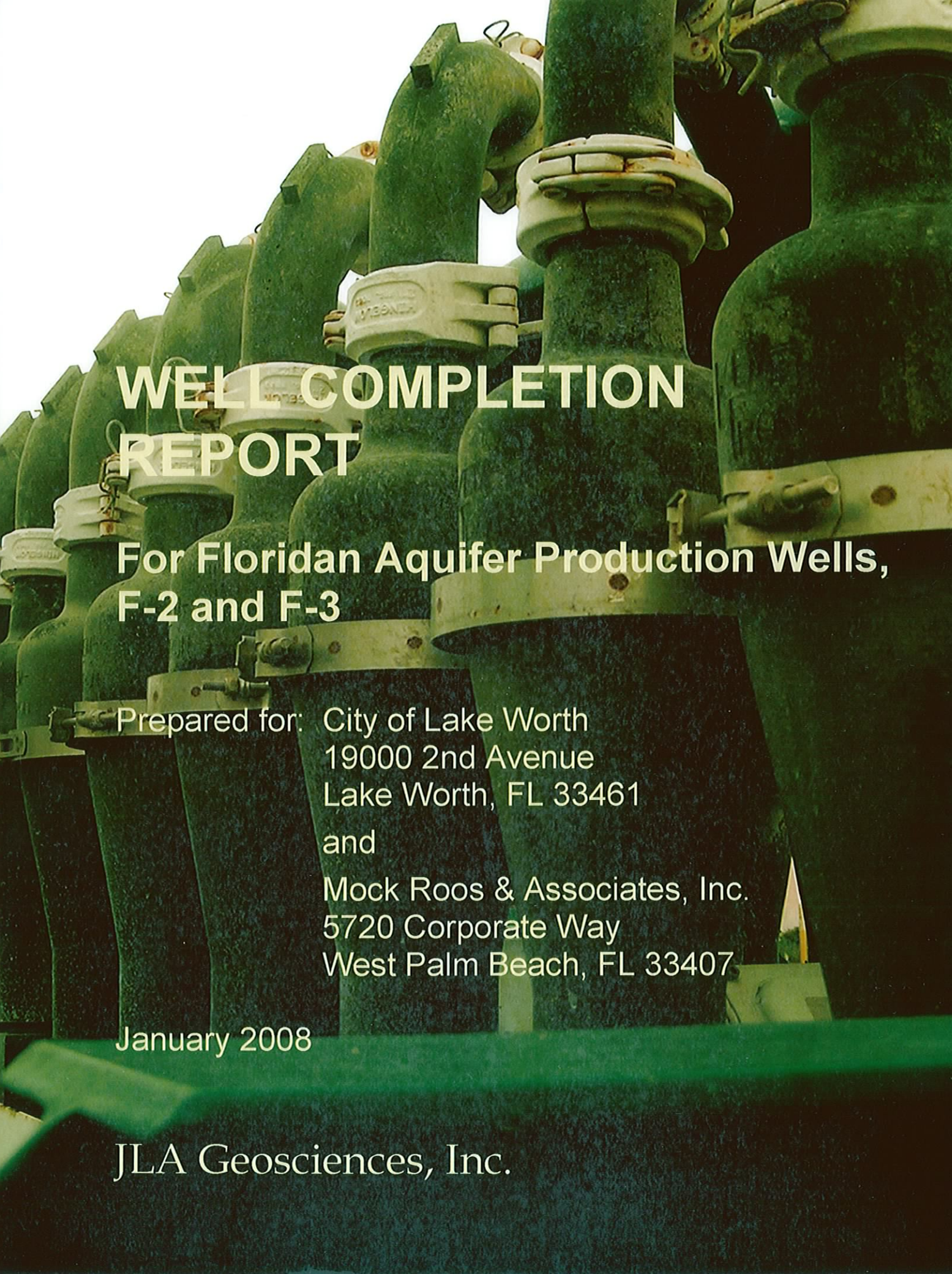

WELL COMPLETION REPORT

For Floridan Aquifer Production Wells, F-2 and F-3

Prepared for: City of Lake Worth
19000 2nd Avenue
Lake Worth, FL 33461

and

Mock Roos & Associates, Inc.
5720 Corporate Way
West Palm Beach, FL 33407

January 2008

JLA Geosciences, Inc.

Construction
✓ APT

LW - F-2
LW - F-3

WELL COMPLETION REPORT for FLORIDAN AQUIFER WELLS F-2 & F-3

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2/5/08

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1.0 INTRODUCTION

JLA Geosciences, Inc. (JLA) was contracted by Mock Roos on behalf of the City of Lake Worth to provide hydrogeologic consulting services associated with the construction of water supply wells completed in the Upper Floridan Aquifer (UFA) to provide raw water supply for the City of Lake Worth. The scope of services provided by JLA included: providing field construction observation, logging, sampling, measurement and testing services; interpreting the hydrogeologic, water quality and geophysical data; and making recommendations as to the depths of boreholes, well casings, and completion intervals. All Webb Enterprises, Inc. (AWE) of Palm Beach Gardens, Fl. was contracted to construct the wells. All Webb complied with the standards of the American Water Works Association for Deep Wells (AWWA A100-90), as referenced in the specifications.

This report documents the water well construction and testing scope of work for the completion of UFA production wells identified as F-2 and F-3 for the City of Lake Worth, Florida. Well F-2 is located in Lake Worth west of I-95 on Lake Osborne Drive between Erie Street to the North and Griswold Drive to the South. Well F-3 is located in Lake Worth on the eastern shore of Lake Osborne near the south west corner of the intersection between Lake Osborne Drive and Lake Worth Road. The well site locations are shown on Figure 1.

The project included construction and testing of UFA wells completed to total depths of 1484 and 1490 feet below land surface (BLS) for F-2 and F-3. Each well included 17.4-inch diameter Poly Vinyl Chloride (PVC) casing installed to depths of 1220 and 1207 feet below land surface (BLS) for F-2 and F-3, respectively. Well F-2 and F-3 were constructed with open hole completion intervals to total depths of 1484 and 1490 feet BLS, respectively. The UFA underlying the area proved to be sufficiently productive to provide the per-well design flow rate of 1400 gallons per minute (gpm), and exceeded the design expectations in terms of water quality and well capacity.

Well construction for F-2 began On January 30TH, 2006 and was completed on August 3rd, 2007. Construction for F-3 began on May 22ND, 2007 and was completed on July 27th, 2007.

2.0 WELL CONSTRUCTION AND TESTING

JLA performed on-site hydrogeologic observation during rotary drilling of pilot holes, geophysical logging, casing installations, casing grouting, reverse air drilling of completion intervals, pump development and pump testing. The well construction details for both wells are provided in Table 1. As-built diagrams of the wells are provided as Figures 2 and 3.

2.1 Construction of Floridan Aquifer Wells F-2 and F-3

By contract, AWE was responsible for all aspects of the production well construction and performed all of the construction elements.

Initially for well F-2, a pilot hole was advanced from land surface using the mud rotary method using a 12-inch diameter bit. Lithologic samples of the penetrated strata were collected from the circulating mud and JLA geologists prepared a field lithologic log based on the samples. Pilot hole drilling continued to 202 feet BLS in order to determine a suitable depth for placement of the surface casing. Surface casing serves the purpose of isolating any unstable sediments or zones of potential loss of circulation in the surficial aquifer which may cause problems during drilling of the lower portion of the well. Following drilling of the pilot hole, a 36-inch borehole was drilled to 200 feet BLS.

Due to the proximity of well F-3 to F-2, lithologic data collected from well F-2 was used to determine an approximate depth for the surface casing of F-3. A 36-inch borehole was drilled using the mud rotary method to a depth of approximately 197 feet BLS in F-3, where a suitable clay was encountered underlying the surficial aquifer.

After the 36-inch hole was completed in each well, drilling fluid was circulated to clear the hole of cuttings in order to accommodate installation of the casing. The surface casing string, which consisted of 30-inch diameter, 0.375-inch thick steel pipe with factory-beveled, butt welded joints, was installed into the nominal 36-inch diameter borehole to depths of 200 and 197 feet BLS, for F-2 and F-3, respectively. Centering guides were welded to the outside of the casing at the base of the casing, 10-feet above the casing base, and at subsequent 40-feet intervals. The guides position the casing in the center of the borehole to help ensure a more uniform grout job. Upon completion of the casing installation, the annular space was pressure grouted using API Class B Portland cement. The initial grouting stage (from approximately 200 ft BLS to 100 ft BLS) was performed using the through-casing, pressure grouting method. Neat cement was used to grout the annulus in order to obtain maximum strength around the casing. Following the initial pressure grouting stage, the depth of grout was determined in the annular space by using tubing (tremmie pipe) which was lowered until a hard top of grout was measured. The subsequent grouting stage from 100 ft BLS to land surface was performed by the "tremmie method" which consisted of pumping API Class B Portland cement slurry containing 6% bentonite clay under pressure through the tremmie pipe to fill the annular space between the casing and borehole. The cement was allowed 24 hours to cure before drilling was resumed.

Following installation and cementing of the surface casing, drilling of the 12-inch diameter pilot hole resumed using the mud rotary method. Pilot-hole drilling continued until a suitable competent limestone was encountered at the top of the UFA. The pilot hole was completed to a depth of 1236 feet BLS for well F-2 and 1240 feet BLS for well F-3. After the pilot hole was completed, drilling fluid was circulated to clear the hole of cuttings. Geophysical logging was then conducted. For well F-2, geophysical logging was conducted by MV Geophysical Serves, Inc. (MVGS) of Fort Myers, Florida. Logging for well F-3 was conducted by AWE. Logging for both wells included spontaneous potential (SP), resistivity, dual induction, and caliper. Based on the analysis of the lithologic samples (drill cuttings) from the pilot hole and the geophysical logging results, JLA recommended a depth for setting the 17.4 inch casing of 1220 feet BLS for F-2 and

1207 feet BLS for well F-3. The primary objective in selecting this casing depth was to enable the well, when completed, to efficiently produce the specified quantity of water at the design withdrawal rate while meeting necessary water quality standards as well. In addition to meeting this goal, it was necessary for the selected interval to be composed of a competent limestone formation to minimize borehole erosion and the subsequent contribution of sand and suspended solids. The interval selected as most desirable for open completion of the well was a limestone and dolomite flow zone sequence located within the Ocala and Avon Park Formations.

Following determination of the final casing setting depth, the pilot hole was reamed to 28-inches in diameter, below the recommended casing setting depth to facilitate installation of the 17.4-inch diameter final casing. Upon reaching total depth, drilling fluid circulation continued until the mud was clear of cuttings in order to facilitate casing installation.

The final casing string consisted of 17.4-inch diameter CertainTeed, Certa-Loc, SDR-17 lock coupling PVC casing. The casing type was chosen because of its ability to resist corrosion in the hydrogen sulfide-rich brackish water environment of the UFA. The casing string for each well consisted of 20-feet sections of 17.4-inch PVC casing held together using CertainTeed, Certa-Loc couplings and spline. The casing was set at depths of 1220 feet BLS in F-2 and 1207 feet BLS in F-3.

Cementing the PVC casing into place in each well was conducted in stages to minimize grouting stress caused by the heat of hydration and potential differential pressures. The annular space was pressure grouted using API Class B Portland cement. The initial two stages consisted of neat cement in order to obtain maximum strength around the base of the casing, and the remaining stages consisted of a grout mixture of 6% bentonite. The addition of bentonite serves to reduce the heat of hydration during the cooling process. The initial grouting stage was accomplished using the through casing pressure grout method. The remaining cement lifts were pumped into the casing annulus using the tremmie method as described for the surface casing string grouting. After each lift of

cement had hardened, the cement fill depth was measured. Grouting continued until the annular space was completely filled to surface. Following cementing, the well was given 24-hour cement curing period before drilling operations resumed.

Following completion of cementing, drilling resumed below the 17.4 inch casing using a nominal 14-inch diameter reaming bit assembly. The reverse air drilling method was used for the open hole sections of each well. Reverse air drilling is accomplished by installing a compressed air airline down the center of the drill string to a point just above the bit. The compressed air forces water and drill cuttings from the borehole to rise up the drill pipe to the surface. Reverse air is the preferred method for drilling in the Floridan aquifer production zones, because it allows for flow testing of the interval with depth, and it eliminates the need for the introduction of heavy drilling fluids into the production zones which can plug the formation and necessitate excessive development. To accomplish drilling of the open hole section, the cement plug at the base of the casing was drilled out. Drilling continued down through the limestone of the UFA to the total depth of the wells (1484 feet BLS for F-2, and 1490 feet BLS for F-3). A JLA geologist was on site during drilling of the open hole intervals to collect lithologic and water quality samples, perform flow tests and perform field water quality analyses. The water quality sampling and drilling flow testing programs are described in Sections 2.2 and 2.3. Upon reaching the total depth of the well, the driller cleared the borehole of drill cuttings and performed geophysical logging as described in Section 2.7.

2.2 Drilling Water Quality Testing

During reverse air drilling in the Floridan aquifer, specific conductance, temperature, pH and chloride concentration of the formation water were measured at regular intervals in order to evaluate variability in water quality in the intended production zone with depth. At approximately every 10-feet during drilling, specific conductance and temperature of the formation water was recorded. Additionally, after every 10-feet or significant change in specific conductance, a water sample was collected for chloride analysis. At every drill rod change, additional water quality analyses were conducted on

the water from the artesian well head flow. Water quality analyses of well head flow included specific conductance, temperature, pH, chloride, hydrogen sulfide and total iron. Chloride analysis was performed using a Hach titrator and silver nitrate titrant. Water quality of the UFA was also evaluated through laboratory analyses of samples collected during reverse air drilling. A summary of the field and laboratory water quality measurements performed during drilling of F-2 and F-3 is provided in Table 4. The complete laboratory reports can be found in Appendix D.

2.3 Drilling Flow Testing

During reverse air drilling through the UFA, flow tests were performed to evaluate the specific capacity of the penetrated open interval. The tests were performed after every drill rod change (approximately every 30 feet). To perform the test, a construction header was fitted to the flanged 30-inch diameter surface casing and sealed to the drilling tools with a rubber stripping header. The construction well head effectively sealed the well so that drilling could be done under artesian conditions. The construction header was equipped with a valved, 8-inch diameter flow port, a 2-inch port for adding brine "kill" water to stop the well from flowing, and a 3/4-inch manometer fitting. A manometer tube was fitted to the construction header to measure the potentiometric (static) water level, which reached approximately 30 feet above land surface (ALS).

The flow rate was measured using an orifice weir and an in–line flow meter installed in the 12-inch diameter discharge pipe which discharged directly into a solids settling tank adjacent to each well. Water levels in the well were measured during the flow test and compared to static, no-flow conditions measured at the beginning of each day and after each test. Measurement of flow rate (Q) and drawdown in the well (dh), allowed for the specific capacity (Cs) of the well to be approximated using the formula Cs = Q/dh (Freeze and Cherry, 1979). Tables 2 and 3 provides a summary of the water quality data and calculated values for specific capacity from flow tests conducted during reverse air drilling of each well.

2.4 Borehole Jetting Development

Both wells were developed with borehole jetting and by using a vertical turbine test pump equipped with an 8-inch diameter pump and 10-inch diameter column pipe. During development, formation water from the well was initially discharged to the formation fluids settling pond at the Lake Worth Water Treatment Plant. Turbid formation water was allowed to settle in the pond prior to being discharged into the Intracoastal Waterway. Discharge from the settling pond was monitored at regular intervals to ensure the discharged water met all applicable water quality standards for the Florida Department of Environmental Protection.

The borehole jetting phase of development was designed to deliver high velocities directly in the borehole with the use of the drill rig and a rotating jetting tool. Following completion of the well and before acid treatment, a jetting tool consisting of four opposing jets spaced 90 degrees apart and one additional jet facing directly downward, was installed into the well open-hole interval. Using the mud system pumps and drilling tools, approximately 500 to 600 gpm of water was delivered through the five jet development tool, imparting an exit velocity of approximately 20 feet per second. During jetting, the well was pumped to the formation water disposal system to remove jet-dislodged sediment from the well bore. This process was continued as the jetting tool was slowly rotated and passed up and down the borehole. This development process involved 40 hours of jetting per well.

2.5 Well Acidization

Based on preliminary testing results following well construction, the initial specific capacity for F-2 was 71 gpm/ft at the flow rate of 1,450 gpm, and the initial specific capacity of F-3 was 53 gpm/ft at 1,050 gpm. Both specific capacities were slightly less than the targeted specific capacity of 80 gpm/ft at design flow. Not knowing what the actual drawdown impacts would be from the wellfield, this conservative estimate was

based on previous experience and was a preliminary estimate of the capacity needed to keep pumping water levels above land surface. It was for this reason that the well design included acid treatment. Additionally, higher capacity wells may reduce the need for future rehabilitation and/or the number of future wells that will ultimately be needed.

F-3 was acidized on July 12th and 13th, 2007, and F-2 was acidized on September 26th and 27th, 2007. The acidization procedure consisted of installing approximately 1,300 feet of drop tubing into the well, and pumping a total of 7,000 gallons of 32%, (20° Baume) hydrochloric acid into the open interval, followed by enough water to displace the tubing in two stages. The well stayed closed in and undisturbed for 18 to 24 hours between each acidization stage. During pumping, the wellhead was sealed and fitted with a pressure gauge to monitor internal casing pressure. A relief valve and gas discharge hose was installed on the wellhead to vent off excess pressure in the well if needed. Venting was not necessary during acidization of each well. After completing the acidization procedure, the well remained undisturbed for approximately 24 hours until development of the well was resumed.

Following acid treatment and development, the specific capacity of well F-2 was determined to have increased to 169.3 gpm/ft at 1,400 gpm, and F-3 was determined to have increased to 183.1 gpm/ft at 1000 gpm. This represented an approximate improvement of 138 percent and 245 percent in wells F-2 and F-3 due to the acid treatment.

2.6 Pump Development

The pump development protocol called for steady pumping at the maximum rate of 3000 gpm, until the discharge water was visibly free of solids and turbidity. Following the steady flow period, the well was pumped intermittently with surge and rest periods. Development progress was measured by performing Rossum sand testing and silt density index (SDI) testing of the raw water. Additionally, the specific capacity of the well was measured periodically during development to evaluate progress by

improvement in well performance. Development was considered complete when the Rossum sand testing results were consistently at or below 1 part per million (ppm) and SDI testing results were less than 1.0 at design flow rates of 1400 gpm for wells F-2 and F-3.

2.7 Pumping Tests

2.7.1 Constant Rate Drawdown Testing

Following well development, but prior to acidization a constant rate drawdown test was performed at well F-2 using the development pump and discharge setup as described previously. The test was completed to assess well yield and anticipated drawdown, and to aid in final well pump selection. The constant rate drawdown test results were also used to measure specific capacity for the well.

Well F-2 was pumped at 1450 gpm for 5 hours. The design pumping rate for the well is 1400 gpm. The flow rate for the test was measured with the use of an in-line flow meter that was calibrated just prior to the start of the project. Prior to starting the test, the static water level was measured with the use of an elevated manometer tube. During the test, water levels were measured in the well with an electronic water level data logger at 0.5 minute intervals. Additionally, field water quality samples were collected at five time intervals to measure hydrogen sulfide, pH, turbidity, SDI, and specific conductance. Results of the constant rate drawdown test are provided in Table 4.

2.7.2 Step Drawdown Testing

Following acidization and well development, a step drawdown test was performed at well PW-3 using the same development pump and discharge setup as for the constant rate test. The step test was completed to assess well yield and anticipated drawdown, and to aid in final pump selection. The step drawdown test results were also used to

measure specific capacity values for the well at increasing pumping rates. Results of the Step Drawdown tests are provided in Table 5.

The flow rate during the test was measured with the use of an in-line flow meter that was calibrated just prior to the start of the project. Prior to starting the test, the static water level was measured with the use of an elevated manometer tube.

Five 120-minute duration steps were pumped at 1,000 gpm, 1,500 gpm, 2,000 gpm, 2,500 gpm and 3,000 gpm, which bracketed the design pumping rate for the well of 1,400 gpm. Water levels were measured in the well with an electronic water level data logger at 0.5 minute intervals, and manually at intervals of 1 to 15 minutes for each pumping rate. Field water quality samples were collected at the end of each step to measure hydrogen sulfide, iron, pH, temperature, turbidity, silt density index (SDI), sand content, specific conductance and chloride.

2.7.3 Upper Floridan Aquifer Performance Test

An aquifer performance test (APT) was conducted between October 30th and November 5th 2007 to evaluate pumping well influence on adjacent production wells, and to estimate appropriate aquifer coefficients for the UFA in the vicinity of the wellfield. The APT involved constant-rate pumping at production well F-2, with continuous monitoring of water levels in production wells F-1 and F-3. Locations of the pumping and observation wells are presented in Figure 1. Drawdown data were collected during the 72-hour pumping phase of the test, as well as a 24-hour recovery phase.

2.7.3 .1 APT Approach and Measurements

The test consisted of 72 hours continuous pumping of F-2 at 1,400 gallons per minute (gpm), which corresponds to the design flow rate for each of the production wells. Discharge rates were monitored from an inline flow meter. Discharge water from the APT was directed via the newly constructed raw water main piping and temporary

HDPE formation fluid disposal line to the existing formation fluids settling pond. From the pond the discharge water was pumped to the outfall location at Bryant Park, in the City of Lake Worth.

To monitor background fluctuations and measure drawdown, wells F-1, F-2, and F-3 were outfitted with electronic data loggers. These data loggers were installed 48 hours prior to the APT, to record background water levels, and to evaluate non-pumping conditions. A composite hydrograph of water levels recorded during the APT for wells F-1, F-2, and F-3 is presented as Figure 5. Figures 6 and 7 present drawdown-versus-time for F-1 and F-3 respectively. Additional charts presenting drawdown, and interpretation of the data to derive hydraulic coefficients, are provided in Appendix E.

Figure 6 indicates that at approximately 400 minutes into the pumping portion of the test, drawdown in the UFA observation well F-1 approached nearly constant values of 1.3-feet. Leveling-off of the drawdown is interpreted to reflect leakage of groundwater from the overlying/underlying portions of the UFA. At roughly the same time in well F-3, drawdown approached 1.5-feet; however, drawdown in F-3 continued to gradually but steadily increase by approximately 0.5-feet over the remainder of the pumping phase of the APT (approximately 0.22-feet per day).

Figure 5 shows a steady, gradual reduction in water levels in F-3 both before and after the pumping phase of the APT, which appears similar in magnitude to the increasing drawdown trend observed in F-3 during the latter stages of the test. A similar trend is not evident for pre- and post-pumping measurements made at F-1 and F-2. The F-3 pre-pumping background data exhibits a reduction in static water levels of approximately 0.42-feet per day, while in the post pumping recovery data static water levels never return to pre pumping conditions, and gradually decline at approximately 0.15-feet per day. In the recovery phase of the APT, the maximum water level in F-3 was 25.88-feet ALS, 0.77 feet lower than the pre-pumping static water level of 26.65-feet ALS. Water levels peaked in the recovery phase approximately 300 minutes after pumping ceased, after which the water levels gradually declined to a minimum of 25.32-

feet ALS.

The gradual reduction in water levels noted in the non-pumping phases of the APT was also seen during the pumping phase of the APT in well F-3. After approximately 400-minutes of elapsed time during the pumping phase of well F-3, drawdown had stabilized at approximately 1.5-feet, and then gradually increased to approximately 2.0-feet by the end of pumping. The drawdown curve for well F-3 appears to represent a slightly different response to pumping than was recorded in F-1 and F-2, which could indicate anisotropy in the UFA at Lake Worth. However, when referenced to the background data taken before and after the pumping phase, most likely represents the gradual depression of water level trend exhibited during the non-pumping phases of the APT.

To remove the gradual water level depression trend from the F-3 pumping data, JLA fit a linear best fit line to the pre and post pumping portions of the water level data. From the slope of the linear best fit line a change in water level over time equal to 0.21 feet/day was calculated. This change in water level over time was subtracted from the drawdown data for well F-3 to generate a corrected drawdown curve. The corrected drawdown curve can be seen in Figure 7. By removing the trend seen in the pre and post pumping phases of the APT, a drawdown curve that closely represents the data collected from wells F-1 and F-2 results. The corrected drawdown curve was used to calculate aquifer properties for well F-3.

The exact cause(s) of the decreasing trend observed in pre- and post-pumping measurements from F-3 is unknown. It is possible that the trend may reflect influence from residual salt or salt kill water located: in the open borehole; the well casing; between the 17.4-inch PVC well casing and the 24-inch steel wellhead casing; or some combination of the three. If residual saline-rich water was agitated as a result of pumping well F-2 during the post acidization/pre-APT development of well F-2 between October 22nd and October 26th, 2007 and/or the APT, it could have an effect on water level measurements recorded by the data logger installed on well F-3. It is recommended that prior to putting well F-3 online it should be pumped to an outfall

location so conductivity, total dissolved solids, and chloride can be monitored to asses if residual salt kill water is in the open borehole or well casing.

Between 400 minutes and 4,320 minutes into the test, cyclical variation in drawdown indicative of tidal influence was apparent. Amplitude of these tidal fluctuations was roughly 10% (0.3-feet) of the tidal range predicted for the Atlantic Ocean at Lake Worth Pier, which included a maximum range of approximately 2.8-feet during the test. Later portions of the pumping and recovery phases exhibited similar tidal fluctuations. The amount of tidal influence (0.3-feet) was minor (14% to 19%) compared to the total amount of drawdown measured in the two UFA observation wells (1.46-feet in (F-1) and 2.02-feet in (F-3). Tidal influence is apparent only when observing water-level measurements over time scales on the order of hours, as illustrated in Figure 5.

2.7.3.2 Determination of Aquifer Properties

Calculation of aquifer properties was performed using standard methodologies. This included the Hantush-Jacob (1955) and Hantush (1960) methods for leaky confined aquifers, and the Cooper-Jacob (1946) method for confined aquifers. Analyses were performed via manual graphical approaches as well as with the Aqtesolve® computer program.

Properties determined by the aquifer testing are defined as follows:

Transmissivity **(T)** – The measure of the rate at which water may be transmitted through a unit width of the saturated thickness of the aquifer under a unit hydraulic gradient;

Storativity **or** ***storage coefficient*** **(S)** — The volume of water that can be withdrawn or injected into an aquifer per unit surface area per unit change in head. S of a confined aquifer is typically small (0.001 or less); and

Leakance — A quantitative estimate of water that passes through semi-confining beds (in the case of the UFA, limestone beds) above and below the well completion interval. The entire UFA is for practical purposes isolated or confined from the overlying Surficial Aquifer by several hundred-feet of clay-rich deposits. However, the many layers of limestone beds occurring above and below the producing intervals in which the production wells are completed also transmit water horizontally and vertically. The movement of water across these beds is typically referred to as leakage, which is accounted for by the leakance aquifer parameter.

Transmissivity

Transmissivity was first calculated manually from the APT data using the Hantush-Jacob Type Curve Method for leaky confined aquifers. The method involves matching field data plotted on a log-log graph with a family of "type curves" plotted from the Hantush equation. After superimposing field data over the appropriate type curve and the two curves are satisfactorily matched, an arbitrary match point is selected. From the match point, values for time (t) and drawdown (s) are obtained for substitution into the appropriate equations to obtain aquifer properties. Transmissivity is solved as follows:

$$T = \frac{114.6QW(u, r/B)}{s}$$

Where: T = transmissivity (gpd/ft)

Q = discharge rate (gpm)

W (u, r/B) = well function of Hantush = 1

s = drawdown (ft)

F-1 Transmissivity Analysis

$$T = \frac{114.6(1400)(1)}{0.26} = 620{,}840\, gpd / ft$$

F-3 Transmissivity Analysis

$$T = \frac{114.6(1400)(1)}{0.24} = 669{,}385 gpd / ft$$

Storativity

From the above results, storativity was then calculated as follows:

$$S = \frac{Tu}{1.87} * {}^{t}\!/_{r^2}$$

Where: S = storativity

r = distance from pumping well (ft)

t = time (days)

u, r/B = well function from Hantush-Jacob curve

F-1 Storativity Analysis

$$S = \frac{620{,}840 * 1}{1.87} * {}^{.00076}\!/_{1870^2} = 7.2x10^{-5}$$

F-3 Storativity Analysis

$$S = \frac{669{,}385 * 1}{1.87} * {}^{.0011}\!/_{1810^2} = 1.2x10^{-4}$$

Leakance

From the above results, leakance was calculated as follows:

Where: K'/b' = leakance in gpd/ft^3

r = distance from pumping well (ft)

T = transmissivity (gpd/ft)

$$K'/b' = \frac{T\left(r/B\right)^2}{r^2}$$

F-1 Leakance Analysis

$$K'/b' = \frac{620{,}840(0.09)^2}{(1{,}870)^2} = 0.0014\ gpd/ft^3$$

F-3 Leakance Analysis

$$K'/b' = \frac{669{,}385(0.085)^2}{(1{,}810)^2} = 0.0015\ gpd/ft^3$$

Additional estimates of these aquifer coefficients were derived using the Aqtesolve® program, as well as manual evaluation of the recovery data. A summary of the calculated aquifer properties is provided in Table 7.

2.7.4 Aquifer Properties Summary

Drawdown data from observation wells are considered optimal for estimating aquifer properties of transmissivity and storage, while recovery data are typically utilized in the absence of suitable drawdown data, or for single-well APTs. The drawdown data from F-1 and F-3 appear to be of high quality, and therefore have been applied as the preferred data available for calculating aquifer properties.

Results presented in Table 7 indicate that different values for aquifer coefficients are calculated depending on the methods used in the analyses. These differences likely reflect contrasting assumptions involved with each technique, as well as subtleties inherent in the interpretation of matches between observed and computed data. For example, the Cooper-Jacob methodology assumes a confined aquifer with no leakage; the Hantush method assumes an aquifer with leakage derived from storage within the confining beds; and the Hantush-Jacob method assumes an aquifer with leakage derived from flow within or across confining beds, but not from confining-bed storage.

Results presented in Table 7 indicate that aquifer transmissivity values determined by the Hantush-Jacob and Hantush methodologies are slightly lower than those estimated using alternative approaches. A prime reason for the slightly lower T values for these approaches is that they account for leakage, whereas the other approaches do not.

Closest agreement between observed data and theoretical type curves is indicated for the Hantush-Jacob solution, which applies to leaky confined aquifers. Consequently, aquifer parameters derived from this approach appear representative of hydraulic properties that may be used for various applications such as groundwater flow modeling.

Averaged values of aquifer properties determined by the Hantush-Jacob method, presented in Table 7, are summarized as follows:

From the APT:

Aquifer Parameter	***APT Results***
Transmissivity	*645,113 gpd/ft*
Storativity	2.0×10^{-4}
Leakance	$1.45 \times 10^{-3} gpd/ft^3$

The transmissivity results are consistent with the relatively high specific capacities measured in the new production wells. The transmissivity and storativity values also fall within the range of values reported in the literature for the UFA. The leakance values derived from the APT also appear to be within the range expected for a well completed within a portion of the UFA.

2.8 Geophysical Logging

Geophysical logs were performed in the pilot hole and/or reamed hole at different stages of well construction. The logs were used to aid in the decision-making and data gathering process to determine hole dimensions, casing setting depths, geologic formation characteristics, water quality, flow zone and aquifer characteristics. After completion of pilot hole drilling into the top of the UFA, a suite of geophysical logs was performed. This suite of logs run by AWE in each well included: dual induction and fluid resistivity; SP; and natural gamma ray. A caliper log was performed after the pilot hole had been reamed, prior to final PVC casing installation. The last suite of geophysical logs was conducted after completion of drilling the open interval, and included dual induction and fluid resistivity; spontaneous potential, natural gamma, temperature, caliper and flow. All of the geophysical logging was performed by AWE, with the exception of the pilot hole logs for F-2 which were performed by MVGS. A JLA hydrogeologist was on site to observe all logging activities. Electronic copies of the

geophysical logs for each well are included in Appendix B. The fluid flow logs revealed the presence of several significant flow zones in each of the wells extending downward from approximately 1290-feet to 1424-feet BLS in well F-2, and from 1286-feet to 1410-feet BLS in well F-3. The geophysical logs were performed under flowing and non-flowing conditions.

2.9 Video Logging

Following the completion of the well, AWE performed down-hole video logging for F-2 July 26th, 2006 and for F-3 on July 27th, 2007. The videos were performed under flowing conditions. Evidence of cement grout was generally limited to the area at and just below the base of the 17.4-inch casing which was at a depth of 1,220 feet BLS for well F-2 and 1,207 feet BLS for well F-3. The casings in each well appeared to be in good condition as evidenced by the final video log for the well. Several areas of solution cavities and vertical fractures were visible in the flow zone intervals of the test well.

3.0 HYDROGEOLOGY

Palm Beach County is underlain by two aquifer systems; the surficial aquifer and the Floridan aquifer system. The drilling phase of the project penetrated these two aquifer systems to a depth of 1,490 feet. A JLA Geosciences geologist was present during key phases of the drilling to collect and log the lithologic samples as the formation materials were encountered. Lithologic logs of each well are provided in Appendix A. A hydrostratigraphic section showing the site lithologies, aquifers and formation names encountered during drilling is provided as Figure 4.

3.1 Surficial Aquifer System

The surficial aquifer is the only fresh groundwater resource in southeast Florida and has a maximum thickness of approximately 150 feet in the area of wells F-2 and F-3.

Descending from land surface, the surficial aquifer system formations include the Pamlico Sand, Anastasia, Fort Thompson, and Tamiami (Reese, 2004).

The veneer of sand covering most of south Florida, known as the Pamlico Sand, is present beneath the site, consisting of fine to medium grained loose quartz sand grains, loose detrital clay and shell. Sand extends to a depth of 30 to 40 feet beneath the site where it becomes interbedded with sandstone and shell. Because the Pamlico does not have a distinct lower contact, the exact depth is not known. The Anastasia Formation underlies the Pamlico and is commonly composed of coquina and mixtures of sand, shell, sandy limestone and sandstone. Lithology of the Anastasia Formation varies greatly within Palm Beach County (Lichtler, 1960); however, vertical changes in lithology tend to follow a downward progression from unconsolidated sand and shell to calcareous sandstone and limestone. Sandstone and limestone units in the Anastasia and possibly of the similar aged Fort Thompson Formation make up the producing zone of the surficial aquifer.

Regionally the units that underlie the Anastasia and the Fort Thompson are the Caloosahatchee Marl (Pleistocene and Pliocene), Tamiami Formation (Pliocene age) and/or the Formations of the Hawthorn Group (Miocene age). Specific depths and even presence of these units are unclear in the available literature. The associated lithologies consist of sand, shell, and limestone. With depth, these units undergo a downward fining trend and ultimately become the underlying confinement of the surficial aquifer system. The basal confining unit of the surficial aquifer occurs at approximately 150 feet beneath the site. From this depth, sandy, silty clay and interbedded sand, shell and limestone predominate.

3.2 Intermediate Confining Unit

The intermediate confining unit consists of the relatively impermeable calcareous clays and silts of the Hawthorn Group. The Miocene aged Hawthorn sediments consist of silty, sandy, dense, green clay, interbedded with depth with sand, shell, lime mud and

limestone. The thickness of the intermediate confining unit is approximately 425 feet beneath the site. The predominantly clayey upper section of the unit is known as the Peace River Formation. The lime muds, shell and limestone that underlie the Peace River comprise the Arcadia Formation.

3.3 Floridan Aquifer System

The Floridan Aquifer System (FAS), a confined aquifer, underlies the intermediate confining unit. The brackish upper portion, having total dissolved solids concentrations less than 10,000 mg/l, is called the UFA. The UFA is predominantly composed of interbedded limestone and dolomite of Late Miocene to middle Eocene age, represented by four primary rock units. From approximately 575 feet BLS at the site, in descending order, these units are: Arcadia Formation of the Basal Hawthorne Unit (Miocene); the Suwannee Limestone (Oligocene age); the Ocala Group (Eocene age); and the Avon Park Limestone (Eocene age).

The maximum depth penetrated during drilling was 1484 feet at F-2 and 1490 feet at F-3. The lithology approaching the terminus of each well consisted of interbedded, microcrystalline limestone and dolomite.

The producing zones within the Floridan aquifer can generally be referred to as "flow zones". A flow zone is typically a thin sequence of highly solutioned rock where water, flowing within the aquifer, is concentrated. Numerous thin flow zones may contribute water to the open interval of a well and often times a high percentage of the water produced by the well comes from one or two thin flow zones.

Based on the lithologic logs, geophysical logs and wellhead flow data, the most productive flow zones occurred between approximately 1,290 feet and 1,424 feet BLS in well F-2, and from 1,286 feet to 1,410 feet BLS in well F-3. Because the flow zones are typically separated from each other by continuous sequences of low permeability strata, water quality may vary significantly with depth. In some areas, water quality improves

with depth, as was found in similar wells drilled for the Town of Jupiter, Martin County, and South Martin County Regional Utilities. Historically, geologists believed that water quality in the FAS was best in its uppermost reaches and it is a relatively new observation that water quality can actually improve with depth.

3.4 Floridan Aquifer Head Pressures

Prior to performing step drawdown testing and constant rate drawdown testing, static water levels were measured in each well. Water levels were physically measured using a manometer tube that was connected to the construction wellhead assembly and elevated vertically by fastening the tube to the rig derrick. At the beginning of each working day the static (non-pumping) water level was measured relative to land surface and recorded as feet above the measuring point. Additionally, each of the wells was fitted with a pressure transducer and data logger to measure and record water levels before, during and after the APT step drawdown and constant rate pump tests for each well.

Well	Completed Wellhead Pad Elevation (Feet NGVD)	Static Water Level Elevation (Feet NGVD) / Date
F-1	+ 26.0	+ 45.3 / Oct. 30, 2007
F-2	+ 15.98	+ 45.6 / Oct. 30, 2007
F-3	+ 15.70*	+ 43.6 / Oct. 30, 2007

*- elevation of 30-inch temporary construction header.

The 0.3-feet difference in water levels between well F-1 and F-2 is attributable to tidally influenced water level fluctuation in the aquifer visible during the APT. The approximately 2-feet difference in static water levels between well F-3 and wells F-1 and F-2 is attributed to the general downward trend of 0.42-feet per day observed in the water level measurement recorded during background monitoring. To evaluate seasonal water level fluctuations, longer term water level monitoring (at least one year duration) would be required. The amount of tidal fluctuation during the APT was about

0.3-feet.

4.0 FLORIDAN AQUIFER WATER QUALITY

There were two key elements of the water quality sampling program implemented during construction of the UFA wells. The first element included the field measured parameters taken from water samples collected during drilling of the expected completion interval. The drilling water quality program is described in detail in Section 2.3, Drilling Water Quality Testing. The first element enabled the JLA project team to monitor water quality almost continuously and in real time so that the completion depth of the well would be based on water quality concerns as well as capacity.

The second element identified in the water sampling program included a comprehensive set of water quality analyses including primary and secondary drinking water components performed by a certified analytical laboratory, in addition to the field parameters of the first element. Collection of water samples was the responsibility of AWE. This included analysis of all of the parameters of the prior element. The subcontracted laboratory used for F-2 was Florida Environmental and for F-3 was Jupiter Environmental Laboratories. Copies of the certified analytical laboratory reports are provided in Appendix D.

Field water quality measurements are summarized in Tables 2 and 3. Additional field water quality measurements including hydrogen sulfide (H_2S), iron, pH, temperature, turbidity, SDI, sand content, specific conductance and chloride were performed by JLA during aquifer testing on each well. The drawdown and water quality data are summarized in Tables 4 and 5. Laboratory data for each well is summarized in Table 6.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The following conclusions are made based on results of the drilling and testing conducted during wellfield construction.

1. UFA production wells F-2 and F-3 were constructed for the City of Lake Worth between January 2006 and July 2007.
   The well completion depths are summarized as follows:
   - F-2, 17.4" PVC casing to 1210-feet, open hole to 1484-feet
   - F-3, 17.4" PVC casing to 1207-feet, open hole to 1490-feet

2. The post acidization specific capacities of well F-2 and F-3, at the designated pumping rates are:
   - F-2, at 1400 gpm, specific capacity is 206 gpm/ft.
   - F-3, at 1500 gpm, specific capacity is 150 gpm/ft.

3. The chloride concentration in the groundwater sample collected from each well after the respective pump testing was approximately 1930 mg/l for F-2 and 1875 mg/l for F-3.

4. Total hydrogen sulfide concentration in the water from each of the wells was consistently between 2.0 ppm and 3.0 ppm. The laboratory reported lower concentrations of H_2S however because the parameter is highly volatile, the field method is considered to be more reliable.

5. Rossum Sand test results for each well were at or below a value of 1.0 ppm when pumped at the design flow rate of 1,400 gpm. Temporary higher concentrations of sand may occur upon startup of the well.

6. During the constant rate pumping test, the static head measured in well F-2 was +31.8-feet ALS. During the step drawdown pumping test, the static head measured in well F-3 was +31.2-feet ALS. These measurements were determined by both physical measurement and with the use of a pressure transducer and data logger.

7. Tidal fluctuations in the Floridan aquifer were approximately 0.3-feet during the APT.

8. During the APT, static head measurements prior to pumping were:

Well	*Static WL (Feet NGVD)*
F-1	+ 45.3
F-2	+ 45.6
F-3	+ 43.6

9. The averaged aquifer properties that were determined in the analysis of the aquifer performance test are summarized as follows:

Aquifer Parameter	*APT Results*
Transmissivity	645,113 gpd/ft
Storativity	2.0×10^{-4}
Leakance	7.0×10^{-4} gpd/ft^3

10. Well F-3 water level measurements exhibited a downward trend over a seven day period encompassing the APT and background measurements. Static water levels dropped by approximately 2.5-feet during this time. The exact cause(s)are unknown, but may reflect an effect from saline residue from the salt kill.

11. Acid treatment was highly effective in wells F-2 and F-3 with approximately 140 and 250 percent improvement in capacity respectively.

12. The majority of the flow entering the wells is produced from flow zones in a 130-feet thick sequence of dolomite and limestone beds in the Avon Park Limestone. Based on the flow logs and video logs, the most productive flow zones were encountered at an upper depth of 1286-feet in both wells.

13. Hydrogeologic formation thickness and aquifer properties determined from onsite data collection varied from the values used in the SFWMD, Water Use Permit (WUP) #50-000234-W for the City of Lake Worth:
    - Both transmissivity (T) and storativity (s) in the Floridan aquifer are an order of magnitude greater in the WUP than calculated from the APT data.
    - The Floridan aquifer and overlying confining bed thicknesses determined from drilling and geophysical logs are approximately half that used in the WUP.
    - The confining bed vertical hydraulic conductivity (K_v) calculated from the APT observations is 3.5 times greater than the WUP K_v.
    - Updated aquifer properties obtained from drilling data and the APT inputted into a transient 90 day analytical model predicted a 1-feet drawdown contour with a radius of approximately 5-miles.

5.1 Recommendations

1. Plant operators should implement a program of continued water level monitoring. Monitoring should include monthly measurements of both static and pumping water levels in both production wells.

2. Monthly monitoring should incorporate basic field water quality parameters, including chloride, specific conductance, sand content, SDI, and temperature in

both production wells. Plant operators should also conduct more detailed laboratory analysis of water quality on an annual basis. This would include the suite of water quality analysis performed at the end of each specific capacity test.

3. Well operations should include the implementation of a well rotation system, ensuring that both wells are utilized equally during plant operations.

4. Prior to bringing well F-3 on line, well operators should monitor water quality parameters of total dissolved solids, specific conductance and chlorides to determine if there is any residual salt kill water in the well casing or borehole. Highly saline water may exceed the capacity of the new RO Plant and should be discharged to an outfall location.

5. Wells F-2 and F-3 should be rehabilitated with acid treatments if the specific capacity of the wells drops below 40% of the values reports in this report.

6.0 REFERENCES

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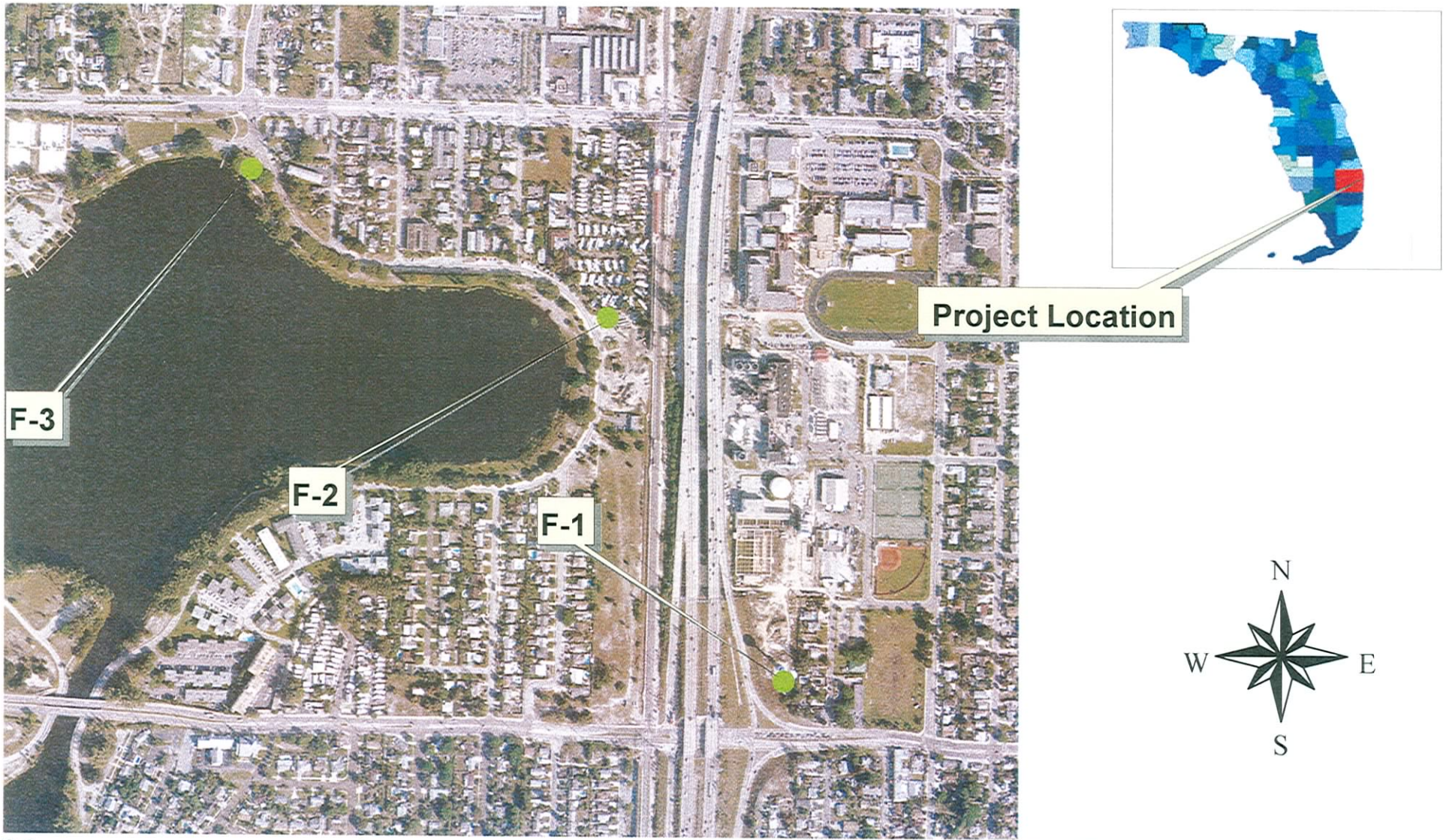
FIGURES

Figure 1



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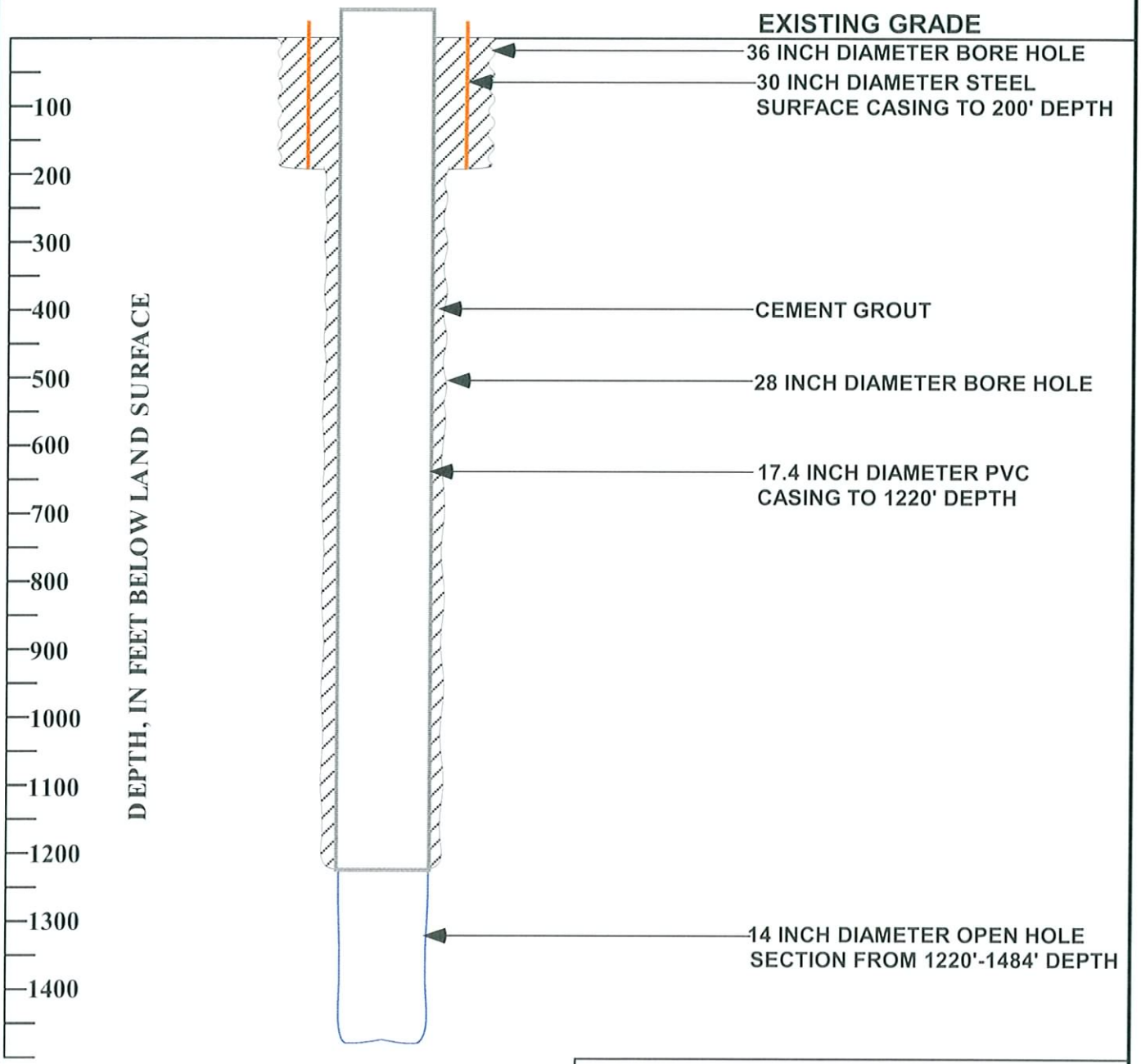

JLA Geosciences, Inc.

LEGEND: CEMENT GROUT; PVC WELL CASING; OPEN BORE HOLE; SURFACE CASING	SCALE: AS SHOWN	DATE: 06/19/06
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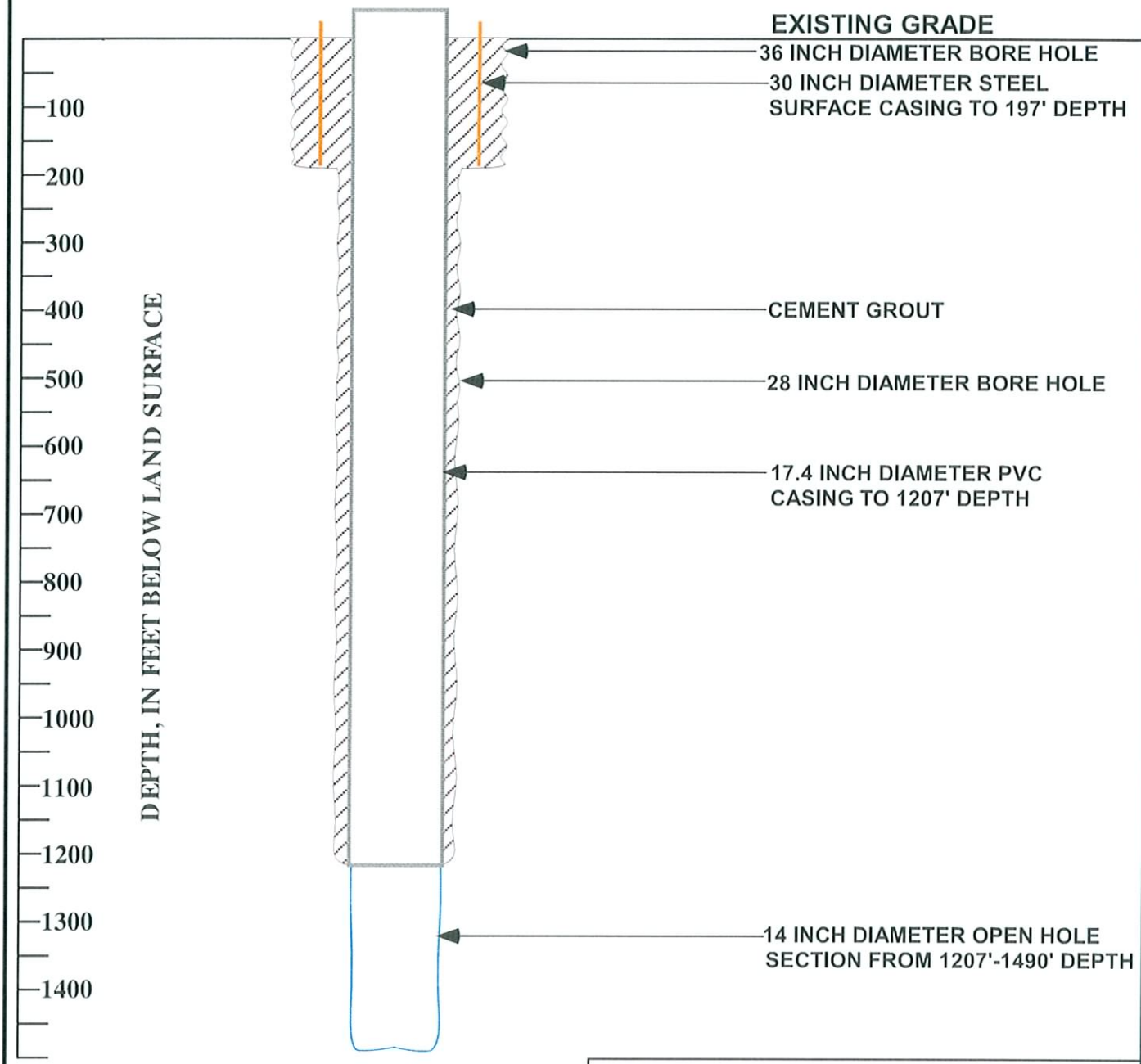
PROJECT SITE: CITY OF LAKE WORTH, FLORIDAN AQUIFER WELL F-2		PROJECT NO: 05-017
FIGURE TITLE: F-2 WELL CONSTRUCTION DETAIL		FIGURE NO: 2



JLA Geosciences, Inc.

LEGEND:

CEMENT GROUT | PVC WELL CASING | OPEN BORE HOLE | SURFACE CASING

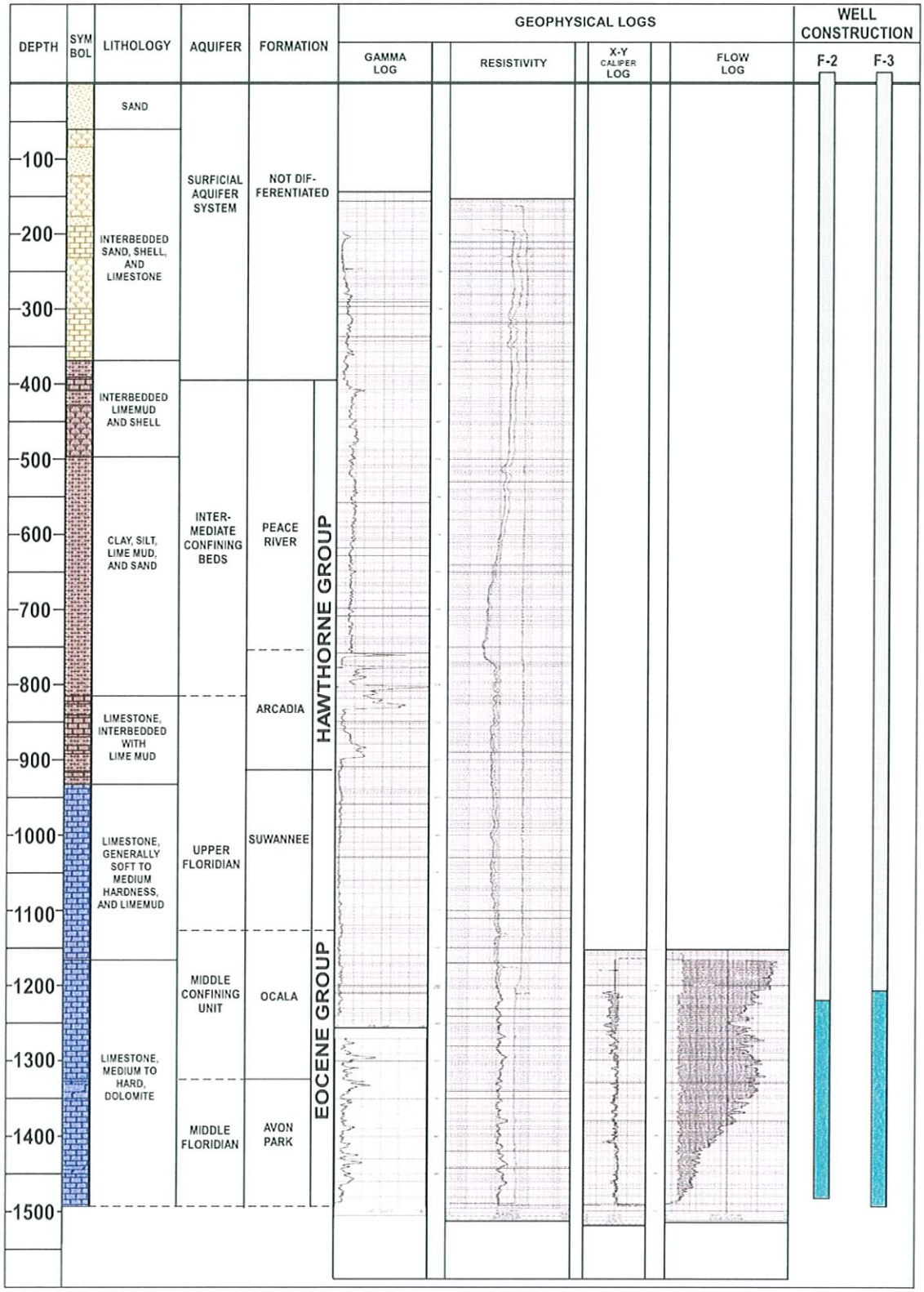
SCALE: AS SHOWN	DATE: 07/19/07
DRAWN BY: JWF	DWG #: 03

PROJECT SITE: CITY OF LAKE WORTH, FLORIDAN AQUIFER WELL F-3

PROJECT NO: 05-020

FIGURE TITLE: F-3 WELL CONSTRUCTION DETAIL

FIGURE NO: 3



LEGEND:
- WELL CASING
- OPEN INTERVAL
- SCREEN INTERVAL
- LIMESTONE
- CLAY/LIMEMUD
- SAND/SANDSTONE
- SHELL HASH
- DOLOMITE
- SURFICIAL AQUIFER
- CONFINING UNIT
- FLORIDAN AQUIFER

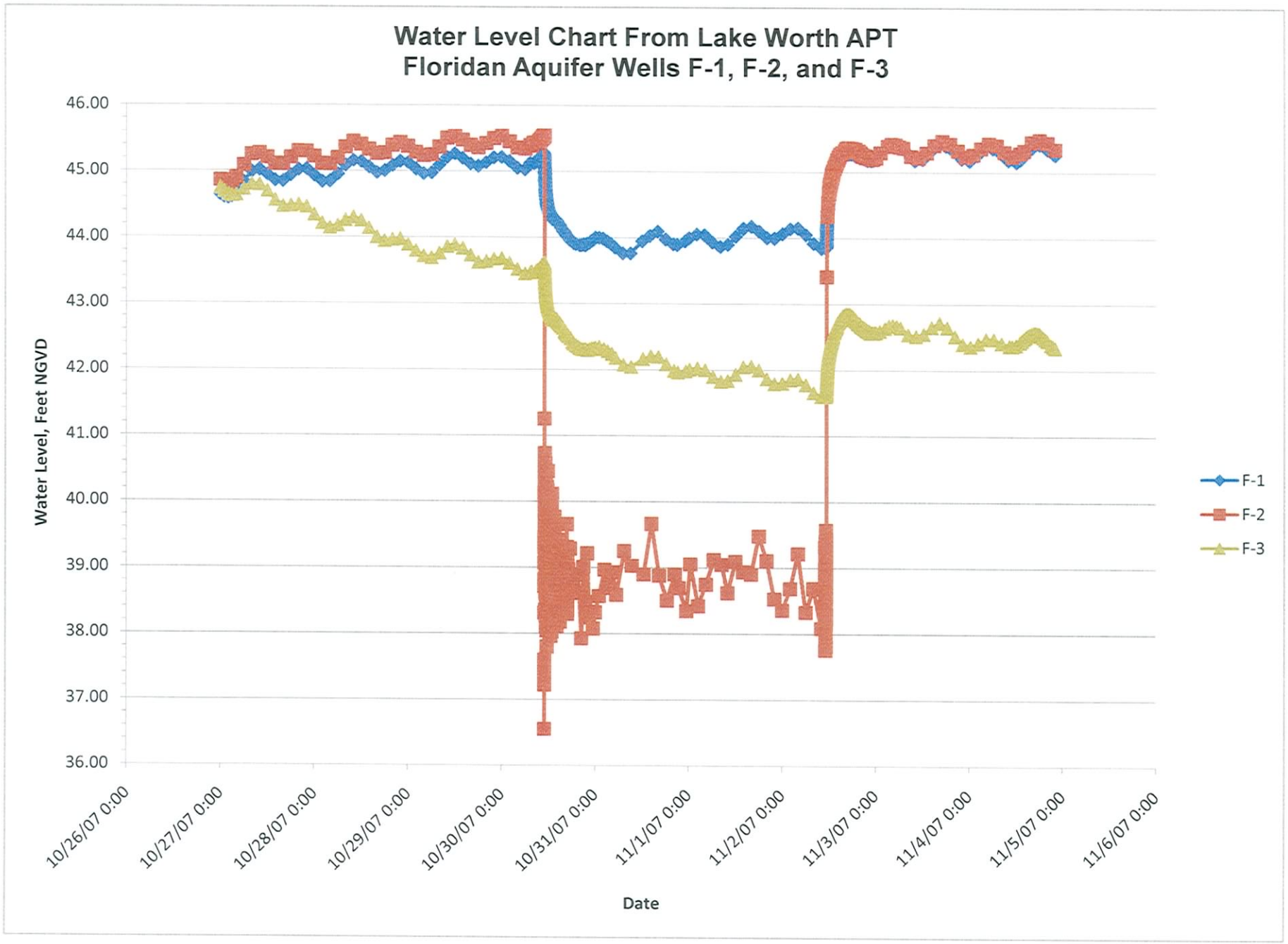
JLA Geosciences, Inc.

DRAWN BY: JWF DATE:08-07-07 SCALE: AS SHOWN

PROJECT SITE: CITY OF LAKE WORTH, FLORIDAN AQUIFER WELLS F-2 AND F-3 PROJECT NO: 05-020

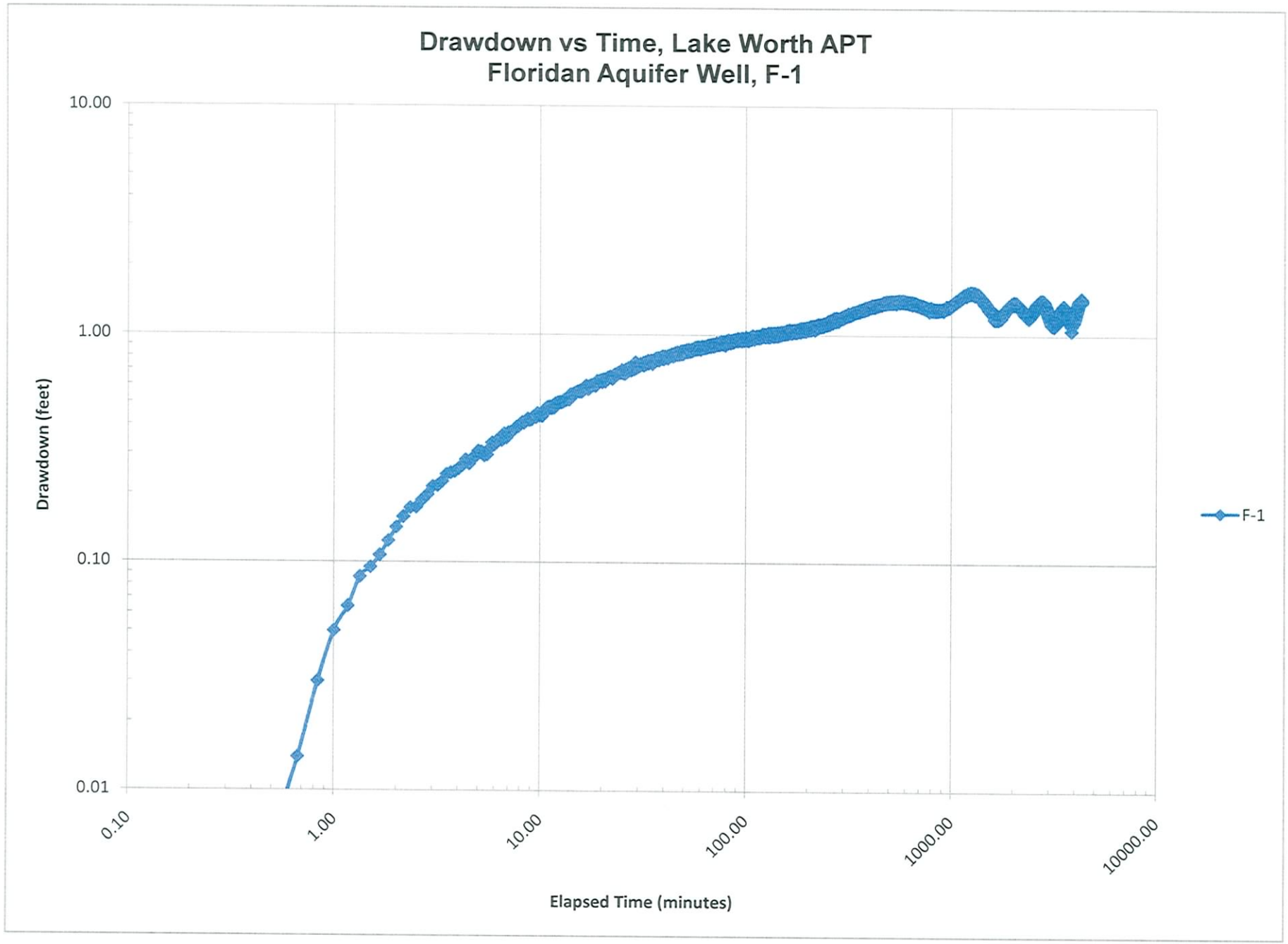
FIGURE TITLE: GENERALIZED HYDROSTRATIGRAPHIC SECTION (TYPICAL) FIGURE NO: 4

Figure 5



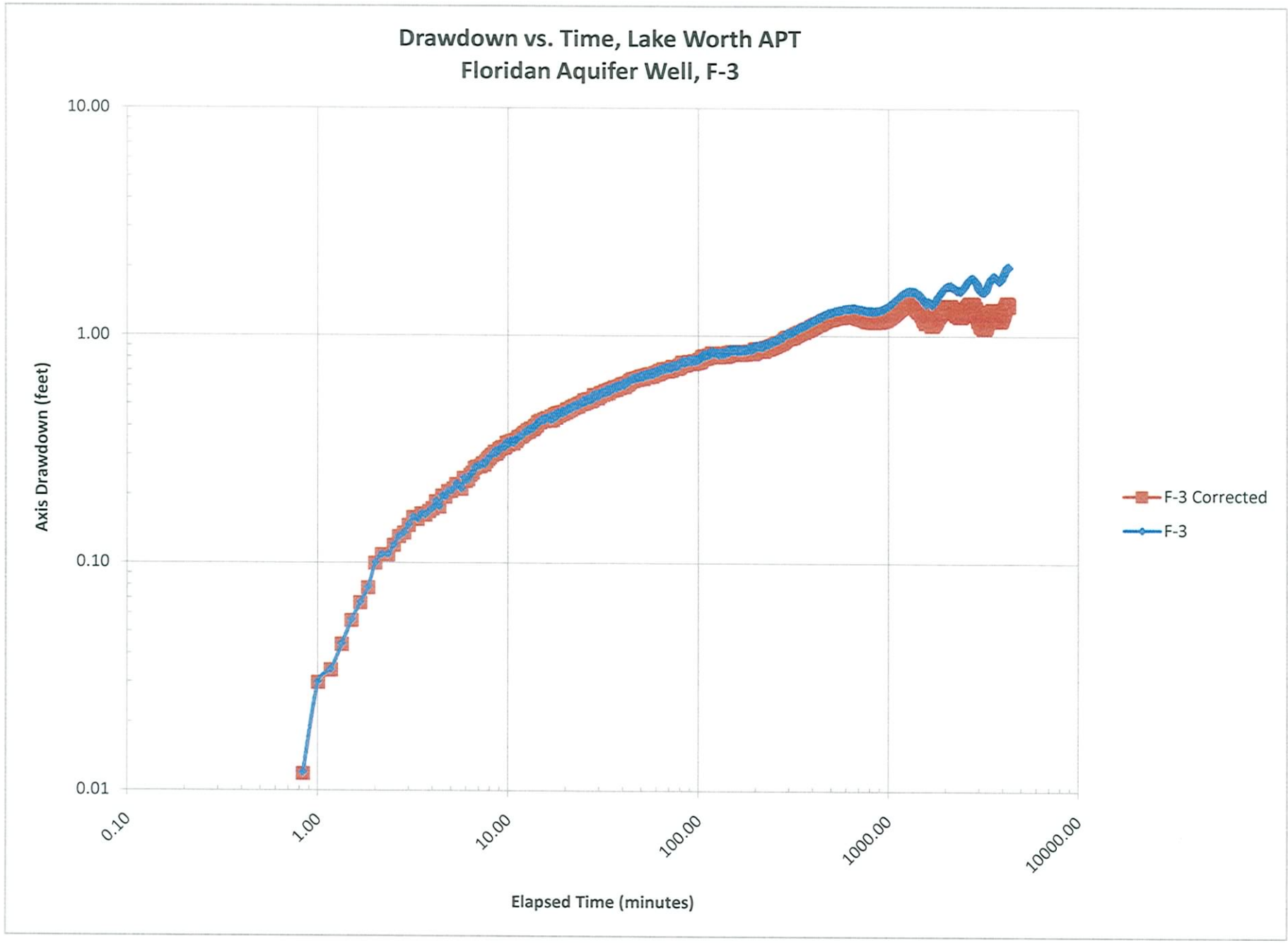
JLA Geosciences, Inc.

Figure 6



JLA Geosciences Inc.

Figure 7


Drawdown vs. Time, Lake Worth APT
Floridan Aquifer Well, F-3
10.00
1.00
0.10
0.01
Axis Drawdown (feet)
0.10
1.00
10.00
100.00
1000.00
10000.00
Elapsed Time (minutes)
F-3 Corrected
F-3

TABLES

TABLE 1
CITY OF LAKE WORTH UTILITIES
FLORIDAN AQUIFER PRODUCTION WELLS F-2 & F-3

WELL CONSTRUCTION DETAILS

WELL NUMBER	TOTAL DEPTH (ft. bls)	CASING DETAILS						OPEN HOLE PRODUCTION ZONE	
		OUTER CASING (Surface Casing)			INNER CASING (Final Casing)				
		TYPE	DIA. (in.)	DEPTH (ft.)	TYPE	DIA. (in.)	DEPTH (ft.)	DIA. (in.)	INTERVAL. (ft. bls)
F-2	1484	Steel	30	200	CERTA-LOC SDR 17 PVC	17.5	0-1220	15.5	1220-1484
F-3	1490	Steel	30	197	CERTA-LOC SDR 17 PVC	17.5	0-1207	14	1207-1490

bls. - below land surface
PVC - Poly vinyl chloride

TABLE 2
WATER QUALITY AND WELL FLOW CAPACITY SUMMARY

LAKEWORTH UTILITY
FLORIDAN AQUIFER PRODUCTION WELL F-2
DRILLING DATA (FROM 1270 TO 1484 FEET BLS)

Sample Depth (feet)	Chloride Conc. (mg/l)	SC (uhmos/cm)	H_2S (mg/l)	Iron (mg/l)	Temp. °C	pH	Flow (gpm)	Specific Capacity (gpm/ft)
1270	--	4056	--	--	26	--	--	
1280	--	4934	--	--	25.4	--	--	
1286	1640	5400	--	--	24.6	7.9		
1286	--	--	--	--	--	--	**26.5**	**1.8**
1290	1745	5150	--	--	24.2	--	--	
1300	1645	5030	--	--	24.1	--	--	
1308	1660	5180	--	--	24	--	--	
1308	**1755**	**5200**	**2.5**	**0.5**	**23.8**	**7.9**	**90**	**5.5**
1310	1740	5250	--	--	23.5	8.2	--	
1320	1705	5160	--	--	23.5	8.0	--	
1330	1730	5100	--	--	23.6	--	--	
1330	**1810**	**5320**	**2.0**	**0.35**	**23.7**	**7.9**	**140.5**	**9.3**
1340	1735	5150	--	--	23.7	8.0	--	
1352	1735	5360	--	--	23.6	--	--	
1352	**1815**	**5270**	**2.5**	**0.20**	**23.6**	**8.0**	**151.5**	**10.6**
1360	1795	5310	--	--	23.6	8.0	--	
1370	1930	5480	--	--	23.7	8.0	--	
1374	1940	5510	--	--	23.6	--	--	
1374	**1740**	**5590**	**3.0**	**0.1**	**23.5**	**7.9**	**201**	**14.7**
1380	1980	5940	--	--	23.4	8.0	--	
1390	1915	6030	--	--	23.4	8.0	--	
1396	1970	6040	--	--	23.4	8.0	--	
1396	**1905**	**5760**	**3.0**	**--**	**23.5**	**7.8**	**500**	**33.2**
1400	1940	5850	--	--	23.6	7.9	--	
1410	1970	6050	--	--	23.2	--	--	
1418	1955	6000	--	--	23.4	--	--	
1418	**1885**	**5790**	**2.5**	**--**	**23.3**	**7.8**	**619**	**43.2**
1420	2010	5850	--	--	23.4	--	--	
1430	1930	5720	--	--	23.5	--	--	
1440	1885	5680	--	--	23.3	--	--	
1440	**1910**	**5900**	**2.0**	**<0.1**	**23.2**	**7.8**	**1220.5**	**82.0**
1450	1890	5740	--	--	23.4	--	--	
1461	1880	5930	--	--	23.4	--	--	
1461	**1860**	**5870**	**2.0**	**<0.1**	**23.3**	**7.8**	**1378**	**96.6**
1470	1930	5620	--	--	23.5	--	--	
1480	1940	5650	--	--	23.3	--	--	
1484	1740	5610	--	--	23.2	--	--	
1484	**1980**	**5910**	**2.0**	**<0.1**	**23.3**	**7.8**	**1287**	**89.4**

Notes:
mg/l-milligrams per liter, chloride concentration determined by the mercuric nitrate titration method
SC-Specific Conductance
umhos/cm-micromhos per centimeter related to 25.0 :C
::C -degrees Celsius
gpm -gallons per minute
gpm/ft-gallons per minute per foot of drawdown, measured using a measuring tape and manometer tube
BOLDED TEXT-measured from well head flow

TABLE 3
WATER QUALITY AND WELL FLOW CAPACITY SUMMARY

LAKEWORTH UTILITY
FLORIDAN AQUIFER PRODUCTION WELL F-3
DRILLING DATA (FROM 1242 TO 1490 FEET BLS)

Sample Depth (feet)	Chloride Conc. (mg/l)	SC (uhmos/cm)	H_2S (mg/l)	Iron (mg/l)	Temp. °C	pH	Flow (gpm)	Specific Capacity (gpm/ft)
1242	**1800**	**6054**	**<0.1**	**2.5**	**25.1**	**8.36**	**200**	**10.0**
1250	1785	5856	--	--	26.7	8.14	--	--
1260	1785	5864	--	--	25.6	8.18	--	--
1270	1785	5765	--	--	25.4	8.09	--	--
1272	**1790**	**5993**	**3.0**	**1.5**	**24.0**	**8.49**	**280**	**11.9**
1280	1670	5702	--	--	23.8	9.94	--	--
1290	1650	5712	--	--	23.7	8.60	--	--
1300	1745	5742	--	--	23.6	8.98	--	--
1304	**1750**	**5944**	**1.5**	**1**	**24.1**	**8.49**	**250**	**16.1**
1310	1710	5766	--	--	23.7	8.28	--	--
1320	1690	5811	--	--	23.7	8.32	--	--
1330	--	5747	--	--	23.6	8.33	--	--
1335	**1775**	**5997**	**<1**	**0.8**	**23.7**	**8.49**	**320**	
1350	--	5800	--	--	23.5	8.30	--	--
1360	1845	6208	--	--	23.6	8.30	--	--
1366	**1920**	**5869**	**1**	**0.2**	**23.5**	**8.40**	**450**	**27.5**
1370	1915	6298	--	--	23.6	8.27	--	--
1380	1920	6296	--	--	23.7	8.14	--	--
1390	1910	6393	--	--	23.4	8.44	--	--
1397	**1935**	**6056**	**2.5**	**0.15**	**23.3**	**8.21**	**600**	**39.1**
1400	1925	6158	--	--	23.6	8.17	--	--
1410	1935	6171	--	--	23.7	8.17	--	--
1420	1940	6167	--	--	23.2	8.37	--	--
1427	**1950**	**6025**	**2.5**	**0.2**	**23.6**	**8.19**	**875**	**46.3**
1430	1900	6185	--	--	23.5	8.31	--	--
1440	1920	6169	--	--	23.3	8.31	--	--
1450	2045	6149	--	--	23.2	8.22	--	--
1457	**1870**	**6156**	**2**	**0.2**	**23.2**	**8.16**	**925**	**47.5**
1470	2060	6057	--	--	23.2	8.19	--	--
1480	2165	5603	--	--	23.1	8.21	--	--
1490	**2360**	**6170**	**3**	**0.15**	**23.1**	**8.16**	**1050**	**50.7**

Notes:
mg/l-milligrams per liter, chloride concentration determined by the mercuric nitrate titration method
SC-Specific Conductance
umhos/cm-micromhos per centimeter related to 25.0 °C
C -degrees Celsius
gpm -gallons per minute
gpm/ft-gallons per minute per foot of drawdown, measured using a measuring tape and manometer tube
BOLDED TEXT-measured from well head flow

TABLE 4

CITY OF LAKE WORTH UTILITIES
FLORIDAN AQUIFER PRODUCTION WELL F-2

CONSTANT RATE DRAWDOWN TEST RESULTS
DRAWDOWN AND WATER QUALITY RESULTS

WELL: F-2 TEST DATE: 7/05/2006
STATIC WATER LEVEL: Referenced starting head, + 31.8 feet above existing land surface.

DRAWDOWN DATA

Pumping Rate (gpm)	Pumping Duration (min)	Water Level (ft. of head relative to LS)	Drawdown (feet)	Specific Cap. (gpm/ft)
1450	60	+ 11.8	20.0	72.5
1450	210	+ 11.7	20.1	72.1
1450	270	+ 11.6	20.2	71.8
1450	300	+ 11.6	20.2	71.8

WATER QUALITY DATA

Pumping Rate (gpm)	Total Pumping Duration (min)	SDI Result	Turbidity (ntu)	Hydrogen Sulfide (ppm)	Dissolved Chloride (mg/l)	Specific Conductance (uS/cm)
1450	60	0.3	0.23	3	1985	5080
1450	210	0.4	0.59	3	2045	4880
1450	270	0.5	Na	Na	Na	Na
1450	300	0.5	0.01	3	1930	4850

Notes:
gpm - gallons per minute
mg/l - milligrams per liter
uS/cm - microsiemens (micromhos) per cm
ppm – parts per million
LS - land surface
SDI - Silt Density Index
ntu – nephelometric turbidity units
NA - not available

TABLE 5

STEP RATE DRAWDOWN TEST RESULTS

CITY OF LAKE WORTH UTILITIES
FLORIDAN AQUIFER PRODUCTION WELL F-3

STEP RATE DRAWDOWN TEST
DRAWDOWN AND WATER QUALITY RESULTS

WELL: F-3 TEST DATE: 7/26/2007
STATIC WATER LEVEL: Referenced starting head, + 31.19 feet above existing land surface.

DRAWDOWN DATA

Pumping Rate (gpm)	Pumping Duration (min)	Water Level (ft. of head relative to LS)	Drawdown (feet)	Specific Cap. (gpm/ft)
1000	126	+25.7	5.46	183.1
1500	136	+21.2	9.99	150.2
2000	112	+17.0	14.15	141.3
2500	120	+11.5	19.68	127.0
3000	123	+5.5	25.72	116.6

WATER QUALITY DATA

Pumping Rate (gpm)	Total Pumping Duration (min)	SDI Result	Turbidity (ntu)	Hydrogen Sulfide (ppm)	Dissolved Chloride (mg/l)	Specific Conductance (uS/cm)
1000	126	NA	0.44	3.0	1900	6.475
1500	136	0.63	0.71	3.0	1840	6.402
2000	112	0.49	0.81	3.0	1880	6.365
2500	120	0.64	1.17	2.0	NA	6.546
3000	123	2.40	1.45	2.5	1875	6.353

Notes:
gpm - gallons per minute
mg/l - milligrams per liter
uS/cm - microsiemens (micromhos) per cm
ppm – parts per million
LS - land surface
SDI - Silt Density Index
ntu – nephelometric turbidity units
NA - not available

TABLE 6

CITY OF LAKE WORTH UTILITIES
FLORIDAN AQUIFER PRODUCTION WELLS F-2 & F-3

LABORATORY WATER QUALITY SUMMARY

Contaminant/Parameter	UNITS	*F-2 RESULTS*	*F-3 RESULTS*
SECONDARY STANDARDS			
Secondary Contaminants			
Chloride	mg/L	*1540*	–
Color	Color Units	*5*	–
Fluoride	mg/L	*0.95*	--
Iron	mg/L	*0.03*	–
MBAS Surfactants	mg/L	*0.07*	--
Odor	Odor Number	*2*	–
pH	pH Unit	–	*8.5*
Sodium	mg/L	*906*	–
Sulfate	mg/L	*394*	–
Total Dissolved Solids	mg/L	*4126*	--
Zinc	mg/L	*U*	*0.011*
PRIMARY STANDARDS			
Inorganic Compounds			
Arsenic	mg/L	*0.0019*	–
Barium	mg/L	*0.0099*	--
Fluoride	mg/L	*0.95*	–
Lead	mg/L	*U*	*0.0012*
Nickel	mg/L	*0.001*	--
Selenium	mg/L	*0.009*	--
Sodium	mg/L	*906*	–
Synthetic Organic Compounds			
Carbofuran (1563-66-2)	mg/L	*0.5U*	--
Endothall (145-73-3)	mg/L	*20U*	–
Oxamyl (vydate) (23135-22-0)	mg/L	*0.5U*	–
Other			
Acetone	mg/L	--	*0.0107*
Hexavalent Chromium	mg/L	--	*U*
Ultra Trace Mercury	mg/L	--	–
TOC (6/25/2007)	mg/L	--	*19*
TOC (7/19/2007)	mg/L	--	*2.3*

U - under detection limits
mg/L - milligrams per liter

Table 7

AQUIFER PERFORMANCE TEST RESULTS

LAKE WORTH UTILITY AUTORITY, FLORIDAN AQUIFER WELL FIELD

PRODUCTION WELLS F-1, F-2, AND F-3

F-2 PUMPING WELL

WELL NO.	PUMPING RATE (gpm)	MAXIMUM DRAWDOWN	DISTANCE FROM TEST PRODUCTION WELL (ft.)	TRANSMISSIVITY (gpd/ft)			STORAGE COEFFICIENT		LEAKANCE (gpd/ft3)
				ANALYSIS METHOD					
				Hantush Jacob*	Hantush*	Cooper Jacob*, ***	Hantush Jacob*	Hantush*, ***	Hantush Jacob*^*
F-2	1400	8.27	0	--	--	--	--	--	--
F-1	--	1.55	1870	**620,840**	620,765	648,000	**0.000072**	0.000065	**0.00144**
F-3	--	2.03	1810	**669,385**	639,690	787,200	**0.00012**	0.00013	**0.00148**
AVERAGE				**645,113**	630,227	717,600	**0.0002**	0.0001	**0.0015**

Abbreviations:

ft. = feet
gpm = gallons per minute

* Solutions derived with Aqtesolve® Software
** Solutions derived Manually
*** Analysis does not calculate leakace
^ Solution derived Manually from Hantush-Jacob* numbers.

APPENDIX A

LITHOLOGIC LOG

LITHOLOGIC LOG

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER TEST PRODUCTION WELL F-2	
Depth in feet below land surface	**Description**
0-25	PEET (100%), brownish black (5YR 2/1), organic rich, some fine sand to silt size grains, low permeability.
25-30	SAND, 100%, very pale orange (10 YR 8/2), grayish orange (10 YR 7/4), unconsolidated, quartz grains, angular to well rounded, fine to medium size grains..
25-38	SAND 100%, pale yellowish orange (10 YR 8/6), unconsolidated, same as above, trace shell fragments as above.
38-59	SANDSTONE 100%, very light olive gray (5 Y 7/1), hard to medium, calcareous cement, sparry calcite, sand grains, quartz, fine to medium grained, angular to well rounded, commonly cemented shell fragments, pale orange (10 YR 7/2).
65-200	SAND 50%, light olive gray (5Y 7/1), unconsolidated to poorly lithified, fine to very fine quartz sand, angular to subrounded. SHELL 30%, white (N9) to very pale orange (10YR 8/2), unconsolidated to poorly lithified in limestone. LIMESTONE 20%, light olive gray (5Y 7/1), medium hardness, sandy with cemented quartz grains and shell, highly interbedded sand, shell, and limestone.
74-87	LIMESTONE 80%, light olive gray (5Y 7/1), medium hardness, sandy with cemented quartz grains, shell fragments. SAND AND SHELL 20%, interbedded, same as above.
87-125	SAND 60%, same as above. SHELL 30%, same as above. LIMESTONE 10%, same as above.
125-145	Sand 90%, light olive gray (5y 6/1), unconsolidated, predominantly very fine grain quartz, phosphate grains also common. SHELL 10%, decrease with size and amount with depth.
145-168	SAND 100%, medium light gray (N6), very fine grain, quartz and phosphate, unconsolidated.
168-185	SAND 50%, same as above. LIMESTONE 30%, olive gray (5Y 4/1), interbedded, medium hardness, sandy, quartz and phosphorous grains, cemented shell fragments. SHELL FRAGMENTS, 20%, loose, unconsolidated, pale orange (10YR 8/2) and yellowish gray (5Y 8/1).
185-195	SAND 90%, same as above, SHELL and LIMESTONE, 10%, same as above.
195-230	SAND 50%, same as above. LIMESTONE 50%, pale yellowish brown (10 YR 6/2) to pale yellowish orange (10 YR 6/6), medium to soft hardness, calcarenite, fossiliferous, and LIMESTONE, very light gray (N8) and medium light gray (N6).

LITHOLOGIC LOG (continued)

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER TEST PRODUCTION WELL F-2	
Depth in feet below land surface	**Description**
230-240	SAND 80%, same as above. LIMESTONE 20%, light olive gray (5Y 8/2), carbonate and quartz grains, medium sand to silt size, poorly cemented, low permeability.
240-245	LIMESTONE 100%, very pale orange (10 YR 8/2), soft granular texture, coarse sand to silt size grains, quartz, shell fragments, phosphate, inter-granular porosity, medium permeability.
245-250	SAND and SHELL 90%, pale yellowish brown (10YR 6/2), unconsolidated, shell fragments, quartz, phosphate, coarse sand to silt size. LIMESTONE, 10%, same as above.
250-260	SAND and SHELL 60%, same as above. LIMESTONE 40%, same as above.
260-280	LIMESTONE 80%, light olive gray (5Y 5/2), soft, granular texture, carbonate grains, shell fragments, quartz, phosphate, medium permeability. SAND 20%, light olive gray (5Y 5/2), unconsolidated, quartz, phosphate, carbonate grains, shell fragments, silt to medium sand size.
280-285	SAND 50%, same as above. LIMESTONE 50%, same as above.
285-300	LIMESTONE 100%, same as above.
300-305	SHELL FRAGMENTS 80%, yellowish gray (5Y 7/2, 8/1), light gray (N7), unconsolidated, medium-gravel to medium-sand size, some quartz and phosphate. LIMESTONE 20%, light olive gray (5Y 6/1), soft, granular texture, carbonate grains, quartz, phosphate, medium to low permeability.
305-310	LIMESTONE 60%, yellowish gray (5Y 8/1), medium soft hardness, granular texture, calcarenite, low porosity, low permeability. SHELL FRAGMENTS 40%, same as above.
310-335	LIMESTONE 70%, light olive gray (5 Y 6/1), medium hard, granular, calcite grains, shell fragments, quartz, phosphate, low permeability. LIMESTONE 20%, same as above. LIMESTONE 10%, pale olive (10Y 6/2), medium hardness, granular texture, calcarenite, quartz, phosphate, overall medium to low permeability.
335-370	LOST WHILE DRILLING
370-390	LIMESTONE 100%, yellowish gray to pale olive (5Y 7/2-10Y 6/2), medium hard, granular texture, calcarenite, silt to medium sand size, phosphate, low permeability.

LITHOLOGIC LOG (continued)

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER TEST PRODUCTION WELL F-2	
Depth in feet below land surface	**Description**
390-410	LIMESTONE 50% same as above. SAND 50%, light olive gray (5Y 5/2), unconsolidated, quartz, phosphate, fine sand to silt size grains, carbonate grains medium sand to fine gravel in size, medium permeability.
410-530	SAND 50%, same as above. LIMESTONE 50%, light olive gray (5Y 5/2), soft, granular texture, calcite cemented, quartz and phosphate grains, low permeability.
530-550	LIMESTONE 70%, same as above. SILTY CLAY 30%, light olive gray (5Y 5/2), clayey and very fine sand and silt size quartz and phosphate grains, low permeability.
550-570	SILTY CLAY 60%, same as above. LIMESTONE 50%, same as above.
590-610	SILTY CLAY 100%, same as above.
610-760	CLAY 100%, grayish olive (10Y 4/2), cohesive, some silt to fine sand size quartz and phosphate grains visible, low permeability.
760-790	CLAY 50%, same as above. SHELL 50%, yellowish gray (5Y 8/1), unconsolidated, fine gravel to medium sand size grains, overall low permeability.
790-800	LIMEMUD 80%, yellowish gray (5Y 7/2), cohesive, LIMESTONE 20%, yellowish gray (5Y 7/2), soft, granular, low permeability.
800-805	LIMESTONE 90%, very pale orange (10 YR 8/2) and dark yellowish brown (10 YR 4/2), loosely consolidated, clay to fine gravel size grains, calcarenite, low to med permeability. LIMEMUD 10%, cohesive, clayey, low permeability.
805-810	LIMESTONE 50%, same as above. LIMEMUD 50%, light olive gray (5Y 5/2), same as above.
810-840	LIME MUD 80%, moderate olive brown (5Y 7/2) and yellowish gray (5Y 7/2) mottled color, cohesive, some fine sand and silt size grains. LIMESTONE 20%, yellowish gray (5Y 7/2), medium hard, granular texture, low permeability.
840-850	LIMESTONE 100%, very pale orange (10 YR 8/2) and yellowish gray (5Y 7/2), medium hard, granular texture, calcarenite, medium porosity, medium permeability.
850-880	LIMESTONE 90%, same as above. LIME MUD 10%, moderate yellowish brown (10YR 5/4), cohesive, low permeability.
880-900	LIMESTONE 100%, very pale orange (10YR 8/2), soft, granular, microcrystalline to granular texture, coarse to fine sand size, calcarenite, low permeability.

LITHOLOGIC LOG (continued)

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER TEST PRODUCTION WELL F-2	
Depth in feet below land surface	**Description**
900-920	LIMESTONE 100%, yellowish gray (5Y 8/1), soft, granular texture, coarse sand to silt size, calcarenite, minor secondary porosity, low permeability.
920-960	LIMESTONE 50%, same as above. LIMESTONE 40%, yellowish gray (5Y 8/1) very light gray (N8), medium hard, fine grained granular to microcrystalline texture, secondary moldic porosity. CLAY 10%, pale yellowish brown, silt to fine sand carbonate, quartz and phosphate grains, semi-cohesive, overall low permeability.
960-975	LIMESTONE 90%, very pale orange (10YR 8/2), soft, granular texture, coarse sand to silt grains, calcarenite, low permeability. LIMESTONE 5%, yellowish gray (5Y 8/1), same as above. CLAY 5%, same as above.
975-1000	LIMESTONE 100%, very pale orange (10YR 8/2), same as above.
1000-1015	LIMESTONE 100%, yellowish gray (5Y 8/1), soft to medium hard, granular texture, very fine grained to medium sand size grains, minor porosity, low permeability.
1015-1020	SAND 50%, pale yellowish brown (10 YR, 6/2), unconsolidated, medium sand to silt size, carbonate and quartz grains. LIMESTONE 50%, very pale orange (10YR 8/2), soft, granular texture, calcarenite, overall medium permeability.
1020-1030	SAND 100%, same as above.
1035-1055	LIMESTONE 100%, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), medium to hard very fine granular to microcrystalline texture, low permeability.
1055-1080	LIMESTONE 100%, yellowish gray (5Y 8/1), medium hard, granular texture, fossiliferous, some primary porosity, secondary moldic porosity, medium permeability.
1080-1085	LIMESTONE 100%, yellowish gray (5Y 8/1), soft, granular texture, medium fine sand size grains, calcarenite, some fine to medium sand size vugged porosity, medium permeability.
1085-1090	SAND 90%, light olive gray (5Y 7/2), unconsolidated, coarse sand to silt size, carbonate, quartz, and phosphate grains. LIMESTONE 10%, same as above).
1090-1100	LIMESTONE 100%, grayish orange (10YR 7/4), soft, granular texture, calcarenite, very fine sand size vugged porosity, medium-low permeability.

LITHOLOGIC LOG (continued)

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER TEST PRODUCTION WELL F-2	
Depth in feet below land surface	**Description**
1100-1105	LIMESTONE 100%, yellowish gray (5Y 8/1), medium hard, granular, very fine grained, quartz, shell fragments, phosphate, low permeability.
1105-1110	LIMESTONE 70%, very pale orange (10YR 8/2), medium hard, calcarenite, medium to fine grained granular texture, silt to medium sand size vugged porosity, low permeability. LIMESTONE 30%, light olive gray (5Y 5/2), hard microcrystalline, some medium to sand size vugged porosity, low permeability.
1110-1130	LIMESTONE 100%, very pale orange (10YR 8/2), same as above.
1130-1155	LIMESTONE 50%, yellowish gray (5Y 8/1), medium hardness, granular to microcrystalline texture, moldic porosity, fine gravel to fine sand size vugged porosity, medium permeability. LIMESTONE (50%), light olive gray (5Y 5/2), hard, microcrystalline, some medium sand to silt size vugged porosity, low permeability.
1155-1165	LIMESTONE 100%, very pale orange (10YR 8/2), medium hard, granular texture, calcarenite, low permeability.
1165-1170	LIMESTONE 80%, same as above. LIMESTONE 20%, yellowish gray (5Y 7/2), medium hard, fine granular texture, medium to fine sand size vugged porosity, medium permeability.
1170-1195	LIMESTONE 90%, very pale orange, medium hard, calcarenite, granular texture, vugged porosity, medium permeability. LIMESTONE 10%, grayish orange (10 YR 7/4), soft, granular, fine vugged porosity, medium low permeability.
1195-1210	LIMESTONE 50%, very pale orange (10YR 8/2), same as above, vuggs increase in size and abundance. LIMESTONE 40%, yellowish gray (5Y7/2), soft fine granular texture, sand size vugged porosity, medium to low permeability. LIMESTONE 10%, grayish orange (10YR 7/4), granular to microcrystalline, calcilutite, medium hard, sand size vugged porosity, medium permeability.
1210-1215	LIMESTONE 100%, yellowish gray (5Y 8/1), granular texture, soft, vugged porosity, medium permeability.
1215-1230	LIMESTONE 50%, same as above. LIMESTONE 50%, very pale orange 10 YR 8/2) to yellowish gray (5Y 8/1), medium hardness, very fine granular texture and size vugged porosity, medium to low permeability.
1230-1235	LIMESTONE 100%, very pale orange (10YR 8/2), same as above.

LITHOLOGIC LOG (continued)

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER TEST PRODUCTION WELL F-2	
Depth in feet below land surface	**Description**
1235-1245	LIMESTONE 90%, grayish orange (10YR 7/4), medium hard, granular texture, calcarenite, inter-granular porosity, low permeability. LIMSTONE 10%, yellowish gray (5Y 8/1), soft, very fine grain granular texture, sand size vugged porosity, low to medium permeability.
1245-1260	LIMESTONE 50%, grayish orange (10YR 7/4), same as above. LIMESTONE 50%, light olive gray 5Y 6/1), hard, fine granular texture, minor vugged porosity, low to medium permeability.
1260-1280	LIMESTONE 60%, grayish orange (10YR 7/4), medium to soft, fine granular to microcrystalline texture, some vugged porosity, low permeability. LIMESTONE 40%, very pale orange (10YR 8/2), medium hard, granular texture, medium to fine sand size vugged porosity, overall low permeability.
1280-1295	LIMESTONE 50%, very pale orange (10YR 8/2), same as above. DOLOMITE 50%, medium gray (N5), hard, microcrystalline, low permeability.
1295-1320	LIMESTONE 100%, very pale orange (10YR 8/2), same as above, larger vugged porosity, medium permeability.
1320-1330	DOLOMITE 60%, pale yellowish brown (10YR 6/2), hard, microcrystalline, minor fine vugged porosity, low permeability. LIMESTONE 40%, same as above.
1330-1340	LIMESTONE 70%, same as above. DOLOMITE, 30%, same as above.
1340-1345	LIMEMUD 70%, dark to pale yellowish brown (10YR 4-6/2), unconsolidated, cohesive, some quartz and phosphate rains, low permeability. LIMESTONE 30%, light olive gray (5Y 6/1), soft, granular, sand size vugged porosity, medium permeability.
1345-1365	LIMESTONE 60%, very pale orange (10YR 8/2), medium to hard, granular, some secondary solution porosity. LIMESTONE 40%, light olive gray (5Y 6/1), granular, very minor porosity, overall low permeability.
1365-1370	LIMESTONE 100%, medium gray (N5), fossiliferous, hard, granular to microcrystalline, low permeability.
1370-1385	LIMESTONE 50%, same as above. DOLOMITE 30%, pale yellowish brown (10YR 6/2), medium hard, granular, minor porosity, low permeability. LIMESTONE 20%, yellowish gray (5Y 8/1), medium to hard, granular, minor pore space, low permeability.

LITHOLOGIC LOG (continued)

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER TEST PRODUCTION WELL F-2	
Depth in feet below land surface	**Description**
1385-1390	LIMESTONE 100%, medium gray (N5), fossiliferous, same as above.
1390-1415	LIMESTONE 50%, very pale orange (10YR 8/2), medium to hard, granular, calcarenite, vugged porosity, good permeability. LIMESTONE 50%, yellowish gray (5Y 8/1), hard microcrystalline, low permeability.
1445-1420	LIMESTONE 100%, yellowish gray (5Y 8/2), medium hard, granular texture, sparry calcite, fine gravel to coarse sand size vugged porosity, high permeability.
1420-1430	LIMESTONE 50%, very light gray to yellowish gray (N8-5Y 8/1), medium to hard, granular to microcrystalline texture, small vugged porosity, calcarenite, low permeability. LIMESTONE 40%, grayish orange (10YR 7/4), hard, sparry calcite, low permeability. LIMESTONE 10%, same as above.
1430-1440	LIMESTONE 100%, very light gray to yellowish gray (N8-5Y 8/1), same as above.
1440-1445	LIMESTONE 100%, pale yellowish brown (10YR 6/2, medium hard, microcrystalline texture, sparry calcite, vugged porosity, low permeability.
1445-1480	LIMESTONE 90%, yellowish gray (5Y 8/1), medium to hard, very fine grained to microcrystalline texture, minor very fine vugged porosity, low permeability. LIMESTONE 10%, very pale orange (10YR 8/2), soft, granular, calcarenite, medium permeability.
1480-1515	LIMESTONE 100%, very pale orange (10YR 8/2), medium hard, granular, calcarenite, medium permeability.
1515-1520	LIMESTONE 100%, very pale orange (10YR 8/2), hard, microcrystalline, dolomite, low permeability.

LITHOLOGIC LOG

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER PRODUCTION WELL F-3	
Depth in feet below land surface	**Description**
0-35	SAND, (100%), very pale orange (10 YR 8/2), dark yellowish orange (10 YR 6/6), light brown (5 YR 5/6), unconsolidated, quartz grains, angular to well rounded, fine to medium size grains.
35-60	SAND (100%), yellowish gray (5Y 8/1), unconsolidated, same as above, trace shell fragments as above.
60-80	SAND (80%), yellowish gray (5Y 8/1), unconsolidated to poorly lithified, fine to very fine quartz sand, angular to subrounded. SHELL (20%), white (N9) to very pale orange (10YR 8/2), unconsolidated, fine gravel to fine sand size fragments, subangular to subrounded.
80-95	SAND (70%), light olive gray (5Y 7/1), unconsolidated to poorly lithified, fine to very fine quartz sand, angular to subrounded. SHELL (30%), same as above.
95-125	SAND (60%), same as above. SHELL (40%), same as above.
125-175	Sand (90%), light olive gray (5y 6/1), unconsolidated, predominantly very fine grain quartz, phosphate grains also common. SHELL (10%), decrease with size and amount with depth.
175-187	SAND (100%), medium light gray (N6), unconsolidated, fine to coarse sand size grains, quartz and phosphate.
187-196	LIMESTONE (50%), pale yellowish brown (10 YR 6/2) to pale yellowish orange (10 YR 6/6), medium to soft hardness, granular texture, intergranular porosity. SHELL HASH, (50%), pale orange (10YR 8/2) and yellowish gray (5Y 8/1), unconsolidated, medium gravel to coarse sand size grains, same as above.
196-200	LIMESTONE (100%), pale yellowish brown (10 YR 6/2) to pale yellowish orange (10 YR 6/6), medium light gray (N6), medium to soft hardness, calcarenite, fossiliferous, intergranular porosity.
200-210	Lost to Drilling.
210-225	LIMESTONE (100%), yellowish gray (5Y 8/1), very pale orange (10 YR 8/2), soft, granular texture, coarse sand to silt size grains, quartz, shell fragments, phosphate, inter-granular porosity, medium permeability.
225-270	SHELL HASH (90%), pale yellowish brown (10YR 6/2), yellowish gray (5Y 7/2), unconsolidated, coarse sand to fine gravel size shell fragments, quartz, phosphate, coarse sand to silt size grains. LIMESTONE, (10%), same as above.

LITHOLOGIC LOG (continued)

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER PRODUCTION WELL F-3	
Depth in feet below land surface	**Description**
270-303	SHELL FRAGMENTS (80%), yellowish gray (5Y 7/2, 8/1), light gray (N7), unconsolidated, medium-gravel to medium-sand size, some quartz and phosphate. LIMESTONE (20%), light olive gray (5Y 6/1), soft, granular texture, carbonate grains, quartz, phosphate, medium to low permeability.
303-322	LIMESTONE (50%), light olive gray (5Y 5/2), moderate yellowish brown (10YR 5/4), soft, granular texture, carbonate grains, shell fragments, quartz, phosphate, medium permeability. LIMEMUD (50%), light olive gray (5Y 5/2), white (N9), unconsolidated, cohesive, overall low permeability.
322-332	LIMESTONE (100%), same as above.
332-345	LIMESTONE (60%), medium light gray (N6), soft to medium hardness, very fine granular texture, intergranular porosity. LIMEMUD, (40%), same as above, overall low permeability.
345-370	LIMESTONE (80%), yellowish gray (5Y 8/1) to olive gray (5Y 4/1), medium hardness, granular texture, calcarenite, intergranular porosity. SHELL FRAGMENTS (20%), yellowish gray (5Y 7/2), unconsolidated, medium gravel to coarse sand size grains, overall moderately low permeability.
370-377	LIMEMUD (90%), light gray (N7) to medium light gray (N6), unconsolidated, cohesive, low permeability. SHELL (10%), same as above.
377-395	LIMESTONE (100%), light olive gray (5Y 5/2), medium to soft hardness, granular texture, medium to fine sand size grains, carbonate, quartz, phosphate, intergranular porosity, fine gravel to coarse sand size shell fragments, and decreasing amount of lime mud with depth, overall moderate permeability.
395-407	LIMESTONE (60%), yellowish gray to pale olive (5Y 7/2-10Y 6/2), soft, granular texture, calcarenite, silt to medium sand size, phosphate, low permeability. LIMEMUD (40%), light olive gray (5Y 5/2), unconsolidated, cohesive, abundant shell fragments, overall low permeability.
407-426	LIMESTONE (90%) same as above. SAND (10%), light olive gray (5Y 5/2), unconsolidated, clayey, quartz, phosphate, fine sand to silt size grains, carbonate grains medium sand to fine gravel in size, medium permeability.

LITHOLOGIC LOG (continued)

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER PRODUCTION WELL F-3	
Depth in feet below land surface	**Description**
426-440	SILTY CLAY (70%), light olive gray (5Y 5/2), clayey and very fine sand and silt size quartz and phosphate grains, abundant shell fragments. LIMESTONE (30%), same as above, overall low permeability.
440-500	LIMESTONE (70%), light olive gray (5Y 5/2), medium light gray (N6), soft, granular texture, sand size grains, carbonate, quartz, silt, sandy, intergranular porosity. SHELL HASH (30%), yellowish gray (5Y 7/2), very pale orange (10YR 8/2), unconsolidated, fine gravel to coarse sand size grains, subangular to subrounded, overall moderately low permeability.
500-510	SILTY CLAY (60%), same as above. LIMESTONE (40%), same as above.
510-552	SILTY CLAY (100%), same as above.
552-582	SILTY CLAY (100%), grayish olive (10Y 4/2), cohesive, silt to fine sand size quartz and phosphate grains, low permeability.
582-700	CLAY (100%), same as above, silty, low permeability
700-710	CLAY (100%), grayish olive (10Y 4/2), unconsolidated, cohesive, dense, very low permeability.
710-757	CLAY (100%), grayish olive (10Y 4/2) to olive gray (5Y 4/1), same as above.
757-771	CLAY (70%), same as above. LIMESTONE (30%), yellowish gray (5Y 7/2), soft, granular texture, shelly, overall low permeability.
771-797	CLAY (100%), olive gray (5Y 4/1), cohesive, silty, low permeability.
797-815	LIMEMUD (80%), yellowish gray (5Y 7/2), light olive gray (5Y 6/1), cohesive. LIMESTONE (20%), yellowish gray (5Y 7/2), soft, granular, shells, overall low permeability.
815-833	LIMESTONE (50%), same as above. LIMEMUD (50%), light olive gray (5Y 5/2), same as above.
833-841	LIMEMUD (100%), light olive gray (5Y 5/2), yellowish gray (5Y 7/2), same as above, low permeability.
841-863	LIMESTONE (90%), medium light gray (N6), yellowish gray (5Y 7/2), soft, granular texture, carbonate, quartz and phosphate, shell fragments, medium to fine sand size grains, intergranular porosity. LIMEMUD (10%), light olive gray (5Y 5/2), same as above, overall moderately low permeability.
863-900	LIMESTONE (50%), same as above. LIMEMUD (50%), same as above.

LITHOLOGIC LOG (continued)

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER PRODUCTION WELL F-3	
Depth in feet below land surface	**Description**
900-942	LIMEMUD (90%), light olive gray (5Y 6/1), unconsolidated, cohesive. LIMESTONE (10%), light olive ray (5Y 6/1), yellowish gray (5Y 8/1), soft, granular, carbonate grains, overall very low permeability.
942-952	LIMESTONE (50%), same as above. LIMEMUD (50%), same as above.
952-994	LIMESTONE (90%), very pale orange (10YR 8/2), soft granular texture, calcarenite, intergranular porosity. LIMEMUD (10%), white (N9), greenish gray (5GY 6/1), cohesive, overall moderate permeability.
994-1020	LIMESTONE (100%), very pale orange (10YR 8/2) and yellowish gray (5Y 7/2), medium hard, granular texture, calcarenite, medium porosity, medium permeability.
1020-1079	LIMESTONE (90%), very pale orange (10YR 8/2), medium soft, granular texture, carbonate cemented, intergranular porosity. LIMEMUD (10%), greenish gray (5GY 6/1), unconsolidated, cohesive, overall low permeability.
1079-1081	LIMESTONE (100%), yellowish gray (5Y 8/1), medium hardness, fine granular texture, calcarenite, intergranular porosity, moderate permeability.
1081-1129	LIMESTONE (50%), yellowish gray (5Y 8/1), same as above. LIMESTONE (30%), grayish orange (10YR 7/4), soft, granular texture, intergranular porosity. LIMEMUD (20%), yellowish gray (5Y 7/2), light olive gray (5Y 6/1), cohesive, overall low permeability.
1129-1148	LIMESTONE (50%), same as above. LIMESTONE (40%), yellowish gray (5Y 8/1) to very light gray (N8), medium hard, fine grained granular to microcrystalline texture, some secondary porosity. LIMEMUD (10%), same as above.
1148-1198	LIMESTONE (50%), very pale orange (10YR 8/2) to grayish orange (10YR 7/4), soft granular texture, carbonate grains, intergranular porosity. LIMSTONE (30%), yellowish gray (5Y 8/1), hard, very fine grained to microcrystalline texture, minor secondary dissolution porosity. LIMEMUD (20%), yellowish gray (5Y 8/1) to greenish gray (5GY 6/1), unconsolidated, cohesive, overall low permeability.

LITHOLOGIC LOG (continued)

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER PRODUCTION WELL F-3	
Depth in feet below land surface	**Description**
1198-1246	LIMESTONE (60%), yellowish gray (5Y 8/1), same as above. LIMESTONE (40%), grayish orange (10YR 7/4), medium to soft hardness, medium granular texture, carbonate cemented grains, intergranular porosity, overall moderate permeability.
1246-1267	LIMESTONE (100%), very pale orange (10YR 8/2), medium hardness, granular to microcrystalline texture, calcarenite, slightly fossiliferous, intergranular porosity, some secondary porosity, overall moderate to good permeability.
1267-1275	LIMESTONE (100%), grayish orange (10YR 7/4) to very pale orange (10YR 8/2), medium soft, granular texture, fine to medium sand size grains, intergranular porosity, low permeability.
1275-1289	LIMESTONE (80%), yellowish gray (5Y 7/2), medium hard, fine grained granular texture, fine sand size grains, slightly fossiliferous, calcarenite, intergranular and some moldic porosity, LIMESTONE (20%), grayish orange (10YR 7/4) to very pale orange (10YR 8/2), same as above, overall moderate permeability.
1289-1302	LIMESTONE (70%), yellowish gray (5Y 7/2), same as above. LIMESTONE (30%), light gray (N7), hard, very fine grained to microcrystalline, overall moderately low permeability.
1302-1333	LIMESTONE (50%), light gray (N7), same as above. LIMESTONE (50%), yellowish gray (5Y 7/2), grayish orange (10YR 7/4) to very pale orange (10YR 8/2), medium to soft, granular texture, fine to medium sand size grains, intergranular porosity, overall low permeability.
1333-1340	DOLOMITE (100%), pale yellowish brown (10YR 6/2), moderate yellowish brown (10YR 5/4), medium dark gray (N4), mottled, hard, microcrystalline, minor fine vuggy porosity, low permeability.
1340-1350	DOLOMITE (100%), light gray (N7), yellowish gray (5Y 8/1), hard microcrystalline, some dissolution porosity, moderate good permeability.
1350-1359	LIMESTONE (100%), yellowish gray (5Y 8/1), hard, granular texture, slightly fossiliferous, intergranular and minor dissolution porosity, good permeability.
1359-1361	DOLOMITE (100%), medium dark gray (N4), hard microcrystalline, some dissolution porosity, moderate permeability.

LAKE WORTH UTILITIES LAKE WORTH FLORIDIAN AQUIFER PRODUCTION WELL F-3	
Depth in feet below land surface	**Description**
1361-1395	LIMESTONE (90%), very pale orange (10YR 8/2) to grayish orange (10YR 7/4), medium to hard, granular, calcarenite, intergranular porosity, some secondary porosity. DOLOMITE (10%), light gray (N7) to medium light gray (N6), hard microcrystalline, overall good permeability.
1395-1405	LIMESTONE (100%), yellowish gray (5Y 8/1), white (N9), medium hard, granular texture, slightly fossiliferous, intergranular and minor dissolution porosity, good permeability.
1405-1430	LIMESTONE (70%), yellowish gray (5Y 7/2), hard, fine grained to microcrystalline texture, coarse to medium sand sized vuggy porosity. DOLOMITE (30%), medium gray (N5), hard, microcrystalline, overall good permeability.
1430-1440	Lost to drilling.
1440-1445	LIMESTONE (100%), grayish orange (10YR 7/4) to moderate yellowish brown (10YR 5/4), hard, fine grained to microcrystalline texture, interconnected coarse to medium sand sized vuggy porosity, good permeability.
1445-1450	DOLOMITE (100%) same as above.
1450-1489	LIMESTONE (100%), grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), medium hard, granular texture, carbonate cemented grains, intergranular porosity, secondary dissolution porosity, interconnected, good permeability.

APPENDIX B

GEOPHYSICAL & VIDEO LOGS

Company	City of Lake Worth
Well	F-2
Field	Lake Osbourne
Country	USA
State/Prv	Florida

ALLWELL WEBBS

FLOWMETER LOG

Company	City of Lake Worth
Well	F-2
Field	Lake Osbourne
Country	USA
State/Province	Florida
Location	
Section, Township, Range	28, 44, 43
Other Services	

Permanent Datum	Elevation
Log Measured From	K.B.
Drilling Measured From	D.F.
	G.L.
Elevation	
Land Surface	
Land Surface	35 ft/06
Run Number	3
Depth Driller	1454'
Depth Logger	1454'
Bottom Logged Interval	1454'
Top Log Interval	0 FT
Casing Driller	13 5/8"
Casing Logger	13 5/8"
Bit Size	14.75"
Type Fluid in Hole	WATER
Density / Viscosity	8.4
pH / Fluid Loss	NA
Source of Sample	NA
Rm @ Meas. Temp	NA
Rmf @ Meas. Temp	NA
Rmc @ Meas. Temp	NA
Source Rmf / Rmc	NA
Rm @ BHT	NA
Time Circulation Stopped	NA
Time Logger on Bottom	NA
Maximum Recorded Temperature	NA
Equipment Number	BA-201
Location	LAKE WORTH
Recorded By	D. VANN
Witnessed By	J. Fredrichs

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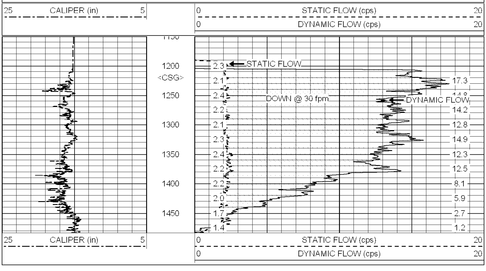
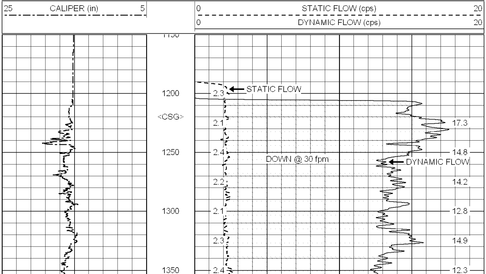
Comments

DYNAMIC AND STATIC FLOWMETER LOGS PERFORMED
DOWN @ 30 FEET PER MINUTE LINESPEED
CALIPER
Q= ~1500 gpm

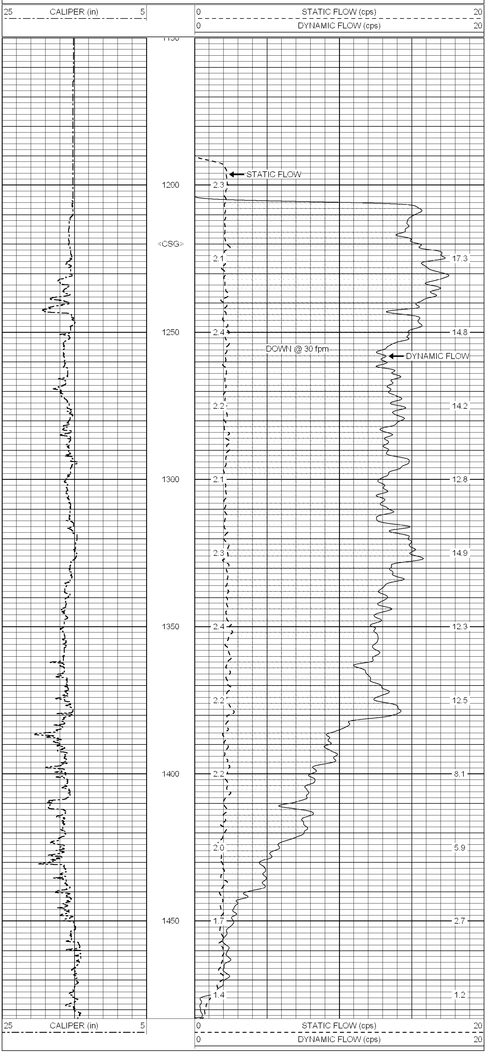
Database File: c:\warrior\data\f-2 folder\29 aug 06 folder\flow cal2.db
Dataset Pathname: pass1
Presentation Format: AWEFLO~1
Dataset Creation: Tue Aug 29 08:42:58 2006
Charted by: Depth in Feet scaled 1:1200



Database File: c:\warrior\data\f-2 folder\29 aug 06 folder\flow cal2.db
Dataset Pathname: pass1
Presentation Format: AWEFLO~1
Dataset Creation: Tue Aug 29 08:42:58 2006
Charted by: Depth in Feet scaled 1:600



Database File: c:\warrior\data\f-2 folder\29 aug 06 folder\flow cal2.db
Dataset Pathname: pass1
Presentation Format: AWEFLO~1
Dataset Creation: Tue Aug 29 08:42:58 2006
Charted by: Depth in Feet scaled 1:240



FLUID CONDUCTIVITY & TEMPERATURE LOG

ALL-WEBBS

Company: City of Lake Worth
Well: F-2
Field: Lake Osbourne
State/Prv: Florida
Country: USA

Company: City of Lake Worth
Well: F-2
Field: Lake Osbourne
State/Province: Florida
Country: USA
Location: Section Township, Range 26 44N 43

Elevation
Permanent Datum:
Log Measured From:
Drilling Measured From:
Land Surface:
Land Surface:
K.B.:
D.F.:
G.L.:

Other Services

Run Number	One
Depth Logged	1484
Depth Logger	1484
Bottom Logged Interval	1484
Top Logged Interval	1218
Casing Driller	1218
Casing Logger	1218
Bit Size	6.25
Type Fluid in Hole	WATER
Density / Viscosity	
pH / Fluid Loss	
Source of Sample	
Rm @ Meas. Temp	
Rmf @ Meas. Temp	
Rmc @ Meas. Temp	
Source of Rmf / Rmc	
Time Circulation Stopped	
Time Logger on Bottom	
Maximum Recorded Temperature	
Equipment Number	
Location	
Recorded By	
Witnessed By	

	26-Jul-06
	1
	1484
	1484
	1218
	1218
	1218
	6.25
	WATER
	14:30
	LA-201
	Lake Worth
	D. Welch, Jr.
	J. Fredricks

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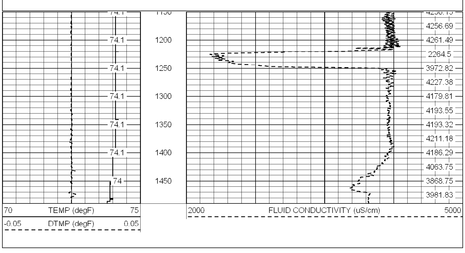
Comments

DYNAMIC DOWN PASS @ 30 FEET PER MINUTE
FLOW Q=~1000 gpm
CALIBRATED 26 JULY 06

Database File: c:\warrior\data\lf-2 folder\plot folder\fluid cond\9041a.db
Dataset Pathname: pass1
Presentation Format: AVECON-1
Dataset Creation: Tue Aug 29 09:43:58 2006
Charted by: Depth in Feet scaled 1:1200

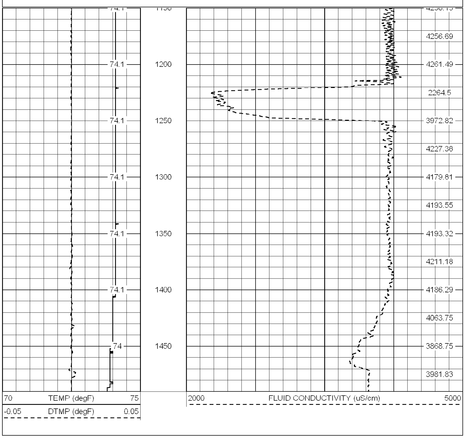
70 TEMP (degF) 75 | 2000 FLUID CONDUCTIVITY (uS/cm) 5000
-0.05 DTMP (degF) 0.05



70 TEMP (degF) 75 | 2000 FLUID CONDUCTIVITY (uS/cm) 5000
-0.05 DTMP (degF) 0.05

Database File: c:\warrior\data\lf-2 folder\plot folder\fluid cond\9041a.db
Dataset Pathname: pass1
Presentation Format: AVECON-1
Dataset Creation: Tue Aug 29 09:43:58 2006
Charted by: Depth in Feet scaled 1:600

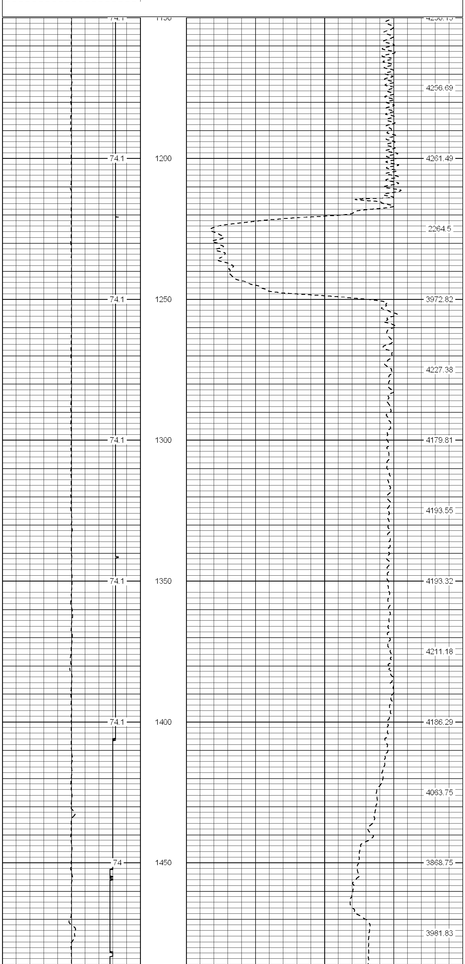
70 TEMP (degF) 75 | 2000 FLUID CONDUCTIVITY (uS/cm) 5000
-0.05 DTMP (degF) 0.05



70 TEMP (degF) 75 | 2000 FLUID CONDUCTIVITY (uS/cm) 5000
-0.05 DTMP (degF) 0.05

Database File: c:\warrior\data\lf-2 folder\plot folder\fluid cond\9041a.db
Dataset Pathname: pass1
Presentation Format: AVECON-1
Dataset Creation: Tue Aug 29 09:43:58 2006
Charted by: Depth in Feet scaled 1:240

70 TEMP (degF) 75 | 2000 FLUID CONDUCTIVITY (uS/cm) 5000
-0.05 DTMP (degF) 0.05



70 TEMP (degF) 75 | 2000 FLUID CONDUCTIVITY (uS/cm) 5000
-0.05 DTMP (degF) 0.05

ALLWEBBS

DYNAMIC FLUID CONDUCTIVITY TEMPERATURE

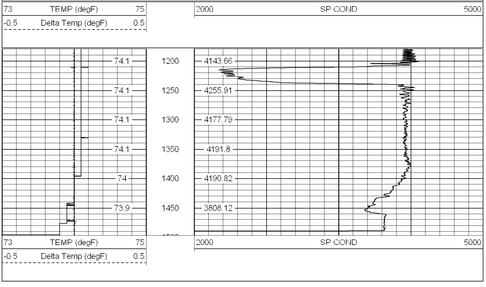
Company: City of Lake Worth
Well: F-2
Field: Lake Osbourne
Country: USA
State/Province: Florida
Location: Section, Township, Range 20, 44, 43
Other Services:

Permanent Datum: Elevation
Log Measured From: Land Surface 39 Jul 06
Drilling Measured From: Land Surface
K.B.
D.F.
G.L.

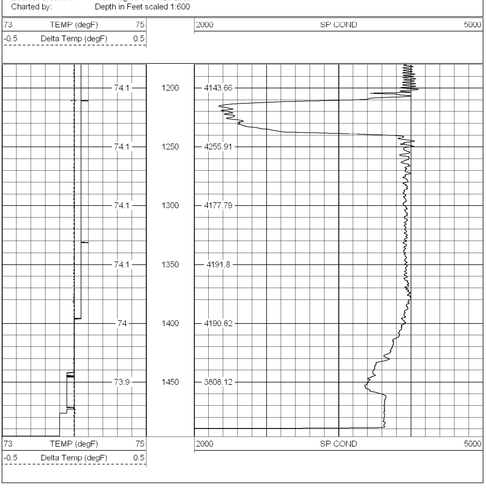
Run Number	
Depth Driller	
Depth Logged	1454
Bottom Logged Interval	1454
Top Log Interval	
Casing Driller	1316
Casing Logger	1316
Bit Size	14.75
Type Fluid in Hole	
Density / Viscosity	
pH / Fluid Loss	
Source of Sample	
Rm @ Meas. Temp	
Rmf @ Meas. Temp	
Rmc @ Meas. Temp	
Source Rmf / Rmc	
Rm @ BHT	
Time Circulation Stopped	
Time Logger on Bottom	
Maximum Recorded Temperature	
Equipment Number	
Location	
Recorded By	D. Marchesani
Witnessed By	J. Friedrichs

Comments

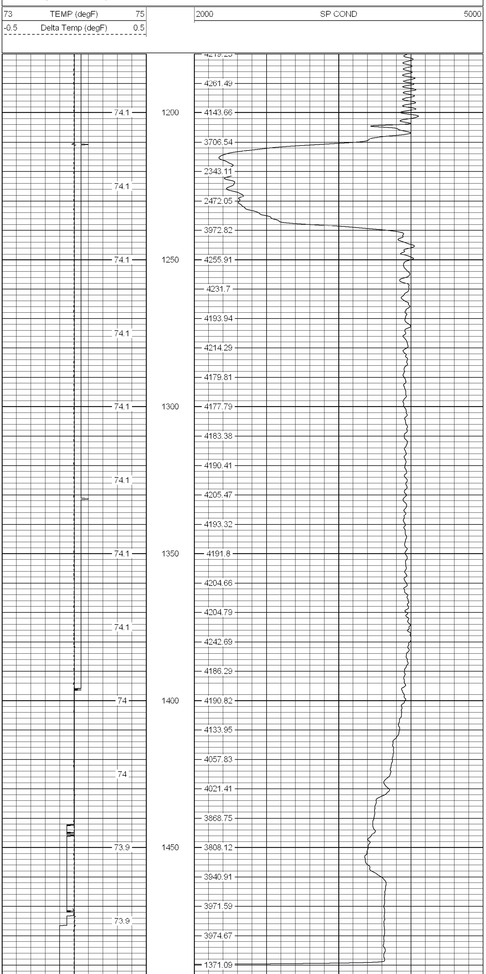
Database File: c:\warrior\data\merge folder\awe b folder\wednesday folder\9041,1200.db
Dataset Pathname: @00000a50
Presentation Format: AWE2_1~1
Dataset Creation: Wed Aug 09 08:41:25 2006
Charted by: Depth in Feet scaled 1:1200



Database File: c:\warrior\data\merge folder\awe b folder\wednesday folder\9041,600.db
Dataset Pathname: @00000a50
Presentation Format: AWE2_6~1
Dataset Creation: Wed Aug 09 08:41:25 2006
Charted by: Depth in Feet scaled 1:600



Database File: c:\warrior\data\merge folder\awe b folder\wednesday folder\9041.db
Dataset Pathname: @00000a50
Presentation Format: awe2
Dataset Creation: Wed Aug 09 08:41:25 2006
Charted by: Depth in Feet scaled 1:240



ALLWEBBS ENTERPRISES, INC.

Dual Induction
Spontaneous Potential
Gamma

Company	City of Lake Worth
Well	F-2
Field	Lake Osbourne
Country	USA
State/Prv	Florida

Company City of Lake Worth
Well F-2
Field Lake Osbourne
Country USA State/Province Florida

Location: Section; Township; Range 28; 44; 43

Other Services

Permanent Datum: Land Surface — Elevation
Log Measured From: Land Surface
Drilling Measured From
Elevation: K.B. / D.F. / G.L.

Date	26 Jul 06		
Run Number	6		
Depth Driller	1484'		
Depth Logger	1484'		
Bottom Logged Interval	1484'		
Top Log Interval	NA		
Casing Driller	1218'		
Casing Logger	1218'		
Bit Size	14.75"		
Type Fluid in Hole	WATER		
Density / Viscosity	NA		
pH / Fluid Loss	NA		
Source of Sample	NA		
Rm @ Meas. Temp	NA		
Rmf @ Meas. Temp	NA		
Rmc @ Meas. Temp	NA		
Source of Rmf / Rmc	NA		
Rm @ BHT	NA		
Time Circulation Stopped	NA		
Time Logger on Bottom	19:10		
Maximum Recorded Temperature	NA		
Equipment Number	VA-201		
Location	Lake Worth		
Recorded By	D. Marchesani	D. Webb, Jr.	
Witnessed By	J. Fredrichs		

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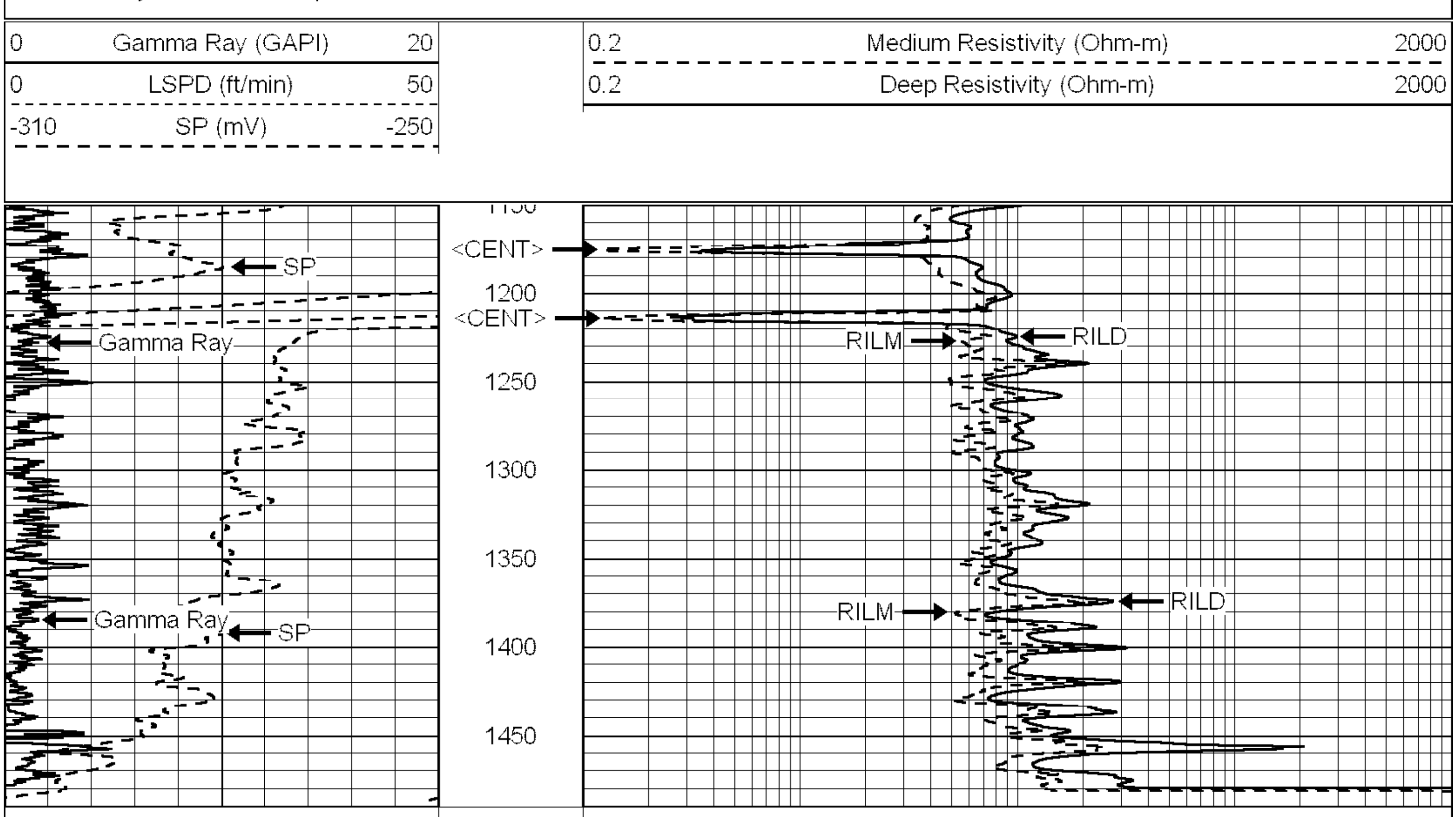
Comments

NOTE: "CENT" in the depth column indicates the location of casing Centralizers.
Q=~1000 gpm

Database File: c:\warrior\data\f-2 folder\plot folder\duin\duin_sp3.db
Dataset Pathname: pass1
Presentation Format: duin
Dataset Creation: Tue Aug 29 10:17:29 2006
Charted by: Depth in Feet scaled 1:1200

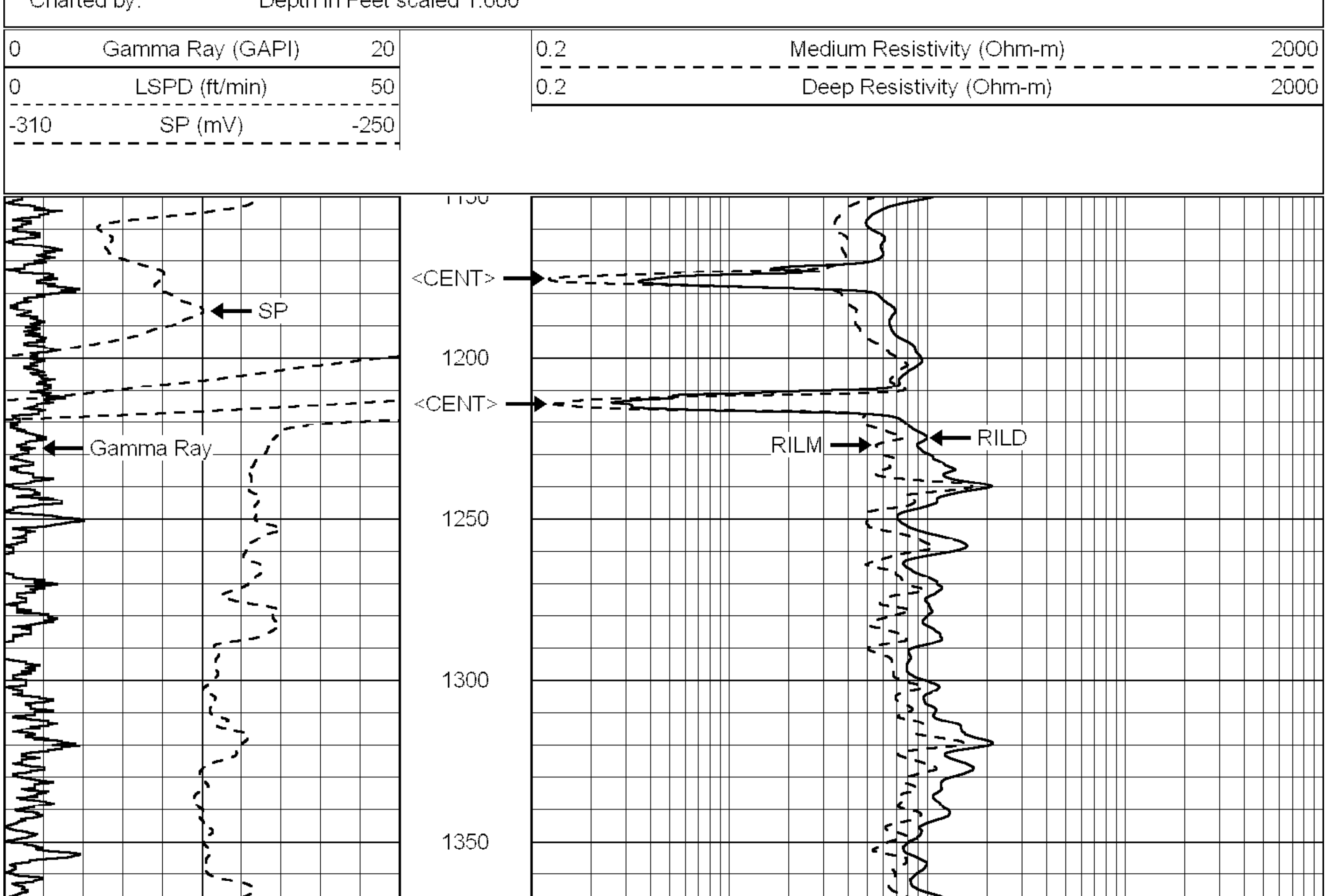
0	Gamma Ray (GAPI)	20	0.2 Medium Resistivity (Ohm-m)	2000
0	LSPD (ft/min)	50	0.2 Deep Resistivity (Ohm-m)	2000
-310	SP (mV)	-250		



0	Gamma Ray (GAPI)	20	0.2 Medium Resistivity (Ohm-m)	2000
0	LSPD (ft/min)	50	0.2 Deep Resistivity (Ohm-m)	2000
-310	SP (mV)	-250		

Database File: c:\warrior\data\f-2 folder\plot folder\duin\duin_sp3.db
Dataset Pathname: pass1
Presentation Format: duin
Dataset Creation: Tue Aug 29 10:17:29 2006
Charted by: Depth in Feet scaled 1:600

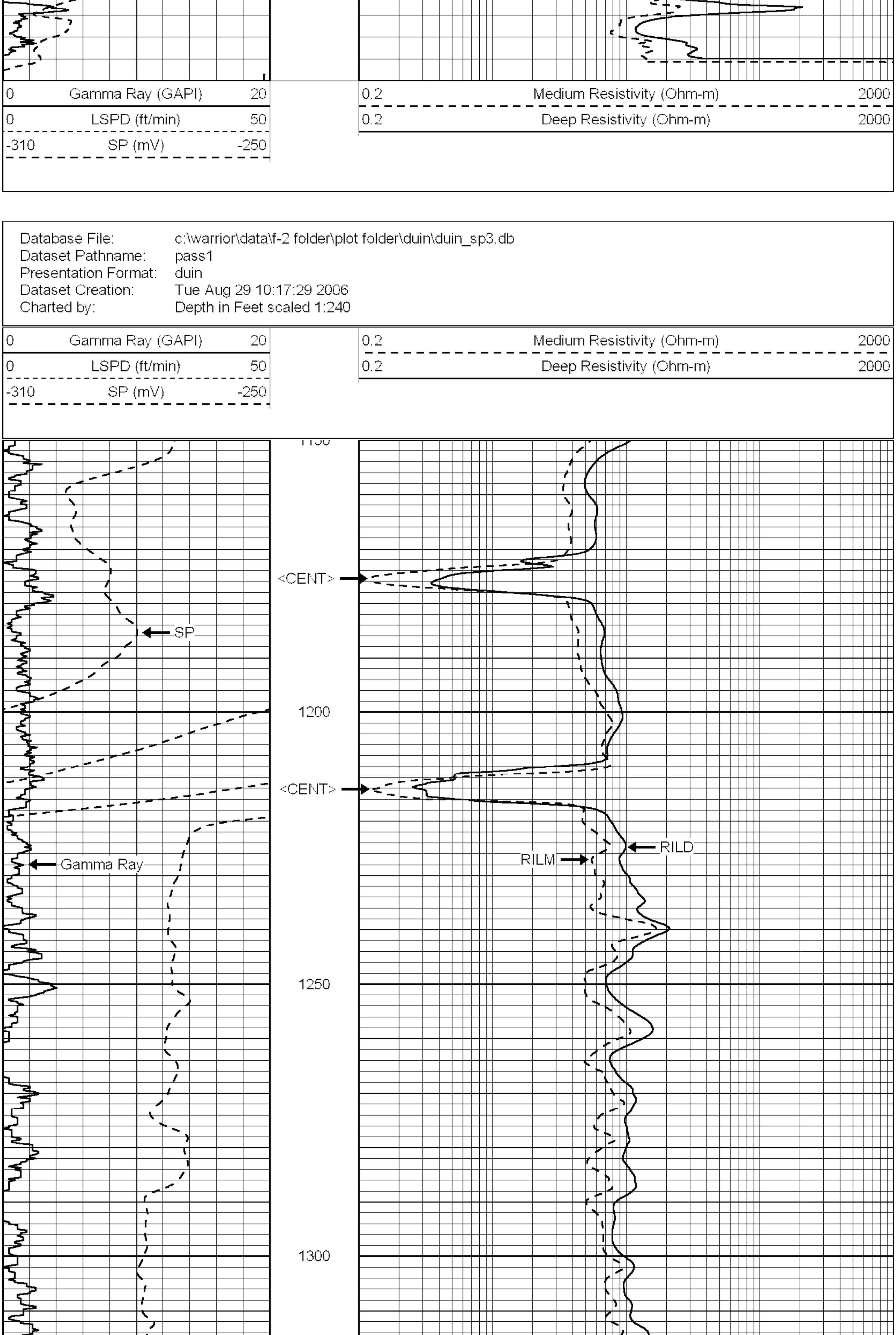
0	Gamma Ray (GAPI)	20	0.2 Medium Resistivity (Ohm-m)	2000
0	LSPD (ft/min)	50	0.2 Deep Resistivity (Ohm-m)	2000
-310	SP (mV)	-250		



0	Gamma Ray (GAPI)	20	0.2 Medium Resistivity (Ohm-m)	2000
0	LSPD (ft/min)	50	0.2 Deep Resistivity (Ohm-m)	2000
-310	SP (mV)	-250		

Database File: c:\warrior\data\f-2 folder\plot folder\duin\duin_sp3.db
Dataset Pathname: pass1
Presentation Format: duin
Dataset Creation: Tue Aug 29 10:17:29 2006
Charted by: Depth in Feet scaled 1:240

0	Gamma Ray (GAPI)	20	0.2 Medium Resistivity (Ohm-m)	2000
0	LSPD (ft/min)	50	0.2 Deep Resistivity (Ohm-m)	2000
-310	SP (mV)	-250		



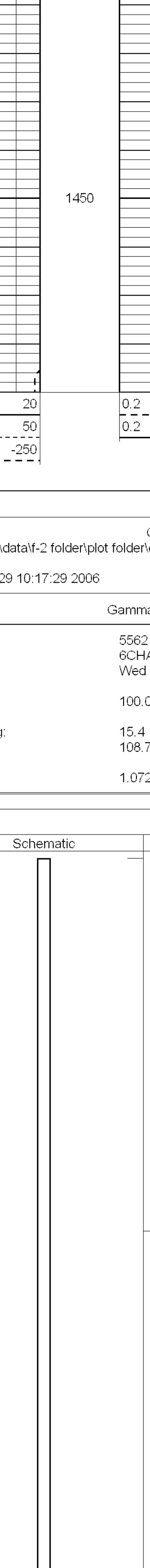
0	Gamma Ray (GAPI)	20	0.2 Medium Resistivity (Ohm-m)	2000
0	LSPD (ft/min)	50	0.2 Deep Resistivity (Ohm-m)	2000
-310	SP (mV)	-250		

Calibration Report

Database File: c:\warrior\data\f-2 folder\plot folder\duin\duin_sp3.db
Dataset Pathname: pass1
Dataset Creation: Tue Aug 29 10:17:29 2006

Gamma Ray Calibration Report

Serial Number:	5562	
Tool Model:	6CHAN	
Performed:	Wed Mar 01 15:51:40 2006	
Calibrator Value:	100.0	GAPI
Background Reading:	15.4	
Calibrator Reading:	108.7	
Sensitivity:	1.0724	GAPI/

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
RGDILGR	7.06		RGDILGR-6CHAN (5562) Robertson Geologging Dual Induction Gamma Ray	7.06	1.50	13.67
GR	6.50					
CILD	2.63					
CILM	1.54					

Dataset: duin_sp3.db: field/well/run1/pass1
Total Length: 7.06 ft
Total Weight: 13.67 lb
O.D.: 1.50 in

ALLWEBBS

DUIN
Spontaneous Potential
GAMMA

Company	City of Lake Worth
Well	F-2
Field	Lake Osbourne
Country	USA
State/Prv	Florida
Location	
Section, Township, Range	22, 44, 43
Permanent Datum	
Log Measured From	
Drilling Measured From	
Elevation	K.B. D.F. G.L.
Other Services	

Date	31-Jul-06
Run Number	
Depth Driller	1454
Depth Logged	1454
Bottom Logged Interval	
Top Log Interval	
Casing Driller	1316
Casing Logger	1316
Bit Size	12.25
Type Fluid in Hole	14.75
Density / Viscosity	
pH / Fluid Loss	
Source of Sample	
Rm @ Meas. Temp	
Rmf @ Meas. Temp	
Rmc @ Meas. Temp	
Source of Rmf / Rmc	
Rm @ BHT	
Time Circulation Stopped	
Time Logger on Bottom	
Maximum Recorded Temperature	
Equipment Number	
Location	
Recorded By	
Witnessed By	D. Marchmont J. Friedrichs
	D. Webb, Jr.

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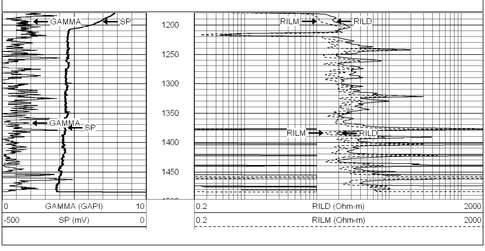
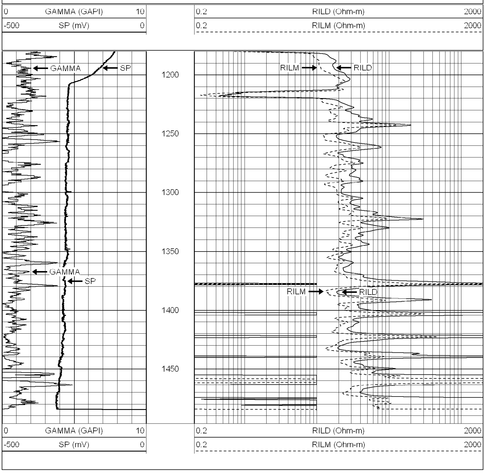
Comments

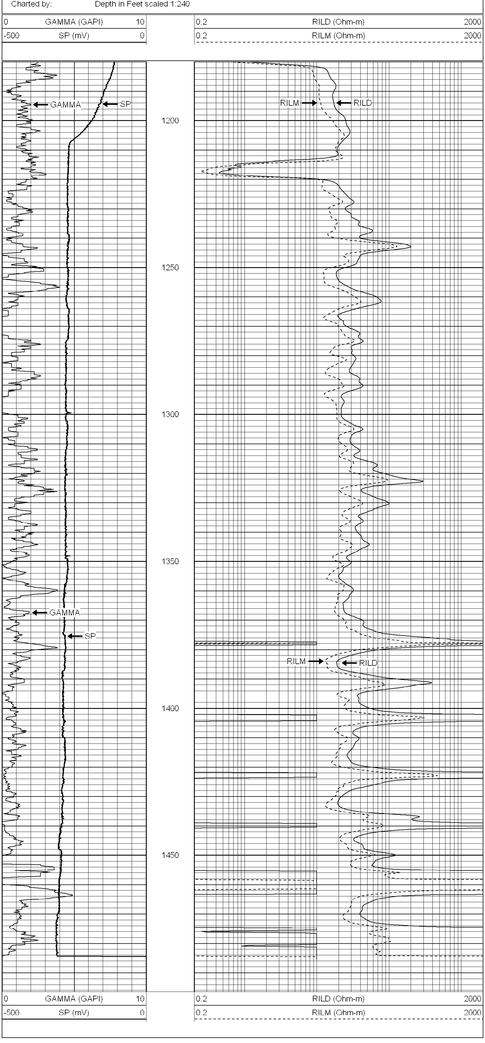
Database File: c:\warrior\data\merge folder\awe a folder\wednesday folder\duin.1200.db
Dataset Pathname: pass1
Presentation Format: awe1
Dataset Creation: Thu Aug 03 10:55:05 2006
Charted by: Depth in Feet scaled 1:1200



Database File: c:\warrior\data\merge folder\awe a folder\wednesday folder\duin.600.db
Dataset Pathname: pass1
Presentation Format: awe1
Dataset Creation: Thu Aug 03 10:55:05 2006
Charted by: Depth in Feet scaled 1:600



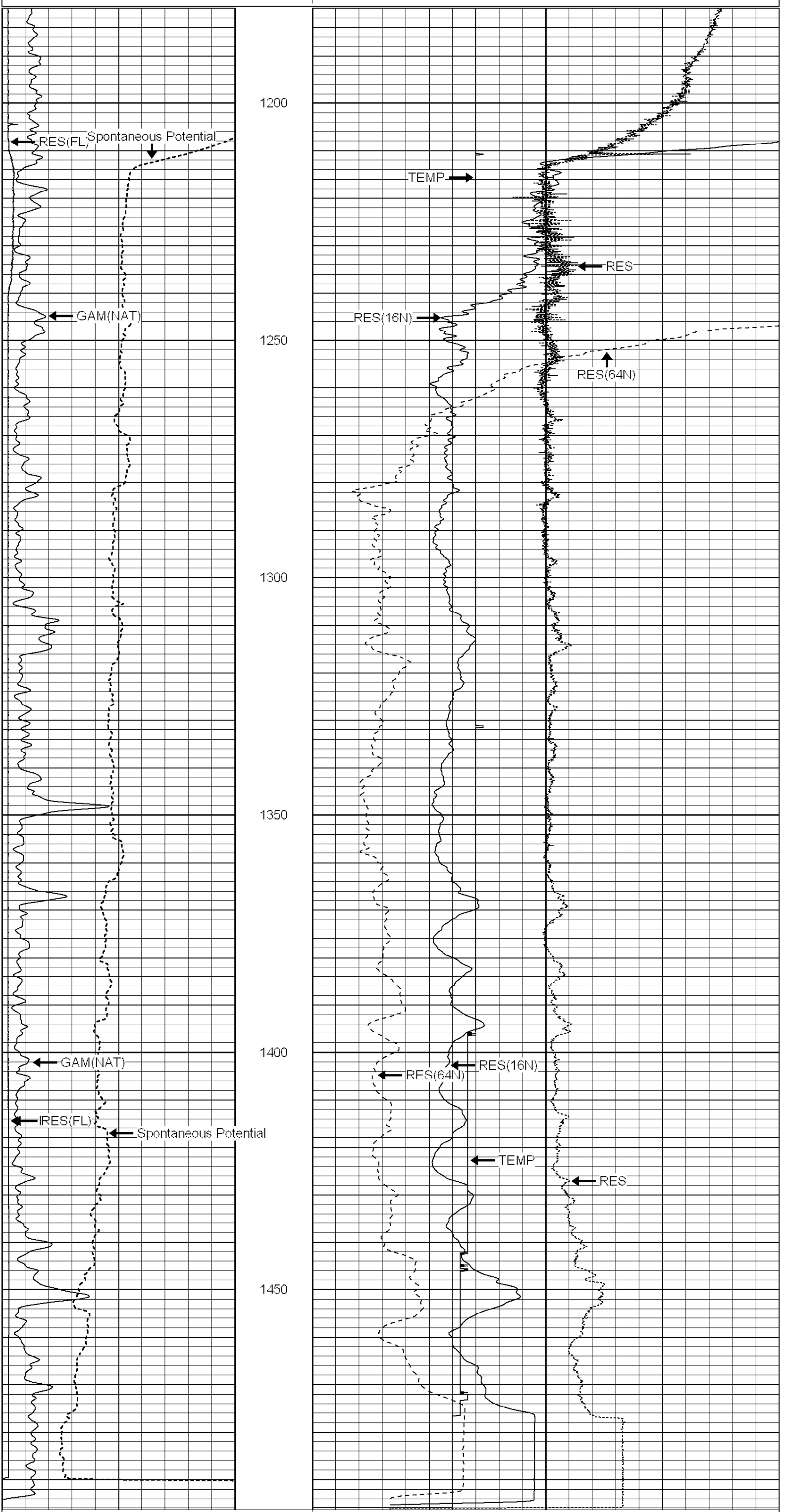
Database File: c:\warrior\data\merge folder\awe a folder\wednesday folder\duin.240.db
Dataset Pathname: pass1
Presentation Format: awe1
Dataset Creation: Thu Aug 03 10:55:05 2006
Charted by: Depth in Feet scaled 1:240



Database File: c:\warrior\data\f-2 folder\plot folder\1,240.db
Dataset Pathname: @00000a50
Presentation Format: elog2
Dataset Creation: Tue Aug 01 16:15:22 2006
Charted by: Depth in Feet scaled 1:240

-350	Spontaneous Potential (mV)	-200
0	GAM(NAT) (API)	200
0	RES(FL) (Ohm-m)	10

-10	RES(16N) (Ohm-m)	50
72	TEMP (degF)	78
-10	RES (Ohm)	50
-10	RES(64N) (Ohm-m)	50



-350	Spontaneous Potential (mV)	-200
0	GAM(NAT) (API)	200
0	RES(FL) (Ohm-m)	10

-10	RES(16N) (Ohm-m)	50
72	TEMP (degF)	78
-10	RES (Ohm)	50
-10	RES(64N) (Ohm-m)	50

Company	Lake Worth Utilities
Well	F-2
Field	Lake Worth
County	Palm Beach
State/Prv	Florida

MV Geophysical

X-Y CALIPER GAMMA RAY LOG

Company: Lake Worth Utilities
Well: F-2
Field: Lake Worth
County: Palm Beach
State/Prv: Florida

Location: City of Lake Worth Water Treatment Plant
JLA Geosciences, Inc.

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Comments

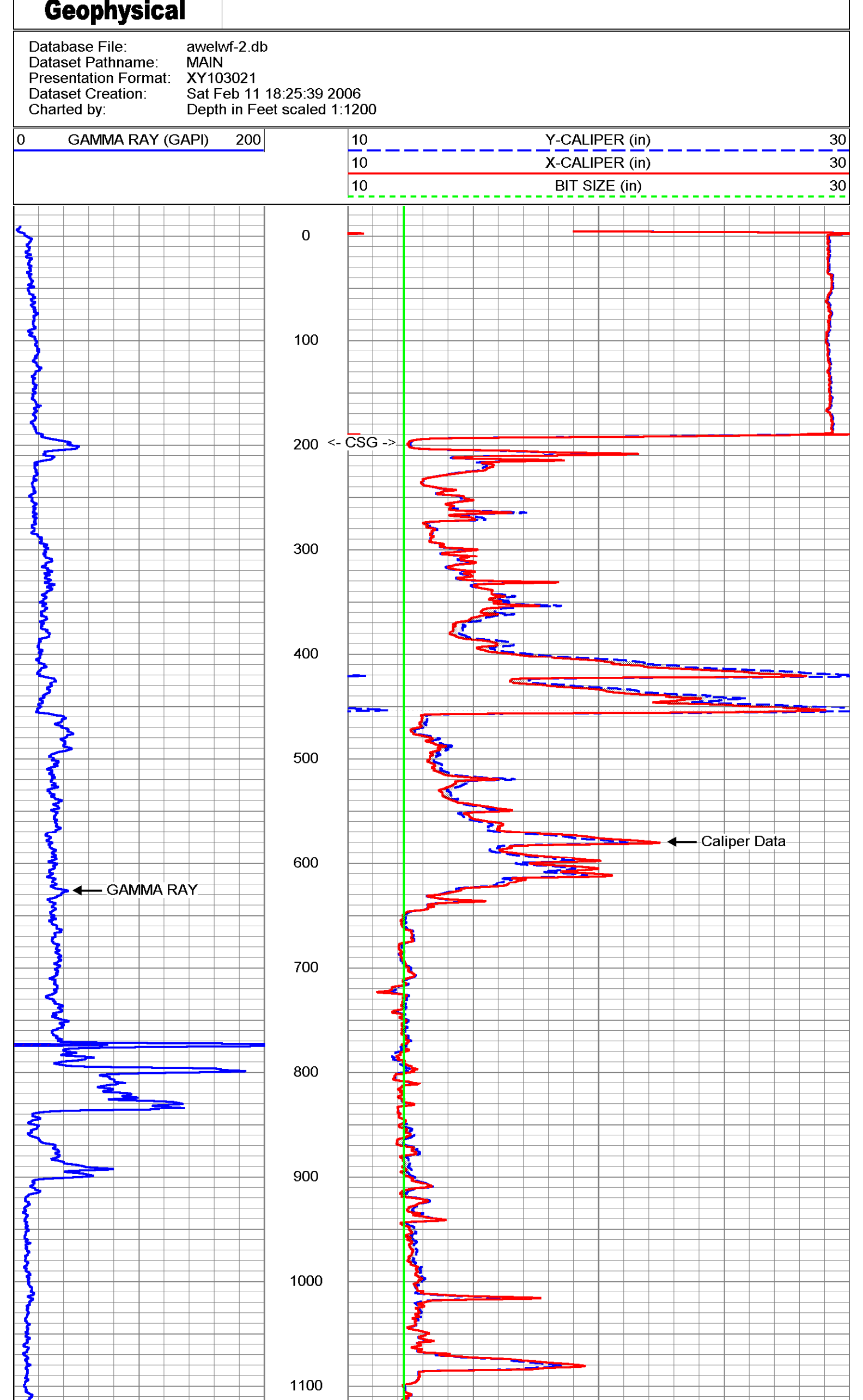
MAXIMUM Caliper Arm Extension: 33"

Drilling Contractor: All Webb Enterprises, Inc.

MV Geophysical

MAIN PASS

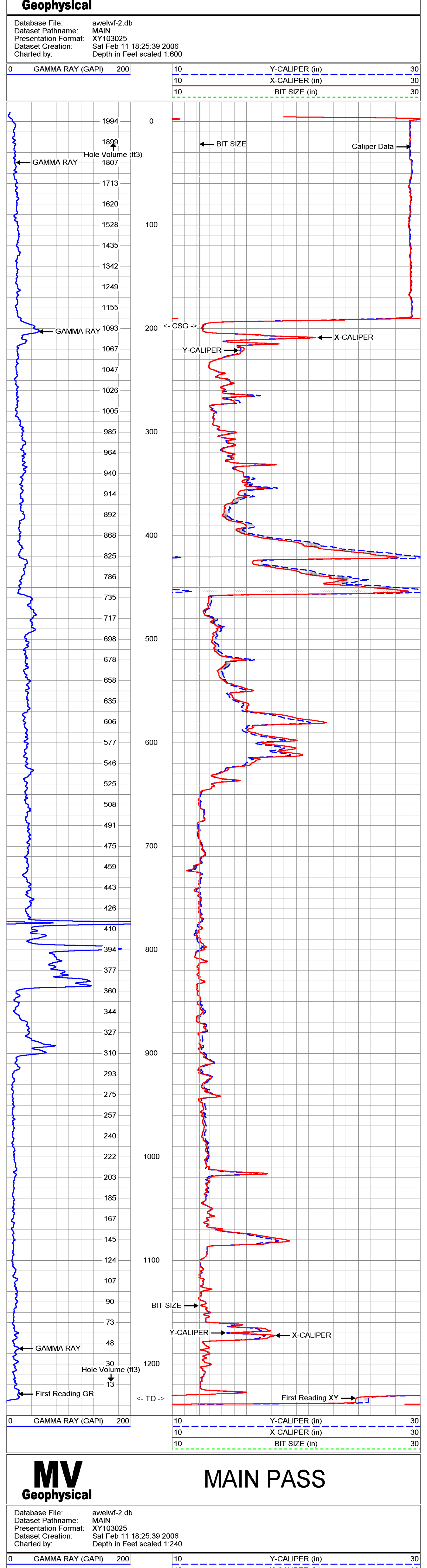
Database File: awelwf-2.db
Dataset Pathname: MAIN
Presentation Format: XY103021
Dataset Creation: Sat Feb 11 18:25:39 2006
Charted by: Depth in Feet scaled 1:1200



MV Geophysical

MAIN PASS

Database File: awelwf-2.db
Dataset Pathname: MAIN
Presentation Format: XY103025
Dataset Creation: Sat Feb 11 18:25:39 2006
Charted by: Depth in Feet scaled 1:600



MV Geophysical

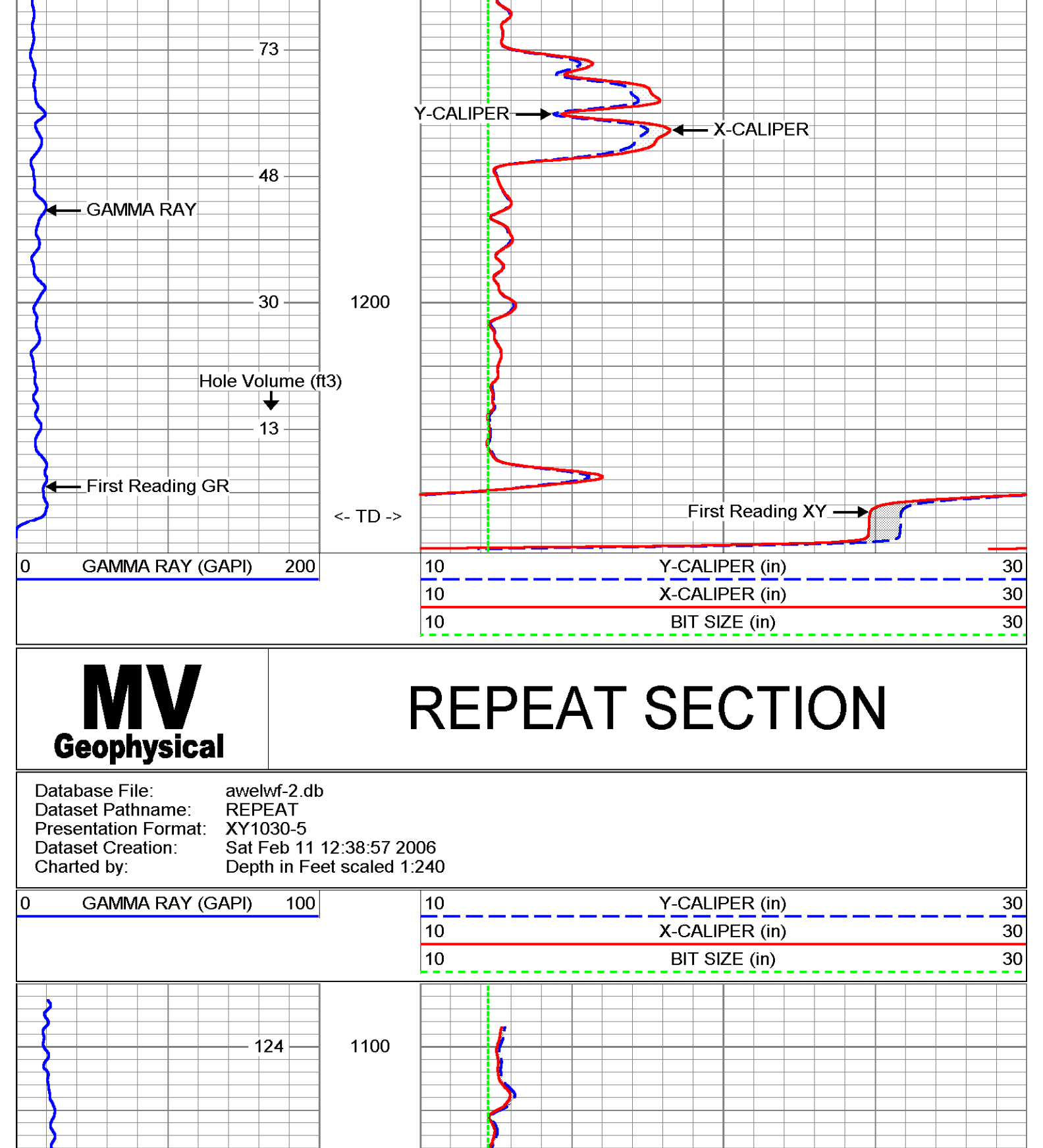
MAIN PASS

Database File: awelwf-2.db
Dataset Pathname: MAIN
Presentation Format: XY103025
Dataset Creation: Sat Feb 11 18:25:39 2006
Charted by: Depth in Feet scaled 1:240

MV Geophysical

REPEAT SECTION

Database File: awelwf-2.db
Dataset Pathname: REPEAT
Presentation Format: XY1030-5
Dataset Creation: Sat Feb 11 12:38:57 2006
Charted by: Depth in Feet scaled 1:240

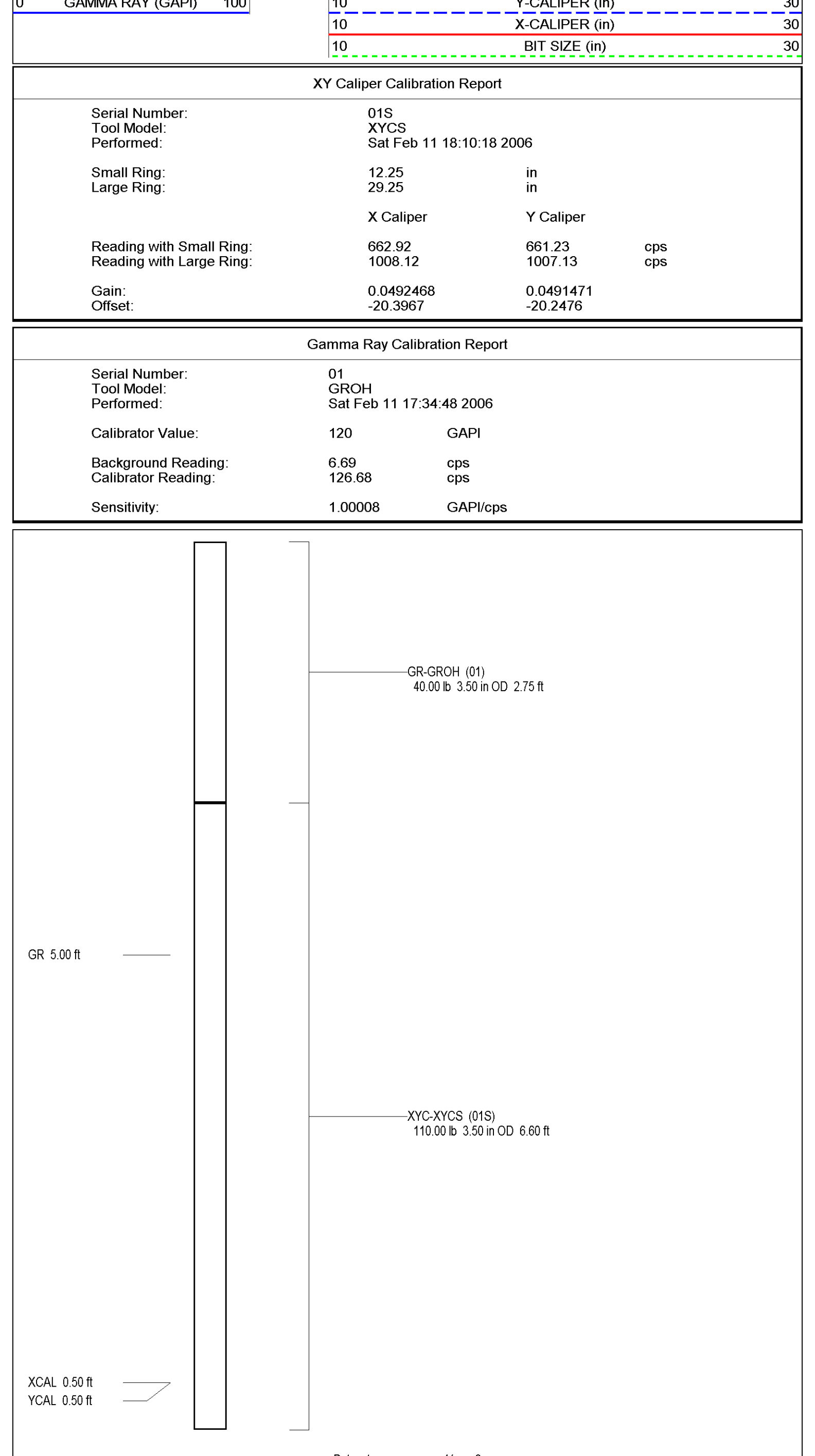


XY Caliper Calibration Report

Serial Number:	01S		
Tool Model:	XYCS		
Performed:	Sat Feb 11 18:10:18 2006		
Small Ring:	12.25	in	
Large Ring:	29.25	in	
	X Caliper	Y Caliper	
Reading with Small Ring:	662.92	661.23	cps
Reading with Large Ring:	1008.12	1007.13	cps
Gain:	0.0492468	0.0491471	
Offset:	-20.3967	-20.2476	

Gamma Ray Calibration Report

Serial Number:	01	
Tool Model:	GROH	
Performed:	Sat Feb 11 17:34:48 2006	
Calibrator Value:	120	GAPI
Background Reading:	6.69	cps
Calibrator Reading:	126.68	cps
Sensitivity:	1.00008	GAPI/cps



Dataset:	run1/pass2
Total Length:	9.35 ft
Total Weight:	150.00 lb
O.D.:	3.50 in

MV Geophysical

DUAL INDUCTION LL3 / SP LOG

Company	Lake Worth Utilities
Well	F-2
Field	Lake Worth
County	Palm Beach
State/Prv	Florida
Location	City of Lake Worth Water Treatment Plant J.A. Geosciences, Inc.
Permanent Datum	G.L.
Log Measured From	G.L.
Drilling Measured From	G.L.
Elevation	K.B. / D.F. / G.L.
Other Services	XY/GR
Date	11-FEB-2006
Run Number	ONE
Depth Driller	1236'
Depth Logger	1230'
Bottom Logged Interval	1230'
Top Logged Interval	100'
Open Hole Size	12.25"
Type Fluid	MUD
Density / Viscosity	9.3/47
Max. Recorded Temp.	NA
Estimated Cement Top	NA
Time Well Ready	18:00 2/11/2006
Time Logger on Bottom	18:30 2/11/2006
Equipment Number	6
Location	Ft. Myers
Recorded By	D. Webb (AWE)
Witnessed By	

Run Number	Bit	From	To	Size	Weight	From	To
ONE	12.25	SURFACE	1230				

	Size	Wgt/Ft	Top	Bottom
Casing Record	30"	0.312" WT	SURFACE	195'
Surface String				
Prot. String				
Production String				
Liner				

Invoice No. 2006027

* FIELD PRINT *

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Comments

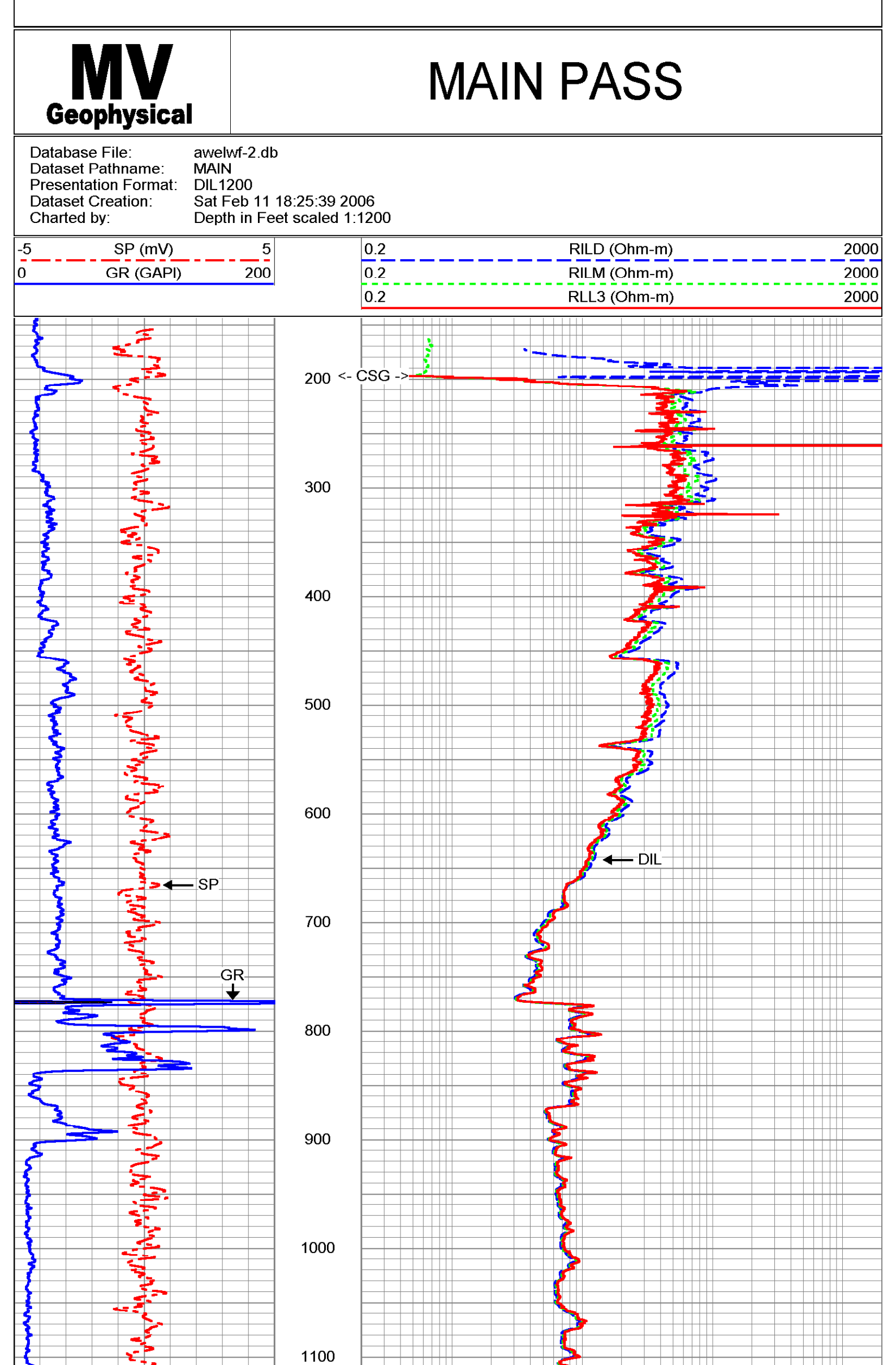
Rm=5.143 OHM-M @ 80.1 degF

Drilling Contractor: All Webb Enterprises, Inc.

MV Geophysical

MAIN PASS

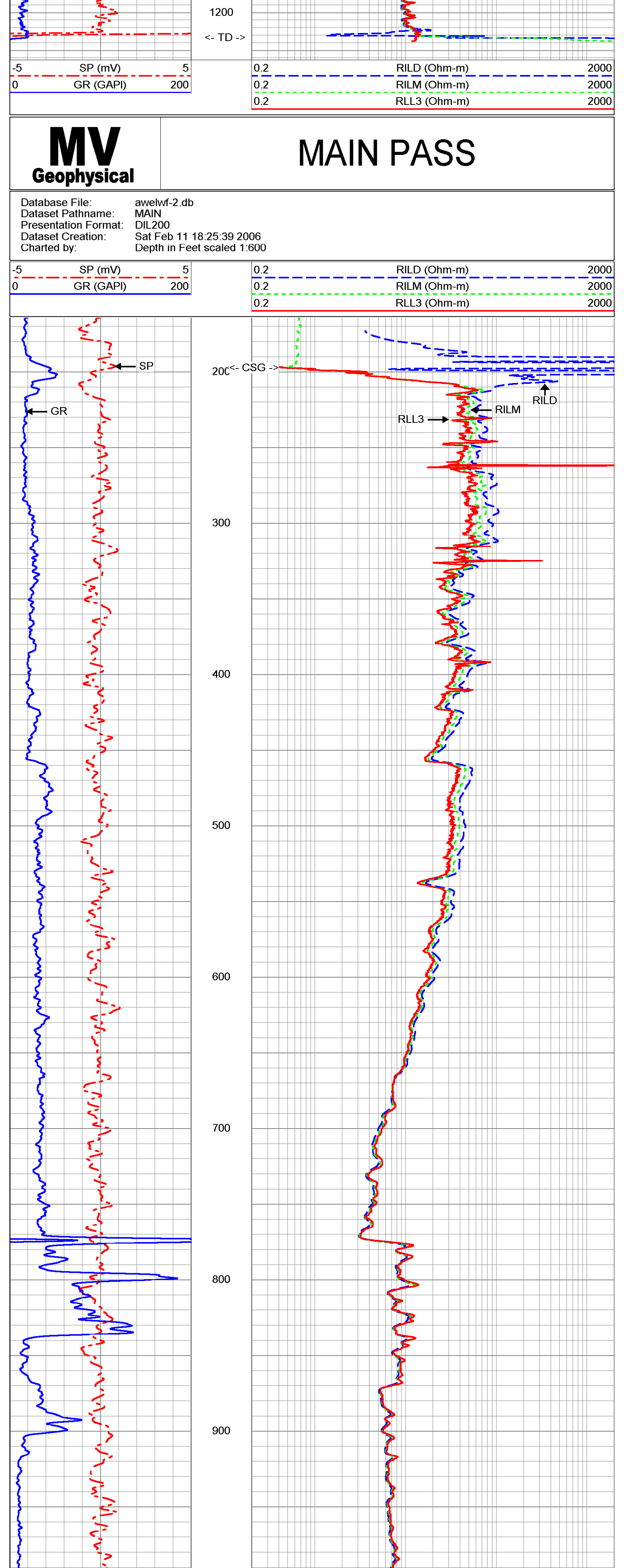
Database File: awelwf-2.db
Dataset Pathname: MAIN
Presentation Format: DIL1200
Dataset Creation: Sat Feb 11 18:25:39 2006
Charted by: Depth in Feet scaled 1:1200



MV Geophysical

MAIN PASS

Database File: awelwf-2.db
Dataset Pathname: MAIN
Presentation Format: DIL200
Dataset Creation: Sat Feb 11 18:25:39 2006
Charted by: Depth in Feet scaled 1:600



MV Geophysical

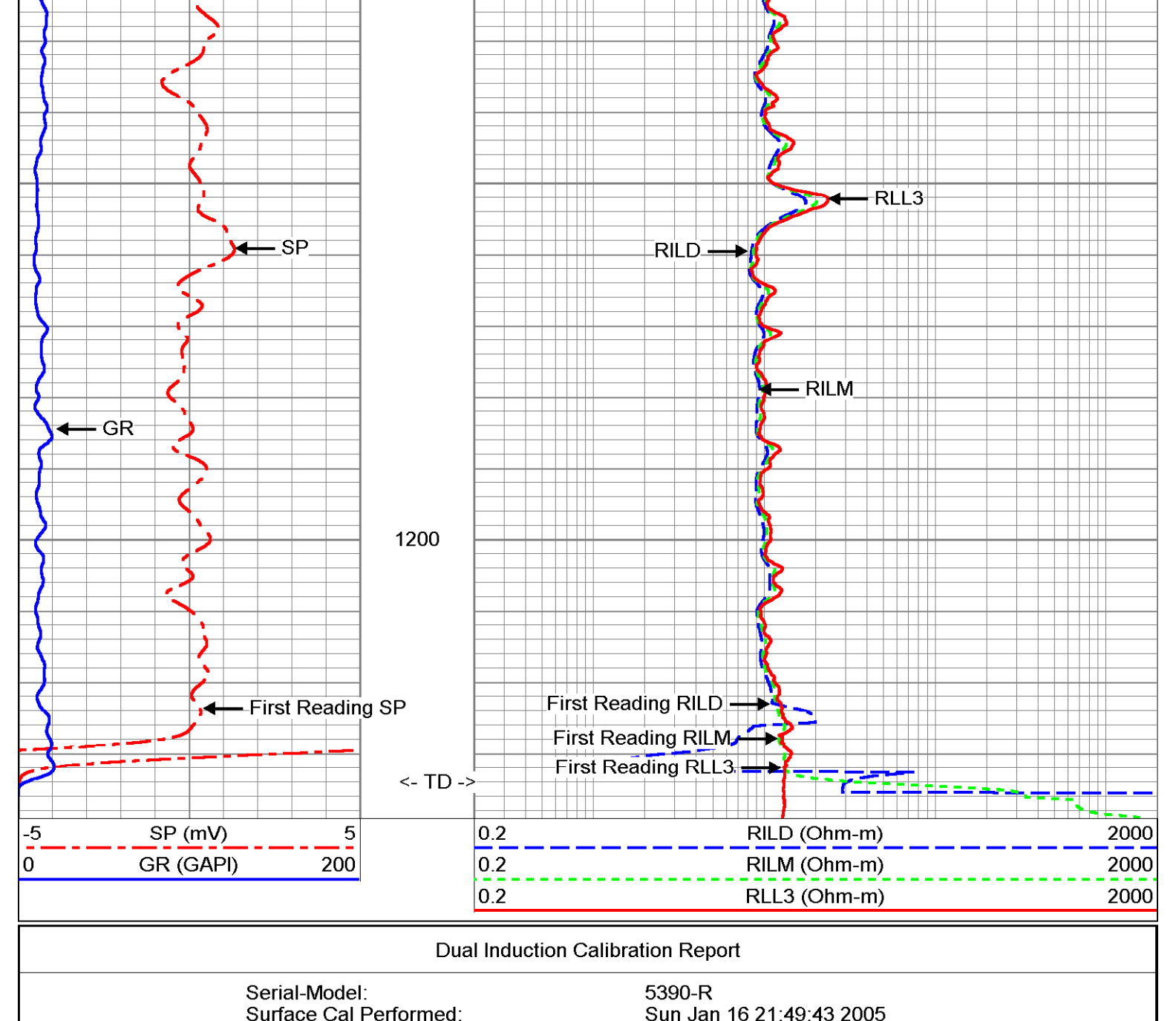
MAIN PASS

Database File: awelwf-2.db
Dataset Pathname: MAIN
Presentation Format: DIL1200
Dataset Creation: Sat Feb 11 18:25:39 2006
Charted by: Depth in Feet scaled 1:240

MV Geophysical

REPEAT SECTION

Database File: awelwf-2.db
Dataset Pathname: REPEAT
Presentation Format: DIL200
Dataset Creation: Sat Feb 11 12:38:57 2006
Charted by: Depth in Feet scaled 1:240



Dual Induction Calibration Report

Serial-Model: 5390-R
Surface Cal Performed: Sun Jan 16 21:49:43 2005
Downhole Cal Performed: Sat Feb 11 18:21:37 2006
After Survey Verification Performed: Sat Feb 11 19:17:50 2006

Surface Calibration

Loop:	Readings Air	Readings Loop		References Air	References Loop		Results m	Results b
Deep	0.050	0.646	V	0.000	400.000	mmho-m	671.771	-33.646
Medium	0.001	0.732	V	0.000	464.000	mmho-m	634.710	-0.492

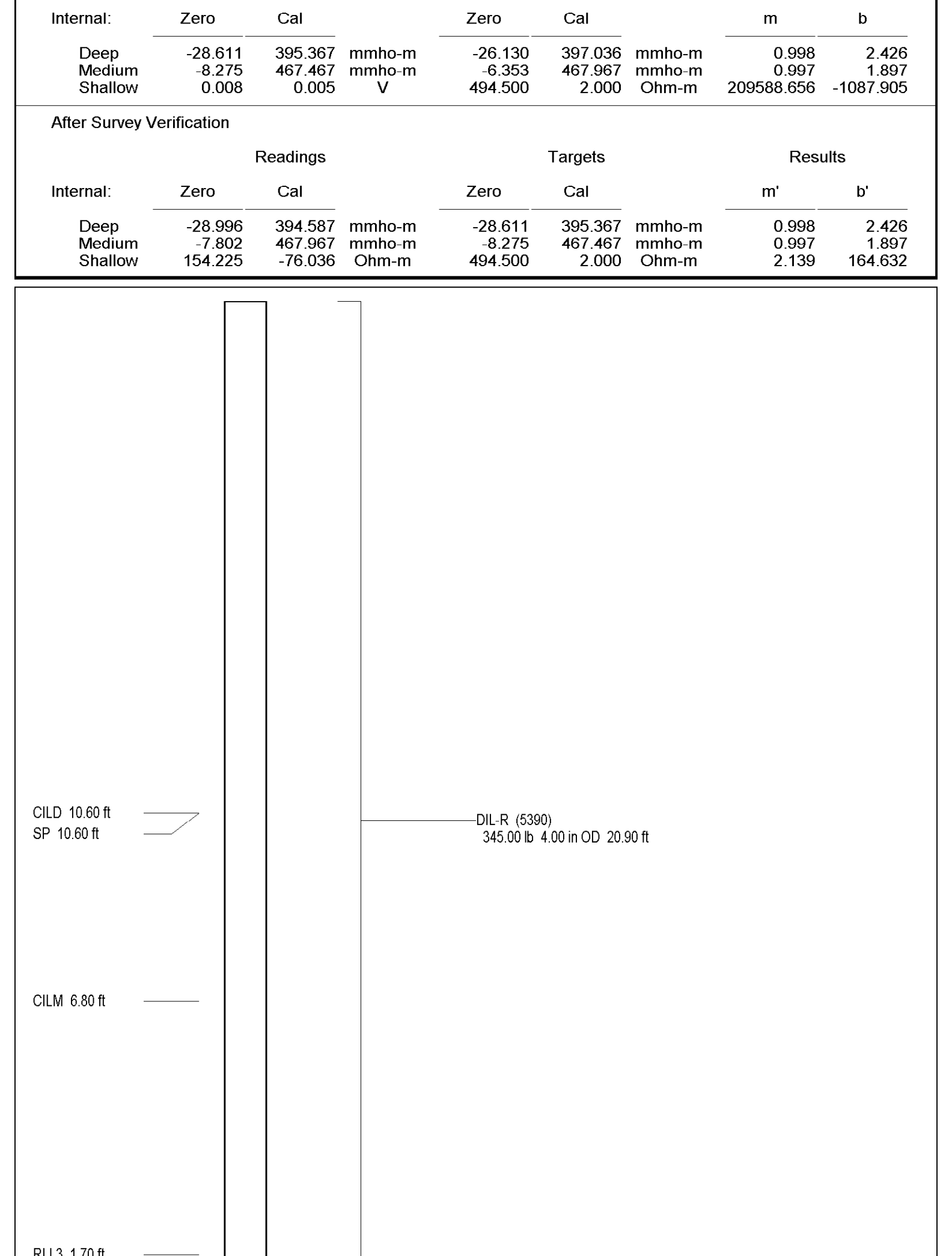
Internal:	Zero	Cal		Zero	Cal		m	b
Deep	0.011	0.641	V	0.000	400.000	mmho-m	634.996	-7.104
Medium	-0.009	0.738	V	0.000	464.000	mmho-m	620.900	5.734

Downhole Calibration

Internal:	Readings Zero	Readings Cal		References Zero	References Cal		Results m	Results b
Deep	-28.611	395.367	mmho-m	-26.130	397.036	mmho-m	0.998	2.426
Medium	8.275	467.467	mmho-m	6.353	467.967	mmho-m	0.997	1.897
Shallow	0.008	0.005	V	494.500	2.000	Ohm-m	209588.656	-1087.905

After Survey Verification

Internal:	Readings Zero	Readings Cal		Targets Zero	Targets Cal		Results m'	Results b'
Deep	-28.996	394.587	mmho-m	-28.611	395.367	mmho-m	0.998	2.426
Medium	-7.802	467.967	mmho-m	8.275	467.467	mmho-m	0.997	1.897
Shallow	154.225	-76.036	Ohm-m	494.500	2.000	Ohm-m	2.139	164.632



Dataset: run1/pass5
Total Length: 20.90 ft
Total Weight: 345.00 lb
O.D.: 4.00 in

12" PILOT HOLE LOGS: XY CALIPER AND GAMMA

ALLWEBBS ENTERPRISES, INC.

Company	City of Lake Worth
Well	F-3
Field	OSBOURNE PARK
County	PALM BEACH
State	FLORIDA

Company: City of Lake Worth
Well: F-3
Field: OSBOURNE PARK
County: PALM BEACH State: FLORIDA
Location: 29 44 43
Other Services

Permanent Datum	GL
Log Measured From	GL
Drilling Measured From	GL
Elevation	K.B. / D.F. / G.L.

Date	06/01/2007
Run Number	2
Depth Driller	1240
Depth Logger	1248
Bottom Logged Interval	1248
Top Log Interval	170
Open Hole Size	9.875
Type Fluid	BENTONITE
Density / Viscosity	
Max. Recorded Temp.	87 F
Estimated Cement Top	
Time Well Ready	1300
Time Logger on Bottom	1315
Equipment Number	VA-201
Location	OSBOURNE PARK
Recorded By	D. MARCHESI
Witnessed By	JON FREDRICHS

Run Number	Bit	From	To	Size	Weight	From	To
Borehole Record				Tubing Record			

	Size	Wgt/Ft	Top	Bottom
Casing Record				
Surface String				
Prot. String				
Production String				
Liner				

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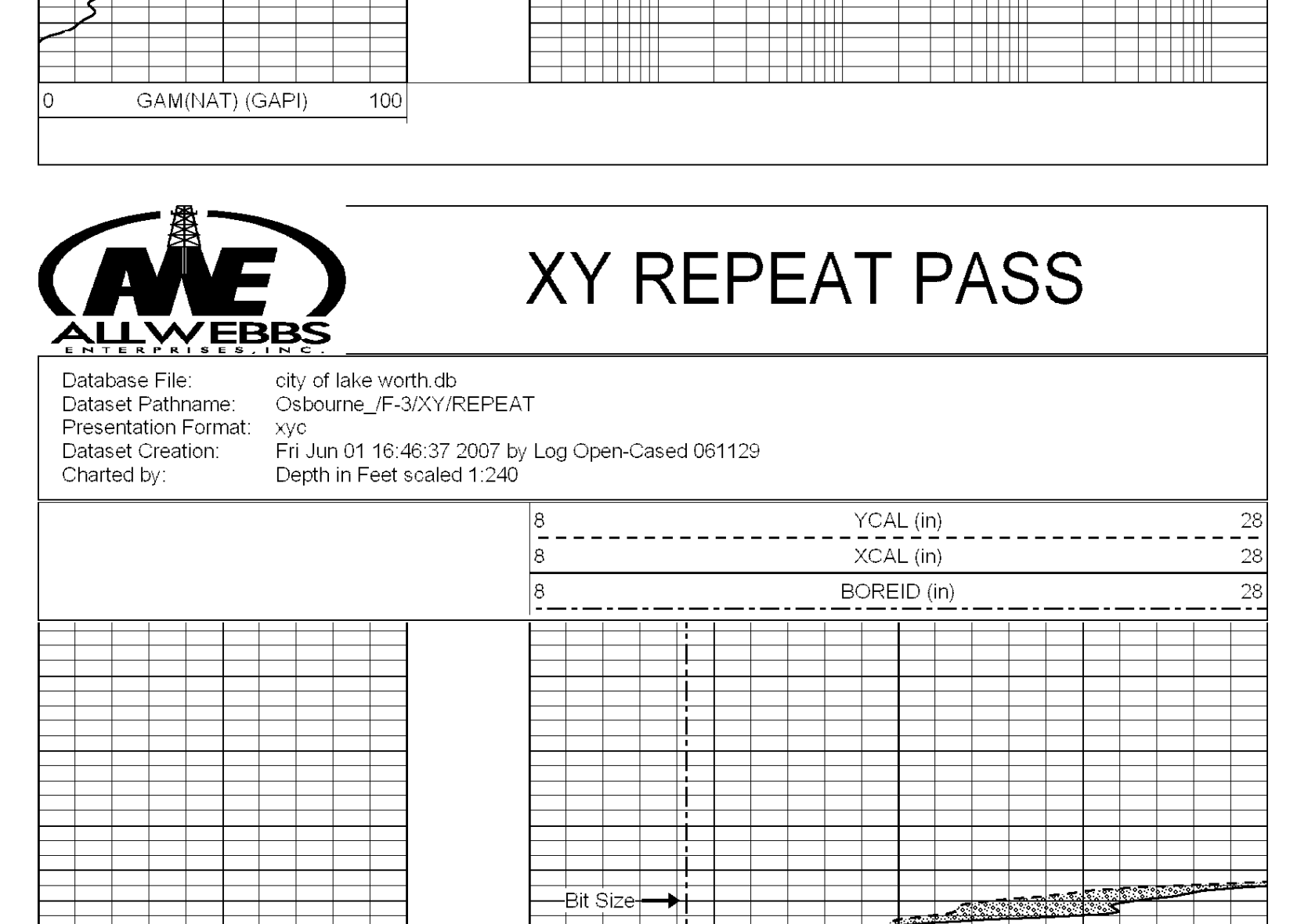
Comments

MAIN PASSES

Database File:	c:\warrior\data\f-3 folder\merge folder\gamma xy.db
Dataset Pathname:	Osbourne/F-3/run1/pass3
Presentation Format:	awe_gam_
Dataset Creation:	Fri Jun 01 17:49:55 2007
Charted by:	Depth in Feet scaled 1:240

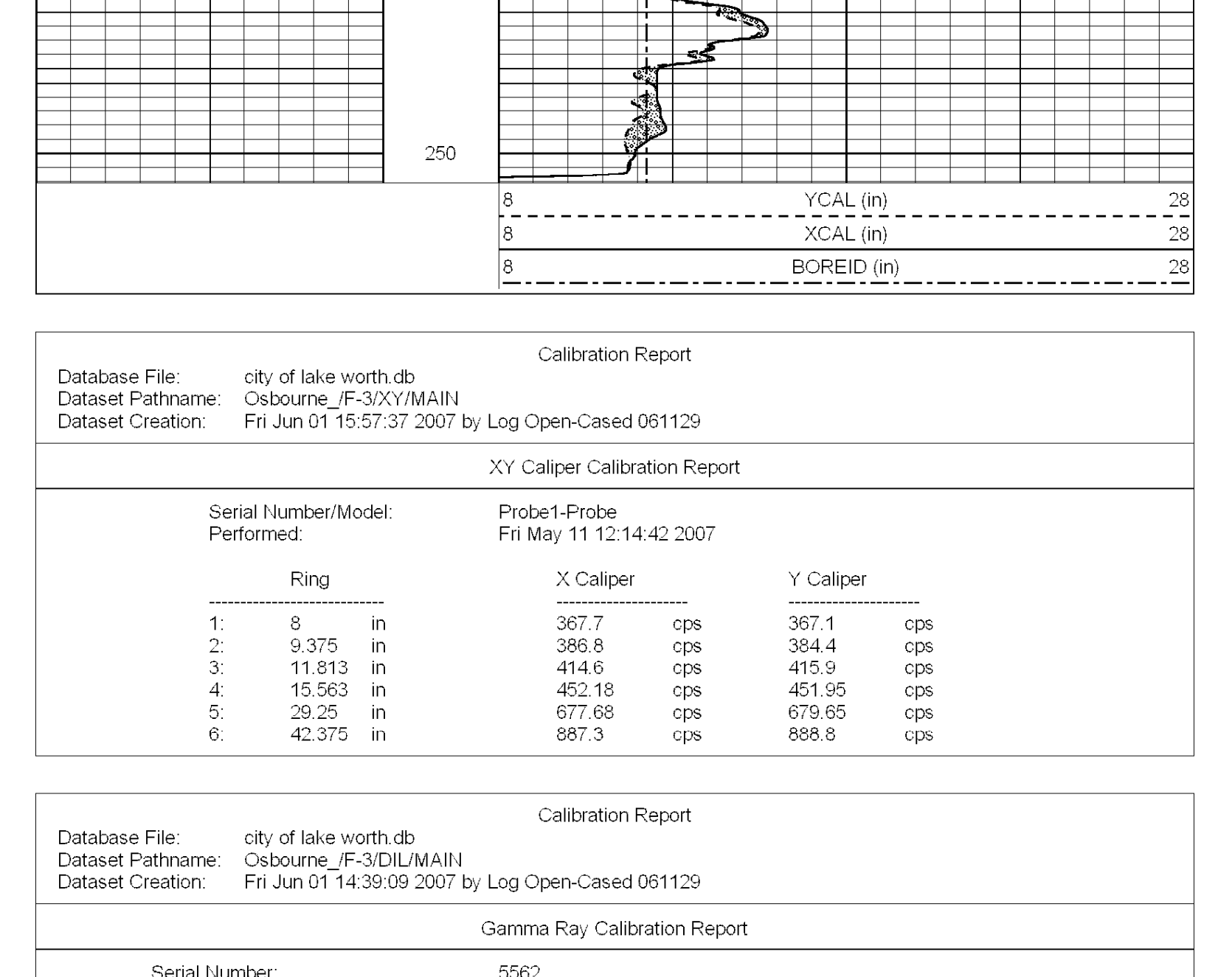
GAMMA REPEAT PASS

Database File:	city of lake worth.db
Dataset Pathname:	Osbourne_/F-3/DIL/REPEAT
Presentation Format:	dil
Dataset Creation:	Fri Jun 01 14:33:05 2007 by Log Open-Cased 061129
Charted by:	Depth in Feet scaled 1:240



XY REPEAT PASS

Database File:	city of lake worth.db
Dataset Pathname:	Osbourne_/F-3/XY/REPEAT
Presentation Format:	xyc
Dataset Creation:	Fri Jun 01 16:46:37 2007 by Log Open-Cased 061129
Charted by:	Depth in Feet scaled 1:240



Calibration Report

Database File:	city of lake worth.db
Dataset Pathname:	Osbourne_/F-3/XY/MAIN
Dataset Creation:	Fri Jun 01 15:57:37 2007 by Log Open-Cased 061129

XY Caliper Calibration Report

Serial Number/Model: Probe1-Probe
Performed: Fri May 11 12:14:42 2007

	Ring		X Caliper		Y Caliper	
1:	8	in	367.7	cps	367.1	cps
2:	9.375	in	386.8	cps	384.4	cps
3:	11.813	in	414.6	cps	415.9	cps
4:	15.563	in	452.18	cps	451.95	cps
5:	29.25	in	677.68	cps	679.65	cps
6:	42.375	in	887.3	cps	888.8	cps

Calibration Report

Database File:	city of lake worth.db
Dataset Pathname:	Osbourne_/F-3/DIL/MAIN
Dataset Creation:	Fri Jun 01 14:39:09 2007 by Log Open-Cased 061129

Gamma Ray Calibration Report

Serial Number:	5562
Tool Model:	6CHAN
Performed:	Sun Jun 13 15:33:21 1993
Calibrator Value:	1.0 GAPI
Background Reading:	0.0
Calibrator Reading:	1.0
Sensitivity:	1.0000 GAPI/

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
			XYC-Probe (Probe1)	5.17	3.50	99.00
XCAL	0.00					
YCAL	0.00					

Dataset: city of lake worth.db: Osbourne_/F-3/XY/MAIN
Total Length: 5.17 ft
Total Weight: 99.00 lb
O.D.: 3.50 in

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	6.50					
			RGDILGR-6CHAN (5562) Robertson Geologging Dual Induction Gamma Ray	7.06	1.50	13.67
CILD	2.63					
CPSD	2.63					
CILM	1.54					
CPSM	1.54					

Dataset: city of lake worth.db: Osbourne_/F-3/DIL/MAIN
Total Length: 7.06 ft
Total Weight: 13.67 lb
O.D.: 1.50 in

ALLWEBBS ENTERPRISES, INC.

12" PILOT HOLE LOGS: SP, SPR, DIL, TEMPERATURE AND GAMMA

Company	City of Lake Worth
Well	F-3
Field	OSBOURNE PARK
County	PALM BEACH
State	FLORIDA
Location	29 44 43
Other Services	

		Elevation
Permanent Datum	GL	K.B.
Log Measured From	GL	D.F.
Drilling Measured From	GL	G.L.

Date	06/01/2007
Run Number	1
Depth Driller	1240
Depth Logger	1248
Bottom Logged Interval	1248
Top Log Interval	170
Open Hole Size	9.875"
Type Fluid	BENTONITE
Density / Viscosity	
Max. Recorded Temp.	87 F
Estimated Cement Top	
Time Well Ready	1300
Time Logger on Bottom	1315
Equipment Number	VA-201
Location	OSBOURNE PARK
Recorded By	D. MARCHESANI
Witnessed By	JON FREDRICHS

Run Number	Borehole Record Bit	From	To	Size	Tubing Record Weight	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String				
Prot. String				
Production String				
Liner				

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Comments

MAIN PASSES

Database File: c:\warrior\data\f-3 folder\merge folder\gamma_dil_sp_spr.db
Dataset Pathname: pass2
Presentation Format: e_dil_xy
Dataset Creation: Fri Jun 01 18:23:16 2007
Charted by: Depth in Feet scaled 1:240

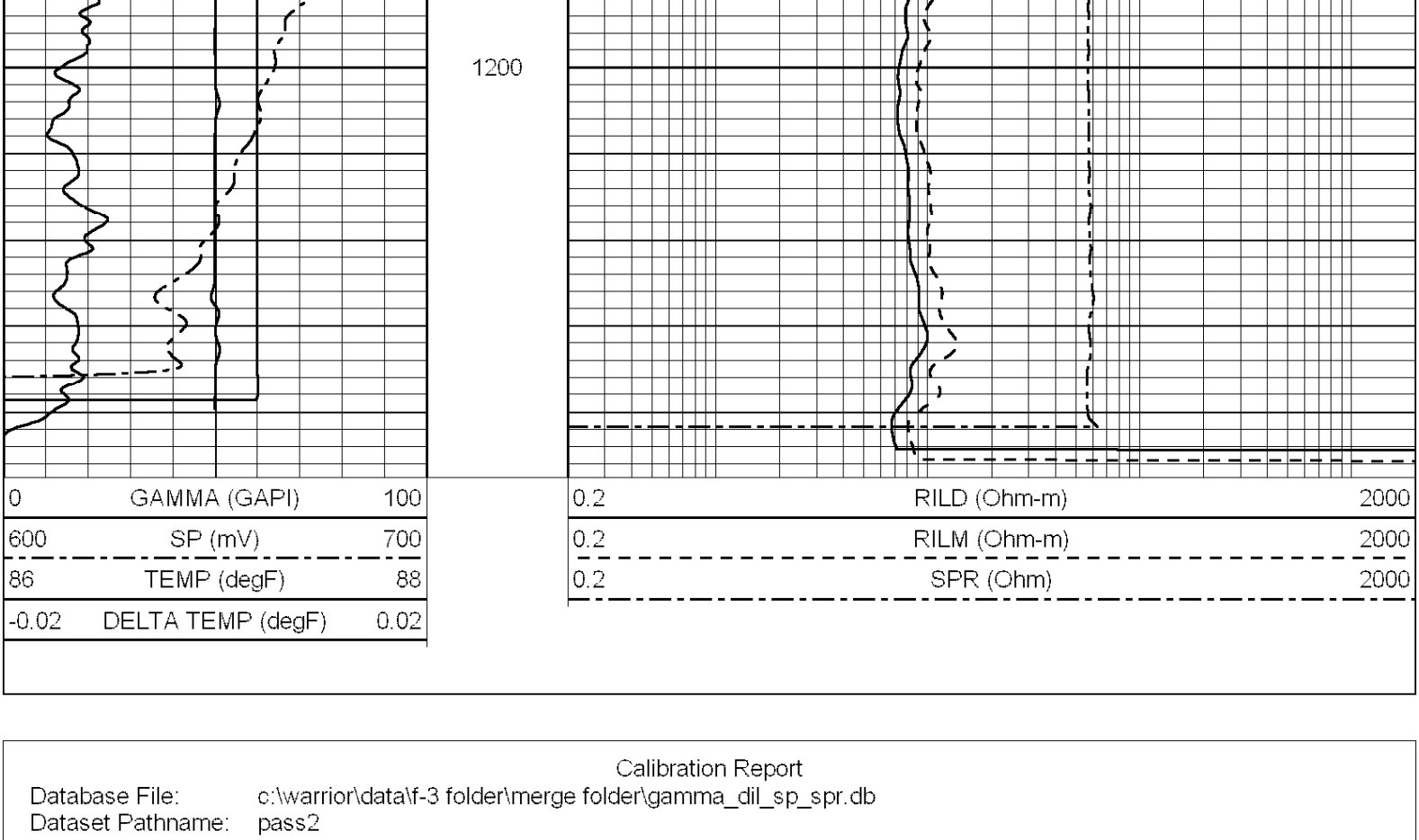
0	GAMMA (GAPI)	300	0.2	RILD (Ohm-m)	2000
-200	SP (mV)	100	0.2	RILM (Ohm-m)	2000
86	TEMP (degF)	88	0.2	RES(OHM) (Ohm)	2000
-0.02	DTMP (degF)	0.02			

0	GAMMA (GAPI)	300	0.2	RILD (Ohm-m)	2000
-200	SP (mV)	100	0.2	RILM (Ohm-m)	2000
86	TEMP (degF)	88	0.2	RES(OHM) (Ohm)	2000
-0.02	DTMP (degF)	0.02			

REPEAT PASSES

Database File: c:\warrior\data\f-3 folder\merge folder\gamma_dil_sp_spr.db
Dataset Pathname: REPEATS
Presentation Format: e_dil_xy
Dataset Creation: Tue Jul 31 12:48:30 2007
Charted by: Depth in Feet scaled 1:240

0	GAMMA (GAPI)	100	0.2	RILD (Ohm-m)	2000
600	SP (mV)	700	0.2	RILM (Ohm-m)	2000
86	TEMP (degF)	88	0.2	SPR (Ohm)	2000
-0.02	DELTA TEMP (degF)	0.02			



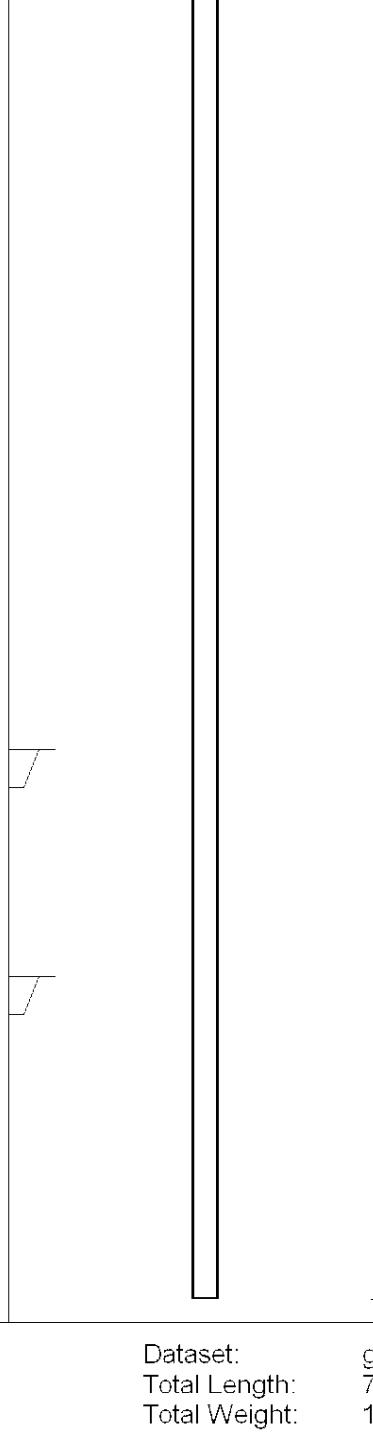
0	GAMMA (GAPI)	100	0.2	RILD (Ohm-m)	2000
600	SP (mV)	700	0.2	RILM (Ohm-m)	2000
86	TEMP (degF)	88	0.2	SPR (Ohm)	2000
-0.02	DELTA TEMP (degF)	0.02			

Calibration Report

Database File: c:\warrior\data\f-3 folder\merge folder\gamma_dil_sp_spr.db
Dataset Pathname: pass2
Dataset Creation: Fri Jun 01 18:23:16 2007

Gamma Ray Calibration Report

Serial Number:	5562	
Tool Model:	6CHAN	
Performed:	Sun Jun 13 15:33:21 1993	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	
Calibrator Reading:	1.0	
Sensitivity:	1.0000	GAPI/

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	6.50		RGDILGR-6CHAN (5562) Robertson Geologging Dual Induction Gamma Ray	7.06	1.50	13.67
CILD	2.63					
CPSD	2.63					
CILM	1.54					
CPSM	1.54					

Dataset: gamma_dil_sp_spr.db: field/well/run1/pass2
Total Length: 7.06 ft
Total Weight: 13.67 lb
O.D.: 1.50 in

Company	City of LW
Well	F-3
Field	Lake Osborne
County	Palm Beach
State	Florida

15" OPEN HOLE LOGS: XY CALIPER, GAMMA

Company: City of LW
Well: F-3
Field: Lake Osborne
County: Palm Beach State: Florida
Location: 29 44 43

Other Services

Permanent Datum: GL
Log Measured From: GL
Drilling Measured From: GL
Elevation
K.B. D.F. G.L.

Date	06/29/2007
Run Number	2
Depth Driller	1489
Depth Logger	1492
Bottom Logged Interval	1492
Top Log Interval	1150
Open Hole Size	14"
Type Fluid	WATER
Density / Viscosity	NA
Max. Recorded Temp.	74F
Estimated Cement Top	
Time Well Ready	
Time Logger on Bottom	1530
Equipment Number	VA-201
Location	Lake Osborne
Recorded By	D.Mirchesani
Witnessed By	J.Friedrichs

Borehole Record: Run Number, Bit, From, To
Tubing Record: Size, Weight, From, To
Casing Record / Surface String / Prot. String / Production String / Liner: Size, Wgt/Ft, Top, Bottom

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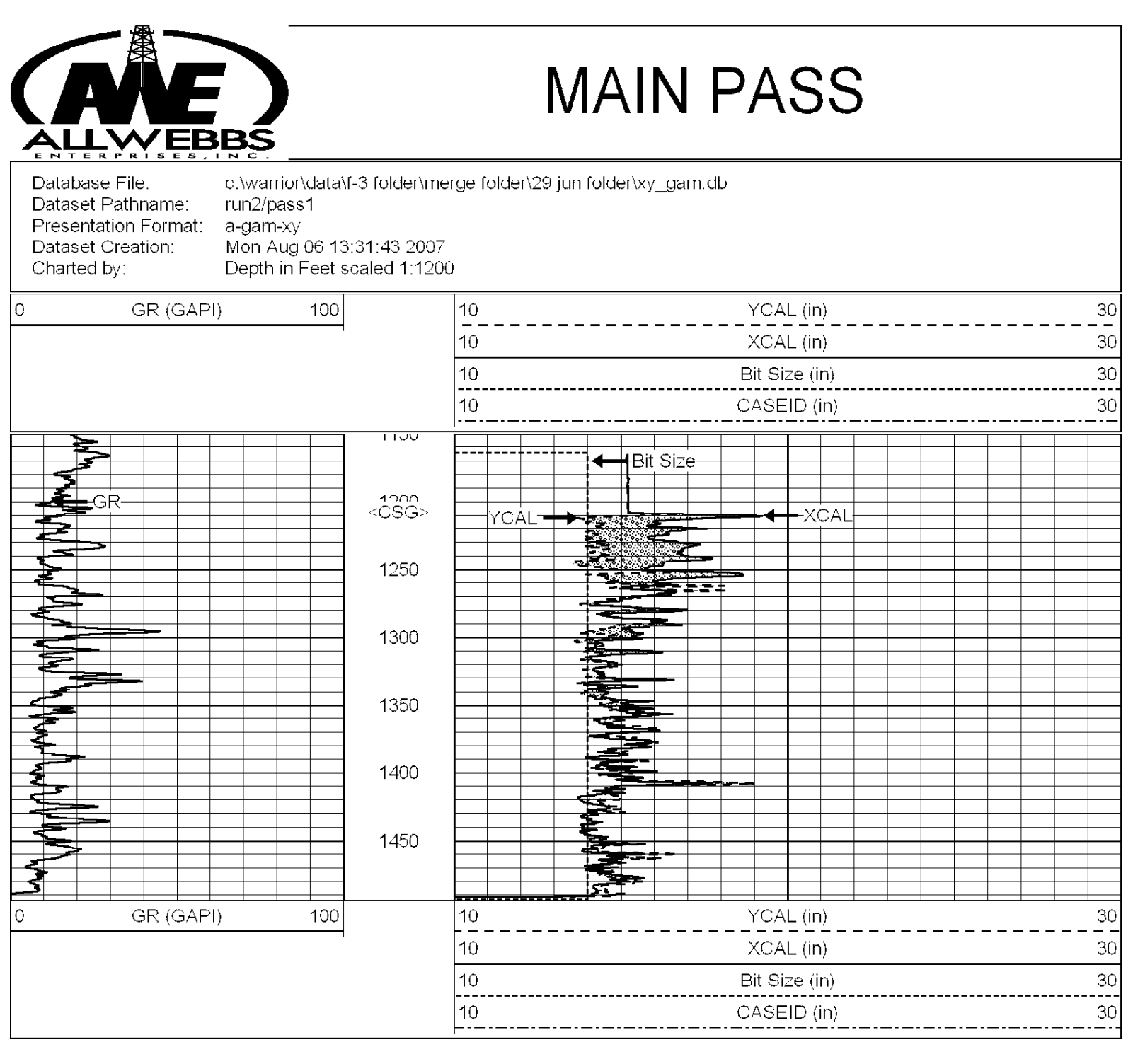
Comments

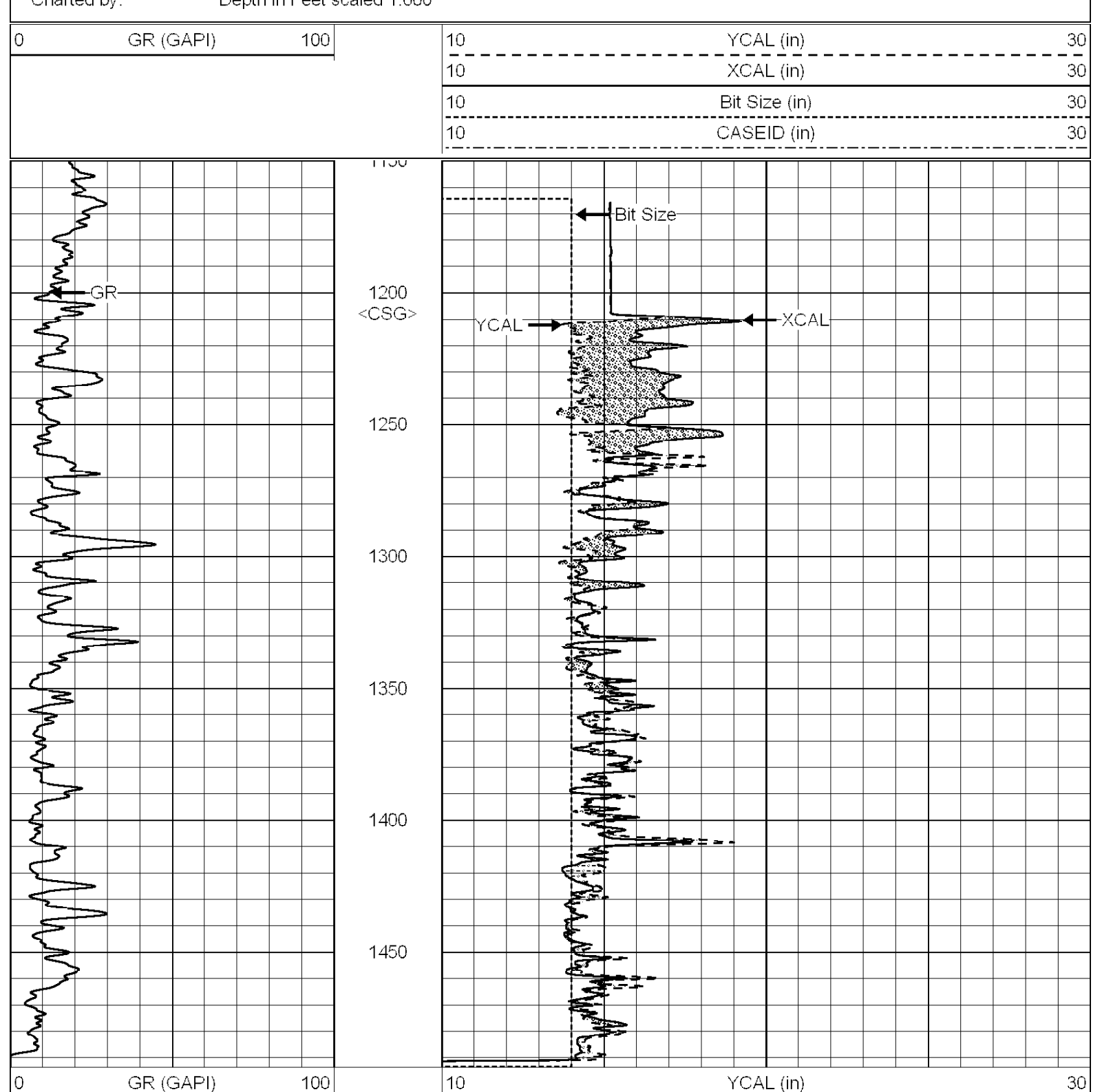
MAIN PASS

Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\xy_gam.db
Dataset Pathname: run2/pass1
Presentation Format: a-gam-xy
Dataset Creation: Mon Aug 06 13:31:43 2007
Charted by: Depth in Feet scaled 1:1200



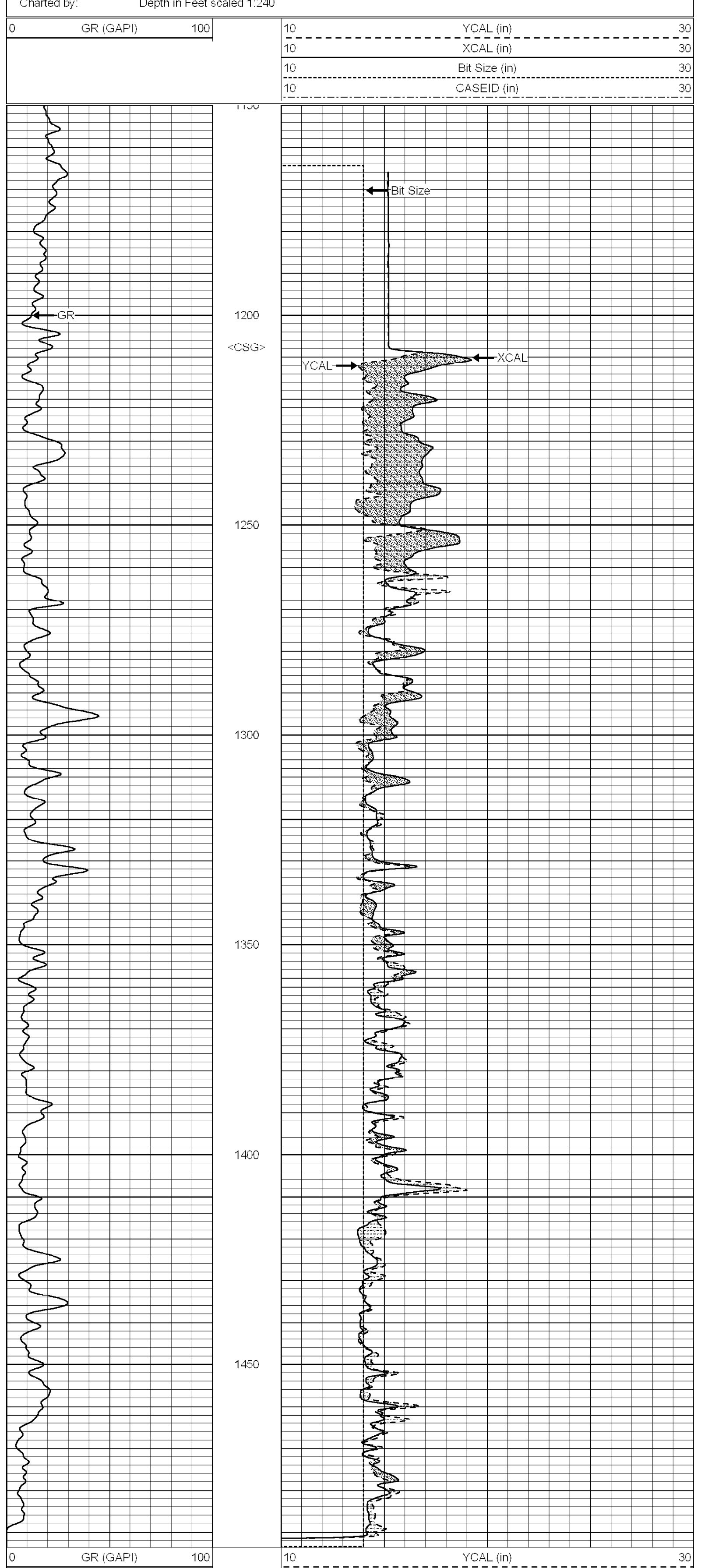
MAIN PASS

Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\xy_gam.db
Dataset Pathname: run2/pass1
Presentation Format: a-gam-xy
Dataset Creation: Mon Aug 06 13:31:43 2007
Charted by: Depth in Feet scaled 1:600



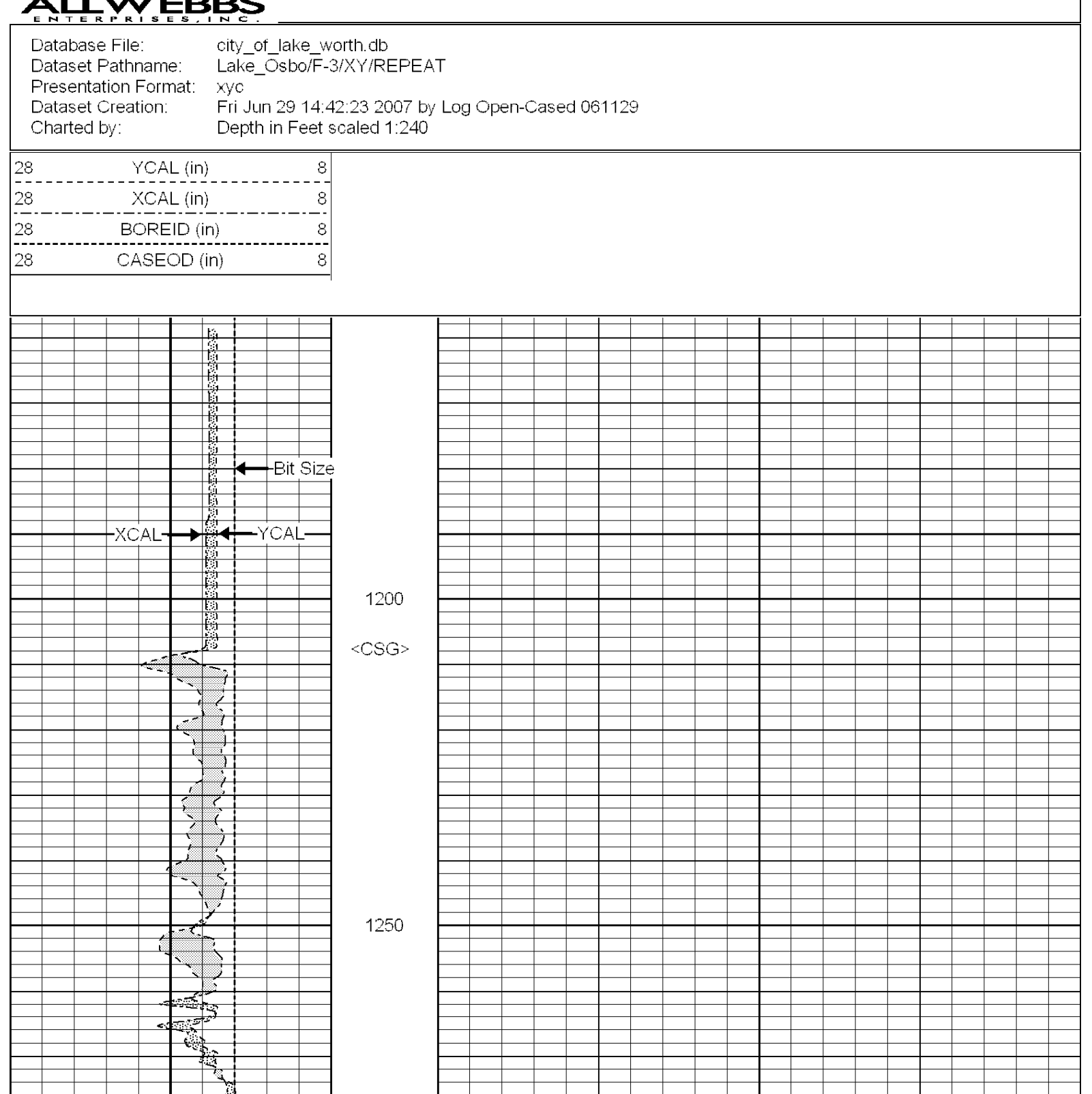
MAIN PASS

Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\xy_gam.db
Dataset Pathname: run2/pass1
Presentation Format: a-gam-xy
Dataset Creation: Mon Aug 06 13:31:43 2007
Charted by: Depth in Feet scaled 1:240

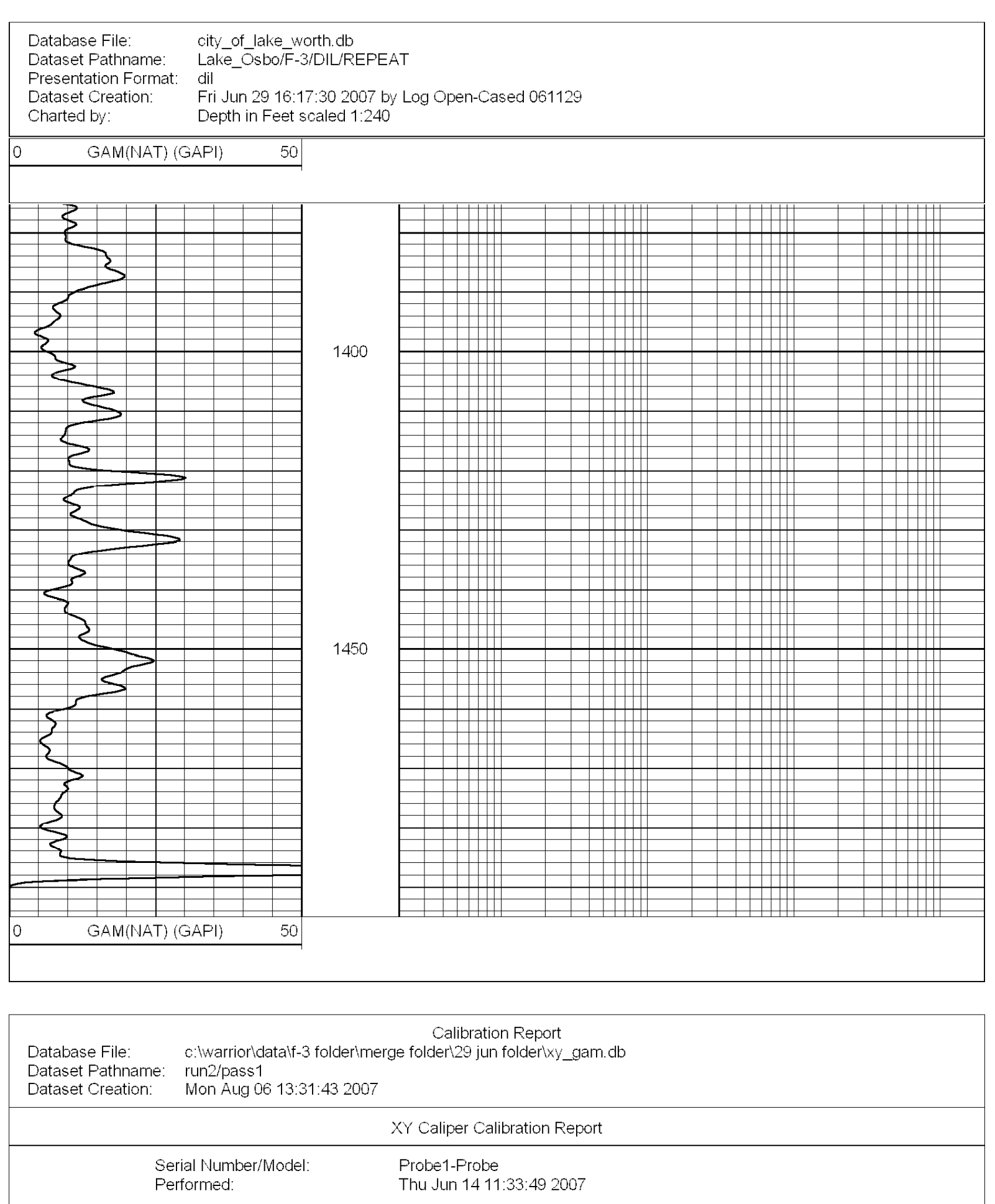


XY REPEAT PASS

Database File: city_of_lake_worth.db
Dataset Pathname: Lake_Osbo/F-3/XY/REPEAT
Presentation Format: xyc
Dataset Creation: Fri Jun 29 14:42:23 2007 by Log Open-Cased 061129
Charted by: Depth in Feet scaled 1:240



Database File: city_of_lake_worth.db
Dataset Pathname: Lake_Osbo/F-3/DIL/REPEAT
Presentation Format: dil
Dataset Creation: Fri Jun 29 16:17:30 2007 by Log Open-Cased 061129
Charted by: Depth in Feet scaled 1:240



Calibration Report

Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\xy_gam.db
Dataset Pathname: run2/pass1
Dataset Creation: Mon Aug 06 13:31:43 2007

XY Caliper Calibration Report

Serial Number/Model: Probe1-Probe
Performed: Thu Jun 14 11:33:49 2007

Ring		X Caliper		Y Caliper	
1:	7.9375 in	361.4	cps	372.8	cps
2:	11.625 in	408.8	cps	421.1	cps
3:	14.4375 in	452.8	cps	454.5	cps
4:	21 in	552.3	cps	554	cps
5:	29.125 in	667.5	cps	687.7	cps
6:	35.3125 in	771.5	cps	797.8	cps

Calibration Report

Database File: city_of_lake_worth.db
Dataset Pathname: Lake_Osbo/F-3/DIL/REPEAT
Dataset Creation: Fri Jun 29 16:17:30 2007 by Log Open-Cased 061129

Gamma Ray Calibration Report

Serial Number: 5562
Tool Model: 6CHAN
Performed: Sun Jun 13 15:33:21 1993

Calibrator Value: 1.0 GAPI

Background Reading: 0.0
Calibrator Reading: 1.0

Sensitivity: 1.0000 GAPI/

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
XCAL	0.00		XYC-Probe (Probe1)	5.17	3.50	99.00
YCAL	0.00					

Dataset: xy_gam.db: field/well/run2/pass1
Total Length: 5.17 ft
Total Weight: 99.00 lb
O.D. 3.50 in

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	6.50		RGDILGR-6CHAN (5562) Robertson Geologging Dual Induction Gamma Ray	7.06	1.50	13.67
CILD	2.63					
CPSD	2.63					
CILM	1.54					
CPSM	1.54					

Dataset: city_of_lake_worth.db: Lake_Osbo/F-3/DIL/REPEAT
Total Length: 7.06 ft
Total Weight: 13.67 lb
O.D. 1.50 in

15" OPEN HOLE LOGS: CALIPER FLOW LOG

ALLWEBBS ENTERPRISES, INC.

Company	City of LW
Well	F-3
Field	Lake Osborne
County	Palm Beach
State	Florida

Company	City of LW		
Well	F-3		
Field	Lake Osborne		
County	Palm Beach	State	Florida
Location	29 44 43		Other Services
Permanent Datum	GL	Elevation	Elevation K.B. D.F. G.L.
Log Measured From	GL		
Drilling Measured From			

Date	06/29/2007
Run Number	3
Depth Driller	1489
Depth Logger	1492
Bottom Logged Interval	1492
Top Log Interval	1150
Open Hole Size	14"
Type Fluid	WATER
Density / Viscosity	NA
Max. Recorded Temp.	
Estimated Cement Top	
Time Well Ready	1300
Time Logger on Bottom	1720
Equipment Number	VA-201
Location	Lake Osborne
Recorded By	D. Marchesani
Witnessed By	Jon Friedrichs

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String				
Prot. String				
Production String				
Liner				

<<< Fold Here >>>

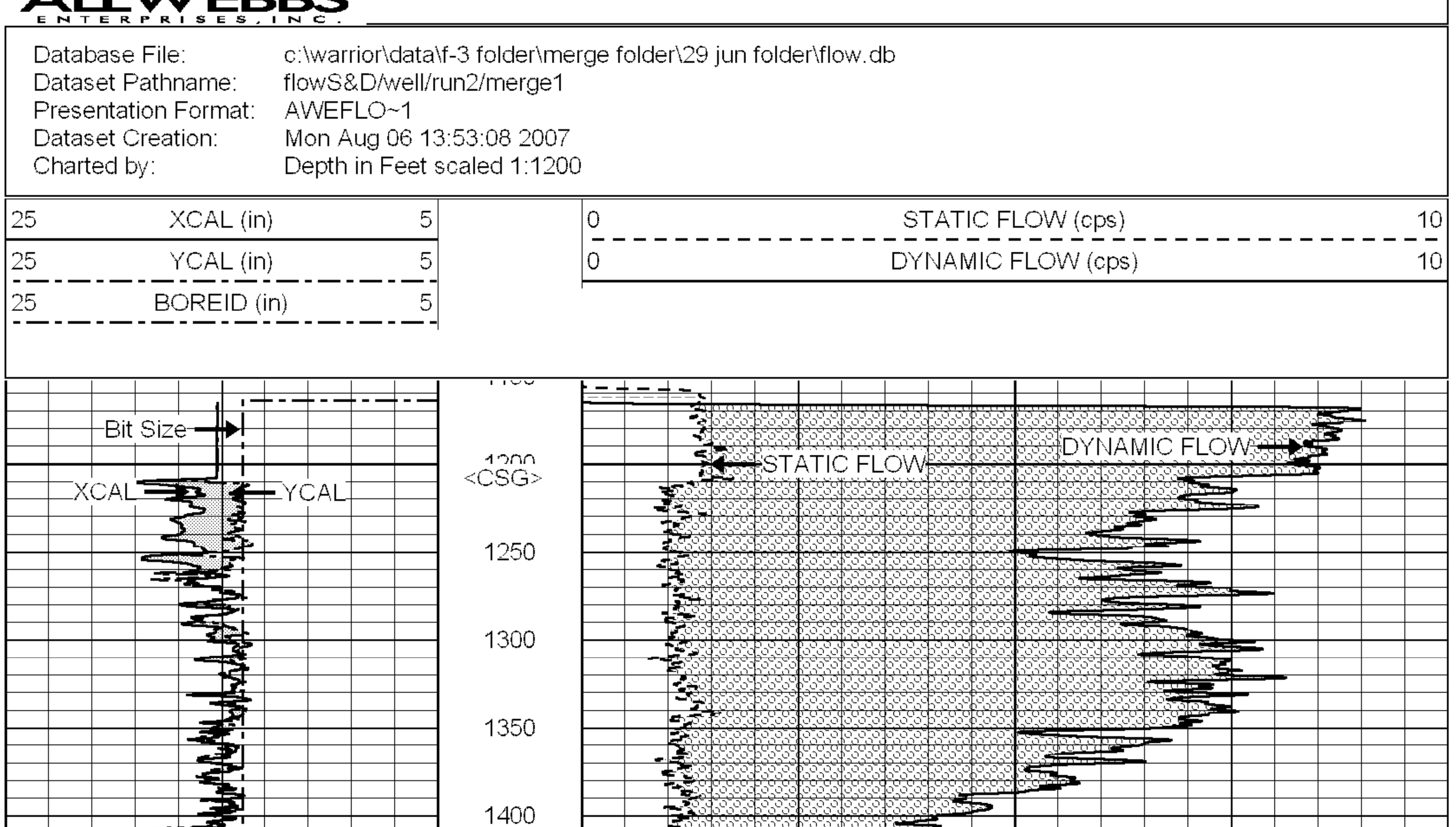
Comments

Logs recorded Statically and Dynamically.
Dynamic Log recorded with Q~= 2000 gpm

MAIN PASS

Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\flow.db
Dataset Pathname: flowS&D/well/run2/merge1
Presentation Format: AWEFLO~1
Dataset Creation: Mon Aug 06 13:53:08 2007
Charted by: Depth in Feet scaled 1:1200

25	XCAL (in)	5	0	STATIC FLOW (cps)	10
25	YCAL (in)	5	0	DYNAMIC FLOW (cps)	10
25	BOREID (in)	5			

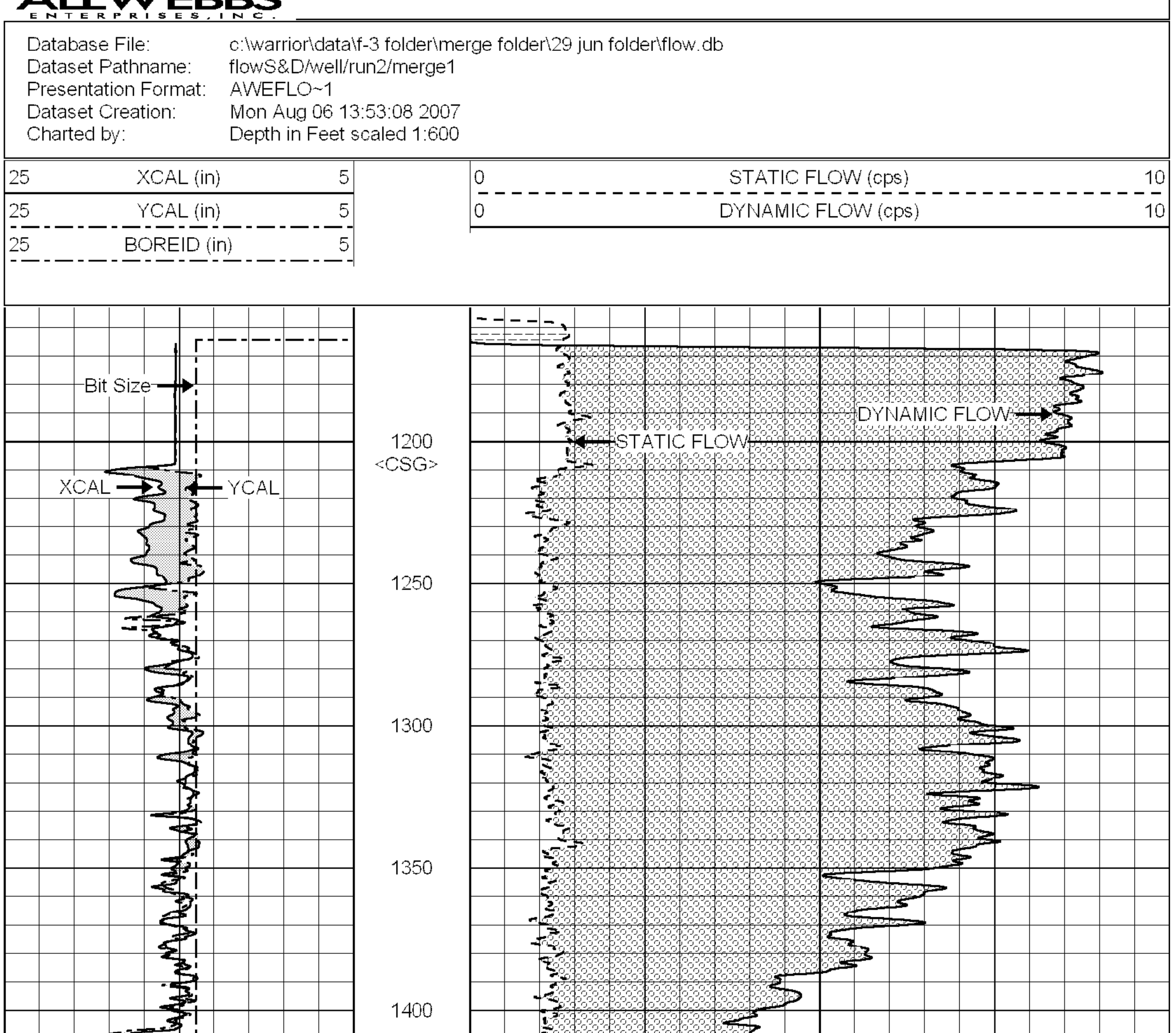


25	XCAL (in)	5	0	STATIC FLOW (cps)	10
25	YCAL (in)	5	0	DYNAMIC FLOW (cps)	10
25	BOREID (in)	5			

MAIN PASS

Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\flow.db
Dataset Pathname: flowS&D/well/run2/merge1
Presentation Format: AWEFLO~1
Dataset Creation: Mon Aug 06 13:53:08 2007
Charted by: Depth in Feet scaled 1:600

25	XCAL (in)	5	0	STATIC FLOW (cps)	10
25	YCAL (in)	5	0	DYNAMIC FLOW (cps)	10
25	BOREID (in)	5			

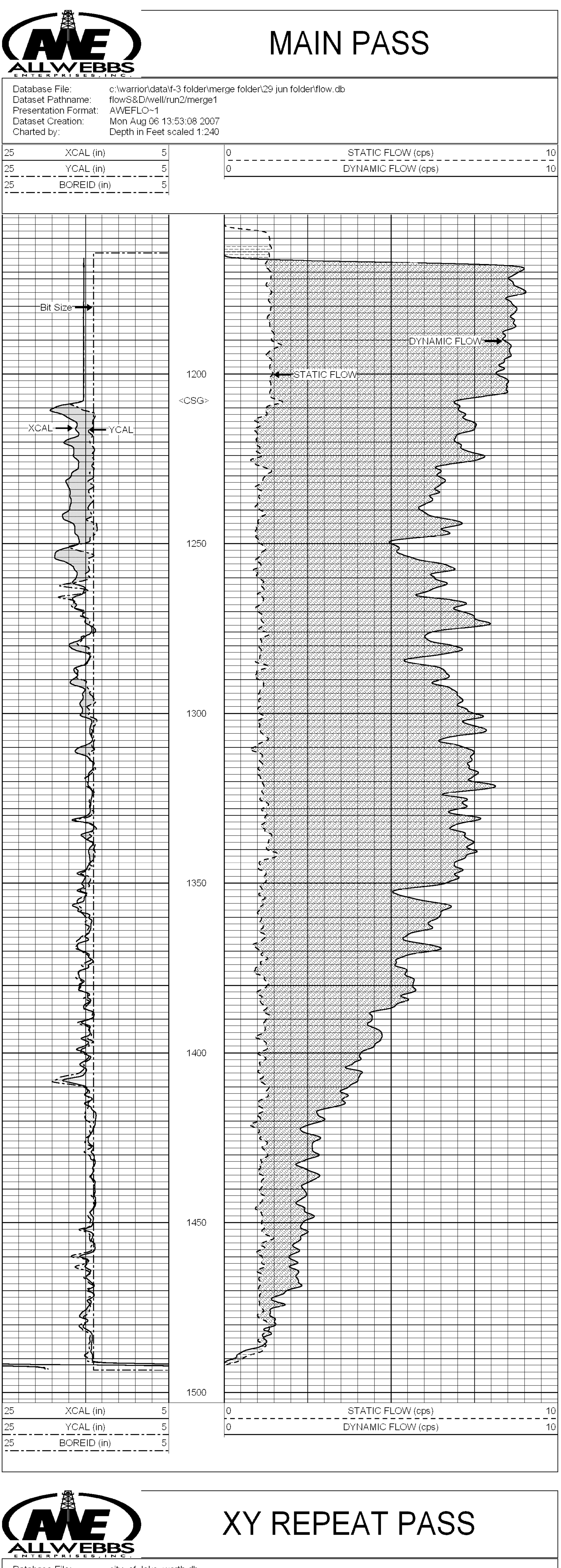


25	XCAL (in)	5	0	STATIC FLOW (cps)	10
25	YCAL (in)	5	0	DYNAMIC FLOW (cps)	10
25	BOREID (in)	5			

MAIN PASS

Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\flow.db
Dataset Pathname: flowS&D/well/run2/merge1
Presentation Format: AWEFLO~1
Dataset Creation: Mon Aug 06 13:53:08 2007
Charted by: Depth in Feet scaled 1:240

25	XCAL (in)	5	0	STATIC FLOW (cps)	10
25	YCAL (in)	5	0	DYNAMIC FLOW (cps)	10
25	BOREID (in)	5			

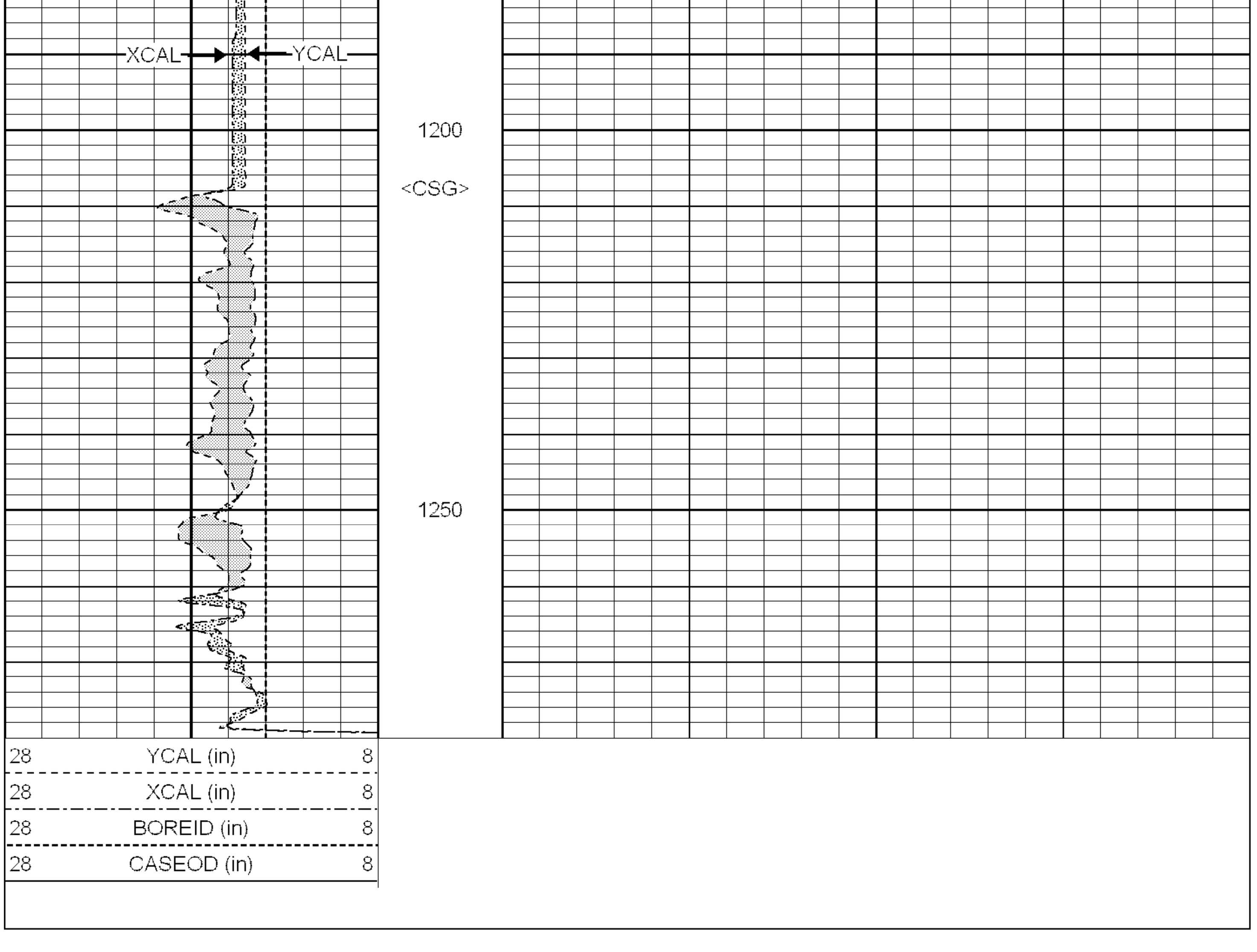


25	XCAL (in)	5	0	STATIC FLOW (cps)	10
25	YCAL (in)	5	0	DYNAMIC FLOW (cps)	10
25	BOREID (in)	5			

XY REPEAT PASS

Database File: city_of_lake_worth.db
Dataset Pathname: Lake_Osbo/F-3/XY/REPEAT
Presentation Format: xyc
Dataset Creation: Fri Jun 29 14:42:23 2007 by Log Open-Cased 061129
Charted by: Depth in Feet scaled 1:240

28	YCAL (in)	8
28	XCAL (in)	8
28	BOREID (in)	8
28	CASEOD (in)	8



28	YCAL (in)	8
28	XCAL (in)	8
28	BOREID (in)	8
28	CASEOD (in)	8

Calibration Report

Database File: city_of_lake_worth.db
Dataset Pathname: Lake_Osbo/F-3/XY/MAIN
Dataset Creation: Fri Jun 29 14:23:50 2007 by Log Open-Cased 061129

XY Caliper Calibration Report

Serial Number/Model: Probe1-Probe
Performed: Thu Jun 14 11:33:49 2007

	Ring		X Caliper		Y Caliper	
1:	7.9375	in	361.4	cps	372.8	cps
2:	11.625	in	408.8	cps	421.1	cps
3:	14.4375	in	442.8	cps	454.5	cps
4:	21	in	538.3	cps	554	cps
5:	29.125	in	667.5	cps	687.7	cps
6:	35.3125	in	771.5	cps	797.8	cps

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
			XYC-Probe (Probe1)	5.17	3.50	99.00
XCAL	0.00					
YCAL	0.00					

Dataset: city_of_lake_worth.db: Lake_Osbo/F-3/XY/MAIN
Total Length: 5.17 ft
Total Weight: 99.00 lb
O.D.: 3.50 in

15" OPEN HOLE LOGS: TEMP, DELTA TEMP AND FLUID RESISTIVITY

ALLWEBBS ENTERPRISES, INC.

Company City of LW
Well F-3
Field Lake Osborne
County Palm Beach
State Florida

Company City of LW
Well F-3
Field Lake Osborne
County Palm Beach State Florida

Location 29 44 43

Other Services

Permanent Datum Elevation
Log Measured From GL
Drilling Measured From GL

Elevation
K.B.
D.F.
G.L.

Date	06/29/2007		
Run Number	2		
Depth Driller	1489		
Depth Logger	1492		
Bottom Logged Interval	1492		
Top Log Interval	1150		
Open Hole Size	14"		
Type Fluid	WATER		
Density / Viscosity	NA		
Max. Recorded Temp.	74F		
Estimated Cement Top			
Time Well Ready			
Time Logger on Bottom	1530		
Equipment Number	VA-201		
Location	Lake Osborne		
Recorded By	D.Marchesani		
Witnessed By	J. Friedrichs		

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String				
Prot. String				
Production String				
Liner				

<< Fold Here >>>

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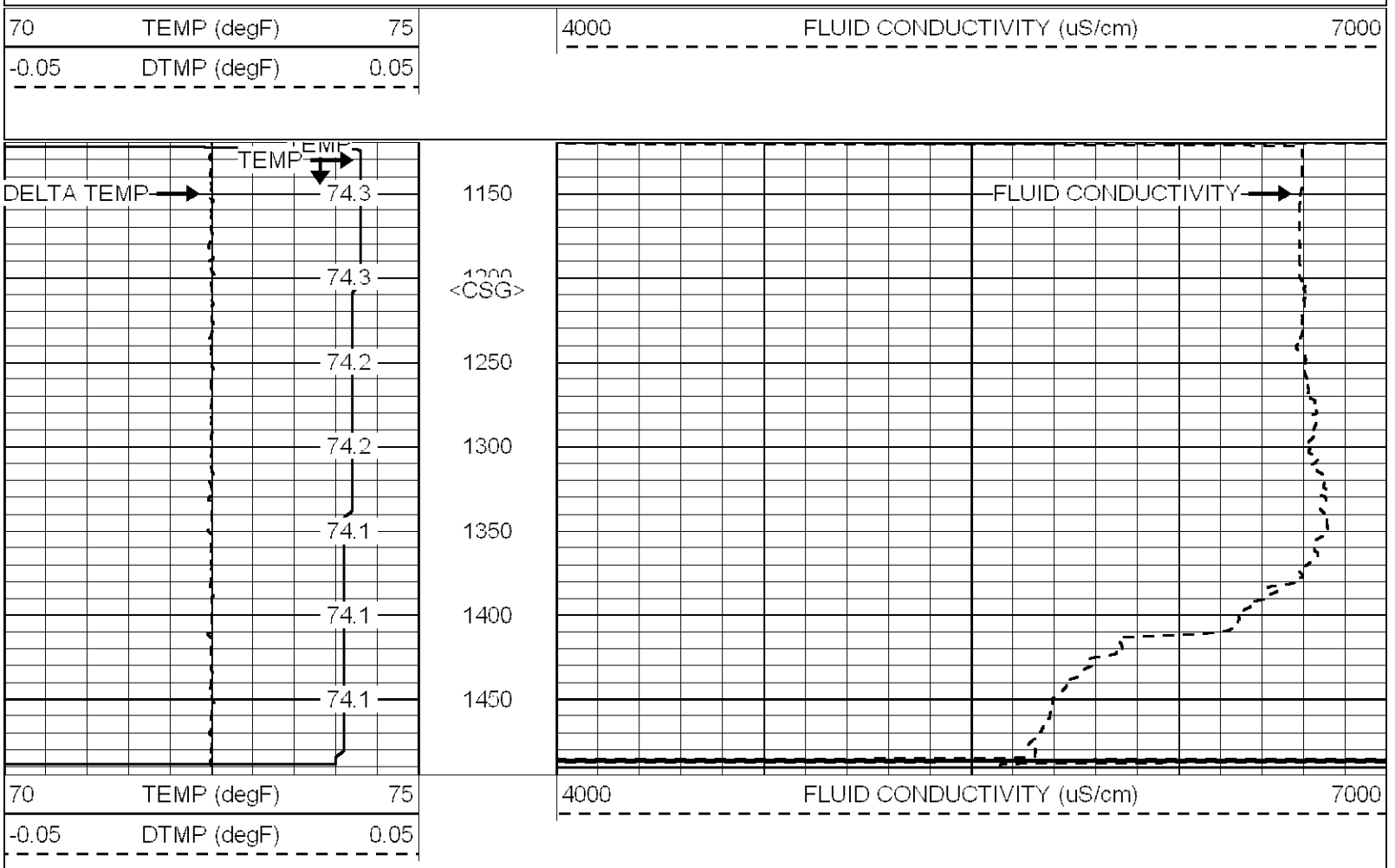
Comments

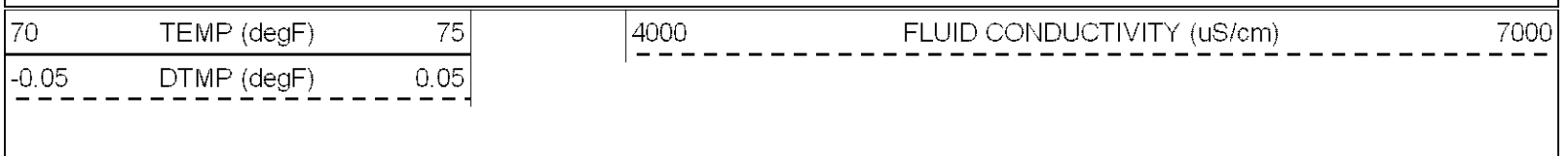
MAIN PASS

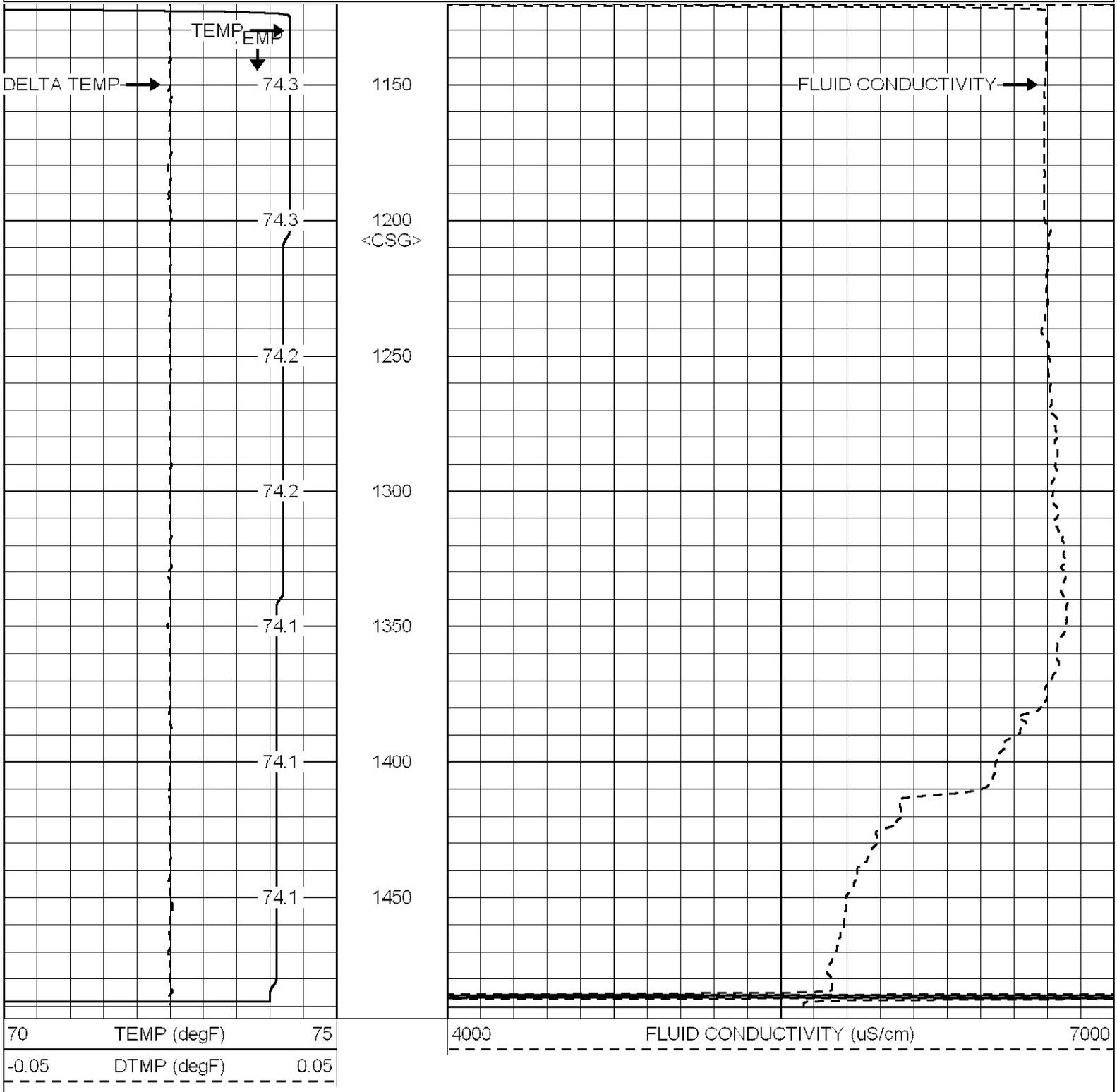
Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\elog.db
Dataset Pathname: 9041/well/run2/merge1
Presentation Format: awe cond
Dataset Creation: Thu Aug 02 12:02:52 2007
Charted by: Depth in Feet scaled 1:1200



MAIN PASS

Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\elog.db
Dataset Pathname: 9041/well/run2/merge1
Presentation Format: awe cond
Dataset Creation: Thu Aug 02 12:02:52 2007
Charted by: Depth in Feet scaled 1:600

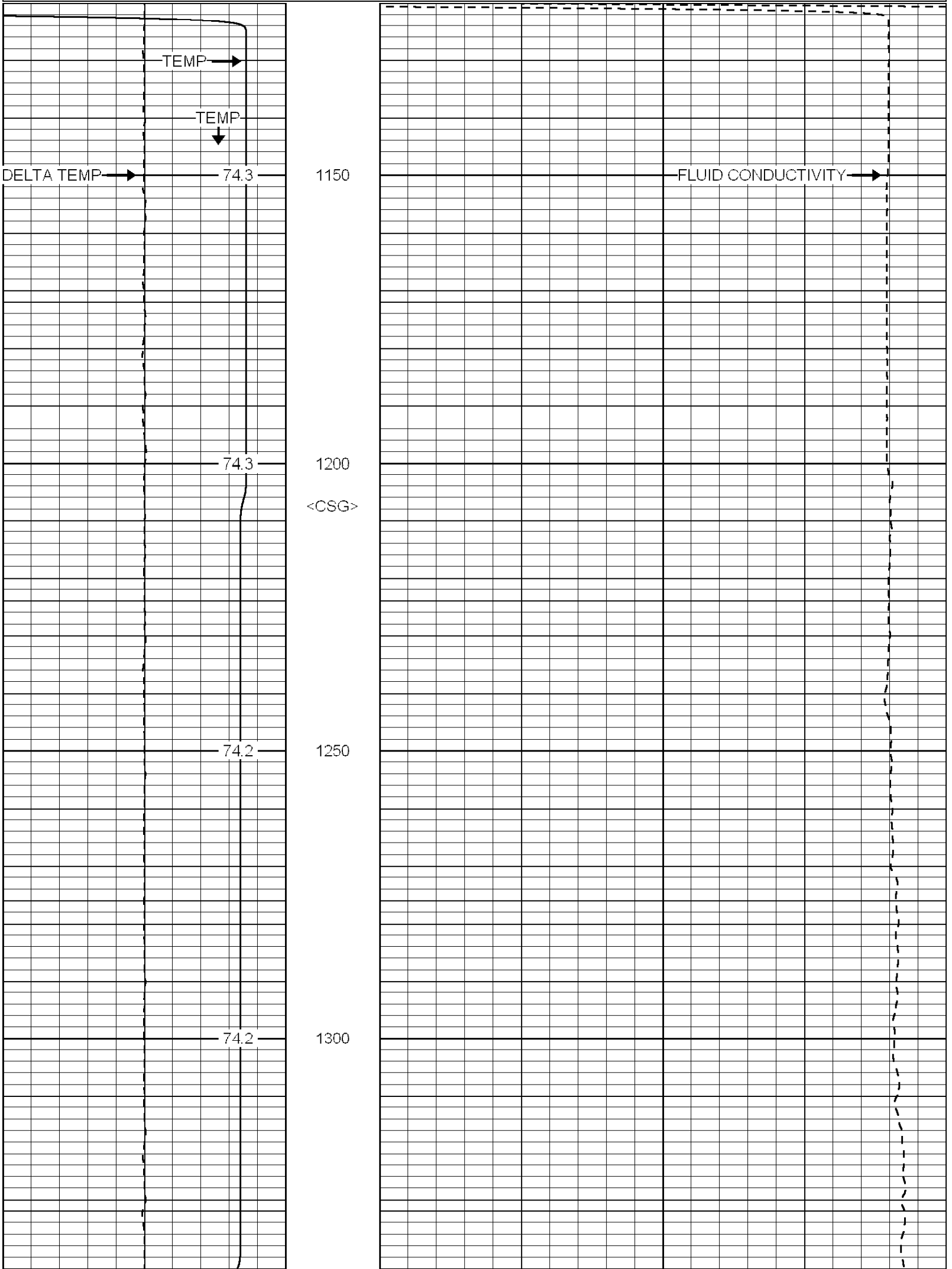


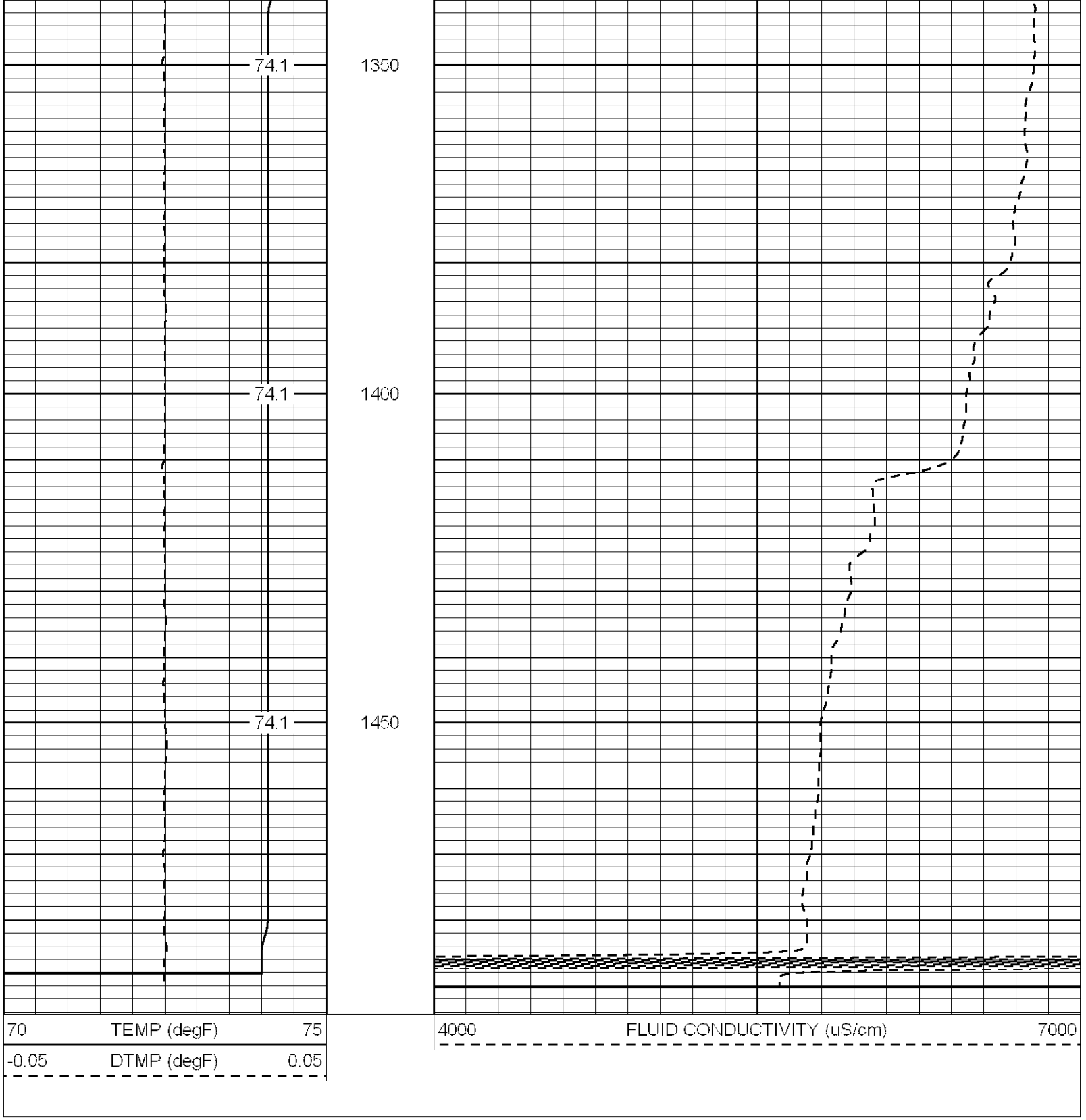


MAIN PASS

Database File:	c:\warrior\data\f-3 folder\merge folder\29 jun folder\elog.db
Dataset Pathname:	9041/well/run2/merge1
Presentation Format:	awe cond
Dataset Creation:	Thu Aug 02 12:02:52 2007
Charted by:	Depth in Feet scaled 1:240

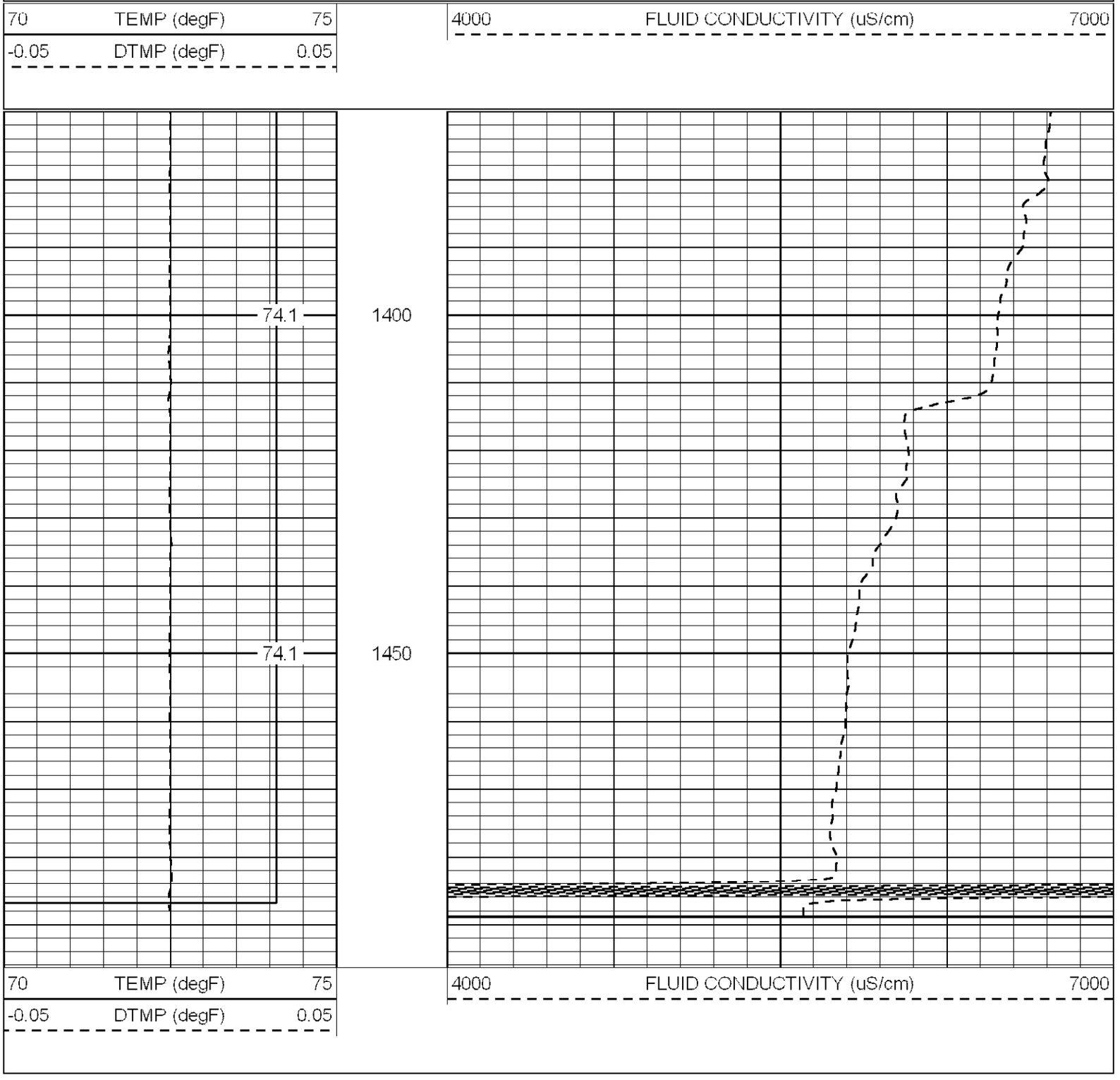
70 TEMP (degF) 75
-0.05 DTMP (degF) 0.05
4000 FLUID CONDUCTIVITY (uS/cm) 7000


TEMP
TEMP
DELTA TEMP
74.3
1150
FLUID CONDUCTIVITY
74.3
1200
<CSG>
74.2
1250
74.2
1300



REPEAT PASSES

Database File:	c:\warrior\data\f-3 folder\merge folder\29 jun folder\elog.db
Dataset Pathname:	9041/well/REPEAT/merge1
Presentation Format:	awe cond
Dataset Creation:	Mon Jul 02 09:49:49 2007
Charted by:	Depth in Feet scaled 1:240



Calibration Report

Database File: city_of_lake_worth.db
Dataset Pathname: Lake_Osbo/F-3/DIL/MAIN
Dataset Creation: Fri Jun 29 15:23:24 2007 by Log Open-Cased 061129

Gamma Ray Calibration Report

Serial Number:	5562	
Tool Model:	6CHAN	
Performed:	Sun Jun 13 15:33:21 1993	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	
Calibrator Reading:	1.0	
Sensitivity:	1.0000	GAPI/

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	6.50					
			RGDILGR-6CHAN (5562) Robertson Geologging Dual Induction Gamma Ray	7.06	1.50	13.67
CILD	2.63					
CPSD	2.63					
CILM	1.54					
CPSM	1.54					

Dataset:	city_of_lake_worth.db: Lake_Osbo/F-3/DIL/MAIN
Total Length:	7.06 ft
Total Weight:	13.67 lb
O.D.	1.50 in

15" OPEN HOLE LOGS: DUAL INDUCTION, GAMMA, SP, AND SPR

ALLWEBBS ENTERPRISES, INC.

Company City of LW
Well F-3
Field Lake Osborne
County Palm Beach
State Florida

Company City of LW
Well F-3
Field Lake Osborne
County Palm Beach State Florida

Location 29 44 43

Other Services

Permanent Datum
Log Measured From GL
Drilling Measured From GL

Elevation

Elevation
K.B.
D.F.
G.L.

Date	06/29/2007		
Run Number	2		
Depth Driller	1489		
Depth Logger	1492		
Bottom Logged Interval	1492		
Top Log Interval	1150		
Open Hole Size	14"		
Type Fluid	WATER		
Density / Viscosity	NA		
Max. Recorded Temp.	74F		
Estimated Cement Top			
Time Well Ready			
Time Logger on Bottom	1530		
Equipment Number	VA-201		
Location	Lake Osborne		
Recorded By	D.Marchesani		
Witnessed By	J. Friedrichs		

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String				
Prot. String				
Production String				
Liner				

<< Fold Here >>>

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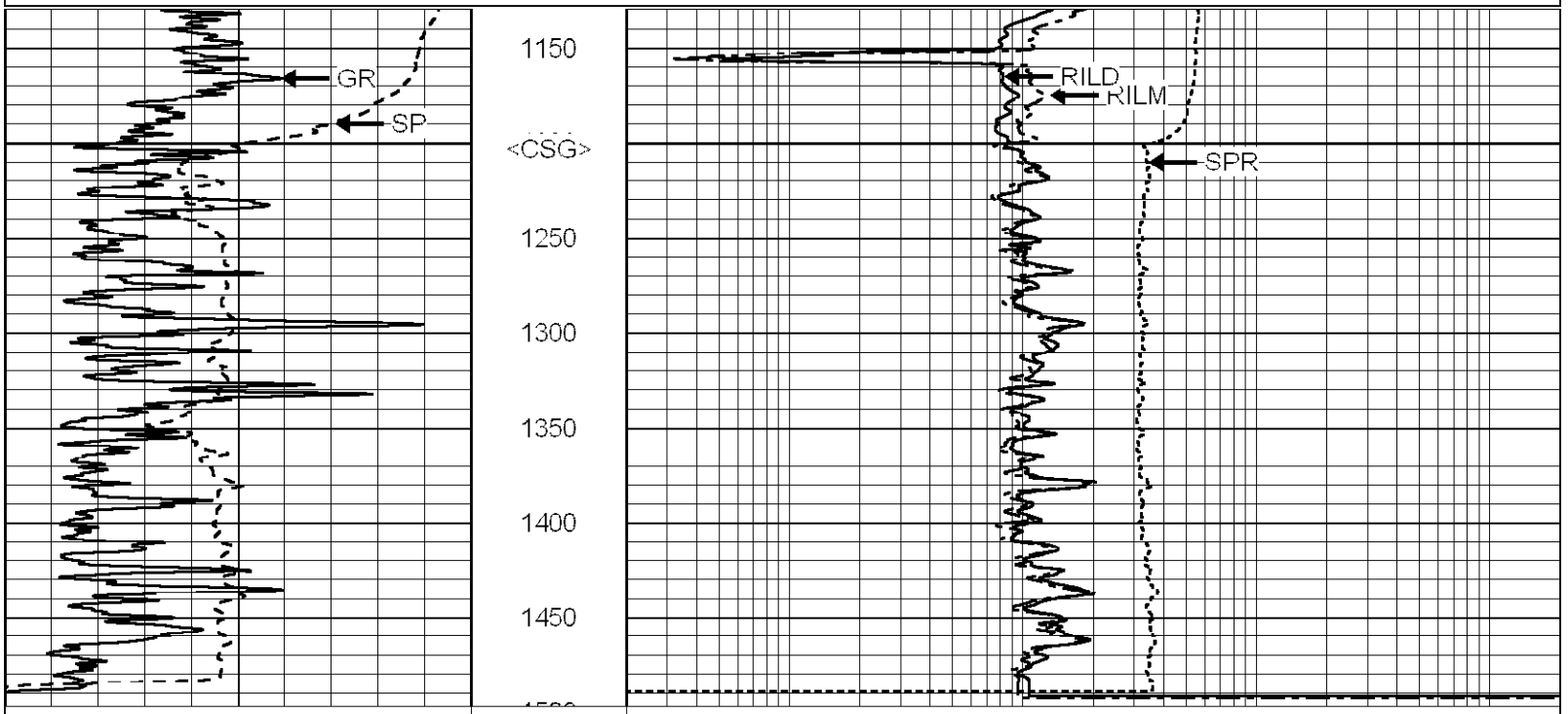
Comments

MAIN PASS

Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\elog.db
Dataset Pathname: 9041/well/run1/merge2
Presentation Format: awe-dil_
Dataset Creation: Fri Jun 29 20:39:38 2007
Charted by: Depth in Feet scaled 1:1200

0	GR (GAPI)	50	0.2	RILD (Ohm-m)	2000
0	SP (mV)	-400	0.2	RILM (Ohm-m)	2000
			0.2	RES(OHM) (Ohm)	2000

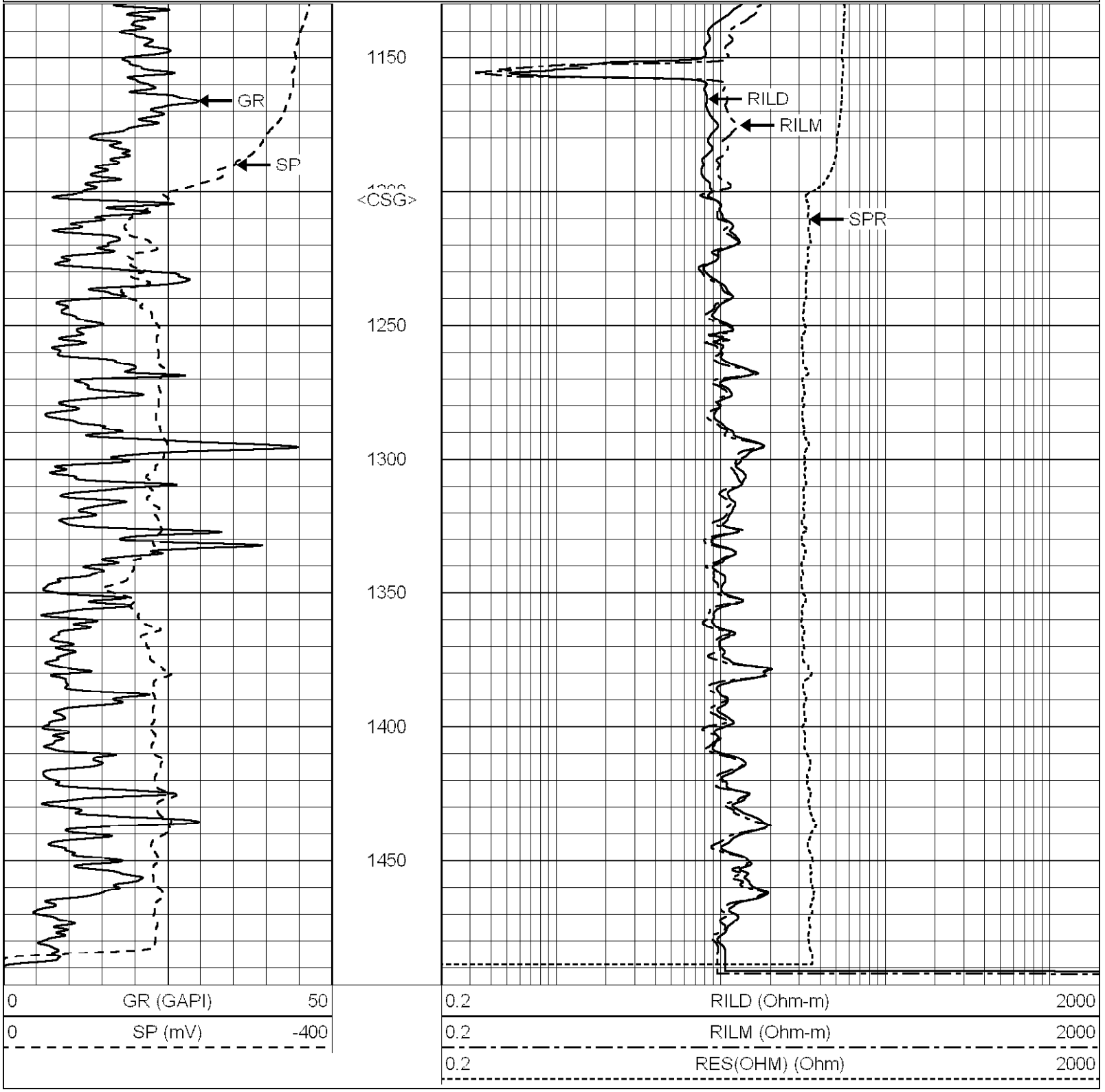


0	GR (GAPI)	50	0.2	RILD (Ohm-m)	2000
0	SP (mV)	-400	0.2	RILM (Ohm-m)	2000
			0.2	RES(OHM) (Ohm)	2000

MAIN PASS

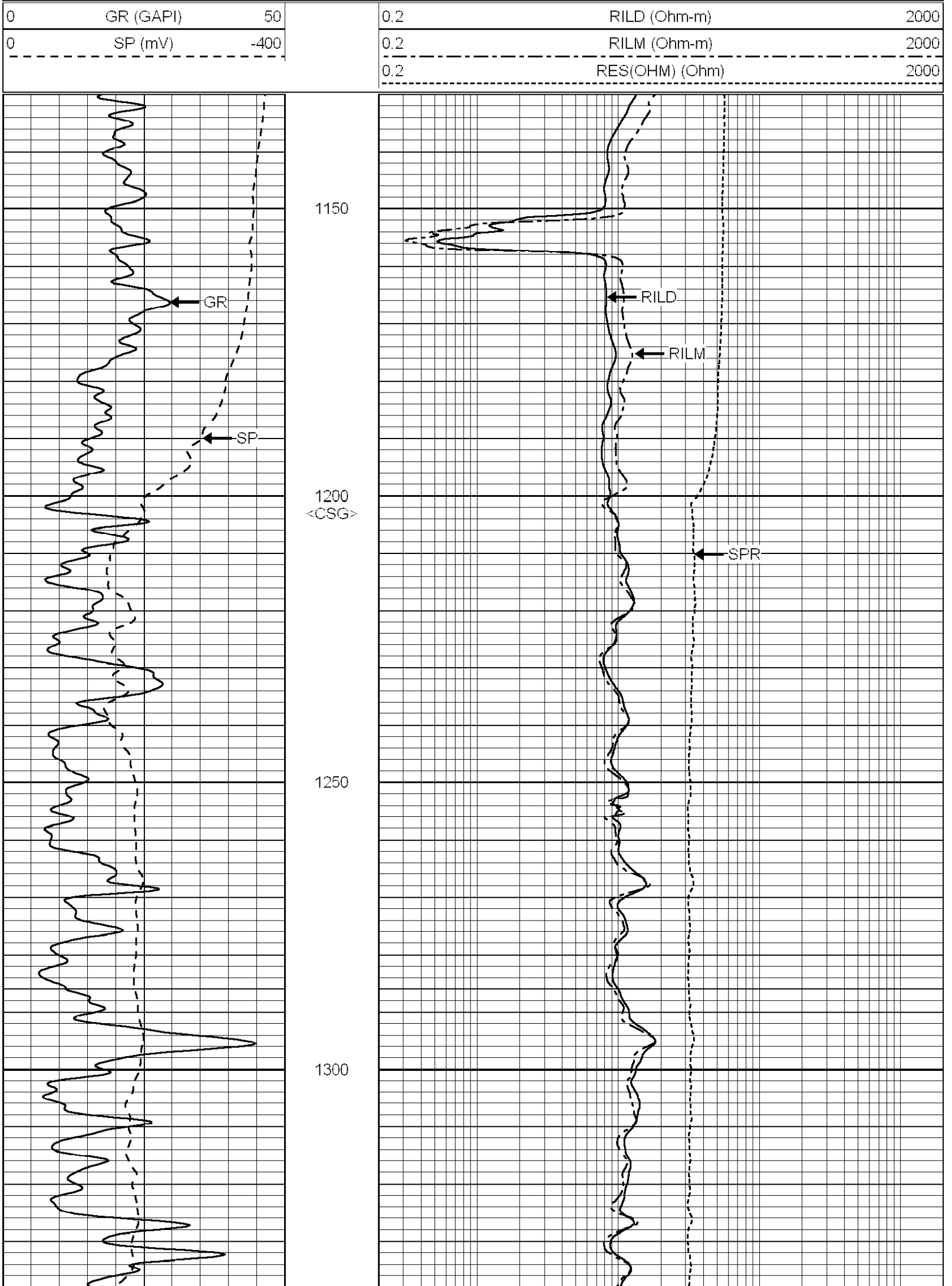
Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\elog.db
Dataset Pathname: 9041/well/run1/merge2
Presentation Format: awe-dil_
Dataset Creation: Fri Jun 29 20:39:38 2007
Charted by: Depth in Feet scaled 1:600

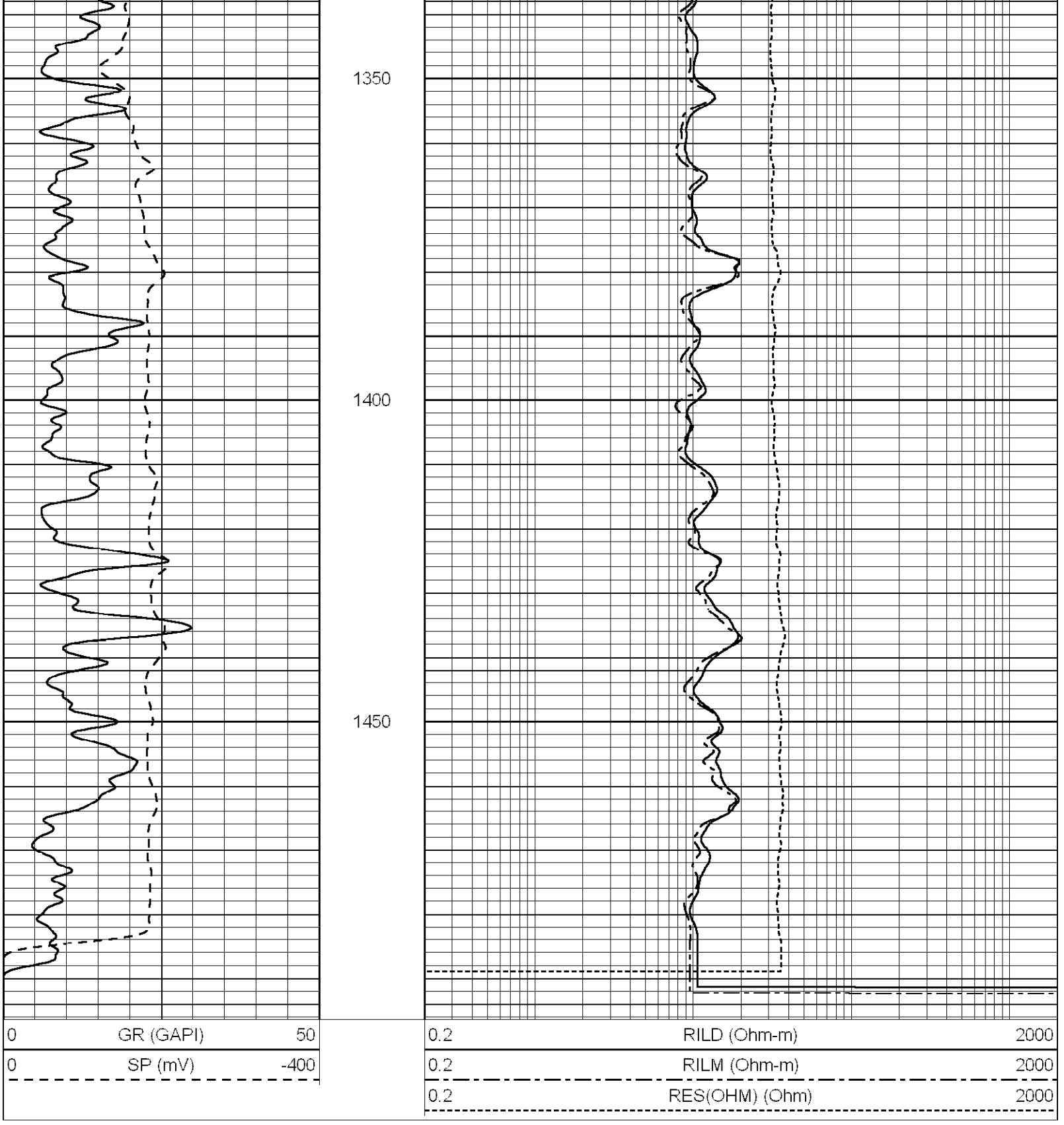
0	GR (GAPI)	50	0.2	RILD (Ohm-m)	2000
0	SP (mV)	-400	0.2	RILM (Ohm-m)	2000
			0.2	RES(OHM) (Ohm)	2000



MAIN PASS

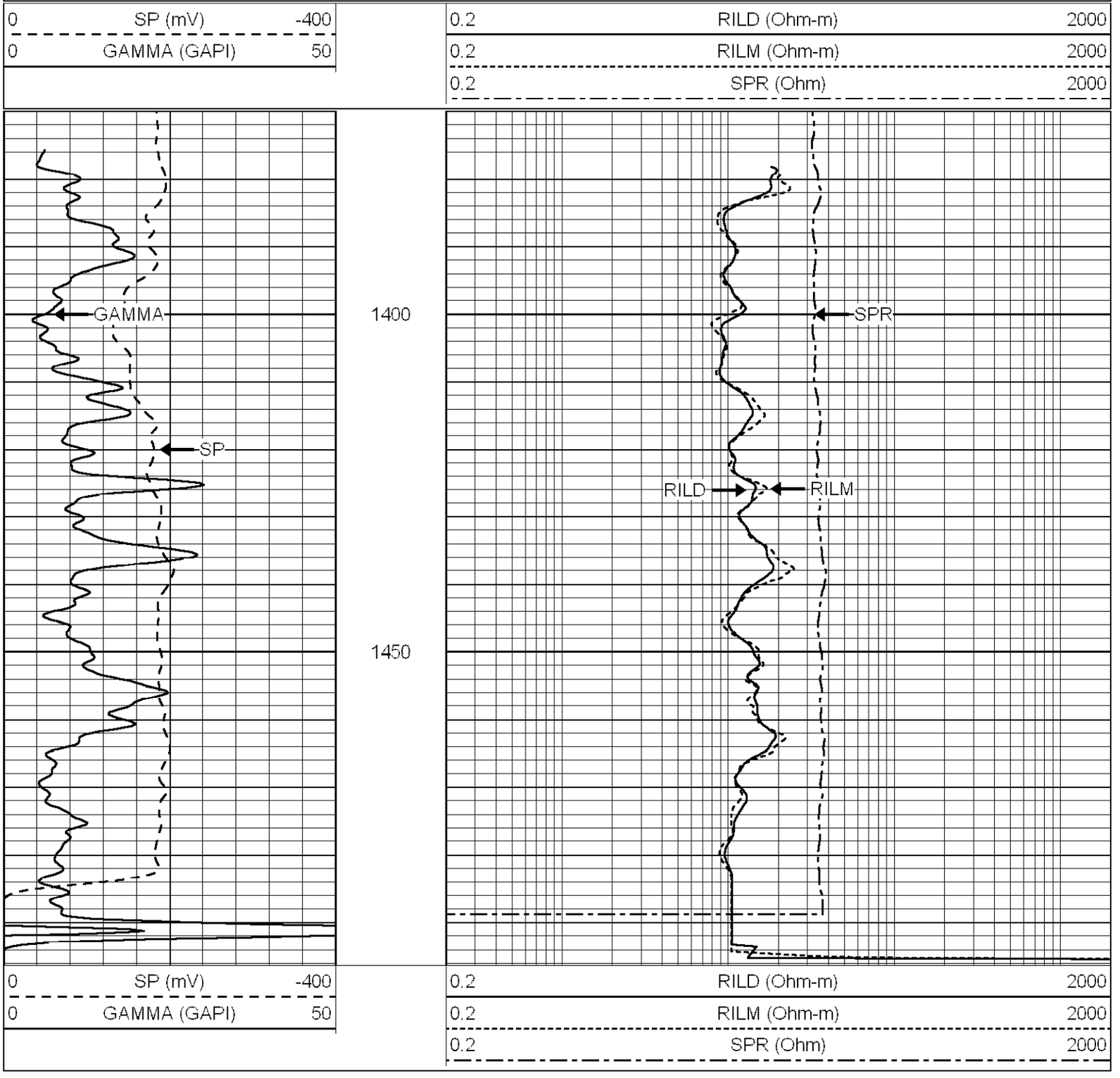
Database File:	c:\warrior\data\f-3 folder\merge folder\29 jun folder\elog.db
Dataset Pathname:	9041/well/run1/merge2
Presentation Format:	awe-dil_
Dataset Creation:	Fri Jun 29 20:39:38 2007
Charted by:	Depth in Feet scaled 1:240


0 GR (GAPI) 50
0 SP (mV) -400
0.2 RILD (Ohm-m) 2000
0.2 RILM (Ohm-m) 2000
0.2 RES(OHM) (Ohm) 2000
1150
1200
<CSG>
1250
1300
GR
SP
RILD
RILM
SPR



REPEAT PASSES

Database File:	c:\warrior\data\f-3 folder\merge folder\29 jun folder\elog.db
Dataset Pathname:	9041/well/REPEAT/merge1
Presentation Format:	duin
Dataset Creation:	Mon Jul 02 09:49:49 2007
Charted by:	Depth in Feet scaled 1:240



Calibration Report

Database File: c:\warrior\data\f-3 folder\merge folder\29 jun folder\elog.db
Dataset Pathname: 9041/well/run1/merge2
Dataset Creation: Fri Jun 29 20:39:38 2007

Gamma Ray Calibration Report

Serial Number:	5562	
Tool Model:	6CHAN	
Performed:	Sun Jun 13 15:33:21 1993	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	
Calibrator Reading:	1.0	
Sensitivity:	1.0000	GAPI/

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	6.50					
			RGDILGR-6CHAN (5562) Robertson Geologging Dual Induction Gamma Ray	7.06	1.50	13.67
CILD	2.63					
CPSD	2.63					
CILM	1.54					
CPSM	1.54					

Dataset:	elog.db: 9041/well/run1/merge2
Total Length:	7.06 ft
Total Weight:	13.67 lb
O.D.	1.50 in

28" REAMED HOLE XY CALIPER WITH BOREHOLE VOLUMES

ALLWEBBS ENTERPRISES, INC.

Company City of Lake Worth
Well F-3
Field OSBOURNE PARK
County PALM BEACH
State FLORIDA

Company City of Lake Worth
Well F-3
Field OSBOURNE PARK
County PALM BEACH State FLORIDA

Location

29 44 43

Other Services

Permanent Datum Elevation
Log Measured From GL
Drilling Measured From GL

Elevation
K.B.
D.F.
G.L.

Date	8 Jun 2007		
Run Number	1		
Depth Driller	1208		
Depth Logger	1208		
Bottom Logged Interval	1208		
Top Log Interval	180		
Open Hole Size	28"		
Type Fluid	WATER		
Density / Viscosity	NA		
Max. Recorded Temp.	87 F		
Estimated Cement Top			
Time Well Ready	1500		
Time Logger on Bottom	1540		
Equipment Number	VA-201		
Location	OSBOURNE PARK		
Recorded By	D. MARCHESANI		
Witnessed By	JON FRIEDRICHS		

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String				
Prot. String				
Production String				
Liner				

<< Fold Here >>>

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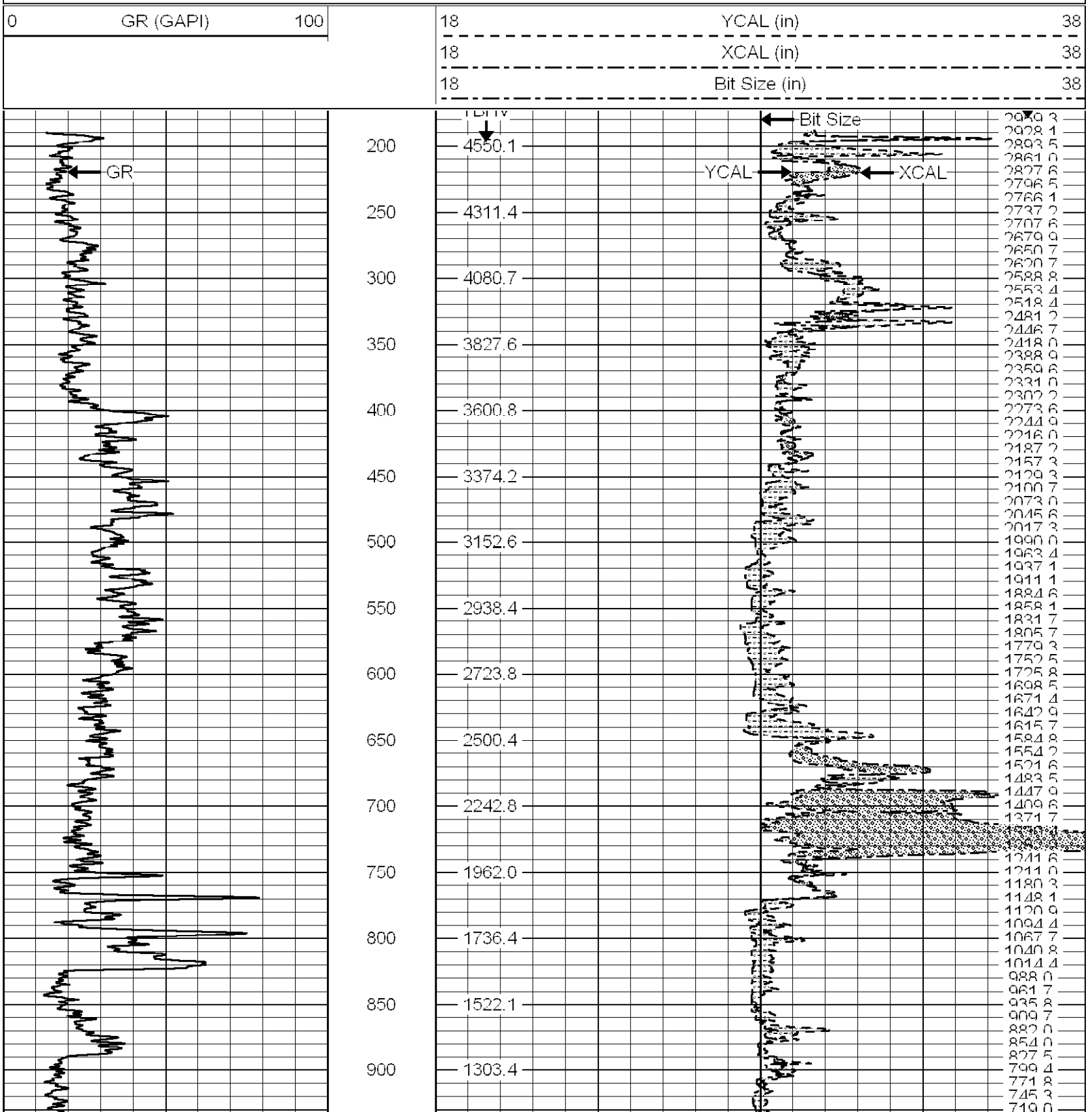
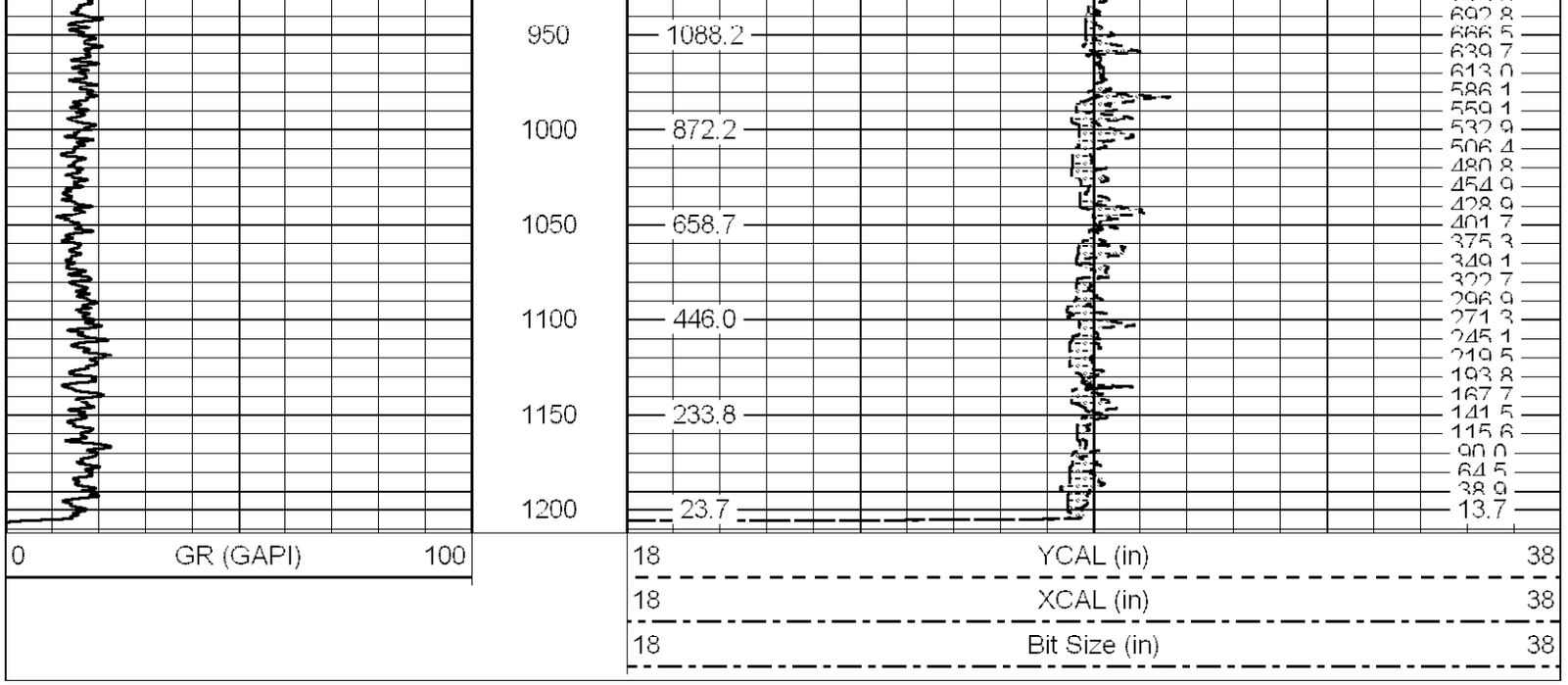
Comments

MAIN PASSES

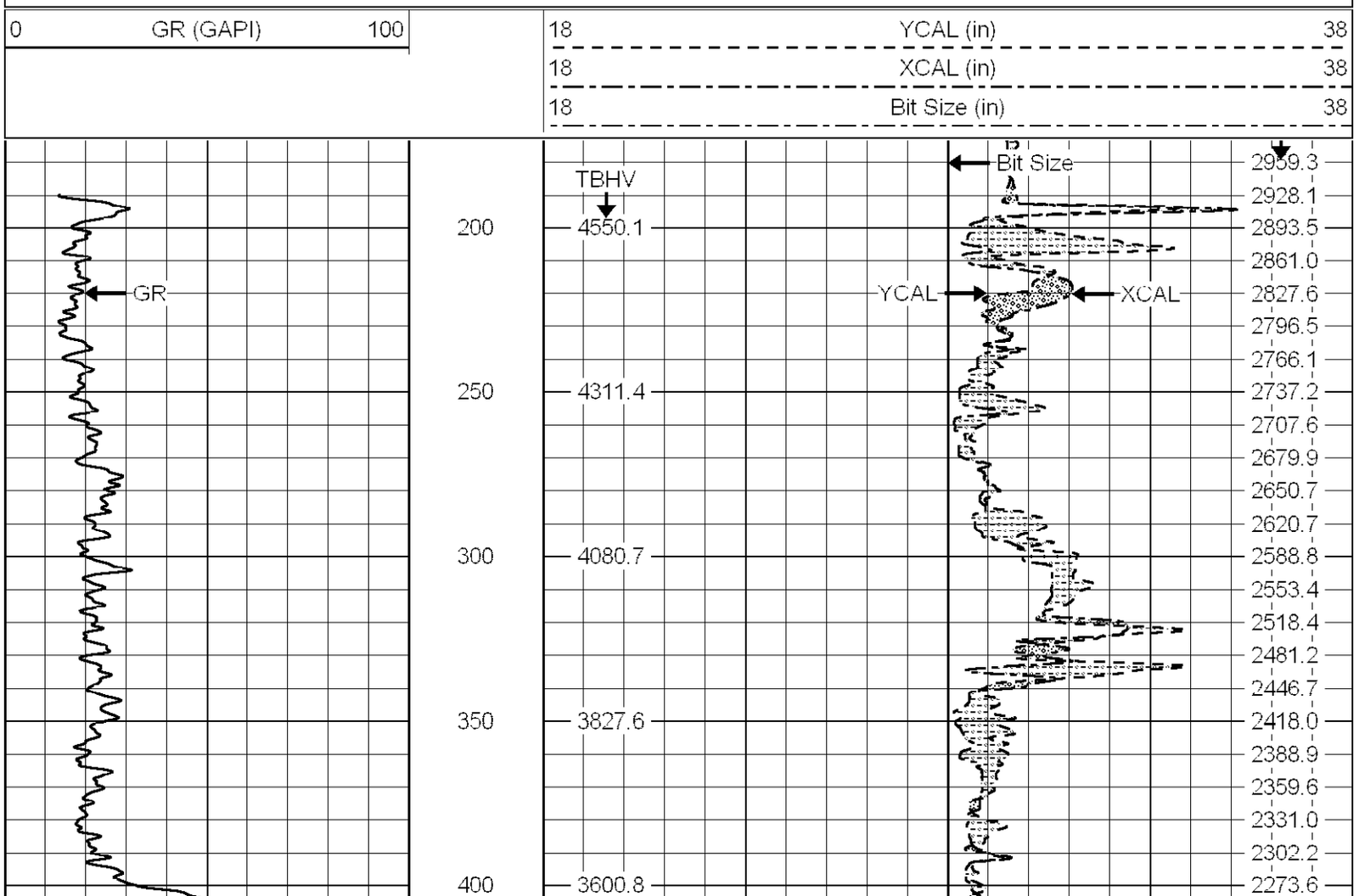
Database File:	c:\warrior\data\f-3 folder\8 jun folder\xy_dil.db
Dataset Pathname:	run2/MAIN
Presentation Format:	xyc
Dataset Creation:	Wed Aug 01 17:16:39 2007
Charted by:	Depth in Feet scaled 1:1200

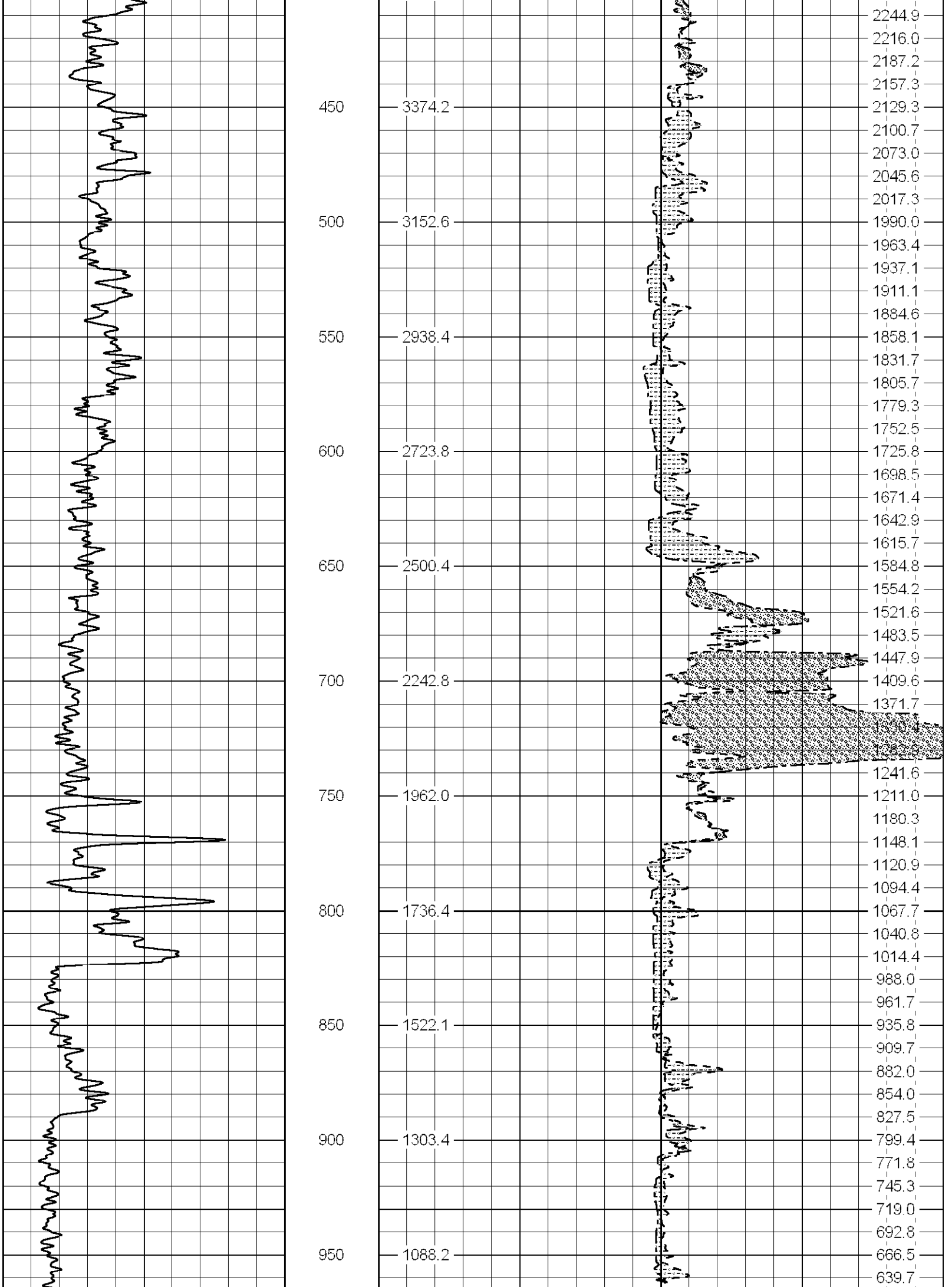




MAIN PASSES

Database File:	c:\warrior\data\f-3 folder\8 jun folder\xy_dil.db
Dataset Pathname:	run2/MAIN
Presentation Format:	xyc
Dataset Creation:	Wed Aug 01 17:16:39 2007
Charted by:	Depth in Feet scaled 1:600

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650
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750
800
850
900
950
3374.2
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2500.4
2242.8
1962.0
1736.4
1522.1
1303.4
1088.2
2244.9
2216.0
2187.2
2157.3
2129.3
2100.7
2073.0
2045.6
2017.3
1990.0
1963.4
1937.1
1911.1
1884.6
1858.1
1831.7
1805.7
1779.3
1752.5
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1671.4
1642.9
1615.7
1584.8
1554.2
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1483.5
1447.9
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1067.7
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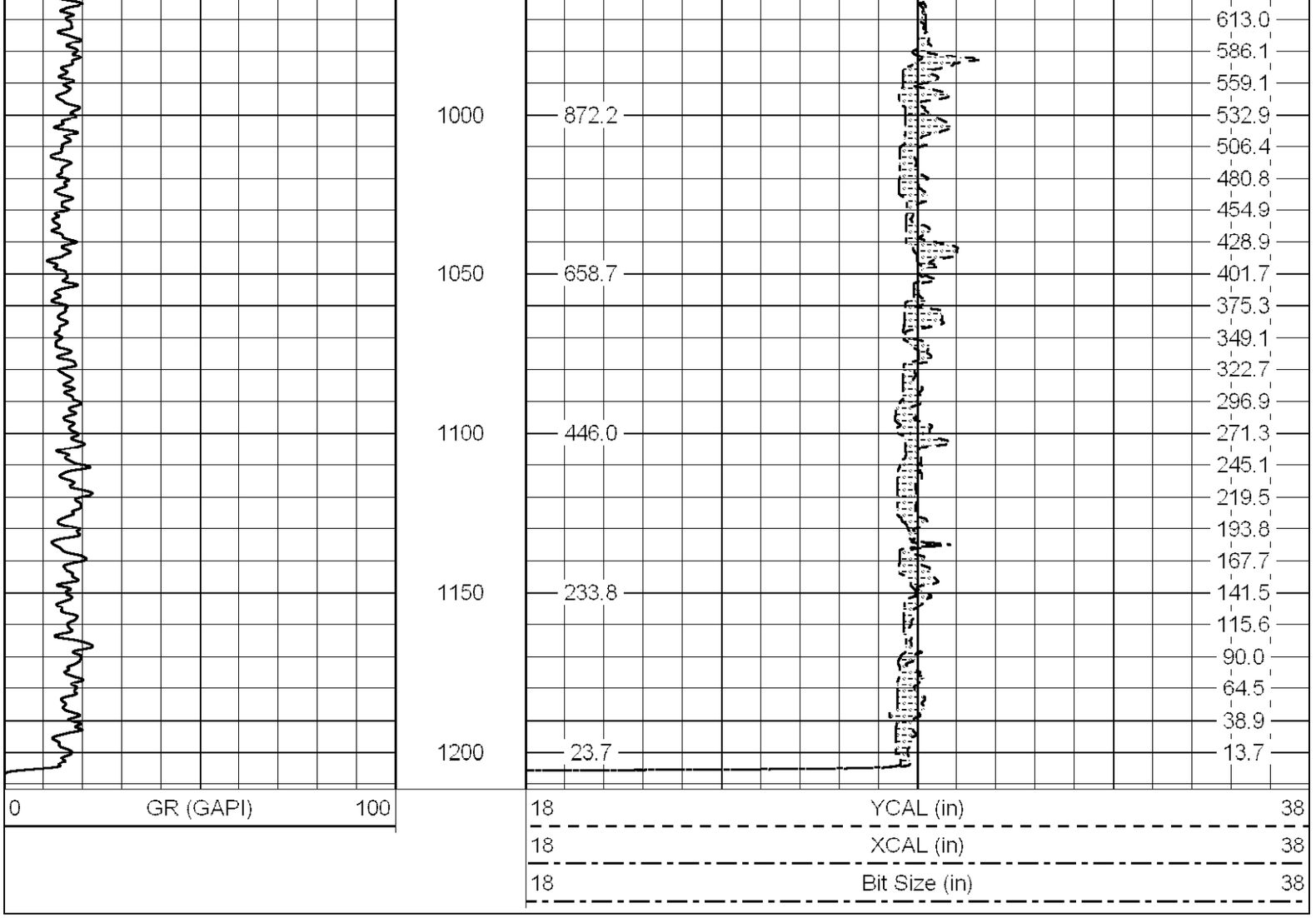

MAIN PASSES

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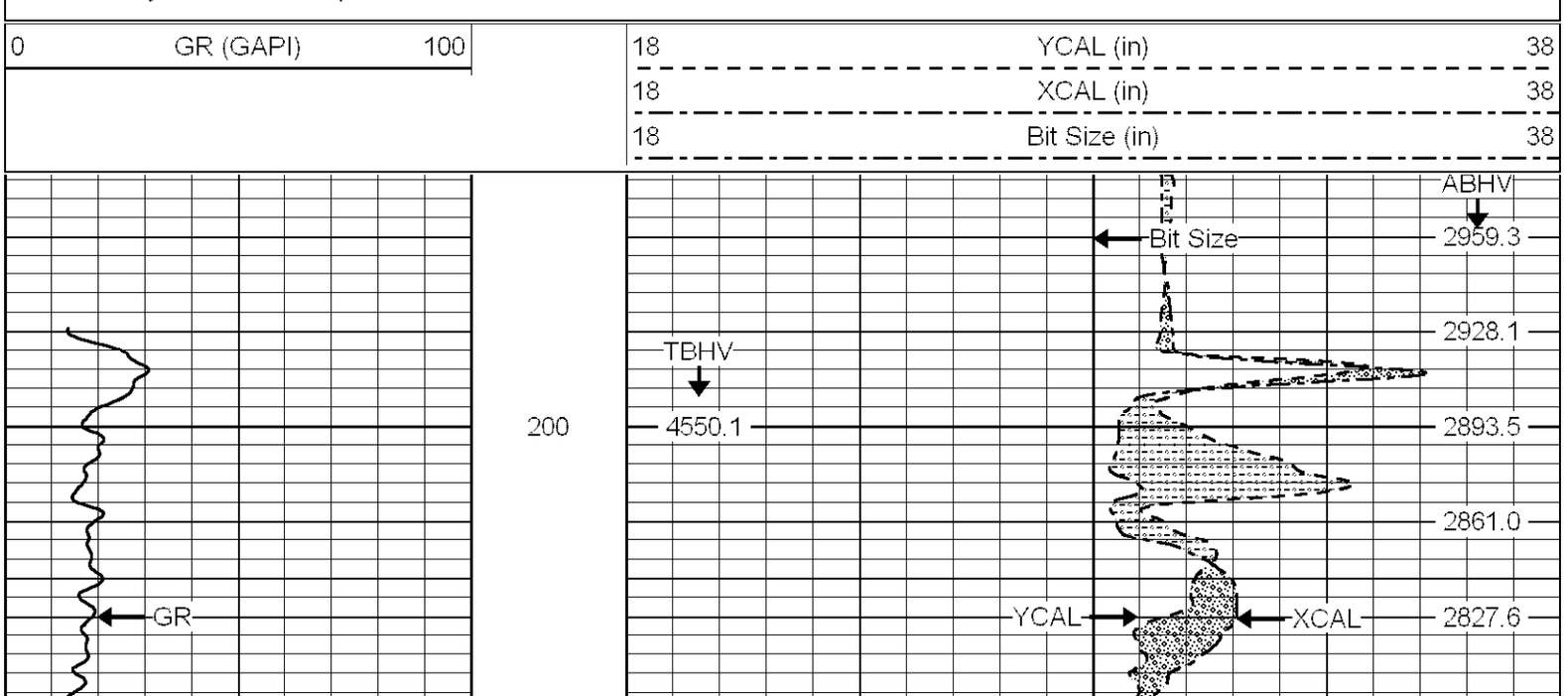
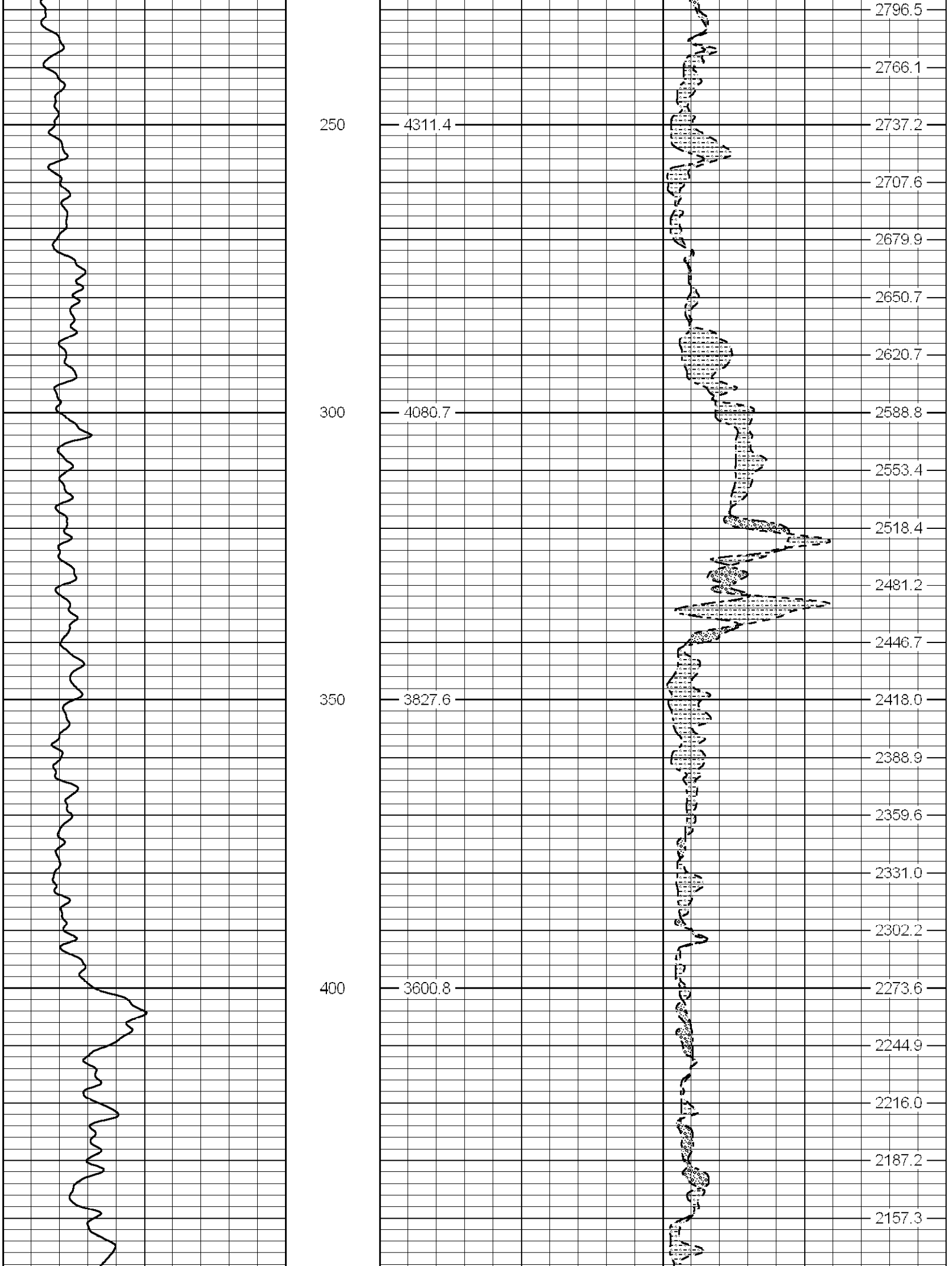
Dataset Pathname: run2/MAIN
Presentation Format: xyc
Dataset Creation: Wed Aug 01 17:16:39 2007
Charted by: Depth in Feet scaled 1:240

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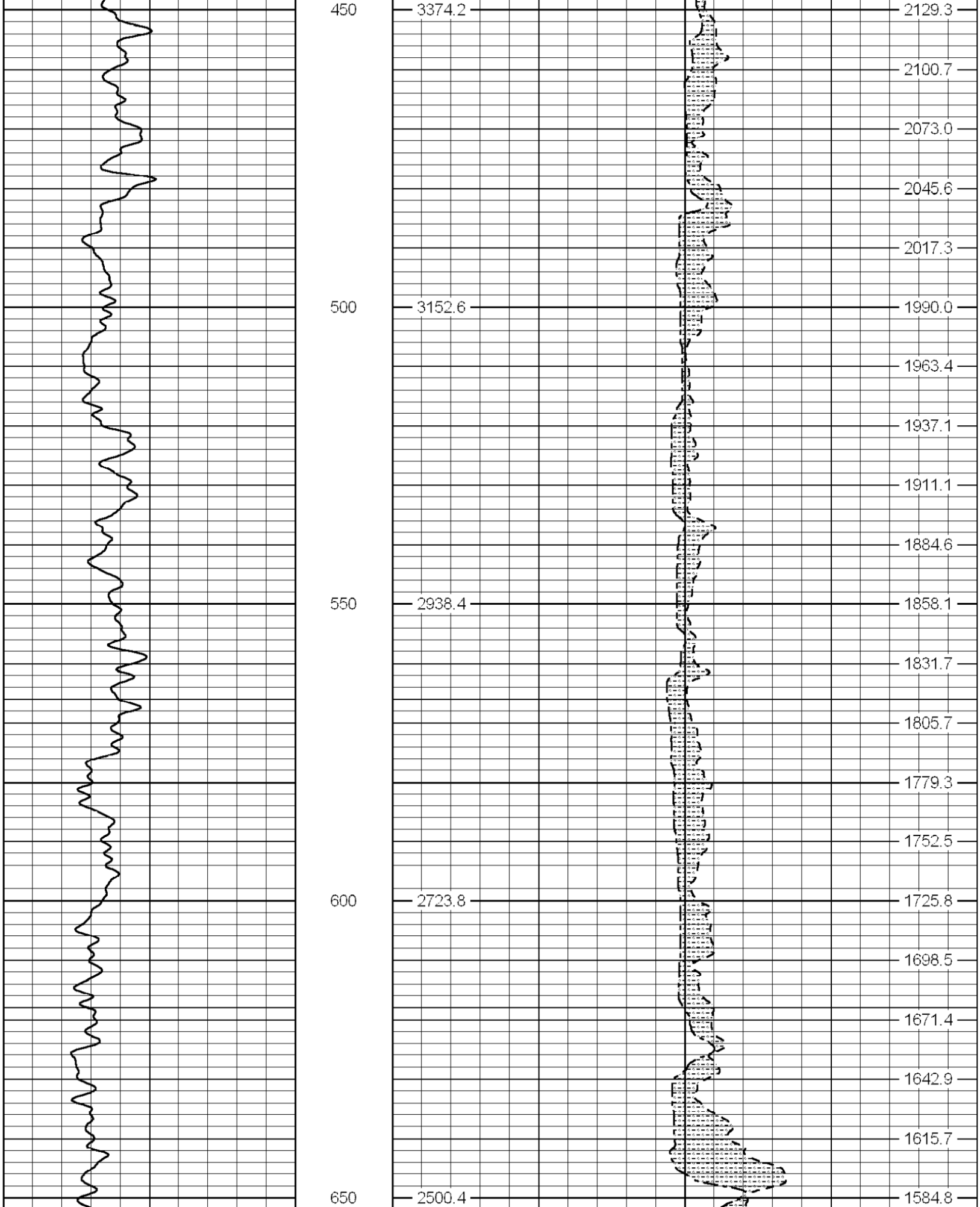
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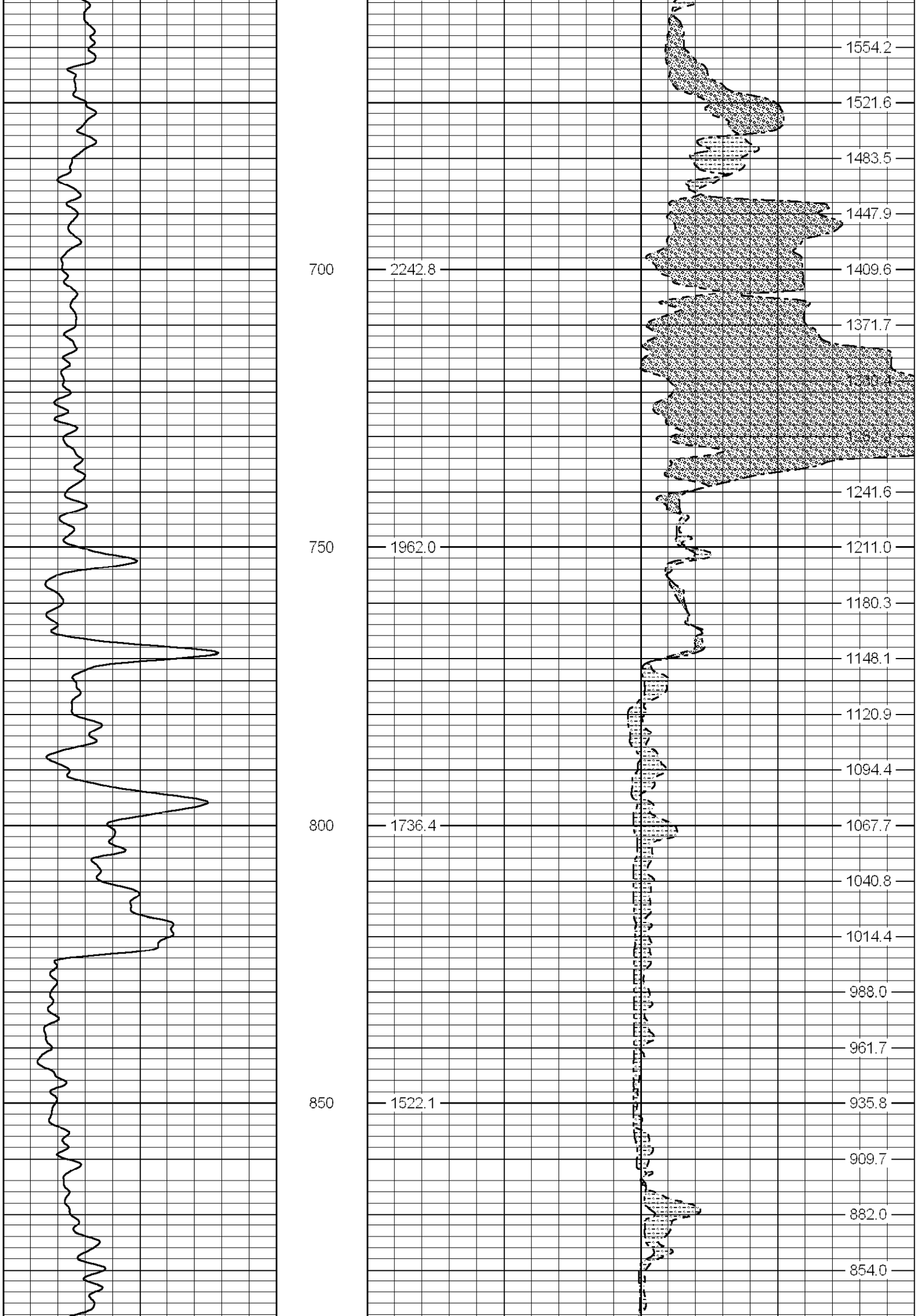
1584.8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1371.7
1330.4
1289.9
1241.6
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1148.1
1120.9
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1040.8
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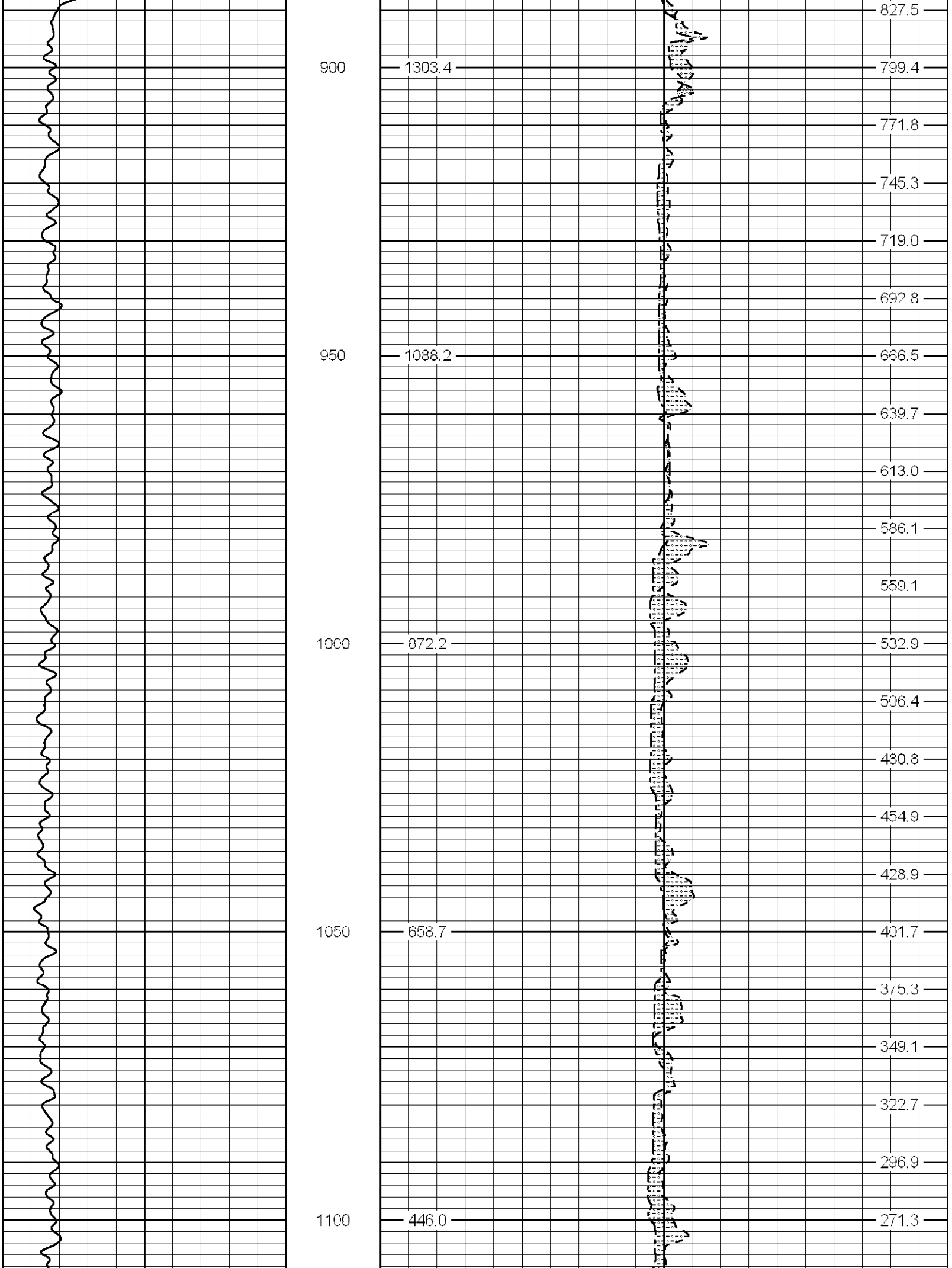
882.0
854.0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827.5
799.4
771.8
745.3
719.0
692.8
666.5
639.7
613.0
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559.1
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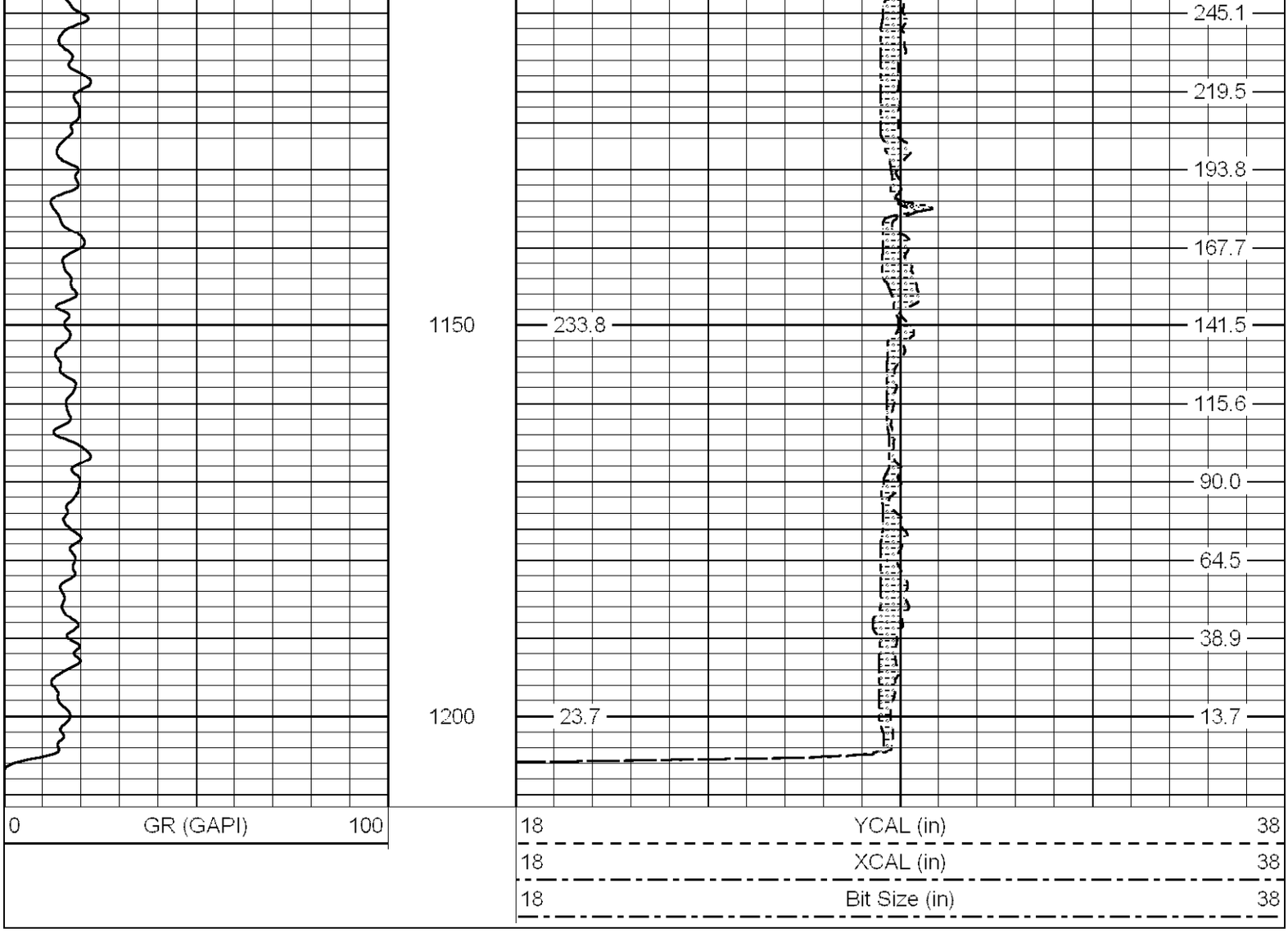
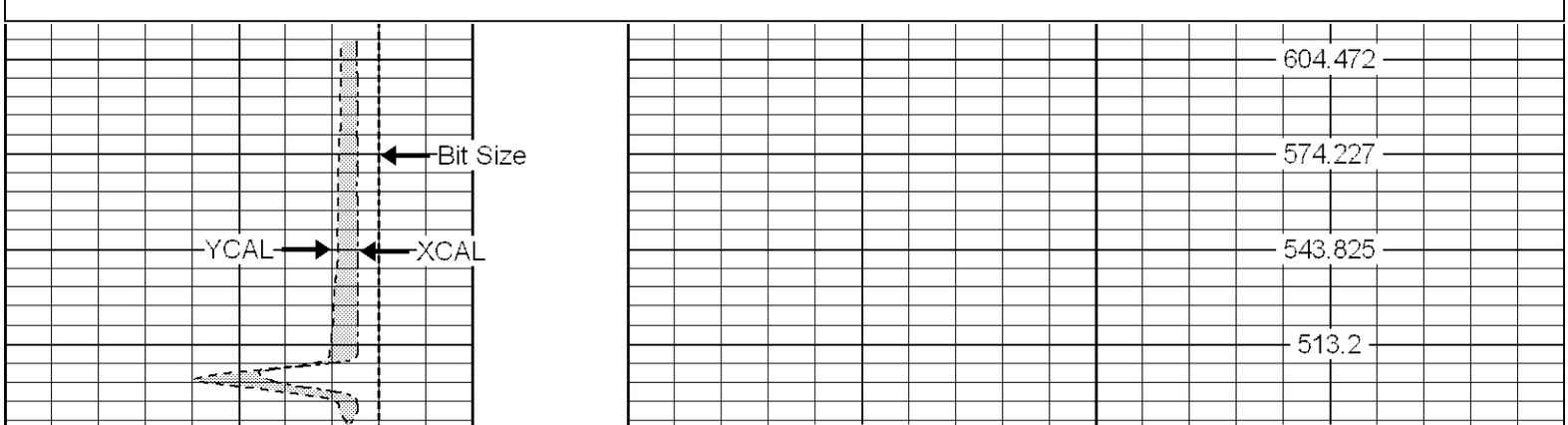
322.7
296.9
271.3

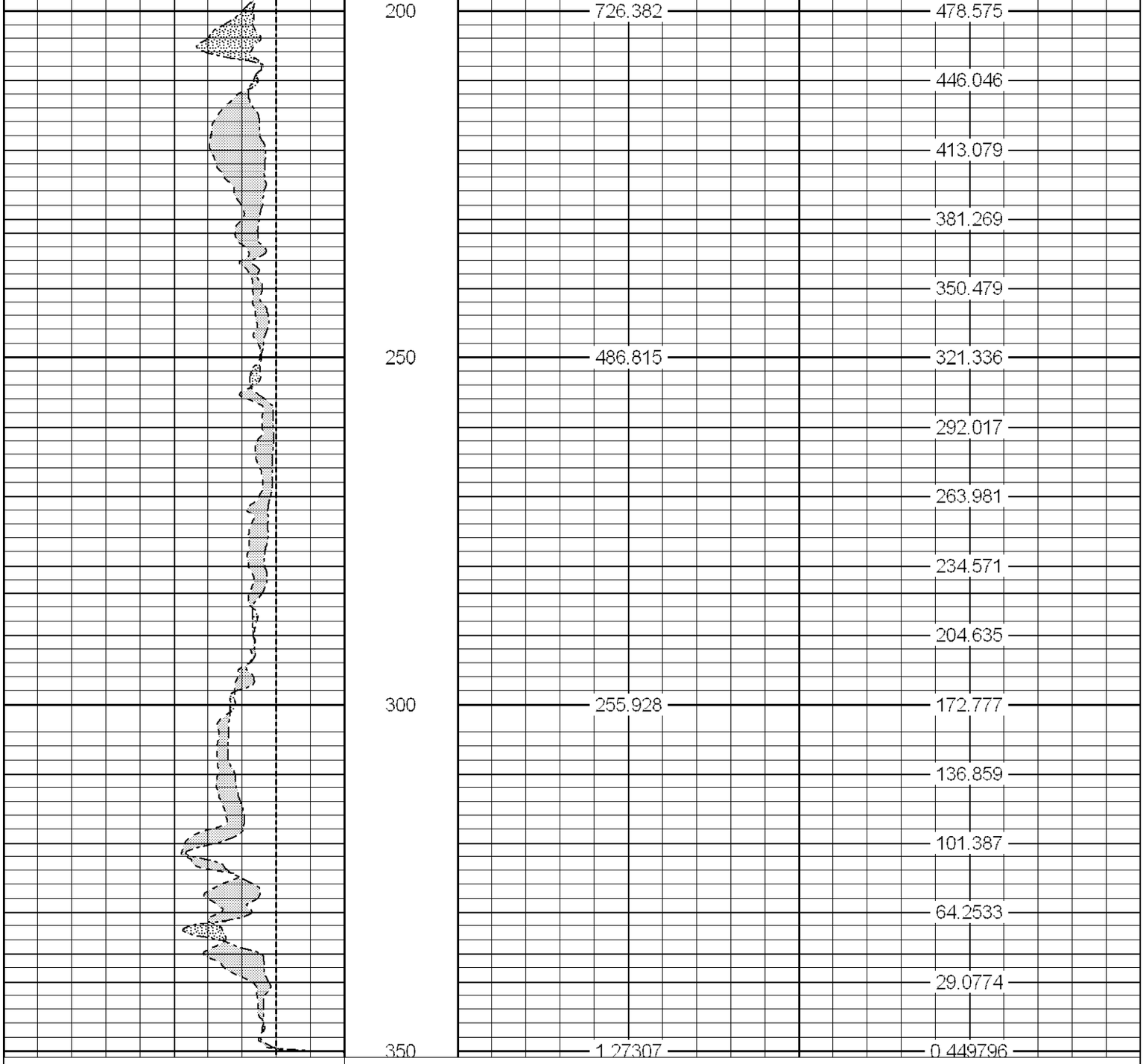


XY REPEAT PASS

Database File:	city of lake worth.db
Dataset Pathname:	John_Prin/F-3/XY/REPEAT
Presentation Format:	xyc
Dataset Creation:	Fri Jun 08 18:01:53 2007 by Log Open-Cased 061129
Charted by:	Depth in Feet scaled 1:240

44	YCAL (in)	24
44	XCAL (in)	24
44	BOREID (in)	24
44	CASEOD (in)	24





44	YCAL (in)	24
44	XCAL (in)	24
44	BOREID (in)	24
44	CASEOD (in)	24

Calibration Report

Database File: city_of_lake_worth.db
Dataset Pathname: Lake_Osbo/F-3/DIL/MAIN
Dataset Creation: Fri Jun 29 15:23:24 2007 by Log Open-Cased 061129

Gamma Ray Calibration Report

Serial Number:	5562	
Tool Model:	6CHAN	
Performed:	Sun Jun 13 15:33:21 1993	
Calibrator Value:	1.0	GAPI
Background Reading:	0.0	
Calibrator Reading:	1.0	
Sensitivity:	1.0000	GAPI/

Calibration Report

Database File: c:\warrior\data\f-3 folder\8 jun folder\xy_dil.db
Dataset Pathname: MAIN
Dataset Creation: Tue Jul 31 08:47:59 2007

XY Caliper Calibration Report

Serial Number/Model: Probe1-Probe
Performed: Thu Jun 14 11:33:49 2007

	Ring		X Caliper		Y Caliper	
1:	7.9375	in	361.4	cps	372.8	cps
2:	11.625	in	408.8	cps	421.1	cps
3:	14.4375	in	442.8	cps	454.5	cps
4:	21	in	538.3	cps	554	cps
5:	29.125	in	667.5	cps	687.7	cps
6:	35.3125	in	771.5	cps	797.8	cps

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
			XYC-Probe (Probe1)	5.17	3.50	99.00
XCAL	0.00					
YCAL	0.00					

Dataset: city_of_lake_worth.db: Lake_Osbo/F-3/XY/MAIN
Total Length: 5.17 ft
Total Weight: 99.00 lb
O.D. 3.50 in

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
GR	6.50					
			RGDILGR-6CHAN (5562) Robertson Geologging Dual Induction Gamma Ray	7.06	1.50	13.67
CILD CPSD	2.63 2.63					
CILM CPSM	1.54 1.54					

Dataset: city_of_lake_worth.db: Lake_Osbo/F-3/DIL/MAIN
Total Length: 7.06 ft
Total Weight: 13.67 lb
O.D. 1.50 in

APPENDIX C

WELL COMPLETION REPORT

WELL COMPLETION REPORT (Please complete in black ink or type.)

PERMIT # 347 2005 CUP/WUP # 50-00234-W DID #

If permit is for multiple wells indicate the number of wells drilled .

Indicate remaining wells to be cancelled

WATER WELL CONTRACTOR'S SIGNATURE LICENSE # 2040

I certify that the information provided in this report is accurate and true.

Grout	No. of Bags	From (Ft)	To (Ft.)
	2147.36	LS	1210

WELL LOCATION: County Palm Beach

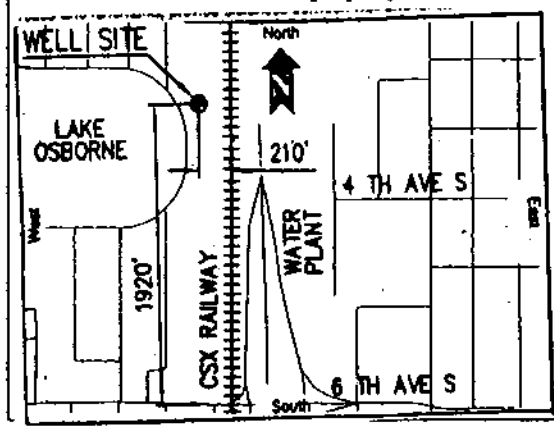
NW ¼ of NW ¼ of Section 28 Twp: 44 Rge: 43

Latitude 26:36:51.32 Longitude 80:04:11.31

Date Stamp

Official Use Only

Sketch of well location on property



ther reference

CHEMICAL ANALYSIS WHEN REQUIRED

Iron: .03 ppm Sulfate: 394 ppm

Chloride: 1540 ppm

[X] Lab Test [ ] Field Test Kit Pump Type: [ ]

Centrifugal [ ] Jet [ ] Submersible [ ] Turbine

Horsepower Capacity G.P.M.

Pump Depth Ft. Intake Depth

OWNER'S NAME City of Lake Worth COMPLETION DATE 9/5/06

Florida Unique I.D. WELL USE: DEP/Public X Irrigation Domestic

Monitor HRS Limited

DRILL METHOD: [X] Rotary [ ] Cable Tool [ ] Combo. [ ] Jet [ ] Auger Other RA

Measured Static Water Level Measured Pumping Water Level

After Hours at G.P.M. Measuring Pt. (Describe):

Which is Ft. [ ] Above [ ] Below Land Surface

Casing: [ ] Black Steel [ ] Galv. [X] PVC Other

[X] Open Hole / [ ] Screen — Casing Diameter & Depth (Ft.)	Depth (Ft.) From	To	DRILL CUTTINGS LOG — Examine cutting every 20 ft. or at formation changes. Note cavities, depth to producing zones. Color / Grain Size / Type of Material
Diameter 30". From LS. To 198.			See attached lithology (6 pages)
Diameter 17.4". From LS. To 1220'.			
Liner [ ] or Casing [ ] Diameter . From . To .			

WELL COMPLETION REPORT (Please complete in black in or type.)

PERMIT # 704 2007 CUP/WUP # 50-00234-W DID # _____

If permit is for multiple wells indicate the number of wells drilled _____.

Indicate remaining wells to be cancelled _____.

WATER WELL CONTRACTOR'S SIGNATURE _____ LICENSE # 2040

I certify that the information provided in this report is accurate and true.

Grout	No. of Bags	From (Ft)	To (Ft.)
	1635	LS	1207

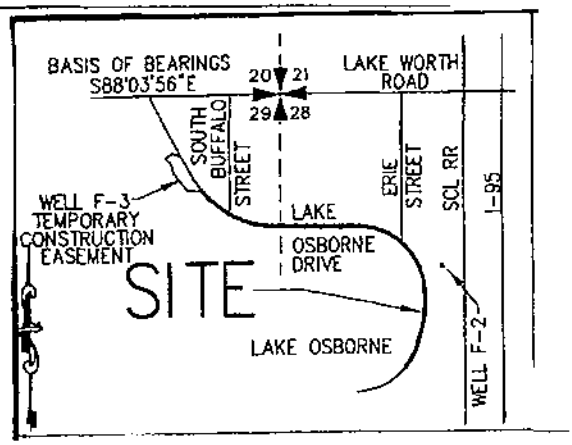
WELL LOCATION: County Palm Beach

NW ¼ of NW ¼ of Section 28 Twp: 44 Rge: 43

Latitude _____ Longitude _____

Date Stamp

Official Use Only



CHEMICAL ANALYSIS WHEN REQUIRED

Iron: .081 ppm Sulfate: 350 ppm

Chloride: 1900 ppm

[X] Lab Test [ ] Field Test Kit Pump Type: [ ]

Centrifugal [ ] Jet [ ] Submersible [ ] Turbine

Horsepower _____ Capacity _____ G.P.M. _____

Pump Depth _____ Ft. Intake Depth _____

OWNER'S NAME City of Lake Worth COMPLETION DATE July 2007

Florida Unique I.D. _____ WELL USE: DEP/Public X Irrigation __ Domestic _____

Monitor _____ HRS Limited

DRILL METHOD: [X] Rotary [ ] Cable Tool [ ] Combo. [ ] Jet [ ] Auger Other RA

Measured Static Water Level _____ Measured Pumping Water Level _____.

After _____ Hours at _____ G.P.M. Measuring Pt. (Describe): _____.

Which is _____ Ft. [ ] Above [ ] Below Land Surface

Casing: [ ] Black Steel [ ] Galv. [X] PVC Other _____.

[X] Open Hole / [ ] Screen — Casing Diameter & Depth (Ft.)	Depth (Ft.) From	To	DRILL CUTTINGS LOG — Examine cutting every 20 ft. or at formation changes. Note cavities, depth to producing zones. Color	Grain Size	Type of Material
Diameter 30". From LS. To 198.			See attached lithology		
Diameter 17.4". From LS. To 1207'.					
Liner [ ] or Casing [ ] Diameter _____. From _____. To _____.					

APPENDIX D

LABORATORY ANALYSES

SUBMISSION # 607-593

Logged in LIMS by MR

CSM assigned

CHAIN OF CUSTODY RECORD

Florida Environmental

1460 W. McNab Road Ft Laud. FL 33309 Tel: (954) 978-6400 Fax: (954) 978-2233
940 Alt. 27 South Babson Park, FL 33827 Tel: (863) 638-3255 Fax: (863) 638-3637
630 Indian Street Savannah, GA 31401 Tel: (912) 238-5050 Fax: (912) 234-4815
528 Gooch Road Fort Meade, FL 33841 Tel: (863) 285-8145 Fax: (863) 285-7030

Original-Return w/report | Yellow- Lab File Copy | Pink- Sampler Copy

DUE DATE Requested

RUSH RESERVATION #

Rush Surcharges apply

Report to: (company name)	ALL WEBB'S ENTERPRISES INC	Report to Address:	on-file
Invoice to: (company name)	SAME	Purchase Order # LW F.2	Invoice to Address: on-file
Project Name and/or Number	LAKE WORTH F.2		Site Location:
Project Contact:	P. WEBB JR	Phone: 561 718 5092	Fax: 561 746 4199 Email:
Sampler Name: (printed)	D. WEBB JR		Sampler Signature

	ORDER # Lab Control Number (Shaded Areas For Laboratory Use Only)	Sample ID	Date Sampled	Time Sampled	Matrix (DW SW GW WW S SED HW BIO SEA OIL X AIR)	Bottle & Pres. Combo Codes	Number of Containers Received & NELAC Letter Suffixes # A-?	Analysis Required (Primary + Secondary)	Field Tests: TEMP-C	PH	COND	CHLOR
1	16434	LW.F2	7/27/06	12:00PM	RAW			X				
2	ALL SAMPLES COLLECTED FROM				GW							
3	LAKE WORTH WELL F.2 SAME DATE/TIME											
4												
5		no Asbestos										
6		no Bact } per Lab										
7		no Radionuc. }										
8												
9		3AG 3LG TU TN FAT FAT										
10		HT SS @TH 2AG 3VG 9VT 2UT										

Special Comments:

"I waive NELAC protocol" (sign here) >

Total: 30

Deliverables: QA/QC Report Needed? Yes No *(additional charge)*

SAMPLE CUSTODY AND TRANSFER SIGNATURES		DATE / TIME
1	Relinquished by:	7/27/06 13:30
1	Received by:	7/27/06 13:30
2	Relinquished by:	7/27/06
2	Received by:	7/27/06 1540
3	Relinquished by:	
3	Received by:	

Sample Custody & Field Comments

Temp as received 4 C

Custody Seals? Y N

Billable Field Time _____ hrs

Misc. Charges _____

Bottle Type
A-liter amber
B-Bacteria bag/bottle
F-500 ml O-125 ml
L-liter bottle
S4- 4 oz soil jar / S8- 8 oz soil jar
T-250 ml
V-40 ml vial
W-wide mouth
X-other TED=Tedlar Air Bag

Preservatives
A-ascorbic acid P-H3PO4
C-HCL S-H2SO4
Cu-CuSO4 T-Na2S2O3-H2O
H-HNO3 U-Unpreserved
M-MCAB P-H3PO4
N-NaOH Z-zinc acetate
NH4-NH4CL

www.flenviro.com COC Page of

Florida Environmental

Report To:
D. Webb Jr.
All Webb's Enterprises, Inc.
309 Commerce Way
Jupiter, FL 33458

Report Printed: 09/05/06 Rev. 2
Submission # 607000593
Order # 16436

Project: Lake Worth F-2
Site Location: Lake Worth
Matrix: Water

Sample I.D.: LW-F2
Collected: 07/27/06 12:00
Received: 07/27/06 15:40
Collected by: D. Webb, Jr.

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Total Dissolved Solids (TDS)	4126		mg/L	0.82	2.46	EPA 160.1	07/31 14:56	07/31 14:56	EMS
Chloride	1540	Q	mg/L	0.10	0.30	300.0	09/01 12:50	09/01 12:50	JB
Fluoride	0.95		mg/L	0.011	0.033	300.0	07/28 12:16	07/28 12:16	EAC
Nitrate (as N)	U	U	mg/l	0.048	0.144	300.0	07/28 12:16	07/28 12:16	EAC
Nitrite (as N)	U	U	mg/L	0.016	0.048	300.0	07/28 12:16	07/28 12:16	EAC
Sulfate	394		mg/L	0.20	0.60	300.0	07/28 12:17	07/28 12:17	EAC
Cyanide, Total	U	U	mg/L	0.002	0.006	335.3	08/03	08/03 17:03	KYT
MBAS Surfactants	0.070		mg/L	0.02	0.06	425.1	07/28 14:45	07/28 14:45	BMS
Odor (Lab)	2.00		TON	0.1	0.3	SM2150B	07/28 08:12	07/28 08:12	BMS
Color (Lab)	5.00		Pt-Co	0.1	0.3	SM2120B	07/28 08:05	07/28 08:05	BMS
Aluminum	U	U	mg/L	0.009	0.027	200.7	07/28	07/28 12:58	IMN
Iron	0.03		mg/L	0.002	0.006	200.7	07/28	07/28 12:58	IMN
Sodium	906		mg/L	0.025	0.075	200.7	07/28	07/31 09:24	IMN
Zinc	U	U	mg/L	0.00056	0.00168	200.7	07/28	07/28 12:58	IMN
200.8 DW-10 Metals in Drinking Water 62-550.310				Dilution Factor =1					
Arsenic	0.0019		mg/L	0.00002	0.00006	4.1.3/200.8	07/31 15:38	07/31 15:38	KYT
Barium	0.0099		mg/L	0.0002	0.0006	4.1.3/200.8	07/31 15:38	07/31 15:38	KYT
Cadmium	U	U	mg/L	0.00001	0.00003	4.1.3/200.8	07/31 15:38	07/31 15:38	KYT

Report To:
D. Webb Jr.
All Webb's Enterprises, Inc.
309 Commerce Way
Jupiter, FL 33458

Report Printed: 09/05/06 Rev. 2
Submission # 607000593
Order # 16436

Project: Lake Worth F-2
Site Location: Lake Worth
Matrix: Water

Sample I.D.: LW-F2
Collected: 07/27/06 12:00
Received: 07/27/06 15:40
Collected by: D. Webb, Jr.

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Chromium	U	U	mg/L	0.00004	0.00012	4.1.3/200.8	07/31 15:38	07/31 15:38	KYT
Lead	U	U	mg/L	0.00006	0.00018	4.1.3/200.8	07/31 15:38	07/31 15:38	KYT
Nickel	0.0010		mg/L	0.00004	0.00012	4.1.3/200.8	07/31 15:38	07/31 15:38	KYT
Selenium	0.0090		mg/L	0.00013	0.00039	4.1.3/200.8	07/31 15:38	07/31 15:38	KYT
Antimony	U	U	mg/L	0.00003	0.00009	4.1.3/200.8	07/31 15:38	07/31 15:38	KYT
Beryllium	U	U	mg/L	0.00003	0.00009	4.1.3/200.8	07/31 15:38	07/31 15:38	KYT
Thallium	U	U	mg/L	0.00001	0.00003	4.1.3/200.8	07/31 15:38	07/31 15:38	KYT
Copper	U	U	mg/L	0.00016	0.00048	200.8	07/31	07/31 15:38	KYT
Manganese	U	U	mg/L	0.00007	0.00021	200.8	07/31	07/31 15:38	KYT
Silver	U	U	mg/L	0.00002	0.00006	200.8	07/31	07/31 15:38	KYT
Mercury	U	U	mg/L	0.0002	0.0006	245.1	07/28	07/28 16:30	BN
504.1 EDB, DBCP: 62-550.310(4)(b)				Dilution Factor =1					
1,2-Dibromo-3-Chloropropane (DBCP)	U	U	ug/L	0.30	0.90	EPA 504.1 ECD	08/0208:00	08/02 17:07	RGC
Ethylene Dibromide (EDB)	U	U	ug/L	0.02	0.06	EPA 504.1 ECD	08/0208:00	08/02 17:07	RGC
508 Pesticides & PCBs: 62-550.310(4)(b)				Dilution Factor =1					
Hexachlorocyclopentdiene	U	U	ug/L	0.42	1.26	508	07/31 09:28	08/02 09:28	AC
Hexachlorobenzene	U	U	ug/L	0.42	1.26	508	07/31 09:28	08/02 09:28	AC
v-BHC (Lindane)	U	U	ug/L	0.004	0.012	508	07/31 09:28	08/02 09:28	AC

Report To:
D. Webb Jr.
All Webb's Enterprises, Inc.
309 Commerce Way
Jupiter, FL 33458

Report Printed: 09/05/06 Rev. 2
Submission # 607000593
Order # 16436

Project: Lake Worth F-2
Site Location: Lake Worth
Matrix: Water

Sample I.D.: LW-F2
Collected: 07/27/06 12:00
Received: 07/27/06 15:40
Collected by: D. Webb, Jr.

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Heptachlor	U	U	ug/L	0.005	0.015	508	07/31 09:28	08/02 09:28	AC
Heptachlor Epoxide	U	U	ug/L	0.008	0.024	508	07/31 09:28	08/02 09:28	AC
Endrin	U	U	ug/L	0.005	0.015	508	07/31 09:28	08/02 09:28	AC
Methoxychlor	U	U	ug/L	0.007	0.021	508	07/31 09:28	08/02 09:28	AC
Arochlor 1016	U	U	ug/L	0.10	0.30	508	07/31 09:28	08/02 09:28	AC
Arochlor 1221	U	U	ug/L	0.10	0.30	508	07/31 09:28	08/02 09:28	AC
Arochlor 1232	U	U	ug/L	0.10	0.30	508	07/31 09:28	08/02 09:28	AC
Arochlor 1242	U	U	ug/L	0.10	0.30	508	07/31 09:28	08/02 09:28	AC
Arochlor 1248	U	U	ug/L	0.10	0.30	508	07/31 09:28	08/02 09:28	AC
Arochlor 1254	U	U	ug/L	0.10	0.30	508	07/31 09:28	08/02 09:28	AC
Arochlor 1260	U	U	ug/L	0.10	0.30	508	07/31 09:28	08/02 09:28	AC
Toxaphene	U	U	ug/L	0.40	1.20	508	07/31 09:28	08/02 09:28	AC
Chordane	U	U	ug/L	0.10	0.30	508	07/31 09:28	08/02 09:28	AC
515.3 Chlorophenoxy Herbicides: 62-550.310(4)(b)				Dilution Factor =1					
Dalapon	U	U	ug/L	0.08	0.24	515.3	08/01 07:46	08/06 07:46	AC
2,4-D	U	U	ug/L	0.09	0.27	515.3	08/01 07:46	08/06 07:46	AC
Pentachlorophenol	U	U	ug/L	0.02	0.06	515.3	08/01 07:46	08/06 07:46	AC
2,4,5-TP (silvex)	U	U	ug/L	0.038	0.114	515.3	08/01 07:46	08/06 07:46	AC

Report To:
D. Webb Jr.
All Webb's Enterprises, Inc.
309 Commerce Way
Jupiter, FL 33458

Report Printed: 09/05/06 Rev. 2
Submission # 607000593
Order # 16436

Project: Lake Worth F-2
Site Location: Lake Worth
Matrix: Water

Sample I.D.: LW-F2
Collected: 07/27/06 12:00
Received: 07/27/06 15:40
Collected by: D. Webb, Jr.

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Dinoseb	U	U	ug/L	0.06	0.18	515.3	08/01 07:46	08/06 07:46	AC
Picloram	U	U	ug/L	0.08	0.24	515.3	08/01 07:46	08/06 07:46	AC
524.2 Volatile Organics: 62-550.310(4)(a)				Dilution Factor =1					
Vinyl Chloride	U	U	ug/L	0.34	1.02	524.2	07/28 13:56	07/28 13:56	MMD
1,1-Dichloroethylene	U	U	ug/L	0.52	1.56	524.2	07/28 13:56	07/28 13:56	MMD
Dichloromethane (Methylene Chloride)	U	U	ug/L	0.99	2.97	524.2	07/28 13:56	07/28 13:56	MMD
Trans-1,2-Dichloroethylene	U	U	ug/L	0.50	1.50	524.2	07/28 13:56	07/28 13:56	MMD
Cis-1,2-Dichloroethylene	U	U	ug/L	0.11	0.33	524.2	07/28 13:56	07/28 13:56	MMD
1,1,1-Trichloroethane	U	U	ug/L	0.25	0.75	524.2	07/28 13:56	07/28 13:56	MMD
Carbon Tetrachloride	U	U	ug/L	0.19	0.57	524.2	07/28 13:56	07/28 13:56	MMD
Benzene	U	U	ug/L	0.09	0.27	524.2	07/28 13:56	07/28 13:56	MMD
1,2-Dichloroethane	U	U	ug/L	0.24	0.72	524.2	07/28 13:56	07/28 13:56	MMD
Trichloroethylene	U	U	ug/L	0.09	0.27	524.2	07/28 13:56	07/28 13:56	MMD
1,2-Dichloropropane	U	U	ug/L	0.20	0.60	524.2	07/28 13:56	07/28 13:56	MMD
Toluene	U	U	ug/L	0.14	0.42	524.2	07/28 13:56	07/28 13:56	MMD
1,1,2-Trichloroethane	U	U	ug/L	0.36	1.08	524.2	07/28 13:56	07/28 13:56	MMD
Tetrachloroethylene	U	U	ug/L	0.11	0.33	524.2	07/28 13:56	07/28 13:56	MMD
Chlorobenzene	U	U	ug/L	0.09	0.27	524.2	07/28 13:56	07/28 13:56	MMD

Report To:
D. Webb Jr.
All Webb's Enterprises, Inc.
309 Commerce Way
Jupiter, FL 33458

Report Printed: 09/05/06 Rev. 2
Submission # 607000593
Order # 16436

Project: Lake Worth F-2
Site Location: Lake Worth
Matrix: Water

Sample I.D.: LW-F2
Collected: 07/27/06 12:00
Received: 07/27/06 15:40
Collected by: D. Webb, Jr.

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Ethylbenzene	U	U	ug/L	0.13	0.39	524.2	07/28 13:56	07/28 13:56	MMD
Xylenes (Total)	U	U	ug/L	0.21	0.63	524.2	07/28 13:56	07/28 13:56	MMD
Styrene	U	U	ug/L	0.17	0.51	524.2	07/28 13:56	07/28 13:56	MMD
1,4-Dichlorobenzene (para)	U	U	ug/L	0.14	0.42	524.2	07/28 13:56	07/28 13:56	MMD
1,2-Dichlorobenzene (ortho)	U	U	ug/L	0.48	1.44	524.2	07/28 13:56	07/28 13:56	MMD
1,2,4-Trichlorobenzene	U	U	ug/L	0.82	2.46	524.2	07/28 13:56	07/28 13:56	MMD
525.2 Semivolatile Organics: 62-550.310(4)(b)				**Dilution Factor =1**					
Di(2-Ethylhexyl)phthalate	U	U	ug/L	0.36	1.08	525.2	08/02 09:14	08/02 09:14	AC
Di(2-Ethylhexyl)adipate	U	U	ug/L	0.36	1.08	525.2	08/02 09:14	08/02 09:14	AC
Benzo(a)pyrene	U	U	ug/L	0.017	0.051	525.2	08/02 09:14	08/02 09:14	AC
Pentachlorophenol	U	U	ug/L	0.02	0.06	525.2	08/02 09:14	08/02 09:14	AC
Alachlor	U	U	ug/L	0.20	0.60	525.2	08/02 09:14	08/02 09:14	AC
Atrazine	U	U	ug/L	0.20	0.60	525.2	08/02 09:14	08/02 09:14	AC
Simazine	U	U	ug/L	0.20	0.60	525.2	08/02 09:14	08/02 09:14	AC
SUB 531.1 Carbamate Pesticides: 62-550.310(4)(b				**Dilution Factor =1**					
Carbofuran	0.5U	I	ug/L	0.36	1.08	531.1	08/01 22:36	08/01 22:36	E84129
Oxamyl (vydate)	0.5U	I	ug/L	0.23	0.69	531.1	08/01 22:36	08/01 22:36	E84129
SUB 531.1 Carbamate Pesticides: 62-550.UNREGULAT				**Dilution Factor =1**					

Report To:
D. Webb Jr.
All Webb's Enterprises, Inc.
309 Commerce Way
Jupiter, FL 33458

Report Printed: 09/05/06 Rev. 2
Submission # 607000593
Order # 16436

Project: Lake Worth F-2
Site Location: Lake Worth
Matrix: Water

Sample I.D.: LW-F2
Collected: 07/27/06 12:00
Received: 07/27/06 15:40
Collected by: D. Webb, Jr.

LABORATORY ANALYSIS REPORT

PARAMETER	RESULT	QC	UNITS	MDL	PQL	METHOD	DATE EXT.	DATE ANALY.	ANALYST
Aldicarb Sulfoxide	0.5U		ug/L	0.50	1.50	531.1	08/01 22:36	08/01 22:36	E84129
Aldicarb Sulfone	0.5U		ug/L	0.50	1.50	531.1	08/01 22:36	08/01 22:36	E84129
Methomyl	0.5U		ug/L	0.50	1.50	531.1	08/01 22:36	08/01 22:36	E84129
3-Hydrocarbofuran	0.5U		ug/L	0.50	1.50	531.1	08/01 22:36	08/01 22:36	E84129
Aldicarb	0.5U		ug/L	0.50	1.50	531.1	08/01 22:36	08/01 22:36	E84129
Carbaryl	0.5U		ug/L	0.50	1.50	531.1	08/01 22:36	08/01 22:36	E84129
Glyphosate	U	U	ug/L	40.0	120.0	547.1	07/28 22:18	07/28 22:18	E84129
Endothall	20U		ug/L	2.0	6.0	548.1	07/29 19:37	08/01 19:37	E84129
SUB 549.2 Diquat/Paraquat: 62-550.310(4)(b)				Dilution Factor =1					
Diquat	U	U	ug/L	1.44	4.32	549.2	08/01 19:40	08/01 19:40	E84129

QC=Qualifier Codes as defined by DEP 62-160
Unless indicated, soil results are reported based on actual (wet) weight basis.
Analytes not currently NELAC certified denoted by *.
Work performed by outside (subcontract) labs denoted by Cert.ID in Analyst Field.

Authorized CSM Signature
Florida Environmental;Certification # E86006

Chain of Custody Record

LAB USE ONLY

J.E.L. Log # 7/8142

P.O. # _____

Quote# _____

BAR CODE

Jupiter Environmental Laboratories

Company Name JLA Geosciences

Address 1931 Commerce Ln Suite 3

City Jupiter State FL Zip 33458

Sampling Site Address Lake Worth F-3

Attn: Jon Friedrichs Fax/Email 746-0119

Project Name Lake Worth Project #

Sampler Name/Signature Paul Stout

#	Sample Label (Client ID)	Collected Date	Collected Time	Matrix Code*	# of Cont	Parameters	BT Metals (Cd, Cu, Pb Zn, Hg	AT Hexavalent Chromium	ET TOC	AI 8021	Field Filtered (Y/N)	Integrity OK (Y/N)	Comments
1	F-3 R.A.	6/25/07	2030	GW	5		1	1	1	2	N		Flowing well
2													
3													
4													
5													
6													
7													
8													
9													
10													

ORIGINAL

Matrix Codes*

S	Soil/Solid Sediment	SW	Surface Water
GW	Ground Water	SL	Sludge
WW	Waste Water	O	Other (Please Specify)
DW	Drinking Water		

A- none I- Ice
B- HNO_3 O- Other
C- H_2SO_4 M- MeOH
D- NaOH
E- HCl

Relinquished by	Date	Time	Received by	Date	Time
Paul M Stout	6/26/07	1620		6/27/07	16:21

QA/QC level with report
None ___1___2___3___ See price guide for applicable fees

T.A.T. Request FDEP____
___ Standard SFWMD____
X Rush Date Required ASAP

Temp Control: 4.5 °C

Jupiter Environmental Laboratories, Inc.
150 Old Dixie Highway, Jupiter, FL 33458
(561) 575-0030 • Fax (561) 575-4118 • clientservices@jupiterlabs.com

C.O.C.# 31207

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118
www.jupiterlabs.com
clientservices@jupiterlabs.com

July 2, 2007

Jon Friedrichs
JLA Geosciences Inc.
1931 Commerce Lane Suite 3
Jupiter, FL 33458

RE: LOG# 718742
Project ID: Lake Worth
COC# 31207

Dear Jon Friedrichs:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday, June 26, 2007. Results reported herein conform to the most current NELAC standards, where applicable, unless indicated by * in the body of the report.

The enclosed Chain of Custody is a component of this package and should be retained with the package and incorporated therein.

Results for all solid matrices are reported in dry weight unless otherwise noted. Results for all liquid matrices are reported as received in the laboratory unless otherwise noted.

Samples are disposed of after 30 days of their receipt by the laboratory unless archiving is requested in writing. The laboratory maintains the right to charge storage fees for archived samples.

Certain analyses are subcontracted to outside NELAC certified laboratories, please see the Footnotes section of this report for NELAC certification numbers of laboratories used.

A Statement of Qualifiers is available upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Erin Beauregard for
Kacia Baldwin
kbaldwin@jupiterlabs.com

Enclosures

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

SAMPLE ANALYTE COUNT

LOG# 718742
Project ID: Lake Worth

Lab ID	Sample ID	Method	Analytes Reported
718742001	F-3 R.A.	EPA 150.1	1
		EPA 200.8 (Total)	5
		EPA 415.1	1
		EPA 7196A	1
		EPA 8260B	76

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

SAMPLE SUMMARY

LOG# 718742
Project ID: Lake Worth

Lab ID	Sample ID	Matrix	Date Collected	Date Received
718742001	F-3 R.A.	Aqueous Liquid	6/25/2007 20:30	6/26/2007 16:21

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

ANALYTICAL RESULTS

LOG# 718742
Project ID: Lake Worth

Lab ID: **718742001** Date Received: 6/26/2007 Matrix: Aqueous Liquid
Sample ID: **F-3 R.A.** Date Collected: 6/25/2007

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	By	Analyzed	By	Qual	CAS
Analysis Desc: Hexavalent Chromium by EPA 7196 (W)			Analytical Method: EPA 7196A								
Hexavalent Chromium	U	mg/L	0.0020		1			06/27/07	SS	Q1	18540-29-9
Analysis Desc: pH by EPA 150.1			Analytical Method: EPA 150.1								
pH	8.15	su			1			06/27/07	KB		
Analysis Desc: TOC by EPA 415.1 [REF] (W)			Analytical Method: EPA 415.1								
TOC	19	mg/L	10		10			06/29/07	USB		
Volatiles by EPA 8260B GC/MS											
Analysis Desc: EPA 8260B Full Scan (W)			Preparation Method: EPA 5030B Analytical Method: EPA 8260B								
1,1,1,2-Tetrachloroethane	U	ug/L	1.00	0.390	1	06/27/07	FO	06/27/07	FO		630-20-6
1,1,1-Trichloroethane	U	ug/L	1.00	0.410	1	06/27/07	FO	06/27/07	FO		71-55-6
1,1,2,2-Tetrachloroethane	U	ug/L	1.00	0.520	1	06/27/07	FO	06/27/07	FO		79-34-5
1,1,2-Trichloroethane	U	ug/L	1.00	0.500	1	06/27/07	FO	06/27/07	FO		79-00-5
1,1-Dichloroethane	U	ug/L	1.00	0.390	1	06/27/07	FO	06/27/07	FO		75-34-3
1,1-Dichloroethene	U	ug/L	1.00	0.540	1	06/27/07	FO	06/27/07	FO		75-35-4
1,1-Dichloropropene	U	ug/L	1.00	0.440	1	06/27/07	FO	06/27/07	FO		563-58-6
1,2,3-Trichlorobenzene	U	ug/L	1.00	0.610	1	06/27/07	FO	06/27/07	FO		87-61-6
1,2,3-Trichloropropane	U	ug/L	1.00	0.550	1	06/27/07	FO	06/27/07	FO		96-18-4
1,2,4-Trichlorobenzene	U	ug/L	1.00	0.560	1	06/27/07	FO	06/27/07	FO		120-82-1
1,2,4-Trimethylbenzene	U	ug/L	1.00	0.430	1	06/27/07	FO	06/27/07	FO		95-63-6
1,2-Dibromo-3-Chloropropane	U	ug/L	1.00	0.200	1	06/27/07	FO	06/27/07	FO		96-12-8
1,2-Dibromoethane (EDB)	U	ug/L	1.00	0.540	1	06/27/07	FO	06/27/07	FO		106-93-4
1,2-Dichlorobenzene	U	ug/L	1.00	0.380	1	06/27/07	FO	06/27/07	FO		95-50-1
1,2-Dichloroethane	U	ug/L	1.00	0.470	1	06/27/07	FO	06/27/07	FO		107-06-2
1,2-Dichloropropane	U	ug/L	1.00	0.340	1	06/27/07	FO	06/27/07	FO		78-87-5
1,3,5-Trimethylbenzene	U	ug/L	1.00	0.370	1	06/27/07	FO	06/27/07	FO		108-67-8
1,3-Dichlorobenzene	U	ug/L	1.00	0.360	1	06/27/07	FO	06/27/07	FO		541-73-1
1,3-Dichloropropane	U	ug/L	1.00	0.300	1	06/27/07	FO	06/27/07	FO		142-28-9
1,4-Dichlorobenzene	U	ug/L	1.00	0.420	1	06/27/07	FO	06/27/07	FO		106-46-7
2,2-Dichloropropane	U	ug/L	1.00	0.200	1	06/27/07	FO	06/27/07	FO		594-20-7
2-Chloroethyl vinyl ether	U	ug/L	1.00	0.400	1	06/27/07	FO	06/27/07	FO		110-75-8
2-Chlorotoluene	U	ug/L	1.00	0.450	1	06/27/07	FO	06/27/07	FO		95-49-8
2-Hexanone	U	ug/L	1.00	0.470	1	06/27/07	FO	06/27/07	FO		591-78-6
4-Chlorotoluene	U	ug/L	1.00	0.420	1	06/27/07	FO	06/27/07	FO		106-43-4

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

ANALYTICAL RESULTS

LOG# 718742
Project ID: Lake Worth

Lab ID: **718742001** Date Received: 6/26/2007 Matrix: Aqueous Liquid
Sample ID: **F-3 R.A.** Date Collected: 6/25/2007

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	By	Analyzed	By	Qual	CAS
4-Isopropyltoluene	U	ug/L	1.00	0.300	1	06/27/07	FO	06/27/07	FO		99-87-6
4-methyl-2-pentanone	U	ug/L	1.00	0.480	1	06/27/07	FO	06/27/07	FO		108-10-1
Acetone	10.7	ug/L	2.00	0.600	1	06/27/07	FO	06/27/07	FO		67-64-1
Acrolein	U	ug/L	5.00	4.10	1	06/27/07	FO	06/27/07	FO		107-02-8
Acrylonitrile	U	ug/L	1.00	0.420	1	06/27/07	FO	06/27/07	FO		107-13-1
Benzene	U	ug/L	1.00	0.350	1	06/27/07	FO	06/27/07	FO		71-43-2
Bromobenzene	U	ug/L	1.00	0.430	1	06/27/07	FO	06/27/07	FO		108-86-1
Bromochloromethane	U	ug/L	1.00	0.470	1	06/27/07	FO	06/27/07	FO		74-97-5
Bromodichloromethane	U	ug/L	0.600	0.290	1	06/27/07	FO	06/27/07	FO		75-27-4
Bromoform	U	ug/L	1.00	0.370	1	06/27/07	FO	06/27/07	FO		75-25-2
Bromomethane	U	ug/L	1.00	0.290	1	06/27/07	FO	06/27/07	FO		74-83-9
Carbon disulfide	U	ug/L	1.00	0.400	1	06/27/07	FO	06/27/07	FO		75-15-0
Carbon tetrachloride	U	ug/L	1.00	0.260	1	06/27/07	FO	06/27/07	FO		56-23-5
Chlorobenzene	U	ug/L	1.00	0.450	1	06/27/07	FO	06/27/07	FO		108-90-7
Chloroethane	U	ug/L	1.00	0.700	1	06/27/07	FO	06/27/07	FO		75-00-3
Chloroform	U	ug/L	1.00	0.510	1	06/27/07	FO	06/27/07	FO		67-66-3
Chloromethane	U	ug/L	1.00	0.540	1	06/27/07	FO	06/27/07	FO		74-87-3
Dibromochloromethane	U	ug/L	1.00	0.390	1	06/27/07	FO	06/27/07	FO		124-48-1
Dibromomethane	U	ug/L	1.00	0.350	1	06/27/07	FO	06/27/07	FO		74-95-3
Dichlorodifluoromethane	U	ug/L	1.00	0.620	1	06/27/07	FO	06/27/07	FO		75-71-8
cis-1,3-Dichloropropene	U	ug/L	1.00	0.250	1	06/27/07	FO	06/27/07	FO		10061-01-5
Ethyl methacrylate	U	ug/L	1.00	0.580	1	06/27/07	FO	06/27/07	FO		97-63-2
Ethylbenzene	U	ug/L	1.00	0.520	1	06/27/07	FO	06/27/07	FO		100-41-4
Hexachlorobutadiene	U	ug/L	1.00	0.320	1	06/27/07	FO	06/27/07	FO		87-68-3
Iodomethane	U	ug/L	1.00	0.300	1	06/27/07	FO	06/27/07	FO		74-88-4
Isopropylbenzene (Cumene)	U	ug/L	1.00	0.360	1	06/27/07	FO	06/27/07	FO		98-82-8
Methyl ethyl ketone (MEK)	U	ug/L	1.00	0.510	1	06/27/07	FO	06/27/07	FO		78-93-3
Methylene chloride	U	ug/L	1.00	0.830	1	06/27/07	FO	06/27/07	FO		75-09-2
Naphthalene	U	ug/L	1.00	0.480	1	06/27/07	FO	06/27/07	FO		91-20-3
Styrene	U	ug/L	1.00	0.470	1	06/27/07	FO	06/27/07	FO		100-42-5
Tetrachloroethene	U	ug/L	1.00	0.520	1	06/27/07	FO	06/27/07	FO		127-18-4
Toluene	U	ug/L	1.00	0.470	1	06/27/07	FO	06/27/07	FO		108-88-3
Trichloroethene	U	ug/L	1.00	0.420	1	06/27/07	FO	06/27/07	FO		79-01-6
Trichlorofluoromethane	U	ug/L	1.00	0.690	1	06/27/07	FO	06/27/07	FO		75-69-4
Vinyl acetate	U	ug/L	1.00	0.760	1	06/27/07	FO	06/27/07	FO		108-05-4
Vinyl chloride	U	ug/L	1.00	0.620	1	06/27/07	FO	06/27/07	FO		75-01-4
cis-1,2-Dichloroethene	U	ug/L	1.00	0.420	1	06/27/07	FO	06/27/07	FO		156-59-2
cis-1,4-Dichloro-2-butene	U	ug/L	1.00	0.250	1	06/27/07	FO	06/27/07	FO		1476-11-5
m & p-xylene	U	ug/L	1.00	0.310	1	06/27/07	FO	06/27/07	FO		1330-20-7[m,p]
n-Butylbenzene	U	ug/L	1.00	0.440	1	06/27/07	FO	06/27/07	FO		104-51-8
n-propylbenzene	U	ug/L	1.00	0.390	1	06/27/07	FO	06/27/07	FO		103-65-1

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

ANALYTICAL RESULTS

LOG# 718742
Project ID: Lake Worth

Lab ID: **718742001** Date Received: 6/26/2007 Matrix: Aqueous Liquid
Sample ID: **F-3 R.A.** Date Collected: 6/25/2007

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	By	Analyzed	By	Qual	CAS
o-Xylene	U	ug/L	1.00	0.670	1	06/27/07	FO	06/27/07	FO		95-47-6
sec-Butylbenzene	U	ug/L	1.00	0.480	1	06/27/07	FO	06/27/07	FO		135-98-8
tert-Butyl methyl ether (MTBE)	U	ug/L	1.00	0.440	1	06/27/07	FO	06/27/07	FO		1634-04-4
tert-Butylbenzene	U	ug/L	1.00	0.340	1	06/27/07	FO	06/27/07	FO		98-06-6
trans-1,2-Dichloroethene	U	ug/L	1.00	0.450	1	06/27/07	FO	06/27/07	FO		156-60-5
trans-1,3-Dichloropropene	U	ug/L	1.00	0.440	1	06/27/07	FO	06/27/07	FO		10061-02-6
trans-1,4-Dichloro-2-butene	U	ug/L	1.00	0.680	1	06/27/07	FO	06/27/07	FO		110-57-6
Dibromofluoromethane (S)	88	%	70-130		1	06/27/07	FO	06/27/07	FO		1868-53-7
Toluene d8 (S)	89	%	70-130		1	06/27/07	FO	06/27/07	FO		2037-26-5
4-Bromofluorobenzene (S)	92	%	70-130		1	06/27/07	FO	06/27/07	FO		460-00-4
Analysis Desc: EPA 200.8 Metals (W)			Analytical Method: EPA 200.8 (Total)								
Copper	U	mg/L	0.00040	0.00020	1	06/27/07	ZS	06/27/07	ZS		7440-50-8
Zinc	0.011	mg/L	0.0019	0.00095	1	06/27/07	ZS	06/27/07	ZS		7440-66-6
Cadmium	U	mg/L	0.00018	0.000091	1	06/27/07	ZS	06/27/07	ZS		7440-43-9
Mercury	U	mg/L	0.0020	0.0012	1	06/27/07	ZS	06/27/07	ZS		7439-97-6
Lead	0.0012	mg/L	0.00024	0.00012	1	06/27/07	ZS	06/27/07	ZS		7439-92-1

FDOH# E86546

CERTIFICATE OF ANALYSIS

nelac

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

ANALYTICAL RESULTS QUALIFIERS

LOG# 718742
Project ID: Lake Worth

PARAMETER QUALIFIERS

Q1	Sample received past/too close to the accepted holding time.

PROJECT COMMENTS

718742	A reported value of U indicates that the compound was analyzed for but not detected above the MDL. A value flagged with an "I" flag indicates that the reported value is between the laboratory method detection limit and the practical quantitation limit. Report Limit = PQL
	Metals Bottle received unpreserved. Bottle preserved in Lab.

SUBCONTRACTOR NELAC CERTIFICATION

718742	USB = E86240

FDOH# E86546

CERTIFICATE OF ANALYSIS

Chain of Custody Record

BAR CODE

LAB USE ONLY

J.E.L. Log # 718770

P.O. # _____

Quote# _____

Jupiter Environmental Laboratories

Company Name JLA Geosciences

Address 1931 Commerce Lane Suite 3

City Jupiter State FL Zip 33458

Sampling Site Address

Attn: Fax/Email

Project Name LAKEWORTH E-3 Project #

Sampler Name/Signature

#	Sample Label (Client ID)	Collected Date	Collected Time	Matrix Code*	# of Cont.	Parameters: UltraTrace Hg	Field Filtered (Y/N)	Integrity OK (Y/N)	Comments
1	UltraTrace Mercury	6/29/07	1900		1	✓	N		
2									
3									
4									
5									
6									
7									
8									
9									
10									

ORIGINAL

Matrix Codes*

S	Soil/Solid Sediment	SW	Surface Water
GW	Ground Water	SL	Sludge
WW	Waste Water	O	Other (Please Specify)
DW	Drinking Water		

Preservatives

A-	none	I-	Ice
B-	HNO_3	O-	Other
C-	H_2SO_4	M-	MeOH
D-	NaOH		
E-	HCl		

Relinquished by	Date	Time	Received by	Date	Time
X	7/2/07	0830		7/2/07	0830

QA/QC level with report

None ___1___2___3___ See price guide for applicable fees

T.A.T. Request FDEP____

____ Standard SFWMD____

____ Rush Date Required_____

Temp Control: 21 °C

Jupiter Environmental Laboratories, Inc.
150 Old Dixie Highway, Jupiter, FL 33458
(561) 575-0030 • Fax (561) 575-4118 • clientservices@jupiterlabs.com

C.O.C.# 31487

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118
www.jupiterlabs.com
clientservices@jupiterlabs.com

July 3, 2007

Jim Anderson
JLA Geosciences Inc.
1931 Commerce Lane
Suite 3
Jupiter, FL 33458

RE: LOG# 718770
Project ID: Lakeworth F-3
COC# 31487

Dear Jim Anderson:

Enclosed are the analytical results for sample(s) received by the laboratory on Monday, July 02, 2007. Results reported herein conform to the most current NELAC standards, where applicable, unless indicated by * in the body of the report.

The enclosed Chain of Custody is a component of this package and should be retained with the package and incorporated therein.

Results for all solid matrices are reported in dry weight unless otherwise noted. Results for all liquid matrices are reported as received in the laboratory unless otherwise noted.

Samples are disposed of after 30 days of their receipt by the laboratory unless archiving is requested in writing. The laboratory maintains the right to charge storage fees for archived samples.

Certain analyses are subcontracted to outside NELAC certified laboratories, please see the Footnotes section of this report for NELAC certification numbers of laboratories used.

A Statement of Qualifiers is available upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Erin Beauregard for
Kacia Baldwin
kbaldwin@jupiterlabs.com

Enclosures

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

SAMPLE ANALYTE COUNT

LOG# 718770
Project ID: Lakeworth F-3

Lab ID	Sample ID	Method	Analytes Reported
718770001	Ultra Trace Mercury	EPA 1631E	1

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

SAMPLE SUMMARY

LOG# 718770
Project ID: Lakeworth F-3

Lab ID	Sample ID	Matrix	Date Collected	Date Received
718770001	Ultra Trace Mercury	Aqueous Liquid	6/29/2007 19:00	7/2/2007 08:30

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

ANALYTICAL RESULTS

LOG# 718770
Project ID: Lakeworth F-3

Lab ID: **718770001** Date Received: 7/2/2007 08:30 Matrix: Aqueous Liquid
Sample ID: **Ultra Trace Mercury** Date Collected: 6/29/2007

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	By	Analyzed	By	Qual	CAS
Analysis Desc: EPA 1631E Ultra Trace Mercury (W)			Preparation Method: EPA 1631E Analytical Method: EPA 1631E								
Mercury	U	ug/L	0.0010	0.00015	1	07/03/07	ZS	07/03/07	ZS		7439-97-6

FDOH# E86546

CERTIFICATE OF ANALYSIS

nelac

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

ANALYTICAL RESULTS QUALIFIERS

LOG# 718770
Project ID: Lakeworth F-3

PARAMETER QUALIFIERS

PROJECT COMMENTS

718770	A reported value of U indicates that the compound was analyzed for but not detected above the MDL. A value flagged with an "i" flag indicates that the reported value is between the laboratory method detection limit and the practical quantitation limit. Report Limit = PQL

FDOH# E86546

CERTIFICATE OF ANALYSIS

BAR CODE

Chain of Custody Record

LAB USE ONLY

J.E.L. Log # 7075

P.O. #

Quote#

Jupiter Environmental Laboratories

Company Name JLA Geosciences

Address 1931 Commerce Ln #3

City Jupiter State FL Zip 33458

Sampling Site Address City of Lake Worth Well F-3

Attn: Jim Andersen Fax/Email 561746-0119

Project Name Lake Worth F-3 Project #

Sampler Name/Signature J. Andersen / [signature]

LAB ANALYSIS

#	Sample Label (Client ID)	Collected Date	Collected Time	Matrix Code*	# of Cont	Parameters: Hex Chrome	Field Filtered (Y/N)	Integrity OK (Y/N)	Comments
1	F-3	6/28/07	0956	GW	1	✓	N	Y	
2									
3									
4									
5									
6									
7									
8									
9									
10									

ORIGINAL

Matrix Codes*

S	Soil/Solid Sediment	SW	Surface Water
GW	Ground Water	SL	Sludge
WW	Waste Water	O	Other (Please Specify)
DW	Drinking Water		

A- none I- Ice
B- HNO_3 O- Other
C- H_2SO_4 M- MeOH
D- NaOH
E- HCl

Relinquished by	Date	Time	Received by	Date	Time
[signature]	6/28	1:24	[signature]	6/28	1:24

QA/QC level with report
None ___1___2___3___ See price guide for applicable fees

T.A.T. Request
___ Standard
X Rush

FDEP___
SFWMD___
Date Required_____

Temp Control: 5 °C

Page_____of_____

Jupiter Environmental Laboratories, Inc.
150 Old Dixie Highway, Jupiter, FL 33458
(561) 575-0030 • Fax (561) 575-4118 • clientservices@jupiterlabs.com

C.O.C.# 31471

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
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www.jupiterlabs.com
clientservices@jupiterlabs.com

June 29, 2007

Jim Anderson
JLA Geosciences Inc.
1931 Commerce Lane
Suite 3
Jupiter, FL 33458

RE: LOG# 718757
Project ID: Lake Worth F-3
COC# 31471

Dear Jim Anderson:

Enclosed are the analytical results for sample(s) received by the laboratory on Thursday, June 28, 2007. Results reported herein conform to the most current NELAC standards, where applicable, unless indicated by * in the body of the report.

The enclosed Chain of Custody is a component of this package and should be retained with the package and incorporated therein.

Results for all solid matrices are reported in dry weight unless otherwise noted. Results for all liquid matrices are reported as received in the laboratory unless otherwise noted.

Samples are disposed of after 30 days of their receipt by the laboratory unless archiving is requested in writing. The laboratory maintains the right to charge storage fees for archived samples.

Certain analyses are subcontracted to outside NELAC certified laboratories, please see the Footnotes section of this report for NELAC certification numbers of laboratories used.

A Statement of Qualifiers is available upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Erin Beauregard for
Kacia Baldwin
kbaldwin@jupiterlabs.com

Enclosures

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

SAMPLE ANALYTE COUNT

LOG# 718757
Project ID: Lake Worth F-3

Lab ID	Sample ID	Method	Analytes Reported
718757001	F-3	EPA 7196A	1

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

SAMPLE SUMMARY

LOG# 718757
Project ID: Lake Worth F-3

Lab ID	Sample ID	Matrix	Date Collected	Date Received
718757001	F-3	Aqueous Liquid	6/28/2007 09:58	6/28/2007 13:24

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

ANALYTICAL RESULTS

LOG# 718757
Project ID: Lake Worth F-3

Lab ID: **718757001** Date Received: 6/28/2007 Matrix: Aqueous Liquid
Sample ID: **F-3** Date Collected: 6/28/2007

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	By	Analyzed	By	Qual	CAS
Analysis Desc: Hexavalent Chromium by EPA 7196 (W)			Analytical Method: EPA 7196A								
Hexavalent Chromium	U	mg/L	0.0020		1			06/28/07	SS		18540-29-9

FDOH# E86546

CERTIFICATE OF ANALYSIS

Chain of Custody Record

LAB USE ONLY

J.E.L. Log # 718838

P.O. # _____

Quote# _____

BAR CODE

Jupiter Environmental Laboratories

Company Name JLA Geosciences

Address 1931 Commerce Lane Suite 3

City Jupiter State FL Zip 33458

Sampling Site Address Lake Worth, Well F-3

Attn: Fax/Email

Project Name LAKE WORTH F-3 Project #

Sampler Name/Signature Jon Fredricks

LAB ANALYSIS

Parameters: TOC, E.I.

#	Sample Label (Client ID)	Collected Date	Collected Time	Matrix Code*	# of Cont.	Field Filtered (Y/N)	Integrity OK (Y/N)	Comments
1	LAKEWORTH, FS	7/16/07	11:00	GW	1			
2								
3								
4								
5								
6								
7								
8								
9								
0								

ORIGINAL

Matrix Codes*

S Soil/Solid Sediment; GW Ground Water; WW Waste Water; DW Drinking Water; SW Surface Water; SL Sludge; O Other (Please Specify)

Preservatives

A- none; B- HNO_3; C- H_2SO_4; D- NaOH; E- HCl; I- Ice; O- Other; M- MeOH

Relinquished by	Date	Time	Received by	Date	Time
Jon Fredricks	7/16/07	8:19	Diane Shoemaker	7/16/07	2:20

QA/QC level with report

None ___1___2___3___ See price guide for applicable fees

T.A.T. Request

___ Standard

_✓_ Rush

FDEP___

SFWMD___

Date Required_____

Temp Control: 6 °C

Jupiter Environmental Laboratories, Inc.
150 Old Dixie Highway, Jupiter, FL 33458
(561) 575-0030 • Fax (561) 575-4118 • clientservices@jupiterlabs.com

C.O.C.# 31783

Page_____of_____

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118
www.jupiterlabs.com
clientservices@jupiterlabs.com

July 20, 2007

Jon Friedrichs
JLA Geosciences Inc.
1931 Commerce Lane Suite 3
Jupiter, FL 33458

RE: LOG# 718838
Project ID: LAKE WORTH F-3
COC# 31783

Dear Jon Friedrichs:

Enclosed are the analytical results for sample(s) received by the laboratory on Monday, July 16, 2007. Results reported herein conform to the most current NELAC standards, where applicable, unless indicated by * in the body of the report.

The enclosed Chain of Custody is a component of this package and should be retained with the package and incorporated therein.

Results for all solid matrices are reported in dry weight unless otherwise noted. Results for all liquid matrices are reported as received in the laboratory unless otherwise noted.

Samples are disposed of after 30 days of their receipt by the laboratory unless archiving is requested in writing. The laboratory maintains the right to charge storage fees for archived samples.

Certain analyses are subcontracted to outside NELAC certified laboratories, please see the Footnotes section of this report for NELAC certification numbers of laboratories used.

A Statement of Qualifiers is available upon request.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Erin Beauregard for
Kacia Baldwin
kbaldwin@jupiterlabs.com

Enclosures

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

SAMPLE ANALYTE COUNT

LOG# 718838
Project ID: LAKE WORTH F-3

Lab ID	Sample ID	Method	Analytes Reported
718838001	Lakeworth, F3	EPA 415.1	1

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

SAMPLE SUMMARY

LOG# 718838
Project ID: LAKE WORTH F-3

Lab ID	Sample ID	Matrix	Date Collected	Date Received
718838001	Lakeworth, F3	Aqueous Liquid	7/16/2007 11:00	7/16/2007 14:20

FDOH# E86546

CERTIFICATE OF ANALYSIS

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

ANALYTICAL RESULTS

LOG# 718838
Project ID: LAKE WORTH F-3

Lab ID: **718838001** Date Received: 7/16/2007 Matrix: Aqueous Liquid
Sample ID: **Lakeworth, F3** Date Collected: 7/16/2007 11:00

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	By	Analyzed	By	Qual	CAS
Analysis Desc: TOC by EPA 415.1 [REF] (W)			Analytical Method: EPA 415.1								
TOC	2.3	mg/L	1.0		1			07/19/07	USB		

FDOH# E86546

CERTIFICATE OF ANALYSIS

nelac

Jupiter
Environmental Laboratories, Inc.

Jupiter Environmental Laboratories, Inc.
150 S. Old Dixie Highway
Jupiter, FL 33458
Phone: (561)575-0030
Fax: (561)575-4118

ANALYTICAL RESULTS QUALIFIERS

LOG# 718838
Project ID: LAKE WORTH F-3

PARAMETER QUALIFIERS

SUBCONTRACTOR NELAC CERTIFICATION

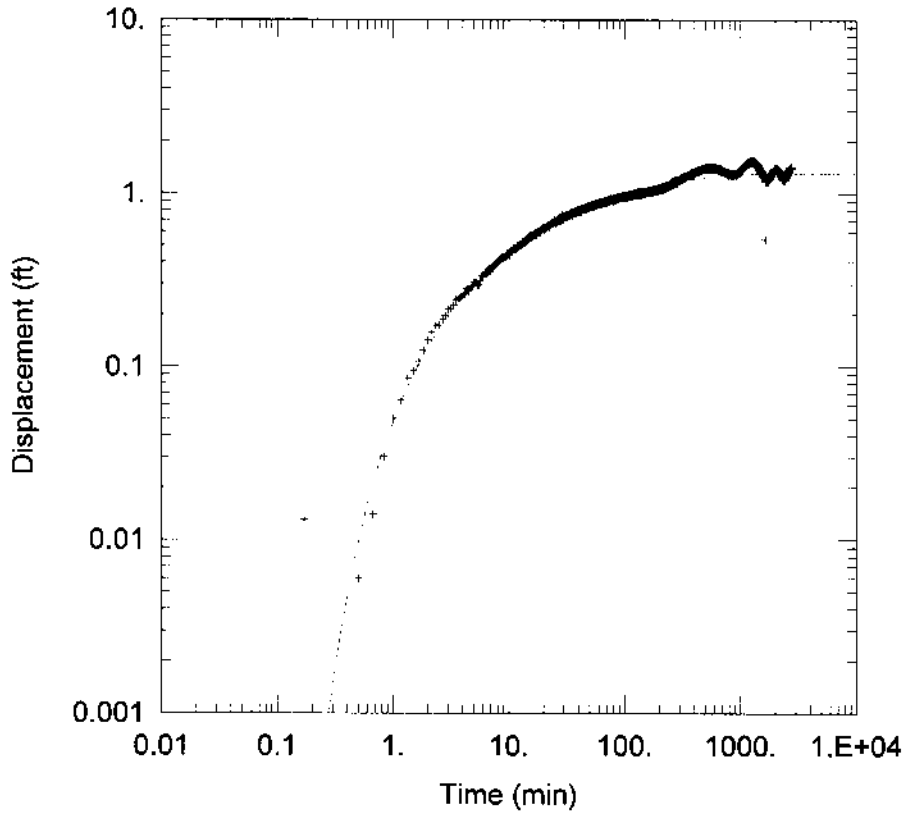
718838	USB = E86240

FDOH# E86546

CERTIFICATE OF ANALYSIS

APPENDIX E

APT DATA



LAKE WORTH F-2 APT

Data Set: H:\JLA\LAKEWO~1\LW_APT~1\F1LKY.AQT
Date: 11/01/07 Time: 12:37:22

PROJECT INFORMATION

Company: JLA Geosciences
Client: LWUA
Test Location: Lake Worth
Test Well: F-2

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob
T = 8.3E+04 ft^2/day
S = 7.202E-05
r/B = 0.09

K = 268 ft/d
K' = 0.067 ft/d
b' = 350 ft

AQUIFER DATA

Saturated Thickness: 310. ft

Anisotropy Ratio (Kz/Kr): 1.

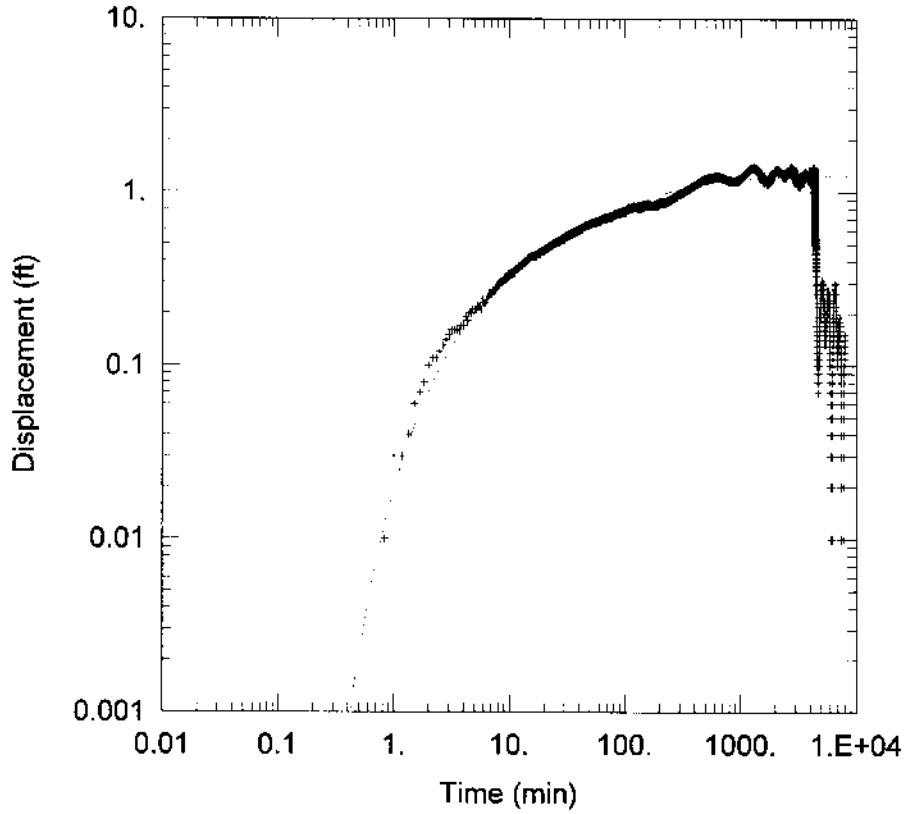
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
F-2	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
F-1	810	-1685



LAKE WORTH F-2 APT

Data Set: H:\JLA\LAKEWO~1\LW_APT~1\F3CORR\F3LKYCOR.AQT
Date: 12/06/07 Time: 18:00:48

PROJECT INFORMATION

Company: JLA Geosciences
Client: LWUA
Test Location: Lake Worth
Test Well: F-2

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob
T = 8.949E+04 ft^2/day
S = 0.0001246
r/B = 0.085

K = 289 ft/d
K' = 0.07 ft/d
b' = 350 ft

AQUIFER DATA

Saturated Thickness: 310. ft

Anisotropy Ratio (Kz/Kr): 1.

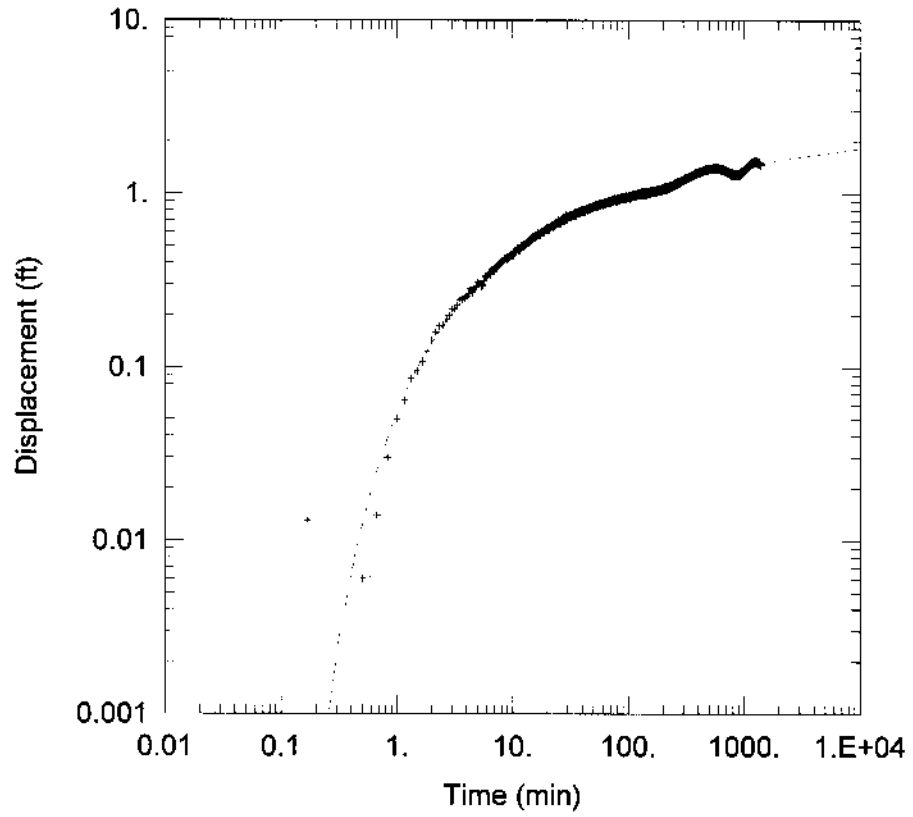
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
F-2	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
F-3	-1665	710



LAKE WORTH F-2 APT

Data Set: H:\JLA\LAKEWO~1\LW_APT~1\F1LKH.AQT
Date: 11/01/07 Time: 12:09:31

PROJECT INFORMATION

Company: JLA Geosciences
Client: LWUA
Test Location: Lake Worth
Test Well: F-2

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush
T = 8.299E+04 ft^2/day
S = 6.582E-05
ß = 0.015

K = 268 ft/d
K' = 0.015 ft/d
b' = 350 ft
K" = 0.005 ft/d
b" = 690 ft

AQUIFER DATA

Saturated Thickness: 310. ft

Anisotropy Ratio (Kz/Kr): 1.

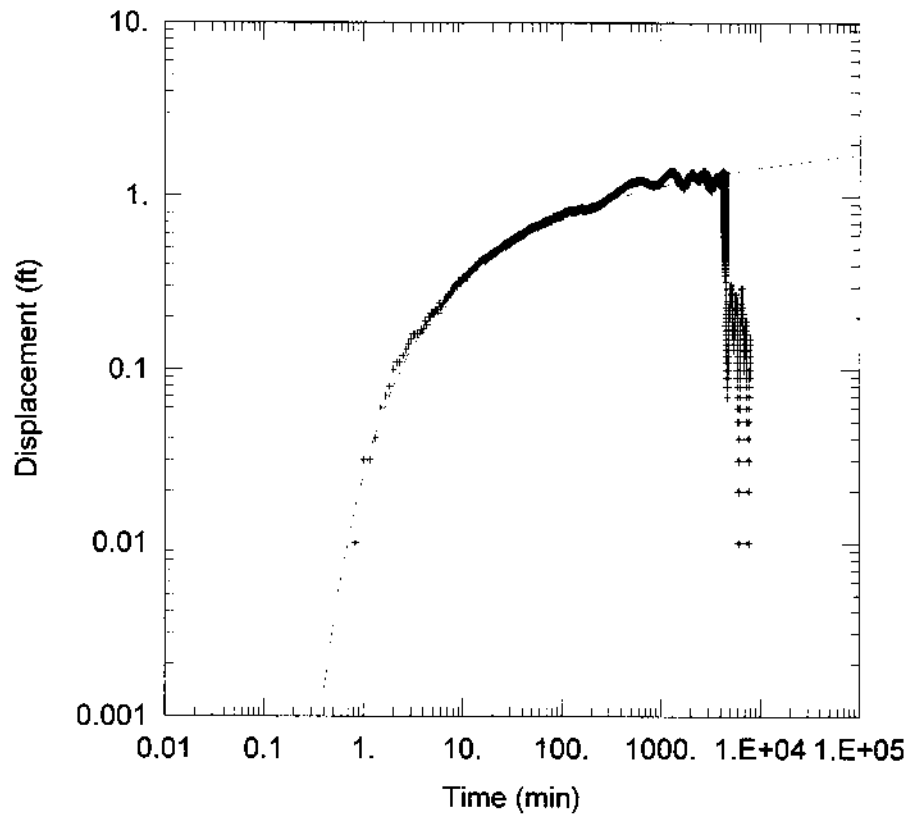
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
F-2	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
F-1	810	-1685



LAKE WORTH F-2 APT

Data Set: H:\JLA\LAKEWO~1\LW_APT~1\F3CORR\F3LKHCOR.AQT
Date: 12/20/07 Time: 14:13:17

PROJECT INFORMATION

Company: JLA Geosciences
Client: LWUA
Test Location: Lake Worth
Test Well: F-2

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush
T = 9.217E+04 ft^2/day
S = 0.0001104
ß = 0.03

K = 297 ft/d
K' = 0.07 ft/d
b' = 350 ft
K" = 0.025 ft/d
b" = 690 ft

AQUIFER DATA

Saturated Thickness: 310. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
F-2	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
+ F-3	-1665	710

APPENDIX F

PROJECT PHOTOGRAPHS