LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

COMPLETION REPORT
of
DEEP WELL MODIFICATIONS
at
KNIGHT TRAIL PARK

Prepared For:
SARASOTA COUNTY BOARD OF COUNTY COMMISSIONERS
Sarasota, Florida

Prepared By:

SMALLY, WELLFORD & NALVEN
and
RUSSELL & AXON, INC.

A Joint Venture
In Association With

LAW ENVIRONMENTAL, INC.
Tampa, Florida

February, 1994
Project No. 57-157601

LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

February 11, 1994

Mr. David J. DeWitt
Staff Hydrologist
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34609-6899

Re: Final Report - Knight Trail Deep Well Modification, Sarasota County
FDEP Consent Order OGC, Case No. 91-1999
Law Environmental, Inc. Project No. 571576.01

Dear Mr. DeWitt:

On behalf of Sarasota County, we are pleased to provide you with one copy of this report entitled "Completion Report of Deep Well Modification at Knight Trail Park" which was prepared by Law Environmental, Inc. in association with a Joint Venture of Smally, Wellford & Nalven and Russell & Axon, Inc. This document describes the procedures used and the work performed in modifying the Knight Trail deep ground-water injection well to a monitoring well.

Law Environmental provided review of the on-site activities. The modifications to the deep well were performed by Youngquist Brothers Inc. Well Drilling, Florida Cement Inc., and Florida Geophysical Logging, Inc. in accordance with the Construction Documents and Specifications for Deep Well Modifications at Knight Trail Park for Sarasota County Board of County Commissioners, County Bid No. 3106R. This report covers the work performed under contract No. 94-007 which was approved on October 5, 1993, by the Sarasota County Board of Commissioners.

We trust the information contained in the report will meet the requirements of the Consent Order. If you have any questions or we can be of assistance, please contact us at (813) 289-9491.

Sincerely,

LAW ENVIRONMENTAL, INC.

C. Edwin Copeland, P.E.
Branch Manger

Alton F. Robertson, P.E.
Principal Hydrologist

cc: Joseph L. Brown, III, P.E.
Judith A. Richtar, P.G.

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George W. Ellsworth 2/4/94

George W. Ellsworth, P.G.

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1.0 INTRODUCTION

1.1 BACKGROUND DATA

The Knight Trail Park deep well site is located in the western-central portion of Sarasota County, Florida (Figure 1, Location Map) in the northeastern quarter of Section 21, Township 38 South, Range 19 East. The site, located approximately 1.5 miles east of Interstate 75, and 5 miles northeast of Venice, Florida, is located on the north side of Rustic Road, approximately 480 feet west of Haul Road adjacent to the Sarasota County Gun Range. The park covers approximately 109 acres and is called the Knight Trail Park after an existing historical trail adjacent to the facility.

The Florida Department of Environmental Protection (FDEP), formerly The Florida Department of Environmental Regulation, issued a construction permit, UC58-125421, to the Sarasota County Engineering Department on April 24, 1987, to construct the Knight Trail Park exploratory monitor well. The purpose of the exploratory monitor well was to investigate the potential for deep injection well disposal of reverse osmosis brine or reject water. The well site covers a relatively small portion of the total property (Figure 2).

Law Environmental was retained by the Joint Venture of Smally, Wellford & Nalven and Russell & Axon, Inc. to provide hydrogeologic services for Sarasota County. Diversified Drilling, Inc. was contracted in 1988 by Sarasota County to drill the deep well. Drilling began in June 1988 and ended on February 27, 1989. The well construction profile is shown in Figure 3. The well was drilled to a total depth of 2,156 feet below land surface and was installed with three casings. A 24-inch diameter steel surface outer casing was installed through the surficial aquifer to a depth of 38 feet below land surface. After a 10-inch pilot hole was opened with a 23-inch reamer, a 16-inch diameter steel casing was installed inside the surface casing and through the intermediate aquifer to a depth of 401 feet below the land surface.

A 16-inch reamer was then used to open the hole to 1,600 feet below land surface. A 10-inch borehole was drilled out of the 16-inch casing through the Upper Floridan aquifer and through an underlying confining zone to a depth of 1,643 feet below land surface. An 8-inch steel casing was installed inside the 16-inch casing from 1.4 feet above land surface to a total depth of 1,599 feet.

An 8-inch borehole was drilled out through the 8-inch steel casing and into the Lower Floridan aquifer to a total depth of 2,146 feet below land surface. The borehole was then cored 10 feet to a total well depth of 2,156 feet below land surface. After conducting various pumping tests, the open hole was plugged back to a depth of 1,910 feet below land surface.

On November 3, 1988, after the installation of the 8-inch steel casing in the exploratory well, a cement bond log was run in the depth interval from 61.20 feet below top of pipe to 1,590 feet below land surface. The cement bond log was evaluated by Loren E. Thompson, of Loren E. Thompson, Inc., Well Log Consulting Services, Lakewood, Colorado. Mr. Thompson concluded that "the borehole is sealed adequately to prevent fluid movement vertically within the annulus and thus isolate the formation below from the formation above". He also concluded "the entire interval from the top of cement to 1,580 feet is not bonded between pipe and cement nor between cement and formation" with annotated reference to the interval 1,510 to 1,580 feet below top of casing (Law Environmental, Inc., 1989).

Data from the well completion report (Law Environmental, Inc., 1989) are provided in Appendix A. The data provided include a well completion diagram, geophysical logs, and the annotated cement bond log.

On October 12, 1989, the FDEP raised concerns about the thickness of the confining zone below the Upper Floridan and the integrity of the cement bond for the 8-inch casing in the confining zone. The FDEP were concerned that the exploratory monitor well may be a threat to the waters of the State by potentially allowing communication between the non-potable Lower Floridan aquifer and the potable Upper Floridan aquifer. The FDEP requested Sarasota County provide a Well Plugging and Abandonment Schedule, pursuant to Florida Administrative Code (F.A.C.) Rule 17-28.350, to alleviate their concerns.

1.2 CONSENT ORDER

On September 9, 1992, Sarasota County entered into Consent Order OGC File No. 91-1999 with the FDEP wherein a settlement was reached regarding plugging of the Knight Trail Park exploratory monitoring well and its conversion to a monitoring well which would be owned and managed by the Southwest Florida Water Management District (SWFWMD). Part of the corrective action specified in the Consent Order required that within 60 days of the effective date of the Consent Order, Sarasota County submit either a well testing and modification plan for conversion of the exploratory monitor well to a regional monitor well or a Plugging and Abandonment Plan. Sarasota County submitted a well plugging/conversion plan prepared by Law (Law Environmental, Inc., 1993) for the exploratory injection well's conversion to a regional monitoring well to be used by SWFWMD.

The conversion plan submitted to the FDEP were the Technical Specifications to be, and subsequently included in, the Construction Documents and Specifications (Law Environmental, Inc., 1993). Copies of the Technical Specifications Section Well Modification Construction are provided in Appendix B.

The conversion plan was incorporated into the Consent Order by amendment on May 19, 1993. The Amendment required that within 210 days of the effective date, Sarasota would implement and complete the well conversion/plugging plan. The Consent Order also required that a well completion report be submitted within 60 days of completion of the well conversion. Copies of the Consent Order and the Amendment are provided in Appendix C.

1.3 OBJECTIVES

The objectives of the Knight Trail Park deep well modifications were as follows:

- To prevent hydraulic communication between the Lower and Upper Floridan aquifers; and
- To facilitate ground-water monitoring of the Upper Floridan aquifer.

The plugging of the open-hole injection zone in the Lower Floridan aquifer and of the 8-inch casing across the confining zone accomplishes the first objective. The perforation of a 25-foot interval of casing near the base of the Upper Floridan and installation of a 4-inch casing above the perforated interval effectively converts the exploratory injection well to an Upper Floridan aquifer monitoring well for use by the SWFWMD, thereby accomplishing the second objective.

In addition, the completion of the FDEP-approved well plugging/conversion plan on December 14, 1993, and submittal of this final report to the FDEP fulfills Sarasota County's obligations under the Consent Order. This report also provides a record and summary of the work performed during plugging/conversion of the exploratory injection well.

1.4 CONSTRUCTION CONTRACT

To perform the work, the Sarasota County government invited sealed bids from general contractors who had been pre-qualified for County construction projects over $50,000 in estimated value. The work required was described in detail in the "Construction Documents and Specifications For Deep Well Modifications at Knight Trail Park", County Bid No. 3106R issued on June 19 and 22, 1993. After the issuance of four bid addendums by the County, bids were received on July 28, 1993. Youngquist Brothers, Inc., the only bidder, submitted a bid of $177,000.00.

The Sarasota County Board of County Commissioners approved a contract (No. 94-007) with Youngquist Brothers, Inc. for the amount of $177,000.00 on October 5, 1993. A Notice to

Proceed was issued by Sarasota County Utilities Department Water Improvement Program to Youngquist Brothers, Inc. on October 7, 1993, with an effective date of October 14, 1993.

Youngquist Brothers, Inc. mobilized to the site and initiated field work on October 19, 1993, and completed the well conversion/plugging work on December 14, 1993. A summary of the well conversion/plugging activities, including dates, is presented in Table 1.

2.0 DEEP WELL MODIFICATION

2.1 SITE WORK

On October 18, 1993, Youngquist Brothers, Inc. initiated site activities. The site work included:

- Site clearing and grubbing;
- Driveway culvert installation;
- Shell driveway construction; and
- Site fencing and entrance gate construction.

Site clearing and grubbing were performed to facilitate the construction of a shell driveway and culvert and installation of perimeter fencing and an entrance gate (see Figure 2, Site Plan).

The shell driveway, 12 feet in width, was constructed up to 12 inches above existing grade from the entrance of Rustic Road to the ramp leading onto the well pad. A 15-inch round diameter cement pipe was installed underneath the entrance to maintain drainage along Rustic Road (see Photograph No. 1).

The site fencing constructed around the perimeter was of the chain link type, 6 feet in height, and with barbed wire strung across the top. A sliding gate, 12 feet in width, was installed across the well-site entrance and then fitted with a chain and locking device (see Photographs No. 1 and 2).

Youngquist Brothers, Inc. constructed the shell driveway and culvert. Site fencing was installed by USA Steel Fence Co./Approved Roofing, who was subcontracted by Youngquist for the work.

2.2 BACK PLUGGING OF OPEN HOLE

The well modification plan in the Construction Documents and Specifications proposed that, prior to grouting the well, a cement bond log would be run from the total well depth of 1,910 feet to the bottom end of the 8-inch casing which was at approximately 1600 feet below the top of casing (TOC). The reason for this procedure was to allow the logging tool a sufficient working interval to record over the entire length of the existing 8-inch steel casing.

Youngquist Brothers, Inc. requested a modification in the procedure to partially backplug the open hole prior to running the logging tool due to schedule constraints and availability of the

logging tool. With FDEP concurrence Law, acting on behalf of the County, approved their request provided that sufficient depth interval remained in the well after partial backplugging to allow the logging tool to record over the entire length of the existing 8-inch steel casing.

The cement specified and used in the backplugging in the open hole and also in backplugging the 8-inch casing was a Type II, Florida Class H, sulfate-resistant cement. Neat cement grout was a slurry and contained less than 5.2 gallons of water per cubic foot of cement. Water used to prepare the cement contained less than 2,000 mg/ℓ (milligrams per liter) total dissolved solids and met quality requirements of the cement manufacturer.

On November 2, 1993, the drilling contractor arrived on site and a 2-inch tremmie pipe was tripped downhole to 1,910 feet below the TOC (see Figure 3, Deep Well Modification Completion Diagram and Photographs No. 3 and 4). Florida Cement, Inc., on November 4, 1993, pressure grouted 17 barrels of neat cement into the interval from 1,910 to 1,739 feet below the TOC and 8 barrels of neat cement from 1,739 to 1,709 feet below the TOC. On November 5, 1993, cement grouting continued. Fifteen barrels were pumped via reverse circulation to 1,709 feet below the TOC with no vertical buildup results. An additional 20 barrels were pumped from 1,709 to 1,705 feet below the TOC. On November 6, 1993, 15 barrels of neat cement were pumped from 1,705 to 1,680 feet below the TOC. Cement grouting data are tabulated in Table 2.

2.3 CEMENT EVALUATION TOOL LOGGING RUN NO. 1

The construction documents specified that the cement bond evaluation be conducted using Schlumberger's Cement Evaluation Tool or an approved equivalent. Youngquist Brothers, Inc. requested that the Sector Bond Log (SBL) manufactured by Computalog Wireline Products, Inc. in Ft. Worth, Texas be approved for use in the cement bond evaluation.

The SBL measures the quality of the cement bond around 360 degrees of the casing and also measures the vertical extent of the cement bond quality. The SBL tool incorporates the standard cement bond log transmitter/receiver spacings of 3 and 5 feet, plus eight 2-foot spaced "sectored" receivers, each looking at only 45 degrees of the casing. Law and the FDEP approved the SBL for use in evaluating the cement bonding in the well.

On November 8, 1993, Florida Geophysical, Inc. (FGL) ran the SBL (Logging Run No. 1) to evaluate the cement bonding in the well (see Photographs No. 5 and 6). Law staff (George Ellsworth, PG and Len Fishkin) and FDEP staff (Joseph Haberfeld, PG and Frank Shelfer) were on site to witness the logging runs. Initially, the SBL was run from 1,606 feet to 1,340 feet below TOC. Bottom of the 8-inch steel casing was determined to be at 1,599 feet below TOC

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as indicated in the well completion report (Law Environmental, Inc., 1988). The tool was lowered to 1,606 feet below TOC, restarted and run to the surface.

Evaluation of the SBL indicated that several zones behind the steel casing were either uncemented or poorly cemented. These zones are as follows:

Zone	Interval (ft)	Cement Bond
1	1,599 - 1,506	Predominantly Uncemented
2	1,126 - 1,012	Poorly Cemented
3	900 - 886	Poorly Cemented

There are also intervals above 400 feet that are poorly cemented, but these are between the 8-inch and 16-inch steel casings. Remaining intervals were moderately well-cemented to well-cemented.

The interval of primary concern, the confining zone at the base of the Upper Floridan, was well cemented with occasional small areas or vugs that were less well-cemented. This well-cemented interval extends over almost 400 feet, from 1,506 feet to 1,126 feet below TOC. No potential channelling was observed in the SBL data for this interval. Bottom of the Upper Floridan aquifer had been picked at 1,130 feet below TOC.

Printouts of the SBL were provided to the FDEP Tallahassee staff on-site. Copies of the SBL were provided to the FDEP Southwest District staff the following day for their review. Copies of the SBL are provided in Appendix D of this report.

2.4 PRESSURE GROUTING BEHIND CASING

Based on Law and FDEP's review of the SBL Run No. 1, it was concluded that the apparent predominantly uncemented interval at the lower 100 feet of the 8-inch steel casing, from 1,599 to 1,506 feet, should not be perforated and squeeze grouted due to concern over the possible detachment of that part of the casing. As an alternative, it was decided that the contractor should be directed to pressure grout behind the casing from the bottom of the casing.

On November 12, 1993, the contractor attempted to force cement up in the annulus behind the 8-inch casing from the bottom of the casing at 1,599 feet by keeping the well filled with water under 40 to 50 psi (pounds per square inch) pressure. The contractor pumped 20 barrels of neat

cement downhole in the attempt to force cement up into the annulus. A summary of the grouting stages is included in Table 2.

2.5 CEMENT EVALUATION TOOL LOGGING RUN NO. 2

On November 13, 1993, after the contractor completed the pressure grouting, Florida Geophysical Logging, Inc., ran a Sector Bond Log tool (Logging Run No. 2) to evaluate the results of the pressure grouting behind the lower 100 feet of the 8-inch steel casing. The SBL tool was connected to the wireline cable and lowered into the well. The well bottom was tagged at 1,583 feet below the TOC indicating that cement had come up 16 feet into the cased well.

On this logging run, the hardware card was replaced for the Variable Density Log (VDL) component of the SBL. The VDL is a log of the acoustic wave train that is recorded photographically off of an oscilloscope. It can provide additional information of cementing conditions.

Calibration results from Run No. 2 were relatively better than those for Run No. 1 which was run on November 8, 1993. Law personnel, who were on-site to evaluate the results of the pressure grouting, decided to re-log the entire well. Above 1,583 feet, results for SBL Run No. 2 resembled results for the first SBL logging run which was run prior to the pressure grouting.

Gradings from the first SBL run which had recorded an un-cemented interval across the base of the 8-inch steel casing from 1,599 to 1,506 feet below TOC were initially discounted as being due to an effect of the initial readings of the logging tool. Based on the contractor's inability to push cement up into the annulus above a 1,583-foot marker, it is possible that the interval that appeared un-cemented on the first logging run was actually well-cemented and was the impediment to the attempted pressure grouting behind casing.

2.6 BACK PLUGGING OF 8-INCH CASING

On November 16, 1993, the FDEP and Law, after receiving the data from the pressure grouting and the second logging run, gave approval to the contractor to proceed with backplugging the 8-inch casing to a depth of approximately 1,130 feet below TOC in at least two stages. The contractor, Tarmac, was on site on November 18, 1993, and pumped cement in two stages into the depth interval from 1,583 to 1,124 feet below TOC. Neat cement was pumped at 07:09 and 14:12 from 1,583 feet to 1,407 feet and from 1,407 feet to 1,124 feet below the TOC, respectively. A summary of the grouting stages is included in Table 2.

2.7 PERFORATING OF 8-INCH CASING

The well modification procedures specified that perforation of the 8-inch casing at the base of the Upper Floridan aquifer should start at 1,150 feet below the TOC. This depth was chosen by the SWFWMD and was a general estimation derived from lithologic and hydrologic data from other deep wells in the local area. Law reviewed the SBL and the lithologic logs from the 1989 Law report and recommended to SWFWMD that the designated monitoring zone should begin at approximately 1,125 feet instead of at 1,150 feet below the TOC.

According to the SBL, the annulus appeared very well cemented from 1,506 to 1,125 feet below the TOC. However, the annulus behind the casing was poorly cemented in the interval from 1,125 to 1,012 feet, excluding 1,094 to 1,090 feet below the TOC, and thus could potentially be more successfully perforated. Based on lithologic logs, dolomite present from 1,125 to 1,090 feet below the TOC was relatively more porous and contained more vugs, fractures and limestone than the adjacent uphole dolomitic section of the Lower Ocala Group. Law concluded, therefore, that the interval from 1,125 to 1,090 feet below the TOC may be a wash zone which is often indicative of horizontal water movement and which would offer a greater potential for ground-water flow. In addition, water flow would not have allowed the cement grout to settle and form there. SWFWMD concurred with Law's recommendation.

On November 23, 1993, Florida Geophysical Logging, Inc. personnel were on site and perforated the 8-inch casing in the poorly cemented 16-inch nominal diameter annulus in the depth interval from 1,123 feet to 1,108 feet below TOC (see Photograph No. 7). Initial perforations were made over a ten-foot interval from 1,123 to 1,113 feet below the TOC. The diameter and maximum effective penetration of the perforations were 0.38 inch and 20 inches, respectively. Each run was comprised of 4 shots per foot with 90-degree phasing. During subsequent well development, the flow rate at the surface was estimated to be at 1 gallon per minute (gpm). Because the well did not flow at the surface at a minimum of 10 gpm cutoff, additional perforations were performed in 5-foot intervals for a maximum perforated interval of 25 feet. A summary of the perforation shots is provided in Table 3.

2.8 DEVELOPMENT OF WELL

After perforating 10 feet of the 8-inch casing and the cemented 16-inch nominal diameter annulus near or at the base of the Upper Floridan aquifer, the water level was approximately 30 feet below TOC. The well was developed by reverse air circulation. The water level was drawn down to 125 feet. The flow rate was estimated at 1 gpm. After the next three perforating runs, water levels rose to 16.6 feet below TOC, 4.0 feet below TOC, and 12.8 feet above TOC, respectively. The flow rate was still only 1 gpm.

On November 26, 1993, the well was developed for 18 hours using a submersible pump set at approximately 210 feet below TOC. The well produced at 15 gpm with an estimated drawdown of 180 feet below TOC. Water flowing at the surface was clear with a flow rate of only 1 gpm.

2.9 VIDEO LOGGING

The well was developed about four days prior to the video logging. Development was sufficient enough to remove particulate residue from the water column. After development, the well was free-flowing at the surface and at the TOC for the first time since the beginning of the well conversion.

On November 29, 1993, a video log was run downhole by the SWFWMD to inspect the 8-inch well casing, including the perforations made in the interval from 1,123 to 1096 feet below the TOC, and water movement. The video log, viewed by personnel from SWFWMD and Law, indicated that no casing damage was detected. Depths at which questionable perforations occurred were noted and recorded. Upon inspecting the perforated interval by closely reviewing the video replay, an estimated 70% of the perforations appeared to be good. Questionable perforations that resembled pock marks or streaks, especially in the depth interval from 1,118 to 1,116 feet below the TOC, were examples of possible ineffective perforations.

Water movement at the low rate of 1 gpm was not noticeable on the video. Based on flow rates from similar zones in the Upper Floridan aquifer in other wells, this well was expected to produce at a higher flow rate.

2.10 ADDITIONAL CASING PERFORATION

The water management district and Law concluded that the low flow rate was possibly due to the amount of perforations that appeared to be ineffective. SWFWMD was also concerned that small perforations would encrust over and subsequently shorten the longevity of the well for monitoring purposes. Law, therefore, recommended to the County that a 10-foot interval of the well casing should be reperforated with large-diameter shot in an effort to increase the flow rate and prolong the usefulness of the well for monitoring. The County approved the plan to conduct additional perforations.

On December 2, 1993, Florida Geophysical Logging, Inc. reperforated a 10-foot interval from 1,118 to 1,108 feet below TOC with 0.5-inch diameter holes with an effective penetration depth of 13 inches. Previous perforations were made with 0.38-inch diameter holes with an effective penetration depth of 20 inches.

The well was briefly developed and sampled. Discharge at the surface was approximately 2 gpm. Water samples were collected for conductivity, temperature, and salinity with the following results: 2,950 micromhos, 25.5° Celsius, and approximately 1.9 parts per thousand, respectively (see Table 4). Well recovery was measured from approximately 120 feet below the TOC up to the TOC. Recovery period was 112 minutes and averaged 1.58 ft/min. (see Table 5, Well Recovery Data).

2.11 INSTALLATION OF 4-INCH CASING

Materials installed consisted of casings, accessories, and cements. Casing, coupling, and components were new and unused polyvinyl chloride (PVC) water-well pipe which conformed to ASTM D-2855 standards and were non-toxic. Casings were 4-inch diameter, Schedule 80 pipe, had a wall thickness of 0.337 inches and weighed 2.82 pounds per foot. The pipe was labelled "Charlotte Pipe 100040 PVC 1120 Sch 80 320 PSI Unthreaded/160 PSI Threaded @ 23 C ASTM D-1785 Made in USA".

In preparation for the well casing installation, on December 12, 1993, 28 pairs of 20-foot segments were joined together by means of a solvent glue. The ends of each casing segment were coated with the solvent glue prior to fitting it in the 8-inch molded bell end of the socket of the adjoining casing segment. Oatey Schedule 80 Gray Glue was used according to specifications.

Earlier, the contractor, Youngquist Brothers, Inc., had requested approval for the use of an 8% bentonite admixture. Section B.3.3 in the Construction Documents and Specifications indicated that the cement contractor may be permitted reasonable latitude in designing the sealing mixture that would be used in sealing above the ground-water monitoring zone. The SWFWMD reported that up to 12% bentonite admixtures have been used on PVC casing within the water management district.

Law approved Youngquist's material modification request for the use of an 8% admixture of bentonite in the neat cement grout for the 4-inch casing installation. The cement grout had to meet all other requirements stated in Section B.3.3 and also conform to ASTM Standard D5092-90. Certain advantages of an 8% additive of bentonite mixture to the neat cement grout included the ability to control the heat of hydration, reduce shrinkage, and control the set time of the cement grout.

On December 3, 1993, the 8-inch steel casing was lined with 1,090 feet of 4-inch PVC casing. A three-foot assemblage composed of 4-inch PVC pipe, couplings, rubber packers, and stainless steel fasteners formed the end of the 4-inch casing and was installed at the bottom of the well.

Centralizers were placed on the 4-inch casing approximately every 100 feet to ensure that this casing was centralized inside the 8-inch casing (see Photographs No. 8 and 9).

On December 3, 1993, Florida Cement, Inc. was on site to set the seal in the well. Approximately 8-feet of shells and bentonite pellets were mixed with the first stage of neat cement to form a bridge above the three-rubber packer assemblage. This was allotted 4.5 hours to cure. The second stage of neat cement was also pressure grouted downhole by the tremmie pipe method.

On December 4, 1993, the 8% bentonite gel cement was pressure-grouted downhole in two separate stages, the first at 06:20 and the second at 14:20. The second stage was allowed to cure for eighteen hours. The final stage of 4-inch casing was cemented with 8% bentonite gel and pumped downhole by the tremmie pipe pressure grouting technique on December 5, 1993. A summary of these cement grouting stages are included in Table 2.

2.12 PRESSURE TESTING OF 4-INCH CASING

On December 7, 1993, a pressure test was conducted to determine the mechanical integrity of the casing and the seals. Pressure tests normally run for a minimum of one-hour with a maximum allowable pressure drop of 5% during a one hour test period. A greater pressure drop would be considered a failure of the test and result in a rejection of the casing installation.

The pressure test was conducted by Youngquist Brothers, Inc. Well Drilling and witnessed by Law personnel. The pressure remained at 53.5 psi during the entire test which began at 11:30 a.m. and ended at 12:32 p.m..

2.13 WELL HEAD INSTALLATION

Well head assemblage consisted of 4-inch casing that extended 48 inches above the pad with a 2-inch PVC "T" and ball valve and a 4-inch threaded cap. All of the materials were Schedule 80 PVC casing pipe. The well head without the 2-inch PVC "T" and ball valve was installed on December 13, 1993. The PVC "T" and ball valve were installed on December 15, 1993. See Figure 4, Well Head Assemblage Diagram, and Photograph No. 10.

The construction plan indicated that four guard posts would be installed for the purpose of well head protection. Due to the construction of the extensive well pad, it was concluded that the guard posts were not necessary. Instead, a protective brace was installed to prevent movement between the 4-inch and 8-inch casing above the pad.

3.0 SUMMARY

The well was successfully plugged back to the base of the Upper Floridan aquifer at 1,124 feet below TOC. Open hole below the 8-inch casing was plugged back in six stages. The 8-inch casing was plugged back in two stages.

The base of the Upper Floridan aquifer was perforated from 1,123 to 1,096 feet in six perforation runs. Following perforation, the well flowed at the top of casing at approximately 2 gpm with a static water level of 14 feet above land surface. A 4-inch PVC casing was installed from above the perforated interval to 4 feet above the well pad. A well head assembly with a valve and 2-inch PVC "T" was installed.

A cement evaluation tool, the Sector Bond Log, was run prior to plugging back the 8-inch casing. Review of the Sector Bond Log indicated that the well was well-cemented over approximately 400 feet of the confining zone and that less than 100 feet near the base of the casing annulus between the 8-inch casing and the formation were poorly cemented to uncemented. Results of the Sector Bond Log and results of an attempted pressure grouting indicated that the bottom 10 feet of the 8-inch casing from 1,599 feet to 1,589 feet were well cemented. Readings on a cement bond log which was run in 1988 began at 1,580 feet. Consequently, no evaluation was made at the bottom of the 8-inch casing at that time.

The well was video logged by SWFWMD after the 8-inch casing had been plugged back and the base of the Upper Floridan aquifer had been perforated. No casing damage was observed.

After installing the 4-inch PVC casing from above the perforated interval to 4 feet above the well pad, the casing was pressure tested to determine mechanical integrity. The pressure test was successful.

After a pressure test was successfully conducted, on December 14, 1993 Law Environmental, Inc. issued a Certificate of Completion, Part B.6, Exploratory/Monitor Well Modification form to the owner, Sarasota County Board of County Commissioners, and the Contractor, Youngquist Brothers, Inc. The Certificate of Completion was submitted to the FDEP on the same day. The FDEP, on December 21, 1993, accepted the Certificate of Completion in addition to the previous submittals as satisfaction of paragraphs 18a through 18c of the Amendment to the Consent Order. A copy of the Certificate of Completion and FDEP acceptance are provided in Appendix E.

A chronological summary of the well modification activity is included in Table 1. Daily reports are provided in Appendix F.

4.0 SUMMARY AND CONCLUSIONS

The objectives of the Knight Trail Park deep well modifications were met with the successful completion of the planned work. Logging confirmed that approximately 400 feet of a confining zone which lies between the Lower and Upper Floridan aquifers is well cemented in the annulus between the 8-inch casing and the formation. In addition, the 8-inch casing up to the base of the Upper Floridan aquifer was back plugged. These well modifications provide assurance that hydraulic communication between the aquifers should not occur.

The perforating and subsequent development of the basal section of the Upper Floridan aquifer will allow monitoring of ground-water quality in this interval. The installation of the 4-inch PVC and well head assembly will further facilitate the use of the well as a ground-water monitoring well.

5.0 REFERENCES

Law Environmental, Inc., 1989, Results of Exploratory/Monitor Well Construction and Testing, Knight Trail Park, prepared by Law for Sarasota County.

Law Environmental, Inc., 1993, Technical Specifications Section B Well Modification Construction, Construction Documents and Specifications for Deep Well Modifications at Knight Trail Park for Sarasota County Board of County Commissioners, County Bid No. 3106R.

TABLES

Table 1. Knight Trail Park Deep Well Modification Activity Summary

Date	Activity
October 8, 1991	Law Environmental, Inc. (Law) submitted a well plugging/conversion plan for the Knight Trail Park Exploratory Monitor Well to the Florida Department of Environmental Protection (FDEP) and the Technical Advisory Committee (TAC).
November 8, 1991	The FDEP and TAC reviewed and approved Law's well plugging conversion plan.
June 19 and 22, 1993	The Sarasota County Purchasing Department published Bid No. 3106.
July 9, 1993	Addendum 2 of the Construction Documents and Specifications.
July 21, 1993	Addendum 3 of the Construction Documents and Specifications.
July 26, 1993	Addendum 4 of the Construction Documents and Specifications which included Attachment A: Revised Bid Form, Schedule of Bid Items.
July 29, 1993	The Sarasota County Purchasing Department received County Bid No. 3106R for the Sarasota Utilities Department Deep Well Modifications at Knight Trail Park. The one bid received was submitted by Youngquist Brothers, Inc. Well Drilling.
October 5, 1993	Construction contract was executed by the Sarasota County Board of County Commissioners and Youngquist Brothers, Inc. Well Drilling from Fort Myers, Florida.
October 7, 1993	Preconstruction meeting was held at the office of Sarasota County Government Water Improvement Program.
October 14, 1993	Formal Notice to Proceed issued to Youngquist Brothers, Inc. Well Drilling from Sarasota County Government.
October 14, 1993	Youngquist Brothers, Inc. Well Drilling requested a material modification for the use of an admixture of 8% bentonite in the cement grout for the 4-inch diameter casing installation.

Table 1. Knight Trail Park Deep Well Modification Activity Summary (Continued)

Date	Activity
October 19, 1993	Youngquist Brothers, Inc. Well Drilling mobilized to the site and initiated field work.
October 20, 1993	Culvert and access road installed. Fence line cleared.
October 28, 1993	The SWFWMD staff, with permission from the County, obtained a water sample from the Lower Floridan aquifer for the Tampa office of the USGS.
November 2, 1993	Tremmie pipe was tripped downhole to the bottom at 1,910 feet below the TOC. Fence posts were installed.
November 3, 1993	Law approved Youngquist's material modification request for the use of an admixture of Bentonite in the neat cement grout.
November 4, 1993	Pressure grouted 17 and 8 barrels of neat cement from 1,910 to 1,739 feet and 1,739 to 1,709 feet below the TOC, respectively.
November 5, 1993	Cementing continued at 1,709 feet below the TOC via reverse circulation of 15 barrels with no vertical buildup results. An additional 20 barrels were pumped from 1,709 to 1,705 feet below the TOC. The fence crew was on site.
November 6, 1993	Fifteen barrels of neat cement were pumped from 1,705 to 1,680 feet below the TOC.
November 8, 1993	FDEP personnel from Tallahassee were on site to witness Florida Geophysical and Logging, Inc. (FGL) run a Sector Bond Log (SBL) which evaluated the cement behind the 8-inch casing. The SBL was run from 1,608 feet below the TOC to TOC.
November 10, 1993	Law met with FDEP in Tampa and reviewed the SBL. FDEP Tallahassee staff also received a copy of SBL.
November 12, 1993	Conducted backplugging by pressure grouting behind casing from the bottom of casing. By keeping the well filled with water under 40-50 psi, 20 barrels of neat cement were forced up the annulus.

Table 1. Knight Trail Park Deep Well Modification Activity Summary (Continued)

Date	Activity
November 13, 1993	FGL personnel were on site. The SBL tagged the bottom of the well at 1,583 feet below the TOC which indicated that cement came up 16 feet in the cased well. Ran SBL tool from 1,583 feet below TOC to TOC. Above 1,583 feet, the SBL resembled the SBL that was run on 11-8-93.
November 16, 1993	FDEP approved backplugging the casing to a depth of approximately 1,130 feet below the TOC in at least two stages.
November 18, 1993	Tarmac was on site and pumped cement in two stages from 1,583 to 1,124 feet below the TOC.
November 23, 1993	FGL personnel were on site and perforated the 8-inch casing and the cemented 16-inch nominal diameter annulus from 1,123 to 1,113 feet below the TOC. The diameter and penetration of the perforations were 0.38 inch and 20 inches respectively. The water level was approximately 30 feet below the TOC. Well development by reverse air circulation resulted in drawdown to approximately 125 feet below the TOC and yielded 1 gpm of surface discharge.
November 24, 1993	The water level was at 4 feet below the TOC. FGL personnel were on site for additional perforations. The following five feet intervals were perforated: 1,112-1,108, 1,107-1,102, and 1,101-1,096 feet below the TOC.
November 26, 1993	The well was producing 15 gpm for an 18-hour developmental period. Well drawdown was estimated at 180 feet below the TOC.
November 29, 1993	The well was flowing at the top of casing or approximately 4 feet above the land surface. A video log was run downhole by the SWFWMD.
November 30, 1993	Law discussed the video log results with the SWFWMD.
December 1, 1993	Law conducted qualitative and quantitative water measurements. The static water level was 12.8 feet above TOC.

Table 1. Knight Trail Park Deep Well Modification Activity Summary (Continued)

Date	Activity
December 2, 1993	Law recommended additional perforations from 1,118 to 1,108 feet. These perforations were relatively larger in diameter with a relatively shorter effective maximum penetration. Water samples were obtained for qualitative parameters. Water measurements were conducted including surface discharge and well recovery. Preparation for the 4-inch diameter well casing installation began.
December 3, 1993	Water samples were taken for qualitative parameters. Installation of 1,090 feet of 4-inch diameter PVC casing. Approximately 8 feet of shell and bentonite pellets formed a pack which was installed above three rubber packers. Neat cement was pressure grouted downhole by the tremmie pipe method in three separate stages.
December 4, 1993	An 8% Bentonite gel cement was pressure grouted downhole in two separate stages. The second stage was allowed to cure for eighteen hours prior to pressure grouting additional cement.
December 5, 1993	The final stage of 4-inch casing was cemented with 8% Bentonite gel and pumped downhole by the tremmie pipe pressure grouting technique.
December 7, 1993	An air slug pressure test was conducted on the 4-inch well casing.
December 8, 1993	Assemblage of the well head which consisted of the 4-inch casing extending 4 feet above the pad without a 2-inch.
December 13, 1993	Two-inch PVC "T" and ball valve and a 4-inch threaded cap were installed on the well head. Law submitted a Certificate of Completion to the FDEP.
December 14, 1993	Demobilize the equipment off of the site.
December 17, 1993	Law personnel visit the site for substantial completion walk through.

Table 2. Summary of Cement Grouting Data

Run	Date	Time	Interval (ft. below TOC)	Casing Dia (inches)	Type	Method
1	11/4/93	09:26	1,910-1,739	Open Hole	Neat	Tremmie Pipe Pressure Grout
2	11/4/93	15:10	1,739-1,709	Open Hole	Neat	Tremmie Pipe Pressure Grout
3	11/5/93	08:59	1,709-1,709	Open Hole	Neat	Tremmie Pipe Pressure Grout
4	11/5/93	14:14	1,709-1,705	Open Hole	Neat	Tremmie Pipe Pressure Grout
5	11/6/93	08:00	1,705-1,680	Open Hole	Neat	Tremmie Pipe Pressure Grout
6	11/12/93	13:00	1,680-1,583	Open Hole/8	Neat	Tremmie Pipe Pressure Grout
7	11/18/93	07:29	1,583-1,407	8	Neat	Tremmie Pipe Pressure Grout
8	11/18/93	14:12	1,407-1,124	8	Neat	Tremmie Pipe Pressure Grout
9	12/3/93	19:18	1,079-1,077	4	Neat	Tremmie Pipe Pressure Grout
10	12/3/93	23:57	1,077-1,069	4	Neat	Tremmie Pipe Pressure Grout
11	12/4/93	06:20	1,069-670	4	8% Gel	Tremmie Pipe Pressure Grout
12	12/4/93	14:20	670-277	4	8% Gel	Tremmie Pipe Pressure Grout
13	12/5/93	06:22	277-5	4	8% Gel	Tremmie Pipe Pressure Grout
14	12/8/93		5-TOC	4	Neat	Tremmie Pipe Pressure Grout

Table 3. Perforation Summary of the 8-Inch Casing

Run No.	Date	Time	Interval (feet)	Shot Diameter Penetration (inches)	Observation
1	11/23/93	15:46	1,123-1,113	0.38 / 20	Water level 30' below TOC
2	11/24/93	12:25	1,112-1,108	0.38 / 20	Water level 16.6' below TOC
3	11/24/93	14:43	1,107-1,102	0.38 / 20	Water level 4' below TOC
4	11/24/93	16:52	1,101-1,096	0.38 / 20	Water level 12.8' above TOC
5	12/2/93	15:34	1,118-1,108	0.5 / 13	

Note: Each run was comprised of 4 shots per foot with 90° phasing.

Table 4. Water Measurements

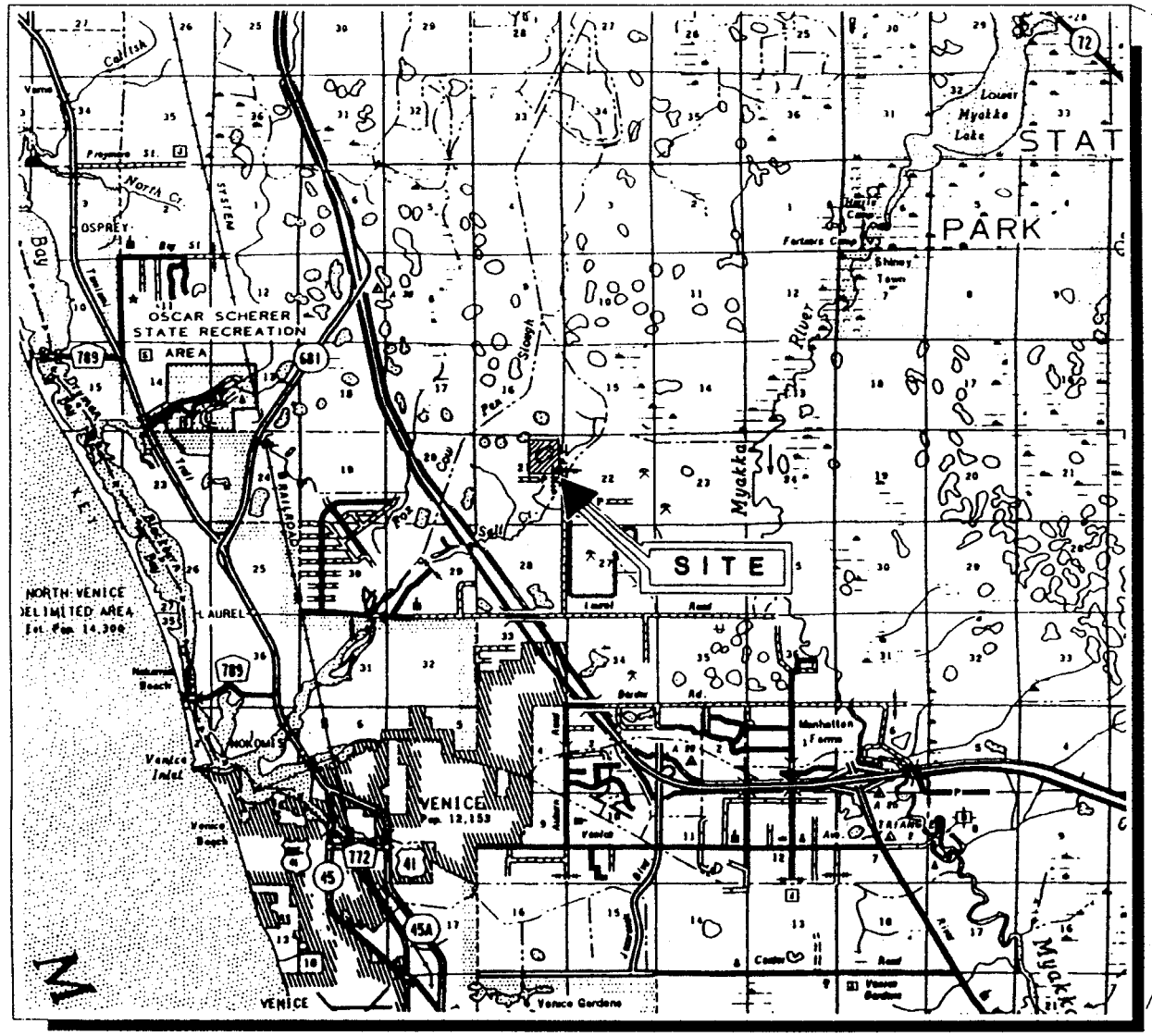
	Conductivity (Micromhos)	Salinity (parts per thousand)	Temperature (°C)	Static Water Level	Flow Rate (from the Upper Floridan aquifer)
Date: 11-23-93 Time: 15:50				30' below TOC	Free-flowing at the surface at 1 gpm.
Date: 11-24-93 Time: 15:51				4' below TOC	5 gpm during an approximate one hour air developmental period.
Date: 11-26-93 Time:					15 gpm for an 18-hour developmental period w/ ~ 180' of well drawdown.
Date: 12-1-93 Time: 11:51	2870	1.9	24	12.8' above TOC	Free-flowing at the surface at 1+ gpm.
Date: 12-2-93 Time: 16:08	2950	1.9	25.5		Free-flowing at the surface at 1+ gpm.

Table 5. Well Recovery Data
December 2, 1993

Time	Water Level
16:42	Turned the submersible pump off.
16:42	*114 feet below the top of the casing (TOC)
16:48	100 feet below the TOC
16:49:50	95 feet below the TOC
16:51:07	90 feet below the TOC
16:52:46	85 feet below the TOC
16:54:30	80 feet below the TOC
16:56:20	75 feet below the TOC
16:58:13	70 feet below the TOC
17:00:47	65 feet below the TOC
17:02:26	60 feet below the TOC
17:04:43	55 feet below the TOC
17:07:10	50 feet below the TOC
17:09:46	45 feet below the TOC
17:12:37	40 feet below the TOC
17:15:44	35 feet below the TOC
17:19:08	30 feet below the TOC
17:22:54	25 feet below the TOC
17:27:09	20 feet below the TOC
17:32:00	15 feet below the TOC
17:37:54	10 feet below the TOC
17:44:56	5 feet below the TOC
17:54:15	0 feet below the TOC

Note: *Denotes that the water level was estimated and not measured directly.

FIGURES



Source: Florida Dept. of Transportation, General Hwy. Map(Sarasota County), 1986

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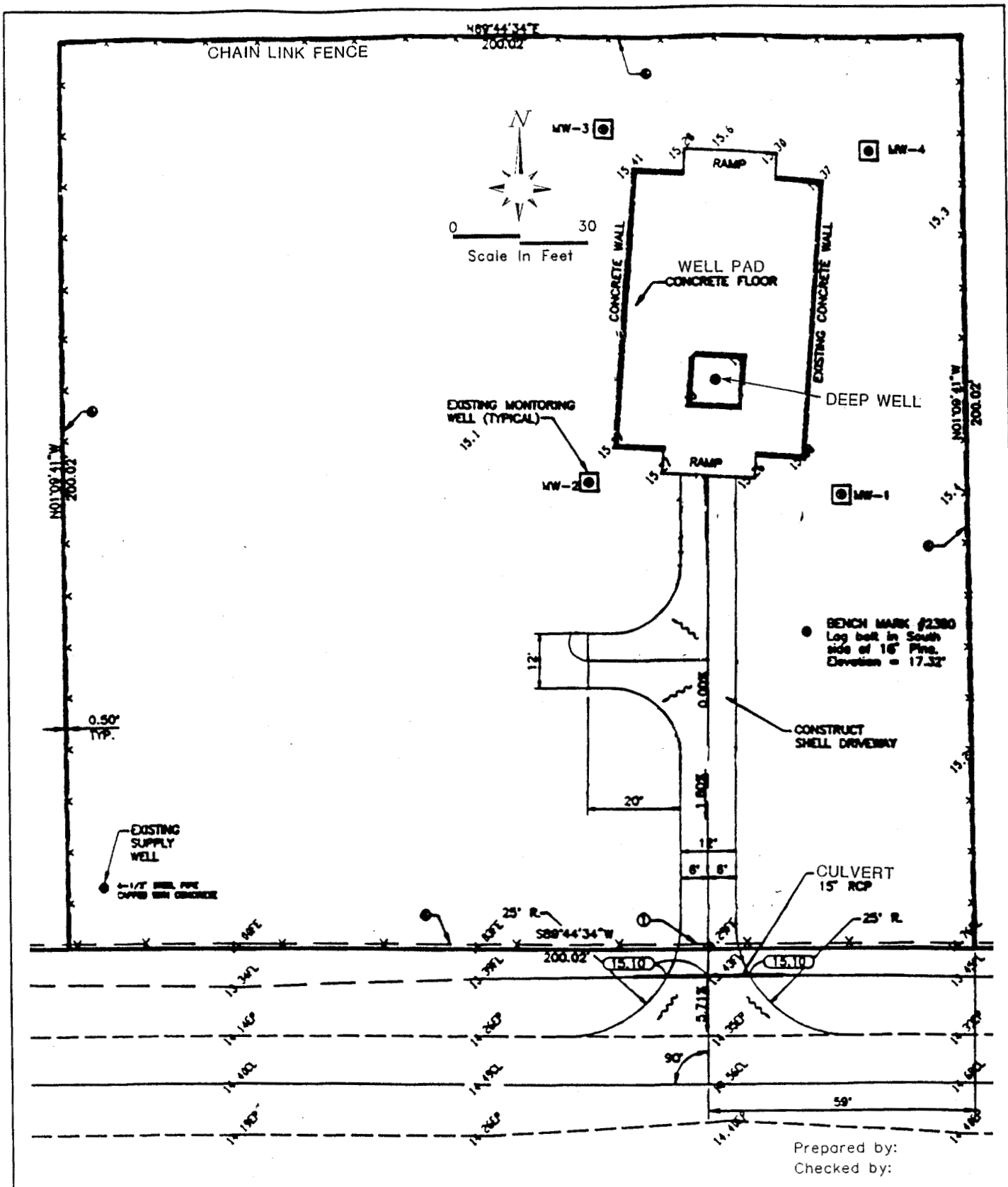
Sarasota County
Sarasota, Florida

LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

Deep Well Modifications
at
Knight Trail Park
Location Map

Project 571577601 Figure 1



Source: Smalley, Wellford, & Nalven, Inc.

Sarasota County
Sarasota, Florida

LAW
ENGINEERING AND ENVIRONMENTAL SERVICES

Deep Well Modifications
at
Knight Trail Park

Site Map

Project 571576016 Figure 2

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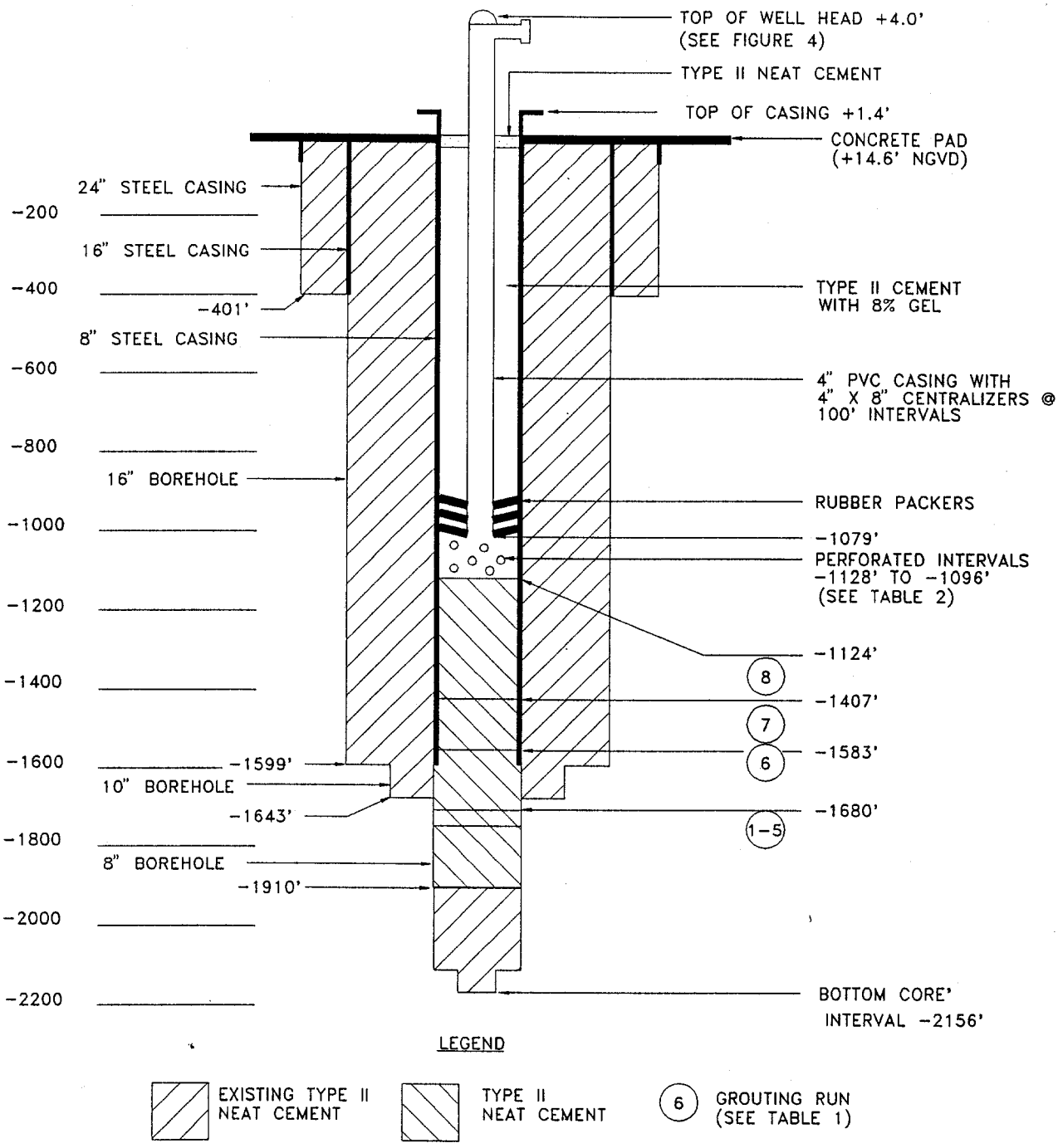

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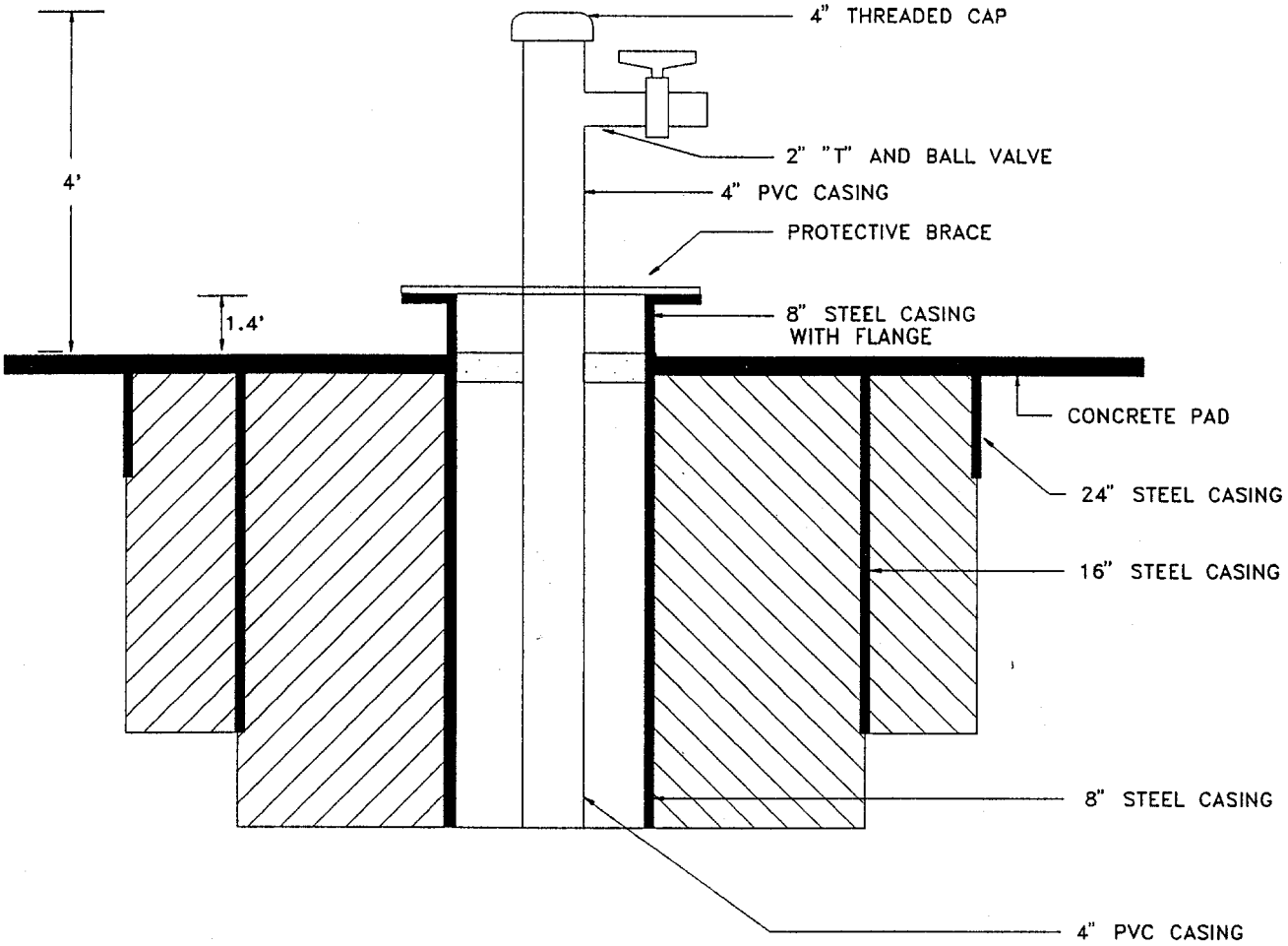
Sarasota County Sarasota, Florida	LAW ENGINEERING AND ENVIRONMENTAL SERVICES	Deep Well Modifications at Knight Trail Park Deep Well Modification Completion Diagram Project 571576016 Figure 3



Not To Scale

Prepared by:
Checked by:

NOTE: ALL PVC MATERIALS TO BE SCHEDULE 80 PIPE.

Sarasota County Sarasota, Florida	LAW ENGINEERING AND ENVIRONMENTAL SERVICES	Deep Well Modifications at Knight Trail Park Well Head Assembly Diagram Project 571576016 Figure 4

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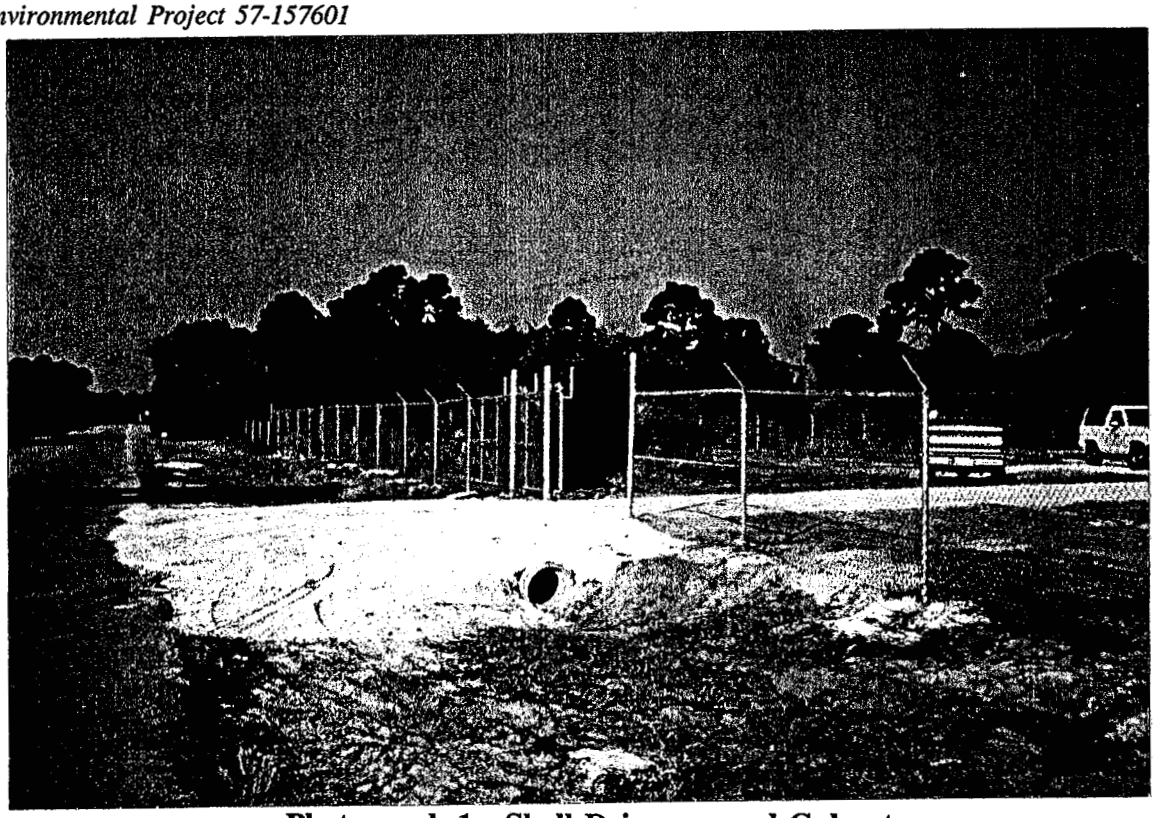
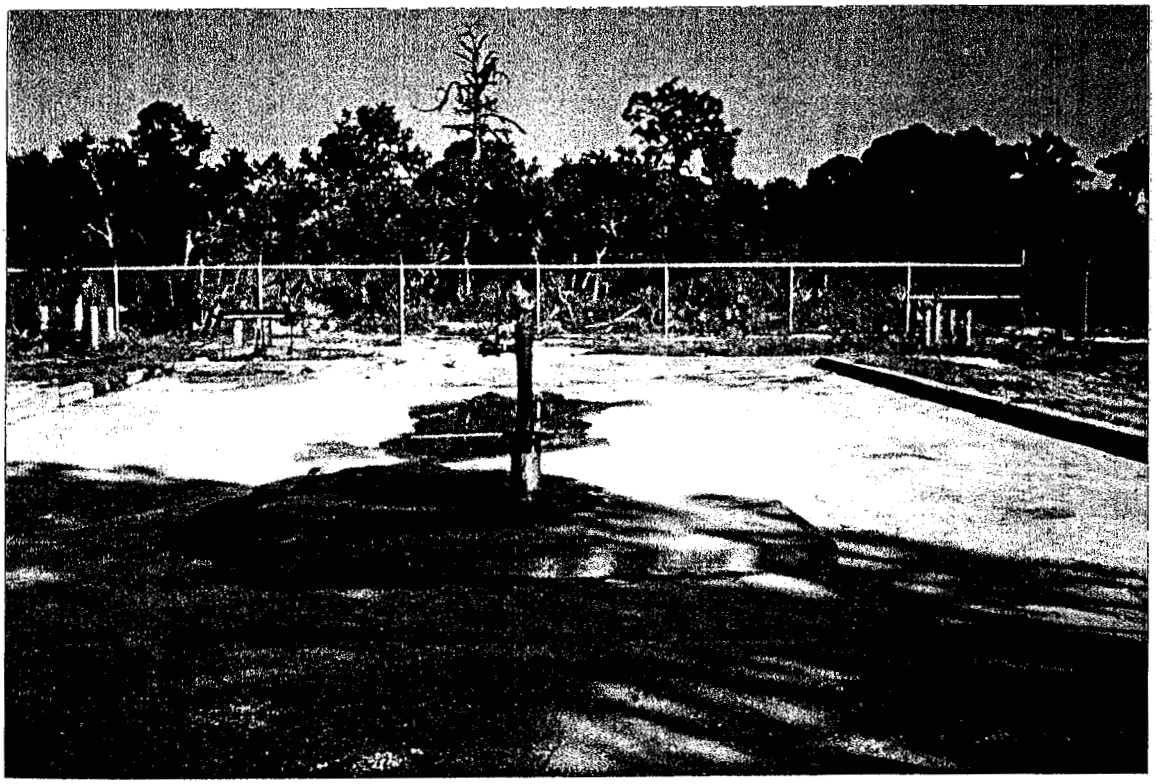
PHOTOGRAPHS

PHOTOGRAPHS

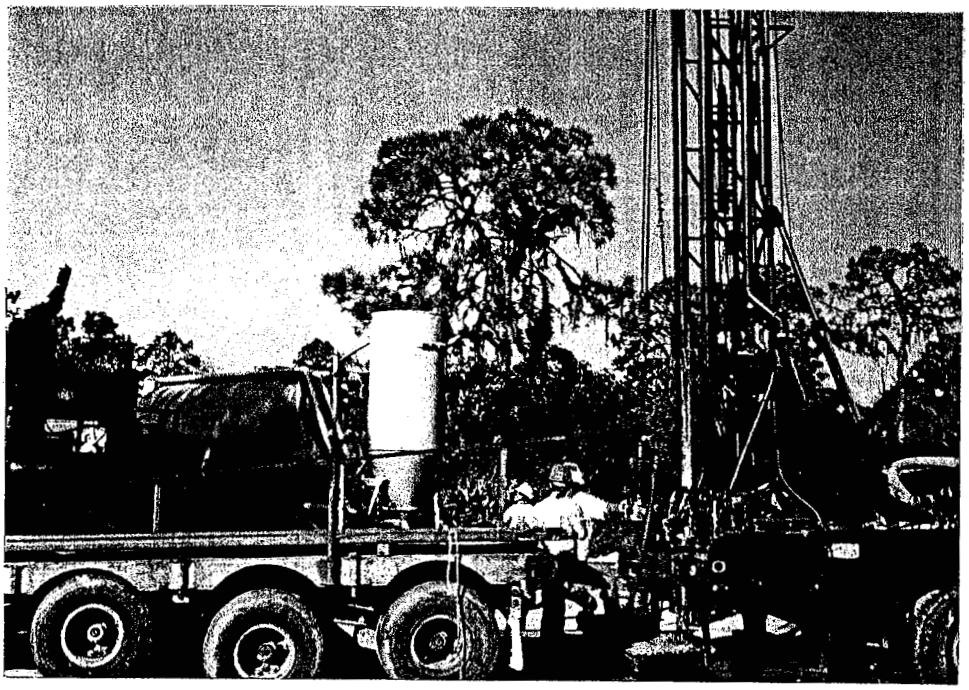


Photograph 1: Shell Driveway and Culvert



Photograph 2: Well Pad and Perimeter Fence

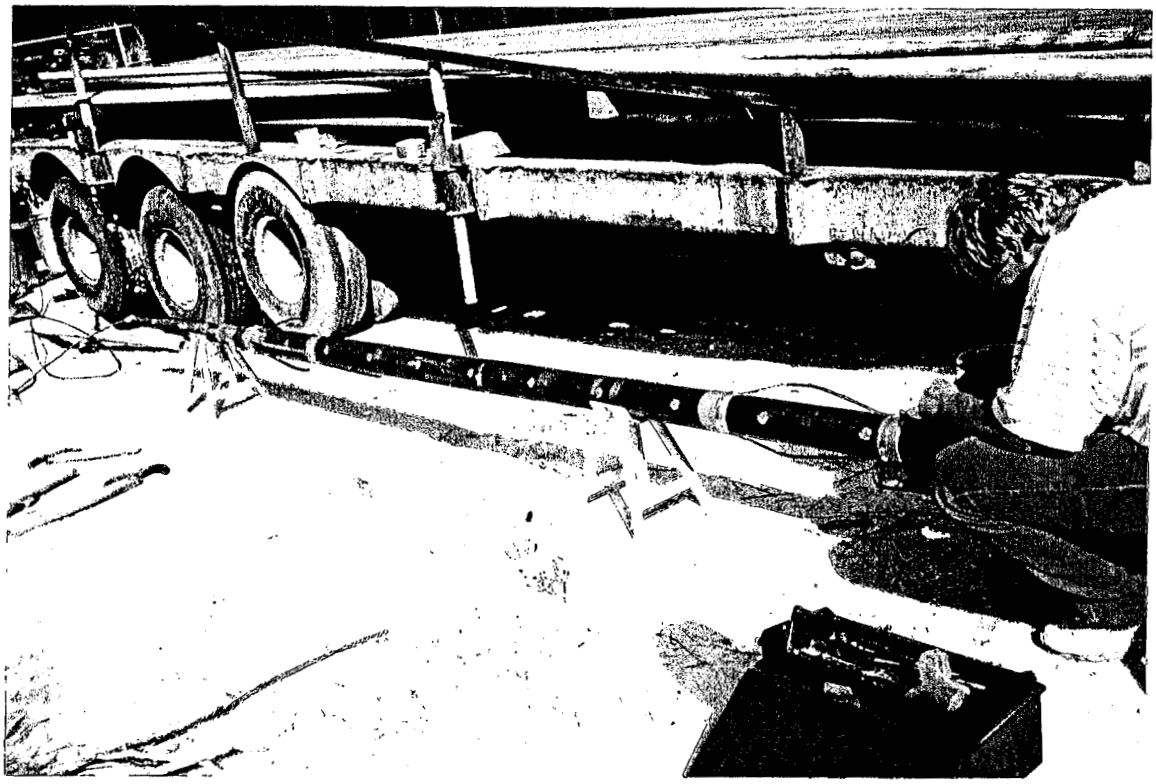
Photograph 3: Drill Rig Setup on Well



Photograph 4: Cement Truck On Site

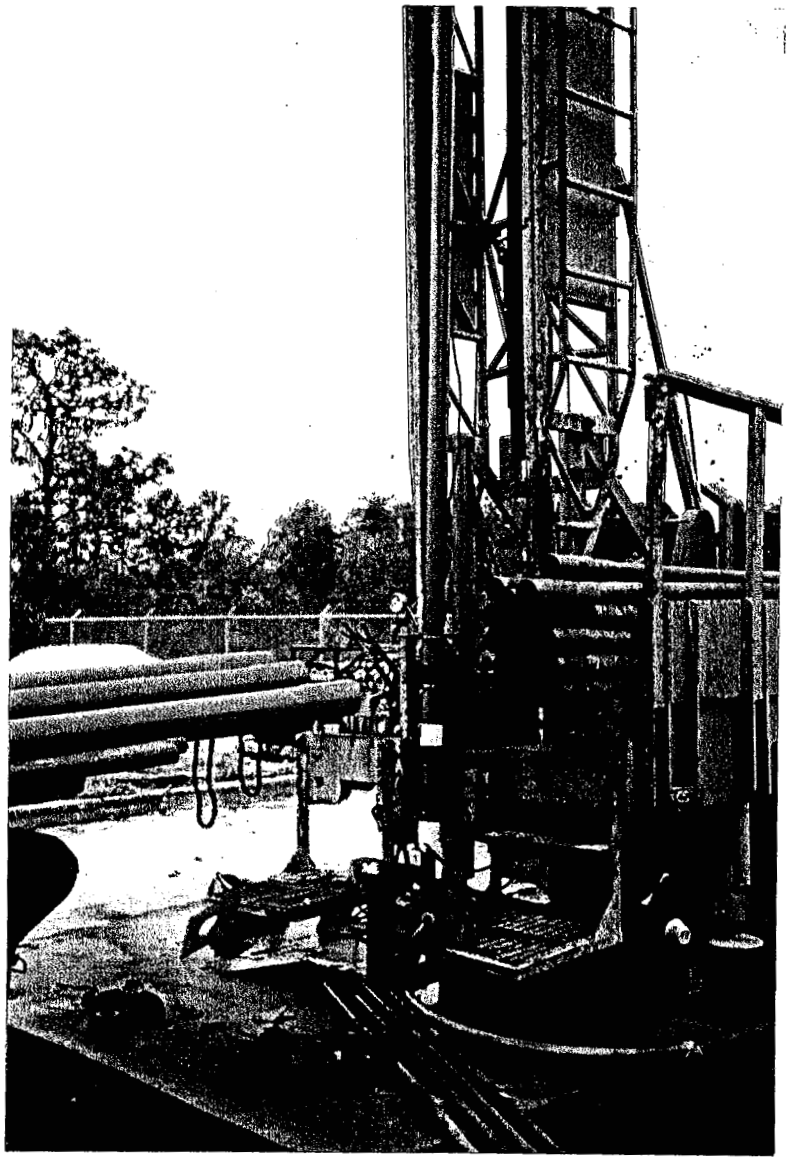
Photograph 5: Florida Geophysical, Inc. On Site

Photograph 6: Sector Bond Log Tool

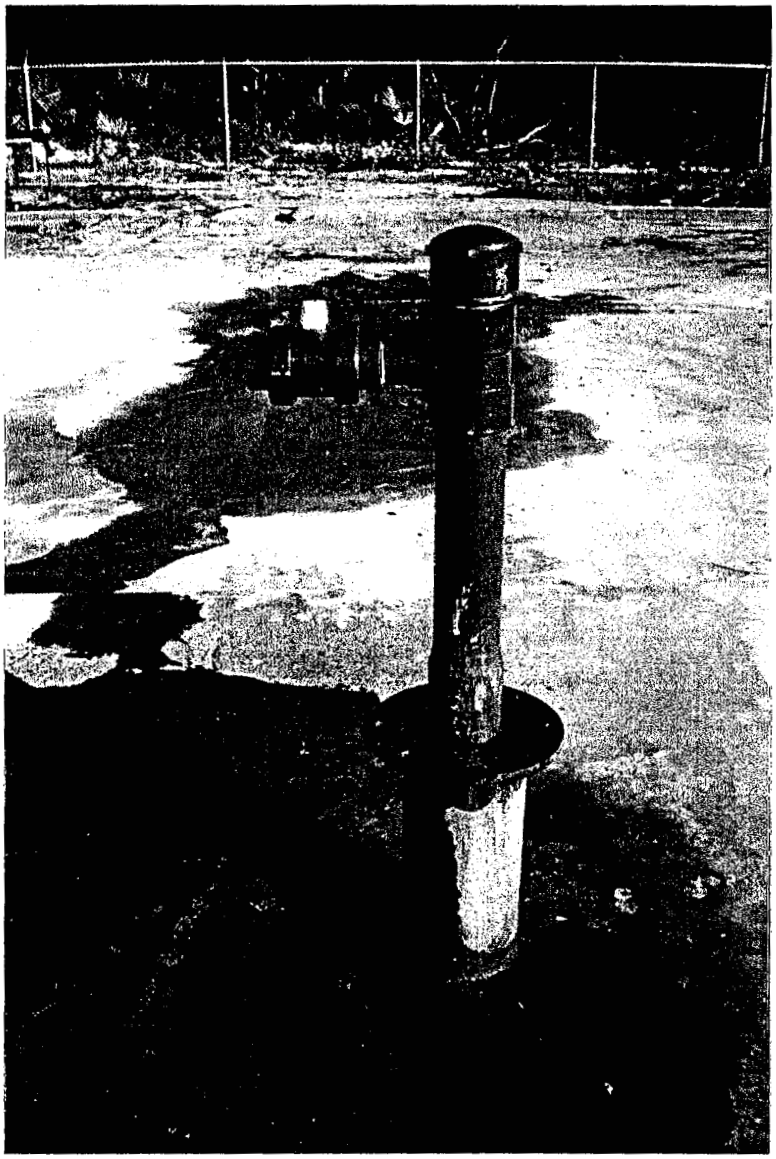


Photograph 7: Perforating Gun

Photograph 8: Packer Assemblage



Photograph 9: Four-Inch Casing

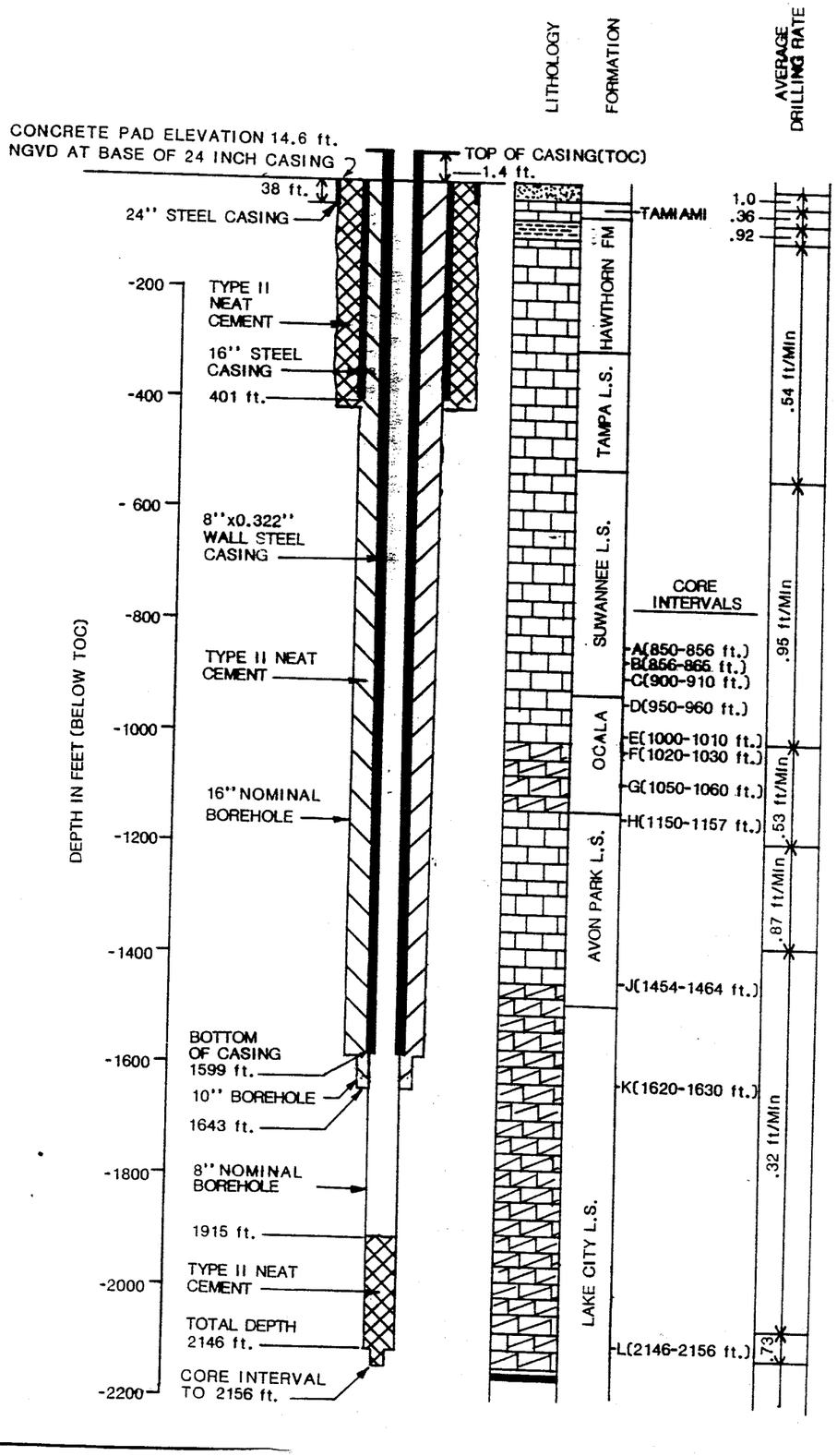


Photograph 10: Well Head Assemblage

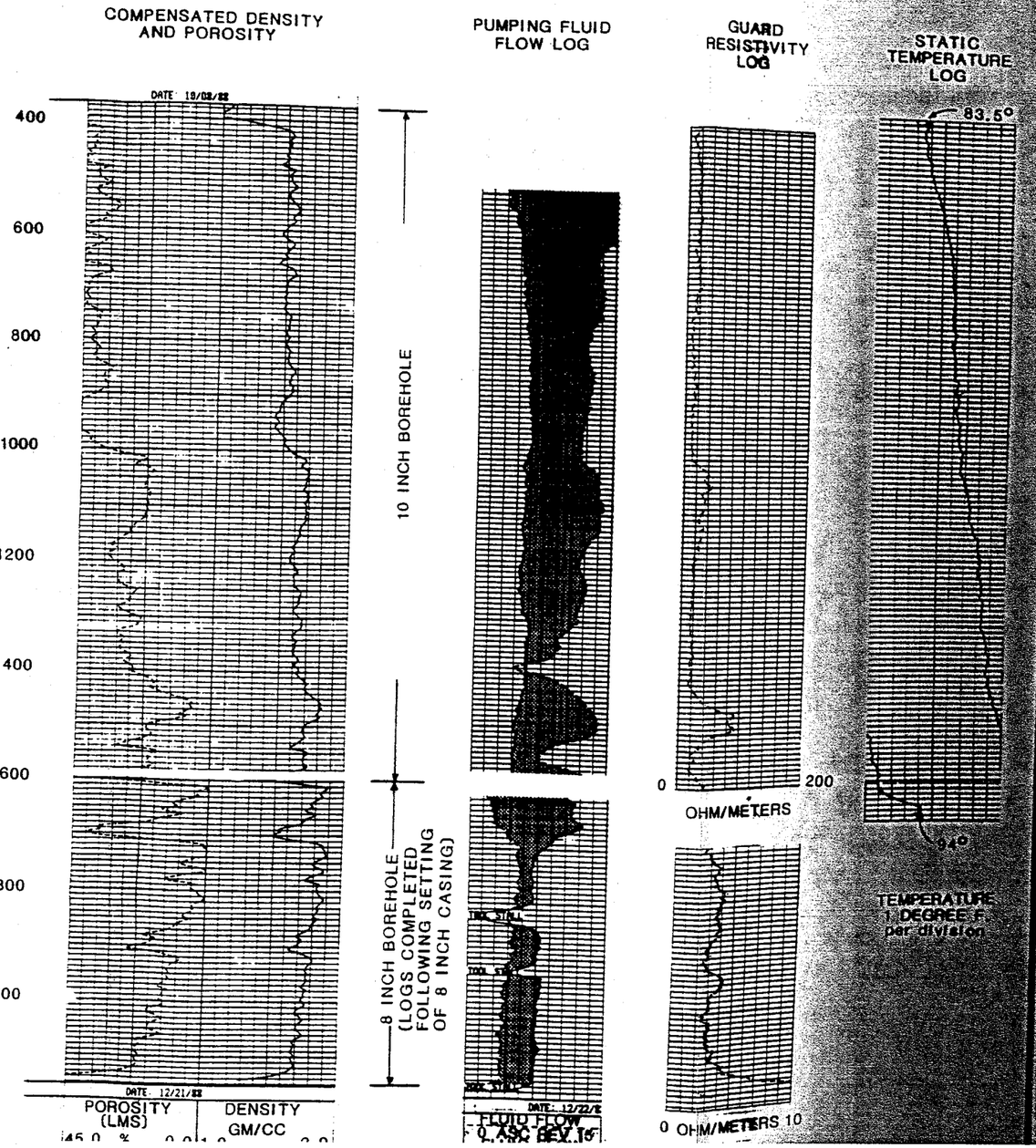
APPENDICES

APPENDIX A

DATA FROM 1989
WELL COMPLETION REPORT



SELECTED GEOPHYSICAL LOGS



KNIGHT TRAIL EXPLORATORY/MONITOR WELL
WELL CONSTRUCTION DIAGRAM/
HYDROGEOLOGIC TEST DATA
JOB NO. 57-6029.01
FIGURE 3

LAW ENVIRONMENTAL INC.

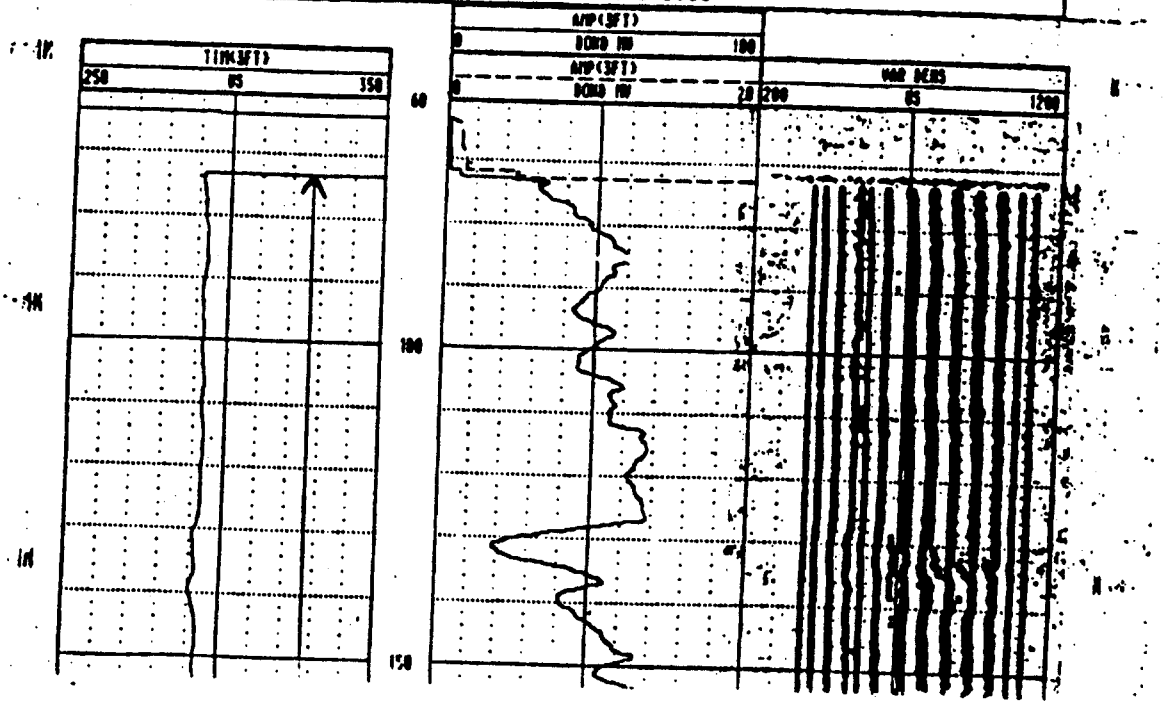
SARASOTA COUNTY
SARASOTA, FLORIDA

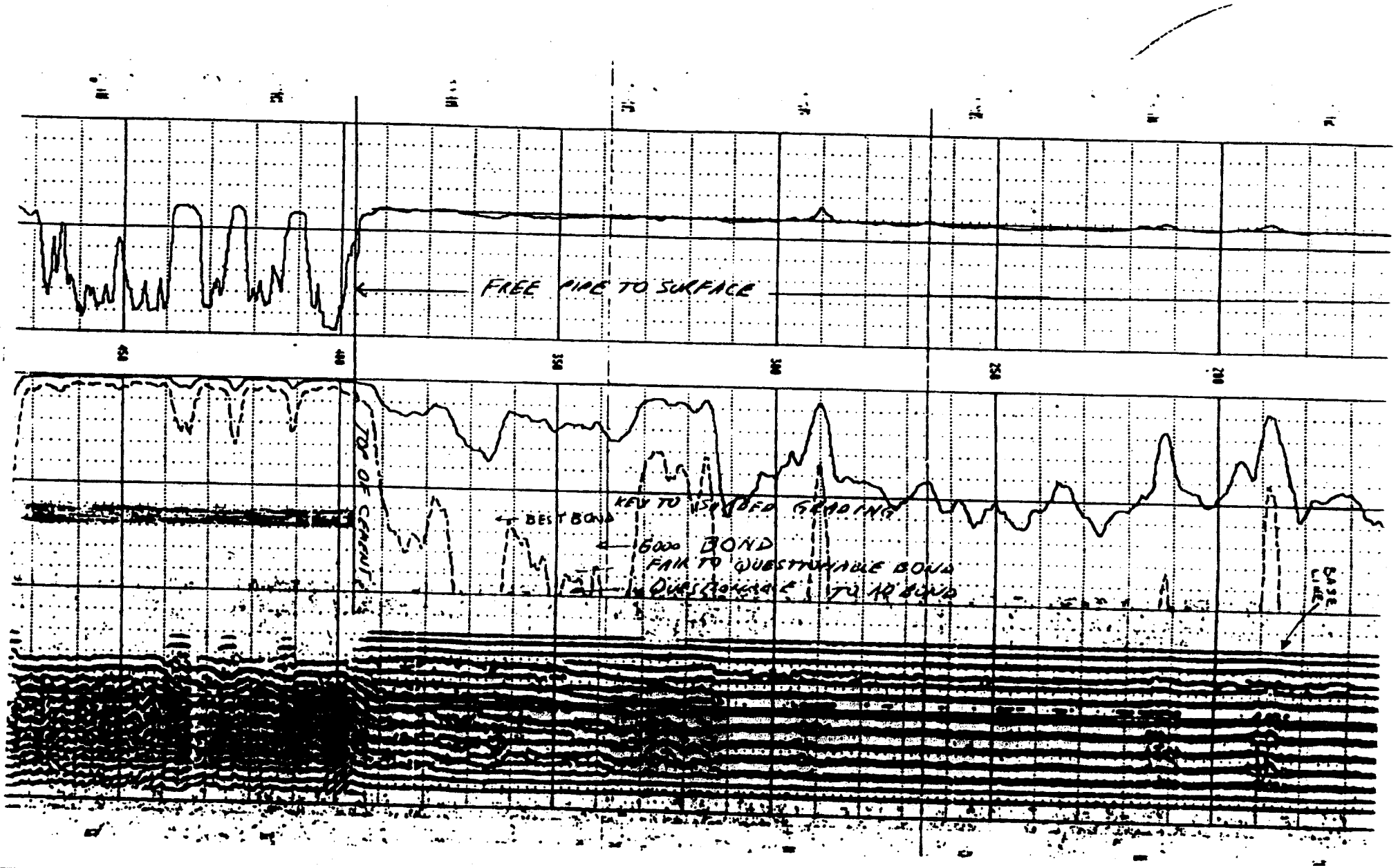
CEMENT BOND LOG

COMPANY	: DIVERSIFIED DRILLING INC.			OTHER SERVICES:	
WELL	: KNIGHTS TRAIL				
LOCATION/FIELD	: SARASOTA				
COUNTY	: SARASOTA				
STATE	: FLA.				
SECTION	: -	TOWNSHIP	: -	RANGE	:
DATE	: 11/03/88	PERMANENT DATUM	: 16 IN	ELEVATIONS	
DEPTH DRILLER	: 1599	ELEV. PERM. DATUM:		KB	:
		LOG MEASURED FROM:	16 IN	DF	:
LOG BOTTOM	: 1590.00	DRL MEASURED FROM:	16 IN	GL	:
LOG TOP	: 61.20				
CASING.DRILLER	: 1599	LOGGING UNIT	: BLUE		
CASING TYPE	: STL	FIELD OFFICE	: GUL		
CASING THICKNESS	: .322	RECORDED BY	: JCP		
BIT SIZE	: -	BOREHOLE FLUID	: WATER	FILE	: ORIGINAL
MAGNETIC DECL.	: 00	RM	: 0	TYPE	: ANIMB
MATRIX DENSITY	: -	RM TEMPERATURE	: 0	LOG	: 3
FLUID DENSITY	: 1.0	MATRIX DELTA T	: 50	PLOT	: BOND 0
NEUTRON MATRIX	: -	FLUID DELTA T	: 200	THRESH:	5000
REMARKS	:				
-					

ANNOTATED LOG
LEJ 2/5/89

TELEPHONE (904)-372-5950




FREE PIPE TO SURFACE
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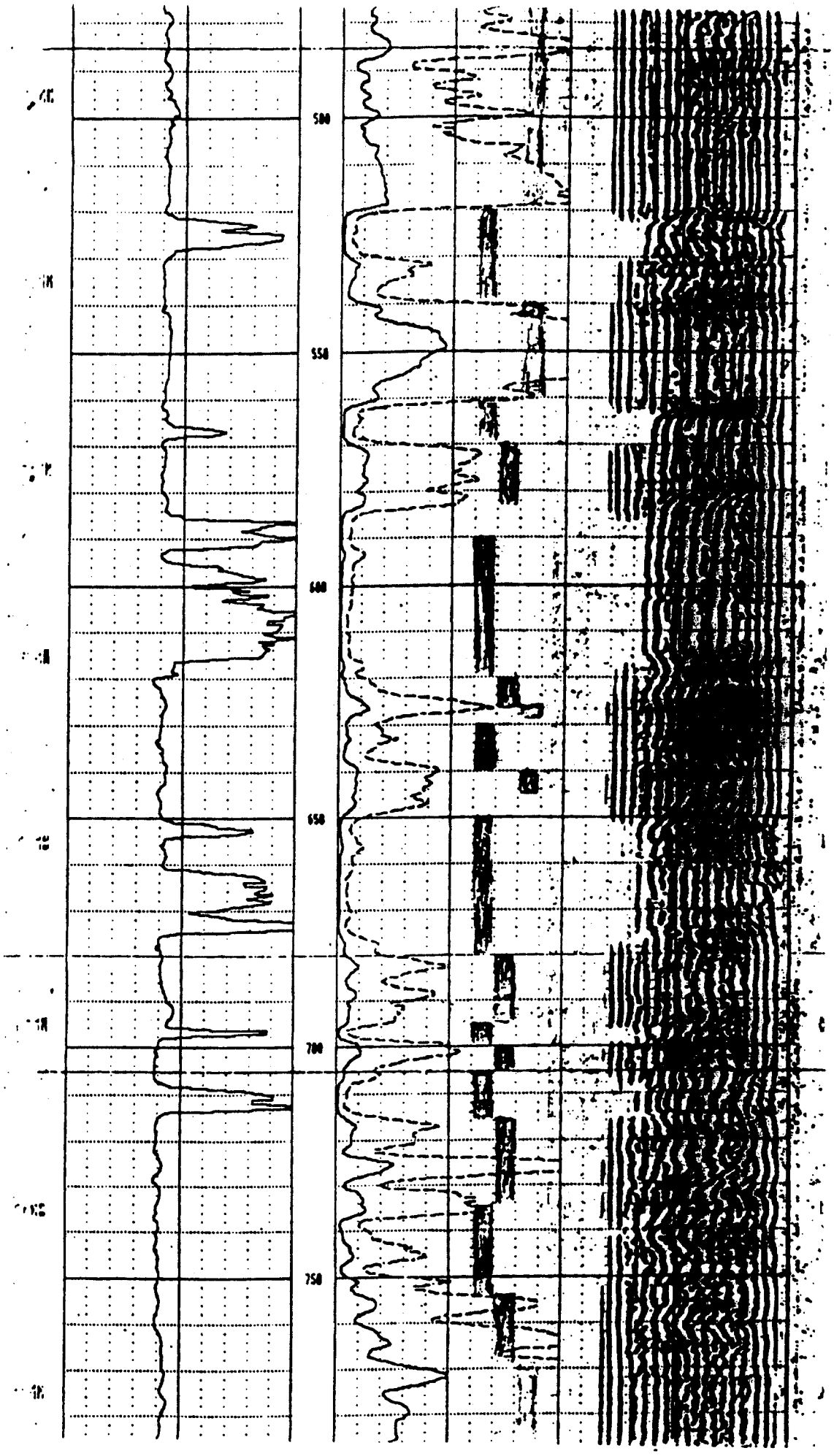
BEST BOND
KEY TO UNBONDED GROUND
GOOD BOND
FAIR TO QUESTIONABLE BOND
QUESTIONABLE TO NO BOND
CASE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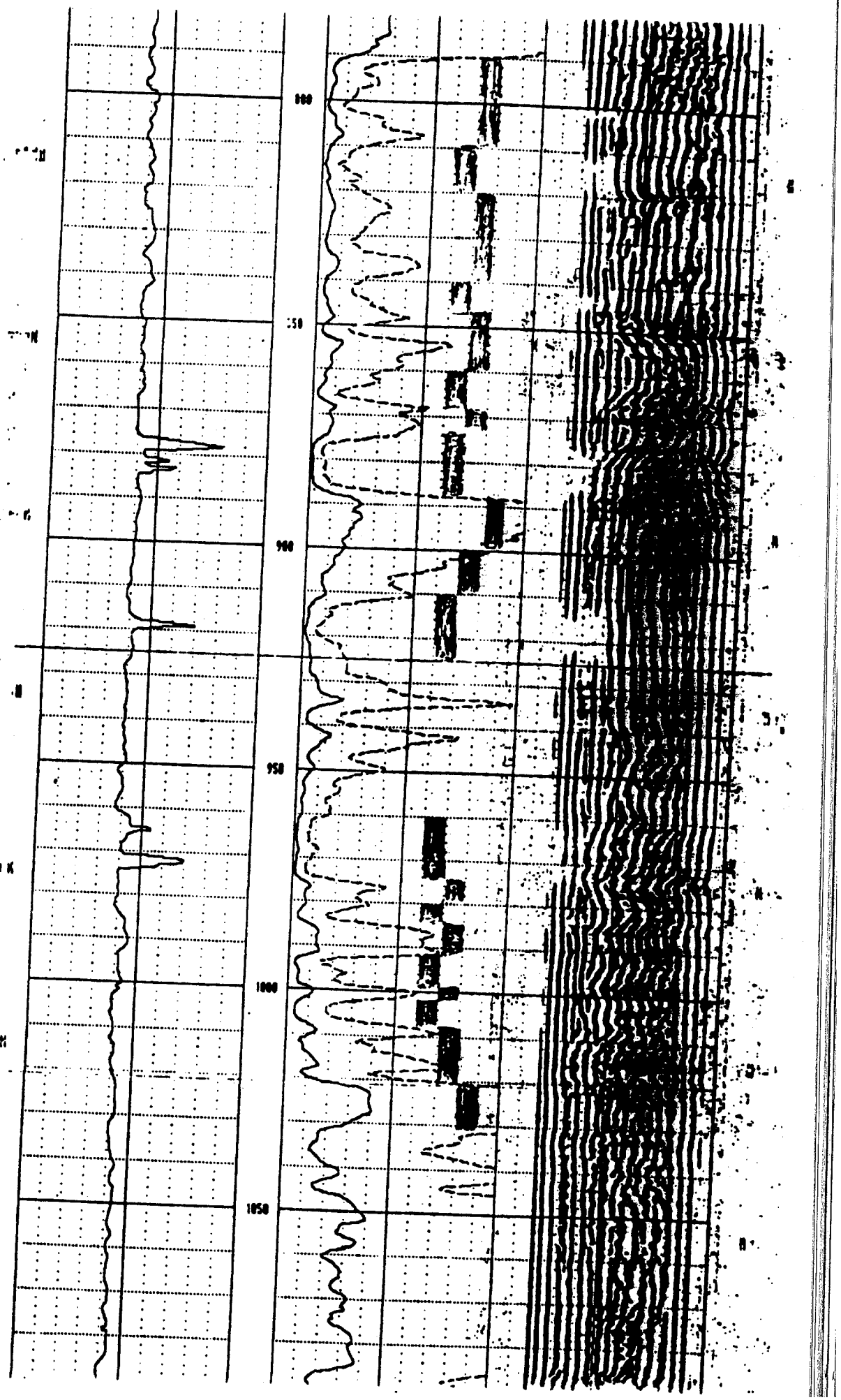
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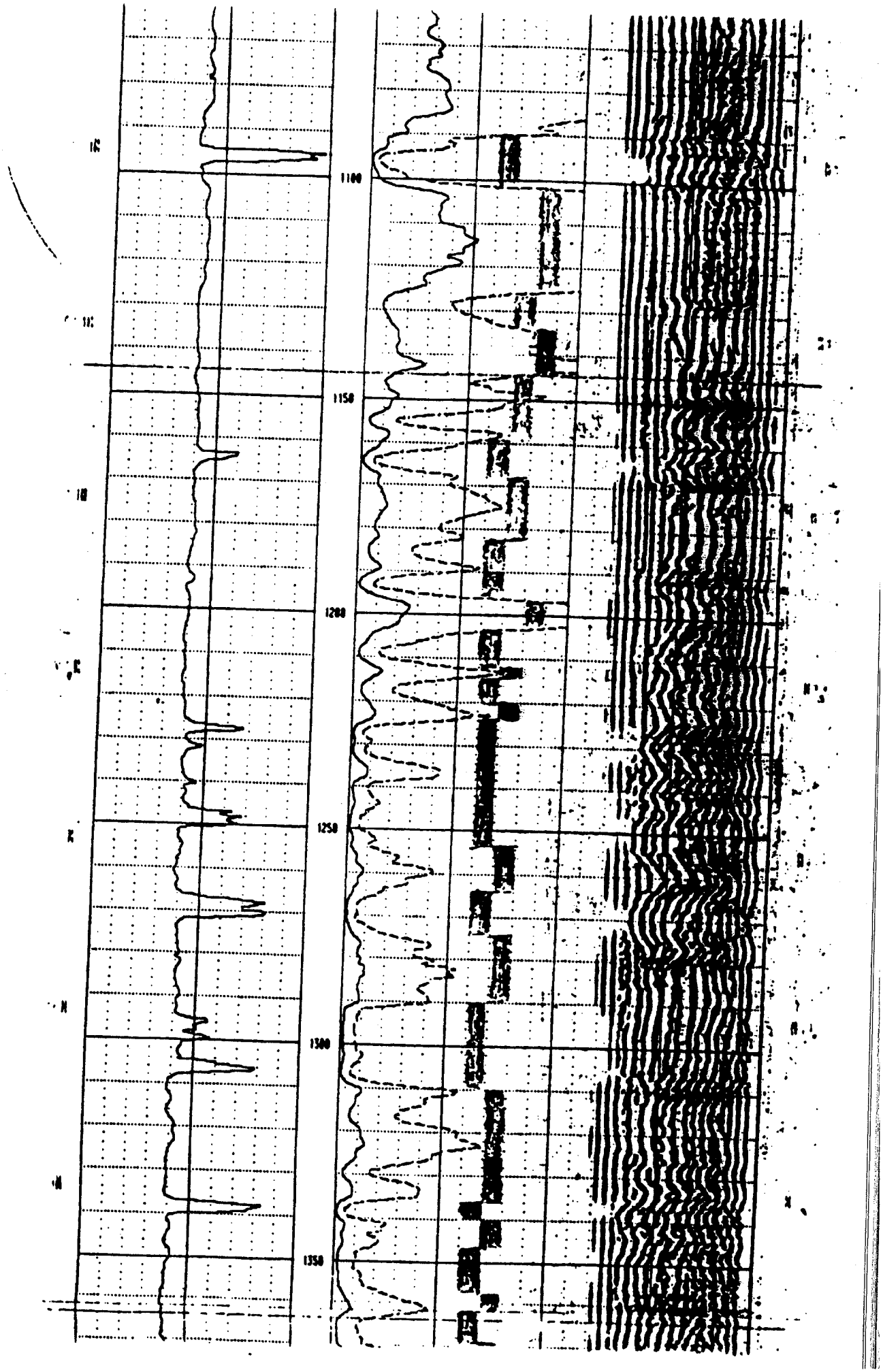
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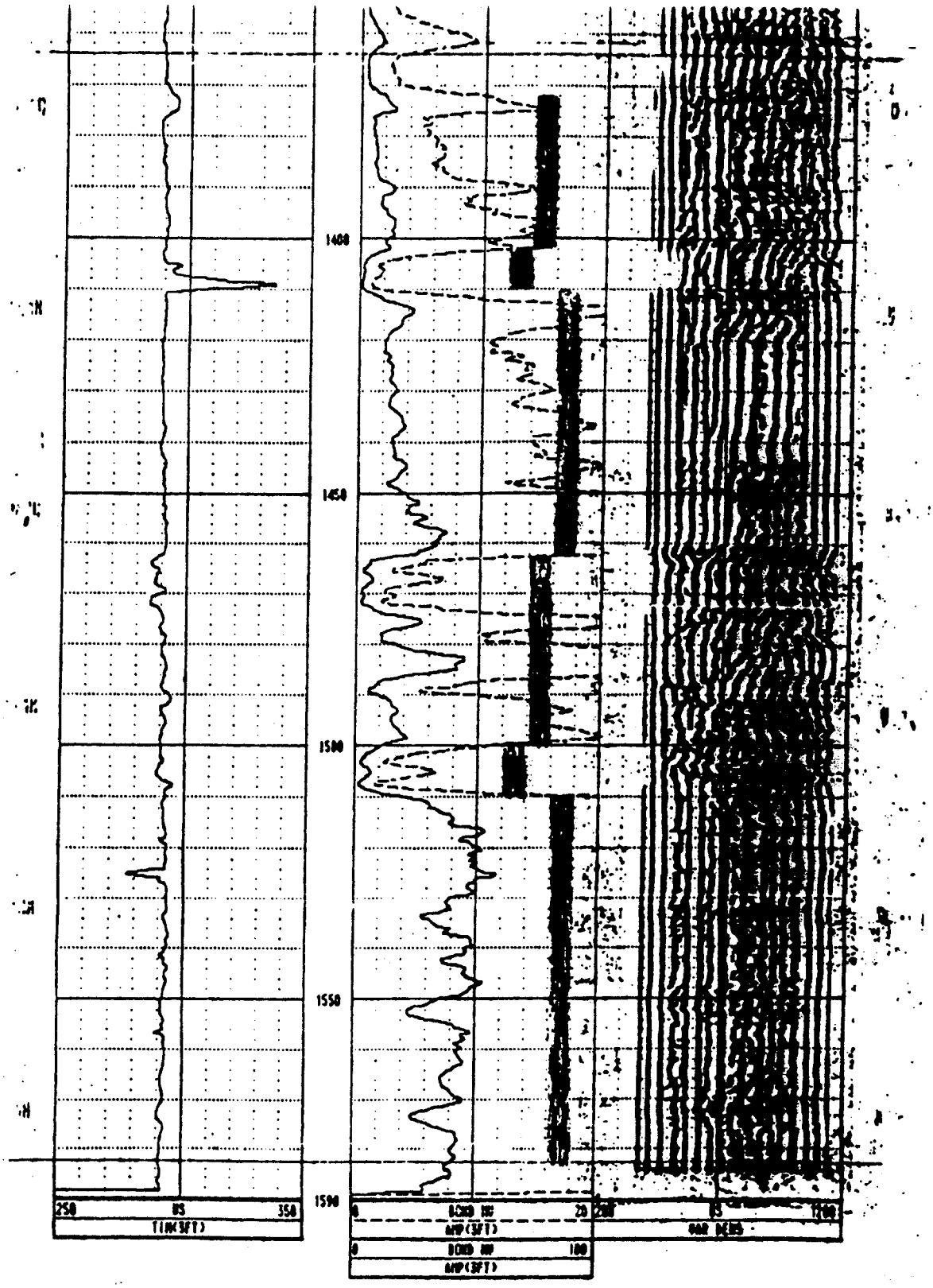
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APPENDIX B

TECHNICAL SPECIFICATIONS

PART B

WELL MODIFICATION CONSTRUCTION

B.1 GENERAL REQUIREMENTS

The specification divisions and the Drawings are an integrated part of the Contract Documents and as such will not stand alone if used independently as individual divisions or Drawings sheets.

1.1 Controls and Instrumentation for Use During Construction

The Contractor shall furnish, install, maintain, and operate all instruments that are required to measure, indicate, totalize, and/or record the specified data generated during the course of well modification activities. Instruments used for this purpose shall not be incorporated into the work and shall remain the property of the Contractor. They need not be new but shall be suitable, as determined by the Engineer, for the intended use and in good operating condition.

Measurements to be made during construction are for the purpose of corroborating data generated during construction of the test facility. Water samples specified to be taken shall be collected in liter or one quart sample containers.

1.2 Instrumentation for Use During Well Conversion and Testing

Instrumentation for withdrawal tests shall include: a totalizing or orifice flow meter to measure the pumped water prior to discharge; an indicating and recording water level instruments of the mechanical or pressure transducer type. The Contractor shall provide a certificate of calibration for each instrument or meter used during construction of the well.

B.2 WELL MODIFICATION

2.1 General Requirements for Construction

The Contractor shall coordinate construction and test activities at the site, under the review of the Engineer. The Contractor shall subcontract those portions of the work that he does not routinely perform with his own personnel. The names of subcontractors shall be submitted to the Engineer for approval. The specific qualifications and experience of the subcontract will be shown on the form provided, for each specialty work item shown on the Bid Form.

Every effort shall be made to preserve the integrity of back- ground conditions, in the formations during testing operations. No freshwater shall be introduced into the borehole for any reason, except for that which is required to prepare the drilling mud.

2.2 Integrity of Casing and Seals

Following grouting of the final casing, a pressure test will be performed to a minimum of 50 p.s.i. for a time of not less than one hour. The maximum allowable pressure drop during the one hour test will be 5%. A greater pressure drop will be considered a failure of the test and rejection of the casing installation.

2.3 Project Records

The Driller shall maintain a written log to provide a chronologic record of all activities at the job site. The format of the log shall be submitted prior to the start of drilling. The log shall be in a columnar format. The following information shall be included in the heading of each page of the log:

1. Page number;
2. Project name;
3. Description and elevation of reference point for all depth measurements; and
4. Inclusive dates and depths covered by the page.

2.4 Project Record Information

The Contractor shall maintain the project records in a format satisfactory to the Engineer. Project record information shall be maintained in the form of a daily narrative description including but not necessarily limited to the following:

1. Quantity, length, type, and location of casing materials;
2. Quantity of cement used to seal casings including the type and quantity of additives used, the purpose of such additives, and the inclusive depths at which seals are located;
3. The quantity and location of each casing accessory, i.e., centralizers, float shoes, cement baskets, etc.;
4. Volume and rate of flow of surplus water; and
5. Description of special construction conditions encountered and actions taken to anticipate or correct them including but not limited to:
   a. Volumes of drilling fluid or other liquids lost into the formation and their locations; and
   b. Depths and descriptions of lost drilling materials and/or tools.

Weekly copies of the Project Daily Narrative shall be provided to the Engineer.

B.3 MATERIALS

3.1 Casings

Corrosion resistant casing, coupling and components shall be new and unused poly (vinyl) (PVC) water well pipe conforming to ASTM Standard D-2855 and shall be non-toxic. The casing shall 4-inch be schedule 80 pipe and have a minimum wall thickness of .337 inches and weigh 2.82 pounds per foot. The casing shall be tested in accordance with ASTM Standards D-638 and S-480.

PVC casing segments shall be joined by solvent welding. The ends of each casing segment shall be coated with solvent cement prior to fitting it in the molded bell end socket of the adjoining casing segment. Oatey Schedule 80 Gray Glue or approved equal shall be used. Proper curing periods shall be used to ensure the integrity of the joint. Three partially penetrating stainless steel screws shall be used to join each casing length.

3.2 Casing Accessories

Casing accessories including guide shoes, collars and centralizers shall be as manufactured by Halliburton Services Company of Duncan, Oklahoma, or approved equal.

3.3 Cement

Unless special cements and/or admixtures such as bentonite and gilsonite designed to reduce shrinkage, control time of set, increase fluidity, or provide other benefits are approved by the Engineer, cement for grouting shall be Type II, Florida Class H, sulfate resistant cement. Neat cement grout shall be a slurry containing not more than 5.2 gallons of water per cubic foot of cement. Water used to prepare the cement shall contain not more than 2000 mg/L TDS and shall meet all quality requirements of the cement manufacturer.

3.4 Special Cements and Admixtures

The Contractor shall be permitted all reasonable latitude in designing the sealing mixture for use in sealing above the monitor zone. The mix shall be designed by an individual experienced in this field, and must be approved by the Engineer. Admixtures that may adversely affect the sulfate resistance to the cement shall not be permitted.

B.4 METHODS

4.1 Well Modification

All well modification operations shall be conducted using a closed circulation system.

All efforts shall be made to prevent spillage of all drilling fluids and any other fluids. In the event of a spill, the Contractor will be responsible for cleanup and restoration.

Fluids and cuttings shall be removed from the site and disposed of at an approved disposal site. The Contractor will provide to the Owner a name and location of the disposal site and documentation from the disposal facility owner or operator assuring acceptance of the materials. Any fluids produced during hydrologic testing shall not be recirculated down the exploratory hole.

4.2 Grouting

The method of placing grout shall, in each instance, be subject to the approval of the Engineer. The preferred method is the tremmie-pipe pressure-grouting technique. All cementing shall be completed by an approved company expert in well cementing, such as Haliburton Services, unless the Contractor can demonstrate that another company is equally qualified.

The cementing shall be done in stages by the tremmie pipe method. The height of each stage shall be determined by the Contractor and must conform to the specifications of the casing materials being set. Adequate pressure differentials shall be maintained to prevent collapse or distortion of the casing.

4.3 Centralizers

Centralizers shall be spaced on the casing at not more than 100 foot centers. The lowest centralizer shall be positioned within five feet of the bottom of the casing. Additional centralizers shall be placed 20 feet above the bottom and every 100 feet thereafter.

Centralizers shall be positioned on the casing by lock clamps or other devices satisfactory to the Engineer.

4.4 Casing Perforation

Perforation of the existing 8 inch steel casing and cemented 16 inch nominal diameter annulus will be by Schlumberger "4 inch Hyper-Jet III" casing perforation services, (4 shots per foot, 90 degree phasing, centralized in well), or equivalent subcontractor casing perforation services as approved by the Engineer. Any perforation which may be conducted in the interval between 0 to 400 feet below top of casing, should not perforate the existing 16 inch steel casing.

B.5 PRELIMINARY CONSTRUCTION

5.1 Site Preparation

All efforts shall be made to prevent spillage of all drilling fluids and any other fluids. In the event of a spill, the Contractor will be responsible for cleanup and restoration.

Fluids and cuttings shall be removed from the site and disposed of at an approved disposal site. The Contractor will provide to the Owner a name and location of the disposal site and documentation from the disposal facility owner or operator assuring acceptance of the materials. Any fluids produced during hydrologic testing shall not be recirculated down the exploratory hole.

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Perforation of the existing 8 inch steel casing and cemented 16 inch nominal diameter annulus will be by Schlumberger "4 inch Hyper-Jet III" casing perforation services, (4 shots per foot, 90 degree phasing, centralized in well), or equivalent subcontractor casing perforation services as approved by the Engineer. Any perforation which may be conducted in the interval between 0 to 400 feet below top of casing, should not perforate the existing 16 inch steel casing.

B.5 PRELIMINARY CONSTRUCTION

5.1 Site Preparation

Clearing of trees, brush, stumps, and other objects, grubbing, and necessary preparation shall be done by the Contractor in accordance with these Specifications. A permanent site access culvert pipe crossing, fencing and entrance gate shall be constructed by the contractor, as shown in Figure 1.

5.2 Water Supply Well(s)

The Contractor shall be responsible for providing the design, permit approvals, materials, equipment, and labor for the construction of water supply well(s) if needed during the exploratory well modification. The well(s) shall be turned over to the Owner at the completion of the project.

B.6 EXPLORATORY/MONITOR WELL MODIFICATION

The procedure for modification of the exploratory/monitor well as shown on Figures 1 and 2 include:

6.1 Conduct a Schlumberger's Cement Evaluation Tool log in the existing 8-inch casing over the entire length of the casing (Bid Item No. 2).

6.2 Prior to any perforating and grouting, backplug from the bottom of the well to just below the bottom of the existing casing, at a depth of approximately 1,600 feet below TOC, in at least two stages. After allowing the cement to harden pressure grout any voids behind casing while making sure the casing is not filled with cement (Bid Item No. 3).

6.3 Perforate and squeeze cement selected intervals of the existing casing if directed by the Engineer based on results of the cement evaluation tool log and with the verbal approval of FDER (Additive Alternate Bid Item No. 4).

6.4 Conduct a Cement Evaluation Tool log over any intervals that were pressure grouted, perforated and/or squeeze cemented. (Bid Item No. 4).

6.5 Backplug the casing to a depth of approximately 1,150 feet in at least two stages (Bid Item No. 3).

6.6 Slot the existing 8-inch diameter steel casing and surrounding cement beginning at 1,150 feet below TOC and moving upward in 5-foot intervals a minimum of 10 feet or until the well flows at the surface at a minimum of 10 gallons per minute as directed by the Engineer in the specified manner (Bid Item No. 3).

6.7 Sufficiently develop the well to remove particular residue from the water columns prior to video logging which will be conducted by SWFWMD (Bid item No. 3).

6.8 Install approximately 1,140 feet of 4-inch diameter ABS casing (0.454-inch wall thickness installed in the specified manner (Bid Item No. 3).

6.9 Install a 10 foot gravel and sand pack above a minimum of two 4 inch x 8 inch rubber packers fastened to the bottom of the 4-inch casing in the specified manner (Bid Item No. 3).

6.10 Cement in the 4-inch casing from the bottom to the existing surface concrete pad using specified cement and method (Bid Item No. 3).

6.11 Conduct pressure test on casing in the specified manner (Bid Item No. 3).

6.12 Well head assemble consisting of 4 inch casing extending a minimum of 48 inches above the pad with 2 inch PVC tee and ball valve and a 4 inch threaded cap as shown on Figure 2 (Bid item No. 3).

B.7 CHAIN LINK FENCE AND GATE (Bid Item No. 1)

7.1 SCOPE

Work specified in this Section covers materials and work necessary for the chain link fence and gate, complete as shown on the Figures.

7.2 MANUFACTURER

Like items of materials provided hereunder shall be the end products of one manufacturer in order to achieve standardization for appearance, maintenance, and replacement.

7.3 SPECIFICATION AND STANDARDS REFERENCE

Where supplementary specifications or standards such as ASTM, AWWA, AASHTO, etc., referenced, such references shall be latest edition.

7.4 FENCE MATERIALS

7.4.1. The use of a manufacturer's name and model or catalog number is for the purpose of establishing standard of quality and general configuration. Products of other manufacturers will be considered in accordance with the General Conditions.

7.4.2. Materials shall be new and products of recognized, reputable manufacturers. Used, rerolled, or regalvanized materials are not acceptable.

7.4.3. All materials shall be hot-dip galvanized after fabrication. Posts and other appurtenances shall have a minimum zinc coating of 1.2 ounces per square foot of surface.

7.4.4. Fabric: Chain link fence fabric, 72-inches high, woven of No. 9-gauge wire in 2-inch diamond-mesh pattern, selvages twisted and barbed, galvanized after weaving with 1.2 ounce zinc coating meeting the requirements of ASTM A 392, Class I.

7.4.5. Posts: Federal Specification RR-F-191, fence, posts, gates, and accessories, except as hereinafter modified. Standard lengths for setting in ground or in concrete as required for conditions shown.

7.4.6 Line Posts: Use galvanized 2-1/2-inch outside diameter, meeting the requirements of ASTM A 120, Schedule 40 steel pipe, weight 3.65 pounds per linear foot.

7.4.7 End, Corner, Angle and Pull Posts: For end, corner, angle, and pull posts, use 1.875-inch outside diameter standard weight steel pipe, weight 5.79 pounds per linear foot.

7.4.8 Gate Posts: For single swing gates up to six feet wide, 2.875 inch outside diameter, 5.79 pounds per foot. For single gates six feet wide to thirteen feet wide, 4-inch outside diameter, 9.1 pounds per foot. For other sizes, follow manufacturer's recommendations.

7.4.9 Post Tops: Post tops shall be pressed steel, or malleable iron, designed as a weathertight closure cap for tabular posts. Provide one cap for each post, unless equal protection is afforded by combination post top cap and barbed wire supporting arm where barbed wire is required. Where top rail is used, provide tops to permit passage of top rail.

7.4.10 Tension Wire: Tension wire shall be zinc or aluminum-coated coil spring steel wire not less than No. 7 gauge (0.177 inch in diameter. Provide tie clips of manufacturer's standard as approved for attaching the wire to the fabric, at intervals not exceeding 24-inches.

7.4.11 Stretcher Bars: Stretcher bars shall be one-piece lengths equal to full height of fabric with a minimum cross-section of 3/16-inch by 3/4-inch. Provide one stretcher bar for each gate and end post and two for each corner and pull post.

7.4.12 Stretcher Bar Bands: Bar bands shall be heavy-pressed steel, spaced not over 25-inches on center to secure stretcher bars to tubular end, corner, pull, and gate posts.

7.4.13 Top Rail: Not less than 18 foot long tubular steel, 1-5/8-inch outside diameter, weight 2.27 pounds per linear foot. coupling to be outside-sleeve type and at least 6 inches long. Provide springs at one coupling in five to permit expansion in rail as recommended by the manufacturer. Top rail to extend through line pot tops to form continuous brace from end-to=end of each fence.

7.4.14 Brace pipe shall be of the same material as the top rail and shall be installed midway between the top rail and extend from the terminal post to the first adjacent line post. Braces shall be securely fastened to the posts by heavy-pressed steel and malleable fittings, then securely trussed from line post to base of terminal post with a 3/8 inch truss rod and tightener.

7.4.15 Fittings: Malleable steel, cast iron, or pressed steel, galvanized to meet the requirements of ASTM A 153. Fittings to include extension arms for barbed wire, stretcher bars and clamps, clips, tension rods, brace rods, hardware, fabric bands and fastenings, and all accessories. Provide 45-degree bracket type supports to accommodate three strands of barbed wire as shown.

7.4.16 Barbed Wire: Four-point pattern with two strands of No. 12-1/2 2 -gauge wire, and 1-inch barbs 5-inches apart. Zinc-coated barbed wire shall meet requirements of ASTM A 121, Class 3; aluminum-coated barbed wire to ASTM A 585.

7.5 GATE MATERIALS

7.5.1 Gate shall be seing or sliding as indicated, complete with latches, stops, keepers, hinges, or rollers and roller tracks.

7.5.2 Gate frames shall be constructed of tubular members welded at all corners or assembled with fittings. On steel, welds shall be painted with zinc-based paint. Where corner fittings are used, gates shall have truss rods of 5/16-inch minimum nominal diameter to prevent sag or twist. Gate leaves shall have vertical intermediate bracing as required, spaced so that no members are more than eight feet apart. Gate leaves shall have vertical intermediate bracing as required, spaced so that no members are more than eight feet apart. Gate leaves ten feet or larger shall have a horizontal brace or one 5/16-inch minimum diagonal truss rod. When fence has barbed wire top, the end members of the gate frames shall be extended one foot above the top horizontal member to which three strands of barbed wire, uniformly spaced, shall be attached by use of bands, clips, or book bolts.

7.5.3 Fabricate frames of standard weight pipe 1.90-inch outside diameter, weight 2.72 pounds per linear foot.

7.5.4 Gate fabric shall be the same type as used in the fence construction. Fabric shall be attached securely to the gate frame at intervals not exceeding 15-inches.

7.5.5 Gate hinges shall be of adequate strength for gate and with large bearing surfaces for clamping in position. Hinges shall not twist or turn under the action of the gate. Gates shall be capable of being opened and closed easily by one person.

7.5.6 Gate latches, stops, and keepers shall be provided for all gates. Latches shall have a plunger-bar arranged to engage the center stop, except that for single gates of openings less than ten feet wide a forked latch may be provided. Latches shall be arranged for locking with padlocks. Center stops shall consist of device arranged to be set in concrete and to engage a plunger-bar on the latch of double gates. No stop is required for single gates. Keepers shall consist of a mechanical device for securing the free end of the gate when in the full open position.

7.5.7. Double Gate: Size and configuration shall be as indicated. Provide gate stops for all double gates, consisting of mushroom type or flush plate with anchors. Set in concrete to engage the center dop rod or plunger bar. Provide locking device and padlock eyes as an integral part of the latch, requiring one padlock for locking both gate leaves.

7.5.8. Sliding Gate: Provide manufacturer's standard heavy-duty track, ball-bearing hanger sheaves, overhead framing and supports, guides, stays, bracking, and accessories as required. Al sliding gates shall be rolling, cantilever slide, or overhead (top) suspended, as indicated on Plans.

7.5.9. Rolling gate track rollers shall be malleable iron or heavy pressed steel construction, with provision for regular grease lubrication. Ground rollers shall have malleable iron or heavy pressed steel hubs with similar provision for lubrication. Gate track shall be Schedule 40 pipe, firmly attached to support posts on seven foot maximum centers. Gates more than eight feet in height shall have three tracks. Rolling gate frames shall be constructed similar to swing gates except diagonal bracing shall reflect different support type.

7.5.10 Cantilever gate rollers shall have heavy malleable rollers, needle or ball bearings with fitting for regular lubrication. Maximum spacing of support posts is ten feet. Additional weight supporting posts with lower roller shall be provided on ten foot maximum centers. Support posts shall be 4-inch diameter, Schedule 40, set 36-inch minimum depth. Top and lower rails of gate shall be 2-3/8-inch OD, Schedule 40 pipe. Vertical support posts shall be on six foot maximum spacing, 1-7/8-inch OD by Schedule 40 pipe, all diagonal bracing 1-5/6-inch OD by Schedule 40 pipe, all connections welded and painted.

7.5.11 Keeper: Provide keeper for all vehicle gates, which automatically engages the gate leaf and hods it is the OPEN position until manually released.

7.6 CHAIN AND LOCK MATERIALS

7.6.1 Immediately upon installation of chain link fence and gates, case hardened chain of adequate length to secure gate and a locked padlock shall be installed to keep the site clear except when Contractor is working on-site. Padlocks shall be Master, Size 3, with master key No. 3623.

7.6.2 If the above master keyed padlocks are not available from the supplier at the time of enclosure installation, other padlocks shall be installed until such time as the specified locks are available.

7.7. CONCRETE

7.7.1 All concrete and concrete work shall conform to the following specifications unless otherwise noted on the Plans. All concrete specified in this Section shall attain a minimum compressive strength of 3000 psi in 28 days.

7.7.2 Concrete Mix Materials: Coarse aggregate shall be hard, clean, washed gravel or crushed stone. The maximum aggregate size shall not be large than 1-inch nor smaller than 1/2 equivalent diameter. Fine aggregate shall be clean, sharp sand. Water shall be clean, fresh free from injurious amounts of materials, organic substances, acids or alkalis. Cement shall be Type I, Domestic Portland Cement, conforming to ASTM C150-latest revision.

7.7.3 Concrete Admixtures: Air-entrainment admixtures in concrete are permitted in accordance with manufacturer's specifications provided the specified strength and quality are maintained and unless the admixtures appear to be causing abnormal field results, and provided that the total entrained air content does not exceed 5.0%. No other admixture of any type will be permitted without the written approval of the Engineer.

7.7.4 Transit or Ready-Mixed Concrete: Transit or ready-mixed concrete may be used provided it meets the requirements of ASTM C94, Ready Mixed Concrete, specifications herein stated and provided the central plan producing the concrete, the batching, mixing and transportation equipment, in the opinion of the engineer, is suitable for the production and transportation of the specified concrete.

7.8 EXECUTION

7.8.1 Installation of fencing shall meet the requirements of ASTM F567.

7.8.2 Fencing shall be installed in straight lines between angle points. Fencing installation shall be in accordance with the manufacturer's recommendations and with these Specifications. Post holes shall be a minimum depth of three feet below finished grade. Holes for line posts shall be 9-inches in diameter. Holes for line posts shall be 9-inches in diameter. Holes for gate, corner, and pull posts shall be 16-inches in diameter. Post space shall not exceed ten feet on centers and in true lines. Posts shall be plumb and to a depth of 2-feet 10-inches. Top rail of the fence shall be at the top of the fabric. Remainder of hole shall have concrete around the posts to a point 2-inches above finished grade. top surface shall have a crown watershed finish. Concrete shall cure prior to installing accessories. Chain link fabric shall be fastened to end posts with stretcher bars

and clamps and to line posts and top rail with wire or bands at approximately 14-inch centers and 24-inch center, respectively. Three stands of barbed wire shall be installed on the brackets. Gate posts shall be braced diagonally to adjacent line posts to ensure stability. Gates shall be hung and adjusted so gates operate from open or closed position in accordance with the manufacturer's recomendations.

END OF PART B

APPENDIX C

CONSENT ORDER AND AMENDMENT

Florida Department of Environmental Regulation

Southwest District • 4520 Oak Fair Boulevard • Tampa, Florida 33610-7347

Lawton Chiles, Governor 813-620-6100 Carol M. Browner, Secretary

CERTIFIED MAIL
RETURN RECEIPT
P 149 931 423

September 9, 1992

Mr. Robert L. Anderson, Chairman
Sarasota County Board of County Commissioners
101 South Washington Blvd.
Sarasota, Fl 33577

Re: Knights Trail Park Consent Order
OGC Case No. 91-1999

Dear Chairman Anderson:

Enclosed please find an executed copy of the above referenced Consent Order. The Department's Office of General Counsel indicates that no petitions were filed against this Order subsequent to publication of the public notice. Therefore, Dr. Garrity has countersigned this Order with an effective date of September 9, 1992.

You can contact me at 813 / 620-6100 X334 if you or your staff have any questions concerning this document.

Sincerely,

Judith A. Richtar

Judith A. Richtar, P.G.
Program Manager
Underground Injection Control

cc: David Schwartz, OGC
Richard Deuerling, BDW&GWR/WFA
Joseph Haberfeld, BDW&GWR/WFA
Anthony Gilboy, SWFWMD
Michael Hollinger, USEPA-UIC
Chuck Wigley, SCUD
Robert Obering, Sarasota Co. Eng. Dept.
Joseph L. Brown, Sarasota County
William A. Dooley, Nelson, Hesse et al

SEP 16 10 16 AM '92
UTILITIES WATER IMPROVEMENT PROGRAM

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION Complainant, vs. SARASOTA COUNTY, Respondent.	IN THE OFFICE OF THE SOUTHWEST DISTRICT OGC FILE NO.: 91-1999

CONSENT ORDER

Pursuant to the provisions of Sections 403.121(2) and 120.57(3), Florida Statutes, and Florida Administrative Code Rule 17-103.110, this Consent Order is entered into between the State of Florida Department of Environmental Regulation ("Department") and Sarasota County ("Respondent") to reach settlement of certain matters at issue between the Department and Respondent.

The Department finds and the Respondent admits the following:

1. The Department is the administrative agency of the State of Florida having the power and duty to control and prohibit pollution of air and water in accordance with Chapter 403, Florida Statutes, and rules promulgated thereunder. The Department has jurisdiction over the matters addressed in this Consent Order.

2. Respondent is a political subdivision of the State of Florida and is a person within the meaning of Section 403.031(5), Florida Statutes.

3. The Respondent, through its Engineering Department, was issued a construction permit, UC58-125241, on April 24, 1987 to construct the Knights Trail Park Exploratory Monitor Well located at Knights Trail Park, in Sarasota County.

4. Respondent's well was constructed as a Class I Exploratory Monitor Well and drilled to 2156 feet below land surface to investigate the site's potential for the deep injection well disposal of reverse osmosis brine reject water.

5. The Department notified the Respondent, on October 12, 1989 of the questionable confining unit thickness and the integrity of the cement bond of the casing to the formation providing limited protection of the Underground Source of Drinking Water (USDW). The Respondent did not reply; the Department was copied on a September 28, 1990 letter from Smally, Wellford & Nalven, Inc. to Sarasota County regarding the Technical Advisory Committee's concerns.

6. The Department notified the Respondent, on July 31, 1990, that the Exploratory Monitor Well was considered a potential threat to the waters of the State and that a Well Plugging and Abandonment Schedule pursuant to Rule 17-28.350, Florida Administrative Code, should be submitted within 90 days of receipt of the notification. The Respondent did not submit the required schedule within the time period. Respondent contacted the

Department on January 9, 1991 to request being placed on the February 14, 1991 agenda of the Technical Advisory Committee meeting to discuss the well conversion/plugging of the exploratory monitor well.

7. The Respondent, on February 14, 1991, presented potential options for the future use of the well to the Department at the Technical Advisory Committee meeting. The Respondent stated that a proposal would be submitted to the Department within 30 days.

8. The Respondent, on March 14, 1991, submitted a proposed schedule (see Attachment 1) at the Technical Advisory Committee meeting which was accepted by the Department at the meeting. A complete plan for plugging and abandonment or conversion to a regional monitor well was to be submitted in accordance with the Department-approved schedule to the Department along with an application by May 9, 1991.

9. The Department notified the Respondent, on May 22, 1991, that the agreed schedule had not been followed. The Respondent, on June 5, 1991, acknowledged that the schedule was delayed and requested to be placed on the July agenda of the Technical Advisory Committee meeting in order to present a well testing and conversion plan.

10. The Respondent notified the Department, on July 10, 1991, that a proposed plan was not prepared and that Respondent

would not attend the July 11, 1991, Technical Advisory Committee meeting. The Department subsequently initiated enforcement action.

11. On July 23, 1991, the Sarasota County Board of County Commissioners directed County staff to prepare bid documents, resume contact with the Department, and to present a schedule of activities to the Department. The County's consultants presented their tentative schedule of well conversion/abandonment at the August 19, 1991 Technical Advisory Committee meeting.

12. Construction permit number UC58-125241 expired April 1, 1989, therefore the Respondent does not have a valid permit for the well. The Respondent has failed to respond or supply additional requested information within a reasonable period of time after receiving several timely notices.

13. The Department alleges that the conditions described in paragraph 12 are violations of Florida Administrative Code Rule 17-28.270 and the well is a potential threat to waters of the State.

Respondent and the Department have reached a resolution of the matter, pursuant to Florida Administrative Code Rule 17-103.110(3), and the entry into this agreement does not constitute an admission by the Respondent to any violations and is being agreed to for the purpose of mutually resolving the disagreement and avoiding any further litigation and cost. Therefore, it is mutually agreed and it is,

ORDERED:

PENALTIES

14. Within 30 days of execution of this Consent Order, Respondent shall pay the Department $6,479.00 in settlement of the matters addressed in this Consent Order. This amount includes a civil penalty of $5,979.00 for alleged violations of Section 403.161, F.S., and of the Department's rules and $500.00 for costs and expenses incurred by the Department during the investigation of this matter and the preparation and tracking of this Consent Order. Payment shall be made by cashier's check or money order. The instrument shall be made payable to the Department of Environmental Regulation and shall include thereon the OGC number assigned to this Order and the notation "Pollution Recovery Fund". The payment shall be sent to the Department of Environmental Regulation, Southwest District Office, 4520 Oak Fair Boulevard, Tampa, Florida 33610-7347.

15. Respondent agrees to pay the Department stipulated penalties in the amount of $100 per day for each and every day Respondent fails to timely comply with any of the requirements of paragraphs 14, 16, 17 and 18 of this Order. A separate stipulated penalty shall be assessed for each violation of this Order. Within 30 days of written demand from the Department, Respondent shall make payment of the appropriate stipulated penalties to "The Department of Environmental Regulation" by cashier's check or money order and shall include

thereon the OGC number assigned to this Order and the notation "Pollution Recovery Fund". Payment shall be sent to the Department of Environmental Regulation, Southwest District, 4520 Oak Fair Boulevard, Tampa, Florida 33610-7347. The Department may make demands for payment at any time after violations occur. Nothing in this paragraph shall prevent the Department from filing suit to specifically enforce any of the terms of this Consent Order.

CORRECTIVE ACTION

16. Within 60 days of the effective date of this Order, Respondent shall submit either a well testing and modification plan for conversion of the exploratory monitor well to a regional monitor well, or a Plugging and Abandonment Plan. The Department shall review the proposal and either accept it, reject it as inadequate, or request in writing that Respondent shall submit any required additional information within 14 days of receipt of each request.

17. Respondent shall pay the Department $100 in processing fees at the time of submittal of the abandonment/conversion plan, pursuant to Florida Administrative Code Rule 17-4.050(4)(i), as required in paragraph 16. Payment shall be made payable to the Department of Environmental Regulation and shall include the OGC number assigned to this Order and the notation "Florida Permit Fee Trust Fund". The payment shall be sent to the Department of

Environmental Regulation, 4520 Oak Fair Boulevard, Tampa, Florida, 33610-7347.

18. The approved well conversion/plugging plan will be incorporated as an addendum to this Consent Order. Within 150 days of receipt of the addendum, Respondent shall implement the terms of the addendum. Implementation means contractor mobilization of rig on-site, begin site preparation and commence plugging/conversion operations. Public noticing of the addendum will be required at least 30 days prior to implementation of the Department approved plan.

STANDARD CLAUSES

19. If any event occurs which causes delay, or the reasonable likelihood of delay, by the County in complying with the requirements of this Consent Order, the County shall have the burden of proving that the delay was, or will be, caused by circumstances beyond the reasonable control of the County could not have been, or cannot be, overcome by due diligence. Changed economic circumstances shall not necessarily be considered circumstances beyond the control of the County nor shall the failure of a contractor, subcontractor, materialman or other agent (collectively referred to as "contractor") to whom responsibility for performance is delegated to meet contractually imposed deadlines, be a cause beyond the control of the County unless the cause of the contractor's late performance was also beyond the

contractor's control. Upon occurrence of an event causing delay or upon becoming aware of a potential for delay, the County shall promptly notify the Department orally and shall, within 7 days of oral notification to the Department, notify the Department in writing of the anticipated length and cause of the delay, the measures taken or to be taken to prevent or minimize the delay, and the timetable by which the County intends to implement these measures. If the parties can agree that the delay or anticipated delay has been or will be caused by circumstances beyond the reasonable control of Respondent, the time for performance hereunder shall be extended for a period equal to the agreed delay resulting measures necessary to avoid or minimize delay. Failure of the County to comply with the notice requirements of this paragraph in a timely manner shall constitute a waiver of the County's right to request an extension of time for compliance with the requirements of this Consent Order.

20. The Department, for and in consideration of the complete and timely performance by Respondent of the obligations agreed to in this Consent Order, hereby waives its right to seek judicial imposition of damages or civil penalties for alleged violations outlined in this Consent Order. Respondent waives its right to an administrative hearing pursuant to Section 120.57, Florida Statutes, on the terms of this Consent Order. Respondent

acknowledges its right to appeal the terms of this Consent Order pursuant to Section 120.68, Florida Statutes, but waives that right upon signing this Consent Order.

21. Nothing herein shall be construed to limit the authority of the Department to undertake any action against any settling Respondent in response to or to recover the costs of responding to conditions at or from the site that require Department action to abate an imminent hazard to the public health, welfare or the environment.

22. The Respondent shall provide within a reasonable time at its expense a permanent safe drinking water supply meeting all drinking water standards set forth in Florida Administrative Code Chapter 17-550 to replace any potable water well that is shown by chemical and hydrogeologic analyses to be contaminated by the Respondent's operations.

23. Entry of this Consent Order does not relieve Respondent of the need to comply with the applicable federal, state or local laws, regulations, or ordinances.

24. The terms and conditions set forth in this Consent Order may be enforced in a court of competent jurisdiction pursuant to Sections 120.69 and 403.121, Florida Statutes. Failure to comply with the terms of this Consent Order shall constitute a violation of Section 403.161(1)(b), Florida Statutes.

25. Respondent is fully aware that a violation of the terms of this Consent Order may subject Respondent to judicial imposition of damages, and civil penalties up to $10,000 per offense.

26. Respondent shall allow all authorized representatives of the Department access to the property at reasonable times for the purpose of determining compliance with the terms of this Consent Order and the rules of the Department.

27. The Department hereby expressly reserves the right to initiate appropriate legal action to prevent or prohibit any violations of applicable statutes or the rules promulgated thereunder that are not specifically addressed by the terms of this Consent Order.

28. No modifications of the terms of this Consent Order shall be effective until reduced to writing and executed by both the Respondent and the Department.

29. All reports, plans, and data required by this Consent Order to be submitted to the Department should be sent to the Department of Environmental Regulation, Underground Injection Control Program, Southwest District Office, 4520 Oak Fair Boulevard, Tampa, Florida 33610.

30. This Consent Order is final agency action of the Department pursuant to Section 120.69, Florida Statutes and

Florida Administrative Code Rule 17-103.110(3), and it is final and effective on the date filed with the Clerk of the Department unless a Petition for Administrative Hearing is filed in accordance with Chapter 120, Florida Statutes.

AGREED AND CONSENTED TO
FOR SARASOTA COUNTY:

8-3-92
DATE

Robert L. Anderson, Chairman
Sarasota County Board of
County Commissioners

DONE AND ORDERED this 9 day of September, 1992, in Tampa, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

Richard D. Garrity, Ph.D.
Director of District Management

Copies furnished to:

Office of General Counsel
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Ms. Judith A. Richtar, P.G.
Underground Injection Control Program
Florida Department of Environmental Regulation
4520 Oak Fair Boulevard
Tampa, Florida 33610-7347

Mr. Richard Deuerling, P.G.
Underground Injection Control Section
Bureau of Drinking Water and Ground Water Resources
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

FILING AND ACKNOWLEDGEMENT

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

Clerk — Date: 9-9-92

Mr. Tony Gilboy, P.G.
Well Construction Permitting
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34609-6899

Ms. Jacq Marie Jack
Underground Injection Control Section
Ground-Water Protection Branch
United States Environmental Protection Agency
345 Courtland Street N.E.
Atlanta, Georgia 30365

Mr. Chuck Wigley, Director
Sarasota County Utilities Department
1301 Cattlemen Road
Sarasota, Florida 34232

Mr. Robert Obering, Manager
Sarasota County Engineering Division
2015 Cattlemen Road
Sarasota, Florida 34232

Mr. Joseph L. Brown, III, P.E.
Sarasota County Utilities Department
Water Improvement Program
2015 Cattlemen Road
Sarasota, Florida 34232

Mr. William A. Dooley
Nelson, Hesse, Cyril, Smith, Widman, Herb, Causey & Dooley
2070 Ringling Boulevard
Sarasota, Florida 34237

RECEIVED MAY 25 19

UTILITIES WATER IMPROVEMENT PROGRAM
MAY 21 03 PM '93

Florida Department of Environmental Regulation

Southwest District • 3804 Coconut Palm Dr • Tampa, Florida 33619

Lawton Chiles, Governor • 813-744-6100 • Virginia Wetherell, Secretary

CERTIFIED MAIL
RETURN RECEIPT
P 648 750 370

May 19, 1993

WLD	GW
Copy	GW/GW
Copy	SUW
Copy	/PAM
File	

Mr. Wayne L. Derr, Chairman
Sarasota County
Board of County Commissioners
101 South Washington Blvd.
Sarasota, Fl 33577

Re: Knights Trail Park Consent Order
OGC Case No. 91-1999 / Amendment

Dear Chairman Derr:

Enclosed please find an executed copy of the Amendment to the above referenced Consent Order. The Department's Office of General Counsel indicates that no petitions were filed against this Order subsequent to publication of the public notice. Therefore, Dr. Garrity has countersigned this Order with an effective date of May 19, 1993.

This Amendement authorizes the County to proceed with the conversion of the exploratory injection well to a regional monitor well in accordance with the plans and specifications submitted and on file at the FDER Southwest District office.

Please contact me at 813 / 620-6100 X334 if you or your staff have any questions concerning this document.

Sincerely,

Judith A. Richtar

Judith A. Richtar, P.G.
Program Manager
Underground Injection Control

cc: Tracey Hartman, OGC
Richard Deuerling, BDW&GWR/WFA
Joseph Haberfeld, BDW&GWR/WFA
Anthony Gilboy, SWFWMD
Michael Hollinger, USEPA-UIC
Larry B. Turner, SCUD
Robert Obering, Sarasota Co. Eng. Dept.
Joseph L. Brown, SCUD

RECEIVED MAY 2 5

UTILITIES WATER IMPROVEMENT PROGRAM

Florida Department of Environmental Regulation

Southwest District • 3804 Coconut Palm Dr • Tampa, Florida 33619

Lawton Chiles, Governor • 813-744-6100 • Virginia Wetherell, Secretary

MAY 21 3 PM '93

CERTIFIED MAIL
RETURN RECEIPT
P 648 750 370

May 19, 1993

JO	JD
WLW	GW
COPY	GW/GW
COPY	SUW
COPY	/PAM
File	

Mr. Wayne L. Derr, Chairman
Sarasota County
Board of County Commissioners
101 South Washington Blvd.
Sarasota, Fl 33577

Re: Knights Trail Park Consent Order
OGC Case No. 91-1999 / Amendment

Dear Chairman Derr:

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Please contact me at 813 / 620-6100 X334 if you or your staff have any questions concerning this document.

Sincerely,

Judith A. Richtar

Judith A. Richtar, P.G.
Program Manager
Underground Injection Control

cc: Tracey Hartman, OGC
Richard Deuerling, BDW&GWR/WFA
Joseph Haberfeld, BDW&GWR/WFA
Anthony Gilboy, SWFWMD
Michael Hollinger, USEPA-UIC
Larry B. Turner, SCUD
Robert Obering, Sarasota Co. Eng. Dept.
Joseph L. Brown, SCUD

BEFORE THE STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION Complainant, vs. SARASOTA COUNTY, Respondent.	IN THE OFFICE OF THE SOUTHWEST DISTRICT OGC FILE NO.: 91-1999

AMENDMENT TO CONSENT ORDER

Pursuant to paragraph 18 of Consent Order No. 91-1999, the Department will amend this Order to incorporate the Department-approved well plugging/conversion plan for the exploratory injection well. The well shall be converted to a regional monitor well to be owned and managed by the Southwest Florida Water Management District. Stipulated penalties referenced in paragraph 15 of the Order shall apply to all terms and deadlines of this Amendment.
IT IS THEREFORE:

ORDERED that the following paragraph of Consent Order 91-1999 originally entered into in this matter on September 9, 1991, is amended to read as follows:

18. Within 210 days of the effective date of this Amendment, Respondent shall implement and complete the well conversion/plugging plan prepared by Law Environmental, Inc., dated January 19, 1993, and which is hereby approved by the Department. Implementation

means no less than contractor mobilization of a drilling rig at the well site, start site preparation and commencement of plugging/conversion operations. The following conditions shall apply to the well plugging/conversion operations:

a. Prior to the beginning of drilling operations, the permittee shall submit a letter to the Department confirming the name of the registered State of Florida driller who will be supervising the operation and the driller's registration number. The permittee or the Engineer of Record shall provide the Department with copies of all federal, state or local permits required prior to spudding the well.

b. A professional engineer, registered pursuant to Chapter 471, Florida Statutes, shall be retained throughout the well conversion period to be responsible for the conversion operation and to certify the specifications and completion report and other related documents. Monitoring of the well conversion operation shall be provided by a Florida registered professional engineer or professional geologist. The Department shall be notified within 48 hours of any change in engineer/geologist.

c. During the well conversion operations allowed by this Amendment, construction progress reports (3 copies) shall be submitted to the Department's Southwest District Underground

Injection Control Program each week. The reporting period shall run Friday through Thursday and reports shall be mailed on Friday of each week. The report 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 the next reporting period.
2) Daily engineer/geologist report and driller's log with detailed descriptions of all testing, logging, casing, cementing (cement volumes, no. of stages, etc.) and drilling activities pursuant to Rule 17-28.270, F.A.C.
3) Detailed description of any unusual construction- related events that occur during the reporting period.

d. Within 60 days of completion of the well conversion, Respondent shall submit a final report to the Department (3 copies). The report shall include, but not be limited to, all information and data collected under Rule 17-28.270, F.A.C., with appropriate interpretations.

This Amendment To Consent Order is final agency action of the Department pursuant to Section 120.69, Florida Statutes, and Florida Administrative Code Rule 17-103.110(3), and it is final and effective on the date filed with the Clerk of the Department.

AGREED AND CONSENTED TO
FOR SARASOTA COUNTY:

April 6, 1993
Date

Wayne L. Derr, Chairman
Sarasota County Board of
County Commissioners

DONE AND ORDERED this 19th day of May, 1993, in Tampa, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL REGULATION

APPROVED AS TO FORM AND CORRECTNESS
COUNTY ATTORNEY

Richard D. Garrity, Ph.D.
Director of District Management
Southwest District
3804 Coconut Palm Drive
Tampa, Fl 33619-8318

Copies furnished to:

Office of General Counsel
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Fl 32399-2400

Judith A. Richtar, P.G.
Underground Injection Control Program
Department of Environmental Regulation
3804 Coconut Palm Drive
Tampa, Fl 33619-8318

Richard Deuerling, P.G.
Bureau of Drinking Water and Ground Water Resources
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Fl 32399-2400

FILING AND ACKNOWLEDGEMENT

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

J. Richtar
Clerk

5/19/93
Date

Michael Hollinger
Underground Injection Control Section
Ground-Water Protection Branch
U.S. Environmental Protection Agency
345 Courtland Street N.E.
Atlanta, GA 30365

Larry B. Turner, Director
Sarasota County Utilities Department
1301 Cattlemen Road
Sarasota, Fl 34232

Robert Obering, Manager
Sarasota County Engineering Division
2015 Cattlemen Road
Sarasota, Fl 34232

Joseph L. Brown, III, Manager
Water Improvement Program
Sarasota County Utilities Department
5570 Bee Ridge Road
Bldg. C, Suite 1
Sarasota, Fl 34233

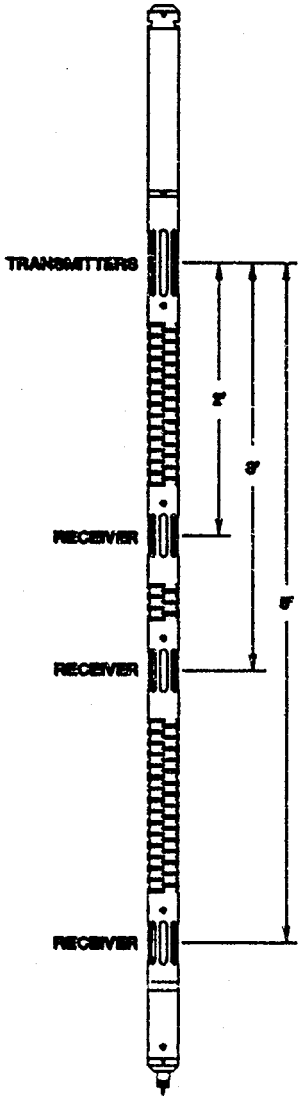
APPENDIX D

SECTOR BOND PRESENTATION AND SECTOR BOND LOGS

COMPUTALOG
WIRELINE PRODUCTS INC

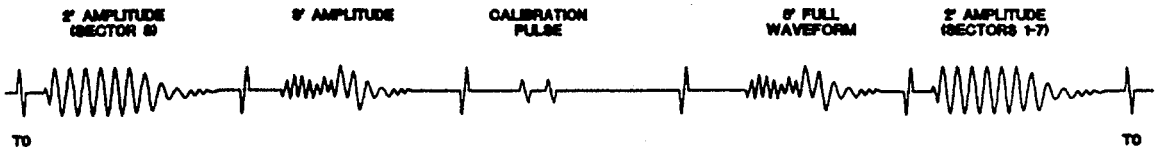
SECTOR BOND TOOL

The new Sector Bond Tool is the latest technical achievement in the long line of Computalog cement bond logging tools. The Sector Bond Tool not only measures the vertical extent of cement bond quality, as do standard bond tools, but also measures the quality of the cement bond laterally around the circumference of the pipe. Measurements include eight sectors amplitudes (45 degree segments) around the tool as well as the standard 3 foot amplitude and travel time and the 5 foot full waveform display. The cycles are displayed below. The Sector Bond Tool can be run in combination with most gamma ray, neutron and casing collar locator tools.



TOOL SPECIFICATIONS

Diameter:	2.75"
Pressure:	20K PSI (137 MPa)
Temperature:	350°F (175°C)
Surface Equipment:	PHASe Computer Logging System AT+ Computer Logging System



7450 Winscott Road, Fort Worth, Texas 76126
(817) 249-7200, FAX (817) 249-7222, TELEX 293224

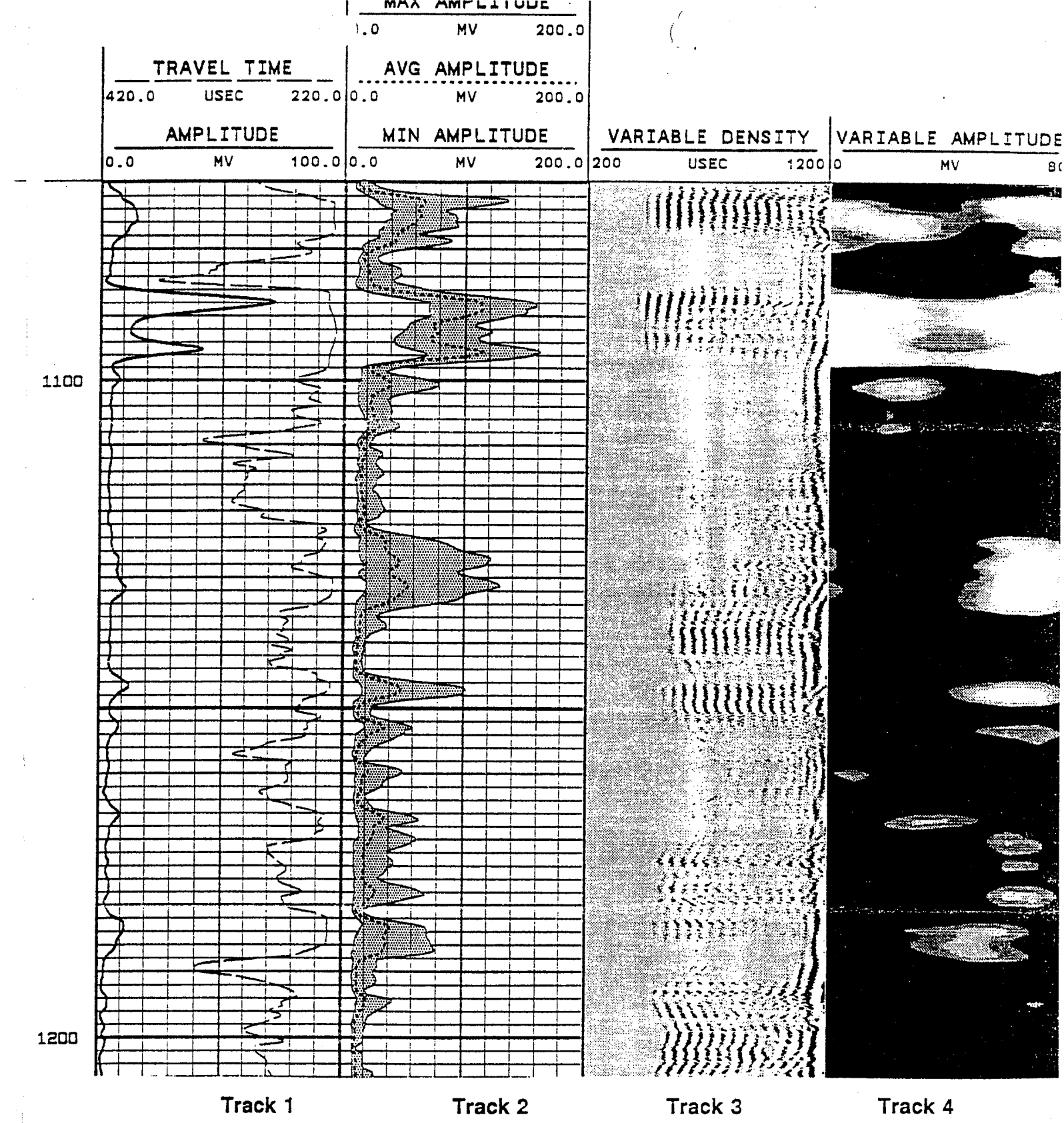


FIGURE 1 - Sector Bond Log Display

Track 1 - Standard 3 foot amplitude and travel time. **Track 2** - Minimum, maximum and average of the sector amplitudes. **Track 3** - Standard 5 foot VDL. **Track 4** - Variable sector amplitude gray scale display.

Interpretation: At depths 1088-1096 feet, poor bond around the circumference of the casing. At depths 1124-1134 feet, the sector amplitudes and variable display indicates a channel. This interpretation would not be apparent with a standard bond tool.

FLORIDA GEOPHYSICAL LOGGING, INC.

SECTOR BOND LOG

RUN NUMBER 1

COMPANY YOUNGQUIST BROTHERS INC.

WELL KNIGHTS TRAIL DEEP WELL MODIFICATION

FIELD KNIGHTS TRAIL PARK

COUNTY SARASOTA STATE FLORIDA

LOCATION
KNIGHTS TRAIL PARK

SEC._____ TWP._____ RGE._____

OTHER SERVICES:
NONE

PERMANENT DATUM PAD ELEV._____
LOG MEASURED FROM PAD FT.ABOVE PERMANENT DATUM
DRILLING MEASURED FROM PAD

ELEV.: K.B._____
D.F._____
G.L._____

DATE	08-NOV-93	
RUN NO.	ONE	
TYPE LOG	SECTOR	
DEPTH-DRILLER	1610'	
DEPTH-LOGGER	1610'	
LOGGED INTERVAL	1602' TO SURF	TO
OPERATING RIG TIME	3 HRS	
TYPE FLUID IN HOLE	WATER	
SALINITY PPM CL	10,000 PPM	
DENSITY-VISCOSITY	8.5 LBS	
LEVEL	20'	
MAX. REC. TEMP. DEG F.		
EQUIPMENT-LOCATION	102/FT MYERS	
RECORDED BY	MILLER	
WITNESSED BY	ELLSWORTH/FISHKIN	HAVERFELD/SHELFER

BOREHOLE RECORD				CASING RECORD			
RUN NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
LAST	7 7/8"	CSG	TD	8 5/8"	35 LB?	SURF	1599'
						LOGGER=	1590' ?

VERSION: 2.16

KTSECTOR2

FINISH DEPTH: -7.2 FEET DIRECTION: UP DATE: 11/08/93 TIME: 12:52:47 MODE: ORIGINAL

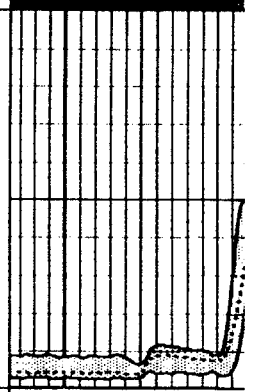
AMPLITUDES

MAX AMPLITUDE 0.0 MV 200.0

AVG AMPLITUDE 0.0 MV 200.0

MIN AMPLITUDE 0.0 MV 200.0

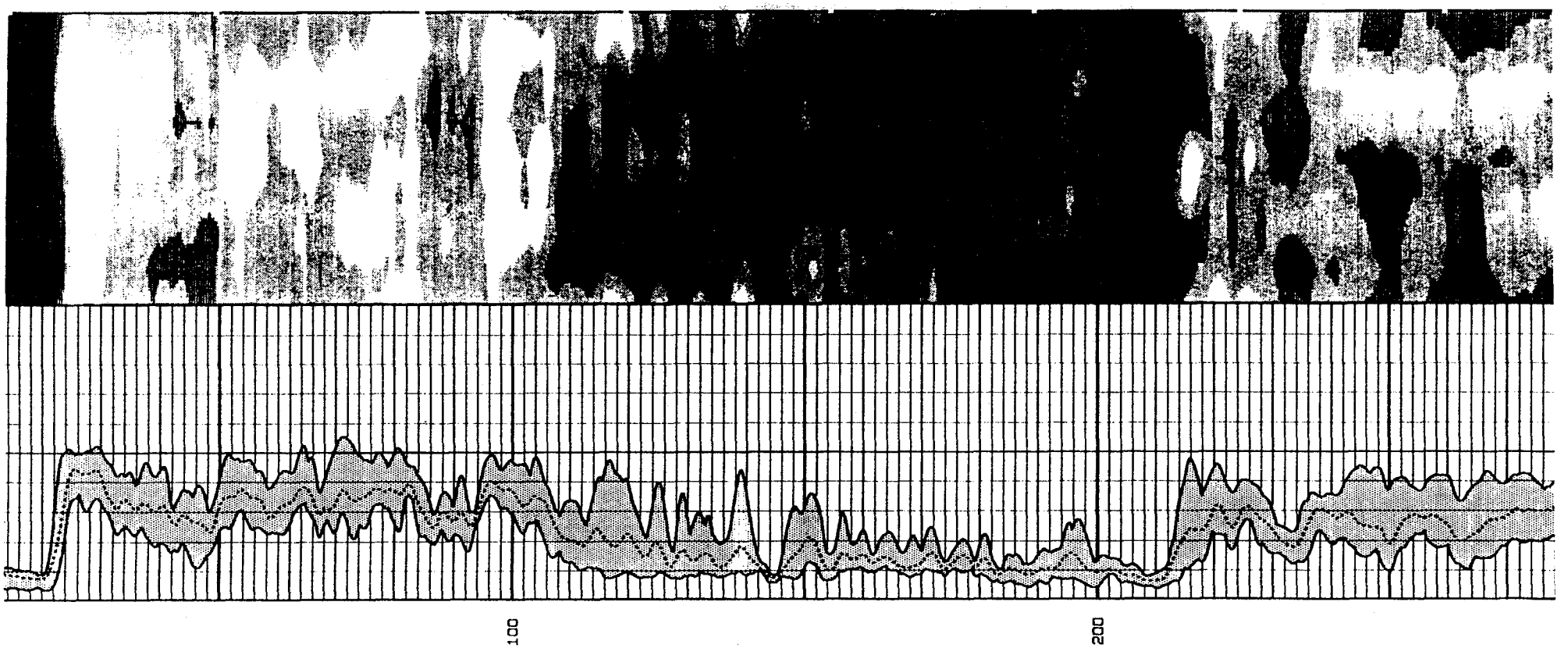
VARIABLE AMPLITUDE 0.0 MILLIVOLTS 90.0

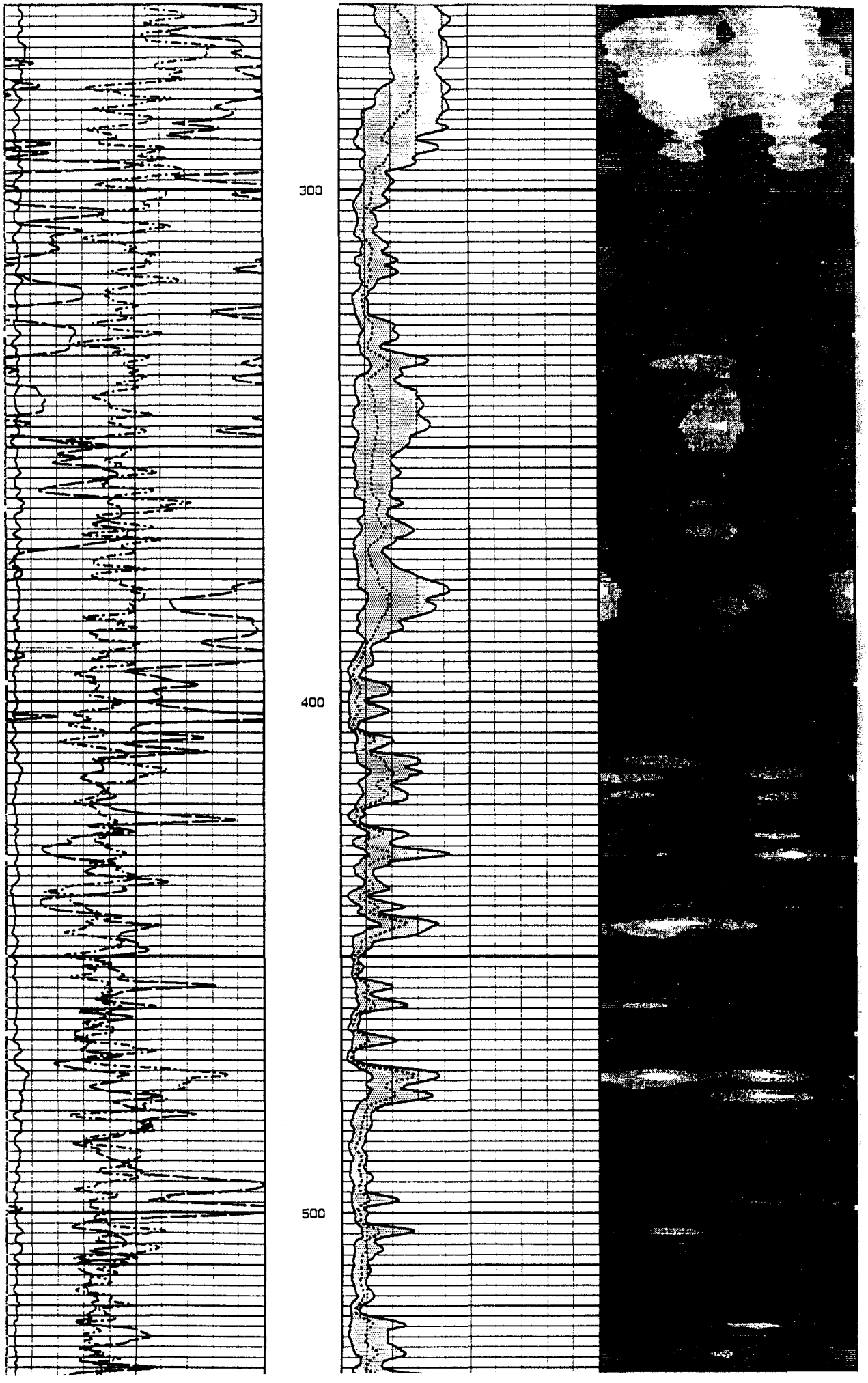


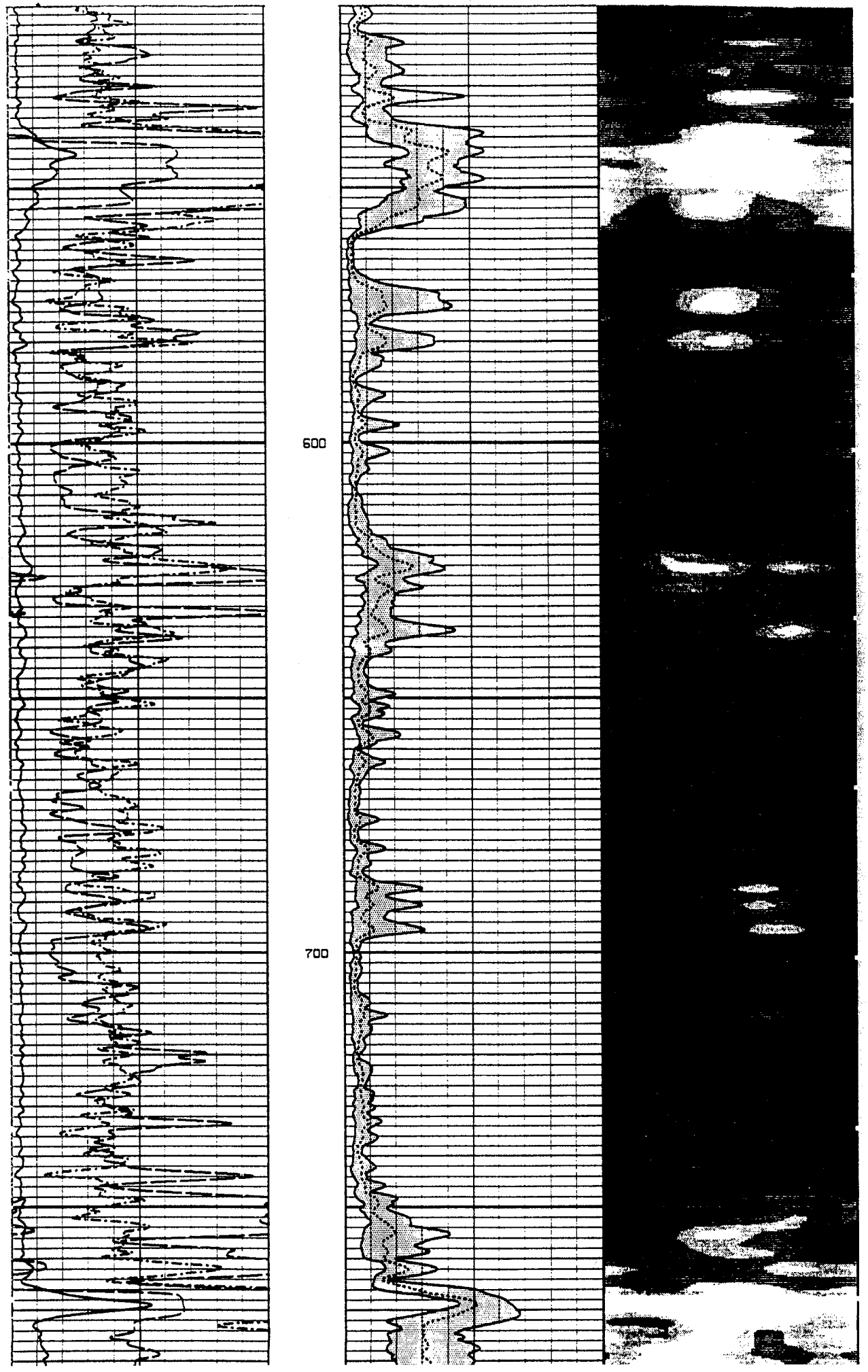
MC: AMPLITUDE 0.0 MV 10.0

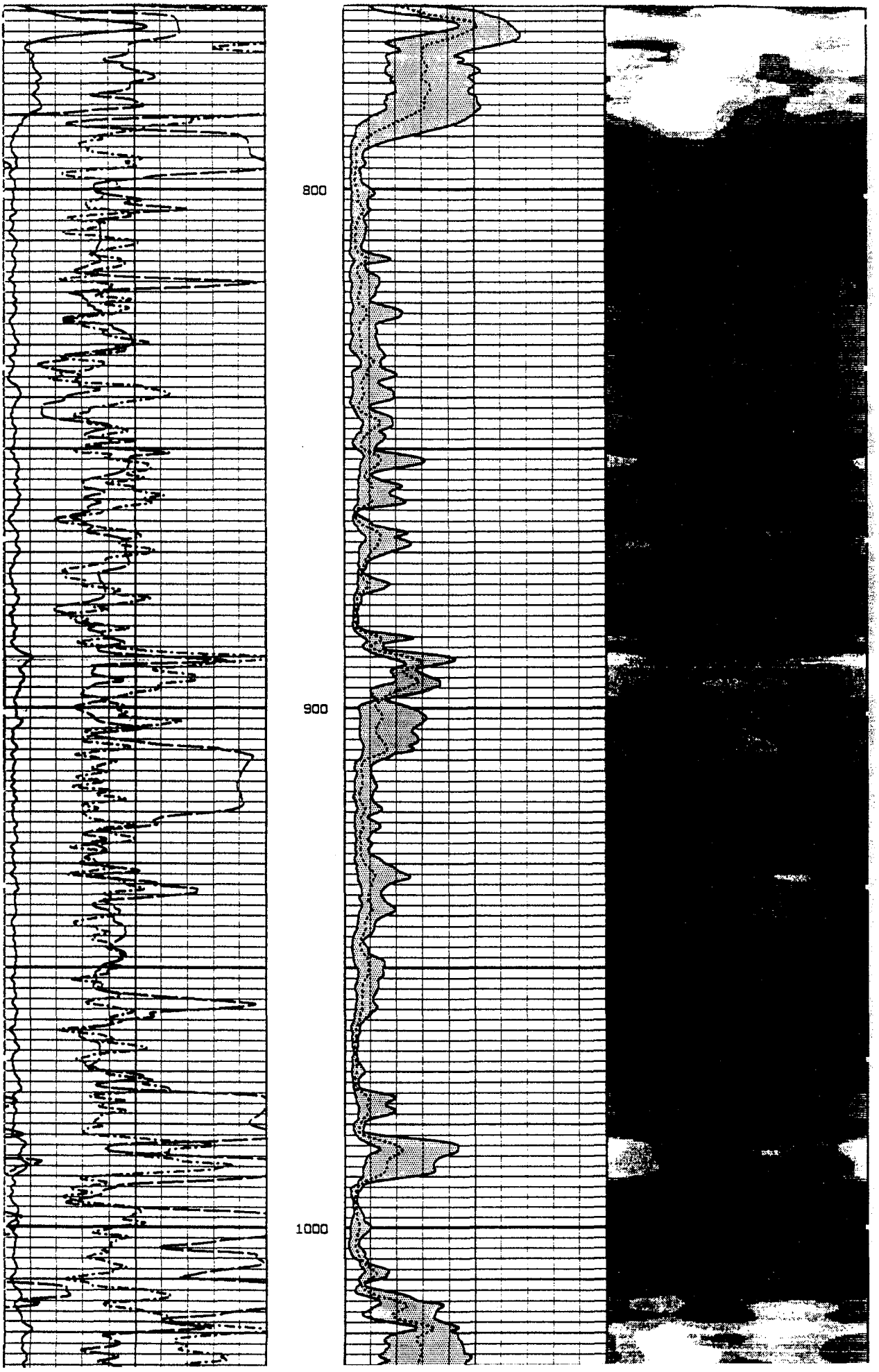
TRAVEL TIME 420.0 USEC 220.0

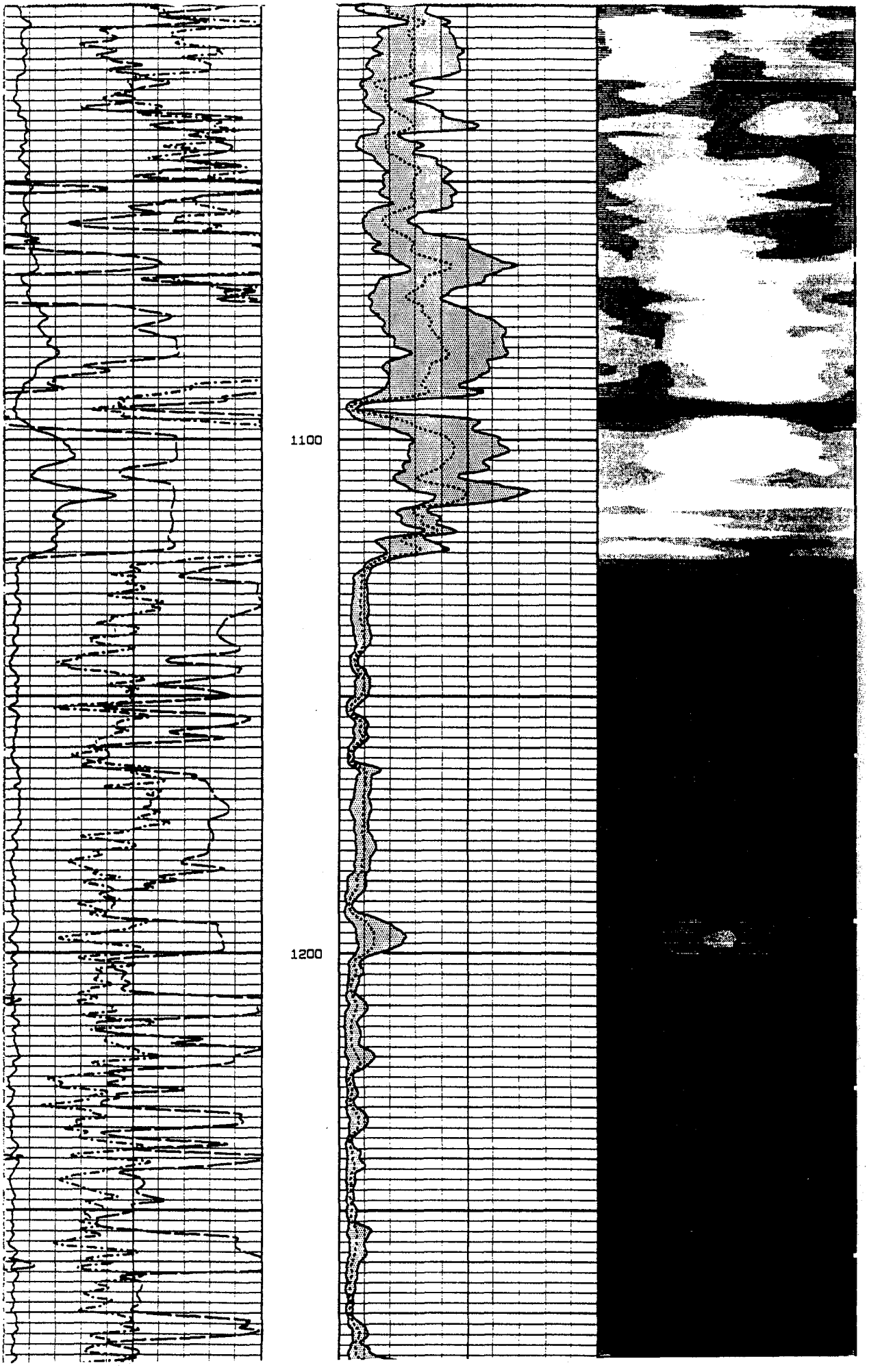
AMPLITUDE 0.0 MV 100.0

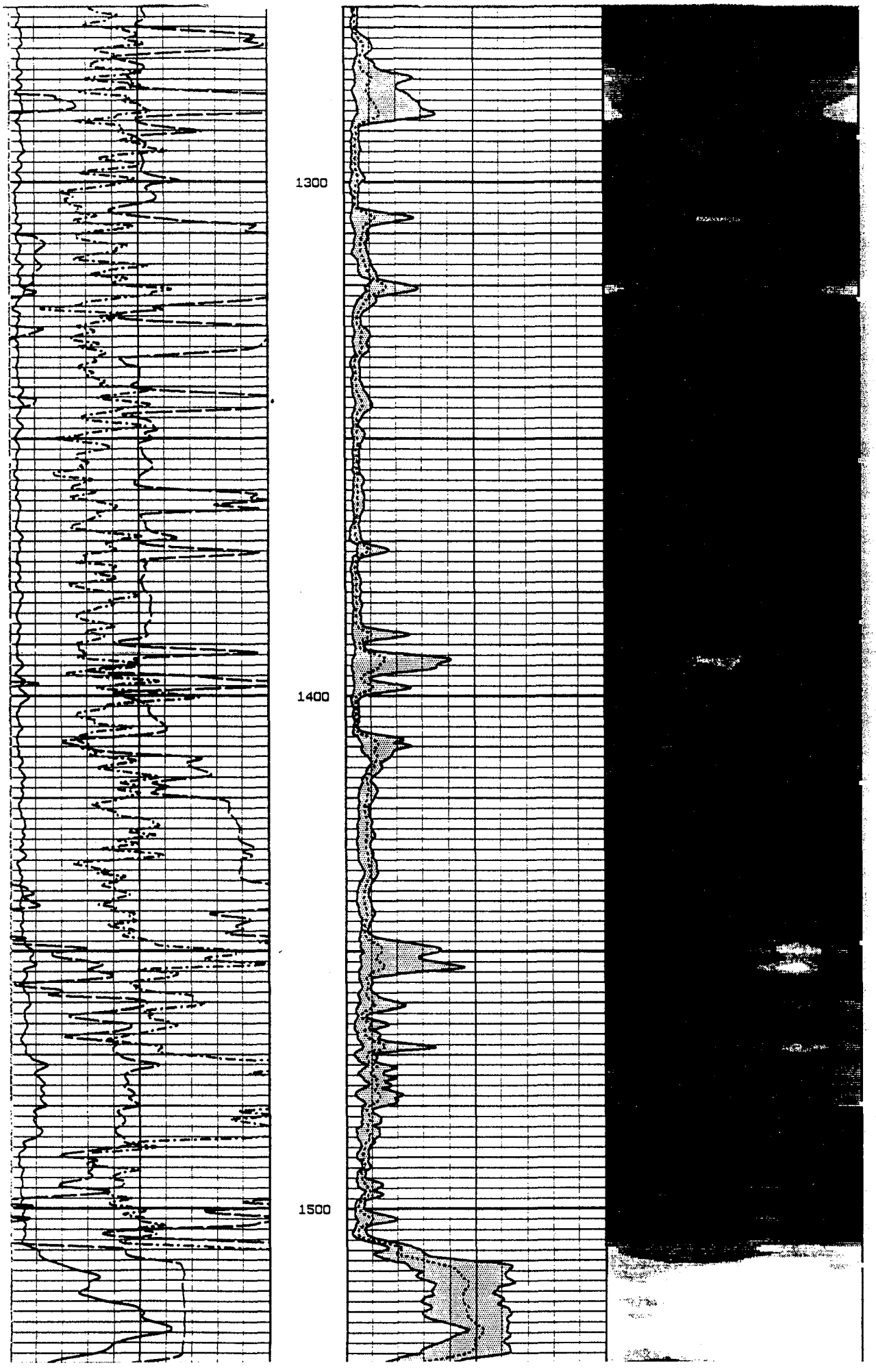

100
200

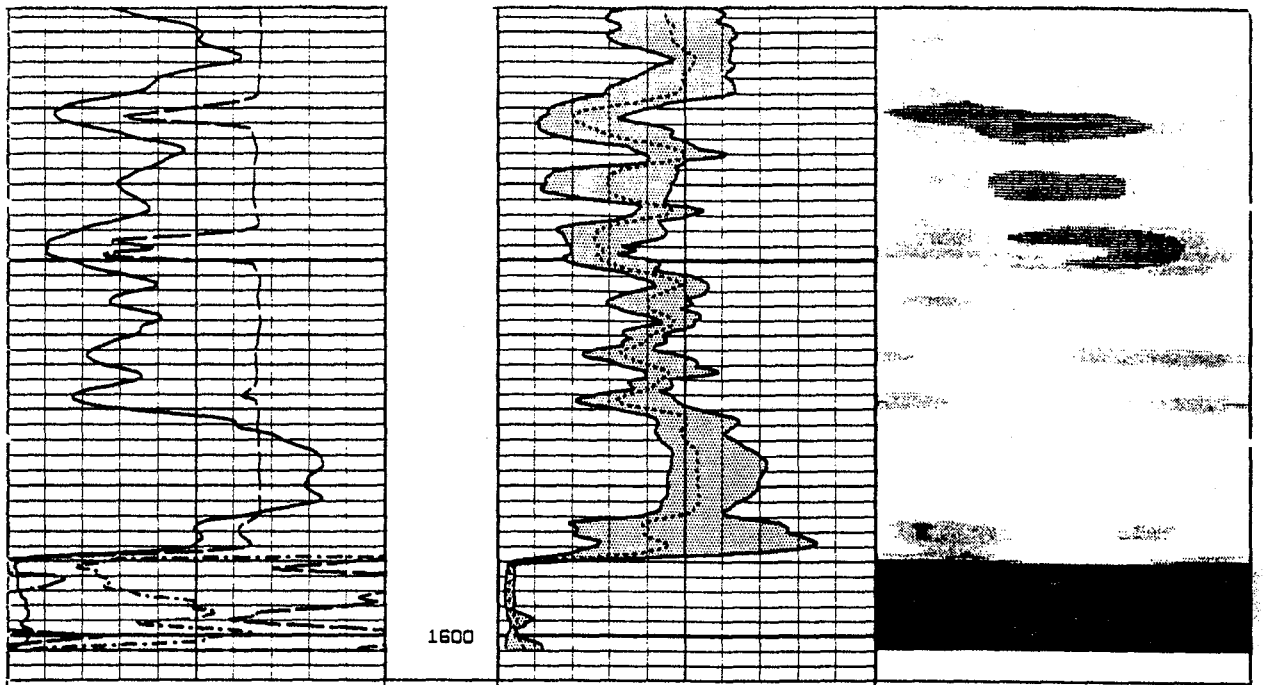

300
400
500


600
700


800
900
1000


1100
1200


1300
1400
1500



AMPLITUDE
0.0 MV 100.0

TRAVEL TIME
420.0 USEC 220.0

MC: AMPLITUDE
0.0 MV 10.0

MIN AMPLITUDE
0.0 MV 200.0

AVG AMPLITUDE
0.0 MV 200.0

MAX AMPLITUDE
0.0 MV 200.0

VARIABLE AMPLITUDE
0.0 MILLIVOLTS 90.0

AMPLITUDES

START DEPTH: **1606.0** FEET DIRECTION: **UP** DATE: **11/08/93** TIME: **12:02:44** MODE: **ORIGINAL**

KTSECTOR2

VERSION: 2.16

REMARKS

REPEAT SECTION

VERSION: 2.16

KTSECTOR1

FINISH DEPTH: **1339.7** FEET DIRECTION: **UP** DATE: **11/08/93** TIME: **11:59:12** MODE: **ORIGINAL**

AMPLITUDES

MC: AMPLITUDE
0.0 MV 10.0

TRAVEL TIME
420.0 USEC 220.0

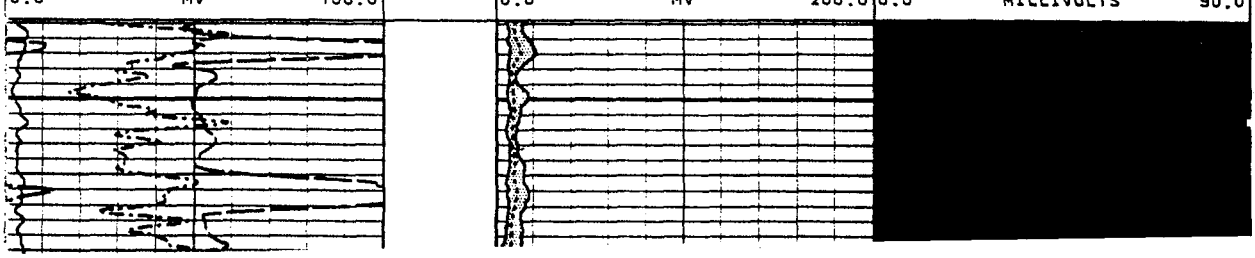
AMPLITUDE
0.0 MV 100.0

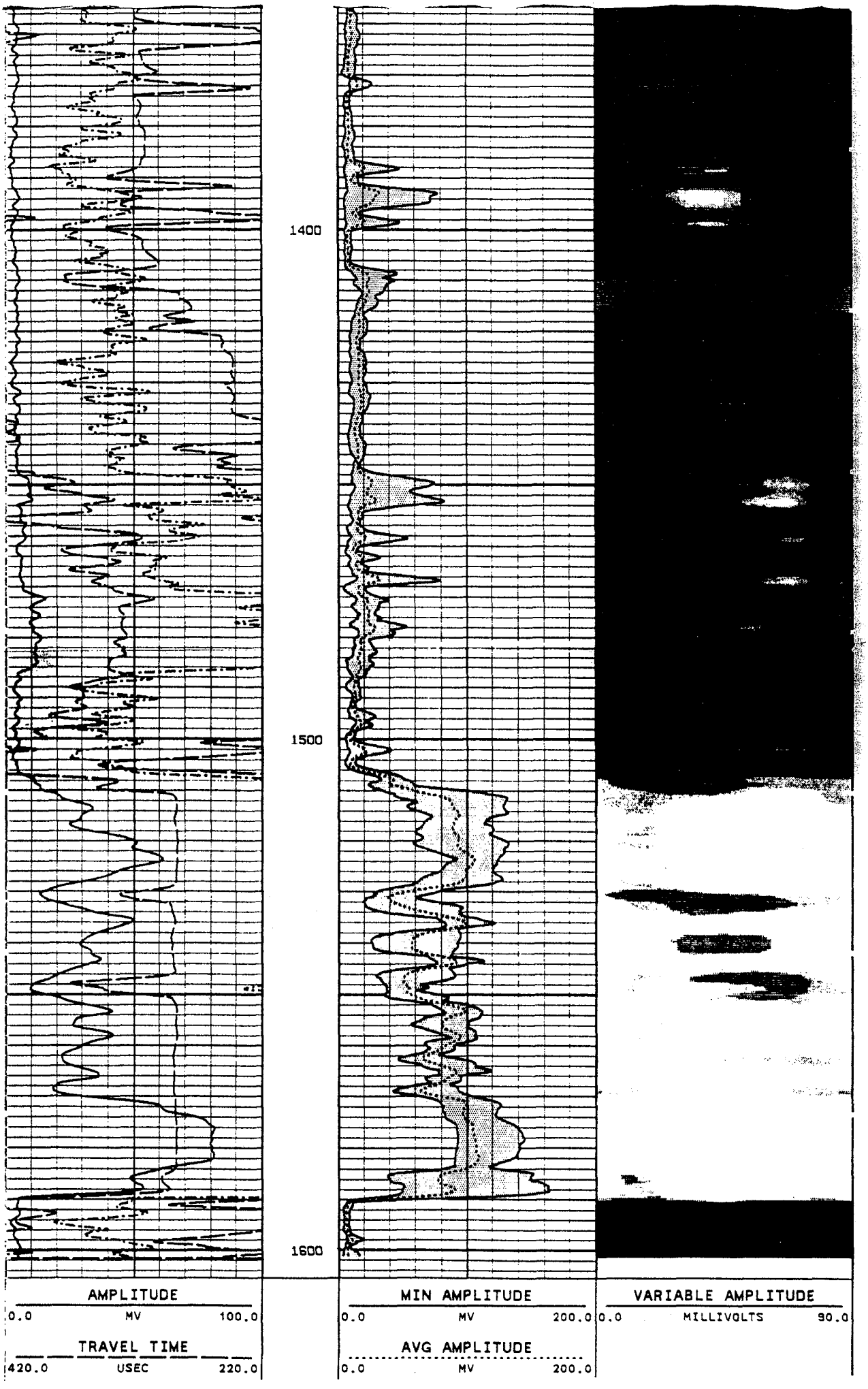
MAX AMPLITUDE
0.0 MV 200.0

AVG AMPLITUDE
0.0 MV 200.0

MIN AMPLITUDE
0.0 MV 200.0

VARIABLE AMPLITUDE
0.0 MILLIVOLTS 90.0




1400
1500
1600
AMPLITUDE
0.0 MV 100.0
TRAVEL TIME
420.0 USEC 220.0
MIN AMPLITUDE
0.0 MV 200.0
AVG AMPLITUDE
0.0 MV 200.0
VARIABLE AMPLITUDE
0.0 MILLIVOLTS 90.0

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFULL NEGLEGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES, OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO OUR GENERAL TERMS AND CONDITIONS SET OUT IN OUR CURRENT PRICE SCHEDULE.

VERSION: 2.16

KTSECTOR2

FINISH DEPTH: -7.2 FEET DIRECTION: UP DATE: 11/08/93 TIME: 12:52:47 MODE: ORIGINAL

AMPLITUDES

MC: AMPLITUDE
0.0 MV 10.0

TRAVEL TIME
420.0 USEC 220.0

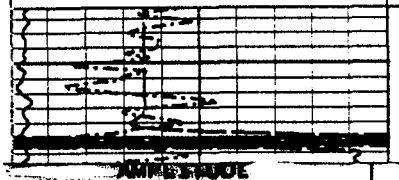
AMPLITUDE
0.0 MV 100.0

MAX AMPLITUDE
0.0 MV 200.0

AVG AMPLITUDE
0.0 MV 200.0

MIN AMPLITUDE
0.0 MV 200.0

VARIABLE AMPLITUDE
0.0 MILLIVOLTS 90.0



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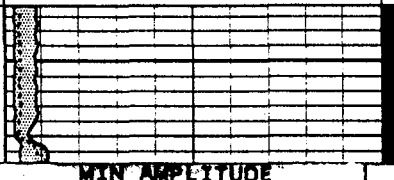
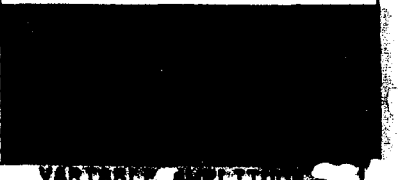




AMPLITUDE
0.0 MV 100.0

TRAVEL TIME
420.0 USEC 220.0

MC: AMPLITUDE
0.0 MV 10.0

MIN AMPLITUDE
0.0 MV 200.0

AVG AMPLITUDE
0.0 MV 200.0

MAX AMPLITUDE
0.0 MV 200.0

VARIABLE AMPLITUDE
0.0 MILLIVOLTS 90.0

AMPLITUDES

START DEPTH: 1605.7 FEET DIRECTION: UP DATE: 11/08/93 TIME: 11:50:14 MODE: ORIGINAL

KTSECTOR1

VERSION: 2.16

COMPANY YOUNGQUIST BROTHERS, INC.

KNIGHTS TRAIL

WELL DEEP WELL MODIFICATION

FIELD SARASOTA STATE FLORIDA

FLORIDA
GEOPHYSICAL LOGGING, INC.

SECTOR BOND LOG
RUN NUMBER 2

FILE NO. _____

COMPANY YOUNGQUIST BROTHERS INC.

WELL KNIGHTS TRAIL DEEP WELL MODIFICATION

FIELD KNIGHTS TRAIL PARK

COUNTY SARASOTA STATE FLORIDA

LOCATION
KNIGHTS TRAIL PARK

SEC. _____ TWP _____ RGE _____

OTHER SERVICES:
NONE

ELEV.: K.B. _____
D.F. _____
G.L. _____

PERMANENT DATUM PAD ELEV. _____
LOG MEASURED FROM PAD FT. ABOVE PERMANENT DATUM
DRILLING MEASURED FROM PAD

DATE	13-NOV-93
RUN NO.	TWO
TYPE LOG	SCBL
DEPTH-DRILLER	1590'
DEPTH-LOGGER	1583'
LOGGED INTERVAL	1576' TO SURF
OPERATING RIG TIME	3 HRS
TYPE FLUID IN HOLE	WATER
SALINITY, PPM CL	10,000 PPM
DENSITY-VISCOSITY	8.5 LBS
LEVEL	8'
MAX. REC. TEMP. DEG F.	102/FT. MYERS
EQUIPMENT-LOCATION	MILLER
RECORDED BY	FISHKIN/MOORE
WITNESSED BY	

BOREHOLE RECORD

RUN NO.	BIT	FROM	TO
LAST	7 7/8"	CSG	TD

CASING RECORD

SIZE	WGT.	FROM	TO
8 5/8"	35 LB?	SURF	1599'
		LOGGER=	1590'

ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS AND WE CANNOT AND DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION, AND WE SHALL NOT, EXCEPT IN THE CASE OF GROSS OR WILLFULL NEGLEGENCE ON OUR PART, BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COSTS, DAMAGES, OR EXPENSES INCURRED OR SUSTAINED BY ANYONE RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR OFFICERS, AGENTS OR EMPLOYEES. THESE INTERPRETATIONS ARE ALSO SUBJECT TO OUR GENERAL TERMS AND CONDITIONS SET OUT IN OUR CURRENT PRICE SCHEDULE.

```
** AT+ Edit Header **

1.  Cased Hole Header
2.  Disclaimer

Selection ? [ ]
```

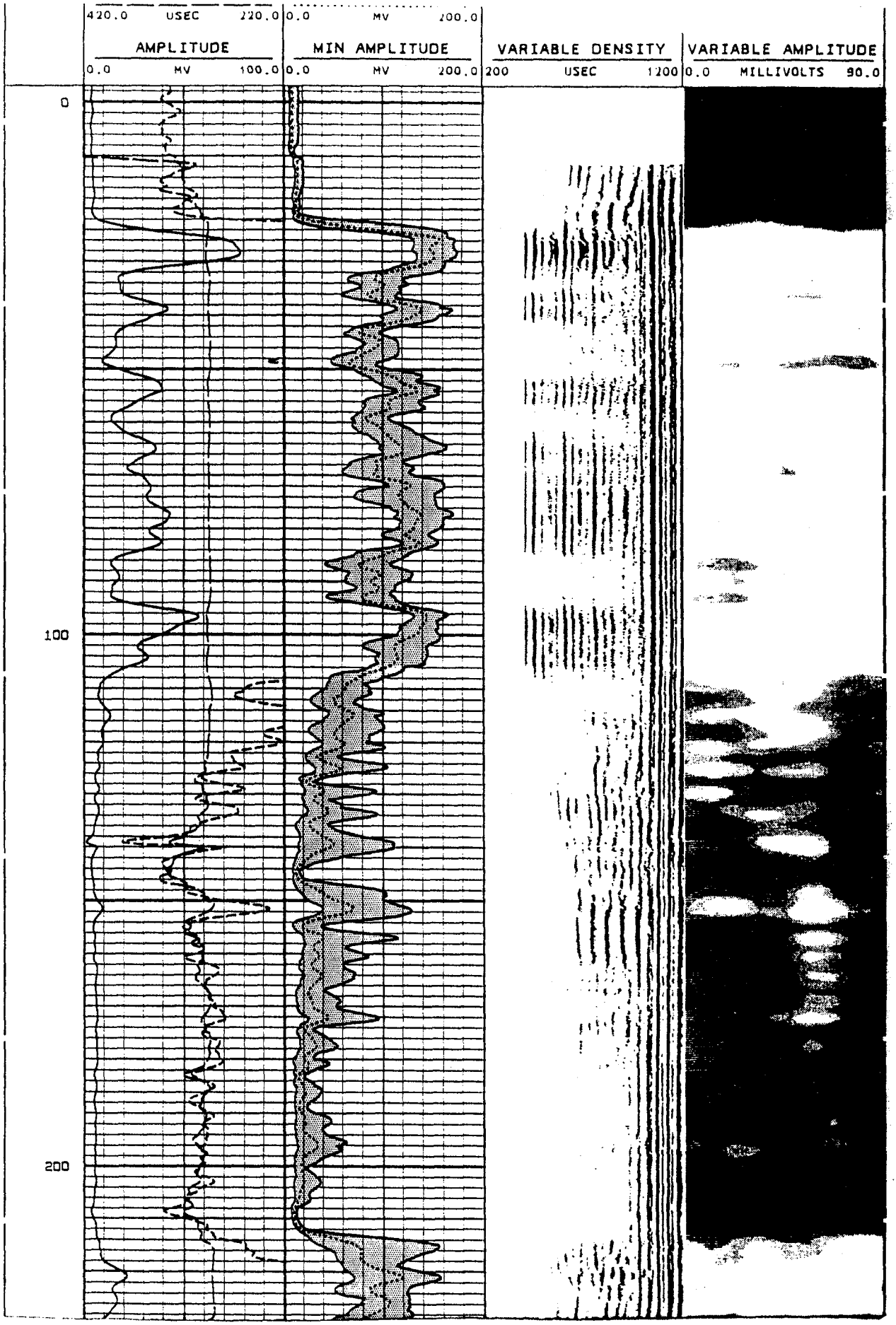
VERSION: 2.16

KTSECTOR2

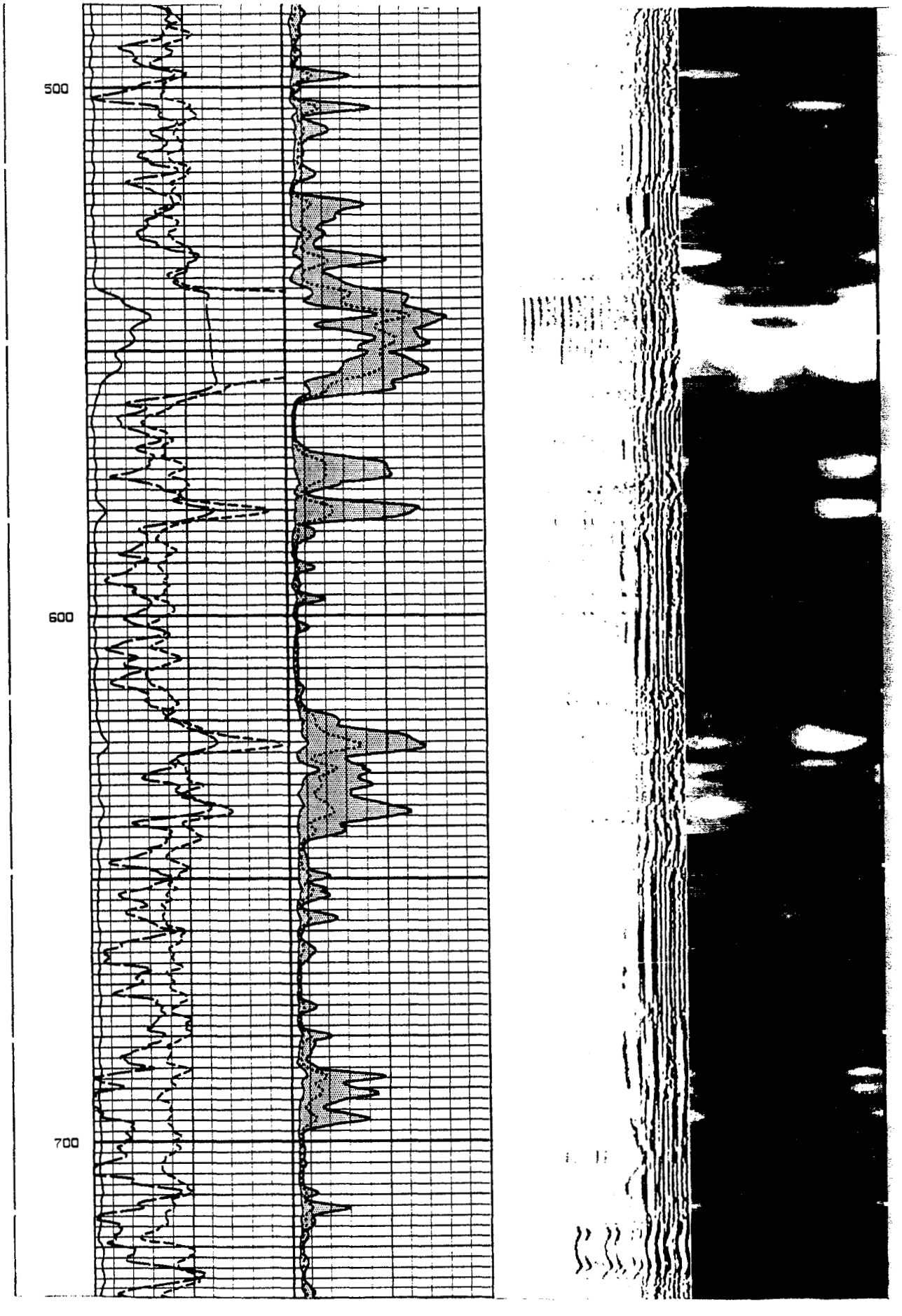
FINISH DEPTH: -2.8 FEET DIRECTION: UP DATE: 11/13/93 TIME: 17:54:26 MODE: ORIGINAL

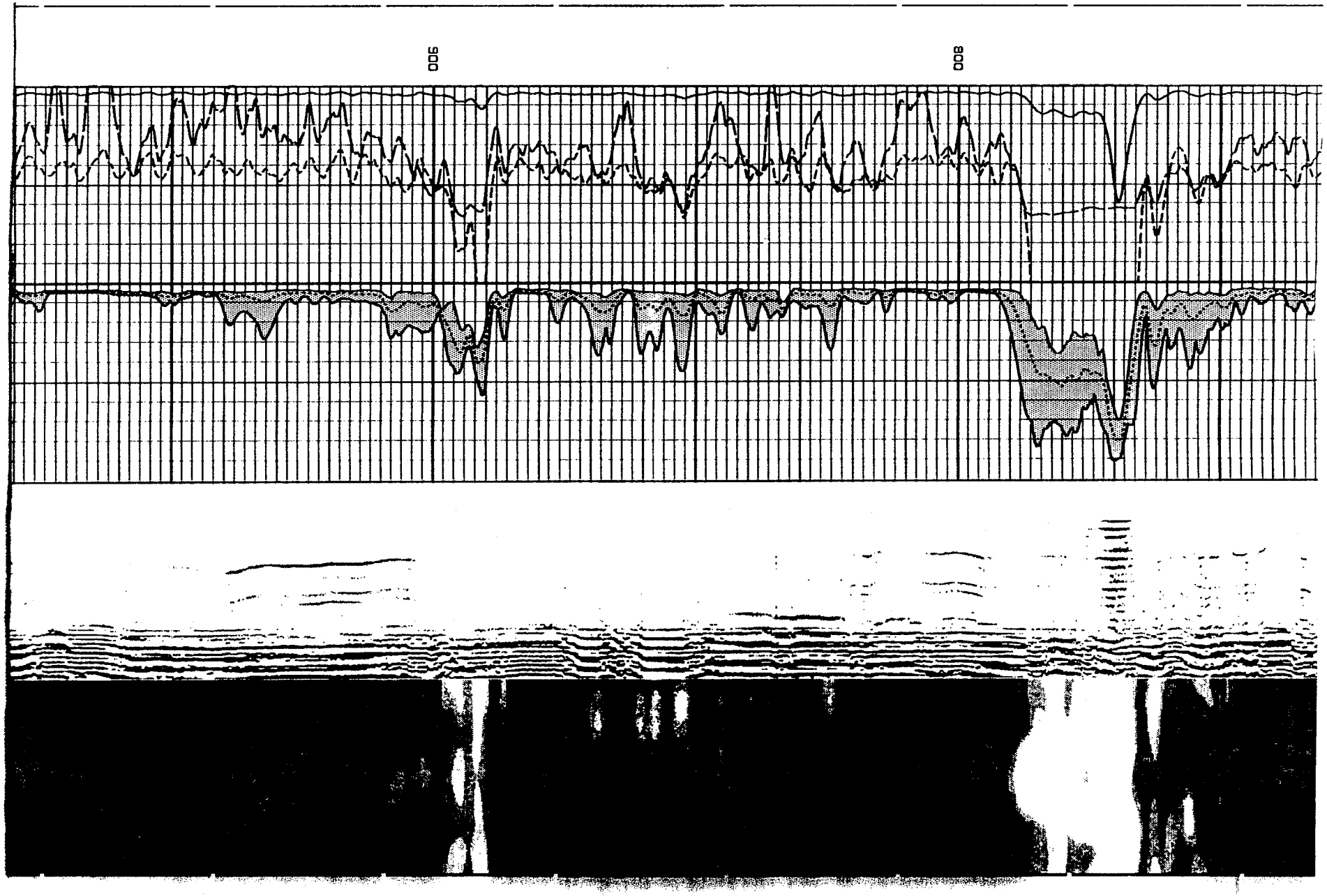
AMPLITUDES

MC: AMPLITUDE	MAX AMPLITUDE
0.0 MV 10.0	0.0 MV 200.0
TRAVEL TIME	AVG AMPLITUDE


420.0 USEC 220.0
AMPLITUDE
0.0 MV 100.0
0.0 MV 200.0
MIN AMPLITUDE
0.0 MV 200.0
VARIABLE DENSITY
200 USEC 1200
VARIABLE AMPLITUDE
0.0 MILLIVOLTS 90.0
0
100
200

300
400


500
600
700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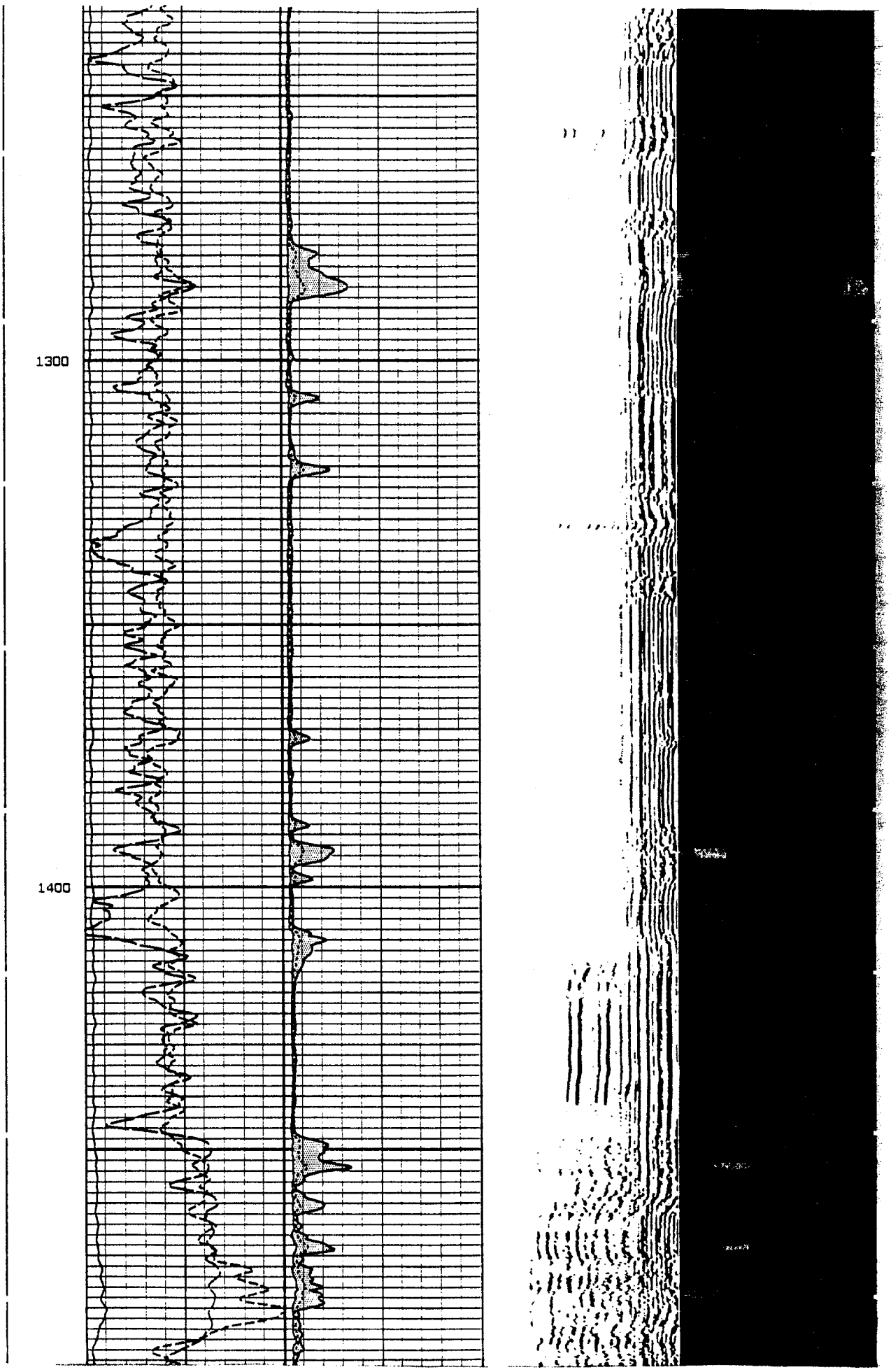
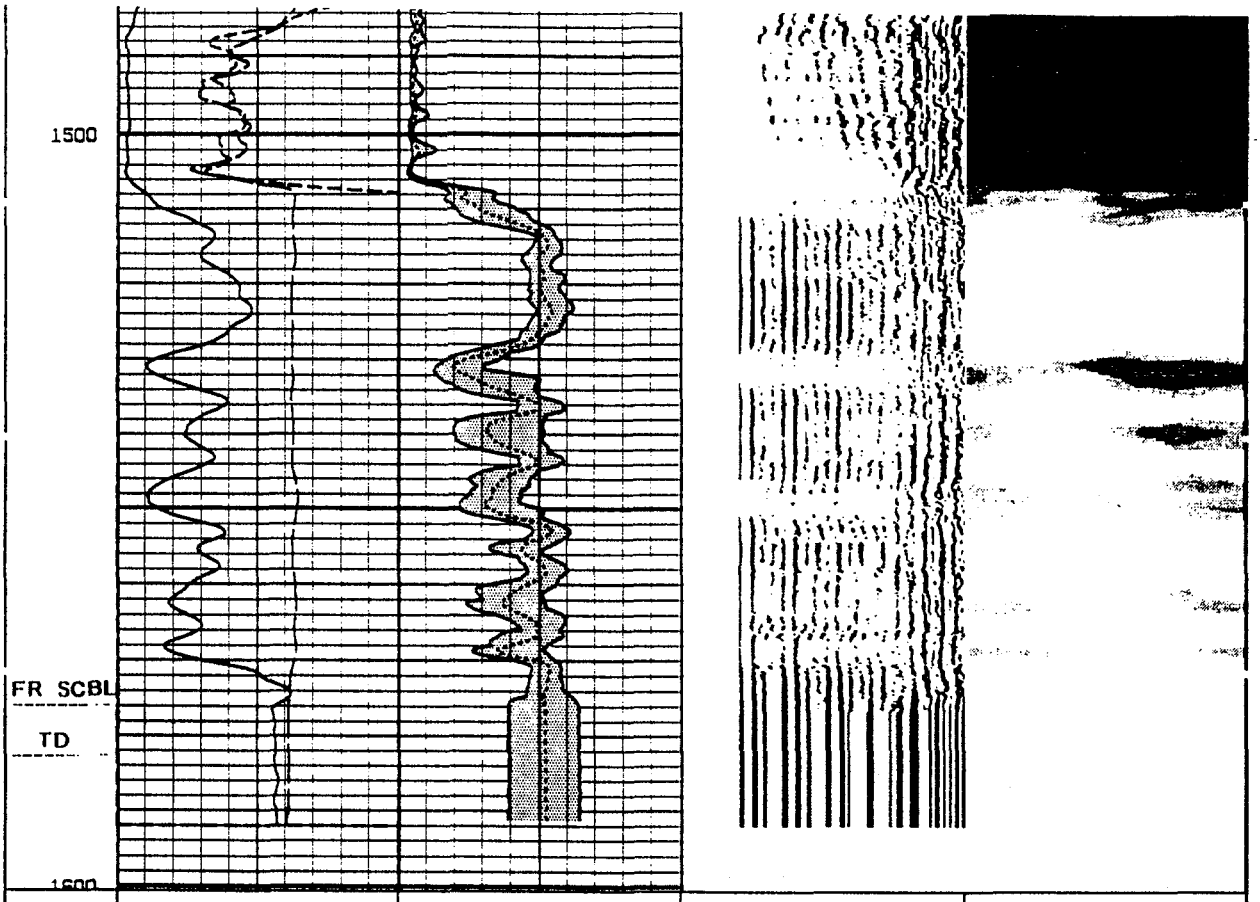
800

1000
1100
1200


1300
1400



AMPLITUDE	MIN AMPLITUDE	VARIABLE DENSITY	VARIABLE AMPLITUDE
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TRAVEL TIME	AVG AMPLITUDE		
420.0 USEC 220.0	0.0 MV 200.0		
MC: AMPLITUDE	MAX AMPLITUDE		
0.0 MV 10.0	0.0 MV 200.0		

AMPLITUDES

START DEPTH: 1600.6 FEET DIRECTION: UP DATE: 11/13/93 TIME: 17:04:28 MODE: ORIGINAL

KTSECTOR2

VERSION: 2.16

REMARKS

REPEAT SECTION

VERSION: 2.16

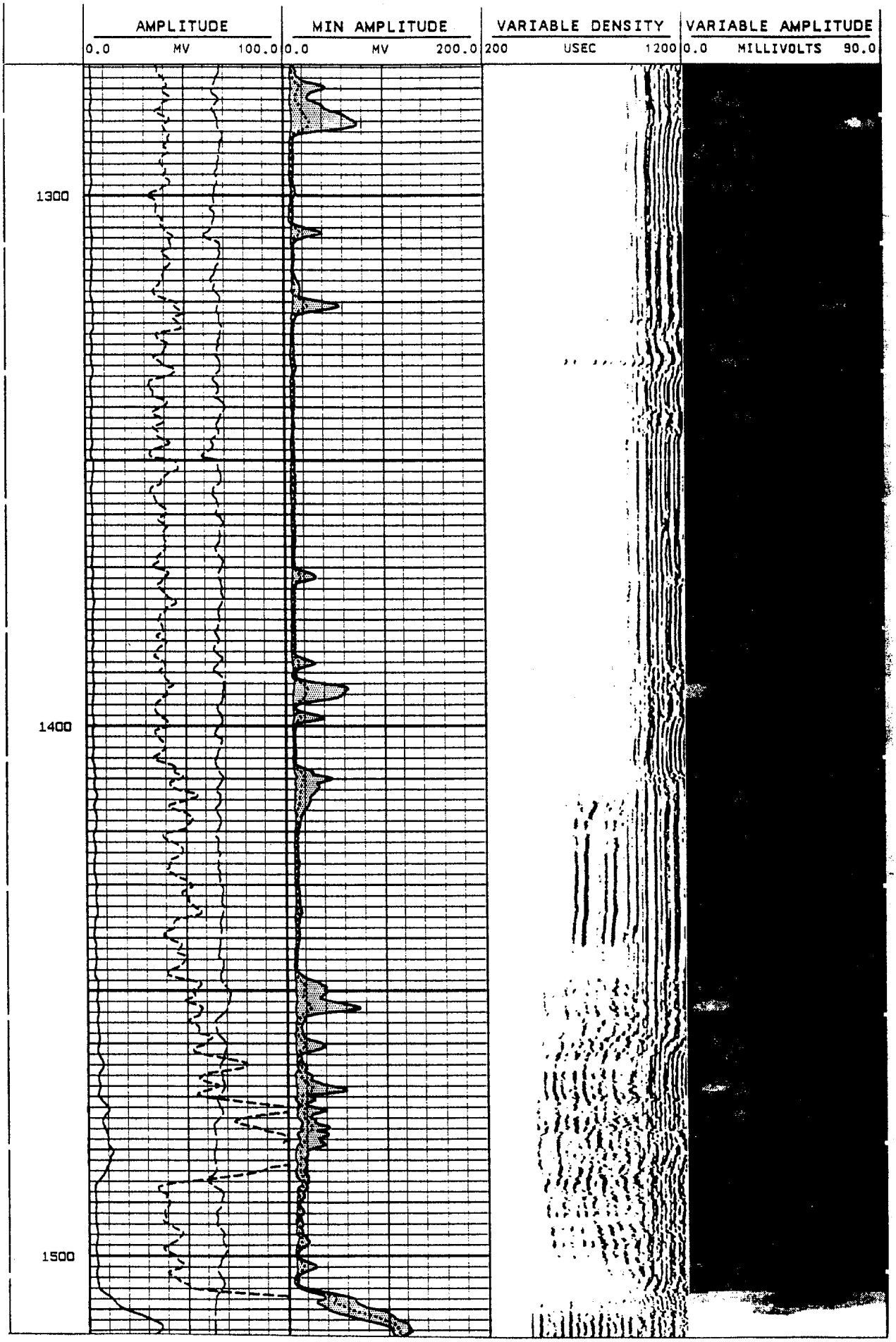
KTSECTOR1

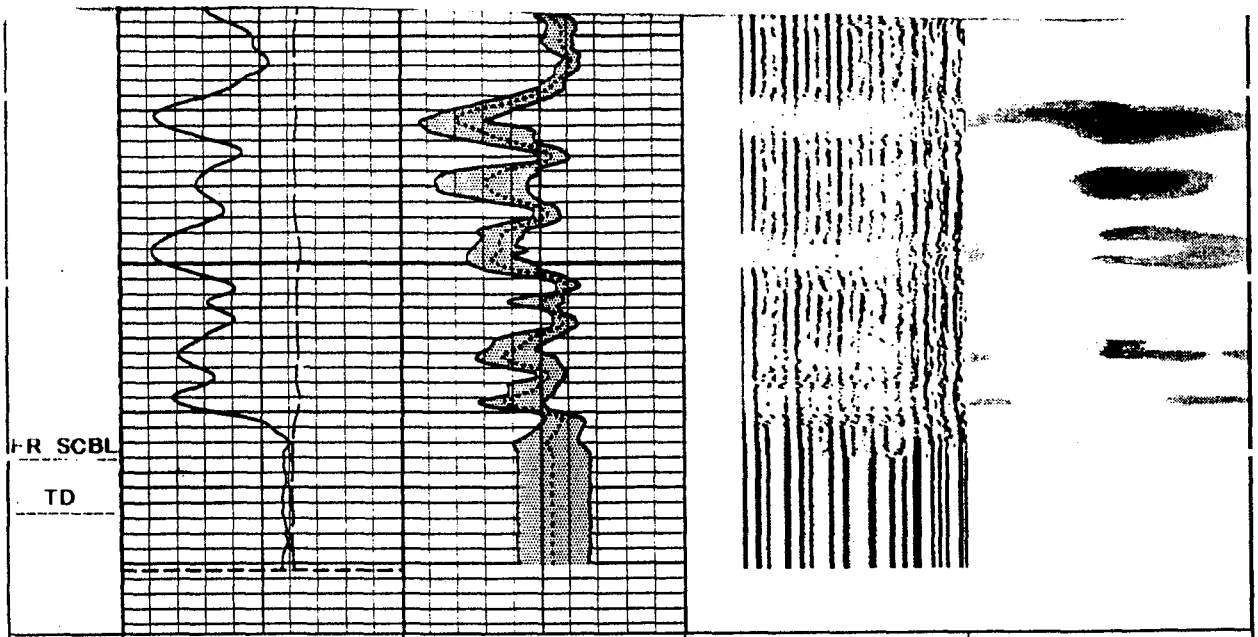
FINISH DEPTH: 1275.7 FEET DIRECTION: UP DATE: 11/13/93 TIME: 18:38:40 MODE: RECOMPUTE

AMPLITUDES

MC: AMPLITUDE	MAX AMPLITUDE
0.0 MV 10.0	0.0 MV 200.0
TRAVEL TIME	AVG AMPLITUDE
420.0 USEC 220.0	0.0 MV 200.0

TRAVEL TIME | AVG AMPLITUDE


AMPLITUDE
0.0 MV 100.0
MIN AMPLITUDE
0.0 MV 200.0
VARIABLE DENSITY
200 USEC 1200
VARIABLE AMPLITUDE
0.0 MILLIVOLTS 90.0
1300
1400
1500



AMPLITUDE	MIN AMPLITUDE	VARIABLE DENSITY	VARIABLE AMPLITUDE
0.0 MV 100.0	0.0 MV 200.0	200 USEC 1200	0.0 MILLIVOLTS 90.0
TRAVEL TIME	AVG AMPLITUDE		
420.0 USEC 220.0	0.0 MV 200.0		
MC: AMPLITUDE	MAX AMPLITUDE		
0.0 MV 10.0	0.0 MV 200.0		

AMPLITUDES

START DEPTH: 1599.7 FEET DIRECTION: UP DATE: 11/13/93 TIME: 15:22:46 MODE: RECOMPUTE

KTSECTOR1

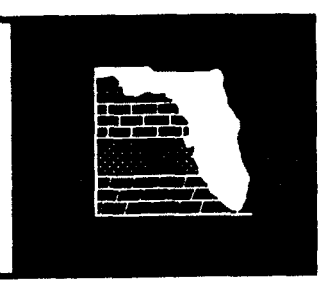
VERSION: 2.15

COMPANY YOUNGQUIST BROTHERS, INC.

KNIGHTS TRAIL

WELL DEEP WELL MODIFICATION

FIELD KNIGHTS TRAIL STATE FLORIDA



APPENDIX E

CERTIFICATE OF COMPLETION

CERTIFICATE OF COMPLETION
PART B.6 EXPLORATORY/MONITOR WELL MODIFICATION

PROJECT Deep Well Modifications at Knight's Trail Park

DATE OF ISSUANCE December 14, 1993

OWNER Sarasota County Board of County Commissioners

OWNER's Contract No. 3106R

CONTRACTOR Youngquist Brothers, Inc. ENGINEER Law Environmental, Inc.

This Certificate of Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

Technical Specifications

Part B - Well Modification Construction

Section 6.1 thru 6.12, Exploratory/Monitor Well Modification except for the 4 by 2 inch PVC tee and 2 inch ball valve.

TO Sarasota County Board of County Commissioners
OWNER

And To Youngquist Brothers, Inc.
CONTRACTOR

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on, except for the installation of the permanent wellhead assembly item B6.12, on December 14, 1993.

From the date of Completion the responsibilities between OWNER and CONTRACTOR, shall be as follows:

RESPONSIBILITIES:

OWNER: As specified in the Contract Bid No. 3106R

CONTRACTOR: The contractor will install the permanent wellhead assembly (item B6.12) as soon as practical after receipt of assembly from manufacturer, but no later than 5 working days from the issuance of this certificate. As specified in the Contract Bid No. 3106R, project close out shall proceed as specified under Part B Section A.13. Requirements for Substantial Completion and Final Acceptance for the entire project are included in Section A.13.

This certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER on December 1, 1993

LAW Environmental, Inc.
ENGINEER

By: _____
(Authorized Signature)

CONTRACTOR accepts this Certificate of Completion on DECEMBER 14 1993

YOUNGQUIST BROTHERS, INC.
CONTRACTOR

By: DON W. DOUGLAS
(Authorized Signature)

OWNER accepts this Certificate of Completion on 12/14, 1993

SARASOTA COUNTY
OWNER

By: _____
(Authorized Signature)

APPENDIX F

DAILY REPORTS

Field Notes
Youngquist Brothers, Inc.

DATE: 11-1-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 10:00 Mobilized the drill rig to the site. Set up the rig and ran tubing pipe.

DATE: 11-2-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 10:00 Brought the tubing trailer and welder on site.
12:00 Tripping 1.5" tubing in 8" I.W.
16:00 Tagged the well bottom at 1910' below the TOC
16:30 Pulled out 1 joint and rigged up to pump.
17:30 At 1884' below TOC.

DATE: 11-3-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 07:00 Lined up the job site. Cleared the fence line.

DATE: 11-4-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: Backfilled 8" borehole by pumping a total of 25 bbl (or 117 square yards) of cement.
07:00 Rigged up FCI to pump the cement.
09:20 Began pumping the neat cement.
09:48 Finished pumping 17 bbl of neat cement. Flushed with 4.2 bbl of fresh water.
10:00 Pulled up 5 joints of tubing and reflushed.
14:55 Tagged the cement at 1739' below TOC.
15:23 Pumped 8 bbl of neat cement.
15:30 Flushed and pulled up 4 joints.

DATE: 11-5-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: Backfilled 8" borehole by pumping a total of 35 bbl (or 164 square yards) of cement.
07:20 Tagged the cement at 1709' below TOC.
08:00 Rigged up to pump at 1699' below TOC.
08:45 Rigged up the stripping head in case of over fill.
09:20 Pumped 15 bbl of neat cement.
14:00 Tagged the cement at 1705' below TOC.
14:15 Rigged up to pump at 1699' below TOC.
14:40 Pumped 20 bbl of neat cement.
15:00 Pulled up the tubing and flushed. Cleaned up the site.

DATE: 11-6-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: Backfilled 8" borehole by pumping a total of 15 bbl (or 70 square yards) of cement.
08:05 Tagged cement at 1680' below TOC. Rigged up to pump.
09:15 Pumped 15 bbl of neat cement.
13:30 Pulled out all of the tubing. Ready for the Sector Bond Log (SBL).

DATE: 11-8-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: Ran the SBL.

DATE: 11-10-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: Unloaded the new 4" pvc pipe with the 8" bells.

DATE: 11-12-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY 08:30 On site and rigged up the stripping head in preparation to pressure grout.
13:35 Pressure grouted 20 bbl (or 94 square yards) into the 8" borehole.
16:50 Pulled out the 1.5" tubing.

DATE: 11-13-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 13:20 Rigging up the logger in preparation for the SBL.
13:30 Tripping in the SBL.

DATE: 11-17-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: Picked up the little pump truck.
Tripped in the tubing and rigged it up to pump cement.
Tagged the cement at 1584' below TOC.

DATE: 11-18-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 07:35 Began to pump the cement.
07:47 Pumped 75 square yards of neat cement.
14:00 Tagged the cement at 1350' below TOC.
14:35 Back flushed at 1130' below TOC.

DATE: 11-22-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 08:18 Steve Miller from Florida Geophysical is unable to schedule the casing perforation.
08:20 Notified Law Environmental of the reschedule at 12:00 to 13:00 on 11-23-93.

DATE: 11-23-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 12:15 On site with Florida Geophysical.
13:45 Rigged up to perforate the casing.
14:30 Tripped the perforation tool down the hole.
14:44 Began to trip the tool out of the hole after a misfire. Perforated the casing from 1123 to 1113' TOC.
16:30 Tripped in 150' of the air-line and began to air develop the well.
18:30 Well produced approximately 1 gpm of surface discharge. Pulled out the tubing.

DATE: 11-24-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 08:00 On site and opened the well. The static water level was 4.5' below TOC. Well perforation continued from 1112 to 1107' and 1107 to 1102' below TOC.
18:30 Perforation continued from 1101 to 1096' below TOC.

DATE: 11-26-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: Rigged up sump pump at 150' below TOC.
11:00 Pumped 20 gpm. Took the water truck to the CC job.

DATE: 11-29-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 07:00 On site and rigged up to run the camera.
09:50 SWFWMD ran the camera down hole.
13:00 The camera survey was completed. Talked with Len and SWFWMD representative (Dave). Talked about bigger casing for the top 200' of the well or more perforations to get more water. Dave indicated that he talked with Ed Copeland and made recommendations.

DATE: 12-2-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 15:00 Reperforated the 8" casing from 1118 to 1108' below TOC.
16:00 Installed the sump pump at 114' below TOC. Pumped 20 gpm.

DATE: 12-3-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: Installed the 4" casing to 1090' below TOC.
07:30 Pumped 0.5 bbl of neat cement.
11:30 Pumped 1 bbl of neat cement.

DATE: 12-4-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 07:30 Pumped 15.5 bbl of 8%.
15:15 Pumped 15.5 bbl of 8%.

DATE: 12-5-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: 06:30 Pumped 12 bbl of 8% to the surface.

TOTAL 44.5 bbl = 138 square yards
400 lbs of gel

DATE: 12-7-93

PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: Ran the pressure test at 50 psi with 0 loss.
Clean up the site and rig down.

DATE: 12-11-93

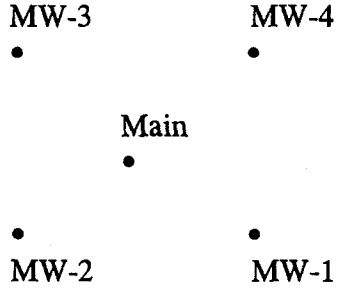
PROJECT: Deep Well Modifications at Knight Trail Park

ACTIVITY: Clean up the job site.

FIELD NOTES
LAW ENVIRONMENTAL, INC.

DATE: 10-20-93

ACTIVITY: 10:10 Dennis Dupont was on site. The fence line was cut.
Photograph #1 - Front end loader.
Photo #2 - Looking NW-SE at loader forks.
Photo #3 - Looking main well facing NW and MW-3.
Photo #4 - Looking SW at MW-2.
Photo #5 - Looking NE at MW-4.
Photo #6 - Looking north toward the main well.
Photo #7 - Looking north from the road.
Photo #8 - Looking NW from the road.
Photo #9 - Looking NE from the road.
Photo #10 - Looking east from the road and the SW corner near the existing supply well.
Photo #11 - Irrigation system.
Photo #12 - Looking east from the western property line.
Photo #13 - Looking west from the eastern property line.
Photo #14 - Looking south from the northern property line.
Photo #15 - Close-up of MW-4; if access to the monitor well is needed then the locks will need to be cut. Access is easy - good. The well is off Rustic Road at the end of Knight Trail.



11:20 Off of the site.

DATE: 10-28-93

ACTIVITY: 08:00 Dennis Dupont was on site with Dave DeWitt from the Southwest Florida Water Management District (SWFWMD) and Laura Sacks from the USGS.
08:18 The well was opened. Photos were taken.
DTW = 16.95' below TOC.
09:05 The first was tripped out of the hole. The sample was obtained in the sampler at 1650' below TOC was tripped out of the hole.
09:28 Sample #1
Temperature = 25.1°C
Conductivity = 43,300
pH = 6.77
Down 18 minutes; 35 seconds
10:20 Sample #2
The bailer holds 2 liters.
Temperature = 25.7°C
Conductivity = 43,100
pH = 7.81
11:17 Sample #3
Temperature = 25.7°C
Conductivity = 42,300 The cond. corr. was 1.15.
pH = 7.6
11:40 (Held) 24.00 - (Wet) 6.98 = (DTW) 17.02' below TOC.
11:50 End of the sampling. Jeff Luetjen from Sarasota County was on site.
12:00 Dennis Dupont was off of the site.

DATE: 11-2-93

WEATHER: Beautiful, cool, clear day in the 70's with very low humidity.

ACTIVITY: 09:20 Len Fishkin was on site with Jeff Luetjen from the Sarasota County Government Water Improvement Program. Youngquist Brothers, Inc. Well Drilling personnel (Troy Moore and Wayne Dorring) were tripping tremie pipe down hole.
13:35 Break for a quick lunch.
13:55 The guys were back on site. The fence posts were already in the ground with no additional fence construction.
14:00 Len Fishkin was off of the site to Tampa Law.

DATE: 11-4-93

WEATHER: Cool, clear day with very low humidity.

ACTIVITY: 08:50 Len Fishkin was on site with Youngquist Brothers, Inc. and Florida Cement, Inc. (John Gero and Arturo Torres). Troy Moore tagged the well at 1910' below TOC. They planned on theoretically pumping 250' downhole or 80 bags.

09:00 John began the cement preparation.

09:16 Arturo checked the cement mix with a single beam mud scale. The cement was 15.9 lbs/gallon. Routine or normal for neat cement is 15.6 lbs/gallon.

09:20 Began pumping the cement. Troy was continually raising and lowering the tremie (approx. 3') during the pressure grouting process.

09:24 Stopped pumping the cement. Removed 2 lengths of tremie pipe.

09:26 Began pumping the cement again.
Photograph #1. Viewing north to the site from the road. Pictured were the rig, cement pump, and support vehicles.

09:32 Stopped pumping a total of 17 barrels of cement.
Removed 2 lengths of tremie pipe. The hose was connected.
The cement tested out at 15.7 lbs/gallon.

09:35 Began pumping water very slowly to flush it out.

09:36 Stopped the water flushing. Disconnected the hose and removed 6 lengths of tremie pipe. Reconnected the hose and cleaned up the removed pipe. Tentatively planned on pumping at 15:00.

10:30 Jeff Luetjen was on site and we briefed him on the morning's activities.

11:00 Len Fishkin was off site to the Sarasota County Government Water Improvement Program office to deliver the conformed specifications and return the reports that Law borrowed.
Fishkin visited Millard Yoder at the Smally, Wellford & Nalven, Inc. office to drop off the conformed version of the specifications and also to inform him of the fence posts.

14:50 Fishkin was back on site.
The cement was tagged at 1739' below TOC.
A sample of the neat cement was saved in a large styrofoam cup.

15:10 The fence crew arrived on site. The company logo on the truck read "USA Steel Fence Co./Approved Roofing 756-8727/366-6247".
Began to pump cement and Troy continued the process of the lowering and raising the tremie pipe.

15:16 Pumped a total of 8 additional barrels of cement.
Stopped the pump and disconnected the hose. Removed 5 lengths of tremie from down hole.
Cleaned out the inside of the pipe which was just removed from the well.
Arturo weighed the cement with the single beam mud scale which resulted in 15.8

lbs/gallon.
There was a total of 25 barrels of cement that was pressure grouted today.
16:00 Off site today to permit the cement to cure.

DATE: 11-5-93

WEATHER: Another beautiful day; cool, clear with very low humidity.

ACTIVITY: 07:50 Fishkin was on site with Youngquist Brothers, Inc. and Florida Cement, Inc. The cement was tagged at 1709' below TOC.
To avoid pumping cement all day, the cement was pumped via reverse circulation. The cement that came in the casing was backfilled out.
A neighbor from approximately 1/4 mile west of this site stopped by the site. He indicated that he has an 1100' well for consumptive use. The surface water discharge has a sulfur odor, however, it is drinkable. The discharge has recently lowered and this could be possibly due to the new orange grove development which is owned by Hodgekist.
Photo #2. This picture was taken looking west of Troy and Wayne connecting flanges, gaskets, etc. in preparation for the reverse circulation of the cement.
08:59 Began pumping the cement.
Photo #3. Looking west at the Florida Cement, Inc. equipment.
As the reverse circulation continued, Troy frequently raised and lowered the pipe.
09:12 Stopped pumping and disconnected the hose.
Removed 4 lengths of tremie pipe and reconnected the hose.
09:17 Began flushing with fresh water.
09:20 Finished flushing with fresh water.
A total of 15 barrels of cement was pumped.
10:00 Off site.
13:00 On site with Law personnel (George Ellsworth and Eric Kramer). George inspected the well and snapped some photos.
Troy, John, et al. were at lunch off site.
13:20 George and Eric left the site.
13:30 Troy and Wayne were on site. They started up the rig and tripped pipe back downhole.
13:43 The fence crew was on site.
13:45 The cement crew arrived on site.
13:48 The cement was tagged and there was 0 buildup of cement (since the last grout). The last 15 barrels could have filled the voids and pores which would make the next cement batch effective.
According to a review of the 1989 Law Report, a caliper log was run.
14:12 John mixed another cement batch with a very small quantity of cypress chips. The

chips were light (low density) and flowed readily with the cement. Chips can be effective in filling in small voids, however, they will be rendered virtually ineffective in large cavities. Cypress shavings was a more accurate description of the material that was used. The shavings were much smaller than commercial chips.

14:13 Began pumping 20 barrels of cement.
14:36 Stopped pumping and disconnected the hose. Removed 3 lengths of tremie pipe and reconnected the hose.
14:39 Flushed the system with water.
14:41 Finished flushing with fresh water. The cement weighed 16.5 lbs/gallon. John indicated that the neat cement was so sticky that it was very difficult to pump (at first). A daily total of 35 barrels of cement was pumped. The cement was tagged at 1705' below TOC.

DATE: 11-6-93

ACTIVITY: 08:00 Youngquist Bros. and Florida Cement crews were on site. Fifteen barrels of cement were pumped. The tubing was flushed out with fresh water and there was a small return. The cement was tagged at 1680' below TOC.

DATE: 11-8-93

ACTIVITY: 04:58 Fishkin left Broward Co., FL. for the site.
08:20 Fishkin was on site with George Ellsworth and the Florida Geophysical crew (Steve Miller and Bill Van Osdol).
09:00 FDEP personnel (Joe Haverfeld and Frank Shelfer) were on site. They arrived from Tallahassee last night.
09:30 The wireline cable was tripped out of the hole.
The instrumentation was being calibrated.
09:45 Moe Bowman from the USGS WRD was on site. Moe is a hydrologic technician and he currently works for Lynn Barr (Tampa USGS). He sought information on shallow wells in the area. The USGS is conducting research in the area for wells above the intermediate and below the surficial. Moe was interested in wells approximately 60' deep.
10:30 Steve indicated that the VDL (variable density log) portion of the cement log was not running. It would have required 3+ hours to obtain a replacement card from Ft. Myers and install it. Joe did not mind if the VDL was run (because a VDL was run 4 years ago). Also, the VDL was an extra feature this time and we were primarily concerned with the cement log. George agreed with Joe's decision.

Moe measured the supply well in the NW corner. The water level was approximately 0.5' below TOC. He was not interested in the well because of its depth (he measured to 140' and stopped). The 3 other wells on site were all approximately 20' deep.

11:20 The fence crew was on site.

11:55 The sector bond log (SBL)was run. The bottom of the SBL tool was at 1604' plus there was a 4' centralizer on the bottom of the tool. The tool was at 1608' below TOC. We requested a repeat of the bottom-most portion of the well.

12:15 The repeat log resembled the first one. (The wireline cable must have torqued the same way in the same place).

13:00 Finished running the log. Steve ran copies for FDEP and Law.

14:00 Everyone broke for lunch off site. We discussed the SBL results during lunch with Steve Miller.

15:40 Fishkin delivered a copy of the SBL to Joe Brown at the Sarasota County Government office. He briefed Joe on the project status.

Law personnel remained in communication with Youngquist Bros. throughout the week. The cement was planned for mid to late morning on 11-12-93.

DATE: 11-12-93

WEATHER: Clear, sunny, cool to warm (70's), and slightly breezy.

ACTIVITY: 10:00 Fishkin was on site with Troy and James. Troy called the Tampa Law office at 9 this morning to inform George that the pour was put back until 13:00.

11:30 Arturo was on site with the cement truck. John was still on the road from their Miami project.

12:40 John Gero was on site. Troy was already rigged up and the hoses were connected. We were shooting for 100 bags or 20.8 barrels.

13:00 Began pumping the neat cement down hole.

A double flange set-up was bolted down at the well head. The well was filled with water which forced the cement out the bottom of the well and up the annulus. The average pressure was 40-50 psi during the cement pumping. Occasionally, the pressure "walked up" a little higher. Troy indicated that the pressure requirements should not exceed 81 psi. (The pipe flanges would have to be welded if the pressures exceeded 250 psi).

13:11 Stopped pumping the cement. Began flushing 40 barrels of fresh water with pressures approaching 100 psi. Prior to pumping, Arturo tested the neat cement and it was 15.6 lbs/gallon. As always, they saved a sample of the cement in a styrofoam cup. The samples were labelled with the date and time of the pour.

13:20 Pumping was over.

14:25 Troy and James began to pull the pipe. They removed 51 lengths of tremie pipe (approximately 1590').

14:29 John and Arturo break for a late lunch off site.

The cement needed a minimum of 24 hours to dry (or cure) for the density of the SBL to be effectively accurate. We expected to begin the SBL at 13:30 to 14:00 tomorrow.

We expected a delivery truck with cement for John.

15:00 Troy and James continued to pull tremie pipe out of the well.

16:05 The cement delivery for John was still not on site. John and Arturo were back on site. Fishkin was off site to make phone calls to cancel his weekend plans.

DATE: 11-13-93

ACTIVITY: Fishkin made Fedex arrangements in the morning. There was not a Fedex facility in Venice. The facility in Punta Gorda does not open on Saturday. The facilities in Ft. Myers and Sarasota were both open until 17:00 on Saturday. Plan B involved the Venice Post Office. Fishkin visited the PO and picked up Priority 2 Day Mail Service packaging. The lobby of the PO remains open at all times. The mail moves on Sunday and the clerk indicated that the packages should arrive in Tampa Law and Tampa FDEP by Monday (11-15-93).

12:15 Fishkin was on site with Florida Geophysical, Inc. Steve was (duct) taping the centralizer because it was very close to the receiver.

13:00 Troy was on site.

13:25 The SBL was tripped down hole.

15:00 Steve was having difficulty adjusting the equipment to make it comparable to the (first run) the other day. He had added the VDL by replacing a card and this has affected the SBL. The SBL is the most sophisticated piece of equipment that Florida Geophysical, Inc. has on board.

*Cement was tagged at 1583' below TOC in the well.

17:00 The results were much better than from the first run on 11-8-93 because the calibration points were better and tighter. The results were relatively much better, therefore, we ran the SBL for the entire well (as opposed to the original plan of 200') because the equipment was on site and calibrated.

17:55 Finished running the SBL with the VDL.

*The cement came up to 1583' below TOC "in the casing", therefore, we could only presume that there was cement in the annulus too. There was no change

above 1583' in the annulus compared to the first SBL run on 11-8-93. Both logs showed none to poorly cemented.

18:35 Fishkin was off site to the Venice PO. He sent 4 copies to Tampa Law (George) and 2 copies to FDEP (Judy Richtar and Joe May).

18:55 Fishkin left Venice for Broward County.

DATE: 11-15-93

ACTIVITY: Fishkin contacted George and explained the details of the past weekend. He had not received the SBL yet. Fishkin faxed George pertinent sections of the SBL when he came in from the field on Monday night. George could use these in preliminary discussions with FDEP regarding the cement job at the bottom of the casing.

FDEP approved the cement job at the bottom of the cased portion of the well. Backplugging the well was slated for 11:00 on Monday (11-17-93).

DATE: 11-17-93

WEATHER: Warm (80's) and partly cloudy

ACTIVITY: 10:45 Fishkin was on site and it was apparent (after a few minutes of waiting) that the cement was postponed.
The fencing was finished including the sliding front gate.

11:00 Fishkin went into town to make some phone calls.
George indicated that he talked with Troy this morning and Troy indicated that the cement should be here this afternoon. There will be a commercial (Tarmac) company on site instead of Florida Cement, Inc. Fishkin could not reach Troy via beeper or mobile phone and the Youngquist office did not know the cement schedule for today.

13:00 Fishkin was on site with the Youngquist Bros. crew (Troy and Manny). Tremie pipe was tripped down hole.
Troy was unable to schedule Tarmac for today. The cement was planned for 7:30 and mid-morning tomorrow.

15:20 Manny filled the water truck with freshwater.

15:30 Fishkin called George and appraised him of the site status and the pending Florida Geophysical schedule.

15:45 Fishkin was off site. Troy touched base with the Miami project supervisor (Jimmy) regarding Steve's availability.

DATE: 11-18-93

WEATHER: Warm (80's) and clear

ACTIVITY:
07:15 Fishkin was on site with the Youngquist Bros. crew.
The Tarmac cement truck was backing up to the water/pump truck.
07:29 Began pumping fresh water down hole.
07:37 Began pumping cement. Troy grabbed a sample and filled up a styrofoam cup. He was constantly checking the cement as it went into the hopper. Manny was raising and lowering the tremie pipe (tubing).
07:47 Finished pumping a total of 3.5 yards (or 94.5 cf or 275' of fill) of cement. There was approximately 700 gallons of fresh water pumped with the cement; approximately 70 gpm for 10 minutes at 1200 rpm. The hose was disconnected and 15 lengths of tremie was tripped out of the well.
07:57 The tarmac truck was cleaned up and off site.
08:03 The hose was reconnected and preparation began for the next batch of cement.
Additional cement is due at 14:00 to 14:30.
We were still waiting on word from the Youngquist crew in Miami concerning the availability of Florida Geophysical.
09:50 Jimmy called from the Miami site and he indicated that tomorrow was out. Steve Miller called back and scheduled for 11:00 on Monday.
10:00 Fishkin left the site to checkout of the hotel.
12:30 Fishkin was on site.
13:15 Began tripping the tremie pipe back down hole for a tag. Tagged at 1407' below TOC; theoretically, this was 2.8 yards (not 3.5 yards). Either 3.5 yards was not delivered or there was a washout zone.
14:06 Tarmac was on site with 3.5 yards of cement.
14:12 Began pumping the cement.
Fishkin contacted the SWFWMD and spoke with Dave DeWitt. Dave indicated that the schedule was fine (Monday at 11:00). He also indicated that the cased well needed to be (thoroughly) developed for the video logging or it would be appear murky. Fishkin contacted FDEP and left a message on Judy's voice mail concerning the perf schedule. Fishkin contacted George and appraised him of the latest schedule.
14:16 Stopped pumping the cement.
14:18 Began pumping the cement.
14:21 Finished pumping the cement. The Tarmac truck was washing out. Troy continued to pump fresh water.
14:28 Stopped pumping water. The hose was disconnected.
14:30 Began to trip out of the hole; removed 6 lengths of tremie pipe (approx. 180'). The cement truck was off site. There was greater than 3.5 yards of cement, therefore, Troy set the tremie pipe at 1130' and began pumping cement up and out

of the well (at approximately 10 gpm). This served as the cement tag.
15:05 Fishkin was off site.

DATE: 11-22-93

WEATHER: Overcast and warm (70's) with low humidity

ACTIVITY: 07:20 Fishkin left Broward Co.
10:30 Fishkin was on site. There was nobody on site and the gate was closed. It appeared that no activity had taken place since Friday afternoon. Fishkin left the site to place some phone calls to Law, Youngquist, FDEP, and the SWFWMD.
11:30 Fishkin left the site for Tampa Law. The perforation was slated for tomorrow at noon. Florida Geophysical ordered a replacement part for the perf tool.
16:00 Fishkin called the SWFWMD and FDEP regarding the reschedule for noon tomorrow.

DATE: 11-23-93

ACTIVITY: 07:20 Dave DeWitt returned a phone call from yesterday regarding the perf schedule and the subsequent video logging. He reiterated that the well needed extensive development. Due to the 8" casing, the well could appear cloudy if the water is not cleared by sufficient well development. He indicated that Monday would be fine for video logging.
08:15 Fishkin contacted Youngquist Bros. concerning the status of the part. Troy indicated that the directional part has not arrived yet. They are expecting it by 10:00.
12:45 George Ellsworth and Len Fishkin were on site. Troy just arrived too. The fence crew were on site to re-align the fence.
13:10 Jeff Luetjen from Sarasota Co. Gov't. arrived on site.
13:20 Steve Miller et al. arrived on site. A field representative from Ireco Dyno Explosives Group of Florida was on site for observation purposes. They supply Florida Geophysical with material for blasting purposes. The preparation began for the down hole placement of the perf tool.
14:00 Steve worked on assembling the perf tool.
14:25 The perf tool was lowered into the well to a depth of 1123' below TOC. The bottom of the perf tool was at 1124' below TOC.
14:30 Either the blasting cap malfunctioned or the juice was not running to the cap. Pulled out of the well.
14:50 Each cap had a 2 ohm resistance. The caps checked out OK. The safety dial was shorting out.

14:58 Rewired and bypassed the dial.
15:42 Placed the perf tool down hole.
15:44 Lowered the tool down hole.
15:46 The caps went off. There was no displacement of water evident that came out of the well. The perf tool was tripped out of the well.
15:50 The tool was out of the well. The water level was approximately 30' below TOC.
16:00 Ellsworth and Fishkin were off site. Fishkin requested that a static water level measurement.
16:30 Well development began (by air). Yield was approximately 1 gpm.
18:30 Water level was approximately 125' below TOC. Troy had 2 lines down hole at 150' and he was blowing the water out by air. He estimated that 20 to 30 feet of water remained in the well.

DATE: 11-24-93

WEATHER: Warm (70's), overcast, and breezy

ACTIVITY: 09:30 Fishkin was on site with Troy. The water level was approximately 4' below TOC. Troy has developed the well for approximately 5 minutes. Steve Miller et al. were due on site in 1 hour to perforate another 5'. The perforation shots were effective for 20" of penetration. Steve indicated that these were the best shots obtainable for this project.
11:00 Steve and his crew were on site. They began to prepare the perf tool for an additional 5' of shots and 5' of blanks.
12:13 The perf tool was placed in the well.
12:15 Lowered the perf tool down hole.
12:22 Tagged the bottom at 1123' below TOC and tripped up to 1113' below TOC. The bottom of the tool was at 1113' and the bottom shot was at 1112' below TOC.
12:25 The caps blasted off. Visually, it appeared that there was relatively more discharging water.
12:26 The perf tool was raised up hole.
12:32 The perf tool was out of the well.
12:35 Troy hooked up the hose and prepared for well development.
12:37 The well development began.
12:41 Well development ended.
12:46 W/L = 21.3' below TOC
12:56 W/L = 19.7' below TOC
13:01 W/L = 17.7' below TOC
13:06 W/L = 16.6' below TOC
We decided to perforate an additional 5' of casing.
Steve et al. prepared 5 more feet of shots.

13:30 Fishkin contacted George to inform him of the results.
W/L = 2' below TOC
14:34 The perf tool was placed in the well; the tool was tripped down hole.
14:43 The caps were blasted from 1107 to 1102' below TOC.
14:44 The perf tool was tripped out of the well.
Troy connected the hoses and prepared for well development. Well development began.
14:57 Development ended.
14:58 W/L = 22' below TOC
15:03 W/L = 20' below TOC
Troy pumped 200 gallons of fresh water in an attempt to "fracture" it.
15:30 Reverse air development began.
15:51 Well development ended. The hose was disconnected.
W/L = 4' below TOC
George called the site from Tampa Law.
15:58 Troy reconnected the hose.
16:03 Reverse air development began.
16:30 Well development ended.
16:45 The perf tool was placed in the well. The tool was tripped down hole.
16:51 Tagged at 1124'; the tool was tripped up to 1101' below TOC.
16:52 The caps were blasted from 1101 to 1096' below TOC.
16:57 The perf tool was out of the well. Troy reconnected the hose and prepared for well development.
17:07 Reverse air development began.
An estimation of the surface discharge was 5 gpm.
17:20 Florida Geophysical, Inc. (Steve, Bill, and Gus) left the site. Troy planned on developing the well until dark (18:00).
17:30 Fishkin left the site.

DATE: 11-27-93

ACTIVITY: Troy was on site. The well had been developed for an 18 hour period. The water level in the well had been pumped down to approximately 210' below TOC. The estimated pumpage over Thanksgiving Day was 17,000 gallons. The well water was pumped into a 24,000 gallon tank.

DATE: 11-29-93

WEATHER: Warm (70's), clear, sunny and dry

ACTIVITY: 08:53 Fishkin was on site. Troy and Angel arrived on site and they were moving pvc pipe from the stock pile to the semi flat bed trailer that was adjacent to the well.

09:00 George Ellsworth was on site.
The well was flowing to the surface. We measured the water level at 4' above the TOC.
Potentiometric mps for this area indicate flow at approximately 10' above the land surface.

09:25 Dave Dewitt was on site.

09:52 The video logger was placed in the well and lowered down hole.

10:20 The video logger was at 1096' below TOC.

10:30 The video logger was at the bottom perf at 1123' below TOC. The cement was at 1124'.
The depth counter was reset to match the wireline.
Dave indicated that the video logger cable is stretched and therefore the length is not accurate.

10:32 The video logger was tripping up hole.
Sediment and small particles were observed moving downhole. Apparently, the flow was not great enough through the perfs to force these small particles upward.

Dave concentrated on video taping the upper perfs.

11:06 The video logger was tripped out of the hole.

11:10 George left the site.

11:26 The video logger was out of the well. The equipment was packed up.

11:40 DeWitt and Fishkin reviewed the video. There appeared to be a lot of misfires.

DEPTH	COMMENTS
1123' below TOC;	the perfs looked good
1122' below TOC;	the perfs looked good
1121' below TOC;	the perfs looked good
1119' below TOC;	the perfs looked good

1118' below TOC; 3 misfired (streaked)
1117' below TOC; 3 or 4 misfired
1114' below TOC; nothing
1113' below TOC; the perfs looked good
1112' below TOC; the perfs looked good
1111' below TOC; there was a possible to probable perf in the lower left quadrant and the 3 other perfs looked OK
1110' below TOC; the perfs looked OK
1109' below TOC; the perf was plugged up with a wire in the lower right quadrant
1108' below TOC; the perf was no good in the upper right quadrant
1107' below TOC; there were 2 good perfs
1106' below TOC; either the perfs were good or the view was blocked by the camera
1105' below TOC; the perfs looked good
1104' below TOC; 1 questionable perf
1103' below TOC; the perfs looked good
1101' below TOC; 1 good perf
1100' below TOC; the perfs looked good
1099' below TOC; the perfs looked good
1098' below TOC; the perfs looked good
The video logger was tripped back down hole.
We made up the following numbering system for quicker referral (in regards to quadrants): 2 1 3 4

DEPTH	GOOD	vs.	BAD PERFS
1097'	2,3,4		1
1098'	1,2,3,4		
1099'	1,2,3,4		
1100'	1,3		2,4
1101'	3,4		1,2
1102'	1,2		3,4
1103'	2 good		2 bad =1098

The counter is off below this .
The new numbering system is as follows (in regards to quadrants):
4 3 1 2

DEPTH	GOOD	vs.	BAD PERFS
1104'	1,2,3,4		
1105'	1,2,3		4
1106'	1,2,3,4		
1107'	1,2,3,4		
1108'	1,3,4		2

1109'	1,2,4	3	
1110'		1,2,3,4	
1111'		1,2,3,4	
1112'	1,2,3,4		
1113'	1,2,3,4		
1114'	1,2,		
1115'	1,2	3,4	questionable
1116'	1,2	3,4	
1117'	2		

1118' This was the bottom; obviously, the counter was off.
Dave suggested making additional perfs to enable the well to make more water. Target zones would be the site of ineffective perfs;
1100-1095 and 1118-1114' below TOC.

12:50 Dave left the site.

13:06 Fishkin left the site.

Viable options for increased water production from the Knight Trail Well included:

1) Perforate more holes (in the same interval).
This may require a change order and would not necessarily guarantee additional flow;
2) Acid Treatment
Keep in mind that this method also dissolves cement;
3) Change the casing configuration to accommodate a 4" pump in the uppermost 200' of the well; and
4) Additional air development after the installation and pressure test of the 4" Schedule 80 pvc pipe.
Air develop at 200' allowing it to recharge and repeat this procedure. This surging may produce additional flow.
The water quality will be tested for conductivity, pH, etc. and it may not be necessary to store and dispose of the well water.

DATE: 11-30-93

ACTIVITY: Fishkin's conversation with Greg McQuown (from the SWFWMD) included quantifying the following prior to deciding on any of the aforementioned items:

1) Establish the static water level (by using a standpipe);
2) Determine the pumping rate;
3) Measure the drawdown; and
4) Show that the water level is stabilizing.

We planned on determining these parameters after the installation of the 4" pipe.

DATE: 12-1-93

WEATHER: Cool, clear , beautiful day

ACTIVITY: 09:20 George and Fishkin were on site. Youngquist was not on site.
10:30 Troy called in and indicated that he had car trouble this morning (with the radiator hose). He planned on being on site in 1/2 an hour.
11:18 Troy and James were on site. They prepared the well head with a flange.
11:29 Began a 5 gallon measuring period.
11:34 Finished measuring approximately 1+ gpm.
11:35 Began a 1 gallon measuring period.
11:36 Ended measuring 1 gpm.
11:51 The static W/L = 12.8' above TOC.
12:08 2870 micromhos = conductivity
24°C = surface water discharge temperature
12:12 Tested fresh bottled water: 390 micromhos = cond.
and 26°C = temperature.
Obtained another water sample: 24°C = temp.;
Salinity was less than 2 ppt (parts per thousand);
and the conductivity = 2875 micromhos.
George and Fishkin reviewed the numbers, perf zone, stratigraphy, etc. They concluded that an additional 5' perforation of the designated interval (probably) would not add much to the flow of water to the surface.
13:10 They made recommendations to the Greg and Dave at the SWFWMD. The receptionist/secretary indicated that Greg would be back at his desk in 1 hour.
14:05 They informed Greg of the static W/L and water qualitative measurements (conductivity, salinity, and temperature).
Greg indicated that he would like the opportunity to discuss the sampling issue with his department including Dave.
They would call back at 07:30 tomorrow morning.
14:40 They discussed everything with Troy. Troy had been installing a new water pump on his pickup truck.
15:08 George and Fishkin left for Tampa Law.
17:00 They discussed the latest news with Ed Copeland.
18:00 Further briefings with Ed Copeland included the diameter size of the perfs (0.38"). In time, these relatively small holes can become encrusted over from the quality of the aggressive water. Law's concern involved the longevity of the well. Everyone concurred to more perfs were needed to increase the longevity of the monitoring zone in the well.

DATE: 12-2-93

WEATHER: Clear, 80's, and breezy

ACTIVITY:
07:30 The group from the SWFWMD were still in discussion. They would call Law back this morning.
08:30 George informed Judy Richtar at FDEP of the latest developments and the possible need of an extra few days to make up for the standby time that was incurred during the holiday to allow for the video logging and (today's) additional perforation job.
09:00 The SWFWMD called back. Greg indicated that the well was producing sufficient water. He was aware that the formations may be tight. He acknowledged that the relatively small perfs may not remain open, however, the SWFWMD would deal with it (themselves) in the future.
09:45 Law had a phone meeting with Steve Miller from Florida Geophysical, Inc. and Troy. Steve indicated that he has larger diameter perfs, however, their penetration was relatively less.
Law decided to re-shoot the 1118 to 1108' interval with 0.5" diameter perfs with a 13" penetration rather than stick with the 0.38" diameter perfs with a 20" penetration.
Steve would be on site at 12:30 to 13:00 today ready to go.
12:45 Fishkin was on site.
13:40 Troy and James from Youngquist were on site.
14:15 The Florida Geophysical crew was on site.
They began their preparation of the perf tool.
14:27 Jeff (from the Sarasota Co. Gov't.) was on site.
14:32 Steve Miller was on site.
14:39 The perf tool was placed on the stands or (holders).
15:07 The surface discharge water was sampled with a (Hach sampling kit).
280 mg/L = Na Cl
600 mg/L = Total Chlorides
15:30 The perf tool was placed in the well.
15:33 Tagged at 1124' below TOC.
The perf tool was raised in the well so the bottom shot was at 1118' and the top shot was at 1108' below TOC.
15:34 The caps were blasted and water shot out approximately 10' above the TOC.
15:39 The perf tool was out of the well and lowered onto the truck.
15:43 Troy prepared the elevators for the submersible pump.
Four lengths of tremie pipe was tripped down the well to 114' below TOC.
16:00 Began pumping water.
16:05 Florida Geophysical, Inc. left the site.
16:08 The surface discharge was 5 gallons in 13.43 seconds.

16:10 A water sample was taken at the surface.
Temperature = 25.5°C
Conductivity = 2950 micrpmhos
Salinity = Less than 2 ppt (approx. 1.9 ppt)
16:42 Turned the pump off. It briefly cavitated.
16:42 W/L = 114' below TOC. This was estimated and not directly measured. (The pump was at 114' below TOC).
16:48 W/L = 100' below TOC
16:49:50 W/L = 95' below TOC
16:51:07 W/L = 90' below TOC
16:52:46 W/L = 85' below TOC
16:54:30 W/L = 80' below TOC
16:56:20 W/L = 75' below TOC
16:58:13 W/L = 70' below TOC
17:00:17 W/L = 65' below TOC
17:02:26 W/L = 60' below TOC
17:04:43 W/L = 55' below TOC
17:07:10 W/L = 50' below TOC
17:09:46 W/L = 45' below TOC
17:12:37 W/L = 40' below TOC
17:15:44 W/L = 35' below TOC
17:19:08 W/L = 30' below TOC
17:22:54 W/L = 25' below TOC
17:27:09 W/L = 20' below TOC
17:32:00 W/L = 15' below TOC
17:37:54 W/L = 10' below TOC
17:44:56 W/L = 5' below TOC
17:54:15 W/L was at the TOC.
The recovery averaged 1.58 ft/min.
Troy and James were preparing doubles while the well was recovering. The process involved cementing (with Oatey pvc cement) 2 lengths of four inch diameter pvc pipe.
There were 60 lengths (each 20') of 4" pipe.
The pipe was labelled the following:
Charlotte Pipe 10040 4" PVC 1120 SCH 80
320 PSI Unthreaded /160 PSI Threaded @ 23°C
ASTM D-1785 Made in USA
17:45 Troy tripped the tremie pipe out of the well.
18:00 Fishkin left the site.

DATE: 12-3-93

WEATHER: Overcast, 70's, and slightly breezy

ACTIVITY: 07:15 Fishkin was on site. Troy arrived on site with a temporary replacement crew. He has business this morning that will take him off site. The driller was Bruce Reynolds and his helper was Ernie Morgan. They both were employed by (Youngquist owned) Southwest Water Wells.

07:55 Troy left the site.

08:10 The installation of the 4" pvc pipe began.

09:45 Bruce poured 2 bags of salt downhole to stop it from flowing. He was having difficulty working the pipedown hole and gluing it. Each bag weighed 80#.

10:30 John Gero (the cement expert) arrived on site.
His helper (named Arturo) was still on the road. He left Miami at 5 am this morning, however, he was pulled over by FDOT. The truck was 6,000# overweight for its length; it should have weighed 75,000#.

12:00 Jeff Luetjen arrived on site. Also, the cement delivery for John was on site with a delivery of 40,000#. John estimated that we would need 10,000#.

12:49 Arturo arrived on site with the cement rig.

14:30 Troy and Duane arrived on site.

15:20 Bruce and Ernie finished running the 4" pvc casing.
56 x 20' = 1120'
# of pipe length

8" bell per pipe
8" x 56 = 448" = 37' of bell overlap

1120' - 37' = 1083' + 3' (packer device at the bottom-most) + 4' (pvc pipe at the top) = 1090'

15:25 Preparation of the tremie pipe began including measuring and marking each tube. Troy manufactured a 9' section of tremie with 0.5" holes.

15:47 *Troy indicated that instead of the sand/gravel pack that was stated in the Construction Documents and Specifications, he has 1 bag of bentonite "hole plug". The bentonite was gravel-size. There was 4' of bentonite in the annulus and 4' of shells to mix with the mud and form a bridge. An estimated 20' of neat cement was on top.

15:58 Began to trip the tremie down hole.

16:50 Stopped tripping the tremie down hole. John and Arturo prepared the neat cement (approximately 1 barrel). John indicated that it was difficult to pump anything less than 1 barrel.

17:03 Troy connected the hose from the cement rig to the well.
Troy contacted the pvc pipe manufacturer in North Carolina about 1 hour ago.

The technical representative indicated the following: Given the temperatures from the cement; approximately 1/3 the unthreaded psi (320 psi) would make a good safety factor. Troy and John kept the pressures under 100 psi.

17:25 We were waiting for the water level to rise.
Tagged the top of the shell at 1079' below TOC.

17:40 Removed 1 length of 30' tremie.

18:12 Surface discharge was 1 gallon in 28 seconds.

18:18 Began to mix the cement.

18:20 Stopped mixing the cement.
The water tank was empty on the water truck. Wayne filled up the water truck from the supply well. Water was coming up through the shells. There was some communication which meant that the bentonite did not seal all the way around the packers.

19:10 John mixed a very small quantity of up Halliburton cellophane flake, a.k.a. Flocele, with a 1/2 batch of cement and eased it down hole.

19:18 Began to pump the cement at first; then with fresh water. Pumped a total of 1/2 barrel.

19:22 Stopped pumping.

19:23 Flushed with 2.3 barrels of fresh water.

19:24 Stopped pumping the water.

19:28 Disconnected the hose.
Removed 2 lengths of tremie pipe from the well.
A period of at least 4 hours was needed for the curing of the neat cement.
Planned on no sooner than 23:22.

19:36 The hose was reconnected from the cement rig to the well; pumped fresh water.

19:39 Stopped pumping the water and disconnected the hose.

19:45 Off site. Everybody planned on pumping cement again at 23:30.

23:30 Everybody was on site.
The cement was tagged at 1077' below TOC. We got a 2' return of fill with the last batch.
John mixed up 1 more barrel of neat cement with a small quantity of cellophane flake.
Troy connected the hose from the cement rig to the well.

23:57 Cement pumping began.

23:59 Finished pumping the cement. Began pumping fresh water.

DATE: 12-4-93

ACTIVITY: 00:02 Finished pumping water.
Troy disconnected the hose and removed 1 length of tremie pipe.
Wayne washed out the hose and reconnected it to the well.
00:15 Everybody left the site. Everybody planned on being back on site by 04:00.
04:00 Fishkin was on site with John Gero and Arturo.
They prepared the gel and allowed it to circulate.
04:30 John called Troy's beeper number; mobile phone; Best Western; Days Inn,...
04:55 Off site to locate Troy.
05:30 Troy was found at the Best Western (after all).
05:40 On site again. The gel was still circulating.
06:00 The cement was tagged at 1069' below TOC.
06:20 The cement with 8% bentonite gel was prepared and pumped down hole. A total of 15.5 barrels was pumped; then flushed with 1.5 barrels of fresh water.
The hose was removed and cleaned out.
Tremie pipe was removed.
06:45 Everybody left the site.
14:16 Everybody was on site.
The gel was circulating. The cement was tagged at 670' below TOC.
14:20 Started the pressure grouting with 8% bentonite gel.
There were 12 barrels of 8% bentonite gel pumped followed by 1/2 of a barrel of fresh water.
14:45 Disconnected the hose and tripped out 15 lengths of tremie pipe.
15:00 Everybody left the site.
19:00 Fishkin contacted George Ellsworth and briefed him on the status of the pvc installation and pressure grouting.
He indicated that a Law employee from Tampa would be present for the pressure test on 12-6-93.

DATE: 12-5-93

WEATHER: It recently stopped raining.

ACTIVITY: 05:00 Fishkin was on site with John Gero and Arturo.
05:10 The cement rig was running.
05:35 John's phone beeper went off. Troy called in and he indicated that he would be on site in 1/2 an hour.
06:08 Troy arrived on site.
06:14 Tripped in 1.3 lengths of tremie pipe and tagged the cement at 277' below TOC.
06:22 Began pressure grouting the 8% bentonite gel.

06:37 Stopped pumping 12 barrels of 8% bentonite gel.
06:37 There was no flushing with fresh water.
06:38 The hose was disconnected and the tremie pipe was tripped out of the well. There was a total of 44 barrels of cement pumped down hole.
07:05 Fishkin was off site.

DATE 12-7-93

ACTIVITY: 09:30 Dupont left the Tampa office.
11:14 Dennis Dupont was on site with Jeff Luetjen and Troy Moore for the purpose of conducting a pressure test.
11:30 53.5 psi.
12:32 53.5 psi. The pressure test was OK. Locks?
12:43 Dupont and Jeff were off of the site. Troy cleaned up the site.

DATE: 12-17-93

ACTIVITY: Ed Copeland and George Ellsworth (from Law Environmental) were on site with Jeff Luetjen (from Sarasota County Utilities Department), Don Douglas (from Youngquist Bros.), and Millard Yoder (from Smally, Wellford, & Nalven). This visit was intended as a final inspection of the site. In lieu of the bollards shown on the plan in the Construction Documents and Specifications, Youngquist Bros. was to provide a protective flange between the 4" and 8" casings. Also, as specified in Part B, page B-2, in items 2.3 and 2.4; Youngquist Bros. was to provide required project records.