0.05		0.05	mg/L	3/26/02 17:37	CC
Nitrite-N	353.2	< 0.05		0.05	mg/L	3/26/02 17:37	CC
Nitrogen, Organic	351.2/350.3	0.42		0.05	mg/L	3/27/02 12:02	CC
Nitrogen, Total Kjeldahl	351.2	0.92		0.06	mg/L	3/27/02 12:02	CC
Odor	SM2150B	17		1	TON	3/26/02 16:15	EW
pH-field	150.1	7.19		0.01	pH units	3/26/02 13:40	JC
Phosphorus, Total	365.2	0.021		0.010	mg/L	3/28/02 10:30	SR
See attached results	Subcontract	n/a		n/a	NONE	3/27/02 16:31	SUB
Selenium	200.7	< 0.0016		0.0016	mg/L	4/4/02 14:40	JPW
Silver	200.7	< 0.001		0.001	mg/L	4/4/02 14:40	JPW
Sodium	200.7	9600		35	mg/L	4/4/02 14:40	JPW
Specific Conductance, field	120.1	**		0.1	umhos/cm	3/26/02 13:40	JC
Sulfate	300.0	2650		30.0	mg/L	3/27/02 17:22	MA
Thallium	200.7	< 0.0035		0.0035	mg/L	4/4/02 14:40	JPW
Total Coliform, MF	9222B	< 1		1	col/100ml	3/26/02 17:00	JS
Total Dissolved Solids	160.1	37800		5	mg/L	3/27/02 7:30	EW
Water Temperature-field	170.1	33.6		0.1	C	3/26/02 13:40	JC

Client Project: City of Fort Myers
Lab Project: N0203567
Report Date: 04/26/02

Laboratory Results

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0203567-01	injection well grab	Ground Water	3/26/02 13:40

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst
Zinc	200.7	0.056		0.002	mg/L	4/4/02 14:40	JPW

Approved by:

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

Comments:

* Due to high conductivity a high dilution had to be done, thus increasing the detection limit. ** No result due to instrument error. A second reading was taken on 04/11/02 - (N0204220)the result was 52,600 umhos/cm.

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 023 11-06-A
Transmittal No. #_____ **Date:** 5/3/02
Signature_____

TestAmerica
INCORPORATED

il 8, 2002

CLIENT: SANDERS LABORATORY
1050 ENDEAVOR CT
NOKOMIS, FL 34275

ATTN: T. BRIGHT

Order Number: 22529
Project Name: 62-550
Project Number: N0203567
Date Received: 03/28/02

Sample Identification	Lab Number	Collection Date and Time
N0203567	02-F7490	3/26/02 13:40

Approved By:

Mark Rusler, Director of Technical Services
Tim Besuden, Q.A. Officer
Linda Williams, Technical Services

Florida Certification Number: E83012 / CQAP990129

Attachments: chain-of-custody/field sheet

Sample report continued . . .

CLIENT: SANDERS LABORATORY
1050 ENDEAVOR CT
NOKOMIS, FL 34275

ATTN: T. BRIGHT

Order Number: 22529
Project: 62-550
Sample ID: N0203567
Lab Number: 02-F7490
Date Collected: 03/26/02
Time Collected: 13:40
Date Received: 03/28/02

LABORATORY REPORT

Analyte	Result	Q	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
EXTRACTABLE ORGANICS										
Benzo(a)pyrene	< 0.0400	U	ug/L	0.0400	1	4/ 3/02	3:54	RW	525.2	8154
Di(2-ethylhexyl)adipate	< 0.600	U	ug/L	0.600	1	4/ 3/02	3:54	RW	525.2	8154
Di(2-ethylhexyl)phthalate	3.90		ug/L	1.32	1	4/ 3/02	3:54	RW	525.2	8154
Butylbenzylphthalate	< 2.55	U	ug/L	2.55	1	4/ 2/02	17:00	RW	625	8152
2-Chlorophenol	< 4.10	U	ug/L	4.10	1	4/ 2/02	17:00	RW	625	8152
Diethylphthalate	< 4.96	U	ug/L	4.96	1	4/ 2/02	17:00	RW	625	8152
Dimethylphthalate	< 5.00	U	ug/L	5.00	1	4/ 2/02	17:00	RW	625	8152
Di-n-butylphthalate	< 4.01	U	ug/L	4.01	1	4/ 2/02	17:00	RW	625	8152
2,4-Dinitrotoluene	< 4.78	U	ug/l	4.78	1	4/ 2/02	17:00	RW	625	8152
Di-n-octylphthalate	< 2.43	U	ug/L	2.43	1	4/ 2/02	17:00	RW	625	8152
Isophorone	< 7.26	U	ug/L	7.26	1	4/ 2/02	17:00	RW	625	8152
2-Methyl-4,6-dinitrophenol	< 4.00	U	ug/L	4.00	1	4/ 2/02	17:00	RW	625	8152
Phenol	< 3.01	U	ug/L	3.01	1	4/ 2/02	17:00	RW	625	8152
2,4,6-Trichlorophenol	< 4.46	U	ug/L	4.46	1	4/ 2/02	17:00	RW	625	8152
VOLATILE ORGANICS										
1,1-Dichloropropene	< 0.06000	U	ug/L	0.06000	1	3/29/02	20:04	CTH	524.2	7914
Benzene	< 0.05000	U	ug/L	0.05000	1	3/29/02	20:04	CTH	524.2	7914
Bromobenzene	< 0.05000	U	ug/L	0.05000	1	3/29/02	20:04	CTH	524.2	7914
Bromoform	< 0.31000	U	ug/L	0.31000	1	3/29/02	20:04	CTH	524.2	7914
Bromomethane	< 0.29000	U	ug/L	0.29000	1	3/29/02	20:04	CTH	524.2	7914
Carbon Tetrachloride	< 0.29000	U	ug/L	0.29000	1	3/29/02	20:04	CTH	524.2	7914
Chlorobenzene	< 0.23000	U	ug/L	0.23000	1	3/29/02	20:04	CTH	524.2	7914
Chloroethane	< 0.29000	U	ug/L	0.29000	1	3/29/02	20:04	CTH	524.2	7914
Chloroform	< 0.16000	U	ug/L	0.16000	1	3/29/02	20:04	CTH	524.2	7914
Chloromethane	< 0.35000	U	ug/L	0.35000	1	3/29/02	20:04	CTH	524.2	7914
2-Chlorotoluene	< 0.33000	U	ug/L	0.33000	1	3/29/02	20:04	CTH	524.2	7914
4-Chlorotoluene	< 0.29000	U	ug/L	0.29000	1	3/29/02	20:04	CTH	524.2	7914
Dibromochloromethane	< 0.27000	U	ug/L	0.27000	1	3/29/02	20:04	CTH	524.2	7914
Dibromomethane	< 0.03000	U	ug/L	0.03000	1	3/29/02	20:04	CTH	524.2	7914
1,2-Dichlorobenzene	< 0.05000	U	ug/L	0.05000	1	3/29/02	20:04	CTH	524.2	7914
1,3-Dichlorobenzene	< 0.20000	U	ug/L	0.20000	1	3/29/02	20:04	CTH	524.2	7914
1,4-Dichlorobenzene	< 0.02000	U	ug/L	0.02000	1	3/29/02	20:04	CTH	524.2	7914
1,1-Dichloroethane	< 0.10000	U	ug/L	0.10000	1	3/29/02	20:04	CTH	524.2	7914
1,2-Dichloroethane	< 0.02000	U	ug/L	0.02000	1	3/29/02	20:04	CTH	524.2	7914
1,1-Dichloroethene	< 0.02000	U	ug/L	0.02000	1	3/29/02	20:04	CTH	524.2	7914

Sample report continued . . .

CLIENT: SANDERS LABORATORY
Order No.: 22529
Lab No.: 02-F7490
Sample ID: N0203567

LABORATORY REPORT CONTINUED

Analyte	Result	Q	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
cis-1,2-Dichloroethene	< 0.03000	U	ug/L	0.03000	1	3/29/02	20:04	CTH	524.2	7914
trans-1,2-Dichloroethene	< 0.12000	U	ug/L	0.12000	1	3/29/02	20:04	CTH	524.2	7914
1,2-Dichloropropane	< 0.33000	U	ug/L	0.33000	1	3/29/02	20:04	CTH	524.2	7914
1,3-Dichloropropane	< 0.05000	U	ug/L	0.05000	1	3/29/02	20:04	CTH	524.2	7914
cis-1,3-Dichloropropene	< 0.21000	U	ug/L	0.21000	1	3/29/02	20:04	CTH	524.2	7914
2,2-Dichloropropane	< 0.38000	U,J3	ug/L	0.38000	1	3/29/02	20:04	CTH	524.2	7914
trans-1,3-Dichloropropene	< 0.50000	U	ug/L	0.50000	1	3/29/02	20:04	CTH	524.2	7914
Ethylbenzene	< 0.47000	U	ug/L	0.47000	1	3/29/02	20:04	CTH	524.2	7914
Methylene Chloride	< 0.31000	U	ug/L	0.31000	1	3/29/02	20:04	CTH	524.2	7914
Styrene	< 0.47000	U	ug/l	0.47000	1	3/29/02	20:04	CTH	524.2	7914
1,1,1,2-Tetrachloroethane	< 0.13000	U	ug/L	0.13000	1	3/29/02	20:04	CTH	524.2	7914
1,1,2,2-Tetrachloroethane	< 0.33000	U	ug/L	0.33000	1	3/29/02	20:04	CTH	524.2	7914
Tetrachloroethene	< 0.21000	U	ug/L	0.21000	1	3/29/02	20:04	CTH	524.2	7914
Toluene	< 0.41000	U	ug/L	0.41000	1	3/29/02	20:04	CTH	524.2	7914
1,2,4-Trichlorobenzene	< 0.22000	U	ug/L	0.22000	1	3/29/02	20:04	CTH	524.2	7914
1,1-Trichloroethane	< 0.21000	U	ug/L	0.21000	1	3/29/02	20:04	CTH	524.2	7914
,2-Trichloroethane	< 0.23000	U	ug/L	0.23000	1	3/29/02	20:04	CTH	524.2	7914
Trichloroethene	< 0.02000	U	ug/L	0.02000	1	3/29/02	20:04	CTH	524.2	7914
1,2,3-Trichloropropane	< 0.39000	U	ug/L	0.39000	1	3/29/02	20:04	CTH	524.2	7914
Vinyl Chloride	< 0.29000	U	ug/L	0.29000	1	3/29/02	20:04	CTH	524.2	7914
Xylenes	< 0.24000	U	ug/L	0.24000	1	3/29/02	20:04	CTH	524.2	7914
Bromodichloromethane	< 0.36000	U	ug/L	0.36000	1	3/29/02	20:04	CTH	524.2	7914
Trichlorofluoromethane	< 0.28000	U	ug/L	0.28000	1	3/29/02	20:04	CTH	524.2	7914
Dichlorodifluoromethane	< 0.50000	U,J3	ug/l	0.50000	1	3/29/02	20:04	CTH	524.2	7914
Methyl-tert-butyl ether	< 1.0000	U	ug/L	1.0000	1	3/29/02	20:04	CTH	524.2	7914
DISINFECTANT BY-PRODUCTS										
Ethylene Dibromide	< 0.01000	U	ug/l	0.01000	1	4/ 2/02	16:46	RW	504.1	8155
1,2-Dibromo-3-chloropropane	< 0.02000	U	ug/L	0.02000	1	4/ 2/02	16:46	RW	504.1	8155
PESTICIDES/PCB's/HERBICIDES										
Glyphosate	< 2.40	U	ug/L	2.40	1	4/ 2/02	12:11	GB	547	8090
Carbofuran	< 0.900	U	ug/L	0.900	1	4/ 4/02	12:55	GB	531.1	8362
Oxamyl (Vydate)	< 1.13	U	ug/L	1.13	1	4/ 4/02	12:55	GB	531.1	8362
2,4-D	< 0.100	U	ug/L	0.100	1	4/ 2/02	5:10	JLS	515.1	8062
2,4,5-TP (Silvex)	< 0.200	U	ug/l	0.200	1	4/ 2/02	5:10	JLS	515.1	8062
Dalapon	< 1.00	U	ug/l	1.00	1	4/ 2/02	5:10	JLS	515.1	8062
Dicamba	< 0.0250	U	ug/L	0.0250	1	4/ 2/02	5:10	JLS	515.1	8062
Dinoseb	< 0.125	U	ug/L	0.125	1	4/ 2/02	5:10	JLS	515.1	8062
Atrazine	0.635		ug/L	0.625	1	4/ 4/02	15:53	JLS	507	8298

ple report continued . . .

CLIENT: SANDERS LABORATORY
Order No.: 22529
Lab No.: 02-F7490
Sample ID: N0203567

LABORATORY REPORT CONTINUED

Analyte	Result	Q	Units	Report Limit	Dil Factor	Date	Time	Analyst	Method	Batch
Carbaryl	< 0.599	U	ug/L	0.599	1	4/ 4/02	12:55	GB	531.1	8362
Simazine	< 0.176	U	ug/L	0.176	1	4/ 4/02	15:53	JLS	507	8298
Pentachlorophenol	< 0.0400	U	ug/L	0.0400	1	4/ 2/02	5:10	JLS	515.1	8062
Propachlor	< 0.380	U	ug/l	0.380	1	4/ 4/02	15:53	JLS	508	8298
Aldrin	< 0.0525	U	ug/L	0.0525	1	4/ 4/02	15:53	JLS	508	8298
Lindane	< 0.0240	U	ug/L	0.0240	1	4/ 4/02	15:53	JLS	508	8298
Dieldrin	< 0.02700	U	ug/l	0.02700	1	4/ 4/02	15:53	JLS	508	8298
Endrin	< 0.0100	U	ug/L	0.0100	1	4/ 4/02	15:53	JLS	508	8298
Heptachlor	< 0.0540	U	ug/L	0.0540	1	4/ 4/02	15:53	JLS	508	8298
Heptachlor Epoxide	< 0.0245	U	ug/L	0.0245	1	4/ 4/02	15:53	JLS	508	8298
Toxaphene	< 0.500	U	ug/L	0.500	1	4/ 4/02	15:53	JLS	508	8298
Butachlor	< 0.500	U	ug/L	0.500	1	4/ 4/02	15:53	JLS	508	8298
Polychlorinated biphenyl (PCB)	< 0.250	U	ug/L	0.250	1	4/ 4/02	15:53	JLS	507	8298
Chlordane	< 0.500	U	ug/L	0.500	1	4/ 4/02	15:53	JLS	508	8298
Hexachlorobenzene	< 0.100	U	ug/L	0.100	1	4/ 4/02	15:53	JLS	508	8298
Methoxychlor	< 0.250	U,J4	ug/L	0.250	1	4/ 4/02	15:53	JLS	508	8298
Hexachlorocyclopentadiene	< 0.100	U	ug/L	0.100	1	4/ 4/02	15:53	JLS	508	8298
Metolachlor	< 0.500	U	ug/L	0.500	1	4/ 4/02	15:53	JLS	508	8298
Alachlor	< 0.0625	U	ug/L	0.0625	1	4/ 4/02	15:53	JLS	507	8298
Metribuzin	< 0.120	U	ug/L	0.120	1	4/ 4/02	15:53	JLS	507	8298
Endothall	< 4.17	U	ug/L	4.17	1	4/ 2/02	13:18	JLS	548.1	8080
Diquat	< 0.960	U	ug/L	0.960	1	4/ 1/02	14:16	GB	549.2	8056
Picloram	< 0.250	U	ug/L	0.250	1	4/ 2/02	5:10	JLS	515.1	8062
Aldicarb	< 1.04	U	ug/L	1.04	1	4/ 4/02	12:55	GB	531.1	8362
Aldicarb Sulfoxide	< 0.850	U	ug/L	0.850	1	4/ 4/02	12:55	GB	531.1	8362
Aldicarb Sulfone	< 0.647	U	ug/l	0.647	1	4/ 4/02	12:55	GB	531.1	8362
3-Hydroxycarbofuran	< 1.13	U	ug/L	1.13	1	4/ 4/02	12:55	GB	531.1	8362
Methomyl	< 0.254	U	ug/L	0.254	1	4/ 4/02	12:55	GB	531.1	8362
GENERAL PARAMETERS										
Total Cyanide	< 0.006	U	mg/l	0.006	1	3/29/02	7:53	TW	4500CNE/335.7899	

Sample Extraction Data

Parameter	Wt/Vol Extracted	Extract Vol	Date	Analyst	Method
507/508	1000 ml	5.00 ml	4/ 1/02	AC	507/508
515.1	1000 ml	5.00 ml	3/29/02	SRB	515

Sample report continued . . .

LIENT: SANDERS LABORATORY
Order No.: 22529
Lab No.: 02-F7490
Sample ID: N0203567

LABORATORY REPORT CONTINUED

Sample Extraction Data

Parameter	Wt/Vol Extracted	Extract Vol	Date	Analyst	Method
548.1	100. ml	1.00 ml	4/ 1/02	WC	548.1
504.1	35. ml	2.0 ml	4/ 2/02	SRB	504.1/8011
549.2	250. ml	10.0 ml	4/ 1/02	WC	549.2
525.2	1000 ml	1.00 ml	4/ 2/02	WC	525.2
BNA's	1000 ml	1.0 ml	4/ 1/02	PN	625

Surrogate	% Recovery	Target Range
625: Nitrobenzene-d5	65	22.0 - 87
625: 2-Fluorobiphenyl	73	43.0 - 116
625: Terphenyl-d14	115	16.0 - 122
625: Phenol-d6	34	10.0 - 94
625: 2,4,6-Tribromophenol	79	19.0 - 107
524.2: 1,2-Dichlorobenzene-d4	89	70.0 - 130
525.2: Pyrene-d10	76	70.0 - 130
515.1: 2,4-Dichlorophenylacetic acid	113	70.0 - 130
524.2: 4-Bromofluorobenzene	94	70.0 - 130
507: 1-Bromo-2-nitrobenzene	82	70.0 - 130
Pest: Decachlorobiphenyl	94	70.0 - 130

ample report continued . . .

CLIENT: SANDERS LABORATORY
Order No.: 22529
Project: 62-550

Qualifier Definitions:

B = results based upon colony counts outside the acceptable range
I = the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
J1 = surrogate recovery limits have been exceeded
J3 = the reported value failed to meet the established quality control criteria for either precision and/or accuracy
J4 = the sample matrix interfered with the ability to make an accurate determination
J5 = the data is questionable because of improper lab or field protocols
K = off-scale low, actual value is less than the value given
L = off-scale high, actual value is known to be greater than the value given
Q = sample held beyond acceptable holding time
U = the compound was analyzed for but not detected
V = the analyte was detected in both the sample and the associated method blank
Y = the laboratory analysis was from an unpreserved or improperly preserved sample
Z = too many colonies present (TNTC)
TIC = analyzed by MS T.I.C.(tentatively identified compound)

*TA = sampled by TestAmerica,Inc. Field Services

The # indicates reported value is outside method defined and/or charted laboratory control limits. Precision limits apply only to sample concentrations greater than five times the report limit for the analyte(s) of concern. Accuracy limits do not apply to samples with concentrations greater than four times the known value concentration.

Sample report continued . . .

CLIENT: SANDERS LABORATORY
Order No.: 22529
roject: 62-550

PROJECT QUALITY CONTROL DATA

Matrix Spike Recovery

Analyte	Units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Batch	Sample Spiked
Total Cyanide	mg/l	< 0.006	0.262	0.400	65.50	42.5 - 132	7899	02-F7138
Total Cyanide	mg/l	< 0.006	0.290	0.400	72.50	42.5 - 132	7899	02-F7490
Glyphosate	ug/L	< 2.40	506.	500.	101.20	66.0 - 126	8090	02-F7514
Glyphosate	ug/L	< 2.40	521.	500.	104.20	66.0 - 126	8090	02-F7514
Benzo(a)pyrene	ug/L	< 0.0400	1.31	5.00	26.20#	70.0 - 130	8154	02-F7394
Carbofuran	ug/L	< 0.900	< 0.900	100.	N/A	70.0 - 130	8362	02-F7947
Di(2-ethylhexyl)adipate	ug/L	< 0.600	5.68	5.00	113.60	70.0 - 130	8154	02-F7394
Di(2-ethylhexyl)phthalate	ug/L	< 1.32	5.21	5.00	104.20	70.0 - 130	8154	02-F7394
Oxamyl (Vydate)	ug/L	< 1.13	< 1.13	100.	N/A	70.0 - 130	8362	02-F7947
Bromoform	ug/L	< 0.31000	10.700	10.000	107.00	70.0 - 130	7914	02-F7436
Chloroform	ug/L	38.800	46.200	10.000	74.00	70.0 - 130	7914	02-F7436
Dibromochloromethane	ug/L	2.0300	12.300	10.000	102.70	70.0 - 130	7914	02-F7436
Bromodichloromethane	ug/L	12.000	21.300	10.000	93.00	70.0 - 130	7914	02-F7436
Ethylene Dibromide	ug/l	< 0.01000	0.2520	0.2500	100.80	70.0 - 130	8155	02-F7698
2,4-D	ug/L	< 0.100	1.11	1.00	111.00	48.0 - 214	8062	02-F7490
2,4,5-TP (Silvex)	ug/l	< 0.200	1.06	1.00	106.00	42.0 - 226	8062	02-F7490
Dalapon	ug/l	< 1.00	4.34	5.00	86.80	40.0 - 160	8062	02-F7490
camba	ug/L	< 0.0250	1.04	1.00	104.00	38.0 - 232	8062	02-F7490
noseb	ug/L	< 0.125	1.20	1.00	120.00	0.0 - 130	8062	02-F7490
Atrazine	ug/L	0.635	3.83	2.50	127.80	70.0 - 130	8298	02-F7490
Simazine	ug/L	< 0.176	0.575	0.500	115.00	70.0 - 130	8298	02-F7490
Pentachlorophenol	ug/L	< 0.0400	0.890	1.00	89.00	36.0 - 224	8062	02-F7490
Propachlor	ug/l	< 0.380	2.91	2.50	116.40	70.0 - 130	8298	02-F7490
1,2-Dibromo-3-chloropropane	ug/L	< 0.02000	0.2510	0.2500	100.40	70.0 - 130	8155	02-F7698
Aldrin	ug/L	< 0.0525	0.0950	0.100	95.00	58.0 - 114	8298	02-F7490
Lindane	ug/L	< 0.0240	0.105	0.100	105.00	60.0 - 118	8298	02-F7490
Dieldrin	ug/l	< 0.02700	0.08500	0.10000	85.00	70.0 - 130	8298	02-F7490
Endrin	ug/L	< 0.0100	0.100	0.100	100.00	70.0 - 130	8298	02-F7490
Heptachlor	ug/L	< 0.0540	0.0900	0.100	90.00	70.0 - 130	8298	02-F7490
Heptachlor Epoxide	ug/L	< 0.0245	0.0900	0.100	90.00	70.0 - 130	8298	02-F7490
Butachlor	ug/L	< 0.500	2.96	2.50	118.40	70.0 - 130	8298	02-F7490
Hexachlorobenzene	ug/L	< 0.100	0.550	0.500	110.00	70.0 - 130	8298	02-F7490
Methoxychlor	ug/L	< 0.250	1.56	1.00	156.00#	70.0 - 130	8298	02-F7490
Hexachlorocyclopentadiene	ug/L	< 0.100	1.14	1.00	114.00	70.0 - 130	8298	02-F7490
Metolachlor	ug/L	< 0.500	2.97	2.50	118.80	70.0 - 130	8298	02-F7490
Alachlor	ug/L	< 0.0625	1.44	1.25	115.20	70.0 - 130	8298	02-F7490
Metribuzin	ug/L	< 0.120	1.26	1.25	100.80	70.0 - 130	8298	02-F7490
Endothall	ug/L	< 4.17	12.9	50.0	25.80#	70.0 - 130	8080	02-F7656
Diquat	ug/L	< 0.960	82.2	100.	82.20	69.0 - 129	8056	02-F7656
Picloram	ug/L	< 0.250	1.28	1.00	128.00	44.0 - 138	8062	02-F7490
Aldicarb	ug/L	< 1.04	< 1.04	100.	N/A	70.0 - 130	8362	02-F7947
Aldicarb Sulfoxide	ug/L	< 0.850	< 0.850	100.	N/A	70.0 - 130	8362	02-F7947
Aldicarb Sulfone	ug/l	5.99	39.6	100.	33.61#	70.0 - 130	8362	02-F7947

Sample report continued . . .

CLIENT: SANDERS LABORATORY
Order No.: 22529
Project: 62-550

PROJECT QUALITY CONTROL DATA

Matrix Spike Duplicate

Analyte	Units	Orig. Val.	Duplicate	RPD	Limit	QC Batch	Sample Duplicated
Total Cyanide	mg/l	0.262	0.270	3.01	17.0	7899	Spike
Total Cyanide	mg/l	0.290	0.281	3.15	17.0	7899	Spike
Glyphosate	ug/L	506.	521.	2.92	20.0	8090	Spike
Bromoform	ug/L	10.700	11.300	5.45	30.0	7914	Spike
Chloroform	ug/L	46.200	46.600	0.86	30.0	7914	Spike
Dibromochloromethane	ug/L	12.300	12.600	2.41	30.0	7914	Spike
Bromodichloromethane	ug/L	21.300	21.400	0.47	30.0	7914	Spike

Laboratory Control Data

Analyte	Units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
Glyphosate	ug/L	500.	513.	103.	66 - 126	8090
Benzo(a)pyrene	ug/L	5.00	4.55	91.	70 - 130	8154
Butylbenzylphthalate	ug/L	100.	107.	107.	0 - 152	8152
Carbofuran	ug/L	100.	92.8	93.	70 - 130	8362
2-Chlorophenol	ug/L	100.	88.6	89.	23 - 134	8152
Diethylphthalate	ug/L	100.	94.8	95.	0 - 114	8152
Dimethylphthalate	ug/L	100.	95.1	95.	0 - 112	8152
Di-n-butylphthalate	ug/L	100.	103.	103.	1 - 118	8152
2,4-Dinitrotoluene	ug/l	100.	86.3	86.	39 - 139	8152
Di-n-octylphthalate	ug/L	100.	111.	111.	4 - 146	8152
Di(2-ethylhexyl)adipate	ug/L	5.00	6.03	121.	70 - 130	8154
Di(2-ethylhexyl)phthalate	ug/L	5.00	5.76	115.	70 - 130	8154
Isophorone	ug/L	100.	76.5	76.	21 - 196	8152
2-Methyl-4,6-dinitrophenol	ug/L	100.	99.4	99.	0 - 181	8152
Oxamyl (Vydate)	ug/L	100.	125.	125.	70 - 130	8362
Phenol	ug/L	100.	54.2	54.	5 - 112	8152
2,4,6-Trichlorophenol	ug/L	100.	97.1	97.	37 - 144	8152
1,1-Dichloropropene	ug/L	10.000	8.0500	80.	70 - 130	7914
Benzene	ug/L	10.000	8.1800	82.	70 - 130	7914
Bromobenzene	ug/L	10.000	8.1400	81.	70 - 130	7914
Bromoform	ug/L	10.000	9.1100	91.	70 - 130	7914
Bromomethane	ug/L	10.000	8.1900	82.	70 - 130	7914
Carbon Tetrachloride	ug/L	10.000	8.4600	85.	70 - 130	7914
Chlorobenzene	ug/L	10.000	8.0200	80.	70 - 130	7914
Chloroethane	ug/L	10.000	8.0800	81.	70 - 130	7914
Chloroform	ug/L	10.000	8.8200	88.	70 - 130	7914
Chloromethane	ug/L	10.000	7.5200	75.	70 - 130	7914
2-Chlorotoluene	ug/L	10.000	7.8600	79.	70 - 130	7914
4-Chlorotoluene	ug/L	10.000	8.0900	81.	70 - 130	7914
Dibromochloromethane	ug/L	10.000	8.5200	85.	70 - 130	7914
Dibromomethane	ug/L	10.000	8.6000	86.	70 - 130	7914

Sample report continued . . .

CLIENT: SANDERS LABORATORY
rder No.: 22529
roject: 62-550

PROJECT QUALITY CONTROL DATA

Laboratory Control Data

Analyte	Units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
1,2-Dichlorobenzene	ug/L	10.000	8.1800	82.	70 - 130	7914
1,3-Dichlorobenzene	ug/L	10.000	7.6900	77.	70 - 130	7914
1,4-Dichlorobenzene	ug/L	10.000	7.5700	76.	70 - 130	7914
1,1-Dichloroethane	ug/L	10.000	8.0200	80.	70 - 130	7914
1,2-Dichloroethane	ug/L	10.000	8.6200	86.	70 - 130	7914
1,1-Dichloroethene	ug/L	10.000	7.1100	71.	70 - 130	7914
cis-1,2-Dichloroethene	ug/L	10.000	8.4800	85.	70 - 130	7914
trans-1,2-Dichloroethene	ug/L	10.000	7.2200	72.	70 - 130	7914
1,2-Dichloropropane	ug/L	10.000	8.8100	88.	70 - 130	7914
1,3-Dichloropropane	ug/L	10.000	8.7500	88.	70 - 130	7914
cis-1,3-Dichloropropene	ug/L	10.000	6.2100	62. #	70 - 130	7914
2,2-Dichloropropane	ug/L	10.000	1.3900	14. #	70 - 130	7914
trans-1,3-Dichloropropene	ug/L	10.000	7.5100	75.	70 - 130	7914
Ethylbenzene	ug/L	10.000	7.9400	79.	70 - 130	7914
Methylene Chloride	ug/L	10.000	8.0900	81.	70 - 130	7914
Styrene	ug/l	10.000	7.4300	74.	70 - 130	7914
1,1,1,2-Tetrachloroethane	ug/L	10.000	8.3700	84.	70 - 130	7914
1,2,2-Tetrachloroethane	ug/L	10.000	4.4600	45. #	70 - 130	7914
etrachloroethene	ug/L	10.000	9.6200	96.	70 - 130	7914
Toluene	ug/L	10.000	8.1100	81.	70 - 130	7914
1,2,4-Trichlorobenzene	ug/L	10.000	7.8100	78.	70 - 130	7914
1,1,1-Trichloroethane	ug/L	10.000	8.3300	83.	70 - 130	7914
1,1,2-Trichloroethane	ug/L	10.000	8.6300	86.	70 - 130	7914
Trichloroethene	ug/L	10.000	10.600	106.	70 - 130	7914
1,2,3-Trichloropropane	ug/L	10.000	8.7600	88.	70 - 130	7914
Vinyl Chloride	ug/L	10.000	8.0600	81.	70 - 130	7914
Xylenes	ug/L	30.000	23.600	79.	70 - 130	7914
Bromodichloromethane	ug/L	10.000	8.2700	83.	70 - 130	7914
Trichlorofluoromethane	ug/L	10.000	7.6400	76.	70 - 130	7914
Dichlorodifluoromethane	ug/l	10.000	6.4100	64. #	70 - 130	7914
Methyl-tert-butyl ether	ug/L	10.000	9.2900	93.	70 - 130	7914
Ethylene Dibromide	ug/l	0.2500	0.2490	100.	70 - 130	8155
2,4-D	ug/L	1.00	0.925	92.	48 - 214	8062
2,4,5-TP (Silvex)	ug/l	1.00	0.965	96.	42 - 226	8062
Dalapon	ug/l	5.00	3.91	78.	40 - 160	8062
Dicamba	ug/L	1.00	0.970	97.	38 - 232	8062
Dinoseb	ug/L	1.00	0.880	88.	0 - 130	8062
Atrazine	ug/L	2.50	3.20	128.	70 - 130	8298
Carbaryl	ug/L	100.	103.	103.	70 - 130	8362
Simazine	ug/L	0.500	0.585	117.	70 - 130	8298
Pentachlorophenol	ug/L	1.00	0.825	82.	36 - 224	8062
Propachlor	ug/l	2.50	2.72	109.	70 - 130	8298
-Dibromo-3-chloropropane	ug/L	0.2500	0.2500	100.	70 - 130	8155

Sample report continued . . .

CLIENT: SANDERS LABORATORY
Order No.: 22529
Project: 62-550

PROJECT QUALITY CONTROL DATA

Laboratory Control Data

Analyte	Units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
Aldrin	ug/L	0.100	0.100	100.	58 - 114	8298
Lindane	ug/L	0.100	0.105	105.	60 - 118	8298
Dieldrin	ug/l	0.10000	0.10000	100.	70 - 130	8298
Endrin	ug/L	0.100	0.110	110.	70 - 130	8298
Heptachlor	ug/L	0.100	0.100	100.	70 - 130	8298
Heptachlor Epoxide	ug/L	0.100	0.100	100.	70 - 130	8298
Butachlor	ug/L	2.50	2.68	107.	70 - 130	8298
Hexachlorobenzene	ug/L	0.500	0.555	111.	70 - 130	8298
Methoxychlor	ug/L	1.00	1.28	128.	70 - 130	8298
Hexachlorocyclopentadiene	ug/L	1.00	1.16	116.	70 - 130	8298
Metolachlor	ug/L	2.50	2.72	109.	70 - 130	8298
Alachlor	ug/L	1.25	1.29	103.	70 - 130	8298
Metribuzin	ug/L	1.25	1.11	89.	70 - 130	8298
Endothall	ug/L	50.0	35.7	71.	70 - 130	8080
Diquat	ug/L	100.	89.7	90.	69 - 129	8056
Picloram	ug/L	1.00	1.07	107.	44 - 138	8062
Aldicarb	ug/L	100.	124.	124.	70 - 130	8362
Aldicarb Sulfoxide	ug/L	100.	93.2	93.	70 - 130	8362
Aldicarb Sulfone	ug/l	100.	114.	114.	70 - 130	8362
3-Hydroxycarbofuran	ug/L	100.	94.0	94.	70 - 130	8362
Methomyl	ug/L	100.	108.	108.	70 - 130	8362
Total Cyanide	mg/l	0.400	0.424	106.	80 - 120	7899

Duplicates

Analyte	Units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch	Duplicated
Total Cyanide	mg/l	< 0.006	< 0.020	N/A	17.0	7899	02-F7138
Total Cyanide	mg/l	< 0.006	< 0.020	N/A	17.0	7899	02-F7490
Ethylene Dibromide	ug/l	0.2490	0.2440	2.03	20.0	8155	known
2,4-D	ug/L	0.925	0.995	7.29	20.0	8062	known
2,4,5-TP (Silvex)	ug/l	0.965	1.04	7.48	20.0	8062	known
Dalapon	ug/l	3.91	4.29	9.27	20.0	8062	known
Dicamba	ug/L	0.970	1.07	9.80	20.0	8062	known
Dinoseb	ug/L	0.880	0.995	12.27	20.0	8062	known
Atrazine	ug/L	3.20	3.18	0.63	20.0	8298	known
Carbaryl	ug/L	0.626	0.610	2.59	20.0	8362	Spike
Simazine	ug/L	0.585	0.545	7.08	20.0	8298	known
Pentachlorophenol	ug/L	0.825	0.900	8.70	20.0	8062	known
Propachlor	ug/l	2.72	2.62	3.75	20.0	8298	known
1,2-Dibromo-3-chloropropane	ug/L	0.2500	0.2510	0.40	20.0	8155	known
Aldrin	ug/L	0.100	0.0950	5.13	20.0	8298	known
Lindane	ug/L	0.105	0.100	4.88	20.0	8298	known

Sample report continued . . .

CLIENT: SANDERS LABORATORY
Order No.: 22529
Project: 62-550

PROJECT QUALITY CONTROL DATA

Duplicates

Analyte	Units	Orig. Val.	Duplicate	RPD	Limit	Q.C. Batch	Sample Duplicated
Dieldrin	ug/l	0.10000	0.10000	0.00	20.0	8298	known
Endrin	ug/L	0.110	0.110	0.00	20.0	8298	known
Heptachlor	ug/L	0.100	0.100	0.00	20.0	8298	known
Heptachlor Epoxide	ug/L	0.100	0.0950	5.13	20.0	8298	known
Butachlor	ug/L	2.68	2.66	0.75	20.0	8298	known
Hexachlorobenzene	ug/L	0.555	0.530	4.61	20.0	8298	known
Methoxychlor	ug/L	1.28	1.34	4.58	20.0	8298	known
Hexachlorocyclopentadiene	ug/L	1.16	1.18	1.71	20.0	8298	known
Metolachlor	ug/L	2.72	2.65	2.61	20.0	8298	known
Alachlor	ug/L	1.29	1.31	1.54	20.0	8298	known
Metribuzin	ug/L	1.11	1.15	3.54	20.0	8298	known
Endothall	ug/L	35.7	35.9	0.56	20.0	8080	known
Diquat	ug/L	82.2	83.8	1.93	20.0	8056	Spike
Picloram	ug/L	1.07	1.22	13.10	20.0	8062	known
Aldicarb	ug/L	< 1.04	< 1.04	N/A	20.0	8362	Spike
Aldicarb Sulfoxide	ug/L	< 0.850	< 0.850	N/A	20.0	8362	Spike
Aldicarb Sulfone	ug/l	39.6	33.1	17.88	20.0	8362	Spike
-Hydroxycarbofuran	ug/L	9.90	8.07	20.37 #	20.0	8362	Spike
Methomyl	ug/L	< 0.254	< 0.254	N/A	20.0	8362	Spike
Benzo(a)pyrene	ug/L	4.55	4.36	4.26	20.0	8154	known
Butylbenzylphthalate	ug/L	107.	111.	3.67	50.0	8152	known
Carbofuran	ug/L	< 0.900	< 0.900	N/A	20.0	8362	Spike
2-Chlorophenol	ug/L	88.6	92.7	4.52	50.0	8152	known
Diethylphthalate	ug/L	94.8	96.8	2.09	50.0	8152	known
Dimethylphthalate	ug/L	95.1	95.2	0.11	50.0	8152	known
Di-n-butylphthalate	ug/L	103.	102.	0.98	50.0	8152	known
2,4-Dinitrotoluene	ug/l	86.3	88.7	2.74	50.0	8152	known
Di-n-octylphthalate	ug/L	111.	108.	2.74	50.0	8152	known
Di(2-ethylhexyl)adipate	ug/L	6.03	5.96	1.17	20.0	8154	known
Di(2-ethylhexyl)phthalate	ug/L	5.76	5.58	3.17	20.0	8154	known
Isophorone	ug/L	76.5	73.2	4.41	50.0	8152	known
2-Methyl-4,6-dinitrophenol	ug/L	99.4	103.	3.56	50.0	8152	known
Oxamyl (Vydate)	ug/L	< 1.13	< 1.13	N/A	20.0	8362	Spike
Phenol	ug/L	54.2	52.3	3.57	50.0	8152	known
2,4,6-Trichlorophenol	ug/L	97.1	96.4	0.72	50.0	8152	known

Blank Data

Analyte	Blank Value	Units	Q.C. Batch
Total Cyanide	< 0.020	mg/l	7899
Glyphosate	< 2.40	ug/L	8090
Benzo(a)pyrene	< 0.0400	ug/L	8154

Sample report continued . . .

CLIENT: SANDERS LABORATORY
Order No.: 22529
Project: 62-550

PROJECT QUALITY CONTROL DATA

Blank Data

Analyte	Blank Value	Units	Q.C. Batch
Butylbenzylphthalate	< 2.55	ug/L	8152
Carbofuran	< 0.900	ug/L	8362
2-Chlorophenol	< 4.10	ug/L	8152
Diethylphthalate	< 4.96	ug/L	8152
Dimethylphthalate	< 5.00	ug/L	8152
Di-n-butylphthalate	< 4.01	ug/L	8152
2,4-Dinitrotoluene	< 4.78	ug/l	8152
Di-n-octylphthalate	< 2.43	ug/L	8152
Di(2-ethylhexyl)adipate	< 0.600	ug/L	8154
Di(2-ethylhexyl)phthalate	< 1.32	ug/L	8154
Isophorone	< 7.26	ug/L	8152
2-Methyl-4,6-dinitrophenol	< 4.00	ug/L	8152
Oxamyl (Vydate)	< 1.13	ug/L	8362
Phenol	< 3.01	ug/L	8152
2,4,6-Trichlorophenol	< 4.46	ug/L	8152
1,1-Dichloropropene	< 0.06000	ug/L	7914
Benzene	< 0.05000	ug/L	7914
Bromobenzene	< 0.05000	ug/L	7914
Bromoform	< 0.31000	ug/L	7914
Bromomethane	< 0.29000	ug/L	7914
Carbon Tetrachloride	< 0.29000	ug/L	7914
Chlorobenzene	< 0.23000	ug/L	7914
Chloroethane	< 0.29000	ug/L	7914
Chloroform	< 0.16000	ug/L	7914
Chloromethane	< 0.35000	ug/L	7914
2-Chlorotoluene	< 0.33000	ug/L	7914
4-Chlorotoluene	< 0.29000	ug/L	7914
Dibromochloromethane	< 0.27000	ug/L	7914
Dibromomethane	< 0.03000	ug/L	7914
1,2-Dichlorobenzene	< 0.05000	ug/L	7914
1,3-Dichlorobenzene	< 0.20000	ug/L	7914
1,4-Dichlorobenzene	< 0.02000	ug/L	7914
1,1-Dichloroethane	< 0.10000	ug/L	7914
1,2-Dichloroethane	< 0.02000	ug/L	7914
1,1-Dichloroethene	< 0.02000	ug/L	7914
cis-1,2-Dichloroethene	< 0.03000	ug/L	7914
trans-1,2-Dichloroethene	< 0.12000	ug/L	7914
1,2-Dichloropropane	< 0.33000	ug/L	7914
1,3-Dichloropropane	< 0.05000	ug/L	7914
cis-1,3-Dichloropropene	< 0.21000	ug/L	7914
2,2-Dichloropropane	< 0.38000	ug/L	7914
trans-1,3-Dichloropropene	< 0.50000	ug/L	7914
Ethylbenzene	< 0.47000	ug/L	7914

Sample report continued . . .

CLIENT: SANDERS LABORATORY
Order No.: 22529
Project: 62-550

PROJECT QUALITY CONTROL DATA

Blank Data

Analyte	Blank Value	Units	Q.C. Batch
Methylene Chloride	< 0.31000	ug/L	7914
Styrene	< 0.47000	ug/l	7914
1,1,1,2-Tetrachloroethane	< 0.13000	ug/L	7914
1,1,2,2-Tetrachloroethane	< 0.33000	ug/L	7914
Tetrachloroethene	< 0.21000	ug/L	7914
Toluene	< 0.41000	ug/L	7914
1,2,4-Trichlorobenzene	< 0.22000	ug/L	7914
1,1,1-Trichloroethane	< 0.21000	ug/L	7914
1,1,2-Trichloroethane	< 0.23000	ug/L	7914
Trichloroethene	< 0.02000	ug/L	7914
1,2,3-Trichloropropane	< 0.39000	ug/L	7914
Vinyl Chloride	< 0.29000	ug/L	7914
Xylenes	< 0.24000	ug/L	7914
Bromodichloromethane	< 0.36000	ug/L	7914
Trichlorofluoromethane	< 0.28000	ug/L	7914
Dichlorodifluoromethane	< 0.50000	ug/l	7914
Methyl-tert-butyl ether	< 1.0000	ug/L	7914
thylene Dibromide	< 0.01000	ug/l	8155
,4-D	< 0.100	ug/L	8062
2,4,5-TP (Silvex)	< 0.200	ug/l	8062
Dalapon	< 1.00	ug/l	8062
Dicamba	< 0.0250	ug/L	8062
Dinoseb	< 0.125	ug/L	8062
Atrazine	< 0.625	ug/L	8298
Carbaryl	< 0.599	ug/L	8362
Simazine	< 0.176	ug/L	8298
Pentachlorophenol	< 0.0400	ug/L	8062
Propachlor	< 0.380	ug/l	8298
1,2-Dibromo-3-chloropropane	< 0.02000	ug/L	8155
Aldrin	< 0.0525	ug/L	8298
Lindane	< 0.0240	ug/L	8298
Dieldrin	< 0.02700	ug/l	8298
Endrin	< 0.0100	ug/L	8298
Heptachlor	< 0.0540	ug/L	8298
Heptachlor Epoxide	< 0.0245	ug/L	8298
Toxaphene	< 0.500	ug/L	8298
Butachlor	< 0.500	ug/L	8298
Polychlorinated biphenyl (PCB)	< 0.250	ug/L	8298
Chlordane	< 0.500	ug/L	8298
Hexachlorobenzene	< 0.100	ug/L	8298
Methoxychlor	< 0.250	ug/L	8298
Hexachlorocyclopentadiene	< 0.100	ug/L	8298
Metolachlor	< 0.500	ug/L	8298

ple report continued . . .

CLIENT: SANDERS LABORATORY
Order No.: 22529
Project: 62-550

PROJECT QUALITY CONTROL DATA

Blank Data

Analyte	Blank Value	Units	Q.C. Batch
Alachlor	< 0.0625	ug/L	8298
Metribuzin	< 0.120	ug/L	8298
Endothall	< 4.17	ug/L	8080
Diquat	< 0.960	ug/L	8056
Picloram	< 0.250	ug/L	8062
Aldicarb	< 1.04	ug/L	8362
Aldicarb Sulfoxide	< 0.850	ug/L	8362
Aldicarb Sulfone	< 0.647	ug/l	8362
3-Hydroxycarbofuran	< 1.13	ug/L	8362
Methomyl	< 0.254	ug/L	8362

End of sample report.

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD
(Test)

PROJECT # 22529

Page ____ of ____

Client Sanders
Address ____
Phone ____ Fax ____

Report To: T. Bright
Bill To: ____
P.O. # ____
Project Name 102-550
Project Location: ____

Sample Supply: GW/DW standards
Customer Type: ____
Field Report #: ____
Kit # ____
REQUESTED DUE DATE: standard

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		ANALYSES REQUEST: Pest + PCBs	625, 524.2	CN-								Sample ID #
	N0203567	3/26/02	1340	G																	F7490

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA

COMMENTS:
102-550

COOLER #

COOLER SEAL INTACT
Yes No

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
B Goodrich	3/27/02	1200	Fed Ex	3/27/02	1200
Fed Ex	3/28/02		Catherine McGowan	3/28/02	9:30

Sanders Laboratories, Inc.

NaOH Ph > 9

UNPPl. = 76

SAMPLE RECEIVING/SHIPPING QUALITY CONTROL CORRECTIVE ACTION FORM

TestAmerica, Inc., Orlando Division

DATE SAMPLES RECEIVED: 3-28-02 WORKORDER ID: 22529

DISCREPANCY DISCOVERED BY: Marianne Bowers

CLIENT: Sanders

CONTACT: Tamie B PHONE: ____

DOCUMENTATION

☐ NO CHAIN OF CUSTODY

☐ CHAIN OF CUSTODY INCOMPLETE

MISSING INFORMATION ____

SAMPLE CONDITION

☐ CONTAINER BROKEN/CRACKED/LEAKING
SAMPLE ID ____

☐ TEMPERATURE < 2°C OR > 6°C ____ °C
SAMPLE ID ____

☐ pH > 2 FOR H_2SO_4 pH = ____
SAMPLE ID ____

☐ pH > 2 FOR HNO_3 pH = ____
SAMPLE ID ____

☐ AIR BUBBLE IN VOC
SAMPLE ID ____

☐ INADEQUATE AMT. SAMPLE
SAMPLE ID ____

☐ pH > 2 FOR HCl pH = ____
SAMPLE ID ____

☐ pH < 10 FOR NaOH pH = ____
SAMPLE ID ____

☐ MORE SAMPLES THAN LISTED ON C-O-C ADDITIONAL SAMPLES ____

☐ FEWER SAMPLES THAN LISTED ON C-O-C MISSING SAMPLES ____

☒ OTHER Question if all unreg. groups are requested since 625 and 524.2 are written on COC.

CORRECTIVE ACTIONS TAKEN:
Per Tamie B and my phone conversation, she asked for Group I, II, III unregulated parameters on this order - MGB

DID THE CORRECTIVE ACTION RESOLVE THE DISCREPANCY? YES ✓ NO ____

IF NO, WHAT FURTHER ACTIONS WERE TAKEN TO RESOLVE THE PROBLEM? ____

SIGNED BY: Marianne Bowers TITLE: Sample Management

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

April 2, 2002
Project No: 28132

Laboratory Report

Project Name	N0203567
Sample Description	N0203567
Matrix	Drinking Water
SAL Sample Number	28132.01
Date/Time Collected	03/26/02 13:40
Date/Time Received	03/27/02 08:49

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Inorganics							
Foaming Agents (LAS, mol wt 342)	mg/l	0.05 U	SM 5540 C	0.05	03/27/02 11:00		TMF

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

April 2, 2002
Project No: 28132

Laboratory Report

Footnotes

*	Test results presented in this report meet all the requirements of the NELAC standards.
**	A statement of estimated uncertainty of test results is available upon request.
U	Analyte was not detected; indicated concentration is method detection limit.

FDOH Laboratory No. E84129
NELAP Accredited

Approved By: **Francis I. Daniels**
Laboratory Director

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD
(Southern)

PROJECT #

Page ______ of ______

Client: Sanders
Address:

Phone: Fax:

Report To: T. Bright
Bill To:
P.O. #
Project Name
Project Location:

Sample Supply: GW/DW Standard
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: Standard

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	ANALYSES REQUEST MBAS	Sample ID #
01	N0203567	3/26/02	1340	G	1	1				1	1/2 Gal. P, C

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED / DATE	VIA

COMMENTS:

COOLER #

COOLER SEAL INTACT
Yes No

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
BGoodrich	3/27/02	0723	Kou [illegible]	3.27.02	0723
Kou [illegible]	3/27/02	0849	Jia Lange	3/27/02	0849

SEVERN
TRENT
SERVICES

STL Sacramento
880 Riverside Parkway
West Sacramento, CA 95605-1500

Tel: 916 373 5600
Fax: 916 371 8420
www.stl-inc.com

April 8, 2002

STL SACRAMENTO PROJECT NUMBER: G2C280216
PO/CONTRACT: N0203567

Tami Bright
Sanders Laboratories Inc
1050 Endeavor Ct
Nokomis, FL 34275

Dear Ms. Bright,

This report contains the analytical results for the sample received under chain of custody by STL Sacramento on March 28, 2002.

The test results in this report meet all NELAC requirements for parameters in which accreditation is required or available. Any exceptions to NELAC requirements are noted in the case narrative. The case narrative is an integral part of this report.

If you have any questions, please feel free to call me at (916) 374-4402.

Sincerely,

Jill Kellmann

Jill Kellmann
Project Manager

CASE NARRATIVE

STL SACRAMENTO PROJECT NUMBER G2C280216

There were no anomalies associated with this project.

STL Sacramento

Quality Control Definitions

QC Parameter	Definition
QC Batch	A set of up to 20 field samples plus associated laboratory QC samples that are similar in composition (matrix) and that are processed within the same time period with the same reagent and standard lots.
Duplicate Control Sample (DCS)	Consist of a pair of LCSs analyzed within the same QC batch to monitor precision and accuracy independent of sample matrix effects. This QC is performed only if required by client or when insufficient sample is available to perform MS/MSD.
Duplicate Sample (DU)	A second aliquot of an environmental sample, taken from the same sample container when possible, that is processed independently with the first sample aliquot. The results are used to assess the effect of the sample matrix on the precision of the analytical process. The precision estimated using this sample is not necessarily representative of the precision for other samples in the batch.
Laboratory Control Sample (LCS)	A volume of reagent water for aqueous samples or a contaminant-free solid matrix (Ottawa sand) for soil and sediment samples which is spiked with known amounts of representative target analytes and required surrogates. An LCS is carried through the entire analytical process and is used to monitor the accuracy of the analytical process independent of potential matrix effects.
Matrix Spike and Matrix Spike Duplicate (MS/MSD)	A field sample fortified with known quantities of target analytes that are also added to the LCS. Matrix spike duplicate is a second matrix spike sample. MSs/MSDs are carried through the entire analytical process and are used to determine sample matrix effect on accuracy of the measurement system. The accuracy and precision estimated using MS/MSD is only representative of the precision of the sample that was spiked.
Method Blank (MB)	A sample composed of all the reagents (in the same quantities) in reagent water carried through the entire analytical process. The method blank is used to monitor the level of contamination introduced during sample preparation steps.
Surrogate Spike	Organic constituents not expected to be detected in environmental media and are added to every sample and QC at a known concentration. Surrogates are used to determine the efficiency of the sample preparation and the analytical process.

Source: STL Sacramento Laboratory Quality Manual

STL Sacramento Certifications:
Alaska (UST-055), Arizona (#AZ00616), Arkansas, California (NELAP # 01119CA) (ELAP #I-2439), Connecticut (#PH-0691), Florida (E87570), Hawaii, Louisiana (AI # 30612), New Jersey (Lab ID 44005), Nevada (#CA 044), New York (LAB ID 11666 serial # 107407), Oregon (LAB ID CA 044), South Carolina (LAB ID 87014, Cert. # 870140), Utah (E-168), Virginia (#00178), Washington (# C087), West Virginia (# 9930C), Wisconsin (Lab 998204680), USNAVY, USACE, USDA Foreign Plant (Permit # 37-82605), USDA Foreign Soil (Permit # S-46613)..

SAMPLE SUMMARY

G2C280216

WO #	SAMPLE#	CLIENT SAMPLE ID	SAMPLED DATE	SAMP TIME
EW4W1	001	N0203567	03/26/02	13:40

NOTE(S):

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD
(STL)

PROJECT #

Page ____ of ____

Client Sanders
Address
Phone Fax

Report To: T. Bright
Bill To:
P.O. #
Project Name
Project Location:

Sample Supply: GW(Dio Standards)
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: Standard

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		ANALYSES REQUEST Dioxin										Sample ID #
	N0203567	3/22/02	1340	G	1	1					1										

RECEIVED IN GOOD CONDITION UNDER COC
MAR 28 2002
INI LB

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
				BGoodrich	3/26/02	1200	Fed Ex	3/27/02	1200
				Fed Ex	3/28/02		Megan Barnett	3/28/02	1100

COMMENTS:

COOLER #

COOLER SEAL INTACT Yes No

STL Sacramento 916-373-56

G2C280216

SANDERS LABORATORIES INC

Client Sample ID: N0203567

Trace Level Organic Compounds

Lot-Sample #...: G2C280216-001
Work Order #...: EW4W11AA
Matrix.........: WATER
Date Sampled...: 03/26/02
Date Received..: 03/28/02
Prep Date......: 04/02/02
Analysis Date..: 04/04/02
Prep Batch #...: 2089102
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	2.3	pg/L	EPA-5 1613B

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	64	(25 - 164)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
37Cl4-2,3,7,8-TCDD	71	(35 - 197)

QC DATA ASSOCIATION SUMMARY

G2C280216

Sample Preparation and Analysis Control Numbers

SAMPLE#	MATRIX	ANALYTICAL METHOD	LEACH BATCH #	PREP BATCH #	MS RUN#
001	WATER	EPA-5 1613B		2089102	

METHOD BLANK REPORT

Trace Level Organic Compounds

Client Lot #...: G2C280216
MB Lot-Sample #: G2C300000-102
Work Order #...: EW7H51AD
Matrix.........: WATER
Prep Date......: 04/02/02
Analysis Date..: 04/04/02
Prep Batch #...: 2089102
Dilution Factor: 1

PARAMETER	RESULT	DETECTION LIMIT	UNITS	METHOD
2,3,7,8-TCDD	ND	1.2	pg/L	EPA-5 1613B

INTERNAL STANDARDS	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	72	(25 - 164)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

Trace Level Organic Compounds

Client Lot #...: G2C280216 **Work Order #...:** EW7H51AC **Matrix.........:** WATER
LCS Lot-Sample#: G2C300000-102
Prep Date......: 04/02/02 **Analysis Date..:** 04/04/02
Prep Batch #...: 2089102
Dilution Factor: 1

PARAMETER	PERCENT RECOVERY	RECOVERY LIMITS	METHOD
2,3,7,8-TCDD	**91**	**(67 - 158)**	**EPA-5 1613B**

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	52	(25 - 164)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
37Cl4-2,3,7,8-TCDD	61	(35 - 197)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

LABORATORY CONTROL SAMPLE DATA REPORT

Trace Level Organic Compounds

Client Lot #...: G2C280216 Work Order #...: EW7H51AC Matrix.........: WATER
LCS Lot-Sample#: G2C300000-102
Prep Date......: 04/02/02 Analysis Date..: 04/04/02
Prep Batch #...: 2089102
Dilution Factor: 1

PARAMETER	SPIKE AMOUNT	MEASURED AMOUNT	UNITS	PERCENT RECOVERY	METHOD
2,3,7,8-TCDD	200	182	pg/L	91	EPA-5 1613B

INTERNAL STANDARD	PERCENT RECOVERY	RECOVERY LIMITS
13C-2,3,7,8-TCDD	52	(25 - 164)

SURROGATE	PERCENT RECOVERY	RECOVERY LIMITS
37Cl4-2,3,7,8-TCDD	61	(35 - 197)

NOTE(S):

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Florida Radiochemistry Services, Inc.

Contact: Michael J. Naumann
5456 Hoffner Ave., Suite 201 Orlando, FL 32812
Phone: (407) 382-7733 Fax: (407)382-7744
Certification I. D. # E83033

Work Order #: 0203247
Report Date: 4/11/02

Report to:

Sanders Laboratories
1050 Endeavor Ct.
Nokomis, FL 34275
Attention: Tami Bright

I do hereby affirm that this record contains no willful misrepresentations and that this information given by me is true to the best of my knowledge and belief. I further certify that the methods and quality control measures used to produce these laboratory results were implemented in accordance with the requirements of this laboratory's certification and NELAC Standards.

Signed Michael J Naumann Date 4-11-02
President

Florida Radiochemistry Services, Inc.

Sample Login

Client:	**Sanders Laboratories**	**Date / Time Received**	**Work order #**
Client Contact:	**Tami Bright**	**3/28/02 10:45**	**0203247**
Client P.O.			
Project I.D.	**N0203567**		

Lab Sample I.D.	Client Sample I.D.	Sample Date/Time	Analysis Requested
0203247-01	N0203567	3/26/02 13:40	Ga, Ra226, Ra228

Analysis Results

Gross Alpha	**85.9 ****
Error +/-	**37.5**
MDL	**53.1**
EPA Method	**900.0**
Prep Date	**4/9/02**
Analysis Date	**4/10/02**

Radium 226	**81.6**	**Radium 228**	**4.7**
Error +/-	**1.5**	**Error +/-**	**1.1**
MDL	**0.2**	**MDL**	**1.2**
EPA Method	**903.1**	**EPA Method**	**Ra-05**
Prep Date	**4/3/02**	**Prep Date**	**4/3/02**
Analysis Date	**4/10/02**	**Analysis Date**	**4/10/02**
Units	**pCi/l**	**Units**	**pCi/l**
Analyst Initials	**MJN**	**Analyst Initials**	**MJN**

** See Case Narrative

QA Page

Analyte	Sample #	Date Analyzed	Sample Result	Amount Spiked	Spike Result	Spike /Dup Result	Spike % Rec.	Spike Dup % Rpd
Gross Alpha	0203257-01	4/10/02	<0.9	10.2	8.6	9.4	84	8.9
Radium 226	0203236-06	4/10/02	0.2	23.5	22.3	20.5	94	8.4
Radium 228	0203236-06	4/10/02	<1.1	8.3	7.7	7.4	93	4.0

Quality Control Limits

	% RPD	% Rec.
Gross Alpha	17.6	61-116
Radium 226	19.5	70-121
Radium 228	15.4	80-128

Case Narrative

NOTE: ** Gross Alpha:

Sample 0203247-01 had an elevated detection limit and/or counting error due to a low volume of sample used. The sample had high TDS (Total Dissolved Solids). Due to the high TDS the sample counting time was increased (the sample was counted over night or as long as possible) to help reduce the detection limit and counting error.

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-C TODY RECORD
(FRS)

PROJECT #

Page ______ of ______

Client Sanders
Address
Phone Fax

Report To: T. Bright
Bill To:
P.O. #
Project Name
Project Location:

Sample Supply: GW (Dw standard
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: Standard

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		ANALYSES REQUEST	Gross Alpha	Rad 226/228										Sample ID #
	N0203567	3/26/02	1340	G	1			1				1	1										

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA

COMMENTS: Run Rads regardless of GA result

COOLER #

COOLER SEAL INTACT Yes No

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
BGoodrich	3/27/02	1200	Fed EX	3/27/02	1200
Fed EX	3/28/02		HDaumann	3/28/02	1045

EMSL Analytical, Inc.

EMSL

04/10/02

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

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

Project ID:	None Provided
Attn:	Tami Bright
Reference Number:	FL02564
Date of Filtration	03-28-02

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

Sample Id	# Asbestos Structures	Type(s) of Asbestos	Concentration of Asbestos Structures (Millions/Liter)	Detection Limit (Millions/Liter)	95% Confidence Limits (Upper-Lower) (Millions/Liter)
N0203567	None Detected	None Detected	BDL	0.34	1.25

Stephen S. Bennett

Analyst

Stephen S. Bennett

Approved
Signatory

Date Analyzed: 4/10/02

ACCREDITATIONS: HRS # E86795

BDL = Below Detection Limit

Sanders Laboratories
Environmental Testing Services

Test # 4P

CHAIN-OF-CUSTODY RECORD

FL 02564 (EMSL)

PROJECT #

Page ______ of ______

Client: Sanders
Address: ______
______
Phone: ______ Fax: ______

Report To: T. Bright
Bill To: ______
P.O. #: ______
Project Name: ______
Project Location: ______

Sample Supply: GW (DW standards)
Customer Type: ______
Field Report #: ______
Kit #: ______
REQUESTED DUE DATE: Standard

Sampled By (PRINT): client
Sampler Signature: ______

		Sample			PRESERVATIVES						ANALYSES REQUEST											
Bottle #	SAMPLE DESCRIPTION	DATE	TIME	TYPE	4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL		Asbestos											Sample ID #
	L0203567	3/26/02	1340	G	1	1					1											

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED · DATE	VIA	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
				BFodrick	3/27/02	1200	Fed Ex	3/27/02	1200
				Fed Ex	3/28/02				

COMMENTS:
[redacted]

COOLER #

COOLER SEAL INTACT
Yes No

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CU ODY RECORD

PROJECT # 00203567

Page 1 of 2

Client /Q
Address
Phone Fax

Report To:
Bill To:
P.O. #
Project Name City of Fm
Project Location:

Sample Supply: GW
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: 3/29/02

Sampled By (PRINT) Joshua Cooney
Sampler Signature Joshua Cooney

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL	CS TD GC	Primary Inorganic Metals	Secondary Inorganic Metals	NO2 NO3	NOX TKN NH3	O-Nitrogen	COD	MBAS F-SO4	Color Cl BOD	Odor	Total Col.	Sample ID #
	IW	3/26/02	1340	G	1			1		1	1	1									1A
					1		1						1								1B
					1		1							1	1						1C
					1	1										1					1D
					1	1											1	1			1E
					1	1													1		1F
					1															1	1G

3/26/02

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
				Joshua Cooney	3/26/02	1535	B Goodrich	3/26/02	1535

COMMENTS:

COOLER #

COOLER SEAL INTACT
Yes No

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-C TODY RECORD

PROJECT # N0203567

Page 2 of 2

Client Y/Q
Address
Phone Fax

Report To:
Bill To:
P.O. #
Project Name City of FM
Project Location:

Sample Supply: GW
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE:

Sampled By (PRINT) Joshua Cooney
Sampler Signature Joshua Cooney

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL	ANALYSES REQUEST Pest + PCB	Dioxin	MBAS 625 524.2	Gross Alpha	Rads 226+228	CN- Asbestos		Field pH Cond	WT DO			Sample ID #
	IW	3/26/02	1340	G						1	1	1	1	1	1		1				1H

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
				Joshua Cooney	7/26/02	1535	BGradlich	3/26/02	1535

COMMENTS:
pH - 7.19
WT - 33.6
Cond - 41,700
DO - 1.78
AT - 34.8

COOLER #

COOLER SEAL INTACT
Yes No

Sanders Laboratories, Inc.
1050 Endeavor Ct., Nokomis, FL 34275-3623 • (941)488-8103 • FAX 484-6774 • 16880 Gator Road, Fort Myers, FL 3391

APPENDIX N.2

DZMW-1 Ambient Water Quality Data

Sanders
Laboratories, Inc.
Environmental Testing Services

February 27,2003

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Fort Myers, FL 33908

Reference: Analysis Certification Letter
Sanders Laboratory Report: N0205472

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or person who manages the system or those person 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 there are significant penalties for submitted false information, including the possibility of fine and imprisonment for knowing violation."

Laura H Sullivan
Laura H. Sullivan
QAO

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

Laboratory Results

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0205472-01	deep zone grab	Ground Water	5/21/02 8:30

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Manganese	200.7	< 0.010		0.010	mg/L	6/3/02 11:01	JPW	E84380
Mercury	245.1	< 0.001		0.001	mg/L	6/10/02 13:48	JPW	E84380
Nickel	200.7	< 0.010		0.010	mg/L	6/3/02 11:01	JPW	E84380
Nitrate+Nitrite-N	353.2	0.02		0.02	mg/L	5/21/02 13:52	CC	E84380
Nitrate-N	353.2	0.02		0.02	mg/L	5/21/02 15:22	CC	E84380
Nitrite-N	353.2	< 0.02		0.02	mg/L	5/21/02 15:22	CC	E84380
Odor	SM2150B	35		1	TON	5/21/02 12:00	EW	E84380
pH-field	150.1	7.10		0.01	pH units	5/21/02 8:30	NO	E84380
Potassium	200.7	885		0.200	mg/L	6/3/02 11:01	JPW	E84380
See attached results	Subcontract				NONE	5/28/02 0:00	SUB	
Selenium	200.7	< 0.020		0.020	mg/L	6/3/02 11:01	JPW	E84380
Silver	200.7	< 0.010		0.010	mg/L	6/3/02 11:01	JPW	E84380
Sodium	273.1	6140		160	mg/L	5/24/02 12:00	JPW	E84380
Specific Conductance-field	120.1	50000		0.1	umhos/cm	5/21/02 8:30	NO	E84380
Sulfate	375.4	2780		100	mg/L	5/22/02 9:30	EW	E84380
Thallium	200.7	< 0.020		0.020	mg/L	6/3/02 11:01	JPW	E84380
Total Coliform, MF	9222B	< 1		1	col/100ml	5/21/02 13:00	RG	E84380
Total Dissolved Solids	160.1	36300		20	mg/L	5/21/02 16:00	EW	E84380
Water Temperature-field	170.1	33.3		0.1	C	5/21/02 8:30	NO	E84380
Zinc	200.7	< 0.020		0.020	mg/L	6/3/02 11:01	JPW	E84380

Page: 1 of 3

Client Project: City of Fort Myers
Lab Project: N0205472
Report Date: 06/11/02

Sanders Laboratories
Environmental Testing Services

Laboratory Results

YOUNGQUIST BROTHERS, INC.
Has Reviewed this Shop Drawing/Submittal
YBI/Section No. # 02311-027A
Transmittal No. # 0123 **Date:** 6/17/02
Signature MLE

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0205472-01	deep zone grab	Ground Water	5/21/02 8:30

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Aluminum	200.7	0.448		0.050	mg/L	6/3/02 11:01	JPW	E84380
Antimony	200.7	< 0.020		0.020	mg/L	6/3/02 11:01	JPW	E84380
Arsenic	200.7	< 0.030		0.030	mg/L	6/3/02 11:01	JPW	E84380
ium	200.7	< 0.003		0.003	mg/L	6/3/02 11:01	JPW	E84380
Beryllium	200.7	0.0170		0.0010	mg/L	6/3/02 11:01	JPW	E84380
Bicarbonate Alkalinity	4500CO2-D	120		3	mg/L	5/24/02 11:30	DA	E84380
Cadmium	200.7	< 0.003		0.003	mg/L	6/3/02 11:01	JPW	E84380
Calcium	200.7	707		0.050	mg/L	6/3/02 11:01	JPW	E84380
Carbonate Alkalinity	4500CO2-D	0.28		0.01	mg/L	5/24/02 11:30	DA	E84380
Chloride	4500Cl-B	10200		1000	mg/L	5/21/02 14:00	MA	E84380
Chromium	200.7	< 0.010		0.010	mg/L	6/3/02 11:01	JPW	E84380
Color	2120B	3		1	PtCo units	5/22/02 15:45	DA	E84380
Copper	200.7	< 0.010		0.010	mg/L	6/3/02 11:01	JPW	E84380
Fecal Coliform, MF	9222D	< 1		1	col/100ml	5/21/02 13:00	RG	E84380
Fluoride	300.0	<35.0	*	35.0	mg/L	5/29/02 15:10	MA	E84380
Iron	200.7	< 0.120		0.120	mg/L	6/3/02 11:01	JPW	E84380
d	200.7	0.011		0.010	mg/L	6/3/02 11:01	JPW	E84380
Magnesium	200.7	1430		0.050	mg/L	6/3/02 11:01	JPW	E84380

Laboratory Results

Approved by:

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

Comments:

*** = Due to high conductivity, dilution raised detection limit.**

Test Results meet all the requirements of the NELAC standards.

SOUTHERN ANALYTICAL LABORATORIES, INC.
110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 2002
Project No: 28961

Laboratory Report

Project Name	N0205472
Sample Description	N0205472 1H
Matrix	Groundwater
SAL Sample Number	28961.01
Date/Time Collected	05/21/02 08:30
Date/Time Received	05/22/02 08:50

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Volatile Organic Compounds (Group II Unregulated)							
1,1,1,2-Tetrachloroethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
1,1,2,2-Tetrachloroethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
1,1-Dichloroethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
1,1-Dichloropropene	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
1,2,3-Trichloropropane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
1,3-Dichloropropane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
1,3-Dichloropropene, Total	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
2,2-Dichloropropane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
Bromobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Bromodichloromethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
Bromoform	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Bromomethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Chloroethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Chloroform	ug/l	0.2 U	EPA 502.2	0.2	05/25/02 04:11		FID
Chloromethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Dibromochloromethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Dibromomethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Dichlorodifluoromethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
m-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Methyl-tert-butyl-ether	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
o-Chlorotoluene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
p-Chlorotoluene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Trichlorofluoromethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Volatile Organic Compounds (Primary DW)							
1,1,1-Trichloroethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
1,1,2-Trichloroethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
1,1-Dichloroethene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
1,2,4 Trichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
1,2-Dichloroethane	ug/l	0.2 U	EPA 502.2	0.2	05/25/02 04:11		FID
1,2-Dichloropropane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
Benzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Carbon tetrachloride	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 04:11		FID
Chlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
cis-1,2-Dichloroethene	ug/l	0.2 U	EPA 502.2	0.2	05/25/02 04:11		FID
Ethylbenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Methylene Chloride	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
o-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
p-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Styrene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID

RECEIVED JUN 17 2002

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 200
Project No: 28961

Laboratory Report

Project Name	N0205472
Sample Description	N0205472 1H
Matrix	Groundwater
SAL Sample Number	28961.01
Date/Time Collected	05/21/02 08:30
Date/Time Received	05/22/02 08:50

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Volatile Organic Compounds (Primary DW)							
Tetrachloroethene	ug/l	0.2 U	EPA 502.2	0.2	05/25/02 04:11		FID
Toluene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
trans-1,2-Dichloroethene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Trichloroethene	ug/l	0.2 U	EPA 502.2	0.2	05/25/02 04:11		FID
Vinyl chloride	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 04:11		FID
Xylenes (Total)	ug/l	1.0 U	EPA 502.2	1.0	05/25/02 04:11		FID
Trihalomethane Analyses							
Total Trihalomethanes	mg/l	0.0015 U	EPA 502.2	0.0015	05/25/02 04:11		FID
Phthalate Esters							
Di(2-ethylhexyl)adipate	ug/l	1 U	EPA 506	1	05/29/02 03:09	05/24/02 11:00	JRW
Di(2-ethylhexyl)phthalate	ug/l	1 U	EPA 506	1	05/29/02 03:09	05/24/02 11:00	JRW
Nitrogen and Phosphorus Pesticides							
Butachlor	ug/l	0.4 U	EPA 507	0.4	05/29/02 03:45	05/24/02 11:00	JRW
Metolachlor	ug/l	0.3 U	EPA 507	0.3	05/29/02 03:45	05/24/02 11:00	JRW
Metribuzin	ug/l	0.2 U	EPA 507	0.2	05/29/02 03:45	05/24/02 11:00	JRW
Nitrogen and Phosphorus Pesticides							
Alachlor	ug/l	0.3 U	EPA 507	0.3	05/29/02 03:45	05/24/02 11:00	JRW
Atrazine	ug/l	0.1 U	EPA 507	0.1	05/29/02 03:45	05/24/02 11:00	JRW
Simazine	ug/l	0.1 U	EPA 507	0.1	05/29/02 03:45	05/24/02 11:00	JRW
Chlorinated Pesticides							
Aldrin	ug/l	0.01 U	EPA 508	0.01	06/04/02 18:55	05/24/02 11:00	JRW
Dieldrin	ug/l	0.01 U	EPA 508	0.01	06/04/02 18:55	05/24/02 11:00	JRW
Propachlor	ug/l	0.5 U	EPA 508	0.5	06/04/02 18:55	05/24/02 11:00	JRW
Chlorinated Pesticides							
Chlordane	ug/l	0.05 U	EPA 508	0.05	06/04/02 18:55	05/24/02 11:00	JRW
Endrin	ug/l	0.01 U	EPA 508	0.01	06/04/02 18:55	05/24/02 11:00	JRW
Heptachlor	ug/l	0.01 U	EPA 508	0.01	06/04/02 18:55	05/24/02 11:00	JRW
Heptachlor epoxide	ug/l	0.01 U	EPA 508	0.01	06/04/02 18:55	05/24/02 11:00	JRW
Hexachlorobenzene	ug/l	0.01 U	EPA 508	0.01	06/04/02 18:55	05/24/02 11:00	JRW
Hexachlorocyclopentadiene	ug/l	0.1 U	EPA 508	0.1	06/04/02 18:55	05/24/02 11:00	JRW
Lindane	ug/l	0.01 U	EPA 508	0.01	06/04/02 18:55	05/24/02 11:00	JRW
Methoxychlor	ug/l	0.02 U	EPA 508	0.02	06/04/02 18:55	05/24/02 11:00	JRW
PCBs	ug/l	0.05 U	EPA 508	0.05	06/04/02 18:55	05/24/02 11:00	JRW
Toxaphene	ug/l	0.2 U	EPA 508	0.2	06/04/02 18:55	05/24/02 11:00	JRW

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 2002
Project No: 28961

Laboratory Report

Project Name	N0205472
Sample Description	N0205472 1H
Matrix	Groundwater
SAL Sample Number	28961.01
Date/Time Collected	05/21/02 08:30
Date/Time Received	05/22/02 08:50

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Chlorinated Herbicides							
Dicamba	ug/l	0.25 U	EPA 515.3	0.25	05/29/02 18:03	05/28/02 10:00	BTJ
Chlorinated Herbicides							
2,4,5-TP (Silvex)	ug/l	0.05 U	EPA 515.3	0.05	05/29/02 18:03	05/28/02 10:00	BTJ
2,4-D	ug/l	0.5 U	EPA 515.3	0.5	05/29/02 18:03	05/28/02 10:00	BTJ
Dalapon	ug/l	1 U	EPA 515.3	1	05/29/02 18:03	05/28/02 10:00	BTJ
Dinoseb	ug/l	0.2 U	EPA 515.3	0.2	05/29/02 18:03	05/28/02 10:00	BTJ
Pentachlorophenol	ug/l	0.05 U	EPA 515.3	0.05	05/29/02 18:03	05/28/02 10:00	BTJ
Picloram	ug/l	0.2 U	EPA 515.3	0.2	05/29/02 18:03	05/28/02 10:00	BTJ
Pesticide Analyses							
Diquat	ug/l	1 U	EPA 549.2	1	05/24/02 11:05	05/23/02 13:30	DF
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	ug/l	0.01 U	EPA 550	0.01	06/05/02 18:30	05/24/02 11:00	DF
Phenols							
2,4,6-Trichlorophenol	ug/l	10 U	EPA 604	10	06/04/02 14:56	05/28/02 12:00	JRW
2-Chlorophenol	ug/l	5 U	EPA 604	5	06/04/02 14:56	05/28/02 12:00	JRW
2-Methyl-4,6-dinitrophenol	ug/l	20 U	EPA 604	20	06/04/02 14:56	05/28/02 12:00	JRW
Phenol	ug/l	5 U	EPA 604	5	06/04/02 14:56	05/28/02 12:00	JRW
Phthalate Esters							
Butyl benzyl phthalate	ug/l	1 U	EPA 606	1	05/29/02 03:09	05/24/02 11:00	JRW
Diethylphthalate	ug/l	1 U	EPA 606	1	05/29/02 03:09	05/24/02 11:00	JRW
Dimethylphthalate	ug/l	1 U	EPA 606	1	05/29/02 03:09	05/24/02 11:00	JRW
Di-n-butylphthalate	ug/l	1 U	EPA 606	1	05/29/02 03:09	05/24/02 11:00	JRW
Dioctylphthalate	ug/l	1 U	EPA 606	1	05/29/02 03:09	05/24/02 11:00	JRW
Nitroaromatics and Cyclic Ketones							
2,4-Dinitrotoluene	ug/l	1 U	EPA 609	1	05/29/02 03:09	05/24/02 11:00	JRW
Isophorone	ug/l	1 U	EPA 609	1	05/29/02 03:45	05/24/02 11:00	JRW
Semivolatile Analyses							
1,2,4-Trichlorobenzene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
1,2-Dichlorobenzene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
1,3-Dichlorobenzene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
1,4-Dichlorobenzene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
2,4,6-Trichlorophenol	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
2,4-Dichlorophenol	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
2,4-Dimethylphenol	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
2,4-Dinitrophenol	ug/l	50 U	EPA 625	50	05/30/02 15:32	05/28/02 11:00	BTJ

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 200.
Project No: 28961

Laboratory Report

Project Name	N0205472
Sample Description	N0205472 1H
Matrix	Groundwater
SAL Sample Number	28961.01
Date/Time Collected	05/21/02 08:30
Date/Time Received	05/22/02 08:50

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Semivolatile Analyses							
2,4-Dinitrotoluene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
2,6-Dinitrotoluene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
2-Chloronaphthalene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
2-Chlorophenol	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
2-Nitrophenol	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
3,3'-Dichlorobenzidine	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
4,6-Dinitro-o-cresol	ug/l	50 U	EPA 625	50	05/30/02 15:32	05/28/02 11:00	BTJ
4-Bromophenyl-phenylether	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
4-Chloro-3-methylphenol	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
4-Chlorophenyl-phenylether	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
4-Nitrophenol	ug/l	50 U	EPA 625	50	05/30/02 15:32	05/28/02 11:00	BTJ
Acenaphthene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Acenaphthylene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Anthracene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Azobenzene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Benzidine	ug/l	30 U	EPA 625	30	05/30/02 15:32	05/28/02 11:00	BTJ
Benzo(a)anthracene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Benzo(a)pyrene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Benzo(b)fluoranthene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Benzo(g,h,i)perylene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Benzo(k)fluoranthene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Bis(2-chlorethyl)ether	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Bis(2-chloroethoxy)methane	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Bis(2-chloroisopropyl)ether	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Bis(2-ethylhexyl)phthalate	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Butylbenzylphthalate	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Chrysene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Dibenzo(a,h)anthracene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Diethylphthalate	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Dimethylphthalate	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Di-n-butylphthalate	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Di-n-octylphthalate	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Fluoranthene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Fluorene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Hexachlorobenzene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Hexachlorobutadiene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Hexachlorocyclopentadiene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Hexachloroethane	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Indeno(1,2,3-cd)pyrene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Isophorone	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 2002
Project No: 28961

Laboratory Report

Project Name	N0205472
Sample Description	N0205472 1H
Matrix	Groundwater
SAL Sample Number	28961.01
Date/Time Collected	05/21/02 08:30
Date/Time Received	05/22/02 08:50

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Semivolatile Analyses							
Naphthalene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Nitrobenzene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
N-Nitrosodimethylamine	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
N-Nitrosodi-n-propylamine	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
N-Nitrosodiphenylamine	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Pentachlorophenol	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Phenathrene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Phenol	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Pyrene	ug/l	10 U	EPA 625	10	05/30/02 15:32	05/28/02 11:00	BTJ
Pesticide Analyses							
Dibromochloropropane	ug/l	0.005 U	EPA 504.1	0.005	05/29/02 00:39	05/28/02 15:00	BTJ
Ethylene dibromide	ug/l	0.005 U	EPA 504.1	0.005	05/29/02 00:39	05/28/02 15:00	BTJ
Carbamate Pesticides							
3-Hydroxycarbofuran	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 07:47		DF
Aldicarb	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 07:47		DF
Aldicarb sulfone	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 07:47		DF
Aldicarb sulfoxide	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 07:47		DF
Carbaryl	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 07:47		DF
Methomyl	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 07:47		DF
Carbamate Pesticides							
Carbofuran	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 07:47		DF
Oxamyl (Vydate)	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 07:47		DF
Pesticide Analyses							
Glyphosate	ug/l	10 U	EPA 547	10	05/25/03 00:36		DF
Pesticide Analyses							
Endothall	ug/l	20 U	EPA 548.1	20	06/04/02 22:28	05/24/02 14:00	JRW
Inorganics							
Cyanide	mg/l	0.005 U	SM 4500 CN	0.005	05/28/02 15:00	05/28/02 10:45	KEN
Foaming Agents (LAS, mol wt 342)	mg/l	0.17	SM 5540 C	0.05	05/23/02 08:15		JEH

Laboratory Report

Footnotes

*	Test results presented in this report meet all the requirements of the NELAC standards.
**	A statement of estimated uncertainty of test results is available upon request.
U	Analyte was not detected; indicated concentration is method detection limit.

Florida Radiochemistry Services, Inc.
Contact: Michael J. Naumann
5456 Hoffner Ave., Suite 201 Orlando, FL 32812
Phone: (407) 382-7733 Fax: (407)382-7744
Certification I. D. # E83033

Work Order #: 0205170
Report Date: 6/6/02

Report to:

Sanders Laboratories
1050 Endeavor Ct.
Nokomis, FL 34275
Attention: Tami Bright

I do hereby affirm that this record contains no willful misrepresentations and that this information given by me is true to the best of my knowledge and belief. I further certify that the methods and quality control measures used to produce these laboratory results were implemented in accordance with the requirements of this laboratory's certification and NELAC Standards.

Signed Michael J Naumann
President

Date 6-6-02

RECEIVED JUN 17 2002

Sample Login

Client:	**Sanders Laboratories**	**Date / Time Received**	**Work order #**
Client Contact:	**Tami Bright**	**5/22/02 10:30**	**0205170**
Client P.O.			
Project I.D.	**N0205472**		

Lab Sample I.D.	**Client Sample I.D.**	**Sample Date/Time**	**Analysis Requested**
0205170-01	**N0205472**	**5/21/02 08:30**	**Ga, Gb, Ra226, Ra228**

Analysis Results

Gross Alpha	**114 ****	**Gross Beta**	**401 ****
Error +/-	**36.1**	**Error +/-**	**48.4**
MDL	**47.3**	**MDL**	**69.0**
EPA Method	**900.0**	**EPA Method**	**900.0**
Prep Date	**5/30/02**	**Prep Date**	**5/30/02**
Analysis Date	**5/31/02**	**Analysis Date**	**5/31/02**
Radium 226	**53.5**	**Radium 228**	**3.4**
Error +/-	**1.1**	**Error +/-**	**0.9**
MDL	**0.1**	**MDL**	**1.1**
EPA Method	**903.1**	**EPA Method**	**Ra-05**
Prep Date	**5/29/02**	**Prep Date**	**5/29/02**
Analysis Date	**6/5/02**	**Analysis Date**	**6/5/02**
Units	**pCi/l**	**Units**	**pCi/l**
Analyst Initials	**MJN**	**Analyst Initials**	**MJN**

** See Case Narrative

QA Page

Analyte	Sample #	Date Analyzed	Sample Result	Amount Spiked	Spike Result	Spike /Dup Result	Spike % Rec.	Spike Dup % Rpd
Gross Alpha	0205196-01	5/31/02	<1.3	10.2	10.6	10.6	104	0.0
Gross Beta	0205196-01	5/31/02	2.2	12.6	13.8	13.7	92	0.7
Radium 226	0205170-01	6/5/02	53.5	23.5	79.8	79.3	112	0.6
Radium 228	0205170-01	6/5/02	3.4	8.1	11.8	11.6	104	1.7

Quality Control Limits

	% RPD	% Rec.
Gross Alpha	17.6	61-116
Gross Beta	17.9	74-126
Radium 226	19.5	70-121
Radium 228	15.4	80-128

Case Narrative

NOTE: ** Gross Alpha and Beta:

Sample 0205170-01 had an elevated detection limit and/or counting error due to a low volume of sample used. The sample had high TDS (Total Dissolved Solids). The high TDS interferes with the sample counting efficiency. This is caused by the solids absorbing the sample activity (Sample self-absorption). The sample counting efficiency is decreased because of this. Therefore, the counting time was increased (the sample was counted over night or as long as possible) to help reduce the detection limit and counting error.

EMSL Analytical, Inc.

EMSL

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

05/31/02

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

Project ID: N0205472
Attn: Tami Bright
Reference Number: FL02962
Date/Time of Filtration May 22, 2002

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

Sample Id	# Asbestos Structures	Type(s) of Asbestos	Concentration of Asbestos Structures (Millions/Liter)	Detection Limit (Millions/Liter)	95% Confidence Limits (Upper-Lower) (Millions/Liter)
N0205472	None Detected	None Detected	BDL	0.08	0.29

Stephen L. Bennett

Analyst

Stephen L. Bennett

Approved Signatory

Date Analyzed: 5/31/02

ACCREDITATIONS: HRS # E86795

BDL = Below Detection Limit

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

Sanders Laboratories

TLI Project: 57453r1
Client Sample: N0205472

1613, Revision B TCDD Analysis (c)
Analysis File: U080803

Client Project:	FORT MEYERS				
Sample Matrix:	AQUEOUS	Date Received:	05/22/02	Spike File:	SP161B2S
TLI ID:	326-37-1B	Date Extracted:	06/04/02	ICal:	UF5307B
		Date Analyzed:	06/13/02	ConCal:	UB20806
Sample Size:	1.020 L	Dilution Factor:	n/a	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	U080702	% Lipid:	n/a
GC Column:	DB-5	Analyst:	JMM	% Solids:	0.5

Analytes	Conc. (pg/L)	DL	Ratio	RT	RRT	Flags
2,3,7,8-TCDD	ND	6.0				—

Internal Standard	Conc. (pg/L)	% Recovery	QC Limits	Ratio	RT	RRT	Flags
$^{13}C_{12}$-2,3,7,8-TCDD	856	43.6	31%-137%	0.81	26:20	1.007	—

Cleanup Standard	Conc. (pg/L)	% Recovery	QC Limits	RT	RRT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	211	108	42%-164%	26:21	1.008	—

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.83	26:09	—

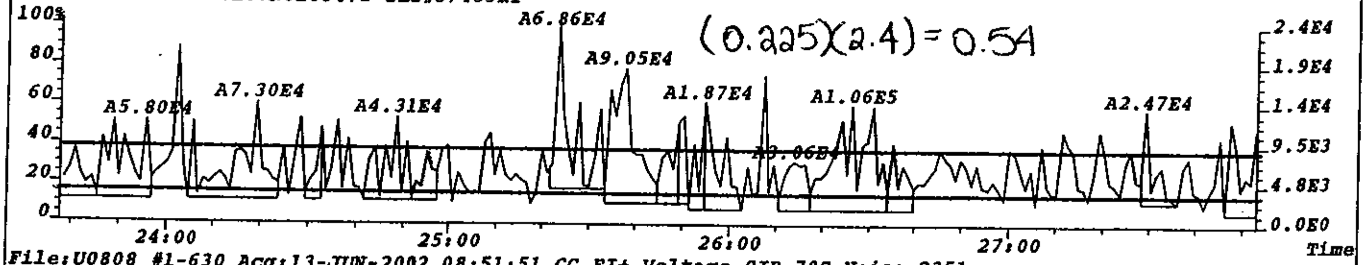
Data Reviewer: AEM 06/13/02

```
                    Initial   ....Date...

Data Review By:     GEM 6.13.02

                                 Calculated Noise Height: 1.10


Page No.    1          Listing of U080803B.dbf
06/13/02               Matched GC Peaks / Ratio / Ret. Time

Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area/Ht Area/Ht.Peak1 Area/Ht.Peak2 Rel.RT Compound.Name.. ID.. Flags.

TCDD                           0.65-0.89                                  0.896-1.045
320-322          DC  NL         Height         3.48        1.60         1.88
                 DC  WH  27:47   0.81         11.47                         1.055
320-322              0 Peaks                   0.00

37Cl-TCDD                                                                 0.924-1.076
328              DC  NL         Height         1.75        1.75
                 DC  WL  24:10                 7.68                         0.918
                 DC  SN  24:32                 2.05                         0.932
                 DC  SN  24:44                 3.27                         0.939
                 DC  SN  24:59                 9.17                         0.949
                 DC  SN  25:08                 2.30                         0.954
                 DC  SN  25:17                 3.34                         0.960
                 DC  SN  25:28                 2.75                         0.967
                 DC  SN  25:35                 7.87                         0.972
                 DC  SN  25:50                 6.45                         0.981
                 DC  SN  26:07                 2.79                         0.992
                         26:21               741.44      741.44             1.001 37Cl-TCDD        CLS
328                  1 Peak                  741.44

13C12-TCDD                     0.65-0.89                                 0.918-1.070
332-334          DC  NL         Height         5.18        3.28         1.90
                         26:09   0.83      6,612.31    3,000.03     3,612.28  0.993 13C12-1234-TCDD RS1
                         26:20   0.81      3,315.85    1,486.75     1,829.10  1.000 13C12-2378-TCDD IS1
                                Height       900.59      399.09       501.50
                         26:34   0.75         17.10        7.35         9.75  1.009
332-334              3 Peaks               9,945.26


Column Description............  "Why" Code Description.........  QC Log Desc.........

M_Z    -Nominal Ion Mass(es)     WL-Below Retention Time Window   A-Peak Added
..RT.  -Retention Time (mm:ss)   WH-Above Retention Time Window   K-Peak Kept
Rat.1  -Ratio of M/M+2 Ions      SN-Below Signal to Noise Level   D-Peak Deleted
OK     -RO=Ratio Outside Limits  <M-Below Method Detection Limit  T-Time Changed
Rel.RT-Relative Retention Time   NL-Channel Specific Noise Level  M-Peak Area Changed
                                                                  N-Name Changed
                                                                  X-Ether Interference
*** End of Report ***
```

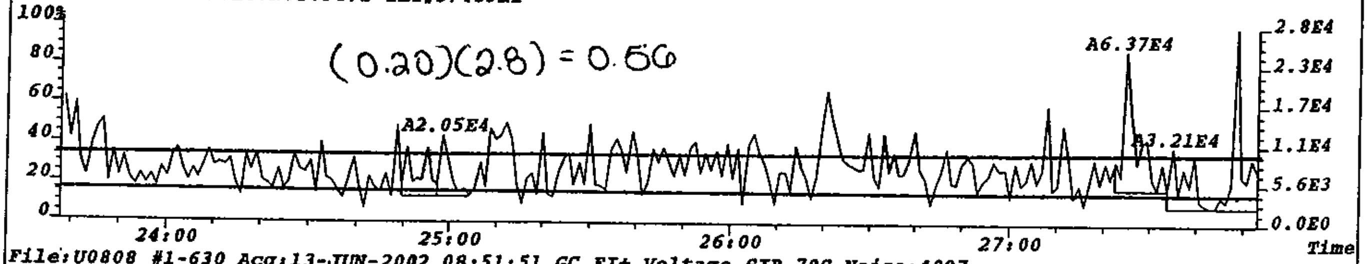
Printed: 13:27 06/13/2002

N = 0.54 + 0.56 = 1.10   OEM 6/13/02

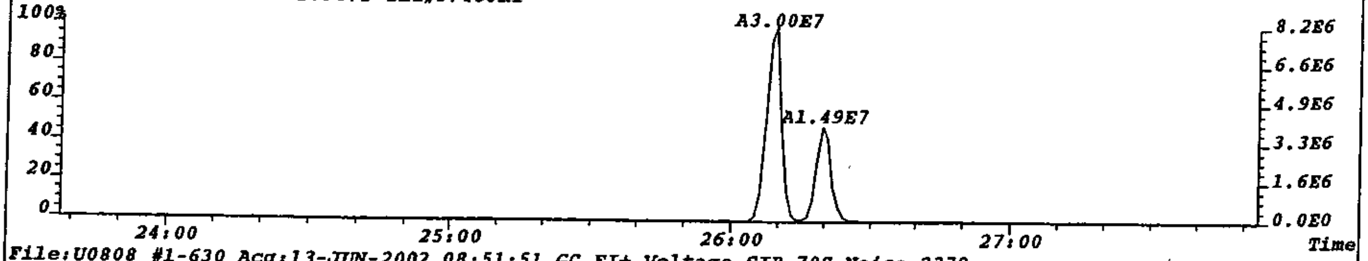
File:U0808 #1-630 Acq:13-JUN-2002 08:51:51 GC EI+ Voltage SIR 70S Noise:1994
319.8965 S:3 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7976.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:N0205472 TLI#57453R1


(0.225)(2.4) = 0.54

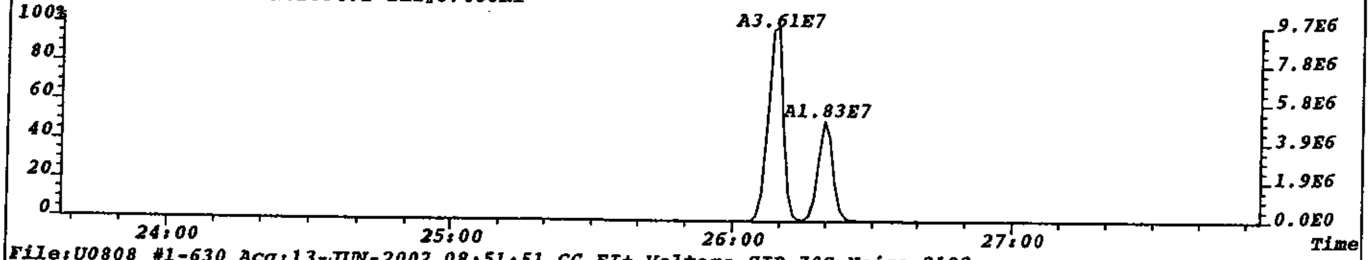
File:U0808 #1-630 Acq:13-JUN-2002 08:51:51 GC EI+ Voltage SIR 70S Noise:2351
321.8936 S:3 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,9404.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:N0205472 TLI#57453R1


(0.20)(2.8) = 0.56

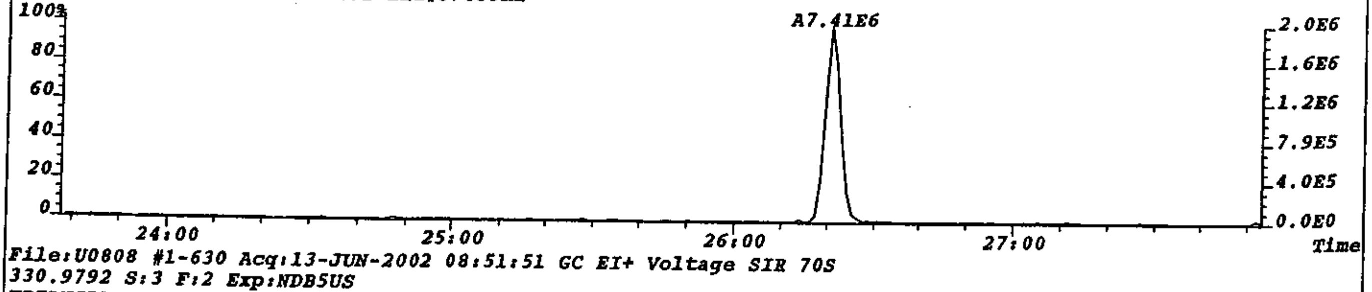
File:U0808 #1-630 Acq:13-JUN-2002 08:51:51 GC EI+ Voltage SIR 70S Noise:4097
331.9368 S:3 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,16388.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:N0205472 TLI#57453R1



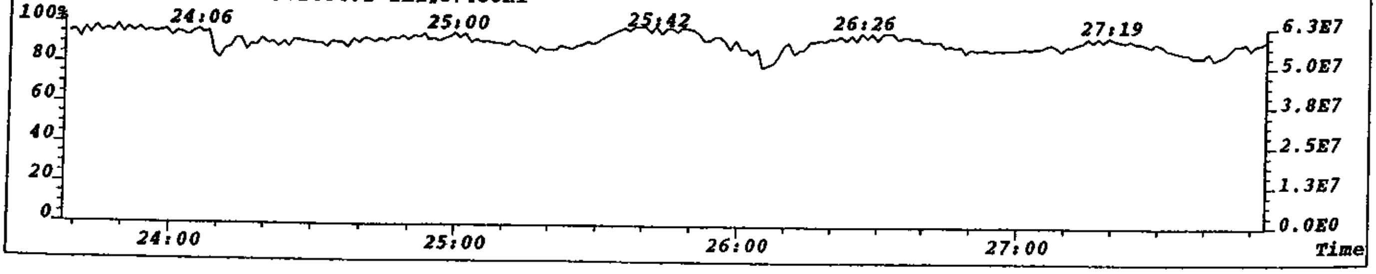
File:U0808 #1-630 Acq:13-JUN-2002 08:51:51 GC EI+ Voltage SIR 70S Noise:2379
333.9338 S:3 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,9516.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:N0205472 TLI#57453R1

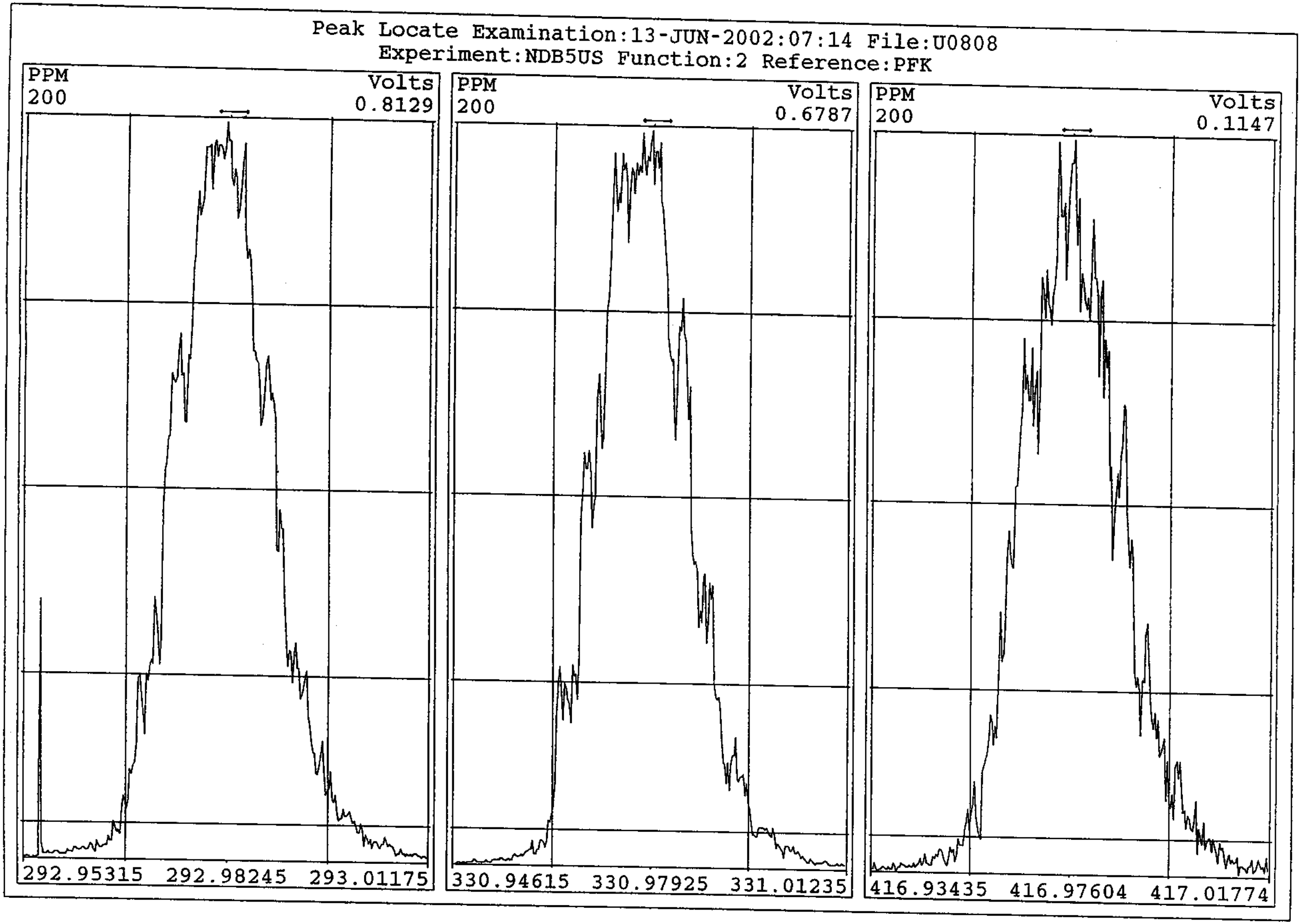


File:U0808 #1-630 Acq:13-JUN-2002 08:51:51 GC EI+ Voltage SIR 70S Noise:2193
327.8847 S:3 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,8772.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:N0205472 TLI#57453R1



File:U0808 #1-630 Acq:13-JUN-2002 08:51:51 GC EI+ Voltage SIR 70S
330.9792 S:3 F:2 Exp:NDB5US
TRIANGLE LABS Text:N0205472 TLI#57453R1





Peak Locate Examination:13-JUN-2002:07:14 File:U0808
Experiment:NDB5US Function:2 Reference:PFK

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD

PROJECT # N02054

Page 1 of 2

Client Youngquist
Address do

Phone ____ Fax ____

Report To:
Bill To:
P.O. #
Project Name City of F.M.
Project Location:

Sample Supply: GW
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: 5/31/02

Sampled By (PRINT) Noah Olenych

Sampler Signature

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL		ANALYSES REQUEST	Cr, K, Mg, Ca	Primary metals	secondary metals	VOC, SOCs	NOx	TDS, F, SO_4	color, Cl-	odor, carbonate	bicarbonate	total col.	fecal col.	Sample ID #
	Deep Zone	5/21/02	830	G	1			1				1	1	1									1A
					1	1									1								1B
					1		1									1							1C
					1	1											1	1					1E
					1	1													1	1			1F
					1	1															1		1G
					1	1																1	1I
	↓	↓	↓	↓	1																		

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA
2002			

COMMENTS: DW standards

COOLER #

COOLER SEAL INTACT
Yes No

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Noah Olenych	5-21-02	1120	Anna [illegible]	5/21/02	1120

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-C TODY RECORD

PROJECT # N02054.2

Page 2 of 2

Client Younggquist
Address
Phone
Fax

Report To:
Bill To:
P.O. #
Project Name City of FM
Project Location:

Sample Supply: GW
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: 5/31/02

Sampled By (PRINT) Noah Olenych
Sampler Signature

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL		ANALYSES REQUEST	Pest + PCB	Dioxin	MBAS 625	524.2	Gross Alpha	Rads 226+228	CN- Asbestos	Fe Gross Beta	(Field)	PH, COND, temp		Sample ID #
	Deep Zone	5/21/02	830	G	1							1	1	1	1	1	1	1	1				1H
	↓	↓	↓	↓																1	1		1I

RECEIVED
2002

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA

COMMENTS:
DW standards

COOLER #

COOLER SEAL INTACT
Yes No

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Noah Olenych	5-21-02	1120	[illegible]	5/21/02	1120

Sanders Laboratories, Inc.
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

APPENDIX N.3

SZMW-1 Ambient Water Quality Data

Sanders Laboratories, Inc.
Environmental Testing Services

February 27,2003

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Fort Myers, FL 33908

Reference: Analysis Certification Letter
Sanders Laboratory Report: N0205473

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or person who manages the system or those person 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 there are significant penalties for submitted false information, including the possibility of fine and imprisonment for knowing violation."

Laura H Sullivan

Laura H. Sullivan
QAO

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

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Page: 1 of 3

Client Project: City of Fort Myers
Lab Project: N0205473
Report Date: 06/11/02

Sanders Laboratories
Environmental Testing Services

Laboratory Results

Youngquist Brothers, Inc.
15465 Pine Ridge Road
Ft. Myers, FL 33908

Lab ID	**Sample Description**	**Sample Source**	**Sample Date/Time**
N0205473-01	storage zone grab	Ground Water	5/21/02 9:10

Analysis	**Method**	**Results**	**Qual**	**Detection Limit**	**Units**	**AnalysisDate/Time**	**Analyst**	**Cert ID**
Aluminum	200.7	0.716		0.050	mg/L	6/3/02 11:01	JPW	E84380
Antimony	200.7	0.069		0.020	mg/L	6/3/02 11:01	JPW	E84380
Arsenic	200.7	< 0.030		0.030	mg/L	6/3/02 11:01	JPW	E84380
um	200.7	< 0.003		0.003	mg/L	6/3/02 11:01	JPW	E84380
Beryllium	200.7	0.0100		0.0010	mg/L	6/3/02 11:01	JPW	E84380
Bicarbonate Alkalinity	4500CO2-D	47		3	mg/L	5/24/02 11:30	DA	E84380
Cadmium	200.7	0.0040		0.0030	mg/L	6/3/02 11:01	JPW	E84380
Calcium	200.7	95.1		0.050	mg/L	6/3/02 11:01	JPW	E84380
Carbonate Alkalinity	4500CO2-D	2.1		0.01	mg/L	5/24/02 11:30	DA	E84380
Chloride	4500Cl-B	2350		200	mg/L	5/21/02 14:00	MA	E84380
Chromium	200.7	< 0.010		0.010	mg/L	6/3/02 11:01	JPW	E84380
Color	2120B	3		1	PtCo units	5/22/02 15:45	DA	E84380
Copper	200.7	0.090		0.010	mg/L	6/3/02 11:01	JPW	E84380
Fecal Coliform, MF	9222D	< 1		1	col/100ml	5/21/02 13:00	RG	E84380
Fluoride	300.0	<7.0	*	7.0	mg/L	5/29/02 15:10	MA	E84380
Iron	200.7	0.161		0.120	mg/L	6/3/02 11:01	JPW	E84380
	200.7	< 0.010		0.010	mg/L	6/3/02 11:01	JPW	E84380
Magnesium	200.7	83.6		0.050	mg/L	6/3/02 11:01	JPW	E84380

Client Project: City of Fort Myers
Lab Project: N0205473
Report Date: 06/11/02

Laboratory Results

Lab ID	Sample Description	Sample Source	Sample Date/Time
N0205473-01	storage zone grab	Ground Water	5/21/02 9:10

Analysis	Method	Results	Qual	Detection Limit	Units	AnalysisDate/Time	Analyst	Cert ID
Manganese	200.7	< 0.010		0.010	mg/L	6/3/02 11:01	JPW	E84380
Mercury	245.1	< 0.001		0.001	mg/L	6/10/02 13:48	JPW	E84380
Nickel	200.7	0.021		0.010	mg/L	6/3/02 11:01	JPW	E84380
Nitrate+Nitrite-N	353.2	< 0.02		0.02	mg/L	5/21/02 13:52	CC	E84380
Nitrate-N	353.2	< 0.02		0.02	mg/L	5/21/02 15:22	CC	E84380
Nitrite-N	353.2	< 0.02		0.02	mg/L	5/21/02 15:22	CC	E84380
Odor	SM2150B	140		1	TON	5/21/02 12:00	EW	E84380
pH-field	150.1	8.94		0.01	pH units	5/21/02 9:10	NO	E84380
Potassium	200.7	95.3		0.200	mg/L	6/3/02 11:01	JPW	E84380
See attached results	Subcontract				NONE	5/28/02 0:00	SUB	
Selenium	200.7	< 0.020		0.020	mg/L	6/3/02 11:01	JPW	E84380
Silver	200.7	0.038		0.010	mg/L	6/3/02 11:01	JPW	E84380
Sodium	273.1	1350		20.0	mg/L	5/24/02 12:00	JPW	E84380
Specific Conductance-field	120.1	7550		0.1	umhos/cm	5/21/02 9:10	NO	E84380
Sulfate	375.4	474		100	mg/L	5/22/02 9:30	EW	E84380
Thallium	200.7	< 0.020		0.020	mg/L	6/3/02 11:01	JPW	E84380
Total Coliform, MF	9222B	< 1		1	col/100ml	5/21/02 13:00	RG	E84380
Total Dissolved Solids	160.1	4800		20	mg/L	5/21/02 16:00	EW	E84380
Water Temperature-field	170.1	32.6		0.1	C	5/21/02 9:10	NO	E84380
Zinc	200.7	< 0.020		0.020	mg/L	6/3/02 11:01	JPW	E84380

Client Project: City of Fort Myers
Lab Project: N0205473
Report Date: 06/11/02

Laboratory Results

Approved by:

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

Comments:

* = Due to high conductivity, dilution raised detection limit.

Test Results meet all the requirements of the NELAC standards.

SOUTHERN ANALYTICAL LABORATORIES, INC.
110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 2002
Project No: 28963

Laboratory Report

Project Name	N0205473
Sample Description	N0205473 1H
Matrix	Groundwater
SAL Sample Number	28963.01
Date/Time Collected	05/21/02 09:10
Date/Time Received	05/22/02 08:50

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Volatile Organic Compounds (Group II Unregulated)							
1,1,1,2-Tetrachloroethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
1,1,2,2-Tetrachloroethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
1,1-Dichloroethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
1,1-Dichloropropene	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
1,2,3-Trichloropropane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
1,3-Dichloropropane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
1,3-Dichloropropene, Total	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
2,2-Dichloropropane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
Bromobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Bromodichloromethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
Bromoform	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Bromomethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Chloroethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Chloroform	ug/l	0.2 U	EPA 502.2	0.2	05/25/02 05:13		FID
Chloromethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Dibromochloromethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Dibromomethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Dichlorodifluoromethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
m-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Methyl-tert-butyl-ether	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
o-Chlorotoluene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
p-Chlorotoluene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Trichlorofluoromethane	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Volatile Organic Compounds (Primary DW)							
1,1,1-Trichloroethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
1,1,2-Trichloroethane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
1,1-Dichloroethene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
1,2,4 Trichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
1,2-Dichloroethane	ug/l	0.2 U	EPA 502.2	0.2	05/25/02 05:13		FID
1,2-Dichloropropane	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
Benzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Carbon tetrachloride	ug/l	0.3 U	EPA 502.2	0.3	05/25/02 05:13		FID
Chlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
cis-1,2-Dichloroethene	ug/l	0.2 U	EPA 502.2	0.2	05/25/02 05:13		FID
Ethylbenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Methylene Chloride	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
o-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
p-Dichlorobenzene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Styrene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 200.
Project No: 28963

Laboratory Report

Project Name	**N0205473**
Sample Description	**N0205473 1H**
Matrix	**Groundwater**
SAL Sample Number	**28963.01**
Date/Time Collected	**05/21/02 09:10**
Date/Time Received	**05/22/02 08:50**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Volatile Organic Compounds (Primary DW)							
Tetrachloroethene	ug/l	0.2 U	EPA 502.2	0.2	05/25/02 05:13		FID
Toluene	ug/l	0.78	EPA 502.2	0.5	05/25/02 05:13		FID
trans-1,2-Dichloroethene	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Trichloroethene	ug/l	0.2 U	EPA 502.2	0.2	05/25/02 05:13		FID
Vinyl chloride	ug/l	0.5 U	EPA 502.2	0.5	05/25/02 05:13		FID
Xylenes (Total)	ug/l	2.6	EPA 502.2	1.0	05/25/02 05:13		FID
Trihalomethane Analyses							
Total Trihalomethanes	mg/l	0.0015 U	EPA 502.2	0.0015	05/25/02 05:13		FID
Phthalate Esters							
Di(2-ethylhexyl)adipate	ug/l	1 U	EPA 506	1	05/29/02 03:52	05/24/02 11:00	JRW
Di(2-ethylhexyl)phthalate	ug/l	1 U	EPA 506	1	05/29/02 03:52	05/24/02 11:00	JRW
Nitrogen and Phosphorus Pesticides							
Butachlor	ug/l	0.4 U	EPA 507	0.4	05/29/02 04:32	05/24/02 11:00	JRW
Metolachlor	ug/l	0.3 U	EPA 507	0.3	05/29/02 04:32	05/24/02 11:00	JRW
Metribuzin	ug/l	0.2 U	EPA 507	0.2	05/29/02 04:32	05/24/02 11:00	JRW
Nitrogen and Phosphorus Pesticides							
Alachlor	ug/l	0.3 U	EPA 507	0.3	05/29/02 04:32	05/24/02 11:00	JRW
Atrazine	ug/l	0.1 U	EPA 507	0.1	05/29/02 04:32	05/24/02 11:00	JRW
Simazine	ug/l	0.1 U	EPA 507	0.1	05/29/02 04:32	05/24/02 11:00	JRW
Chlorinated Pesticides							
Aldrin	ug/l	0.01 U	EPA 508	0.01	06/04/02 19:34	05/24/02 11:00	JRW
Dieldrin	ug/l	0.01 U	EPA 508	0.01	06/04/02 19:34	05/24/02 11:00	JRW
Propachlor	ug/l	0.5 U	EPA 508	0.5	06/04/02 19:34	05/24/02 11:00	JRW
Chlorinated Pesticides							
Chlordane	ug/l	0.05 U	EPA 508	0.05	06/04/02 19:34	05/24/02 11:00	JRW
Endrin	ug/l	0.01 U	EPA 508	0.01	06/04/02 19:34	05/24/02 11:00	JRW
Heptachlor	ug/l	0.01 U	EPA 508	0.01	06/04/02 19:34	05/24/02 11:00	JRW
Heptachlor epoxide	ug/l	0.01 U	EPA 508	0.01	06/04/02 19:34	05/24/02 11:00	JRW
Hexachlorobenzene	ug/l	0.01 U	EPA 508	0.01	06/04/02 19:34	05/24/02 11:00	JRW
Hexachlorocyclopentadiene	ug/l	0.1 U	EPA 508	0.1	06/04/02 19:34	05/24/02 11:00	JRW
Lindane	ug/l	0.01 U	EPA 508	0.01	06/04/02 19:34	05/24/02 11:00	JRW
Methoxychlor	ug/l	0.02 U	EPA 508	0.02	06/04/02 19:34	05/24/02 11:00	JRW
PCBs	ug/l	0.05 U	EPA 508	0.05	06/04/02 19:34	05/24/02 11:00	JRW
Toxaphene	ug/l	0.2 U	EPA 508	0.2	06/04/02 19:34	05/24/02 11:00	JRW

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 2002
Project No: 28963

Laboratory Report

Project Name	**N0205473**
Sample Description	**N0205473 1H**
Matrix	**Groundwater**
SAL Sample Number	**28963.01**
Date/Time Collected	**05/21/02 09:10**
Date/Time Received	**05/22/02 08:50**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Chlorinated Herbicides							
Dicamba	ug/l	0.25 U	EPA 515.3	0.25	05/29/02 18:24	05/28/02 10:00	BTJ
Chlorinated Herbicides							
2,4,5-TP (Silvex)	ug/l	0.05 U	EPA 515.3	0.05	05/29/02 18:24	05/28/02 10:00	BTJ
2,4-D	ug/l	0.5 U	EPA 515.3	0.5	05/29/02 18:24	05/28/02 10:00	BTJ
Dalapon	ug/l	1 U	EPA 515.3	1	05/29/02 18:24	05/28/02 10:00	BTJ
Dinoseb	ug/l	0.2 U	EPA 515.3	0.2	05/29/02 18:24	05/28/02 10:00	BTJ
Pentachlorophenol	ug/l	0.05 U	EPA 515.3	0.05	05/29/02 18:24	05/28/02 10:00	BTJ
Picloram	ug/l	0.2 U	EPA 515.3	0.2	05/29/02 18:24	05/28/02 10:00	BTJ
Pesticide Analyses							
Diquat	ug/l	1 U	EPA 549.2	1	05/24/02 11:16	05/23/02 13:30	DF
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	ug/l	0.01 U	EPA 550	0.01	06/05/02 18:59	05/24/02 11:00	DF
Phenols							
2,4,6-Trichlorophenol	ug/l	10 U	EPA 604	10	06/04/02 15:42	05/28/02 12:00	JRW
2-Chlorophenol	ug/l	5 U	EPA 604	5	06/04/02 15:42	05/28/02 12:00	JRW
2-Methyl-4,6-dinitrophenol	ug/l	20 U	EPA 604	20	06/04/02 15:42	05/28/02 12:00	JRW
Phenol	ug/l	5 U	EPA 604	5	06/04/02 15:42	05/28/02 12:00	JRW
Phthalate Esters							
Butyl benzyl phthalate	ug/l	1 U	EPA 606	1	05/29/02 03:52	05/24/02 11:00	JRW
Diethylphthalate	ug/l	1 U	EPA 606	1	05/29/02 03:52	05/24/02 11:00	JRW
Dimethylphthalate	ug/l	1 U	EPA 606	1	05/29/02 03:52	05/24/02 11:00	JRW
Di-n-butylphthalate	ug/l	1 U	EPA 606	1	05/29/02 03:52	05/24/02 11:00	JRW
Dioctylphthalate	ug/l	1 U	EPA 606	1	05/29/02 03:52	05/24/02 11:00	JRW
Nitroaromatics and Cyclic Ketones							
2,4-Dinitrotoluene	ug/l	1 U	EPA 609	1	05/29/02 03:52	05/24/02 11:00	JRW
Isophorone	ug/l	1 U	EPA 609	1	05/29/02 04:32	05/24/02 11:00	JRW
Semivolatile Analyses							
1,2,4-Trichlorobenzene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
1,2-Dichlorobenzene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
1,3-Dichlorobenzene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
1,4-Dichlorobenzene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
2,4,6-Trichlorophenol	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
2,4-Dichlorophenol	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
2,4-Dimethylphenol	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
2,4-Dinitrophenol	ug/l	50 U,Q	EPA 625	50	06/07/02 16:16	06/07/02 10:30	BTJ

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 200
Project No: 28963

Laboratory Report

Project Name	N0205473
Sample Description	N0205473 1H
Matrix	Groundwater
SAL Sample Number	28963.01
Date/Time Collected	05/21/02 09:10
Date/Time Received	05/22/02 08:50

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Semivolatile Analyses							
2,4-Dinitrotoluene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
2,6-Dinitrotoluene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
2-Chloronaphthalene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
2-Chlorophenol	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
2-Nitrophenol	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
3,3'-Dichlorobenzidine	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
4,6-Dinitro-o-cresol	ug/l	50 U,Q	EPA 625	50	06/07/02 16:16	06/07/02 10:30	BTJ
4-Bromophenyl-phenylether	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
4-Chloro-3-methylphenol	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
4-Chlorophenyl-phenylether	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
4-Nitrophenol	ug/l	50 U,Q	EPA 625	50	06/07/02 16:16	06/07/02 10:30	BTJ
Acenaphthene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Acenaphthylene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Anthracene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Azobenzene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Benzidine	ug/l	30 U,Q	EPA 625	30	06/07/02 16:16	06/07/02 10:30	BTJ
Benzo(a)anthracene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Benzo(a)pyrene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Benzo(b)fluoranthene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Benzo(g,h,i)perylene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Benzo(k)fluoranthene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Bis(2-chlorethyl)ether	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Bis(2-chloroethoxy)methane	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Bis(2-chloroisopropyl)ether	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Bis(2-ethylhexyl)phthalate	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Butylbenzylphthalate	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Chrysene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Dibenzo(a,h)anthracene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Diethylphthalate	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Dimethylphthalate	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Di-n-butylphthalate	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Di-n-octylphthalate	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Fluoranthene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Fluorene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Hexachlorobenzene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Hexachlorobutadiene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Hexachlorocyclopentadiene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Hexachloroethane	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Indeno(1,2,3-cd)pyrene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Isophorone	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 2002
Project No: 28963

Laboratory Report

Project Name **N0205473**
Sample Description **N0205473 1H**
Matrix **Groundwater**
SAL Sample Number **28963.01**
Date/Time Collected **05/21/02 09:10**
Date/Time Received **05/22/02 08:50**

Parameters	Units	Results	Method	Detection Limit	Date/Time Analyzed	Date/Time Prep	Analyst
Semivolatile Analyses							
Naphthalene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Nitrobenzene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
N-Nitrosodimethylamine	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
N-Nitrosodi-n-propylamine	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
N-Nitrosodiphenylamine	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Pentachlorophenol	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Phenathrene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Phenol	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Pyrene	ug/l	10 U,Q	EPA 625	10	06/07/02 16:16	06/07/02 10:30	BTJ
Pesticide Analyses							
Dibromochloropropane	ug/l	0.005 U	EPA 504.1	0.005	05/29/02 01:02	05/28/02 15:00	BTJ
Ethylene dibromide	ug/l	0.005 U	EPA 504.1	0.005	05/29/02 01:02	05/28/02 15:00	BTJ
Carbamate Pesticides							
3-Hydroxycarbofuran	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 08:24		DF
Aldicarb	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 08:24		DF
Aldicarb sulfone	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 08:24		DF
Aldicarb sulfoxide	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 08:24		DF
Carbaryl	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 08:24		DF
Methomyl	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 08:24		DF
Carbamate Pesticides							
Carbofuran	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 08:24		DF
Oxamyl (Vydate)	ug/l	0.5 U	EPA 531.1	0.5	05/30/02 08:24		DF
Pesticide Analyses							
Glyphosate	ug/l	10 U	EPA 547	10	05/25/03 00:48		DF
Pesticide Analyses							
Endothall	ug/l	20 U	EPA 548.1	20	06/04/02 23:04	05/24/02 14:00	JRW
Inorganics							
Cyanide	mg/l	0.005 U	SM 4500 CN	0.005	05/28/02 15:00	05/28/02 10:45	KEN
Foaming Agents (LAS, mol wt 342)	mg/l	0.05 U	SM 5540 C	0.05	05/23/02 08:15		JEH

Francis I. Daniels
Laboratory Director

Sanders Laboratories
1050 Endeavor Court
Nokomis, FL 34275-3623

June 11, 200
Project No: 28963

Laboratory Report

Footnotes

*	Test results presented in this report meet all the requirements of the NELAC standards.
**	A statement of estimated uncertainty of test results is available upon request.
U	Analyte was not detected; indicated concentration is method detection limit.
U,Q	Analyte was not detected; indicated concentration is method detection limit. Sample held beyond the accepted holding time.

FDOH Laboratory No. E84129
NELAP Accredited

Approved By: Francis I. Daniels
Laboratory Director

EMSL Analytical, Inc.

05/31/02

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

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

Project ID:	N0203493
Attn:	Tami Bright
Reference Number:	FL02693
Date/Time of Filtration	May 22, 2002

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

Sample Id	# Asbestos Structures	Type(s) of Asbestos	Concentration of Asbestos Structures (Millions/Liter)	Detection Limit (Millions/Liter)	95% Confidence Limits (Upper-Lower) (Millions/Liter)
N0205473	None Detected	None Detected	BDL	0.08	0.29

Stephen S. Bennett
Analyst

Stephen S. Bennett
Approved Signatory

Date Analyzed: 5/31/02

ACCREDITATIONS: HRS # E86795 BDL = Below Detection Limit

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

Florida Radiochemistry Services, Inc.
Contact: Michael J. Naumann
5456 Hoffner Ave., Suite 201 Orlando, FL 32812
Phone: (407) 382-7733 Fax: (407)382-7744
Certification I. D. # E83033

Work Order #: 0205171
Report Date: 6/6/02

Report to:

Sanders Laboratories
1050 Endeavor Ct.
Nokomis, FL 34275
Attention: Tami Bright

I do hereby affirm that this record contains no willful misrepresentations and that this information given by me is true to the best of my knowledge and belief. I further certify that the methods and quality control measures used to produce these laboratory results were implemented in accordance with the requirements of this laboratory's certification and NELAC Standards.

Signed Michael J. Naumann
President

Date 6-6-02

RECEIVED JUN 1 7 2002

Florida Radiochemistry Services, Inc.

Sample Login

Client:	**Sanders Laboratories**	**Date / Time Received**	**Work order #**
Client Contact:	**Tami Bright**	**5/22/02 10:30**	**0205171**
Client P.O.			
Project I.D.	**N0205473**		

Lab Sample I.D.	**Client Sample I.D.**	**Sample Date/Time**	**Analysis Requested**
0205171-01	**N0205473**	**5/21/02 09:00**	**Ga, Gb, Ra226, Ra228**

Analysis Results

Gross Alpha	**<12.1 ****	**Gross Beta**	**59.7 ****
Error +/-	**7.6**	**Error +/-**	**10.0**
MDL	**12.1**	**MDL**	**14.8**
EPA Method	**900.0**	**EPA Method**	**900.0**
Prep Date	**5/29/02**	**Prep Date**	**5/29/02**
Analysis Date	**5/30/02**	**Analysis Date**	**5/30/02**
Radium 226	**2.5**	**Radium 228**	**<1.1**
Error +/-	**0.2**	**Error +/-**	**0.7**
MDL	**0.2**	**MDL**	**1.1**
EPA Method	**903.1**	**EPA Method**	**Ra-05**
Prep Date	**5/29/02**	**Prep Date**	**5/29/02**
Analysis Date	**6/5/02**	**Analysis Date**	**6/5/02**
Units	**pCi/l**	**Units**	**pCi/l**
Analyst Initials	**MJN**	**Analyst Initials**	**MJN**

** See Case Narrative

QA Page

Analyte	Sample #	Date Analyzed	Sample Result	Amount Spiked	Spike Result	Spike /Dup Result	Spike % Rec.	Spike Dup % Rpd
Gross Alpha	0205180-01	5/30/02	1.0	10.2	11.0	10.4	98	5.6
Gross Beta	0205180-01	5/30/02	1.6	12.6	13.9	14.4	98	3.5
Radium 226	0205170-01	6/5/02	53.5	23.5	79.8	79.3	112	0.6
Radium 228	0205170-01	6/5/02	3.4	8.1	11.8	11.6	104	1.7

	Quality Control Limits	
	% RPD	% Rec.
Gross Alpha	17.6	61-116
Gross Beta	17.9	74-126
Radium 226	19.5	70-121
Radium 228	15.4	80-128

Florida Radiochemistry Services, Inc.

Case Narrative

NOTE: ** Gross Alpha and Beta:

Sample 0205171-01 had an elevated detection limit and/or counting error due to a low volume of sample used. The sample had high TDS (Total Dissolved Solids). The high TDS interferes with the sample counting efficiency. This is caused by the solids absorbing the sample activity (Sample self-absorption). The sample counting efficiency is decreased because of this. Therefore, the counting time was increased (the sample was counted over night or as long as possible) to help reduce the detection limit and counting error.

Sanders Laboratories

TLI Project: **57453r1**
Client Sample: **N0205473**

1613, Revision B TCDD Analysis (c)
Analysis File: **U080804**

Client Project:	**FORT MEYERS**				
Sample Matrix:	**AQUEOUS**	Date Received:	**05/22/02**	Spike File:	**SP161B2S**
TLI ID:	**326-37-2B**	Date Extracted:	**06/04/02**	ICal:	**UF5307B**
		Date Analyzed:	**06/13/02**	ConCal:	**UB20806**
Sample Size:	**1.000 L**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U080702**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**JMM**	% Solids:	**<0.1**

Analytes	Conc. (pg/L)	DL	Ratio	RT	RRT	Flags
2,3,7,8-TCDD	ND	5.6				—

Internal Standard	Conc. (pg/L)	% Recovery	QC Limits	Ratio	RT	RRT	Flags
$^{13}C_{12}$-2,3,7,8-TCDD	933	46.7	31%-137%	0.83	26:19	1.006	—

Cleanup Standard	Conc. (pg/L)	% Recovery	QC Limits	RT	RRT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	136	68.0	42%-164%	26:20	1.007	—

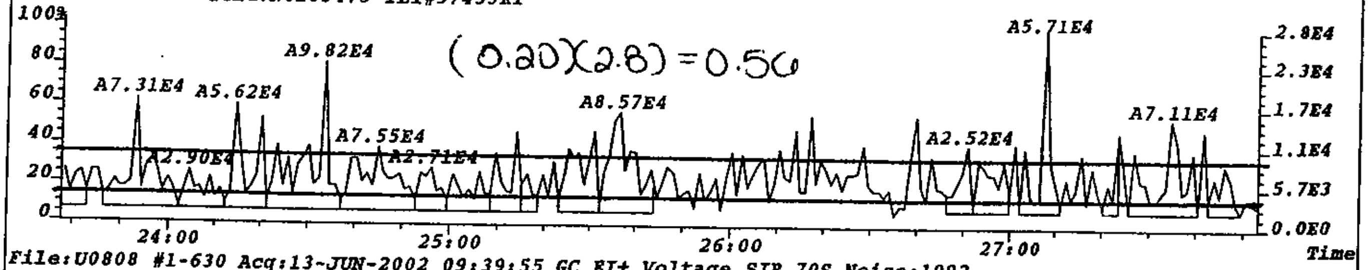
Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.81	26:09	—

Data Reviewer: ______________________ 06/13/02

```
                        Initial    ....Date...

Data Review By:          GSM        6/13/02

                                            Calculated Noise Height: 1.14


Page No.     1            Listing of U080804B.dbf
06/13/02                  Matched GC Peaks / Ratio / Ret. Time

Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area/Ht Area/Ht.Peak1 Area/Ht.Peak2 Rel.RT Compound.Name.. ID.. Flags.

TCDD                           0.65-0.89                                  0.896-1.045
320-322          DC  NL         Height        3.07          1.48          1.59
                 DC  SN  23:35    0.84       21.55                              0.896
                 DC  SN  25:31    0.77       13.89                              0.970
                 DC  SN  26:51 RO 0.63        6.54                              1.020
320-322               0 Peaks                 0.00

37Cl-TCDD                                                                 0.924-1.076
328              DC  NL         Height        1.57          1.57
                         26:20              508.64        508.64                1.001 37Cl-TCDD        CLS
                 DC  SN  27:52                4.81                              1.059
328                   1 Peak                508.64

13C12-TCDD                     0.65-0.89                                  0.918-1.070
332-334          DC  NL         Height        5.51          3.43          2.08
                         26:09   0.81     7,176.70      3,207.64      3,969.06  0.994 13C12-1234-TCDD RS1
                         26:19   0.83     3,847.30      1,747.47      2,099.83  1.000 13C12-2378-TCDD IS1
                                Height    1,029.48        456.48        573.00
332-334               2 Peaks            11,024.00


Column Description...........  "Why" Code Description.........  QC Log Desc.........

M_Z    -Nominal Ion Mass(es)    WL-Below Retention Time Window   A-Peak Added
..RT.  -Retention Time (mm:ss)  WH-Above Retention Time Window   K-Peak Kept
Rat.1  -Ratio of M/M+2 Ions     SN-Below Signal to Noise Level   D-Peak Deleted
OK     -RO=Ratio Outside Limits <M-Below Method Detection Limit  T-Time Changed
Rel.RT-Relative Retention Time  NL-Channel Specific Noise Level  M-Peak Area Changed
                                                                 N-Name Changed
                                                                 X-Ether Interference

*** End of Report ***
```

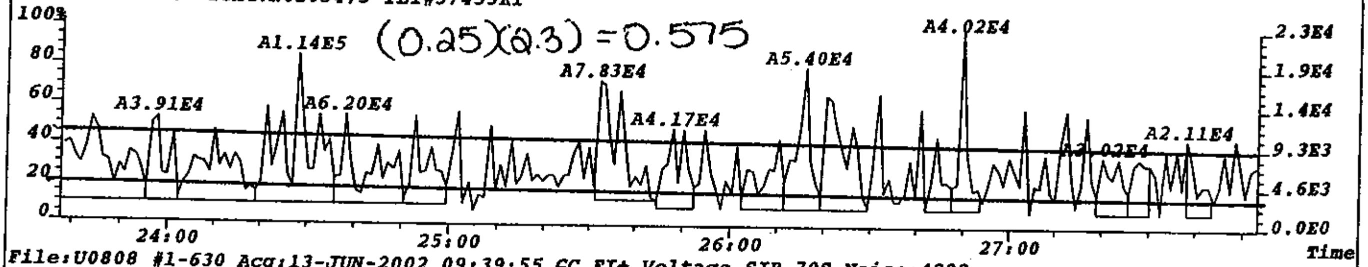
N = 0.56+0.575 = 1.135 QEM 6/13/02

File:U0808 #1-630 Acq:13-JUN-2002 09:39:55 GC EI+ Voltage SIR 70S Noise:1856
319.8965 S:4 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7424.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:N0205473 TLI#57453R1



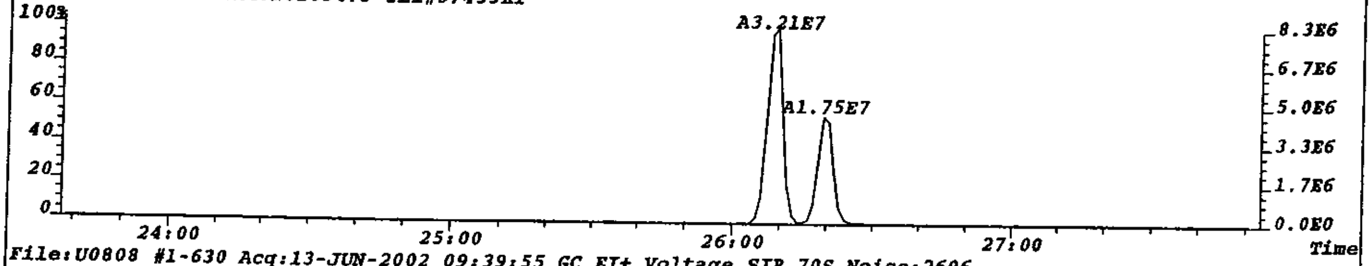
(0.20)(2.8) = 0.56

File:U0808 #1-630 Acq:13-JUN-2002 09:39:55 GC EI+ Voltage SIR 70S Noise:1992
321.8936 S:4 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7968.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:N0205473 TLI#57453R1

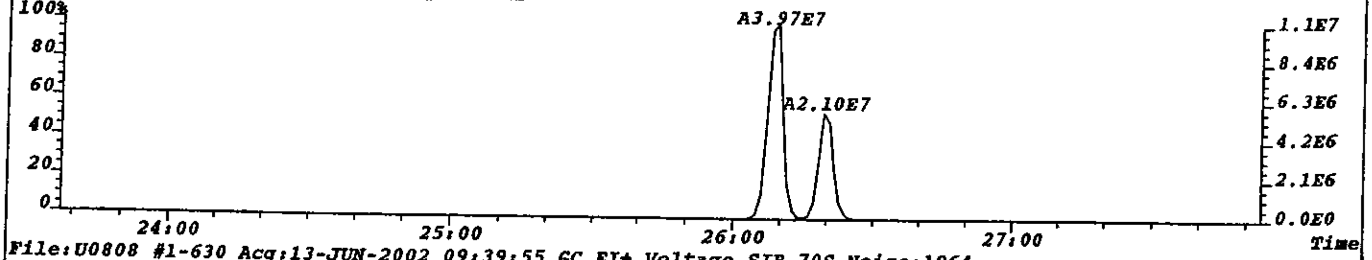


(0.25)(2.3) = 0.575

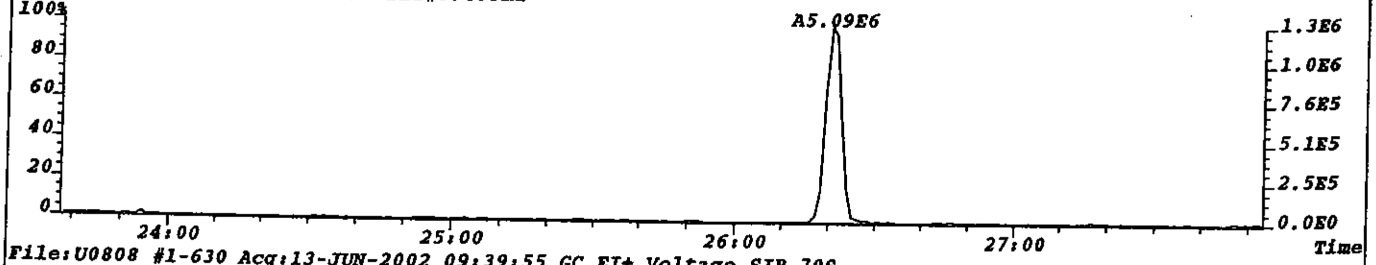
File:U0808 #1-630 Acq:13-JUN-2002 09:39:55 GC EI+ Voltage SIR 70S Noise:4289
331.9368 S:4 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,17156.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:N0205473 TLI#57453R1



File:U0808 #1-630 Acq:13-JUN-2002 09:39:55 GC EI+ Voltage SIR 70S Noise:2606
333.9338 S:4 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,10424.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:N0205473 TLI#57453R1



File:U0808 #1-630 Acq:13-JUN-2002 09:39:55 GC EI+ Voltage SIR 70S Noise:1964
327.8847 S:4 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7856.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:N0205473 TLI#57453R1



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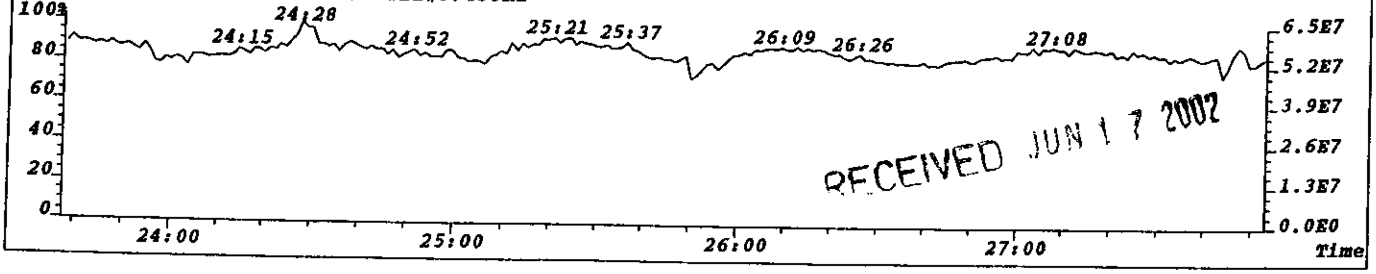
330.9792 S:4 F:2 Exp:NDB5US
TRIANGLE LABS Text:N0205473 TLI#57453R1



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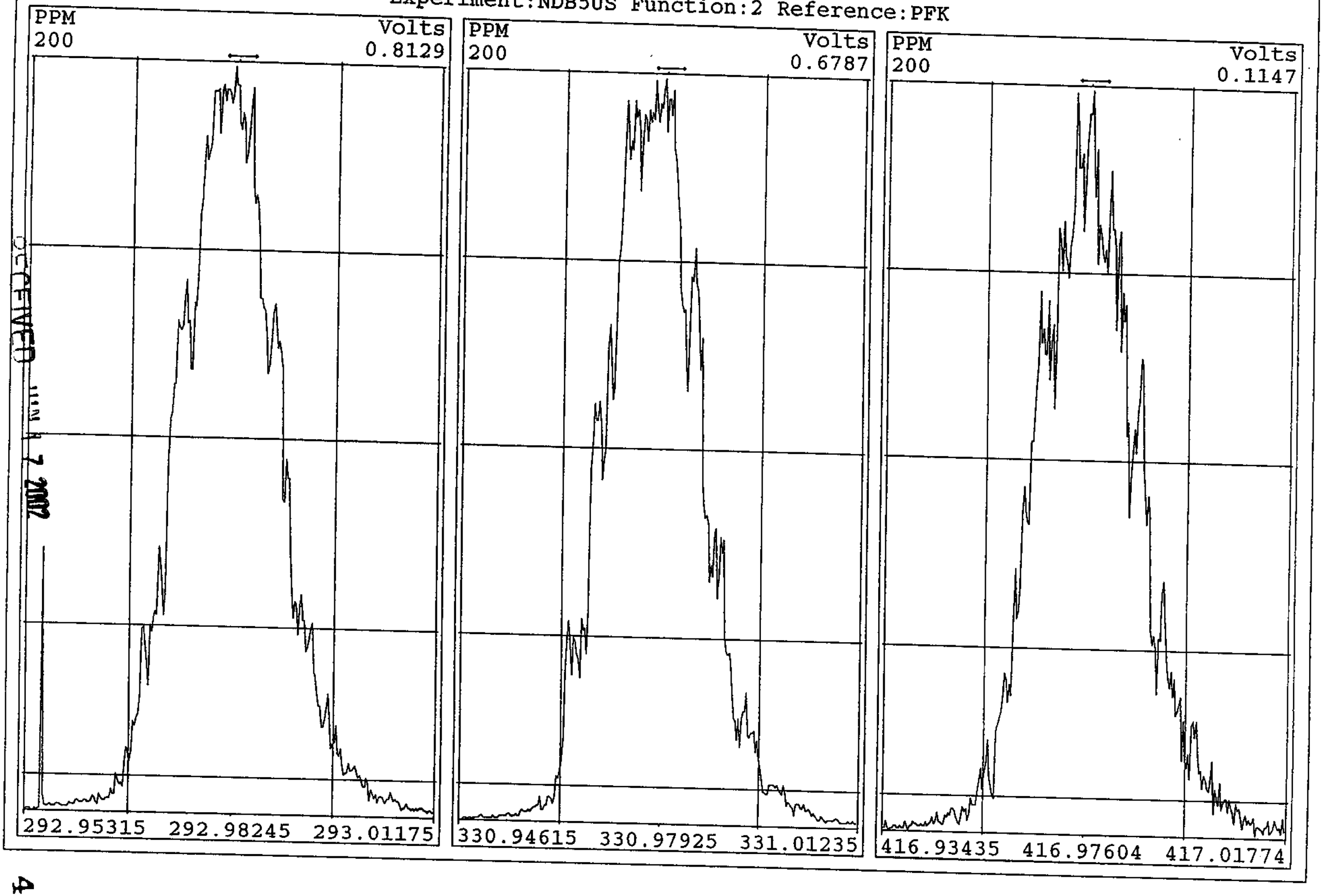
Experiment:NDB5US Function:2 Reference:PFK



Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD

PROJECT # 28963

Page ____ of ____

(Southern)

Client: Sanders
Address:
Phone: Fax:

Report To: Tami Bright
Bill To:
P.O. #
Project Name
Project Location:

Sample Supply: GW- DW standards
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: standard

Sampled By (PRINT): Client
Sampler Signature:

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL	NaOH	MCAA	CN-	MBAS	549.1	Group III	506, 507, 508	515, 550	531.1	504.1	505	525.5, 548		Sample ID #
01	W0205473 1H	5/21/02	910	G	1					1		1											2x ½ gal P
					1	1							1										4x40mL Via
					1		1							1									4x 1LG.
					1	1									1								1L cubie P
					1	1										3	3						
					1						1							1					
					1				1										3				
					1	1														3			
					1	1															2		

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA

COMMENTS:
02-550
DW standards
please

COOLER #

COOLER SEAL INTACT Yes No

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	5/22/02	0700		5/22/02	0700
	5/22/02	0850		5/22/02	0850

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-C TODY RECORD

PROJECT # N02054.3

Page 1 of 2

Client Youngquist
Address
Phone Fax

Report To:
Bill To:
P.O. #
Project Name City of FM
Project Location:

Sample Supply: GW
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: 5/31/02

Sampled By (PRINT) NOAH OCENYCH
Sampler Signature

RECEIVED JUN 1 7

Bottle #	SAMPLE DESCRIPTION	Sample DATE	Sample TIME	Sample TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL		ANALYSES REQUEST	Cr K Mo Co	Primary metals	Secondary metals	NO2 NO3	NOX	TDS F- SO4	color Cl-	odor carbonate	bicarbonate	total col.	fecal col.	Sample ID #
	Storage Zone	5/21/02	910	G	1			1				1	1	1									1A
					1	1									1								1B
					1		1									1							1C
					1	1											1	1					1E
					1	1													1	1			1F
					1	1															1		1G
					1	1																1	1I

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	5-21/02	1120		5/21/02	1120

COMMENTS:
DW standards

COOLER #

COOLER SEAL INTACT
Yes No

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-C TODY RECORD

PROJECT # N020546

Page 2 of 2

Client Youngquist
Address
Phone
Fax

Report To:
Bill To:
P.O. #
Project Name City of FM
Project Location:

Sample Supply: GW
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: 5/31/02

Sampled By (PRINT) NOAH OLENYCH
Sampler Signature Noah Olenych

Bottle #	SAMPLE DESCRIPTION	Sample DATE	TIME	TYPE	PRESERVATIVES 4°C	UNPRESERVED	H_2SO_4	HNO_3	HCL	ANALYSES REQUEST Pest + PCB	Dioxin	MBAS 625	524.2	Gross Alpha	Rads 226+228	CN- Asbestos	Gross Beta	(field)	PH, Cond, temp		Sample ID #
	Storage Zone	5/21/02	910	G	1					1	1	1	1	1	1	1	1	+ ee 5/22/02			1H
	↓	↓	↓	↓														1	1		1I

Bottle Lot #	OUT / DATE	SHIPMENT METHOD RETURNED DATE	VIA

COMMENTS:
DW standards

COOLER #

COOLER SEAL INTACT
Yes No

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Noah Olenych	5/21/02	1120		5/21/02	1120

APPENDIX O

Casing Pressure Test Data

APPENDIX O.1

IW-1 Casing Pressure Test Data

APPENDIX O.1.1

Final Steel Casing

CH2MHILL

CASING PRESSURE TEST DATA

Site Activity: **FDEP Observed Final Injection Well 12-Inch Diameter Casing Pressure Test**
Date: February 21, 2002
Observers: Randy Dean/CH2M HILL, Jack Myers/FDEP (8:35-9:35)

Time	Pressure (psi)	Time	Pressure (psi)	Time	Pressure (psi)
8:35:00	113.50	9:23:00	110.50	10:11:00	108.25
8:36:00	113.50	9:24:00	110.50	10:12:00	108.25
8:37:00	113.50	9:25:00	110.50	10:13:00	108.25
8:38:00	113.50	9:26:00	110.50	10:14:00	108.25
8:39:00	113.50	9:27:00	110.00	10:15:00	108.00
8:40:00	113.00	9:28:00	110.00	10:16:00	108.00
8:41:00	113.00	9:29:00	110.00	10:17:00	108.00
8:42:00	113.00	9:30:00	110.00	10:18:00	108.00
8:43:00	113.00	9:31:00	110.00	10:19:00	108.00
8:44:00	113.00	9:32:00	110.00	10:20:00	108.00
8:45:00	113.00	9:33:00	110.00	10:21:00	108.00
8:46:00	113.00	9:34:00	110.00	10:22:00	108.00
8:47:00	113.00	9:35:00	110.00	10:23:00	108.00
8:48:00	112.75	9:36:00	110.00	10:24:00	108.00
8:49:00	112.75	9:37:00	110.00	10:25:00	108.00
8:50:00	112.50	9:38:00	109.75	10:26:00	108.00
8:51:00	112.50	9:39:00	109.75	10:27:00	108.00
8:52:00	112.50	9:40:00	109.75	10:28:00	108.00
8:53:00	112.50	9:41:00	109.75	10:29:00	108.00
8:54:00	112.50	9:42:00	109.50	10:30:00	107.90
8:55:00	112.00	9:43:00	109.50	10:31:00	107.90
8:56:00	112.00	9:44:00	109.50	10:32:00	107.90
8:57:00	112.00	9:45:00	109.50	10:33:00	107.90
8:58:00	112.00	9:46:00	109.25	10:34:00	107.90
8:59:00	112.00	9:47:00	109.25	10:35:00	107.90
9:00:00	112.00	9:48:00	109.25	End of Test	
9:01:00	112.00	9:49:00	109.00		
9:02:00	112.00	9:50:00	109.00		
9:03:00	112.00	9:51:00	109.00		
9:04:00	112.00	9:52:00	109.00		
9:05:00	112.00	9:53:00	109.00		
9:06:00	111.50	9:54:00	109.00		
9:07:00	111.50	9:55:00	108.75		
9:08:00	111.50	9:56:00	108.75		
9:09:00	111.50	9:57:00	108.75		
9:10:00	111.50	9:58:00	108.75		
9:11:00	111.00	9:59:00	108.75		
9:12:00	111.00	10:00:00	108.75		
9:13:00	111.00	10:01:00	108.75		
9:14:00	111.00	10:02:00	108.50		
9:15:00	111.00	10:03:00	108.50		
9:16:00	111.00	10:04:00	108.50		
9:17:00	111.00	10:05:00	108.50		
9:18:00	111.00	10:06:00	108.50		
9:19:00	111.00	10:07:00	108.50		
9:20:00	111.00	10:08:00	108.25		
9:21:00	111.00	10:09:00	108.25		
9:22:00	111.00	10:10:00	108.25		

APPENDIX O.1.2

FRP Tubing

CH2MHILL

CASING PRESSURE TEST DATA

Site Activity: **Final Injection Well FRP Tubing Pressure Test**
Date: April 9, 2002
Observer: Randy Dean/CH2M HILL

Time	Pressure (psi)	Time	Pressure (psi)	Time	Pressure (psi)
7:35:00	110.00	8:23:00	112.00	9:11:00	113.50
7:36:00	110.00	8:24:00	112.00	9:12:00	113.50
7:37:00	110.00	8:25:00	112.00	9:13:00	113.50
7:38:00	110.00	8:26:00	112.00	9:14:00	113.50
7:39:00	110.00	8:27:00	112.50	9:15:00	114.00
7:40:00	110.00	8:28:00	112.50	9:16:00	114.00
7:41:00	110.00	8:29:00	112.50	9:17:00	114.00
7:42:00	110.00	8:30:00	112.50	9:18:00	114.00
7:43:00	110.00	8:31:00	112.50	9:19:00	114.00
7:44:00	110.00	8:32:00	112.50	9:20:00	114.00
7:45:00	110.00	8:33:00	112.50	9:21:00	114.00
7:46:00	110.00	8:34:00	112.50	9:22:00	114.00
7:47:00	110.50	8:35:00	113.00	9:23:00	114.00
7:48:00	110.50	8:36:00	113.00	9:24:00	114.00
7:49:00	110.50	8:37:00	113.00	9:25:00	114.00
7:50:00	110.50	8:38:00	113.00	9:26:00	114.00
7:51:00	110.50	8:39:00	113.00	9:27:00	114.50
7:52:00	110.50	8:40:00	113.00	9:28:00	114.50
7:53:00	110.50	8:41:00	113.00	9:29:00	114.50
7:54:00	110.50	8:42:00	113.00	9:30:00	114.50
7:55:00	111.00	8:43:00	113.00	9:31:00	114.50
7:56:00	111.00	8:44:00	113.00	9:32:00	114.50
7:57:00	111.00	8:45:00	113.00	9:33:00	114.50
7:58:00	111.00	8:46:00	113.00	9:34:00	114.50
7:59:00	111.00	8:47:00	113.00	9:35:00	115.00
8:00:00	111.00	8:48:00	113.00	end of test	
8:01:00	111.00	8:49:00	113.00		
8:02:00	111.00	8:50:00	113.00		
8:03:00	111.00	8:51:00	113.00		
8:04:00	111.00	8:52:00	113.00		
8:05:00	111.00	8:53:00	113.00		
8:06:00	111.00	8:54:00	113.00		
8:07:00	111.50	8:55:00	113.00		
8:08:00	111.50	8:56:00	113.00		
8:09:00	111.50	8:57:00	113.00		
8:10:00	111.50	8:58:00	113.00		
8:11:00	111.50	8:59:00	113.50		
8:12:00	111.50	9:00:00	113.50		
8:13:00	111.50	9:01:00	113.50		
8:14:00	111.50	9:02:00	113.50		
8:15:00	112.00	9:03:00	113.50		
8:16:00	112.00	9:04:00	113.50		
8:17:00	112.00	9:05:00	113.50		
8:18:00	112.00	9:06:00	113.50		
8:19:00	112.00	9:07:00	113.50		
8:20:00	112.00	9:08:00	113.50		
8:21:00	112.00	9:09:00	113.50		
8:22:00	112.00	9:10:00	113.50		

APPENDIX O.1.3

Annular Zone

CH2MHILL

CASING PRESSURE TEST DATA

Site Activity: **Injection Well Final Annular Zone Pressure Test**
Date: February 28, 2002
Observers: Randy Dean/CH2M HILL

Time	Pressure (psi)	Time	Pressure (psi)	Time	Pressure (psi)
13:14:00	107.00	14:02:00	108.00	14:50:00	111.00
13:15:00	107.00	14:03:00	108.00	14:51:00	111.00
13:16:00	107.00	14:04:00	108.00	14:52:00	111.00
13:17:00	107.00	14:05:00	109.00	14:53:00	111.00
13:18:00	107.00	14:06:00	109.00	14:54:00	111.00
13:19:00	107.00	14:07:00	109.00	14:55:00	111.00
13:20:00	107.00	14:08:00	109.00	14:56:00	111.00
13:21:00	107.00	14:09:00	109.00	14:57:00	111.00
13:22:00	107.00	14:10:00	109.00	14:58:00	111.00
13:23:00	107.00	14:11:00	109.00	14:59:00	111.00
13:24:00	107.00	14:12:00	109.00	15:00:00	111.00
13:25:00	107.00	14:13:00	109.00	15:01:00	111.00
13:26:00	107.00	14:14:00	109.00	15:02:00	111.00
13:27:00	107.00	14:15:00	109.00	15:03:00	111.00
13:28:00	107.00	14:16:00	109.00	15:04:00	111.00
13:29:00	107.00	14:17:00	109.00	15:05:00	111.00
13:30:00	107.00	14:18:00	109.00	15:06:00	111.00
13:31:00	107.00	14:19:00	109.00	15:07:00	112.00
13:32:00	107.00	14:20:00	109.00	15:08:00	112.00
13:33:00	107.00	14:21:00	109.00	15:09:00	112.00
13:34:00	107.00	14:22:00	109.00	15:10:00	112.00
13:35:00	107.00	14:23:00	109.00	15:11:00	112.00
13:36:00	107.00	14:24:00	109.00	15:12:00	112.00
13:37:00	107.00	14:25:00	109.00	15:13:00	112.00
13:38:00	107.00	14:26:00	110.00	15:14:00	112.00
13:39:00	107.00	14:27:00	110.00	end of test	
13:40:00	107.00	14:28:00	110.00		
13:41:00	107.00	14:29:00	110.00		
13:42:00	108.00	14:30:00	110.00		
13:43:00	108.00	14:31:00	110.00		
13:44:00	108.00	14:32:00	110.00		
13:45:00	108.00	14:33:00	110.00		
13:46:00	108.00	14:34:00	110.00		
13:47:00	108.00	14:35:00	110.00		
13:48:00	108.00	14:36:00	110.00		
13:49:00	108.00	14:37:00	110.00		
13:50:00	108.00	14:38:00	110.00		
13:51:00	108.00	14:39:00	110.00		
13:52:00	108.00	14:40:00	110.00		
13:53:00	108.00	14:41:00	110.00		
13:54:00	108.00	14:42:00	110.00		
13:55:00	108.00	14:43:00	110.00		
13:56:00	108.00	14:44:00	110.00		
13:57:00	108.00	14:45:00	110.00		
13:58:00	108.00	14:46:00	110.00		
13:59:00	108.00	14:47:00	111.00		
14:00:00	108.00	14:48:00	111.00		
14:01:00	108.00	14:49:00	111.00		

APPENDIX O.2

DZMW-1 Casing Pressure Test Data

CH2MHILL

CASING PRESSURE TEST DATA

Site Activity: **Well DZMW-1 Final 6-inch FRP Tubing Pressure Test**
Date: April 5, 2002
Observer: Mike Weatherby/CH2M HILL

Time	Pressure (psi)	Time	Pressure (psi)	Time	Pressure (psi)
14:12:00	70.00				
14:17:00	70.00				
14:22:00	70.00				
14:40:00	70.10				
14:52:00	70.40				
15:00:00	70.50				
15:13:00	70.50				

APPENDIX P

RO Injection Well Facilities O&M Manual

Operation and Maintenance Manual

Reverse Osmosis Water Treatment Plant
Injection Well System

Prepared for

City of Fort Myers

August 19, 2002

CH2MHILL

Contents

List of Attachments

List of Figures

List of Tables

List of Acronyms and Abbreviations

bfl	Below flange level
bls	Below land surface
bpl	Below pad level
FAC	Florida Administrative Code
FRP	Fiberglass reinforced plastic
ft/s	Feet per second
gpm	Gallons per minute
mgd	Million gallons per day
mg/L	Micrograms per Liter
MIT	Mechanical integrity testing
MORs	Monthly operating reports
O&M	Operation and Maintenance
pCi/L	Picocuries per Liter
PLC	Program logic control
psi	Pounds per square inch
psig	Pounds per square inch gauge
SII	Specific Injectivity
SII	Specific Injectivity Index
RO	Reverse osmosis
ROWTP	Reverse Osmosis Water Treatment Plant
µmhos/cm	Micromhoms per centimeter

OPERATION AND MAINTENANCE MANUAL

Introduction

This Operation and Maintenance (O&M) Manual was prepared for the City of Fort Myers Reverse Osmosis Water Treatment Plant (ROWTP) injection well system. It is intended to provide operational guidelines during the operational testing of the reverse osmosis (RO) injection well. This document will be modified as needed to incorporate any changes pending the operational testing results.

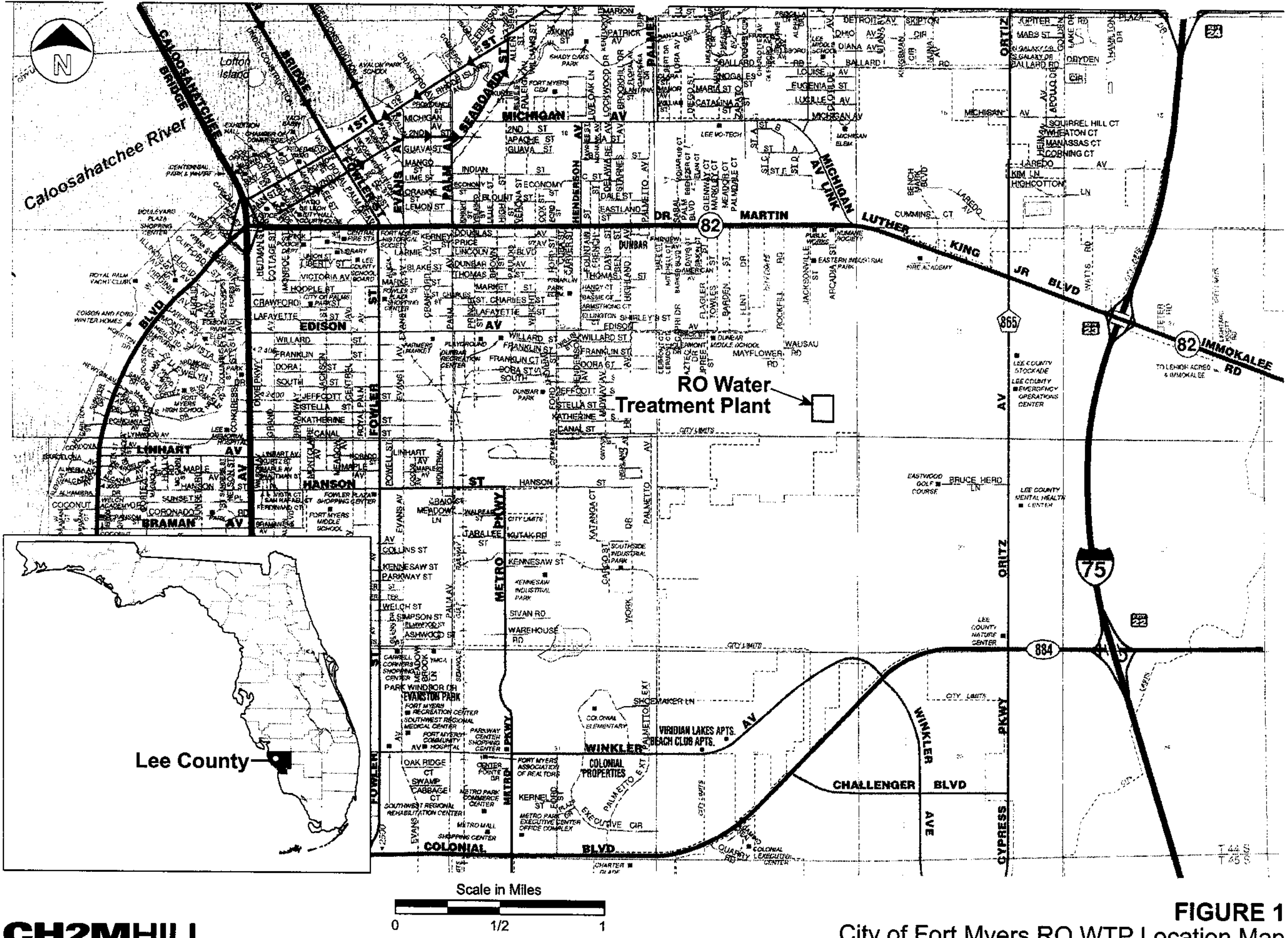
Construction of the wells was completed in accordance with Chapter 62-528 of the Florida Administrative Code (FAC), and Florida Department of Environmental Protection (FDEP) well construction permit No. 165628-001-UC. The construction of the City of Fort Myers ROWTP injection well (RO IW-1) and facilities began in September 2001 and was completed in May 2002. The surface facilities were deemed substantially completed on June 29, 2002, and the FDEP operational testing permit was issued on July 5, 2002. A copy of the operational testing permit and conditions is provided in Attachment A. The facility start up occurred on July 11, 2002.

The ROWTP is located in eastern Fort Myers at the intersection of Canal and Jacksonville Streets. (Figure 1). The injection well facility consists of one injection well with one surge tank, an annular fluid tank, compressor and controls, located inside the southwest corner of the ROWTP, and a dual-zone monitoring well (shallow zone and deep zone monitoring intervals) and five surficial water table monitoring wells. The injection well is designated as a Class I industrial injection well and is designed to accept RO concentrate. The dual-zone monitor well is located approximately 71 feet southwest of the injection well.

Injection occurs into a deep, permeable, saltwater-bearing zone, which lies within the Oldsmar Formation. The open borehole extends from approximately 2,305 feet to 3,040 feet below land surface (bls) at the IW-1 site. The primary injection zones occur at approximately 2,250 feet to 2,520 feet bls, and 2,700 feet to 3,040 feet bls. Less permeable to impermeable units overlie the open borehole interval, restricting upward migration of injection fluids.

The dual zone monitoring well is designed to monitor for upward movement of injected fluids above the confining layers overlying the injection zone. The lower monitoring interval extends from 1,700 feet to 1,750 feet bls, while the shallow monitoring interval extends from 1,250 feet to 1,350 feet bls. The five shallow water table monitoring wells are located surrounding the injection and shallow zone monitoring well pads. These shallow wells were used to monitor the surficial water quality effects of any saltwater spills during the construction of the injection well. Figure 2 presents the injection facilities layout of the IW-1 facilities.

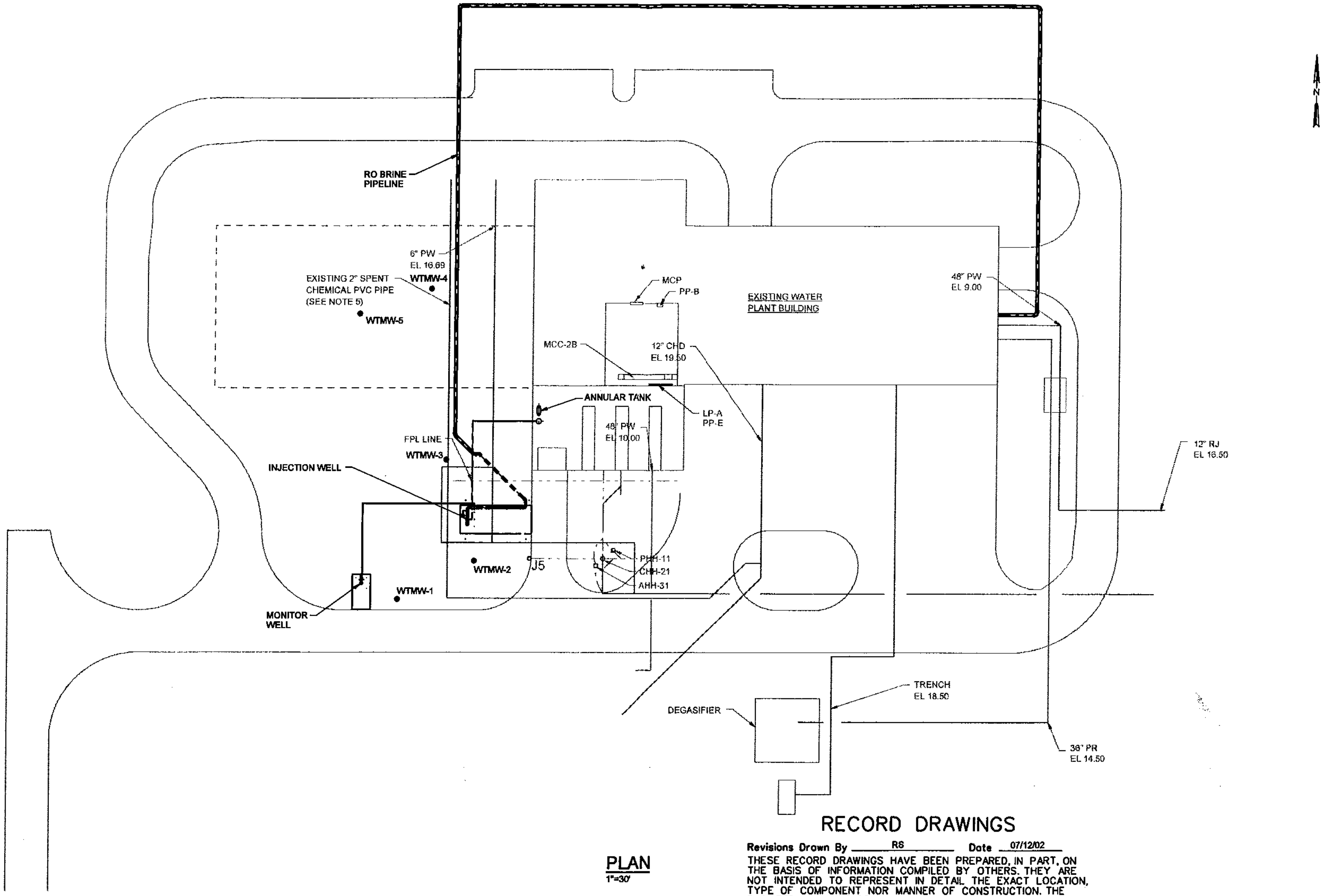
155336.IW.60 8/02 2002TPA



CH2MHILL

FIGURE 1

City of Fort Myers RO WTP Location Map



PLAN

1"=30'

RECORD DRAWINGS

Revisions Drawn By RS Date 07/12/02

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

FIGURE 2
RO IW-1 SITE AND FACILITIES LAYOUT

DSGN O. DUARTE						VERIFY SCALE	CH2MHILL	DEEP WELL INJECTION PROJECT FOR CITY OF FORT MYERS	MECHANICAL INJECTION WELL FACILITIES LAYOUT
DR P SANTOS						BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	3011 SW WILLISTON RD. GAINESVILLE, FL 32608 EB0000072 AAC001992		SHEET M-1 DWG DATE JULY 2001 PROJ 155336.IW
CHK T. INNISS									
APVD W. BEDDOW	NO.	DATE	REVISION	BY	APVD				

02-OCT-2002 12:45:30 5336m01c.dgn

BID DOCUMENT

Injection System Description

The injected fluid (RO reject concentrate) is piped directly from the concentrate side of the membranes is transported via a new 16-inch-diameter PVC pipeline to the injection well. A bypass pipeline was installed from the ROWTP 12-inch diameter brine discharge pipeline terminating at Billy's Creek approximately 3 miles north of the ROWTP. The bypass piping was used after converting from the softening plant to the RO facility and prior to the start up of the injection well. Although this pipeline does exist, its use is regulated by FDEP and consent from FDEP must be given prior to use of this line. Figure 3 presents a well completion diagram for IW-1 injection well and associated monitoring wells.

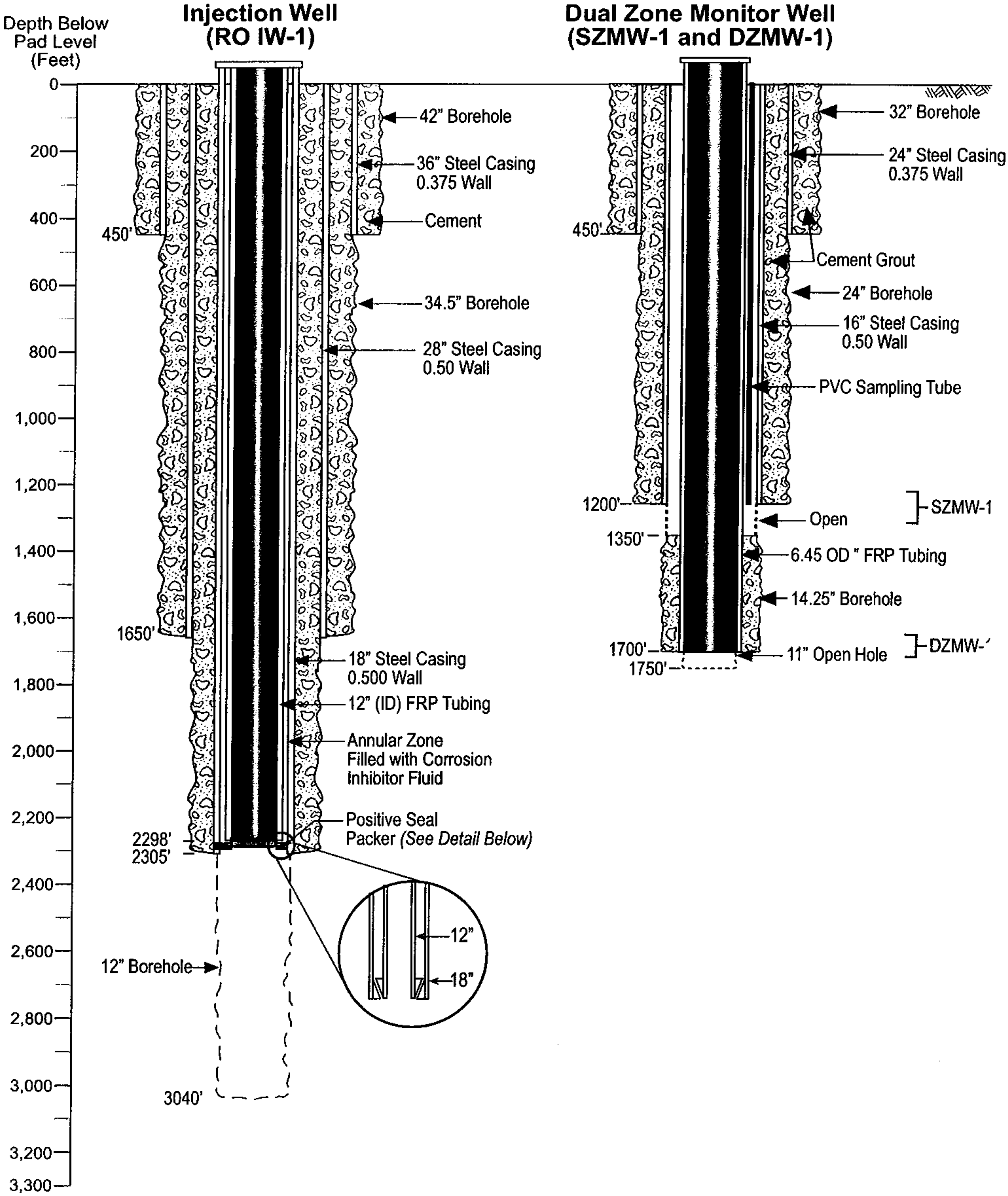
Injection Well RO IW-1

The injection well was constructed with three concentric casings. The outermost casing is a 36-inch-diameter steel casing installed to a depth of 450 feet below pad level (bpl). The intermediate casing is a 28-inch-diameter steel casing set to a depth of 1,650 feet bpl. The final casing string consists of an 18-inch steel casing set to a depth of 2,305 feet bpl. The minimum wall thickness of the surface and intermediate steel casings is 0.375 inch. The final 18-inch-diameter steel casing wall thickness is 0.500 inches. All casings are cemented from the base of the casing to land surface. The 12-inch diameter fiberglass reinforced plastic (FRP) injection tubing, was installed inside the 18-inch casing and set to a depth of 2,298 feet bls. An open borehole exists below the final steel casing, extending from 2,305 feet to 3,040 feet bls. A detailed description of the construction and testing of the injection well and monitoring wells is presented in the comprehensive final engineering construction report. A well completion diagram for IW-1 injection well is provided in Figure 3.

The maximum permitted injection rate for this well is 2,820 gallons per minute. Manually operated valves on the wellhead are designed to control flow to and from the well, control the potentiometric head caused by the injection fluid, and to allow for well access during periods of well maintenance. The wellhead also accommodates the necessary flow and pressure measuring devices in addition to an air/vacuum release valve. A more detailed discussion of the instrumentation and control equipment is presented in later sections of this O&M manual.

NOTE: ***The maximum allowable injection rate per FDEP permit is 2,820 gallons per minute (gpm) which maintains injection velocities less than 10 feet per second (ft/s) in the 12-inch diameter FRP casing. The well shall not be operated at a higher injection rate without satisfying required permitting procedures.***

The injection well wellhead is constructed of stainless steel piping with epoxy-coated steel or stainless steel valves. Two 12-inch-diameter butterfly valves located on the wellhead and one 12-inch-diameter epoxy coated gate valve located at the top of the well control the flow into the injection well. The wellhead record drawing for the injection well is presented in Attachment B-1. This wellhead design allows for the monitoring of wellhead injection pressures and RO brine water quality.



Not to Scale

FIGURE 3
Injection Well and Monitoring Well Completion Details

CH2MHILL

Dual-Zone Monitoring Well (SZMW-1 and DZMW-1)

The dual zone monitoring well monitors two distinct intervals, the shallow monitoring zone and the deep monitoring zone (see Figure 3). The dual zone monitoring well was constructed with three concentric casings. The outermost casing is a 24-inch diameter steel casing installed to a depth of 450 feet bls. The minimum wall thickness of the surface steel casing is 0.375-inch. The intermediate casing is a 16-inch diameter steel casing set to a depth of 1,250 feet bls. The intermediate 16-inch diameter steel casing wall thickness is 0.500-inch. The casings were all pressure cemented in the initial cement stage and cemented from the base of the casing to land surface. The final casing consists of a 6-inch diameter FRP casing, and was installed through the 16-inch diameter casing and set to a depth of 1,700 feet bls. An 11-inch diameter open borehole exists below the final FRP casing, extending from 1,700 feet to 1,750 feet bls. The FRP was pressure cemented in the initial cement stage then cement was tremmied to a depth of 1,350 feet bls. The shallow zone monitoring well consists of the open interval from the top of the cement at 1,350 feet to the base of the 16-inch diameter steel casing at 1,250 feet bls. A detailed description of the construction and testing of the dual zone monitoring well will be presented in the comprehensive final engineering construction report. A well completion diagram for the dual zone monitoring well (SZMW-1 and DZMW-1) is provided in Figure 3.

The dual-zone wellhead is constructed of stainless steel and accommodates the necessary flow and pressure measuring devices, in addition to an air/vacuum release valve. A more detailed discussion of the instrumentation and control equipment is presented in later sections of this O&M manual. This wellhead is designed for monitoring wellhead pressures, water levels and water quality from SZMW-1 and DZMW-1. The wellhead record drawing for the dual-zone well is presented in Attachment B-2.

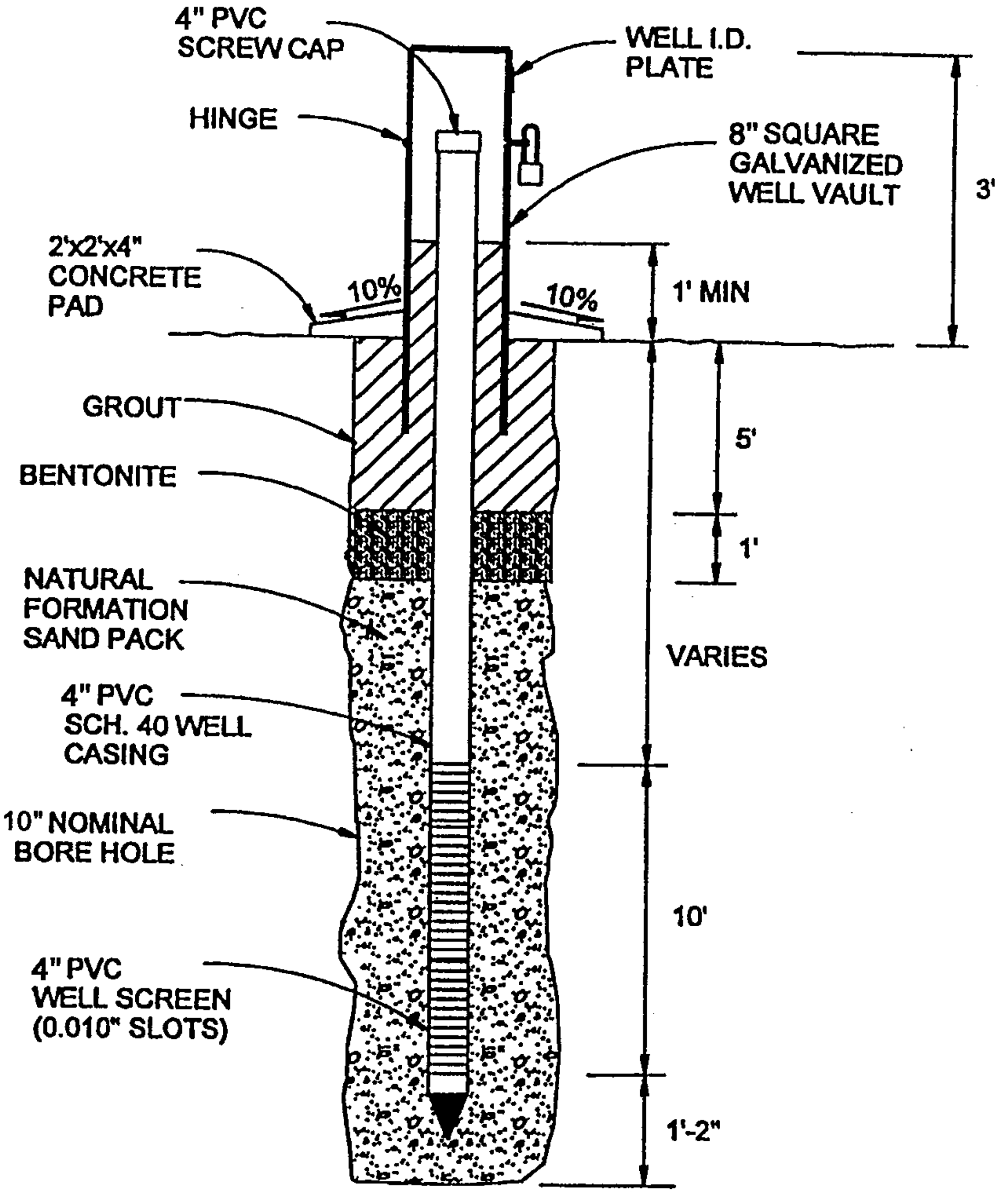
Surficial Aquifer Monitoring Wells

Five surficial aquifer-monitoring wells were installed at the site (see Figure 2) to monitor the surficial (water table) aquifer during construction of the injection well. The wells are shallow, 4-inch-diameter screened PVC wells installed to a depth of approximately 27 feet bls. Figure 4 presents a typical well configuration of the surficial aquifer wells installed at the site. Although these wells are not included in the operational monitoring program, they will remain intact for future use until they are approved for abandonment by FDEP. During periods of injection well remediation or testing, the wells can be used to monitor for potential impacts to the surficial aquifer during these activities.

Wellhead Facilities Description

The wellhead facilities include the individual wellheads, a surge tank, the pressurized annular tank and air compressor system with control panel, the monitoring well main instrumentation control panel, monitor well flow meter readouts panels and the injection well flow meter readout panel. Wellhead facilities instrumentation has been provided to record data such as:

- The injection well flow rate and wellhead pressure
- The monitoring well water levels/pressure and sample pump flow rates



Typical Well Depth is 25 Feet

FIGURE 4

Typical Water Table Monitoring Well Details

- The annular fluid pressure and level of inhibitor fluid in the onsite pressurized storage tank
- Surge tank pressure (manually monitored by plant staff)

All of the electronic wellhead instrumentation sends data signals to the ROWTP main control panel program logic control (PLC) where they are monitored and recorded by WTP staff. Associated alarms, consisting of high and low wellhead pressure, high and low annular tank pressure and levels, are also monitored by the ROWTP operator. An O&M manual by CC Controls, Inc. for all of the wellhead and control panel instrumentation was supplied to Fort Myers ROWTP.

The power to all of the onsite monitoring well flow meters, pressure transducers, transmitters, and the entire control panel is controlled by the main power switch located on the dual-zone monitoring well main control panel on the east side of the dual-zone well concrete pad. A breaker in the electrical room controls power to the entire wellhead facilities.

RO Brine Pipeline and Injection Wellhead

The injection well brine pipeline consists of approximately 350 feet of 16-inch diameter PVC piping, which is connected to the RO reject water pipeline leaving the ROWTP. The 16-inch diameter PVC pipe transitions into a 12-inch diameter PVC pipe near the well pad. After transitioning from the 12-inch-diameter PVC to 12-inch-diameter stainless steel, the RO brine pipeline exits the ground. The 12-inch-diameter stainless steel pipe is equipped with a 12-inch-diameter butterfly valve, a 10-inch-diameter magnetic flow meter, and a swing check valve, followed by another butterfly valve. All aboveground piping of all the wellheads are stainless steel. The record drawing for the pipeline connection is presented in Attachment B-3. As previously mentioned, Attachment B-1 includes the record drawing of the final wellhead configuration. The major injection well wellhead appurtenances consists of the following:

Magnetic Flow Meter (Magmeter)

The 10-inch magnetic flow meter measures the flow rate and totalizes the accumulated flow. This information is sent to a visual display at the well pad, to a flowmeter display on the annular tank control panel in the pump building, and sent to the ROWTP control room PLC visual display.

At the injection wellhead, the ABB flowmeter has several display options. To navigate through the display options, press the lower left button of the four buttons on the front. The display options are (the option number indicates the number of times the display button must be pushed to reach that option):

0 – Flow displayed in gpm (current display)
1 – Percent flow of meter range (0 to 3000 gpm)
2 – Right direction flow and totalizer (opposite direction of current injection flow)
3 - Left direction flow and totalizer (correct direction of current injection flow)
4 – Totalizer of both flow directions added together

5 – Alarms for high or low flow (no alarms set)
6 – Flow velocity in feet/second

Globe Check Valve

This 12-inch-diameter stainless steel globe check valve is located after the flowmeter. This valve prevents any reverse movement of the RO brine through the wellhead piping away from the injection well when injection is stopped. This well can be under pressure during static conditions, therefore, this valve prevents reverse flow that could be caused from static pressure.

Pressure Transducer and Gauge

A pressure transducer, indicator and transmitter to measure injection pressure is located on the horizontal pipe of the injection well wellhead just before the 'T' which directs the flow down the well. The measurements are transmitted via a 4-20 mA signal to the ROWTP control room screen display. Also, a glycerin filled pressure gauge is also attached to the casing to provide a visual mechanical wellhead pressure reading and to provide backup to the electronic pressure transducer.

Air/Vacuum Release Valve

A 4-inch diameter air/vacuum release valve is located at the top of the injection wellhead to prevent air and excessive vacuum from building in the well.

Injection Well Gate Valve

The 12-inch diameter epoxy coated gate valve on the wellhead allows the wellhead to be sealed against natural artesian pressures.

Surge Tank

A surge tank is connected to the injection well wellhead to reduce the effects of any high or low pressure surges on the injection wellhead or brine pipeline. Surges can occur when the well is brought into service or when taken out of service. A pressure gauge is located on the tank and on the 2-inch diameter stainless steel pipe connection to the injection wellhead.

Pressurized Annular Tank System

The pressurized annular tank system is located in the onsite facilities pump house and loading dock. It consists of a 426-gallon pressurized storage tank, 2-inch diameter buried carbon steel pipeline leading from the tank to the injection well, and an air compressor and associated automatic controls to maintain the storage tank within a predetermined pressure range. A compressed-air system O&M manual was previously supplied as a submittal. The pressurized annular tank system facilities record drawing is presented in Attachment B-4.

Dual-Zone Monitoring Well (SZMW-1 and DZMW-1)

The dual zone monitoring well consists of two monitoring intervals, SZMW-1 and DZMW-1. These zones have identical wellhead components and function, however, are different with respect to monitoring depths, construction details, purging well volumes, hydraulic response, and pressure transducer instrument setup.

Deep Zone Monitoring Well (DZMW-1 or inner zone)

This zone monitors the interval between 1,700 feet bls to 1,750 feet bls. The well construction is a 6-inch-diameter FRP casing transitioning to a 6-inch-diameter stainless riser pipe above the first flange on the wellhead.

Pressure Transducer and Gauge

The pressure transducer is installed in DZMW-1 to a depth of 145 feet below flange level (bfl) on top of the 6-inch diameter casing. The operating range of this transducer is 0 psi to 100 psi (or 0 feet to 231 feet of water). The transducer pressure data is sent to the dual zone monitoring well control panel where they are converted from psi to, and displayed as, feet of water column above the transducer. The pressure data is also sent to the ROWTP PLC screen display, which also converts the pressure data into feet of water above the transducer. If there is a complete power failure, and the well is under artesian pressure, the wellhead pressure can be manually recorded from the glycerin filled pressure gauge attached to the 6-inch stainless steel casing wall to provide a visual mechanical wellhead pressure reading and to provide backup to the electronic pressure transducer. Under static or RO IW-1 injection conditions, the wellhead of the deep zone of the dual-zone well has not been under artesian pressure.

Sampling Pump

The deep zone of the dual zone monitoring well is provided with an electric submersible pump, flow meter, discharge piping, and a sampling port to facilitate purging of the monitoring interval and obtaining a representative water sample from this monitoring zone.

The deep zone monitoring well, is equipped with a Grundfos Model 25S15-9 (1.5 HP) 4-inch stainless steel submersible well pump set to a depth of 145 feet bpl. The pump has a 1.25-inch outlet and is designed to provide up to 20 gpm with 210 feet of head. A field mounted main power switch is located on the monitoring well control panel, which controls local power to the dual-zone wellhead facilities. This switch allows the power to be turned off at the individual wellhead instead of cutting power to the entire injection well system. A manually operated ON/OFF switch with operational status lights is located on the control panel in the facilities building which operates the DZMW-1 submersible pump.

Stainless Steel Ball Valves

Several stainless steel 2-inch diameter ball valves exist on the discharge piping of the wellhead. The ball valve on the pump discharge piping can be used to control any artesian pressure found in the discharge piping when the pump is off. The ball valve on the down stream side of the flow meter can be used to control flow rate of the pump.

Check Valve Assembly

The check valve assembly consists of two isolation ball valves and the check valve between them. This assembly maintains the flow of the discharge in the wellhead in one direction and minimizes any flow backwards from the injection well to the monitoring well.

Magnetic Flowmeter

A 2-inch diameter electromagnetic flowmeter is installed on the discharge line of the DZMW-1 monitoring well. The electronic signal from the flowmeter is sent to the corresponding flowmeter display on the onsite facilities control panel. The display also has a digital readout for the totalizer. The flowmeter electronic signals are transmitted from the facilities building to the ROWTP PLC screen display, which reports the totalizer data in 1,000-gallon increments.

The DZMW-1 ABB flowmeter has several display options. To navigate through the display options, press the lower left button of the four buttons on the front. The display options are (the option number indicates the number of times the display button must be pushed to reach that option):

0 – Flow displayed in gpm (current display)
1 – Percent flow of meter range (0 to 25 gpm)
2 – Right direction flow and totalizer (opposite direction of current injection flow)
3 - Left direction flow and totalizer (correct direction of current injection flow)
4 – Totalizer of both flow directions added together
5 – Alarms for high or low flow (no alarms set)
6 – Flow velocity in feet/second

NOTE: ***The discharge flow is also displayed at the main control panel. This display has a range of 0 to 25 gpm. If the flow reaches a level of 110% of the maximum range of this display (i.e. up to 27.5 gpm) the display will freeze and will not correctly display the flow rate. The ABB flowmeter will correctly display flows to a level of 150% of the maximum range of this display (i.e. up to 37.5 gpm). For any discharge rates above 27.5 gpm, the ABB flowmeter display should be monitored instead of the flow display at the control pane.***

When the injection well is operating, and after the monitoring wells have been run for several minutes, the discharge rates of the monitoring well pumps should be much lower and this display discrepancy should not be an issue.

Air/Vacuum Release Valve

An air/vacuum release valve is located at the top of the DZMW-1 wellhead to prevent air and excessive vacuum from building in the well. The ball valve to the air-vacuum valve shall remain open.

The other ball valves on the wellhead allow the wellhead to be sealed against natural artesian pressures. Using these valves will isolate portions of the wellhead as needed for repair or service.

Shallow Zone Monitoring Well (SZMW-1 or annular zone)

This zone monitors the interval between 1,250 feet bls to 1,350 feet bls. The well SZMW-1 construction consists as the annular zone between the 16-inch-diameter carbon steel casing, cemented to a depth of 1,250 feet bls, and the 6-inch FRP casing, cemented to a depth of 1,350 feet bls. Within this annular space, a 4-inch-diameter PVC sample tube, which transitions into a 2-inch-diameter PVC sample tube at 250 feet bls, extends down to the base of the 16-inch-diameter carbon steel casing at 1,250 feet bls. This 4-inch-diameter sample tube transitions to a 4-inch-diameter stainless riser pipe above the first flange on the wellhead.

Pressure Transducer and Gauge

The pressure transducer is installed in SZMW-1 to a depth of 195 feet below flange level (bfl) on top of the 16-inch diameter casing. The operating range of this transducer is 0 psi to 100 psi (or 0 feet to 231 feet of water). The transducer pressure data is sent to the dual zone monitoring well control panel where they are converted from psi to, and displayed as, feet of water column above the transducer. The pressure data is also sent to the ROWTP PLC screen display, which also converts the pressure data into feet of water above the transducer. If there is a complete power failure, the wellhead pressures can be manually recorded from the glycerin filled pressure gauge attached to the 16-inch diameter casing flange of the annular zone to provide a visual mechanical wellhead pressure reading and to provide backup to the electronic pressure transducer. Under static or RO IW-1 injection conditions, the wellhead of the shallow zone of the dual-zone well should be under artesian pressure.

Sampling Pump

The shallow zone of the dual zone monitoring well is provided with an electric submersible pump, flow meter, discharge piping, and a sampling port to facilitate purging of the monitoring interval and obtaining a representative water sample from this monitoring zone.

The shallow zone monitoring well, is equipped with a Grundfos Model 25S15-9 (1.5 HP) 4-inch stainless steel submersible well pump set to a depth of 200 feet bpl. The pump has a 1.25-inch outlet and is designed to provide up to 20 gpm with 210 feet of head. A field mounted main power switch is located on the monitoring well control panel, which controls local power to the dual-zone wellhead facilities. This switch allows the power to be turned off at the individual wellhead instead of cutting power to the entire injection well system. A manually operated ON/OFF switch with operational status lights is located on the control panel in the facilities building which operates the SZMW-1 submersible pump.

Stainless Steel Ball Valves

Several stainless steel 2-inch diameter ball valves exist on the discharge piping of the wellhead. The ball valve on the pump discharge piping can be used to control any artesian pressure found in the discharge piping when the pump is off. The ball valve on the down stream side of the flow meter can be used to control flow rate of the pump.

Check Valve Assembly

The check valve assembly consists of two isolation ball valves and the check valve between them. This assembly maintains the flow of the discharge in the wellhead in one direction and minimizes any flow backwards from the injection well to the monitoring well.

Magnetic Flowmeter

A 2-inch electromagnetic flowmeter is installed on the discharge line of the SZMW-1 monitoring well. The electronic signal from the flowmeter is sent to the corresponding flowmeter display on the onsite facilities control panel. The display also has a digital readout for the totalizer. The flowmeter electronic signals are transmitted from the facilities building to the ROWTP PLC screen display, which reports the totalizer data in 1,000-gallon increments.

The SZMW-1 ABB flowmeter has several display options. To navigate through the display options, press the lower left button of the four buttons on the front. The display options are (the option number indicates the number of times the display button must be pushed to reach that option):

0 – Flow displayed in gpm (current display)
1 – Percent flow of meter range (0 to 25 gpm)

2 – Right direction flow and totalizer (opposite direction of current injection flow)
3 - Left direction flow and totalizer (correct direction of current injection flow)
4 – Totalizer of both flow directions added together
5 – Alarms for high or low flow (no alarms set)
6 – Flow velocity in feet/second

NOTE: ***The discharge flow is also displayed at the main control panel. This display has a range of 0 to 25 gpm. If the flow reaches a level of 110% of the maximum range of this display (i.e. up to 27.5 gpm) the display will freeze and will not correctly display the flow rate. The ABB flowmeter will correctly display flows to a level of 150% of the maximum range of this display (i.e., up to 37.5 gpm). For any discharge rates above 27.5 gpm, the ABB flowmeter display should be monitored instead of the flow display at the control pane.***

When the injection well is operating, the discharge rates of the monitoring well pumps will be much lower and this display discrepancy should not be an issue.

WARNING: ***The discharge flow on this zone needs to be monitored to reduce the risk of lowering the water level to the pump intake. The flows should be reduced using the ball valve on the pump discharge line.***

Air/Vacuum Release Valve

An air/vacuum release valve is located at the top of the SZMW-1 wellhead to prevent air and excessive vacuum from building in the well. The ball valve to the air-vacuum valve shall be open before operating the injection well.

The other ball valves on the wellhead allow the wellhead to be sealed against natural artesian pressures. Using these valves will isolate portions of the wellhead so it can be taken apart and be worked on.

Electrical Panels

The following panels are provided (panel locations are presented in Attachment B-5):

- Monitoring well control panel (at eastern edge of the dual zone monitoring well pad) - contains ON/OFF operational switches for the monitor well pumps, flow readouts for both zones, and water level readouts for both zones. The record drawing for the onsite dual zone monitoring well control panel is presented in Attachment B-6.

- Monitoring well magmeter flow display panels for each well.

- Injection well and annular tank control panel (in pump station building) – contains operational switches for the annular tank solenoid which regulates the tank operational pressure range, annular tank level display, annular tank pressure and level alarms, injection well flow and wellhead pressure alarms. The record drawing for the onsite annular tank control panel is presented in Attachment B-7.

- Annular tank control panel (in facilities building) - controller for air addition solenoid valve, tank site glass level and air compressor.

Injection Well System Operations

Component Manufacturers and Suppliers

Before operating any equipment associated with the DIW, the operator should consult the Deep Well System Equipment Manual and read the provided equipment manufacturer's information. **Table** C-1 in **Attachment** C provides names, phone numbers, and addresses of equipment suppliers used in this project.

Injection Facility Operational Limits

The injection rate established for the Fort Myers ROWTP injection well is dependent upon several criteria, which include well integrity, formation integrity, and the ability of the injection zone to readily accept the injected fluids. The integrity of the well is regulated under the current Chapter 62-528, FAC, which limits injection velocities to 10 ft/s. The 10 ft/s velocity within the final 12-inch inside diameter FRP casing is considered by the FDEP to be the maximum safe injection rate. The safe injection rate also applies to the preservation of the formation by limiting scouring velocities in the injection zone. This velocity equates to a safe injection rate of approximately 3,525 gpm (5.1 million gallons per day [mgd]) for the Fort Myers ROWTP injection well. The construction permit limited the injection rate to 2,917 gpm (4.2 mgd). The injection well was tested at a maximum rate of 2,820 gpm for the majority of the test duration, which is approximately 8 ft/s. The capability of the formation to readily accept the injection rate has been demonstrated by the successful results of the short-term injection testing at the rate of approximately 2,820 gpm (1.03 mgd).

The injection pressure observed during the short-term injection test was approximately 37 pounds per square inch (psi) at the wellhead, which poses no threat to the integrity of the well or formation at depth. Since the RO IW-1 wellhead was under approximately 10 psi of artesian pressure at the start of the short-term injection test, the increase in wellhead pressure at the 2,820 gpm injection rate was approximately 27 psi. Most of the 27 psi wellhead pressure is the result of dynamic frictional losses in the tubing and from the background static pressure of the well.

The final steel casing was successfully pressure tested at 113.5 psi as part of the mechanical integrity testing (MIT) of the well. Because current regulations require the pressure testing of the final casing at 1.5 times the operating pressure, the maximum operational wellhead is limited to 75 psi. To be conservative, a maximum pressure of 60 psi is recommended.

NOTE: ***The above injection rates and injection pressures are based on the short-term testing performed on the injection well during construction. These injection rates and pressures have been approved by FDEP for operational testing. Operators should familiarize themselves with the FDEP-approved and permitted operational testing rates and pressures.***

Wellhead pressure and flow, and annular fluid tank pressure and levels are monitored and associated alarms (wellhead pressure high and low, annular tank pressure and level high and low) are sent to the ROWTP operator control center display screen for attention. The alarms associated with the injection well and the limits of each are:

Injection well:

- High wellhead pressure (initially set to 60 psi)

- Low wellhead pressure (initially set to 0.1 psi)

Annular tank:
- High tank pressure (initially set to 75 psi)
- Low tank pressure (initially set to 40 psi)
- High fluid level (initially set to 40 inches)
- Low fluid level (initially set to 10 inches)

Dual zone monitoring well:
- DZMW-1 Low water level (set to 20 feet of water above transducer)
- SZMW-1 Low water level (set to 50 feet of water above transducer)

Injection System Start-up and Shut-down

The wellhead and pipeline connection record drawings, in Attachment B-1 and B-3, respectively, show the locations of the valves on the wellheads and on the transmission line, which are discussed below.

To put the well into service, the operator first needs to confirm the valve positions on both the wellhead and injection piping and on the Air Gap piping. It is imperative that the air release/vacuum valve on the injection wellhead be in the open position. This valve should remain in the open position unless needed closed for repairs or maintenance.

Normal Injection Well Operation

When demand is low and the storage tanks are above a full level, the RO system is operated at lower capacity to meet demands. When demand is high and the tank levels decline below a low level, the RO system capacity is automatically increased to produce finished water until the full level of the storage tanks are reached. Because of this operation sequence, the injection well wellhead valves must remain open when the ROWTP is operational. If the ROWTP is shutdown for maintenance or emergency reasons, the procedures for shutting down or starting up the injection well after the ROWTP shutdown shall be as follows:

Injection Well Shut-Down

Procedures for shutting down the injection well for a period of time when it is not used should follow the following procedures:

1. At this time the ROWTP shall be shut down.
2. The gate valve on the wellhead shall remain opened.
3. The butterfly valve on the downstream side of the globe check valve of the injection wellhead shall be closed.
4. The butterfly valve on the upstream side of the globe check valve of the injection wellhead shall then be closed.
5. The pressure/vacuum release valve will prevent any static artesian pressure from the injection well to unnecessary backflow pressure on the globe check valve and the pressure/vacuum release valve.

With this shutdown procedure, the static wellhead pressure continues to be monitored, and the injection well is available to discharge any water if the monitor wells are to be sampled during this shutdown period.

Injection Well Start-up

1. The pressure/vacuum release ball valve on the injection wellhead must be open.
2. Confirm that the monitoring well pipeline ball valve, are closed.
3. The butterfly valves must be open.
4. The wellhead gate valve must be open.
5. At this time the ROWTP shall be placed into operation mode.
6. Monitor injection well activity for:
   a. trapped air in the pipeline or wellhead
   b. injection flow rate (at well pad, control panel, and in control room)
   c. wellhead pressure (at well pad, control panel, and in control room)
   d. annular tank fluid level movement or fluctuations (at tank and in control room)
7. Confirm proper operation of monitoring equipment such as the flow meter and the water level and pressure recorders.

Emergency Contingency Plan

FDEP requires that, before any injection (testing or operational), an emergency discharge program must be in place in the event that the injection well fails or is taken out of service.

In the event of well failure or well maintenance requiring shutting down the injection well, the City will shut down the WTP and use stored water in the three 5-million-gallon aboveground storage tanks located onsite.

Operational Monitoring and Reporting

The construction permit stipulations require a period of operational testing before issuance of an operating permit. As of July 11, 2002, the Fort Myers ROWTP test injection well is currently being used under an operational testing permit. Consequently the operational monitoring program discussed below is outlined for the operational testing period only and may be modified by FDEP at any time during the operational testing period or as part of the issuance of the operating permit.

Results of all injection well and monitoring well data shall be submitted to FDEP by the last day of the month following the month of record. Copies of the results will be sent to the FDEP Southwest District (Fort Myers) office of the Underground Injection Control Program, at FDEP in Tallahassee and to CH2M HILL Tampa office. A 1-year data collection and sampling schedule for all of the wells is provided in Attachment D-1, showing July 11, 2002, as Day 1. A 1-year blank data collection and sampling schedule for all of the wells is provided in Attachment D-2 which allows the operator to monitor all data collection and sampling progress.

The required operational reporting data, calculated for reportable data minimums, maximums, and averages over a 24-hour period, are displayed at the RO IW-1 facilities ROWTP PLC screen display. The data can also be printed out as a daily report from the computer system. The monthly operating reports (MORs) will be created from the data collected at the ROWTP operator display screen and from the printed summary reports. Monthly reporting forms were developed based on the data collection required. An example monthly reporting form is provided in Attachment D-3.

The reportable data to be provided in the MOR from the injection well shall include wellhead pressure, flow meter and totalizer, brine water quality, annular tank level and pressure. The data reportable in the MOR from DZMW-1 and SZMW-1 include wellhead pressure or water level, and the sampling discharge flowmeter totalizer added into the RO IW-1 totalizer.

Operational Testing Conditions

Operational testing started on July 11, 2002. The brine flow rate at start up was 1,700 gpm.

Flow to the injection well and wellhead pressure must be monitored continuously to ensure that wellhead pressure does not exceed 60 psi at a maximum flow of 4.06 mgd (2,820 gpm).

All pressure gauges, flow meters, recorders, and related equipment associated with the injection and monitoring well systems shall be maintained and kept in good operating condition and shall be calibrated on a semi-annual basis. Laboratory equipment, methods, and quality control will follow EPA guidelines as expressed in the Standard Methods for the Examination of Water and Wastewater. The pressure gauges and flowmeters shall be calibrated using standard engineering methods.

Injection Well Facilities Monitoring Program

The final injection well specifications are listed in Table 1. The injection well will be monitored in accordance with the parameters and frequencies listed in Table 2. A summary of the monthly monitoring data to be submitted to FDEP shall include the parameters and frequencies listed in Table 2.

TABLE 1
Injection Well RO IW-1 Construction Details
The City of Fort Myers – RO IW O&M Manual

Well No.	Casing Diameter and Material (Inches)	Casing Total Depth (Feet)	Open Borehole (Feet)
RO IW-1	36-inch steel	450 feet	
	28-inch steel	1,650 feet	
	18-inch steel	2,305 feet	2,305 feet to 3,040 feet
	12-inch ID FRP	2,298 feet	

ID – inside diameter
FRP – fiberglass reinforced plastic

TABLE 2
Injection Well RO IW-1 FDEP Required Monitoring Data
The City of Fort Myers – RO IW O&M Manual

Operation Parameter	Parameter	Recording Frequency	Reporting Frequency
Injection Pressure (psi)	Maximum Injection Pressure	Continuous	Daily/Monthly
	Minimum Injection Pressure	Continuous	Daily/Monthly
	Average Injection Pressure	Continuous	Daily/Monthly
Flow Rate (gpm)	Maximum Flow Rate	Continuous	Daily/Monthly
	Minimum Flow Rate	Continuous	Daily/Monthly
	Average Flow Rate	Continuous	Daily/Monthly
Annular Pressure (psi)	Maximum Annular Pressure	Continuous	Daily/Monthly
	Minimum Annular Pressure	Continuous	Daily/Monthly
	Average Annular Pressure	Continuous	Daily/Monthly
Annular Changes	Fluid added/removed (gallons)	Continuous	Daily/Monthly
	Pressure added/removed (psi)	Continuous	Daily/Monthly
ROWTP Brine Volume (gallons)	Total Volume Injected	Continuous	Daily/Monthly
ROWTP Brine Water Quality*	TKN (mg/L)		Monthly
	pH (standard units)		Monthly
	Specific Conductivity (μmhos/cm)		Monthly
	Chloride (mg/L)		Monthly
	Sulfate (mg/L)		Monthly
	Temperature (Centigrade)		Monthly
	Total Dissolved Solids (mg/L)		Monthly
ROWTP Brine Water Quality*	Sodium (mg/L)		Monthly
	Calcium (mg/L)		Monthly
	Potassium (mg/L)		Monthly
	Magnesium (mg/L)		Monthly
	Iron (mg/L)		Monthly
	Carbonate (mg/L)		Monthly
	Bicarbonate (mg/L)		Monthly
	Gross Alpha (pci/L)		Monthly
	Radium 226/228 (pci/L)		Monthly

* Water quality may be reduced to monthly analysis after 6 months with FDEP approval.

The final monitoring well specifications are listed in Table 3. The monitoring wells will be monitored in accordance with the parameters and frequencies listed in Table 4. A summary of the monthly monitoring data to be submitted to FDEP shall include the parameters and frequencies listed in Table 4. Water Quality data may be reduced to monthly analysis after a minimum of 6 months of data [Rule 62-528.450(3)(a)(9), FAC] with FDEP approval.

TABLE 3
Monitoring Well Construction Details
The City of Fort Myers – RO IW O&M Manual

Monitoring Wells	Casing Diameter and Material (Inches)	Casing Total Depth (Feet)[1]	Open Borehole (Feet)[1]
SZMW-1[2]	16-inch Steel	1,250 feet	1,250 feet to 1,350 feet
DZMW-1[2]	6-inch ID FRP	1,700 feet	1,700 feet to 1,750 feet

[1] Depth below land surface
[2] Dual-zone monitoring well
ID = inside diameter
FRP = fiberglass reinforced plastic

TABLE 4
Monitoring Well FDEP Required Monitoring Data
The City of Fort Myers – RO IW O&M Manual

Operation Parameter	Parameter	Recording Frequency	Reporting Frequency
Water Level / Pressure	Maximum Water Level / Pressure	Continuously	Daily/Weekly
(not required for IAMW-1)	Minimum Water Level / Pressure	Continuously	Daily/Weekly
	Average Water Level / Pressure	Continuously	Daily/Weekly
Water Quality*	TKN (mg/L)		Weekly
	Specific Conductivity (µmhos/cm)		Weekly
	Total Dissolved Solids (mg/L)		Weekly
	pH (standard units)		Weekly
	Chloride (mg/L)		Weekly
	Sulfate (mg/L)		Weekly
	Temperature (Centigrade)		Weekly
	Sodium (mg/L)		Monthly
	Calcium (mg/L)		Monthly
	Potassium (mg/L)		Monthly
	Magnesium (mg/L)		Monthly
	Iron (mg/L)		Monthly
	Carbonate (mg/L)		Monthly
	Bicarbonate (mg/L)		Monthly
	Gross Alpha (pci/L)	DZMW-1 only	Monthly
	Radium 226/228 (pci/L)	DZMW-1 only	Monthly

* Water quality may be reduced to monthly analysis after 6 months with FDEP approval.

Operational testing of this injection well will cease upon expiration of this permit unless the FDEP has issued an intent to issue an operations permit, or a timely renewal application (Rule 62-4.090, FAC) for this construction permit has been submitted to the FDEP. Under no circumstances, however, shall the duration of operational testing period exceed 2 years, as specified in Rule 62-528.450(3), FAC. A request for an operations permit must be sent to FDEP no later than 6 months prior to the end of the testing period.

Water Quality Sampling Procedure

RO Brine Sampling

The injection well and the monitoring well are to be sampled for the water quality parameters as indicated in the previous tables. The sampling protocol for the injection well is relatively straightforward. With the valve on the discharge pipeline from the monitoring wells closed, the sampling of the RO reject stream is completed through the stainless steel sampling port (with ball valve) located on the wellhead.

NOTE: ***Samples should ONLY be collected at the RO IW-1 wellhead while injecting water down the well and without the monitoring wells being purged.***

Monitoring Well Sampling

Sampling of the monitoring wells requires more diligence because of the need for well evacuations before sampling to ensure that a representative sample is obtained and to protect against cross-contamination between each monitoring well and between the monitoring wells and the injection well.

NOTE: ***The operations staff needs to familiarize themselves with the proper operation of the sample pumps and valves before the collection of water samples.***

Deep Zone Monitoring Well (DZMW-1) Sampling Procedures

The deep zone monitor well is equipped with a dedicated submersible pump for evacuating and sampling purposes. Before collecting a water sample, a minimum of two casing volumes needs to be removed from the well. Allowing for the borehole volume and volume within the FRP casing, these 2 volumes equates to **2,390 gallons.** The calculated purge volumes for DZMW-1 are presented in Appendix E. The calculated purge volumes recommended for the operational testing permit requirements (based on 2 volumes per purge) are provided in Appendix E.1 and the purge volumes recommended for the operation permit requirements (based on 3 volumes per purge) are provided in Appendix E.2.

DZMW-1 will produce enough water to sustain the sampling pump rate with the ball valves fully open. The water level in the well, however, should be monitored when purging this well to make sure it is not drawing down to the pump. If it does, the ball valve on the DZMW-1 wellhead should be closed back to reduce the sample pump flow. The procedure to evacuate the well is as follows:

1. Open the 2-inch diameter ball valve at the end of the monitoring well discharge piping connected to the injection wellhead.
2. Confirm that all valves on the DZMW-1 wellhead are open except for the last ball valve on the discharge pipeline.
3. Start the DZMW-1 zone submersible pump and quickly open the last discharge pipeline ball valve on the deep zone wellhead.
4. Following the evacuation of **2,390 gallons** (two casing volumes) as measured by the sampling totalizer meter, a sample may be collected from the sampling port on the discharge pipe of the wellhead.

5. After the sample is collected, close the last ball valve on the deep zone monitoring wellhead and immediately turn off the deep zone sampling pump.
6. If all sampling is completed, close the 2-inch diameter ball valve on the monitoring well discharge piping connected to the injection wellhead.

Shallow Zone Monitoring Well (SZMW-1) Sampling Procedures

The shallow zone monitor well is equipped with a dedicated submersible pump for evacuating and sampling purposes. As with the other wells, before collecting a water sample, a minimum of two casing volumes needs to be removed from the well. This well has a Allowing for the borehole volume and volume within the PVC casing, these 2 volumes equates to **1,730 gallons**. The calculated purge volumes for SZMW-1 are presented in Appendix E. The calculated purge volumes recommended for the operational testing permit requirements (based on 2 volumes per purge) are provided in Appendix E.1 and the purge volumes recommended for the operation permit requirements (based on 3 volumes per purge) are provided in Appendix E.2.

The procedure to evacuate the well is as follows:

1. Open the 2-inch diameter ball valve at the end of the monitoring well discharge piping connected to the injection wellhead.
2. Confirm that all valves on the SZMW-1 wellhead are open except for the last ball valve on the discharge pipeline.
3. Start the SZMW-1 zone submersible pump and quickly open the last discharge pipeline ball valve on the deep zone wellhead.
4. Following the evacuation of **1,730 gallons** (two casing volumes) as measured by the sampling totalizer meter, a sample may be collected from the sampling port on the discharge pipe of the wellhead.
5. After the sample is collected, close the last ball valve on the shallow zone monitoring wellhead and immediately turn off the deep zone sampling pump.
6. If all sampling is completed, close the 2-inch diameter ball valve on the monitoring well discharge piping connected to the injection wellhead.

NOTE: ***This well produces very little water and can draw the water level down to the pump level and damage the pump. Care must be taken when sampling this well.***

WARNING: If the feet of water column above the transducer approaches 30 feet, turn off the pump and allow the water to recover sufficiently prior to completing purge.

Regulatory Requirements for Mechanical Integrity Testing

FDEP requires that all Class I Injection Wells demonstrate mechanical integrity at the end of construction activities, prior to operational testing, and at least once every five years for the life of the well pursuant to Rule 62-528.425(1)(d), FAC. A video survey shall also be completed as part of the base line monitoring information and every five years thereafter as stated in Rule 62-528.425 (1)(d)1., FAC. Determination of mechanical integrity and methods of testing mechanical integrity will follow directives outlined in Rule 62-528.300(6), FAC.

After construction of the well and prior to operational testing, mechanical testing of well RO IW-1 was completed which included a pressure test of the final casing, a pressure test of the 12-inch diameter FRP tubing, a radioactive tracer survey, and a video survey of the well. The next required mechanical integrity test will be under the directive of a final operations permit.

Regulatory Requirements for Specific Injectivity Testing

The FDEP requires that all Class I injection wells conduct SI testing as specified in the Rule 62-528.430(2)(c), FAC. This rule states that:

> "Specific injectivity testing shall be performed while the pumping rate to the well(s) has been set at a predetermined level and reported as the specific injectivity index (gpm/specific pressure (pounds per square inch gauge [psig]). As part of this test, the well shall be shut-in for a period of time necessary to conduct a valid observation of pressure fall-off. The applicant shall propose which pumping rate will be used based on the expected flow, the design of the pump station including the volume of the wet well and pump type(s), and the type of pump controls used. The pumping rate(s) shall be included as a condition of the operation permit. For Class I wells, other than municipal wells the permittee shall conduct one pressure fall-off test annually."

FDEP requires that the SI test be conducted quarterly under Rule 62-528.430(2)(c), FAC. Monthly testing is required to remain in compliance to operate a Class I injection well.

The following general procedures should be performed to allow for successful implementation of the proposed SI testing plan:

1. Shut-in the injection well for a period of time to allow well to reach static (equilibrated) conditions. Record static wellhead pressure at the injection well at the end of the 1-hour shut-in period.

2. Inject water into the injection well at a constant flow rate for 15 minutes. If possible, the flow rate should be similar for each SI testing event. A flow rate of 2.0 mgd (approximately 1,400 gpm) is proposed for future testing activities. Record flow rate on the corresponding injection well data sheet.

3. At the end of the 15-minute injection period, record the average wellhead pressure on the corresponding injection well data sheet.

4. Shut-in the injection well (cease flow). Monitor pressure falloff at the wellhead and record pressure on the appropriate form provided in the attachments. The pressure should be recorded for a minimum of 10 minutes (in 30-second intervals) or until the well returns to static (pre-injection) conditions, whichever is longer. This pressure falloff testing must be conducted quarterly, at a minimum, and submitted as part of the SI testing results.

After collecting all data at each injection facility, calculate a monthly Specific Injectivity Index (SII) submit data sheet (including calculations) to FDEP with the monthly operating reports for the corresponding injection facility. Each form should be completed in its entirety. An example monthly reporting form is provided in Attachment D-3.

Evaluate SII data, including pressure falloff data, in the annual injection system report for the Fort Myers deep injection well systems. Use data to determine when well rehabilitation activities are warranted on any injection wells to maintain permitted injection capacities while maintaining wellhead pressures below the maximum permitted pressure.

ATTACHMENT A

RO IW-1 Operational Testing Permit

Department of
Environmental Protection

Jeb Bush
Governor

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

David B. Struhs
Secretary

COP

July 5, 2002

CERTIFIED MAIL NO: 7001 2510 0001 0872 2709
RETURN RECEIPT REQUESTED

In the Matter of an
Application for Permit by:

Emmette P. Waite, Jr., Public Works Director
City of Fort Myers
2200 Second Street
Fort Myers, FL 33902
____________________________________/

Lee - UIC/IW
FDEP File No. 165628-001-UC
City of Fort Myers Water Treatment Plant
IW-1 Class I Injection Well

Dear Mr. Waite:

The Department has received and hereby approves the request by the City of Fort Myers Water Treatment Plant to begin operational testing of injection well IW-1 for the Reverse Osmosis Water Treatment Plant. The City of Fort Myers Water Treatment Plant may commence operational testing in accordance with specific condition 7 of construction permit 165628-001-UC and the specific testing and reporting conditions listed below.

Operational Testing Conditions

a. A qualified representative of the Engineer of Record must be present for the start-up operations and the Department must be notified in writing of the date operation began for the subject well.

b. Only non-hazardous reverse osmosis concentrate from the City of Fort Myers Water Treatment Plant may be injected.

c. Continuous recording of water levels in monitor well DZMW-1 shall begin at least 48 hours prior to the start of operational testing.

d. Flow to the injection well shall be monitored at all times to ensure the maximum sustained pressure at the wellhead does not exceed 76 psi on the final casing and a maximum injection rate of 2820 gpm (4.06 MGD).

e. The permittee shall calibrate all pressure gauge(s), flow meter(s), chart recorder(s), and other related equipment associated with the injection well system on a semiannual basis. The permittee shall maintain all monitoring equipment and shall ensure that the monitoring equipment is calibrated and in proper operating condition at all times. Laboratory equipment, methods, and quality control will follow EPA guidelines as expressed in standard methods for the examination of water and wastewater. The pressure gauge(s), flow meter(s), and chart recorder(s) shall be calibrated using standard engineering methods.

f. Injection Well IW - I

The specifications for the injection well are as follows:

Casing Diameter (OD)	Depth (bls) Cased/Total	Open Hole (bls)
36"Steel	450'	
28"Steel	1650'	
18" Steel	2305'	2305-3040'
12" FRP Tbg	2298'	

The injection well shall be monitored in accordance with the parameters and frequency listed below. The permitee shall submit a Summary of the Monthly Monitoring Data developed from the injection well instrumentation. Injection pressure and injection flow rate shall be monitored continuously and reported at the frequency indicated below. The report shall include the following data:

Parameters	Reporting Frequency
Injection Pressure (p.s.i)	Daily/Monthly
Maximum Injection Pressure	Daily/Monthly
Minimum Injection Pressure	Daily/Monthly
Average Injection Pressure	Daily/Monthly
Flow Rate (g.p.m.)	Daily/Monthly
Maximum Flow Rate	Daily/Monthly
Average Flow Rate	Daily/Monthly
Minimum Flow Rate	Daily/Monthly
Annular Pressure (p.s.i.)	Daily/Monthly
Maximum Annular Pressure	Daily/Monthly
Minimum Annular Pressure	Daily/Monthly
Average Annular Pressure	Daily/Monthly
Annular Fluid added/removed (gallons)	Daily/Monthly
Annular Pressure added/removed (p.s.i.)	Daily/Monthly
Total Volume WTP Concentrate Injected (gallons)	Daily
Total Volume WTP Concentrate Injected (gallons)	Monthly

WTP Concentrate Water Quality

TKN (mg/L)	Monthly
pH (std. units)	Monthly
Specific Conductivity (μmhos/cm)	Monthly
Chloride (mg/L)	Monthly
Sulfate (mg/L)	Monthly
Field Temperature (deg. C)	Monthly
Total Dissolved Solids (mg/L)	Monthly

Sodium (mg/L)	Monthly
Calcium (mg/L)	Monthly
Potassium (mg/L)	Monthly
Magnesium (mg/L)	Monthly
Iron (mg/L)	Monthly
Carbonate (mg/L)	Monthly
Bicarbonate (mg/L)	Monthly
Gross Alpha	Monthly
Radium 226	Monthly
Radium 228	Monthly

Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.

g. Monitor Well System

The monitor well system consists of one dual zone monitor well as described below:

Well Number	Casing Dia. (OD)	Depth (bls) Cased/Total
DZMW-1	24" Steel	450'
	16" Steel	1200'/1350'
	6" FRP Tbg	1700'/1750'

All monitor wells shall be monitored in accordance with rule 62-528.615, F.A.C. The following monitor well performance data shall be recorded and reported at the frequency indicated from the monitor well instrumentation in the Monthly Operating Report as indicated below. Samples and measurements taken forth purpose of monitoring shall be representative of the monitored activity. The permittee shall use continuous indicating and recording devices to monitor the monitor zone pressures or water levels. In the case of operational failure of any of these instruments for a period of more than 48 hours, the permittee shall report to the Department in writing the remedial action to be taken and the date when the failure will be corrected.

DZMW-1

Parameters	Reporting Frequency
Maximum Water Level/Pressure	Daily/Monthly
Minimum Water Level/Pressure	Daily/Monthly
Average Water Level/Pressure	Daily/Monthly
Water Quality	
TKN (mg/L)	Weekly
Specific Conductivity (μmhos/cm)	Weekly
Total Dissolved Solids (mg/L)	Weekly
pH (std. units)	Weekly
Chloride (mg/L)	Weekly
Sulfate (mg/L)	Weekly
Field Temperature (°C)	Weekly

Sodium (mg/L)	Monthly
Calcium (mg/L)	Monthly
Potassium (mg/L)	Monthly
Magnesium (mg/L)	Monthly
Iron (mg/L)	Monthly
Carbonate (mg/L)	Monthly
Bicarbonate (mg/L)	Monthly
Gross Alpha **(Deep Zone Only)**	Monthly
Radium 226 **(Deep Zone Only)**	Monthly
Radium 228 **(Deep Zone Only)**	Monthly

Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.

h. A specific injectivity test shall be performed monthly on the injection well as required by Rule 62-528.430(2)(b)1.b., F.A.C. Pursuant to Rule 62-528.430(2)(d), F.A.C., the specific injectivity test shall be performed with the pumping rate to the well set at a predetermined level and reported as the specific injectivity index (gallons per minute/specific pressure). The pumping rate to be used shall be based on the expected flow, the design of the pump types, and the type of pump control used. As part of this test, the well shall be shut-in for a period of time necessary to conduct a valid observation of pressure fall-off. The specific injectivity test data shall be submitted along with the monitoring results of the injection and monitoring well data.

i. The permittee shall submit monthly to the Department the results of all injection well and monitor well data required by this permit no later than the last day of the month immediately following the month of record. The results shall be sent to the Department of Environmental Protection, P.O. Box2549, Fort Myers, Florida 33902-2549. A copy of this report shall also be sent to the Department of Environmental Protection, Underground Injection Control Program, MS 3530, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

j. Operational testing of this injection well system shall cease upon expiration of this permit, unless the Department has issued an intent to issue an operation permit, or a timely renewal application (Rule 6204.090. F.A.C.) for this construction permit has been submitted to the Department. However, under no circumstances shall the duration of the operational testing period exceed two years as specified in Rule 62-528.450(3)(e), F.A.C.

k. Financial responsibility must be maintained in accordance with specific condition 10 of construction permit.

l. Abnormal Events

a. In the event the permittee is temporarily unable to comply with any conditions of this permit due to breakdown of equipment, power outages, destruction by hazard of fire, wind, or by other cause, the permittee shall notify the Department. Notification shall be made in person, by telephone or by telegraph within 24 hours of breakdown or malfunction to the UIC Program staff, South District office.

b. A written report of any noncompliance referenced in 1) above shall be submitted to the South District office within five days after its occurrence. The report shall describe the nature and cause of the breakdown or malfunction, the steps being taken or planned to be taken to correct the problem and

c. prevent its reoccurrence, emergency procedures in use pending correction of the problem, and the time when the facility will again be operating in accordance with permit conditions.

m. Emergency Disposal

a. All applicable federal, state and local permits must be in place to allow for any alternate discharges due to emergency or planned outage conditions.

b. Any changes in emergency disposal methods must be submitted for Technical Advisory Committee (TAC) and USEPA review and Department approval.

c. The permittee shall notify the Department within 24 hours whenever an emergency discharge has occurred (Rule 62-528.415(4)(c)1., F.A.C.). Written notification shall be provided to the Department within 5 days after each occurrence. The Permittee shall indicate the location and duration of the discharge and the volume of fluid discharged.

n. Certification

Reports required by this permit and applications should contain the proper signatories and certification language contained in Rule 62-528.340, F.A.C. (see specific condition 1.g. of the construction permit).

This letter must be attached to your permit and becomes a part of that permit.

Sincerely,

Richard W. Cantrell
Director of
District Management

RWC/JBM/mjf

Copies furnished to:

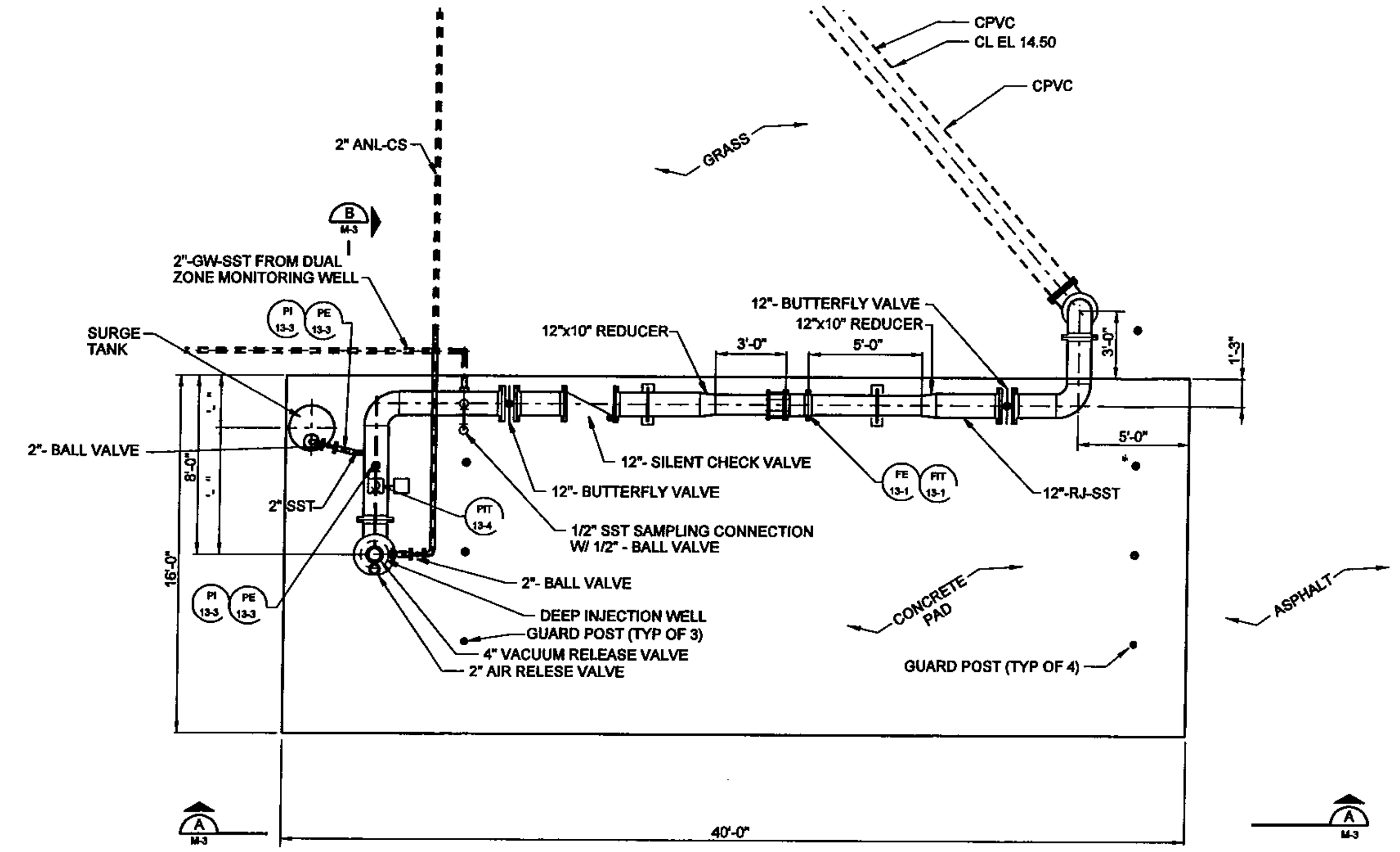
William D. Beddow, P.E. – CH2M Hill – Tampa
Charles Davault – FDEP Fort Myers
TAC

ATTACHMENT B

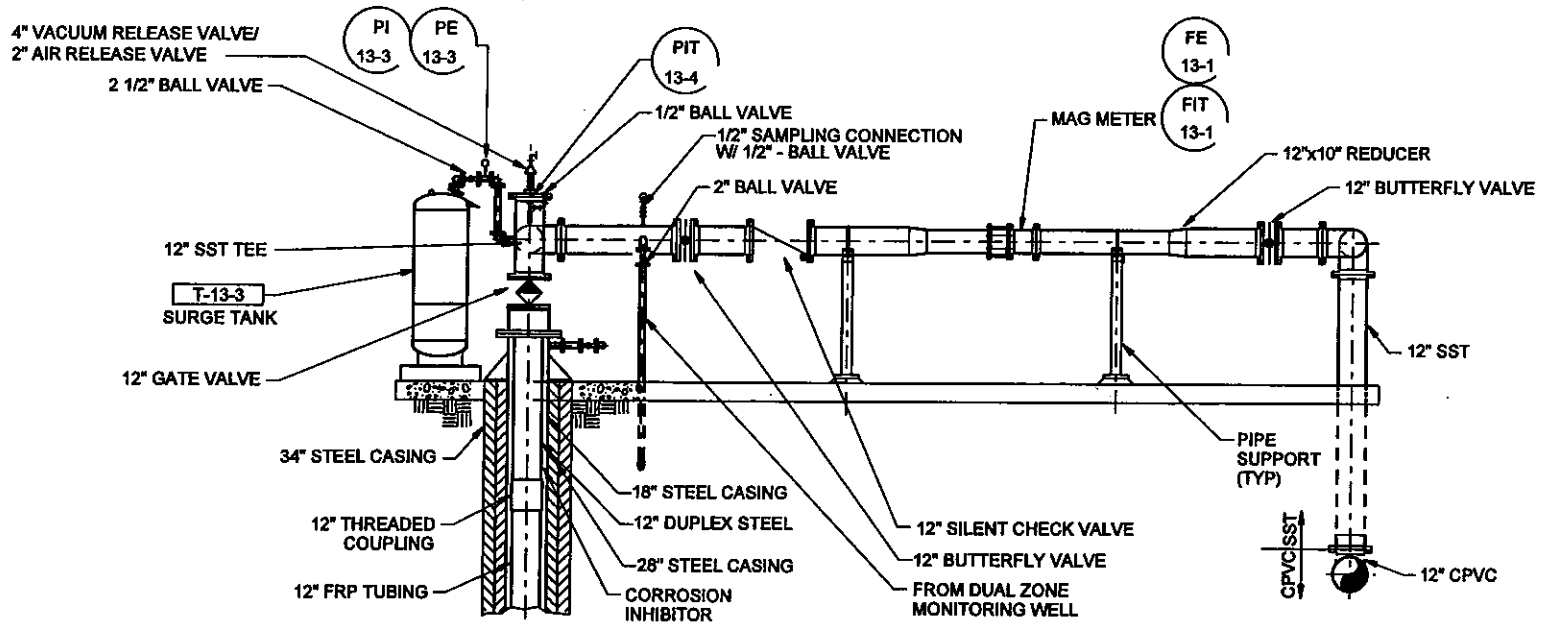
RO IW-1 System Record Drawings

ATTACHMENT B.1

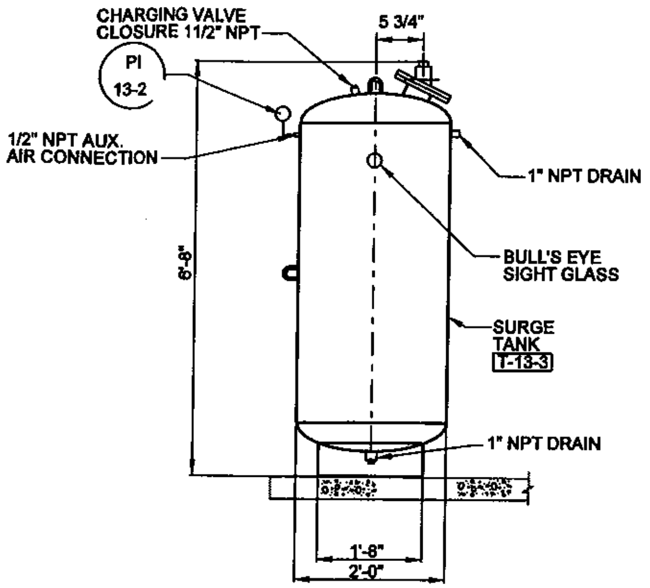
RO IW-1 Wellhead Record Drawing



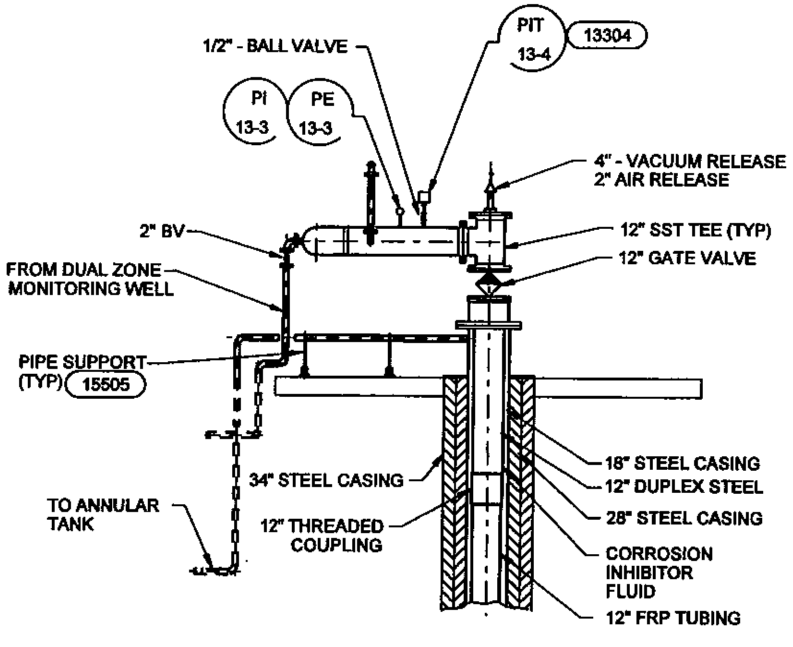
INJECTION WELL PAD (PLAN A)
3/8"=1'-0" M-1



SECTION A
1/4"=1'-0" M-2



SURGE TANK
NTS



SECTION B
1/4"=1'-0" M-2

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

ATTACHMENT B-1
RO IW-1 WELLHEAD
RECORD DRAWINGS

DSGN O. DUARTE
DR E CABALE
CHK T. INNISS
APVD W. BEDDOW

NO.	DATE	REVISION	BY	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL
DEEP INJECTION WELL
ENLARGED PLAN AND DETAIL

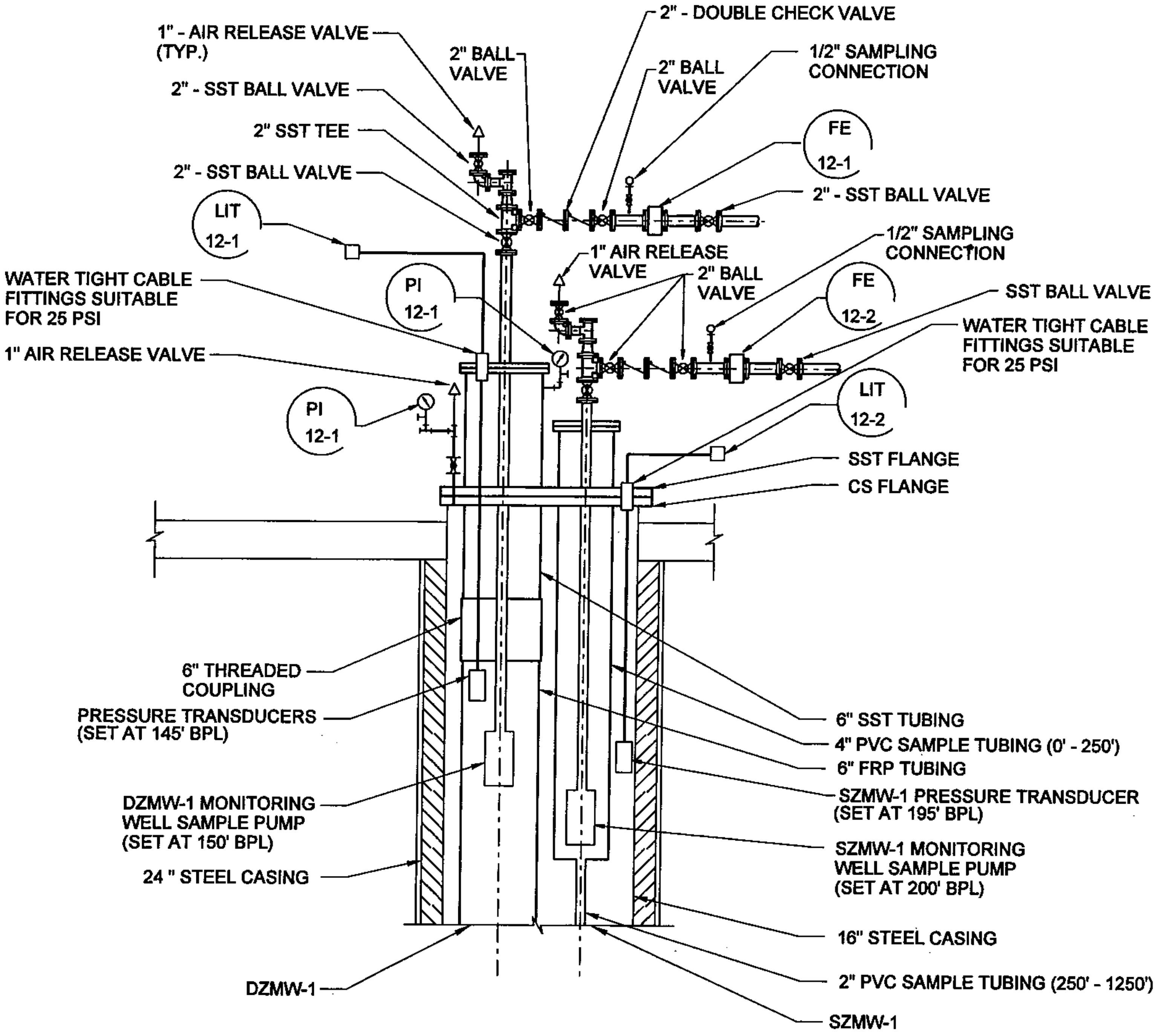
SHEET
DWG M-2A
DATE JULY 2001
PROJ 155336.IW

BID DOCUMENT

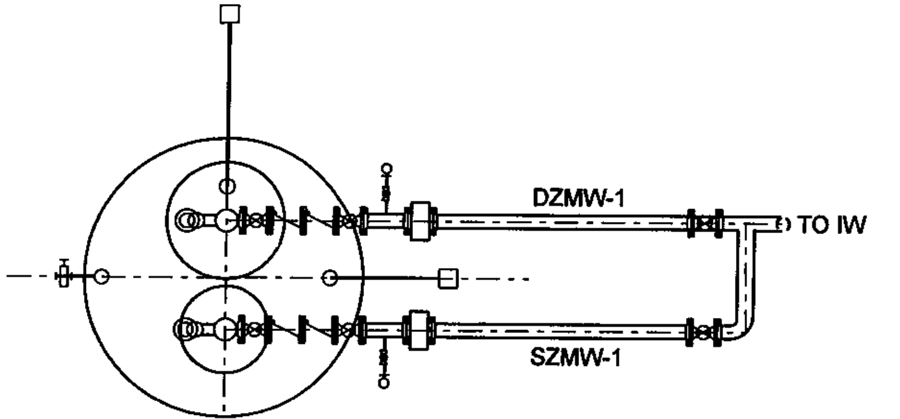
ATTACHMENT B.2

Dual Zone Wellhead Record Drawing

SZMW-1 and DZMW-1



SIDE VIEW
NTS M-2



OVERHEAD VIEW
NTS

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

ATTACHMENT B-2
DUAL ZONE WELLHEAD
RECORD DRAWINGS

DSGN O. DUARTE
DR E CABALE
CHK T. INNISS
APVD W. BEDDOW

NO.	DATE	REVISION	BY	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL

MONITORING WELL
ENLARGED PLAN AND DETAIL

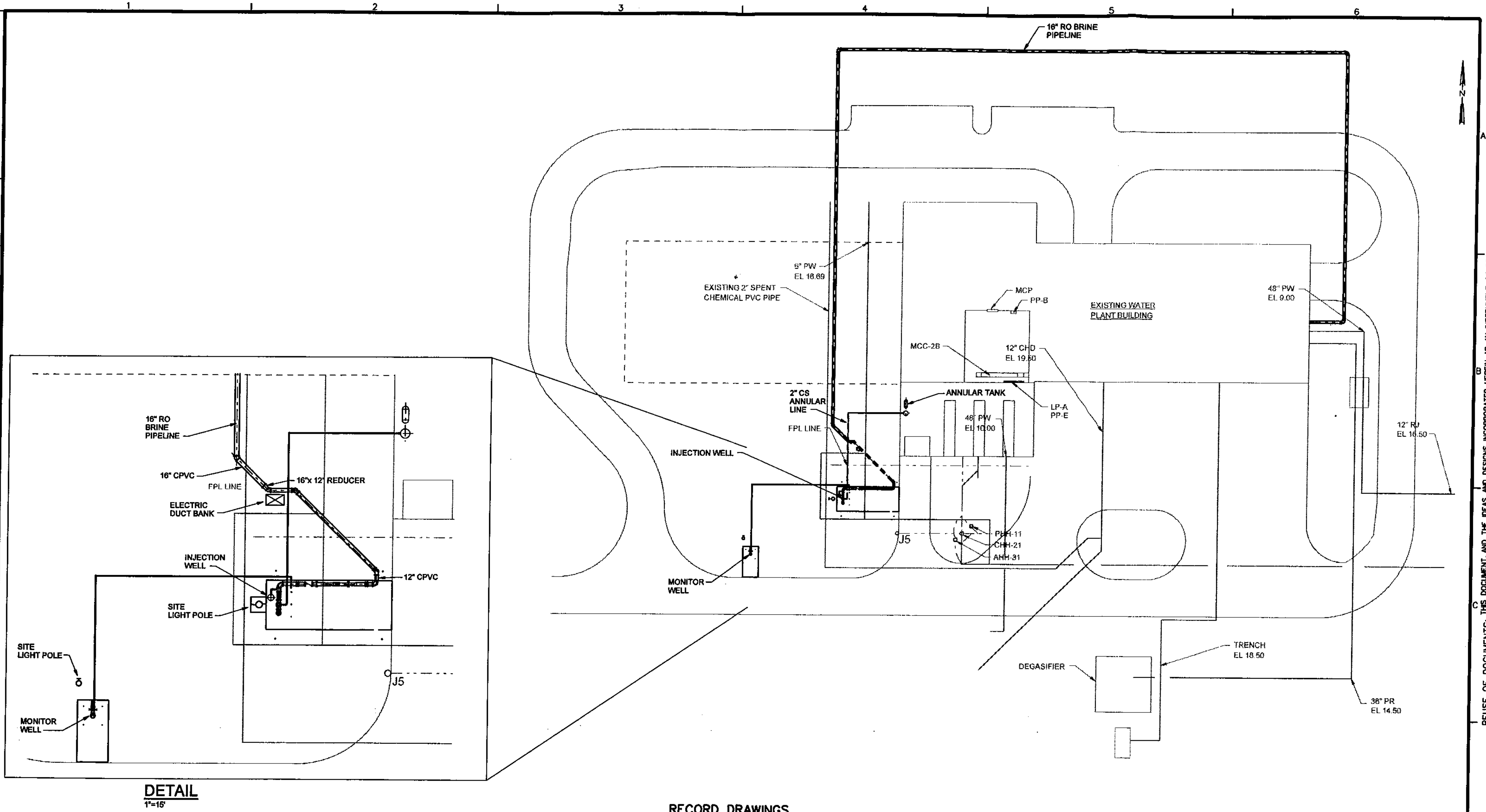
SHEET
DWG
DATE JULY 2001
PROJ 155336.IW

02-OCT-2002 14:23:19 5336m02dc.dgn

BID DOCUMENT

ATTACHMENT B.3

RO Brine Pipeline Connection Record Drawing



DETAIL
1"=15'

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

ATTACHMENT B-3
RO BRINE PIPELINE CONNECTION
RECORD DRAWINGS

DSGN O. DUARTE						
DR P SANTOS						
CHK T. INNISS						
APVD W. BEDDOW	NO.	DATE	REVISION	BY	APVD	

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL

BRINE CONCENTRATE PIPING

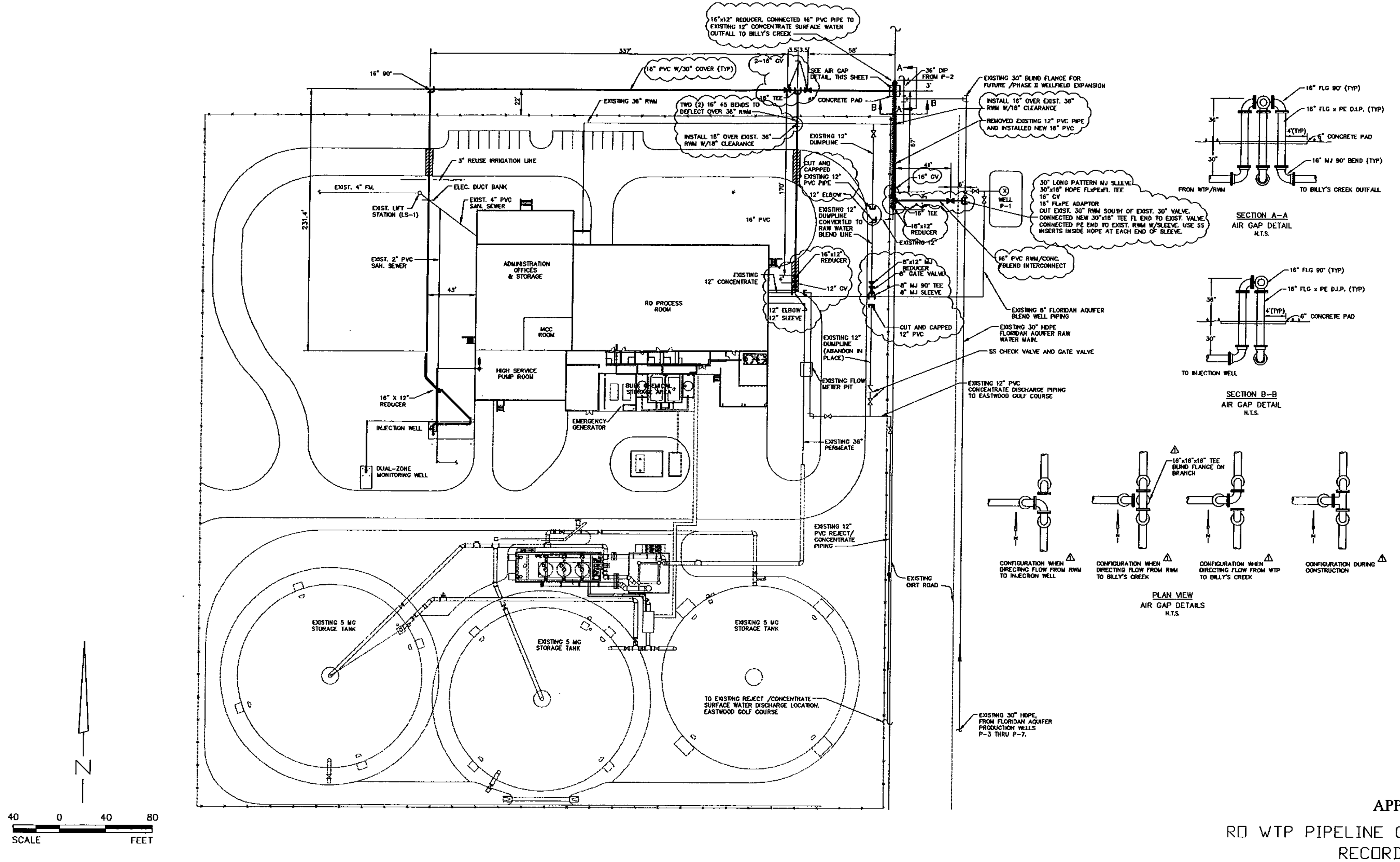
SHEET M-1
DWG
DATE JULY 2001
PROJ 155336.IW

03-OCT-2002 17:08:12 5336m01d.dgn

BID DOCUMENT

ATTACHMENT B.4

RO WTP Pipeline Connection Record Drawing



APPENDIX B-4

RO WTP PIPELINE CONNECTION RECORD DRAWINGS

DSGN
DR S. HANEY/TPA
CHK M. WEATHERBY/TPA
APVD

NO.	DATE	REVISION	BY	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

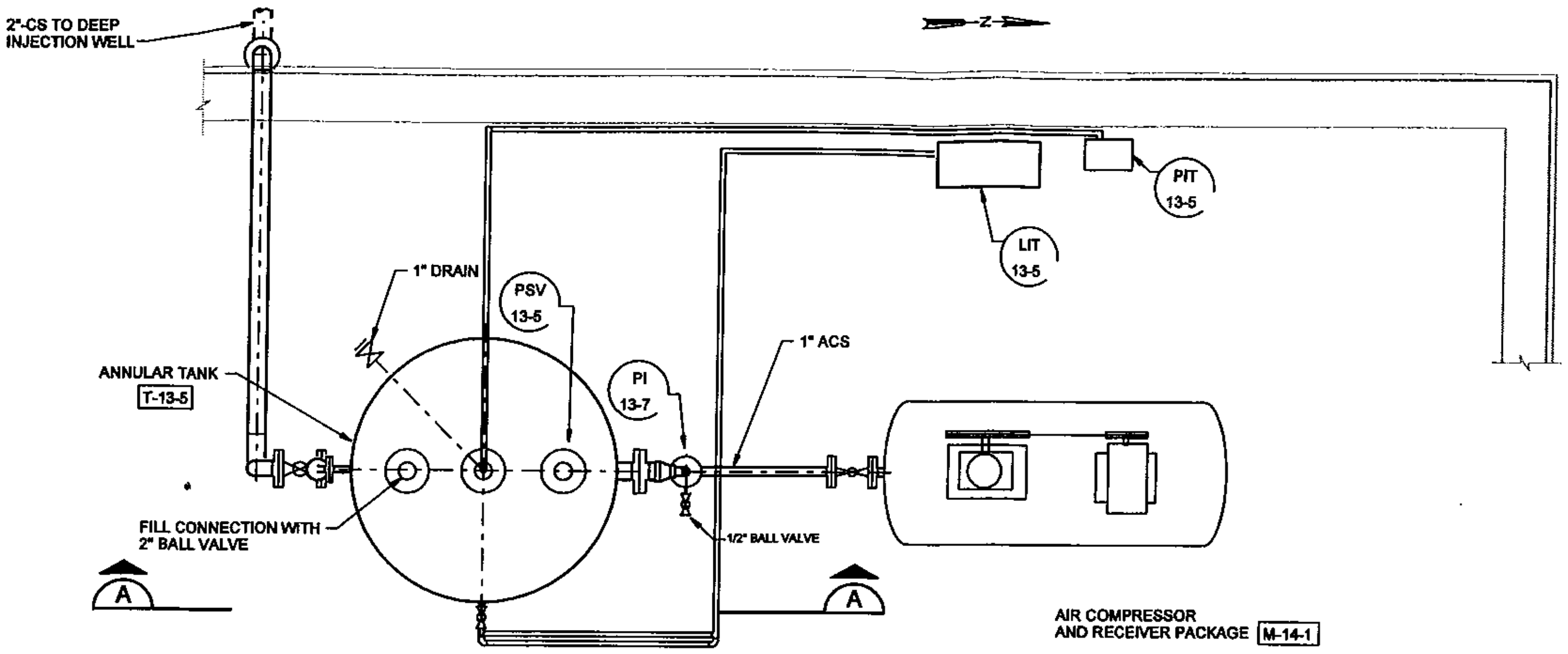
DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

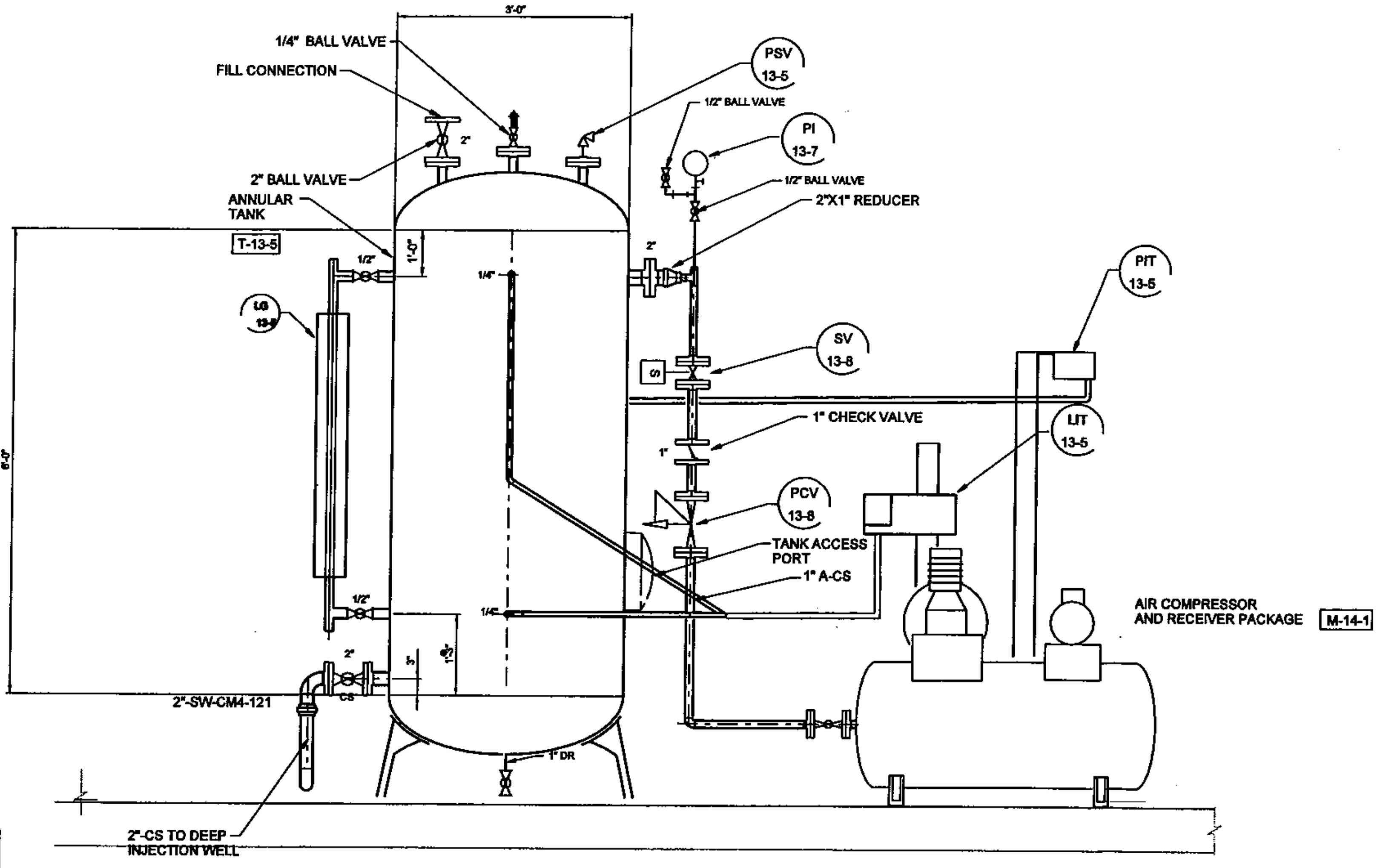
SHEET
DWG
DATE JULY 2002
PROJ 155336.IW

ATTACHMENT B.5

Annular Tank Facilities Record Drawing

Annular Tank and Air Compressor Details





SECTION A

RECORD DRAWINGS

Revisions Drawn By RS Date 07/12/02

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

ATTACHMENT B-5
ANNULAR TANK FACILITIES RECORD DRAWINGS

DSGN O. DUARTE						
DR P. SANTOS						
CHK T. INNISS						
APVD W. BEDDOW	NO.	DATE	REVISION	BY	APVD	

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL

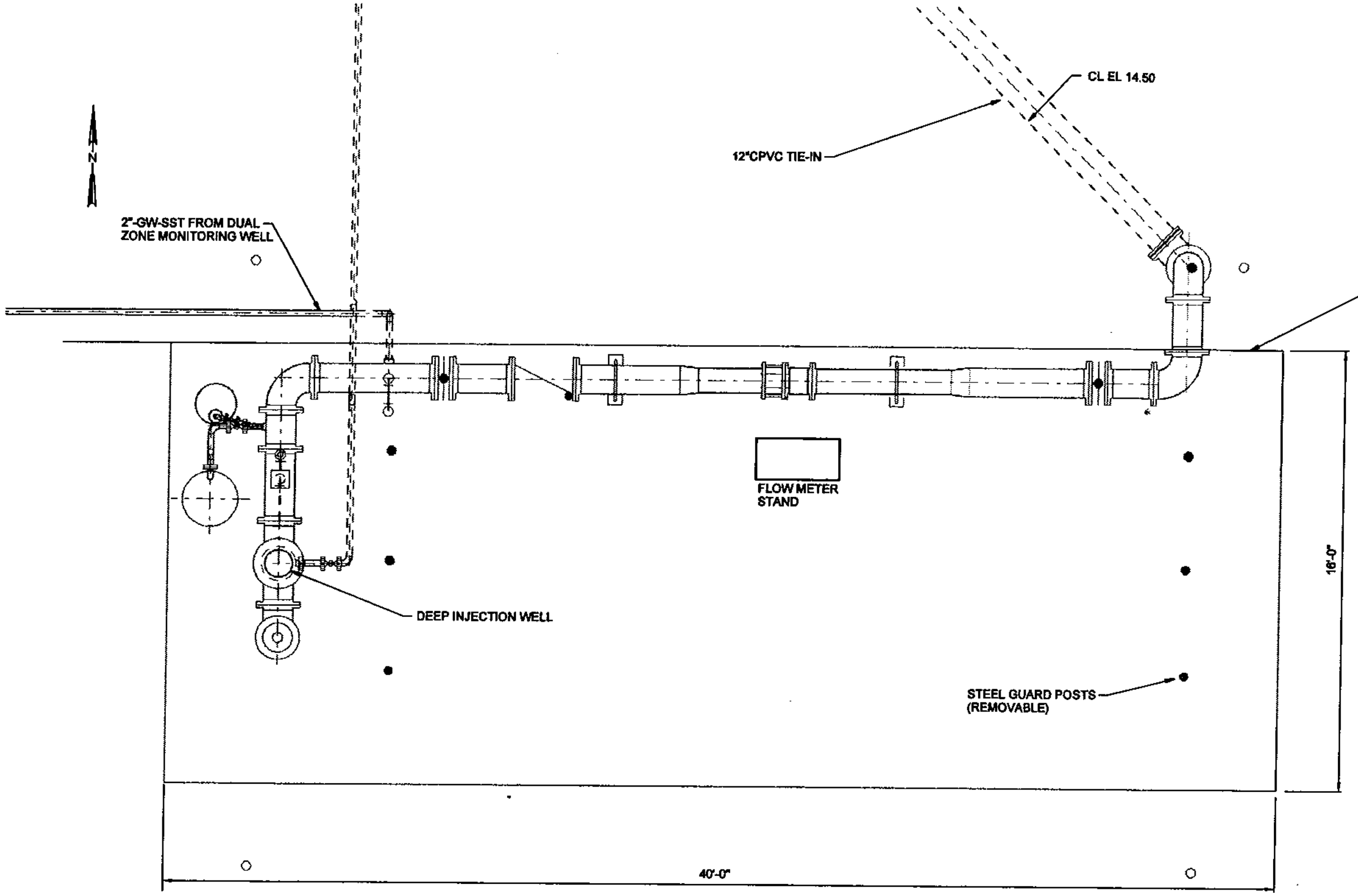
ANNULAR TANK SYSTEM
PLAN AND DETAIL

SHEET
DWG M-4
DATE JULY 2001
PROJ 155336.IW

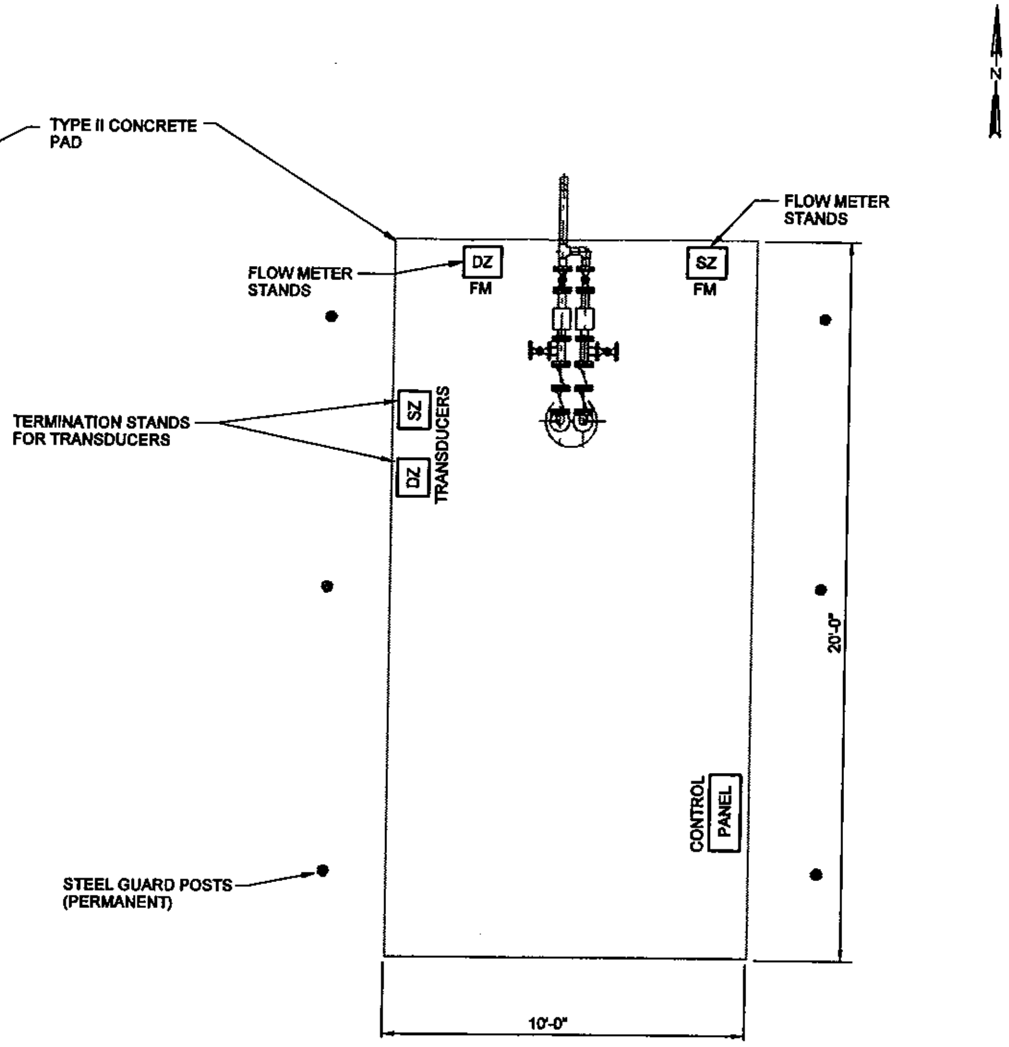
BID DOCUMENT

ATTACHMENT B.6

Control Panel Locations



INJECTION WELL PAD
3/8"=1'-0"



DUAL ZONE MONITORING WELL PAD (PLAN B)
3/8"=1'-0"
M-1

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02
THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

ATTACHMENT B-6
CONTROL PANEL LOCATIONS

DSGN O. DUARTE
DR P. SANTOS
CHK T. INNISS
APVD W. BEDDOW

NO.	DATE	REVISION	BY	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL
DEEP INJECTION WELL AND
MONITORING WELL PANEL LOCATION
ENLARGED PLAN AND DETAIL

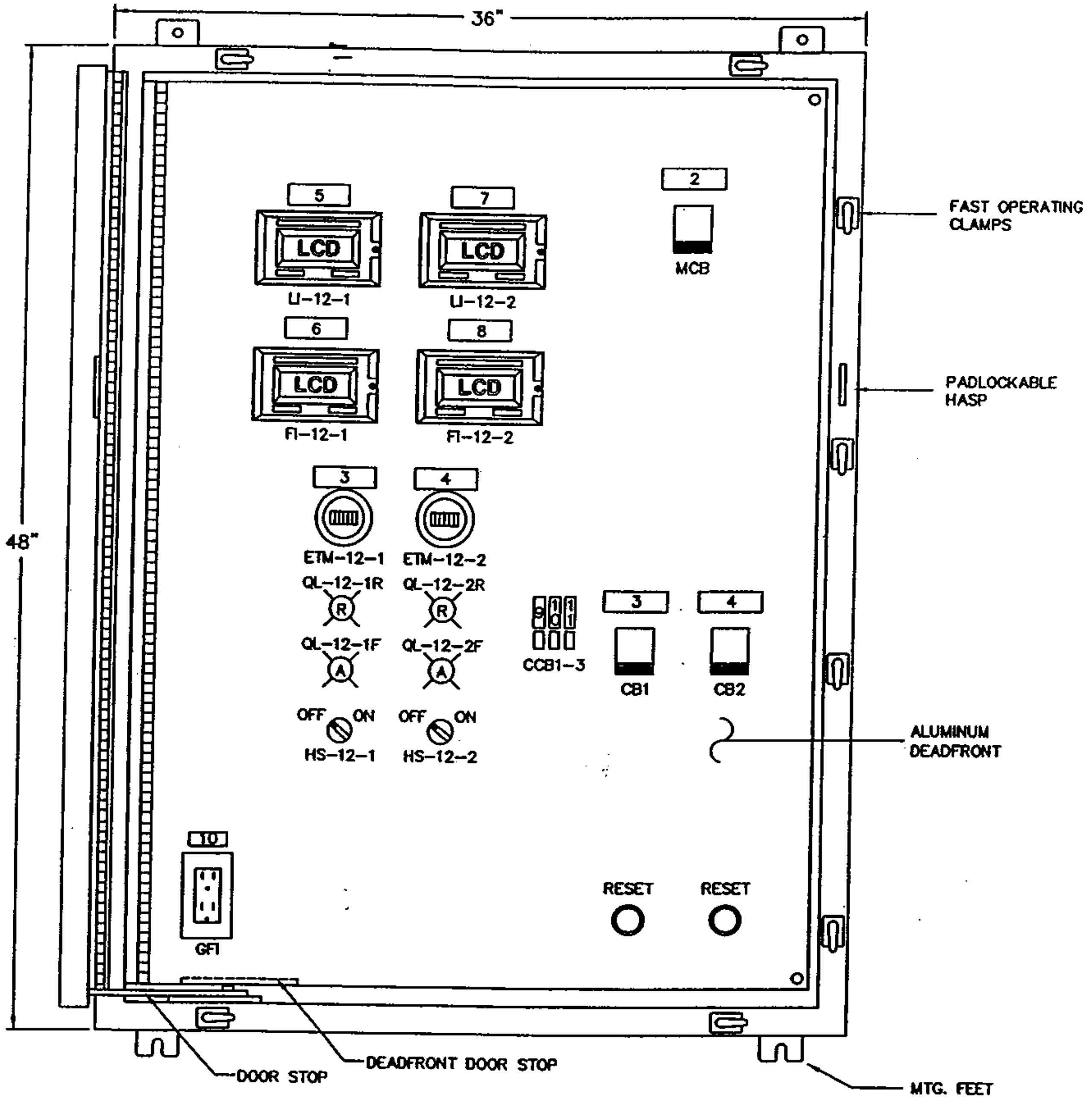
SHEET
DWG M-2
DATE JULY 2001
PROJ 155336.IW

04-OCT-2002 14:25:23 5336m02d.dgn

BID DOCUMENT

ATTACHMENT B.7

Dual Zone Monitor Well Control Panel Layout



DEADFRONT VIEW
(DOOR SHOWN OPEN)

NAMEPLATE SCHEDULE

1	1 X 3	MONITORING WELL PUMPS CONTROL PANEL CP-12
RED — 2	1 X 3	MAIN DISCONNECT
3	1 X 3	DZMW-1 PUMP
4	1 X 3	SZMW-1 PUMP
5	1 X 3	LI-12-1 DZMW-1 WATER LEVEL RANGE: 0-231 FT.
6	1 X 3	FI-12-1 DZMW-1 FLOW RANGE: 0-25 GPM
7	1 X 3	LI-12-2 SZMW-1 WATER LEVEL RANGE: 0-231 FT.
8	1 X 3	FI-12-2 SZMW-1 FLOW RANGE: 0-25 GPM
9	1/2 X 1 1/2	CONTROL
10	1/2 X 1 1/2	G.F.I.
11	1/2 X 1 1/2	PANEL LIGHT
RED — 12	1 1/2 X 3	CAUTION: TO REDUCE THE RISK OF FIRE REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE.
QL-12-1R,2R	RING	RUNNING
QL-12-1F,2F	RING	FAIL
HS-12-1,HS-12-2	RING	OFF - ON

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

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Attachment B-7
Dual Zone Monitor Well Control Panel Layout

DSGN O. DUARTE						VERIFY SCALE	
DR P. SANTOS						BAR IS ONE INCH ON ORIGINAL DRAWING. 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.	
CHK T. INNISS							
APVD W. BEDDOW	NO.	DATE	REVISION	BY	APVD		

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL

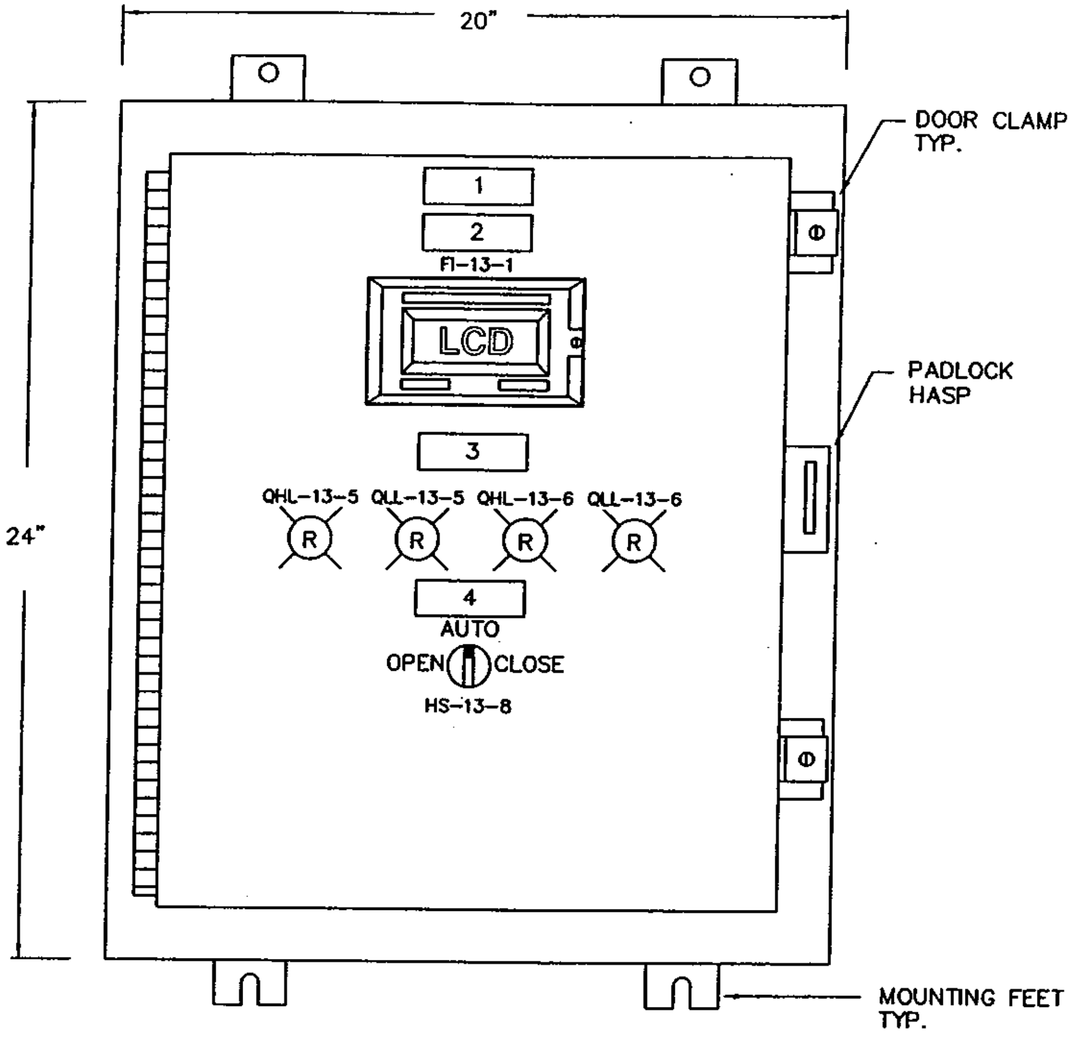
DUAL MONITOR WELL
CONTROL PANEL

SHEET
DWG
DATE JULY 2001
PROJ 155336.IW

BID DOCUMENT

ATTACHMENT B.8

Annular Tank Facilities Control Panel Layout



FRONT VIEW

NAME PLATE SCHEDULE

1	1 X 3	CP-13
2	1 X 3	DEEP INJECTION WELL FLOW RANGE: 0-3000 GPM
3	1 X 3	ANNULAR TANK T-13-5
4	1 X 3	SV-13-8 ANNULAR AIR VALVE
QHL-13-5	RING	HIGH LEVEL
QLL-13-5	RING	LOW LEVEL
QHL-13-6	RING	HIGH PRESSURE
QLL-13-6	RING	LOW PRESSURE
HS-13-8	RING	OPEN - AUTO - CLOSE
5	LABEL	CAUTION: TO REDUCE THE RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE

RECORD DRAWINGS

Revisions Drawn By RS Date 07/11/02

THESE RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED BY OTHERS. THEY ARE NOT INTENDED TO REPRESENT IN DETAIL THE EXACT LOCATION, TYPE OF COMPONENT NOR MANNER OF CONSTRUCTION. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THE RECORD DRAWINGS.

Attachment B-8
Annular Tank Facilities Control Panel Layout

DSGN O. DUARTE
DR P. SANTOS
CHK T. INNISS
APVD W. BEDDOW

NO.	DATE	REVISION	BY	APVD

VERIFY SCALE
BAR IS ONE INCH ON ORIGINAL DRAWING.
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

CH2MHILL
3011 SW WILLISTON RD.
GAINESVILLE, FL 32608
EB0000072 AAC001992

DEEP WELL INJECTION PROJECT
FOR
CITY OF FORT MYERS

MECHANICAL
ANNULAR TANK
CONTROL PANEL

SHEET
DWG
DATE JULY 2001
PROJ 155336.IW

BID DOCUMENT

ATTACHMENT C

Component Manufacturers and Suppliers

Attachment C

Equipment Suppliers List

Deep Injection Well

Flow Transmitter (FIT-13-1)	Mfr: Local Rep:	ABB Magmeters and Converters C.C. Controls Corp. 1235 Park Lane South Jupiter, FL 33458 (561) 748-3737
Flow Meter (FE-13-1)	Mfr: Local Rep:	ABB Magmeters and Converters C.C. Controls Corp. 1235 Park Lane South Jupiter, FL 33458 (561) 748-3737
Pressure Transmitter (PIT-13-4,5)	Mfr: Local Rep:	Rosemount C.C. Controls Corp. 1235 Park Lane South Jupiter, FL 33458 (561) 748-3737
Pressure Gauges (PI-13-2,3)	Mfr: Local Rep:	Ashcroft C.C. Controls Corp. 1235 Park Lane South Jupiter, FL 33458 (561) 748-3737

Annular Tank

Tank (T-13-5)	Mfr: Local Rep:	Dixie Tank Co. Atlantic Environmental Services, Inc. 615-2 Whitney Ave. Lantana, FL 33462 (561) 547-8080
Magnetic "Flag-Type" Level Indicator (LG-13-5)	Mfr: Local Rep:	John C. Ernst Co., Inc. Atlantic Environmental Services, Inc. 615-2 Whitney Ave. Lantana, FL 33462 (561) 547-8080
Pressure Gauge Assembly (PI-13-7)	Mfr: Local Rep:	Quincy Compressor Div. Atlantic Environmental Services, Inc. 615-2 Whitney Ave. Lantana, FL 33462 (561) 547-8080
Air Compressor (M-14-1)	Mfr: Local Rep:	Quincy Compressor Div. Atlantic Environmental Services, Inc. 615-2 Whitney Ave. Lantana, FL 33462 (561) 547-8080
Surge Tank (T-13-3)	Mfr: Local Rep:	TACO Corp. Atlantic Environmental Services, Inc. 615-2 Whitney Ave. Lantana, FL 33462 (561) 547-8080
Differential Pressure Transmitter (LIT-13-5)	Mfr: Local Rep:	Rosemount C.C. Controls Corp. 1235 Park Lane South Jupiter, FL 33458 (561) 748-3737

Dual Zone Monitor Well

Depth Level Transmitters (LT-12-1,2)	Mfr: Local Rep:	Druck C.C. Controls Corp. 1235 Park Lane South Jupiter, FL 33458 (561) 748-3737
Pressure Gauge (PI-12-2)	Mfr: Local Rep:	Ashcroft C.C. Controls Corp. 1235 Park Lane South

Attachment C
Equipment Suppliers List

		Jupiter, FL 33458 (561) 748-3737
Submersible Sample Pumps (12-1,2)	Mfr:	Grundfos
	Local Rep:	Atlantic Environmental Services, Inc. 615-2 Whitney Ave. Lantana, FL 33462 (561) 547-8080
Submersible Motors (12-1,2)	Mfr:	Franklin Electric
	Local Rep:	Atlantic Environmental Services, Inc. 615-2 Whitney Ave. Lantana, FL 33462 (561) 547-8080
Valving and Fittings		
Gate Valves	Mfr:	American Flow Control
	Local Rep:	American Flow Control P.O. Box 2727 Birmingham, Alabama 35202-2727 1-800-326-8051
Butterfly Valves	Mfr:	DeZURIK
	Local Rep:	DeZURIK 250 Riverside Avenue North Sartell, MN 56377 (320)-259-2000
Air/Vacuum Release Valves	Mfr:	Val-Matic Valve and Manufacturing Co.
	Local Rep:	Val-Matic Valve and Manufacturing Co. 905 Riverside Dr. Elmhurst, IL 60126 (630) 941-7600
Check Valves	Mfr:	Mueller Steam Specialty
	Local Rep:	Mueller Steam Specialty 1491 NC Hwy. 20W St. Pauls, NC 28384 1-800-334-6259
Solenoid Valve (SV-13-8)	Mfr:	ASCO
	Local Rep:	Atlantic Environmental Services, Inc. 615-2 Whitney Ave. Lantana, FL 33462 (561) 547-8080
Air Pressure Regulator Control Valve (PCV-13-8)	Mfr:	Wilkerson-Speedaire
	Local Rep:	Atlantic Environmental Services, Inc. 615-2 Whitney Ave. Lantana, FL 33462 (561) 547-8080
Safety Pressure Relief Valve (PSV-13-5)	Mfr:	Quincy Compressor Div.
	Local Rep:	Atlantic Environmental Services, Inc. 615-2 Whitney Ave. Lantana, FL 33462 (561) 547-8080

ATTACHMENT D

Operational Data Reporting Forms

ATTACHMENT D.1

Operational Data Schedules

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - IW-1 Operational Data and Sampling Schedule

Date and Status							Operations				RO Brine Injected Fluid Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Injection Pressure (psi)	Flow Rate (gpm)	Annular Pressure (psi) and Tank Fluid Level (inches)	Total Volume WTP Concentrate Injected (gal)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
1	07/11/2002	Th					x	x	x	x																		
2	07/12/2002	F					x	x	x	x																		
3																												
4																												
5	07/15/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
6	07/16/2002	T					x	x	x	x																		
7	07/17/2002	W					x	x	x	x																		
8	07/18/2002	Th					x	x	x	x																		
9	07/19/2002	F					x	x	x	x																		
10																												
11																												
12	07/22/2002	M					x	x	x	x																		
13	07/23/2002	T					x	x	x	x																		
14	07/24/2002	W					x	x	x	x																		
15	07/25/2002	Th					x	x	x	x																		
16	07/26/2002	F					x	x	x	x																		
17																												
18																												
19	07/29/2002	M					x	x	x	x																		
20	07/30/2002	T					x	x	x	x																		
21	07/31/2002	W					x	x	x	x																		
22	08/01/2002	Th					x	x	x	x																		
23	08/02/2002	F					x	x	x	x																		
24																												
25																												
26	08/05/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
27	08/06/2002	T					x	x	x	x																		
28	08/07/2002	W					x	x	x	x																		
29	08/08/2002	Th					x	x	x	x																		
30	08/09/2002	F					x	x	x	x																		
31																												
32																												
33	08/12/2002	M					x	x	x	x																		
34	08/13/2002	T					x	x	x	x																		
35	08/14/2002	W					x	x	x	x																		
36	08/15/2002	Th					x	x	x	x																		
37	08/16/2002	F					x	x	x	x																		
38																												
39																												
40	08/19/2002	M					x	x	x	x																		
41	08/20/2002	T					x	x	x	x																		
42	08/21/2002	W					x	x	x	x																		
43	08/22/2002	Th					x	x	x	x																		
44	08/23/2002	F					x	x	x	x																		
45																												
46																												
47	08/26/2002	M					x	x	x	x																		
48	08/27/2002	T					x	x	x	x																		
49	08/28/2002	W					x	x	x	x																		
50	08/29/2002	Th					x	x	x	x																		
51	08/30/2002	F					x	x	x	x																		
52																												
53																												
54	09/02/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
55	09/03/2002	T					x	x	x	x																		
56	09/04/2002	W					x	x	x	x																		
57	09/05/2002	Th					x	x	x	x																		
58	09/06/2002	F					x	x	x	x																		
59																												
60																												
61	09/09/2002	M					x	x	x	x																		
62	09/10/2002	T					x	x	x	x																		
63	09/11/2002	W					x	x	x	x																		
64	09/12/2002	Th					x	x	x	x																		
65	09/13/2002	F					x	x	x	x																		
66																												
67																												
68	09/16/2002	M					x	x	x	x																		
69	09/17/2002	T					x	x	x	x																		
70	09/18/2002	W					x	x	x	x																		
71	09/19/2002	Th					x	x	x	x																		
72	09/20/2002	F					x	x	x	x																		
73																												
74																												
75	09/23/2002	M					x	x	x	x																		
76	09/24/2002	T					x	x	x	x																		
77	09/25/2002	W					x	x	x	x																		
78	09/26/2002	Th					x	x	x	x																		
79	09/27/2002	F					x	x	x	x																		
80																												
81																												
82	09/30/2002	M					x	x	x	x																		
83	10/01/2002	T					x	x	x	x																		
84	10/02/2002	W					x	x	x	x																		
85	10/03/2002	Th					x	x	x	x																		
86	10/04/2002	F					x	x	x	x																		
87																												
88																												
89	10/07/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
90	10/08/2002	T					x	x	x	x																		
91	10/09/2002	W					x	x	x	x																		
92	10/10/2002	Th					x	x	x	x																		
93	10/11/2002	F					x	x	x	x																		
94																												
95																												
96	10/14/2002	M					x	x	x	x																		
97	10/15/2002	T					x	x	x	x																		
98	10/16/2002	W					x	x	x	x																		
99	10/17/2002	Th					x	x	x	x																		
100	10/18/2002	F					x	x	x	x																		
101																												
102																												

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - IW-1 Operational Data and Sampling Schedule

Date and Status							Operations				RO Brine Injected Fluid Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Injection Pressure (psi)	Flow Rate (gpm)	Annular Pressure (psi) and Tank Fluid Level (inches)	Total Volume WTP Concentrate Injected (gal)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
103	10/21/2002	M					x	x	x	x																		
104	10/22/2002	T					x	x	x	x																		
105	10/23/2002	W					x	x	x	x																		
106	10/24/2002	Th					x	x	x	x																		
107	10/25/2002	F					x	x	x	x																		
108																												
109																												
110	10/28/2002	M					x	x	x	x																		
111	10/29/2002	T					x	x	x	x																		
112	10/30/2002	W					x	x	x	x																		
113	10/31/2002	Th					x	x	x	x																		
114	11/01/2002	F					x	x	x	x																		
115																												
116																												
117	11/04/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
118	11/05/2002	T					x	x	x	x																		
119	11/06/2002	W					x	x	x	x																		
120	11/07/2002	Th					x	x	x	x																		
121	11/08/2002	F					x	x	x	x																		
122																												
123																												
124	11/11/2002	M					x	x	x	x																		
125	11/12/2002	T					x	x	x	x																		
126	11/13/2002	W					x	x	x	x																		
127	11/14/2002	Th					x	x	x	x																		
128	11/15/2002	F					x	x	x	x																		
129																												
130																												
131	11/18/2002	M					x	x	x	x																		
132	11/19/2002	T					x	x	x	x																		
133	11/20/2002	W					x	x	x	x																		
134	11/21/2002	Th					x	x	x	x																		
135	11/22/2002	F					x	x	x	x																		
136																												
137																												
138	11/25/2002	M					x	x	x	x																		
139	11/26/2002	T					x	x	x	x																		
140	11/27/2002	W					x	x	x	x																		
141	11/28/2002	Th					x	x	x	x																		
142	11/29/2002	F					x	x	x	x																		
143																												
144																												
145	12/02/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
146	12/03/2002	T					x	x	x	x																		
147	12/04/2002	W					x	x	x	x																		
148	12/05/2002	Th					x	x	x	x																		
149	12/06/2002	F					x	x	x	x																		
150																												
151																												
152	12/09/2002	M					x	x	x	x																		
153	12/10/2002	T					x	x	x	x																		
154	12/11/2002	W					x	x	x	x																		
155	12/12/2002	Th					x	x	x	x																		
156	12/13/2002	F					x	x	x	x																		
157																												
158																												
159	12/16/2002	M					x	x	x	x																		
160	12/17/2002	T					x	x	x	x																		
161	12/18/2002	W					x	x	x	x																		
162	12/19/2002	Th					x	x	x	x																		
163	12/20/2002	F					x	x	x	x																		
164																												
165																												
166	12/23/2002	M					x	x	x	x																		
167	12/24/2002	T					x	x	x	x																		
168	12/25/2002	W					x	x	x	x																		
169	12/26/2002	Th					x	x	x	x																		
170	12/27/2002	F					x	x	x	x																		
171																												
172																												
173	12/30/2002	M					x	x	x	x																		
174	12/31/2002	T					x	x	x	x																		
175	01/01/2003	W					x	x	x	x																		
176	01/02/2003	Th					x	x	x	x																		
177	01/03/2003	F					x	x	x	x																		
178																												
179																												
180	01/06/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
181	01/07/2003	T					x	x	x	x																		
182	01/08/2003	W					x	x	x	x																		
183	01/09/2003	Th					x	x	x	x																		
184	01/10/2003	F					x	x	x	x																		
185																												
186																												
187	01/13/2003	M					x	x	x	x																		
188	01/14/2003	T					x	x	x	x																		
189	01/15/2003	W					x	x	x	x																		
190	01/16/2003	Th					x	x	x	x																		
191	01/17/2003	F					x	x	x	x																		
192																												
193																												
194	01/20/2003	M					x	x	x	x																		
195	01/21/2003	T					x	x	x	x																		
196	01/22/2003	W					x	x	x	x																		
197	01/23/2003	Th					x	x	x	x																		
198	01/24/2003	F					x	x	x	x																		
199																												
200																												
201	01/27/2003	M					x	x	x	x																		
202	01/28/2003	T					x	x	x	x																		
203	01/29/2003	W					x	x	x	x																		
204	01/30/2003	Th					x	x	x	x																		
205	01/31/2003	F					x	x	x	x																		
206																												
207																												
208	02/03/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
209	02/04/2003	T					x	x	x	x																		
210	02/05/2003	W					x	x	x	x																		
211	02/06/2003	Th					x	x	x	x																		
212	02/07/2003	F					x	x	x	x																		

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - IW-1 Operational Data and Sampling Schedule

	Date and Status						Operations				RO Brine Injected Fluid Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Injection Pressure (psi)	Flow Rate (gpm)	Annular Pressure (psi) and Tank Fluid Level (inches)	Total Volume WTP Concentrate Injected (gal)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
213																												
214																												
215	02/10/2003	M					x	x	x	x																		
216	02/11/2003	T					x	x	x	x																		
217	02/12/2003	W					x	x	x	x																		
218	02/13/2003	Th					x	x	x	x																		
219	02/14/2003	F					x	x	x	x																		
220																												
221																												
222	02/17/2003	M					x	x	x	x																		
223	02/18/2003	T					x	x	x	x																		
224	02/19/2003	W					x	x	x	x																		
225	02/20/2003	Th					x	x	x	x																		
226	02/21/2003	F					x	x	x	x																		
227																												
228																												
229	02/24/2003	M					x	x	x	x																		
230	02/25/2003	T					x	x	x	x																		
231	02/26/2003	W					x	x	x	x																		
232	02/27/2003	Th					x	x	x	x																		
233	02/28/2003	F					x	x	x	x																		
234																												
235																												
236	03/03/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
237	03/04/2003	T					x	x	x	x																		
238	03/05/2003	W					x	x	x	x																		
239	03/06/2003	Th					x	x	x	x																		
240	03/07/2003	F					x	x	x	x																		
241																												
242																												
243	03/10/2003	M					x	x	x	x																		
244	03/11/2003	T					x	x	x	x																		
245	03/12/2003	W					x	x	x	x																		
246	03/13/2003	Th					x	x	x	x																		
247	03/14/2003	F					x	x	x	x																		
248																												
249																												
250	03/17/2003	M					x	x	x	x																		
251	03/18/2003	T					x	x	x	x																		
252	03/19/2003	W					x	x	x	x																		
253	03/20/2003	Th					x	x	x	x																		
254	03/21/2003	F					x	x	x	x																		
255																												
256																												
257	03/24/2003	M					x	x	x	x																		
258	03/25/2003	T					x	x	x	x																		
259	03/26/2003	W					x	x	x	x																		
260	03/27/2003	Th					x	x	x	x																		
261	03/28/2003	F					x	x	x	x																		
262																												
263																												
264	03/31/2003	M					x	x	x	x																		
265	04/01/2003	T					x	x	x	x																		
266	04/02/2003	W					x	x	x	x																		
267	04/03/2003	Th					x	x	x	x																		
268	04/04/2003	F					x	x	x	x																		
269																												
270																												
271	04/07/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
272	04/08/2003	T					x	x	x	x																		
273	04/09/2003	W					x	x	x	x																		
274	04/10/2003	Th					x	x	x	x																		
275	04/11/2003	F					x	x	x	x																		
276																												
277																												
278	04/14/2003	M					x	x	x	x																		
279	04/15/2003	T					x	x	x	x																		
280	04/16/2003	W					x	x	x	x																		
281	04/17/2003	Th					x	x	x	x																		
282	04/18/2003	F					x	x	x	x																		
283																												
284																												
285	04/21/2003	M					x	x	x	x																		
286	04/22/2003	T					x	x	x	x																		
287	04/23/2003	W					x	x	x	x																		
288	04/24/2003	Th					x	x	x	x																		
289	04/25/2003	F					x	x	x	x																		
290																												
291																												
292	04/28/2003	M					x	x	x	x																		
293	04/29/2003	T					x	x	x	x																		
294	04/30/2003	W					x	x	x	x																		
295	05/01/2003	Th					x	x	x	x																		
296	05/02/2003	F					x	x	x	x																		
297																												
298																												
299	05/05/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
300	05/06/2003	T					x	x	x	x																		
301	05/07/2003	W					x	x	x	x																		
302	05/08/2003	Th					x	x	x	x																		
303	05/09/2003	F					x	x	x	x																		
304																												
305																												
306	05/12/2003	M					x	x	x	x																		
307	05/13/2003	T					x	x	x	x																		
308	05/14/2003	W					x	x	x	x																		
309	05/15/2003	Th					x	x	x	x																		
310	05/16/2003	F					x	x	x	x																		
311																												
312																												
313	05/19/2003	M					x	x	x	x																		
314	05/20/2003	T					x	x	x	x																		
315	05/21/2003	W					x	x	x	x																		
316	05/22/2003	Th					x	x	x	x																		
317	05/23/2003	F					x	x	x	x																		
318																												
319																												

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - IW-1 Operational Data and Sampling Schedule

Date and Status							Operations				RO Brine Injected Fluid Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Injection Pressure (psi)	Flow Rate (gpm)	Annular Pressure (psi) and Tank Fluid Level (inches)	Total Volume WTP Concentrate Injected (gal)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
320	05/26/2003	M					x	x	x	x																		
321	05/27/2003	T					x	x	x	x																		
322	05/28/2003	W					x	x	x	x																		
323	05/29/2003	Th					x	x	x	x																		
324	05/30/2003	F					x	x	x	x																		
325																												
326																												
327	06/02/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
328	06/03/2003	T					x	x	x	x																		
329	06/04/2003	W					x	x	x	x																		
330	06/05/2003	Th					x	x	x	x																		
331	06/06/2003	F					x	x	x	x																		
332																												
333																												
334	06/09/2003	M					x	x	x	x																		
335	06/10/2003	T					x	x	x	x																		
336	06/11/2003	W					x	x	x	x																		
337	06/12/2003	Th					x	x	x	x																		
338	06/13/2003	F					x	x	x	x																		
339																												
340																												
341	06/16/2003	M					x	x	x	x																		
342	06/17/2003	T					x	x	x	x																		
343	06/18/2003	W					x	x	x	x																		
344	06/19/2003	Th					x	x	x	x																		
345	06/20/2003	F					x	x	x	x																		
346																												
347																												
348	06/23/2003	M					x	x	x	x																		
349	06/24/2003	T					x	x	x	x																		
350	06/25/2003	W					x	x	x	x																		
351	06/26/2003	Th					x	x	x	x																		
352	06/27/2003	F					x	x	x	x																		
353																												
354																												
355	06/30/2003	M					x	x	x	x																		
356	07/01/2003	T					x	x	x	x																		
357	07/02/2003	W					x	x	x	x																		
358	07/03/2003	Th					x	x	x	x																		
359	07/04/2003	F					x	x	x	x																		
360																												
361																												
362	07/07/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
363	07/08/2003	T					x	x	x	x																		
364	07/09/2003	W					x	x	x	x																		
365	07/10/2003	Th					x	x	x	x																		

Notes:

1) Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.
2) All pressure gauge(s), flow meter(s), and other related equipment shall be calibrated on a semi-annual basis.
3) All injection well and monitor well data results required by the permit shall be submitted to the Department no later than the last day of the month immediately following the month of record.

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - DZMW-1 Operational Data and Sampling Schedule

Date and Status							Operations			DZMW-1 Background Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
1	07/11/2002	Th					x	x	x																		
2	07/12/2002	F					x	x	x																		
3																											
4																											
5	07/15/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
6	07/16/2002	T					x	x	x																		
7	07/17/2002	W					x	x	x																		
8	07/18/2002	Th					x	x	x																		
9	07/19/2002	F					x	x	x																		
10																											
11																											
12	07/22/2002	M					x	x	x	x	x	x	x	x	x	x											
13	07/23/2002	T					x	x	x																		
14	07/24/2002	W					x	x	x																		
15	07/25/2002	Th					x	x	x																		
16	07/26/2002	F					x	x	x																		
17																											
18																											
19	07/29/2002	M					x	x	x	x	x	x	x	x	x	x											
20	07/30/2002	T					x	x	x																		
21	07/31/2002	W					x	x	x																		
22	08/01/2002	Th					x	x	x																		
23	08/02/2002	F					x	x	x																		
24																											
25																											
26	08/05/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
27	08/06/2002	T					x	x	x																		
28	08/07/2002	W					x	x	x																		
29	08/08/2002	Th					x	x	x																		
30	08/09/2002	F					x	x	x																		
31																											
32																											
33	08/12/2002	M					x	x	x	x	x	x	x	x	x	x											
34	08/13/2002	T					x	x	x																		
35	08/14/2002	W					x	x	x																		
36	08/15/2002	Th					x	x	x																		
37	08/16/2002	F					x	x	x																		
38																											
39																											
40	08/19/2002	M					x	x	x	x	x	x	x	x	x	x											
41	08/20/2002	T					x	x	x																		
42	08/21/2002	W					x	x	x																		
43	08/22/2002	Th					x	x	x																		
44	08/23/2002	F					x	x	x																		
45																											
46																											
47	08/26/2002	M					x	x	x	x	x	x	x	x	x	x											
48	08/27/2002	T					x	x	x																		
49	08/28/2002	W					x	x	x																		
50	08/29/2002	Th					x	x	x																		
51	08/30/2002	F					x	x	x																		
52																											
53																											
54	09/02/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
55	09/03/2002	T					x	x	x																		
56	09/04/2002	W					x	x	x																		
57	09/05/2002	Th					x	x	x																		
58	09/06/2002	F					x	x	x																		
59																											
60																											
61	09/09/2002	M					x	x	x	x	x	x	x	x	x	x											
62	09/10/2002	T					x	x	x																		
63	09/11/2002	W					x	x	x																		
64	09/12/2002	Th					x	x	x																		
65	09/13/2002	F					x	x	x																		
66																											
67																											
68	09/16/2002	M					x	x	x	x	x	x	x	x	x	x											
69	09/17/2002	T					x	x	x																		
70	09/18/2002	W					x	x	x																		
71	09/19/2002	Th					x	x	x																		
72	09/20/2002	F					x	x	x																		
73																											
74																											
75	09/23/2002	M					x	x	x	x	x	x	x	x	x	x											
76	09/24/2002	T					x	x	x																		
77	09/25/2002	W					x	x	x																		
78	09/26/2002	Th					x	x	x																		
79	09/27/2002	F					x	x	x																		
80																											
81																											
82	09/30/2002	M					x	x	x	x	x	x	x	x	x	x											
83	10/01/2002	T					x	x	x																		
84	10/02/2002	W					x	x	x																		
85	10/03/2002	Th					x	x	x																		
86	10/04/2002	F					x	x	x																		
87																											
88																											
89	10/07/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
90	10/08/2002	T					x	x	x																		
91	10/09/2002	W					x	x	x																		
92	10/10/2002	Th					x	x	x																		
93	10/11/2002	F					x	x	x																		
94																											
95																											
96	10/14/2002	M					x	x	x	x	x	x	x	x	x	x											
97	10/15/2002	T					x	x	x																		
98	10/16/2002	W					x	x	x																		
99	10/17/2002	Th					x	x	x																		
100	10/18/2002	F					x	x	x																		
101																											
102																											

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - DZMW-1 Operational Data and Sampling Schedule

Date and Status							Operations			DZMW-1 Background Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
103	10/21/2002	M					x	x	x	x	x	x	x	x	x	x											
104	10/22/2002	T					x	x	x																		
105	10/23/2002	W					x	x	x																		
106	10/24/2002	Th					x	x	x																		
107	10/25/2002	F					x	x	x																		
108																											
109																											
110	10/28/2002	M					x	x	x	x	x	x	x	x	x	x											
111	10/29/2002	T					x	x	x																		
112	10/30/2002	W					x	x	x																		
113	10/31/2002	Th					x	x	x																		
114	11/01/2002	F					x	x	x																		
115																											
116																											
117	11/04/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
118	11/05/2002	T					x	x	x																		
119	11/06/2002	W					x	x	x																		
120	11/07/2002	Th					x	x	x																		
121	11/08/2002	F					x	x	x																		
122																											
123																											
124	11/11/2002	M					x	x	x	x	x	x	x	x	x	x											
125	11/12/2002	T					x	x	x																		
126	11/13/2002	W					x	x	x																		
127	11/14/2002	Th					x	x	x																		
128	11/15/2002	F					x	x	x																		
129																											
130																											
131	11/18/2002	M					x	x	x	x	x	x	x	x	x	x											
132	11/19/2002	T					x	x	x																		
133	11/20/2002	W					x	x	x																		
134	11/21/2002	Th					x	x	x																		
135	11/22/2002	F					x	x	x																		
136																											
137																											
138	11/25/2002	M					x	x	x	x	x	x	x	x	x	x											
139	11/26/2002	T					x	x	x																		
140	11/27/2002	W					x	x	x																		
141	11/28/2002	Th					x	x	x																		
142	11/29/2002	F					x	x	x																		
143																											
144																											
145	12/02/2002	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
146	12/03/2002	T					x	x	x																		
147	12/04/2002	W					x	x	x																		
148	12/05/2002	Th					x	x	x																		
149	12/06/2002	F					x	x	x																		
150																											
151																											
152	12/09/2002	M					x	x	x	x	x	x	x	x	x	x											
153	12/10/2002	T					x	x	x																		
154	12/11/2002	W					x	x	x																		
155	12/12/2002	Th					x	x	x																		
156	12/13/2002	F					x	x	x																		
157																											
158																											
159	12/16/2002	M					x	x	x	x	x	x	x	x	x	x											
160	12/17/2002	T					x	x	x																		
161	12/18/2002	W					x	x	x																		
162	12/19/2002	Th					x	x	x																		
163	12/20/2002	F					x	x	x																		
164																											
165																											
166	12/23/2002	M					x	x	x	x	x	x	x	x	x	x											
167	12/24/2002	T					x	x	x																		
168	12/25/2002	W					x	x	x																		
169	12/26/2002	Th					x	x	x																		
170	12/27/2002	F					x	x	x																		
171																											
172																											
173	12/30/2002	M					x	x	x	x	x	x	x	x	x	x											
174	12/31/2002	T					x	x	x																		
175	01/01/2003	W					x	x	x																		
176	01/02/2003	Th					x	x	x																		
177	01/03/2003	F					x	x	x																		
178																											
179																											
180	01/06/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
181	01/07/2003	T					x	x	x																		
182	01/08/2003	W					x	x	x																		
183	01/09/2003	Th					x	x	x																		
184	01/10/2003	F					x	x	x																		
185																											
186																											
187	01/13/2003	M					x	x	x	x	x	x	x	x	x	x											
188	01/14/2003	T					x	x	x																		
189	01/15/2003	W					x	x	x																		
190	01/16/2003	Th					x	x	x																		
191	01/17/2003	F					x	x	x																		
192																											
193																											
194	01/20/2003	M					x	x	x	x	x	x	x	x	x	x											
195	01/21/2003	T					x	x	x																		
196	01/22/2003	W					x	x	x																		
197	01/23/2003	Th					x	x	x																		
198	01/24/2003	F					x	x	x																		
199																											
200																											
201	01/27/2003	M					x	x	x	x	x	x	x	x	x	x											
202	01/28/2003	T					x	x	x																		
203	01/29/2003	W					x	x	x																		
204	01/30/2003	Th					x	x	x																		
205	01/31/2003	F					x	x	x																		
206																											
207																											

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - DZMW-1 Operational Data and Sampling Schedule

Date and Status							Operations			DZMW-1 Background Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
208	02/03/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
209	02/04/2003	T					x	x	x																		
210	02/05/2003	W					x	x	x																		
211	02/06/2003	Th					x	x	x																		
212	02/07/2003	F					x	x	x																		
213																											
214																											
215	02/10/2003	M					x	x	x	x	x	x	x	x	x	x											
216	02/11/2003	T					x	x	x																		
217	02/12/2003	W					x	x	x																		
218	02/13/2003	Th					x	x	x																		
219	02/14/2003	F					x	x	x																		
220																											
221																											
222	02/17/2003	M					x	x	x	x	x	x	x	x	x	x											
223	02/18/2003	T					x	x	x																		
224	02/19/2003	W					x	x	x																		
225	02/20/2003	Th					x	x	x																		
226	02/21/2003	F					x	x	x																		
227																											
228																											
229	02/24/2003	M					x	x	x	x	x	x	x	x	x	x											
230	02/25/2003	T					x	x	x																		
231	02/26/2003	W					x	x	x																		
232	02/27/2003	Th					x	x	x																		
233	02/28/2003	F					x	x	x																		
234																											
235																											
236	03/03/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
237	03/04/2003	T					x	x	x																		
238	03/05/2003	W					x	x	x																		
239	03/06/2003	Th					x	x	x																		
240	03/07/2003	F					x	x	x																		
241																											
242																											
243	03/10/2003	M					x	x	x	x	x	x	x	x	x	x											
244	03/11/2003	T					x	x	x																		
245	03/12/2003	W					x	x	x																		
246	03/13/2003	Th					x	x	x																		
247	03/14/2003	F					x	x	x																		
248																											
249																											
250	03/17/2003	M					x	x	x	x	x	x	x	x	x	x											
251	03/18/2003	T					x	x	x																		
252	03/19/2003	W					x	x	x																		
253	03/20/2003	Th					x	x	x																		
254	03/21/2003	F					x	x	x																		
255																											
256																											
257	03/24/2003	M					x	x	x	x	x	x	x	x	x	x											
258	03/25/2003	T					x	x	x																		
259	03/26/2003	W					x	x	x																		
260	03/27/2003	Th					x	x	x																		
261	03/28/2003	F					x	x	x																		
262																											
263																											
264	03/31/2003	M					x	x	x	x	x	x	x	x	x	x											
265	04/01/2003	T					x	x	x																		
266	04/02/2003	W					x	x	x																		
267	04/03/2003	Th					x	x	x																		
268	04/04/2003	F					x	x	x																		
269																											
270																											
271	04/07/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
272	04/08/2003	T					x	x	x																		
273	04/09/2003	W					x	x	x																		
274	04/10/2003	Th					x	x	x																		
275	04/11/2003	F					x	x	x																		
276																											
277																											
278	04/14/2003	M					x	x	x	x	x	x	x	x	x	x											
279	04/15/2003	T					x	x	x																		
280	04/16/2003	W					x	x	x																		
281	04/17/2003	Th					x	x	x																		
282	04/18/2003	F					x	x	x																		
283																											
284																											
285	04/21/2003	M					x	x	x	x	x	x	x	x	x	x											
286	04/22/2003	T					x	x	x																		
287	04/23/2003	W					x	x	x																		
288	04/24/2003	Th					x	x	x																		
289	04/25/2003	F					x	x	x																		
290																											
291																											
292	04/28/2003	M					x	x	x	x	x	x	x	x	x	x											
293	04/29/2003	T					x	x	x																		
294	04/30/2003	W					x	x	x																		
295	05/01/2003	Th					x	x	x																		
296	05/02/2003	F					x	x	x																		
297																											
298																											
299	05/05/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
300	05/06/2003	T					x	x	x																		
301	05/07/2003	W					x	x	x																		
302	05/08/2003	Th					x	x	x																		
303	05/09/2003	F					x	x	x																		
304																											
305																											
306	05/12/2003	M					x	x	x	x	x	x	x	x	x	x											
307	05/13/2003	T					x	x	x																		
308	05/14/2003	W					x	x	x																		
309	05/15/2003	Th					x	x	x																		
310	05/16/2003	F					x	x	x																		
311																											
312																											

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - DZMW-1 Operational Data and Sampling Schedule

Date and Status							Operations			DZMW-1 Background Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
313	05/19/2003	M					x	x	x	x	x	x	x	x	x	x											
314	05/20/2003	T					x	x	x																		
315	05/21/2003	W					x	x	x																		
316	05/22/2003	Th					x	x	x																		
317	05/23/2003	F					x	x	x																		
318																											
319																											
320	05/26/2003	M					x	x	x	x	x	x	x	x	x	x											
321	05/27/2003	T					x	x	x																		
322	05/28/2003	W					x	x	x																		
323	05/29/2003	Th					x	x	x																		
324	05/30/2003	F					x	x	x																		
325																											
326																											
327	06/02/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
328	06/03/2003	T					x	x	x																		
329	06/04/2003	W					x	x	x																		
330	06/05/2003	Th					x	x	x																		
331	06/06/2003	F					x	x	x																		
332																											
333																											
334	06/09/2003	M					x	x	x	x	x	x	x	x	x	x											
335	06/10/2003	T					x	x	x																		
336	06/11/2003	W					x	x	x																		
337	06/12/2003	Th					x	x	x																		
338	06/13/2003	F					x	x	x																		
339																											
340																											
341	06/16/2003	M					x	x	x	x	x	x	x	x	x	x											
342	06/17/2003	T					x	x	x																		
343	06/18/2003	W					x	x	x																		
344	06/19/2003	Th					x	x	x																		
345	06/20/2003	F					x	x	x																		
346																											
347																											
348	06/23/2003	M					x	x	x	x	x	x	x	x	x	x											
349	06/24/2003	T					x	x	x																		
350	06/25/2003	W					x	x	x																		
351	06/26/2003	Th					x	x	x																		
352	06/27/2003	F					x	x	x																		
353																											
354																											
355	06/30/2003	M					x	x	x	x	x	x	x	x	x	x											
356	07/01/2003	T					x	x	x																		
357	07/02/2003	W					x	x	x																		
358	07/03/2003	Th					x	x	x																		
359	07/04/2003	F					x	x	x																		
360																											
361																											
362	07/07/2003	M					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
363	07/08/2003	T					x	x	x																		
364	07/09/2003	W					x	x	x																		
365	07/10/2003	Th					x	x	x																		

Notes:

1) Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.
2) All pressure gauge(s), flow meter(s), and other related equipment shall be calibrated on a semi-annual basis.
3) All injection well and monitor well data results required by the permit shall be submitted to the Department no later than the last day of the month immediately following the month of record.

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - SZMW-1 Operational Data and Sampling Schedule

Date and Status								Operations				SZMW-1 Background Water Quality																
Day	Date	Week Day	Weekend	Time	Injection	Static		Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)		TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)		Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)		Comments
1	07/11/2002	Th						x	x	x																		
2	07/12/2002	F						x	x	x																		
3																												
4																												
5	07/15/2002	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
6	07/16/2002	T						x	x	x																		
7	07/17/2002	W						x	x	x																		
8	07/18/2002	Th						x	x	x																		
9	07/19/2002	F						x	x	x																		
10																												
11																												
12	07/22/2002	M						x	x	x		x	x	x	x	x	x	x										
13	07/23/2002	T						x	x	x																		
14	07/24/2002	W						x	x	x																		
15	07/25/2002	Th						x	x	x																		
16	07/26/2002	F						x	x	x																		
17																												
18																												
19	07/29/2002	M						x	x	x		x	x	x	x	x	x	x										
20	07/30/2002	T						x	x	x																		
21	07/31/2002	W						x	x	x																		
22	08/01/2002	Th						x	x	x																		
23	08/02/2002	F						x	x	x																		
24																												
25																												
26	08/05/2002	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
27	08/06/2002	T						x	x	x																		
28	08/07/2002	W						x	x	x																		
29	08/08/2002	Th						x	x	x																		
30	08/09/2002	F						x	x	x																		
31																												
32																												
33	08/12/2002	M						x	x	x		x	x	x	x	x	x	x										
34	08/13/2002	T						x	x	x																		
35	08/14/2002	W						x	x	x																		
36	08/15/2002	Th						x	x	x																		
37	08/16/2002	F						x	x	x																		
38																												
39																												
40	08/19/2002	M						x	x	x		x	x	x	x	x	x	x										
41	08/20/2002	T						x	x	x																		
42	08/21/2002	W						x	x	x																		
43	08/22/2002	Th						x	x	x																		
44	08/23/2002	F						x	x	x																		
45																												
46																												
47	08/26/2002	M						x	x	x		x	x	x	x	x	x	x										
48	08/27/2002	T						x	x	x																		
49	08/28/2002	W						x	x	x																		
50	08/29/2002	Th						x	x	x																		
51	08/30/2002	F						x	x	x																		
52																												
53																												
54	09/02/2002	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	*		
55	09/03/2002	T						x	x	x																		
56	09/04/2002	W						x	x	x																		
57	09/05/2002	Th						x	x	x																		
58	09/06/2002	F						x	x	x																		
59																												
60																												
61	09/09/2002	M						x	x	x		x	x	x	x	x	x	x										
62	09/10/2002	T						x	x	x																		
63	09/11/2002	W						x	x	x																		
64	09/12/2002	Th						x	x	x																		
65	09/13/2002	F						x	x	x																		
66																												
67																												
68	09/16/2002	M						x	x	x		x	x	x	x	x	x	x										
69	09/17/2002	T						x	x	x																		
70	09/18/2002	W						x	x	x																		
71	09/19/2002	Th						x	x	x																		
72	09/20/2002	F						x	x	x																		
73																												
74																												
75	09/23/2002	M						x	x	x		x	x	x	x	x	x	x										
76	09/24/2002	T						x	x	x																		
77	09/25/2002	W						x	x	x																		
78	09/26/2002	Th						x	x	x																		
79	09/27/2002	F						x	x	x																		
80																												
81																												
82	09/30/2002	M						x	x	x		x	x	x	x	x	x	x										
83	10/01/2002	T						x	x	x																		
84	10/02/2002	W						x	x	x																		
85	10/03/2002	Th						x	x	x																		
86	10/04/2002	F						x	x	x																		
87																												
88																												
89	10/07/2002	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
90	10/08/2002	T						x	x	x																		
91	10/09/2002	W						x	x	x																		
92	10/10/2002	Th						x	x	x																		
93	10/11/2002	F						x	x	x																		
94																												
95																												
96	10/14/2002	M						x	x	x		x	x	x	x	x	x	x										
97	10/15/2002	T						x	x	x																		
98	10/16/2002	W						x	x	x																		
99	10/17/2002	Th						x	x	x																		
100	10/18/2002	F						x	x	x																		
101																												
102																												
103	10/21/2002	M						x	x	x		x	x	x	x	x	x	x										
104	10/22/2002	T						x	x	x																		
105	10/23/2002	W						x	x	x																		
106	10/24/2002	Th						x	x	x																		
107	10/25/2002	F						x	x	x																		
108																												
109																												

City of Fort Myers - RO ınjection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - SZMW-1 Operational Data and Sampling Schedule

Date and Status								Operations				SZMW-1 Background Water Quality																
Day	Date	Week Day	Weekend	Time	Injection	Static		Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)		TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)		Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)		Comments
110	10/28/2002	M						x	x	x		x	x	x	x	x	x	x										
111	10/29/2002	T						x	x	x																		
112	10/30/2002	W						x	x	x																		
113	10/31/2002	Th						x	x	x																		
114	11/01/2002	F						x	x	x																		
115																												
116																												
117	11/04/2002	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
118	11/05/2002	T						x	x	x																		
119	11/06/2002	W						x	x	x																		
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121	11/08/2002	F						x	x	x																		
122																												
123																												
124	11/11/2002	M						x	x	x		x	x	x	x	x	x	x										
125	11/12/2002	T						x	x	x																		
126	11/13/2002	W						x	x	x																		
127	11/14/2002	Th						x	x	x																		
128	11/15/2002	F						x	x	x																		
129																												
130																												
131	11/18/2002	M						x	x	x		x	x	x	x	x	x	x										
132	11/19/2002	T						x	x	x																		
133	11/20/2002	W						x	x	x																		
134	11/21/2002	Th						x	x	x																		
135	11/22/2002	F						x	x	x																		
136																												
137																												
138	11/25/2002	M						x	x	x		x	x	x	x	x	x	x										
139	11/26/2002	T						x	x	x																		
140	11/27/2002	W						x	x	x																		
141	11/28/2002	Th						x	x	x																		
142	11/29/2002	F						x	x	x																		
143																												
144																												
145	12/02/2002	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
146	12/03/2002	T						x	x	x																		
147	12/04/2002	W						x	x	x																		
148	12/05/2002	Th						x	x	x																		
149	12/06/2002	F						x	x	x																		
150																												
151																												
152	12/09/2002	M						x	x	x		x	x	x	x	x	x	x										
153	12/10/2002	T						x	x	x																		
154	12/11/2002	W						x	x	x																		
155	12/12/2002	Th						x	x	x																		
156	12/13/2002	F						x	x	x																		
157																												
158																												
159	12/16/2002	M						x	x	x		x	x	x	x	x	x	x										
160	12/17/2002	T						x	x	x																		
161	12/18/2002	W						x	x	x																		
162	12/19/2002	Th						x	x	x																		
163	12/20/2002	F						x	x	x																		
164																												
165																												
166	12/23/2002	M						x	x	x		x	x	x	x	x	x	x										
167	12/24/2002	T						x	x	x																		
168	12/25/2002	W						x	x	x																		
169	12/26/2002	Th						x	x	x																		
170	12/27/2002	F						x	x	x																		
171																												
172																												
173	12/30/2002	M						x	x	x		x	x	x	x	x	x	x										
174	12/31/2002	T						x	x	x																		
175	01/01/2003	W						x	x	x																		
176	01/02/2003	Th						x	x	x																		
177	01/03/2003	F						x	x	x																		
178																												
179																												
180	01/06/2003	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
181	01/07/2003	T						x	x	x																		
182	01/08/2003	W						x	x	x																		
183	01/09/2003	Th						x	x	x																		
184	01/10/2003	F						x	x	x																		
185																												
186																												
187	01/13/2003	M						x	x	x		x	x	x	x	x	x	x										
188	01/14/2003	T						x	x	x																		
189	01/15/2003	W						x	x	x																		
190	01/16/2003	Th						x	x	x																		
191	01/17/2003	F						x	x	x																		
192																												
193																												
194	01/20/2003	M						x	x	x		x	x	x	x	x	x	x										
195	01/21/2003	T						x	x	x																		
196	01/22/2003	W						x	x	x																		
197	01/23/2003	Th						x	x	x																		
198	01/24/2003	F						x	x	x																		
199																												
200																												
201	01/27/2003	M						x	x	x		x	x	x	x	x	x	x										
202	01/28/2003	T						x	x	x																		
203	01/29/2003	W						x	x	x																		
204	01/30/2003	Th						x	x	x																		
205	01/31/2003	F						x	x	x																		
206																												
207																												
208	02/03/2003	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
209	02/04/2003	T						x	x	x																		
210	02/05/2003	W						x	x	x																		
211	02/06/2003	Th						x	x	x																		
212	02/07/2003	F						x	x	x																		
213																												
214																												
215	02/10/2003	M						x	x	x		x	x	x	x	x	x	x										
216	02/11/2003	T						x	x	x																		
217	02/12/2003	W						x	x	x																		
218	02/13/2003	Th						x	x	x																		
219	02/14/2003	F						x	x	x																		
220																												
221																												

City of Fort Myers - RO injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - SZMW-1 Operational Data and Sampling Schedule

Date and Status								Operations				SZMW-1 Background Water Quality																
Day	Date	Week Day	Weekend	Time	Injection	Static		Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)		TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)		Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)		Comments
222	02/17/2003	M						x	x	x		x	x	x	x	x	x	x										
223	02/18/2003	T						x	x	x																		
224	02/19/2003	W						x	x	x																		
225	02/20/2003	Th						x	x	x																		
226	02/21/2003	F						x	x	x																		
227																												
228																												
229	02/24/2003	M						x	x	x		x	x	x	x	x	x	x										
230	02/25/2003	T						x	x	x																		
231	02/26/2003	W						x	x	x																		
232	02/27/2003	Th						x	x	x																		
233	02/28/2003	F						x	x	x																		
234																												
235																												
236	03/03/2003	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
237	03/04/2003	T						x	x	x																		
238	03/05/2003	W						x	x	x																		
239	03/06/2003	Th						x	x	x																		
240	03/07/2003	F						x	x	x																		
241																												
242																												
243	03/10/2003	M						x	x	x		x	x	x	x	x	x	x										
244	03/11/2003	T						x	x	x																		
245	03/12/2003	W						x	x	x																		
246	03/13/2003	Th						x	x	x																		
247	03/14/2003	F						x	x	x																		
248																												
249																												
250	03/17/2003	M						x	x	x		x	x	x	x	x	x	x										
251	03/18/2003	T						x	x	x																		
252	03/19/2003	W						x	x	x																		
253	03/20/2003	Th						x	x	x																		
254	03/21/2003	F						x	x	x																		
255																												
256																												
257	03/24/2003	M						x	x	x		x	x	x	x	x	x	x										
258	03/25/2003	T						x	x	x																		
259	03/26/2003	W						x	x	x																		
260	03/27/2003	Th						x	x	x																		
261	03/28/2003	F						x	x	x																		
262																												
263																												
264	03/31/2003	M						x	x	x		x	x	x	x	x	x	x										
265	04/01/2003	T						x	x	x																		
266	04/02/2003	W						x	x	x																		
267	04/03/2003	Th						x	x	x																		
268	04/04/2003	F						x	x	x																		
269																												
270																												
271	04/07/2003	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
272	04/08/2003	T						x	x	x																		
273	04/09/2003	W						x	x	x																		
274	04/10/2003	Th						x	x	x																		
275	04/11/2003	F						x	x	x																		
276																												
277																												
278	04/14/2003	M						x	x	x		x	x	x	x	x	x	x										
279	04/15/2003	T						x	x	x																		
280	04/16/2003	W						x	x	x																		
281	04/17/2003	Th						x	x	x																		
282	04/18/2003	F						x	x	x																		
283																												
284																												
285	04/21/2003	M						x	x	x		x	x	x	x	x	x	x										
286	04/22/2003	T						x	x	x																		
287	04/23/2003	W						x	x	x																		
288	04/24/2003	Th						x	x	x																		
289	04/25/2003	F						x	x	x																		
290																												
291																												
292	04/28/2003	M						x	x	x		x	x	x	x	x	x	x										
293	04/29/2003	T						x	x	x																		
294	04/30/2003	W						x	x	x																		
295	05/01/2003	Th						x	x	x																		
296	05/02/2003	F						x	x	x																		
297																												
298																												
299	05/05/2003	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
300	05/06/2003	T						x	x	x																		
301	05/07/2003	W						x	x	x																		
302	05/08/2003	Th						x	x	x																		
303	05/09/2003	F						x	x	x																		
304																												
305																												
306	05/12/2003	M						x	x	x		x	x	x	x	x	x	x										
307	05/13/2003	T						x	x	x																		
308	05/14/2003	W						x	x	x																		
309	05/15/2003	Th						x	x	x																		
310	05/16/2003	F						x	x	x																		
311																												
312																												
313	05/19/2003	M						x	x	x		x	x	x	x	x	x	x										
314	05/20/2003	T						x	x	x																		
315	05/21/2003	W						x	x	x																		
316	05/22/2003	Th						x	x	x																		
317	05/23/2003	F						x	x	x																		
318																												
319																												
320	05/26/2003	M						x	x	x		x	x	x	x	x	x	x										
321	05/27/2003	T						x	x	x																		
322	05/28/2003	W						x	x	x																		
323	05/29/2003	Th						x	x	x																		
324	05/30/2003	F						x	x	x																		
325																												
326																												
327	06/02/2003	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
328	06/03/2003	T						x	x	x																		
329	06/04/2003	W						x	x	x																		
330	06/05/2003	Th						x	x	x																		
331	06/06/2003	F						x	x	x																		
332																												
333																												

City of Fort Myers - Rᴗ ınjection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - SZMW-1 Operational Data and Sampling Schedule

Date and Status								Operations				SZMW-1 Background Water Quality																
Day	Date	Week Day	Weekend	Time	Injection	Static		Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)		TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)		Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)		Comments
334	06/09/2003	M						x	x	x		x	x	x	x	x	x	x										
335	06/10/2003	T						x	x	x																		
336	06/11/2003	W						x	x	x																		
337	06/12/2003	Th						x	x	x																		
338	06/13/2003	F						x	x	x																		
339																												
340																												
341	06/16/2003	M						x	x	x		x	x	x	x	x	x	x										
342	06/17/2003	T						x	x	x																		
343	06/18/2003	W						x	x	x																		
344	06/19/2003	Th						x	x	x																		
345	06/20/2003	F						x	x	x																		
346																												
347																												
348	06/23/2003	M						x	x	x		x	x	x	x	x	x	x										
349	06/24/2003	T						x	x	x																		
350	06/25/2003	W						x	x	x																		
351	06/26/2003	Th						x	x	x																		
352	06/27/2003	F						x	x	x																		
353																												
354																												
355	06/30/2003	M						x	x	x		x	x	x	x	x	x	x										
356	07/01/2003	T						x	x	x																		
357	07/02/2003	W						x	x	x																		
358	07/03/2003	Th						x	x	x																		
359	07/04/2003	F						x	x	x																		
360																												
361																												
362	07/07/2003	M						x	x	x		x	x	x	x	x	x	x		x	x	x	x	x	x	x		
363	07/08/2003	T						x	x	x																		
364	07/09/2003	W						x	x	x																		
365	07/10/2003	Th						x	x	x																		

Notes:

1) Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.

2) All pressure gauge(s), flow meter(s), and other related equipment shall be calibrated on a semi-annual basis.

3) All injection well and monitor well data results required by the permit shall be submitted to the Department no later than the last day of the month immediately following the month of record.

ATTACHMENT D.2

Operational Data Blank Forms

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - IW-1 Operational Data and Sampling Schedule

Date and Status							Operations				RO Brine Injected Fluid Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Injection Pressure (psi)	Flow Rate (gpm)	Annular Pressure (psi) and Tank Fluid Level (inches)	Total Volume WTP Concentrate Injected (gal)	TKN (mg/L)	pH	Specific Conductivity	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
1	07/11/2002	Th																										
2	07/12/2002	F																										
3																												
4																												
5	07/15/2002	M																										
6	07/16/2002	T																										
7	07/17/2002	W																										
8	07/18/2002	Th																										
9	07/19/2002	F																										
10																												
11																												
12	07/22/2002	M																										
13	07/23/2002	T																										
14	07/24/2002	W																										
15	07/25/2002	Th																										
16	07/26/2002	F																										
17																												
18																												
19	07/29/2002	M																										
20	07/30/2002	T																										
21	07/31/2002	W																										
22	08/01/2002	Th																										
23	08/02/2002	F																										
24																												
25																												
26	08/05/2002	M																										
27	08/06/2002	T																										
28	08/07/2002	W																										
29	08/08/2002	Th																										
30	08/09/2002	F																										
31																												
32																												
33	08/12/2002	M																										
34	08/13/2002	T																										
35	08/14/2002	W																										
36	08/15/2002	Th																										
37	08/16/2002	F																										
38																												
39																												
40	08/19/2002	M																										
41	08/20/2002	T																										
42	08/21/2002	W																										
43	08/22/2002	Th																										
44	08/23/2002	F																										
45																												
46																												
47	08/26/2002	M																										
48	08/27/2002	T																										
49	08/28/2002	W																										
50	08/29/2002	Th																										
51	08/30/2002	F																										
52																												
53																												
54	09/02/2002	M																										
55	09/03/2002	T																										
56	09/04/2002	W																										
57	09/05/2002	Th																										
58	09/06/2002	F																										
59																												
60																												
61	09/09/2002	M																										
62	09/10/2002	T																										
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64	09/12/2002	Th																										
65	09/13/2002	F																										
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68	09/16/2002	M																										
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72	09/20/2002	F																										
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76	09/24/2002	T																										
77	09/25/2002	W																										
78	09/26/2002	Th																										
79	09/27/2002	F																										
80																												
81																												
82	09/30/2002	M																										
83	10/01/2002	T																										
84	10/02/2002	W																										
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89	10/07/2002	M																										
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91	10/09/2002	W																										
92	10/10/2002	Th																										
93	10/11/2002	F																										
94																												
95																												
96	10/14/2002	M																										
97	10/15/2002	T																										
98	10/16/2002	W																										
99	10/17/2002	Th																										
100	10/18/2002	F																										
101																												
102																												

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - IW-1 Operational Data and Sampling Schedule

Date and Status							Operations				RO Brine Injected Fluid Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Injection Pressure (psi)	Flow Rate (gpm)	Annular Pressure (psi) and Tank Fluid Level (inches)	Total Volume WTP Concentrate Injected (gal)	TKN (mg/L)	pH	Specific Conductivity	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
103	10/21/2002	M																										
104	10/22/2002	T																										
105	10/23/2002	W																										
106	10/24/2002	Th																										
107	10/25/2002	F																										
108																												
109																												
110	10/28/2002	M																										
111	10/29/2002	T																										
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114	11/01/2002	F																										
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118	11/05/2002	T																										
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146	12/03/2002	T																										
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148	12/05/2002	Th																										
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166	12/23/2002	M																										
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168	12/25/2002	W																										
169	12/26/2002	Th																										
170	12/27/2002	F																										
171																												
172																												
173	12/30/2002	M																										
174	12/31/2002	T																										
175	01/01/2003	W																										
176	01/02/2003	Th																										
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202	01/28/2003	T																										
203	01/29/2003	W																										
204	01/30/2003	Th																										
205	01/31/2003	F																										
206																												
207																												
208	02/03/2003	M																										
209	02/04/2003	T																										
210	02/05/2003	W																										
211	02/06/2003	Th																										
212	02/07/2003	F																										

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - IW-1 Operational Data and Sampling Schedule

Date and Status							Operations				RO Brine Injected Fluid Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Injection Pressure (psi)	Flow Rate (gpm)	Annular Pressure (psi) and Tank Fluid Level (inches)	Total Volume WTP Concentrate Injected (gal)	TKN (mg/L)	pH	Specific Conductivity	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
213																												
214																												
215	02/10/2003	M																										
216	02/11/2003	T																										
217	02/12/2003	W																										
218	02/13/2003	Th																										
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233	02/28/2003	F																										
234																												
235																												
236	03/03/2003	M																										
237	03/04/2003	T																										
238	03/05/2003	W																										
239	03/06/2003	Th																										
240	03/07/2003	F																										
241																												
242																												
243	03/10/2003	M																										
244	03/11/2003	T																										
245	03/12/2003	W																										
246	03/13/2003	Th																										
247	03/14/2003	F																										
248																												
249																												
250	03/17/2003	M																										
251	03/18/2003	T																										
252	03/19/2003	W																										
253	03/20/2003	Th																										
254	03/21/2003	F																										
255																												
256																												
257	03/24/2003	M																										
258	03/25/2003	T																										
259	03/26/2003	W																										
260	03/27/2003	Th																										
261	03/28/2003	F																										
262																												
263																												
264	03/31/2003	M																										
265	04/01/2003	T																										
266	04/02/2003	W																										
267	04/03/2003	Th																										
268	04/04/2003	F																										
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270																												
271	04/07/2003	M																										
272	04/08/2003	T																										
273	04/09/2003	W																										
274	04/10/2003	Th																										
275	04/11/2003	F																										
276																												
277																												
278	04/14/2003	M																										
279	04/15/2003	T																										
280	04/16/2003	W																										
281	04/17/2003	Th																										
282	04/18/2003	F																										
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284																												
285	04/21/2003	M																										
286	04/22/2003	T																										
287	04/23/2003	W																										
288	04/24/2003	Th																										
289	04/25/2003	F																										
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291																												
292	04/28/2003	M																										
293	04/29/2003	T																										
294	04/30/2003	W																										
295	05/01/2003	Th																										
296	05/02/2003	F																										
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298																												
299	05/05/2003	M																										
300	05/06/2003	T																										
301	05/07/2003	W																										
302	05/08/2003	Th																										
303	05/09/2003	F																										
304																												
305																												
306	05/12/2003	M																										
307	05/13/2003	T																										
308	05/14/2003	W																										
309	05/15/2003	Th																										
310	05/16/2003	F																										
311																												
312																												
313	05/19/2003	M																										
314	05/20/2003	T																										
315	05/21/2003	W																										
316	05/22/2003	Th																										
317	05/23/2003	F																										
318																												
319																												

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - IW-1 Operational Data and Sampling Schedule

Date and Status							Operations				RO Brine Injected Fluid Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Injection Pressure (psi)	Flow Rate (gpm)	Annular Pressure (psi) and Tank Fluid Level (inches)	Total Volume WTP Concentrate Injected (gal)	TKN (mg/L)	pH	Specific Conductivity	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
320	05/26/2003	M																										
321	05/27/2003	T																										
322	05/28/2003	W																										
323	05/29/2003	Th																										
324	05/30/2003	F																										
325																												
326																												
327	06/02/2003	M																										
328	06/03/2003	T																										
329	06/04/2003	W																										
330	06/05/2003	Th																										
331	06/06/2003	F																										
332																												
333																												
334	06/09/2003	M																										
335	06/10/2003	T																										
336	06/11/2003	W																										
337	06/12/2003	Th																										
338	06/13/2003	F																										
339																												
340																												
341	06/16/2003	M																										
342	06/17/2003	T																										
343	06/18/2003	W																										
344	06/19/2003	Th																										
345	06/20/2003	F																										
346																												
347																												
348	06/23/2003	M																										
349	06/24/2003	T																										
350	06/25/2003	W																										
351	06/26/2003	Th																										
352	06/27/2003	F																										
353																												
354																												
355	06/30/2003	M																										
356	07/01/2003	T																										
357	07/02/2003	W																										
358	07/03/2003	Th																										
359	07/04/2003	F																										
360																												
361																												
362	07/07/2003	M																										
363	07/08/2003	T																										
364	07/09/2003	W																										
365	07/10/2003	Th																										

Notes:
1) Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.
2) All pressure gauge(s), flow meter(s), and other related equipment shall be calibrated on a semi-annual basis.
3) All injection well and monitor well data results required by the permit shall be submitted to the Department no later than the last day of the month immediately following the month of record.

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - DZMW-1 Operational Data and Sampling Schedule

Date and Status							Operations			DZMW-1 Background Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
1	07/11/2002	Th																									
2	07/12/2002	F																									
3																											
4																											
5	07/15/2002	M																									
6	07/16/2002	T																									
7	07/17/2002	W																									
8	07/18/2002	Th																									
9	07/19/2002	F																									
10																											
11																											
12	07/22/2002	M																									
13	07/23/2002	T																									
14	07/24/2002	W																									
15	07/25/2002	Th																									
16	07/26/2002	F																									
17																											
18																											
19	07/29/2002	M																									
20	07/30/2002	T																									
21	07/31/2002	W																									
22	08/01/2002	Th																									
23	08/02/2002	F																									
24																											
25																											
26	08/05/2002	M																									
27	08/06/2002	T																									
28	08/07/2002	W																									
29	08/08/2002	Th																									
30	08/09/2002	F																									
31																											
32																											
33	08/12/2002	M																									
34	08/13/2002	T																									
35	08/14/2002	W																									
36	08/15/2002	Th																									
37	08/16/2002	F																									
38																											
39																											
40	08/19/2002	M																									
41	08/20/2002	T																									
42	08/21/2002	W																									
43	08/22/2002	Th																									
44	08/23/2002	F																									
45																											
46																											
47	08/26/2002	M																									
48	08/27/2002	T																									
49	08/28/2002	W																									
50	08/29/2002	Th																									
51	08/30/2002	F																									
52																											
53																											
54	09/02/2002	M																									
55	09/03/2002	T																									
56	09/04/2002	W																									
57	09/05/2002	Th																									
58	09/06/2002	F																									
59																											
60																											
61	09/09/2002	M																									
62	09/10/2002	T																									
63	09/11/2002	W																									
64	09/12/2002	Th																									
65	09/13/2002	F																									
66																											
67																											
68	09/16/2002	M																									
69	09/17/2002	T																									
70	09/18/2002	W																									
71	09/19/2002	Th																									
72	09/20/2002	F																									
73																											
74																											
75	09/23/2002	M																									
76	09/24/2002	T																									
77	09/25/2002	W																									
78	09/26/2002	Th																									
79	09/27/2002	F																									
80																											
81																											
82	09/30/2002	M																									
83	10/01/2002	T																									
84	10/02/2002	W																									
85	10/03/2002	Th																									
86	10/04/2002	F																									
87																											
88																											
89	10/07/2002	M																									
90	10/08/2002	T																									
91	10/09/2002	W																									
92	10/10/2002	Th																									
93	10/11/2002	F																									
94																											
95																											
96	10/14/2002	M																									
97	10/15/2002	T																									
98	10/16/2002	W																									
99	10/17/2002	Th																									
100	10/18/2002	F																									
101																											
102																											

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - DZMW-1 Operational Data and Sampling Schedule

Date and Status							Operations			DZMW-1 Background Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
103	10/21/2002	M																									
104	10/22/2002	T																									
105	10/23/2002	W																									
106	10/24/2002	Th																									
107	10/25/2002	F																									
108																											
109																											
110	10/28/2002	M																									
111	10/29/2002	T																									
112	10/30/2002	W																									
113	10/31/2002	Th																									
114	11/01/2002	F																									
115																											
116																											
117	11/04/2002	M																									
118	11/05/2002	T																									
119	11/06/2002	W																									
120	11/07/2002	Th																									
121	11/08/2002	F																									
122																											
123																											
124	11/11/2002	M																									
125	11/12/2002	T																									
126	11/13/2002	W																									
127	11/14/2002	Th																									
128	11/15/2002	F																									
129																											
130																											
131	11/18/2002	M																									
132	11/19/2002	T																									
133	11/20/2002	W																									
134	11/21/2002	Th																									
135	11/22/2002	F																									
136																											
137																											
138	11/25/2002	M																									
139	11/26/2002	T																									
140	11/27/2002	W																									
141	11/28/2002	Th																									
142	11/29/2002	F																									
143																											
144																											
145	12/02/2002	M																									
146	12/03/2002	T																									
147	12/04/2002	W																									
148	12/05/2002	Th																									
149	12/06/2002	F																									
150																											
151																											
152	12/09/2002	M																									
153	12/10/2002	T																									
154	12/11/2002	W																									
155	12/12/2002	Th																									
156	12/13/2002	F																									
157																											
158																											
159	12/16/2002	M																									
160	12/17/2002	T																									
161	12/18/2002	W																									
162	12/19/2002	Th																									
163	12/20/2002	F																									
164																											
165																											
166	12/23/2002	M																									
167	12/24/2002	T																									
168	12/25/2002	W																									
169	12/26/2002	Th																									
170	12/27/2002	F																									
171																											
172																											
173	12/30/2002	M																									
174	12/31/2002	T																									
175	01/01/2003	W																									
176	01/02/2003	Th																									
177	01/03/2003	F																									
178																											
179																											
180	01/06/2003	M																									
181	01/07/2003	T																									
182	01/08/2003	W																									
183	01/09/2003	Th																									
184	01/10/2003	F																									
185																											
186																											
187	01/13/2003	M																									
188	01/14/2003	T																									
189	01/15/2003	W																									
190	01/16/2003	Th																									
191	01/17/2003	F																									
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193																											
194	01/20/2003	M																									
195	01/21/2003	T																									
196	01/22/2003	W																									
197	01/23/2003	Th																									
198	01/24/2003	F																									
199																											
200																											
201	01/27/2003	M																									
202	01/28/2003	T																									
203	01/29/2003	W																									
204	01/30/2003	Th																									
205	01/31/2003	F																									
206																											
207																											

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - DZMW-1 Operational Data and Sampling Schedule

Date and Status							Operations			DZMW-1 Background Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
208	02/03/2003	M																									
209	02/04/2003	T																									
210	02/05/2003	W																									
211	02/06/2003	Th																									
212	02/07/2003	F																									
213																											
214																											
215	02/10/2003	M																									
216	02/11/2003	T																									
217	02/12/2003	W																									
218	02/13/2003	Th																									
219	02/14/2003	F																									
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222	02/17/2003	M																									
223	02/18/2003	T																									
224	02/19/2003	W																									
225	02/20/2003	Th																									
226	02/21/2003	F																									
227																											
228																											
229	02/24/2003	M																									
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233	02/28/2003	F																									
234																											
235																											
236	03/03/2003	M																									
237	03/04/2003	T																									
238	03/05/2003	W																									
239	03/06/2003	Th																									
240	03/07/2003	F																									
241																											
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245	03/12/2003	W																									
246	03/13/2003	Th																									
247	03/14/2003	F																									
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252	03/19/2003	W																									
253	03/20/2003	Th																									
254	03/21/2003	F																									
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257	03/24/2003	M																									
258	03/25/2003	T																									
259	03/26/2003	W																									
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261	03/28/2003	F																									
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264	03/31/2003	M																									
265	04/01/2003	T																									
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268	04/04/2003	F																									
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271	04/07/2003	M																									
272	04/08/2003	T																									
273	04/09/2003	W																									
274	04/10/2003	Th																									
275	04/11/2003	F																									
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280	04/16/2003	W																									
281	04/17/2003	Th																									
282	04/18/2003	F																									
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303	05/09/2003	F																									
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305																											
306	05/12/2003	M																									
307	05/13/2003	T																									
308	05/14/2003	W																									
309	05/15/2003	Th																									
310	05/16/2003	F																									
311																											
312																											

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - DZMW-1 Operational Data and Sampling Schedule

Date and Status							Operations			DZMW-1 Background Water Quality																	
Day	Date	Week Day	Weekend	Time	Injection	Static	Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)	TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Gross Alpha	Radium 226	Radium 228	Comments
313	05/19/2003	M																									
314	05/20/2003	T																									
315	05/21/2003	W																									
316	05/22/2003	Th																									
317	05/23/2003	F																									
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324	05/30/2003	F																									
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326																											
327	06/02/2003	M																									
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329	06/04/2003	W																									
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331	06/06/2003	F																									
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338	06/13/2003	F																									
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341	06/16/2003	M																									
342	06/17/2003	T																									
343	06/18/2003	W																									
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345	06/20/2003	F																									
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347																											
348	06/23/2003	M																									
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350	06/25/2003	W																									
351	06/26/2003	Th																									
352	06/27/2003	F																									
353																											
354																											
355	06/30/2003	M																									
356	07/01/2003	T																									
357	07/02/2003	W																									
358	07/03/2003	Th																									
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361																											
362	07/07/2003	M																									
363	07/08/2003	T																									
364	07/09/2003	W																									
365	07/10/2003	Th																									

Notes:

1) Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.
2) All pressure gauge(s), flow meter(s), and other related equipment shall be calibrated on a semi-annual basis.
3) All injection well and monitor well data results required by the permit shall be submitted to the Department no later than the last day of the month immediately following the month of record.

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - SZMW-1 Operational Data and Sampling Schedule																												
Date and Status								Operations				SZMW-1 Background Water Quality																
Day	Date	Week Day	Weekend	Time	Injection	Static		Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)		TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)		Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)		Comments
1	07/11/2002	Th																										
2	07/12/2002	F																										
3																												
4																												
5	07/15/2002	M																										
6	07/16/2002	T																										
7	07/17/2002	W																										
8	07/18/2002	Th																										
9	07/19/2002	F																										
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11																												
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13	07/23/2002	T																										
14	07/24/2002	W																										
15	07/25/2002	Th																										
16	07/26/2002	F																										
17																												
18																												
19	07/29/2002	M																										
20	07/30/2002	T																										
21	07/31/2002	W																										
22	08/01/2002	Th																										
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24																												
25																												
26	08/05/2002	M																										
27	08/06/2002	T																										
28	08/07/2002	W																										
29	08/08/2002	Th																										
30	08/09/2002	F																										
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91	10/09/2002	W																										
92	10/10/2002	Th																										
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98	10/16/2002	W																										
99	10/17/2002	Th																										
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104	10/22/2002	T																										
105	10/23/2002	W																										
106	10/24/2002	Th																										
107	10/25/2002	F																										
108																												
109																												

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - SZMW-1 Operational Data and Sampling Schedule

Date and Status								Operations				SZMW-1 Background Water Quality																
Day	Date	Week Day	Weekend	Time	Injection	Static		Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)		TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)		Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)		Comments
110	10/28/2002	M																										
111	10/29/2002	T																										
112	10/30/2002	W																										
113	10/31/2002	Th																										
114	11/01/2002	F																										
115																												
116																												
117	11/04/2002	M																										
118	11/05/2002	T																										
119	11/06/2002	W																										
120	11/07/2002	Th																										
121	11/08/2002	F																										
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124	11/11/2002	M																										
125	11/12/2002	T																										
126	11/13/2002	W																										
127	11/14/2002	Th																										
128	11/15/2002	F																										
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131	11/18/2002	M																										
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172																												
173	12/30/2002	M																										
174	12/31/2002	T																										
175	01/01/2003	W																										
176	01/02/2003	Th																										
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210	02/05/2003	W																										
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218	02/13/2003	Th																										
219	02/14/2003	F																										
220																												
221																												

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - SZMW-1 Operational Data and Sampling Schedule

Date and Status								Operations				SZMW-1 Background Water Quality																
Day	Date	Week Day	Weekend	Time	Injection	Static		Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)		TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)		Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)		Comments
222	02/17/2003	M																										
223	02/18/2003	T																										
224	02/19/2003	W																										
225	02/20/2003	Th																										
226	02/21/2003	F																										
227																												
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229	02/24/2003	M																										
230	02/25/2003	T																										
231	02/26/2003	W																										
232	02/27/2003	Th																										
233	02/28/2003	F																										
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236	03/03/2003	M																										
237	03/04/2003	T																										
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320	05/26/2003	M																										
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322	05/28/2003	W																										
323	05/29/2003	Th																										
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326																												
327	06/02/2003	M																										
328	06/03/2003	T																										
329	06/04/2003	W																										
330	06/05/2003	Th																										
331	06/06/2003	F																										
332																												
333																												

City of Fort Myers - RO Injection Well System
Water Quality Sample Summary Sheet

RO Brine Injection Well System - SZMW-1 Operational Data and Sampling Schedule																												
Date and Status								Operations				SZMW-1 Background Water Quality																
Day	Date	Week Day	Weekend	Time	Injection	Static		Maximum Water Level (feet)/ Pressure (psi)	Minimum Water Level (feet)/ Pressure (psi)	Average Water Level (feet)/ Pressure (psi)		TKN (mg/L)	pH	Specific Conductivity (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	Field Temperature (deg. C)	TDS (mg/L)		Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)		Comments
334	06/09/2003	M																										
335	06/10/2003	T																										
336	06/11/2003	W																										
337	06/12/2003	Th																										
338	06/13/2003	F																										
339																												
340																												
341	06/16/2003	M																										
342	06/17/2003	T																										
343	06/18/2003	W																										
344	06/19/2003	Th																										
345	06/20/2003	F																										
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350	06/25/2003	W																										
351	06/26/2003	Th																										
352	06/27/2003	F																										
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362	07/07/2003	M																										
363	07/08/2003	T																										
364	07/09/2003	W																										
365	07/10/2003	Th																										

Notes:
1) Water quality data may be reduced to monthly analyses after a minimum six months of data if the conditions of Rule 62-528.450(3)(d), F.A.C., have been met and with Department approval.
2) All pressure gauge(s), flow meter(s), and other related equipment shall be calibrated on a semi-annual basis.
3) All injection well and monitor well data results required by the permit shall be submitted to the Department no later than the last day of the month immediately following the month of record.

ATTACHMENT D.3

Monthly Operating Report Example

City of Fort Myers Water Assoc., Inc.
RO WTP Injection Well Monthly Operating Reporting
FDEP Permit No. 165628-001-UC

For the Month/Year of ____________________

I certify under penalty of law that this document and all attachments (pages 2 – 6) 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.

____
(Signed) Chief Operator

____
(Printed) Chief Operator

City of Fort Myers RO WTP Injection Well (IW-1) Operational Testing Data
FDEP Permit No. 165628-001-UC

Month/Yr	IW-1 Injection Pressure			IW-1 Injection Flow Rate			IW-1 Annular Pressure			Annular Tank Level (inches)	Annular Fluid Added/Removed (gal)	Annular Pressure Added/Removed (psi)	Daily Total Injected Brine Volume (gal)	Comments
	Daily Average (psi)	Daily Minimum (psi)	Daily Maximum (psi)	Daily Average (gpm)	Daily Minimum (gpm)	Daily Maximum (gpm)	Daily Average (psi)	Daily Minimum (psi)	Daily Maximum (psi)					
1														
2														
3														
4														
5														
6														
7														
8														
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11														
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24														
25														
26														
27														
28														
29														
30														
31														
Monthly Average														
Monthly Minimum														
Monthly Maximum														
Total for the Month														

City of Fort Myers RO WTP DZMW-1 & SZMW-1 Operational Testing Data
FDEP Permit No. 165628-001-UC

Month/Yr	DZMW-1 - Water Column (feet above transducer)			SZMW-1 - Water Column (feet above transducer)			Weekly Calculations		
	Daily Average	Daily Minimum	Daily Maximum	Daily Average	Daily Minimum	Daily Maximum	Weekly Average	Weekly Minimum	Weekly Maximum
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
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21									
22									
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24									
25									
26									
27									
28									
29									
30									
31									
Monthly Average									
Monthly Minimum									
Monthly Maximum									

City of Fort Myers RO WTP Injection Well (IW-1) Water Quality Data
FDEP Permit No. 165628-001-UC
Year ______

Date		TKN	pH	Specific Cond.	Chloride	Sulfate	TDS	Field Temp.	Sodium	Calcium	Potassium	Magnesium	Iron	Carbonate	Bicarbonate	Gross Alpha	Radium 226	Radium 228
Month	Day	(mg/L)	(su)	(uS/cm)	(mg/L)	(mg/L)	(mg/L)	(C)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(pci/L)	(pci/L)	(pci/L)
January																		
February																		
March																		
April																		
May																		
June																		
July																		
August																		
September																		
October																		
November																		
December																		

City of Fort Myers RO WTP Inje n Well (SZMW-1) Water Quality Data
FDEP Permit No. 165628-001-UC
Year ______

Date		TKN (mg/L)	pH (su)	Specific Cond. (uS/cm)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Field Temp. (C)	Sodium (mg/L)	Calcium (mg/L)	Potassium (mg/L)	Magnesium (mg/L)	Iron (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)
Month	Day														
January															
February															
March															
April															
May															
June															
July															
August															
September															
October															
November															
December															

City of Fort Myers RO WTP Injection Well (DZMW-1) Water Quality Data

FDEP Permit No. 165628-001-UC

Year ______

Date		TKN	pH	Specific Cond.	Chloride	Sulfate	TDS	Field Temp.	Sodium	Calcium	Potassium	Magnesium	Iron	Carbonate	Bicarbonate	Gross Alpha	Radium 226	Radium 228
Month	Day	(mg/L)	(su)	(uS/cm)	(mg/L)	(mg/L)	(mg/L)	(C)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(pci/L)	(pci/L)	(pci/L)
January																		
February																		
March																		
April																		
May																		
June																		
July																		
August																		
September																		
October																		
November																		
December																		

Foryt Myers RO WTP Injection Well Specific Injectivity Testing

Date: ____________________

Static Wellhead Pressure Following 1 Hour Shut In Period (psi) ____________________

Injection Flow Rate (gpm) ____________________

Average Wellhead Pressure Following 15-minute Injection (psi) ____________________

Specific Injectivity (gpm/psi) ____________________

Shut In Injection-Well and Record Wellhead Pressure Falloff

Time (minutes)	Wellhead Pressure (psi)

ATTACHMENT E

Monitor Well Purge Volume Calculations

ATTACHMENT E.1

Two Well Volumes

Monitoring Well Purge Volume Calculations for IW-1 Operational Testing Permit Requirements

The Operational Testing permit requires weekly sampling of the monitoring wells. Since the monitoring wells are sampled frequently, the recommended purge volumes can be reduced for each sampling event. For these calculations, it is assumed that purging 2 borehole volumes will be sufficient to acquire representative water samples of these monitored zones.

A) Well DZMW-1 Purge Volume Calculations

Well dimensions and characteristics:

6-inch diameter fiberglass reinforced plastic (FRP) casing	5.43-inch inside diameter (ID)
Open borehole from 1,700 feet to 1,750 feet	11-inch diameter
Sample pump set depth	150 feet
Sample pump drop pipe	2-inch diameter PVC

Follow the steps below to calculate the purge volume of DZMW-1 in gallons:

Explanation

$\Pi = pi = 3.1415927$

r = radius of casing in feet = radius in inches/12 inches

Length = length of casing section in calculation

1) Volume Calculation of FRP Casing (5.43-inch ID)

The length of the FRP casing in this calculation is 1,700 feet minus the sample pump setting depth of 150 feet.

Inside diameter = 5.43 inches /2 = 2.72 inches = radius

$$= \Pi * (r)^2 * Length$$

$$= \Pi * (\frac{2.72''}{12''})^2 * (1700 ft - 150 ft)$$

=250.2 ft^3 = volume of FRP casing

2) Volume Calculation of Open Borehole (11-inch Diameter)

The length of the DZMW-1 open borehole in this calculation is 50 feet.

Borehole diameter = 11 inches /2 = 5.5 inches = radius

$$= \Pi * (r)^2 * Length$$

$$=\Pi * (\frac{5.5"}{12"})^2 * (50 ft)$$

$=33.0\ ft^3$ = volume of 11-inch diameter borehole

3) Volume Calculation of 2-inch PVC Pump Drop Pipe

The length of the PVC drop pipe connected to the sample pump in this calculation is 150 feet.

Inside diameter = 2 inches /2 = 1 inch = radius

$$=\Pi * (r)^2 * Length$$

$$=\Pi * (\frac{1.0"}{12"})^2 * (150 ft)$$

$=3.27\ ft^3$ = volume of 2-inch PVC drop pipe to be purged

4) Calculation of Total Volume to be Purged from DZMW-1 (assuming 2 borehole volumes)

=vol. of FRP casing + vol. of 2-inch PVC drop pipe + 2 x vol. of open borehole

$=250.2\ ft^3 + 3.27\ ft^3 + 2x\ (33.0\ ft^3)$

$=319\ ft^3$

$=319\ ft^3 \times 7.48\ gal/\ ft^3$

=2,390 gallons for each weekly sampling

Monitoring Well Purge Volume Calculations for IW-1 Operational Testing Permit Phase Requirements

(assume purging 2 borehole volumes due to frequent sampling permit requirements)

B) Well SZMW-1 Purge Volume Calculations

Dimensions:

16-inch diameter steel casing		15-inch inside diameter
6-inch diameter FRP casing		6.45-inch outside diameter (OD)
Open borehole		15-inch diameter
Sample pump set depth		200 feet
Sample tube:	4-inch diameter PVC	250 feet
	2-inch diameter PVC	1000 feet

Follow the steps below to calculate the purge volume of SZMW-1 in gallons:

Explanation

$\Pi = pi = 3.1415927$

r = radius of casing in feet = radius in inches/12 inches

Length = length of casing section in calculation

Volume Calculation of Open Borehole Annular Space

1) Volume Calculation of 15-inch ID Open Borehole

The length of the open borehole in this calculation is 100 feet.

Inside diameter = 15 inches /2 = 7.5 inches = radius

$$= \Pi * (r)^2 * Length$$

$$= \Pi * (\frac{7.5''}{12''})^2 * (100 ft)$$

=122.7 ft^3 = volume of open borehole

2) Volume Calculation of FRP Casing (6.45-inch OD)

The length of the FRP casing that exists within the open borehole in this calculation is 100 feet.

Inside diameter = 6.45 inches /2 = 3.2 inches = radius

$$= \Pi * (r)^2 * Length$$

$$=\Pi * (\frac{3.2''}{12''})^2 * (100 ft)$$

$=22.3\ ft^3=$ volume of FRP casing

3) Volume Calculation of Annular Space Between Open Borehole and FRP

=Volume of 15-inch Borehole – Volume of FRP OD

$=122.7\ ft^3 - 22.3\ ft^3$

$= 100.4\ ft^3 =$ volume of borehole annular space

Volume Calculation of SZMW-1 Sample Tube

The sample tube consists of 250 feet of 4-inch PVC and 1000 feet of 2-inch PVC. The total length of the sample tube is 1,250 feet and was installed to the top of the open borehole interval to reduce the amount of water that needs to be purged prior to obtaining a sample. The sample pump is located at a depth of 200 feet within the 4-inch PVC.

4) Volume Calculation of 4-inch Diameter PVC Sample Tube

The length of the 4-inch PVC in this calculation is 50 feet since the pump is set within it at a depth of 200 feet.

Inside diameter = 4 inches /2 = 2 inches = radius

$$=\Pi * (r)^2 * Length$$

$$=\Pi * (\frac{2''}{12''})^2 * (50 ft)$$

$=4.36\ ft^3=$ volume of 4-inch PVC sample tube to be purged

5) Volume Calculation of 2-inch Diameter PVC Sample Tube

The length of the 2-inch PVC in this calculation is 1000 feet.

Inside diameter = 2 inches /2 = 1 inch = radius

$$=\Pi * (r)^2 * Length$$

$$=\Pi * (\frac{1''}{12''})^2 * (1000 ft)$$

$=21.8\ ft^3=$ volume of 2-inch PVC sample tube to be purged

6) Volume Calculation of 2-inch Diameter PVC Pump Drop Pipe

The length of the 2-inch PVC drop pipe connected to the sample pump in this calculation is 200 feet.

Inside diameter = 2 inches /2 = 1 inch = radius

$$=\Pi * (r)^2 * Length$$

$$= \Pi * (\frac{1''}{12''})^2 * (200\,ft)$$

=4.36 ft^3= volume of 2-inch PVC drop pipe to be purged

7) Calculation of Total Volume to be Purged from SZMW-1 (assuming 2 borehole volumes)

= vol. of 4-inch PVC sample tube + vol. of 2-inch PVC sample tube + vol. of 2-inch PVC drop pipe + 2 x vol. of annular space of open borehole

=4.36 ft^3 + 21.8 ft^3 + 4.36 ft^3 + 2x (100.4 ft^3)

=231.3 ft^3

=231.3 ft^3 x 7.48 gal/ ft^3

=1,730 gallons for each weekly sampling

ATTACHMENT E.2

Three Volumes

Monitoring Well Purge Volume Calculations for IW-1 Operation Permit Requirements

The Operation permit will require less frequent sampling of the monitoring wells than required in the Operational Testing permit. Since the monitoring wells are sampled less frequently, the recommended purge volumes are increased for each sampling event. For these calculations, it is assumed that purging 3 borehole volumes will be sufficient to acquire representative water samples of these monitored zones.

A) Well DZMW-1 Purge Volume Calculations

Well dimensions and characteristics:

6-inch diameter fiberglass reinforced plastic (FRP) casing	5.43-inch inside diameter (ID)
Open borehole from 1,700 feet to 1,750 feet	11-inch diameter
Sample pump set depth	150 feet
Sample pump drop pipe	2-inch diameter PVC

Follow the steps below to calculate the purge volume of DZMW-1 in gallons:

Explanation

$\Pi = pi = 3.1415927$

r = radius of casing in feet = radius in inches/12 inches

Length = length of casing section in calculation

1) Volume Calculation of FRP Casing (5.43-inch ID)

The length of the FRP casing in this calculation is 1,700 feet minus the sample pump setting depth of 150 feet.

Inside diameter = 5.43 inches /2 = 2.72 inches = radius

$$= \Pi * (r)^2 * Length$$

$$= \Pi * (\frac{2.72''}{12''})^2 * (1700 ft - 150 ft)$$

=250.2 ft^3 = volume of FRP casing

2) Volume Calculation of Open Borehole (11-inch Diameter)

The length of the DZMW-1 open borehole in this calculation is 50 feet.

Borehole diameter = 11 inches /2 = 5.5 inches = radius

$$= \Pi * (r)^2 * Length$$

$$= \Pi * (\frac{5.5''}{12''})^2 * (50 ft)$$

=33.0 ft^3 = volume of 11-inch diameter borehole

3) Volume Calculation of 2-inch PVC Pump Drop Pipe

The length of the PVC drop pipe connected to the sample pump in this calculation is 150 feet.

Inside diameter = 2 inches /2 = 1 inch = radius

$$= \Pi * (r)^2 * Length$$

$$= \Pi * (\frac{1.0''}{12''})^2 * (150 ft)$$

=3.27 ft^3 = volume of 2-inch PVC drop pipe to be purged

4) Calculation of Total Volume to be Purged from DZMW-1 (assuming 3 borehole volumes)

=vol. of FRP casing + vol. of 2-inch PVC drop pipe + 3 x vol. of open borehole

=250.2 ft^3 + 3.27 ft^3 + 3x (33.0 ft^3)

=352 ft^3

=352 ft^3 x 7.48 gal/ ft^3

=2,636 gallons for each sampling event

Monitoring Well Purge Volume Calculations for IW-1 Operation Permit Phase Requirements

(assume purging 3 borehole volumes due to frequent sampling permit requirements)

B) Well SZMW-1 Purge Volume Calculations

Dimensions:

16-inch diameter steel casing		15-inch inside diameter
6-inch diameter FRP casing		6.45-inch outside diameter (OD)
Open borehole		15-inch diameter
Sample pump set depth		200 feet
Sample tube:	4-inch diameter PVC	250 feet
	2-inch diameter PVC	1000 feet

Follow the steps below to calculate the purge volume of SZMW-1 in gallons:

Explanation

$\Pi = pi = 3.1415927$

r = radius of casing in feet = radius in inches/12 inches

Length = length of casing section in calculation

Volume Calculation of Open Borehole Annular Space

1) Volume Calculation of 15-Inch ID Open Borehole

The length of the open borehole in this calculation is 100 feet.

Inside diameter = 15 inches /2 = 7.5 inches = radius

$$= \Pi * (r)^2 * Length$$

$$= \Pi * (\frac{7.5''}{12''})^2 * (100 ft)$$

=122.7 ft^3 = volume of open borehole

2) Volume Calculation of FRP Casing (6.45-Inch OD)

The length of the FRP casing that exists within the open borehole in this calculation is 100 feet.

Inside diameter = 6.45 inches /2 = 3.2 inches = radius

$$= \Pi * (r)^2 * Length$$

$$=\Pi * (\frac{3.2''}{12''})^2 * (100 ft)$$

=22.3 ft^3= volume of FRP casing

3) Volume Calculation of Annular Space Between Open Borehole and FRP

=Volume of 15-inch Borehole – Volume of FRP OD

=122.7 ft^3 – 22.3 ft^3

= 100.4 ft^3 = volume of borehole annular space

Volume Calculation of SZMW-1 Sample Tube

The sample tube consists of 250 feet of 4-inch PVC and 1000 feet of 2-inch PVC. The total length of the sample tube is 1,250 feet and was installed to the top of the open borehole interval to reduce the amount of water that needs to be purged prior to obtaining a sample. The sample pump is located at a depth of 200 feet within the 4-inch PVC.

4) Volume Calculation of 4-inch Diameter PVC Sample Tube

The length of the 4-inch PVC in this calculation is 50 feet since the pump is set within it at a depth of 200 feet.

Inside diameter = 4 inches /2 = 2 inches = radius

$$=\Pi * (r)^2 * Length$$

$$=\Pi * (\frac{2''}{12''})^2 * (50 ft)$$

=4.36 ft^3= volume of 4-inch PVC sample tube to be purged

5) Volume Calculation of 2-inch Diameter PVC Sample Tube

The length of the 2-inch PVC in this calculation is 1000 feet.

Inside diameter = 2 inches /2 = 1 inch = radius

$$=\Pi * (r)^2 * Length$$

$$=\Pi * (\frac{1''}{12''})^2 * (1000 ft)$$

=21.8 ft^3= volume of 2-inch PVC sample tube to be purged

6) Volume Calculation of 2-inch Diameter PVC Pump Drop Pipe

The length of the 2-inch PVC drop pipe connected to the sample pump in this calculation is 200 feet.

Inside diameter = 2 inches /2 = 1 inch = radius

$$=\Pi * (r)^2 * Length$$

$$= \Pi * (\frac{1"}{12"})^2 * (200 ft)$$

=4.36 ft^3= volume of 2-inch PVC drop pipe to be purged

7) Calculation of Total Volume to be Purged from SZMW-1 (assuming 3 borehole volumes)

= vol. of 4-inch PVC sample tube + vol. of 2-inch PVC sample tube + vol. of 2-inch PVC drop pipe + 3 x vol. of annular space of open borehole

=4.36 ft^3 + 21.8 ft^3 + 4.36 ft^3 + 3x (100.4 ft^3)

=331.7 ft^3

=331.7 ft^3 x 7.48 gal/ ft^3

=2,481 gallons for each sampling event