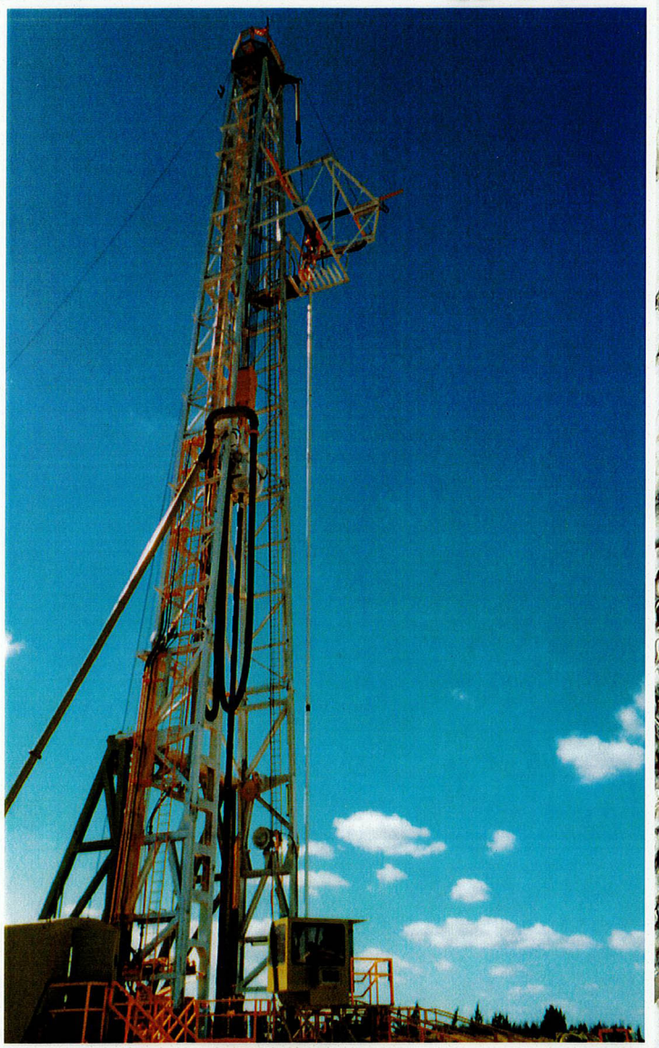
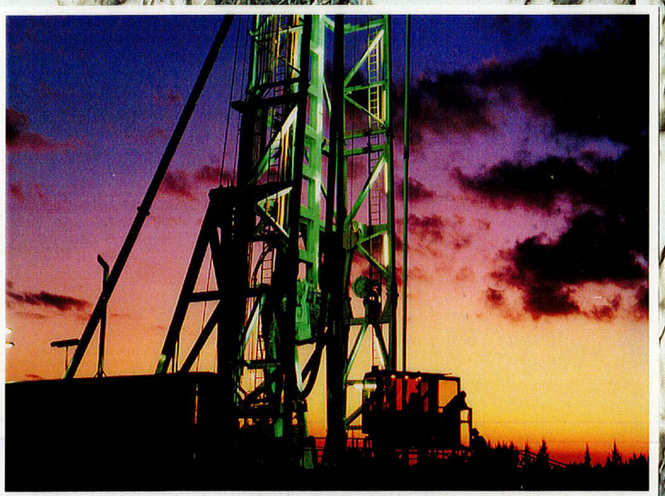




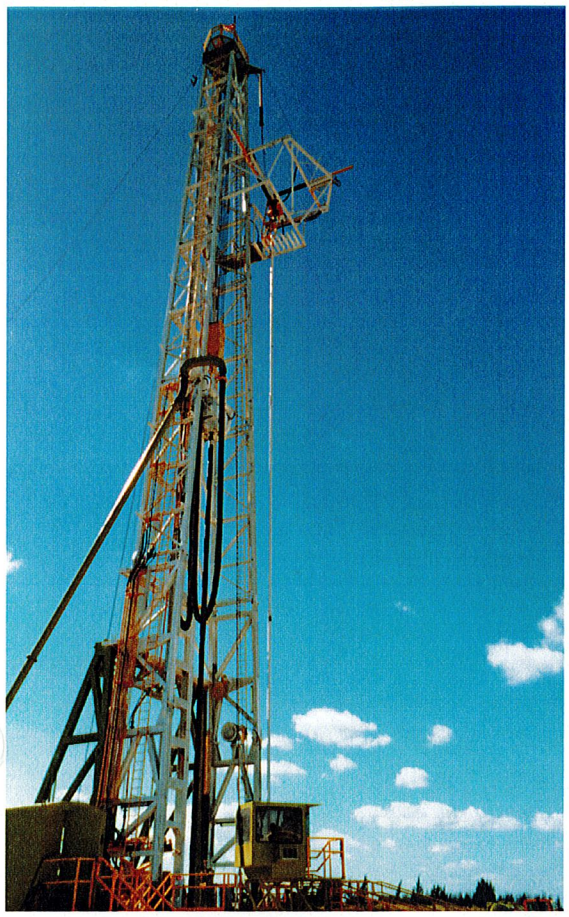
Engineering Report of the Construction and Testing of the Aquifer Storage and Recovery (ASR) System at the MDWASD West Wellfield

Prepared for

Miami-Dade
Water and Sewer Department
MDWASD Contract W-740A

Prepared by
CH2MHILL

May 1998



Engineering Report of the Construction and Testing of the Aquifer Storage and Recovery (ASR) System at the MDWASD West Wellfield

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Prepared by
CH2MHILL

May 1998

Proprietary Notice

CH2M HILL considers the data and information contained in this report to be proprietary. This report and any information contained herein shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate this report.

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CH2MHILL

May 29, 1998

141378.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD) West Wellfield ASR Project; Permit Numbers UC 13-255913 (ASR-1), UC 13-255914 (ASR-2), and UC 13-255915 (ASR-3).

On behalf of the Miami-Dade Water and Sewer Department (MDWASD), CH2M HILL is pleased to present 2 copies of the Engineering Report of the above-referenced facility. With submission of this document, we hereby request approval to conduct operational testing for this facility. The operations and maintenance (O&M) manual and record drawings are under preparation, and will be submitted to you shortly.

Please call me at (954) 426-6112 (x297) if you have any questions.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/981490001/set634.doc
c: Jorge Rodriguez/MDWASD
Diana Trettin/CH2M HILL/MIA
Rich Deuerling/FDEP/TLH
Ron Reese/USGS/MIA
Nancy Marsh/EPA/ATL
Jose Lopez/DERM
Bertha Goldenberg/MDWASD
David Pyne/CH2M HILL/GNV
Len Fishkin/FDEP/WPB
Samir Elmir/MDCHD
Lou Devillon/SFWMD/WPB
Harvey Kottke/DERM

PETER J. KWIATKOWSKI
5/29/98

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SECTION 1

Introduction

Background Information

The Miami-Dade Water and Sewer Department (MDWASD) retained the services of CH2M HILL HILL in December 1993 to permit, design and oversee construction of an aquifer storage and recovery (ASR) system at the MDWASD West Wellfield in unincorporated western Miami-Dade County, Florida. The purpose of the project is to store raw Biscayne aquifer water into ASR well(s) for retrieval during peak, seasonal, or emergency demand periods. Each ASR well is completed into the upper portions of the Floridan Aquifer System, separated from the overlying Biscayne aquifer by approximately 650 feet of relatively impermeable clays of the Hawthorn Group.

The location map for the West Wellfield is shown in Figure 1-1. The site layout of the ASR system is shown in Figure 1-2. The ASR wells are cased with nominal 30-inch-diameter steel to an approximate depth of 850 feet below pad level (bpl), and are completed with open-hole construction to a depth of approximately 1,250 feet bpl. In addition to the ASR wells, an exploratory, single-zone monitor well (MW-1) was modified to dual-zone status to monitor water quality of the stored water within the ASR zone, as well as just below the storage zone. MW-1 is located approximately 300 feet due north of ASR-1 as shown in Figure 1-2.

A permit application was submitted to the Florida Department of Environmental Protection (FDEP) for the construction of the ASR system in August 1994. Permits for raw water ASR well systems were issued by FDEP (Permit Numbers UC 13-255913, UC 13-255914, and UC 13-255915) on June 30, 1995. Additionally, MDWASD applied for a water quality criteria exemption (WQCE) to facilitate storage of raw water that met primary drinking water standards (DWS), but might not meet all secondary DWS. The WQCE was granted by FDEP on July 25, 1995. A copy of the WQCE and the raw water ASR construction permits are presented in Appendix A.

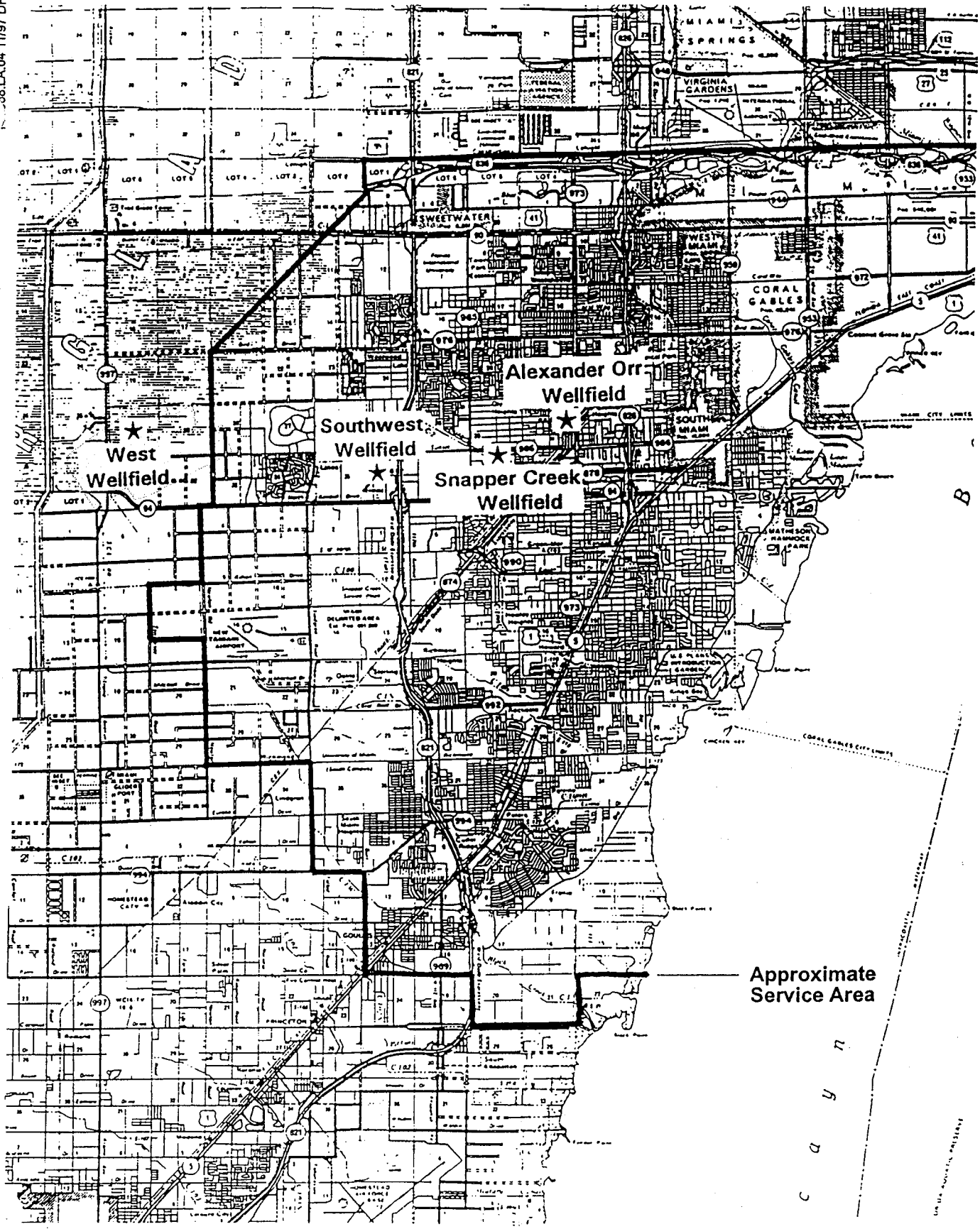

Figure 1-1
Wellfield Location Map

CH2MHILL

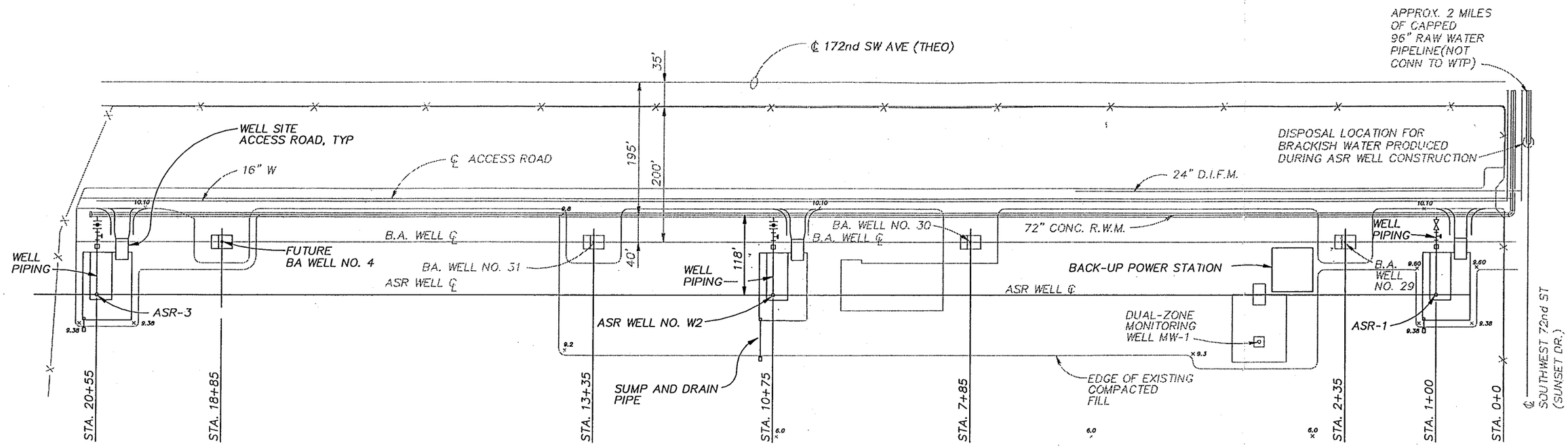

FIGURE 1-2
SITE PLAN

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Project Description

CH2M HILL served as the engineer of record for the permitting, design and well construction activities for the ASR system. Youngquist Brothers Inc. (YBI) of Fort Myers, Florida, selected as the low-bid contractor to construct the ASR system, was issued a Notice to Proceed on June 7, 1996. Construction was completed in April 1998.

Construction activities at the ASR system included the installation of concrete drilling pads; shallow pad monitor wells; drilling, construction and testing of the 3 ASR wells; modification of an existing single-zone monitor well to dual-zone status; completion of wellhead piping, pumps, and valves; electrical facilities; and instrumentation and control.

The FDEP Technical Advisory Committee (TAC) coordinated the actions of local, state, and federal agencies including the Dade County Department of Health (DCDH), Dade County Department of Environmental Resource Management (DERM), the South Florida Water Management District (SFWMD), the Environmental Protection Agency (EPA), and the United States Geological Survey (USGS). A tabulated summary of construction activities and weekly summaries of the construction progress are presented in Appendix B and C, respectively.

SECTION 2

Construction Phase

The following section describes the construction, drilling, and testing details associated with the construction of the ASR wells (ASR-1, ASR-2, and ASR-3) and modification of the monitor well (MW-1) to a dual-zone well.

Concrete Drilling Pads

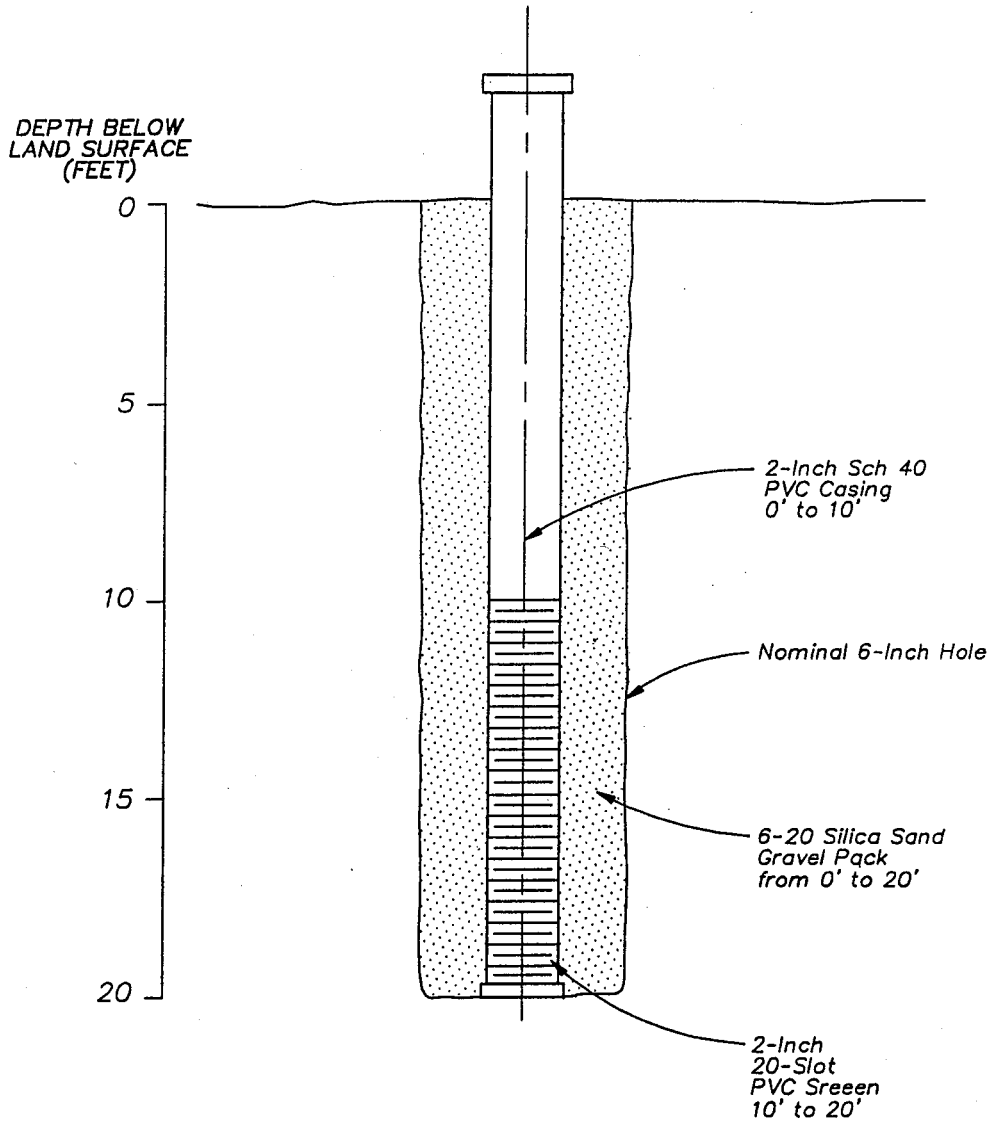
As required by the FDEP construction permit (Appendix A), drilling pads were installed at each ASR wellsite prior to well construction. The purpose of these pads was to containerize drilling fluids and prevent brackish groundwater (derived during drilling from the underlying Floridan aquifer) from migrating into the Biscayne aquifer — the source of potable water for MDWASD. YBI constructed the drilling pads in compliance with the contract documents by pouring 12-inch thick, reinforced concrete slabs with concrete curbs.

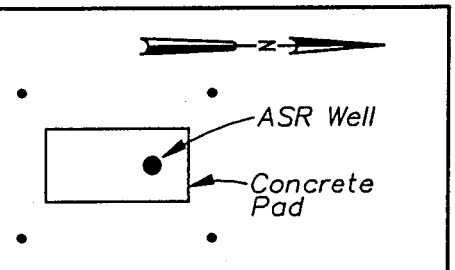
Pad Monitor Wells

As required by the FDEP construction permit (Appendix A), pad monitor wells (PMWs) were installed at each ASR wellsite. PMWs are monitor wells completed into the Biscayne aquifer to a depth of approximately 20 feet bpl, and installed at each corner of the drilling pads to monitor for discharge of drilling fluids and brackish groundwater during construction. Following installation of the PMWs, surficial groundwater samples were collected and analyzed to establish background water quality data, and sampled weekly during well construction. A typical PMW diagram is presented in Figure 2-1. Water quality data from the PMWs is discussed in Section 4, *Hydrogeologic Testing* of this report.

ASR Well 1 (ASR-1)

Drilling of ASR-1 commenced on November 23, 1996. Mud rotary techniques were used to drill through the Biscayne aquifer and clay intervals to a depth of approximately 850 feet bpl. Mud-rotary drilling is most appropriate while drilling through clay sediments, but yields limited information regarding hydraulic characteristics or water quality. Reverse- air techniques were used during subsequent drilling stages to a total depth of 1,302 feet bpl to remove cuttings from the borehole and to collect water samples at 30-foot intervals.





Pad Monitor Well Orientation

FIGURE 2-1
TYPICAL PAD MONITOR WELL COMPLETION DIAGRAM

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An open-circulation system was used during reverse-air drilling to collect more representative water samples during drilling. Water produced while reverse-air drilling was conveyed via temporary piping to an onsite force main for disposal.

The drilling schedule and casing setting depths were designed to conform to the hydrogeologic features observed at the site, as well as various regulatory agency requirements. Geologic formation samples were collected and described at 10-foot intervals during the drilling of the pilot hole, as more fully described in Section 3, *Geologic Framework*. Data from the pilot hole interval (formation samples [cuttings], water samples, and geophysical logs) were evaluated to provide the basis for describing the geologic formations encountered, to assist in selection of the actual casing setting depths, and to interpret the site lithology and hydrogeology. The pilot hole was then reamed to the specified diameter to the selected final casing setting depth as approved by FDEP.

Construction of ASR-1 took place with two concentric steel casings (40-inch and 30-inch outside diameters). The cementing program was specifically tailored for each casing installed. A table summarizing the casing depths and the types and quantities of cement used is presented in Table 2-1. Appendix D contains the casing mill certificates for each of the casings used during construction. Refer to the well completion diagram presented in Figure 2-2 and the casing mill certificates in Appendix D for more precise casing dimensions.

The ASR storage zone was completed in a permeable zone between 850 and 1,302 feet bpl. Construction of ASR-1 began with the drilling of a nominal 12-1/4-inch pilot hole to 200 feet bpl. The pilot hole was then geophysically logged (caliper, gamma ray, spontaneous potential [SP] and dual-induction electric logs) and reamed to a nominal 48-inch diameter to a depth of 170 feet bpl. Following a caliper log of the reamed hole, a 40-inch-diameter steel casing was installed and cemented utilizing the pressure grout method through the surficial aquifer to a depth of 170 feet bpl.

Below the 40-inch casing, drilling of the 12-1/4-inch pilot hole continued within the casing to 902 feet bpl. The pilot hole was then geophysically logged (caliper, gamma ray, SP and dual-induction electric logs) and reamed to a nominal 39-inch diameter to a depth of 860 feet bpl. Following a caliper log of the reamed hole, installation of the final, 30-inch-diameter casing was completed via pressure- and tremie-grout methods through the confining units of the Hawthorn Group to a depth of 850 feet bpl. This setting depth was selected to seal off the overlying clay layers of the Hawthorn Group from the

TABLE 2-1
Summary of Well Cementing Operations
MDWASD - West Wellfield ASR Project

Date	Casing ID (inches)	Casing OD (inches)	Casing Depth (ft bpl)	Type	Quantity (Barrels)	Cement Interval (ft bpl)
ASR-1						
11/26/96	39	40	170	Pressure Grout	209	0 to 170
12/5/96	29	30	850	Pressure Grout	367	105 to 850
12/6/96	29	30	850	Tremie Grout	58	0 to 105
ASR-2						
1/8/97	39	40	170	Pressure Grout	141	0 to 170
1/16/97	29	30	845	Pressure Grout	358	0 to 845
ASR-3						
2/14/97	39	40	170	Pressure Grout	209	0 to 170
2/21/97	29	30	835	Pressure Grout	393	0 to 835
MW-1						
1/2/97	12	2	NA	Tremie Grout	92	1,350 to 1,227
1/3/97	12	2	NA	Tremie Grout	85	1,227 to 1,010

Notes:
ID = Inside Diameter
OD = Outside Diameter
ft bpl = feet below pad level
All cement is neat cement (no additives)

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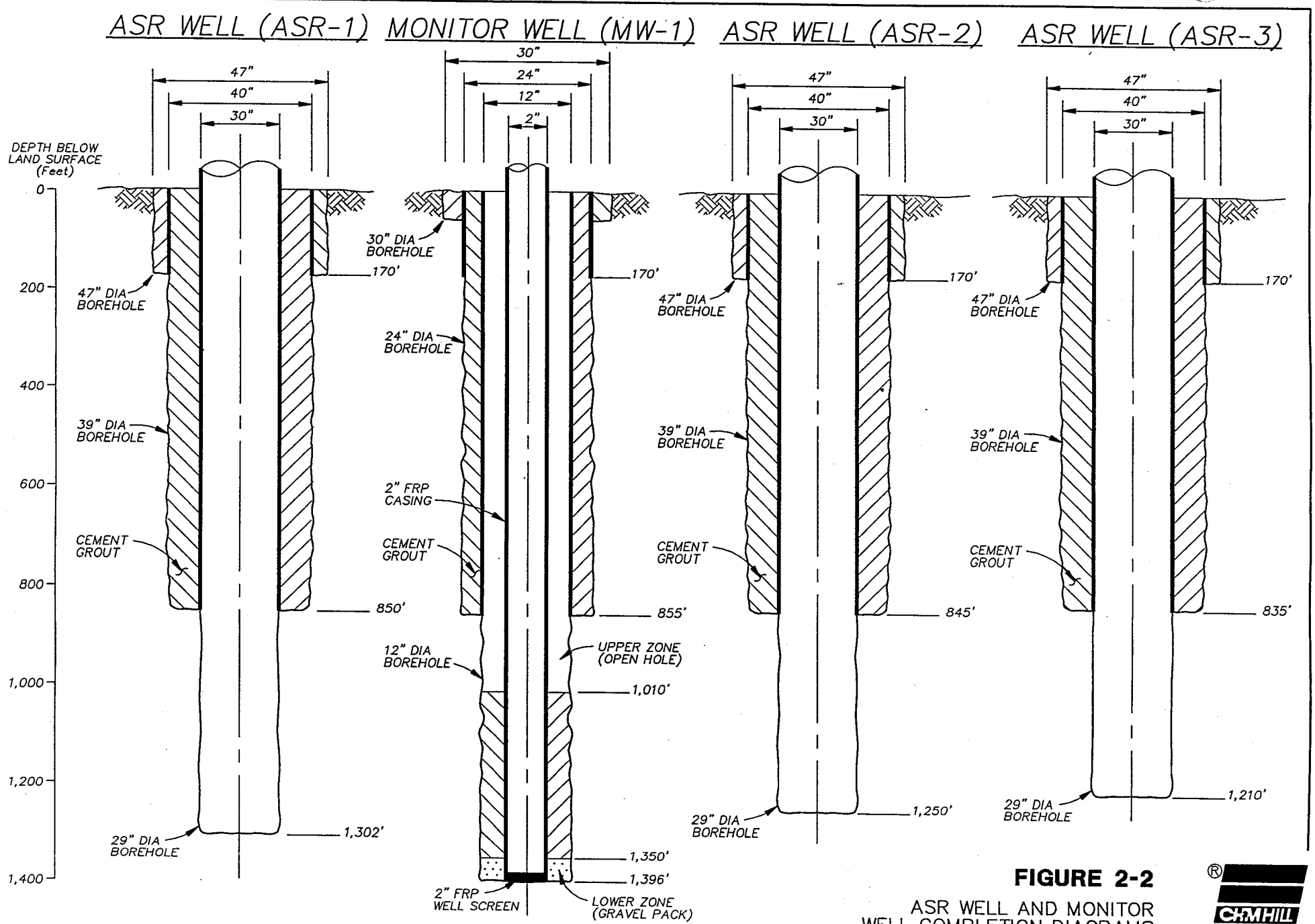

FIGURE 2-2

ASR WELL AND MONITOR WELL COMPLETION DIAGRAMS

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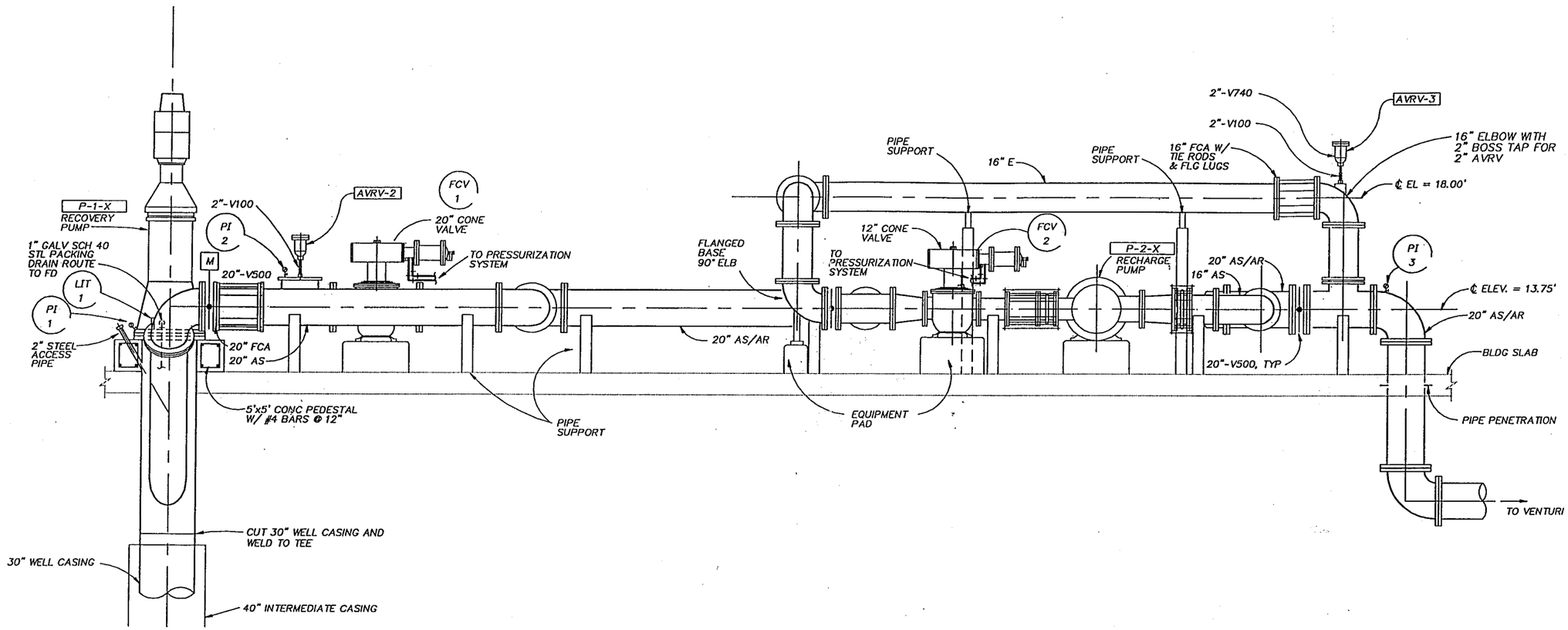
permeable limestone of the storage zone. Following the completion of casing cementing, a successful pressure test on the 30-inch steel casing was conducted. Additionally, a cement bond log and final video survey were conducted, as described in Section 5, *Mechanical Integrity*.

Reverse-air drilling with open circulation was conducted through the cement plug at the base of the 30-inch casing in two phases: the first to 1,155 feet bpl and the second to 1,302 feet bpl. Coring was attempted at several depth intervals but the formation proved too friable for core recovery. The pilot hole was then developed with compressed air to remove cuttings/fines from the borehole and geophysically logged. The logs performed through this interval include caliper, gamma ray, SP, dual-induction electric, sonic, temperature, fluid resistivity, flowmeter, and video as more fully described in Section 4, *Hydrogeologic Testing*. Following logging, the borehole was reamed with a 29-inch diameter bit to a final depth of 1,300 feet bpl, and geophysical logs performed. ASR-1 was acidized to improve the well's specific capacity, as more fully described in Section 4, *Hydrogeologic Testing*.

The ASR-1 wellhead was completed with the construction of a concrete building slab on top of the drilling pad, and installation of recharge and recovery pumps, wellhead piping, electrically and manually operated valves, bi-directional venturi flowmeter, electrical facilities, and instrumentation and controls. A submerged pressure transducer records pressure readings from ASR-1 that are transmitted to the field panel for display and recording. A pressure gauge at the wellhead allows local observation of ambient pressure from ASR-1. Sample taps allow water samples to be obtained for analysis to document water quality per the permit. Figure 2-3 depicts the completion diagram for the ASR-1 wellhead.

ASR Well 2 (ASR-2)

Drilling of the 30-inch ASR well (ASR-2) commenced on January 6, 1997. Mud rotary techniques were used to drill through the Biscayne aquifer and clay intervals to a depth of approximately 850 feet bpl. Reverse-air techniques were used during subsequent stages to a total depth of 1,350 feet bpl to remove cuttings from the borehole and to collect water samples at 30-foot intervals. An open-circulation system was used during reverse-air drilling to collect more representative water samples during drilling. Water produced while



SECTION
3/16"=1'-0"

FIGURE 2-3
ASR WELL WELLHEAD COMPLETION DIAGRAM

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drilling on reverse air was conveyed via temporary piping to an onsite force main for disposal.

The drilling schedule and casing setting depths were designed to conform to the hydrogeologic features observed at the site, as well as various regulatory agency requirements. Geologic formation samples were collected and described at 10-foot intervals during the drilling of the pilot hole, as more fully described in Section 3, *Geologic Framework.* Data from the pilot hole interval (formation samples [cuttings], water samples, and geophysical logs) were evaluated to provide the basis for describing the geologic formations encountered, to assist in selection of the actual casing setting depths, and to interpret the site lithology and hydrogeology. The pilot hole was then reamed to the specified diameter to the selected final casing setting depth as approved by FDEP.

Construction of ASR-2 took place with two concentric steel casings (40-, and 30-inch outside diameters). The cementing program was specifically tailored for each casing installed. A table summarizing the casing depths and the types and quantities of cement used is presented in Table 2-1. Appendix D contains the casing mill certificates for each of the casings used during construction. Refer to the well completion diagram presented in Figure 2-2 and the casing mill certificates in Appendix D for more precise casing dimensions.

The ASR storage zone was completed in a permeable zone between 845 and 1,240 feet bpl. Construction of ASR-2 began with the drilling of a nominal 12-1/4-inch pilot hole to 207 feet bpl. The pilot hole was then geophysically logged (caliper, gamma ray, SP and dual-induction electric logs) and reamed to a nominal 48-inch diameter to a depth of 188 feet bpl. Following a caliper log of the reamed hole, a 40-inch-diameter steel casing was installed and cemented through the surficial aquifer to a depth of 170 feet bpl.

Below the 40-inch casing, drilling of the 12-1/4-inch pilot hole continued within the casing to a depth of 902 feet bpl. The pilot hole was then geophysically logged (caliper, gamma ray, SP and dual-induction electric logs) and reamed to a nominal 39-inch diameter to a depth of 850 feet bpl. Following a caliper log of the reamed hole, installation of the 30-inch-diameter casing was completed via pressure-grout methods through the confining units of the Hawthorn Group to a depth of 845 feet bpl. This setting depth was selected to isolate the storage zone form the overlying clay layers of the Hawthorn Group. Following the completion of casing cementing, a successful pressure test on the 30-inch steel casing was conducted. Additionally, a cement bond log and final video survey were conducted as more fully described in Section 5, *Mechanical Integrity.*

Reverse-air drilling with open circulation was conducted with a nominal 12-inch-diameter bit through the cement plug at the base of the 30-inch casing to 1,350 feet bpl. The pilot hole was then developed with compressed air to remove cuttings/fines from the borehole and geophysically logged, as more fully described in Section 4, *Hydrogeologic Testing*. Following logging, it was determined that the pilot hole should be plugged back with neat cement to a depth of 1,240 feet bpl prior to reaming. Once plugged back, the borehole was reamed with a 29-inch-diameter bit to a final depth of 1,240 feet bpl. ASR-2 was acidized and redeveloped to improve the well's specific capacity, as more fully described in Section 4, *Hydrogeologic Testing*. Final geophysical logs including fluid resistivity, temperature, flowmeter, and video survey were then conducted to complete well construction activities.

The ASR-2 wellhead was completed with the construction of a concrete building slab on top of the drilling pad, and installation of wellhead piping, recharge and recovery pumps, electrically and manually operated valves, bi-directional venturi flowmeter, electrical facilities, and instrumentation and controls. A submerged pressure transducer records pressure readings from ASR-2 that are transmitted to the field panel for display and recording. A pressure gauge at the wellhead allows local observation of ambient pressure from ASR-2. Sample taps allow water samples to be obtained for analysis to document water quality per the permit.

ASR Well 3 (ASR-3)

Drilling of the 30-inch ASR well (ASR-3) commenced on February 12, 1997. Mud rotary techniques were used to drill through the Biscayne aquifer and clay intervals to a depth of approximately 840 feet bpl. Reverse- air techniques were used during subsequent stages to a total depth of 1,310 feet bpl to remove cuttings from the borehole and to collect water samples at 30-foot intervals. An open-circulation system was used during reverse-air drilling to collect more representative water samples during drilling. Water produced while drilling on reverse air was conveyed via temporary piping to an onsite force main for disposal.

The drilling schedule and casing setting depths were designed to conform to the hydrogeologic features observed at the site, as well as various regulatory agency requirements. Geologic formation samples were collected and described at 10-foot intervals during the drilling of the pilot hole, as more fully described in Section 3, *Geologic Framework*. Data

from the pilot hole interval (formation samples [cuttings], water samples, and geophysical logs) were evaluated to provide the basis for describing the geologic formations encountered, to assist in selection of the actual casing setting depths, and to interpret the site lithology and hydrogeology. The pilot hole was then reamed to the specified diameter to the selected final casing setting depth as approved by FDEP.

Construction of ASR-3 took place with two concentric steel casings (40-, and 30-inch outside diameters). The cementing program was specifically tailored for each casing installed. A table summarizing the casing depths and the types and quantities of cement used is presented in Table 2-1. Appendix D contains the casing mill certificates for each of the casings used during construction. Refer to the ASR-3 completion diagram presented in Figure 2-2 and the casing mill certificates in Appendix D for more precise casing dimensions.

The ASR storage zone was completed in a permeable zone between 835 and 1,210 feet bpl. Construction of ASR-3 began with the drilling of a nominal 12-1/4-inch pilot hole to 207 feet bpl. The pilot hole was then geophysically logged (caliper, gamma ray, SP and LSN electric logs) and reamed to a nominal 48-inch diameter to a depth of 180 feet bpl. Following a caliper log of the reamed hole, a 40-inch-diameter steel casing was installed and cemented utilizing the pressure grout method through the surficial aquifer to a depth of 170 feet bpl.

Below the 40-inch casing, drilling of the 12-1/4-inch pilot hole continued within the casing to a depth of 900 feet bpl. The pilot hole was then geophysically logged (caliper, gamma ray, SP and dual-induction electric logs) and reamed to a nominal 39-inch diameter to a depth of 840 feet bpl. Following a caliper log of the reamed hole, installation of the 30-inch-diameter casing was completed via pressure-grout methods through the confining units of the Hawthorn Group to a depth of 835 feet bpl. This setting depth was selected to isolate the storage zone form the overlying clay layers of the Hawthorn Group. Following the completion of casing cementing, a successful pressure test on the 30-inch steel casing was conducted. Additionally, a cement bond log and final video survey were conducted as more fully described in Section 5, *Mechanical Integrity*.

Reverse-air drilling with open circulation was conducted with a nominal 12-inch-diameter bit through the cement plug at the base of the 30-inch casing to 1,210 feet bpl. The pilot hole was then developed with compressed air to remove cuttings/fines from the borehole and geophysically logged, as more fully described in Section 4, *Hydrogeologic Testing*. Following logging, it was determined that the pilot hole should be plugged back with neat cement to a

depth of 1,210 feet bpl prior to reaming. Once plugged back, the borehole was reamed with a 29-inch diameter bit to a final depth of 1,210 feet bpl. ASR-3 was acidized and redeveloped to improve the well's specific capacity, as more fully described in Section 4, *Hydrogeologic Testing*. Final geophysical logs including fluid resistivity, temperature, flowmeter, and video survey were then conducted to complete well construction activities.

The ASR-3 wellhead was completed with the construction of a concrete building slab on top of the drilling pad, and installation of wellhead piping, recharge and recovery pumps, electrically and manually operated valves, bi-directional venturi flowmeter, electrical facilities, and instrumentation and controls. A submerged pressure transducer records pressure readings from ASR-3 that are transmitted to the field panel for display and recording. A pressure gauge at the wellhead allows local observation of ambient pressure from ASR-3. Sample taps allow water samples to be obtained for analysis to document water quality per the permit.

Monitor Well 1 (MW-1)

A test/monitor well was constructed at the West Wellfield site in 1994 to evaluate site-specific hydrogeologic conditions. This well was completed with a 12-inch-diameter steel casing to a depth of 855 feet bpl, with open-hole construction to 1,396 feet bpl (Appendix E). Based on a target storage interval of approximately 850 to 1,300 feet bpl, it was decided to modify this well to dual-zone status. In doing so, water quality could be monitored within the ASR storage zone (upper zone: 855 to 1,010 feet bpl) as well as just below (lower zone: 1,370 to 1,390 feet bpl). Monitoring just below the ASR zone could provide an early warning of problem conditions such as saltwater upconing from below, if it were to occur.

Modifying the well to dual-zone status required installation of a nominal 2-inch-diameter fiberglass reinforced plastic (FRP) threaded casing and screen assembly (Appendix E), extending from the base of the well to land surface. The well screen is 20 feet in length and is machine-slotted (vertical slots). Upon installation of the casing/screen assembly, gravel pack was installed in the well annulus via the tremie method from a depth interval of 1,396 to 1,350 feet bpl. The lower zone was then developed to allow settling of the gravel pack prior to cementing. The annulus between the FRP casing and 12-inch borehole was then

filled with neat cement via the tremie-grout method in two stages to a depth of 1,010 feet bpl (Table 2-1). Figure 2-4 presents the completion diagram for MW-1.

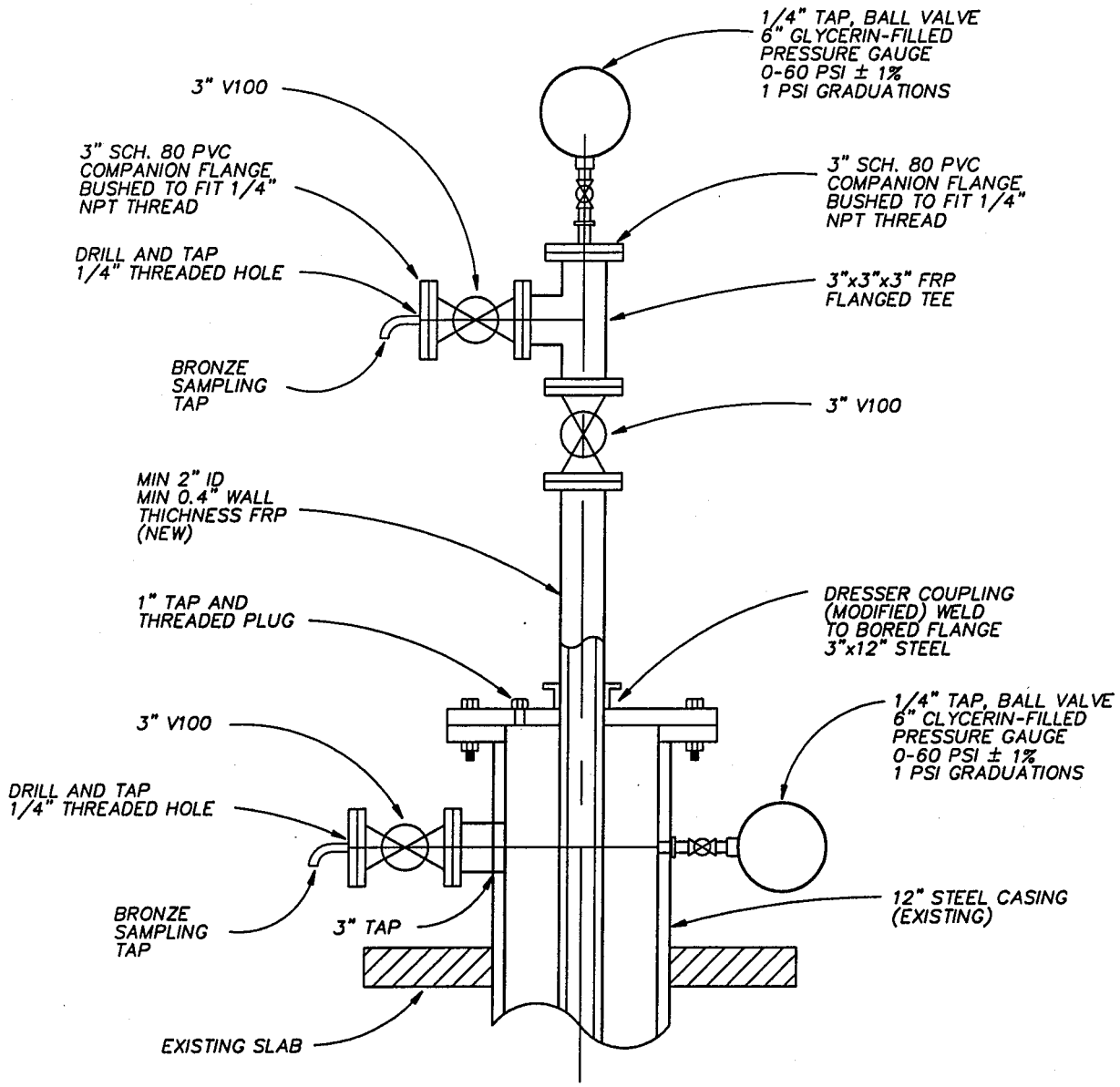


FIGURE 2-4

MONITOR WELL MW-1
WELLHEAD COMPLETION DIAGRAM

SECTION 3

Geologic Framework

Geology

Formation cutting samples from each ASR well were collected at 10-foot intervals from land surface to total depth and were characterized for rock type, color, consolidation, hardness, and fossils. Detailed lithologic descriptions of samples from each ASR well are provided in Appendix F.

Geophysical Logging

Geophysical logs were performed in the pilot holes of each ASR well to correlate formation samples collected during drilling, identify formation boundaries, and obtain specific data pertaining to the underground formations. These data were then used to assist in the selection of the optimum casing setting depths for each ASR well. A summary of geophysical logs conducted is shown in Table 3-1. Copies of geophysical logs are presented in Appendix G.

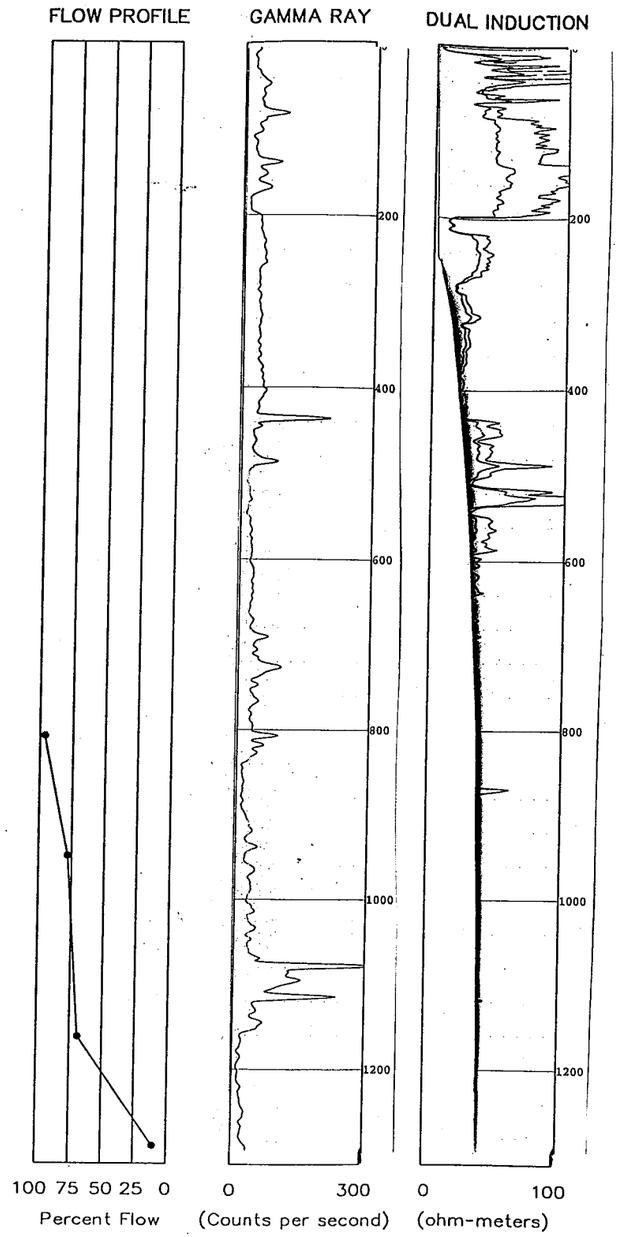
A stratigraphic profile from each ASR well was derived from the correlation of formation samples with geophysical logs run during pilot hole drilling. Strata encountered during construction of each ASR well ranged in age from Eocene to Pleistocene deposits. The stratigraphic units and their respective ages (presented in order from youngest to oldest) are as follows: undifferentiated Pleistocene and Pliocene Age sediments; the Hawthorn Group of Miocene Age; the Suwannee Limestone of Oligocene Age; and the Avon Park Limestone of Eocene Age. Figure 3-1 contains the general lithologic description, results from geophysical logs (flow profile, gamma ray, and dual-induction electric), and casing setting depths for ASR-1, considered representative of the 3 ASR wells.

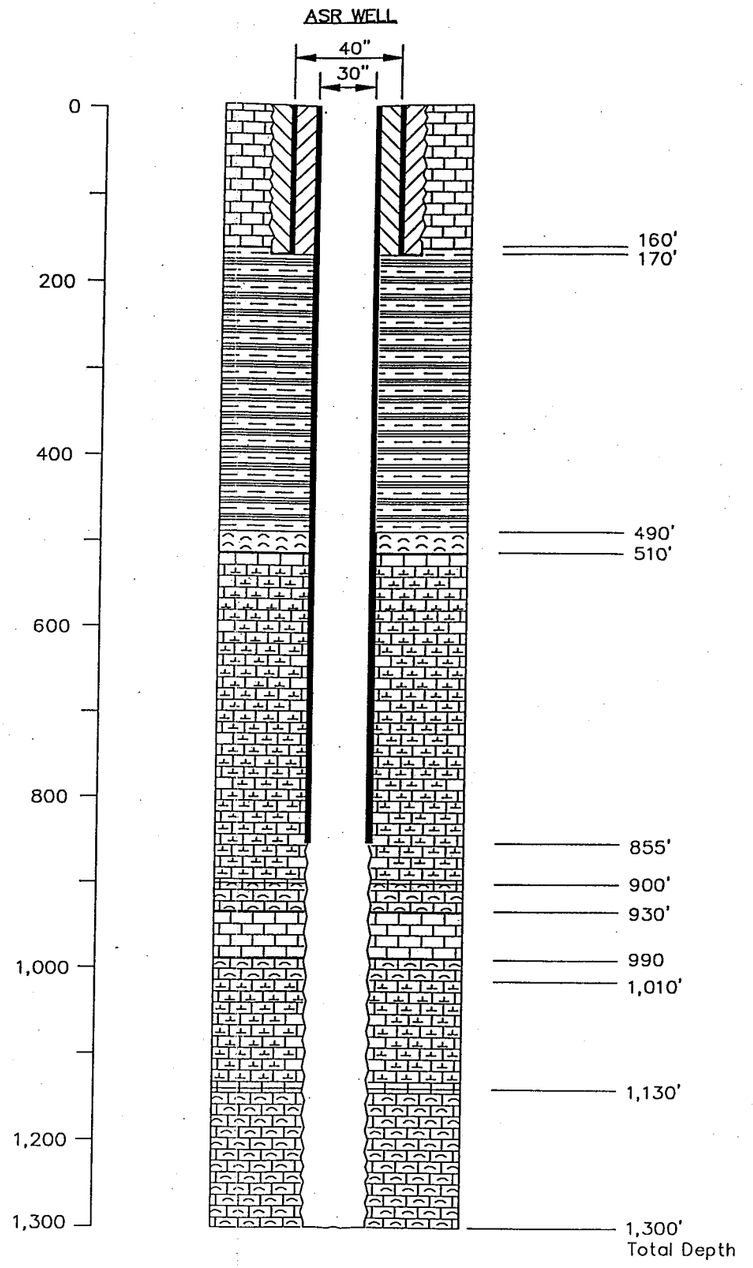
TABLE 3-1
Summary of Geophysical Logs
MDWASD - West Wellfield ASR Project

Date	Log(s)	Type	Depth (ft bpl)
	ASR-1		
11/24/96	Caliper, Gamma, Dual Induction	Pilot Hole	200
11/27/96	Temperature Log	Casing	170
11/30/96	Caliper, Gamma, Dual Induction, SP	Pilot Hole	902
12/5/96	Caliper, Gamma	Reamed Hole	860
12/6/96	Temperature Log	Casing	850
12/16/96	Caliper, Gamma, Temp, Fluid Res., Flowmeter	Pilot Hole	1,155
12/20/96	Caliper, Gamma, Dual Induction, Sonic, SP, Fluid Res., Flowmeter, Video	Pilot Hole	1,302
12/23/96	Caliper, Gamma	Reamed Hole	1,302
12/23/96	Cement Bond Log	Casing	850
1/6/97	Temperature, Fluid Resistivity, Flowmeter, Caliper	Reamed Hole	1,302
1/28/97	Final Video	Reamed Hole	1,302
	ASR-2		
1/7/97	Caliper, Gamma, Dual Induction, SP	Pilot Hole	200
1/8/97	Caliper, Gamma	Reamed Hole	188
1/10/97	Caliper, Gamma, Dual Induction, SP	Pilot Hole	902
1/16/97	Caliper, Gamma	Reamed Hole	850
1/24/97	Caliper, Gamma, Dual Induction, SP, Sonic, Temp.	Pilot Hole	1,350
1/27/97	Fluid Res., Flowmeter, Video	Pilot Hole	1,350
2/26/97	Cement Bond Log	Casing	845
2/26/97	Temperature, Fluid Res., Flowmeter, Caliper, Gamma	Reamed Hole	1,250
3/13/97	Final Video	Reamed Hole	1,250
	ASR-3		
2/12/97	Caliper, Gamma, Dual Induction, SP	Pilot Hole	207
2/14/97	Caliper, Gamma	Reamed Hole	180
2/18/97	Caliper, Gamma, Dual Induction, SP	Pilot Hole	900
2/21/97	Caliper, Gamma	Reamed Hole	840
2/28/97	Caliper, Gamma, Dual Induction, SP, Temp. Fluid Res., Flowmeter, Video	Pilot Hole	1,300
4/9/97	Temperature, Fluid Res., Flowmeter, Caliper, Gamma	Reamed Hole	1,210
4/17/97	Cement Bond Log	Reamed Hole	835
4/17/97	Final Video	Reamed Hole	1,210

03-18-98

DEPTH BELOW PAD SURFACE (Feet)	LITHOLOGIC DESCRIPTION	GEOLOGIC AGE	FORMATION NAME		HYDROGEOLOGIC UNIT
0	Limestone, Oolitic	Pleistocene	Miami Limestone Fort Thompson Formation		Surficial Aquifer System
	Calcareous Sandstone with Calcareous Clay	Pliocene	Tamiami		
200	Yellowish Gray to Light Olive Gray Phosphatic Clay, with minor amounts of inter bedded Limestone	Miocene	Peace River Formation	Hawthorn Group	Confining Unit
400					
600	Micritic Limestone, Silty, Yellowish Gray	Miocene	Arcadia Formation		Confining Unit
800					
1,000	Fossiliferous Biomicritic Limestone, Yellowish Gray, Pinkish Gray	Oligocene	Suwanne Limestone	Floridan Aquifer System	Artesian Aquifer
1,200	Very pale Orange Yellowish Gray to Pinkish Gray Porous, Finely Fragmented, Highly Fossiliferous Limestone	Eocene	Avon Park Limestone		
1,300					





LEGEND

- Shell Fragments
- Micritic Limestone
- Limestone
- Clay
- Fossiliferous Limestone
- Dolomite

FIGURE 3-1

GENERALIZED SUBSURFACE DATA AND COMPLETION DIAGRAM FOR ASR-1
MDWASD WEST WELLFIELD ASR PROJECT

CH2MHILL

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Lithostratigraphic Descriptions

Undifferentiated Pleistocene and Pliocene Series

From land surface to a depth of approximately 160 feet bpl, the lithology consists of poorly to well-consolidated sandstone, and limestone. Formations which make up the Pleistocene to Pliocene series at this site include the Miami Limestone, Fort Thompson Formation, and Tamiami Formation, though these formations were not differentiated in this project. These formations comprise the surficial aquifer system, locally known as the Biscayne aquifer. The gamma ray response in this interval is relatively low (0 to 50 counts per second [cps]), consistent with the clay-free formations encountered. The Tamiami Formation-Hawthorn Group boundary is not distinguishable on the gamma ray log, but is selected based on the first occurrence of olive-green clays at a depth of approximately 160 feet bpl.

Miocene Series

Hawthorn Group. The Hawthorn Group of Miocene Age constitutes the primary interval of confinement and low permeability between the surficial aquifer system and Floridan aquifer system. The Hawthorn Group sediments at the site occur from approximately 160 to 980 feet bpl and consist of dense, phosphatic calcareous siltstone, olive-green clay, and phosphatic limestone.

The Hawthorn Group has been subdivided into two formations by Scott (1988): the overlying Peace River Formation and the underlying Arcadia Formation. The Peace River Formation is siliciclastic in origin, consisting predominantly of calcareous siltstones and clays with some interbedded limestone layers. It underlies the Tamiami Formation, and its presence at the site is correlated with the first olive-green clay observed in the drill cuttings. Scott (1988) estimates a thickness of the Peace River Formation of approximately 300 feet at the site.

The Arcadia Formation, in contrast, is predominantly of carbonate origin (e.g., limestone). The top of the Arcadia Formation is placed at a depth of 490 feet bpl, corresponding to 20-foot-thick shell layer underlain by a silty limestone. This lithology extends to a depth of approximately 870 feet bpl, which also corresponds to a marked decrease in natural radioactivity on the gamma log. Scott (1988) estimates a thickness of the Arcadia Formation at the site of approximately 550 feet.

The gamma ray signature through the Hawthorn Group is consistently moderate to high (40 to 600 cps), with sharp off-scale (>100 cps) peaks occurring at approximately 435, 485,

725, 810 and 840 feet bpl. Lithologically, these gamma peaks correspond to highly phosphatic clay and limestone layers or formation contacts.

Oligocene Series

Suwannee Limestone. The Suwannee Limestone of Oligocene Age has variable thickness, ranging from 120 to more than 300 feet in southeast Florida (Miller, 1986). The Suwannee Limestone is characterized by a yellowish-gray to white, silty limestone with layers of diverse marine fauna including bryozoans, gastropods, and pelecypods.

The boundary between the overlying Hawthorn Group and Suwannee Limestone is ill-defined, given the similarity in lithology as confirmed by Reese (1994). For the purposes of this project, this contact is selected at 940 feet bpl for several reasons. First, a color change from white to pinkish-gray is observed. Second, this depth is consistent with the 550-foot thickness of the Arcadia Formation as reported by Scott (1988). Third, Meyer (1989) notes that unconformities (such as exists at the Hawthorn Group-Suwannee contact) are frequently the site of zones of dissolution. The permeable nature of the formation at this depth, as discussed in Section 4, *Hydrogeologic Testing* is evidence of a zone of dissolution.

An off-scale peak on the gamma log at a depths of 1,040 corresponds closely with a change in lithology from limestone to calcareous siltstone. Off-scale peaks on the gamma log at 1,120 to 1,145 correspond to a change in lithology from calcareous siltstone to a pinkish-gray limestone. Reese (1994) confirms the existence of phosphatic zones and coincident increased gamma ray responses at the base of the Suwannee Limestone. The base of the Suwannee Limestone is interpreted to occur at the base of the last gamma ray peak at approximately 1,145 feet bpl.

Eocene Series

Avon Park Limestone. The Avon Park Limestone of Eocene Age occurs from a depth of approximately 1,150 feet bpl to below the total depth of the well. The observed lithology closely matches that described by Chih Shan Chen in Florida Geological Bulletin No. 45, *The Regional Lithostratigraphic Analysis of Paleocene and Eocene Rocks of Florida, 1965.* This late- to mid-Eocene age formation is a light gray to grayish-orange, poor to well consolidated limestone with microfauna including forams. The 1,150-foot depth represents a change in lithology as described above, as well as a sharp decrease in gamma ray activity. Reese (1994) confirms the low, natural radioactivity on the gamma log. Reese (1994) also presents a top-of-Eocene-rocks contour map of Miami-Dade County confirming the top of the Avon Park Limestone at the site. As stated above, Meyer (1989) notes that zones of dissolution (high permeability) correspond to unconformities associated with formation contacts.

A high permeability zone begins at an approximate depth of 1,150 feet bpl, as indicated on the flowmeter log as discussed in Section 4, *Hydrogeologic Testing*.

Miller (1986) observed that portions of the Avon Park Limestone are fine-grained and have low permeability, thereby acting as intra-aquifer confining units within the Floridan aquifer system. This is confirmed by the flowmeter log for each ASR well as described more fully in Section 4, *Hydrogeologic Testing*.

SECTION 4

Hydrogeologic Testing

Pad Monitor Wells

Prior to the start of and during construction at each ASR well, water samples were collected on a weekly basis from the four surficial pad monitor wells (PMWs; one located at each corner of each drilling pad). Samples were sent to the MDWASD laboratory at the Alexander Orr Jr. WTP for total dissolved solids [TDS], conductivity, and chlorides analysis. In general, slight variability in water quality values was observed, consistent with natural temporal variations in water quality and laboratory precision. One exception to this was an inadvertent, overnight artesian overflow of MW-1, resulting in a few hundred gallons discharged to the ground. However, water quality within the PMWs returned to normal within a few weeks. This discharge was identified, regulatory agencies promptly notified, and the wellhead sealed to prevent future occurrences. Remedial measures included continuous purging of PMWs for several hours until water quality returned to ambient conditions. A summary of analytical data from each of the PMWs is presented in Appendix H.

Pilot Hole Data

Water samples were also collected at approximately 30-foot intervals during reverse-air open-circulation drilling of each ASR well. The purpose of these samples was to provide a generalized profile of water quality changes with respect to depth. Water samples were analyzed by the MDWASD laboratory for conductivity, chlorides, and TDS. A summary of pilot-hole water quality data is presented in Table 4-1. In general, water quality was approximately 4,000 to 4,500 mg/L TDS from the base of each casing (approximately 850 feet bpl) to 1,100 feet bpl. At this depth, water quality degraded slightly, with TDS values ranging from 5,000 to 6,000 mg/L. This change in water quality roughly corresponds to a more permeable zone at approximately 1,100 feet bpl. Other than these observations, water quality was fairly uniform with depth.

Geophysical Logs

Geophysical logs were conducted on the open-hole portion of each ASR well to delineate flow zones. Logs particularly useful in delineating flow zones include caliper, flowmeter, temperature, and fluid resistivity. By analyzing the flowmeter and caliper logs

TABLE 4-1
Pilot Hole Water Quality Data
MDWASD - West Wellfield ASR Project

ASR-1				ASR-2				ASR-3			
Depth (feet bls)	Chloride (mg/L)	Conductivity (µmho/cm)	TDS (mg/L)	Depth (feet bls)	Chloride (mg/L)	Conductivity (µmho/cm)	TDS (mg/L)	Depth (feet bls)	Chloride mg/L)	Conductivity (µmho/cm)	TDS (mg/L)
900	1,010	NA	NA	900	1,260	6,660	4,440	900	NA	NA	NA
930	1,120	NA	NA	930	1,300	6,080	4,100	930	NA	NA	NA
960	1,120	NA	NA	960	1,240	6,100	4,060	960	1,340	6,980	4,660
990	1,100	NA	NA	990	1,280	6,360	4,260	990	1,400	6,900	4,600
1,020	1,140	NA	NA	1,020	1,280	6,420	4,280	1,020	1,380	6,860	4,560
1,050	1,120	NA	NA	1,050	1,300	6,880	4,580	1,050	1,400	6,800	4,540
1,080	1,100	NA	NA	1,080	1,300	6,860	4,540	1,080	1,360	6,860	4,560
1,110	1,060	NA	NA	1,100	1,400	5,840	3,880	1,100	1,360	6,860	4,560
1,140	1,130	NA	NA	1,130	1,840	8,180	5,460	1,130	1,600	7,520	5,020
1,150	640	NA	NA	1,160	1,900	8,300	5,520	1,160	1,560	7,480	4,960
1,180	1,660	6,500	4,360	1,190	1,820	8,540	5,640	1,190	1,610	6,960	4,630
1,203	1,800	6,520	4,480	1,220	1,920	8,500	5,640	1,220	2,000	7,640	5,100
1,233	1,880	7,300	4,800	1,250	1,920	8,300	5,480	1,250	1,980	7,690	5,120
1,263	1,960	7,860	5,240	1,280	2,000	8,700	5,700	1,280	1,980	7,670	5,110
1,293	1,920	7,800	5,100	1,310	2,040	8,520	5,660	1,310	1,980	7,670	5,110
1,300	1,600	9,140	6,080	1,340	2,040	8,500	5,660	1,340	NA	NA	NA
				1,350	2,000	8,620	5,800	1,350	NA	NA	NA

Note: NA = Not available

concurrently, water velocity with depth, and therefore the percent contribution of flow within the borehole can be calculated. Table 3-1 summarizes geophysical logs conducted, copies of which are contained in Appendix G. Appendix G also presents flow profiles of both the pilot and reamed boreholes. A brief description of flow zones identified in geophysical logs of each ASR well is presented below.

ASR-1

Flow logs were conducted in two phases on ASR-1; first, form the base of casing (850 feet bpl) to 1,155 feet bpl, and second, from base of casing to 1,302 feet bpl. The logs indicated two predominant flow zones: 900 to 940 and 1,160 to 1,240 feet bpl.

The caliper log indicates a washout below the base of the casing, which is commonly observed following reverse-air drilling operations. The caliper log indicated a relatively gauge hole (i.e., similar to the drilled diameter) down to 1,100 feet bpl, where diameter gradually increases from approximately 15 to 28 inches. The fluid resistivity and temperature logs indicate slight deflections from approximately 900 to 950 feet bpl,

interpreted to indicate a flow zone. The flowmeter log indicates increased flow from 1,170 to 1,210 feet bpl. This is consistent with the increased artesian flow (800 gpm at 1,197 feet bpl) observed during pilot-hole drilling.

Based on the results of the final (reamed hole) flowmeter log of ASR-1 (Appendix G), it was apparent that 65-percent of the flow from the open borehole originated from a depth between 1,140 and 1,260 feet bpl. A smaller flow zone extends from the base of casing to 940 feet bpl, consistent with the other geophysical logs.

ASR-2

Flow logs were conducted from the base of casing (845 feet bpl) to 1,350 feet bpl on the pilot hole and indicate two predominant flow zones: 980 to 1,020 and 1,130 to 1,210 feet bpl.

The caliper log indicates a washout below the base of the casing, which is commonly observed following reverse-air drilling operations. The caliper log indicated a relatively gauge hole (i.e., similar to the drilled diameter), except between 1,180 and 1,260 where borehole diameter increases a few inches. The fluid resistivity and temperature logs indicate slight deflections from approximately 1,150 to 1,240 feet bpl, interpreted to indicate a flow zone. The flowmeter log indicates increased flow from 1,145 to 1,210 feet bpl.

Based on the results of the final (reamed hole) flowmeter log of ASR-2 (Appendix G), it was apparent that 70-percent of the flow from the open borehole originated from a depth between 1,140 and 1,210 feet bpl. A smaller flow zone extends from 980 to 1,020 feet bpl, consistent with the other geophysical logs.

ASR-3

Flow logs were conducted from the base of casing (835 feet bpl) to 1,300 feet bpl on the pilot hole and indicate two predominant flow zones: 835 to 1,000 and 1,100 to 1,276 feet bpl.

The caliper log indicates a washout below the base of the casing, which is commonly observed following reverse-air drilling operations. The caliper log indicated a relatively gauge hole (i.e., similar to the drilled diameter), except between 1,160 and 1,250 where borehole diameter increases a few inches. The fluid resistivity log indicates a slight deflection at 1,200 feet bpl, interpreted to indicate a flow zone. The flowmeter log indicates increased flow from 1,120 to 1,200 feet bpl.

Based on the results of the final (reamed hole) flowmeter log of ASR-3 (Appendix G), it was apparent that 65-percent of the flow from the open borehole originated from a depth between 1,100 and 1,210 feet bpl. A smaller flow zone extends from 970 to 1,010 feet bpl, consistent with the other geophysical logs.

Acidization

Acidization was conducted at each ASR well to improve each well's specific capacity, defined herein as the flow rate (gpm) divided by the water level drawdown (feet). Acidization was conducted by installing a 3-inch-diameter tubing into each ASR well-sealed at the wellhead—to a depth selected by CH2M HILL. These target depths were based on fractures or flow zones delineated by flowmeter logging as described above. Acid was delivered to the site in approximately 5,000-gallon tanker trucks, and pumped into the well by the contractor. During placement of the acid, potable water was simultaneously injected into the well at a rate of approximately 200 gpm. Freshwater injection served to maintain flow in the well to prevent upward migration of acid inside the casing, and to force the acid into the formation.

Wellhead pressures typically increase following acidization, due to the aggressive chemical reaction between the acid and the carbonate (limestone) formation, yielding carbon dioxide buildup. Following acidization, the well was shut in overnight to allow the acid reactions to occur and aggressively dissolve the carbonate formations of the ASR storage zone. Wellhead pressures were monitored by the contractor, and excess pressure manually released at the wellhead with a ball valve. With the pump still in the well, the spent acid could be discharged to the onsite force main. Additionally, the well's specific capacity could be recorded and the need for additional acidization be evaluated. If acidization only slightly improved specific capacity, either the target depth was changed or acidization was discontinued.

A summary of acidization activities is presented in Table 4-2. This table describes the depth of acid injection, acid volume, and pre- and post-acidization specific capacity of the well. In general, the results of acidization were very successful, with specific capacity increasing between 45 and 75 percent. Acid volumes for each well ranged from approximately 20,000 to 25,000 gallons.

TABLE 4-2
Summary of Acidization Operations
MDWASD - West Wellfield ASR Project

Well Number	Date	Injection Depth (ft bpl)	Acid Volume Gallons)	Pre-Acidization Specific Capacity (gpm/ft)	Post-Acidization Specific Capacity (gpm/ft)
ASR-1	1/17/97	871	10,129	34.3	55.2
ASR-1	1/20/97	1,152	4,964	55.2	55.1
ASR-1	1/21/97	1,152	5,007		55.1
ASR-1	1/23/97	871	4,700		55.1
ASR-2	2/12/97	1,150	9,417	30.8	46.5
ASR-2	2/20/97	870	10,000	46.5	52.9
ASR-3	3/17/97	1,130	9,572	27.7	31.1
ASR-3	3/20/97	870	4,844	31.1	39
ASR-3	3/26/97	930	4,764	39	40
ASR-3	4/1/97	1,150	4,594	40	40

Notes:
ft bpl = feet below pad level
gpm/ft = gallons per minute per foot

Pumping Tests

Pumping tests were conducted at each ASR well to evaluate flow characteristics of the storage zone and assist in the final design of the permanent recharge and recovery pumps. The tests included an approximately 8-hour step pumping test on each ASR well, and a 72-hour constant-rate (3,500 gpm) test on ASR-1. Pumping test data is presented in Appendix I.

Step-Pumping Tests

The step-pumping tests were conducted on each ASR well upon construction completion to evaluate water level drawdown in the well at 3 different pumping rates. From this information, hydraulic characteristics and pumping water level could be determined to assist in final pump design.

To perform the test, a temporary vertical turbine pump was installed at each ASR well, with the pump set to a depth of approximately 100 feet bpl on 14-inch column pipe. A pressure gauge was used to measure and record discharge pressure. Temporary, 16-inch steel piping was set up to convey water from the drilling pad at each ASR well to the onsite force main. Static water level prior to the test was approximately 21 feet above pad level. Note that the well must have been partially "killed" as static level is typically 30 feet above pad level. An in-line flowmeter with totalizer was used to measure flow. Each test was conducted at three flow rates, and results are summarized in Table 4-3 below:

TABLE 4-3
Summary of Step-Test Results
MDWASD - West Wellfield ASR Project

	Well Date	Duration (hours)	Flow Rate (gpm)	Drawdown (feet)	Specific Capacity (gpm/ft)
ASR-1	1/26/97	2	1,400	5.40	269
ASR-1	1/26/97	3.5	2,800	52.54	53.3
ASR-1	1/26/97	2	4,000	76.80	52.1
ASR-2	2/25/97	2	1,500	11.85	126.6
ASR-2	2/25/97	2.5	2,800	49.38	56.7
ASR-2	2/25/97	2.5	3,800	74.37	51.1
ASR-3	4/8/97	1.25	1,500	32.52	46.1
ASR-3	4/8/97	2	2,800	68.75	40.7
ASR-3	4/8/97	4	3,800	99.61	38.2

Figures 4-1, 4-2, and 4-3 display drawdown data versus time for the 3 pumping rates of each step test. From this data, optimum well recharge and recovery rates were determined and assisted in final pump selection. Based on the above information, the final design recharge and recovery rate for each well was approximately 3,500 gpm (5 mgd).

ASR-1 Constant Rate Test

A 72-hour, constant-rate (3,500 gpm) pumping test was conducted at ASR-1 on December 9, 1997. The purpose of this test was to evaluate aquifer characteristics of the proposed storage zone. Water levels were measured in ASR-1, ASR-2, ASR-3, and MW-1 before, during, and after pumping ASR-1. Most of the data obtained was through the use of a HERMIT® data logger and pressure transducer system. Two pressure transducers were set up at each well for confirmatory purposes. Background data collection commenced on December 6, 1997 and water levels remained fairly constant with no appreciable tidal fluctuations. After a few false starts, water levels were allowed to stabilize and the official test began on December 9, 1997 at approximately 14:30. Flowmeter discrepancies resulted in some temporary pump shutdowns, but the pump was quickly restarted and the test continued. The 72-hour test was conducted using the permanent recovery pump and piping and flowmeter, with water conveyed to the 72-inch raw water main.

Data and analyses from the 72-hour aquifer test are presented in Appendix I. The data were analyzed by the Walton (1962) method for leaky aquifers, and the Cooper-Jacob straight-line method. These data are summarized in Table 4-4 below, and indicate an average transmissivity of 118,000 gallons per day per foot (gpd/ft), a storage coefficient of

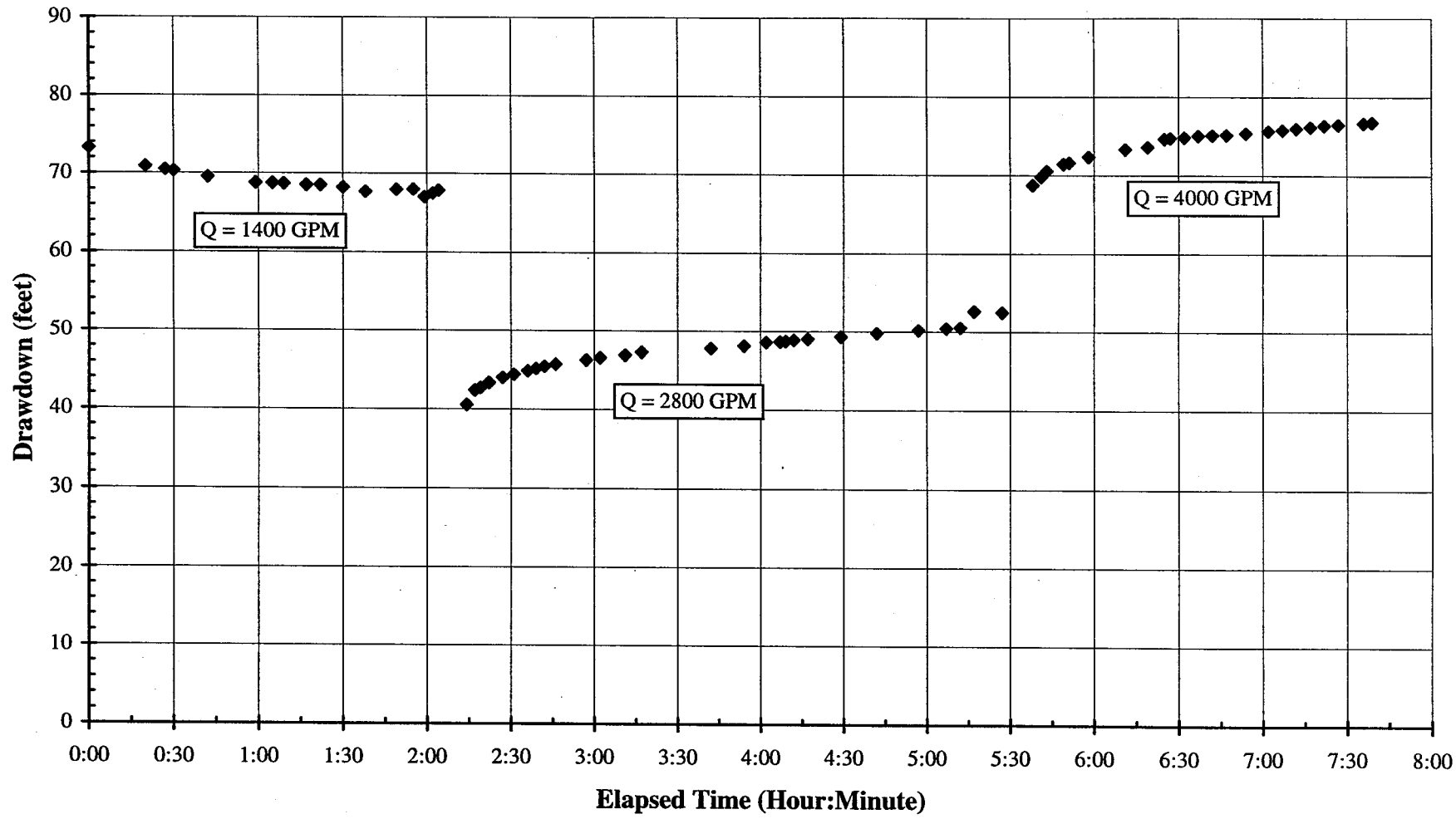


FIGURE 4-1
Graph of Drawdown Versus Time

CH2MHILL

MDWASD
Step Pumping Test for ASR-1

File: Asr1.xls : pumping test plot Date: 4/17/98 Time: 9:45 AM

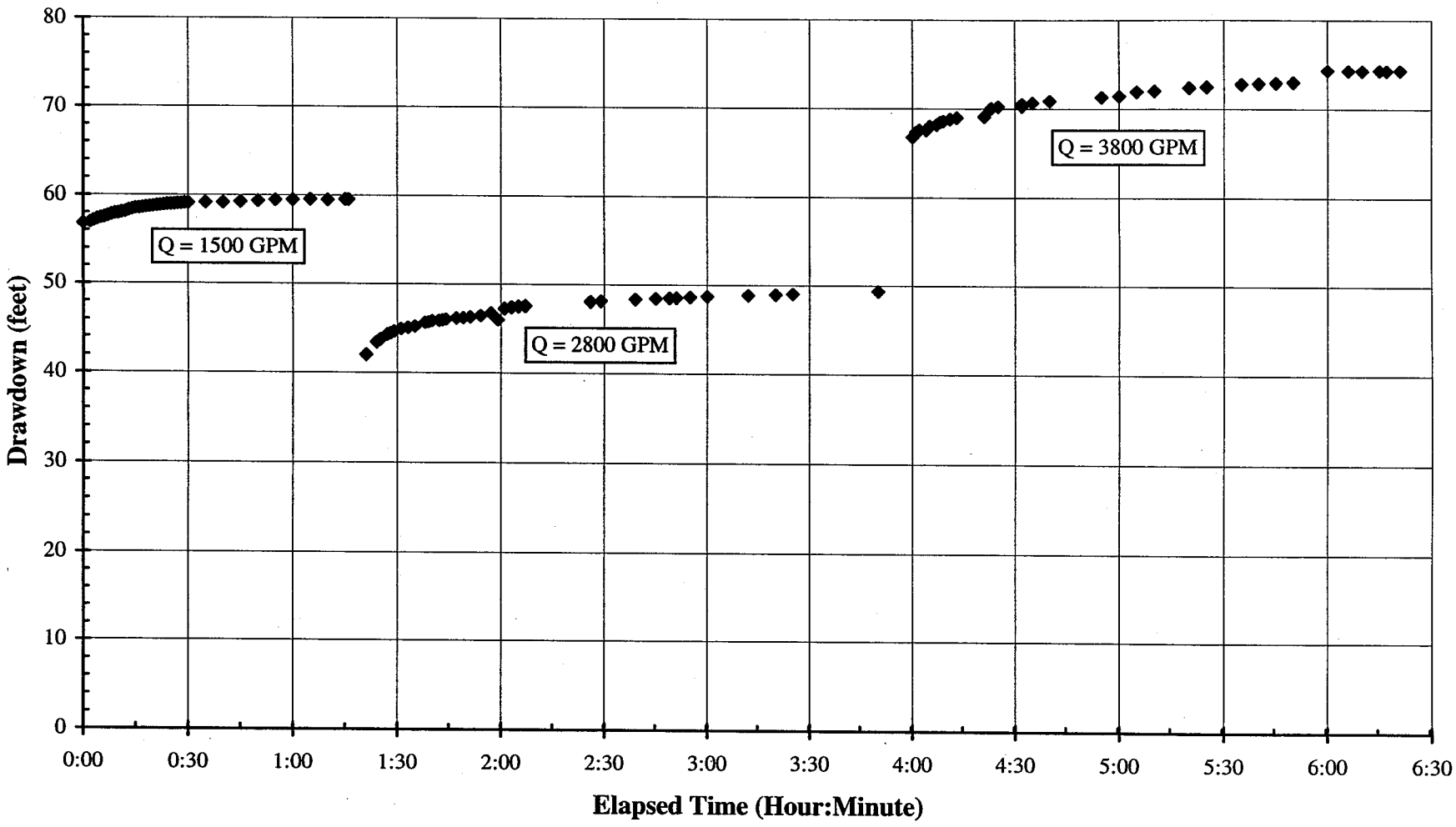


FIGURE 4-2
Graph of Drawdown Versus Time

CH2MHILL

MDWASD
Step Pumping Test for ASR-2

File: Asr2.xls : pumping test plot Date: 4/17/98 Time: 9:46 AM

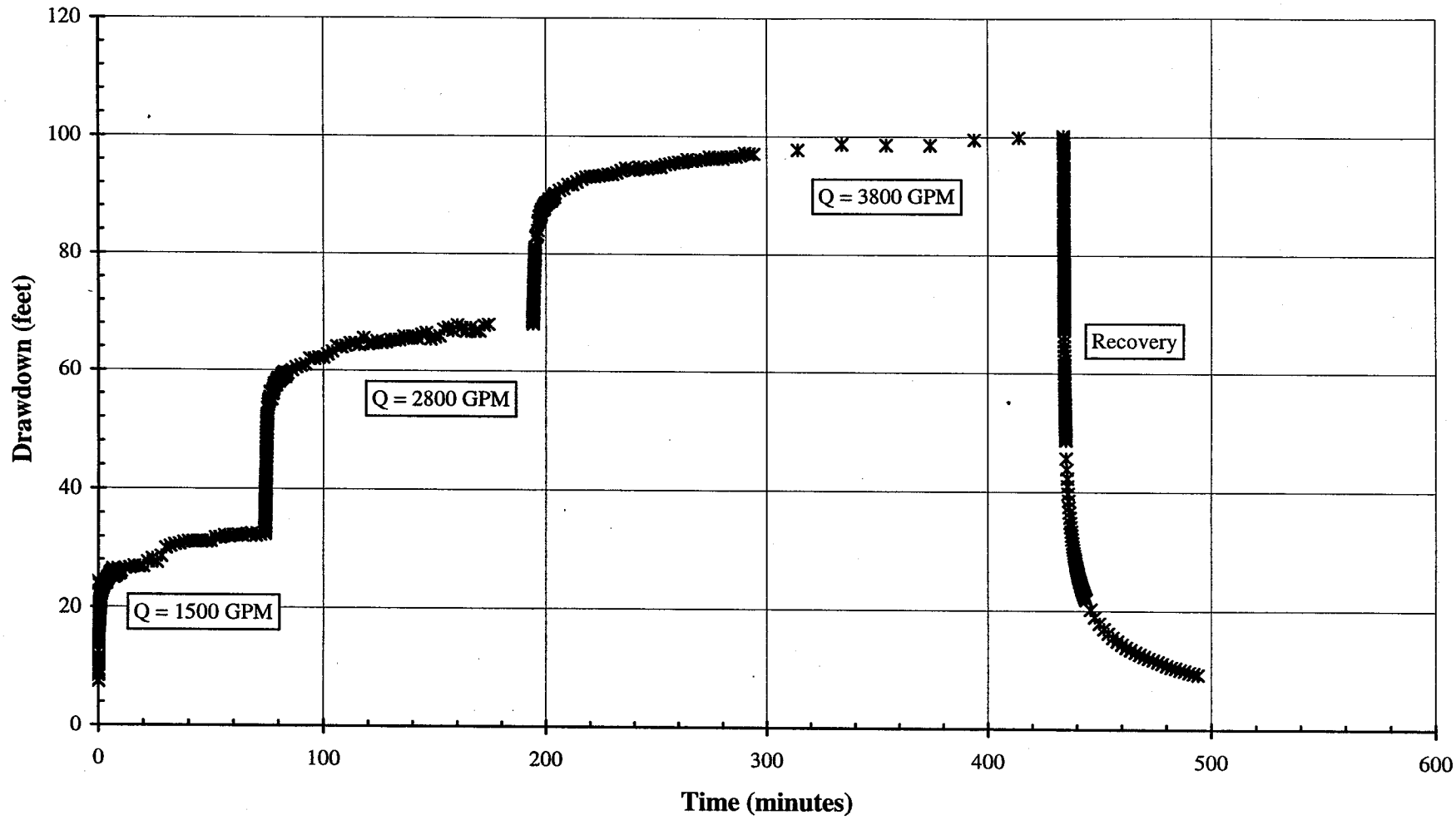


FIGURE 4-3
Graph of Drawdown Versus Time

CH2MHILL

MDWASD
Step Pumping Test for ASR-3

File: Asr3.xls : pumping test plot Date: 4/17/98 Time: 9:47 AM

3.6 x 10^{-4} and a leakance value of 3.1 x 10^{-3} gpd/ft^2/ft. These data can be used to evaluate aquifer response based on future operating conditions in the ASR wells.

TABLE 4-4
Summary of Aquifer Test Analysis
MDWASD - West Wellfield ASR Project – December 9, 1997

	Transmissivity (gpd/ft)			Storativity (dimensionless)			Leakance (gpd/ft^2/ft)		
Method	**ASR-1**	**ASR-2**	**ASR-3**	**ASR-1**	**ASR-2**	**ASR-3**	**ASR-1**	**ASR-2**	**ASR-3**
Walton	NA	115,000	115,000	NA	3.9 x 10^{-4}	4.4 x 10^{-4}	NA	1.2 x 10^{-2}	2.9 x 10^{-4}
Cooper-Jacob	77,000	136,000	147,000	NA	2.9 x 10^{-4}	3.3 x 10^{-4}	NA	NA	NA
Average	118,000			3.6 x 10^{-4}			3.1 x 10^{-3}		

Notes:
gpd/ft = gallons per day per foot
NA = Not Analyzed - Method Inappropriate

Water Quality

Background water quality samples were obtained at each ASR well and both zones of MW-1 to establish baseline water quality prior to cycle testing. The FDEP construction permit specified that samples be analyzed for primary and secondary drinking water standards (DWS) parameters and the minimum criteria parameters commonly known as "freefroms."

Results of these analyses are summarized in Table 4-5, and laboratory analytical reports are presented in Appendix J. Water quality data from each ASR well is consistent with each other. The brackish waters of the Floridan aquifer system are known to contain higher dissolved solids concentrations than that of the Biscayne aquifer, for example.

Inorganic parameters that exceed maximum contaminant levels (MCLs) from each ASR well water sample include sodium, chlorides, sulfate, iron, and TDS. The only organic parameters detected were THMs (9.93 µg/L) and total xylene (11 µg/L), both at ASR-1 though significantly below the MCLs of 100 and 10,000 µg/L, respectively. Radiological parameters (gross alpha and radium-226/228) at ASR-2 and ASR-3 and the lower zone of MW-1 exceed the MCLs. However, the relatively high TDS levels of the Floridan aquifer system are known to result in false positive readings for these parameters.

Table 4-5
Background Water Quality Analysis, ASR-1, ASR-2, ASR-3, and MW-1

Primary Drinking Water Standards: Inorganics						
		MW-1				
Parameter	MCL (mg/L)	Upper 2/6/97 (mg/L)	Lower 2/6/97 (mg/L)	ASR-1 1/26/97 (mg/L)	ASR-2 2/25/97 (mg/L)	ASR-3 4/9/97 (mg/L)
Antimony	0.006	<0.005	<0.005	<0.005	<0.005	<0.005
Arsenic	0.05	0.0025	0.024	<0.01	<0.0025	<0.0022
Barium	2	0.275	1.33	<0.05	0.376	<0.200
Beryllium	0.004	<0.002	<0.002	<0.002	<0.002	<0.002
Cadmium	0.005	<0.003	<0.003	<0.005	<0.003	<0.003
Chromium	0.10	<0.020	<0.020	0.019	<0.020	<0.020
Cyanide	0.20	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoride	4.0	1.7	0.38	1.5	1.86	1.80
Lead	0.015	<0.040	<0.040	0.005	<0.0001	<0.001
Mercury	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	0.1	0.039	0.082	<0.005	<0.010	<0.010
Nitrate (as N)	10.0	<0.01	<0.01	NA	0.11	<0.01
Nitrite (as N)	1.0	<0.01	<0.01	NA	<0.01	<0.01
Selenium	0.05	<0.004	<0.004	<0.010	<0.002	<0.004
Sodium	160	**1,150**	**2,167**	**950**	**1,029**	**1,053**
Thallium	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Coliform, Total (col/100 ml)		<1	<1	NA	<1	TNTC
Primary Drinking Water Standards: Volatile Organics						
Parameter	**MCL (ug/L)**	**Upper (ug/L)**	**Lower (ug/L)**	**ASR-1 (ug/L)**	**ASR-2 (ug/L)**	**ASR-3 (ug/L)**
THMs (Total)	100	0.5	1.1	9.93	<0.5	<0.5
Trichloroethene	3	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	3	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon Tetrachloride	3	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl Chloride	1	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	200	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	3	<0.5	<0.5	<0.5	<0.5	<0.5
Benzene	1	<0.5	<0.5	<0.5	<0.5	<0.5
Cis-1,2-Dichloroethene	70	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethene	7	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	700	<0.5	<0.5	2.8	<0.5	<0.5
Monochlorobenzene	100	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	600	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	75	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	100	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	1,000	<0.5	<0.5	<0.5	<0.5	<0.5
Trans-1,2-Dichloroethene	100	<0.5	<0.5	<0.5	<0.5	<0.5
Xylenes (Total)	10,000	<0.5	<0.5	11	<0.5	<0.5
Dichloromethane (Methylene Chloride)	5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	70	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylene Dibromide	0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Dibromochloropropane	0.2	<0.02	<0.02	<0.02	<0.02	<0.02

Table 4-5
Background Water Quality Analysis, ASR-1, ASR-2, ASR-3, and MW-1

Primary Drinking Water Standards: Organics						
Parameter	**MCL (ug/L)**	**Upper (ug/L)**	**Lower (ug/L)**	**ASR-1 (ug/L)**	**ASR-2 (ug/L)**	**ASR-3 (ug/L)**
Pesticides/PCBs						
Alachlor	2	<0.01	<0.01	<0.01	<0.01	<0.01
Atrazine	3	<0.20	<0.20	<0.20	<0.20	<0.20
Metribuzin	NA	<0.25	<0.25	<0.25	<0.25	<0.25
Simazine	4	<0.50	<0.50	<0.50	<0.50	<0.50
Endrin	2	<0.01	<0.01	<0.01	<0.01	<0.01
Lindane	0.2	<0.01	<0.01	<0.01	<0.01	<0.01
Methoxychlor	40	<0.01	<0.01	<0.01	<0.01	<0.01
Toxaphene	3	<0.01	<0.01	<0.01	<0.01	<0.01
Chlordane	2	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor	0.4	<0.01	<0.01	<0.01	<0.01	<0.01
Heptachlor Epoxide	0.2	<0.01	<0.01	<0.01	<0.01	<0.01
PCB	0.5	<0.01	<0.01	<0.01	<0.01	<0.01
Propachlor	NA	<1.0	<1.0	<1.0	<1.0	<1.0
Aldrin	NA	<0.09	<0.09	<0.09	<0.09	<0.09
Dieldrin	NA	<0.02	<0.02	<0.02	<0.02	<0.02
Metolachlor	NA	<0.90	<0.90	<0.90	<0.90	<0.90
Herbicides						
2,4-D	70	<20.0	<0.20	<0.20	<0.20	<0.20
2,4,5-TP (Silvex)	50	<0.20	<0.20	<0.20	<0.20	<0.20
Pentachlorophenol	1	<0.20	<0.20	<0.20	<0.20	<0.20
Picloram	500	<0.20	<0.20	<0.20	<0.20	<0.20
Dalapon	200	<1.30	<1.30	<1.30	<1.30	<1.30
Dicamba	NA	<0.20	<0.20	<0.20	<0.20	<0.20
Dinoseb	7	<0.20	<0.20	<0.20	<0.20	<0.20
Base Neutrals						
Hexachlorobenzene	1	<0.01	<0.01	<0.01	<0.01	<0.01
Hexachlorocyclopentadiene	50	<0.01	<0.01	<0.01	<0.01	<0.01
Benzo(a)pyrene	0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Di(2-ethylhexyl)phthalate	6	<5.0	<5.0	<5.0	<5.0	<5.0
Di(2-ethylhexyl)adipate	400	<5.0	<5.0	<0.5	<0.5	<0.5
Other Organics						
Carbofuran	40	<10.0	<10.0	<10.0	<10.0	<10.0
Carbaryl	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Methomyl	NA	<2.5	<2.5	<2.5	<2.5	<2.5
Aldicarb Sulfoxide	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Aldicarb Sulfone	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Aldicarb	NA	<5.0	<5.0	<5.0	<5.0	<5.0
3-Hydroxycarbofuran	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Oxamyl (Vydate)	200	<50.0	<50.0	<50.0	<50.0	<50.0
Endothall	100	<10.0	<10.0	<10.0	<10.0	<10.0
Glyphosate (Roundup)	700	<10.0	<10.0	<10.0	<10.0	<10.0
Diquat	20	<0.5	<0.5	<0.5	<0.5	<0.5

Table 4-5
Background Water Quality Analysis, ASR-1, ASR-2, ASR-3, and MW-1

Unregulated Organics						
2-Chlorophenol	NA	<10.0	<10.0	<10.0	<10.0	<10.0
2-Methyl-4, 6-dinitrophenol	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Phenol	NA	<10.0	<10.0	<10.0	<10.0	<10.0
2,4,6-Trichlorophenol	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Butylbenzylphthalate	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Di-n-butylphthalate	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Diethylphthalate	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Dimethylphthalate	NA	<10.0	<10.0	<10.0	<10.0	<10.0
2,4-Dinitrotoluene	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Di-n-octylphthalate	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Isophorone	NA	<10.0	<10.0	<10.0	<10.0	<10.0
Primary Drinking Water Standards: Radionuclides						
Parameter	**MCL**	**Upper**	**Lower**	**ASR-1**	**ASR-2**	**ASR-3**
Radium 266 and 228	5pCi/l	4.1	**7.3**	4.1	**10.7**	**13.5**
Gross Alpha	15pCi/l	12.9	**15.4**	7.8	**47**	**19.3**
Secondary Drinking Water Standards						
Parameter	**MCL (mg/L)**	**Upper (mg/L)**	**Lower (mg/L)**	**ASR-1 (mg/L)**	**ASR-2 (mg/L)**	**ASR-3 (mg/L)**
Aluminum	0.2	<0.200	<0.200	<0.05	<0.200	<0.200
Chloride	250	**2,499**	**4,649**	**2,000**	**2,449**	**2,349**
Copper	1.0	<0.010	0.020	0.005	0.010	0.023
Color	15 PCU	12	12	10	2	**31**
Fluoride	2.0	1.7	0.38	1.5	1.86	1.80
Foaming Agents (MBAS)	0.5	0.2	0.27	<0.01	0.13	0.18
Iron	0.3	**0.501**	**0.443**	**4.295**	**0.343**	**0.575**
Manganese	0.05	0.017	0.013	**0.165**	0.012	0.015
Odor	3 TON	2	**4**	1	2	1
pH (at Collection Point)	6.5 - 8.5	7.36	**10.61**	6.91	7.12	8.39
Silver	0.1	<0.010	0.017	<0.004	<0.010	<0.010
Sulfate	250	**662**	**466**	238	**615**	**595**
Total Dissolved Solids (TDS)	500	**4,300**	**7,220**	**5,980**	**4,390**	**4,040**
Zinc	5	0.19	0.016	0.018	0.065	0.324
Other Parameters						
2,3,7,8-TCDD (Dioxin)	NA	<0.00003	<0.00003	<0.00003	<0.00003	<0.00003
TKN	NA	1.63	0.76	0.87	0.71	0.91
Ammonia	NA	0.50	0.42	0.68	0.40	0.49
Organic Nitrogen	NA	1.13	0.34	0.19	0.31	0.42
Total Nitrogen	NA	1.63	0.76	0.91	0.82	0.91
Total Phosphorous	NA	0.03	0.7	NA	0.22	0.29
Orthophosphate	NA	<0.02	<0.02	<0.02	0.19	0.20
Conductivity (umhos/cm)	NA	6,520	10,590	8,980	6,650	6,750
Corrosivity	NA	0.2	3.6	-0.1	0.71	1.91
BOD (5-day)	NA	<1	<1	<1	1.8	1.9

1. Maximum Contaminant Level (MCL) per Rules 17-550.310 and 17-550.320, FAC.
2. Analyses conducted by Sanders Laboratories and Precision Laboratories

SECTION 5

Mechanical Integrity Testing

Mechanical integrity testing (MIT) of each ASR well was performed by conducting a casing pressure test, a cement bond log (CBL), and a video survey of each completed well. Results of MIT testing for each ASR well are summarized below.

ASR-1

On December 12, 1996, a casing pressure test was successfully performed on ASR-1 following cementing of the final 30-inch steel casing. The cement plug at the base of the casing did not provide the desired seal, so a temporary, inflatable packer was installed at the base of the casing and inflated to facilitate the test. The pressure test was performed by filling the casing with freshwater to eliminate air from inside the casing, and sealing the wellhead with a welded steel plate. The casing was then pressurized to 101.5 psi with a high pressure pump. A 200-psi calibrated pressure gauge was used to measure casing pressure. A summary of the casing pressure test data sheet is presented in Appendix K. A copy of the pressure gauge calibration certificate is provided in Appendix L.

One hour after establishing the initial pressure at 101.5 psi, the pressure was recorded at 101.8 psi. The 0.3 psi gain was well within the 5 percent limit specified by FDEP regulations. The test was continued for an additional hour with no significant change in pressure observed. The casing pressure test was observed by Mr. Greg Ford from CH2M HILL and Mr. Mark Silverman from FDEP. A total of 17.5 gallons of water was drained from the casing while pressure was released.

On December 23, 1996, the cement behind the ASR-1 casing was evaluated by conducting a CBL log from the base of the 30-inch-diameter steel casing at 855 feet bpl to pad level. The CBL log demonstrates an adequate cement bond around the 30-inch casing from 995 feet bpl to pad level. A copy of the CBL log is presented in Appendix G.

A video survey of ASR-1 was conducted on January 28, 1997. The video survey showed no inconsistencies and the 30-inch steel casing appeared in good condition. Casing joints were visible throughout the casing string. The video survey was conducted from pad level to 1,304 feet bpl at the borehole terminus. Alternating layers of caverns and relatively impermeable (tight) formations were observed throughout the survey. The video survey summary and video tape are provided in Appendix M.

ASR-2

On January 21, 1997, a casing pressure test was successfully performed on ASR-2 following cementing of the final 30-inch steel casing. The cement plug at the base of the casing served as a seal to facilitate the test. The pressure test was performed by filling the casing with freshwater to eliminate air from inside the casing, and sealing the wellhead with a welded steel plate. The casing was then pressurized to 109.9 psi with a high pressure pump. A 200-psi calibrated pressure gauge was used to measure casing pressure. A summary of the casing pressure test data sheet is presented in Appendix K. A copy of the pressure gauge calibration certificate is provided in Appendix L.

One hour after establishing the initial pressure at 109.9 psi, the pressure was recorded at 111.1 psi. The 1.2 psi gain was within the 5 percent limit specified by FDEP regulations. The test was continued for an additional hour with no significant change in pressure observed. The casing pressure test was observed by Mr. Greg Ford from CH2M HILL and Mr. Len Fishkin from FDEP. A total of 17.5 gallons of water was drained from the casing while pressure was released.

On February 26, 1997, the cement behind the ASR-2 casing was evaluated by conducting a CBL log from the base of the 30-inch-diameter steel casing at 845 feet bpl to pad level. The CBL log demonstrates an adequate cement bond around the 30-inch casing from 845 feet bpl to pad level. A copy of the CBL log is presented in Appendix G.

A video survey of ASR-2 was conducted on March 13, 1997. The video survey showed no inconsistencies and the 30-inch steel casing appeared in good condition. Casing joints were visible throughout the casing string. The video survey was conducted from pad level to 1,240 feet bpl near the borehole terminus. Alternating layers of caverns and relatively impermeable (tight) formations were observed throughout the survey. The video survey summary and video tape are provided in Appendix M.

ASR-3

On February 26, 1997, a casing pressure test was successfully performed on ASR-3 following cementing of the final 30-inch steel casing. The cement plug at the base of the casing did not provide the desired seal, so a temporary, inflatable packer was installed at the base of the casing and inflated to facilitate the test. The pressure test was performed by filling the casing with freshwater to eliminate air from inside the casing, and sealing the wellhead with a welded steel plate. The casing was then pressurized to 109.9 psi with a high pressure pump. A 200-psi calibrated pressure gauge was used to measure casing

pressure. A summary of the casing pressure test data sheet is presented in Appendix K. A copy of the pressure gauge calibration certificate is provided in Appendix L.

One hour after establishing the initial pressure at 104 psi, the pressure was recorded at 104 psi. The 0 psi gain was within the 5 percent limit specified by FDEP regulations. The test was continued for an additional hour with no significant change in pressure observed. The casing pressure test was observed by Mr. Greg Ford from CH2M HILL and Mr. Mark Silverman from FDEP. A total of 16.5 gallons of water was drained from the casing while pressure was released.

On April 17, 1997, the cement behind the ASR-3 casing was evaluated by conducting a CBL log from the base of the 30-inch-diameter steel casing at 835 feet bpl to pad level. The CBL log demonstrates an adequate cement bond around the 30-inch casing from 835 feet bpl to pad level. A copy of the CBL log is presented in Appendix G.

A video survey of ASR-3 was conducted on April 17, 1997. The video survey showed no inconsistencies and the 30-inch steel casing appeared in good condition. Casing joints were visible throughout the casing string. The video survey was conducted from pad level to 1,210 feet bpl near the borehole terminus. Alternating layers of caverns and relatively impermeable (tight) formations were observed throughout the survey. The video survey summary and video tape are provided in Appendix M.

SECTION 6

Summary and Conclusions

An aquifer storage and recovery (ASR) well system has been constructed at the Miami-Dade Water and Sewer Department (MDWASD) West Wellfield site in unincorporated Dade County, Florida. The purpose of the ASR system is to store raw Biscayne aquifer water during times of excess, and recover this water during peak, seasonal, or emergency demands. Raw water is provided by the onsite West Wellfield, completed into the prolific Biscayne aquifer. Water is stored into ASR wells completed into the brackish Floridan Aquifer System, confined by overlying clays of the Hawthorn Group that impede upward migration of stored water.

This facility will be one of the first in Florida to store raw groundwater, whereas most existing ASR systems use treated water. Raw water quality indicates compliance with primary drinking water standards (DWS), but some secondary DWS (e.g., color, iron, odor) are close to the limit or are exceeded. The State of Florida's Underground Injection Control (UIC) program regulates well construction practices, and the State's water quality criteria exemption (WQCE) allows exemption for secondary DWS parameters. Both well construction and WQCE permits were granted to MDWASD by FDEP for this project.

The ASR system consists of three, 1,300-feet wells and one dual-zone monitor well. Each ASR well is completed with 30-inch steel casing cemented in place to a depth of approximately 850 feet bpl. Below this casing, each well extends with open-hole construction to approximately 1,300 feet bpl. The open-hole portion of each ASR well is exposed to permeable limestone formations which will allow storage of raw Biscayne aquifer water. The dual-zone monitor well is open to two zones: an upper zone between 850 and 1,010 feet bpl (within the ASR zone) and a lower zone between 1,380 to 1,396 feet bpl (below the storage zone). Water quality samples will be obtained from the monitor well routinely to evaluate movement of stored water within the ASR storage zone.

Surface facilities include piping, a recharge pump, electrically-actuated control valves, a bi-directional flowmeter, vertical turbine recovery pump, electrical systems, and instrumentation and controls. Raw water is conveyed both to and from the ASR system via

an onsite 72-inch raw water main. Stored water is pumped from the ASR well to the 72-inch raw water main, which conveys it to the Alexander Orr Jr., Water Treatment Plant (WTP) for treatment and distribution. Recharge and recovery rates are approximately 5.0 mgd.

Construction of the ASR system is now complete. Upon approval of operational testing from FDEP, a cycle testing plan will be implemented. This will involve a series of recharge, storage, and recovery cycles to evaluate system performance. Upon successful completion of the cycle testing plan, an application for an operating permit shall be submitted to FDEP. This application will include the cycle testing data as supporting information.

APPENDIX A

FDEP Well Construction Permits and WQCE

Department of Environmental Protection

Lawton Chiles
Governor

Southeast District
P.O. Box 15425
West Palm Beach, Florida 33416

Virginia B. Wetherell
Secretary

JUN 3 0 1995

NOTICE OF PERMIT

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Dade County
UIC - West Wellfield (ASR)

Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department
4200 Salzedo Street
Coral Gables, FL 33146

Dear Mr. Clemente:

Enclosed is Permit Number UC 13-255913 to construct Class V Group 6b Aquifer Storage and Recovery (ASR) well ASR-W-1 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, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Should you have any questions, please contact Mr. Mark A. Silverman, P.G., of this office at (407) 433-2650, extension 272.

Executed in West Palm Beach, Florida

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

for Carlos Rivero-deAguilar
Director of District Management
P. O. Box 15425
West Palm Beach, FL 33416

CRA:AM:dp

Copies furnished to:

Bertha Goldenberg, P.E., MDWASD
Gene McLoughlin, P.E., MDWASD
Janet Bowman, OGC, FDEP/Tlh.
Richard Deuerling, FDEP/Tlh.
Cathy McCarty, FDEP/Tlh.
J. P. Listick, FDEP/WPB
John Petronio, DW, FDEP/WPB
Mike Bechtold, DW, FDEP/WPB
David Pyne, P.E., CH2M Hill
Carmen Causaras, P.G., MDWASD
Jeanne Dove, USEPA/Atlanta
Steve Anderson, SFWMD
Jim Jackson, SFWMD
Ron Reese, USGS
Jose Lopez, DERM

CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF PERMIT and all copies were mailed before the close of business on JUN 3 0 1995 to the listed persons.

FILING AND ACKNOWLEDGMENT:

FILED, on this date, pursuant to the §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Linda J. Schaffpat
Clerk

JUN 3 0 1995
Date

Department of Environmental Protection

Lawton Chiles
Governor

Southeast District
P.O. Box 15425
West Palm Beach, Florida 33416

Virginia B. Wetherell
Secretary

PERMITTEE:
Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department
4200 Salzedo Street
Coral Gables, FL 33146

PERMIT/CERTIFICATION NUMBER: UC 13-255913
DATE OF ISSUE: June 30, 1995
EXPIRATION DATE: December 31, 1997
COUNTY: Dade
LATITUDE/LONGITUDE: 25°42'00"N/80°28'30"W
PROJECT: MDWSD Class V Group 6b ASR

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-3, 62-4, 62-600, 62-528 and 62-550. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

TO CONSTRUCT: A Class V Group 6b Aquifer Storage and Recovery (ASR) well, SR-W-1, the final depth of which is to be determined during field testing. The SR well will be used to store and recover waters from the Biscayne Aquifer by injection into a suitable storage zone in the upper Floridan Aquifer.

IN ACCORDANCE WITH: Application to Construct Class V Aquifer Group 6b Storage and Recovery (ASR) Well ASR-W-1 received August 12, 1994; Request for Information (RFI) dated September 9, 1994; responses received October 19, 1994 and December 16, 1994; Publication of the Intent to Issue Permit UC 13-255913 in the Miami Daily Business Review on May 3, 1995; and in consideration of public comment received as a result of the public meeting held on June 12, 1995.

LOCATED AT: Miami Dade Water and Sewer Department West Wellfield (ASR) at the corner of SW 72nd Street and SW 172nd Avenue, unincorporated Dade County, FL.

TO SERVE: The potable raw water needs of south Dade County.

SUBJECT TO: General Conditions 1-23 and Specific Conditions 1-7.

DER Form 17-1.201(5)
Effective November 30, 1982

GENERAL CONDITIONS:

he following General Conditions are referenced in Florida Administrative Code Rule 62-620.610.

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are binding and enforceable pursuant to Chapter 403, Florida Statutes. Any permit noncompliance constitutes a violation of Chapter 403, Florida Statutes, and is grounds for enforcement action, permit termination, permit revocation and reissuance, or permit revision.

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

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

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

5. This permit does not relieve the permittee from liability and penalties for harm or injury to human health or welfare, animal or plant life, or property caused by the construction or operation of this permitted source; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department. The permittee shall take all reasonable steps to minimize or prevent any discharge, reuse of reclaimed water, or residuals use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. 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.

6. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee shall apply for and obtain a new permit.

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

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

9. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, including an authorized representative of the Department and authorized EPA personnel, when applicable, upon presentation of credentials or other documents as may be required by law, and at reasonable times, depending upon the nature of the concern being investigated, to:

   a. Enter upon the permittee's premises where a regulated facility, system, or activity is located or conducted, or where records shall be kept under the conditions of this permit;

   b. Have access to and copy any records that shall be kept under the conditions of this permit;

   c. Inspect the facilities, equipment, practices, or operations regulated or required under this permit; and

   d. Sample or monitor any substances or parameters at any location necessary to assure compliance with this permit or Department rules.

GENERAL CONDITIONS:

0. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data, and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except as such use is proscribed by Section 403.111, Florida Statutes, or Rule 62-620.302, Florida Administrative Code. Such evidence shall only be used to the extent that it is consistent with the Florida Rules of Civil Procedure and applicable evidentiary rules.

11. When requested by the Department, the permittee shall within a reasonable time provide any information required by law which is needed to determine whether there is cause for revising, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also provide to the Department upon request copies of records required by this permit to be kept. If the permittee becomes aware of relevant facts that were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be promptly submitted or corrections promptly reported to the Department.

12. Unless specifically stated otherwise in Department rules, the permittee, in accepting this permit, agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-302.500, F.A.C., shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard.

13. The permittee, in accepting this permit, agrees to pay the applicable regulatory program and surveillance fee in accordance with Rule 62-4.052, F.A.C.

14. This permit is transferable only upon Department approval in accordance with Rule 62-620.340, F.A.C. The permittee shall be liable for any noncompliance of the permitted activity until the transfer is approved by the Department.

15. The permittee shall give the Department written notice at least 60 days before inactivation or abandonment of a wastewater facility and shall specify what steps will be taken to safeguard public health and safety during and following inactivation or abandonment.

16. The permittee shall apply for a revision to the Department permit in accordance with Rules 62-620.300, 62-620.420 or 62-620.450, F.A.C., as applicable, at least 90 days before construction of any planned substantial modifications to the permitted facility is to commence or with Rule 62-620.300 for minor modifications to the permitted facility. A revised permit shall be obtained before construction begins except as provided in Rule 62-620.300, F.A.C.

17. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The permittee shall be responsible for any and all damages which may result from the changes and may be subject to enforcement action by the Department for penalties or revocation of this permit. The notice shall include the following information:

    a. A description of the anticipated noncompliance;

    b. The period of the anticipated noncompliance, including dates and times; and

    c. Steps being taken to prevent future occurrence of the noncompliance.

18. Sampling and monitoring data shall be collected and analyzed in accordance with Rule 62-4.246, Chapters 62-160 and 62-601, F.A.C., and 40 CFR 136, as appropriate.

    a. Monitoring results shall be reported at the intervals specified elsewhere in this permit and shall be reported on a Discharge Monitoring Report (DMR), DEP Form 62-620.910(10).

    b. If the permittee monitors any contaminate more frequently than required by the permit, using Department approved test procedures, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

c. Calculations for all limitations which require averaging of measurements shall use an arithmetic mean unless otherwise specified in this permit.

d. Any laboratory test required by this permit for domestic wastewater facilities shall be performed by a laboratory that has been certified by the Department of Health and Rehabilitative Services (DHRS) under Chapter 10D41, F.A.C., to perform the test. On-site tests for dissolved oxygen, pH, and total chlorine residual shall be performed by a laboratory certified to test for those parameters or under the direction of an operator certified under Chapter 61E12-41, F.A.C.

e. Under Chapter 62-160, F.A.C., sample collection shall be performed by following the protocols outlined in "DER Standard Operating Procedures for Laboratory Operations and Sample Collection Activities" (DER-QA-001/92). Alternatively, sample collection may be performed by an organization who has an approved Comprehensive Quality Assurance Plan (CompQAP) on file with the Department. The CompQAP shall be approved for collection of samples from the required matrices and for the required tests.

19. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule detailed elsewhere in this permit shall be submitted no later than 14 days following each schedule date.

20. The permittee shall report to the Department any noncompliance which may endanger health or the environment. 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 five 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 time, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

a. The following shall be included as information which must be reported within 24 hours under this condition:

1. Any unanticipated bypass which causes any reclaimed water or effluent to exceed any permit limitation or results in an unpermitted discharge,

2. Any upset which causes any reclaimed water or the effluent to exceed any limitation in the permit,

3. Violation of a maximum daily discharge limitation for any of the pollutants specifically listed in the permit for such notice, and

4. Any unauthorized discharge to surface or ground waters.

b. If the oral report has been received within 24 hours, the noncompliance has been corrected, and the noncompliance did not endanger health or the environment, the Department shall waive the written report.

21. The permittee shall report all instances of noncompliance not reported under Permit Conditions IX. 18. and 19. of this permit at the time monitoring reports are submitted. This report shall contain the same information required by Permit Condition IX. 20 of this permit.

22. Bypass Provisions.

a. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless the permittee affirmatively demonstrates that:

1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and

2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

3. The permittee submitted notices as required under Permit Condition IX. 22. b. of this permit.

b. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least 10 days before the date of the bypass. The permittee shall submit notice of an unanticipated bypass within 24 hours of learning about the bypass as required in Permit Condition IX. 20. of this permit. A notice shall include a description of the bypass and its cause; the period of the bypass, including exact dates and times; if the bypass has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the bypass.

c. The Department shall approve an anticipated bypass, after considering its adverse effect, if the permittee demonstrates that it will meet the three conditions listed in Permit Condition IX. 22. a. 1. through 3. of this permit.

d. A permittee may allow any bypass to occur which does not cause reclaimed water or effluent limitations to be exceeded if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Permit Condition IX. 22. a. through c. of this permit.

23. Upset Provisions

a. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

1. An upset occurred and that the permittee can identify the cause(s) of the upset;

2. The permitted facility was at the time being properly operated;

3. The permittee submitted notice of the upset as required in Permit Condition IX. 20. of this permit; and

4. The permittee complied with any remedial measures required under Permit Condition IX. 5. of this permit.

b. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

c. Before an enforcement proceeding is instituted, no representation made during the Department review of a claim that noncompliance was caused by an upset is final agency action subject to judicial review.

SPECIFIC CONDITIONS:

1. Site Requirements

   a. The measurement points for drilling and logging operations shall be surveyed and referenced to the National Geodetic Vertical Datum (NGVD) of 1929 prior to the onset of drilling activities for this ASR well and associated monitor well.

   b. Four (4) permanent surficial aquifer monitor wells identified as Pad Monitor Wells (PMWs) shall be located at the corners of the ASR well drilling pad and identified by location number and pad location, i.e. N.W., NE, S.W., and SE. These wells shall be sampled and analyzed prior to the onset of drilling for chlorides (mg/l), conductivity (umhos), total dissolved solids and water level (relative to NGVD). Initial analyses must be submitted prior to the initiation of work on the Class V, Group 6, ASR well. These wells are to be retained in service, sampled weekly for the above parameters during the construction phase of the project. If located in a traffic area the well heads must be protected by a traffic bearing enclosure and cover. Individual covers must be specifically marked to identify the well and its purpose. A copy of the FDEP Southeast District Summary Sheet is attached for your use when reporting the above information.

2. Construction and Testing Requirements

   a. Blow-out preventers shall be installed on the respective wells prior to penetration of the Floridan Aquifer System.

   b. If a storage zone monitor well in addition to the exploratory/monitor well constructed under a permit from the South Florida Water Management District is deemed necessary to monitor the lateral extent of the injectate, the monitor zone of the monitor well should be established in an interval demonstrating a transmissivity sufficient to allow sufficient yield from that zone for collection of a representative sample. Upon approval by the Department, the monitor well will be positioned such that the lateral areal extent of injectant is adequately monitored. To achieve that end the monitor zone should be positioned in a transmissive interval laterally contiguous with the storage zone in order to monitor the lateral extent of injected fluids. The data and analysis supporting the selection of the monitoring interval must be submitted to the TAC after the collection, interpretation and analysis of all pertinent cores, geophysical logs, analysis of fluid samples and sufficient cycles of the ASR system to determine an appropriate lateral distance from the ASR well system and the necessity for such a well. The hydrogeologic evaluation of the proposed monitoring zone will be submitted only after the collection, interpretation and analysis of all pertinent cores, packer tests, geophysical logs and analysis of fluid samples. The final selection of the specific monitoring interval and well location must be approved by the Department.

   c. Recommended setting depths for casing in the Class V, Group 6b, ASR well and those in the monitor well associated with the monitoring zone referenced in Specific Condition (S.C.) 2(b) above must be accompanied by technical justification, geophysical logs with engineering and geological interpretations and water quality data. Department approval will be based on the permittee's presentation that shows compliance with Department rules and this permit. All casing seat approval requests shall be accompanied geophysical logs and other pertinent information with interpretations.

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

PERMITTEE:

Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department

PERMIT/CERTIFICATION NUMBER: UC 13-255913
DATE OF ISSUE: June 30, 1995
EXPIRATION DATE: December 31, 1997

SPECIFIC CONDITIONS:

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

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

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

f. TAC meetings are scheduled on the 2nd and 4th Tuesday of each month subject to a five working day prior notice and timely receipt of critical data by all TAC members. Emergency meetings may be arranged when justified to avoid undue construction delays.

g. The geophysical logging program to be conducted during the drilling of both the ASR well and the additional storage zone monitor well shall, at a minimum, include the following:

1. Test/pilot hole to approximately 200 feet below land surface (bls):

Long and short normal electric
Caliper
Natural gamma

2. Reamed hole to approximately 170 feet bls:

Caliper

3. Cased hole to approximately 170 feet bls:

Temperature log after each stage of cementing

4. Test/pilot hole to the top of the Floridan Aquifer at approximately 1,100 feet bls:

Long and short normal electric
Caliper
Natural gamma

5. Reamed hole to the top of the Floridan Aquifer at approximately 1,100 feet bls:

Caliper

6. Cased hole to storage zone:

Temperature log after each stage of cementing

7. Test/pilot hole below ASR well casing:

Dual induction log
Borehole compensated sonic
Caliper
Natural gamma
Temperature (shut-in and while pumping)
Borehole television

8. Completed well (ASR well only)

Borehole television
Temperature

SPECIFIC CONDITIONS:

h. The formation evaluation program to be conducted during the drilling of the ASR well and the additional storage zone monitor well (if required) shall include, at a minimum, packer and/or interval tests, and analysis to qualify water quality characteristics. This testing should be conducted, at a minimum, in the prospective storage zone of the first ASR well installed. These tests are to qualify water quality characteristics and to provide a better definition of the quantitative characteristics (permeability values) of the zone. A five (5) gallon sample of formation fluids should be collected from all packer or interval tests conducted below the base of the Hawthorn Group for which a background sample unaffected by injection can be obtained and has not already been aquired. These samples should be collected at the end of those interval or packer tests, labeled as to well number, depth, and type of sample (monitor well or packer test) and shipped to the Underground Injection Control Section of the Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee FL 32399-2400.

i. Pressure gages and flow meters must be installed on the ASR well prior to initiating ASR activities at the site.

j. The pressure test for the final casing will be accepted if tested with a fluid-filled casing at 1.5 times the expected operating pressure with a test tolerance of + or - 5%. Verification of pressure gage calibration must be provided with the test reports.

k. Department approval and TAC review pursuant to Chapter 62-528 F.A.C. is required for the following stages of construction:

1. Mechanical integrity, confinement and injectivity testing.

2. Final ASR well casing seat.

3. Final location of the storage zone monitor well, referenced in S.C. 2(b) above, if deemed necessary.

4. Final casing seat of the storage zone monitor well referenced in S.C. 2(b) above.

5. The method(s) to be used for flow control during recharge of the ASR well system during operation and operational testing.

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

m. No drilling operations shall begin without an approved disposal site for drilling fluids, cuttings, or waste. It shall be the permittee's responsibility to obtain the necessary approval(s) for disposal prior to the start of construction.

n. Department or Department delegated local program potable water construction permits must be issued for all surface piping and appurtenances upstream of the ASR well-head. Bacteriological clearance must be performed prior to operational testing of the ASR system.

3. Quality Assurance/Quality Control Requirements

a. The Professional Engineer of Record shall certify all documents related to the completion of the Class V ASR well and associated storage zone monitor well. The Department shall be notified immediately of any change of the Engineer of Record.

SPECIFIC CONDITIONS:

b. All documents prepared for the geological/hydrogeological evaluation of this project shall be signed and sealed by a Florida Licensed Professional Geologist or qualified Florida Licensed Professional Engineer.

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

4. Reporting Requirements

a. All reports and surveys required by this permit shall be submitted concurrently to all the members of the TAC. The Technical Advisory Committee (TAC) shall consist of representatives from these agencies:

Department of Environmental Protection, West Palm Beach and Tallahassee
United States Environmental Protection Agency, Region IV, Atlanta
United States Geological Survey, Miami
South Florida Water Management District, West Palm Beach
Dade County Environmental Resources Management, Miami

b. The Department and other applicable agencies must be notified immediately of any unusual events occurring during construction activities (e.g. on-site spills, artesian flows, large volumes of circulation losses, etc.). A written report describing the incident shall also be given to the Department within 72 hours of the start of the event. In addition, a final written report shall be sent to the Department within two weeks of the event. The final report shall contain a complete description of the occurrence, discuss its cause(s) and the steps being taken to reduce, eliminate, and prevent recurrence of the event and all other information deemed necessary by the Department.

c. The Department shall be notified at least seventy-two (72) hours prior to all testing for mechanical integrity of the ASR well.

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

e. A weekly submittal of construction progress reports shall include at a minimum the following information:

1. A cover letter summary of the daily engineer report, work log and a projection for activities in the next reporting period.

2. Daily engineers report and work log with detailed descriptions of all testing, logging, and casing installation activities.

3. Detailed description of any unusual construction-related events that occur during the reporting period.

4. Weekly water quality analysis and water levels for the four (4) pad monitor wells. (See S.C. 1b)

f. A drilling and system construction schedule must be submitted to the Department and TAC prior to site preparation for the ASR well system.

SPECIFIC CONDITIONS:

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

h. Upon completion of analysis of cores and sample cuttings recovered during the installation of the ASR and storage zone lateral monitor wells, the permittee shall contact the Underground Injection Control Section of the Department of Environmental Protection in Tallahassee to arrange their transfer to the Florida State Geologic Survey.

i. A final report shall be submitted to the Department and the TAC after completion of the ASR well system. A report detailing necessity or conversely the lack of necessity for the installation of a storage zone lateral fluid movement monitor well must be submitted after one year of operational testing. An application to operate the Class V, Group 6, Aquifer Storage and Recovery (ASR) test well must be submitted at least 60 days prior to the expiration of this permit. Pursuant to Rule 62-4.080(3) a permittee may request that a permit be extended as a modification of an existing permit. Such a request must be submitted to the Department before the expiration of the permit. In accordance with Rule 62-4.070(4) F.A.C., no Department permit(s) shall be issued for a term of more than five (5) years. This permit cannot be extended beyond the maximum five year period which ends June 29, 2000 and cannot and will not constitute a permit to operate the ASR well after the five year date cited above. Submission of an application for an operation permit following the five year date cannot and will not constitute timely submittal for the purposes of continued operation of the ASR well.

5. Operational Testing Requirements

a. The operational testing of the Class V, Group 6, ASR well system under this permit shall not commence without written authorization from the Department.

b. An operation and maintenance manual with emergency procedures must be submitted to the Department and the TAC members prior to a request for system operation approval.

c. Prior to operational testing approval, the following items must be submitted for TAC review and Department approval:

1. Borehole television survey of the ASR well and the final casing of the well.

2. Geophysical logs with interpretations.

3. Certification of mechanical integrity and interpreted test data.

4. Inferred transmissivity test data.

5. The well location must be surveyed by a Florida registered land surveyor. The location of the well and associated monitor well(s) must be determined relative to permanent referenced points. The permittee shall also locate the well and associated monitor well(s) by latitude and longitude and submitted on a site plan.

6. Background water quality data (storage zones) analysis for primary and secondary drinking water standards (per 62-550, F.A.C.) and minimum criteria parameters as attached.

7. Background water quality data (Injectate) analysis for primary and secondary standards and minimum criteria as attached.

SPECIFIC CONDITIONS:

8. Surface equipment completion certification or certification of interim completion for the purposes of testing.

9. Signed and sealed record engineering drawings of all surface equipment and appurtenances.

6. Operational Testing Conditions

a. Upon receipt of written authorization from the Department (S.C. 5a), the operational testing of the ASR well system shall be subject to the following conditions:

1. The flows to the ASR well shall be monitored and controlled at all times to ensure the maximum injection rate does not exceed that rate at which the well was tested.

2. Any failure of the ASR well monitoring and recording equipment for a period of more than forty-eight (48) hours shall be reported immediately to the Department. A written report describing the incident shall also be given to the Department within 72 hours of the start of the event. In addition, a final written report shall be sent to the Department within two weeks of the event. The final report shall contain a complete description of the occurrence, discuss its cause(s) and the steps being taken to reduce, eliminate, and prevent recurrence of the event, and all other information deemed necessary by the Department.

3. The following ASR well performance and monitoring zone data shall be recorded for the exploratory/storage zone monitor well, the monitoring well referenced in S.C. 2(b) above, if established, and the ASR well as indicated and reported to the Department in a Monthly Operating Report (MOR):

a. ASR well performance:

* total daily flow to/from each well (mg)
* daily average, maximum and minimum injection pressure at each well (psig)
* monthly maximum daily flow to/from each well
* monthly averages for the above daily measurements for each well
* monthly cumulative storage for each well

b. Chemical characteristics of the fluid injected (weekly for the first three (3) month and monthly thereafter during injection phase):

* total dissolved solids-measured (mg/l)
* chlorides (mg/l)
* color
* specific conductance (umho/cm)
* odor
* iron (mg/l)

c. Chemical characteristics of the exploratory/monitor well and the monitoring zone referenced in S.C. 2(b) and (c) above if required (weekly for the first month and monthly there after):

* total dissolved solids-measured (mg/l)
* chlorides (mg/l)
* pH (units)
* conductivity (umho/cm)

SPECIFIC CONDITIONS:

d. The Department may require the monitoring of additional parameters (as appropriate) in the exploratory/monitor well and/or monitor well referenced in S.C.2(b) and (c) (if required) if water quality monitoring of the Biscayne aquifer or the injection fluid indicates any of the following:

1. The quality of the ASR supply water is diminishing;

2. the above referenced monitoring results indicate significant differences in water quality during consecutive sampling events;

3. a source of contamination to the ASR supply zone is discovered that was not addressed in the permit.

e. TKN and Ammonia shall be included in the chemical characteristics of the monitoring zone (Specific Condition 6.a.4.c.) if background water quality data required by Specific Condition 5.c.6. shows significant difference when compared with the values recorded for the fluid injected.

4. A minimum of three (3) well volumes of fluid shall be evacuated from the monitor well prior to sampling for the chemical parameters listed above.

5. All ASR data submissions, including Monthly Operating Reports (MOR's), shall be clearly identified on each page with Facility Name, ID. Number, date of sampling/recording, operator's name, license and telephone number, and type of data shown (monitor zones will be identified by monitor well number and depth interval). The lead plant operator or higher official must sign and date each submittal. A copy of the Southeast District, UIC Section, MOR summary sheet is attached for your use.

6. All monthly reports (MOR's) shall be submitted to this office (FDEP UIC Section, Southeast District, P. O. Box 15425, West Palm Beach, FL 33416), and our Tallahassee office (UIC/Criteria and Standards Section, Twin Towers Building, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400) by the fifteenth of the month following the period of record.

7. A qualified representative of the Engineer of Record must be present for the start-up operations.

8. The Department must be notified in writing of the date of operation.

9. The permittee shall be subject to all requirements and regulations of Dade County, and the South Florida Water Management District regarding the construction, testing and operation of this ASR well system.

10. The permittee shall submit on a monthly basis on or before the 15th day of following month a water quality report on the injected fluid. This water quality report shall include the following:

(a) Daily volume of water injected
(b) Daily volume of water recovered
(c) Monthly totals of injected and recovered water
(d) Primary and Secondary drinking water standards (quarterly).

PERMITTEE:
Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department

PERMIT/CERTIFICATION NUMBER: UC 13-255913
DATE OF ISSUE: June 30, 1995
EXPIRATION DATE: December 31, 1997

SPECIFIC CONDITIONS:

b. The integrity of the monitor well system referenced in S.C. 2(b) above, if established, shall be maintained at all times. Sampling lines shall be clearly and unambiguously identified at the point at which samples are drawn. All reasonable and prudent precautions shall be taken to insure that samples are properly identified and that samples obtained are representative. Sampling lines and equipment shall be kept free of contamination with independent discharges and no interconnections with any other lines.

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

d. Waters spilled during drilling of the system shall be contained and properly disposed.

e. The only source of injectant shall be water meeting all Primary and Secondary drinking water quality standards and minimum criteria unless otherwise exempted.

7. Financial Responsibility

The permittee unconditionally obligates themselves to plug and abandon the ASR and monitoring wells (with the appropriate Department permit) should the well or wells become a threat to the waters of the State, if the wells are no longer used, or if the wells are no longer usable for their intended purpose or other purposes as approved by the Department. In order to achieve these ends the permittee shall maintain at all times the resources necessary to close, plug, and abandon the Class V, Group 6, ASR well and associated monitor wells.

Issued this 30 day of JUNE, 1995

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Carlos Rivero-deAguilar
Director of District Management

Department of Environmental Protection

Lawton Chiles
Governor

Southeast District
P.O. Box 15425
West Palm Beach, Florida 33416

Virginia B. Wetherell
Secretary

JUN 3 0 1995

NOTICE OF PERMIT

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Dade County
UIC - West Wellfield (ASR)

Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department
4200 Salzedo Street
Coral Gables, FL 33146

Dear Mr. Clemente:

Enclosed is Permit Number UC 13-255914 to construct Class V Group 6b Aquifer Storage and Recovery (ASR) well ASR-W-2 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, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Should you have any questions, please contact Mr. Mark A. Silverman, P.G., of this office at (407) 433-2650, extension 272.

Executed in West Palm Beach, Florida

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

for

Carlos Rivero-deAguilar
Director of District Management
P. O. Box 15425
West Palm Beach, FL 33416

CRA:AM:dp

Copies furnished to:

Bertha Goldenberg, P.E., MDWASD	David Pyne, P.E., CH2M Hill
Gene McLoughlin, P.E., MDWASD	Carmen Causaras, P.G., MDWASD
Janet Bowman, OGC, FDEP/Tlh.	Jeanne Dove, USEPA/Atlanta
Richard Deuerling, FDEP/Tlh.	Steve Anderson, SFWMD
Cathy McCarty, FDEP/Tlh.	Jim Jackson, SFWMD
J. P. Listick, FDEP/WPB	Ron Reese, USGS
John Petronio, DW, FDEP/WPB	Jose Lopez, DERM
Mike Bechtold, DW, FDEP/WPB	

CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF PERMIT and all copies were mailed before the close of business on JUN 3 0 1995 to the listed persons.

FILING AND ACKNOWLEDGMENT:

FILED, on this date, pursuant to the §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Linda Schappat
Clerk

JUN 3 0 1995
Date

Department of Environmental Protection

Lawton Chiles
Governor

Southeast District
P.O. Box 15425
West Palm Beach, Florida 33416

Virginia B. Wetherell
Secretary

PERMITTEE:
Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department
4200 Salzedo Street
Coral Gables, FL 33146

PERMIT/CERTIFICATION NUMBER: UC 13-255914
DATE OF ISSUE: June 30, 1995
EXPIRATION DATE: December 31, 1997
COUNTY: Dade
LATITUDE/LONGITUDE:25°42'00"N/80°28'30"W
PROJECT: MDWSD Class V Group 6b ASR

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-3, 62-4, 62-600, 62-528 and 62-550. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

TO CONSTRUCT: A Class V Group 6b Aquifer Storage and Recovery (ASR) well, ASR-W-2, the final depth of which is to be determined during field testing. The ASR well will be used to store and recover waters from the Biscayne Aquifer by injection into a suitable storage zone in the upper Floridan Aquifer.

IN ACCORDANCE WITH: Application to Construct Class V Aquifer Group 6b Storage and Recovery (ASR) Well ASR-W-2 received August 12, 1994, Request for Information (RFI) dated September 9, 1994; responses received October 19, 1994 and December 16, 1994; Publication of the Intent to Issue Permit UC 13-255914 in the Miami Daily Business Review on May 3, 1995; and in consideration of public comment received as a result of the public meeting held on June 12, 1995.

LOCATED AT: Miami Dade Water and Sewer Department West Wellfield (ASR) at the corner of SW 72nd Street and SW 172nd Avenue, unincorporated Dade County, FL.

TO SERVE: The potable raw water needs of south Dade County.

SUBJECT TO: General Conditions 1-23 and Specific Conditions 1-7.

DER Form 17-1.201(5)
Effective November 30, 1982

GENERAL CONDITIONS:

The following General Conditions are referenced in Florida Administrative Code Rule 62-620.610.

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are binding and enforceable pursuant to Chapter 403, Florida Statutes. Any permit noncompliance constitutes a violation of Chapter 403, Florida Statutes, and is grounds for enforcement action, permit termination, permit revocation and reissuance, or permit revision.

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

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

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

5. This permit does not relieve the permittee from liability and penalties for harm or injury to human health or welfare, animal or plant life, or property caused by the construction or operation of this permitted source; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department. The permittee shall take all reasonable steps to minimize or prevent any discharge, reuse of reclaimed water, or residuals use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. 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.

6. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee shall apply for and obtain a new permit.

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

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

9. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, including an authorized representative of the Department and authorized EPA personnel, when applicable, upon presentation of credentials or other documents as may be required by law, and at reasonable times, depending upon the nature of the concern being investigated, to:

   a. Enter upon the permittee's premises where a regulated facility, system, or activity is located or conducted, or where records shall be kept under the conditions of this permit;

   b. Have access to and copy any records that shall be kept under the conditions of this permit;

   c. Inspect the facilities, equipment, practices, or operations regulated or required under this permit; and

   d. Sample or monitor any substances or parameters at any location necessary to assure compliance with this permit or Department rules.

GENERAL CONDITIONS:

10. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data, and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except as such use is proscribed by Section 403.111, Florida Statutes, or Rule 62-620.302, Florida Administrative Code. Such evidence shall only be used to the extent that it is consistent with the Florida Rules of Civil Procedure and applicable evidentiary rules.

11. When requested by the Department, the permittee shall within a reasonable time provide any information required by law which is needed to determine whether there is cause for revising, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also provide to the Department upon request copies of records required by this permit to be kept. If the permittee becomes aware of relevant facts that were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be promptly submitted or corrections promptly reported to the Department.

12. Unless specifically stated otherwise in Department rules, the permittee, in accepting this permit, agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-302.500, F.A.C., shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard.

13. The permittee, in accepting this permit, agrees to pay the applicable regulatory program and surveillance fee in accordance with Rule 62-4.052, F.A.C.

14. This permit is transferable only upon Department approval in accordance with Rule 62-620.340, F.A.C. The permittee shall be liable for any noncompliance of the permitted activity until the transfer is approved by the Department.

15. The permittee shall give the Department written notice at least 60 days before inactivation or abandonment of a wastewater facility and shall specify what steps will be taken to safeguard public health and safety during and following inactivation or abandonment.

16. The permittee shall apply for a revision to the Department permit in accordance with Rules 62-620.300, 62-620.420 or 62-620.450, F.A.C., as applicable, at least 90 days before construction of any planned substantial modifications to the permitted facility is to commence or with Rule 62-620.300 for minor modifications to the permitted facility. A revised permit shall be obtained before construction begins except as provided in Rule 62-620.300, F.A.C.

17. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The permittee shall be responsible for any and all damages which may result from the changes and may be subject to enforcement action by the Department for penalties or revocation of this permit. The notice shall include the following information:

    a. A description of the anticipated noncompliance;

    b. The period of the anticipated noncompliance, including dates and times; and

    c. Steps being taken to prevent future occurrence of the noncompliance.

18. Sampling and monitoring data shall be collected and analyzed in accordance with Rule 62-4.246, Chapters 62-160 and 62-601, F.A.C., and 40 CFR 136, as appropriate.

    a. Monitoring results shall be reported at the intervals specified elsewhere in this permit and shall be reported on a Discharge Monitoring Report (DMR), DEP Form 62-620.910(10).

    b. If the permittee monitors any contaminate more frequently than required by the permit, using Department approved test procedures, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

GENERAL CONDITIONS:

c. Calculations for all limitations which require averaging of measurements shall use an arithmetic mean unless otherwise specified in this permit.

d. Any laboratory test required by this permit for domestic wastewater facilities shall be performed by a laboratory that has been certified by the Department of Health and Rehabilitative Services (DHRS) under Chapter 10D41, F.A.C., to perform the test. On-site tests for dissolved oxygen, pH, and total chlorine residual shall be performed by a laboratory certified to test for those parameters or under the direction of an operator certified under Chapter 61E12-41, F.A.C.

e. Under Chapter 62-160, F.A.C., sample collection shall be performed by following the protocols outlined in "DER Standard Operating Procedures for Laboratory Operations and Sample Collection Activities" (DER-QA-001/92). Alternatively, sample collection may be performed by an organization who has an approved Comprehensive Quality Assurance Plan (CompQAP) on file with the Department. The CompQAP shall be approved for collection of samples from the required matrices and for the required tests.

19. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule detailed elsewhere in this permit shall be submitted no later than 14 days following each schedule date.

20. The permittee shall report to the Department any noncompliance which may endanger health or the environment. 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 five 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 time, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

a. The following shall be included as information which must be reported within 24 hours under this condition:

1. Any unanticipated bypass which causes any reclaimed water or effluent to exceed any permit limitation or results in an unpermitted discharge,

2. Any upset which causes any reclaimed water or the effluent to exceed any limitation in the permit,

3. Violation of a maximum daily discharge limitation for any of the pollutants specifically listed in the permit for such notice, and

4. Any unauthorized discharge to surface or ground waters.

b. If the oral report has been received within 24 hours, the noncompliance has been corrected, and the noncompliance did not endanger health or the environment, the Department shall waive the written report.

21. The permittee shall report all instances of noncompliance not reported under Permit Conditions IX. 18. and 19. of this permit at the time monitoring reports are submitted. This report shall contain the same information required by Permit Condition IX. 20 of this permit.

22. Bypass Provisions.

a. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless the permittee affirmatively demonstrates that:

1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and

2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

3. The permittee submitted notices as required under Permit Condition IX. 22. b. of this permit.

b. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least 10 days before the date of the bypass. The permittee shall submit notice of an unanticipated bypass within 24 hours of learning about the bypass as required in Permit Condition IX. 20. of this permit. A notice shall include a description of the bypass and its cause; the period of the bypass, including exact dates and times; if the bypass has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the bypass.

c. The Department shall approve an anticipated bypass, after considering its adverse effect, if the permittee demonstrates that it will meet the three conditions listed in Permit Condition IX. 22. a. 1. through 3. of this permit.

d. A permittee may allow any bypass to occur which does not cause reclaimed water or effluent limitations to be exceeded if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Permit Condition IX. 22. a. through c. of this permit.

23. Upset Provisions

a. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

1. An upset occurred and that the permittee can identify the cause(s) of the upset;

2. The permitted facility was at the time being properly operated;

3. The permittee submitted notice of the upset as required in Permit Condition IX. 20. of this permit; and

4. The permittee complied with any remedial measures required under Permit Condition IX. 5. of this permit.

b. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

c. Before an enforcement proceeding is instituted, no representation made during the Department review of a claim that noncompliance was caused by an upset is final agency action subject to judicial review.

SPECIFIC CONDITIONS:

1. Site Requirements

   a. The measurement points for drilling and logging operations shall be surveyed and referenced to the National Geodetic Vertical Datum (NGVD) of 1929 prior to the onset of drilling activities for this ASR well and associated monitor well.

   b. Four (4) permanent surficial aquifer monitor wells identified as Pad Monitor Wells (PMWs) shall be located at the corners of the ASR well drilling pad and identified by location number and pad location, i.e. N.W., NE, S.W., and SE. These wells shall be sampled and analyzed prior to the onset of drilling for chlorides (mg/l), conductivity (umhos), total dissolved solids and water level (relative to NGVD). Initial analyses must be submitted prior to the initiation of work on the Class V, Group 6, ASR well. These wells are to be retained in service, sampled weekly for the above parameters during the construction phase of the project. If located in a traffic area the well heads must be protected by a traffic bearing enclosure and cover. Individual covers must be specifically marked to identify the well and its purpose. A copy of the FDEP Southeast District Summary Sheet is attached for your use when reporting the above information.

2. Construction and Testing Requirements

   a. Blow-out preventers shall be installed on the respective wells prior to penetration of the Floridan Aquifer System.

   b. If a storage zone monitor well in addition to the exploratory/monitor well constructed under a permit from the South Florida Water Management District is deemed necessary to monitor the lateral extent of the injectate, the monitor zone of the monitor well should be established in an interval demonstrating a transmissivity sufficient to allow sufficient yield from that zone for collection of a representative sample. Upon approval by the Department, the monitor well will be positioned such that the lateral areal extent of injectant is adequately monitored. To achieve that end the monitor zone should be positioned in a transmissive interval laterally contiguous with the storage zone in order to monitor the lateral extent of injected fluids. The data and analysis supporting the selection of the monitoring interval must be submitted to the TAC after the collection, interpretation and analysis of all pertinent cores, geophysical logs, analysis of fluid samples and sufficient cycles of the ASR system to determine an appropriate lateral distance from the ASR well system and the necessity for such a well. The hydrogeologic evaluation of the proposed monitoring zone will be submitted only after the collection, interpretation and analysis of all pertinent cores, packer tests, geophysical logs and analysis of fluid samples. The final selection of the specific monitoring interval and well location must be approved by the Department.

   c. Recommended setting depths for casing in the Class V, Group 6b, ASR well and those in the monitor well associated with the monitoring zone referenced in Specific Condition (S.C.) 2(b) above must be accompanied by technical justification, geophysical logs with engineering and geological interpretations and water quality data. Department approval will be based on the permittee's presentation that shows compliance with Department rules and this permit. All casing seat approval requests shall be accompanied geophysical logs and other pertinent information with interpretations.

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

PERMITTEE:

Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department

PERMIT/CERTIFICATION NUMBER: UC 13-255914
DATE OF ISSUE: June 30, 1995
EXPIRATION DATE: December 31, 1997

SPECIFIC CONDITIONS:

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

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

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

f. TAC meetings are scheduled on the 2nd and 4th Tuesday of each month subject to a five working day prior notice and timely receipt of critical data by all TAC members. Emergency meetings may be arranged when justified to avoid undue construction delays.

g. The geophysical logging program to be conducted during the drilling of both the ASR well and the additional storage zone monitor well shall, at a minimum, include the following:

1. Test/pilot hole to approximately 200 feet below land surface (bls):

Long and short normal electric
Caliper
Natural gamma

2. Reamed hole to approximately 170 feet bls:

Caliper

3. Cased hole to approximately 170 feet bls:

Temperature log after each stage of cementing

4. Test/pilot hole to the top of the Floridan Aquifer at approximately 1,100 feet bls:

Long and short normal electric
Caliper
Natural gamma

5. Reamed hole to the top of the Floridan Aquifer at approximately 1,100 feet bls:

Caliper

6. Cased hole to storage zone:

Temperature log after each stage of cementing

7. Test/pilot hole below ASR well casing:

Dual induction log
Borehole compensated sonic
Caliper
Natural gamma
Temperature (shut-in and while pumping)
Borehole television

8. Completed well (ASR well only)

Borehole television
Temperature

SPECIFIC CONDITIONS:

h. The formation evaluation program to be conducted during the drilling of the ASR well and the additional storage zone monitor well (if required) shall include, at a minimum, packer and/or interval tests, and analysis to qualify water quality characteristics. This testing should be conducted, at a minimum, in the prospective storage zone of the first ASR well installed. These tests are to qualify water quality characteristics and to provide a better definition of the quantitative characteristics (permeability values) of the zone. A five (5) gallon sample of formation fluids should be collected from all packer or interval tests conducted below the base of the Hawthorn Group for which a background sample unaffected by injection can be obtained and has not already been aquired. These samples should be collected at the end of those interval or packer tests, labeled as to well number, depth, and type of sample (monitor well or packer test) and shipped to the Underground Injection Control Section of the Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee FL 32399-2400.

i. Pressure gages and flow meters must be installed on the ASR well prior to initiating ASR activities at the site.

j. The pressure test for the final casing will be accepted if tested with a fluid-filled casing at 1.5 times the expected operating pressure with a test tolerance of + or - 5%. Verification of pressure gage calibration must be provided with the test reports.

k. Department approval and TAC review pursuant to Chapter 62-528 F.A.C. is required for the following stages of construction:

1. Mechanical integrity, confinement and injectivity testing.

2. Final ASR well casing seat.

3. Final location of the storage zone monitor well, referenced in S.C. 2(b) above, if deemed necessary.

4. Final casing seat of the storage zone monitor well referenced in S.C. 2(b) above.

5. The method(s) to be used for flow control during recharge of the ASR well system during operation and operational testing.

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

m. No drilling operations shall begin without an approved disposal site for drilling fluids, cuttings, or waste. It shall be the permittee's responsibility to obtain the necessary approval(s) for disposal prior to the start of construction.

n. Department or Department delegated local program potable water construction permits must be issued for all surface piping and appurtenances upstream of the ASR well-head. Bacteriological clearance must be performed prior to operational testing of the ASR system.

3. Quality Assurance/Quality Control Requirements

a. The Professional Engineer of Record shall certify all documents related to the completion of the Class V ASR well and associated storage zone monitor well. The Department shall be notified immediately of any change of the Engineer of Record.

SPECIFIC CONDITIONS:

b. All documents prepared for the geological/hydrogeological evaluation of this project shall be signed and sealed by a Florida Licensed Professional Geologist or qualified Florida Licensed Professional Engineer.

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

4. Reporting Requirements

a. All reports and surveys required by this permit shall be submitted concurrently to all the members of the TAC. The Technical Advisory Committee (TAC) shall consist of representatives from these agencies:

Department of Environmental Protection, West Palm Beach and Tallahassee
United States Environmental Protection Agency, Region IV, Atlanta
United States Geological Survey, Miami
South Florida Water Management District, West Palm Beach
Dade County Environmental Resources Management, Miami

b. The Department and other applicable agencies must be notified immediately of any unusual events occurring during construction activities (e.g. on-site spills, artesian flows, large volumes of circulation losses, etc.). A written report describing the incident shall also be given to the Department within 72 hours of the start of the event. In addition, a final written report shall be sent to the Department within two weeks of the event. The final report shall contain a complete description of the occurrence, discuss its cause(s) and the steps being taken to reduce, eliminate, and prevent recurrence of the event and all other information deemed necessary by the Department.

c. The Department shall be notified at least seventy-two (72) hours prior to all testing for mechanical integrity of the ASR well.

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

e. A weekly submittal of construction progress reports shall include at a minimum the following information:

1. A cover letter summary of the daily engineer report, work log and a projection for activities in the next reporting period.

2. Daily engineers report and work log with detailed descriptions of all testing, logging, and casing installation activities.

3. Detailed description of any unusual construction-related events that occur during the reporting period.

4. Weekly water quality analysis and water levels for the four (4) pad monitor wells. (See S.C. 1b)

f. A drilling and system construction schedule must be submitted to the Department and TAC prior to site preparation for the ASR well system.

SPECIFIC CONDITIONS:

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

h. Upon completion of analysis of cores and sample cuttings recovered during the installation of the ASR and storage zone lateral monitor wells, the permittee shall contact the Underground Injection Control Section of the Department of Environmental Protection in Tallahassee to arrange their transfer to the Florida State Geologic Survey.

i. A final report shall be submitted to the Department and the TAC after completion of the ASR well system. A report detailing necessity or conversely the lack of necessity for the installation of a storage zone lateral fluid movement monitor well must be submitted after one year of operational testing. An application to operate the Class V, Group 6, Aquifer Storage and Recovery (ASR) test well must be submitted at least 60 days prior to the expiration of this permit. Pursuant to Rule 62-4.080(3) a permittee may request that a permit be extended as a modification of an existing permit. Such a request must be submitted to the Department before the expiration of the permit. In accordance with Rule 62-4.070(4) F.A.C., no Department permit(s) shall be issued for a term of more than five (5) years. This permit cannot be extended beyond the maximum five year period which ends June 29, 2000 and cannot and will not constitute a permit to operate the ASR well after the five year date cited above. Submission of an application for an operation permit following the five year date cannot and will not constitute timely submittal for the purposes of continued operation of the ASR well.

5. Operational Testing Requirements

a. The operational testing of the Class V, Group 6, ASR well system under this permit shall not commence without written authorization from the Department.

b. An operation and maintenance manual with emergency procedures must be submitted to the Department and the TAC members prior to a request for system operation approval.

c. Prior to operational testing approval, the following items must be submitted for TAC review and Department approval:

1. Borehole television survey of the ASR well and the final casing of the well.

2. Geophysical logs with interpretations.

3. Certification of mechanical integrity and interpreted test data.

4. Inferred transmissivity test data.

5. The well location must be surveyed by a Florida registered land surveyor. The location of the well and associated monitor well(s) must be determined relative to permanent referenced points. The permittee shall also locate the well and associated monitor well(s) by latitude and longitude and submitted on a site plan.

6. Background water quality data (storage zones) analysis for primary and secondary drinking water standards (per 62-550, F.A.C.) and minimum criteria parameters as attached.

7. Background water quality data (Injectate) analysis for primary and secondary standards and minimum criteria as attached.

SPECIFIC CONDITIONS:

8. Surface equipment completion certification or certification of interim completion for the purposes of testing.

9. Signed and sealed record engineering drawings of all surface equipment and appurtenances.

6. Operational Testing Conditions

a. Upon receipt of written authorization from the Department (S.C. 5a), the operational testing of the ASR well system shall be subject to the following conditions:

1. The flows to the ASR well shall be monitored and controlled at all times to ensure the maximum injection rate does not exceed that rate at which the well was tested.

2. Any failure of the ASR well monitoring and recording equipment for a period of more than forty-eight (48) hours shall be reported immediately to the Department. A written report describing the incident shall also be given to the Department within 72 hours of the start of the event. In addition, a final written report shall be sent to the Department within two weeks of the event. The final report shall contain a complete description of the occurrence, discuss its cause(s) and the steps being taken to reduce, eliminate, and prevent recurrence of the event, and all other information deemed necessary by the Department.

3. The following ASR well performance and monitoring zone data shall be recorded for the exploratory/storage zone monitor well, the monitoring well referenced in S.C. 2(b) above, if established, and the ASR well as indicated and reported to the Department in a Monthly Operating Report (MOR):

a. ASR well performance:

* total daily flow to/from each well (mg)
* daily average, maximum and minimum injection pressure at each well (psig)
* monthly maximum daily flow to/from each well
* monthly averages for the above daily measurements for each well
* monthly cumulative storage for each well

b. Chemical characteristics of the fluid injected (weekly for the first three (3) month and monthly thereafter during injection phase):

* total dissolved solids-measured (mg/1)
* chlorides (mg/1)
* color
* specific conductance (umho/cm)
* odor
* iron (mg/1)

c. Chemical characteristics of the exploratory/monitor well and the monitoring zone referenced in S.C. 2(b) and (c) above if required (weekly for the first month and monthly there after):

* total dissolved solids-measured (mg/1)
* chlorides (mg/1)
* pH (units)
* conductivity (umho/cm)

SPECIFIC CONDITIONS:

d. The Department may require the monitoring of additional parameters (as appropriate) in the exploratory/monitor well and/or monitor well referenced in S.C.2(b) and (c) (if required) if water quality monitoring of the Biscayne aquifer or the injection fluid indicates any of the following:

1. The quality of the ASR supply water is diminishing;

2. the above referenced monitoring results indicate significant differences in water quality during consecutive sampling events;

3. a source of contamination to the ASR supply zone is discovered that was not addressed in the permit.

e. TKN and Ammonia shall be included in the chemical characteristics of the monitoring zone (Specific Condition 6.a.4.c.) if background water quality data required by Specific Condition 5.c.6. shows significant difference when compared with the values recorded for the fluid injected.

4. A minimum of three (3) well volumes of fluid shall be evacuated from the monitor well prior to sampling for the chemical parameters listed above.

5. All ASR data submissions, including Monthly Operating Reports (MOR's), shall be clearly identified on each page with Facility Name, ID. Number, date of sampling/recording, operator's name, license and telephone number, and type of data shown (monitor zones will be identified by monitor well number and depth interval). The lead plant operator or higher official must sign and date each submittal. A copy of the Southeast District, UIC Section, MOR summary sheet is attached for your use.

6. All monthly reports (MOR's) shall be submitted to this office (FDEP UIC Section, Southeast District, P. O. Box 15425, West Palm Beach, FL 33416), and our Tallahassee office (UIC/Criteria and Standards Section, Twin Towers Building, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400) by the **fifteenth of the month following the period of record.**

7. A qualified representative of the Engineer of Record must be present for the start-up operations.

8. The Department must be notified in writing of the date of operation.

9. The permittee shall be subject to all requirements and regulations of Dade County, and the South Florida Water Management District regarding the construction, testing and operation of this ASR well system.

10. The permittee shall submit on a monthly basis on or before the 15th day of following month a water quality report on the injected fluid. This water quality report shall include the following:

(a) Daily volume of water injected
(b) Daily volume of water recovered
(c) Monthly totals of injected and recovered water
(d) Primary and Secondary drinking water standards (quarterly).

PERMITTEE:
Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department

PERMIT/CERTIFICATION NUMBER: UC 13-255914
DATE OF ISSUE: June 30, 1995
EXPIRATION DATE: December 31, 1997

SPECIFIC CONDITIONS:

b. The integrity of the monitor well system referenced in S.C. 2(b) above, if established, shall be maintained at all times. Sampling lines shall be clearly and unambiguously identified at the point at which samples are drawn. All reasonable and prudent precautions shall be taken to insure that samples are properly identified and that samples obtained are representative. Sampling lines and equipment shall be kept free of contamination with independent discharges and no interconnections with any other lines.

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

d. Waters spilled during drilling of the system shall be contained and properly disposed.

e. The only source of injectant shall be water meeting all Primary and Secondary drinking water quality standards and minimum criteria unless otherwise exempted.

7. Financial Responsibility

The permittee unconditionally obligates themselves to plug and abandon the ASR and monitoring wells (with the appropriate Department permit) should the well or wells become a threat to the waters of the State, if the wells are no longer used, or if the wells are no longer usable for their intended purpose or other purposes as approved by the Department. In order to achieve these ends the permittee shall maintain at all times the resources necessary to close, plug, and abandon the Class V, Group 6, ASR well and associated monitor wells.

Issued this 30 **day of** JUNE, **1995**

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

for

Carlos Rivero-deAguilar
Director of District Management

DER Form 17-1.201(5)
Effective November 30, 1982

SOUTHEAST DISTRICT UIC SECTION

SURFICIAL AQUIFER MONITOR WELL QUARTERLY REPORT

FACILITY NAME _____ REPORT MO/YR._____

OPERATOR NAME_____ LICENSE #_____

I.D.NUMBER _____ PERMIT #_____

INJECTION WELL #_____

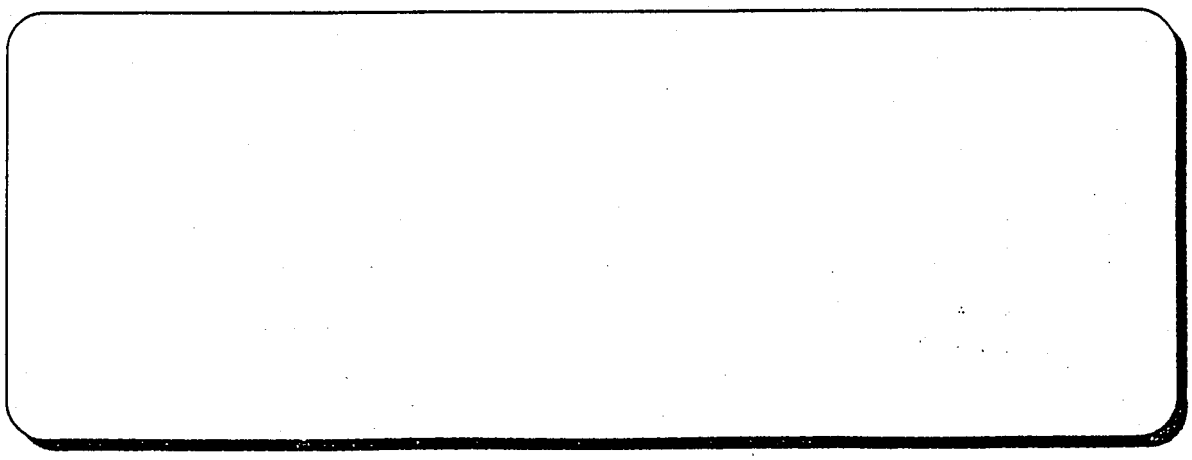
SAMPLING DATE_____ TIME_____

	PMW #1	PMW #2	PMW #3	PMW #4
LOCATION	NE CORNER	NW CORNER	SE CORNER	SW CORNER
ELEVATION OF TOC (NGVD)				
DEPTH TO WATER (TOC)				
WATER LEVEL (NGVD)				
CHLORIDES (MG/L.)				
CONDUCTIVITY (UMHOS)				
TEMPERATURE (F)				

ANALYZED BY:_____ SAMPLED BY:_____

PHONE #_____ TITLE_____

SITE PLAN OF PMW LOCATIONS



UNDERGROUND INJECTION CONTROL SECTION
MONTHLY OPERATING REPORT DATA SUMMARY

FACILITY;_____ REPORT MONTH/YEAR_____

I.D. NUMBER:_____ PERMIT NUMBER_____
PERMIT EXPIRATION DATE_____

INJECTION WELL #_____ LEAD OPERATOR_____

CASING DEPTH_____ PHONE NUMBER_____

IW TOTAL DEPTH _____

INJECTION WELL DATA

AVERAGE DAILY FLOW _____MGD
**MAX DAILY FLOW PER MO (mg) _____MG
**PEAK HR FLOW (MGD)ON MAX DAY_____MGD
MAXIMUM SUSTAINED INJECTION PRESSURE _____PSIG
MONTHLY AVG. INJECTION PRESS._____PSIG
MONTHLY WELLHEAD PRESSURE WITH NO FLOW(Shut-in)_____PSIG
***MAXIMUM INJECTION PRESSURE PERMITTED_____PSIG
***(note: injection pressure not to exceed 66% tested pressure)
Tested casing pressure during MIT _____PSIG

MONITORING WELL DATA (MW #____)

UPPER MONITORING INTERVAL (from to ft. b.l.s.)

MONTHLY MAX DAILY PRESSURE_____PSIG or FT. HEAD (Rel to NGVD)
MONTHLY MIN DAILY PRESSURE_____PSIG or FT. HEAD (Rel to NGVD)
TDS (monthly average) _____mg/l
CHLORIDE (monthly avg.) _____mg/l
AMMONIA-N (monthly avg.) _____mg/l
TKN (monthly average) _____mg/l
pH (monthly avg) _____Std units
CONDUCTIVITY (mo. avg.) _____umho/cm
FECAL COLIFORM (mo.avg.) _____#col/100ml
TEMPERATURE (mo. avg.) _____deg. F.
TOTAL PHOSPHOROUS (mo.avg) _____mg/l
SULFATE (monthly avg.) _____mg/l

LOWER MONITORING INTERVAL (from to ft. b.l.s.)

MONTHLY MAX DAILY PRESSURE _____PSIG or FT. HEAD (Rel to NGVD)
MONTHLY MIN DAILY PRESSURE _____PSIG or FT. HEAD (Rel to NGVD)
TDS (monthly average) _____mg/l
CHLORIDE (monthly avg.) _____mg/l
AMMONIA-N (monthly avg.) _____mg/l
TKN (monthly avg.) _____mg/l
pH (monthly avg) _____Std units
CONDUCTIVITY (mo. avg.) _____umho/cm.
FECAL COLIFORM (mo.avg.) _____#col/100ml
TEMPERATURE (mo.avg.) _____deg. F.
TOTAL PHOSPHOROUS (mo.avg) _____mg/l
SULFATE (monthly avg.) _____mg/l

WASTESTREAM ANALYSIS: Sample Date:_____
Submittal Date:_____

UNDERGROUND INJECTION CONTROL

INJECTIVITY TESTING SUMMARY SHEET

FACILITY_____

TIME

Deep Injection Well System
Injectivity Testing

Injection Well No. :
DATE OF TEST:
FDER PERMIT No.:

	START	SHUT-IN PRESSURE
	MINS AFTER SHUT -IN	CALIBRATED PRESSURE GAUGE AT WELL HEAD (PSI)
	10	
	20	
	30	

_____
Signature of Lead Operator

Were Wellhead Valves Exercised _____YES _____ NO

COLUMN: 1	2	3	4	5	6	7	8	9	10
TIME	INJECTION WELL SHUT-IN PRESSURE AFTER 30 MINUTES (PSI)	PUMP NUMBER(S) ON-LINE	INJECTION RATE (gpm) or (mgd)	Injection Pressure after 10 minutes of pumping		PRESSURE DIFFERENTIAL (Col 5 - Col 2)	INJECTIVITY INDEX (Col 4 divide by Col 7)	UPPER MONITOR ZONE IN FEET OF HEAD ABOVE NGVD (FEET)	LOWER MONITOR ZONE IN FEET OF HEAD ABOVE NGVD (FEET)
				CALIBRATED GAUGE AT INJECTION WELLHEAD (PSI)	PRESSURE RECORDER (PSI)	FROM CALIBRATED PRESSURE GAUGE AT INJECTION WELLHEAD (PSI)	FROM CALIBRATED PRESSURE GAUGE AT INJECTION WELLHEAD (GPM / PSI)		

NOTES

1. INJECTIVITY INDEX (GPM/PSI) = INJECTION RATE (GPM) (COLUMN 4) / (INJECTION PRESSURE (PSI) (COLUMN 5) - SHUT-IN PRESSURE (PSI) (COLUMN 2))

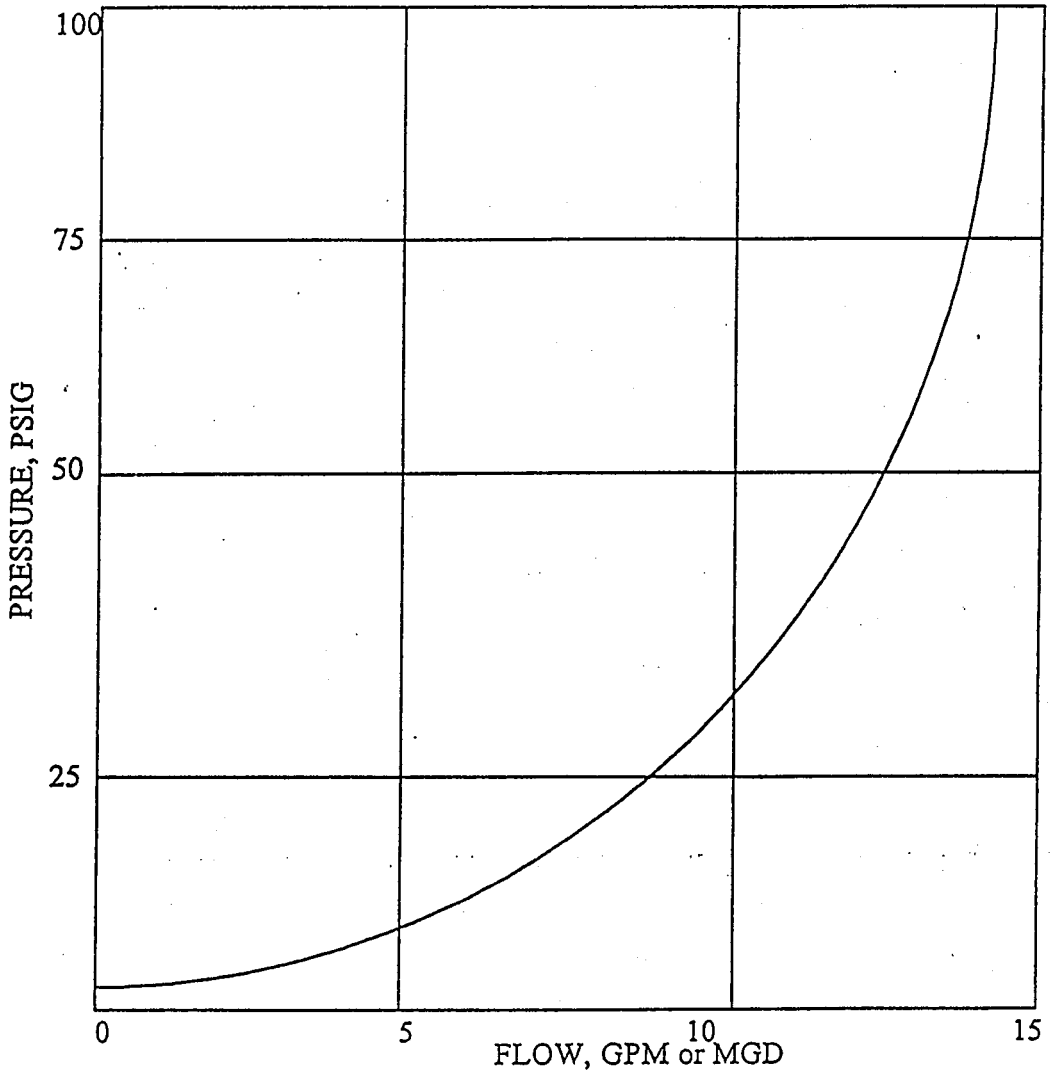
2. FOR MORE INFORMATION REGARDING EXECUTION OF THIS TEST CONSULT THE INJECTIVITY TESTING PROTOCOL IN THE O&M MANUAL

UNDERGROUND INJECTION CONTROL

DATE OF TEST :	FACILITY :
PERMIT NO. :	I.D. # :
WELL NO.	LEAD OPERATOR_____ SIGNATURE

INJECTIVITY TEST

SAMPLE



PRIMARY STANDARDS DRINKING WATER STANDARDS
Updated November 1, 1994

PARAMETER

Alachlor
Alpha, Gross
Antimony
Arsenic
Atrazine
Barium
Benzene
Benzo(a)pyrene
Beryllium
Cadmium
Carbofuran
Carbon Tetrachloride (Tetrachloromethane)
Chlordane
Chloroethylene (Vinyl Chloride)
Chromium
Coliforms, Total
Cyanide
2,4-D (2,4-Dichlorophenoxyacetic acid)
Dalapon (2,2-Dichloropropionic acid)
Dibromochloropropane (DBCP)
1,2-Dibromoethane (EDB, Ethylene Dibromide)
1,2-Dichlorobenzene (o-Dichlorobenzene)
1,4-Dichlorobenzene (p-Dichlorobenzene)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (Vinylidene chloride)
cis-1,2-Dichloroethylene
trans-1,2-Dichloroethylene
Dichloromethane (Methylene chloride)
1,2-Dichloropropane
Di(2-ethylhexyl) adipate
Di(2-ethylhexyl) phthalate
Dinoseb
Diquat
EDB (Ethylene dibromide, 1,2-Dibromoethane)
Endothall
Endrin
Ethylbenzene
Ethylene dichloride (1,2-Dichloroethane)
Fluoride
Glyphosate (Roundup)
Gross Alpha
Heptachlor
Heptachlor Epoxide
Hexachlorobenzene (HCB)
gamma-Hexachlorocyclohexane (Lindane)
Hexachlorocyclopentadiene
Lead
Lindane (gamma-Hexachlorocyclohexane)

PRIMARY STANDARDS DRINKING WATER STANDARDS CONTINUED

PARAMETER

Mercury
Methoxychlor
Methylene chloride (Dichloromethane)
Monochlorobenzene
Nickel
Nitrate (as N)
Nitrite (as N)
Total Nitrate + Nitrite (as N)
Oxamyl
Pentachlorophenol
Perchloroethylene (Tetrachloroethylene)
Picloram
Polychlorinated biphenyl (PCB)
Radium
Roundup (Glyphosate)
Selenium
Silvex (2,4,5-TP)
Simazine
Sodium
Styrene (Vinyl benzene)
Tetrachloroethylene (Perchloroethylene)
Tetrachloromethane (Carbon Tetrachloride)
Thallium
Toluene
Toxaphene
2,4,5-TP (Silvex)
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene, TCE)
Trihalomethanes, Total
Vinyl Chloride (Chloroethylene)
Xylenes (total)

SECONDARY DRINKING WATER STANDARDS

PARAMETER

Aluminum
Chloride
Color
Copper
Corrosivity
Ethylbenzene
Fluoride
Foaming Agents (MBAS)
Iron
Manganese
Odor
pH
Silver
Sulfate
Toluene
Total Dissolved Solids (TDS)
Xylenes
Zinc

MINIMUM CRITERIA
GROUND WATER MONITORING PARAMETERS

INORGANICS

Ammonia
Nitrogen (organic)
Orthophosphate (soluble)
Phosphorus
Total Kjeldahl Nitrogen

VOLATILE ORGANICS

Chloroethane
Chloroform
para-Dichlorobenzene
1,2-Dichloroethylene

Base/Neutral Organics

Anthracene
Butylbenzylphthallate
Dimethylphthallate
Naphalene
Phenanthrene

PESTICIDES AND PCBs

Aldrin
Dieldrin
Dioxin

Acid Extractables

2-chlorophenol
Phenol
2,4,6-trichlorophenol

Other

Conductivity
Biological Oxygen Demand
Temperature

Department of Environmental Protection

Lawton Chiles
Governor

Southeast District
P.O. Box 15425
West Palm Beach, Florida 33416

Virginia B. Wetherell
Secretary

JUN 3 0 1995

NOTICE OF PERMIT

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Dade County
UIC - West Wellfield (ASR)

Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department
4200 Salzedo Street
Coral Gables, FL 33146

Dear Mr. Clemente:

Enclosed is Permit Number UC 13-255915 to construct Class V Group 6b Aquifer Storage and Recovery (ASR) well ASR-W-3 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, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Should you have any questions, please contact Mr. Mark A. Silverman, P.G., of this office at (407) 433-2650, extension 272.

Executed in West Palm Beach, Florida

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Carlos Rivero-deAguilar
Director of District Management
P. O. Box 15425
West Palm Beach, FL 33416

CRA:AM:dp

Copies furnished to:

Bertha Goldenberg, P.E., MDWASD
Gene McLoughlin, P.E., MDWASD
Janet Bowman, OGC, FDEP/Tlh.
Richard Deuerling, FDEP/Tlh.
Cathy McCarty, FDEP/Tlh.
J. P. Listick, FDEP/WPB
John Petronio, DW, FDEP/WPB
Mike Bechtold, DW, FDEP/WPB
David Pyne, P.E., CH2M Hill
Carmen Causaras, P.G., MDWASD
Jeanne Dove, USEPA/Atlanta
Steve Anderson, SFWMD
Jim Jackson, SFWMD
Ron Reese, USGS
Jose Lopez, DERM

CERTIFICATE OF SERVICE

This is to certify that this NOTICE OF PERMIT and all copies were mailed before the close of business on JUN 3 0 1995 to the listed persons.

FILING AND ACKNOWLEDGMENT:

FILED, on this date, pursuant to the §120.52(9), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Linda Ischappat
Clerk

JUN 3 0 1995
Date

Department of Environmental Protection

Lawton Chiles
Governor

Southeast District
P.O. Box 15425
West Palm Beach, Florida 33416

Virginia B. Wetherell
Secretary

PERMITTEE:
Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department
4200 Salzedo Street
Coral Gables, FL 33146

PERMIT/CERTIFICATION NUMBER: UC 13-255915
DATE OF ISSUE: June 30, 1995
EXPIRATION DATE: December 31, 1997
COUNTY: Dade
LATITUDE/LONGITUDE:25°42'00"N/80°28'30"W
PROJECT: MDWSD Class V Group 6b ASR

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 62-3, 62-4, 62-600, 62-528 and 62-550. The above named permittee is hereby authorized to perform the work or operate the facility shown on the application and approved drawing(s), plans, and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

TO CONSTRUCT: A Class V Group 6b Aquifer Storage and Recovery (ASR) well, ASR-W-3, the final depth of which is to be determined during field testing. The ASR well will be used to store and recover waters from the Biscayne Aquifer by injection into a suitable storage zone in the upper Floridan Aquifer.

IN ACCORDANCE WITH: Application to Construct Class V Aquifer Group 6b Storage and Recovery (ASR) Well ASR-W-3 received August 12, 1994, Request for Information (RFI) dated September 9, 1994; responses received October 19, 1994 and December 16, 1994; Publication of the Intent to Issue Permit UC 13-255915 in the Miami Daily Business Review on May 3, 1995; and in consideration of public comment received as a result of the public meeting held on June 12, 1995.

LOCATED AT: Miami Dade Water and Sewer Department West Wellfield (ASR) at the corner of SW 72nd Street and SW 172nd Avenue, unincorporated Dade County, FL.

TO SERVE: The potable raw water needs of south Dade County.

SUBJECT TO: General Conditions 1-23 and Specific Conditions 1-7.

DER Form 17-1.201(5)
Effective November 30, 1982

GENERAL CONDITIONS:

The following General Conditions are referenced in Florida Administrative Code Rule 62-620.610.

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are binding and enforceable pursuant to Chapter 403, Florida Statutes. Any permit noncompliance constitutes a violation of Chapter 403, Florida Statutes, and is grounds for enforcement action, permit termination, permit revocation and reissuance, or permit revision.

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

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

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

5. This permit does not relieve the permittee from liability and penalties for harm or injury to human health or welfare, animal or plant life, or property caused by the construction or operation of this permitted source; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department. The permittee shall take all reasonable steps to minimize or prevent any discharge, reuse of reclaimed water, or residuals use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. 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.

6. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee shall apply for and obtain a new permit.

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

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

9. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, including an authorized representative of the Department and authorized EPA personnel, when applicable, upon presentation of credentials or other documents as may be required by law, and at reasonable times, depending upon the nature of the concern being investigated, to:

   a. Enter upon the permittee's premises where a regulated facility, system, or activity is located or conducted, or where records shall be kept under the conditions of this permit;

   b. Have access to and copy any records that shall be kept under the conditions of this permit;

   c. Inspect the facilities, equipment, practices, or operations regulated or required under this permit; and

   d. Sample or monitor any substances or parameters at any location necessary to assure compliance with this permit or Department rules.

GENERAL CONDITIONS:

10. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data, and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except as such use is proscribed by Section 403.111, Florida Statutes, or Rule 62-620.302, Florida Administrative Code. Such evidence shall only be used to the extent that it is consistent with the Florida Rules of Civil Procedure and applicable evidentiary rules.

11. When requested by the Department, the permittee shall within a reasonable time provide any information required by law which is needed to determine whether there is cause for revising, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also provide to the Department upon request copies of records required by this permit to be kept. If the permittee becomes aware of relevant facts that were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be promptly submitted or corrections promptly reported to the Department.

12. Unless specifically stated otherwise in Department rules, the permittee, in accepting this permit, agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-302.500, F.A.C., shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard.

13. The permittee, in accepting this permit, agrees to pay the applicable regulatory program and surveillance fee in accordance with Rule 62-4.052, F.A.C.

14. This permit is transferable only upon Department approval in accordance with Rule 62-620.340, F.A.C. The permittee shall be liable for any noncompliance of the permitted activity until the transfer is approved by the Department.

15. The permittee shall give the Department written notice at least 60 days before inactivation or abandonment of a wastewater facility and shall specify what steps will be taken to safeguard public health and safety during and following inactivation or abandonment.

16. The permittee shall apply for a revision to the Department permit in accordance with Rules 62-620.300, 62-620.420 or 62-620.450, F.A.C., as applicable, at least 90 days before construction of any planned substantial modifications to the permitted facility is to commence or with Rule 62-620.300 for minor modifications to the permitted facility. A revised permit shall be obtained before construction begins except as provided in Rule 62-620.300, F.A.C.

17. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The permittee shall be responsible for any and all damages which may result from the changes and may be subject to enforcement action by the Department for penalties or revocation of this permit. The notice shall include the following information:

    a. A description of the anticipated noncompliance;

    b. The period of the anticipated noncompliance, including dates and times; and

    c. Steps being taken to prevent future occurrence of the noncompliance.

18. Sampling and monitoring data shall be collected and analyzed in accordance with Rule 62-4.246, Chapters 62-160 and 62-601, F.A.C., and 40 CFR 136, as appropriate.

    a. Monitoring results shall be reported at the intervals specified elsewhere in this permit and shall be reported on a Discharge Monitoring Report (DMR), DEP Form 62-620.910(10).

    b. If the permittee monitors any contaminate more frequently than required by the permit, using Department approved test procedures, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

GENERAL CONDITIONS:

c. Calculations for all limitations which require averaging of measurements shall use an arithmetic mean unless otherwise specified in this permit.

d. Any laboratory test required by this permit for domestic wastewater facilities shall be performed by a laboratory that has been certified by the Department of Health and Rehabilitative Services (DHRS) under Chapter 10D41, F.A.C., to perform the test. On-site tests for dissolved oxygen, pH, and total chlorine residual shall be performed by a laboratory certified to test for those parameters or under the direction of an operator certified under Chapter 61E12-41, F.A.C.

e. Under Chapter 62-160, F.A.C., sample collection shall be performed by following the protocols outlined in "DER Standard Operating Procedures for Laboratory Operations and Sample Collection Activities" (DER-QA-001/92). Alternatively, sample collection may be performed by an organization who has an approved Comprehensive Quality Assurance Plan (CompQAP) on file with the Department. The CompQAP shall be approved for collection of samples from the required matrices and for the required tests.

19. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule detailed elsewhere in this permit shall be submitted no later than 14 days following each schedule date.

20. The permittee shall report to the Department any noncompliance which may endanger health or the environment. 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 five 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 time, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

a. The following shall be included as information which must be reported within 24 hours under this condition:

1. Any unanticipated bypass which causes any reclaimed water or effluent to exceed any permit limitation or results in an unpermitted discharge,

2. Any upset which causes any reclaimed water or the effluent to exceed any limitation in the permit,

3. Violation of a maximum daily discharge limitation for any of the pollutants specifically listed in the permit for such notice, and

4. Any unauthorized discharge to surface or ground waters.

b. If the oral report has been received within 24 hours, the noncompliance has been corrected, and the noncompliance did not endanger health or the environment, the Department shall waive the written report.

21. The permittee shall report all instances of noncompliance not reported under Permit Conditions IX. 18. and 19. of this permit at the time monitoring reports are submitted. This report shall contain the same information required by Permit Condition IX. 20 of this permit.

22. Bypass Provisions.

a. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless the permittee affirmatively demonstrates that:

1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and

2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

3. The permittee submitted notices as required under Permit Condition IX. 22. b. of this permit.

b. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least 10 days before the date of the bypass. The permittee shall submit notice of an unanticipated bypass within 24 hours of learning about the bypass as required in Permit Condition IX. 20. of this permit. A notice shall include a description of the bypass and its cause; the period of the bypass, including exact dates and times; if the bypass has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the bypass.

c. The Department shall approve an anticipated bypass, after considering its adverse effect, if the permittee demonstrates that it will meet the three conditions listed in Permit Condition IX. 22. a. 1. through 3. of this permit.

d. A permittee may allow any bypass to occur which does not cause reclaimed water or effluent limitations to be exceeded if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Permit Condition IX. 22. a. through c. of this permit.

23. Upset Provisions

a. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

1. An upset occurred and that the permittee can identify the cause(s) of the upset;

2. The permitted facility was at the time being properly operated;

3. The permittee submitted notice of the upset as required in Permit Condition IX. 20. of this permit; and

4. The permittee complied with any remedial measures required under Permit Condition IX. 5. of this permit.

b. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

c. Before an enforcement proceeding is instituted, no representation made during the Department review of a claim that noncompliance was caused by an upset is final agency action subject to judicial review.

PERMITTEE:
Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department

PERMIT/CERTIFICATION NUMBER: UC 13-255915
DATE OF ISSUE: June 30, 1995
EXPIRATION DATE: December 31, 1997

SPECIFIC CONDITIONS:

1. Site Requirements

   a. The measurement points for drilling and logging operations shall be surveyed and referenced to the National Geodetic Vertical Datum (NGVD) of 1929 prior to the onset of drilling activities for this ASR well and associated monitor well.

   b. Four (4) permanent surficial aquifer monitor wells identified as Pad Monitor Wells (PMWs) shall be located at the corners of the ASR well drilling pad and identified by location number and pad location, i.e. N.W., NE, S.W., and SE. These wells shall be sampled and analyzed prior to the onset of drilling for chlorides (mg/l), conductivity (umhos), total dissolved solids and water level (relative to NGVD). Initial analyses must be submitted prior to the initiation of work on the Class V, Group 6, ASR well. These wells are to be retained in service, sampled weekly for the above parameters during the construction phase of the project. If located in a traffic area the well heads must be protected by a traffic bearing enclosure and cover. Individual covers must be specifically marked to identify the well and its purpose. A copy of the FDEP Southeast District Summary Sheet is attached for your use when reporting the above information.

2. Construction and Testing Requirements

   a. Blow-out preventers shall be installed on the respective wells prior to penetration of the Floridan Aquifer System.

   b. If a storage zone monitor well in addition to the exploratory/monitor well constructed under a permit from the South Florida Water Management District is deemed necessary to monitor the lateral extent of the injectate, the monitor zone of the monitor well should be established in an interval demonstrating a transmissivity sufficient to allow sufficient yield from that zone for collection of a representative sample. Upon approval by the Department, the monitor well will be positioned such that the lateral areal extent of injectant is adequately monitored. To achieve that end the monitor zone should be positioned in a transmissive interval laterally contiguous with the storage zone in order to monitor the lateral extent of injected fluids. The data and analysis supporting the selection of the monitoring interval must be submitted to the TAC after the collection, interpretation and analysis of all pertinent cores, geophysical logs, analysis of fluid samples and sufficient cycles of the ASR system to determine an appropriate lateral distance from the ASR well system and the necessity for such a well. The hydrogeologic evaluation of the proposed monitoring zone will be submitted only after the collection, interpretation and analysis of all pertinent cores, packer tests, geophysical logs and analysis of fluid samples. The final selection of the specific monitoring interval and well location must be approved by the Department.

   c. Recommended setting depths for casing in the Class V, Group 6b, ASR well and those in the monitor well associated with the monitoring zone referenced in Specific Condition (S.C.) 2(b) above must be accompanied by technical justification, geophysical logs with engineering and geological interpretations and water quality data. Department approval will be based on the permittee's presentation that shows compliance with Department rules and this permit. All casing seat approval requests shall be accompanied geophysical logs and other pertinent information with interpretations.

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

PERMITTEE:

Mr. Anthony Clemente
Director
Miami Dade Water and Sewer Department

PERMIT/CERTIFICATION NUMBER: UC 13-255915
DATE OF ISSUE: June 30, 1995
EXPIRATION DATE: December 31, 1997

SPECIFIC CONDITIONS:

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

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

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

f. TAC meetings are scheduled on the 2nd and 4th Tuesday of each month subject to a five working day prior notice and timely receipt of critical data by all TAC members. Emergency meetings may be arranged when justified to avoid undue construction delays.

g. The geophysical logging program to be conducted during the drilling of both the ASR well and the additional storage zone monitor well shall, at a minimum, include the following:

1. Test/pilot hole to approximately 200 feet below land surface (bls):

Long and short normal electric
Caliper
Natural gamma

2. Reamed hole to approximately 170 feet bls:

Caliper

3. Cased hole to approximately 170 feet bls:

Temperature log after each stage of cementing

4. Test/pilot hole to the top of the Floridan Aquifer at approximately 1,100 feet bls:

Long and short normal electric
Caliper
Natural gamma

5. Reamed hole to the top of the Floridan Aquifer at approximately 1,100 feet bls:

Caliper

6. Cased hole to storage zone:

Temperature log after each stage of cementing

7. Test/pilot hole below ASR well casing:

Dual induction log
Borehole compensated sonic
Caliper
Natural gamma
Temperature (shut-in and while pumping)
Borehole television

8. Completed well (ASR well only)

Borehole television
Temperature

SPECIFIC CONDITIONS:

h. The formation evaluation program to be conducted during the drilling of the ASR well and the additional storage zone monitor well (if required) shall include, at a minimum, packer and/or interval tests, and analysis to qualify water quality characteristics. This testing should be conducted, at a minimum, in the prospective storage zone of the first ASR well installed. These tests are to qualify water quality characteristics and to provide a better definition of the quantitative characteristics (permeability values) of the zone. A five (5) gallon sample of formation fluids should be collected from all packer or interval tests conducted below the base of the Hawthorn Group for which a background sample unaffected by injection can be obtained and has not already been aquired. These samples should be collected at the end of those interval or packer tests, labeled as to well number, depth, and type of sample (monitor well or packer test) and shipped to the Underground Injection Control Section of the Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee FL 32399-2400.

i. Pressure gages and flow meters must be installed on the ASR well prior to initiating ASR activities at the site.

j. The pressure test for the final casing will be accepted if tested with a fluid-filled casing at 1.5 times the expected operating pressure with a test tolerance of + or - 5%. Verification of pressure gage calibration must be provided with the test reports.

k. Department approval and TAC review pursuant to Chapter 62-528 F.A.C. is required for the following stages of construction:

1. Mechanical integrity, confinement and injectivity testing.

2. Final ASR well casing seat.

3. Final location of the storage zone monitor well, referenced in S.C. 2(b) above, if deemed necessary.

4. Final casing seat of the storage zone monitor well referenced in S.C. 2(b) above.

5. The method(s) to be used for flow control during recharge of the ASR well system during operation and operational testing.

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

m. No drilling operations shall begin without an approved disposal site for drilling fluids, cuttings, or waste. It shall be the permittee's responsibility to obtain the necessary approval(s) for disposal prior to the start of construction.

n. Department or Department delegated local program potable water construction permits must be issued for all surface piping and appurtenances upstream of the ASR well-head. Bacteriological clearance must be performed prior to operational testing of the ASR system.

3. Quality Assurance/Quality Control Requirements

a. The Professional Engineer of Record shall certify all documents related to the completion of the Class V ASR well and associated storage zone monitor well. The Department shall be notified immediately of any change of the Engineer of Record.

SPECIFIC CONDITIONS:

b. All documents prepared for the geological/hydrogeological evaluation of this project shall be signed and sealed by a Florida Licensed Professional Geologist or qualified Florida Licensed Professional Engineer.

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

4. Reporting Requirements

a. All reports and surveys required by this permit shall be submitted concurrently to all the members of the TAC. The Technical Advisory Committee (TAC) shall consist of representatives from these agencies:

Department of Environmental Protection, West Palm Beach and Tallahassee
United States Environmental Protection Agency, Region IV, Atlanta
United States Geological Survey, Miami
South Florida Water Management District, West Palm Beach
Dade County Environmental Resources Management, Miami

b. The Department and other applicable agencies must be notified immediately of any unusual events occurring during construction activities (e.g. on-site spills, artesian flows, large volumes of circulation losses, etc.). A written report describing the incident shall also be given to the Department within 72 hours of the start of the event. In addition, a final written report shall be sent to the Department within two weeks of the event. The final report shall contain a complete description of the occurrence, discuss its cause(s) and the steps being taken to reduce, eliminate, and prevent recurrence of the event and all other information deemed necessary by the Department.

c. The Department shall be notified at least seventy-two (72) hours prior to all testing for mechanical integrity of the ASR well.

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

e. A weekly submittal of construction progress reports shall include at a minimum the following information:

1. A cover letter summary of the daily engineer report, work log and a projection for activities in the next reporting period.

2. Daily engineers report and work log with detailed descriptions of all testing, logging, and casing installation activities.

3. Detailed description of any unusual construction-related events that occur during the reporting period.

4. Weekly water quality analysis and water levels for the four (4) pad monitor wells. (See S.C. 1b)

f. A drilling and system construction schedule must be submitted to the Department and TAC prior to site preparation for the ASR well system.

SPECIFIC CONDITIONS:

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

h. Upon completion of analysis of cores and sample cuttings recovered during the installation of the ASR and storage zone lateral monitor wells, the permittee shall contact the Underground Injection Control Section of the Department of Environmental Protection in Tallahassee to arrange their transfer to the Florida State Geologic Survey.

i. A final report shall be submitted to the Department and the TAC after completion of the ASR well system. A report detailing necessity or conversely the lack of necessity for the installation of a storage zone lateral fluid movement monitor well must be submitted after one year of operational testing. An application to operate the Class V, Group 6, Aquifer Storage and Recovery (ASR) test well must be submitted at least 60 days prior to the expiration of this permit. Pursuant to Rule 62-4.080(3) a permittee may request that a permit be extended as a modification of an existing permit. Such a request must be submitted to the Department before the expiration of the permit. In accordance with Rule 62-4.070(4) F.A.C., no Department permit(s) shall be issued for a term of more than five (5) years. This permit cannot be extended beyond the maximum five year period which ends June 29, 2000 and cannot and will not constitute a permit to operate the ASR well after the five year date cited above. Submission of an application for an operation permit following the five year date cannot and will not constitute timely submittal for the purposes of continued operation of the ASR well.

5. Operational Testing Requirements

a. The operational testing of the Class V, Group 6, ASR well system under this permit shall not commence without written authorization from the Department.

b. An operation and maintenance manual with emergency procedures must be submitted to the Department and the TAC members prior to a request for system operation approval.

c. Prior to operational testing approval, the following items must be submitted for TAC review and Department approval:

1. Borehole television survey of the ASR well and the final casing of the well.

2. Geophysical logs with interpretations.

3. Certification of mechanical integrity and interpreted test data.

4. Inferred transmissivity test data.

5. The well location must be surveyed by a Florida registered land surveyor. The location of the well and associated monitor well(s) must be determined relative to permanent referenced points. The permittee shall also locate the well and associated monitor well(s) by latitude and longitude and submitted on a site plan.

6. Background water quality data (storage zones) analysis for primary and secondary drinking water standards (per 62-550, F.A.C.) and minimum criteria parameters as attached.

7. Background water quality data (Injectate) analysis for primary and secondary standards and minimum criteria as attached.

SPECIFIC CONDITIONS:

8. Surface equipment completion certification or certification of interim completion for the purposes of testing.

9. Signed and sealed record engineering drawings of all surface equipment and appurtenances.

6. Operational Testing Conditions

a. Upon receipt of written authorization from the Department (S.C. 5a), the operational testing of the ASR well system shall be subject to the following conditions:

1. The flows to the ASR well shall be monitored and controlled at all times to ensure the maximum injection rate does not exceed that rate at which the well was tested.

2. Any failure of the ASR well monitoring and recording equipment for a period of more than forty-eight (48) hours shall be reported immediately to the Department. A written report describing the incident shall also be given to the Department within 72 hours of the start of the event. In addition, a final written report shall be sent to the Department within two weeks of the event. The final report shall contain a complete description of the occurrence, discuss its cause(s) and the steps being taken to reduce, eliminate, and prevent recurrence of the event, and all other information deemed necessary by the Department.

3. The following ASR well performance and monitoring zone data shall be recorded for the exploratory/storage zone monitor well, the monitoring well referenced in S.C. 2(b) above, if established, and the ASR well as indicated and reported to the Department in a Monthly Operating Report (MOR):

a. ASR well performance:

* total daily flow to/from each well (mg)
* daily average, maximum and minimum injection pressure at each well (psig)
* monthly maximum daily flow to/from each well
* monthly averages for the above daily measurements for each well
* monthly cumulative storage for each well

b. Chemical characteristics of the fluid injected (weekly for the first three (3) month and monthly thereafter during injection phase):

* total dissolved solids-measured (mg/1)
* chlorides (mg/1)
* color
* specific conductance (umho/cm)
* odor
* iron (mg/1)

c. Chemical characteristics of the exploratory/monitor well and the monitoring zone referenced in S.C. 2(b) and (c) above if required (weekly for the first month and monthly there after):

* total dissolved solids-measured (mg/1)
* chlorides (mg/1)
* pH (units)
* conductivity (umho/cm)

SPECIFIC CONDITIONS:

d. The Department may require the monitoring of additional parameters (as appropriate) in the exploratory/monitor well and/or monitor well referenced in S.C.2(b) and (c) (if required) if water quality monitoring of the Biscayne aquifer or the injection fluid indicates any of the following:

1. The quality of the ASR supply water is diminishing;

2. the above referenced monitoring results indicate significant differences in water quality during consecutive sampling events;

3. a source of contamination to the ASR supply zone is discovered that was not addressed in the permit.

e. TKN and Ammonia shall be included in the chemical characteristics of the monitoring zone (Specific Condition 6.a.4.c.) if background water quality data required by Specific Condition 5.c.6. shows significant difference when compared with the values recorded for the fluid injected.

4. A minimum of three (3) well volumes of fluid shall be evacuated from the monitor well prior to sampling for the chemical parameters listed above.

5. All ASR data submissions, including Monthly Operating Reports (MOR's), shall be clearly identified on each page with Facility Name, ID. Number, date of sampling/recording, operator's name, license and telephone number, and type of data shown (monitor zones will be identified by monitor well number and depth interval). The lead plant operator or higher official must sign and date each submittal. A copy of the Southeast District, UIC Section, MOR summary sheet is attached for your use.

6. All monthly reports (MOR's) shall be submitted to this office (FDEP UIC Section, Southeast District, P. O. Box 15425, West Palm Beach, FL 33416), and our Tallahassee office (UIC/Criteria and Standards Section, Twin Towers Building, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400) by the **fifteenth of the month following the period of record.**

7. A qualified representative of the Engineer of Record must be present for the start-up operations.

8. The Department must be notified in writing of the date of operation.

9. The permittee shall be subject to all requirements and regulations of Dade County, and the South Florida Water Management District regarding the construction, testing and operation of this ASR well system.

10. The permittee shall submit on a monthly basis on or before the 15th day of following month a water quality report on the injected fluid. This water quality report shall include the following:

(a) Daily volume of water injected
(b) Daily volume of water recovered
(c) Monthly totals of injected and recovered water
(d) Primary and Secondary drinking water standards (quarterly).

SPECIFIC CONDITIONS:

b. The integrity of the monitor well system referenced in S.C. 2(b) above, if established, shall be maintained at all times. Sampling lines shall be clearly and unambiguously identified at the point at which samples are drawn. All reasonable and prudent precautions shall be taken to insure that samples are properly identified and that samples obtained are representative. Sampling lines and equipment shall be kept free of contamination with independent discharges and no interconnections with any other lines.

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

d. Waters spilled during drilling of the system shall be contained and properly disposed.

e. The only source of injectant shall be water meeting all Primary and Secondary drinking water quality standards and minimum criteria unless otherwise exempted.

7. Financial Responsibility

The permittee unconditionally obligates themselves to plug and abandon the ASR and monitoring wells (with the appropriate Department permit) should the well or wells become a threat to the waters of the State, if the wells are no longer used, or if the wells are no longer usable for their intended purpose or other purposes as approved by the Department. In order to achieve these ends the permittee shall maintain at all times the resources necessary to close, plug, and abandon the Class V, Group 6, ASR well and associated monitor wells.

Issued this 30 **day of** JUNE, **1995**

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

for **Carlos Rivero-deAguilar**
Director of District Management

SOUTHEAST DISTRICT UIC SECTION

SURFICIAL AQUIFER MONITOR WELL QUARTERLY REPORT

FACILITY NAME _____ REPORT MO/YR.: _____

OPERATOR NAME _____ LICENSE # _____

I.D.NUMBER _____ PERMIT # _____

INJECTION WELL # _____

SAMPLING DATE _____ TIME _____

	PMW #1	PMW #2	PMW #3	PMW #4
LOCATION	NE CORNER	NW CORNER	SE CORNER	SW CORNER
ELEVATION OF TOC (NGVD)				
DEPTH TO WATER (TOC)				
WATER LEVEL (NGVD)				
CHLORIDES (MG/L.)				
CONDUCTIVITY (UMHOS)				
TEMPERATURE (F)				

ANALYZED BY: _____ SAMPLED BY: _____

PHONE # _____ TITLE _____

SITE PLAN OF PMW LOCATIONS

UNDERGROUND INJECTION CONTROL SECTION
MONTHLY OPERATING REPORT DATA SUMMARY

FACILITY;_____ REPORT MONTH/YEAR_____

I.D. NUMBER:_____ PERMIT NUMBER_____
PERMIT EXPIRATION DATE_____

INJECTION WELL #_____ LEAD OPERATOR_____

CASING DEPTH_____ PHONE NUMBER_____

IW TOTAL DEPTH _____

INJECTION WELL DATA

AVERAGE DAILY FLOW _____MGD
**MAX DAILY FLOW PER MO (mg) _____MG
**PEAK HR FLOW (MGD)ON MAX DAY_____MGD
MAXIMUM SUSTAINED INJECTION PRESSURE _____PSIG
MONTHLY AVG. INJECTION PRESS._____PSIG
MONTHLY WELLHEAD PRESSURE WITH NO FLOW(Shut-in)_____PSIG
***MAXIMUM INJECTION PRESSURE PERMITTED_____PSIG
***(note: injection pressure not to exceed 66% tested pressure)
Tested casing pressure during MIT _____PSIG

MONITORING WELL DATA (MW #____)

UPPER MONITORING INTERVAL (from to ft. b.l.s.)

MONTHLY MAX DAILY PRESSURE_____PSIG or FT. HEAD (Rel to NGVD)
MONTHLY MIN DAILY PRESSURE_____PSIG or FT. HEAD (Rel to NGVD)
TDS (monthly average) _____mg/l
CHLORIDE (monthly avg.) _____mg/l
AMMONIA-N (monthly avg.) _____mg/l
TKN (monthly average) _____mg/l
pH (monthly avg) _____Std units
CONDUCTIVITY (mo. avg.) _____umho/cm
FECAL COLIFORM (mo.avg.) _____#col/100ml
TEMPERATURE (mo. avg.) _____deg. F.
TOTAL PHOSPHOROUS (mo.avg) _____mg/l
SULFATE (monthly avg.) _____mg/l

LOWER MONITORING INTERVAL (from to ft. b.l.s.)

MONTHLY MAX DAILY PRESSURE _____PSIG or FT. HEAD (Rel to NGVD)
MONTHLY MIN DAILY PRESSURE _____PSIG or FT. HEAD (Rel to NGVD)
TDS (monthly average) _____mg/l
CHLORIDE (monthly avg.) _____mg/l
AMMONIA-N (monthly avg.) _____mg/l
TKN (monthly avg.) _____mg/l
pH (monthly avg) _____Std units
CONDUCTIVITY (mo. avg.) _____umho/cm.
FECAL COLIFORM (mo.avg.) _____#col/100ml
TEMPERATURE (mo.avg.) _____deg. F.
TOTAL PHOSPHOROUS (mo.avg) _____mg/l
SULFATE (monthly avg.) _____mg/l

WASTESTREAM ANALYSIS: Sample Date:_____
Submittal Date:_____

UNDERGROUND INJECTION CONTROL

INJECTIVITY TESTING SUMMARY SHEET

FACILITY_____

Deep Injection Well System
Injectivity Testing

Injection Well No. :
DATE OF TEST:
FDER PERMIT No.:

_____
Signature of Lead Operator

Were Wellhead Valves Exercised _____YES _____NO

TIME

	START	SHUT-IN PRESSURE
	MINS AFTER SHUT -IN	CALIBRATED PRESSURE GAUGE AT WELL HEAD (PSI)
	10	
	20	
	30	

COLUMN: 1	2	3	4	5	6	7	8	9	10
TIME	INJECTION WELL SHUT-IN PRESSURE AFTER 30 MINUTES (PSI)	PUMP NUMBER(S) ON-LINE	INJECTION RATE (gpm) or (mgd)	Injection Pressure after 10 minutes of pumping		PRESSURE DIFFERENTIAL (Col 5 - Col 2)	INJECTIVITY INDEX (Col 4 divide by Col 7)	UPPER MONITOR ZONE IN FEET OF HEAD ABOVE NGVD (FEET)	LOWER MONITOR ZONE IN FEET OF HEAD ABOVE NGVD (FEET)
				CALIBRATED GAUGE AT INJECTION WELLHEAD (PSI)	PRESSURE RECORDER (PSI)	FROM CALIBRATED PRESSURE GAUGE AT INJECTION WELLHEAD (PSI)	FROM CALIBRATED PRESSURE GAUGE AT INJECTION WELLHEAD (GPM / PSI)		

NOTES

1. INJECTIVITY INDEX (GPM/PSI) = INJECTION RATE (GPM) (COLUMN 4) / (INJECTION PRESSURE (PSI) (COLUMN 5) - SHUT-IN PRESSURE (PSI) (COLUMN 2))

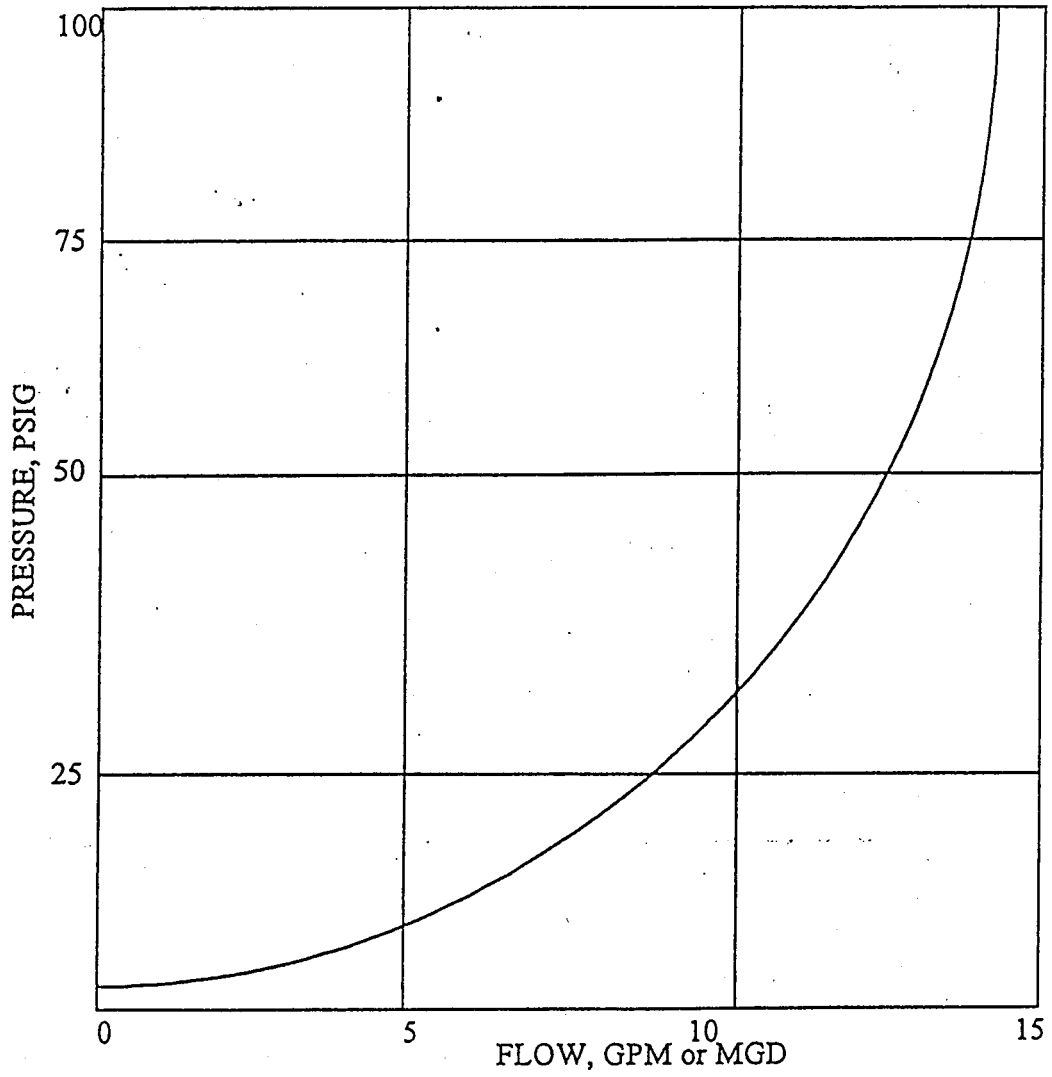
2. FOR MORE INFORMATION REGARDING EXECUTION OF THIS TEST CONSULT THE INJECTIVITY TESTING PROTOCOL IN THE O&M MANUAL

UNDERGROUND INJECTION CONTROL

DATE OF TEST :	FACILITY :
PERMIT NO. :	I.D. # :
WELL NO.	LEAD OPERATOR_____ SIGNATURE

INJECTIVITY TEST

SAMPLE



PRIMARY STANDARDS DRINKING WATER STANDARDS
Updated November 1, 1994

PARAMETER

Alachlor
Alpha, Gross
Antimony
Arsenic
Atrazine
Barium
Benzene
Benzo(a)pyrene
Beryllium
Cadmium
Carbofuran
Carbon Tetrachloride (Tetrachloromethane)
Chlordane
Chloroethylene (Vinyl Chloride)
Chromium
Coliforms, Total
Cyanide
2,4-D (2,4-Dichlorophenoxyacetic acid)
Dalapon (2,2-Dichloropropionic acid)
Dibromochloropropane (DBCP)
1,2-Dibromoethane (EDB, Ethylene Dibromide)
1,2-Dichlorobenzene (o-Dichlorobenzene)
1,4-Dichlorobenzene (p-Dichlorobenzene)
1,2-Dichloroethane (Ethylene dichloride)
1,1-Dichloroethylene (Vinylidene chloride)
cis-1,2-Dichloroethylene
trans-1,2-Dichloroethylene
Dichloromethane (Methylene chloride)
1,2-Dichloropropane
Di(2-ethylhexyl) adipate
Di(2-ethylhexyl) phthalate
Dinoseb
Diquat
EDB (Ethylene dibromide, 1,2-Dibromoethane)
Endothall
Endrin
Ethylbenzene
Ethylene dichloride (1,2-Dichloroethane)
Fluoride
Glyphosate (Roundup)
Gross Alpha
Heptachlor
Heptachlor Epoxide
Hexachlorobenzene (HCB)
gamma-Hexachlorocyclohexane (Lindane)
Hexachlorocyclopentadiene
Lead
Lindane (gamma-Hexachlorocyclohexane)

PRIMARY STANDARDS DRINKING WATER STANDARDS CONTINUED

PARAMETER

Mercury
Methoxychlor
Methylene chloride (Dichloromethane)
Monochlorobenzene
Nickel
Nitrate (as N)
Nitrite (as N)
Total Nitrate + Nitrite (as N)
Oxamyl
Pentachlorophenol
Perchloroethylene (Tetrachloroethylene)
Picloram
Polychlorinated biphenyl (PCB)
Radium
Roundup (Glyphosate)
Selenium
Silvex (2,4,5-TP)
Simazine
Sodium
Styrene (Vinyl benzene)
Tetrachloroethylene (Perchloroethylene)
Tetrachloromethane (Carbon Tetrachloride)
Thallium
Toluene
Toxaphene
2,4,5-TP (Silvex)
1,2,4-Trichlorobenzene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
Trichloroethylene (Trichloroethene, TCE)
Trihalomethanes, Total
Vinyl Chloride (Chloroethylene)
Xylenes (total)

SECONDARY DRINKING WATER STANDARDS

PARAMETER

Aluminum
Chloride
Color
Copper
Corrosivity
Ethylbenzene
Fluoride
Foaming Agents (MBAS)
Iron
Manganese
Odor
pH
Silver
Sulfate
Toluene
Total Dissolved Solids (TDS)
Xylenes
Zinc

MINIMUM CRITERIA
GROUND WATER MONITORING PARAMETERS

INORGANICS

Ammonia
Nitrogen (organic)
Orthophosphate (soluble)
Phosphorus
Total Kjeldahl Nitrogen

VOLATILE ORGANICS

Chloroethane
Chloroform
para-Dichlorobenzene
1,2-Dichloroethylene

Base/Neutral Organics

Anthracene
Butylbenzylphthallate
Dimethylphthallate
Naphalene
Phenanthrene

PESTICIDES AND PCBs

Aldrin
Dieldrin
Dioxin

Acid Extractables

2-chlorophenol
Phenol
2,4,6-trichlorophenol

Other

Conductivity
Biological Oxygen Demand
Temperature

West Wellfield - MDW DO
MDWASD

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

IN RE:	)	
	)	
Petition for Water Quality Exemptions by Miami-Dade Water and Sewer Department (MDWS)	)	OGC File No. 95-0605

FINAL ORDER

BY THE DEPARTMENT:

On October 11, 1994, the Department received from Miami-Dade Water and Sewer Department (MDWS) a Petition for exemptions, pursuant to Florida Administrative Code (F.A.C.) Rule 62-520.500. The Petitioner requested relief from Rule 62-520.420, F.A.C., (standards for Class G-I and Class G-II ground water), for an installation that will discharge into a Class G-II ground water. The exemptions are color 60 color units (standard 15 color units), odor 6 threshold odor number (standard 3 threshold odor number), and iron 2.0 mg/L (standard 0.3 mg/L). The installation is the MDWS West Wellfield aquifer storage and recovery (ASR) facility, which will be located at the corner of SW 72 Street and SW 172 Avenue, in unincorporated Dade County.

After reviewing the Petition, the Department concluded that it satisfied the requirements and criteria set forth in Rule 62-520, F.A.C. A copy of the Department's intent to grant letter

with the findings and recommendations that the exemptions be granted under specified conditions is attached hereto and incorporated herein as Exhibit I.

The letter with the notice of intent, notified the Petitioner of the Department's proposed agency action and advised it of its right to a hearing pursuant to Section 120.57, Florida Statutes (F.S.). On May 2, 1995, notice was given in the Miami Daily Business Review, Miami, Florida, and on May 5, 1995, notice was published in the Florida Administrative Weekly, informing the public of the Department's intended action and offering an opportunity for hearing pursuant to Section 120.57, F.S. Copies of the notices are attached as Exhibit II and III, respectively.

The Petitioner and interested parties having been advised of their rights under Chapter 120, F.S., and having failed or declined to file a Petition pursuant to Section 120.57, F.S., are hereby deemed to have waived those rights.

Any Party to this Order has the right to seek judicial review of the Order pursuant to Section 120.69, F.S., 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, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400; and by filing a copy of the Notice of Appeal, accompanied by the applicable filling fees, with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Order is filed with the clerk of the Department.

IT IS THEREFORE ORDERED that the Petition of Miami-Dade Water

and Sewer Department requesting exemptions from the color, odor, and iron water quality criteria set forth in Rule 62-550.320, F.A.C., for the ground waters specified herein is hereby GRANTED, subject to the conditions recommended by the Department staff in Exhibit I.

These exemptions, unless otherwise ordered shall be valid for the duration of the MDWS West Wellfield ASR project Class V well construction permit. Additionally, the applicant must petition the Department for exemptions in conjunction with an operation permit for any ASR project at this site.

DONE AND ORDERED this 25th day of July 1995 in Tallahassee, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

FILING AND ACKNOWLEDGEMENT
FILED, on this date, pursuant to S120.52 Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Barbara O'Neal 7/25/95
Clerk **Date**

VIRGINIA B. WETHERELL
Secretary

3900 Commonwealth Boulevard
Tallahassee, Florida

Telephone: (904)488-1554

Copies furnished to:

Richard Harvey - TLH
Mary Williams - TLH
Carlos Rivero deAguilar - WPB
Cynthia Christen - TLH
Cathy Conrardy - TLH
Nancy Marsh - EPA Atlanta

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing FINAL ORDER has been furnished by the United States Mail to Mr. Anthony J. Clemente, Director, Miami-Dade Water and Sewer Department, 4200 Salzedo Street, Coral Gables, Florida 33146, this 25th day of July 1995.

Cynthia K. Christen
Assistant General Counsel
3900 Commonwealth Boulevard
Mail Station 35
Tallahassee, Florida 32399-3000

Telephone: (904) 488-9730

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION

In the Matter of an Petition for Water Quality Exemptions, Dade County West Wellfield:	OGC File No. 95-0605 Dade County

INTENT TO GRANT

The Department of Environmental Protection gives notice of its intent to grant water quality exemptions (draft copy attached) to the Miami-Dade Water and Sewer Department, Mr. Anthony J. Clemente, P.E., Director, 4200 Salzedo Street Coral Gables, Florida, for the proposed project as detailed in the application specified above. The Department is issuing this Intent to Grant for the reasons stated below.

On October 11, 1994, the Department received a petition from the applicant, Miami-Dade Water and Sewer Department (MDWS) for the exemptions for installations discharging into Class G-II ground water pursuant to Rule 62-520.500, Florida Administrative Code (F.A.C.). The MDWS requested exemptions from three ground water standards contained in Rule 62-520.420(1), F.A.C. Specifically, the petition requested exemptions from three secondary drinking water standards which are incorporated as ground water standards. The standards are for color at 15 color units and the request is for 60 color units; iron at .3 mg/L and the request is for 2 mg/L; and odor at 3 threshold odor number and the request is

EXHIBIT I

for 6 threshold odor number. As secondary drinking water standards, the standards are aesthetically based and do not pose a health threat at the requested levels. The installation is the MDWS West Wellfield aquifer storage and recovery (ASR) facility which will be located at the corner of SW 72 Street and SW 172 Avenue, unincorporated Dade County.

The Department has also permitting jurisdiction under Chapter 403 of the Florida Statutes (F.S.). The project is not exempt from permitting procedures. The Department has determined that in addition to an exemption, a construction permit is required for the facility.

The Department has reviewed the above petition for the exemptions under the requirements of Rule 62-520.500, F.A.C., and hereby gives notice of its intent to grant the exemptions to MDWS for its aquifer storage and recovery facility based on the following findings:

(1) Granting these exemptions is clearly in the public interest. Storing excess water of good quality by ASR projects for future use meets the public demand for a reliable supply of water at a reasonable cost, while not adversely affecting the environment. The water to be used for this ASR operation has a total dissolved solids concentration (TDS) of approximately 340 mg/l. The secondary drinking water standard for TDS is 500 mg/L.

The receiving aquifer has a TDS concentration of approximately 5000 to 6000 mg/l. Since the injected fluid is to have a lower concentration of TDS and it meets all of the primary drinking water standards, saving this water for future drinking water, via ASR, is in the public interest.

(2) Compliance with presently specified criteria is unnecessary for the protection of present and future potable water supplies. Water from the Floridan aquifer in this area is not presently being used. Desalination of water from the Floridan aquifer, in the vicinity of the proposed project, would be necessary to render this water suitable for a potable supply. Desalination is usually accomplished by reverse osmosis. Color and iron are completely removed by reverse osmosis and are not likely to adversely impact the treatability of water from this aquifer. Color, iron, and odor are all removed in the normal treatment process for potable drinking water treatment.

(3) Granting the exemptions will not interfere with existing uses or the designated use of the waters or of contiguous water. The ground water which is proposed for injection is currently being used as a drinking water source in the Dade County area. The ground water

to be injected is of better quality with respect to total dissolved solids than the ground water in the Floridan aquifer. No wells penetrate the Floridan aquifer within the one mile area of review around this facility, therefore the existing use of the water should not be affected. There will be no impact on quality of the contiguous water because it is the Biscayne aquifer which is the source of the ASR water. The injected water meets all of the primary drinking water standards.

(4) The economic, environmental and social costs of compliance with existing criteria outweigh the economic, environmental, and social benefits of compliance. Compliance with the criteria would mean that the recharge water would have to be treated before being injected. The total capital cost for treating the water so that color, odor, and iron would be within the secondary drinking water standards would be approximately $32 million. The operation and maintenance costs for the additional treatment process would be $3 million per year. If the ASR water were to be treated before storage it would require that a pipeline be constructed. Construction of an additional pipeline would cause additional disturbance of the surface environment. There would also be energy costs associated with treating the water and pumping it to the

ASR well before being injected. The stored water (even with the presence of color, iron, and odor) should tend to improve both the quality and yield of water in this zone. The economic, environmental, and social costs of compliance with the criteria, plus the energy costs associated with treating and pumping this water, outweigh the economic, environmental, and social benefits which are a reliable supply of water at a reasonable cost, while not adversely affecting the environment. This is especially relevant because the receiving ground water is not currently used for potable supply, and its future potable use will require appropriate treatment technology.

(5) An adequate monitoring program approved by the Department has been established to ascertain the location of the stored water, to detect any leakage of the stored water to other aquifers or surface waters, and to detect any adverse effect on underground geologic formations or waters. This program has been designed to meet the requirements set forth in Rule 62-528.615, F.A.C. Monitoring will include recharge water quality, recovered water quality, quality of water in several Biscayne aquifer monitor wells in the immediately surrounding area, and regular reporting of monitoring data.

(6) The exemptions will not present a danger to the public health, safety, or welfare. The recharge water is raw water from the Biscayne aquifer which meets all primary drinking water standards. Color, iron, and odor are regulated as secondary drinking water standards. Secondary standards, by definition, are aesthetically based. Exceedence of these secondary drinking water standards should have no adverse affect upon the health or safety of persons or the Floridan or Biscayne aquifers. The proposed ASR operations will immediately improve public health, safety and welfare by providing a reliable water source of suitable quality and at relatively low cost to meet projected public demands.

The Department intends to grant these exemptions subject to the following conditions:

(a) The exemptions are granted for the duration of the MDWS West Wellfield ASR Class V well construction permit. Future exemptions must be petitioned for by the applicant in conjunction with an operation permit for any ASR project at this site.

(b) The exemptions provide relief only for the iron, color, and odor standards contained in Rule 62-550.320, F.A.C., as referenced in Rule 62-520.420, F.A.C. The minimum

criteria contained in Rule 62-520.400, F.A.C., apply to this ASR project.

(c) The monitoring program for this project must adhere to the West Wellfield Groundwater Monitoring Network plan which was attached to the March 3, 1995, submittal by the applicant (incorporated as Exhibit A) and the specific conditions of this ASR's construction permit.

Pursuant to Section 403.815, F.S., and DEP Rule 62-103.150, F.A.C., you (the applicant) are required to publish at your own expense the enclosed Notice of Intent to Grant the Water Quality Exemptions. The notice shall be published one time only within 30 days, in the legal ad section of a newspaper of general circulation in the area affected. For the purpose of this rule, "publication in a newspaper of general circulation in the area affected" means publication in a newspaper meeting the requirements of Sections 50.011 and 50.031, F.S., in the county where the activity is to take place. The applicant shall provide original copy of the proof of publication to Mr. James McNeal of the Department, at 2600 Blair Stone Road, Twin Towers Office Building, Mail Station 3530, Tallahassee, Florida 32399-2400, within seven days of publication. Failure to publish the notice and provide proof of publication within the allotted time may result in the

denial of the exemptions.

The Department will grant the exemptions unless a petition for an administrative proceeding (hearing) is filed pursuant to the provisions of Section 120.57, F.S.

A person whose substantial interests are affected by the Department's proposed exemption decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, F.S. The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400. Petitions filed by the exemption applicant and the parties listed below must be filed within 21 days of receipt of this intent. Petitions filed by other persons must be filed within 21 days of publication of the public notice or within 21 days of their receipt of this intent, whichever first occurs. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information:

(a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department File Number and the county in which the project is proposed;

(b) A statement of how and when each petitioner received notice of the Department's action or proposed action;

(c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action;

(d) A statement of the material facts disputed by Petitioner, if any;

(e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action;

(f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and

(g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this intent. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 21 days of receipt of this

intent, in the Office of General Counsel at the above address of the Department.

Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Rule 28-5.207, F.A.C.

DONE AND ENTERED this 18th day of April 1995 in Tallahassee, Florida.

18 April 1995
Date

Dale H. Thompson for
Virginia B. Wetherell
Secretary

State of Florida Department
of Environmental Protection
The Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399

Copies furnished to:

Cynthia Christen, Office of General Counsel, DEP
Richard Deuerling, DEP

USEPA/Atlanta
Steve Anderson, SFWMD
J.P. Listick, DEP/WPB
Cathy Conrardy, DEP/Tlh.

WEST WELLFIELD GROUNDWATER MONITORING NETWORK

I. Tables of monitoring sites, well depths, and well construction.

II. Maps of monitoring well network.

III. Tables of Sampling Schedules.

Exhibit A

I. Tables of monitoring sites, well depths, and well construction.

TABLE I - monitoring well depth and construction
1992-1994

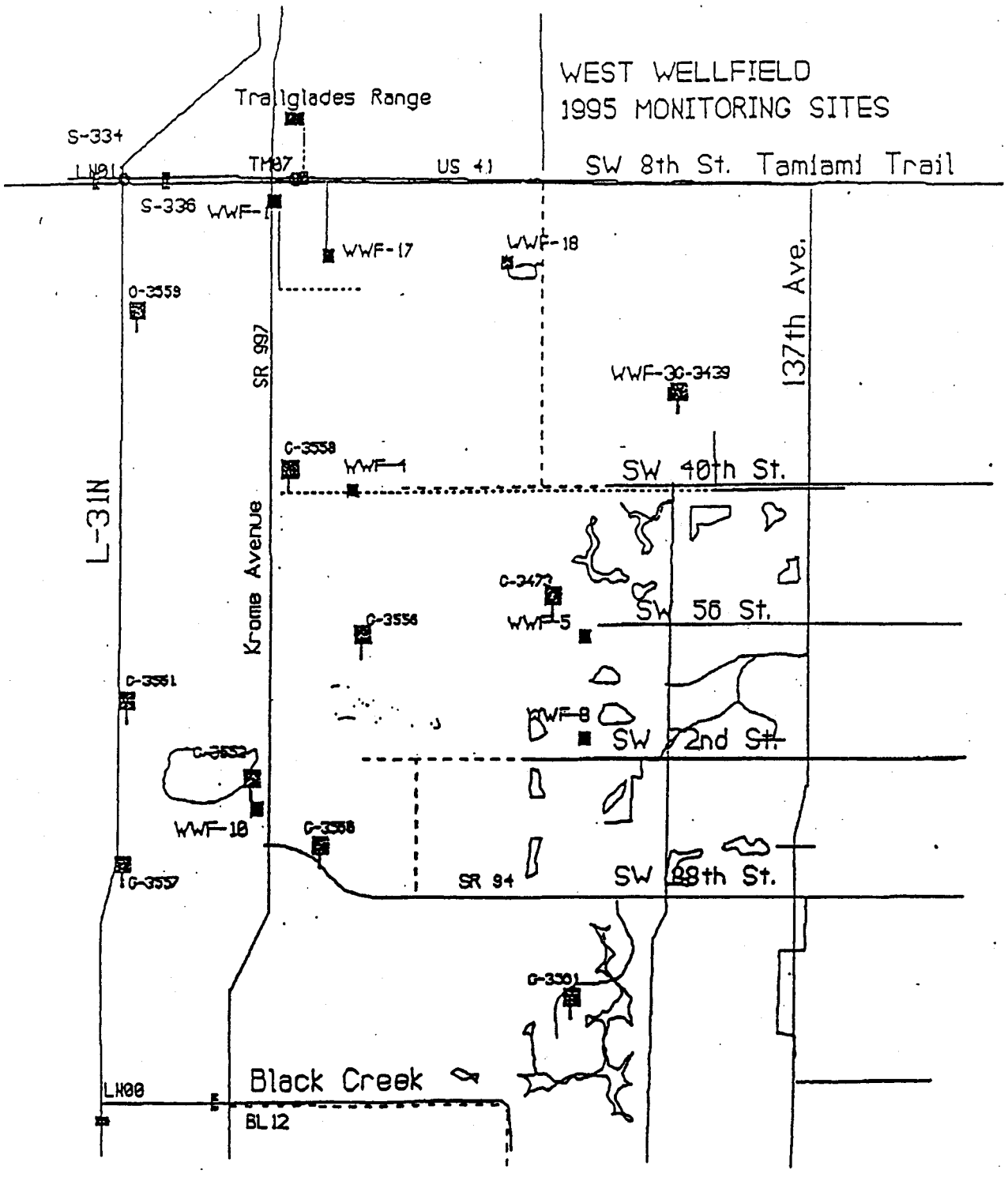
Site	Depth	Casing Material	Approximate Address
WWF-1	25	PVC	Krome Ave, 792' S. of Tamiami Trail
WWF-2	25	PVC	US Army TransmitterFac. 8,448' S. of Tamiami Trail
WWF-3	20	USGS *(G-3439,GW-16)*	SW 36 St. & 152 Ave.
WWF-4	25	Stainless steel	FPL Service Rd. Bird Dr. Canal Extension
WWF-5	25	Stainless Steel	SW 57 St. & 152 Ct.
WWF-7S	25	PVC (open hole)	SW 72 St. & 167 Ave.
WWF-7D	45	Stainless Steel	SW 72 St. & 167 Ave.
WWF-8	25	Stainless Steel	SW 70 St. & 152 Ave
WWF-9	20	USGS *(G-1487, GW-21)*	SW 88 St. & 187 Ave.20' W. of L-31N Canal
WWF-10	20	PVC (open hole)	Krome Ave., 1900' N. of Kendall Drive
WWF-11S	25	PVC (open hole)	SW 80 St. & 167 Ave.
WWF-11D	45	Stainless Steel	SW 80 St. & 167 Ave.
WWF-12	20	USGS *(G-855)*	Krome Ave, Approx. 1500' South of Kendall Drive
WWF-13	20	PVC, (destroyed, 1993)	Krome Ave. & Appr. 96 St.
WWF-15	25	Stainless Steel	Entrance to Krome N. Det Center, 1/2 mi. S. of Tamiami Trail
WWF-16	25	PVC, (destroyed, 1993)	Trailglades Range
WWF-17	25	PVC	End of borrow canal, Appr. 1/2 mi S. of Tamiami Trail & 1/2 mi east of Krome Ave
WWF-18	25	PVC	Appr. 1/2 mi S. of Tamiami Trail & 1/4 mi west of theoretical 157 Ave.
LN00	surface	canal	L31N @ Tamiami Canal
LN01	surface	canal	L31N @ Black Creek
TM07	surface	canal	Tamiami Canal @ Trailglades
BL12	surface	canal	Black Creek @ RR tressel

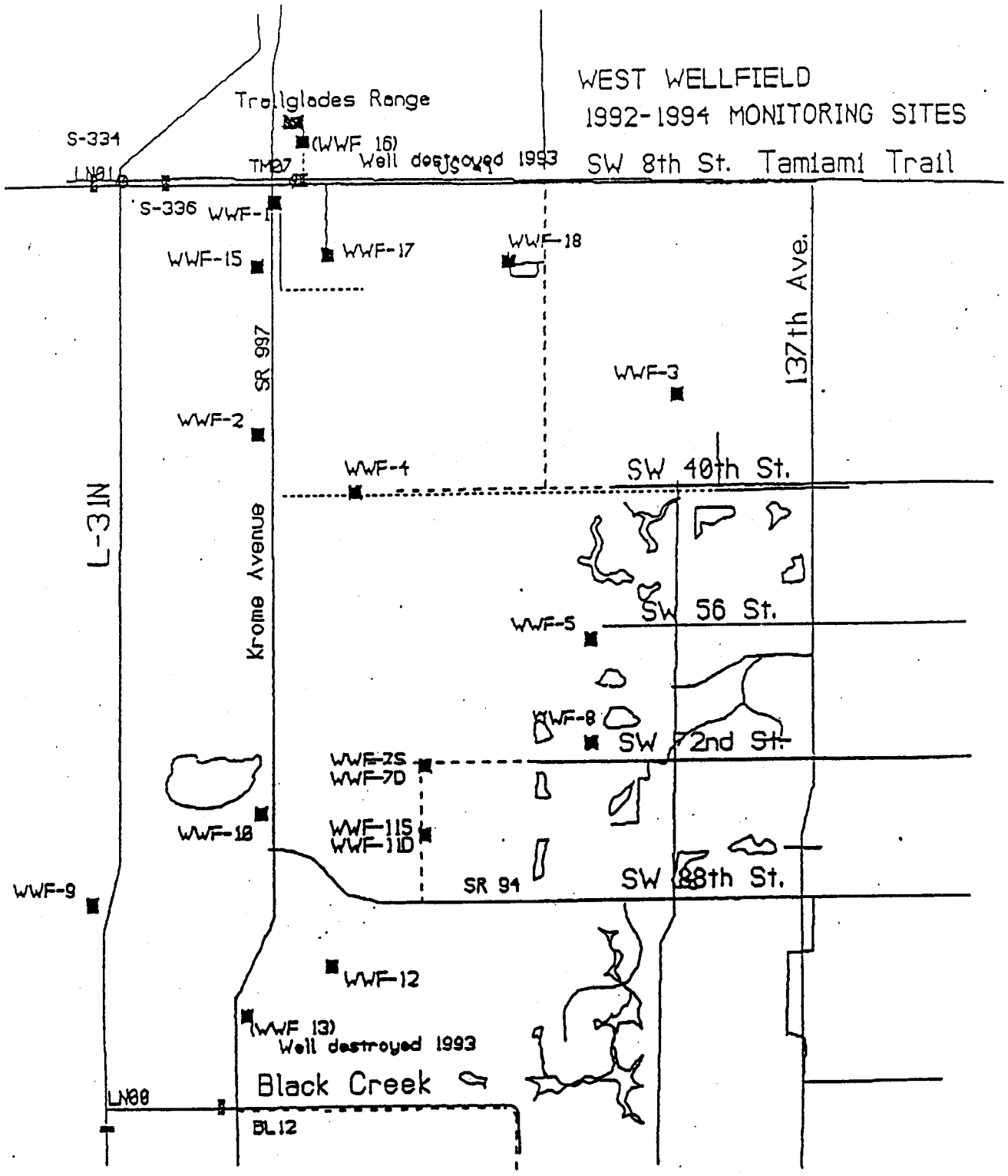
WEST WELLFIELD

MONITORING SITES FOR 1995

SITE	USGS ID	DEPTH (FEET)	CASING ID (INCHES)	CASING MATERIAL
W-1	G-3551	20	5	PVC
W-6	G-3556	20	5	PVC
W-7	G-3557	20	5	PVC
W-8	G-3558	20	5	PVC
W-9	G-3559	20	5	PVC
W-10	G-3560	20	5	PVC
W-11	G-3561	20	5	PVC
WWF-1		25	2	PVC
WWF-3	G-3439	20	4	PVC
WWF-4		25	2	Stainless Steel
WWF-5		25	2	Stainless Steel
WWF-8		25	2	Stainless Steel
WWF-10		25	2	PVC
WWF-17		25	2	PVC
WWF-18		25	2	PVC
LN00		(Surface water site)		
BL12		(Surface water site)		
LN01		(Surface water site)		
TM07		(Surface water site)		

II.Maps of monitoring well network.


WEST WELLFIELD
1995 MONITORING SITES
Trailglades Range
S-334
LW91
TH87
US 41
SW 8th St. Tamiami Trail
S-336
WWF-1
WWF-17
WWF-18
C-3559
SR 997
137th Ave.
WWF-30-3439
C-3558
WWF-1
SW 40th St.
L-31N
Krome Avenue
C-3478
WWF-5
SW 56 St.
C-3556
C-3561
WWF-8
SW 72nd St.
C-3552
WWF-10
C-3560
C-3557
SR 94
SW 88th St.
C-3561
Black Creek
LW00
BL12


WEST WELLFIELD
1992-1994 MONITORING SITES
Trailglades Range
S-334
(WWF 16)
Well destroyed 1993
SW 8th St. Tamiami Trail
S-336
WWF-1
WWF-15
WWF-17
WWF-18
137th Ave.
SR 997
WWF-3
WWF-2
WWF-4
SW 40th St.
L-31N
Krome Avenue
SW 56 St.
WWF-5
WWF-8
SW 72nd St.
WWF-7S
WWF-7D
WWF-18
WWF-11S
WWF-11D
WWF-9
SR 94
SW 88th St.
WWF-12
(WWF 13)
Well destroyed 1993
Black Creek
L-30
BL12

III. Tables of Sampling Schedules.

(revision 3, tentative, 12-05-94)

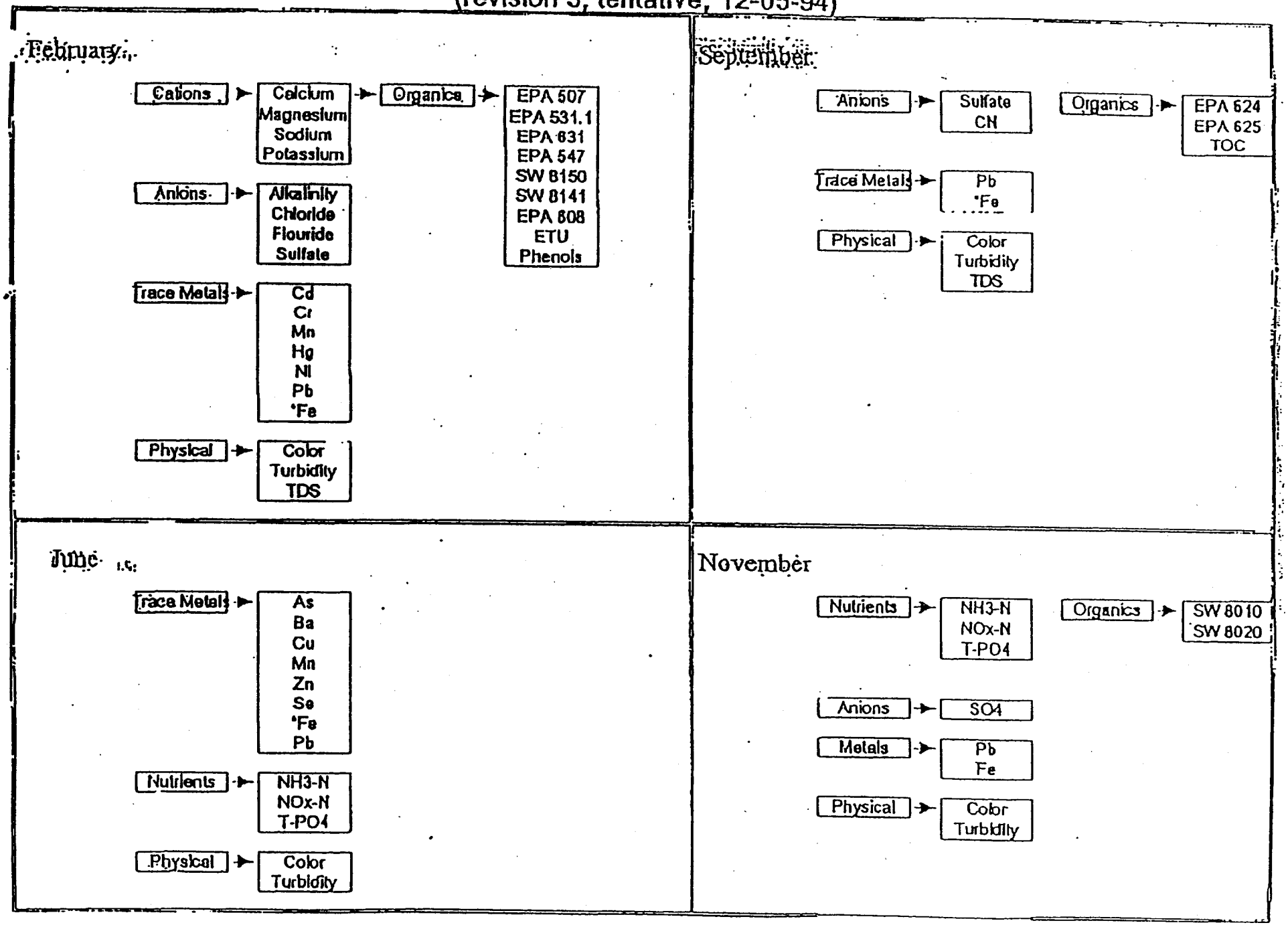
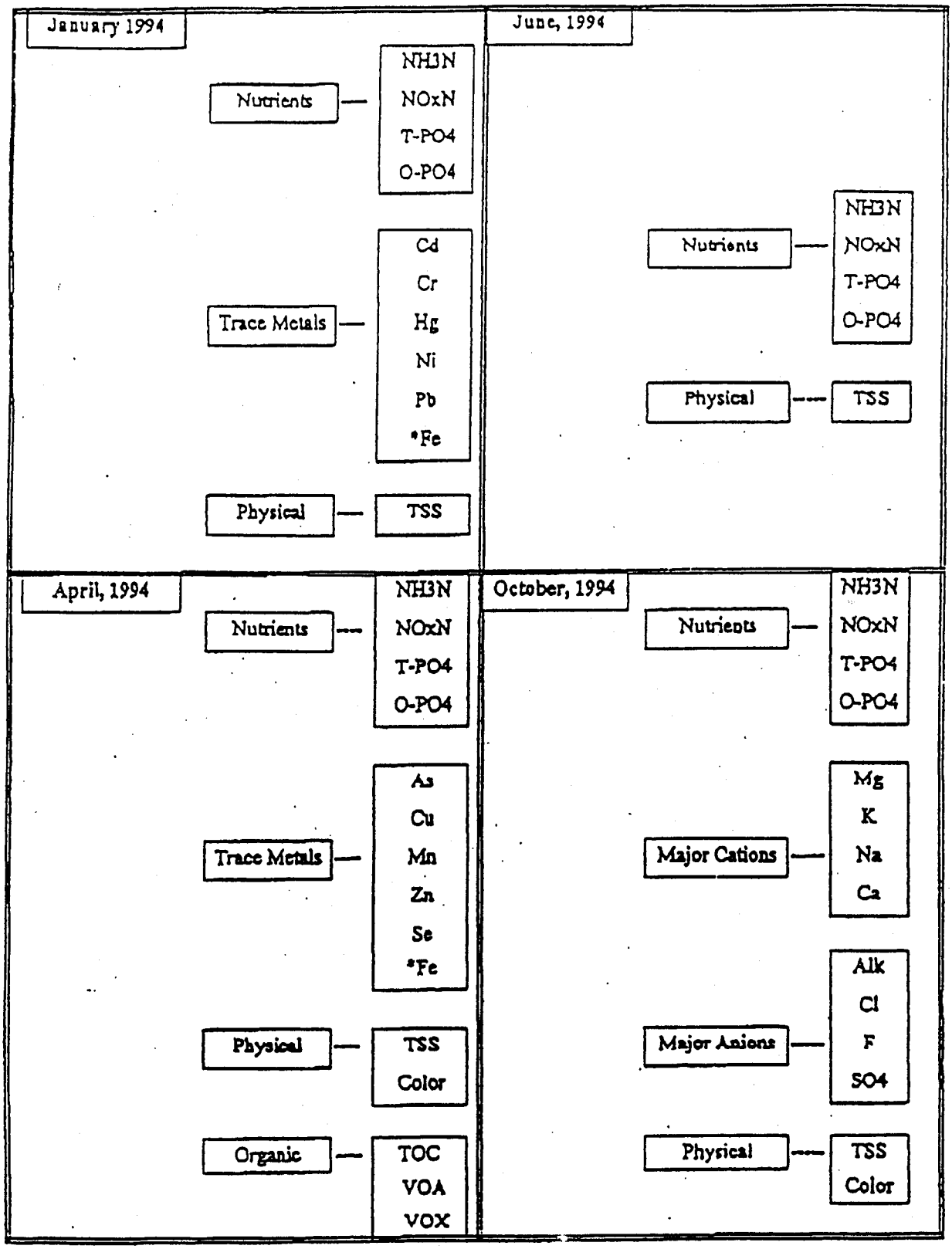
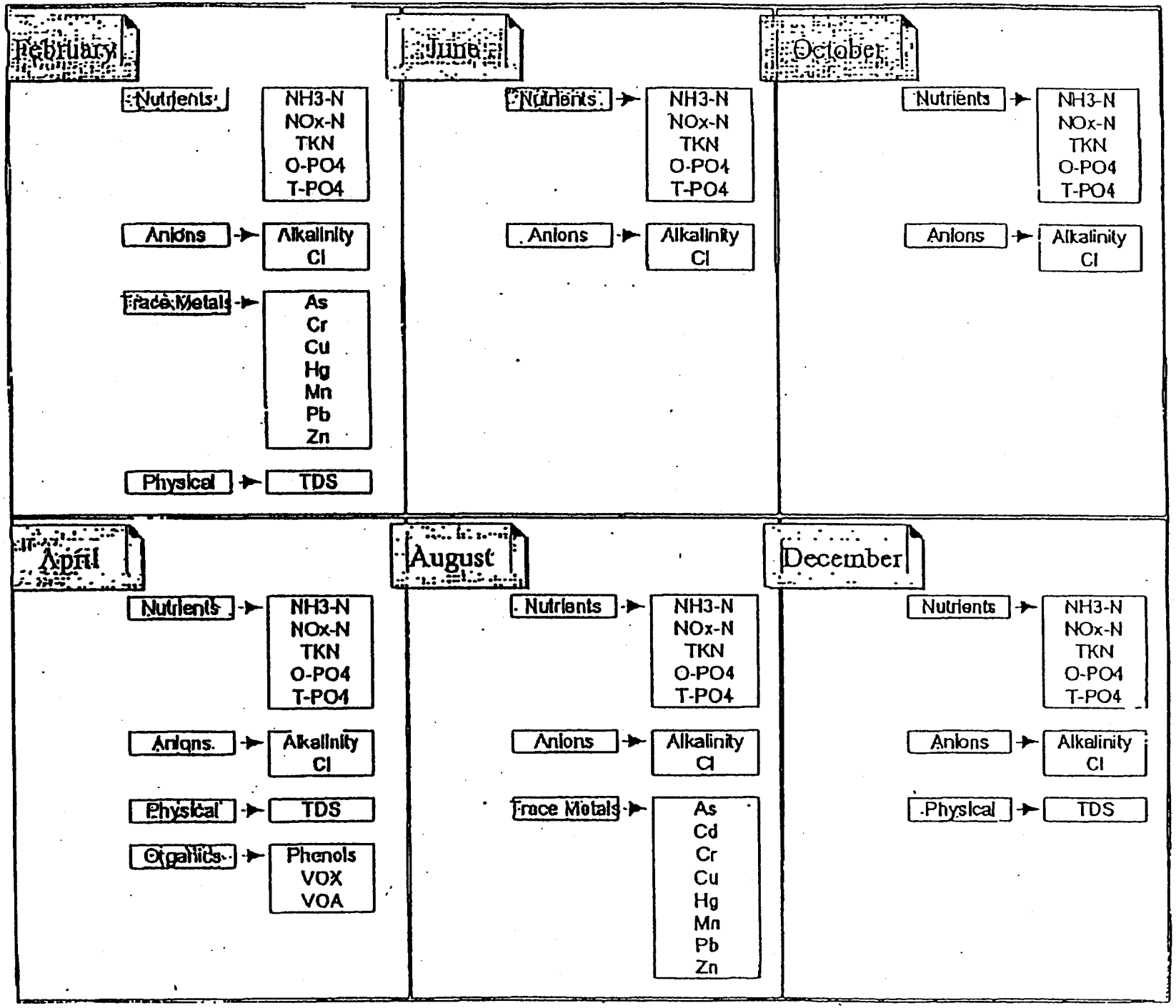


TABLE II - WEST WELLFIELD SCHEDULE FOR 1994





CERTIFIED: Z 211 684 947
RETURN RECEIPT

May 8, 1995

Mr. James E. McNeal, P.G.
Administrator
Ground Water Resources and UIC Program
Bureau of Drinking Water and Ground Water Resources
Florida Department of Environmental Protection
2600 Blair Stone Road
Twin Towers Office Building, Mail Station 3530
Tallahassee, FL 32399-2400

RE: Miami-Dade Water and Sewer Department
West Wellfield Aquifer Storage and Recovery (ASR) Project
Water Quality Exemption

Dear Mr. McNeal:

Enclosed please find a certified proof of publication of the "Notice of Intent to Grant Water Quality Exemption", for the referenced project, as required by Section 403.815 F.S., and DEP Rule 62-103. 150 F.A.C. The notice was published in the Miami Daily Business Review, a newspaper of general circulation in the area affected, on May 2, 1995.

Should you have any questions, please call me at (305) 669-5711.

Sincerely,

Bertha M. Goldenberg, P.E.
Environmental Coordinator

BMG/rsl

Enclosures

EXHIBIT II

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF INTENT TO GRANT
WATER QUALITY EXEMPTION

The Department of Environmental Protection gives notice of its intent to grant water quality exemptions for the aesthetically based secondary drinking water standards for color (standard 15 color units, exemption limit 60 color units), iron (standard 0.3 mg/L, exemption limit 2.0 mg/L), and odor (standard 3 threshold odor number, exemption limit 6 threshold-odor number) to Miami-Dade Water and Sewer (MDWS) Department, Mr. Anthony J. Clemente, Director for the Miami-Dade West Wellfield aquifer storage and recovery (ASR) project. The exemptions are granted for the duration of the MDWS West Wellfield ASR Class V well construction permit. Future exemptions must be petitioned for by the applicant in conjunction with an operation permit for any ASR project at this site. The ASR wells are located at the Miami-Dade West Wellfield at the corner of SW 72 Street and SW 172 Avenue, unincorporated Dade County.

A person whose substantial interests are affected by the Department's proposed exemption decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes (F.S.). The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 21 days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information; (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by Petitioner, if any; (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 21 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding officer upon motion filed pursuant to Florida Administrative Code Rule 28-5.207.

EXHIBIT III

The application is available for public inspection during business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the Tallahassee Office, 600 Blair Stone Road, Room 232, Tallahassee, Florida 32399-2400.

NOTICE OF REQUEST FOR PUBLIC COMMENT

The Department of Environmental Protection is requesting public comment on the priority list of surface waters requiring the development of Total Maximum Daily Loads (TMDLs). Section 303(d) of the Clean Water Act and EPA water quality and management regulations require the States to identify surface waters that do not meet or are not expected to meet water quality standards even after technology-based or other required controls are in place. These waters require the development of TMDLs which consider controls on point and nonpoint sources on an individual water body as well as watershed management.

The State of Florida has listed in its 1994 303(d) TMDL list the corresponding watersheds, indications of whether each water segment meets its designated use, pollutant sources specifying nonpoint and point sources, pollutants impacting water quality, and "poor" and "threatened" water segments.

Water segments identified as "fair" by the 1994 section 305(b) Water Quality Assessment and waters expected to result in the attainment and maintenance of applicable water quality standards are being evaluated to determine whether they meet federal guidelines to be included on the List.

Many water segments identified as priority-ranked and scheduled for TMDL development within the next two years are dependent upon the completion of Pollutant Load Reduction Goals, nonpoint source load reductions, by the State Water Management Districts.

Federal guidelines utilized in the development of the State's 1994 303(d) TMDL List were section 303(d) of the Clean Water Act, 40 C.F.R. §130.7, 57 Fed. Reg. 33,040 – 33,048 (1992), and EPA Guidance for Water Quality-based Decisions: The TMDL Process. State sources included the 1994 Section 305(b) Water Quality and Section 319 Nonpoint Source Assessments, Section 304(l) Impaired Waters Lists, and the 1994 Lakes Bioassessments Report

A copy of the State's 1994 section 303(d) TMDL List can be obtained by contacting Al Bishop, Department of Environmental Protection, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, telephone (904)488-0780. Comments on the list should be submitted within 30 days to the above address.

CHILDREN'S BOARD OF HILLSBOROUGH COUNTY

A PUBLIC ANNOUNCEMENT FROM THE CHILDREN'S BOARD

The Children's Board of Hillsborough County, in cooperation with the Hillsborough Juvenile Justice Council, has established a mini-grant program to support summer juvenile - delinquency prevention and early intervention programs serving at-risk youth ages 10-17. It is the purpose of this grant program to enhance or support programs designed to provide services to youth and their families during the summer months.

The Children's Board anticipates the allocation of approximately $75,000 for the funding period to begin June 1, 1995 and end September 30, 1995. The maximum grant available under this program will be $7,000. Awards will be made through a competitive process. All applications will be rated by review teams composed of representatives of the Children's Board and the Juvenile Justice Council.

MIAMI DAILY BUSINESS REVIEW

Published Daily except Saturday, Sunday and Legal Holidays
Miami, Dade County, Florida.

STATE OF FLORIDA
COUNTY OF DADE:

Before the undersigned authority personally appeared Sookie Williams, who on oath says that she is the Vice President of Legal Advertising of the Miami Daily Business Review f/k/a Miami Review, a daily (except Saturday, Sunday and Legal Holidays) newspaper, published at Miami in Dade County, Florida; that the attached copy of advertisement, being a Legal Advertisement of Notice in the matter of

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL
PROTECTION
NOTICE OF INTENT TO GRANT
WATER QUALITY EXEMPTION

In the .....XXXXX..... Court,

was published in said newspaper in the issues of
2, 1995

Affiant further says that the said Miami Daily Business Review is a newspaper published at Miami in said Dade County, Florida, and that the said newspaper has heretofore been continuously published in said Dade County, Florida, each day (except Saturday, Sunday and Legal Holidays) and has been entered as second class mail matter at the post office in Miami in said Dade County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that she has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

Sookie Williams

Sworn to and subscribed before me this
2 day of May, A.D. 1995

OFFICIAL NOTARY SEAL
ADELE S. PENA
NOTARY PUBLIC STATE OF FLORIDA
COMMISSION NO. CC 172108
MY COMMISSION EXP. JAN. 6,1996

(SEAL)

Sookie Williams personally known

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NOTICE OF INTENT TO GRANT WATER QUALITY EXEMPTION

The Department of Environmental Protection gives notice of its intent to grant water quality exemptions for the aesthetically based secondary drinking water standards for color (standard 15 color units, exemption limit 60 color units), iron (standard 0.3 mg/L, exemption limit 2.0 mg/L), and odor (standard 3 threshold odor number, exemption limit 6 threshold odor number) to Miami-Dade Water and Sewer (MDWS) Department, Mr. Anthony J. Clemente Director, for the Miami-Dade West Wellfield aquifer storage and recovery (ASR) project. The exemptions are granted for the duration of the MDWS West Wellfield ASR Class V well construction permit. Future exemptions must be petitioned for by the applicant in conjunction with an operation permit for any ASR project at this site. The ASR wells are located at the Miami-Dade West Wellfield at the corner of SW 72 Street and SW 172 Avenue, unincorporated Dade County.

A person whose substantial interests are affected by the Department's proposed exemption decision may petition for an administrative proceeding (hearing) in accordance with Section 120.57, Florida Statutes (F.S.). The petition must contain the information set forth below and must be filed (received) in the Office of General Counsel of the Department at 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, within 21 days of publication of this notice. Petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. Failure to file a petition within this time period shall constitute a waiver of any right such person may have to request an administrative determination (hearing) under Section 120.57, F.S.

The Petition shall contain the following information; (a) The name, address, and telephone number of each petitioner, the applicant's name and address, the Department File Number and the county in which the project is proposed; (b) A statement of how and when each petitioner received notice of the Department's action or proposed action; (c) A statement of how each petitioner's substantial interests are affected by the Department's action or proposed action; (d) A statement of the material facts disputed by Petitioner, if any; (e) A statement of facts which petitioner contends warrant reversal or modification of the Department's action or proposed action; (f) A statement of which rules or statutes petitioner contends require reversal or modification of the Department's action or proposed action; and (g) A statement of the relief sought by petitioner, stating precisely the action petitioner wants the Department to take with respect to the Department's action or proposed action.

If a petition is filed, the administrative hearing process is designed to formulate agency action. Accordingly, the Department's final action may be different from the position taken by it in this Notice. Persons whose substantial interests will be affected by any decision of the Department with regard to the application have the right to petition to become a party to the proceeding. The petition must conform to the requirements specified above and be filed (received) within 21 days of publication of this notice in the Office of General Counsel at the above address of the Department. Failure to petition within the allowed time frame constitutes a waiver of any right such person has to request a hearing under Section 120.57, F.S., and to participate as a party to this proceeding. Any subsequent intervention will only be at the approval of the presiding Officer upon motion filed pursuant to Florida Administrative Code Rule 28-5.207.

The application is available for public inspection during normal business hours, 8:00 a.m. to 5:00 p.m., Monday through Friday, except legal holidays, at the Tallahassee Office, 2600 Blair Stone Road, Room 232, Tallahassee, Florida 32399-2400.

5/2

95-4-050251M

APPENDIX B

Summary of Construction Activities

Appendix B

Summary of Construction Activities - West Wellfield ASR Project

Date	Description of Activities
11/23/96	Begin drilling 12-inch pilot hole at ASR-1.
11/24	Conduct pilot hole logs to 200 feet at ASR-1. Begin reaming.
11/25	Ream to 48 inches from 50 feet to 170 feet.
11/26	Install and cement 40-inch casing to 170 feet with 209 barrels neat cement.
11/27	Conduct temperature and gamma logs on cement stage at ASR-1 to 170 feet.
11/29	Begin pilot hole at 200 feet at ASR-1.
11/30	Complete pilot hole to 900 feet and conduct geophysical logs at ASR-1.
12/4	Re-ream from 170 feet to 860 feet.
12/5	Conduct reamed hole caliper log to 850 feet. Install and cement 30-inch casing with 367 barrels of neat cement.
12/6	Tag cement at 105 feet and tremie grout with 58 barrels at ASR-1. Conduct temperature log.
12/12	Conduct pressure test at ASR-1, begin pilot hole from 845 feet to 1,115 feet.
12/13	Pilot hole drilled from 1,115 feet to 1,155 feet.
12/16	Cal, T, Fl, Res on pilot hole to 1,155 feet at ASR-1.
12/17	Continue pilot hole from 1,155 feet to 1,197 feet. Coring unsuccessful.
12/18	Complete pilot hole at ASR-1 to 1,300 feet.
12/20	Tremie gravel at MW-1 (20 buckets).
12/20	Pilot Hole Flowmeter Log at ASR-1 (800 and 1,400 gpm), video too.
12/23	Caliper on reamed hole 0-1,300 feet and CBL at ASR-1.
1/2/97	Cement (1st stage) MW-1 with 92 barrels neat cement from 1,350 feet to 1,227 feet.
1/3	Cement (2nd stage) MW-1 with 85 barrels neat cement from 1,227 feet to 1,010 feet.
1/6	Begin drilling at ASR-2. Flow logs at ASR-1 (2,950 gpm).
1/7	Conduct pilot hole logs at ASR-2 to 200 feet.
1/8	Conduct reamed hole logs at ASR-2 to 200 feet. Install and cement 40-inch casing to 170 feet and cement with 141 barrels.
1/10	Conduct pilot hole logs at ASR-2 (0-900 feet).
1/16	Reamed Hole Caliper Log. Install and cement 30-inch casing at ASR-2 (358 barrels).
1/17	First Acidization at ASR-1 at 871 feet (10,129 gallons).
1/20	Acidize ASR-1 (1 tanker) at 1,152 feet.
1/21	Pressure test at ASR-2; acidize ASR-1 (1 tanker) at 1,152 feet.
1/23	Acidize ASR-1 at 871 feet (4,700 gallons).
1/24	Pilot hole logs at ASR-2 to 1,350 feet.
1/26	Step test at ASR-1.
1/27	Plug back pilot hole at ASR-2 to 1,287 feet. Ream ASR-2. Final video at ASR-1. Flowmeter at ASR-2 pilot hole.
2/3	Complete reaming at ASR-2 to 1,240 feet.
2/12	Acidize (± 9,500 gallons at ASR-2 at 1,150 feet. Pilot hole logs at ASR-3 (207 feet).
2/13	Ream 48 inch hole to 180 feet at ASR-3. Acid pump out at ASR-2.
2/14	Install and cement 40-inch casing at ASR-2 with 209 barrels of neat cement. Reamed hole logs at ASR-3 to 180 feet.
2/18	Conduct pilot hole geophysical logs to 900 feet at ASR-3.
2/20	Acidize ASR-2 with ± 9,500 gallon acid at 870 feet.
2/21	Conduct caliper log on reamed hole. Install 30-inch casing at ASR-3 and cement with 393 barrels of neat cement.
2/24	Acid pump out at ASR-2.
2/25	Step test at ASR-2.
2/26	Flow logs and CBL at ASR-2 reamed hole. Pressure test at ASR-3.
2/28	Flow logs at ASR-3 pilot hole to 1,300 feet.
3/11	Plug back ASR-3 to 1,202 feet. 43 barrels neat cement.
3/13	Final video at ASR-2.
3/17	Acidize ASR-3. Two tankers. 1,130 feet target depth.

Appendix B
Summary of Construction Activities - West Wellfield ASR Project

Date	Description of Activities
Cont.	
3/18	Acid pumpout.
3/20	Acidization at ASR-3 at 870 feet.
3/24	Acid pump out.
3/26	Acidization at ASR-3 at 930 feet.
3/27	Acid pump out.
4/1	Acidization at ASR-3 at 1,150 feet.
4/2	Acid pump out at ASR-3.
4/8	Step test at ASR-3.
4/9	Final flow logs at ASR-3.
4/17	Cement bond log at ASR-3.

APPENDIX C

Weekly Summaries

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CH2MHILL

April 21, 1997
136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (April 14 -- April 18, 1997)

Conduct cement bond log and final video survey.

Remainder of Project

This concludes the well construction and testing activities at the site. Surface facility construction will continue to approximately January 1998 for project completion. The permanent recharge and recovery pumps for ASR-2 and ASR-3 will be ordered this week, with approximately 14 - 20 week delivery times anticipated. Pending approval from the Dade County Department of Health, we plan to conduct a 72-hour aquifer test by pumping ASR-1 in May 1997. Sampling of pad monitor wells will cease after this week as no well activities will occur. We will forward engineering reports, O&M Manuals, and certificate of completion for surface facilities per the permit requirements. Upon start-up of the facility, we will conduct sampling of the pad monitor wells as required under operational testing.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12552.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

DAILY SUMMARY

Day/Date: 4-17-97
Client: MIAMI - DADE WEST WELL FIELD
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-3
Weather: p-cloudy ~80deg. F

Day Shift (0700 to 1900 hours)

Activity: ASR-3 LOGGING, FINAL VIDEO AND CBL LOGS

Time	Description
0955	ONSITE , G.FORD. FLORIDA GEOPHYSICAL LOGGING ONSITE, SETTING UP FOR VIDEO RUN .
1005	LOADED WATER SAMPLE COLLECTED FROM ASR-3 STEP TEST,
1015	VIDEO TOOL IN PACK OFF AND BOLTING DOWN TO WELL HEAD.
1020	STARTED VIDEO RUN, AT 10 FT BELOW SURFACE .
1042	AT 747 FT , NOTED POSSIBLE PITTING IN CASING AT WELD JOINT.
1045	AT 786 FT (SAME AS ABOVE) AT 839 FT , END OF CASING , OPEN HOLE AT 1206 FT UNABLE TO SEE.
1104	AT 1209 FT T.D. COMPLETED CAMERA RUN.
1230	CAMERA TOOL OUT OF HOLE . LEE (FLORIDA GEOPHYSICAL LOGGING) WORKING ON SYSTEM FOR CBL LOGGING, REPROGRAMMING COMPUTER . MAIN SYSTEM DOWN .
1320	TOOL IN HOLE, PACKOFF WAS TOO SHORT FOR TOOL, HAD TO OPEN VALVE AT WELL HEAD AND LOWER TOOL THROUGH VALVE AND BOLT PACKOFF TO TOP OF VALVE WHILE WELL FREE FLOWED.
1325	STARTED CALIBRATION ON CBL TOOL .
1450	STARTED LOGGING , UP RUN AT 842 FT . STOPPED LOGGING , CALIBRATION IS OFF .
1515	STARTED LOGGING AT 842 FT , UP RUN .
1550	COMPLETED LOGGING .
1600	TOOL OUT OFF HOLE.
1620	COLLECTED 3 COPIES OF CBL LOGS AND A COPY OF THE VIDEO .
1630	OFFSITE

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CH2MHILL

April 16, 1997

136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (April 7 - 11, 1997)

Conduct 8-hour step-pumping test of reamed hole at ASR-W-3. Collect water sample for water quality analysis. Conduct final geophysical logs at ASR-W-3.

Next Week (April 14 - 18, 1997)

Conduct cement bond log and final video survey.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12551.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

Project No. 130282.A5.05 Date 4-9-97

Client MDWASAD

Contractor YOUNGQUIST BROTHERS

Well No. ASR WELL 3

DAILY OPERATIONS REPORT

Weather MOSTLY CLOUDY, HUMID, ≈ 78°F

Shift No. 1 Time _____

Driller MIKE

Activity GEOPHYSICAL LOGGING

Starting Depth N/A

Shift No. _____ Time _____

Driller _____

Activity _____

Starting Depth _____

Formation samples collected _____

Water samples collected _____

Deviation Survey _____

Drilling fluid additives _____

Well water level

Time	Depth

Measurement reference point _____

elevation _____

Supply deliveries _____

Time	Description of Operations
0815	M. SCHILLING ARRIVES ON SITE. YOUNGQUIST BROTHERS HAS A THREE-MAN CREW ALREADY ON SITE LOADING OUT EQUIPMENT FOR DEMOBILIZATION.
0915	FLORIDA GEOPHYSICAL ARRIVES ON SITE AND STARTS SETTING UP TO CONDUCT LOGGING. THE LOGS TO BE CONDUCTED ARE CALIPER, TEMPERATURE, FLUID RESISTIVITY, AND FLOWMETER LOGS. THE CALIPER LOG WILL BE CONDUCTED UNDER STATIC CONDITIONS WHILE THE REMAINDER ARE UNDER DYNAMIC CONDITIONS
1015	START LOGGING
1300	M. SCHILLING OFFSITE FOR LUNCH. THE FLOWMETER LOG IS THE ONLY REMAINING LOG.
1330	M. SCHILLING RETURNS TO THE SITE. LOGGING RESUMES.
1530	LOGGING COMPLETED
1600	M. SCHILLING OFFSITE FOR THE DAY.

MARK SCHILLING - SITE INSPECTOR

M. Schilling

Project No. 136282.A5.05 Date 4-3-97

Client MDWASA

Contractor YOUNGQUIST BROTHERS

Well No. ASR WELL 3

DAILY OPERATIONS REPORT

Weather CLEAR, WARM, ≈ 85°F

Shift No. 1 Time _____

Driller MIKE

Activity STEP PUMPING TEST

Starting Depth N/A

Shift No. _____ Time _____

Driller _____

Activity _____

Starting Depth _____

Formation samples collected _____

Water samples collected _____

Deviation Survey _____

Drilling fluid additives _____

Well water level

Time	Depth

Measurement reference point _____

elevation _____

Supply deliveries _____

Time	Description of Operations
0700 -	M. SCHILLING ARRIVES ON SITE. YOUNGQUIST BROTHERS HAS A THREE-MAN CREW ALREADY ON SITE YESTERDAY, THE CREW HAD TESTED THE PUMP AND DETERMINED THE ENGINE RPM'S NEEDED FOR EACH STEP OF THE PUMPING TEST. M. SCHILLING STARTS SETTING UP FOR THE TEST
0955 -	START STEP PUMPING TEST. THIS WILL BE A 4-STEP TEST. STEPS AT 1,500 RPM, 2,800 GPM, AND 3,800 GPM THEN RECOVERY PHASE.
1820 -	STEP PUMPING TEST
1845 -	M. SCHILLING OFFSITE FOR THE DAY YOUNGQUIST CREW REMAINED ON-SITE TO LOAD TRAILERS FOR TRANSPORT OF YOUNGQUIST EQUIPMENT TO THEIR NEXT DRILLING JOB

MARK SCHILLING - SITE INSPECTER

M. Schilling

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CH2MHILL

April 3, 1997

136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (March 31–April 4, 1997)

Conduct acidization of ASR-W-3 with approximately 5,000 gallons of 32 percent hydrochloric acid to improve the well's specific capacity. Conduct acid pump-out to evaluate results of first acidization.

Next Week (April 7–11, 1997)

Conduct 8-hour step-pumping test of reamed hole at ASR-W-3. Collect water sample for water quality analysis. Conduct final geophysical logs at ASR-W-3.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12467.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

DAILY SUMMARY

Day/Date: 4-2-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-3
Weather: p-cloudy ~81deg. F

Day Shift (0700 to 1900 hours)

Activity: ASR-3 , ACID PUMP OUT , 1,150 FT RUN . Driller: TROY MOORE

Time	Description
0950	ONSITE , G.FORD. CALLED BOB ZIELKE (MIAMI-DADE) TO NOTIFY HIM WE WILL BE PUMPING TO SEWER MAIN TODAY AT 2,500- 3,500 GPM . TROY MOORE OFFSITE.
1010	ARRIVED AT ASR-3 PAD, SETTING UP FOR PUMP OUT. WELL HEAD PRESSURE =13.0 PSI . SEWER MAIN = 6.0 PSI .
1024	STARTED PUMP AT 1,200 GPM , DTW= ABOVE TOC.
1030	INCREASED FLOW TO 1,800 GPM, DTW= TOC.
1032	FLOW = 1,800 GPM , DTW= .30 FT
1039	INCREASED FLOW TO 2,800 GPM , DTW= 24.40 FT.
1145	FLOW = 2,800 GPM , DTW= 38.65 FT.
1147	INCREASED FLOW TO 3,050 , DTW=42.80 FT.
1157	INCREASED FLOW TO 3,500 , DTW=53.60 FT.
1220	FLOW AT 3,500 , DTW= 55.10 FT.
1330	FLOW AT 3,500 , DTW= 56.80 FT., SHUT PUMP OFF, DISCHARGE LINE STARTING TO LEAK AT A SEAM NEAR EDGE OFF PAD. APPX. 3.5 MINS FOR RETURN TO SURFACE. CLOSED VALVES AT SEWER MAIN.
1405	CALLED PETE KWIATKOWSKI (CH2M HILL) DISCUSSED PUMP OUT DATA AND POSSIBLE STEP PUMPING TEST TO BE DONE.
1425	BEEPED TROY MOORE (YOUNQUIST) .
1435	TALKED WITH TROY MOORE ABOUT LEAK AT DISCHARGE LINE, PULLING TUBING OUT OF WELL FOR BACK GROUND DATA USING HERMIT. CAN NOT HAVE TUBING PULLED IN TIME AND DISCHARGE REPAIRED IN TIME TO CONDUCT STEP TEST BY FRIDAY , MAY BE ABLE TO CONDUCT STEP TEST ON 4-7-97.
1500	CALLED PETE KWIATKOWSKI TO DISCUSS FINDINGS. COLLECTED WATER SAMPLES AND EQUIPMENT TO RETURN TO DFB OFFICE .
1555	OFFSITE,

Miami-Dade Water and Sewer Department
West Wellfield ASR Project
Pad Monitor Well Water Quality Data

		PMW-NE			PMW-NW			PMW-SE			PMW-SW			
Well	Date	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Comments
W-1	11/19/96	44	560	270	45	420	190	47	510	220	8	420	190	Initial Sampling
W-1	12/4/96	45	568	379	47	486	324	47	578	385	48	540	359	MDWASD Lab
W-1	12/12/97	41	570	380	43	481	321	43	572	382	47	527	351	
W-1	1/2/97	47	572	380	315	992	661	48	552	369	49	523	350	
W-1	1/16/97	53	574	384	265	950	631							
W-2	1/2/97	53	511	340	46	454	302	51	542	361	54	525	350	Initial Sampling
W-2	1/16/97	54	514	342	54	505	337	55	462	308	76	505	337	
W-2	1/21/97	52	515	344	62	458	306	56	477	318	53	523	348	
W-2	2/4/97	52	506	338	146	699	466	55	489	327	55	516	345	
W-2	2/12/97	58	528	351	200	843	561	58	529	354	54	493	322	
W-2	3/11/97	66	554	368	108	633	422	58	520	348	54	536	357	
W-3	2/12/97	54	543	361	56	594	395	56	535	356	58	565	376	Initial Sampling
W-3	2/20/97	57	556	379	57	595	396	57	556	371	50	519	345	
W-3	3/11/97	75	628	418	61	615	410	59	594	394	64	615	410	
W-3	3/24/97	109	710	479	92	696	463	67	623	414	79	664	441	
W-3	3/27/97	113	724	481	88	689	459	64	582	388	80	664	442	
W-3														
W-3														
W-3														
W-3														
MW-1	1/3/97				68	610	406				76	643	428	
MW-1														
MW-1														
MW-1														
MW-1														

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CH2MHILL

March 28, 1997

136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (March 24 -28, 1997)

Conduct acidization of ASR-W-3 with approximately 5,000 gallons of 32 percent hydrochloric acid to improve the well's specific capacity. Conduct acid pump-out to evaluate results of first acidization.

Next Week (March 31 -APRIL 4, 1997)

Conduct acidization of ASR-W-3 with approximately 5,000 gallons of 32% hydrochloric acid to improve the well's specific capacity. Conduct acid pump-out to evaluate results of acidization. Conduct 8-hour step-pumping test of reamed hole at ASR-W-3. Collect water sample for water quality analysis. Conduct final geophysical logs at ASR-W-3.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12444.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

DAILY SUMMARY

Day/Date: 3-27-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-3
Weather: p-cloudy ~80deg. F.

Day Shift (0700 to 1900 hours)

Activity: ASR-3, ACID PUMP OUT. **Driller: TROY MOORE**

Time	Description
0800	ONSITE , G.FORD. YOUNGQUIST WORKING ON PUMP, WILL CONDUCT ACID PUMPOUT TODAY. TROY MOORE NOTED THAT HE WILL REPLACE FLOW METER AT DISCHARGE LINE, APPEARS IT MAY NOT BE WORKING PROPERLY. WILL CHECK WITH FIRST HOUR OF PUMP OUT.
0910	STARTED PUMP AT ASR-3 , AT 2,750 GPM . TOC = 1.2 FT ABOVE PAD. WELLHEAD PRESSURE BEFORE PUMPING = 13.0 PSI .
1005	DTW = 39.0 FT AT 2,650 GPM .
1010	SHUT DOWN PUMP FOR NEW FLOW METER INSTALLATION. NOTED VERY HIGH PRESSURE IN DISCHARGE LINE , WILL TRY TO BLEED OFF PRESSURE.
1030	STARTED PURGING MONITOR WELLS AT ASR-3 PAD.
1100	CALLED PETE KWIATKOWSKI (CH2M HILL) DISCUSSED REPAIRS TO FLOW METER AND DTW AFTER ONE HOUR OF PUMPING.
1155	COLLECTED WATER SAMPLES AT ASR-3 MONITOR WELLS .
1230	COMPLETED SAMPLE COLLECTIONS.
1232	STARTED PUMPING ASR-3 AT 1,200 GPM , UPPED FLOW TO 2,400 GPM. AND FINAL TO 2,950 GPM.
1240	DTW =30.45 FT.AT 2,950 GPM.
1256	DTW = 36.90 FT. AT 2,800 GPM . PLEASE SEE PUMP OUT SHEET .
1430	DTW = 39.90 FT. AT 2,800 GPM .
1431	INCREASED FLOW RATE TO 3,600 GPM.
1433	DTW = 56.50 FT. AT 3,600 GPM .
1445	DTW = 59.55 FT. AT 3,500 GPM .
1530	DTW = 62.25 FT. AT 3,500 GPM .
1531	PUMP OFF, NOTED RECOVERY TIME TO SURFACE IS SLOW COMPARED TO ASR-1 AND 2 . APPX. 5.0 MINS.
1600	WELLHEAD PRESSURE = 4.0 PSI .
1610	OFFSITE

DAILY SUMMARY

Day/Date: 3-26-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-3
Weather: p-cloudy ~83 deg. F

Day Shift (0700 to 1900 hours)

Activity: ASR-3 ACID PUMP IN AT 930 FT. Driller: TROY MOORE

Time	Description
1015	ONSITE , G.FORD. ACID TANKER ONSITE. PUMPING FRESH WATER TO ASR-3 AT 930 FT. WELL HEAD PRESSURE = 12.0 PSI .
1025	HOOKING UP FOR ACID RUNS AT ASR-3 .
1030	CALLED PETE KWIATKOWSKI (CH2M HILL)DISCUSSED ACID PUMP IN AT ASR-3, WILL PUMP ACID TO 930 FT THROUGH TUBING, IF A REACTION IS NOTED AT THIS DEPTH , WILL CALL PETE AND TRY ALTERNATE DEPTH.
1045	TANKER DRIVER WILL NEED TO CHECK WITH OFFICE TO USE STAINLESS STEEL 2 INCH QUICK CONNECT FOR TRANSFER OF ACID TO ASR-3 .
1120	RECEIVED O.K. TO USE QUICK CONNECT.
1125	STARTED FIRST HALF OF ACID PUMP IN TO ASR-3 .
1155	STOPPED PUMPING ACID , STARTED FRESH WATER CHASE THROUGH TUBING. WELLHEAD PRESSURE = 15.0 PSI .
1225	STARTED SECOND HALF OF ACID PUMP IN .
1340	COMPLETED ACID RUNS IN ASR-3 , WELL HEAD PRESSURE = 24.0 PSI . STARTED FRESH WATER CHASE THROUGH TUBING .
1400	CALLED PETE KWIATKOWSKI (CH2M HILL) DISCUSSED ACID PUMP IN AT ASR-3 , ALSO WILL CONDUCT PUMP OUT ON 3-27-97.
1425	CHECKED ASR-3 WELLHEAD PRESSURE = 14.0 PSI . COLLECTED ACID PAPER WORK , ALSO NOTIFIED BOB ZIELKE (MIAMI - DADE) THAT WE WILL BE PUMPING TOMORROW 3-27-97 AT 0700-0800 FOR APPX. 2 - 3 HOURS . WILL BEEP ME IF A PROBLEM OCCURS DURING PUMP OUT.
1440	OFFSITE.

DAILY SUMMARY

Day/Date: 3-24-97
Client: MIAMI - DADE WEST WELL FIELD
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-3
Weather: p-cloudy ~81deg. F

Day Shift (0700 to 1900 hours)

Activity: ASR-3 **Driller: TROY MOORE**

Time	Description
1010	ONSITE , G.FORD. TALKED WITH TROY MOORE (YOUNGQUIST) FOR SITE UPDATE , CONTRACTOR WORKING ON REPAIRING LEAK IN DISCHARGE LINE TO SEWER MAIN, AND BACK FLOW PREVENTERS. CAN NOT START ACID PUMP OUT UNTIL REPAIRS ARE COMPLETED.
1110	STARTED PURGING MONITOR WELLS AT ASR-3 PAD FOR WATER QUALITY SAMPLING.
1230	STARTED COLLECTING WATER SAMPLES AT ASR-3 PAD MONITOR WELLS .
1300	COMPLETED WATER QUALITY SAMPLE COLLECTIONS AT ASR-3 PAD.
1335	COMPLETED REPAIRS FOR DISCHARGE LINE AT ASR-3 .
1342	STARTED ACID PUMP OUT AT ASR-3 FLOW RATE = 3,100 GPM.
1347	DTW =31.10 AT 3,050 GPM , TOC = 1.2 FT ABOVE PAD .
1400	DTW =40.05 AT 2,900 GPM ,
1440	DTW =41.80 AT 2,800 GPM ,
1510	CALLED PETE KWIATKOWSKI (CH2M HILL) DISCUSSED DRAW DOWN AT ASR-3.
1530	DTW =43.30 AT 2,800 GPM ,
1550	DTW =43.40 AT 2,800 GPM. PUMP OFF , RETURN TO SURFACE IN 1.05 MINS.
1600	TROY WILL TRY TO SCHEDULE ACID RUN IN ASR-3 FOR WED.3-26-97 COLLECTED PAST ACID PAPER WORK FOR 3-20-97 ACID RUN.
1640	OFFSITE.

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CH2MHILL

March 24, 1997

136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager–UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File #UC 13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (March 17-21, 1997)

Conduct acidization of ASR-W-3 with approximately 15,000 gallons total (10,000 and 5,000 gallon separate attempts) of 32 percent hydrochloric acid to improve the well's specific capacity. Conduct acid pump-out to evaluate results of first acidization.

Next Week (March 24-28, 1997)

Conduct acidization of ASR-W-3 with approximately 10,000 gallons of 32 percent hydrochloric acid to improve the well's specific capacity. Conduct acid pump-out to evaluate results of acidization. Conduct 8-hour step-pumping test of reamed hole at ASR-W-3. Collect water sample for water quality analysis. Conduct final geophysical logs at ASR-W-3.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12415.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

DAILY SUMMARY

Day/Date: 3-17-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-3
Weather: p-cloudy ~80deg. F

Day Shift (0700 to 1900 hours)

ACTIVITY: ACIDIZATION AT ASR-3 , TUBING AT 1,130 FT.
DRILLER: TROY MOORE.

Time	Description
0950	ONSITE, G.FORD. ASR-3 RIGGED UP FOR ACIDIZATION YOUNGQUIST WORKING ON THE BREAKDOWN OF RIG 222.
1000	WAITING ON FIRST TANKER TO ARRIVE , SCHEDULED FOR 1000 AM AND NOON . STARTED FRESH WATER PUMPING TO ASR-3 AT 0800 0N 3-17.
1130	TWO TANKERS ONSITE. HOOKING UP FOR ACID PUMP IN.
1210	STARTED PUMPING ACID FROM FIRST TANKER. CENT. PUMP DOWN , WILL TRY TO PUMP ACID WITH TANKER AIR PUMP. PUMPING ACID AT 18-20 PSI FROM TANKER.
1245	WELLHEAD PRESSURE = 15 PSI. STARTED FRESH WATER CHASE.
1300	STARTED ACID PUMPING. WELLHEAD PRESSURE = 20 PSI. WELLHEAD PRESSURE = 24 PSI. YBI WORKING ON REPAIRING CENT. PUMP. ALSO. PRESSURE AT ASR-3 = SAME THAT IS MAX FOR TANKER PUMP OUT. NEED TO USE CENT. PUMP FOR ACID RUNS TO COVER PRESSURE BUILD UP IN CASING.
1310	WELLHEAD PRESSURE = 27 PSI
1320	COMPLETED FIRST TANKER , PUMPING FRESH WATER AT 50 GPM. HOOKING UP REPAIRED CENT. PUMP TO ASR-3 TO HELP WITH PUMPING ACID TO ASR-3.
1323	HOOKING UP SECOND TANKER FOR ACID RUNS.
1335	STARTED PUMPING ACID. HEADER PRESSURE = 28 PSI .
1345	WELLHEAD PRESSURE = 30 PSI .
1355	STARTED FRESH WATER AT 50 GPM.
1425	STARTED ACID PUMPING. WELLHEAD PRESSURE = 40 PSI .
1505	COMPLETED SECOND TANKER PUMP OUT. STARTED FRESH WATER PUMPING AT 50 GPM. WELLHEAD PRESSURE = 65 PSI STOPPED FRESH WATER PUMPING. WILL LET ACID SIT OVER NIGHT AND CONDUCT PUMP OUT ON 3-18-97 .

1525 COLLECTED ACID PAPER WORK FROM CONTRACTOR .
CHECKED WELL HEAD PRESSURE AT ASR-3 = 72 PSI .
1600 OFFSITE.

DAILY SUMMARY

Day/Date: 3-18-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor:YOUNGQUIST BROTHERS INC.
Well No.: ASR-3
Weather: p-cloudy ~83deg. F

Day Shift (0700 to 1900 hours)

ACTIVITY: ACID PUMP OUT AT ASR-3

Time	Description
0850	ONSITE, G.FORD. SETTING UP FOR ACID PUMP OUT AT ASR-3 , ACID WAS PUMPED INTO ASR-3 ON 3-17-97 AT 1,130 FT BELOW SURFACE. PUMPING STARTED AT 0730.
0915	CHECKED PUMP , PUMP ON , FLOW RATE = 2,800 GPM. UNABLE TO COLLECT DEPTH TO WATER , NO SAMPLE PORT AVAILABLE. TALKED WITH YOUNGQUIST (MIKE). NEED TO WELD A 2-INCH PORT ON CASING FOR DEPTH TO WATER DATA COLLECTION.
1000	WILL TRY TO COLLECT D.T.W. FROM TUBING PORT. =62.5 FT
1010	OFFSITE TO GET FIELD POTABLES.
1035	ONSITE, WELDING 2-INCH PORT ON ASR-3 CASING.
1100	COMPLETED WELDING, DTW=60.80 FT AT 2,800 GPM. TOC= 1.2 FT ABOVE PAD.
1145	COMPLETED PUMP OUT AT ASR-3 , DTW = 60.85 FT . ASSUMED STATIC = 30.0 FT + 60.85 FT =90.85 FT - 1.2 FT=89.65 FT =31.2 GAL/FT AT 2,800 GPM. PURGE ASR-3 4 HR, 15 MINS.
1200	CALL PETE KWIATKOWSKI (CH2MILL) IN A MEETING UNTIL 1500 TODAY , WILL TRY LATER.
1300	MIAMI DADE (MARIO) NOTED YOUNGQUIST WASHING DOWN ASR-3 PAD AND THAT VALVE TO DRAIN PIPE WAS OPEN, ALLOWING WASH OFF TO DRAIN TO LOW AREA OUTSIDE OFF PAD. CALL A LAB THAT MIAMI-DADE USES TO COME OUT TO THE SITE AND COLLECT SURFACE WATER SAMPLES OF STANDING WATER, FOR POSIBLE TPH ANALYSIS. AND CHLORIDE ANALYSIS. WILL DO A VISUAL INSPECTION ON AREA.
1335	NOTED DRILL MUD INAREA. APPEARS TO BE NO OIL / FUEL SHEENS OR ODORS.
1400	LEFT SITE FOR DEERFIELD OFFICE.

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CH2MHILL

March 14, 1997

136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255914 (ASR-W-2) and UC-13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (March 10 -14, 1997)

Conduct short-term pumping test of reamed hole at ASR-W-3. Conduct final video of ASR-W-2.

Schedule for Next Week

Conduct acidization of ASR-W-3 with approximately 10,000 gallons of 32 percent hydrochloric acid to improve the well's specific capacity. Conduct acid pump-out to evaluate results of acidization. Conduct 8-hour step-pumping test of reamed hole at ASR-W-3. Collect water sample for water quality analysis. Conduct final geophysical logs at ASR-W-3.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12366.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

DAILY SUMMARY

Day/Date: 3-13-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-2 AND ASR-3
Weather: p-cloudy ~82deg. F

Day Shift (0700 to 1900 hours)

ACTIVITY: ASR-2 FINAL VIDEO SURVEY.

Time	Description

0957 ONSITE , G.FORD. FLORIDA GEOPHYSICAL LOGGING ON SITE. RIGGING UP FOR VIDEO SURVEY.

1000 CALLED PETE KWIATKOWSKI (CH2M HILL) DISCUSSED PUMPING TEST ON ASR-3, ALSO PENDING FILES , WATER QUALITY DATA, AND PAD MONITOR WELLS (N.W AT ASR-1 AND ASR-2) FOR PURGING UNTIL BACK GROUND LEVELS ARE ACHIEVED.

1035 PACKING OFF CAMERA TOOL.

1050 STARTED CAMERA RUN IN ASR-2. NOTED NO ABNORMAL AREAS DURING CASING VIDEO, NOTED WHAT APPEARS TO BE SMALL PITTING AROUND 831 FT IN CASING. OPEN HOLE FOUND AT 840 FT, APPEARS TO HAVE A CAVERN JUST BELOW CASING TO APPX. 870 FT.

1120-COMPLETED CAMERA RUN.

1215- CAMERA TOOL OUT OF HOLE.

1235-RECEIVED LOGS FROM ASR-3 PILOT HOLE, ASR-2 VIDEO.

1245-TALKED WITH TROY MOORE (YOUNGQUIST) ACID RUNS ON ASR-3 TO BE DONE ON MON. 3-17-97 AT 1000 AND 1200. ALSO, HE WILL CALL ACID SUPPLIER FOR COPIES OF PAST 1-21,1-23, AND 2-20-97 ACID TARE WEIGHTS.

1310-LEFT SITE TO DROP OFF WATER QUALITY SAMPLES AT WATER PLANT.

1355- ARRIVED AT WATER PLANT, TALKED WITH NOEL GRANT(MIAMI-DADE), DISCUSSED WATER QUALITY DATA AND THAT SOME PAST DATA IS MISSING.

WILL GO THROUGH DATA AND CALL PETE KWIATKOWSKI (CH2M HILL).

1425-LEFT WATER PLANT FOR DFB OFFICE TO DROP OFF LOGS AND FILES.

DAILY SUMMARY

Day/Date: 3-11-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-2 AND ASR-3
Weather: p-cloudy ~83deg. F

Day Shift (0700 to 1900 hours)

ACTIVITY:ASR-3, BACK PLUG TO 1,200 FT. ASR-1,2 AND 3 PAD ELEVATION CHECK, ALSO MONITOR WELL SAMPLING AT ASR-2 AND 3 PADS.

Time	Description
1230	ONSITE , G.FORD. YOUNGQUIST ONSITE, SETTING UP AT ASR-3 FOR CEMETING BACK TO1,200 FT BELOW PAD.
1237	STARTED CEMENTING, 5-BARRELS OF CHASE.
1239	STARTED PUMPING CEMENT. AT 3.0 BAR/MIN. 15.7 LBS/GAL.
1255	COMPLETED CEMENT PUMPING, TOTAL= 43 BARRELS.
1257	COMPLETED CHASE , 5 BARRELS.
1310	STARTED PURGING ASR-3 PAD MONITOR WELLS.
1400	COLLECTED WATER QUALITY SAMPLES AT ASR-3 PAD MONITOR WELLS.
1430	SET UP LEVEL BETWEEN ASR-1 AND ASR-2 , BM=ASR-1 ASSM. 100.0 FT ELEVATION, ROD = 5.19 FT I.H.=105.19. (-) .80 FT ROD BELOW PAD DUE TO ASR-1 CONSTRUTION=4.37 ELEVATION. ASR-2=4.35 ROD . DIFF=.02 FT ELEVATION AT ASR-1 AND ASR-2 PADS. ASR-3=5.05 ROD (NOTE : DUE TO DISTANCE OF ASR-3 FROM ASR-2 AN ERROR OF ROD HT. IS POSSIBLE .30-.70 FT). ASR-3= 5.05 / DIFF. OF .70 FT BELOW PAD ELEVATION AT ASR-2 PAD.
1545	LEVEL CHECK, ASR-1 = 4.365 , CLOSE AT .005 DIFF.
1600	STARTED PURGING ASR-2 PAD MONITOR WELLS.
1630	TAGGED ASR-3 AT 1,212 FT BELOW PAD. T.D.
1640	COLLECTED WATER QUALITY SAMPLES AT ASR-2 PAD MONITOR WELLS.
1700	TUBING SET AT 1,130 FT BELOW PAD AT ASR-3 FOR ACID RUNS.
1730	UNABLE TO COLLECT WELL HEAD PREASSURE AT ASR-2 DUE TO WELL BEING KILLED FOR PUMP REMOVAL. PRESSURE= 5.0 PSI. ASR-1 = 13.0 PSI
1745	STARTED PUMPING FRESH WATER INTO ASR-2 FOR POSSIBLE VIDEO SURVEY ON 3-12.
1810	OFFSITE.

DAILY SUMMARY

Day/Date: 3-12-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-2 and ASR-3
Weather: p-cloudy ~83deg. F

Day Shift (0700 to 1900 hours)

ACTIVITY: ASR-2 VIDEO SURVEY; ASR-3 PRE-ACID PUMPING TEST

Time	Description
1020	ONSITE, G.FORD . FLORIDA GEOPHYSICAL LOGGING ONSITE AND SETTING UP ON ASR-2 FOR FINAL VIDEO SURVEY.
1030	LOGGER OFFSITE. RESCHEDULE FOR 3-13-97 AT 1000 AM.

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CH2MHILL

March 14, 1997

136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255914 (ASR-W-2) and UC-13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (March 3 -7, 1997)

No work conducted this week. Begin demobilization of rig.

Schedule for Next Week

Conduct short-term pumping test of reamed hole at ASR-W-3. Conduct final video of ASR-W-2.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12365.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

CH2MHILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-Dade | Project No. 136282.45.04.05 | Date 3-5-96

Contractor Youngquist | Well No. ASR-2 / ASR-3

Weather P.cloudy & 82°F

Drillers

Activity Moving Rig. Sampling Monitor wells

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. Ford

1400 - Onsite, Contractor Breaking Down Drill Rig, Sent 2-26 & 2-28 Daily Reports to office.
Rig is off ASR-3 pad, Prep. for Dismantling and MOB off site.
Purged Monitor wells at ASR-2 and ASR-3 pads.
1700 - Started Sample Collections at ASR-2 pad monitor wells
1745 - Started Sample collections at ASR-3 pad monitor wells.
NOTE: ASR-2 has not been fitted with Final Header at this Time;
Talked with Mike (Youngquist) that we would like to have Final Video on ASR-2 next week.
ASR-3, has welded Plate over Casing, 30".
Mario (Miami-Dade) will take water Sample to Plant, 3/6 offsite @ - 1850

MW52.
MW53.

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CH2MHILL

March 5, 1997

136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255914 (ASR-W-2) and UC-13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (February 24- March 1, 1997)

Conduct step-drawdown test on ASR-W-2. Conduct final geophysical logs including caliper, temperature, fluid resistivity, cement bond, and flowmeter on ASR-W-2.

Conduct successful casing pressure test (100 psi) at ASR-W-3. Drill out cement plug and conduct pilot-hole drilling within 30-inch-diameter casing from base of casing to 1,300 feet bls. Conduct geophysical logging on ASR-W-3 pilot hole including caliper, gamma, dual induction, fluid resistivity, temperature, flowmeter and video. Ream pilot hole to a nominal 30-inch diameter.

Schedule for Next Week

No work to be conducted during the week of March 3, 1997.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12319.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

DAILY SUMMARY

Day/Date: 2-28-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-3
Weather: p-cloudy ~81deg. F

Day Shift (0700 to 1900 hours)

Activity: ASR-3 LOGGING, PILOT HOLE TO 1,300 FT **Driller: TROY MOORE**
Starting Depth: 825 FT **Ending Depth: 1,300**
Bit Size: 12-1/4-INCH/ REVERSE AIR.

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
1200	ONSITE , G.FORD. FINISHED UP DAILY FOR 2-26-97, LOGGING ON ASR-3 SCHEDULED FOR 1300 TODAY. PUMP IS IN ASR-3.
1300	WAITING ON LOGGER TO ARRIVE. COMPLETE CHAIN OF CUSTODY FOR WATER SAMPLES COLLECTED DURING PILOT HOLE DRILLING.
1315	LEE (FLORIDA GEOPHYSICAL LOGGING) ONSITE.
1325	SETTING UP FOR TEMP., FL.RES. LOGGING.
1355	CALLED PETE KWIATKOWSKI (CH2M HILL). DISCUSS ACTIVITIES AT ASR-3. YOUNGQUIST SHOULD NOT COMPLETE REAMING UNTIL LOGS ARE REVIEWED.
1420	STARTED LOGGING.
1500	SETTING UP FOR CALIPER / GAMMA LOGGING.
1545	SETTING UP FOR DUAL-INDUCTION LOGGING
1635	COMPLETED LOGGING.
1700	SETTING UP FOR FLOW LOGGING (STATIC RUNS) AT 50 , 100 , AND 150 FPM. FOUND STALL SPEED OF TOOL AT 16.5 FPM AT 1.5 COUNTS.
1800	SETTING UP FOR FLOW LOGGING AT 2,000 GPM, WORKING ON PUMP AND PACK OFF FOR FLOW TOOL.
1826	PUMP ON AT 2,000 GPM. STARTED FLOW LOGGING. RUN TWO PASSES AT 50 FPM AND 75 FPM. ALSO, FOUR TIME DRIVE LOGS AT 735, 950, 1,120, AND 1,200 FEET (MAY CHANGE DEPTHS).
2025	SETTING UP FOR VIDEO RUN. / DEPTH TO WATER AT 2,000 GPM = 37.40 - 8.0 FEET (PACK OFF RISER) = 29.40 FEET. CASING 4.2=25.20 FEET BELOW PAD.
2212	VIDEO SURVEY COMPLETED. TOOL OUT OFF HOLE. DEPTH TO WATER = 38.90 - 8.0 = 30.90-4.2 CASING = 26.70 FEET BELOW PAD.
2300	COLLECTED COPIES OF LOGS AND VIDEO. OFFSITE.

DAILY SUMMARY

Day/Date: 2-26-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-2 / ASR-3
Weather: p-cloudy ~79deg. F

Day Shift (0700 to 1900 hours)

Activity: LOGGING (ASR-2); PRESSURE TEST (ASR-3) Driller: TROY MOORE
Starting Depth: **Ending Depth:**
Bit Size:

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
0855	ONSITE , G.FORD. FLORIDA GEOPHYSICAL LOGGING ONSITE, SETTING UP FOR FL.RES. LOGGING AT ASR-2.
0930	COLLECTED HERMIT AND TRANSDUCER FROM ASR-2. DTW = 6.00 FT FROM TOP OF RISER.
0945	FL.RES. TOOL IN HOLE.
1005	COMPLETED FL.RES / TEMP. LOGGING.
1020	CALIPER / GAMMA TOOL IN HOLE .
1050	COMPLETED LOGGING.
1115	FLOW TOOL IN HOLE ,STARTED STATIC RUNS.
1140	FOUND STALL SPEED OF TOOL = 1.5 COUNTS AT 17.5 FPM.
1205	STARTED FLOW LOGGING.
1330	COMPLETED FLOW LOGGING. DEP (M. SILVERMAN) ONSITE. BEGAN PRESSURE TEST ON 30-INCH CASING AT ASR-3 AT 104 PSI.
1500	COMPLETED PRESSURE TEST (106.2 PSI).
1505	BLEED OFF OF PRESSURE AT ASR-3 (17.2 GALS).
1530	PURGED PAD MONITOR WELLS AT ASR-2 AND ASR-3 PADS FOR SAMPLE COLLECTION.
1705	COLLECTED SAMPLES FROM ASR-2 PAD.
1735	STARTED CEMENT BOND LOGGING AT ASR-2.
1805	COMPLETED CEMENT BOND LOGGING.
1840	VIDEO CAMERA IN ASR-2.
1850	LIGHT FOR CAMERA FAILED TO WORK. / REPAIRING.
1935	TOOL IN HOLE.
1940	TOOL STUCK AT APPX. 63 FT BELOW SURFACE
2100	UNABLE TO FREE TOOL.

2020 CALLED PETE KWIATKOWSKI (CH2M HILL) DISCUSSED PROBLEMS AT ASR-2 , WILL RETRIEVE TOOL TOMORROW (2-27-97) AM AND RUN CAMERA LOG AT A LATER DATE.

2040 OFFSITE. CONTRACTOR DRILLING PILOT HOLE AT ASR-3 TO 1,300 FT. SHOULD COMPLETE PILOT HOLE BY 2-28-97.

SUBJECT Casing Pressure Test - ASR-3 BY Greg Ford

MDWASD - West Wellfield ASR SHEET NO. 1 of 1 DATE 2/26/97

ASR-3 PROJECT NO. 141378.AS.05

30" CASING. PRESSURE TEST W/ Packer @ 815 (Ft) Below SURFACE.

DEP: onsite @ 1325 / Mark Silverman.

START: ~~0800~~ 1230 PRESSURE: 104. PSI.

Time:	PSI	
1330	104.0	
1345	104.5	
1350	104.5	
1355	104.7	
1400	104.9	
1405	105	
1410	105	
~~1414~~ 1415	105.1	
1420	105.2	
1425	105.3	
1430	105.4	
1435	105.8	
1440	106.0	
1445	106.1	
1450	106.2	
1455	106.2	FINAL

GAUGE/M/C 0-200
CALIBRATED BY BARFIELD.
1-15-97.
SN # 950284 ~~BWIC~~

5 gals = 70 PSI

10 gals = 36 PSI

15 gals = 2.0 PSI

10.5 = Ø Time 1505

~~Secure~~ MARK SILVERMAN OFF ~~SITE~~ @ 1508

1700 - Picker out of Hole.

DAILY SUMMARY

Day/Date: 2-25-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-2
Weather: p-cloudy ~79deg. F

Day Shift (0700 to 1900 hours)

Activity: ASR-2 STEP TEST **Driller: TROY MOORE**
Starting Depth: **Ending Depth:**
Bit Size:

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
0855	ONSITE , G.FORD. TALKED WITH TROY , WILL NEED TO RUN PACKER IN ASR-3 FOR PRESSURE TEST.
0930	COLLECTED WATER LEVEL FROM ASR-2 = 5.88 FT. FROM TOP OF RISER. RISER = 39.55 FT. ABOVE PAD. STATIC = 33.67 FT. ABOVE PAD., DAVID MCNABB TROUBLESHOOTING TRANSDUCERS. FOUND ONE PIN FOR CONNECTION ON TRANSDUCER TO BE BROKEN OFF. CONNECTED BACK TRANSDUCER. RECHECKED MEASUREMENT. TRANSDUCER SET AT 95 FT. BELOW TOP OF RISER/ = 55.45 FT. BELOW SURFACE.
1035	DAVID MCNABB (CH2M HILL) CALLED PETE KWIATKOWSKI(CH2M HILL) TO DISCUSS PROBLEM WITH TRANSDUCER, WILL RUN STEP TEST AND COLLECT HAND WATER LEVELS WITH M-SCOPE TO BACK UP HERMIT. PLEASE SEE PUMPING DATA SHEETS.
1058	STARTED PUMP TEST AT 1,500 GPM.
1220	1,500 GPM = 27.70 FT. FROM TOP OF RISER /= 11.85 FT. ABOVE PAD.
1221	STEP TO 2,800 GPM
1455	2,800 = 17.51 FT. FROM TOC/ = 15.71 FT. BELOW PAD.
1505	STEP TO 3,800 GPM
1726	3,800 = 42.50 FT. FROM TOC / = 40.70 FT. BELOW PAD.
1727	SHUT DOWN AND STEP FOR RECOVERY
1800	COLLECTED READINGS FROM ASR-1 AND MW-1 UPPER AND LOWER ZONES.
1920	COLLECTED LAST READINGS FROM MW-1 , OFFSITE. WILL COLLECT WATER LEVEL FROM ASR-2 FIRST THING ON 2-26. ALSO CONDUCT FINAL LOGGING AT ASR-2, POSSIBLE CASING PRESSURE TEST AT ASR-3.

DAILY SUMMARY

Day/Date: 2-24-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHER INC.
Well No.: ASR-2
Weather: p-cloudy ~78deg. F

Day Shift (0700 to 1900 hours)

Activity: ACID PUMP OUT/ SET UP FOR PUMP TEST. **Driller: TROY MOORE**
Starting Depth: **Ending Depth:**
Bit Size:

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
0900	ONSITE, G.FORD , CREW WORKING ON RISERS FOR MW-1, WILL CALL NOEL GRANT(MIAMI-DADE) TO INFORM HIM OF SCHEDULE CHANGE FOR PUMP STEP TEST AT ASR-2.
0955	SETTING UP MW-1 LOWER ZONE OF MONITORING. MAY NEED TO USE A PRESSURE GAUGE FOR UPPER ZONE UNTIL A VACUUM IS NOTED DUE TO VERY HIGH STATIC HEAD ON UPPER ZONE.
1155	STARTED PUMPING ASR-2 FOR ACID REMOVAL AND DRAWDOWN CHECK. ALSO WILL USE DRAWDOWN TIME TO SET TRANSDUCER IN WELL(ASR-2) FOR BACKGROUND READINGS OVERNIGHT.
1315	BOB ZIELKE (MIAMI-DADE)W.W.T.P. ONSITE ,DISCUSS PUMPING TESTS TO BE PERFORMED ON ASR-2. DOES NOT WANT US TO PUMP MORE THAN 3,800 GPM DUE TO CHECK VALVES INLINE TO LIFT STATION.
1550	COMPLETED ACID PUMPOUT, FLOW RATE = 3,800 GPM. DRAW DOWN = 40.0 FT. ON ASR-2 ACID PUMP OUT.
1610	SET UP HERMIT AND TEST MODE FOR BACK GROUND DATA COLLECTION. CALLED BOB ZIELKE AT W.W.T.P. LET HIM KNOW WE STOPPED PUMPING AT ASR-2 AND WILL PUMP FOR 6-8 HOURS ON 2-25 TUES. FOR STEP TEST STARTING AROUND 1000 AM. TALKED WITH MARK SCHILLING(CH2M HILL). WILL TRY TO SCHEDULE LOGGING ON ASR-2 FOR THUR.2-27-97.
1725	STARTED HERMIT FOR BACKGROUND DATA COLLECTION.
1740	TALKED WITH MIKE (YOUNGQUIST). STILL NEED TO MAKE A RISER ON MW-1 UPPER ZONE , WILL WORK ON IT TODAY. CREW STILL COOLING CASING AT ASR-3 FOR TRIAL PRESSURE TEST.
1800	OFFSITE.

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CH2MHILL

Celebrating 50 Years

February 24, 1997

136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255914 (ASR-W-2) and UC-13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (February 17- 21, 1997)

Youngquist Brothers Inc. (YBI) conducted acidization of ASR-W-2 at approximately 870 feet bls with approximately 9,500 gallons of hydrochloric acid to improve specific capacity.

Sample pad monitor wells (PMWs) at ASR-W-3. Drill 12-1/4-inch pilot hole within 40-inch casing from 207 to 900 feet bls with mud rotary techniques. Conduct caliper, gamma, and dual-induction logs on pilot hole. Prepare casing seat approval request and forward to TAC. Receive TAC approval for casing seat depth of 835 feet bls. Ream pilot hole to nominal 40 inches. Set 835 feet of 30-inch steel casing and cement in place with neat cement via the pressure grout method.

Schedule for Next Week

Conduct 8-hour step drawdown test at ASR-W-2 and obtain water quality samples for primary, secondary and minimum criteria analysis. Conduct final geophysical logs on ASR-W-2.

Conduct casing pressure test on 30-inch casing. Conduct pilot hole drilling inside the 30-inch casing at ASR-W-3 to an approximate depth of 1,300 feet bls. Conduct geophysical logs on the pilot hole.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12238.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

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CH2MHILL

Celebrating 50 Years

February 19, 1997
136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Casing Seat Approval Request; Miami-Dade Water and Sewer Department (MDWASD);
West Wellfield ASR Project; ASR Well Number 3 (ASR-W-3).
FDEP Permit Number UC-13-255915
MDWASD Project Number: W-740A

This letter serves to request approval for a casing seat (30-inch) at approximately 835 feet below land surface (bls) at the subject site for the ASR well. The following information is provided to support this recommendation:

1. Lithologic Information
2. Excerpts from Geophysical Logs (attached)
3. Excerpt from the onsite Monitor Well Lithologic Log (attached)

As background, a 40-inch casing has been cemented in place to a depth of approximately 170 feet bls to isolate the Biscayne aquifer. Through this casing, a nominal 12-inch pilot hole has been advanced using mud circulation to a depth of approximately 900 feet bls.

Analysis

Lithologic information obtained from drill cuttings indicates that clays, mudstones, and limestone layers of the Hawthorn Group predominate from 170 to 835 feet bls. At 835 feet bls, white to medium gray, fossiliferous limestone was first observed in the cuttings. Soft layers between 805 and 818 feet bls are silt/clay layers, based on review of cuttings samples.

The gamma log delineates sharp peaks at depths of approximately 435, 485, 690, 725, 805, and 818, with a smaller peak at 828 feet bls. These generally correlate with clay lenses, formation boundaries, or heavy phosphorite deposits. These depths also correlate with peaks observed at ASR-W-1 and ASR-W-2, though it is apparent that the depth to the base of the Hawthorn Group clays becomes shallower as we proceed north from ASR-W-1 to ASR-W-3 The caliper log indicates a relatively gauge borehole (i.e., similar to the diameter of the drill bit). The dual-induction log displays relatively uniform electric response, except for a sharp increase in resistivity at 525 feet bls. This geophysical signature could not be

correlated with other geophysical or lithologic data to yield a conclusive interpretation, though this feature was present at ASR-W-1 and ASR-W-2.

Review of previous data from the Floridan Aquifer monitor well installed at the West Wellfield site in 1994 shows consistency with data obtained at ASR-W-3. At the monitor well and ASR-W-1, the final casing string was set to a depth of 855 feet bls, while at ASR-W-2 the casing was set at 845 feet bls.

Summary

Review of lithologic and geophysical logs from the subject borehole and from existing data indicates that the base of relatively impermeable clays and mudstones of the Hawthorn Group exists at a depth of approximately 835 feet bls. The purpose of setting the final 30-inch casing at ASR-W-3 at a depth of 835 feet bls is:

1. Seal off overlying clays and impermeable limestones of the Hawthorn Group.

2. Facilitate reverse-air drilling through underlying permeable formations of the Floridan Aquifer System for water quality sampling/analysis.

3. Evaluate flow characteristics of the open-hole interval for final selection of the ASR zone. The nearby ASR-W-1 indicates good production from a flow zone at approximately 875 feet bls.

4. Be consistent with the casing depths selected for the other onsite wells.

Based on the above information, we believe a successful ASR system will be constructed, with the monitor and ASR wells completed to similar depths and production zones.

Thank you in advance for your prompt review of this material. Please call me at (561) 737-6665 if you have any questions.

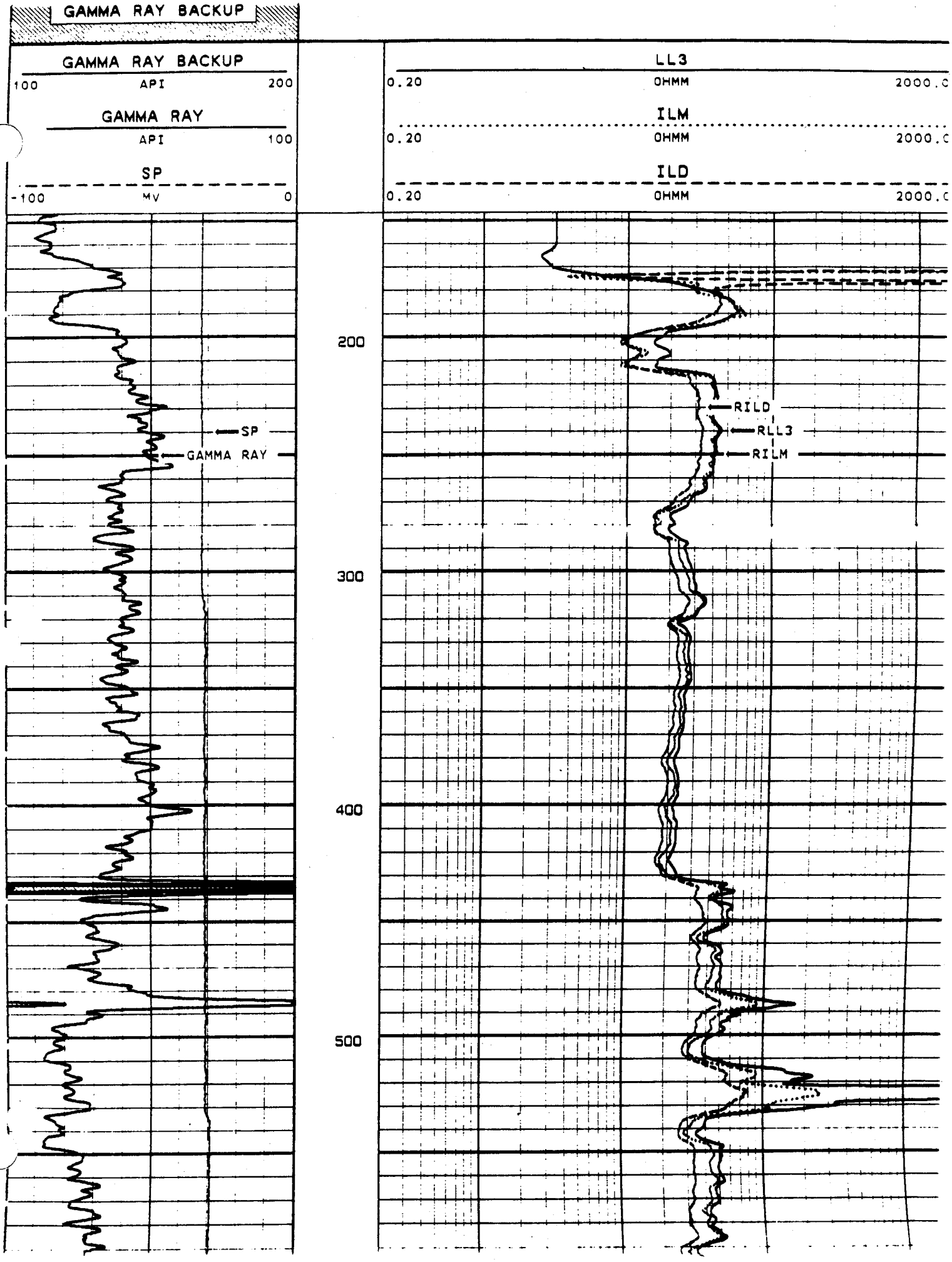
Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12203.DOC
Attachments
c: Gene McLaughlin/MDWASD
Members of the TAC

2/19/97


GAMMA RAY BACKUP
GAMMA RAY BACKUP
100
API
200
GAMMA RAY
API
100
SP
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MV
0
LL3
0.20
OHMM
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GAMMA RAY
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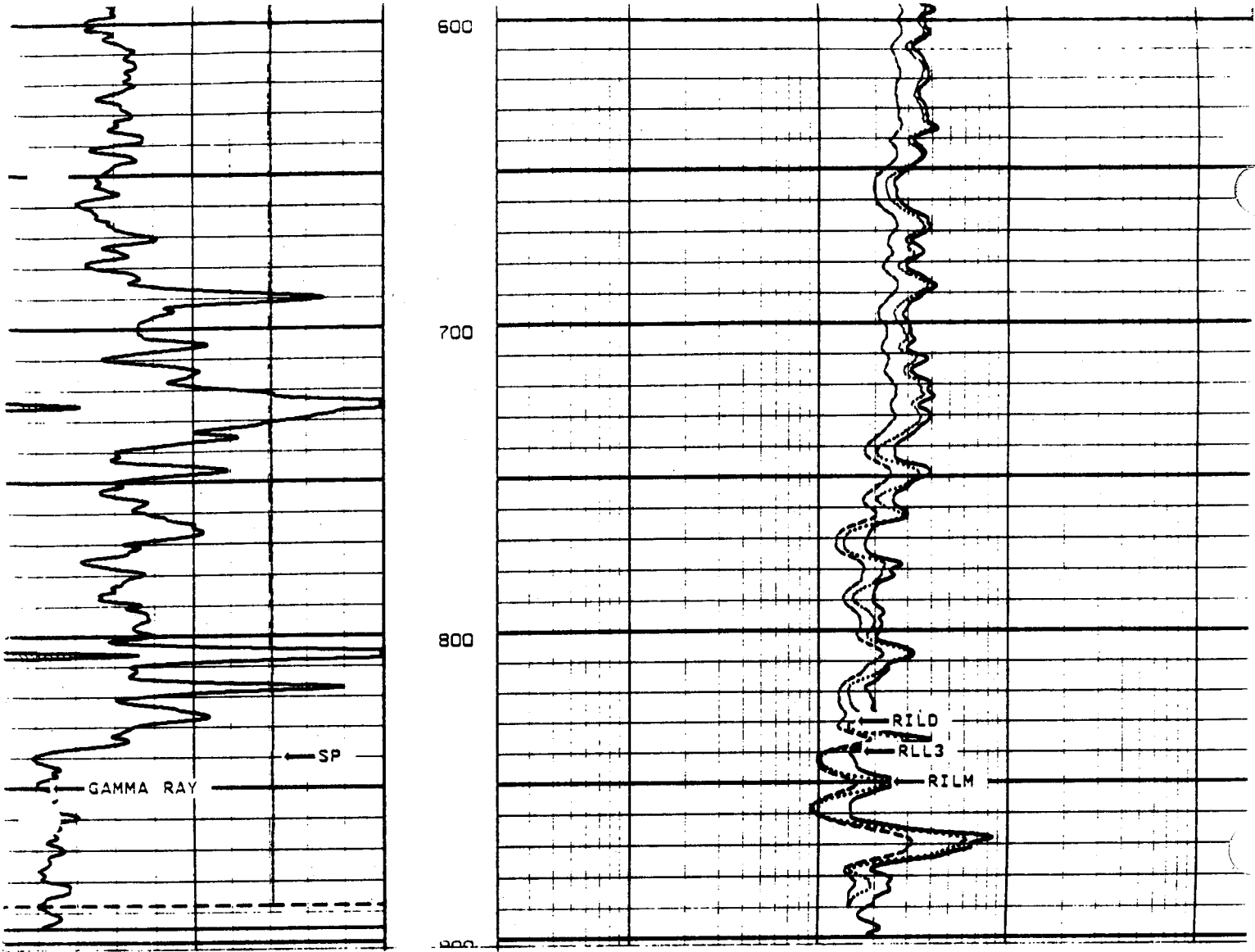
RILM



SP
-100 MV 0

GAMMA RAY
API 100

GAMMA RAY BACKUP
API 200

ILD
0.20 OHMM 2000.00

ILM
0.20 OHMM 2000.00

LL3
0.20 OHMM 2000.00

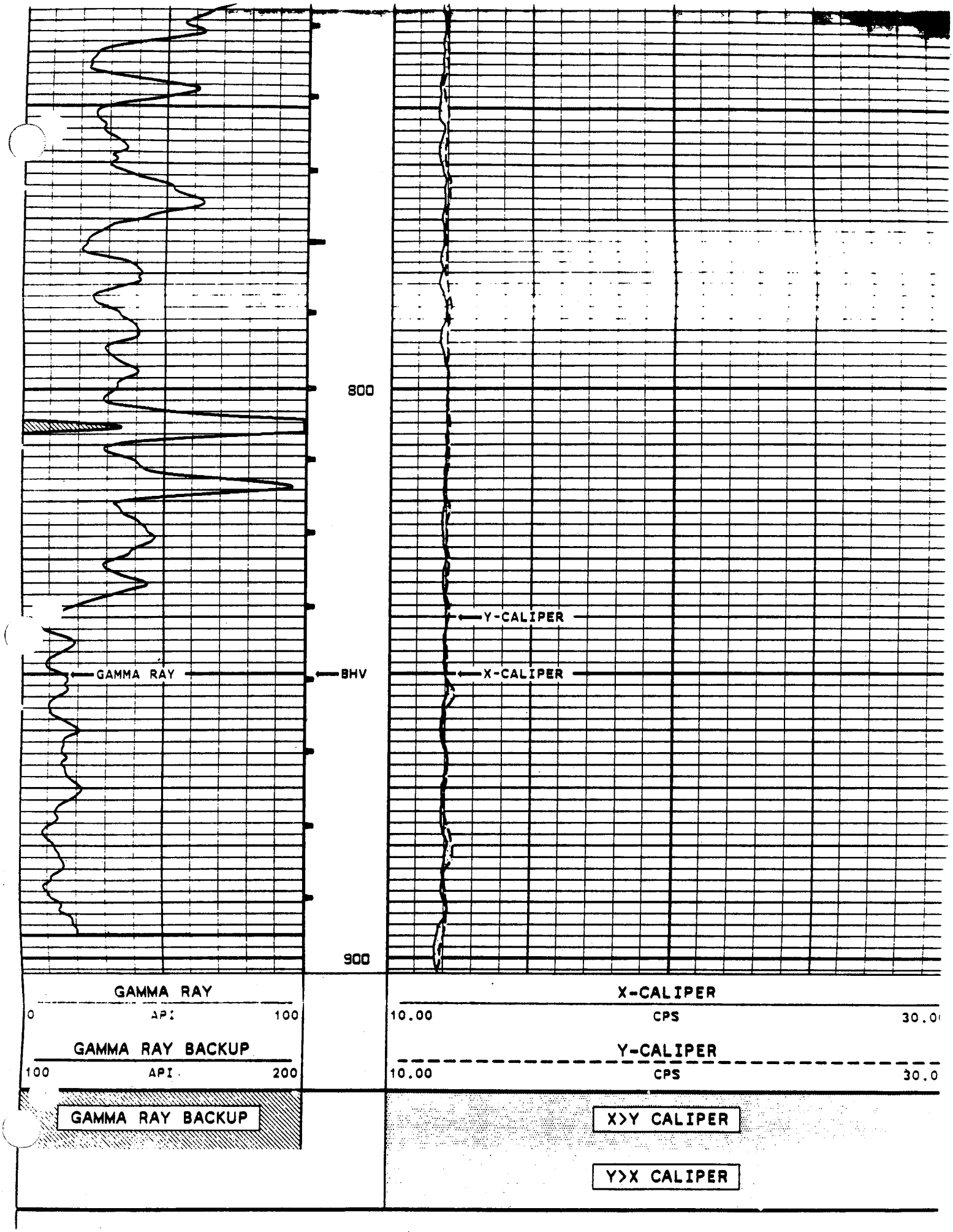
GAMMA RAY BACKUP

START DEPTH: 902.1 FEET DIRECTION: UP DATE: 02/18/97 TIME: 23:53:57 MODE: TRACE PLAYBACK

WW33DILMP

MAIN PASS

VERSION: 2.42


800
900
Y-CALIPER
GAMMA RAY
BHV
X-CALIPER
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API
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X-CALIPER
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Y-CALIPER
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GAMMA RAY BACKUP
X>Y CALIPER
Y>X CALIPER

DAILY SUMMARY

Day/Date: 2-21-97
Client: MIAMI - DADE WEST WELL FIELD ASR.
Contractor: YOUNGQUIST BROTHERS INC..
Well No.: ASR-3
Weather: p-cloudy ~75deg. F

Day Shift (0700 to 1900 hours)

Activity: CASING RUN TO 835 FT **Driller: TROY MOORE**
Starting Depth: 0 **Ending Depth: 835 FT**
Bit Size:

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
0645	G.FORD ONSITE, CHECKED WELL HEAD PRESSURE AT ASR-2 , MAX PRESSURE GAUGE. LOGGER NOT ONSITE.
0700	TALKED WITH TROY MOORE (YOUNGQUIST) ABOUT PRESSURE AT ASR-2 , WILL TRY TO BLEED OFF AIR THROUGH 2 INCH VALVES AT WELLHEAD.
0710	STARTED BLEEDING PRESSURE OFF ASR-2 , APPEARS TO BE ALL AIR. WAITING ON LOGGER FOR ASR-3 CALIPER RUN. ORGANIZING ASR-2 CUTTINGS.
0825	LOGGER ONSITE. SETTING UP FOR CALIPER RUN.
0845	STARTED LOGGING, APPEARS CASING IS AT 172 FT. TD= 839 FT.
0910	COMPLETED LOGGING ON ASR-3 , PREP. FOR CASING RUN.
0950	1ST SECTION IN HOLE =14.0 FT
1033	2ND SECTION IN HOLE =120.19 TOTAL=134.19
1105	3RD SECTION IN HOLE=120.08 TOTAL=254.27
1144	4TH SECTION IN HOLE=115.52 TOTAL=369.79
1222	5TH SECTION IN HOLE=119.19 TOTAL=488.98
1256	6TH SECTION IN HOLE=118.65 TOTAL=607.63
1336	7TH SECTION IN HOLE=117.15 TOTAL=724.78
1415	8TH SECTION IN HOLE=119.90 TOTAL=844.68 - FLOOR = 836 TO 837 FT. TOTAL BELOW SURFACE.
1435	COMPLETED CASING RUN, PREP. FOR CEMENTING.
1500	CHECKED PRESSURE AT ASR-2 = 20 PSI. CALL PETE KWIATKOWSKI/CH2M HILL. DISCUSSED FIELD ACTIVITIES ON ASR-2 AND ASR-3. ALSO MET WITH NOEL GRANT(MIAMI DADE). HE WILL PULL SAMPLES FROM MW-1 AND ASR-1 FOR BAC-T ANALYSIS OVER THE NEXT FOUR TO FIVE DAYS.

Time	Description
1635	TALKED WITH TROY MOORE (YOUNGQUIST) , WILL SCHEDULE STEP PUMPING TEST FOR TUES. 2-25 AND POSSIBLE CASING PRESSURE TEST ON ASR-3. ALSO RIG MW-1 WITH RISERS, ASR-1 WITH PRESSURE GAUGE ON MON. 2-24 , ALSO ON MON., PUMP ASR-2 UNTIL STABLE , SHUT DOWN AND SET UP HERMIT FOR BACK GROUND READINGS. ALSO POSSIBLE LOGGING ASR-2 ON WED. 2-26.
1700	JIMMY BRANTLY(YOUNGQUIST) ONSITE FOR CEMENTING ASR-3., CREW STILL TRIPPING IN TUBING.
1759	STARTED CHASE
1802	STARTED CEMENT PUMPING -15.7LBG/GAL , 7-3/4-BARR/MIN .
1854	COMPLETED CEMENTING , RETURNS TO SURFACE. 393 TOTAL BAR. HEADER PRESSURE=265PSI.
1925	**OFFSITE.**

DAILY SUMMARY

Day/Date: 2-20-97
Client:MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-2
Weather:p-cloudy ~78deg. F

Day Shift (0700 to 1900 hours)

Activity: ACIDIZATION AT 870 FT, ASR-2 **Driller: TROY MOORE**
Starting Depth: 870 FT **Ending Depth: N/A**
Bit Size:N/A

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
0910	G.FORD ONSITE, FLORIDA GEOPHYSICAL LOGGING ON SITE. MAKING PRINTS OF 2-18 LOGS.
1007	FIRST ACID TANKER ONSITE. HOOKING UP TO PUMP AND NEW FITTINGS.
1035	STARTED PUMPING ACID INTO ASR-2 , TUBING AT 869 FT .
1110	STOPPED ACID AND STARTED FRESH WATER CHASE.
1130	STARTED SECOND ACID RUN.
1148	END OF ACID RUN FROM TANKER #1, WELL HEAD PRESSURE = 35 PSI STARTED FRESH WATER CHASE. WAITING ON SECOND ACID TANKER TO ARRIVE.
1230	STARTED SAMPLING MONITOR WELLS AT ASR-3 PAD.
1330	COMPLETED SAMPLING MONITOR WELLS.
1350	COLLECTED CUTTINGS FROM ASR-3.
1450	SECOND ACID TANKER ONSITE.
1505	STARTED PUMPING ACID TO ASR-2
1540	STARTED FRESH WATER CHASE.
1600	STARTED ACID PUMPING
1635	COMPLETED ACID RUNS FROM SECOND TANKER, WELLHEAD PRESSURE = 55 PSI. STARTED FRESH WATER CHASE.
1700	NOTED WELLHEAD PRESSURE STILL CLIMBING, AT 65 PSI. FOUND AIR BUBBLING UP AND AROUND 40 INCH CASING. TRIED TO BLEED OFF PRESSURE WITH 2 INCH VALVES BUT NO AIR ALL WATER, NOTED THAT WHEN WE TRIED TO BLEED OF AIR, PRESSURE WOULD TRY TO CLIMB. ASR-3 TD AT 1630 835 FT , WILL LOG 2-21 AT 0700 AND START CASING RUN.
1800	WELL STOPPED BUBBLING , OFFSITE.

CH2M HILL

PROJECT NO. 136282.AS.05 **BY:** GREG FORD

MIAMI-DADE WEST WELL FIELD ASR-3
MONITOR WELL WATER QUALITY DATA

Date	LOCATION ASR-3 PAD	Time (hours)	Depth to Water (ft-toc)	CONDUCTIVITY (umhos/cm)	TEMP. (deg..C)	CHLORIDE (mg/L)	Remarks
2/20/97	N.E.	1230	N/A	495	24.5	N/A	SLOW RECHARGE
2/20/97	N.W.	1215	N/A	875	24.5	N/A	GOOD RECHARGE
2/20/97	S.E.	1225	N/A	485	24.0	N/A	RISER BROKEN
2/20/97	S.W.	1220	N/A	465	24.0	N/A	RISER BROKEN

CONDUCTIVITY METER: YSI MODEL 33 SCT. # 3140
ZEROED, REDLINED, READ 1,000 umhos/cm AT 22 DEG.C
ON A STANDARD OF A 1,000 umhos, at 22.5 DEG. C

DAILY SUMMARY

Day/Date: 2-18-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-3
Weather: p-cloudy ~70deg. F

Day Shift (0700 to 1900 hours)

Activity: **Driller: TROY MOORE**
Starting Depth: **Ending Depth:**
Bit Size:

Night Shift (1900 to 0700[1] hours)

Activity: LOGGING PILOT HOLE **Driller: MARK**
Starting Depth: 160 FEET **Ending Depth: 900 FEET**
Bit Size: 12-1/4-INCH

Time	Description
2125	ONSITE , G.FORD. DRILLERS TRIPPING OUT DRILL STRING. FLORIDA GEOPHYSICAL LOGGING ONSITE. LOGGER WAITING ON DRILL STRING TO BE REMOVED FOR LOGGING.
2225	DRILL STRING OUT OF HOLE, SETTING UP FOR LOGGING. STARTED CALIPER / GAMMA LOG.
2325	TOOL OUT OF HOLE, RIGGING UP FOR DUAL-INDUCTION RUN. T.D.= 902 FEET. NOTED SOME SWELLING IN BORE HOLE AT APPX. 320 - 390 FEET.
2330	TOOL IN HOLE.
0015	COMPLETED LOGGING , TOOL OUT OF HOLE.
0030	RECEIVED 1 COPY OF LOGS , LEFT NOTE FOR TROY MOORE (YOUNGQUIST) TO PREP. MW-1 WITH RISERS FOR POSSIBLE PUMPING TEST ON 2-21-97. WILL BE ONSITE FOR ACID RUNS IN ASR-2 SCHEDULED FOR 2-20-97 . CONTRACTOR IS WORKING ON 6 INCH PIPING FROM RIG TO MUD PITS, HAD TO REPLACE TEMP. PIPING WITH WELDED PIPING.
0045	LEFT SITE

CH2M HILL
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800 Fairway Drive
Suite 350
Deerfield Beach, FL
33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

February 17, 1997

136282.AS.05

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255914 (ASR-W-2) and UC-13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (February 10- 14, 1997)

Youngquist Brothers Inc. (YBI) conducted pumping development of ASR-W-2 at approximately 3,200 gpm. Conducted acidization of ASR-W-2 at approximately 1,150 feet bls with approximately 9,500 gallons of hydrochloric acid to improve specific capacity. Conducted acid pump out test (4 hours) on ASR-W-2.

Sample pad monitor wells (PMWs) at ASR-W-3. Relocate rig to ASR-W-3 and begin drilling on February 12, 1997. Drill 12-1/4-inch pilot hole to 207 feet with mud rotary techniques. Conduct caliper, gamma, and dual-induction logs on pilot hole. Ream pilot hole to nominal 48-inches. Set 170 feet of 40-inch steel casing and cement in place with neat cement via the pressure grout method.

Schedule for Next Week

Conduct second acidization run at a depth of 870 feet at ASR-W-2. Conduct 8-hour step drawdown test at ASR-W-2 and obtain water quality samples for primary, secondary and minimum criteria analysis. Conduct final geophysical logs on ASR-W-2.

Conduct pilot hole drilling inside the 40-inch casing at ASR-W-3 to an approximate depth of 900 feet bls. Conduct geophysical logs on the pilot hole and submit casing seat request to

FDEP. Ream pilot hole to a nominal 40 inches to an approximate depth of 850 feet bls. Set 30-inch casing and cement in place with neat cement via the pressure grout method.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12184.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

DAILY SUMMARY

Day/Date: 2-14-97
Client:MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR-3
Weather:p-cloudy ~75deg. F

Day Shift (0700 to 1900 hours)

Activity: LOGGING / CASING RUN (40 INCH) **Driller:TROY MOORE**
Starting Depth:O **Ending Depth: 170 FT**
Bit Size: 46-1/2-INCH

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
0650	ONSITE, G.FORD . LOGGER SETTING UP ON ASR -3 FOR CALIPER LOG.
0700	WELDER ON SITE . ASR-2 WELLHEAD PRESSURE =13.5 PSI / TRIPPING OUT DRILL STRING AT ASR-3, HAD TROUBLE KEEPING CIRCULATION AT ASR-3 DURING REAMING AT APPX. 135 FT TO T.D. APPX. 178 FT.
0805	COMPLETED WELL LOGGING , T.D.= 178 FT.
0815	SETTING UP FOR CASING RUN, 40-INCH , TO BE SET AT APPX. 170 FT.
0900	RECEIVED LOGS FROM FLORIDA GEOPHYSICAL LOGGING.
0905	1st SECTION OF CASING LOWERED INTO HOLE
0925	2ND SECTION OF CASING MATED TO 1ST.
0927	STARTED WELDING PASSES
1000	COMPLETED WELDING
1030	LOWERING 2ND SECTION INTO HOLE . CASING RUN COMPLETED.
1050	CHECKED ASR-2 WELL HEAD PRESSURE=13.5 PSI
1100	TALKED WITH TROY MOORE(YOUNGQUIST) CEMENTING WILL START AROUND 2:30-3:00 PM, WAITING ON JIMMY BRANTLY, (YOUNQUIST) TO ARRIVE. ALSO REMINDED HIM THAT THE N.W. MONITOR WELLS AT ASR-1 AND 2 PADS NEED TO BE PURGED TO RETURN WATER QUALITY TO BACKGROUND LEVELS.
1130	WORKED ON PUMP TEST SHEETS , AND M-SCOPE.
1330	LEFT SITE FOR LUNCH
1430	ONSITE.
1500	CEMENT TRUCK WAS INVOLVED IN A ACCIDENT , WILL NOT BE ONSITE UNTIL APPX.1700-1730. ACTIVITIES SHUT DOWN AT SITE.
1715	CEMENT PUMPER ONSITE , REPAIRING FOR CEMENT PUMPING .

DATE:2-14-97

Time	Description
1715	JIMMY BRANTLY (YOUNGQUIST) ONSITE.
1957	STARTED PUMPING CEMENT.
2024	COMPLETED CEMENT PUMPING. TOTAL BARRELS=209
	BAR/MIN=8 LBS/GAL=15.6
2100	OFFSITE.

DAILY SUMMARY

Day/Date: 2-13-97
Client: MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS INC.
Well No.: ASR - 2/ ASR-3
Weather: p-cloudy ~78deg. F

Day Shift (0700 to 1900 hours)

Activity: ACID PUMP OUT **ASR-2 / REAMING ASR-3 Driller: TROY MOORE**
Starting Depth :0 **Ending Depth: 170 FEET**
Bit Size : 46-1/2-INCH

Night Shift (1900 to 0700[1] hours)

Activity: REAMING ASR-3 **Driller:TROY MOORE**
Starting Depth: **Ending Depth: 170 FEET**
Bit Size: 46-1/2-INCH

Time	Description
1130	ONSITE,G.FORD. ASR-3 REAMING 12-1/4 PILOT HOLE. STARTED AT 0700.
1200	CALLED BOB ZIEKLE (MIAMI-DADE) TO LET THEM KNOW WE WILL BE PUMPING TODAY. WILL CALL BACK AT 1300 AND START PUMPING ASR-2 AT 1315-1330 TODAY.
1345	TALKED WITH BOB ZIEKLE , O.K. TO PUMP TODAY AT MAX. FLOW RATE. HOOKED UP PRESSURE GAUGE TO ASR-2 =16.0 PSI
1415	STARTED PUMPING OUT ASR-2 AT 4,200 GPM DTW=31.25 FEET BTOC PUMP SLOWED TO 3,700 GPM IN APPX. 18 MINS, =42.35.
1448	PUMPING AT 3,800 , DTW=45.10 FEET BTOC
1715	PUMP = 3,900GPM ,DTW=51.95 FEET BTOC. BACKED OFF FLOW TO 3,800 GPM
1720	PUMPING =3,800 GPM , DTW=51.15 FEET BTOC
1740	PUMPING = 3,800 GPM , DTW=50.25 FEET BTOC
1745	SAME, DTW = 49.85 FEET BTOC
1755	SAME , DTW = 49.80 FEET BTOC
1805	SAME , DTW = 49.85 FEET BTOC
1806	STOPPED PUMPING, APPX. 2.5 MINS FOR RETURN TO SURFACE.
1809	WELL HEAD PRESSURE = 5.0 PSI
1813	WELL HEAD PRESSURE = 8.0 PSI
1815	WELL HEAD PRESSURE = 9.0 PSI / ASR-3 REAMING AT 133 FT.
1830	WELL HEAD PRESSURE = 10.5 PSI / GAUGE USED IS SAME ONE USED FOR CASING PRESSURE TESTS. WILL COLLECT PRESSURE READING FIRST THING 2-14-97
1900	OFFSITE, WILL BE ONSITE AT 0700, 2-14-97 FOR REAMED HOLE LOGGING.

DAILY SUMMARY

Day/Date:2-12-97
Client:MIAMI - DADE WEST WELL FIELD.
Contractor: YOUNGQUIST BROTHERS.
Well No.: ASR - 2
Weather: clear ~60deg. F

Day Shift (0700 to 1900 hours)

Activity: ACID RUNS ASR-2 **Driller: TROY MOORE**
Starting Depth: 1,150 FEET
PUMP SET- 73FT

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
0900	ONSITE G.FORD, WORKING ON DISCHARGE PIPE AT ASR-2, MIXING MUD AT ASR-3 ,COLLECTED SAMPLE BOTTLES AND LABELED FOR ASR-3 PAD MONITOR WELLS.
0945	FIRST ACID TANKER ONSITE.
0959	CALLED BOB ZIELKE AT W.W.T.P TO NOTIFY WE WILL BE PUMPING ASR-2 TODAY FOR 4 HRS AT APP. 4,000 GPM.. THIS WAS NO PROBLEM. GAVE MY BEEPER NUMBER TO BOB AND WILL BEEP ME IF THERE IS A PROBLEM AT LIFT STATION AND WILL SHUT DOWN PUMPING.
1010	START PUMP, SHUT DOWN AT 1012, DUE TO PUMP NEEDED OIL.
1026	START PUMP , FLOW=3,700 GPM
1028	FLOW=3,100 GPM (SEE PUMPING DATA SHEET)
1040	INCREASED PUMP RPMS TO MAXIMUM (2010). PUMP=3,200GPM DRAWDOWN=60.40 FT FROM TOC
1415	COMPLETED PUMPING 3,200GPM=71.90 DRAWDOWN FROM TOC. WELL RECOVERED IN APPX. 5 MINS, WELL HEAD PRESSURE=10.0PSI
1425	STARTED FRESH WATER PUMPING TO WELL AT 90 GPM.
1455	STARTED 1ST ACID RUN.
1525	STARTED FRESH WATER RUN AT 90 GPM.
1555	STARTED ACID RUN. WELL HEAD PREASSURE=20 PSI.
1615	COMPLETED 1ST TANKER ACID RUN.
1615	STARTED FRESH WATER FLOW AT 90 GPM.
1645	STARTED 1ST ACID RUN FROM 2ND TANKER.
1710	STARTED FRESH WATER RUN AT 90 GPM.
1740	STARTED 1ST ACID RUN, 2ND TANKER.
1810	COMPLETED 2ND TANKER, WELL HEAD PRESSURE=30 PSI
1810	STARTED FRESH WATER CHASE.

1840	COMPLETED WATER CHASE. SAMPLED PAD MONITOR WELLS AT ASR-2 PAD. MONITOR WELLS AT ASR-3 WERE DAMAGED DURING RIG MOVEMENT. CONTRACTOR TO REPAIR ASAP FOR SAMPLING TODAY.
1855	STARTED SAMPLING MONITOR WELLS AT ASR-3 PAD
1930	COMPLETED SAMPLING.
1940	LOGGER ONSITE(FLORIDA GEOPHYSICAL LOGGING)
1950	SETTING UP FOR LOGGING ASR-3 FOR 0-200 FT PILOT HOLE. (PLEASE SEE DRILLERS DAILY REPORT FOR START TIME ON DRILLING FOR ASR-3 PILOT HOLE)
2145	COMPLETED LOGGING.
2200	COLLECTED ONE COPY OF LOG, OFFSITE.

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
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33441-1831
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Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

February 7, 1997

136282.AS.04

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255914 (ASR-W-2) and UC-13-255915 (ASR-W-3)
MDWASD #740A

Weekly Summary (February 3- 7, 1997)

Youngquist Brothers Inc. (YBI) conducted reaming of ASR-W-2 to 1,240 feet bls with nominal 30-inch bit.

Schedule for Next Week

Conduct pumping development. Conduct acidization of ASR-W-2 at approximately 1,150 feet bls with approximately 9,500 gallons of hydrochloric acid to improve specific capacity. Conduct step-drawdown test on ASR-W-2. Obtain water samples at MW-1 and ASR-W-2 for primary and secondary standards and minimum criteria analysis. Sample pad monitor wells (PMWs) at ASR-W-3. Relocate rig to ASR-W-3 and begin drilling, scheduled for February 13, 1997.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12131.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

DAILY SUMMARY

Day/Date:2-4-97
Client:MIAMI - DADE WEST WELL FIELD.
Contractor:YOUNGQUIST.
Well No.:ASR - 2
Weather:p-cloudy ~78deg. F

Day Shift (0700 to 1900 hours)

Activity: **Driller:TROY MOORE**
Starting Depth: **Ending Depth:**
Bit Size:

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
1115	ONSITE , G.FORD , CALL PETE KWIATKOWSKI (CH2M HILL) DISCUSS FIELD ACTIVITIES FOR TODAY AND 2-5-97.
1245	CALLED PETE AND LEFT VOICE MAIL ON PROGRESS AT ASR-2,AND MONITOR WELL-1, LOST AIR LINE FOR DRILLING ON 2-3-97 AROUND 1600,REPAIRS COMPETED EARLY AM: ON 2-4-97,LAB WAS UNABLE TO MEET SCHEDULE FOR SAMPLING MW-1 ON 2-4-97 WILL SAMPLE ON 2-5-97. 2-10-97 IS POSSIBLE SET UP DATE FOR ASR-3,AND ACID RUNS IN ASR-2. YOUNGQUIST BUILDING LIME ROCK ROAD FOR RIG MOB TO ASR-3 DISCUSSED MWS AT PAD-1 AND PAD-2. THE N.W.MWS HAVE HIGH CONDUCTIVITY, POSSIBLE THAT SUMPS AT PAD ARE LEAKING,TROY MOORE TO CHECK SUMPS. BOTH MONITOR WELLS ARE AT THE N.W.CORNERS OF THE PADS AND SAME LOCATION AS SUMPS. I WILL KEEP IN TOUCH WITH TROY MOORE(YOUNGQUIST) ON DRILLING ACTIVITIES, AND SCHEDULE FOR ACID RUNS ON ASR-2, HE WOULD LIKE TO HAVE THE RIG SETUP OR MOVED TO ASR-3 BEFORE ACID RUNS AND PUMP OUT.
1330	OFFSITE.

DAILY SUMMARY

Day/Date:2-3-97
Client:MIAMI - DADE WEST WELL FIELD.
Contractor:YOUNGQUIST BROTHERS INC.
Well No.:ASR - 2
Weather:p-cloudy ~78deg. F

Day Shift (0700 to 1900 hours)

Activity:REAMING **Driller:TROY MOORE**
Starting Depth:940 **Ending Depth:**
Bit Size:

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
1130	ONSITE ,G.FORD; REAMING ASR-2 AT 940 FT DISCUSSED SAMPLING OF MW-1 ON 2-4-97 BEFORE ACID RUNS AND PURGING ASR-1N.W. TO CLEAN UP WATER QUALITY. NO DRILLING ACTIVITIES ONSITE FROM 1-29 TO 2-2-97.
1200	STARTED PURGING MONITOR WELLS AT ASR-2 PAD FOR SAMPLE COLLECTION. RECEIVED WATER SAMPLED FROM YOUNGQUIST FOR ASR-2 30 FT, INTERVAL 12-INCH PILOT HOLE DRILLING. TROY MOORE OFFSITE, MIKE DRILLING.
1400	COMPLETED MONITOR WELL SAMPLING AT ASR-2 PAD, FOUND THAT ASR-2 N.W. COND. =750 umhos/cm AT 23 DEG.C CHECKED TWICE, FOUND SAME READING. PREVIOUS READINGS WERE 450 TO 470. WILL DISCUSS WITH TROY MOORE ON 2-4-97. YOUNGQUIST TO PURGE MW-1 EARLY 2-4-97 SO SAMPLES MAY BE TAKEN LATER.
1500	AT 1,040 FT; SHOULD TD AT 1,240 TONIGHT AND FLUSH UNTIL AM:
1515	LEFT SITE FOR A.O.W.T.P. TO DROP OF WATER SAMPLES.

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
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Deerfield Beach, FL
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CH2MHILL

Celebrating 50 Years

February 6, 1997

136282.AS.04

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255913 (ASR-W-1) and UC-13-255914 (ASR-W-2)
MDWASD #740A

Weekly Summary (January 27 -- 31, 1997)

Youngquist Brothers, Inc. (YBI) conducted a flowmeter log of the pilot hole at ASR-W-2. Conduct video survey of ASR-W-1.

Schedule for Next Week

Conduct reaming of ASR-W-2 to 1,240 feet bls with nominal 30-inch bit.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12130.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

DAILY SUMMARY

Day/Date:1-28-97
Client:MIAMI-DADE WEST WELL FIELD
Contractor:YOUNGQUIST BROTHERS INC.
Well No.:ASR-2
Weather:P-CLOUDY, INTERMITTENT RAIN,78F

Day Shift (0700 to 1900 hours)

Activity:TAG CEMENT PLUG, START REAMING. **Driller:TROY MOORE**
Starting Depth: 845 FEET BLS **Ending Depth:**
Bit Size: 28.5 INCHES

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
0400	TAGGED BOTTOM OF CEMENT IN ASR-2=1287 FEET
0530	TRIPPING IN WITH REAMING BIT. 28.5 INCH BIT. CLEAN SITE. FILED PICTURES FROM ASR-1 AND ASR-2 ACTIVITIES. SHALLOW WATER WELLS BEING DRILLED AT ADJACENT FIELDS FOR IRRIGATION OF CROPS.
0830	MARIO (MIAMI - DADE) ONSITE, CROP DUST WORKING ADJACENT FIELDS.
1000	START FINAL VIDEO RUN IN ASR-1
1058	COMPLETED VIDEO RUN AT 1,303 FT. FOUND WHAT APPEARED TO BE A 6 INCH FLANGE AT T.D.
1100	MIAMI -DADE PERSONNEL ARRIVING ON SITE.
1200	OPEN HOUSE STARTED.
1400	END OF OPEN HOUSE
1520	LOGGING TOOL OUT OF HOLE

BY : GREG FORD **DATE: 1-28-97**

CH2M HILL
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CH2MHILL

Celebrating 50 Years

January 31, 1997
136282.AS.04

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255913 (ASR-W-1) and UC-13-255914 (ASR-W-2)
MDWASD #740A

Weekly Summary (January 20 – 26, 1997)

Youngquist Brothers Inc. (YBI) conducted a casing pressure test of the final 30-inch casing (845 feet bls) at ASR-W-2 at approximately 100 psi. The test was successful and was witnessed by Mr. Len Fishkin/FDEP-WPB. Conducted pilot hole drilling (reverse-air, open circulation) at ASR-W-2 from 850 to 1,350 feet bls. Conducted geophysical logs including caliper, gamma, dual induction, spontaneous potential, fluid resistivity, temperature, and sonic logs on the ASR-W-2 pilot hole.

Conducted acidization of ASR-W-1 at 1,150 feet bls with approximately 9,500 gallons of hydrochloric acid to improve specific capacity. Conducted the final step-drawdown test on ASR-W-1 at rates of 1,400, 2,800, and 4,000 gpm. Obtained water samples at ASR-W-1 for primary and secondary standards and minimum criteria analysis.

Schedule for Next Week

Conduct flowmeter log of the pilot hole at ASR-W-2. Ream ASR-W-2 to 1,200 feet bls with nominal 30-inch-diameter bit. Conduct video survey of ASR-W-1.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12102.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

DAILY SUMMARY

Day/Date:1-26-97
Client:MIAMI-DADE WEST WELL FIELD
Contractor:YOUNGQUIST
Well No.:ASR-1
Weather:

Day Shift (0700 to 1900 hours)

Activity:STEP PUMPING TEST **Driller:TROY MOORE**

Starting Depth:PUMP SET AT 107FT BELOW SURFACE.

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time	Description
0630	G.FORD ONSITE, TROY MOORE ONSITE, SETTING UP FOR PUMP TEST. CREW ONSITE AT 0700, CLEANING UP SITE.
0736	STARTED PUMP TEST, 1,400 GPM(SEE TEST 1 DATA SHT)
0940	STARTED SECOND STEP, FLOW RATE=2,800GPM.
1308	STARTED THIRD STEP TEST, FLOW RATE =4,000GPM **COLLECTED WATER SAMPLES AT 1455.** PRESSURE AT FORCE MAIN = 19.5 PSI
1513	STARTED RECOVERY DATA.
1625	CLEANING UP TRAILER, AND FILLING NOTES, CHECKING HERMIT FOR RECOVERY DATA.
1633	**ASR-1=73.297 FROM HERMIT.**
1636	**ASR-1=73.297** **MW-1=5.597 AND 26.882**
1651	**ASR-1=73.297- FULL RECOVERY** **MW-1=6.69 AND 25.78**
1700	PREP FOR RISER AND TRANSDUCER REMOVAL FROM ASR-1
1715	TRANSDUCER OUT OF ASR-1.
1730	SET UP HERMIT TO MONITOR MW-1 OVER NIGHT.

DAILY SUMMARY

Day/Date:1-24-97
Client:MIAMI-DADE
Contractor:YOUNQUIST
Well No.:ASR-1
Weather:P-CLOUDY

Day Shift (0700 to 1900 hours)

Activity:PUMP TEST ASR-1 **Driller:TROY MOORE**
Starting Depth:N/A **Ending Depth:N/A**
Bit Size:N/A

Night Shift (1900 to 0700[1] hours)

Activity: **Driller:**
Starting Depth: **Ending Depth:**
Bit Size:

Time **Description**

0835 G.FORD,M.SCHILLING ONSITE, CHECKED HERMIT, FOUND THAT THE HERMIT WOULD LOSE DATA IF .VIEWED. CALLED PETE KWIATKOWSKI (CH2M HILL) TO SEE IF PUMP TEST SHOULD BE DONE, WILL TRY PUMP TEST AND MONITOR WITH M-SCOPE FOR BACK UP DATA. MEASURED FROM TOP OF RISER TO PAD =38.40 FT , DTW=10.85 FT FROM TOP OF RISER. THIS =27.65 STATIC HEAD. TRANSDUCER SET AT 100 FT BELOW TOP OF RISER=61.6 FT BELOW PAD.
1040-STOPPED TEST DUE TO PUMP PROBLEMS ,APPEARS BEARING IS BAD AT TOP OF PUMP.UNABLE TO KEEP STEADY FLOW RATE.
1100-SET UP NEW HERMIT-2000 ON ASR-1 AND MW-1 FOR BACK GROUND DATA.
1200-LUNCH
1300-ONSITE, TROY WILL LOG ASR-2 TODAY AT 2-3PM, CALLED STEVE EAGLES (MIAMI-DADE) TO GET PEAK FLOW TIMES TO W.W.T.P. ON WEEKENDS ,WILL CALL BACK.
1400-MARIO (MIAMI-DADE) MUST MAKE A SCHEDULE FOR PUMP TEST AND GIVE TO ALFREDO SANCHES,AND STEVE EAGLES. ALSO A MIAMI DADE EMPLOYEE MUST BE ON SITE WHILE PUMP TEST IS BEING PERFORMED.
1600-.STEVE EAGLES CALLED , LOW FLOW TIMES FOR SAT,AND SUN. ARE 0900-1500, MADE SCHEDULE AND FAXED OUT.
1700-CHECKED WITH MARK SCHILLING (CH2MHILL) ON LOGGING PROGRESS. LOGGING SHOULD BE COMPLETED AROUND 1840.
1730-G.FORD OFFSITE. HERMIT SETUP FOR BACK GROUND DATA, WILL START HERMIT ON1-26-97 AROUND 1600.

DRILLER'S DAILY SUMMARY

Date:1/23/97
Client:MIAMI- DADE WEST WELL FIELD
Contractor:YOUNGQIUST
Well No.:ASR-2
Weather:P-CLOUDY ~ 75 DEG. F

Day Shift (0700 to 1900 hours)

Activity:PILOT HOLE **Driller:TROY MOORE**
Starting Depth:843 **Ending Depth:1,100**
Bit Size:12 1/4

Night Shift (1900 to 0700[1] hours)

Activity:CORING **Driller:TROY MOORE**
Starting Depth:1,100 **Ending Depth:1,120**
Bit Size:CORE BARREL 30FT BY 4 INCH.

Time **Description**

0900 G.FORD ONSITE, DRILLERS TRIPPING OUT TUBING TO BRING IT UP TO 871 FT BELOW SURFACE, FOR ACID RUN TODAY.
TALKED WITH TROY ABOUT LAST NIGHTS ACTIVITIES, COLLECT ONE CORE AT 1,100 FT 20 % RETURN.PILOT HOLE IS AT 1,100 FT BELOW SURFACE AT 0915 ON ASR-2
1030-COMPLETED TUBING TRIP OUT ON ASR-1 , TUBING IS AT 871 FT BELOW SURFACE.
WAITING ON TANKER TO ARRIVE. MIAMI-DADE VISITORS ON SITE ,WENDY GLADSTONE,TOM SEGARS.
1100-PILOT HOLE AT 1,100 FT BELOW SURFACE , TRIPPING IN DRILL STRING. ON ASR-2,MIAMI-DADE VISITORS OFFSITE.
1220-ACID TANKER ONSITE, MAKING CONNETIONS TO ASR-1 FOR PUMPING.
1245-STARTED PUMPING ACID TO ASR-1
1335-COMPLETED ACID PUMPING.
1355-TANKER OFFSITE
1410-DISCUSSES FIELD ACTIVITIES WITH PETE KWIATKOSKI(CH2M HILL) WENT OVER TASKS TO BE DONE FOR STEP TEST AND ASR-2 LOGGING.
1435-SETTING UP TRANSDUCERS IN ASR-1 AND MONITOR WELL -1 SHALLOW ZONE. AND TO SET UP A RISER PIPE ON THE DEEP ZONE ,AND ONE ON THE ASR-1 WELL.
1705-COMPLETED TRANSDUCER INSTALLATIONS AT ASR-1 AND MW-1 , TOP OF RISER ON ASR-1 IS 33.34 FT ABOVE PAD LEVEL, AND DTW=5.70 FT FROM TOP OF RISER. STARTED HERMIT AT **1703** TO COLLECT BACK GROUND DATA.
1730- CHECKED HERMIT, OFFSITE.TRANS.SET AT 60 FT BELOW PAD.

Recorded By: G.FORD DATE: 1-23-97

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-DADE Project No. 136282.A5.03 Date 1/21/97

Contractor YOUNGQUIST Well No. ASR-1

Weather Clear & 55°F

Drillers Troy Moore

Activity ACID RUNS

Starting Depth 1,150'

End Depth N/A

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

0735 - ONSITE, ACID TANKER SHOULD ARRIVE AT 0820.
DRILLER CIRCULATING WATER IN ASR-2 TO TRY AND COOL CEMENT AND CASING.
0830 STARTED RUNNING MONITOR WELLS AT ASR-2 FOR SAMPLING.
0935 COMPLETED MONITOR WELL SAMPLING AT ASR-2 PAD, NO TANKER ONSITE AT THIS TIME!
1005 TROY MOORE (YOUNGQUIST) TOLD ME ASR-2 WAS HOLDING PRESSURE, CALLED LEN AT DEP AND DISCUSSED PRE TEST, HE WILL BE ONSITE AT ≈ 1215-1230 FOR FINAL PRESSURE TEST ON 30" CASING AT ASR-2.
1115 TALKED WITH MARK SCHILLING (CH2M HILL) NEEDS HERMIT CABLES, SENT TO MARK BY YOUNGQUIST EMPLOYEE WHO WAS GOING TO BROWARD.
1135 AT ASR-2 FOR PRESSURE UP OF ASR-2 CASING.
1150 STARTED PRESSURE TEST AT ASR-2 ACID TANKER ONSITE. YOUNGQUIST TO OVERSEE ACID PUMPING.
(SEE PRESSURE TEST SHT)
1325 - D.E.P. LEN, ONSITE.
1409 - END TEST, PRESSURE BLEED DOWN.
TOTAL 17.5 gals
1420 - D.E.P. LEN OFFSITE.

gnR267A/33

9

CH2MHILL

SUBJECT Pressure Test 30" Casing — ASR-2 - Final

BY G. Ford

SHEET NO. ____ of ____ DATE 1/21/97

PROJECT NO. 136282.AS.04

Pressure Gauge: 0-200 PSI / SN# 7868113 Calibrated By Barfield Inc. 1/15/97

START Time: 1150 PSI: 109.9

Time:	PSI:
1155	110.5
1200	110.5
1205	110.8
1210	110.9
1215	111.0
1220	111.0
1225	111.1
1230	111.1
1235	111.1
1240	111.1
1245	111.1
1250	111.1
1255	111.1
1300	111.1
1305	111.1
1310	111.1
1315	111.1
1320	111.1
1325	111.0
1330	111.0
1335	111.0
1340	111.0
1345	110.9
1350	110.5
1355	110.5
1400	110.2
1405	110.0
1409	5 gals = 78 psi START Bleed Off.
1411	5 gals = 42.5 psi
1414	5 gals = 10.0 psi
1416	2.5 gals = 0

Total 17.5 gals

REV 9 93 FORM 138

CH2MHILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-Dade Project No. 136282.AS.04 Date 1/20/97

Contractor Youngquist Well No. ASR-1 AND ASR-2

Weather

Drillers Troy Moore

Activity

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

0655 - ONSITE, NO ACTIVITIES.
0705 - TROY MOORE ONSITE, MOVING TUBING TO ASR-1 TO BRING TUBING TO 1,150 BELOW SURFACE FOR ACID RUN AT NOON.
NO PRE-PRESSURE TEST RUN OVER WEEKEND ON ASR-2 CASING.
0740 - FREE FLOW ASR-1 = 400 GPM.
0740 - STARTED PUMP, FLOW = 1800 GPM ALLOWED MOTOR TO WARM UP.
DTW = .60 (TOC) TOC = 3.0' ABOVE PAD.
0753 TURNED UP FLOW TO 3,100 GPM
0755 DTW = 22.0' (TOC) @ 3,100 GPM (SEE PUMPING SHT)
0928 STOPPED PUMPING FLOW = 2,950 GPM
DTW = 29.25 (TOC)
0931 WATER RETURNED TO HEADER. (RECOVERY)
0934 STARTED FRESH WATER PUMPING TO ASR-1 TUBING AT 1,152' BELOW SURFACE.
50-60 GPM Totalizer = 027193.00
0950 - TALKED WITH Pete Kwiatkowski (CH2M Hill) DISCUSSED PUMPING RATES AND DRAWDOWNS.
1100 BROKE FOR LUNCH. 1ST TANKER SHOULD BE ONSITE AT 1200. DRILLERS CLEANING OUT MUD FROM ASR-2 REPLACING WITH FRESH WATER, SETTING UP FOR PRE-PRESSURE TEST ON CASING.
1210 - 1ST ACID TANKER ONSITE.
1245 - STARTED 1ST STAGE PUMPING (ACID)
1321 - STOPPED 1ST STAGE ACID, START FRESH WATER PUMPING
1333 - STARTED 2ND STAGE ACID PUMPING
1407 - STOPPED 2ND STAGE ACID, STARTED FRESH WATER PUMPING. TALKED W/ TRUCKER, NOTED HE HAD 1 TRUCK COMING TOMARROW AT 1200, NOTED TO HIM IT WAS TO BE HERE AT 2:00PM TODAY, WILL LET TROY MOORE KNOW CONFLICT.
1620 TANKER WILL BE ONSITE @ 0700-0800 ON 1/21 TROY UNABLE TO GET 2ND TANKER TODAY. OFFSITE.

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

CH2M HILL

PROJECT NO. 136282.AS.04 **BY:** GREG FORD

MIAMI-DADE WEST WELL FIELD ASR-2

MONITOR WELL WATER QUALITY DATA

Date	LOCATION ASR-2 PAD	Time (hours)	Depth to Water (ft-toc)	CONDUCTIVITY (umhos/cm)	TEMP. (deg..C)	CHLORIDE (mg/L)	Remarks
2/3/97	N.E.	1345	8.17	470	22.5	N/A	SLOW RECHARGE
2/3/97	N.W.	1350	7.75	750	23.0	N/A	CHECKED COND.TWICE
2/3/97	S.E.	1340	10.41	445	22.5	N/A	VERY SLOW RECHARGE
2/3/97	S.W.	1355	7.70	445	23.0	N/A	G00D RECHARGE

CONDUCTIVITY METER: YSI MODEL 33 SCT. # 3140

ZEROED, REDLINED, READ 1025 umhos/cm AT 23 DEG.C

ON A STANDARD OF A 1,000 umhos, at 25 DEG. C

CH2M HILL
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CH2MHILL

Celebrating 50 Years

January 21, 1997
136282.AS.04

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255913 (ASR-W-1) and UC-13-255914 (ASR-W-2)
MDWASD #740A

Weekly Summary (January 13 -- 17, 1997)

Youngquist Brothers Inc. (YBI) began reaming the pilot hole of ASR-W-2 to a nominal 40 inches. Prepared and submitted casing seat request to TAC. Conducted geophysical logs (enclosed) of reamed hole at ASR-W-2 to 850 feet bls. Casing seat approved by TAC. Cemented 30-inch steel casing to approximately 845 feet bls with neat cement by the pressure grout method. Conducted acidization of ASR-W-1 at a target depth of 870 feet bls to attempt to improve specific capacity.

Schedule for Next Week

Conduct casing pressure test of 30-inch casing at ASR-W-2. Conduct acidization of ASR-W-1 at 1,150 feet bls to improve specific capacity. Conduct pilot hole drilling at ASR-W-2.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12031.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

CH2MHILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-DADE Project No. 136282.AS.04 Date 1/17/97

Contractor YOUNGQUIST Well No. ASR-1

Weather Clear ≈ 55°F

Drillers Tracy Moore

Activity Acid @ 870'

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

0959 - ONSITE, TANKER ONSITE, RECEIVED CERTIFICATE OF ANALYSIS FROM HYDROCHLORIC A.D. ; TANKER HAS NO WAY TO MEASURE FLOW OUT, IT TAKES ≈ 45 MINS TO UNLOAD FULL TANK, SO WE WILL PUMP FOR 20 MINS FOR 1ST SLUG AND 25 MINS FOR SECOND SLUG, OR UNTIL EMPTY.
1225 STARTED PUMPING FRESH WATER.
@ 55-60 GPM Totalizer = 027007.00
TUBING AT 871' BELOW SURFACE.
1100 STOPPED FRESH WATER FLOW TO ASR-1
Totalizer = 027026.00 ≈ 2,500 gals.
STARTED ACID PUMPING TO ASR-1 @ 1100 AT EST. 60 GPM
STOPPED @ 1120 TO REPAIR A LEAK AT PUMP.
1128 STARTED PUMPING
1146 STOPPED ACID PUMPING.
≈ 2,000 GALS PUMPED. HEADER PRESSURE = 5 PSI
1148 STARTED FRESH WATER 2ND STAGE PUMPING AT 60 GPM. Totalizer = 027026.00
1210 STOPPED FRESH WATER PUMPING.
Totalizer = 027069.00
1304 STARTED 2ND ACID SLUG PUMPING.
1330 - STOPPED PUMPING ACID, EMPTY TANKER.
1330 - STARTED FRESH WATER PUMPING @ 85 GPM
Totalizer = 027111.00
2ND TANKER TRUCK HOOKING UP.
1352 STOPPED FRESH WATER PUMPING
Totalizer = 027128.00
1353 STARTED ACID PUMPING FROM 2ND TANKER.
1424 STOPPED ACID PUMPING.
1424 STARTED FRESH WATER PUMPING @ 80 GPM
Totalizer = 027127.00
1449 STOPPED FRESH WATER PUMPING
Totalizer = 027146.00

gnR267A/33

WEST WELL Field.

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami'-DADE Project No. 15282.A5.04 Date 1/16/97

Contractor YOUNG QUIST Well No. ASR-2.

Weather Pcldy

Drillers Troy Moore

Activity Logging, Casing RUN.

Starting Depth ϕ

End Depth 845'

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

0450 - ONSITE, FLORIDA Geophysical Logging ONSITE, TOOL over Hole.

0455 - START Logging Caliper, GAMMA

0548 - Completed Logging. Tool OUT OF Hole.

T.D. AT 850', CASING to Be Set AT 845'

BREAKING DOWN Logging. AVERAGE = 38.5"-39" Hole.

0600 - PREP. FOR CASING RUN.

0605 - WELDERS ONSITE. 3 MAN CREW.

0619 - 1st Section IN Hole 11(Ft) total length.

0705 - 2ND Section RAISED & MATED 120.30Ft Total = 131.30

0755 - 3RD Section 120.20 Total = 251.50

0959 - 4th Section 119.30 = 370.80 (Photo

0959 - 5th Section 120.10 = 490.90

1100 - 6th Section 120.0 = 610.90

1155 - 7th Section 120.10 = 731.00

1245 - 8th Section 120.70 Total = 851.70

130' - Completed CASING RUN.

NOTE: THERE Appears to Be Drilling MUD on the NORTH SIDE OF RIG, OUT SIDE OF ASR-2 PAD.

STABILIZERS AT EACH END OF CASINGS @ Every 110' to 120'. Drill FLOOR is @ 5.8" ABOVE PAD Level.

0925 MARIO (Miami'-DADE) ONSITE. NOTED City WAS HAVING TROUBLE with PRODUCTION Wells #29 and #30

1235 Filling Cement vessel, MOVING Equipment FOR Cementing.

1255 (Miami'-DADE) Visitors ONSITE with Tom Seager.

1350 setting up For Trim Pipe INSTALLATION.

1400 Purged Monitor wells AT ASR-2 Location AND Sampled.

1455 - Called OFFICE AND DISCUSSED Field Activities with Pete Kwiatkwoski (CH2M Hill)

1530 Purged Monitor wells ASR-1 N.E. AND N.W. For Re Sample, NOTED N.W. COND. WAS High

@ 1450 unloaded.

1630 LEFT SITE FOR Rotables.

gnR267A/33

CH2MHILL

WEST WELL FIELD.

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE

Project No. 136282.AS.04 Date 1/16/97

Contractor YOUNGQUIST

Well No. ASR-2

Weather P.CLOUDY ~ 75°F

Drillers TROY MOORE

Activity CEMENTING.

Starting Depth 850'

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

1655 ONSITE, CHECKED W/TROY MOORE (YOUNGQUIST) SAID JIMMY BRANTLY IS RUNNING A LITTLE LATE, WE WERE TO START AT 1700.

CHECKED FIELD NOTE BOOK FOR PAST WATER QUALITY DATA, POSSIBLE 2 WEEKS (1-LATE DEC. AND 1- 1ST WEEK JAN) MAY NOT HAVE BEEN DONE DUE TO HOLIDAYS AND NO SITE ACTIVITIES.

1725 - DRILLERS WAITING TO CEMENT, CIRCULATING HOLE THROUGH TUBING.

EST- 419 BARRELS, TUBING SET AT 817' BELOW SURFACE.

1810 - JIMMY BRANTLY ONSITE (YOUNGQUIST)

1822 STARTED CEMENTING

1920 END CEMENTING. TOTAL 358 BARRELS

HEADER PRESSURE = 275

(SEE CEMENT PUMPING DATA SHT)

1945 OFFSITE.

CH2M HILL

SUBJECT ASR-2 30" CASING RUN BY G. FORD

SHEET NO. ____ of ____ DATE 1/16/97

30"-CASING PROJECT NO. 136282.A5.04

	CASING Lengths	Heat Numbers
1.	11.0	N/A
2	120.30	93932761 ##
3	120.20	93932521 ##
4	119.30	93932641 ##
5	120.10	93932441 ##
6	120.0	93932521 ##
7	120.10	93932521 ##
8	120.70	93932561 ##
	Total (Ft)	851.70

CH2M HILL
Hillsboro Executive Center North
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CH2MHILL

Celebrating 50 Years

January 13, 1997

136282.AS.04

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Casing Seat Approval Request; Miami-Dade Water and Sewer Department;
West Wellfield ASR Project; ASR Well Number 2 (ASR-W-2).
FDEP Permit Number UC-13-255914
MDWASD Project Number: W-740A

This letter serves to request approval for a casing seat (30-inch) at approximately 845 feet below land surface (bls) at the subject site for the ASR well. The following information is provided to support this recommendation:

1. Lithologic Information
2. Excerpts from Geophysical Logs (attached)
3. Excerpt from the onsite Monitor Well Lithologic Log (attached)

As background, a 40-inch casing has been cemented in place to a depth of approximately 170 feet bls to isolate the Biscayne aquifer. Through this casing, a nominal 12-inch pilot hole has been advanced using mud circulation to a depth of approximately 900 feet bls.

Analysis

Lithologic information obtained from drill cuttings indicates that clays, mudstones, and limestone layers of the Hawthorn Group predominate from 170 to 850 feet bls. At 850 feet bls, white to medium gray, fossiliferous limestone was first observed in the cuttings. Soft layers between 815 and 830 feet bls are silt/clay layers, based on review of cuttings samples.

The gamma log delineates sharp peaks at depths of approximately 440, 697, 734, 817, and 828, with a smaller peak at 838 feet bls. These generally correlate with clay lenses, formation boundaries, or heavy phosphorite deposits. These depths also correlate with peaks observed at ASR-W-1. The caliper log indicates a relatively gauge borehole (i.e., similar to the diameter of the drill bit). The dual-induction log displays relatively uniform electric response, except for a sharp increase in resistivity at 530 feet bls. This geophysical signature could not

be correlated with other geophysical or lithologic data to yield a conclusive interpretation, though this feature was present at ASR-W-1.

Review of previous data from the Floridan Aquifer monitor well installed at the West Wellfield site in 1994 shows consistency with data obtained at ASR-W-2. At the monitor well and ASR-W-1, the final casing string was set to a depth of 855 feet bls.

Summary

Review of lithologic and geophysical logs from the subject borehole and from existing data indicates that the base of relatively impermeable clays and mudstones of the Hawthorn Group exists at a depth of approximately 845 feet bls. The purpose of setting the final 30-inch casing at the site at a depth of 845 feet bls is:

1. Seal off overlying clays and impermeable limestones of the Hawthorn Group.

2. Facilitate reverse-air drilling through underlying permeable formations of the Floridan Aquifer System for water quality sampling/analysis.

3. Evaluate flow characteristics of the open-hole interval for final selection of the ASR zone. The nearby ASR-W-1 indicates good production from a flow zone at approximately 875 feet bls.

Based on the above information, we believe a successful ASR system will be constructed, with the monitor and ASR wells completed to similar depths and production zones.

Thank you in advance for your prompt review of this material. Please call me at (561) 737-6665 if you have any questions.

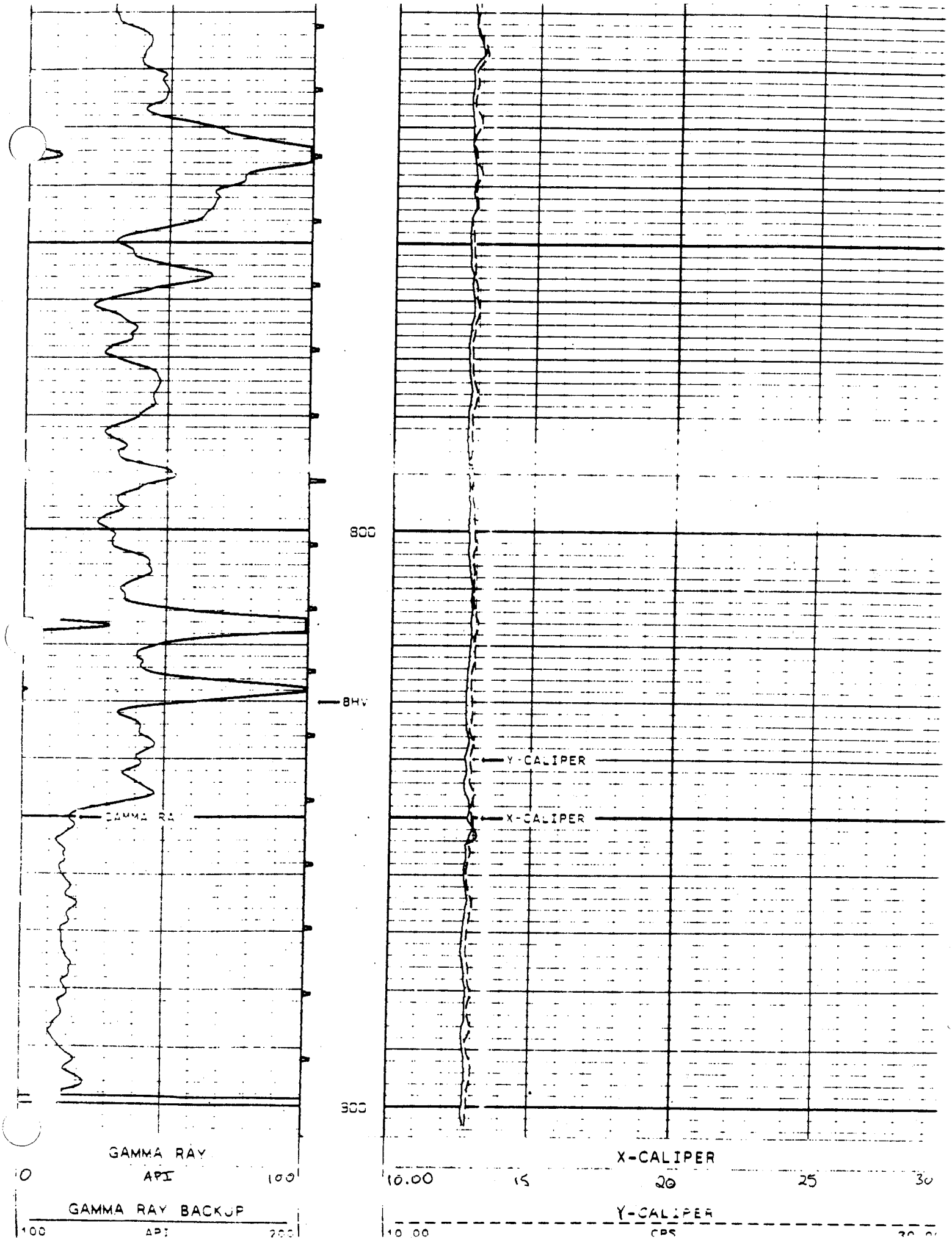
Sincerely,

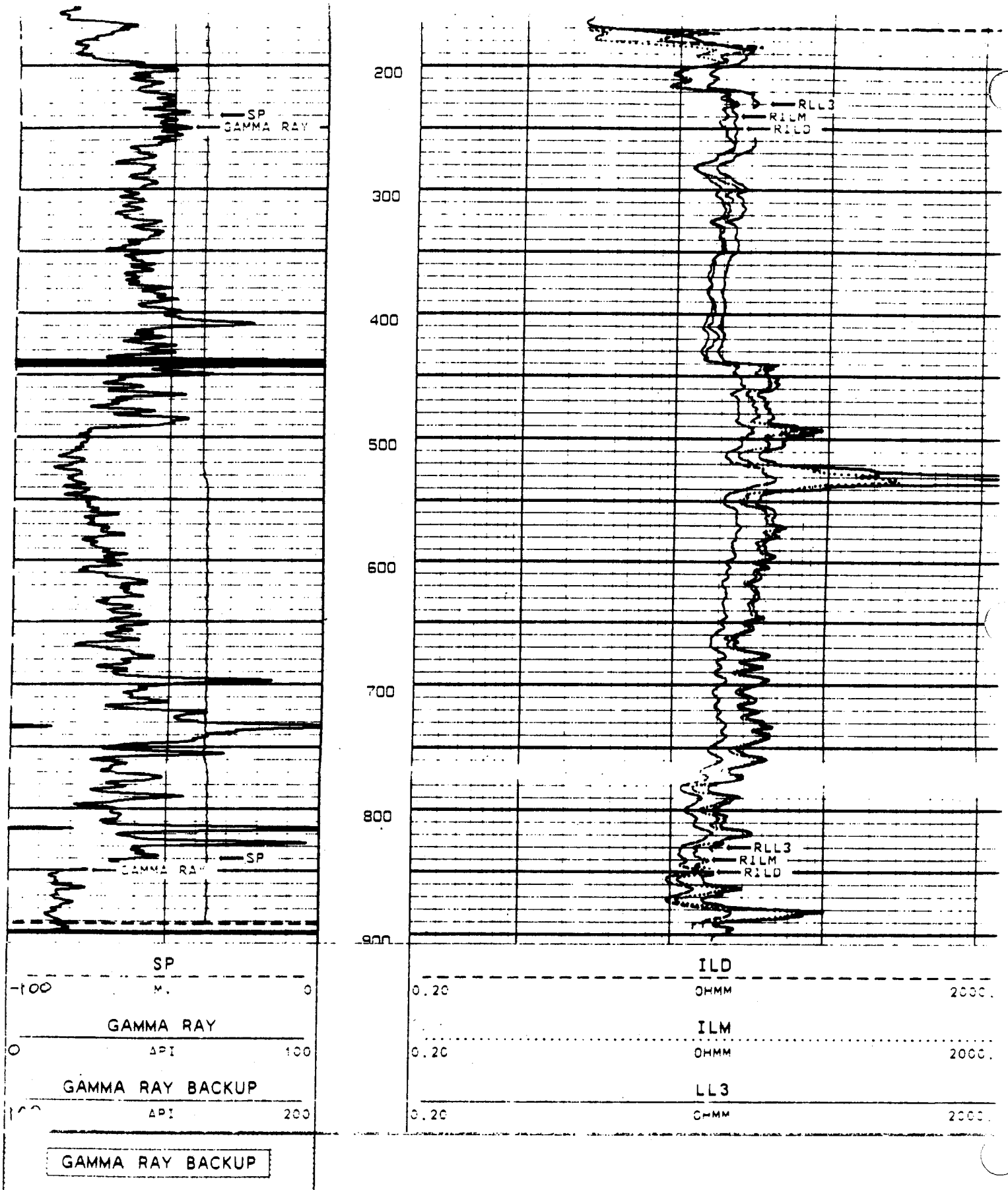
CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/11967.DOC
Attachments
c: Gene McLaughlin/MDWASD
Members of the TAC

1/13/97


800
BHV
Y-CALIPER
X-CALIPER
300
GAMMA RAY
0
API
100
GAMMA RAY BACKUP
100
API
200
X-CALIPER
10.00
15
20
25
30
Y-CALIPER
10.00
CPS



DEPTH 906.9 FEET DIRECTION: UP DATE: 01/10/97 TIME: 21:49:18 MODE: TRACE PLAYBAC

WW23DILMP

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
Suite 350
Deerfield Beach, FL
33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

January 16, 1997
136282.AS.04

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255913 (ASR-W-1) and UC-13-255914 (ASR-W-2)
MDWASD #740A

Weekly Summary (January 6 -- 10, 1997)

Youngquist Brothers Inc. (YBI) began drilling the pilot hole of ASR-W-2. Conducted flow logging of ASR-W-1 to evaluate flow zones. Began air development of both zones of MW-1 with discharge to the onsite lift station. Conducted geophysical logs (enclosed) of pilot hole at ASR-W-2 to 200 feet bls. Cemented 40-inch steel casing to approximately 170 feet bls with neat cement by the pressure grout method. Resume pilot hole drilling within 40-inch casing to approximately 900 feet bls. Conduct geophysical logs of pilot hole.

Schedule for Next Week

Prepare and submit casing seat request to TAC. Ream pilot hole to a nominal 40 inches to proposed casing seat depth of 845 feet bls. Conduct caliper log of reamed hole, install 845 feet of nominal 30-inch steel casing, and cement in place via pressure grout method. Conduct acidization of ASR-W-1 at 870 feet bls to improve specific capacity.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/12004.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE WASAD Project No. 136282.A5.02 Date 1/10/97

Contractor YOUNGQUIST BROTHERS, INC. Well No. ASR-2

Weather SUNNY, COOL, ≈70°F

Drillers TROY MOREE

Activity GEOPHYSICAL LOGGING

Starting Depth 150 FT B.P.L.

End Depth 900 FT B.P.L.

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

M. SCHILLING

1930 - M. SCHILLING ARRIVES AT THE SITE. THE CONTRACTOR IS IN THE PROCESS OF TRIPPING OUT THE DRILL RODS AND BIT. FLORIDA GEOPHYSICAL IS ALREADY ON SITE AND IS WAITING ON CONTRACTOR TO FINISH TRIPPING OUT TO ~~SEE~~ START GEOPHYSICAL LOGGING. THE LOGS TO BE CONDUCTED ARE CALIPER, NATURAL GAMMA RAY, DUAL INDUCTION ELECTRIC, AND SPONTANEOUS POTENTIAL LOGS.

2030 - START GEOPHYSICAL LOGGING.

2230 - GEOPHYSICAL LOGGING COMPLETED. MARK SCHILLING OFFSITE FOR THE DAY. THE CONTRACTOR WILL CLEAN UP THE SITE AND THEN SHUT DOWN FOR THE WEEKEND.

gnR267A/33

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-Dade Project No. 136282.A5.03 Date 1/8/97

Contractor Young Quist Well No. ASR-2

Weather P.Cloudy ~80°F

Drillers Troy Moore

Activity Logging Reamed Hole. Install 40" Casing

Starting Depth Ø

End Depth 200'

Formation Samples Collected

Every 10 Ft.

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. Ford.

1500 - Onsite, Logging Tool In Hole, Started Caliper, Gamma Log Run. Appears to Be open to ~90-120 Broken Formations Caliper = 28" to 59" In Area.
- Completed Well Logging On 0-200' Reamed Hole. Tagged At 188' Below Surface.
1500 - 1st Section of 40" Casing In Hole = 50'; Gave Totalizer Readings From 1/7/97 to Bob Zielke (Miami-Dade)
1520 - 2nd Section of 40" Casing Being Placed In Hole = 120' (Photo)
1525 - Started Welding Casing Joint. 2-Welders Working On Casing. (Photo)
1630 - 170' of Casing In Hole. Drillers Prep. For Trim Pipe Installation.
1700 Left site for Dinner.
1735 Onsite, Working on Pump seal For ASR-1 and Rigging up For Cementing. Cement Trucks Arriving, Filling Main Vessel At Rig.
1745 Painted monitor well Risers at All Pads w/ Red to Help keep Visible During Activities Around site.
1900 Completed Filling Cement Vessel/ Driller completed Hook up For Cementing.
1930 - Waiting On Jimmy Brantley (Young Quist) to start Cementing.
0847 Jimmy Onsite.
2109 Started Pumping Cement Est. 157 Barrels
2128 completed Pumping Cement. Total 141 Barrels. (See Cement Pumping Data Sht)
2135 Offsite. Troy will Call Pete Kwiatkowski (CH2M Hill) on 1/9/97 to Discuss New Motor For Pump Test.

gnR267A/33

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE | Project No. 136282.AS.03 | Date 1/7/97

Contractor YOUNG QUIST | Well No. ASR-1 AND ASR-2

Weather Clear ≈ 71°F

Drillers TROY MOORE.

Activity FINAL FLOW LOGGING ASR-1 200' PILOT HOLE ASR-2

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

0900 - ONSITE, LOGGERS HOOKING UP PACK OFF.
0915 - MARIO (MIAMI-DADE) ONSITE
FLOW TOOL IN WELL, - FLORIDA GEOPHYSICAL LOGGING
DISCUSSED LOGGING WITH MARK SCHILLING (CH2M HILL)
0945 CALLED NOEL GRANT (MIAMI-DADE) TALKED WITH HIM ABOUT PUMP TEST BEING RESCHEDULED FOR 1/8/97 AND WILL CALL HIM ON 1/8/97 IF PUMP TEST HAPPENS. FP&L ONSITE.
1015 COMPLETED STATIC LOG.
1040 READY FOR FLOW LOGGING.
1045 STARTED PUMPING.
1100 SHUT DOWN DUE TO DIESEL MOTOR IS OVERHEATING AND PUMP LEAKING BAD AROUND ROPPE SEAL. MAX GPM = 3,550 15.0 PSI
1220 2ND TRY / STARTED PUMP.
1225 SHUT DOWN, MOTOR OVER HEATING.
TROY IS LOOKING FOR A DIESEL MOTOR LARGE ENOUGH TO RUN PUMP, ALSO SENT YOUNG QUIST EMPLOYEE TO PICK UP NEW ROPE SEAL IN MIAMI FOR PUMP. HAVE ELECTRICITY AT TRAILER NOW.
1240 LOGGER BREAKING DOWN TO LOG 12¼" PILOT HOLE AT ASR-2 LOCATION. PILOT HOLE TO 200' BELOW SURFACE, FLOW LOGGING ON HOLD UNTIL NEW MOTOR ARRIVES, AND PUMP SEALS FIXED. ASR-2 ACTIVITIES, TEIGGING OUT FOR LOGGING RUN.
*1402 CALIPER AND GAMMA TOOL IN HOLE, *HAVING TROUBLE WITH TOOL, LINE #6. WORKING ON PROBLEM. FIXED TOOL @ 1350
1435 LSN TOOL IN HOLE. (DUEL INDUCTION)
1505 LSN TOOL OUT OF HOLE, LOGGING COMPLETED ON 12¼" PILOT HOLE AT 0-200' ASR-2.
LOGGER WILL BREAKE DOWN AND SETUP ON ASR-1.
DRILLERS WORKING ON PUMP AT ASR-1

gnR267A/33

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-Dade
Project No. 136282.A5.03 Date 1/7/97
Contractor Youngquist
Well No. ASR-1

Weather
Drillers Troy Moore
Activity Flow Logging
Starting Depth
End Depth
Formation Samples Collected
Water Samples Collected
Drilling Fluid Additives
Well Water Level

Time	Depth

Supply Deliverables
Measurement Reference Point
Elevation
CH2M HILL Personnel
G. Ford

1535 Hooking up for Flow Log at ASR-1
Will Try to Run Pump at 2,600-3,000 GPM without Heating Diesel motor.
1643 Completed Repairs to Pump.
1645 Started Pumping.
1648 @ 3,200 GPM DTW = 57.0 from TOC.
1658 @ 3,100 GPM DTW = 60.0 from TOC.
1700 Started Flow Logging, Can not collect DTW Due to Logging Cable and Tool is to Close to Sample Port. will Collect DTW when to is In Pack off.
1759 Flow Tool out of Hole.
DTW = 60.8 at 2,950 GPM @ (TOC)
1814 Start Fluid Res. Logging.
1902 Shut Down Pump
2,950 GPM = 61.5 DTW from (TOC)
Cap = 29.9 ga/Ft.
1910 Called Pete Kwiatkowski (CH2M Hill). Discussed Pumping, and Logging Activities will Talk with Pete on 1/8/97
2000 Recieved ~~Logg~~ Logs, offsite. (See Pumping Shts) 1/7/97

gnR267A/33

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-Dade | Project No. 136282.A5.03 | Date 1/6/97

Contractor Youngquist | Well No. ASR-1

Weather P.cloudy & 70°F

Drillers Troy Moore

Activity Logging
Finished pole.

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. Ford

0815 - onsite, Contractors setting up for Flow Logging, Killing well for Pump Installation.
0830 - Left site for Water Treatment Plant to Drop off Monitor well samples. For ASR-2 Pad and 2-monitorwells S.W, N.W. from MW-1 Pad.
1030 onsite Driller Installing Pump / working around ASR-2 Pad and Rig.
G. Ford - working on Paper Filing and Photo Files.
1130 - Left for Lunch..
1220 onsite, Florida Geophysical Logging onsite, Drillers Connecting Header to ASR-1 for Flow Logging.
Drillers starting to mix Drill Mud at ASR-2
Repairing water line to ASR-2 Pad that was cut By Ditch witch.
1430 Pump and Pipes in well, Contractor noted pump needs to be turned 180° Due to Gate Valve and Pack off for Logger was on the same side as Drive End of Pump. Changing Pump and Motor Placement, Relocation for Logger also to South side of Pad.
1630 - Talked with Tizoy Moore (Youngquist) about Flow Logging, He noted it would be Better to try Again Tomarrow Due to Time frame with W.W.T.P. Peak Hours and the Test would be done in Daylight, Will Run static log first thing Tomarrow. and Flow Log to Follow.
1735 Called Rick Devlis (CH2M Hill) left message that Step Test will not be done on 1/7/97. Offsite.

gnR267A/33

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
Suite 350
Deerfield Beach, FL
33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

January 10, 1997
136282.AS.03

Mr. William W. Cocke, P.G.
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255913 (ASR-W-1) and UC-13-255914 (ASR-W-2)
MDWASD #740A

Weekly Summary (December 30, 1996 -- January 3, 1997)

Youngquist Brothers Inc (YBI) completed the mobilization of the rig to ASR-W-2. Pad monitor wells (PMWs) were sampled at ASR-W-2 and submitted to the lab for analysis. FDEP notified of commencement of drilling activities at ASR-W-2 for next week.

It was brought to the attention of CH2M HILL that the monitor well annulus leaked artesian brackish water the evening of December 29, 1996 from approximately 4:00 pm to 10:00 pm. No one was onsite during this period. The well was shut in, but obviously not well enough. According to YBI, approximately 6,000 to 10,000 gallons of approximately 1,000 mg/L TDS water was spilled. Existing PMWs were sampled at the monitor well to evaluate the extent of the situation.

Began cementing up monitor well annulus from top of gravel (1,350 feet bpl) to 1,000 feet bpl with neat cement. First stage pumped 92 barrels via tremie method and tagged cement at 1,227 feet bpl next day. Second stage of cement consisted of 85 barrels pumped via tremie method. Cement level tagged in annulus at 1,010 feet bpl.

Schedule for Next Week

Begin drilling of ASR-W-2. Conduct flow logging of ASR-W-1. Begin development of both zones of MW-1. Conduct geophysical logs of pilot hole at ASR-W-2 and cement 40-inch steel casing to approximately 170 feet bpl. Resume pilot hole drilling within 40-inch casing.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB11962.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
Suite 350
Deerfield Beach, FL
33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

January 3, 1997

136282.AS

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Notification of Beginning of Drilling Activities at West Wellfield Aquifer Storage and Recovery (ASR) Site; Miami-Dade Water and Sewer Authority; Well W-2. FDEP Permit No. UC-13-255914

This letter is to inform you that well drilling activities will commence on Monday, January 6, 1997. The drilling contractor is Youngquist Brothers, Inc. of Fort Myers, Florida. CH2M HILL obtained water samples from the four pad monitor wells (PMWs) on Thursday, January 2, 1997. The samples will be analyzed for the requisite parameters and results forwarded to you upon completion.

Please call me at (407) 737-6665 (x297) if you have any further questions.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/11916.DOC
c: Gene McLoughlin/MDWASD
Members of the TAC

West well Field.

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-Dade Project No. 136282.AS.03 Date 1-2-97

Contractor Youngquist Well No. ASR-1

Weather Friday @ 80°F

Drillers Troy Moore

Activity Grouting of Mon. for well.

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

B. Ford

1130 - Onsite, Talked with Mario (Miami-Dade) on site Activities Passed week and Holidays. Noted: Mon for Blew Cap Sunday Night Dec 29th 4:10pm and Flowed until @ 12:15pm, noted no Youngquist Employees were onsite when Monitor well Blew. Also noted they will have to Kill ASR-1 for Y-Flange to be welded on Casing, still no Power to Trailer.

Rig has been moved to ASR-2 Pad. Mario noted one Youngquist Employee will be onsite at all time now Due to Monitor well ~~Problem~~ Problem, and if ASR-1 was to Blow Cap. Also noted DEP was onsite 12-31-96, wanted to collect water Samples

1235 - Purged Monitor wells at ASR-1 N.E, N.W, S.W, & S.E.

1345 - Collected water Samples at Monitor wells for ASR-1 (See water Quality Sht) Contractor Working on Pad at ASR-1, Digging out around Casing, also setting up at ASR-2 for Drilling, Talked with Troy Moore (Youngquist) will Due Flow Logging Tomarrow 1/3/97 around 1000am, also will start Pump Grout into Monitor well # 1 some Time @ 5-6pm Today.

1420 - collected Photos of ASR-1 Pad. and Dig out around Casing.

1515 - Left site for Lunch.

1530 - Back onsite. Call CH2M Hill Office Talked w/ Pete Kwiatkowski on Activities onsite and Future Pump test.

1600 Started Pumping Monitor wells at ASR-2 Location.

gnR267A/33

West well Field.

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-DADE

Project No. 136282.AS.03 Date 1/2/97

Contractor YOUNG & QUIST

Well No. MONITOR WELL #7

Weather

Drillers

Activity

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

1655 - PURGED ONE MONITOR WELL AT MONITOR WELL #7 PAD, N.W. COULD NOT FIND ANY OF THE OTHER MW's. APPEARS THE RISERS HAVE BEEN KNOCKED OFF BY HEAVY EQUIPMENT. TALKED TO TROY WILL TRY TO FIX ASAP. FOR SAMPLING

1800 COMPLETED SAMPLING

JIMMY BRANTLY (YOUNG QUIST) ONSITE FOR MONITOR WELL GROUTING.

1829 BELT BROKE ON COMPRESSOR FOR GROUTING. (REPAIRING)

1835 HOOKING UP BACK UP COMPRESSOR.

1851 - STARTED PUMPING GROUT @ 6 BAR/MIN 15.5 GAL/LB.

1929 COMPLETED 1-STAGE TOTAL/MIN = 17

TOTAL BARRELS = 92

30 BAGS OF CHASE USED.

2000 - OFFSITE.

gnR267A/33

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE
Project No. 136282.AS.03 Date 1/3/97
Contractor YOUNGQUIST
Well No. ASR-1 AND MW-1

Weather Foggy/calm ≈ 70°F
Drillers TROY MOORE
Activity 2ND STAGE cementing monitor well #1
Starting Depth 1,227
End Depth
Formation Samples Collected
N/A
Water Samples Collected
N/A
Drilling Fluid Additives
N/A
Well Water Level

Time	Depth

Supply Deliverables
N/A
Measurement Reference Point
Elevation
CH2M HILL Personnel
G. FORD

0845 - ONSITE, CONTRACTOR KILLING ASR-1 WELL FOR 4-FLANG TO BE WELDED ON TO 30" CASING. CEMENT TRUCK ONSITE, LOADING TO VESSELS. MONITOR WELL TAG = 1,227' BELOW SURFACE.
0900 STEVE EAGLES (MIAMI-DADE) W.W.T.P. ONSITE, DISCUSSED UPCOMING PUMP TESTS AT ASR-1, NOTED 20psi IS MAX FOR LIFT STATION, STATIC PSI AT LIFT STATION = 10psi WILL CALL W.W.T.P ON DAY OF PUMP TESTS TO GIVE THEM A PHONE # ONSITE, IF THERE IS A PROBLEM AT THE LIFT STATION OR PLANT. JIMMY BEAUTY ONSITE.
0940 STEVE EAGLES OFFSITE. PREP. FOR 2ND STAGE CEMENTING OF MONITOR WELL #1
0954 STARTED PUMP CEMENT. 75.6 @ 6.0 BAR/MIN.
1016 COMPLETED - 85 BARRELS.
1030 - WORKING WITH CONTRACTOR TO LOCATE MONITOR WELLS AROUND MW-1 PAD.
1130 OFFSITE FOR LUNCH & POTABLES
1215 ONSITE FOUND S.W. MONITOR WELL AND S.E., PURGED S.W. COLLECTED SAMPLE AT 1330, OTHER WELL APPEARED TO BE PLUGED ABOVE WATER TABLE. CONTRACTOR WILL TRY TO AIR DEVELPE MW5.
1350 TAG CEMENT IN MONITOR WELL #1 AT 1010 BELOW SURFACE.
CALLED PETE KWINTKWOSKI (CH2M HILL) AND DISCUSSED GROUT DEPTH. O.K. DRILLERS PULLING TRIM PIPE FROM MONITOR WELL. TROY WILL CALL IF FLOW LOGGING HAPPENS TOMARROW.

gnR267A/33

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
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33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

January 10, 1997

136282.AS.03

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255913 (ASR-W-1); MDWASD #740A

Weekly Summary (December 23 -- 27, 1996)

Youngquist Brothers Inc (YBI) reamed the 12.25-inch pilot hole to a nominal 29 inches to 1,300 feet bpl. Conduct cement bond log of 30-inch casing. Began moving rig to ASR-W-2.

Schedule for Next Week

Continue mobilizing rig to ASR-W-2. Cement up monitor well from top of gravel (1,350 feet bpl) to 1,000 feet bpl with neat cement.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB11961.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

CH2MHILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE
Project No. 130282.AS.03 Date 12-23-96
Contractor YOUNGQUIST
Well No. ASR-1

Weather P.cloudy Windy 45°F
Drillers YQR. Troy Moore.
Activity ~~Logging~~ Reamed Hole
Starting Depth
End Depth 13
Formation Samples Collected
N/A
Water Samples Collected
N/A
Drilling Fluid Additives
N/A
Well Water Level

Time	Depth

Supply Deliverables
Measurement Reference Point
Elevation
CH2M HILL Personnel
C. FORD

1140 - ONSITE, NO LOGGING TRUCK ONSITE GOT PHONE CALL AT 0945 FROM RICK NEVULIS AND MARK SCHILLING (CH2M HILL) SAID CONTRACTOR WAS WAITING ON ME TO RUN LOGS. TALKED WITH TROY MOORE (YOUNGQUIST) ON 12-22-96 AM AND TOLD HIM I WOULD BE OUT AROUND 11-12 ON THE 23RD.
TALKED WITH RICK AND MARK ON STEP TEST, THEY NOTED WE SHOULD TRY TO PUMP AT 5,000 gpm I NOTED THIS WAS NOT POSSIBLE DUE TO FORCE MAIN IS ONLY 24" AND WE CAN NOT EXCEED 20 PSI WHILE PUMPING. 1,400 gpm = 11-12 psi.
1215 - TALKED WITH TROY ON LOGGING, WILL RUN TV, CALIPER, GAMMA, FRT, FLOW + TEMP. TROY NOTED AFTER STEP PUMP TEST WE NEED TO COLLECT PRIM. AND 2ND DRINKING WATER STANDARDS. FOR ANALYSIS. WILL TRY TO FIND SAMPLE KITS TODAY.
1255 - FLORIDA GEOPHYSICAL LOGGING ONSITE NO PHONE SERVICE AT FIELD TRAILER TODAY, WAS TOLD SOMEONE HAD SHOT THE PHONE LINE OVER WEEKEND. DUMP TRUCK ONSITE, LOADING CUTTINGS FROM PIT INTO TRUCKS FOR REMOVAL OFFSITE. WORKING ON RIG, PREP. FOR MOVING RIG TO ASR-2 LOCATION.
1315 - APPEARS REAMED HOLE IS ± 50"-60" WIDE NEAR BOTTOM (T.D.) CALIPER AND CEMENT BOND LOGS ONLY TODAY. WILL PERFORM REMAIN LOGS AFTER STEP PUMPING TEST HAS BEEN PREFORMED.
1330 - DISCUSSED WORK TO BE COMPLETED ON MONITOR WELL BEFORE STEP TEST WILL BE PREFORMED. TROY WILL WORK ON MONITOR WELL, MOVING RIG UNTIL CH2M HILL HAS REVIEWED FLOW ~~RATE~~ DATA AND LOGS FROM INTERVAL TESTS

gnR267A/33

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE

Contractor YOUNGQUIST

Project No. 136282.A5.03 Date 12-23-96

Well No. ASR-1

Weather PCLOUDY-WINDY ~80°	AND Written Approval From W.W.T.P.
Drillers Troy Moore	FOR PUMPING 3,500 GPM OR GREATER
	HAS BEEN RECEIVED BY YOUNGQUIST OR
Activity LOGGING Caliper/Cement Bond.	CH2M HILL.
Starting Depth	1530 - Call Rick Nevulis (CH2M HILL) Discussed
End Depth	Activities AROUND site, will Meet 12-24-96
Formation Samples Collected	AM. AND View DATA FROM Pump Tests AND
	well Logging. / MARIO (MIAMI-DADE) OFFsite.
	STARTED Cement Bond Log @ 1600
	TALKED w/ TROY CAN NOT Cement Monitor well
	up to 1,000 Ft. until MONDAY 12-30-96
Water Samples Collected	will work ON RIG FOR MOB. to ASR-2
	Location. Also Lined up Sample kits
	W/ SAVANNAH LAB, Troy will Have them onsite
Drilling Fluid Additives	when Pump Test is Ready.
	1735 Completed Bond Log, Collected
	Copies of logs.
Well Water Level	
	OFFsite.

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel
G. FORD

gnR267A/33

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
Suite 350
Deerfield Beach, FL
33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

January 10, 1997
136282.AS.03

Mr. William W. Cocke, P.G.
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255913 (ASR-W-1); MDWASD #740A

Weekly Summary (December 16 – 20, 1996)

Youngquist Brothers Inc (YBI) conducted an interval pumping test from the base of casing (855 feet bpl) to 1,155 feet bpl. The pumping rate was approximately 800 gpm. Geophysical logs including caliper, temperature, fluid resistivity were conducted to delineate flow zones. Core runs were attempted from 1,203 and 1,239 feet bpl with only 1 foot of recovery. Formation appears friable preventing good core recovery. Completed pilot hole with 12.25-inch bit to 1,300 feet bpl. Conduct geophysical logs including video survey of complete pilot hole to 1,300 feet bpl at an approximate rate of 800 gpm. The video survey displayed the borehole, and the picture clouded up at 1,240 feet bpl. Conducted 2-hour interval pumping test to evaluate flow characteristics to 1,300 feet. With a pumping rate of approximately 1,400 gpm, and drawdown of approximately 44 feet, a specific capacity of approximately 31 gpm/ft was obtained.

Work was also conducted in converting the existing 12-inch-diameter monitor well to a dual-zone well. With nominal 2-inch FRP casing and 20-foot screen assembly in place to a total depth of 1,394 feet bpl, gravel was installed via the tremie method from bottom to 1,350 feet bpl. Following this, development of the 2-inch tubing commenced to allow the gravel to settle.

Schedule for Next Week

Ream the 12.25-inch pilot hole to a nominal 29 inches to 1,300 feet bpl. Conduct cement bond log of 30-inch casing.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB11960.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE Project No. 136282.AS.03 Date 12-20-96

Contractor YOUNGQUIST Well No. ASR-1

Weather P.CLOUDY, WINDY ~50°F

Drillers ~~TROY MOORE~~

Activity Logging Pump test Monitor well Gravel.

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

1045 ONSITE, TRIPPING IN TUBING FOR GRAVEL PUMPING OF MONITOR WELL. (PHOTO) USED 11 BAGS OF SALT TO KILL ASR-1 FLOW FOR PUMP INSTALLATION. PUMP AND TUBING IN ASR-1. (PHOTO)

1135 TALKED WITH STEVE (MIAMI-DADE) AT W.W.T.P MAIN CONNECTION AT SUNSET IS COMPLETED APPROVED 3,500 gpm FLOW TO PLANT AS LONG AS HEAD PRESSURE DOES NOT PASS 20 psi

1200 - TALKED WITH TROY, MAY RUN TV LOG LAST, AFTER PUMP TEST TO TRY AND CLEAN WATER QUALITY UP. LOGGER IS ON ITS WAY OUT TO RUN CALIPER, GAMMA, IES, ~~TEMP~~ ~~ACT~~ LOGS. FAXED TOTALIZER AND FLOW READINGS TO W.W.T.P.

1255 TRIPPING IN LAST JOINT IN MONITOR WELL. TOTAL 1380.77'

1305 - LOGGER ONSITE (GEOPHYSICAL FLORIDA LOGGING)

1330 - SETTING UP LOGGER.

1340 - TOOL IN HOLE.

I.D. AT 1302' HOLE APPEARS TO BE @ ~25" AT BOTTOM. COMPLETED @ 1420

1500 - 2ND SHIFT ONSITE. DIESEL FUEL TRUCK ONSITE.

1510 - COMPLETED SONIC LOGGING.

20 BUCKETS OF GRAVEL IN MONITOR WELL.

1550 - FUEL TRUCK OFFSITE, WORKING ON HEADER STANDPIPE FOR TRANSDUCE AND FLOW LOG. (PACK OFF)

1650 STARTED FLOW LOG. [redacted] WILL RUN 2 PASS 1-40' PER MIN. / 60' PER MIN. 16.7 PSI

1725 FLOW LOG COMPLETED.

1735 STARTED 2ND FLOW LOG AT [redacted] AND 50' PER/MIN RUN.

HEADER = 12.5 / 13.0 PSI

1800 - COMPLETED FLOW LOG. TOOL STUCK IN RISER, 1835 TOOL OUT OF HOLE.

gnR267A/33

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE Project No. 136286.AS.03 Date 12-20-96

Contractor YOUNGQUIST Well No.

Weather

Drillers TROY MOORE.

Activity

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

1835 - SETTING UP FOR ~~VIDEO~~ Temp LOGGING ~~VIDEO~~ TOOL IN HOLE @ 1850 RAN ~~VIDEO~~ LOG AT Ft/MIN.
1920 - completed Temp, FLUID Res. LOG.
1935 - DISCONNECTED STAND PIPE AND PACKOFF, SHUT PUMP DOWN. APPEARED FLOW (NATURAL) IS ≈ 800 gpm PUMP WAS TURNED ON AND RAN UP UNTIL ARTESIAN FLOW STOPPED AND STAYED @ 1" BELOW TOC.
2000 - VIDEO TOOL IN HOLE, VIDEO CLOUDED UP AT ≈ 1240', NOTED CEMENT ON CASING AT ≈ 830 to 855.
2115 - VIDEO TOOL OUT OF HOLE, SHUT PUMP OFF, SHUT WELL IN. FOR STATIC WATER LEVEL RECOVERY. TROY MOORE OFFSITE. TOTAL BUCKETS OF GRAVEL IN MONITOR WELL = 47, SHUT DOWN GRAVEL INSTALLATION, WILL RESUME ON 12-23-96. INSTALLING RISER PIPE FOR TRANSDUCER ON TOC.
2220 STATIC WATER = 17.50 INSIDE A 2" X 40' RISER ATTACHED TO TOC.
2306 PUMP ON FLOW = 1400 STABLE @ 1380 gpm HEADER PRESSURE = 10.0
(SEE NEXT PAGE FOR PUMP TEST.)
0102 PUMP OFF, STEP-1
0250 STATIC WATER LEVEL = ~~17.50~~ 13.22
LOADED UP HERMIT AND EQUIPMENT OFFSITE @ 0300 DRILLERS MOVING EQUIPMENT TO NEXT PAD.
NOTE: CONTRACTOR HAD TROUBLE GETTING PUMP STARTED ~~TO~~ DUE TO DEAD BATTERY

gnR267A/33

INTERVAL PUMP TEST @ 1300'

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE
Project No. 136282.AS.03 Date 12-20-96
Contractor YOUNGQUIST
Well No. ASR-1

Weather PARTLY-WINDY - ~50F
Drillers TERRY MOORE

Activity PUMP TEST @ 1300' 12.25" P.20 - HOLE
Starting Depth
End Depth 1300'
T.D @ 1302 W/ LOGGING
Formation Samples Collected
N/A

Water Samples Collected
5 gals AT END OF TEST.

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel G. FORD
HERMIT MODEL SE1000
SN: 1KC-490
TRANSDUCER: INSITU.
SN: 5372GM - 30.0SIG

TIME:	DEPTH (ft)	(GPM) FLOW RATE	HEADER PRESSURE PSI	COMMENTS
2220	STATIC = 17.50 HEAD RELOWING HERM.it = 73.09	Ø	Ø	TOTALIZER START = 003252.210
2306		1,400	10.0	START-TEST
2311		1,380	9.0	003258.380
2317		1,380	9.0	003267.800
2329		1,380	9.0	003283.500
2342		1,380	9.25	003302.500
0012		1,380	9.5	003343.400
0036		1,380	9.5	003374.00
0053		1,380	9.5	003398.200
0100	*19.25	1,380	9.5	003410.00
STEP-1				PUMP STOPPED.
0102				
0136				
0217	HERMIT 72.0			
0250	13.22			STOPPED - STEP

TRANSDUCER SET AT 100.0' BELOW TOC.
COLLECTED WATER SAMPLE AT - 0050 - 5 gals.
* DTW TAKEN FROM TOP OF VALVE @ 2.20' ABOVE TOC. (HERMIT MAY SHOW AFFECTS)

HERMIT READS 73.09 AT STATIC / STANDBY

STATIC = 17.50 INSIDE 2" x 40' RISER ATTACHED TO TOC.
@ 2.20' VALVE = 42.20 ABOVE TOC.

TUBING TALLY FOR GRAVEL VP. 1

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE
Project No. 136282.AS.03 Date 12-20-96
Contractor YOUNGQUIST
Well No. MONITOR well

Weather CLOUDY, WINDY ~ 50F
Drillers TROY MOORE

Activity INSTALL GRAVEL TO 1350'
Starting Depth 1393.87
End Depth
Formation Samples Collected

Water Samples Collected
Drilling Fluid Additives
Well Water Level

Time	Depth

Supply Deliverables
Measurement Reference Point
Elevation
CH2M HILL Personnel
G.FORD

TUBING FOR GRAVEL
SET AT -

Joint #	Total Length	Joint #	Total Length
1	30.66	23	28.70
2	30.44	24	30.76
Total	61.10	Total —	726.97
3	30.64	25	30.79
4	30.52	26	30.79
Total	122.26	Total —	788.55
5	28.68	27	30.60
6	30.53	28	30.77
Total	181.47	Total —	849.92
7	30.58	29	30.58
8	30.67	30	30.59
Total	242.72	31	30.41
9	30.66	32	30.61
10	30.63	Total —	972.11
Total	304.01	33	28.98
11	30.65	34	28.63
12	30.64	35	30.57
Total	365.30	36	28.68
13	28.67	37	30.44
14	30.57	38	28.55
Total	424.54	39	30.76
15	30.59	40	30.59
16	29.35	41	30.67
Total	484.48	42	28.24
17	30.09	43	30.64
18	30.37	44	30.70
Total	544.94	45	30.64
19	30.67	46	30.67
20	30.67	Total —	1380.77
Total	606.28		
21	30.59		
22	30.6		
Total	667.48		

FRP - SET AT 1393.87

JOINTS SET AT 1380.77
13.10' FROM BOTTOM.

PULL ONE JOINT = 1350.10

WEST Wellfield ASR-1

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE

Project No. 136282.AS.03 Date 12-18-96

Contractor YOUNG QUIST

Well No. ASR-1

Weather CLOUDY & 75°F

Drillers TROY MOORE

2ND SHIFT. JERRY

Activity

Starting Depth CORE-1233'

End Depth 1263'

Formation Samples Collected

EVERY TEN FT. DURING DRILLING OF PILOT HOLE. CORED AT 1234'-1259'

Water Samples Collected

EVERY 30ft OF PILOT HOLE DRILLING.

Drilling Fluid Additives

REVERSE AIR

N/A

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

1040 - ONSITE, G. FORD DRILLERS CLEANED OUT HOLE TO 1233' COLLECTED CUTTINGS EVERY 10FT. AND COLLECTED 8 WATER SAMPLES AT 1203' AND 1233'. TRIPPING IN DRILL ROD WITH 30'/4" CORE BARREL ATTACHED. CORE RUN ON 12-17-96 GAVE ONLY 1 FT. RETURN. 2ND RUN TODAY.

1155 - COMPLETED TRIPPING IN DRILL ROD, CHANGING OVER TO PIT TANKS, CONNECTING ONE 40 FT JOINT THAT HAS 5 FT MARKINGS MADE ON IT FOR VISUAL REF. WHILE CORING.

1335 STARTED CORE RUN., WATER CIRCULATION IS BEING DONE FROM SMALLER PUMP TO TRY TO KEEP FLOW RATE AT ≈ 40gpm, RIG PUMP WAS TO STRONG TO BRING FLOW DOWN TO WANTED RATE FOR CORING.

1445 COMPLETED CORE RUN, AND TRIPPING OUT. 2ND SHIFT ARRIVING ONSITE.

1615 - CORE BARREL AND SUB STILL IN HOLE, STOPPED TRIPPING OUT, DUE TO TRUCKS WITH SUPPLIES ONSITE, NEED CREW TO HELP WITH UNLOADING OF SUPPLIES AND ONE TRACK FOR RIG ONSITE (Photo of Track)

1620 - TRIPPING OUT SUB.

1645 - CORE BARREL OUT OF HOLE, CONNECTING 12.25" BIT TO ~~F~~ SUB, LOWING BIT AND SUB IN HOLE TO LOCK OF FLOW FROM well.

1650 TROY UNLOADING ONE TRACK FOR RIG OF LOW BOY AND PLACED BY PAD

1715 - OPENED BARREL Ø RETURN.

1755 - Call Pete (CH2M Hill) DISCUSSED CORE RUNS, WILL NOT TRY ANOTHER RUN. WILL FINISH PILOT HOLE TO 1300', TROY WILL WORK ON MONITOR WELL ON 12-19-96 AND WILL DUE LOGGING AND PUMP TEST: pm

gnR267A/33

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-DADE Project No. 136282.A5.03 Date 12-18-96

Contractor YOUNGQUIST Well No. ASR-1

Weather SEE PAGE 1 OF 2

Drillers Jenny

Activity

Starting Depth 1239'

End Depth 1300'

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel
G-FORD

1810 Hooking up For Drilling Pilot Hole to 1300'. SUBS, COLARS AND Bit Assembly 1-more Drill string (3-40 ft Joints)
1830 offsite For Potables.
1850 onsite.
1901 STARTED Tripping IN Drill strings
1924 Troy offsite, Jenny Running Rig.
Noted: ~30 ft of Head in well During "Tripping IN."
ROD IN Hole, STARTED Drilling 12.25" Pilot Hole to 1300'
Collected water samples AT 1263', 1293' AND AT 1300', Cutting Every 10 ft.
2255 Completed Drilling Pilot Hole to 1300', Noted From Jenny that we were AT 1294' Due to Floor Height, Drilled 6 more ft For Total of 1300'. will FLUSH well AND CALL me ON 12-19-96 When Wave Begins ON Mon. for well.
2300 END

gnR267A/33

CH2MHILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-DADE | Project No. 136282.AS.03 | Date 12-17-96

Contractor YOUNGQUIST | Well No. ASR-1

Weather P.cloudy & 70°F

Drillers TROY MOORE
MARK

Activity Drilling FROM 1155' TO 1203' collect CORE.

Starting Depth 1155'

End Depth ~~1203~~ 1197' (CORE)

Formation Samples Collected
Every 10(Ft)

Water Samples Collected
Every ~~10 OF 30~~(Ft)
1st collected @ 1,180

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel
G. FORD

0655- ONSITE, G. FORD, YOUNGQUIST CREWS ARRIVING. NO ACTIVITIES.
0710 - CREW REMOVING DIESEL MOTOR USED FOR PUMP TEST AND PREP. FOR 1,155' TO 1,203' DRILL DOWN W/ 12.25 BIT. REMOVING TURB. PUMP AND PIPING FROM DRILL FLOOR.
0805 - TRIPPING IN FIRST SECTION OF DRILL STRING. =120' W/ 12.25 BIT. DRILLER BENT GUID ON TOP DRIVE FOR DRILL ROD, HEATING GUID AND BENDING BACK TO SHAPE.
0845: HOOKING UP 2ND DRILL STRING = 240'
0900: HOOKING UP 3RD DRILL STRING = 360'
0915: HOOKING UP 4TH DRILL STRING = 480'
0927: HOOKING UP 5TH DRILL STRING = 600'
0935: HOOKING UP 6TH DRILL STRING = 720'
0939: HOOKING UP ~~8TH~~ 7TH DRILL STRING = 840'
0947: HOOKING UP 8TH DRILL STRING = 960'
0953: HOOKING UP 9TH DRILL STRING = 1080'
~~HOOKING UP 10TH DRILL STRING = 1200'~~
1080' PLUS COLLARS AND BIT. TOTAL ~ 1197.0' AT T.D.
1014: TRIPPING IN AIR TUBING
1025: DRILLERS HAVING TROUBLE WITH KELLY AIR LINE LOCKING INTO TOP DRIVE AND CABLE FLIP RAPING.
1120: BREAKING OFF 1 JOINT FROM DRILL STRING. LOWERED TOP DRIVE, TRY TO LINE UP AIR LINE BY LOWERING TOP DRIVE OVER AIR TUBING.
1157: RAISING TUBING SECTION
1200: CONNECTED DRILL STRING, STARTED UP COMPRESSOR,
1210: RESUMED DRILLING AT 1,155' BELOW SURFACE.
1212 AT ~ 1160' HARD LIMESTONE W/ VERY LIGHT FINES.
1220 - CHANGED TO MORE SANDS WITH LIMESTONE @ 1170-1180'
1230, - AT 1197' FT. BELOW SURFACE, FLOW FROM CUTTINGS PIT = 400 GPM. COLLECTED WATER SAMPLES AT 1080' AND 1197'.

gnR267A/33

WESTWELL Field ASR-1

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE

Project No. 136282.A5.03 Date 12-17-96

Contractor YOUNGQUIST

Well No. ASR-1

Weather P.CLOUDY ≈75°F

Drillers TROY MOORE

MARK, 2ND SHIFT JERRY

Activity CORING @ 1,197'

Starting Depth 1,197'

End Depth

Formation Samples Collected

Yes - Every 10 Ft of Drilling.

CORE 1,197 to 1228'

% Recovered = 1 Ft (1)

90 (2)

Water Samples Collected

Yes - EVERY 30 Ft of Drilling

Drilling Fluid Additives

N/A

Well Water Level *

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

1230 - FLUSHING BORE HOLE. / FLOW RATE = 800 gpm

1300 - Completed FLUSHING BORE HOLE. @ 1,197' Ft

1310 - STARTED TRIPPING OUT AIR TUBING, DRILL ROD AND BIT, FOR ~~the~~ CORE RUN.

1415 - BIT OUT OF HOLE. MIAMI DADE ELECTRICAL INSPECTOR PASSED TRAILER, BUT CAN NOT TURN POWER ON until Cert. of Occupance for TRAILER is onsite. TALKED with TROY, will NOT RUN 3RD CREW TODAY, DAY will END ≈ 11:00pm.

2ND SHIFT ONSITE)

1525 - RAISING CORE BARREL (30'x4") - (Photo) AND LOWERING INTO HOLE. CONNECTING BACK FLOW PREVENTER.

1530 - CONNECTING CORE BARREL to DRILL STRING.

1550 - TRIPPING IN DRILL ROD

CORE RUN will BE ~~From~~ 1,197' to 1227'

1800 - Completed TRIPPING IN DRILL STRINGS

1850 - STARTED CORE RUN. FLOW = 50 GPM

1915 - Completed CORE RUN, TRIPPING OUT.

NOTE - Drillers HAD to Make NEW Connection Pipe FOR CORE BARREL collection RUN, HOOKED up to settling Pit to Circulate Fresh WATER to Core BARREL. STARTED - 1630 / END - 1835

ALSO HAD TROUBLE with FLOW METER.

2050 Removed CORE 1-Ft RETURN

2055 Assembling CORE BARREL FOR SECOUND RUN. ATTACHING 12.25 Bit to DRILL STRING, will TRIP IN AND Clean OUT HOLE, will TRIP OUT ON 12-18-96 AND ATTACH CORE BARREL FOR SECOUND RUN.

2125 - OFFSITE.

gnR267A/33

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-DADE Project No. 136282 AS.30 Date 12-16-96

Contractor YOUNGQUIST Well No. ASR-1

Weather P.cloudy & 68°F

Drillers Troy Moore

Activity Pump TEST @ 1155 / GEOphysical Logging

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

0645 - G. FORD onsite. NO operations AT this Time.

0650 - YOUNGQUIST CREWS ARRIVING ONSITE Prepping FOR Pump TEST AND GEOphysical Logging.

0700 - Troy Moore (YOUNGQUIST) ONsite. Still NO Power to Trailer. Crew working on Pump Head, to couple to Drive motor.

0900 - Hooking up Large Dia. HOSE for Discharge From Pump to Sewer MAIN Pipe. Due to Larger Flow CAPACITY NEEDED for Pump TEST.

0915 - FLORIDA GEOphysical Logging setting up FOR Caliper, Temperature, Flow AND Fluid Resistance Log Runs.

0925 - STARTED pumping To Sewer MAIN. FLOW RATE = 600 gpm HEADER @ Sewer = 8.5 psi

1025 - Logging Tool In Hole. will Run First Log From @ 170' to TD. @ 1,155 Ft

1130 - Called W.W.T.P. to GET O.K. For FLOW Rate of 1,000 gpm to Plant, will FAX Letter of Approval to YOUNGQUIST AND MIAMI-DADE W.T.P. Loggers Breaking DOWN, & MUST Leave site For North Miami, FOR DEP. Inspection AT that site. will TALK With Troy (YOUNGQUIST) ON Possible Pump TEST while Loggers is GONE AND Let FLOW Log Be Run last. Collected DRAW DOWN @ ASR-1 = 28.8 Ft. AT 600 gpm.

1225 - Installing TRANSDUCER IN 40' Riser Pipe AT well HEAD. TRANSDUCER SET AT 100 Ft Below Top of CASING. Pump SHUT DOWN. well SHUT IN. Weighting FOR static Recovery.

1352 - Recovery Stable, STATIC = 35.44' ABOVE TOC.

1408 - STARTED Pump TEST @ 1,000 gpm

1455 - HARRY (MIAMI-DADE) ONsite.

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami - DADE

Project No. 136282.15.03 Date 12/16/96

Contractor YOUNG QUIST

Well No. ASR-1

Weather P. cloudy ~75°F

Drillers Troy Moore

Activity Pump Test Interval

Starting Depth 1,155 Ft.

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. Ford

1541 - STEP-1, SHUT DOWN PUMP. FOR 1,155 Ft INTERVAL PUMP TEST

PAD to FLOOR = 5.70'

TOC to FLOOR = 2.90'

40(Ft) 2" RISER ATTACHED to TOC.

1741 - STOPPED STEP-1 TEST HERMIT 4.96

1745 - REMOVING TRANSDUCER AND RISER. INSTALLING PLUG WERE RISER WAS ATTACHED to well HEAD. (TOC.)

1800 - LOADED EQUIPMENT IN FIELD OFFICE OFFSITE.

gnR267A/33

WEST WELLFIELD - ASR-1

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE Project No. 136282.A5.03 Date 12-16-96

Contractor YOUNGQUIST Well No. ASR-1

Weather

Drillers Troy Moore

Activity Interval Test @ 1,155'

Starting Depth

End Depth 1,155'

Formation Samples Collected

Water Samples Collected

5 gals. AT END OF TEST.

Drilling Fluid Additives

Well Water Level

Time	Depth
1405	+4.56 (TOC) (ABOVE)
1741	+4.96

Supply Deliverables

Measurement Reference Point

40' RISER ON TOC

Elevation

CH2M HILL Personnel

B. FORD.

Time	(GPM) Flow Rate	Totalizer	(PSI) Head Pressure	
1408	0	002312.750	0	START
1418	800	002319.600	7.25	
1426	800	—	7.25	
1438	800	002336.200	7.25	
1448	800	002346.300	7.75	
1501	800	002355.800	7.75	
1512	800	002362.200	7.75	
1518	800	—	8.0	
1529	800	002374.600	8.0	
1541	800	002382.58	8.0	END

gnR267A/33

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client _____ Project No. _____ Date _____

Contractor _____ Well No. _____

Weather _____

Drillers _____

Activity _____

Starting Depth _____

End Depth _____

Formation Samples Collected

Water Samples Collected ____

44.70'

Drilling Fluid Additives ____

Well Water Level

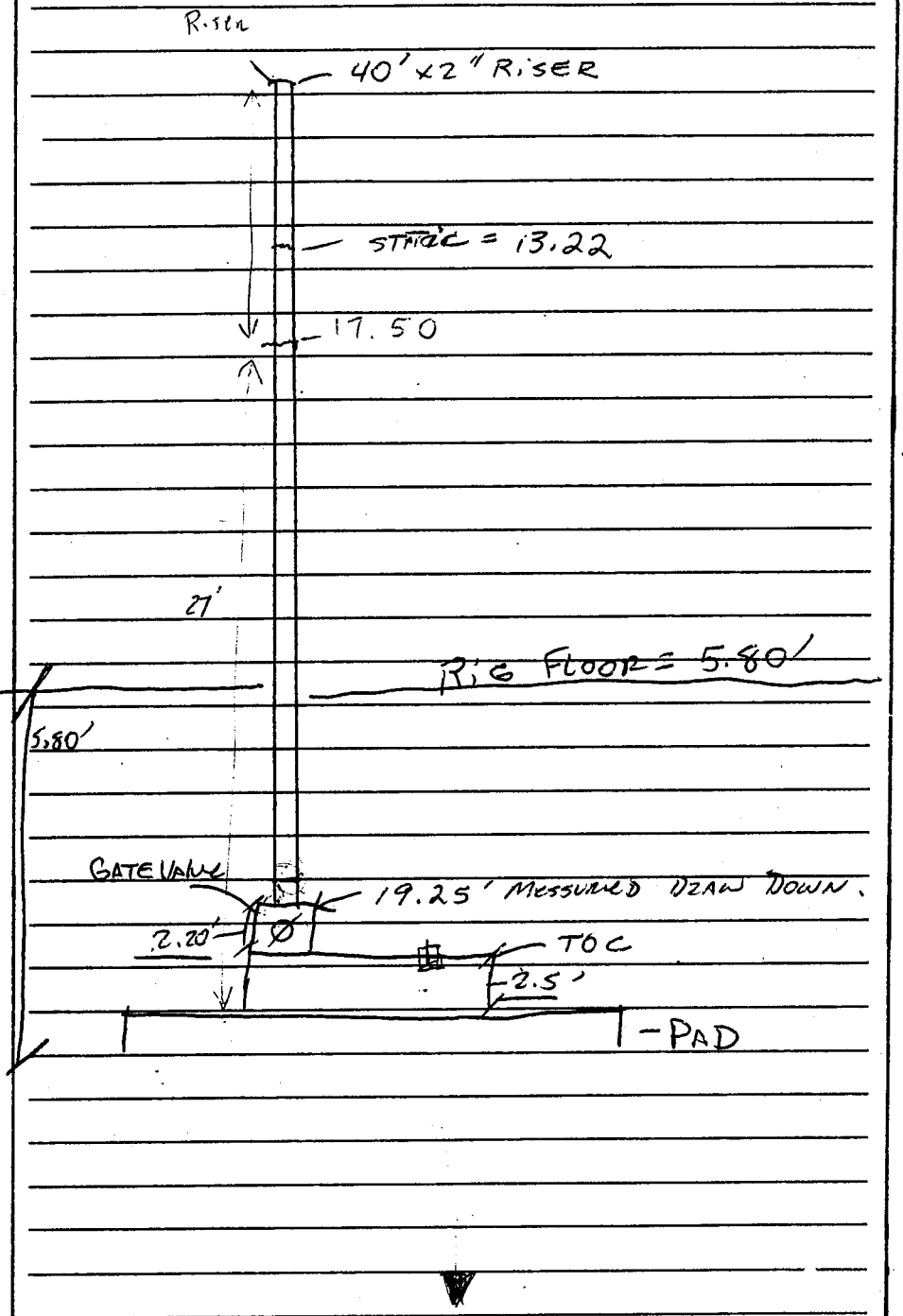
Time	Depth

Supply Deliverables _____

Measurement Reference Point

Elevation _____

CH2M HILL Personnel _____



gnR267A/33

CH2M HILL
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800 Fairway Drive
Suite 350
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33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

January 10, 1997

136282.AS.03

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255913 (ASR-W-1); MDWASD #740A

Weekly Summary (December 9 -- 13, 1996)

Youngquist Brothers Inc. (YBI) rigged up for and conducted a successful pressure test on the final (30-inch) casing on December 12, 1996. Some difficulty was encountered with conducting the test with only the cement plug at the base of the casing; therefore a packer was set near the base off the casing. Mark Silverman/FDEP witnessed the pressure test. YBI also rigged up for and began reverse-air drilling (open circulation, discharge to lift station) on the pilot hole within the 30-inch casing in the Floridan Aquifer System. Drilling was stopped at 1,155 feet below pad level (bpl) and set up for an interval pumping test commenced.

Schedule for Next Week

Conduct geophysical logs of pilot hole to 1,155 feet. Conduct 2-hour interval pumping test to evaluate flow characteristics. Attempt to obtain a core at 1,200 feet bpl.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB11959.DOC
c: Gene McLaughlin/MDWASD
Members of the TAC

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE Project No. 136252.AS.03 Date 12-9-96

Contractor YOUNGQUIST Well No. ASR-1

Weather Clear, cool ≈ 70°F

Drillers YOUNGQUIST

Activity Pressure Test.

Starting Depth /

End Depth /

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

1220 ONSITE, TALKED WITH TROY, HOLE IS STILL TO HOT, TRIEING TO COOL IT DOWN, HE HOPES PRESSURE TEST WILL BE O.K. BY 1-2PM TANK TRUCKS LEAVING SITE WITH CUTTINGS AND DRILL MUD.
1240 - LEFT SITE.
1300 - ONSITE, TOOK PICTURES OF CASING CAP MADE FOR PRESSURE TEST AND PIPING.
1320: MARIO MIAMI-DADE ONSITE ALSO TROY. ELECTRICIAN WORKING ON ELECTRIC FOR TRAILER FROM MAIN POWER POLE, ALSO TIE IN FOR 24" MAIN WAS GOING TO GO ACROSS MAIN ROAD, MARIO NOTED THIS WILL NOT WORK, WILL BLOCK TRAFFIC.
1345 - RE PRESSURED WELL. FOUND ONE LEAK ON PRESSURE PIPING, REPAIRING.
1430 - TALKED W/TROY, NO PRESSURE TEST TODAY, CEMENT IS STILL TO HOT, WILL PUMP OUT DRILL MUD AND REPLACE WITH FRESH WATER TO HELP COOL WELL AND TRY TEST FIRST THING TOMARROW 12-10-96 WILL CALL AND LET ME KNOW.
1445 - ~~ONSITE~~. OFFSITE.

gnR267A/33

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-DADE
Project No. 136282.AS.03 Date 12-10-96
Contractor YOUNGQUIST
Well No. ASR-1

Weather Clear, Cool ≈60°F
Drillers YOUNGQUIST
Activity Pressure Test.
Starting Depth
End Depth
Formation Samples Collected
Water Samples Collected
Drilling Fluid Additives
Well Water Level

Time	Depth

Supply Deliverables
Measurement Reference Point
Elevation
CH2M HILL Personnel
G. FORD

1000 ONSITE, YOUNGQUIST ONSITE, REMOVING WATER AND MUD FROM WELL, TANKERS BEING FILLED FOR REMOVAL OFF SITE. TALKED WITH TROY / STILL HAVING TROUBLE WITH HEAT LATE LAST NIGHT. WILL TRY AGAIN TODAY. ELECTRICIANS WORKING ON LINE TO TRAILER, WILL LOSE ELECTRICITY TO TRAILER TODAY UNTIL FINAL HOOK UP IS DONE WELDERS ONSITE TODAY ALSO. WORKING ON MUD PIT.
1130 - WILL TRY NEXT PRESSURE TEST ≈ 1.5 2.0 HRS FROM NOW.
1135 - LEFT SITE.
1305 - ONSITE.
PRESSURED UP WELL TO 100 DROPPED ≈ 15 PSI IN 20 MINS.
1338 - PRESSURED UP TO 139 PSI DROPPED TO 118 IN 24 MINS.
END OF TEST. WILL LOOK FOR PACKER OR MAY RUN ONE MORE CEMENT STAGE TO BOTTOM PLUG. WILL CALL 12-11-96 IF TEST RESUMES.
1410 - END OFF DAY.

gnR267A/33

CH2MHILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE
Project No. 136282.A5.03 Date 12-12-96
Contractor YOUNGQUIST
Well No. ASR-1

Weather P.CLOUDY, ≈ 70°F
Drillers YOUNGQUIST
Activity PRESSURE TEST.
Starting Depth
End Depth
Formation Samples Collected
* → GAUGE - MC
ACCURACY .25%
0-200 PSI
SN# 7868120 COLIBRATED
~~Water Samples Collected~~
BY BARFIELD. MIAMI
5-22-96
Drilling Fluid Additives
Well Water Level

Time	Depth

Supply Deliverables
Measurement Reference Point
Elevation
CH2M HILL Personnel
G. FORD

▶ 0740 ONSITE, TROY ONSITE, SET PACKER 12-11-96
▶ 0758 STARTED PRESSURE TEST @ 101.5PSI
DRILLER NOTED PRE-TEST ONLY DROPPED 2 PSI
OVER ≈ 16 HRS TIME FRAME. MARKS FROM
DEP CALL WILL BE ONSITE AT ≈ 0815. 0807-101.5psi
0813 - MARK SILVERMAN FROM DEP. ONSITE.
PRESSURE AT 101.5 PSI.
0840 - PRESSURE AT 101.5 PSI.
0845 - PRESSURE AT 101.5
0850 - PRESSURE AT 101.5.
0859 - 101.8 PSI
0909 - 102.0 PSI
0912 - 102 PSI.
0917 - 102.1 PSI
0932 - 102.1 PSI
0938 - 102.1 PSI
0944 - 102.1 PSI
0950 - 102.1 PSI
0955 - 102.1 PSI
0958 102.2 PSI
END, BLEEDING WATER INTO 5 gal BUCKETS
① 5 gals = 65 PSI
② 5 gals = 32 PSI Total = ≈ 17.5 gals
③ 5 gals = .9 PSI
④ 2.5 gals = Ø END @ 1006 - DEP OFFSITE.
BREAKING DOWN HEADER.
1020 - LEFT SITE
1057 - ONSITE., TRIPPING OUT TUBING FOR
PACKER REMOVAL.
1138 - PACKER REMOVED FROM CASING (PHOTO'S
1205 - OFFSITE TO PICK UP HERMIT + TRANS.
FROM MIAMI OFFICE, ALSO 2-5 gal WATER
CONTAINERS.
1335 - ONSITE, DRILLERS REP. FOR DRILLING.

gnR267A/33

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE
Project No. 136282.A5.03 Date 12-12-96
Contractor YOUNGQUIST
Well No. ASR-1

Weather Clear & 75°F
Drillers YOUNGQUIST.
Activity 12¼ PILOT HOLE.
Starting Depth ~~855'~~
End Depth
Formation Samples Collected
Every 10 Ft. STARTING AT 900'
Water Samples Collected
Every 30 Ft. STARTING AT 900' DUE TO CEMENT PLUG.
Drilling Fluid Additives
N/A Re. Air.
Well Water Level

Time	Depth

Supply Deliverables
Measurement Reference Point
Elevation
CH2M HILL Personnel
G. FORD

1415 - CHECKED PROGRESS, MAKING COUPLING FOR DISCHARGE LINE, CHECKING COMPRESSERS, ELECTRIC INSPECTOR ONSITE, TRAILER FAILED, WILL TRY AGAIN ON 12-12-96.
1435 - TALKED WITH PETE ON WORK ACTIVITIES TO BE DONE WHEN DRILLING STARTS UP.
1535 - TALKED WITH TROY ABOUT WELL LOGGING AT INTERVALS WHERE PUMP TESTS WILL BE DONE.
1600 - CALLED PETE FOR OK. ON LARGER CORE BARREL TO BE USED 30 Ft x 4" OK., TROY TALKED WITH PETE ON RUNNING LOGS ~~BE FOR~~ BEFORE THE PUMP TEST. O.K.
1655 - HOOKING UP 12¼" BIT TO FIRST ROD SECTION.
1700 - LOWERING 1st SECTION INTO HOLE.
1705 LEFT SITE FOR POTABLES AND FOOD.
1735 - ONSITE, STILL TRIPPING IN DRILL ROD.
1800 - LABELED WATER SAMPLE BOTTLES
1825 - ATTACHING BLOW BY PREVENTERS ON DRILLING RODS. MOVED EQUIPMENT FROM TRAILER TO FIELD TRUCK DUE TO NO ELECTRICITY AT TRAILER (TO DARK TO WORK IN).
1925 - TRIPPING IN 2" TUBING INSIDE OF DRILL ROD.
2000 - CONNECTED DRILL ROD, STARTED MUD PUMPS AND CIRCULATING, HAD TWO LEAKS AROUND TUBING, REPAIRING
2100 - AT 843 'Ft. PREFORMING MAINTENANCE ON TOP DRIVE AND TOP DRIVE WINCH. TAG CEMENT PLUG AT ~845
2135 - CALL MARK SCHILLING, DISCUSSED ACTIVITIES AT SITE, NOTED THAT START UP FOR DRILLING IS GOING VERY SLOW.

gnR267A/33

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client ~~For~~ Miami - DADE Project No. 136482.AS.03 Date 12-12-96

Contractor YOUNG QUIST Well No. ASR-1

Weather SEE PAGE 1

Drillers YOUNG QUIST

Activity Drilling to 1150'

Starting Depth 845'

End Depth

Formation Samples Collected

Every 10 Ft.

Water Samples Collected

Every 30 Ft.

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

C. FORD

► Drillers still working on Top Drive Winch. @ 2157.

2214 - Hooking up 120' of Drill Rod. Total = 963'

2230 - AT ≈ 845 STARTED Drilling Through Cement PLUG.

2250 - Shut Down Due to Compressor Problems, High Heat Warning shut on Compressor.

2310 - Completed Repairs to Compressor.

2315 - Resumed Drilling AT ≈ 850'

2340 - Changing over ~~to~~ ~~Flow~~ to Discharge Line (Sewer MAIN) Total Depth ≈ 930'. For Bore Hole clean out AND to collect 1st Water Sample.

2350 - Completed change over. Flowing well AT 180 Gpm, Line HAS Air, GETTING Back Pressure. ~~= Collected 1st water sample.~~ 12-13

Totalizer READ 2136 AT START OF FLOW. to Sewer MAIN. STOPPED Due to Air in Line.

0047 - Checked FLOW, meter READ ≈ 1,000 gpm, Appears that the Air IN sewer MAIN is Giving False READINGS Due to MAIN NOT Being Bleed. collected 1st Sample @ 900'

0102 - AT 930' collected water Sample FLOW Appears to Be ≈ 800 gpm. PRESSURE AT Sewer MAIN JOINT Connection READ 13 psi. cutting, Limestone w/small shell + Fines.

0120 AT 956', cutting Appear to Be Mostly Limestone w/ small shell AND Fines. FLOW meter READ 850 gpm. Header AT Sewer MAIN READ 13.5 psi Totalizer 2180

0133 FLOW meter READ 1,000 gpm. ? Purging well AND Bore Hole.

Note: Gauge ON Header AT Sewer MAIN 8" 0-200 Same Gauge used ON Casing Pressure Test.

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami - DADE
Project No. 136282.A5.03 Date 12-12-96
Contractor YOUNGQUIST
Well No. ASR-1

Weather P. cloudy & 65°F
Drillers YOUNGQUIST

Activity Drilling to 1150'
Starting Depth 845'
End Depth
Formation Samples Collected
Every 10 Ft.

Water Samples Collected
Every 30 Ft.

Drilling Fluid Additives
N/A

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel
G. FORD

0135 - Making a Better Sample Port for Water Sample Collection By Discharge AT Settling TUB. Still AT 956' Below SURFACE.
0212 - ADDING Drill ROD STRING.
TOTAL = 1,083 Ft.
0233 - Resumed Drilling.
0241 - collected 960' Water Samples
HEADER PRESSURE AT SEWER MAIN = 12.0 psI
" FLOW meter NOT WORKING "
0300 - AT 990', collected Water Samples
Cutting Appear to Be Mostly LIMESTONE W/SMALL Shells, AND FINES. HEAD AT SEWER MAIN = 13.0 psI
0315 AT 1,010. Collected Water Samples.
FLOW meter NOT WORKING HEADER @ Sewer = 11.5 psI
cuttings appear to Be SAME AS 990' BUT CLAY ALSO,
0333 AT 1,040, collected Water Samples.
0338 - HEADER PRESSURE AT SEWER MAIN = 11.0 psI
0345 - @ 1070 collected Water Samples
HEADER @ SEWER MAIN = 11.0 psI
cutting Appear to Have More Clay then Limestone. (Lime MUD)
0355 - @ 1076', ~~Circulating~~ Flushing Bore Hole. Drillers ~~Bring~~ MOVING 3 ROD Joints to RIG W/ LOADER. = 120'
0425 - 1 Joint ADDED. = 1,123 Ft. Total ROD.
(-) 7 Ft. From PLATFORM to PAD = 1,116.
0434 - Resumed Drilling @ 1076'
0446 @ 1,100 collected water samples.
CUTTINGS: CLAY W/ SMALL LIMESTONE AND FINES (Lime MUD)
Heuben pressure @ Sewer MAIN = 12.5 psI
0455 AT 1,116
Cutting: Appears to Be MORE LIMESTONE W/ FINES AND LESS CLAYS + (Lime MUD)
0510 - HOOKing up 2ND Joint - total = 1,163

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE Project No. 136282.45.03 Date 12-13-96

Contractor YOUNGQUIST Well No. ASR-1

Weather SEE PAGE 4 OF 5

Drillers

Activity

Starting Depth

End Depth

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

0535 - ~~REMOVE~~ Drilling AT 1,116'
Drillers Having Trouble with Top Section of 2" TUBING for Air Supply, CABLE ON 2" Top section FRAYED AND CAUSE A PLUG IN Air Line, Working ON Repair.
0625 - 2 YOUNGQUIST Crew OFFSITE. Appears Repair DID NOT WORK.
0630 - MARK SCHILLING ONSITE.
0650 - GREG FORD OFFSITE

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Project No. 136282.A5.03 Date 12-13-96

Client MIAMI-DADE WASAD

Contractor YOUNGQUIST BROTHERS, INC.

Well No. ASR-1

DAILY OPERATIONS REPORT

Weather CLEAR, ≈80°F

Shift No. 1 Time 0700-~~1900~~-1500

Driller TROY MOORE

Activity DRILLING 12.25" PILOT HOLE

Starting Depth 1,115 - 1,155 FT B.P.L.

Shift No. _____ Time _____

Driller _____

Activity _____

Starting Depth _____

Formation samples collected _____

Water samples collected _____

Deviation Survey _____

Drilling fluid additives _____

Well water level

Time	Depth

Measurement reference point _____

elevation _____

Supply deliveries _____

Time	Description of Operations
0700 -	REPAIRS TO THE KELLY AIR LINE ~~AND~~ CABLE ARE STILL IN PROGRESS
1000 -	REPAIRS COMPLETED. DRILLING OF 12.25-INCH PILOT HOLE RESUMED AT 1,115 FEET B.P.L.
1030 -	DRILLING REACHED THE DESIRED DEPTH OF 1,150 FEET B.P.L. AND WATER SAMPLES COLLECTED AT ~~1,150~~ 1,140 AND 1,150 FEET B.P.L. THE CONTRACTOR IS CURRENTLY CIRCULATING TO CLEAN OUT THE BOREHOLE
1040 -	THE CONTRACTOR REQUESTED THAT THE PILOT HOLE BE ALL DRILLED TO 1,155 FEET B.P.L. TO ALLOW ANOTHER JOINT OF DRILL PIPE TO BE ADDED FOR EASE OF TRIPPING OUT. M. SCHILLING GAVE THE CONTRACTOR PERMISSION TO DRILL OUT THE ADDITIONAL 5 FEET OF PILOT HOLE. DRILLING RESUMED.
1045 -	DRILLING OF THE 12.25-INCH PILOT HOLE IS STOPPED AT THE DEPTH OF 1,155 FEET B.P.L.
1100 -	START TRIPPING OUT THE DRILL PIPE AND BIT.
1200 -	AFTER BRINGING THE DRILL STRING AND BIT INTO THE 30-INCH CASING, THE 3-INCH VALVE ON THE SIDE WAS OPENED TO DETERMINE THE ARTESIAN FLOW OF THE WELL. THE ~~VALVE~~ WATER FLOWING FROM THE VALVE WAS FLOWING HORIZONTALLY = Ø INCHES.
1245 -	DRILL BIT REMOVED FROM THE WELL. AFTER A PHONE CONVERSATION BETWEEN M. SCHILLING & P. KWIATKOWSKI OF CH2M HILL, IT WAS DETERMINED THAT THE BOREHOLE CONDITIONS PRECLUDED A FLOWING INTERVAL TEST AND GEOPHYSICAL LOGGING. A 500 GPM PUMP CAPABLE OF DRAWING 120-FEET OF HEAD WAS DETERMINED NECESSARY TO PROVIDE USEFUL DATA FOR THE TESTING & LOGGING. M. SCHILLING INFORMS TROY MOORE OF THIS DEVELOPMENT. FLORIDA GEOPHYSICAL ARRIVES ON SITE.
1355 -	CONDUCTED A MINI-PUMP TEST TO DETERMINE IF A CENTRIFRIGAL PUMP COULD HANDLE THE REQUIREMENTS. THE PUMP WAS PUMPING AT A RATE OF ≈ 400 GPM WITH A DRAWDOWN OF ≈ 14 FEET. SPECIFIC CAPACITY = ≈ 28 FT/GAL
1455	MARIO OF MIAMI-DADE NOTED THAT THERE WAS SOME DIESEL/HYDRAULIC FLUID ON DRILLING THAT NEEDED TO BE REMOVED. T. MOORE INFORMED OF PROBLEM AND ACTION WAS TAKEN TO CORRECT THE PROBLEM.

Project No. 136282 A5 03 Date 12-13-96

Client MIAMI-DADE WASAD

Contractor YOUNGQUIST BROTHERS, INC.

Well No. ASR-1

DAILY OPERATIONS REPORT

Weather CLEAR, ≈ 80°F

Shift No. 2 Time 1500-2300

Driller JERRY

Activity SETTING UP FOR INTERVAL PUMP TEST

Starting Depth _____

Shift No. _____ Time _____

Driller _____

Activity _____

Starting Depth _____

Formation samples collected _____

Water samples collected _____

Deviation Survey _____

Drilling fluid additives _____

Well water level

Time	Depth

Measurement reference point _____

elevation _____

Supply deliveries _____

Time	Description of Operations
1545	AFTER SEVERAL DISCUSSIONS CONCERNING PUMP OPTIONS FOR THE INTERVAL PUMP TEST, THE CONTRACTOR MADE THE DECISION TO INSTALL A TURBINE PUMP WITH APPROX. 120 FEET OF PUMP COLUMN TO CONDUCT BOTH THE PUMPING TEST AND THE GEOPHYSICAL LOGGING. THE CONTRACTOR WILL INSTALL THE PUMP DURING THIS SHIFT (1500-2300) AND CONDUCT THE TESTS ON MONDAY 12-16-96.
1600	M. SCHILLING OFFSITE FOR THE DAY.

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
Suite 350
Deerfield Beach, FL
33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

December 9, 1996

136282.AS.03

Mr. William W. Cocke, P.G.
Program Manager–UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD)
West Wellfield ASR Project;
FDEP File # UC 13-255913 (ASR-W-1); MDWASD #740A

Weekly Summary (December 1–6, 1996)

A casing seat request was submitted and verbally approved by Mr. Len Fishkin/FDEP-West Palm Beach on Wednesday, December 4, 1996. The drilling contractor (Youngquist Brothers Inc. [YBI]) reamed the pilot hole to a nominal 39-inch diameter. Notified FDEP of pending pressure test. Installed 30-inch steel casing to 855 feet bls. Conducted pressure grout with approximately 1,746 sacks of neat cement. Conducted temperature log and tagged cement at 105 feet bls. Tremie grouted second stage (approximately 276 sacks of neat cement) to land surface. Allowed cement to set over the weekend.

Schedule for Next Week

YBI will rig up for and conduct the pressure test on the final (30-inch) casing. YBI will also rig up for and begin reverse-air drilling on the pilot hole within the 30-inch casing in the Floridan Aquifer System.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB11745.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

WEST WELL Field - ASR-1

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE Project No. 136282.AS.03 Date 12-6-96

Contractor YOUNGQUIST Well No. ASR-1

Weather Cloudy, Int. RAIN ~75°F

Drillers YOUNGQUIST

Activity ~~Logging~~/Cementing

Starting Depth /105'

End Depth /Ø

Formation Samples Collected

Cement Samples Collected.

Water Samples Collected

~~N/A~~ AT MONITOR WELLS ASR-1 NE, NW, SW, SE.

Drilling Fluid Additives

N/A

Well Water Level

Time	Depth

Supply Deliverables

N/A

Measurement Reference Point

N/A

Elevation

CH2M HILL Personnel

G. FORD

0640 - ONSITE. LEE (Geophysical Logging) ONSITE. SETTING UP FOR TEMP., GAMMA LOG RUN.

0645 TALKED WITH DRILLER CEMENT WAS TAG AT 105' BELOW SURFACE, MONITOR WELL ASR-1 S.E. WAS REPAIRED LAST NIGHT. DRILLER SETUP 2-TRIM PIPES FOR CEMENTING LATER.

0705 COLLECTED WATER LEVELS ON MONITOR WELLS,

0720 PURGED MONITOR WELLS FOR SAMPLE COLLECTION.

0735 COMPLETED LOGGING. SETTING UP FOR CEMENT RUN.

0745 COMPLETED MONITOR WELL PURGING. TRIM PIPE SET AT 105' BELOW SURFACE. COLLECTED WATER SAMPLES FROM MONITOR WELLS

0825 DRILLERS BREAKING DOWN EXTRA TRIM PIPE. CLEANING UP RIG.

0832 CEMENT TANKER ONSITE.

0840 HOOKING UP TANKER TO PUMP TRUCK. CHECKING LOG, APPEARS CEMENT IS AT ~ 105'-106' BELOW SURFACE

0914 ~ 3 MINS INTO CEMENT PUMPING. 15.6 GAL/bb 5.6 BAR/min TOTAL BAR = 14.0

0924 COMPLETED CEMENTING, TOTAL BAR = 58 TO SURFACE. 15.5 GAL/bb, 6.3 BAR/min.

0940 TALKED W/ TROY, IS NOT SURE OF WORK SCHEDULE FOR WEEKEND, AND ALSO APPROVAL FOR TIE IN TO SEWER LINE. WILL CALL AND LET ME KNOW LATER TODAY.

1005 MARIO ONSITE, LOADED WITH GS TO TAKE BACK TO DFB-OFFICE.

1015 - OFFSITE

gnR267A/33

WEST WELL FIELD - ASR-1

CH2MHILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-Dade. Project No. 136282.AS.03 Date 12-5-96

Contractor YoungQuist Well No. ASR-1

Weather Clear ≈ 72.°F

Drillers YoungQuist

Activity Logging + Casing Placement

Starting Depth 170'

End Depth 855'

Formation Samples Collected

N/A

will collect Cement Samples.

Water Samples Collected

n/a

Drilling Fluid Additives

N/A

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. Ford.

0450 - Onsite, Last Section of Drill Rod Being Removed. ≈ 120'

0505 - Reaming Bit out of Hole

0520 - Setting up For Logging.

0625 - Tool out of Hole. Welders onsite.

0635 - Troy of YoungQuist onsite, Preping For Casing Installation 30", to ~~850~~ 855' Below Surface

0640 Lifting Bottom Section of Casing, = 24.0'

0657 24 Ft. Section of Casing Lowed For Next Joint to Be welded. 4-Welders onsite.

0723 Lifting 2nd Section of Casing/Crop Duster Spraying.

0730 - Left site to make copies of log to Fax to DFB. 1st Section Casing = 24.0' 2nd Section = 119.85

0740 Onsite. Welding 1st and 2nd Joint.

0810 1st and 2nd Sections Lowered Into Hole.

0822 3rd Section of Casing Being Raised. Section Length = 119.90' Started Welding @ 0831

0900 - Checked Weld and Centralizers, Lowering Casing

0905 - Lifting 4th Section = 118.95' Total = 382.70' Started Welding @ 0910.

0925 completed welding and Centralizers

0958 Lowered 4th section In Hole.

1010 Lifting 5th Section = 120.10' Total = 502.80

1015 - Welding Section.

Other Activities: Loading Cuttings to Dump Truck For Removal offsite. Checked Area where Dump Truck and Loader is working, Monitor is in this Are ASR-1-SE. Found ~~Raise~~ Riser Bent over, will need to Repair Before we can Sample well. Discussed with Troy.

1110 - Lowering 5th Section In Hole.

1120 - Welding 6th Section = 119.20' Total = 622.0' Jimmy (YoungQuist onsite).

1225 Lowering 6th Section Into Hole.

gnR267A/33

WEST WELLFIELD ASR-1 PAGE 2 OF 2

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE Project No. 136252.A5.03 Date 12-5-96

Contractor YOUNGQUIST Well No. ASR-1

Weather P.CLOUDY & 78°F

Drillers YOUNGQUIST

Activity CASING RUN + CEMENTING

Starting Depth 860'

End Depth

Formation Samples Collected

Cement Samples collected

Water Samples Collected

N/A

Drilling Fluid Additives

N/A

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD, M. SHILLING

1230 7th Section Beg RAISED = 120.0 Total = 742.0'
1302 Mark shilling on site.
1330 - 7th Section Lowered into Hole.
1340 8th Section Being Raised = 118.60' Total 860.6
Last Section to Be WELDED.
1443. LAST Section IN Hole Total = 860.6
1450 - Left Site For Lunch. G. FORD, M. Schilling
1555 - ONSite G. FORD, M. Schilling, RAining Heavy. Drillers Circulating Hole.
1758 completed Pressure Drop pipe, end Fittings.
1802 STARTED Pumping Cement Run.
15.6 15.7 Gal/Lb. 6.5 Barrels A MIN.
(SEE DATA SHT STAGE 2.)
1927 STOPPED Pumping Cement Due to one Vessel Tank WAS NOT Operational. Will GET Cement TRUCKED IN AM. to complete Cementing.
Will RUN GAMMA + Temp Log. 7:AM. ON 12-6-96.
1945 END OF DAY.

gnR267A/33

Joint #	Length	Total Length	Time In Well	Comments.
1	24.0'	24.'	0657	Centralizer 5 Feet From Base of Casing.
2	119.85	143.85	0810	Centoalizer at 41' From Base of Bottom Casing ~~[illegible]~~ ANi 100' or Joint
3	119.90	263.75	0905	Centralizer 100' Above LN Section.
4	118.95	382.70	0958	Centralizer at Joint
5	120.10	502.80	1130	Centralizer at Joint
6	119.20	622.0	1225	Centralizer at Joint
7	120.00	742.0	1330	Centralizer at Joint
8	118.60	860.6	1443	Centralizer at Joint

WEST WELLFIELD ASR-1

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI - DADE
Project No. 136282.AS.03 Date 12-4-96
Contractor YOUNG QUIST.
Well No. ASR-1

Weather MCLOUDY @ 73°F
Drillers YOUNG QUIST
Activity ~~LOGGING~~ REREAM. ~~NO CASING~~ RUN.
Starting Depth 170'
End Depth 860'
Formation Samples Collected
N/A

Water Samples Collected N/A

Drilling Fluid Additives
N/A

Well Water Level

Time	Depth

Supply Deliverables N/A

Measurement Reference Point

Elevation

CH2M HILL Personnel
G. FORD.

▶ 0500 ONSITE G.FORD. 38" REAMING BIT, BEING REMOVED FROM BORE HOLE. REAMED TO A TOTAL DEPTH OF
▶ 0520, HOOKING UP FOR LOGGING RUN. CALIPER LOG ONLY.
▶ TOOL OVER BORE HOLE @ 0525
▶ 0530 RUNNING TOOL DOWN HOLE.
▶ 0540 TROY (YOUNG QUIST ONSITE) REPLACE TEFLON(TM) BAILER IN MONITOR WELL ASR-1 N.E.
▶ 0600 BAILED MONITOR WELLS. FOR SAMPLE COLLECTION, TDS, CHLORIDE, COND, AND TEMP.
▶ 0640 STARTED COLLECTING SAMPLES FROM MONITOR WELLS. LOGGING COMPLETED, TOOL OUT OF HOLE.
▶ 0655 COMPLETED SAMPLE COLLECTIONS. 2ND SHIFT FOR DRILLING ONSITE, WELDER (PICKEL) ONSITE. DRILLERS PREPING FOR CASING INSTALLATION. 30"
▶ CALIPER LOG ON ~~SECOND~~ SECOND RUN T.D. AT 843' APPEARES TO BE SOME CAVE OFF, DRILLERS PREPING TO RE DRILL AND CIRCULATE BORE HOLE FOR A T.D. OF 860', ALSO FOUND @ ±180' ±0.250' WALLS ± 33" ±035"
▶ 0735 - LOST POWER TO TRAILER.
▶ 0758 - HOOKING UP REAMING BIT AND 1ST ROD. WELDER NOTED, TANKS AT RIG WERE OUT OF FUEL FOR WELDING, MAIN TANKS ARE FULL, AND WILL FILL SMALL TANKS FROM THEM. TALKED TO TROY - NEED CALIBRATION SHT FOR PRESSURE GAUGE, DAILY DRILLING REPORTS TODAY. TROY CALLING FOR A 8" PRESSURE GAUGE TO PURCHASE TODAY. ?
▶ 0825 FIRST SECTION OF ROD + BIT IN HOLE.
▶ LEFT FOR MIAMI OFFICE @ 1000
▶ 1250, ONSITE, 1300 MIAMI DADE PERSONNEL ONSITE WITH ALBERT MUNIZ
▶ 1400 MIAMI-DADE PERSONNEL OFFSITE AND ALBERT MUNIZ

gnR267A/33

MIAMI-DADE Westwell Field.

WELL.

DATE Dec. 1st. ASR-1

0900 ONSITE G. FORD, ≈240' PLUS REAMING BIT 38" IN HOLE ≈150'. LOGGING TOOL RECOVERED, WELDER CUTTING TOOL OUT OF CATCHER, TOOL APPEARS TO BE IN GOOD SHAPE. LOADING CUTTINGS IN DUMP TRUCK AND TANKER TRUCK FOR REMOVAL OFFSITE. TROY NOTED CUTTINGS GOING TO DUMP OFF OF HWY 27, SAME DUMPSITE USED FOR ATLANTIC GLADES SITE.

0935. WELDER WORKING ON 30" CASING, WELDING 3 SECTIONS AT A TIME TOGETHER, PUTTING 3RD PASS ON. DRILLERS TO START REAMING BORE HOLE TODAY.

1000 - OFFSITE.

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
Suite 350
Deerfield Beach, FL
33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

December 4, 1996

136282.AS.01

Mr. William W. Cocke, P.G.
Program Manager–UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Casing Seat Approval Request; Miami-Dade Water and Sewer Department (MDWASD); West Wellfield ASR Project; ASR Well Number 1 (ASR-W-1).
FDEP Permit Number UC-13-255913
MDWASD Project Number: W-740A

This letter serves to request approval for a casing seat (30-inch) at approximately 855 feet below land surface (bls) at the subject site for the ASR well. The following information is provided to support this recommendation:

1. Lithologic Information
2. Excerpts from Geophysical Logs (attached)
3. Excerpt from the onsite Monitor Well Lithologic Log (attached)

As background, a 40-inch casing has been cemented in place to a depth of approximately 170 feet bls to isolate the Biscayne aquifer. Through this casing, a nominal 12-inch pilot hole has been advanced using mud circulation to a depth of approximately 900 feet bls.

Analysis

Lithologic information obtained from drill cuttings indicates that clays, mudstones, and limestone layers of the Hawthorn Group predominate from 170 to 850 feet bls. At 850 feet bls, white to medium gray, fossiliferous limestone was first observed in the cuttings. Soft layers between 820 and 850 feet bls are silt/clay layers, based on review of cuttings samples.

The gamma log delineates sharp peaks at depths of approximately 445, 700, 740, 822, and 835, with a smaller peak at 850 feet bls. These generally correlate with clay lenses, formation boundaries, or heavy phosphorite deposits. The caliper log indicates a relatively gauge borehole (i.e., similar to the diameter of the drill bit). The dual-induction log displays relatively uniform electric response, except for a sharp increase in resistivity at 538 feet bls. This geophysical signature could not be correlated with other geophysical or lithologic data to yield a conclusive interpretation.

Review of previous data from the Floridan Aquifer monitor well installed at the West Wellfield site in 1994 shows consistency with data obtained at this site. At the monitor well, the final casing string was also set to a depth of 855 feet bls.

Summary

Review of lithologic and geophysical logs from the subject borehole and from existing data indicates that the base of relatively impermeable clays and mudstones of the Hawthorn Group exists at a depth of approximately 850 feet bls. The purpose of setting the final 30-inch casing at the site at a depth of 855 feet bls is:

1. Seal off overlying clays and impermeable limestones of the Hawthorn Group.
2. Facilitate reverse-air drilling through underlying permeable formations of the Floridan Aquifer System for water quality sampling/analysis.
3. Evaluate flow characteristics of the open-hole interval for final selection of the ASR zone. The onsite monitor well indicates good production from flow zones between 1,150 and 1,300 feet bls.

Based on the above information, we believe a successful ASR system will be constructed, with the monitor and ASR wells completed to similar depths and production zones.

Thank you in advance for your prompt review of this material. Please call me at (561) 737-6665 if you have any questions.

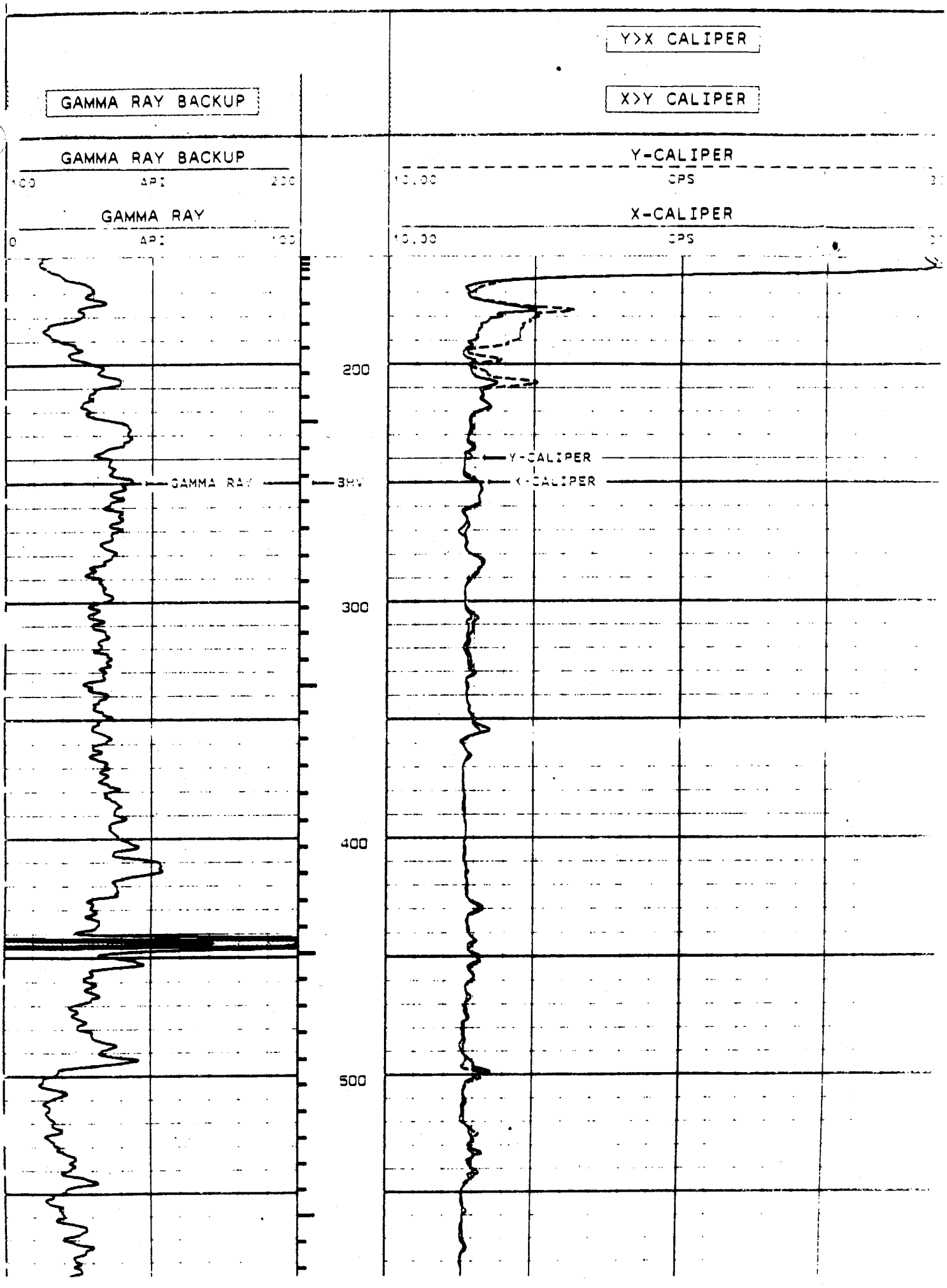
Sincerely,

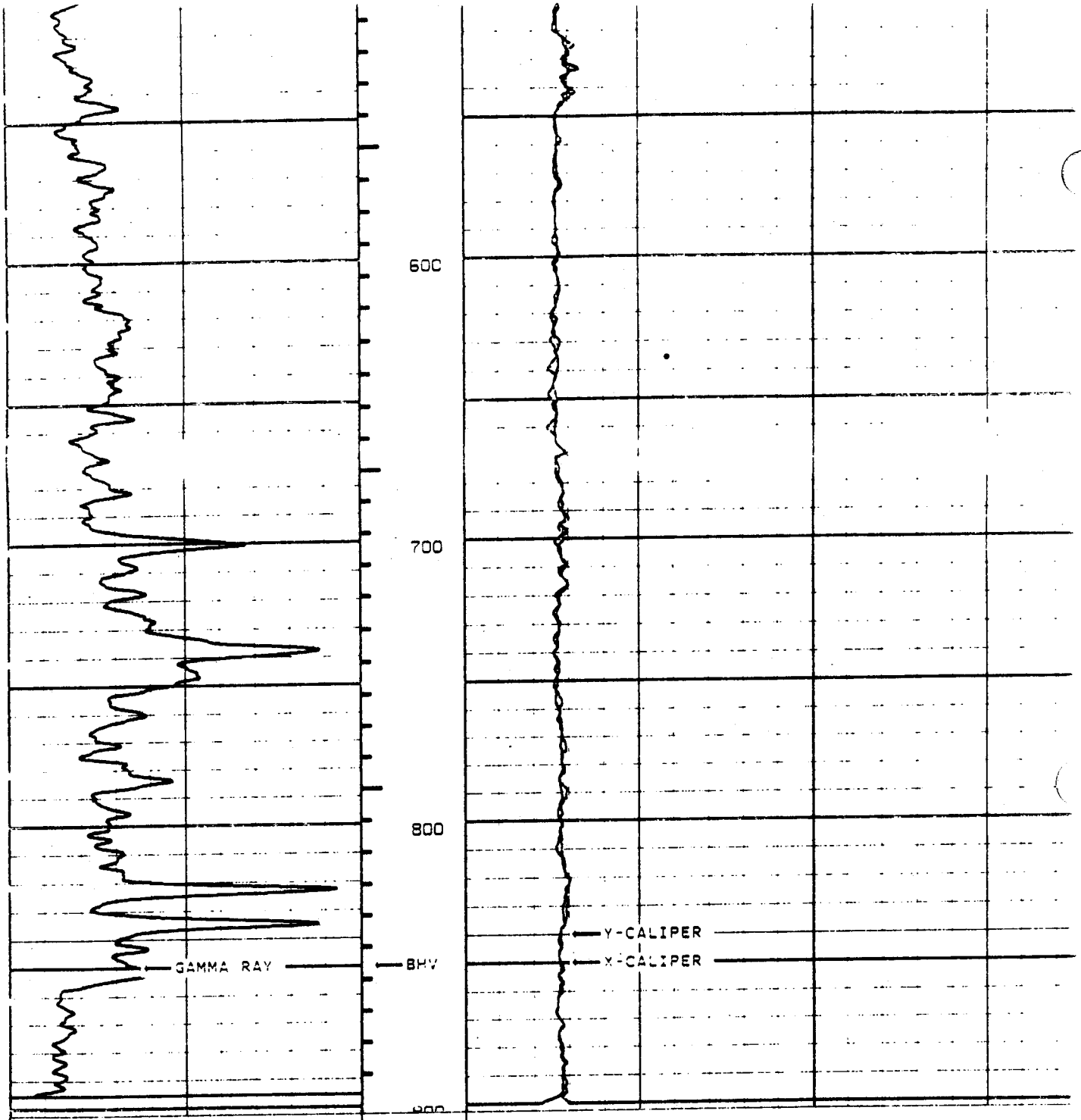
CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB11715.DOC
Attachments
c: Gene McLaughlin/MDWASD
Members of the TAC

Peter J. Kwiatkowski
12/4/96


GAMMA RAY BACKUP
Y>X CALIPER
X>Y CALIPER
GAMMA RAY BACKUP
100 API 200
GAMMA RAY
0 API 100
Y-CALIPER
10.00 CPS
X-CALIPER
10.00 CPS
200
300
400
500
GAMMA RAY
BHV
Y-CALIPER
X-CALIPER



GAMMA RAY
0 API 100

GAMMA RAY BACKUP
100 API 200

X-CALIPER
10.00 CPS

Y-CALIPER
10.00 CPS

GAMMA RAY BACKUP

X>Y CALIPER

Y>X CALIPER

START DEPTH: 902.3 FEET DIRECTION: UP DATE: 11/30/96 TIME: 11:07:02 MODE: TRACE P

WW13XYMP

WW13DILMP

FINISH DEPTH: 159.2 FEET DIRECTION: UP DATE: 11/30/96 TIME: 12:21:04 MODE: TRACE PLAYB

GAMMA RAY BACKUP

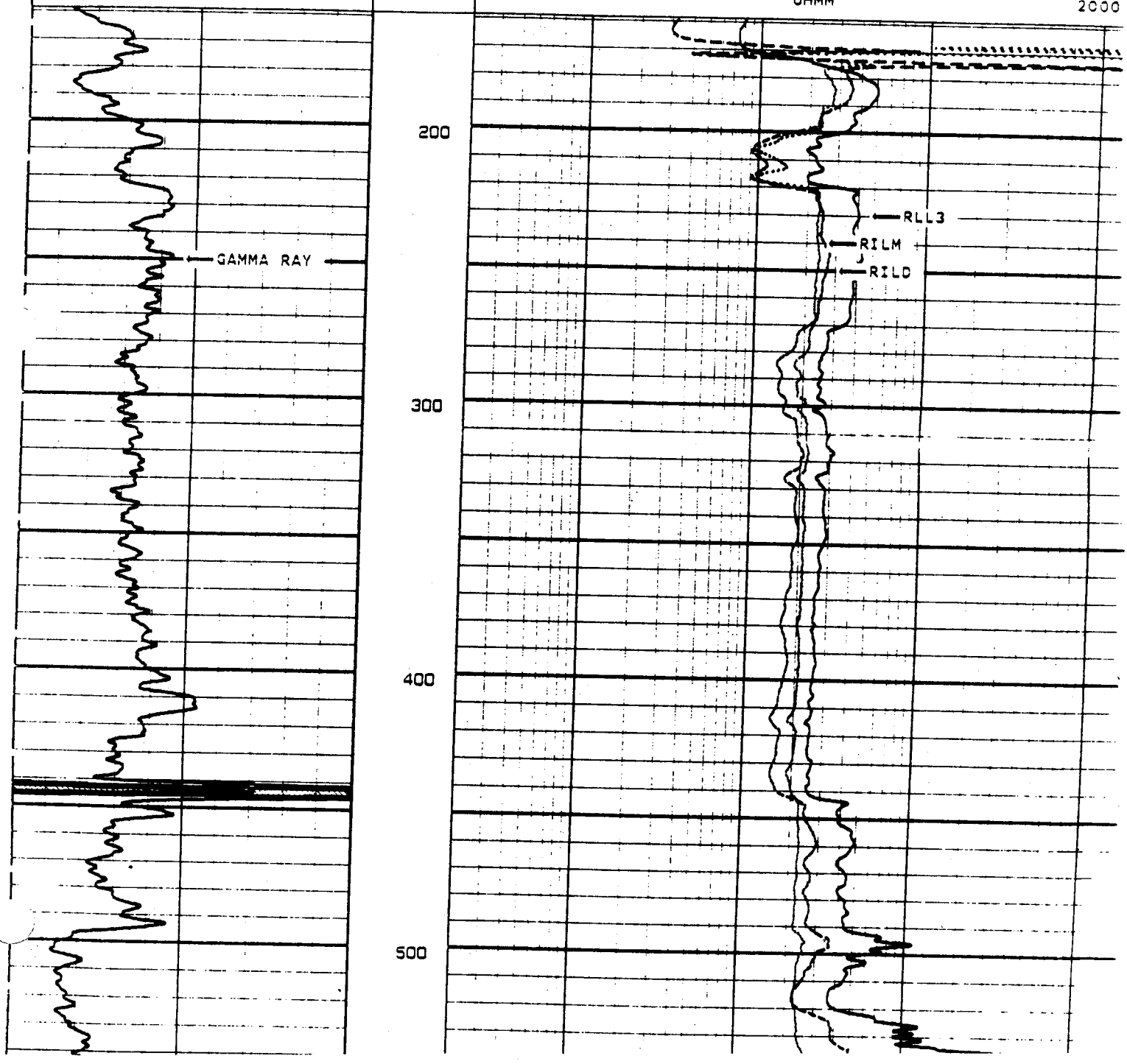
GAMMA RAY BACKUP
100 API 200

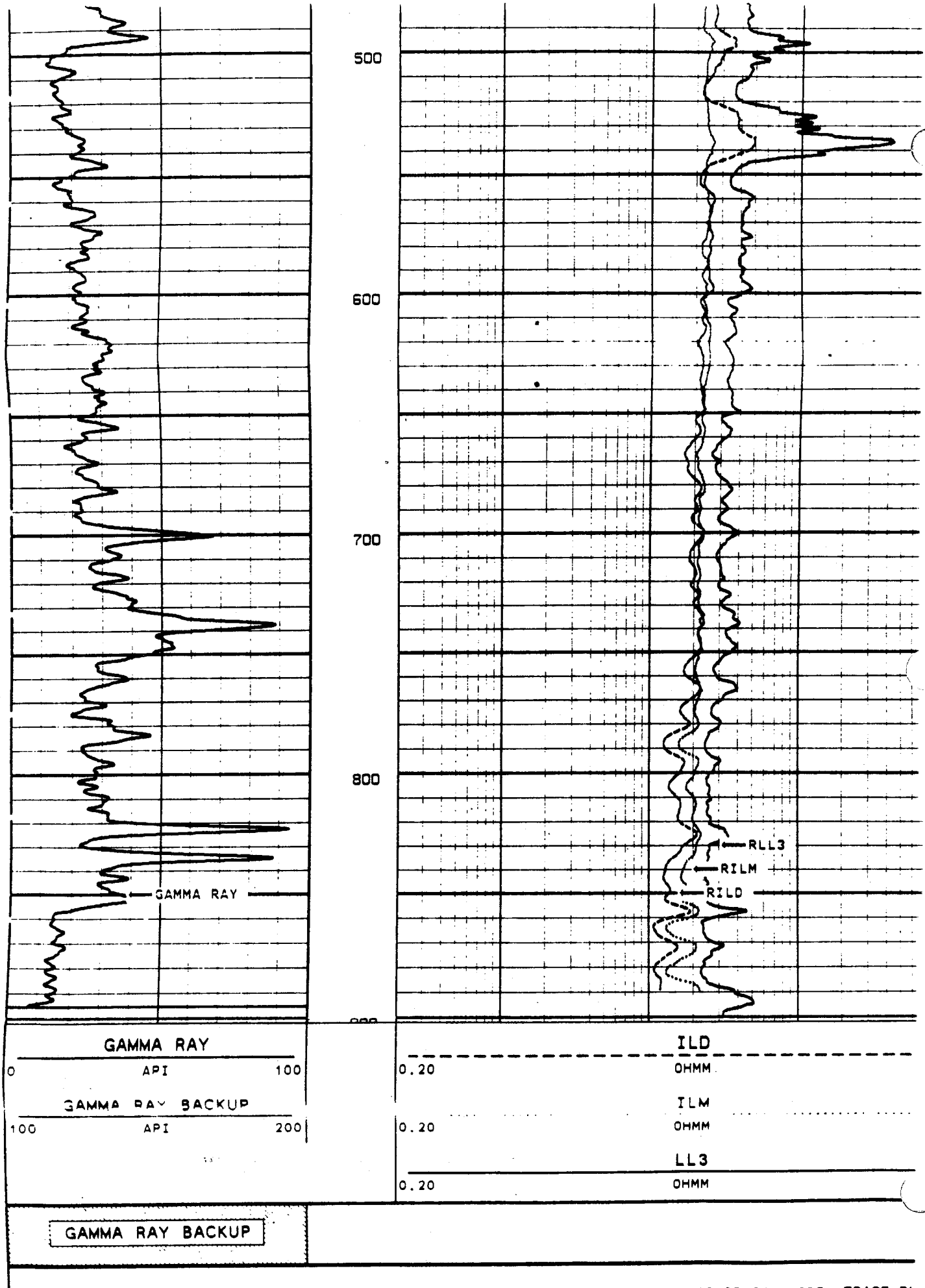
GAMMA RAY
0 API 100

LL3
0.20 OHMM 2000

ILM
0.20 OHMM 2000

ILD
0.20 OHMM 2000





START DEPTH: 801.8 FEET DIRECTION: UP DATE: 11/30/98 TIME: 12:03:31 MODE: TRACE PL

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
Suite 350
Deerfield Beach, FL
33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

December 6, 1996

136282.AS.03

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Miami-Dade Water and Sewer Department (MDWASD - West Wellfield ASR Project; FDEP File # UC 13-255913 (ASR-W-1); MDWASD #740A

Weekly Summary (November 23 – 30, 1996)

The drilling contractor (Youngquist Brothers Inc. [YBI]) previously constructed a 12-inch-thick concrete drilling pad prior to drill rig mobilization. YBI began drilling at the first ASR well (ASR-W-1) on November 23, 1996. The 12-1/4-inch pilot hole was extended with mud-rotary drilling to 200 feet below land surface (bls). Geophysical logs (caliper, gamma, LSN) were conducted on the pilot hole. The borehole was reamed to 48 inches. Approximately 170 feet of 40-inch casing was cemented in place with neat cement (995 sacks) to land surface by the pressure grout method. The pilot hole was advanced by drilling inside the 40-inch casing with the 12-1/4-inch bit to approximately 900 feet bls. Geophysical logs (caliper, gamma, LSN) were conducted on the pilot hole to 900 feet bls.

Schedule for Next Week

Evaluate casing setting depth for the final 30-inch casing. Notify FDEP of chosen casing setting depth (30-inch casing) and pending pressure test. Ream borehole to nominal 39 inches and cement 30-inch casing in place via pressure grout method.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/11733.DOC
Enclosures
c: Gene McLaughlin/MDWASD
Members of the TAC

Project No. 136282.A6C3 Date 11-30-96

Client MIAMI-DADE WASAD

Contractor YOUNGQUIST BROTHERS

Well No. ASR-1

DAILY OPERATIONS REPORT

Weather SUNNY, BREEZY ≈ 80°F

Shift No. 1 Time 0700

Driller TROY MOORE

Activity GEOPHYSICAL LOGGING

Starting Depth

Shift No. Time

Driller

Activity

Starting Depth

Formation samples collected

Water samples collected

Deviation Survey

Drilling fluid additives

Well water level

Time	Depth

Measurement reference point

elevation

Supply deliveries

Time	Description of Operations
0800	M. SCHILLING ARRIVES ON SITE. THE CONTRACTOR HAS REACHED THE DESIRED DEPTH OF 900 FEET B.P.L. AND IS IN THE PROCESS OF CIRCULATING TO CLEAN OUT THE BOREHOLE IN PREPARATION FOR THE GEOPHYSICAL LOGGING. FLORIDA GEOPHYSICAL IS ALSO ON SITE
1000	START GEOPHYSICAL LOGGING. LOGS TO BE COLLECTED ARE CALIPER, NATURAL GAMMA RAY, DUAL INDUCTION ELECTRIC LOGS.
1215	LOGGING COMPLETED WHILE REMOVING THE DUAL INDUCTION TOOL FROM THE BOREHOLE, THE TOOL SEPARATES FROM THE CABLE AND FELL DOWN INTO THE BOREHOLE. THE CONTRACTOR IS IN THE PROCESS OF DEVISING A PLAN TO FISH THE TOOL OUT.
1330	M. SCHILLING OFFSITE AFTER INSTRUCTING T. MOORE TO TELEPHONE HIM UPON RETRIEVAL OF THE TOOL FROM THE BOREHOLE. THE CONTRACTOR IS BUILDING AN OVERSHOT FISHING TOOL FOR THIS PURPOSE
2100	T. MOORE CALLS M. SCHILLING AT HOME AND INFORMS HIM THAT THE TOOL HAS BEEN RETRIEVED AND IS ON THE GROUND. M. SCHILLING INFORMS T. MOORE THAT A CH2M HILL REPRESENTATIVE WILL BE ONSITE IN THE MORNING TO INSPECT THE TOOL. M. SCHILLING GIVE T. MOORE PERMISSION TO SET-UP AND START REAMING THE PILOT HOLE.

WEST WELL Field ASR-1

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client Miami-Dade. Project No. 136282.AS.03 Date 11/29/96

Contractor YoungQuist Well No. ASR-1

Weather P.Cloudy, ~ 72°F

Drillers YoungQuist.

Activity Pilot Hole to 850'

Starting Depth 200'

End Depth

Formation Samples Collected

Every 10' to 850' Below Surface.

Water Samples Collected

None.

Drilling Fluid Additives

None.

Well Water Level

N/-

Time	Depth

Supply Deliverables

N/A

Measurement Reference Point

N/A

Elevation N/A

CH2M HILL Personnel

G. Ford.

▶0725 - Onsite, YoungQuist onsite. Prepiz For 12¼" 850' Drill Run. 8 sections of Rods In Rack = 960' Ft. +Main Drive Kelly Rod = 120' Ft.

▶0745 - Hooking up Main Kelly to Rod with 12¼" Bit. Contractor loading Cuttings In Dump Truck.

▶0830 - Lowering First section of Rod In Hole. Left Site.

▶0900 - Onsite. Hooking 2nd Section of Rod up.

▶0930 - Pat. From Florida Geophysical Logging onsite.

▶0940 - Drillers working on Back Flow Preventer, and Brake out Tool. Arm is to short, welding new lenght to Arm. Back Flow Preventer had to be Fabricated onsite Also two Locke Down Blocks.

▶1140 - Started Pumping Mud. and Circulating through Rig and Shackers.

▶1155 - Started Drilling w/12¼" Bit.

▶1215 stopped Drilling Due to Back Flow failed, Lost Drill Mud on Pad working on Back Flow seal, washing Pad.

▶1230 - Resumed Drilling. Depth = 203' Below Surface. Re Circulating Mud. Contractor unable to Locate A Approved Dump site that is open, Due to Holidays.

▶1315 at 220' Below Surface.

▶~~Re~~1320 Re Circulating Mud, Pre Forming Maintence on Kelly Drive (Top Drive unit)

▶1430 Hooked up 3 2nd Drill String to Rods = 340' started Mud Pumps.

▶1435 - Started Drilling @ 220' Below Surface. Contractor Cleaning up site, and Rig.

gnR267A/33

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client: MIAMI-DADE
Contractor: YOUNGQUIST
Project No. 136282.A5.03 Date 11-29-96 / 11-30-96
Well No. ASR-1

Weather: P. Cloudy ~75°F	▶ 1600 - TALKED W/ TROY (YOUNGQUIST) WILL NOT RUN 24 HRS TODAY. CREW WILL STOP AT 11:00 pm TONIGHT.
Drillers: YOUNGQUIST	▶ 1625 @ 340' BELOW SURFACE. Prep. For 3RD Drill Rod section. (Cuttings ARE Mostly Clay.)
Activity: 12¼ PILOT Hole	3 STRING OF ROD = 460', Circulating MUD.
Starting Depth: 200'	▶ 1700 - Connecting 3RD Drill string.
End Depth:	▶ 1724 - Resumed Drilling.
Formation Samples Collected: Every 10' Ft	▶ 1726 - Crop Duster SPRAYING Fields JUST to the EAST OF SITE. WINDS COMING FROM the EAST, "Heavey ODOR FROM DUSTING."
	▶ 1835 - AT 460' BELOW SURFACE, Circulating MUD. (Cuttings Mostly Clay w/ SPARSE Rock + shell)
Water Samples Collected: N/A	▶ 1840 - LEFT ~~SITE~~ SITE FOR Potables.
	▶ 1856 - ONSITE, Hooking up FOR 4th Drill Rod Section (Total ROD = 580 Ft.)
Drilling Fluid Additives: N/A	▶ 1940 - RESUMED Drilling. (Cuttings mostly Clay some ~~Lime Sand Rock~~) LIMESTONE, SHOWING MORE LIMESTONE AND shell. ~~FOR~~ FOUND Lime Rock @ ~470'-480'. YOUNGQUIST (TROY) WILL TRY to FINISH PILOT Hole TONIGHT! AND RUN Logs ON 11-30-96 AT 0800 AM. AND NO Drilling to Be Done ON SAT. OR SUN. WILL START REAMING sometime ON MON. Dec-2
Well Water Level: N/A	
▶ 0900 AT 530' Below SURFACE (Cuttings Appear to Be Mostly Lime Rock / Limestone w/ Shell)	
Supply Deliverables: N/A	▶ ~~A~~ 2220 — AT ~~8~~ 580' Below SURFACE. (Cuttings Appear to Be (Limestone AND SHELL)
Measurement Reference Point: N/A	▶ 2256 - Hooking up 5th ROD STRING = 700.0'
	▶ 2320 - Resumed Drilling.
Elevation:	▶ 0035 NOTED Change In Cuttings AT ~645' Small shell, Limestone w/ Fines (Notable Less Shell + Limestone)
CH2M HILL Personnel: G. FORD	▶ 0115 AT ~700' Below SURFACE, Flushing Hole with MUD. (Limemud, Fines, Shell, Clay.)
	▶ 0210 — Hooking up 6th ROD STRING = 820'
	▶ 0230 — Resumed Drilling

Well Water Level table:

Time	Depth

gnR267A/33

WEST WELL FIELD ASR-1 PAGE 3 of 3

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE Project No. 136282.AS.03 Date 11-29-96 11-30-96

Contractor YOUNGQUIST Well No. ASR-1

Weather PAGE 1 OF 3

Drillers YOUNGQUIST

Activity 12¼" PILOT HOLE.

Starting Depth 200'

End Depth

Formation Samples Collected

Every 10'

Water Samples Collected

N/A

Drilling Fluid Additives

N/A

Well Water Level

Time	Depth

Supply Deliverables

N/A

Measurement Reference Point

N/A

Elevation

CH2M HILL Personnel

G. FORD

▶ 0321 ≈ ~~750'~~ 730' Cuttings appear to be LIMEMUD w/ SHELL AND LIMESTONE w/ FINES AND CLAY

▶ 0355 ≈ 770' cuttings appear to be LIMEMUD BIT w/more LIMESTONE AND SHELLS, LIGHT CLAYS AND FINES.

▶ 0420 - Appeares to still be IN LIMEMUD AT 790-800 Ft. (Heavy Clays, Fines w/ SHELL AND LIMESTONE)

▶ 0448 810'-820' (Heavy Clays, LIMESTONE w/FINES.)

▶ 0510 AT 820'-830' (SAME AS ABOVE.) Circulating MUD through Hole.

▶ Hooking up 7th ROD string ≈ 940'

▶ 0552 - Resumed Drilling. 830'-840' (MORE LIMESTONE)

▶ 0615 - ≈ 853' FOUND HARD PACK, Possible START OF LIMESTONE.

▶ 0625 PULED cutting SAMPLES to VARIFY. (Cuttings: LIMESTONE w/ LIGHT CLAY AND SMALL SHELL) Will Drill to 860'-870'

▶ 0635 Appeares to be IN LIMESTONE STILL.

▶ 0645 - Collected cuttings FROM SHAKER (Fine cut LIMESTONE w/ SMALL SHELL VERY LIGHT SANDS)

Total BORE HOLE DEPTH = 870'
Will FINISH PILOT HOLE to 900 Ft.
END OF DAY.

gnR267A/33

WEST WELL Field ASR-1

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE

Project No. 136282.AS.03 Date 11-27-96

Contractor YOUNGQUIST

Well No. ASR-1

Weather Cloudy, cool, ~65°F

Drillers YOUNGQUIST.

Activity Logging

Starting Depth

End Depth

Formation Samples Collected
N/A

Water Samples Collected
N/A

Drilling Fluid Additives
N/A

Well Water Level

Time	Depth

Supply Deliverables
N/A

Measurement Reference Point
N/A

Elevation

CH2M HILL Personnel
G. FORD.

▶ 0655 onsite, YOUNGQUIT onsite. Prep. Drill Rig for 850' Run. setting up Drill Rods and Placing in Rack.
Check Grouting around 40" casing at surface. Will Run Temp. log today. Also Removing Pressure Cap from 40" casing and Fittings for Access to well.
▶ 0745 LEE with Geophysical logging onsite. Prep. Logger and Equipment for logging.
▶ 0853 Started Temp. Log Run.
▶ 0855 MARIO (Miami-Dade) onsite.
▶ Completed Temp. Log Run @ 0900
▶ 1000 Received Temp. Log from F.G.L.
▶ 1035 Talked w/Mario on up coming Activities. and Schedule, may work Friday, Sat, Sun. Will know later today. Left site for office. —DFB

gnR267A/33

West Wellfield ASR-1

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client METRO-DADE

Project No. 136252.AS.03 Date 11-26-96

Contractor YOUNGQUIST.

Well No. ASR-1

Weather P.Cloudy & 82°F

Drillers YOUNGQUIST

Activity 170' CASING 40"

Starting Depth

End Depth

Formation Samples Collected

N/A

Water Samples Collected

N/A

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

G. FORD

▶1430 ONSITE. G. FORD. YOUNGQUIST DRILLING DRILL ROD FROM HOLE. PREP. FOR CASING INSTALLATION. 40" TO 170' BELOW SURFACE. (Photo) MARIO (MIAMI-DADE) ONSITE DISCUSSED FIELD FINDINGS.

▶1510 LAST SECTION OF DRILL ROD BEING REMOVED PLUS BIT AND STABILIZER. 30'.

▶1513 TALKED W/ TROY (YOUNGQUIST) AND MARIO (MIAMI DADE), MARIO NOTED TO TROY THE 5 DAY 24 HR WORK SCHEDULE WAS APPROVED. TALKED ABOUT WORKING ON FRI. 11-29, WILL WORK. POSSIBLY ON SAT. & SUN. ALSO. MARIO NOTED ALSO YOUNGQUIST MUST HAVE ALL APPROVED SUBMITTALS CHANGE REQUEST, AS BUILT DRAWINGS ON SITE. TROY NOTED TO MARIO, YOUNGQUIST OFFICE CALLED AND TOLD TROY TO GET ALL PAPER WORK TOGETHER.

▶1555, RAISING 1st SECTION (BOTTOM SECTION OF CASING) TOTAL LENGTH = 53.5' OF 40" CASING.

▶1605 WELDING ON CENTRALIZERS TO OUTSIDE (Photos) OF 40" CASING. 3½" CENTRALIZER

▶1620 LOWERED CASING TO DEPTH FOR WELDING OF 2ND SECTION (119.5 Ft) TO 53.5 Ft. SECTION. TOTAL LENGTH = 173.0' FEET.

▶1625 HOOKED UP TO 119.5 SECTION. (Photos) MATED 2 SECTIONS AND SPOT WELDED INPLACE.

▶1645 STARTED FIRST WELDING PASS ON (Photos) CASINGS. ASSEMBLING TRIM PIPE FOR CEMENTING.

▶1705 STARTED 2ND PASS WELDING ON CASING JOINT.

▶1730 COMPLETED 3RD PASS. ON CASING JOINT. SETTING UP FOR CEMENTING, DROP PIPES, HOOK UPS ECT.

▶REMOVING CASING LOWED INTO BORE HOLE @1800 SETTING UP MIXERS AND PUMPS FOR GROUTING. DROP PIPES SET AT 170' BELOW SURFACE.

CASING SET AT 170' BELOW SURFACE.

gnR267A/33

- Topo map. From - Engineer ( )
- SUB. For Cementing, and any Materials used.
- Credit for FPL Service, Due to Driller used Gen. (Diesel) and not FPL Like specs. say.
- No Record Documents onsite.
- Weekly Meeting of Site and Field Trailer.
- Samples - Label and Stone
- A Mechanical Deviet. Indicator at least every 90 Ft. (Delivered at Completion of well.)
- Youngquist to have a Complete set of All Approved SUB. onsite. also MSDS shts.

WEST WELLFIELD ASR-1 PAGE 2 OF 2

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI-DADE Project No. 13682.A5.03 Date 11/26/96

Contractor YOUNGQUIST Well No. ASR-1

Weather Cloudy, Breezy ~75°F

Drillers YOUNGQUIST.

Activity Casing Placement 40" AND Cementing.

Starting Depth Ø

End Depth

Formation Samples Collected

N/A

Water Samples Collected N/A

Drilling Fluid Additives

N/A

Well Water Level

Time	Depth

Supply Deliverables

N/A

Measurement Reference Point

Elevation N/A

CH2M HILL Personnel

G. FORD

▶ STARTED GROUTING @ 1842 BY PUMPING TO 170' BELOW SURFACE. DRILL MUD BEING PUMPED TO MUD TUB. GROUT = 15.6 gl/lb. PUMPING AT 50 PSI.

▶ 1939 GROUT = 15.6 gl/lb. PUMPED 209 BARRELS, PUMPING AT 7-BARRELS A MIN. 32 gals OF WATER USED FOR CHASING. GROUTING COMPLETED TO SURFACE.

▶ OFF-SITE @ 2010

gnR267A/33

WEST wellfield - ASR-1

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client MIAMI DADE. Project No. 136282.A5.03 Date 11-25-96

Contractor YOUNGQUIST Well No. ASR-1

Weather SUNNY, WINDY 45°F

Drillers YOUNGQUIST

Activity REAMING BOREHOLE

Starting Depth 50'

End Depth

Formation Samples Collected
NONE

Water Samples Collected NONE

Drilling Fluid Additives
ADDED MUD TO 50 VCT.
FOR CAVERNESS AREA @50.3'

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel
G. FORD

1130 ONSITE, MARIO (MIAMI DADE) ONSITE, NOTED REAMING IS GOING SLOW, SHUT DOWN ON 11-24-96 AT 1730. TODAY TOTAL DEPTH OF REAMING IS AT 53' BELOW SURFACE @ 1200 HIT HARD FORMATION. REAMING SHOULD GO BETER AS FORMATION BECOMES SOFTER.

1210 CALL OFFICE. MARIO IS LOOKING FOR CHANGE ORDERS FOR S CASING CHANGE.

MARIO OFFSITE FOR LUNCH.

TALKED W/TROY OF YOUNGQUIST, MAY SET CASING LATE TODAY, WILL CALL 2-HRS BEFORE CASING RUN TO LET ME KNOW AND TO BE ONSITE.

1230 LEFT SITE FOR DEB OFFICE.

YOUNGQUIST TRUCK ONSITE W/TANK FOR CEMENTING (APPEARS TO BE PRESSURE TANK).

gnR267A/33

WEST WellField - ASR-1

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client METRO-DADE Project No. 136282AS.30 Date 11-24-96

Contractor YOUNGQUIST Well No. ASR-1

Weather M-CLOUDY ≈ 71°F

Drillers YOUNGQUIST

Activity REAM BORE HOLE

Starting Depth Ø

End Depth 50'

Formation Samples Collected

NONE FOR REAMING.

Water Samples Collected

1- COLLECTED FOR LATER ANALYSIS.

Drilling Fluid Additives

N/A

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point *

Elevation

CH2M HILL Personnel

G. FORD.

- 0710. ONSITE, DRILLERS ONSITE, FLORIDA GEOPHYSICAL LOGGING ONSITE AND SETUP W/NEW LOGGER ON WELL. WILL RUN CALIPER, GAMMA AND LSN LOG ON 200' PILOT HOLE, LOGGING IN PROCESS
- 0755 ~~SETUP FOR CALIPER RUN~~. COMPLETED WELL LOGGING. NO MIAMI DADE PERSONNEL ONSITE
- 0810 SETTING UP FOR 46½" BOREHOLE REAM TO 170' BELOW SURFACE
- 0835 OFFSITE FOR POTABLES
- 0900 TALKED W/DRILLER, REAMING WILL TAKE ≈ 6-7 HRS WILL CALL ME WHEN REAMING IS COMPLETED. NOTED TO TROY (YOUNGQUIST) TO STRAP MEASURE EACH CASING SECTION BEFORE INSTALLING. ~~THE~~ ~~BOTE~~ BOREHOLE WILL BE REAMED WITH 46½" BIT AND STABLIZER. MARIO (MIAMI DADE) ONSITE.
- 0940 MARIO VOICED CONCERN ABOUT A SHEEN NOTED ON TOP OFF WATER IN BORE HOLE, CALLED PETE (CH2M HILL) NOTED TO PULL A SAMPLE FOR LATER ANALYSIS AND VISUAL INSPECTION, COLLECTED A WATER SAMPLE AT 0940 WITH A TEFLON(TM) BAILER AND COLLECTED IN PRECLEANED I-CHEM BOTTLE LOT# 6053012, VISUAL INSPECTION SHOWED NO SIGN OF SHEEN, VISUAL OIL DEPOSITS OR OTHER ABNORMAL SIGNS, OR ODORS.
- 1000 MEET W/MARIO AND DISCUSSED FIELD ACTIVITIES ON 11-23-96 AND PROBLEM FOUND WITH 1ST LOGGING RIG. NOTE THAT LOGGING WAS PREFORMED WITH ANOTHER RIG THAT WAS CLEAN OF OIL AND GREASE.
- 1040 TALKED WITH TROY (YOUNGQUIST) TO PLEASE CALL ME AT HOME IF AND WHEN THEY FINISH REAMING OR SHUT DOWN TODAY.
- 1130 OFFSITE.

gnR267A/33

* SEE BACK OF SHEET.

CH2MHILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client METROPOLITAN DADE COUNTY Project No. 136282.AS.30 Date 11-23-96

Contractor YOUNGQUIST Well No. ASR-1

Weather P.Cloudy ≈ 75°F

Drillers YOUNGQUIST

Activity 12¼" PILOT HOLE

Starting Depth Ø

End Depth ≈200'

Formation Samples Collected

Every 10 Ft.

Total Samples = 20 X 2

40 Sample Bags collected.

Water Samples Collected NO

Drilling Fluid Additives

None.

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

GREG FORD

▶1035 - G. FORD, ONSITE, DRILLER WORKING ON RIGS, CONVAULT BEING FILLED BY COASTAL FUELS. COASTAL FUELS OFFSITE @ 1115 PILOT HOLE @ 20 Ft.

▶1100 — STARTED DRILLING PILOT HOLE @ 20' BELOW W/ 12¼ INCH. BIT.

▶1135 — AT 62.5 Feet, STOPPED DRILLING DUE TO A 3" PLUG CAP THAT WAS NOT INSTALLED ON REVERSE AIR LINE, WHICH CAUSED BACK FLOW FROM MUD PUMP TO BLOW THROUGH LINE. CONTRACTOR REPAIRING CAP ON LINE @ 1140

▶1146 — STARTED DRILLING, REPAIRS COMPLETED.

▶1240 — TOTAL DEPTH = 120' BELOW SURFACE SETTING UP FOR 120' - 200' DRILL DOWN.

▶1336 STARTED DRILLING TO 139.' BELOW SURFACE

▶1345 - LEFT SITE FOR LUNCH.

▶1435 ONSITE, AT 163' Ft. BELOW SURFACE.

▶1500 AT 200' BELOW SURFACE, PUMPING MUD THROUGH BOREHOLE FOR CLEAN OUT OF CUTTINGS.

▶1530 - STARTED ~~BEGIN BROKEN DOWN OF DRILL RODS~~, WASHING DOWN OUTER SECTIONS OF DRILL RODS W/ TAP WATER. DISCUSSED CLEAN UP OF AREA WHERE DRILL MUD WAS PRESENT OUTSIDE OF PAD AREA DUE TO BLOW BY AT 1135, WITH METRO. DADE INSPECTOR (HARRY) ALSO NOTED CONTAINMENT AREA FOR FUEL TANK NEEDS TO BE RAISED ≈ 1.5 - 2.0' HIGHER TO HOLD 150% OF FUEL IF A SPILL OCCURED.

▶1605 BREAKING DOWN DRILL ROD.

▶1625 WELL LOGGER ONSITE: FLORIDA GEOPHYSICAL LOGGING.

▶1640 - BIT OUT OF HOLE, SETTING UP FOR LOGGING.

▶1700 STARTED CLEANING CABLE + TOOLS FOR LOGGING NOTED ~~OIL~~ WHAT APPEARED TO BE OIL OR GREASE ON TOOL + CABLE, METRO DADE (HARRY) TALKED WITH TROY TO HAVE ALL DOWN HOLE EQUIPMENT CLEANED.

West well field ASR-1

CH2M HILL

WELL CONSTRUCTION
DAILY OPERATIONS REPORT

Client METRO DADE. Project No. 136282.AS.30 Date 11-23-96

Contractor _____ Well No. ASR-1

Weather _____

Drillers _____

SEE PAGE 1

Activity _____

Starting Depth _____

End Depth _____

Formation Samples Collected

Water Samples Collected

Drilling Fluid Additives

Well Water Level

Time	Depth

Supply Deliverables

Measurement Reference Point

Elevation

CH2M HILL Personnel

▶1745 - FLORIDA GEOPHYSICAL LOGGING OFFSITE TO FIND A PRESSURE WASHER to Clean Tools AND CABLE BEFORE WELL LOGGING CAN BE APPROVED BY MIAMI DADE INSPECTOR. "SITE HAS NO PRESSURE WASHER FOR CLEANING"

▶1835 OFFSITE FOR POTABLE DRINKS.

▶1900 ONSITE Drillers cleaning up work AREA, AND RAISING CONTAINMENT AREA AROUND FUEL TANK.

▶2040. FLORIDA GEOPHYSICAL LOGGING ONSITE NOT ABLE to Locate PRESSURE WASHER, BUT TRIED to WASH DOWN CABLE W/ SOAP AND WATER AT A GAS STATION. METRO DADE INSPECTOR to INSPECT CABLE AND TOOLS. (HARRY)-METRO DADE, NOT ACCEPTABLE FOR LOGGING. SHUTTING DOWN ACTIVITIES UNTIL ALL CONCERNS HAVE BEEN ADDRESSED.

▶@ 2105 OFFSITE, will Meet @ 0700 ON 11-24-96.

gnR267A/33

Miami-Dade Water and Sewer Department
West Wellfield ASR Project
Pad Monitor Well Water Quality Data

		PMW-NE			PMW-NW			PMW-SE			PMW-SW			
Well	Date	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Comments
W-1	11/19/96	44	560	270	45	420	190	47	510	220	8	420	190	Initial Sampling
W-1														
W-1														
W-1														
W-1														
W-1														
W-1														
W-1														Final Sampling
W-2														Initial Sampling
W-2														
W-2														
W-2														
W-2														
W-2														
W-2														
W-2														
W-2														Final Sampling
W-3														Initial Sampling
W-3														
W-3														
W-3														
W-3														
W-3														
W-3														
W-3														
W-3														Final Sampling

CH2M HILL
Hillsboro Executive Center North
800 Fairway Drive
Suite 350
Deerfield Beach, FL
33441-1831
Tel 954.426.4008
Fax 954.698.6010

CH2MHILL

Celebrating 50 Years

November 15, 1996

136282.AS

Mr. William W. Cocke, P.G.
Program Manager - UIC
Florida Department of Environmental Protection
P.O. Box 15425
West Palm Beach, FL 33416

Dear Bill:

Subject: Notification of Beginning of Drilling Activities at West Wellfield Aquifer Storage and Recovery (ASR) Site; Miami-Dade Water and Sewer Authority; Well W-1. FDEP Permit No. UC-13-255913

This letter is to inform you that well drilling activities will commence on Monday, November 18, 1996. The drilling contractor is Youngquist Brothers Inc. of Fort Myers, Florida. CH2M HILL will obtain water samples from the four pad monitor wells (PMWs) and analyze them for the requisite parameters and forward results to you upon completion.

Please call me at (407) 737-6665 (x297) if you have any further questions.

Sincerely,

CH2M HILL

Peter J. Kwiatkowski, P.G.
Project Manager

DFB/11605.DOC

c: Gene McLoughlin/MDWASD
Members of the TAC

SUBJECT Miami-Dade NSA Monitor Well Modification - 2" Tubing Installation

BY M. Schlinke DATE 11-5-96

SHEET NO. 1 OF 2

PROJECT NO.

Joint #	Length	Total Length	Time in Well	Comments
1	31.00	31.00	0855	5 ft blank at bottom, 20 ft of vertical slotted screen, 6 ft blank at top. Centralizers at bottom & top of joint
2	20.80	51.80	0903	
3	29.80	81.60	0910	
4	29.84	111.44	0919	Centralizers at top of joint
5	29.83	141.27	0927	
6	29.84	171.11	0935	
7	29.81	200.92	0943	
8	29.85	230.77	0950	Centralizers at top of joint
9	29.83	260.60	0958	
10	29.84	290.44	1007	
11	29.81	320.25	1015	
12	29.80	350.05	1023	Centralizers at top of joint
13	29.81	379.86	1031	
14	29.80	409.66	1038	
15	29.83	439.49	1045	
16	29.82	469.31	1053	Centralizers at top of joint
17	29.84	499.15	1059	
18	29.84	528.99	1105	
19	29.82	558.81	1110	
20	29.84	588.65	1116	Centralizers at top of joint
21	29.82	618.47	1122	
22	29.83	648.30	1127	
23	29.83	678.13	1132	
24	29.80	707.93	1137	Centralizers at top of joint
25	29.82	737.75	1142	
26	29.80	767.55	1148	
27	29.81	797.36	1154	
28	29.82	827.18	1159	Centralizers at top of joint
29	29.83	857.01	1205	
30	29.85	886.96	1210	

SUBJECT Miami-Dade ASR Monitor Well Modification - 2" Tubing Installation

BY M. Schwindle DATE 11-5-96

SHEET NO. 2 OF 2

PROJECT NO.

JOINT #	LENGTH	TOTAL LENGTH	TIME IN WELL	COMMENTS
31	29.83	916.69	1215 ~~0855~~	
32	29.83	946.52	1220	CENTRALIZERS AT TOP OF JOI
33	29.84	976.36	1225	
34	29.84	1,006.20	1230	
35	29.80	1,036.00	1236	
36	29.83	1,065.83	1242	CENTRALIZERS AT TOP OF JOINT
37	29.80	1,095.63	1247	
38	29.83	1,125.46	1252	
39	29.85	1,155.31	1257	
40	29.81	1,185.12	1302	CENTRALIZERS AT TOP OF JOINT
41	29.84	1,214.96	1307	
42	29.83	1,244.79	1312	
43	29.83	1,274.62	1317	
44	29.83	1,304.45	1323	CENTRALIZERS AT TOP OF JOINT
45	29.80	1,334.25	1329	
46	29.82	1,364.07	1335	
47	29.80	1,393.87	14 ~~15~~30	WELLHEAD COUPLING JOINT INSTALLED AND CASING SECURED. TOP OF CASING IS AT 4 FEET ABOVE PAD LEVEL.

FORM 3B

APPENDIX D

Casing Mill Certificates

BERG STEEL PIPE CORP.
P. O. BOX 2029
PANAMA CITY, FL 32402
904/769-2273

MILL TEST REPORT

PAGE: 1

SOLD TO: BARTOW STEEL INC.
P.O. BOX 1789

BARTOW, FL
33830

CUSTOMER ORDER NO: 14659
MILL ORDER NO: 806933

BILL OF LADING NO: 058175 058176 058177

SHIPMENT DATE: 8/02/96

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 33699
BARTOW STEEL REF. # 18256

ITEM NO.	QUANTITY	O.D.	WALL	GRADE SPECIFICATION	HYDROSTATIC TEST PRESSURE (PSI)	HYDROSTATIC TEST DWELL (SEC)
1	65	30.000"	.500"	API 5L GR B	700	10

---- BASE MATERIAL ----

ITEM NO.	HEAT NO.	YIELD P.S.I.	TENSILE P.S.I.	ELONG %	Y/T	C	MN	P	S	CB	V	TI	AL	SI	CR	MO	CU	NI	B	CE
1	98982521	47142	70157	39.5		.14	.84	.014	.007	.005	.002	.002	.062	.26	.025	.003	.035	.042	.0001	.287
1	98982561	46203	69871	39.5		.12	.80	.016	.009		.001	.002	.047	.20	.019	.007	.020	.033		.264
1	98982601	50632	79057	36.0		.17	.99	.012	.007	.006	.001	.002	.055	.29	.029	.006	.027	.044	.0001	.344
1	98982621	50411	77462	36.0		.15	.98	.015	.008	.006	.001	.002	.049	.23	.027	.006	.024	.033	.0002	.327
1	98982641	49792	77247	36.0		.15	.96	.012	.009		.001	.002	.049	.22	.025	.007	.033	.045		.327
1	98982761	48533	76759	37.0		.16	1.05	.012	.007	.004	.003	.002	.061	.27	.028	.006	.020	.034	.0001	.345
1	98982771	50754	78546	38.5		.17	1.05	.014	.007	.004	.002	.002	.033	.25	.032	.012	.021	.035	.0001	.353

---- LOT TEST (HELD) ----

ITEM NO.	HEAT NO.	TENSILE P.S.I.	ELONG %	DIRCT	BEND TEST	BEND TYPE
1	98982601	85385		TRANS	OK	ROOT & FACE
1	98982641			TRANS	OK	ROOT & FACE
1	98982761	82934		TRANS	OK	ROOT & FACE

WE CERTIFY THAT THIS REPORT IS CORRECT AS CONTAINED IN THE COMPANY RECORDS:

CERTIFICATION NUMBER: 058175

DATE: 8/05/96

BERG STEEL PIPE CORP.
P. O. BOX 2029
PANAMA CITY, FL 32402
904/769-2273

MILL TEST REPORT

ISO 9001

PAGE:

SOLD TO: BARTOW STEEL INC.
P.O. BOX 1789

BARTOW, FL

CUSTOMER ORDER NO: 14559
MILL ORDER NO: BD6933

BILL OF LADING NO: 058601

SHIPMENT DATE: 8/21/96

ITEM NO.	QUANTITY	O.D.	WALL	GRADE SPECIFICATION	HYDROSTATIC TEST PRESSURE (PSI)	HYDROSTATIC TEST DWELL (SEC)
2	12	40.000"	.500"	API 5L GR B	530	10

---- BASE MATERIAL----

ITEM NO.	HEAT NO.	YIELD P.S.I.	TENSILE P.S.I.	ELONG %	Y/T	C	MN	P	S	CB	V	TI	AL	SI	CR	MO	CU	NI	B	CE
2	98940841	46125	68853	38.5		.13	.75	.010	.007	.007	.001	.002	.040	.23	.034	.005	.048	.036	.0001	.269
2	98930901	43552	67243	42.0		.12	.74	.011	.007	.003	.002	.002	.031	.23	.029	.009	.060	.048		.256
2	98930941	42922	64993	41.0		.11	.46	.006	.00?	.004	.001	.002	.060	.19	.014	.003	.022	.035	.0001	.231
2	98992511	43470	68089	39.0		.13	.62	.011	.010	.004	.002	.002	.074	.24	.029	.004	.025	.036	.0001	.279

---- LOT TEST (WELD) ----

ITEM NO.	HEAT NO.	TENSILE P.S.I.	ELONG %	DIRCT	BEND TEST	BEND TYPE
2	98940841	72167		TRANS	OK	ROOT & FACE

WE CERTIFY THAT THIS REPORT IS CORRECT AS CONTAINED IN THE COMPANY RECORDS:

CERTIFICATION NUMBER: 058601

DATE: 8/23/96

MIAMI-DADE
WATER AND SEWER DEPARTMENT
Date: SEP 11 1995 Contract No.: W-740A
☒ APPROVED
☐ APPROVED SUBJECT TO NOTATIONS AND CORRECTIONS AS INDICATED.
☐ DISAPPROVED. REVISE AS INDICATED BY NOTATIONS AND CORRECTIONS, AND RESUBMIT.
Checking of shop drawing submittals is limited to general design and general arrangements only. It is not intended to be a verification of the items, or total material required. Approval shall not relieve the Contractor of the responsibility for details of design, correct dimensions for proper fitting, capacity, performance, construction, or any other requirement of the Contract.
CH[illegible] LAS REVIEWED: [illegible]

THESE MILL TEST REPORTS APPLY TO
YOUR P.O. # 33699
BARTOW STEEL REF. # 18256

MIAMI-DADE WATER AND SEWER AUTHORITY DEPT.
RECEIVED
SEP 03 1996
ENGINEERING DIVISION

TUBULAR FIBERGLASS CORPORATION
11811 Proctor Road • Houston, Texas 77038
P. O. Box 670507 • Houston, Texas 77267-0507
Phone: (713) 847-2987 • Fax: (713) 847-1931

June 25, 1996

Youngquist Brothers, Inc.
15551 Pine Ridge Road
Fort Myers, Fl 33908

Project: Miami-Dade Water and Sewer Dept.

Subject: Fiberglass Slotted Well Screen Product Data.

The following information and specifications shall apply to the fiberglass 2" ID slotted well screen quoted as Item 2 of TFC quote 5053 Rev. 1 of March 13, 1996.

Product Description	Saw cut axially slotted fiberglass well screen fabricated by cutting multiple axial slots through the wall of a standard 2-3/8" downhole tubing joint.
Raw Material Components	Aromatic amine cured epoxy resin, 675 yield E type fiberglass.
Overall Joint Length	30 feet
Joint Connection	2-3/8" 8 Round EUE Threaded connec-tion
End Cap	2-3/8" threaded fiberglass closed coup-ling
Joint Body Wall Thickness	0.40 in. min.
Length of Slotted Area	20 feet
Slots per lin. foot	24 per foot
Open length per slot	2"
Slot Thickness	0.050" nom.
Open area per foot of screen	2.40 sq. in.
Open area overall	48 sq. in.

TUBULAR FIBERGLASS CORPORATION
11811 Proctor Road • Houston, Texas 77038
P. O. Box 670507 • Houston, Texas 77267-0507
Phone: (713) 847-2987 • Fax: (713) 847-1931

April 15, 1996

RED BOX 3000 SP

FIBERGLASS TUBING, CASING, AND LINERS
AROMATIC AMINE CURED EPOXY RESIN

DIMENSIONAL SPECIFICATIONS

Nominal Size (inches)	Minimum O.D.* (inches)	Minimum I.D. (inches)	Minimum Drift Dia. (inches)	Pin Upset Dia. (inches)	Max.Box O.D. (inches)	Minimum Wall* (inches)	Nominal Weight (lbs/ft)	Nominal Weight (lbs/jt)	Connection Type API 5B 2.6a*, 2.3**, 2.2***
2-3/8	2.80	2.00	1.91	2.70	3.35	0.40	2.7	80	2-3/8" 8Rd EUE Long*

* for products with resin-rich internal liner, add liner thickness.

Standard Joint Length: 30 ft.

PERFORMANCE AND RATINGS (-60 deg F to +210 deg F)

Nominal Size	Pressure Rating (psi)	Mill Test Pressure (psi)	Collapse Rating (psi)	Axial Tension Rating (lbs)	Stretch vs. Tension Over Pipe Wt-(ft)
2-3/8	3,000	3,000	4,000	20,200	0.111 x P x L

P = Tensile Load (1,000 lbs)
L = String Length (1,000 ft)

MECHANICAL AND PHYSICAL PROPERTIES

PROPERTY	VALUE	UNIT	TEST METHOD
Tensile Strength, Hoop	31,300	psi	ASTM D1599
Tensile Strength, Axial	30,000	psi	ASTM D2105
Modulus of Elasticity, Axial	3.0	10E+06 psi	ASTM D2105
Long Term Hydrostatic Strength at 20 Years	15,000	psi	ASTM D2992(B)
Specific Gravity	1.9	---	ASTM D792
Density	0.07	lbs/cu.inch	ASTM D792
Thermal Conductivity	1.4	Btu/hr/ft2in/degF	---
Thermal Expansion Coefficient (Linear)	1.1	10E-05 in/in/degF	ASTM D696
Flow Factor	150	---	Hazen Williams

APPENDIX E

Dual-Zone Monitor Well Construction Data

RESULTS OF THE UPPER FLORIDAN AQUIFER SYSTEM INVESTIGATION

WEST WELLFIELD

Prepared For:

Miami-Dade Water and Sewer Department
Contract No. W-711
ER N o. 13374

June 1995

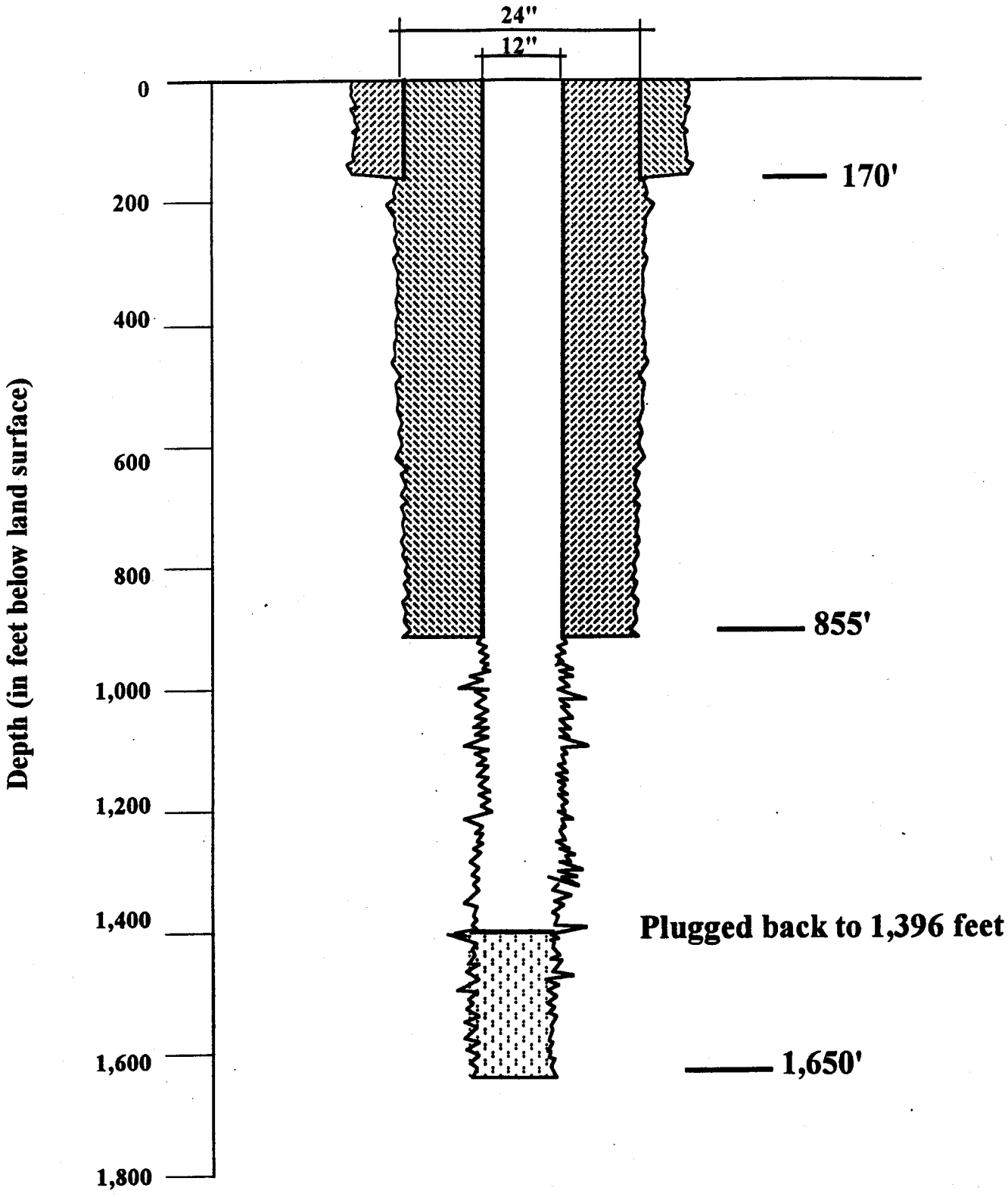


FIGURE 2-1
WELL CONSTRUCTION DIAGRAM

APPENDIX F

Lithologic Logs

Lithologic Description
ASR-1
MDWASD - West Wellfield ASR Project

Depth Interval (ft. bpl)			
Date	From	To	Observer's Description
	0	10	Limestone, very pale orange (10 YR 8/2), fine grained, sparry cement, high porosity, moderately consolidated
	10	20	Same as above, with 5% shell fragments
	20	30	Same as above
	30	40	Limestone, white (N 9), very fine to coarse sand grained, micritic cement, high porosity, poor to well consolidated
	40	50	Same as above
	50	60	Same as above
	60	70	Limestone, white (N 9) to pinkish-gray (5 YR 8/1), fine sand grained, micritic cement, moderate to high porosity, well consolidated
	70	80	Shell fragments, white (N 9) to light gray (N 7), coarse sand grained, unconsolidated
	80	90	Same as above
	90	100	Same as above, with 30% limestone, pinkish-gray (5 YR 8/1), fine grained, sparry cement, low porosity, well consolidated
	100	110	Same as above, increase limestone to 40%
	110	120	Same as above
	120	130	Same as above
	130	140	Same as above
	140	150	Same as above
	150	160	Clay (60%), light olive gray (5 Y 5/2), silty; fossiliferous limestone (40%), white (N 9) to medium light gray (N 6), coarse sand grained fossil fragments, micritic cement, low porosity, well consolidated
	160	170	Clay, light olive gray (5 Y 5/2), silty, low porosity
	170	180	Same as above
	180	190	Same as above
	190	200	Same as above
	200	210	Same as above
	210	220	Same as above
	220	230	Same as above
	230	240	Same as above, with 10% fine grained limestone and quartz sand
	240	250	Same as above
	250	260	Same as above, increase limestone to 20%
	260	270	Same as above, decrease limestone to 10%
	270	280	Clay, light olive gray (5 Y 5/2), silty and sandy, trace of limestone
	280	290	Same as above
	290	300	Same as above
	300	310	Same as above
	310	320	Same as above
	320	330	Same as above
	330	340	Same as above, with 10% limestone
	340	350	Clay, light olive gray (5 Y 5/2), silty and sandy, trace of limestone
	350	360	Same as above
	360	370	Same as above
	370	380	Same as above
	380	390	Same as above

Lithologic Description
ASR-1
MDWASD - West Wellfield ASR Project

Depth Interval (ft. bpl)			
Date	From	To	Observer's Description
	390	400	Same as above
	400	410	Same as above
	410	420	Same as above
	420	430	Calcareous Siltstone (80%), very pale orange (10 YR 8/2), low porosity, poorly consolidated; limestone (20%), light gray (N 7), silty, micritic cement, low porosity, well consolidated
	430	440	Same as above
	440	450	Same as above
	450	460	Same as above
	460	470	Same as above.
	470	480	Same as above
	480	490	Same as above
	490	500	Shell fragments (80%), pinkish gray (5 YR 8/1), medium sand to coarse sand grained, unconsolidated; calcareous siltstone (20%), very pale orange (10 YR 8/2), low porosity, poorly consolidated
	500	510	Same as above
	510	520	Limestone, very light gray (N 8), very fine sand to fine silt grained, micritic cement, low porosity, well consolidated
	520	530	Same as above
	530	540	Same as above
	540	550	Same as above, with 20% calcareous siltstone, very pale orange (10 YR 8/2), low porosity, poorly consolidated
	550	560	Same as above
	560	570	Same as above
	570	580	Silty Limestone, yellowish gray (5 Y 7/2), some fine grained quartz sand, micritic cement, moderate porosity, moderately consolidated
	580	590	Same as above
	590	600	Same as above
	600	610	Same as above
	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	Same as above
	680	690	Same as above
	690	700	Same as above
	700	710	Same as above
	710	720	Same as above
	720	730	Same as above
	740	750	Same as above
	750	760	Same as above
	760	770	Same as above
	770	780	Same as above
	780	790	Same as above

Lithologic Description
ASR-1
MDWASD - West Wellfield ASR Project

Depth Interval (ft. bpl)			
Date	From	To	Observer's Description
	790	800	Same as above
	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	Limestone, white (N 9), micritic, moderate porosity, well consolidated
	880	890	Same as above
	890	900	Fossiliferous Limestone (N 9), coarse sand to gravel sized fossil fragments, micritic cement, high porosity, poorly to moderately consolidated
	900	910	Same as above
	910	920	Same as above
	920	930	Limestone (90%), white (N 9), micritic, moderate porosity, well consolidated; fossil fragments (10%), coarse sand to gravel sized, poorly consolidated
	930	940	Limestone, pinkish gray (5 YR 8/1), silty with some coarse sand sized fossil fragments, micritic cement, moderate porosity, moderately consolidated
	940	950	Same as above
	950	960	Same as above
	960	970	Same as above, except poorly to well consolidated
	970	980	Same as above
	980	990	Fossiliferous Limestone, white (N 9), large mollusk fragments, high porosity, vuggy, well consolidated
	990	1000	Same as above
	1000	1010	Limestone, pinkish gray (5 YR 8/1), silty with some coarse sand sized fossil fragments, micritic cement, moderate porosity, moderately consolidated
	1010	1020	Calcareous Siltstone, light olive gray (5 Y 6/1), low porosity, moderately consolidated
	1020	1030	Calcareous Siltstone, yellowish gray (5 Y 8/1), low porosity, moderately to well consolidated
	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	Limestone, pinkish gray (5 YR 8/1) to light gray (N 7), fine to medium sand grained, sparry cement, low porosity, well consolidated
	1130	1140	Same as above
	1140	1150	Limestone, very pale orange (10 YR 8/2), medium sand grained, sparry

Lithologic Description
ASR-1
MDWASD - West Wellfield ASR Project

Depth Interval (ft. bpl)			
Date	From	To	**Observer's Description**
			cement, high porosity, well consolidated
	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
	1260	1270	Same as above
	1270	1280	Same as above
	1280	1290	Same as above
	1290	1300	Same as above

Lithologic Description
ASR-2
MDWASD - West Wellfield ASR Project

Depth Interval (ft. bpl)			
Date	From	To	Observer's Description
	0	10	Limestone, very pale orange (10 YR 8/2), fine grained, sparry cement, high porosity, moderately consolidated
	10	20	Same as above, with 5% shell fragments
	20	30	Same as above
	30	40	Limestone, white (N 9), very fine to coarse sand grained, micritic cement, high porosity, poor to well consolidated
	40	50	Same as above
	50	60	Same as above
	60	70	Limestone, white (N 9) to pinkish-gray (5 YR 8/1), fine sand grained, micritic cement, moderate to high porosity, well consolidated
	70	80	Shell fragments, white (N 9) to light gray (N 7), coarse sand grained, unconsolidated
	80	90	Same as above
	90	100	Same as above, with 30% limestone, pinkish-gray (5 YR 8/1), fine grained, sparry cement, low porosity, well consolidated
	100	110	Same as above, increase limestone to 40%
	110	120	Same as above
	120	130	Same as above
	130	140	Same as above, increase limestone to 50%
	140	150	Same as above
	150	160	Limestone, yellowish-gray (5 Y 7/2), medium sand grained, sparry cement, moderate porosity, fossiliferous, well consolidated
	160	170	Same as above
	170	180	Same as above
	180	190	Same as above
	190	200	Clay (60%), light olive gray (5 Y 5/2), silty; fossiliferous limestone (40%), white (N 9) to medium light gray (N 6), coarse sand grained fossil fragments, micritic cement, low porosity, well consolidated
	200	210	Clay, light olive gray (5 Y 5/2), silty, low porosity
	210	220	Same as above
	220	230	Same as above
	230	240	Same as above, with 10% fine grained limestone and quartz sand
	240	250	Same as above
	250	260	Same as above, increase limestone to 20%
	260	270	Same as above, decrease limestone to 10%
	270	280	Clay, light olive gray (5 Y 5/2), silty and sandy, trace of limestone
	280	290	Same as above
	290	300	Same as above
	300	310	Same as above
	310	320	Same as above
	320	330	Same as above
	330	340	Same as above, with 10% limestone
	340	350	Clay, light olive gray (5 Y 5/2), silty and sandy, trace of limestone
	350	360	Same as above
	360	370	Same as above
	370	380	Same as above

Lithologic Description
ASR-2
MDWASD - West Wellfield ASR Project

Depth Interval (ft. bpl)			
Date	From	To	Observer's Description
	380	390	Same as above
	390	400	Same as above
	400	410	Same as above
	410	420	Same as above
	420	430	Same as above
	430	440	Missing Sample
	440	450	Missing Sample
	450	460	Missing Sample
	460	470	Same as above
	470	480	Same as above
	480	490	Same as above
	490	500	Shell fragments (80%), pinkish gray (5 YR 8/1), medium sand to coarse sand grained, unconsolidated; calcareous siltstone (20%), very pale orange (10 YR 8/2), low porosity, poorly consolidated
	500	510	Same as above
	510	520	Limestone, very light gray (N 8), very fine sand to fine silt grained, micritic cement, low porosity, well consolidated
	520	530	Same as above
	530	540	Same as above
	540	550	Same as above, with 20% calcareous siltstone, very pale orange (10 YR 8/2), low porosity, poorly consolidated
	550	560	Same as above
	560	570	Same as above
	570	580	Silty Limestone, yellowish gray (5 Y 7/2), some fine grained quartz sand, micritic cement, moderate porosity, moderately consolidated
	580	590	Same as above
	590	600	Same as above
	600	610	Same as above
	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	Same as above
	680	690	Same as above
	690	700	Same as above
	700	710	Same as above
	710	720	Same as above
	720	730	Same as above
	740	750	Same as above
	750	760	Same as above
	760	770	Same as above
	770	780	Same as above
	780	790	Same as above
	790	800	Same as above

Lithologic Description
ASR-2
MDWASD - West Wellfield ASR Project

Depth Interval (ft. bpl)			
Date	From	To	Observer's Description
	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	Limestone, white (N 9), micritic, moderate porosity, well consolidated
	880	890	Same as above
	890	900	Fossiliferous Limestone (N 9), coarse sand to gravel sized fossil fragments, micritic cement, high porosity, poorly to moderately consolidated
	900	910	Same as above
	910	920	Same as above
	920	930	Limestone (90%), white (N 9), micritic, moderate porosity, well consolidated; fossil fragments (10%), coarse sand to gravel sized, poorly consolidated
	930	940	Limestone, pinkish gray (5 YR 8/1), silty with some coarse sand sized fossil fragments, micritic cement, moderate porosity, moderately consolidated
	940	950	Same as above
	950	960	Same as above
	960	970	Same as above, except poorly to well consolidated
	970	980	Same as above
	980	990	Fossiliferous Limestone, white (N 9), large mollusk fragments, high porosity, vuggy, well consolidated
	990	1000	Same as above
	1000	1010	Limestone, pinkish gray (5 YR 8/1), silty with some coarse sand sized fossil fragments, micritic cement, moderate porosity, moderately consolidated
	1010	1020	Calcareous Siltstone, light olive gray (5 Y 6/1), low porosity, moderately consolidated
	1020	1030	Calcareous Siltstone, yellowish gray (5 Y 8/1), low porosity, moderately to well consolidated
	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	Limestone, pinkish gray (5 YR 8/1) to light gray (N 7), fine to medium sand grained, sparry cement, low porosity, well consolidated
	1130	1140	Same as above
	1140	1150	Limestone, very pale orange (10 YR 8/2), medium sand grained, sparry cement, high porosity, well consolidated

Lithologic Description
ASR-2
MDWASD - West Wellfield ASR Project

Depth Interval (ft. bpl)			
Date	From	To	Observer's Description
	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	Missing Sample
	1220	1230	Missing Sample
	1230	1240	Missing Sample
	1240	1250	Missing Sample
	1250	1260	Same as above

Lithologic Description
ASR-3
MDWASD - West Wellfield ASR Project

Depth Interval (ft. bpl)			
Date	From	To	Observer's Description
	0	10	Limestone, very pale orange (10 YR 8/2), fine grained, sparry cement, high porosity, moderately consolidated
	10	20	Same as above, with 5% shell fragments
	20	30	Same as above
	30	40	Limestone, white (N 9), very fine to coarse sand grained, micritic cement, high porosity, poor to well consolidated
	40	50	Same as above
	50	60	Same as above
	60	70	Limestone, white (N 9) to pinkish-gray (5 YR 8/1), fine sand grained, micritic cement, moderate to high porosity, well consolidated
	70	80	Shell fragments, white (N 9) to light gray (N 7), coarse sand grained, unconsolidated
	80	90	Same as above
	90	100	Same as above, with 30% limestone, pinkish-gray (5 YR 8/1), fine grained, sparry cement, low porosity, well consolidated
	100	110	Same as above, increase limestone to 40%
	110	120	Same as above
	120	130	Same as above
	130	140	Same as above
	140	150	Same as above
	150	160	Same as above
	160	170	Clay (60%), light olive gray (5 Y 5/2), silty; fossiliferous limestone (40%), white (N 9) to medium light gray (N 6), coarse sand grained fossil fragments, micritic cement, low porosity, well consolidated
	170	180	Clay, light olive gray (5 Y 5/2), silty, low porosity
	180	190	Same as above
	190	200	Same as above
	200	210	Same as above
	210	220	Same as above
	220	230	Same as above
	230	240	Same as above, with 10% fine grained limestone and quartz sand
	240	250	Same as above
	250	260	Same as above, increase limestone to 20%
	260	270	Same as above, decrease limestone to 10%
	270	280	Clay, light olive gray (5 Y 5/2), silty and sandy, trace of limestone
	280	290	Same as above
	290	300	Same as above
	300	310	Same as above
	310	320	Same as above
	320	330	Same as above
	330	340	Same as above, with 10% limestone
	340	350	Clay, light olive gray (5 Y 5/2), silty and sandy, trace of limestone
	350	360	Same as above
	360	370	Same as above
	370	380	Same as above
	380	390	Same as above

Lithologic Description
ASR-3
MDWASD - West Wellfield ASR Project

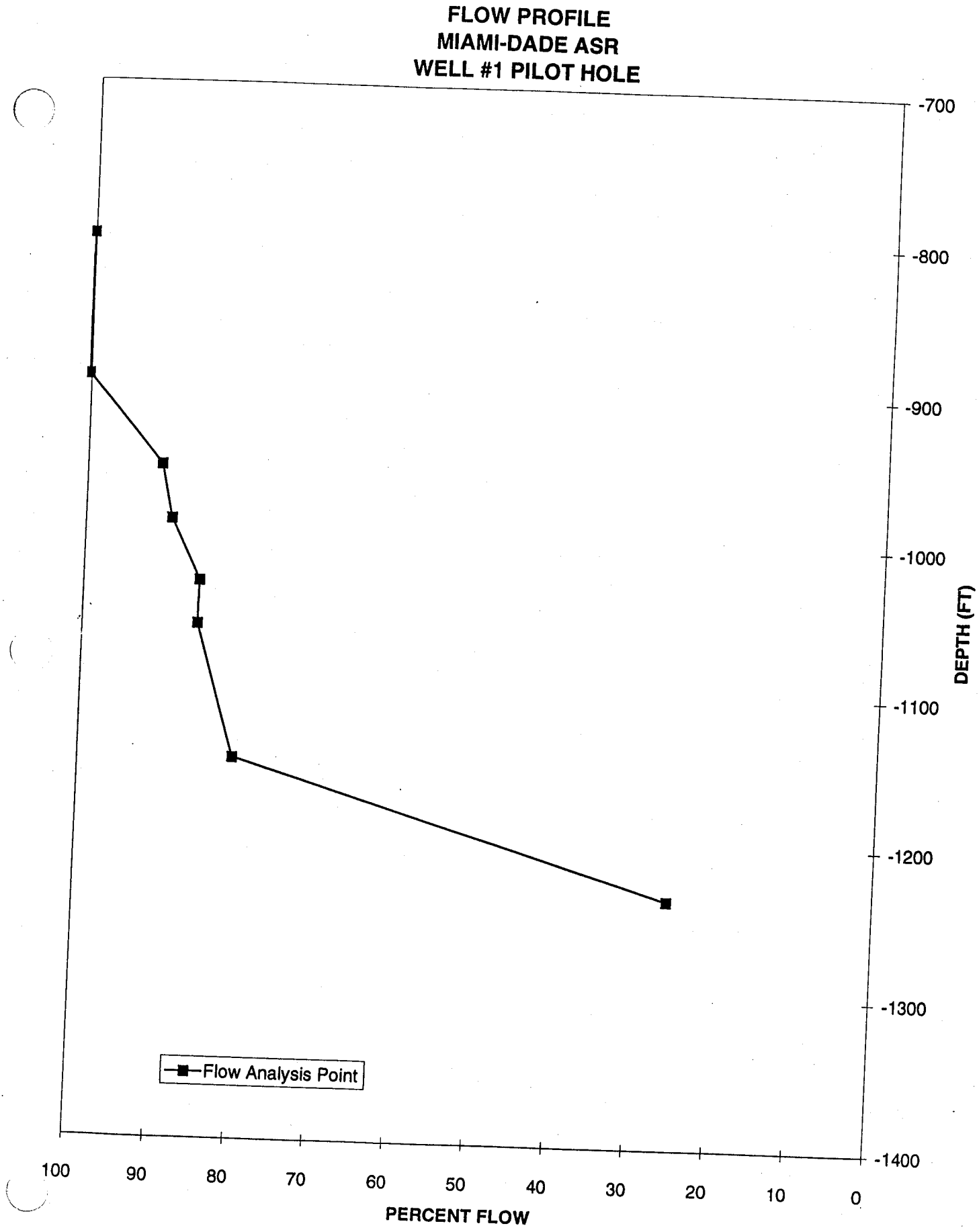
Depth Interval (ft. bpl)			
Date	From	To	Observer's Description
	390	400	Same as above
	400	410	Same as above
	410	420	Same as above
	420	430	Calcareous Siltstone (80%), very pale orange (10 YR 8/2), low porosity, poorly consolidated; limestone (20%), light gray (N 7), silty, micritic cement, low porosity, well consolidated
	430	440	Same as above
	440	450	Same as above
	450	460	Same as above
	460	470	Same as above
	470	480	Same as above
	480	490	Same as above
	490	500	Shell fragments (80%), pinkish gray (5 YR 8/1), medium sand to coarse sand grained, unconsolidated; calcareous siltstone (20%), very pale orange (10 YR 8/2), low porosity, poorly consolidated
	500	510	Same as above
	510	520	Limestone, very light gray (N 8), very fine sand to fine silt grained, micritic cement, low porosity, well consolidated
	520	530	Same as above
	530	540	Same as above
	540	550	Same as above, with 20% calcareous siltstone, very pale orange (10 YR 8/2), low porosity, poorly consolidated
	550	560	Same as above
	560	570	Same as above
	570	580	Silty Limestone, yellowish gray (5 Y 7/2), some fine grained quartz sand, micritic cement, moderate porosity, moderately consolidated
	580	590	Same as above
	590	600	Same as above
	600	610	Same as above
	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	Same as above
	680	690	Same as above
	690	700	Same as above
	700	710	Same as above
	710	720	Same as above
	720	730	Same as above
	740	750	Same as above
	750	760	Same as above
	760	770	Same as above
	770	780	Same as above
	780	790	Same as above

Lithologic Description
ASR-3
MDWASD - West Wellfield ASR Project

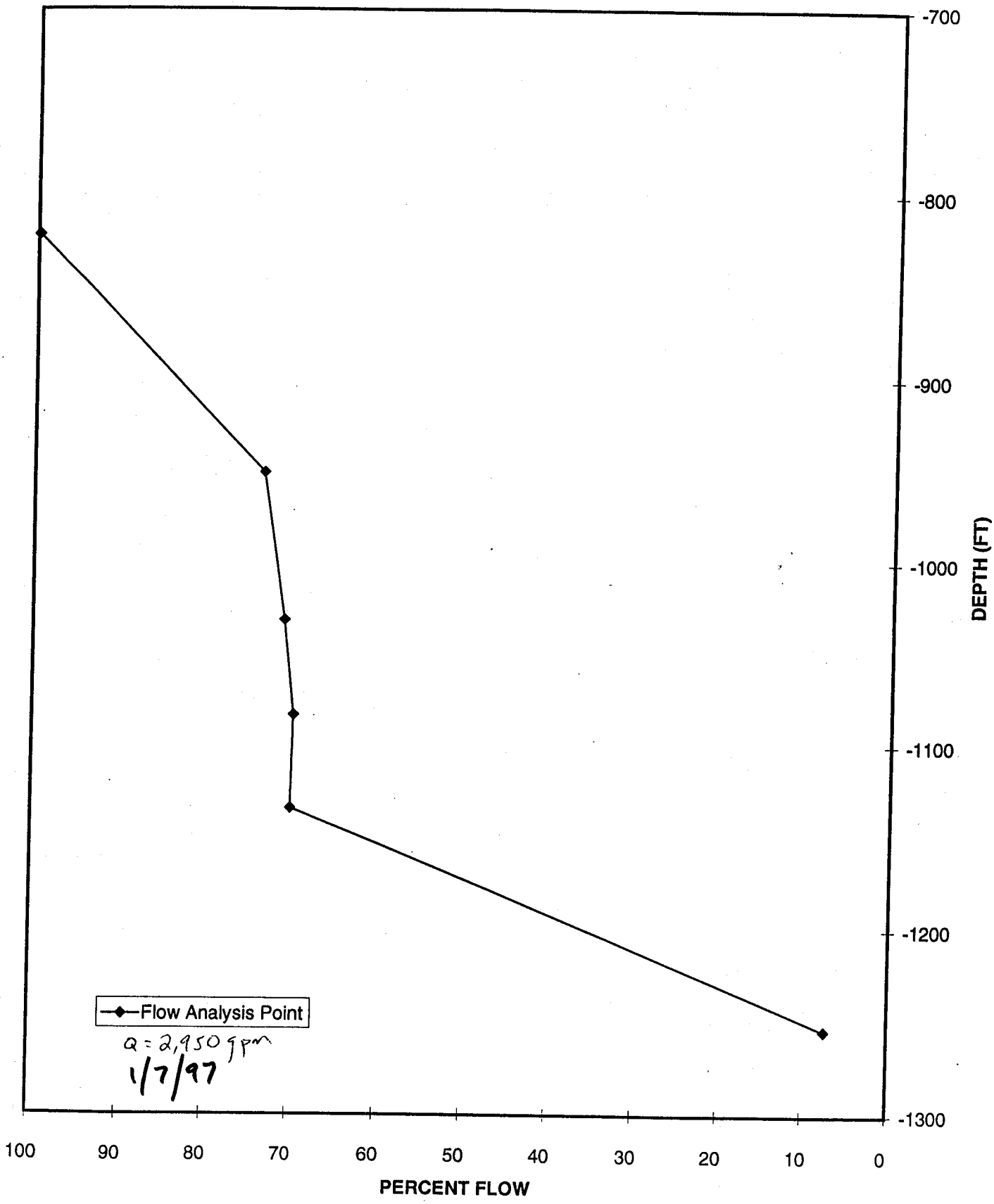
Depth Interval (ft. bpl)			
Date	From	To	Observer's Description
	790	800	Same as above
	800	810	Same as above
	810	820	Same as above
	820	830	Same as above
	830	840	Same as above
	840	850	Same as above
	850	860	Same as above
	860	870	Same as above
	870	880	Limestone, white (N 9), micritic, moderate porosity, well consolidated
	880	890	Same as above
	890	900	Fossiliferous Limestone (N 9), coarse sand to gravel sized fossil fragments, micritic cement, high porosity, poorly to moderately consolidated

APPENDIX G

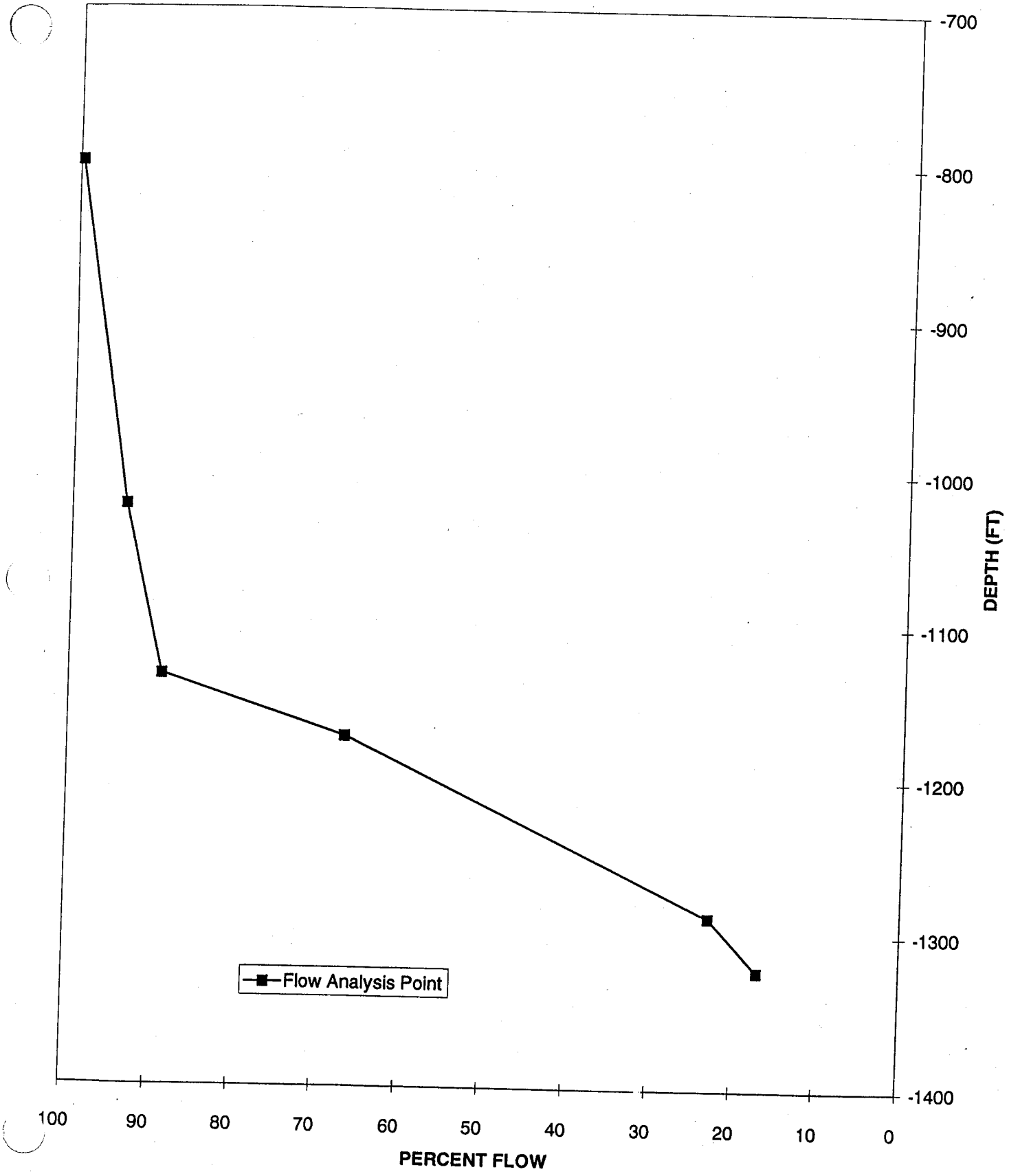
Geophysical Logs


FLOW PROFILE
MIAMI-DADE ASR
WELL #1 PILOT HOLE
-700
-800
-900
-1000
-1100
-1200
-1300
-1400
DEPTH (FT)
Flow Analysis Point
100
90
80
70
60
50
40
30
20
10
0
PERCENT FLOW

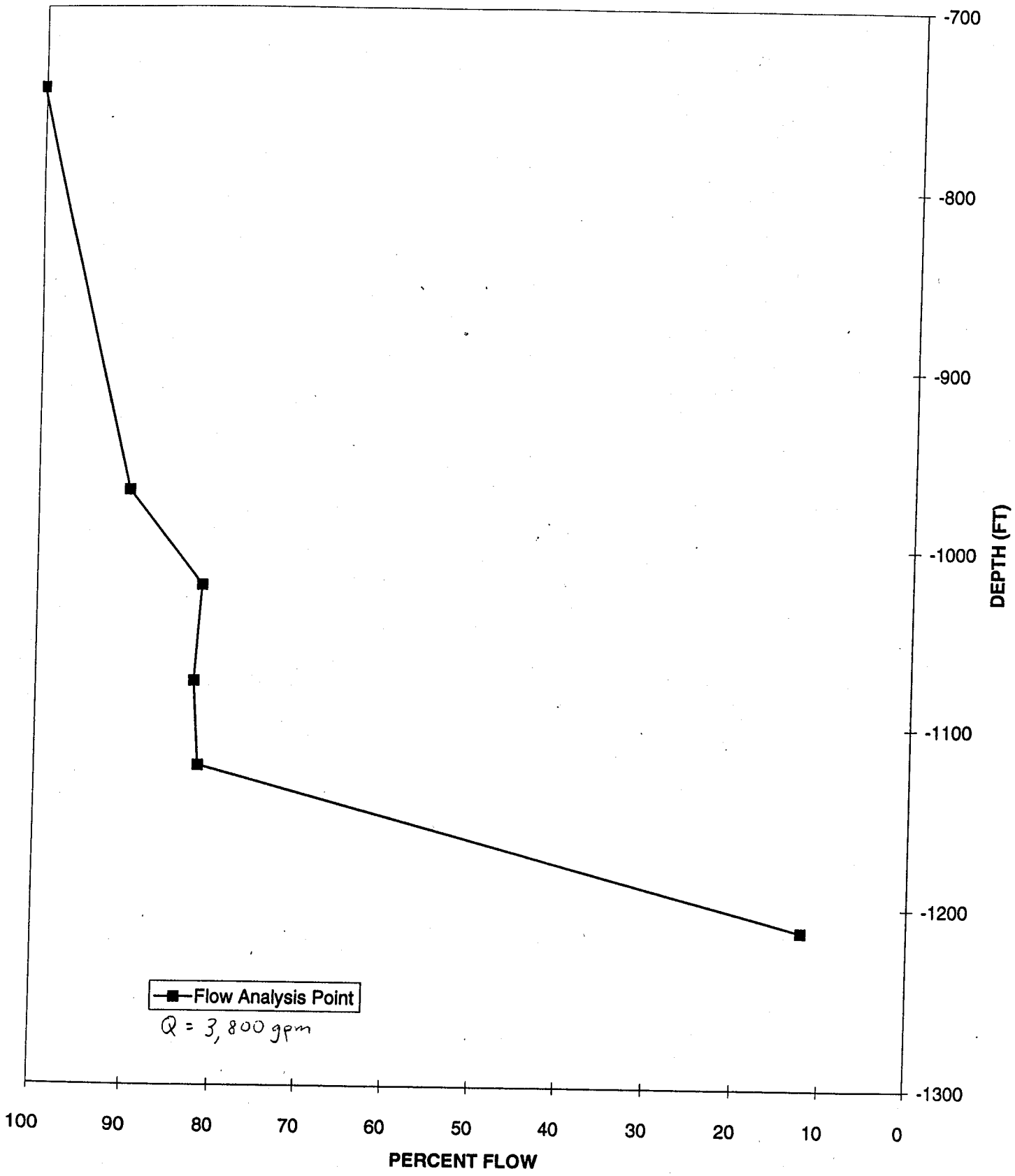
FLOW PROFILE
MIAMI-DADE ASR WELL #1
REAMED HOLE



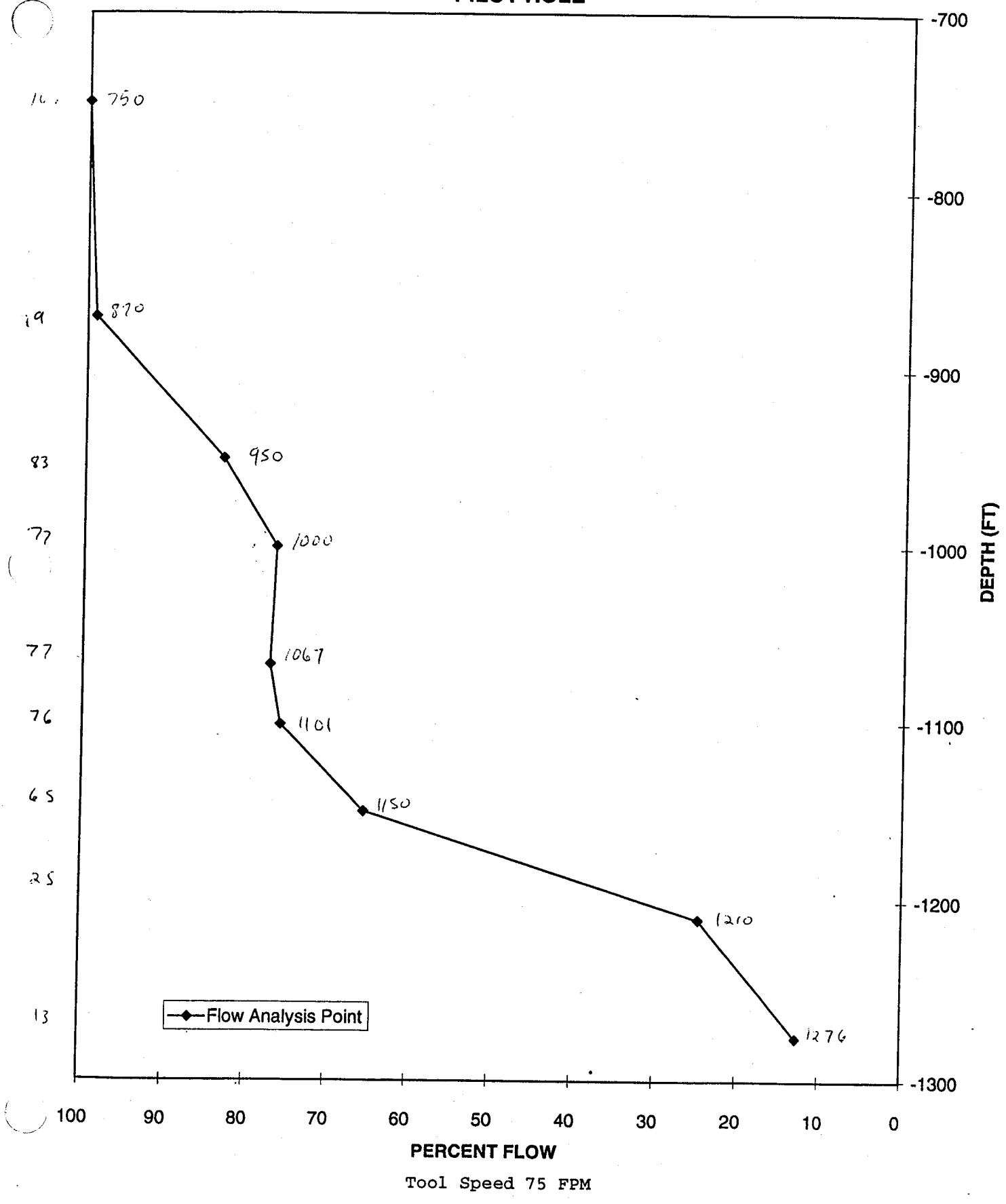
FLOW PROFILE
MIAMI-DADE ASR
WELL #2 PILOT HOLE



FLOW PROFILE
MIAMI-DADE ASR WELL #2
REAMED BOREHOLE

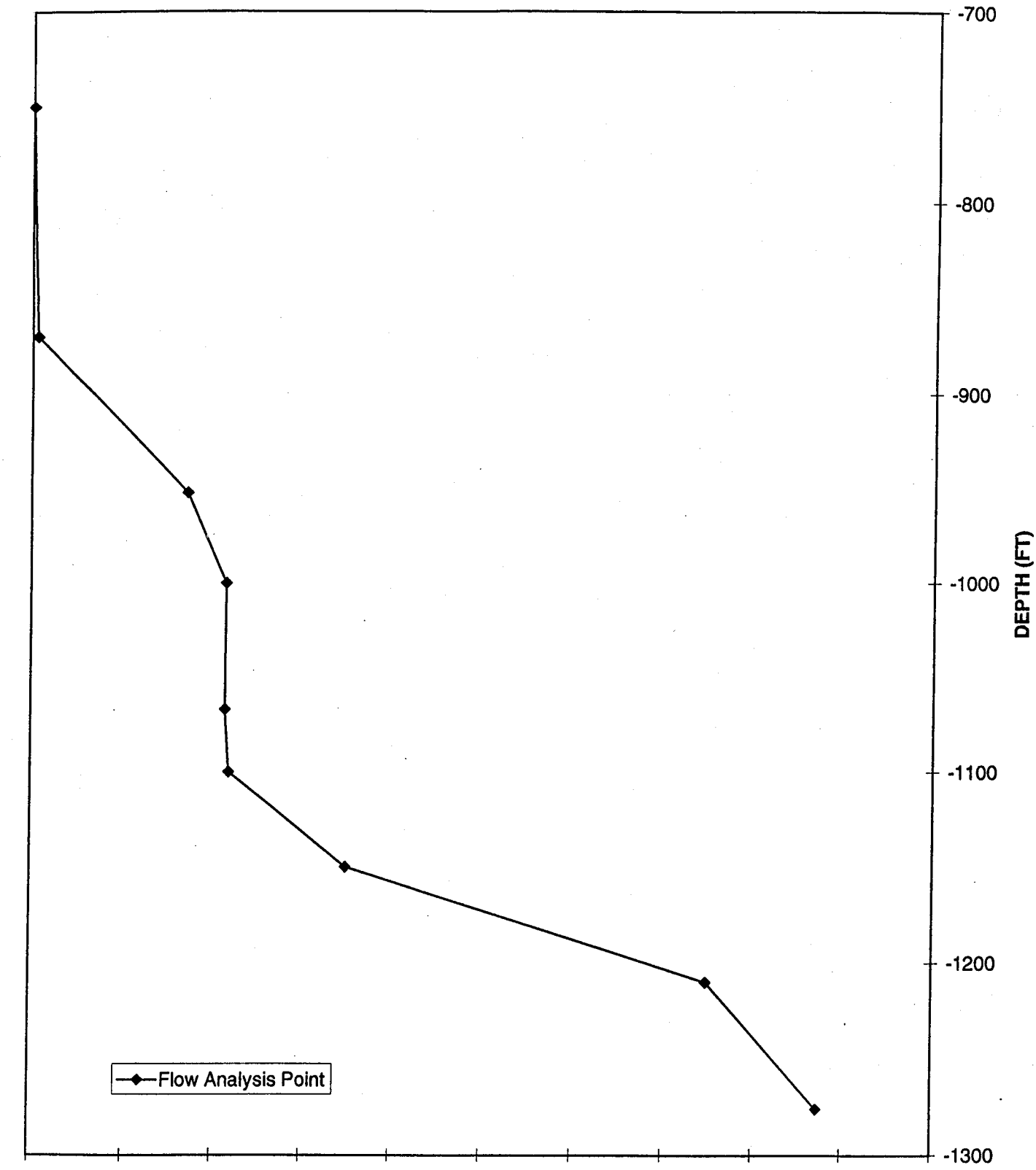


FLOW PROFILE
MIAMI-DADE ASR WELL #3
PILOT HOLE



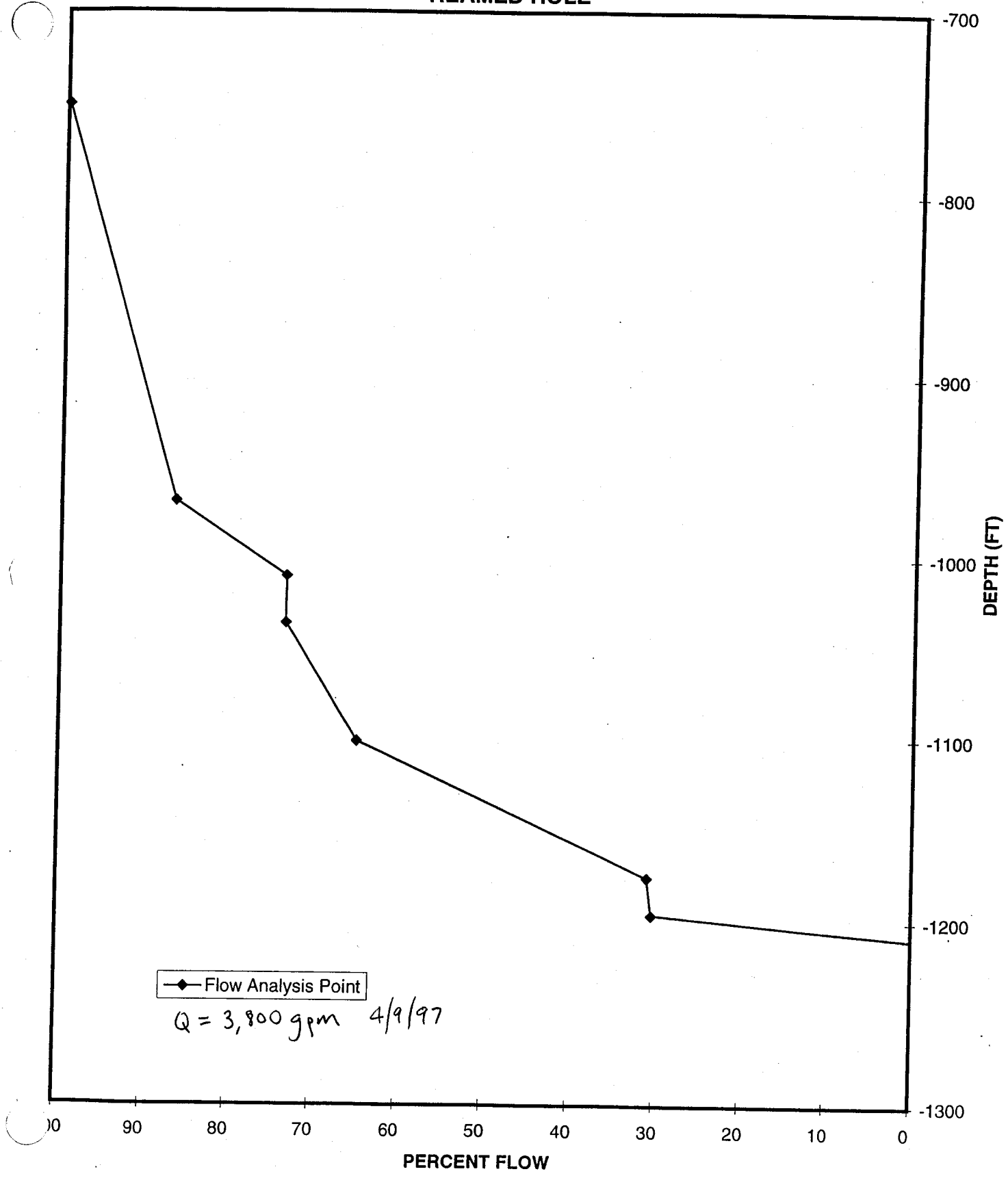
Tool Speed 75 FPM

FLOW PROFILE
MIAMI-DADE ASR WELL #3
PILOT HOLE



Tool Speed 50 FPM

FLOW PROFILE
MIAMI-DADE ASR WELL #3
REAMED HOLE



APPENDIX H

Pad Monitor Well Water Quality Data

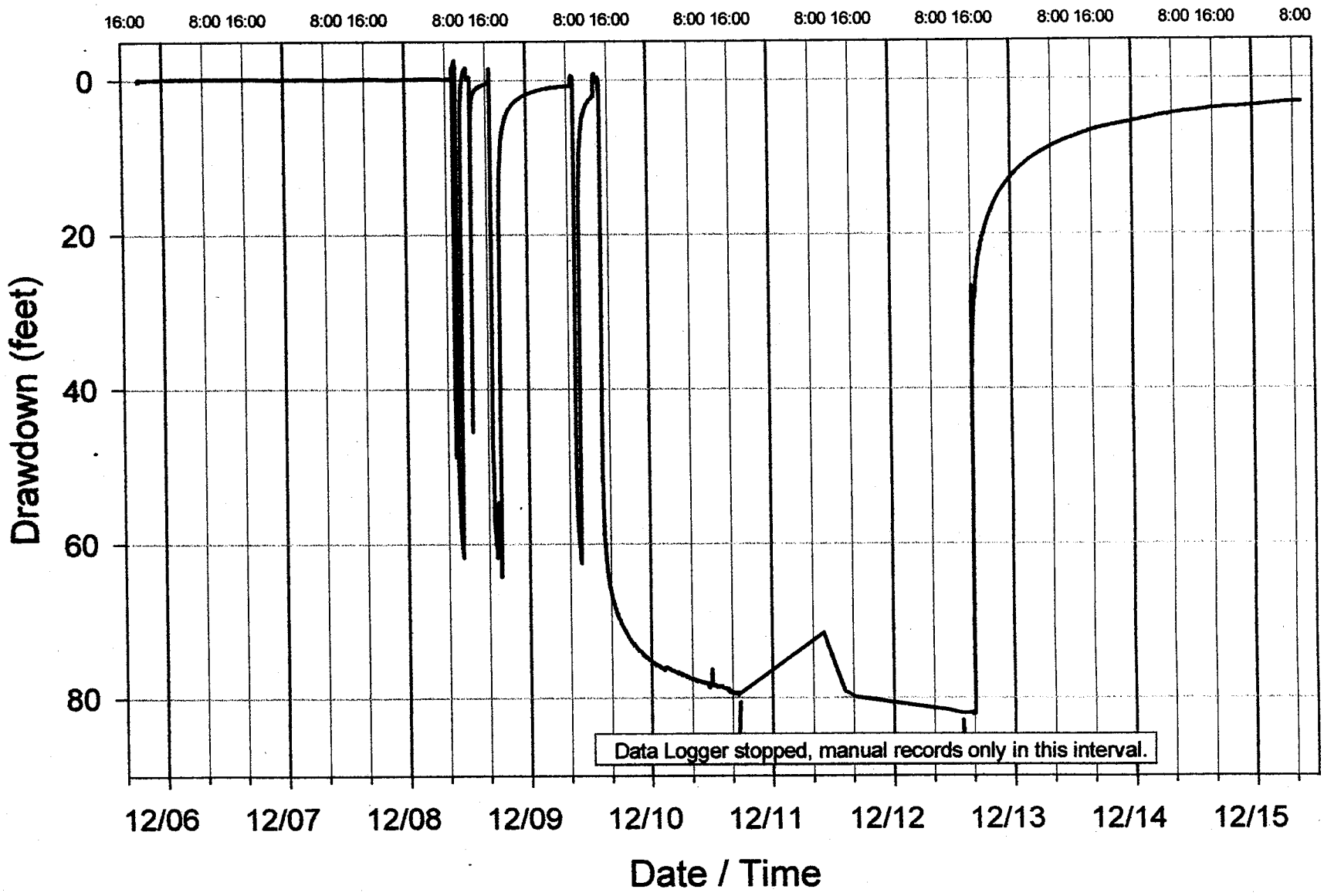
Appendix H
Pad Monitor Well Water Quality Data
MDWASD - West Wellfield ASR Project

		PMW-NE			PMW-NW			PMW-SE			PMW-SW			
Well	Date	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Chloride (mg/l)	Conductivity (umho/cm)	TDS (mg/l)	Comments
ASR-1	11/19/96	44	560	270	45	420	190	47	510	220	8	420	190	Initial Sampling
ASR-1	12/4/96	45	568	379	47	486	324	47	578	385	48	540	359	MDWASD Lab
ASR-1	12/12/97	41	570	380	43	481	321	43	572	382	47	527	351	
ASR-1	1/2/97	47	572	380	315	992	661	48	552	369	49	523	350	
ASR-1	1/16/97	53	574	384	265	950	631							
ASR-2	1/2/97	53	511	340	46	454	302	51	542	361	54	525	350	Initial Sampling
ASR-2	1/16/97	54	514	342	54	505	337	55	462	308	76	505	337	
ASR-2	1/21/97	52	515	344	62	458	306	56	477	318	53	523	348	
ASR-2	2/4/97	52	506	338	146	699	466	55	489	327	55	516	345	
ASR-2	2/12/97	58	528	351	200	843	561	58	529	354	54	493	322	
ASR-2	3/11/97	66	554	368	108	633	422	58	520	348	54	536	357	
ASR-3	2/12/97	54	543	361	56	594	395	56	535	356	58	565	376	Initial Sampling
ASR-3	2/20/97	57	556	379	57	595	396	57	556	371	50	519	345	
ASR-3	3/11/97	75	628	418	61	615	410	59	594	394	64	615	410	
ASR-3	3/24/97	109	710	479	92	696	463	67	623	414	79	664	441	
ASR-3	3/27/97	113	724	481	88	689	459	64	582	388	80	664	442	
ASR-3														
MW-1	1/3/97				68	610	406				76	643	428	
MW-1														

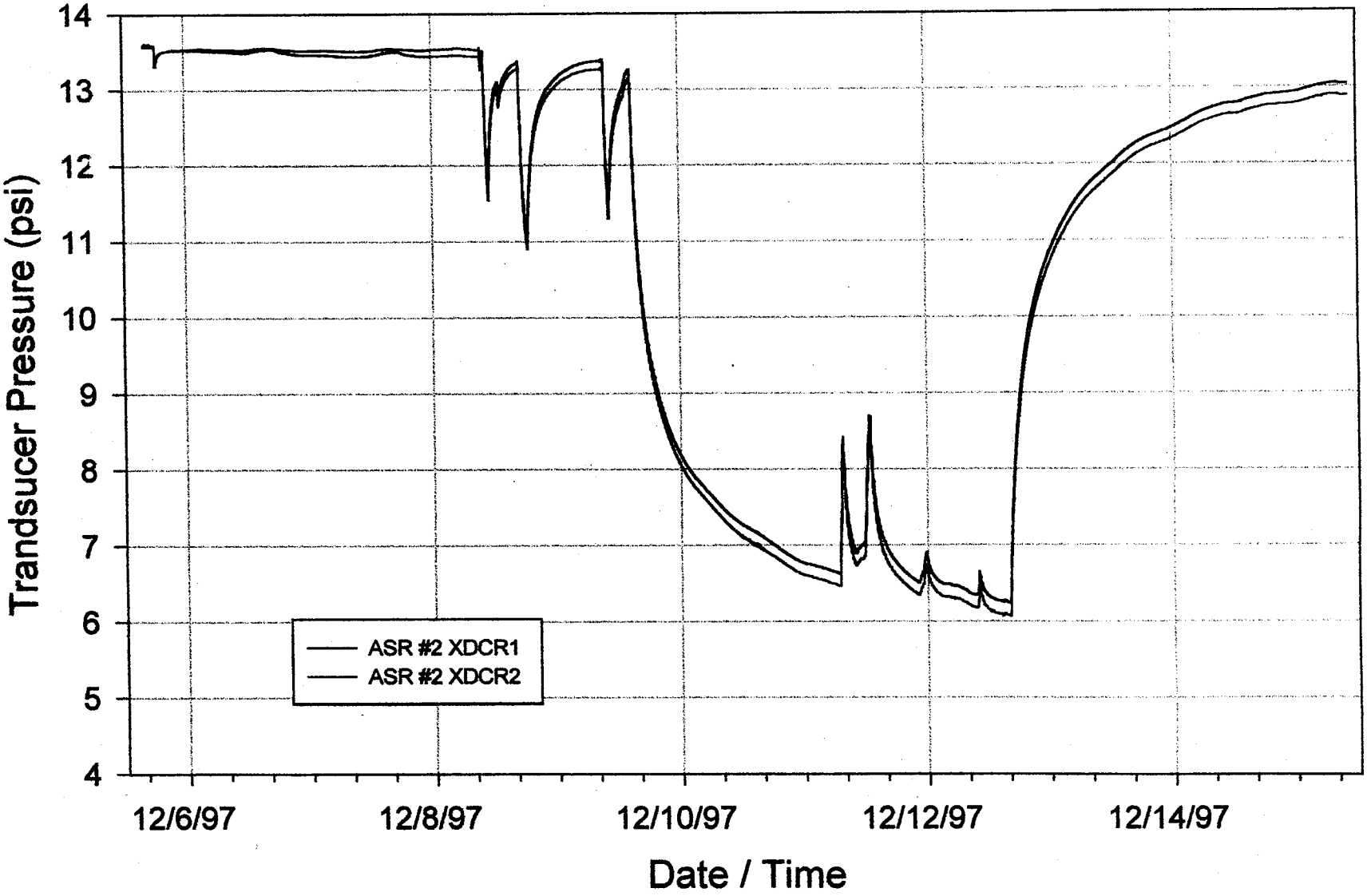
APPENDIX I

Pumping Test Data and Analysis

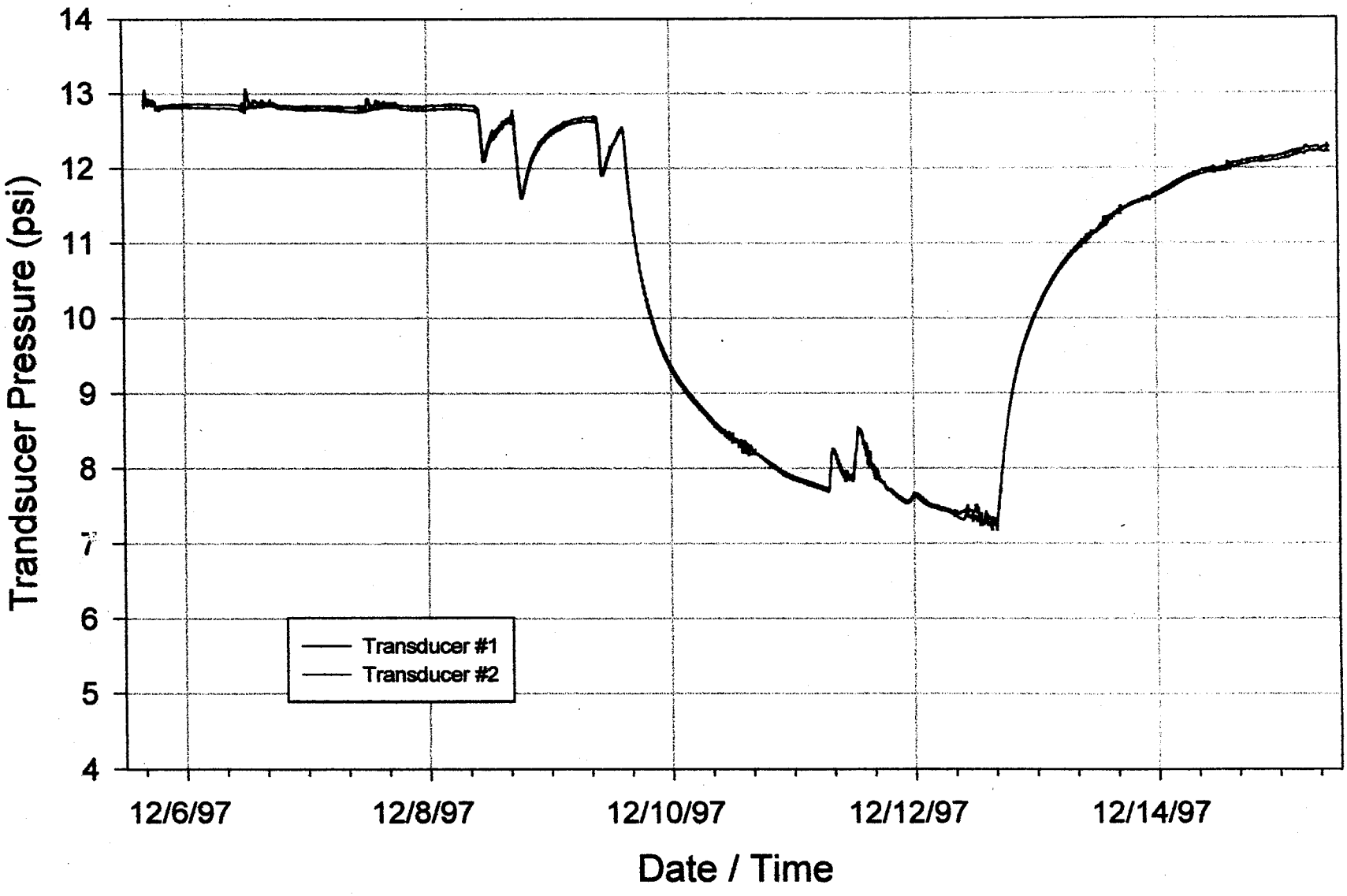
Miami Dade West Wellfield ASR #1



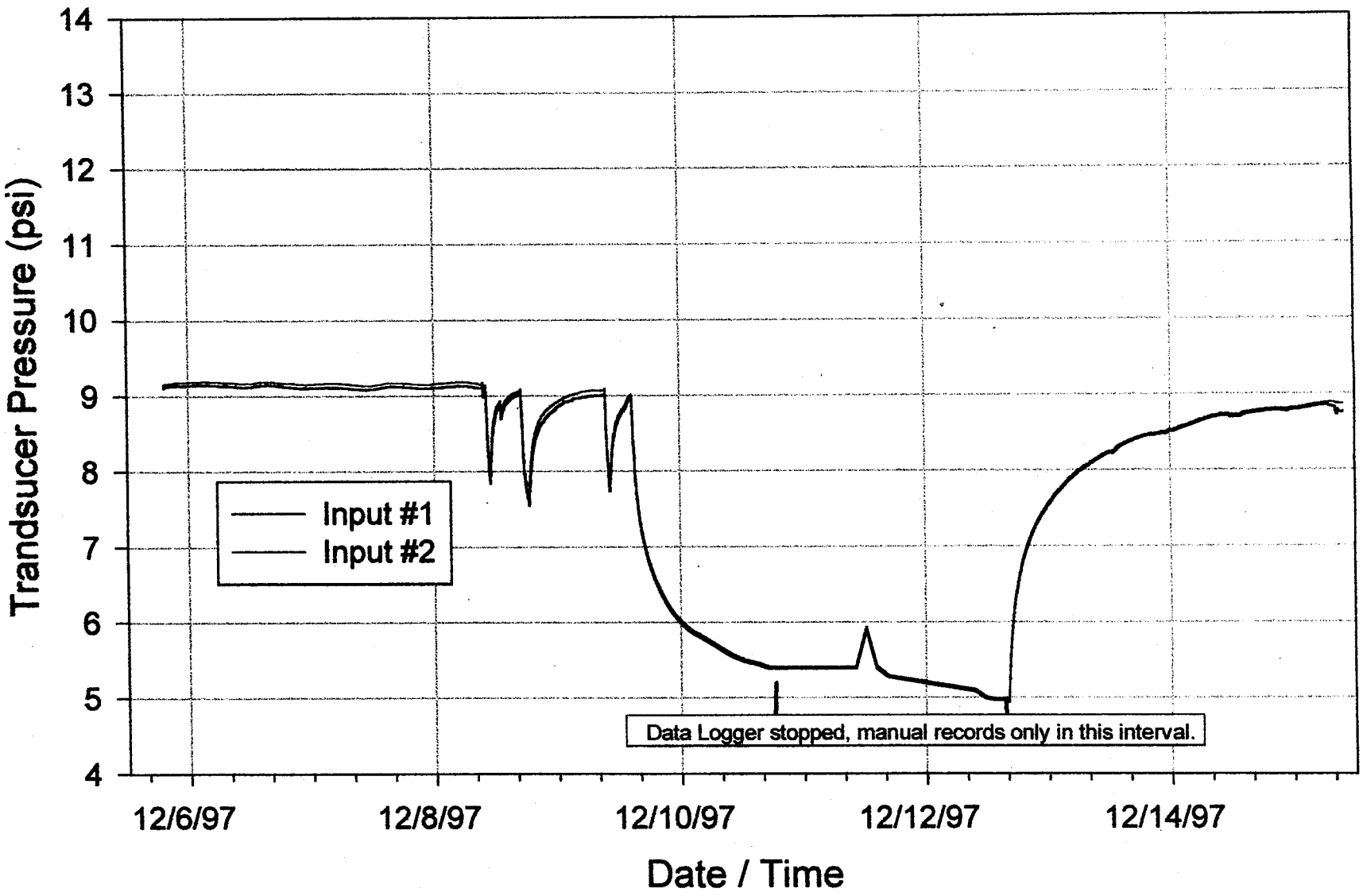
Miami Dade West Wellfield ASR #2 Data



Miami Dade West Wellfield ASR #3 Data



Miami Dade West Wellfield Monitor Well Data (Deep Zone)



Walton (1962) Method for Leaky Aquifers
Type Curve Method $Q = 3,500$ gpm, $r = 1970$ ft.

$W(u, r/B) = 1$
$1/u = 1$
$s = 3.5$ ft
$t = 40$
$r/B = 0.1$

$$T = \frac{114.6\,Q}{s}(1) = \frac{(114.6)(3,500)}{3.5} = 114,600 \text{ gpd/ft}$$

$$S = \frac{T\,t\,u}{2693\,r^2} = \frac{(114,600)(40)}{2693(1970)^2} = 4.4 \times 10^{-4}$$

$$K'/b' = [T\,(r/B)^2]/r^2$$

$$= \frac{(114,600)(0.1)^2}{(1970)^2}$$

$$= 2.9 \times 10^{-4}$$

Walton (1962) Method for Leaky Aquifers
Type Curve Match, $Q = 3,500$ gpm, $r = 985$

$W(u, r/B) = 1$
$1/u = 1$
$s = 3.5$ ft
$t = 9$
$r/B = 0.1$

$$T = \frac{114.6\,Q}{s}(1) = \frac{(114.6)(3,500)}{3.5} = 114,600 \text{ gpd/ft}$$

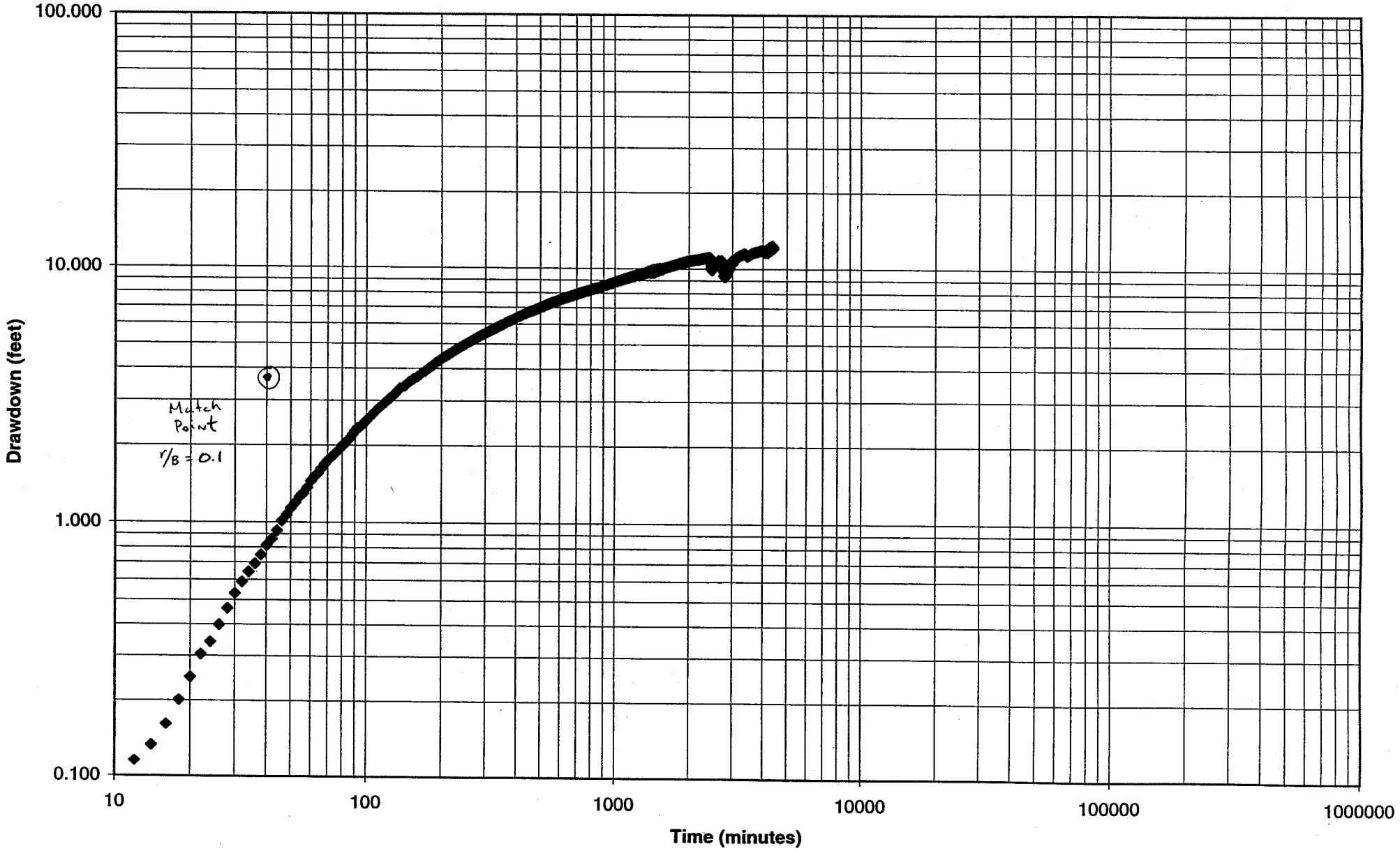
$$S = \frac{T\,t\,u}{2693\,r^2} = \frac{(114,600)(9)}{2693\,(985)^2} = 3.9 \times 10^{-4}$$

$$K'/b' = [T\,(r/B)^2]/r^2$$

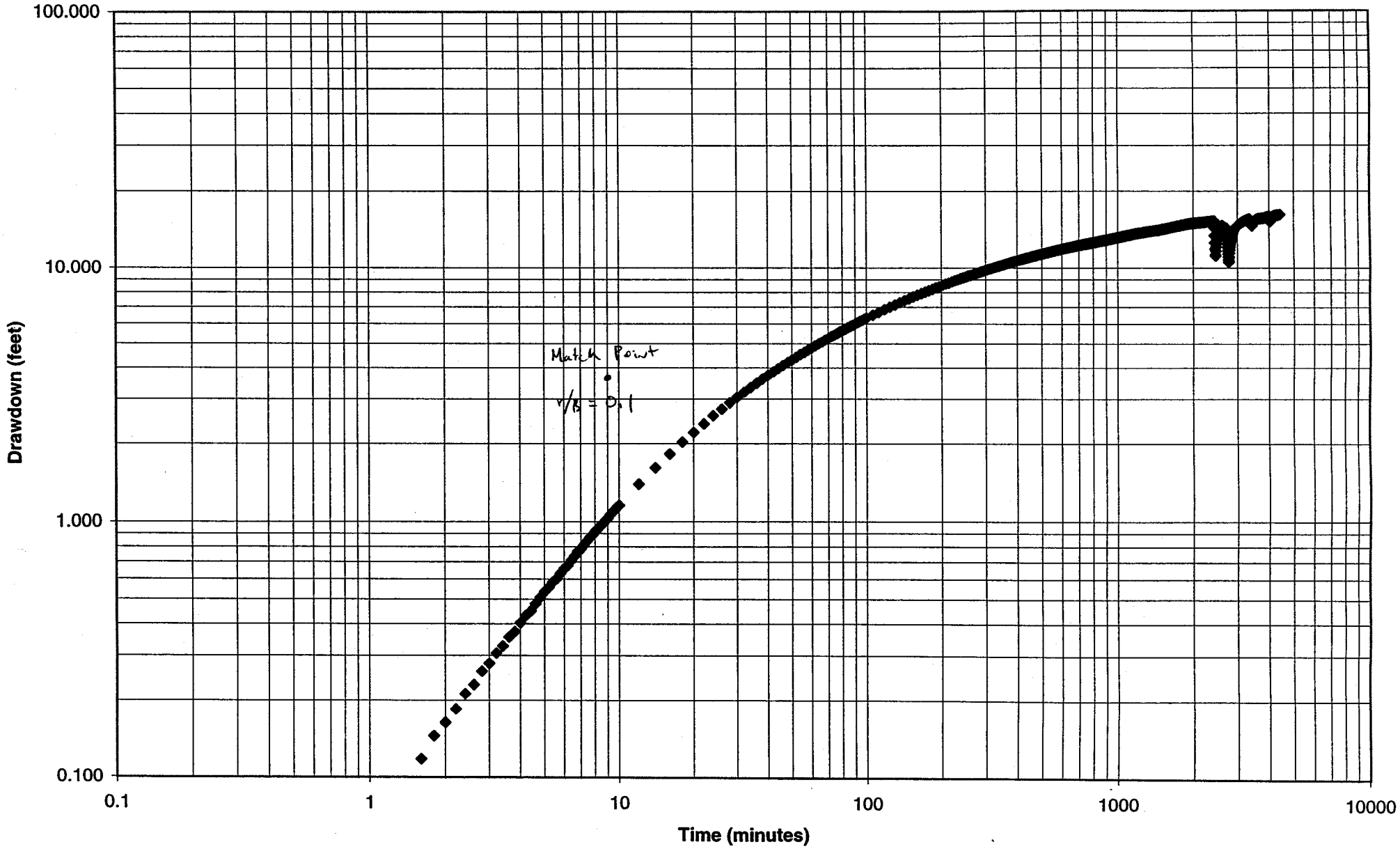
$$= \frac{(114,600)(0.1)^2}{(985)^2}$$

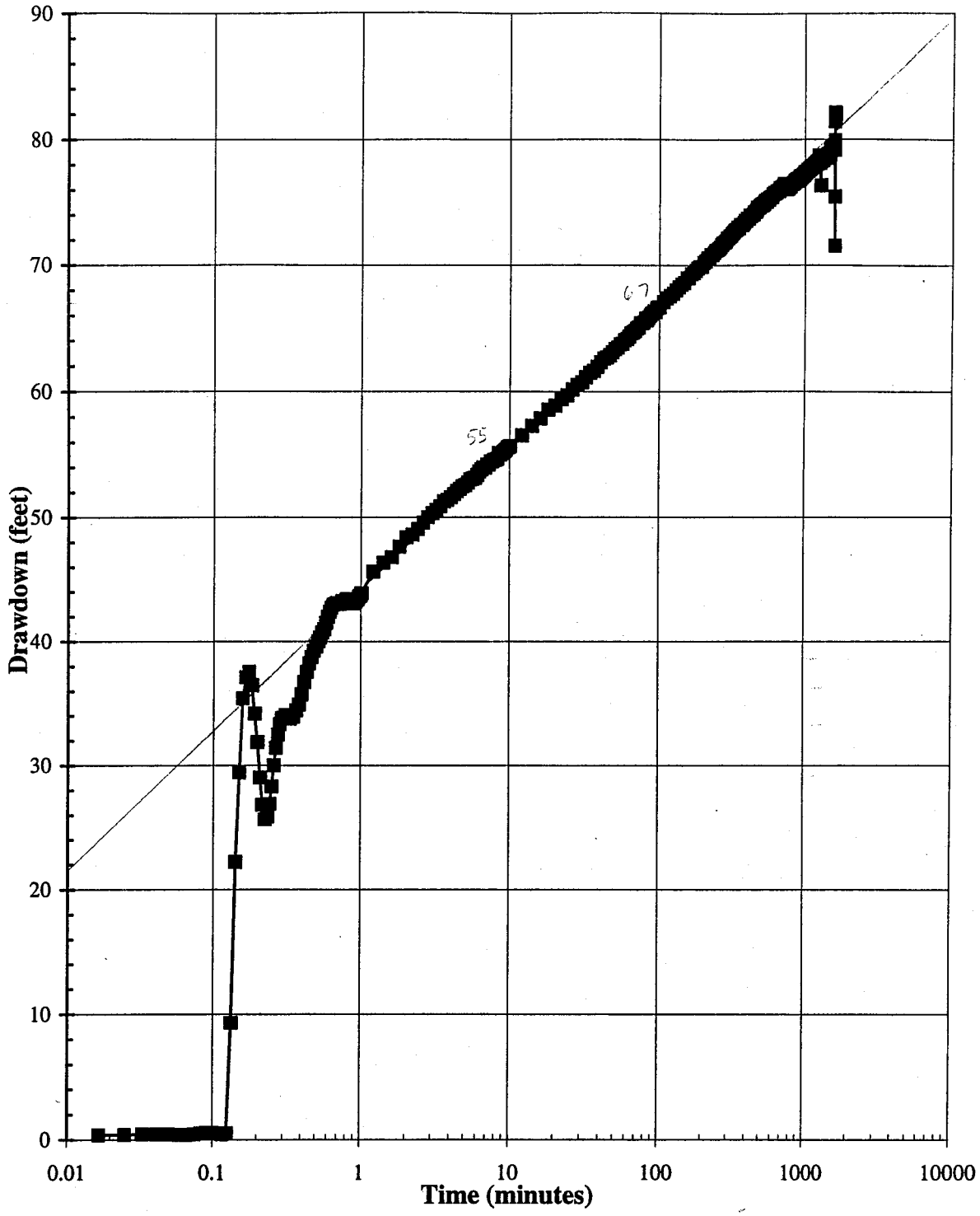
$$= 1.2 \times 10^{-3} \text{ gpd/ft}^2\text{/ft}$$

Drawdown vs. Time at ASR-3



Drawdown vs. Time at ASR-2





Q = 3,500 gpm

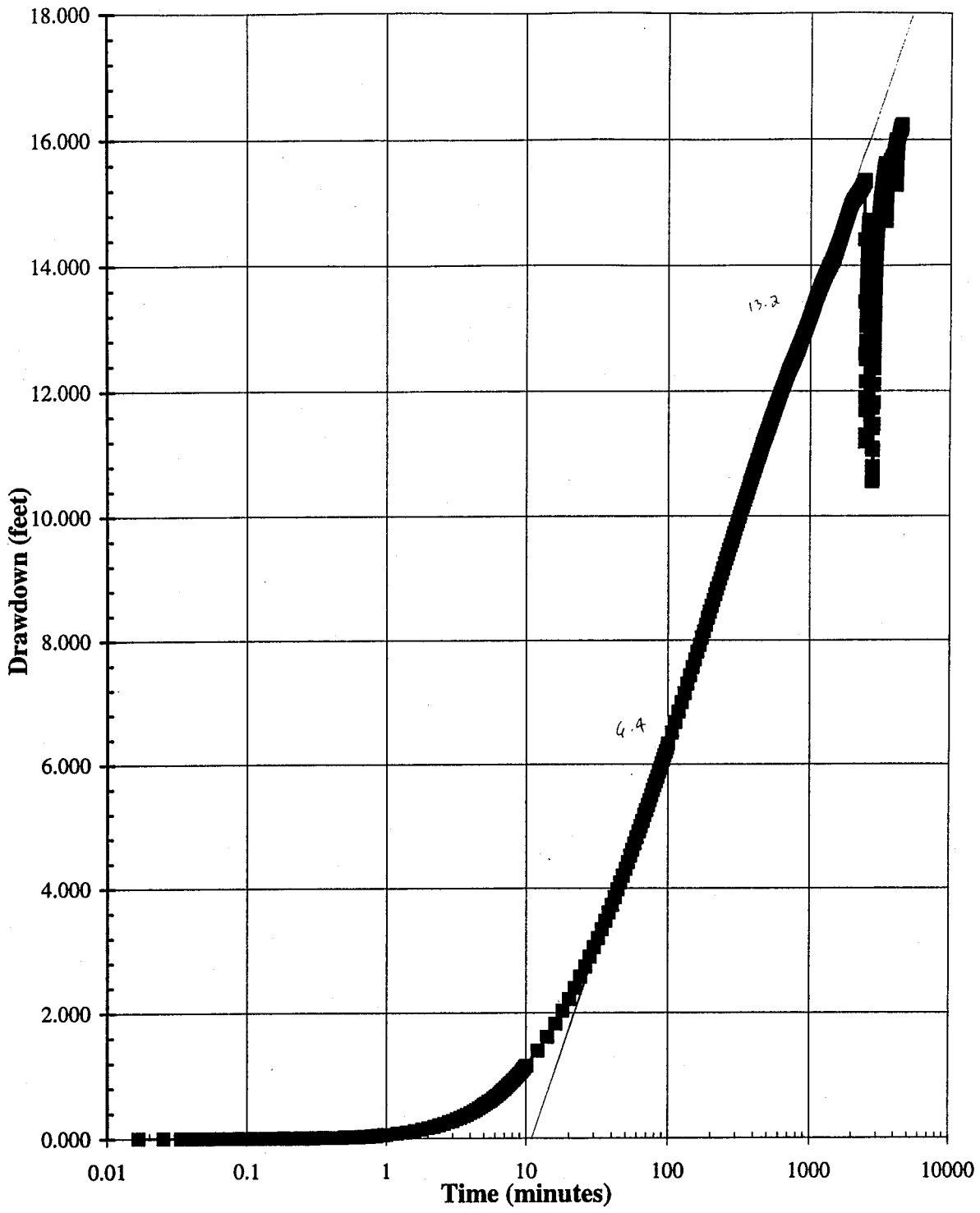
T = 264Q/s = 77,000

FIGURE 1
Cooper-Jacob Method

Miami-Dade Water and Sewer Department
West Wellfield ASR Project

CH2MHILL

File: asr3r.xls : cjasr1graph Date: 2/4/98 Time: 2:43 PM



Q = 3,500 gpm

$T = 264Q/s = 136{,}000$ gpd/ft

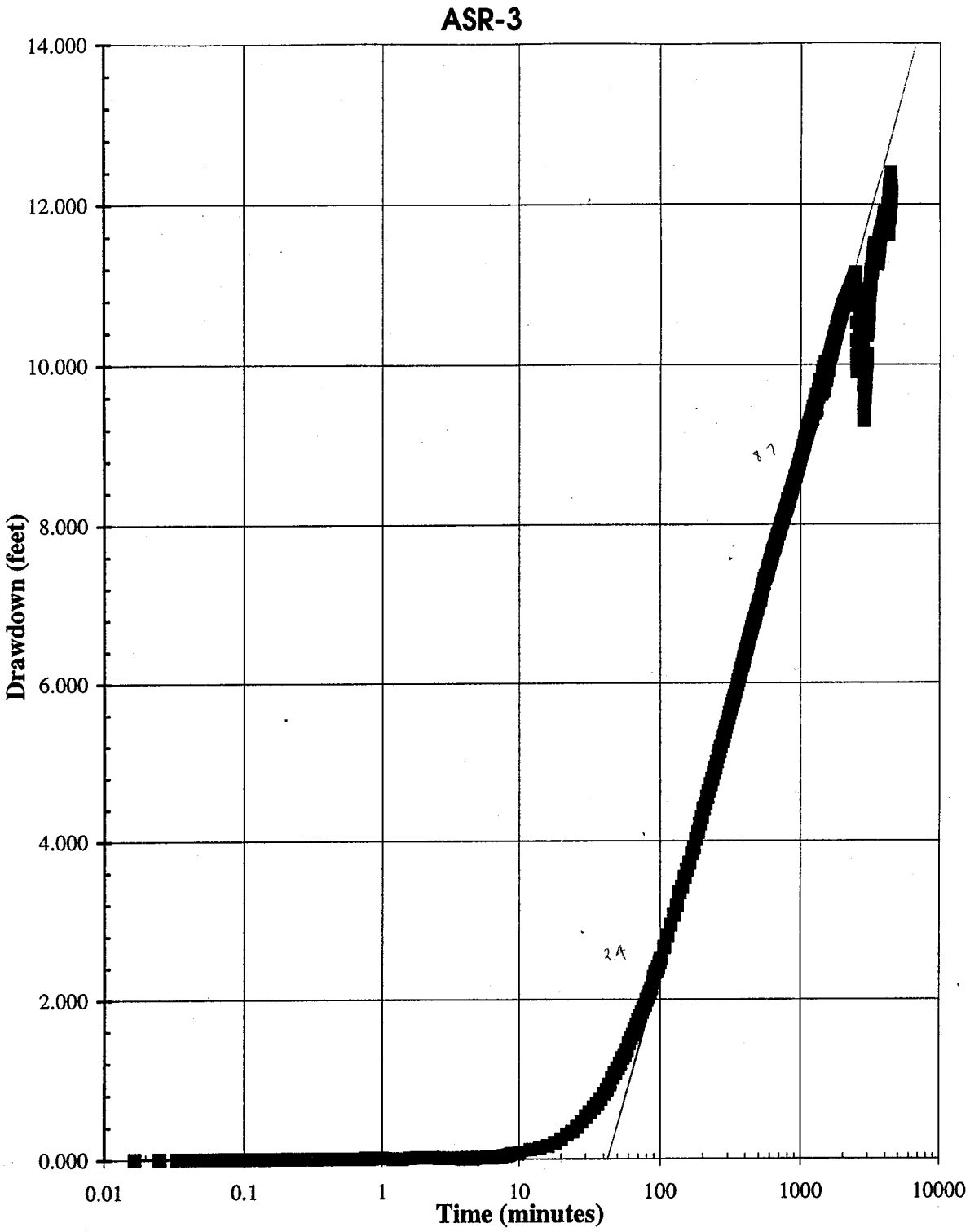
$S = \frac{Tt_o}{4790r^2} = \frac{(136{,}000)(10)}{4790(985ft)^2} = 2.9 \times 10^{-4}$

FIGURE 2
Cooper-Jacob Method

Miami-Dade Water and Sewer Department
West Wellfield ASR Project

CH2MHILL

File: asr3r.xls : cjasr2graph Date: 2/4/98 Time: 1:19 PM



Q = 3,500 gpm

$T = 264Q/s = 147{,}000$ gpd/ft

$S = \frac{Tt_o}{4790(r^2)} = \frac{(147{,}000)(42)}{4790(1970)^2} = 3.3 \times 10^{-4}$

FIGURE 3
Cooper-Jacob Method

Miami-Dade Water and Sewer Department
West Wellfield ASR Project

CH2M HILL

File: asr3r.xls : cjmwgraph Date: 2/4/98 Time: 11:27 AM

APPENDIX J

Background Water Quality Data

PRECISION ENVIRONMENTAL LABORATORY, INC.
10200 USA Today Way
Miramar, Florida 33025
(954) 431-4550

INVOICE # 30553

January 31, 1997

Client #MIAMID000307
Miami Dade Water & Sewer Dept-Accts Pay.
P.O. Box 330316
Miami,FL 33233-0316
Attn: Accounts Payable

Submission #: 9701000779
Miami Dade Water & Sewer
P.O. Box 330316
Miami,FL 33173
Attn:R Diaz PO# T02301B

DESCRIPTION

Project Location: Miami Dade Water & Sewer.
Project #/ID: ASR # Well 1

Quotation #:134-Special MDWS Quote
Purchase Order #:97-10025B

Item Name	Qty	List/ Quoted	Adj	Price	Adj Price
Requisition #: A02711	0	0.00		0.00	0.00
Primary Drinking Water Metals	1	74.00		74.00	74.00
335.2 Cyanide, Total (Waters)	1	16.00		16.00	16.00
62-550.310(2)(c) Pest. & PCB's	1	558.00		558.00	558.00
62-550.405 -PWS35 Group I Unregulated Organics	1	248.00		248.00	248.00
62-550.410 -PWS34 Group II Unregulated Organics	1	70.00		70.00	70.00
62-550.415 -PWS36,37 Group III Unregulated Semivol	1	70.00		70.00	70.00

Thank you for selecting Precision Environmental Laboratory.
For technical assistance with your analytical results, or questions concerning this invoice; contact Customer Service at (954) 431-4550.

PAYMENT DUE 03/02/97 **TOTAL AMOUNT DUE $1,036.00**

interoffice
MEMORANDUM

to: Bertha Goldenberg, Environmental Coordinator
from: Noel Grant, Acting Chemist 3
subject: ASR Well #1
date: October 31, 1997

This well was sampled on January 26,1997

If I can be of further assistance please feel free to call me at 275-3170.

pH	7.12
Color (pcu)	10
Conductivity (mmho/cm)	8,980
TDS (mg/L)	5,980
T Hardness (mg/L)	1,459
T Alkalinity (mg/L)	284
Chloride (mg/L)	2,000
Turbidity (ntu)	9.5
Fluoride (mg/L)	1.5

Results of Analysis

Work ID: ASR Well Study Work Order: 97-01-344

Client Number:		Well #29	Well #30	Well #11	Well #13
OLI Number:		01A	02A	03A	04A
Gross Alpha: Water					
EPA 900 0	Units	Result/Flag	Result/Flag	Result/Flag	Result/Flag
Gross Alpha	pCi/l	1.8 U	1.4 U	1.4 U	1.2
Counting Error	pCi/l	+/- 1.1	+/- 1.0	+/- 0.9	+/- 0.8

Client Number:		Well #15	Well #17	Well #19	Well #25
OLI Number:		05A	06A	07A	08A
Gross Alpha: Water					
EPA 900 0	Units	Result/Flag	Result/Flag	Result/Flag	Result/Flag
Gross Alpha	pCi/l	1.7	2.3	3.2	2.9
Counting Error	pCi/l	+/- 0.8	+/- 0.9	+/- 1.0	+/- 0.9

Client Number:		Well #28	ASR Well #1
OLI Number:		09A	10A
Gross Alpha: Water			
EPA 900 1	Units	Result/Flag	Result/Flag
Gross Alpha	pCi/l	2.1	12.3
Counting Error	pCi/l	+/- 0.9	+/- 2.5

PRECISION ENVIRONMENTAL LABORATORY, INC.

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MIAMID000307
R Diaz PO# T02301B
Miami Dade Water & Sewer
6800 S.W. 87th Avenue
Miami, FL 33173

January 31, 1997
Submission # 9701000779
Order # 199919
FDER CompQAP# 920323G
HRS Certification# E86349, 86413

Site Location/Project
Miami Dade Water & Sewer.
ASR # Well 1

Sample I.D.: ASR Well #1
Collected: 01/26/97 11:30
Received: 01/27/97 16:00
Collected by: Client

UNREGULATED GROUP III ACID EXTRACTABLES
62-550.415
PWS037
Units are ug/L

Parameter ID	NAME	Sample Number	Analysis Result	Analytical Method	Detection Limit	Analysis Date	Analyst ID
9108	2-chlorophenol	199919	< 10.0	525.1	10.0	01/29/97	MEC
9112	2-methyl-4,6-dinitrophenol	199919	< 10.0	525.1	10.0	01/29/97	MEC
9115	Phenol	199919	< 10.0	525.1	10.0	01/29/97	MEC
9116	2,4,6-trichlorophenol	199919	< 10.0	525.1	10.0	01/29/97	MEC

Work Subcontracted to Outside Labs Denoted by HRS Cert ID in Analyst Field

Qualifier following result conforms to FAC 17-160 Table 7

Michael A. Spitzer, Laboratory Director

10200 USA Today Way • Miramar, FL 33025 • Tel: (954) 431-4550 • (800) LAB-8550 • Fax: (954) 431-1959

PRECISION ENVIRONMENTAL LABORATORY, INC.

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MIAMID000307
R Diaz PO# T02301B
Miami Dade Water & Sewer
6800 S.W. 87th Avenue
Miami, FL 33173

January 31, 1997
Submission # 9701000779
Order # 199919
FDER CompQAP# 920323G
HRS Certification# E86349, 86413

Site Location/Project
Miami Dade Water & Sewer.
ASR # Well 1

Sample I.D.: ASR Well #1
Collected: 01/26/97 11:30
Received: 01/27/97 16:00
Collected by: Client

UNREGULATED GROUP III BASE NEUTRAL EXTRACTABLES
62-550.415
PWS036
Units are ug/L

Parameter ID	NAME	Sample Number	Analysis Result	Analytical Method	Detection Limit	Analysis Date	Analyst ID
2262	Isophorone	199919	< 10.0	525.1	10.0	01/29/97	MEC
2270	2,4-dinitrotoluene	199919	< 10.0	525.1	10.0	01/29/97	MEC
2282	Dimethylphthalate	199919	< 10.0	525.1	10.0	01/29/97	MEC
2284	Diethylphthalate	199919	< 10.0	525.1	10.0	01/29/97	MEC
2290	Di-n-butylphthalate	199919	< 10.0	525.1	10.0	01/29/97	MEC
2294	Butyl benzyl phthalate	199919	< 10.0	525.1	10.0	01/29/97	MEC
9089	Dioctylphthalate	199919	< 10.0	525.1	10.0	01/29/97	MEC

Work Subcontracted to Outside Labs Denoted by HRS Cert ID in Analyst Field

Qualifier following result conforms to FAC 17-160 Table 7

Michael A. Spitzer, Laboratory Director

PRECISION ENVIRONMENTAL LABORATORY, INC.

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MIAMID000307
R Diaz PO# T02301B
Miami Dade Water & Sewer
6800 S.W. 87th Avenue
Miami, FL 33173

January 31, 1997
Submission # 9701000779
Order # 199919
FDER CompQAP# 920323G
HRS Certification# E86349, 86413

Site Location/Project
Miami Dade Water & Sewer.
ASR # Well 1

Sample I.D.: ASR Well #1
Collected: 01/26/97 11:30
Received: 01/27/97 16:00
Collected by: Client

UNREGULATED GROUP I ANALYSIS
62-550.405
PWS035
Units are ug/L

Parameter ID	NAME	Sample Number	Analysis Result	Analytical Method	Detection Limit	Analysis Date	Analyst ID
2021	Carbaryl	199919	< 10.0	531	10.0	01/29/97	PMD
2022	Methomyl	199919	< 2.5	531	2.5	01/29/97	PMD
2043	Aldicarb Sulfoxide	199919	< 10.0	531	10.0	01/29/97	PMD
2044	Aldicarb Sulfone	199919	< 10.0	531	10.0	01/29/97	PMD
2045	Metolachlor	199919	< 0.90	507	0.90	01/29/97	JT
2047	Aldicarb	199919	< 5.0	531	5.0	01/29/97	PMD
2066	3-Hydrocarbofuran	199919	< 10.0	531	10.0	01/29/97	PMD
2076	Butachlor	199919	< 0.5	507	0.5	01/29/97	JT
2077	Propachlor	199919	< 1.0	505	1.0	01/29/97	JT
2356	Aldrin	199919	< 0.09	505	0.09	01/29/97	JT
2364	Dieldrin	199919	< 0.02	505	0.02	01/29/97	JT
2440	Dicamba	199919	< 0.20	515.1	0.20	01/29/97	JT
2595	Metribuzin	199919	< 0.25	507	0.25	01/29/97	JT

Work Subcontracted to Outside Labs Denoted by HRS Cert ID in Analyst Field

Qualifier following result conforms to FAC 17-160 Table 7

Michael A. Spitzer, Laboratory Director

10200 USA Today Way • Miramar, FL 33025 • Tel: (954) 431-4550 • (800) LAB-8550 • Fax: (954) 431-1959

PRECISION ENVIRONMENTAL LABORATORY, INC.

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MIAMID000307
R Diaz PO# T02301B
Miami Dade Water & Sewer
6800 S.W. 87th Avenue
Miami, FL 33173

January 31, 1997
Submission # 9701000779
Order # 199919
FDER CompQAP# 920323G
HRS Certification# E86349, 86413

Site Location/Project
Miami Dade Water & Sewer.
ASR # Well 1

Sample I.D.: ASR Well #1
Collected: 01/26/97 11:30
Received: 01/27/97 16:00
Collected by: Client

PESTICIDE & PCB CHEMICAL ANALYSIS
62-550.310(2)(c)
PWS029
Units are ug/L

Parameter ID	NAME	Sample Number	Analysis Result	Analytical Method	Detection Limit	Analysis Date	Analyst ID
2105	2,4-D	199919	< 0.20	EPA 515.1	0.20	01/29/97	JT
2110	2,4,5-TP (silvex)	199919	< 0.20	EPA 515.1	0.20	01/29/97	JT
2274	Hexachlorobenzene	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2306	Benzo(a)pyrene	199919	< 0.2	EPA 525.1	0.2	01/29/97	MEC
2326	Pentachlorophenol	199919	< 0.20	EPA 515.1	0.20	01/29/97	JT
2383	Arochlor 1016	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2383	Arochlor 1221	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2383	Arochlor 1232	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2383	Arochlor 1242	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2383	Arochlor 1248	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2383	Arochlor 1254	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2383	Arochlor 1260	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2931	1,2-Dibromo-3-Chloropropane (DBCP)	199919	< 0.02	EPA 504	0.02	01/29/97	PMD
2946	Ethylene Dibromide (EDB)	199919	< 0.02	EPA 504	0.02	01/29/97	PMD
2959	Chlordane	199919	< 0.01	EPA 505	0.01	01/29/97	JT

Work Subcontracted to Outside Labs Denoted by HRS Cert ID in Analyst Field

Qualifier following result conforms to FAC 17-160 Table 7

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MIAMID000307
R Diaz PO# T02301B
Miami Dade Water & Sewer
6800 S.W. 87th Avenue
Miami, FL 33173

January 31, 1997
Submission # 9701000779
Order # 199919
FDER CompQAP# 920323G
HRS Certification# E86349, 86413

Site Location/Project
Miami Dade Water & Sewer.
ASR # Well 1

Sample I.D.: ASR Well #1
Collected: 01/26/97 11:30
Received: 01/27/97 16:00
Collected by: Client

PESTICIDE & PCB CHEMICAL ANALYSIS
62-550.310(2)(c)
PWS029
Units are ug/L

Parameter ID	NAME	Sample Number	Analysis Result	Analytical Method	Detection Limit	Analysis Date	Analyst ID
2005	Endrin	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2010	v-BHC (Lindane)	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2015	Methoxychlor	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2020	Toxaphene	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2031	Dalapon	199919	< 1.30	EPA 515.1	1.30	01/29/97	JT
2032	Diquat	199919	< 0.50	549	0.50	01/30/97	84147
2033	Endothall	199919	< 10.0	548	10.0	01/30/97	84147
2034	Glyphosate	199919	< 10.0	547	10.0	01/30/97	84147
2035	Di(2-Ethylhexyl)adipate	199919	< 5.0	EPA 525.1	5.0	01/29/97	MEC
2036	Oxamyl (vydate)	199919	< 50.0	531	50.0	01/29/97	PMD
2037	Simazine	199919	< 0.50	EPA 507	0.50	01/29/97	JT
2039	Di(2-Ethylhexyl)phthalate	199919	< 5.0	EPA 525.1	5.0	01/29/97	MEC
2040	Picloram	199919	< 0.20	EPA 515.1	0.20	01/29/97	JT
2041	Dinoseb	199919	< 0.20	EPA 515.1	0.20	01/29/97	JT
2042	Hexachlorocyclopentdiene	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2046	Carbofuran	199919	< 10.0	531	10.0	01/29/97	PMD
2050	Atrazine	199919	< 0.20	EPA 507	0.20	01/29/97	JT
2051	Alachlor	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2063	(Dioxin) (Screen/Optional)	199919	< 10.0	525.1	10.0	01/29/97	MEC
2065	Heptachlor	199919	< 0.01	EPA 505	0.01	01/29/97	JT
2067	Heptachlor Epoxide	199919	< 0.01	EPA 505	0.01	01/29/97	JT

PRECISION ENVIRONMENTAL LABORATORY, INC.

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NOV - 7

MIAMID000307
R Diaz PO# T02301B
Miami Dade Water & Sewer
6800 S.W. 87th Avenue
Miami, FL 33173

Page 1
January 31, 1997
Submission # 9701000779
Order # 199919
FDER CompQAP# 920323G
HRS Certification# E86349, 86413

Site Location/Project
Miami Dade Water & Sewer.
ASR # Well 1

Sample I.D.: ASR Well #1
Collected: 01/26/97 11:30
Received: 01/27/97 16:00
Collected by: Client

INORGANICS ANALYSIS
62-550.310(1)
PWS030
Units are mg/L; except Asbestos = MFL

Parameter ID	NAME	Sample Number	Analysis Result	Analytical Method	Detection Limit	Analysis Date	Analyst ID
1005	Arsenic	199919	< 0.010	SM3114B (206.3)	0.010	01/29/97	MB
1010	Barium	199919	< 0.05	SM3111D (208.1)	0.05	01/28/97	CDP
1015	Cadmium	199919	< 0.005	SM3113B (213.2)	0.005	01/28/97	CDP
1020	Chromium	199919	0.019	SM3113B (218.2)	0.005	01/29/97	MB
1024	Cyanide, Total	199919	< 0.004	335.2	0.004	01/28/97	PND
1030	Lead	199919	< 0.005	SM3113B (239.2)	0.005	01/28/97	CDP
1035	Mercury	199919	< 0.001	SM3112B (245.1)	0.001	01/29/97	CDP
1036	Nickel	199919	< 0.005	SM3113B (249.2)	0.005	01/31/97	PND
1045	Selenium	199919	< 0.010	SM3113B (270.2)	0.010	01/29/97	MB
1052	Sodium	199919	950	273.1	1.0	01/28/97	CDP
1074	Antimony	199919	< 0.005	SM3113B (204.2)	0.005	01/31/97	PND
1075	Beryllium	199919	< 0.002	SM3113B (210.2)	0.002	01/30/97	MAH
1085	Thallium	199919	< 0.002	200.9 (279.2)	0.002	01/31/97	PND

Work Subcontracted to Outside Labs Denoted by HRS Cert ID in Analyst Field

Qualifier following result conforms to FAC 17-160 Table 7

Michael A. Spitzer, Laboratory Director

10200 USA Today Way • Miramar, FL 33025 • Tel: (954) 431-4550 • (800) LAB-8550 • Fax: (954) 431-1959

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD

INTAKE FORM # 800,002

Page 1 of 1

Client: Youngquist Brothers
Address: 15465 Pine Ridge Rd.
Ft. Myers Fla
Phone: 941-489-4444 Fax: 941-489-4545

Report To: Youngquist Brothers
Bill To:
P.O. #
Project Name: Dade County Wellfield
Project Location:

Sample Supply: DW
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: 2/19

Sampled By (PRINT): Martha Vizcaino
Sampler Signature: Martha Vizcaino

ITEM #	SAMPLE DESCRIPTION / LOCATION	JOB #	Sample DATE	Sample TIME	Sample TYPE	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	HCL		Primary	Secondary	THM	GA Rad	VOC	Pest/PCB	Unreg Gr I Pest	Unreg Gr III Pest	[illegible]	T. Coliform	[illegible]	Org Nit [illegible] / TKN, COND / BOD, TEMP	LAB NUMBER
	DW - Well Site											X	X	X	X	X	X	X	X	X	X	X	X	D97003
	MW #1 - (zone [redacted] 2/6/97 1350)																							

OUT / DATE	SHIPMENT METHOD RETURNED / DATE	VIA	ITEM #	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
				[signature]	2/6	9:30 AM	Martha Vizcaino	2/6	9:30 AM
							[signature]	2/7/97	9:00

COMMENTS:

COOLER #

625 UNIT I, North Tamiami Trail, Nokomis, [illegible] 4275 • (941) 488-8103 • FAX 484-6774
16880 [illegible]

Phosphorus, Total	N97003	0.7	mg/L	EPA 365.2	0.02	2/12/97	84352	ua
Nitrogen, Total Kjeldahl	N97003	0.76	mg/L	EPA 351.3	0.2	2/14/97	84352	ua
Conductivity	N97003	10,590	umhos/c	EPA 120.1	1	2/7/97	84352	ua
BOD	N97003	<1	mg/L	EPA 405.1	1	2/7/97 10:00	84352	ua
Temperature	N97003	25.0	C	EPA 170.1	0.1	2/7/97	84352	ua

proved by:

)ebra Sanders
.aboratory Director

Approved by:

Patrick N. Sterling
Laboratory Manager

Comments:

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

2364	Dieldrin	N97003	<0.02 ug/L	EPA 505	0.02	2/8/97	86413	ua
2440	Dicamba	N97003	<0.20 ug/L	EPA 515.1	0.20	2/11/97	86413	ua
2595	Metribuzin	N97003	<0.25 ug/L	EPA 507	0.25	2/7/97	86413	ua

Unregulated Group III Analysis

62-550.415

PWS036 & 037

2262	Isophorone	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua
2270	2,4-Dinitrotoluene	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua
2282	Dimethylphthalate	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua
2284	Diethylphthalate	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua
2290	Di-n-Butylphthalate	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua
2294	Butyl benzyl phthalate	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua
9089	Di-n-octylphthalate	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua
9108	2-Chlorophenol	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua
9112	2-Methyl-4,6-dinitophenol	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua
9115	Phenol	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua
9116	2,4,6-Trichlorophenol	N97003	<10.0 ug/L	EPA 525.1	10.0	2/8/97	86413	ua

	Dioxin - 2,3,7,8-TCDD	N97003	ND ug/L	EPA 1613	0.00003	2/12/97	87293	ua

	Total Coliform	N97003	<1 col/100ml	SM9221B	1	2/7/97	9:30 84352	ua

	Corrosivity	N97003	(+)3.60			2/19/97	84352	ua

	Ammonia-N	N97003	0.42 mg/L	EPA 350.3	0.03	2/12/97	84352	ua

	Nitrogen, Organic	N97003	0.34 mg/L	EPA 351.3	0.2	2/14/97	84352	ua

	Orthophosphate	N97003	<0.02 mg/L	EPA 365.2	0.02	2/7/97	84352	ua

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

Pesticide/PCB Chemical Analysis

62-550.310(2)(c)

PWS029

2005	Endrin (2)	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
20	Lindane (2)	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2015	Methoxychlor (40)	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
020	Toxaphene (3)	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2031	Dalapon (200)	N97003	<1.30 ug/L	EPA 515.1	1.30	2/8/97	86413	ua
2032	Diquat (20)	N97003	<0.50 ug/L	EPA 549	0.50	2/12/97	86413	ua
2033	Endothall (100)	N97003	<10.0 ug/L	EPA 548	10.0	2/12/97	84147	ua
2034	Glyphosate (700)	N97003	<10.0 ug/L	EPA 547	10.0	2/12/97	84147	ua
2035	Di(2-ethylhexyl) adipate (400)	N97003	<5.0 ug/L	EPA 525.1	5.0	2/8/97	84147	ua
2036	Oxamyl (Vydate) (200)	N97003	<50.0 ug/L	EPA 531	50.0	2/7/97	86413	ua
2037	Simazine (4)	N97003	<0.50 ug/L	EPA 507	0.50	2/7/97	86413	ua
2039	Di(2-ethylhexyl) phthalate (6)	N97003	<5.0 ug/L	EPA 525.1	5.0	2/8/97	86413	ua
2040	Picloram (500)	N97003	<0.20 ug/L	EPA 515.1	0.20	2/8/97	86413	ua
2041	Dinoseb (7)	N97003	<0.20 ug/L	EPA 515.1	0.20	2/8/97	86413	ua
2042	Hexachlorocyclopentadiene(50	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2046	Carbofuran (40)	N97003	<10.0 ug/L	EPA 531	10.0	2/7/97	86413	ua
2050	Atrazine (3)	N97003	<0.20 ug/L	EPA 507	0.20	2/7/97	86413	ua
2051	Alachlor (2)	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2065	Heptachlor (.4)	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2067	Heptachlor Epoxide (.2)	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2105	2,4-D (70)	N97003	<0.20 ug/L	EPA 515.1	0.20	2/8/97	86413	ua
2111	2,4,5-TP (Silvex) (50)	N97003	<0.20 ug/L	EPA 515.1	0.20	2/8/97	86413	ua
2274	Hexachlorobenzene (1)	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
306	Benzo(a)pyrene (.2)	N97003	<0.2 ug/L	EPA 525.1	0.2	2/8/97	86413	ua
2326	Pentachlorophenol (1)	N97003	<0.20 ug/L	EPA 515.1	0.20	2/8/97	86413	ua
2383	PCB (.5)	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
1931	Dibromochloropropane (.2)	N97003	<0.02 ug/L	EPA 504	0.02	2/7/97	86413	ua
2946	Ethylene Dibromide (.02)	N97003	<0.02 ug/L	EPA 504	0.02	2/7/97	86413	ua
2959	Chlordane (2)	N97003	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua

Unregulated Group I Analysis

62-550.405

PWS035

2021	Carbaryl	N97003	<10.0 ug/L	EPA 531.1	10.0	2/7/97	86413	ua
2022	Methomyl	N97003	<2.5 ug/L	EPA 531.1	2.5	2/7/97	86413	ua
2043	Aldicarb Sulfoxide	N97003	<10.0 ug/L	EPA 531.1	10.0	2/7/97	86413	ua
2044	Aldicarb Sulfone	N97003	<10.0 ug/L	EPA 531.1	10.0	2/7/97	86413	ua
2045	Metolachlor	N97003	<0.90 ug/L	EPA 507	0.90	2/7/97	86413	ua
2047	Aldicarb	N97003	<5.0 ug/L	EPA 531.1	5.0	2/7/97	86413	ua
2066	3-Hydroxycarbofuran	N97003	<10.0 ug/L	EPA 531.1	10.0	2/7/97	86413	ua
2077	Propachlor	N97003	<1.0 ug/L	EPA 505	1.0	2/8/97	86413	ua
2356	Aldrin	N97003	<0.09 ug/L	EPA 505	0.09	2/8/97	86413	ua

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

1055	Sulfate	(250)	N97003	466	mg/L	EPA 375.4	5	2/13/97	84352	ua
1095	Zinc	(5)	N97003	0.016	mg/L	EPA 289.1	0.005	2/14/97	84352	ua
1905	Color	(15)	N97003	12	color unit	EPA 110.3	1	2/7/97	84352	ua
1920	Odor	(3)	N97003	4	TON	EPA 140.1	1	2/7/97	84352	ua
1[illegible]	pH	(6.5-8.5)	N97003	10.61	std units	EPA 150.1	n/a	2/7/97	84352	ua
1[illegible]	Total Dissolved Solids	(500)	N97003	7220	mg/L	EPA 160.1	7	2/10/97	84352	ua
2905	Foaming Agents	(1.5)	N97003	0.27	mg/L	EPA 425.1	0.05	2/11/97	86413	ua

Trihalomethane Analysis

62-550.310(2)(a)

PWS027

2950	Total THM's	(0.10)	N97003	0.0011	mg/L	EPA 524.2	0.0005	2/7/97	86413	ua

Radiochemical Analysis

62-550.310(5)

PWS033

4000	Gross Alpha		N97003	15.4	pCi/L	EPA 900.0	+\-9.1	2/11/97	83[illegible]0	ua
4020	Radium 226		N97003	6.5	pCi/L	EPA 903.1	+\-0.3	2/13/97	83170	ua
4030	Radium 228		N97003	0.8	pCi/L	Brooks&Bla	+\-0.4	2/25/97	83170	ua

Volatile Organic Analysis

62-550.310(2)(b)

PWS028

2378	1,2,4-Trichlorobenzene	(70)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2380	Cis-1,2-Dichloroethylene	(70)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2955	Xylenes (Total)	(10,000)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
296[illegible]	Dichloromethane	(5)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2[illegible]	O-Dichlorobenzene	(600)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2969	Para-Dichlorobenzene	(75)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2976	Vinyl Chloride	(1)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2977	1,1-Dichloroethylene	(7)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2979	Trans-1,2-Dichloroethylene	(10	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2980	1,2-Dichloroethane	(3)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2981	1,1,1-Trichloroethane	(200)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2982	Carbon Tetrachloride	(3)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2983	1,2-Dichloropropane	(5)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2984	Trichloroethylene	(3)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2985	1,1,2-Trichloroethane	(5)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2987	Tetrachloroethylene	(3)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2989	Monochlorobenzene	(100)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2990	Benzene	(1)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2991	Toluene	(1000)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2992	Ethylbenzene	(700)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua
2996	Styrene	(100)	N97003	<0.5	ug/L	EPA 524.2	0.5	2/7/97	86413	ua

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

Sanders Laboratories
Environmental Testing Services

Project Name:	Dade County Wellfield
Project Location:	MW # 1 Zone1350
Sample Supply:	Ground Water
Collector:	Martha Vizcaino
Sample Received Date/Time:	2/7/97 9:30

Date: 04-Mar-97

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

Parameter ID	Analysis	Lab ID	Result	Unit	Method	D. L.	Analysis Date/Time	LabID	Analyst
	Inorganic Analysis 62-550.310(1) PWS030								
1005	Arsenic (.05)	N97003	0.024	mg/L	EPA 206.2	0.0022	2/13/97	84352	ua
1010	Barium (2)	N97003	1.33	mg/L	EPA 208.1	0.200	2/18/97	84352	ua
1015	Cadmium (.005)	N97003	<0.003	mg/L	EPA 213.1	0.003	2/13/97	84352	ua
1020	Chromium (0.1)	N97003	<0.020	mg/L	EPA 218.1	0.020	2/17/97	84352	ua
1024	Cyanide (0.2)	N97003	<0.004	mg/L	EPA 335.2	0.004	2/7/97	86413	ua
1025	Fluoride (4)	N97003	0.38	mg/L	EPA 340.2	0.2	2/19/97	84352	ua
1030	Lead (0.015)	N97003	<0.040	mg/L	EPA 239.1	0.040	2/13/97	84352	ua
1035	Mercury (0.002)	N97003	<0.001	mg/L	EPA 245.1	0.001	2/19/97	84352	ua
1036	Nickel (0.1)	N97003	0.082	mg/L	EPA 249.1	0.010	2/13/97	84352	ua
1040	Nitrate (10)	N97003	<0.01	mg/L	EPA 352.1	0.01	2/7/97	84352	ua
1041	Nitrite (1)	N97003	<0.01	mg/L	EPA 354.1	0.01	2/7/97	84352	ua
1045	Selenium (0.05)	N97003	<0.004	mg/L	EPA 270.2	0.004	2/14/97	84352	ua
1052	Sodium (160)	N97003	2167	mg/L	EPA 273.1	0.003	2/18/97	84352	ua
1074	Antimony (0.006)	N97003	<0.005	mg/L	EPA 204.2	0.005	2/9/97	86413	ua
1075	Beryllium (0.004)	N97003	<0.002	mg/L	EPA 210.2	0.002	2/9/97	86413	ua
1085	Thallium (0.002)	N97003	<0.002	mg/L	EPA 279.2	0.002	2/9/97	86413	ua
	Secondary Chemical Analysis 62-550.320 PWS031								
1002	Aluminum (0.2)	N97003	<0.200	mg/L	EPA 202.1	0.200	2/19/97	84352	ua
1017	Chloride (250)	N97003	4649	mg/L	EPA 325.2	5	2/11/97	84352	ua
1022	Copper (1)	N97003	0.020	mg/L	EPA 220.2	0.010	2/13/97	84352	ua
1025	Fluoride (2.0)	N97003	0.38	mg/L	EPA 340.2	0.2	2/19/97	84352	ua
1028	Iron (0.3)	N97003	0.443	mg/L	EPA 236.1	0.015	2/19/97	84352	ua
1032	Manganese (0.05)	N97003	0.013	mg/L	EPA 243.1	0.005	2/19/97	84352	ua
1050	Silver (0.1)	N97003	0.017	mg/L	EPA 272.1	0.010	2/18/97	84352	ua

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

625 N. Tamiami Trail • Nokomis, FL 34275 • Phone: (941) 488-8103 • (800) 255-3108 • Fax: (941) 484-6774

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD

INTAKE FORM # 800,001

Page 1 of 1

Client: Youngquist Brothers
Address: 15465 Pine Ridge Rd
Ft Myers FL
Phone: 941-489-4444 Fax: 941-489-4545

Report To: Youngquist Brothers
Bill To:
P.O. #
Project Name: Dade County Wellfield
Project Location: WELL SITE (#850 Zone) → MW# Zone 850

Sample Supply: ~~[illegible]~~ DW
Customer Type:
Field Report #:
Kit #
REQUESTED DUE DATE: 2/19

Sampled By (PRINT): MARTHA VIZCAINO
Sampler Signature: Martha Vizcaino

ITEM #	SAMPLE DESCRIPTION / LOCATION	JOB #	Sample DATE	Sample TIME	Sample TYPE	NO. OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	HCL	Primary Inorg	Second. Inorg	TTHM	GA, Rad 226/Rad 228	VOC	Pest/PCB	Unreg Gr I-Pest	Unreg Gr III-Pest	Dioxin	T. Coliform	Corrosivity, NH3	Un-Nit, OP+TP, TKN, Cond, BOD, Temp	LAB NUMBER
	DW – WELL SITE MW#1 (Zone 850)										X	X	X	X	X	X	X	X	X	X	X	X	D97602

SHIPMENT METHOD OUT / DATE	RETURNED / DATE	VIA

COMMENTS:

COOLER #

ITEM #	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
	[signature]	2-5-97	11:25 AM	Martha Vizcaino	2/5/97	11:35 AM
	Greyhound	2/6/97	0930	[signature]	2/6/97	0930

REV 3/95 A024

						Date/Time		
Phosphorus, Total	D97002	0.03	mg/L	EPA 365.2	0.02	2/10/97	84352	ua
Nitrogen, Total Kjeldahl	D97002	1.63	mg/L	EPA 351.3	0.2	2/12/97	84352	ua
Conductivity	D97002	6,520	umhos/c	EPA 120.1	1	2/7/97	84352	ua
BOD	D97002	<1	mg/L	EPA 405.1	1	2/7/97	9:00 84352	ua
Temperature	D97002	25.0	C	EPA 170.1	0.1	2/7/97	84352	ua

Approved by:

Debra Sanders
Laboratory Director

Approved by:

Patrick N. Sterling
Laboratory Manager

Comments:

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

Parameter ID	Analysis	Lab ID	Result	Unit	Method	D. L.	Analysis Date/Time	LabID	Analyst
2364	Dieldrin	D97002	<0.02	ug/L	EPA 505	0.02	2/8/97	86413	ua
2440	Dicamba	D97002	<0.20	ug/L	EPA 515.1	0.20	2/8/97	86413	ua
2595	Metribuzin	D97002	<0.25	ug/L	EPA 507	0.25	2/7/97	86413	ua

Unregulated Group III Analysis

62-550.415

PWS036 & 037

2262	Isophorone	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua
2270	2,4-Dinitrotoluene	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua
2282	Dimethylphthalate	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua
2284	Diethylphthalate	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua
2290	Di-n-Butylphthalate	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua
2294	Butyl benzyl phthalate	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua
9089	Di-n-octylphthalate	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua
9108	2-Chlorophenol	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua
9112	2-Methyl-4,6-dinitophenol	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua
9115	Phenol	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua
9116	2,4,6-Trichlorophenol	D97002	<10.0	ug/L	EPA 525.1	10.0	2/7/97	86413	ua

	Dioxin - 2,3,7,8-TCDD	D97002	ND	ug/L	EPA 1613	0.00003	2/7/97	87293	ua
	Total Coliform	D97002	<1	col/100ml	SM9221B	1	2/6/97 9:30	84352	ua
	Corrosivity	D97002	(+) 0.16				2/19/97	84352	ua
	Ammonia-N	D97002	0.50	mg/L	EPA 350.2	0.03	2/12/97	84352	ua
	Nitrogen, Organic	D97002	1.13	mg/L	EPA 351.3	0.2	2/12/97	84352	ua
	Orthophosphate	D97002	<0.02	mg/L	EPA 365.2	0.02	2/7/97	84352	ua

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

Pesticide/PCB Chemical Analysis

62-550.310(2)(c)

PWS029

2(	Endrin (2)	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2010	Lindane (.2)	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2015	Methoxychlor (40)	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2020	Toxaphene (3)	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2031	Dalapon (200)	D97002	<1.30 ug/L	EPA 515.1	1.30	2/12/97	86413	ua
2032	Diquat (20)	D97002	<0.50 ug/L	EPA 549	0.50	2/12/97	84147	ua
2033	Endothall (100)	D97002	<10.0 ug/L	EPA 548	10.0	2/12/97	84147	ua
2034	Glyphosate (700)	D97002	<10.0 ug/L	EPA 547	10.0	2/12/97	84147	ua
2035	Di(2-ethylhexyl) adipate (400)	D97002	<5.0 ug/L	EPA 525.1	5.0	2/7/97	86413	ua
2036	Oxamyl (Vydate) (200)	D97002	<50.0 ug/L	EPA 531	50.0	2/6/97	86413	ua
2037	Simazine (4)	D97002	<0.50 ug/L	EPA 507	0.50	2/7/97	86413	ua
2039	Di(2-ethylhexyl) phthalate (6)	D97002	<5.0 ug/L	EPA 525.1	5.0	2/7/97	86413	ua
2040	Picloram (500)	D97002	<0.20 ug/L	EPA 515.1	0.20	2/8/97	86413	ua
2041	Dinoseb (7)	D97002	<0.20 ug/L	EPA 515.1	0.20	2/8/97	86413	ua
2042	Hexachlorocyclopentadiene(50	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2046	Carbofuran (40)	D97002	<10.0 ug/L	EPA 531	10.0	2/6/97	86413	ua
2050	Atrazine (3)	D97002	<0.20 ug/L	EPA 507	0.20	2/7/97	86413	ua
2051	Alachlor (2)	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2065	Heptachlor (.4)	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2067	Heptachlor Epoxide (.2)	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
21	2,4-D (70)	D97002	<20.0 ug/L	EPA 515.1	20.0	2/8/97	86413	ua
2110	2,4,5-TP (Silvex) (50)	D97002	<0.20 ug/L	EPA 515.1	0.20	2/8/97	86413	ua
2274	Hexachlorobenzene (1)	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
306	Benzo(a)pyrene (.2)	D97002	<0.2 ug/L	EPA 525.1	0.2	2/7/97	86413	ua
2326	Pentachlorophenol (1)	D97002	<0.20 ug/L	EPA 515.1	0.20	2/8/97	86413	ua
2383	PCB (.5)	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua
2931	Dibromochloropropane (.2)	D97002	<0.02 ug/L	EPA 504	0.02	2/7/97	86413	ua
2946	Ethylene Dibromide (.02)	D97002	<0.02 ug/L	EPA 504	0.02	2/7/97	86413	ua
2959	Chlordane (2)	D97002	<0.01 ug/L	EPA 505	0.01	2/8/97	86413	ua

<0.20 per Katie Sanders

Unregulated Group I Analysis

62-550.405

PWS035

2021	Carbaryl	D97002	<10.0 ug/L	EPA 531	10.0	2/6/97	86413	ua
2022	Methomyl	D97002	<2.5 ug/L	EPA 531	2.5	2/6/97	86413	ua
2043	Aldicarb Sulfoxide	D97002	<10.0 ug/L	EPA 531	10.0	2/6/97	86413	ua
2044	Aldicarb Sulfone	D97002	<10.0 ug/L	EPA 531	10.0	2/6/97	86413	ua
2045	Metolachlor	D97002	<0.90 ug/L	EPA 507	0.90	2/7/97	86413	ua
2047	Aldicarb	D97002	<5.0 ug/L	EPA 531	5.0	2/6/97	86413	ua
2066	3-Hydroxycarbofuran	D97002	<10.0 ug/L	EPA 531	10.0	2/6/97	86413	ua
2077	Propachlor	D97002	<1.0 ug/L	EPA 505	1.0	2/8/97	86413	ua
235	Aldrin	D97002	<0.09 ug/L	EPA 505	0.09	2/8/97	86413	ua

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

								Date/Time		
1055	Sulfate	(250)	D97002	662	mg/L	EPA 375.4	5	2/13/97	84352	ua
1095	Zinc	(5)	D97002	0.19	mg/L	EPA 289.1	0.005	2/14/97	84352	ua
1905	Color	(15)	D97002	12	color unit	EPA 110.3	1	2/7/97	84352	ua
1[illegible]	Odor	(3)	D97002	2	TON	EPA 140.1	1	2/5/97	84352	ua
19[illegible]	pH	(6.5-8.5)	D97002	7.36	std units	EPA 150.1	n/a	2/7/97	84352	ua
1930	Total Dissolved Solids	(500)	D97002	4,300	mg/L	EPA 160.1	7	2/10/97	84352	ua
2905	Foaming Agents	(1.5)	D97002	0.2	mg/L	EPA 425.1	0.01	2/6/97	86413	ua

Trihalomethane Analysis

62-550.310(2)(a)

PWS027

2950	Total THM's	(0.10)	D97002	<0.0005	mg/L	EPA 524.2	0.0005	2/6/97	86413	ua

Radiochemical Analysis

62-550.310(5)

PWS033

4000	Gross Alpha		D97002	12.9	pCi/L	EPA 900.0	+\-4.9	2/11/97	83170	ua
4020	Radium 226		D97002	3.3	pCi/L	EPA 903.1	+\-0.2	2/13/97	83170	ua
4030	Radium 228		D97002	0.8	pCi/L	Brooks&Bla	+\-0.5	2/25/97	83170	ua

Volatile Organic Analysis

62-550.310(2)(b)

PWS028

2378	1,2,4-Trichlorobenzene	(70)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2380	Cis-1,2-Dichloroethylene	(70)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2955	Xylenes (Total)	(10,000)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2[illegible]	Dichloromethane	(5)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2968	O-Dichlorobenzene	(600)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2969	Para-Dichlorobenzene	(75)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2976	Vinyl Chloride	(1)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2977	1,1-Dichloroethylene	(7)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2979	Trans-1,2-Dichloroethylene	(10	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2980	1,2-Dichloroethane	(3)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2981	1,1,1-Trichloroethane	(200)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2982	Carbon Tetrachloride	(3)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2983	1,2-Dichloropropane	(5)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2984	Trichloroethylene	(3)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2985	1,1,2-Trichloroethane	(5)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2987	Tetrachloroethylene	(3)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2989	Monochlorobenzene	(100)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2990	Benzene	(1)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2991	Toluene	(1000)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2992	Ethylbenzene	(700)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua
2996	Styrene	(100)	D97002	<0.5	ug/L	EPA 524.2	0.5	2/6/97	86413	ua

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

Sanders Laboratories
Environmental Testing Services

Project Name: Dade County Wellfield
Project Location: Site # 850 Zone ~~ALSTOM~~ M/W #1
Sample Supply: Ground Water
Collector: Martha Vizcaino
Sample Received Date/Time: 2.6/97 9:30

Date: 04-Mar-97

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

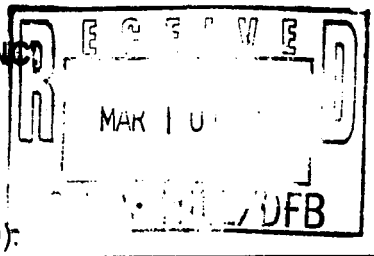
Parameter ID	Analysis	Lab ID	Result	Unit	Method	D. L.	Analysis Date/Time	LabID	Analyst
	Inorganic Analysis 62-550.310(1) PWS030								
1005	Arsenic (.05)	D97002	0.0025	mg/L	EPA 206.2	0.0022	2/13/97	84352	ua
1010	Barium (2)	D97002	0.275	mg/L	EPA 208.1	0.200	2/7/97	84352	ua
1015	Cadmium (.005)	D97002	<0.003	mg/L	EPA 213.1	0.003	2/13/97	84352	ua
1020	Chromium (0.1)	D97002	<0.020	mg/L	EPA 218.1	0.020	2/17/97	84352	ua
1024	Cyanide (0.2)	D97002	<0.004	mg/L	EPA 335.2	0.004	2/7/97	86413	ua
1025	Fluoride (4)	D97002	1.67	mg/L	EPA 340.2	0.2	2/19/97	84352	ua
1	Lead (0.015)	D97002	<0.040	mg/L	EPA 239.1	0.040	2/13/97	84352	ua
1035	Mercury (0.002)	D97002	<0.001	mg/L	EPA 245.1	0.001	2/19/97	84352	ua
1036	Nickel (0.1)	D97002	0.039	mg/L	EPA 249.1	0.010	2/13/97	84352	ua
1040	Nitrate (10)	D97002	<0.01	mg/L	EPA 352.1	0.01	2/7/97	84352	ua
1041	Nitrite (1)	D97002	<0.01	mg/L	EPA 354.1	0.01	2/7/97	84352	ua
1045	Selenium (0.05)	D97002	<0.004	mg/L	EPA 270.2	0.004	2/14/97	84352	ua
1052	Sodium (160)	D97002	1,150	mg/L	EPA 273.1	0.003	2/18/97	84352	ua
1074	Antimony (0.006)	D97002	<0.005	mg/L	EPA 204.2	0.005	2/9/97	86413	ua
1075	Beryllium (0.004)	D97002	<0.002	mg/L	EPA 210.2	0.002	2/9/97	86413	ua
1085	Thallium (0.002)	D97002	<0.002	mg/L	EPA 279.2	0 002	2/9/97	86413	ua
	Secondary Chemical Analysis 62-550.320 PWS031								
1002	Aluminum (0.2)	D97002	<0.200	mg/L	EPA 202.1	0.200	2/19/97	84352	ua
1017	Chloride (250)	D97002	2,499	mg/L	EPA 325.2	5	2/11/97	84352	ua
1022	Copper (1)	D97002	<0.010	mg/L	EPA 220.2	0.010	2/13/97	84352	ua
1025	Fluoride (2.0)	D97002	1.67	mg/L	EPA 340.2	0.2	2/19/97	84352	ua
1028	Iron (0.3)	D97002	0.501	mg/L	EPA 236.1	0.015	2/19/97	84352	ua
1032	Manganese (0.05)	D97002	0.017	mg/L	EPA 243.1	0.005	2/19/97	84352	ua
1050	Silver (0.1)	D97002	<0.010	mg/L	EPA 272.1	0.010	2/18/97	84352	ua

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

625 N. Tamiami Trail • Nokomis, FL 34275 • Phone: (941) 488-8103 • (800) 255-3108 • Fax: (941) 484-6774

LETTER OF TRANSMITTAL

HOME OFFICE
YOUNGQUIST BROTHERS, INC.
15465 PINE RIDGE ROAD
FORT MYERS, FL 33908
(941) 489-4444
FAX: (941) 489-4545



FIELD OFFICE (RETURN TO): _____

DATE: March 6, 97
PROJECT: W-740-A
JOB: West Well Field
FILE: _____

TO: CH2M Hill
ADDRESS: 800 Fairway Drive, Ste
CITY: Deerfield Beach, FL 33441
ATTENTION: Peter Kwiatkowski

PLEASE BE ADVISED:

WE ARE SENDING YOU ☒ ATTACHED ☐ UNDER SEPARATE COVER VIA: _____ THE FOLLOWING:

☐ PRINTS ☐ PLANS ☐ SHOP DRAWINGS ☐ SAMPLES ☐ SPECIFICATIONS

☐ PAY REQUEST ☐ PROOFS ☐ PHOTOGRAPHS ☐ COPY OF LETTER ☐ CHANGE ORDER

No.	DATE	COPIES	DESCRIPTION
1	3-6-97	1	Water Quality Analysis

THESE ARE BEING TRANSMITTED AS INDICATED BELOW:

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COMMENTS: Amy Questions Please Call
Thank You,
Ed McCullers
mcp

Lab ID Sample ID Type Sample Date/Time

Analysis	Method	Result	D. L.	Unit	Analysis Date/Time		LabID:
Propachlor	EPA 505	<1.0	1.0	ug/L	2/8/97		86413
Aldrin	EPA 505	<0.09	0.09	ug/L	2/8/97		86413
Dieldrin	EPA 505	<0.02	0.02	ug/L	2/8/97		86413
Dicamba	EPA 515.1	<0.20	0.20	ug/L	2/8/97		86413
Metribuzin	EPA 507	<0.25	0.25	ug/L	2/7/97		86413
Isophorone	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
2,4-Dinitrotoluene	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
Dimethylphthalate	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
Diethylphthalate	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
Di-n-Butylphthalate	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
Butyl benzyl phthalate	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
Di-n-octylphthalate	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
2-Chlorophenol	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
2-Methyl-4,6-dinitophenol	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
Phenol	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
2,4,6-Trichlorophenol	EPA 525.1	<10.0	10.0	ug/L	2/7/97		86413
Dioxin - 2,3,7,8-TCDD	EPA 1613	ND	0.00003	ug/L	2/7/97		87293
Total Coliform	SM9221B	<1	1	col/100ml	2/6/97	9:30	84352
Corrosivity		(+) 0.16			2/19/97		84352
Ammonia-N	EPA 350.2	0.50	0.03	mg/L	2/12/97		84352
Nitrogen, Organic	EPA 351.3	1.13	0.2	mg/L	2/12/97		84352
Orthophosphate	EPA 365.2	<0.02	0.02	mg/L	2/7/97		84352
Phosphorus, Total	EPA 365.2	0.03	0.02	mg/L	2/10/97		84352
Nitrogen, Total Kjeldahl	EPA 351.3	1.63	0.2	mg/L	2/12/97		84352
Conductivity	EPA 120.1	6,520	1	umhos/cm	2/7/97		84352
BOD	EPA 405.1	<1	1	mg/L	2/7/97	9:00	84352
Temperature	EPA 170.1	25.0	0.1	C	2/7/97		84352

Approved by:

Debra Sanders
Laboratory Director

Comments:
2,4-D Result and Detection Limit Revised.

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

Lab ID	Sample ID	Type	Sample Date/Time

Analysis	Method	Result	D. L.	Unit	Analysis Date/Time	LabID:
Lindane (.2)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413
Methoxychlor (40)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413
Toxaphene (3)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413
Dalapon (200)	EPA 515.1	<1.30	1.30	ug/L	2/12/97	86413
Diquat (20)	EPA 549	<0.50	0.50	ug/L	2/12/97	84147
Endothall (100)	EPA 548	<10.0	10.0	ug/L	2/12/97	84147
Glyphosate (700)	EPA 547	<10.0	10.0	ug/L	2/12/97	84147
Di(2-ethylhexyl) adipate (400)	EPA 525.1	<5.0	5.0	ug/L	2/7/97	86413
Oxamyl (Vydate) (200)	EPA 531	<50.0	50.0	ug/L	2/6/97	86413
Simazine (4)	EPA 507	<0.50	0.50	ug/L	2/7/97	86413
Di(2-ethylhexyl) phthalate (6)	EPA 525.1	<5.0	5.0	ug/L	2/7/97	86413
Picloram (500)	EPA 515.1	<0.20	0.20	ug/L	2/8/97	86413
Dinoseb (7)	EPA 515.1	<0.20	0.20	ug/L	2/8/97	86413
Hexachlorocyclopentadiene(50)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413
Carbofuran (40)	EPA 531	<10.0	10.0	ug/L	2/6/97	86413
Atrazine (3)	EPA 507	<0.20	0.20	ug/L	2/7/97	86413
Alachlor (2)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413
Heptachlor (.4)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413
Heptachlor Epoxide (.2)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413
2,4-D (70)	EPA 515.1	<0.20	0.20	ug/L	2/8/97	86413
2,4,5-TP (Silvex) (50)	EPA 515.1	<0.20	0.20	ug/L	2/8/97	86413
Hexachlorobenzene (1)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413
Benzo(a)pyrene (.2)	EPA 525.1	<0.2	0.2	ug/L	2/7/97	86413
Pentachlorophenol (1)	EPA 515.1	<0.20	0.20	ug/L	2/8/97	86413
PCB (.5)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413
Dibromochloropropane (.2)	EPA 504	<0.02	0.02	ug/L	2/7/97	86413
Ethylene Dibromide (.02)	EPA 504	<0.02	0.02	ug/L	2/7/97	86413
Chlordane (2)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413
Carbaryl	EPA 531	<10.0	10.0	ug/L	2/6/97	86413
Methomyl	EPA 531	<2.5	2.5	ug/L	2/6/97	86413
Aldicarb Sulfoxide	EPA 531	<10.0	10.0	ug/L	2/6/97	86413
Aldicarb Sulfone	EPA 531	<10.0	10.0	ug/L	2/6/97	86413
Metolachlor	EPA 507	<0.90	0.90	ug/L	2/7/97	86413
Aldicarb	EPA 531	<5.0	5.0	ug/L	2/6/97	86413
3-Hydroxycarbofuran	EPA 531	<10.0	10.0	ug/L	2/6/97	86413

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

Lab ID Sample ID Type Sample Date/Time

Analysis	Method	Result	D. L.	Unit	Analysis Date/Time	LabID:
Manganese (0.05)	EPA 243.1	0.017	0.005	mg/L	2/19/97	84352
Silver (0.1)	EPA 272.1	<0.010	0.010	mg/L	2/18/97	84352
Sulfate (250)	EPA 375.4	662	5	mg/L	2/13/97	84352
Zinc (5)	EPA 289.1	0.19	0.005	mg/L	2/14/97	84352
Color (15)	EPA 110.3	12	1	color units	2/7/97	84352
Odor (3)	EPA 140.1	2	1	TON	2/5/97	84352
pH (6.5-8.5)	EPA 150.1	7.36	n/a	std units	2/7/97	84352
Total Dissolved Solids (500)	EPA 160.1	4,300	7	mg/L	2/10/97	84352
Foaming Agents (1.5)	EPA 425.1	0.2	0.01	mg/L	2/6/97	86413
Total THM's (0.10)	EPA 524.2	<0.0005	0.0005	mg/L	2/6/97	86413
Gross Alpha	EPA 900.0	12.9	+\-4.9	pCi/L	2/11/97	83170
Radium 226	EPA 903.1	3.3	+\-0.2	pCi/L	2/13/97	83170
Radium 228	Brooks&Blanc	0.8	+\-0.5	pCi/L	2/25/97	83170
1,2,4-Trichlorobenzene (70)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Cis-1,2-Dichloroethylene (70)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Xylenes (Total) (10,000)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Dichloromethane (5)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
O-Dichlorobenzene (600)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Para-Dichlorobenzene (75)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Vinyl Chloride (1)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
1,1-Dichloroethylene (7)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Trans-1,2-Dichloroethylene(100)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
1,2-Dichloroethane (3)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
1,1,1-Trichloroethane (200)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Carbon Tetrachloride (3)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
1,2-Dichloropropane (5)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Trichloroethylene (3)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
1,1,2-Trichloroethane (5)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Tetrachloroethylene (3)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Monochlorobenzene (100)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Benzene (1)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Toluene (1000)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Ethylbenzene (700)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Styrene (100)	EPA 524.2	<0.5	0.5	ug/L	2/6/97	86413
Endrin (2)	EPA 505	<0.01	0.01	ug/L	2/8/97	86413

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

Sanders Laboratories
Environmental Testing Services

INTAKE #: 800001

Date: 13-Mar-97

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

Project Name: Dade County Wellfield
Project Location: Site # 850 Zone
Job ID:
Sample Supply: Ground Water
Collector: Martha Vizcaino
Sample Received Date/Time: 2/6/97 9:30

RECEIVED MAR 2 1 1997

Lab ID Sample ID Type Sample Date/Time

Analysis	Method	Result	D. L.	Unit	Analysis Date/Time	LabID:
D97002 site 850 RAW						
Arsenic (.05)	EPA 206.2	0.0025	0.0022	mg/L	2/13/97	84352
Barium (2)	EPA 208.1	0.275	0.200	mg/L	2/7/97	84352
Cadmium (.005)	EPA 213.1	<0.003	0.003	mg/L	2/13/97	84352
Chromium (0.1)	EPA 218.1	<0.020	0.020	mg/L	2/17/97	84352
Cyanide (0.2)	EPA 335.2	<0.004	0.004	mg/L	2/7/97	86413
Fluoride (4)	EPA 340.2	1.67	0.2	mg/L	2/19/97	84352
Lead (0.015)	EPA 239.1	<0.040	0.040	mg/L	2/13/97	84352
Mercury (0.002)	EPA 245.1	<0.001	0.001	mg/L	2/19/97	84352
Nickel (0.1)	EPA 249.1	0.039	0.010	mg/L	2/13/97	84352
Nitrate (10)	EPA 352.1	<0.01	0.01	mg/L	2/7/97	84352
Nitrite (1)	EPA 354.1	<0.01	0.01	mg/L	2/7/97	84352
Selenium (0.05)	EPA 270.2	<0.004	0.004	mg/L	2/14/97	84352
Sodium (160)	EPA 273.1	1,150	0.003	mg/L	2/18/97	84352
Antimony (0.006)	EPA 204.2	<0.005	0.005	mg/L	2/9/97	86413
Beryllium (0.004)	EPA 210.2	<0.002	0.002	mg/L	2/9/97	86413
Thallium (0.002)	EPA 279.2	<0.002	0.002	mg/L	2/9/97	86413
Aluminum (0.2)	EPA 202.1	<0.200	0.200	mg/L	2/19/97	84352
Chloride (250)	EPA 325.2	2,499	5	mg/L	2/11/97	84352
Copper (1)	EPA 220.2	<0.010	0.010	mg/L	2/13/97	84352
Fluoride (2.0)	EPA 340.2	1.67	0.2	mg/L	2/19/97	84352
Iron (0.3)	EPA 236.1	0.501	0.015	mg/L	2/19/97	84352

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

625 N. Tamiami Trail • Nokomis, FL 34275 • Phone: (941) 488-8103 • (800) 255-3108 • Fax: (941) 484-6774

Sanders Laboratories
Environmental Testing Services

CHAIN-OF CUSTODY RECORD

INTAKE FORM # 800,003

Page 1 of 1

Client: Youngquist Brothers, Inc
Address: 15465 Pine Ridge Rd
Ft Myers FL
Phone: 941-489-4444 Fax: 941-489-4545

Report To: Youngquist Brothers, Inc
Bill To:
P.O. #:
Project Name: Dade County Wellfield-West
Project Location:

Sample Supply: DW
Customer Type:
Field Report #:
Kit #: 10010
REQUESTED DUE DATE:

Sampled By (PRINT): MARTHA Vizerino
Sampler Signature: Martha Vizerini

ITEM #	SAMPLE DESCRIPTION / LOCATION	JOB #	Sample DATE	Sample TIME	Sample TYPE	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	HCL	Prim. Inorganics	Second. Inorg.	THM	GA Rad 226/228	VOC	Pest + PCB	Unreg Gr I Pest	Unreg Gr III Pest	Dioxin	T. Coliform	Corrosivity	LAB NUMBER
1	WELL RSR #X2 1300		2/25/97	1900	G	1					X	X	X	X	X	X	X	X	X	X	X	D9700

OUT DATE	SHIPMENT METHOD RETURNED / DATE	VIA	ITEM #	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
				[signature]	2-25-97	1600	Martha Vizerini	2-25-97	

COMMENTS:

COOLER #

REV. 3/95 A024

625 UNIT I, North Tamiami Trail, Nokomis, FL 34275 • (941) 488-8103 • FAX 484-6774
16880 Gator Road, Fort Myers, FL 33912 • (941) 590-0337

Orthophosphate	D97004	0.19	mg/L	EPA 365.2	0.02	2/27/97	84352	ua
Phosphorus, Total	D97004	0.22	mg/L	EPA 365.2	0.02	2/28/97	84352	ua
Nitrogen, Total Kjeldahl	D97004	0.71	mg/L	EPA 351.3	0.2	3/3/97	84352	ua
Conductivity	D97004	6,650	umhos/c	EPA 120.1	0.1	3/4/97	84352	ua
BOD	D97004	1.8	mg/L	EPA 405.1	1	2/27/97 10:00	84352	ua
Temperature	D97004	23	C	EPA 170.1		2/26/97	84352	ua

Approved by:

Debra A. Sanders

Debra Sanders
Laboratory Director

Approved by:

Patrick N. Sterling
Laboratory Manager

Comments:

2047	Aldicarb	D97004	<0.5 ug/L	EPA 531	5.0	2/27/97	86413	ua
2066	3-Hydroxycarbofuran	D97004	<10.0 ug/L	EPA 531	10.0	2/27/97	86413	ua
2077	Propachlor	D97004	<1.0 ug/L	EPA 505	1.0	2/26/97	86413	ua
2356	Aldrin	D97004	<0.09 ug/L	EPA 505	0.09	2/26/97	86413	ua
↓	Dieldrin	D97004	<0.02 ug/L	EPA 505	0.02	2/26/97	86413	ua
2440	Dicamba	D97004	<0.20 ug/L	EPA 515.1	0.20	2/27/97	86413	ua
2595	Metribuzin	D97004	<0.25 ug/L	EPA 507	0.25	2/26/97	86413	ua

Unregulated Group III Analysis

62-550.415

PWS036 & 037

2262	Isophorone	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua
2270	2,4-Dinitrotoluene	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua
2282	Dimethylphthalate	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua
2284	Diethylphthalate	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua
2290	Di-n-Butylphthalate	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua
2294	Butyl benzyl phthalate	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua
9089	Di-n-octylphthalate	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua
9108	2-Chlorophenol	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua
9112	2-Methyl-4,6-dinitophenol	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua
9115	Phenol	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua
9116	2,4,6-Trichlorophenol	D97004	<10.0 ug/L	EPA 525.1	10.0	3/4/97	86413	ua

	Dioxin	D97004	<.00003 ug/L	EPA 1613	0.00003	3/5/97	87293	ua

	Total Coliform	D97004	<1 col/100ml	SM9221B	1	2/26/97 17:30	84352	ua

	Corrosivity	D97004	+0.71			3/5/97	84352	ua

	Ammonia-N	D97004	0.40 mg/L	EPA 350.2	0.05	3/5/97	84352	ua

	Nitrogen, Organic	D97004	0.31 mg/L	EPA 351.3	0.2	3/5/97	84352	ua

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

2990	Benzene (1)	D97004	<0.5 ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2991	Toluene (1000)	D97004	<0.5 ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2992	Ethylbenzene (700)	D97004	<0.5 ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2996	Styrene (100)	D97004	<0.5 ug/L	EPA 524.2	0.5	2/27/97	86413	ua

Pesticide/PCB Chemical Analysis

62-550.310(2)(c)

PWS029

2005	Endrin (2)	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua
2010	Lindane (.2)	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua
2015	Methoxychlor (40)	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua
2020	Toxaphene (3)	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua
2031	Dalapon (200)	D97004	<1.30 ug/L	EPA 515.1	1.30	2/27/97	86413	ua
2032	Diquat (20)	D97004	<0.50 ug/L	EPA 549	0.50	3/5/97	84147	ua
2033	Endothall (100)	D97004	<10.0 ug/L	EPA 548	10.0	3/5/97	84147	ua
2034	Glyphosate (700)	D97004	<10.0 ug/L	EPA 547	10.0	3/5/97	84147	ua
2035	Di(2-ethylhexyl) adipate (400)	D97004	<5.0 ug/L	EPA 525.1	5.0	3/4/97	86413	ua
2036	Oxamyl (Vydate) (200)	D97004	<50.0 ug/L	EPA 531	50.0	2/27/97	86413	ua
2037	Simazine (4)	D97004	<0.50 ug/L	EPA 507	0.50	2/26/97	86413	ua
2039	Di(2-ethylhexyl) phthalate (6)	D97004	<5.0 ug/L	EPA 525.1	5.0	3/4/97	86413	ua
2040	Picloram (500)	D97004	<0.20 ug/L	EPA 515.1	0.20	2/27/97	86413	ua
2041	Dinoseb (7)	D97004	<0.20 ug/L	EPA 515.1	0.20	2/27/97	86413	ua
2042	Hexachlorocyclopentadiene(50	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua
2046	Carbofuran (40)	D97004	<10.0 ug/L	EPA 531	10.0	2/27/97	86413	ua
2050	Atrazine (3)	D97004	<0.20 ug/L	EPA 507	0.20	2/26/97	86413	ua
	Alachlor (2)	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua
2065	Heptachlor (.4)	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua
2067	Heptachlor Epoxide (.2)	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua
2105	2,4-D (70)	D97004	<0.20 ug/L	EPA 515.1	0.20	2/27/97	86413	ua
2110	2,4,5-TP (Silvex) (50)	D97004	<0.20 ug/L	EPA 515.1	0.20	2/27/97	86413	ua
2274	Hexachlorobenzene (1)	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua
2306	Benzo(a)pyrene (.2)	D97004	<0.2 ug/L	EPA 525.1	0.2	3/4/97	86413	ua
2326	Pentachlorophenol (1)	D97004	<0.20 ug/L	EPA 515.1	0.20	2/27/97	86413	ua
2383	PCB (.5)	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua
2931	Dibromochloropropane (.2)	D97004	<0.02 ug/L	EPA 504	0.02	3/2/97	86413	ua
2946	Ethylene Dibromide (.02)	D97004	<0.02 ug/L	EPA 504	0.02	3/2/97	86413	ua
2959	Chlordane (2)	D97004	<0.01 ug/L	EPA 505	0.01	2/26/97	86413	ua

Unregulated Group I Analysis

62-550.405

PWS035

2021	Carbaryl	D97004	<10.0 ug/L	EPA 531	10.0	2/27/97	86413	ua
2022	Methomyl	D97004	<2.5 ug/L	EPA 531	2.5	2/27/97	86413	ua
2043	Aldicarb Sulfoxide	D97004	<10.0 ug/L	EPA 531	10.0	2/27/97	86413	ua
2044	Aldicarb Sulfone	D97004	<10.0 ug/L	EPA 531	10.0	2/27/97	86413	ua
2045	Metolachlor	D97004	<0.90 ug/L	EPA 507	0.90	2/26/97	86413	ua

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

1055	Sulfate	(250)	D97004	615	mg/L	EPA 375.4	5	3/6/97	84352	ua
1095	Zinc	(5)	D97004	0.065	mg/L	EPA 289.1	0.005	3/4/97	84352	ua
1905	Color	(15)	D97004	2	color unit	EPA 110.3	1	3/4/97	84352	ua
1920	Odor	(3)	D97004	2	TON	EPA 140.1	1	2/25/97	84352	ua
	pH	(6.5-8.5)	D97004	7.12	std units	EPA 150.1	n/a	2/25/97	84352	ua
1930	Total Dissolved Solids	(500)	D97004	4,390	mg/L	EPA 160.1	7.0	2/26/97	84352	ua
2905	Foaming Agents	(1.5)	D97004	0.13	mg/L	EPA 425.1	0.01	2/27/97	86413	ua

Trihalomethane Analysis

62-550.310(2)(a)

PWS027

2950	Total THM's (0.10)	D97004	<0.5	mg/L	EPA 524.2	0.5	2/27/97	86413	ua

	Gross Alpha	D97004	47.0	pCi/L	EPA 900.0	+/-7.9	2/27/97	83170	ua

	Radium 226	D97004	10.0	pCi/L	EPA 903.1	+/-0.4	2/27/97	83170	ua

	Radium 228	D97004	0.7	pCi/L	Brooks&Bl	+/-0.4	3/7/97	83170	ua

Volatile Organic Analysis

62-550.310(2)(b)

PWS028

2378	1,2,4-Trichlorobenzene (70)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2380	Cis-1,2-Dichloroethylene (70)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2955	Xylenes (Total) (10,000)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2964	Dichloromethane (5)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2968	O-Dichlorobenzene (600)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2969	Para-Dichlorobenzene (75)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2976	Vinyl Chloride (1)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2977	1,1-Dichloroethylene (7)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2979	Trans-1,2-Dichloroethylene(10	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2980	1,2-Dichloroethane (3)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2981	1,1,1-Trichloroethane (200)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2982	Carbon Tetrachloride (3)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2983	1,2-Dichloropropane (5)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2984	Trichloroethylene (3)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2985	1,1,2-Trichloroethane (5)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2987	Tetrachloroethylene (3)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua
2989	Monochlorobenzene (100)	D97004	<0.5	ug/L	EPA 524.2	0.5	2/27/97	86413	ua

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

Sanders Laboratories
Environmental Testing Services

Date: *18-Mar-97*

Project Name:	Dade County Well Field-West
Project Location:	Well RSR 2-1300
Sample Supply:	Water
Collector:	Martha Vizoaino
Sample Received Date/Time:	2/25/97 17:00

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

RECEIVED MAR 2 1 1997

Parameter ID	Analysis	Lab ID	Result	Unit	Method	D. L.	Analysis Date/Time	LabID	Analyst
	Inorganic Analysis 62-550.310(1) PWS030								
1005	Arsenic (.05)	D97004	<0.0025	mg/L	EPA 206.2	0.0025	2/27/97	84352	ua
1010	Barium (2)	D97004	0.376	mg/L	EPA 208.1	0.200	3/8/97	84352	ua
1015	Cadmium (.005)	D97004	<0.003	mg/L	EPA 213.1	0.003	3/3/97	84352	ua
1020	Chromium (0.1)	D97004	<0.020	mg/L	EPA 218.1	0.020	3/3/97	84352	ua
1024	Cyanide (0.2)	D97004	<0.004	mg/L	EPA 335.2	0.004	2/27/97	86413	ua,
1025	Fluoride (4)	D97004	1.86	mg/L	EPA 340.2	0.2	3/6/97	84352	ua
)	Lead (0.015)	D97004	<0.0001	mg/L	EPA 239.2	0.0001	3/10/97	84352	ua
1035	Mercury (0.002)	D97004	<0.001	mg/L	EPA 245.1	0.001	3/6/97	84352	ua
1036	Nickel (0.1)	D97004	<0.010	mg/L	EPA 249.1	0.010	3/5/97	84352	ua
1040	Nitrate (10)	D97004	0.11	mg/L	EPA 352.1	0.01	2/27/97	84352	ua
1041	Nitrite (1)	D97004	<0.01	mg/L	EPA 354.1	0.01	2/26/97	84352	ua
1045	Selenium (0.05)	D97004	<0.002	mg/L	EPA 270.2	0.002	3/3/97	84352	ua
1052	Sodium (160)	D97004	1,029	mg/L	EPA 273.1	0.003	3/6/97	84352	ua
1074	Antimony (0.006)	D97004	<0.005	mg/L	EPA 204.2	0.005	2/27/97	86413	ua
1075	Beryllium (0.004)	D97004	<0.002	mg/L	EPA 210.2	0.002	2/27/97	86413	ua
1085	Thallium (0.002)	D97004	<0.002	mg/L	EPA 279.2	0.002	2/26/97	86413	ua
	Secondary Chemical Analysis 62-550.320 PWS031								
1002	Aluminum (0.2)	D97004	<0.200	mg/L	EPA 202.1	0.200	3/8/97	84352	ua
1017	Chloride (250)	D97004	2,449	mg/L	EPA 325.2	5	3/4/97	84352	ua
1022	Copper (1)	D97004	0.010	mg/L	EPA 220.2	0.001	3/4/97	84352	ua
1025	Fluoride (2.0)	D97004	1.86	mg/L	EPA 340.2	0.2	3/6/97	84352	ua
1028	Iron (0.3)	D97004	0.343	mg/L	EPA 236.1	0.015	3/12/97	84352	ua
1032	Manganese (0.05)	D97004	0.012	mg/L	EPA 243.1	0.005	3/12/97	84352	ua
1050	Silver (0.1)	D97004	<0.010	mg/L	EPA 272.1	0.010	3/4/97	84352	ua

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

625 N. Tamiami Trail • Nokomis, FL 34275 • Phone: (941) 488-8103 • (800) 255-3108 • Fax: (941) 484-6774

LETTER OF TRANSMITTAL

HOME OFFICE
YOUNGQUIST BROTHERS, INC.
15465 PINE RIDGE ROAD
RT MYERS, FL 33908
+1) 489-4444
FAX: (941) 489-4545

FIELD OFFICE (RETURN TO): _____

DATE: 3-24-97
PROJECT: West Well Field
JOB: W-740 A.
FILE: _____

TO: CH 2M Hill
ADDRESS: 800 Fairway Drive, Ste 350
CITY: Deerfield Beach, FL. 33441
ATTENTION: Peter Kwiatkowski

PLEASE BE ADVISED:

WE ARE SENDING YOU ☒ ATTACHED ☐ UNDER SEPARATE COVER VIA _____ THE FOLLOWING:

☐ PRINTS ☐ PLANS ☐ SHOP DRAWINGS ☐ SAMPLES ☐ SPECIFICATIONS
☐ PAY REQUEST ☐ PROOFS ☐ PHOTOGRAPHS ☐ COPY OF LETTER ☐ CHANGE ORDER
☐ _____

	NO.	DATE	COPIES	DESCRIPTION
1	1	3/24	1	Revised Water Quality Analysis
2				
3				
4				
5				

THESE ARE BEING TRANSMITTED AS INDICATED BELOW:

☐ AS REQUESTED ☐ APPROVED AS IS ☐ SUBMIT ____ COPIES FOR DISTRIBUTION
☐ FOR APPROVAL ☐ APPROVED WITH CORRECTIONS ☐ RETURN ____ CORRECTED ____
☐ FOR YOUR USE ☐ RETURNED WITH CORRECTIONS ☐ RETURNED AFTER LOAN TO US
☐ FOR YOUR COMMENTS ☐ RESUBMIT ____ COPIES FOR APPROVAL ☐ _____
☐ FOR BID(S) DUE _____

COMMENTS: Any questions please call.

Thank You,
Ed McCullers
mse

SIGNED: _____

Sanders Laboratories
Environmental Testing Services

CHAIN-OF-CUSTODY RECORD

INTAKE FORM # 800,004

Page 1 of 1

Client: Younggquist Brothers
Address: 15465 Pine Ridge Rd
Ft Myers FL 33908
Phone: 941-489-4444 Fax: 941-489-4545

Report To: Younggquist Brothers
Bill To: Ed McCullers
P.O. #:
Project Name: Dade County Wellfield-West
Project Location:

Sample Supply: Dw
Customer Type:
Field Report #:
Kit #:
REQUESTED DUE DATE: 7 [illegible]

Sampled By (PRINT): RICARDO CEDENO
Sampler Signature: [signature]

Analyses Request: Primary Inorganics; Secondary Inorg; TTHM; CA Rad 226+228; VOC; Pest + PCB; Unreg Group I - Pesticides; Unreg Group III; Dioxin; T. Coliform; Corrosivity, NH3, (?) NH3, OP, TP, TKN, Cond, BOD, TOC

ITEM #	SAMPLE DESCRIPTION / LOCATION	JOB #	DATE	TIME	TYPE	NO. OF CONTAINERS	UNPRESERVED	H_2SO_4	HNO_3	HCL	Sodium Thiosulfate	Primary Inorganics	Secondary Inorg	TTHM	CA Rad 226+228	VOC	Pest + PCB	Unreg Group I	Unreg Group III	Dioxin	T. Coliform	Corrosivity, NH3	LAB NUMBER
	#D97005 (well)		4/8/97	1530		7	2	1	3		1	X	X	X	X	X	X	X	X	X	X	X	D97005

SHIPMENT METHOD OUT / DATE	RETURNED / DATE	VIA	ITEM #	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
		GREYHOUND		[signature]	4/8/97	1745	GREYHOUND		
							[signature]	4/9/97	9:00

COOLER #:

COMMENTS:
FIELD TIME 3 1/2 [illegible]

625 UNIT I, North Tamiami Trail, Nokomis, FL 34275 • (941) 488-8103 • FAX 484-6774
16880 Gator Road, Fort Myers, FL 33912 • (941) 590-0337

Lab ID	Sample ID	Type	Sample Date/Time

Analysis	Method	Result	D. L.	Unit	Analysis Date/Time		LabID:
Propachlor	EPA 505	<1.0	1.0	ug/L	4/10/97		86413
Aldrin	EPA 505	<0.09	0.09	ug/L	4/10/97		86413
Dieldrin	EPA 505	<0.02	0.02	ug/L	4/10/97		86413
Dicamba	EPA 515.1	<0.20	0.20	ug/L	4/15/97		86413
Metribuzin	EPA 507	<0.25	0.25	ug/L	4/10/97		86413
Isophorone	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
2,4-Dinitrotoluene	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
Dimethylphthalate	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
Diethylphthalate	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
Di-n-Butylphthalate	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
Butyl benzyl phthalate	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
Di-n-octylphthalate	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
2-Chlorophenol	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
2-Methyl-4,6-dinitophenol	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
Phenol	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
2,4,6-Trichlorophenol	EPA 525.1	<10.0	10.0	ug/L	4/10/97		86413
Dioxin - 2,3,7,8-TCDD	EPA 1613	<0.00003	0.00003	ug/L	4/14/97		86413
Total Coliform	SM9221B	TNTC	1	col/100ml	4/9/97	9:00	84352
Corrosivity	Calc.	(+)1.91			4/11/97		84352
Ammonia-N	EPA 350.2	0.49	0.05	mg/L	4/17/97		84352
Nitrogen, Organic	EPA 351.3	0.42	0.2	mg/L	4/17/97		84352
Orthophosphate	EPA 365.2	0.20	0.02	mg/L	4/10/97		84352
Phosphorus, Total	EPA 365.2	0.29	0.02	mg/L	4/10/97		84352
Nitrogen, Total	Calc.	0.91	0.01	mg/L	4/15/97		84352
Conductivity	EPA 120.1	6,750	1.0	umhos/cm	4/9/97		84352
BOD	EPA 405.1	1.9	1	mg/L	4/9/97	7:00	84352

Approved by:

Debra Sanders
Laboratory Director

Comments:
Sample D97005 - Total Coliform result of "TNTC" means Coliform presence was "too numerous to count".

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

Lab ID	Sample ID	Type	Sample Date/Time

Analysis	Method	Result	D. L.	Unit	Analysis Date/Time	LabID:
Lindane (.2)	EPA 505	<0.01	0.01	ug/L	4/10/97	86413
Methoxychlor (40)	EPA 505	<0.01	0.01	ug/L	4/10/97	86413
Toxaphene (3)	EPA 505	<0.01	0.01	ug/L	4/10/97	86413
Dalapon (200)	EPA 515.1	<1.30	1.30	ug/L	4/14/97	86413
Diquat (20)	EPA 549.1	<0.50	0.50	ug/L	4/14/97	86413
Endothall (100)	EPA 548	<10.0	10.0	ug/L	4/14/97	86413
Glyphosate (700)	EPA 547	<10.0	10.0	ug/L	4/14/97	86413
Di(2-ethylhexyl) adipate (400)	EPA 525.1	<5.0	5.0	ug/L	4/10/97	86413
Oxamyl (Vydate) (200)	EPA 531.1	<50.0	50.0	ug/L	4/15/97	86413
Simazine (4)	EPA 507	<0.50	0.50	ug/L	4/10/97	86413
Di(2-ethylhexyl) phthalate (6)	EPA 525.1	<5.0	5.0	ug/L	4/10/97	86413
Picloram (500)	EPA 515.1	<0.20	0.20	ug/L	4/11/97	86413
Dinoseb (7)	EPA 515.1	<0.20	0.20	ug/L	4/11/97	86413
Hexachlorocyclopentadiene(50)	EPA 505	<0.01	0.01	ug/L	4/10/97	86413
Carbofuran (40)	EPA 531.1	<10.0	10.0	ug/L	4/15/97	86413
Atrazine (3)	EPA 507	<0.20	0.20	ug/L	4/10/97	86413
Alachlor (2)	EPA 507	<0.01	0.01	ug/L	4/10/97	86413
Heptachlor (.4)	EPA 505	<0.01	0.01	ug/L	4/10/97	86413
Heptachlor Epoxide (.2)	EPA 505	<0.01	0.01	ug/L	4/10/97	86413
2,4-D (70)	EPA 515.1	<0.20	0.20	ug/L	4/11/97	86413
2,4,5-TP (Silvex) (50)	EPA 515.1	<0.20	0.20	ug/L	4/11/97	86413
Hexachlorobenzene (1)	EPA 505	<0.01	0.01	ug/L	4/10/97	86413
Benzo(a)pyrene (.2)	EPA 525.1	<0.2	0.2	ug/L	4/10/97	86413
Pentachlorophenol (1)	EPA 515.1	<0.20	0.20	ug/L	4/11/97	86413
PCB (.5)	EPA 505	<0.01	0.01	ug/L	4/10/97	86413
Dibromochloropropane (.2)	EPA 504	<0.02	0.02	ug/L	4/9/97	86413
Ethylene Dibromide (.02)	EPA 504	<0.02	0.02	ug/L	4/9/97	86413
Chlordane (2)	EPA 505	<0.01	0.01	ug/L	4/10/97	86413
Carbaryl	EPA 531.1	<10.0	10.0	ug/L	4/15/97	86413
Methomyl	EPA 531.1	<2.5	2.5	ug/L	4/15/97	86413
Aldicarb Sulfoxide	EPA 531.1	<10.0	10.0	ug/L	4/15/97	86413
Aldicarb Sulfone	EPA 531.1	<10.0	10.0	ug/L	4/15/97	86413
Metolachlor	EPA 507	<0.90	0.90	ug/L	4/10/97	86413
Aldicarb	EPA 531.1	<5.0	5.0	ug/L	4/15/97	86413
3-Hydroxycarbofuran	EPA 531.1	<10.0	10.0	ug/L	4/15/97	86413

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

Lab ID	Sample ID	Type	Sample Date/Time

Analysis	Method	Result	D. L.	Unit	Analysis Date/Time	LabID:
Manganese (0.05)	EPA 243.1	0.015	0.005	mg/L	4/10/97	84352
Silver (0.1)	EPA 272.1	<0.010	0.010	mg/L	4/21/97	84352
Sulfate (250)	EPA 375.4	595	5	mg/L	4/14/97	84352
Zinc (5)	EPA 289.1	0.324	0.005	mg/L	4/22/97	84352
Color (15)	EPA 110.3	31	1	color units	4/9/97	84352
Odor (3)	EPA 140.1	1	1	TON	4/9/97	84352
pH (6.5-8.5)	EPA 150.1	8.39	n/a	std units	4/9/97	84352
Total Dissolved Solids (500)	EPA 160.1	4040	7.0	mg/L	4/15/97	84352
Foaming Agents (1.5)	EPA 425.1	0.18	0.01	mg/L	4/9/97	86413
Total THM's (0.10)	EPA 524.2	<0.5	0.5	mg/L	4/10/97	86413
Gross Alpha	EPA 900.0	19.3	+\-5.4	pCi/L	4/15/97	83170
Radium 226	EPA 903.1	12.6	+\-0.6	pCi/L	4/18/97	83170
Radium 228	Brooks&Bl	0.9	+\-0.6	pCi/L	4/18/97	83170
1,2,4-Trichlorobenzene (70)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Cis-1,2-Dichloroethylene (70)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Xylenes (Total) (10,000)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Dichloromethane (5)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
O-Dichlorobenzene (600)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Para-Dichlorobenzene (75)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Vinyl Chloride (1)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
1,1-Dichloroethylene (7)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Trans-1,2-Dichloroethylene(100)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
1,2-Dichloroethane (3)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
1,1,1-Trichloroethane (200)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Carbon Tetrachloride (3)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
1,2-Dichloropropane (5)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Trichloroethylene (3)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
1,1,2-Trichloroethane (5)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Tetrachloroethylene (3)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Monochlorobenzene (100)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Benzene (1)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Toluene (1000)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Ethylbenzene (700)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Styrene (100)	EPA 524.2	<0.5	0.5	ug/L	4/10/97	86413
Endrin (2)	EPA 505	<0.01	0.01	ug/L	4/10/97	86413

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

INTAKE #: 800004

Sanders Laboratories
Environmental Testing Services

Project Name:	Dade County Wellfield-West
Project Location:	ASR # 3
Job ID:	
Sample Supply:	Water
Collector:	Ricardo Cedeno
Sample Received Date/Time:	4/9/97 9:00

Date: *29-Apr-97*

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

RECEIVED MAY 0 2 1997

Lab ID	Sample ID	Type	Sample Date/Time
D97005		RAW	4/8/97 15:30

Analysis	Method	Result	D. L.	Unit	Analysis Date/Time	LabID:
Arsenic (.05)	EPA 206.2	<0.0022	0.0022	mg/L	4/16/97	84352
Barium (2)	EPA 208.2	<0.200	0.200	mg/L	4/21/97	84352
Cadmium (.005)	EPA 213.1	<0.003	0.003	mg/L	4/17/97	84352
Chromium (0.1)	EPA 218.1	<0.020	0.020	mg/L	4/10/97	84352
Cyanide (0.2)	EPA 335.2	<0.004	0.004	mg/L	4/12/97	86413
Fluoride (4)	EPA 340.2	1.8	0.2	mg/L	4/11/97	84352
Lead (0.015)	EPA 239.2	<0.001	0.001	mg/L	4/16/97	84352
Mercury (0.002)	EPA 245.1	<0.001	0.001	mg/L	4/22/97	84352
Nickel (0.1)	EPA 249.1	<0.010	0.010	mg/L	4/16/97	84352
Nitrate (10)	EPA 352.1	<0.01	0.01	mg/L	4/10/97	84352
Nitrite (1)	EPA 354.1	<0.01	0.01	mg/L	4/10/97	84352
Selenium (0.05)	EPA 270.2	<0.004	0.004	mg/L	4/14/97	84352
Sodium (160)	EPA 273.1	1053	0.003	mg/L	4/9/97	84352.
Antimony (0.006)	EPA 204.2	<0.005	0.005	mg/L	4/10/97	86413
Beryllium (0.004)	EPA 210.2	<0.002	0.002	mg/L	4/10/97	86413
Thallium (0.002)	EPA 279.2	<0.002	0.002	mg/L	4/10/97	86413
Aluminum (0.2)	EPA 202.1	<0.20	0.20	mg/L	4/22/97	84352
Chloride (250)	EPA 325.2	2349	5	mg/L	4/15/97	84352
Copper (1)	EPA 220.2	0.023	0.001	mg/L	4/17/97	84352
Fluoride (2.0)	EPA 340.2	1.8	0.2	mg/L	4/11/97	84352
Iron (0.3)	EPA 236.1	0.575	0.015	mg/L	4/11/97	84352

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

Rpt form #7; Rev 1/1/96

625 N. Tamiami Trail • Nokomis, FL 34275 • Phone: (941) 488-8103 • (800) 255-3108 • Fax: (941) 484-6774

APPENDIX K

Casing Pressure Test Data

CASING PRESSURE TEST

Project: MDWASD West Wellfield ASR Project
Well: ASR-1
Diameter 30 inches
Driller: Youngquist Brothers Inc.
Date: 12-Dec-96
Casing Depth: 850 feet bpl
Witnessed By: Mark Silverman, P.G./FDEP/West Palm Beach
Witnessed By: Greg Ford/CH2M HILL
Reviewed By: Peter J. Kwiatkowski, P.G./CH2M HILL
Remarks: Packer at base of casing
Gauge: Foreign 200-psi gauge; 0.5 psi increments
Results: **-0.69%** PASSED

Time	Elapsed Time (min)	Pressure (psi)	Differential (psi)	Comments
7:58 AM	0	**101.5**	0.0	Start test
8:03 AM	5	101.5	0.0	
8:08 AM	10	101.5	0.0	
8:13 AM	15	101.5	0.0	
8:18 AM	20	101.5	0.0	
8:23 AM	25	101.5	0.0	
8:28 AM	30	101.5	0.0	
8:33 AM	35	101.5	0.0	
8:40 AM	42	101.5	0.0	
8:45 AM	47	101.5	0.0	
8:50 AM	52	101.5	0.0	
8:59 AM	61	101.8	-0.3	
9:09 AM	71	102.0	-0.5	
9:12 AM	74	102.0	-0.5	
9:17 AM	79	102.1	-0.6	
9:32 AM	94	102.1	-0.6	
9:38 AM	100	102.1	-0.6	
9:44 AM	106	102.1	-0.6	
9:50 AM	112	102.1	-0.6	
9:55 AM	117	102.1	-0.6	
9:58 AM	120	102.2	**-0.7**	End test.
10:00 AM		102.2	0	Bleed off pressure
10:02 AM		65	5 gallon	
10:03 AM		32	5 gallon	
10:04 AM		0.9	5 gallon	
10:06 AM		0	2.5 gallon	17.5 gallons total

CASING PRESSURE TEST

Project: MDWASD West Wellfield ASR Project
Well: ASR-2
Diameter 30 inches
Driller: Youngquist Brothers Inc.
Date: 21-Jan-97
Casing Depth: 845 feet bpl
Witnessed By: Len Fishkin, P.G./FDEP/West Palm Beach
Witnessed By: Greg Ford/CH2M HILL
Reviewed By: Peter J. Kwiatkowski, P.G./CH2M HILL
Remarks: Cement plug at base of casing
Gauge: Foreign 200-psi gauge; 0.5 psi increments
Results: **-0.09%** PASSED

Time	Elapsed Time (min)	Pressure (psi)	Differential (psi)	Comments
11:50 AM	0	**109.9**	0.00	Start test
11:55 AM	5	110.5	-0.60	
12:00 PM	10	110.5	-0.60	
12:05 PM	15	110.8	-0.90	
12:10 PM	20	110.9	-1.00	
12:15 PM	25	111.0	-1.10	
12:20 PM	30	111.0	-1.10	
12:25 PM	35	111.1	-1.20	
12:30 PM	40	111.1	-1.20	
12:35 PM	45	111.1	-1.20	
12:40 PM	50	111.1	-1.20	
12:45 PM	55	111.1	-1.20	
12:50 PM	60	111.1	-1.20	
12:55 PM	65	111.1	-1.20	
1:00 PM	70	111.1	-1.20	
1:05 PM	75	111.1	-1.20	
1:10 PM	80	111.1	-1.20	
1:15 PM	85	111.1	-1.20	
1:20 PM	90	111.1	-1.20	
1:25 PM	95	111.0	-1.10	
1:30 PM	100	111.0	-1.10	
1:35 PM	105	111.0	-1.10	
1:40 PM	110	111.0	-1.10	
1:45 PM	115	110.9	-1.00	
1:50 PM	120	110.5	-0.60	
1:55 PM	125	110.5	-0.60	
2:00 PM	130	110.2	-0.30	
2:05 PM	135	110.0	**-0.10**	End test.
2:05 PM		110.0	0	Bleed off pressure
2:09 PM		78	5 gallon	
2:11 PM		42.5	5 gallon	
2:14 PM		10	5 gallon	
2:16 PM		0	2.5 gallon	17.5 gallons total

CASING PRESSURE TEST

Project: MDWASD West Wellfield ASR Project
Well: ASR-3
Diameter 30 inches
Driller: Youngquist Brothers Inc.
Date: 26-Feb-97
Casing Depth: 835 feet bpl
Witnessed By: Mark Silverman, P.G./FDEP/West Palm Beach
Witnessed By: Greg Ford/CH2M HILL
Reviewed By: Peter J. Kwiatkowski, P.G./CH2M HILL
Remarks: Temporary packer installed at 815 feet bpl
Gauge: Foreign 200-psi gauge; 0.5 psi increments
Results: **-2.12%** PASSED

Time	Elapsed Time (min)	Pressure (psi)	Differential (psi)	Comments
12:30 PM	0	**104.0**	0.00	Start test
12:35 PM	5	104.0	0.00	
12:40 PM	10	104.0	0.00	
12:45 PM	15	104.0	0.00	
12:50 PM	20	104.0	0.00	
12:55 PM	25	104.0	0.00	
1:00 PM	30	104.0	0.00	
1:05 PM	35	104.0	0.00	
1:10 PM	40	104.0	0.00	
1:15 PM	45	104.0	0.00	
1:20 PM	50	104.0	0.00	
1:25 PM	55	104.0	0.00	
1:30 PM	60	104.0	0.00	
1:45 PM	75	104.5	-0.50	
1:50 PM	80	104.5	-0.50	
1:55 PM	85	104.5	-0.50	
2:00 PM	90	104.7	-0.70	
2:05 PM	95	104.9	-0.90	
2:10 PM	100	105.0	-1.00	
2:15 PM	105	105.0	-1.00	
2:20 PM	110	105.1	-1.10	
2:25 PM	115	105.2	-1.20	
2:30 PM	120	105.3	-1.30	
2:35 PM	125	105.4	-1.40	
2:40 PM	130	105.8	-1.80	
2:45 PM	135	106.0	-2.00	
2:50 PM	140	106.1	-2.10	
2:55 PM	145	106.2	**-2.20**	End test.
2:55 AM		106.2	0	Bleed off pressure
2:09 PM		70	5 gallon	
2:11 PM		36	5 gallon	
2:14 PM		2	5 gallon	
2:16 PM		0	1.5 gallon	16.5 gallons total

APPENDIX L

Pressure Gauge Calibration Certificate

ARFIELD
MI. FL ATLANTA, GA

PO BOX 023367, MIAMI, FL. 33102-5367
4101 NW 29th STREET, MIAMI, FL. 33142
LOCAL: (305) 871-3900
FAX: (305) 871-5629

ASR-3

SERVICE ORDER: 9766550
DATE: 1/15/97

****
** CUSTOMER DATA **
****

CUSTOMER NAME:
PURCHASE ORDER:

CUSTOMER NUMBER: 3447

****
** CERTIFICATE OF CALIBRATION **
****

DATE OF CALIBRATION: 1/15/97
PART NUMBER: 0-200 PSI
SERIAL NUMBER: 950284 AIC
DESCRIPTION: PRESSURE GAUGE
MANUFACTURER: FOREIGN

DUE CALIBRATION: 1/15/98
RECEIVED IN TOLERANCE: NO
RETURNED IN TOLERANCE: YES
TEMPERATURE: 70 DEG F.
HUMIDITY: 70 %

CALIBRATION EQUIPMENT (List All Standards)

Equipment	S / N.	Last Date Calibration	Equipment	S / N.	Last Date Calibration
10058	B5268	1/97			

The metrology procedures utilized satisfy the requirements set forth in MIL-STD-45662A

The accuracy and calibration of this instrument is traceable to the National Institute of Standards and Technology through standards maintained by BARFIELD Inc. and is guaranteed to meet published specifications, with an uncertainty of + or - 25% of the acceptable tolerance for each characteristic being calibrated.

****
***** REMARKS *****
****

Pointer off zero, Reset pointer and Cal checked to plus or minus .25% of full scale

Certified by James F. Rose

ASR-3

BARFIELD INSTRUMENT CORPORATION
4101 N.W. 29th Street
P.O. Box 420-637
Miami, Florida 33142

RECORD OF INSTRUMENT CALIBRATION COMPARISON

For: Youngquist Brothers, Inc.
Mfr: Foreign
Desc. ~~Type~~: Pressure Gauge

BIC W.O.: 9766550
P/N Model: 0-200 PSI
S/N: 950284 BIC

BIC TEST UNIT	CUSTOMER UNIT
0	0
20	20
40	40
60	60
80	80
100	100
120	120
140	140
160	160
180	180
200	200

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

Date: 1/15/97
Temperature: 70 Deg. F.
Tested By: Jean A. Bo
Inspected By:

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

ASR-3

BARFIELD
MIAMI, FL ATLANTA, GA

PO BOX 025367, MIAMI, FL. 33102-5367
4101 NW 29th STREET, MIAMI, FL. 33142
LOCAL: (305) 871-3900
FAX: (305) 871-5629

ASR-2

SERVICE ORDER: 9766552
DATE: 1/15/97

** CUSTOMER DATA **

CUSTOMER NAME: Youngquist Brothers, inc CUSTOMER NUMBER: 3447
PURCHASE ORDER: 968004958014

** CERTIFICATE OF CALIBRATION **

DATE OF CALIBRATION: 1/15/97
PART NUMBER: 0-200 PSI
SERIAL NUMBER: 7868113
DESCRIPTION: PRESSURE GAUGE
MANUFACTURER: FOREIGN

DUE CALIBRATION: 1/15/98
RECEIVED IN TOLERANCE: NO
RETURNED IN TOLERANCE: YES
TEMPERATURE: 70DEG. F
HUMIDITY: 70 %

CALIBRATION EQUIPMENT (List All Standards)

Equipment	S / N.	Last Date Calibration	Equipment	S / N.	Last Date Calibration
1005E	B8268	1/97			

The metrology procedures utilized satisfy the requirements set forth in MIL-STD-45662A

The accuracy and calibration of this instrument is traceable to the National Institute of Standards and Technology through standards maintained by BARFIELD Inc. and is guaranteed to meet published specifications, with an uncertainty of + or - 25% of the acceptable tolerance for each characteristic being calibrated.

***** REMARKS *****

Pointer off zero, Reset pointer and
Recal to plus or minus .25% of full scale

Certified by Juan A. Boss

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

RECORD OF INSTRUMENT CALIBRATION COMPARISON

For: Voumaquist Brothers, inc. BIC W.O.: 9766552

Mfr: FOREIGN P/N ~~Model~~: 0-200 PSI

~~DESC~~ ~~Type~~: Pressure Gauge S/N: 7868113

BIC TEST UNIT	CUSTOMER UNIT
0	0
20	20
40	40
60	60
80	80
100	100
120	120
140	140
160	160
180	180
200	200

Tim -16-97 For P/U 941-489-4444

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

Date: 1/15/97

Temperature: 70 DEG. F

Tested By: Juan A. Bosch

Inspected By: _____

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

BARFIELD
MIAMI, FL ATLANTA, GA
PO BOX 025367, MIAMI, FL. 33102-5367
4101 NW 29th STREET, MIAMI, FL. 33142
LOCAL: (305) 871-3900
FAX: (305) 871-3629

ASR-1

SERVICE ORDER: 56/6130
DATE: 11/22/96

** CUSTOMER DATA **

CUSTOMER NAME: Youngquist Brothers, Inc CUSTOMER NUMBER: 3447
PURCHASE ORDER: 57962

** CERTIFICATE OF CALIBRATION **

DATE OF CALIBRATION: 11/22/96
PART NUMBER: 0-200 PSI
SERIAL NUMBER: 706470
DESCRIPTION: Pressure Gauge
MANUFACTURER: Ashcroft

DUE CALIBRATION: 11/22/97
RECEIVED IN TOLERANCE: Yes
RETURNED IN TOLERANCE: Yes
TEMPERATURE: 70
HUMIDITY: 62 %

CALIBRATION EQUIPMENT (List All Standards)

Equipment	S / N.	Last Date Calibration	Equipment	S / N.	Last Date Calibration
1005E	0814	6/96			

The metrology procedures utilized satisfy the requirements set forth in MIL-STD-45662A

The accuracy and calibration of this instrument is traceable to the National Institute of Standards and Technology through standards maintained by BARFIELD Inc. and is guaranteed to meet published specifications, with an uncertainty of + or - 25% of the acceptable tolerance for each characteristic being calibrated.

***** REMARKS *****

Needle Not Zeroed.
Reset Needle and Cal Chart to plus or Minus 2 percent of full scale.

Certified by

BARFIELD
MIAMI FL ATLANTA GA

PO BOX 025367, MIAMI, FL 33102-5367
4101 NW 29th STREET, MIAMI, FL 33142
LOCAL: (305) 871-3900
FAX: (305) 871-5629

SERVICE ORDER: 5646130
DATE: 11/22/96

** CUSTOMER DATA **

CUSTOMER NAME: Youngquist Brothers, Inc CUSTOMER NUMBER: 3447
PURCHASE ORDER: 5796

** CERTIFICATE OF CALIBRATION **

DATE OF CALIBRATION: 11/22/96 DUE CALIBRATION: 11/22/96
PART NUMBER: 0-200 PSI RECEIVED IN TOLERANCE: Yes
SERIAL NUMBER: 7WB120 RETURNED IN TOLERANCE: Yes
DESCRIPTION: Pressure Gauge TEMPERATURE: 70
MANUFACTURER: Foreign HUMIDITY: 62 %

CALIBRATION EQUIPMENT (List All Standards)

Equipment	S/N.	Last Date Calibration	Equipment	S/N.	Last Date Calibration
[illegible]	[illegible]	[illegible]			

The metrology procedures utilized satisfy the requirements set forth in MIL-STD-45662A

The accuracy and calibration of this instrument is traceable to the National Institute of Standards and Technology through standards maintained by BARFIELD Inc. and is guaranteed to meet published specifications, with an uncertainty of + or - 25% of the acceptable tolerance for each characteristic being calibrated.

***** REMARKS *****

Needle Not Zeroed.
Reset Needle and Cal check to plus or Minus
2 percent of full scale.

Certified by [signature]

F.A.A. REPAIR STATION - MIAMI XB1R995K, ATLANTA XB1D996K • J.A.A. - APPROVED

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

RECORD OF INSTRUMENT CALIBRATION COMPARISON

For: Youngquist Brothers, Inc BIC W.O.: 9646130
Mfr: Foreign Model: 0-200 PSI
Type: Pressure Gauge S/N: 7868120

BIC TEST UNIT	CUSTOMER UNIT
0	0
20	19.75
40	40
60	60.25
80	80.25
100	100
120	120
140	140
160	160
180	180.
200	200

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

Date: 11/22/96
Temperature: 70
Tested By: [signature]
Inspected By:

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

APPENDIX M

Video Survey Summary and Video Tape

RECORD OF UNDERWATER TV SURVEY

Client:	Miami Dade Water and Sewer Department
Project:	West Wellfield ASR Project
Well:	ASR-1 (30-inch Diameter)
Survey By:	Florida Geophysical Inc.
Survey Date:	28-Jan-97
Total Depth:	1304 feet below pad level (bpl)
Witnessed By:	Greg Ford/CH2M HILL
Reviewed By:	Peter Kwiatkowski, P.G./CH2M HILL
Remarks:	Camera zeroed at pad level

Depth (feet bpl)	Observations
32	Tubing Joint, Smooth casing to 270 feet bpl.
72	Tubing Joint
112	Tubing Joint, Rotating head view of joint.
152	Tubing Joint
192	Tubing Joint
231	Tubing Joint
270	Tubing Joint; Striations in casing apparent
310	Tubing Joint; smooth casing appearance
350	Tubing Joint; striated appearance
391	Tubing Joint
431	Tubing Joint
471	Tubing Joint
511	Tubing Joint; smooth casing appearance
550	Tubing Joint; striated appearance
590	Tubing Joint
630	Tubing Joint
670	Tubing Joint
710	Tubing Joint
750	Tubing Joint; striated appearance
790	Tubing Joint
830	Tubing Joint
854	Bottom of 30-inch casing
859	Small vugs
860	Smooth borehole appearance (tight formation)
873	Small caverns
888	Cavernous
905	Smooth borehole appearance (tight formation)
920	Elliptical borehole shape
936	Small vugs
950	Smooth borehole appearance (tight formation)
1008	Small vugs
1013	Smooth borehole appearance (tight formation)
1030	Very smooth (tight formation)
1048	Small vugs
1056	Smooth borehole appearance (tight formation)
1069	Small vugs
1080	Smooth borehole appearance (tight formation)
1115	Vuggy
1210	Elliptical borehole shape
1304	Total Depth - End of Survey

RECORD OF UNDERWATER TV SURVEY

Client:	Miami Dade Water and Sewer Department
Project:	West Wellfield ASR Project
Well:	ASR-2 (30-inch Diameter)
Survey By:	Florida Geophysical Inc.
Survey Date:	13-Mar-97
Total Depth:	1240 feet below pad level (bpl)
Witnessed By:	Greg Ford/CH2M HILL
Reviewed By:	Peter Kwiatkowski, P.G./CH2M HILL
Remarks:	Camera zeroed at pad level

Depth (feet bpl)	Observations
31	Tubing Joint, Smooth casing to 270 feet bpl.
71	Tubing Joint
111	Tubing Joint
151	Tubing Joint
190	Tubing Joint
230	Tubing Joint; Striations in casing apparent
270	Tubing Joint; Striations in casing apparent
310	Tubing Joint; Striations in casing apparent
350	Tubing Joint; Striations in casing apparent
390	Tubing Joint; Striations in casing apparent
430	Tubing Joint; Striations in casing apparent
470	Tubing Joint; Striations in casing apparent
509	Tubing Joint; Striations in casing apparent
549	Tubing Joint; Striations in casing apparent
588	Tubing Joint; Striations in casing apparent
628	Tubing Joint; Striations in casing apparent
668	Tubing Joint; Striations in casing apparent
708	Tubing Joint; Striations in casing apparent
748	Tubing Joint; Striations in casing apparent
788	Tubing Joint; Striations in casing apparent
828	Tubing Joint
840	Bottom of 30-inch casing
843	Small vugs
848	Smooth borehole appearance (tight formation)
857	Vugs
868	Large Vug
875	Smaller vugs
889	Large Vug
890	Reamed hole offset from pilot hole, Flow Apparent
905	Reamed hole follows pilot hole
914	Smooth borehole appearance (tight formation)
916	Small vugs
930	Smooth borehole appearance (tight formation)
947	Small vugs
948	Smooth borehole appearance (tight formation)
985	Small vugs
990	Smooth borehole appearance (tight formation)
1010	Very smooth borehole appearance (tight formation)
1024	Small vug zone
1033	Smooth borehole appearance (tight formation)

1091	Larger Vugs
1099	Smaller Vugs
1110	Smooth borehole appearance (tight formation)
1128	Large Vug
1140	Very Vuggy Appearance
1150	Smooth borehole appearance (tight formation)
1170	Vuggy
1176	Smooth borehole appearance (tight formation)
1195	Very Vuggy
1197	Smooth borehole appearance (tight formation)
1206	Camera hits borehole wall. Some flow observed.
1235	Very Cloudy
1238	Dark Picture - END OF SURVEY