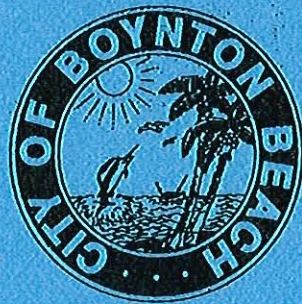


Drilling and Testing of the Concentrate Injection and Dual-Zone Monitor Wells

**For the Disposal of Concentrate Rejects
From the Low Pressure Membrane Water
Softening Facilities at the City of Boynton Beach -
West Water Treatment Plant**

Prepared for the

**City of Boynton Beach
Utilities Department**



Prepared by

CH2M HILL



50.336

SEF26410.Q1

Mr. Al Mueller, Jr., P.G., P.E.
Florida Department of Environmental Regulation
1900 S. Congress Avenue, Suite A
West Palm Beach, FL 33406-0160

Dear Al:

Subject: Boynton Beach Concentrate Disposal Well, FDER Permit No. UC 50-182070

Enclosed for your review are four copies of the "Drilling and Testing of the Concentrate Injection and Dual-Zone Monitor Wells for the Disposal of Concentrate Rejects from the Low Pressure Membrane Water Softening Facilities at the City of Boynton Beach West Water Treatment Plant," Volumes I and II. We have forwarded a copy of the report to each member of the TAC to facilitate your review.

An Operation and Maintenance Manual for the Disposal Well will be prepared and submitted as the water treatment plant construction draws to a close. Anticipated start up for the plant and well is scheduled for mid 1993.

Please advise if any further information is needed in addition to the Operation and Maintenance Manual before your Department will approve operational start up of the well. Should you have any questions, please feel free to contact Bart Ziegler or me at 305-305-426-4008.

Sincerely,

CH2M HILL

Albert Muniz
8/10/92

Albert Muniz, P.E.
Project Manager
Enclosures
ab/10011504.DFB

cc: TAC Members
Pete Mazzella/City of Boynton Beach
Bart Ziegler/CH2M HILL/DFB
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1992

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June 29, 1992
SEF26410.P1

Mr. John A. Guidry
Director of Utilities
City of Boynton Beach
124 S.E. 15th Avenue
Boynton Beach, FL 33425

Dear John:

Subject: Engineering Report on Drilling and Testing of the Injection and Dual - Zone Monitor Wells for the Disposal of Concentrate Rejects from the Low-Pressure Membrane Water Softening Facilities at the City of Boynton Beach West Water Treatment Plant

It is with great satisfaction that we submit to you the referenced Engineering Report. This report includes the data collected during the construction and testing of the disposal and dual-zone monitor wells. Both wells were constructed in accordance with the specific conditions of Construction and Testing Permit Number UC 50-182070 issued by the Florida Department of Environmental Regulation (FDER) on January 16, 1991.

We are pleased to report that the project has been successfully completed within the specified budget in the contract. This achievement was possible because of the personal interest and assistance of the City of Boynton Beach staff, efficient performance by the contractor, and cooperation of the FDER Technical Advisory Committee.

Very truly yours,

CH2M HILL

Albert Muniz, P.E.
Project Manager
Engineer of Record

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Project Administrator

Engineering Report

**Drilling and Testing of the Injection
and Dual-Zone Monitor Wells for the Disposal of
Concentrate Rejects from the Low-Pressure Membrane
Water Softening Facilities at the
City of Boynton Beach West Water Treatment Plant**

Volume I

Prepared for

**The City of Boynton Beach
Utilities Department**

Prepared by:

**CH2M HILL
800 Fairway Drive, Suite 350
Deerfield Beach, Florida 33441**

**June 1992
SEF26410.P1**

Engineering Report

Drilling and Testing of the Injection and Dual-Zone Monitor Wells for the Disposal of Concentrate Rejects from the Low-Pressure Membrane Water Softening Facilities at the City of Boynton Beach West Water Treatment Plant

Volume II

Geophysical Logs

Prepared for

**The City of Boynton Beach
Utilities Department**

Prepared by:

**CH2M HILL
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**June 1992
SEF26410.P1**

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- Appendix O. Surficial Aquifer Monitor Well Water Quality Data
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Acknowledgements

The successful completion of the injection well system at the City of Boynton Beach West Water Treatment Plant was the result of continuous communication and cooperation between the many organizations and individuals involved in its design, construction and permitting. These organizations are: The City of Boynton Beach Utilities Department, the Florida Department of Environmental Regulation (FDER), the United States Environmental Protection Agency (EPA), the South Florida Water Management District (SFWMD), the Lake Worth Drainage District (LWDD), the United States Geological Survey (USGS), the Palm Beach County Health Department (PBCHD), and the contractor, Youngquist Brothers, Inc., of Ft. Meyers, Florida.

Individuals who played key roles in the completion of this system were:

City of Boynton Beach

John A. Guidry, P.E., Director of Utilities
Peter V. Mazzella, Assistant to the Director

FDER

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CH2M HILL

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Bart Ziegler, P.E., Lead Engineer

Paul Linton, P.E., Project Engineer

Acronyms

API	American Petroleum Institute
bls	below land surface
cm	centimeter
cm/sec	centimeters per second
cps	counts per second
EPA	Environmental Protection Agency
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
FDOT	Florida Department of Transportation
gpm	gallons per minute
LSN	long and short normal
LWDD	Lake Worth Drainage District
mgd	million gallons per day
mg/l	milligrams per liter
μ hos/cm	micromoles per centimeter
mv	millivolt
NGVD	National Geodetic Vertical Datum
PBCHD	Palm Beach County Health Department
psi	pounds per square inch
psig	pounds per square inch gauge
RTS	radioactive tracer survey
SFWMD	South Florida Water Management District
TAC	Technical Advisory Committee
TDS	total dissolved solids
UIC	underground injection control
USDW	underground source of drinking water
USGS	United States Geological Survey

Executive Summary

Construction of an injection well system for the disposal of the reject waters from the City of Boynton Beach's West Water Treatment Plant (low-pressure membrane water softening facility) has been successfully completed. The concentrate disposal injection system consists of a tubing and packer injection well (13-3/8-inch-diameter mild steel liner), a 6-inch-diameter dual-zone monitor well, four surficial monitor wells, and a concrete drilling pad. Construction of the system began in March 1991 and was completed in January 1992. The targeted injection interval extends from 2,780 to 3,312 feet below land surface.

The disposal well is designed to accept concentrate flows through buildout of the membrane water treatment plant. The design capacity of this plant is 16 million gallons per day (mgd) and the required disposal capacity of the well is 4 mgd. This well was constructed in accordance with the specific conditions of the construction and testing permit (No. UC 50-182070) issued by the Florida Department of Environmental Regulation (FDER) on January 16, 1991.

Two zones were selected to monitor performance of the injection system at the dual-zone monitor well located 70 feet east of the injection well. An upper zone (970 to 1,084 feet below land surface) monitors waters in an underground source of drinking water (USDW), while the lower zone (1,800 to 1,855 feet below land surface) monitors waters in the first permeable zone below the USDW. Water containing total dissolved solids (TDS) less than 10,000 milligrams per liter (mg/l) are defined as USDWs although the U.S. Drinking Water Standard for TDS is 500 mg/l.

Hydrogeologic formations encountered during drilling of the wells and results from coring and geophysical data indicate that confinement exists and separates the injection zone from the overlying USDW. Water samples collected from straddle packer tests indicate that the 10,000 mg/l TDS interface occurs below 1,608 feet.

As required by FDER, mechanical integrity tests were performed to demonstrate the integrity of the disposal system. These tests consisted of a television survey, radioactive tracer tests (under static and dynamic conditions), and a casing pressure test. These tests satisfactorily met requirements set forth by FDER in Florida Administrative Code 1728.220(7)(c), and were observed by FDER personnel.

An injection test was also performed to confirm that the targeted injection zone would accept the buildout design disposal flow of 4.0 mgd. Results of this test showed wellhead pressures of 47 pounds per square inch while injecting at 3,000 gallons per minute (gpm) (4.32 mgd). No pressure increase was observed at the monitor well during injection testing other than tidal influences.

Because the West Water Treatment Plant is presently under construction, operational data cannot be collected at this time. However, after completion of the West Water Treatment Plant, the following actions are recommended:

- Initiate a 6-month injection testing program to monitor changes in injection well capacity, wellhead pressure, and flow rates and to determine the effectiveness of the overlying confining units. During operational testing period, the water quality of the two monitor zones and the injection fluid will be monitored. In addition, water levels and pressures in each zone of the dual-zone monitor well will be monitored.
- Request an extension of the FDER construction permit to allow acquisition of 6 months of operating data after the plant is operational. This extension will depend on the startup date for the water treatment plant.
- Prepare and submit an operating permit application which summarizes data collected during the 6-month operational testing program.
- Perform mechanical integrity testing on or before December 31, 1996, 5 years following the completion of the final casing pressure test (December 31, 1991). Under current operational requirements, this testing will be required.

Section 1 Introduction

Scope

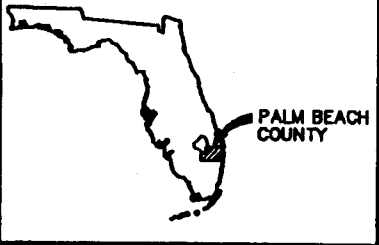
This report presents the results of the drilling, testing and environmental monitoring during the construction of the injection well system for the disposal of concentrate reject waters from the low-pressure membrane water-softening facility at the City of Boynton Beach West Water Treatment Plant. A 16-inch diameter Class I industrial deep injection well with a 13-3/8-inch liner, a 6-inch-diameter dual-zone monitor well, four surficial monitor wells, and a concrete drilling pad were constructed as part of the injection well system. This system is located at the City's West Water Treatment Plant, on Boynton Beach Boulevard, west of Military Trail in Palm Beach County. Figure 1-1 shows the location of the project site.

Construction and testing of the concentrate disposal system was performed in accordance with Florida Administrative Code (FAC) 17-28 Underground Injection Control (UIC), and the provisions of the Florida Department of Environmental Regulation (FDER) construction permit. On January 18, 1991, FDER issued Permit Number UC 50-182070 (I.D. No. 5050M03127) to the City of Boynton Beach for the construction of a Class I industrial test well and dual-zone monitor well.

Project Description

The City of Boynton Beach retained CH2M HILL in 1988 as its general consultant. The first task entailed development of a master plan for the City's water and wastewater systems (1989). The master plan demonstrated the need for enhancement of the City's water treatment system. Additional raw water supplies and a treatment process capable of meeting proposed regulations were needed to provide for future growth. The City has proceeded with the expansion of their water treatment system through the design and construction of a membrane water treatment plant and associated disposal system. At buildout, this system will be capable of producing 16 million gallons per day (mgd) of potable water. Phase 1 of the treatment plant will provide the City with 4 mgd of potable water.

The new membrane water treatment facility is located north of Boynton Beach Boulevard, about 0.5 miles west of Military Trail. This new facility will be called the West Water Treatment Plant.



FLORIDA'S TURNPIKE

CANAL C-16

JOG RD

804

CANAL E-3

CANAL L-25

CANAL L-26

MILITARY TRAIL

GOLF RD

RIDGEWOOD RD

KNOLLWOOD RD

809

BOYNTON BEACH WEST WATER TREATMENT PLANT

CONGRESS AVE

OLD BOYNTON WEST

BOYNTON BEACH BLVD

CANAL E-4

95

SEACREST BLVD

FEDERAL HWY

OCEAN AVE

A1A

ATLANTIC OCEAN



FIGURE 1-1
Project Location Map



Several disposal methods for the disposal of process concentrated rejects were considered during the design of the membrane water treatment plant. Two of the more feasible options were a disposal well and discharge into the Intracoastal Waterway. Many factors were considered during the evaluation of these options, particularly the mitigation of potential long-term environmental impacts. Pilot studies conducted for this facility show that the concentrate waters from the membrane softening plant meet the technical and regulatory criteria for disposal by deep well injection. A disposal well was selected as the primary disposal option with emergency disposal to the South Central Wastewater Treatment Plant via an interconnect to an existing sanitary force main.

A 16-inch concentrate disposal well with a 13-3/8-inch liner capable of disposing of up to 4 mgd of reject was permitted for construction. A dual-zone monitor well was constructed 70 feet east of the concentrate disposal well also to monitor performance of the confining intervals.

Construction of the concentrate disposal system began on March 18, 1991, and was completed in January 1992. Operational testing of the well can not commence until completion of the membrane water treatment plant which is expected in 1993. Approximately 6 months of operating and monitoring data must then be collected and submitted to FDER with an operating permit application. The expiration date of the well construction permit is December 10, 1992, (Appendix A). A 5-year extension to this permit will be requested to allow ample time for collection of operating data to support the operating permit application.

The FDER Technical Advisory Committee (TAC) coordinated the actions of local, state, and federal agencies, including FDER's state and local representatives, the South Florida Water Management District (SFWMD), the United States Environmental Protection Agency (EPA), the Palm Beach County Health Department (PBCHD), and the United States Geological Survey (USGS). TAC members met periodically to review project progress and testing procedures. Summaries of the TAC meetings are included in Appendix T. Daily engineer's summaries and weekly summaries of the construction progress were prepared and submitted to members of the TAC and are found in Appendix R and Appendix S, respectively.

Section 2 Construction

The low pressure membrane softening reject concentrate disposal system consists of a concrete drilling pad, one 12.347-inch inside diameter Class I tubing and packer concentrate disposal well, a dual-zone monitor well, and a surge control system. Construction of the surge control system is included under a separate contract for the water treatment plant, currently under construction. The reinforced concrete drilling pad and containment curbs were constructed before drilling started to provide stable support for the drilling equipment and to contain any minor spills that might occur during drilling operations.

The Class I injection well and the dual-zone monitor well were constructed in accordance with the requirements of the provisions of Part II, Chapter 17-28, FAC. Multiple, telescoped casings of new and unused steel were used to construct the wells. The final casing on the concentrate disposal well was seamless mild steel pipe with a wall thickness of 0.656 inches. A cementing program was specifically tailored for each casing installation to account for the different hydrogeological units penetrated and natural variations within each of these units.

Concentrate Disposal Well

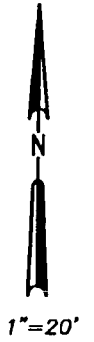
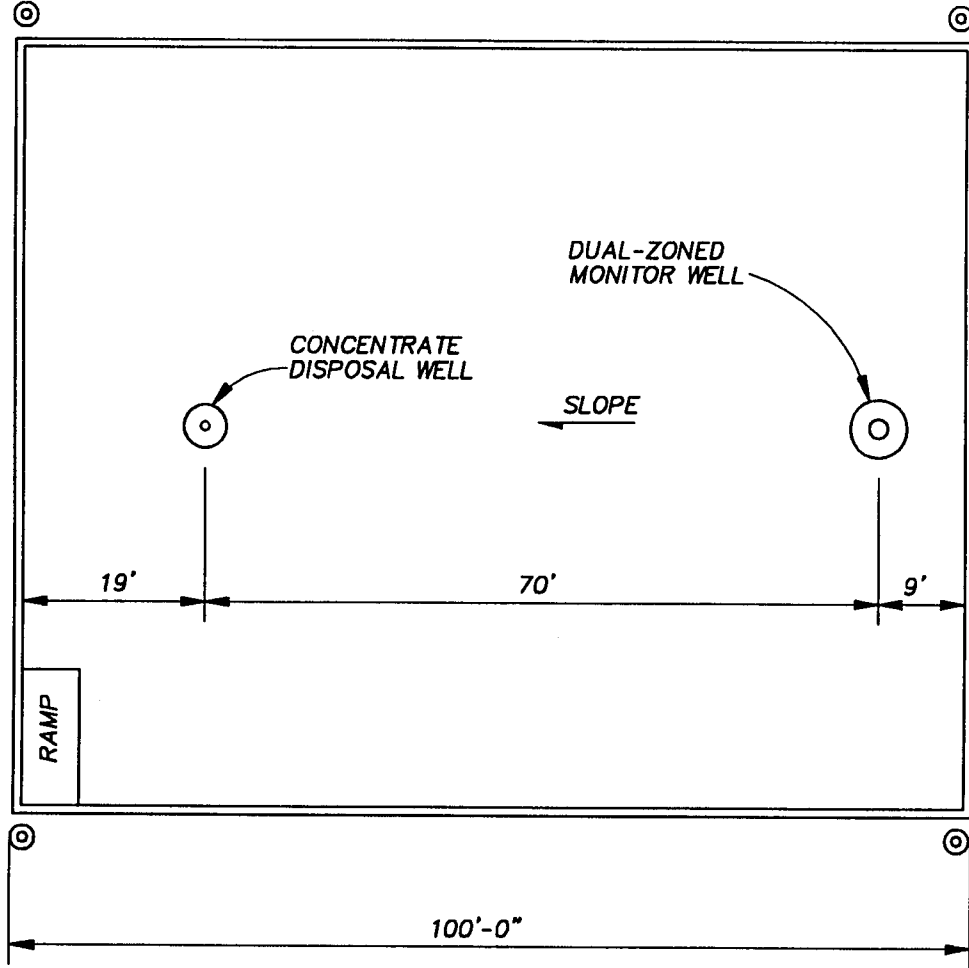
A notice to proceed for construction of the wells was issued to Youngquist Brothers, Inc., on March 18, 1991. The construction contract required completion within 240 days (November 13, 1991). Construction of the reinforced concrete drilling pad and containment curbs commenced on April 4, 1991. The drilling pad layout is presented in Figure 2-1. All casing depths are referenced to the top of the pad at the injection well.

Drilling of the disposal well started on May 3, 1991. Both mud rotary and reverse-air drilling techniques were used during construction. Mud rotary techniques were used to drill the pilot hole in stages to 365 feet and 1,021 feet. Subsequent stages were drilled using reverse-air techniques to remove cuttings and to collect water samples at 30-foot intervals. A closed circulation system was used with the reverse-air technique on the disposal well because an acceptable disposal site for the drilling fluids was unavailable.

Drilling and casing depths were designed to meet the hydrogeological features anticipated at the site and various regulatory requirements. Formation samples were collected at 10-foot intervals during drilling of the pilot hole to provide information on the geological formation encountered. Water quality and lithological data obtained from the formation samples, water samples, coring samples and geophysical logs were used to select the actual casing setting depths. Vertical alignment of the pilot hole was checked by

SURFICIAL
MONITOR WELL
No. 1

SURFICIAL
MONITOR WELL
No. 2



SURFICIAL
MONITOR WELL
No. 3

SURFICIAL
MONITOR WELL
No. 4

FIGURE 2-1 [®]
Drilling Pad Layout at the
Boynton Beach West Treatment Plant



deviation surveys (90-foot intervals) performed during drilling and by gyroscopic surveys on the completed pilot holes. Appendices H and I contain the deviation surveys and gyroscopic surveys. After the casing depth was selected, each pilot hole was reamed to the specified diameter required to allow its installation and cementing. Table 2-1 summarizes the drilling and testing performed during the construction of the concentrate disposal well. Table 2-2 summarizes the geophysical logging performed during the construction of the well. Figure 2-2 provides a graphic representation of the completed concentrate disposal well.

Four concentric steel casings (42-, 34-, 26-, and 16-inch-diameter) were used in the construction of the well. A 48-inch-diameter surface casing was vibrated in place to a total depth of 48 feet below land surface (bls) on April 25, 1991. The 42-inch casing was set in a nominal 48-inch-diameter borehole following drilling of the pilot hole. It was then cemented from the top of the upper confining beds at a total depth of 345 feet to the surface to prevent possible contamination of the surficial aquifer.

The pilot hole was continued to 1,021 feet and logged. Installation of the 34-inch casing was then completed through the confining intervals of the Hawthorn and Tampa formations and into the top of the Floridan aquifer system to a depth of 970 feet. This casing setting depth was selected to protect the integrity of the upper confining interval and to prevent interference from swelling clays and soft limestones during reverse-air drilling below 970 feet.

The pilot hole was then completed to 2,100 feet and four straddle packer pumping tests were performed over the interval from 1,428 feet to 1,759 feet. The tests were initiated in waters which were anticipated to have a total dissolved solid (TDS) concentration greater than 10,000 milligrams per liter (mg/l). The fourth test was performed over an interval which was expected to have water containing less than 10,000 mg/l TDS. Testing was successful in demonstrating that waters below approximately 1,608 feet have TDS concentration greater than 10,000 mg/l. Data collected during the test is contained in Appendix E. Results from the packer testing are discussed in further detail in Section 4.

A 26-inch casing was installed to a depth of 2,000 feet, below the 10,000 mg/l TDS interface and cemented back to land surface. This casing was installed to prevent possible contamination of the underground source of drinking water to control artesian flows of the upper Floridan aquifer system.

The pilot hole was then advanced to a total depth of 3,312 feet. During drilling of the pilot hole, six coring runs were made to obtain samples for vertical and horizontal permeability testing. A video survey of the pilot hole was attempted after flushing with potable water, but a clear picture could not be obtained. The pilot hole was then reamed with a 24-1/2-inch-diameter bit from a depth of 2,000 feet to 2,790 feet bls. A drillable

Table 2-1
Summary of Drilling and Testing of the Boynton Beach
Concentrate Disposal Well

Depth (feet bls)	Nominal Diameter (inches)	Date Completed	Description of Activity
48	48	04/25/91	Surface casing vibrated in place
365	12	05/04/91	Completed pilot hole for 42-inch casing
355	48	05/10/91	Completed borehole for installation of 42-inch casing
345	42	05/11/91	Completed installation of 42-inch casing
1,021	12	05/15/91	Completed pilot hole for 34-inch casing
980	42	05/20/91	Completed borehole for installation of 34-inch casing
970	34	05/25/91	Completed installation of 34-inch casing
2,100	12	06/03/91	Completed pilot hole for 26-inch casing
1,737 - 1,759	12	06/06/91	Straddle Packer Test No. 1
1,708 - 1,729	12	06/07/91	Straddle Packer Test No. 2
1,608 - 1,629	12	06/07/91	Straddle Packer Test No. 3
1,428 - 1,449	12	06/08/91	Straddle Packer Test No. 4
2,010	34	06/26/91	Completed borehole for installation of 26-inch casing
2,001	26	07/09/91	Completed installation of 26-inch casing
2,130-2,147	12	07/13/91	Coring Run 1
2,200-2,214	12	07/14/91	Coring Run 2
2,351-2,365	12	07/15/91	Coring Run 3
2,411-2,426	12	07/17/91	Coring Run 4
2,441-2,456	12	07/18/91	Coring Run 5
2,651-2,662	12	07/20/91	Coring Run 6
3,312	12	07/23/91	Completed pilot hole
2,790	26	08/02/91	Completed borehole for installation of 16-inch casing
2,795	26	08/21/91	Completed installation of drillable bridge plug

Table 2-1
Summary of Drilling and Testing of the Boynton Beach
Concentrate Disposal Well

Depth (feet bls)	Nominal Diameter (inches)	Date Completed	Description of Activity
2,780	16	08/27/91	Completed installation of 16-inch casing
2,780	16	08/30/91	Conducted casing pressure test
3,312	16	09/04/91	Completed borehole
3,312	16	09/05/91	Developed well
2,720	16	09/23/91	Installed packer assembly with liner hanger
2,229.31	16	10/02/91	Identified pin-hole leak in 16-inch casing at 2,229.31 feet
2,229.31	16	12/02/91	Installed K-Trol-C
2,257	16	12/15/91	Performed pressure test to check K-Trol performance
2,214-2,244	16	12/16/91	Installed internal casing patch
2,694	16	12/17/91	Performed pressure test to check K-Trol and internal casing patch performance
2,720	13	12/22/91	Completed installation of 13-3/8-inch liner and performed preliminary pressure tests on 13-3/8-inch liner
3,312	13	12/23/91	Completed wellhead assembly
3,312	13	12/28/91	Completed step injection test
3,312	13	12/30/91	Performed radioactive tracer survey
2,720	13	12/31/91	Performed final pressure test on annulus between the 13-3/8-inch liner and 16-inch casing

**Table 2-2
Summary of Geophysical Logging
of the Boynton Beach Concentrate
Disposal Well**

Depth (feet)	Section	Diameter (inches)	Date	Geophysical Logging Performed
365	Pilot	12-1/4	05/04/91	CAL, LSN, GR, SP
1,021	Pilot	12-1/4	05/15/91	CAL, LSN, GR, SP, GYR
970	Casing	34	05/25/91	TP, GR
2,100	Pilot	12-1/4	06/02/91	GYR
2,100	Pilot	12-1/4	06/04/91	CAL, LSN, GR, SP, TP, FR, IND
2,010	Reamed	32-1/2	06/26/91	CAL, GR
2,010	Casing	26	06/28/91	TP, GR
3,312	Pilot	12-1/4	07/24/91	CAL, LSN, GR, SP, TP, FR, GYR, IND, BCS, FI
3,312	Pilot	12-1/4	07/25/91	TV
2,790	Reamed	26	08/20/91	CAL
2,780	Casing	16	08/22/91	TP
2,780	Casing	16	08/30/91	CB
2,780	Casing	16	09/09/91	TV
2,712	Casing Patch	16	12/20/91	TV
3,312	Reamed	16	12/23/91	CAL, TP, FR, GR (final background logs)
3,312	Reamed	16	12/28/91	TP, FM
3,312	Well	13	12/30/91	RTS

BCS - Borehole Compensated Sonic
CAL - Caliper
CB - Cement Bond
CCL - Casing Collar Locator
FI - Fracture Identification
FM - Flow Meter
FR - Fluid Resistivity
GR - Gamma Ray
GYR - Gyroscopic Survey
IND - Dual Induction
LSN - Long and Short Normal Electric
RTS - Radioactive Tracer Survey with CCL and TP
SP - Spontaneous Potential
TP - Temperature
TV - Black-and-White Video

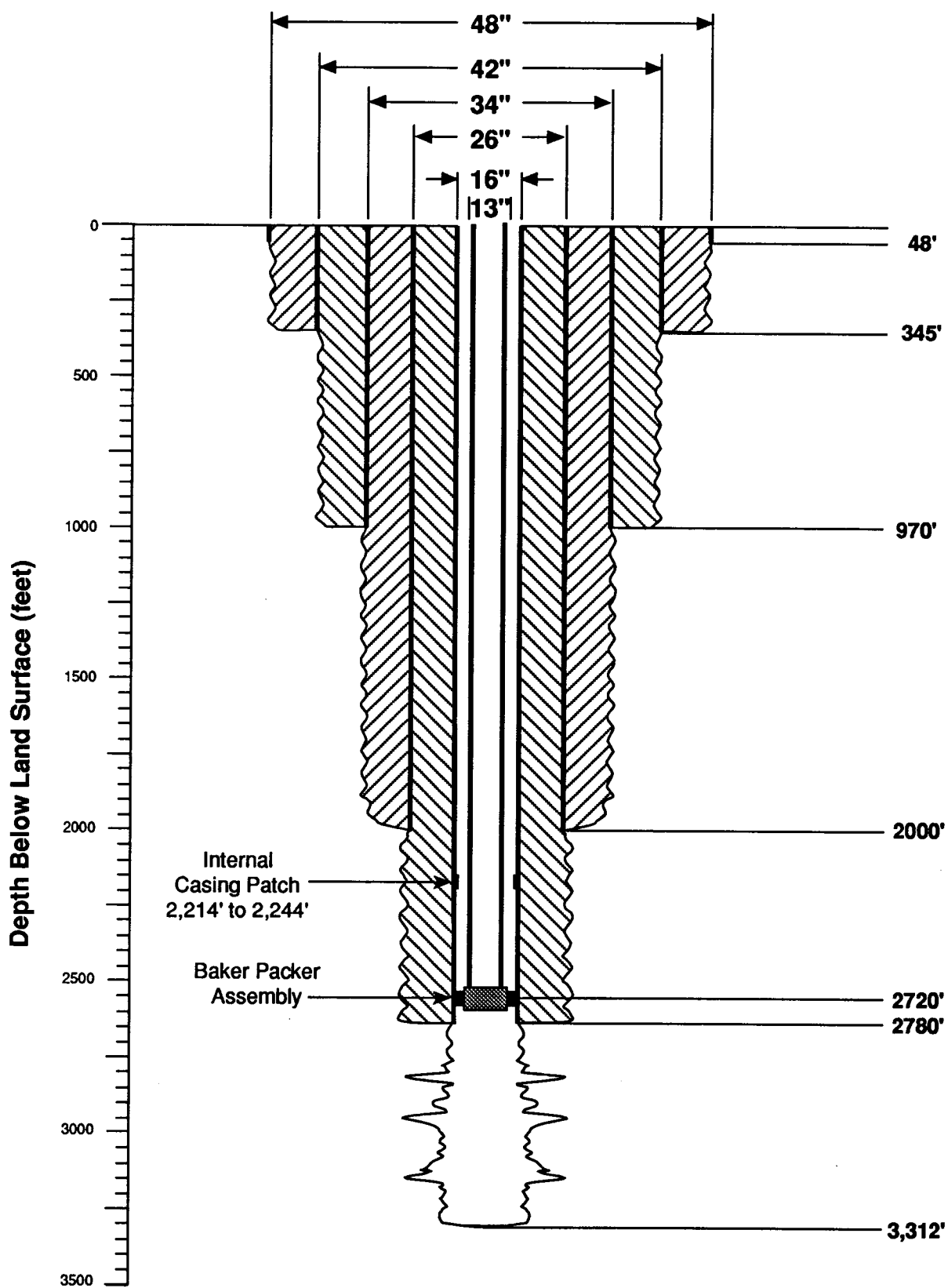


FIGURE 2-2
Concentrate Disposal Well Completion Diagram



bridge plug was installed to prevent cement from moving down the pilot hole during grouting of the 16-inch-diameter casing. The 16-inch-diameter, 0.656-inch wall casing (American Petroleum Institute [API] 5L Grade B Seamless), was installed to a depth of 2,780 feet bls and grouted to the surface. Appendix B contains the casing mill certificates submitted during construction. Appendix C contains a table summarizing the casing setting depths and types of cement and quantities used.

A casing pressure test was successfully conducted after circulating the casing with potable water for 2 days to reduce heat generated by the curing cement. The well was then completed with an open hole to 3,312 feet.

After the open hole was complete, the well was developed for 8 hours by circulating with reverse-air. A black-and-white video survey was then performed on the complete well after flushing with potable water. A summary of observation from this survey is in Appendix L.

The next stage of construction was preparation of the 16-inch casing for installation of the Baker packer assembly and 13-3/8-inch liner. The 16-inch casing was prepared by running a casing scraper the complete length of the casing to remove any obstructions that may have existed on the casing wall. A Baker packer assembly was then installed at a depth of 2,720 feet bls followed by installation of the 13-3/8-inch liner.

A pressure test was conducted on the annulus between the liner and the 16-inch casing, but the annulus would not hold pressure. After several days of testing, a pin-hole leak was identified at a depth of 2,229.31 feet as the reason for the failure of the annulus to hold pressure. FDER and TAC members were then informed, and a corrective action plan was prepared and implemented.

The pin-hole leak was repaired with a two-phased approach. First, Haliburton Services, Inc., was retained by Youngquist Brothers to plug the leak with K-Trol Sealant. K-Trol is a grout sealant built from an acrylamide monomer. The K-Trol was applied by placing 630 gallons in the 16-inch casing over the interval from 2,176 feet to 2,248 feet (72-foot column). The 16-inch casing was then pressurized to 200 pounds per square inch (psi) to force the K-Trol into the pin-hole. Pressure was then maintained for approximately 3.0 hours until the material set. Approximately 7.3 gallons of K-Trol were forced out into the leak before the material set.

The spent material was recovered from the well with a junk basket and by reverse circulation. A casing scraper was then run in the 16-inch casing over the interval from 2,212 feet to 2,252 feet to remove any excess K-Trol remaining on the casing wall. Recovered material was sealed in Florida Department of Transportation (FDOT) drums and disposed of by chemical waste management at the Emelle Facility in Emelle, Alabama.

In addition to the K-Trol, a 30-foot Homco, Inc., internal casing patch was placed in the 16-inch casing over the interval from 2,214 feet to 2,244 feet. The patch was a steel cylinder 14.500-inch inside diameter, with a wall thickness of 0.125 inches. Pressure tests were conducted after each phase to determine if the corrective action performed as expected. After placement of the K-Trol material and the internal casing patch, both pressure tests were successful.

Following remedial activities, the 13-3/8-inch liner was reinstalled. Torque data recorded during installation of the liner is included in Appendix J. The annulus between the 16-inch casing and the liner was then filled with a corrosion inhibitor (Cronox 669 F manufactured by Baker Services) and was then successfully pressure tested for one hour with no pressure drop.

The permanent wellhead assembly was installed, background geophysical logs were run, and a step injection test was performed. Following the injection test, a radioactive tracer survey (RTS) was successfully completed on the well. A pressure test was also successfully performed on the annulus between the 13-3/8-inch liner and the 16-inch casing to complete construction of the well. Diagrams of the completed concentrate disposal well packer assembly and wellhead are shown in Figures 2-3 and 2-4.

Dual-Zone Monitor Well

Drilling of the 6-inch dual-zone monitor well commenced on July 7, 1991, with the same drilling techniques used for the concentrate disposal well. Fluids produced during reverse-air drilling through the artesian zones of the upper Floridan aquifer (below 1,000 feet) were disposed of into the completed concentrate disposal well. This technique allowed open circulation drilling of the dual-zone monitor well and resulted in the collection of more representative water samples during drilling.

The upper and lower monitor zones were selected in the Floridan aquifer system above the primary confining intervals of the injection zone. The monitor zones are open over the intervals from 970 feet to 1,084 feet and 1,800 feet to 1,855 feet for the upper and lower zones, respectively.

Three concentric steel casings (24-, 16-, and 6-inch) were used to construct the dual-zone monitor well. Casing setting depths for the dual-zone monitor well were similar to those for the concentrate disposal well. A 24-inch casing was set through the surficial aquifer to 345 feet, a 16-inch casing was installed through the Hawthorn and Tampa formations into the upper Floridan aquifer to 970 feet, and a 6-inch casing was installed to 1,800 feet. The 24- and 16-inch casings were cemented to the surface. The 6-inch casing was cemented from its base to 1,084 feet. The annulus was left open from 1,084 feet to the base of the 16-inch casing at 970 feet to serve as the upper monitor

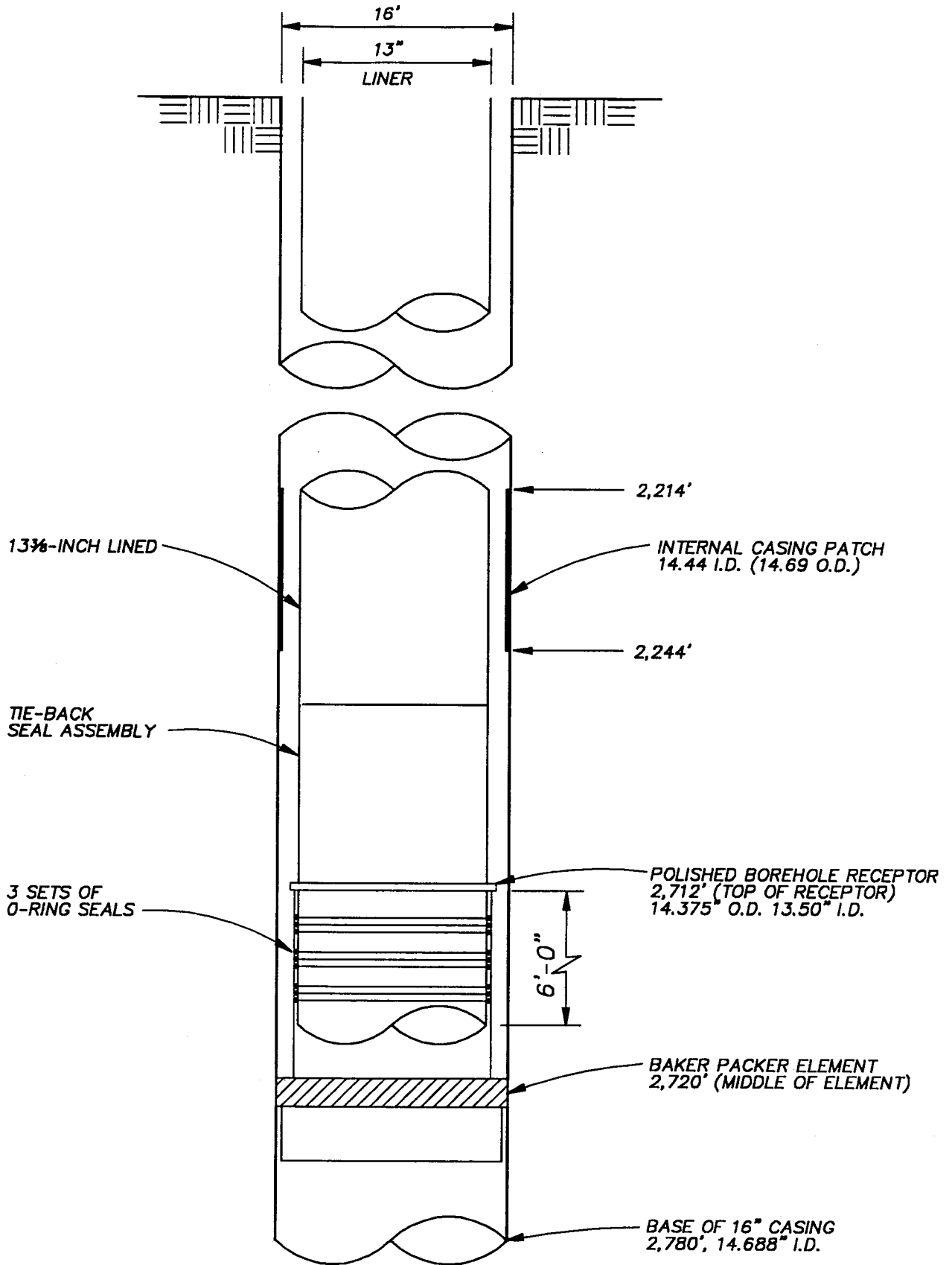
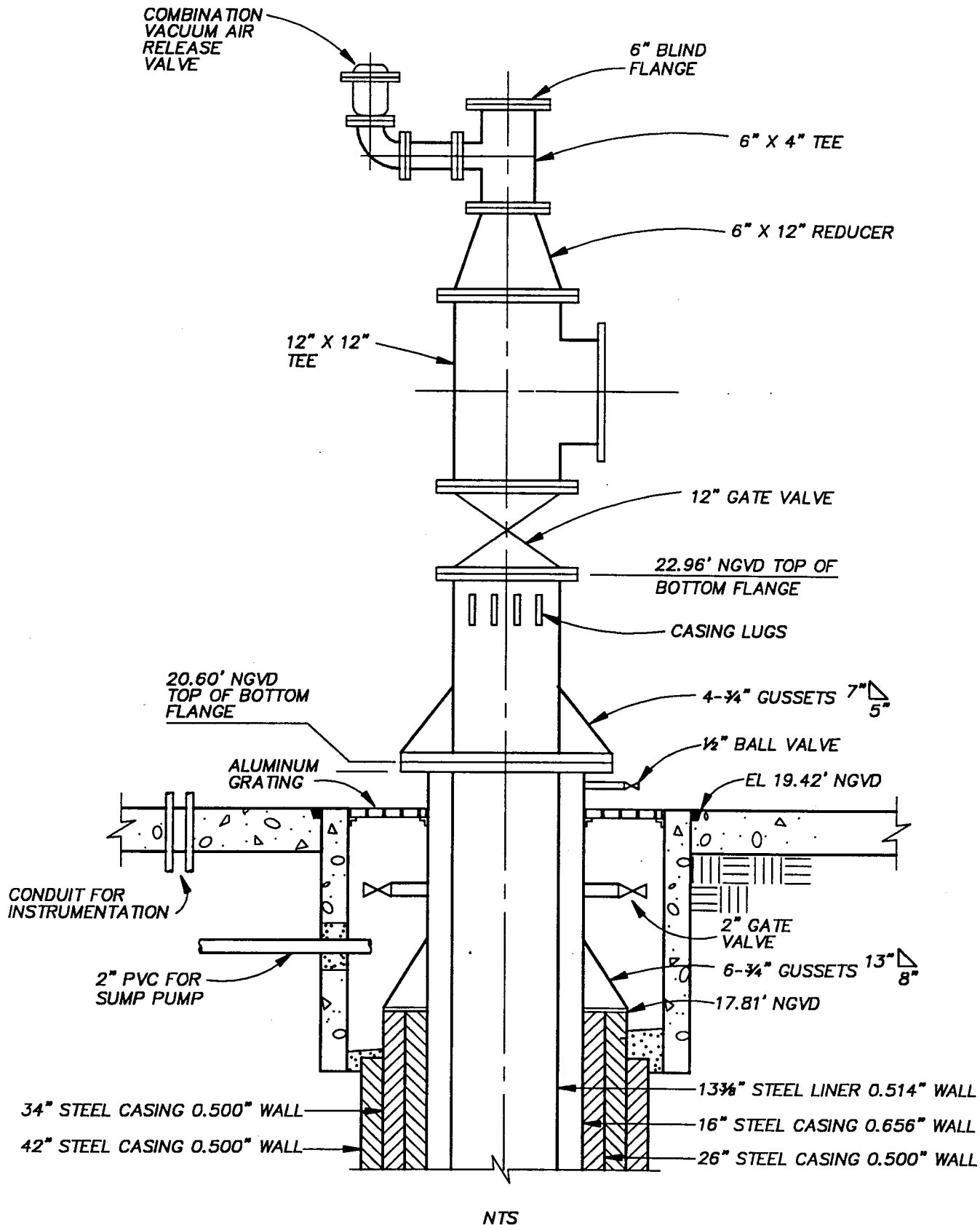


FIGURE 2-3
Concentrate Disposal Well Packer
Assembly Completion Diagram





NOTE:

INSTRUMENTATION TO BE COMPLETED AT A FUTURE DATE UNDER THE WATER TREATMENT PLANT CONTRACT.

NTS

FIGURE 2-4
 Concentrate Disposal Well
 Wellhead Completion Diagram



zone. The lower monitor zone was then completed with an open hole from the base of the 6-inch casing at 1,800 feet to 1,855 feet. Table 2-3 summarizes the drilling and testing performed during construction. Table 2-4 summarizes geophysical logging performed during construction. Appendix C contains a table summarizing casing depths, cement types and quantities used. Completion diagrams of the dual-zone monitor well and wellhead are shown in Figures 2-5 and 2-6, respectively. The wellhead will be completed at a later date under the water treatment plant contract.

Surficial Monitor Wells

Four surficial monitor wells were installed at the corners of the drilling pad as shown in Figure 2-1. These wells were constructed to monitor for potential on-site saltwater contamination of the shallow groundwater resulting from drilling activities. Construction details of the wells are shown in Figure 2-7. All four wells were sampled weekly during construction activities. The wells were sampled and analyzed in the field for temperature, conductivity, and chloride concentration. The wells were left with protective casings and locking caps and can be used in the future for on-site monitoring. Water quality data from these wells is discussed further in Section 6 of this report.

Surge Control System

Construction of the surge control system has been incorporated into the contract for the membrane water treatment plant currently under construction. The hydropneumatic surge control system will serve to cushion hydraulic surges within the system. The hydro-pneumatic tank functions by accepting or releasing water into the disposal well piping to prevent sudden pressure surges and the separation of the water column in the well in the event that an interruption in flow occurs. The system will be connected to the concentrate disposal well wellhead piping and will consist of a 4,000-gallon steel tank, an air compressor, level control system, and monitoring instrumentation.

The function of the level control system will be to add air to the tank if the water level is above a maximum level and to vent air from the tank if the level is below the minimum. Should the air supply pressure drop below a pre-set minimum, a low pressure switch will activate an air compressor.

The annulus between the 13-3/8-inch liner and 16-inch casing will also be connected at the wellhead to a hydropneumatic tank. This hydropneumatic tank will be designed to maintain a pressure on the annulus greater than the injection pressure of the well. Should a leak develop in the packer assembly or the liner, the hydropneumatic tank would lose pressure and activate a low-pressure signal in the control center.

**Table 2-3
Summary of Drilling and Testing of the Boynton Beach Dual-Zone Monitor Well**

Depth (feet)	Nominal Diameter (inches)	Date	Description of Activity
355	30	07/01/91	Completed borehole for installation of 24-inch casing
345	24	07/02/91	Completed installation of 24-inch casing
1,005	10	07/09/91	Completed pilot hole
980	24	07/30/91	Completed borehole for the installation of 16-inch casing
970	16	08/03/91	Completed installation of 16-inch casing
1,808	16	08/18/91	Completed borehole
1,800	6	10/09/91	Completed installation of 6-5/8-inch casing
1,800	6	10/11/91	Completed casing pressure test
1,855	6	10/17/91	Completed lower monitor zone
1,855	16 & 6	04/21/92	Completed development of monitor zones

Table 2-4
Summary of Geophysical Logging
of the Boynton Beach Dual Zone Monitor Well

Depth (feet)	Section	Diameter (inches)	Date	Logging Performed
355	Reamed	30	07/02/91	CAL, LSN, GR, SP
1,005	Pilot	10	07/10/91	CAL, LSN, GR, SP
970	Casing	16	08/01/91	TP
970	Casing	16	08/02/91	CB
1,808	Reamed	16	08/29/91	CAL, LSN, GR, SP, FR, TP
1,800	Casing	6	09/13/91	TP ¹
1,800	Casing	6	10/09/91	TP (6-inch casing) ¹
1,800	Casing	6	10/10/01	CB
1,855	Reamed	6	10/18/91	CAL, GR

¹ Temperature logs were performed on each stage of cement

CAL - Caliper
 CB - Cement Bond
 FR - Fluid Resistivity
 GR - Gamma Ray
 LSN - Long and Short Normal Electric
 SP - Spontaneous Potential
 TP - Temperature

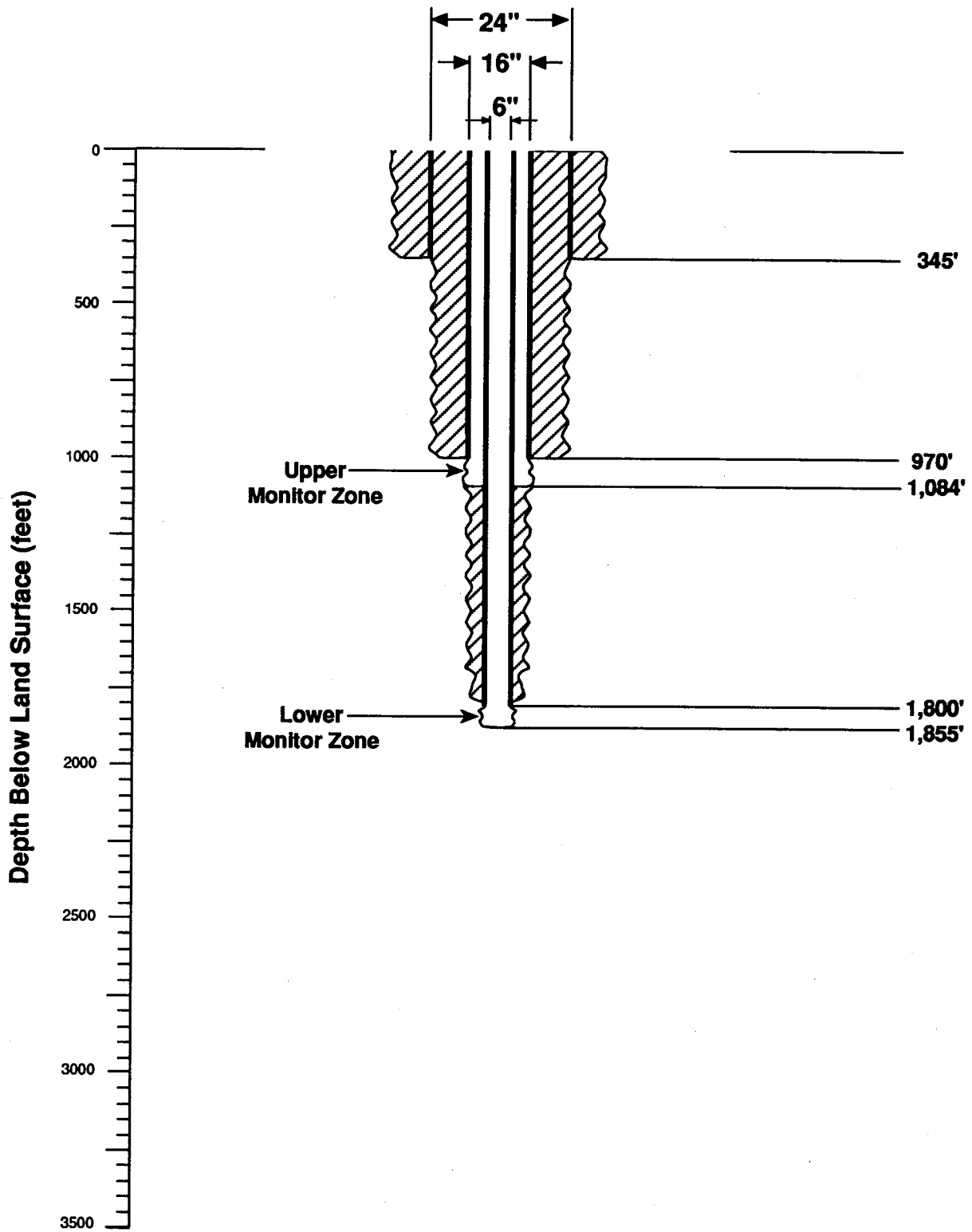
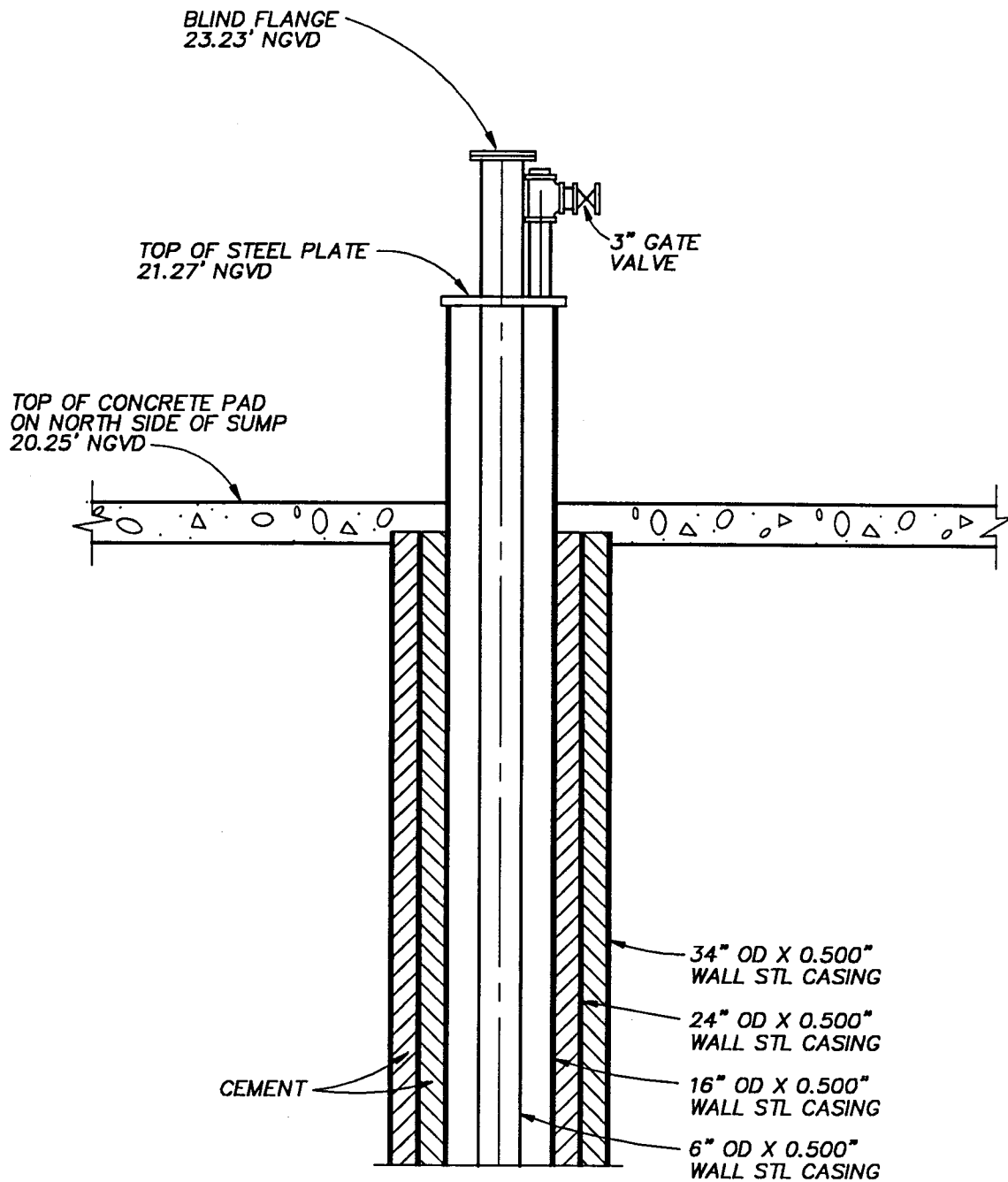


FIGURE 2-5 [®]
Dual-Zone Monitor
Well Completion Diagram





NOTE:

WELLHEAD PIPING AND INSTRUMENTATION ARE TO BE COMPLETED AT FUTURE DATE UNDER THE WATER TREATMENT PLANT CONTRACT.

FIGURE 2-6
Dual-Zone Monitor Well Wellhead Completion Diagram



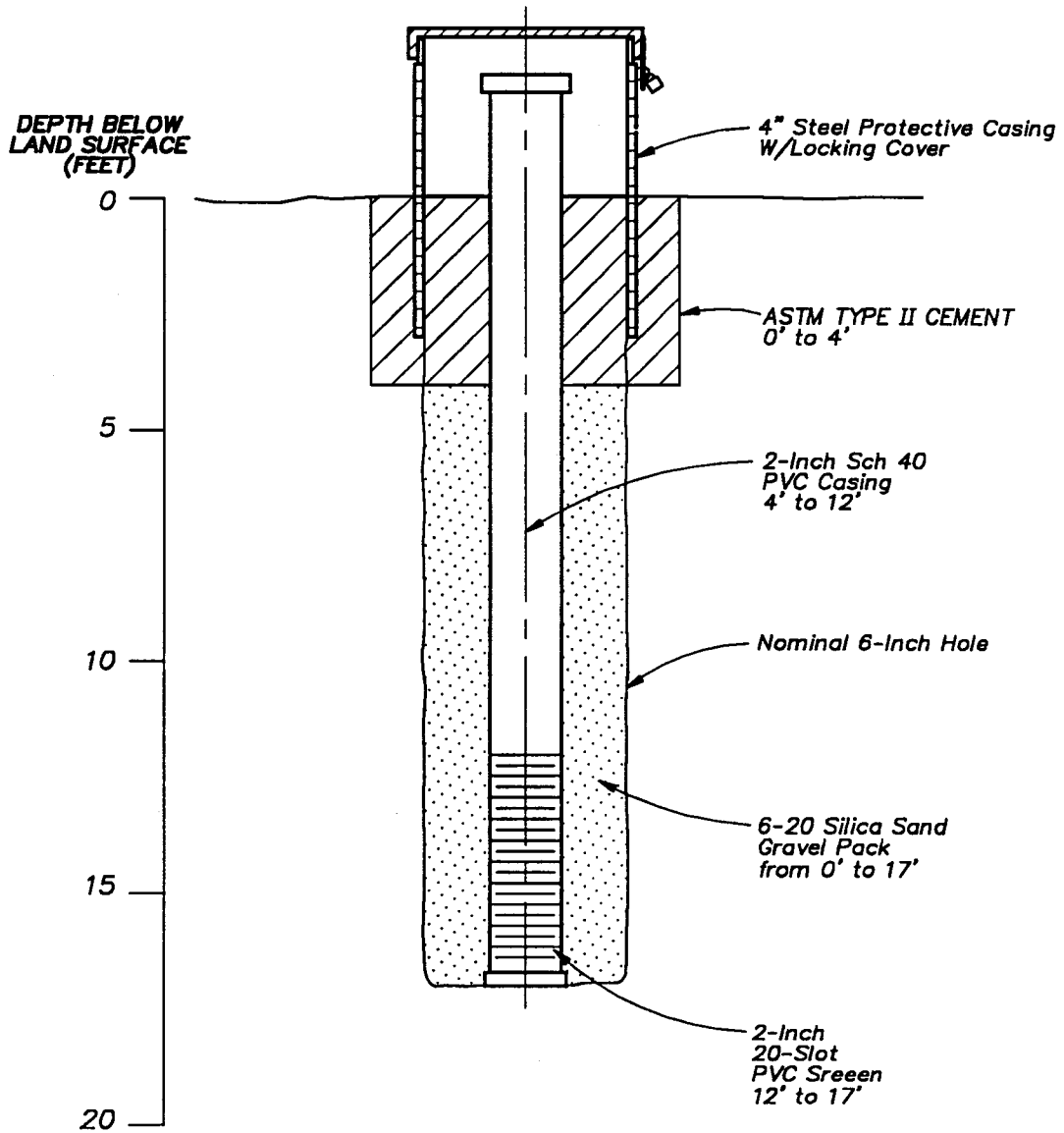


FIGURE 2-7
Typical Surficial Monitor Well Completion Diagram



Section 3 Hydrogeologic Framework

Geology

A stratigraphic profile of the disposal and monitor well at the Boynton Beach West Water Treatment Plant was derived from the microscopic analysis of formation samples and their correlation with geophysical logs run during pilot hole drilling. Brief lithologic descriptions, and a summary of geophysical logs (gamma ray, caliper, and long and short normal electric [LSN]) are included in Figure 3-1. Strata encountered at this site range in age from older Eocene to more recent Pleistocene deposits. The stratigraphic units and their respective ages from the bottom up are as follows: the Oldsmar Limestone, Lake City Limestone, and Avon Park Limestone of Eocene age; the Suwannee Limestone of Oligocene Age; the Tampa Limestone and Hawthorn Formations of Mid to Lower Miocene Age; the Tamiami Formation of Pliocene Age; and the Anastasia Formation and Pamlico Sands of Pleistocene Age. Detailed lithologic logs of the injection well and the monitor well are provided in Appendix D. The following is a lithostratigraphic description of the site.

Lithostratigraphic Descriptions

Pleistocene Series

Pamlico Sand

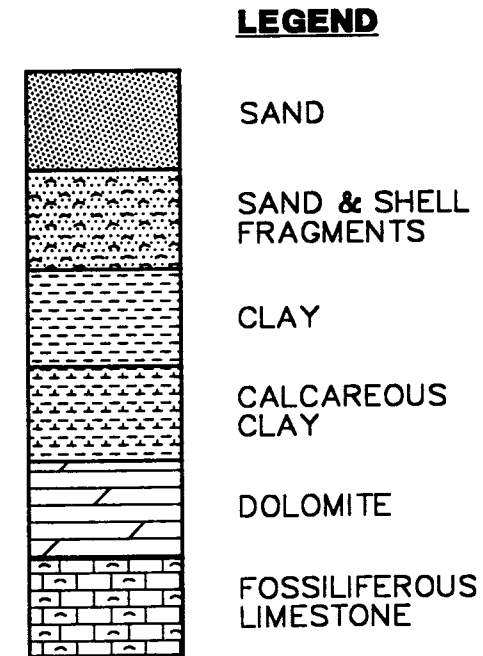
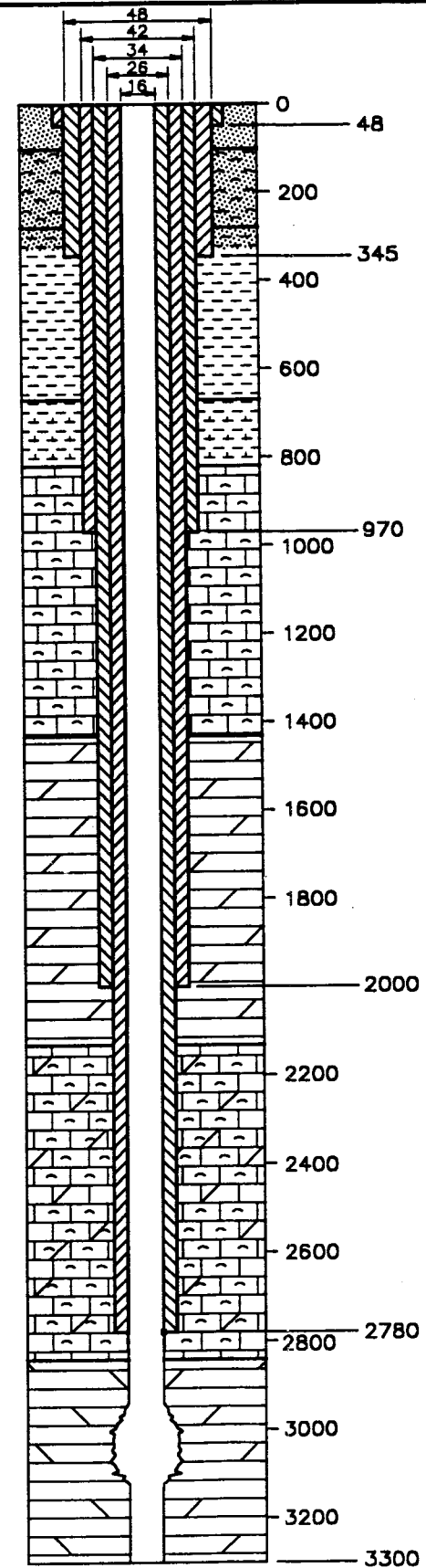
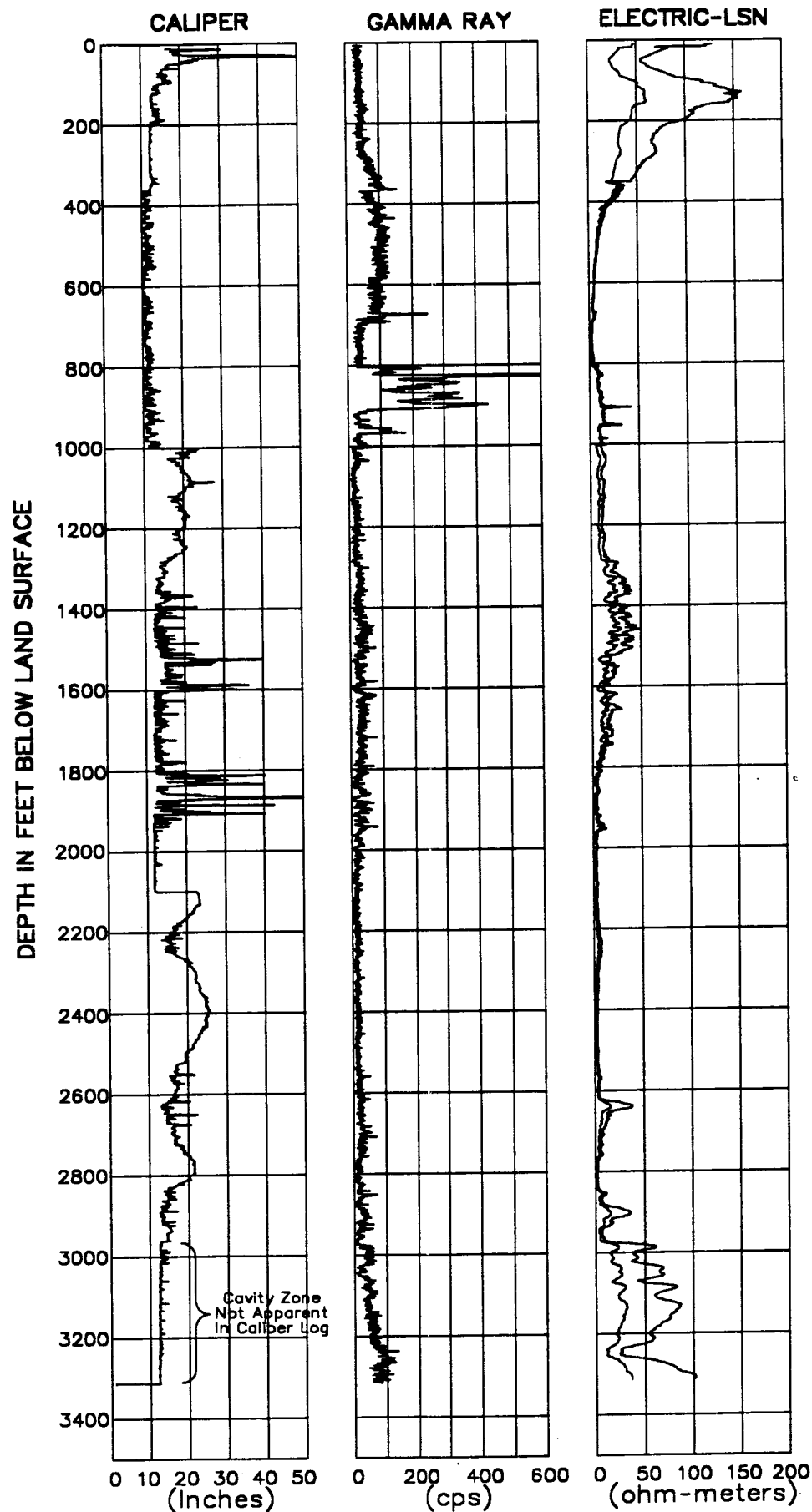
At this site, the Pamlico Sands occur from land surface to approximately 80 feet bls and consist of unconsolidated medium light gray to dark gray, fine to coarse grained, very well sorted, subangular to subrounded, quartz sands with interbedded coquina and calcareous sandstone. The gamma ray response in the Pamlico Sand interval is typically low (50 to 100 counts per second [cps]).

Anastasia Formation

The Anastasia Formation of Pleistocene age, which is overlain by the Pamlico Sands, makes up most of the surficial aquifer system, the principle source of groundwater in Palm Beach County. It occurs from a depth of approximately 80 feet to 280 feet bls and consists of interbedded layers of arenaceous limestone, coquina and calcareous sandstone with well sorted, subangular to subrounded, medium to coarse grained sand and fine phosphoritic grains. An increase in the gamma ray response at approximately 80 feet (approximately 60 cps) indicates the top of the Anastasia Formation.

LITHOLOGIC DESCRIPTION	GEOLOGIC AGE	FORMATION NAME	
Shell, Sand, Calcareously Cemented Sandstone	Pleistocene	Pamlico Sand/Anastasia	Surficial Aquifer
Calcareous Sandstone with Calcareous Clay	Pliocene	Tamiami	
Light Olive Gray Calcareous Clay	Miocene	Hawthorn	Confining Units
Dusky Yellow-Green Calcareous Clay, with Fossiliferous Limestone; Olive Green Chert and Shell		Tampa Limestone	
Fossiliferous Biomicritic Limestone, Yellowish Gray, Pinkish Gray	Oligocene	Suwannee Limestone	Artesian Aquifer
Very pale Orange Yellowish Gray to Pinkish Gray Porous, Finely Fragmented, Highly Fossiliferous Limestone	Upper Eocene	Avon Park Limestone	
Light Brown to Brown, very Fine to Medium Crystalline, Sucrosic Dolomite	Middle Eocene	Lake City Limestone	Non-Artesian Aquifer
Yellowish Gray Biomicritic Limestone with very pale Orange Dolomitic Limestone & hard crystalline Dolomite			
Yellowish Gray Biomicritic Fossiliferous Limestone with Dark Yellowish Brown Dolomite			Confining Unit
Pale Yellowish Brown to Dark Yellowish Brown, Finely Crystalline, Vuggy and Sucrosic Textured, Dolomite	Lower Eocene	Oldsmar Limestone	High Permeability (Boulder Zone)

NOTE: Geophysical Logs have been Generated from Computer Data Collected in Field. The Geophysical Logs are Located in Volume II of this Report.



NOTE
 cps Counts per Second
 LSN Long-Short Normal Electric Resistivity

FIGURE 3-1
 GENERALIZED SUBSURFACE DATA FOR THE
 CONCENTRATE DISPOSAL WELL AT THE BOYNTON
 BEACH EAST WATER TREATMENT PLANT



Pliocene Series

Tamiami Formation

At this site, the Tamiami Formation of Pliocene age occurs from approximately 280 feet to 330 feet bls and consists primarily of shelly, redundant, light-olive-gray, calcareous sandstone with calcareous clay (marl) and a trace of phosphatic sand. A moderate gamma ray response (80 to 100 cps) is typical through most of this interval.

Miocene Series

Hawthorne Formation and Tampa Limestone

Both the Hawthorn and Tampa formations constitute a substantial interval of confinement and low permeability between the surficial aquifer and Floridan aquifer.

The Hawthorn formation sediments occur from 330 feet bls to 670 feet bls and consist of dense, light-olive-gray calcareous clay. The gamma ray signature through this interval is consistently moderate to high (80 to 100 cps) with the base of the formation marked by a sharp off-scale peak occurring at approximately 670 feet bls.

The Tampa Limestone was encountered at 670 feet in depth and extends to approximately 820 feet bls. This formation is characterized by a lithologic color change to a light-olive-gray calcareous clay with the occurrence of grayish-yellow fossiliferous limestone, olive green chert, and shell. The gamma ray response through this interval is low to moderate (50 to 100 cps) with the base of the formation marked by sharp deflection of the gamma signature to approximately 900 cps. This sharp gamma shift correlates to the occurrence of fossiliferous and arenaceous phosphatic limestones. The LSN log also indicates this formation change with a shift to slightly higher resistance.

Oligocene Series

Suwannee Limestone

At this site, the Suwannee formation occurs from a depth of approximately 820 feet bls to 975 feet bls and is characterized by a yellowish-gray to pinkish-gray biomicritic fossiliferous limestone. The Suwannee is a geologic formation of the upper Floridan aquifer system and characteristically exhibits high permeability and artesian pressure. The lower zone of this artesian unit was selected for monitoring of the upper Floridan aquifer. The gamma log indicated this formation change with a shift to higher counts. An increase in borehole diameter shown on the caliper log from 890 feet bls to 910 feet bls correlates to high permeabilities typical of this formation. The base of this unit is marked by a sharp drop in the gamma ray response.

Eocene Series

Avon Park Limestone

The sharp drop in the gamma ray response marking the base of the Suwannee Limestone also identifies the upper boundary of the Upper Eocene Avon Park Limestone. 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 mid-Eocene age formation is a very pale orange, yellowish-gray to pinkish-gray, porous, finely fragmented, highly fossiliferous (bio-micritic) limestone with the occurrence of a light brown to brown, very fine to medium crystalline, rather porous, sucrosic textured dolomite. Characteristic microfauna identified in the cutting samples included *Coskinolina sp.*, *Lituonela sp.*, and *Dictyoconus sp.*, in addition to others.

At this site, the Avon Park Limestone occurs from 975 feet bls to approximately 1,420 feet bls. At a depth of 1,420 feet bls the gamma signature shifts from a count rate of approximately 40 cps to 65 cps, correlating to a change in lithology from limestone to dolomite. Below 1,420 feet bls, a fine to medium crystalline dolomite with vuggy texture and secondary porosity is dominant. As described by Chen (1965), this change could relate to the fine to medium crystalline dolomite bed forming the base of the Avon Park Limestone and overlying the Lake City Limestone.

Lake City Limestone

In general, the lower Lake City Limestone (1,900 feet bls to 2,800 feet bls) is considered a confining unit. The upper Lake City Limestone, which is found from 1,420 feet to 1,900 feet bls, was identified in South Florida by Applin and Applin (1944) as a bio-stratigraphic unit of alternating layers of brown, hard, crystalline dolomite and dolomitic limestone, and a cream-colored, soft to hard, chalky fossiliferous limestone. Scattered chert nodules, thin chert layers and the presence of carbonaceous laminae are also noted as consistent features of this unit.

At this site, a brown, crystalline, vuggy and sucrosic-textured, very hard dolomite is predominant from a depth of 1,420 to 1,960 feet bls. From 1,960 feet bls to a depth of 2,830 feet bls a chalky bromieritic fossiliferous limestone is predominant. The base of the Lake City Limestone is marked by an increase in response from the gamma ray, electric dual induction log, and borehole compensated sonic logs, and was identified at a depth of 2,830 feet bls.

Oldsmar Limestone

The top of the Lower Eocene Oldsmar Limestone at 2,830 feet bls is identified by increased resistance from the LSN electric log and a significant change in the electric dual induction log, and borehole compensated sonic logs. The lithology from 2,830 feet

bls to 3,300 feet bls is predominantly a pale orange to dark yellowish-brown, finely crystalline, vuggy and sucrosic textured, very hard dolomite. The fracture identification log from 2,830 feet bls to the total depth of 3,300 feet bls indicates a highly fractured or cavernous formation typical of the Oldsmar Limestone of the lower Eocene Series. This cavernous formation, also known as the "Boulder Zone" is characterized by a hard, fine to coarsely crystalline fractured dolomite formation that is highly transmissive. The cavernous nature of this zone is not apparent in the caliper log run. No evaporites were observed in the drill cuttings samples.

Section 4 Hydrogeologic Testing

Formation Sampling

Formation samples were collected at 10-foot intervals from land surface to total depth on both the concentrate disposal well and dual-zone monitor well. The samples were washed and then characterized under the microscope for rock type, color, texture, matrix materials, porosity, sedimentary structure, hardness, and fossils. Their lithologic descriptions are found in Appendix D.

At the end of construction, one set of samples from each well was sent to the Florida Geological Survey in Tallahassee, Florida.

Geophysical Logging

Geophysical logs were performed on pilot hole intervals to assist in correlation of formation samples taken during drilling, to identify formation boundaries, and to obtain specific data pertaining to the underground formations. The geophysical logs also provided data used in the selection of casing setting depths on both wells.

Copies of the logs are contained in Volume II of this report. Analytical data from geophysical logs performed during the injection test helped to define fluid loss zones (injection zones) and to provide a basis for future comparison of well performance. These data are further discussed in this section.

Packer Tests

Four straddle packer pumping tests were performed on the pilot hole of the concentrate disposal well over the interval from 1,428 feet bls to 1,759 feet bls to establish the depth of the 10,000-mg/l TDS interface and to assist in the selection of the lower monitor zone.

The packer test equipment consisted of a 5-horsepower submersible pump set to a depth of 160 feet on 1-7/8-inch tubing inside the 6-5/8-inch drill pipe. The straddle packer assembly was attached to the drillpipe and straddled the intervals shown in Table 4-1.

Water samples were collected during the above tests and field analyzed for conductivity and chloride concentration to determine when purged waters had stabilized. At the conclusion of each test, a sample was collected and sent to a local laboratory for analysis.

Table 4-1
Summary of Packer Pumping Tests from the Boynton Beach
Concentrate Disposal Well

Packer Test Number	Date	Depth Interval (feet bls)	Stabilized Specific Conductivity ¹ (μ mhos/cm)		Stabilized Chloride Concentration ¹ (mg/l)	Total Dissolved Solids Concentration ² (mg/l)
1	06/06/91	1,737-1,759	21,500	24,000	7,710	14,300
2	06/07/91	1,708-1,729	20,000	22,900	7,440	14,000
3	06/07/91	1,608-1,629	15,200	18,200	5,810	11,400
4	06/08/91	1,428-1,449	7,200	8,450	2,460	4,880

¹Values presented were analyzed in field laboratory

²Values presented were analyzed in laboratory

μ mhos = micromoles per centimeter

mg/l = milligrams per liter

Laboratory and field analyses are presented in Appendix E. Testing was initiated in waters which were anticipated to have a TDS concentration greater than 10,000 mg/l. A fourth test was performed over an interval which was expected to have waters containing less than a 10,000-mg/l concentration of TDS. Stabilized conductivity and chloride concentrations and laboratory TDS concentrations are shown in Table 4-1 for each of the tests performed. Testing was successful in demonstrating that waters below approximately 1,608 feet have a TDS concentration greater than 10,000 mg/l. Water quality data collected during reverse-air drilling/direct discharge of the monitor well supported data collected during the packer tests. Appendix E contains field notes and the additional data collected during the straddle packer pumping tests.

Coring and Analyses

While drilling the pilot hole of the concentrate disposal well, core samples were collected at specific intervals to determine hydraulic characteristics of the confining beds above the injection zone. Samples were obtained using a 4-inch-diameter tungsten carbide-tipped core bit on a 10-foot long core barrel between the depths of 2,130 and 2,662 feet bls. The cores were first examined on site and then wrapped to minimize fluid loss before shipment to the testing laboratory. Table 4-2 summarizes the coring program and provides a lithologic description of the cores.

Ardaman & Associates, Inc., was selected to determine the vertical and horizontal permeabilities and total porosities of core samples from six distinct intervals. Ardaman & Associates subcored and trimmed the cores to lengths between 6.5 and 8.2 centimeters (cm) with a diameter of 3.3 cm. The cores were then encased in a cylindrical, latex membrane with porous stones and blocks on the top and bottom. The encased sample was enclosed in a triaxial cell and permeated under a differential head. Total porosity tests were then performed on the samples. Results from both tests are presented in Table 4-2. A detailed lithologic description of the cores along with the laboratory report are contained in Appendix F. Results of the vertical permeability tests indicated values which ranged from 6.6×10^{-9} to 2.6×10^{-5} centimeters per second (cm/sec).

These values represent very low permeabilities and indicate the presence of substantial confinement above the injection zone. The main confining sequence, as interpreted from the cutting samples, the core data, and the geophysical logs, extends from the top of the Boulder Zone at approximately 2,600 feet bls to 2,000 feet bls.

Table 4-2

LAB Core Data New table

**Core Intervals and Lithologic Descriptions from the
Boynton Beach Concentrate Disposal Well**

Core Run No.	Date	Cored Interval	Percent Recovery	Formation Description	Interval Sampled	Direction	Permeability Coefficient "k" (cm/sec)	Total Porosity (%)
1	07/13/91	2,130-2,147	100	Biomicritic Fossiliferous Limestone, yellowish gray, moderately hard	2,137.5-2,138.5	Vertical	7.9×10^{-6}	26
						Horizontal	1.5×10^{-5}	26
2	07/14/91	2,200-2,214	50	Dolomite; pale yellowish-brown to dark yellowish-brown; slightly porous; crystalline, very hard	2,204.1-2,204.5	Vertical	6.6×10^{-9}	7
						Horizontal	2.5×10^{-9}	29
3	07/15/91	2,351-2,365	100	Biomicritic Fossiliferous Limestone, yellowish-gray, moderately hard	2,361.8-2,362.7	Vertical	3.4×10^{-5}	29
						Horizontal	4.5×10^{-5}	28
4	07/17/91	2,411-2,426	80	Biomicritic Fossiliferous Limestone, yellowish-gray to white; trace microfauna; hard	2,416.3-2,416.9	Vertical	2.6×10^{-5}	35
						Horizontal	1.9×10^{-5}	33
5	07/18/91	2,441-2,456	80	Biomicritic Fossiliferous Limestone; yellowish-gray to very pale orange; trace of foraminifera	2,448.5-2,449.0	Vertical	2.7×10^{-5}	32
						Horizontal	1.2×10^{-5}	29
6	07/20/91	2,651-2,662	23	Dolomite, dark yellowish; brown, slightly crystalline; slightly vuggy texture	2,653.0-2,653.5	Vertical	4.6×10^{-8}	9
						Horizontal	1.2×10^{-7}	5

Injection Test

On December 28, 1991, an 8.5-hour step injection test was performed on the concentrate disposal well. Approval for canal water withdrawal was received from the Lake Worth Drainage District (LWDD) prior to testing. This test was conducted to evaluate the injection characteristics of the concentrate disposal well. Two lines of approximately 450 feet of 8-inch lay-flat hose were run from the LWDD E-3 Canal to the concentrate disposal well. One 6 x 8 Mission Magnum centrifugal pump, powered by a 671 Caterpillar diesel engine and two 6 x 8 Mission Magnum centrifugal pumps, powered by a 3408 Caterpillar diesel engine, were used to pump water from the E-3 canal to the storage tanks on the concrete drilling pad. Two additional 6 x 8 Mission Magnum centrifugal pumps, powered by a 3412 Caterpillar diesel engine pumped water from the storage tanks into the disposal well. A 12-inch flow totalizer manufactured by Water Specialties Corp. (Model ML-03) was installed in the pipeline to the wellhead to measure flow and cumulative volume of water injected. A 100-psi Heise gauge, 12 inches in diameter, was installed at the wellhead to measure injection pressures.

Temperature and electrical conductivity of the injection fluid (canal water) were recorded at the canal prior to the test. The canal water had a temperature of 71.6 degrees Fahrenheit, with a conductivity of 500 micromoles (umhos/cm). The canal water was light brown in color with a minimal amount of suspended particles.

A 200-psi Heise gauge, 6 inches in diameter, was used to record pressure readings in the upper monitor zone before, during, and after the injection test. A steel measuring tape was used to monitor water level changes in the lower monitor zone.

Background data was collected at all monitor points for approximately one hour prior to the test. The step injection test was then performed at rates of approximately 1,350; 2,350; and 3,000 gallons per minute (gpm). Stable injection pressures observed at the 100 psi Heise gauge were 28.5, 35.7, and 42.8 psi for the three injection rates, respectively. The pumps were shut down after the third step to record recovery data. The shut-in pressure was 23.0 psi one hour after pump shutdown and 22.6 psi 12 hours after shut down. The observed shut-in pressure of 22.6 psi correlates with the calculated shut-in pressure of approximately 20.5 psi. Appendix M contains a table showing pressure changes in the concentrate disposal well and the upper monitor zone and water level changes in lower monitor zone. A summary of data collected during the injection test is also provided.

Geophysical logging was performed during the second step of the test after the injection pressure had stabilized. Temperature and flow meter logs were performed over the open hole portion of the well at an injection rate of approximately 2,350 gpm.

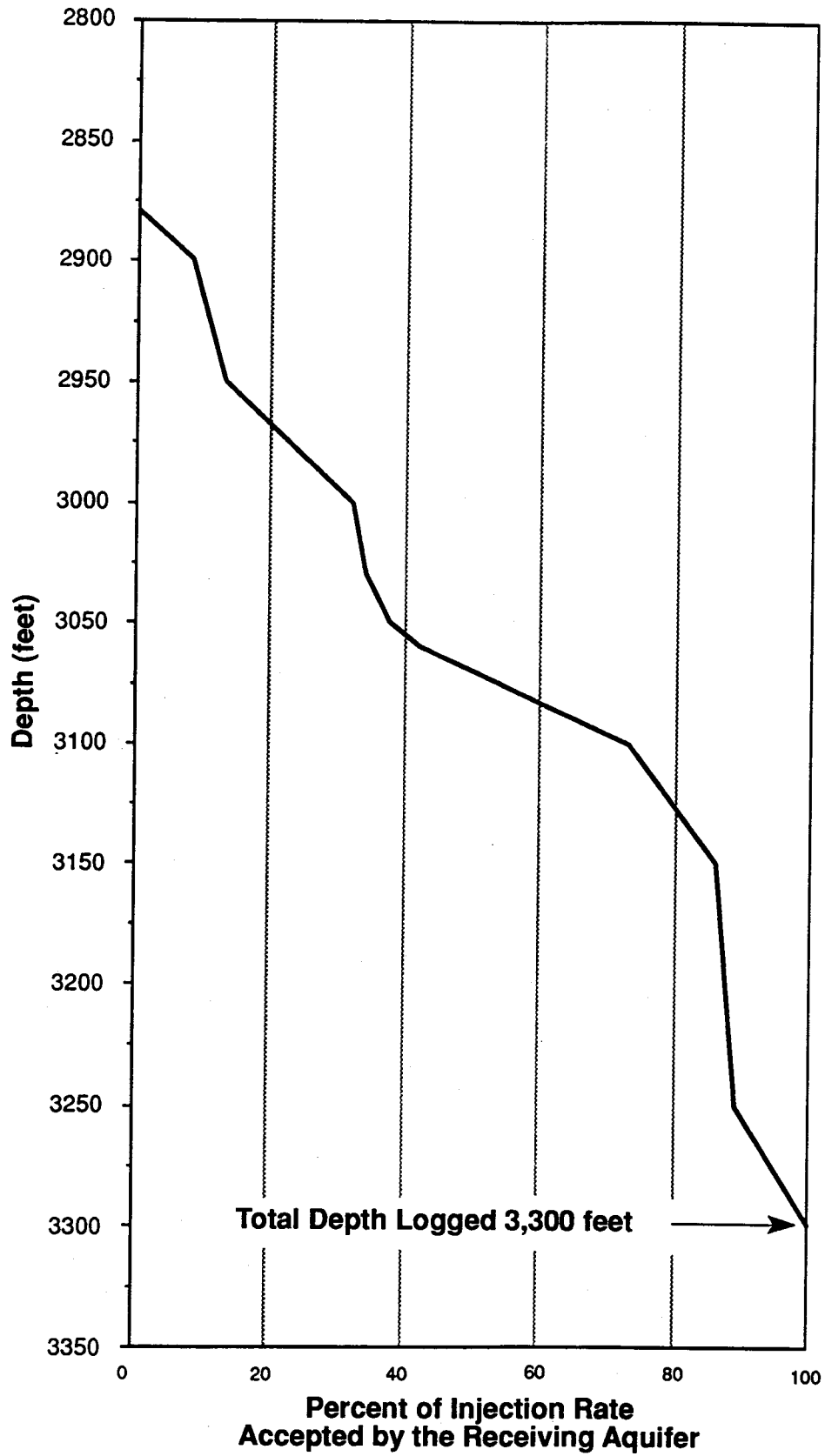
An analysis of the flow meter log indicated that flow was uniformly accepted by the formation from approximately 2,870 feet bls to 3,140 feet bls. Approximately 20 percent of the flow was accepted between 3,140 feet and total depth (3,300 feet). A profile of the aquifer fluid rate of acceptance is presented in Figure 4-1.

The temperature log conducted during the injection test showed displacement of the native formation waters throughout the borehole by the injected fluids to a depth of approximately 3,180 feet. Below 3,180 feet to total depth, the logs indicate native formation waters, implying no movement of injected waters below this depth.

Data collected from the monitor well showed no change in the upper zone and only minor tidal fluctuations over the recorded time interval for the lower zone. Tidal influence began to subside prior to the completion of test. No changes in water level or pressure that would coincide with pumping rate changes were observed in the monitor well during the injection test. This indicates that confinement exists between the injection zone and the overlying monitor zones.

Pressure data recorded for the concentrate disposal well and the dual-zone monitor well during the test are presented in Figures 4-2 and 4-3, respectively.

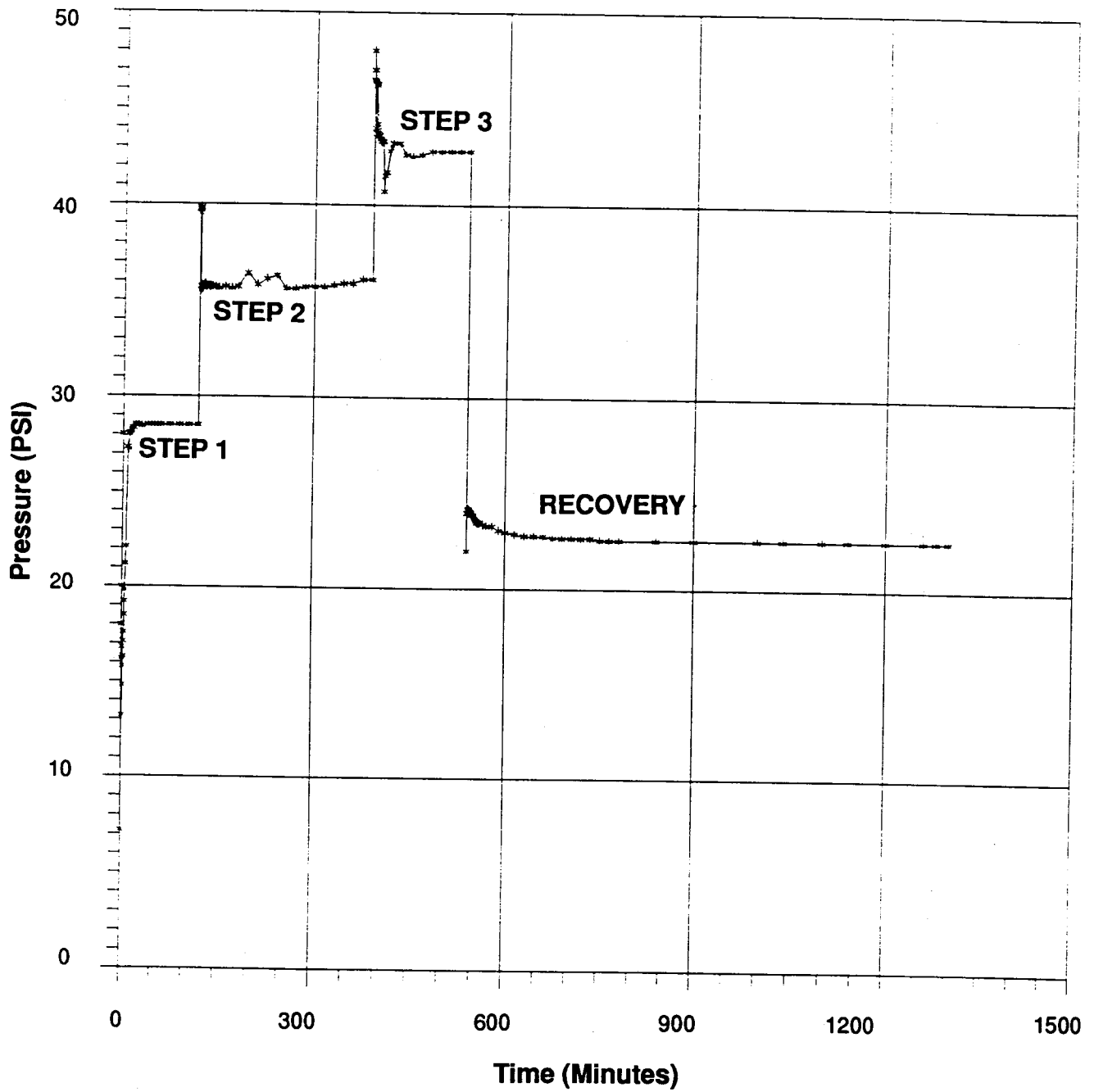
For purposes of future reference, the pressure in the upper monitor zone was 10 psi at the end of construction and before operational testing, and the water elevation in the lower monitor zone was 17.75 feet above National Geodetic Vertical Datum (NGVD) as measured at the well head (May 12, 1992, at 10:00 hours). These data points were determined after all testing and sampling was complete and the well had been allowed to stabilize for approximately 2 weeks.



NOTE: Log performed during second step of Injection Test (Injection Rate \approx 2,350 gpm)

FIGURE 4-1 ©
Acceptance of Injection Rate through the Receiving Aquifer during Injection Testing of the Concentrate Disposal Well



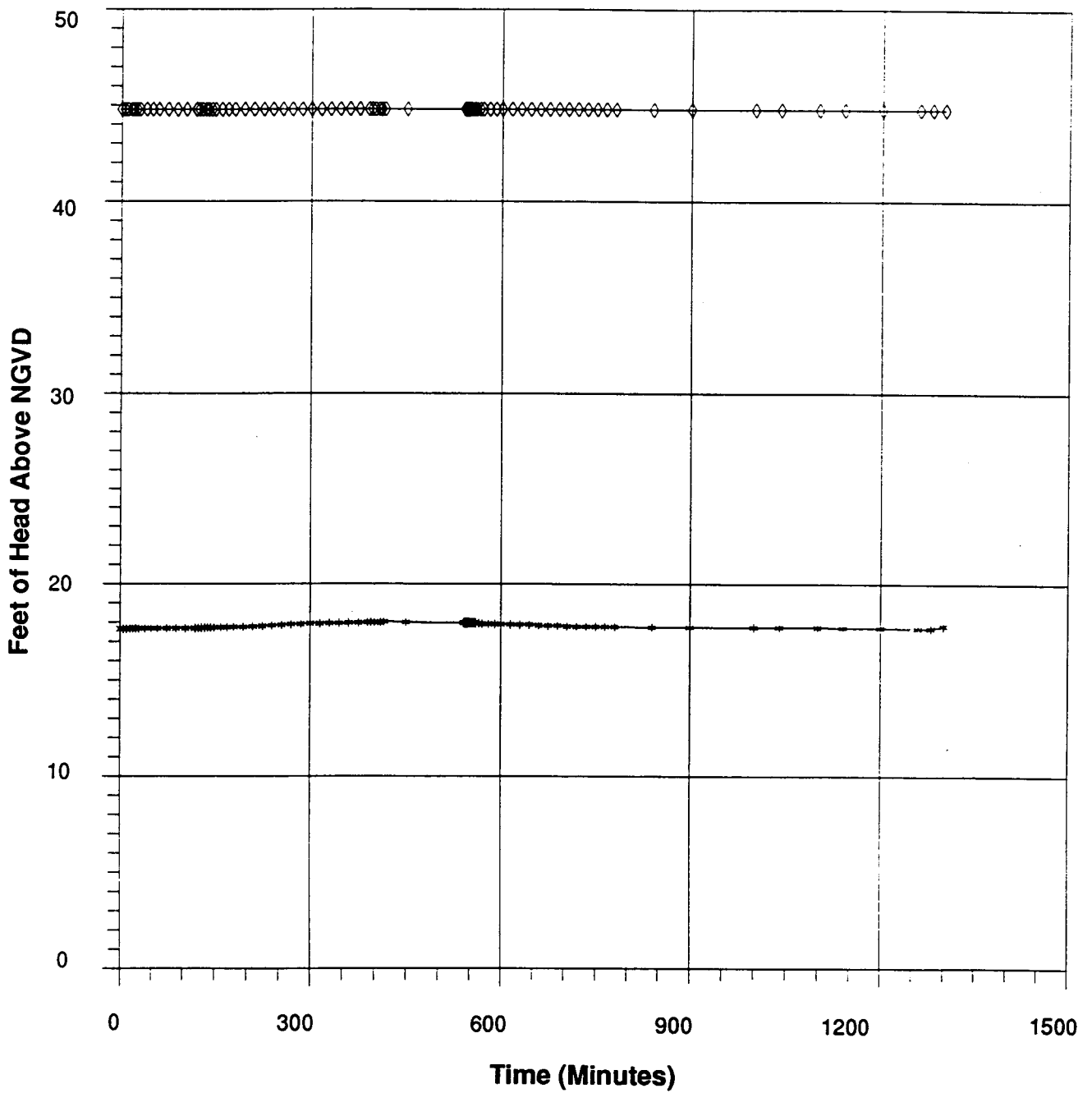


NOTE:

- 1.) Wellhead Pressure, Recorded in Pounds Per Square Inch During the Test

FIGURE 4-2[®]
Recorded Injection Pressure in the Concentrate
Disposal Well During the Injection Test





NOTE:

1.) Lower Monitor Zone Recorded in Feet of Head Above National Geodetic Vertical Datum

LEGEND

- *-*-*-* Upper Monitor Zone
- ◇◇◇◇ Lower Monitor Zone

FIGURE 4-3[®]
Recorded Water Levels in the Dual-Zone Monitor Well During the Injection Test



Section 5 Mechanical Integrity Testing

Mechanical Integrity Testing of the Concentrate Disposal Well

Pressure Test

On August 30, 1991, a casing pressure test was performed on the 16-inch casing of the concentrate disposal well. After cementing the 16-inch casing and before drilling out the cement plug, the casing was pressure tested for leaks. The casing was filled with water to eliminate air compression in the casing column and a 300-psi calibrated pressure gauge was installed to measure pressure during a 1-hour test. The test was run in accordance with construction permit Specific Condition 2c which requires that the pressure be monitored for one hour with a test tolerance of ± 5 percent. The contractor pressurized the casing to 121.0 pounds per square inch gauge (psig) with a high pressure pump. One hour after establishing 121.0 psig, the pressure was recorded at 119.5 psig. The drop of 1.5 psi was within the 5 percent limit specified by FDER. This pressure test was observed by Mr. Ed Rahrig of FDER who was present as the casing was filled with water, pressurized, and depressurized. A copy of the pressure test data sheet is contained in Appendix K.

A final pressure test was conducted (December 31, 1991) on the annulus between the 13-3/8-inch liner and the 16-inch final casing. This test was conducted after repairs (K-Trol and an internal casing patch) were made to the pin-hole leak at 2,229.31 feet. The annulus had previously been filled with a corrosion inhibitor during construction. Care was taken to remove any air trapped in the annulus and a 200-psi calibrated pressure gauge was installed to measure pressure during the 1-hour test. The test was run in accordance with Specific Condition 2c of the construction permit which requires that the casing be pressure tested at 1.5 times the expected operating pressure with a test tolerance of ± 5 percent. The contractor pressurized the casing to 150.0 psig with a high pressure pump. One hour after establishing 150 psig, the pressure was recorded at 150.0 psig. No drop in pressure was observed at the completion of the test which met the ± 5 percent test tolerance. The pressure test was observed by Mr. Ed Rahrig of FDER who was present as the annulus was pressurized and depressurized. A copy of the pressure test data sheet is contained in Appendix K.

Video Television Survey

On September 9, 1991, a black-and-white video television survey was performed on the disposal well (liner and open hose) to visually observe the condition of the casing and

borehole and to provide a record of the condition of the well after construction. Black and white was selected because its higher resolution generally captures a more detailed image of the well. The survey was run from land surface to a total depth of 3,297 feet bls. The survey of the well indicated that the casing appeared in good condition. The 16-inch borehole had some cavities and both vertical and horizontal fractures at various depths to total depth.

A second black-and-white video television survey was performed on December 20, 1991, after corrective actions were made on the pin-hole leak at 2,229.31 feet bls. The survey was performed on the 16-inch casing to inspect the internal casing patch. The survey verified installation of the patch and confirmed that it was in good visible condition. Summaries of the video surveys are contained in Appendix L.

Geophysical Logs

On December 23, 1991, final geophysical logs of the complete well under static conditions were performed. These logs were performed to establish a downhole profile from total depth to land surface. These logs are provided in Volume II of this report and include temperature, fluid resistivity, gamma ray, and LSN electric.

Radioactive Tracer Survey

On December 30, 1991, an RTS was successfully performed on the disposal well using Florida Geophysical Logging. The survey was conducted in both static and dynamic states to evaluate the integrity of the grout seal around the base of the 16-inch final casing with the liner in place. No upward movement of the tracer was observed during the test by representatives of FDER (Ed Rahrig), CH2M HILL, or the contractor. A detailed summary of the RTS is provided in Appendix N.

Mechanical Integrity Testing of the Dual-Zone Monitor Well

Pressure Test

On October 11, 1991, a casing pressure test was performed on the dual-zone monitor well. The casing was pressure tested after cementing the 6-inch casing prior to drilling out the cement plug. The pressure test conducted on the monitor well was performed following the criteria used during the pressure testing of the disposal well. The casing was pressurized to 100 psig. After one hour, the pressure was recorded at 97.5 psig. Mr. Ed Rahrig and Mr. Tom Ferrell, representatives of FDER, observed the filling,

pressurizing, and depressurizing of the casing. A copy of the pressure test data sheet is shown in Appendix K.

As required by the construction permit, a sonic bond log was performed to assess the quality of the cement-to-casing bond of the final casing. The sonic bond log measures and records the cycle of a sonic signal within the pipe in millivolts (mv). Maximum amplitudes indicate unbonded pipe, and minimum amplitudes indicate well-bonded pipe.

Results of the sonic bond log showed signal amplitudes on the cemented portion of the casing which ranged from approximately 2 mv to 8 mv from approximately 1,750 feet bls up to 1,530 feet bls, indicating a very good cement bond. The interval from approximately 1,530 feet bls up to 1,470 feet bls showed signal amplitudes ranging from approximately 8 mv to 24 mv, again indicating very good cement to casing bond. The interval from approximately 1,470 feet bls to 1,080 feet bls showed signal amplitudes ranging from 8 mv to 60 mv which indicates an average cement bond. The uncemented portion of the borehole (900 feet bls to 970 feet bls) and the logged portion of the open annulus between the 6-inch and 16-inch casing (970 feet bls to 1,084 feet bls) showed signal amplitudes ranging from approximately 45 mv to 80 mv indicating no cement bond. The sonic bond log was terminated at 900 feet bls because the remainder of the annulus was open for the upper monitor zone, and no benefit would have been gained by performing the log to the surface. No vertical channels were interpreted from the sonic bond log.

Section 6 Monitoring Program

Background Water Quality

Water samples were collected at approximately 30-foot intervals below the depth of 1,000 feet during reverse-air closed circulation drilling of the disposal well and open circulation drilling of the dual-zone monitor well. The samples were field-analyzed for conductivity, temperature, and chlorides. Water samples collected during closed circulation drilling of the disposal well were not truly representative due to mixing of referenced waters with the native formation waters throughout the borehole. They did show, however, general trends. Samples collected during the open circulation drilling of the dual-zone monitor well were more representative. However, all the data were useful in determining the general water quality trends of each well and in establishing the approximate location of the 10,000-mg/l TDS interface. Figures 6-1 and 6-2 show the results of the water quality analyses collected during drilling. Detailed water quality data from the pilot hole drilling are also presented in Appendix G.

Concentrate Disposal Well

FDER required that the lower intermediate casing (26-inch) be set below the base of the underground source of drinking water (USDW). The USDW includes all waters with a TDS content of less than 10,000 mg/l. To confirm the depth of native formation waters with TDS greater than 10,000 mg/l, straddle packer tests were performed as described in Section 4, Packer Testing. Straddle packer testing was successful in delineating waters with a concentration of TDS greater than 10,000 mg/l below approximately 1,608 feet bls. The intermediate casing (26-inch) was set at a depth of 2,000 feet, well below the 10,000 mg/l TDS interface.

On September 7, 1991, samples were collected from the injection zone for analysis of primary and secondary drinking water standards. The samples were collected while circulating the borehole from 3,000 feet using reverse-air techniques. Laboratory results from this sampling effort are contained in Appendix Q. A 5-gallon unacidized sample was also collected and shipped to FDER in Tallahassee in accordance with the requirements of the construction permit.

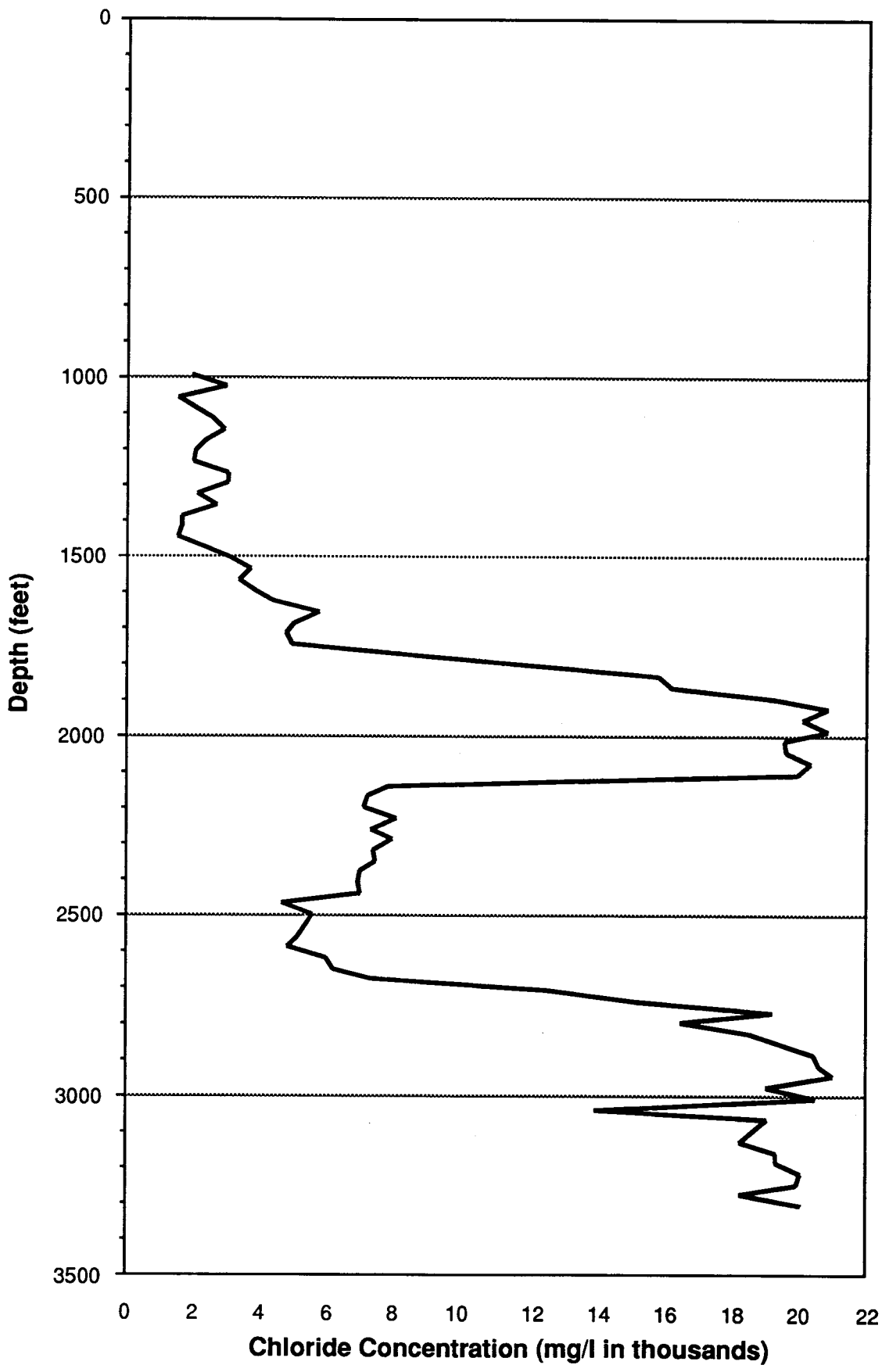


FIGURE 6-1
Pilot Hole Water Quality While Drilling
the Boynton Beach Concentrate Disposal Well



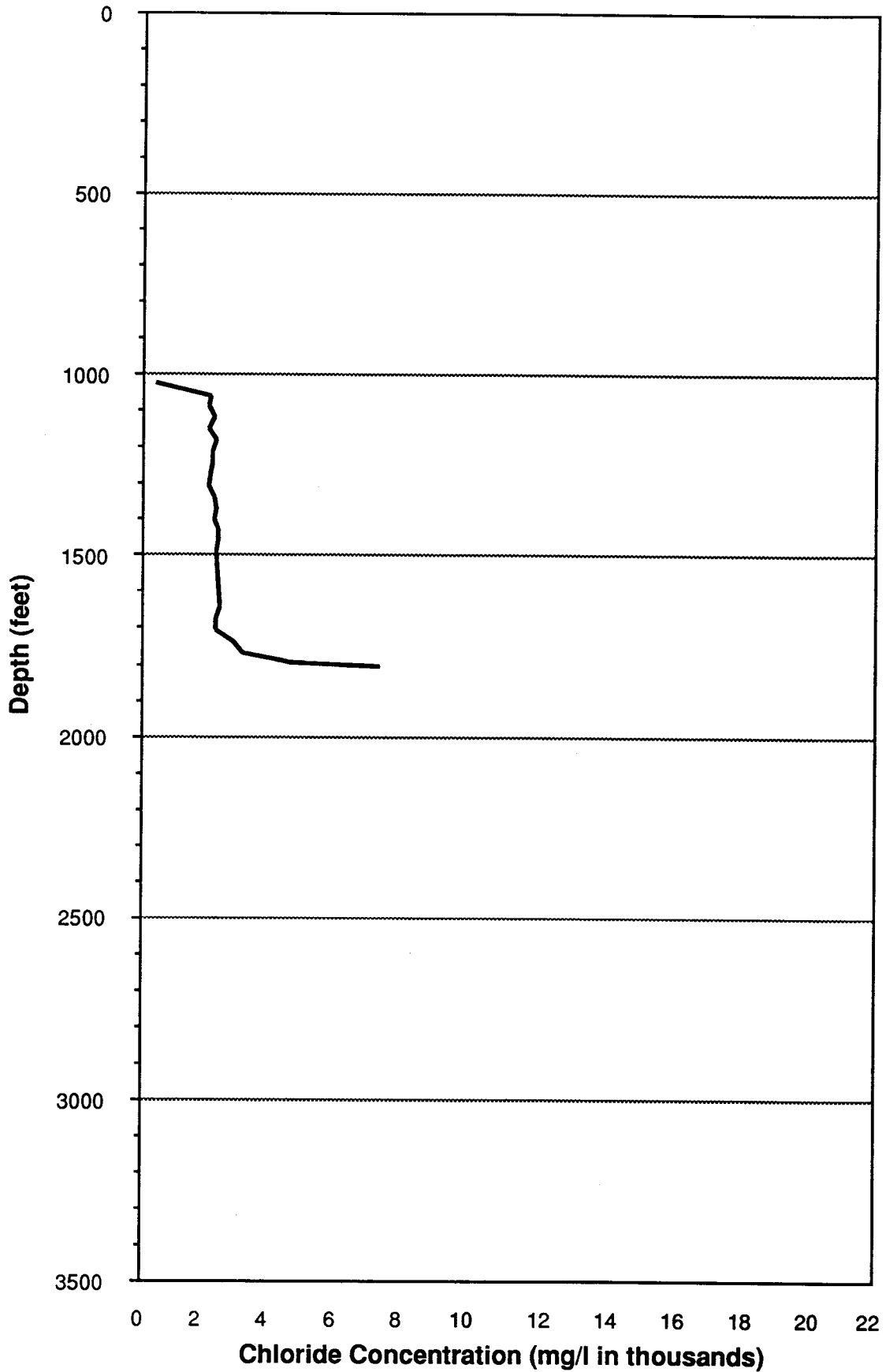



FIGURE 6-2
Water Quality While Drilling
the Boynton Beach Dual-Zone Monitor Well



Dual-Zone Monitor Well

Two zones were selected for long-term monitoring on the basis of water quality data and the geophysical logs from the disposal well and the dual-zone monitor well pilot holes. The upper monitor zone extends over the interval from 970 to 1,084 feet bls and will be used to monitor formation waters with less than 10,000 mg/l TDS. This zone is under artesian pressure with a head of approximately 10.0 psi, which represents a static water level of 44.3 feet NGVD. The lower monitor zone extends from 1,800 to 1,855 feet bls and will monitor formation waters greater than 10,000 mg/l TDS. After completion of the dual-zone monitor well, the upper monitor zone was developed by back-flowing under the artesian head. The lower monitor zone was developed by pumping. Development water was injected to the disposal well.

To ensure further development and establish background data, each zone was purged continuously for approximately 2 months. A temporary submersible pump was placed in the lower monitor zone and a temporary pump was placed in the disposal well sump to pump purged water into the disposal well. The upper monitor zone was throttled to approximately 50 gpm while the lower monitor zone was pumped at approximately 50 gpm. Appendix P contains a table which outlines the purging duration for each zone. Samples were collected on a bi-weekly basis through the pumping period. The samples were field analyzed for conductivity and chlorides. These results are also presented in Appendix P.

At the conclusion of the background sampling period, samples were collected from both zones and analyzed for primary and secondary drinking water standards. These data were fairly consistent indicating that the well had been properly developed. The data are contained in Appendix P.

Surficial Monitor Wells

Throughout construction, water samples were collected from four surficial monitor wells surrounding the concrete drilling pad. All four surficial monitor wells were sampled prior to construction and through the end of construction on a weekly basis. Samples were field-analyzed for temperature, conductivity, and chlorides. The data collected from the wells indicated no significant increase or decrease in water quality during the course of construction. Actual field analytical data are presented in Appendix O.

Operational Monitoring

The monitoring system will include continuous recording and indicating instruments for flows and pressures at the wellheads and in the motor control center. Flow and pressure for the disposal system will be electronically recorded at the motor control center.

Integrity of the confining intervals above the injection zone will be monitored with the dual-zone monitor well located east of the disposal well. Continuous water level monitoring of the two zones will be provided at the wellhead with a pressure gauge on the upper zone and pressure transducer with digital readout on the lower zone. These data will also be electronically recorded in the motor control center on a continuous basis.

The injected effluent and the water quality of the two monitoring zones will be monitored periodically, in accordance with the requirements of Section 17-28.250, FAC and as required by the disposal well operating permit. The operational monitoring plan will be developed with the assistance of the TAC during the operating permit application process and will be contained in the Operation and Maintenance Manual.

Section 7

Summary and Recommendations

Summary

Construction of the concentrate disposal system began in March 1991 and was completed in January 1992. The following casings for the concentrate disposal well were installed to depths of 345 feet, 970 feet, 2,000 feet and 2,780 feet bls, respectively; 42-inch-diameter through the surficial aquifer, 34-inch-diameter through the confining clays, 26-inch-diameter through the 10,000 mg/l TDS interface, and 16-inch-diameter into the confinement above the injection zone. A 13-3/8-inch-diameter liner was installed to a depth of 2,720 feet, and a 16-inch-diameter borehole was completed through the injection zone to a total depth of 3,312 feet.

While pressure testing the annulus between the 13-3/8-inch liner and the final casing, a pin-hole leak was identified at 2,229.31 feet bls. The leak was repaired by a two-phased approach. The pin-hole leak was first sealed with K-Trol sealant by pressurizing to force the K-Trol in place, and then an internal steel casing patch was placed over the interval from 2,214 feet to 2,244 feet bls.

A dual-zone monitor well was constructed to detect any changes above background water quality and to monitor pressure impacts from injection. Casings for the well included 24-, 16-, and 6-inch-diameter steel pipe installed to depths of 345, 970 and 1,800 feet bls, respectively. The lower zone extends over the interval from 1,800 to 1,855 feet and monitors formation waters with concentrations of TDS greater than 10,000 mg/l. The upper zone extends from 970 to 1,084 feet bls and monitors the brackish waters of the upper Floridan aquifer.

In the concentrate disposal well the 10,000 mg/l TDS interface appeared to occur at approximately 1,608 feet bls as delineated in packer testing of the pilot hole. Below this depth, TDS and chloride concentrations increase rapidly to those found in the injection zone. The injection zone water quality analysis for the concentrate disposal well closely represents that of seawater with a chloride concentration of 19,200 mg/l and TDS of 37,200 mg/l.

The injection zone was encountered from approximately 2,870 feet bls and extends to total depth of 3,132 feet bls. When injection was performed at 2,350 gpm, this interval accounted for greater than 80 percent of the fluid loss. The maximum wellhead pressure during injection was observed to be 47.0 psi at 3,000 gpm (4.32 mgd).

Mechanical integrity testing of the concentrate disposal well was successfully performed by pressure testing the annulus between the liner and the final casing, geophysical logging, RTS and a television video survey. Each of the testing procedures confirmed that the well had mechanical integrity and met the standards of FAC 17.28.130(6).

Recommendations

Construction of the Boynton Beach Concentrate Disposal Well at the West Water Treatment Plant is complete. It is recommended that the following items be initiated to assure compliance with regulatory requirements:

- A 6-month extended injection testing program should be initiated to monitor changes in well capacity and wellhead pressure, and to determine the effectiveness of the overlying confining units. During the test operation period, the water quality of the two monitor zones and the injection fluid should be monitored. In addition, water levels in the dual-zone monitor well and pressures and flow rates at the concentrate disposal well should be recorded.

- An operating permit application which includes a summation of data collected during the 6-month testing program should be prepared and submitted.

**Concentrate Disposal Well
Construction Permit (FDER)**



Florida Department of Environmental Regulation

Southeast District • 1900 S. Congress Ave., Suite A • West Palm Beach, Florida 33406 • 407-964-9668

Bob Martinez, Governor

Dale Twachtman, Secretary

John Shearer, Assistant Secretary

Scott Benvon, Deputy Assistant Secretary

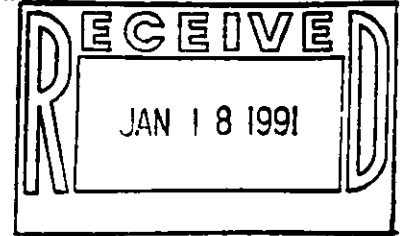
NOTICE OF PERMIT

New Telephone No. 407/433-2650

JAN 16 1991

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Palm Beach County
UIC - City of Boynton Beach
Class I Injection Well



Mr. John Guidry
Director of Utilities
City of Boynton Beach
124 SE 15th Avenue
Boynton Beach, FL 33425

Dear Mr. Guidry:

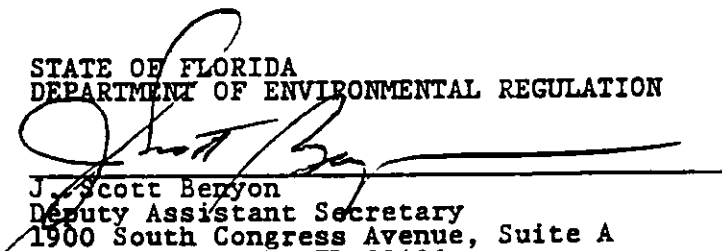
Enclosed is Permit Number UC 50-182070, to construct one (1) 16-inch O.D. Casing with 13.375-inch OD tubing, Class I Industrial Injection Well, issued pursuant to Section(s) 403.087, Florida Statutes and Florida Administrative Codes 17-3, 17-4, 17-600, 17-660, 17-28 & 17-550.

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.

If you have any questions please contact Peggie Highsmith or Al Mueller of this office, phone (407) 433-2650.

Executed in West Palm Beach, Florida

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION


J. Scott Benvon
Deputy Assistant Secretary
1900 South Congress Avenue, Suite A
West Palm Beach, FL 33406
407/433-2650

JSB:ams/273

Copies furnished to:

Office of General Counsel, DER/Tlh.
Richard Deuerling, DER/Tlh.
Mike Merritt, USGS
Tony LasCasas, PBCHU
Tom McCormick, CH2M Hill
Dan Bedford, "

Steve Burton, EPA/Atlanta
Gardner Strasser, SFWMD
Don White, DER/WPB
Pam Smith, "
Albert Muniz, CH2M Hill

CERTIFICATE OF SERVICE

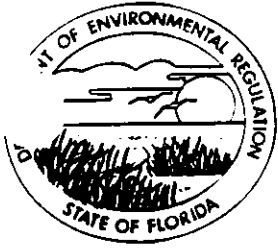
This is to certify that this NOTICE OF PERMIT and all copies were mailed before the close of business on JAN 16 1991 to the listed persons.

Clerk Stamp

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

Mary A. Smith
Clerk

JAN 16 1991
Date



Florida Department of Environmental Regulation

Southeast District • 1900 S. Congress Ave., Suite A • West Palm Beach, Florida 33406 • 407-964-9668

Bob Martinez, Governor

Dale Twachtmann, Secretary

John Shearer, Assistant Secretary
Scott Benvon, Deputy Assistant Secretary
New Telephone No. 407/433-2650

PERMITTEE:

Mr. John Guidry
Director of Utilities
City of Boynton Beach
124 SE 15th Avenue
Boynton Beach, FL 33425

I.D. NUMBER: 5050M03127

PERMIT/CERTIFICATION NUMBER: UC 50-182070

DATE OF ISSUE: JAN 16 1991

EXPIRATION DATE: December 10, 1992

COUNTY: Palm Beach

SECTION/TOWNSHIP/RANGE: 23/T45S/R42E

LATITUDE/LONGITUDE: 26°31'43"/80°07'18

PROJECT: Class I Injection Well

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Florida Administrative Code Chapters 17-3, 17-4, 17-600, 17-660, 17-28 and 17-550. 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: One (1) 12.347 inch ID/13.375 inch O.D., Class I Tubing and Packer test injection well system with a 15.000 inch ID/16.000 inch OD cemented final casing to a total depth of 3300 feet BLS; associated appurtenances/equipment for water hammer control; appurtenances/equipment for annular pressure compensation of annular fluids; the dual zone monitor well to an approximate depth of 2050 feet below land surface. The Class I Tubing & Packer injection well will be used to dispose of 4 MGD of non-hazardous, membrane softening reject concentrate from potable water treatment facilities. Emergency disposal method is discharge to City of Boynton Beach sewerage system (see Specific Condition 7).

IN ACCORDANCE WITH: Application received June 12, 1990; additional information received from CH2M Hill on July 2, 1990, August 2, August 24, October 9, October 15, October 26, October 29, 1990, November 6, 1990 and November 14, 1990 (gyroscopic survey). Certificate of Financial Responsibility issued November 6, 1990.

LOCATED AT: Boynton Beach West Water Treatment Plant, W. Boynton Beach Blvd., 0.5 miles west of Military Trail, Boynton Beach, FL.

TO SERVE: City of Boynton Beach West Water Treatment Plant Service Area.

SUBJECT TO: General Conditions 1-17 and Specific Conditions 1-7.

GENERAL CONDITIONS:

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

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

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

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

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

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

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

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

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

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

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

GENERAL CONDITIONS:

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

10. The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

11. This permit is transferable only upon Department approval in accordance with Rule 17-4.120 and 17-30.300, F.A.C., as applicable. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department

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

13. This permit also constitutes:

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

14. The permittee shall comply with the following:

- (a) Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records will be extended automatically unless otherwise stipulated by the Department.
- (b) The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.
- (c) Records of monitoring information shall include:
 1. the date, exact place, and time of sampling or measurements;
 2. the person responsible for performing the sampling or measurements;
 3. the dates analyses were performed;
 4. the person responsible for performing the analyses;
 5. the analytical techniques or methods used;
 6. the results of such analyses.

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

GENERAL CONDITIONS:

16. In the case of an underground injection control permit, the following permit conditions also shall apply:
- (a) All reports or information required by the Department shall be certified as being true, accurate and complete.
 - (b) Reports of compliance or noncompliance with, or any progress reports on, requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.
 - (c) Notification of any noncompliance which may endanger health or the environment shall be reported verbally to the Department within 24 hours and again within 72 hours, and a final written report provided within two weeks.
1. The verbal reports shall contain any monitoring or other information which indicate that any contaminant may endanger an underground source of drinking water and any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.
 2. The written submission shall contain a description of and a discussion of the cause of the noncompliance and, if it has not been corrected, the anticipated time the noncompliance is expected to continue, the steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance and all information required by Rule 17-28.230(4)(b), F.A.C.
 - (d) The Department shall be notified at least 180 days before conversion or abandonment of an injection well, unless abandonment within a lesser period of time is necessary to protect waters of the state.
17. The following conditions also shall apply to a hazardous waste facility permit.
- (a) The following reports shall be submitted to the Department:
 1. Manifest discrepancy report. If a significant discrepancy in a manifest is discovered, the permittee shall attempt to rectify the discrepancy. If not resolved within 15 days after the waste is received, the permittee shall immediately submit a letter report, including a copy of the manifest, to the Department.
 2. Unmanifested waste report. The permittee shall submit an unmanifested waste report to the Department within 15 days of receipt of unmanifested waste.
 3. Annual report. An annual report covering facility activities during the previous calendar year shall be submitted pursuant to Chapter 17-30, F.A.C.
 - (b) Notification of any noncompliance which may endanger health or the environment, including the release of any hazardous waste that may endanger public drinking water supplies or the occurrence of a fire or explosion from the facility which could threaten the environment or human health outside the facility, shall be reported verbally to the Department within 24 hours, and a written report shall be provided within 5 days. The verbal report shall include the name, address, I.D. number, and telephone number of the facility, its owner or operator, the name and quantity of materials involved, the extent of any injuries, an assessment of actual or potential hazards, and the estimated quantity and disposition of recovered material. The written submission shall contain:
 1. A description and cause of the noncompliance.
 2. If not corrected, the expected time of correction, and the steps being taken to reduce, eliminate, and prevent recurrence of the noncompliance.
 - (c) Reports of compliance or noncompliance with, or any progress reports on, requirements in any compliance schedule shall be submitted no later than 14 days after each schedule date.
 - (d) All reports or information required by the Department by a hazardous waste permittee shall be signed by a person authorized to sign a permit application.

PERMITTEE:
Mr. John Guidry
Director of Utilities
City of Boynton Beach

I.D. NUMBER: 5050M03127
PERMIT/CERTIFICATION NUMBER: UC 50-182070
DATE OF ISSUE: JAN 16 1991
EXPIRATION DATE: December 10, 1992

SPECIFIC CONDITIONS:

1. Site Requirements

- ✓ a. The measurement points for drilling and logging operations will be surveyed and referenced to NGVD of 1929 prior to the onset of drilling activities for the injection well.
- ✓ b. The four (4) surficial aquifer wells will be sampled and analyzed prior to drilling and then weekly for chlorides (mg/l), conductivity (umhos), temperature (°F), and water level (NGVD). Initial analyses must be submitted prior to construction of the well.

2. Construction and Testing Requirements

- ✓ a. Blow-out preventors will be installed on the injection well prior to penetration of the Floridan aquifer system.
- b. Upon approval by the Department, the lower monitor zone will be positioned in the first adequately transmissive interval below the USDW.
- c. Mechanical integrity of the injection wells, will be determined pursuant to Chapter 17-28.130(6)(b)2 and (c)2. F.A.C. The pressure test for the final casing will be accepted if tested with a liquid-filled casing at 1.5 times the expected operating pressure with a test tolerance of ±5%. Verification of pressure gauge calibration must be provided with the test report.
- d. Department approval and TAC review pursuant to F.A.C. 17-28 is required for the following stages of construction:
 - ✓ 1. Pre-construction meeting: review revised contract documents and notice to proceed. (see Specific Condition 2h)
 - 2. ✓ Intermediate casing seat and upper/lower monitor zone selections
 - 3. Final casing seat selection.
 - 4. Mechanical integrity, confinement and injectivity testing..
- e. Department approval at a scheduled TAC meeting will be based on the permittee's presentation that shows compliance with the rules and this permit.
- 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. A revised set of contract documents that includes this permit and all approved revisions, (resulting from responses to requests for information or post-permitting approvals) must be submitted for Department approval and TAC review prior to all construction activities.
- ✓ h. The Department must be notified within 48-hours after drilling has begun (spud-date).
- NA i. Hurricane Preparedness - Upon the issuance of a "Hurricane Watch" by the National Weather Service, the preparations to be made include but are not necessarily limited to the following:
 - 1. Secure all on-site salt 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 on-site treatment process equipment.

PERMITTEE:
Mr. John Guidry
Director of Utilities
City of Boynton Beach

I.D. NUMBER: 5050M03127
PERMIT/CERTIFICATION NUMBER: UC 50-182070
DATE OF ISSUE: JAN 16 1991
EXPIRATION DATE: December 10, 1992

SPECIFIC CONDITIONS:

- j. Proposed cementing procedures (cement volumes, no. of stages, etc.) for the deep intermediate (24-inch) and final (16-inch) casings must be submitted with the caliper logs (reamed sections) for Department approval and TAC review. All uses of water taken from the dual zone monitor well must be limited to a completed monitor well (final casing installed) with adequate back flow prevention (double check valves, air break, etc.).
3. Quality Assurance/Quality Control Requirements
- a. Pursuant to Chapter 17-28.310(5)(b), the Professional Engineer of Record will certify all documents related to the completion of the injection well system as a disposal facility. The Department must be notified immediately of any transfer of the Engineer of Record.
 - b. Where required by Chapter 471 (P.E.) or Chapter 492 (P.G.) Florida Statutes, applicable portions of permit applications and supporting documents which are submitted to the Department for public record shall be signed and sealed by the professional(s) who prepared them.
 - c. Continuous on-site supervision by qualified personnel (engineer and geologist) is required during all testing and geophysical logging operations.
4. Reporting Requirements
- a. All reports and surveys required by this permit must be submitted concurrently to all the members of the TAC. The Technical Advisory Committee (TAC) will consist of representatives from these agencies:

Department of Environmental Regulation, 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
Palm Beach County Health Department, West Palm Beach
 - 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.).
 - c. The Department must be notified seventy-two (72) hours prior to all testing for mechanical integrity on the injection and monitor wells.
 - d. All testing for mechanical integrity on the injection and monitor wells must be initiated during daylight hours, Monday through Friday.
 - e. A weekly submittal of construction progress reports will include at a minimum the following information:
 1. A cover letter summary of the daily engineer/geologist report and driller's log and projection for activities in next reporting period.
 2. Daily engineer/geologist report and driller's log with detailed descriptions of all testing, logging, casing, cementing and drilling activities pursuant to Section 17-28.340 F.A.C.
 3. Lithologic log with cuttings descriptions, drilling rate curve and formation tops.
 4. Weekly water quality analyses and water levels for the four (4) surficial aquifer wells. (See S.C. 1a and c)
 5. Detailed description of any unusual construction-related events that occur during the reporting period.
 - f. A drilling and system construction schedule will be submitted to the Department and TAC prior to site preparation for the injection well system.
 - g. An evaluation of all test results and geophysical logs must be submitted with all test data.

PERMITTEE:
Mr. John Guidry
Director of Utilities
City of Boynton Beach

I.D. NUMBER: 5050M03127
PERMIT/CERTIFICATION NUMBER: WQ-50-182070
DATE OF ISSUE: JAN 16 1991
EXPIRATION DATE: December 10, 1992

SPECIFIC CONDITIONS:

- h. An aquifer performance test evaluation with a description of test equipment/procedures, graphical representations of draw down/recovery curves and the certified lab report on water quality must be submitted to the TAC with the request for monitor zone selection approvals (see Specific Condition 2e).
 - i. Annotated copies of geophysical logs, lithologic descriptions and logs (S.C. 4.e.3), and water quality data (from drilling and packer tests) must be submitted to the TAC for deep intermediate and final casing seat selection approvals by the department (see Specific Condition 2e.);
 - j. A final report pursuant to 17-28.340 F.A.C. will be submitted to the Department, Florida Geological Survey and the TAC after completion of the injection well system. An application to operate the Class I injection well must be submitted at least sixty (60) days prior to expiration of this permit.
 - k. After the well has been completed, cuttings and cores shall be shipped to the Florida Geological Survey, 903 West Tennessee Street, Tallahassee, Florida 32304. *DW sent 7/24/91*
5. Operational Testing Requirements
- a. The operational testing of the injection well system with reverse osmosis reject concentrate will not commence without written authorization from the Department.
 - b. A draft operation and maintenance manual with emergency procedures must be submitted to the Department and TAC prior to a request for system operation approval.
 - c. Prior to operational testing approval, the following items must be submitted for Department approval and TAC review:
 1. Borehole television survey of final casing and open-hole to TD
 2. Geophysical logs with interpretations
 3. Certification of mechanical integrity and interpreted test data
 4. Injection test data and evaluation
 5. Confining zone data (cores, etc.) and confirmation of confinement
 6. Background water quality data (monitor zones)
 7. Waste stream analysis
 8. Surface equipment completion certified by the professional engineer of record.
6. Operational Testing Conditions
- a. Upon receipt of written authorization from the Department (S.C. 5a), the operational testing of the injection well system will be subject to the following conditions.
 1. The progress of the operational testing for the system will be reviewed during TAC meetings scheduled at least every three months after operation has begun. Reports evaluating the system's progress must be submitted to each member of the TAC at least two weeks prior to the scheduled meeting. The conditions for the operational test period may be modified by the Department at each of these TAC review intervals.
 2. The flows to the injection well will be monitored and controlled at all times to ensure the maximum pressure at each wellhead does not exceed 66% of the tested pressure on the final casing and the velocity down the wells does not exceed 8.0 feet per second.
 3. Any failure of injection well monitoring and recording equipment for a period of more than forty-eight (48) hours will be reported immediately to the Department.

PERMITTEE:
Mr. John Guidry
Director of Utilities
City of Boynton Beach

I.D. NUMBER: 5050M03127
PERMIT/CERTIFICATION NUMBER: UC 50-182070
DATE OF ISSUE: JAN 16 1991
EXPIRATION DATE: December 10, 1992

PECIFIC CONDITIONS:

4. The following injection well performance and monitor zone data will be recorded for each well as indicated and reported monthly:
 - a. Injection well performance:
 - total daily flow (mgd)
 - daily maximum flow (mgd)
 - daily maximum injection pressure (psig)
 - daily average injection pressure (psig)
 - monthly averages for the above daily measurements
 - b. Annular zone performance:
 - water level on pressure compensation tank
 - daily max pressure on annulus (psig)
 - daily minimum pressure on annulus (psig)
 - c. Monitor well performance:
 1. Physical characteristics of upper and lower monitor zone:
 - daily maximum, sustained monitor zone pressure (psig)
 - daily minimum, sustained monitor zone pressure (psig)
 - daily average monitor zone pressure (psig)
 - monthly averages for the above
 2. Chemical characteristics of upper and lower monitoring zones (weekly) (subject to change during/following operational testing period):
 - sulfate (mg/l)/sulfide (mg/l) ratio
 - total dissolved solids-measured (mg/l)
 - chlorides (mg/l)
 - conductivity (umho/cm)
 - pH
 - temperature
 - iron

(monthly):

 - TOC
 - Total Hardness
 - Calcium Hardness
 - Magnesium Hardness
 - Potassium
 - Bromide
 - Sodium
5. A minimum of three (3) well volumes of fluid will be evacuated from each monitor system prior to sampling for chemical parameters listed above.
 6. The following wastestream analysis for the injection well will be recorded and reported as indicated:

daily

pH
Conductivity
TDS
Phosphate
Sulfate
TOC
Ammonia

monthly

Formaldehyde

PERMITTEE:
Mr. John Guidry
Director of Utilities
City of Boynton Beach

I.D. NUMBER: 5050M03127
PERMIT/CERTIFICATION NUMBER: UG 50-182070
DATE OF ISSUE: JAN 16 1991
EXPIRATION DATE: December 10, 1992

SPECIFIC CONDITIONS:

7. A scan for Florida primary and secondary standards and other applicable parameters (see Exhibit I) to characterize the wastestream will be performed and submitted prior to operational testing approval (see S.C. 5c7).
 8. All injection well data submissions will be clearly identified on each page with facility name, I.D. Number, date of sampling/recording and type of data shown. The lead plant operator or higher official must sign and date each submittal.
 9. All monthly reports will be submitted to this office and our Tallahassee office (2600 Blair Stone Road, Tallahassee, FL 32301).
 10. A qualified representative of the Engineer of Record must be present for the start-up operations.
 11. The Department must be notified in writing of the date operation began for the subject well.
- b. The integrity of the monitor zone sampling systems will be maintained at all times. Sampling lines and equipment shall be kept free of contamination with independent discharges and no interconnections with any other lines.
- c. An evaluation based on the combined wastestream characteristics (R/O reject and spent cleaning solution tank) for "fingerprinting" the migration of waste into the lower monitor zone must be submitted for TAC review and Department approval prior to operational testing approval. This evaluation should include a consideration of the practical application of the following geochemical analyses:
- discriminant analyses of ionic ratios
 - stable isotopes
 - ion exchange
 - trace elements
 - redox reactions

7. Emergency disposal method is via the Boynton Beach sewerage system within which 1.0 MGD capacity is reserved for emergency use. During emergency disposal situations, it is understood that the membrane softening facility will increase membrane efficiency so as not to cause a concentrate discharge greater than 1 MGD.

Issued this 16th day of January, 1991

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

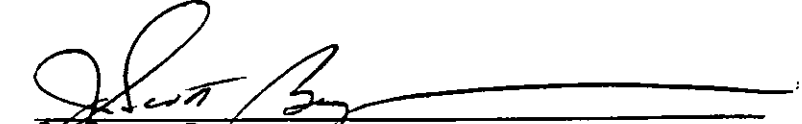

J. Scott Benyon
Deputy Assistant Secretary

Table 3
TYPICAL RO MEMBRANE CLEANING COMPOUNDS

1. Cleaning Solution: Low pH
 - Composition: 1.0 to 2.0 % (Wt.) Citric Acid (Food grade) mixed in RO permeate. Adjust final pH to between 2.3 - 4.0 with ammonium hydroxide.
 - Foulants: Inorganic salts (CaSO_4 , CaCO_3 , BaSO_4) and metal oxides
2. Cleaning Solution: High pH
 - Composition: 0.1 % (Wt.) Sodium Hydroxide, 0.1 % (Wt.) Sodium Ethylene Diamine Tetra-acetic Acid (EDTA) mixed in RO permeate. Final pH is approximately 12.
 - Foulants: Inorganic colloids, silica, and biological films
3. Cleaning Solution: High pH
 - Composition: 1.0 % (Wt.) Borax, 1.0 % (Wt.) Sodium Ethylene Diamine Tetra-acetic Acid (EDTA) and 1.0 % (Wt.) Trisodium Phosphate (TSP) mixed in RO permeate. Final pH is approximately 12.
 - Foulants: Inorganic colloids, silica, and biological films
4. Cleaning Solution: High pH
 - Composition: RO permeate adjusted to pH 11.0 using Sodium Hydroxide.
 - Foulants: Inorganic colloids, silica, and biological films
5. Disinfection Solution: Sodium Bisulfite
 - Composition: 0.25 to 1.0 % (Wt.) Sodium Metabisulfite (Food Grade) mixed in RO permeate.
 - Applications: Typically used as a short term preservative in addition to biocide.
6. Disinfection Solution: Formaldehyde
 - Composition: 0.25 to 0.5 % (Wt.) Formaldehyde mixed in RO permeate.
 - Applications and Limitations: Very good long term preservative. Not all membrane manufacturers will permit the use of formaldehyde with their products. Others limit its use and warn of potential reduction in membrane performance.

EXHIBIT I

**Concentrate Disposal Well
Casing Mill Certificates**

**CONCENTRATE
DISPOSAL WELL**

TELEPHONE (416) 291-1111
 FAX (416) 291-1112
 TELEVISION

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF JAY-M HOLDINGS LIMITED
 289 HORNER AVENUE
 TORONTO, ONTARIO, CANADA
 M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE OCT. 17/90 CUSTOMER BARTOW STEEL
 SPECIFICATION A139B ADDRESS BARTOW, FLORIDA 35830
 O.D. & GAUGE 48" O.D. x .375 CUSTOMERS'S P.O. NO. 1372
 HYDROTEST --- P.S.I. FOR --- MIN. CANADIAN PHOENIX REF. NO. 90-2629

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST		ELONGATION X IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
		YIELD STRENGTH	TENSILE STRENGTH				
169945	6	42970	66280	31.0	69320	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS					
	C.	Mn	P	S		
169945	.22	.82	.008	.013		

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


 APPROVED BY

Oct. 17/90
 DATE

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF JAY-M HOLDINGS LIMITED

280 HORNER AVENUE
 TORONTO, ONTARIO, CANADA
 M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE MARCH 15/91 CUSTOMER BARTON STEEL INC.
 SPECIFICATION A 139 B ADDRESS BARTON, FLORIDA 32830
 O.D. & GAUGE 44" O.D. X .375
34" O.D. X .500 CUSTOMER'S P.O. NO. 1456
 HYDROTEST 480 P.S.I. FOR 2 MIN
825 P.S.I. FOR 2 MIN CANADIAN PHOENIX REF. NO. 91-2681

*No 47
 1/2" - 1/4" project*

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST		ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
		YIELD STRENGTH	TENSILE STRENGTH				
44" 264527	3	38200 ✓	63900 ✓	33.0 ✓	67700	PM	
34" 173154	6	39900 ✓	65290 ✓	32.0 ✓	69100	PM	
34" 173148	9	44000 ✓	67600 ✓	32.0 ✓	71200	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS				
	C.	Mn	P	S	
264527	.21 ✓	.75 ✓	.005 ✓	.008 ✓	
173154	.22 ✓	.79 ✓	.008 ✓	.012 ✓	
173148	.23 ✓	.84 ✓	.009 ✓	.013 ✓	

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

M. J. Kaminski
 APPROVED BY
March 15/91
 DATE

TELEPHONE (416) 291-1111
 FAX (416) 291-1111
 TELEX 06-0577

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF JAY-M HOLDINGS LIMITED
 289 HORNER AVENUE
 TORONTO, ONTARIO, CANADA
 M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE AUG. 30/90 CUSTOMER BARTON STEEL
 SPECIFICATION A 139 B ADDRESS BARTON, FLORIDA 33850
 O.D. & GAUGE 42" O.D. X. 500 CUSTOMERS' P.O. NO. 1372
 HYDROTEST — P.S.I. FOR — MIN. CANADIAN PHOENIX REF. NO. 90-2629

PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST		ELONGATION % IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
		YIELD STRENGTH	TENSILE STRENGTH				
254513	2	40890 ✓	61370 ✓	32.0 ✓	69480	PM	

CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS				
	C.	Mn	P	S	
254513	.21 ✓	.78 ✓	.010 ✓	.014 ✓	

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

N. N. Tamura
 APPROVED BY
 DATE AUG 30/90

**STANDARD CERTIFIED TEST REPORT
GEORGIA TUBULAR PRODUCTS, INC.**



Customer Name **YOUNGQUIST BROTHERS, INC.**
 Address **15000 PINE RIDGE ROAD**
 State, Zip **FORT MYERS, FLA. 33908**

Date **3-28-90**
 Customer Order No **21357**

GTP Invoice No
**PALM BEACH CO. PROJ.#87-16
 CH2m HILL #SEF 24770 TO**

Specification A-139 GR. B

Coil or Lot No.	Size O.D.	Wr. Fr or Wall Thick.	Min Hydro. Test Pres. P.S.I.	MECHANICAL PROPERTIES			CHEMICAL ANALYSIS (%)				
				Yield Strength P.S.I. Point	Tensile Strength P.S.I.	Elong In 2" %	C	Mn	P	S	SI
5B27918	54"	.500	3891bs	55,000	76,600	37.9	.19	.79	.025	.012	
C01750	44"	"	4771bs	46,950	69,900	35	.18	.76	.017	.008	
C01533	"	"	"	52,390	71,440	35	.19	.70	.015	.009	
C01506	"	"	"	40,980	68,600	37.5	.20	.79	.016	.009	
C01744	"	"	"	49,260	72,020	30	.22	.79	.020	.009	
C01752	"	"	"	48,920	70,130	35	.19	.78	.017	.010	
5B15348	"	"	"	47,200	65,500	33	.21	.44	.019	.014	
C01750	34"	"	6181bs	46,950 ✓	69,900 ✓	35 ✓	.18 ✓	.76 ✓	.017 ✓	.008 ✓	
C01752	"	"	"	48,900 ✓	70,130 ✓	35 ✓	.19 ✓	.78 ✓	.017 ✓	.010 ✓	
C01718	"	"	"	58,610 ✓	68,740 ✓	35 ✓	.21 ✓	.74 ✓	.015 ✓	.007 ✓	
C01700	"	"	"	56,850 ✓	71,820 ✓	35 ✓	.24 ✓	.81 ✓	.016 ✓	.006 ✓	
C01483	"	"	"	44,560	69,490	35	.24	.72	.013	.006	
C01704	"	"	"	55,670	70,310	35	.21	.75	.027	.011	

The undersigned hereby certifies that the above materials have been inspected and tested in accordance with the methods prescribed in the applicable specifications and the results of such inspection and tests shown above. In determining properties or characteristics for which no methods of measuring or testing are prescribed by said specifications, the standard mill inspection and testing practices of Georgia Tubular Products, Inc. have been applied. Any special inspection or testing otherwise in the results of such inspection and tests shown above, the undersigned believes that said materials conform to said specifications.

Marvin M. Hendrix

MARVIN M. HENDRIX
MANUFACTURING MANAGER

Name & Title

Subscribed and sworn to before me
 this 28th day of MARCH, 1990

H. Stanley Jones, Jr.
 Notary Public
 MY COMMISSION EXPIRES FEB. 28, 1993



Georgia Tubular Products, Inc.
 P.O. Box 748 • 109 Dent Drive, Cartersville, GA 30120
 (404) 386-2553

CANADIAN PHOENIX STEEL PRODUCTS

DIVISION OF JAY-M HOLDINGS LIMITED
 889 HORNER AVENUE
 TORONTO, ONTARIO, CANADA
 M8Z 4Y4

LABORATORY REPORT AND MILL TEST CERTIFICATE

DATE May 17/91 CUSTOMER BARTON STEEL
 SPECIFICATION A139 B ADDRESS BARTON, FLORIDA 33830
 O.D. & GAUGE 26" O.D. X .500 CUSTOMERS'S P.O. NO. 1756
 HYDROTEST 1075 P.S.I. FOR 2 MIN. CANADIAN PHOENIX REF. NO. 91-2690

✓ PHYSICAL PROPERTIES

HEAT NO.	PIPE NO.	LONGITUDINAL TEST		ELONGATION X IN 2"	TRANSVERSE WELD TENSILE	BREAK LOCATION	REMARKS
		YIELD STRENGTH	TENSILE STRENGTH				
173375	3	43100 ✓	65700 ✓	32.0 ✓	68900	PM	
267209	43	41200 ✓	64300 ✓	32.0 ✓	68100	PM	
267208	49	39800 ✓	63900 ✓	33.0 ✓	67200	PM	
	9-						

95x

✓ CHEMICAL PROPERTIES

HEAT NO.	LADLE ANALYSIS				
	C	Mn	P	S	
173375	.23 ✓	.83 ✓	.020 ✓	.016 ✓	
267209	.21 ✓	.81 ✓	.007 ✓	.010 ✓	
267208	.20 ✓	.77 ✓	.007 ✓	.008 ✓	

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

M. Nakamura
 APPROVED BY

May 17/91
 DATE

CH2M HILL
 REVIEWED BY PFL 11107
 6-25-91 1340 USING
 ASTM A139 GRADE B E 5LS-
 APPROVED *PJ17/91*

CERTIFICATE NO: PSY726

INSPECTION CERTIFICATE

03:01 JC-04 (JC-04) PAGE 1 / 1 (4)

PURCHASE ORDER NO: _____

KAWASAKI STEEL CORPORATION
CHITA WORKS

CONTRACT NO: 6393-71370-02 (035 F204111)

1. KAWASAKI-KICHO | CHOME, HANDA, 475 JAPAN

SHIPPER: HITSUI & CO., LTD.

BUYER OR CUSTOMER: _____

COMMODITY & SPECIFICATION: SEAMLESS STEEL PIPE BLACK PLAIN BEVELLED ENDS:
(KOBUN)
KMP80 (RPE-BVL)

DATE: AUGUST 11, 1988

SIZE: (OD) 16" X 0.625" X 42'44" TOTAL LENGTH: 774.9 F

NO. OF PCS: 16 NO. OF BDL: _____ WEIGHT (NET): 37,832 kg

HEAT NO.	CHEMICAL COMPOSITION (%)																TEST NO.	TENSILE TEST					IMPACT TEST			
	C	Si	Mn	P	S	Cu	Ni	Cr	Mo	Al	Ti	V	Nb	N	Co	CEQ		GRADE (JIS 12C) YIELD					IMPACT VALUE			
	x100			x1000			x100			x1000			%			%		GL - 90MPa		SHEAR STRUCTURE AREA (%)		SPOT				
	16	35	130	29	15	50	250	250	8	60			80	90				TEN TENSILE	TENSILE STRENGTH	REDUCTION OF AREA	ELONGATION		TEAR RATIO	DIRECTION	VALUE	2V
E2525-01	10	29	86	9	32	98	6	43				35	<1			IPG610	84	29	51	18		799	1097			
F7525-02	10	24	84	11	32	98	5	40				35	<1			IPG110	81	26	52			1855	1805			
E2188-01	10	27	84	11	31	98	5	39				35	<1			JTC810	80	24	50			2115	1696			

QUALITY ASSURANCE	HYDROSTATIC TEST	FLATTENING TEST	BEND TEST	FLARING TEST (80% EXPANSION)	FLANGE TEST	REBURS TEST	REVERSE FLATTENING TEST	GALVANIZED TEST	WELD METAL TEST	DRIFT TEST	N. D. E.	REMARKS & COMMENTS
GOOD		GOOD										

REMARKS	Notes
	H---Heat analysis P---Product analysis L---Longitudinal T---Transverse CEQ---Carbon equivalent A---GL=146 VA

WE HEREBY CERTIFY THAT MATERIAL HEREIN DESCRIBED HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS SPECIFIED BY YOU AND THAT IT SATISFIES THE REQUIREMENTS

[Signature]
CHIEF INSPECTOR

PC 55 1P03

TEG5

P. 03

17193367677

13:46

05/30/91

CI KATE NO. PGY6P1

INSPECTION CERTIFICATE

1230 JC-09 (JC) PAGE 2 / 10

PL ASK ORDER NO.:

KAWASAKI STEEL CORPORATION
CINTA WORKS

CONTRACT NO.: 6393-71570-01 (035 F204111)

1, KAWASAKICHO 1 CHOME, MAZDA, 75, JAPAN

SHIPPER: MITSUBI & CO., LTD.

BUYER OR CUSTOMER:

COMMODITY & SPECIFICATION: SEAMLESS STEEL PIPE BLACK PLAIN BEVELLED ENDS
(K1000) K1000 (BPE-PVL)

DATE: JULY 20, 1989

SIZE: OD16" X 0.626" X 42'044'

TOTAL LENGTH: 301.0 F

NO. OF PCS: 7 NO. OF BDL: WEIGHT (NET): 14,489 kg

HEAT NO.	CHEMICAL COMPOSITION (%)														TEST NO.	TENSILE TEST				IMPACT TEST						
	C	Si	Mn	P	S	Cr	Ni	Co	Mo	Al	Ti	V	Nb	N		Coq	DIRECTION - L		GE-500K		IMPACT VALUE		SHEAR STRUCTURE AREA			
	X100			X1000		X100						X1000				%		%		-10°C		%				
E2689-01	16	32	50	25	15	50	25	80	60			80	50				KGF/CM ²		%		KJ-CM ²		%		%	
	15	30		10	20	10	10					20					70	80	18		350		2050	2100		
	100	27	44	31	31	90	50	39				39	41				80		32		2920		2040			

HYDROSTATIC TEST	FLARING TEST	BEND TEST	FLANGING TEST	FLANGE TEST	GRIND TEST	REVERSE FLATTENING TEST	CALCINATED TEST	WELD FACILITY TEST	DRIFT TEST	K. E. Z.	T HEADS & CORN.
GOOD	GOOD										

REMARKS: _____

Notes:
 M... Heat analysis
 P... Product analysis
 L... Longitudinal
 T... Transverse
 Coq - Carbon equivalent
 A - GL-565 / K

WE HEREBY CERTIFY THAT MATERIAL HEREIN DESCRIBED HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS SPECIFIED BY YOU AND THAT IT SATISFIES THE REQUIREMENTS.

A. Grimes
CHIEF INSPECTOR

-655

700

CERTIFICATE NO.: PGY67

INSPECTION CERTIFICATE

11/5 JC-09 (JC-04) PAGE 1/1 (7)

PURCHASE ORDER NO.: _____

KAWASAKI STEEL CORPORATION
CHITA WORKS

CONTRACT NO.: 6392-71370-01 (022 F204111)

1, KAWASAKICHOI CHOME, HANDA 475 JAPAN

SHIPPER: MIYAMA & CO., LTD.

BUYER OR CUSTOMER: _____

COMMODITY & SPECIFICATION: SEAMLESS STEEL PIPE BLACK FLARE BEVELLED ENDS
KIPGB (BPE-BVL)

DATE: JULY 26, 1988

SIZE: Ø16" X 0.636" X 42"=44" TOTAL LENGTH: 2,482.0 F

NO. OF PCS.: 01 NO. OF BDL.: _____ WEIGHT (NET): 140.970 kg

HEAT NO.	CHEMICAL COMPOSITION (%)														TEST NO.	TENSILE TEST				IMPACT TEST			
	C	Si	Mn	P	S	Co	Ni	C	Mo	Al	Ti	V	Nb	N		YIELD STRENGTH	TENSILE STRENGTH	ELONGATION	REDUCTION OF AREA	IMPACT VALUE	SHEAR FRACTURE AREA		
	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100	x100		x100	MPA	MPA	(%)	(%)	KG-M	20°	
E2524-01	0.26	0.15	0.25	0.015	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	50	60	28	35	2621	2534		
E2524-02	0.26	0.15	0.25	0.015	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	50	60	28	35	2738	2728		

WELDED	HYDROSTATIC TEST	FLARE TEST	BEND TEST	FLANGING TEST	FLANG TEST	CRUSH TEST	REVERSE FLATTENING TEST	CORROSION TEST	PERMEABILITY TEST	SHIFT TEST	N D E	FLANGE & COUPLING
GOOD		GOOD										

REMARKS: _____

Notes:
 H---Heat analysis Cq---Carbon equivalent
 P---Product analysis A---GL=305 /A
 L---Longitudinal
 T---Transverse

WE HEREBY CERTIFY THAT MATERIAL HEREIN DESCRIBED HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS SPECIFIED BY YOU AND THAT IT SATISFIES THE REQUIREMENTS.

A. G. ...
 CHIEF INSPECTOR

PC855 8P03

TE03

CERTIFICATE NO.: PGT25

INSPECTION CERTIFICATE

02/01 JC-00 (A) PAGE 1 / 10

PURCHASE ORDER NO.:

CONTRACT NO.: 6395-73:70-01 (035 F204131)

KAWASAKI STEEL CORPORATION
CHITA WORKS

SHIPPER: MITSUBISHI CE, LTD.

1, KAWASAKIHOI CHIKOME HANDA, 475 JAPAN

BUYER OR CUSTOMER:

COMMODITY & SPECIFICATION: SEAMLESS STEEL PIPE BLACK PLAIN BEVELLED ENDS
(K0660)
K1060 (BPE-2VL)

DATE: AUGUST 11, 1988

SIZE: (OD 16") 0.636" X 42" X 44"

TOTAL LENGTH: 783.3 F

NO. OF PCS.: 20 NO. OF BDL.: WEIGHT NET: 38,225 kg

HEAT NO.	CHEMICAL COMPOSITION (%)														TEST NO.	TENSILE TEST					IMPACT TEST			
	C	Si	Mn	P	S	Ca	Ni	Cr	Mo	Al	Ti	V	Nb	N		YIELD STRENGTH	TENSILE STRENGTH	ELONGATION	REDUCTION OF AREA	IMPACT VALUE		SHEAR FRACTURE AREA%		
	x 100		x 100		x 100		x 1000		x 100		x 1000		x 100			%		%		%				
E2688-01	0.26	0.12	0.23	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	69	70	42	2660	2613	2660	2660	2980		
E2688-02	0.27	0.12	0.22	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	63	68	41	2980	2980	2980	2980	2980		
E2879-01	0.27	0.12	0.22	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	66	71	42	2647	2655	2660	2650	2650		

HYDROSTATIC TEST	BATHING TEST	BEND TEST	FLARING TEST	FLANGE TEST	WORM TEST	REVERSE FLATTENING TEST	GALVANIZED TEST	WELD METAL TEST	DRIFT TEST	K. D. E.	TREADS & CO.
GOOD	GOOD										

REMARKS:

Notes:
 H--Heat analysis
 P--Product analysis
 L--Longitudinal
 T--Transverse
 Ca--Carbon equivalent
 A--0.1-5/8" A

WE HEREBY CERTIFY THAT MATERIAL HEREIN DESCRIBED HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS SPECIFIED BY YOU AND THAT IT SATISFIES THE REQUIREMENTS.

[Signature]
CHIEF INSPECTOR

P.01

17193367677

13:43

05/30/91

PC835

LONE STAR STEEL COMPANY
MATERIAL TEST REPORT

09/11/91

CUSTOMER...VINSON SUPPLY CO.
LSD...1-31-0125A ITEM...0001
DIAMETER...13.375 GAUGE... .514
HYDROSTATIC PRESSURE... 4900 PSI

ORDER NUMBER... 90-204143
SPECIMEN SIZE...1.5 INCHES
GRADE...NB0 WT/FT...70.60
FLATTENING TEST...OK

HEAT	LOT	YIELD STR. (KSI)	TENSILE STR. (KSI)	% ELONG IN 2 IN.								
41321	53	110.0 ✓	123.0 ✓	27.0 ✓								
HEAT C	.24 MN	1.35	P	.013 S	.002 SI	.14	CU	.02	NI	.03		
			CR	.120 MO	.060 AL	.029	CB	.000	V	.040		
CHK C	.24 MN	1.31	P	.011 S	.001 SI	.14	CU	.02	NI	.03		
			CR	.125 MO	.064 AL	.031	CB	.001	V	.045		
CHK C	.24 MN	1.31	P	.011 S	.001 SI	.14	CU	.02	NI	.03		
			CR	.125 MO	.062 AL	.031	CB	.001	V	.045		
41321	54	110.0 ✓	122.0 ✓	28.0 ✓								
HEAT C	.24 MN	1.35	P	.013 S	.002 SI	.14	CU	.02	NI	.03		
			CR	.120 MO	.060 AL	.029	CB	.000	V	.040		
CHK C	.24 MN	1.33	P	.012 S	.001 SI	.14	CU	.02	NI	.03		
			CR	.132 MO	.065 AL	.028	CB	.001	V	.045		
CHK C	.24 MN	1.33	P	.012 S	.002 SI	.14	CU	.02	NI	.03		
			CR	.133 MO	.064 AL	.028	CB	.000	V	.040		

CHEMICAL AND PHYSICAL PROPERTIES CONFORM TO SPECIFICATION:
API SPEC 5CT GR NB0.

SUBSCRIBED AND SWORN TO BEFORE ME

THIS ___ DAY OF _____

[Signature]
PHYSICAL TEST LABORATORY

NOTARY PUBLIC IN AND FOR
STATE OF TEXAS

LONE STAR STEEL COMPANY
MATERIAL TEST REPORT

09/11/91

CUSTOMER...VINSON SUPPLY CO.
I.S.O...1-31-0125A ITEM...0001
DIAMETER...13.375 GAUGE... .514
HYDROSTATIC PRESSURE... 4900 PSI

ORDER NUMBER... 90-204143
SPECIMEN SIZE...1.5 INCHES
GRADE...N80 WT/FT...70.60
FLATTENING TEST...OK

HEAT	LOT	YIELD STR. (KSI)	TENSILE STR. (KSI)	% ELONG. IN 2 IN.								
41321	53	110.0	123.0	27.0								
HEAT C	.24 MN	1.35	P	.013	S	.002	SI	.14	CU	.02	NI	.03
			CR	.120	MO	.060	AL	.029	CB	.000	V	.040
CHK C	.24 MN	1.31	P	.011	S	.001	SI	.14	CU	.02	NI	.03
			CR	.125	MO	.064	AL	.031	CB	.001	V	.045
CHK C	.24 MN	1.31	P	.011	S	.001	SI	.14	CU	.02	NI	.03
			CR	.125	MO	.062	AL	.031	CB	.001	V	.045
41321	54	110.0	122.0	28.0								
HEAT C	.24 MN	1.35	P	.013	S	.002	SI	.14	CU	.02	NI	.03
			CR	.120	MO	.060	AL	.029	CB	.000	V	.040
CHK C	.24 MN	1.33	P	.012	S	.001	SI	.14	CU	.02	NI	.03
			CR	.132	MO	.065	AL	.028	CB	.001	V	.045
CHK C	.24 MN	1.33	P	.012	S	.002	SI	.14	CU	.02	NI	.03
			CR	.133	MO	.064	AL	.028	CB	.000	V	.046

CHEMICAL AND PHYSICAL PROPERTIES CONFORM TO SPECIFICATION:
API SPEC 5CT GR N80.

SUBSCRIBED AND SWORN TO BEFORE ME
THIS ___ DAY OF _____


Sham Allen
PHYSICAL TEST LABORATORY

NOTARY PUBLIC IN AND FOR
STATE OF TEXAS

**Dual-Zone Monitor Well
Casing Mill Certificates**

Hoesch Rohr AG

Abnahmeprüfzeugnis
(gem. DIN 50049-3.1 B)
Inspection-Certificate
(According to DIN 50049-3.1 B)
Certificat de Reception
(conform. DIN 50049-3.1 B)

Besteller: Contractor: Commanditant:		Zeugnis-Nr.: Certificate No.: Certificat No.:	M 495/89
Unterbesteller: Purchaser: Sous-Commanditant:		Bestell-Nr.: Order No.: No. commande:	24.08.04.89
Hersteller: Manufacturer: Fabricant:	Hoesch Rohr AG	Bestell-Nr.: Order No.: No. commande:	156650
Prüfgegenstand: Product: Objet des essais:	High frequency inductive steel pipe		
Lieferbedingung: Specification: Conditions de livraison:	API 5L, ASTM A 53		
Werkstoff: Grade of steel: Nuance d'acier:	Grade B		
Erschmelzungsart: Melting process: Procédé d'élaboration de l'acier:	-		
Kennzeichnung: Marking: Marquage:	acc. to specification and Order No.		
		Zeichen des Lieferwerks: Manufacturer's brand: Cible du fabricant:	
		Siegel des Sachverständigen: Inspector's stamp: Ponçon de l'agent receptronnaire:	-

Umfang der Lieferung:
Volume of delivery:
Volume de la livraison:

Pos. Item No. Pcs.	Stückzahl Number Nombre	Abmessungen und Menge Dimensions and quantity Dimensions et quantité	Prüfdruck - Test pressure Pression d'essai	Schmelze Heat Coulée	Probe-Nr. Test No. No. échantillon
			Wasserhydrostatisch Hydrostatique Lubrification		
04	58	pipes 16" o.d. x 0.500 w.th. in length of 40 ft total length: 2.266,40 ft total weight: 84.539 kg	1310 holding time 5 s	see appendix 2	

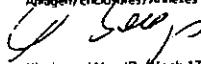
THESE MILL TEST REPORTS APPLY TO:
YOUR P. O. # 2531-BAYTON BEAR

LA BARGE INVOICE # S.N. 170406
acc. to specification

Es wird bestätigt, daß die Röhre der oben genannten Lieferbedingung entsprechen.
Sämtliche Röhre haben den Innendruckversuch wie oben angegeben bestanden.
Die Röhre wurden der Lieferbedingung entsprechend zerstörungsfrei geprüft.
Die Röhre wurden über die gesamte Länge der folgenden Wärmebehandlung unterzogen.
This is to certify that the tubes comply with the above specification.
All tubes have passed the hydraulic pressure test mentioned above.
The tubes have been subjected over their total length to the following heat treatment.
Nous confirmons que les tubes répondent aux conditions de livraison ci-dessus indiquées.
Tous les tubes ont subi avec succès l'épreuve hydrostatique ci-dessus indiquée.
Les tubes ont subi avec succès les essais non-destructifs conformément aux conditions de livraison.
Les tubes ont subi sur toute la longueur le traitement thermique suivant.
Ergebnis der Prüfungen: Die gestellten Anforderungen sind erfüllt.
Result of tests: All tubes comply with the requirements of the specification.
Résultats des examens: Les conditions exigées ont été satisfaites.

Hamm, October 19, 1989

Anlagen/Enclosures/Annexes


Kissinger Weg (Postfach 1713)
D-4700 Hamm 1
Telefon (0 23 81) 4 20- 0
Telefax (0 23 81) 420265
Telex 8 28 601
Drahtwort hoeschrohr hammwestf.

Die Gesellschaft handelt im Namen der Hoesch AG.

Qualitätsstelle
Quality control
Service contrôle



Ergebnis der Prüfungen
Result of tests
Resultats des essais

Zeugnis Nr.:
Certificate No.: M 495/89
No. certificat:

Anlage: 1 Serie:
Enclosure: 1 Page: 1
Annexe: Page:

1. Besichtigung und Maßkontrolle: Control of dimensions: Contrôle aspect et dimensionnel:	without rejection
2. Fallversuch: Ringfallversuch: Ringzugversuch: Dead test: Flattening test: Ring-separation test: Essai de pilage, Écrasement Traction sur anneau:	acc. to specification API 5L, ASTM A 53
Ringuidom.: Aufweit.: Börderversuch: Ring expanding test: Drift expanding test: Flange test: Essai de mandrinage. Essai d'évasement. Essai de bordage:	-
3. Zugversuch: Tensile test: Essai de traction:	-

Probe Nr. Test No. No. échantillon		Streckgrenze Yield strength Limite élastique psi	Zugfestigkeit Tensile strength Tension de rupture psi	Streckgrenze Zugfestigkeit Yield strength Tensile strength Limite élastique Tension de rupture	Bruchdehnung Elongation Allongement à la rupture (L ₀ = 2") %	Kerbschlagzähigkeit Impact value Résilience Probenorm Type of specimen Forme de l'échantillon
Anforderungen Requirements Conditions exigées		≥ 35000	≥ 60000		≥ 29,5	
AY 2	w b	49900	74100 66900	0,75	45	
BA 1	w b	51100	76100 67300	0,76	46	
BA 2	w b	57600	75400 69800	0,83	42	
BA 3	w b	49300	70200 62800	0,79	48	
AX 1	w b	52800	73400 67200	0,79	46	

w = welded material transverse
b = base material transverse

THESE MILL TEST REPORTS APPLY
YOUR P. O. # 2531 - Baylen B.
LA BARGE INVOICE # S.N. 170406

Hamm, October 19, 1989

Krüssinger Weg (Postfach 1713)
D-4700 Hamm 1
Telefon (0 23 81) 4 20-0
Telefax (0 23 81) 4 20 2 65
Telex 8 28 6 61
Drehwort hoeschrohr hammwestf.
Die Gesellschaft handelt im Namen der Hoesch AG.

Qualitätsstelle
Quality control
Service contrôle

Bescheinigung
über chemische Zusammensetzung
Attest
chemical composition
Attestation
sur composition chimique

Zeugnis-Nr.:
Certificate No.: M 495/89
No. certificat:

Anlage: 2 Seite:
Enclosure: page: 1
Annexe: page:

Heat Analysis

Schmelze Nr. Heat No. No. coulée	C %	Si %	Mn %	P %	S %	Al %	Test	No.
87 541 247	0,145	0,23	0,51	0,007	0,009	0,041	BA 1	
87 541 248	0,148	0,24	0,55	0,011	0,005	0,049	BA 2	
87 546 597	0,114	0,23	0,92	0,015	0,009	0,045	BA 3	
87 546 598	0,115	0,22	0,93	0,012	0,007	0,043	AX 1	
87 513 747	0,129	0,22	0,95	0,012	0,005	0,035	AY 2	
Heat No.		Pipe No.						
87 541 248		1, 2,	22, 27, 49,		52			
87 546 597		3-9,	11, 21, 26,		29, 44-48			
87 546 598		10, 18-	20, 23-25,		38, 50, 51			
87 541 247		28, 30-	37, 39-43,		53-58			
87 513 747		12-17						

THESE MILL TEST REPORTS APPLY TO:
YOUR P. O. # 7531-BAYTON BEAC
LA BARGE INVOICE # S.N. 170406

Hamm, October 19, 1989

Kissinger Weg (Postfach 1713)
D-4700 Hamm I
Telefon (02381) 420-0
Telefax (02381) 420265
Telex 828661
Drahtwort hoeschrohr hammwesil.
Die Gesellschaft handelt im Namen der Hoesch AG.

Qualitätsstelle
Quality control
Service contrôle



AMERICAN STEEL PIPE

A DIVISION OF
AMERICAN CAST IRON PIPE COMPANY
QUALIFICATION REPORT OF SHIPMENT

CUSTOMER: LaBarge Pipe and Steel

DATE: August 23, 1990
REV: November 1, 1990

LEGEND - ANALYSES
H - HEAT
M - MILL CONTROL
P - Product

DESTINATION: St. Louis, Mo or
Bessemer, Al.

ORDER NUMBER	
CUSTOMER	REF.
156840	MMW90-1324

PIECES	FOOTAGE	SIZE D. O.	WT/LF OR WALL THICKNESS
		24"	.375"
		24"	.500"

THESE MILL TEST REPORTS APPLY TO:
YOUR P. O. # **2531-BOYTON BEACH**
LA BARGE INVOICE # **SN 170483**

Page 2 of 3

SPECIFICATION	GRADE
ASTM-A53, ASME-SA53 (Type "E") and API-5L	"B" P/X42

These Pipe were manufactured in the U.S.A.

HEAT NO.	A	C	P	Mn	S	Si	Cu	V	CS	CR	MO	Ni	WELD TENSILE PSI	R O U D Y			HYDRO-TEST PRESSURE PSI	ITEM	
														TENSILE PSI	YIELD PSI	EL. EL. IN. 2"			
T-5B28601	H	.08	.02	1.08	.01				.025										
	P	.08	.02	1.07	.01	.17	.036	.002	.020	.015	.006	.018	70,700	69,200	57,000	35.4	1180	7	
T-5B28595	H	.08	.01	.99	.01	.17	.048	.001	.018	.016	.006	.018	70,100	66,900	54,700	39.8	1180	7	
	P	.08	.01	1.00	.01	.17	.048	.001	.018	.016	.006	.018	70,100	66,900	54,700	39.8	1180	7	
T-5B25480	H	.07	.02	1.02	.01	.20	.048	.002	.024	.018	.006	.023	70,800	68,200	56,600	37.0	1180	7	
	P	.07	.01	1.01	.01	.20	.048	.002	.024	.018	.006	.023	70,800	68,200	56,600	37.0	1180	7	
T-5B25482	H	.16	.01	.65	.01	.20	.043	.002	.028	.017	.005	.020	70,900	74,500	63,900	37.7	1180	7	
	P	.16	.01	.68	.01	.14	.006	.001	.012	.010	.002	.017	70,200	69,200	57,300	37.2	1580	8	
F-10024948	H	.16	.01	.68	.01	.14	.006	.001	.012	.010	.002	.017	70,200	69,200	57,300	37.2	1580	8	
F-10024946	H	.15	.02	.66	.01	.13	.007	.003	.012	.015	.002	.019	69,500	69,000	56,800	40.7	1580	8	
	P	.16	.02	.63	.01	.13	.007	.003	.014	.019	.002	.020	70,300	70,000	57,700	37.6	1580	8	
F-10024945	H	.15	.01	.68	.01	.13	.007	.003	.014	.019	.002	.020	70,300	70,000	57,700	37.6	1580	8	
	P	.16	.01	.69	.01	.13	.006	.001	.012	.014	.003	.017	58,700	69,400	56,000	35.5	1580	8	
F-10015679	H	.15	.01	.67	.01	.13	.006	.001	.012	.014	.003	.017	58,700	69,400	56,000	35.5	1580	8	
	P	.16	.01	.69	.01	.13	.006	.001	.012	.014	.003	.017	58,700	69,400	56,000	35.5	1580	8	
F-10015680	H	.15	.01	.66	.01	.13	.006	.001	.004	.012	.002	.019	68,500	68,400	55,000	39.3	1580	8	
	P	.16	.01	.66	.01	.13	.006	.001	.004	.012	.002	.019	68,500	68,400	55,000	39.3	1580	8	

P062779

European Confidence

H171
B/K52

Certificado de inspección
Work's inspection certificate

M.P.O. : 7661

 **Siderca**

Buenos Aires, 9/24/98

Orden/Order
461-T-088

Expediente No. AP 1 de 1
5/3299.26

Clientes/Customer

Norma/Specifications
ASTM A-186/A 53 - ASME SA 186
SA 53 AND API 5L GR. B*

Cantidades/Quantity
32

Acero/Steel
GDO B

409,98 kg 22899

Producto/Product
SEAMLESS LINE PIPE
BEVELED (30 DEG)

Dimensiones/Dimensions
6 5/8 X 0.562
LENGTH 10.7/14.0 MTS

1344,82 50483
TOTAL DELIVERY / ITEM COMPLETE

Ensayos mecánicos/Mechanical test

Probeta/ Test specimen N°	Dimensiones/ Dimensions	Tracción/Tensile Test			BHN/B				Resiliencia/Impact test						
		Fluencia/ Yield strength	Rotura/ Tensile strength	Alargamiento/ Elongation	Abocardado/ Flaring test	Dureza/ Hardness	Apilamiento/ Flattening test	Curvado/ Bend test	Expansión/ Expanding	Anillo/Ring Tracción/ Tensile	Dimensiones/ Dimensions	Temp / °C	Dircc./ Orient.	Requerido/Required Min. Med.	Obtenido/Result
	IN	PBI	PBT	%											
1	0,988X0,566	43111	69530	42		134	X								
2	0,996X0,555	42676	69965	48		14	X								

Probeta/ Test specimen N°	Colado/Heat	Análisis químicos de colado/Heat analysis (X)										
		C	MN	S	SI	P	NI	CR	MO	V	NB	CU
1	20632	0,1800	0,6200	0,0040	0,2400	0,0170	0,0700	0,0400	0,0200	0,0000	0,0000	0,1500
2	61558	0,1800	0,6700	0,0010	0,2500	0,0140	0,0300	0,0500	0,0200	0,0000	0,0000	0,0800

Notas/Notes
5L 9078 API ASTM A53/A106/API 5L
E BEAMLESS 6 5/8 .562 36,39 2800
PBI SIDERCA P.O. 62779
~~MANUFACTURED BY SIDERCA~~

Señal control de calidad/Quality control chief

Observaciones/Remarks

HYDROSTATIC TEST PRESSURE: 197 KPA=100 2800
#NACE MR-01-75.
THE PIPES HASN'T BEEN REPAIRED BY WELDING

SIDERCA S.A.I.C.

We hereby certify that material herein described has been manufactured in accordance with the standards and specifications specified by you and that it satisfies the requirements.

Sede Central
Av. L. N. Alem 1067
10011 Buenos Aires
Argentina
Teléfono 311-1091
Télex 9134 Data Ar
Facsimil 313-6185

Planta Industrial
Dr. Strawn s/n.
2804 Carreras
Argentina

Por la presente certificamos que el material aquí descrito ha sido fabricado de acuerdo con las normas y especificaciones por uds. solicitadas y que satisfacen los requerimientos.

1 N/mm² = 1 MPa = 10.19 Kg/cm² = 145.06 Psi

146 18 - 08/98

証明書番号: BYYF4917 Page: 1 Date: 1990-6-29
 注文番号: 091 071 E265411 OP14N&579
 Shipper: MITSUI AND CO., LTD.

検査証明書
 INSPECTION CERTIFICATE



住友金属工業株式会社 和歌山製鉄所
 SUMITOMO METAL INDUSTRIES, LTD.
 WAKAYAMA STEEL WORKS
 1850 Minato, Wakayama, Japan

Customer: MITSUI TUBULAR PRODUCTS, INC.
 Commodity: SEAMLESS STEEL PIPE, API 5L-B/ASTM A106-B/ASME SA106-B
 規格: API 5L GR.B
 Standard: ASTM/ASME A/SA-106 GR.B

Order No.: 3686-KEN
 Specification:

検査番号 Heat No.	化学成分 Chemical Composition %	引張試験 Tensile Test	硬さ Hardness	衝撃試験 Impact Test
MIN	C: 0.25, Si: 0.25, Mn: 0.25, P: 0.01, S: 0.01, Cu: 0.01, Ni: 0.01, CR: 0.01, MO: 0.01, V: 0.01, U: 0.01	49 = S * 11 = 2.0"		
MAX	C: 0.27, Si: 0.25, Mn: 0.25, P: 0.01, S: 0.01, Cu: 0.01, Ni: 0.01, CR: 0.01, MO: 0.01, V: 0.01, U: 0.01	LBR 350 600280		
J016215	23 24 7315 7 1 2 2 0 0 0 0	LBR 438 745388		
	24 24 7216 7 1 3 3 1 0 0 0			
	23 27 7316 7 1 3 3 1 0 0 0			

- 1. Unit (単位)
- 2. L=Length, H=Height, S=Section
- 3. Kind of Steel (鋼種)
- 4. Direction (方向)
- 5. Sampling Place (試験位置)
- 6. Unit (単位)
- 7. Cause of Impact Test
- 8. Unit (単位)
- 9. Test (試験)
- 10. Test (試験)
- 11. Test (試験)
- 12. Test (試験)
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- 44. Test (試験)
- 45. Test (試験)
- 46. Test (試験)
- 47. Test (試験)
- 48. Test (試験)
- 49. Test (試験)
- 50. Test (試験)

Hydrostatic	2800	Flattening	Bending	Flange	Well	Crush	Reverse Flattening	Reverse Bend	Ring Expansion	Ring Tension	Ring Gauge	Flared	Coating & Lining
GOOD	GOOD	GOOD									GOOD		

HEAT TREATMENT : AS ROLLED
 ANALYSIS : CU+NI+CR+MO+V

WE HEREBY CERTIFY THAT THE MATERIAL HEREIN DESCRIBED HAS BEEN MANUFACTURED, SAMPLED, TESTED, AND INSPECTED IN ACCORDANCE WITH ABOVE STANDARD AND SPECIFICATION AND SATISFIES THE REQUIREMENTS.

品質管理部長 田中 隆夫
 MANAGER OF QUALITY SYSTEM SECTION
 QUALITY CONTROL DEPARTMENT

PO 62779

SH174
B/L 38



Certificado de inspección
Work's inspection certificate

NRO.: 8550

Sungail

Buenos Aires, 11/28/90

Expediente Pág. Nº 1 de 1

Cliente/Customer

461-T-080

5/3299.26

Norma/Specifications ASTM A-106/A 53 - ASME SA 106 SA 53 AND API 5L ER. 80

Cantidad/Quantity 5

Acero/Steel

600 8

m 58,13 kg 3162

Producto/Product

SEAMLESS LINE PIPE
BEVELED (30 DEG)

Dimensiones/Dimensions

6 5/8 X 0,562
LENGTH 10.7/14.0 MTS

ft 190,70 6971

PARTIAL DELIVERY / ITEM COMPLETED.

Ensayos mecánicos/Mechanical test

Probeta/ Test specimen Nº	Dimensiones/ Dimensions	Tracción/Tensile Test				Aplanado/ Flattening test	DINING Curves/ Hardness	Anillo/Ring Expansion/ Expanding Tension/ Tensile	Resistencia/Impact test			Requerido/Required		Obtenido/Result	
		Fluencia/ Yield strength	Rotura/ Tensile strength	Alargamiento/ Elongation % 1/2"					Dimensiones/ Dimensions	Temp./ °C	Direct./ Orient.	Min.	Max.		
1	IN 0,988X0,574	PSI 40789	PSI 67207	44		138 X									

Probeta/ Test specimen Nº	Código/Heat	Análisis químicos de carbono/Chem analysis (%)										
		C	MN	S	SI	P	NI	CR	MO	V	NB	CU
1	20214	0,1600	0,5900	0,0100	0,2100	0,0150	0,0400	0,0400	0,0200	0,0000	0,0000	0,0900

Notas/Marks

6 5L 009B API MONTH YEAR ASTM A53/
A106/API 5L B E SEAMLESS 6 5/8 .562
34.39 2800 PSI SIDERCA P.O.62779
MANUFACTURED BY SIDERCA

jefe control de calidad/Quality control chief

Observaciones/Remarks

HYDROSTATIC TEST PRESSURE: 197 KPA*100 2000 PS.
(*) NACE MR-01-75
THE PIPES HASN'T BEEN REPAIRED BY WELDING

SIDERCA SAIC

Por la presente certificamos que el material aquí descrito ha sido fabricado de acuerdo con las normas y especificaciones por Ud. solicitadas y que satisfacen los requerimientos.

We hereby certify that material herein described has been manufactured in accordance with the standards and specifications specified by you and that it satisfies the requirements

Sede Central
Av. L. N. Alem 1367
(1001) Buenos Aires
Argentina

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Telex 9134 Odeba Ar
Facsimil 313-6165

Planta Industrial
Dr. Simónfn.
(2304) Comodoro
Argentina

1 N/mm² = 1 MPa = 10,19 Kgf/cm² = 145,05 Psi

4061568

TUBOS DE ACERO DE MEXICO S.A. TAMSA : MILL TEST CERTIFICATE NO. 90104240 : DATE : 28/11/90
 PURCHASER : TAMSA, INC/MITSUI : INSPECTOR :

SALES CONFIRMATION NO. : 044979/3 : BILL OF MATERIAL : : TYPE OF PIPE : API 5L : SPECIFICATION :
 CONDUCCION ASME SA 1058 : ASTM A106

OUTSIDE DIAMETER : 6 5/8 INCH : WALL THICKNESS : .562 INCH : STEEL GRADE : B : NOMINAL WEIGHT : 36.39 LB/FT : SPECIFIC LENGTH OR RANGE : 35 TO 42 FT.

SURFACE : VARNISHED : END : BEVELLED : HYDROSTATIC TEST PRESSURE : 2,800.00 PSI

MECHANICAL PROPERTIES AND TEST

HEAT NUMBER	YIELD STRENGTH PSI	TENSILE STRENGTH PSI	ELONGATION % EN 2 INCH	FLATTNING INCH	FLARING INCH	HARDNESS	IMPACT FT-LB	
							INDIVIDUAL VALUE	AVERAGE VAL
MINIMUM:	35,000.00	60,000.00	27.49	3.89				
MAXIMUM:								
78725	50,071.12	78,236.13	39.00	600D				

PRODUCT CHEMICAL ANALYSIS

HEAT NUMBER	C	Mn	Si	P	S	MO	CR	V	NB	NI	CU	SN	AL	TI	B	N	CA	GRAIN SIZE	
																			PPM
MINIMUM:	.29	.10		.025	.025	.150	.400	.080		.400	.400								
MAXIMUM:	.30	1.06																	
79725	.21	.75	.27	.006	.004	.070	.070	.002		.050	.120	.008	.009						

NOTES : THIS CERTIFICATE CANCEL AND SUBSTITUTE THE ONE SEND WITH NUM:90104071. IS IN ACCORDING WITH API 5L X-42 REF 61021

QUANTITY : 37 LENGTHS : COPY : QUALITY CERTIFICATION : NAME AND SIGNATURE : ING. EDILIA ESQUIVEL B.

MILL TEST REPORT

44000100

PO 64889

SH182
B/L 120



Certificado de inspección
Work's inspection certificate

NRO.: 9220

San Prisco

Fecha/Airt. 1/ 3/91

Order/Ord. 517-T-110

Expediente No. No 1 1
5/4185.24

Cliente/Customer
TEXAS PIPE

Normas/Specifications ASTM A-106/A 53 - ASME 9A 106
SA 53 AND API 5L GR. B*

Cantidad/Quantity 45

Producto/Product
SEAMLESS LINE PIPE
BEVELED (30 DEG)

6 X 562

Acero/Steel GDO B
Dimensiones/Dimensions
6 5/8 X 0.562
LENGTH 10.7/14.0 MTS

613.76 kg 33990
2913.65 74935
TOTAL DELIVERY / ITEM COMPLETED

Ensayos mecánicos/Mechanical test

Prueba/ Test specimen	Dimensiones/ Dimensions	Tracción/Tensile Test			BHN Martens Flattening test	Anillo/Ring Expanding Traction/ Tensile	Fisiles de/Impact test			Requerido/Required		Obtenido/Result
		Fuerza/ Yield strength	Ruptura/ Tensile strength	Alargamiento/ Elongation			Dimensiones/ Dimensions	Temp/ °C	Dircc./ Orient.	Min.	Max.	
1	1.000 X 0.582 IN	40490 PSI	66846 PSI	47 %	130 X							

Prueba/ Test specimen	Código/Item	Análisis químicos de coque/Rean analysis (X)										
		C	MN	S	SI	P	NI	CR	MO	V	NB	CU
1	21560	0.1700	0.6000	0.0030	0.2500	0.0110	0.0300	0.0100	0.0100	0.0000	0.0000	0.0700

Marcas/Markas
5L009B API MONTH YEAR ASTM A53/
A106/API 5L-B-S 6.5/8 .562 36.39
2890PSI SIDERCA PD.64889.
MANUFACTURED BY SIDERCA

etc control de calidad/Quality control sheet
[Signature]
SIDERCA S.A.I.C.

Observaciones/Remarks
HYDROSTATIC TEST PRESSURE: 197 KPA*100 2000
(*) NACE MR-01-75

Por la presente certificamos que el material aqui descrito ha sido fabricado de acuerdo con las normas y especificaciones por uds. solicitadas y que satisfacen los requerimientos.
1 N/mm² = 1 MPa = 10.19 Kg/cm² = 145.05 Psi

We hereby certify that material herein described has been manufactured in accordance with the standards and specifications specified by you and that it satisfies the requirements.

Sede Central
Av. L. N. Alem 1067
1001 Buenos Aires
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Teléfono 311-1091
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Facsimil 313-6165
Planta Industrial
Dr. Simónighi
(2804) Campana
Argentina

**Concentrate Disposal Well
Casing Setting Depths and Cement Quantities**

**SUMMARY OF CASING SETTING DEPTHS AND CEMENT QUANTITIES FOR THE
BOYNTON BEACH CONCRETE DISPOSAL WELL**

Casing Purpose	Casing Material	-----CASING SIZE-----			Casing Depth Feet	Cement Stage	Date	Type of Cement	Quantity of cement (sacks)	Remarks
		Outside Dia. In.	Inside Dia. In.	Thickness In.						
Pit	Steel	48.000	47.625	0.375	48	N/A	N/A	N/A	Casing vibrated in place	
Surface (Aquifer Protection)	Steel	42.000	41.000	0.500	345	#1	5/10/91	Neat	495	Pressure grout
						#2	5/11/91	Neat	262	Second stage tremied from 102 feet bls
						Total sacks neat:		757		
		% of theoretical:		135						
Upper Intermed. (Construction through clays)	Steel	34.000	33.000	0.500	970	#1	5/24/91	4%	621	Pressure grout, 621 sacks 4% followed by 574 sacks neat
								Neat	574	
						#2	5/25/91	12%	406	Second stage tremied from 343 feet bls
		Total Sacks Neat:		574						
		Total Sacks 4%:		621						
		Total Sacks 12%:		406						
		% of theoretical:		90						
Lower Intermed. (Construction through artesian zones)	Steel	26.000	25.000	0.500	2000	#1	6/27/91	Neat	585	Pressure grout
						#2	6/28/91	Neat	343	Second stage tremied from 1,883 feet bls
						#3	6/29/91	Neat	143	Third stage tremied from 1,878 feet bls
						#4	6/29/91	Neat	286	Fourth stage tremied from 1,877 feet bls
						#5	6/30/91	12%	141	Fifth stage tremied from 1,877 feet bls
						#6	6/30/91	Neat	152	Sixth stage tremied from 1,861 feet bls
						#7	7/1/91	12%	136	Seventh stage tremied from 1,856 feet bls
						#8	7/1/91	12%	141	Eighth stage tremied from 1,851 feet bls
						#9	7/2/91	12%	149	Ninth stage tremied from 1,827 feet bls
						#10	7/2/91	12%	115	Tenth stage tremied from 1,810 feet bls
						#11	7/3/91	Neat	295	Eleventh stage tremied from 1,730 feet bls

**SUMMARY OF CASING SETTING DEPTHS AND CEMENT QUANTITIES FOR THE
BOYNTON BEACH CONCRETE DISPOSAL WELL**

Casing Purpose	Casing Material	-----CASING SIZE-----			Casing Depth Feet	Cement Stage	Date	Type of Cement	Quantity of cement (sacks)	Remarks
		Outside Dia. In.	Inside Dia. In.	Thickness In.						
						#12	7/3/91	4%	423	Twelfth stage tremied from 1,640 feet bls
						#13	7/4/91	4%	225	Thirteenth stage tremied from 1,610 feet bls
						#14	7/5/81	4%	254	Fourteenth stage tremied from 1,580 feet bls
						#15	7/5/81	12%	223	Fifteenth stage tremied from 1,541 feet bls
						#16	7/5/91	12%	205	Sixteenth stage tremied from 1,465 feet bls
						#17	7/6/91	12%	226	Seventeenth stage tremied from 1,372 feet bls
						#18	7/6/91	4%	460	Eighteenth stage tremied from 1,262 feet bls
						#19	7/7/91	4%	225	Nineteenth stage tremied from 1,068 feet bls
						#20	7/7/91	Neat	176	Twentieth stage tremied from 971 feet bls
						#21	7/8/91	12%	304	Twenty-first stage tremied from 880 feet bls
						#22	7/9/91	12%	311	Twenty-second stage tremied from 580 feet bls
						#23	7/9/91	12%	278	Twenty-third stage tremied from 280 feet bls
							Total sacks neat:		1980	Sacks
							Total sacks 8%:		1587	Sacks
							Total sacks 12%:		2239	Sacks
							% of theoretical:		212	
Final	Steel	16.000	14.688	0.656	2780	#1	8/22/91	Neat	895	Pressure grout
						#2	8/24/91	Neat	790	Second stage tremied from 2,620 feet bls
						#3	8/25/91	4%	572	Third stage tremied from 2,392 feet bls
						#4	8/25/91	4%	692	Fourth stage tremied from 2,223 feet bls
						#5	8/26/91	4%	688	Fifth stage tremied from 1,800 feet bls
						#6	8/26/91	4%	688	Sixth stage tremied from 1,270 feet bls
						#7	8/27/91	4%	688	Seventh stage tremied from 771 feet bls
						#8	9/3/91	4%	340	Eighth stage tremied from 249 feet bls
							Total sacks neat:		1685	
							Total sacks 8%:		3668	
							% of theoretical:		137	

**Dual-Zone Monitor Well
Casing Setting Depths and Cement Quantities**

**SUMMARY OF CASING SETTING DEPTHS AND CEMENT QUANTITIES FOR THE
DUAL-ZONE MONITOR WELL AT THE BOYNTON BEACH CONCENTRATE DISPOSAL WELL**

Casing Purpose	Casing Material	-----CASING SIZE-----			Casing Depth Feet	Cement Stage	Date	Type of Cement	Quantity of cement (sacks)	Remarks	
		Outside Dia. In.	Inside Dia. In.	Thickness In.							
Surface (Aquifer Protection)	Steel	24.000	23.000	0.500	345	#1	7/2/91	Neat	642	Pressure grout, one stage	
									Total sacks neat:		642
									% of theoretical:		124
Upper Intermed. (Construction through clays)	Steel	16.000	15.000	0.500	980	#1	7/31/91	4%	606	Pressure grout, 606 sacks 4% followed by 238 sacks neat	
								Neat	238		
						#2	8/3/91	4%	188	Second stage tremied from 220 feet bls	
								Total Sacks Neat:	238		
								Total Sacks 4%:	794		
% of theoretical:	104										
Lower Intermed. (Construction through artesian zones)	Steel	6.625	5.501	0.562	1800	#1	9/12/91	Neat	452	Pressure grout	
						#2	9/14/91	Neat	433	Second stage tremied from 1,620 feet bls	
						#3	9/14/91	12%	81	Third stage tremied from 1,503 feet bls	
						#4	9/15/91	12%	106	Fourth stage tremied from 1,495 feet bls	
						#5	9/17/91	12%	80	Fifth stage tremied from 1,400 feet bls	
						#6	9/17/91	Neat	76	Sixth stage tremied from 1,378 feet bls	
						#7	9/18/91	12%	80	Seventh stage tremied from 1,378 feet bls	
						#8	9/18/91	12%	80	Eighth stage tremied from 1,377 feet bls	
						#9	9/19/91	12%	42	Ninth stage tremied from 1,376 feet bls	
						#10	9/19/91	12%	26	Tenth stage tremied from 1,370 feet bls	
						#11	10/1/91	Neat	46	Eleventh stage tremied from 1,370 feet bls 79 cubic feet of gravel were placed before grouting	
									52		
						#12	10/2/91	Neat	52	Twelfth stage tremied from 1,353 feet bls	

**SUMMARY OF CASING SETTING DEPTHS AND CEMENT QUANTITIES FOR THE
DUAL-ZONE MONITOR WELL AT THE BOYNTON BEACH CONCENTRATE DISPOSAL WELL**

Casing Purpose	Casing Material	-----CASING SIZE-----			Casing Depth Feet	Cement Stage	Date	Type of Cement	Quantity of cement (sacks)	Remarks
		Outside Dia. In.	Inside Dia. In.	Thickness In.						
					#13	10/3/91	Neat	137	Thirteenth stage tremied from 1,346 feet bls	
					#14	10/4/91	Neat	48	Fourteenth stage tremied from 1,340 feet bls	
					#15	10/4/91	8%	39	Fifteenth stage tremied from 1,340 feet bls	
					#16	10/5/91	Neat	52	Sixteenth stage tremied from 1,340 feet bls Placed gravel from 1,334 feet to 1,340 feet before grouting	
					#17	10/6/91	Neat	48	Seventeenth stage tremied from 1,275 feet bls	
					#18	10/7/91	Neat	76	Eighteenth stage tremied from 1,228 feet bls	
					#19	10/7/91	Neat	52	Nineteenth stage tremied from 1,187 feet bls	
					#20	10/8/91	Neat	50	Twentieth stage tremied from 1,130 feet bls	
					#21	10/9/91	Neat	48	Twenty-first stage tremied from 1,113 feet bls	
Total sacks neat:								1570	Sacks	
Total sacks 8%:								39	Sacks	
Total sacks 12%:								495	Sacks	
% of theoretical:								420		

**Concentrate Disposal Well
Geological Data**

Client: City of Boynton Beach
Project: Concentrate Disposal Well
Project No. SEF26410.P1

Note: Depth Intervals were referenced
from top of pad - 19.56 NGVD

GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
05/08/91	30	40	Sand, medium light gray to light gray (N6-N7); medium to coarse grained; subrounded; very well sorted; trace pelecypods; 5 percent shell fragments	DHV
05/08/91	40	50	Sand, medium light gray to light gray (N6-N7); medium to coarse grained; subrounded; very well sorted; trace pelecypods; 5 percent shell fragments	DHV
05/08/91	50	60	Sand, medium light gray to light gray (N6-N7); medium to coarse grained; subrounded; very well sorted; trace pelecypods; 5 percent shell fragments	DHV
05/08/91	60	70	Coquina with sand; yellowish gray (5Y7/2); 80 percent shell, 20 percent sand; fine to medium grained; subangular to subrounded well sorted; poorly cemented	DHV
05/08/91	70	80	Coquina with calcareous sandstone; yellowish gray (5Y7/2) to dark gray (N5); 70 percent shell; abundant pelecypods; moderately well cemented sand; fine to medium grained; subangular; trace black phosphorite grains	DHV
05/08/91	80	90	Coquina with calcareous sandstone; as above; increasing calcareous sandstone (40%); trace black phosphorite grains	DHV
05/08/91	90	100	Sand; medium gray to dark gray (N4-N5); medium to coarse grained; subrounded; well sorted; trace arenaceous limestone fragments; trace shell fragments; trace black phosphorite grains	DHV
05/08/91	100	110	Calcareous Sandstone; medium gray to medium dark gray (N4-N5); fine to medium grained; subangular to subrounded; moderately well sorted; moderately well cemented; trace calcite crystals; 5 percent shell; increasing arenaceous limestone fragments; trace black phosphorite grains	DHV

Client: City of Boynton Beach
Project: Concentrate Disposal Well
Project No. SEF26410.P1

Note: Depth Intervals were referenced
from top of pad - 19.56 NGVD

GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
05/08/91	110	120	Calcareous Sandstone; medium gray to medium dark gray (N4-N5); medium grained; well sorted; sub-angular; poorly cemented; abundant calcite crystals; trace arenaceous limestone fragments; decreasing shell; increasing black phosphorite grains	DHV
05/08/91	120	130	Calcareous sandstone; medium gray to medium dark gray (N4-N5); fine to medium grained; subrounded; moderately well sorted; very well cemented; trace calcite crystals; 5 percent shell; decreasing calcareous sandstone; trace black phosphorite grains	DHV
05/08/91	130	140	Calcareous Sandstone; medium gray (N4) to yellowish gray (5Y7/2); fine to medium grained; subrounded; moderately well sorted; poorly cemented; increasing calcite crystals; trace black phosphorite grains	DHV
05/08/91	140	150	Calcareous Sandstone; light gray (N7) to yellowish gray (5Y7/2); interbedded sand; abundant calcite crystals; fine to medium grained; subrounded; well cemented	DHV
05/08/91	150	160	Calcareous sandstone; light gray (N7); poorly cemented; medium to coarse grained; subrounded; moderately well sorted; trace calcite crystals; trace shell; trace black phosphorite grains	DHV
05/08/91	160	170	Calcareous sandstone; as above; trace shell fragments; abundant coarse sand grains; subrounded; very well sorted; poorly cemented; trace black phosphate grains	DHV
05/08/91	170	180	Calcareous sandstone; yellowish gray (5Y7/2) to light gray (N7); trace shell fragments; 80 percent sand; medium to coarse grained; subrounded; moderately well sorted; 10 percent yellowish gray (5Y7/2) arenaceous limestone fragments	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
05/08/91	180	190	Calcareous sandstone with coquina; yellowish gray (5Y7/2); 70 percent shell hash; 30 percent sand; medium to coarse grained; subrounded; moderately well sorted; 15 percent light gray (N7) arenaceous limestone fragments.	DHV
05/09/91	190	200	Micro fossilian limestone with sand, fine to medium grained, yellowish gray (5Y7/2); some development of calcitic crystals, with some very fine phosphorite grains.	DHV
05/09/91	200	210	Same as above	DHV
05/09/91	210	220	Same as above	DHV
05/09/91	220	230	Same as above	DHV
05/09/91	230	240	Same as above	DHV
05/09/91	240	250	Same as above	DHV
05/09/91	250	260	Same as above	DHV
05/09/91	260	270	Same as above	DHV
05/09/91	270	280	Same as above	DHV
05/09/91	280	290	Arenaceous limestone; lime mud matrix; fine to medium grained sand; well sorted; subrounded; light olive gray (5Y6/1) some shell fragments trace phosphorite grains.	DHV
05/09/91	290	300	Same as above	DHV
05/09/91	300	310	Same as above	DHV
05/09/91	310	320	Same as above	DHV
05/09/91	320	330	Same as above	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
05/09/91	330	340	Calcareous clay; grayish olive (10Y 4/2); with shell fragments, vigorous response in HCl	DHV
05/09/91	340	350	Same as above	DHV
05/09/91	350	360	Same as above	DHV
05/09/91	360	370	Same as above	STS
05/09/91	370	380	Same as above	STS
05/09/91	380	390	Same as above	STS
05/20/91	390	400	Same as above	STS
05/20/91	400	410	Same as above; with abundant gastropods .5 to 1 mm	STS
05/20/91	410	420	Same as above; with abundant gastropods .5 to 1 mm	STS
05\20\91	420	430	Calcareous clay; with fine to coarse grain silica sand, trace phosphorite, vigorous response to HCL, light olive gray (5Y5/2)	STS
05\20\91	430	440	Same as above	STS
05\20\91	440	450	Same as above	STS
05\20\91	450	460	Calcareous clay; with very fine to fine grain sand, trace phosphorite, vigorous response to HCL, light olive gray (5Y5/2)	STS
05\20\91	460	470	Same as above	STS
05\20\91	470	480	Same as above	STS
05\20\91	480	490	Same as above	STS
05\20\91	490	500	Same as above	STS

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GEOLOGIC DATA
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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
05\20\91	500	510	Same as above	STS
05\20\91	510	520	Same as above	STS
05\20\91	520	530	Same as above	STS
05\20\91	530	540	Same as above	STS
05\20\91	540	550	Same as above	STS
05\20\91	550	560	Same as above	STS
05\20\91	560	570	Same as above	STS
05\20\91	570	580	Same as above	STS
05\20\91	580	590	Same as above	STS
05\20\91	590	600	Same as above	STS
05\20\91	600	610	Same as above	STS
05\20\91	610	620	Same as above	STS
05\20\91	620	630	Same as above	STS
05\20\91	630	640	Same as above	STS
05\20\91	650	660	Same as above	STS
05\20\91	660	670	Same as above	STS
05\20\91	670	680	Same as above with Limestone, fossiliferous, white (N9)	STS
05\20\91	680	690	Same as above	STS
05\20\91	690	700	Calcareous clay; with very fine to fine grain sand, trace phosphorite, vigorous HCL response, light olive gray (5Y5/2)	STS
05\20\91	700	710	Same as above	STS

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
05\20\91	710	720	Same as above	STS
05\20\91	720	730	Same as above	STS
05\20\91	730	740	Same as above	STS
05\20\91	750	760	Same as above	STS
05\20\91	760	770	Same as above	STS
05\20\91	770	780	Same as above	STS
05\20\91	780	790	Same as above	STS
05\20\91	790	800	Same as above	STS
05\20\91	800	810	Limestone, biomicrite with very fine grain sand fragments of chert, very light gray (N8)	STS
05\20\91	810	820	Same as above	STS
05\20\91	820	830	Limestone, arenaceous, calcareous matrix, fine to coarse grained, rounded to angular, some moldic porosity, sparsely fossiliferous, fine to pebbly grained phosphorite, moderately consolidated, crumbly to hard, white (N9) to very light gray (N8)	STS
05\20\91	830	840	Same as above	STS
05\20\91	840	850	Same as above	STS
05\20\91	850	860	Same as above	STS
05\20\91	860	870	Same as above	STS
05\20\91	870	880	Same as above	STS
05\20\91	880	890	Same as above	STS
05\20\91	890	900	Same as above	STS

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
05\20\91	900	910	Same as above without phosphorite	STS
05\20\91	910	920	Same as above	STS
05\20\91	920	930	Same as above	STS
05\20\91	930	940	Same as above	STS
05\20\91	940	950	Same as above	STS
05\20\91	950	960	Biomicrite limestone, calcilutite, some fine grained sand, soft, poorly consolidated, chalky, pinkish gray (5YR8/1) foraminifera (dictyconus)	STS
05\20\91	960	970	Same as above	STS
05\20\91	970	980	Same as above	STS
05\20\91	980	990	Same as above - abundant dictyconus	STS
05\20\91	990	1000	Same as above - abundant dictyconus	STS
05\20\91	1000	1010	Same as above - abundant dictyconus	STS
06\03\91	1010	1020	Limestone; yellowish gray (5Y8/1) to white (N9); porous; abundant dictyconus; trace bryozoans; trace shell fragments; soft.	DHV
06\03\91	1020	1030	Limestone; yellowish gray (5Y8/1); as above, trace shell casts.	DHV
06\03\91	1030	1040	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR1); as above; trace shell casts and shells.	DHV
06\03\91	1040	1050	Limestone; pinkish gray (5YR8/1); as above.	DHV
06\03\91	1050	1060	Limestone; pinkish gray (5YR8/1); as above.	DHV
06\03\91	1060	1070	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1) as above; trace pinkish gray (5YR8/1) calcareous siltstone fragments trace calcite; very soft.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
06\03\91	1070	1080	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1) as above; trace pinkish gray (5YR8/1) calcareous siltstone fragments trace calcite, very soft.	DHV
06\03\91	1080	1090	Limestone; pinkish gray (5YR8/1); as above; trace pinkish gray (5YR8/1) calcareous siltstone fragments.	DHV
06\03\91	1090	1100	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1) as above; trace foraminifera (Dictyonus); pelecypod fragments; trace calcite; very soft.	DHV
06\03\91	1100	1110	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above.	DHV
06\03\91	1110	1120	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above.	DHV
06\03\91	1120	1130	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above.	DHV
06\03\91	1130	1140	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above	DHV
06\03\91	1140	1150	Limestone; pinkish gray (5YR8/1); trace echinoids; pelecypods and foraminifera (Dictyonus); very soft.	DHV
06\03\91	1150	1160	Limestone; pinkish gray (5YR8/1); as above.	DHV
06\03\91	1160	1170	Limestone; yellowish gray (5YR8/1) to pinkish gray (5YR8/1); as above.	DHV
06\03\91	1170	1180	Limestone; pinkish gray (5YR8/1); as above.	DHV
06\03\91	1180	1190	Limestone; pinkish gray (5YR8/1); as above.	DHV
06\03\91	1200	1210	Limestone; pinkish gray (5YR8/1) to yellowish gray (5Y8/1); trace pelecypods; trace bryozoans; very soft.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
06\03\91	1210	1220	Limestone; very pale orange (10Y8/2); trace dolomitic limestone fragments; moderate yellowish brown (10YR5/4); porous; trace echinoids; trace bryozoans; pelecypods; foraminifera (Dictyconus, Miliolina); shell casts.	DHV
06\03\91	1220	1230	Limestone; very pale orange (10Y8/2); increasing dolomitic limestone fragments; moderate yellowish brown (10YR5/4); as above.	DHV
06\03\91	1230	1240	Limestone; pinkish gray (5YR8/1) to very pale orange (10Y8/2); increasing dolomitic limestone fragments; as above.	DHV
06\03\91	1240	1250	Limestone; very pale orange (10Y8/2); as above.	DHV
06\03\91	1250	1260	Limestone; yellowish gray (5Y8/1); to very pale orange (10Y8/2); trace fossils: echinoid fragments; Miliolina foraminifera; fine shell fragments.	DHV
06\03\91	1260	1270	Limestone; yellowish gray (5Y8/1) to very pale orange (10Y8/2); as above.	DHV
06\03\91	1270	1280	Limestone; yellowish gray (5Y8/1); trace sand; very well sorted; subangular to subrounded; trace echinoids; Miliolina foraminifera; trace dolomitic limestone fragments; moderate yellowish brown (10YR5/4).	DHV
06\03\91	1280	1290	Limestone with dolomitic limestone; yellowish gray (5Y8/1) to very pale orange (10Y8/2); trace echinoids; foraminifera; bryozoans; dolomitic limestone is moderate yellowish brown (10YR5/4).	DHV
06\03\91	1290	1300	Dolomite with limestone; yellowish gray (5Y8/1) to pale yellowish brown (10YR6/2); as above.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
06\03\91	1300	1310	Limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); 35% moderate yellowish brown (10YR5/4) dolomite; trace echinoids; Miliolina foraminifera; trace calcite.	DHV
06\03\91	1310	1320	Limestone; yellowish gray (5Y8/1); 20% pale yellowish brown (10YR6/2) dolomite fragments; as above.	DHV
06\03\91	1320	1330	Limestone w/ dolomite; yellowish gray (5Y8/1) to dark yellowish brown (10YR4/2); increasing dolomite; limestone soft; trace microfossils; as above.	DHV
06\03\91	1330	1340	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); limestone is yellowish gray (5Y8/1); trace microfossils.	DHV
06\03\91	1340	1350	Dolomite w/ limestone; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); 45% yellowish gray (5Y8/1) soft limestone; as above.	DHV
06\03\91	1350	1360	Limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); 40% moderate yellowish brown (10YR5/4) dolomite; very hard.	DHV
06\03\91	1360	1370	Limestone; yellowish gray (5Y8/1) to very pale orange (20YR8/2); 40% moderate yellowish brown (10YR5/4) dolomite.	DHV
06\03\91	1370	1380	Limestone; very pale orange (10YR8/2) to white (N9); trace microfossils; shellcasts; echinoids; very soft; 30% fine sand.	DHV
06\03\91	1380	1390	Limestone; yellowish gray (5Y8/1); very porous; very soft; 40% moderate yellowish brown (10YR5/4) dolomite; very hard.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
06\03\91	1390	1400	Limestone; very pale orange (10YR8/2) to white (N9); trace foraminifera; echinoids; 10% moderate yellowish brown (10YR5/4) dolomite fragments.	DHV
06\03\91	1400	1410	Limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); porous; soft; 40% moderate yellowish brown (10YR5/4) dolomite; very hard.	DHV
06\03\90	1410	1420	Limestone; very pale orange (10YR8/2) to grayish orange (10YR7/4); 30% moderate yellowish gray dolomite fragments; shell casts; trace bryozoans; echinoids; foraminifera: Dictyconus, Miliolina; dolomite very hard.	DHV
06\03\91	1420	1430	Dolomite with limestone; very pale orange (10YR8/2) to pale yellowish brown (10YR6/2); 40% yellowish gray (5Y8/1) very soft limestone.	DHV
06\03\91	1430	1440	Dolomite with limestone; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); limestone is very porous; soft; shellcasts; dolomite is very hard.	DHV
06\03\91	1440	1450	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown; very hard; 30% soft yellowish gray (5Y8/1) limestone; microfossils; shellcasts.	DHV
06\03\91	1450	1460	Dolomite with limestone; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); 40% very soft, yellowish gray (5Y8/1) limestone; trace microfossils.	DHV
06\03\91	1460	1470	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); 30% very soft yellowish gray (5Y8/1) limestone; trace echinoids; shellcasts; foraminifera.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
06\03\91	1470	1480	Dolomitic limestone; very pale orange (10YR8/2) to pale yellowish brown (10YR6/2).	DHV
06\03\91	1480	1490	Dolomitic limestone; very pale orange (10YR8/2) to pale yellowish brown (10YR6/2); limestone is very porous dolomite; trace light gray (N7) dolomitic fragments.	DHV
06\03\91	1490	1500	Dolomitic limestone; pale yellowish brown (10YR6/2); very hard; very pale orange (10YR8/2) limestone fragments; porous; very soft; trace light gray (N7) dolomitic fragments.	DHV
06\03\91	1500	1510	Dolomite; moderate yellowish brown (10YR5/4); slightly porous; hard.	DHV
06\03\91	1510	1520	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); slightly crystalline; hard.	DHV
06\03\91	1520	1530	Dolomite; pale yellowish brown (10YR6/2); slightly crystalline; 10% light gray (N7) sandstone fragments; trace white (N9) to yellowish gray (5Y8/1) very soft limestone (biomicritic) fragments.	DHV
06\03\91	1530	1540	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); 40% light gray (N7) sandstone; medium to fine grained; well sorted; subangular; very hard.	DHV
06\03\91	1540	1550	Dolomite; moderate yellowish brown (10YR5/4); porous; 10% sandstone fragments; light gray (N7); very hard.	DHV
06\03\91	1550	1560	Dolomite; grayish orange (10YR7/4); as above; very porous; slightly crystalline; sucrosic texture.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
06\03\91	1560	1570	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); very porous; sucrosic texture.	DHV
06\03\91	1570	1580	Dolomite; very pale orange (10YR8/2) to grayish orange (10YR7/4); hard.	DHV
06\03\91	1580	1590	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); porous; hard.	DHV
06\03\91	1590	1600	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR8/4); slightly crystalline; sucrosic texture; hard.	DHV
06\03\91	1600	1610	Dolomite; dark yellowish brown (10YR4/2); to moderate yellowish brown (10YR5/4); hard.	DHV
06\03\91	1610	1620	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); hard.	DHV
06\03\91	1620	1630	Dolomite; moderate yellowish brown (10YR5/4); hard; slightly crystalline.	DHV
06\03\91	1630	1640	Dolomite; dark yellow brown (10YR4/2) to moderate yellowish brown (10YR5/4); as above.	DHV
06\03\91	1640	1650	Dolomite; moderate yellowish brown (10YR5/4) to dark yellowish brown (10YR4/2); very hard.	DHV
06\03\91	1650	1660	Dolomite; moderate yellowish brown (10YR5/4); trace fossils; very hard; sucrosic texture.	DHV
06\03\91	1660	1670	Dolomite; light gray (N7) pale to moderate yellowish brown (10YR5/4); as above.	DHV
06\03\91	1670	1680	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); very hard; as above.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
06\03\91	1680	1690	Dolomite; pale yellowish brown (10YR6/2); very hard.	DHV
06\03\91	1690	1700	Dolomite; dark yellowish brown (10YR5/2) to pale yellowish brown (10YR6/2); as above.	DHV
06\03\91	1700	1710	Dolomite; moderate yellowish brown (10YR5/4) to pale yellowish brown (10YR6/2); as above.	DHV
06\03\91	1710	1720	Dolomite; moderate yellowish brown (10YR5/4) to pale yellowish brown (10YR6/2); trace soft yellowish gray (5Y8/1) limestone fragments; trace microfossils.	DHV
06\03\91	1720	1730	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); crystalline fragments; porous; very hard.	DHV
06\03\91	1730	1740	Dolomite; moderate yellowish brown (10YR5/4) to pale yellowish brown (10YR6/2); as above.	DHV
06\03\91	1740	1750	Dolomite; moderate yellowish brown (10YR5/4) to pale yellowish brown (10YR6/2); as above.	DHV
06\03\91	1750	1760	Dolomite; moderate yellowish brown (10YR5/4); as above.	DHV
06\03\91	1760	1770	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); as above.	DHV
06\03\91	1770	1780	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); as above.	DHV
06\03\91	1780	1790	Dolomite; dark yellowish brown (10YR4/2); to moderate yellowish brown (10Y5/4); 30% white (N9) to yellowish gray very soft biomicritic limestone.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
06\03\91	1790	1800	Dolomite; dark yellowish brown (10YR4/2); to moderate yellowish brown (10YR5/4); 20% white (N9) to yellowish gray (5Y8/1) biomicritic; very soft; limestone.	DHV
06\03\91	1800	1810	Dolomite; moderate yellowish brown (10YR5/4); slightly crystalline; hard.	DHV
06\03\91	1810	1820	Dolomite; moderate yellowish brown (10YR5/4); as above.	DHV
06\03\91	1820	1830	Dolomite; moderate yellowish brown (10YR5/4) to pale yellowish brown (10YR6/2); porous; slightly crystalline; very hard.	DHV
06\03\91	1830	1840	Dolomite; moderate yellowish brown (10YR5/4); porous; slightly crystalline; sucrosic texture; hard.	DHV
06\03\91	1840	1850	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); as above.	DHV
06\03\91	1850	1860	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); as above.	DHV
06\03\91	1860	1870	Dolomite; moderate yellowish brown (10YR5/4); as above.	DHV
06\03\91	1870	1880	Dolomite; moderate yellowish brown (10YR4/2); as above; 20% white (N9) to yellowish gray (5Y8/1) very soft biomicritic limestone.	DHV
06\03\91	1880	1890	Dolomite; moderate yellowish brown (10YR4/2); porous; slightly crystalline; sucrosic texture.	DHV
06\03\91	1890	1900	Dolomite; pale yellowish brown (10TR6/2) to light gray (N7); porous; slightly crystalline; sucrosic texture; hard to crumbly.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
06\03\91	1900	1910	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); large color variation; very porous; crystalline; sucrosic texture; hard to crumbly.	DHV
06\03\91	1920	1930	Dolomite; dark yellowish brown (10YR4/2) to medium dark gray (N4); large color variation; as above.	DHV
06\03\91	1930	1940	Dolomite; very pale orange (10YR8/2); very hard.	DHV
06\03\91	1940	1950	Limestone (biomicritic); white (N9) to yellowish gray (5Y8/1); very soft; trace microfossils.	DHV
06\03\91	1950	1960	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); slightly crystalline; very porous, very hard. 10% white (N9) to yellowish gray biomicritic limestone fragments; very soft.	DHV
06\03\91	1960	1970	Dolomitic limestone; white (N9) to grayish orange (10YR7/4); 45% very soft biomicritic limestone; dolomite is hard; slightly crystalline; sucrosic texture.	DHV
06\03\91	1970	1980	Limestone (biomicritic); white (N9) to yellowish gray (5Y8/1); trace foraminifera; calcite crystals; very soft.	DHV
06\03\91	1980	1990	Limestone (biomicritic); white (N9); trace shell fragment; foraminifera; microfossils; very soft.	DHV
06\03\91	1990	2000	Limestone (biomicritic); white (N9); trace foraminifera; echinoids; microfossils; very soft.	DHV
06\03\91	2000	2010	Dolomite; very pale orange (10YR8/2); slightly crystalline; sucrosic texture; 10% very soft white (N9); biomicritic limestone fragments.	
06\03\91	2010	2020	Dolomite; very pale orange (10YR8/2) to white (N9); 30% very soft biomicritic limestone fragments.	DHV

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Note: Depth Intervals were referenced
from top of pad - 19.56 NGVD

GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
06\03\91	2020	2030	Dolomite; light gray (N7) to moderate yellowish brown (10YR5/4); porous; very hard; slightly crystalline; sucrosic texture.	DHV
06\03\91	2030	2040	Limestone (biomicritic); white (N9) to yellowish gray (5Y8/1); 40% grayish orange (10YR7/1) dolomite; hard; sucrosic texture.	DHV
06\03\91	2040	2050	Limestone (biomicritic); white (N9) to yellowish gray (5Y8/1); trace microfossils; very soft; 20% grayish orange (10YR7/4) dolomite hard; sucrosic texture.	DHV
06\03\91	2050	2060	Limestone (biomicritic); white (W9) to yellowish gray (5Y8/1); as above.	DHV
06\03\91	2060	2070	Limestone (biomicritic); white (N9) to yellowish gray (5Y8/1); as above.	DHV
06\03\91	2070	2080	Dolomitic limestone; very pale orange (10YR8/2) to moderate yellowish brown (10YR5/4); slightly crystalline; sucrosic texture; 15% white (N9) biomicritic limestone fragments; very soft.	DHV

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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7/27/91	2080	2090	Biomicritic limestone; yellowish gray (5Y 8/1); very soft.	DHV
7/27/91	2090	2100	Biomicritic limestone; yellowish gray (5Y 8/1); very soft.	DHV
7/27/91	2100	2110	Biomicritic limestone; yellowish gray (5Y 8/1); abundant foraminifera; very soft.	DHV
7/27/91	2110	2120	Biomicritic limestone; yellowish gray (5Y 8/1); as above.	DHV
7/27/91	2120	2130	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); as above.	DHV
7/27/91	2130	2140	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); as above.	DHV
7/27/91	2140	2150	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1) to white (N9); as above.	DHV
7/27/91	2150	2160	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); as above.	DHV
7/27/91	2160	2170	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); as above.	DHV
7/27/91	2170	2180	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); increasing pale yellowish brown (10YR 6/2) dolomite.	DHV
7/27/91	2180	2190	Biomicritic limestone; yellowish gray (5Y 8/1) to white (N9); very soft; trace pale yellowish brown (10YR 6/2) dolomite.	DHV
7/27/91	2190	2200	Biomicritic limestone; yellowish gray (5Y 8/1) to white (N9); very soft; fossiliferous; trace pale yellowish brown (10TR 6/2) dolomite.	DHV

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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7/27/91	2200	2210	Dolomite; dark yellowish brown (10YR 4/2) to dark gray (N3); slightly crystalline; porous; trace yellowish gray (5Y 8/1) fossiliferous limestone.	DHV
7/27/91	2210	2220	Dolomite; moderate yellowish brown (10YR 5/4); to dark yellowish brown (10YR 4/2); slightly crystalline; porous; trace fossiliferous limestone.	DHV
7/27/91	2220	2230	Dolomite; moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2); as above; trace yellowish gray (5Y 8/1) very soft fossiliferous limestone.	DHV
7/27/91	2230	2240	Dolomite; dark yellowish brown (10TR 4/2); slightly crystalline; sucrosic texture; trace very soft fossiliferous limestone.	DHV
7/27/91	2240	2250	Dolomite; dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2); trace very soft fossiliferous limestone.	DHV
7/27/91	2250	2260	Dolomite; dark yellowish brown (10YR 4/2); very hard; trace fossiliferous limestone.	DHV
7/27/91	2260	2270	Dolomite; dark yellowish brown (10YR 4/2); hard; crystalline; sucrosic texture.	DHV
7/27/91	2270	2280	Dolomite; dark yellowish brown (10YR 4/2) crystalline; slightly porous; very hard.	DHV
7/27/91	2280	2290	Biomicrotic fossiliferous limestone; yellowish gray (5Y 7/2) to white (N9); very soft.	DHV
7/27/91	2290	2300	Biomicrotic fossiliferous limestone; yellowish gray (5Y 7/2); very soft.	DHV
7/27/91	2300	2310	Biomicrotic fossiliferous limestone; yellowish gray (5Y 8/1); fossiliferous; abundant foraminifera.	DHV

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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7/27/91	2310	2320	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); very soft.	DHV
7/27/91	2320	2330	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); very soft; trace dark yellowish brown (10YR 4/2) dolomite; very hard.	DHV
7/27/91	2330	2340	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); very soft; trace dark yellowish brown dolomite (10YR 4/2); very hard.	DHV
7/27/91	2340	2350	Biomicritic fossiliferous limestone; yellowish gray (5YR 8/1); abundant foraminifera; trace dark yellowish brown dolomite (10YR 4/2); very hard.	DHV
7/27/91	2350	2360	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); abundant foraminifera; very soft.	DHV
7/27/91	2360	2370	Biomicritic fossiliferous limestone; yellowish gray (5YR 8/1) to white (N9) very soft.	DHV
7/27/91	2370	2380	Biomicritic fossiliferous limestone; yellowish gray (5YR 8/1) to white (N9); very soft.	DHV
7/27/91	2380	2390	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1) to white (N9); very soft.	DHV
7/27/91	2390	2400	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1) to white (N9); very soft.	DHV
7/27/91	2400	2410	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1) to white (N9); very soft.	DHV
7/28/91	2410	2420	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); very soft.	DHV
7/28/91	2420	2430	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1); very soft.	DHV

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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7/28/91	2430	2440	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); very soft.	
7/28/91	2440	2450	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); very soft.	DHV
7/28/91	2250	2460	Biomicritic fossiliferous limestone; yellowish gray (5YR 8/1); very soft.	DHV
7/28/91	2460	2470	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); very soft.	DHV
7/28/91	2470	2480	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1) to white (N9); abundant foraminifera.	DHV
7/28/91	2480	2490	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1) to white (N9); trace foraminifera; very soft.	DHV
7/28/91	2490	2500	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); abundant foraminifera; very soft.	DHV
7/28/91	2500	2510	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1) to white (N9); trace foraminifera; very soft.	DHV
7/28/91	2510	2520	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); trace foraminifera; very soft.	DHV
7/28/91	2520	2530	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); trace foraminifera; very soft.	DHV
7/28/91	2530	2540	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); trace foraminifera; very soft; trace dark yellowish brown (10YR 4/2) dolomite fragments.	DHV
7/28/91	2540	2550	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1); trace foraminifera; very soft; increasing dark yellowish brown (10YR 4/2) dolomite fragments.	DHV

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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7/28/91	2550	2560	Biomicritic fossiliferous limestone; yellowish gray (5Y 8\1); trace foraminifera; very soft; increasing dark yellowish brown (10YR 4\2) dolomite fragments.	DHV
7/28/91	2560	2570	Dolomite; dark yellowish brown (10YR 4/2); finely crystalline; sucrosic and vuggy texture; very hard.	DHV
7/28/91	2570	2580	Dolomite; dark yellowish brown (10YR 4/2); coarsely crystalline; sucrosic and vuggy texture; very hard.	DHV
7/28/91	2580	2590	Biomicritic fossiliferous limestone; yellowish gray (5Y 8\1) to white (N9); abundant foraminifera; very soft; trace dark yellowish brown (10YR 4\2) dolomite fragments.	DHV
7/28/91	2590	2600	Biomicritic fossiliferous limestone; white (N9) to yellowish gray (5Y 8\1); trace foraminifera; very soft.	DHV
7/28/91	2600	2610	Biomicritic fossiliferous limestone; white (N9) to yellowish gray (5Y 8\1); trace foraminifera; very soft; trace dark yellowish brown (10YR 4\2) dolomite fragments.	DHV
7/28/91	2610	2620	Dolomite; dark yellowish brown (10 YR 4\4); crystalline; sucrosic and vuggy texture; very hard.	DHV
7/28/91	2620	2630	Dolomite; dark yellowish brown (10 YR 4\2); crystalline; sucrosic and vuggy texture; very hard.	DHV
7/28/91	2630	2640	Dolomite; dark yellowish brown (10TR 4\2); as above.	DHV
7/28/91	2640	2650	Dolomite; dark yellowish brown (10YR 4\2); to dusky yellowish brown (10YR 2\2); very hard.	DHV
7/28/91	2650	2660	Dolomite; dark yellowish brown (YR 4\2) to dusky yellowish brown (10YR 2\2); very hard.	DHV

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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7/28/91	2660	2670	Dolomite; dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2); very hard.	DHV
7/28/91	2670	2680	Dolomite; dark yellowish brown (10 YR 4/2) to dusky yellowish brown (10YR 2/2); very hard; trace biomicritic limestone fragments.	DHV
7/28/91	2680	2690	Dolomite; dark yellowish brown (10YR 4/2); 40% creamy white biomicritic limestone fragments.	DHV
7/28/91	2690	2700	Dolomite; dusky yellowish brown (10YR 4/2); 30% very pale orange (10YR 8/2) biomicritic limestone fragments.	DHV
7/28/91	2700	2710	Biomicritic fossiliferous limestone; very pale orange (10YR 8/2); very soft; trace dark yellowish brown (10YR 4/2) dolomite fragments.	DHV
7/28/91	2710	2720	Biomicritic fossiliferous limestone; white (N9) to very pale orange (10YR 8/2); very soft; trace pale yellowish brown (10YR 6/2) dolomite fragments.	DHV
7/28/91	2720	2730	Dolomite; dark yellowish brown (10YR 4/2) to pale yellowish brown (10YR 6/2); very hard; 30% biomicritic limestone fragments.	DHV
7/28/91	2730	2740	Dolomite; dusky yellowish brown (10YR 2/2); very hard; with 40% yellowish gray (5Y8/1) biomicritic fossiliferous limestone fragments.	DHV
7/28/91	2740	2750	Dolomite; dusky yellowish brown (10YR 2/2); very hard.	DHV
7/28/91	2750	2760	Biomicritic fossiliferous limestone; very pale orange (10YR 8/2); very soft; 40% dusky yellowish brown (10YR 2/2); Dolomite fragments.	DHV
7/28/91	2760	2770	Biomicritic fossiliferous limestone; very pale orange (10YR 8/2); very soft.	

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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7\28\91	2770	2780	Biomicrotic fossiliferous limestone; yellowish gray (5Y 8/1); very soft; trace foraminifera; some dolomite fragments.	DHV
7\28\91	2780	2790	Biomicrotic fossiliferous limestone; yellowish gray (5Y 8\1); very soft; trace dusky yellowish brown (10YR 2\2) dolomite fragments.	DHV
7\28\91	2790	2800	Biomicrotic fossiliferous limestone; yellowish gray (5Y 8\1); very soft.	DHV
7\28\91	2800	2810	Biomicrotic fossiliferous limestone; yellowish gray (5Y 8\1) to white (N9); very soft.	DHV
7\28\91	2810	2820	Biomicrotic fossiliferous limestone; white (N9) to yellowish gray (5Y 8\1); very soft; trace foraminifera.	DHV
7\28\91	2820	2830	Biomicrotic fossiliferous limestone; white (N9) to yellowish gray (5Y 8/1); very soft; trace dark yellowish brown (10YR 4\2) dolomite fragments.	DHV
7\28\91	2830	2840	Biomicrotic fossiliferous limestone; white (N9) to yellowish gray (5Y 8/1); abundant foraminifera; very soft.	DHV
7\28\91	2840	2850	Dolomite; pale yellowish brown (10YR 6\2); with white (N9) biomicrotic limestone fragments.	DHV
7\18\91	2850	2860	Dolomite; pale yellowish brown (10YR 6\2); with white (N9) biomicrotic limestone fragments.	DHV
7\28\91	2860	2870	Dolomite; pale yellowish brown (10YR 6\2) to dark yellowish brown (10YR 4\2); finely crystalline; sucrosic texture; trace white (N9) biomicrotic limestone fragments.	DHV

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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7/28/91	2870	2880	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2); trace very pale orange dolomitic limestone fragments; moderately hard.	DHV
7/28/91	2880	2890	Dolomite; dark yellowish brown (10YR 4/2); sucrosic texture; trace biomicritic limestone fragments.	DHV
7/28/91	2890	2900	Dolomite; dark yellowish brown (10YR 4/2) to pale yellowish brown (10YR 6/2); sucrosic texture; very hard; trace yellowish gray biomicritic limestone fragments.	DHV
7/28/91	2900	2910	Biomicritic fossiliferous limestone; yellowish gray (5Y 8/1) to white (N9); very soft; 35% dark yellowish brown (10YR 4/2) dolomite fragments.	DHV
7/28/91	2910	2920	Dolomite; pale yellowish brown (10YR 6/2) to very pale orange (10YR 8/2); finely crystalline; sucrosic texture; moderately hard.	DHV
7/28/91	2920	2930	Biomicritic fossiliferous limestone; white (N9) to very pale orange (10YR 8/2); very soft.	DHV
7/28/91	2930	2940	Biomicritic fossiliferous limestone; white (N9) to yellowish gray (10YR 8/2); very soft.	DHV
7/28/91	2940	2950	Biomicritic fossiliferous limestone; white (N9) to yellowish gray (5Y 8/1); very soft; trace foraminifera.	DHV
7/28/91	2950	2960	Biomicritic fossiliferous limestone; white (N9); very soft; trace pale yellowish brown (10YR 6/2) dolomite fragments.	DHV
7/28/91	2960	2970	Dolomite; dusky yellowish brown (10YR 2/2); very hard; trace biomicritic limestone fragments.	DHV
7/28/91	2970	2980	Dolomite; dark yellowish brown (10YR 4/2) to pale yellowish brown (10YR 6/2); sucrosic texture; finely crystalline; very hard.	DHV

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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7/28/91	2980	2990	Dolomite; dark yellowish brown (10YR 4/2); to dusky yellowish brown (10YR 2/2); sucrosic texture; very hard.	DHV
7/28/91	2990	3000	Dolomite; very pale orange (10YR 8/2) to grayish orange (10YR 7/4); very hard.	DHV
7/27/91	3000	3010	Dolomite; dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2); very hard; finely crystalline.	DHV
7/27/91	3010	3020	Dolomite; pale yellowish brown (10YR 6/2) to dusky yellowish brown (10YR 2/2); very hard; finely crystalline.	DHV
7/27/91	3020	3030	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10 YR 6/2); very hard; as above.	DHV
7/27/91	3030	3040	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2); very hard; as above.	DHV
7/27/91	3040	3050	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2); finely crystalline.	DHV
7/27/91	3050	3060	Dolomite; very pale orange (10 YR 8/2) to dusky yellowish brown (10YR 2/2); as above.	DHV
7/27/91	3060	3070	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2); very hard.	DHV
7/27/91	3070	3080	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2); finely crystalline; very hard.	DHV
7/27/91	3080	3090	Dolomite; very pale orange (10YR 8/2); very hard.	DHV
7/27/91	3090	3100	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2); very hard.	DHV

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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7/27/91	3100	3110	Dolomite; pale yellowish brown (10YR 6/2) to very pale orange (10YR 8/2); very hard; finely crystalline.	DHV
7/28/91	3110	3120	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2); very hard; finely crystalline.	DHV
7/27/91	3120	3130	Dolomite; very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2); very hard; finely crystalline.	DHV
7/27/91	3130	3140	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2); as above.	DHV
7/27/91	3140	3150	Dolomite; pale yellowish brown (10YR 6/2); very hard; finely crystalline.	DHV
7/27/91	3150	3160	Dolomite; dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2); very hard; finely crystalline.	DHV
7/27/91	3160	3170	Dolomite; very pale orange (10YR 8/10) to dark yellowish brown (10YR 4/2); very hard; finely crystalline.	DHV
7/27/91	3170	3180	Dolomite; dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2); slightly vuggy; sucrosic texture; very hard.	DHV
7/27/91	3080	3190	Dolomite; pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2); very hard; sucrosic texture.	DHV
7/27/91	3190	3200	Dolomite; very pale orange (10YR 8/2) to dark yellowish brown (10YR 4/2); as above.	DHV
7/27/91	3200	3210	Dolomite; very pale orange (10YR 8/2) to dusky yellowish brown (10YR 4/2); very hard; as above.	DHV

Client: City of Boynton Beach
Project: Concentrate Disposal Well
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GEOLOGIC DATA
Concentrate Disposal Well

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
7/27/91	3210	3220	Dolomite; dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2); finely crystalline; very hard; sucrosic texture.	DHV
7/27/91	3220	3230	Dolomite; pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2); sucrosic texture; finely crystalline; very hard.	DHV
7/27/91	3230	3240	Dolomite; dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2); sucrosic texture; finely crystalline; very hard.	DHV
7/27/91	3240	3250	Dolomite; pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2); finely crystalline; very hard.	DHV
7/27/91	3250	3260	Dolomite; dark yellowish brown (10YR 4/2); finely crystalline; sucrosic texture; very hard.	DHV
7/27/91	3260	3270	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2); very hard; finely crystalline.	DHV
7/27/91	3270	3280	Dolomite; very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2); as above.	DHV
7/27/91	3280	3290	Dolomite; dark yellowish brown (10YR 4/2); slightly crystalline; sucrosic texture; very hard.	DHV
7/27/91	3290	3300	Dolomite; pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 4/2); sucrosic texture; very hard.	DHV
7/27/91	3300	3310	Dolomite; dark yellowish brown (10YR 4/2) to dusky yellowish brown (10YR 2/2); slightly crystalline; trace sucrosic texture.	DHV

**Dual-Zone Monitor Well
Geological Data**

Client: City of Boynton Beach
Project: Boynton Beach Concentrate Disposal Well
Project No. SEF26410.P1

Note: Depth Intervals were referenced
from top of pad - 19.56 NGVD

GEOLOGIC DATA DUAL-ZONE MONITOR WELL

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
07/11/91	30	40	Sand, medium light gray to light gray (N6-N7); very coarse to medium grained; subangular; moderately well sorted; trace pelecypods.	DHV
07/11/91	40	50	Sand, medium light gray to light gray (N6-N7); medium grained; subangular; very well sorted; trace shell fragments.	DHV
07/11/91	50	60	Sand, medium light gray to light gray (N6-N7); medium grained; subangular; very well sorted; trace shell fragments.	DHV
07/11/91	60	70	Sand; light olive gray (5Y6/1); fine to medium grained; subangular; very well sorted.	DHV
07/11/91	70	80	Sand; light olive gray (5Y6/1); fine to medium grained; subangular; trace black phosphorite grains.	DHV
07/11/91	80	90	Sand; as above; trace black phosphorite grains; trace shell fragments.	DHV
07/11/91	90	100	Sand; as above; medium grained; subrounded; very well sorted; increasing shell fragments; trace black phosphorite grains.	DHV
07/11/91	100	110	Sand; as above; medium to coarse grained; subangular to subrounded; moderately well sorted; trace shell fragments; trace black phosphorite grains.	DHV
07/11/91	110	120	Sand; medium gray to medium dark gray (N4-N5); medium to coarse grained; poorly sorted; subangular; trace calcite crystals; trace calcareous sandstone fragments; trace black phosphorite grains.	DHV
07/11/91	120	130	Calcareous sandstone with sand; sand is medium gray to medium dark gray (N4-N5); coarse to medium grained; subangular; moderately well sorted; sandstone is well cemented; trace calcite crystals; trace shell; trace black phosphorite grains.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
07/11/91	130	140	Sand; medium gray (N4) to light olive gray (5Y6/1); medium to coarse grained; subangular; moderately well sorted; 40% calcareous sandstone; trace black phosphorite grains.	DHV
07/11/91	140	150	Sand; light gray (N7); 30% calcareous sandstone; yellowish gray (5Y7/2); trace calcite crystals; medium to coarse grained; subrounded; trace phosphorite grains.	DHV
07/11/91	150	160	Calcareous sandstone; light gray (N7) to light olive gray; 35% sand; medium to coarse grained; subrounded; moderately well sorted; trace calcite crystals; trace shell; trace black phosphorite grains.	DHV
07/11/91	160	170	Calcareous sandstone with sand; as above; trace shell fragments; abundant coarse sand grains; subrounded; very well sorted; poorly cemented sandstone; trace black phosphite grains.	DHV
07/11/91	170	180	Calcareous sandstone with sand; as above; trace shell fragments; sand is medium to coarse grained; subrounded; moderately well sorted.	DHV
07/11/91	180	190	Shell hash with sand; yellowish gray (5Y7/2); 60 percent shell hash; 40 percent sand; sand is medium to coarse grained; subrounded; moderately well sorted; trace light gray (N7) calcareous sandstone fragments.	DHV
07/11/91	190	200	Calcareous sandstone with sand; yellowish gray (5Y7/2); medium to coarse grained; microfossils; trace of calcite crystals; trace phosphorite grains.	DHV
07/11/91	200	210	Calcareous sand; as above; well cemented; decreasing sand content.	DHV
07/11/91	210	220	Same as above; with traces of medium to fine sand.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
07/11/91	220	230	Same as above; with traces of black phosphorite grains.	DHV
07/11/91	230	240	Same as above; with medium sand; trace black phosphorite grains.	DHV
07/11/91	240	250	Same as above; with sand and shell hash; trace black phosphorite grains.	DHV
07/11/91	250	260	Same as above; with increasing medium sand; shell hash; trace black phosphorite grains.	DHV
07/11/91	260	270	Same as above (See 280-290) Calcareous sandstone with sand; fine to medium grained sand; well sorted; subrounded; light olive gray (5Y6/1); shell hash; trace phosphorite grains.	DHV
07/11/91	270	280	Same as above (See 280-290) Calcareous sandstone with sand; fine to medium grained sand; well sorted; subrounded; light olive gray (5Y6/1); shell hash; trace phosphorite grains.	DHV
07/11/91	280	290	Calcareous sandstone with sand; fine to medium grained sand; well sorted; subrounded; light olive gray (5Y6/1); shell hash; trace phosphorite grains.	DHV
07/11/91	290	300	Same as above	DHV
07/11/91	300	310	Shell hash with sand; light olive gray (5Y6/1); sand is medium grained; well sorted; subangular; trace black phosphorite grains.	DHV
07/11/91	310	320	Same as above; increasing medium sand content.	DHV
07/11/91	320	330	Sand; grayish yellow green (5GY7/2); medium grained; well sorted; decreasing shell hash; increasing greenish color.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
07/11/91	330	340	Same as above; increasing grayish yellow green (5GY7/2) color, shell hash; trace black phosphorite grains.	DHV
07/11/91	340	350	Same as above; fine to medium grained sand.	DHV
07/11/91	350	360	Same as above; increasing fine grained sand.	DHV
07/11/91	360	370	Calcareous clay; pale olive (10Y6/2) to grayish olive (10Y4/2); fine sand; trace shell hash.	DHV
07/11/91	370	380	Calcareous clay with sand; pale olive (10Y6/2); shell hash abundant; trace black phosphorite grains.	DHV
07/11/91	380	390	Same as above; increasing shell hash content in clay matrix.	DHV
07/11/91	390	400	Calcareous clay; light olive (10Y5/4); trace shell hash; becoming darker green.	DHV
07/11/91	400	410	Same as above; light olive (10Y5/4) to grayish olive (10Y4/2); stiff.	DHV
07/11/91	410	420	Same as above; increasing stiffness.	DHV
07/11/91	420	430	Same as above	DHV
07/11/91	430	440	Same as above	DHV
07/11/91	440	450	Same as above	DHV
07/11/91	450	460	Calcareous clay; grayish olive (10Y4/2); very stiff.	DHV
07/11/91	460	470	Same as above	DHV
07/11/91	470	480	Same as above	DHV
07/11/91	480	490	Same as above	DHV
07/11/91	490	500	Same as above	DHV
07/11/91	500	510	Same as above	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
07/11/91	510	520	Same as above	DHV
07/11/91	520	530	Same as above	DHV
07/11/91	530	540	Same as above	DHV
07/11/91	540	550	Same as above; with fine silty sand in clay matrix.	DHV
07/11/91	550	560	Calcareous clay; grayish olive (10Y4/2); very stiff.	DHV
07/11/91	560	570	Same as above	DHV
07/11/91	570	580	Same as above	DHV
07/11/91	580	590	Same as above	DHV
07/11/91	590	600	Same as above; with fine silty sand in clay matrix.	DHV
07/11/91	600	610	Calcareous clay; grayish olive (10Y4/2); very stiff.	DHV
07/11/91	610	620	Same as above	DHV
07/11/91	620	630	Same as above	DHV
07/11/91	630	640	Same as above	DHV
07/11/91	650	660	Same as above	DHV
07/11/91	660	670	Same as above	DHV
07/11/91	670	680	Same as above	DHV
07/11/91	680	690	Same as above	DHV
07/11/91	690	700	Calcareous clay; pale olive (10Y6/2); color becoming lighter; increasing yellowish gray (5Y7/2) limestone fragments.	DHV
07/11/91	700	710	Same as above; 30% yellowish gray (5Y7/2) limestone fragments.	DHV
07/11/91	710	720	Same as above; limestone content increasing.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
07/11/91	720	730	Same as above: very stiff.	DHV
07/11/91	730	740	Same as above	DHV
07/11/91	740	750	Same as above	DHV
07/11/91	750	760	Same as above	DHV
07/11/91	760	770	Same as above	DHV
07/11/91	770	780	Same as above	DHV
07/11/91	780	790	Same as above	DHV
07/11/91	790	800	Same as above	DHV
07/11/91	800	810	Calcareous clay; pale olive (10Y6/2); trace yellowish gray (5Y7/2) limestone fragments; trace black chert fragments.	DHV
07/11/91	810	820	Same as above; increasing black chert fragments.	DHV
07/11/91	820	830	Same as above; larger chert fragments.	DHV
07/11/91	830	840	Same as above; limestone content increasing.	DHV
07/11/91	840	850	Same as above; 40% yellowish gray (8Y7/2) limestone fragments.	DHV
07/11/91	850	860	Calcareous clay with limestone; pale olive (10Y6/2) to yellowish gray (5Y7/2).	DHV
07/11/91	860	870	Same as above; trace black chert fragments.	DHV
07/11/91	870	880	Clayey limestone; pale olive to yellowish gray; Abondant black medium grained phosphorite grains.	DHV
07/11/91	880	890	Same as above; increased stiffness; abundant black phosphorite grains.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
07/11/91	890	900	Clayey limestone; pale olive to yellowish gray; medium to coarse grained sand; 60% black phosphorite grains.	DHV
07/11/91	900	910	Same as above; decreasing phosphorite.	DHV
07/11/91	910	920	Same as above; white (N9) limestone fragments; trace chert; trace phosphorite.	DHV
07/11/91	920	930	Same as above; white (N9) limestone fragments; trace chert fragments; trace phosphorite.	DHV
07/11/91	930	940	Clayey limestone; white (N9) to pale olive (10Y6/2); 90% white limestone; very soft; microfossiliferous.	DHV
07/11/91	940	950	Same as above	DHV
07/11/91	950	960	Biomitic limestone with calcareous clay; chalky white (N9) foraminifera (dictyconus); very soft; 35% calcareous-clay content.	DHV
07/11/91	960	970	Same as above - abundant dictyconus	DHV
07/11/91	970	980	Same as above - abundant dictyconus	DHV
07/11/91	980	990	Same as above - abundant dictyconus	DHV
07/11/91	990	1000	Same as above - abundant dictyconus	DHV
07/11/91	1000	1010	Same as above - abundant dictyconus	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
08\21\91	1010	1020	Biomicrite limestone; yellowish gray (5Y8/1) to white (N9); abundant dictyconus; trace bryozoans; trace shell fragments; soft.	DHV
08\21\91	1020	1030	Biomicrite limestone; yellowish gray (5Y8/1); as above.	DHV
08\21\91	1030	1040	Biomicrite limestone; yellowish gray (5Y8/1); as above; trace shell casts.	DHV
08\21\91	1040	1050	Biomicrite limestone; yellowish gray (5Y8/1); as above.	DHV
08\21\91	1050	1060	Biomicrite limestone; yellowish gray (5Y8/1); as above.	DHV
08\21\91	1060	1070	Biomicrite limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above; trace calcite; very soft.	DHV
08\21\91	1070	1080	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above; trace shell fragments, very soft.	DHV
08\21\91	1080	1090	Limestone; pinkish gray (5YR8/1); as above; trace shell fragments.	DHV
08\21\91	1090	1100	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1) as above; trace foraminifera (Dictyconus); trace shell fragments; trace calcite; very soft.	DHV
08\21\91	1100	1110	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above.	DHV
08\21\91	1110	1120	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above.	DHV
08\21\91	1120	1130	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
08\21\91	1130	1140	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above	DHV
08\21\91	1140	1150	Limestone; yellowish gray (5Y8/1); trace echinoids; trace foraminifera (Dictyconus); very soft.	DHV
08\21\91	1150	1160	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above.	DHV
08\21\91	1160	1170	Limestone; yellowish gray (5YR8/1) to pinkish gray (5YR8/1); as above.	DHV
08\21\91	1170	1180	Limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); abundant Dictyconus; very soft.	DHV
08\21\91	1180	1190	Biomicro limestone; yellowish gray (5Y8/1) to pinkish gray (5YR8/1); as above.	DHV
08\21\91	1200	1210	Biomicro limestone; pinkish gray (5YR8/1) to yellowish gray (5Y8/1); trace pelecypods; trace bryozoans; abundant Dictyconus; very soft.	DHV
08\21\91	1210	1220	Biomicro limestone; very pale orange (10Y8/2) to yellowish gray (5Y8/1); trace dolomitic limestone fragments; moderate yellowish brown (10YR5/4); porous; trace echinoids; trace bryozoans; pelecypods; foraminifera (Dictyconus, Miliolina); shell casts.	DHV
08\21\91	1220	1230	Biomicro limestone; very pale orange (10Y8/2) to yellowish gray (5Y8/1); trace dolomitic limestone fragments; moderate yellowish brown (10YR5/4); as above.	DHV
08\21\91	1230	1240	Limestone; pinkish gray (5YR8/1); yellowish gray (5Y8/1); abundant Dictyconus; very soft.	DHV
09\21\91	1240	1250	Biomicro limestone; very pale orange (10Y8/2) to yellowish gray (5Y8/1); abundant Dictyconus; trace calcite crystals.	DHV

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	From	To		
08\21\91	1250	1260	Biomicrite limestone; yellowish gray (5Y8/1); to very pale orange (10Y8/2); trace echinoid fragments; abundant Dictyonus and Miliolina; shell fragments.	DHV
08\21\91	1260	1270	Biomicrite limestone; yellowish gray (5Y8/1) to very pale orange (10Y8/2); as above.	DHV
08\21\91	1270	1280	Limestone with dolomite; yellowish gray (5Y8/1); trace echinoids; Miliolina foraminifera; very soft; 50 percent dolomite fragments; dark yellowish brown (10YR4/2); hard.	DHV
08\21\91	1280	1290	Dolomite; moderate yellowish brown (10YR5/4) to dark yellowish brown (10YR4/2); slightly porous; moderately hard.	DHV
08\21\91	1290	1300	Dolomite; pale yellowish brown (10YR6/2) to dark yellowish brown (10YR4/2); as above.	DHV
08\21\91	1300	1310	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR 5/4); slightly porous; moderately hard; trace dolomitic limestone fragments.	DHV
08\21\91	1310	1320	Dolomite; pale yellowish brown (10YR6/2); slightly porous; abundant dolomitic limestone fragments.	DHV
08\21\91	1320	1330	Dolomite; dark yellowish brown (10YR4/2); increasing hardness.	DHV
08\21\91	1330	1340	Dolomite; dark yellowish brown (10YR4/2) as above.	DHV
08\21\91	1340	1350	Dolomite; dark yellowish brown (10YR4/2) to dusky yellowish brown (10YR2/2); slightly porous; very hard.	DHV
08\21\91	1350	1360	Dolomite; dark yellowish brown (10YR4/2); porous; sucrosic texture; very hard.	DHV

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Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
08\22\91	1360	1370	Dolomite; very pale orange (10YR8/2) to dark yellowish brown (10YR4/2); porous; slightly vuggy to sucrosic texture; hard.	DHV
08\22\91	1370	1380	Dolomite; very pale orange (10YR8/2); to light olive gray (5Y6/1) to dark yellowish brown (10YR4/2); porous; vuggy and sucrosic texture.	DHV
08\22\91	1380	1390	Dolomite; very pale orange (10YR8/2) to light olive gray (5Y6/1) to dark yellowish brown (10YR4/2); porous; vuggy and sucrosic texture; hard.	DHV
08\22\91	1390	1400	Dolomite; very pale orange (10YR8/2) to light olive gray (5Y6/1); as above.	DHV
08\22\91	1400	1410	Dolomite; moderate yellowish brown (10YR5/4); sucrosic texture; moderately hard.	DHV
08\22\90	1410	1420	Dolomite; very pale orange (10YR8/2) to grayish orange (10YR7/4) to moderate yellowish brown (10YR5/4); slightly vuggy and sucrosic texture; trace limestone fragments; moderately hard.	DHV
08\22\91	1420	1430	Dolomite; very pale orange (10YR8/2) to pale yellowish brown (10YR6/2); slightly vuggy and sucrosic texture; hard.	DHV
08\22\91	1430	1440	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); sucrosic texture; very hard.	DHV
08\22\91	1440	1450	Dolomite; pale yellowish brown (10YR6/2) to light olive gray (5Y6/1); slightly porous; very hard.	DHV
08\22\91	1450	1460	Dolomite; very pale orange (10YR8/2) to pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); slightly porous; sucrosic texture; very hard.	DHV

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	From	To		
08\22\91	1460	1470	Dolomite; pale yellowish brown (10YR6/2) to dark yellowish brown (10YR4/2); sucrosic texture; very hard; trace yellowish gray (5Y8/1) limestone fragments; porous.	DHV
08\22\91	1470	1480	Dolomitic limestone; very pale orange (10YR8/2) to pale yellowish brown (10YR6/2); trace sucrosic textured dolomite; moderately hard.	DHV
08\22\91	1480	1490	Dolomitic limestone; very pale orange (10YR8/2) to dark yellowish brown (10YR4/2); dolomite is slightly vuggy and sucrosic textured; slightly porous; limestone is white to yellowish gray; very soft.	DHV
08\22\91	1490	1500	Dolomite; pale yellowish brown (10YR6/2); to dark yellowish brown (10YR4/2); slightly porous; very hard; trace limestone fragments.	DHV
08\22\91	1500	1510	Dolomite; moderate yellowish brown (10YR5/4); to dusky yellowish brown (10YR2/2); porous; very hard; trace white to yellowish gray limestone fragments; microfossils; very soft.	DHV
08\22\91	1510	1520	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); to dark yellowish brown (10YR4/2); sucrosic texture; slightly porous; moderately hard.	DHV
08\22\91	1520	1530	Dolomite; dark yellowish brown (10YR4/2); to dusky yellowish brown (10YR2/2); sucrosic texture; trace white (N9) to yellowish gray (5Y8/1) very soft limestone (biomicritic) fragments.	DHV
08\22\91	1530	1540	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); sucrosic texture; moderately hard.	DHV
08\22\91	1540	1550	Dolomite; very pale orange (10YR8/2) to grayish orange (10YR7/4); hard.	DHV

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	From	To		
08\22\91	1550	1560	Dolomite; grayish orange (10YR7/4); to very pale orange (10YR8/2); as above.	DHV
08\22\91	1560	1570	Dolomite; dark yellowish brown (10YR4/2) to dusky yellowish brown (10YR4/2); slightly sucrosic texture; hard.	DHV
08\22\91	1570	1580	Dolomite; very pale orange (10YR8/2) to grayish orange (10YR7/4); hard.	DHV
08\22\91	1580	1590	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); slightly crystalline; porous; sucrosic texture; moderately hard.	DHV
08\22\91	1590	1600	Dolomite; light olive gray (5Y6/1) to very pale orange (10YR8/2); slightly porous; sucrosic texture; hard.	DHV
08\22\91	1600	1610	Biomicroite fossiliferous limestone: white (N9) to very pale orange (10YR8/2); microfossils; very soft.	DHV
08\22\91	1610	1620	Dolomite with limestone; very pale orange (10YR8/2) to pale yellowish brown (10Y6/2); slightly sucrosic texture; limestone is yellowish gray (5Y8/1); very soft.	DHV
08\22\91	1620	1630	Dolomite; moderate yellowish brown (10YR5/4) to dark yellowish brown (10YR4/2); slightly crystalline; sucrosic texture; very hard.	DHV
08\22\91	1630	1640	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); as above.	DHV
08\22\91	1640	1650	Dolomite; moderate yellowish brown (10YR5/4) to dark yellowish brown (10YR4/2); as above.	DHV
08\22\91	1650	1660	Dolomite; moderate yellowish brown (10YR5/4) to dark yellowish brown (10YR4/2); sucrosic texture; slightly porous; hard.	DHV

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	From	To		
08\22\91	1660	1670	Dolomite; pale (10YR6/2) to moderate yellowish brown (10YR5/4); as above.	DHV
08\22\91	1670	1680	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10YR5/4); vuggy and sucrosic texture; slightly porous; very hard.	DHV
08\22\91	1680	1690	Dolomite; dark yellowish brown (10YR4/2); porous; microcrystalline; sucrosic texture; very hard.	DHV
08\22\91	1690	1700	Dolomite; dark yellowish brown (10YR4/2) to pale yellowish brown (10YR6/2); as above.	DHV
08\22\91	1700	1710	Dolomite; moderate yellowish brown (10YR5/4) to dusky yellowish brown (10YR2/2); as above.	DHV
08\22\91	1710	1720	Dolomite; grayish orange (10YR7/4) to pale yellowish brown (10YR6/2); porous; vuggy and sucrosic texture; micro-crystalline; hard.	DHV
08\22\91	1720	1730	Dolomite; dark yellowish brown (10YR4/2) to light olive gray (5Y6/1); crystalline fragments; porous; sucrosic texture; very hard.	DHV
08\22\91	1730	1740	Dolomite; very pale orange (10YR8/2) to dark yellowish brown (10YR4/2); as above.	DHV
08\22\91	1740	1750	Dolomite; moderate yellowish brown (10YR5/4) to dusky yellowish brown (10YR2/2); very hard.	DHV
08\22\91	1750	1760	Dolomite; very pale orange (10YR8/2) to pale yellowish brown (10YR6/2); porous; vuggy and sucrosic texture; hard.	DHV
08\22\91	1760	1770	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); as above.	DHV
08\22\91	1770	1780	Dolomite; very pale orange (10YR8/2) to dark yellowish brown (10YR4/2); as above.	DHV

Client: City of Boynton Beach
Project: Boynton Beach Concentrate Disposal Well
Project No. SEF26410.P1

Note: Depth Intervals were referenced
from top of pad - 19.56 NGVD

**GEOLOGIC DATA
DUAL-ZONE MONITOR WELL**

Date	Depth Interval (ft)		Observer's Description	Initials
	From	To		
08\22\91	1780	1790	Dolomite; pale yellowish brown (10YR6/2) to moderate yellowish brown (10Y4/5); very hard.	DHV
08\22\91	1790	1800	Dolomite; dark yellowish brown (10YR4/2) to dusky yellowish brown (10YR2/2); micro-crystalline; vuggy and sucrosic texture; very hard.	DHV
08\22\91	1800	1810	Dolomite; moderate yellowish brown (10YR5/4) to dark yellowish brown (10YR4/2); sucrosic texture; slightly crystalline; very hard.	DHV
10\29\91	1810	1820	Dolomite; moderate yellowish brown (10YR5/4); as above.	DHV
10\29\91	1820	1830	Dolomite; moderate yellowish brown (10YR5/4); as above.	DHV
10\29\91	1830	1840	Dolomite; moderate yellowish brown (10YR5/4); porous; slightly crystalline; sucrosic texture; hard.	DHV
10\29\91	1840	1850	Dolomite; dark yellowish brown (10YR4/2) to moderate yellowish brown (10YR5/4); as above.	DHV

**Concentrate Disposal Well
Packer Test Data and Water Quality Data**

PROJECT: BOYNTON BEACH DISPOSAL WELL
 PROJECT NO.: SEF28410.P1
 DATE: JUNE 5, 1991
 COMPILED BY: PAUL LINTON
 REVIEWED BY: BART ZIEGLER
 FILE: PACKERIWPACK1A.WK1

DESCRIPTION: PACKER TEST NO. 1 (1,737 TO 1,759 FT), PURGE UNTIL NATIVE FORMATION WATERS PRESENT

DATE	TIME (HRS)	D-TIME (MINUTES)	DEPTH TO WATER, TOC		CONDUCTIVITY (UMHOS/CM)	FLOW METER (GALLONS)	PUMPED VOLUME (GALLONS)	PUMPING RATE (GPM)	COMMENTS
			DRILL PIPE (FEET)	ANNULUS (FEET)					
6/5	1855	0	19.30	5.90		8,719,500	NA	0	PUMP SET 160 FT BELOW DRILL PIPE
6/5	1853	0	19.20	5.80			NA		STARTED PUMP, WATER CLOUDY
6/5	1907	0			41,000		NA		STOPPPED DUE TO PUMP BREAKDOWN
6/5	1911	0	5.90				NA		PACKER P = 1,100 PSI
6/5	2111	0	3.50				NA		START NEW CENTRIFUGAL PUMP
6/5	2130	19	FLOWING		11,000	8,721,500	0		WITH 20 FT OF SUCTION LINE
6/5	2145	34	FLOWING		12,000	8,722,400	900		
6/5	2200	49	FLOWING		13,000	8,723,300	1,800		
6/5	2215	64	FLOWING		14,000	8,724,200	2,700		
6/5	2230	79	FLOWING		14,500	8,724,900	3,400	58	PACKER P = 1,100 PSI
6/5	2245	94	FLOWING	6.65	14,500	8,725,600	4,100		
6/5	2300	109	FLOWING		14,500	8,726,300	4,800		
6/5	2315	124	FLOWING		15,000	8,727,100	5,600		
6/5	2330	139	FLOWING		15,000	8,727,800	6,300		
6/5	2345	154	FLOWING		15,500	8,728,500	7,000		
6/5	2400	169	FLOWING	6.65	16,000	8,729,200	7,700		
6/6	15	184	FLOWING		15,500	8,730,000	8,500		
6/6	30	199	FLOWING		15,000	8,730,800	9,300		
6/6	45	214	FLOWING		16,000	8,731,500	10,000	61	
6/6	100	229	1.20		16,000	8,732,300	10,800		
6/6	115	244			17,000	8,733,100	11,600		
6/6	130	259			17,000	8,733,800	12,300		PACKER P = 1,100 PSI
6/6	145	274	1.57	6.05	18,000	8,734,500	13,000		
6/6	200	289	1.80		17,000	8,735,300	13,800		
6/6	215	304			17,500	8,736,100	14,600		
6/6	230	319			18,000	8,736,900	15,400		
6/6	245	334	2.15		18,500	8,737,700	16,200	58	
6/6	300	349			18,000	8,738,400	16,900		
6/6	315	364	2.30		18,500	8,739,200	17,700		
6/6	330	379			18,000	8,740,000	18,500		
6/6	345	394	2.50	5.40	18,500	8,740,700	19,200		
6/6	400	409	2.72	5.34	18,000	8,741,500	20,000		
6/6	415	424	2.76	5.20	18,000	8,742,300	20,800		
6/6	430	439	2.90	5.15	18,500	8,743,000	21,500		
6/6	445	454	2.92	5.16	18,500	8,743,800	22,300		PACKER P = 1,100 PSI
6/6	500	469	2.97	5.10	18,500	8,744,700	23,200		STOP PUMP
6/6	502	471	1.25	5.00					
6/6	600	529	0.75	4.75					
6/6	635	564	0.8	4.40					

Notes:

- 1) Straddle Packer Interval (1,737 feet to 1,759 feet)
- 2) Data collected by B. Ziegler and P. Linton.
- 3) Measuring point for drill pipe was 14.13 ft above pad.
- 4) Measuring point for annulus was 6.3 ft above pad.

PROJECT: BOYNTON BEACH DISPOSAL WELL
 PROJECT NO.: SEF26410.P1
 DATE: JUNE 6, 1991
 COMPILED BY: PAUL LINTON
 REVIEWED BY: BART ZIEGLER
 FILE: PACKER1WPACK1B.WK1

DESCRIPTION: PACKER TEST NO. 1 (1,737 TO 1,759 FT), PERFORM PUMPING TEST

DATE	TIME	D-TIME (HRS) (MINUTES)	DEPTH TO			ANNULUS (FEET)	CONDUCTIVITY (UMHOS/CM)	FLOW METER (GALLONS)	PUMPED VOLUME (GALLONS)	PUMPING RATE (GPM)	COMMENTS
			WATER, TOC	HERMIT	DRILL PIPE						
6/6	713	0	0.80	0	4.1	19,000	8,745,200	0	0	STARTED PUMP	
6/6	718	5				19,000				INSITU PROBE SET 20.0 FT BELOW	
6/6	723	10	4.50			19,000				TOP OF DRILL PIPE	
6/6	730	17	4.40	3.66		19,000	8,745,800	600	60	PACKER P = 1,100 PSI	
6/6	800	47		3.51	3.75	19,000	8,747,500	2,300			
6/6	815	62				20,000	8,748,500	3,300			
6/6	830	77				20,000	8,749,200	4,000			
6/6	845	92				20,000	8,750,000	4,800			
6/6	900	107	4.05	3.11	3.4	20,000	8,750,800	5,600	60	PACKER P = 1,100 PSI	
6/6	915	122				20,500	8,751,600	6,400			
6/6	930	137				-	8,752,400	7,200		SAMPLE SPILLED	
6/6	945	152				21,000	8,753,200	8,000			
6/6	1000	167	4.25	3.27	2.8	21,000	8,754,000	8,800			
6/6	1015	182				21,000	8,754,800	9,600	60	PACKER P = 1,100 PSI	
6/6	1030	197				21,000	8,756,600	11,400			
6/6	1045	212				21,500	8,756,400	11,200			
6/6	1100	227				-	8,757,200	12,000			
6/6	1115	242	4.25	3.37	2.1	21,500	8,758,000	12,800			
6/6	1117	244								STOPPED PUMP	
6/6	1215	302	1.85							COLLECTED RECOVERY DATA	

Notes:

- 1) Straddle Packer Interval (1,737 feet to 1,759 feet)
- 2) Data collected by Paul Linton.
- 3) Measuring point for drill pipe was 14.13 ft above pad.
- 4) Measuring point for annulus was 6.3 ft above pad.
- 5) Pump set 160 ft below top of drill pipe.

PROJECT: BOYNTON BEACH DISPOSAL WELL
 PROJECT NO.: SEF26410.P1
 DATE: JUNE 6, 1991
 COMPILED BY: PAUL LINTON
 REVIEWED BY: BART ZIEGLER
 FILE: PACKER11WPACK2A.WK1

DESCRIPTION: PACKER TEST NO. 2 (1,708 TO 1,729 FT), PURGE UNTIL NATIVE FORMATION WATERS PRESENT

DATE	TIME	D-TIME	DEPTH TO WATER, TOC	DRILL PIPE (FEET)	ANNULUS (FEET)	CONDUCTIVITY (UMHOS/CM)	FLOW METER (GALLONS)	TOTAL PUMPED VOLUME (GALLONS)	PUMPING RATE (GPM)	COMMENTS
6/6	2017	0	1.23	0.00			8,758,200	0	0	STARTED PUMP
6/6	2032	15	9.57	0.00		19,800	8,759,336	1,136	75.7	PACKER P ≈ 1,050 psi
6/6	2047	30				19,600				
6/6	2101	44	5.25	0.00		15,900	8,761,610	3,410	78.4	
6/6	2117	60	3.30	FLOWING		15,200	8,762,819	4,619	75.6	
6/6	2132	75				15,000				
6/6	2147	90				15,300				
6/6	2202	105	4.05	FLOWING		15,800	8,766,360	8,160	78.7	
6/6	2217	120				15,200				
6/6	2232	135				15,700				
6/6	2247	150	4.58	FLOWING		16,600	8,769,825	11,625	77.0	
6/6	2302	165				16,900				
6/6	2317	180	4.97	FLOWING		17,100	8,772,110	13,910	76.2	
6/6	2332	195	5.18	FLOWING		17,600	8,773,340	15,140	82.0	
6/6	2347	210				17,400				
6/7	2	225				17,900				
6/7	17	240	5.58	FLOWING		17,900	8,776,790	18,590	76.7	
6/7	32	255				18,200				
6/7	47	270	5.82	FLOWING		18,700	8,779,220	21,020	81.0	
6/7	102	285				18,800				
6/7	117	300	5.99	FLOWING		18,900	8,781,632	23,432	80.4	
6/7	132	315	6.05	FLOWING		18,900	8,782,843	24,643	80.7	STOPPED PUMP
6/7	147	330	0.40	FLOWING		N/A	8,782,843	24,643	0.0	COLLECT RECOVERY DATA
6/7	202	345	0.34	FLOWING		N/A	8,782,843	24,643	0.0	
6/7	217	360	0.31	FLOWING		N/A	8,782,843	24,643	0.0	
6/7	232	375	0.30	FLOWING		N/A	8,782,843	24,643	0.0	
6/7	247	390				N/A	8,782,843	24,643	0.0	
6/7	302	405				N/A	8,782,843	24,643	0.0	

Notes:

- 1) Straddle Packer Interval (1,708 feet to 1,729 feet)
- 2) Data collected by Rick Olson.
- 3) Measuring point for drill pipe was 15.65 ft above pad.
- 4) Measuring point for annulus was 6.3 ft above pad.

PROJECT: BOYNTON BEACH DISPOSAL WELL
 PROJECT NO.: SEF28410.P1
 DATE: JUNE 7, 1991
 COMPILED BY: BART ZIEGLER
 REVIEWED BY: ALBERT MUNIZ
 FILE: PACKER\IWPACK2B.WK1

DESCRIPTION: PACKER TEST NO. 2 (1,708 TO 1,729 FT), PERFORM PUMPING TEST

DATE	TIME	D-TIME	DEPTH TO WATER, TOC DRILL PIPE	HERMIT READING	ANNULUS	CONDUCTIVITY	FLOW METER	PUMPED VOLUME	PUMPING RATE	COMMENTS
	(HRS)	(MINUTES)	(FEET)		(FEET)	(UMHOS/CM)	(GALLONS)	(GALLONS)	(GPM)	
6/7	345	0	0.10	19.98	LOWING		8,782,900	0	0	STARTED PUMP
6/7	400	15	6.75	13.07	LOWING	18,000	8,784,000	1,100	73	INSITU PROBE SET 20.0 FT BELOW
6/7	415	30			FLOWING	18,000	8,785,300	2,400	87	TOP OF DRILL PIPE
6/7	430	45			FLOWING	18,000	8,786,500	3,800	80	PACKER P = 1,020 PSI
6/7	445	60			FLOWING	18,200	8,787,900	5,000	93	
6/7	500	75			FLOWING	18,500	8,789,000	6,100	73	
6/7	515	90			FLOWING	18,500	8,790,300	7,400	87	
6/7	530	105			FLOWING	18,500	8,791,500	8,600	80	
6/7	545	120			FLOWING	19,000	8,792,800	9,900	87	PACKER P = 1,020 PSI
6/7	600	135	7.20	12.96	LOWING	19,500	8,794,100	11,200	87	Q = 83 gpm
6/7	615	150			FLOWING	19,000	8,795,400	12,500	87	
	630	165			FLOWING	18,500	8,796,400	13,500	67	
	645	180			FLOWING	19,000	8,797,600	14,700	80	
	700	195	7.35	12.79	LOWING	19,000	8,799,000	16,100	93	PACKER P = 1,020 PSI
6/7	715	210			FLOWING	19,000	8,800,300	17,400	87	Q = 85 gpm
6/7	730	225			FLOWING	19,200	8,801,400	18,500	73	
6/7	745	240			FLOWING	19,200	8,802,700	19,800	87	
6/7	800	255			FLOWING	20,000	8,803,900	21,000	80	
6/7	815	270	7.30	12.91	LOWING	20,000	8,805,100	22,200	80	
6/7	823	278			FLOWING		8,805,800	22,900	88	STOPPED PUMP
6/7	833	288	1.25	18.91	LOWING					COLLECT RECOVERY DATA

Notes:

- 1) Straddle Packer Interval (1,708 feet to 1,729 feet)
- 2) Data collected by Bart Ziegler.
- 3) Measuring point for drill pipe was 13.33 ft above pad.
- 4) Measuring point for annulus was 6.3 ft above pad.
- 5) Pump set 160 ft below top of drill pipe.

PROJECT: BOYNTON BEACH DISPOSAL WELL
 PROJECT NO.: SEF28410.P1
 DATE: JUNE 7, 1991
 COMPILED BY: PAUL LINTON
 REVIEWED BY: BART ZIEGLER
 FILE: PACKER\IWPACK3A.WK1

DESCRIPTION: PACKER TEST NO. 3 (1,608 TO 1,629 FT), PURGE UNTIL NATIVE FORMATION WATERS PRESENT

DATE	TIME (HRS)	D-TIME (MINUTES)	DEPTH BELOW		PUMPING RATE (GPM)	COMMENTS
			TOC DRILL PIPE (FEET)	CONDUCTIVITY (UMHOS/CM)		
6/7	1540	0				STARTED PUMPS
6/7	1542	2		9,000		PACKER PRESSURE = 1,050 psi
6/7	1602	22		9,300		FLOW METER = 8,805,800
6/7	1620	40		16,240		
6/7	1628	48		16,800		
6/7	1630	50		17,000		
6/7	1645	65		17,100		
6/7	1700	80		17,100	56	STARTED TO RAIN
6/7	1730	110		17,000		
6/7	1811	151		16,500		
6/7	1830	170		16,000		
6/7	1900	200		16,100		
6/7	1930	230		15,900		STOPPED PUMP
6/7	2000	260		15,900		COLLECT RECOVERY DATA
6/7	2030	290		15,900	56	
6/7	2038	298	0.95			MEASUREMENTS TO M-SCOPE
6/7	2040	300	0.95			MEASUREMENTS
6/7	2045	305	0.93			
6/7	2050	310	0.89			
6/7	2055	315	0.89			
6/7	2100	320	0.87			
6/7	2110	330	0.85			
6/7	2120	340	0.85			
6/7	2130	350	0.85			

Notes:

- 1) Straddle Packer Interval (1,608 feet to 1,629 feet)
- 2) Data collected by Dave Snyder.
- 3) Measuring point for drill pipe was 19.6 ft above pad.
- 4) Measuring point for annulus was 6.3 ft above pad.

PROJECT: BOYNTON BEACH DISPOSAL WELL
 PROJECT NO.: SEF26410.P1
 DATE: JUNE 7, 1991
 COMPILED BY: PAUL LINTON
 REVIEWED BY: BART ZIEGLER
 FILE: PACKER\PACK3B.WK1

DESCRIPTION: PACKER TEST NO. 3 (1,608 TO 1,629 FT), PERFORM PUMPING TEST

DATE	TIME	D-TIME (HRS) (MINUTES)	DEPTH BELOW		PUMPING RATE (GPM)	COMMENTS
			TOC DRILL PIPE (FEET)	CONDUCTIVITY (UMHOS/CM)		
6/7	2132	0	10.25	15,100	0	STARTED PUMP
6/7	2134	2	9.97			INSITU PROBE SET 20.0 FT BELOW
6/7	2136	4	10.00			TOP OF DRILL PIPE
6/7	2138	6	10.30		66	PACKER P = 1,100 PSI
6/7	2140	8	10.30			
6/7	2145	13	10.30	15,300		
6/7	2200	28	10.28	15,600		
6/7	2215	43	9.94	15,200		
6/7	2230	58	9.87	15,100	60	SAMPLED FOR LABORATORY ANALYSIS
6/7	2245	73	9.71	15,200		STOPPED PUMP
6/7	2247	75	0.97			COLLECTED RECOVERY DATA
6/7	2249	77	1.00			
6/7	2251	79	0.98			
6/7	2253	81	0.98			
6/7	2255	83	0.95			
6/7	2300	88	0.90			
6/7	2305	93	0.87			
6/7	2310	98	0.88			
	2315	103	0.87			

Notes:

- 1) Straddle Packer Interval (1,608 feet to 1,629 feet)
- 2) Data collected by David Snyder.
- 3) Measuring point for drill pipe was 9.6 feet above rotary table.
- 4) Measuring point for drill pipe was 19.6 feet above pad.
- 5) Measuring point for annulus was 6.3 ft above pad.

PROJECT: BOYNTON BEACH DISPOSAL WELL
 PROJECT NO.: SEF28410.P1
 DATE: JUNE 8, 1991
 COMPILED BY: PAUL LINTON
 REVIEWED BY: BART ZIEGLER
 FILE: PACKERIWPACK4A.WK1

DESCRIPTION: PACKER TEST NO. 4 (1,428 TO 1,449 FT), PURGE UNTIL NATIVE FORMATION WATERS PRESENT

DATE	TIME (HRS)	D-TIME (MINUTES)	DEPTH BELOW		PUMPING RATE (GPM)	COMMENTS
			TOC DRILL PIPE (FEET)	CONDUCTIVITY (UMHOS/CM)		
6/8	900	0			75	STARTED PUMP
6/8	902	2	7.20	12,300		PACKER P = 800 psi
6/8	904	4	5.70			
6/8	906	6				
6/8	907	7	4.80			
6/8	911	11	3.85			
6/8	915	15	2.70	15,000		
6/8	930	30		7,000	75	WATER LEVEL ABOVE TOP OF DRILL PIPE
6/8	943	43	10.55	7,000		
6/8	1000	60	10.65	7,000		
6/8	1030	90	10.85	7,000		
6/8	1100	120	11.30	7,000		
6/8	1130	150	11.40	7,000		
6/8	1200	180	11.38	7,000		
6/8	1200	180			75	STOPPED PUMP
6/8	1202	182	15.50			RECORDED RECOVERY DATA
6/8	1204	184	15.35			
6/8	1206	186	15.36			
6/8	1208	188	15.35			
6/8	1210	190	15.36			
6/8	1215	195	15.38			
6/8	1230	210	15.36			
6/8	1300	240	15.38			

Notes:

- 1) Straddle Packer Interval (1,428 feet to 1,449 feet)
- 2) Data collected by Rick Olson.
- 3) Measuring point for drill pipe was 19.8 ft above pad.
- 4) Measuring point for annulus was 6.3 ft above pad.

PROJECT: BOYNTON BEACH DISPOSAL WELL
 PROJECT NO.: SEF28410.P1
 DATE: JUNE 8, 1991
 COMPILED BY: PAUL LINTON
 REVIEWED BY: BART ZIEGLER
 FILE: PACKER\PACK4B.WK1

DESCRIPTION: PACKER TEST NO. 4 (1,428 TO 1,449 FT), PERFORM PUMPING TEST

DATE	TIME	D-TIME (HRS) (MINUTES)	DEPTH BELOW		CONDUCTIVITY (UMHOS/CM)	PUMPING RATE (GPM)	COMMENTS
			TOC	DRILL PIPE (FEET)			
6/8	1300	0				0	STARTED PUMP
6/8	1302	2	11.02		7,500		INSITU PROBE SET 20.0 FT BELOW
6/8	1315	15	11.15		7,200		TOP OF DRILL PIPE
6/8	1330	30	11.35		7,200	75	PACKER P = 800 PSI
6/8	1345	45	11.35		7,200		
6/8	1400	60	11.40		7,200		
6/8	1415	75	11.55		7,100		
6/8	1430	90	11.59		7,000		
6/8	1445	105	11.53		7,000	75	
6/8	1500	120	11.62		7,200		
6/8	1415	75	11.65		7,200		
6/8	1530	150	11.66		7,200		
6/8	1545	165	11.67		7,200		SAMPLED FOR LABORATORY ANALYSIS
6/8	1600	180	11.70		7,100	75	STOPPED PUMP
6/8	1600	180					
6/8	1605	185	15.40				WATER LEVEL ABOVE TO OF DRILL PIPE

Notes:

- 1) Straddle Packer Interval (1,448 feet to 1,449 feet)
- 2) Data collected by David Snyder.
- 3) Measuring point for drill pipe was 9.7 feet above rotary table.
- 4) Measuring point for drill pipe was 19.7 feet above pad.
- 5) Measuring point for annulus was 6.3 ft above pad.

Boynton Beach	CH2MHILL
Attention: Albert Muniz/DFB Address: DFB Copies to: Bart Ziegler/DFB	Project No: SEF24610.P1.40 Received: 06/14/91 Reported: 06/26/91
Collected: 06/08/91 by Paul Linton Type: water Location: Packer Test	

SAMPLE NUMBER	96063	96064	96065	96066	96067
SAMPLE DESCRIPTIONS	Packer Test #1 Sta. 1737 6/5/91	Packer Test #2 Sta. 1708 6/6/91	Packer Test #3 Sta. 1608 6/7/91	Packer Test #4 Sta. 1428 6/8/91	Travel Blank
GENERAL					
pH (Units)	7.30 06/14/91	7.30 06/14/91	7.35 06/14/91	7.50 06/14/91	n/r
Alkalinity, Phenolphthalein	<1.0 06/18/91	<1.0 06/18/91	<1.0 06/18/91	<1.0 06/18/91	n/r
Alkalinity, Total (as CaCO3)	158 06/18/91	134 06/18/91	148 06/18/91	140 06/18/91	n/r
Carbon Dioxide (free)	15.4 06/25/91	13.0 06/25/91	12.8 06/25/91	8.7 06/25/91	n/r
Color (APHA)	60 06/14/91	70 06/14/91	55 06/14/91	25 06/14/91	n/r
Conductivity (umhos/cm)	24,000 06/19/91	22,900 06/19/91	18,200 06/19/91	8450 06/19/91	n/r
Hardness, Calcium (as CaCO3)	765 06/19/91	666 06/19/91	650 06/19/91	430 06/19/91	n/r
Bicarbonate (as HCO3)	193 06/24/91	163 06/24/91	180 06/24/91	171 06/24/91	n/r
Hardness, NonCarbonate (as CaC)	2940 06/18/91	2670 06/18/91	2170 06/18/91	990 06/18/91	n/r
Hardness, Total (as CaCO3)	3100	2800	2320	1130	n/r

NOTE: Values are mg/l as substance unless otherwise stated.

Respectfully submitted,


Ward Dickens, Laboratory Manager

n/r = not requested

NOTE: This report contains test data and no interpretation is intended or implied.



Engineers
Planners
Economists
Scientists

REPORT OF ANALYSIS

Florida Certification: 82112; E82124.

AAE68

06/26/91

Page 2 of 4

Sample Nos: 96063 - 96066

SAMPLE NUMBER	96063	96064	96065	96066	96067
SAMPLE DESCRIPTIONS	Packer Test #1 Sta. 1737 6/5/91	Packer Test #2 Sta. 1708 6/6/91	Packer Test #3 Sta. 1608 6/7/91	Packer Test #4 Sta. 1428 6/8/91	Travel Blank
Turbidity (NTU)	06/18/91 12	06/18/91 17	06/18/91 7.9	06/18/91 4.4	n/r
Odor (TON)	06/14/91 1.1	06/14/91 N.O.0	06/14/91 1.3	06/14/91 1.0	n/r
Carbonate (as CO3=)	06/14/91 <1.0	06/14/91 <1.0	06/14/91 <1.0	06/14/91 <1.0	n/r
Hydroxides (OH-)	06/24/91 <1.0	06/24/91 <1.0	06/24/91 <1.0	06/24/91 <1.0	n/r
SOLIDS					
Total Dissolved Solids	06/24/91 14,300	06/24/91 14,400	06/24/91 11,400	06/24/91 4880	n/r
METALS					
Calcium - FL	06/17/91 248	06/17/91 263	06/17/91 242	06/17/91 159	<1.0
Iron, Total - FL	06/24/91 1.6	06/24/91 1.8	06/24/91 1.8	06/24/91 0.81	06/24/91 <0.02
Magnesium - FL	06/23/91 433	06/23/91 460	06/23/91 386	06/23/91 175	06/23/91 <0.25
ANIONS					
Chloride	06/24/91 7710	06/24/91 7440	06/24/91 5810	06/24/91 2460	n/r
Fluoride	06/20/91 0.64	06/20/91 0.63	06/20/91 0.68	06/20/91 0.77	n/r
Sulfate	06/25/91 990	06/25/91 930	06/25/91 774	06/25/91 458	n/r
NUTRIENTS					
Nitrate & Nitrite (as N)	06/26/91 <0.02	06/26/91 <0.02	06/26/91 <0.02	06/26/91 <0.02	n/r

NOTE: Values are mg/l as substance unless otherwise stated.

Respectfully submitted,


Ward Dickens, Laboratory Manager

n/r = not requested

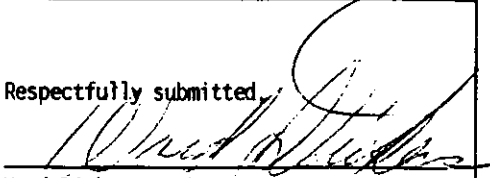
NOTE: This report contains test data and no interpretation is intended or implied.

Boynton Beach	C H 2 M H I L L
Attention: Albert Muniz/DFB Address: DFB Copies to: Bart Ziegler/DFB	Project No: SEF24610.P1.40 Received: 06/14/91 Reported: 06/26/91
Collected: 06/08/91 by Paul Linton Type: water Location: Packer Test	

SAMPLE NUMBER	96068
SAMPLE DESCRIPTIONS	Laboratory Method Blank
GENERAL	
pH (Units)	Not Applicable 06/14/91
Alkalinity, Phenolphthalein	<1.0 06/18/91
Alkalinity, Total (as CaCO3)	<1.0 06/18/91
Carbon Dioxide (free)	Not Applicable 06/25/91
Color (APHA)	0 06/14/91
Conductivity (umhos/cm)	<2.0 06/19/91
Hardness, Calcium (as CaCO3)	<1.0 06/19/91
Bicarbonate (as HCO3)	Not Applicable 06/24/91
Hardness, NonCarbonate (as CaC	Not Applicable 06/18/91
Hardness, Total (as CaCO3)	<1.0

NOTE: Values are mg/l as substance unless otherwise stated.

Respectfully submitted,


Ward Dickens, Laboratory Manager

n/r = not requested

NOTE: This report contains test data and no interpretation is intended or implied.

SAMPLE NUMBER	96068
SAMPLE DESCRIPTIONS	Laboratory Method Blank
	06/18/91
Turbidity (NTU)	<0.2
	06/14/91
Odor (TON)	N.O.O
	06/14/91
Carbonate (as CO3=)	Not Applicable
	06/24/91
Hydroxides (OH-)	Not Applicable
	06/24/91
SOLIDS	
Total Dissolved Solids	<1.0
	06/17/91
METALS	
Calcium - FL	<1.0
	06/24/91
Iron, Total - FL	<0.02
	06/23/91
Magnesium - FL	<0.25
	06/24/91
ANIONS	
Chloride	<1.0
	06/20/91
Fluoride	<0.01
	06/25/91
Sulfate	<1.0
	06/26/91
NUTRIENTS	
Nitrate & Nitrite (as N)	<0.02
	06/24/91

NOTE: Values are mg/l as substance unless otherwise stated.

Respectfully submitted,


 Ward Dickens, Laboratory Manager

n/r = not requested

NOTE: This report contains test data and no interpretation is intended or implied.

CH2M HILL QUALITY ANALYTICS

CHAIN OF CUSTODY RECORD

PROJECT NUMBER SEF 24610.P1.40		PROJECT NAME BOWLING GREEN DIW		CLIENT ADDRESS AND PHONE NUMBER										FOR LAB USE ONLY				
CLIENT NAME														LAB# AAE 680				
PROJECT MANAGER ALBERTO MUNIZ/DFB		COPY TO: BARI ZIEGLER/DFB		ANALYSES REQUESTED										LAB ID				
REQUESTED COMP. DATE Std.		SAMPLING REQUIREMENTS		<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);"># OF CONTAINERS</div> <div style="display: flex; flex-direction: column; gap: 5px;"> Color, Fe Odor, Turb TH, Carb Heav Non-Carb Heav, TDS PAEK, ALK, CO2 HCO3, CO3, OH Cond, pH, CaH NO23 Fe, Ca, Mg </div> </div>													LAB# PROJECT NO. ACK VERIFIED QUOTE# BS NO. OF SAMP PG OF REMARKS	
STA NO.	DATE	TIME	COMP											GRA	SOIL	SAMPLE DESCRIPTIONS (12 CHARACTERS)		
1737	6/5					3	X	X	X	X	X	X	X	X	X	X	96063	metals fractions arrived at LGN pH=7. HCO3 added in lab 6/14/91 Color, Odor, Turb, pH all DOA. TDS on #96063-65 DOA.
1708	6/6					3	X	X	X	X	X	X	X	X	X	X	64	
1608	6/7					3	X	X	X	X	X	X	X	X	X	X	65	
1429	6/8					3	X	X	X	X	X	X	X	X	X	X	66	
						1											67	
SAMPLED BY AND TITLE PAUL LINTON		DATE/TIME 6/5-6/9/91		RELINQUISHED BY P.H. Yoo				DATE/TIME 6/13/91				HAZWRAP/NEESA Y <input checked="" type="checkbox"/> N <input type="checkbox"/>						
RECEIVED BY: [Signature]		DATE/TIME 6/13/91/3:45 P.M.		RELINQUISHED BY: [Signature]				DATE/TIME 6/13/91/4:30 P.M.				QC LEVEL 1 <input checked="" type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/>						
RECEIVED BY		DATE/TIME		REINQUISHED BY				DATE/TIME				COC <input checked="" type="checkbox"/>						
RECEIVED BY LAB: M Morgan		DATE/TIME 6-14-91 1445		SAMPLE SHIPPED VIA UPS BUS <input checked="" type="checkbox"/> FED-EX <input type="checkbox"/> HAND <input type="checkbox"/> OTHER <input type="checkbox"/>				AIR BILL# 7195768296				ICE <input checked="" type="checkbox"/>						
REMARKS												TEMP <input checked="" type="checkbox"/>						
												CUST SEAL <input checked="" type="checkbox"/> Ph <input checked="" type="checkbox"/>						
												SAMPLE COND. good						
												ENTERED INTO LIMS _____ COC REVIEWE _____						

Concentrate Disposal Well Core Data



Ardaman & Associates, Inc.

BOYNTON BEACH CONCENTRATE
DISPOSAL WELL
SEF 26410. P1
RECEIVED 9/8/91

Consultants in Soils, Hydrogeology,
Foundations and Materials Testing

File Number 91-127
September 3, 1991

Youngquist Brothers, Inc.
15000 Pine Ridge Road
Ft. Myers, Florida 33908

Attn: Mr. Don Douglas

Subject: Geotechnical Laboratory Test Results

Gentlemen:

As requested, the six core samples you provided us were tested to determine the vertical and horizontal hydraulic conductivity and porosity.

The permeability test specimens were subcored and trimmed from the rock cores to a length between 6.5 and 8.2 cm and a diameter of 3.3 cm. Each specimen was placed within a flexible latex membrane, and mounted in a triaxial-type permeameter. An isotropic effective confining stress of at least 6 lbs/in² was applied. Each specimen was permeated with deaired water under a backpressure of more than 90 lb/in². The specimens were permeated using a net hydraulic head across the specimen ranging between 50 and 1000 cm of water. The inflow to and outflow from each specimen were monitored with time, and the coefficient of permeability calculated for each recorded flow increment. Each test was continued until steady-state flow was achieved, (as evidenced by an outflow/inflow ratio between 0.75 and 1.25 for each increment), and until stable values of the coefficient of permeability were measured. The porosity was calculated from the dry density and the estimated specific gravity. A specific gravity of 2.70 was selected except for the cores with dry densities greater than 150 pcf where a specific gravity of 2.80 was used.

Core Number*	Depth (ft)	Initial/Final Moisture Content (%)	Final Dry Density (pcf)	Coefficient of Permeability (cm/sec)	Porosity
1-V	2137.5-2138.5	12.3/12.2	125.0	7.9x10 ⁻⁶	0.26
1-H	2137.5-2138.5	12.2/12.3	125.3	1.5x10 ⁻⁵	0.26
2-V	2204.1-2204.5	2.7/2.7	160.4	6.6x10 ⁻⁹	0.08
2-H	2204.1-2204.5	2.7/2.8	162.0	2.5x10 ⁻⁹	0.07
3-V	2361.8-2362.7	14.4/14.7	120.0	3.4x10 ⁻⁵	0.29
3-H	2361.8-2362.7	14.0/14.2	121.2	4.5x10 ⁻⁵	0.28


<u>Core Number*</u>	<u>Depth (ft)</u>	<u>Initial/Final Moisture Content (%)</u>	<u>Final Dry Density (pcf)</u>	<u>Coefficient of Permeability (cm/sec)</u>	<u>Porosity</u>
4-V	2416.3-2416.9	13.1/15.9	109.5	2.6×10^{-5}	0.35
4-H	2416.3-2416.9	14.0/15.9	112.8	1.9×10^{-5}	0.33
5-V	2448.5-2449.0	13.0/16.4	114.2	2.7×10^{-5}	0.32
5-H	2448.5-2449.0	13.5/14.8	119.1	1.2×10^{-5}	0.29
6-H**	2653.0-2653.5	1.7/2.0	166.3	1.2×10^{-7}	0.05


* V= vertical orientation, H= horizontal orientation

** Testing on core number 6-V in progress

It has been a pleasure assisting you with this test program. If you have any questions or if you require additional testing, please contact us.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.


Jan C. Wildman
Manager of Technical Services


Nadim F. Fuleihan
Principal
Florida Registration No. 31953

CORE #1
(2,130-2,147 feet)

CORE LITHOLOGY
100% RECOVERY

2,130-2,131	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,131-2,132	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,132-2,133	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,133-2,134	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,134-2,135	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,135-2,136	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,136-2,137	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,137-2,138	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,138-2,139	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,139-2,140	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,140-2,414	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,141-2,142	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.

2,142-2,143	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,143-2,144	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,144-2,145	Biomicritic fossiliferous limestone; very pale orange (10YR8/2); trace foraminifera; shell fragments; fragmented; trace small solution cavities; moderately soft.
2,145-2,146	Biomicritic fossiliferous limestone; very pale orange (10YR8/2); trace foraminifera; shell fragments; fragmented; trace small solution cavities; moderately soft.
2,146-2,147	Biomicritic fossiliferous limestone; very pale orange (10YR8/2); trace foraminifera; soft.
<p>Notes:</p> <p>Rock classification referenced from:</p> <p>Swanson, R.G. <i>Sample Examination Manual, Shell Oil Company Exploration Training</i>, The American Association of Petroleum Geologists. 1981.</p> <p>Goddard, E.N., Trask, P., Ford, R., Rose, O. <i>Rock-Color Chart</i>. Geological Society of America. 1984.</p> <p>Rock descriptions conducted by Doug VanNote, CH2M HILL.</p>	

Core #2
(2,200-2,214 feet)

CORE LITHOLOGY
50% RECOVERY

2,200-2,201	Dolomite; grayish orange (10YR7/4) to dark yellowish brown (10YR4/2); crystalline; sucrosic texture; porous; very hard.
2,201-2,202	Dolomite; grayish orange (10YR7/4) to dark yellowish brown (10YR4/2); slightly crystalline; vuggy and sucrosic texture; porous, very hard.
2,202-2,203	Dolomite; pale yellowish brown (10YR6/2) to dark yellowish brown (10YR4/2); slightly porous; vuggy texture; crystalline; very hard.
2,203-2,204	Dolomite; pale yellowish brown (10YR6/2) to dark yellowish brown (10YR4/2); slightly porous; vuggy texture; crystalline; very hard.
2,204-2,205	Dolomite; pale yellowish brown (10YR6/2) to dark yellowish brown (10YR4/2); slightly porous; vuggy texture; crystalline; very hard.
2,205-2,206	Dolomite; pale yellowish brown (10YR6/2) to dark yellowish brown (10YR4/2) to dusky yellowish brown (10YR2/2); slightly porous; vuggy texture; crystalline; very hard.
2,206-2,207	Dolomite; pale yellowish brown (10YR6/2) to dark yellowish brown (10YR4/2) to dusky yellowish brown (10YR2/2); slightly porous; vuggy texture; crystalline; very hard.
<p>Notes:</p> <p>Rock classification referenced from:</p> <p>Swanson, R.G. <i>Sample Examination Manual, Shell Oil Company Exploration Training</i>, The American Association of Petroleum Geologists. 1981.</p> <p>Goddard, E.N., Trask, P., Ford, R., Rose, O. <i>Rock-Color Chart</i>. Geological Society of America. 1984.</p> <p>Rock descriptions conducted by Doug VanNote, CH2M HILL.</p>	

Core #3
(2,351-2,365 feet)

CORE LITHOLOGY
100% RECOVERY

2,351-2,312	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1); abundant foraminifera; moderately hard.
2,372-2,353	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1); abundant foraminifera; moderately hard.
2,353-2,354	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1); abundant foraminifera; moderately hard.
2,354-2,355	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1); abundant foraminifera; moderately hard.
2,355-2,356	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); abundant shellcasts; trace foraminifera; moderately hard.
2,356-2,357	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace shellcasts; trace foraminifera; moderately hard.
2,357-2,358	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace shellcasts; trace foraminifera; moderately hard.
2,358-2,359	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace shell casts; trace foraminifera; moderately hard.
2,359-2,360	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace shellcasts; trace foraminifera; moderately hard.
2,360-2,361	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace shellcasts; trace foraminifera; moderately hard.
2,361-2,362	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace shellcasts; trace foraminifera; moderately hard.
2,362-2,363	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace shellcasts; trace foraminifera; moderately hard.
2,363-2,364	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace shellcasts; trace foraminifera; moderately hard.

2,364-2,365	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace shellcasts; trace foraminifera; moderately hard.
<p>Notes:</p> <p>Rock classification referenced from:</p> <p>Swanson, R.G. <i>Sample Examination Manual, Shell Oil Company Exploration Training</i>, The American Association of Petroleum Geologists. 1981.</p> <p>Goddard, E.N., Trask, P., Ford, R., Rose, O. <i>Rock-Color Chart</i>. Geological Society of America. 1984.</p> <p>Rock descriptions conducted by Doug VanNote, CH2M HILL.</p>	

Core #4
(2,411-2,426 feet)

CORE LITHOLOGY
100% RECOVERY

2,411-2,412	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2) to white (N9); trace micro-fossils; hard.
2,412-2,413	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2) to white (N9); trace micro-fossils; hard.
2,413-2,414	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2) to white (N9); trace micro-fossils; hard.
2,414-2,415	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
2,415-2,416	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
2,416-2,417	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
2,417-2,418	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
2,418-2,419	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
2,419-2,420	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
2,420-2,421	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
2,421-2,422	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
2,422-2,423	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
2,423-2,424	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
2,424-2,425	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.

2,425-2,426	Biomicritic fossiliferous limestone; yellowish gray (5YR7/2); trace micro-fossils; hard.
<p>Notes:</p> <p>Rock classification referenced from:</p> <p>Swanson, R.G. <i>Sample Examination Manual, Shell Oil Company Exploration Training</i>, The American Association of Petroleum Geologists. 1981.</p> <p>Goddard, E.N., Trask, P., Ford, R., Rose, O. <i>Rock-Color Chart</i>. Geological Society of America. 1984.</p> <p>Rock descriptions conducted by Doug VanNote, CH2M HILL.</p>	

Core #5
(2,441-2,456 feet)

CORE LITHOLOGY
80% RECOVERY

2,441-2,442	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,442-2,443	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,443-2,444	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,444-2,445	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,445-2,446	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,446-2,447	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,447-2,448	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,448-2,449	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,449-2,450	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,450-2,451	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
2,451-2,452	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.

2,452-2,453	Biomicritic fossiliferous limestone; yellowish gray (5Y8/1) to very pale orange (10YR8/2); trace foraminifera, moderately hard.
<p>Notes:</p> <p>Rock classification referenced from:</p> <p>Swanson, R.G. <i>Sample Examination Manual, Shell Oil Company Exploration Training</i>, The American Association of Petroleum Geologists. 1981.</p> <p>Goddard, E.N., Trask, P., Ford, R., Rose, O. <i>Rock-Color Chart</i>. Geological Society of America. 1984.</p> <p>Rock descriptions conducted by Doug VanNote, CH2M HILL.</p>	

Core #6
(2,651-2661 feet)

CORE LITHOLOGY
25% RECOVERY

2,651-2,652	Dolomite; dark yellowish brown (10YR4/2); slightly crystalline; slightly vuggy texture; very hard.
2,652-2,653	Dolomite; dark yellowish brown (10YR4/2); slightly crystalline; very hard.
2,653-2,653.5	Dolomite; dark yellowish brown (10YR4/2); slightly vuggy texture; slightly crystalline; very hard.
<p>Notes:</p> <p>Rock classification referenced from:</p> <p>Swanson, R.G. <i>Sample Examination Manual, Shell Oil Company Exploration Training</i>, The American Association of Petroleum Geologists. 1981.</p> <p>Goddard, E.N., Trask, P., Ford, R., Rose, O. <i>Rock-Color Chart</i>. Geological Society of America. 1984.</p> <p>Rock descriptions conducted by Doug VanNote, CH2M HILL.</p>	

**Concentrate Disposal Well
Pilot Hole Water Quality Data**

Water Quality Data from Pilot Hole Drilling

Date	Time (Hrs.)	Depth (feet)	Temp. (C)	Specific Cond. (umhos/cm)	Chloride (mg/l)	Remarks	By
05/27/91	2320	996	23	1.100	1.850	Sample Very Cloudy From Drilling Fluids	DGS
05/28/91	0035	1,026	20	850	2.900	"	DGS
05/28/91	0200	1,056	20	910	1.490	"	DGS
05/28/91	0315	1,086	20	930	1.900	"	DGS
05/28/91	0425	1,116	21	820	2.500	"	DGS
05/28/91	0540	1,146	20	930	2.830	"	DGS
05/28/91	0650	1,177	20	920	2.250	"	DGS
05/28/91	0725	1,207	21	1.180	1.950	"	DGS
05/28/91	0850	1,237	20	1.220	1.900	Sample Cloudy From Drilling Fluids	DGS
05/28/91	1140	1,267	21	1.180	2.950	"	DGS
05/28/91	1310	1,297	21	1.180	2.950	"	DGS
05/28/91	1510	1,327	20	1.100	2.050	"	DGS
05/28/91	1655	1,357	20	1.100	2.600	"	DGS
05/28/91	1700	1,387	21	1.100	1.600	Sample Very Cloudy From Drilling Fluids	DGS
05/28/91	1840	1,417	21	1.100	1.600	"	DGS
05/28/91	2035	1,447	21	1.100	1.490	"	DGS
05/29/91	0125	1,477	21	1.080	2.300	"	DGS
05/29/91	0430	1,507	21	5.300	3.000	"	DGS
05/29/91	0700	1,537	21	5.500	3.590	"	DGS
05/29/91	1530	1,567	21	6.300	3.300	"	DGS
05/29/91	1830	1,598	21	7.100	3.800	"	DGS
05/30/91	0430	1,628	23	7.500	4.300	Sample Clear With Moderate Suspended Solids	DGS
05/30/91	0830	1,658	23	8.000	5.650	"	DGS
05/30/91	2040	1,688	20	8.100	4.900	"	DGS
05/30/91	2305	1,718	24	9.000	4.700	"	DGS
05/31/91	0250	1,748	24	9.100	4.850	"	DGS
05/31/91	0650	1,778	21	17.600	8.550	"	DGS
05/31/91	NA	1.800	NA	NA	NA	Water Sample Lost	DGS

Water Quality Data from Pilot Hole Drilling

Date	Time (Hrs.)	Depth (feet)	Temp. (C)	Specific Cond. (umhos/cm)	Chloride (mg/l)	Remarks	By
05/31/91	1400	1,838	28	42,000	15,800	Sample Clear With Moderate Suspended Solids	DGS
05/31/91	1730	1,868	28	39,700	16,200	"	DGS
06/01/91	0930	1,898	28	44,000	19,300	"	DGS
06/01/91	1600	1,928	28	48,100	20,800	"	DGS
06/01/91	1900	1,958	24	45,100	20,100	"	DGS
06/01/91	2115	1,988	24	48,200	20,800	"	DGS
06/01/98	2310	2,018	24	43,000	19,500	"	DGS
06/02/91	0100	2,048	24	45,200	19,600	"	DGS
06/02/91	0325	2,078	24	46,500	20,300	"	DGS
06/02/91	0530	2,110	24	44,900	19,900	"	DGS
07/13/91	0920	2,140	21	16,000	7,747	Begin drilling below intermediate casing. Native formation waters are diluted from previous casing installation.	DGS
07/13/91	1125	2,170	21	21,500	7,120	"	DGS
07/14/91	0130	2,200	21	21,000	7,000	"	DGS
07/15/91	0230	2,231	21	20,500	7,950	"	DGS
07/15/91	0400	2,261	21	20,500	7,200	"	DGS
07/15/91	0625	2,290	25	19,500	7,850	"	DGS
07/15/91	0807	2,320	25	19,000	7,250	"	DGS
07/15/91		2,351	25	19,500	7,350	"	DGS
07/16/91		2,381	25	17,000	6,900	"	DGS
07/16/91	1220	2,411	25	17,500	6,800	"	DGS
07/17/91		2,441	21	18,000	6,900	"	DGS
07/19/91	0140	2,471	22	12,500	4,550	"	DGS
07/19/91	0320	2,501	23	14,000	5,450	"	DGS
07/19/91	0435	2,531	23	15,000	5,250	"	DGS
07/19/91	0615	2,561	23	14,500	5,000	"	DGS
07/19/91	0800	2,591	23	13,500	4,750	"	DGS
07/19/91	1030	2,621	23	13,500	5,850	"	PFL
07/19/91	1300	2,651	23	15,000	6,100	"	PFL

Water Quality Data from Pilot Hole Drilling

Date	Time (Hrs.)	Depth (feet)	Temp. (C)	Specific Cond. (umhos/cm)	Chloride (mg/l)	Remarks	By
07/20/91	1815	2.680	23	15.500	7,200	"	PFL
07/20/91	2057	2.712	23	27.500	12,450	"	PFL
07/21/91	0130	2.742	23	31.000	15,100	"	PFL
07/21/91	0530	2.772	23	33.500	19,200	"	PFL
07/21/91	0800	2.802	23	35.000	16,500	"	PFL
07/21/91	1111	2.831	23	36.000	18,500	"	PFL
07/21/91	2300	2.891	23	37.500	20,400	"	PFL
07/22/91	0400	2.921	23	40.000	20,600	"	PFL
07/22/91	0630	2.950	23	39.500	21,000	"	PFL
07/22/91	0937	2.981	23	39.000	19,000	"	PFL
07/22/91	1230	3.011	23	40.500	20,500	"	PFL
07/22/91	1530	3.041	23	31.000	13,912	"	PFL
07/22/91	1710	3.071	23	40.000	19,000	"	PFL
07/22/91	2030	1.310	23	41.000	19,800	"	PFL
07/23/91	0015	3.131	23	40.000	18,200	"	PFL
07/23/91	0500	3.161	23	40.000	19,300	"	PFL
07/23/91	0900	3.191	23	40.500	19,300	"	PFL
07/23/91	1150	3.220	23	41.000	20,000	"	PFL
07/23/91	1445	3.251	23	40.000	19,900	"	PFL
07/23/91	1830	3.281	23	41.000	18,200	"	PFL
07/23/91	2200	3.311	30	45.000	20,100	"	PFL

**Dual-Zone Monitor Well
Pilot Hole Water Data**

Dual Zone Monitor Well

Project No:
SEF26410.P1

Page 1 of 1

Water Quality Data from Pilot Hole Drilling

Date	Time (Hrs.)	Depth (feet)	Temp. (C)	Specific Cond. (umhos/cm)	Chloride (mg/l)	Remarks	By
08-05-91	2150	1.025	28	1.200	340	Sample fairly clear	PFL
08-06-91	1415	1.060	28	5,600	2,020	Clear sample	PFL
08-06-91	1600	1.090	27	5,500	1,950	Clear sample	PFL
08-06-91	1700	1.120	23	6,000	2,100	Clear sample	PFL
08-06-91	1805	1.150	23	6,300	1,950	Clear sample	PFL
08-06-91	1900	1.180	23	6,500	2,200	Clear sample	PFL
08-06-91	2015	1.214	23	6,000	2,050	Clear sample	PFL
08-06-91	2200	1.244	23	5,900	2,050	Clear sample	PFL
08-06-91	2255	1.274	23	6,000	2,000	Clear sample	PFL
08-07-91	0120	1.308	23	5,500	1,950	Clear sample	PFL
08-07-91	1330	1.339	23	6,500	2,150	Clear sample	PFL
08-07-91	1900	1.370	27	7,000	2,200	Clear sample	WBZ
08-14-91	0830	1.401	27	7,000	2,150	Clear sample	WBZ
08-14-91	1600	1.432	27	8,000	2,250	Clear sample	WBZ
08-15-91	0031	1.463	27	8,000	2,250	Clear sample	WBZ
08-15-91	1330	1.493	27	8,000	2,200	Clear sample	WBZ
08-15-91	1800	1.520	27	8,100	2,200	Clear sample	WBZ
08-15-91	2300	1.553	27	8,400	2,250	Clear sample	WBZ
08-16-91	0515	1.583	27	8,500	2,250	Clear sample	WBZ
08-16-91	0900	1.614	27	8,700	2,290	Clear sample	WBZ
08-16-91	1435	1.645	27	9,000	2,300	Clear sample	WBZ
08-16-91	1900	1.676	27	8,500	2,200	Clear sample	WBZ
08-17-91	2400	1.708	27	9,000	2,200	Clear sample	WBZ
08-17-91	0530	1.739	27	10,000	2,700	Clear sample	WBZ
08-17-91	1300	1.771	27	11,000	3,000	Clear sample	WBZ
08-17-91	2005	1.790	27	15,000	4,200	Clear sample	WBZ
08-17-91	2120	1.795	27	15,500	4,450	Clear sample	WBZ
08-18-91	1600	1.808	27	18,000	7,150	Sample collected after circulating for 7.5 hours	WBZ

Concentrate Disposal Well Deviation Surveys



DEVIATION SURVEY

WELL P1W

Date	Depth (ft)	Deviation (minutes)	Construction Activity
5/3/91	90	7.5	1 1/4 - INCH PILOT HOLE
5/4/91	180	15.0	"
5/4/91	270	15.0	"
5/7/91	90	15.0	4 1/2 - INCH REAMED HOLE
5/8/91	180	15.0	"
5/8/91	270	15.0	"
5/13/91	360	15.0	1 1/4 inch P. LOT hole
5/12/91	450	15.0	"
5/13/91	540	15.0	"
5/13/91	630	15.0	"
5/14/91	720	15.0	1 1/4 inch P. LOT hole
5/14/91	810	15.0	"
5/15/91	900	15.0	"
5/16/91	360	15.0	4 1/2 - INCH REAMED HOLE
5/17/91	450	20.0	"
5/18/91	540	15.0	"
5/19/91	630	15.0	"
5/19/91	720	15.0	"
5/19/91	810	7.5	"
5/19/91	900	7.5	"
5/28/91	990	7.5	1 1/4 - INCH PILOT HOLE
5/28/91	1080	7.5	"
5/28/91	1170	15.0	"
5/28/91	1260	15.0	"
5/28/91	1350	7.5	"
5/29/91	1440	15.0	"
5/29/91	1530	15.0	"
5/30/91	1620	15.0	1 1/4 inch P. LOT hole
5/31/91	710	15.0	"
5/31/91	800	15.0	"
6/1/91	890	7.5	"
6/1/91	980	7.5	"
6/2/91	1070	15.0	"
6/10/91	990	15.0	3 1/2 inch Reamed hole
6/11/91	1080	15.0	" "
6/14/91	1170	7.5	" "
6/12/91	1260	7.5	"

Reference point CONCRETE PADelevation 19.56 ft NGVD



DEVIATION SURVEY

WELL D1W

Date	Depth (ft)	Deviation (minutes)	Construction Activity
6/13/91	1350	15.0	3 1/2 inch reamed hole
6/14/91	1440	15.0	" "
6/15/91	1530	7.5	" "
6/16/91	1620	7.5	" "
6/19/91	1710	15.0	" "
6/21/91	1800	15.0	" "
6/23/91	1890	7.5	" "
7/12/91	1980	7.5	" "
7/24/91	2070	3.5	1 1/4 inch Pilot Hole
7/12/91	2160	15.0	" "
7/15/91	2250	15.0	" "
7/16/91	2340	7.5	" "
7/19/91	2430	7.5	" "
7/19/91	2520	15.0	" "
7/19/91	2610	15.0	" "
7/21/91	2700	15.0	" "
7/21/91	2790	15.0	" "
7/22/91	2880	7.5	" "
7/22/91	2970	7.5	" "
7/22/91	3060	15.0	" "
7/23/91	3150	7.5	" "
7/23/91	3240	7.5	" "
7/27/91	2070	15.0	2 1/2 INCH DIAMETER REAMED HOLE
7/27/91	2160	15.0	" "
7/27/91	2250	15.0	" "
7/27/91	2340	15.0	" "
7/27/91	2430	15.0	" "
7/27/91	2520	20.0	" "
8/21/91	2610	15.0	" "
8/21/91	2700	15.0	" "
9/1/91	2880 2790	7.5	1 1/2 INCH Reamed Hole
9/1/91	2970 2880	7.5	" "
9/1/91	2960 2970	7.5	" "
9/1/91	3060	15.0	" "
9/2/91	3150	7.5	" "
9/4/91	3240	7.5	" "

Reference point Concrete PADelevation 19.56 ft NGVD

Dual-Zone Monitor Well Deviation Surveys



DEVIATION SURVEY

WELL MW

Date	Depth (ft)	Deviation (minutes)	Construction Activity
6-30-91	70	9	BORE HOLE FOR FIRST CASING
6-30-91	120	15	" "
7-1-91	270	8	" "
7-9-91	540	15	PILOT HOLE FOR SECOND CASING BOREHOLE
7-9-91	630	15	" "
7-9-91	720	8	" "
7-9-91	810	15	" "
7-9-91	900	15	" "
7-9-91	990	15	" "
7-11-91	360	8	REAMED HOLE FOR SECOND CASING 22 1/2
7-11-91	+50	15	" "
7-11-91	540	15	" "
7-12-91	630	8	" "
7-12-91	600	15	" "
7-12-91	690	8	" "
7-12-91	780	15	" "
7-31-91	870	15	" "
7-31-91	960	10	" "
8-6-91	1080	20	14 1/2 inch diameter bore hole
8-6-91	1170	20	" "
8-7-91	1270	10	" "
8-12-91	1350	15	" "
8-15-91	1440	15	" "
8-15-91	1530	7.5	" "
8-16-91	1620	7.5	" "
8-17-91	1710	7.5	" "

Reference point Concrete P+D
 elevation 19.56 ft NGVD

Concentrate Disposal Well Gyroscopic Surveys

Concentrate Disposal Well Liner Torque Data

J.A.M SERVICES REPORT

JAM REPORT

Company : YOUNGQUIST BROTHERS

Lease : BOYNTON BEACH INJECTION WELL

Well # : IW-1

Pipe Desc. : 13 3/8 72# N-80 NJO

J.A.M SERVICES REPORT

Company : YOUNGQUEST BROTHERS
Service Ticket Number: 620167
Diskette I.D. Number: LAF #192
Lease : BOYNTON BEACH INJECTION WELL
Well Number : IW-1
Rig Name : YOUNGQUEST #1
Tong Model : W/FORD 16K
Customer Representative : JIM BRANTLEY
Pipe Condition : USED
Thread Lubricant : FRANKS API 106074
Computer #1 : LV-15 AT-58
Computer #2 : LV-15 AT-57
Technician #1 : STACY HANKS
Pipe representative : LESTER LABUFF
Torque information supplied by : BAKER

J.A.M SERVICES REPORT

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Technician #1 : STACY HANKS
Pipe representative : LESTER LABUFF
Torque information supplied by : BAKER

J.A.M SERVICES REPORT

Time Summary :

The following is a summary of the time spent on this job.

Departed Weatherford service point @ 06:00 (12-20-91) .

Arrived at the location / rig @ 17:00 (12-21-91) .

Started running pipe @ 07:00 (12-22-91) .

Finished running pipe @ 16:00 (12-22-91) .

Departed the location / rig @ 20:00 (12-22-91) .

Returned to the Weatherford service point @ 12:01 (12-24-91).

Remarks :

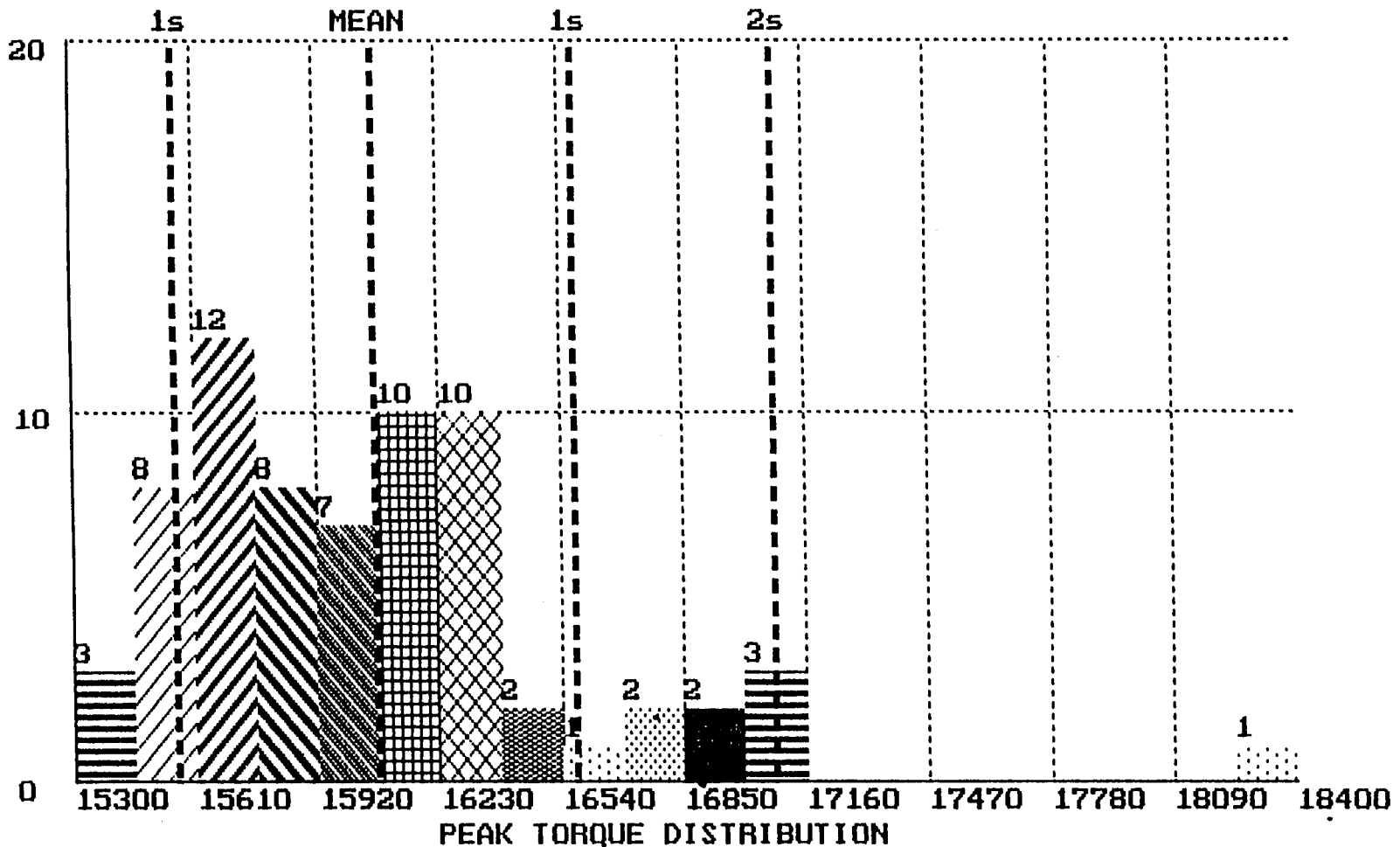
Upon arrival at the location on Saturday 21,1991 we off loaded all the equipment off the truck. We rigged up all our equipment and tested to see if it was all in working condition. The company man, Mr Jim Youngquist, then instructed us to go get a hotel room and return in the morning. All the pipe was cleaned and inspected by the Baker representative prior to makeup. All the connections made up fine with no problems. The fluctuation in the torque at the start of the makeups are due to the stabber was inexperienced with the stabbing of the large casing.

Weatherford experienced no safety violations of any kind on this job. If you have any questions regarding this job or any other job, please do not hesitate to call us. Thank you very much for the work.

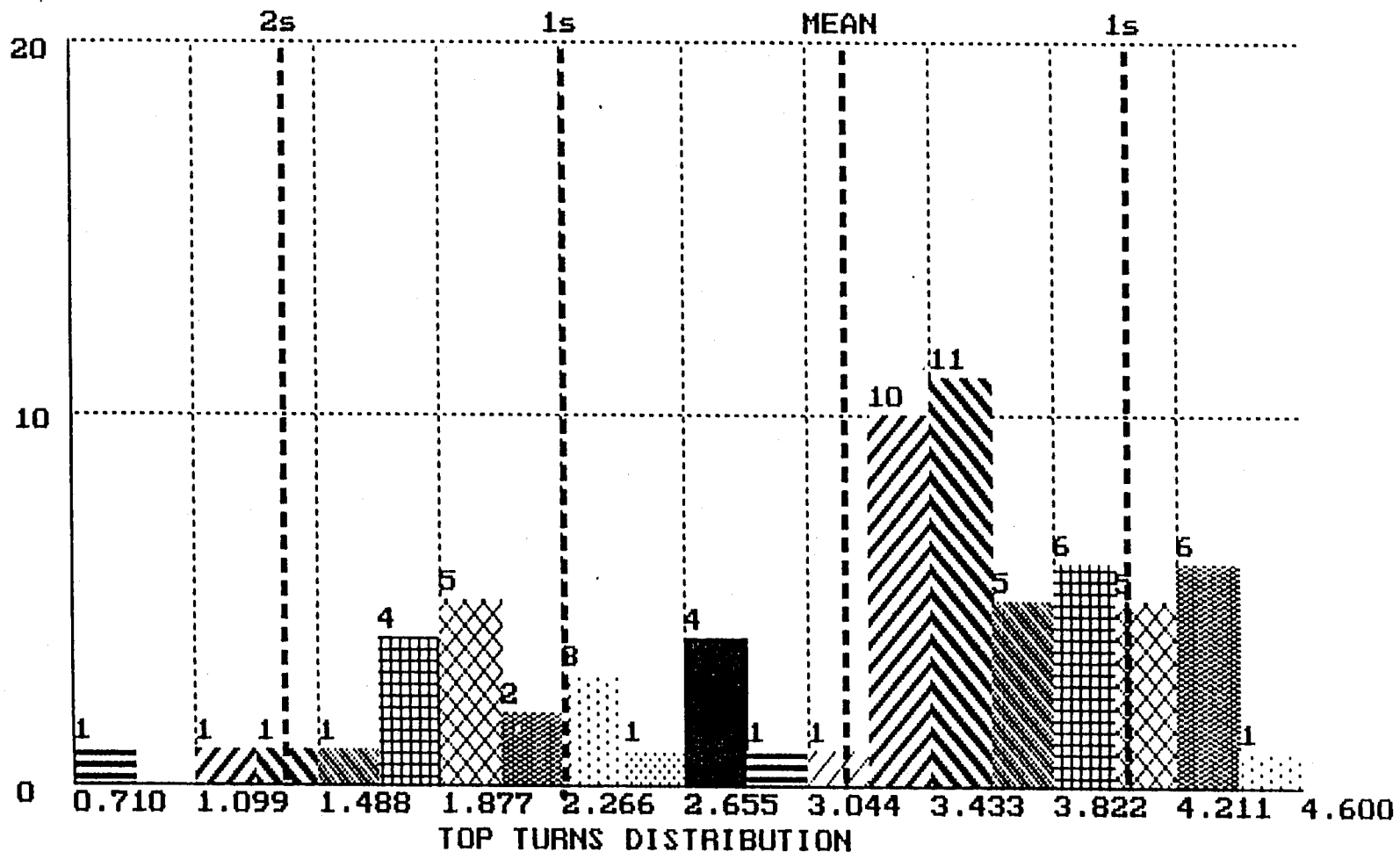
J.A.M SERVICES REPORT

MAKEUP DATA

COLOR	RED	WHITE	BLUE	
THREADS	BAKER-NJO			
SIZE INS.	13 3/8			
WEIGHT	72#			
GRADE	N-80			
MAX. TQ.	17400			
OPT. TQ.	16500			
MIN. TQ.	15200			
REF. TQ.	250			
MAX. TNS.	5			
MIN. TNS.	0			
JTS. RUN	69			
BACKED-OUT	0			
REJECTED	0			
FOOTAGE.	2780			



NJO 13 3/8 72 N-80
 MEAN = 16074 STANDARD DEVIATION = 510.335
 TOTAL CONNECTIONS = 69 IN RANC = 69



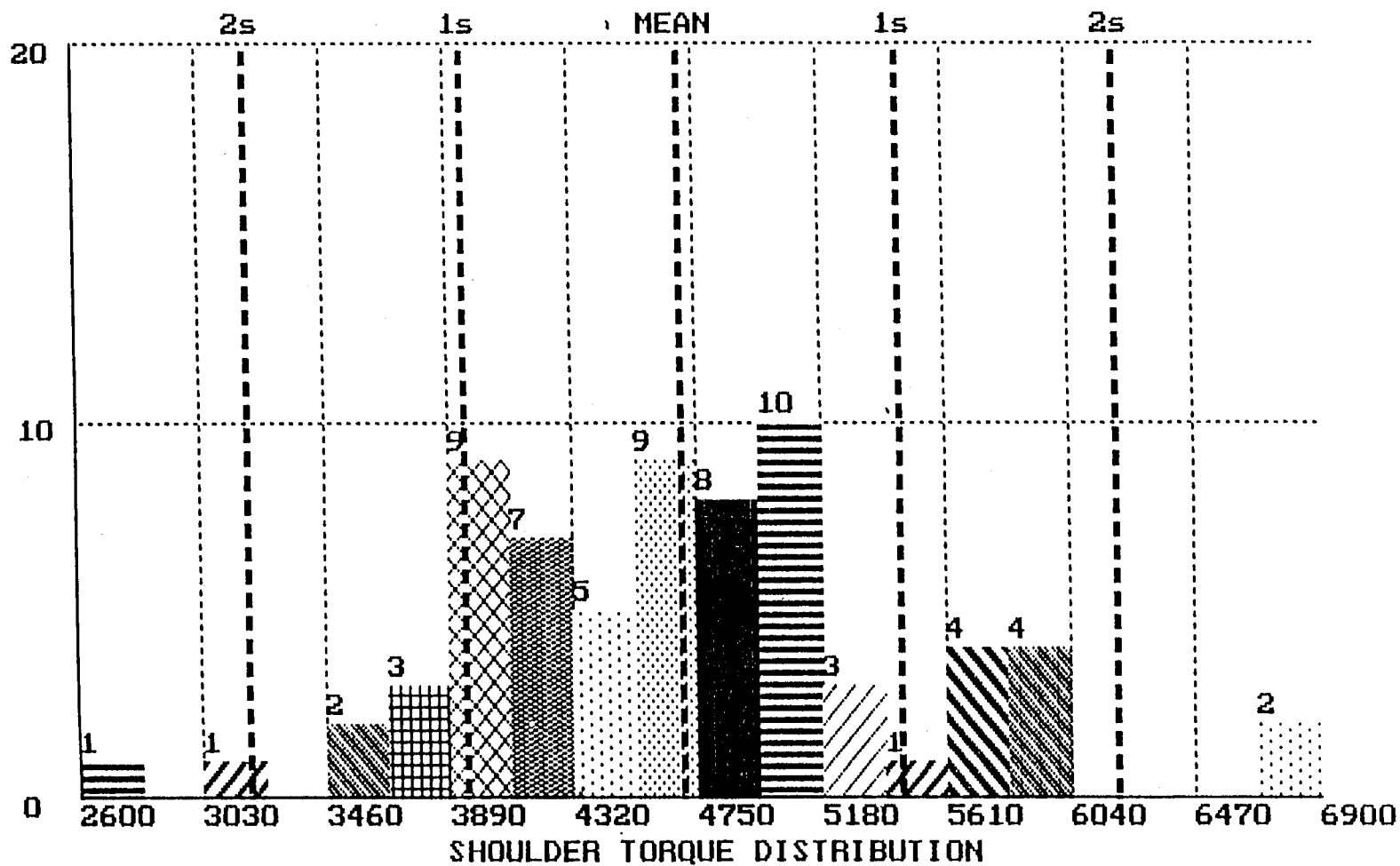
NJO 13 3/8 72 N-80

MEAN = 3.168

STANDARD DEVIATION = 0.897

TOTAL CONNECTIONS = 69

IN RANGE = 69



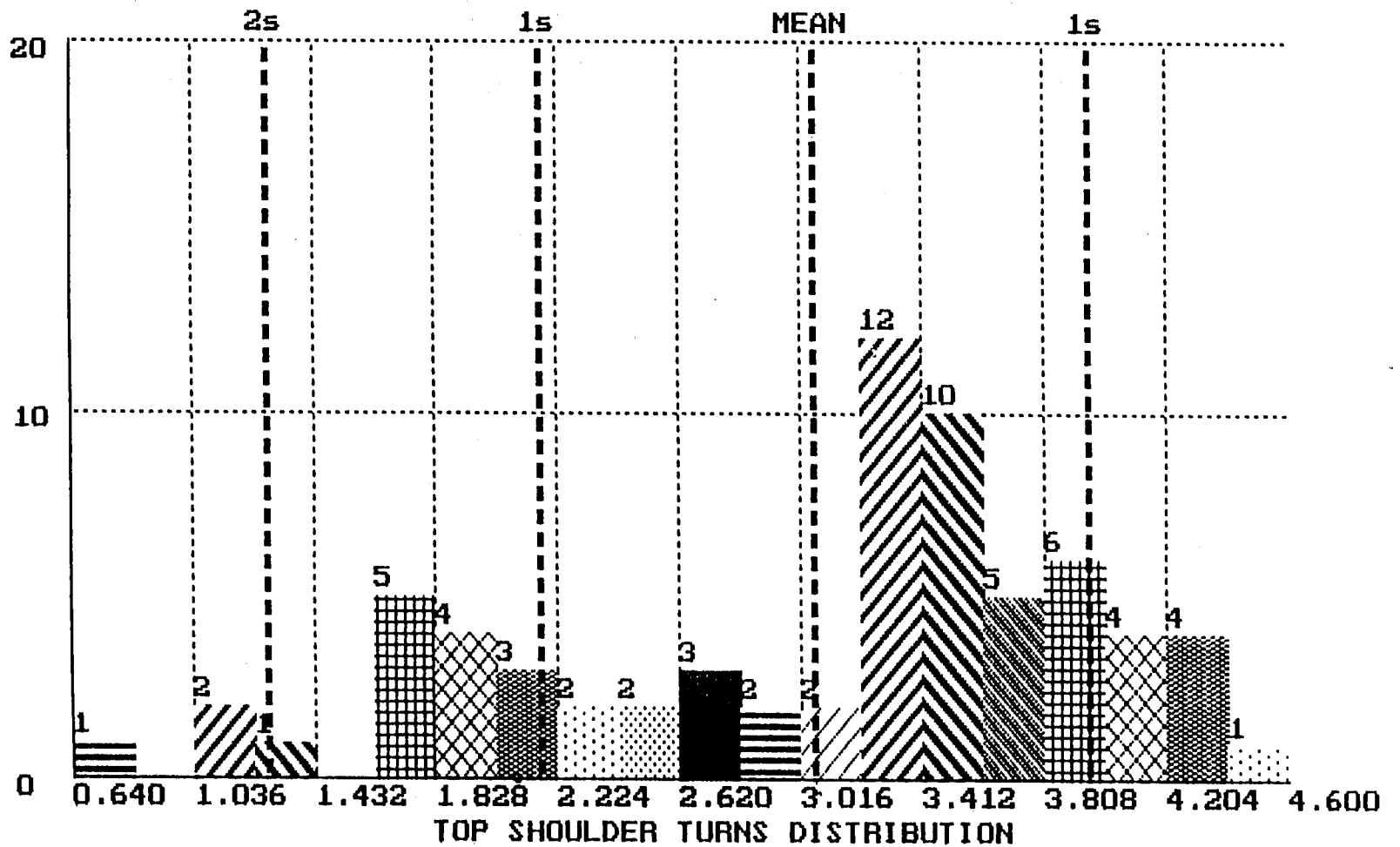
NJO 13 3/8 72 N-80

MEAN = 4706

TOTAL CONNECTIONS = 69

STANDARD DEVIATION = 759.678

RANGE = 69



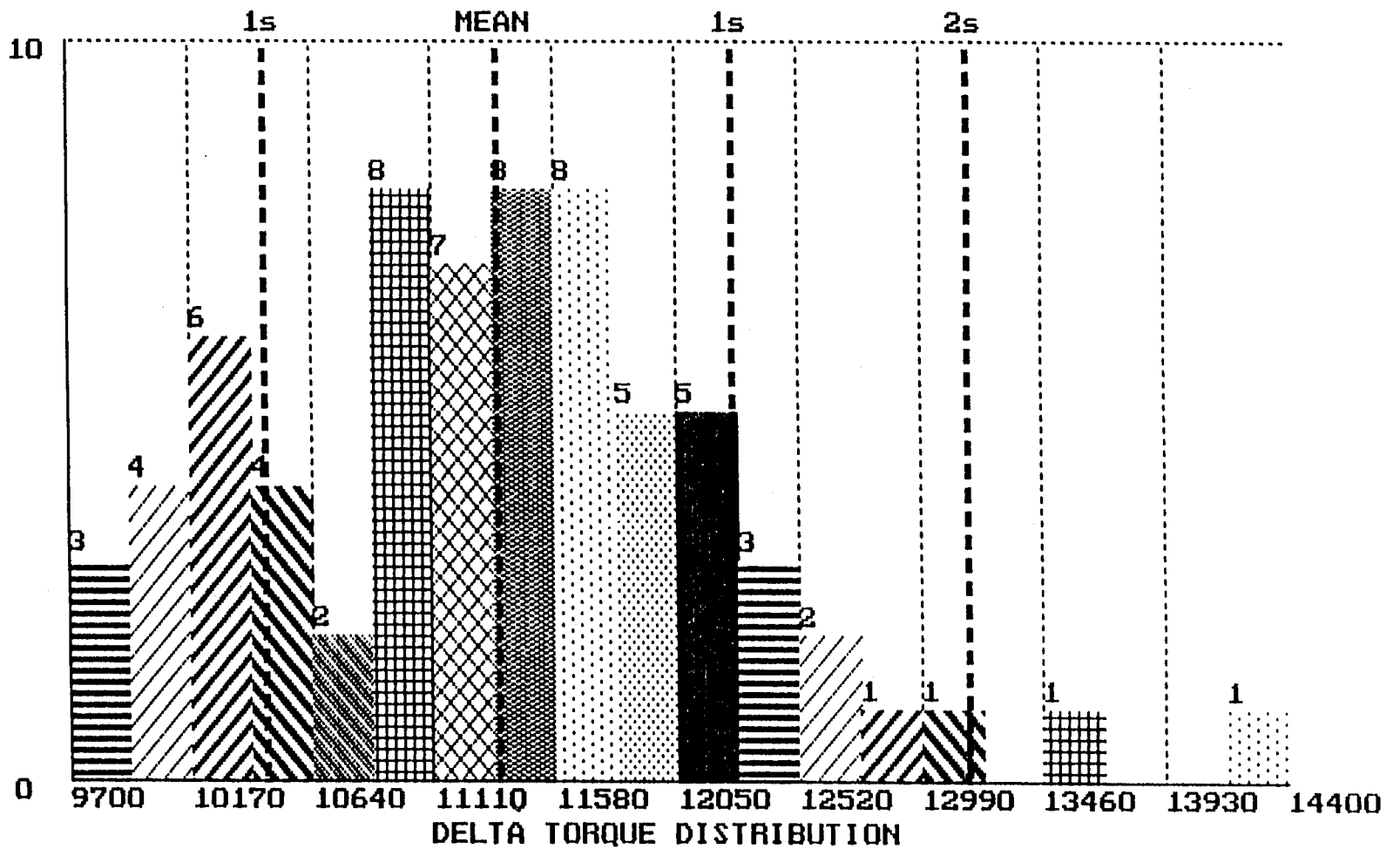
NJO 13 3/8 72 N-80

MEAN = 3.067

TOTAL CONNECTIONS = 69

STANDARD DEVIATION = 0.897

IN RANGE = 69



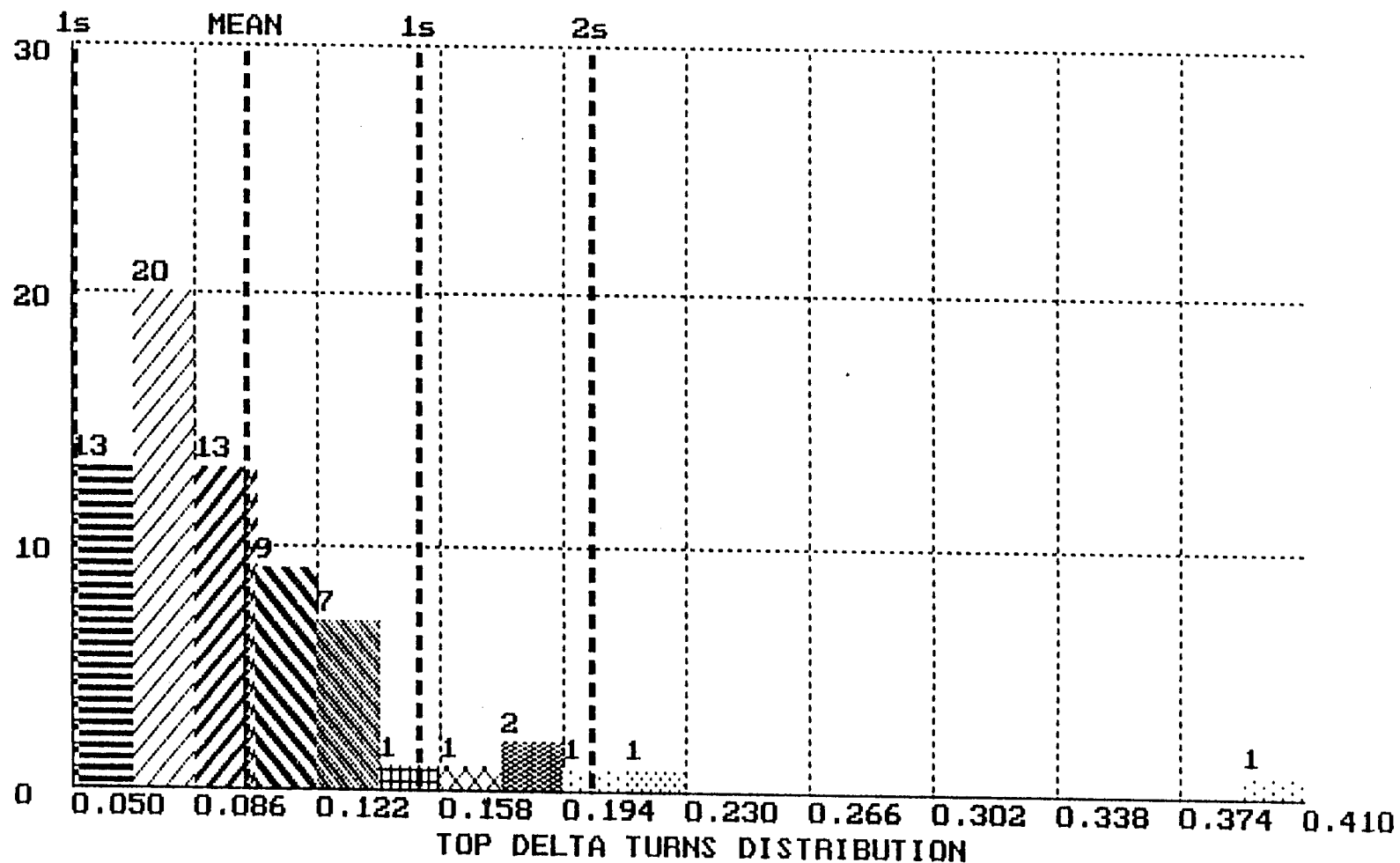
NJ0 13 3/8 72 N-80

MEAN = 11368

TOTAL CONNECTIONS = 69

STANDARD DEVIATION = 908.076

IN RANGE = 69

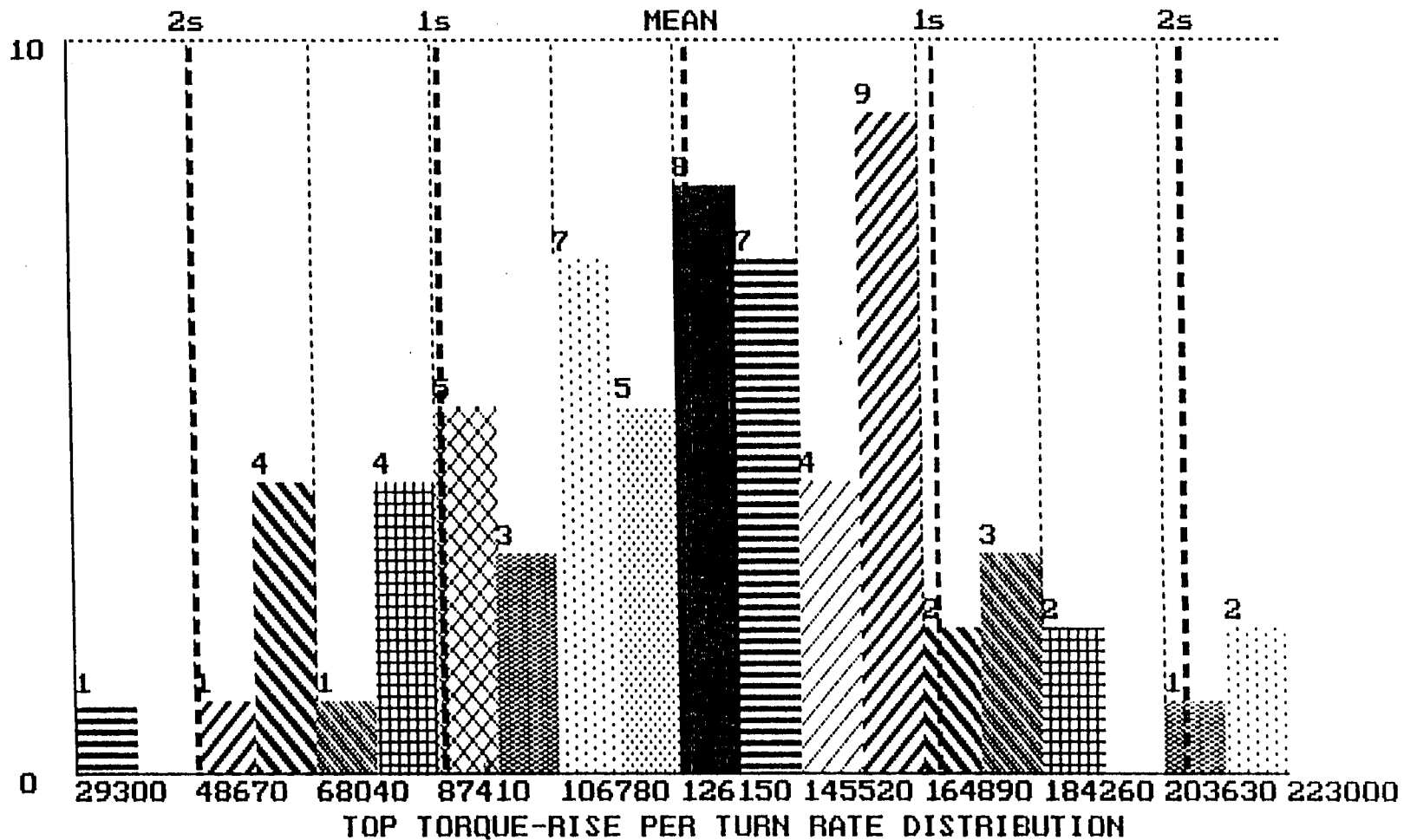


NJO 13 3/8 72 N-80

MEAN = 0.101

TOTAL CONNECTIONS = 69

STANDARD DEVIATION = 0.051
IN RANGE = 69



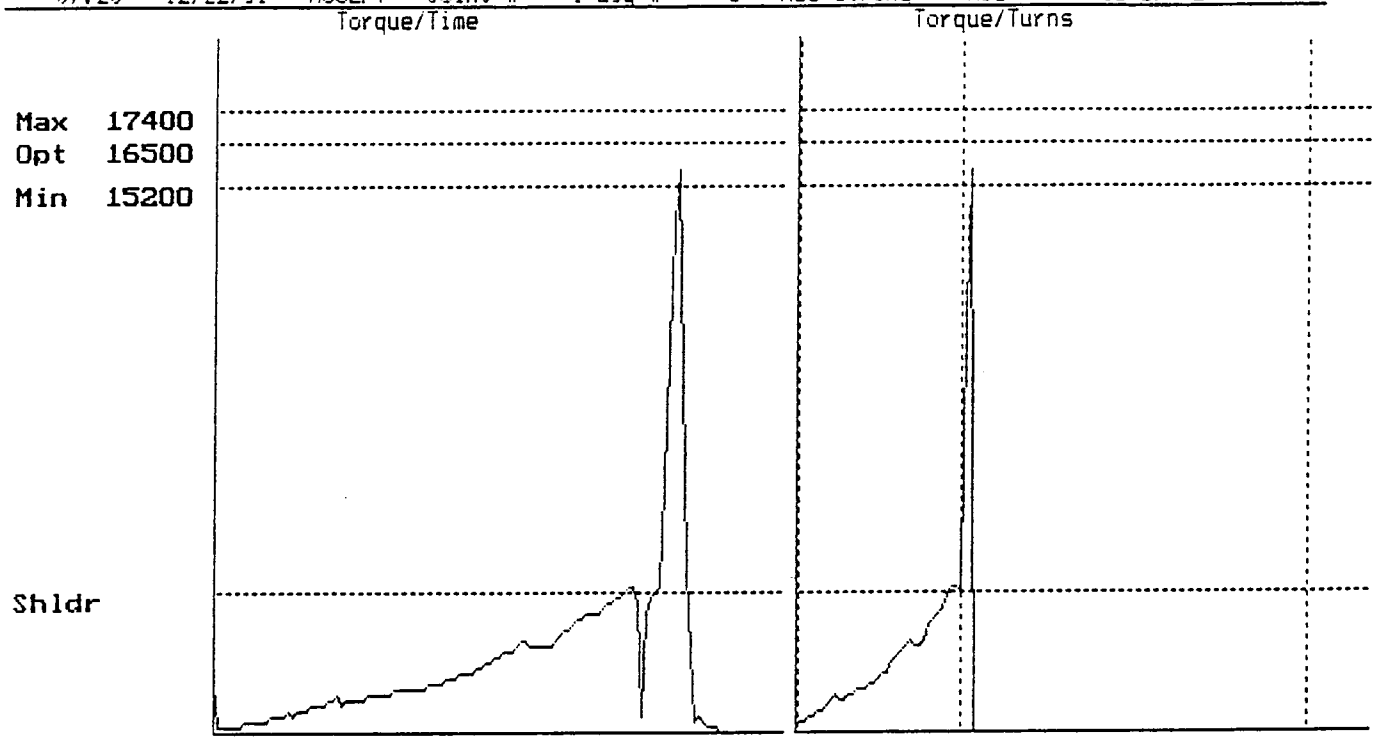
NJO 13 3/8 72 N-80

MEAN = 128280

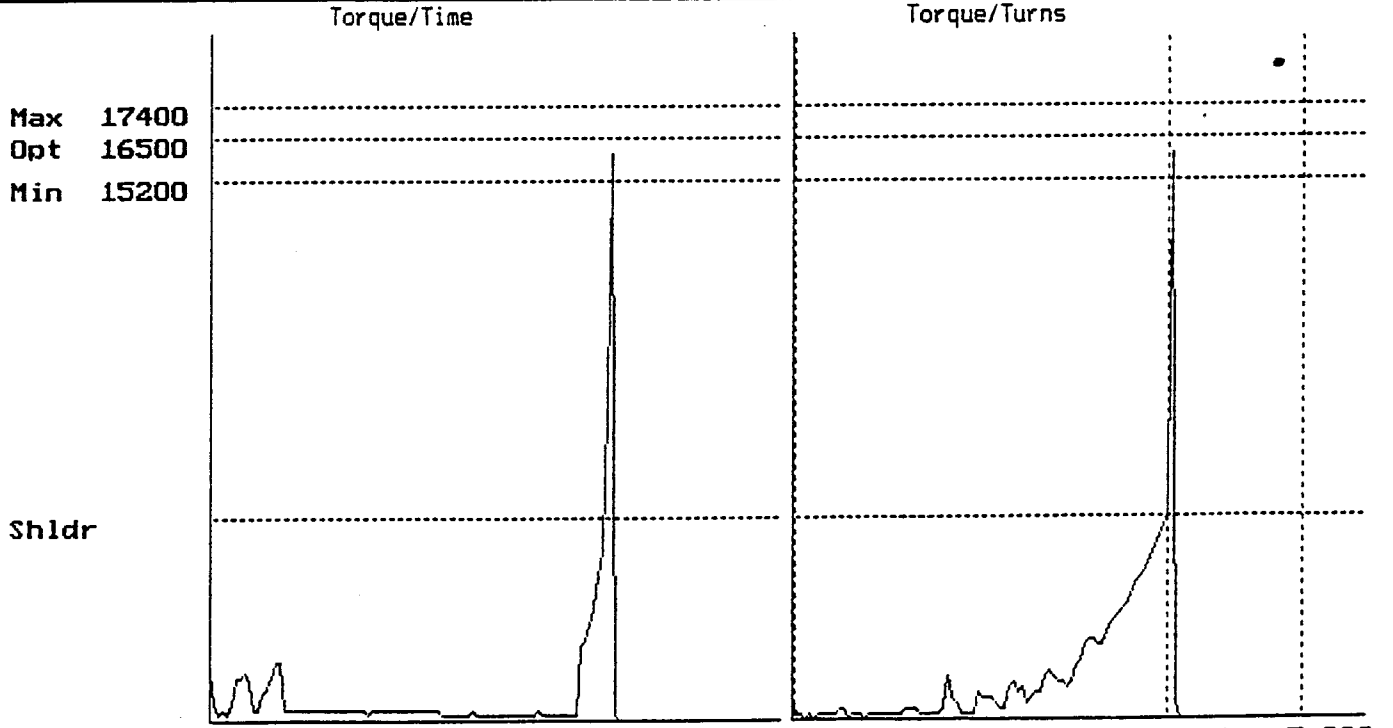
STANDARD DEVIATION = 39661.05

TOTAL CONNECTIONS = 69

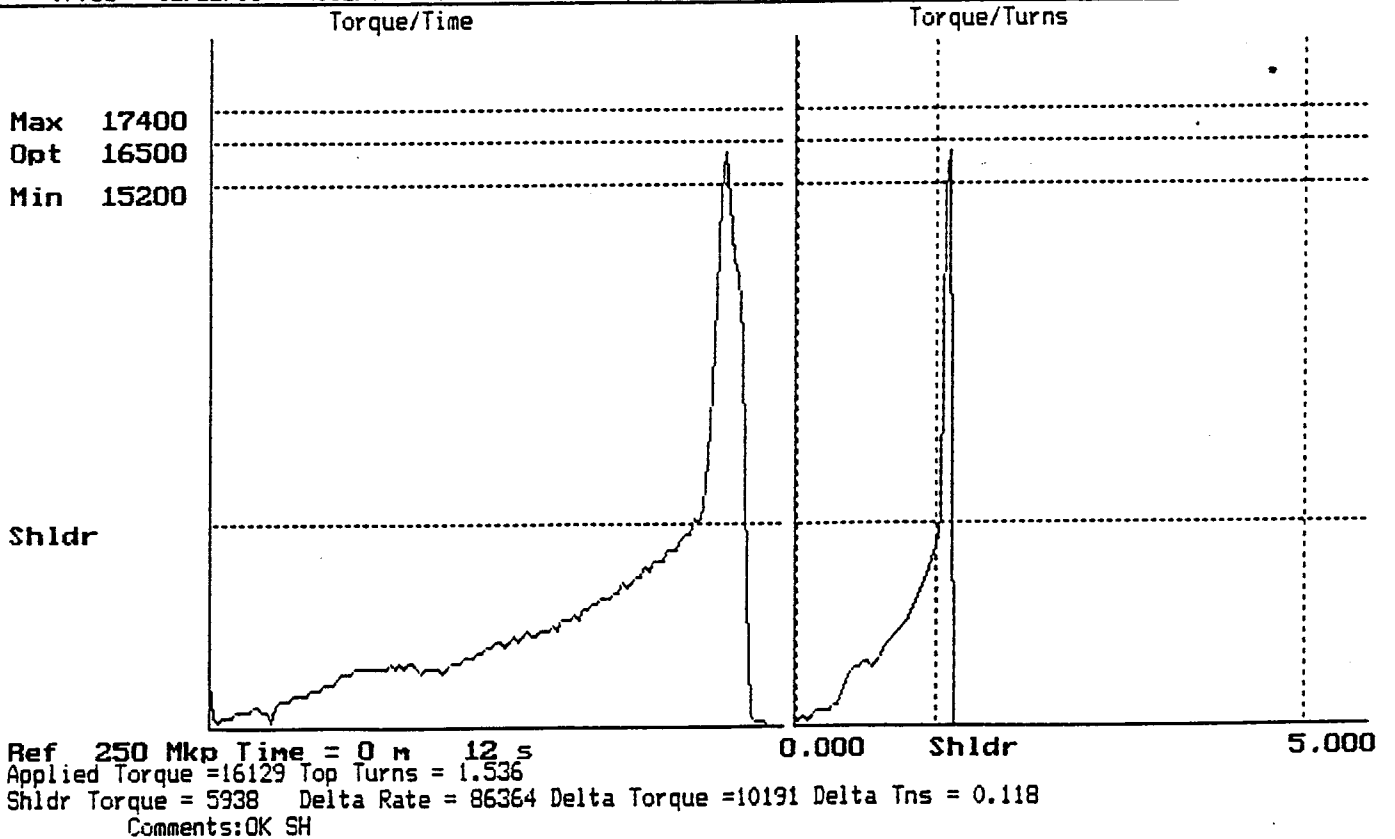
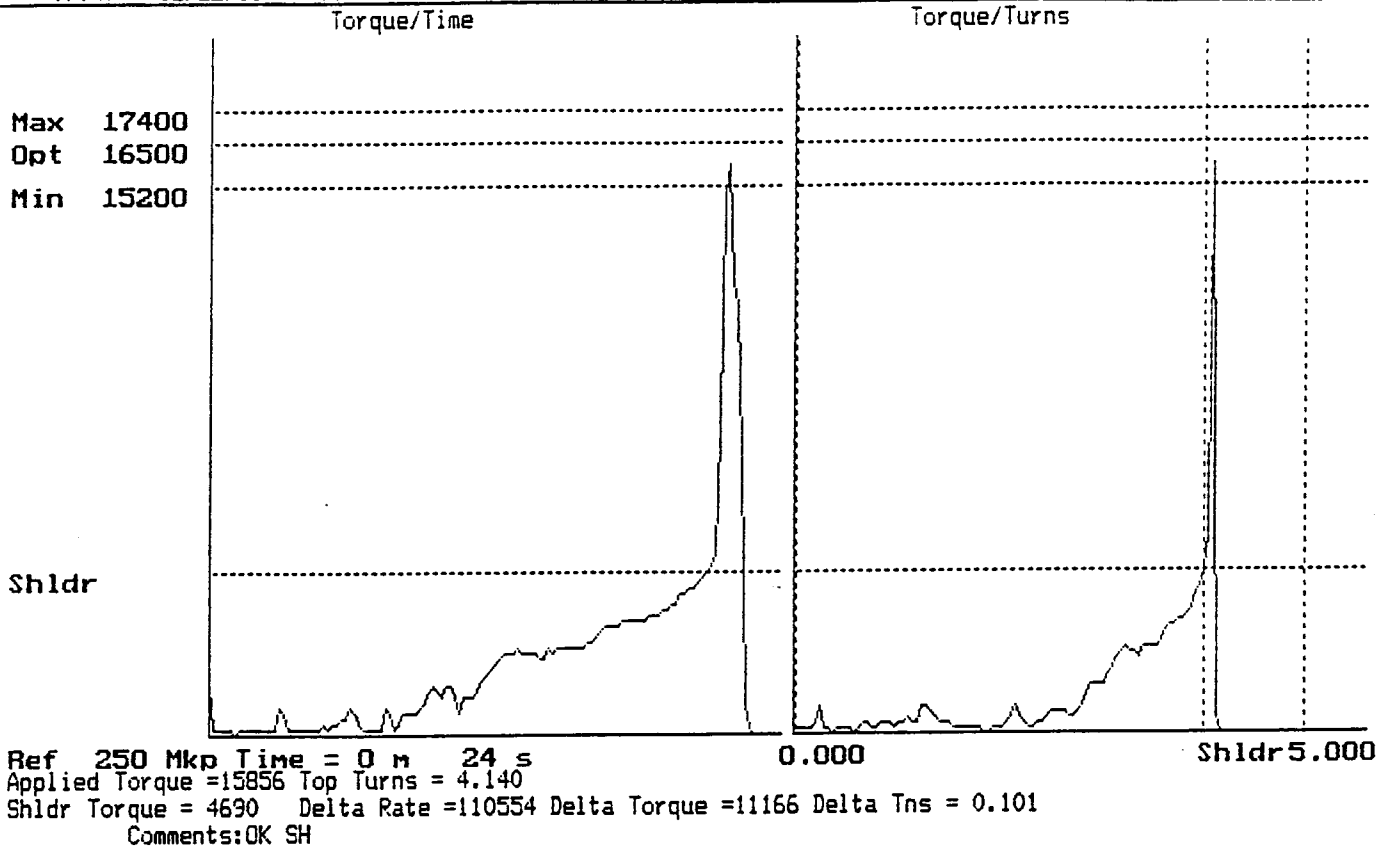
IN RANGE = 69

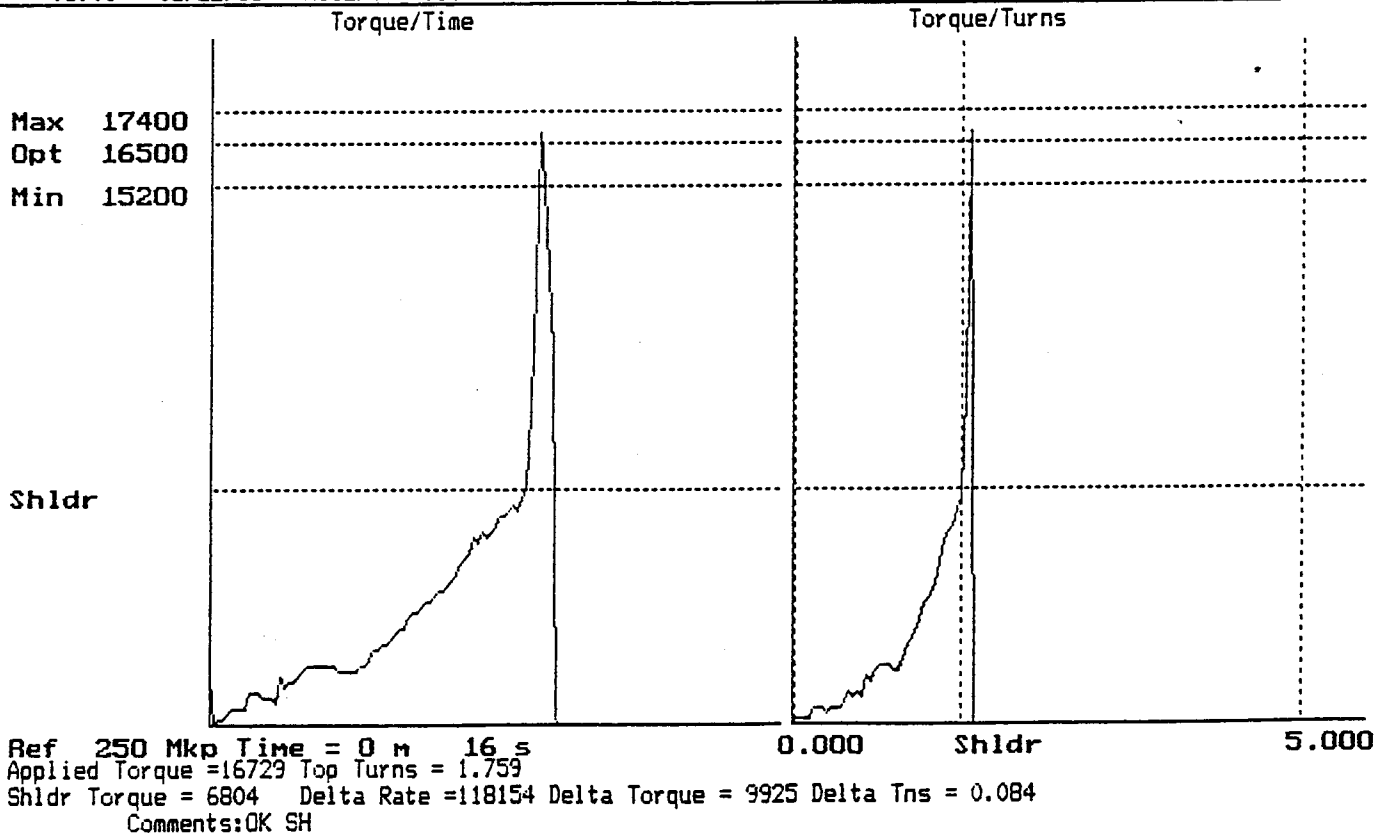
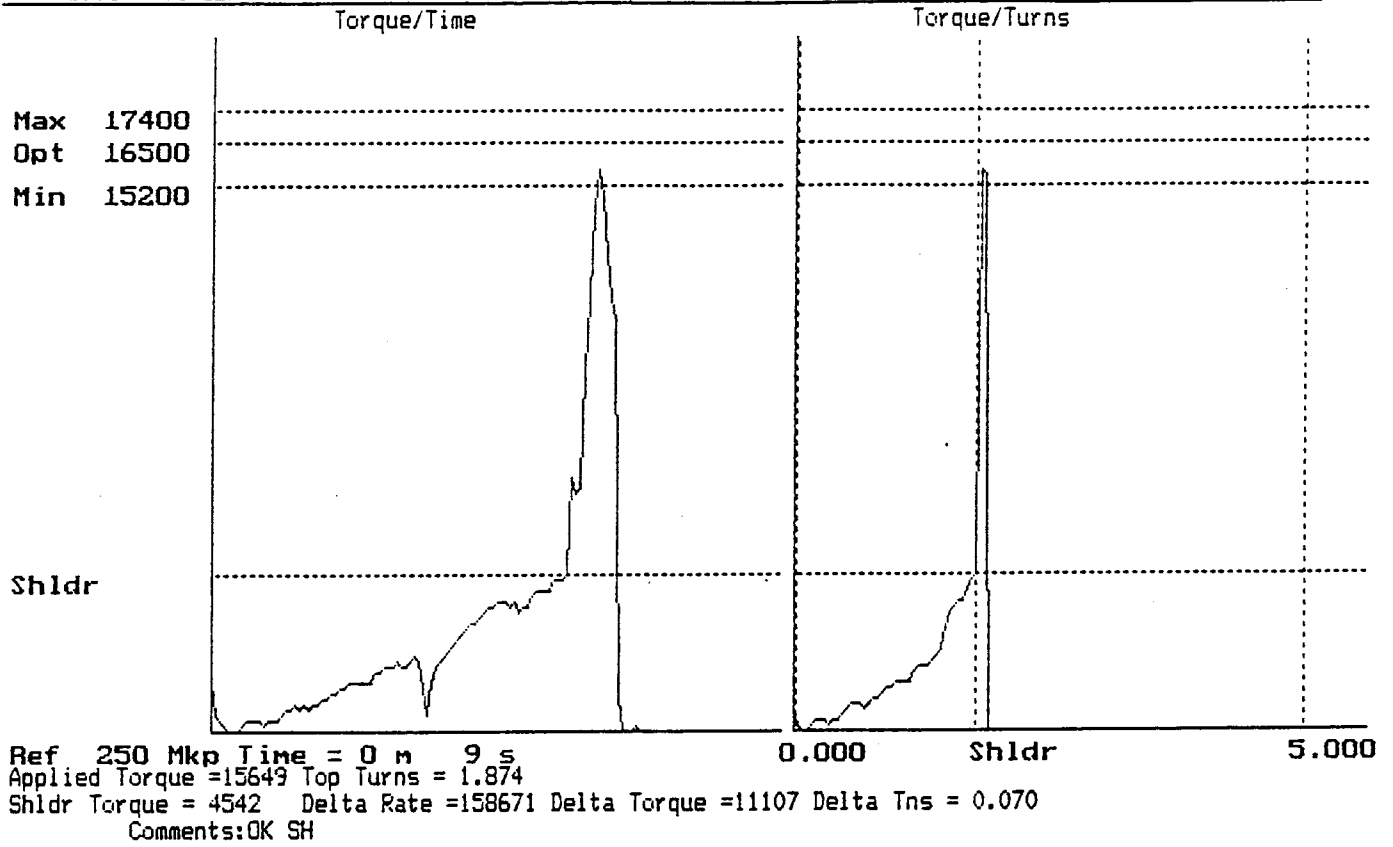


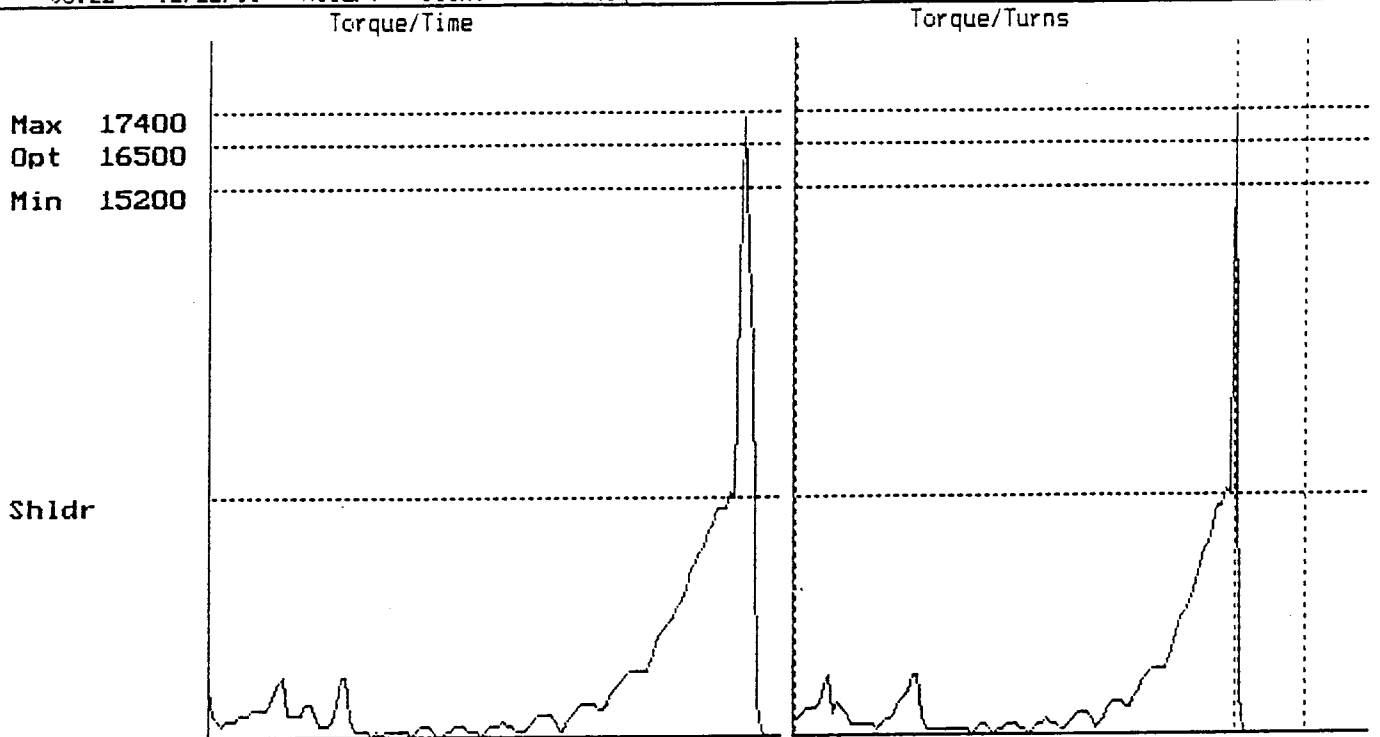
Ref 250 Mkp Time = 0 m 23 s 0.000 Shldr 5.000
Applied Torque =15702 Top Turns = 1.717
Shldr Torque = 4098 Delta Rate =136517 Delta Torque =11604 Delta Tns = 0.085
Comments:JOINT 1 TO SEALS...BACKUPS SLIPPED DURING MAKEUP



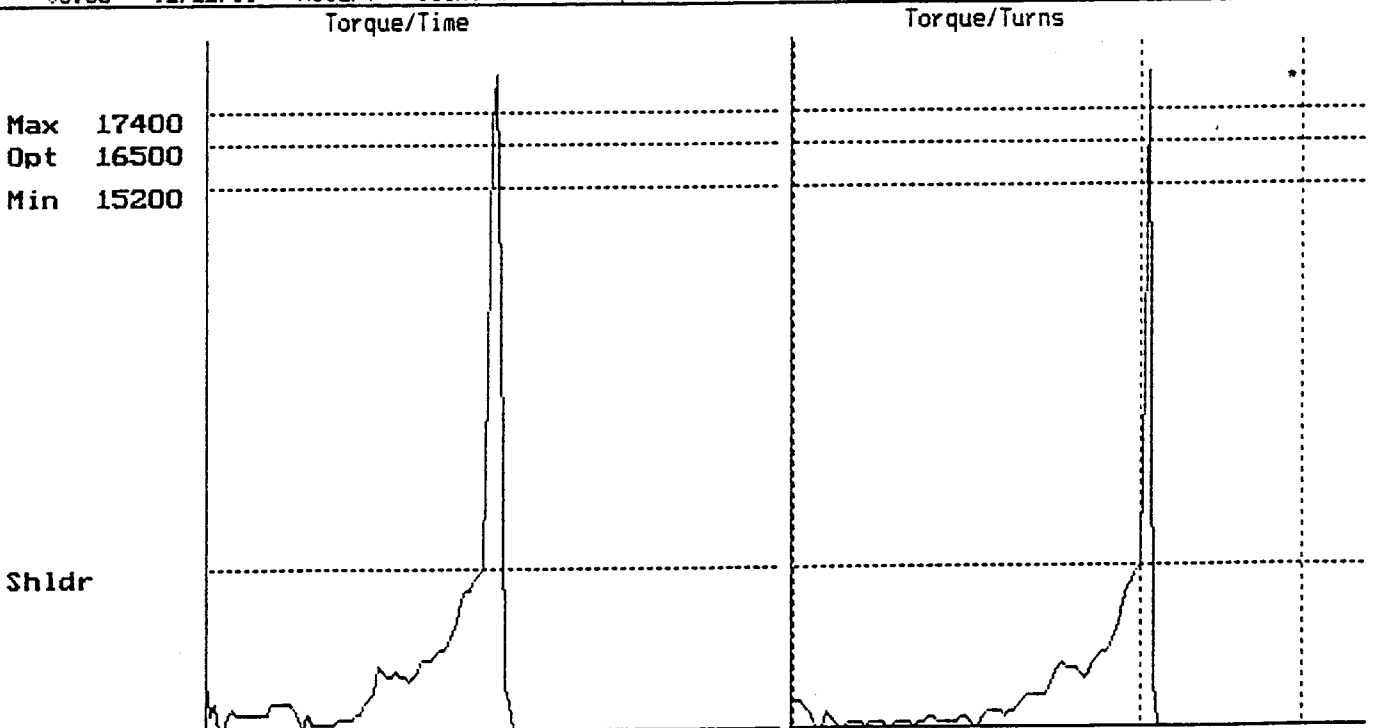
Ref 250 Mkp Time = 2 m 28 s 0.000 Shldr 5.000
Applied Torque =15982 Top Turns = 3.760
Shldr Torque = 5874 Delta Rate =155507 Delta Torque =10108 Delta Tns = 0.065
Comments:OK SH ...STABBER TRYING TO CLOSE ELEVATORS DURING
MAKEUP



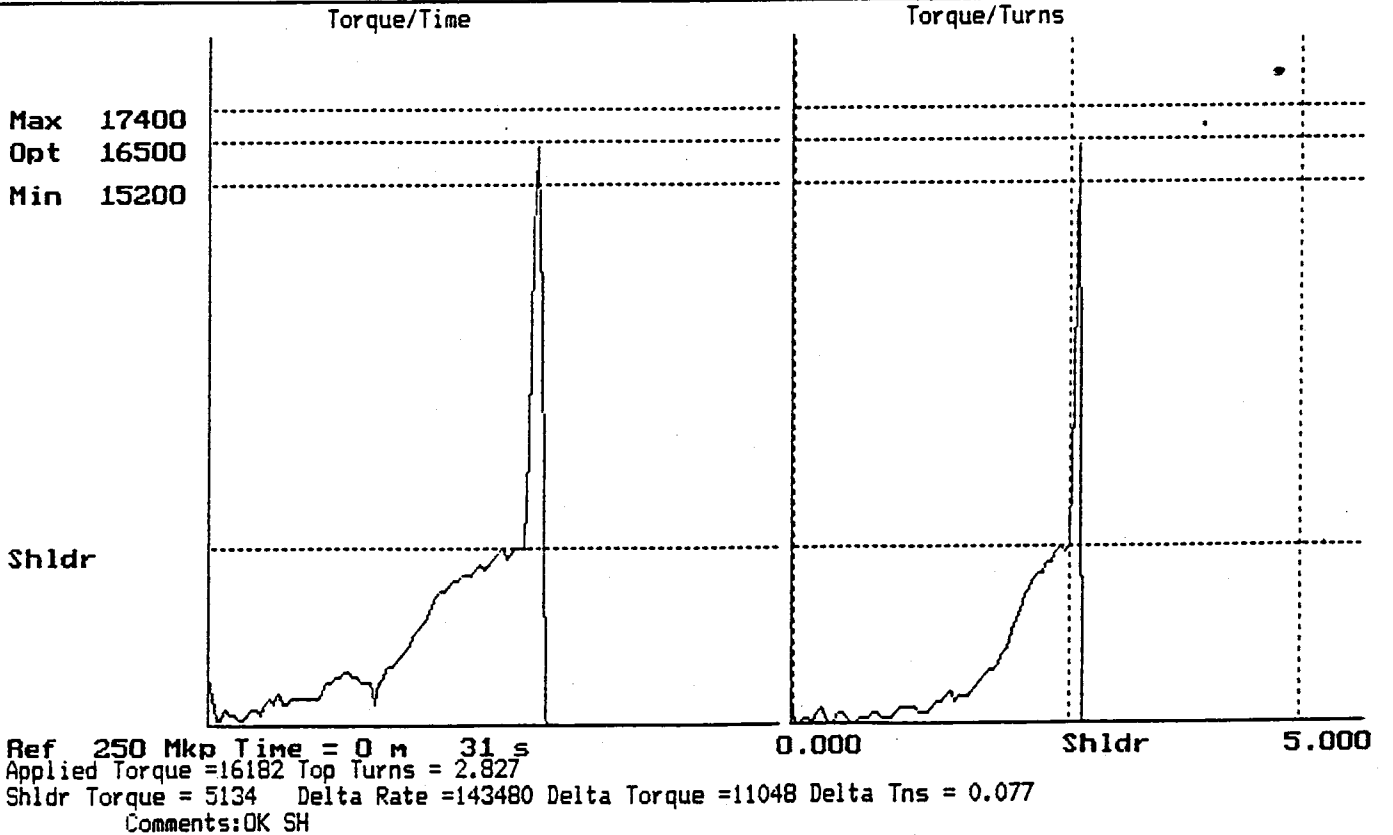
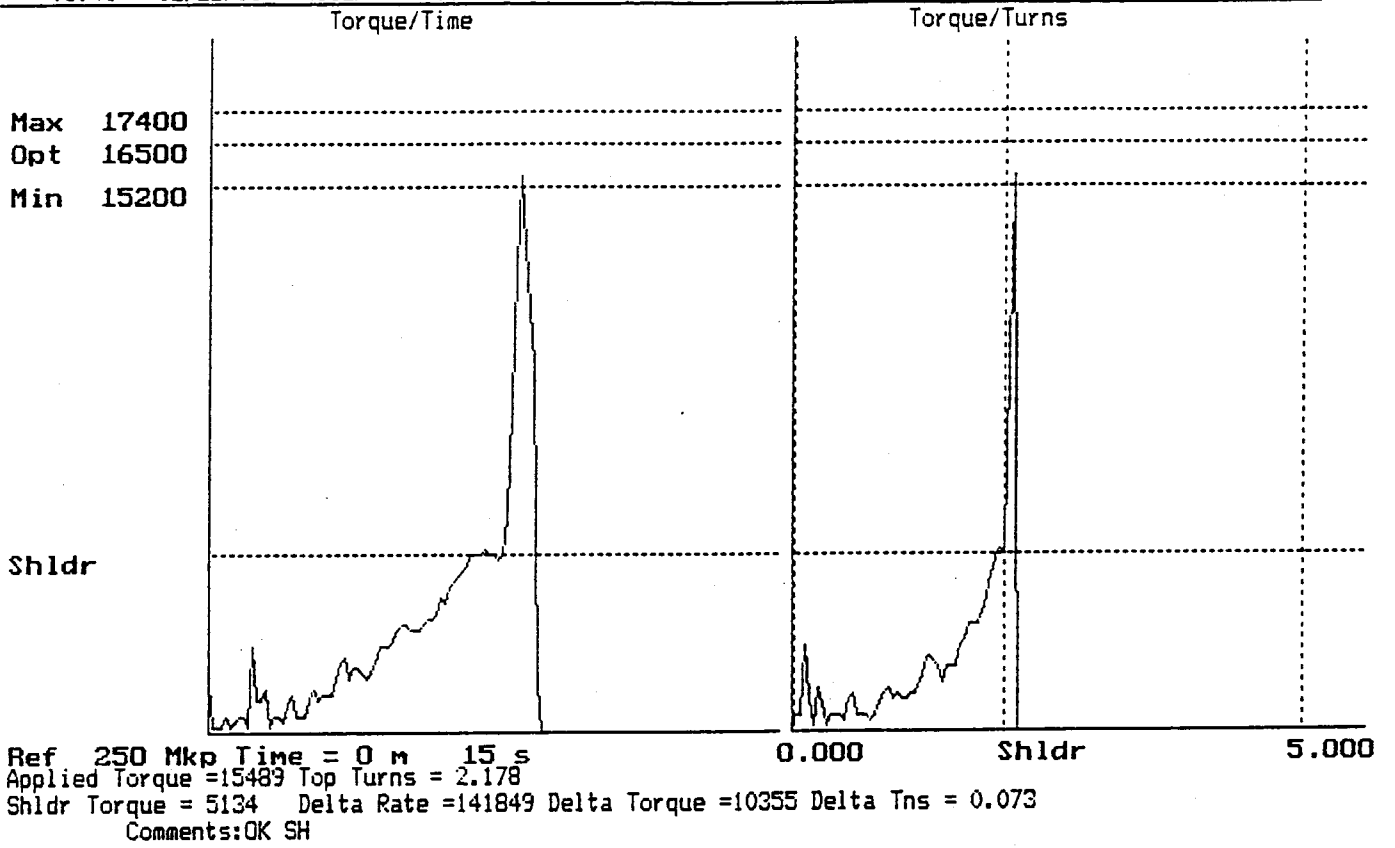


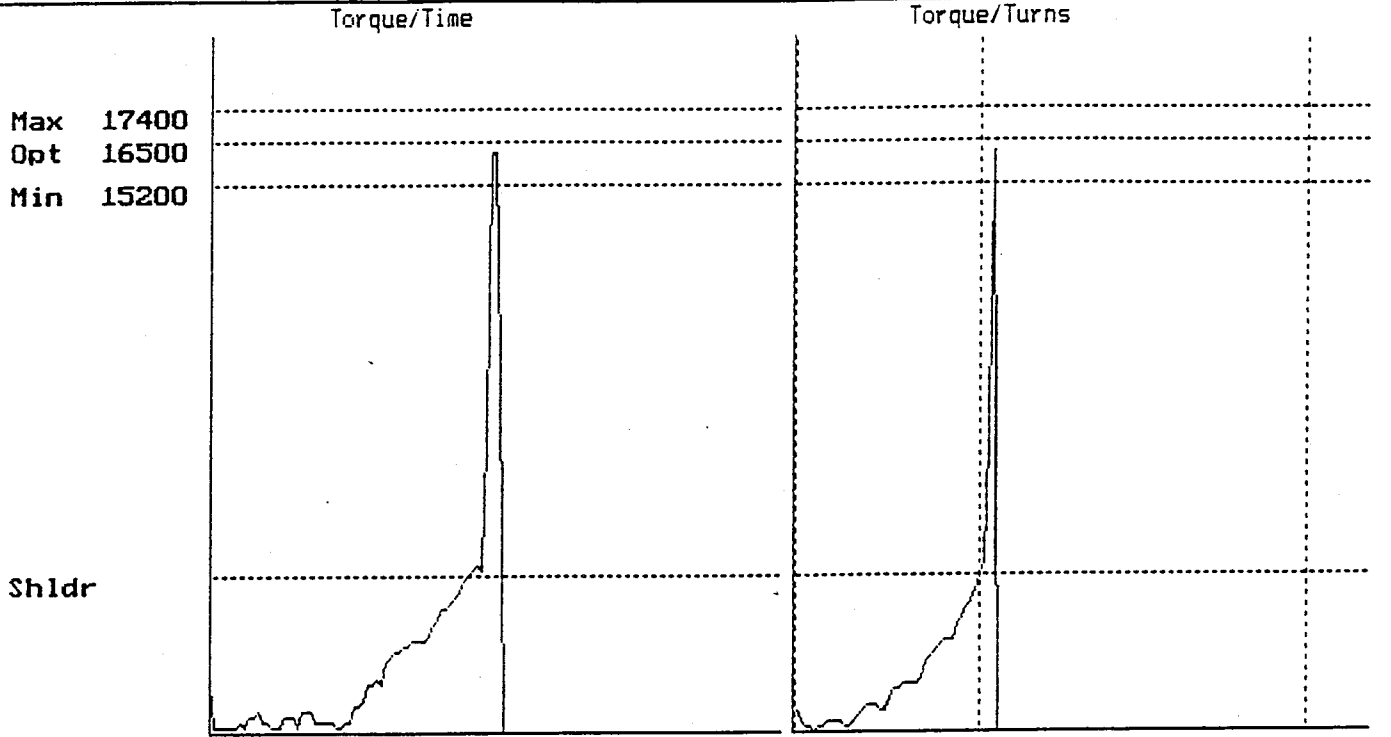


Ref 250 Mkp Time = 0 m 50 s 0.000 Shldr 5.000
 Applied Torque = 17142 Top Turns = 4.356
 Shldr Torque = 6762 Delta Rate = 175932 Delta Torque = 10380 Delta Tns = 0.059
 Comments: OK SH

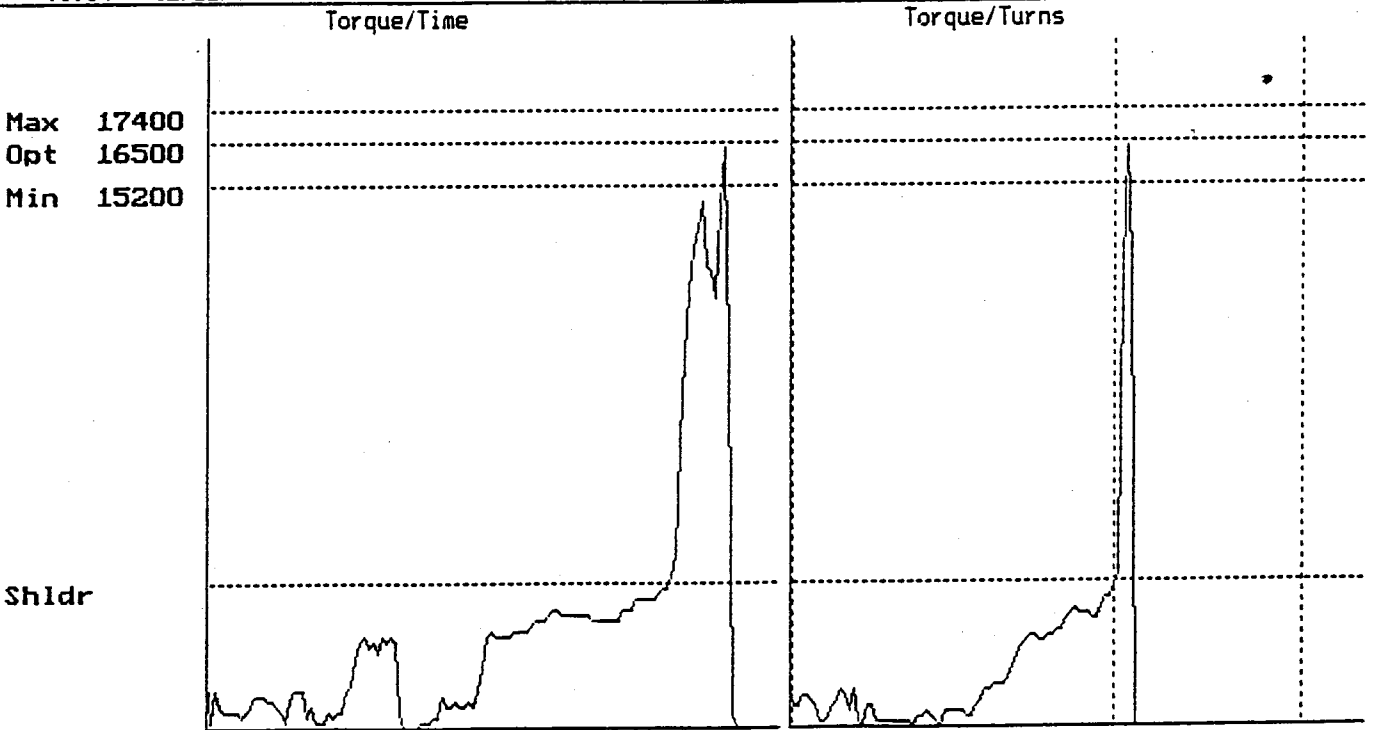


Ref 250 Mkp Time = 0 m 27 s 0.000 Shldr 5.000
 Applied Torque = 18362 Top Turns = 3.543
 Shldr Torque = 4690 Delta Rate = 128981 Delta Torque = 13672 Delta Tns = 0.106
 Comments: BACKUP TONG HAD SLACK IN THE SNUB LINE CAUSING THE
 TONG TO JERK AROUND...MAKEUP OK AS PER BAKER REP

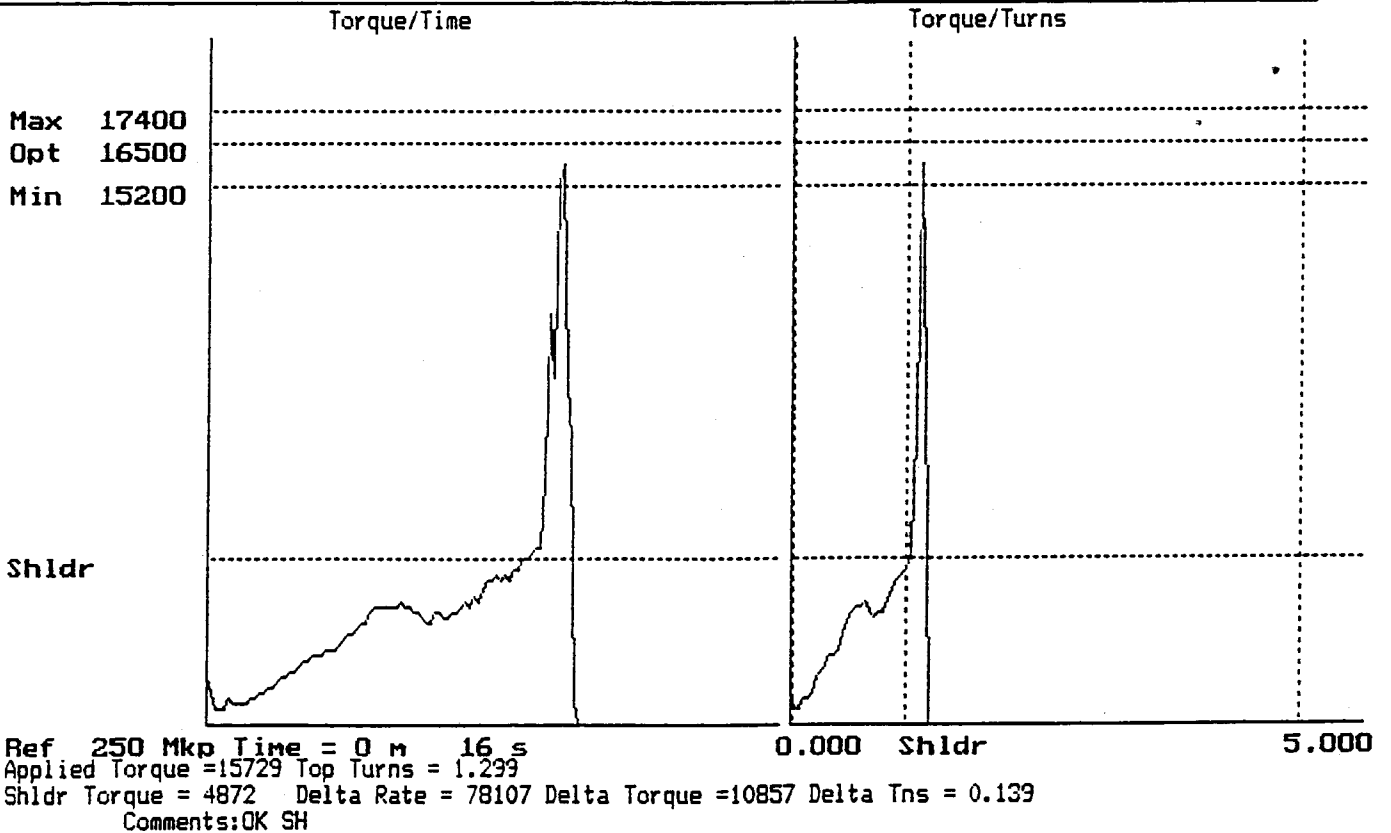
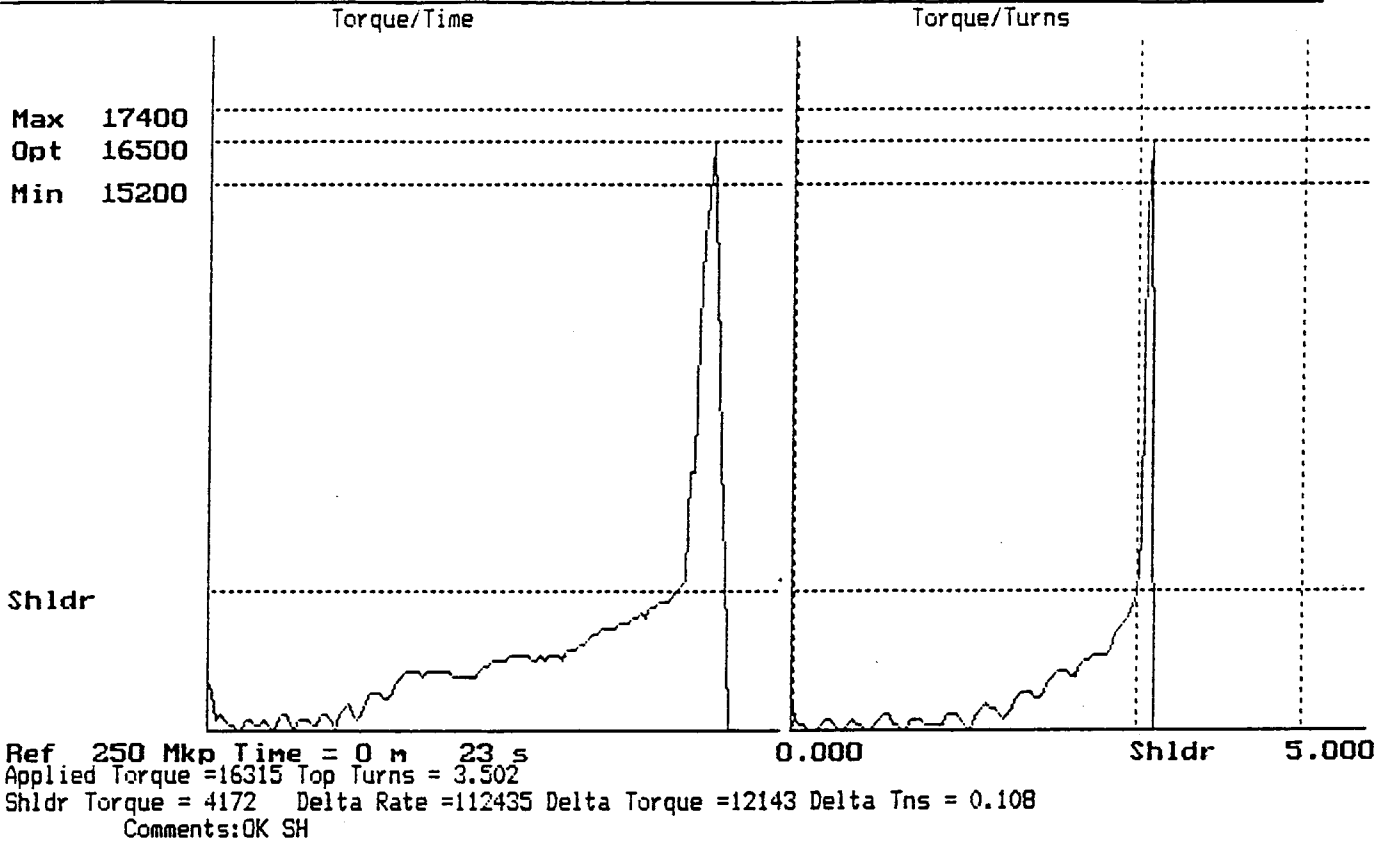


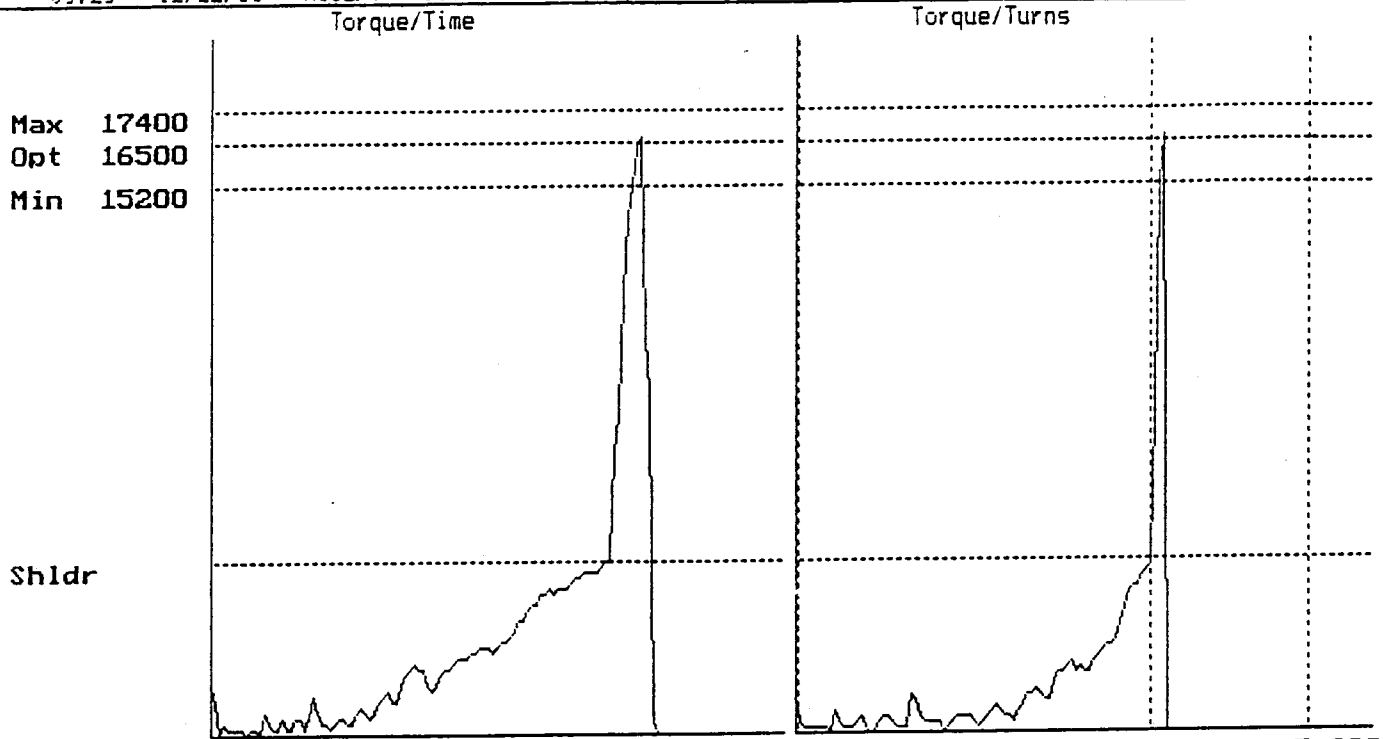


Ref 250 Mkp Time = 0 m 26 s
Applied Torque = 16135 Top Turns = 1.975
Shldr Torque = 4542 Delta Rate = 90570 Delta Torque = 11593 Delta Tns = 0.128
Comments: OK SH

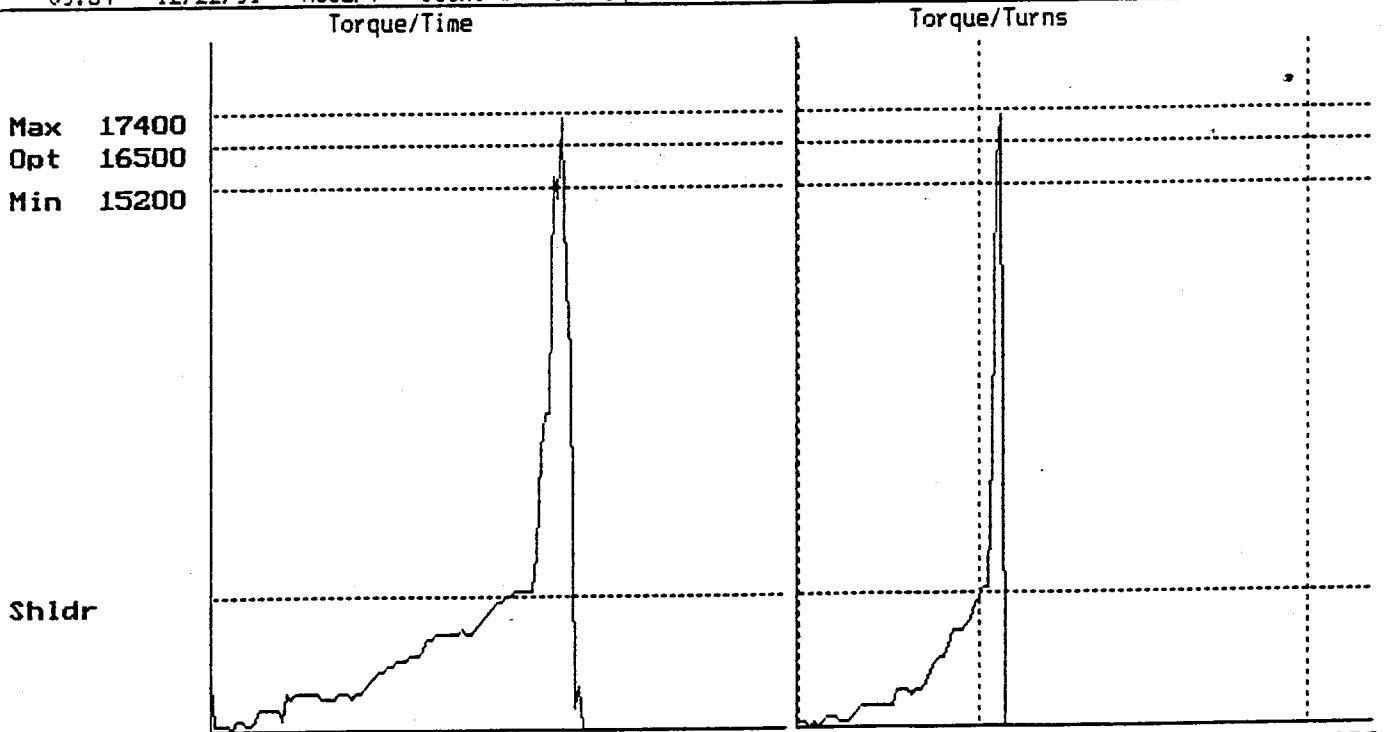


Ref 250 Mkp Time = 0 m 48 s
Applied Torque = 16162 Top Turns = 3.325
Shldr Torque = 4392 Delta Rate = 80616 Delta Torque = 11770 Delta Tns = 0.146
Comments: TONG OPERATOR WENT INTO IT SLOW DUE TO THE CHAIN ON THE BOWL WAS LOOSE...OK AS PER BAKER REP

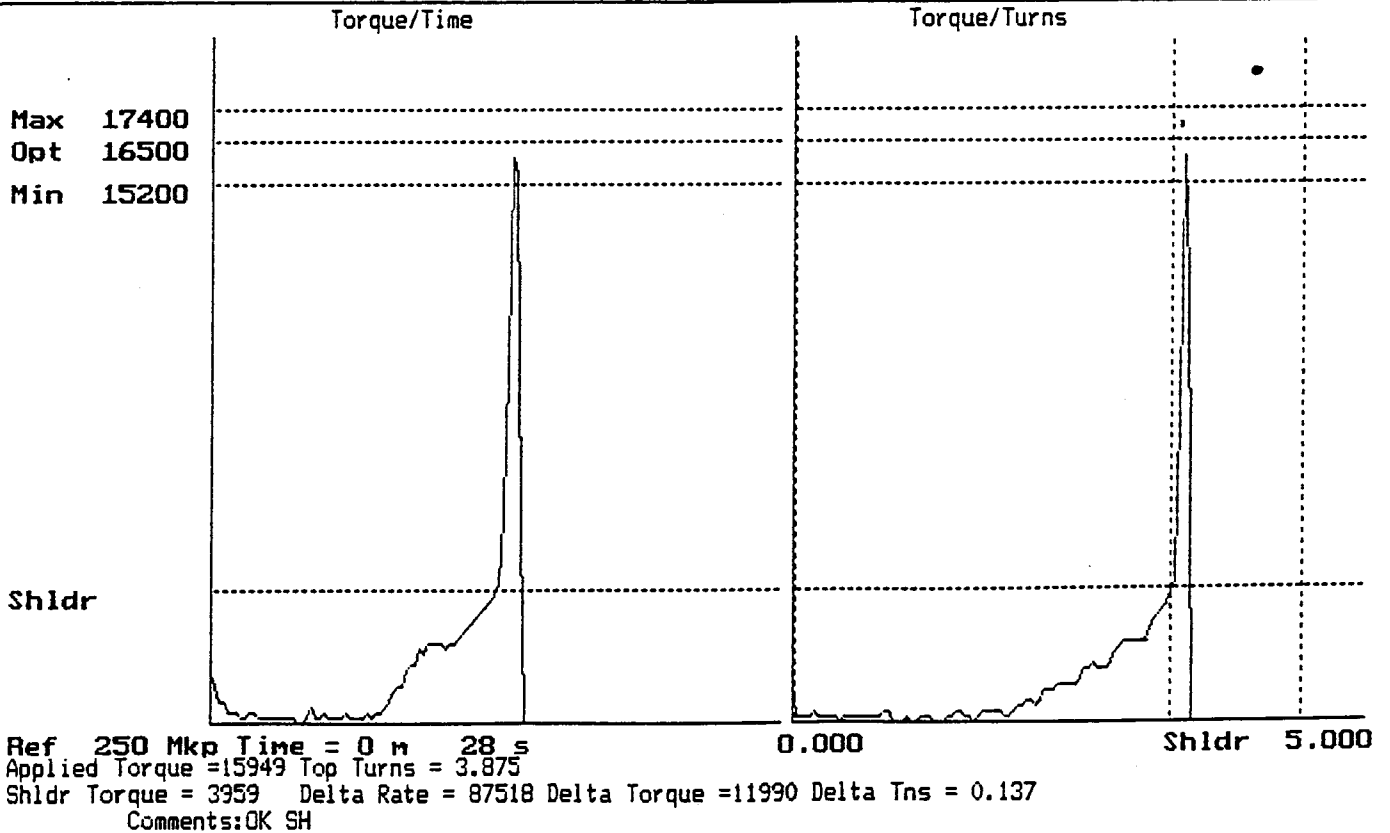
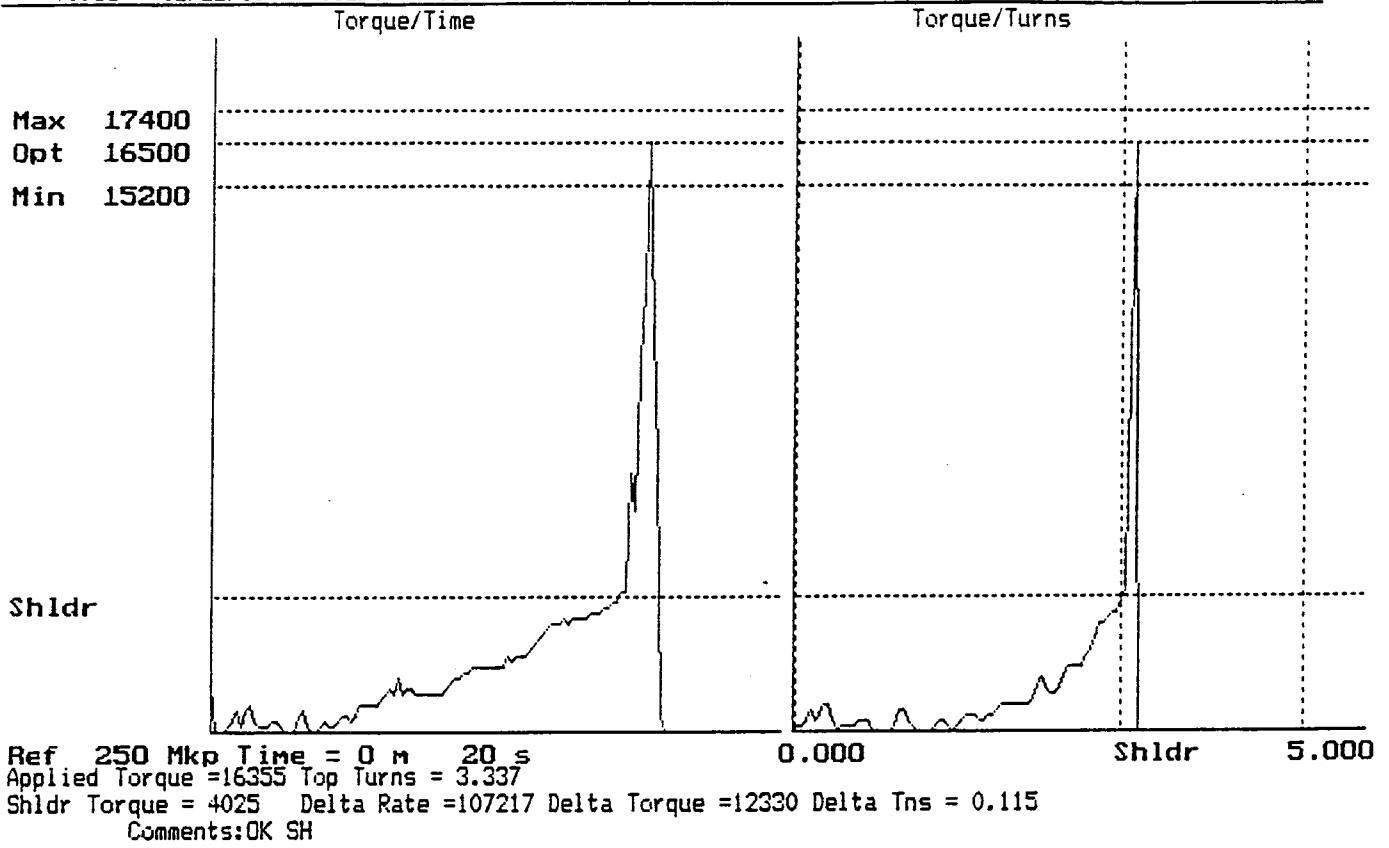


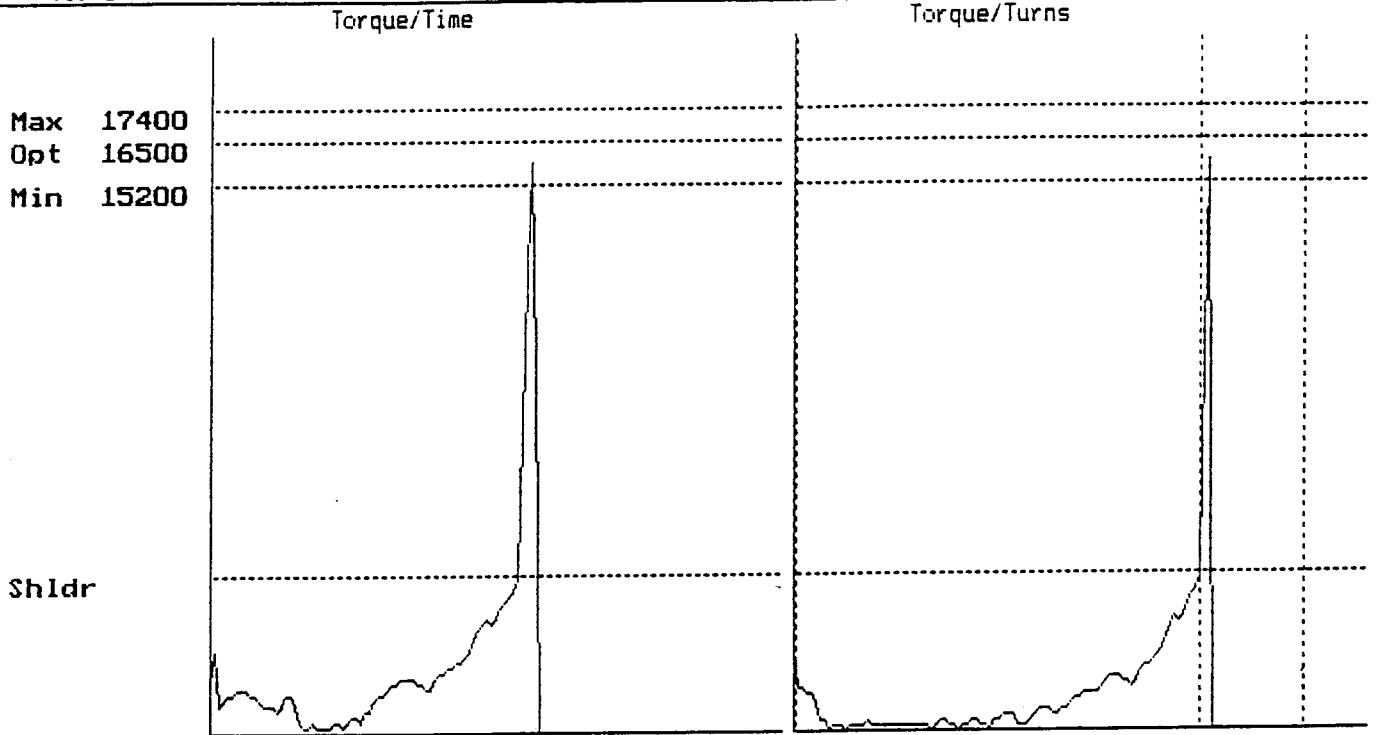


Ref 250 Mkp Time = 0 m 20 s
Applied Torque = 16475 Top Turns = 3.600
Shldr Torque = 5018 Delta Rate = 95474 Delta Torque = 11457 Delta Tns = 0.120
Comments:OK SH

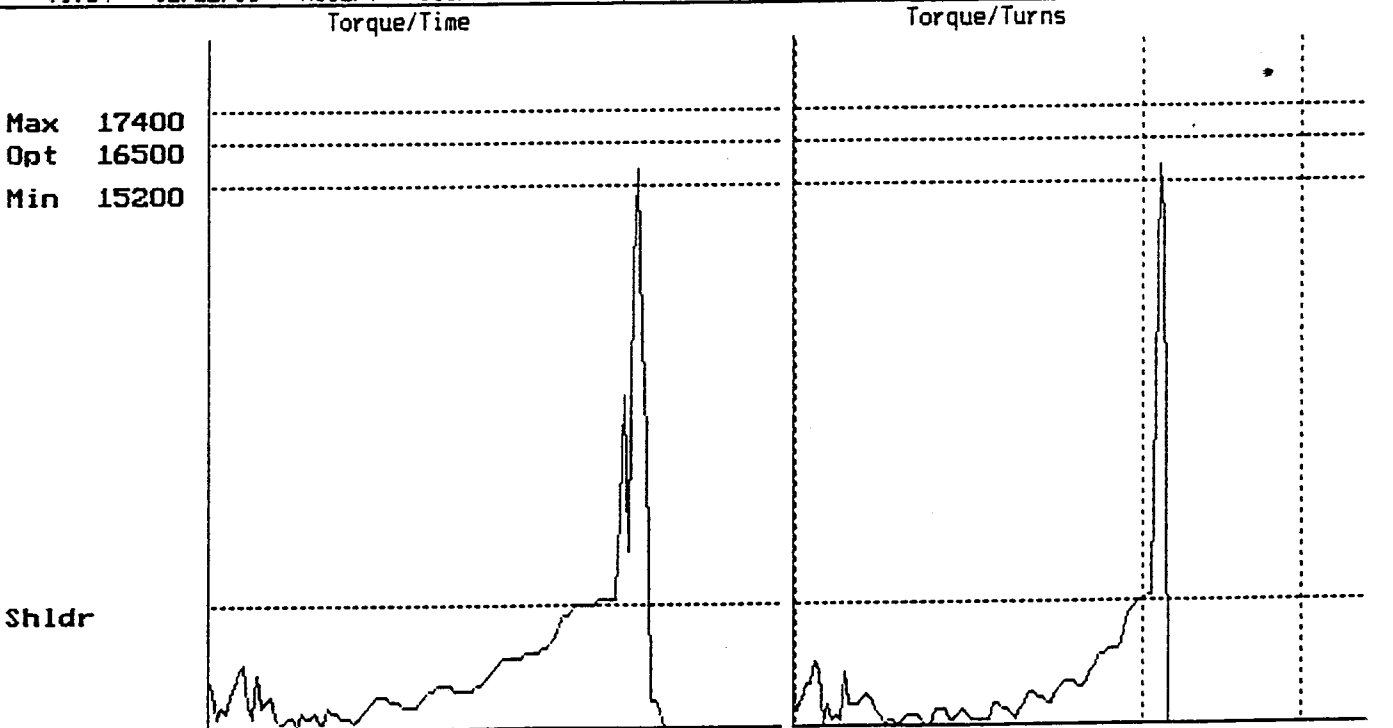


Ref 250 Mkp Time = 0 m 17 s
Applied Torque = 17115 Top Turns = 2.004
Shldr Torque = 3992 Delta Rate = 65614 Delta Torque = 13123 Delta Tns = 0.200
Comments:OK SH...TRIED WITH NO BACKUP TONG

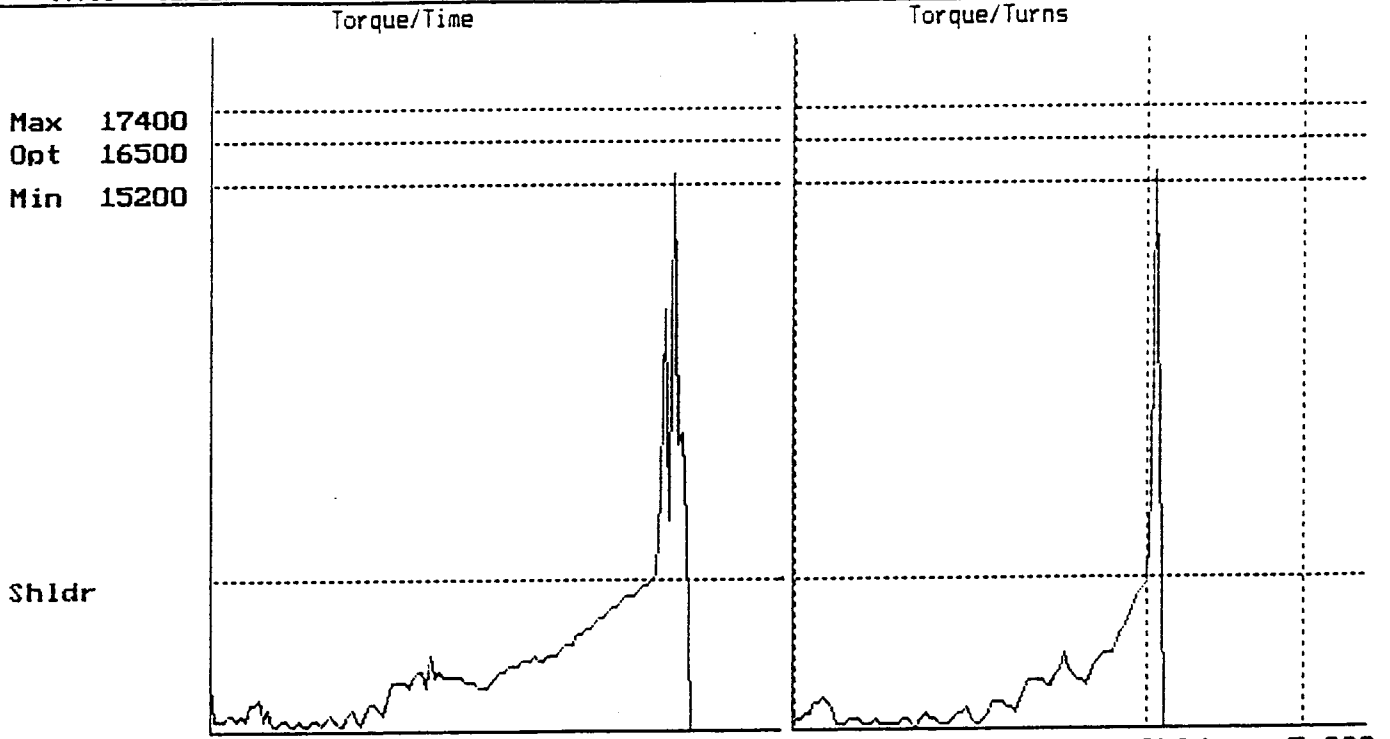




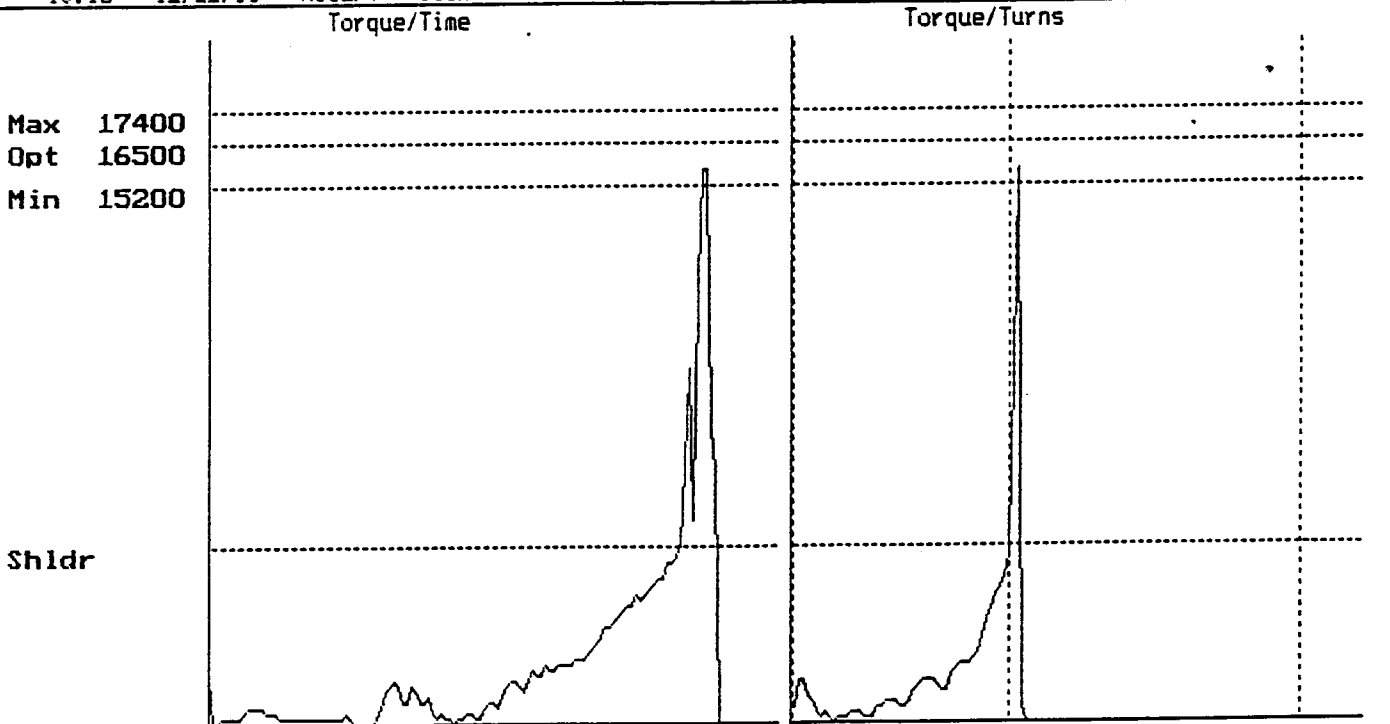
Ref 250 Mkp Time = 0 m 29 s
Applied Torque = 15742 Top Turns = 4.067
Shldr Torque = 4565 Delta Rate = 157422 Delta Torque = 11177 Delta Tns = 0.071
Comments:OK SH



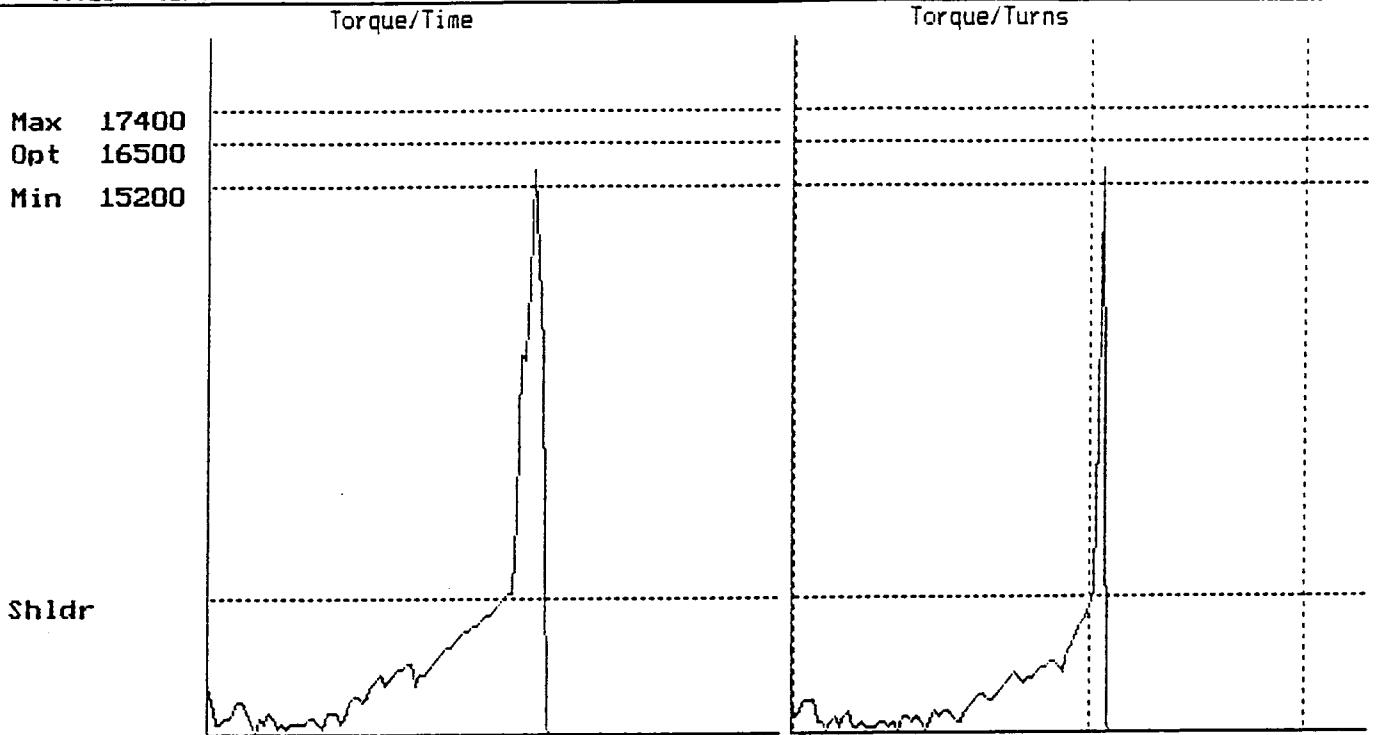
Ref 250 Mkp Time = 0 m 20 s
Applied Torque = 15602 Top Turns = 3.622
Shldr Torque = 3712 Delta Rate = 64270 Delta Torque = 11890 Delta Tns = 0.185
Comments:OK SH



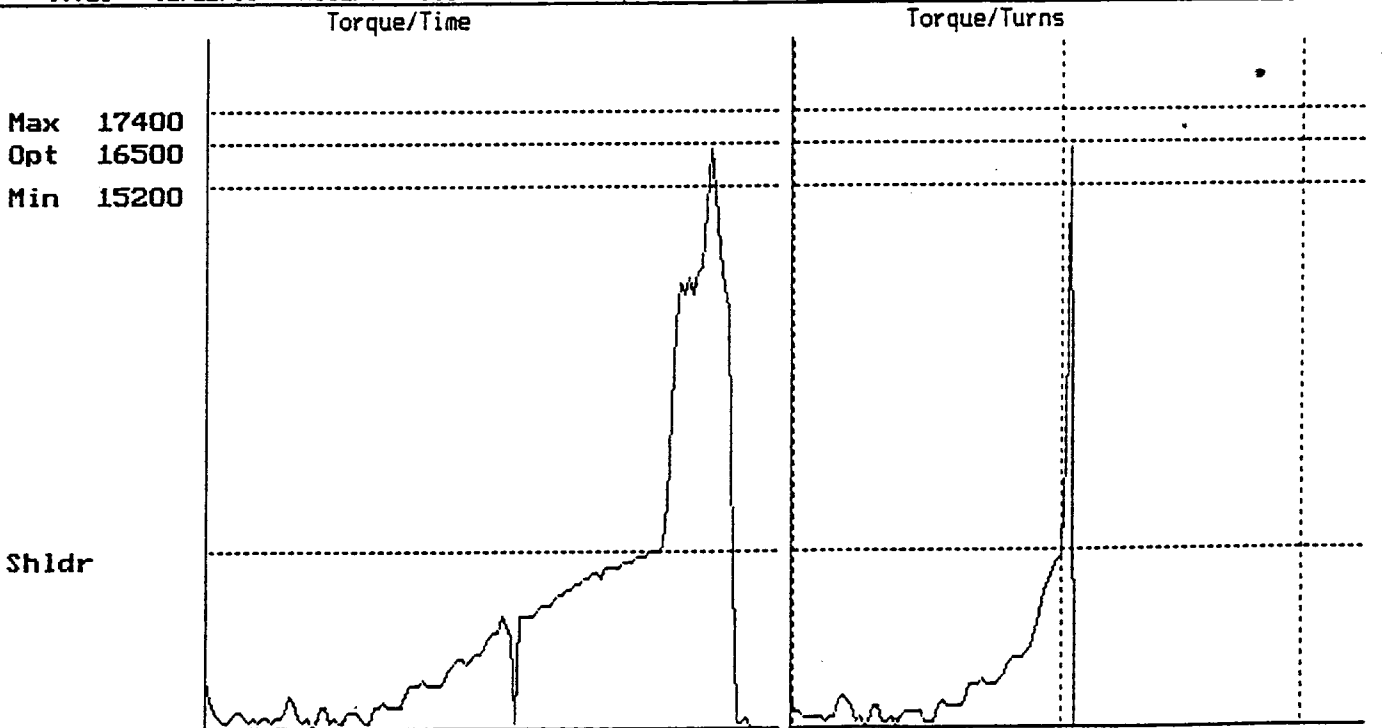
Ref 250 Mkp Time = 0 m 22 s
Applied Torque = 15489 Top Turns = 3.581
Shldr Torque = 4512 Delta Rate = 108683 Delta Torque = 10977 Delta Tns = 0.101
Comments:OK SH



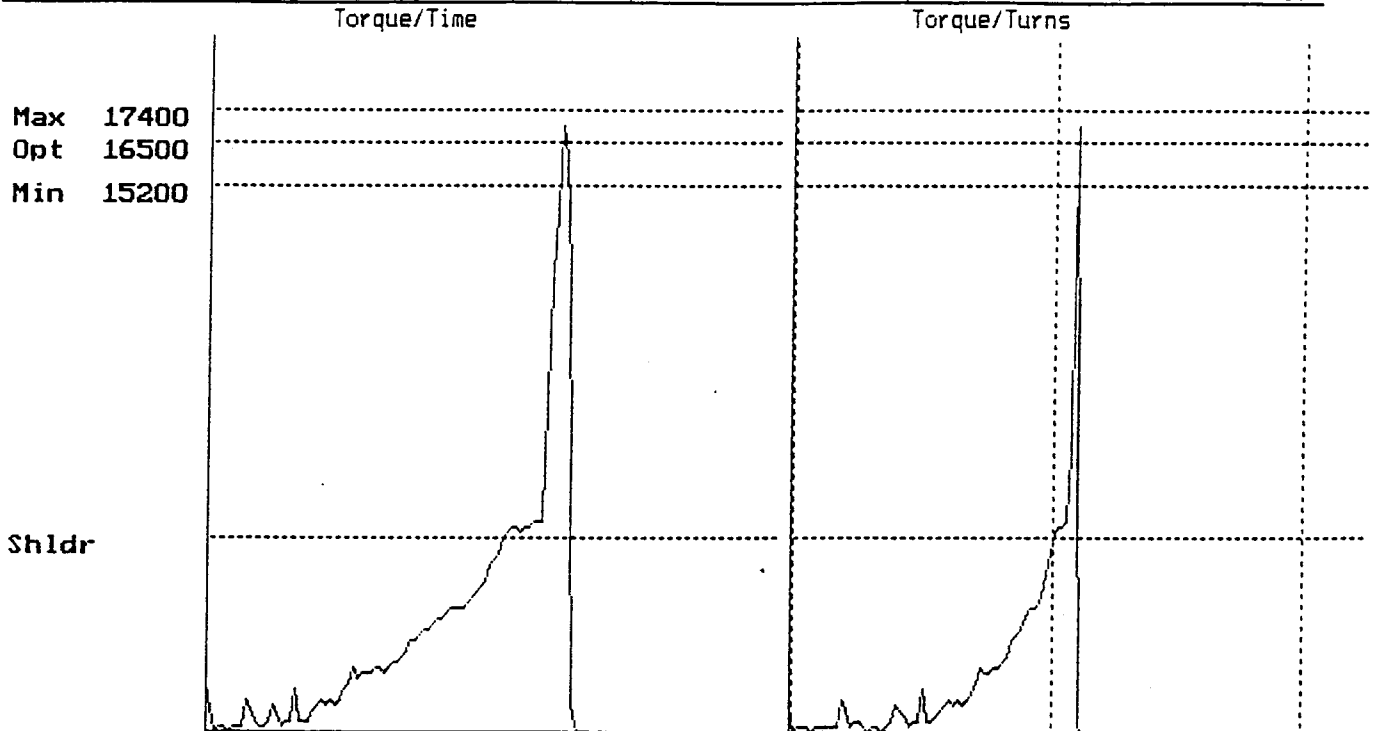
Ref 250 Mkp Time = 0 m 23 s
Applied Torque = 15709 Top Turns = 2.242
Shldr Torque = 5192 Delta Rate = 111882 Delta Torque = 10517 Delta Tns = 0.094
Comments:OK SH



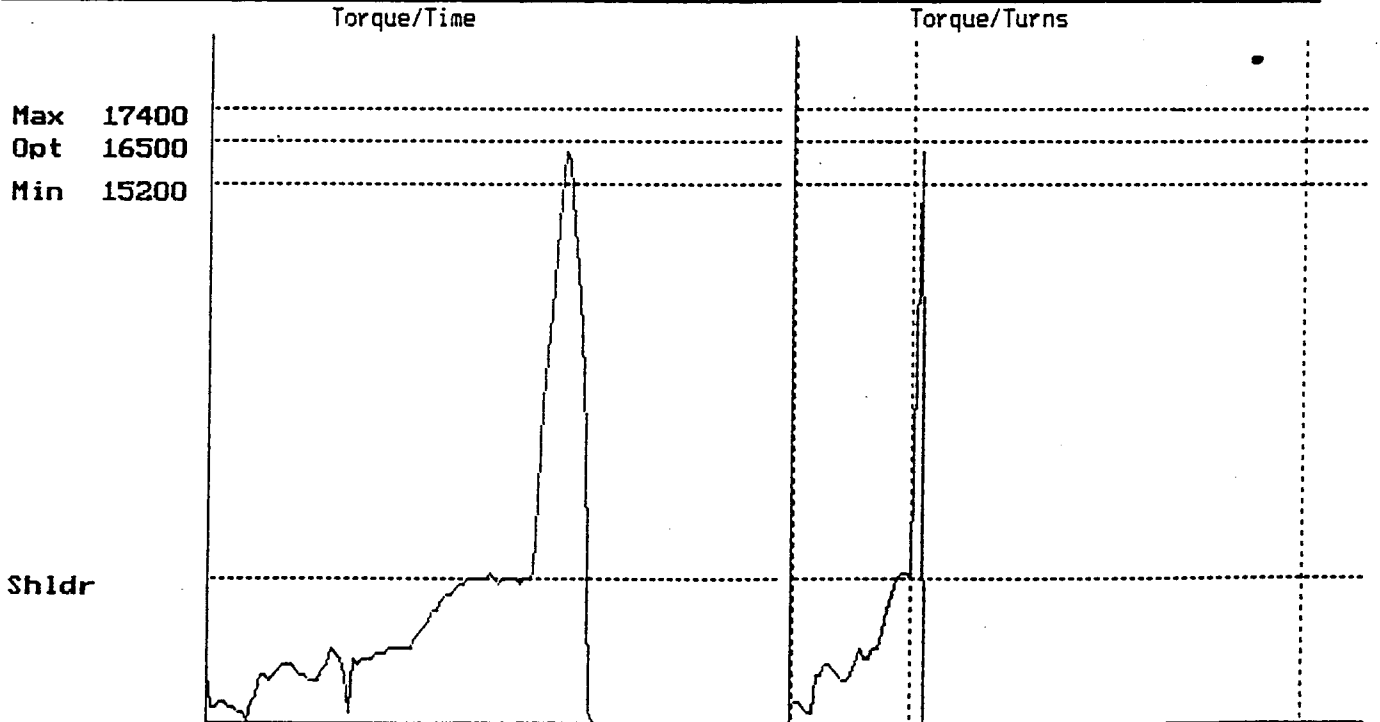
Ref 250 Mkp Time = 0 m 15 s
Applied Torque =15582 Top Turns = 3.060
Shldr Torque = 4072 Delta Rate = 82805 Delta Torque =11510 Delta Tns = 0.139
Comments:OK SH



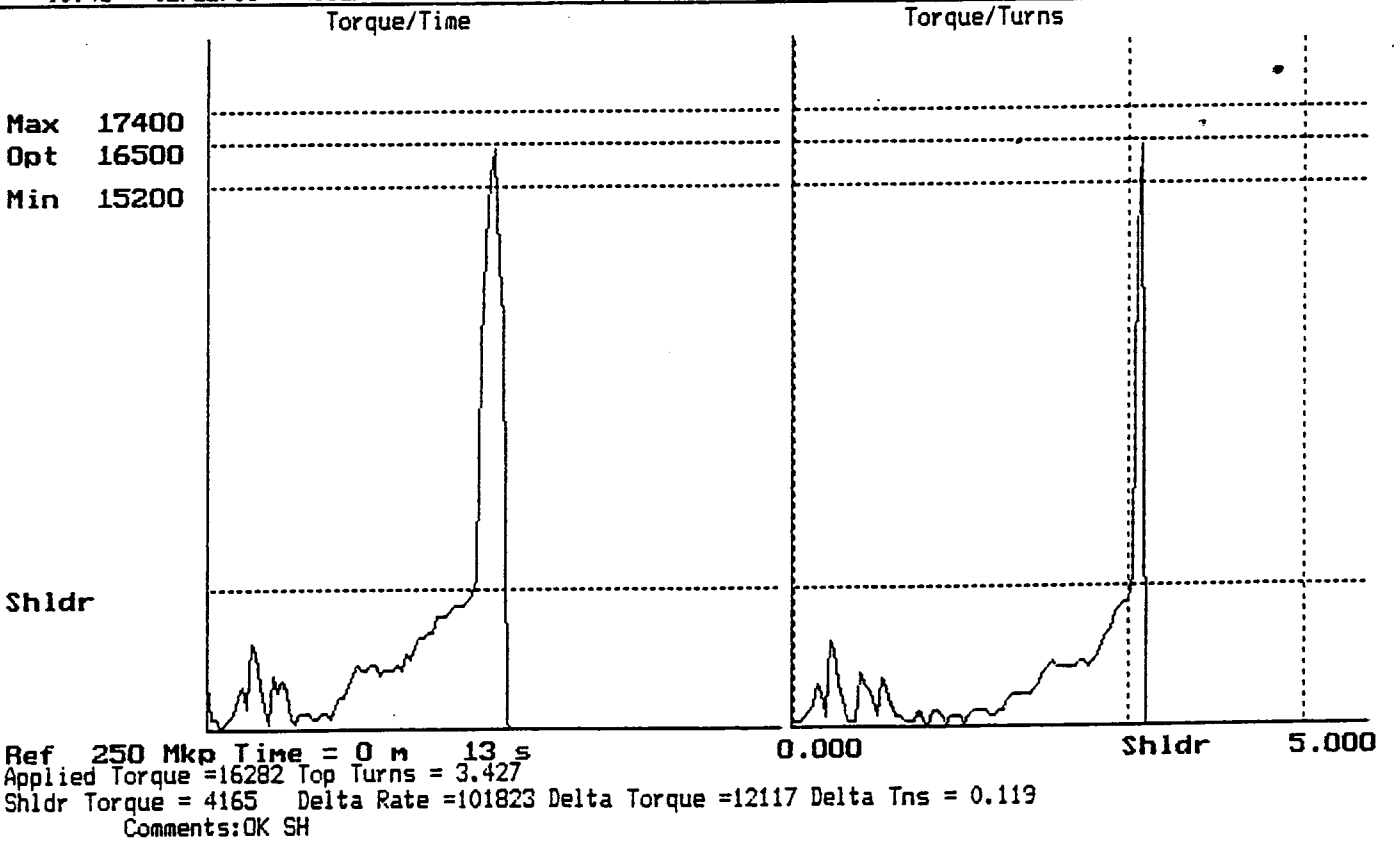
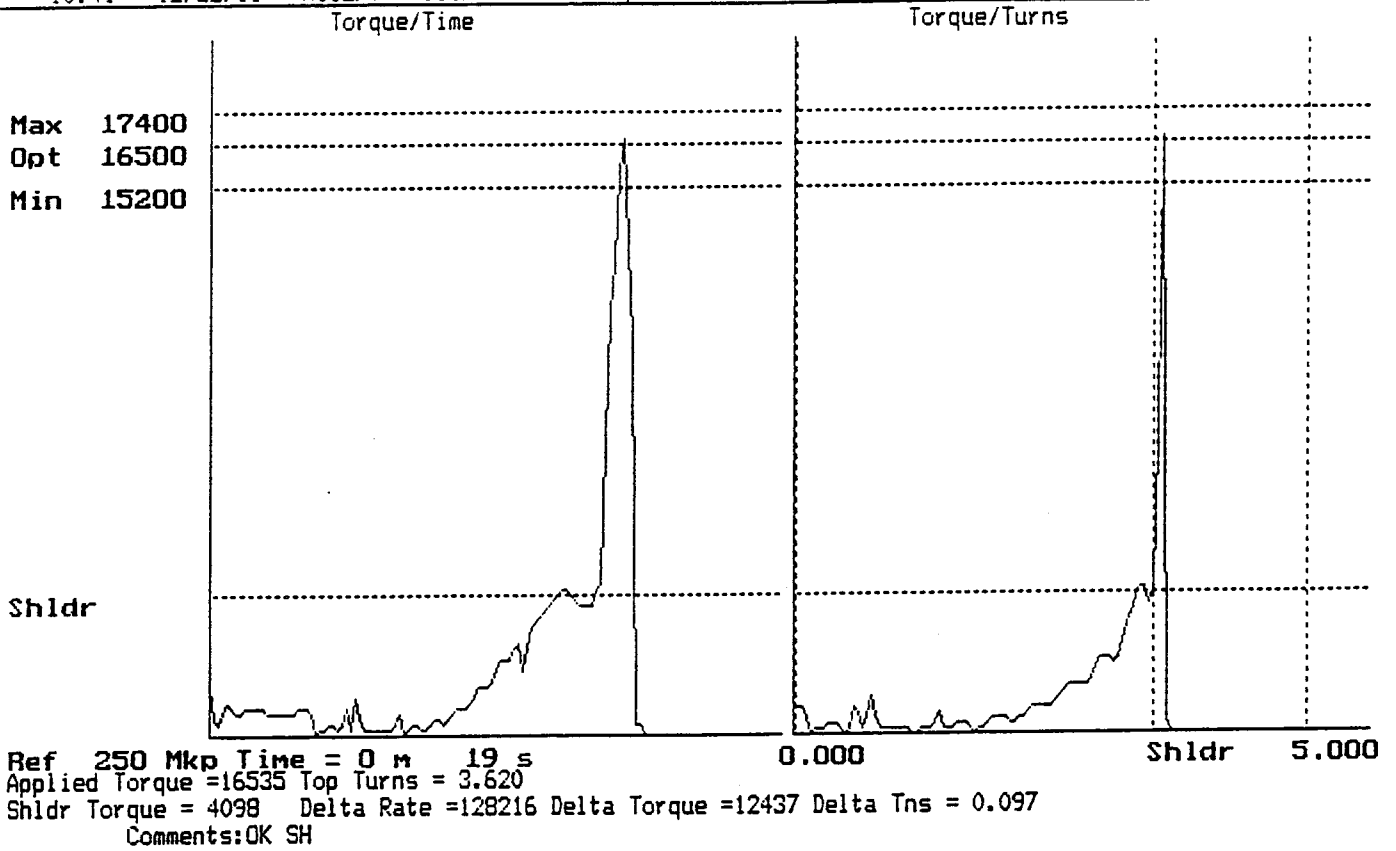
Ref 250 Mkp Time = 0 m 12 s
Applied Torque =16195 Top Turns = 2.749
Shldr Torque = 5198 Delta Rate =129376 Delta Torque =10997 Delta Tns = 0.085
Comments:ROTARY TABLE STARTED TO TURN AT END OF MAKEUP...OK
SH

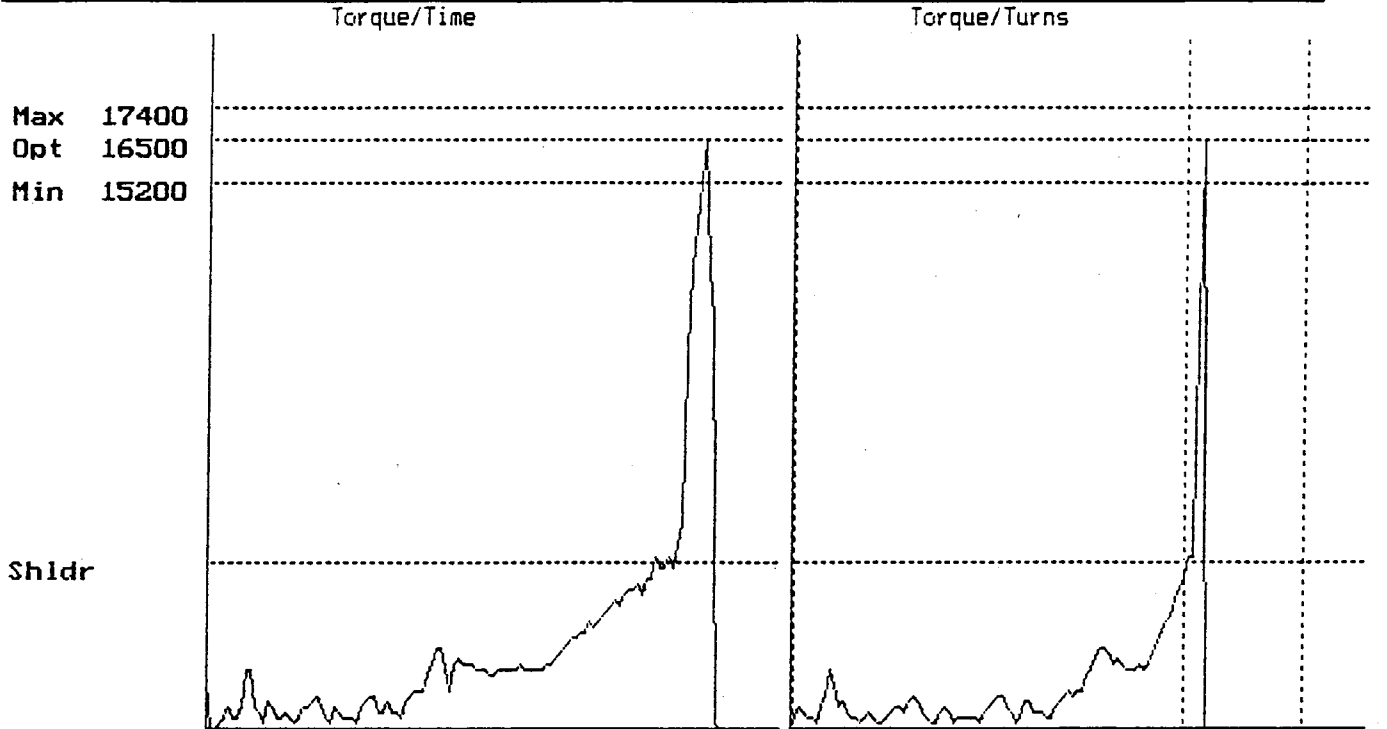


Ref 250 Mkp Time = 0 m 17 s
Applied Torque = 16789 Top Turns = 2.803
Shldr Torque = 5705 Delta Rate = 49262 Delta Torque = 11084 Delta Tns = 0.225
Comments: OK SH

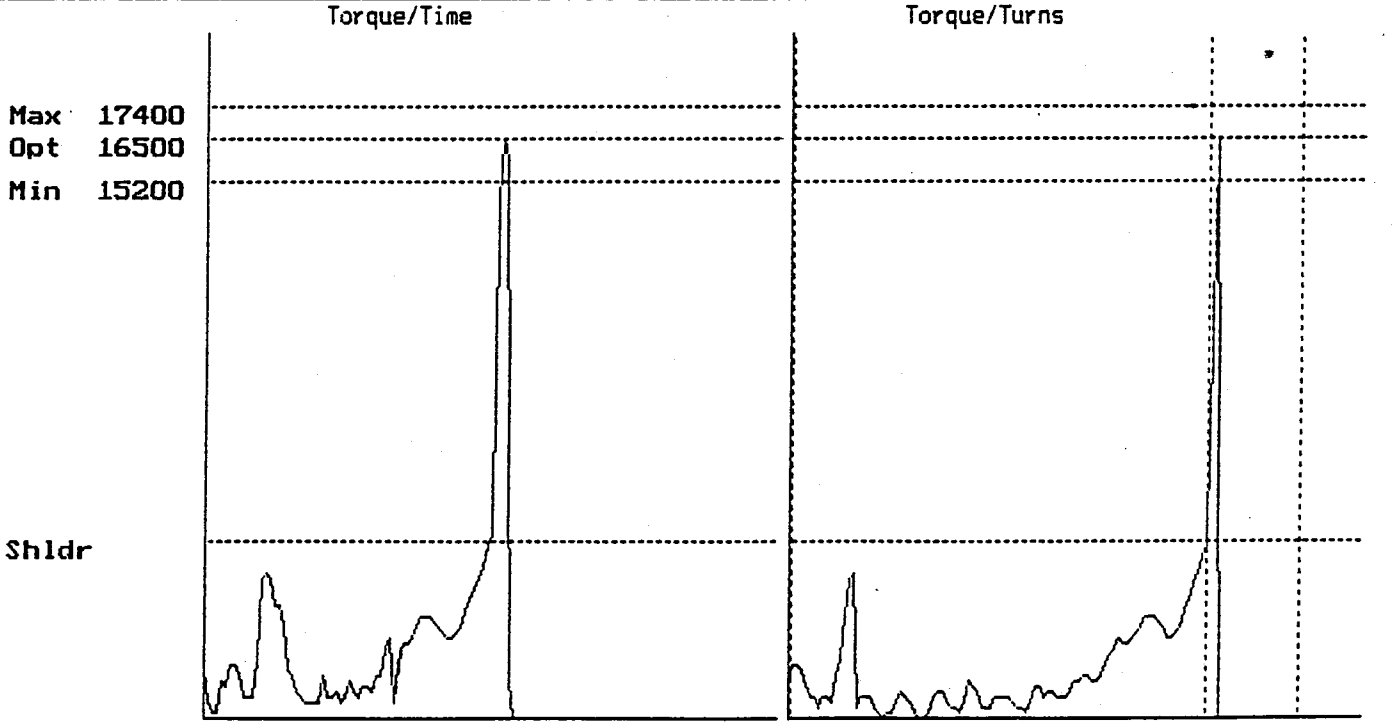


Ref 250 Mkp Time = 0 m 8 s
Applied Torque = 16042 Top Turns = 1.277
Shldr Torque = 4246 Delta Rate = 159405 Delta Torque = 11796 Delta Tns = 0.074
Comments: OK SH

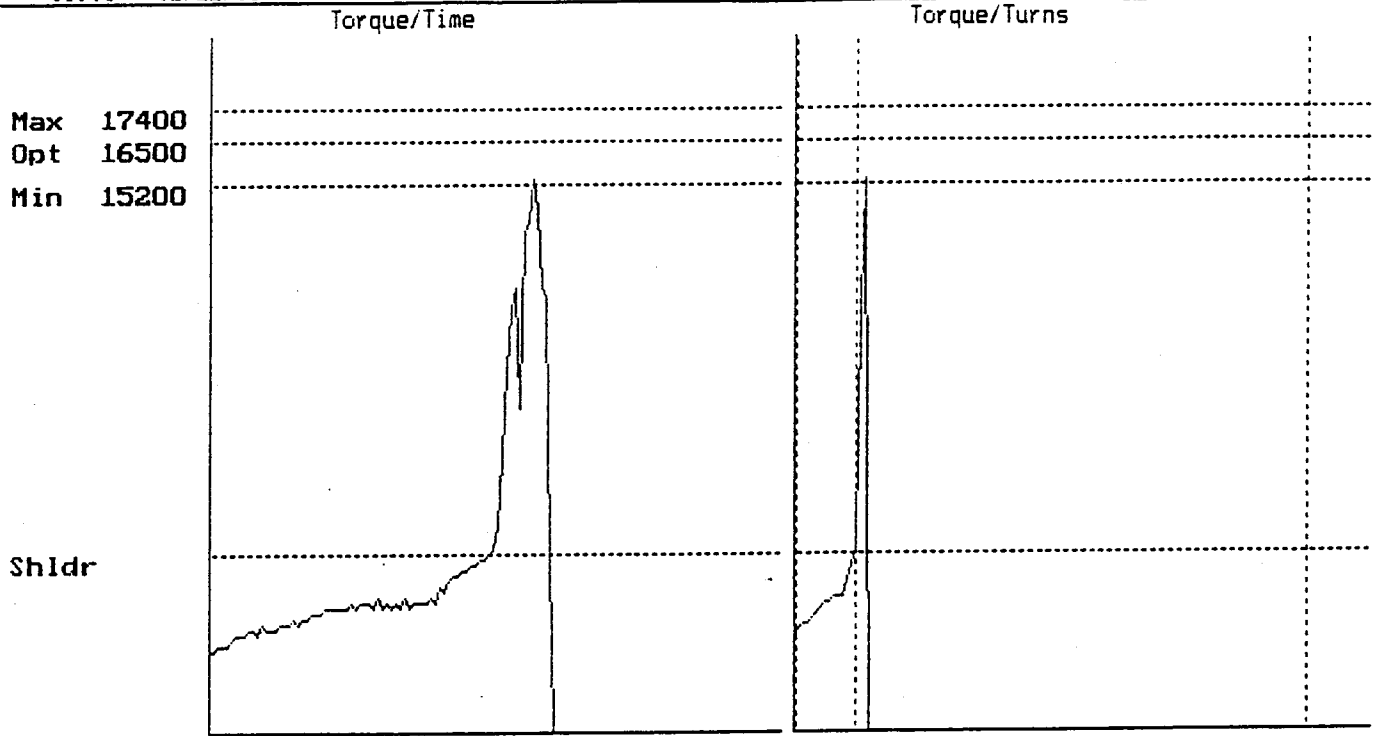




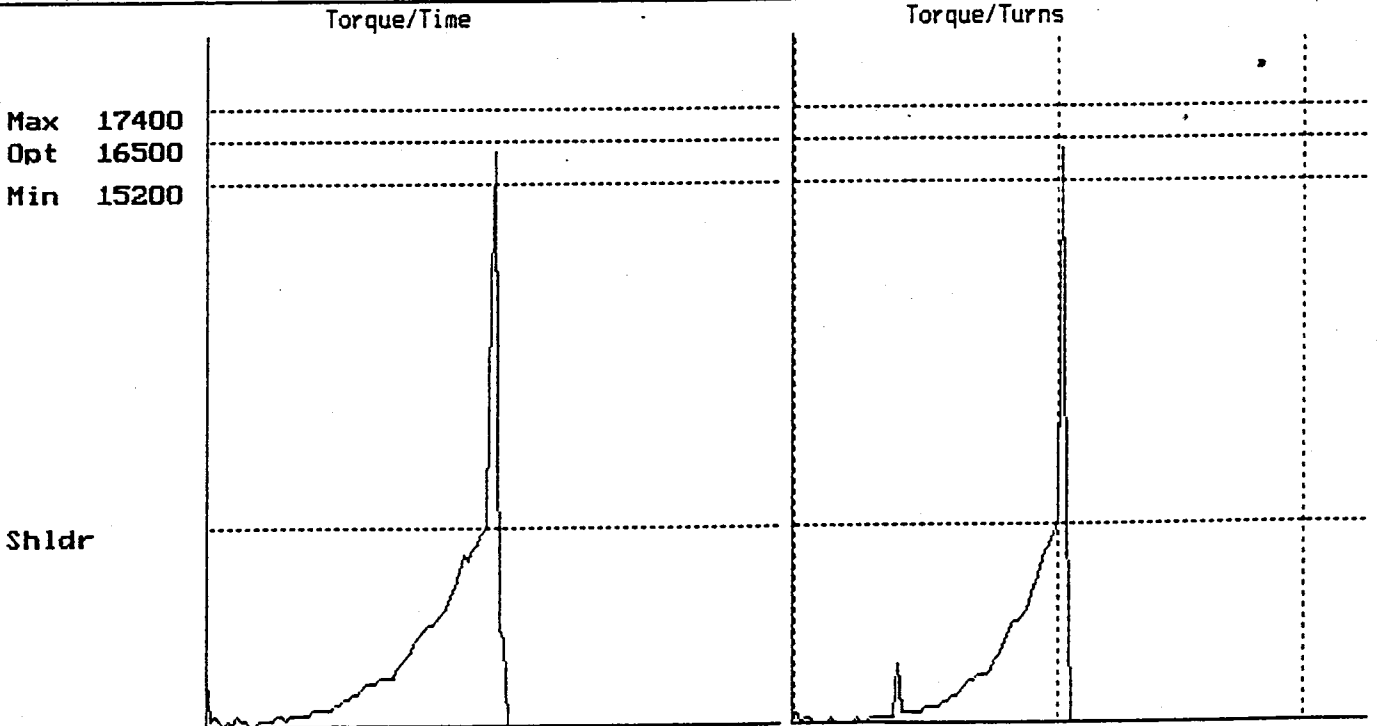
Ref 250 Mkp Time = 0 m 23 s
 Applied Torque = 16329 Top Turns = 4.041
 Shldr Torque = 4892 Delta Rate = 65729 Delta Torque = 11437 Delta Tns = 0.174
 Comments: OK SH



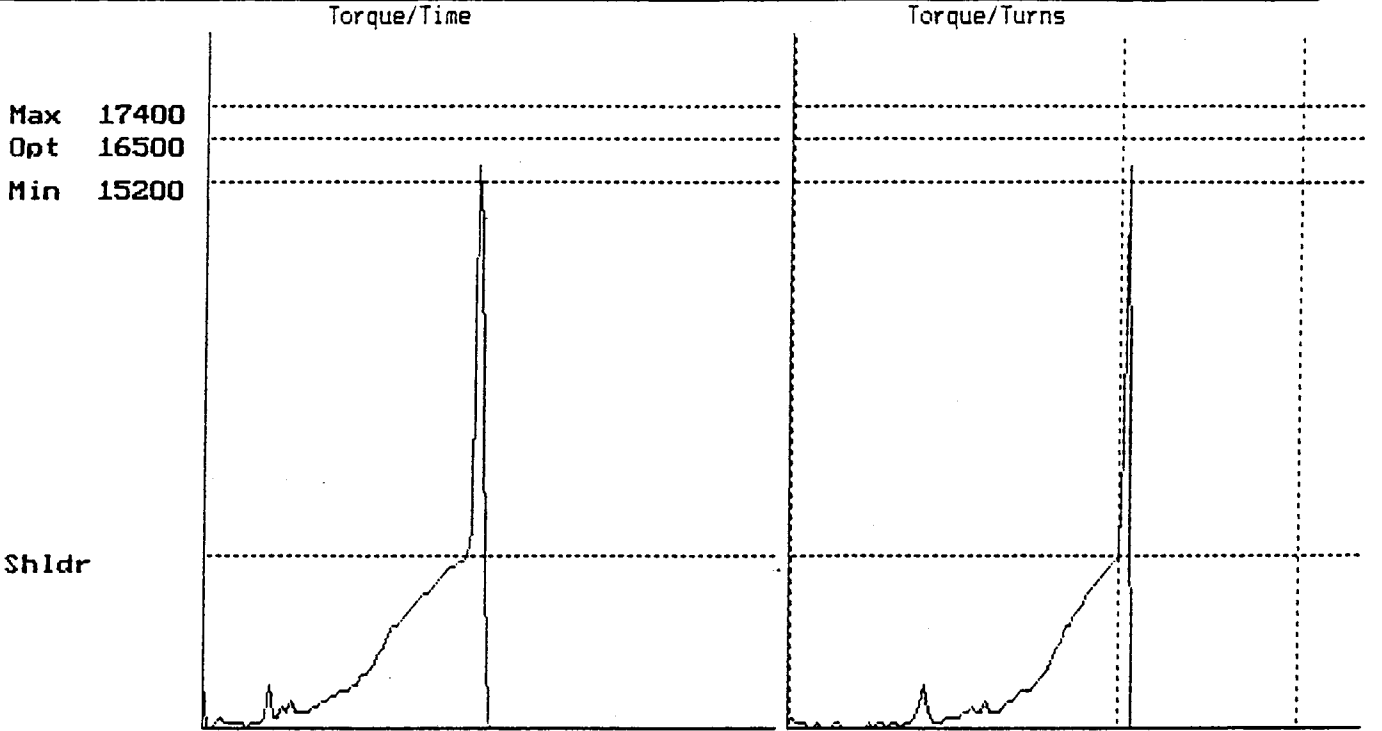
Ref 250 Mkp Time = 0 m 27 s
 Applied Torque = 16355 Top Turns = 4.215
 Shldr Torque = 5178 Delta Rate = 124188 Delta Torque = 11177 Delta Tns = 0.090
 Comments: OK SH



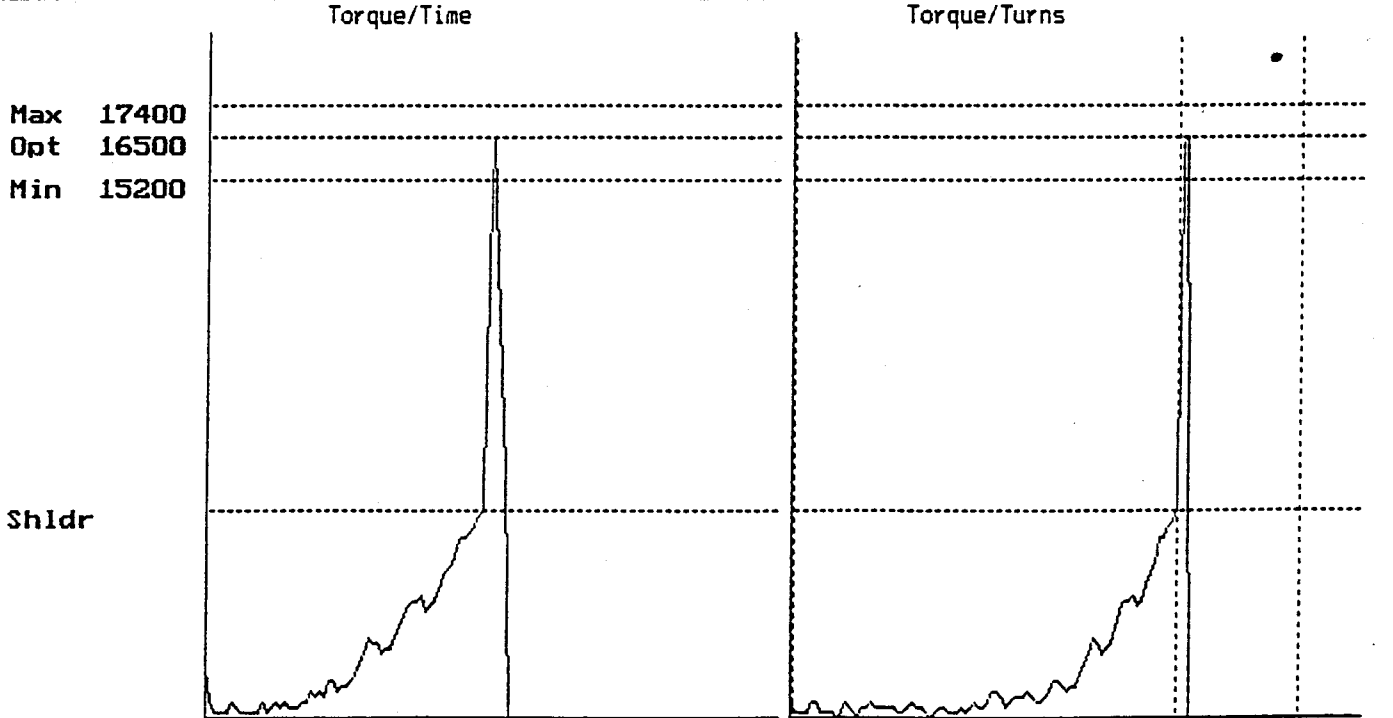
Ref 250 Mkp Time = 0 m 7 s
Applied Torque = 15322 Top Turns = 0.719
Shldr Torque = 5265 Delta Rate = 134093 Delta Torque = 10057 Delta Tns = 0.075
Comments: STARTED COMPUTER LATE...OK AS PER BAKER REP



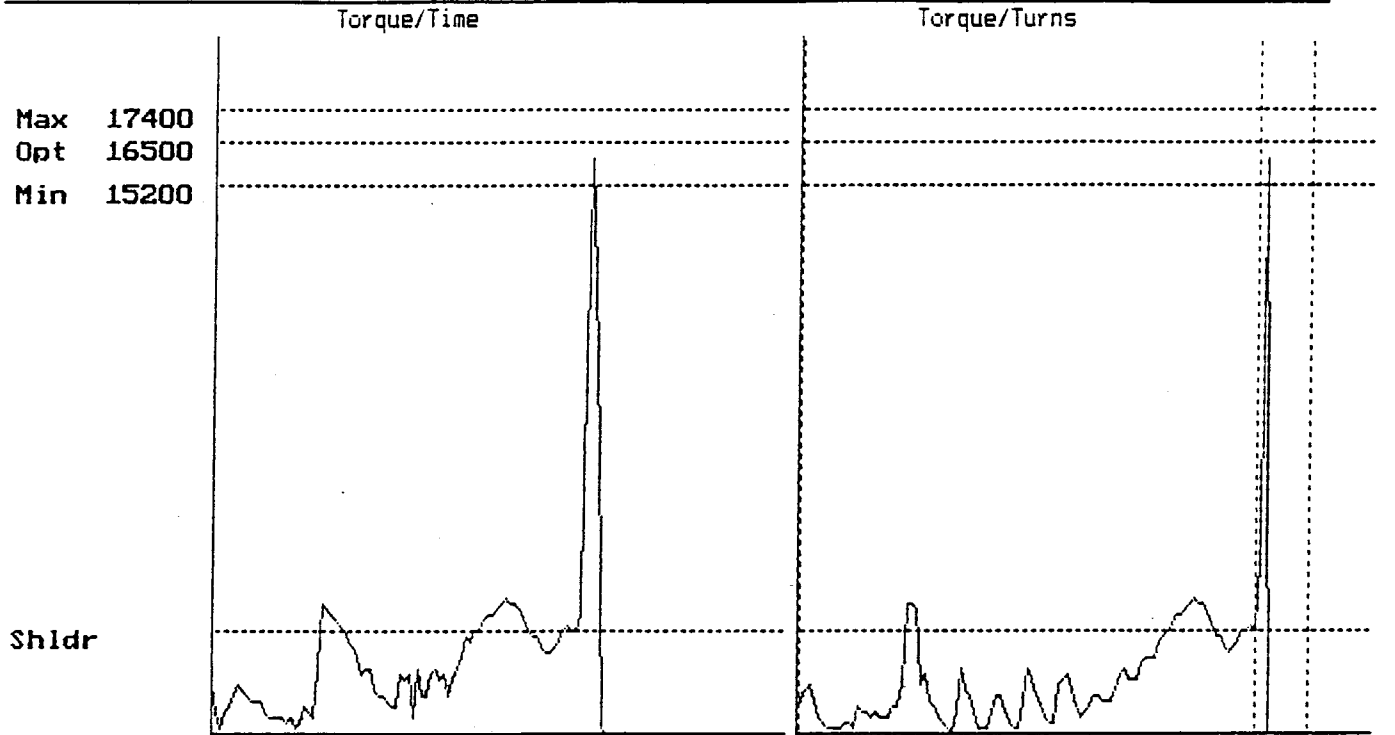
Ref 250 Mkp Time = 0 m 27 s
Applied Torque = 16015 Top Turns = 2.677
Shldr Torque = 5726 Delta Rate = 183732 Delta Torque = 10289 Delta Tns = 0.056
Comments: OK SH



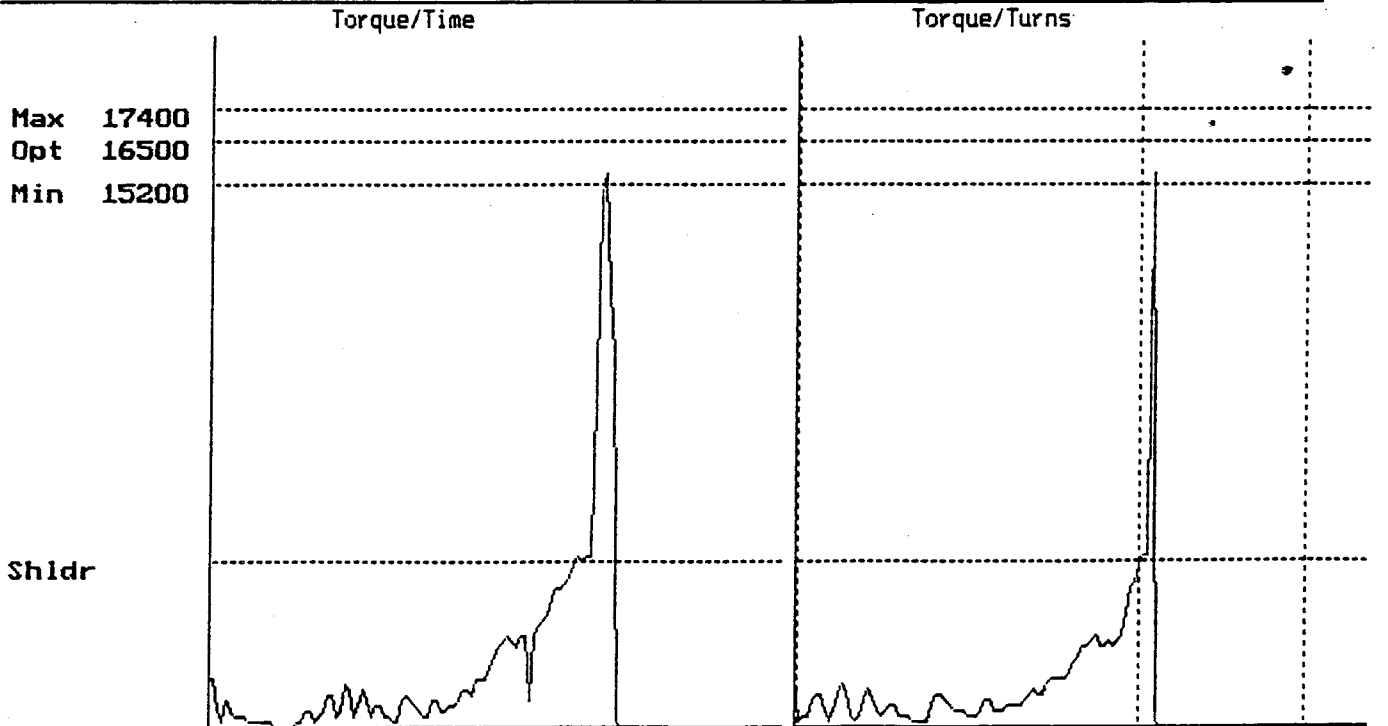
Ref 250 Mkp Time = 0 m 26 s
Applied Torque = 15596 Top Turns = 3.334
Shldr Torque = 4986 Delta Rate = 153768 Delta Torque = 10610 Delta Tns = 0.069
Comments: OK SH



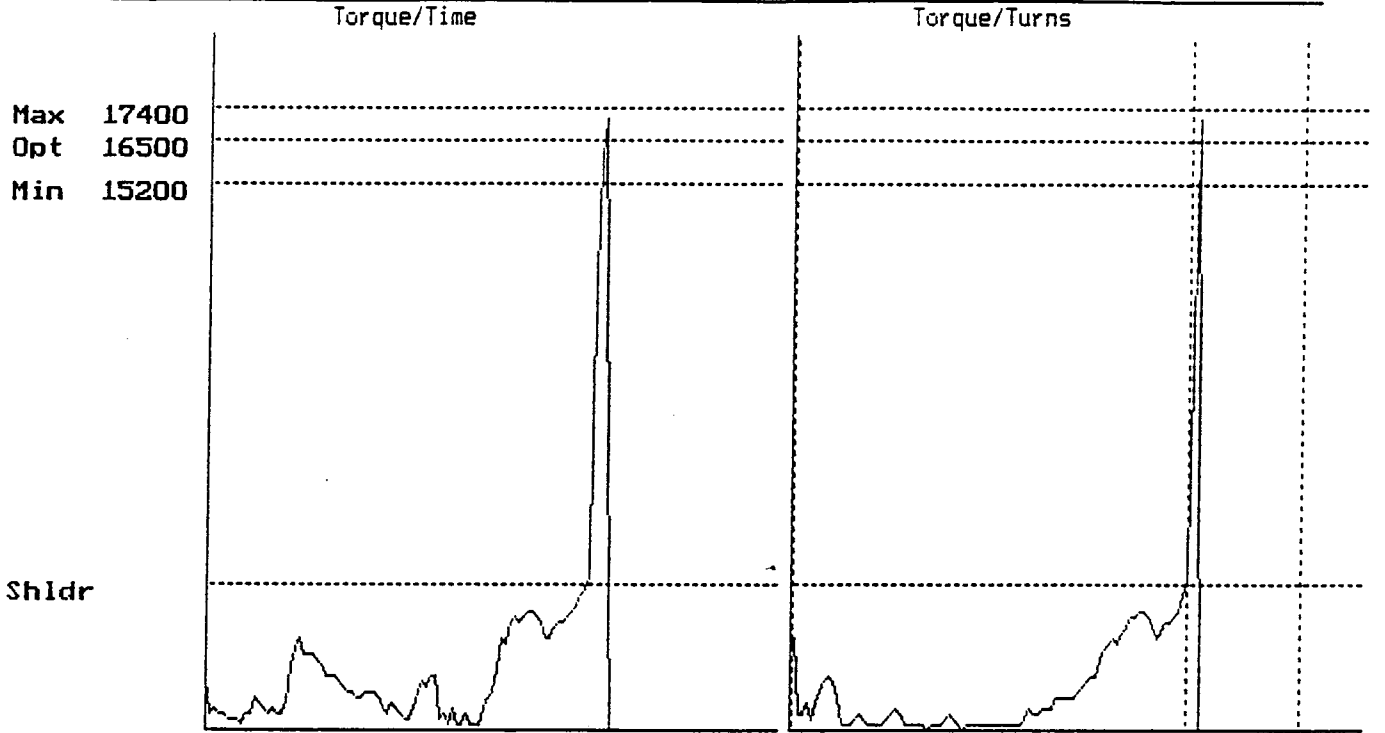
Ref 250 Mkp Time = 0 m 28 s
Applied Torque = 16329 Top Turns = 3.887
Shldr Torque = 6022 Delta Rate = 163603 Delta Torque = 10307 Delta Tns = 0.063
Comments: OK SH



Ref 250 Mkp Time = 0 m 35 s
 Applied Torque = 15916 Top Turns = 4.593
 Shldr Torque = 3062 Delta Rate = 156756 Delta Torque = 12854 Delta Tns = 0.082
 Comments: JOINT CROSSED AT START OF MAKEUP...OK SH

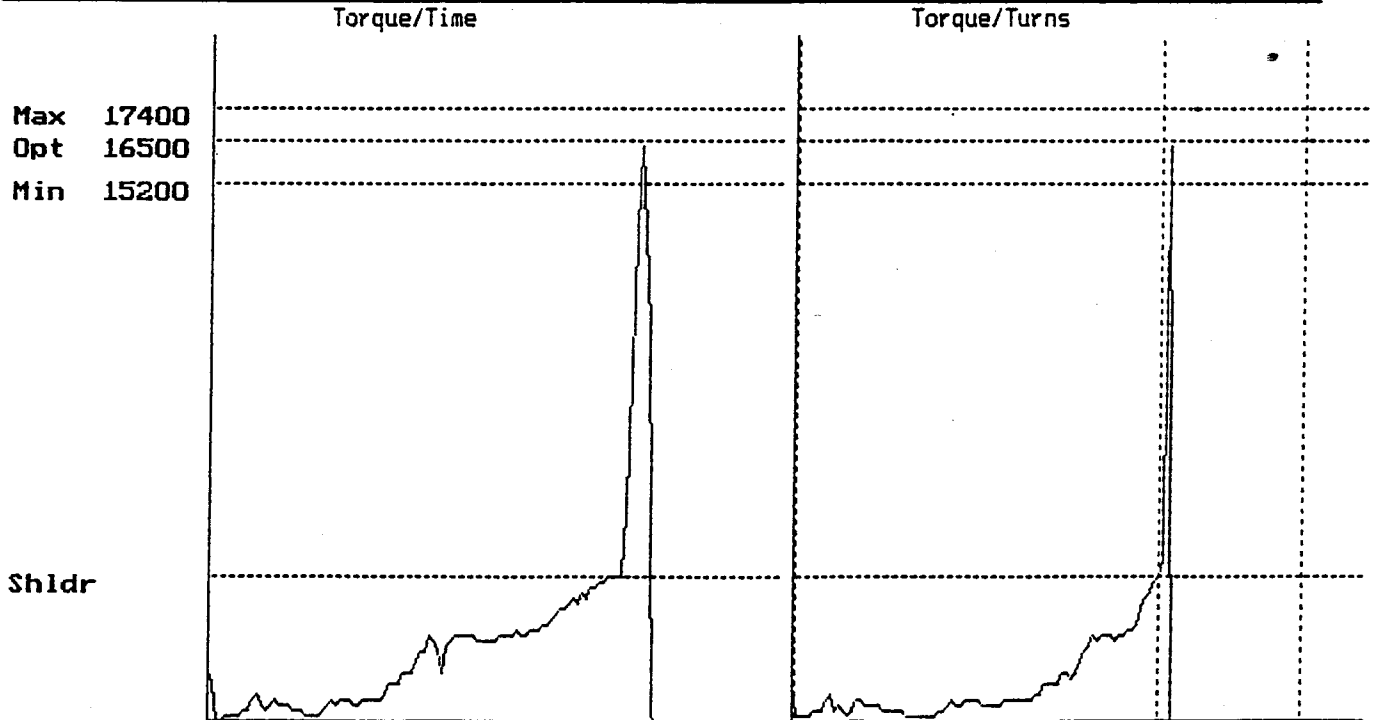


Ref 250 Mkp Time = 0 m 18 s
 Applied Torque = 15509 Top Turns = 3.532
 Shldr Torque = 4912 Delta Rate = 76789 Delta Torque = 10597 Delta Tns = 0.138
 Comments: OK SH



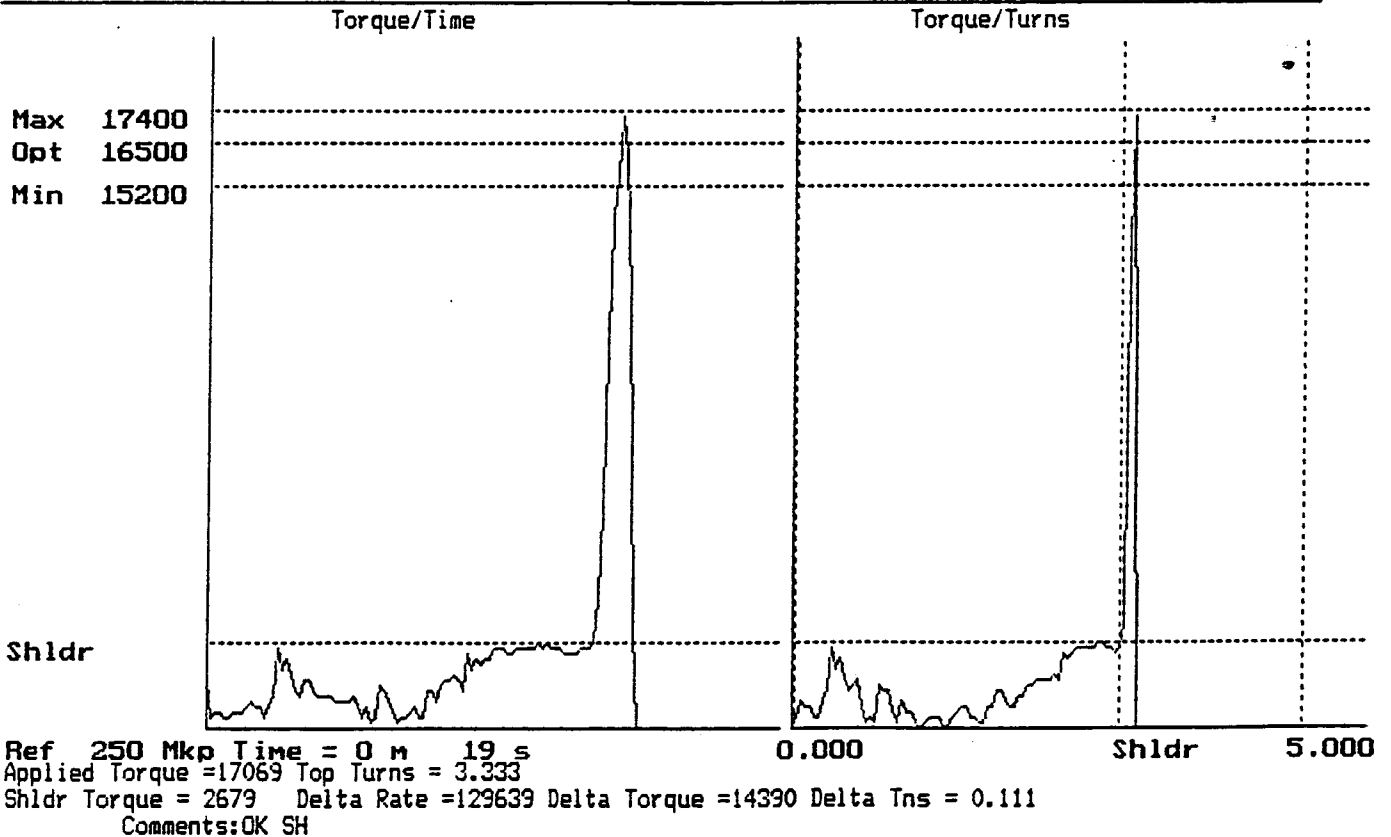
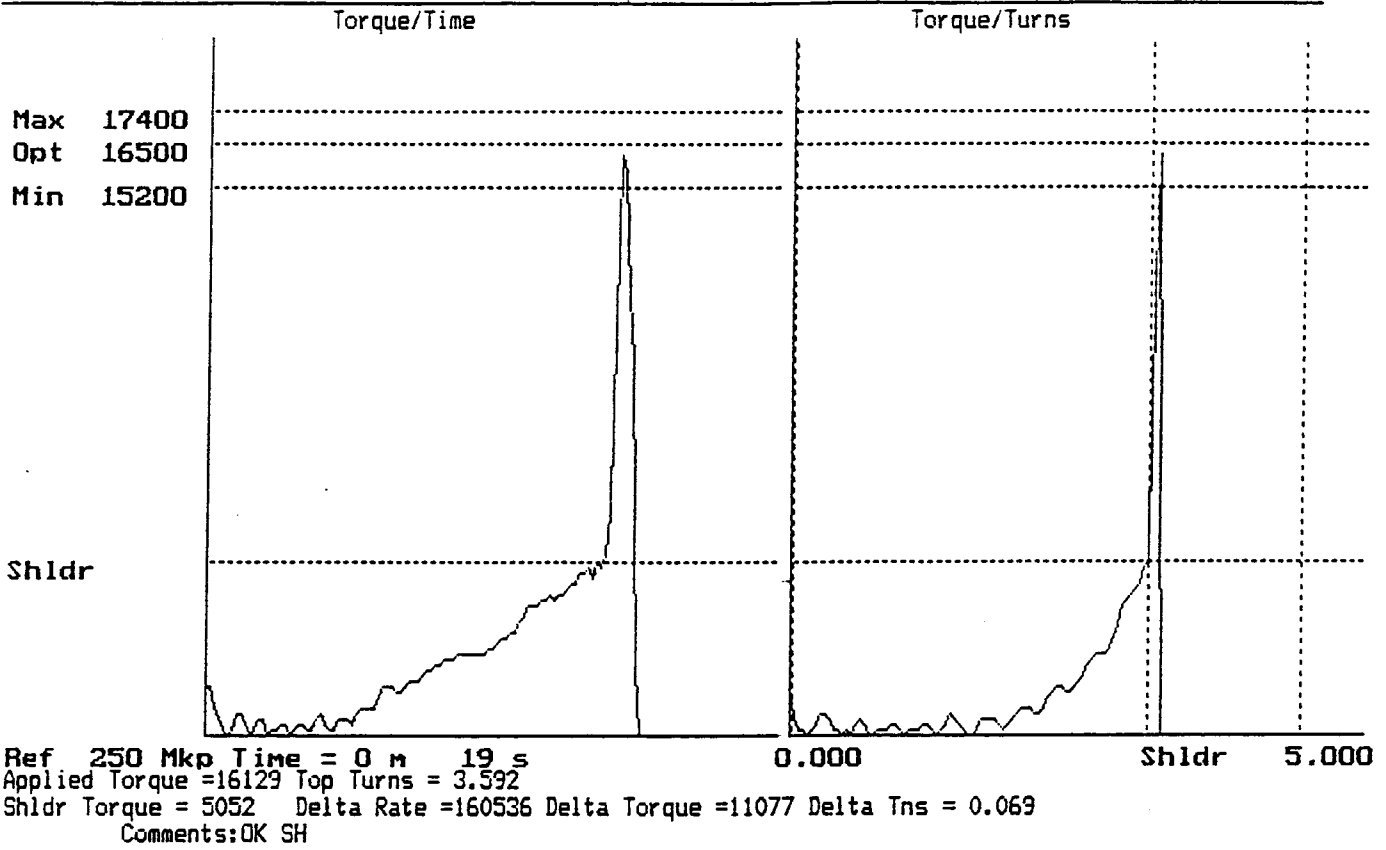
Max 17400
Opt 16500
Min 15200

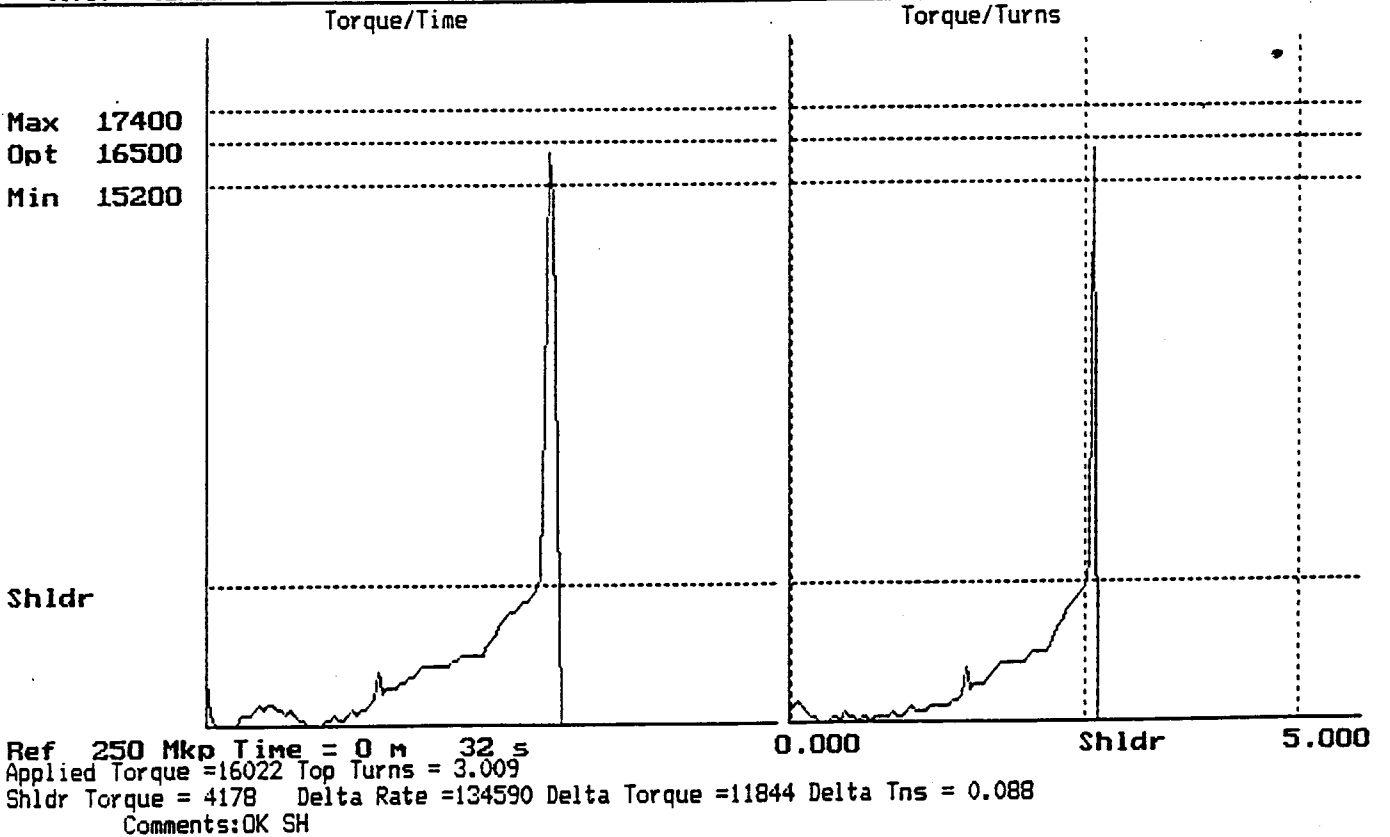
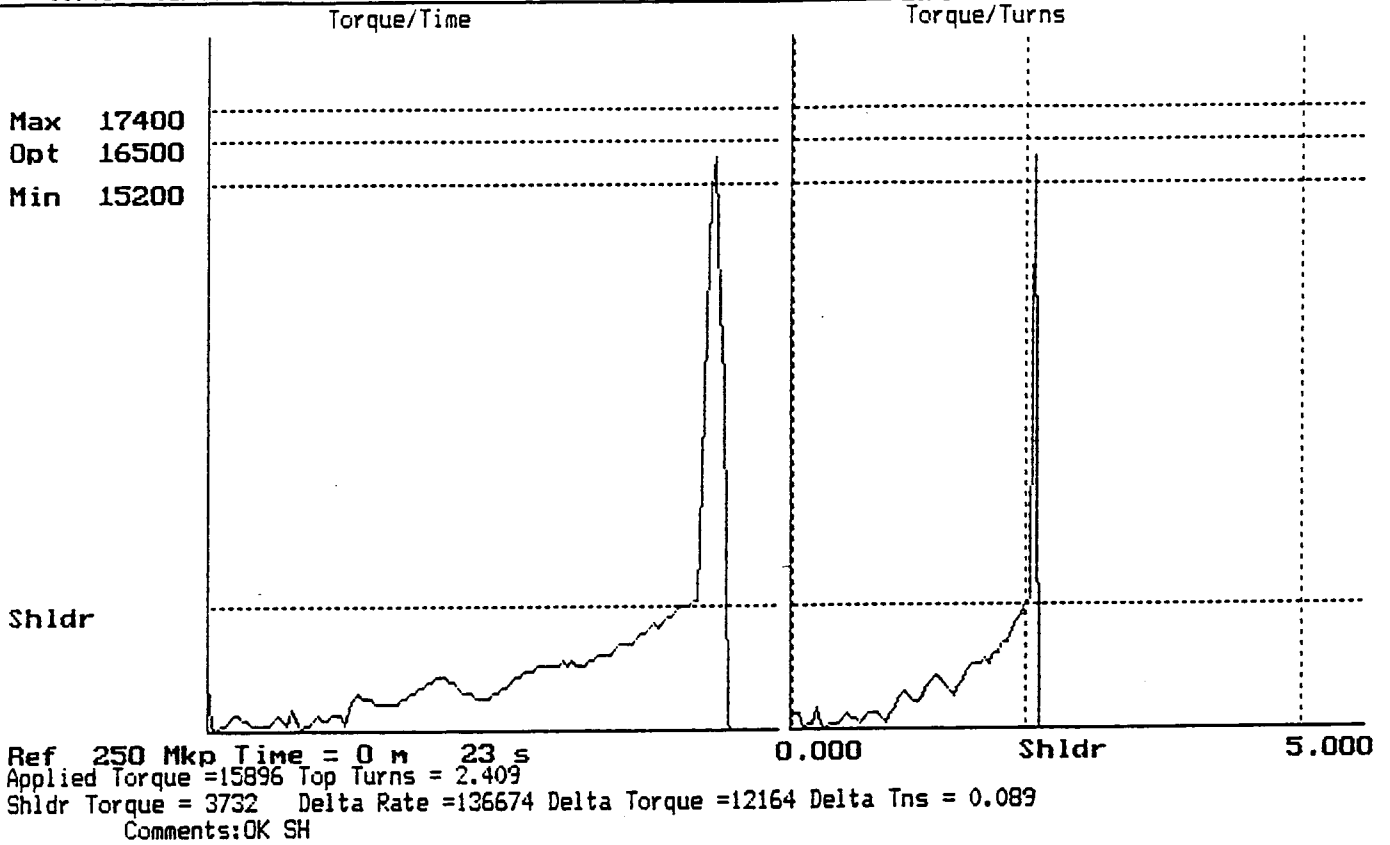
Ref 250 Mkp Time = 0 m 36 s
Applied Torque = 16935 Top Turns = 3.980
Shldr Torque = 4246 Delta Rate = 181271 Delta Torque = 12689 Delta Tns = 0.070
Comments:OK SH

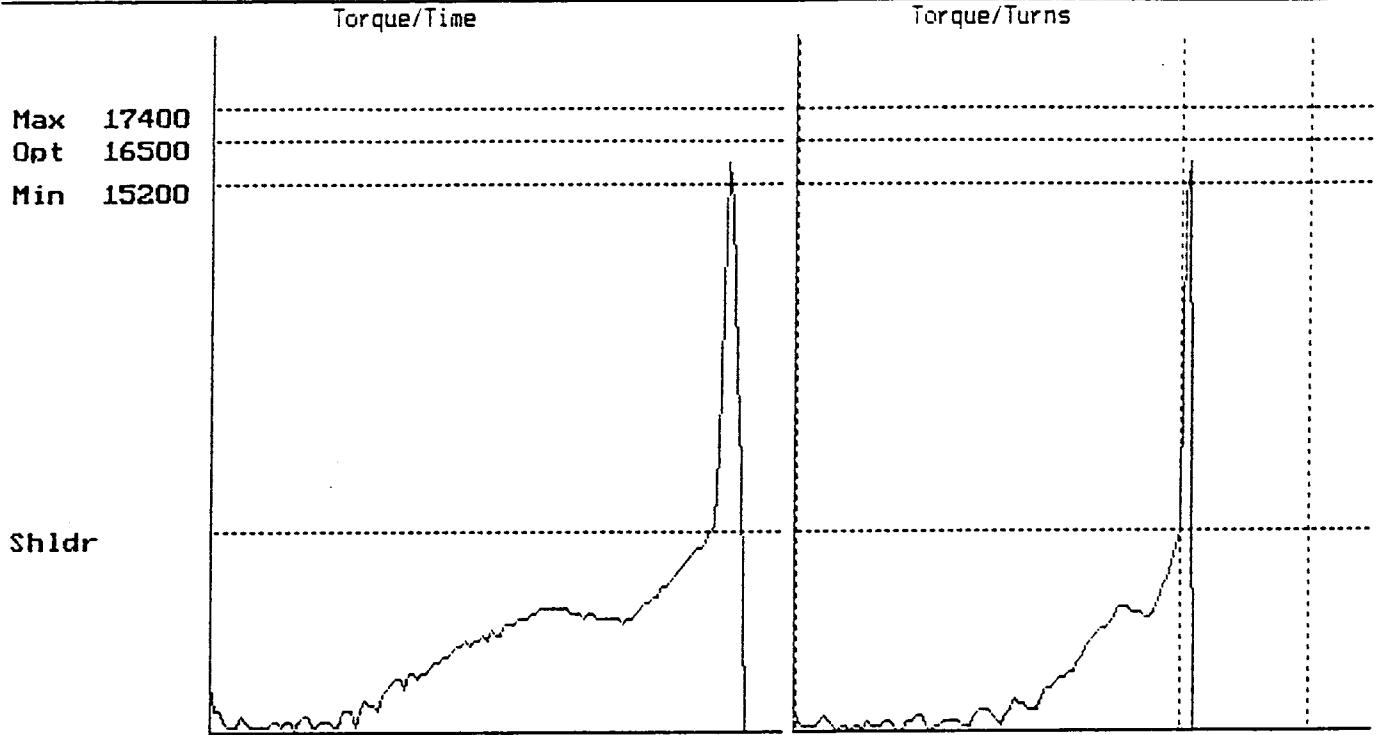


Max 17400
Opt 16500
Min 15200

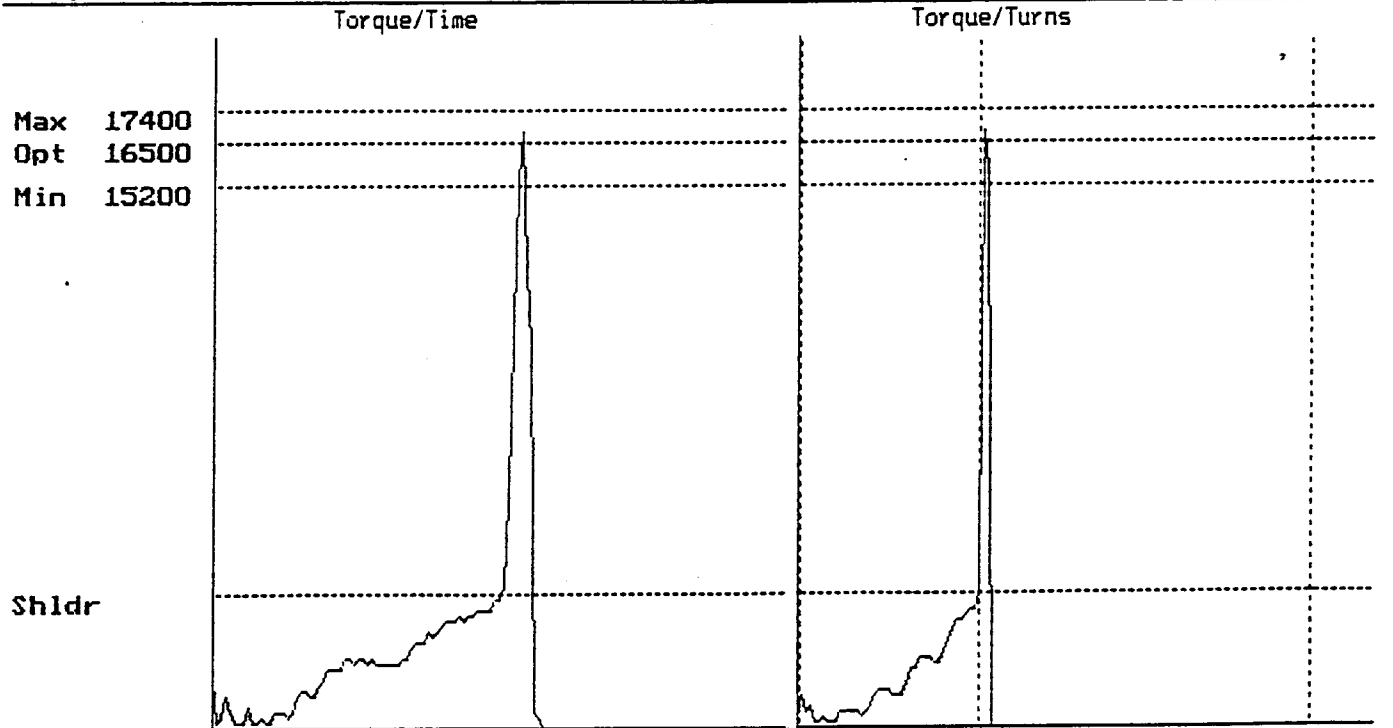
Ref 250 Mkp Time = 0 m 20 s
Applied Torque = 16242 Top Turns = 3.696
Shldr Torque = 4292 Delta Rate = 137356 Delta Torque = 11950 Delta Tns = 0.087
Comments:OK SH



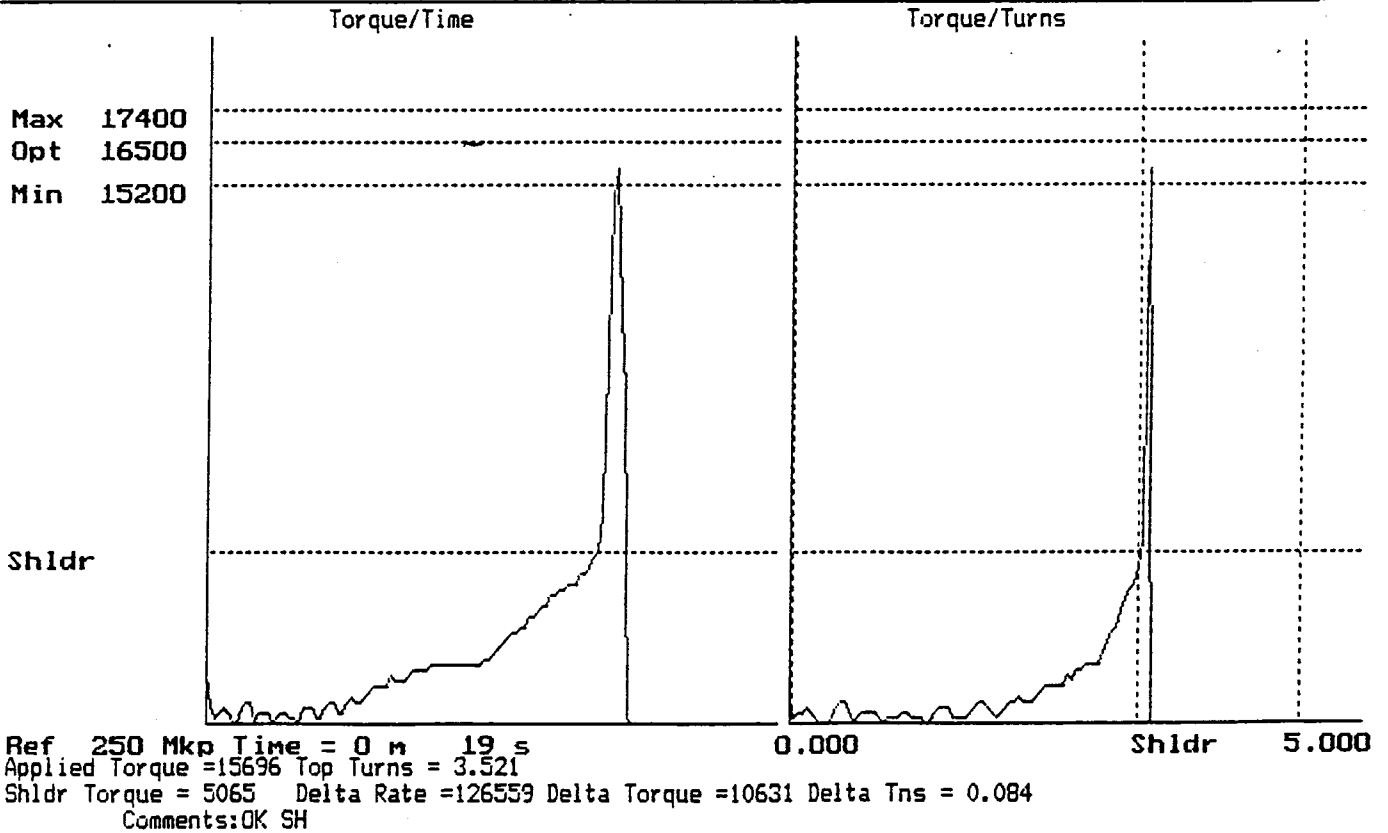
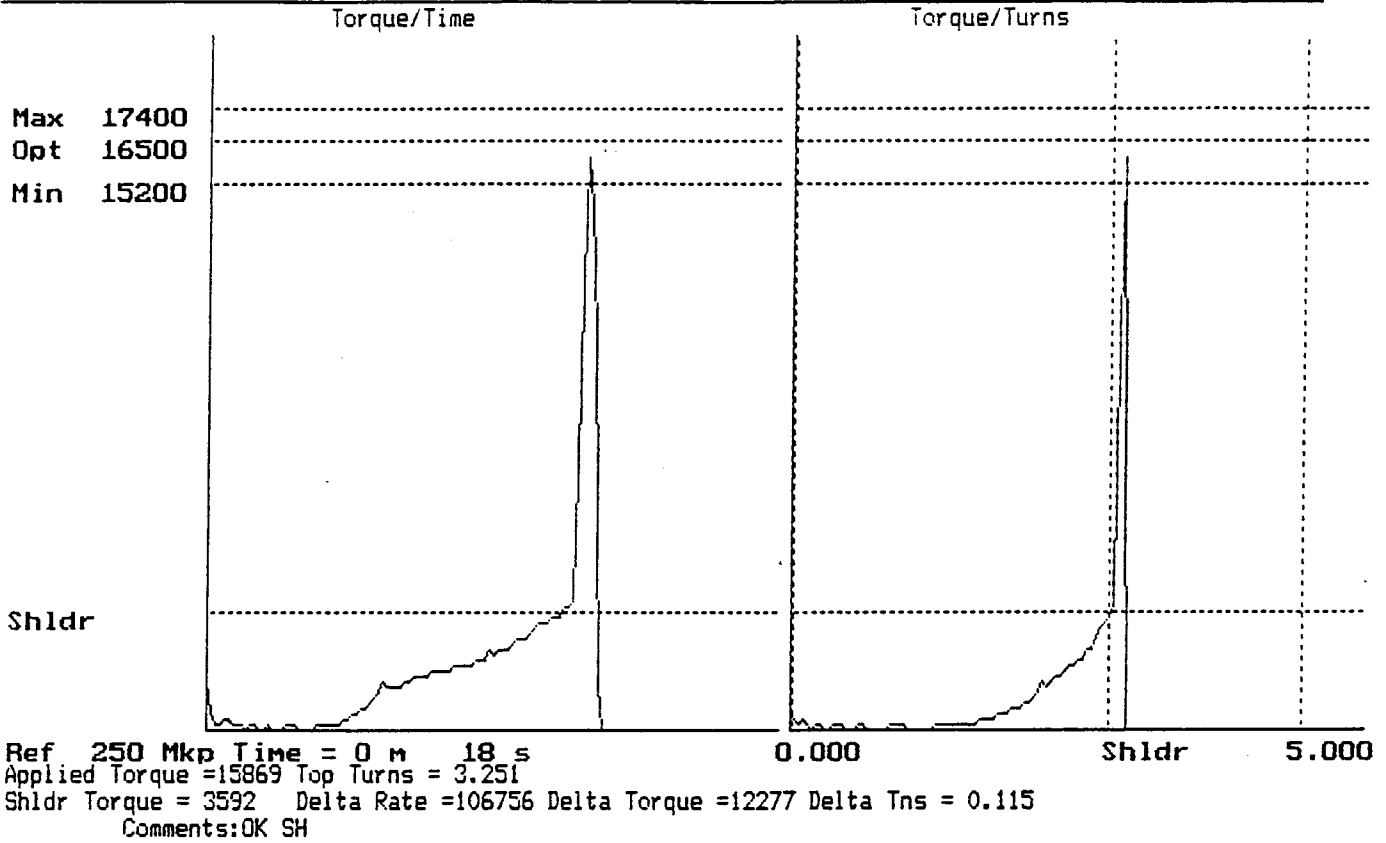


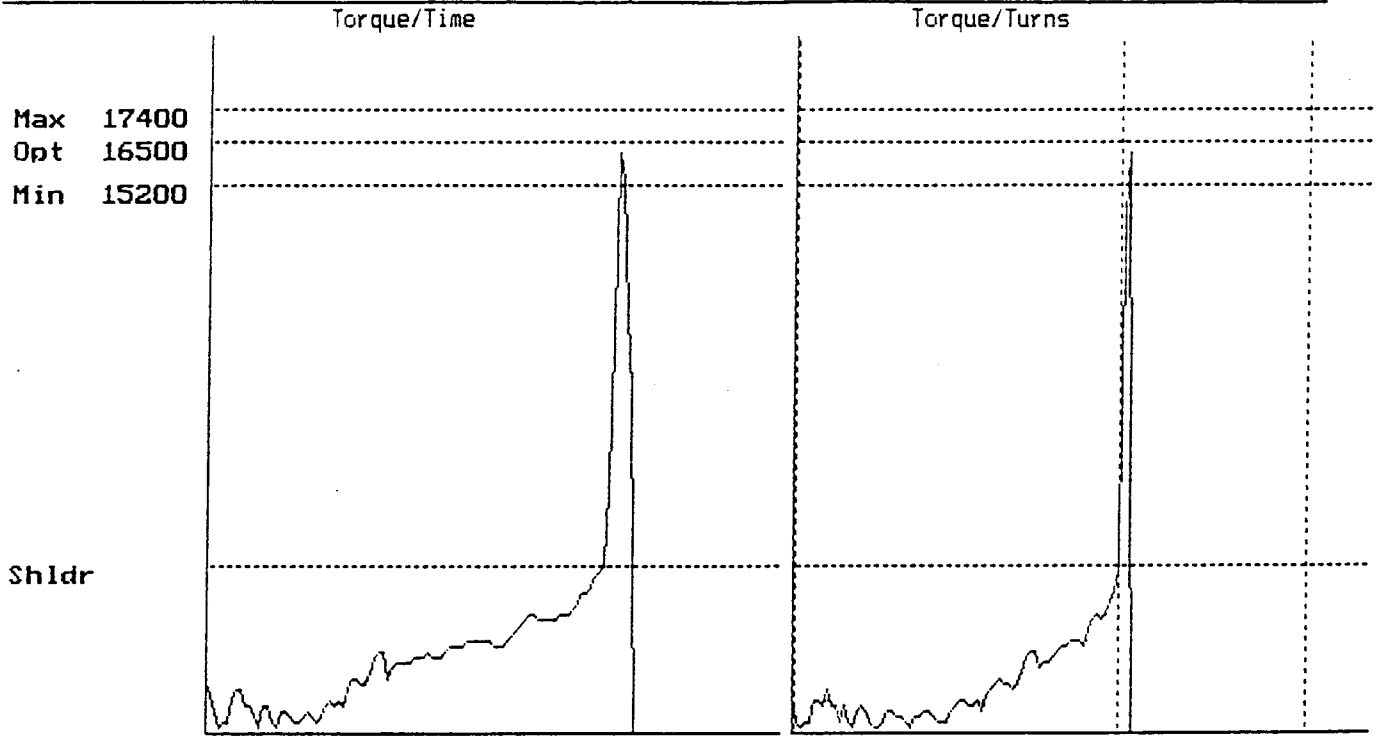


Ref 250 Mkp Time = 0 m 24 s
Applied Torque = 15782 Top Turns = 3.843
Shldr Torque = 5838 Delta Rate = 160387 Delta Torque = 9944 Delta Tns = 0.062
Comments:OK SH

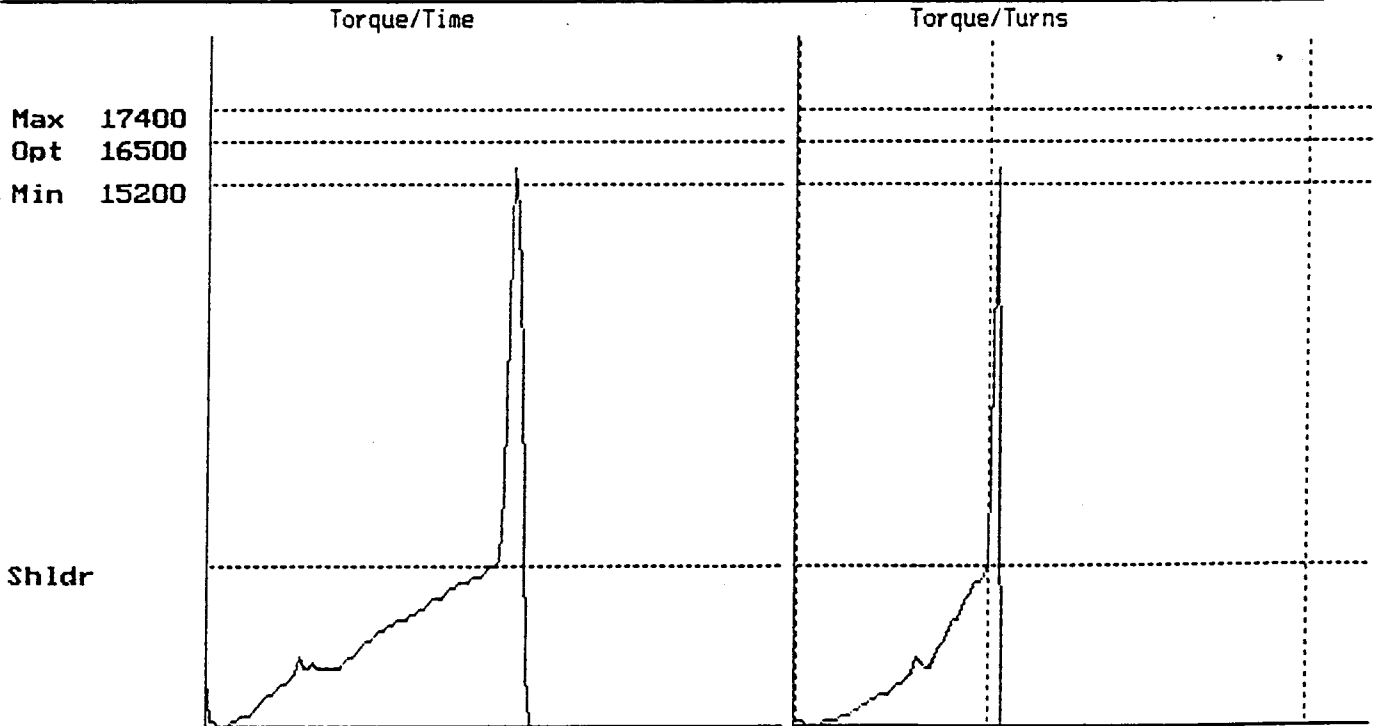


Ref 250 Mkp Time = 0 m 14 s
Applied Torque = 16609 Top Turns = 1.864
Shldr Torque = 4025 Delta Rate = 209733 Delta Torque = 12584 Delta Tns = 0.060
Comments:OK SH

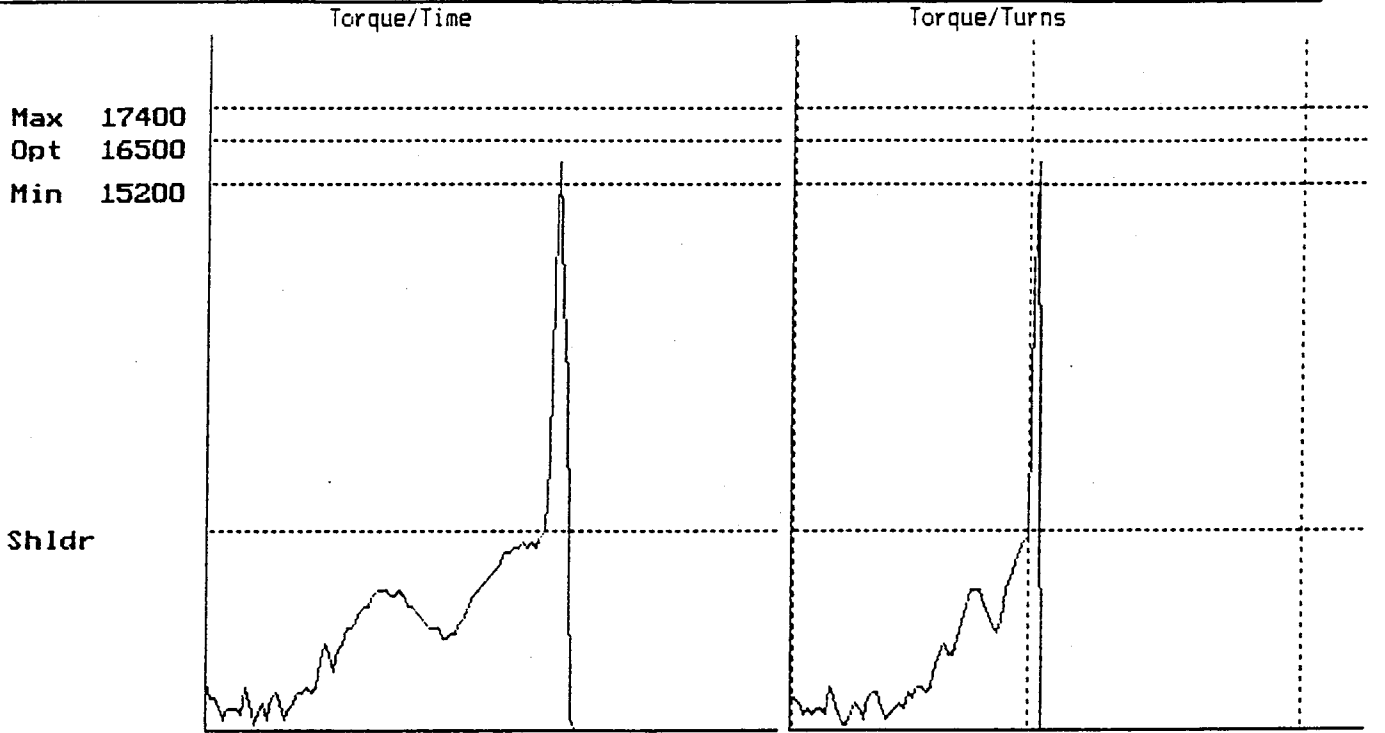




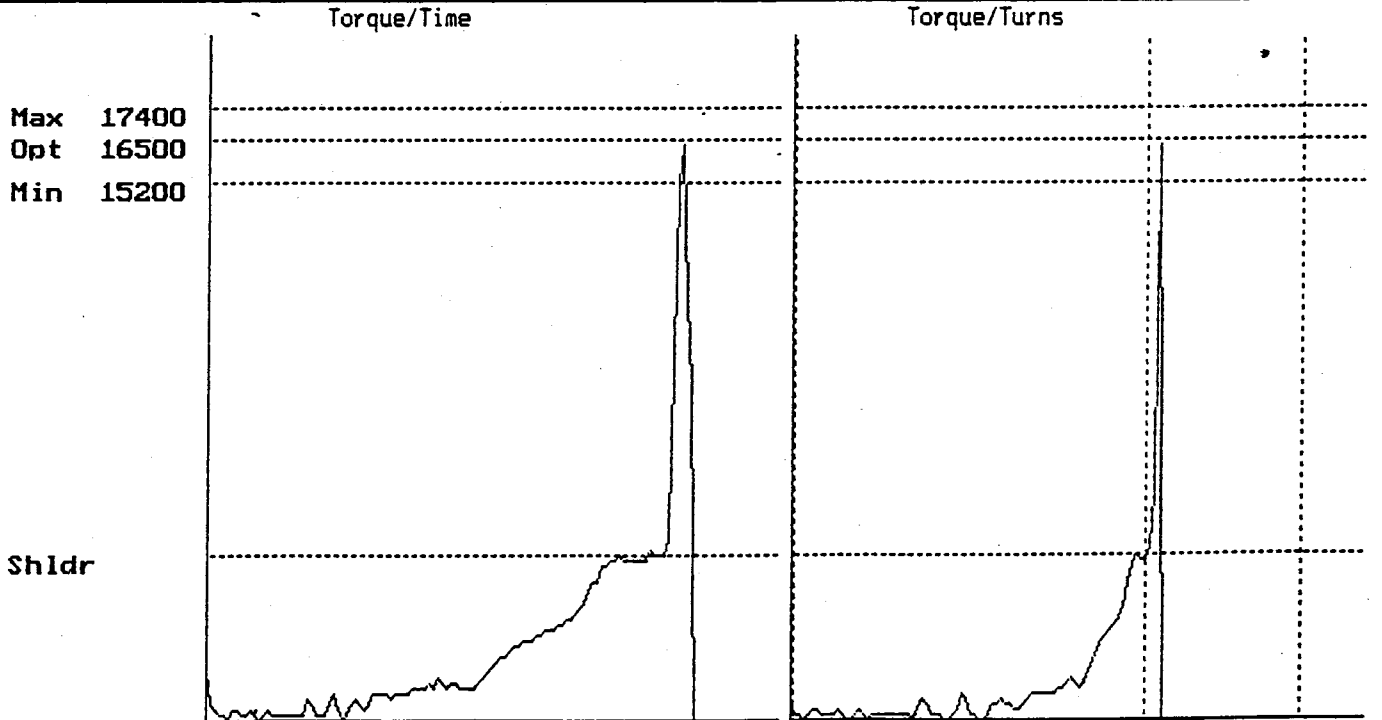
Ref 250 Mkp Time = 0 m 19 s Applied Torque =16042 Top Turns = 3.289
Shldr Torque = 4885 Delta Rate =166522 Delta Torque =11157 Delta Tns = 0.067
Comments:OK SH



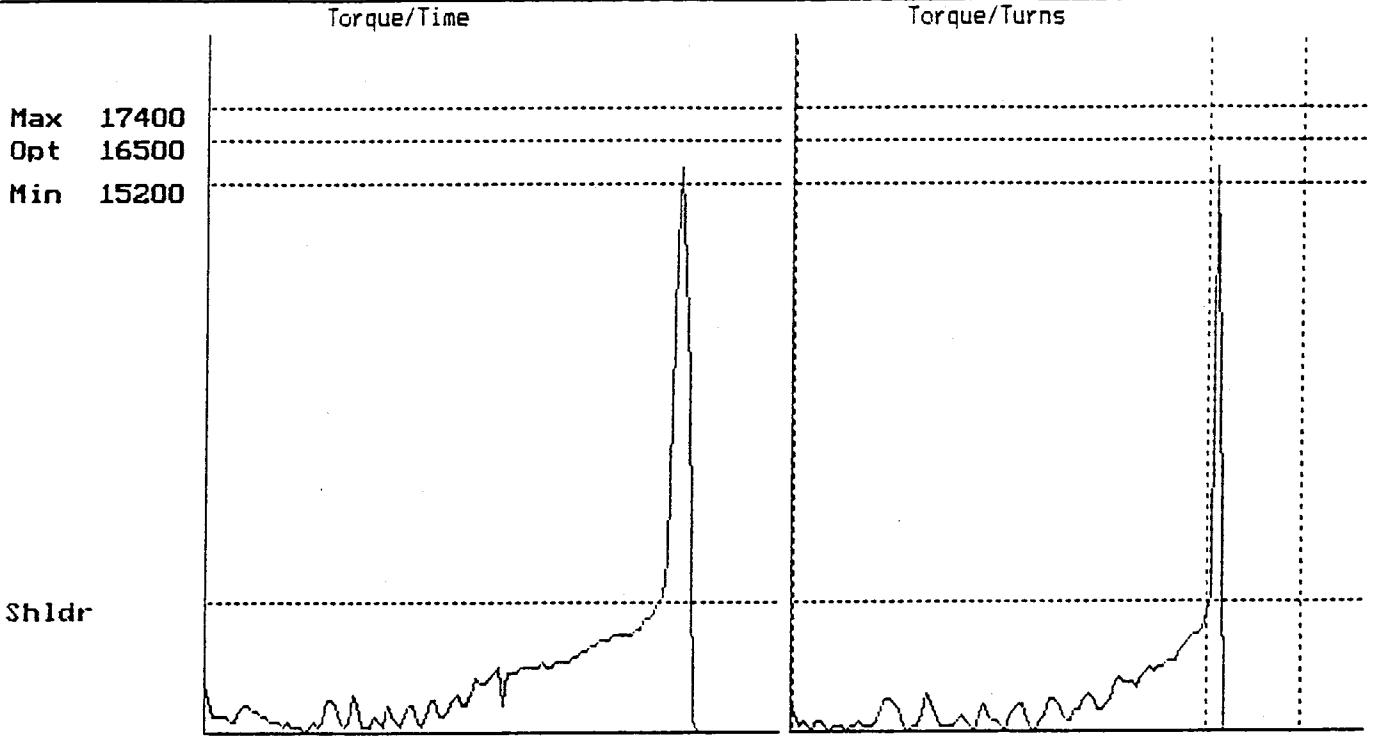
Ref 250 Mkp Time = 0 m 14 s Applied Torque =15709 Top Turns = 1.998
Shldr Torque = 4758 Delta Rate =168476 Delta Torque =10951 Delta Tns = 0.065
Comments:OK SH



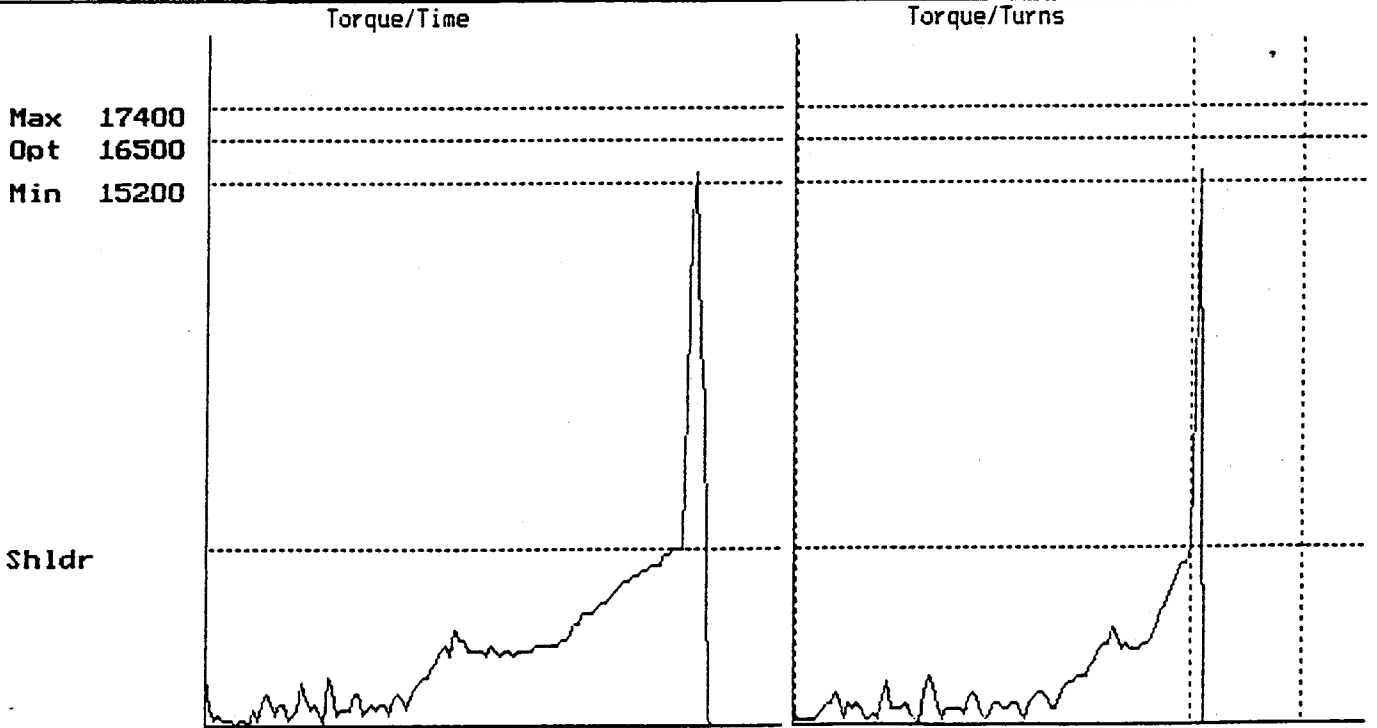
Ref 250 Mkp Time = 0 m 16 s
Applied Torque = 15782 Top Turns = 2.425
Shldr Torque = 5731 Delta Rate = 162112 Delta Torque = 10051 Delta Tns = 0.062
Comments:OK SH



Ref 250 Mkp Time = 0 m 22 s
Applied Torque = 16249 Top Turns = 3.648
Shldr Torque = 4885 Delta Rate = 90911 Delta Torque = 11364 Delta Tns = 0.125
Comments:OK SH

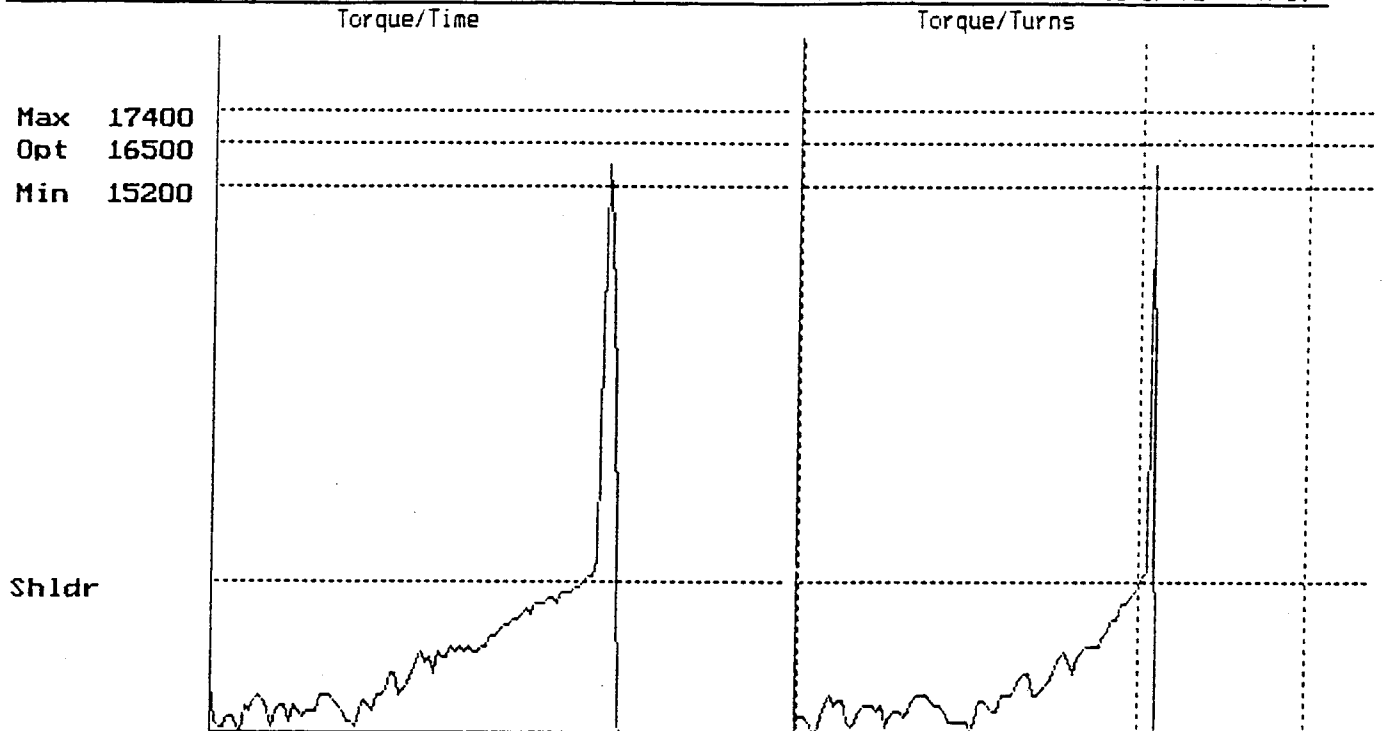


Ref 250 Mkp Time = 0 m 22 s
Applied Torque =15696 Top Turns = 4.224
Shldr Torque = 3885 Delta Rate =119303 Delta Torque =11811 Delta Tns = 0.099
Comments:OK SH



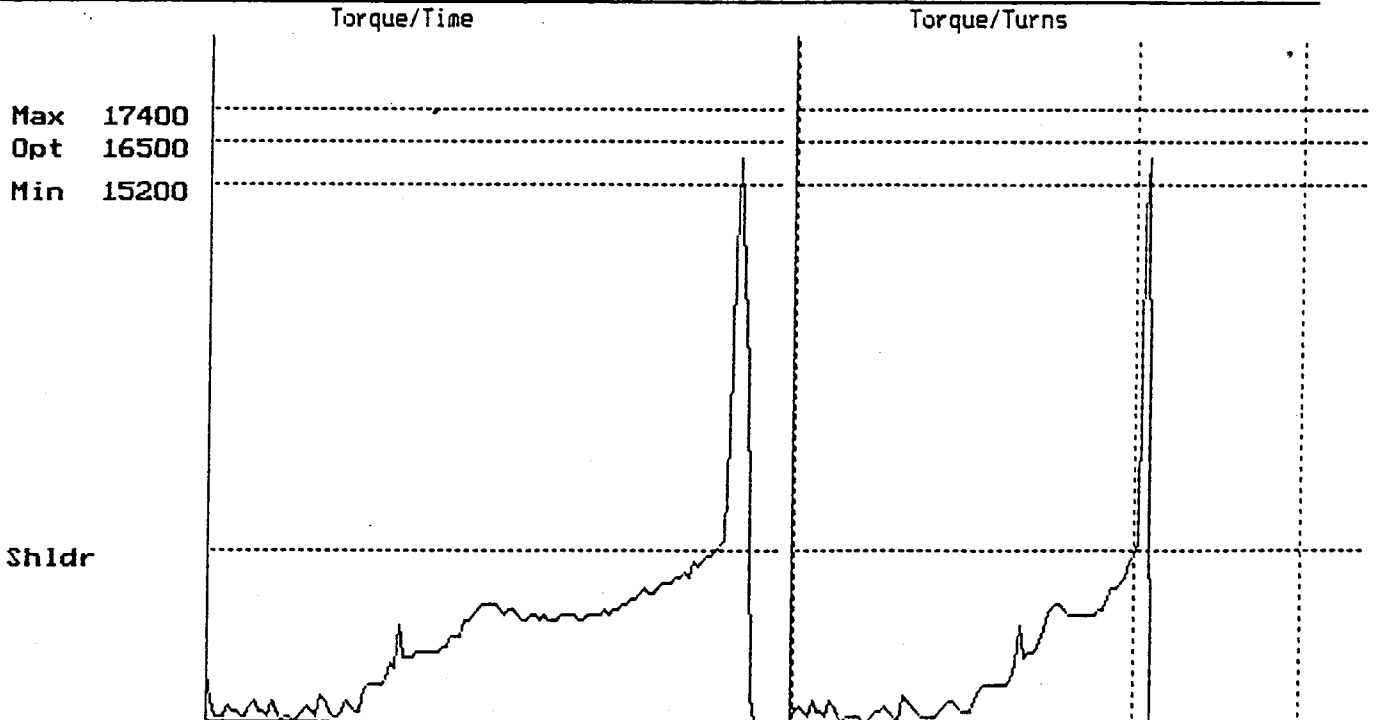
Ref 250 Mkp Time = 0 m 22 s
Applied Torque =15529 Top Turns = 4.025
Shldr Torque = 5145 Delta Rate =144222 Delta Torque =10384 Delta Tns = 0.072
Comments:OK SH

12:37 12/22/91 ACCEPT Joint # = 53 Log # = 55 Red String NJD 13 3/ 72 N-80

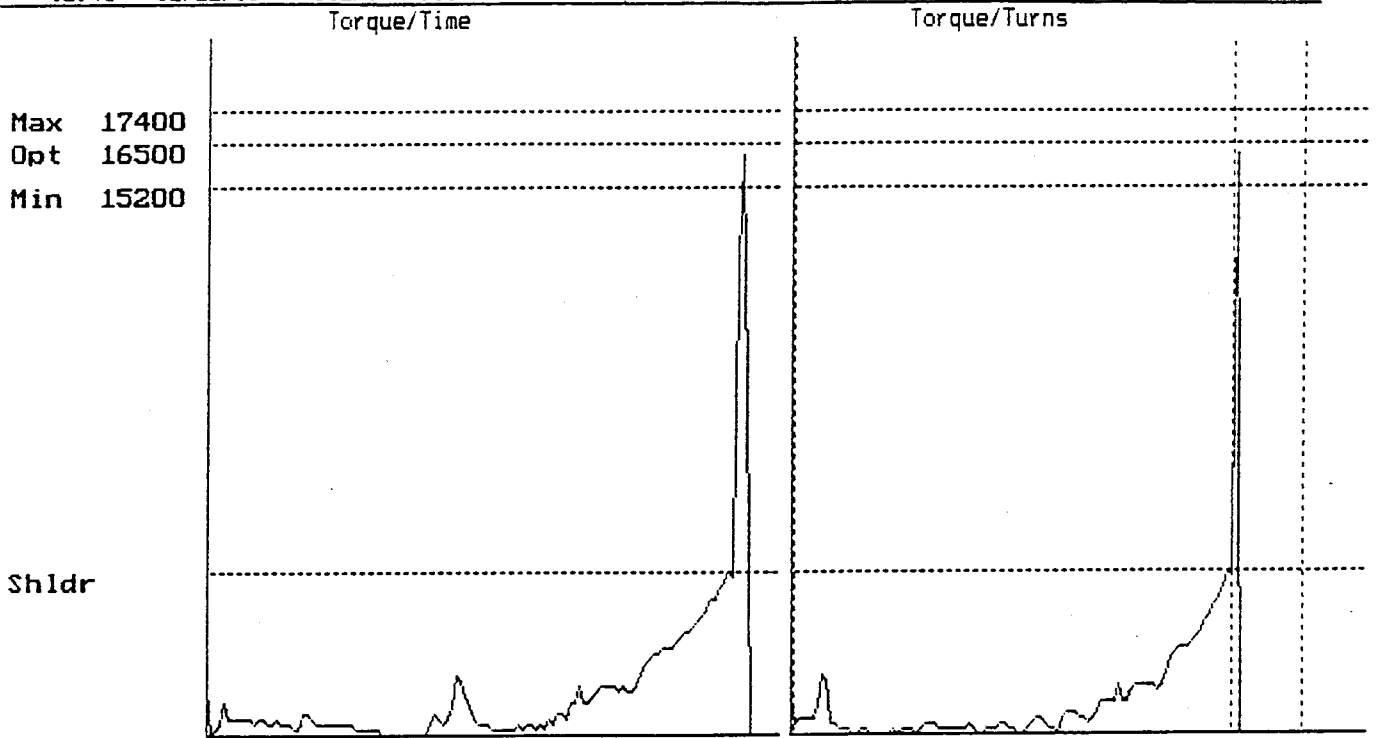


Ref 250 Mkp Time = 0 m 18 s
Applied Torque = 15782 Top Turns = 3.520
Shldr Torque = 4452 Delta Rate = 89920 Delta Torque = 11330 Delta Tns = 0.126
Comments:OK SH

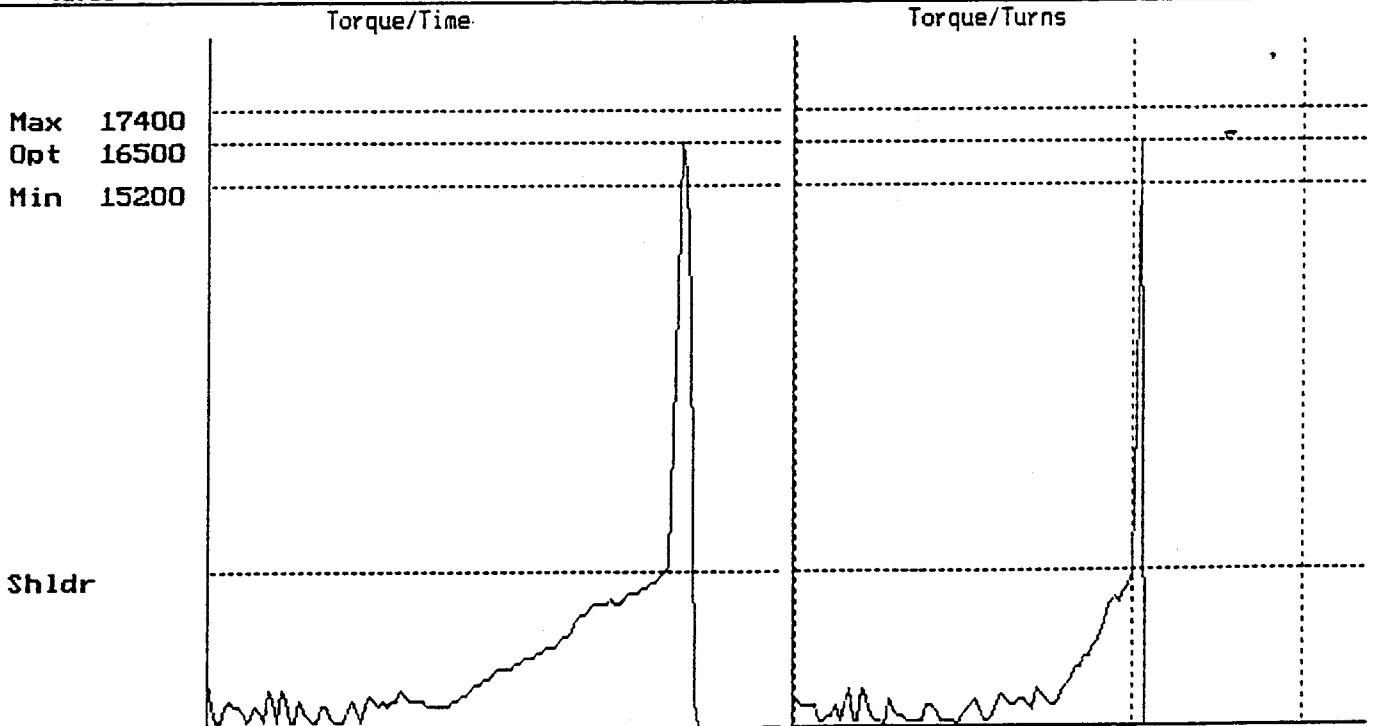
12:41 12/22/91 ACCEPT Joint # = 54 Log # = 56 Red String NJD 13 3/ 72 N-80



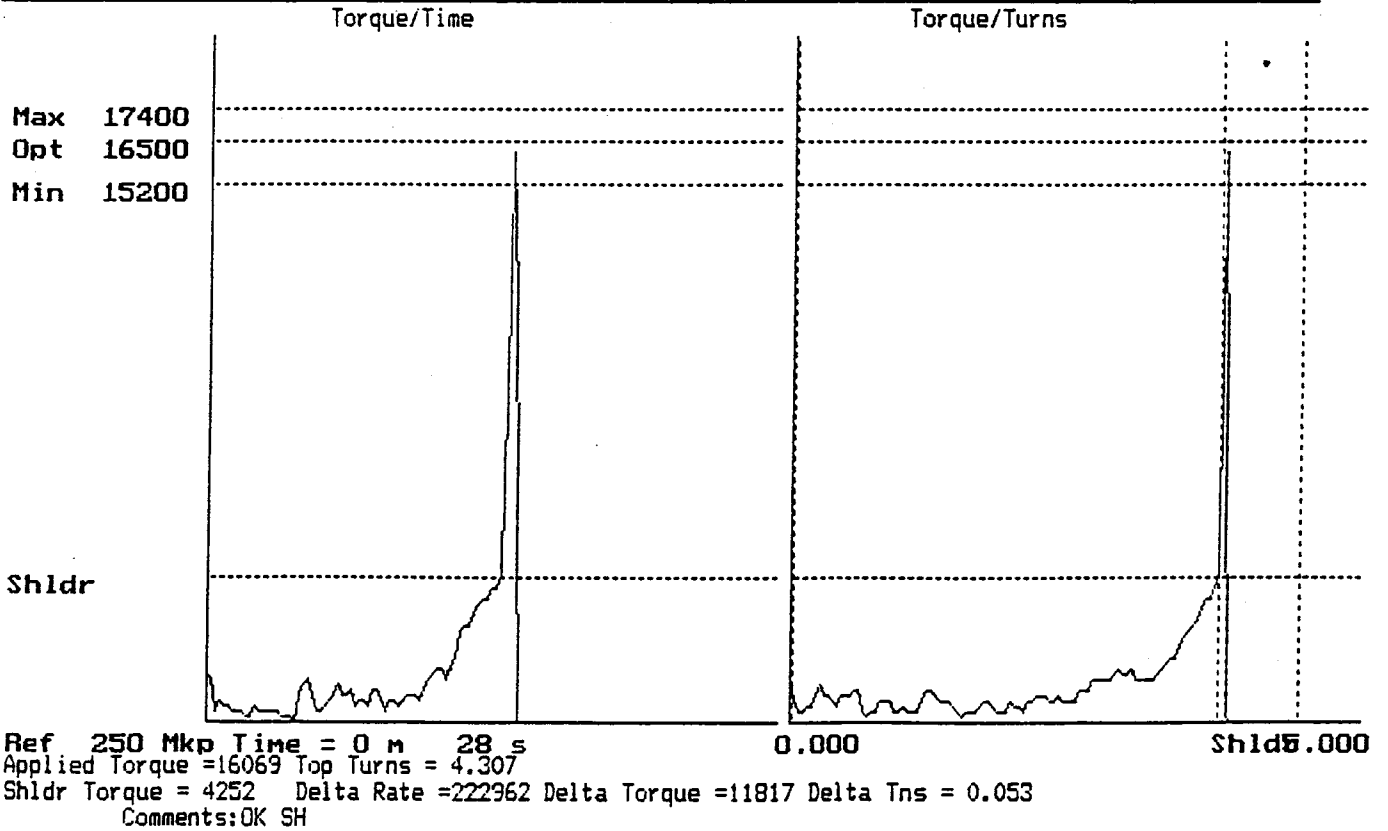
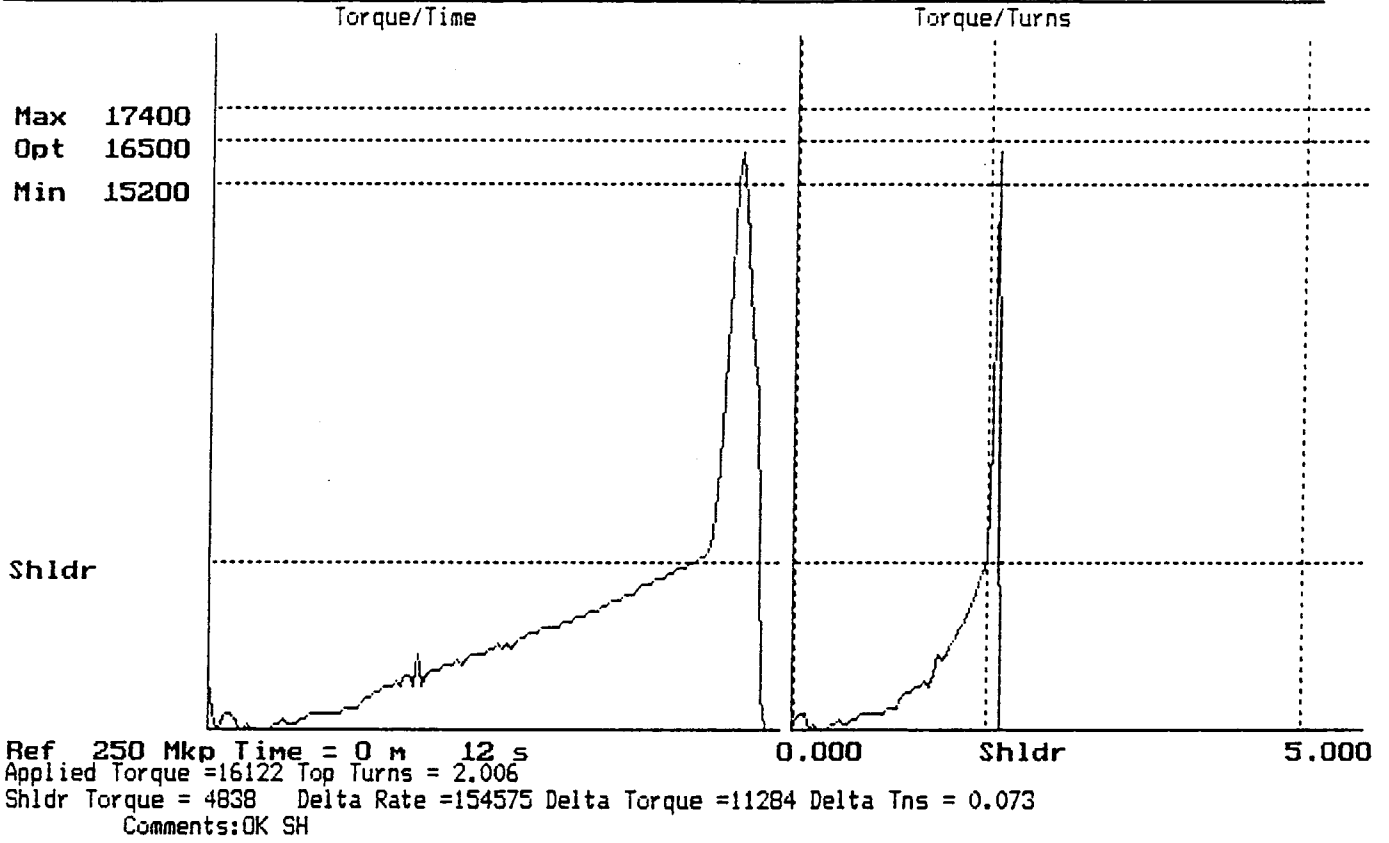
Ref 250 Mkp Time = 0 m 25 s
Applied Torque = 15876 Top Turns = 3.499
Shldr Torque = 5078 Delta Rate = 102838 Delta Torque = 10798 Delta Tns = 0.105
Comments:OK SH

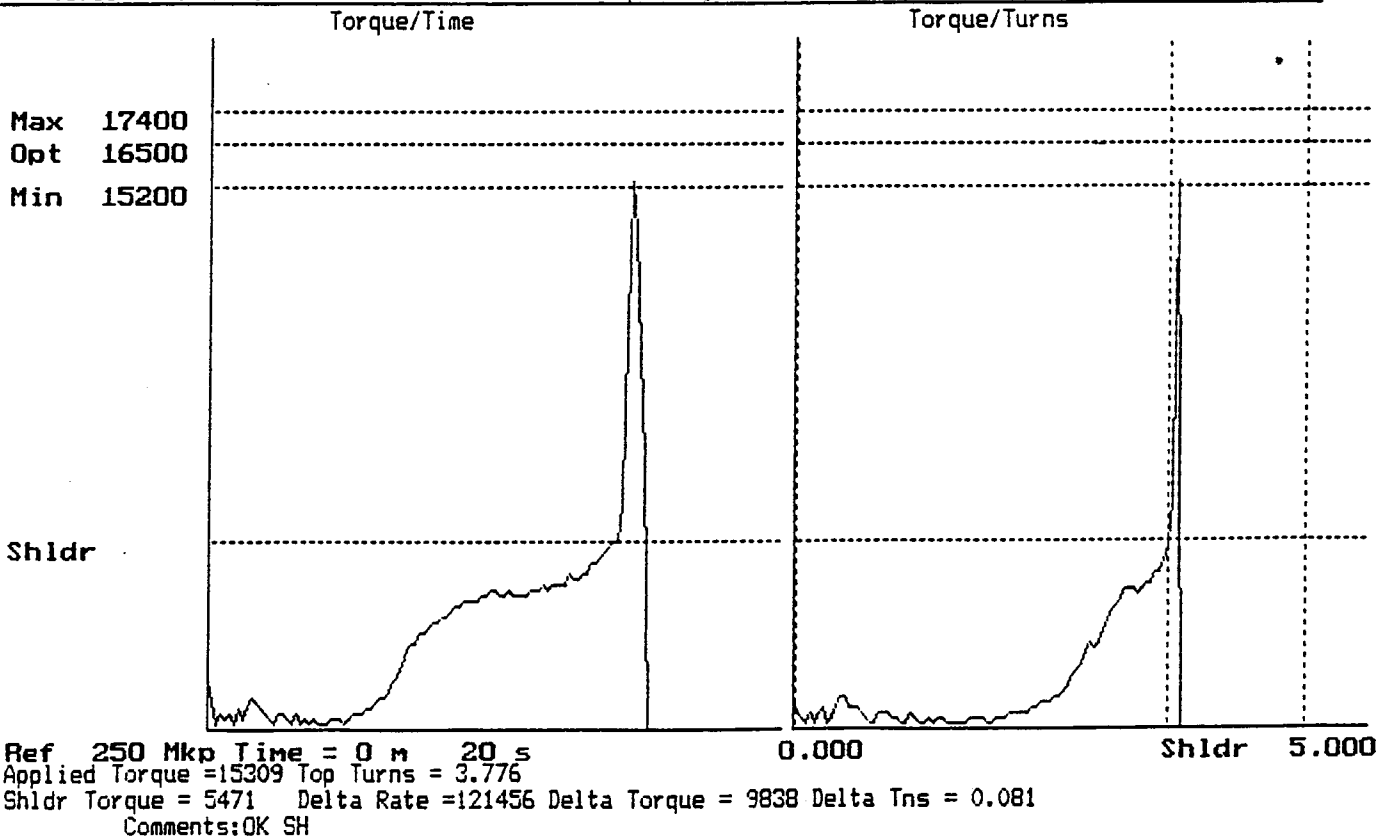
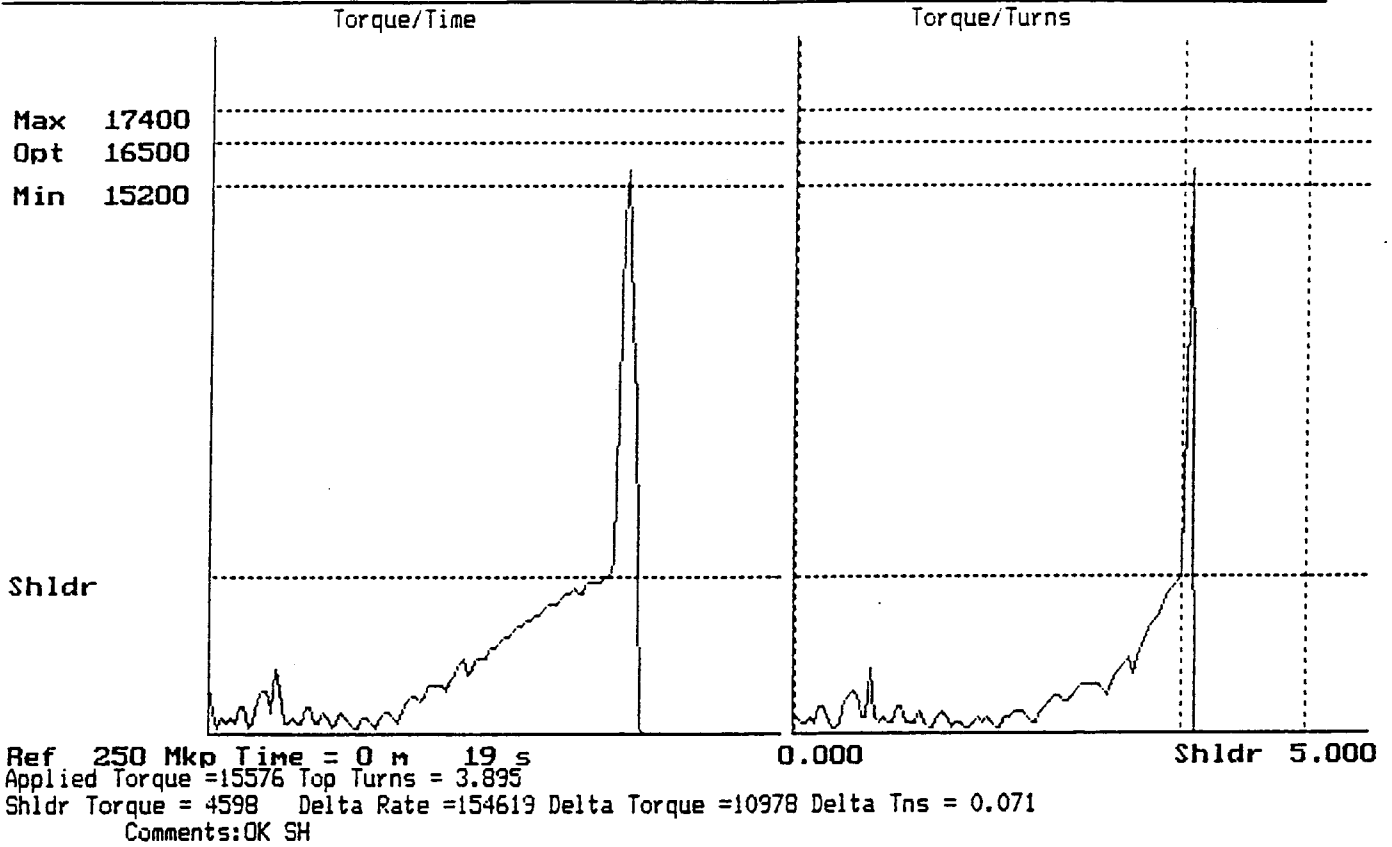


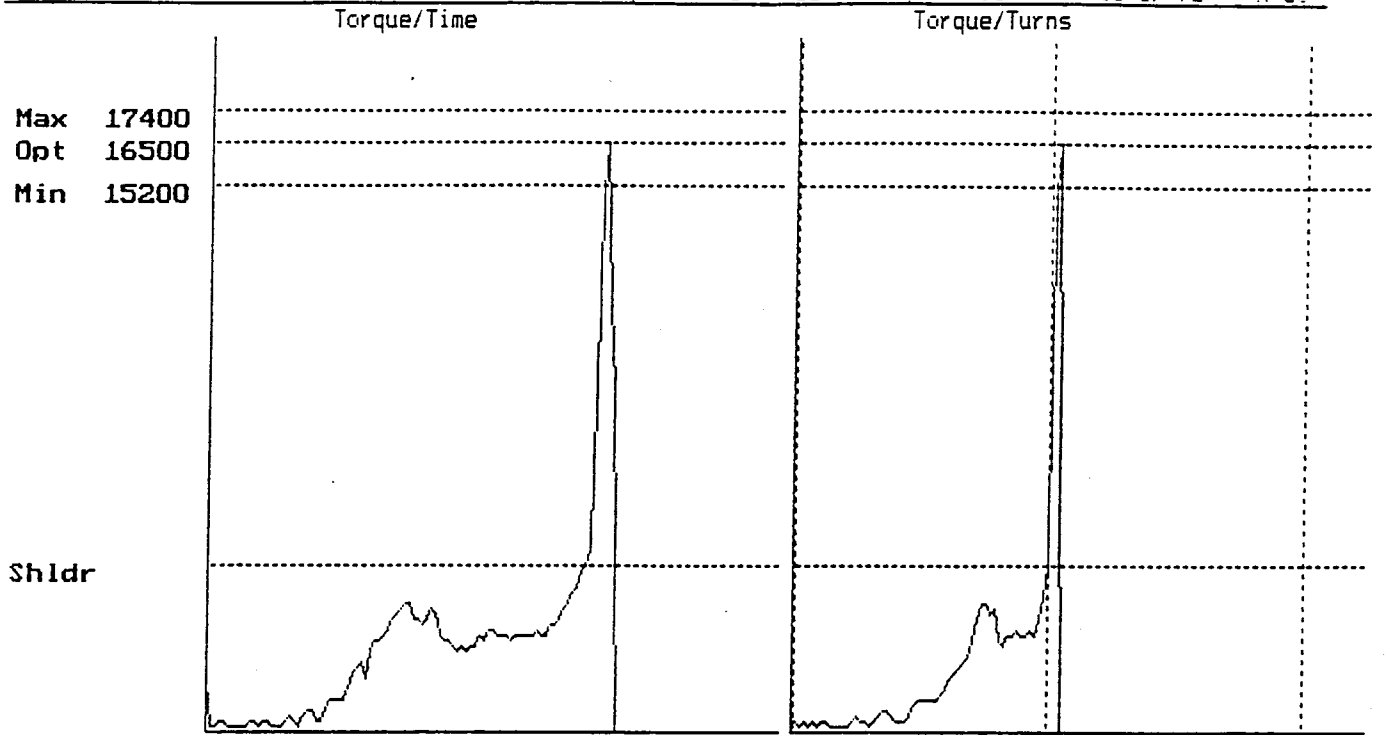
Ref 250 Mkp Time = 0 m 49 s
Applied Torque = 16122 Top Turns = 4.381
Shldr Torque = 4690 Delta Rate = 136095 Delta Torque = 11432 Delta Tns = 0.084
Comments: OK SH



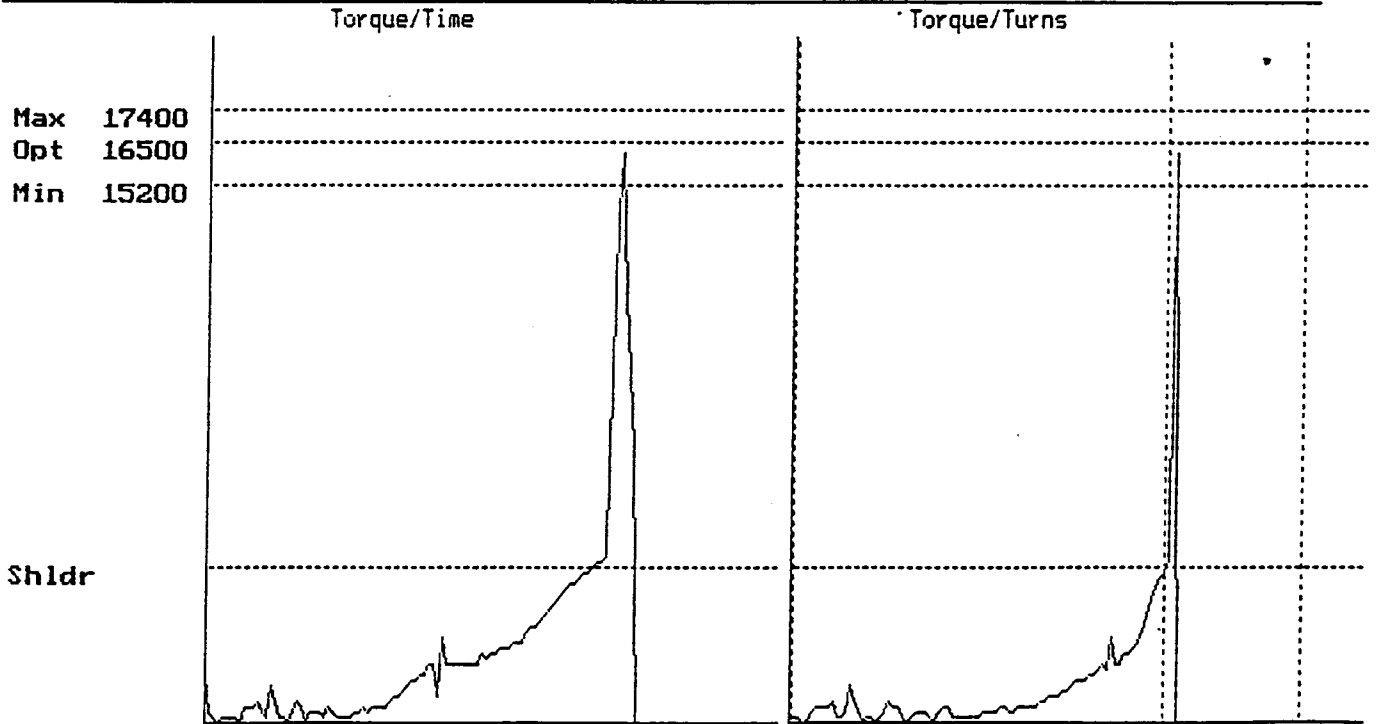
Ref 250 Mkp Time = 0 m 22 s
Applied Torque = 16309 Top Turns = 3.430
Shldr Torque = 4585 Delta Rate = 148405 Delta Torque = 11724 Delta Tns = 0.079
Comments: OK SH



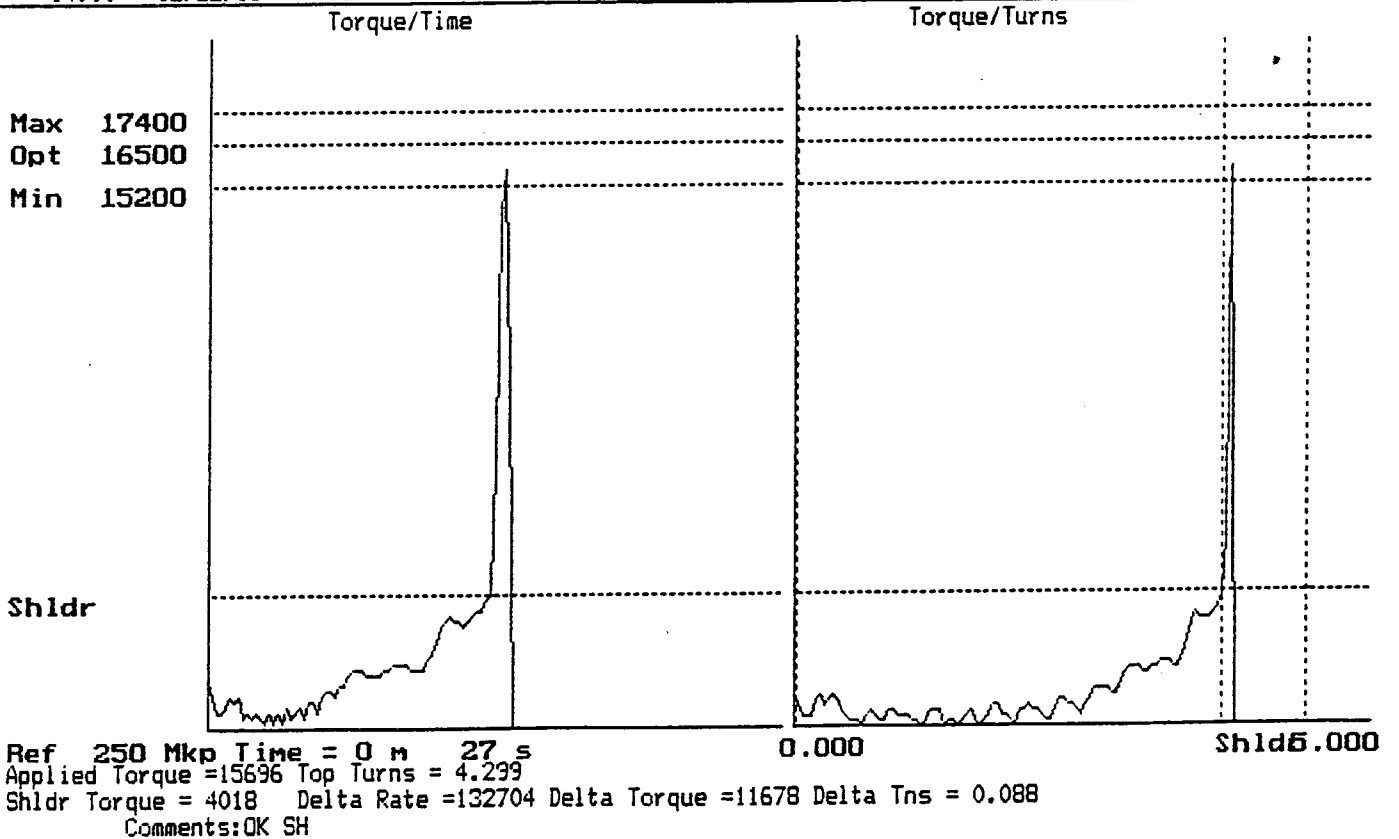
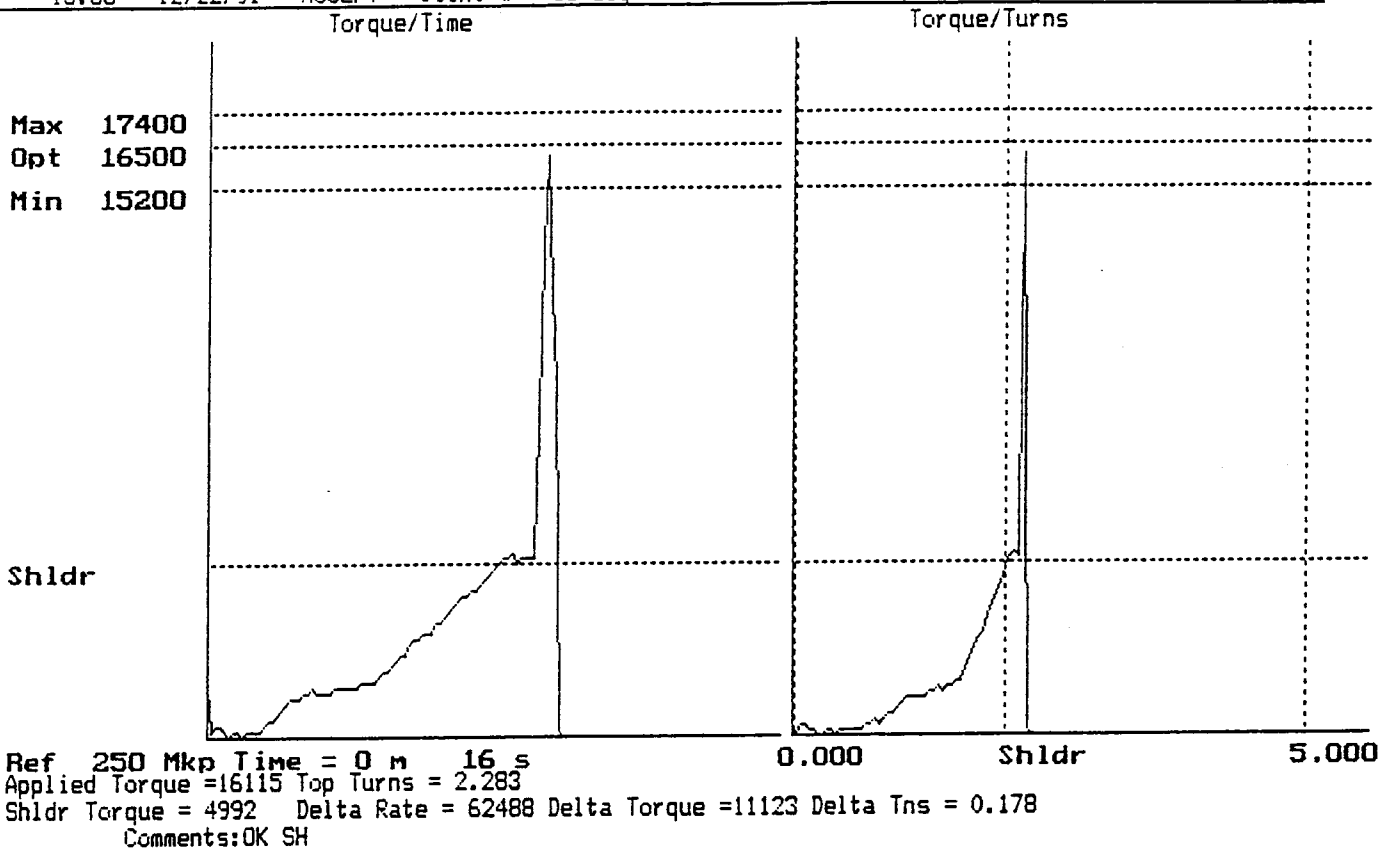


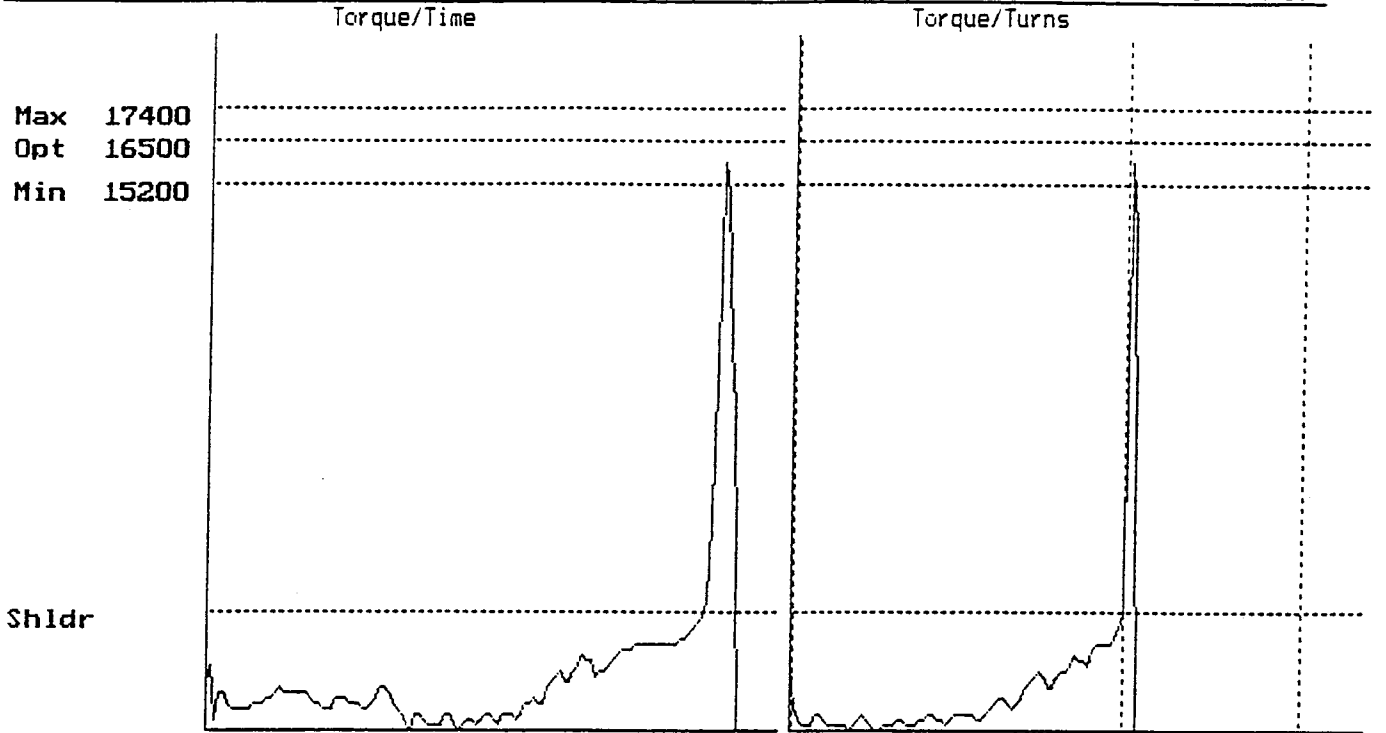


Ref. 250 Mkp Time = 0 m 18 s
Applied Torque = 16355 Top Turns = 2.595
Shldr Torque = 4932 Delta Rate = 190383 Delta Torque = 11423 Delta Tns = 0.060
Comments: OK SH

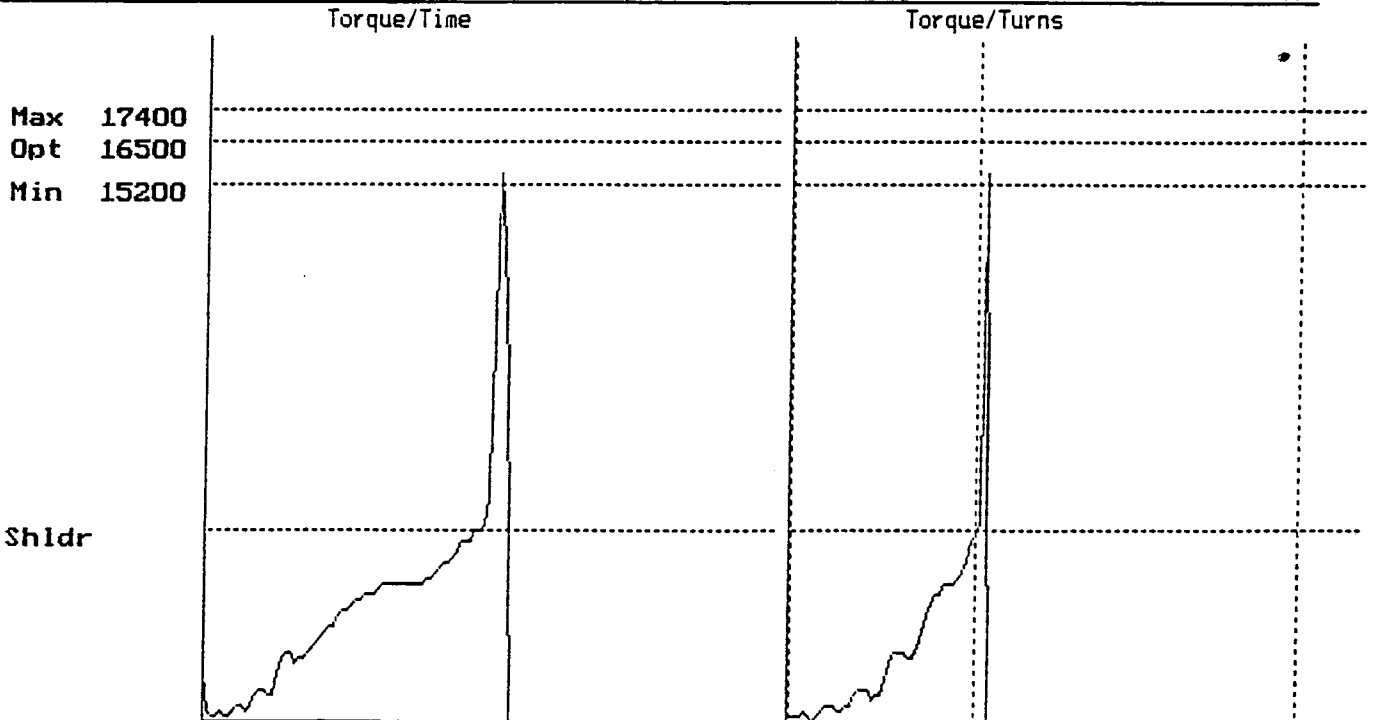


Ref. 250 Mkp Time = 0 m 19 s
Applied Torque = 16142 Top Turns = 3.789
Shldr Torque = 4678 Delta Rate = 121957 Delta Torque = 11464 Delta Tns = 0.094
Comments: OK SH

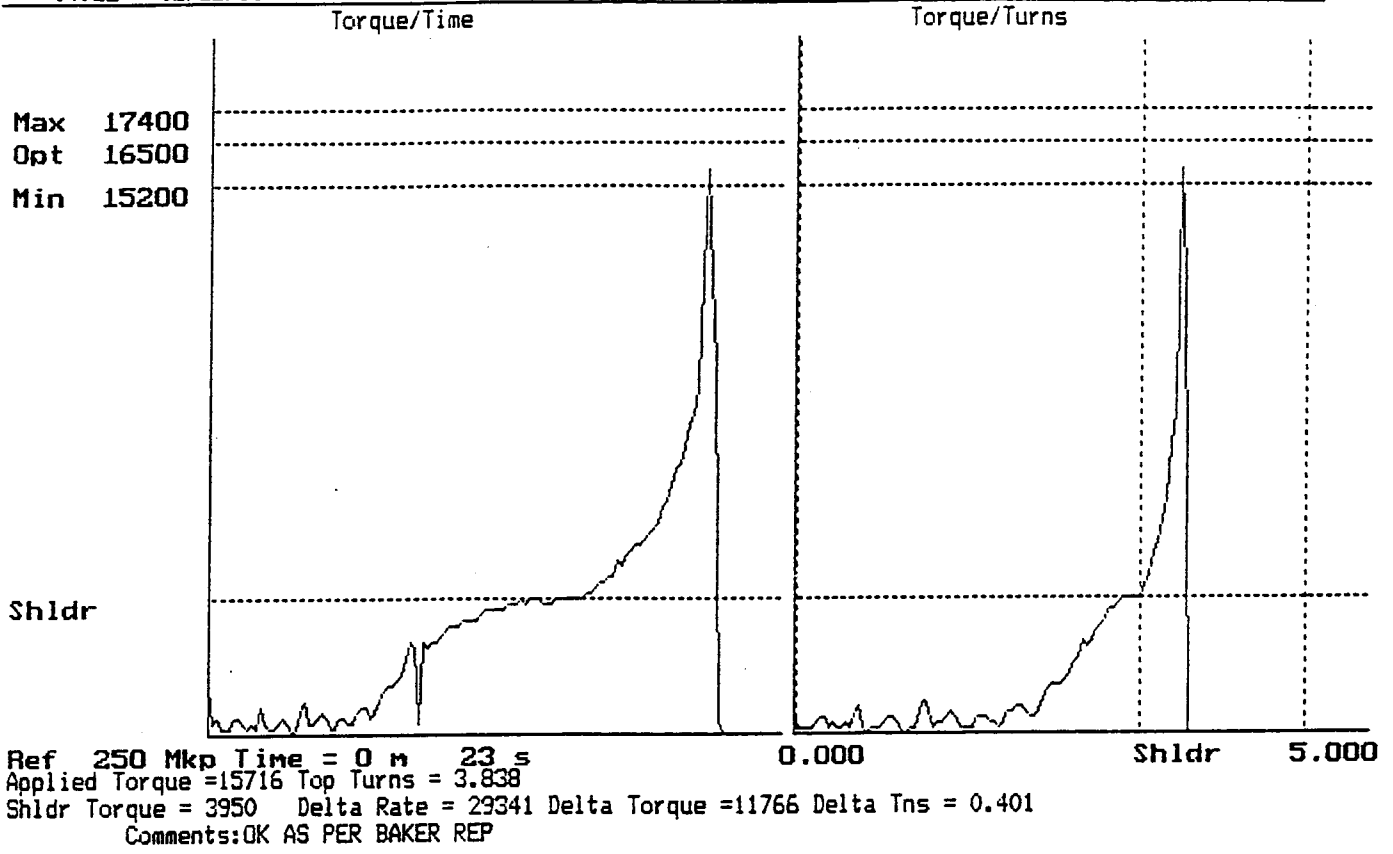




Ref 250 Mkp Time = 0 m 24 s
Applied Torque = 15756 Top Turns = 3.365
Shldr Torque = 3572 Delta Rate = 213754 Delta Torque = 12184 Delta Tns = 0.057
Comments: OK SH



Ref 250 Mkp Time = 0 m 14 s
Applied Torque = 15442 Top Turns = 1.977
Shldr Torque = 5651 Delta Rate = 112540 Delta Torque = 9791 Delta Tns = 0.087
Comments: OK SH



Concentrate Disposal Well Pressure Test Data



HEADER PRESSURE DURING TESTING

WELL DISPOSAL WELL

Date AUG 30, 1991

Time start 0621 HRS

Time finish 0743 HRS

Time	Total minutes	Header Pressure (PSIG)	Comments
0621		0	PRESSURIZE CASING TO TEST PRESSURE
0623		128.5	STOP PRESSURIZING AND BLEED OFF PRESSURE
0628	0	121.0	START PRESSURE TEST
0633	5	121.0	
0638	10	121.0	
0643	15	120.5	
0648	20	120.5	
0653	25	120.5	
0658	30	120.5	
0703	35	120.0	
0708	40	120.0	
0713	45	120.0	
0718	50	120.0	
0723	55	119.5	
0728	60	119.5	PRESSURE TEST COMPLETE
0732			BLEED PRESSURE OFF (10.5 GALS OF WATER WERE DISPLACED)
0743			TEST COMPLETE

PRESSURE GAUGE:

SN: 910723 BIC
CALIBRATED 8/91 BARFIELD, MIA/FL
NEW
300PSI, 1PSI INCREMENTS

B-7

Observes

BART ZIEGLER / OFB 8/30/91
Tom McCormick / OFB 8/30/91
Ed RANKIN / FOER / WPB 8/30/91
JIM BRANTLEY / YBWD

BARFIELD INSTRUMENT CORPORATION
4101 N.W. 29th STREET
MIAMI, FL. 33142

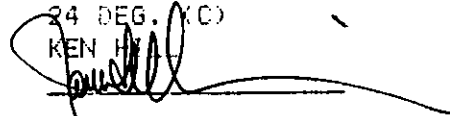
RECORD OF INSTRUMENT CALIBRATION COMPARISON

FOR: YOUNGQUIST BROTHERS W/O:
MFG: AMETEK/U.S. GAUGE DIVISION MODEL: 0-300 PSI.
TYPE: PRESSURE GAUGE S/N: 910723810

BIC TEST UNIT	CUSTOMER UNIT
0	0
20	20
40	40
60	60
80	79.5
100	100
120	120
140	140
160	160
180	180
200	200
220	220
240	240
260	260
280	280
300	300

THE ABOVE CALIBRATION COMPARISON WAS MADE BY BARFIELD INSTRUMENTS CORP
MIAMI, FL. USING AN APPROVED BIC TEST UNIT.

THIS APPLIANCE CALIBRATED
USING MODEL# 2008E
SERIAL# 14704
ACCURACY IS TRACEABLE TO
THE N.I.S.T.

DATE: AUGUST 27, 1991
TEMPERATURE: 24 DEG. (C)
TESTED BY: KEN H
INSPECTED BY: 

HEADER PRESSURE DURING TESTING

WELL DISPOSAL WELL

Date 12/15/91

Time start 1352

Time finish 1452

PRESSURE TEST AFTER K-TROL

Time	Total minutes	Header Pressure (PSIG)	Comments
1349	0	0	PRESSURE 16" CASING UP, INFLATABLE PACKER SET @ 2,257'
1352	10	100	START PRESSURE TEST
1402	10	100	
1412	20	99.5	
1422	30	99.5	
1432	40	99.5	
1442	50	99.5	
1452	60	99.5	TERMINATE TEST
			BLOOD OFF PRESSURE

Observes
B. ZIEGLER / CH2M HILL
J. BRANTLEY / YBWD
K. CREVEL / YBWD

HEADER PRESSURE DURING TESTING

WELL DISPOSAL

Date 12/17/91

Time start 1805

Time finish 1905

16" CASING AFTER LINER INSTALLATION

Time	Total minutes	Header Pressure (PSIG)	Comments
1805	0	150.5	CASING WAS PRESSURIZED TO 150.5 PSIG AND STARTED TEST
1815	10	150.0	
1825	20	150.0	
1835	30	150.0	
1845	40	149.5	
1855	50	149.5	
1905	60	149.5	STOP TEST AND LEAVE WELL PRESSURIZED
1920		149.0	
2100		148.5	BLEED PRESSURE OFF

Observes
B. Ziegler / CH2M Hill WNY
K. Connel / YBWD
J. Bramley / YBWD

HEADER PRESSURE DURING TESTING

WELL 01W

Date 12/22/91

Time start 1853

Time finish 2020

PRELIMINARY TEST AFTER K-TRAIL PATCH

Time	Total minutes	Header Pressure (PSIG)	WITH LINER IN PLACE Comments
1850	0	0	ANNULUS PRESSURIZED TO 157PSI
1853	0	157.0	START TEST
1923	30	156.5	
1953	60	156.5	
2020	87	156.5	TEST TERMINATED, LOOKS GOOD

Observes
B. ZIEGLER / CH2M HILL WAJ
KE GREVEL / YOWA
J. BRANTLEY / YOWA

HEADER PRESSURE DURING TESTING

WELL DISPOSAL WELL

Date 12/31/91

Time start 0848

Time finish 0957

Time	Total minutes	Header Pressure (PSIG)	Comments
0848	0	0	PRESSURIZE ANNULUS TO 156 PSI AND BLEED DOWN TO 150 PSI AFTER REMOVING AIR
0852	0	150.0	START PRESSURE TEST
0902	10	149.5	
0912	20	149.25	
0922	30	149.5	
0932	40	149.5	
0942	50	150.0	
0952	60	150.0	TERMINATE TEST
0954		150.0	BLEED PRESSURE OFF ANNULUS
0957		0	PRESSURE DOWN TO ZERO, TEST COMPLETE

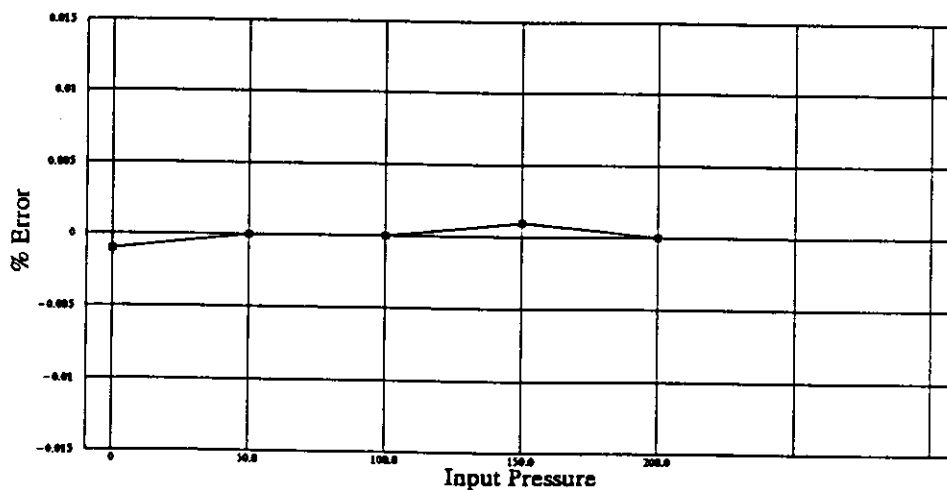
Observes
E. RAHRIG / FDBR
B. ZIEGLER / CH2M Hill WNSJ
S. STEHAN / CH2M Hill Tech T. Ste
K. GREVEL / YBWO

CALIBRATION CHART

Date 15-Oct-91
 Client CH2M Hill
 P.O. No. SEF28698A070

Instrument Ashcroft 60-1082AS-02L
 Range 0/200 PSIG
 Accuracy +/- .25% Full Scale

Input Pressure	Gauge Reading:		% Error	
	Upscale	Downscale	Upscale	Downscale
0	-0.2	-0.2	-0.10%	-0.10%
50.0	50.0	50.0	0.00%	0.00%
100.0	100.0	100.0	0.00%	0.00%
150.0	150.2	150.2	0.10%	0.10%
200.0	200.0	200.0	0.00%	0.00%



SOLARES FLORIDA CORPORATION
 Tampa, FL



Solares

SOLARES FLORIDA CORP. SOLARES SOUTHEAST CORP.

Miami Phone: (305) 592-0593
Tampa Phone: (813) 622-8822
Jacksonville Phone: (904) 398-9396
Atlanta Phone: (404) 981-9282

Miami Fax: (305) 592-0400
Tampa Fax: (813) 622-8922
Jacksonville Fax: (904) 398-9396
Atlanta Fax: (404) 981-9397

CUSTOMER P.O. NUMBER	CUST. NO.	ORDER NO.	DATE ORDERED
SEF28698A070	CH1470	50078	10/15/91

20

SHIP TO

CHEM HILL
7201 N.W. 11TH PLACE
ATTN: JEFF LEHNER

GAINESVILLE FL 32605



OIL EQUIPMENT JOBBERS
INDUSTRIAL SUPPLIERS
PROCESS CONTROLS
INSTRUMENTS

SALESMAN NAME	
PH	PAUL H. HANNON

DELIVERY / PACKING LIST

TERMS	
N3	NET 30 DAYS

DATE REQUESTED
10/15/91

Title to ownership of this purchase remains with Solares Florida Corp. or Solares Southeast Corp. until same is fully paid. No returns without authorization from us.

CUSTOMER ACCEPTS BACKORDERS (N/A)

STOCK NUMBER	QUANTITY ORDERED	QTY. SHIPPED	QTY. B.O.	BIN LOC.	UNIT PRICE	TOTAL	DESCRIPTION
/CALIBRATION	1	1			50.000	50.00	ASHCROFT 60-1002AS-02L 0/200 PSI CALIBRATE & SUPPLY CAL CHART MB

TOTAL 50.00

SHIPPED FROM

SOLARES FLORIDA CORP. (TAMPA)
3803 CORPOREX PARK DRIVE
SU 300

SHIPMENT TOTAL- 50.00

We hereby certify that this invoice is true and correct in all respects, and that the equipment stated hereon was made in the United States of America.

PIECES	DIMENSIONS	LBS. EACH	LBS. TOTAL
5	7 1/2 x 11 x 6	5	5

Shipped UPS

Freight 3.12

Dual-Zone Monitor Well Pressure Test Data

HEADER PRESSURE DURING TESTING

WELL MW

Date 10/11/91

Time start 1330

Time finish 1433

Time	Total minutes	Header Pressure (PSIG)	Comments
1330	0	0	PRESSURIZE 6" CASING W/ High Pressure Pump
1331	0	122	Bleed Pressure Back To 100 PSI
1333	0	100.0	START PRESSURE TEST
1338	5	100.0	
1343	10	99.5	
1348	15	99.0	
1353	20	99.0	
1358	25	99.0	
1403	30	99.0	
1408	35	98.5	
1413	40	98.0	
1418	45	98.0	
1423	50	98.0	
1428	55	97.75	
1433	60	97.50	END OF TEST, TEST SUCCESSFUL WITHIN 5% TOLERANCE
			- CASING WAS BLEED OFF, APPROXIMATELY 1 GALLON OF WATER
			- HEADER WAS CUT OFF AND KELLY WAS TRAPPED IN AND SCREWED ONTO DRILL PIPE LEFT IN HOLE

Gauge SERIAL No. 910410 BIC

Observes

ED RAHRIG / FDER

TOM FARRELL / FDER

BART ZIEGLER / CH2M HILL

KEVIN GREVEL / YRWO

W.H. Jones

BARFIELD INSTRUMENT CORPORATION
4101 N.W. 29th STREET
MIAMI, FL. 33142

RECORD OF INSTRUMENT CALIBRATION COMPARISON

FOR: YOUNGQUIST BROTHERS INC. W/O: 9101740
MFG: AMETEK/U.S. GAUGE MODEL: 0-160 P.S.I.
TYPE: PRESSURE GAUGE S/N: 910410 BIC

BIC TEST UNIT	CUSTOMER UNIT
0	0
10	10
20	20
30	30
40	40
50	50
60	60
70	70
80	80
90	90
100	100
110	110
120	120
130	130
140	140
150	150
160	160

THE ABOVE CALIBRATION COMPARISON WAS MADE BY BARFIELD INSTRUMENTS CORP
MIAMI, FL. USING AN APPROVED BIC TEST UNIT.

THIS APPLIANCE CALIBRATED
USING MODEL# 2008E
SERIAL# 14704
ACCURACY IS TRACEABLE TO
THE N.I.S.T.

DATE: 9/23/91
TEMPERATURE: 24 DEG. (C)
TESTED BY: KEN HILL
INSPECTED BY: *Dennis R. Gachant*
FAA RPRMN CERT #2455319



Form No. 3271

Rev 10/90

Test Equipment INSPECTION CERTIFICATION

Customer Youngquist Brothers, inc
 BIC W/O No. 01740
 Item Pressure Gauge
 Mfg. Ametek, U.S. Gauge
 Part/Model No. 0-100 PSI
 Serial No. 910410BIC

This unit is Certified to be within manufacturers' specifications, except as noted:

And the accuracy is traceable to the N.I.S.T. (formerly NBS), or reference standards based upon fundamental constants of nature.

Signed: *Dennette Long*
 Date: 9-23-91

BARFIELD INSTRUMENT CORPORATION
 4101 N.W. 29th Street
 Miami, FL 33142
 XBIR995K
 1478 Central Avenue
 East Point, GA 30344
 XBID995K

Concentrate Disposal Well Video Survey Summaries

RECORD OF UNDERWATER TV SURVEY

Project: City of Boynton Beach Concentrate Disposal Well
 Well: Concentrate Disposal Well, 16" Casing and Borehole Prior to Installation of the Baker Paker
 Survey By: Florida Geophysical Logging

Survey Date: September 9, 1991 Total Depth: 3,297 feet

Witnessed By: B. Ziegler
 Reviewed By: B. Ziegler Date: November 14, 1991
 Remarks: Camera zeroed at pad surface

Depth in Feet		Observations
From	To	
0	100	Casing joints at 28', 72'
100	200	Casing joints at 115', 159'
200	300	Casing joints at 203', 246', 289'
300	400	Casing joints at 331', 374'
400	500	Casing joints at 491', 462'
500	600	Casing joints at 505', 548', 591'
600	700	Casing joints at 634', 377'
700	800	Casing joints at 720', 764'
800	900	Casing joints at 807', 850', 893'
900	1000	Casing joints at 936', 979'
1000	1100	Casing joints at 1022', 1065'
1100	1200	Casing joints at 1108', 1151', 1194'
1200	1300	Casing joints at 1238', 1281'
1300	1400	Casing joints at 1324', 1367'
1400	1500	Casing joints at 1410', 1453', 1496'
1500	1600	Casing joints at 1539', 1582'
1600	1700	Casing joints at 1625', 1668'
1700	1800	Casing joints at 1711', 1754', 1798'
1800	1900	Casing joints at 1841', 1884'
1900	2000	Casing joints at 1927', 1970'
2000	2100	Casing joints at 2013', 2057'
2100	2200	Casing joints at 2100', 2144', 2187'
2200	2300	Casing joints at 2230', 2273'
2300	2400	Casing joints at 2316', 2359'
2400	2500	Casing joints at 2403', 2446', 2489'
2500	2600	Casing joints at 2532', 2575'
2600	2700	Casing joints at 2618', 2662'
2700	2800	Casing joints at 2705', 2748', Base of casing 2778'
2800	2827	Gauge hole (14 1/2")
2827	2840	Borehole highly fractured

RECORD OF UNDERWATER TV SURVEY

Project: City of Boynton Beach Concentrate Disposal Well
 Well: Concentrate Disposal Well, 16" Casing and Borehole Prior to Installation of the Baker Paker
 Survey By: Florida Geophysical Logging
 Survey Date: September 9, 1991 Total Depth: 3,297 feet
 Witnessed By: B. Ziegler
 Reviewed By: B. Ziegler Date: November 14, 1991
 Remarks: Camera zeroed at pad surface

Depth in Feet		Observations
From	To	
2840	2850	Gauge hole
2850	2852	Small cavity
2852	2857	Gauge hole
2857	2880	Borehole fractured and vuggy
2880	2884	Gauge hole
2884	2886	Borehole fractured, vertical fracture observed on one side of borehole
2886	2892	Upward flow observed at 2886'
2892	2900	Gauge hole
2900	2914	Borehole fractured and cavernous
2914	2949	Gauge hole
2949	2974	Gauge hole with some horizontal fractures
2974	3002	Borehole fractured with small to medium size cavities
3002	3046	Gauge borehole, vuggy borehole surface
3046	3047	Small cavity
3047	3087	Gauge hole
3087	3090	Vertical and horizontal fractures
3090	3141	Gauge hole, some small cavities
3141	3143	Large cavity
3143	3209	Gauge hole with some fractured areas
3209	3213	Large cavity and fractured area
3213	3247	Gauge hole with some small fractures
3247	3266	Very smooth gauge hole
3266	3268	Gauge hole with some vertical fractures
3268	3297	Gauge hole
3297		Total depth

Concentrate Disposal Well Injection Test Data

CITY OF BOYNTON BEACH CONCENTRATE DISPOSAL WELL INJECTION TEST

REFERENCE POINTS DIW: 100 PSI HEISE, 27.14 FT NGVD
UPPER MONITOR ZONE: 200 PSI HEISE, 21.67 FT NGVD
LOWER MONITOR ZONE: STEEL TAPE, REFERENCE 23.19 FT NGVD

DATE: DECEMBER 28, 1991
PROJECT NO.: SEF26410.P1

STEP NO.	ELAPSED TIME (MIN)	ACTUAL TIME (HOURS)	TOTALIZER (GALLONS X1000)	FLOW RATE (GPM)	INJECTION PRESSURE (PSI)	UPPER MONITOR ZONE FT ABOVE NGVD	LOWER MONITOR ZONE FT ABOVE NGVD	COMMENTS
BACKGROUND			300	NA	NA	44.77	17.94	COLLECT BACKGROUND DATA
			330	NA	NA	44.77	17.94	
			400	NA	NA	44.77	17.92	
			430	NA	NA	44.77	17.90	
			500	NA	NA	44.77	17.88	
			530	NA	NA	44.77	17.84	
			600	NA	NA	44.77	17.79	
			630	NA	NA	44.77	17.75	
			700	NA	NA	44.77	17.71	
			715	NA	NA	44.77	17.69	
STEP NO. 1	0	720	795	0	7.2	44.77	17.67	START STEP NO. 1
	0.17				28.0			ADJUSTING FLOW RATE
	0.33				20.0			
	0.5				18.0			
	0.67				16.8			
	0.83				16.2			
	1	721			13.2			
	1.5				14.8			
	2	722	798	1500	15.8			ADJUSTING FLOW RATE
	2.5				16.3			
	3	723			17.1			
	3.5				17.6			
	4	724			18.5			
	4.5				19.2			
	5	725	801	1100	19.8	44.77	17.67	HEAD STARTING TO BUILD ON WELL
	6	726			21.2			ADJUST FLOW RATE
	7	727			22.1			
	8	728			27.3			
	9	729		1450	27.2			
	10	730			28	44.77	17.67	
	12	732			28.1			
	14	734			28.2			
	16	736		1350	28.3	44.77	17.67	FLOW RATE STABLE
	18	738			28.3			
	20	740			28.5	44.77	17.69	
	25	745			28.5	44.77	17.69	INJECTION PRESSURE STABLE
	30	750			28.4	44.77	17.69	
	40	800	823	1380	28.5	44.77	17.69	
	50	810			28.5	44.77	17.69	
	60	820	875	1350	28.5	44.77	17.69	
	75	835			28.5	44.77	17.69	
	90	850			28.5	44.77	17.69	
	105	905	912	1380	28.5	44.77	17.69	
	120	920	960	1380	28.5	44.77	17.69	

CITY OF BOYNTON BEACH CONCENTRATE DISPOSAL WELL INJECTION TEST

REFERENCE POINTS DIW: 100 PSI HEISE, 27.14 FT NGVD
UPPER MONITOR ZONE: 200 PSI HEISE, 21.87 FT NGVD
LOWER MONITOR ZONE: STEEL TAPE, REFERENCE 23.19 FT NGVD

DATE: DECEMBER 28, 1991
PROJECT NO.: SEF28410.P1

STEP NO.	ELAPSED TIME (MIN)	ACTUAL TIME (HOURS)	TOTALIZER (GALLONS X1000)	FLOW RATE (GPM)	INJECTION PRESSURE (PSI)	UPPER MONITOR ZONE FT ABOVE NGVD	LOWER MONITOR ZONE FT ABOVE NGVD	COMMENTS
STEP NO. 2	0	920	960	1360	28.5	44.77	17.69	START STEP NO. 2
	0.17				39.7			ADJUSTING FLOW RATE
	0.33				39.7			
	0.5				39.5			
	0.67							
	0.83				39.7			
	1	921			39.8	44.77	17.69	
	1.5				39.8			
	2	922			35.5			FLOW RATE STABLE
	2.5				35.7			
	3	923			35.7			CONFIRM STABLE FLOW RATE BEFORE STARTING FLOW LOG
	3.5				35.7			
	4	924	970	2350	35.6			
	4.5				35.6			
	5	925			35.7	44.77	17.69	
	6	926			35.7			
	7	927			35.8			
	8	928			35.8			
	9	929			35.8			
	10	930			35.7	44.77	17.73	
	12	932	992	2350	35.7			
	14	934			35.7			
	16	936			35.7	44.77	17.73	
	18	938			35.7			
	20	940			35.7	44.77	17.73	
	25	945	1018	2350	35.7	44.77	17.73	
	30	950			35.6	44.77	17.73	
	40	1000			35.7	44.77	17.75	
	50	1010			35.6	44.77	17.75	
	60	1020			35.7	44.77	17.77	
	75	1035	1130	2350	36.4	44.77	17.77	
	90	1050			35.8	44.77	17.79	
105	1105			36.1	44.77	17.81		
120	1120	1245	2350	36.3	44.77	17.84		
135	1135			35.6	44.77	17.86		
150	1150			35.6	44.77	17.90		
165	1205			35.7	44.77	17.92		
180	1220			35.7	44.77	17.94		
195	1235			35.7	44.77	17.94		
210	1250			35.8	44.77	17.96		
225	1305			35.9	44.77	17.96		
240	1320			35.9	44.77	17.98		
255	1335	1560	2350	36.1	44.77	17.98		
260	1340			2350				

CITY OF BOYNTON BEACH CONCENTRATE DISPOSAL WELL INJECTION TEST

REFERENCE POINTS DIW: 100 PSI HEISE, 27.14 FT NGVD

UPPER MONITOR ZONE: 200 PSI HEISE, 21.67 FT NGVD

LOWER MONITOR ZONE: STEEL TAPE, REFERENCE 23.19 FT NGVD

DATE: DECEMBER 28, 1991

PROJECT NO.: SEF26410.P1

STEP NO.	ELAPSED TIME (MIN)	ACTUAL TIME (HOURS)	TOTALIZER (GALLONS X1000)	FLOW RATE (GPM)	INJECTION PRESSURE (PSI)	UPPER MONITOR ZONE FT ABOVE NGVD	LOWER MONITOR ZONE FT ABOVE NGVD	COMMENTS
STEP NO. 3	0	1340	1568	2350	36.1	44.77	18.02	ADJUSTING FLOW RATE
	0.17				48			
	0.33				47			
	0.5				46.5			
	0.67				47			
	0.83				46.6			ADJUSTING FLOW RATE
	1	1341	1573	3200	46.5			
	1.5				46.4			
	2	1342			44			
	2.5	1342	1576	2900	43.8			
	3	1343			43.7			FLOW RATE STABILIZING
	3.5				46.2			
	4	1344			46.3			
	4.5			3200	46.2			
	5	1345	1587	3000	44.2	44.77	18.02	
	6	1346			43.9			THROTTLE ON DIESEL ENGINE SLIPPIN
	7	1347			43.6			
	8	1348			43.6			
	9	1349			43.4			
	10	1350		3000	43.3	44.77	18.00	
	12	1352			43.3			THROTTLE ON DIESEL ENGINE SLIPPIN
	14	1354			43.3			
	16	1356			40.7	44.77	18.00	
	18	1358			41.5			
	20	1400			41.7	44.77	18.02	
	25	1405			42.8	44.77	18.04	THROTTLE ON DIESEL ENGINE SLIPPIN
	30	1410		3100	43.2			
		1415				44.77	18.02	
	40	1420			43.2			
		1425				44.77	18.02	
	50	1430			42.6			THROTTLE ON DIESEL ENGINE SLIPPIN
	60	1440			42.5	44.77	18.02	
		1450				44.77	18.02	
	75	1455			42.6			
	1505				44.77	18.02		
90	1510	1830	3000	42.8			THROTTLE ON DIESEL ENGINE SLIPPIN	
	1520				44.77	18.02		
105	1525			42.8				
	1535				44.77	17.98		
120	1540	1928	3000	42.8				
	1550				44.77	17.98	THROTTLE ON DIESEL ENGINE SLIPPIN	
135	1555	1970	3000	42.8				
	1565				44.77	17.98		
140	1600	1978		42.8	44.77	17.98		
							TERMINATE TEST	

CITY OF BOYNTON BEACH CONCENTRATE DISPOSAL WELL INJECTION TEST

DATE: DECEMBER 28, 1991
PROJECT NO.: SEF28410.P1

REFERENCE POINTS DIW: 100 PSI HEISE, 27.14 FT NGVD
UPPER MONITOR ZONE: 200 PSI HEISE, 21.67 FT NGVD
LOWER MONITOR ZONE: STEEL TAPE, REFERENCE 23.19 FT NGVD

STEP NO.	ELAPSED TIME (MIN)	ACTUAL TIME (HOURS)	TOTALIZER (GALLONS X1000)	FLOW RATE (GPM)	INJECTION PRESSURE (PSI)	UPPER MONITOR ZONE FT ABOVE NGVD	LOWER MONITOR ZONE FT ABOVE NGVD	COMMENTS
STEP NO. 4 RECOVERY	0	1800			42.8	44.77	17.98	START COLLECTING RECOVERY DATA
	0.17				22	44.77	17.98	
	0.33				24	44.77	17.98	
	0.5				24	44.77	17.98	
	0.67				24	44.77	17.98	
	0.83				24	44.77	17.98	
	1	1801			24	44.77	17.98	
	1.5				24	44.77	17.98	
	2	1802			24.2	44.77	17.98	
	2.5				24.2	44.77	17.98	
	3	1803			24.2	44.77	17.98	
	3.5				24.2	44.77	17.98	
	4	1804			24.1	44.77	17.98	
	4.5				24.1	44.77	17.98	
	5	1805			24.1	44.77	17.98	
	6	1806			24	44.77	17.98	
	7	1807			24	44.77	17.98	
	8	1808			23.9	44.77	17.98	
	9	1809			23.9	44.77	17.98	
	10	1810			23.8	44.77	17.98	
	12	1812			23.7	44.77	17.98	
	14	1814			23.6	44.77	17.98	
	16	1816			23.5	44.77	17.98	
	18	1818			23.5	44.77	17.98	
	20	1820			23.5	44.77	17.98	
	25	1825			23.4	44.77	17.98	
	30	1830			23.3	44.77	17.92	
	40	1840			23.3	44.77	17.92	
	50	1850			23.1	44.77	17.92	
	60	1700			23	44.77	17.92	
	75	1715			22.9	44.77	17.90	
	90	1730			22.8	44.77	17.90	
	105	1745			22.8	44.77	17.90	
120	1800			22.8	44.77	17.86		
135	1815			22.7	44.77	17.84		
150	1830			22.7	44.77	17.84		
165	1845			22.7	44.77	17.81		
180	1900			22.7	44.77	17.79		
195	1915			22.7	44.77	17.79		
210	1930			22.6	44.77	17.79		
225	1945			22.6	44.77	17.79		
240	2000			22.6	44.77	17.79		
300	2100			22.6	44.77	17.77		
360	2200			22.6	44.77	17.77		
420	2300			22.6	44.77	17.77		
480	2400			22.6	44.77	17.77		
540	0100			22.6	44.77	17.75		
600	0200			22.6	44.77	17.73		
660	0300			22.6	44.77	17.73		
720	0400			22.6	44.77	17.71		
780	0500			22.6	44.77	17.71		
800	0700			22.6	44.77	17.84	STOP COLLECTING RECOVERY DATA	

Concentrate Disposal Well Radioactive Tracer Survey

Radioactive Tracer Survey

On December 30, 1991, a Radioactive Tracer Survey (RTS) was performed on the concentrate disposal well by Florida Geophysical Logging, Inc. in the presence of FDER.

The radioactive isotope used to trace the fluid was Iodine 131. The tracer fluid was placed in a tool equipped with upper, middle, and lower gamma ray detectors with a single ejector port. The upper detector is positioned above the ejector port while the middle and lower ejector ports are positioned below. Prior to the logging of the well, the tool was loaded with 10 millicuries of tracer. Multiple ejections were made under both static and dynamic conditions.

A baseline natural gamma ray log was performed before testing from total depth (3,277 feet bls) to within 50 feet of land surface, "File 121, Dec-30-91, 11:24. Baseline and tracer log (horizontal) scales range from 0 to 100 for the upper (GRT) and lower (GRB) gamma ray detectors and from 0 to 1000 for the middle (GRM) gamma ray detector. The detectors record gamma American Petroleum Institute (GAPI) units.

During the baseline gamma ray log, a casing collar locator (CCL) was also performed to identify the base of the casing. The base of the casing was identified at a depth of 2,776 feet bls. Small discrepancies between the recorded total length of casing installed and the depth recorded by the CCL were due to cable strength and referencing of the logging tools. For the purposes of this discussion, the depth recorded by the CCL (2,776 feet bls) will be used. The ejections made during the test are summarized as follows:

Ejection No. 1 (First Static Test)

After completion of the baseline gamma ray log, the tool was positioned with the ejector port 2 feet below the base of the casing at 2,778 feet bls. After background gamma counts were recorded on each detector, 1.5 millicuries of tracer fluid was ejected. The output of the three gamma ray detectors after ejection is displayed in "File 122, Dec-30-91, 13:11." The time at which the tracer was ejected is indicated by a triangular symbol between the upper (GRT) and lower (GRB) gamma ray detectors. The tracer was released approximately 3 minutes after the time drive began.

This segment of the log records detector output over time. The bottom of the log indicates a time of 12:05 and the top a time of 13:11. The far left side of the upper gamma ray detector scale is the time scale. Each break on the vertical scale is equal to one minute of elapsed time. Approximately 0.7 minutes after the ejection, the middle detector (GRM) indicated increased gamma ray activity. The lower (GRB) detector indicated higher gamma activity at approximately 45 minutes after ejection. The upper (GRT) detector indicated a higher gamma response at approximately 51 minutes after ejection. Sixty-six minutes into the test, time drive was terminated and the tool was

repositioned upward showing no evidence of tracer above a depth of 2,764 feet bls on the upper detector (GRB). This log is shown on "File 123, Dec-30-91, 13:20."

After the tool was repositioned, the disposal well was flushed at approximately 1,000 gpm for 5 minutes, displacing approximately 560 feet of water column in the 16-inch casing to flush the tracer material out of the casing. The tool was then repositioned at a depth of 2,791 bls feet and logged up. As shown in "File 124, Dec-30-91, 14:25", there is staining at the base of the casing from 2,791 bls feet up to 2,772 feet bls. Results of the first static test indicate no upward migration of radioactive tracer.

Ejection No. 2 (Second Static)

The ejector port was repositioned at a depth of 2,778 feet (same depth as the first static test), 2 feet below the base of the casing, and a second static test was conducted as shown in "File 125, Dec-30-91, 14:54." A 1.5 millicurie ejection of tracer was ejected approximately 3.0 minutes after the time drive began. The middle detector (GRM) indicated higher gamma activity immediately after ejection. The signal from the lower (GRB) detector was briefly interrupted (less than 1 minute) due to the concentration of tracer saturation of the middle detector causing excessive responsive signal. This interruption occurred from approximately 1 minute after ejection until 2 minutes after ejection.

The upper (GRT) detector indicated higher gamma activity at approximately 4.5 minutes after ejection. The lower (GRB) detector indicated higher gamma activity 9 minutes after ejection. Sixty minutes into the test, time drive was terminated and the tool was repositioned upward showing no evidence of tracer above a depth of 2,720 feet on the upper detector (GRT). This log is shown on "File 126, Dec-30-91, 14:55."

After the tool was repositioned, the disposal well was flushed at approximately 1,000 gpm for 5 minutes, displacing approximately 560 feet of water column in the 16-inch casing to flush the remaining tracer out of the casing. The tool was then repositioned at a depth of 2,791 feet bls and logged up. As shown in "File 127, Dec-30-91, 15:19", there is staining at the base of the casing from 2,791 feet bls up to 2,760 feet bls as shown on the upper detector. Results of the second static test indicate a uniform dispersion of radioactive tracer as shown on the first ejection. No movement of tracer behind the casing is evident.

Ejection No. 3 (First Dynamic)

After the second static test was completed, the tool was positioned so that the ejector port was located at 2,770 feet bls (6 feet inside the casing). A potable waterline was connected to the well using appropriate backflow preventors to enable injection for dynamic testing. After a constant injection rate of approximately 20 gpm as measured by the water meter was established, a 2.0 millicurie slug of tracer fluid was ejected and gamma activity monitored for 60 minutes. The output of the three gamma detectors after ejection is displayed in "File 128 Dec-30-91, 15:35".

The middle (GRM) indicated increased gamma activity approximately 20 seconds after ejection and became saturated. Again, the signal from the lower detector was briefly interrupted due to the high signal experienced from the middle detector. This interruption occurred from approximately 0.5 minutes after ejection to 1.0 minutes.

The lower detector (GRB) became saturated 5 minutes after ejection. Movement of the center of the tracer slug past the lower detector (GRB) is consistent with a fluid velocity of approximately 2.3 feet per minute (ft/min). This is equivalent to an ejection rate of approximately 23 gpm. During this 60-minute dynamic ejection the upper detector showed no increased gamma activity.

"File 129 Dec-30-91, 16:40" is the log of the tool being raised upward to 2,575 feet bls. This log indicated some residual tracer on the lower detector.

After the tool was repositioned, the well was flushed with approximately 8,000 gallons of water to remove any tracer remaining in the casing. The tool was repositioned at a depth of 2,789 feet bls and logged up. The log after flushing, "File 130 Dec-30-91, 17:00," indicated staining up to approximately 2,754 feet bls on the upper (GRT) detector. No tracer was observed on the upper (GRT) detector above 2,754 feet bls. The lower (GRB) detector continued to indicate a low residual stain.

This log indicates no movement of tracer behind the base of the casing.

Ejection No. 4 (Second Dynamic)

A second dynamic ejection was performed with the ejector port positioned at 2,767 feet bls, 9 feet above the base of the casing. After establishing a constant flow rate of 60 gpm as measured by the flow meter, a 2.0 millicurie slug of tracer was ejected and gamma activity monitored for one hour. The output of the three gamma detectors after ejection is displayed on "File 131 Dec-30-91, 17:13."

The middle (GRM) indicated increased gamma activity approximately 10 seconds after ejection and became saturated. Again, the signal from the lower detector was briefly interrupted due to the high signal experienced from the middle detector. This interruption occurred from approximately 1.5 minutes after ejection to 2.0 minutes.

The lower detector (GRB) became saturated 2.0 minutes after ejection. Movement of the tracer past the lower detector (GRB) is consistent with a fluid velocity of approximately 6.3 feet per minute (ft/min), equivalent to an ejection rate of approximately 57 gpm in the 16-inch casing. The upper detector showed no increased gamma activity during this 60-minute dynamic ejection.

"File 132 Dec-30-91, 18:28" is the log of the tool being raised upward to 2,574 feet bls. This log indicated some residual tracer on the middle and lower detectors.

After the tool was repositioned at 2,574 feet bls, the final fresh water flush was started.

Final Gamma Ray Log

While the final flush was being performed, the tool was lowered into the injection zone to a total depth of 3,271 feet bls. The tool was emptied while logging out from 3,271 feet bls during final flushing of the well. The final gamma ray log commenced at a depth of 3,150 feet bls and is shown on "File 133 Dec-30-91, 19:13." This log was superimposed on the background gamma ray log up to 50 feet. The file indicates gamma response above background on the upper (GRT) detector up to 2,762 feet bls. These elevated responses are attributed to tracer that has been displaced down hole and tracer staining in the work area (2,767 feet bls to 2,778 feet bls). Above 2,762 feet bls, the upper (GRT) detector repeats the gamma signature recorded on the background log. The lower detector indicates gamma response higher than background from tracer stain remaining on the tool. No evidence of tracer migration was observed either inside or behind the casing on the final gamma log.

Dual-Zone Monitor Well Background Sampling Data

**DEVELOPMENT OF THE CITY OF BOYNTON BEACH
DUAL-ZONE MONITOR WELL**

DATE	UPPER ZONE		LOWER ZONE		COMMENTS
	CHLORIDES (mg/l)	CONDUCTIVITY (mg/l)	CHLORIDES (mg/l)	CONDUCTIVITY (mg/l)	
3/27/92	-	-	-	-	START 24 HOUR DEVELOPMENT. BOTH ZONES PUMPING AT APPROXIMATELY 50 GPM. PURGED WATER DISPOSED OF INTO THE DISPOSAL WELL.
3/30/92	2080	6000	15200	30000	CONTINUOUS DISCHARGE
4/03/92	2500	6000	14000	28000	CONTINUOUS DISCHARGE
4/06/92	2000	6000	15100	31000	CONTINUOUS DISCHARGE
4/13/92	2100	6500	16500	31000	CONTINUOUS DISCHARGE
4/16/92	2000	6500	15900	31000	CONTINUOUS DISCHARGE
4/21/92	-	-	-	-	PRIMARY AND SEONDARY SAMPLES COLLECTED. DEVELOPMENT STOPPED.



QUALITY
ANALYTICAL
LABORATORIES

May 26, 1992

SEF26141.P1.41 | AAG368

RE: Boynton Beach DIW laboratory samples

Dear Albert Muniz/DFB:

On April 22, 1992 the CH2M Hill Gainesville Laboratory received 4 water, grab samples with a request for analysis of selected parameters.

The analytical results are enclosed. In the analysis of Arsenic and Lead matrix interferences were encountered. The samples had to be diluted 1:4 in order to obtain acceptable QA/QC data. The detection limits were elevated accordingly.

If you should have any questions concerning the results, please call Don Hash or Tom Emenhiser.

Sincerely,

Don Hash
Client Services

Enclosure(s):

cc: Bart Ziegler/DFB



Boynton Beach DIW	CH2M HILL
Attention: Albert Muniz Address: DFB Copies to: Bart Ziegler/DFB,	Project No: SEF26141.P1.41 Received: 04/22/92 Reported: 05/27/92
Collected: 04/21/92 by Carl Patterson Type: water, grab Location: Dual-Zone Monitor Well	

SAMPLE NUMBER	110968	110969	110970	110971
SAMPLE DESCRIPTIONS	Upper Zone 04/21/92 12:15	Lower Zone 04/21/92 12:25	Trip Blank 04/21/92	Laboratory Method Blank
GENERAL				
pH (Units)	7.80 04/22/92	7.45 04/22/92	n/r n/r	Not Applicable 04/22/92
Alkalinity, Total (as CaCO3)	142 04/30/92	132 04/30/92	n/r n/r	<1.0 04/30/92
Hardness, Total (as CaCO3)	840 05/04/92	5100 05/04/92	n/r n/r	<1.0 05/04/92
Turbidity (NTU)	9.2 04/22/92	15 04/22/92	n/r n/r	<0.2 04/22/92
SOLIDS				
Total Dissolved Solids	3800 06/08/92	28,300 06/08/92	n/r n/r	<1.0 06/08/92
Total Suspended Solids	<1.0 04/23/92	5.0 04/23/92	n/r n/r	<1.0 04/23/92
METALS				
Antimony - ICP	<0.030 05/14/92	<0.030 05/14/92	n/r n/r	<0.030 05/14/92
Arsenic - FU	<0.025 ** 05/26/92	<0.025 ** 05/26/92	n/r n/r	<0.005 05/26/92
Beryllium - ICP	<0.0006	<0.0006	n/r	<0.0006

NOTE: Values are mg/l as substance unless otherwise stated.
* Inorganic analysis were not requested for this sample number.
** See cover letter.
REVISED REPORT

Respectfully submitted,

Isaac D. Lynch, Inorganics Supervisor

n/r = not requested

NOTE: This report contains test data and no interpretation is intended or implied.



SAMPLE NUMBER	110968	110969	110970	110971
SAMPLE DESCRIPTIONS	Upper Zone 04/21/92 12:15	Lower Zone 04/21/92 12:25	Trip Blank 04/21/92	Laboratory Method Blank
Cadmium - ICP	05/14/92 <0.005	05/14/92 <0.005	n/r	05/14/92 <0.005
Chromium, Tot - ICP	05/14/92 <0.006	05/14/92 <0.006	n/r	05/14/92 <0.006
Copper - ICP	05/14/92 <0.006	05/14/92 <0.006	n/r	05/14/92 <0.006
Lead - FU	05/14/92 <0.010 **	05/14/92 <0.010 **	n/r	05/14/92 <0.002
Mercury - CV	05/20/92 <0.0002	05/20/92 <0.0002	n/r	05/20/92 <0.0002
Nickel - ICP	05/05/92 <0.015	05/05/92 <0.015	n/r	05/05/92 <0.015
Selenium	05/14/92 <0.005	05/14/92 <0.005	n/r	05/14/92 <0.005
Silica, React	05/19/92 12.1	05/19/92 9.64	n/r	05/19/92 <0.05
Silver - ICP	05/07/92 <0.005	05/07/92 <0.005	n/r	05/07/92 <0.005
Thallium - ICP	05/14/92 <0.025	05/14/92 <0.025	n/r	05/14/92 <0.025
Zinc - ICP	05/18/92 <0.003	05/18/92 0.018	n/r	05/18/92 <0.003
	05/21/92	05/21/92	n/r	05/21/92
ANIONS				
Chloride	2050 06/12/92	14,000 06/12/92	n/r	<1.0 06/12/92
Cyanide, Total	<0.005 04/23/92	<0.005 04/23/92	n/r	<0.005 04/23/92
Sulfate	319 05/05/92	1390 05/05/92	n/r	<1.0 05/05/92
Sulfide	3.8	2.6	n/r	<0.2

NOTE: Values are mg/l as substance unless otherwise stated.

* Inorganic analysis were not requested for this sample number.

** See cover letter.

REVISED REPORT

Respectfully submitted,

Isaac D. Lynch
Isaac D. Lynch, Inorganics Supervisor

n/r = not requested

NOTE: This report contains test data and no interpretation is intended or implied.



SAMPLE NUMBER	110968	110969	110970	110971
SAMPLE DESCRIPTIONS	Upper Zone 04/21/92 12:15	Lower Zone 04/21/92 12:25	Trip Blank 04/21/92	Laboratory Method Blank
NUTRIENTS	04/27/92	04/27/92	n/r	04/27/92
Ammonia (as N)	0.56 05/04/92	0.27 05/04/92	n/r n/r	<0.04 05/04/92
Nitrate & Nitrite (as N)	<0.02 05/04/92	<0.02 05/04/92	n/r n/r	<0.02 05/04/92
Kjeldahl Nitrogen (as N)	0.69 06/12/92	0.32 06/12/92	n/r n/r	<0.04 06/12/92
Total Phosphorus (as P)	<0.01 05/04/92	0.01 05/04/92	n/r n/r	<0.01 05/04/92
OXYGEN DEMAND				
BOD (5 day)	4.5 04/22/92	<2.0 04/22/92	n/r n/r	<2.0 04/22/92
GENERAL ORGANICS				
Phenol, 4AAP	0.042 05/06/92	0.018 05/06/92	n/r n/r	<0.002 05/06/92
Surfactants (MBAS)	0.030 04/30/92	0.177 04/30/92	n/r n/r	<0.025 04/30/92

NOTE: Values are mg/l as substance unless otherwise stated.
* Inorganic analysis were not requested for this sample number.
** See cover letter.
REVISED REPORT

Respectfully submitted,


Isaac D. Lynch, Inorganics Supervisor

n/r = not requested

NOTE: This report contains test data and no interpretation is intended or implied.



REPORT OF ANALYSES

CH2MHILL SOUTHEAST
ONE INNOVATION DRIVE
P.O. BOX 370
ALACHUA, FL 32615-0370

DATE: 05/12/92
DHRS #: 82282, E82001

ATTN: MR. DON HASH

TABLE 1: SAMPLES RECEIVED 04/22/92

CLIENT STATION ID	LAB NUMBER	FOAMING AGENTS-MBAS (mg/L)
110968	64269	0.030
110969	64270	0.177

* Sample 64272 CH2 111007 analyzed 4/22/92 with a value >0.5 mg/L.
Sample was diluted and extracted 4/28/92 with a value < 0.1 mg/L.
Sample was extracted and analyzed 4/30/92 with a value <0.025 mg/L.

M. Kelly Bergdoll
PROJECT MANAGER



QUALITY
ANALYTICAL
LABORATORIES

May 14, 1992

SEF26140.P1.41

Mr. A. Múniz
CH2M HILL/DFB

Deerfield Beach, Florida

RE: Analytical Data for Boynton Beach D.I.W., LGN Lab No. 110968 - 110970

Dear Mr. Muniz:

On April 22, 1992, the CH2M HILL Gainesville Laboratory received three samples with a request for analysis of selected organic and inorganic parameters.

The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analyses of this sample are discussed in the case narratives.

Under CH2M HILL policy, your samples will be stored for up to 30 days after reporting. If you have not given us prior instructions for disposal, we will contact you if any samples require disposal as hazardous waste.

CH2M HILL Laboratories appreciate your business and look forward to serving your analytical needs again. If you should have any questions concerning the data, or if you need additional information, please call our Client Services Manager, Tom Emenhiser or myself, at 904-462-3050.

Sincerely,

Don Hash
Client Services

Enclosures

ORGANIC DATA QUALIFIERS

- U -- Indicates the compound was analyzed for but not detected. The number adjacent to the "U" qualifier indicates the reporting limit for that compound. The reporting limit can vary from sample to sample depending on dilution factors or percent moisture adjustment when indicated.
- J -- Indicates an estimated value. It is used when the data indicates the presence of a compound below the stated reporting limit.
- C -- This flag applies to GC pesticide results only. The "C" flag indicates the presence of this compound has been confirmed by GC/MS analysis.
- B -- This flag is used when the analyte is found in the associated blank as well as the sample. This notation indicates possible blank contamination and suggests the data user evaluate these compounds and their amounts carefully.
- E -- This flag applies to GC/MS only. The "E" qualifier indicates a compound may be above or below the linear range of the instrument. If the particular compound level is deemed above the linear calibration range, then the sample should be reanalyzed at an appropriate dilution. Therefore, the "E" qualified amount is an estimated concentration. The results for the dilution will be reported on a separate Form I and will be flagged with a "D" if the dilution brings the concentration within proper calibration.
- D -- This flag identifies compounds which have been run at a dilution to bring the concentration of that compound within the linear range of the instrument. "D" qualifiers are only used for samples that have been run initially with results above acceptable ranges.

SAMPLE ID QUALIFIERS

The qualifiers that may be appended to the sample ID for organic analyses are defined below:

- DL** -- Dilution Run. Indicates the sample contained compounds exceeding the calibration range. The sample was diluted and reanalyzed. Both results are reported.
- R** -- Rerun. The sample was reanalyzed. The "R" is not used if the sample was also re-extracted.
- RX** -- Re-extraction Analysis. The sample was re-extracted and reanalyzed.
- RD** -- Diluted Rerun. The sample was re-extracted and a dilution was also required.
- MS** -- Matrix Spike (may be followed by a digit to indicate multiple matrix spikes within a sample set)
- MSD** -- Matrix Spike Duplicate (may be followed by a digit to indicate multiple matrix spike duplicates within a sample set)

CASE NARRATIVE
GC/MS VOLATILE SAMPLES

LABORATORY: CH2M HILL LABORATORIES

CLIENT: Boynton Beach D.I.W.

CASE NO. : 92D22V01

CONTRACT NO.: N/A

LAB NO. : 110968 - 110970

SDG NO.: N/A

I. RECEIPT

A. DATE: April 22, 1992

B. SAMPLE INFORMATION

<u>LAB ID</u>	<u>CLIENT ID</u>	<u>SAMPLE MATRIX</u>	<u>DATE SAMPLED</u>	<u>EXTRACTION DATE</u>	<u>ANALYSIS DATE</u>
110968	UPPER ZONE	WATER	04/21/92	NA	05/01/92
110969	LOWER ZONE	WATER	04/21/92	NA	05/01/92
110970	TRIP BLANK	WATER	04/21/92	NA	05/01/92
VBLK01	QC_BLANK_W	WATER	NA	NA	05/01/92

C. Documentation

Exceptions : No exceptions were encountered.

II. EXTRACTION

- A. Holding Times: Not applicable.
- B. Extraction
Exceptions : Not applicable.

III. ANALYSIS

- A. Holding times: All holding times were met.
- B. Analytical
Exceptions : No exceptions were encountered.

IV. QUALITY CONTROL

- A. Method Blank : All associated method blanks met acceptable QC criteria.
- B. Surrogate
Recoveries : All samples met acceptable QC limits.
- C. Matrix Spike
Results : All spike recoveries were within CLP advisory limits.

- V. I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package (computer-readable data submitted on diskette is not provided) has been authorized by the Laboratory Manager or his designee, as verified by the following signature.



Andrés A. Romeu, Ph.D
Manager, Organics Division

Date

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL LGN
 Lab Sample ID: 110968
 Client Sample ID: UPPER ZONE

Concentration: LOW
 Sample Matrix: WATER
 Percent Moisture: _____

Date Extracted: _____
 Date Analyzed: 05/01/92
 Dilution Factor: 1.0

VOLATILE COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
74-87-3	Chloromethane	10.0	U	127-18-4	Tetrachloroethene	10.0	U
74-83-9	Bromomethane	10.0	U	79-34-5	1,1,2,2-Tetrachloroethane	10.0	U
75-01-4	Vinyl Chloride	10.0	U	108-88-3	Toluene	10.0	U
75-00-3	Chloroethane	10.0	U	108-90-7	Chlorobenzene	10.0	U
75-09-2	Methylene Chloride	10.0	U	100-41-4	Ethylbenzene	10.0	U
75-69-4	Trichlorofluoromethane	10.0	U	541-73-1	1,3-Dichlorobenzene	10.0	U
75-35-4	1,1-Dichloroethene	10.0	U	106-46-7	1,4-Dichlorobenzene	10.0	U
75-34-3	1,1-Dichloroethane	10.0	U	95-50-1	1,2-Dichlorobenzene	10.0	U
156-60-5	Trans-1,2-Dichloroethene	10.0	U		-----		
67-66-3	Chloroform	10.0	U		Toluene-d8 - SS	109	
107-06-2	1,2-Dichloroethane	10.0	U		Bromofluorobenzene - SS	105	
71-55-6	1,1,1-Trichloroethane	10.0	U		1,2-Dichloroethane-d4 - SS	99	
56-23-5	Carbon Tetrachloride	10.0	U				
75-27-4	Bromodichloromethane	10.0	U				
78-87-5	1,2-Dichloropropane	10.0	U				
10061-01-5	cis-1,3-Dichloropropene	10.0	U				
79-01-6	Trichloroethene	10.0	U				
24-48-1	Dibromochloromethane	10.0	U				
79-00-5	1,1,2-Trichloroethane	10.0	U				
71-43-2	Benzene	10.0	U				
10061-02-6	trans-1,3-Dichloropropene	10.0	U				
110-75-8	2-Chloroethylvinylether	10.0	U				
75-25-2	Bromoform	10.0	U				

- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- SS - Surrogate Standard reported as percent recovery.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL LGN
 Lab Sample ID: 110969
 Client Sample ID: LOWER ZONE

Concentration: LOW
 Sample Matrix: WATER
 Percent Moisture: _____

Date Extracted: _____
 Date Analyzed: 05/01/92
 Dilution Factor: 1.0

VOLATILE COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L
74-87-3	Chloromethane	10.0	U	127-18-4	Tetrachloroethene	10.0 U
74-83-9	Bromomethane	10.0	U	79-34-5	1,1,2,2-Tetrachloroethane	10.0 U
75-01-4	Vinyl Chloride	10.0	U	108-88-3	Toluene	10.0 U
75-00-3	Chloroethane	10.0	U	108-90-7	Chlorobenzene	10.0 U
75-09-2	Methylene Chloride	10.0	U	100-41-4	Ethylbenzene	10.0 U
75-69-4	Trichlorofluoromethane	10.0	U	541-73-1	1,3-Dichlorobenzene	10.0 U
75-35-4	1,1-Dichloroethene	10.0	U	106-46-7	1,4-Dichlorobenzene	10.0 U
75-34-3	1,1-Dichloroethane	10.0	U	95-50-1	1,2-Dichlorobenzene	10.0 U
156-60-5	Trans-1,2-Dichloroethene	10.0	U	-----		
67-66-3	Chloroform	10.0	U		Toluene-d8 - SS	105
107-06-2	1,2-Dichloroethane	10.0	U		Bromofluorobenzene - SS	104
71-55-6	1,1,1-Trichloroethane	10.0	U		1,2-Dichloroethane-d4 - SS	101
56-23-5	Carbon Tetrachloride	10.0	U			
75-27-4	Bromodichloromethane	10.0	U			
78-87-5	1,2-Dichloropropane	10.0	U			
10061-01-5	cis-1,3-Dichloropropene	10.0	U			
79-01-6	Trichloroethene	10.0	U			
24-48-1	Dibromochloromethane	10.0	U			
9-00-5	1,1,2-Trichloroethane	10.0	U			
71-43-2	Benzene	10.0	U			
10061-02-6	trans-1,3-Dichloropropene	10.0	U			
110-75-8	2-Chloroethylvinylether	10.0	U			
75-25-2	Bromoform	10.0	U			

- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- SS - Surrogate Standard reported as percent recovery.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL LGN
 Lab Sample ID: 110970
 Client Sample ID: TRIP BLANK

Concentration: LOW
 Sample Matrix: WATER
 Percent Moisture: _____

Date Extracted: _____
 Date Analyzed: 05/01/92
 Dilution Factor: 1.0

VOLATILE COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L
74-87-3	Chloromethane	10.0	U	127-18-4	Tetrachloroethene	10.0 U
74-83-9	Bromomethane	10.0	U	79-34-5	1,1,2,2-Tetrachloroethane	10.0 U
75-01-4	Vinyl Chloride	10.0	U	108-88-3	Toluene	10.0 U
75-00-3	Chloroethane	10.0	U	108-90-7	Chlorobenzene	10.0 U
75-09-2	Methylene Chloride	10.0	U	100-41-4	Ethylbenzene	10.0 U
75-69-4	Trichlorofluoromethane	10.0	U	541-73-1	1,3-Dichlorobenzene	10.0 U
75-35-4	1,1-Dichloroethene	10.0	U	106-46-7	1,4-Dichlorobenzene	10.0 U
75-34-3	1,1-Dichloroethane	10.0	U	95-50-1	1,2-Dichlorobenzene	10.0 U
156-60-5	Trans-1,2-Dichloroethene	10.0	U		-----	
67-66-3	Chloroform	10.0	U		Toluene-d8 - SS	107
107-06-2	1,2-Dichloroethane	10.0	U		Bromofluorobenzene - SS	106
71-55-6	1,1,1-Trichloroethane	10.0	U		1,2-Dichloroethane-d4 - SS	100
56-23-5	Carbon Tetrachloride	10.0	U			
75-27-4	Bromodichloromethane	10.0	U			
78-87-5	1,2-Dichloropropane	10.0	U			
10061-01-5	cis-1,3-Dichloropropene	10.0	U			
79-01-6	Trichloroethene	10.0	U			
24-48-1	Dibromochloromethane	10.0	U			
9-00-5	1,1,2-Trichloroethane	10.0	U			
71-43-2	Benzene	10.0	U			
10061-02-6	trans-1,3-Dichloropropene	10.0	U			
110-75-8	2-Chloroethylvinylether	10.0	U			
75-25-2	Bromoform	10.0	U			

- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- SS - Surrogate Standard reported as percent recovery.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL LGN
 Lab Sample ID: VBLK01
 Client Sample ID: QC BLANK W

Concentration: LOW
 Sample Matrix: WATER
 Percent Moisture: _____

Date Extracted: _____
 Date Analyzed: 05/01/92
 Dilution Factor: 1.0

VOLATILE COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L
74-87-3	Chloromethane	10.0	U	127-18-4	Tetrachloroethene	10.0 U
74-83-9	Bromomethane	10.0	U	79-34-5	1,1,2,2-Tetrachloroethane	10.0 U
75-01-4	Vinyl Chloride	10.0	U	108-88-3	Toluene	10.0 U
75-00-3	Chloroethane	10.0	U	108-90-7	Chlorobenzene	10.0 U
75-09-2	Methylene Chloride	10.0	U	100-41-4	Ethylbenzene	10.0 U
75-69-4	Trichlorofluoromethane	10.0	U	541-73-1	1,3-Dichlorobenzene	10.0 U
75-35-4	1,1-Dichloroethene	10.0	U	106-46-7	1,4-Dichlorobenzene	10.0 U
75-34-3	1,1-Dichloroethane	10.0	U	95-50-1	1,2-Dichlorobenzene	10.0 U
156-60-5	Trans-1,2-Dichloroethene	10.0	U		-----	
67-66-3	Chloroform	10.0	U		Toluene-d8 - SS	106
107-06-2	1,2-Dichloroethane	10.0	U		Bromofluorobenzene - SS	107
71-55-6	1,1,1-Trichloroethane	10.0	U		1,2-Dichloroethane-d4 - SS	99
56-23-5	Carbon Tetrachloride	10.0	U			
75-27-4	Bromodichloromethane	10.0	U			
78-87-5	1,2-Dichloropropane	10.0	U			
10061-01-5	cis-1,3-Dichloropropene	10.0	U			
79-01-6	Trichloroethene	10.0	U			
74-48-1	Dibromochloromethane	10.0	U			
9-00-5	1,1,2-Trichloroethane	10.0	U			
71-43-2	Benzene	10.0	U			
10061-02-6	trans-1,3-Dichloropropene	10.0	U			
110-75-8	2-Chloroethylvinylether	10.0	U			
75-25-2	Bromoform	10.0	U			

- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- SS - Surrogate Standard reported as percent recovery.



May 6, 1992

SEF26140.P1.41

Mr. Don Hash
CH2M HILL/LGN
One Innovation Drive, Suite C
P.O. Box 370
Alachua, Florida 32615-0370

RE: Analytical Data for Boynton Beach D.I.W., LMG Laboratory No. 21516
LGN Laboratory No. 110968-110969

Dear Mr. Hash:

On April 23, 1992, the CH2M HILL Montgomery Laboratory received two samples with a request for analysis of selected organic parameters.

The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analyses of these samples are discussed in the case narratives.

If you should have any questions concerning the data, please inquire.

The CH2M HILL policy is to store samples for up to 30 days after reporting. If you desire, our laboratory will maintain your samples for a longer period at a cost of \$5.00 per sample per month. Samples determined to be hazardous can either be returned to you or disposed of at a cost of \$25.00 per sample.

Sincerely,

Wanda L. Hall

Wanda L. Hall
Data Package Supervisor

Enclosures



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ANALYTICAL METHODS

Organic Analysis

Priority Pollutants: Water, soil and waste sample are analyzed in accordance with procedures described in Methods 608, 624, and 625, EPA-600/4-82-057 (1982); Methods 8080, 8240, and 8270, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition; and methods outlined in the USEPA Contract Laboratory Program Statement of Work for Organics Analysis, February, 1988.

Volatile Analysis (Safe Drinking Water Act): Water samples are analyzed in accordance with procedures described in Method 524.2, Federal Register (50 FR 46902), November 13, 1985.

Chlorinated Phenoxyacid Herbicides: Samples are analyzed in accordance with procedures described in Method 8150, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Organophosphorous Pesticides: Samples are analyzed in accordance with procedures described in Methods 614 and 622, EPA-600/4-79-019 (1979) and in Method 8140, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Phenolic Acid Analysis by GC: Samples are analyzed in accordance with procedures described in Method 604, Federal Register, 40 CFR, Part 136 (July 1, 1987) and in Method 8040, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Polynuclear Aromatic Hydrocarbons (GC analysis): Samples are analyzed in accordance with procedures described in Method 610, Federal Register, 40 CFR, Part 136 (July 1, 1987) and in Method 8100, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Ethylene Dibromide: Water samples are analyzed in accordance with procedures described in Method 504, Federal Register, (50 FR 46902), November 13, 1985.

Trihalomethanes: Water samples are analyzed in accordance with procedures described in Method 501.2, Federal Register, Vol. 44, No. 231, Part II, November 29, 1979.

EPA - DEFINED QUALIFIERS

ORGANICS

Definitions for the EPA-defined qualifiers:

- U -- Indicates the compound was analyzed for but not detected. The number adjacent to the "U" qualifier indicates the quantitation limit for that compound. The detection limit can vary from sample to sample depending on dilution factors or percent moisture adjustment when indicated.
- J -- Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound below the stated quantitation limit. The "J" qualifier is not used with pesticide results.
- C -- This flag applies to pesticide results only. The "C" flag indicates the presence of this compound has been confirmed by GC/MS analysis.
- B -- This flag is used when the analyte is found in the associated blank as well as the sample. This notation indicates possible blank contamination and suggests the data user evaluate these compounds and their amounts carefully.
- E -- This flag applies to GC/MS only. The "E" qualifier indicates a compound may be above or below the linear range of the instrument. If the particular compound level is deemed above the linear calibration range, then the sample should be reanalyzed at an appropriate dilution. Therefore, the "E" qualified amount is an estimated concentration. The results for the dilution will be reported on a separate Form I and will be flagged with a "D" if the dilution brings the concentration within proper calibration.
- D -- This flag identifies compounds which have been run at a dilution to bring the concentration of that compound within the linear range of the instrument. "D" qualifiers are only used for samples that have been run initially with results above acceptable ranges. For secondary dilutions the "DL" suffix is appended to the sample number on the Form I.
- A -- Indicates the Tentatively Identified Compound (TIC) is a suspected aldol-condensation product.
- X -- Indicates the compound concentration has been manually modified or the EPA qualifier has been manually modified or added.
- JX -- The compound was detected and quantitated below the Contract Required Quantitation Limit.

CLIENT SAMPLE ID QUALIFIERS

LEVEL 1

The qualifiers that GC/MS and GC use with the client sample ID are defined below:

- DL -- Dilution Run
- R -- Rerun (may be followed by a digit to indicate multiple reruns)
- RD -- Diluted Rerun
- RX -- Re-extraction Analysis
- MS -- Matrix Spike (may be followed by a digit to indicate multiple matrix spikes within a sample set)
- MSD -- Matrix Spike Duplicate (may be followed by a digit to indicate multiple matrix spike duplicates within a sample set)
- QC_BLANK -- Method Blank (may be followed by a "W" for waters, "S" for soils run at a low level, or "SM" for soils run at a medium level -- these letters may be followed by a digit to indicate multiple blanks of that type; if there are no letters, the digit indicates multiple blanks).

These qualifiers allow GC/MS and GC to have unique client sample ID's so that the client can get more accurate information from the data reported.

TABLE 1

SAMPLE CROSS-REFERENCE SUMMARY

CH2M HILL Laboratory No. 21516

<u>LMG</u> <u>Sample No.</u>	<u>LGN</u> <u>Sample No.</u>	<u>Sample Description</u>			
21516001	110968	UPPERZONE	04/21/92	1215	GRAB
21516002	110969	LOWERZONE	04/21/92	1225	GRAB

**CASE NARRATIVE FOR PNA
 GAS CHROMATOGRAPHY SAMPLES**

LABORATORY: CH2M HILL LABORATORIES

CLIENT: BOYNTON BEACH

CASE NO. : N/A

CONTRACT NO.: N/A

LAB NO. : 21516

SDG NO.: N/A

I. RECEIPT

A. DATE: April 23, 1992

B. SAMPLE INFORMATION

<u>LAB ID</u>	<u>CLIENT ID</u>	<u>SAMPLE MATRIX</u>	<u>DATE SAMPLED</u>	<u>EXTRACTION DATE</u>	<u>ANALYSIS DATE</u>
21516001	UPPERZONE	WATER	04/21/92	04/23/92	04/28/92
21516002	LOWERZONE	WATER	04/21/92	04/23/92	04/28/92
C04323B1	QC BLANK	WATER	N/A	04/23/92	04/28/92

C. Documentation

Exceptions : No exceptions were encountered.

000001



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 04/23/92
 Lab Sample ID: 21516001 Sample Matrix: WATER Date Analyzed: 04/28/92
 Client Sample ID: UPPERZONE Percent Moisture: _____ Dilution Factor: 1.0

PNA COMPOUNDS

CAS Number		ug/L	
91-20-3	Naphthalene	2	U
91-57-6	2-Methylnaphthalene . . .	2	U
90-12-0	1-Methylnaphthalene . . .	2	U
208-96-8	Acenaphthylene	2	U
83-32-9	Acenaphthene	2	U
86-73-7	Fluorene.	2	U
85-01-8	Phenanthrene.	2	U
120-12-7	Anthracene.	2	U
206-44-0	Fluoranthene.	2	U
129-00-0	Pyrene.	2	U
56-55-3	Benzo(a)anthracene. . . .	2	U
218-01-9	Chrysene.	2	U
205-99-2	Benzo(b)fluoranthene . .	2	U
207-08-9	Benzo(k)fluoranthene . .	2	U
50-32-8	Benzo(a)pyrene.	2	U
193-39-5	Indeno(1,2,3-cd)pyrene. .	2	U
53-70-3	Dibenzo(a,h)anthracene. .	2	U
191-24-2	Benzo(g,h,i)perylene. . .	2	U
	Terphenyl-d14 - SS	81	

- U - Analyzed for but not detected.
- B - Detected in QC blank.
- JX - Detected, concentration estimated.
- SS - Surrogate Standard reported as percent recovery.

Comments:

Form I

000003



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 04/23/92
 Lab Sample ID: 21516002 Sample Matrix: WATER Date Analyzed: 04/28/92
 Client Sample ID: LOWERZONE Percent Moisture: _____ Dilution Factor: 1.0

PNA COMPOUNDS

<u>CAS Number</u>		<u>ug/L</u>	
91-20-3	Naphthalene	2	U
91-57-6	2-Methylnaphthalene . . .	2	U
90-12-0	1-Methylnaphthalene . . .	2	U
208-96-8	Acenaphthylene	2	U
83-32-9	Acenaphthene	2	U
86-73-7	Fluorene.	2	U
85-01-8	Phenanthrene.	2	U
120-12-7	Anthracene.	2	U
206-44-0	Fluoranthene.	2	U
129-00-0	Pyrene.	2	U
56-55-3	Benzo(a)anthracene. . . .	2	U
218-01-9	Chrysene.	2	U
205-99-2	Benzo(b)fluoranthene . .	2	U
207-08-9	Benzo(k)fluoranthene . .	2	U
50-32-8	Benzo(a)pyrene.	2	U
193-39-5	Indeno(1,2,3-cd)pyrene. .	2	U
53-70-3	Dibenzo(a,h)anthracene. .	2	U
<u>191-24-2</u>	<u>Benzo(g,h,i)perylene. . .</u>	<u>2</u>	<u>U</u>
	Terphenyl-d14 - SS	92	

- U - Analyzed for but not detected.
- B - Detected in QC blank.
- JX - Detected, concentration estimated.
- SS - Surrogate Standard reported as percent recovery.

Comments:

Form I

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 04/23/92
 Lab Sample ID: C04232B1 Sample Matrix: WATER Date Analyzed: 04/28/92
 Client Sample ID: QC BLANK Percent Moisture: _____ Dilution Factor: 1.0

PNA COMPOUNDS

CAS Number		ug/L
91-20-3	Naphthalene	2 U
91-57-6	2-Methylnaphthalene . . .	2 U
90-12-0	1-Methylnaphthalene . . .	2 U
208-96-8	Acenaphthylene	2 U
83-32-9	Acenaphthene	2 U
86-73-7	Fluorene.	2 U
85-01-8	Phenanthrene.	2 U
120-12-7	Anthracene.	2 U
206-44-0	Fluoranthene.	2 U
129-00-0	Pyrene.	2 U
56-55-3	Benzo(a)anthracene. . . .	2 U
218-01-9	Chrysene.	2 U
205-99-2	Benzo(b)fluoranthene . .	2 U
207-08-9	Benzo(k)fluoranthene . .	2 U
50-32-8	Benzo(a)pyrene.	2 U
193-39-5	Indeno(1,2,3-cd)pyrene. .	2 U
53-70-3	Dibenzo(a,h)anthracene. .	2 U
<u>191-24-2</u>	<u>Benzo(g,h,i)perylene. . .</u>	<u>2 U</u>
	Terphenyl-d14 - SS	90

- U - Analyzed for but not detected.
- B - Detected in QC blank.
- JX - Detected, concentration estimated.
- SS - Surrogate Standard reported as percent recovery.

Comments:

Form I



CH2M HILL

QUALITY ANALYTICAL LABORATORIES

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

LRA LMG PPS

CH2M HILL Project # SEFZ6140.P1.41		Purchase Order #		LAB TEST CODES										SHADED AREA -- FOR LAB USE ONLY																																			
Project Name BOYNTON BEACH D.I.W. (DUAL-ZONE MONITOR WELL)		Company Name/CH2M HILL Office DFB		ANALYSES REQUESTED										Lab 1 #		Lab 2 #																																	
Project Manager & Phone # Mr. A. MUNIZ/DFB Ms. B. ZIEGLER/DFB		Report Copy to:		CONTAINERS										Quote #		Kit Request #																																	
Requested Completion Date: STANDARD		Sampling Requirements SDWA NPDES RCRA OTHER												Sample Disposal: Dispose Return		Project #																																	
1992 Sampling		Type Matrix		CONTAINERS										No. of Samples		Page of																																	
Date Time		C O M P G R A B W A T E R S O I L												CLIENT SAMPLE ID (9 CHARACTERS)		COC Rev		LogIn		LIMS Ver		Ack Gen																											
04-21 1215		XX		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>EPA 624 w/o (HCL)</td> <td>125ml AMBER (H2SO4)</td> <td>500ml AMBER (-)</td> <td>2 Liter AMBER (-)</td> <td>1/2 gal. (NaOH)</td> <td>1/2 gal. AIK, SO3, PH Handmade (-)</td> <td>QUART (-)</td> <td>QUART (HNO3)</td> <td>QUART (H2SO4)</td> <td>PINT (ZnAc/NaOH)</td> </tr> <tr> <td>Z</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> </tr> <tr> <td>Z</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> <td>I</td> </tr> </table>										EPA 624 w/o (HCL)	125ml AMBER (H2SO4)	500ml AMBER (-)	2 Liter AMBER (-)	1/2 gal. (NaOH)	1/2 gal. AIK, SO3, PH Handmade (-)	QUART (-)	QUART (HNO3)	QUART (H2SO4)	PINT (ZnAc/NaOH)	Z	I	I	I	I	I	I	I	I	I	Z	I	I	I	I	I	I	I	I	I	REMARKS		LAB 1 ID		LAB 2 ID	
EPA 624 w/o (HCL)	125ml AMBER (H2SO4)	500ml AMBER (-)	2 Liter AMBER (-)											1/2 gal. (NaOH)	1/2 gal. AIK, SO3, PH Handmade (-)	QUART (-)	QUART (HNO3)	QUART (H2SO4)	PINT (ZnAc/NaOH)																														
Z	I	I	I											I	I	I	I	I	I																														
Z	I	I	I	I	I	I	I	I	I																																								
04-21 1225		XX		<p style="text-align: center;">Method Blank</p>										SEE "SAMPLE KIT TRACKING FORM" FOR DETAILS OF ANALYSES		110 968		001																															
-		XX												<p style="text-align: center;">Method Blank</p>										*ONE OF THE TRIP BLANK VIALS WAS RECEIVED BROKEN ON 04-21-92. CBP		969		002																					
-		XX		<p style="text-align: center;">Method Blank</p>																						970																							
-		XX												<p style="text-align: center;">Method Blank</p>												971																							

000000



Engineers
Planners
Economists
Scientists

May 11, 1992

SEF26140.P1.41

Mr. Don Hash
CH2M HILL
One Innovation Drive, Suite C
Alachua, FL 32615-9586

RE: Analytical Data for Boynton Beach D.I.W., LRD Laboratory No. 32773
LGN Laboratory No. 110968-69

Dear Mr. Hash:

On April 23, 1992, The CH2M HILL Redding Laboratory received two samples with a request for analysis of selected organic parameters.

The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analyses of this sample are discussed in the case narratives.

Under CH2M HILL policy, your samples will be stored for up to 30 days after reporting. If you have not given us prior instructions for disposal, we will contact you if any samples require disposal as hazardous waste.

CH2M HILL Laboratories appreciate your business and look forward to serving your analytical needs again. If you should have any questions concerning the data, or if you need additional information, please call our Client Services Representatives, Mr. Mark Cichy or Ms. Mary Paschke, at (916) 244-5227.

Sincerely,

Peggy A. Norton
Senior Data Package Specialist

Enclosures

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ORGANIC DATA QUALIFIERS

- U -- Indicates the compound was analyzed for but not detected. The number adjacent to the "U" qualifier indicates the reporting limit for that compound. The reporting limit can vary from sample to sample depending on dilution factors or percent moisture adjustment when indicated.
- J -- Indicates an estimated value. It is used when the data indicates the presence of a compound below the stated reporting limit.
- C -- This flag applies to GC pesticide results only. The "C" flag indicates the presence of this compound has been confirmed by GC/MS analysis.
- B -- This flag is used when the analyte is found in the associated blank as well as the sample. This notation indicates possible blank contamination and suggests the data user evaluate these compounds and their amounts carefully.
- E -- This flag applies to GC/MS only. The "E" qualifier indicates a compound may be above or below the linear range of the instrument. If the particular compound level is deemed above the linear calibration range, then the sample should be reanalyzed at an appropriate dilution. Therefore, the "E" qualified amount is an estimated concentration. The results for the dilution will be reported on a separate Form I and will be flagged with a "D" if the dilution brings the concentration within proper calibration.
- D -- This flag identifies compounds which have been run at a dilution to bring the concentration of that compound within the linear range of the instrument. "D" qualifiers are only used for samples that have been run initially with results above acceptable ranges.

SAMPLE ID QUALIFIERS

The qualifiers that may be appended to the sample ID for organic analyses are defined below:

- DL** -- Dilution Run. Indicates the sample contained compounds exceeding the calibration range. The sample was diluted and reanalyzed. Both results are reported.
- R** -- Rerun. The sample was reanalyzed. The "R" is not used if the sample was also re-extracted.
- RX** -- Re-extraction Analysis. The sample was re-extracted and reanalyzed.
- RD** -- Diluted Rerun. The sample was re-extracted and a dilution was also required.
- MS** -- Matrix Spike (may be followed by a digit to indicate multiple matrix spikes within a sample set)
- MSD** -- Matrix Spike Duplicate (may be followed by a digit to indicate multiple matrix spike duplicates within a sample set)

CLIENT SAMPLE CROSS-REFERENCE

CH2M HILL Laboratory No. 32773

LRD Sample No.	Client ID	LGN Sample No.
32773001	UPPER ZONE	LG110968
32773002	LOWER ZONE	LG110969

IV. QUALITY CONTROL

A. Method Blank : The method blank associated with these samples met QC criteria.

Surrogate
B. Recoveries : Not applicable.

Matrix
C. Spike Results: Not applicable.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Diskette deliverables have not been provided for this data package.

 5-11-92
Brian Geers Date
Organics Division Manager



Engineers
 Planners
 Economists
 Scientists

FORMALDEHYDE

Client: Boynton Beach D.I.W.
 Client Sample ID: UPPER ZONE
 Inter Lab ID: LGN 110968

Sample Matrix: Water
 Dilution Factor: 1

Reference No: 32773001
 Date Sampled: 04-21-92
 Date Received: 04-23-92
 Date Extracted: 04-29-92
 Date Analyzed: 04-29-92

<u>Compounds</u>	<u>Reporting Limit</u>	<u>Sample Result</u>	<u>Units</u>
Formaldehyde	20	U	ug/l

U = Compound analyzed for but not detected above reporting limit.

Comments:

Approved By: Brian Goetz



Engineers
Planners
Economists
Scientists

FORMALDEHYDE

Client: Boynton Beach D.I.W.
Client Sample ID: LOWER ZONE
Inter Lab ID: LGN 110969

Sample Matrix: Water
Dilution Factor: 1

Reference No: 32773002

Date Sampled: 04-21-92
Date Received: 04-23-92
Date Extracted: 04-29-92
Date Analyzed: 04-29-92

<u>Compounds</u>	<u>Reporting Limit</u>	<u>Sample Result</u>	<u>Units</u>
Formaldehyde	20	U	ug/l

U = Compound analyzed for but not detected above reporting limit.

Comments:

Approved By:

0000



Engineers
Planners
Economists
Scientists

FORMALDEHYDE

Sample Matrix: Water
Dilution Factor: 1

Reference No: METHOD BLANK
Date Extracted: 04-29-92
Date Analyzed: 04-29-92

<u>Compounds</u>	<u>Reporting Limit</u>	<u>Method Blank Result</u>	<u>Units</u>
Formaldehyde	20	U	ug/l

U = Compound analyzed for but not detected above reporting limit.

Comments:

Approved By: Brian [Signature]

CH2M HILL

QUALITY ANALYTICAL LABORATORIES

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M HILL Project # SEEZ6140.P1.41 Purchase Order # _____

Project Name BOYNTON BEACH D.I.W. (DUAL-ZONE MONITOR WELL)

Company Name/CH2M HILL Office DFB

Project Manager & Phone # Mr. X A. MUNIZ / DFB Report Copy to: B. ZIEGLER / DFB

Requested Completion Date: STANDARD Sampling Requirements: SDWA NPDES RCRA OTHER Sample Disposal: Dispose Return

LAB TEST CODES: VOCs, Phenol, Formaldehyde, GLO, CN, TSS, BOD, SO4, Turb, Silica, MBAS, Metals, NH3, TP04, Al2O3, Sulfide S.

SHADED AREA - FOR LAB USE ONLY: Lab 1 # 3277.3, Lab 2 # _____, Quote # _____, Kit Request # _____

ANALYSES REQUESTED: EPA 624 w/o (HCL), 125ml AMBER (H2SO4), 500ml AMBER (-), 2 Liter AMBER (-), 1/2 gal. (NaOH), 1/2 gal. AIL, SO3, PH, HANCOCK (-), QUART (-), QUART (HNO3), QUART (H2SO4), PINT (ZnAc/NaOH)

1992 Sampling		Type	Matrix		CLIENT SAMPLE ID (9 CHARACTERS)				
Date	Time	COMP	GRAB	WATER	SOIL				
04-21	1215		XX			U	P	P	E
04-21	1225		XX			L	O	W	E
-	-		XX			T	R	I	I

Method Blank

HAZWRAP/NESSA: Y N

QC LEVEL 1 2 3

COC YES NO ICE YES NO

ANAL RES Y N TEMP 4°C

CUST SEAL NO PH N/A

SAMPLE COND. 900

BUS UPS EX OTHER

Sampled By & Title (Please sign and print name) CARL B. PATTERSON / TA-2 Date/Time 4-21-92/1300

Relinquished By (Please sign and print name) CARL B. PATTERSON Date/Time 4-21-92/1430

Received By (Please sign and print name) _____ Date/Time _____

Relinquished By (Please sign and print name) Fred Reeves (PPB) Date/Time 4/22/92 1200

Received By (Please sign and print name) Nichole L. Oliveira Date/Time 4/23/92

Relinquished By (Please sign and print name) Fred Reeves (LRA) & (LMC) Date/Time 4/22/92 1600

Received By (Please sign and print name) DFB Date/Time 4/22/92 1003

Shipped Via BUS Shipping # 106-578-218-0

Work Author (Please sign and print name) _____

Remarks: UPPER ZONE / pH = 7.60 COND. = 600 TEMP = 25.0°C // LOWER ZONE / pH = 7.24 COND. = 330 TEMP = 26.0°C

000000

LRA LMC PPB

SEE "SAMPLE KIT TRACKING FORM" FOR DETAILS OF ANALYSES

110 968
969
970
971

*ONE OF THE TRIP BLANK VIALS WAS RECEIVED BROKEN ON 04-21-92. CBP



HEADER PRESSURE DURING TESTING

WELL DISPOSAL WELL

Date AUG 30, 1991

Time start 0621 HRS

Time finish 0743 HRS

Time	Total minutes	Header Pressure (PSIG)	Comments
0621		0	PRESURIZE CASING TO TEST PRESSURE
0623		128.5	STOP PRESURIZING AND BLEED OFF PRESSURE
0628	0	121.0	START PRESSURE TEST
0633	5	121.0	
0638	10	121.0	
0643	15	120.5	
0648	20	120.5	
0653	25	120.5	
0658	30	120.5	
0703	35	120.0	
0708	40	120.0	
0713	45	120.0	
0718	50	120.0	
0723	55	119.5	
0728	60	119.5	PRESSURE TEST COMPLETE
0732			BLEED PRESSURE OFF (10.5 GALS OF WATER WERE DISPLACED)
0743			TEST COMPLETE

PRESSURE GAUGE:

SN: 910723 BIC
CALIBRATED 8/91 BARFIELD, MIA/FL
NEW
300PSI, 1PSI INCREMENTS

B-7

Observes

BOB ZIEGLER / OFB WJL
Tom McCORMICK / OFB WJL 8/20/91
ED RARRIG / FOER / WFB 9/6/91
JIM BRANTLEY / YBWD

BARFIELD INSTRUMENT CORPORATION
4101 N.W. 29th STREET
MIAMI, FL. 33142

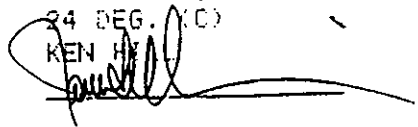
RECORD OF INSTRUMENT CALIBRATION COMPARISON

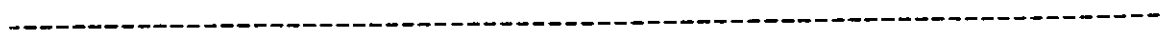
FOR: YOUNGQUIST BROTHERS M/O:
MFG: AMETEK/U.S. GAUGE DIVISION MODEL: 0-300 PSI.
TYPE: PRESSURE GAUGE S/N: 910723810

BIC TEST UNIT	CUSTOMER UNIT
0	0
20	20
40	40
60	60
80	79.5
100	100
120	120
140	140
160	160
180	180
200	200
220	220
240	240
260	260
280	280
300	300

THE ABOVE CALIBRATION COMPARISON WAS MADE BY BARFIELD INSTRUMENTS CORP
MIAMI, FL. USING AN APPROVED BIC TEST UNIT.

THIS APPLIANCE CALIBRATED
USING MODEL# 2008E
SERIAL# 14704
ACCURACY IS TRACEABLE TO
THE N.I.S.T.

DATE: AUGUST 27, 1991
TEMPERATURE: 24 DEG. (C)
TESTED BY: KEN
INSPECTED BY: 



Dual-Zone Monitor Well Background Sampling Data

**DEVELOPMENT OF THE CITY OF BOYNTON BEACH
DUAL-ZONE MONITOR WELL**

DATE	UPPER ZONE		LOWER ZONE		COMMENTS
	CHLORIDES (mg/l)	CONDUCTIVITY (mg/l)	CHLORIDES (mg/l)	CONDUCTIVITY (mg/l)	
3/27/92	-	-	-	-	START 24 HOUR DEVELOPMENT. BOTH ZONES PUMPING AT APPROXIMATELY 50 GPM. PURGED WATER DISPOSED OF INTO THE DISPOSAL WELL.
3/30/92	2080	6000	15200	30000	CONTINUOUS DISCHARGE
4/03/92	2500	6000	14000	28000	CONTINUOUS DISCHARGE
4/06/92	2000	6000	15100	31000	CONTINUOUS DISCHARGE
4/13/92	2100	6500	16500	31000	CONTINUOUS DISCHARGE
4/16/92	2000	6500	15900	31000	CONTINUOUS DISCHARGE
4/21/92	-	-	-	-	PRIMARY AND SEONDARY SAMPLES COLLECTED. DEVELOPMENT STOPPED.



QUALITY
ANALYTICAL
LABORATORIES

May 26, 1992

SEF26141.P1.41 | AAG368

RE: Boynton Beach DIW laboratory samples

Dear Albert Muniz/DFB:

On April 22, 1992 the CH2M Hill Gainesville Laboratory received 4 water, grab samples with a request for analysis of selected parameters.

The analytical results are enclosed. In the analysis of Arsenic and Lead matrix interferences were encountered. The samples had to be diluted 1:4 in order to obtain acceptable QA/QC data. The detection limits were elevated accordingly.

If you should have any questions concerning the results, please call Don Hash or Tom Emenhiser.

Sincerely,

Don Hash
Client Services

Enclosure(s):

cc: Bart Ziegler/DFB



Boynton Beach DIW	CH2M HILL
Attention: Albert Muniz Address: DFB Copies to: Bart Ziegler/DFB,	Project No: SEF26141.P1.41 Received: 04/22/92 Reported: 05/27/92
Collected: 04/21/92 by Carl Patterson Type: water, grab Location: Dual-Zone Monitor Well	

SAMPLE NUMBER	110968	110969	110970	110971
SAMPLE DESCRIPTIONS	Upper Zone 04/21/92 12:15	Lower Zone 04/21/92 12:25	Trip Blank 04/21/92	Laboratory Method Blank
GENERAL				
pH (Units)	7.80 04/22/92	7.45 04/22/92	n/r n/r	Not Applicable 04/22/92
Alkalinity, Total (as CaCO3)	142 04/30/92	132 04/30/92	n/r n/r	<1.0 04/30/92
Hardness, Total (as CaCO3)	840 05/04/92	5100 05/04/92	n/r n/r	<1.0 05/04/92
Turbidity (NTU)	9.2 04/22/92	15 04/22/92	n/r n/r	<0.2 04/22/92
SOLIDS				
Total Dissolved Solids	3800 06/08/92	28,300 06/08/92	n/r n/r	<1.0 06/08/92
Total Suspended Solids	<1.0 04/23/92	5.0 04/23/92	n/r n/r	<1.0 04/23/92
METALS				
Antimony - ICP	<0.030 05/14/92	<0.030 05/14/92	n/r n/r	<0.030 05/14/92
Arsenic - FU	<0.025 ** 05/26/92	<0.025 ** 05/26/92	n/r n/r	<0.005 05/26/92
Beryllium - ICP	<0.0006	<0.0006	n/r	<0.0006

NOTE: Values are mg/l as substance unless otherwise stated.
* Inorganic analysis were not requested for this sample number.
** See cover letter.
REVISED REPORT

Respectfully submitted,

Isaac D. Lynch, Inorganics Supervisor

n/r = not requested

NOTE: This report contains test data and no interpretation is intended or implied.



SAMPLE NUMBER	110968	110969	110970	110971
SAMPLE DESCRIPTIONS	Upper Zone 04/21/92 12:15	Lower Zone 04/21/92 12:25	Trip Blank 04/21/92	Laboratory Method Blank
Cadmium - ICP	05/14/92 <0.005	05/14/92 <0.005	n/r	05/14/92 <0.005
Chromium, Tot - ICP	05/14/92 <0.006	05/14/92 <0.006	n/r	05/14/92 <0.006
Copper - ICP	05/14/92 <0.006	05/14/92 <0.006	n/r	05/14/92 <0.006
Lead - FU	05/14/92 <0.010 **	05/14/92 <0.010 **	n/r	05/14/92 <0.002
Mercury - CV	05/20/92 <0.0002	05/20/92 <0.0002	n/r	05/20/92 <0.0002
Nickel - ICP	05/05/92 <0.015	05/05/92 <0.015	n/r	05/05/92 <0.015
Selenium	05/14/92 <0.005	05/14/92 <0.005	n/r	05/14/92 <0.005
Silica, React	05/19/92 12.1	05/19/92 9.64	n/r	05/19/92 <0.05
Silver - ICP	05/07/92 <0.005	05/07/92 <0.005	n/r	05/07/92 <0.005
Thallium - ICP	05/14/92 <0.025	05/14/92 <0.025	n/r	05/14/92 <0.025
Zinc - ICP	05/18/92 <0.003	05/18/92 0.018	n/r	05/18/92 <0.003
	05/21/92	05/21/92	n/r	05/21/92
ANIONS				
Chloride	2050 06/12/92	14,000 06/12/92	n/r	<1.0 06/12/92
Cyanide, Total	<0.005 04/23/92	<0.005 04/23/92	n/r	<0.005 04/23/92
Sulfate	319 05/05/92	1390 05/05/92	n/r	<1.0 05/05/92
Sulfide	3.8	2.6	n/r	<0.2

NOTE: Values are mg/l as substance unless otherwise stated.

* Inorganic analysis were not requested for this sample number.

** See cover letter.

REVISED REPORT

Respectfully submitted,

Isaac D. Lynch
Isaac D. Lynch, Inorganics Supervisor

n/r = not requested

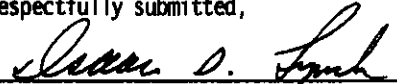
NOTE: This report contains test data and no interpretation is intended or implied.



SAMPLE NUMBER	110968	110969	110970	110971
SAMPLE DESCRIPTIONS	Upper Zone 04/21/92 12:15	Lower Zone 04/21/92 12:25	Trip Blank 04/21/92	Laboratory Method Blank
NUTRIENTS	04/27/92	04/27/92	n/r	04/27/92
Ammonia (as N)	0.56 05/04/92	0.27 05/04/92	n/r n/r	<0.04 05/04/92
Nitrate & Nitrite (as N)	<0.02 05/04/92	<0.02 05/04/92	n/r n/r	<0.02 05/04/92
Kjeldahl Nitrogen (as N)	0.69 06/12/92	0.32 06/12/92	n/r n/r	<0.04 06/12/92
Total Phosphorus (as P)	<0.01 05/04/92	0.01 05/04/92	n/r n/r	<0.01 05/04/92
OXYGEN DEMAND				
BOD (5 day)	4.5 04/22/92	<2.0 04/22/92	n/r n/r	<2.0 04/22/92
GENERAL ORGANICS				
Phenol, 4AAP	0.042 05/06/92	0.018 05/06/92	n/r n/r	<0.002 05/06/92
Surfactants (MBAS)	0.030 04/30/92	0.177 04/30/92	n/r n/r	<0.025 04/30/92

NOTE: Values are mg/l as substance unless otherwise stated.
* Inorganic analysis were not requested for this sample number.
** See cover letter.
REVISED REPORT

Respectfully submitted,


Isaac D. Lynch, Inorganics Supervisor

n/r = not requested

NOTE: This report contains test data and no interpretation is intended or implied.



REPORT OF ANALYSES

CH2MHILL SOUTHEAST
ONE INNOVATION DRIVE
P.O. BOX 370
ALACHUA, FL 32615-0370

DATE: 05/12/92
DHRS #: 82282, E82001

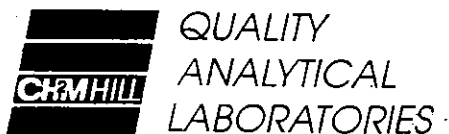
ATTN: MR. DON HASH

TABLE 1: SAMPLES RECEIVED 04/22/92

CLIENT STATION ID	LAB NUMBER	FOAMING AGENTS-MBAS (mg/L)
110968	64269	0.030
110969	64270	0.177

* Sample 64272 CH2 111007 analyzed 4/22/92 with a value >0.5 mg/L.
Sample was diluted and extracted 4/28/92 with a value < 0.1 mg/L.
Sample was extracted and analyzed 4/30/92 with a value <0.025 mg/L.

M. Kelly Bergdoll
PROJECT MANAGER



May 14, 1992

SEF26140.P1.41

Mr. A. Múniz
CH2M HILL/DFB

Deerfield Beach, Florida

RE: Analytical Data for Boynton Beach D.I.W., LGN Lab No. 110968 - 110970

Dear Mr. Muniz:

On April 22, 1992, the CH2M HILL Gainesville Laboratory received three samples with a request for analysis of selected organic and inorganic parameters.

The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analyses of this sample are discussed in the case narratives.

Under CH2M HILL policy, your samples will be stored for up to 30 days after reporting. If you have not given us prior instructions for disposal, we will contact you if any samples require disposal as hazardous waste.

CH2M HILL Laboratories appreciate your business and look forward to serving your analytical needs again. If you should have any questions concerning the data, or if you need additional information, please call our Client Services Manager, Tom Emenhiser or myself, at 904-462-3050.

Sincerely,

Don Hash
Client Services

Enclosures

ORGANIC DATA QUALIFIERS

- U -- Indicates the compound was analyzed for but not detected. The number adjacent to the "U" qualifier indicates the reporting limit for that compound. The reporting limit can vary from sample to sample depending on dilution factors or percent moisture adjustment when indicated.
- J -- Indicates an estimated value. It is used when the data indicates the presence of a compound below the stated reporting limit.
- C -- This flag applies to GC pesticide results only. The "C" flag indicates the presence of this compound has been confirmed by GC/MS analysis.
- B -- This flag is used when the analyte is found in the associated blank as well as the sample. This notation indicates possible blank contamination and suggests the data user evaluate these compounds and their amounts carefully.
- E -- This flag applies to GC/MS only. The "E" qualifier indicates a compound may be above or below the linear range of the instrument. If the particular compound level is deemed above the linear calibration range, then the sample should be reanalyzed at an appropriate dilution. Therefore, the "E" qualified amount is an estimated concentration. The results for the dilution will be reported on a separate Form I and will be flagged with a "D" if the dilution brings the concentration within proper calibration.
- D -- This flag identifies compounds which have been run at a dilution to bring the concentration of that compound within the linear range of the instrument. "D" qualifiers are only used for samples that have been run initially with results above acceptable ranges.

SAMPLE ID QUALIFIERS

The qualifiers that may be appended to the sample ID for organic analyses are defined below:

- DL** -- Dilution Run. Indicates the sample contained compounds exceeding the calibration range. The sample was diluted and reanalyzed. Both results are reported.
- R** -- Rerun. The sample was reanalyzed. The "R" is not used if the sample was also re-extracted.
- RX** -- Re-extraction Analysis. The sample was re-extracted and reanalyzed.
- RD** -- Diluted Rerun. The sample was re-extracted and a dilution was also required.
- MS** -- Matrix Spike (may be followed by a digit to indicate multiple matrix spikes within a sample set)
- MSD** -- Matrix Spike Duplicate (may be followed by a digit to indicate multiple matrix spike duplicates within a sample set)

CASE NARRATIVE
GC/MS VOLATILE SAMPLES

LABORATORY: CH2M HILL LABORATORIES

CLIENT: Boynton Beach D.I.W.

CASE NO. : 92D22V01

CONTRACT NO.: N/A

LAB NO. : 110968 - 110970

SDG NO.: N/A

I. RECEIPT

A. DATE: April 22, 1992

B. SAMPLE INFORMATION

<u>LAB ID</u>	<u>CLIENT ID</u>	<u>SAMPLE MATRIX</u>	<u>DATE SAMPLED</u>	<u>EXTRACTION DATE</u>	<u>ANALYSIS DATE</u>
110968	UPPER ZONE	WATER	04/21/92	NA	05/01/92
110969	LOWER ZONE	WATER	04/21/92	NA	05/01/92
110970	TRIP BLANK	WATER	04/21/92	NA	05/01/92
VBLK01	QC_BLANK_W	WATER	NA	NA	05/01/92

C. Documentation

Exceptions : No exceptions were encountered.

II. EXTRACTION

- A. Holding Times: Not applicable.
- B. Extraction
Exceptions : Not applicable.

III. ANALYSIS

- A. Holding times: All holding times were met.
- B. Analytical
Exceptions : No exceptions were encountered.

IV. QUALITY CONTROL

- A. Method Blank : All associated method blanks met acceptable QC criteria.
- B. Surrogate
Recoveries : All samples met acceptable QC limits.
- C. Matrix Spike
Results : All spike recoveries were within CLP advisory limits.

- V. I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package (computer-readable data submitted on diskette is not provided) has been authorized by the Laboratory Manager or his designee, as verified by the following signature.



Andrés A. Romeu, Ph.D
Manager, Organics Division

Date

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL LGN
 Lab Sample ID: 110968
 Client Sample ID: UPPER ZONE

Concentration: LOW
 Sample Matrix: WATER
 Percent Moisture: _____

Date Extracted: _____
 Date Analyzed: 05/01/92
 Dilution Factor: 1.0

VOLATILE COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L	
74-87-3	Chloromethane	10.0	U	127-18-4	Tetrachloroethene	10.0	U
74-83-9	Bromomethane	10.0	U	79-34-5	1,1,2,2-Tetrachloroethane	10.0	U
75-01-4	Vinyl Chloride	10.0	U	108-88-3	Toluene	10.0	U
75-00-3	Chloroethane	10.0	U	108-90-7	Chlorobenzene	10.0	U
75-09-2	Methylene Chloride	10.0	U	100-41-4	Ethylbenzene	10.0	U
75-69-4	Trichlorofluoromethane	10.0	U	541-73-1	1,3-Dichlorobenzene	10.0	U
75-35-4	1,1-Dichloroethene	10.0	U	106-46-7	1,4-Dichlorobenzene	10.0	U
75-34-3	1,1-Dichloroethane	10.0	U	95-50-1	1,2-Dichlorobenzene	10.0	U
156-60-5	Trans-1,2-Dichloroethene	10.0	U		-----		
67-66-3	Chloroform	10.0	U		Toluene-d8 - SS	109	
107-06-2	1,2-Dichloroethane	10.0	U		Bromofluorobenzene - SS	105	
71-55-6	1,1,1-Trichloroethane	10.0	U		1,2-Dichloroethane-d4 - SS	99	
56-23-5	Carbon Tetrachloride	10.0	U				
75-27-4	Bromodichloromethane	10.0	U				
78-87-5	1,2-Dichloropropane	10.0	U				
10061-01-5	cis-1,3-Dichloropropene	10.0	U				
79-01-6	Trichloroethene	10.0	U				
24-48-1	Dibromochloromethane	10.0	U				
79-00-5	1,1,2-Trichloroethane	10.0	U				
71-43-2	Benzene	10.0	U				
10061-02-6	trans-1,3-Dichloropropene	10.0	U				
110-75-8	2-Chloroethylvinylether	10.0	U				
75-25-2	Bromoform	10.0	U				

- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- SS - Surrogate Standard reported as percent recovery.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL LGN
 Lab Sample ID: 110969
 Client Sample ID: LOWER ZONE

Concentration: LOW
 Sample Matrix: WATER
 Percent Moisture: _____

Date Extracted: _____
 Date Analyzed: 05/01/92
 Dilution Factor: 1.0

VOLATILE COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L
74-87-3	Chloromethane	10.0	U	127-18-4	Tetrachloroethene	10.0 U
74-83-9	Bromomethane	10.0	U	79-34-5	1,1,2,2-Tetrachloroethane	10.0 U
75-01-4	Vinyl Chloride	10.0	U	108-88-3	Toluene	10.0 U
75-00-3	Chloroethane	10.0	U	108-90-7	Chlorobenzene	10.0 U
75-09-2	Methylene Chloride	10.0	U	100-41-4	Ethylbenzene	10.0 U
75-69-4	Trichlorofluoromethane	10.0	U	541-73-1	1,3-Dichlorobenzene	10.0 U
75-35-4	1,1-Dichloroethene	10.0	U	106-46-7	1,4-Dichlorobenzene	10.0 U
75-34-3	1,1-Dichloroethane	10.0	U	95-50-1	1,2-Dichlorobenzene	10.0 U
156-60-5	Trans-1,2-Dichloroethene	10.0	U	-----	-----	-----
67-66-3	Chloroform	10.0	U		Toluene-d8 - SS	105
107-06-2	1,2-Dichloroethane	10.0	U		Bromofluorobenzene - SS	104
71-55-6	1,1,1-Trichloroethane	10.0	U		1,2-Dichloroethane-d4 - SS	101
56-23-5	Carbon Tetrachloride	10.0	U			
75-27-4	Bromodichloromethane	10.0	U			
78-87-5	1,2-Dichloropropane	10.0	U			
10061-01-5	cis-1,3-Dichloropropene	10.0	U			
79-01-6	Trichloroethene	10.0	U			
24-48-1	Dibromochloromethane	10.0	U			
9-00-5	1,1,2-Trichloroethane	10.0	U			
71-43-2	Benzene	10.0	U			
10061-02-6	trans-1,3-Dichloropropene	10.0	U			
110-75-8	2-Chloroethylvinylether	10.0	U			
75-25-2	Bromoform	10.0	U			

- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- SS - Surrogate Standard reported as percent recovery.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL LGN
 Lab Sample ID: 110970
 Client Sample ID: TRIP BLANK

Concentration: LOW
 Sample Matrix: WATER
 Percent Moisture: _____

Date Extracted: _____
 Date Analyzed: 05/01/92
 Dilution Factor: 1.0

VOLATILE COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L
74-87-3	Chloromethane	10.0	U	127-18-4	Tetrachloroethene	10.0 U
74-83-9	Bromomethane	10.0	U	79-34-5	1,1,2,2-Tetrachloroethane	10.0 U
75-01-4	Vinyl Chloride	10.0	U	108-88-3	Toluene	10.0 U
75-00-3	Chloroethane	10.0	U	108-90-7	Chlorobenzene	10.0 U
75-09-2	Methylene Chloride	10.0	U	100-41-4	Ethylbenzene	10.0 U
75-69-4	Trichlorofluoromethane	10.0	U	541-73-1	1,3-Dichlorobenzene	10.0 U
75-35-4	1,1-Dichloroethene	10.0	U	106-46-7	1,4-Dichlorobenzene	10.0 U
75-34-3	1,1-Dichloroethane	10.0	U	95-50-1	1,2-Dichlorobenzene	10.0 U
156-60-5	Trans-1,2-Dichloroethene	10.0	U		-----	
67-66-3	Chloroform	10.0	U		Toluene-d8 - SS	107
107-06-2	1,2-Dichloroethane	10.0	U		Bromofluorobenzene - SS	106
71-55-6	1,1,1-Trichloroethane	10.0	U		1,2-Dichloroethane-d4 - SS	100
56-23-5	Carbon Tetrachloride	10.0	U			
75-27-4	Bromodichloromethane	10.0	U			
78-87-5	1,2-Dichloropropane	10.0	U			
10061-01-5	cis-1,3-Dichloropropene	10.0	U			
79-01-6	Trichloroethene	10.0	U			
24-48-1	Dibromochloromethane	10.0	U			
9-00-5	1,1,2-Trichloroethane	10.0	U			
71-43-2	Benzene	10.0	U			
10061-02-6	trans-1,3-Dichloropropene	10.0	U			
110-75-8	2-Chloroethylvinylether	10.0	U			
75-25-2	Bromoform	10.0	U			

- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- SS - Surrogate Standard reported as percent recovery.

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL LGN
 Lab Sample ID: VBLK01
 Client Sample ID: QC BLANK W

Concentration: LOW
 Sample Matrix: WATER
 Percent Moisture: _____

Date Extracted: _____
 Date Analyzed: 05/01/92
 Dilution Factor: 1.0

VOLATILE COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L
74-87-3	Chloromethane	10.0	U	127-18-4	Tetrachloroethene	10.0 U
74-83-9	Bromomethane	10.0	U	79-34-5	1,1,2,2-Tetrachloroethane	10.0 U
75-01-4	Vinyl Chloride	10.0	U	108-88-3	Toluene	10.0 U
75-00-3	Chloroethane	10.0	U	108-90-7	Chlorobenzene	10.0 U
75-09-2	Methylene Chloride	10.0	U	100-41-4	Ethylbenzene	10.0 U
75-69-4	Trichlorofluoromethane	10.0	U	541-73-1	1,3-Dichlorobenzene	10.0 U
75-35-4	1,1-Dichloroethene	10.0	U	106-46-7	1,4-Dichlorobenzene	10.0 U
75-34-3	1,1-Dichloroethane	10.0	U	95-50-1	1,2-Dichlorobenzene	10.0 U
156-60-5	Trans-1,2-Dichloroethene	10.0	U		-----	
67-66-3	Chloroform	10.0	U		Toluene-d8 - SS	106
107-06-2	1,2-Dichloroethane	10.0	U		Bromofluorobenzene - SS	107
71-55-6	1,1,1-Trichloroethane	10.0	U		1,2-Dichloroethane-d4 - SS	99
56-23-5	Carbon Tetrachloride	10.0	U			
75-27-4	Bromodichloromethane	10.0	U			
78-87-5	1,2-Dichloropropane	10.0	U			
10061-01-5	cis-1,3-Dichloropropene	10.0	U			
79-01-6	Trichloroethene	10.0	U			
74-48-1	Dibromochloromethane	10.0	U			
9-00-5	1,1,2-Trichloroethane	10.0	U			
71-43-2	Benzene	10.0	U			
10061-02-6	trans-1,3-Dichloropropene	10.0	U			
110-75-8	2-Chloroethylvinylether	10.0	U			
75-25-2	Bromoform	10.0	U			

- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- SS - Surrogate Standard reported as percent recovery.



May 6, 1992

SEF26140.P1.41

Mr. Don Hash
CH2M HILL/LGN
One Innovation Drive, Suite C
P.O. Box 370
Alachua, Florida 32615-0370

RE: Analytical Data for Boynton Beach D.I.W., LMG Laboratory No. 21516
LGN Laboratory No. 110968-110969

Dear Mr. Hash:

On April 23, 1992, the CH2M HILL Montgomery Laboratory received two samples with a request for analysis of selected organic parameters.

The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analyses of these samples are discussed in the case narratives.

If you should have any questions concerning the data, please inquire.

The CH2M HILL policy is to store samples for up to 30 days after reporting. If you desire, our laboratory will maintain your samples for a longer period at a cost of \$5.00 per sample per month. Samples determined to be hazardous can either be returned to you or disposed of at a cost of \$25.00 per sample.

Sincerely,

Wanda L. Hall

Wanda L. Hall
Data Package Supervisor

Enclosures



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Copy of Chain-of-custody	6

ANALYTICAL METHODS

Organic Analysis

Priority Pollutants: Water, soil and waste sample are analyzed in accordance with procedures described in Methods 608, 624, and 625, EPA-600/4-82-057 (1982); Methods 8080, 8240, and 8270, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition; and methods outlined in the USEPA Contract Laboratory Program Statement of Work for Organics Analysis, February, 1988.

Volatile Analysis (Safe Drinking Water Act): Water samples are analyzed in accordance with procedures described in Method 524.2, Federal Register (50 FR 46902), November 13, 1985.

Chlorinated Phenoxyacid Herbicides: Samples are analyzed in accordance with procedures described in Method 8150, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Organophosphorous Pesticides: Samples are analyzed in accordance with procedures described in Methods 614 and 622, EPA-600/4-79-019 (1979) and in Method 8140, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Phenolic Acid Analysis by GC: Samples are analyzed in accordance with procedures described in Method 604, Federal Register, 40 CFR, Part 136 (July 1, 1987) and in Method 8040, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Polynuclear Aromatic Hydrocarbons (GC analysis): Samples are analyzed in accordance with procedures described in Method 610, Federal Register, 40 CFR, Part 136 (July 1, 1987) and in Method 8100, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Ethylene Dibromide: Water samples are analyzed in accordance with procedures described in Method 504, Federal Register, (50 FR 46902), November 13, 1985.

Trihalomethanes: Water samples are analyzed in accordance with procedures described in Method 501.2, Federal Register, Vol. 44, No. 231, Part II, November 29, 1979.

EPA - DEFINED QUALIFIERS

ORGANICS

Definitions for the EPA-defined qualifiers:

- U -- Indicates the compound was analyzed for but not detected. The number adjacent to the "U" qualifier indicates the quantitation limit for that compound. The detection limit can vary from sample to sample depending on dilution factors or percent moisture adjustment when indicated.
- J -- Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound below the stated quantitation limit. The "J" qualifier is not used with pesticide results.
- C -- This flag applies to pesticide results only. The "C" flag indicates the presence of this compound has been confirmed by GC/MS analysis.
- B -- This flag is used when the analyte is found in the associated blank as well as the sample. This notation indicates possible blank contamination and suggests the data user evaluate these compounds and their amounts carefully.
- E -- This flag applies to GC/MS only. The "E" qualifier indicates a compound may be above or below the linear range of the instrument. If the particular compound level is deemed above the linear calibration range, then the sample should be reanalyzed at an appropriate dilution. Therefore, the "E" qualified amount is an estimated concentration. The results for the dilution will be reported on a separate Form I and will be flagged with a "D" if the dilution brings the concentration within proper calibration.
- D -- This flag identifies compounds which have been run at a dilution to bring the concentration of that compound within the linear range of the instrument. "D" qualifiers are only used for samples that have been run initially with results above acceptable ranges. For secondary dilutions the "DL" suffix is appended to the sample number on the Form I.
- A -- Indicates the Tentatively Identified Compound (TIC) is a suspected aldol-condensation product.
- X -- Indicates the compound concentration has been manually modified or the EPA qualifier has been manually modified or added.
- JX -- The compound was detected and quantitated below the Contract Required Quantitation Limit.

CLIENT SAMPLE ID QUALIFIERS

LEVEL 1

The qualifiers that GC/MS and GC use with the client sample ID are defined below:

- DL -- Dilution Run
- R -- Rerun (may be followed by a digit to indicate multiple reruns)
- RD -- Diluted Rerun
- RX -- Re-extraction Analysis
- MS -- Matrix Spike (may be followed by a digit to indicate multiple matrix spikes within a sample set)
- MSD -- Matrix Spike Duplicate (may be followed by a digit to indicate multiple matrix spike duplicates within a sample set)
- QC_BLANK -- Method Blank (may be followed by a "W" for waters, "S" for soils run at a low level, or "SM" for soils run at a medium level -- these letters may be followed by a digit to indicate multiple blanks of that type; if there are no letters, the digit indicates multiple blanks).

These qualifiers allow GC/MS and GC to have unique client sample ID's so that the client can get more accurate information from the data reported.

TABLE 1

SAMPLE CROSS-REFERENCE SUMMARY

CH2M HILL Laboratory No. 21516

<u>LMG</u> <u>Sample No.</u>	<u>LGN</u> <u>Sample No.</u>	<u>Sample Description</u>			
21516001	110968	UPPERZONE	04/21/92	1215	GRAB
21516002	110969	LOWERZONE	04/21/92	1225	GRAB

**CASE NARRATIVE FOR PNA
 GAS CHROMATOGRAPHY SAMPLES**

LABORATORY: CH2M HILL LABORATORIES

CLIENT: BOYNTON BEACH

CASE NO. : N/A

CONTRACT NO.: N/A

LAB NO. : 21516

SDG NO.: N/A

I. RECEIPT

A. DATE: April 23, 1992

B. SAMPLE INFORMATION

<u>LAB ID</u>	<u>CLIENT ID</u>	<u>SAMPLE MATRIX</u>	<u>DATE SAMPLED</u>	<u>EXTRACTION DATE</u>	<u>ANALYSIS DATE</u>
21516001	UPPERZONE	WATER	04/21/92	04/23/92	04/28/92
21516002	LOWERZONE	WATER	04/21/92	04/23/92	04/28/92
C04323B1	QC BLANK	WATER	N/A	04/23/92	04/28/92

C. Documentation

Exceptions : No exceptions were encountered.

000001

II. EXTRACTION

- A. Holding times: All holding times were met.
- B. Extraction
Exceptions : No exceptions were encountered.

III. ANALYSIS

- A. Holding times: All holding times were met.
- B. Analytical
Exceptions : No exceptions were encountered.

IV. QUALITY CONTROL

- A. Method Blank : All associated method blanks met acceptable QC criteria.
- B. Surrogate
Recoveries : All samples met acceptable QC limits.
- C. Matrix Spike
Results : Matrix spike results have not been reported with this contract.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.


Herb Kelly
Manager, Organic Division

5/6/92
Date



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 04/23/92
Lab Sample ID: 21516001 Sample Matrix: WATER Date Analyzed: 04/28/92
Client Sample ID: UPPERZONE Percent Moisture: Dilution Factor: 1.0

PNA COMPOUNDS

Table with 3 columns: CAS Number, Compound Name, and ug/L. Lists various polynuclear aromatic hydrocarbons (PAHs) such as Naphthalene, Anthracene, and Pyrene, all with a concentration of 2 ug/L and a 'U' status.

- U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments:

Form I

Handwritten signature

000003



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 04/23/92
Lab Sample ID: 21516002 Sample Matrix: WATER Date Analyzed: 04/28/92
Client Sample ID: LOWERZONE Percent Moisture: Dilution Factor: 1.0

PNA COMPOUNDS

Table with 3 columns: CAS Number, Compound Name, and ug/L. Lists various polycyclic aromatic hydrocarbons (PAHs) such as Naphthalene, Anthracene, and Benzo(a)anthracene, all with a concentration of 2 ug/L and a 'U' status.

- U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Comments:

Form I

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 04/23/92
 Lab Sample ID: C04232B1 Sample Matrix: WATER Date Analyzed: 04/28/92
 Client Sample ID: QC BLANK Percent Moisture: _____ Dilution Factor: 1.0

PNA COMPOUNDS

CAS Number		ug/L
91-20-3	Naphthalene	2 U
91-57-6	2-Methylnaphthalene . . .	2 U
90-12-0	1-Methylnaphthalene . . .	2 U
208-96-8	Acenaphthylene	2 U
83-32-9	Acenaphthene	2 U
86-73-7	Fluorene.	2 U
85-01-8	Phenanthrene.	2 U
120-12-7	Anthracene.	2 U
206-44-0	Fluoranthene.	2 U
129-00-0	Pyrene.	2 U
56-55-3	Benzo(a)anthracene. . . .	2 U
218-01-9	Chrysene.	2 U
205-99-2	Benzo(b)fluoranthene . .	2 U
207-08-9	Benzo(k)fluoranthene . .	2 U
50-32-8	Benzo(a)pyrene.	2 U
193-39-5	Indeno(1,2,3-cd)pyrene. .	2 U
53-70-3	Dibenzo(a,h)anthracene. .	2 U
<u>191-24-2</u>	<u>Benzo(g,h,i)perylene. . .</u>	<u>2 U</u>
	Terphenyl-d14 - SS	90

- U - Analyzed for but not detected.
- B - Detected in QC blank.
- JX - Detected, concentration estimated.
- SS - Surrogate Standard reported as percent recovery.

Comments:

Form I



CH2M HILL

QUALITY ANALYTICAL LABORATORIES

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

LRA LMG PPS

CH2M HILL Project # SEFZ6140.P1.41		Purchase Order #		LAB TEST CODES										SHADED AREA -- FOR LAB USE ONLY																
Project Name BOYNTON BEACH D.I.W. (DUAL-ZONE MONITOR WELL)		Company Name/CH2M HILL Office DFB		ANALYSES REQUESTED										Lab 1 #		Lab 2 #														
Project Manager & Phone # Mr. A. MUNIZ / DFB Ms. B. ZIEGLER / DFB		Report Copy to:		CONTAINERS										Quote #		Kit Request #														
Requested Completion Date: STANDARD		Sampling Requirements SDWA NPDES RCRA OTHER												Sample Disposal: Dispose Return		Project #														
1992 Sampling		Type	Matrix	CLIENT SAMPLE ID (9 CHARACTERS)										No. of Samples		Page of														
Date	Time	COM	GRA											WATER		SOIL		COC Rev		LogIn		LIMS Ver		Ack Gen						
04-21	1215	XX		U	P	P	E	Z	O	N	E	Z	I	I	I	I	I	I	I	I	I	I	REMARKS		LAB 1 ID		LAB 2 ID			
04-21	1225	XX		L	O	W	E	R	Z	O	N	E	Z	I	I	I	I	I	I	I	I	I			SEE "SAMPLE KIT TRACKING FORM" FOR DETAILS OF ANALYSES		110 968		001	
-	-	XX		T	R	I	P	B	L	A	N	K	I	1*												*ONE OF THE TRIP BLANK VIALS WAS RECEIVED BROKEN ON 04-21-92. CBP		969		002
				Method Blank																										
Sampled By & Title CARL B. PATTERSON / TA-2		Date/Time 4-21-92 / 1300		Relinquished By CARL B. PATTERSON		Date/Time 4-21-92 / 1430		HAWZWRAP/NESSA: Y <input checked="" type="checkbox"/> N																						
Received By [Signature]		Date/Time 4/23/92		Relinquished By Fred Reeves (TRB)		Date/Time 4/23/92 1200		QC Level: 0 2 3 Other: _____																						
Received By [Signature]		Date/Time 4/22/92		Relinquished By Fred Reeves (LRA) & (LMG)		Date/Time 4/22/92 1600		COC Rec Y ICE Method																						
Received By [Signature]		Date/Time 4/22/92		Shipped Via UPS (BUS) Fed-Ex Hand Other		Shipping # 106-578-218-0		Ana Req Y TEMP																						
Work Authorized By [Signature]		Remarks UPPER ZONE / PH = 7.60 COND. = 6250 TEMPC = 25.0°C						Cust Seal Y Ph <input checked="" type="checkbox"/>																						
								LOWER ZONE / PH = 7.24 COND. = 33000 TEMPC = 26.5°C																						

000000



Engineers
Planners
Economists
Scientists

May 11, 1992

SEF26140.P1.41

Mr. Don Hash
CH2M HILL
One Innovation Drive, Suite C
Alachua, FL 32615-9586

RE: Analytical Data for Boynton Beach D.I.W., LRD Laboratory No. 32773
LGN Laboratory No. 110968-69

Dear Mr. Hash:

On April 23, 1992, The CH2M HILL Redding Laboratory received two samples with a request for analysis of selected organic parameters.

The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analyses of this sample are discussed in the case narratives.

Under CH2M HILL policy, your samples will be stored for up to 30 days after reporting. If you have not given us prior instructions for disposal, we will contact you if any samples require disposal as hazardous waste.

CH2M HILL Laboratories appreciate your business and look forward to serving your analytical needs again. If you should have any questions concerning the data, or if you need additional information, please call our Client Services Representatives, Mr. Mark Cichy or Ms. Mary Paschke, at (916) 244-5227.

Sincerely,

Peggy A. Norton
Senior Data Package Specialist

Enclosures

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ORGANIC DATA QUALIFIERS

- U -- Indicates the compound was analyzed for but not detected. The number adjacent to the "U" qualifier indicates the reporting limit for that compound. The reporting limit can vary from sample to sample depending on dilution factors or percent moisture adjustment when indicated.
- J -- Indicates an estimated value. It is used when the data indicates the presence of a compound below the stated reporting limit.
- C -- This flag applies to GC pesticide results only. The "C" flag indicates the presence of this compound has been confirmed by GC/MS analysis.
- B -- This flag is used when the analyte is found in the associated blank as well as the sample. This notation indicates possible blank contamination and suggests the data user evaluate these compounds and their amounts carefully.
- E -- This flag applies to GC/MS only. The "E" qualifier indicates a compound may be above or below the linear range of the instrument. If the particular compound level is deemed above the linear calibration range, then the sample should be reanalyzed at an appropriate dilution. Therefore, the "E" qualified amount is an estimated concentration. The results for the dilution will be reported on a separate Form I and will be flagged with a "D" if the dilution brings the concentration within proper calibration.
- D -- This flag identifies compounds which have been run at a dilution to bring the concentration of that compound within the linear range of the instrument. "D" qualifiers are only used for samples that have been run initially with results above acceptable ranges.

SAMPLE ID QUALIFIERS

The qualifiers that may be appended to the sample ID for organic analyses are defined below:

- DL** -- Dilution Run. Indicates the sample contained compounds exceeding the calibration range. The sample was diluted and reanalyzed. Both results are reported.
- R** -- Rerun. The sample was reanalyzed. The "R" is not used if the sample was also re-extracted.
- RX** -- Re-extraction Analysis. The sample was re-extracted and reanalyzed.
- RD** -- Diluted Rerun. The sample was re-extracted and a dilution was also required.
- MS** -- Matrix Spike (may be followed by a digit to indicate multiple matrix spikes within a sample set)
- MSD** -- Matrix Spike Duplicate (may be followed by a digit to indicate multiple matrix spike duplicates within a sample set)

CLIENT SAMPLE CROSS-REFERENCE

CH2M HILL Laboratory No. 32773

LRD Sample No.	Client ID	LGN Sample No.
32773001	UPPER ZONE	LG110968
32773002	LOWER ZONE	LG110969

LABORATORY: CH2M HILL CLIENT : Boynton Beach D.I.W.
CASE NO : N/A CONTRACT NO.: N/A
LAB ID : 32773 SDG # : N/A

I. RECEIPT

A. Date: April 23, 1992

LAB ID	CLIENT ID	SAMPLE MATRIX	DATE SAMPLED	EXTRACTION DATE	ANALYSIS DATE
METHOD BLK	N/A	Water	N/A	4/29/92	4/29/92
32773001	UPPER ZONE	Water	4/21/92	4/29/92	4/29/92
32773002	LOWER ZONE	Water	4/21/92	4/29/92	4/29/92

Documentation
C. Exceptions : None encountered.

II. EXTRACTION

A. Holding Times: Holding times were met.

Extraction
B. Exceptions : None encountered.

III. ANALYSIS

A. Holding Times: Holding times were met.

Analytical
B. Exceptions : None encountered.

Bl

IV. QUALITY CONTROL

- A. Method Blank : The method blank associated with these samples met QC criteria.
- Surrogate
- B. Recoveries : Not applicable.
- Matrix
- C. Spike Results: Not applicable.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature. Diskette deliverables have not been provided for this data package.

 5-11-92
Brian Geers Date
Organics Division Manager



Engineers
 Planners
 Economists
 Scientists

FORMALDEHYDE

Client: Boynton Beach D.I.W.
 Client Sample ID: UPPER ZONE
 Inter Lab ID: LGN 110968

Sample Matrix: Water
 Dilution Factor: 1

Reference No: 32773001
 Date Sampled: 04-21-92
 Date Received: 04-23-92
 Date Extracted: 04-29-92
 Date Analyzed: 04-29-92

<u>Compounds</u>	<u>Reporting Limit</u>	<u>Sample Result</u>	<u>Units</u>
Formaldehyde	20	U	ug/l

U = Compound analyzed for but not detected above reporting limit.

Comments:

Approved By: Brian Goetz



Engineers
 Planners
 Economists
 Scientists

FORMALDEHYDE

Client: Boynton Beach D.I.W.
 Client Sample ID: LOWER ZONE
 Inter Lab ID: LGN 110969

 Sample Matrix: Water
 Dilution Factor: 1

Reference No: 32773002

 Date Sampled: 04-21-92
 Date Received: 04-23-92
 Date Extracted: 04-29-92
 Date Analyzed: 04-29-92

<u>Compounds</u>	<u>Reporting Limit</u>	<u>Sample Result</u>	<u>Units</u>
Formaldehyde	20	U	ug/l

U = Compound analyzed for but not detected above reporting limit.

Comments:

Approved By: Brian [Signature]

0000



Engineers
Planners
Economists
Scientists

FORMALDEHYDE

Sample Matrix: Water
Dilution Factor: 1

Reference No: METHOD BLANK
Date Extracted: 04-29-92
Date Analyzed: 04-29-92

<u>Compounds</u>	<u>Reporting Limit</u>	<u>Method Blank Result</u>	<u>Units</u>
Formaldehyde	20	U	ug/l

U = Compound analyzed for but not detected above reporting limit.

Comments:

Approved By: Brian [Signature]

CH2M HILL

QUALITY ANALYTICAL LABORATORIES

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M HILL Project # SEEZ6140.P1.41 Purchase Order # _____

Project Name BOYNTON BEACH D.I.W. (DUAL-ZONE MONITOR WELL)

Company Name/CH2M HILL Office DFB

Project Manager & Phone # Mr. X A. MUNIZ / DFB Report Copy to: B. ZIEGLER / DFB

Requested Completion Date: STANDARD Sampling Requirements: SDWA NPDES RCRA OTHER Sample Disposal: Dispose Return

LAB TEST CODES: VOCs, Phenol, Formaldehyde, GLO, CN, TSS, BOD, SO4, Turb, Silica, MBAS, Metals, NH3, TP04, Al2O3, Sulfide S.

SHADED AREA - FOR LAB USE ONLY: Lab 1 # 3277.3, Lab 2 # _____, Quote # _____, Kit Request # _____

ANALYSES REQUESTED: EPA 624 w/o (HCL), 125ml AMBER (H2SO4), 500ml AMBER (-), 2 Liter AMBER (-), 1/2 gal. (NaOH), 1/2 gal. AIL, SO3, PH, HANDBOOK (-), QUART (-), QUART (HNO3), QUART (H2SO4), PINT (ZnAc/NaOH)

CONTAINERS: 10

Date	Time	Type	Matrix	CLIENT SAMPLE ID (9 CHARACTERS)
04-21	1215	XX	WATER	UPPER ZONE
04-21	1225	XX	WATER	LOWER ZONE
-	-	XX	WATER	TRIP BLANK 1

Method Blank

HAZWRAP/NESSA: Y N

QC LEVEL 1 2 3

COC YES NO ICE YES NO

ANALYSIS Y N TEMP 4°C

CUST SEAL YES NO PH N/A

SAMPLE COND. 900

BUS UPS EX OTHER

REMARKS: SEE "SAMPLE KIT TRACKING FORM" FOR DETAILS OF ANALYSES. *ONE OF THE TRIP BLANK VIALS WAS RECEIVED BROKEN ON 04-21-92. CBP

LRA LMG PPB

RESULTS TO DON HASK QC LEVEL: 1 5/11/92

Sampled By & Title: CARL B. PATTERSON / TA-2 Date/Time: 4-21-92/1300 Relinquished By: CARL B. PATTERSON Date/Time: 4-21-92/1430

Received By: Nichole L. ... Date/Time: 09:30 Relinquished By: Fred Reeves (PPB) Date/Time: 4/22/92 1200

Received By: DFB Date/Time: 4/22/92 1003 Relinquished By: Fred Reeves (LRA) & (LMG) Date/Time: 4/22/92 1600

Shipping # 106-578-218-0

HAZWRAP/NESSA: Y N

QC Level: 1 2 3 Other: _____

COC Rec Y N ICE Melted No

Ana Req Y N TEMP _____

Cust Seal Y N Ph

Work Author: _____ Remarks: UPPER ZONE / pH = 7.60 COND. = 600 TEMP = 25.0°C // LOWER ZONE / pH = 7.24 COND. = 330 TEMP = 26.0°C

000000



Project No. SEF26410.P1

BOYNTON BEIT CONCENTRATE
DISPOSAL WELL

HEADER PRESSURE DURING TESTING
WELL DISPOSAL WELL

Date AUG 30, 1991
Time start 0621 HRS
Time finish 0743 HRS

Time	Total minutes	Header Pressure (PSIG)	Comments
0621		0	PRESURIZE CASING TO TEST PRESSURE
0623		128.5	STOP PRESURIZING AND BLEED OFF PRESSURE
0628	0	121.0	START PRESSURE TEST
0633	5	121.0	
0638	10	121.0	
0643	15	120.5	
0648	20	120.5	
0653	25	120.5	
0658	30	120.5	
0703	35	120.0	
0708	40	120.0	
0713	45	120.0	
0718	50	120.0	
0723	55	119.5	
0728	60	119.5	PRESSURE TEST COMPLETE
0732			BLEED PRESSURE OFF (10.5 GALS OF WATER WERE DISPLACED)
0743			TEST COMPLETE

PRESSURE GAUGE:

SN: 910723 BIC
CALIBRATED 8/91 BARFIELD, MIA/FL
NEW
300PSI, 1PSI INCREMENTS

B-7

Observes

BOB ZIEGLER / OFB WJ
Tom McCORMICK / OFB WJ 8/20/91
ED RARRIG / FOER / WFB 9/6/91
JIM BRANTLEY / YBWD

BARFIELD INSTRUMENT CORPORATION
4101 N.W. 29th STREET
MIAMI, FL. 33142

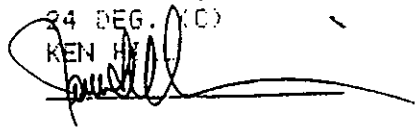
RECORD OF INSTRUMENT CALIBRATION COMPARISON

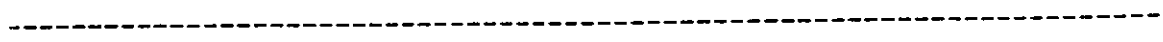
FOR: YOUNGQUIST BROTHERS M/O:
MFG: AMETEK/U.S. GAUGE DIVISION MODEL: 0-300 PSI.
TYPE: PRESSURE GAUGE S/N: 910723810

BIC TEST UNIT	CUSTOMER UNIT
0	0
20	20
40	40
60	60
80	79.5
100	100
120	120
140	140
160	160
180	180
200	200
220	220
240	240
260	260
280	280
300	300

THE ABOVE CALIBRATION COMPARISON WAS MADE BY BARFIELD INSTRUMENTS CORP
MIAMI, FL. USING AN APPROVED BIC TEST UNIT.

THIS APPLIANCE CALIBRATED
USING MODEL# 2008E
SERIAL# 14704
ACCURACY IS TRACEABLE TO
THE N.I.S.T.

DATE: AUGUST 27, 1991
TEMPERATURE: 24 DEG. (C)
TESTED BY: KEN
INSPECTED BY: 



**Concentrate Disposal Well
Background Sample Laboratory Analysis**

September 30, 1991

SEF26410.P1 | AAF166

RE: City of Boynton Beach laboratory samples

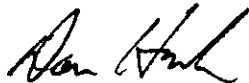
Dear Albert Muniz/DFB:

On September 10, 1991 the CH2M Hill Gainesville Laboratory received 2 water, grab samples with a request for analysis of selected parameters.

The analytical results are enclosed. In the analysis of Selenium matrix interferences were encountered. The sample had to be diluted 1:4 in order to obtain acceptable QA/QC data. The detection limit was elevated accordingly.

If you should have any questions concerning the results, please call Don Hash or Tom Emenhiser.

Sincerely,



Don Hash
Client Services

Enclosure(s):

cc: Bart Ziegler/DFB

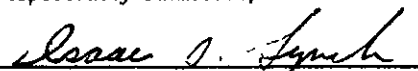
City of Boynton Beach	CH2M HILL
Attention: Albert Muniz Address: DFB Copies to: Bart Ziegler/DFB,	Project No: SEF26410.P1 Received: 09/10/91 Reported: 09/30/91
Collected: 09/07/91 by Bart Ziegler Type: water, grab Location: Boynton Disposal Well	

SAMPLE NUMBER	99914	99915
SAMPLE DESCRIPTIONS	Boynton Disposal Well 09/07/91 12:30	Laboratory Method Blank
GENERAL		
pH (Units)	7.80 09/11/91	Not Applicable 09/11/91
Alkalinity, Total (as CaCO3)	100 09/11/91	<1.0 09/11/91
Color (APHA)	50 09/11/91	0 09/11/91
Hardness, Calcium (as CaCO3)	960 09/18/91	<1.0 09/18/91
Turbidity (NTU)	24 09/11/91	<0.2 09/11/91
Odor (TON)	N.O.O. 09/11/91	N.O.O. 09/11/91
SOLIDS		
Total Dissolved Solids	37,200 09/20/91	<1.0 09/20/91
METALS		
Antimony - FU	<0.20 09/17/91	<0.20 09/17/91
Arsenic - FU	<0.005	<0.005

NOTE: Values are mg/l as substance unless otherwise stated.

* See cover letter.

Respectfully submitted,


 Isaac D. Lynch, Inorganics Supervisor

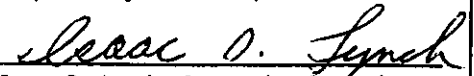
n/r = not requested

NOTE: This report contains test data and no interpretation is intended or implied.

SAMPLE NUMBER	99914	99915
SAMPLE DESCRIPTIONS	Boynton Disposal Well 09/07/91 12:30	Laboratory Method Blank
Barium - FL	09/18/91 <0.20	09/18/91 <0.20
Beryllium - FU	09/20/91 0.01	09/20/91 <0.01
Cadmium - FU	09/23/91 0.0037	09/23/91 <0.0002
Chromium, Tot - FU	09/13/91 0.002	09/13/91 <0.002
Copper - FL	09/20/91 0.03	09/20/91 <0.02
Iron, Total - FL	09/20/91 4.0	09/20/91 <0.02
Lead - FU	09/16/91 0.040	09/16/91 <0.002
Manganese - FL	09/10/91 0.19	09/10/91 <0.01
Mercury - CV	09/17/91 <0.0002	09/17/91 <0.0002
Nickel - FL	09/13/91 <0.05	09/13/91 <0.05
Selenium	09/19/91 <0.025 *	09/19/91 <0.005
Silver - FL	09/11/91 0.06	09/11/91 <0.02
Sodium - FL	09/23/91 11,400	09/23/91 <0.50
Thallium - FL	09/24/91 1.2	09/24/91 <0.50
Zinc - FL	09/23/91 <0.01	09/23/91 <0.01
	09/13/91	09/13/91

NOTE: Values are mg/l as substance unless otherwise stated.
* See cover letter.

Respectfully submitted,


 Isaac D. Lynch, Inorganics Supervisor

n/r = not requested

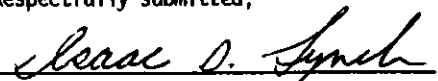
NOTE: This report contains test data and no interpretation is intended or implied.

SAMPLE NUMBER	99914	99915
SAMPLE DESCRIPTIONS	Boynton Disposal Well 09/07/91 12:30	Laboratory Method Blank
ANIONS		
Chloride	19,200 09/18/91	<1.0 09/18/91
Cyanide, Total	<0.005 09/20/91	<0.005 09/20/91
Fluoride	0.55 09/17/91	<0.01 09/17/91
Sulfate	2590 09/26/91	<1.0 09/26/91
NUTRIENTS		
Nitrate & Nitrite (as N)	0.12 09/24/91	<0.02 09/24/91
GENERAL ORGANICS		
Phenol, 4AAP	0.084 09/13/91	<0.002 09/13/91
Surfactants (MBAS)	0.055 09/10/91	<0.025 09/10/91

NOTE: Values are mg/l as substance unless otherwise stated.

* See cover letter.

Respectfully submitted,


 Isaac D. Lynch, Inorganics Supervisor

n/r = not requested

NOTE: This report contains test data and no interpretation is intended or implied.



Client: CITY OF BOYNTON BEACH/BOYNTON DISPOSAL WELL
Attention: A. MUNIZ
Address: CH2M HILL DEERFIELD BEACH OFFICE

Sample Number: 99914
Date Received: 09/10/91

Dear Client:

The Gainesville Organics Laboratory received your sample with a request for analysis of selected parameters.

The analytical results are enclosed. No unusual difficulties were encountered in the analysis.

An extraction blank was not prepared on 9/12/91 when the sample was extracted. The same hexane was used for the extraction blank prepared on 9/17/91, 3HB0917A, and the results are enclosed. The sample was analyzed with a batch begun on 9/17/91, and the actual analysis took place after midnight.

If you should have any questions concerning the results please contact us. Thank you.

Sincerely,

A handwritten signature in cursive script, appearing to read 'Tom Emenhiser'.

Tom Emenhiser
Client Services

CH2M Hill Organics Laboratory

Analytical Report

Report Contents

Sample Information

Definitions of Reporting Qualifiers

Description of Analytical Methods

Sample Quantitation Reports including Surrogate Recoveries

QA/QC Package Including:

Initial Calibration (*)

Continuing Calibration (Daily Standard) (*)

Quantitation Reports for Organic-Free Water Blanks

Matrix Spike/Matrix Spike Duplicate (*)

Surrogate Control Charts (*)

Chromatograms (*)

Copy of Chain-of-Custody

(*) Information provided where applicable or when requested.

SAMPLE INFORMATION

Client: CITY OF BOYNTON BEACH/BOYNTON DISPOSAL WELL
Attention: A. MUNIZ
Address: CH2M HILL DEERFIELD BEACH OFFICE

Description: WATER SAMPLE
BOYNTON DISPOSAL WELL
EDB ANALYSIS

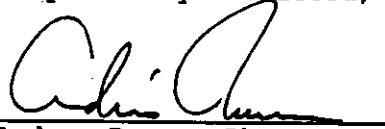
Sample Number: 99914
Quantity: 1
Date Received: 09/10/91
Date Completed: 09/18/91
Date Reported: 09/23/91
Project Number: SEF 26410.P1
Number of Pages: 8

The information shown in this report is test data only
and no interpretation of this data is intended or implied.

State of Alabama Certification No.: 40080

State of Florida Certification No.: 82112, E82124

Respectfully submitted,


Andres Romeu, Ph.D.
Organics Division Manager

Definitions of Reporting Qualifiers

Result Qualifiers

- (U) Indicates the compound was analyzed for but not detected. The number adjacent to the "U" qualifier indicates the Reporting Limit for that compound. The Reporting Limit can vary from sample to sample depending on dilution factors or percent moisture adjustment when indicated.

Analysis (Run) Qualifiers

- (M) Matrix interference precludes achieving lower Reporting Limit. The Reporting Limit is determined by the largest peak in the sample, and the dilution is adjusted so that neither chemical nor electronic overload of the gas chromatography system takes place. Either condition could affect the reliability of peak identification and quantitation.
- (N) Sample contains non-target compounds. Many samples, especially "fuel" samples, often contain non-target compounds. This qualifier is used to alert the client to the presence of non-target compounds in samples, even if no target compounds are detected.

Reporting Limit = 1.0 ug/l for water samples and 1.0 ug/kg for soil and sediment samples unless noted otherwise.

Note: the minimum Reporting Limit for methanol extracts of high-level soil and sediment samples is 50 ug/kg due to the effect of methanol on "purging efficiency."

Analytical Methods

Purgeable Halocarbons in Water: EPA Method 601 as described in the Title 40 Code of Federal Regulations, Part 136, Appendix A, July, 1988, and CH2M Hill GC Volatiles SOP, October, 1988.

Purgeable Aromatics in Water: EPA Method 602 as described in the Title 40 Code of Federal Regulations, Part 136, Appendix A, July, 1988, and CH2M Hill GC Volatiles SOP, October, 1988.

Purgeable Halocarbons in Soil and Sediment: EPA Method 8010 as described in Test Methods for Evaluating Solid Waste (SW-846) and CH2M Hill GC Volatiles SOP, October, 1988.

Purgeable Aromatics in Soil: EPA Method 8020 as described in Test Methods for Evaluating Solid Waste (SW-846) and CH2M Hill GC Volatiles SOP, October, 1988.

Trihalomethanes in Water: EPA Method 501.1 as described in the Federal Register, Vol. 44, No. 231, Appendix C, and CH2M Hill Volatiles SOP, October, 1988.

Ethylene Dibromide in Water: EPA Method 504 (1,2-dibromomethane and 1,2-dibromo-3-chloropropane in water by microextraction and gas chromatography).

Fuel Screening: Procedure for estimation of concentration and identification of "fuel" samples; used to assist in determination of required EPA methods for subsequent analysis. This methodology is not an established EPA procedure.

State of Alabama Certification Number: 40080

State of Florida Certification Numbers: 82112 and E82124



Report of Analytical Data - EDB

Client: CITY OF BOYNTON BEACH	Laboratory: GAINESVILLE	Date Sampled: 09/07/91
Project: BOYNTON DISPOSAL WELL	Lab Sample Id: 99914E	Date Received: 09/10/91
Proj No: SEF 26410.P1	% Moisture 0.00	Date Extracted: 09/12/91
Method: EDB	Dilution Factor: 1.00	Date Analyzed: 09/18/91
Matrix: WATER	Instrument ID: GC#3	Analyst: CJ
Sampler: BZ	Column: SUPELCO VOCOL	Date Reported: 09/23/91

Client Sample ID/Description: BOYNTON DISPOSAL WELL

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L

79-00-5	1,1,2-Trichloroethane (VOCOL-ANALYTICAL COLUMN)	86	%rec
79-00-5	1,1,2-Trichloroethane (DB-1 CONFIRMATION COLUMN)	80	%rec

U = Compound analyzed for but not detected
 SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/23/91



Report of Analytical Data - EDB

Client: CITY OF BOYNTON BEACH
Project: BOYNTON DISPOSAL WELL
Proj No: SEF 26410.P1
Method: EDB
Matrix: WATER
Sampler: N/A

Laboratory: GAINESVILLE
Lab Sample Id: 3HB0917A
% Moisture: 0.00
Dilution Factor: 1.00
Instrument ID: GC#3
Column: SUPELCO VOCOL

Date Sampled: N/A
Date Received: N/A
Date Extracted: 09/12/91
Date Analyzed: 09/17/91
Analyst: CJ
Date Reported: 09/23/91

Client Sample ID/Description: EXTRACTION BLANK

CAS Number	Compound	Reporting Limit	Sample Result	Reporting Units
106-93-4	1,2-Dibromoethane	0.02	U	ug/L

79-00-5	1,1,2-Trichloroethane (VOCOL-ANALYTICAL COLUMN)	106	%rec
79-00-5	1,1,2-Trichloroethane (DB-1 CONFIRMATION COLUMN)	103	%rec

U = Compound analyzed for but not detected
SS = Surrogate Standard reported as percent recovery

Reviewed by: Charlie Jarman 9/23/91



October 1, 1991

SEF26410.P1

Mr. Don Hash
CH2M HILL/LGN
7201 N.W. 11th Place
Gainesville, Florida 32605

RE: Analytical Data for City of Boynton Beach, LMG Laboratory No. 19521
LGN Laboratory No. 99914

Dear Mr. Hash:

On September 14, 1991, the CH2M HILL Montgomery Laboratory received two samples with a request for analysis of selected organic parameters.

The analytical results and associated quality control data are enclosed. Any unusual difficulties encountered during the analyses of these samples are discussed in the case narratives.

If you should have any questions concerning the data, please inquire.

The CH2M HILL policy is to store samples for up to 30 days after reporting. If you desire, our laboratory will maintain your samples for a longer period at a cost of \$5.00 per sample per month. Samples determined to be hazardous can either be returned to you or disposed of at a cost of \$25.00 per sample.

Sincerely,

Wanda L. Hall

Wanda L. Hall
Data Package Supervisor

Enclosures

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ANALYTICAL METHODS

Organic Analysis

Priority Pollutants: Water, soil and waste sample are analyzed in accordance with procedures described in Methods 608, 624, and 625, EPA-600/4-82-057 (1982); Methods 8080, 8240, and 8270, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition; and methods outlined in the USEPA Contract Laboratory Program Statement of Work for Organics Analysis, February, 1988.

Volatile Analysis (Safe Drinking Water Act): Water samples are analyzed in accordance with procedures described in Method 524.2, Federal Register (50 FR 46902), November 13, 1985.

Chlorinated Phenoxyacid Herbicides: Samples are analyzed in accordance with procedures described in Method 8150, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Organophosphorous Pesticides: Samples are analyzed in accordance with procedures described in Methods 614 and 622, EPA-600/4-79-019 (1979) and in Method 8140, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Phenolic Acid Analysis by GC: Samples are analyzed in accordance with procedures described in Method 604, Federal Register, 40 CFR, Part 136 (July 1, 1987) and in Method 8040, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Polynuclear Aromatic Hydrocarbons (GC analysis): Samples are analyzed in accordance with procedures described in Method 610, Federal Register, 40 CFR, Part 136 (July 1, 1987) and in Method 8100, Test Methods for Evaluating Solid Waste, 1986, SW-846, Third Edition.

Ethylene Dibromide: Water samples are analyzed in accordance with procedures described in Method 504, Federal Register, (50 FR 46902), November 13, 1985.

Trihalomethanes: Water samples are analyzed in accordance with procedures described in Method 501.2, Federal Register, Vol. 44, No. 231, Part II, November 29, 1979.

EPA - DEFINED QUALIFIERS

ORGANICS

Definitions for the EPA-defined qualifiers:

- U -- Indicates the compound was analyzed for but not detected. The number adjacent to the "U" qualifier indicates the quantitation limit for that compound. The detection limit can vary from sample to sample depending on dilution factors or percent moisture adjustment when indicated.
- J -- Indicates an estimated value. This flag is used when the mass spectral data indicates the presence of a compound below the stated quantitation limit. The "J" qualifier is not used with pesticide results.
- C -- This flag applies to pesticide results only. The "C" flag indicates the presence of this compound has been confirmed by GC/MS analysis.
- B -- This flag is used when the analyte is found in the associated blank as well as the sample. This notation indicates possible blank contamination and suggests the data user evaluate these compounds and their amounts carefully.
- E -- This flag applies to GC/MS only. The "E" qualifier indicates a compound may be above or below the linear range of the instrument. If the particular compound level is deemed above the linear calibration range, then the sample should be reanalyzed at an appropriate dilution. Therefore, the "E" qualified amount is an estimated concentration. The results for the dilution will be reported on a separate Form I and will be flagged with a "D" if the dilution brings the concentration within proper calibration.
- D -- This flag identifies compounds which have been run at a dilution to bring the concentration of that compound within the linear range of the instrument. "D" qualifiers are only used for samples that have been run initially with results above acceptable ranges. For secondary dilutions the "DL" suffix is appended to the sample number on the Form I.
- A -- Indicates the Tentatively Identified Compound (TIC) is a suspected aldol-condensation product.
- X -- Indicates the compound concentration has been manually modified or the EPA qualifier has been manually modified or added.
- JX -- The compound was detected and quantitated below the Contract Required Quantitation Limit.

CLIENT SAMPLE ID QUALIFIERS

LEVEL 1

The qualifiers that GC/MS and GC use with the client sample ID are defined below:

- DL -- Dilution Run
- R -- Rerun (may be followed by a digit to indicate multiple reruns)
- RD -- Diluted Rerun
- RX -- Re-extraction Analysis
- MS -- Matrix Spike (may be followed by a digit to indicate multiple matrix spikes within a sample set)
- MSD -- Matrix Spike Duplicate (may be followed by a digit to indicate multiple matrix spike duplicates within a sample set)
- QC_BLANK -- Method Blank (may be followed by a "W" for waters, "S" for soils run at a low level, or "SM" for soils run at a medium level -- these letters may be followed by a digit to indicate multiple blanks of that type; if there are no letters, the digit indicates multiple blanks).

These qualifiers allow GC/MS and GC to have unique client sample ID's so that the client can get more accurate information from the data reported.

TABLE 1

SAMPLE CROSS-REFERENCE SUMMARY

CH2M HILL Laboratory No. 19521

<u>LMG</u> <u>Sample No.</u>	<u>LGN</u> <u>Sample No.</u>	<u>Sample Description</u>			
19521001	99914	BOYNTON DISPOSAL WELL	09/07/91	1230	GRAB
19521002	99914	DISPOSAL WELL	09/12/91	1400/1500	GRAB

**CASE NARRATIVE FOR VOLATILE
 MASS SPECTROMETRY SAMPLES**

LABORATORY: CH2M HILL LABORATORIES **CLIENT:** CITY OF BOYNTON BEACH
CASE NO. : N/A **CONTRACT NO.:** N/A
LAB NO. : 19521 **SDG NO.:** N/A

I. RECEIPT

A. DATE: September 14, 1991

B. SAMPLE INFORMATION

<u>LAB ID</u>	<u>CLIENT ID</u>	<u>SAMPLE MATRIX</u>	<u>DATE SAMPLED</u>	<u>EXTRACTION DATE</u>	<u>ANALYSIS DATE</u>
19521001	BOYNTON	WATER	09/07/91	NA	09/15/91
X09151B1	QC_BLANK_W	WATER	NA	NA	09/15/91

C. Documentation

Exceptions : Tentatively Identified Compounds were not requested as part of this analysis. Therefore, these forms will not be included.

000001

II. EXTRACTION

- A. Holding Times: Medium level protocol was not performed; therefore, extraction time is not applicable.
- B. Extraction
Exceptions : Not applicable.

III. ANALYSIS

- A. Holding times: All holding times were met.
- B. Analytical
Exceptions : Unless otherwise indicated, all water volatile samples were analyzed using the HCl-preserved vial.

IV. QUALITY CONTROL

- A. Method Blank : All associated method blanks met acceptable QC criteria.
- B. Surrogate
Recoveries : All samples met acceptable QC limits.
- C. Matrix Spike
Results : Matrix spike results have not been reported with this contract.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.


Herb Kelly
Manager, Organic Division


Date

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM
Lab Sample ID: 19521001
Client Sample ID: BOYNTON

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: _____

Date Extracted: _____
Date Analyzed: 09/15/91
Dilution Factor: 1.0

VOLATILE COMPOUNDS

CAS Number	ug/L	CAS Number	ug/L
74-87-3	Chloromethane 10 U	71-43-2	Benzene 5 U
74-83-9	Bromomethane 10 U	10061-02-6	trans-1,3-Dichloropropene 5 U
75-01-4	Vinyl chloride 10 U	110-75-8	2-Chloroethylvinylether . 10 U
75-00-3	Chloroethane 10 U	75-25-2	Bromoform 5 U
75-09-2	Methylene chloride 5 B	591-78-6	2-Hexanone 10 BU
67-64-1	Acetone 5 BJ	108-10-1	4-Methyl-2-pentanone . . . 10 U
75-15-0	Carbon disulfide 5 U	127-18-4	Tetrachloroethene 5 U
75-69-4	Trichlorofluoromethane . . 5 U	79-34-5	1,1,2,2-Tetrachloroethane 5 U
75-35-4	1,1-Dichloroethene 5 U	108-88-3	Toluene 5 U
75-34-3	1,1-Dichloroethane 5 U	108-90-7	Chlorobenzene 5 U
540-59-0	1,2-Dichloroethene (total) 5 U	100-41-4	Ethylbenzene 5 U
67-66-3	Chloroform 5 U	100-42-5	Styrene 5 U
107-06-2	1,2-Dichloroethane 5 U	1330-20-7	Xylenes (total) 5 U
78-93-3	2-Butanone 10 U	541-73-1	1,3-Dichlorobenzene 5 U
71-55-6	1,1,1-Trichloroethane . . . 5 U	106-46-7	1,4-Dichlorobenzene 5 U
56-23-5	Carbon tetrachloride 5 U	95-50-1	1,2-Dichlorobenzene 5 U
108-05-4	Vinyl acetate 10 U	107-02-8	Acrolein 100 U
75-27-4	Bromodichloromethane 5 U	107-13-1	Acrylonitrile 100 U
87-5	1,2-Dichloropropane 5 U		
10061-01-5	cis-1,3-Dichloropropene . . . 5 U		Toluene-d8 - SS 100
79-01-6	Trichloroethene 1 J		1,4-Bromofluorobenzene - SS 102
124-48-1	Dibromochloromethane 5 U		1,2-Dichloroethane-d4 - SS 100
79-00-5	1,1,2-Trichloroethane 5 U		

- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- SS - Surrogate Standard reported as percent recovery.

Form I

11/91

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM
Lab Sample ID: X09151B1
Client Sample ID: QC BLANK W

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: _____

Date Extracted: _____
Date Analyzed: 09/15/91
Dilution Factor: 1.0

VOLATILE COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L
74-87-3	Chloromethane	10	U	71-43-2	Benzene	5 U
74-83-9	Bromomethane	10	U	10061-02-6	trans-1,3-Dichloropropene	5 U
75-01-4	Vinyl chloride	10	U	110-75-8	2-Chloroethylvinylether .	10 U
75-00-3	Chloroethane	10	U	75-25-2	Bromoform	5 U
75-09-2	Methylene chloride	2	BJ	591-78-6	2-Hexanone	1 BJ
67-64-1	Acetone	14	B	108-10-1	4-Methyl-2-pentanone . . .	10 U
75-15-0	Carbon disulfide	5	U	127-18-4	Tetrachloroethene	5 U
75-69-4	Trichlorofluoromethane . . .	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5 U
75-35-4	1,1-Dichloroethene	5	U	108-88-3	Toluene	5 U
75-34-3	1,1-Dichloroethane	5	U	108-90-7	Chlorobenzene	5 U
540-59-0	1,2-Dichloroethene (total)	5	U	100-41-4	Ethylbenzene	5 U
67-66-3	Chloroform	5	U	100-42-5	Styrene	5 U
107-06-2	1,2-Dichloroethane	5	U	1330-20-7	Xylenes (total)	5 U
78-93-3	2-Butanone	10	U	541-73-1	1,3-Dichlorobenzene	5 U
71-55-6	1,1,1-Trichloroethane	5	U	106-46-7	1,4-Dichlorobenzene	5 U
56-23-5	Carbon tetrachloride	5	U	95-50-1	1,2-Dichlorobenzene	5 U
108-05-4	Vinyl acetate	10	U	107-02-8	Acrolein	100 U
75-27-4	Bromodichloromethane	5	U	107-13-1	Acrylonitrile	100 U
87-5	1,2-Dichloropropane	5	U		-----	
10061-01-5	cis-1,3-Dichloropropene	5	U		Toluene-d8 - SS	101
79-01-6	Trichloroethene	5	U		1,4-Bromofluorobenzene - SS	100
124-48-1	Dibromochloromethane	5	U		1,2-Dichloroethane-d4 - SS	99
79-00-5	1,1,2-Trichloroethane	5	U			

U - Compound analyzed for but not detected.
B - Compound was detected in QC blank.
J - Reported value less than quantitation limit.
SS - Surrogate Standard reported as percent recovery.

Form I

MSH

**CASE NARRATIVE FOR SEMIVOLATILE
 MASS SPECTROMETRY SAMPLES**

LABORATORY: CH2M HILL LABORATORIES CLIENT: CITY OF BOYNTON BEACH
 CASE NO. : N/A CONTRACT NO.: N/A
 LAB NO. : 19521 SDG NO.: N/A

I. RECEIPT

A. DATE: September 14, 1991

B. SAMPLE INFORMATION

<u>LAB ID</u>	<u>CLIENT ID</u>	<u>SAMPLE MATRIX</u>	<u>DATE SAMPLED</u>	<u>EXTRACTION DATE</u>	<u>ANALYSIS DATE</u>
19521002	DISPOSAL_WELL	WATER	09/12/91	09/16/91	09/18/91
W09161B1	QC_BLANK_W	WATER	NA	09/16/91	09/19/91

C. Documentation

Exceptions : Tentatively Identified Compounds were not requested as part of this analysis. Therefore, these forms will not be included.

II. EXTRACTION

- A. Holding Times: All holding times were met.
- B. Extraction
Exceptions : No exceptions were encountered.

III. ANALYSIS

- A. Holding times: All holding times were met.
- B. Analytical
Exceptions : No exceptions were encountered.

IV. QUALITY CONTROL

- A. Method Blank : All associated method blanks met acceptable QC criteria.
- B. Surrogate
Recoveries : All samples met acceptable QC limits.
- C. Matrix Spike
Results : Matrix spike results have not been reported with this contract.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.



Herb Kelly
Manager, Organic Division



Date

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM
Lab Sample ID: 19521002
Client Sample ID: DISPOSAL WELL

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: _____

Date Extracted: 09/16/91
Date Analyzed: 09/18/91
Dilution Factor: 1.0

SEMIVOLATILE COMPOUNDS

CAS Number		ug/L	CAS Number		ug/L
62-75-9	N-Nitrosodimethylamine . .	10 U	100-02-7	4-Nitrophenol	50 U
108-95-2	Phenol	10 U	132-64-9	Dibenzofuran	10 U
62-53-3	Aniline	10 U	121-14-2	2,4-Dinitrotoluene	10 U
111-44-4	bis(2-Chloroethyl)ether .	10 U	84-66-2	Diethylphthalate	10 U
95-57-8	2-Chlorophenol	10 U	7005-72-3	4-Chlorophenyl-phenylether	10 U
541-73-1	1,3-Dichlorobenzene . . .	10 U	86-73-7	Fluorene	10 U
106-46-7	1,4-Dichlorobenzene . . .	10 U	100-01-6	4-Nitroaniline	50 U
100-51-6	Benzyl Alcohol	10 U	534-52-1	4,6-Dinitro-2-methylphenol	50 U
95-50-1	1,2-Dichlorobenzene . . .	10 U	86-30-6	N-Nitrosodiphenylamine (1)	10 U
95-48-7	2-Methylphenol	10 U	122-66-7	1,2-Diphenylhydrazine . .	10 U
108-60-1	bis(2-Chloroisopropyl)ether	10 U	101-55-3	4-Bromophenyl-phenylether	10 U
106-44-5	4-Methylphenol	10 U	118-74-1	Hexachlorobenzene	10 U
621-64-7	N-Nitroso-di-n-propylamine	10 U	87-86-5	Pentachlorophenol	50 U
67-72-1	Hexachloroethane	10 U	85-01-8	Phenanthrene	10 U
98-95-3	Nitrobenzene	10 U	120-12-7	Anthracene	10 U
78-59-1	Isophorone	10 U	84-74-2	Di-n-Butylphthalate	3 J
88-75-5	2-Nitrophenol	10 U	206-44-0	Fluoranthene	10 "
-67-9	2,4-Dimethylphenol	10 U	92-87-5	Benzidine	50
65-85-0	Benzoic acid	50 U	129-00-0	Pyrene	10 U
111-91-1	bis(2-Chloroethoxy)Methane	10 U	85-68-7	Butylbenzylphthalate	10 U
120-83-2	2,4-Dichlorophenol	10 U	91-94-1	3,3'-Dichlorobenzidine . . .	20 U
120-82-1	1,2,4-Trichlorobenzene . .	10 U	56-55-3	Benzo(a)anthracene	10 U
91-20-3	Naphthalene	10 U	218-01-9	Chrysene	10 U
106-47-8	4-Chloroaniline	10 U	117-81-7	bis(2-Ethylhexyl)phthalate	3 J
87-68-3	Hexachlorobutadiene	10 U	117-84-0	Di-n-octylphthalate	10 U
59-50-7	4-Chloro-3-methylphenol . .	10 U	205-99-2	Benzo(b)fluoranthene	10 U
91-57-6	2-Methylnaphthalene	10 U	207-08-9	Benzo(k)fluoranthene	10 U
77-47-4	Hexachlorocyclopentadiene	10 U	50-32-8	Benzo(a)pyrene	10 U
88-06-2	2,4,6-Trichlorophenol . . .	10 U	193-39-5	Indeno(1,2,3-cd)pyrene . . .	10 U
95-95-4	2,4,5-Trichlorophenol . . .	50 U	53-70-3	Dibenz(a,h)anthracene	10 U
91-58-7	2-Chloronaphthalene	10 U	191-24-2	Benzo(g,h,i)perylene	10 U
88-74-4	2-Nitroaniline	50 U			
131-11-3	Dimethyl phthalate	10 U		Nitrobenzene-d5 - SS	51
208-96-8	Acenaphthylene	10 U		2-Fluorobiphenyl - SS	44
606-20-2	2,6-Dinitrotoluene	10 U		Terphenyl-d14 - SS	90
99-09-2	3-Nitroaniline	50 U		Phenol-d5 - SS	39
83-32-9	Acenaphthene	10 U		2-Fluorophenol - SS	44
51-28-5	2,4-Dinitrophenol	50 U		2,4,6-Tribromophenol - SS	80

- (1) - Cannot be separated from diphenylamine.
- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- SS - Surrogate Standard reported as percent recovery.

Handwritten signature

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM
Lab Sample ID: W09161B1
Client Sample ID: QC BLANK W

Concentration: LOW
Sample Matrix: WATER
Percent Moisture: _____

Date Extracted: 09/16/91
Date Analyzed: 09/19/91
Dilution Factor: 1.0

SEMIVOLATILE COMPOUNDS

CAS Number	ug/L	CAS Number	ug/L
62-75-9	N-Nitrosodimethylamine 10 U	100-02-7	4-Nitrophenol 50 U
108-95-2	Phenol 10 U	132-64-9	Dibenzofuran 10 U
62-53-3	Aniline 10 U	121-14-2	2,4-Dinitrotoluene 10 U
111-44-4	bis(2-Chloroethyl)ether 10 U	84-66-2	Diethylphthalate 10 U
95-57-8	2-Chlorophenol 10 U	7005-72-3	4-Chlorophenyl-phenylether 10 U
541-73-1	1,3-Dichlorobenzene 10 U	86-73-7	Fluorene 10 U
106-46-7	1,4-Dichlorobenzene 10 U	100-01-6	4-Nitroaniline 50 U
100-51-6	Benzyl Alcohol 10 U	534-52-1	4,6-Dinitro-2-methylphenol 50 U
95-50-1	1,2-Dichlorobenzene 10 U	86-30-6	N-Nitrosodiphenylamine (1) 10 U
95-48-7	2-Methylphenol 10 U	122-66-7	1,2-Diphenylhydrazine . . . 10 U
108-60-1	bis(2-Chloroisopropyl)ether 10 U	101-55-3	4-Bromophenyl-phenylether 10 U
106-44-5	4-Methylphenol 10 U	118-74-1	Hexachlorobenzene 10 U
621-64-7	N-Nitroso-di-n-propylamine 10 U	87-86-5	Pentachlorophenol 50 U
67-72-1	Hexachloroethane 10 U	85-01-8	Phenanthrene 10 U
98-95-3	Nitrobenzene 10 U	120-12-7	Anthracene 10 U
78-59-1	Isophorone 10 U	84-74-2	Di-n-Butylphthalate 10 U
88-75-5	2-Nitrophenol 10 U	206-44-0	Fluoranthene 10 U
105-67-9	2,4-Dimethylphenol 10 U	92-87-5	Benzidine 50 U
85-0	Benzoic acid 50 U	129-00-0	Pyrene 10 U
111-91-1	bis(2-Chloroethoxy)Methane 10 U	85-68-7	Butylbenzylphthalate 10 U
120-83-2	2,4-Dichlorophenol 10 U	91-94-1	3,3'-Dichlorobenzidine . . . 20 U
120-82-1	1,2,4-Trichlorobenzene . . . 10 U	56-55-3	Benzo(a)anthracene 10 U
91-20-3	Naphthalene 10 U	218-01-9	Chrysene 10 U
106-47-8	4-Chloroaniline 10 U	117-81-7	bis(2-Ethylhexyl)phthalate 10 U
87-68-3	Hexachlorobutadiene 10 U	117-84-0	Di-n-octylphthalate 10 U
59-50-7	4-Chloro-3-methylphenol . . . 10 U	205-99-2	Benzo(b)fluoranthene 10 U
91-57-6	2-Methylnaphthalene 10 U	207-08-9	Benzo(k)fluoranthene 10 U
77-47-4	Hexachlorocyclopentadiene 10 U	50-32-8	Benzo(a)pyrene 10 U
88-06-2	2,4,6-Trichlorophenol 10 U	193-39-5	Indeno(1,2,3-cd)pyrene . . . 10 U
95-95-4	2,4,5-Trichlorophenol 50 U	53-70-3	Dibenz(a,h)anthracene 10 U
91-58-7	2-Chloronaphthalene 10 U	191-24-2	Benzo(g,h,i)perylene 10 U
88-74-4	2-Nitroaniline 50 U		
131-11-3	Dimethyl phthalate 10 U		Nitrobenzene-d5 - SS 78
208-96-8	Acenaphthylene 10 U		2-Fluorobiphenyl - SS 54
606-20-2	2,6-Dinitrotoluene 10 U		Terphenyl-d14 - SS 135
99-09-2	3-Nitroaniline 50 U		Phenol-d5 - SS 40
83-32-9	Acenaphthene 10 U		2-Fluorophenol - SS 58
51-28-5	2,4-Dinitrophenol 50 U		2,4,6-Tribromophenol - SS . 100

- (1) - Cannot be separated from diphenylamine.
- U - Compound analyzed for but not detected.
- B - Compound was detected in QC blank.
- J - Reported value less than quantitation limit.
- S - Surrogate Standard reported as percent recovery.

MSK

**CASE NARRATIVE FOR PESTICIDE/PCB
 GAS CHROMATOGRAPHY SAMPLES**

LABORATORY: CH2M HILL LABORATORIES

CLIENT: CITY OF BOYNTON BEACH

CASE NO. : N/A

CONTRACT NO.: N/A

LAB NO. : 19521

SDG NO.: N/A

I. RECEIPT

A. DATE: September 14, 1991

B. SAMPLE INFORMATION

<u>LAB ID</u>	<u>CLIENT ID</u>	<u>SAMPLE MATRIX</u>	<u>DATE SAMPLED</u>	<u>EXTRACTION DATE</u>	<u>ANALYSIS DATE</u>
19521002	DISPOSAL WELL	WATER	09/12/91	09/16/91	09/25/91
W09161B1	QC BLANK	WATER	NA	09/16/91	09/25/91

C. Documentation

Exceptions : No exceptions were encountered.

II. EXTRACTION

- A. Holding times: All holding times were met.
- B. Extraction
Exceptions : No exceptions were encountered.

III. ANALYSIS

- A. Holding times: All holding times were met.
- B. Analytical
Exceptions : The report limit for endrin aldehyde was elevated for sample 19521002 (DISPOSAL WELL) due to chemical noise not removed by our cleanup procedures.

IV. QUALITY CONTROL

- A. Method Blank : All associated method blanks met acceptable QC criteria.
- B. Surrogate
Recoveries : All samples met acceptable QC limits.
- C. Matrix Spike
Results : Matrix spike results have not been reported with this contract.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.



Herb Kelly
Manager, Organic Division



Date

ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 09/16/91
 Lab Sample ID: 19521002 Sample Matrix: WATER Date Analyzed: 09/25/91
 Client Sample ID: DISPOSAL WELL Percent Moisture: _____ Dilution Factor: 1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L
319-84-6	alpha-BHC	0.01	U			
319-85-7	beta-BHC	0.02	U			
319-86-8	delta-BHC	0.01	U			
58-89-9	gamma-BHC (Lindane)	0.01	U			
76-44-8	Heptachlor	0.01	U			
309-00-2	Aldrin	0.01	U			
1024-57-3	Heptachlor Epoxide	0.01	U			
959-98-8	Endosulfan I	0.02	U			
60-57-1	Dieldrin	0.02	U			
72-55-9	4,4'-DDE	0.02	U			
72-20-8	Endrin	0.02	U			
33213-65-9	Endosulfan II	0.02	U			
72-54-8	4,4'-DDD	0.02	U			
1031-07-8	Endosulfan Sulfate	0.02	U			
50-29-3	4,4'-DDT	0.02	U			
72-43-5	Methoxychlor	0.04	U			
7421-93-4	Endrin Aldehyde	0.05	U			
57-74-9	Chlordane	0.1	U			
01-35-2	Toxaphene	0.5	U			
12674-11-2	Aroclor-1016	0.8	U			
11104-28-2	Aroclor-1221	2	U			
11141-16-5	Aroclor-1232	2	U			
53469-21-9	Aroclor-1242	0.8	U			
12672-29-6	Aroclor-1248	0.4	U			
11097-69-1	Aroclor-1254	0.2	U			
11096-82-5	Aroclor-1260	0.2	U			

	Dibutylchlorendate - SS	104				

- U - Analyzed for but not detected.
- B - Detected in QC blank.
- JX - Detected, concentration estimated.
- SS - Surrogate Standard reported as percent recovery.

Comments: Best reporting limits were not achieved for all compounds due to chemical interference not removed during extract cleanup procedures.

Form I

JMS



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 09/16/91
 Lab Sample ID: W09161B1 Sample Matrix: WATER Date Analyzed: 09/25/91
 Client Sample ID: QC BLANK Percent Moisture: _____ Dilution Factor: 1.0

PESTICIDE / PCB COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L
319-84-6	alpha-BHC	0.01	U			
319-85-7	beta-BHC	0.02	U			
319-86-8	delta-BHC	0.01	U			
58-89-9	gamma-BHC (Lindane)	0.01	U			
76-44-8	Heptachlor	0.01	U			
309-00-2	Aldrin	0.01	U			
1024-57-3	Heptachlor Epoxide	0.01	U			
959-98-8	Endosulfan I	0.02	U			
60-57-1	Dieldrin	0.02	U			
72-55-9	4,4'-DDE	0.02	U			
72-20-8	Endrin	0.02	U			
33213-65-9	Endosulfan II	0.02	U			
72-54-8	4,4'-DDD	0.02	U			
1031-07-8	Endosulfan Sulfate	0.02	U			
50-29-3	4,4'-DDT	0.02	U			
72-43-5	Methoxychlor	0.04	U			
7421-93-4	Endrin Aldehyde	0.02	U			
57-74-9	Chlordane	0.1	U			
01-35-2	Toxaphene	0.5	U			
12674-11-2	Aroclor-1016	0.8	U			
11104-28-2	Aroclor-1221	2	U			
11141-16-5	Aroclor-1232	2	U			
53469-21-9	Aroclor-1242	0.8	U			
12672-29-6	Aroclor-1248	0.4	U			
11097-69-1	Aroclor-1254	0.2	U			
11096-82-5	Aroclor-1260	0.2	U			

	Dibutylchlorendate - SS	90				

- U - Analyzed for but not detected.
- B - Detected in QC blank.
- JX - Detected, concentration estimated.
- SS - Surrogate Standard reported as percent recovery.

Form I

**CASE NARRATIVE FOR HERBICIDES
 GAS CHROMATOGRAPHY SAMPLES**

LABORATORY: CH2M HILL LABORATORIES **CLIENT:** CITY OF BOYNTON BEACH
CASE NO. : N/A **CONTRACT NO.:** N/A
LAB NO. : 19521 **SDG NO.:** N/A

I. RECEIPT

A. DATE: September 14, 1991

B. SAMPLE INFORMATION

<u>LAB ID</u>	<u>CLIENT ID</u>	<u>SAMPLE MATRIX</u>	<u>DATE SAMPLED</u>	<u>EXTRACTION DATE</u>	<u>ANALYSIS DATE</u>
19521002	DISPOSAL WELL	WATER	09/12/91	09/17/91	09/26/91
W09171B1	QC BLANK	WATER	NA	09/17/91	09/26/91

C. Documentation

Exceptions : No exceptions were encountered.

II. EXTRACTION

- A. Holding times: All holding times were met.
- B. Extraction
Exceptions : No exceptions were encountered.

III. ANALYSIS

- A. Holding times: All holding times were met.
- B. Analytical
Exceptions : No exceptions were encountered.

IV. QUALITY CONTROL

- A. Method Blank : All associated method blanks met acceptable QC criteria.
- B. Surrogate
Recoveries : All samples met acceptable QC limits.
- C. Matrix Spike
Results : Matrix spike results have not been reported with this contract.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.



Herb Kelly
Manager, Organic Division



Date



ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 09/17/91
Lab Sample ID: 19521002 Sample Matrix: WATER Date Analyzed: 09/26/91
Client Sample ID: DISPOSAL WELL Percent Moisture: Dilution Factor: 1.0

SDWA HERBICIDE COMPOUNDS

Table with 4 columns: CAS Number, Compound Name, Concentration (ug/L), and Unit. Rows include 2,4-D (2.5 U), Silvex (0.5 U), and 3,5-Dichlorobenzoic acid - SS (95).

- U - Analyzed for but not detected.
B - Detected in QC blank.
JX - Detected, concentration estimated.
SS - Surrogate Standard reported as percent recovery.

Form I

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ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CH2M HILL/MGM Concentration: LOW Date Extracted: 09/17/91
 Lab Sample ID: W09171B1 Sample Matrix: WATER Date Analyzed: 09/26/91
 Client Sample ID: QC BLANK Percent Moisture: _____ Dilution Factor: 1.0

SDWA HERBICIDE COMPOUNDS

CAS Number		ug/L		CAS Number		ug/L
94-75-7	2,4-D	2.5	U			
93-72-1	Silvex	0.5	U			

	3,5-Dichlorobenzoic acid - SS	86				

- U - Analyzed for but not detected.
- B - Detected in QC blank.
- JX - Detected, concentration estimated.
- SS - Surrogate Standard reported as percent recovery.

Form I

GREEN HILL QUALITY ANALYTICS
CHAIN OF CUSTODY RECORD

MIXED #
RMS
PUSH

USE FOR ANALYSES

72

10 LM -

PROJECT NUMBER: **SEF 26410.P1**
PROJECT NAME: **BOYNTON DISPOSAL WELL**
CLIENT NAME: **CITY OF BOYNTON BEACH**
PROJECT MANAGER: **A. Muniz IAFB**
COPY TO: **B. Ziesler IOFB**
REQUESTED COMP. DATE: **STANDARD**
SAMPLING REQUIREMENTS:
SDWA NPDES RCRA OTHER

CLIENT ADDRESS AND PHONE NUMBER: **ON FILE**

ANALYSES REQUESTED:

CONTAINERS	TO LRD	TO PPB
Metals		
PICNOLS		
EOB		
CN		
GROSS & S.D.		
MBAS		
625		
EXTRA SAMPLE?		

FOR LAB USE ONLY

LAB#

LAB#

PROJECT NO.

ACK VERIFIED

QUOTE# BS

NO. OF SAMP PG OF

REMARKS

SIA NO	DATE	TIME	C O M P I B I L	SAMPLE DESCRIPTIONS (12 CHARACTERS)
1	9/7/91	1230	X	BOYNTON DISPOSAL WELL

Received 2 40 ml vials, one preserved, one unpreserved

NOTE: BOTH G2S SAMPLES ARRIVED BROKEN. SAMPLE LOST.

NOTE: RECEIVED OUT OF HOLDING TIME FOR ODOB, COLOR, TUBS, PH & MBAS.

RESULTS TO BE TURNED IN BY: 9/28/91

FILE TIME: 10/1/91

99914

Sample Collected DURING REVERSE AIR CIRCULATION / DIRECT DISCHARGE TO MESA TANKS 3,000 FT

NOTE: PLEASE RUN PRIMARY & SECONDARY DRINKING WATER STANDARDS TO PRIMARY POLLUTANTS

NOTE: FECAL SAMPLES SHIPPED TO GGGTCH LABS / UARB

FOR LAB USE ONLY

LAB# 19521 PAGE 192

PROJ. SEF 26410.P1

ACK CR 9/18 VERIFIED

HAZWRAP/NEESA Y (N)

GC LEVEL 2 3

COC Yes ICE Yes

ANA REQ Yes TEMP 40C

CUST SEAL No PH Native / NA

SAMPLE COND. water

SAMPLED BY AND TITLE: **A. Ziesler I.P.E.**
DATE/TIME: **9/7/91 1230**
RECEIVED BY: **W. Sileo**
DATE/TIME: **9/11/91 0930**
RECEIVED BY LAB: **Fred Reever**
DATE/TIME: **9/10/91 0850**

RELINQUISHED BY: **[Signature]**
DATE/TIME: **9/7/91 1337**
RELINQUISHED BY: **Fred Reever**
DATE/TIME: **9/13/91 11:00**
SAMPLE SHIPPED VIA: **FED-EX**

HAZWRAP/NEESA Y (N)

GC LEVEL 2 3

COC Y ICE Y

ANA REQ Y TEMP

CUST SEAL Y Ph Y

SAMPLE COND. GOOD (EXCEPT AS NOTED)

AIR BILL# 3126545192

ENTERED INTO LIMS RMS

COC REVIEWER 4/29/16/ki

000017

WILL QUALITY ANALYTICS
MAN OF CUSTODY RECORD

LM6

PROJECT NUMBER SEP 26 410.P1		PROJECT NAME BOYNTON BEACH DISPOSAL WELL		CLIENT ADDRESS AND PHONE NUMBER ON FILE		FOR LAB USE ONLY			
CLIENT NAME CITY OF BOYNTON BEACH				# OF CONTAINERS 390 625-6081 + m... SOUR NERS NO. 27	ANALYSES REQUESTED		LAB#		
PROJECT MANAGER A. MUNEZ / DFA		COPY TO: N. ZIEGLER					LAB#		
REQUESTED COMP. DATE STD		SAMPLING REQUIREMENTS SDWA <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER <input type="checkbox"/>					PROJECT NO.		
STA NO.	DATE	TIME	COM P		GRA B	SOIL	SAMPLE DESCRIPTIONS (12 CHARACTERS)	ACK	VERIFIED
1	9/12	1400	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	DISPOSAL WELL	99914	002	
FOR LAB USE ONLY				<p><i>Note different collection dates on 001, & 002 on our #002 use 1400/1500 GRAB for time collected, per S. Harold, MS via LGN</i></p>				REMARKS	
LAB# 19521 VAGE 017								<p><i>These are additional samples for the one that broke in TRAIL LAST WEEK-END</i></p> <p><i>o Samples were collected from a 5 Gall Unpreserved CONTAINER ON SITE</i></p>	
PHONE# SEP 26 410.P1								RESULTS TO DON HASH	
ACK ER VERIFIED ER								QC LEVEL: 1	
HAZWRAP/NEESA Y (1)								DATE DUE: 9/28/91	
QC LEVEL 020								10/1/91	
COC Yes ICE Yes									
ANA REQ Yes TEMP Yes									
CUST SEAL No PH Not									
SAMPLE COND. Water									
SAMPLED BY AND TITLE A. Ziegler / ER2		DATE/TIME 9/12/91 1400		RELINQUISHED BY [Signature]		DATE/TIME 9/12 1700 MS		HAZWRAP/NEESA Y (1)	
RECEIVED BY:		DATE/TIME		RELINQUISHED BY:		DATE/TIME		QC LEVEL 2 3	
RECEIVED BY: [Signature]		DATE/TIME 9/14/91 0930		RELINQUISHED BY: [Signature]		DATE/TIME 9/13/91 1600		COC Y ICE Yes	
RECEIVED BY LAB: [Signature]		DATE/TIME 9-13-91		SAMPLE SHIPPED VIA FED-EX HAND OTHER		AIR BILL# 1244272142		ANA REQ Y TEMP	
REMARKS								CUST SEAL N Ph Y	
								SAMPLE COND. good	
								ENTERED INTO LIMS	
								COC REVIEWED [Signature]	

000018



Engineers
Planners
Economists
Scientists

October 10, 1991

LRD294.10

CH2M HILL
7201 N.W. 11th Place
Gainesville, FL 32605

Attention: Don Hash

RE: Laboratory Reference Number - 30808
Boynton Disposal Well

Dear Mr. Hash:

The results are enclosed for your samples that were received by our laboratory on September 12, 1991.

If you have any questions please contact Mr. Mark Cichy or Ms. Mary Paschke in Client Services.

CH2M HILL stores samples for 30 days after the written report date at no charge. After 30 days, non-hazardous samples are disposed of at no charge. If you require either of the following services you need to notify us within 15 days:

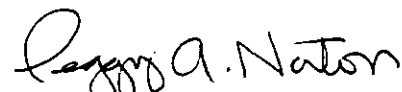
- * Return of samples to the address shown above.
- * Storage of samples at \$5.00/sample/month.

If a sample is determined to be hazardous, we will contact you to discuss disposal options.

Thank you for selecting a CH2M HILL laboratory for your analytical testing needs.

Sincerely,

CH2M HILL QUALITY ANALYTICS LABORATORY


Peggy A. Norton
Senior Data Package Specialist

Encl.

CASE NARRATIVE
General Chemistry
30808

I. Holding Time: All criteria met.

II. Analysis:

- A. Calibration: Acceptance criteria met.
- B. Blanks: Acceptance criteria met.
- C. Matrix Spike: Acceptance criteria met.
- D. Duplicate Analysis: Acceptance criteria met.
- E. Lab Control Sample: Acceptance criteria met.
- F. The Nitrate results are reported as N. To convert to Nitrate as NO₃ multiply the result by 4.43. The primary method for Nitrate is EPA 300.0. The alternate method, EPA 353.3 may be used if the sample can not be analyzed with method 300.0.
- G. Other: None.

III. I certify that this data package is in compliance with the terms and conditions agreed to by the client and CH2M HILL, both technically and for completeness, for other than the conditions detailed above.

SIGNED: Randall L. Wright
Randall L. Wright
General Chemistry Supervisor

DATE: 10/10/91

000001



Engineers
Planners
Economists
Scientists

REPORT OF ANALYTICAL RESULTS

Date: 10/10/91

Client: CH2M HILL/LGN
7201 N.W. 11TH PLACE
GAINESVILLE, FL 32605

Project Number: SEF26410.P1
BOYNTON DISPOSAL WELL
Laboratory Number: 30808
Date Received: 09/12/91

Atten: MR. DON HASH

=====
Sample Description: BOYNTON DIS. LG99914
Laboratory Sample Number: 30808001 Date Collected: 09/07/91 Matrix: WATER
=====

Analytical Parameter	Method	Rep Limit	Result	Units	Ana Date
Gross Alpha	EPA900.0	----	24.1 +/- 20.8	pCi/L	09/30/91
Gross Beta	EPA900.0	----	4640 +/- 260	pCi/L	09/30/91

Results for non-aqueous matrices are based on dry sample weight unless noted otherwise.

Reviewed by:

INRPRPT(v910325)
000002

CHM HILL QUALITY ANALYTICS

CHAIN OF CUSTODY RECORD

4140
PACK
KING

FOR ANALYSIS (72)

PROJECT NUMBER SEP26410.P1		PROJECT NAME BOYNTON DISPOSAL WELL		CLIENT ADDRESS AND PHONE NUMBER ON FILE										FOR LAB USE ONLY								
CLIENT NAME CITY OF BOYNTON BEACH				ANALYSES REQUESTED Metals, Piconols, EOB, CR, GROSS S.D., MBAS, G25, EXTRA SAMPLE?										LAB# 30808								
PROJECT MANAGER A. MUNIZ IOFB		COPY TO: B. Ziesler IOFB												ACK			VERIFIED					
REQUESTED COMP. DATE STANDARD				SAMPLING REQUIREMENTS SDWA <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER <input type="checkbox"/>										PROJECT NO.								
STA NO.				DATE				TIME				CORRECTION		SOIL		SAMPLE DESCRIPTIONS (12 CHARACTERS)				REMARKS		
1				9/7/91				1230				X				BOYNTON DISPOSAL WELL				99914		
																METHOD BLANK				99915		
																RESULTS TO DON HAN				* NOTE: BOTH G25 SAMPLES ARRIVED BROKEN. SAMPLE LOST. (P)		
																DATE DUE: 10/3/91				NOTE: RECEIVED OUT OF HOLDING TIME FOR ODR, COLOR, TURB, PH & MBAS.		
SAMPLED BY AND TITLE B. Ziesler P.E.				DATE/TIME 9/7/91 1230				RELINQUISHED BY [Signature]				DATE/TIME 9/7/91 1337				HAZWRAP/NEEDLE SW (N)						
RECEIVED BY:				DATE/TIME				RELINQUISHED BY:				DATE/TIME				QC LEVEL (V2'S)						
RECEIVED BY: Cindy Barber				DATE/TIME 9/12/91 1500				RELINQUISHED BY: Fred Reeves				DATE/TIME 9/10/91 11:00				COC <input checked="" type="checkbox"/> ICE <input checked="" type="checkbox"/>						
RECEIVED BY LAB: Fred Reeves				DATE/TIME 9/10/91 0850				SAMPLE SHIPPED VIA FED-EX				AIR BILL# 3126545192				ANA REQ <input checked="" type="checkbox"/> TEMP						
REMARKS																CUST SEAL <input checked="" type="checkbox"/> PH <input checked="" type="checkbox"/>						
																SAMPLE COND. GOOD (EXCEPT AS NOTED)						
																ENTERED INTO LIMS						
																COC REVIEWED						

CHAIN OF CUSTODY RECORD

SEE ANALYSES FOR ANALYSES

72

PROJECT NUMBER SEP 26410.P1		PROJECT NAME BOYNTON DISPOSAL WELL		CLIENT ADDRESS AND PHONE NUMBER ON FILE		FOR LAB USE ONLY			
CLIENT NAME CITY OF BOYNTON BEACH				ANALYSES REQUESTED		LAB# NAF 166			
PROJECT MANAGER A. MUNIZ IOFB		COPY TO: B. Ziesler IOFB				LAB#			
REQUESTED COMP. DATE STANDARD		SAMPLING REQUIREMENTS		LAB ID		PROJECT NO.			
		SDWA <input type="checkbox"/> NPDES <input type="checkbox"/> RCRA <input type="checkbox"/> OTHER <input type="checkbox"/>				ACK		VERIFIED	
STA NO.	DATE	TIME	COMP	GRA	SOIL	QUOTE#		BS	
SAMPLE DESCRIPTIONS (12 CHARACTERS)						NO. OF SAMP		PG OF	
1	9/7/91	1230	X			99914		99915	
BOYNTON DISPOSAL WELL						99914		99915	
METHOD BLANK									
* NOTE: BOTH GZS SAMPLES ARRIVED BROKEN. SAMPLE LOST.						REMARKS SAMPLES COLLECTED DURING REVERSE AIR CIRCULATION / DIRECT DISCHARGE TO MUD TANKS 3,000 FT		NOTE: PLEASE RUN PRIMARY & SECONDARY DRINKING WATER STANDARDS TO PRIMARY POLLUTANTS NOTE: FEEL SAMPLES SHIPPED TO GEOTECH LABS / WAB	
SAMPLED BY AND TITLE B. Ziesler I.P.E.		DATE/TIME 9/7/91 1230		RELINQUISHED BY 		DATE/TIME 9/7/91 1337		HAZWRAP/NEESA Y <input checked="" type="checkbox"/> (N)	
RECEIVED BY:		DATE/TIME		RELINQUISHED BY:		DATE/TIME		QC LEVEL <input checked="" type="checkbox"/> 1 2 3	
RECEIVED BY:		DATE/TIME		RELINQUISHED BY: Fred Roover		DATE/TIME 9/10/91 11:00		COC Y ICE Y	
RECEIVED BY LAB: Fred Roover		DATE/TIME 9/10/91 0850		SAMPLE SHIPPED VIA UPS BUS <input checked="" type="checkbox"/> FED-EX HAND OTHER		AIR BILL# 3126545192		ANA REQ Y TEMP	
REMARKS						CUST SEAL Y Ph Y		SAMPLE COND. GOOD (EXCEPT AS NOTED)	
						ENTERED INTO LIMS		COC REVIEW	

CITY OF BOYNTON BEACH SEF 26410.P1

TO LMG 608 PEST/PCB (COMBINED WITH 625 SAMPLE)

TO LMG 624

TO LMG 625 - (SAMPLES BROKE IN TRANSIT - B. ZIEGLER WILL SEND MORE)

TO LMG SDWA PEST/HERB

EDB ✓

CN ✓

PHENOLS ✓

FR- ✓

CR- ✓

ODOR * ✓

ALK * ✓

COLOR * ✓

SO₄ ✓

Ca HARD ✓

TURB * ✓

pH * ✓

TDS ✓

NO₂3 ✓

TO PPB MBAS * ✓

TO LED GROSS & Y.B ✓

* RECEIVED OUT OF HOLDING TIME

Engineer's Daily Reports

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

January 1, 1992

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

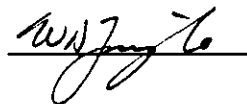
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

Drilling activities have been completed as of this date. The Contractor began demobilization of the drilling rig and equipment. No other work was performed during this report.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 31, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler, S. Skehan and E. Rahrig arrived on site at 0830 hours to observe the annular casing pressure test. The pressure test commenced at 0848 hours by pressurizing the annulus between the 13 3/8 inch liner and the 16 inch casing to 156 psi. Care was taken to insure that all the air was removed from the system. The pressure was bled down to 150 psi and monitored for one hour. A 200 psi calibrated Heise gauge was used during the test to monitor pressure changes. At the end of one hour, the annulus had not lost any pressure. Annular pressure was then bled down to zero. The test was successfully completed at 0957 hours.


B. Ziegler, S. Skehan and E. Rahrig left the site at 1010 hours.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.

SURFICIAL MONITOR WELLS

The surficial monitor wells were purged and sampled one last time and analyzed for temperature, conductivity, and chlorides.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 30, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

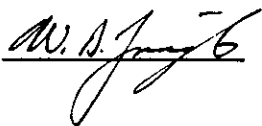
B. Ziegler arrived on site at 0800 hours. Florida Geophysical Logging was on site performing the background gamma ray and temperature logs of the complete well. A background geiger counter survey was also performed at 0830 hours. The ejector tool was loaded with 10 millicurie of tracer (Iodine 131).

E. Rahrig/FDER arrived on site at 1045 hours. The radioactive tracer test commenced at 1212 hours. One static and two dynamic (low rate and high rate) tests were performed. The high rate test was completed at 1842 hours when flushing of the well began at a rate of approximately 2,200 gpm. During flushing of the well, the ejector tool was tripped to the bottom of the well where the remainder of tracer material was discharged. A final gamma ray log was performed from the injection zone up to the surface. The test was successfully completed at 1920 hours. No indication of upward movement of tracer either in the casing or behind the base of the casing was noted during the test.

A pressure test of the annulus between the 13 inch liner and the 16 inch casing was attempted. The test was terminated due to an increase in pressure in the annulus that was attributed to the increasing temperature of the water pulled from the canal and pumped down the well. The temperature of the water in the canal was 71.6 degrees F while the temperature in the well was approximately 72 degrees F.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.


W. S. Jones

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 29, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed during this shift report. The Contractor began installing wellhead piping and prepared for the radioactive tracer survey scheduled for tomorrow.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.

W.S.Z.

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 28, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

Background readings for the injection test commence at 0300 hours. B. Ziegler arrived on site at 0615 hours and reviewed test equipment for the injection test. Florida geophysical logging was on site to perform logging during test.

The injection test commenced at 0720 hours. The test was performed at three step injection rates (1,380 gpm, 2,300 gpm, and 3,000 gpm). Florida Geophysical Logging performed a flow log and temperature log during the second step of the test. The injection test was completed at 1600 hours. A maximum injection pressure of 48 psi was reached during the 3,000 gpm injection rate. The maximum sustained injection pressure was 42 psi.

Pressures on the disposal and dual-zone monitor well was monitored for the remainder of the shift. The injection equipment was to remain in place until after the radioactive tracer survey was completed. No other work was performed during the shift.

B. Ziegler left the site at 1700 hours.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.

W.S. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 27, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

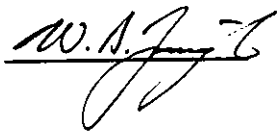
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Contractor completed set up for the injection test and performed a preliminary injection test. Injection pumps produced in excess of the required 3,000 gpm. Water for the injection test will be pulled from the E-3 canal to the west of the site and pumped into storage tanks on the concrete drilling pad. A second set of pumps will pull water from the storage tanks and pump down the disposal well.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 26, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed during this shift report. The Contractor continued to set up for the injection test.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.

10.1.7.76

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 25, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

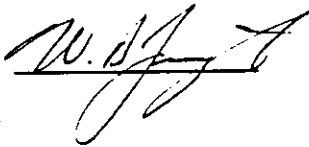
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed during this shift.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 24, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed during this shift. The Contractor continued to set up for the injection test.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



W. A. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 23, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler was on site from 1130 hours to 1200 hours to observe set up for injection test.


B. Ziegler arrived on site at 1415 hours. Florida Geophysical Logging set up and began running final background logs (gamma ray, electric, fluid resistivity, and caliper) at 1450 hours. The background logs were completed at approximately 2200 hours.

B. Ziegler rescheduled the radioactive tracer survey and pressure test with E. Rahrig of FDER for December 30, 1991.

The Contractor continued setting up for the injection test through the shift.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 22, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0830 hours. The Weatherford casing crew was on site setting up to install the 13 inch liner.

Installation of the liner commenced at 0930 hours and was completed at 1600 hours. The Contractor then pumped the corrosion inhibitor which had been placed in a storage tank during the corrective action plan. Approximately 8,000 gallons of the inhibitor were pumped down the annulus from the surface with the tie back assembly one foot above the borehole receptor. A total pressure of 33 psi was observed during pumping of the inhibitor.

The liner was then set in place with 20,000 lbs resting on the Baker packer assembly. The remainder of weight (172,000 lbs) was placed on the landing assembly at the surface.

At 1853 hours, a preliminary pressure test was conducted on the annulus between the 13 inch liner and the 16 inch casing. The annulus was pressurized to 157 psi and monitored for one hour. A total drop 0.5 psi was observed after one hour.

B. Ziegler left the site at 2035 hours. The well was secured for the night.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 21, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

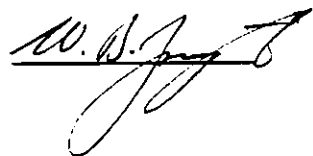
DISPOSAL WELL :

No drilling activities were performed during this shift report. Contractor began setting up for the injection test. Water will be pulled from the adjacent Lake Worth Drainage District canal to the west of the site.

The Weatherford casing crew was scheduled for arrival late during this shift.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 20, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

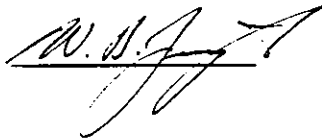
DISPOSAL WELL

Florida Geophysical set up and began a video survey of the complete well at 0900 hours. B. Ziegler arrived on site at 0930 hours to observe the survey. The video survey was completed at 1200 hours when B. Ziegler left the site.

The remainder of the shift was spent setting up to install the 13 inch liner scheduled for Sunday, December 22, 1991.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 19, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

This shift report began with the Contractor fabricating a wall hook to remove the material wedged between the borehole receptor and the 16 inch casing. Fabrication of the tool was completed at 1000 hours and was then tripped in the hole on the bottom of drill pipe.

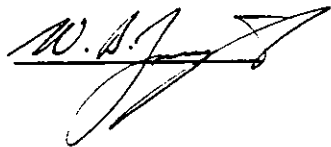
B. Ziegler was on site from 1300 hours to 1320 hours to observe the Contractor remove the material wedged between the borehole receptor and the 16 inch casing. The fabricated wall hook and a video camera were used simultaneously to complete the task.

B. Ziegler canceled the pressure test with E. Rahrig of FDER that was scheduled for following day.

At 1630 hours, the Contractor began tripping out of the hole with the drill pipe. The well was secured at 1900 hours when the Contractor began flushing the well with potable water to provide a clear picture during the video survey of the complete well.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 18, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

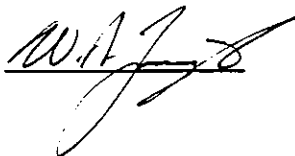
B. Ziegler spoke with J. Brantley at 0800 hours, a TV survey will be run to inspect the Baker Packer Assembly to be sure nothing had fallen between the borehole receptor and the 16 inch casing. The drill pipe was tripped in to 2,700 feet and potable water was pumped down the drill pipe to provide a clear picture.

The TV survey indicated that a tooth from the junk basket used to retrieve the K-Trol had lodged between the borehole receptor and the 16 inch casing. The Contractor will attempt to remove it with reverse-air circulation.

J. Brantley informed B. Ziegler at 2000 hours that reverse-air was unsuccessful. A wall hook will be fabricated tomorrow to remove the material. The site was secured at 2100 hours.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 17, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0900 hours. The schedule for completion of the well was reviewed with J. Brantley. Installation of the 13 inch liner was scheduled for December 19, 1991 with the final pressure test the following day at 1300 hours. The injection test would be run over the weekend if possible with the RTS on December 23, 1991.

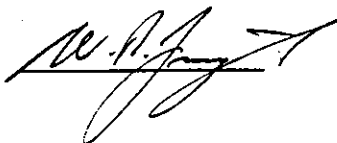
B. Ziegler left the site at 1100 hours. The Contractor continued tripping in the hole with an inflatable packer to pressure test the 16 inch casing from the surface to just above the Baker Packer Assembly.

B. Ziegler returned to the site at 1630 hours. The inflatable packer was set at 2,694 feet. The casing was pressurized to 150.5 psi. The pressure test commenced at 1805 hours and was completed at 1905 hours with at 1.0 psi drop in pressure. B. Ziegler left the site at 1930 hours. The well was left pressurized to monitor pressure through the night.

The pressure reading at 2100 hours was 148.5 psi. No other work was performed during this shift.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 16, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0815 hours. Contractor was setting up to install the Homco, Inc. internal casing patch. R. Sevin was on site as the Homco representative.

A. Mueller and E. Rahrig of FDER were on site from 0845 hours to 0930 hours to observe the internal casing patch and installation.

At 1030 hours, the Contractor began applying a fiberglass adhesive to the outside of the patch. Installation of the patch commenced at 1100 hours. E. Rahrig returned to the site at 1115 hours.

The bottom of the internal casing patch was set at 2,244 feet (top of patch at 2,214 feet) at 1450 hours. Setting of the patch commenced at 1455 hours and was completed at 1630 hours.

B. Ziegler and E. Rahrig left the site at 1630 hours. A pressure test would be conducted tomorrow to confirm sealing of the pin-hole leak.

The remainder of the shift was spent tripping out of the hole.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 15, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0930 hours to observe a pressure test on the 16 inch casing. The inflatable packer had been installed to a depth of 2,257 feet, 27 feet below the pin-hole leak. At 1349 hours, the casing was pressurized to 100 psi. The pressure test commenced at 1352 hours and was completed at 1452 hours with a drop in pressure of 0.5 psi.

FDER was notified that the pressure test held and that installation of the internal casing patch would commence at 0900 hours tomorrow. B. Ziegler left the site at 1515 hours.

The remainder of the shift was spent tripping the inflatable packer out of the hole. The well was secured at 1700 hours.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 14, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

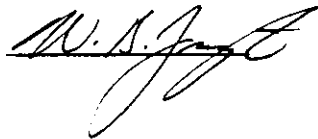
B. Ziegler arrived on site at 1115 hours. The Contractor was preparing the 16 inch casing from 2,212 feet to 2,252 feet with a casing scrapper. A slug of salt water was mixed and pumped down the 16 inch casing this morning to kill the artesian head remaining on the well. B. Ziegler left the site at 1150 hours.

The casing scrapper was removed from the well at 1430 hours. B. Ziegler returned to the site at 1540 hours. The Contractor was installing an inflatable packer to test effectiveness of the K-Trol. Work was to be stopped no later than 2100 hours. B. Ziegler left the site at 1615 hours.

The packer was tripped in the hole to 2,257 feet and the well secured for the night at 2100 hours.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

December 13, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

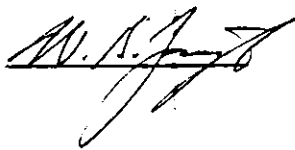
This shift report began with the well sealed, waiting on the Health Unit to determine what samples needed to be collected from the well. At 1345 hours, the Contractor began tripping the inflatable packer out of the hole through a stripping head (disposal well had an artesian head on it).

B. Ziegler received a phone call from Mr. A. LasCasas at 1645 hours. He stated that the Health Unit could not require that samples be collected from the well or the standing water to the north of the drilling pad.

After reviewing the conversation with the City, B. Ziegler informed the Contractor (1700 hours) to proceed with construction activities and to prepare for installation of the internal casing patch. The remainder of the shift was spent killing the artesian head on the disposal well with waters pulled from the lower monitor zone.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 19, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Halliburton and Homco, Inc.

B. Ziegler arrived on site at 1130 hours. The Contractor was set up to determine the volume of fluid that would pass through the pin-hole leak at 2,229.31 feet at a given pressure. The casing was pressurized to 150 psi and maintained for 1 hour while monitoring the volume of fluid lost. No fluid was lost over the 1 hour period. The procedure was repeated for 30 minutes and still had no fluid lost. The Contractor began flushing the 16 inch casing with fresh water in the area where the pin-hole leak occurred. This may help unclog the leak. It may be necessary to jet the area if flushing is unsuccessful. B. Ziegler left the site at 1330 hours.

The remainder of the shift was spent flushing the 16 inch casing with fresh water in the area of the pin-hole leak.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 18, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Halliburton and Homco, Inc.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig complete.

W. H. Jones

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 17, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

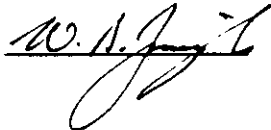
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Halliburton and Homco, Inc.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 16, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

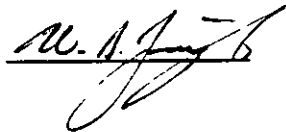
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Halliburton and Homco, Inc.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig complete.


W. A. Jones

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 15, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Halliburton and Homco, Inc.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig complete.

W. H. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 14, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

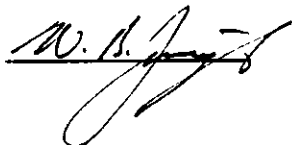
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Halliburton and Homco, Inc.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig complete.



W. B. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 13, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

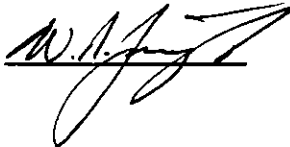
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Haliburton and Homco, Inc.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig complete.



W. A. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 12, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Haliburton and Homco, Inc.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 11, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

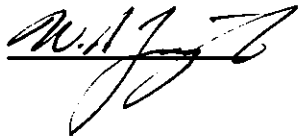
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Haliburton and Homco, Inc.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 10, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

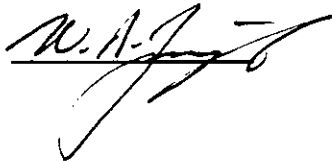
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Haliburton and Homco, Inc.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 9, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed during this shift. The Contractor continued to coordinate corrective action activities with Haliburton and Homco, Inc.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 8, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

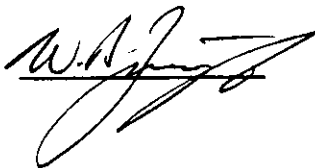
DISPOSAL WELL

At 0730 hours, the Contractor began tripping tubing in the 16 inch casing to tag the gravel cap placed on the inflatable packer. The gravel was tagged at 2,246 feet below land surface and the tubing was tripped out of the hole. The shift was spent setting up to squeeze the K-Trol-C.

The Contractor set up the 16 inch diameter casing to measure the volume of fluid lost through the pin-hole leak (2,229.31 feet bls) at a given pressure. The casing was pressurized to 150 psi and maintained for 1 hour while measuring the volume of fluid lost out of a 55 gallon storage tank. After one hour of monitoring, the volume lost was 4.5 gallons. The test was repeated for one hour maintaining 150 psi. A total of 4.5 gallons of water were lost. No other testing was performed on the well during the shift.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete. The monitor well wellhead was sandblasted and primed to prevent rusting.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 7, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

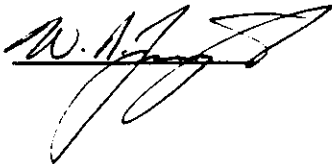
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Contractor continued to coordinate corrective action activities with Homco, Inc. and Halliburton Services, Inc. An inflatable packer was set in place at 2,255 feet below land surface. The 2 3/8 inch diameter tubing was then unscrewed from the packer and 9 feet of gravel was tremied on top of the packer to seal it. The remainder of the shift was spent tripping the tubing out of the hole. The well was secured for the night at 2100 hours.

DUAL-ZONE MONITORING WELL

Demobilization of the drilling rig complete.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 6, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor continued to coordinate corrective action activities with Homco, Inc. and Halliburton Services, Inc.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig continued.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 5, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Contractor continued to coordinate corrective action activities with Homco, Inc. and Halliburton Services, Inc.

B. Ziegler arrived on site at 0850 hours. Schlumberger Well Services began the caliper log of the 16 inch casing at 0845 hours concentrating on the 50 foot interval above and below the pin-hole leak (2,229 feet). The caliper log was completed at 1130 hours. B. Ziegler left the site at 1145 hours. No other drilling activities were performed on the well during this shift report.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig continued.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 4, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

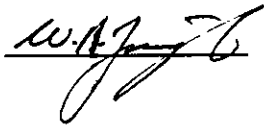
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor continued to coordinate corrective action activities with Homco, Inc. and Halliburton Services, Inc.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig continued.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 3, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor continued to coordinate corrective action activities with Homco, Inc. and Halliburton Services, Inc.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig continued.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 2, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor continued to coordinate corrective action activities with Homco, Inc. and Halliburton Services, Inc. A caliper log will be performed by Schlumberger Well Services on November 5, 1991 to size the internal casing patch.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig continued.

W. A. Jones

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

November 1, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

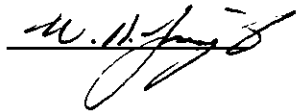
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor received written authorization from the Engineer to proceed with the corrective action plan to repair the pin-hole leak in the 16 inch casing. Scheduling of Homco, Inc. and Halliburton Services, Inc. began.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig continued.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 31, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. Demobilization of the drilling rig continued.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 30, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. B. Ziegler and A. Muniz on site from 1330 to 1530 hours. Demobilization of the drilling rig continued.

W. B. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 29, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift.

W. B. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 28, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

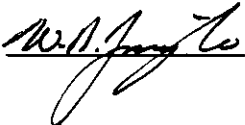
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. B. Ziegler on site from 1400 to 1500 hours. The Contractor continued to demobilize the drilling rig.

A handwritten signature in black ink, appearing to read "B. Ziegler", is written over a horizontal line.

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 27, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

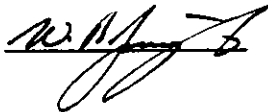
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 26, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 25, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

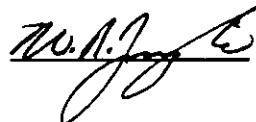
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 24, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 23, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

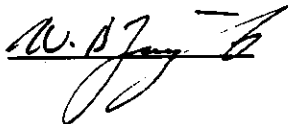
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 22, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

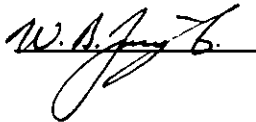
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 21, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

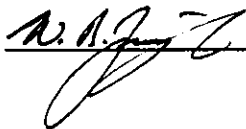
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 20, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

The Contractor began setting up to air develop the lower monitor zone at 0700 hours. Development of the lower monitor zone commenced at 0800 hours. Waters produced during development were pumped down the concentrated disposal well. Development was completed at 1700 hours.

A two month long term development program will commence once the concentrate disposal well is complete to establish background parameter levels for the upper and lower monitor intervals.

No other drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 19, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

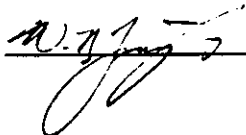
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

No drilling activities were performed during the shift. The Contractor began demobilizing the drill rig during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 18, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

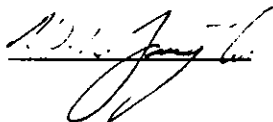
No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

DUAL-ZONE MONITORING WELL

B. Ziegler arrived on site at 1300 hours. Florida Geophysical Logging was setting up to perform logging on the lower zone of the monitor well. Logging commenced at 1330 hours and was completed at 1730 hours. Gamma ray and caliper logs were performed.

B. Ziegler left the site at 1800 hours. The well was shut in and secured for the night.

No other drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 17, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift. The Contractor is waiting for approval to proceed with corrective action plan.

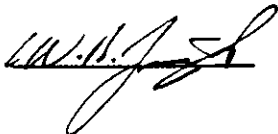
DUAL-ZONE MONITORING WELL

The Contractor resumed drilling of the lower monitor zone at 1300 hours at a depth of 1,826 feet. The borehole remained open overnight from 1,800 to 1,826 feet. A total depth of 1,855 feet was reached at 1530 hours. The borehole remained open and the drill string was tripped out of the hole.

B. Ziegler arrived on site at 1630 hours. The Contractor had brought the lower zone alive (flowing). The flow rate was estimated by closing the wellhead in and timing flow through a 2 inch gate valve. Flow was estimated to be approximately 50 gpm. Conductivity of the purged water was 22,000 umhos/cm (TDS approximately 16,000 mg/l). The Contractor was informed that the monitor well rig could be demobilized.

B. Ziegler left the site at 1800 hours. The well was shut in and secured for the night.

No other drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 16, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift.

DUAL-ZONE MONITORING WELL

The lower monitor zone filled in over night. Redrilling of the lower monitor zone from a depth of 1,800 feet began at 1000 hours. Total depth of 1,850 feet was reached at about 1600 hours. The drill string was tripped up into the 6 inch casing and the well secured for the night.

No other drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 15, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

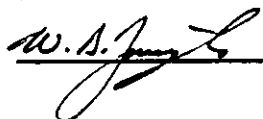
No drilling activities were performed on the well during this shift.

A meeting was held at FDER's office between the City, the Contractor, and the Engineer to review the corrective action plan for the pin-hole leak in the 16 inch casing.

DUAL-ZONE MONITORING WELL

Drilling of the lower monitor zone resumed at a depth of 1,790 feet at 0730 hours. Total depth of 1,850 feet was reached at about 1630 hours. The drill string was tripped up into the 6 inch casing and the well secured for the night.

No other drilling activities were performed during the shift.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 14, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift.

DUAL-ZONE MONITORING WELL

The Contractor fabricated the monitor well wellhead in accordance with the specifications from 0700 to 1400 hours at which time the Contractor began drilling out the cement plug at the base of the 6 inch casing. Drilling was stopped at a depth of 1,790 feet and the well secured in case the lower zone flowed.

Drilling will resume tomorrow.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 13, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

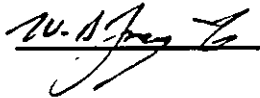
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift. The lower monitor zone will be drilled out to approximately 1,850 feet on October 14, 1991.


W. S. Jones

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 12, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift. The lower monitor zone will be drilled out to approximately 1,850 feet on October 14, 1991.

W. D. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 11, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift.

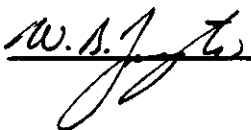
DUAL-ZONE MONITORING WELL

This shift report commenced with the Contractor circulating the 6 inch casing with fresh water in preparation for the casing pressure test. Circulation of the 16 inch casing continued until 1100 hours at which time the Contractor unscrewed the kelly and left the drill pipe in the well. The header assembly was then welded in place and a preliminary pressure test was conducted, 1215 hours. The preliminary test had a decrease in pressure from 102 to 101 psi in 40 minutes.

B. Ziegler arrived on site at 1245 hours while the preliminary pressure test was being conducted. E. Rahrig and T. Ferrell of FDER arrived on site at 1320 hours. The Contractor pressurized the casing from 0 to 122 psi with a high pressure pump. The pressure was bled off to 100 psi. The pressure test commenced at 1333 hours and was completed at 1433 hours with a final gauge reading of 97.5 psi (drop of 2.5 psi), within the 5 percent tolerance. A summary of the pressure test is attached. The pressure was then bled off in the presence of FDER. Approximately 1.0 gallon of water was bled off. The Contractor removed the header assembly, screwed the kelly onto the drill pipe in the 6 inch casing and picked it up off of the cement plug. The well was then secured for the day.

FDER left the site at 1450 hours. B. Ziegler left the site at 1515 hours. The lower monitor zone will be drilled out to approximately 1,850 feet on October 14, 1991.

No other drilling activities were performed during this shift report.





HEADER PRESSURE DURING TESTING

Date 10/11/91WELL MWTime start 1330Time finish 1433

Time	Total minutes	Header Pressure (PSIG)	Comments
1330	0	0	Pressurize 6" casing w/ High Pressure Pump
1331	0	122	Bleed Pressure Back To 100 PSI
1333	0	100.0	START PRESSURE TEST
1338	5	100.0	
1343	10	99.5	
1348	15	99.0	
1353	20	99.0	
1358	25	99.0	
1403	30	99.0	
1408	35	98.5	
1413	40	98.0	
1418	45	98.0	
1423	50	98.0	
1428	55	97.75	
1433	60	97.50	END OF TEST, TEST SUCCESSFUL WITHIN 5% TOLERANCE
			- CASING WAS BLEED OFF, APPROXIMATELY 1 GALLON OF WATER
			- HEADER WAS CUT OFF AND KELLY WAS TRAPPED IN AND SCREWED ONTO DRILL PIPE LEFT IN HOLE

Gauge SERIAL No. 910410 BIC

Observes

ED RARRIG / FNERTOM FARRELL / FNERBART ZIEGLER / CHZMTHL W.J.KEVIN GREVEL / YBWO

Form No. 3271

Rev 10/90

Test Equipment INSPECTION CERTIFICATION

Customer: Youngquist Brothers, Inc
 BIC W/O No. 01740
 Item: Pressure Gauge
 Mfg. Ametek U.S. Gauge
 Part/Model No. 0-160 PSI
 Serial No. 910410B1C

This unit is Certified to be within manufacturer's specifications, except as noted:

And the accuracy is traceable to the N.I.S.T. (formerly NBS), or reference standards based upon fundamental constants of nature.

Signed: *Donnette Long*
 Date: 9-23-91

BARFIELD INSTRUMENT CORPORATION

4101 N.W. 29th Street
 Miami, FL 33142
 XBIR995K

1478 Central Avenue
 East Point, GA 30344
 XBID995K

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 10, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift.

DUAL-ZONE MONITORING WELL

B. Ziegler arrived on site at 1500 hours. Stage No. 21 was tagged at a total depth of 1,084 feet below land surface. The upper monitor zone will remain open from 970 feet to 1,084 feet.

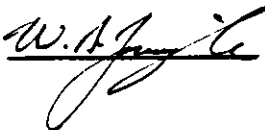
Florida Geophysical Logging began the cement bond log of the 6 inch casing at 1515 hours and completed the log at 1550 hours.

Pressure testing of the 6 inch casing was scheduled for 1300 hours. FDER was confirmed.

The Contractor tripped in with the drill string to the top of the cement plug and began circulating the 6 inch casing with fresh water in preparation for the pressure test.

B. Ziegler left the site at 1630 hours. The remainder of the shift was spent circulating the 6 inch casing with fresh water.

No other drilling activities were performed during this shift report.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 9, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift.

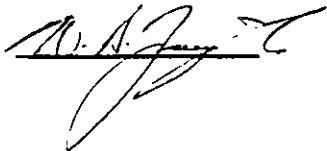
DUAL-ZONE MONITORING WELL

B. Ziegler arrived on site at 1315 hours. Stage No. 20 was tagged at a depth of 1,113 feet below land surface. Florida Cementing began the 21th stage of cementing on the 6 inch casing at 1319 hours and completed the operation at 1329 hours. Cement was pumped down one tremie line because of the small volume of cement that was placed. The tremie line was placed approximately 10 feet above the tag. A total of 10 barrels (48 sacks) of neat cement were pumped.

Pressure test of the 6 inch casing was rescheduled with FDER for 1300 hours tomorrow.

B. Ziegler left the site at 1420 hours.

No other drilling activities were performed during this shift report.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 8, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

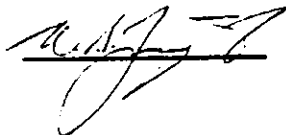
No drilling activities were performed on the well during this shift.

DUAL-ZONE MONITORING WELL

A. Muniz arrived on site at 1130 hours. Stage No. 19 was tagged at a depth of 1,130 feet below land surface. Florida Cementing began the 20th stage of cementing on the 6 inch casing at 1155 hours and completed the operation at 1202 hours. Cement was pumped down one tremie line because of the small volume of cement that was placed. The tremie line was placed approximately 10 feet above the tag. A total of 10.5 barrels (50 sacks) of neat cement were pumped.

A. Muniz left the site at 1400 hours.

No other drilling activities were performed during this shift report.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 7, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift.

DUAL-ZONE MONITORING WELL

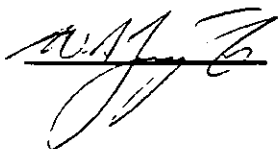
B. Ziegler arrived on site at 0745 hours. Stage No. 17 was tagged at a depth of 1,228 feet below land surface. Florida Cementing began the 18th stage of cementing on the 6 inch casing at 0750 hours and completed the operation at 0806 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag. A total of 16 barrels (76 sacks) of neat cement were pumped. B. Ziegler left the site at 1134 hours.

B. Ziegler returned to the site at 1430 hours. Stage No. 18 was tagged at a depth of 1,187 feet below land surface. Florida Cementing began the 19th stage of cementing on the 6 inch casing at 1520 hours and completed the operation at 1548 hours. Cement was pumped down one tremie line because of the small volume of cement that was placed. The tremie line was placed approximately 10 feet above the tag. A total of 11 barrels (52 sacks) of neat cement were pumped.

Pressure testing of the 6 inch casing was rescheduled with FDER for 0700 on October 10, 1991.

B. Ziegler left the site at 1615 hours.

No other drilling activities were performed during this shift report.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 6, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

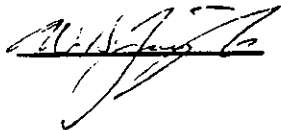
DISPOSAL WELL

No drilling activities were performed on the well during this shift.

DUAL-ZONE MONITORING WELL

S. Skehan arrived on site at 0700 hours. Stage No. 16 was tagged at a depth of 1,275 feet below land surface. Florida Cementing began the 17th stage of cementing on the 6 inch casing at 0800 hours and completed the operation at 0815 hours. Cement was pumped down one tremie line because of the small volume of cement that was place. The tremie line was placed approximately 10 feet above the tag. A total of 11 barrels (52 sacks) of neat cement were pumped. S. Skehan left the site at 0820 hours.

No other drilling activities were performed during this shift report.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 5, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

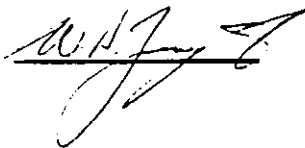
No drilling activities were performed on the well during this shift.

DUAL-ZONE MONITORING WELL

S. Skehan arrived on site at 0700 hours. Stage No. 15 was tagged at a depth of 1,340 feet below land surface (no fill up with last three lifts). The Contractor placed (tremied) gravel from 1,340 feet up to 1,334 feet to prevent further loss of cement.

Florida Cementing began the 16th stage of cementing on the 6 inch casing at 1130 hours and completed the operation at 1155 hours. Cement was pumped down one tremie line because of the small volume of cement that was placed. The tremie line was placed approximately 10 feet above the tag. A total of 11 barrels (52 sacks) of neat cement were pumped. S. Skehan left the site at 1205 hours.

No other drilling activities were performed during this shift report.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 4, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the well during this shift.

DUAL-ZONE MONITORING WELL

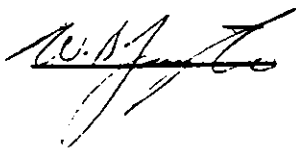
S. Skehan arrived on site at 0700 hours. Stage No. 13 was tagged at a depth of 1,340 feet below land surface (no fill up). Florida Cementing began the 14th stage of cementing on the 6 inch casing at 0700 hours and completed the operation at 0735 hours. Cement was pumped down one tremie line because of the small volume of cement that was placed. The tremie line was placed approximately 10 feet above the tag. A total of 10 barrels (48 sacks) of neat cement were pumped. S. Skehan left the site at 0735 hours.

B. Ziegler arrived on site at 1400 hours. Stage No. 14 was tagged at 1,340 feet (no fill up). Florida Cementing began the 15th stage of cementing at 1405 hours and completed the operation at 1413 hours. Cement was pumped down one tremie line because of the small volume of cement that was placed. The tremie line was placed approximately 10 feet above the tag. A total of 13 barrels (40 sacks) of 8 percent bentonite cement were pumped.

FDER was scheduled for pressure testing the 6 inch casing on October 7, 1991 at 1000 hours. Stage No. 16 of cementing was scheduled for 0730 hours tomorrow.

No other drilling activities were performed during this shift report.

B. Ziegler left the site at 1600 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 3, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

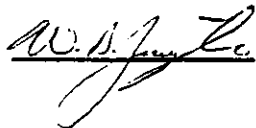
DISPOSAL WELL

The Contractor performed a video survey of the 16 inch casing of the disposal well during this shift. The survey was conducted to inspect the casing joint at 2,231 feet and the Baker packer assembly at 2,720 feet. No other drilling activities were performed on the well during this shift.

A conference call was held between J. Brantley, J.I. Garcia-Bengochea, P. Waller, A. Muniz, and Haliburton services to discuss the corrective action plan to repair the leak in the 16 inch casing.

DUAL-ZONE MONITORING WELL

A. Muniz arrived on site at 1100 hours. Stage No. 12 was tagged at a depth of 1,346 feet below land surface. Florida Cementing began the 13th stage of cementing on the 6 inch casing at 1120 hours and completed the operation at 1130 hours. Tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag. A total of 28.5 barrels (136 sacks) of neat cement were pumped. No other drilling activities were performed during this report.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 2, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

This report commenced with the Contractor monitoring flow from the 16 inch casing with the inflatable packer set at 2,230 feet. At 0005 hours, the 16 inch casing was pressurized to 112 psi. The casing dropped to 58 psi in one hour. At 0100 hours, the Contractor began tripping out inflatable packer out of the hole.

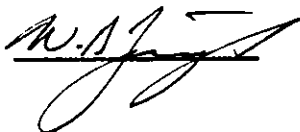
The inflatable packer was set on the ground at 1300 hours and the well secured. No other work was performed on the well during this shift.

DUAL-ZONE MONITORING WELL

P. Linton arrived on site at 1635 hours. The top of the 11 stage of cement was tagged at 1,353 feet below land surface with both tremie lines. Florida Cementing, Inc. began the 12 stage of cement at 1643 hours and completed the operation at 1651 hours. Cement was pumped down one tremie line because of the small volume of cement that was placed. A total of 11 barrels (52 sacks) of neat cement were pumped.

Florida Cementing began pumping the 11 stage of cement at 1520 hours and completed the operation at 1529 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag. A total of 9.6 barrels (46 sacks) of neat cement were pumped. The remainder of the shift was spent waiting on the cement to set.

P. Linton left the site at 1709 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

October 1, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

This report commenced with the Contractor monitor pressure on the 16 inch casing with the inflatable packer set at 2,225 feet. The pressure was monitored until 0700 hours. The casing dropped in pressure from 108 psi to 100 psi, in the last 8 hours. B. Ziegler was on site from 0830 hours to 0945 hours to review testing progress.

At 1800 hours, the Contractor reset the inflatable packer at 2,243 feet in the 16 inch casing and monitored for flow. The 16 inch casing flowed approximately 1 quart in 16 minutes. The 16 inch casing was pressurized to 100 psi and monitored for one hour. The pressure dropped to 54 psi. The casing was repressurized to 100 psi at 2000 hours and monitored for one hour. The casing dropped to 61 psi.

The Contractor reset the inflatable packer at 2,230 feet (2200 hours) and monitored for flow. The casing flowed at approximately 1 quart in 16 minutes.

At 2300 hours the inflatable packer was reset at 2,229 feet in the 16 inch casing. The casing did not flow. The packer was then reset at 2,230 feet to confirm flow. The 16 inch casing flowed at approximately 1 quart in 16 minutes. This shift report was concluded with the Contractor monitoring flow from the 16 inch casing.

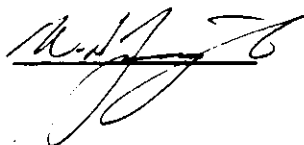
DUAL-ZONE MONITORING WELL

T. Sharp arrived on site at 0800 hours. At 0830, the Contractor began placing gravel with a tremie line in the annulus between the 6 inch and 16 inch casing. Gravel was started at 1,378 feet. The Contractor continued to add gravel and kill artesian flow with salt water until 1505 hours. A total of approximately 80 cubic feet of gravel was placed. The top of the gravel was tagged at 1,370 feet.

Florida Cementing began pumping the 11 stage of cement at 1520 hours and completed the operation at 1529 hours. Two tremie lines were placed 180 degrees apart approximately 10

feet above the tag. A total of 9.6 barrels (46 sacks) of neat cement were pumped. The remainder of the shift was spent waiting on the cement to set.

T. Sharp left the site at 1550 hours.

A handwritten signature in black ink, appearing to read "T. Sharp", with a horizontal line drawn through the middle of the signature.

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 30, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

This report began with the Contractor maintaining 100 psi on the 16 inch casing. At 0400 hours, the pressure was still bleeding off. The inflatable packer was reset at 2,675 feet. The 16 inch casing continued to flow at approximately 1 quart in 23 minutes. The 16 inch casing was shut in and monitored for a pressure increase. The pressure increased 7 psi in 2 hours with no Contractor influence. The pressure on the inflatable packer was constant.

B. Ziegler arrived on site a 1030 hours. The Contractor reset the inflatable packer at 1,900 feet in the 16 inch casing and monitored for flow at 1100 hours. No flow was detected for 2 hours. The 16 inch casing was then pressurized to 101 psi and monitored for one hour. The casing lost only 1 psi. B. Ziegler left the site at 1100 hours.

At 1600 hours, the Contractor reset the inflatable packer at 2,340 feet in the 16 inch casing and monitored for flow from the 16 inch casing. The casing flowed approximately 1 quart in 18 minutes.

The following is a summary of the inflatable packer sets that were performed during the remainder of the shift:

1700 hours	Set packer at 2,090 feet, no flow from 16 inch casing
1800 hours	Set packer at 2,215 feet, no flow from 16 inch casing
1900 hours	Set packer at 2,278 feet, 16 inch casing flowed approximately 1 quart in 21 minutes
1930 hours	Set packer at 2,264 feet, 16 inch casing flowed approximately 1 quart in 20 minutes
2000 hours	Set packer at 2,234 feet, 16 inch casing flowed approximately 1 quart

in 19 minutes

2100 hours Set packer at 2,231 feet, 16 inch casing flowed approximately 1 quart in 20 minutes

2200 hours Set packer at 2,225 feet, no flow from 16 inch casing

2300 hours 16 inch casing was pressure tested at 108 psi until the end of this shift

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift. All efforts were focused on the disposal well.

W.A. [Signature]

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 29, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

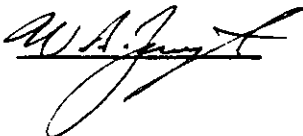
This shift report commenced with the Contractor tripping the inflatable packer in the hole. The inflatable packer was set in the 16 inch casing at 2,705 feet at 0400 hours. The casing was pressurized to 100 psi at 0400 hours. The pressure was maintained at 100 psi by adding pressure to stabilize inflatable packer. The casing would not hold pressure. The Contractor tested the 16 inch casing until 1400 hours.

The pressure was bled off at 1400 hours and the casing was monitored for flow. No flow was observed from the well. The Contractor then flushed the well with fresh water (approximately 25,000 gallons) from 1500 to 2000 hours.

The inflatable packer was reset at 2,704 feet and the casing was monitored for flow. The 16 inch casing leaked out approximately 1 pint every 30 minutes. The casing was pressurized to 100 psi and maintained (kept pressuring up to 100 psi) through the end of this shift report.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift. All efforts were focused on the disposal well.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 28, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

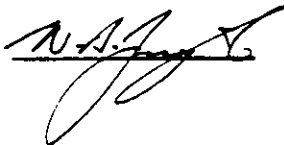
B. Ziegler arrived on site at 1100 hours. Contractor began removing 13 inch liner at 1000 hours. The liner would be stored next to the drilling pad. B. Ziegler left the site at 1130 hours.

B. Ziegler returned to the site at 1630 hours. The Contractor continued removing the 13 inch liner. B. Ziegler left the site at 1650 hours.

The Contractor completed removal of the 13 inch liner at 2345 hours. The shift ended with the Contractor rigging up to install the inflatable packer and test the 16 inch casing.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the monitor well during this shift. All efforts were focused on the disposal well.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 27, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0900 hours. The Contractor tried to pressurize the inflatable packer at 0700 hours. The packer would not inflate.

At 1030 hours, the Contractor began tripping out of the hole with the inflatable packer to check. B. Ziegler left the site at 1100 hours. The packer checked out ok on the surface at 1330 hours. The inflatable packer was then tripped in the 13 inch liner and set at 2,728 feet. At 1455 hours the 13 inch liner was pressurized to 149 psi. The pressure settled at 130 psi. The annulus was pressurized to 62 psi but bled off.

The packer was reset at 2,730 feet. The liner was pressurized to 170 psi. Liner held pressure, annulus still leaked at approximately 1 quart in 8 minutes. The annulus was then sealed off, it gained 3 psi in 10 minutes.

The liner was bled off and the annulus was pressurized to 160 psi. It lost 90 psi in 12 minutes. The packer was then reset at 2,754 feet and the annulus pressurized to 200 psi. The annulus lost approximately 12 psi per minute.

The inflatable packer was then removed from the 13 inch liner and the well secured at 2300 hours.

B. Ziegler was informed by J. Brantley that the liner would be removed first thing tomorrow to retest the 16 inch casing.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift. B. Ziegler received FAX from Mr. E. Rahrig of FDER approving placement of gravel through the fractured interval from 1,340 to 1,378 feet on the 6 inch casing.

J. Brantley stated that he would begin graveling of the annulus this weekend providing manpower was available.

W.A. Brantley

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 26, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0900 hours. The Contractor continued the preliminary pressure test on the annulus between 16 inch casing and 13 inch liner. The Contractor was unable to hold pressure on annulus and began tripping an inflatable packer in the 13 inch liner to test liner for leaks at 1200 hours.

The inflatable packer was set at 2,721 feet inside the Baker Packer Assembly (below top seal assembly) at 1800 hours. The annulus was pressurized to 150 psi but would not hold pressure. Pressure was bled off the annulus and the 13 inch liner was pressurized to 25 psi. The liner held pressure, but the annulus had a steady leak.

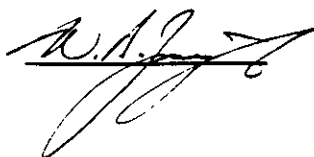
The inflatable packer was reset at 2,730 feet below the Baker Packer Assembly. The 13 inch liner was pressurized to 145 psi, 1930 hours. Pressure was maintained in the liner at 145 for 3 hours. The annulus was pressurized to 160 psi at the same time but would not hold pressure.

B. Ziegler left the site at 1600 hours.

The Contractor secured the disposal well and site at 2000 hours. No other drilling activities were performed during this report.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift, Contractor waiting on approval to gravel annulus between 1,340 and 1,380 feet.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 25, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0800 hours. The Contractor was set up to install the casing corrosion inhibitor. The 13 inch liner was picked up approximately 10 feet releasing the upper seal assembly in the packer.

The Contractor diluted 55 gallons of the corrosion inhibitor (Cronox 669 F, manufactured by Baker) with 8,400 gallons of water in a large mud tank. Installation of the corrosion inhibitor commenced at 1010 hours. Contractor pumped fluid in the annulus from the surface at a rate of approximately 1 barrel per minute. Displacement of corrosion inhibitor was completed at 1300 hours. Two times the annulus volume (8,200 gallons) were displaced. Annulus pressure at completion was 25 psi.

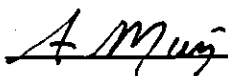
The Contractor lowered the 13 inch liner back into the packer assembly and performed a preliminary pressure test on the annulus. The pressure test indicated a small leak. Heavy rains began, Contractor was unable to determine where the leak was. The well disposal and job site were secured for the remainder of the day (1600 hours).

The Contractor requested that the final pressure test be delayed until September 27, 1991, he would not be ready to perform the test tomorrow.

P. Linton left the site at 1600 hours.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift, Contractor waiting on approval to gravel annulus between 1,340 and 1,378 feet.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 24, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

S. Skehan arrived on site at 0800 hours. Franks casing crew was on site setting up for installation of 13 inch liner.

Installation of 13 inch liner commenced at 0930 hours. Torque of each casing joint was measured and recorded by the computer placed on the rig floor by Franks casing crew.

A. Muniz and T. Sharp were on site from 1145 to 1245 hours to observe liner installation.
B. Ziegler on site from 1220 to 1300 hours to observe construction progress.

T. McCormick was on site from 1445 to 1515 hours to review construction progress and installation of liner.

P. Linton arrived on site at 1535 hours. S. Skehan left the site at 1545 hours.

Installation of the 13 inch liner was completed at 1740 hours. The Contractor welded the flange assembly on the 13 inch liner and lowered the liner in place at 1800 hours.

P. Linton left the site at 1830 hours. The Contractor scheduled installation of the casing corrosion inhibitor for tomorrow and a preliminary pressure test of the annulus. Pressure test was tentatively scheduled for September 26, 1991.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift, Contractor waiting on approval to gravel annulus between 1,340 and 1,378 feet.

A. Muniz

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 23, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0815 hours. The Contractor was ready to begin installation of Baker Packer Assembly. Baker Tool Services was on site to install packer. Installation of the packer assembly commenced at 0845 hours.

B. Ziegler reviewed the drill pipe tally with J. Brantley and Baker Service representative. Planned to set packer element at 2,720 feet. This setting depth would keep the packer elements away from any casing joints.

The packer assembly was set in place at 2,720 feet at 1445 hours at which time the Contractor began tripping the drill rods out of the hole. The Contractor completed tripping out of the hole at 1800 hours.

No other drilling activities were performed on the well during this report. Installation of the 13 inch diameter liner was scheduled for tomorrow.

B. Ziegler left the site at 1800 hours.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift, Contractor waiting on approval to gravel annulus between 1,340 and 1,378 feet.

A. Muri

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 22, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the disposal well during this report period. The Contractor continued fabricating the wellhead for the 13 inch diameter liner.

Installation of packer assembly was scheduled for September 23, 1991.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift, Contractor waiting on approval to gravel annulus between 1,340 and 1,378 feet.

A. Meis

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 21, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the disposal well during this report period. The Contractor continued fabricating the wellhead for the 13 inch diameter liner.

DUAL-ZONE MONITORING WELL

No drilling activities were performed on the well during this shift, Contractor waiting on approval to gravel annulus between 1,340 and 1,378 feet.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 20, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

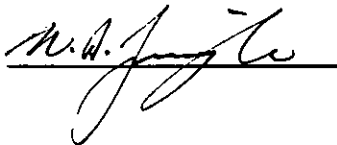
DISPOSAL WELL

No drilling activities were performed on the disposal well during this report period. The Contractor continued fabricating the wellhead for the 13 inch diameter liner.

DUAL-ZONE MONITORING WELL

The Contractor requested that the borehole annulus be graveled from approximately 1,340 to 1,378 feet because very little progress had been made with the last five lifts of cement. The Contractor was informed that the Engineer would review the request with FDER and advise as soon as possible.

No drilling activities were performed on the well during this shift.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 19, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the disposal well during this report period. The Contractor continued fabricating the wellhead for the 13 inch diameter liner.

DUAL-ZONE MONITORING WELL

Florida Geophysical Logging performed a temperature log on the eighth stage of cement from 0639 to 0645 hours. The log indicated the top of cement from approximately 1,370 to 1,380 feet.

S. Skehan arrived on site at 0740 hours. The Contractor tagged the eighth stage of cement at 1,376.5 feet on both tremie lines.

Florida Cementing, Inc. (FCI) began the ninth stage of cementing at 0758 hours and completed the operation at 0810 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag depth. A total of 16 barrels (42 sacks) of 12 percent bentonite cement with cellaflake were pumped.

S. Skehan left the site at 0835 hours.

Florida Geophysical Logging performed a temperature log on the ninth stage of cement from 1344 to 1350 hours. The temperature log indicated the top of cement from approximately 1,370 to 1,380 feet.

S. Skehan returned to the site at 1645 hours. The Contractor tagged the ninth stage of cement at 1,370 feet with both tremie lines.

FCI began the tenth stage of cementing at 1718 hours and completed the operation at 1724 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag depth. A total of 10 barrels (26 sacks) of 12 percent bentonite cement with cellaflake were

pumped.

S. Skehan left the site at 1800 hours. The remainder of the shift was spent waiting on cement to set.

W. A. J. J.

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 18, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed on the disposal well during this report period. The Contractor began fabricating the wellhead for the 13 inch liner landing assembly.

DUAL-ZONE MONITORING WELL

Florida Geophysical Logging performed a temperature log on the sixth stage of cement from 0625 to 0632 hours. The log indicated the top of cement from approximately 1,370 to 1,380 feet.

R. Olson arrived on site at 0700 hours. The Contractor tagged the sixth stage of cement at 1,378 feet with both tremie lines.

Florida Cementing, Inc. (FCI) began the seventh stage of cementing at 0756 hours and completed the operation at 0826 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag depth. A total of 30 barrels (80 sacks) of 12 percent bentonite cement were pumped.

R. Olson left the site at 0830 hours.

Florida Geophysical Logging performed a temperature log on the seventh stage of cement from 1400 to 1406 hours. The temperature log indicated the top of cement from approximately 1,370 to 1,380 feet.

R. Olson returned to the site at 1550 hours.

The Contractor tagged the seventh stage of cement at 1,377 feet with both tremie lines. FCI began the eighth stage of cementing at 1558 hours and completed the operation at 1626 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag depth. A total of 30 barrels (80 sacks) of 12 percent bentonite cement were pumped.

R. Olson left the site at 1640 hours.

The remainder of the shift was spent waiting on cement to set.

M. A. J. [Signature]

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 17, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Contractor ran the spring loaded casing scrapper from the surface to the bottom of the 16 inch casing from 0745 to 1300 hours. Casing appeared to be free of beers and ready for installation of the packer assembly. No other drilling activities were performed on the well during this report period.

DUAL-ZONE MONITORING WELL

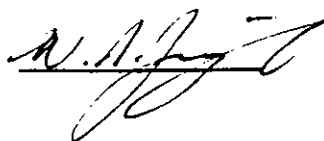
S. Skehan arrived on site at 0700 hours. The Contractor tagged the fourth stage of cement at 1,400 feet on the East side and 1,403 feet on the West side.

Florida Cementing, Inc. (FCI) began the fifth stage of cementing at 0721 hours and completed the operation at 0728 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag depth. A total of 30 barrels (80 sacks) of 12 percent bentonite cement with cellaflake were pumped.

Florida Geophysical Logging performed a temperature log on the fifth stage of cement from 1337 to 1343 hours. The temperature log indicated the top of cement from approximately 1,370 to 1,380 feet.

The Contractor tagged the ^{SIXTH} sixth stage of cement at 1,378 feet with both tremie lines. FCI began the sixth stage of cementing at 1519 hours and completed the operation at 1527 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag depth. A total of 16 barrels (76 sacks) of neat cement were pumped.

The remainder of the shift was spent waiting on cement to set.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 16, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

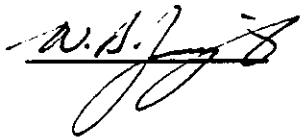
No drilling activities were performed during this report. The Contractor continued to schedule installation of the packer assembly and liner.

The Contractor set up to run the casing scrapper on the 16 inch casing in preparation for installation of the 13 inch liner and packer assembly.

DUAL-ZONE MONITORING WELL

Florida Geophysical Logging performed a temperature log of the fourth stage of cement from 0904 to 0912 hours. The temperature log indicated the top of cement from approximately 1,400 to 1,450 feet.

The remainder of the shift was spent waiting on cement to set.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 15, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed during this report. The Contractor continued to schedule installation of the packer assembly and liner.

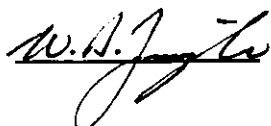
DUAL-ZONE MONITORING WELL

S. Skehan arrived on site at 0720 hours. Florida Geophysical Logging (FGL) performed a temperature log on the third stage of cement. The temperature log indicated cement between approximately 1,500 and 1,550 feet.

The Contractor tagged the third stage of cement at 1,495 feet with both tremie lines. Florida Cementing, Inc. (FCI) began cementing the fourth stage of cement at 0758 hours and completed the operation at 0808 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag depth. A total of 40 barrels (106 sacks) of 12 percent bentonite cement with cellaflake.

S. Skehan left the site at 0830 hours.

The remainder of the shift was spent waiting on cement to set. No other drilling activities were performed.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 14, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed during this report. The Contractor continued to schedule installation of the packer assembly and liner.

DUAL-ZONE MONITORING WELL

S. Skehan arrived on site at 0730 hours. The pressure grout (first stage) was tagged at 1,620 feet.

Florida Cementing, Inc. (FCI) began cementing of the second stage of cement at 0755 hours and completed the operation at 0833 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag. A total of 91 barrels (433 sacks) of neat cement were pumped.

S. Skehan left the site at 0900 hours.

S. Skehan returned to the site at 1715 hours. Florida Geophysical Logging performed a temperature log on the second stage of cement from 1712 to 1722 hours. The temperature log indicated the top of cement at approximately 1,500 and 1,560 feet.

The Contractor tagged the second stage of cement at 1,503 feet on the East side and 1,500 feet on the West side. FCI began cementing of the third stage of cement at 1757 hours and completed the operation at 1813 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the tag. A total of 30.5 barrels (81 sacks) of 12 percent bentonite cement with cellaflake were pumped.

S. Skehan left the site at 1830 hours. The remainder of the shift was spent waiting on cement to set.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 13, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed during this report. The Contractor continued to schedule installation of the packer assembly and liner.

DUAL-ZONE MONITORING WELL

B. Ziegler arrived on site at 1000 hours. Florida Geophysical Logging (FGL) was prepared to perform the temperature log on the first stage (pressure grout) of cement on the 6 inch casing.

FGL began the temperature log at 1015 hours and completed the log at 1141 hours. Temperature log indicated the top of cement at approximately 1,600 to 1,650 feet.

B. Ziegler left the site at 1200 hours. The remainder of the shift was spent tripping tubing in the hole for grouting.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 12, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed during this report. The Contractor continued to schedule installation of the packer assembly and liner.

DUAL-ZONE MONITORING WELL

B. Ziegler arrived on site at 0600 hours. The 6 inch casing tally was prepared for installation to a total depth of 1,800 feet. Casing heat numbers were reviewed for correlation with mill certificates previously submitted by the Contractor. All heat numbers were consistent with those appearing on the mill certificates.

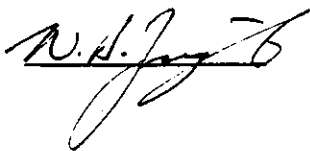
Installation of the 6 inch casing commenced at 0800 hours.

A. Muniz arrived on site at 1300 hours to review construction progress. A. Muniz left the site at 1400 hours.

Installation of the 6 inch casing to 1,800 feet was completed at 1600 hours. B. Ziegler left the site. Contractor began setting up for pressure grout.

B. Ziegler on site at 1800 hours. Cement quantities and pressures were reviewed with J. Brantley. Florida Cementing, Inc. began the pressure grout at 1912 hours and completed the process at 1942 hours. A total of 95 barrels (452 sacks) of neat cement were pumped.

B. Ziegler left the site at 1950 hours. The remainder of the shift was spent waiting on the cement to set.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 11, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed on the Disposal Well during this report. The Contractor is trying to schedule running of the tubing and packer assembly.

B. Ziegler and A. Muniz reviewed performing the RTS on the Disposal Well with Al Mueller/FDER. It was decided to perform the RTS after the liner assembly was in place. This will provide the best consistency with conditions that will be tested during the 5 year MIT.

DUAL-ZONE MONITORING WELL

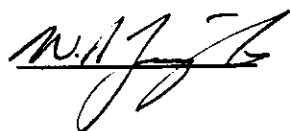
No drilling activities were performed on the Monitor Well during this report.

B. Ziegler and A. Muniz receive verbal approval from Al Mueller/FDER in a conference call for a lower monitor interval of 1,800 to 1,850 feet.

Installation of the 6 inch casing was scheduled for 0700 hours tomorrow.

SURFICIAL MONITOR WELLS

The surficial monitor wells were sampled and will be analyzed for chlorides, conductivity and temperature tomorrow.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 10, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

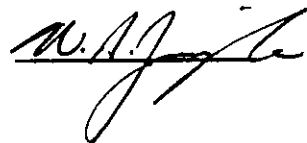
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activity was performed on the Disposal Well during this report.

DUAL-ZONE MONITORING WELL

No drilling activity performed on the Monitor Well during this report. Contractor waiting on final casing setting depth approval.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 9, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 1100 hours. Florida Geophysical Logging (FGL) was setting up to perform the TV survey. The well was still being flushed with fresh water.

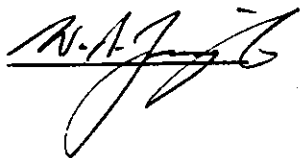
The TV survey of the 16 inch casing and borehole commenced at 1400 hours. The base of the 16 inch casing and the total depth were observed at 2,779 feet and 3,297 feet, respectively. The survey was completed at 1537 hours. The Contractor stopped the flow of fresh water to the well and began demobilizing FGL. The final flow meter reading was 2304998 gallons. A total of 162,198 gallons were used to flush the well in preparation of and during the TV survey.

B. Ziegler left the site at 1555 hours. No other drilling activities were performed during this report.

DUAL-ZONE MONITORING WELL

Mr. Al Mueller/FDER tentatively approved the 1,800 foot setting depth of the 6 inch casing in a telephone conversation with Bart Ziegler.

The Contractor began tripping the 14 1/2 inch bit assembly in the hole at 0900 hours to check for any bridging that may have occurred in the borehole. The bottom of the borehole was tagged at 1,805 feet at 1300 hours. No bridging was encountered. The remainder of the shift was spent tripping out of the hole. The rig was shut down at 1700 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 8, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

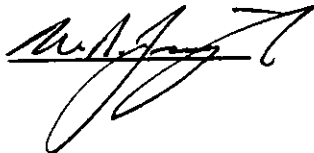
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

No drilling activities were performed during this report. The Contractor continued to flush the well in preparation for the TV survey.

DUAL-ZONE MONITORING WELL

No work was performed on the monitor well this report. The Contractor is waiting on approval of the lower monitor zone.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 7, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 1100 hours. The Contractor was set up to circulate the well from 3,000 feet. Federal Express delivered the sample bottles at 1130 hours.

The Contractor began purging the well with reverse air at 1142 hours. The mud tanks were empty when purging began. The discharge rate was approximately 430 gpm as measured by the volume of tank filled over a given time. A total of approximately 18,000 gallons of water were purged when collection of samples began. Circulation was stopped at 1245 hours when all sample bottles were filled.

Primary and secondary drinking water standards along with priority pollutants were collected and shipped to CH2M Hill's laboratory in Gainesville, Florida for analysis. Fecal coliform samples were collected and delivered to Geotech Labs in West Palm Beach, Florida. A five gallon sample was also collected for submittal the U.S. Geological Survey in Tallahassee, Florida.

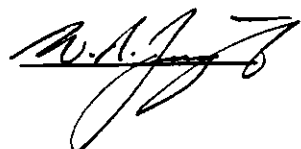
B. Ziegler left the site at 1300 to deliver water samples.

The remainder of the shift was spent tripping the drill pipe out of the hole and setting up to flush the well with fresh water for the TV Survey.

Flushing of the well commenced at 1830 hours. The flow meter reading was 2304998 gallons.

DUAL-ZONE MONITORING WELL

No work was performed on the monitor well this report. The Contractor is waiting on approval of the lower monitor zone.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 6, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

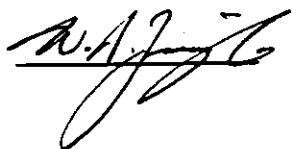
The Contractor began tripping the remainder of drill pipe out of the hole at 0700 hours. All the drill pipe and collars were out of the hole at 0915 hours.

B. Ziegler informed J. Brantley that water samples from the injection zone were not collected after development. Brantley stated that the drill pipe will be installed again and should be ready to sample by tomorrow morning. B. Ziegler scheduled sampling for 1030 hours tomorrow.

The Contractor began tripping back in the hole with the drill pipe at 1345 hours. Drill pipe was set to a depth of 3,000 feet and the well was shut in a 1730 hours in preparation for tomorrow sampling.

DUAL-ZONE MONITORING WELL

No work was performed on the monitor well this report. The Contractor is waiting on approval of the lower monitor zone.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 1, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

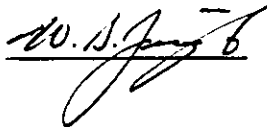
Drilling of the 14-1/2-inch reamed hole continued through the shift.

P. Linton arrived on site at 2030 hours to review drilling progress. P. Linton off site at 2130 hours. Reamed hole was down to 3,060 feet.

A total depth of approximately 3,101 feet had been reached with the 14-1/2-inch reamed hole at the conclusion of this report.

DUAL-ZONE MONITOR WELL

No drilling activity was performed on the monitor well today. Contractor is waiting for approval of the lower monitor zone by FDER.


W. S. Jones

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 31, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

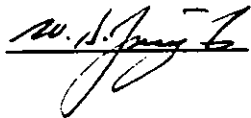
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

Drilling of the 14-1/2-inch reamed hole commenced at the beginning of this report. The neat cement plug was tagged at 2,750 feet in the 16 inch casing. A total depth of 2,891 feet had been reached with the 14-1/2-inch reamer assembly at the close of this report.

DUAL-ZONE MONITOR WELL

No drilling activity was performed on the monitor well today. Contractor is waiting for approval of the lower monitor zone by FDER.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 30, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

This report commenced with the Contractor tripping the drill pipe out of the 16-inch casing to perform the pressure test. Welding of the casing header began at about 0300 hours once all the drill pipe was out of the hole.

B. Ziegler arrived on site at 0515 hours. The Contractor completed installation of the casing header and calibrated pressure gauge at 0600 hours when Ed Rahrig of FDER arrived on site. Tom McCormick arrived on site at 0609 hours.

The 16-inch casing was completely filled with water and pressurized to 128.5 psi at 0623 hours. The pressure was bled off to 121.0 psi at 0628 hours when the pressure test began. P. Mazzella arrived on site at 0708 hours during the test.

The pressure was 119.5 psi after one hour of monitoring. The drop in pressure was 1.5 psi, well within the 5 percent fluctuation allowed for a successful test. The Contractor was informed that the test was acceptable and to proceed with the cement bond log. A summary of the casing pressure test and gauge calibration are attached with this daily report.

Ed Rahrig and T. McCormick left the site at 0745 hours. A. Muniz arrived on site at 0815 hours to review pressure test results and construction progress. P. Mazzella and A. Muniz left the site at 0845 hours when the Florida Geophysical Logging began the cement bond log.

B. Ziegler left the site at 1015 hours once the cement bond log was completed. The Contractor spent the remainder of the shift tripping the 14-1/2-inch reamer assembly in the hole to complete the well to approximately 3,300 feet.

DUAL-ZONE MONITOR WELL

No drilling activity was performed on the monitor well today. Contractor is waiting for approval of the lower monitor zone by FDER.

W.A. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 29, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

Circulation of the 16-inch casing with fresh water continued through shift in preparation for the pressure test. Water was circulated through drill pipe from 2,750 feet until 2400 hours, at which time the contractor began tripping drill pipe out for the pressure test.

J.I. Garcia-Bengochea was on site from 1400 to 1430 hours to review construction progress.

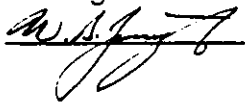
DUAL-ZONE MONITOR WELL

Florida Geophysical Logging (FGL) arrived on site at 0900 hours and set up to perform logging on the 14-1/2-inch borehole to approximately 1,800 feet. Geophysical logging commenced at 1030 hours with the X-Y caliper.

B. Ziegler arrived on site at 1100 hours to observe geophysical logging. FGL was able to log the complete hole with the X-Y caliper but had difficulty getting the temperature, fluid resistivity, and gamma ray tools past a ledge at approximately 1,386 feet. These logs were run from 1,386 feet to the surface.

Drill pipe was installed to 1,390 feet at 1730 hours to allow FGL to get their logging tools past 1,386 feet. Temperature, fluid resistivity and gamma ray logs were then performed from 1,390 feet to approximately 1,800 feet. Geophysical logging was completed at 1930 hours.

B. Ziegler left the site at 1945 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 28, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

This report began with the Contractor tripping drill pipe in the hole to circulate the 16-inch casing.

Circulation of the 16-inch casing commenced at 0630 hours in preparation for the pressure test. The drill pipe was set at a depth of 2.750 feet for circulation.

B. Ziegler arrived on site at 1930 hours to review construction progress. B. Ziegler left the site at 2300 hours.

The remainder of the shift was spent circulating the 16-inch casing with fresh water.

DUAL-ZONE MONITORING WELL

C. DiGiacomo arrived on site at 0800 hours and set up to perform geophysical logging. Geophysical logging commenced at 0830 hours. The borehole was blocked off at 1,380 feet. Several attempts were made to pass the obstruction with no success. C. DiGiacomo left the site at 0915 hours.

Contractor tripped in hole with 14 1/2 inch bit assembly at approximately 1100 hours. The bit assembly dropped to 1,808 feet without encountering an obstruction. Geophysical logging was rescheduled for tomorrow morning at 1000 hours.



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CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 27, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

P. Linton arrived on site at 0800 hours. Tags of 770 feet and 772 feet were observed on the East and West tremie lines, respectively.

Florida Cementing, Inc (FCI) began cementing stage No. 7 at 0900 hours and completed cementing procedures at 0945 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag at the beginning of the cementing stage. A total of 190 barrels (688 sacks) of 4 percent bentonite cement were pumped.

P. Linton left the site at 1030 hours.

Wellhead pressure was monitored and bled off as necessary until 2200 hours when the header assembly was removed. The remainder of the shift was spent tripping drill pipe in to circulate the 16-inch casing in preparation for the pressure test.

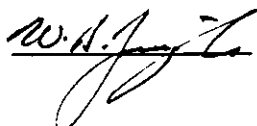
The casing pressure test was tentatively scheduled with FDER for 0600 hours on August 30, 1991.

DUAL-ZONE MONITORING WELL

At 0000 hours, the Contractor began redrilling the 14-1/2-inch borehole. The borehole was circulated until 0400 hours when the swivel assembly locked up.

Repairs were made on the swivel assembly until 1900 hours at which time redrilling of the borehole resumed. Three trips were made with the drill bit assembly from approximately 1,100 feet to 1,800 feet. No obstruction was encountered in the borehole.

Geophysical logging of the borehole was rescheduled for tomorrow morning.



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CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 26, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0800 hours. Tags of 1,800 feet and 1,799 feet were observed on the East and West tremie lines, respectively.

Florida Cementing, Inc (FCI) began cementing stage No. 5 at 0917 hours and completed cementing procedures at 0958 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag at the beginning of the cementing stage. A total of 190 barrels (688 sacks) of 4 percent bentonite cement were pumped.

B. Ziegler left the site at 1130 hours

B. Ziegler arrived on site at 1945 hours. Tags of 1,270 feet were observed on both the East and West tremie lines.

Florida Cementing, Inc (FCI) began cementing stage No. 6 at 2003 hours and completed cementing procedures at 1957 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag at the beginning of the cementing stage. A total of 191 barrels (692 sacks) of 4 percent bentonite cement were pumped.

The remainder of the shift was spent monitoring the wellhead pressure and bleeding pressure off as necessary.

B. Ziegler left the job site at 2200 hours.

DUAL-ZONE MONITORING WELL

The Contractor began tripping the 14 1/2 bit assembly in the hole at 1045 hours to determine if the borehole had remained open.

Borehole continued to fill in between 1.100 feet and 1.380 feet. At 1800 hours the bit assembly was tripped out and the well was killed. The drilling crew moved over to the Disposal Well to pump the sixth stage of cement.

No other drilling activities were performed on the monitor well through the end of this report.

W. H. Jones

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 25, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0800 hours. Tags of 2.391 feet and 2.393 feet were observed on the East and West tremie lines, respectively.

Florida Cementing, Inc (FCI) began cementing stage No. 3 at 0842 hours and completed cementing procedures at 0935 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag at the beginning of the cementing stage. A total of 158 barrels (572 sacks) of 4 percent bentonite cement were pumped.

B. Ziegler left the site at 1000 hours

B. Ziegler arrived on site at 1750 hours. Tags of 2.220 feet and 2.225 feet were observed on the East and West tremie lines, respectively.

Florida Cementing, Inc (FCI) began cementing stage No. 4 at 1850 hours and completed cementing procedures at 1957 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag at the beginning of the cementing stage. A total of 191 barrels (692 sacks) of 4 percent bentonite cement were pumped.

The remainder of the shift was spent monitoring the wellhead pressure and bleeding pressure off as necessary.

No other drilling activities were performed on the disposal well during this shift report.

DUAL-ZONE MONITORING WELL

Redrilling of the 14-1/2-inch borehole resumed at 1000 hours. A total depth of 1,808 feet was reached at 1630 hours.

Redrilling was stopped at 1730 hours after tripping the bit out of the hole to pump the fourth stage of cement on the Disposal Well.

No other drilling activities were performed on the monitor well through the end of this report.

W. S. J. J.

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CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 24, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0615 hours. A tag of 2.620 feet on both the East and West tremie lines was observed.

Florida Cementing, Inc (FCI) began cementing stage No. 2 at 0645 hours and completed the operation at 0702 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag at the beginning of the cementing stage. A total of 166 barrels (790 sacks) of neat cement were pumped.

B. Ziegler left the site at 0930 hours.

The remainder of the shift was spent monitoring the wellhead pressure and bleeding off pressure as necessary.

No other drilling activities were performed on the disposal well during this shift report.

DUAL-ZONE MONITORING WELL

This report began with the Contractor redrilling of the 14-1/2-inch borehole. Contractor had to begin circulating at 1,500 feet to remove material that had fallen in the borehole.

Redrilling was stopped at 0600 hours at a depth of 1,710 feet to pump cement on the Disposal Well.

No other drilling activities were performed on the monitor well through the end of this report.



dbt098\173.51

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 23, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

This shift report began with the Contractor tripping 2-3/8-inch tubing for tremie grouting. K. Greuel informed B. Ziegler that a cement tag for the pressure grout was made at approximately 2,620 feet (0015 hours).

The remainder of the shift was spent tripping tremie line to perform the second stage of cementing.

No other drilling activities were performed on the disposal well during this shift report.

DUAL-ZONE MONITORING WELL

At 1900 hours, the Contractor began tripping the 14-1/2 bit assembly in the hole to redrill the bridge encountered at 1,380 feet during geophysical logging.

The bridge was tagged at 1,380 feet. Redrilling of the borehole commenced at approximately 2000 hours on closed circulation and continued through the end of the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 22, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

This report began while waiting for the cement bridge plug to set that was placed at 2.795 feet. The bridge plug was tagged at 2.784 feet at 0100 hours.

B. Ziegler arrived on site at 0745 hours. The Contractor was setting up to pressure grout the 16-inch-diameter casing. The centrifugal pump used to prehydrate bentonite for cementing, malfunctioned. Contractor would only be able to pump neat cement on the pressure grout. Cement calculations and quantities were then reviewed with J. Brantley.

Pressure grouting of the 16-inch casing began at 0828 hours and was completed at 0922 hours. A total of 188 barrels (895 sacks) of neat cement were pumped.

B. Ziegler left the site at 1000 hours. The contractor monitored wellhead pressure until removing the header to perform the temperature log.

Florida Geophysical Logging (FGL) arrived on site at 2100 hours. Temperature logging of the first stage of cement commenced at 2130 hours. B. Ziegler arrived on site at 2200 hours. B. Ziegler left the site at 2345 hours after geophysical logging was completed.

Temperature log indicated cement at approximately 2.600 feet.

The remainder of the shift was spent rigging up to run tubing.

DUAL-ZONE MONITORING WELL

C. DiGiacomo arrived on site at 1230 hours and prepared to log the 14-1/2-inch borehole to 1.808 feet. Geophysical logging commenced at 1300 hours. B. Ziegler arrived on site at 1315 hours. The logging tools would not pass an obstruction at 1.380 feet. Contractor will re-drill borehole and reschedule logging once the obstruction has been removed.

C. DiGiacomo off site at 1400 hours. B. Ziegler off site at 1500 hours.

W.A. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 21, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 0700 hours. Installation of the 16-inch casing resumed at 0720 hours with joint number 47.

Installation of the 16-inch casing was completed at 1456 hours. Contractor began running 2-3/8-inch tubing to place drillable bridge plug and pressure grout.

B. Ziegler off site at 1515 hours.

P. Linton on site at 1905 hours. The bottom of the 24-1/2-inch reamed hole was tagged with the tubing at 2,795 feet below land surface. Placement of the drillable bridge plug began at 1905 hours and was completed at 1923 hours. A total of 6.5 barrels (31 sacks) of neat cement were pumped. P. Linton left the site at 2000 hours.

The remainder of this report was spent waiting on the drillable bridge plug to set.

DUAL-ZONE MONITORING WELL

The Contractor began tripping the 14-1/2-inch bit assembly out of the well at 0100 hours in preparation for geophysical logging. At 0700 hours, all the drill pipe had been removed from the well. The drill collars and bit assembly remained in the well for removal until a full crew was available.

Geophysical logging of the borehole remained tentatively scheduled for 0900 hours on Thursday, August 22, 1991.

SURFICIAL MONITOR WELLS

The surficial monitor wells were sampled from 0740 hours to 0900 hours. The samples were analyzed for conductivity, temperature, and chloride content.

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CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 20, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

This report began with the Contractor tripping the 24-1/2-inch reamer assembly out of the hole. Removal of the reamer assembly was completed at 0245 hours.

Florida Geophysical Logging (FGL) arrived on site at 0400 hours and began setting up to perform a caliper log on the 24-1/2-inch diameter reamed hole.

B. Ziegler arrived on site at 0700 hours at which time FGL began performing the caliper log on the 24-1/2-inch diameter reamed hole. Geophysical logging was completed at 0750 hours and installation of the 16-inch casing commenced. Certified welders on site were Terry Hill and David Miller.

A. Muniz arrived on site at 1215 hours to review construction progress. B. Ziegler and A. Muniz left the site at 1230 hours.

B. Ziegler on site at 1330 hours.

P. Linton arrived on site at 1815 hours. B. Ziegler off site 1900 hours.

Installation of the 16-inch casing continued through the end of this report. A total of 46 joints (1,973 feet) of casing had been installed at the conclusion of this report. Installation was stopped at 2400 hours until tomorrow morning.

P. Linton left the job site at 0100 hours.

DUAL-ZONE MONITORING WELL

No drilling activity was performed on the well during this report period. Geophysical logging of the borehole was rescheduled for 0900 hours on Thursday, August 22, 1991.

Geotech Labs provided verbal information on the water sample collected from 1.808 feet during reverse-air drilling of the 14-1/2-inch borehole. Total dissolved solids and chloride content were measured at 14,232 mg/l and 5,500 mg/l, respectively.

W. S. Jones

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 19, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

B. Ziegler arrived on site at 1300 hours.

The Disposal Well remained inactive until 1645 hours at which time reaming of the 24-1/2-inch borehole resumed (2,790 feet). Reaming of the borehole was completed at 1715 hours to a total depth of 2,795 feet. The additional 5 feet was drilled to allow flexibility in setting the drillable bridge plug.

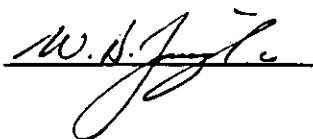
The borehole was circulated until 1900 hours at which time the Contractor began tripping the 24-1/2 reamer assembly out of the hole for installation of the 16-inch casing.

A casing tally was prepared and heat numbers on the casing were reviewed for consistency with the mill certificates submitted by the Contractor.

This shift was concluded while tripping the 24-1/2-inch reamer assembly out of the hole.

DUAL-ZONE MONITORING WELL

No drilling activity was performed on the well during this report period. Geophysical logging of the borehole was scheduled for 0900 hours on Wednesday, August 21, 1991.



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CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 18, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Disposal Well was not active today. The reamer assemble is located approximately 30 feet above the bottom of the reamed hole at 2,760 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

Installation of 16-inch casing was rescheduled for Tuesday, August 20, 1991.

DUAL-ZONE MONITORING WELL

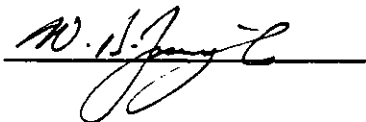
Drilling of the 14-1/2-inch borehole resumed at 0900 hours at a depth of 1,800 feet. The borehole was completed to a total depth of 1,808 feet at 1030 hours.

B. Ziegler arrived on site at 1600 hours to review drilling progress and water quality data.

A water sample from reverse-air drilling (1,808 feet) was collected after the hole had been circulated for 7.5 hours. The sample was sent to GeoTech Labs in West Palm Beach for chloride and total dissolved solids analyses.

B. Ziegler left the site at 1700 hours.

Circulation of the borehole continued until 1800 hours at which time the Engineer instructed the Contractor to shut the well in, schedule geophysical logging and wait for approval of the lower monitor zone.



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CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 17, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Disposal Well was not active today. The reamer assemble is located approximately 30 feet above the bottom of the reamed hole at 2,760 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

Installation of 16-inch casing remains scheduled for Monday, August 19, 1991.

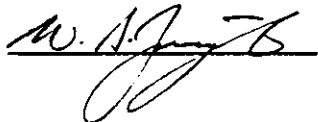
DUAL-ZONE MONITORING WELL

Drilling of the 14-1/2-inch borehole continued through the shift. The borehole was down to 1,771 feet when B. Ziegler arrived on site at 1600 hours.

Formation waters produced during reverse-air drilling continued to be disposed of down the disposal well after allowing cuttings and fines to settle.

B. Ziegler left the site at 1700 hours.

A total depth of 1,800 feet had been reached with the 14-1/2-inch borehole at the end of this shift report. The well was shut in until the following day when the next shift was scheduled to resume drilling at 0700 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 16, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Disposal Well was not active today. The reamer assemble is located approximately 30 feet above the bottom of the reamed hole at 2,760 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

Installation of 16-inch casing was tentatively scheduled for Monday, August 19, 1991.

DUAL-ZONE MONITORING WELL

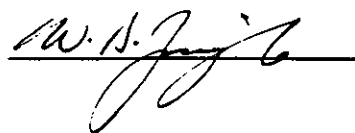
Drilling of the 14-1/2-inch borehole continued through the shift. The borehole was down to 1,630 feet when B. Ziegler arrived on site at 1100 hours.

Formation waters produced during reverse-air drilling continued to be disposed of down the disposal well after allowing fines to settle.

B. Ziegler left the job site at 1145 hours.

S. Skehan arrived on site at 1230 hours with several staff members from the CH2M Hill, Deerfield Beach office. A brief tour of the site was conducted. S. Skehan and staff left the site at 1330 hours.

A total depth of 1,708 feet and been reach with the 14-1/2-inch borehole at the end of this shift report.



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CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 15, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

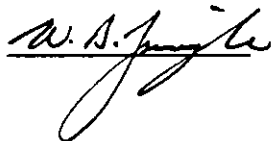
DISPOSAL WELL

The Disposal Well was not active today. The reamer assemble is located approximately 30 feet above the bottom of the reamed hole at 2,760 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

DUAL-ZONE MONITORING WELL

Drilling of the 14-1/2-inch borehole continued through the shift. The borehole was down to 1,500 feet when B. Ziegler arrived on site at 1500 hours.

B. Ziegler left the job site at 1620 hours. At the conclusion of the shift report the 14-1/2-inch borehole had been advance to total depth of 1,560 feet.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 14, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

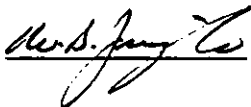
The Disposal Well was not active today. The reamer assemble is located approximately 30 feet above the bottom of the reamed hole at 2,760 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

DUAL-ZONE MONITORING WELL

Drilling of the 14-1/2-inch borehole continued through the shift. The borehole was down to 1,401 feet when B. Ziegler arrived on site at 1300 hours.

The surficial monitor wells were sampled and analyzed for chlorides, temperature, and conductivity. Water level measurements were also performed on the surficial monitor wells.

B. Ziegler left the job site at 1715 hours. At the conclusion of the shift report the 14-1/2 borehole had been advance to total depth of 1,460 feet.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 13, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Disposal Well was not active today. The reamer assemble is located approximately 30 feet above the bottom of the reamed hole at 2.760 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

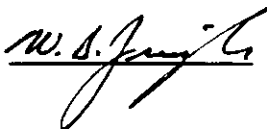
DUAL-ZONE MONITORING WELL

This shift report commenced with the crew tripping out of the hole to unplug the bit and drill pipe. At 1100 hours, the bit was on the surface and unplugged.

At 1200 hours, the Contractor began tripping the bit back in the hole.

D. VanNote arrived on site at 1600 hours to complete lithologic descriptions of cores pulled from the Disposal Well. At 1645 hours, the Contractor resumed drilling of the 14-1/2-inch borehole at a depth of 1,339 feet.

D. VanNote left the site at 1800 hours. The remainder of the shift was spent drilling the 14-1/2-inch borehole. A total depth of 1,390 feet had been reached at the end of this report.



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CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 12, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

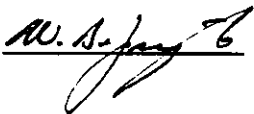
DISPOSAL WELL

The Disposal Well was not active today. The reamer assemble is located approximately 30 feet above the bottom of the reamed hole at 2,760 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

DUAL-ZONE MONITORING WELL

B. Ziegler on site at 0750 hours. Repairs on the monitor well rig are being completed. Drilling is expected to resume late during the shift. B. Ziegler off site 0830 hours.

K. Greuel informed B. Ziegler that drilling of the monitor well resumed at 1730 hours at a depth of 1,350 feet. At 1,370 feet (2015 hours), the drill bit plugged off. The remainder of the shift was spent tripping out of the hole to unplug the bit and drill pipe.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 11, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

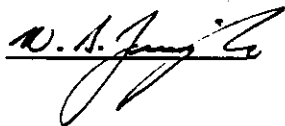
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Disposal Well was not active today. The reamer assemble is located approximately 30 feet above the bottom of the reamed hole at 2,760 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

DUAL-ZONE MONITORING WELL

K. Greuel informed B. Ziegler at 1130 hours that the sprocket for the monitor well rig is still being machined. Drilling is not expected to commence until late tomorrow.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 10, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Disposal Well was not active today. The reamer assemble is located approximately 30 feet above the reamed hole depth of 2,790 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

DUAL-ZONE MONITORING WELL

P. Linton arrived at the job site at 1000 hours. Repairs continue on the Gardner Denver 3000 rig. The 14-1/2-inch borehole was a depth of 1,350 feet. P. Linton informed B. Ziegler of status at the site. P. Linton left the job site at 1130 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 9, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Disposal Well was not active today. The 22-1/2-inch reamer assemble is located approximately 30 feet above the reamed hole depth of 2,790 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

DUAL-ZONE MONITORING WELL

The Dual-Zone Monitor Well was not active today. Repairs on the Gardner Denver 3000 rig continued through the end of the shift. The 14-1/2-inch reamed hole remains at a depth of 1,350 feet. The contractor estimates that repairs on the rig will be completed by Saturday, August 10, 1991.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 8, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Disposal Well was not active today. The drill bit is located approximately 30 feet above the reamed hole depth of 2,790 feet. The Contractor has ordered the 16-inch casing and is intermittently circulating the borehole until the casing arrives and is prepared for installation.

DUAL-ZONE MONITORING WELL

P. Linton arrived on the site at 0805 hours. The 14-1/2-inch borehole was at a depth of 1,350 feet. The borehole has not been advanced since Wednesday, August 7, 1991, when the rig broke down.

Repairs on the drive chain continued through the reporting period. The surficial monitor wells were sampled from 1020 to 1140 hours. The samples were analyzed for temperature, conductivity, and chloride content. P. Linton left the job site at 1230 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 7, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

P. Linton arrived at the job site at 1030 hours. The drill rig for the Disposal Well was not active today. The reamer assembly remains in the borehole. The Contractor is intermittently circulating the disposal well borehole until the casing arrives and is prepared for installation.

DUAL-ZONE MONITORING WELL

The 14-1/2-inch borehole had been advanced to a depth of 1,350 feet bls at 1030 hours. At a depth of about 1,330 feet bls the drilling rate slowed due to dredging of the formation. At 1640 hours the Contractor shut down the monitor well rig to repair the drive chain. The Contractor estimated that it would require at least a day to repair the rig.

P. Linton reviewed the cutting samples and measured the temperature, conductivities, and chloride content of the water quality samples (1,120, 1,150, 1,180, 1,214, 1,244, 1,274, 1,308, 1,339 feet bls). P. Linton left the job site at 2000 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 6, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

P. Linton arrived at the job site at 1520 hours. The drill rig for the Disposal Well was not active today. The reamer assembly remains in the borehole. The Contractor is intermittently circulating the disposal well until the casing arrives and is prepared for installation.

DUAL-ZONE MONITORING WELL

The 14-1/2-inch borehole had been advanced to a depth of 1,100 feet by 1500 hours. Drilling was slowed due to repairs on the swivel. The well is under artesian conditions with head of approximately 37 feet NGVD. P. Linton reviewed the cutting samples and measured the temperature, conductivities, and chloride content of the water quality samples (1,025, 1,060, 1,090 feet bls). P. Linton left the job site at 1905 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 5, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

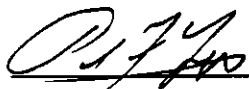
P. Linton arrived at the job site at 1105 hours. The drill rig for the Disposal Well was not active today. The reamer assembly remains in the hole. The Contractor has ordered the 16-inch casing and is intermittently circulating the disposal well until the casing arrives and is prepared for installation.

The Contractor indicated that a second load of 16-inch-diameter casing was delivered. A total of 20 joints are in stock on site.

K. Greuel delivered 10 video tape copies of the 12-1/4-inch pilot hole between the depths of 2,000 feet and 3,300 feet.

DUAL-ZONE MONITORING WELL

The Contractor completed setting up the monitor well rig for direct discharge to the disposal well during reverse-air drilling and commenced drilling the 14-1/2-inch borehole at approximately 2100 hours. P. Linton left the job site at 1955 hours. The borehole had been advanced to a total depth of 1,022 feet.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 4, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

P. Linton arrived on site at 1040 hours.

The drill rig for the Disposal Well was not active today. The reamer assembly is located approximately one joint above the total depth drilled of 2,790 feet. The Contractor is intermittently circulating the disposal well until the casing arrives and is prepared for installation. The contractor indicated that the 16-inch-diameter casing was ordered and should be delivered by Friday, August 9, 1991.

DUAL-ZONE MONITORING WELL

C. Digiacomo arrived at the job site at 1015 hours. The temperature log for the second cement stage of the 16-inch-diameter casing commenced at 1030 hours. The temperature log was completed at 1105 hours and C. Digiacomo left the job site at 1115 hours.

P. Linton talked to K. Greuel regarding the drilling schedule for the Monitor well and the disposal well at 1802 hours. The Contractor indicated that drilling of the 14-1/2-inch-diameter borehole for the monitor well would commence on Monday, August 5, 1991.

P. Linton left the job site at 1955 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 3, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

P. Linton arrived at the job site at 0750 hours.

The drill rig for the Disposal Well was not active today. The reaming assembly was raised approximately one joint above the reamed hole depth of 2,790 feet. The contractor has ordered the 16-inch casing and is intermittently circulating the disposal well until the casing arrives and is prepared for installation.

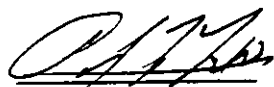
At 1230 hours a load of 16-inch pipe arrived at the job site and was unloaded.

DUAL-ZONE MONITORING WELL

The Contractor had tagged the top of the cement from the 1st lift at a depth of about 210 feet below land surface. The wellhead was resealed and pressurized to 90 psi.

The cement calculation were reviewed with J. Brantley. J. Brantley agreed with the plan to pump about 180 sacks of cement using a 4 percent bentonite mix with a calculated lift height of 200 feet.

The Contractor started the second cement stage for the 16-inch diameter casing at 0830 hours. A total of 188 sacks (51 barrels) of 4 percent bentonite cement were pumped. C. Digiacoimo was scheduled to perform a temperature log at 1100 hours tomorrow. P. Linton left the job site at 1530 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 2, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

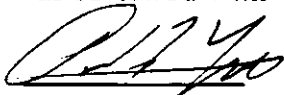
DISPOSAL WELL

P. Linton arrived at the job site at 1030 hours.

The 24-1/2-inch reamed hole was advanced from a depth of about 2,652 feet to a depth of 2,790 by the end of the day. Two sure shot deviation surveys were performed at depths of 2,610 and 2,700 feet. The reamed hole was circulated for the remainder of the day.

DUAL-ZONE MONITORING WELL

The Contractor indicated that Florida Geophysical Logging, Inc., would arrive this afternoon to perform cement bond log. Tom McCormick arrived at the job site at 1220 hours. Florida Geophysical Logging arrived at the job site a 1245 hours. Tom McCormick left the job site at 1335 hours. The Cement Bond log was performed from 1345 to 1530 hours. The 2nd stage of cementing for the 16-inch casing was scheduled for 0800 hours tomorrow, August 3, 1991. The cement calculation for the 2nd lift of cement was reviewed with T. McCormick. P. Linton left the job site at 1615 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 1, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

P. Linton arrived at the job site at 0905 hours.

The drill rig for the Disposal Well was active today. B. Ziegler called at 1435 hours, he stated that a FAX had been received from FDER approving the casing depth of 2,780 feet. At 1440 hours, P. Linton gave J. Brantley written confirmation of the depth for the 16 inch diameter casing. The Contractor started tripping the reamer assembly from the bottom of the 24 inch diameter casing to the bottom of the reamed hole at about 1500 hours. The reamed hole was advanced from a depth of about 2,592 feet to a depth of 2,622 by the end of the day.

D. VanNote arrived at the job site to classify the cores pulled from the pilot hole between the depths of approximately 2,000 feet and 2,700 feet. D. VanNote left the job site at about 1600 hours. P. Linton left the job site at 1815 hours.

DUAL-ZONE MONITORING WELL

C. Digiacommo of CH2M HILL was on site setting up to perform the temperature log of the first cement stage of the 16 inch diameter casing at 0900 hours. The temperature log was started at 0930 hours and completed by 1033 hours. The contractor indicated that Florida Geophysical Logging, Inc would perform the cement bond log at about 1000 hours tomorrow August 2, 1991. No further work was performed on the well through this shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: July 31, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The drill rig for the Disposal Well was not active today. Construction will not proceed until a final casing setting depth is approved by FDER.

DUAL-ZONE MONITORING WELL

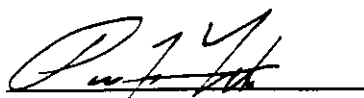
P. Linton received a call from J. Brantley at 0650 hours. The reamed hole had been completed to a total depth of 980 feet. The Contractor indicated that a wiper trip had been performed and that casing installation will begin at 0800 hours.

P. Linton arrived at the job site at 0715 hours. Contractor had tripped out the reamer assembly, but was not prepared to installed casing due to a mechanical breakdown.

Installation of the 16-inch-diameter casing commenced at 0900 hours. Centralizers were placed as required in the specifications. The contractor installed joints 1 through 25 by 1626 hours. A total of 970 feet of 16-inch-diameter casing was installed below the land surface.

Cement calculations were reviewed with J. Brantley of Youngquist Brothers Well Drilling.

The contractor started pressure grouting of the 16-inch-diameter casing at 1928 hours. A total of 606 sacks of cement were pumped (164 barrels) of 4 percent bentonite cement were pumped followed by 236 sacks (50 barrels) of neat cement. Cement returns at the surface were not observed. P. Linton left the job site at 2045 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: July 30, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

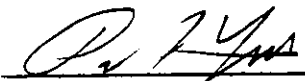
DISPOSAL WELL

The drill rig for the Disposal Well was not active today. Construction will not proceed until a final casing setting depth is approved by FDER.

DUAL-ZONE MONITORING WELL

P. Linton arrived at the job site at 0900 hours. The Contractor continued reconditioning of the 22-1/2-inch borehole. Installation of the 16-inch casing has been rescheduled for Wednesday, July 31, 1991. Pete Mazzella was informed that the 16-inch-diameter casing installation was rescheduled for Wednesday, July 31, 1991.

The surficial monitor wells were sampled from 0830 to 1025 hours. P. Linton measured temperatures, conductivities, chloride content and water levels from 1100 to 1330 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: July 29, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The drill rig for the Disposal Well was not active. Construction will not proceed until a final casing setting depth is approved by FDER.

D. VanNote completed classification of the cuttings and left the job site at 0200 hours.

DUAL-ZONE MONITORING WELL

P. Linton arrived at the job site at 1000 hours. The Contractor commenced redrilling of the 22-1/2-inch reamed borehole for the 16-inch diameter casing. The Contractor redrilled the borehole from a depth of 345 feet to 851 feet during this reporting period.

P. Linton verified the heat numbers on the 16-inch diameter casing for consistency with mill certificates submitted by the Contractor. P. Linton left the job site at 1545 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: July 27, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

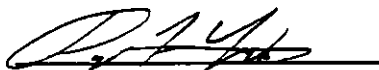
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

D. VanNote arrived at the job site at 2200 hours to perform lithologic descriptions of formation cuttings from 2,100 - 3,300 feet. The Contractor was making the 69th connection and had advanced the 22-1/2 reamed hole to a depth of 2,352 feet. The contractor had advanced the reamed borehole from a depth of 2,111 feet at the start of this reporting period. D. VanNote left the job site at 2400 hours. The Contractor had drilled the reamed hole to a total depth of 2,400 feet at the completion of this report.

DUAL-ZONE MONITORING WELL

The drill rig for the Dual-Zone Monitor Well was not active today. Installation of the 16-inch casing is tentatively scheduled for Monday, July 29, 1991.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: July 28, 1991

FDER I.D. Number	=	505M03127
FDER Permit/Certification Number	=	UC 50-182070
CH2M HILL Project Number	=	SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

P. Linton arrived at the job site at 1300 hours. The reamed hole had been advanced to a depth of 2.562 feet.

Reaming of the borehole for the 16-inch-diameter casing was stopped at a depth of 2.592 feet at 1330 hours to await approval from FDER on final casing seat. At 1600 hours the Contractor commenced tripping out the reamer assembly.

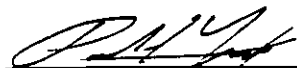
The contractor will postpone drilling activities until a final casing setting depth is approved by the Technical Advisory Committee (TAC).

D. VanNote arrived on site at 2300 hours. Review of the cutting samples was completed to a depth of 3.310 feet.

DUAL-ZONE MONITORING WELL

The drill rig for the Dual-Zone Monitor Well was active today. The contractor reconditioned the drilling fluid and performed maintenance on the rig. The 22-1/2-inch reamer assembly was tripped into the borehole.

Installation of the 16-inch casing is tentatively scheduled for Tuesday, July 30, 1991.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: July 26, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

P. Linton arrived at the job site at 0800 hours. The video camera was at a depth of 2,000 feet. The bottom of the drill pipe was reached at a depth of 2,030 feet. There was zero visibility from the bottom of the drill pipe to a depth of 2,840 feet. From a depth of 2,840 to the bottom of the borehole (at a depth of 3,302 feet) the visibility remained very poor.

Called B. Ziegler and informed him of the poor visibility. A total of approximately 48,000 gallons was injected from 2200 hours on Thursday July 25, 1991, to 0800 hours on Friday July 26, 1991. This was a large enough volume to displace the pilot hole volume six times. The Contractor was instructed to remove the video equipment and commence reaming the pilot hole.

The Contractor killed the well and tripped out the drill pipe from 1000 to 1500 hours. At 1500 the contractor commenced tripping in with the 22-1/2-inch diameter reamer assembly. P. Linton left the job site at 1600 hours.

DUAL-ZONE MONITORING WELL

The drill rig for the Dual-Zone Monitor Well was not active today. Installation of the 16-inch casing is tentatively scheduled for Monday, July 29, 1991.



CH2M HILL DAILY CONSTRUCTION REPORT BOYNTON BEACH

CONCENTRATE DISPOSAL WELL

Date: July 25, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

P. Linton arrived at the job site at 0845 hours. The Contractor was tripping in drill pipe to the bottom of the last casing string (2,000 feet). Florida Geophysical Loggers was setting up for the television survey of the borehole from 2,000-3,000 feet. The Contractor provided the logs listed below.

- 15 Borehole Compensated Sonic Logs W/VDL
- 16 Dual Induction /SFL Logs
- 15 Fracture Identification Logs
- 1 Field Copy of the Gyroscopic Survey for the 12-1/2-inch diameter Pilot Borehole from a depth of 2,070 to 3,270 feet

The contractor packaged and shipped cutting samples to the USGS office in Tallahassee. Flushing of the borehole with potable water commenced at 0900 hours at a rate of 80 gpm.

B. Ziegler arrived at the job site at 1300 hours. The video survey of the pilot hole for the disposal well commenced at about 1300 hours. The water was very cloudy and the borehole side were not visible from a depth of about 2,050 to 2,970 feet. The water became relatively clear at a depth of about 3,000 feet and remained clear to the maximum depth of 3,302 feet. B. Ziegler instructed the contractor to continue flushing of the borehole with potable water and left the job site at 1430 hours.

The contractor continued to inject the well with potable water at about 80 gpm until 1730 hours when the drill head seals started leaking and required replacement. A second television survey was attempted from 1800 to 1820 hours. The water was very cloudy from a depth of 2.070 feet to the bottom of the bore hole.

From 1900 to 2200 hours the well was killed and the wellhead seals were replaced. The contractor restarted injection of potable water at 2200 hours, which continued through the end of the shift. P. Linton left the job site at 2215 hours.

DUAL-ZONE MONITORING WELL

The drill rig for the Dual-Zone Monitor Well was not active today. Installation of the 16 inch casing is tentatively scheduled for Monday, July 29, 1991.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 24,1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

K. Greuel informed B. Ziegler at 0200 hours that the pilot hole had been completed to a depth of 3,311 feet at 0030 hours. The borehole was circulated and prepared for the gyroscopic survey which began at 0220 hours.

B. Ziegler arrived on site at 0250 hours to observe the gyroscopic survey. The gyroscopic survey was completed at 0350 hours. B. Ziegler left the site at 0410 hours. The Contractor tripped the 12 1/4 inch pilot bit out and prepared for geophysical logging.

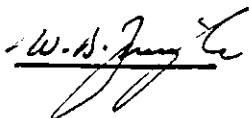
C. DiGiacomo arrived on site at 0850 hours and set up to perform geophysical logging. B. Ziegler arrived on site at 1130 hours. The geophysical logging (gamma ray, temperature, LSN electric, fluid resistivity, and caliper logs) commenced at 0940 hours and was completed at 1520 hours.

Schlumberger Well Services arrived on site at 1330 hours and set up for geophysical logging. Schlumberger began geophysical logging (fracture identifier, borehole compensated sonic, and dual induction logs) at 1600 hours and completed logging at hours.

B. Ziegler left the site hours. The remainder of the shift was spent preparing for the black and white video survey tentatively scheduled for tomorrow morning.

DUAL-ZONE MONITOR WELL

No activity. Installation of the 16 inch casing is scheduled for Monday, July 29, 1991.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 23,1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

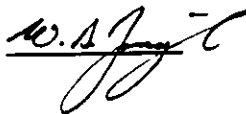
B. Ziegler and A. Muniz arrived on site at 1130 hours. The pilot hole had been advanced to 3,221 feet. Individual core sections were selected for horizontal and vertical permeability and porosity analysis. The cores will be shipped to Ardaman & Associates by Youngquist Brothers tomorrow.

B. Ziegler and A. Muniz left the site at 1230 hours. B. Ziegler returned to the site at 1330 hours.

K. Greuel will contact B. Ziegler when pilot hole is completed to a depth of 3,300 feet and the gyroscopic survey begins. B. Ziegler left the site at 1600 hours. The pilot hole was down to 3,251 feet. Drilling continued through the end of this shift report.

DUAL-ZONE MONITOR WELL

No activity. J. Brantley stated that the 16 inch casing will be installed on Monday, July 29, 1991.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 22, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

Drilling of the pilot hole continued through the shift. The pilot hole had been advanced to 2,951 feet at 0700 hours.

B. Ziegler arrived on site at 1700 hours. The plot hole was down to 3,059 feet. B. Ziegler left the site at 1800 hours.

At the close of this shift report the pilot hole was down to 3,131 feet.

DUAL-ZONE MONITOR WELL

No activity.

W. A. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 21,1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

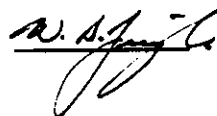
D. Snyder arrived on site at 0732 hours. The pilot hole had been advanced to 2,785 feet. Drilling of the pilot hole continued through the shift.

B. Ziegler was updated on drilling progress at 1030 hours. Gyroscopic survey was tentatively scheduled for Tuesday, July 23, 1991. Geophysical logging was tentatively scheduled for Wednesday, July 24, 1991.

D. Snyder off site at 1300 hours. Drilling of the pilot hole continued through the end of this shift report to a depth of 2,838 feet.

DUAL-ZONE MONITOR WELL

No activity.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 20,1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

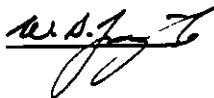
Coring was completed to a depth of 2,661 feet at 0345 hours. The core was tripped out and on the surface at 0620 hours. D. Snyder arrived on site at 0640 hours and observed removal of the core from the core barrel (cored interval 2,651 to 2,661 feet). The core was predominately dolomite with pieces of chert. A total of 2.5 feet (25 percent) of core was recovered. The Contractor was informed that the core was unacceptable and instructed to continue the pilot hole to approximately 3,300 feet.

The Contractor tripped the 12 1/4 inch pilot bit to 2,651 feet and began drilling at 1600 hours. D. Snyder off site at 1603 hours.

D. Snyder on site from 1912 to 2031 hours. Drilling of the pilot hole continued through the end of this report. The pilot hole had been drilled to 2,730 feet at 2400 hours.

DUAL-ZONE MONITOR WELL

No activity.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 19,1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

D. Snyder on site at 0710 hours. The pilot hole had been drilled to a depth of 2,567 feet. Drilling of the 12 1/4 inch pilot hole commenced at 0100 hours. The Contractor reached the next core depth (2,651 feet) at 1245 hours. The pilot bit was tripped out of the hole at 1800 hours and set up for coring began. D. Snyder off site at 1700 hours.

The core barrel was tripped in and coring commenced (2,651 feet) at 2300 hours. D. Snyder on site from 2330 hours through the end of this shift report. The remainder of the shift was spent coring.

DUAL-ZONE MONITOR WELL

No activity.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 18,1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

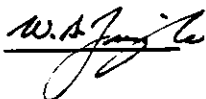
D. Snyder on location at 0658 hours. Contractor completed tripping in hole with core barrel to a depth of 2,441 and began coring at 0830 hours. Coring was completed to a depth of 2,456 feet and the Contractor began tripping out at 0955 hours. D. Snyder observed removal of the core from the core barrel at 1205 hours. The core was predominately limestone with 80 percent recovery (12 feet). The core was labeled and stored for analysis. The Contractor was informed that the core was acceptable and to proceed to the next core depth.

B. Ziegler on site from 1230 to 1330 hours to review drilling and coring progress. D. Snyder off site at 1900 hours.

The Contractor tripped the 12 1/4 inch pilot bit in to a depth of 2,441 feet and began and began setting up to drill at 2000 hours. D. Snyder on site from 2215 to 2240 hours. The remainder of the shift was spent rigging up to drill pilot hole.

DUAL-ZONE MONITOR WELL

Received a call from Bart Ziegler at 1548 hours. The upper monitor zone of 970 feet to 1,020 feet had been approved by FDER. K. Greuel and J. Brantley were informed the upper monitor zone had been approved and to proceed with installation of the 16 inch casing to 970 feet. Brantley stated that drilling would commence as soon as possible.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 17, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

Drilling of the pilot hole was stopped at a depth of 2,411 feet at 0020 hours and circulated until 0100 hours in preparation for the next core interval. The 12 1/4 inch diameter pilot bit was tripped out of the hole at 0550 hours. The core barrel was tripped in the hole and coring commenced at 2,411 feet at 1115 hours.

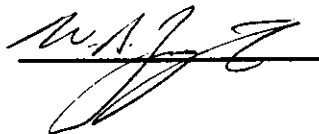
D. Snyder arrived on site at 0815 hours. The Contractor completed coring to a depth of 2,426 feet (15 feet) and began tripping out of the hole at 1300 hours. D. Snyder observed removal of the core at 1600 hours. The core was predominantly limestone with 85 percent recovery. The core was labeled and stored for analysis. The Contractor was informed that the core was acceptable and to continue to the next core interval. The Contractor began tripping the 12 1/4 inch diameter pilot bit in the hole at 1700 hours.

D. Snyder left the job site at 1730 hours.

D. Snyder returned to the site at 2310 hours. The Contractor began drilling the pilot hole at a depth of 2,411 feet at 2315 hours. The remainder of the shift was spent drilling the pilot hole.

DUAL ZONE MONITOR WELL

No work activity. Waiting on approval of the upper monitor zone from the Technical Advisory Committee.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 16, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

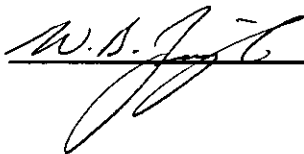
This shift report began with the core assembly being tripped to the surface from the cored interval of 2,351 to 2,365 feet. B. Ziegler observed removal of the core from the core barrel at 0130 hours. The core was predominately limestone with 100 percent recovery (14 feet). The core was labeled and stored for analysis. The Contractor was informed that the core was acceptable and to proceed to the next core interval.

B. Ziegler off site at 0300 hours. Maintenance was performed on the kelly swivel until 1630 hours. The pilot bit was tripped in the hole and drilling resumed at 1900 hours at a depth of 2,351 feet.

The remainder of the shift was spent drilling the pilot hole. A total depth of 2,390 feet had been reached at the end of the this report period.

DUAL ZONE MONITOR WELL

No work activity. Waiting on approval of the upper monitor zone from the Technical Advisory Committee.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 15, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

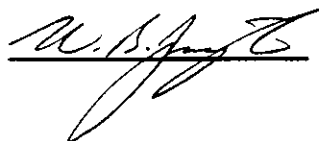
DISPOSAL WELL

The 12 1/4 inch pilot bit was tripped in and drilling resumed at a depth of 2,200 at 2400 hours. The pilot hole was completed to a depth of 2,351 feet and the Contractor tripped the pilot bit out of the hole in preparation for the next core interval. The core barrel was assembled and tripped in the hole. Coring began at a depth of 2,351 feet at 2040 hours.

Coring was completed to a depth of 2,365 feet at 2245 hours. B. Ziegler arrived site at 2400 hours. This report period ended with the core assembly being tripped out of the hole.

DUAL ZONE MONITOR WELL

No work activity. Waiting on approval of the upper monitor zone from the Technical Advisory Committee.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 14, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

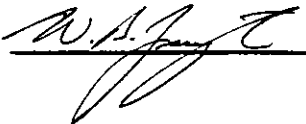
Drilling of the pilot hole was stopped at a depth of 2,200 feet at 0130 hours in preparation for the second core interval. The pilot bit was removed and the core barrel was tripped in to 2,200 feet. Coring commenced at 0915 hours and was completed to a depth of 2,214 feet at 1415 hours.

P. Linton arrived at the job site at 1200 hours.

The core was tripped to the surface and removed from the core barrel at 1730 hours. Seven feet of limestone core was recovered. The sample was labeled and stored for testing. B. Ziegler was informed of the results at 1830 hours. The core was accepted and the Contractor was instructed to proceed to the next core interval. P. Linton left the job site at 2000 hours.

DUAL ZONE MONITOR WELL

No work performed. Waiting on approval of the upper monitor zone from the Technical Advisory Committee.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 13, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

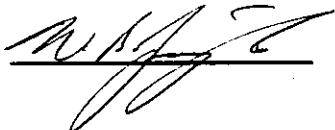
D. Snyder arrived at the job site at 0700 hours. The contractor had completed tripping out the pilot bit and had commenced tripping in with the core barrel. Coring began at a depth of 2,130 feet at 0920 hours. Coring was completed to a depth of 2,147 feet at 1200 hours. The Contractor began tripping the core barrel out of the hole and D. Snyder left the job site at 1205 hours.

B. Ziegler arrived at the job site at 1430 hours and observed removal of the core from the core barrel. P. Linton arrived on site at 1515 hours. The core sample was predominately limestone with 100 percent recovery. The samples were labeled and stored for testing. B. Ziegler and P. Linton left the site at 1630 hours.

The 12 1/4 inch pilot bit was tripped in the hole and drilling resumed at 2100 hours. The pilot hole was at a total depth of 2,170 feet at the end of this report period.

DUAL ZONE MONITOR WELL

No work was performed on the well. Waiting on approval from the Technical Advisory Committee for the upper monitor interval.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 12, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

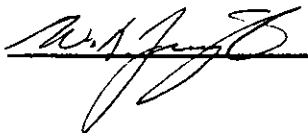
DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

D. Snyder arrived at the job site at 0910 hours. Repair of the engine supercharger was completed at 0900 hours. The contractor tripped the 12 1/2 inch diameter pilot in the hole and commenced drilling at a depth of 2,021 feet at 1620 hours. The borehole was advanced to the first core interval of 2330 feet and began tripping out. The remainder of the shift was spent tripping the pilot bit out of the hole.

DUAL ZONE MONITOR WELL

Reaming of the 22 1/2 inch diameter borehole continued through the shift. A total depth of 881 feet was reached at 1615 hours. Reaming of the borehole was stopped to wait for approval from FDER on the upper monitor interval. The reamer assembly was tripped up to 330 feet within the 30 inch casing at 1900 hours. D. Snyder left the job site at 2330 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 11, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

P. Linton arrived at the job site at 0830 hours. The surficial monitoring wells were sampled from 1115 to 1215 hours. The samples were analyzed for temperature, conductivity and chlorides content. B. Ziegler visited the site from 1115 to 1150 hours. P. Linton left the job site at 1215 hours.

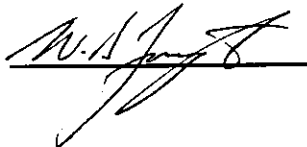
P. Linton on site from 1400 to 2105 to update paper work and prepare the formation samples for geological classification.

DISPOSAL WELL

Drilling of the 24 1/2 inch diameter "Duck's Nest" was completed to 2,021 feet at 0530 hours. The reamer assembly was tripped to the surface at 0830 hours. The rig was shut down the remainder of the shift as a result of mechanical failure with the engine's supercharger.

DUAL ZONE MONITOR WELL

Drilling of the 22 1/2 inch diameter hole did not commence as noted at the conclusion of the July 10, 1991 daily report do to servicing of the rig. Reaming of the 22 1/2 inch borehole commenced at 1400 hours. The reamed hole was at a total depth of approximately 600 feet at the close of this report period.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 10, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The Contractor released the pressure on the 26 inch casing at 0700 hours and began rigging up to drill out the cement at the base of the 26 inch casing. Tripping in of the 24 1/2 inch diameter reamer assembly began at 1200 hours. The cement plug was tagged at 1,992 feet. Drilling of the "Duck's Nest" commenced at 2200 hours and continued through the end of this shift.

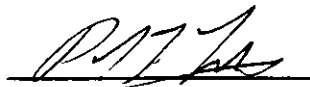
DUAL ZONE MONITOR WELL

This report began with the Contractor completing a wiper trip to 1,011 feet in preparation for geophysical logging. Superior Survey Systems arrived on site at 0400 hours and began performing the gyroscopic survey. P. Linton arrived on the job site at 0600 hours. The gyroscopic survey was completed at 0645 hours and the Contractor began tripping out the 12 inch pilot bit.

C. DiGiacomo arrived on site with the CH2M Hill logging equipment at 0845 hours. P. Linton left the job site at 0915 hours.

P. Linton returned to the job site at 1130 hours. Geophysical logging of the pilot hole (caliper, LSN electrical, and gamma ray) commenced at 1130 hours and was completed at 1250 hours.

The contractor commenced reaming of the pilot hole to 22 1/2 inches in diameter at 1600 hours. P. Linton left the job site at 1830 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 9, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

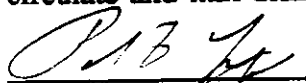
P. Linton was at the job site at the start of this reporting period due noise complaint. P. Mazzella arrived at the job site at 0015 to check the noise levels. P. Linton, P. Mazzella, and K. Grueul walked the job site to monitor the noise levels. The noise levels were moderate to low. P. Mazzella left the job site at 0025 hours. P. Linton left the job site at 0030 hours.

P. Linton arrived at the job site at 0600 hours. The contractor tagged the top of the 21st lift at a depth of 580 feet on both the east and west side. The Contractor began pumping the 22nd stage at 0654 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 12 was completed at 0714 hours. A total of 311 sacks of cement were used to produce 121 barrels (total volume) of 12 percent bentonite mix. P. Linton left the job site at 0930 hours.

P. Linton arrived at the job site at 1740 hours. The top of the 22nd cement stage was tagged at a depth of 280 feet by the east and west tremie lines. The Contractor began pumping the 23rd stage at 1800 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 23 was completed at 1816 hours. A total of 278 sacks of cement were used to produce 108 barrels (total volume) of 12 percent bentonite mix. P. Linton left the job site at 2000 hour.

DUAL ZONE MONITOR WELL

The pilot hole for the second casing string was advanced to a total depth of 1,011 feet. The borehole had a partial circulation loss at a depth of 1,005 feet. The contractor continued to circulate and mix drilling fluids for the rest of this reporting period.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 8, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

The grouting of 20th stage was in progress at the start of this reporting period. Stage No. 20 was completed at 0020 hours. A total of 176 sacks of cement were used to produce 37 barrels (total volume) of neat mix. B. Ziegler left the job site at 0045 hour.

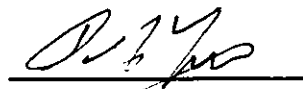
P. Linton arrived at the job site at 0945 hours. The Contractor was performing maintenance on cement batch plant.

At 1000 hours the top of the 20th cement stage was tagged at depths of 880 and 880 feet by the east and west tremie lines, respectively. The Contractor began pumping the 21th stage at 1233 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 21 was completed at 1254 hours. A total of 304 sacks of cement were used to produce 118 barrels (total volume) of 12 percent bentonite mix. P. Linton left the job site at 1500 hours.

P. Linton arrived at the job site at 2345 hours to observe the 22nd grouting stage. Contractor had received site visit and noise complaint from H. Merkin from 2300 to 2330 hours. Noise level at the site was moderate to low. The contractor postponed the grouting of the 22nd stage until 0700 hours to prevent further noise complaints.

DUAL ZONE MONITOR WELL

Drilling of the pilot hole for the second casing interval commenced at approximately 1000 hours. Drilling of the pilot hole continued through the end of this reporting period.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 7, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

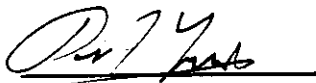
B. Ziegler arrived at the job site at 0850 hours.

The top of the 18th cement stage was tagged at depths of 1,069 and 1,066 feet by the east and west tremie lines, respectively. The Contractor began pumping the 19th stage at 0950 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 19 was completed at 0950 hours. A total of 225 sacks of cement were used to produce 62 barrels (total volume) of 4 percent bentonite mix. B. Ziegler called A. Muniz and updated him on the status of the job. B. Ziegler left the job site at 1030 hours

B. Ziegler arrived at the job site at 2330 hours. The top of the 19th cement stage was tagged at depths of 972 and 971 feet by the east and west tremie lines, respectively. The Contractor began pumping the 20th stage at 2354 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. The grouting of stage 20 continue through the end of this reporting period.

DUAL ZONE MONITOR WELL

No activities performed on monitor well.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 6, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

Grouting of the 16th stage was in progress at the start of this reporting period. A total of 205 sacks of cement were used to produce 80 barrels (total volume) of 12 percent bentonite mix. B. Ziegler left the job site at 0045 hours.

B. Ziegler arrived at the job site at 1050 hours. At 1050 hours the top of the 16th cement stage was tagged at depths of 1,371 and 1,373 feet by the east and west tremie lines, respectively. The Contractor began pumping the 17th stage at 1056 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 17 was completed at 1155 hours. A total of 226 sacks of cement were used to produce 88 barrels (total volume) of 12 percent bentonite mix. B. Ziegler left the job site at 1220.

A. Muniz arrived at the job site at 2145 hours. The top of the 17th cement stage was tagged at depths of 1,262 and 1,261 feet by the east and west tremie lines, respectively. The Contractor began pumping the 18th stage at 2205 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 18 was completed at 2248 hours. A total of 460 sacks of cement were used to produce 127 barrels (total volume) of 4 percent bentonite mix. A. Muniz left the job site at 2315 hours

DUAL ZONE MONITOR WELL

Contractor indicated that the monitoring well rig would be inactive until monday. The contractor finished conditioning of the drilling fluid.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 5, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

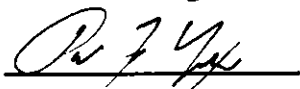
B. Ziegler arrived at the job site at 0745 hours. At 0745 hours the top of the 13th cement stage was tagged at depths of 1,580 and 1,580 feet by the east and west tremie lines, respectively. The Contractor began pumping the 14th stage at 0800 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 14 was completed at 0838 hours. A total of 254 sacks of cement were used to produce 70 barrels (total volume) of 4 percent bentonite mix. B. Ziegler left the job site at 1100 hours.

B. Ziegler arrived at the job site at 1600 hours. The top of the 14th cement stage was tagged at depths of 1,541 and 1,540 feet by the east and west tremie lines, respectively. The Contractor began pumping the 15th stage at 1635 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 15 was completed at 1715 hours. A total of 233 sacks of cement were used to produce 90 barrels (total volume) of 12 percent bentonite mix. B. Ziegler left the job site at 1730 hours.

B. Ziegler arrived at the job site at 2300 hours. The top of the 15th cement stage was tagged at depths of 1,465 and 1,464 feet by the east and west tremie lines, respectively. The Contractor began pumping the 16th stage at 2343 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. The grouting of Stage No. 15 continued through the end of this reporting period.

DUAL ZONE MONITOR WELL

The Contractor performed rig maintenance before commencing with the pilot hole. Contractor began conditioning mud for drilling at 2340 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date July 4, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

DISPOSAL WELL

D. Snyder arrived at the job site at 0645 hours.

At 0830 hours the top of the 12th cement stage was tagged at depths of 1,610 and 1,610 feet by the east and west tremie lines, respectively. The Contractor began pumping the 13th stage at 1015 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 13 was completed at 1110 hours. A total of 225 sacks of cement were used to produce 62 barrels (total volume) of 4 percent bentonite mix.

DUAL ZONE MONITOR WELL

The Contractor tagged the top of the cement inside of the 24 inch diameter casing at a depth of 340 feet. The Contractor drilled out the cement plug with a 23 inch diameter bit. The Contractor tripped out the 23 inch diameter bit and changed to the 9 1/2 inch diameter pilot bit.

D. Snyder left the job site at 2005 hours.



**CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL**

Date: July 3, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

MONITOR WELL

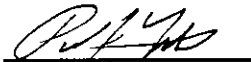
D. Snyder arrived at the job site at 0645 hours. The contractor tagged the top of the second cement stage for the 24-inch-diameter at a depth of 4 feet below ground surface. No activity scheduled for the monitor well for the remainder of this reporting period.

DISPOSAL WELL

At 0710 hours, the top of the 10th cement stage was tagged at depths of 1,730 and 1,730 feet by the east and west tremie lines, respectively. Stage No. 11 commenced at 0753 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 11 was completed at 0806 hours. A total of 295 sacks of cement were used to produce 62 barrels of neat cement mix.

At 1715 hours, the top of the 11th cement stage was tagged at depths of 1,640 and 1,640 feet by the east and west tremie lines, respectively. Stage No. 12 began at 1829 hours. The two tremie lines were placed 180° apart approximately 10 feet above the top of the previous lift. Stage No. 12 was completed at 1907 hours. A total of 423 sacks of cement were used to produce 116 barrels of 4 percent bentonite mix.

D. Snyder left the job site at 2005 hour.



CH2M HILL DAILY CONSTRUCTION REPORT BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: July 2, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: David Snyder and Paul Linton

DESCRIPTION OF ACTIVITIES:

DUAL ZONE MONITORING WELL

D. Snyder arrived at the job site at 0645 hours, the Contractor was tripping the drill bit and rods out of monitor well. C. Digiacommo arrived on sight with the CH2M Hill logging equipment at 0705 hours. Geophysical logging (caliper, gamma ray and LSN electrical) commenced at 0808 hours and was completed at 0930 hours.

The Contractor started the 24 inch diameter casing run at 0959 hours. At 1230 hours the 24-inch casing was stuck by differential pressure to the borehole side at a depth of 339 feet. Mud was circulated by a connection to the header at a rate of 500 gpm from 1410 hours until the casing was freed at 1651 hours. Casing installation resumed and the bottom of the casing was set at a depth of 345 feet below land surface at 1655 hours. The Contractor then set up for pressure grouting using 2-3/8-inch-diameter tremie pipe. The pressure grouting started at 1810 hours and was completed at 1835 hours. A total of 650 sacks of cement were used to produce 135 barrels of neat cement mix.

CONCENTRATE DISPOSAL WELL

At 0811 hours the top of the 8th cement stage was tagged at a depth of 1,828 and 1,826 feet by the east and west tremie lines, respectively. Cementing of Stage No. 9 commenced at 0911 hours. Two tremie lines were placed 180 degrees apart approximately 10-feet above the cement tag. Stage No. 9 was completed at 0934 hours. A total of 149 sacks of cement were used to produce 58 barrels of 12 percent bentonite mix.

At 1930 hours, Stage No. 9 was tagged at depth of 1,809 and 1,810 feet for the east and west tremie lines, respectively. Cementing of Stage No. 10 started at 1944 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag.

Stage No. 10 was completed at 1956 hours. A total of 115 sacks of cement were used to produce 45 barrels of 12 percent cement mix.

P. J. Y.

CH2M HILL DAILY CONSTRUCTION REPORT BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: July 1, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Dave Snyder and Paul Linton

DESCRIPTION OF ACTIVITIES:

P. Linton arrived at the job site at 0715 hours. Stage No. 6 was tagged at a depth of 1,855 and 1,857 feet by the east and west tremie lines, respectively. The two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag. A total of 136 sacks of cement were used to produce 53 barrels of 12 percent mix.

D. Snyder arrived at the job site at 0940 hours.

The 28-1/2-inch-diameter borehole for the monitor well was advanced to a depth 295 feet at 0959 hours. The monitor well borehole was completed to a total depth of 345 feet at 1348 hours. The contractor indicated that he would continue to circulate and condition the hole in preparation for the logging scheduled for tomorrow, July 2, 1991 at 0735 hours.

The top of the 7th cement stage of the disposal well was tagged at depths of 1,850 and 1,852 for the east and west sides, respectively. Stage No. 8 commenced at 1815 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag. Stage No. 8 was completed at 1846 hours. A total of 141 sacks of cement were used to produce 55 barrels of 12 percent mix.

D. Snyder left the job site at 1900 hours.



CH2M HILL DAILY CONSTRUCTION REPORT BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 30 ,1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

P. Linton arrived at the job site at 0100 hours. Based on the results of the first four stages and the X-Y caliper log it was decided to pump 12 percent bentonite cement for the fifth stage. J. Brantley decide to postpone the schedule cement lift until tomorrow to allow time to prepare the water and bentonite mixture for the 12 percent lift. P. Linton left the job site at 0215 hours.

At 0900 hour K. Grueul called B. Ziegler to inform him that the crew was ready to pump the fifth stage of cement. B. Ziegler arrived at the job site at 0930 hours. The fourth stage of the cement was tagged at a depth of 1,877 and 1,878 feet for the east and west sides respectively. The fifth lift stage began at 0941 hours. The two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag. Stage No. 5 was completed at 1021 hours. A total of 141 sacks (55 barrels) of 12 percent were pumped.

The contractor commenced drilling on the monitor well and has advance the 28-1/2-inch-diameter borehole to a depth about 145 feet. The contractor indicated that drilling of the monitor well would occur only during the day light hours. B. Ziegler left the job site at 1130 hours. The monitoring well borehole was advanced to a depth of 195 feet.

P. Linton arrived at the job site at 1800 hours and reviewed the cement calculations with the Contractor. T. Sharp arrived at the job site at 1830 hours. Stage No. 5 was tagged at depths of 1,860 and 1,862 feet on the east and west tremie line, respectively. The Contractor started the sixth cement stage at 1850 hours. The two tremie lines were placed 180 degrees apart approximately 10-feet above the cement tag. The Contractor completed Stage No. 6 at 1916 hours. A total of 152 sacks of cement were used to produce 32 barrels of neat cement. P. Linton left the job site at 1920.



CH2M HILL DAILY CONSTRUCTION REPORT BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 29, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

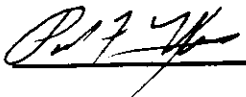
DESCRIPTION OF ACTIVITIES:

Cementing of stage No. 2 was in progress at the beginning of this report. Stage No. 2 was terminated at 0020 hours due to a mechanical breakdown in the tornado pump of cement truck. A total of 343 sacks (72 barrels) of neat cement were pumped. P. Linton and B. Ziegler left the job site at 0130 hours.

P. Linton arrived at the job site at 1110 hours. Stage No. 2 had been tagged at depths of 1,877 and 1,878 feet for the east and west tremie lines, respectively. B. Ziegler arrived at the job site and reviewed the cement calculations with Contractor. The third stage of cementing for the 26-inch-diameter casing commenced at 1130 hours. The two tremie lines were placed 180 degrees apart approximately 10 feet above the cement area. Stage No. 3 was completed at 1157 hours. A total of 143 sacks of cement were used to make 30 barrels of neat mix.

B. Ziegler left the job site at 1220 hours. P. Linton left the job site at 1230 hours.

P. Linton returned to the job site at 1800 hours to observe the fourth cementing stage for the 26 inch diameter casing. Stage No. 3 had been tagged at depths of 1,877 and 1,878 feet on the east and west tremie lines, respectively. P. Linton reviewed the cement calculations with the Contractor. The fourth stage of cementing began at 1812 hours. The two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag. Stage No. 4 was completed at 1827 hours. A total of 286 sacks of cement were used to produce 60 barrels of neat mix. P. Linton left the job site at 1900 hours.



**CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL**

Date: June 28, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

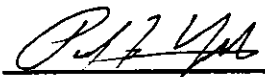
DESCRIPTION OF ACTIVITIES:

Paul Linton arrived at the job site at 2015 hours to check on the status of preparations for the second cement stage. The contractor indicated that he would be using two 1-1/2-inch-diameter tremie pipes for this stage and that he estimated they would be ready at about 2300 hours. Paul Linton left the job site at 2030 hours.

P. Linton and B. Ziegler arrived at the job site at 2300 hours. P. Linton the reviewed tremie line tallies. B. Ziegler reviewed cement calculations with the Contractor.

The Contractor tagged the top of the first lift at a depth of 1,882 feet and 1,883 feet on the east and west tremie lines, respectively.

The second cement stage commenced at 2350 hours. Two tremie lines were placed 180 degrees apart approximately 10 feet above the cement tag. The contractor continued to pump neat cement through the end of this reporting period.



CH2M HILL DAILY CONSTRUCTION REPORT BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 27, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

P. Linton continued observing the installation of the casing. By the end of June 27, 1991, 10 joints of the 26-inch-diameter casing had been installed. The noise of installation was controlled by operating the equipment at idle speeds. Centralizers were installed as specified.

The contractor had installed joint 31 by 0700 hours (about 1,241 feet of 26-inch-diameter casing). B. Ziegler arrived at the job site at 0700 hours. The contractor commenced day light procedure by ceasing the noise control protocol and increasing the installation rate.

P. Linton left the job site at 0720 hours. B. Ziegler reviewed tallies and called A. Muniz with update on the project status. The contractor estimated that drilling of the monitoring well would start this weekend. The contractor has been waiting on new desanding equipment before commencing the 28-1/2-inch borehole to a depth of approximately 350 feet.

Geophysical logging was tentatively scheduled (temperature log on first stage of cement) for tomorrow night. Cement calculations were reviewed by B. Ziegler and J. Brantley of Youngquist Brother, Inc. J. Brantley agreed with the plan to pump about 500 sacks of neat cement which would yield about 300 feet of theoretical fill. The volume calculations were based on the diameters measured by the X-Y caliper logging of the reamed borehole. The last joint of 26-inch-diameter casing was set at 1340 hours. B. Ziegler left the job site at 1350 while Contractor rigged up to pressure grout 26-inch casing.

P. Linton returned to the job site at 1945 hours and checked on the 2-3/8-inch-diameter tubing tally for the pressure grout. A. Muniz and B. Ziegler arrived at the job site at 2030 hours. Cement quantities were reviewed before cementing began.

The contractor started the first cement stage for the 26-inch-diameter casing at 2100

hours. Neat cement was pumped until the header pressure stopped increasing indicating that the cement had stopped rising in the annulus. Stage No. 1 was completed at 2130 hours. A total of 585 sacks of cement were used to make 88 barrels of neat mix. A. Muniz and B. Ziegler left the job site at about 2230 hours.

The surficial monitoring wells were sampled from 2245 to 2345 hours. P. Linton left the job site at 2330 hours.

P. Linton

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 26, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

Reaming of the 32-1/2-inch-diameter borehole continued. B. Ziegler received a call from K. Greuel at 0315 hours. The reamed hole had been completed to a total depth of 2,010 feet. The Contractor will perform a wiper trip up to the base of the 34-inch casing to determine if the borehole will remain open for casing installation.

The reamer assembly or stabilizers hit a ledge at 1,915 feet. Contractor re-reamed borehole from 1,900 to 2,010 feet to insure installation of casing.

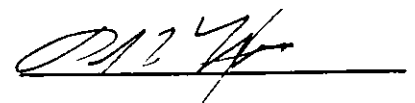
P. Linton on-site at 0900 hours. Contractor began tripping out of the hole at 1210 hours and began setting up to install 26-inch casing. The casing tally was checked and mill certificates reviewed for compliance with specifications.

P. Linton off-site at 1230 hours. Contractor instructed to notify Engineer one hour before casing installation begins.

P. Linton and B. Ziegler on-site 2030 hours. Installation of the 26-inch-diameter casing commenced at 2130 hours. Centralizers were placed as specified in the specifications.

B. Ziegler off-site at 2230 hours.

Installation of the casing continued through the end of the shift. A total of 400 feet of casing had been installed at 2400 hours.



dbt098/101.51

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 25, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

The Contractor continued rigging up to trip the new 32-1/2-inch reamer assembly in the hole. Tripping in the hole began at 0300 hours.

P. Linton on-site 1015 hours. Tripping in with reamer assembly continued.

J.I. Garcia-Bengochea on-site at 1235 hours. B. Ziegler on-site at 1250 hours. A review of all field files was conducted by J.I. Garcia-Bengochea.

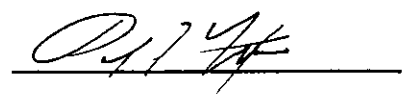
Contractor tagged bottom of reamed hole 1,944 feet and began reaming at 1330 hours.

T. McCormick on-site at 1430 hours to review project progress.

B. Ziegler, T. McCormick and J.I. Garcia-Bengochea off-site at 1519 hours.

Reaming of the 32-1/2-inch borehole continued through the end of the shift.

P. Linton off-site at 1800 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 24, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

Penetration of the 32-1/2-inch-diameter reamed hole stopped at 1,944 feet, 0130 hours. Contractor suspected a problem with the reamer assembly and began tripping out of the hole.

D. Snyder on-site at 0700 hours. Reamer assembly on the surface at 0815 hours. One roller cone was missing from the reamer assembly. Contractor began fabricating "junk" basket to retrieve roller.

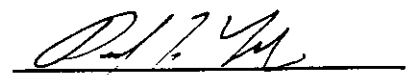
P. Linton on-site 0900 hours to update field files. B. Ziegler on-site 1100 hours. D. Snyder, B. Ziegler, and P. Linton off-site 1300 hours. Contractor continued fabricating basket to retrieve roller.

Contractor began tripping junk basket in hole at 1430 hours. Bottom of 32-1/2-inch reamed hole was tagged at 1,948 feet, 1830 hours. The junk basket was removed from the hole with care after rotating on the bottom for approximately 15 minutes.

B. Ziegler received call from J. Brantley at 0930 hours. The roller had been retrieved on the first trip.

P. Linton on-site at 2245 hours to inspect roller assembly. Roller piece matched those remaining on the 32-1/2-inch reamer assembly. P. Linton off-site 2315 hours.

Remainder of shift was spent rigging up to trip new 32-1/2-inch reamer assembly in the hole.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 23, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

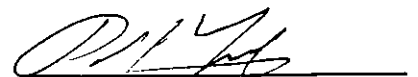
D. Snyder arrived on-site at 0700 hours. Contractor continued reaming of the 32-1/2-inch borehole. Reamed hole was at a depth of 1,915 feet. Contractor noted that the 32-1/2-inch-diameter borehole was still dredging a significant amount of formation.

A load of 24-inch-diameter casing for the dual-zone monitor well arrived on-site at 0740 hours. The casing had been sandblasted to remove a protective coating from the casing. Heat numbers were recorded and were visible on the inside and outside of the casing.

The Contractor's drill pipe tally for the 32-1/2-diameter reamed borehole was reviewed and confirmed by the Engineer.

Reaming of the borehole continued through the shift. A total depth of 1,932 feet had been reached when D. Snyder left the job site at 1350 hours.

D. Snyder returned to the job site at 1442 hours. Reamed hole at a depth of 1,942 feet. D. Snyder left the job site at 1730 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 22, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

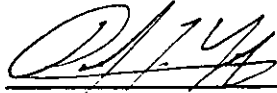
D. Snyder arrived on-site at 0710 hours. Contractor reaming pilot hole at a depth of 1,879 feet. Contractor reaming and dredging the 32-1/2-inch-diameter borehole at a depth of 1,887 feet, 0830 hours.

Contractor working on both the cementing equipment and the drill rig for the monitoring well. Contractor continues to have slow progress with setting up the monitoring well rig. Mud pump motors not functioning properly.

D. Snyder left the job site at 1300 hours.

D. Snyder returned to the job site at 1530 hours. Contractor continued to ream and dredge with very little progress at a depth of 1,902 feet. D. Snyder left the job site at 1745 hours.

D. Snyder made a site visit from 2010 to 2100 hours. Contractor has not advanced the hole below a depth of 1,902 feet.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 21, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

D. Snyder arrived at the job site at 0915 hours. The contractor continued reaming of the 32-1/2-inch-diameter borehole. The reamed hole was advanced to a depth of 1,846 feet. D. Snyder phoned A. Muniz and updated him on the project status at 1040 hours. D. Snyder left the job site at 1305 hours.

D. Snyder returned to the job site at 1352 hours. Contractor continued reaming borehole at a depth of 1,853 feet. Penetration rate remained very low due to dredging. D. Snyder checked and tabulated lengths and heat numbers of the 26-inch-diameter casing on-site.

Contractor continues to set up the Gardner Denver 3000 drill rig for the monitor well. D. Snyder left the job site at 1630 hours.

D. Snyder returned for a site visit from 2000 to 2130 hours. Contractor slowly continued reaming and dredging at a depth of 1,871 feet.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 20, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

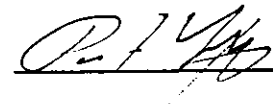
B. Ziegler and A. Muniz arrived on-site at 1040 hours.

Contractor continued reaming of pilot hole to 32-1/2-inch-diameter. The reamed hole was at a depth of 1,776 feet.

A. Muniz called and updated J.I. Garcia-Bengochea on project status. Cuttings continue to be collected from the mud tank and hauled to the approved disposal site.

B. Ziegler and A. Muniz left the job site at 1200 hours.

B. Ziegler and A. Muniz returned to the job site at 1230 hours. The 32-1/2-inch-diameter borehole was advanced to a depth of about 1,800 feet at 1630 hours. B. Ziegler and A. Muniz left the job site at about 1700 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 19, 1991

FDER I.D. Number	=	505M03127
FDER Permit/Certification Number	=	UC 50-182070
CH2M HILL Project Number	=	SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

P. Linton arrived on the job site at 1440 hours. Reaming of the 32-1/2-inch borehole continued and was at a depth of about 1,650 feet.

The surficial monitoring wells were purged and sampled from 1000 to 1400 hours. Water levels were also collected.

The reamed hole was down to 1,751 feet at 1900 hours. P. Linton left the job site at 1915 hours.

Paul Linton

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 18, 1991

FDER I.D. Number	=	505M03127
FDER Permit/Certification Number	=	UC 50-182070
CH2M HILL Project Number	=	SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

B. Ziegler spoke with J. Brantley at 1000 hours. The 32-1/2-inch reamed hole was down to approximately 1,600 feet. Penetration rate remains slow, however, plugging off of the bit has slowed.

Installation of the 26-inch casing has been tentatively rescheduled for the beginning of next week.

Reamed hole down to 1,661 feet at 2000 hours.



dbt098/086.51

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 17, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

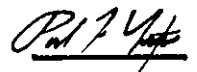
DESCRIPTION OF ACTIVITIES:

P. Linton arrived on the job site at 0700 hours to review drilling progress. D. Snyder arrived on the job at 0730 hours. Reaming of the 32-1/2-inch borehole continued at a very slow rate. Reamed hole was down to 1,544 feet at 0700 hours. The penetration rate was less than 2 feet per hour. P. Linton left the job site at 0753 hours.

D. Snyder updated A. Muniz on the drilling progress. B. Ziegler on-site at 1015 hours.

D. Snyder and B. Ziegler left the job site at 1100 hours.

A. Muniz received verbal approval from P. Highsmith of FDER for the 2,000-foot casing setting depth (26-inch-diameter). A formal letter will follow.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 16, 1991

FDER I.D. Number	=	505M03127
FDER Permit/Certification Number	=	UC 50-182070
CH2M HILL Project Number	=	SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

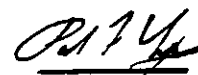
The contractor contacted D. Snyder at 0300 hours and informed him that drilling of the 32-1/2-inch reamed hole had commenced. The starting depth was 1,516 feet.

D. Snyder arrived on the job site at 0720 hours. The contractor continued reaming of the 32-1/2-inch-diameter borehole. The depth at 0700 hours was 1,511 feet.

D. Snyder left the job site at 1155 hours.

D. Snyder returned to the job site at 1310 hours. Drilling progress was still slow. The reamed hole was at a depth of 1,531 feet at 1630 hours when D. Snyder left the job site.

D. Snyder made a site visit from 1910 to 2045 hours. Reamed hole was at 1,524-feet, 1900 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 15, 1991

FDER I.D. Number	=	505M03127
FDER Permit/Certification Number	=	UC 50-182070
CH2M HILL Project Number	=	SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

D. Snyder arrived on the job site at 0710 hours. The contractor was tripping the reamer assembly to the surface for inspection. At 1040 hours the reamer assembly was on the surface. The lead bit and reamer assembly were worn out. Drill collar was also split where reamer assembly was attached. The remainder of the day was spent replacing the reamer assembly and drill collar.

Contractor began tripping the reamer assembly in the hole at 1900 hours. Two additional drill collars were added in an attempt to keep the reamer assembly from bouncing while drilling. A total of nine drill collars are now in place.

Tripping in with the 32-1/2-inch borehole assembly continued through the end of the shift.

Paul Linton

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 14, 1991

FDER I.D. Number	=	505M03127
FDER Permit/Certification Number	=	UC 50-182070
CH2M HILL Project Number	=	SEF26410.P1

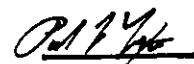
Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

D. Snyder arrived on the job site at 0915 hours. Drilling was stopped at 0915 hours while the stand pipe flange was repaired. The contractor resumed reaming of the 32-1/2-inch borehole at a depth of 1,461 feet at 1014 hours. A load of the 26-inch-diameter casing was delivered to the job site at 1046 hours. The contractor continued to set up and prepare to drill the monitoring well. Drilling of the dual-zone monitor well is tentatively scheduled to commence on June 21, 1991. D. Snyder left the job site at 1345 hours.

D. Snyder returned to the job site at 1430 hours. Reaming of 32-1/2-inch-diameter borehole continued. Penetration rate still very slow. D. Snyder left the job site at 1805 hours.

D. Snyder made a site visit from 2110 to 2230 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: June 13, 1991

FDER I.D. Number	=	505M03127
FDER Permit/Certification Number	=	UC 50-182070
CH2M HILL Project Number	=	SEF26410.P1

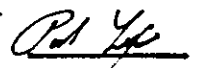
Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

B. Ziegler spoke with J. Brantley at 0900 hours. Reaming of 32-1/2-inch borehole progressing very slow due to the soft formation and plugging of the bit.

B. Ziegler on-site at 1630 hours. The 32-1/2-inch reamed hole was down to 1,415 feet. Penetration rate still very slow. Bit continues to plug off. B. Ziegler off-site at 1700 hours.

B. Ziegler dropped a signed and sealed letter at FDER which contained the selected casing setting depth of 2,000 feet for the 26-inch casing, 1730 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 12, 1991

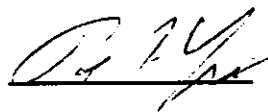
FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

P. Linton arrived at the job site at 0800 hours. Contractor reaming 32 1/2 inch diameter borehole at a depth of 1,240 feet. Deviation surveys were checked and were within the allowable tolerances. P. Linton left the job site at 1130 hours.

P. Linton returned to the job site at 1420 hours. The surficial monitoring wells were purged for 15 minutes and then sampled. Contractor reaming 32 1/2 inch diameter borehole at a depth of 1,360 feet, 1830 hours. P. Linton left the job site at 1830 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 11, 1991

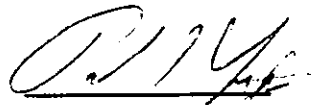
FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

P. Linton arrived on site at 0830 hours. Contractor reaming with the 32 1/2 inch diameter reamer assembly at a depth of about 1,148 feet.

B. Ziegler made a site visit from 1330 to 1430 hours. Contractor reaming at a depth of 1,220 feet at 1800 hours. Paul Linton left the job site at 1800 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 10, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

D. Snyder arrived on site at 0730 hours. Reaming of the 32 1/2 inch diameter borehole continued. The contractor stated that drilling slowed down at a depth of about 1,070 feet and that the bit was probably plugging off.

Contractor began tripping reamer assembly out at 1120 hours. The bit was plugged off. Contractor stated that drilling would commence in the late afternoon.

D. Snyder left the job site at 1245 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 9, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

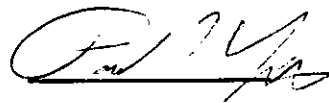
Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

D. Snyder arrived on site at 0800 hours. Contractor had tripped the packer and rods out of the hole and started setting up to ream the 32 1/2 inch diameter borehole. The contractor stated that the blow off preventer would require some maintenance before starting the reamed hole.

The reamer assembly was set up with a 17 1/2 inch lead bit, a 32 1/2 inch reamer and three 31 inch diameter stabilizers.

Heavy rains began at about 1050 hours. D. Snyder left the job site at about 1430 hours. P. Linton made a site visit from 1546 to 1600 hours. Contractor started reaming the 32 1/2 inch diameter borehole at about 1900 hours. D. Snyder made a site visit from 2000 to 2315 hours to observe progress on the reamed borehole.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 8, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

D. Snyder arrived at the job site at 0710 hours. Contractor setting up for Packer Test Number 4 with an straddled interval from 1,428 to 1,449 feet. Started purging of the straddled interval at 0900 hours. Water quality samples were taken on 15 minute intervals. The conductivity readings stabilized after approximately one hour at about 7,000 umhos/cm. Purging of the straddled interval was stopped at 1200 hours. A total of approximately 13,500 gallons were pumped. Recovery water level data was taken from 1200 to 1300 hours.

Straddle Packer Pumping Test Number 4 was started at 1300 hours. Conductivity and water level reading were collected on 15 minute interval. An average flow rate of 75 gpm was estimated by volumetric measurements (totalizing flow meter not functioning). The conductivity stabilized at about 7,200 umhos/cm after approximately two hours of pumping. Water samples were collected at 1545 hours for shipment to a laboratory for a physical parameters analysis. The test was terminated at 1600 hours. Post test water levels were above the top of the drill pipe.

D. Snyder informed the contractor that packer testing was complete and that the packer assembly could be removed from the hole. D. Snyder left the job site at 1730 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 7, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

R. Olson on site monitoring the second packer test at 0000 hours. The pump was shut off at 0132 hours. The conductivity readings stabilized at approximately 19,000 umhos/cm after approximately 5 hours of pumping. The final reading on the totalizing flow meter was 8,782,909 gallons indicating that approximately 24,700 gallons were displaced. The water level in the annular space (between drill pipe and 34-inch casing) was above the valve (4 feet above pad) throughout the test. The packer pressure was steady at 1,040 psi throughout the test. R. Olson called B. Ziegler to schedule the start of the pumping test.

B. Ziegler arrived at the job site at 0330 hours. The data acquisition equipment was set up with the transducer set at a depth of 20.0 feet below top of drill pipe. Drill pipe positioned 13.3 feet above the pad. The initial reading on the hermit was 19.96 feet which confirmed the probe's setting depth below the water surface. Packer Test Number 2 was started at 0345 hours with flow rate of approximately 80 gpm. R. Olson left site once test was under way. Water levels and conductivity readings were taken on 15 minute intervals. Conductivity measurements were approximately stable at 19,500 umhos/cm throughout the test.

Water quality samples were collected at 0819 hours for shipment to a laboratory for a physical parameters analysis. The test was stopped at 0823 hours. Recovery was monitored for one hour after shut down. The final totalizing flow meter reading was 8,805,800 gallons.

A. Muniz and B. Ziegler selected a third straddle packer test interval from approximately 1,600 to 1,650-feet. B. Ziegler off site at 1000 hours.

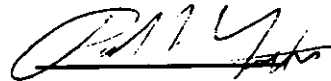
D. Snyder arrived on the site at 1025 hours. The packers were set to isolate a interval from 1,608 to 1,629-feet.

B. Ziegler received verbal confirmation at 1400 hours on water quality samples from the first packer test. Geotech Laboratory reported a TDS concentration for the two samples of 16,208 mg/l and 16,028 mg/l.

Purging of the Straddle Packer Test No. 3 commenced at 1540 hours. Initial totalizing flow meter reading was 8,805,800 gallons. Water levels and conductivity readings were recorded on 15 minute intervals. The conductivity readings stabilized at approximately 15,900 umhos/cm after 230 minutes. The pump was shut down at 2030 hours to allow the straddled interval to equilibrate before the pumping test. The totalizing flow meter stopped functioning toward the end of the test. Flow was estimated by volumetric means.

The pumping test commenced at 2130 hours. Water levels and conductivity readings were monitored on 15 minute intervals. Conductivity readings remained constant at approximately 15,200 umhos/cm throughout the test. Water samples were collected prior to shut down for a physical parameters analysis. The test was shut down at 2245 hours and recovery was monitored for one hour.

D. Snyder left the job site at 2330 hours.

A handwritten signature in black ink, appearing to read "D. Snyder", is located in the lower right quadrant of the page. The signature is written in a cursive style with a horizontal line underneath.

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 6, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

Purging of Packer Test Number 1 continued. Test Number 1 commenced at 2130 hours on June 5, 1991. The straddled interval was from 1,737 to 1,759 feet. B. Ziegler and A. Muniz on the job site. Pumping remained constant at approximately 58 gallons per minute. Packer pressure remained stable at 1,100 psi. A. Muniz off site at 0040 hours.

Conductivity readings stabilized at about 18,500 umhos/cm after approximately 3.5 hours of pumping. P. Linton arrived on site at 0300 hours. B. Ziegler left the job site at 0330 hours. Purging was terminated at 0500 hours to allow the straddled zone to equilibrate before the pumping test. Data acquisition equipment was set up to monitor during pumping test.

B. Ziegler returned to the job site at 0700 hours. The first packer pumping test was started at 0717 hours with a pumping rate of about 65 gpm. The duration of the test was 302 minutes with water quality samples taken every 15 minutes to monitor conductivity. Water samples were collected at 1115 hours for a physical parameters analysis.

Two samples were also collected and submitted to Geotech Laboratory/WPB for a one day turnaround TDS analysis. The test was stopped at 1117 hours and recovery was monitored until 1210 hours. P. Linton off site at 1300 hours. Contractor began setting up for the second packer test.

R. Olson arrived on the job site at 1900 hours. The second straddle packer test was set up over the interval from 1,708 to 1,729 feet. The pump was set up with the intake at a depth of 160 feet below the top of the drill pipe. The drill pipe was positioned approximately 13.3 feet above the top of the pad. R. Olson called B. Ziegler at 1930 hours to notify him of the planned start time. B. Ziegler arrived on site at 2000 hours. The initial water level was measured at 1.23 feet below the top of the drill pipe. The initial flow meter reading was 8,758,200 gallons.

The second packer test commenced at 2017 hours with a pumping rate of approximately 80 gpm. Water samples for were collected on 15 minute intervals to monitor conductivity. B.

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 5, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

B. Ziegler and P. Linton arrived on site at 0700 hours. Contractor was not prepared to run the first packer test. The contractor stated that the packer assembly had been tripped in last night but would not inflate. Packer assembly was at the surface, appears that a seal in the lower packer assembly was missing. Contractor made repair and began installing packer assembly, 0900 hours.

B. Ziegler and P. Linton set up the data acquisition equipment for the packer tests.

B. Ziegler performed tally to confirm packer setting depth. The packer assembly will seal the interval from 1,737 to 1,759-feet. P. Linton and B. Ziegler left the job site at 0930 hours with instruction for the Contractor to call when packer assembly was in place.

B. Ziegler returned to the job site at 1630 hours. Packer assembly in place and sealed for the first test over the interval from 1,737 to 1,759-feet. Background water level data collected and Contractor attempted to begin purging zone at 1655 hours, pump malfunctioned.

Contractor started pump at 1853 hours with an initial flow meter reading of 8,719,500 and a initial flow rate of approximately 60 gallons per minute (gpm). The applied packer pressure was measured at 1,100 psi at the surface pressure source. The pump malfunctioned again at 1907 hours. Submersible pump was pulled again and inspected, 1920 hours. Contractor began repairs on pump and instructed to call B. Ziegler when ready. B. Ziegler off site at 19:30.

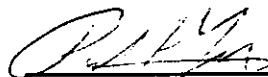
P. Linton and T. Sharp on site at 2000 hours. The site conditions are poor with heavy rains and lightning. Contractor continued working on submersible pump. P. Linton and T. Sharp left the job site at 20:25.

B. Ziegler received call from Contractor at 2100 hours pump in place and functioning. B. Ziegler returned to the job site at 2230 hours. Contractor started pumping at 2111 hours

with a centrifugal pump. Centrifugal pump set inside 6-inch ID drill pipe which is attached to packer assembly. The initial pumping rate was approximately 58 gpm. Packer pressure was maintained at 1,100 psi.

A. Muniz arrived on site at 2300 hours.

Packer testing continued through the end of the shift.

A handwritten signature in black ink, appearing to be "R. L. Y.", located at the bottom right of the page.

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 4, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

B. Ziegler and C. DiGiacomo arrived on the job site at 0700 hours and began geophysical logging (caliper, LSN electric, gamma ray, temperature, and fluid resistivity).

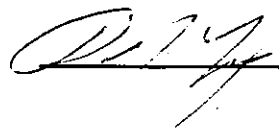
K. Greuel requested clarification of the specifications on the monitor well drilling section. Is the monitor well to be drilled open discharge to the disposal well, it is not specified. B. Ziegler informed the Contractor that the monitoring well is to be drilled reverse-air below approximately 1,000-feet with direct discharge to the disposal well.

B. Ziegler updated P. Mazzella on the drilling progress and informed him that packer testing should begin tomorrow and proceed through the end of the week.

C. DiGiacomo completed geophysical logging at 1130 hours. Florida Geophysical, Inc. (FGI) set up and began running geophysical logs (X-Y caliper and induction log). C. Digiacomo left the job site at 1200 hours.

B. Ziegler sampled the surficial monitor wells and analyzed for chlorides, conductivity and temperature.

FGI completes required geophysical logs at 1515 hours. B. Ziegler left the job site at 1530 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 3, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

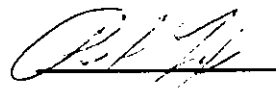
Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

D. Snyder arrived at the job site at 0706 hours. Contractor encountered obstruction at 1,869 and began dredging. Contractor continues preparation for drilling of monitor well. Contractor still dredging pilot hole at 1121 hours. Drilling rate increased at a depth of 1,920 feet.

Contractor stated that he would clean the complete borehole to the total depth of 2,100-feet. The contractor further stated that they would confirm a clean borehole by pulling up above the dredging zone and waiting a couple of hours to see if it fills in again.

D. Snyder left the job site at 1310 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 2, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

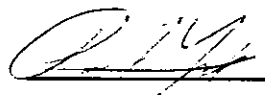
D. Snyder received phone call from the Contractor at 0550 hours, a total depth of 2,100 feet had been reached with pilot hole. D. Snyder arrived at the job site at 0710 hours. Contractor began removing air line at 0926 hours to perform gyroscopic survey.

Contractor began gyroscopic survey at 1050 hours and completed the survey at 1240 hours. Field report did not indicate any survey point out more than 15 minutes of one degree. Survey was acceptable.

Contractor began tripping out 12 1/4-inch diameter pilot bit at 1345 hours. D. Snyder called C. DiGiacomo and scheduled the geophysical logger for 1700 hours. D. Snyder left the job site at 1345 hours.

D. Snyder returned to the job site at 1505 hours. Contractor still tripping pilot bit and preparing for geophysical logging. A. Muniz arrived at the job site at 1630 hours. C. DiGiacomo arrived at the job site, 1651 hours. Albert Muniz left the job site at 1732 hours. Geophysical logging (caliper, temperature, gamma ray, and fluid resistivity) of the pilot hole began at 1745 hours.

Geophysical logging aborted at a depth of about 1,870-feet due to an obstruction in the pilot hole. C. DiGiacomo off site 2000 hours. Contractor began tripping in with the 12 1/4-inch pilot bit to clean borehole. D. Snyder left the job site at 2030 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date June 1, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

D. Snyder arrived at the job site, 0640 hours. Progress through the night was slow because of dredging. The 12 1/4-inch diameter pilot hole was advanced to a depth of 1,886 at 0730 hours. Cuttings indicate a formation of dolomitic limestone.

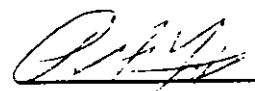
D. Snyder left the job site at 12:35 hours.

D. Snyder returned to the job site at 1350 hours. Pilot hole at a depth of 1,906 feet and was and still dredging. D. Snyder called C. Digiacoimo and rescheduled geophysical logging for tomorrow afternoon.

D. Snyder left the job site at 1510 hours.

D. Snyder returned to the job site at 1540 hours. Pilot hole at a depth of 1,928-feet. Review of the cuttings indicate a lithology change at a depth of about 1,910-feet. Formation consists of carbonitic limestone with streaks of dolomitic limestone. Drilling rate increased in new formation.

D. Snyder left the job site at 1820 hours after requesting that the contractor call him when the total depth of 2,100-feet had been reached.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 31, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

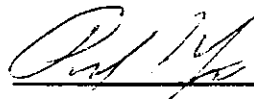
DESCRIPTION OF ACTIVITIES:

D. Snyder arrived at the job site at 0900 hours. Contractor continuing to drill 12 1/4-inch diameter pilot hole. Contractor drilling slowly at a depth of 1,786 feet. Water samples continue to be collected at 30-foot intervals.

Contractor continued to drill slowly with significant dredging in a dolomite formation. At 1426 hours the pilot hole reached a depth of 1,819 feet.

Dredging continued at 1517 hours when D. Snyder left the job site.

D. Snyder performed a site visit from 1909 to 2010 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 30, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

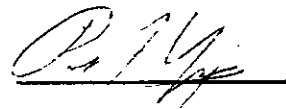
Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived at the job site at 1500 hours. The 12 1/4-inch diameter pilot hole reach a depth of 1,630 feet. Reviewed last nights drilling progress. Drilling was limited due time required for repair of kelly swivels. A tentative schedule for logging and packer testing of the pilot hole was reviewed with J. Brantley.

B. Ziegler tentatively scheduled C. DiGiacomo for geophysical logging at 1000 hours on Saturday, June 1, 1991.

B. Ziegler off site, 1800 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 29, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived at the job site at 0900 hours. Pilot hole down to a depth of 1,500-feet.

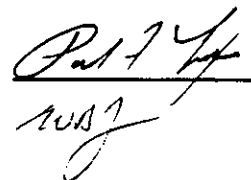
Water samples, formation samples and deviations surveys were collected.

J. Brantley indicated that the pilot hole should be ready for logging late Friday. B. Ziegler tentatively scheduled geophysical logging for Friday evening.

B. Ziegler instructed the contractor to complete his paper work on the cementing and make a formal submittal on the mill certificates for the 34-inch diameter casing.

Sampling the surficial monitoring wells commenced at 1000 hours.

B. Ziegler left the job site at 1145 hours.


Paul Linton

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 28, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

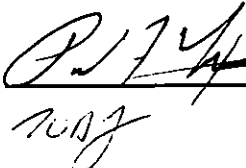
B. Ziegler arrived at the job site at 0815 hours. Pilot hole down to 1,203-feet.

The contractor submitted Pay Request Number 2.

S. Lavinder of CH2M Hill was on site taking photographs at 1030 to 1115 hours.

B. Ziegler left the job site at 1130 hours.

Contractor continued drilling pilot hole and collecting formation and water samples through the shift.



PL

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 27, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

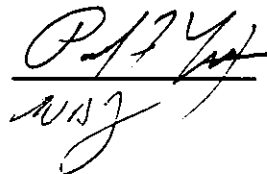
D. Snyder arrived at job site at 0650 hours. Contractor tagged the top of the cement plug in the 34-inch diameter casing during the night shift at a depth of 964-feet and commenced drilling. At 0817 hours, the 12-1/2 inch diameter lead bit reach at total depth of 971-feet. The contractor continued circulation until 0825 hours.

Contractor removed the 32 1/2-inch reamer assembly and tripped 12 1/4-inch pilot bit to 971-feet. Drilling of the 12 1/4-inch pilot hole commenced at 1300 hours.

D. Snyder observed the Contractor perform compressive strength testing of the cement samples collected while grouting the 34-inch casing. The following information was collected:

Description	Unconfined Compressive Strengths		
	Sample 1 (psi)	Sample 2 (psi)	Sample 3 (psi)
Neat (Pressure Grout)	<5,000	<5,000	<5,000
4 % (Pressure Grout)	3,000	2,650	2,350
4 % (Pressure Grout)	2,450	2,600	2,500
12 % (Pressure Grout)	1,300	1,200	1,300

D. Snyder left the job site at 1345 hours. Drilling of the 12 1/4-inch pilot continued through the shift. Contractor began collecting formation samples every 10-feet and water samples every 30-feet.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 26, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

D. Snyder arrived at the site at 0755 hours. Contractor tagged the top of cement in the annulus between the 34-inch and 42-inch casing at a depth of 3-feet below the drilling pad.

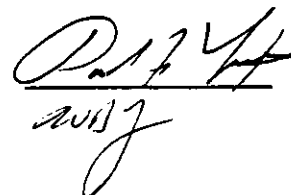
First load of drill cuttings and fluid left site at 0830 hours for disposal.

Contractor began preparations for reverse-air drilling at 0910 hours and continued them through the day. Setup of the monitor well rig also continued through the shift.

A second and third load of drill cuttings left site for disposal at 0945 hours and 1049 hours, respectively.

D. Snyder off site from 1158 to 1258 hours.

D. Snyder left the job site at 2331 hours. Contractor will tag cement plug in the base of the 34-inch casing with the 32 1/2-inch reamer assemble during the night shift.


Paul Linton

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 25, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

D. Snyder arrived at the job site at 0625 hours. Contractor removed tremie line used during pressure grout. Cuttings disposal tanker left the job site at 0705 hours. D. Snyder observed disposal of cuttings at approved facility.

At 0810 hours a load of cement arrived at the job site.

The contractor began preparing the wellhead for geophysical logging and installation of the tremie line in the annulus.

C. Digiacommo arrived at the job site at 0827 to perform temperature and gamma ray logs. The contractor filled and hauled a second load of drill cuttings, D. Snyder observed disposal at the approved site.

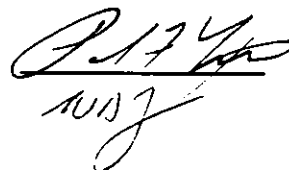
Geophysical logging commenced at 0912 hours and was completed at 1058 hours.

Contractor attempted to install 2 3/8-inch tremie line in the annulus between the 34-inch and 34-inch diameter casings. Contractor removed the 2 3/8-inch tremie and installed smaller diameter tremie lines. D. Snyder off site from 1455 to 1555 hours.

Installation of tremie lines was completed at 1955 hours. Contractor tagged the top of the cement at a depth of 345-feet on the North side and at a depth of 342-feet on the South side. Contractor set up for cementing of the second stage.

A. Muniz arrived at the job site at 2106 hours and the cementing of second stage commenced. The second stage of cementing was completed at 2225 hours. A total of 406 sacks of 12 percent cement were pumped. Cement was observed at the surface.

D. Snyder and A. Muniz left the job site at 2310 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 24, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived at the job site at 0700 hours. Installation of the 34-inch casing began at 0710 hours.

D. Snyder arrived at the job site at 0800 hours.

Installation of the 34-inch casing to 970-feet was completed at 1522 hours. Casing centralizers were placed as required in the contract documents.

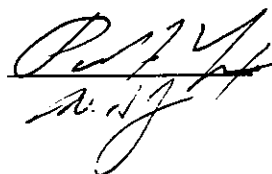
The contractor installed the tremie line for pressure grouting from 1522 to 1648 hours. P. Linton and A. Muniz arrived at the job site and pressure grouting commenced at 1855 hours.

D. Snyder left the job site at 1930 hours.

Pressure grouting was completed at 2012 hours. A. Muniz left the job site.

Volume Pumped (barrels)	Volume Pumped (sacks)	Type Cement
168	621	4 Percent
121	574	Neat

B. Ziegler contacted C. Digiacommo and scheduled temperature log for 0900 hours tomorrow, May 25, 1991. P. Linton and B. Ziegler left site at 2030 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 23, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

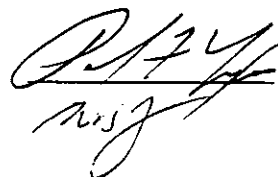
B. Ziegler arrived at the job site at 0700 hours. Circulation of the borehole continued through the night shift. K. Greuel stated that 34-inch casing would not be run today due to a 70 percent chance of rain. The 34-inch diameter casing was moved to the West side of the of the rig in preparation for the casing run.

P. Mazzella called at 0950 hours and was updated on the current schedule for installation of the 34-inch diameter casing.

B. Ziegler requested that Youngquist Brothers, Inc. not move cranes or loaders until 0800 hours with out approval from the engineer due to noise complaints.

B. Ziegler left the job site at 1200 hours.

Contractor continued circulation of the borehole through the shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 22, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

B. Ziegler on site, 0700 hours. The 40 1/2-inch reamer assembly had been tripped to the surface in preparation to install 34-inch casing. Weather still bad (heavy rains and high winds).

Contractor decided to hold off installation of 34-inch casing until tomorrow. Would not be able to weld pipe properly in the rain.

B. Ziegler off site, 0900 hours.

Contractor tripped reamer assembly to total depth and circulated borehole (conditioned borehole) through the day and night shift.

Bart Ziegler
AZ

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 21, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

S. Skehan on site to complete review of formation samples collected from pilot hole drilling to 1,021-feet, 0800 hours.

B. Ziegler on site, 0820 hours. Heavy rains and high winds were present. Contractor will not install 34-inch casing until tomorrow morning. Unable to weld properly with existing weather conditions.

Contractor conditioned borehole through the shift.

B. Ziegler off site, 0920 to 1000 hours. Last joint of 34-inch casing arrived on site.

Begin sampling surficial monitor wells, 1030 hours.

S. Skehan off site, 1130 hours. Lithologic description of formation samples complete.

B. Ziegler off site, 1220 to 1330 hours.

B. Ziegler off site for day, 1600 hours.

Bart Ziegler
BZ

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 20, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

P. Linton on site, 0900 hours. Reamed hole at 980-feet.

B. Ziegler on site, 0920 hours. Reaming of the 40 1/2 inch borehole was completed at 04:500 hours. Due to the bad weather conditions (chance of rain) will install casing tomorrow.

P. Linton began 34-inch casing tally with Contractor. Not enough casing on site, will re-tally tomorrow when all casing is on site.

One joint of 34-inch casing arrives site, 1000 hours.

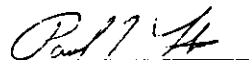
B. Ziegler off site, 1100 hours.

S. Skehan on site to continue review of formation samples collected from the pilot hole to 1,021-feet, 1440 hours.

B. Ziegler informed Peggie Highsmith/FDER of the selected setting depth of 970-feet for the 34-inch casing. P. Highsmith had no objection to the selected depth.

P. Linton off site, 1700 hours.

Two wiper runs were made during the night shift to condition complete borehole.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 19, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

P. Linton on site, 1200 hours. Reamed hole at 817-feet.

Contractor stated that the additional 34-inch casing was scheduled to arrive on site tomorrow with mill certificates.

Reaming of the 40 1/2-inch borehole continued through shift.

P. Linton off site, 1400 hours. Reamed hole at 840-feet.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 18, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

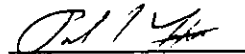
DESCRIPTION OF ACTIVITIES:

P. Linton on site, 0930 hours. Reamed hole at 650-feet, progressing slowly through heavy clay formation.

Set-up of monitor well rig continued.

Reaming of the 40 1/2-inch borehole continued through the shift.

P. Linton off site, 1700 hours. Reamed hole at 726-feet.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 17, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

S. Skehan on site to review formation samples collected from the pilot hole to 1,021-feet, 0800 hours.

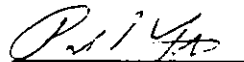
Contractor continued reaming of the 40 1/2-inch borehole. Reaming at 456-feet, 0800 hours.

A. Muniz on site, 1155 hours. Reamed hole at 475 feet, 1200 hours.

Contractor raised mast on monitor well rig at 1300 hours.

Reaming of the 40 1/2-inch borehole continued through the day shift and night shift.

S. Skehan and A. Muniz off site, 1640 hours. Reamed hole at 500-feet.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 16, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

D. Snyder on site, 0615 hours. Contractor setting up to ream 40 1/2-inch borehole. D. Snyder off site, 0705 to 0735 hours. Contractor began welding lugs on 34-inch casing.

Crew began setting up rig to drill dual-zone monitor well 0800 hours.

P. Linton on site, 1000 hours.

Contractor began drilling the 40 1/2-inch borehole at 340-feet, 1140 hours.

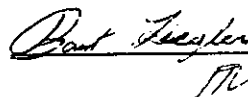
P. Linton off site, 1145 hours.

A. Muniz, J.I. Garcia-Bengochea, and B. Ziegler on site, 1500 hours. Review geophysical logs and formation cuttings from pilot hole. Select a setting depth of 970-feet for the 34-inch diameter casing.

B. Ziegler spoke with Ed Rahrig/FDER and informed him of the selected casing setting depth of 970-feet. E. Sleeted requested that we contact FDER on Monday to confirm.

A. Muniz, J.I. Garcia-Bengochea, B. Ziegler and D. Snyder off site, 1630 hours.

Reaming of the 40 1/2-inch borehole continued through the shift. Borehole down to 370-feet at shift change, 1900 hours.


BZ

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 15, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

D. Snyder on site, 0612 hours. Limestone layers began to appear at the base of the Hawthorn at approximately 880-feet. Contractor lost circulation at a depth of 996 feet (0621 hours).

D. Snyder reviewed lithology with B. Ziegler. Consistent limestone began to appear at approximately 950-feet, decided to stop pilot hole at a depth of 1025-feet if Contractor gets circulation back and can drill without locking drill string in hole.

Contractor terminates pilot hole at 1021-feet (0910 hours). Losing large volumes of drilling fluid. Van Wayhan/Superior Survey Systems from Corpus Christi, TX arrived site to perform gyroscopic survey, 0910 hours. Gyroscopic survey began at 1123 hours and was completed to a total depth of 960-feet at 1225 hours.

D. Snyder off site at 1300 hours, returned 1356 hours. Field report for the gyroscopic survey indicates a closer of 3.84-feet which is within the maximum tolerance of 12.57-feet. Gyroscopic survey acceptable.

Contractor tripping pilot bit to 1,021-feet and continued circulation. A wiper run was begun at 1644 hours. Contractor began removing drill string 1653 hours. C. DiGiacomo arrived on site at 1700 hours.

Geophysical logging (Caliper, Gamma Ray, and LSN Electric) commenced at 2105 hours and was completed at 2230 hours.

D. Snyder and C. DiGiacomo off site at 1030 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 14, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

D. Snyder on site, 0620 hours. Drilling rate was steady through night shift. Pilot hole to a depth of 730-feet.

Deviation survey targets from the pilot hole collected and reviewed.

Collection of water samples and water levels from the surficial monitor wells commenced at 0934 hours.

Drilling of pilot hole stopped to replace shell shaker motor on mud system at 0945 hours.

Contractor completed repairs and resumed drilling of the pilot hole at 0955 hours.

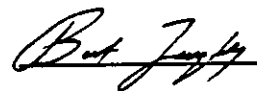
Pilot hole down to 758-feet, 1020 hours. Contractor scheduled gyroscopic survey for tomorrow.

Contractor began welding lugs onto the 34-inch diameter casing in preparation for its installation. Contractor continued to have trouble with shell shaker motor on mud system.

Drilling was steady and at a depth of 801-feet, 1521 hours.

D. Snyder off site, 1816 hours.

D. Snyder on site, 2200 to 2321 hours. Drilling steady no formation change. A total of three loads of drilling fluid and formation cuttings were hauled off by contractor (1035, 1213, and 1409 hours)



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 13, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

B. Ziegler on site, 0730 hours. Contractor cut off 42-inch casing inside of 48-inch diameter casing and has begun fabrication of a new header.

D. Snyder arrived site, 0730 hours.

B. Ziegler spoke with P. Mazzella at 1000 hours to update construction progress.

Contractor tagged bottom of duck's nest at depth 350-feet inside the 42-inch casing with 12 1/4-inch pilot bit. Drilling of the 12 1/4-inch diameter pilot hole began at 1100 hours.

Heavy rains begin at 1305 hours. D. Snyder off site at 1310 hours, returned to site at 1552 hours.

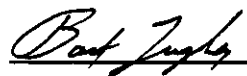
Pilot hole drilled to a depth of 435-feet, 1515 hours. Heavy rains stopped.

D. Snyder off site, 1720 hours.

D. Snyder on site at 1800 hours for brief period to check on progress, off site at 1820 hours.

D. Snyder on site, 2315 hours. Pilot hole to a depth of 595-feet. D. Snyder off site, 2345 hours.

A total of 4 tanks of drilling fluids and cuttings were removed during this report period.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 12, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

Contractor tagged top of cement inside 42-inch casing at a depth of 343-feet below land surface. Drilling of the duck's nest began with a 39 1/2-inch diameter reamer assembly to assure alignment of the 12-inch pilot hole. The duck's nest was drilled to a total depth of 344-feet.

No other drilling activities performed during this shift.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 11, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul Linton

DESCRIPTION OF ACTIVITIES:

P. Linton on site, 1100 hours. Contractor setting up for cementing second stage of 42-inch casing. Top of first stage (pressure grout) tagged at a depth of 102 feet below land surface.

B. Ziegler arrived site, 1400 hours.

The second stage of cement on the 42-inch casing began at 1432 hours. Casing was pressurized to 65 psi for additional safety prior to grouting. Second stage of cementing was completed at 1456 hours. A total of 55 barrels (262 sacks) of neat cement were pumped. Cement was observed at the surface.

B. Ziegler off site, 1530 hours. P. Linton off site, 1600 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 10, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

B. Ziegler and P. Mazzella on site, 0800 hours. Contractor began installation 42-inch casing.

B. Ziegler reviewed construction progress with P. Mazzella and informed him that Florida Cementing, Inc. will be performing the cementing operation on the project. Densometer, which measures weight of cement slurry pumped, was returned to YBWD after having been shipped to Texas for calibration.

Joint Number 3 of 42-inch casing installed at 0920 hours.


P. Mazzella called, stated that a Ms. Greenstein of 5450 Verona Drive Number J (Plattina) called (407/354-4616) and informed him that vibration occurring at approximately 0300 hours caused damage in her apartment. P. Mazzella requested that either a representative of CH2M Hill or Youngquist Brothers call her to discuss issue with her.

Joint number 9 of 42-inch casing installed, 1200 hours.

B. Ziegler spoke with J. Brantley regarding Ms. Greenstein's apartment. Brantley stated that he will have his insurance agent contact her Monday. B. Ziegler informed Ms. Greenstein (1240 hours) that the Contractor's insurance agent will contact her Monday morning.

T. Youngquist, H. Youngquist and A. Muniz arrive on site, 1400 hours.

Pressure grouting of the 42-inch casing began at 1539 hours. Pressure grouting completed at 1620 hours. A total of 104 barrels (495 sacks) of neat cement were pumped during the pressure grout (Stage 1). B. Ziegler and A. Muniz left site at 1645 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 9, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

B. Ziegler on site at 0800 hours. Contractor completed reaming of the 46 1/2-inch borehole during the night shift to a total depth of 353-feet. Reamer assembly rubbed between 100-feet and 180-feet. Borehole will be re-reamed through the shift. Setting of the 42-inch casing scheduled for tomorrow.

At 0900 hours B. Ziegler notified P. Mazzeila that 42-inch casing scheduled to be run tomorrow, May 10, 1991. Reviewed Florida Cement Inc. (FCI) cement procedures and equipment with J. Brantley. Contractor set up FCI equipment on the southeast corner of site. Installation of water line, a cement line, and a communication line between cement pump truck and disposal well begun.

Performed preliminary cement volume and pressure calculations for installation of 42-inch diameter casing.

Tom Hartye and A. Muniz arrived on site to review progress at 1030 hours. T. Hartye and A. Muniz left site at 1100 hours.

B. Ziegler off site, 1230 hours. B. Ziegler on site, 1400 hours. Contractor continued set up of cementing equipment.

D. VanNote arrived at 1430 hours to complete lithological classification of cutting samples collected from the pilot hole. D. VanNote off site, 1600 hours. Contractor began re-reaming of the 46 1/2-inch borehole at 1700 hours.

J. Brantley stated that he has begun the permit application for pulling water from the adjacent canal during the injection test. B. Ziegler off site 1800 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 8, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

Bart Ziegler arrived on site at 0800 hours and reviewed drilling progress. J. Brantley stated that there were no complaints about noise during the night. At 0930 hours started purging SMW-1 through SMW-4 for weekly sampling. Samples were analyzed for conductivity, temperature, and chloride concentration. J. Brantley submitted Mill Certificates for 42-inch and 34-inch diameter casing. B. Ziegler called P. Highsmith with a progress report and informed her that the contractor should be able to start installing 42-inch diameter casing tomorrow May 9, 1991. A setting depth of 345 feet was selected for the 42-inch casing.

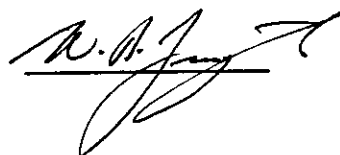
A. Muniz arrived on site at 1045 hours and reviewed construction progress to date. A. Muniz and B. Ziegler left the site for Lunch.

A. Muniz and B. Ziegler returned to the site at 1300 hours. D. VanNote arrived on site at 1320 hours to begin classification of the formation samples. A. Muniz and B. Ziegler met with J. Brantley to discuss cementing Quality Assurance procedures. Albert Muniz left site at 1340 hours.

J. Brantley received a fascimile transmittal from Al Mueller/FDER stating that the cuttings disposal plan was approved. J. Brantley to provide follow up paper work.

Tallied the 42-inch diameter casing and reviewed heat numbers. Review of the mill certificates indicate that the heat numbers match casing on site.

First load of drilling mud leaves site for disposal at the Boynton Sands Pit (1500 hours).
Bart Ziegler off site at 1700 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 7, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

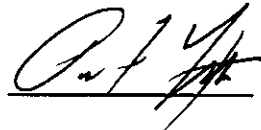
Prepared By: Paul F. Linton

DESCRIPTION OF ACTIVITIES:

Paul Linton arrived on site at 0830 hours, contractor crew of four was laying concrete block containment wall (three courses high) around perimeter of pad. Reaming of the 46 1/2-inch borehole was in progress and at a depth of 90 feet.

Reaming of the 46 1/2-inch borehole continued through the shift.

P. Linton off site at 1115 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 6, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Paul F. Linton

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived on site at 0800 hours and Paul Linton arrived on site at 0830 hours. Contractor was rigging up to commence reaming of the 46 1/2 inch diameter borehole. Measurement of the lead bits, hole opener and the stabilizer assembly were recorded. B. Ziegler called Pete Mazzela of the City of Boynton Beach and Al Mueller of the FDER with update of drilling progress. A setting depth of 345-feet was selected for the 42-inch diameter casing.

P. Linton and B. Ziegler off site at 0945 hours.


Paul F. Linton

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

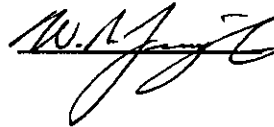
Date May 5, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

No activities performed. Drilling of the 46 1/2-inch diameter hole will commence on May 6, 1991.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 4, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived on site at 0900 hours, contractor had completed drilling 12 1/4 inch diameter pilot hole to a depth of 335 feet bls. The cuttings from this depth contained trace quantities of clay based on visual inspection. The contractor was instructed by the Engineer to drill to a depth of 365 feet bls. At 0930 hours the pilot hole was completed to a depth of 365 feet bls. Cuttings from this depth were clayey, indicating that the top of the Hawthorn was penetrated. C. DiGiacomo arrived on site with logging equipment. At 0940 hours the contractor began tripping out of the hole.

At 1020 hours C. DiGiacomo (CH2M Hill) began geophysical logging on the complete hole. A. Muniz and P. Linton (CH2M Hill) arrived on site. The geophysical logging (Gamma Ray, LSN, Electric, and Caliper) was completed at approximately 1200 hours. The geophysical logs were reviewed by A. Muniz and B. Ziegler and a casing setting depth of 345 feet was selected. The contractor was informed of the casing depth.

P. Linton, A. Muniz, B. Ziegler, and C. DiGiacomo off site at 1300 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 3, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

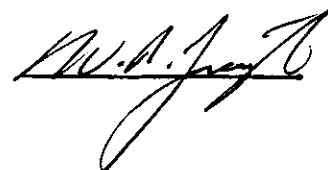
B. Ziegler spoke with J. Brantley (0800 hours). Drilling will not commence until 2000 hours today, drilling crew not be available until late.

B. Ziegler arrived site 2100 hours. Drilling of the 12 1/4-inch pilot hole commenced at 2000 hours. B. Ziegler reviewed collection of formation cuttings, performance of deviation surveys and preparation of daily reports with the Contractor. Contractor confirmed that all will performed in accordance with the specifications.

Contractor informed to continue pilot hole until top of Hawthorn is reached and to notify B. Ziegler of any problems that develop during the night.

Decible reading were taken behind sound tarps. Readings were below 50 db, except for traffic on Boynton Beach Boulevard.

B. Ziegler off site 2200 hours. Pilot hole down to 90-feet.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 2, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived site 1300 hours. Set up of drilling equipment continued in preparation for drilling. Several hundred bags of gel were re-arranged on east side of the drilling pad to help reduce engine noise.

Bob Kenyon/City of Boynton Beach arrived site at 1330 hours to review construction progress. Off site 1400 hours.

Geophysical logger notified that logging of the 250-foot pilot hole would be performed in the next two days.

A. Muniz arrived site 1430 hours. Reviewed progress at site and drilling procedures for the 250-foot pilot hole. A. Muniz informed P. Mazzella that drilling is scheduled to begin tomorrow as per the Contractor. Muniz off site 1530 hours.

B. Ziegler off site 1800 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date May 1, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

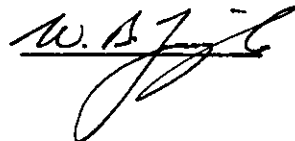
Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived site at 1030 hours. Set up of drilling equipment continued.

Contractor anticipates drilling will commence late tomorrow.

B. Ziegler off site 1145 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date April 29, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

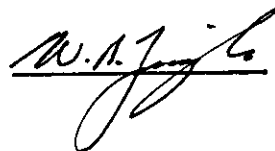
B. Ziegler arrived site at 1500 hours. Set up of drilling equipment continued. Drill rig for Dual-Zone Monitor Well was mobilized on pad.

Surficial monitor wells were sampled for background data.

Commencement of drilling has been scheduled for end of work week.

B. Ziegler off site 1700 hours.

No work other than set up of drilling equipment occurred through May 1, 1991.


W. A. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date April 26, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

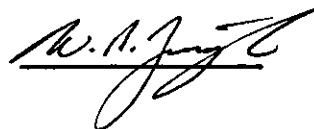
DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived site at 1000 hours. Set up of the Injection Well drilling rig continues. Commencement of drilling operations is scheduled for the middle of next week.

Contractor begins pumping surficial monitor wells to complete development. Each surficial monitor well was pumped for 2 hours until sand free water was produced.

B. Ziegler off site 1430 hours.

No work other than set up of drilling equipment occurred through April 29, 1991.


W. B. Ziegler

CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date April 25, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived site at 0900 hours. Contractor setting up to vibrate 48-inch surface casing for the Injection Well. One load of 34-inch casing arrived site. Heat numbers were recorded and pipe was unloaded at the North end of the site.

W. Welch and D. Bedford of CH2M Hill arrive site. Review progress and depart from site 1120 hours.

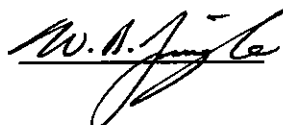
P. Mazzella, A. Muniz, and J. I. Bengochea-Garcia arrive site to observe surface casing installation. Two joints of casing were prepared for installation. One joint was 42-feet the other was 20-feet in length.

First joint of 48-inch casing was vibrated in place at 1300 hours.

P. Mazzella, A. Muniz, B. Ziegler and J.I. Bengochea-Garcia off site.

B. Ziegler on site 1430 hours, observe installation of second joint of 48-inch casing. A total of 48-feet of surface casing was installed.

B. Ziegler off site 1730 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date April 25, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived site at 0900 hours. Contractor setting up to vibrate 48-inch surface casing for the Injection Well. One load of 34-inch casing arrived site. Heat numbers were recorded and pipe was unloaded at the North end of the site.

W. Welch and D. Bedford of CH2M Hill arrive site. Review progress and depart from site 1120 hours.

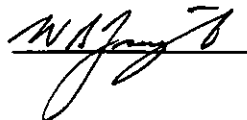
P. Mazzella, A. Muniz, and J. I. Bengochea-Garcia arrive site to observe surface casing installation. Two joints of casing were prepared for installation. One joint was 42-feet the other was 20-feet in length.

First joint of 48-inch casing was vibrated in place at 1300 hours.

P. Mazzella, A. Muniz, B. Ziegler and J.I. Bengochea-Garcia off site.

B. Ziegler on site 1430 hours, observe installation of second joint of 48-inch casing. A total of 48-feet of surface casing was installed.

B. Ziegler off site 1730 hours.



CH2M HILL DAILY CONSTRUCTION REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

April 18, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived site at 0800 hours. Contractor set up to install surficial monitor wells (SMW) at each corner of the drilling pad. Concrete drilling pad has remained flooded since placement of concrete.

Water levels were observed at 5.5-feet below land surface in two existing SMW's at the site.

All four SMW's were installed with a Failing 1500 drilling rig using water circulation. The wells were screened over the interval from 12-feet to 17-feet using 20 slot screen. Each well was air-developed for approximately 15 minutes after installation until clear water was produced. Wells will be further developed with a centrifugal pump prior to sampling.

The SMW's were numbered as follows:

SMW-1	Northwest corner of drilling pad
SMW-2	Northeast corner of drilling pad
SMW-3	Southwest corner of drilling pad
SMW-4	Southeast corner of drilling pad

Installation of sound barriers continued through the day.


B. Ziegler off site 1200 hours.



CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

April 16, 1991

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler 

DESCRIPTION OF ACTIVITIES:

B. Ziegler arrived site at 0645 hours. Review concrete pad for proper changes noted during inspection on April 15, 1991. Water stops were installed on all conduits and PVC pipe. Concrete pump truck arrived on site at 0715 hours and set up.

Placement of concrete began at 0735 hours in the Northwest corner of the pad. Concrete supplier was Rinker (Lake Worth Plant). Slump of the concrete was monitored on site by Gold Coast Testing Labs. Concrete cylinders were also collected by Gold Coast from the NW corner, middle, and the SE corner of the drilling pad.

P. Mazzella arrived site at 0800 hours to observe concrete pour. Off site 0845 hours. A. Muniz arrived site 1000 hours.

Concrete pour was completed at 1130 hours. A total of 185 cubic yards of concrete were used. B. Ziegler and A. Muniz off site 1135 hours.


B. Ziegler on site 1300 hours. Contractor continued finishing the pad. Pad was flooded at 1500 hours to aid in curing process.

B. Ziegler off site 1530 hours.

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

April 15, 1991

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

Prepared By: Bart Ziegler 

DESCRIPTION OF ACTIVITIES:

B. Ziegler and A. Muniz arrived site at 1400 hours. Drilling pad permit was reviewed with J. Brantley of Youngquist Brothers. Palm Beach County Building Department inspected and signed off on the steel and form work this morning.

A review of the concrete drilling pad was performed for conformance with the specifications. It was noted that conduits and PVC pipe protruding through the base of the pad would need to have water stops installed prior to placement of concrete.

J. Brantley stated that Rinker made the adjustment to the concrete mix as noted in the submittal to comply with specification requirements for water/cement ratio. They will provide proof of the change tomorrow on the batch tickets.

Placement of concrete is scheduled for 0730 hours. Surficial monitor wells will be installed on April 18, 1991 under B. Ziegler's supervision.

B. Ziegler and A. Muniz off site at 1530 hours.

Weekly Summaries

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

March 18, 1991 to March 27, 1991

Report No. 1

I.D. Number	= 505M03127
Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Notice-to Proceed was issued to the Contractor (Youngquist Brothers, Inc.) on March 18, 1991. Contract duration is 240 consecutive days with a completion date of November 13, 1991.

During the first week of construction the Contractor has located temporary water, sewer, power, and has mobilized his construction trailer and the monitor well rig. The Engineer's trailer is expected to be on site with telephone service by mid April. The site has been stripped and grubbed in preparation for the concrete drilling pad.

A preconstruction meeting was held on March 26, 1991 at the site in the presence of FDER, the City, and the Engineer. The Engineer will notify FDER within 48 hours of the commencement of drilling operations. Drilling is expected to begin by late April.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Installation of the concrete drilling pad and sound barrier.

ATTACHMENTS: None

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

March 28, 1991 to April 3, 1991

Report No. 2

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

During the second week of construction, the Contractor mobilized the Engineer's construction trailer and connected temporary water and sewer. Telephone service has been installed; however, Engineer does not anticipate being on site full time until late April.

Contractor continued mobilization of equipment and preparation of concrete drilling pad through the week. Placement of the concrete pad is expected by April 10, 1991.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Installation of sound barriers and surficial monitor wells.

ATTACHMENTS:

Contractor's Weekly Report

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

April 4, 1991 to April 10, 1991

Report No. 3

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Contractor continued mobilization of equipment and preparation of concrete drilling pad through the week. Concrete pad form work, vapor barrier and approximately 70 percent of reinforcing steel have been installed. Placement of the concrete pad has been rescheduled for Monday April 15, 1991.

On April 10, 1991, a brief overview of construction activities was presented to the Platina Home Owner's Association which is adjacent to the construction site. General and emergency phone numbers were left with the association for the City and the Contractor should any problems arise during construction.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Installation of sound barriers, surficial monitor wells. Placement of the concrete drilling pad is also scheduled for the upcoming week.

ATTACHMENTS:

Contractor's Weekly Report

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

April 11, 1991 to April 17, 1991

Report No. 4

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

Prepared By: Bart Ziegler

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Mobilization of equipment and preparation of concrete drilling pad form work continued through the week. The concrete drilling pad was poured on April 16, 1991 and remained flooded for curing through this report period.

Contractor has begun installation of sound barriers along the eastern side of the construction area.

Surge analysis for injection well system was submitted to FDER.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Installation, development, and sampling of surficial monitor wells.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Weekly Report

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

April 18, 1991 to April 24, 1991

Report No. 5

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

During this report period, the Contractor completed installation of the sound barriers, the surficial monitor wells, and mobilization and set up of the drilling rig onto the pad.

The Engineer's (CH2M Hill) trailer has been equipped and can be reached at 407/364-4739.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Installation of the 48-inch surface casing for the injection well and background sampling of the surficial monitor wells. Commencement of drilling operations is expected by the end of next week.

ATTACHMENTS:

Contractor's Weekly Report
Engineer's Daily Reports

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

April 25, 1991 to May 1, 1991

Report No. 6

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

During this report period, the Contractor completed installation of 48-inch surface casing to 48-feet below land surface. Surface casing was installed using a casing vibrator supplied by International Construction Equipment.

Development of the surficial monitor wells was completed. Background samples were collected and analyzed for conductivity, temperature, and chlorides.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Commencement of drilling operations is expected by the end of next week. Pilot hole will be drilled to approximately 250-feet and logged to identify the top of the Hawthorn formation.

ATTACHMENTS:

Contractor's Weekly Report
Engineer's Daily Reports
Surficial Monitor Well Water Quality

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

May 2, 1991 to May 8, 1991

Report No. 7

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

During this report period, the Contractor completed 12 1/4-inch pilot hole drilling from 0-365 feet and reaming of the 46 1/2-inch diameter borehole to a total depth 350 feet below land surface.

Geophysical logs were performed on the complete pilot hole. This report period ended with contractor setting up to install 42-inch diameter casing to 345-feet.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

The 42-inch diameter casing will be installed and cemented in place.

ATTACHMENTS:

Contractor's Weekly Report
Engineer's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

May 9, 1991 to May 15, 1991

Report No. 8

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

During this report period, the Contractor completed installation of the 42-inch diameter casing to a depth of 345-feet below land surface. The 42-inch casing was grouted in place with two stages using a total of 757 sacks of neat cement.

Drilling of the 12 1/4-inch pilot hole commenced on May 13, 1991 and was completed to a total depth of 1,021-feet on May 15, 1991. Geophysical logs (Caliper, Gamma Ray, and LSN Electric) were performed on the complete pilot hole the same day.

The surficial monitor wells were also sampled and analyzed for conductivity, temperature, and chlorides on May 13, 1991.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Selection of a casing setting depth for the 34-inch diameter casing and reaming of the 40 1/2-inch diameter borehole for installation of the 34-inch casing.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys
Gyroscopic Survey (Field Report)
Geophysical Logs (Pilot Hole to 365-feet and 1,021-feet)

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

May 16, 1991 to May 22, 1991

Report No. 9

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

During this report period, the Contractor completed reaming of the 40 1/2-inch borehole (May 21, 1991) to a total depth of 980-feet. A setting depth of 970-feet for the 34-inch casing was selected and reviewed with the Department.

Contractor was unable to begin installation of 34-inch casing because of heavy rain and high winds.

The surficial monitor wells were sampled and analyzed for conductivity, temperature, and chlorides during this report period.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Installation and cementing of the 34-inch diameter casing.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys
Lithology (0 - 1,021 feet)

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

May 23, 1991 to May 29, 1991

Report No. 10

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

During this report period, the Contractor completed installation of the 34-inch diameter casing to a depth of 970-feet below land surface. The casing was grouted to the surface in two lifts. Drilling of the 12 1/4-inch pilot hole to approximately 2,100-feet commenced on May 27, 1991. At the close of this report period, the pilot hole had been drilled to 1,643-feet.

The surficial monitor wells were sampled and analyzed for conductivity, temperature, and chlorides during this report period.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Pilot hole will be completed to an approximate depth of 2,100-feet during the next reporting period. Geophysical logs and packer testing will be performed on the complete borehole.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

May 30, 1991 to June 5, 1991

Report No. 11

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

During this report period the Contractor completed the 12 1/4-inch pilot hole to a total depth of 2,100-feet on June 4, 1991. Geophysical logging (caliper, temperature, gamma ray, LSN electric, fluid resistivity, and dual induction) of the pilot hole were also performed on June 4, 1991. The first packer test over the interval from 1,737 to 1,759-feet commenced on June 5, 1991 and continued through the end of this report period.

The surficial monitor wells were sampled and analyzed for conductivity, temperature, and chlorides during this report period.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Complete packer testing and commence reaming of the 32 1/2-inch diameter borehole for installation of the 26-inch casing.

ATTACHMENTS:

- Engineer's Daily Reports
- Contractor's Daily Reports
- Surficial Monitor Well Water Quality
- Deviation Surveys
- Pilot Hole Water Quality
- Gyroscopic Survey
- Geophysical Logs

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

June 6, 1991 to June 12, 1991

Report No. 12

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Four packer tests were performed to obtain water quality information. The results of these test are listed in the table below.

Packer Test Number	Depth Interval (feet)	Stabilized Conductivities (umhos/cm)	Date
1	1,737 to 1,759	21,500	June 6, 1991
2	1,708 to 1,729	20,000	June 7, 1991
3	1,608 to 1,629	15,200	June 7, 1991
4	1,428 to 1,449	7,200	June 8, 1991

Contractor commenced reaming of the 12 1/4 inch diameter pilot hole to 32 1/2 inch on June 9, 1991. The 32 1/2 inch diameter bore hole was advanced to a depth of about 1,360 feet at the close of this reporting period. The monitoring wells for the surficial aquifer were sampled and analyzed for conductivity, temperature, and chlorides during this report period.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Continue to drill the 32 1/2 inch diameter bore hole and prepare for the subsequent 26-inch casing installation. Continue to set up the drill rig for the monitoring well. Sample the monitoring wells for conductivity, temperature, and chlorides content.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

June 13, 1991 to June 19, 1991

Report No. 13

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Reaming of the 32 1/2-inch borehole to a depth of 2,000 feet continued through this report period. The reamed hole was at a depth of approximately 1,751 feet at the close of this report period. The surficial monitor wells were sampled and analyzed for conductivity, temperature, and chlorides. FDER reviewed and approved a installation depth of 2,000 feet for the lower intermediate casing (26-inch) of the disposal well.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Complete drilling of the 32 1/2 inch diameter borehole and install the 26-inch diameter casing to 2,000 feet. Commence drilling of the dual-zone monitor well. Sample the surficial monitor wells for conductivity, temperature, and chlorides content.

ATTACHMENTS:

- Engineer's Daily Reports
- Contractor's Daily Reports
- Surficial Monitor Well Water Quality
- Deviation Surveys
- Lithologic Descriptions

Prepared By: B. Ziegler & A. Muniz

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

DISPOSAL WELL

Set up and complete coring of the 12 1/2 inch diameter pilot hole.

DUAL ZONE MONITORING WELL

Complete reaming of the borehole for installation of the 16 inch diameter casing.
Complete preparation for installation of the second casing string.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

June 20, 1991 to June 26, 1991

Report No. 14

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

This report period commenced with reaming of the 32-1/2-inch-diameter borehole to 2,000 feet. On June 24, 1991, and at a depth of 1,944 feet, a roller bit was broken off the reamer assembly. The roller was recovered late the same day by using a "junk" basket fabricated by the Contractor. Reaming of the 32-1/2-inch borehole was completed at 0300 hours on June 26, 1991.

Installation of the 26-inch casing commenced at 2130 hours on the 26th and continued through the close of this report period.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Complete installation and cementing of the 26-inch casing on the disposal well.
Commence drilling of the dual-zone monitor well.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys

Prepared By: B. Ziegler and A. Muniz

CH2M HILL WEEKLY REPORT BOYNTON BEACH CONCENTRATE DISPOSAL WELL

June 27, 1991 to July 3, 1991

Report No. 15

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

DISPOSAL WELL

This reporting period commenced during installation of the 26-inch casing. Approximately ten joints (400 feet) of casing had been installed in the previous reporting period. The reaming 40 joints (1,600 feet) were installed on June 27, 1991. The casing was pressure grouted after installation. A total of twelve stages were pumped to cement the annular space from a depth of 2,010 feet to a depth of 1,610 feet. Specific information on each stage is provide in Table 1.

DUAL ZONE MONITORING WELL

Drilling of the 28-1/2-inch borehole commenced on June 30, 1991, and was completed on July 2, 1991. Geophysical logging was performed (caliper, LSN electrical, and gamma ray) on the borehole the same day. The 24-inch-diameter casing was installed and cemented in place on July 2, 1991. This report period ended while waiting for the cement to set.

SHALLOW MONITORING WELLS

The shallow monitoring wells were sampled on July 27, 1991 from 2245 to 2345 hours. The samples were analyzed for temperature, conductivity and chloride content.

Table 1 Summary of Cement Volumes Used for Stages 1 through 12.

Date	Stage	East Tag Depths	West Tag Depths	Neat Cement Volumes	4 % Cement Volumes	12 % Cement Volumes
(-)	(-)	(feet)	(feet)	(sacks)	(sacks)	(sacks)
06-27-91	1	2,010	2,010	585	0	0
06-28-91	2	1,882	1,883	343	0	0
06-29-91	3	1,877	1,878	143	0	0
06-29-91	4	1,877	1,878	286	0	0
06-30-91	5	1,877	1,878	0	0	141
06-30-91	6	1,860	1,862	152	0	0
07-01-91	7	1,855	1,857	0	0	136
07-01-91	8	1,850	1,852	0	0	141
07-02-91	9	1,828	1,826	0	0	149
07-02-91	10	1,809	1,810	0	0	115
07-03-91	11	1,730	1,730	295	0	0
07-03-91	12	1,640	1,640	0	423	0

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

DISPOSAL WELL

Complete cementing of the 26 inch diameter casing and begin set up for drilling and coring.

DUAL ZONE MONITORING WELL

Drill the pilot hole to a depth of about 1000 feet. Perform gyroscopic, gamma, LSN electrical and caliper logging of the pilot hole.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys
Geophysical logs

Prepared By: B. Ziegler & A. Muniz

**CH2M HILL WEEKLY REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL**

July 4, 1991 to July 10, 1991

Report No. 16

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

DISPOSAL WELL

This reporting period commenced with the 13th stage of grouting for the 26 inch diameter casing. Grouting was completed by on July 9,1991 and allowed to cure through the end of this reporting period. A total of 23 stages were required to bring cement to the surface. Specific information on each stage is provide in Table 1.

This report period ended with the Contractor tripping in the 24 1/2 inch reamer assembly to drill out the cement plug at the base of the 26 inch casing.

DUAL ZONE MONITORING WELL

The pilot hole for the second casing string was completed to a depth of 1,011 feet on July 10, 1991. Geophysical logging was performed (caliper, LSN electrical, and gamma ray) on the borehole the same day. Reaming of the pilot hole with a 22 1/2 inch diameter bit also commenced on July 10, 1991.

SHALLOW MONITORING WELLS

Sampling of the shallow monitoring wells was postponed until July 11, 1991. The samples will be analyzed for temperature, conductivity and chloride content.

Enclosed with the this report is a copy of Report 14 which was previously labeled Report 13. Also, please note that the pilot hole water quality of the disposal well submitted with Report 14 was labeled sheets 1 & 2 of 4. There were only 2 sheets of water quality. This change will be reflected in the next submittal of pilot hole water quality.

Table 1
Cement Volumes and Depths for the Boynton Beach Disposal Well
Stages 1 through 23 for the 26 inch Diameter Casing

Date	Stage	Tag Depths		Cement Pumped		
		East	West	Neat	4 %	12 %
(-)	(-)	(feet)	(feet)	(sacks)	(sacks)	(sacks)
06-27-91	1	2,010	2,010	585	0	0
06-28-91	2	1,882	1,883	343	0	0
06-29-91	3	1,877	1,878	143	0	0
06-29-91	4	1,877	1,878	286	0	0
06-30-91	5	1,877	1,878	0	0	141
06-30-91	6	1,860	1,862	152	0	0
07-01-91	7	1,855	1,857	0	0	136
07-01-91	8	1,850	1,852	0	0	141
07-02-91	9	1,828	1,826	0	0	149
07-02-91	10	1,809	1,810	0	0	115
07-03-91	11	1,730	1,730	295	0	0
07-03-91	12	1,640	1,640	0	423	0
07-04-91	13	1,610	1,610	0	225	0
07-05-91	14	1,580	1,580	0	254	0
07-05-91	15	1,541	1,540	0	0	233
07-05-91	16	1,465	1,464	0	0	205
07-06-91	17	1,371	1,373	0	0	226
07-06-91	18	1,262	1,261	0	460	0
07-07-91	19	1,069	1,066	0	225	0
07-07-91	20	971	972	176	0	0
07-08-91	21	880	880	0	0	304
07-09-91	22	580	580	0	0	311
07-09-91	23	280	280	0	0	278

CH2M HILL WEEKLY REPORT BOYNTON BEACH CONCENTRATE DISPOSAL WELL

July 11, 1991 to July 17, 1991

Report No. 17

FDER I.D. Number = 505M03127
 FDER Permit/Certification Number = UC 50-182070
 CH2M HILL Project Number = SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

DISPOSAL WELL

This reporting period commenced upon the final stages of grouting the 26 inch diameter casing in place. The cement plug at the base of the 26 inch casing was drill out on July 11, 1991. Drilling of the pilot hole commenced the same day. Over this report period four core samples were collected for horizontal and vertical permeability testing. The core intervals are as follows:

Date	Coring Interval		Recovery (percent required)
	Top (feet bls)	Bottom (feet bls)	
07-13-91	2,130	2,147	100
07-14-91	2,200	2,214	70 50
07-15-91	2,351	2,365	100
07-17-91	2,411	2,426	100 80

The remainder of this report period was spent drilling the pilot hole to the fifth core interval of approximately 2,400 to 2,410 feet.

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DUAL ZONE MONITORING WELL

Drilling of the 22 1/2 inch borehole commenced on July 11, 1991 and was terminated at 881 feet on July 12, 1991 to await approval of the upper monitor interval by the Technical Advisory Committee.

SURFICIAL MONITOR WELLS

The shallow monitoring wells were sampled on July 11, 1991 from 1115 to 1215 hours. The samples will be analyzed for temperature, conductivity and chloride content.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

DISPOSAL WELL

Complete coring and drilling of the pilot to approximately 3,300 feet. Perform geophysical logging and TV survey of the pilot hole from 2,000 to approximately 3,300 feet.

DUAL ZONE MONITORING WELL

Complete 22 1/2 inch diameter reamed hole to approximately 970 feet and install 16 inch diameter casing.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Pilot Hole Water Quality (Disposal Well)
Deviation Surveys (Disposal and Monitor Well)

Prepared By: B. Ziegler & A. Muniz

**CH2M HILL WEEKLY REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL**

July 18, 1991 to July 24, 1991

Report No. 18

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

DISPOSAL WELL

This reporting period commenced with coring of the 12 1/4 inch pilot hole to approximately 3,300 feet. Over this report period the final two core samples were collected for horizontal and vertical permeability testing. The core intervals are as follows:

Date	Coring Interval		Recovery (percent required)
	Top (feet bls)	Bottom (feet bls)	
07-18-91	2,441	2,456	80
07-20-91	2,651	2,661	25

Drilling of the pilot hole to 3,311 feet was completed on July 24, 1991. This report period concluded with geophysical logging being performed on the borehole.

DUAL ZONE MONITORING WELL

The upper monitor zone from 970 to 1,020 feet was approved by FDER on July 18, 1991. The 22 1/2 inch diameter borehole has been advanced to approximately 880 feet. Installation of the 16 inch casing to 970 feet will be performed on July 30, 1991.

SURFICIAL MONITOR WELLS

The shallow monitoring wells were sampled on July 23, 1991. The samples will be analyzed for temperature, conductivity and chloride content.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

DISPOSAL WELL

Complete geophysical logging and TV survey of the pilot hole from 2,000 to 3,311 feet.
Commence reaming of the 24 1/2 inch diameter borehole for final casing installation.

DUAL ZONE MONITORING WELL

Complete 22 1/2 inch diameter reamed hole to approximately 970 feet and install 16 inch diameter casing.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Pilot Hole Water Quality (Disposal Well)
Deviation Surveys (Disposal Well)
Geophysical Logs (Disposal Well)

Prepared By: B. Ziegler & A. Muniz

CH2M HILL DAILY CONSTRUCTION REPORT
BOYNTON BEACH CONCENTRATE DISPOSAL WELL

Date: July 25 to July 31, 1991

Report No. 19

FDER I.D. Number	=	505M03127
FDER Permit/Certification Number	=	UC 50-182070
CH2M HILL Project Number	=	SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

DISPOSAL WELL

A video survey from a depth of 2.050 to 3.302 feet was performed on July 25, 1991. The Contractor commenced reaming of the 22-1/2-inch-diameter borehole for the 16-inch-diameter casing from a depth of about 2.000 to 2.592 feet from July 26, 1991, to July 28, 1991. The Contractor has postponed completing the reamed hole until a final casing setting depth is approved by the Technical Advisory Committee (TAC).

DUAL-ZONE MONITORING WELL

The Dual-Zone Monitoring Well was inactive from July 25, 1991, to July 27, 1991. The Contractor redrilled and completed reaming the 22 1/2-inch borehole to a depth of 980 feet from July 28, 1991, to July 31, 1991. The Contractor installed the 16-inch-diameter casing and pressure grouted on July 31, 1991.

SURFICIAL MONITORING WELLS

The surficial monitoring wells were sampled on July 30, 1991, from 0830 to 1020 hours. The samples were analyzed for temperature, conductivity, and chloride content.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

DISPOSAL WELL

Contingent on the Technical Advisory Committee's response, the Contractor will complete reaming of the borehole and install the 16-inch diameter casing.

DUAL ZONE MONITORING WELL

Temperature and cement bonding logs will be performed on the 16-inch diameter casing. Cementing of the 16-inch-diameter well will be completed.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surticial Monitor Well Water Quality
Deviation Surveys
Geophysical Logs (Disposal Well)

Prepared By: B. Ziegler and A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 1, 1991 to August 8, 1991

Report No. 20

FDER I.D. Number = 505M03127
FDER Permit/Certification Number = UC 50-182070
CH2M HILL Project Number = SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Disposal Well

The Contractor completed reaming of the pilot hole to a depth of 2,780 feet bls on August 3, 1991. The Contractor is intermittently circulating the borehole while waiting on the 16-inch-diameter casing to be delivered. A total of 25 joints of 16-inch casing had been delivered to the site at the close of this report period. Intermittent circulation of the borehole continues.

Dual-Zone Monitoring Well

Temperature and cement bonding logs were performed on the first cement stage of the 16 inch diameter casing. Cementing of the 16 inch diameter casing was completed on Saturday August 3, 1991. A temperature log was performed on August 4, 1991, of the final cement stage. The Contractor commenced drilling of the 14-1/2-inch-diameter borehole on August 5, 1991. The Contractor advanced the borehole to a depth of about 1,350 feet bls by the end of this reporting period. The rig was shut down at the end of this report for repairs.

Shallow Monitoring Wells

The shallow monitoring wells were not sampled this reporting period because of a malfunction of the purging pump. The monitor wells will be sample on August 8, 1991. The samples will be analyzed for temperature, conductivity, and chloride content and will be included in this report.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Disposal Well

Installation of the 16-inch-diameter casing is tentatively scheduled for August 14, 1991.

Dual Zone Monitoring Well

The Contractor will complete repairs of the rig and advance the 14 1/2 inch diameter borehole to a depth of about 1,700 feet.

Shallow Monitoring Wells

The shallow monitoring wells will be purged, sampled, and analyzed for temperature, conductivity, and chloride content.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys
Geophysical Logs (Monitor Well)
Pilot Hole Water Quality (Monitor Well)

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 8, 1991 to August 14, 1991

Report No. 21

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Disposal Well

There was no drilling or testing activity on the Disposal Well through this report period. The 22-1/2-inch reamed hole was completed to a total depth 2,790 feet on August 2, 1991. The Contractor is currently waiting on additional 16-inch-diameter casing to arrive on site.

Dual Zone Monitoring Well

At the close of the last reporting period, the drilling rig had broken down. Repairs on the rig were completed and drilling of the 14-1/2-inch borehole resumed on August 12, 1991. At the close of this reporting period, the borehole had been advanced to a total depth of 1,460 feet.

Shallow Monitoring Wells

The shallow monitoring wells were sampled on August 14, 1991. The samples were analyzed for temperature, conductivity, and chloride content.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Disposal Well

Installation of the 16-inch-diameter casing to a total depth of 2,780 feet below land surface.

Dual Zone Monitoring Well

Completion of the 14-1/2-inch borehole to approximately 1,800 feet and selection of the lower monitor zone.

Shallow Monitoring Wells

The shallow monitoring wells will be purged and sampled. The samples will be analyzed for temperature, conductivity, and chloride content.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys
Pilot Hole Water Quality (Monitor Well)

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 15, 1991 to August 21, 1991

Report No. 22

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

DISPOSAL WELL

The Disposal Well was inactive at the conclusion of the last reporting period. Formation waters produced during reverse-air drilling of the dual-zone monitor well were pumped to the disposal well until August 18, 1991.

The 24-1/2-inch reamer assembly was removed from the well on August 20, 1991. A caliper log of the reamed hole (2,795 feet) was performed by Florida Geophysical Logging on August 20, 1991. Installation of the 16-inch casing to 2,780 feet commenced on the same day and was completed on August 21, 1991.

A neat cement drillable bridge plug (31 sacks) was placed at 2,795 feet on August 21, 1991. The remainder of this report was spent waiting on the bridge plug to set.

DUAL ZONE MONITORING WELL

Drilling of the 14-1/2-inch-diameter borehole was in progress at the beginning of this report period. The borehole was completed to a total depth of 1,808 feet on August 18, 1991. At the close of this report period, the Contractor was preparing for geophysical logging of the borehole.

SHALLOW MONITORING WELLS

The surficial monitor wells were sampled on August 21, 1991 from 0740 to hours. The samples were analyzed for temperature, conductivity, and chloride content.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

DISPOSAL WELL

Complete grouting of the 16-inch casing and perform cement bond log.

DUAL ZONE MONITORING WELL

Perform geophysical logging of the 14-1/2-inch borehole to 1,808 feet. Select a lower monitor interval based on lithologic descriptions, geophysical logging, packer test data from the disposal well.

SHALLOW MONITORING WELLS

The surficial monitor wells will be purged and sampled. The samples will be analyzed for temperature, conductivity, and chloride content.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Pilot Hole Water Quality (Monitor Well)
Geophysical Logs (Disposal Well)
Deviation Surveys (Monitor Well)

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 22, 1991 to August 28, 1991

Report No. 23

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Disposal Well

This reporting period began with pressure grouting of the 16-inch-casing on August 22, 1991. A temperature log was performed the following day to locate cement fill in the annulus. Cement was brought to within approximately 200 feet of the surface in seven stages on August 27, 1991. The header was removed the same day and drill pipe was tripped to the top of the neat cement plug at 2,750 feet. Circulation of the casing with fresh water commenced on August 28, 1991, in preparation for the casing pressure test.

Circulation of the 16-inch casing was still in progress at the conclusion of this report.

Dual Zone Monitoring Well

Geophysical logging of the monitor well was attempted on August 22, 1991. The borehole was bridged off at approximately 1,380 feet. The Contractor redrilled the 14-1/2 borehole until August 28, 1991, when geophysical logging was attempted a second time. A bridge was again encountered at approximately 1,380 feet. The remainder of this report was spent redrilling the borehole to obtain the geophysical logs.

Shallow Monitoring Wells

The surficial monitor wells were sampled on August 28, 1991 from to hours. The samples were analyzed for temperature, conductivity, and chloride content.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Disposal Well

Perform casing pressure test and ream the pilot hole to approximately 3,300 feet.

Dual Zone Monitoring Well

Perform geophysical logging of the 14-1/2 borehole to 1.808 feet. Select a lower monitor interval based on lithologic descriptions, geophysical logging and packer test data from the disposal well.

Shallow Monitoring Wells

The surficial monitor wells will be purged and sampled. The samples will be analyzed for temperature, conductivity, and chloride content.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Geophysical Logs

Prepared By: B. Ziegler & A. Muniz

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CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

August 29, 1991 to September 4, 1991

Report No. 24

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

DISPOSAL WELL

This reporting period began with the Contractor circulating the 16-inch casing with fresh water. Circulation of the casing was stopped on August 30, 1991, to set up for the casing pressure test. A successful casing pressure test was performed on August 30, 1991 in the presence of Mr. Ed Rahrig of FDER. The cement bond log of the 16-inch casing was performed the same day.

Reaming of the 14-1/2-inch borehole commenced on August 31, 1991, and was completed to a total depth of 3,312 feet on September 4, 1991. The eighth and final stage of cement was pumped on September 3, 1991. Development of the Disposal Well from 3,312 feet commenced on September 4, 1991, and was still in progress at the conclusion of this report.

DUAL ZONE MONITOR WELL

Geophysical logging of the 14-1/2-inch borehole was accomplished to approximately 1,800 feet on August 29, 1991. The remainder of this report period was spent waiting to receive approval of the final casing setting depth and the lower monitor interval.

SHALLOW MONITORING WELLS

The surficial monitor wells were sampled on September 4, 1991. The samples were analyzed for temperature, conductivity, and chloride content.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

DISPOSAL WELL

Collect background water quality samples from the injection zone, perform TV survey of complete well and prepare wellhead for liner installation.

DUAL ZONE MONITORING WELL

Install 6-inch casing to approximately 1,800 feet and complete the lower monitor interval to approximately 1,850 feet.

SHALLOW MONITORING WELLS

The surficial monitor wells will be purged and sampled. The samples will be analyzed for temperature, conductivity, and chloride content.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality
Deviation Surveys (Disposal Well)

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 5, 1991 to September 11, 1991

Report No. 25

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Disposal Well

This report period began with the Contractor developing the well. Development of the well was completed on September 5, 1991. A total of 8 hours were spent on development. Samples for Primary and Secondary drinking water standard with priority pollutants were collected on September 7, 1991 for analysis. The samples were collected by purging the well from 3,000 feet with reverse air.

The Contractor began flushing the well with fresh water following collection of the samples in preparation for the TV survey. A black and white TV Survey was performed on the 16 inch casing and complete borehole on September 9, 1991.

No other drilling activities were performed on the well through the end of this report.

Dual Zone Monitoring Well

The Contractor waited on approval of the lower monitor zone from the beginning of this report until September 11, 1991 at which time verbal approval was received from FDER for the lower monitor interval of 1,800 to 1,850 feet. The remainder of this report period was spent setting up to install the 6 inch casing.

Shallow Monitoring Wells

The surficial monitor wells were sampled on September 11, 1991 and analyzed for temperature, conductivity, and chloride content on September 12, 1991.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Disposal Well

Installation of the packer assembly and liner.

Dual Zone Monitoring Well

Installation of the 6 inch casing to 1,800 feet, pressure test and cement bond log.

Shallow Monitoring Wells

Will be sampled and analyzed for temperature, conductivity, and chloride content.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 12, 1991 to September 18, 1991

Report No. 26

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Disposal Well

This report period commenced with the Contractor preparing to set the packer assembly in the 16 inch casing. No drilling activities were performed on the well from September 12, 1991 through September 16, 1991.

On September 17, 1991, the Contractor ran a spring loaded casing scrapper on the 16 inch diameter casing from the surface to the total depth of 2,780 feet.

The remainder of this report period was spent setting up for and scheduling installation of the packer assembly and 13 inch diameter liner.

Dual-Zone Monitoring Well

Installation of the 6 inch casing (final string) commenced on September 12, 1991 and was installed to a total depth of 1,800 feet. The casing was pressure grouted in place with neat cement the same day.

The remainder of this report period was spent grouting the 6 inch casing and performing temperature logs after each stage of cement. At the conclusion of this report period a total of eight stages of cement had been pumped. The top of the cement was last tagged at 1,377 feet below land surface.

Shallow Monitoring Wells

The surficial monitor wells were sampled on September 18, 1991 and analyzed for temperature, conductivity, and chloride content on September 25, 1991.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Disposal Well

Installation of the packer assembly and liner.

Dual Zone Monitoring Well

Complete grouting of the 6 inch casing up to approximately 1,100 feet, pressure test the casing and perform a cement bond log.

Shallow Monitoring Wells

Will be sampled and analyzed for temperature, conductivity, and chloride content.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 19, 1991 to September 25, 1991

Report No. 27

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Disposal Well

No drilling activities were performed on the disposal well from September 19, 1991 through September 22, 1991.

On September 23, 1991 the Contractor set a Baker Packer Assembly in the 16 inch final casing string at a depth of 2,720 feet below land surface. The 13 inch diameter liner was installed to a total depth of 2,720 feet the following day. On September 25, 1991, the Contractor displaced the annulus between the 16 inch casing and 13 inch liner with a corrosion inhibitor.

This report period ended with the Contractor performing a preliminary pressure test on the annulus.

Dual-Zone Monitoring Well

This report period commenced with the Contractor pumping the ninth and tenth stages of cement on September 19, 1991. The Contractor experienced an excessive amount of cement loss in the fractured interval at 1,378 feet. On September 20, 1991, the Contractor requested that he be allowed to gravel the fractured interval from 1,340 to 1,378 feet to prevent any further excessive losses of cement to the formation. The Contractor spent the remainder of this report period waiting on approval to gravel.

Shallow Monitoring Wells

The surficial monitor wells were sampled on September 25, 1991 and analyzed for temperature, conductivity, and chloride content.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Disposal Well

Final pressure test on the 13 inch diameter liner and set up for injection test.

Dual Zone Monitoring Well

Complete grouting of the 6 inch casing up to approximately 1,100 feet, pressure test the casing and perform a cement bond log.

Shallow Monitoring Wells

Will be sampled and analyzed for temperature, conductivity, and chloride content.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality

Prepared By: B. Ziegler & A. Muniz

CH2M HILL WEEKLY REPORT

BOYNTON BEACH CONCENTRATE DISPOSAL WELL

September 26, 1991 to October 2, 1991

Report No. 28

FDER I.D. Number	= 505M03127
FDER Permit/Certification Number	= UC 50-182070
CH2M HILL Project Number	= SEF26410.P1

SUMMARY OF ENGINEER'S/DRILLER'S LOG

Disposal Well

This report period commenced with the Contractor performing a preliminary pressure test on the 13 inch liner. The annulus between the 16 inch casing and 13 inch liner would not hold pressure. The Contractor began a series of tests with an inflatable packer on September 26, 1991 in an attempt to identify the leak. On September 28, 1991, it was determined that the 13 inch liner and Baker packer assembly were not malfunctioning. The Contractor removed the 13 liner on the same day and began a series of pressure tests on the 16 inch casing.

On October 2, 1991, it was determined that the 16 inch casing had a pin-hole leak at 2,229.31 feet below land surface. No other drilling activities were performed during this report.

Dual-Zone Monitoring Well

Approval to gravel the annular space through the interval from 1,340 to 1,378 feet was received from FDER on September 27, 1991. The Contractor began placing gravel in 6 foot lifts and cementing on October 1, 1991. At the close of this report period cement was tagged at 1,353 feet below land surface.

Shallow Monitoring Wells

The surficial monitor wells were sampled on October 2, 1991 and analyzed for temperature, conductivity, and chloride content.

PROJECTION OF ACTIVITIES IN NEXT REPORTING PERIOD

Disposal Well

Evaluate possible solution to pin-hole leak in 16 inch casing and meeting with FDER.

Dual Zone Monitoring Well

Complete grouting of the 6 inch casing up to approximately 1,100 feet, pressure test the casing and perform a cement bond log.

Shallow Monitoring Wells

Will be sampled and analyzed for temperature, conductivity, and chloride content.

ATTACHMENTS:

Engineer's Daily Reports
Contractor's Daily Reports
Surficial Monitor Well Water Quality

Prepared By: B. Ziegler & A. Muniz

TAC Meeting Summaries

MEETING SUMMARY

CH2M HILL

TO: Al Mueller/FDER/WPB
Peggy Highsmith/FDER/WPB
Tom Farrell/FDER/WPB
Ed Rahrig/FDER/WPB
Pete Mazzella/City of Boynton Beach
Jimmy Brantley/Youngquist Brothers
J. I. Garcia-Bengochea/CH2M HILL/GNV
Bart Zeigler/CH2M HILL/DFB
Albert Muniz/CH2M HILL/DFB

COPIES: Tom McCormick/CH2M HILL/DFB
Wayne Welch/CH2M HILL/DFB

FROM: Albert Muniz/DFB

DATE: October 10, 1991

SUBJECT: Boynton Beach Concentrate Disposal Well
October 7, 1991 Meeting

PROJECT: SEF26410.P1.30

The above met at FDER's office in West Palm Beach to discuss a pinhole leak that was detected during the preliminary pressure test of the 13" liner. Muniz stated that he called the meeting as follow-up to the conversation held between himself and Mueller on October 2, 1991, regarding this subject.

Muniz noted that a small leak, about one pint lost in 8 minutes, was identified during testing of the 16" final casing after the preliminary pressure test on the 13" liner. A loss of pressure was noted during pressure tests run on the 13" liner and annulus. After several pressure tests, the location was isolated to a casing joint located at 2,229.31 feet below land surface.

The cause of the small leak is most likely attributed to a faulty weld at the joint between pipe sections 13 and 14.

Muniz noted that he wanted discuss the problem with FDER as soon as possible and was anticipating to submit a corrective action plan to repair the pinhole leak by the end of the week. He also noted that the City of Boynton Beach must first accept the proposed plan before it could be presented to FDER.

Brantley feels strongly that the leak is at least partially a result of the weld. He stated that some flux or impurities in the welding material could have contributed to the problem.

Highsmith asked where the leak occurs in relation to the geologic units and if there was flow/production at this depth. Muniz said he would look into this and address the hydrogeology in our response to FDER.

A television survey was performed on the well on October 3, 1991. The surveyed shows the joint in question and the Baker packer assembly set at 2,720 feet. No visible hole was detected from this survey.

Rahrig asked Mueller if a TAC response was needed and Mueller said that he thought the District office could handle this.

Highsmith asked about the toxicity of the material to be used to seal the pinhole. Garcia-Bengochea stated that the sealant is not toxic once it sets, however, it does require proper disposal of excess material.

Muniz noted that a meeting is scheduled with Halliburton Services at 1:00 pm on Tuesday October 15, 1991 at FDER's West Palm Beach office to discuss corrective actions.

Garcia-Bengochea asked the attendees to submit any questions that they may have prior to October 11, 1991, so we could address these concerns in our submittal.

The meeting adjourned around 1:45 pm.

SUMMARY OF MEETING

CH2M HILL

MEETING

LOCATION: Boynton Beach Membrane Softening Concentrate Deep Injection Well Disposal Site (2:45 p.m.)

ATTENDING: Pete Mazzella/Boynton Beach
Peggie Highsmith/FDER/WPB
Albert Muniz/CH2M HILL/DFB
J.I. Bengochea-Garcia/CH2M HILL/DFB
Bart Ziegler/CH2M HILL/DFB

COPIES: John Guidry/Boynton Beach
Wayne Welch/CH2M HILL/DFB
Tom McCormick/CH2M HILL/DFB

DATE: March 26, 1991

PREPARED BY: Bart Ziegler (March 27, 1991)

PROJECT: SEF26410.P1

SUBJECT: Preconstruction Meeting for the Membrane Softening Concentrate Deep Injection Well Disposal System with FDER

1. Mr. Albert Muniz opened the meeting with an introduction of the project team members. They are as follows:

City of Boynton

Pete Mazzella/Main (Point of Contact) 407/738-7462

Florida Department of Environmental Regulation

Al Mueller/TAC Chairman 407/433-2650
Peggie Highsmith/Point of Contact
for Field Activities

CH2M HILL

J.I. Bengochea-Garcia/Prj. Adm.
Albert Muniz/Project Manager Emg. 305/975-6307
Tom McCormick/Senior Review Emg. 407/488-1060
Bart Ziegler/Project Engineer Emg. 407/392-8977
Dave Snyder/Resident Mbl. 813/240-4550
Sean Skehan/Project Geologist Emg. 407/968-4270

TO: Al Mueller/FDER/WPB
Peggy Highsmith/FDER/WPB
Thomas Farrell/FDER/WPB
Ed Rahrig/FDER/WPB
Cathy Conrardy/FDER/TAL
Tony LasCasas/Palm Beach County Public Health Unit
Russ McLean/EPA/ATL
Mike Piper/SFWMD/WPB
Pete Mazzella/City of Boynton Beach
Jimmy Brantley/Youngquist Brothers
Bob Pendergraft/Halliburton Services
Allan Spencer/Halliburton Services
Mark Schnitker/HOMCO
J. I. Garcia-Bengochea/CH2M HILL/GNV
Bart Ziegler/CH2M HILL/DFB
Albert Muniz/CH2M HILL/DFB

COPIES: Tom McCormick/CH2M HILL/DFB
Wayne Welch/CH2M HILL/DFB

PREPARED BY: Albert Muniz/DFB

DATE: October 21, 1991

SUBJECT: Boynton Beach Concentrate Disposal Well--October 15, 1991, Meeting

PROJECT: SEF26410.P1

The above met at FDER's office in West Palm Beach to discuss the remediation of a pinhole leak that was detected during the preliminary pressure test of the 13-inch liner at the referenced project. The meeting commenced at 2:40 p.m. Mueller suggested that the meeting begin with everyone introducing themselves.

Following introductions, Muniz began the meeting by distributing the following handouts:

- Meeting Agenda
- Chronology of Events
- Halliburton Services: k-Trol XC Sealant Data
- HOMCO: Internal Steel Liner Casing Patch Data

MEETING SUMMARY

Page 2

October 21, 1991

SEF26410.P1

- Cronox 669 Corrosion Inhibitor Data
- Implementation Schedule

Muniz said that the repair recommended consists of sealing the pin-hole with k-Trol XC sealant and installing an internal steel liner casing patch.

Chronology of Events

Muniz reviewed the construction and testing activities that led to the finding of the pin-hole leak in the 16-inch casing. The 16-inch casing was completely cemented in early September 1991. A successful casing pressure test was performed on August 8, 1991, in the presence of FDER (Rahrig). Upon completion of the casing pressure test, a cement bond log was performed (8/30/91). The cement bond log showed bonding around the 16-inch casing. A casing scraper was then run to prepare the casing for the Baker packer assembly. The Baker packer assembly and 13-inch liner were installed on September 23, and 24, 1991, respectively. A series of pressure tests were then conducted to test the liner, the annular space between the liner and 16-inch casing, and the packer assembly. Results of these test indicated that the packer assembly and liner were not leaking, therefore, the liner was removed and the 16-inch casing was re-tested. Inflatable packers were used to isolated the leak during pressure testing. The apparent pin-hole leak was located at the weld between pipe joints 13 and 14, and which occurred at 2,229.31 feet below pad surface (10/1/91).

On October 2, 1991, CH2M HILL notified the City on this matter and then called FDER (Mueller). An initial meeting was held with FDER on October 7, 1991, to present the pressure test data and discuss the issue with FDER. This second meeting was then scheduled for October 15, 1991, to present a corrective action plan to repair the pin-hole leak.

k-Trol XC Sealant (Halliburton Services)

The next topic on the agenda was discussion of the application of k-Trol XC sealant. Pendergraf led the discussion on the application of the proposed sealant as outlined in the handout distributed. Rahrig noted that brines may accelerate the setting time of the sealant. Pendergraft stated that a water sample would be collected and tested in a laboratory to adjust for any accelerated setting or reactions that may occur prior to placement of the sealant.

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Placing of the sealant would be accomplished by filling the area around the leak with the sealant and pressurizing the casing to 500 psi to squeeze the sealant through the pin-hole area. Setting time is estimated to be around 4 to 5 hours. Pendergraft said they would attempt to squeeze a maximum of ten (10) barrels of sealant into the pin-hole. He also stated that it was not likely that 10 barrels would be forced through the leak. Pressure would remain on the casing until the 10 barrel maximum is reached or the set time is reached, whichever occurs first. Pendergraft said a teacup of sealant should repair the leak.

Rahrig asked if it was possible to put a radioactive tracer in the k-Trol XC to track its movement outside the 16-inch casing. Muniz said he does not recommend tracking the sealant with a radioactive tracer because it would be very difficult to track since inside casing staining would mask the ability to trace. Pendergraft also said that he does not recommend a radioactive tracer.

Halliburton recommended cleaning the excess sealant by jetting and washing out the section of casing in question. Brantley said they would also run a milling tool to prepare the casing for the liner patch. Pendergraft said cleaning of the casing should not affect the k-Trol XC. Schnitker said HOMCO has set patch across many squeeze jobs, but has never had to set one across a hole sealed with k-Trol XC, but does not anticipate any difficulty with the procedure.

Piper asked if a television survey was performed on the 16-inch casing. Muniz and Brantley responded that a black and white television survey was performed (10/3/91), but no visible signs of the leak were evident.

Muniz noted that pressure tests would be performed on the section of casing repaired and the entire 16-inch casing.

Conrardy asked how the pin-hole could have occurred. Brantley said there appeared to be a weak weld and that the installation of the packer assembly (about 27,000 lbs needed to shear-off the setting pin) caused a jolt which may have caused the problem.

Halliburton recommended that 140 feet of casing be filled with k-Trol XC. Approximately 30 feet would be below the pin-hole and 100+ feet above the pin-hole. This would allow sufficient sealant above the leak to force the sealant (at least 10 barrels) into the leak when the casing is pressurized to 500 psi.

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Brantley noted that the casing area in question has already been pressurized to about 300 psi during testing, and that pressurizing the 16-inch casing to 500 psi would not be a problem.

Internal Steel Casing Liner Patch (HOMCO)

Muniz asked Schnitker to discuss the details of how the liner patch would be installed. Schnitker described the installation, which is also described in the HOMCO handout. He said that a 20 foot liner patch is recommended. Typically, they prefer to have a minimum of 6 to 8 feet on either side of the pin-hole. Since the liner sections come in 10 foot sections, a weld would be needed to manufacture a 20 foot liner patch. Muniz said it may be more desirable to recommend a 30 foot section to ensure that a welded liner joint does not lie over the welded joint on the 16-inch casing.

Rahrig asked if this size liner was ever installed. Schnitker said they frequently make 13-3/8 inch liner patches, however, he only knows of one other patch of this size that was manufacturer, and to his knowledge the patch had not yet been installed. He also noted that many patches are over 30 years old and have not leaked. The liner patch will be 11 gauge (1/8 inch thick).

The patch will be set by radial compression which holds the liner in-place. An epoxy is applied to the outside of the liner patch to fill the pores prior to setting of the liner patch. Schnitker said a caliper of the well that is accurate within 1/16 inch must be run prior to manufacturing of the patch.

Rahrig asked if the packer assembly could be removed. Brantley said the assembly could possibly be removed if all the dimensions are within the tolerances, however, the packer may not be reuseable. He also said that the packer could be milled out or left in place and another packer assembly installed if it were not retrievable. Brantley noted that both ends of the patch are beveled to prevent tools and casing joints from hanging during construction.

Cronox 669 Corrosion Inhibitor

Data on the corrosion inhibitor was briefly discussed. Both Halliburton and HOMCO felt that the proposed corrosion inhibitor would be compatible with the repair recommended.

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Implementation Schedule

Muniz said that the City has accepted the recommended repair process and that FDER need to review and approve the procedure if it is acceptable. He said that approximately 4 weeks are needed to manufacturer the liner patch, and that Youngquist Brothers contract expires November 13, 1991. Muniz requested that a verbal approval be granted within a couple of days so the drilling contractor could begin remediation. Mueller said he would telephone CH2M HILL tomorrow with his comments.

The meeting adjourned around 1:45 pm.

Highsmith asked where the leak occurs in relation to the geologic units and if there was flow/production at this depth. Muniz said he would look into this and address the hydrogeology in our response to FDER.

A television survey was performed on the well on October 3, 1991. The surveyed shows the joint in question and the Baker packer assembly set at 2,720 feet. No visible hole was detected from this survey.

Rahrig asked Mueller if a TAC response was needed and Mueller said that he thought the District office could handle this.

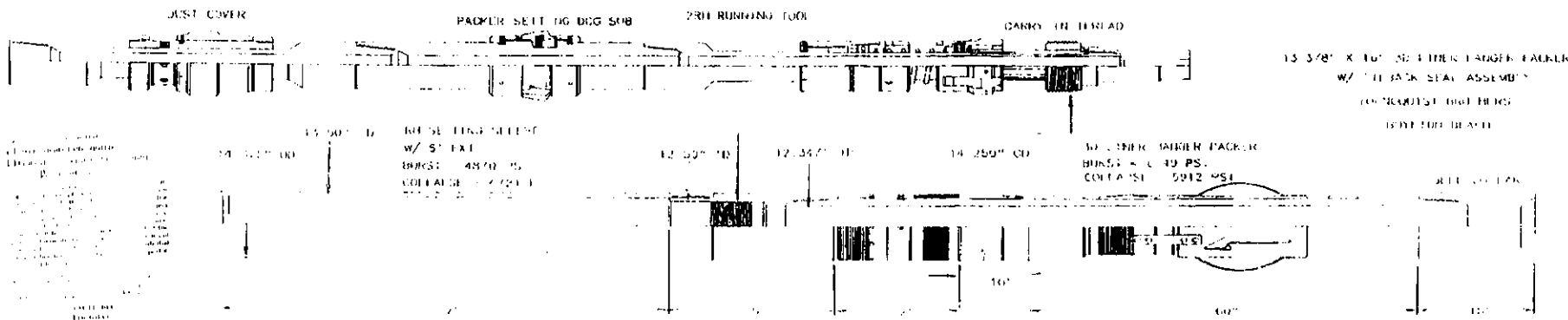
Highsmith asked about the toxicity of the material to be used to seal the pinhole. Garcia-Bengochea stated that the sealant is not toxic once it sets, however, it does require proper disposal of excess material.

Muniz noted that a meeting is scheduled with Halliburton Services at 1:00 pm on Tuesday October 15, 1991 at FDER's West Palm Beach office to discuss corrective actions.

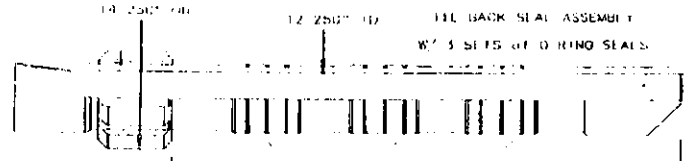
Garcia-Bengochea asked the attendees to submit any questions that they may have prior to October 11, 1991, so we could address these concerns in our submittal.

The meeting adjourned around 1:45 pm.

Baker Packer Assembly



- 1. 13 3/8" X 10' 30" LITER LARGER PACKER
- 2. TIE BACK SEAL ASSEMBLY
- 3. 16 LITER LARGER PACKER
- 4. 12 5/8" ID
- 5. 12 3/4" ID
- 6. 14 250" OD
- 7. 16 LITER LARGER PACKER
- 8. 12 5/8" ID
- 9. 12 3/4" ID
- 10. 14 250" OD
- 11. 16 LITER LARGER PACKER
- 12. 12 5/8" ID
- 13. 12 3/4" ID
- 14. 14 250" OD
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BAKER
SERVICE TOOLS

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