BF Goodrich Site Investigation Multi-Port Monitoring Well Installation

Rialto, California

Prepared for

USEPA Region 9
San Francisco, California

August 2010

Prepared by

CH2MHILL

6 Hutton Centre, Suite 700
Santa Ana, California 92707

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Abbreviations and Acronyms

bgs	below ground surface
CLP	Contract Laboratory Program
EC	electrical conductivity
EPA	United States Environmental Protection Agency
FS	Feasibility Study
IDW	investigation-derived waste
J	estimated value; estimated result
ug/L	micrograms per liter
MCL	California maximum contaminant level
ml	milliliter(s)
MP	multiport
NTU	nephelometric turbidity units
OU	operable unit
PCE	tetrachloroethene
PPE	personal protective equipment
RCB	Rialto-Colton Basin
RI	Remedial Investigation
TCE	trichloroethene
VOC	volatile organic compound
USGS	United States Geologic Survey

1. Introduction

This report presents the methods and findings of well installation and groundwater monitoring activities performed between April and December 2009 in the Rialto-Colton Basin (RCB). Six multiport (MP) monitoring wells were installed in the eastern portion of the RCB to investigate contamination from the B.F. Goodrich Superfund Site (Site). The Site includes the 160-Acre Area where volatile organic compounds (VOCs) and perchlorate have contaminated soil, groundwater, and downgradient areas of groundwater. Figure 1 shows the general Site location.

1.1 Project Objectives

The United States Environmental Protection Agency's (EPA's) general objectives for the Remedial Investigation/Feasibility Study (RI/FS) work at the Site include characterization of the nature and extent of contamination and identification and evaluation of appropriate remedial actions to address the contamination. EPA's first priority is to limit further spread of the most contaminated groundwater at the site. EPA designated the Interim Source Area Operable Unit (OU) to address migration of contaminated groundwater away from the 160-Acre Area. CH2M HILL, on behalf of the EPA Region 9, completed a RI/FS that addressed groundwater contamination in the Interim Source Area OU (CH2M HILL, 2010). However, some highly contaminated groundwater has already moved past the Interim Source Area OU and additional characterization of conditions in the downgradient area is required.

Six MP monitoring wells were installed to monitor groundwater flow directions and gradients and to further characterize the nature and extent of regional perchlorate and VOC contamination downgradient of the 160-Acre Area. The results of the MP well installation support ongoing evaluation of contamination conditions and guide additional RI activities. Cleanup actions will be planned for the downgradient areas once groundwater flow directions and the extent of contamination are better understood.

1.2 Background

This section provides an abbreviated summary of the site hydrogeologic setting and brief synopsis of relevant prior investigations. A more complete discussion of the Site background and the hydrogeologic setting are provided in the RI/FS Report (CH2M HILL, 2010)

1.2.1 Hydrogeologic Setting

The RCB is a northwest-southeast trending alluvial basin located southwest of the San Bernardino Mountains. The basin is approximately 10 miles long and ranges from 3.5 miles wide in the northwest to 1.5 miles wide in the southeast. Groundwater flow in the RCB is strongly influenced by the presence of several faults that act as partial barriers to groundwater flow (see Figure 2). The six new EPA MP monitoring wells were installed in the main part of the RCB between the unnamed fault and the Rialto-Colton Fault.

The United States Geologic Survey (USGS) defined four major water-bearing units in the RCB (USGS, 1997): river-channel deposits and upper, middle, and lower water-bearing units. Underlying the water-bearing units are consolidated deposits that are not part of the active groundwater system. The river channel deposits and upper water-bearing unit were not present or were unsaturated in the portion of the RCB where the new MP wells were installed.

Data collected by GeoLogic Associates during investigations downgradient of the former bunker area (see Figure 1) suggest that groundwater in the northern portion of the RCB occurs in three laterally continuous water-bearing units (GeoLogic, 2005). These units are part of the middle and lower water-bearing units defined by the USGS. The Upper Aquifer is currently dry. The Intermediate Aquifer (also known as the B Aquifer), first encountered at a depth of approximately 400 to 450 feet below ground surface (bgs), is approximately 100 feet thick beneath the 160-Acre Area and thins to the southeast. The Intermediate Aquifer is variably saturated and perched on top of a laterally extensive aquitard (termed the BC Aquitard) that separates the Intermediate Aquifer from the deeper Regional Aquifer (also known as the C Aquifer). Downgradient of the 160-Acre Area, it appears that the BC Aquitard "pinches out" in the vicinity of the Rialto-02 and Rialto-03 wells (Figure 2).

1.2.2 Previous Groundwater Investigations

Between 2003 and 2008, numerous investigations were conducted to characterize potential releases of contaminants at the Site. Three of these investigations included the installation of groundwater monitoring wells and/or the collection and analysis of groundwater samples. Wells installed during these investigations are shown on Figure 2. Descriptions of each investigation are provided in the following subsections.

Geosyntec Consultants, 2004 and 2006

Geosyntec Consultants (Geosyntec) performed investigation activities on behalf of Goodrich Corp., in two separate phases, summarized in a March 24, 2005 RI report (Geosyntec, 2005) and an October 21, 2006 additional interim RI report (Geosyntec, 2006). The investigations included the installation of 9 wellbores, 18 temporary groundwater wells, 3 piezometers, 4 conventional (single-screen) groundwater monitoring wells, and 5 MP monitoring wells.

The 2004 investigation included temporary monitoring well sampling and piezometer and conventional well installations. The four conventional monitoring wells are on or bordering the 160-Acre Area, including one upgradient well (PW-1) and three downgradient wells (PW-2 through PW-4). These wells were all completed in the Intermediate Aquifer (B Aquifer) that is variably saturated. Three deeper piezometers were installed into the deeper Regional Aquifer (C Aquifer). Well locations are shown in Figure 2. The four wells and three piezometers were periodically monitored between 2004 and 2008, and the results were summarized in monthly reports prepared between May 2004 and March 2008 (Geosyntec, 2004 to 2008). EPA sampled the three downgradient wells in January 2008, March 2009, and April 2010. The downgradient wells contained elevated concentrations of perchlorate and trichloroethene (TCE).

In 2006, Geosyntec conducted the second phase of the groundwater investigation that consisted of the installation of five permanent MP groundwater monitoring wells (PW-5 through PW-9). The investigation was designed to further investigate hydrogeologic

conditions in the vicinity and downgradient of the 160-Acre Area and to evaluate the areal and vertical extent of contaminants in groundwater, including perchlorate and TCE. The deepest screens in these MP wells ranged from 667 to 817 feet bgs. The furthest downgradient well (PW-9) is more than 3 miles downgradient (i.e., southeast) of the 160-Acre Area and contains significantly elevated perchlorate and TCE. The five MP wells were periodically sampled between August 2006 and February 2007, and the results were summarized in monthly reports (Geosyntec, 2004 to 2008). EPA also sampled the five wells in January 2008, March 2009, and April 2010.

ENVIRON International Corp. and Adverus, 2006

In 2006, ENVIRON International Corp. (ENVIRON) and Adverus carried out a groundwater investigation at the Site on behalf of Emhart Industries and Pyro Spectaculars. The results are summarized in a February 2010 Final RI Report (Environ, 2010). The investigation included the installation of five monitoring well clusters, each containing three wells, in the middle portion of the 160-Acre Area. These well clusters, designated CMW-01 through CMW-05, are all screened in the Intermediate Aquifer or upper portions of the BC Aquitard and confirm the presence of elevated perchlorate and TCE in the middle of the 160-Acre Area. The five well clusters have been sampled quarterly since 2006 and EPA sampled two of the five well clusters in January 2008.

DPRA Incorporated, 2008

In February 2008, DPRA Incorporated (DPRA) carried out a groundwater investigation on behalf of the City of Colton, California. The investigation included the installation of two MP wells (CPW-16 and CPW-17). Each of the MP wells was constructed with seven screens in the Regional Aquifer at depths between approximately 250 and 750 feet bgs. The two wells were sampled initially in February and March 2008. The results of the DPRA investigation are summarized in the April 2008 Draft Site Inspection Report (DPRA, 2008). EPA sampled wells CPW-16 and CPW-17 in March and April 2009 and April 2010. CPW-16 contains elevated levels of perchlorate and low levels of TCE.

1.3 Rationale for Drilling Locations

The new MP monitoring wells were installed to better define groundwater flow directions and the lateral and vertical extent of contamination downgradient of the 160-Acre Area. Most of the new wells are located in an area approximately 3 to 4.5 miles downgradient of the 160-Acre Area, beyond the previously delineated extent of contamination. Descriptions of the new MP well locations (with their equivalent planning location identifier in parentheses) and their purpose are provided in the following section.

- EPA-MP1 (EPA-E) was installed downgradient of PW-9 to determine the extent of contamination and direction of groundwater flow. The well is located between PW-9 and CPW-16; both wells contain elevated levels of perchlorate.
- EPA-MP2 (EPA-D) was installed downgradient of PW-9 to determine the extent of contamination and direction of groundwater flow. This well anticipated a more southerly groundwater flow direction downgradient of PW-9.

- EPA-MP3 (EPA-C) was installed to better define the eastern extent of groundwater contamination downgradient of the 160-Acre Area. This well was intended to define the eastern extent of contamination.
- EPA-MP4 (EPA-A) was installed to better define the extent of groundwater contamination downgradient of the 160-Acre Area and is near the location where the Intermediate (B Aquifer) and Regional Aquifers are expected to merge.
- EPA-MP5 (EPA-G) was installed cross-gradient of PW-9 to determine the southwest extent of contamination and direction of groundwater flow. The original location planned for this well was farther to the west, but it was moved east based on low perchlorate concentrations from initial samples at EPA-MP2.
- EPA-MP6 (EPA-F) was installed down- and cross-gradient of PW-9 to determine the extent of contamination and direction of groundwater flow. This well was intended to define the eastern extent of contamination.

During initial planning for the well installations, seven drilling locations were being considered (EPA-A through EPA-G), of which six were installed. The placement of EPA-B was intended to investigate the lateral and vertical extent of contamination between City of Rialto production wells Rialto-4 (impacted by perchlorate) and Rialto-5 (not impacted). The presence of a USGS cluster monitoring well with five screen intervals (1S/5W-3A) near Rialto-4 reduced the need for an MP well at this location.

2. Field Methods and Procedures

This section describes the well installation and sampling activities performed by CH2M HILL at the Site. All field work was performed or overseen by CH2M HILL in accordance with a Field Sampling Plan prepared by CH2M HILL (CH2M HILL, 2009).

2.1 Multi-Port Monitoring Well Installation

Borehole drilling and well installation services were provided by Best Drilling and Pump of Highland, California. Westbay MP system installation was performed by Schlumberger Water Services (Westbay) of Burnaby, Vancouver, Canada.

2.1.1 Borehole Drilling

Prior to the start of drilling activities, individual boring locations were cleared for subsurface utilities using the Underground Service Alert of Southern California (DigAlert) notification processes and a private geophysical utility locating company, Spectrum Geophysics of Burbank, California. In addition, each boring location was cleared to approximately 10-feet bgs using compressed air/vacuum (airknife) before advancing the borehole. Sound control was set up at each drilling location to minimize the noise disturbance to nearby residents.

At each drilling location, a 16-inch permanent steel conductor casing was installed in a 24-inch diameter borehole to a depth 25 feet bgs to stabilize the borehole. After installation of the conductor casing, a 12-inch (nominal) diameter borehole was advanced to the total depth. Boreholes were advanced using direct mud rotary drilling techniques with a Failing Jed-A trailer-mounted drill rig. Mud rotary was selected as the preferred drilling method to minimize the likelihood of borehole collapse and to reduce the possibility of cross-contamination between groundwater zones during borehole drilling.

Soil cutting samples were collected from the flow-line at ground surface and logged at 10-foot intervals to characterize lithology. After achieving total depth, geophysical logs were run in each borehole. Results from the geophysical logging were used to assist in selecting screen intervals for each MP well. The geophysical logging suite included natural gamma, short (16-inch) and long (64-inch) normal resistivity, lateral resistivity, spontaneous potential, and sonic logs. A caliper log was also run in the open borehole to assist in determining borehole volumes during well construction. Boring logs for each new MP well are included in Appendix A. Geophysical logs are included in Appendix B.

2.1.2 Well Construction

Well design (e.g., location of screen intervals) was based largely on the results of geophysical logging, and to a much lesser extent on the lithologic log generated from collection of drill cuttings. To assist in selection of screen intervals, geophysical logs for each new EPA borehole were compared to geophysical logs from existing wells in the surrounding area with known levels of contamination. EPA MP wells were generally

designed to have a vertical distribution of screens/sample ports that included zones of contamination in surrounding wells and extended to a depth below regional contamination (where applicable).

The outer well casing consists of alternating sections of 4-inch-inside-diameter (ID) Schedule 40 mild steel blank casing, Schedule 10S stainless steel (Type 304) blank casing, and stainless steel wire-wrap well screen. A section of stainless steel blank casing was installed above and below each screen section. Mild steel centralizers were attached above and below each screen interval and approximately at every 50 feet of blank casing. Figure 3 shows the typical MP monitoring well design.

Annular materials were placed using a tremie pipe. Filter pack consists of No. 3 silica sand and generally extends 10 feet above and below each screen, as shown in Figure 3. Approximately 3 feet of No. 1/20 silica sand was placed above each filter pack to prevent seal material from invading the filter pack. Annular seals between the screened zones consist of a 1:1 mixture (dry volume) of granular bentonite and sand. The uppermost annular seal (between the uppermost screen and ground surface) consists of cement grout. Well construction details are summarized in Table 1.

2.1.3 Well Development

Following completion of well construction, each screened interval was developed by a combination of swabbing, airlifting, and pumping. After allowing the cement sanitary seal to cure for a minimum of 24 hours, heavy drilling mud was flushed from the well casing with a combination of airlifting and circulating fresh water. Primary well development consisted of a combination of airlifting and swabbing with a dual-swab tool. Generally screens were swabbed and airlifted once from the top down, and then each screen was swabbed and airlifted again from the bottom screen back out of the well. In some cases the uppermost screen was positioned too close to the water table to maintain adequate submergence for airlifting. In these instances, the screens were only swabbed.

Following airlifting and swabbing, a submersible pump with straddle packers was placed in the well to develop each screen interval separately. The pump was turned on and off periodically to induce backwashing of the water into the gravel pack and aquifer. A turbidity meter was used to monitor turbidity levels in water during well development. Development continued until three consecutive turbidity measurements of less than 10 nephelometric turbidity units (NTU) were achieved or until the water was relatively clear and sediment free.

Upon completion of the development activities, a video survey was conducted of the well casing and the screen of each MP well. The video survey was used to confirm the integrity of the well casing and the screen position for installation of the Westbay MP System.

2.1.4 Westbay MP System Installation

The Westbay MP system instrumentation was installed after confirmation of the well casing and screen assembly integrity through the video survey. The MP system consists of casing, couplings with sampling and pumping ports, and inflatable packers. The bottom packer for each zone was set within the blank stainless steel casing. The upper packer and a companion packer were set within the blank stainless-steel casing and blank mild steel casing

immediately above each zone. These two packers serve to isolate a measurement port for testing the integrity of the packers between screened intervals. Installation of the MP system, including inflation of packers and testing of the system integrity, was performed by a Schlumberger Water Services (Westbay) field technician. The typical design detail for an MP monitoring well is included as Figure 3. Westbay System completion diagrams are included as Appendix C.

2.1.5 Surveying

The locations and elevations of the EPA MP monitoring wells were surveyed by a professional land surveyor, Calvada Surveying Inc. of Corona, California. MP monitoring well coordinates and elevations are included in Table 1.

2.2 Groundwater Monitoring

Groundwater elevations were measured and samples were collected from EPA-MP1 and EPA-MP2 in August 2009, and from all new MP wells in December 2009 as part of the field investigation. The following subsections describe groundwater elevation measurement and groundwater sample collection procedures.

2.2.1 Groundwater Elevation Measurement

The procedure for measuring water levels in a MP monitoring well differs from that of a conventional monitoring well. In a conventional well, the depth to water below a reference point is measured using an electric sounder and the groundwater elevation is given by the difference between the reference point elevation and the depth to water in the well. In a MP well, the groundwater elevation, or height of the piezometric surface, for individual screens/sample ports is determined by the water pressure outside of the MP system (through the sample port within the given screen interval) and the elevation of the sample port.

Individual screens of each MP well are isolated from one another by the MP system (casing, couplings, and packers) and are not interconnected with the inside of the MP casing. This prohibits gauging the well with an electric sounder. The groundwater elevation for a given screen interval in an MP well is calculated using the water pressure outside of the MP system at the sample port within that screen interval. Water pressures are measured at the sample ports associated with each screen interval using the Westbay sampling/profiling tool. The water pressures that are measured prior to collection of groundwater samples from each sample port are used to calculate groundwater elevations. Using the initial pressure measured at each sample port during a given gauging event insures groundwater elevations represent static conditions.

2.2.2 Groundwater Sample Collection

Similar to water level measurement, the procedure for sampling MP wells differs from that of conventional monitoring wells. MP wells do not have standing water inside the well casing; thus, purging the well prior to collecting a groundwater sample is not required. Groundwater samples are taken directly from the aquifer via the depth-discrete sampling ports with a specially-designed sampling tool.

The sampling tool is lowered to the desired sampling port and activated from the surface to collect each groundwater sample. The sampling tool has one or more 250-milliliter (ml) stainless-steel collection tubes (or "bottles") attached to it. The sampling tool, with the filled tubes attached, is returned to the surface and the sample is transferred directly into the appropriate sample containers. The first sample drawn from each depth was used to measure field parameters (temperature, pH, turbidity, and electrical conductivity [EC]) and to allow for some flushing of the sampling instrumentation. The second sample drawn from each sample port was used to fill sample containers for VOC and perchlorate analysis. The above procedure was repeated until samples were collected from each sample port at each new MP well. The groundwater sample containers were packed on ice and shipped via Federal Express to the designated laboratories.

Disposable gloves were worn during sampling and a new pair of gloves was used at each sampling port. A Horiba U-10, or equivalent, was used for field measurements of pH, EC, and temperature. Turbidity was measured using a LaMotte 2020e turbidimeter, or equivalent. Samples for field measurements were collected in a beaker and used solely for field parameter determinations. All probes were thoroughly rinsed with distilled water prior to and between any measurements at each well.

MP well sampling was performed by CH2M HILL staff that have been certified by Westbay to operate their equipment. The instruments used to measure field parameters were maintained and calibrated according to manufacturer specifications. Calibration occurred at the start of each day and was recorded in the field logbook along with equipment serial number.

2.2.3 Laboratory Analytical Methods

Groundwater samples (primary and duplicate samples) collected during the December 2009 sampling event were analyzed for:

- Perchlorate (EPA 314) by the EPA Region 9 laboratory in Richmond, California
- VOCs (SOM01.2) by Mitkem Laboratories in Warwick, Rhode Island. VOC analysis was performed under EPA's Contract Laboratory Program (CLP).

2.3 Investigation-Derived Waste

The following investigation-derived waste (IDW) was generated during the well installation activities at the Site:

- **Used personal protective equipment (PPE).** Used PPE was double bagged and placed in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill.

- **Drill cuttings, drilling mud, and well-development water.** Excess cuttings, drilling mud, and water generated during drilling and well development activities were placed into roll-off bins and tanks, respectively. Soil, mud, and water waste were temporarily stored at each drill site. One mud sample and one water sample were collected at each drilling location and analyzed by the following analytical methods:

  - Perchlorate (EPA 314)
  - Purgeable and extractable petroleum hydrocarbons (EPA 8015B)
  - Metals (EPA 6000/7000 series)
  - VOCs (EPA 8260B)
  - pH (EPA 9040C/9045D)

The IDW soil, mud, and water sample containers were packed on ice and shipped via Federal Express to the EPA Region 9 laboratory. CH2M HILL worked with an IDW subcontractor (Haz Mat Trans Inc.) to complete waste profiling and arrange for waste disposal. A CH2M HILL representative signed the waste manifests on behalf of EPA.

3. Summary of Results and Conclusions

This section discusses the results of groundwater elevation measurement, groundwater sampling, and IDW sampling activities associated with installation of the new EPA MP wells.

3.1 Groundwater Elevations and Aquifer Units

Groundwater elevation data were collected from all new MP wells during EPA's December 2009 monitoring event. Groundwater elevation measurements were also collected from EPA-MP1 and EPA-MP2 in August 2009 to assist in refinement of drilling locations. All groundwater elevation data collected as part of MP well installation activities are summarized in Table 2. Based on the measured groundwater elevations and review of the geophysical logs, the following conclusions can be made:

- All ports at the new MP wells are screened in the Regional Aquifer (C Aquifer) except EPA-MP1E, EPA-MP2F, and EPA-MP4A.
  - EPA-MP1E and EPA-MP2F represent the deepest port at the respective MP locations and have groundwater elevations that are relatively higher (8 to 14 feet) than the other (shallower) ports. Higher groundwater elevations and the results of geophysical logging suggest these two ports are located in the consolidated deposits below the Regional Aquifer.
  - EPA-MP4A is the shallowest port at this location and has a significantly higher groundwater elevation (63 feet) than the deeper ports. Review of groundwater elevation data and geophysical logs (particularly the sonic velocity log) from EPA-MP4 confirm that EPA-MP4A is screened in the Intermediate Aquifer (B Aquifer).
- A downward vertical gradient was observed at each of the new EPA MP wells within the Regional Aquifer.
- Geophysical logs suggest that consolidated deposits were encountered at four of the six new MP well locations.
  - The top of the consolidated deposits (the base of the Regional Aquifer) was encountered at EPA-MP1 (762 feet bgs), EPA-MP2 (740 feet bgs), EPA-MP5 (748 feet bgs), and EPA-MP6 (800 feet bgs).
  - Consolidated deposits were not encountered at EPA-MP3 or EPA-MP4.

3.2 Groundwater Analytical Results

Groundwater samples were collected from all sample ports of the new MP wells in December 2009 and analyzed for perchlorate and VOCs. Samples were also collected from EPA-MP1 and EPA-MP2 in August 2009 to refine the remaining MP well drilling locations.

Table 3 summarizes the detected analytes from the August and December 2009 sampling events and Appendix D summarizes all results from the December 2009 sampling.

Perchlorate, tetrachloroethene (PCE), and seven other VOCs were detected during the August 2009 sampling of EPA-MP1 and EPA-MP2. Observations regarding the August 2009 results are as follows:

- Perchlorate was detected at low levels at EPA-MP2 (ports A, B, D, and E), but was not detected in any ports at EPA-MP1
- PCE was detected at EPA-MP2 (ports B, D, and E) at concentrations ranging from 0.1 J ug/L (estimated micrograms per liter) to 0.31 J ug/L
- Acetone, carbon disulfide, chloroform, chloromethane, m&p-xylene, styrene, and toluene were detected at various ports in EPA-MP1 and/or EPA-MP2, all at estimated concentrations (J-flagged).

Perchlorate, TCE, and four other VOCs were detected at the new MP wells in the December sampling event. Observations regarding the December 2009 groundwater sampling results from the new MP wells are as follows:

- Perchlorate was detected at four of the six new MP wells: EPA-MP2 (ports A and B), EPA-MP3 (ports A, B, and C), EPA-MP5 (ports A and B), and EPA-MP6 (ports A and B):
  - Concentrations ranged from 1.7 J ug/L (EPA-MP3B) to 26 ug/L (EPA-MP6A)
  - Concentrations at EPA-MP2B, EPA-MP3A, EPA-MP5A, and EPA-MP6A exceeded the California maximum contaminant level (MCL) of 6 ug/L
- Data from EPA's April 2010 sampling event suggest that perchlorate is also present at low levels in EPA-MP4 (perchlorate was not detected at this location in the December 2009 sampling).
- TCE was detected in samples from EPA-MP4 ports B, C, and D, and at EPA-MP5B. TCE concentrations ranged from 0.26 J ug/L to 0.93 ug/L (all detections were below the MCL of 5 ug/L for TCE).
- Other VOCs were detected at EPA-MP4 and EPA-MP5:
  - Chloroform was detected at EPA-MP4B and EPA-MP 5C; both detections were below the MCL
  - Cis-1,2-Dichloroethene, freon-11, and PCE were detected at EPA-MP5B. Detections of these VOCs were all below their respective MCLs

3.3 Investigation-Derived Waste Sample Results

Two soil, one drilling mud, and one water sample were collected at each drilling location. Results were below levels of concern for disposal. All IDW analytical data are provided in Appendix E. Soil and drilling mud IDW was transported from the Site by Haz Mat Trans Inc. for disposal at Chemical Waste Management's Kettleman Hills Facility in Kettleman City, California. IDW water was transported from the Site by Haz Mat Trans Inc. for disposal at Siemens Water Technologies' Waste Treatment Facility in Vernon, California.

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Tables

TABLE 1
Well Construction Details
BF Goodrich Site Investigation

Well Designation	Date Completed	Total Borehole Depth (ft bgs)	Total Cased Depth (ft bgs)	Coordinates [1]		Ground Surface Elevation [2] (ft msl)	Reference Point Elevation [2] (ft msl)	Screen Designation	Screen Interval [3] (ft bgs)	Filter Pack Interval [4] (ft bgs)	Seal Interval [5] (ft bgs)
				Northing (feet)	Easting (feet)						
EPA-MP1	4/29/2009	880	825	1861218.60	6755615.25	1226.52	1226.05	A	363 - 373	353 - 383	336 - 353
								B	459 - 469	448 - 479	383 - 448
								C	559 - 569	547 - 578	479 - 489
								D	730 - 740	718 - 749	578 - 718
								E	795 - 805	782 - 825	749 - 782
EPA-MP2	6/12/2009	870	792	1862206.02	6750912.01	1270.57	1269.99	A	346 - 356	335 - 365	310 - 335
								B	406 - 416	395 - 425	365 - 395
								C	506 - 516	495 - 525	425 - 495
								D	612 - 622	599 - 630	525 - 599
								E	712 - 722	700 - 730	630 - 700
								F	762 - 772	755 - 792	730 - 755
EPA-MP3	7/17/2009	932	923	1868093.97	6751465.05	1363.73	1363.10	A	454 - 464	444 - 475	427 - 444
								B	590 - 600	580 - 610	475 - 580
								C	684 - 694	674 - 705	610 - 674
								D	811 - 821	800 - 830	705 - 800
								E	897 - 907	886 - 923	830 - 886
EPA-MP4	8/21/2009	820	782	1872998.04	6746393.63	1458.00	1457.82	A	411 - 421	398 - 425	367 - 398
								B	505 - 515	493 - 524	425 - 493
								C	585 - 595	573 - 596	524 - 573
								D	639 - 649	637 - 657	596 - 597.5 [6]
								E	752 - 762	740 - 782	657 - 740
EPA-MP5	9/25/2009	831	767	1862496.33	6748262.44	1284.96	1285.16	A	352 - 362	342 - 372	319 - 342
								B	408 - 418	398 - 428	372 - 398
								C	502 - 512	492 - 522	428 - 492
								D	626 - 636	616 - 646	522 - 616
								E	737 - 747	725 - 767	646 - 725
EPA-MP6	11/4/2009	864	792	1864484.13	6755205.86	1273.66	1273.41	A	351 - 361	342 - 372	317 - 342
								B	445 - 455	436 - 466	372 - 436
								C	569 - 579	560 - 590	466 - 560
								D	656 - 666	646 - 676	590 - 646
								E	762 - 772	752 - 792	676 - 725

Notes:

ft bgs = feet below ground surface
ft msl = feet (elevation relative to) mean sea level
[1] State Plane Coordinates, CA Zone 5, NAD 83.
[2] Surveyed to NAVD 88. Reference point elevation is 4-inch outer mild steel casing.
[3] 0.030-inch slot stainless steel wire-wrap screens were used at EPA-MP1.
0.020-inch slot stainless steel wire-wrap screens were used for all screens at EPA-MP2, EPA-MP3, EPA-MP4, EPA-MP5, and EPA-MP6.
[4] Filter pack material is #3 sand.
[5] Seal is composed of 1:1 (by volume) granular bentonite and #3 sand. The seal interval includes #1/20 transition sand used at the top of filter packs. Transition sands were typically 3 feet.
[6] Swelling clay and/or slough from 597.5'-637'.

TABLE 2
Groundwater Elevation Measurements
BF Goodrich Site Investigation

Well	Date	Screen Designation	Screen Interval (ft bgs)	Zone Depth [1] (ft bgs)	Depth to Water (ft bmp)	Groundwater Elevation (ft msl)
EPA-MP1	8/3/2009	A	363-373	366.0	274.03	952.02
		B	459-469	462.0	274.16	951.89
		C	559-569	562.0	274.39	951.66
		D	730-740	732.0	275.64	950.41
		E	795-805	797.0	266.67	959.38
	12/16/2009	A	363-373	366.0	275.76	950.29
		B	459-469	462.0	275.89	950.16
		C	559-569	562.0	275.98	950.07
		D	730-740	732.0	276.84	949.21
		E	795-805	797.0	268.10	957.95
EPA-MP2	8/4/2009	A	346-356	350.0	296.27	973.72
		B	406-416	410.0	296.07	973.92
		C	506-516	510.0	296.85	973.14
		D	612-622	615.0	298.58	971.41
		E	712-722	715.0	299.27	970.72
		F	762-772	765.0	288.67	981.32
	12/15/2009	A	346-356	350.0	298.49	971.50
		B	406-416	410.0	298.44	971.55
		C	506-516	510.0	298.95	971.04
		D	612-622	615.0	301.04	968.95
		E	712-722	715.0	301.37	968.62
		F	762-772	765.0	286.96	983.03
EPA-MP3	12/14/2009	A	454-464	457.0	384.36	978.74
		B	590-600	592.0	384.48	978.62
		C	684-694	687.0	384.83	978.27
		D	811-821	814.0	385.58	977.52
		E	897-907	899.0	385.78	977.32
EPA-MP4	12/16/2009	A	411-421	413.0	401.90	1055.92
		B	505-515	507.0	464.97	992.85
		C	585-595	586.0	465.05	992.77
		D	639-649	641.0	465.20	992.62
		E	752-762	753.0	465.23	992.59
EPA-MP5	12/17/2009	A	352-362	356.0	307.21	977.95
		B	408-418	411.0	307.26	977.90
		C	502-512	506.0	307.55	977.61
		D	626-636	629.0	309.35	975.81
		E	737-747	739.0	309.89	975.27
EPA-MP6	12/18/2009	A	351-361	355.0	310.59	962.82
		B	445-455	449.0	310.68	962.73
		C	569-579	573.0	311.11	962.30
		D	656-666	659.0	311.50	961.91
		E	762-772	765.0	311.51	961.90

Notes:

ft bgs = feet below ground surface
ft bmp = feet below measuring point
ft msl = feet (relative to) mean sea level
[1] Zone depth refers to the depth of the Westbay system sampling port within each screen interval.

TABLE 3
Summary of Detected Perchlorate and Volatile Organic Compounds in Groundwater
BF Goodrich Site, San Bernardino County, California

Well	Screen Designation	Sample Date	Sample Type	Perchlorate (ug/L)	Acetone (ug/L)	Carbon Disulfide (ug/L)	Chloroform (ug/L)	Chloromethane (ug/L)	cis-1,2-Dichloroethene (ug/L)	Freon 11 (ug/L)	m&p-Xylene (ug/L)	Styrene (ug/L)	Tetrachloroethene (ug/L)	Toluene (ug/L)	Trichloroethene (ug/L)
EPA-MP1	A	03-Aug-09	N	<2	**5 J**	<0.5	<0.5	**0.22 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		16-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	B	03-Aug-09	N	<2	**5 J**	<0.5	<0.5	**0.21 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		16-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	C	03-Aug-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		16-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	D	03-Aug-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		16-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	E	03-Aug-09	N	<2	**5 J**	**0.12 J**	<0.5	<0.5	<0.5	<0.5	**0.5 J**	**0.18 J**	<0.5	**0.5 J**	<0.5
		16-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EPA-MP2	A	04-Aug-09	N	**4.1**	**5 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		15-Dec-09	N	**3.5**	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	B	04-Aug-09	N	**6.5**	**5 J**	<0.5	**0.42 J**	<0.5	<0.5	<0.5	<0.5	<0.5	**0.31 J**	<0.5	<0.5
		15-Dec-09	N	**3.3**	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		15-Dec-09	FD	**7.3**	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	C	04-Aug-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		15-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	D	04-Aug-09	N	**1.1 J**	<5	<0.5	**0.22 J**	<0.5	<0.5	<0.5	<0.5	<0.5	**0.1 J**	<0.5	<0.5
		15-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	E	04-Aug-09	N	**3.6**	**5 J**	<0.5	**0.3 J**	**0.25 J**	<0.5	<0.5	<0.5	<0.5	**0.17 J**	<0.5	<0.5
		04-Aug-09	FD	**4.9**	<5	<0.5	**0.27 J**	<0.5	<0.5	<0.5	<0.5	<0.5	**0.12 J**	<0.5	<0.5
		15-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	F	04-Aug-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.13 J**	<0.5	<0.5	<0.5
		15-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EPA-MP3	A	14-Dec-09	N	**7.9**	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	B	14-Dec-09	N	**1.7 J**	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	C	14-Dec-09	N	**2.1**	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	D	14-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	E	14-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EPA-MP4	A	17-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		17-Dec-09	FD	<4	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	B	17-Dec-09	N	<2	<5	<0.5	**0.25 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.66**
	C	16-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.59**
	D	16-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.93**
	E	16-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EPA-MP5	A	17-Dec-09	N	**7**	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	B	17-Dec-09	N	**4.5**	<5	<0.5	<0.5	<0.5	**0.31 J**	**0.20 J**	<0.5	<0.5	**2.7**	<0.5	**0.26 J**
	C	17-Dec-09	N	<2	<5	<0.5	**0.23 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	D	17-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	E	17-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
EPA-MP6	A	18-Dec-09	N	**26**	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	B	18-Dec-09	N	**2.5**	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	C	18-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	D	18-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	E	18-Dec-09	N	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
		18-Dec-09	FD	<2	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:
Detected results are bolded
N: Primary Sample
FD: Field Duplicate
ug/L: micrograms per liter
J = Estimated result
< = Non detect at the reporting limit

Figures

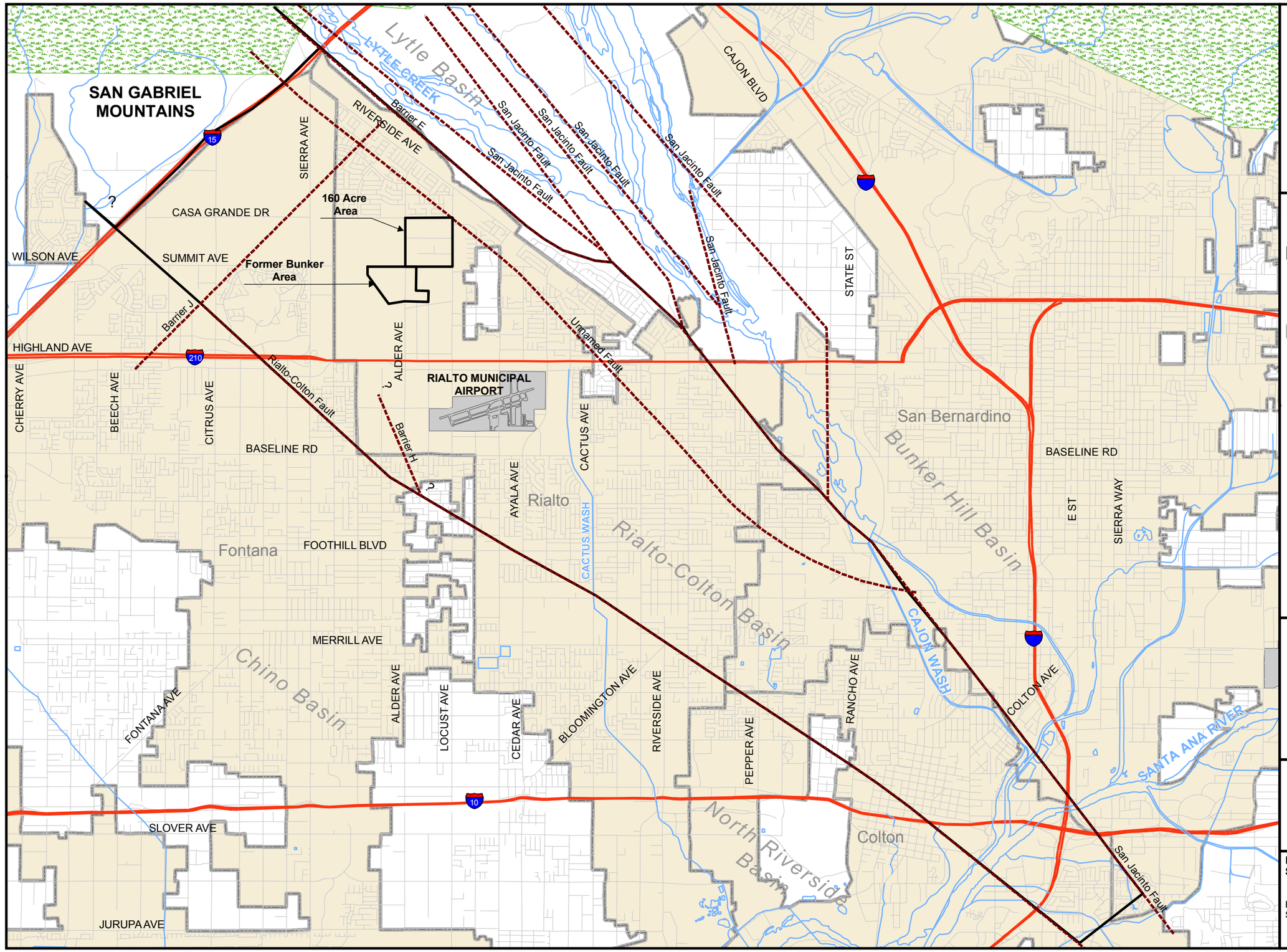

FIGURE 1
SITE LOCATION MAP

B.F. Goodrich Site
San Bernardino County, CA

CH2MHILL

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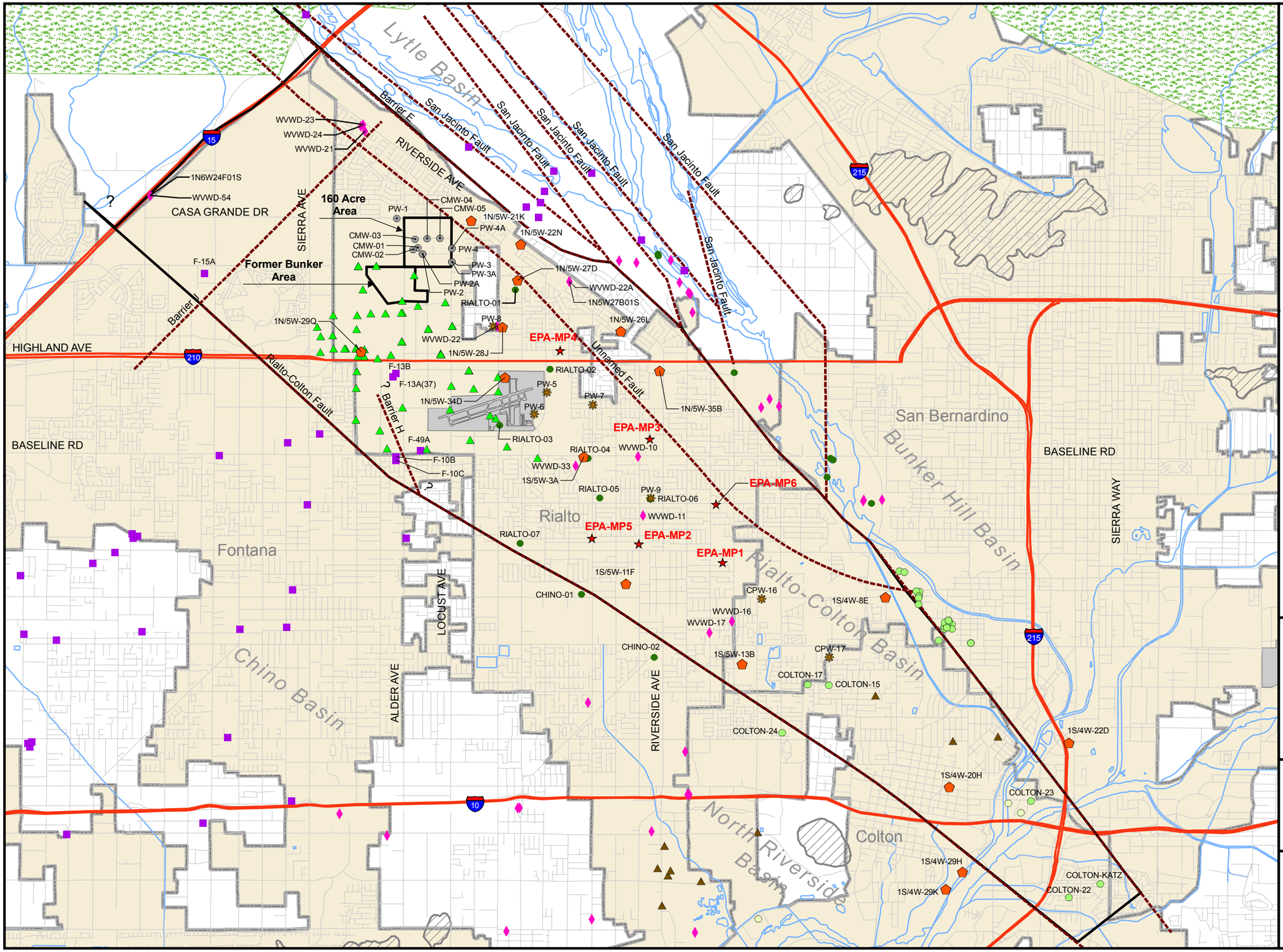

LEGEND

- EPA Monitoring Well
- USGS Cluster Well
- San Bernardino County MVSL Wells
- 160-Acre Area Monitoring Well
- 160-Acre Area - Downgradient Monitoring Well
- City of Colton Production Well
- City of Rialto Production Well
- City of Riverside Production Well
- Fontana Water Company Production Well
- West Valley Water District Production Well
- Other Production/ Monitoring Well
- Faults/Geologic Contact
- Roads
- Approximate Basin Boundary
- Site Boundary
- Airports
- Parks
- City Boundary
- Bedrock

N

0 2,500 5,000 10,000

Feet

FIGURE 2
STUDY AREA AND WELL LOCATIONS

B.F. Goodrich Site
San Bernardino County, CA

CH2MHILL

\\MADISON\GROUPS\EMS\GIS_LIBRARY\RIALTO-COLTON\MAPFILES\REPORT_MAPFILES\20100503\FIGURE2_STUDYAREA_WELLSLOCATIONS.MXD CVONFREE 5/24/2010 12:35:20

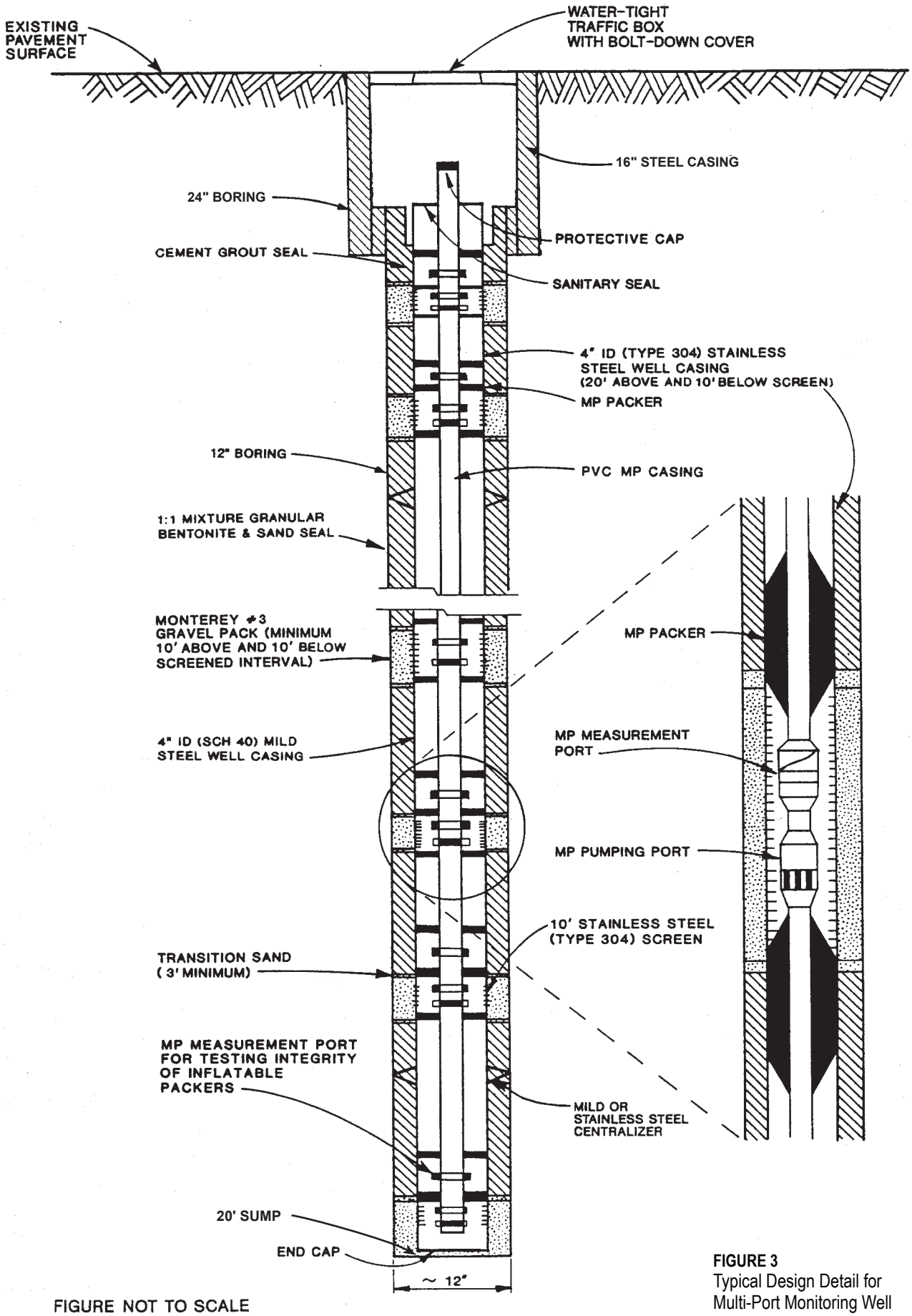

FIGURE 3
Typical Design Detail for
Multi-Port Monitoring Well
BF Goodrich Site Investigation

CH2MHILL

Appendixes

Appendix A
Boring Logs

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP1 SHEET 1 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 600 ft. south of Foothill Blvd between N. Acacia Ave and N. Eucalyptus Ave

ELEVATION : 1226.5 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1050187, W 117.3593116
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 4/9/2009
END : 4/23/2009
LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
0		**SILTY SAND (SM)** dark yellowish brown (10YR 3/4), moist, 75% fine to medium sand, 20% fines, 5% gravel, micaceous fine sand, subrounded coarse gravel up to 1 diameter, low plasticity.	Air knifed for subsurface utility clearance. 4-6-09, Bucket auger rig from 10' to 25' bgs.	Well Vault 4" ID SCH 40 Low-Carbon Steel Blank Casing Cement
10		**POORLY GRADED SAND WITH SILT (SP-SM)** dark yellowish brown (10YR 3/4), 80% fine to coarse sand, 10% gravel, 10% fines, micaceous fine sand, subangular coarse gravel up to 3 diameter.	coarsening downward	
20		**POORLY GRADED SAND WITH GRAVEL (SP)** very dark grayish brown (2.5Y 3/2), 50% fine to medium sand, 25% fine gravel, 25% coarse sand, micaceous fine sand, subangular gravel up to 0.5 diameter.	4-6-09, 1105, stop drilling, set conductor casing 4-9-09, 1150, resume drilling	
30		**POORLY GRADED SAND WITH GRAVEL (SP)** as above.	Rig chatter at 36' Rig chatter at 38'	
40		**POORLY GRADED SAND WITH GRAVEL (SP)** as above.	Rig chatter at 46' Rig chatter at 48'	
50		**POORLY GRADED SAND (SP)** very dark grayish brown (2.5Y 3/2), 50% coarse sand, 50% fine to medium sand, micaceous.	0.2 ft/min	
60		**POORLY GRADED SAND (SP)** very dark grayish brown (2.5Y 3/2), 50% coarse sand, 50% fine to medium sand, micaceous.		
70		**POORLY GRADED SAND WITH GRAVEL (SP)** very dark grayish brown (2.5Y 3/2), 50% medium sand, 25% fine to coarse gravel, 25% coarse sand.	4-9-09, end drilling 4-10-09, 0830, resume drilling	
80		**POORLY GRADED SAND (SP)** very dark grayish brown (2.5Y 3/2), 50% coarse sand, 50% fine to medium sand.		
90		**POORLY GRADED SAND WITH GRAVEL (SP)** very dark grayish brown (2.5Y 3/2), 50% coarse sand, 25% fine gravel, 25% fine to medium sand, micaceous fine to medium sand.	Rig chatter 0.2 ft/min	
100				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP1 SHEET 2 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 600 ft. south of Foothill Blvd between N. Acacia Ave and N. Eucalyptus Ave

ELEVATION : 1226.5 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1050187, W 117.3593116
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 4/9/2009
END : 4/23/2009
LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
110		**POORLY GRADED SAND WITH GRAVEL (SP)** dark gray (5Y 4/1), 50% coarse sand, 25% fine gravel, 25% fine to medium sand, micaceous fine to medium sand.		
		POORLY GRADED SAND (SP) dark grayish brown (2.5Y 4/2), 50% coarse sand, 1/4" diam., 50% fine to medium sand, subangular coarse sand, micaceous fine sand.	0.2 ft/min	
120		**POORLY GRADED SAND (SP)** dark grayish brown (2.5Y 4/2), 50% coarse sand, 1/4" diam., 50% fine to medium sand, subangular coarse sand, micaceous fine sand.		
130			4-10-09, end drilling 4-13-09, 0825, resume drilling	
140		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), 60% coarse sand, 30% medium sand, 10% fine sand, trace mica, salt and pepper appearance, mottled, subangular quartz and feldspar, some orange-colored sand grains (K-feldspar).		
150		**POORLY GRADED SAND (SP)** olive gray (5Y 4/2), 60% coarse sand, 25% medium sand, 15% fine sand, micaceous fine sand, granodioritic composition.	0.3 ft/min Mud properties at 150': pH:7, weight: 8.9 lb/gal, viscosity: 34 sec/qt, water loss: 7cc, sand content: 0.25% 1015, resume drilling from 153'	
160		**POORLY GRADED SAND WITH GRAVEL (SP)** olive gray (5Y 4/2), 50% coarse sand, 20% fine gravel, 20% medium sand, 10% fine sand, subangular to angular fragments/grains of mafic and felsic minerals, salt and pepper appearance, some K-feldspar.	0.5 ft/min	
170		**POORLY GRADED SAND WITH GRAVEL (SP)** as above.	0.6 ft/min	
180		**POORLY GRADED GRAVEL WITH SAND (GP)** olive gray (5Y 4/2), 55% fine gravel, 30% coarse sand, 15% fine to medium sand, subangular to angular fragments of gravel up to 1/2, visible foliation of mica in some grains.	0.3 ft/min	
190		**POORLY GRADED SAND WITH GRAVEL (SP)** olive brown (2.5Y 4/3), 50% coarse sand, 20% fine gravel, 20% medium sand, 10% fine sand, trace mica, subangular to angular, angular fragments of fine gravel.	0.2 ft/min	
200				

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP1 SHEET 3 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 600 ft. south of Foothill Blvd between N. Acacia Ave and N. Eucalyptus Ave

ELEVATION : 1226.5 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1050187, W 117.3593116
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 4/9/2009 END : 4/23/2009 LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) olive brown (2.5Y 4/3), 40% coarse sand, 20% medium sand, 20% fine sand, 15% fines, medium plastic, 5% fine gravel, angular, trace mica.	0.3 ft/min	
210		**POORLY GRADED SAND (SP)** dark grayish brown (2.5Y 4/2), 70% coarse sand, 30% medium sand, trace fine gravel, subangular, trace mica, salt and pepper appearance.	1338, resume drilling at 203', 0.2 ft/min	
220		**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/3), as above, 60% coarse sand, 30% medium sand, 10% fine sand, trace fine gravel, subangular to angular.	0.2 ft/min	
230			1610, 4/13/09, Circulate for 10 min. Stopped at 230' for the day. 0.2 ft/min 0755, 4/14/09, resume drilling at 230'	
240		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), 60% coarse sand, 30% medium sand, 10% fine sand, trace mica, coarse sand-size rock fragments, angular to subangular, freshly broken angular rock fragments.	0.4 ft/min	
250		**POORLY GRADED SAND (SP)** as above, 50% coarse sand-size rock fragments, 40% fine to medium sand, 10% fine gravel-size rock fragments, consisting of quartz, feldspar, slate/phyllite fragments, salt and pepper appearance.	0.2 ft/min	
260		**POORLY GRADED SAND (SP)** as above, 40% coarse sand-size rock fragments, 30% medium sand, 20% fine sand, 10% fine gravel-size rock fragments, consisting of quartz, feldspar, slate/phyllite fragments.	0.2 ft/min	
270		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), as above, 40% coarse sand-size rock fragments, angular to subangular, 30% medium sand, 20% fine sand, 10% fine gravel-size rock fragments, consisting of quartz, feldspar, slate/phyllite fragments.	0.3 ft/min	
280			0.2 ft/min	
290		**POORLY GRADED SAND (SP)** brown (10YR 5/3), as above, 50% coarse sand-size rock fragments, mostly felsic (quartz and feldspar), subangular, 30% medium sand, 20% fine sand.	0.2 ft/min rig chatter at 293'	
300				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP1 SHEET 4 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 600 ft. south of Foothill Blvd between N. Acacia Ave and N. Eucalyptus Ave

ELEVATION : 1226.5 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1050187, W 117.3593116
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 4/9/2009
END : 4/23/2009
LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
310		**POORLY GRADED SAND (SP)** brown (10YR 5/3), as above, 100% coarse sand, subangular to angular, trace fine gravel-size rock fragments, mostly quartz and feldspar, some fine-grained mafics (slate/phyllite).	0.3 ft/min	
320		**POORLY GRADED SAND (SP)** as above, 60% coarse sand, 30% medium sand, 10% fine sand, trace fine gravel, mostly quartz and feldspar, some fine-grained mafics (slate/phyllite).	0.1 ft/min	
330		**POORLY GRADED SAND (SP)** as above, 40% coarse sand, 30% medium sand, 20% fine sand, 10% fine gravel-size rock fragments, angular, trace mica flakes, quartz, feldspar, slate/phyllite fragments.	0.2 ft/min	
340		**POORLY GRADED SAND (SP)** as above.	1558, 4/14/09, stopped at 330', 0.2 ft/min 0740, 4/15/09, resume drilling at 330'	Bentonite/Sand Seal
350		**POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC)** light olive brown (2.5Y 5/3), 40% coarse sand, subangular to angular, mostly quartz and feldspar, 30% fine to medium sand, 20% fine gravel-size rock fragments of slate/phyllite and intermediate igneous rock, 10% clay, medium plastic, trace mica.	0.2 ft/min 0.3 ft/min	Transition Sand #1/20 sand Filter Pack #3 Sand
360		**POORLY GRADED SAND WITH CLAY (SP-SC)** as above, 40% coarse sand, 40% fine to medium sand, 10% fine gravel, subangular to angular, quartz and feldspar grains, some mafic rock fragments, 10% clay, medium plastic.	0.2 ft/min	4" ID Stainless Steel Wire-Wrap Screen Filter Pack #3 Sand
370		**POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC)** light olive brown (2.5Y 5/4), as above, 40% coarse sand, 35% fine to medium sand, 15% fine gravel, subangular, quartz grains and mafic rock fragments, 10% clay, medium plastic.	0.2 ft/min	
380		**POORLY GRADED SAND WITH GRAVEL (SP)** light olive brown (2.5Y 5/3), 40% coarse sand, 40% fine to medium sand, 15% fine gravel, subangular, mostly quartz grains and mafic rock fragments, 5% clay, medium plastic.	0.3 ft/min	Bentonite/Sand Seal
390		**SANDY LEAN CLAY (CL)** light olive brown (2.5Y 5/3), 50% clay, medium plastic, 30% fine to medium sand, 15% coarse sand, 5% fine gravel, clay matrix with subangular coarse sand grains.	driller indicates hard sediment at 396'	
400				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP1 SHEET 5 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 600 ft. south of Foothill Blvd between N. Acacia Ave and N. Eucalyptus Ave

ELEVATION : 1226.5 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1050187, W 117.3593116
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 4/9/2009
END : 4/23/2009
LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
410		**POORLY GRADED SAND WITH CLAY (SP-SC)** light olive brown (2.5Y 5/3), 40% coarse sand, mostly quartz and chalky feldspar, 30% fine sand, 15% medium sand, 10% clay, medium plastic, 5% fine gravel, subangular, trace mica.	0.2 ft/min	
420		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/3), 50% fine to medium sand, 30% coarse sand, 20% clay, medium plastic, trace fine gravel.	0.1 ft/min	
430		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/3), as above, clay, medium plastic.	0.3 ft/min 4/15/09, stopped at 424' 4/16/09, 0845, resume drilling	
440		**POORLY GRADED SAND (SP)** pale yellow (2.5Y 7/3), 70% coarse sand, 25% medium sand, 5% fine sand, trace fines, sand made up of rounded to subrounded quartz, subangular feldspar, and lithics.		
450		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), as above.	0.2 ft/min	Transition Sand #1/20 sand Filter Pack #3 Sand
460		**POORLY GRADED SAND (SP)** as above, 75% coarse sand, 15% medium sand, 5% fine sand, 5% fines, possible interbedded clay, clay balls in cuttings, medium plastic.	0.2 ft/min Mud properties at 450': pH:7, weight: 9.2 lb/gal, viscosity: 34 sec/qt, water loss: 10cc, sand content: 0.25%	
470		**POORLY GRADED SAND (SP)** as above, 80% medium sand, subrounded to subangular, 10% coarse sand, subrounded to subangular, 10% fine sand, trace fines, quartz, feldspar, lithic fragments.	0.3 ft/min	4" ID Stainless Steel Wire-Wrap Screen
480		**POORLY GRADED SAND (SP)** as above, 75% medium sand, 10% coarse sand, 10% fine sand, 5% fines.	0.2 ft/min	Filter Pack #3 Sand
490		**POORLY GRADED SAND (SP)** grayish brown (10YR 5/2), 60% coarse sand, subangular, 20% medium sand, subrounded, 20% fine sand, possible gravel.	0.4 ft/min rig chatter from 485'-495'	Bentonite/Sand Seal
500		**POORLY GRADED SAND WITH SILT (SP-SM)** light yellowish brown (2.5Y 6/4), 45% fine sand, 30% medium sand, 15% coarse sand, 10% fines.	0.3 ft/min	

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP1 SHEET 6 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 600 ft. south of Foothill Blvd between N. Acacia Ave and N. Eucalyptus Ave

ELEVATION : 1226.5 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1050187, W 117.3593116
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 4/9/2009 END : 4/23/2009 LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		SILTY SAND (SM) light yellowish brown (2.5Y 6/4), 80% fine sand, 15% fines, 5% medium to coarse sand.	rig chatter at 500', likely gravel, 0.5 ft/min Mud properties at 500': pH:7, weight: 9.1 lb/gal, viscosity: 34 sec/qt, water loss: 9cc, sand content: 0.25%	
510		**SILTY SAND (SM)** as above, 55% fine sand, 30% medium to coarse sand, 15% fines.	4/16/09, 1600, stop drilling 4/17/09, 0800, resume drilling, clear out hole	
520		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), 50% medium sand, 30% coarse sand, subangular, 20% fine sand, trace fines, coarse sand-size quartz, feldspar, plagioclase, sand-size granitic and schistose clasts.	0.2 ft/min, rig chatter from 515'-525'	
530		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), as above, 45% medium sand, 30% fine sand, 25% coarse sand.	0.2 ft/min	
540		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), 70% fine sand, 15% medium to coarse sand, 15% fines.	0.3 ft/min	Transition Sand #1/20 sand Filter Pack #3 Sand
550		**SILTY SAND (SM)** as above, 55% fine sand, 30% medium to coarse sand, 15% fines, trace fine gravel.	0.2 ft/min Mud properties at 550': pH:7, weight: 9.2 lb/gal, viscosity: 34 sec/qt, water loss: 9cc, sand content: 0.25%	
560		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), 60% fine sand, 25% medium sand, subangular to subrounded, 15% coarse sand, subangular to subrounded, trace fine gravel.	0.3 ft/min rig chatter at 565' to 575' bgs	4" ID Stainless Steel Wire-Wrap Screen
570		**POORLY GRADED SAND WITH GRAVEL (SP)** light gray (2.5Y 7/2), varied color, 45% fine sand, 40% medium to coarse sand, subangular, 15% fine gravel-size rock fragments, angular, granitic, gneissic, schistose.	0.2 ft/min, rig chatter	Filter Pack #3 Sand
580		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), 50% medium sand, rounded to subrounded, 35% fine sand, 15% coarse sand, subangular to subrounded, trace fine gravel, angular to subangular.	0.2 ft/min	Bentonite/Sand Seal
590		**POORLY GRADED SAND (SP)** as above, 60% medium sand, rounded to subrounded, 35% fine sand, 5% coarse sand, subrounded, trace fine gravel, subrounded.	0.2 ft/min 4-17-09, 1552, terminate drilling for the day	
600				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP1 SHEET 7 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 600 ft. south of Foothill Blvd between N. Acacia Ave and N. Eucalyptus Ave

ELEVATION : 1226.5 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1050187, W 117.3593116
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 4/9/2009 END : 4/23/2009 LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED SAND (SP) light yellowish brown (2.5Y 6/4), 50% medium sand, subangular, 30% fine sand, subrounded, 15% coarse sand, angular, 5% fines.	4-20-09, 0710, drill out slough from 580'-595' 0.2 ft/min	
610		**POORLY GRADED SAND (SP)** as above, 45% medium sand, 35% fine sand, 15% coarse sand, 5% fines.	0.2 ft/min	
620		**SILTY SAND (SM)** pale yellow (2.5Y 7/4), 40% medium sand, 35% fine sand, 15% fines, 10% coarse sand.	0.2 ft/min, driller indicates likely alternating soft and hard layers of sediment	
630		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), 60% coarse sand, 40% medium sand, fines downward.	rig chatter, likely gravel 0.3 ft/min few cuttings off shaker	
640		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/3), slightly more red than other samples, 50% fine sand, 30% fines, 15% medium sand, subrounded, 5% coarse sand, subangular.	0.2 ft/min	
650		**SILTY SAND (SM)** as above.	0.2 ft/min Mud properties at 650': pH:7, weight: 9.2 lb/gal few cuttings off shaker	
660		**SILTY SAND (SM)** as above, 40% fine sand, 35% medium sand, 15% fines, 10% coarse sand.	0.2 ft/min	
670		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/4), slightly more red than other samples, 60% fines, medium plastic, 40% fine to medium sand.	0.4 ft/min	
680		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 40% fine sand, 40% fines, medium plastic, 10% coarse sand, subangular, 10% medium sand, subangular to subrounded.	hard drilling at bottom, 0.2 ft/min 4-20-09, 1545, stop drilling, trip out 4-21-09, 0820, resume drilling	
690		**POORLY GRADED SAND WITH CLAY (SP-SC)** light yellowish brown (2.5Y 6/4), 50% fine sand, 35% medium sand, subrounded, 10% fines, medium plastic, 5% coarse sand, subrounded to subangular.	0.2 ft/min few cuttings off shaker rig chatter	
700				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP1 SHEET 8 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 600 ft. south of Foothill Blvd between N. Acacia Ave and N. Eucalyptus Ave

ELEVATION : 1226.5 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1050187, W 117.3593116
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 4/9/2009 END : 4/23/2009 LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED SAND WITH CLAY (SP-SC) light olive gray (5Y 6/2), as above.	0.2 ft/min Mud properties at 700': pH:7, weight: 9.1 lb/gal, viscosity: 34 sec/qt, water loss: 9cc, sand content: 0.25%	
710			0.2 ft/min	
			slower drilling	Transition Sand #1/20 sand
720		**SILTY SAND/CLAYEY SAND (SM/SC)** olive yellow (2.5Y 6/6), 55% fine sand, micaceous, 25% fines, medium plastic clay and micaceous silt, 15% medium sand, 5% coarse sand, trace fine gravel.	0.2 ft/min	Filter Pack #3 Sand
730		**CLAYEY SAND (SC)** as above.	rig chatter, 0.1 ft/min	4" ID Stainless Steel Wire-Wrap Screen
			4-21-09, 1558, stop drilling for the day 4-22-09, 0700, resume drilling	
740		**POORLY GRADED SAND WITH CLAY (SP-SC)** light yellowish brown (2.5Y 6/3), 65% fine sand, 25% medium sand, subangular to subrounded, quartzose, granitic, metamorphic, 10% fines, medium plastic.	0.2 ft/min	Filter Pack #3 Sand
			rig chatter	
750			smooth drilling, fine sand and fines off shaker	
		CLAYEY SAND (SC) light yellowish brown (10YR 6/4), more red than other samples, 65% fine sand, 20% fines, medium plastic, 10% medium sand, subangular, 5% coarse sand, angular.	0.2 ft/min Mud properties at 750': pH:7, weight: 9.1 lb/gal, viscosity: 34 sec/qt, water loss: 9cc, sand content: 0.25%	Bentonite/Sand Seal
		POORLY GRADED SAND (SP) light yellowish brown (2.5Y 6/4), 45% fine sand, 35% medium sand, subangular, 20% coarse sand, subangular, trace rock fragments.	rig chatter rig chatter, sand off shaker is coarse	
760			0.2 ft/min	
770		**CLAYEY SAND (SC)** light yellowish brown (10YR 6/4), 80% fine sand, 15% fines, medium plastic, 5% medium to coarse sand, angular to subangular.	0.2 ft/min	
			smooth drilling, fines off shaker (clay balls)	
780		**CLAYEY SAND (SC)** very pale brown (10YR 7/4), as above, 60% fine sand, 35% fines, medium plastic, 5% medium to coarse sand, subangular to angular.	0.2 ft/min 4-22-09, 1550, stop drilling for the day 4-23-09, 0810, resume drilling	Transition Sand #1/20 sand Filter Pack #3 Sand
			clay balls coming off shaker	
790		**CLAYEY SAND (SC)** yellowish brown (10YR 5/4), as above, 60% fine sand, 20% fines, medium plastic, 15% medium sand, subangular, 5% coarse sand, subangular.	0.3 ft/min clay balls coming off shaker	
			rig chatter, less fines and more sand off shaker	4" ID Stainless Steel Wire-Wrap Screen
800				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-MP1	SHEET 9 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : 600 ft. south of Foothill Blvd between N. Acacia Ave and N. Eucalyptus Ave

ELEVATION : 1226.5 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1050187, W 117.3593116
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 4/9/2009
END : 4/23/2009
LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
810		**POORLY GRADED SAND WITH SILT (SP-SM)** pale yellow (2.5Y 7/4), 45% fine sand, 40% medium sand, subangular, 10% fines, 5% coarse sand, subangular to subrounded.	0.2 ft/min Mud properties at 800': pH:7, weight: 9.1 lb/gal, viscosity: 34 sec/qt, water loss: 9cc, sand content: 0.25% sand off shaker	Filter Pack #3 Sand
820		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), 45% fine sand, 40% medium sand, subangular to subrounded, 10% coarse sand, subangular, 5% fines, gravel likely.	0.3 ft/min few cuttings off shaker rig chatter smooth drilling	
830		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), 70% fine sand, micaceous, 15% medium to coarse sand, subangular, 15% fines, micaceous silt present.	0.2 ft/min fine sand off shaker rig chatter, driller indicates likely dense, silty layer, fine sand coming off shaker, few medium to coarse sand	Bentonite/Sand Seal Bottom cap
840		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 65% fine sand, micaceous, 25% fines, medium plastic, 10% medium to coarse sand, subangular to subrounded.	0.3 ft/min smooth drilling	
850		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 65% fine sand, 30% fines, medium plastic, silt present in fines, 5% medium to coarse sand.	0.3 ft/min fine sand and fines off shaker	
860		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/3), 65% fines, 35% fine sand, medium plastic, soft.	0.4 ft/min abundant clay coming off shaker	
870		**SANDY CLAYEY SILT (CL/ML)** light olive brown (2.5Y 5/3), 65% fines (silt and clay), 35% fine sand, trace medium to coarse sand, some medium plastic fines, fine gravel-sized fragments of CLAYEY SILT (CL/ML), light olive brown (2.5Y 5/4) .	0.5 ft/min smooth drilling, fine sand and fines off shaker	
880		**SANDY CLAYEY SILT (CL/ML)** light yellowish brown (10YR 6/4), 70% fines (silt and clay, medium plastic), 30% fine sand, trace medium sand, fine gravel-sized fragments of CLAYEY SILTSTONE, light olive brown (2.5Y 5/4). **SANDY CLAYEY SILT (CL/ML)** pale yellow (2.5Y 7/3), as above, fine gravel-sized rock fragments of CLAYEY SILTSTONE, light olive brown (2.5Y 5/4).	0.4 ft/min harder drilling 0.3 ft/min Boring terminated at 880'	Slough
890				
900				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP2 SHEET 1 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Willow Ave., 90 ft south of W. Ramona Dr.

ELEVATION : 1270.6 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1078133, W 117.3748276
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 5/13/2009 END : 6/9/2009 LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
10		Cobbles up to 10 in diameter.	Air knifed to 10' bgs for subsurface utility clearance. Bucket auger rig from 10' to 25' bgs. Install 16" steel conductor casing to 25' bgs.	Well Vault 4" ID SCH 40 Low-Carbon Steel Blank Casing Cement
20				
30		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), 50% coarse sand, 35% medium sand, 10% fine sand, 5% fine gravel.	5/18/09, 0730, resume drilling at 25' bgs rig chatter at 32'	
40		**POORLY GRADED SAND (SP)** as above, 50% coarse sand, 45% medium sand, 5% gravel.	5/18/09, 0830, bit at 35' bgs rig chatter at 40'	
50		**POORLY GRADED SAND WITH GRAVEL (SP)** very dark grayish brown (2.5Y 3/2), 40% coarse sand, 30% medium sand, 15% fine gravel, 15% fine sand, fine gravel/coarse sand may be from larger gravel clasts, ~50/50 felsic/mafic.	1005, rig chatter at 45'	
60		**POORLY GRADED SAND (SP)** very dark grayish brown (2.5Y 3/2), 40% coarse sand, 40% medium sand, 20% fine sand, sand is ~50/50 felsic/mafic.		
70		**POORLY GRADED SAND (SP)** as above.	Mud properties at 70': pH:7.5, weight: 8.2 lb/gal, viscosity: 33 sec/qt, sand content: 0.5%	
80		**POORLY GRADED SAND WITH GRAVEL (SP)** dark gray (2.5Y 4/1), varied color, 50% coarse sand, 30% fine gravel, 20% fine to medium sand.	rig chatter Mud properties at 80': pH:7.5, weight: 8.2 lb/gal, viscosity: 33 sec/qt, sand content: 0.5% 5/18/09, 1640, stop for the day at 86' 5/19/09, resume drilling	
90		**POORLY GRADED SAND WITH GRAVEL (SP)** dark grayish brown (2.5Y 4/2), 50% coarse sand, 40% fine gravel, subangular, 10% fine to medium sand.	rig chatter	
100				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP2 SHEET 2 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Willow Ave., 90 ft south of W. Ramona Dr.

ELEVATION : 1270.6 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1078133, W 117.3748276
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 5/13/2009 END : 6/9/2009 LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED SAND WITH GRAVEL (SP) as above.	1000, rig chatter	
			Mud properties at 105': pH:7.5, weight: 8.3 lb/gal, viscosity: 34 sec/qt, sand content: 0.5%	
110		**POORLY GRADED SAND (SP)** as above, 80% coarse sand, 10% fine gravel, 10% fine to medium sand.	1200, rig chatter	
120		**POORLY GRADED SAND (SP)** dark gray (2.5Y 4/1), 50% coarse sand, 40% fine to medium sand, 10% fine gravel.	1330, rig chatter	
130			1440, rig chatter Mud properties at 130': pH:7.5, weight: 8.6 lb/gal, viscosity: 36 sec/qt, sand content: 0.5%	
140		**POORLY GRADED SAND WITH GRAVEL (SP)** as above, 50% coarse sand, 30% fine to medium sand, 20% fine gravel.	1600, rig chatter	
			5/20/09, 0740, resume drilling	
150		**POORLY GRADED SAND WITH GRAVEL (SP)** dark gray (2.5Y 4/1), as above, 50% coarse sand, 30% fine gravel, 20% medium sand, gravel is angular to subangular, could be from larger clasts, 50/50 lithic/felsic.		
160		**POORLY GRADED SAND WITH GRAVEL (SP)** light olive brown (2.5Y 5/3), 40% coarse sand, 20% medium sand, 20% fine gravel, 20% fine sand.	driller indicates likely clay in this interval due to soft drilling rig chatter	
170		**POORLY GRADED SAND WITH SILT (SP-SM)** light olive brown (2.5Y 5/3), 40% medium sand, 25% fine sand, 20% coarse sand, 10% fines, 5% fine gravel.		
180		**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)** grayish brown (2.5Y 5/2), 40% coarse sand, 25% medium sand, 15% fine gravel, 10% fine sand, 10% fines.	Mud properties at 180': pH:7.5, weight: 8.6 lb/gal, viscosity: 34 sec/qt, sand content: 0.25% 1150, slow drilling	
190		**POORLY GRADED SAND (SP)** dark grayish brown (2.5Y 4/2), 40% coarse sand, 30% medium sand, 30% fine sand.		
200				

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-MP2	SHEET 3 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Willow Ave., 90 ft south of W. Ramona Dr.

ELEVATION : 1270.6 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1078133, W 117.3748276
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 5/13/2009
END : 6/9/2009
LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
210		**POORLY GRADED SAND (SP)** light brownish gray (2.5Y 6/2), 40% medium sand, 40% fine sand, 20% coarse sand.	Mud properties at 197': pH:7.5, weight: 8.5 lb/gal, viscosity: 36 sec/qt, sand content: 0.25% 1534, rig chatter, cobble zone 5/21/09, 0730, resume drilling	
220		**POORLY GRADED SAND (SP)** as above, 40% medium sand, 40% fine sand, 20% coarse sand.	0915, rig chatter, cobble zone Mud properties at 210': pH:8.5, weight: 8.9 lb/gal, viscosity: 37 sec/qt, water loss: 12cc, sand content: 0.5%	
230		**POORLY GRADED SAND (SP)** as above.	0955, rig chatter, cobble zone	
240		**POORLY GRADED SAND (SP)** grayish brown (2.5Y 5/2), 40% coarse sand, 30% medium sand, 30% fine sand.	1050, rig chatter, cobble zone	
250		**POORLY GRADED SAND (SP)** grayish brown (2.5Y 5/2), 40% fine sand, 30% coarse sand, 25% medium sand, 5% fines.	1230, rig chatter, cobble zone Mud properties at 240': pH: 8, weight: 8.9 lb/gal, viscosity: 37 sec/qt, water loss: 13cc, sand content: 0.5%	
260		**POORLY GRADED SAND (SP)** as above.	1330, rig chatter, cobble zone	
270		**POORLY GRADED SAND (SP)** as above.	1430, rig chatter, cobble zone	
280		**POORLY GRADED SAND (SP)** grayish brown (2.5Y 5/2), 50% coarse sand, 25% medium sand, 20% fine sand, 5% fines.	1520, rig chatter, decrease slightly in cobbles	
290		**POORLY GRADED SAND (SP)** grayish brown (2.5Y 5/2), as above, 45% fine sand, 30% coarse sand, 20% medium sand, 5% fines.	1615, rig chatter, cobble zone 1630, circulate, trip out for the day 5/22/09, 0700, resume drilling	
300		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 40% medium sand, 30% fine sand, 20% fines, medium plastic, 10% coarse sand.	0855, rig chatter	

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP2 SHEET 4 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Willow Ave., 90 ft south of W. Ramona Dr.

ELEVATION : 1270.6 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1078133, W 117.3748276
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 5/13/2009 END : 6/9/2009 LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) light yellowish brown (2.5Y 6/4), as above, 50% medium sand, 30% fine sand, 15% fines, medium plastic, 5% coarse sand.		
310		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), 40% medium sand, 30% fine sand, 25% coarse sand, 5% fines.		Bentonite/Sand Seal
			1153, slow drilling	
320		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 50% medium sand, 30% fine sand, 15% fines, medium plastic, 5% coarse sand.		
330		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 40% medium sand, 40% fine sand, 20% fines, medium plastic.		Transition Sand #1/20 sand Filter Pack #3 Sand
340		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/3), 40% medium sand, 40% fine sand, 20% fines.	1620, stop for the day 5/26/09, 0800, resume drilling	
			rig chatter	4" ID Stainless Steel Wire-Wrap Screen
350		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), 95% medium sand, 5% coarse sand, trace fine sand.	rig chatter, 0.1 ft/min Mud properties at 350': pH:7.5, weight: 8.6 lb/gal, viscosity: 36 sec/qt, sand content: 0.25%	Filter Pack #3 Sand
360		**POORLY GRADED SAND (SP)** as above.	rig chatter, 0.2 ft/min	Bentonite/Sand Seal
370		**POORLY GRADED SAND (SP)** as above, 90% medium sand, subangular, 5% coarse sand, subangular, 5% fine sand, trace fines.	0.2 ft/min Mud properties at 370': pH:7.5, weight: 8.6 lb/gal, viscosity: 36 sec/qt, sand content: 0.5%	
380		**POORLY GRADED SAND (SP)** as above, 60% medium sand, 25% fine sand, 15% coarse sand, subangular to angular.	0.2 ft/min fines coming off shaker	
390		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), as above, 65% medium sand, 20% fine sand, 15% coarse sand, subangular, trace fines.	0.1 ft/min Mud properties at 390': pH:7.5, weight: 8.6 lb/gal, viscosity: 34 sec/qt, sand content: 0.25%	Transition Sand #1/20 sand Filter Pack #3 Sand
400				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-MP2	SHEET 5 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Willow Ave., 90 ft south of W. Ramona Dr.

ELEVATION : 1270.6 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1078133, W 117.3748276
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 5/13/2009
END : 6/9/2009
LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
410		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/3), 30% medium sand, 30% fine sand, 30% fines (low plastic), 10% coarse sand, subangular.	0.1 ft/min some fines on shaker, hard drilling	4" ID Stainless Steel Wire-Wrap Screen
420		**SILTY SAND (SM)** as above.	0.1 ft/min Mud properties at 410': pH:7.5, weight: 8.7 lb/gal, viscosity: 35 sec/qt, sand content: 0.5% hard drilling, some fines on shaker	Filter Pack #3 Sand
430		**SILTY SAND (SM)** as above, 35% medium sand, 35% fine sand, 15% fines, silt, some medium plastic, 15% coarse sand, subangular.	0.1 ft/min 1353, driller makes adjustments to help increase drill rate some fines coming off shaker, hard drilling	Bentonite/Sand Seal
440		**POORLY GRADED SAND WITH SILT (SP-SM)** light yellowish brown (2.5Y 6/3), 40% medium sand, 40% fine sand, 10% coarse sand, 10% fines, silt.	0.1 ft/min Mud properties at 430': pH:7.5, weight: 8.6 lb/gal, viscosity: 36 sec/qt, sand content: 0.5%	
450		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), 50% medium to coarse sand, subrounded, 50% fine sand, trace fines.	0.1 ft/min, rig chatter 1110, stop for repairs 1530, resume drilling	
460		**POORLY GRADED SAND (SP)** as above, 80% medium to coarse sand, 20% fine sand, trace fines.	0.1 ft/min Mud properties at 450': pH:7.5, weight: 8.6 lb/gal, viscosity: 36 sec/qt, sand content: 0.5% 1700, circulate and stop for the day, 0.1 ft/min	
470		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/3), 55% fine sand, micaceous, 30% medium to coarse sand, subrounded, 15% fines.	5/29/09, 0710, resume drilling fines coming off shaker 0.1 ft/min fines coming off shaker hard drilling	
480		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 50% fine sand, 30% fines, medium plastic, 20% medium sand, subrounded.	0.1 ft/min hard drilling, fines coming off shaker Mud properties at 475': pH:7.5, weight: 9.2 lb/gal, viscosity: 34 sec/qt, sand content: 0.5%	
490		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/3), 60% fine sand, 20% medium to coarse sand, 20% fines, silt, some medium plastic.	0.1 ft/min hard drilling, driller indicates likely cemented sediment	
500		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/3), 65% fine sand, 20% medium to coarse sand, 15% fines, low plastic to nonplastic.	0.1 ft/min hard drilling, fines off shaker	Transition Sand #1/20 sand Filter Pack #3 Sand

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP2 SHEET 6 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Willow Ave., 90 ft south of W. Ramona Dr.

ELEVATION : 1270.6 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1078133, W 117.3748276
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 5/13/2009 END : 6/9/2009 LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	SOIL DESCRIPTION: SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
510	**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), 100% medium sand, trace coarse sand, trace fines.	0.2 ft/min Mud properties at 505': pH:7.5, weight: 9.2 lb/gal, viscosity: 34 sec/qt, sand content: 0.5%	4" ID Stainless Steel Wire-Wrap Screen
520	**POORLY GRADED SAND (SP)** as above.	0.2 ft/min	Filter Pack #3 Sand
530	**POORLY GRADED SAND (SP)** as above, trace fines.	0.2 ft/min 5/29/09, 1700, stop to circulate for the day 6/1/09, 0700, resume drilling	Bentonite/Sand Seal
540	**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 50% fine sand, 30% fines, some medium plastic, 20% medium to coarse sand.	clay and sand coming off shaker 0.1 ft/min	
550	**CLAYEY SAND (SC)** as above, 50% fine sand, 30% medium to coarse sand, 20% fines, some medium plastic.	0.1 ft/min fines coming off shaker	
560	**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/4), 60% fines, medium plastic, 40% fine to medium sand.	0.1 ft/min Mud properties at 555': pH:7.5, weight: 9.1 lb/gal, viscosity: 36 sec/qt, sand content: trace fines and fine sand coming off shaker	
570	**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 50% fine sand, 30% fines, some medium plastic, some silt, 20% medium to coarse sand.	0.1 ft/min fines and coarser sand coming off shaker Mud properties at 565': pH:7.5, weight: 9.2 lb/gal, viscosity: 36 sec/qt, sand content: trace	
580	**CLAYEY SAND (SC)** light olive brown (2.5Y 5/3), 70% fine sand, 25% fines, medium plastic, 5% medium sand.	0.1 ft/min	
590	**SANDY LEAN CLAY (CL)** brown (10YR 5/3), more red in color, 55% fines, medium plastic, 40% fine sand, 5% medium sand.	0.2 ft/min 1700, circulate to shut down for the day 6/2/09, 0700, resume drilling 0800, shutoff to fix mud pump 1220, resume drilling Mud properties at 583': pH:7.5, weight: 9.2 lb/gal, viscosity: 36 sec/qt, sand content: 0.5% 0.1 ft/min	
600	**CLAYEY SAND (SC)** pale brown (10YR 6/3), 50% fine sand, 35% fines, medium plastic, 15% medium to coarse sand.		Transition Sand #1/20

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP2 SHEET 7 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Willow Ave., 90 ft south of W. Ramona Dr.

ELEVATION : 1270.6 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1078133, W 117.3748276
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 5/13/2009 END : 6/9/2009 LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
610		**CLAYEY SAND (SC)** yellowish brown (10YR 5/4), 60% fine sand, 20% medium to coarse sand, 20% fines, medium plastic.	0.2 ft/min	sand Filter Pack #3 Sand
620		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 65% fine sand, micaceous, 15% medium to coarse sand, 20% fines, medium plastic, some silt.	0.1 ft/min	4" ID Stainless Steel Wire-Wrap Screen
630		**POORLY GRADED SAND WITH CLAY (SP-SC)** light yellowish brown (2.5Y 6/3), 60% fine sand, 30% medium to coarse sand, 10% fines, medium plastic, some silt.	0.1 ft/min Mud properties at 625': pH:7.5, weight: 9.1 lb/gal, viscosity: 34 sec/qt, sand content: trace	Filter Pack #3 Sand
640		**POORLY GRADED SAND WITH CLAY (SP-SC)** as above, 80% fine sand, 10% medium to coarse sand, 10% fines, medium plastic.	0.1 ft/min	Bentonite/Sand Seal
650		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), 65% fine sand, 30% medium to coarse sand, 5% fines.	0.1 ft/min rig chatter, gravel	
660		**POORLY GRADED SAND WITH CLAY (SP-SC)** light yellowish brown (2.5Y 6/3), 65% fine sand, 25% medium to coarse sand, 10% fines, medium plastic.	0.1 ft/min, rig chatter, gravel Mud properties at 650': pH:7.5, weight: 9.2 lb/gal, viscosity: 36 sec/qt, sand content: trace	
670		**POORLY GRADED SAND WITH CLAY (SP-SC)** light yellowish brown (2.5Y 6/3), 60% fine sand, 30% medium to coarse sand, 10% fines, medium plastic.	6/3/09, 1640, circulate to shutdown for the day 6/4/09, 0706, resume drilling 0.1 ft/min	
680		**POORLY GRADED SAND WITH CLAY (SP-SC)** as above, 65% fine sand, 25% medium to coarse sand, 10% fines, medium plastic.	0.1 ft/min	
690		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), 60% fine sand, 35% medium to coarse sand, 5% fines, medium plastic, some silt.	0.1 ft/min Mud properties at 685': pH:7.5, weight: 9.2 lb/gal, viscosity: 36 sec/qt, sand content: trace	
700		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 65% fine sand, 20% fines, some medium plastic, some silt, 15% medium to coarse sand.	0.2 ft/min hard drilling, silt coming off shaker	Transition Sand #1/20

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP2 SHEET 8 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Willow Ave., 90 ft south of W. Ramona Dr.

ELEVATION : 1270.6 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1078133, W 117.3748276
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 5/13/2009 END : 6/9/2009 LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		SILT WITH SAND (ML) light yellowish brown (2.5Y 6/4), 75% fines, silt, some medium plastic, 25% fine to coarse sand, fine micaceous.	0.1 ft/min Mud properties at 700': pH:7.5, weight: 9.1 lb/gal, viscosity: 34 sec/qt, sand content: trace hard drilling, silt coming off shaker 6/4/09, 1615, circulate for the day 6/5/09, 0700, resume drilling	sand Filter Pack #3 Sand
710		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 60% fine sand, 30% fines, some medium plastic, some silt, 10% medium to coarse sand.	0.1 ft/min hard drilling, some sand off shaker	4" ID Stainless Steel Wire-Wrap Screen
720		**CLAYEY SAND (SC)** as above, 60% fine sand, 25% fines, medium plastic, some silt, 15% medium to coarse sand.	0.1 ft/min Mud properties at 725': pH:7.5, weight: 9.2 lb/gal, viscosity: 34 sec/qt, sand content: trace	Filter Pack #3 Sand
730		**CLAYEY SAND (SC)** as above.	0.1 ft/min increase drill rate due to soft sediment	Bentonite/Sand Seal
740		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, more red in color, 55% fine sand, 30% fines, medium plastic, some silt, 15% medium to coarse sand.	0.2 ft/min Mud properties at 745': pH:7.5, weight: 9.3 lb/gal, viscosity: 36 sec/qt, sand content: trace	
750		**CLAYEY SAND (SC)** as above.	0.1 ft/min 6/5/09, 1652, circulate to shut down for the day 6/8/09, 0700, resume drilling	Transition Sand #1/20 sand Filter Pack #3 Sand
760		**LEAN CLAY (CL)** light yellowish brown (2.5Y 6/3), 95% fines, medium plastic, very soft, some silt, 5% fine sand.	0.2 ft/min	4" ID Stainless Steel Wire-Wrap Screen
770		**SANDY LEAN CLAY (CL)** pale brown (10YR 6/3) light yellowish brown (2.5Y 6/3), 65% fines, medium plastic, some silt (pale brown), 35% fine sand, very soft (light yellowish brown).	0.2 ft/min rig chatter, driller indicates likely gravel	Filter Pack #3 Sand
780		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), a little more red in color, 60% fine sand, 25% fines including CLAYEY SILT, 15% medium sand, angular.	rig chatter, coarser material 0.2 ft/min	
790		**SILTY SAND (SM)** light olive brown (2.5Y 5/3) pale yellow (2.5Y 7/3), 45% fine sand (pale yellow), 45% fines with cuttings of CLAYEY SILT (CL/ML) (light olive brown), 10% medium to coarse sand, angular.	0.2 ft/min Mud properties at 795': pH:7.5, weight: 9.2 lb/gal, viscosity: 36 sec/qt, sand content: trace	Bentonite/Sand Seal Bottom cap
800				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP2 SHEET 9 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Willow Ave., 90 ft south of W. Ramona Dr.

ELEVATION : 1270.6 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1078133, W 117.3748276
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 5/13/2009
END : 6/9/2009
LOGGER : M Mayry

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
810		**SILTY SAND (SM)** olive brown (2.5Y 4/3) light yellowish brown (2.5Y 6/3), as above, cuttings of CLAYEY SILT (CL/ML).	0.1 ft/min	
		SILTY SAND (SM) as above.	0.1 ft/min	
820		**SANDY SILT (ML)** olive yellow (2.5Y 6/6) light olive brown (2.5Y 5/3), 70% fines (light olive brown), 30% fine sand (olive yellow), soft.	Mud properties at 816': pH:7.5, weight: 9.2 lb/gal, viscosity: 34 sec/qt, sand content: trace 0.2 ft/min 6/8/09, 1640, circulate to shutdown for the day 6/9/09, 0720, resume drilling	
830		**SANDY SILT (ML)** light brown (7.5YR 6/4) dark yellowish brown (10YR 4/4), as above, 60% fines (dark yellowish brown), some silt, some medium plastic, 30% fine sand (light brown), 10% medium to coarse sand, cuttings of CLAYEY SILT present.	0.2 ft/min	
840		**CLAYEY SAND (SC)** light yellowish brown (10YR 6/4), 45% fine sand, 45% fines, medium plastic, some cuttings of CLAYEY SILT, 10% medium to coarse sand.	0.2 ft/min sand coming off shaker	
850		**CLAYEY SAND (SC)** as above, 50% fine sand, 35% fines, medium plastic, trace cuttings of CLAYEY SILT (CL/ML), 15% medium to coarse sand, subangular.	0.1 ft/min Mud properties at 855': pH:7.5, weight: 9.3 lb/gal, viscosity: 36 sec/qt, sand content: 0.5%	
860		**SILTY SAND (SM)** light yellowish brown (10YR 6/4) dark brown (7.5YR 3/3), 40% fine sand, 35% fines, cuttings of CLAYEY SILT (CL/ML) with dark brown (7.5YR 3/3) color, 25% medium to coarse sand, trace fines, medium plastic.	0.1 ft/min sand coming off shaker Mud properties at 865': pH:7.5, weight: 9.2 lb/gal, viscosity: 35 sec/qt, sand content: 0.25%	
870		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4) dark brown (7.5YR 3/3), as above, 40% fine sand, 30% medium to coarse sand, 30% fines, trace cuttings of CLAYEY SILT (CL/ML) with dark brown (7.5YR 3/3) color.	0.1 ft/min Boring terminated at 870'	
880				
890				
900				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP3 SHEET 1 OF 10

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : Intersection of N. Alice Ave. and W. Virginia St.

ELEVATION : 1363.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1239828, W 117.3728793
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 6/23/2009
END : 7/14/2009
LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
			Air knifed to 10' bgs for subsurface utility clearance. Bucket auger rig from 10' to 25' bgs. Install 16" steel conductor casing to 25' bgs on 6/23/09.	Well Vault 4" ID SCH 40 Low-Carbon Steel Blank Casing Cement
10		**SILTY SAND (SM)** yellowish brown (10YR 5/4), dry, 75% fine sand, micaceous, 15% fines, 5% fine to coarse gravel, subrounded, 5% medium sand.		
20		**POORLY GRADED GRAVEL WITH SAND (GP)** light olive brown (2.5Y 5/4), 55% fine to coarse gravel, subangular to subrounded, 25% fine sand, 15% medium to coarse sand, subangular, 5% fines.	6/25/09, 1320, begin drilling with Failing Jed-A direct mud rotary Mud properties at 20': pH:7.5, weight: 8.9 lb/gal, viscosity: 33 sec/qt, sand content: 0.25%	
30		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), varied color, 100% medium to coarse sand, angular to subangular.	0.2 ft/min rig chatter	
40		**POORLY GRADED SAND (SP)** as above, 100% medium sand, trace coarse sand, trace fine sand.	0.1 ft/min	
50		**POORLY GRADED SAND (SP)** as above.	0.1 ft/min 6/25/09, 1700, stop for the day 6/26/09, 0645, resume drilling	
60		**POORLY GRADED SAND (SP)** as above, 95% medium sand, 5% fine gravel.	0.4 ft/min rig chatter 0710, shut off to fix mud shaker 1330, resume drilling	
70		**POORLY GRADED SAND (SP)** dark grayish brown (2.5Y 4/2), as above, 95% medium sand, 5% fine gravel.	0.1 ft/min rig chatter, gravel 6/26/09, 1700, shutoff for the day 6/29/09, 0700, cleanout hole 0820, resume drilling at 73' bgs gravel off shaker, mud loss from system to formation	
80		**POORLY GRADED SAND WITH GRAVEL (SP)** dark gray (2.5Y 4/1), varied color, 65% medium to coarse sand, 35% fine gravel, angular to subangular, gravel is granitic, schistose, gneissic, and phyllitic, gravel as rock fragments.	0.1 ft/min gravel off shaker, mud loss in gravel	
90		**POORLY GRADED SAND WITH GRAVEL (SP)** as above.	0.2 ft/min 1140, high amount of mud loss in gravel zone, mix 800 gallons of water, add 11 bags of bentonite, gravel off shaker, rig chatter	
100				

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP3 SHEET 2 OF 10

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : Intersection of N. Alice Ave. and W. Virginia St.

ELEVATION : 1363.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1239828, W 117.3728793
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 6/23/2009
END : 7/14/2009
LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
110		**POORLY GRADED GRAVEL WITH SAND (GP)** grayish brown (2.5Y 5/2), varied color, 85% fine to coarse gravel, subangular, granitic, schistose, gneissic, phyllitic, 15% medium to coarse sand.	0.1 ft/min rig chatter	
120			0.4 ft/min rig chatter Mud properties at 115': pH: 8, weight: 9.0 lb/gal, viscosity: 36 sec/qt, sand content: 0.25%	
130		**POORLY GRADED GRAVEL WITH SAND (GP)** gray (2.5Y 5/1), as above, abundant rock fragments, greater coarse gravel.	0.3 ft/min rig chatter	
140		**POORLY GRADED SAND WITH GRAVEL (SP)** very dark gray (2.5Y 3/1), 85% medium to coarse sand-sized rock fragments, angular, 15% fine gravel, subangular.	0.1 ft/min	
150			0.2 ft/min	
160		**POORLY GRADED SAND (SP)** dark grayish brown (2.5Y 4/2), 95% medium to coarse sand, angular, 5% fine gravel, gravel likely present at this interval.	0.4 ft/min Mud properties at 150': pH: 8, weight: 9.0 lb/gal, viscosity: 34 sec/qt, sand content: 0.25% 6/29/09, 1650, shutdown for the day 6/30/09, 0645, resume drilling	
170		**POORLY GRADED GRAVEL WITH SAND (GP)** very dark grayish brown (2.5Y 3/2), 80% fine gravel and gravel-sized rock fragments, angular, schistose and granitic, 15% coarse sand, angular, 5% fine to medium sand, micaceous.	0.1 ft/min hard drilling, rig chatter	
180		**POORLY GRADED SAND WITH GRAVEL (SP)** very dark grayish brown (2.5Y 3/2), 70% medium to coarse sand, angular to subangular, 25% fine gravel, angular, 5% fine sand, micaceous.	0.3 ft/min hard drilling, rig chatter	
190		**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM)** light yellowish brown (2.5Y 6/3), 45% fine sand, micaceous, 30% fine gravel, angular, 15% medium to coarse sand, 10% fines mostly silt.	0.2 ft/min	
200		**POORLY GRADED SAND (SP)** varied color, 90% medium to coarse sand, angular, 5% fine gravel, 5% fine sand.	0.1 ft/min	

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP3 SHEET 3 OF 10

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : Intersection of N. Alice Ave. and W. Virginia St.

ELEVATION : 1363.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1239828, W 117.3728793
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 6/23/2009 END : 7/14/2009 LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED SAND (SP) as above, 100% medium to coarse sand, angular, trace fine sand.	0.2 ft/min Mud properties at 200': pH: 8, weight: 9.1 lb/gal, viscosity: 34 sec/qt, sand content: trace	
210		**POORLY GRADED SAND (SP)** as above.	0.1 ft/min	
220		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), as above, 90% medium sand, angular, 10% coarse sand, angular, trace fine sand.	0.2 ft/min	
230		**POORLY GRADED SAND (SP)** as above, 100% medium to coarse sand, angular to subangular.	0.1 ft/min	
240		**POORLY GRADED SAND (SP)** grayish brown (2.5Y 5/2), as above, 90% medium sand, 10% coarse sand.	0.1 ft/min Mud properties at 240': pH: 8, weight: 9.0 lb/gal, viscosity: 35 sec/qt, sand content: 0.25%	
250		**POORLY GRADED SAND (SP)** as above, 100% medium sand, trace coarse sand.	0.1 ft/min 6/30/09, 1700, circulate for the day 7/1/09, 0700, resume drilling	
260		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), 70% medium to coarse sand, subrounded, 15% fine sand, 15% fines, increase in fines downward.	0.1 ft/min	
270		**SILTY SAND (SM)** olive (5Y 5/4), as above, 60% medium to coarse sand, 20% fine sand, 20% fines.	0.2 ft/min	
280		**POORLY GRADED SAND (SP)** pale olive (5Y 6/4), 85% medium to coarse sand, subrounded, 10% fine sand, 5% fines.	0.2 ft/min	
290		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), as above, 100% medium to coarse sand, trace fine sand.	0.2 ft/min	
300				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP3 SHEET 4 OF 10

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : Intersection of N. Alice Ave. and W. Virginia St.

ELEVATION : 1363.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1239828, W 117.3728793
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 6/23/2009 END : 7/14/2009 LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED SAND (SP) light yellowish brown (2.5Y 6/3), as above, 100% medium sand, trace coarse sand, trace fine sand.	0.1 ft/min	
310		**POORLY GRADED SAND (SP)** as above, 95% medium sand, 5% fine sand.	0.2 ft/min Mud properties at 310': pH: 8, weight: 9.2 lb/gal, viscosity: 35 sec/qt, sand content: 0.25%	
320		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min	
330		**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/4), as above, 100% medium to coarse sand, angular to subangular, trace fine sand.	0.3 ft/min	
340		**POORLY GRADED SAND (SP)** as above, 90% medium sand, 10% coarse sand, trace fine sand.	0.2 ft/min	
350		**POORLY GRADED SAND (SP)** as above, 100% medium to coarse sand, trace fine sand.	0.1 ft/min 7/1/09, 1715, circulate to shutdown for the day 7/2/09, 0655, resume drilling Mud properties at 355': pH: 8, weight: 9.2 lb/gal, viscosity: 35 sec/qt, sand content: 0.25%	
360		**SANDY SILT (ML)** light yellowish brown (2.5Y 6/4), 55% fines, 25% medium sand, subangular, 20% fine sand.	0.2 ft/min	
370		**CLAYEY SAND (SC)** light yellowish brown (10YR 6/4), 45% fines, some medium plastic, 35% fine sand, 20% medium sand, trace coarse sand, angular.	0.3 ft/min fines coming off shaker	
380		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 40% fine sand, 30% fines, some medium plastic, 20% medium sand, subrounded, 10% coarse sand, subangular.	coarsening downward 0.2 ft/min fines off shaker	
390		**CLAYEY SAND (SC)** as above, 50% fine sand, 25% medium to coarse sand, subangular, 25% fines.	0.2 ft/min	
400				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP3 SHEET 5 OF 10

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : Intersection of N. Alice Ave. and W. Virginia St.

ELEVATION : 1363.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1239828, W 117.3728793
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 6/23/2009
END : 7/14/2009
LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		SANDY LEAN CLAY (CL) yellowish brown (10YR 5/4), 55% fines, medium plastic, 30% fine sand, 15% medium to coarse sand, subangular to angular.	0.3 ft/min Mud properties at 400': pH: 8, weight: 9.2 lb/gal, viscosity: 34 sec/qt, sand content: 0.5%	
410		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 40% fine sand, 35% fines, medium plastic, 25% medium to coarse sand, subangular.	0.2 ft/min clayey sand off shaker	
420		**CLAYEY SAND (SC)** as above.	0.2 ft/min	
430		**CLAYEY SAND (SC)** as above.	0.1 ft/min Mud properties at 430': pH: 8, weight: 9.1 lb/gal, viscosity: 34 sec/qt, sand content: 0.25%	Bentonite/Sand Seal
440		**CLAYEY SAND (SC)** as above, 40% fine sand, 35% fines, medium plastic, 25% medium to coarse sand, angular.	0.1 ft/min 7/2/09, 1658, circulate for the day	Transition Sand #1/20 sand Filter Pack #3 Sand
450		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 60% medium to coarse sand, subangular, 30% fines, 10% fine sand.	very hard drilling	4" ID Stainless Steel Wire-Wrap Screen
460		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 35% medium sand, 35% fines, 20% coarse sand, subrounded to subangular, 10% fine sand.	0.1 ft/min	Filter Pack #3 Sand
470		**CLAYEY SAND (SC)** as above.	0.1 ft/min	Bentonite/Sand Seal
480		**CLAYEY SAND (SC)** as above, 40% fines, 30% fine sand, 25% medium sand, 5% coarse sand, subrounded to angular.	0.1 ft/min	
490		**CLAYEY SAND (SC)** as above, 50% medium sand, 20% fine sand, 20% fines, 10% coarse sand, subrounded to subangular.	0.1 ft/min	
500				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP3 SHEET 6 OF 10

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : Intersection of N. Alice Ave. and W. Virginia St.

ELEVATION : 1363.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1239828, W 117.3728793
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 6/23/2009 END : 7/14/2009 LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) as above.	0.1 ft/min	
510		**CLAYEY SAND (SC)** as above, 40% fines, 30% medium sand, 25% fine sand, 5% coarse sand, subrounded to subangular.	0.1 ft/min	
520		**CLAYEY SAND (SC)** as above.	7/7/09, 0735	
530		**CLAYEY SAND (SC)** as above, 40% medium sand, 35% fines, 20% fine sand, 5% coarse sand, subrounded to subangular.	0.1 ft/min	
540		**CLAYEY SAND (SC)** as above.	0.1 ft/min	
550		**CLAYEY SAND (SC)** pale olive (5Y 6/4), as above, 70% medium sand, 20% fines, 10% fine sand, subrounded to subangular.	0.1 ft/min	
560		**CLAYEY SAND (SC)** as above.	0.1 ft/min	
570		**SANDY LEAN CLAY (CL)** pale olive (5Y 6/3), 70% fines, medium plastic, 20% fine sand, 10% medium sand, very soft.		
580		**SANDY LEAN CLAY (CL)** as above, 60% fines, 30% fine sand, 10% medium sand, very soft.	0.1 ft/min rig chatter, hard drilling	Transition Sand #1/20 sand Filter Pack #3 Sand
590		**SANDY LEAN CLAY (CL)** as above.	0.1 ft/min rig chatter	4" ID Stainless Steel Wire-Wrap Screen
600				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP3 SHEET 7 OF 10

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : Intersection of N. Alice Ave. and W. Virginia St.

ELEVATION : 1363.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1239828, W 117.3728793
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 6/23/2009
END : 7/14/2009
LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) light yellowish brown (2.5Y 6/3), 40% medium sand, 40% fines, medium plastic, 20% fine sand, subrounded to subangular.	0.1 ft/min	Filter Pack #3 Sand
610			7/9/09, 0730, resume drilling	
		LEAN CLAY WITH SAND (CL) pale olive (5Y 6/3), as above, 80% fines, medium plastic, 20% fine sand, very soft.	0.1 ft/min	Bentonite/Sand Seal
620		**LEAN CLAY WITH SAND (CL)** as above.	0.1 ft/min	
630		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/3), as above, 60% fines, 20% medium sand, 20% fine sand, very soft.	0.1 ft/min	
		LEAN CLAY (CL) light yellowish brown (2.5Y 6/3), 90% fines, medium plastic, 10% fine to coarse sand, trace gravel, soft.		
640		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 40% medium sand, 40% fines, medium plastic 20% fine sand.	7/10/09, 0745, resume drilling 0.2 ft/min	
650		**CLAYEY SAND (SC)** as above.	0.2 ft/min	
660		**CLAYEY SAND (SC)** as above.	0.2 ft/min	
670		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/3), 60% fines, medium plastic, 20% medium sand, 20% fine sand.	0.3 ft/min	Transition Sand #1/20 sand Filter Pack #3 Sand
680		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 40% medium sand, 40% fines, medium plastic, 20% fine sand.	0.2 ft/min	4" ID Stainless Steel Wire-Wrap Screen
690		**WELL GRADED SAND WITH SILT (SW-SM)** light yellowish brown (2.5Y 6/4), 60% medium sand, 20% coarse sand, 10% fine sand, 10% fines.	0.2 ft/min	Filter Pack #3 Sand
700				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP3 SHEET 8 OF 10

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : Intersection of N. Alice Ave. and W. Virginia St.

ELEVATION : 1363.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1239828, W 117.3728793
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 6/23/2009 END : 7/14/2009 LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED SAND (SP) light yellowish brown (2.5Y 6/4), 80% medium sand, 10% coarse sand, 10% fine sand.	0.3 ft/min	Bentonite/Sand Seal
710		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 40% medium sand, 40% fines, medium plastic 10% coarse sand, 10% fine sand.	0.2 ft/min	
720		**CLAYEY SAND (SC)** as above.	0.3 ft/min	
730		**CLAYEY SAND (SC)** as above.	0.2 ft/min	
740		**CLAYEY SAND (SC)** as above, 40% medium sand, 40% fines, 20% fine sand, subrounded to subangular.	0.1 ft/min	
750		**CLAYEY SAND (SC)** as above.	0.2 ft/min	
760		**CLAYEY SAND (SC)** as above.	0.1 ft/min	
770		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 40% fines, 30% medium sand, 30% fine sand, subrounded to subangular.	0.2 ft/min rig chatter around 774'-775'	
780		**CLAYEY SAND (SC)** as above.	0.2 ft/min	
790		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 50% fine sand, 40% fines, 10% medium sand, subrounded.	0.2 ft/min	
800				Transition Sand #1/20

PROJECT NUMBER:	BORING NUMBER:
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Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : Intersection of N. Alice Ave. and W. Virginia St.

ELEVATION : 1363.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1239828, W 117.3728793
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 6/23/2009 END : 7/14/2009 LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) as above, 40% fine sand, 40% fines, 20% medium sand.	0.3 ft/min rig chatter around 806'	sand Filter Pack #3 Sand
810		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 50% medium sand, 30% fines, 20% fine sand, subrounded to subangular.	0.2 ft/min	4" ID Stainless Steel Wire-Wrap Screen
820		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 60% fine sand, 30% fines, 10% medium sand.	0.2 ft/min	Filter Pack #3 Sand
830		**CLAYEY SAND (SC)** as above, 40% medium sand, 30% fines, 20% fine sand, 10% coarse sand, subrounded.	0.2 ft/min 7/13/09, 1710, shutdown for the day	Bentonite/Sand Seal
840		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/4), 60% fines, medium plastic, 25% fine sand, 15% medium sand, subrounded to subangular.	0.1 ft/min rig chatter from 844'-846'	
850		**SANDY LEAN CLAY (CL)** as above.	0.2 ft/min	
860		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 55% fine sand, 40% fines, medium plastic, 5% medium sand.	0.1 ft/min	
870		**CLAYEY SAND (SC)** as above, 40% fines, 30% fine sand, 20% medium sand, 10% coarse sand.	0.2 ft/min	
880		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/4), 60% fines, medium plastic, 25% fine sand, 15% medium sand, very soft.	0.2 ft/min	Transition Sand #1/20 sand Filter Pack #3 Sand
890		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 40% fines, medium plastic, very soft, 20% coarse sand, 20% medium sand, 20% fine sand, subrounded to subangular.	0.1 ft/min	
900				4" ID Stainless Steel

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP3 SHEET 10 OF 10

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : Intersection of N. Alice Ave. and W. Virginia St.

ELEVATION : 1363.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1239828, W 117.3728793
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 6/23/2009
END : 7/14/2009
LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) as above, 40% coarse sand, 20% medium sand, 20% fine sand, 20% fines, subangular.	0.2 ft/min	Wire-Wrap Screen Filter Pack #3 Sand
910		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/4), 60% fines, medium plastic, 30% fine sand, 10% medium sand, very soft.	0.2 ft/min	
920		**SANDY LEAN CLAY (CL)** as above.	0.1 ft/min very hard, rig chatter at 920'	Bottom cap Filter Pack #3 Sand
930		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/4), as above, 60% fines, 20% coarse sand, 20% fine sand, very soft.	0.2 ft/min Boring terminated at 932'	
940				
950				
960				
970				
980				
990				
1000				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-MP4	SHEET 1 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : W. Casmalia St., 830 ft east of Ayala Dr.

ELEVATION : 1458.3 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1375441, W 117.3895372
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 8/3/2009
END : 8/18/2009
LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
0			Air knifed to 4' bgs for subsurface utilities. Bucket auger rig drilled to 25.5' bgs from surface. Installed 16 steel conductor casing to 25' bgs.	Well Vault 4" ID SCH 40 Low-Carbon Steel Blank Casing Cement
10				
20		**SILTY SAND WITH GRAVEL (SM)** pale yellow (2.5Y 7/3), 45% fine to coarse sand, 40% fine to coarse gravel, subangular to subrounded, 15% fines, granitic, phyllitic, and schistose.		
30		**POORLY GRADED SAND (SP)** dark grayish brown (2.5Y 4/2), 90% medium to coarse sand, angular to subangular, 10% fine sand, trace fines, 25/75 felsic/mafic.	7-28-09, 1115, installed conductor to 25' bgs 8-3-09, 1330, begin mud drilling 0.1 ft/min driller indicates gravel and cobbles at current depth, drilling at slow rate	
40		**POORLY GRADED SAND (SP)** as above, 90% medium sand, 10% fine sand.	0.2 ft/min gravel likely	
50		**POORLY GRADED SAND (SP)** as above.	8-3-09, 1730, shutdown for the day, 0.2 ft/min 8-4-09, 0700, resume drilling, coarsening downward 1014, add 4 bags of bentonite to thicken mud and better cleanout hole	
60		**POORLY GRADED GRAVEL (GP)** very dark grayish brown (2.5Y 3/2), 100% fine gravel sized fragments, angular, 80/20 mafic/felsic.	<0.1 ft/min rig chatter, gravel likely rig chatter, gravel and cobbles, few cuttings off shaker	
70		**POORLY GRADED SAND (SP)** dark grayish brown (2.5Y 4/2), 100% medium sand, angular to subangular, trace fine sand, gravel likely, 35/65 felsic/mafic.	0.1 ft/min Mud properties at 70': pH: 7.5, weight: 8.8 lbs/gal, viscosity: 36 sec/qt, sand: 0.25% 1256, add 2 more bags of bentonite with quiktrol to thicken mud to 36 sec/qt to help lift cuttings to clean out hole	
80		**POORLY GRADED SAND (SP)** as above, 85% medium sand, 10% coarse sand, angular, 5% fine gravel, angular.	0.2 ft/min rig chatter	
90		**POORLY GRADED SAND (SP)** as above.	0.3 ft/min rig chatter, gravel	
100				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP4 SHEET 2 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : W. Casmalia St., 830 ft east of Ayala Dr.

ELEVATION : 1458.3 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1375441, W 117.3895372
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 8/3/2009
END : 8/18/2009
LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
110		**POORLY GRADED GRAVEL (GP)** varied color, 90% fine gravel-sized rock fragments, angular, 10% sand, angular, 20/80 felsic/mafic.	0.1 ft/min rig chatter, gravel off shaker	
120		**POORLY GRADED SAND (SP)** dark grayish brown (2.5Y 4/2), 100% medium sand, subangular, trace coarse sand, trace fines, 30/70 felsic/mafic.	0.1 ft/min, rig chatter Mud properties at 110': pH: 8, weight: 9 lbs/gal, viscosity: 35 sec/qt, sand: 0.25% 8-4-09, 1740, shutdown for the day 8-5-09, 0700, resume drilling	
130		**POORLY GRADED SAND (SP)** dark grayish brown (2.5Y 4/2), 90% medium to coarse sand, subangular to angular, 10% fine gravel, subangular, 50/50 felsic/mafic.	0.1 ft/min, fine gravel off shaker add 3 more bags of quickgel bentonite to thicken mud due to hole infilling, cuttings are now being lifted from the borehole fine gravel off shaker	
140		**SILTY SAND WITH GRAVEL (SP)** light olive brown (2.5Y 5/4), 60% fine to coarse sand, subangular to angular, 20% fine gravel-size rock fragments, angular, 20% fines, 40/60 felsic/mafic, granitic and schistose gravel fragments.	0.1 ft/min, loss gravel off shaker more fines in mud	
150		**POORLY GRADED SAND WITH SILT (SP-SM)** light olive brown (2.5Y 5/4), 80% fine to coarse sand, subangular to angular, 10% fine gravel-sized rock fragments, angular, 10% fines, 50/50 felsic/mafic.	0.3 ft/min, fast drilling	
160		**POORLY GRADED SAND WITH SILT (SP-SM)** as above.	0.3 ft/min Mud properties at 150': pH: 9.6, weight: 9.6 lbs/gal, viscosity: 47 sec/qt, sand: 0.25%	
170		**POORLY GRADED SAND (SP)** olive brown (2.5Y 4/3), 95% medium to coarse sand, angular (some possible rock fragments), 5% fine gravel-size rock fragments, angular, 40/60 felsic/mafic.	0.2 ft/min, more coarse sand off shaker, trace gravel	
180		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), 60% medium to coarse sand, angular, 25% fine sand, 15% fines, trace fine gravel-size rock fragments, 60/40 felsic/mafic.	0.1 ft/min	
190		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/4), 95% medium sand, subrounded, 5% fine sand, trace fines, 50/50 felsic/mafic.	0.3 ft/min medium sand off shaker Mud properties at 185': pH: 9.6, weight: 9.6 lbs/gal, viscosity: 47 sec/qt, sand: 0.25%	
200		**POORLY GRADED SAND (SP)** as above.	0.3 ft/min	

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-MP4	SHEET 3 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : W. Casmalia St., 830 ft east of Ayala Dr.

ELEVATION : 1458.3 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1375441, W 117.3895372
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 8/3/2009
END : 8/18/2009
LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED SAND (SP) as above.	0.2 ft/min	
			medium sand off shaker	
210		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min Mud properties at 210': pH: 8, weight: 9.6 lbs/gal, viscosity: 37 sec/qt, sand: 0.2%	
220		**POORLY GRADED SAND (SP)** varied color, 100% medium sand, subrounded, 65/35 felsic/mafic.	0.2 ft/min 8-5-09, 1719, circulate, shutdown for the day 8-6-09, resume drilling	
230		**POORLY GRADED SAND (SP)** varied color, 80% medium sand, 20% coarse sand, angular, 60/40 felsic/mafic.		
240		**POORLY GRADED SAND (SP)** varied color, 60% medium sand, 20% coarse sand, subangular, 20% fine sand.	0.1 ft/min Mud properties at 240': pH: 8, weight: 9.1 lbs/gal, viscosity: 37 sec/qt, sand: 0.25%	
250		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min	
260		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/4), 40% fines, medium plastic, 30% fine sand, 20% coarse sand, subangular, 10% medium sand.	0.2 ft/min	
270			rig chatter	
		POORLY GRADED SAND (SP) varied color, 80% medium sand, angular, 20% fine sand, granitic, 60/40 felsic/mafic.	0.2 ft/min	
280		**SANDY LEAN CLAY (CL)** light olive brown (2.5Y 5/4), 65% fines, medium plastic, 35% fine sand.	0.2 ft/min Mud properties at 280': pH: 8, weight: 9.0 lbs/gal, viscosity: 35 sec/qt, sand: 0.25%	
290		**SANDY LEAN CLAY (CL)** as above, 70% fines, 30% fine sand.	0.2 ft/min	
300				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP4 SHEET 4 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : W. Casmalia St., 830 ft east of Ayala Dr.

ELEVATION : 1458.3 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1375441, W 117.3895372
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 8/3/2009 END : 8/18/2009 LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) light olive brown (2.5Y 5/4), 40% medium sand, 30% fines, medium plastic, 20% fine sand, 10% coarse sand, granitic sand.	0.1 ft/min 8-6-09, 1700, end of drilling	
310		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), 40% medium sand, 30% fines, some silt, micaceous, some medium plastic fines, 20% fine sand, 10% coarse sand, 70/30 felsic/mafic.	0.1 ft/min, few cuttings off shaker, smooth drilling Mud properties at 315': pH: 8, weight: 9.0 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%	
320		**SILTY SAND (SM)** as above.	0.1 ft/min	
330		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), as above, 70/30 felsic/mafic.	0.1 ft/min few cuttings off shaker, smooth drilling	
340		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), appears more red between 10YR and 2.5Y, 35% fine sand, micaceous, 30% fines, medium plastic, some silt, soft, 25% coarse sand, angular, 10% medium sand, subangular, 70/30 felsic/mafic.	0.1 ft/min driller indicates likely clay with current drill rig response Mud properties at 345': pH: 8, weight: 9.1 lbs/gal, viscosity: 37 sec/qt, sand: 0.25%	
350		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above.	0.1 ft/min red clayey material off the shaker 8-7-09, 1630, circulate for the day 8-10-09, 0730, resume drilling abundant clay and fines off shaker	
360		**CLAYEY SAND (SC)** yellowish brown (10YR 5/4), 45% fine sand, 30% fines, medium plastic, some silt, 20% medium sand, subangular, 5% coarse sand, 70/30 felsic/mafic.	0.1 ft/min, clayey sand off shaker	
370		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), 40% fine sand, 30% medium sand, subangular, 30% fines, some silt, trace medium plastic fines, 60/40 felsic/mafic.	0.2 ft/min	Bentonite/Sand Seal
380		**SILTY SAND (SM)** as above.	0.2 ft/min Mud properties at 382': pH: 8, weight: 9.0 lbs/gal, viscosity: 34 sec/qt, sand: 0.25% medium sand off shaker	
390		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), as above, 45% medium sand, subrounded, 35% fine sand, 20% fines, mostly silt, some medium plastic 50/50 felsic/mafic.	0.2 ft/min, medium sand, few cuttings off shaker	Transition Sand #1/20 sand Filter Pack #3 Sand
400				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP4 SHEET 5 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : W. Casmalia St., 830 ft east of Ayala Dr.

ELEVATION : 1458.3 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1375441, W 117.3895372
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 8/3/2009
END : 8/18/2009
LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		SILTY SAND (SM) light yellowish brown (2.5Y 6/4), as above.	0.1 ft/min, medium sand, few cuttings off shaker	
410		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 40% medium sand, subrounded, 35% fine sand, 25% fines, medium plastic, some silt 50/50 felsic/mafic.	0.1 ft/min, clayey sand off shaker, smooth drilling	4" ID Stainless Steel Wire-Wrap Screen
420		**CLAYEY SAND (SC)** as above, 40% fine sand, 25% fines, medium plastic, some silt, 20% coarse sand, subangular, 15% medium sand, subrounded.	0.4 ft/min	Filter Pack #3 Sand Bentonite/Sand Seal
430		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 40% fine sand, 30% fines, medium plastic, some silt, 20% medium sand, subangular, 10% coarse sand, subangular.	0.4 ft/min	
440		**CLAYEY SAND (SC)** as above.	0.3 ft/min Mud properties at 445': pH: 8, weight: 9.0 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%	
450		**CLAYEY SAND (SC)** as above.	0.1 ft/min 8-10-09, 1730, circulate to stop for the day 8-11-09, 0730, resume drilling clayey medium to coarse sand off shaker, smooth drilling	
460		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 50% fine sand, 25% fines, medium plastic, some silt, 15% medium sand, subangular, 10% coarse sand, subangular 40/60 felsic/mafic.	0.1 ft/min	
470		**CLAYEY SAND (SC)** as above, 40% fine sand, 30% medium sand, subangular, 25% fines, medium plastic, trace silt, 5% coarse sand, subangular.	0.2 ft/min	
480		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), 40% fine sand, some micaceous, 25% medium sand, subangular, 25% fines, mostly silt, trace medium plastic, 10% coarse sand, subangular 60/40 felsic/mafic.	0.1 ft/min Mud properties at 480': pH: 7.5, weight: 9.2 lbs/gal, viscosity: 34 sec/qt, sand: 0.25% medium to coarse sand off shaker	
490		**SILTY SAND (SM)** as above, 35% fine sand, 25% fines, silt, and medium plastic fines, 20% coarse sand, subangular, 20% medium sand, subangular 75/25 felsic/mafic.	0.1 ft/min medium to coarse sand off shaker, some clayey material	Transition Sand #1/20 sand Filter Pack #3 Sand
500				

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP4 SHEET 6 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : W. Casmalia St., 830 ft east of Ayala Dr.

ELEVATION : 1458.3 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1375441, W 117.3895372
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 8/3/2009
END : 8/18/2009
LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
510		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), as above, 40% fine sand, 35% medium sand, subangular, 25% fines, as silt, and some medium plastic fines 75/25 felsic/mafic.	<0.1 ft/min	4" ID Stainless Steel Wire-Wrap Screen
		SILTY SAND (SM) as above, trace coarse sand.	0.3 ft/min clayey sand off shaker	Filter Pack #3 Sand
520		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 40% fine sand, 35% medium sand, subangular, 25% fines, some medium plastic, some silt, trace coarse sand 70/30 felsic/mafic.	0.2 ft/min Mud properties at 520': pH: 8, weight: 9.1 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%	Bentonite/Sand Seal
530		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/4), as above, 50% fine sand, micaceous, 35% fines, medium plastic, some silt, 10% medium sand, subangular, 5% coarse sand, subangular 70/30 felsic/mafic.	8-11-09, 1720, circulate for the day 8-12-09, 0730, resume drilling 0.1 ft/min	
540		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), 40% fine sand, micaceous, 35% medium sand, subrounded, 25% fines, mostly silt, some medium plastic 80/20 felsic/mafic.	0.2 ft/min Mud properties at 540': pH: 8, weight: 9.2 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%	
550		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), a little darker in between (10YR and 2.5Y), 50% fine sand, 30% fines, medium plastic, some silt, 10% coarse sand, subangular, 10% medium sand, subangular.	0.1 ft/min	
560		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above.	0.1 ft/min	
570		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above.	0.1 ft/min clayey sand off shaker	Transition Sand #1/20 sand Filter Pack #3 Sand
580		**CLAYEY SAND (SC)** as above.	0.2 ft/min	4" ID Stainless Steel Wire-Wrap Screen
590		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 50% fine sand, 30% fines, medium plastic, some silt, 10% coarse sand, subangular, 10% medium sand, subangular, 80/20 felsic/mafic.	Mud properties at 588': pH: 8, weight: 9.2 lbs/gal, viscosity: 34 sec/qt, sand: 0.25% 0.1 ft/min, rig chatter	Filter Pack #3 Sand Bentonite/Sand Seal Slough and swelling
600				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP4 SHEET 7 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : W. Casmalia St., 830 ft east of Ayala Dr.

ELEVATION : 1458.3 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1375441, W 117.3895372
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 8/3/2009 END : 8/18/2009 LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) light yellowish brown (2.5Y 6/3), as above, 50% fine sand, 30% fines, medium plastic, some silt, 10% coarse sand, subangular, 10% medium sand, subangular 80/20 felsic/mafic.	0.2 ft/min 8-12-09, 1715, circulate to shutdown for the day 8-13-09, 0720, resume drilling	clays
610		**SANDY LEAN CLAY (CL)** light brownish gray (2.5Y 6/2), 70% fines, medium plastic, 30% fine sand, very soft.	0.1 ft/min	
620		**SANDY LEAN CLAY (CL)** as above.	0.2 ft/min Mud properties at 620': pH: 8, weight: 9 lbs/gal, viscosity: 34 sec/qt, sand: 0.25% 1218, change out bit 1520, resume drilling	
630		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/3), as above, 60% fines, 40% fine sand, very soft.	0.1 ft/min 1713, stop drilling for the day, Mud properties at 630': pH: 8, weight: 9 lbs/gal, viscosity: 34 sec/qt, sand: 0.25% 8-14-09, 0730, resume drilling	Filter Pack #3 Sand 4" ID Stainless Steel Wire-Wrap Screen
640		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), 40% fine sand, 30% medium sand, subangular, 30% fines, as silt, some medium plastic, trace coarse sand.	<0.1 ft/min, rig chatter Mud properties at 644': pH: 8, weight: 9.1 lbs/gal, viscosity: 35 sec/qt, sand: 0.25%	
650		**SILTY SAND (SM)** as above, some medium plastic fines.	<0.1 ft/min	Filter Pack #3 Sand
660		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 40% fine sand, 30% fines, medium plastic, some silt, 20% medium sand, subangular, 10% coarse sand, subangular.	0.1 ft/min	Bentonite/Sand Seal
670		**CLAYEY SAND (SC)** as above, 45% fine sand, 35% fines, medium plastic, some silt, 20% medium sand, subangular, trace coarse sand.	0.2 ft/min	
680		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), as above.	0.1 ft/min abundant fines coming off shaker	
690		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 45% fine sand, 45% fines, medium plastic, 10% medium sand.	0.2 ft/min Mud properties at 694': pH: 8, weight: 9.2 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%	
700				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP4 SHEET 8 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : W. Casmalia St., 830 ft east of Ayala Dr.

ELEVATION : 1458.3 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1375441, W 117.3895372
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 8/3/2009 END : 8/18/2009 LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) as above, 45% fine sand, 40% fines, medium plastic, 10% medium sand, 5% coarse sand, subangular.	0.2 ft/min 8-14-09, 1712, circulate to shutdown for the day 8-17-09, 0730, clear out hole due to swelling clays from 500'-700', add 3 bags of quiktrol to control swelling clay Mud properties at 705': pH: 8, weight: 9.1 lbs/gal, viscosity: 34 sec/qt, sand: 0.25% 1015, resume drilling at 700' bgs 0.1 ft/min	
710		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 40% fine sand, 25% medium sand, subrounded, 25% fines, medium plastic, 10% coarse sand, subangular.		
720		**SANDY LEAN CLAY INTERBEDDED WITH CLAYEY SAND (CL)** light yellowish brown (2.5Y 6/3), CL: 55% fines, medium plastic, 35% fine sand, 10% medium sand, subangular SC: 45% fine sand, 40% fines, medium plastic, 15% medium sand, subangular.	0.2 ft/min sand off shaker	
730		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 40% fine sand, 30% fines, medium plastic, 15% coarse sand, subangular to angular, 15% medium sand, subangular.	0.2 ft/min, clayey sand off shaker	
740		**CLAYEY SAND (SC)** as above, 50% fine sand, 25% medium sand, subangular, 25% fines, medium plastic.	0.2 ft/min	Transition Sand #1/20 sand Filter Pack #3 Sand
750		**CLAYEY SAND (SC)** as above, trace coarse sand.	0.2 ft/min rig chatter 8-17-09, 1710, circulate to shutdown for the day Mud properties at 755': pH: 8, weight: 9.2 lbs/gal, viscosity: 35 sec/qt, sand: 0.25%	4" ID Stainless Steel Wire-Wrap Screen
760		**CLAYEY SAND (SC)** as above, no coarse sand.	8-18-09, 0730, resume drilling rig chatter 0.1 ft/min, clayey sand off shaker	Filter Pack #3 Sand
770		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/3), 55% fines, medium plastic, and some silt, 30% fine sand, 15% medium sand, subrounded, 1/4 fragments of fine-grained material, some silt in sample.	0.1 ft/min, sandy fines off shaker rig chatter, clayey sand off shaker Mud properties at 775': pH: 8, weight: 9.1 lbs/gal, viscosity: 38 sec/qt, sand: 0.25%	
780		**SANDY LEAN CLAY (CL)** as above.	0.2 ft/min	Bentonite/Sand Seal Bottom cap
790		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/3), 40% fine sand, 35% medium sand, subrounded, 25% fines, mostly silt, some medium plastic fines.	0.1 ft/min, starting to thin back drilling mud	
800				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP4 SHEET 9 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : W. Casmalia St., 830 ft east of Ayala Dr.

ELEVATION : 1458.3 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1375441, W 117.3895372
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 8/3/2009 END : 8/18/2009 LOGGER : M Mayry/M. Oviedo

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
810		**SILTY SAND (SM)** as above.	0.2 ft/min	
		SILTY SAND (SM) light yellowish brown (2.5Y 6/4), 40% fine sand, micaceous, 35% medium sand, subrounded, 25% fines, silt, some medium plastic, 90/10 felsic/mafic.	0.1 ft/min, sand off shaker	
820		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 40% fine sand, micaceous, 30% medium sand, subangular to subrounded, 30% fines, medium plastic and silt, 80/20 felsic/mafic.	Mud properties at 815': pH: 8, weight: 9.2 lbs/gal, viscosity: 34 sec/qt, sand: 0.25% 0.2 ft/min 1617, begin circulating Boring terminated at 820'	Slough
830				
840				
850				
860				
870				
880				
890				
900				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP5 SHEET 1 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Cactus Ave, 150 ft north of W. Ramona Dr.

ELEVATION : 1285.0 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.108656, W 117.3835743
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 9/3/2009 END : 9/23/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
10			8-31-09, 1000, Air knifed to 8' bgs for subsurface utility clearance. Bucket auger rig drilled to 25.5' bgs from surface.	Well Vault 4" ID SCH 40 Low-Carbon Steel Blank Casing Cement
20		**POORLY GRADED SAND WITH GRAVEL (SP)** yellowish brown (10YR 5/4), 50% fine sand, 20% fine to coarse gravel, rounded, 15% coarse sand, subrounded, 15% medium sand, subangular, trace fines, 70/30 felsic/mafic.	9-3-09, Installed 16" steel conductor casing to 25' bgs.	
30		**POORLY GRADED SAND (SP)** dark brown (10YR 3/3), 100% fine to medium sand, trace coarse sand, trace fines, 40/60 felsic/mafic.	9-9-09, 1000, advance drilling with mud rotary rig chatter, slow drilling through gravel	
40		**POORLY GRADED SAND (SP)** as above.	0.1 ft/min rig chatter	
50		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min hard drilling to clear out hole, add 6 bags of quikgel to drilling mix abundant fine gravel off shaker	
60		**POORLY GRADED GRAVEL WITH SAND (GP)** very dark grayish brown (2.5Y 3/2), 70% fine gravel sized rock fragments, angular, granitic, phyllitic, gneissic, 30% fine to coarse sand, angular, 40/60 felsic/mafic.	0.2 ft/min rig chatter 9-9-09, 1715, circulate mud to shutdown for the day to change bit	
70		**POORLY GRADED SAND (SP)** dark olive brown (2.5Y 3/3), 70% coarse sand sized rock fragments, angular (probably fine gravel broken up by bit), 30% fine to medium sand, angular to subangular, 40/60 felsic/mafic.	9-10-09, resume drilling <0.1 ft/min, fine gravel off shaker, add coarser screen to shaker to reduce excess liquids in cuttings	
80		**POORLY GRADED GRAVEL WITH SAND (GP)** very dark grayish brown (2.5Y 3/2), 70% fine gravel, granitic, gneissic, angular, 30% medium to coarse sand, subangular, trace fine sand, 60/40 felsic/mafic.	more sand and less fine gravel off shaker	
90		**POORLY GRADED SAND WITH GRAVEL (SP)** very dark grayish brown (2.5Y 3/2), 85% medium to coarse sand, subangular to angular, 15% fine gravel, angular, 60/40 felsic/mafic.	0.2 ft/min driller indicates smooth drilling, some clay cuttings off shaker	
100				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP5 SHEET 2 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Cactus Ave, 150 ft north of W. Ramona Dr.

ELEVATION : 1285.0 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.108656, W 117.3835743
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 9/3/2009 END : 9/23/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED GRAVEL WITH SAND (GP) very dark grayish brown (2.5Y 3/2), 85% fine gravel sized rock fragments, angular, granitic, schistose, phyllitic, 15% fine to coarse sand, subangular, trace silt, micaceous, 40/60 felsic/mafic.	Mud properties at 100': pH: 8, weight: 9.8 lbs/gal, viscosity: 40 sec/qt, sand: 0.25%, water loss: 8cc fine gravel off shaker	
110		**POORLY GRADED GRAVEL WITH SAND (GP)** as above, 55% fine gravel, 45% fine to coarse sand, subangular, trace silt, micaceous.	0.2 ft/min fine gravel off shaker, rig chatter	
120		**POORLY GRADED SAND WITH GRAVEL (SP)** very dark grayish brown (2.5Y 3/2), 85% medium to coarse sand sized rock fragments, angular, 15% fine gravel sized rock fragments, angular, 70/30 felsic/mafic.	0.2 ft/min, rig chatter, coarse sand off shaker	
130		**POORLY GRADED GRAVEL WITH SAND (GP)** very dark grayish brown (2.5Y 3/2), 70% fine gravel sized rock fragments, angular, granitic, phyllitic, gneissic, 30% medium to coarse sand sized rock fragments, angular, 35/65 felsic/mafic.	0.2 ft/min rig chatter	
140		**POORLY GRADED GRAVEL WITH SAND (GP)** dark grayish brown (2.5Y 4/2), as above, 40/60 felsic/mafic.	0.3 ft/min rig chatter, gravel off shaker	
150		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/4), 50% coarse sand, angular, 30% medium sand, angular, 20% fine sand, micaceous, trace silt, 60/40 felsic/mafic.	9-10-09, 1711, circulate to shutdown for the day 9-11-09, 0715, resume drilling 0.2 ft/min, rig chatter	
160		**POORLY GRADED SAND (SP)** dark olive brown (2.5Y 3/3), as above, 80% coarse sand, 20% medium sand, trace fine sand, trace silt, 65/35 felsic/mafic.	0.2 ft/min, coarse sand off shaker	
170		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min, rig chatter, coarse sand off shaker	
180		**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), 85% medium to coarse sand, angular, 10% fine sand, 5% fines as silt, 65/35 felsic/mafic.	0.2 ft/min	
190		**POORLY GRADED SAND (SP)** as above, 95% medium to coarse sand, angular, 5% fine sand, micaceous, trace fines as silt, 75/25 felsic/mafic.	0.2 ft/min, medium to coarse sand off shaker	
200				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
385219.FI.01	EPA-MP5	SHEET 3 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Cactus Ave, 150 ft north of W. Ramona Dr.

ELEVATION : 1285.0 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.108656, W 117.3835743
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 9/3/2009
END : 9/23/2009
LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED SAND (SP) as above.	0.2 ft/min	
210		**POORLY GRADED SAND (SP)** as above, 95% medium sand, subangular, 5% fine sand, trace coarse sand.	0.2 ft/min, medium sand off shaker	
220		**POORLY GRADED SAND (SP)** as above.	0.3 ft/min, medium sand off shaker	
230		**POORLY GRADED SAND (SP)** as above.	0.3 ft/min	
240		**POORLY GRADED SAND (SP)** as above, 80% medium sand, angular, 15% coarse sand, angular, 5% fine sand, 75/25 felsic/mafic.	0.3 ft/min, medium sand off shaker, some coarse sand	
250		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min 9-11-09, 1638, circulate to shutdown for the day 9-14-09, 0730, resume drilling fine to medium sand off shaker	
260		**SILTY SAND (SM)** light olive brown (2.5Y 5/3), 45% medium sand, angular, 40% fine sand, micaceous, 15% fines as silt, trace coarse sand, angular.	0.2 ft/min, fine to medium sand off shaker	
270		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), as above, 40% fine sand, 30% medium sand, subangular, 20% fines, 10% coarse sand, subangular, 80/20 felsic/mafic.	0.3 ft/min, red colored fines off shaker, smooth, fast drilling	
280		**CLAYEY SAND (SC)** dark yellowish brown (10YR 4/6), 60% fine sand, 20% medium to coarse sand, angular, 20% fines, clay, medium plastic, and silt, 90/10 felsic/mafic.	0.2 ft/min, red fines off shaker	
290		**CLAYEY SAND (SC)** yellowish brown (10YR 5/4), as above, 50% fine sand, 40% fines, 10% medium to coarse sand, angular.	0.3 ft/min, clayey sand off shaker	
300				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP5 SHEET 4 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Cactus Ave, 150 ft north of W. Ramona Dr.

ELEVATION : 1285.0 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.108656, W 117.3835743
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 9/3/2009 END : 9/23/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) light olive brown (2.5Y 5/4), 70% fine sand, 15% medium to coarse sand, subangular, 15% fines, medium plastic, some silt.	0.1 ft/min, clayey sand off shaker Mud properties at 300': pH: 8, weight: 10.2 lbs/gal, viscosity: 39 sec/qt, sand: 0.5%, water loss: 9 cc	
310		**CLAYEY SAND (SC)** as above.	0.1 ft/min, silty sand off shaker	
320		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), 80% fine sand, 15% fines, some clay, 5% medium to coarse sand, angular.	0.2 ft/min	Bentonite/Sand Seal
330		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), as above, 75% fine sand, 15% fines, silt, some medium plastic, 10% medium to coarse sand, angular.	0.2 ft/min	
340		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/3), 80% fine sand, 15% fines, medium plastic, some as silt, some clay, 5% medium to coarse sand, angular.	9-14-09, 1658, circulate to shutdown for the day 9-15-09, 0820, resume drilling at 338' bgs 0.1 ft/min	Transition Sand #1/20 sand Filter Pack #3 Sand
350		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/3), as above.	0.1 ft/min, clayey sand off shaker Mud properties at 350': pH: 8, weight: 10.2 lbs/gal, viscosity: 39 sec/qt, sand: 0.5%, water loss: 9 cc	4" ID Stainless Steel Wire-Wrap Screen
360		**SILTY SAND (SM)** light olive brown (2.5Y 5/3), 50% fine sand, micaceous, 35% medium sand, subangular, 15% fines as silt, 75/25 felsic/mafic.	0.1 ft/min, medium sand off shaker	Filter Pack #3 Sand
370		**POORLY GRADED SAND WITH SILT (SP-SM)** light olive brown (2.5Y 5/3), 50% medium sand, subangular, 40% fine sand, micaceous, 10% fines, 90/10 felsic/mafic.	medium to coarse sand off shaker, hard drilling, dense sediment 0.1 ft/min, medium sand off shaker	Bentonite/Sand Seal
380		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/3), 75% medium sand, subangular, 20% fine sand, micaceous, 5% fines.	0.1 ft/min	
390		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), 95% medium sand, subangular, 5% fine sand, trace fines.	0.3 ft/min, medium sand and trace coarse sand off shaker	Transition Sand #1/20 sand Filter Pack #3 Sand
400				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP5 SHEET 5 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Cactus Ave, 150 ft north of W. Ramona Dr.

ELEVATION : 1285.0 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.108656, W 117.3835743
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 9/3/2009 END : 9/23/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED SAND (SP) as above.	0.3 ft/min Mud properties at 400': pH: 8, weight: 9.8 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%, water loss: 9cc 9-15-09, 1726, circulate to shutdown for the day 9-16-09, 0725, resume drilling 0.1 ft/min, medium sand	
410		**POORLY GRADED SAND (SP)** as above.		4" ID Stainless Steel Wire-Wrap Screen
420		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min, medium sand off shaker	Filter Pack #3 Sand
430		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min, medium sand off shaker	Bentonite/Sand Seal
440		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min, medium sand off shaker driller indicates silt in drilling mud	
450		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), as above.	0.2 ft/min, medium sand off shaker Mud properties at 450': pH: 8, weight: 10.1 lbs/gal, viscosity: 35 sec/qt, sand: 0.75%, water loss: 9cc	
460		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min, medium sand off shaker	
470		**POORLY GRADED SAND (SP)** as above.	0.3 ft/min	
480		**POORLY GRADED SAND (SP)** as above.	0.3 ft/min 0.3 ft/min, medium sand off shaker	
490		**POORLY GRADED SAND (SP)** as above.	0.4 ft/min, medium sand off shaker	Transition Sand #1/20 sand Filter Pack #3 Sand
500				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP5 SHEET 6 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Cactus Ave, 150 ft north of W. Ramona Dr.

ELEVATION : 1285.0 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.108656, W 117.3835743
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 9/3/2009 END : 9/23/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
510		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min, medium sand off shaker Mud properties at 500': pH: 8, weight: 10.2 lbs/gal, viscosity: 34 sec/qt, sand: 0.75%, water loss: 9cc 9-16-09, 1656, circulate to shutdown for the day 9-17-09, 0735, resume drilling 0.2 ft/min, smooth drilling, driller indicates drilling through fines	4" ID Stainless Steel Wire-Wrap Screen Filter Pack #3 Sand
520		**POORLY GRADED SAND WITH SILT (SP-SM)** light yellowish brown (2.5Y 6/4), 70% medium sand, subangular, 20% fine sand, micaceous, 10% fines.		
530		**POORLY GRADED SAND WITH SILT (SP-SM)** light yellowish brown (2.5Y 6/3), as above, 60% medium sand, subangular, 30% fine sand, 10% fines.	0.2 ft/min, medium sand off shaker	Bentonite/Sand Seal
540		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), 80% medium sand, subangular, 15% fine sand, 5% fines.	0.2 ft/min, medium sand off shaker	
550		**SILTY SAND (CL)** light yellowish brown (2.5Y 6/4), 70% medium to coarse sand, subangular, 20% fines as clay balls in sample, 10% fine sand, 70/30 felsic/mafic.	0.2 ft/min, clay balls in sample	
560		**SILTY SAND (SM)** light olive brown (2.5Y 5/3), 35% medium sand, subangular, 35% fines, silt, micaceous, 30% fine sand, micaceous, 80/20 felsic/mafic, possibly interbedded SILT (ML).	few cuttings off shaker, very hard drilling, driller indicates cemented sediment 0.1 ft/min, poor sample recovery, abundant silt in drilling mud Mud properties at 550': pH:8, weight: 10.4 lbs/gal, viscosity: 34 sec/qt, sand: 0.75%, water loss: 9cc pump off mud and add 5 bags of quikgel to mix new batches of mud 0.3 ft/min, clayey sand off shaker	
570		**SILTY SAND (SM)** light yellowish brown (10YR 6/4), as above, with some interbedded LEAN CLAY (CL).		
580		**POORLY GRADED SAND WITH SILT (SP-SM)** light olive brown (2.5Y 5/4), 70% medium sand, subangular, 20% fine sand, 10% fines as silt, 85/15 felsic/mafic.	0.3 ft/min	
590		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), 85% medium sand, 15% fine sand, trace fines, 85/15 felsic/mafic.	0.2 ft/min, medium sand off shaker	
600		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min, medium sand off shaker	

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP5 SHEET 7 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Cactus Ave, 150 ft north of W. Ramona Dr.

ELEVATION : 1285.0 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.108656, W 117.3835743
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA
START : 9/3/2009
END : 9/23/2009
LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
610		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), 50% medium sand, subangular, 30% fine sand, 20% fines as silt, 85/25 felsic/mafic.	0.2 ft/min Mud properties at 600': pH: 8, weight: 10.4 lbs/gal, viscosity: 35 sec/qt, sand: 0.5%, water loss: 9cc 9-17-09, 1700, circulate to shutdown for the day 9-18-09, 0740, resume drilling	
620		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/4), more red than 2.5Y, 70% medium sand, subangular, 15% fine sand, 15% fines, medium plastic, some silt, 85/25 felsic/mafic.	0.1 ft/min, clayey sand to silty sand off shaker	Transition Sand #1/20 sand Filter Pack #3 Sand
630		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/3), 55% medium sand, subangular, 25% fines, medium plastic, some silt, 20% fine sand.	0.1 ft/min, clayey sand to silty sand off shaker rig problems resume drilling	4" ID Stainless Steel Wire-Wrap Screen
640		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 50% medium sand, subangular, 40% fines, medium plastic, some silt, 10% fine sand.	0.1 ft/min, clayey sand off shaker	Filter Pack #3 Sand
650		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/3), 40% fine sand, 35% fines as silt, 25% medium sand, subangular, 65/35 felsic/mafic.	0.1 ft/min	Bentonite/Sand Seal
660		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), 40% fine sand, 35% fines, medium plastic, some silt, 25% medium sand, subangular, 70/30 felsic/mafic.	0.3 ft/min Mud properties at 650': pH: 8, weight: 10.5 lbs/gal, viscosity: 35 sec/qt, sand: 0.25%, water loss: 8cc	
670		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/3), 40% medium sand, subangular, 40% fine sand, 15% coarse sand, subangular, 5% fines, 80/20 felsic/mafic.	0.1 ft/min, medium sand off shaker 9-18-09, 1700, circulate to shutdown for the day 9-21-09, 0900, resume drilling	
680		**POORLY GRADED SAND (SP)** as above, 65% medium sand, subangular, 30% fine sand, 5% fines, trace coarse sand, 80/20 felsic/mafic.	0.1 ft/min	
690		**POORLY GRADED SAND (SP)** as above, 50% medium sand, subangular, 45% fine sand, 5% fines, trace coarse sand, 75/25 felsic/mafic.	0.1 ft/min, fines in sample, medium sand off shaker	
700		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/3), 45% fine sand, 35% fines as silt, some medium plastic, 20% medium sand, subrounded, 80/20 felsic/mafic.	0.1 ft/min, medium sand and fines off shaker	

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP5 SHEET 8 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Cactus Ave, 150 ft north of W. Ramona Dr.

ELEVATION : 1285.0 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.108656, W 117.3835743
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 9/3/2009 END : 9/23/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		SILTY SAND (SM) as above.	0.1 ft/min Mud properties at 700': pH: 8, weight: 10.2 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%, water loss: 14 cc	
710		**SILTY SAND (SM)** as above.	0.2 ft/min, fine sand off shaker 9-21-09, 1700, circulate for the day 9-22-09, 0740, resume drilling	
720		**SILTY SAND (SM)** as above.	0.1 ft/min, hard drilling	Transition Sand #1/20 sand Filter Pack #3 Sand
730		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/3), 50% fine sand, 25% medium sand, 25% fines.	0.1 ft/min	
740		**SILTY SAND (SM)** as above.	0.1 ft/min	4" ID Stainless Steel Wire-Wrap Screen Filter Pack #3 Sand
750		**SANDY SILT (ML)** light yellowish brown (2.5Y 6/3), 60% fines, 20% medium sand, 20% fine sand.	0.1 ft/min Mud properties at 750': pH: 8, weight: 10.2 lbs/gal, viscosity: 35 sec/qt, sand: 0.5%, water loss: 12 cc	
760		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/3), 60% fines, 20% medium sand, 20% fine sand, medium plasticity.	0.3 ft/min	
770		**SANDY LEAN CLAY (CL)** as above.	0.1 ft/min	Bentonite/Sand Seal Bottom cap
780		**SANDY LEAN CLAY (CL)** as above.	0.1 ft/min 9-22-09, 1615, circulate for the day 9-23-09, 0730, resume drilling	
790		**SANDY LEAN CLAY (CL)** light yellowish brown (2.5Y 6/4), 55% fines, medium plastic, some silt, 35% fine sand, 10% medium sand, subangular.	0.2 ft/min	
800			red clay off shaker	

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP5 SHEET 9 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : N. Cactus Ave, 150 ft north of W. Ramona Dr.

ELEVATION : 1285.0 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.108656, W 117.3835743
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 9/3/2009 END : 9/23/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
810		**SANDY LEAN CLAY (CL)** yellowish brown (10YR 5/4), as above, some silt, possible interbedded silt (ML).	0.2 ft/min Mud properties at 800': pH: 8, weight: 10.2 lbs/gal, viscosity: 35 sec/qt, sand: 0.25%, water loss: 13cc	
820		**CLAYEY SAND (SC)** light yellowish brown (10YR 6/4), 45% fine sand, 30% fines, medium plastic, some silt, and cuttings of clayey silt, 25% medium sand, subangular, trace coarse sand, 85/15 felsic/mafic.	0.2 ft/min, clay and sand off shaker	
830		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above.	0.1 ft/min, clayey sand off shaker	
840		**CLAYEY SAND (SC)** light yellowish brown (2.5Y 6/4), as above, 45% fine sand, 30% fines, medium plastic, some silt, 25% medium sand, subangular, trace coarse sand, 85/15 felsic/mafic.	0.3 ft/min 9-23-09, 1225, circulate to prepare for geophysical survey Boring terminated at 831'	
850				
860				
870				
880				
890				
900				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP6 SHEET 1 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : E. Etiwanda Ave, 290 ft east of N. Acacia Ave

ELEVATION : 1273.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1139989, W 117.3605954
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 10/1/2009 END : 10/28/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
			10-1-09, air knifed to 10' bgs for subsurface utility clearance. Bucket auger rig drilled to 25.5' bgs from surface.	Well Vault 4" ID SCH 40 Low-Carbon Steel Blank Casing Cement
10		**SILTY SAND (SM)** yellowish brown (10YR 5/4), 70% fine sand, 15% fines, 10% medium to coarse sand, 5% fine gravel, angular.	10-1-09, 1130, drill from 10' to 28' bgs with 24" bit with bucket auger rig.	
20		**SILTY SAND (SM)** as above.		
			10-1-09, 1330, set 16" steel conductor casing from 0' to 25' bgs.	
30		**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), 40% medium sand, angular, 35% coarse sand sized rock fragments, angular, 25% fine sand, 35/65 felsic/mafic.	10-6-09, 1030, begin drilling direct mud rotary. medium to coarse sand off shaker	
40		**POORLY GRADED GRAVEL WITH SAND (GP)** dark yellowish brown (10YR 4/4), 55% fine gravel (from shaker), angular, 30% medium to coarse sand sized rock fragments, angular, 15% fine sand, 35/65 felsic/mafic.	0.3 ft/min Mixed a total of 12 bags of bentonite. Abundant fine gravel off shaker	
50		**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), 45% medium sand, angular, 35% coarse sand, angular, 20% fine sand, 35/65 felsic/mafic.	0.2 ft/min, Mud properties: pH:8, weight: 9.1 lbs/gal, viscosity: 36 sec/qt, sand: 0.25%	
60		**POORLY GRADED SAND WITH GRAVEL (SP)** light olive brown (2.5Y 5/3), 30% coarse sand sized rock fragments, angular, 30% medium sand, subangular, 20% fine gravel sized rock fragments, angular, 20% fine sand, granitic, schistose, phyllitic, 40/60 felsic/mafic.	0.3 ft/min, medium to coarse sand off shaker	
70		**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), 65% medium sand, subrounded to subangular, 30% fine sand, 5% coarse sand, angular, 50/50 felsic/mafic.	0.3 ft/min, fine to coarse sand, abundant fine sand add 4 bags of bentonite, some fine gravel off shaker	
80		**POORLY GRADED SAND WITH GRAVEL (SP)** dark brown (10YR 3/3), 65% medium to coarse sand, angular, 20% fine sand, 15% fine gravel sized rock fragments, angular, granitic, phyllitic, 35/65 felsic/mafic.	0.3 ft/min, fine to coarse sand off shaker	
90		**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), 40% coarse sand, subrounded to subangular, 30% medium sand, subangular, 25% fine sand, 5% fine gravel, angular, 60/40 felsic/mafic.	0.3 ft/min, fine to coarse sand off shaker rig chatter, likely gravel	
100				

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP6 SHEET 2 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : E. Etiwanda Ave, 290 ft east of N. Acacia Ave

ELEVATION : 1273.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1139989, W 117.3605954
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 10/1/2009 END : 10/28/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
110		**POORLY GRADED GRAVEL WITH SAND (GP)** yellowish brown (10YR 5/4), 85% fine gravel sized rock fragments, angular, granitic, phyllitic, gneissic, 15% fine to coarse sand, 35/65 felsic/mafic.	0.3 ft/min, fine to coarse sand off shaker, add 1 bag of drilling mix, fine gravel off shaker, 10-6-09, 1635, circulate for the day 10-7-09, 0800, resume drilling. Mud properties: pH: 8, weight: 9 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%	
120		**WELL GRADED SAND (SW)** yellowish brown (10YR 5/4), 60% coarse sand, 20% medium sand, 20% fine sand.	fine to coarse sand off shaker	
130		**WELL GRADED SAND (SW)** as above.	0.3 ft/min, add 1 bag of bentonite	
140		**WELL GRADED SAND WITH GRAVEL (SW)** 50% coarse sand, 20% fine gravel, subangular, 15% medium sand, 15% fine sand.	coarse sand off shaker	
150		**POORLY GRADED SAND (SP)** yellowish brown (10YR 5/4), 60% coarse sand, 30% medium sand, 10% fine sand.	0.3 ft/min	
160		**WELL GRADED SAND WITH GRAVEL (SW)** yellowish brown (10YR 5/4), 50% coarse sand, 25% fine gravel, 15% medium sand, 10% fine sand.	0.2 ft/min, circulate mud for 20 minutes. Mud properties: pH:8, weight: 9.2 lbs/gal, viscosity: 33 sec/qt, sand: 0.25%	
170		**WELL GRADED SAND WITH GRAVEL (SW)** yellowish brown (10YR 5/4), 40% coarse sand, 20% fine gravel, 20% medium sand, 20% fine sand.	0.2 ft/min	
180		**WELL GRADED SAND WITH GRAVEL (SW)** as above.	0.3 ft/min	
190		**WELL GRADED SAND WITH GRAVEL (SW)** as above.	0.1 ft/min, add 2 bags of drilling mix 10-7-09, 1630, circulate for the day 10-8-09, 0800, resume drilling	
200		**SILTY SAND (SM)** yellowish brown (10YR 5/4), 30% coarse sand, 30% fines, 20% medium sand, 20% fine sand.	0.2 ft/min	

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP6 SHEET 3 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : E. Etiwanda Ave, 290 ft east of N. Acacia Ave

ELEVATION : 1273.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1139989, W 117.3605954
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 10/1/2009 END : 10/28/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
210		**WELL GRADED SAND (SW)** yellowish brown (10YR 5/4), 30% coarse sand, 30% medium sand, 30% fine sand, 10% fine gravel.	0.2 ft/min, Mud properties: pH:8, weight: 9 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%	
220		**SILTY SAND (SM)** strong brown (7.5YR 4/6), 30% coarse sand, 30% medium sand, 20% fine sand, 20% fines.	0.2 ft/min, fine sand off shaker	
230		**SILTY SAND (SM)** strong brown (7.5YR 4/6), 40% fine sand, 20% coarse sand, 20% medium sand, 20% fines.	0.2 ft/min, fine and medium sand off shaker	
240		**SILTY SAND (SM)** yellowish brown (10YR 5/4), 40% fine sand, 20% coarse sand, 20% medium sand, 20% fines.	0.1 ft/min, fine and medium sand off shaker	
250		**SILTY SAND (SM)** as above.	0.1 ft/min	
260		**SILTY SAND (SM)** yellowish brown (10YR 5/4), 50% fine sand, 20% medium sand, 20% fines, 10% coarse sand.	0.2 ft/min, mostly fine sand off shaker 10-8-09, 1605, circulate for the day. Mud properties: pH: 8, weight: 9.2 lbs/gal, viscosity: 39 sec/qt, sand: 0.25%	
270		**SANDY SILT (ML)** yellowish brown (10YR 5/4), 60% fines, 20% medium sand, 20% fine sand.	10-9-09, 0730, resume drilling 0.1 ft/min, very little fine and medium sand off shaker	
280		**SANDY SILT (ML)** yellowish brown (10YR 5/4), 60% fines, 40% fine to medium sand.	0.2 ft/min	
290		**SILTY SAND (SM)** yellowish brown (10YR 5/4), 40% fine sand, 30% medium sand, 30% fines.	0.1 ft/min	
300		**SILTY SAND (SM)** as above.	0.1 ft/min	

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP6 SHEET 4 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : E. Etiwanda Ave, 290 ft east of N. Acacia Ave

ELEVATION : 1273.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1139989, W 117.3605954
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 10/1/2009 END : 10/28/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		SILTY SAND (SM) as above.	0.2 ft/min, mostly fine sand off shaker. Mud properties: pH: 8, weight: 9.3 lbs/gal, viscosity 37 sec/qt, sand: 0.25%	
310		**SANDY SILT (ML)** yellowish brown (10YR 5/6), 70% fines, 30% fine to medium sand.	0.2 ft/min	
320		**SILTY SAND (SM)** yellowish brown (10YR 5/6), 40% fines, 30% medium sand, 30% fine sand.	0.2 ft/min, mostly fine sand off shaker	Bentonite/Sand Seal
330		**SILTY SAND (SM)** as above.	0.3 ft/min 10-9-09, 1540, circulate for the day 10-12-09, 0800, resume drilling at 331' bgs, silty sand off shaker	
340		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), 55% fine sand, 30% fines, silt, 15% medium sand, subangular.	0.1 ft/min, silty sand off shaker, driller indicates slow drilling through silt-rich zones	Transition Sand #1/20 sand Filter Pack #2/12 Sand
350		**SILTY SAND (SM)** as above, 45% fine sand, 40% fines, silt, 15% medium sand, subangular.	0.1 ft/min, mud properties: pH: 8, weight: 10.1 lbs/gal, viscosity: 36 sec/qt, sand: 0.25%	4" ID Stainless Steel Wire-Wrap Screen
360		**SILTY SAND (SM)** as above, 85/15 felsic/mafic.	0.1 ft/min, silty sand off shaker	Filter Pack #2/12 Sand
370		**SILTY SAND (SM)** as above.	<0.1 ft/min, fines and sand off shaker, few cuttings	Bentonite/Sand Seal
380		**SANDY SILT (ML)** light olive brown (2.5Y 5/4), 55% fines, silt, 30% fine sand, 15% medium sand, subangular, 85/15 felsic/mafic.	0.1 ft/min 10-12-09, 1655, circulate for the day, few cuttings off shaker, some fines and sand 10-13-09, 0800, resume drilling	
390		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), 40% fines, silt, 35% fine sand, 25% medium sand, subangular, 85/15 felsic/mafic.	0.1 ft/min, few cuttings off shaker	
400				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP6 SHEET 5 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : E. Etiwanda Ave, 290 ft east of N. Acacia Ave

ELEVATION : 1273.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1139989, W 117.3605954
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 10/1/2009 END : 10/28/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		SILTY SAND (SM) as above, 50% fine sand, 35% medium sand, subangular, 15% fines, silt, 85/15 felsic/mafic.	0.2 ft/min, mud properties: pH: 8, weight: 10.4 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%, water loss: 14 cc	
410		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/4), 50% fine sand, 35% medium sand, subangular, 15% fines, medium plastic, some silt, appears more red than 2.5Y but less red than 10YR, 85/15 felsic/mafic.	0.2 ft/min, more fine sand off shaker, faster drilling	
420		**CLAYEY SAND (SC)** as above, trace coarse sand, angular.	0.3 ft/min, abundant fine sand off shaker	
430		**CLAYEY SAND (SC)** as above.	0.4 ft/min, abundant fine sand off shaker	Transition Sand #1/20 sand Filter Pack #2/12 Sand
440		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/4), 65% fine sand, micaceous, 30% medium sand, subangular, 5% fines, silt, trace coarse sand, angular, 85/15 felsic/mafic.	0.2 ft/min	4" ID Stainless Steel Wire-Wrap Screen
450		**POORLY GRADED SAND (SP)** as above.	0.1 ft/min abundant fine sand off shaker	Filter Pack #2/12 Sand
460		**POORLY GRADED SAND (SP)** as above.	10-13-09, 1600, circulate for the day 10-14-09, 1215, resume drilling 0.3 ft/min, abundant fine sand off shaker	Bentonite/Sand Seal
470		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min, fine to medium sand off shaker	
480		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min fines out of borehole, clayey sand off shaker 10-14-09, 1600, circulate for the day 10-15-09, resume drilling	
490		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/4), 50% fine sand, 25% medium sand, subangular, 25% fines, medium plastic, some silt, 90/10 felsic/mafic.	0.1 ft/min, clayey sand off shaker	
500				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP6 SHEET 6 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : E. Etiwanda Ave, 290 ft east of N. Acacia Ave

ELEVATION : 1273.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1139989, W 117.3605954
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 10/1/2009 END : 10/28/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
510		**SILTY SAND (SM)** light olive brown (2.5Y 5/4), 50% fine sand, 35% fines, silt, 15% medium sand, subangular, 90/10 felsic/mafic.	0.1 ft/min, driller indicates abundant silt coming out of borehole. Mud properties: pH: 8, weight: 10.5 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%, water loss: 13 cc	
520		**SILTY SAND (SM)** as above, 45% fine sand, 45% fines, as silt, 10% medium sand, subangular, 90/10 felsic/mafic.	0.1 ft/min, clay and silty sand coming off shaker	
530		**CLAYEY SAND (SC)** light olive brown (2.5Y 5/4), 45% fine sand, 45% fines, some medium plastic as silt, 10% medium sand, subangular, 90/10 felsic/mafic.	0.1 ft/min, silty, clayey sand off shaker driller indicates that drilling is hard at 527' bgs	
540		**CLAYEY SAND (SC)** as above.	0.1 ft/min 10-15-09, 1550, circulate for the day 10-16-09, 0840, change out button-tooth bit for mill-tooth bit. 0940, resume drilling	
550		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), 65% medium sand, subangular, 30% fine sand, 5% fines, 85/15 felsic/mafic.	0.3 ft/min, fine to medium sand off shaker	
560		**POORLY GRADED SAND WITH SILT (SP-SM)** light yellowish brown (2.5Y 6/4), 60% medium sand, subangular, 30% fine sand, 10% fines, 85/15 felsic/mafic.	0.3 ft/min, medium sand off shaker. Mud properties: pH: 8, weight: 10.1 lbs/gal, viscosity: 36 sec/qt, sand: 0.25%	Transition Sand #1/20 sand Filter Pack #3 Sand
570		**POORLY GRADED SAND (SP)** light yellowish brown (2.5Y 6/4), 65% medium sand, subangular, 30% fine sand, 5% fines, 85/15 felsic/mafic.	0.2 ft/min, medium sand off shaker	
580		**POORLY GRADED SAND (SP)** light olive brown (2.5Y 5/4), as above, 50% fine sand, micaceous, 45% medium sand, subangular, 5% fines, 85/15 felsic/mafic.	0.2 ft/min, medium sand off shaker	4" ID Stainless Steel Wire-Wrap Screen
590		**POORLY GRADED SAND (SP)** as above, 55% medium sand, 40% fine sand, 5% fines.	0.2 ft/min, sand off shaker	Filter Pack #3 Sand
600		**POORLY GRADED SAND (SP)** as above.	0.2 ft/min, sand off shaker	Bentonite/Sand Seal

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP6 SHEET 7 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : E. Etiwanda Ave, 290 ft east of N. Acacia Ave

ELEVATION : 1273.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1139989, W 117.3605954
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 10/1/2009 END : 10/28/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		POORLY GRADED SAND (SP) as above, 65% medium sand, subangular, 30% fine sand, 5% fines, 95/15 felsic/mafic.	0.3 ft/min, medium sand off shaker. Mud properties: pH: 8, weight: 9.8 lbs/gal, viscosity: 34 sec/qt, sand: 0.25%, water loss: 13 cc	
610		**POORLY GRADED SAND WITH SILT (SP-SM)** light yellowish brown (2.5Y 6/4), 60% medium sand, subrounded, 30% fine sand, 10% fines, 95/5 felsic/mafic.	10-16-09, 1620, circulate for the day 10-20-09, 0850, resume drilling 0.1 ft/min	
620		**SILTY SAND (SM)** light yellowish brown (2.5Y 6/4), 55% medium sand, subrounded, 30% fine sand, 15% fines.	0.2 ft/min, rig chatter	
630		**SILTY SAND (SM)** as above, 50% fine sand, 25% medium sand, subangular, 20% fines, 5% coarse sand, subangular, 90/10 felsic/mafic.	0.3 ft/min, rig chatter 1100, adjust swivel on kelly head 1140, resume drilling	
640		**SILTY SAND (SM)** as above.	0.3 ft/min	Transition Sand #1/20 sand Filter Pack #3 Sand
650		**POORLY GRADED SAND WITH SILT (SP-SM)** light yellowish brown (2.5Y 6/4), 60% medium sand, subrounded, 30% fine sand, 10% fines, 95/5 felsic/mafic.	1050, stop drilling to take down sound paneling 1305, resume drilling, 0.2 ft/min, fines and sand off shaker	4" ID Stainless Steel Wire-Wrap Screen
660		**POORLY GRADED SAND WITH SILT (SP-SM)** as above, 55% medium sand, 30% fine sand, 10% fines, 5% coarse sand, angular, 90/10 felsic/mafic.	0.1 ft/min, medium to coarse sand off shaker	Filter Pack #3 Sand
670		**POORLY GRADED SAND WITH SILT (SP-SM)** as above.	0.3 ft/min, medium sand off shaker	Bentonite/Sand Seal
680		**POORLY GRADED SAND WITH SILT (SP-SM)** as above.	0.3 ft/min, medium sand off shaker	
690		**WELL GRADED SAND (SW)** light yellowish brown (2.5Y 6/4), 35% medium sand, subrounded, 35% fine sand, 25% coarse sand, subangular, 5% fines, 85/15 felsic/mafic.	0.3 ft/min, medium sand off shaker	
700				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP6 SHEET 8 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : E. Etiwanda Ave, 290 ft east of N. Acacia Ave

ELEVATION : 1273.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1139989, W 117.3605954
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 10/1/2009 END : 10/28/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		SILTY SAND (SM) light yellowish brown (2.5Y 6/4), 50% fine sand, micaceous, 30% medium sand, subangular, 15% fines, silt, micaceous, 5% coarse sand, subangular, 90/10 felsic/mafic.	0.3 ft/min, medium sand off shaker	
710			10-21-09, 1610, circulate for the day 10-22-09, resume drilling	
		SANDY LEAN CLAY (CL) light yellowish brown (2.5Y 6/4), 55% fines, medium plastic, some silt, 40% fine sand, micaceous, 5% medium to coarse sand, subangular, clay balls in sample.	0.2 ft/min, 0945, fines and sand off shaker	
720				
		CLAYEY SAND (SC) light yellowish brown (2.5Y 6/4), 55% fine sand, micaceous, 35% fines, medium plastic, some silt, 10% medium sand, subangular, 90/10 felsic/mafic.	0.3 ft/min, fines and sand off shaker	
730				
		CLAYEY SAND (SC) as above.	0.3 ft/min, fines and sand off shaker	
740				
		SILTY SAND (SM) light yellowish brown (2.5Y 6/4), 65% fine sand, some micaceous, 20% medium sand, subangular, 15% fines, silt, 90/10 felsic/mafic.	0.2 ft/min, fine to medium sand off shaker, trace fines off shaker	
750				
		SILTY SAND (SM) as above.	0.1 ft/min, medium sand with clay off shaker. Mud properties: pH: 8, weight: 10.7 lbs/gal, viscosity: 36 sec/qt, sand: 0.5%, water loss: 14 cc	Transition Sand #1/20 sand Filter Pack #3 Sand
760				
		SILTY SAND (SM) as above, 45% fine sand, micaceous, 40% medium to coarse sand, subangular, 15% fines, 85/15 felsic/mafic.	0.2 ft/min	4" ID Stainless Steel Wire-Wrap Screen
770				
		CLAYEY SAND (SC) light yellowish brown (2.5Y 6/3), 45% fine sand, micaceous, 35% medium to coarse sand, subangular, 20% fines, medium plastic, some silt, 85/15 felsic/mafic.	0.3 ft/min, clayey sand off shaker	Filter Pack #3 Sand
780				
		CLAYEY SAND (SC) as above.	10-22-09, circulate for the day, 0.2 ft/min, clayey sand off shaker 10-23-09, 0850, resume drilling	
790				
		SANDY SILT (ML) light yellowish brown (2.5Y 6/3), 65% fines, silt, some medium plastic, 30% fine sand, micaceous, 5% medium sand, subangular, 85/15 felsic/mafic.	<0.1 ft/min, few cuttings	Bentonite/Sand Seal Bottom cap
800				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

PROJECT NUMBER:	BORING NUMBER:
385219.FI.01	EPA-MP6 SHEET 9 OF 9

Soil Boring Log

PROJECT : EPA BF Goodrich Investigation, Rialto, California
LOCATION : E. Etiwanda Ave, 290 ft east of N. Acacia Ave

ELEVATION : 1273.7 ft msl (ground surface)
DRILLING CONTRACTOR : Best Drilling and Pump Inc.

COORDINATES : N 34.1139989, W 117.3605954
DRILLING METHOD AND EQUIPMENT : Mud Rotary/Failing Jed-A

WATER LEVEL: NA START : 10/1/2009 END : 10/28/2009 LOGGER : M Mayry/J. Ockerman

DEPTH BELOW GROUND SURFACE (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	WELL DETAILS
		CLAYEY SAND (SC) light yellowish brown (2.5Y 6/4), 50% fine sand, micaceous, 25% medium to coarse sand, subangular, 25% fines, medium plastic, 85/15 felsic/mafic.	0.2 ft/min, medium sand off shaker	
810			increase in fines off shaker	
		CLAYEY SAND (SC) as above, 50% fine sand, micaceous, 40% fines, medium plastic, some silt, 10% medium sand, subangular, 90/10 felsic/mafic.	0.4 ft/min, medium sand and fines off shaker smooth, fast drilling	
820				
		CLAYEY SAND (SC) light yellowish brown (2.5Y 6/3), 45% fine sand, micaceous, 45% fines, medium plastic, some silt, 10% medium sand, subangular, 90/10 felsic/mafic.	0.6 ft/min, clayey sand off shaker. Mud properties: pH: 8, weight: 11 lbs/gal, viscosity: 44 sec/qt, sand: 0.5%	
830				
		SANDY LEAN CLAY (CL) light yellowish brown (2.5Y 6/3), 55% fines, medium plastic, some silt, 40% fine sand, micaceous, 5% medium sand, subangular, 90/10 felsic/mafic.	0.5 ft/min, clay off shaker, very little sand off shaker, add water to mud system to thin back drilling mud increase in sand, clayey sand off shaker	Slough
840				
		SILTY SAND (SM) light yellowish brown (2.5Y 6/4), 50% fine sand, micaceous, 40% fines, silt, some medium plastic, 10% medium sand, subangular, 90/10 felsic/mafic.	0.3 ft/min, fines and sand off shaker, abundant fine sand pump off mud from shaker into storing tank to thin back drilling mud 10-23-09, 1530, circulate for the day 10-28-09, 1250, resume drilling, medium sand and some fines off shaker, few cuttings off shaker 0.3 ft/min, fines and fine sand off shaker, abundant cuttings off shaker. Mud properties: pH: 8, weight: 10.3 lbs/gal, viscosity: 35 sec/qt, sand: 0.05%, water loss: 14 cc	
850				
		CLAYEY SAND (SC) light yellowish brown (2.5Y 6/4), 55% fine sand, micaceous, 30% fines, medium plastic, some silt, 15% medium sand, subangular, 90/10 felsic/mafic.		
860		**CLAYEY SAND (SC)** as above, 40% fine sand, micaceous, 30% fines, medium plastic, some silt, 30% medium sand, subangular, trace coarse sand, 90/10 felsic/mafic.	clayey sand off shaker 10-28-09, 1455, circulate mud for the day, fines and fine sand off shaker, abundant cuttings off shaker Boring terminated at 864'	
870				
880				
890				
900				

SOIL BORING LOG 385219, BFGOODRICH.GPJ, CH2M GEOTECH_06_REVISED_385219.GLB, 8/10/10

Appendix B
Geophysical Logs

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No. 14593

File No.

Company BEST DRILLING & PUMP

Well EPA MP1

Field RIALTO

County SAN BERNARDINO State CA

Location:

ACACIA @ FOOTHILL BLVD.
GPS: N34o 06.305' W117o 21.568'

Sec. Twp. Rge.

Other Services:

GR/LL3
SONIC/VDL
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation K.B. D.F. G.L.
Log Measured From	G.L.	0	
Drilling Measured From	G.L.		

Date	04-24-09		
Run Number	ONE		
Depth Driller	880'		
Depth Logger	880'		
Bottom Logged Interval	880'		
Top Log Interval	30'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	13.75 @ 77F		
Rmf @ Meas. Temp	14.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HRS		
Time Logger on Bottom	16:30		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	L.A.		
Recorded By	RIDDER		
Witnessed By	B.J. LECHLER		

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Comments

Calibration Report

Database File: 14593.db
Dataset Pathname: Best/well/run1/Elog
Dataset Creation: Fri Apr 24 16:28:25 2009 by Log Open-Cased 081212

ELOG Calibration Report

Serial:	D4
Model:	DTQ
Shop Calibration Performed:	Thu Mar 20 11:33:28 2008
Before Survey Verification Performed:	Sun Sep 09 13:17:43 2007
After Survey Verification Performed:	Sun Sep 09 13:17:48 2007

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	9.852	101.836		10.200	102.200	Ohm-m	1.000	0.346
Long	10.744	100.214		10.200	102.200	Ohm-m	1.028	-17.311
IEE	7625.740	7624.080	counts	8.346	8.344	A		
VSN	8684.080	8685.640	counts	165.638	165.668	V		
VLN	2162.320	2161.980	counts	41.244	41.237	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.249	101.201		40.505	101.206	Ohm-m	0.996	0.422
Long	142.638	102.842		102.858	102.858	Ohm-m	1.024	-2.408
IEE	212.960	7070.960	counts	0.233	7.738	A		
VSN	96.300	8039.720	counts	1.837	153.348	V		
VLN	85.320	2042.520	counts	1.627	38.959	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.270	101.200		40.249	101.201	Ohm-m	1.000	-0.035
Long	142.491	102.843		102.842	102.842	Ohm-m	1.004	-0.383
IEE	213.380	7077.580	counts	0.234	7.746	A		
VSN	96.540	8047.160	counts	1.841	153.490	V		
VLN	85.400	2044.440	counts	1.629	38.995	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	40.505	40.249	Ohm-m	101.206	101.201	Ohm-m
Long	143.592	142.638	Ohm-m	102.858	102.842	Ohm-m

Gamma Ray Calibration Report

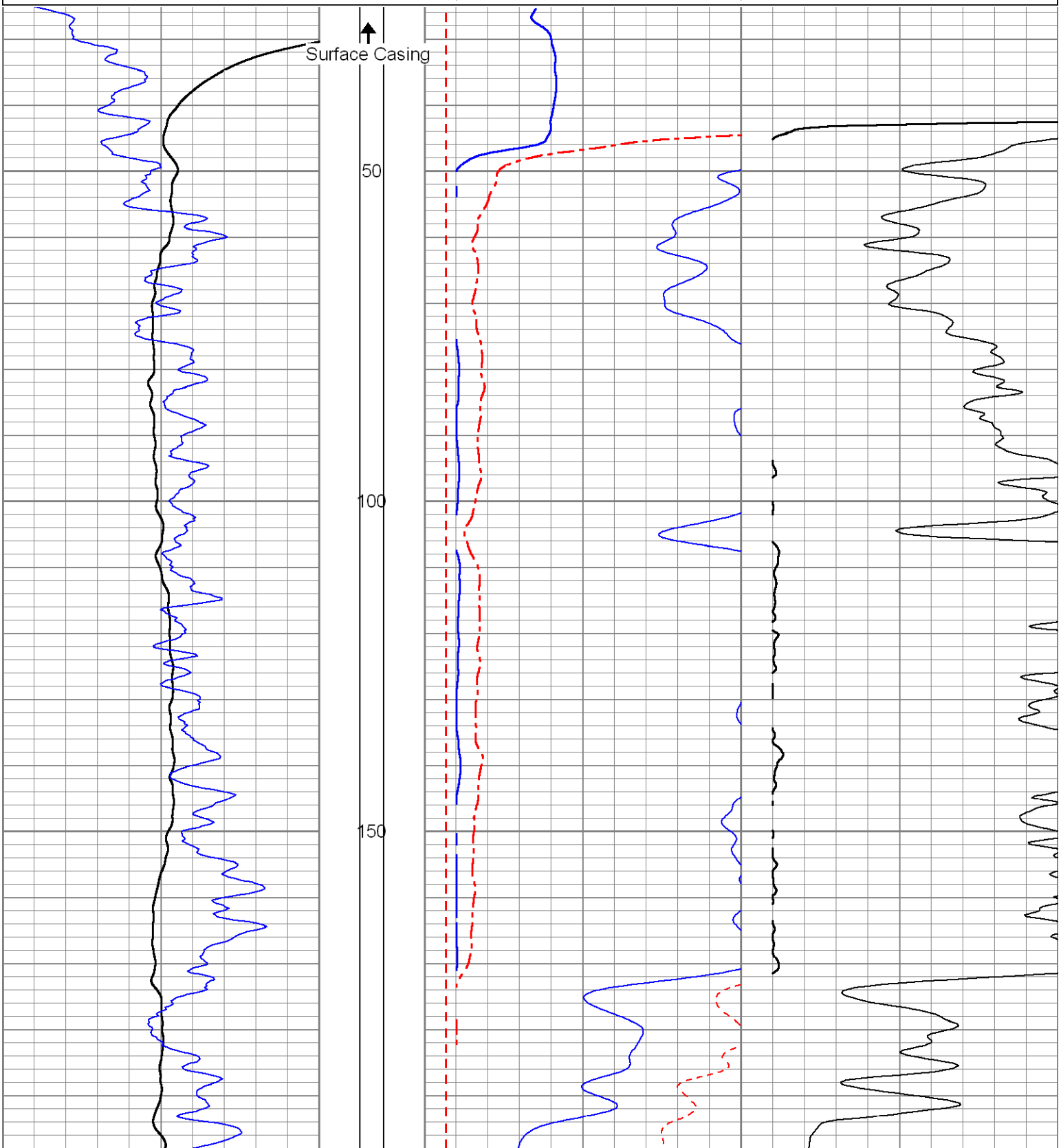
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Sun Sep 09 13:17:55 2007	
Calibrator Value:	162.0	GAPI
Background Reading:	172.5	cps
Calibrator Reading:	717.9	cps
Sensitivity:	0.2970	GAPI/cps

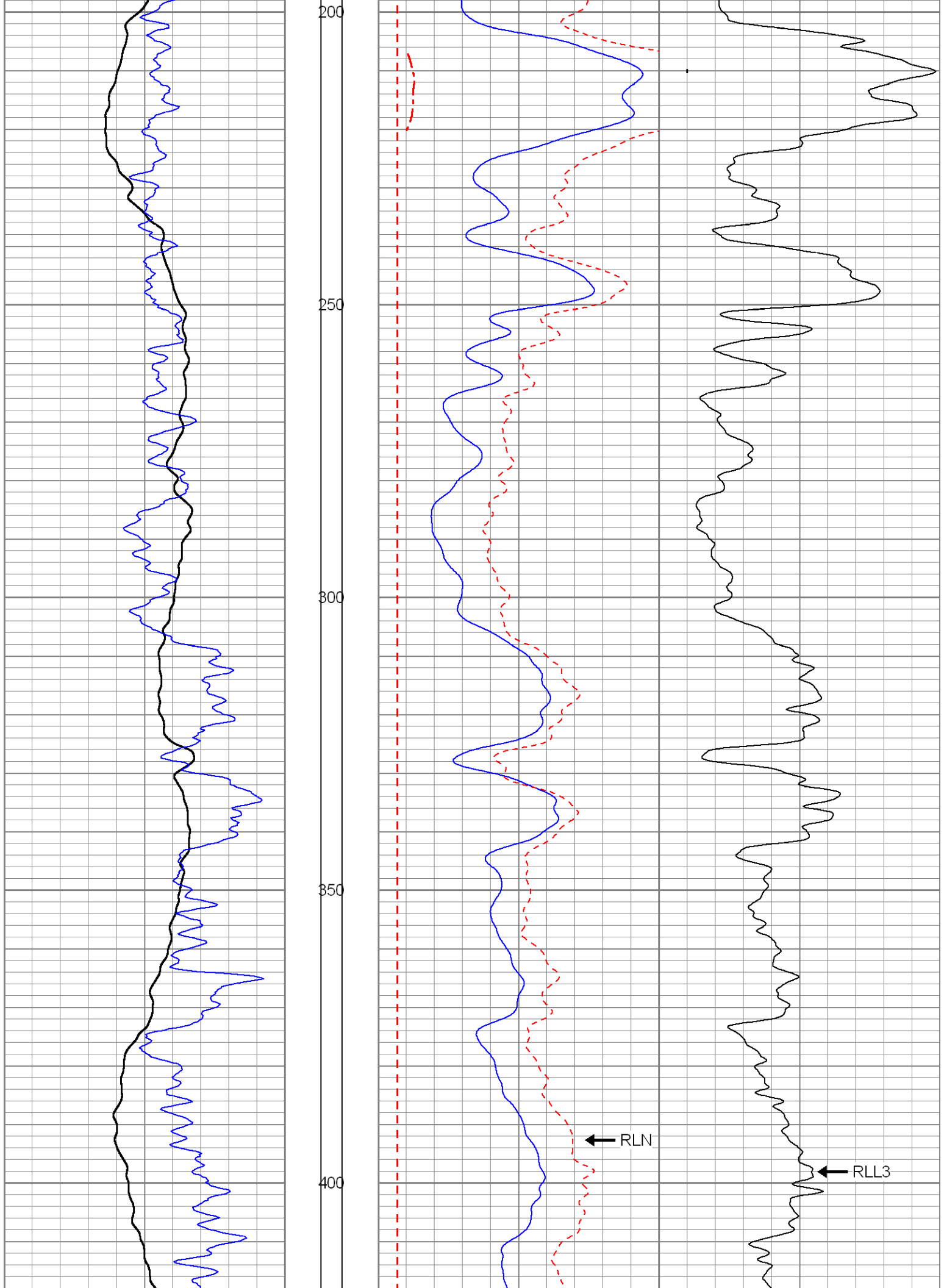
Database File:	14593.db
Dataset Pathname:	Best/well/run1/Elog
Presentation Format:	elog
Dataset Creation:	Fri Apr 24 16:28:25 2009 by Log Open-Cased 081212
Charted by:	Depth in Feet scaled 1:240

-50	SP (mV)	50
0	Line Speed (ft/min)	100
40	Gamma-Ray (GAPI)	110

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 (Ohm-m)	2000

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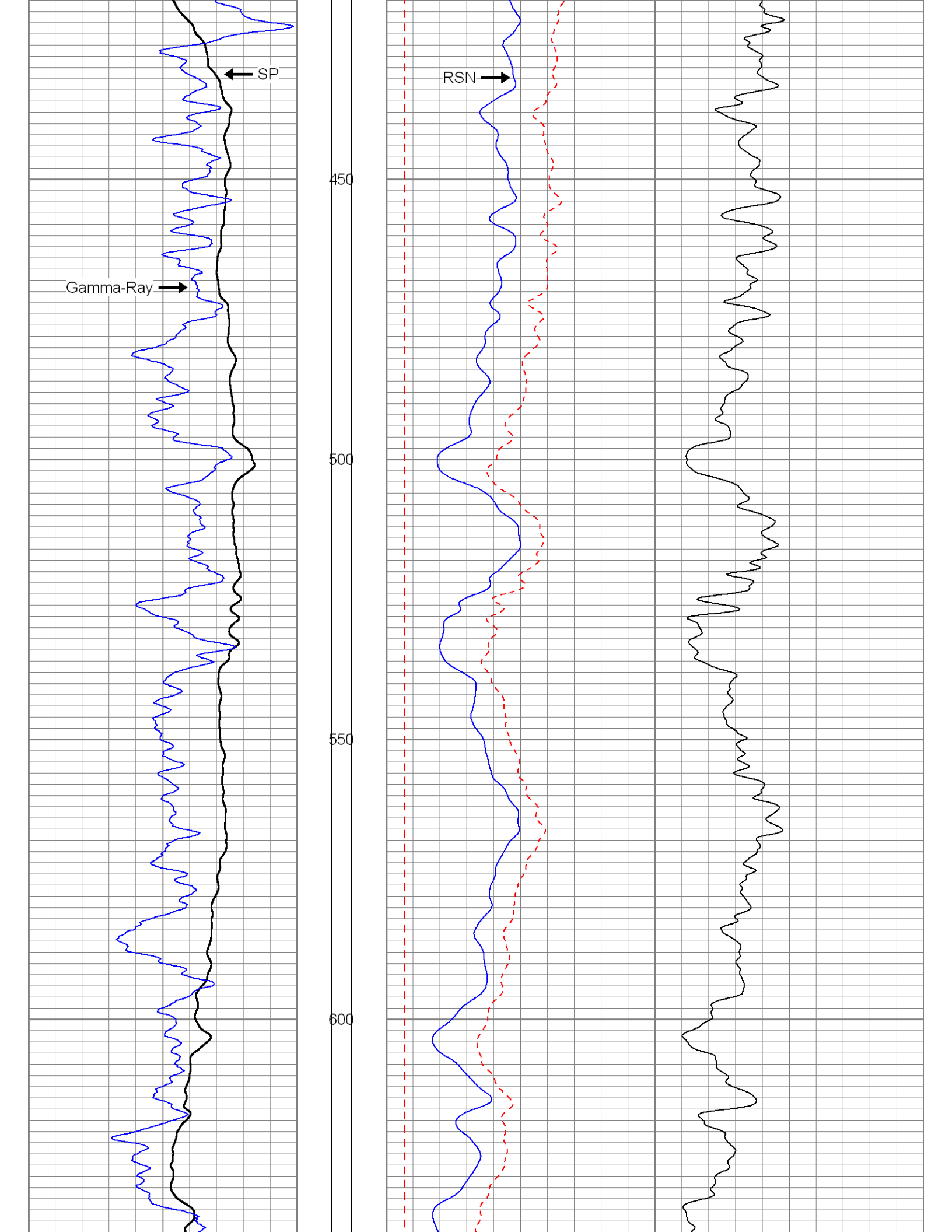
250
300
350
400
RLN
RLL3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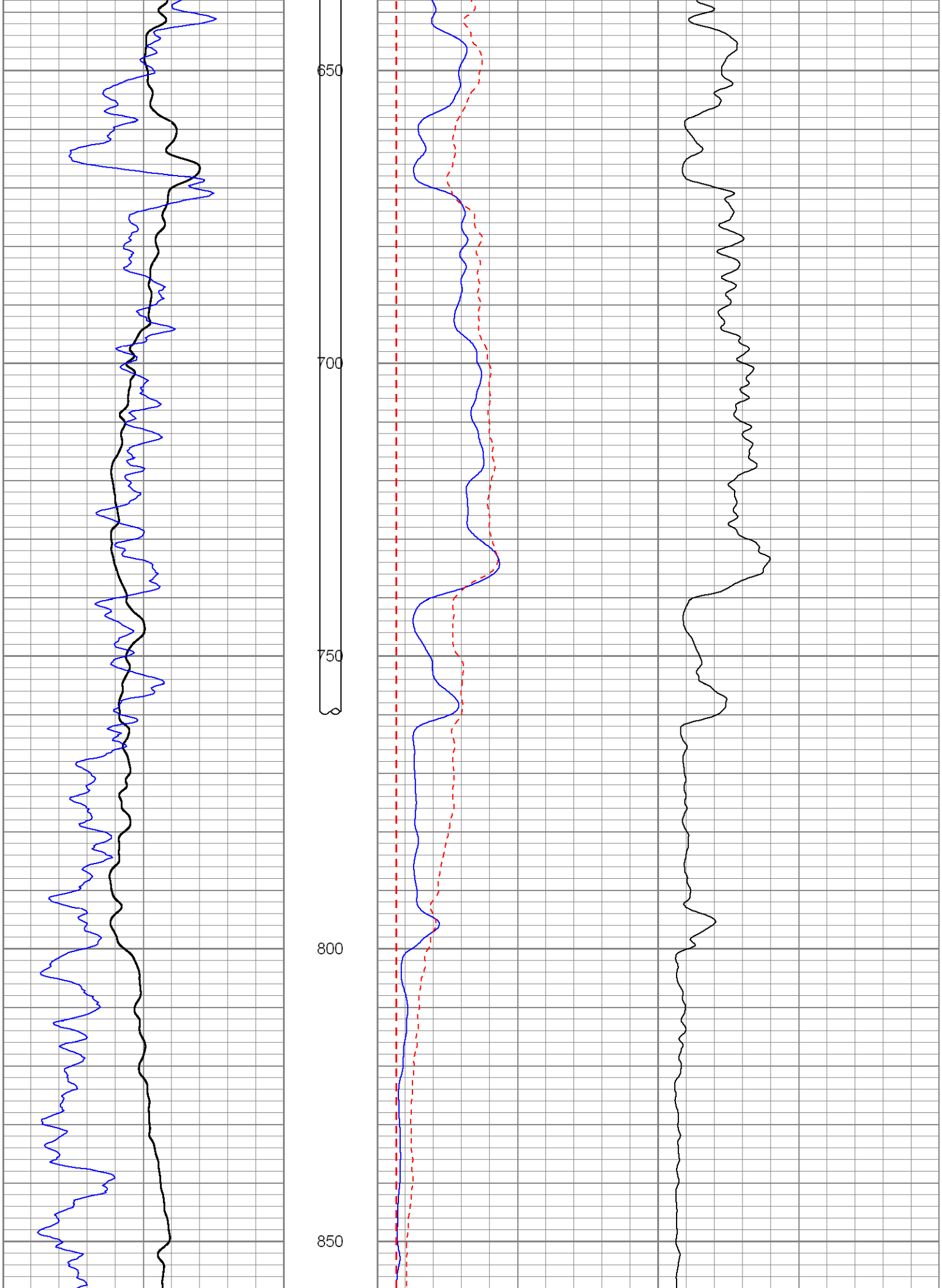
Gamma-Ray
RSN
450
500
550
600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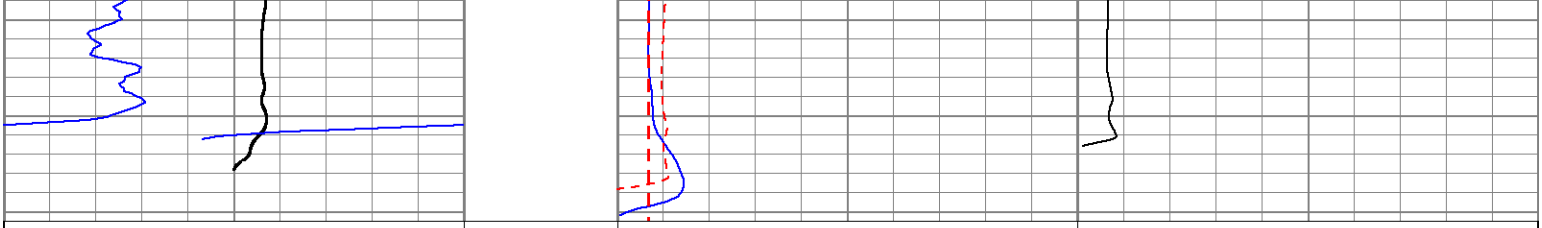
700
750
800
850



-50	SP (mV)	50
0	Line Speed (ft/min)	100
40	Gamma-Ray (GAPI)	110

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 (Ohm-m)	2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No. 14593

File No.

Company BEST DRILLING & PUMP

Well EPA MP1

Field RIALTO

County SAN BERNARDINO State CA

Location:

ACACIA @ FOOTHILL BLVD.
GPS: N34o 06.305' W117o 21.568'

Other Services:

ELOG
SONIC/VDL
CALIPER

Sec. Twp. Rge.

Permanent Datum	G.L.	0	Elevation above perm. datum	K.B.
Log Measured From	G.L.			D.F.
Drilling Measured From	G.L.			G.L.

Date	04-24-09		
Run Number	ONE		
Depth Driller	880'		
Depth Logger	877'		
Bottom Logged Interval	877'		
Top Log Interval	30'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	13.75 @ 77F		
Rmf @ Meas. Temp	14.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HRS		
Time Logger on Bottom	16:30		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	LA.		
Recorded By	RIDDER		
Witnessed By	B.J. LECHLER		

<<< Fold Here >>>

Comments

Calibration Report

Database File: 14593.db
Dataset Pathname: Best/well/run1/LL3
Dataset Creation: Fri Apr 24 17:08:29 2009 by Log Open-Cased 081212

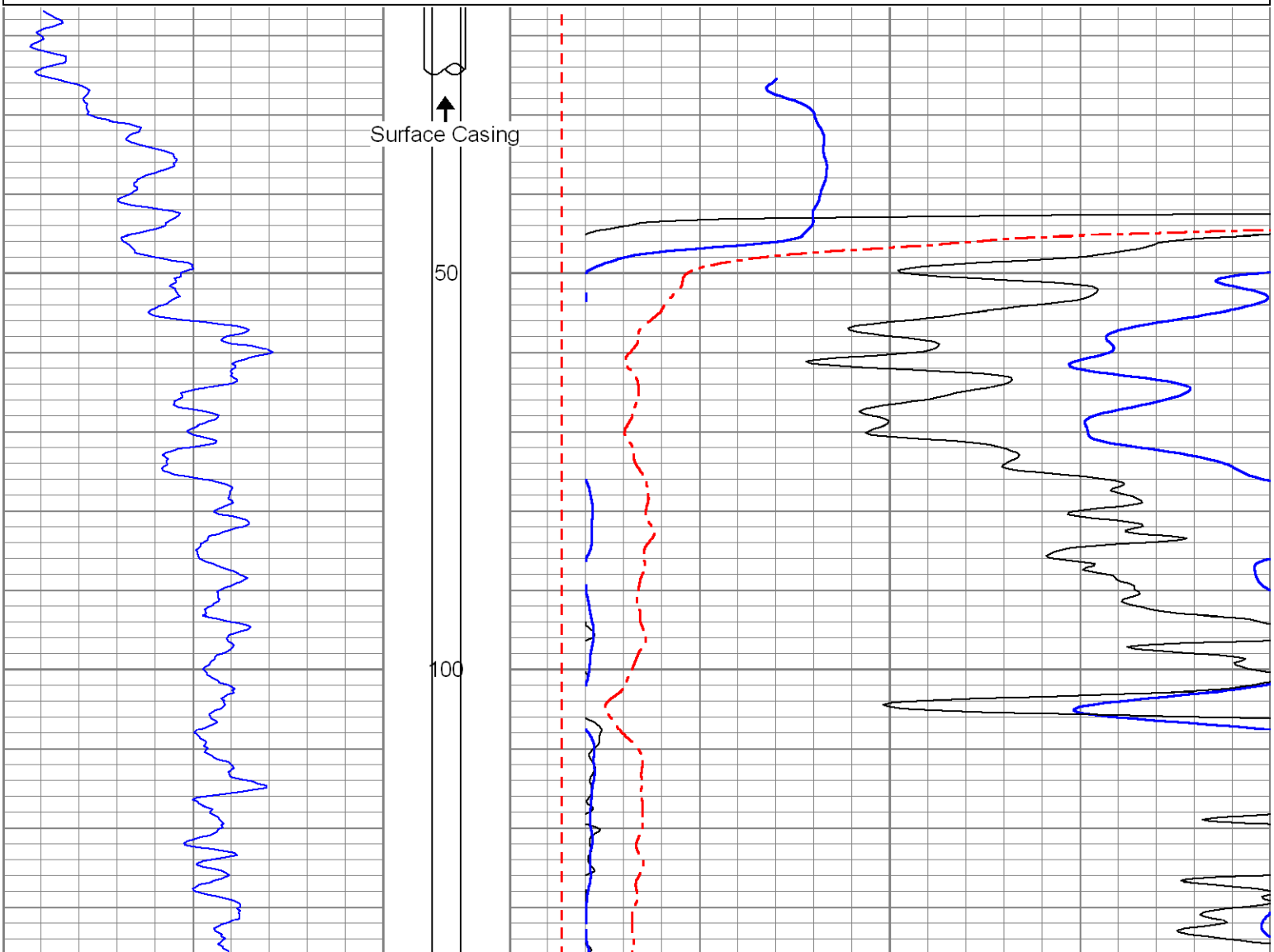
Gamma Ray Calibration Report

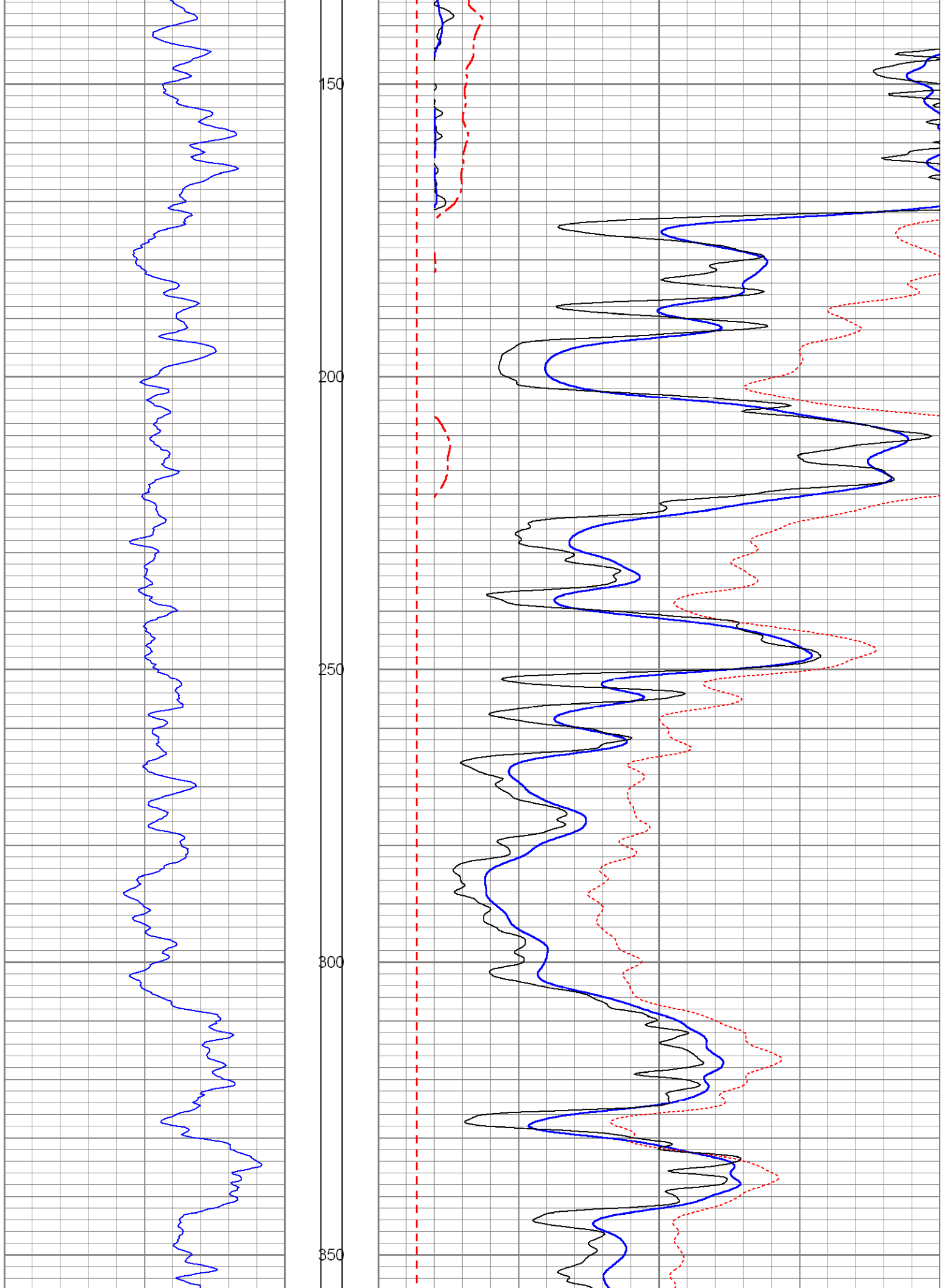
Serial Number:	12	
Tool Model:	GROH	
Performed:	Thu Feb 12 09:06:37 2004	
Calibrator Value:	162.0	GAPI
Background Reading:	46.0	
Calibrator Reading:	174.5	
Sensitivity:	1.2612	GAPI/

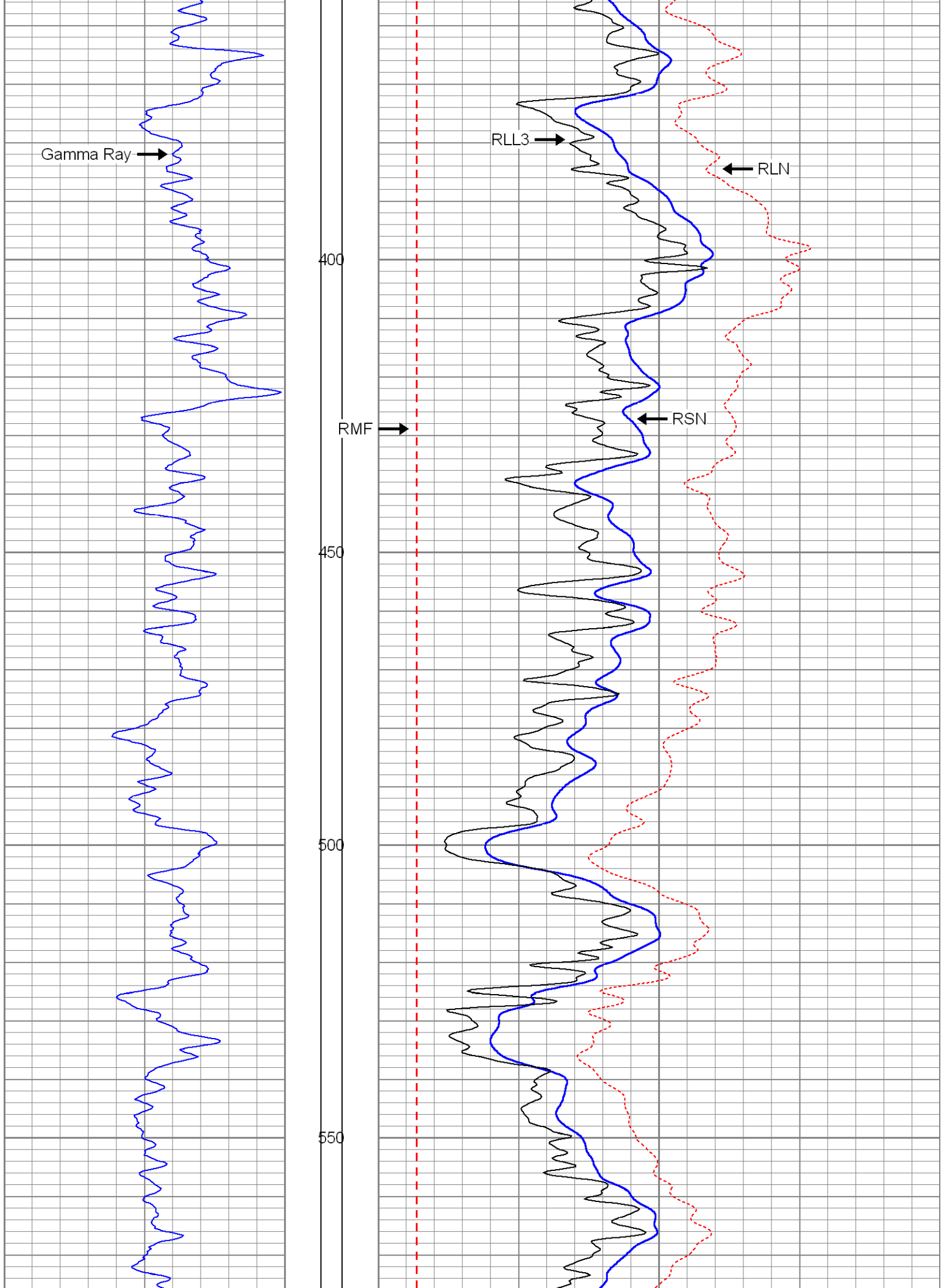
Database File:	14593.db
Dataset Pathname:	Best/well/run1/LL3
Presentation Format:	guard
Dataset Creation:	Fri Apr 24 17:08:29 2009 by Log Open-Cased 081212
Charted by:	Depth in Feet scaled 1:240

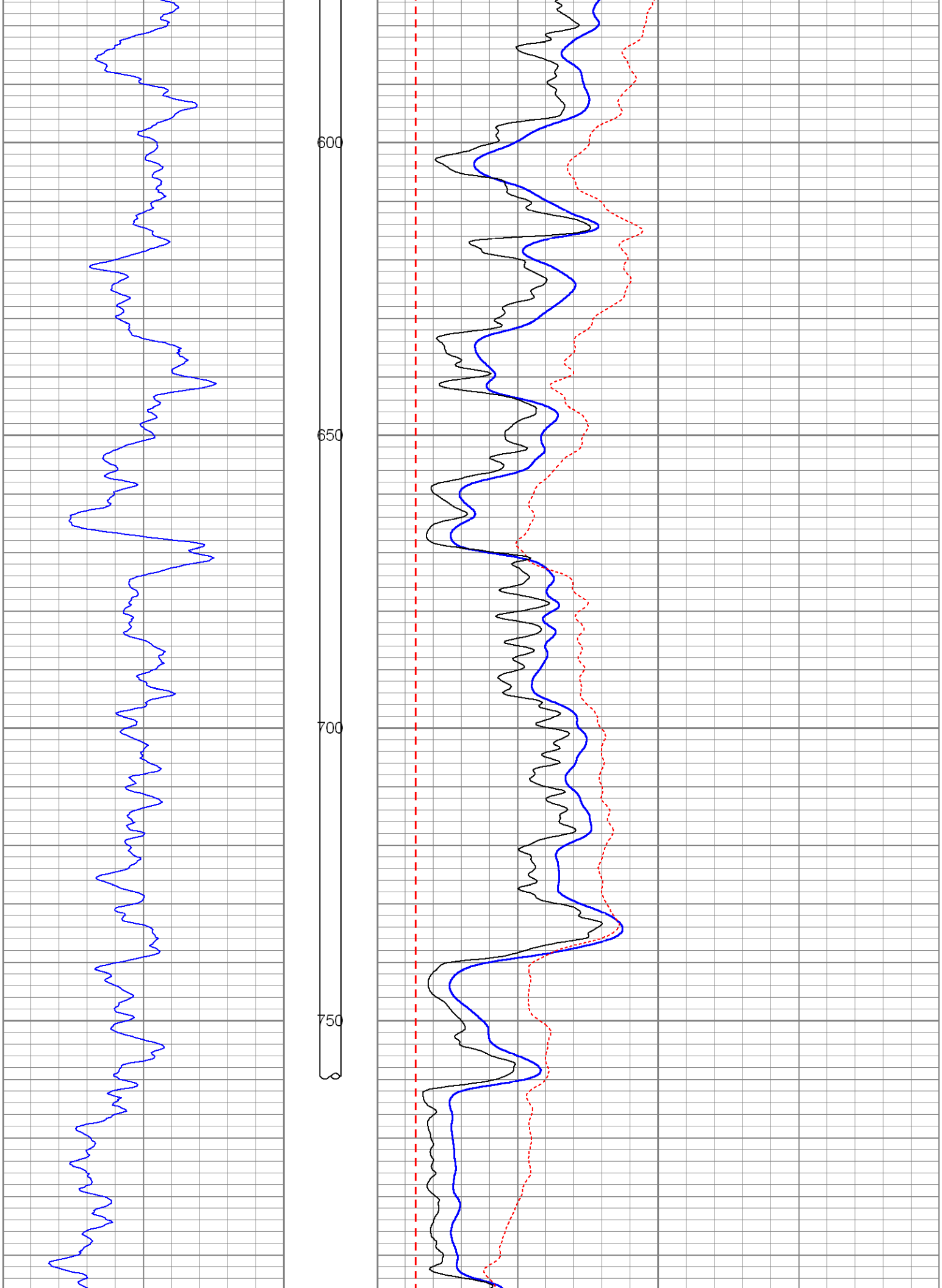
40	Gamma-Ray (GAPI)	110

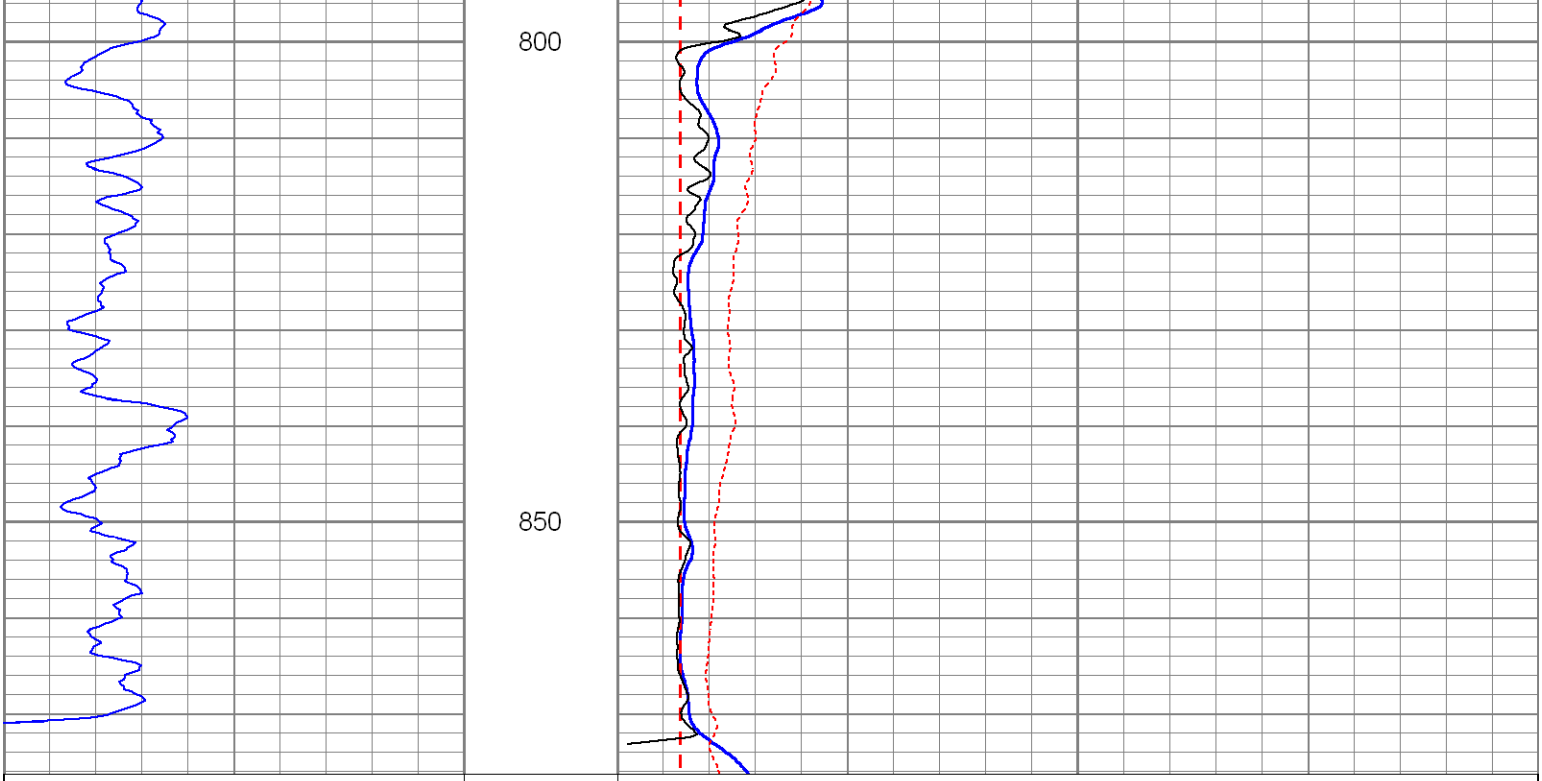
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000




150
200
250
300
350


Gamma Ray
RLL3
RLN
RSN
RMF
400
450
500
550


600
650
700
750



40	Gamma-Ray (GAPI)	110
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No. 14593

File No.

Company BEST DRILLING & PUMP

Well EPA MP1

Field RIALTO

County SAN BERNARDINO State CA

Location:

ACACIA @ FOOTHILL BLVD.
GPS: N34o 06.305' W117o 21.568'

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation K.B.
Log Measured From	G.L. 0		D.F.
Drilling Measured From	G.L.		G.L.

Date	04-24-09		
Run Number	ONE		
Depth Driller	880'		
Depth Logger	877'		
Bottom Logged Interval	877'		
Top Log Interval	30'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	13.75 @ 77F		
Rmf @ Meas. Temp	14.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HRS		
Time Logger on Bottom	16:30		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	L.A.		
Recorded By	RIDDER		
Witnessed By	B.J. LECHLER		

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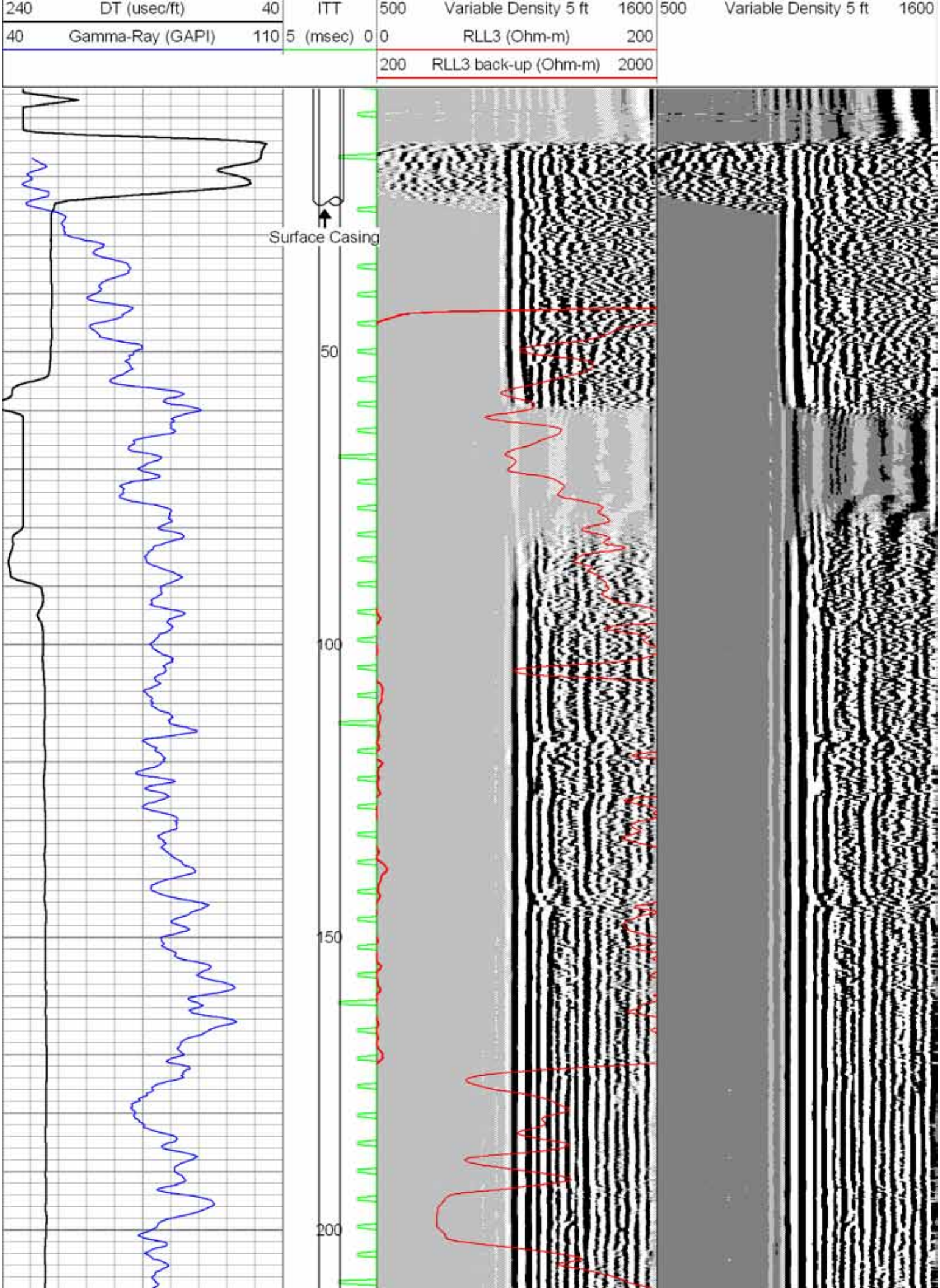
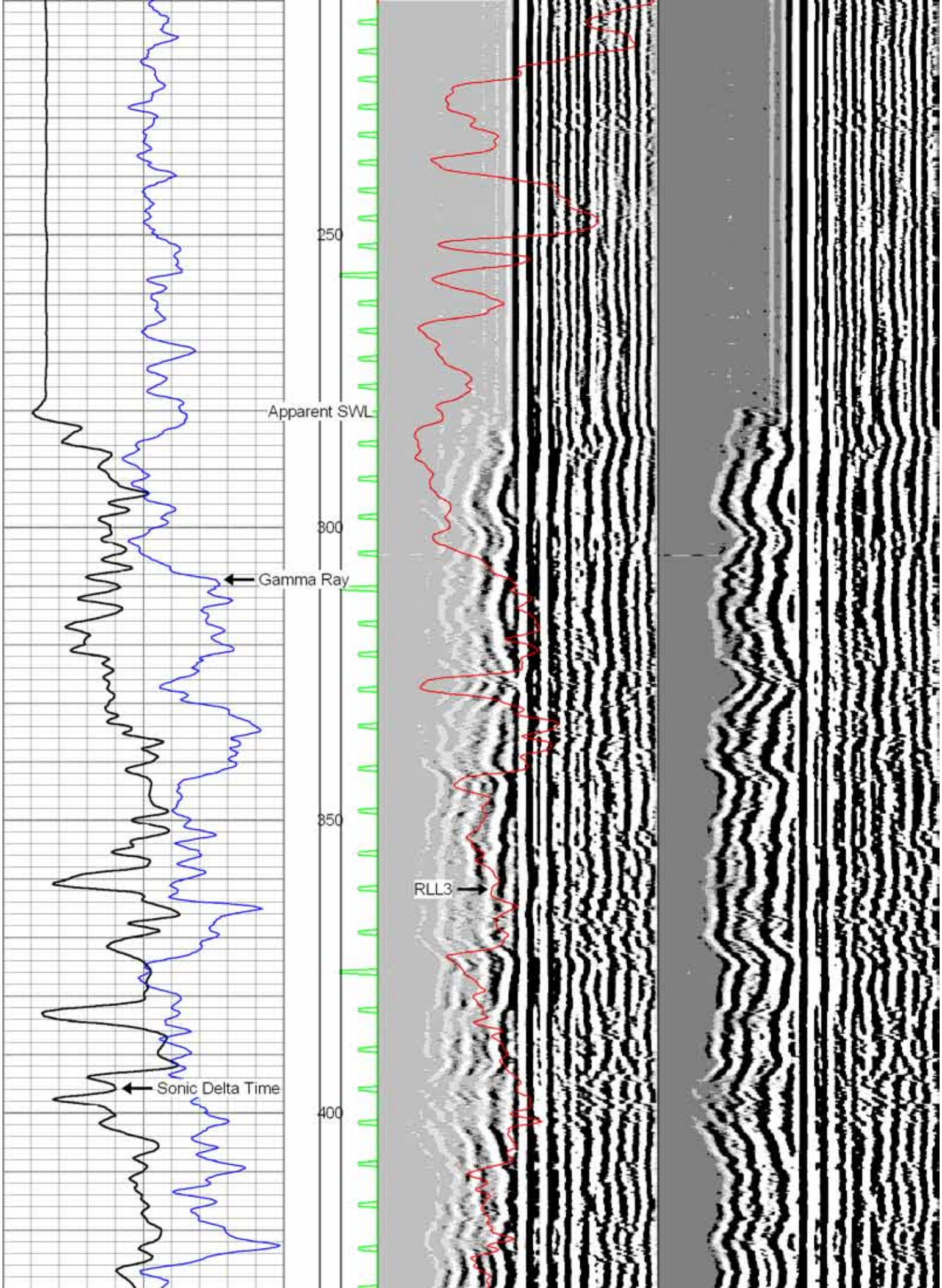
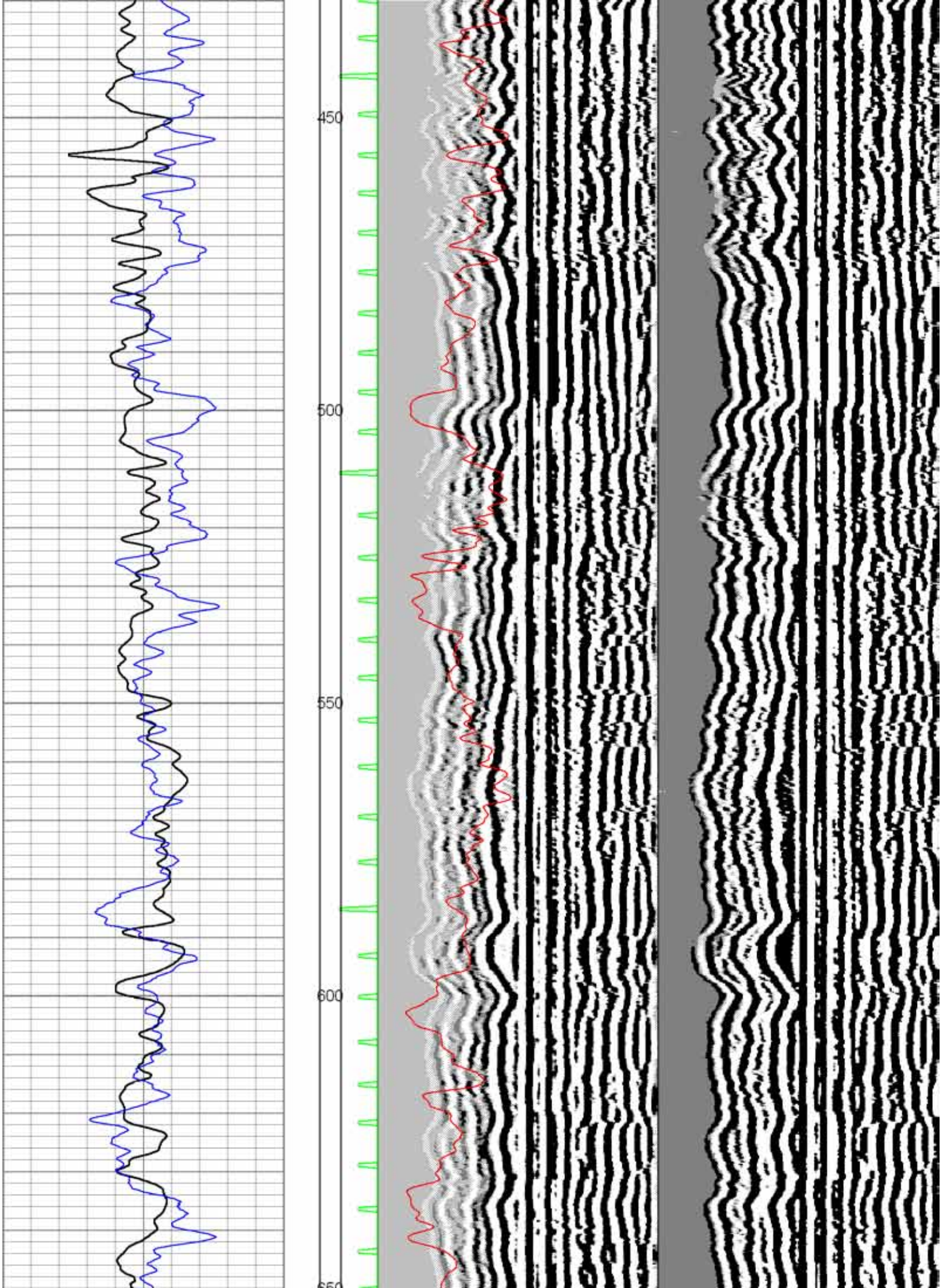
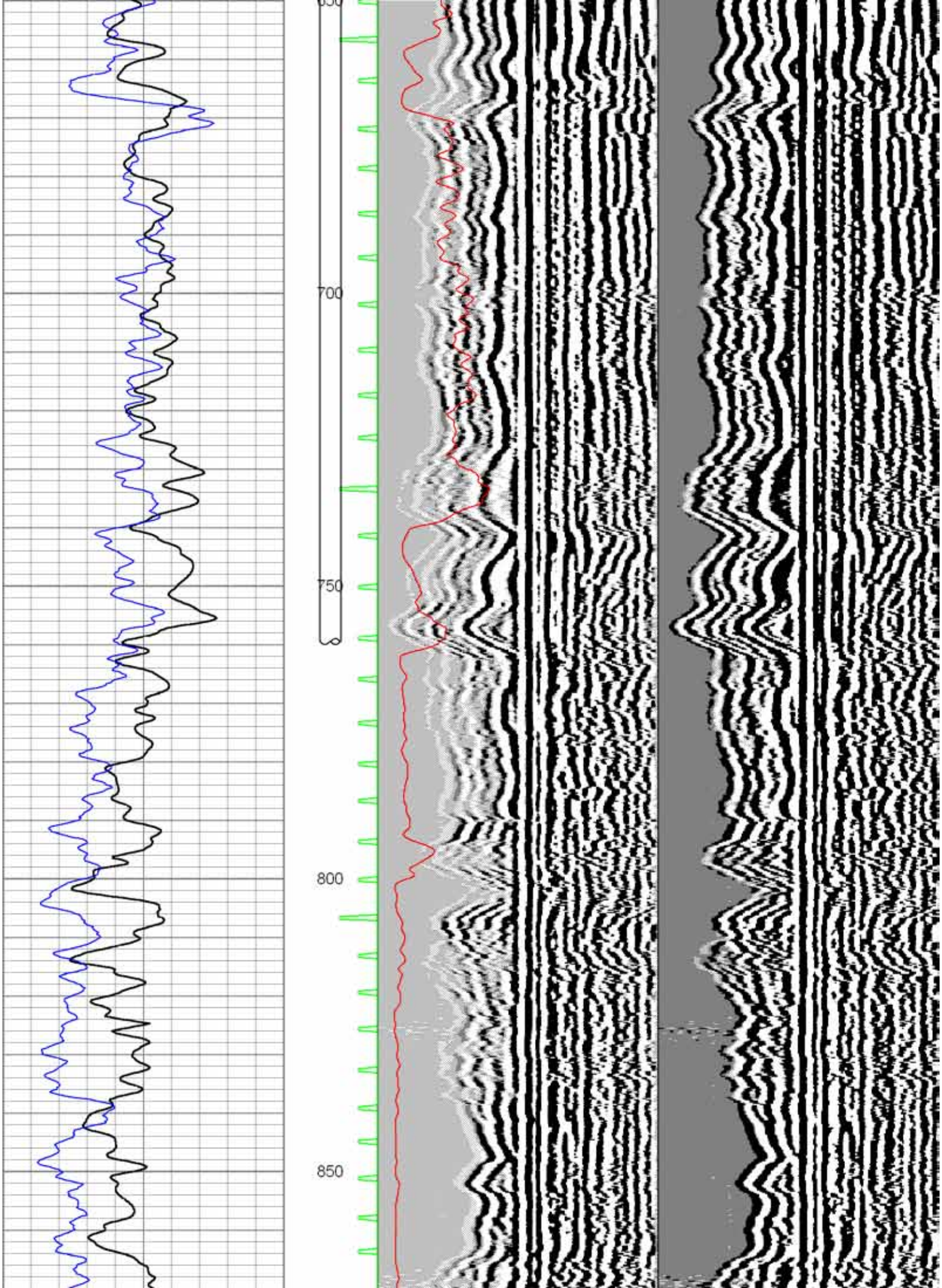
Comments

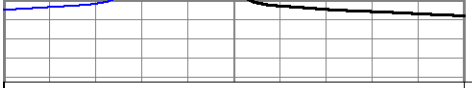
Database File: 14593.db
Dataset Pathname: Best/well/run1/sonic1
Presentation Format: slt
Dataset Creation: Fri Apr 24 17:45:31 2009 by Log Open-Cased 081212
Charted by: Depth in Feet scaled 1:240


240 DT (usec/ft) 40
40 Gamma-Ray (GAPI) 110
ITT
5 (msec) 0
500 Variable Density 5 ft 1600
0 RLL3 (Ohm-m) 200
200 RLL3 back-up (Ohm-m) 2000
500 Variable Density 5 ft 1600
Surface Casing
50
100
150
200


250
Apparent SWL
300
Gamma Ray
350
RLL3
Sonic Delta Time
400


450
500
550
600


650
700
750
800
850



240	DT (usec/ft)	40	ITT	500	Variable Density 5 ft	1600	500	Variable Density 5 ft	1600
40	Gamma-Ray (GAPI)	110	5 (msec) 0	0	RLL3 (Ohm-m)	200			
				200	RLL3 back-up (Ohm-m)	2000			

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No. 14692

Company BEST DRILLING & PUMP

Well EPA MP2

Field RIALTO

County SAN BERNARDINO State CA

Location:

CORNER OF WILLOW @ ROMONA
GPS: N34o 06.477' W117o 22.489

Sec. Twp. Rge.

Other Services:

GR/LL3
SONIC/VDL
CALIPER

			Elevation
Permanent Datum	G.L.	Elevation above perm. datum	K.B.
Log Measured From	G.L.	0	D.F.
Drilling Measured From	G.L.		G.L.

Date	06-09-09		
Run Number	ONE		
Depth Driller	870'		
Depth Logger	869'		
Bottom Logged Interval	868'		
Top Log Interval	30'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	13.5 @ 77F		
Rmf @ Meas. Temp	12.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HRS		
Time Logger on Bottom	19:10		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	RIDDER		
Witnessed By	B.J. LECHLER		

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Comments

ELOG Calibration Report

Serial: D1
Model: DTQ

Shop Calibration Performed: Wed Jan 28 14:40:45 2009
Before Survey Verification Performed: Mon Aug 06 11:54:10 2007
After Survey Verification Performed: Mon Aug 06 11:54:38 2007

Shop Calibration

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	10.916	101.981		10.200	102.200	Ohm-m	1.010	-0.828
Long	15.254	104.296		10.200	102.200	Ohm-m	1.033	-19.746
IEE	92.849	6387.565	counts	0.102	6.991	A		
VSN	122.623	7235.648	counts	2.339	138.011	V		
VLN	70.858	1828.759	counts	1.352	34.881	V		

Before Survey Verification

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	183.906	100.821		9.828	100.799	Ohm-m	-1.095	211.190
Long	422.542	101.924		101.776	101.776	Ohm-m	-0.317	134.130
IEE	92.849	6387.565	counts	0.102	6.991	A		
VSN	122.623	7235.648	counts	2.339	138.011	V		
VLN	70.858	1828.759	counts	1.352	34.881	V		

After Survey Verification

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	117.548	100.824		183.906	100.821	Ohm-m	4.968	-400.076
Long	271.705	101.931		101.924	101.924	Ohm-m	1.888	-90.571
IEE	92.849	6387.565	counts	0.102	6.991	A		
VSN	122.623	7235.648	counts	2.339	138.011	V		
VLN	70.858	1828.759	counts	1.352	34.881	V		

After Survey Verification compared to Before Survey Calibration

	Zero Before	Zero After		Cal Before	Cal After	
Short	9.828	183.906	Ohm-m	100.799	100.821	Ohm-m
Long	0.000	422.542	Ohm-m	101.776	101.924	Ohm-m

Gamma Ray Calibration Report

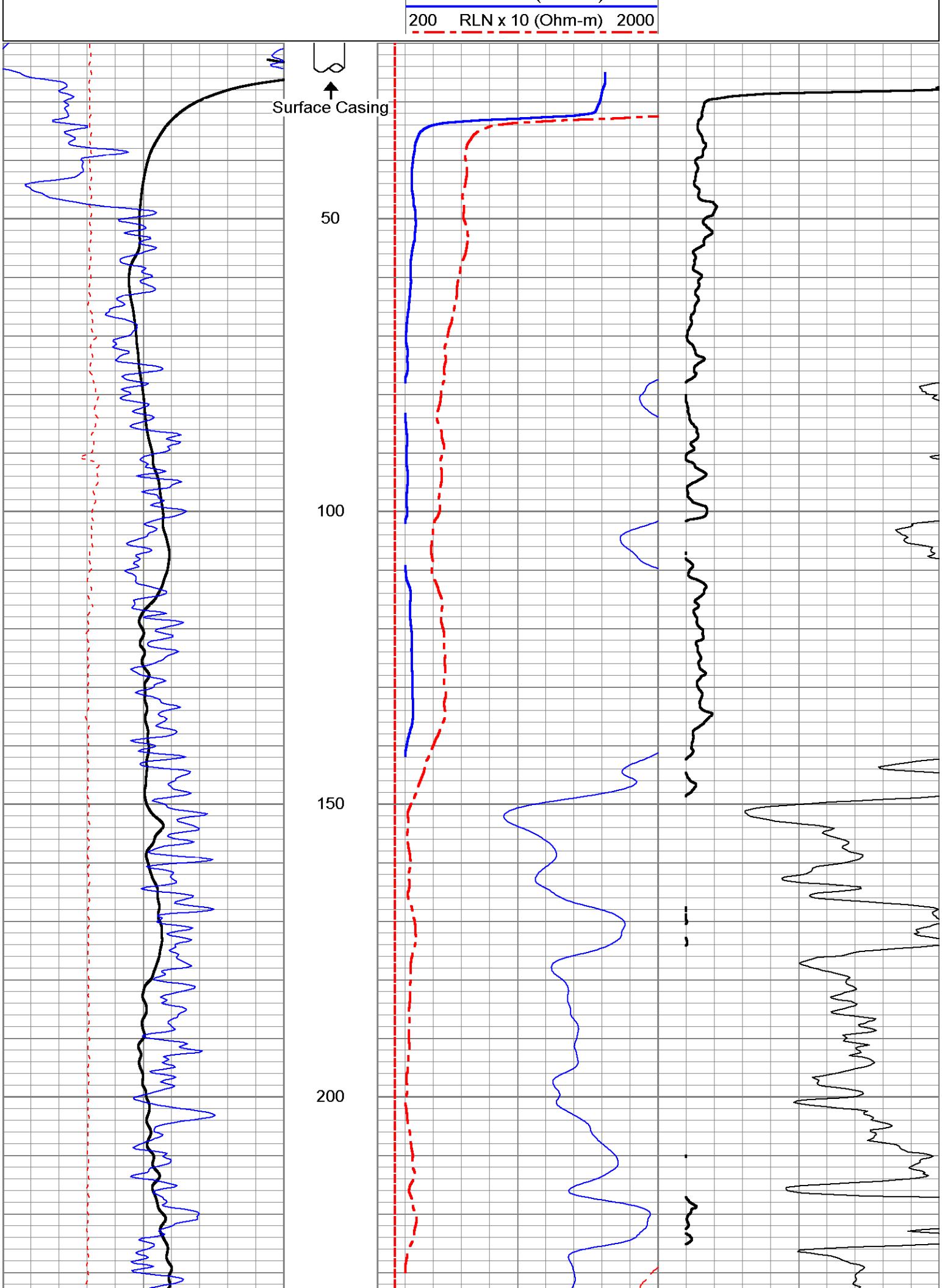
Serial Number:	D1	
Tool Model:	ELOG	
Performed:	Mon Sep 29 13:55:50 2008	
Calibrator Value:	162	GAPI
Background Reading:	151.12	cps
Calibrator Reading:	599.794	cps
Sensitivity:	0.361064	GAPI/cps

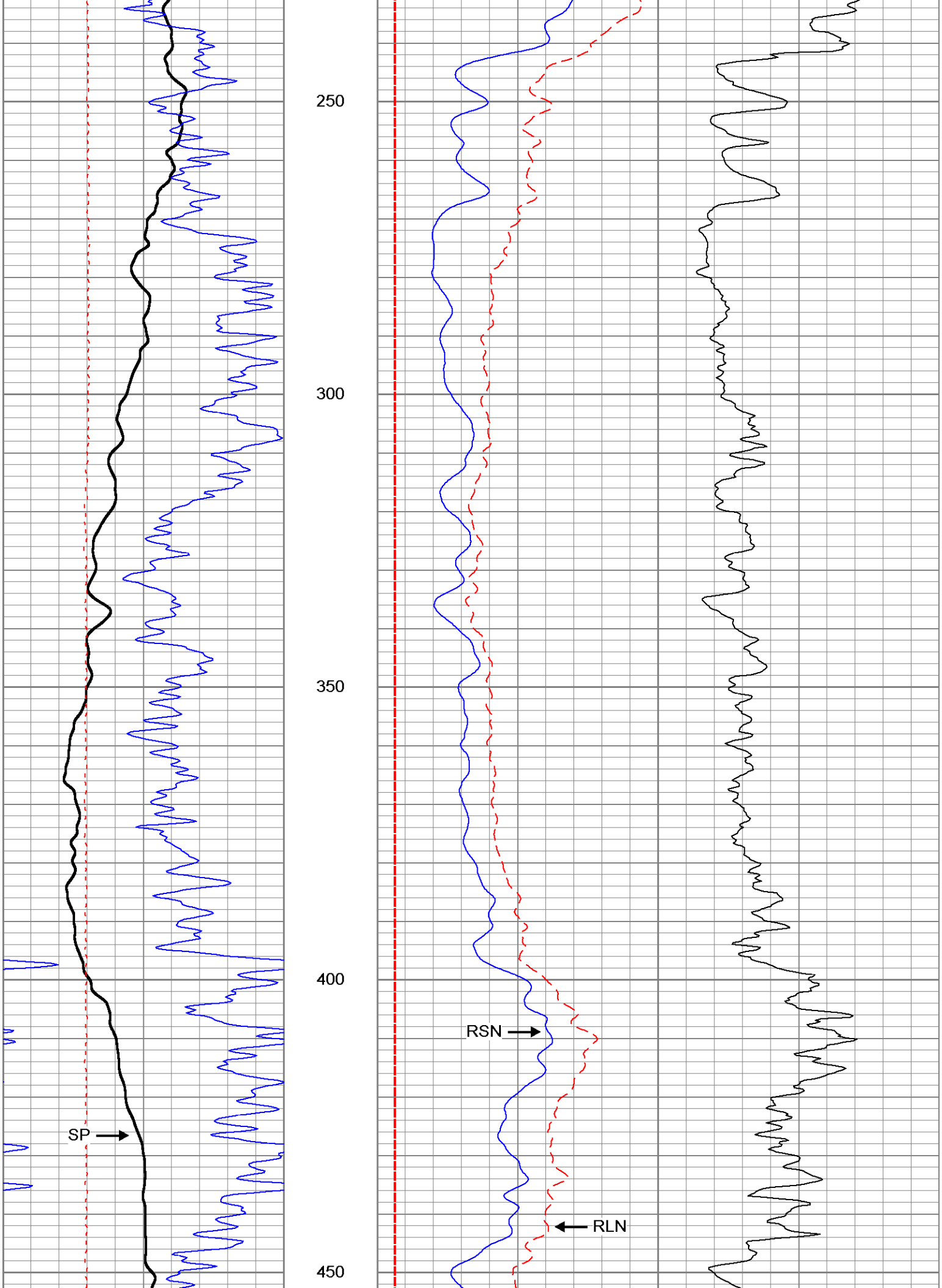
Database File:	14692.db
Dataset Pathname:	Best/well/run1/Elog.1
Presentation Format:	ELOG
Dataset Creation:	Tue Jun 09 19:36:04 2009 by Calc Warrior Version 6.6
Charted by:	Depth in Feet scaled 1:240

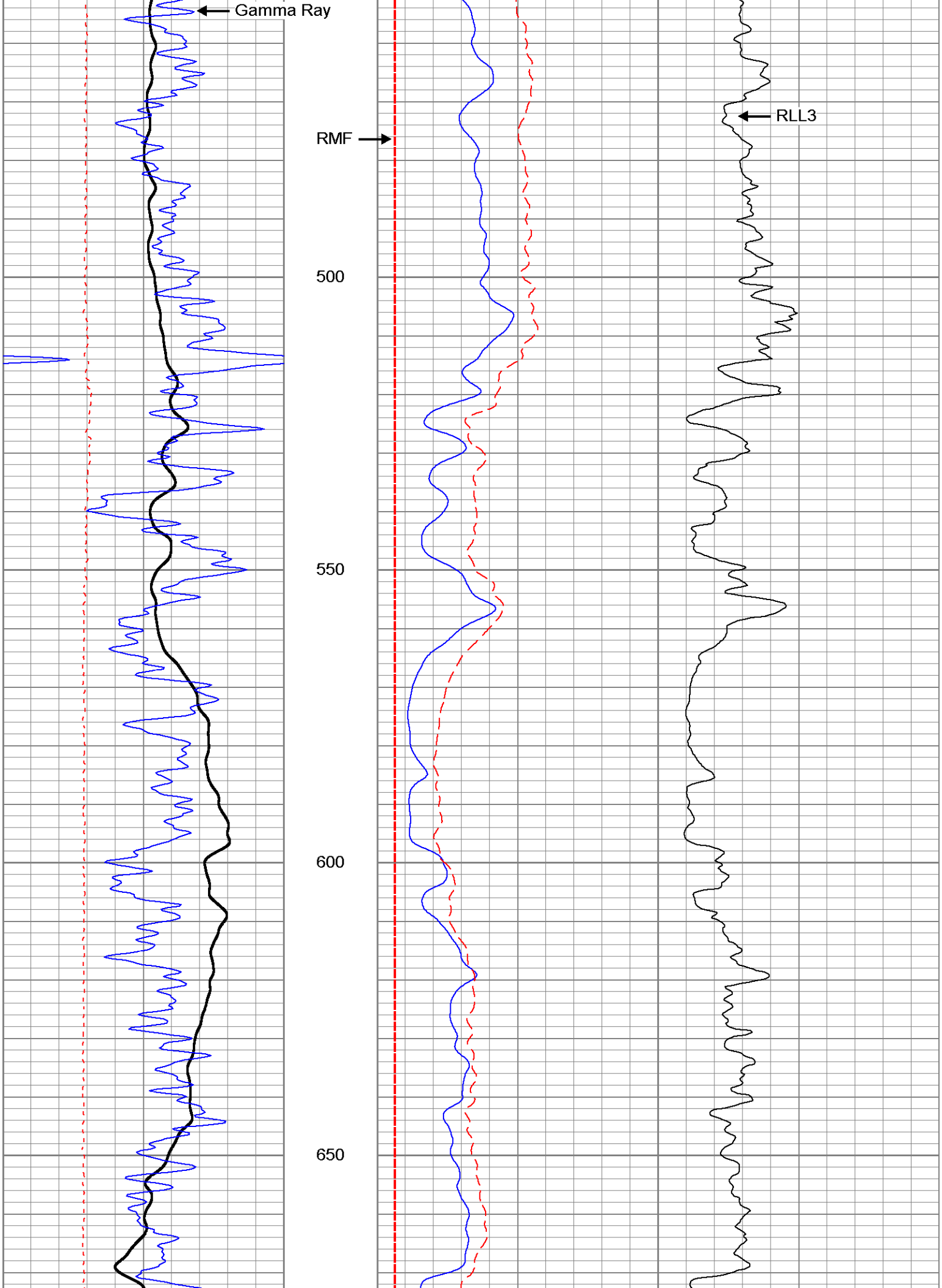
-170	SP (mV)	70
0	Line Speed (ft/min)	100
45	Gamma-Ray (GAPI)	115

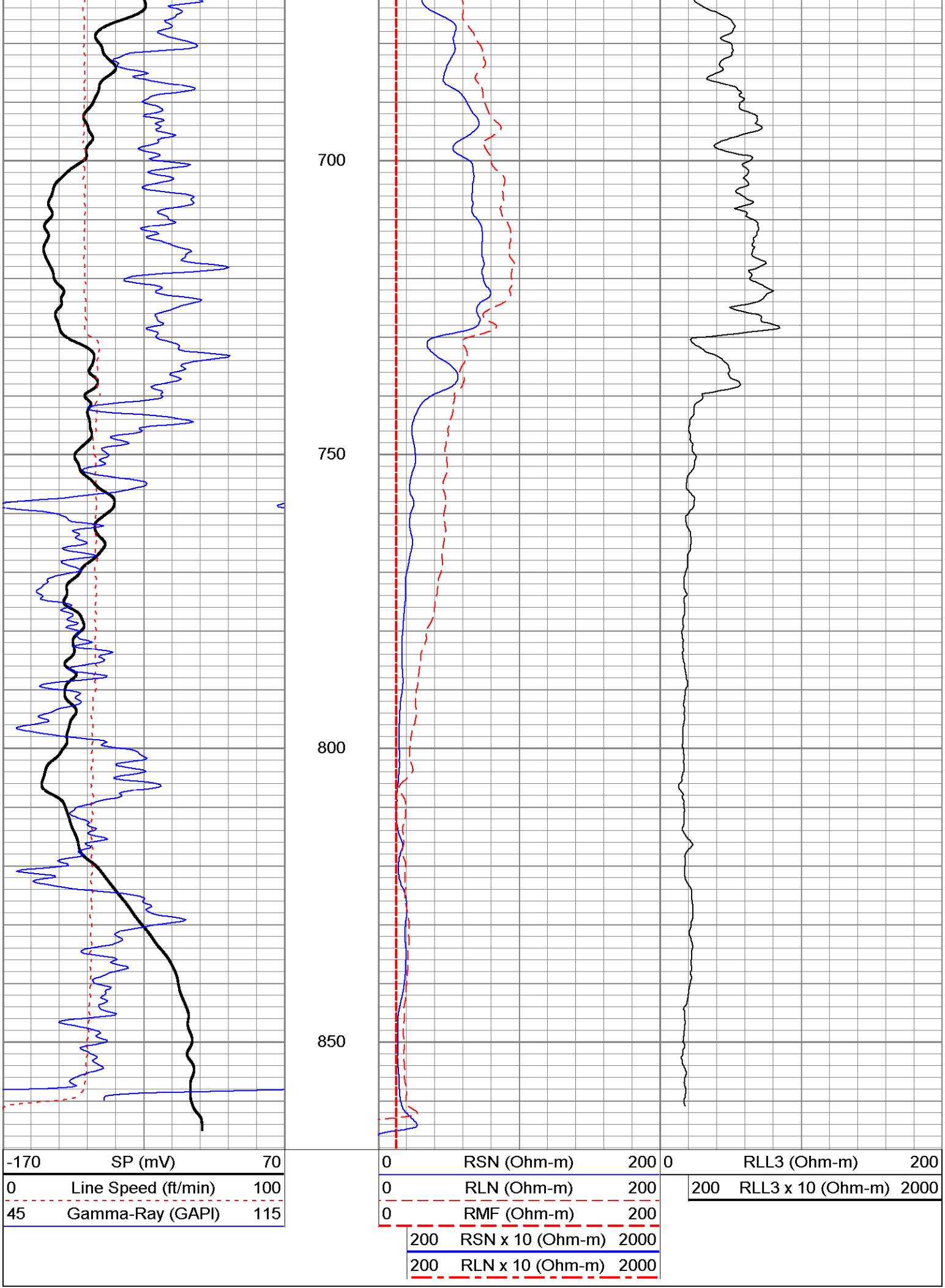
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000


200 RLN x 10 (Ohm-m) 2000
Surface Casing
50
100
150
200


250
300
350
400
450
SP
RSN
RLN


Gamma Ray
RMF
RLL3
500
550
600
650


700
750
800
850
-170 SP (mV) 70
0 Line Speed (ft/min) 100
45 Gamma-Ray (GAPI) 115
0 RSN (Ohm-m) 200
0 RLN (Ohm-m) 200
0 RMF (Ohm-m) 200
200 RSN x 10 (Ohm-m) 2000
200 RLN x 10 (Ohm-m) 2000
0 RLL3 (Ohm-m) 200
200 RLL3 x 10 (Ohm-m) 2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No.
14692

Company BEST DRILLING & PUMP
Well EPA MP2
Field RIALTO
County SAN BERNARDINO State CA

Location:

CORNER OF WILLOW @ ROMONA
GPS: N34o 06.477' W117o 22.489

Sec. Twp. Rge.

Other Services:

ELOG
SONIC/VDL
CALIPER

			Elevation
Permanent Datum	G.L.	Elevation above perm. datum	K.B.
Log Measured From	G.L.	0	D.F.
Drilling Measured From	G.L.		G.L.

Date	06-09-09		
Run Number	ONE		
Depth Driller	870'		
Depth Logger	869'		
Bottom Logged Interval	868'		
Top Log Interval	30'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	13.5 @ 77F		
Rmf @ Meas. Temp	12.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HRS		
Time Logger on Bottom	19:10		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	RIDDER		
Witnessed By	B.J. LECHLER		

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Comments

Gamma Ray Calibration Report

Serial Number: 13
Tool Model: GROH
Performed: Mon Sep 29 14:35:52 2008

Calibrator Value: 162 GAPI

Background Reading:	36.9056	
Calibrator Reading:	160.261	
Sensitivity:	1.31328	GAPI/

Simplec Long Guard Calibration Report

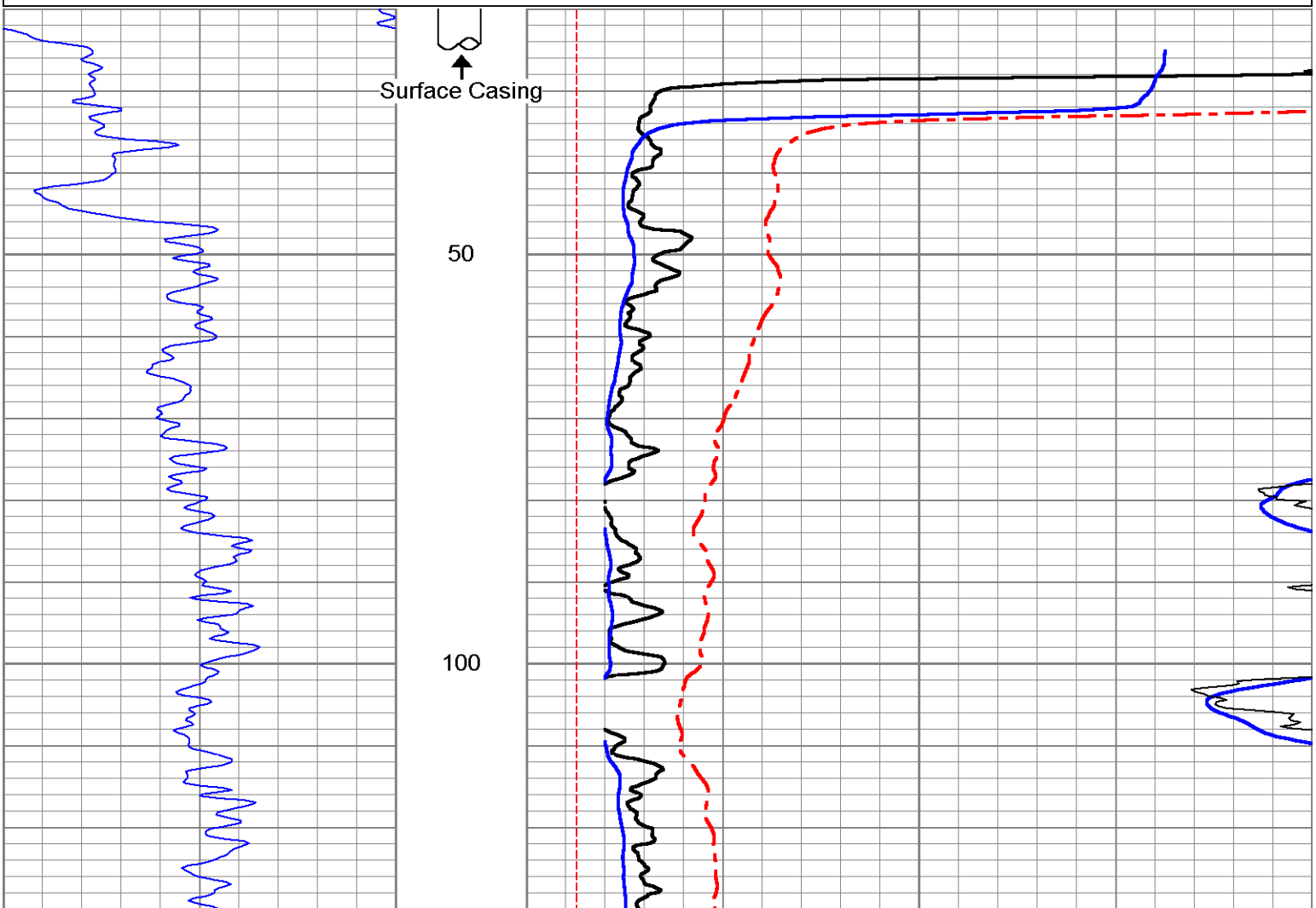
Serial Number:	81
Tool Model:	M&W
Performed:	Wed Jan 28 14:45:28 2009

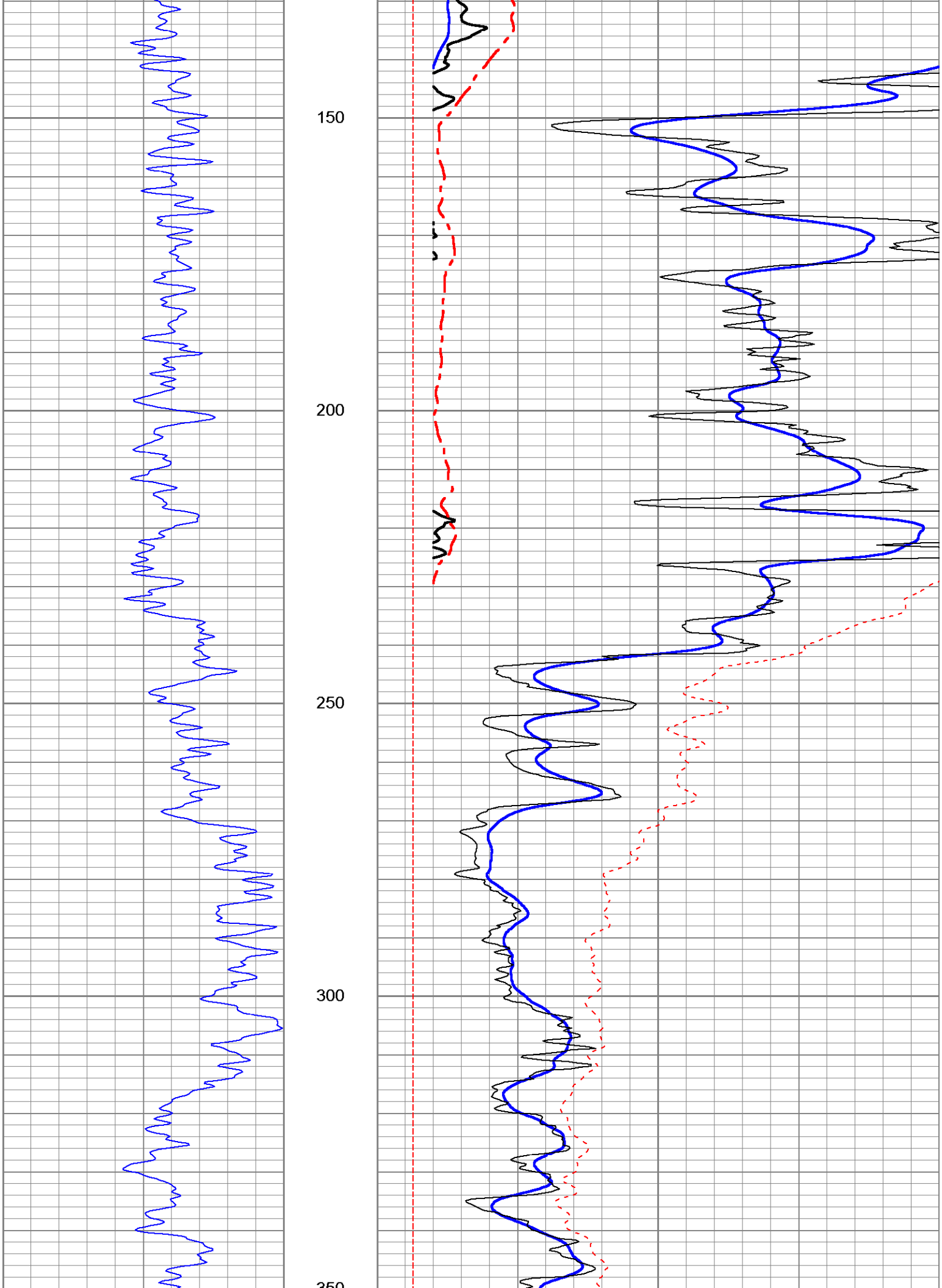
System Reading	Calibration Reference	
0.306	2.500	Ohm-m
0.605	5.000	
6.015	50.000	
28.373	250.000	
56.371	500.000	

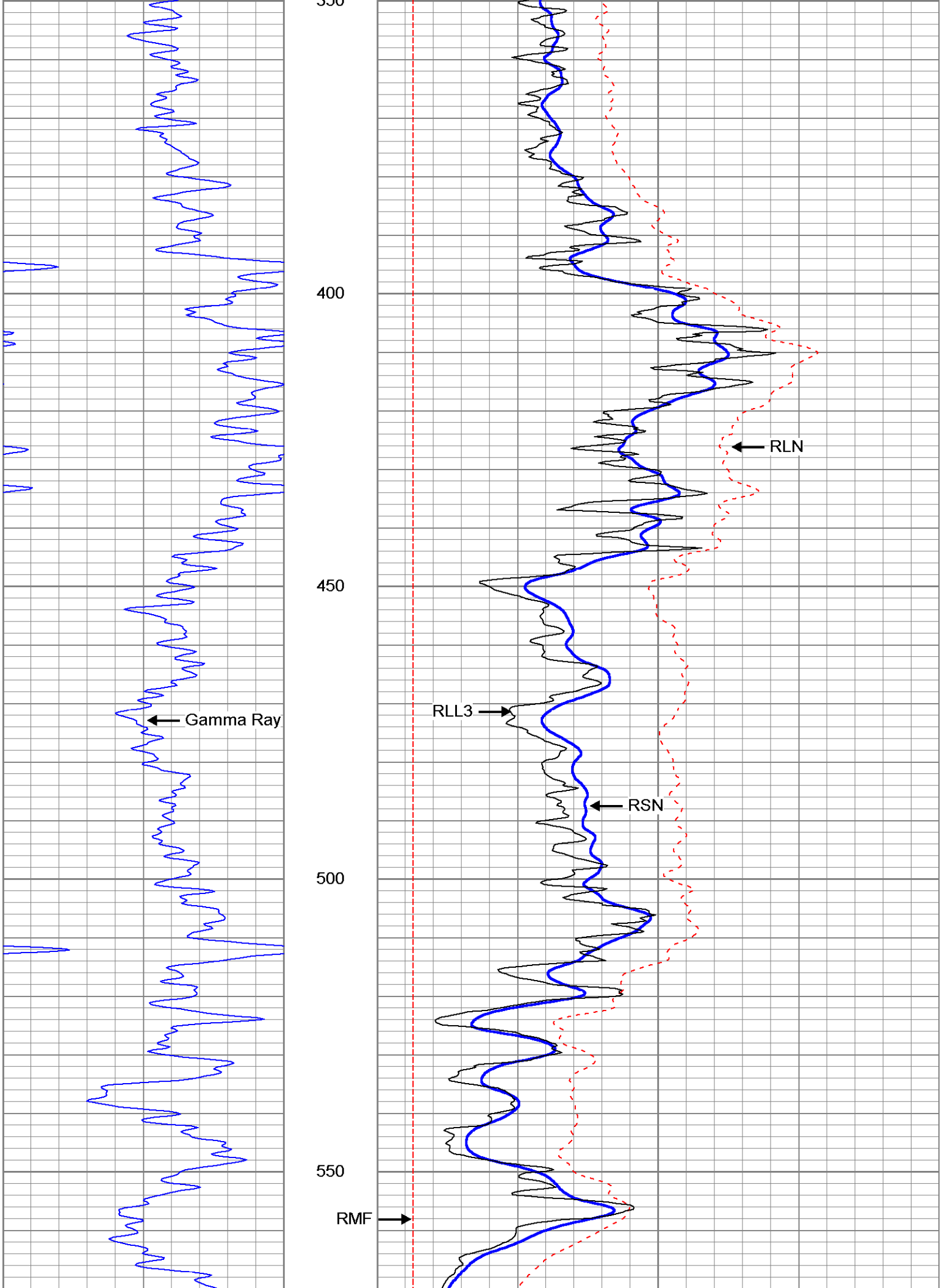
Database File:	14692.db
Dataset Pathname:	Best/well/run1/LL3
Presentation Format:	GUARD
Dataset Creation:	Tue Jun 09 19:47:46 2009 by Log Warrior Version 6.6
Charted by:	Depth in Feet scaled 1:240

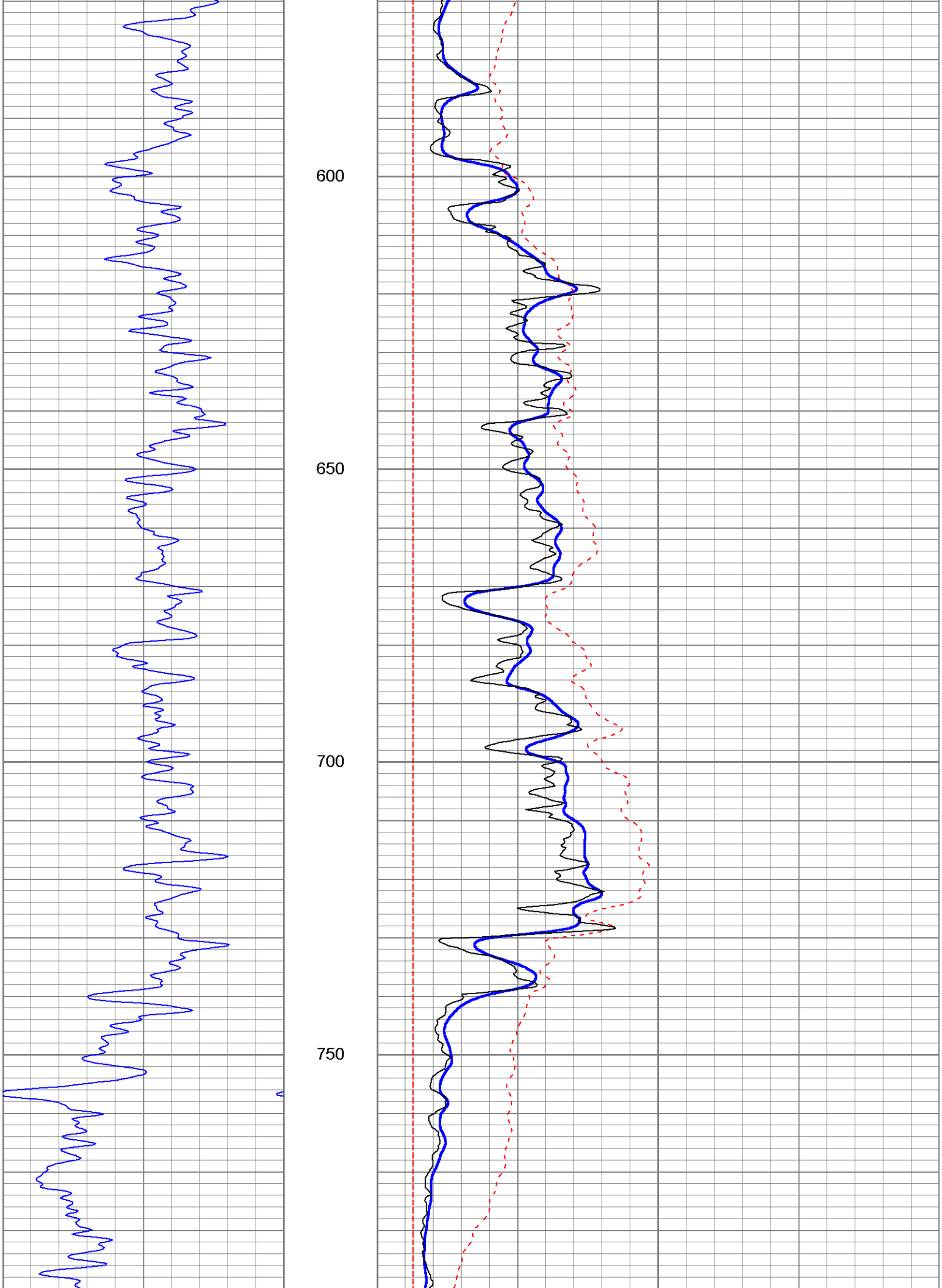
45	Gamma-Ray (GAPI)	115

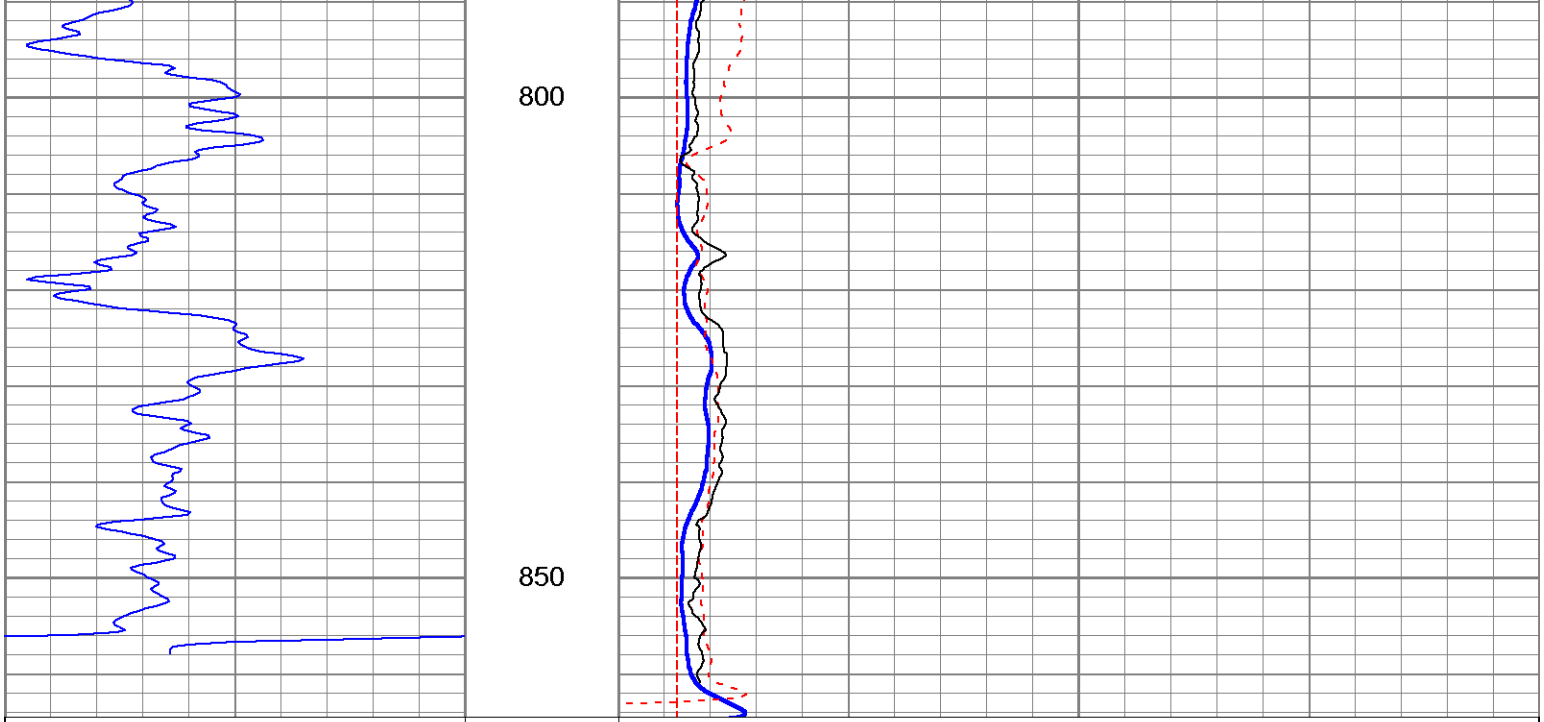
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000




150
200
250
300
350


350
400
450
500
550
Gamma Ray
RLL3
RSN
RLN
RMF


600
650
700
750



45	Gamma-Ray (GAPI)	115
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No. 14692

Company BEST DRILLING & PUMP
Well EPA MP2
Field RIALTO
County SAN BERNARDINO State CA

Location:

CORNER OF WILLOW @ ROMONA
GPS: N34o 06.477' W117o 22.489

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation K.B. D.F. G.L.
Log Measured From	G.L.	0	
Drilling Measured From	G.L.		

Date	06-09-09		
Run Number	ONE		
Depth Driller	870'		
Depth Logger	869'		
Bottom Logged Interval	868'		
Top Log Interval	30'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	13.5 @ 77F		
Rmf @ Meas. Temp	12.8 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HRS		
Time Logger on Bottom	19:10		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	RIDDER		
Witnessed By	B.J. LECHLER		

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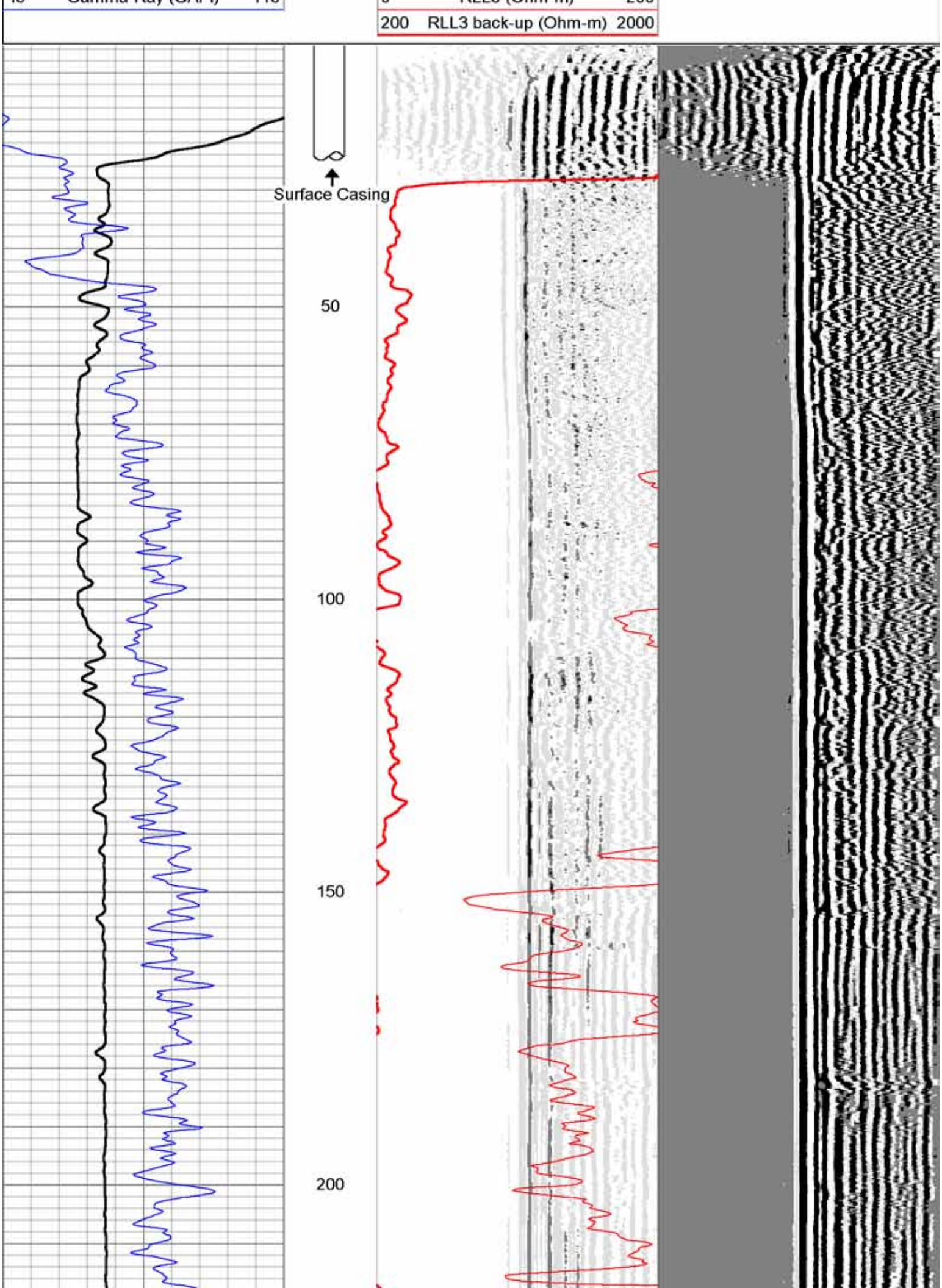
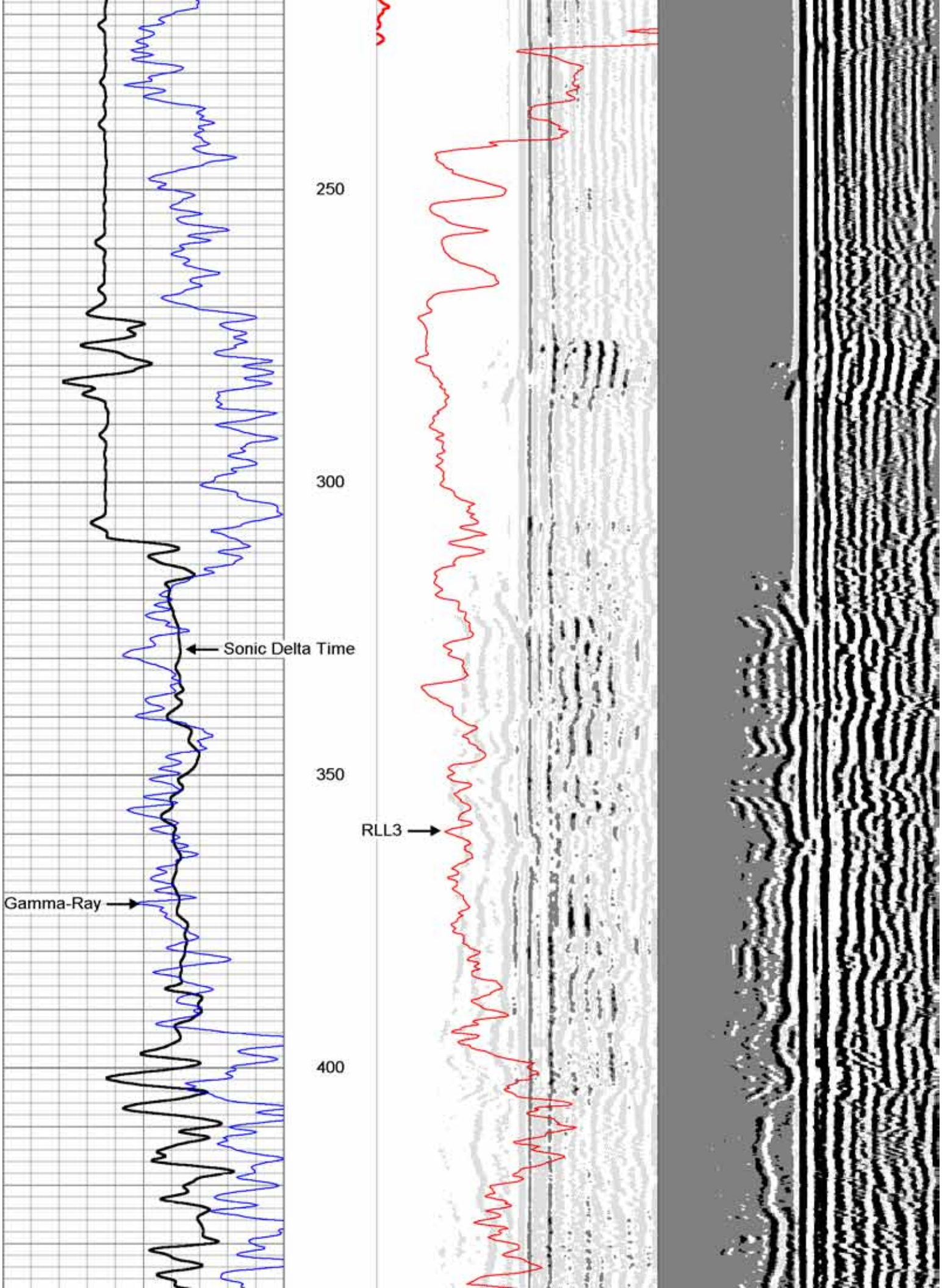
All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

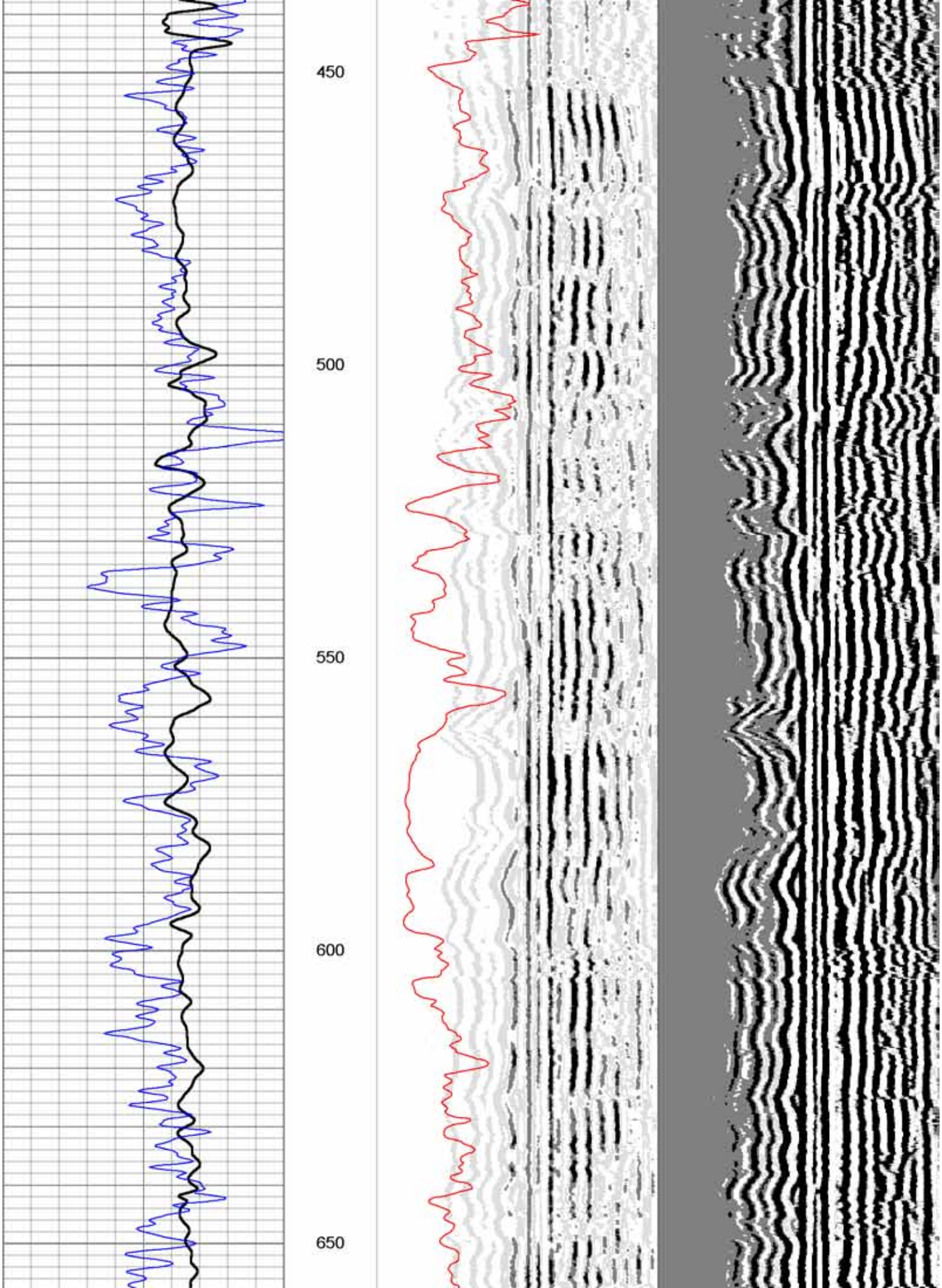
Comments

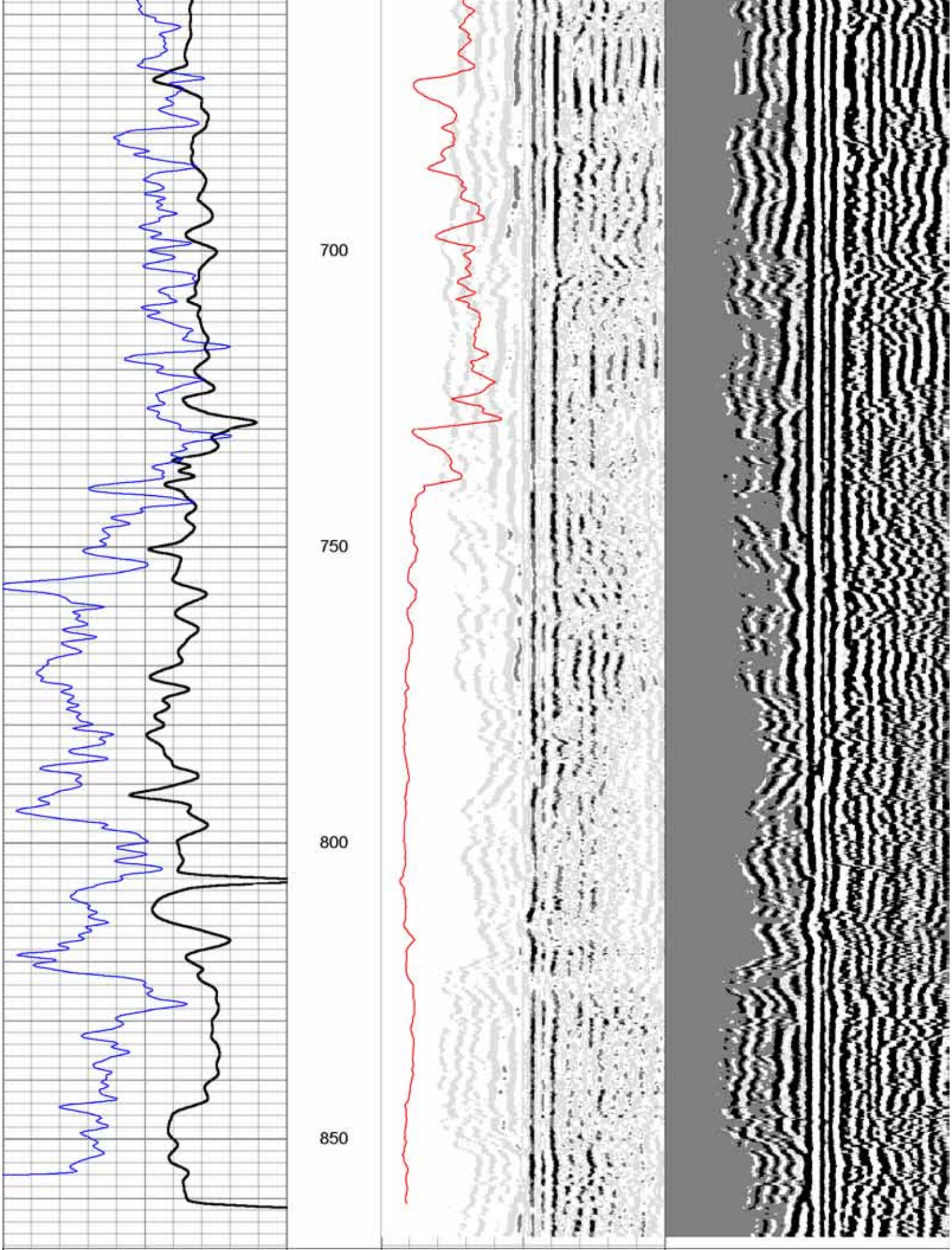
Database File: 14692.db
Dataset Pathname: Best/well/run1/SONIC
Presentation Format: SLT
Dataset Creation: Tue Jun 09 20:18:44 2009 by Log Warrior Version 6.6
Charted by: Depth in Feet scaled 1:240

260	DT (usec/ft)	60		500	Variable Density 5 ft	1600
45	Gamma-Ray (GAPI)	115		0	RLL3 (Ohm-m)	200


200 RLL3 back-up (Ohm-m) 2000
Surface Casing
50
100
150
200


250
300
Sonic Delta Time
350
RLL3
Gamma-Ray
400


450
500
550
600
650


700
750
800
850
260 DT (usec/ft) 60
45 Gamma-Ray (GAPI) 115
500 Variable Density 5 ft 1600
0 RLL3 (Ohm-m) 200
500 Variable Density 5 ft 1600

200 RLL3 back-up (Ohm-m) 2000

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA RAY

Job No.
14762

Company BEST DRILLING & PUMP
Well MP-3
Field RIALTO
County SAN BERNARDINO State CA

Location:

N34*07.437' W117*22.380'

Sec. Twp. Rge.

Other Services:

GR/LL3
SONIC/VDL
CALIPER

			Elevation
Permanent Datum	G.L.	Elevation above perm. datum	K.B.
Log Measured From	G.L.	0'	D.F.
Drilling Measured From	G.L.		G.L.

Date	7-15-2009		
Run Number	ONE		
Depth Driller	932'		
Depth Logger	932'		
Bottom Logged Interval	931'		
Top Log Interval	0'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	20.1 @ 77F		
Rmf @ Meas. Temp	22.7 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HOURS		
Time Logger on Bottom	5:30 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	ABREAU		
Witnessed By	B.J LECHLER		

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Comments

ELOG Calibration Report

Serial: D1
Model: DTQ

Shop Calibration Performed: Wed Jan 28 14:40:45 2009
Before Survey Verification Performed: Mon Aug 06 11:54:10 2007
After Survey Verification Performed: Mon Aug 06 11:54:38 2007

Shop Calibration

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	10.916	101.981		10.200	102.200	Ohm-m	1.010	-0.828
Long	15.254	104.296		10.200	102.200	Ohm-m	1.033	-19.746
IEE	83.389	24228.514	counts	0.091	26.516	A		
VSN	103.676	2918.243	counts	1.977	55.662	V		
VLN	34.667	0.000	counts	0.661	0.000	V		

Before Survey Verification

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	183.906	100.821		9.828	100.799	Ohm-m	-1.095	211.190
Long	422.542	101.924		101.776	101.776	Ohm-m	-0.317	134.130
IEE	59.028	6394.075	counts	0.065	6.998	A		
VSN	121.963	7242.794	counts	2.326	138.147	V		
VLN	70.056	1830.495	counts	1.336	34.914	V		

After Survey Verification

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	117.548	100.824		183.906	100.821	Ohm-m	4.968	-400.076
Long	271.705	101.931		101.924	101.924	Ohm-m	1.888	-90.571
IEE	92.849	6387.565	counts	0.102	6.991	A		
VSN	122.623	7235.648	counts	2.339	138.011	V		
VLN	70.858	1828.759	counts	1.352	34.881	V		

After Survey Verification compared to Before Survey Calibration

	Zero Before	Zero After		Cal Before	Cal After	
Short	9.828	183.906	Ohm-m	100.799	100.821	Ohm-m
Long	0.000	422.542	Ohm-m	101.776	101.924	Ohm-m

Gamma Ray Calibration Report

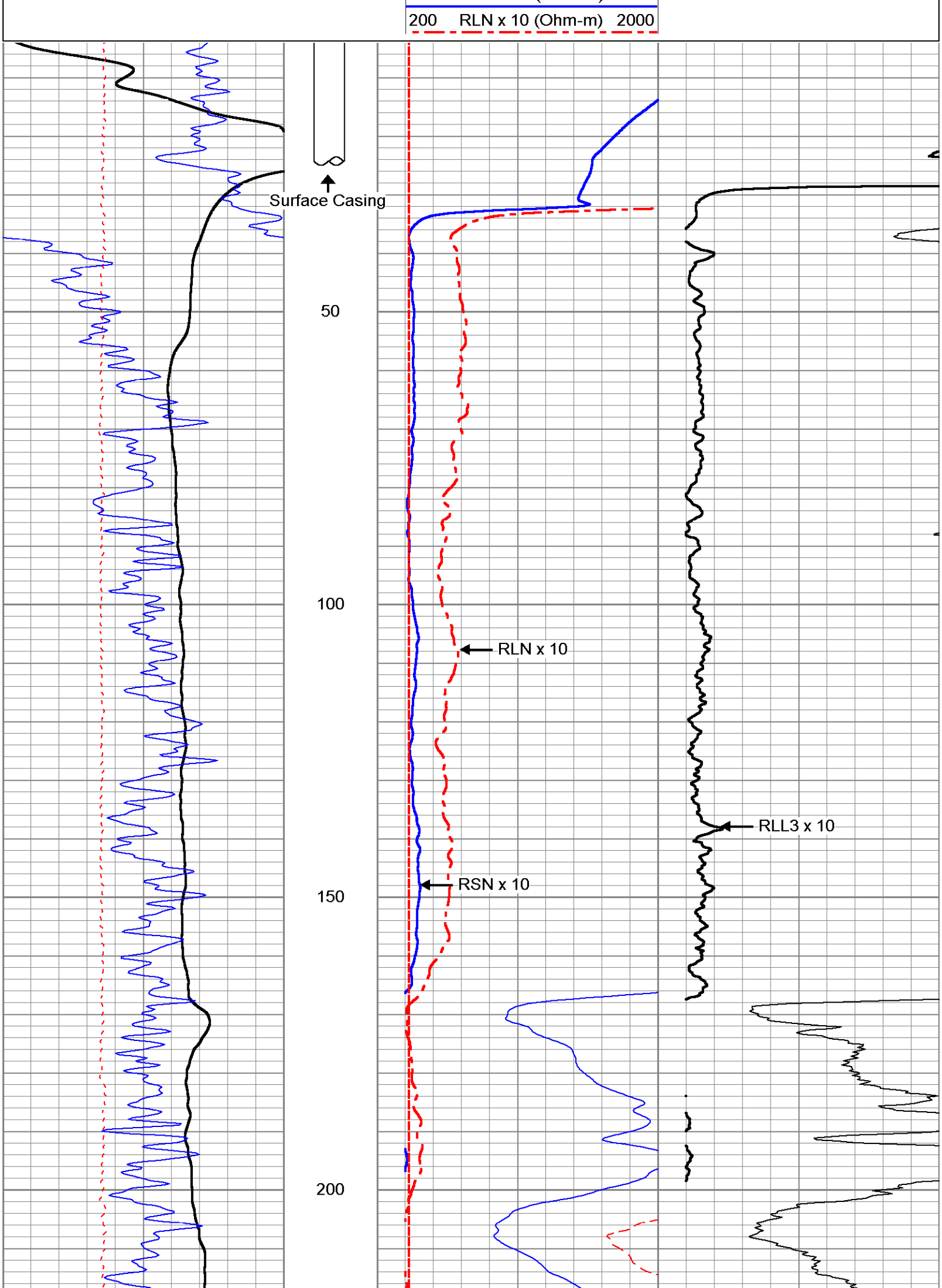
Serial Number:	D1	
Tool Model:	ELOG	
Performed:	Mon Sep 29 13:55:50 2008	
Calibrator Value:	162	GAPI
Background Reading:	151.12	cps
Calibrator Reading:	599.794	cps
Sensitivity:	0.361064	GAPI/cps

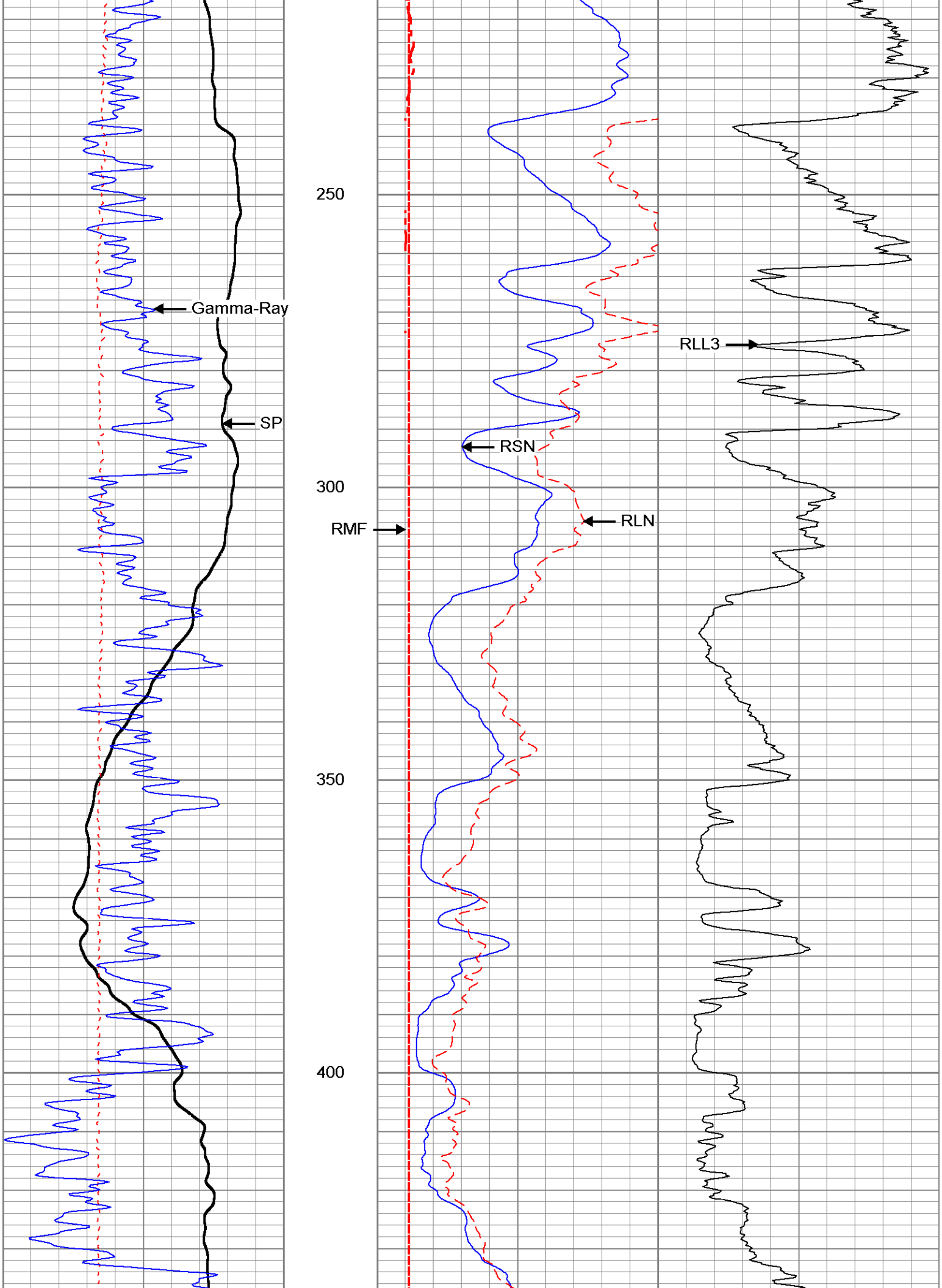
Database File:	14762.db
Dataset Pathname:	elog
Presentation Format:	ELOG
Dataset Creation:	Wed Jul 15 17:32:23 2009 by Log Warrior Version 6.6
Charted by:	Depth in Feet scaled 1:240

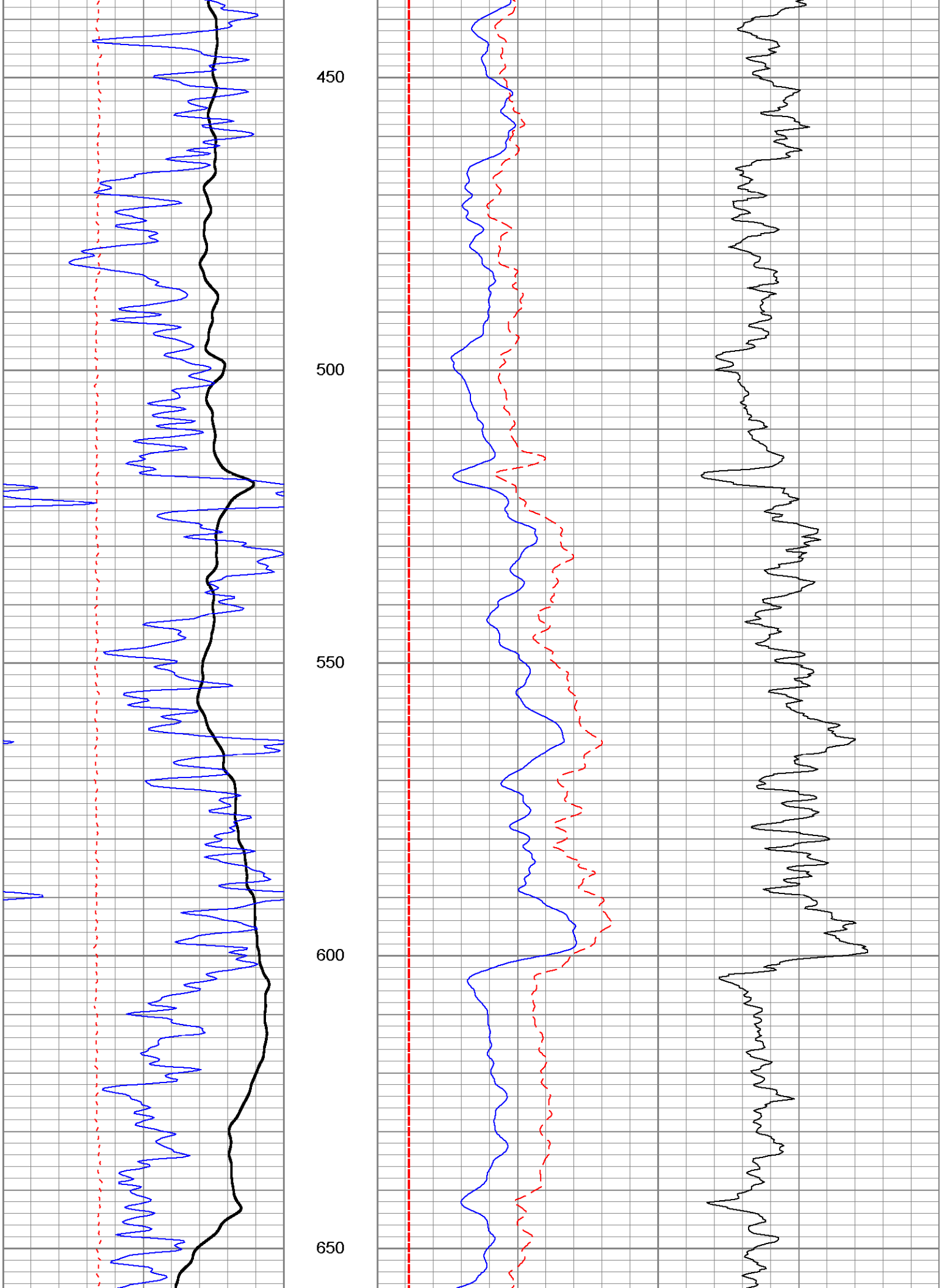
-150	SP (mV)	100
0	Line Speed (ft/min)	100
60	Gamma-Ray (GAPI)	120

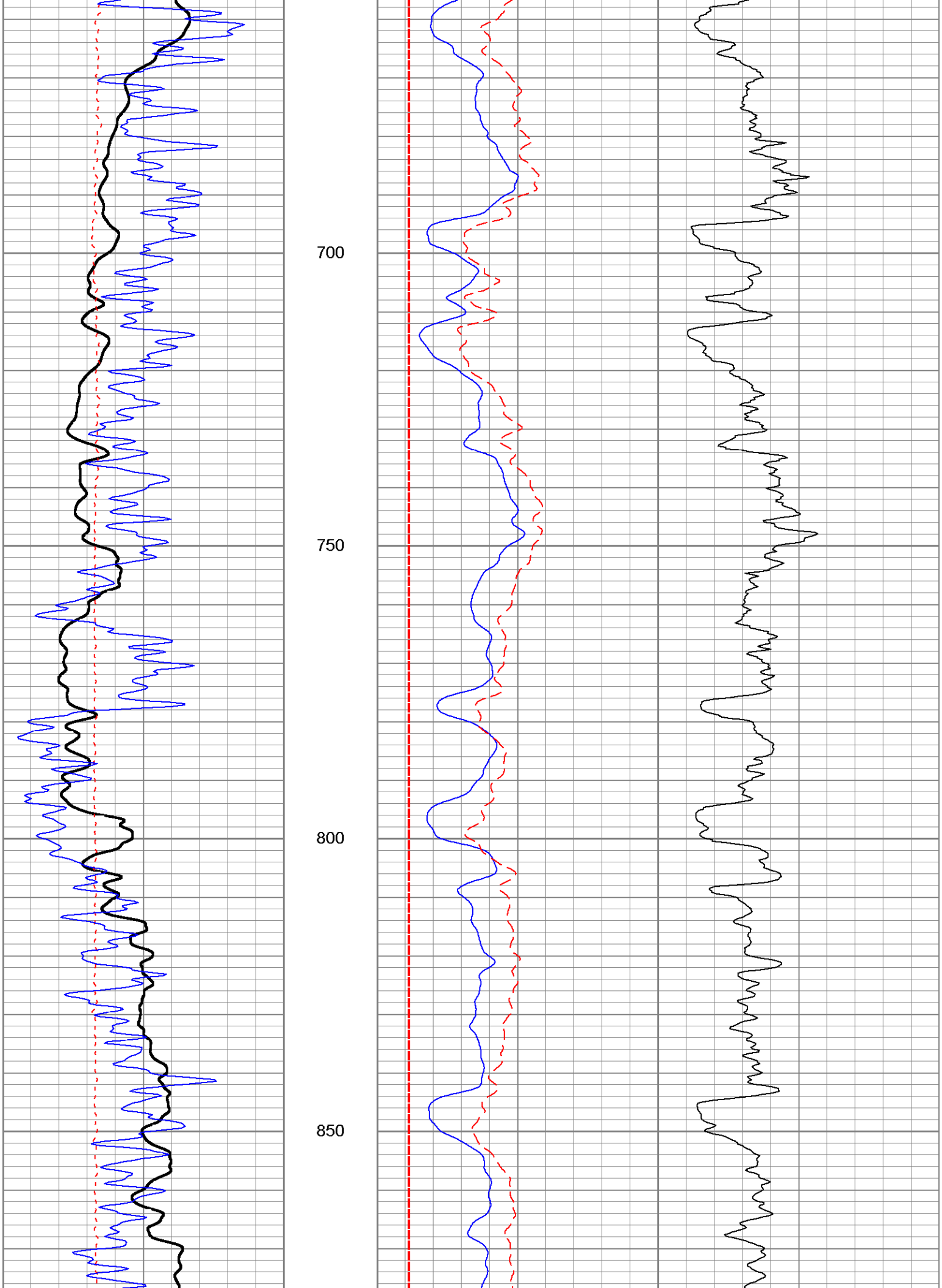
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000

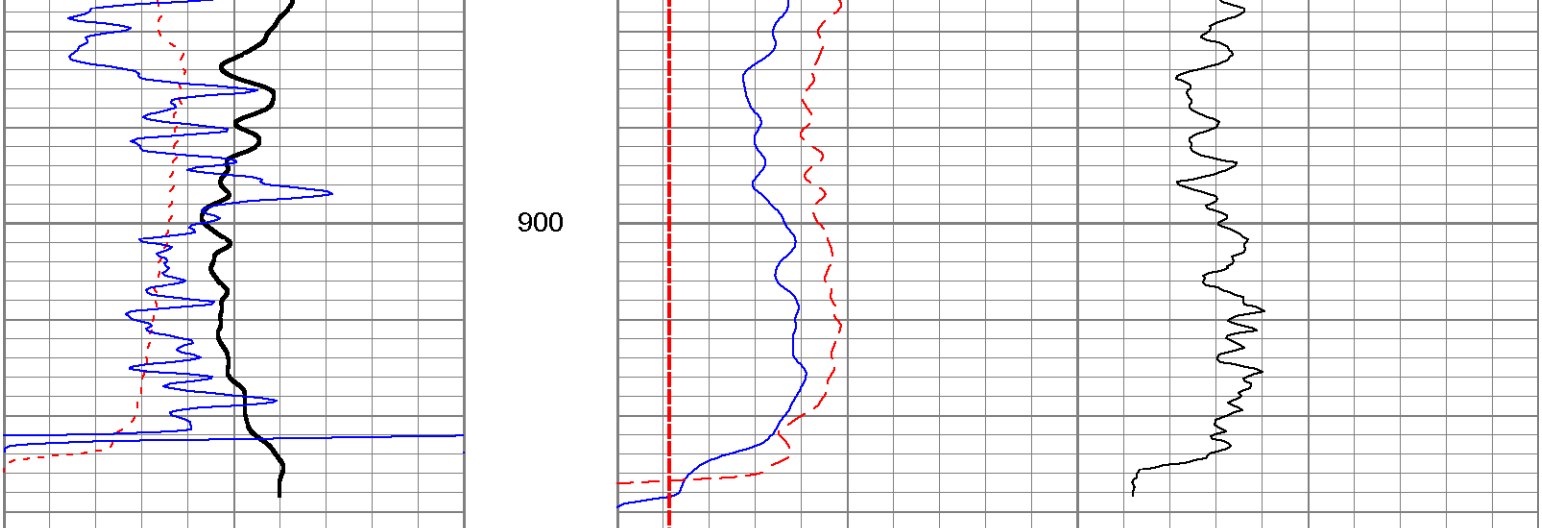
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000


200 RLN x 10 (Ohm-m) 2000
Surface Casing
50
100
150
200
RLN x 10
RSN x 10
RLL3 x 10


250
300
350
400
Gamma-Ray
SP
RMF
RSN
RLN
RLL3


450
500
550
600
650


700
750
800
850


900
-150 SP (mV) 100
0 Line Speed (ft/min) 100
60 Gamma-Ray (GAPI) 120
0 RSN (Ohm-m) 200
0 RLN (Ohm-m) 200
0 RMF (Ohm-m) 200
200 RSN x 10 (Ohm-m) 2000
200 RLN x 10 (Ohm-m) 2000
0 RLL3 (Ohm-m) 200
200 RLL3 x 10 (Ohm-m) 2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA RAY

Job No.
14762

Company BEST DRILLING & PUMP
Well MP-3
Field RIALTO
County SAN BERNARDINO State CA

Location:

N34*07.437' W117*22.380'

Sec. Twp. Rge.

Other Services:

ELOG
SONIC/VDL
CALIPER

			Elevation
Permanent Datum	G.L.	Elevation above perm. datum	K.B.
Log Measured From	G.L.	0'	D.F.
Drilling Measured From	G.L.		G.L.

Date	7-15-2009		
Run Number	ONE		
Depth Driller	932'		
Depth Logger	932'		
Bottom Logged Interval	931'		
Top Log Interval	0'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	20.1 @ 77F		
Rmf @ Meas. Temp	22.7 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HOURS		
Time Logger on Bottom	5:30 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	ABREAU		
Witnessed By	B.J LECHLER		

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Comments

Gamma Ray Calibration Report

Serial Number: 13
Tool Model: GROH
Performed: Mon Sep 29 14:35:52 2008

Calibrator Value: 162 GAPI

Background Reading:	36.9056	
Calibrator Reading:	160.261	
Sensitivity:	1.31328	GAPI/

Simplec Long Guard Calibration Report

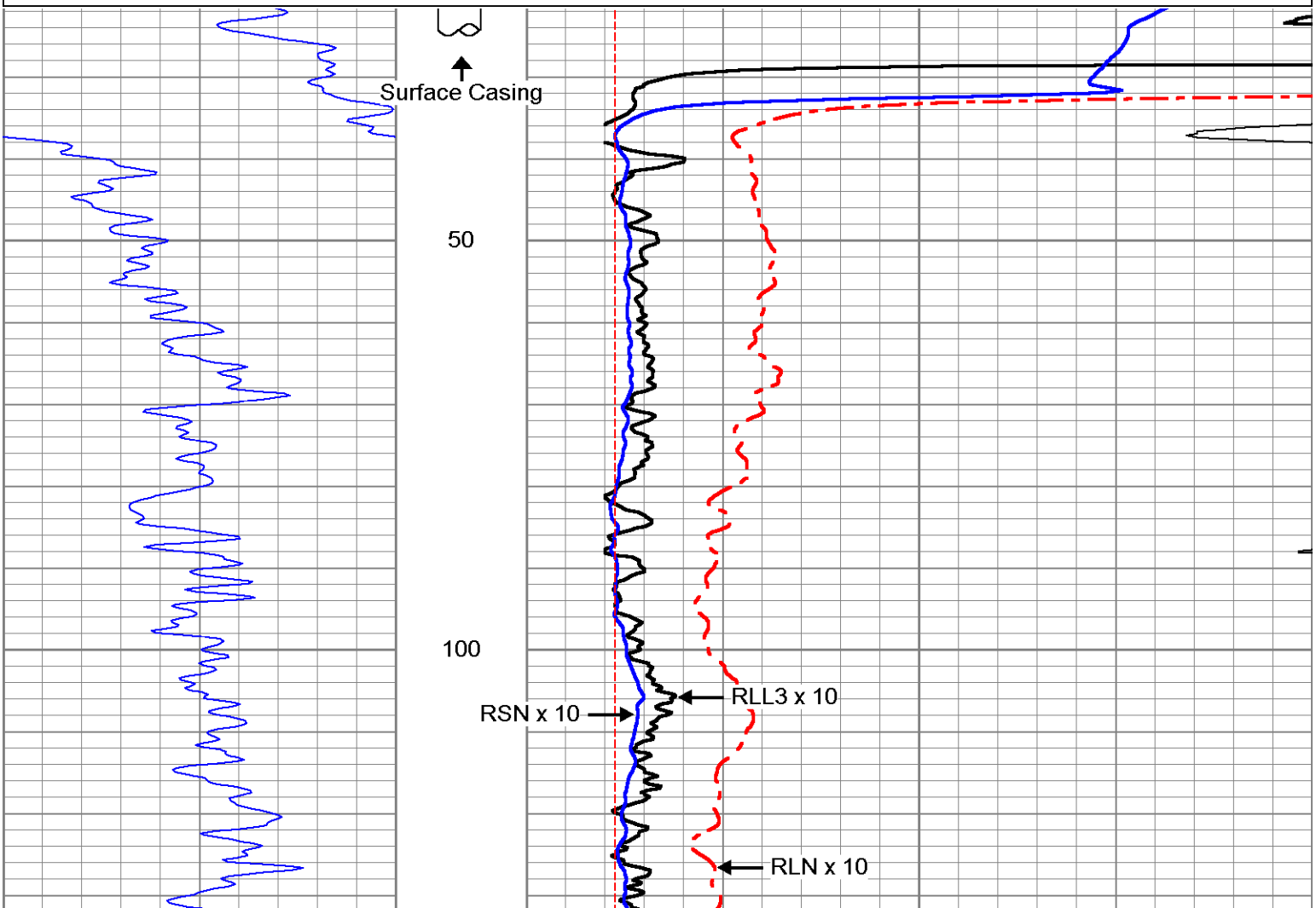
Serial Number:	81
Tool Model:	M&W
Performed:	Wed Jan 28 14:45:28 2009

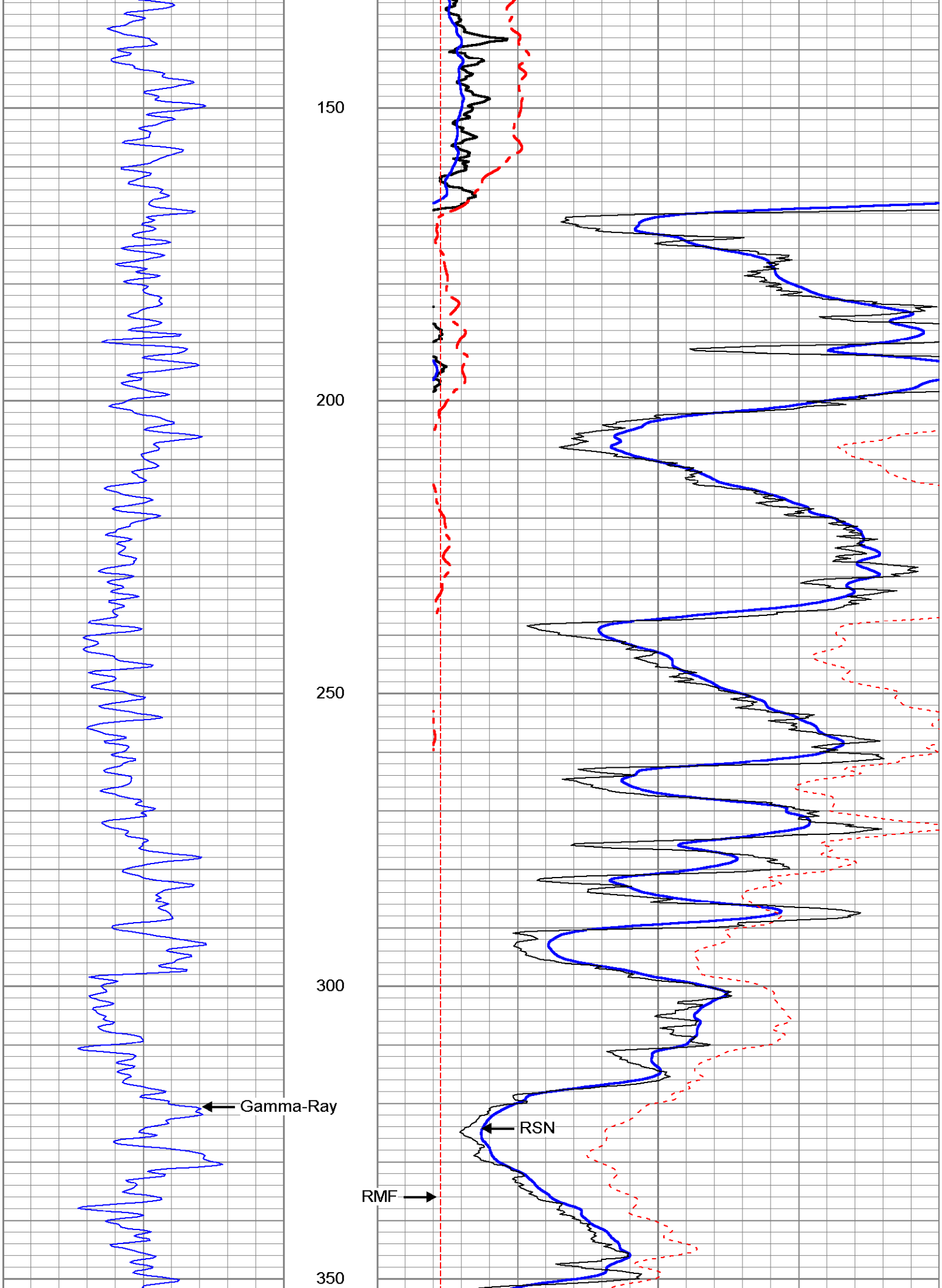
System Reading	Calibration Reference	
0.306	2.500	Ohm-m
0.605	5.000	
6.015	50.000	
28.373	250.000	
56.371	500.000	

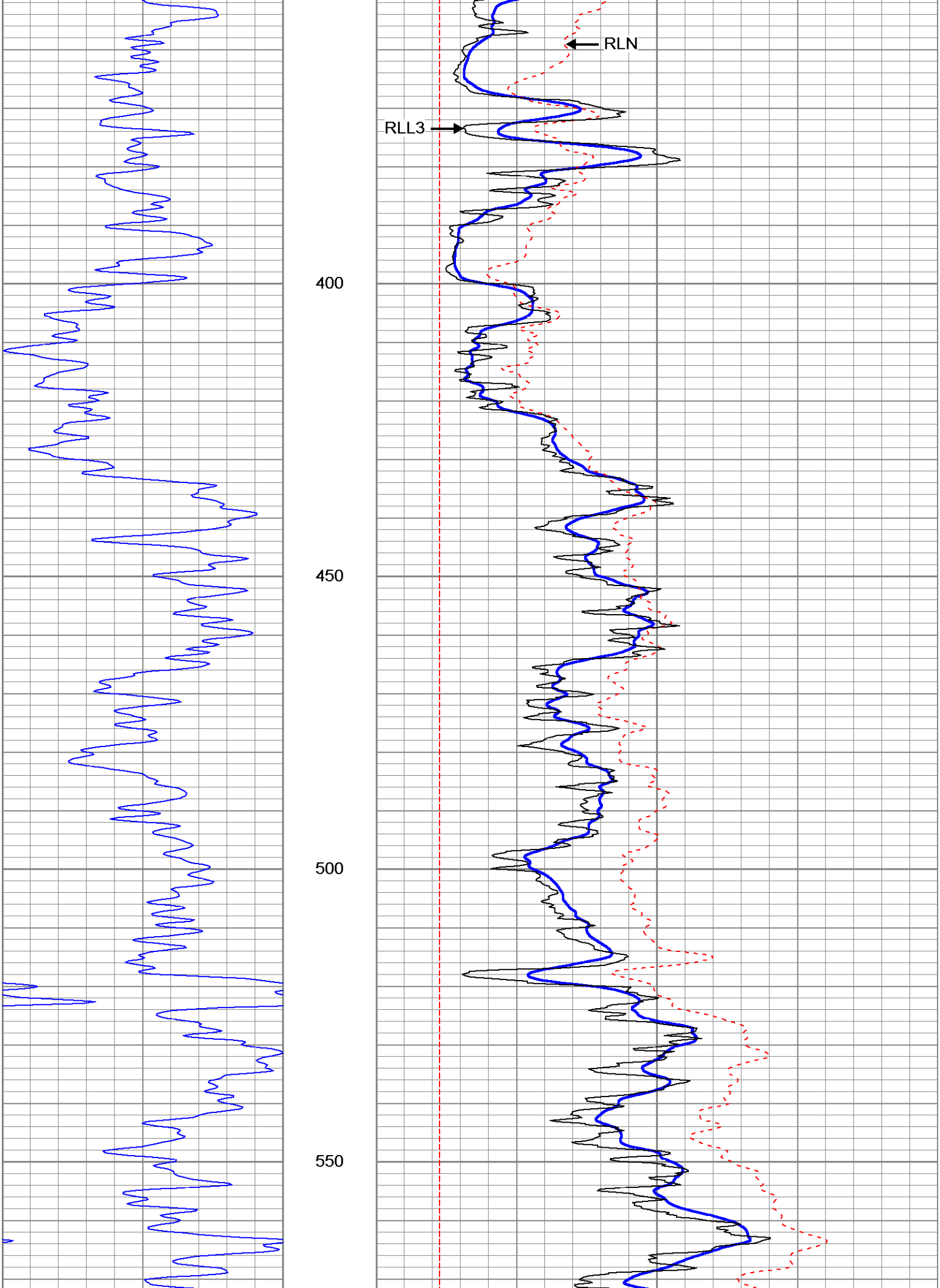
Database File:	14762.db
Dataset Pathname:	LL3
Presentation Format:	GUARD
Dataset Creation:	Wed Jul 15 18:09:50 2009 by Log Warrior Version 6.6
Charted by:	Depth in Feet scaled 1:240

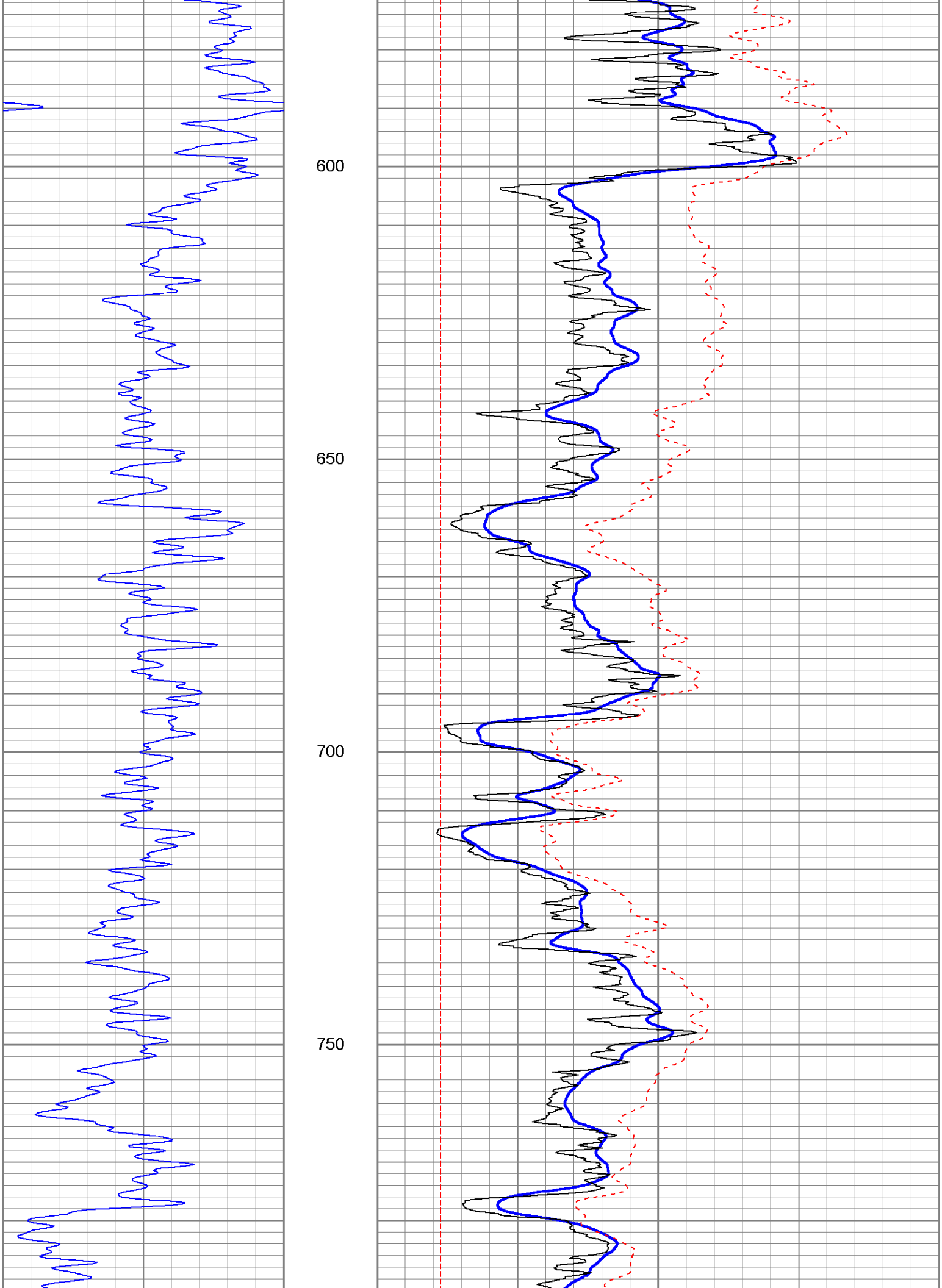
60	Gamma Ray (GAPI)	120

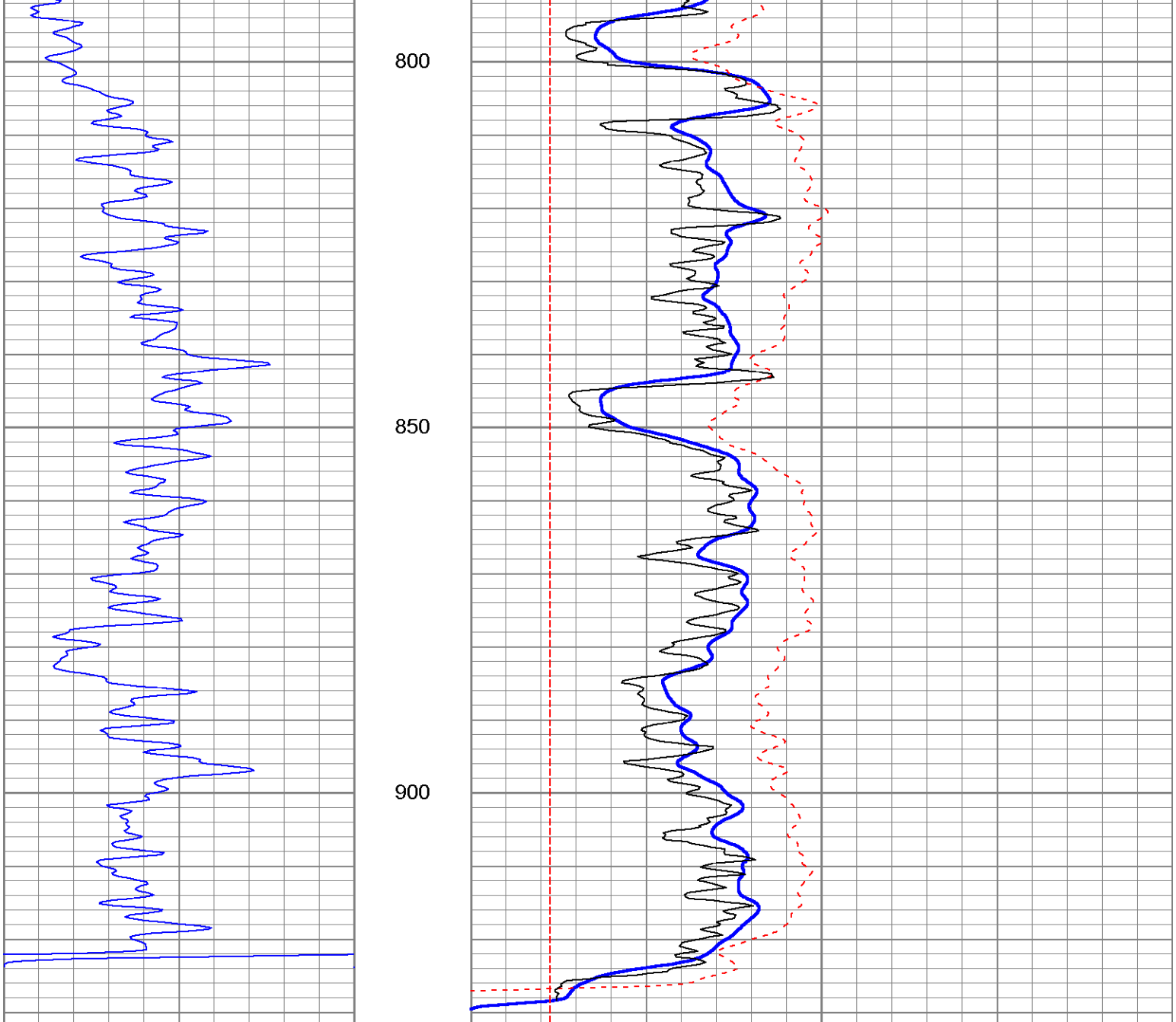
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000




150
200
250
300
350
Gamma-Ray
RSN
RMF


RLN
RLL3
400
450
500
550


600
650
700
750



60	Gamma Ray (GAPI)	120
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No. 14762

Company BEST DRILLING & PUMP

Well MP-3

Field RIALTO

County SAN BERNARDINO State CA

Location:

N34*07.437' W117*22.380'

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation K.B. D.F. G.L.
Log Measured From	G.L.	0'	
Drilling Measured From	G.L.		

Date	7-15-2009		
Run Number	ONE		
Depth Driller	932'		
Depth Logger	932'		
Bottom Logged Interval	931'		
Top Log Interval	0'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	20.1 @ 77F		
Rmf @ Meas. Temp	22.7 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HOURS		
Time Logger on Bottom	5:30 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	ABREAU		
Witnessed By	B.J LECHLER		

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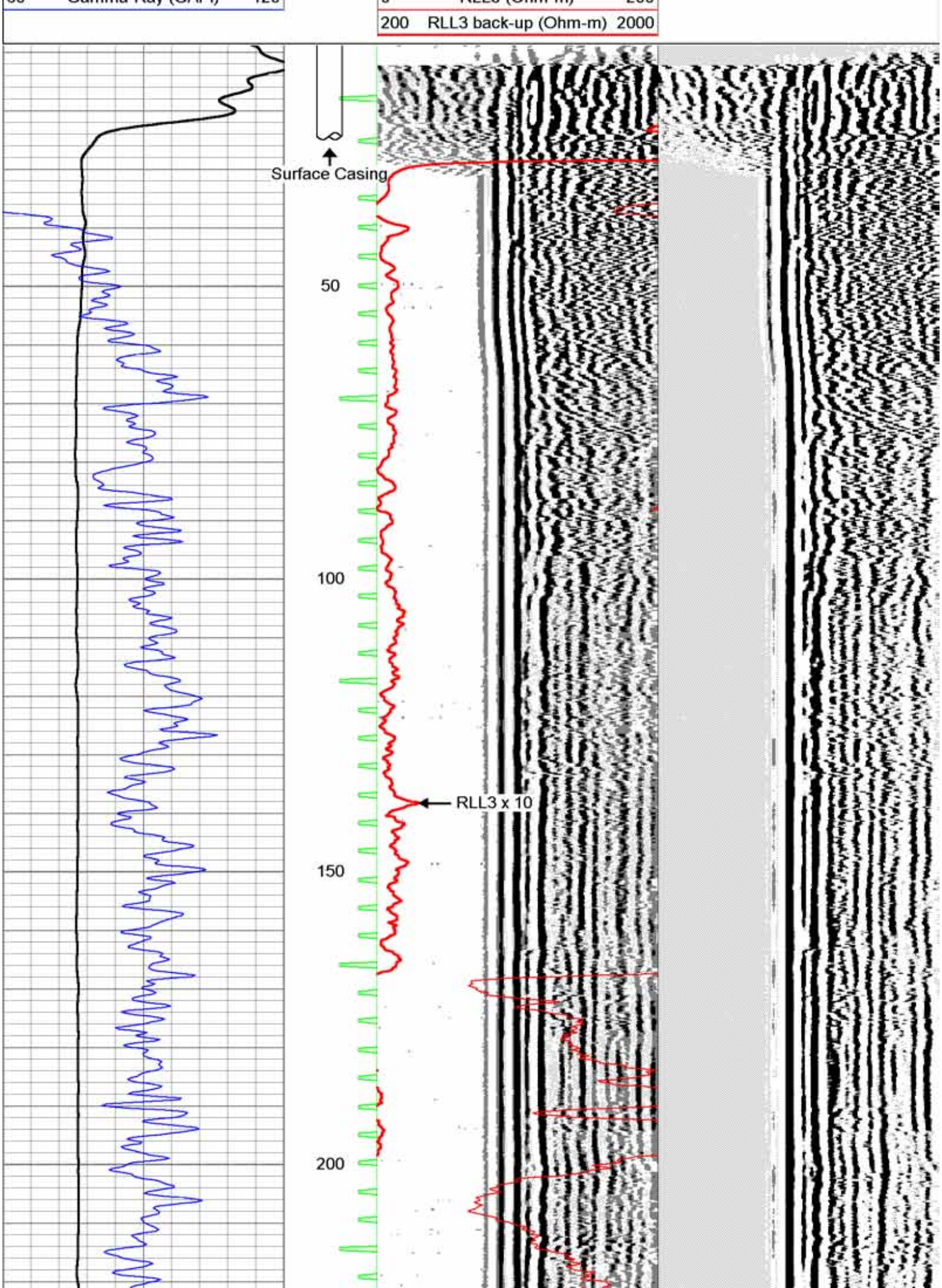
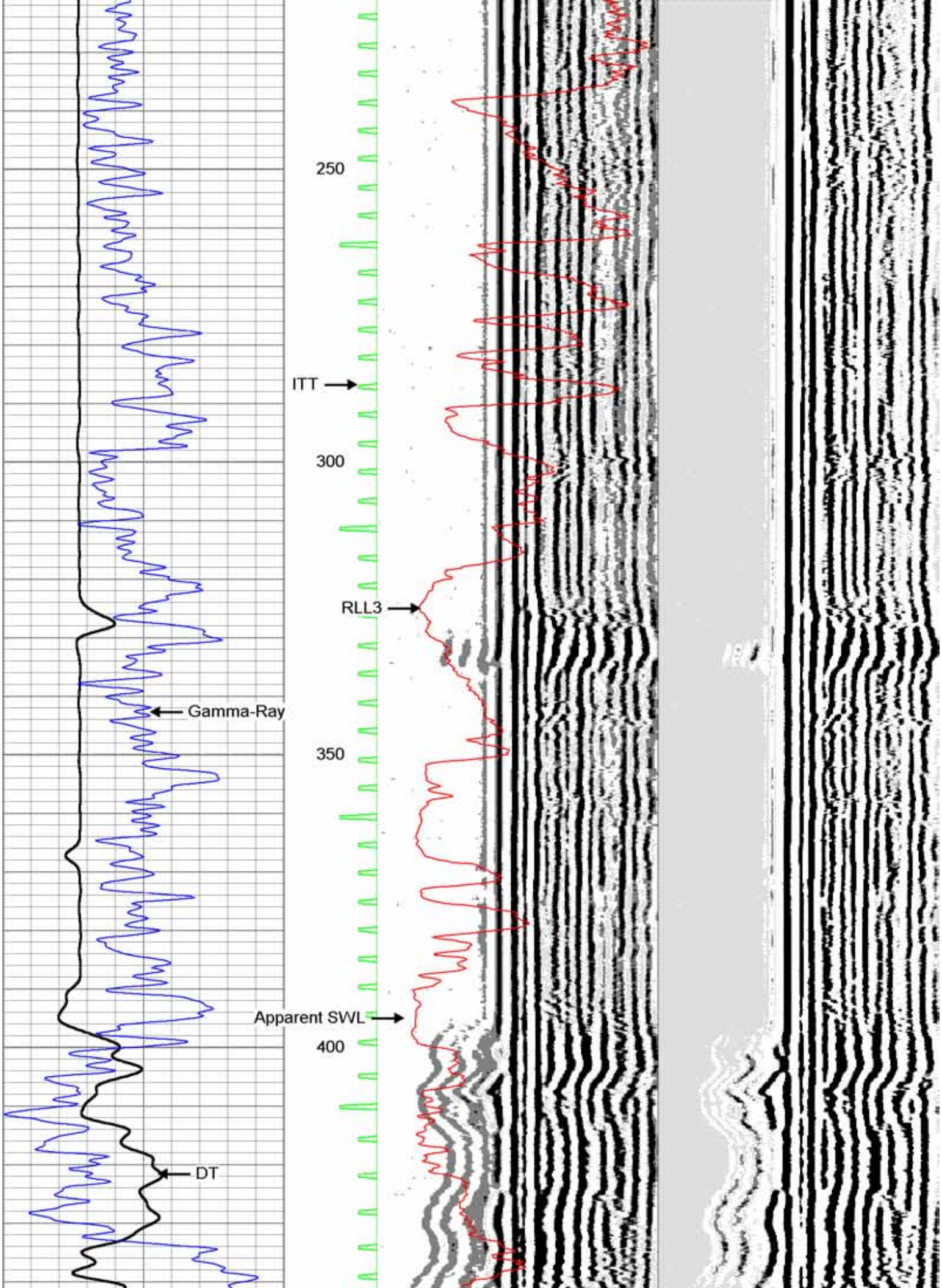
All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

Database File: 14762.db
Dataset Pathname: snc
Presentation Format: SLT
Dataset Creation: Wed Jul 15 18:38:03 2009 by Log Warrior Version 6.6
Charted by: Depth in Feet scaled 1:240

260	DT (usec/ft)	60	ITT (msec)	600	Variable Density 5 ft	1600	Variable Density 5 ft	1600
60	Gamma-Ray (GAPI)	120		0	RLL3 (Ohm-m)	200		


200 RLL3 back-up (Ohm-m) 2000
Surface Casing
50
100
RLL3 x 10
150
200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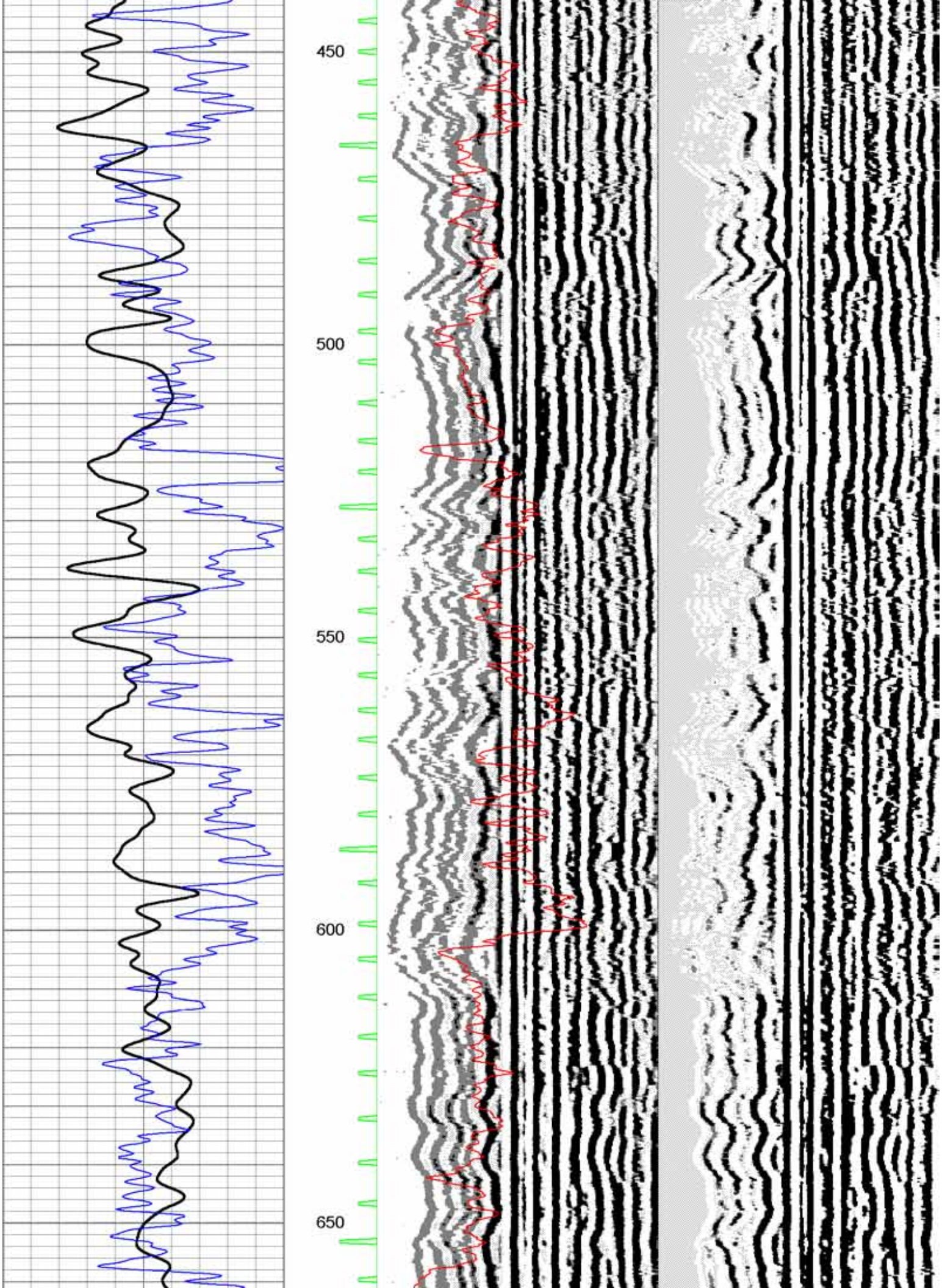
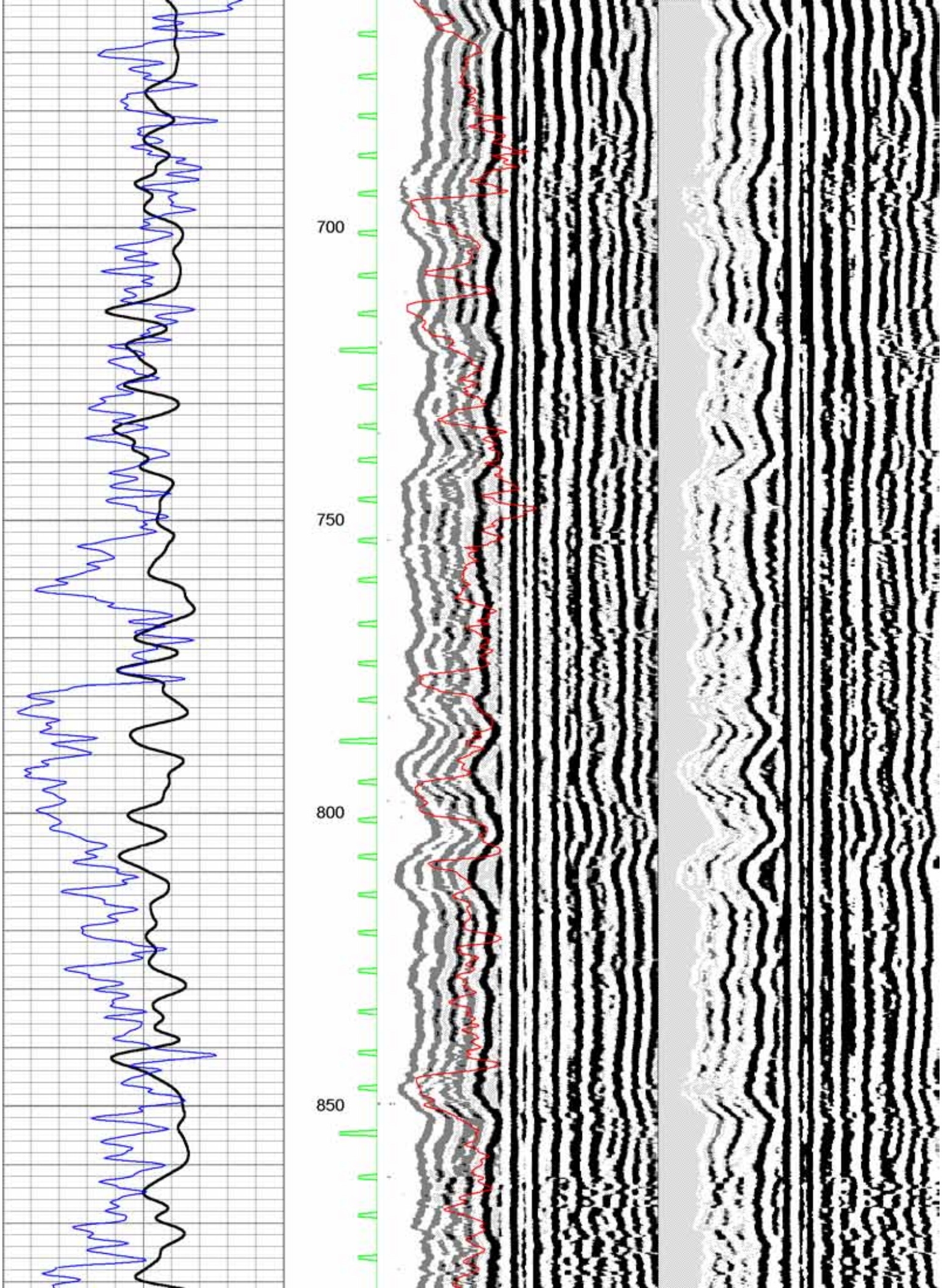
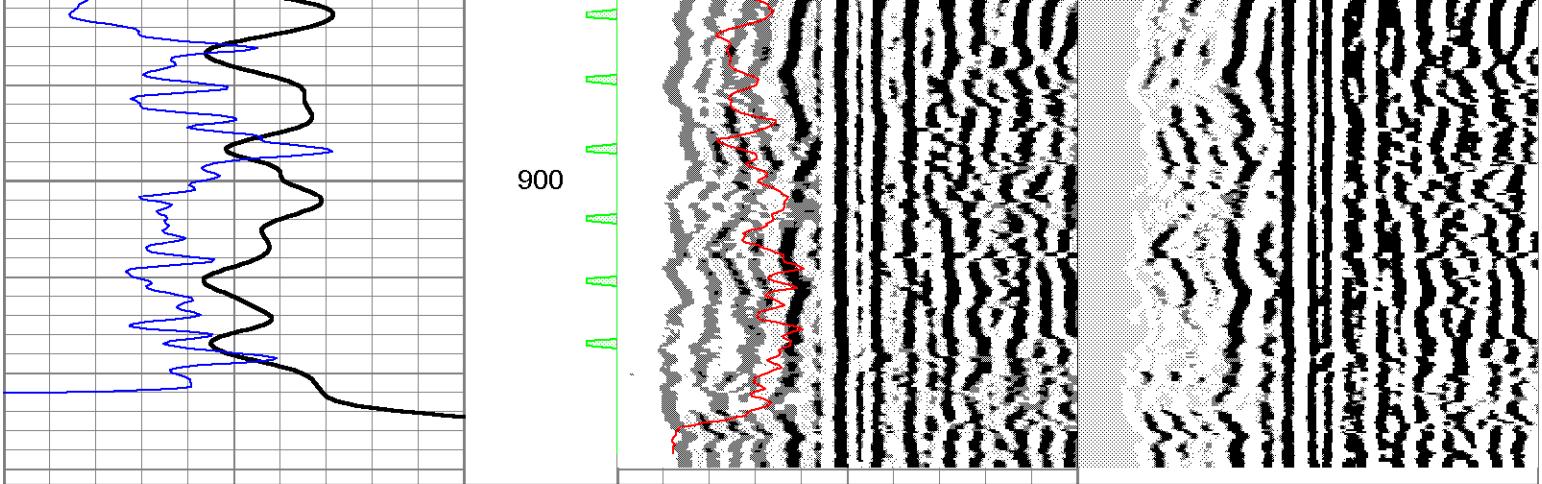
ITT
300
RLL3
Gamma-Ray
350
Apparent SWL
400
DT


450
500
550
600
650


700
750
800
850


900
260 DT (usec/ft) 60
60 Gamma-Ray (GAPI) 120
ITT (msec)
600 Variable Density 5 ft 1600
0 RLL3 (Ohm-m) 200
200 RLL3 back-up (Ohm-m) 2000
600 Variable Density 5 ft 1600

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA RAY

Job No. 14817

Company BEST DRILLING & PUMP
Well MP-4
Field RIALTO
County SAN BERNARDINO State CA

Location:
N34*08.255' W117*23.380'
Sec. Twp. Rge.

Other Services:
GR/LL3
SONIC/VDL
CALIPER

			Elevation
Permanent Datum	G.L.	Elevation above perm. datum	K.B.
Log Measured From	G.L.	0'	D.F.
Drilling Measured From	G.L.		G.L.

Date	8-18-2009		
Run Number	ONE		
Depth Driller	820'		
Depth Logger	819'		
Bottom Logged Interval	819'		
Top Log Interval	0'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	11.7 @ 77F		
Rmf @ Meas. Temp	12.9 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HOURS		
Time Logger on Bottom	7:10 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	ABREAU/NELSON		
Witnessed By	B.J LECHLER		

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Comments

ELOG Calibration Report

Serial: D1
Model: DTQ

Shop Calibration Performed: Wed Jan 28 14:40:45 2009
Before Survey Verification Performed: Mon Aug 06 11:54:10 2007
After Survey Verification Performed: Mon Aug 06 11:54:38 2007

Shop Calibration

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	10.916	101.981		10.200	102.200	Ohm-m	1.010	-0.828
Long	15.254	104.296		10.200	102.200	Ohm-m	1.033	-19.746
IEE	83.389	24228.514	counts	0.091	26.516	A		
VSN	103.676	2918.243	counts	1.977	55.662	V		
VLN	34.667	0.000	counts	0.661	0.000	V		

Before Survey Verification

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	183.906	100.821		9.828	100.799	Ohm-m	-1.095	211.190
Long	422.542	101.924		101.776	101.776	Ohm-m	-0.317	134.130
IEE	59.028	6394.075	counts	0.065	6.998	A		
VSN	121.963	7242.794	counts	2.326	138.147	V		
VLN	70.056	1830.495	counts	1.336	34.914	V		

After Survey Verification

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	117.548	100.824		183.906	100.821	Ohm-m	4.968	-400.076
Long	271.705	101.931		101.924	101.924	Ohm-m	1.888	-90.571
IEE	92.849	6387.565	counts	0.102	6.991	A		
VSN	122.623	7235.648	counts	2.339	138.011	V		
VLN	70.858	1828.759	counts	1.352	34.881	V		

After Survey Verification compared to Before Survey Calibration

	Zero Before	Zero After		Cal Before	Cal After	
Short	9.828	183.906	Ohm-m	100.799	100.821	Ohm-m
Long	0.000	422.542	Ohm-m	101.776	101.924	Ohm-m

Gamma Ray Calibration Report

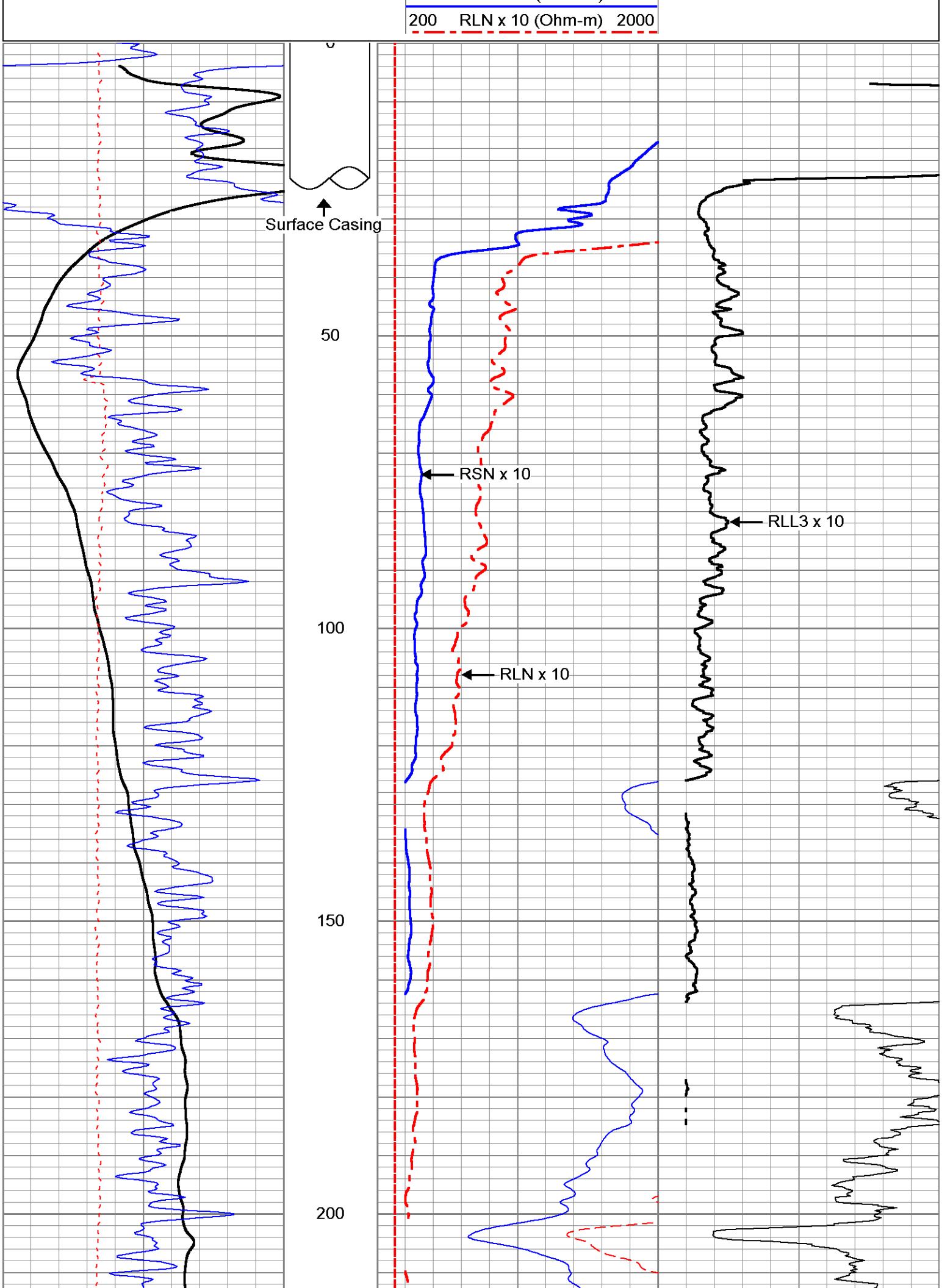
Serial Number:	D1	
Tool Model:	ELOG	
Performed:	Mon Sep 29 13:55:50 2008	
Calibrator Value:	162	GAPI
Background Reading:	151.12	cps
Calibrator Reading:	599.794	cps
Sensitivity:	0.361064	GAPI/cps

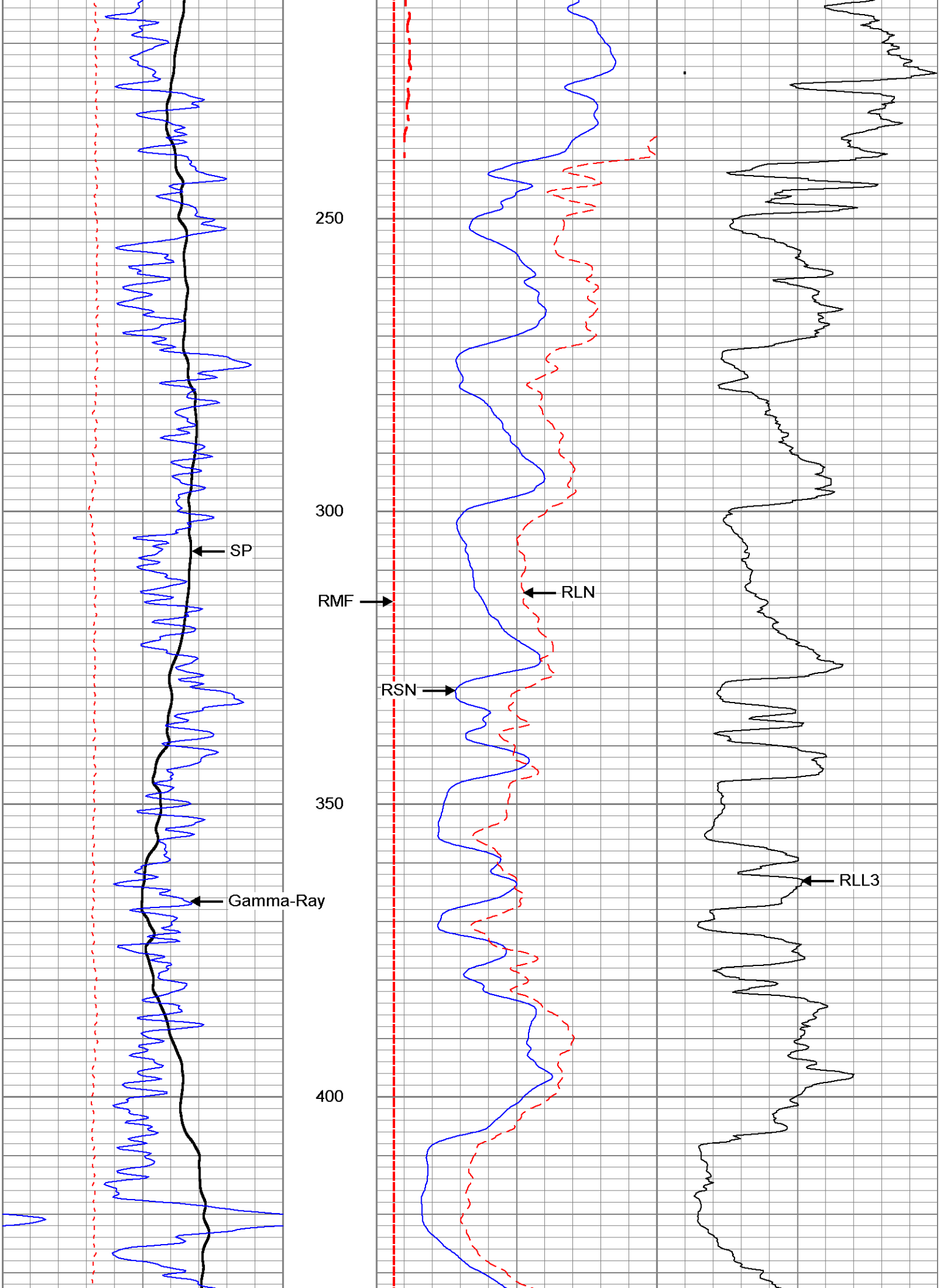
Database File:	14817.db
Dataset Pathname:	elog
Presentation Format:	ELOG
Dataset Creation:	Tue Aug 18 19:15:06 2009 by Log Warrior Version 6.6
Charted by:	Depth in Feet scaled 1:240

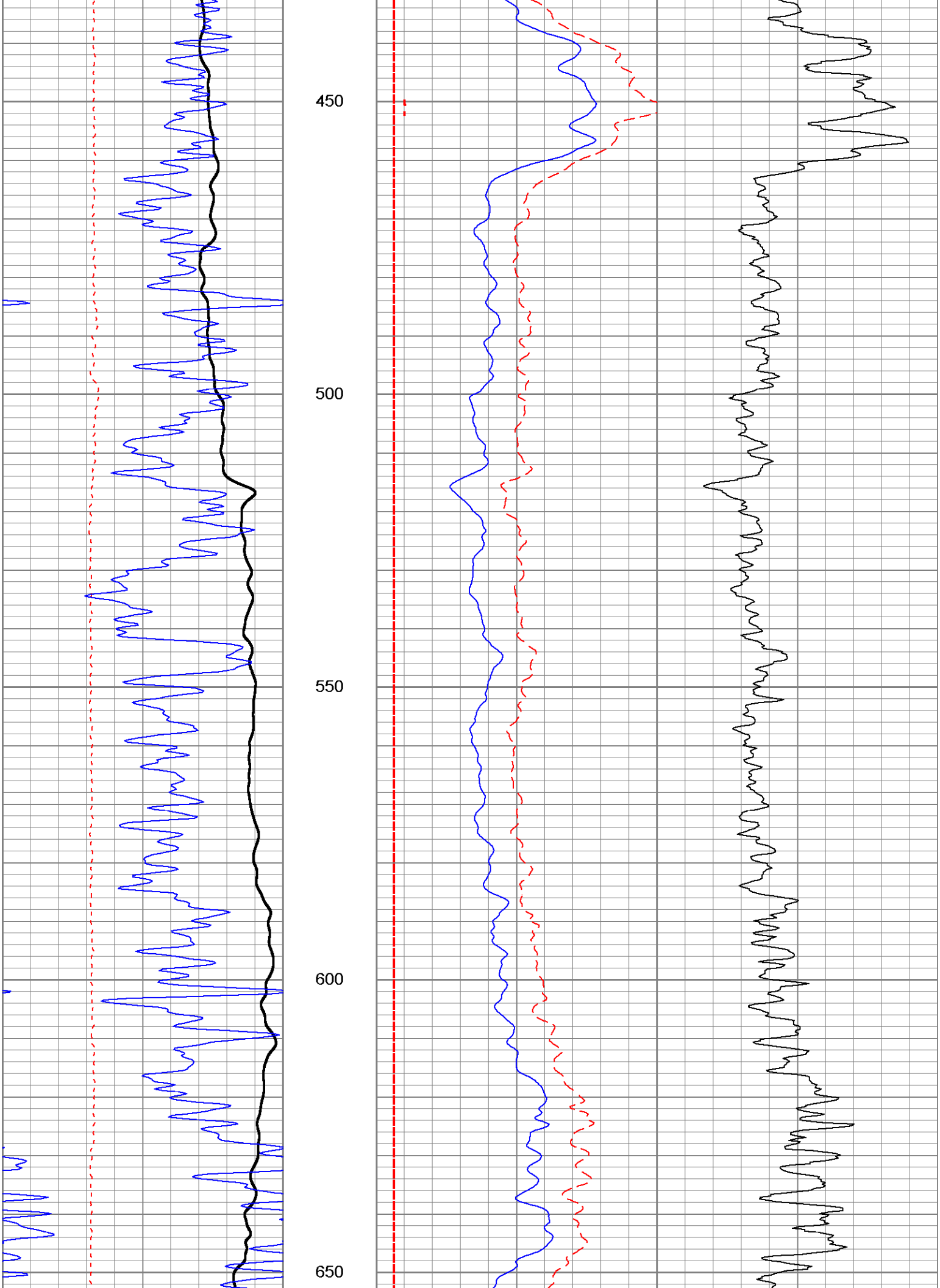
-40	SP (mV)	180
0	Line Speed (ft/min)	100
60	Gamma-Ray (GAPI)	120

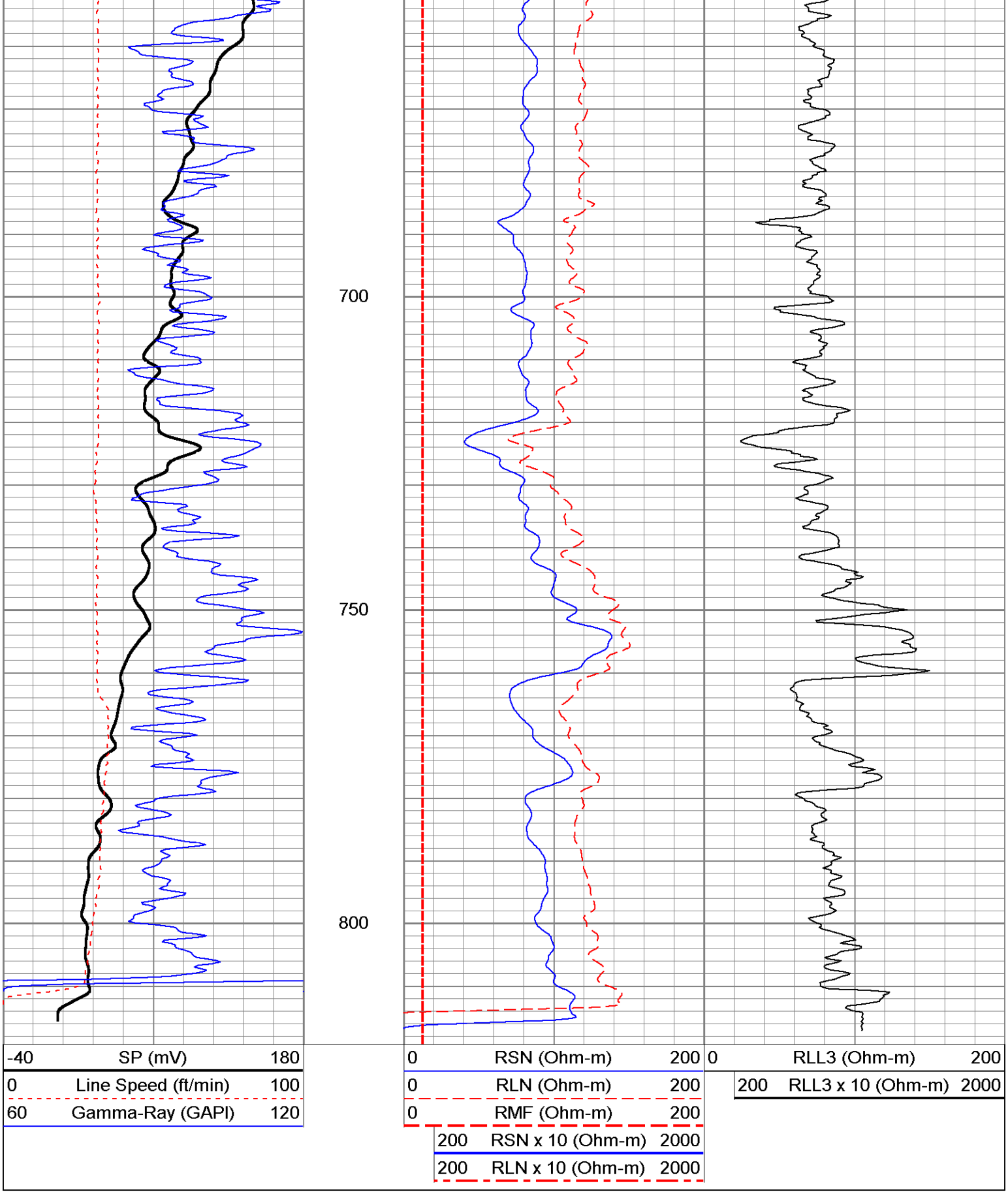
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000


200 RLN x 10 (Ohm-m) 2000
Surface Casing
50
100
150
200
RSN x 10
RLN x 10
RLL3 x 10


250
300
350
400
SP
Gamma-Ray
RMF
RSN
RLN
RLL3


450
500
550
600
650


700
750
800
-40 SP (mV) 180
0 Line Speed (ft/min) 100
60 Gamma-Ray (GAPI) 120
0 RSN (Ohm-m) 200
0 RLN (Ohm-m) 200
0 RMF (Ohm-m) 200
200 RSN x 10 (Ohm-m) 2000
200 RLN x 10 (Ohm-m) 2000
0 RLL3 (Ohm-m) 200
200 RLL3 x 10 (Ohm-m) 2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA RAY

Job No.
14817

Company BEST DRILLING & PUMP
Well MP-4
Field RIALTO
County SAN BERNARDINO State CA

Location:

N34*08.255' W117*23.380'

Sec. Twp. Rge.

Other Services:

ELOG
SONIC/VDL
CALIPER

			Elevation
Permanent Datum	G.L.		K.B.
Log Measured From	G.L.	0' above perm. datum	D.F.
Drilling Measured From	G.L.		G.L.

Date	8-18-2009		
Run Number	ONE		
Depth Driller	820'		
Depth Logger	819'		
Bottom Logged Interval	819'		
Top Log Interval	0'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	11.7 @ 77F		
Rmf @ Meas. Temp	12.9 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HOURS		
Time Logger on Bottom	7:10 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	ABREAU/NELSON		
Witnessed By	B.J LECHLER		

<< Fold Here >>>

Comments

Gamma Ray Calibration Report

Serial Number: 13
Tool Model: GROH
Performed: Mon Sep 29 14:35:52 2008

Calibrator Value: 162 GAPI

Background Reading:	36.9056	
Calibrator Reading:	160.261	
Sensitivity:	1.31328	GAPI/

Simplec Long Guard Calibration Report

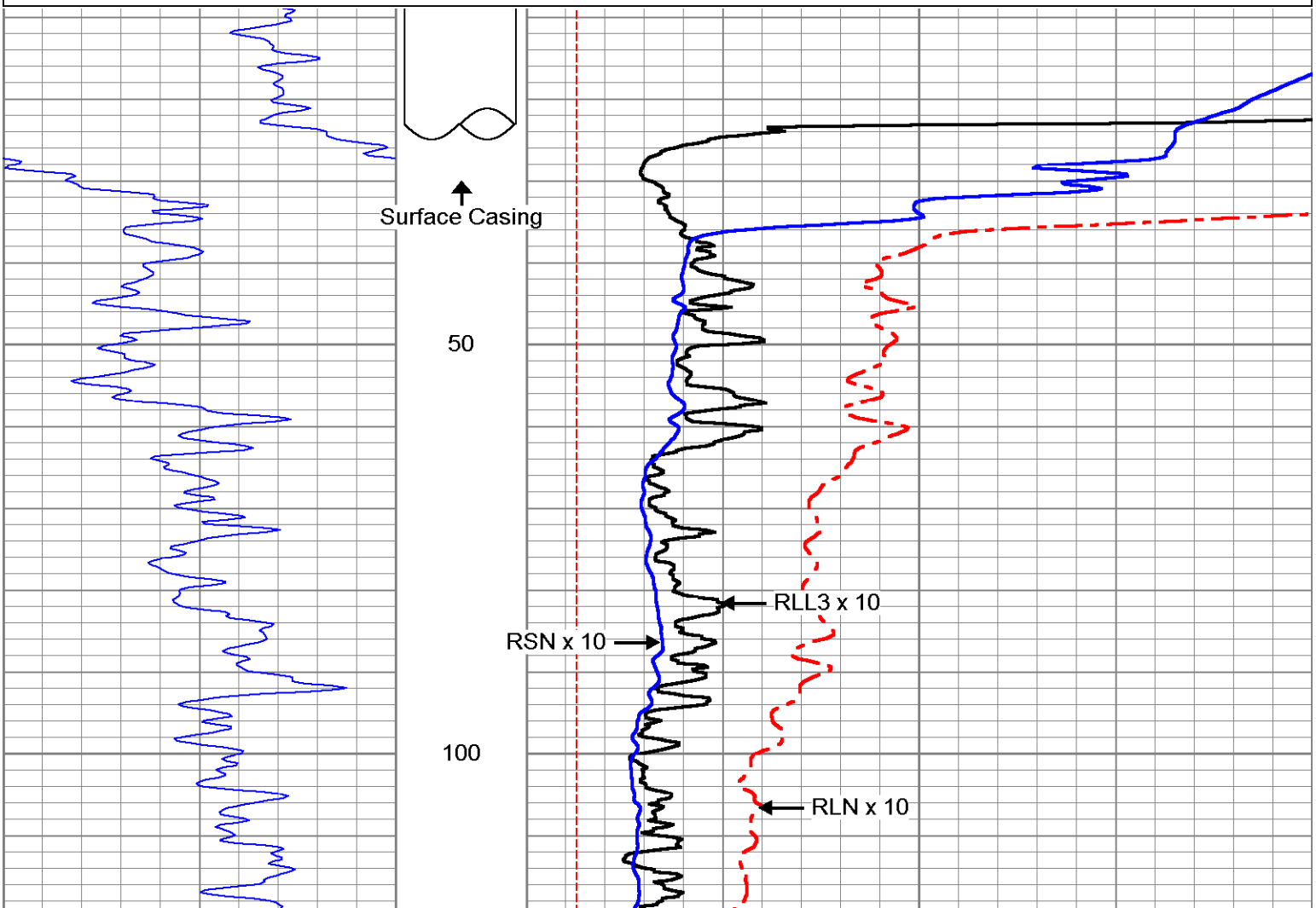
Serial Number:	81
Tool Model:	M&W
Performed:	Wed Jan 28 14:45:28 2009

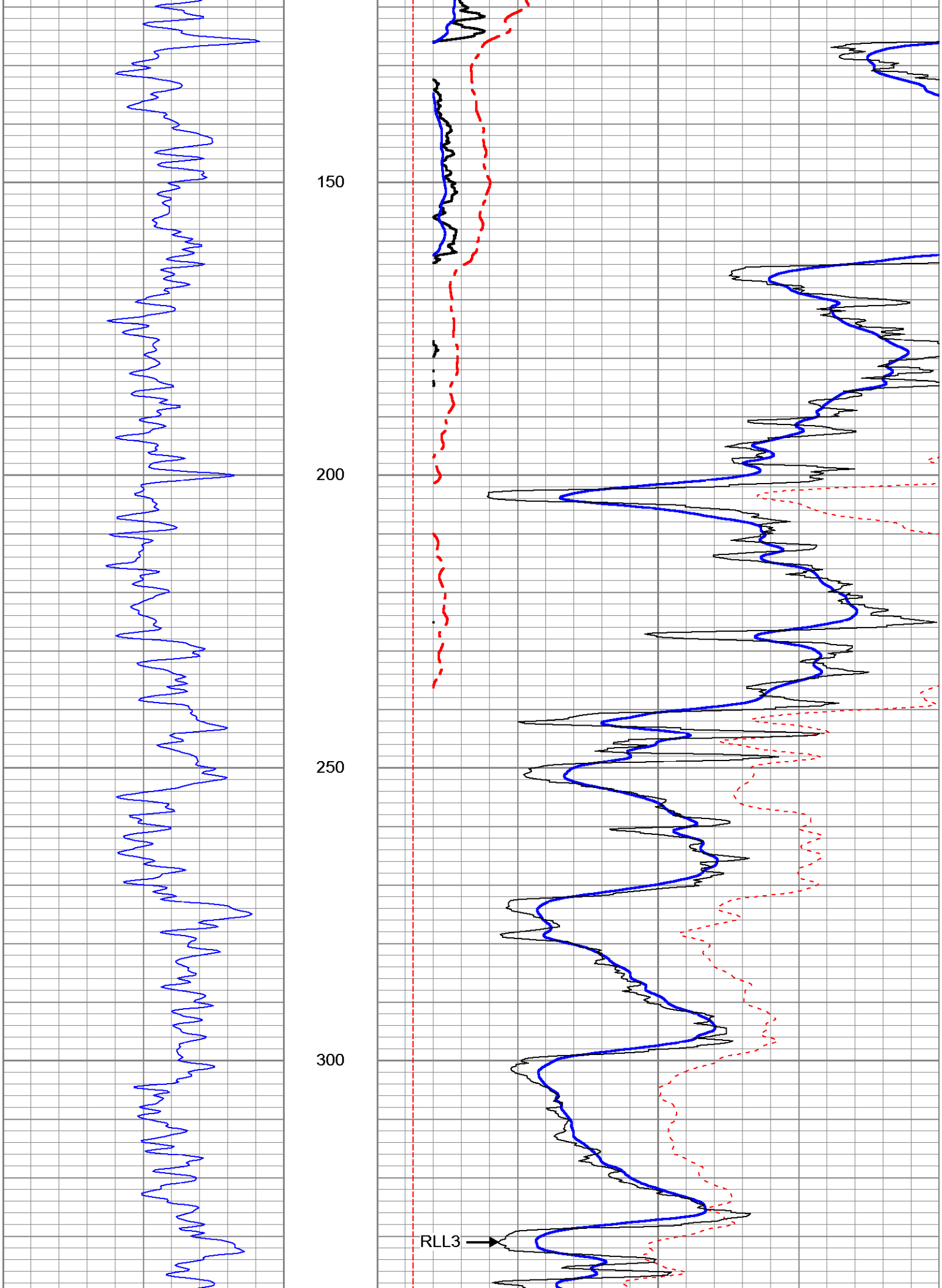
System Reading	Calibration Reference	
0.306	2.500	Ohm-m
0.605	5.000	
6.015	50.000	
28.373	250.000	
56.371	500.000	

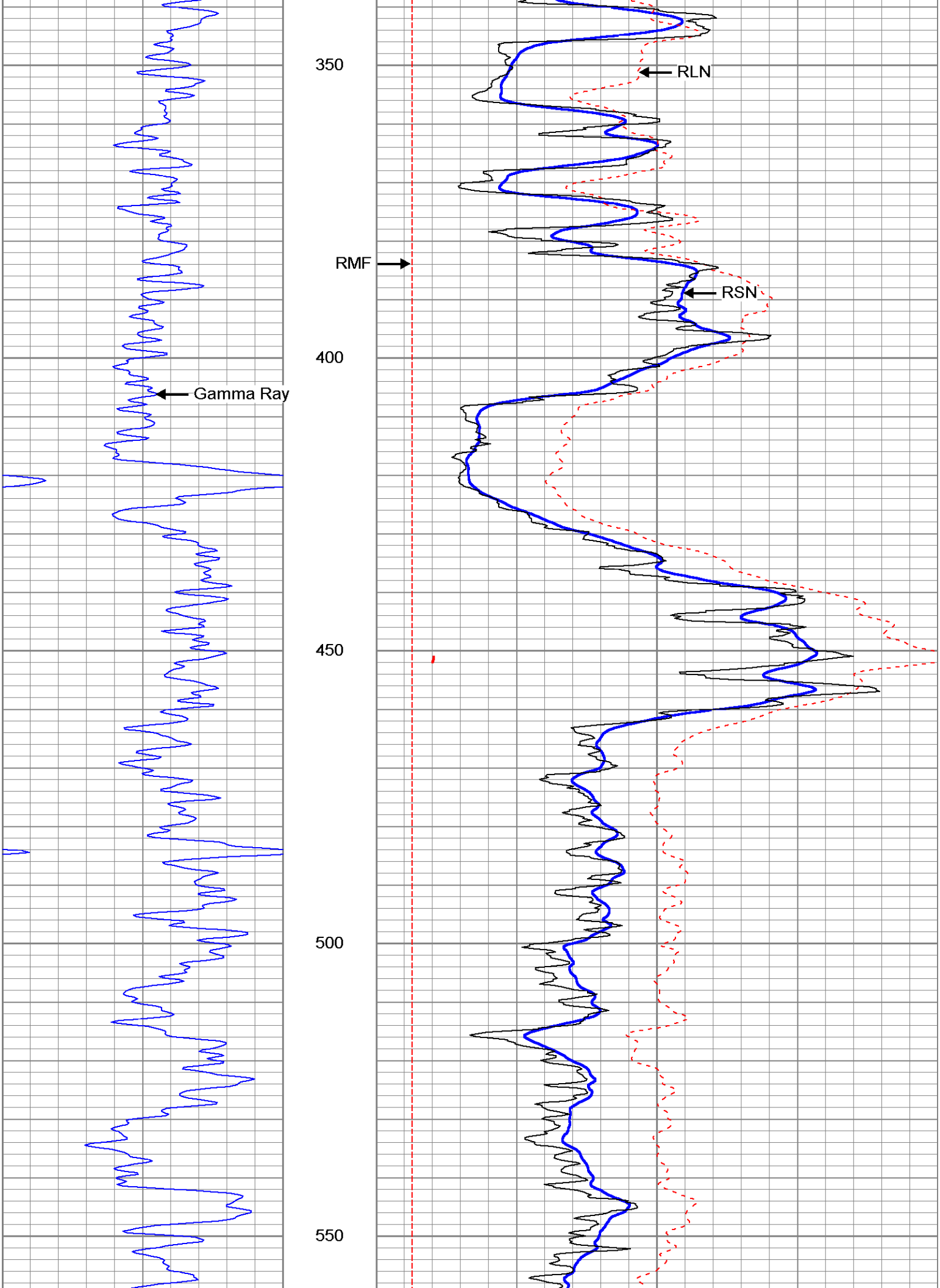
Database File:	14817.db
Dataset Pathname:	II3
Presentation Format:	GUARD
Dataset Creation:	Tue Aug 18 19:47:03 2009 by Log Warrior Version 6.6
Charted by:	Depth in Feet scaled 1:240

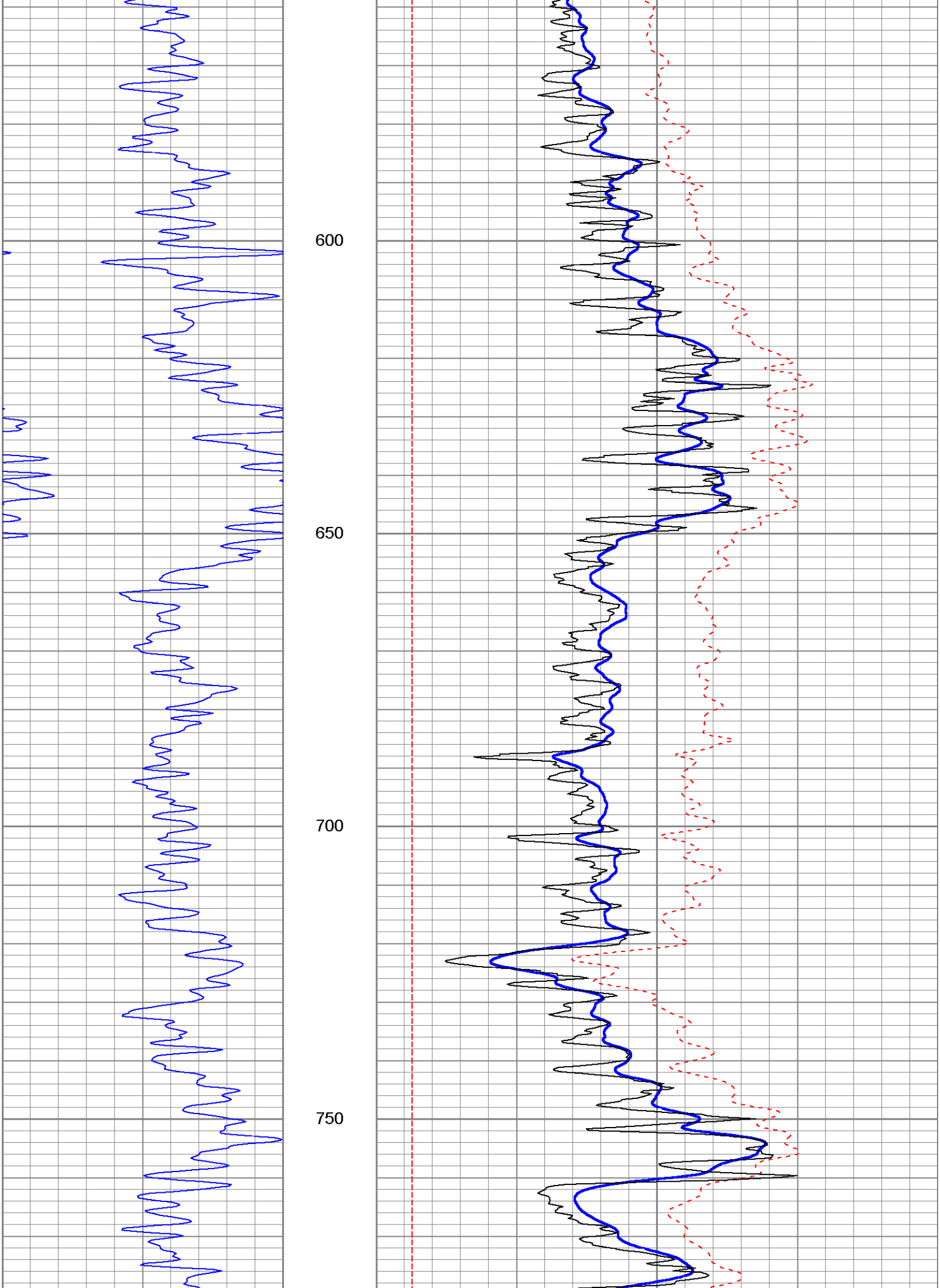
60	Gamma Ray (GAPI)	120

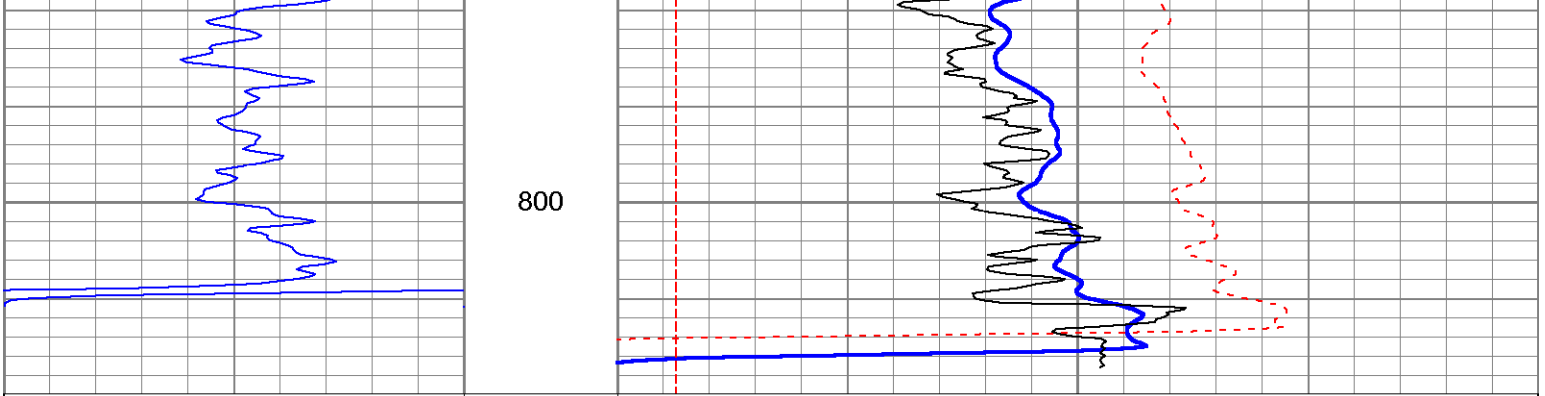
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000




150
200
250
300
RLL3


350
400
450
500
550
RLN
RMF
RSN
Gamma Ray


600
650
700
750



60	Gamma Ray (GAPI)	120
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No. 14817

Company BEST DRILLING & PUMP

Well MP-4

Field RIALTO

County SAN BERNARDINO State CA

Location:

N34*08.255' W117*23.380'

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation K.B.
Log Measured From	G.L. 0'		D.F.
Drilling Measured From	G.L.		G.L.

Date	8-18-2009		
Run Number	ONE		
Depth Driller	820'		
Depth Logger	819'		
Bottom Logged Interval	819'		
Top Log Interval	0'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	11.7 @ 77F		
Rmf @ Meas. Temp	12.9 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HOURS		
Time Logger on Bottom	7:10 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	ABREAU/NELSON		
Witnessed By	B.J LECHLER		

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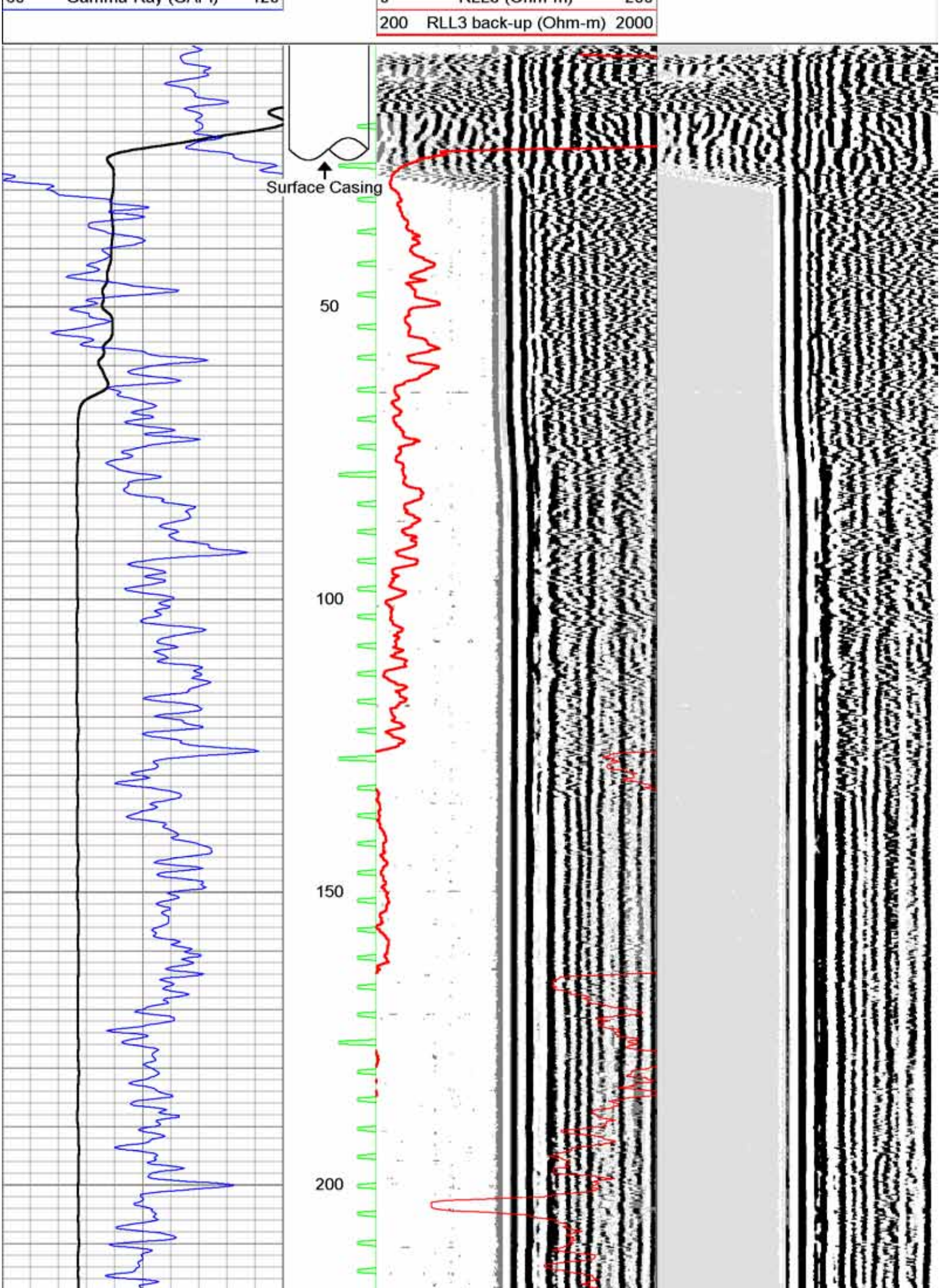
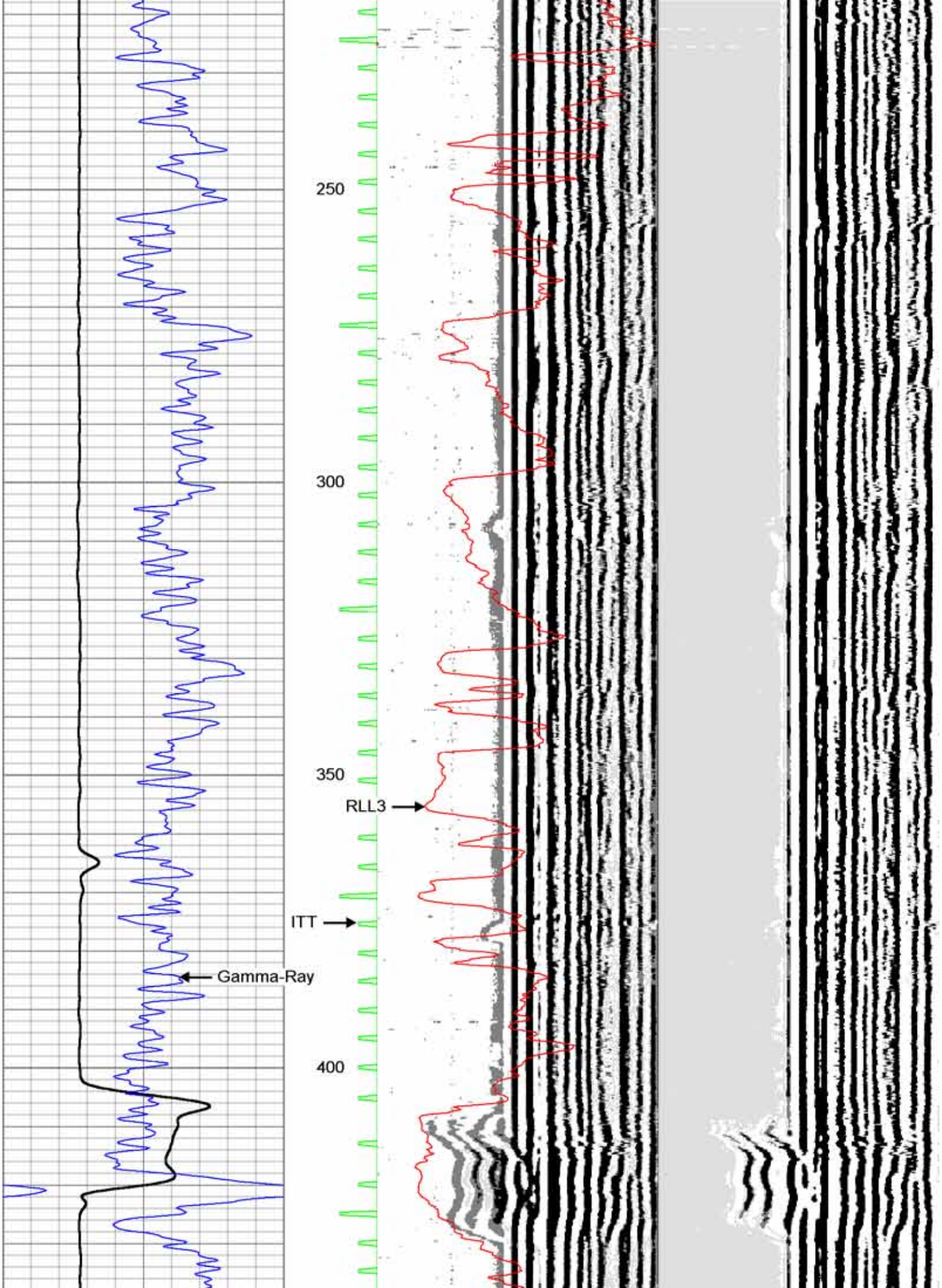
All interpretations are opinions based on inferences from electrical or other measurements and we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

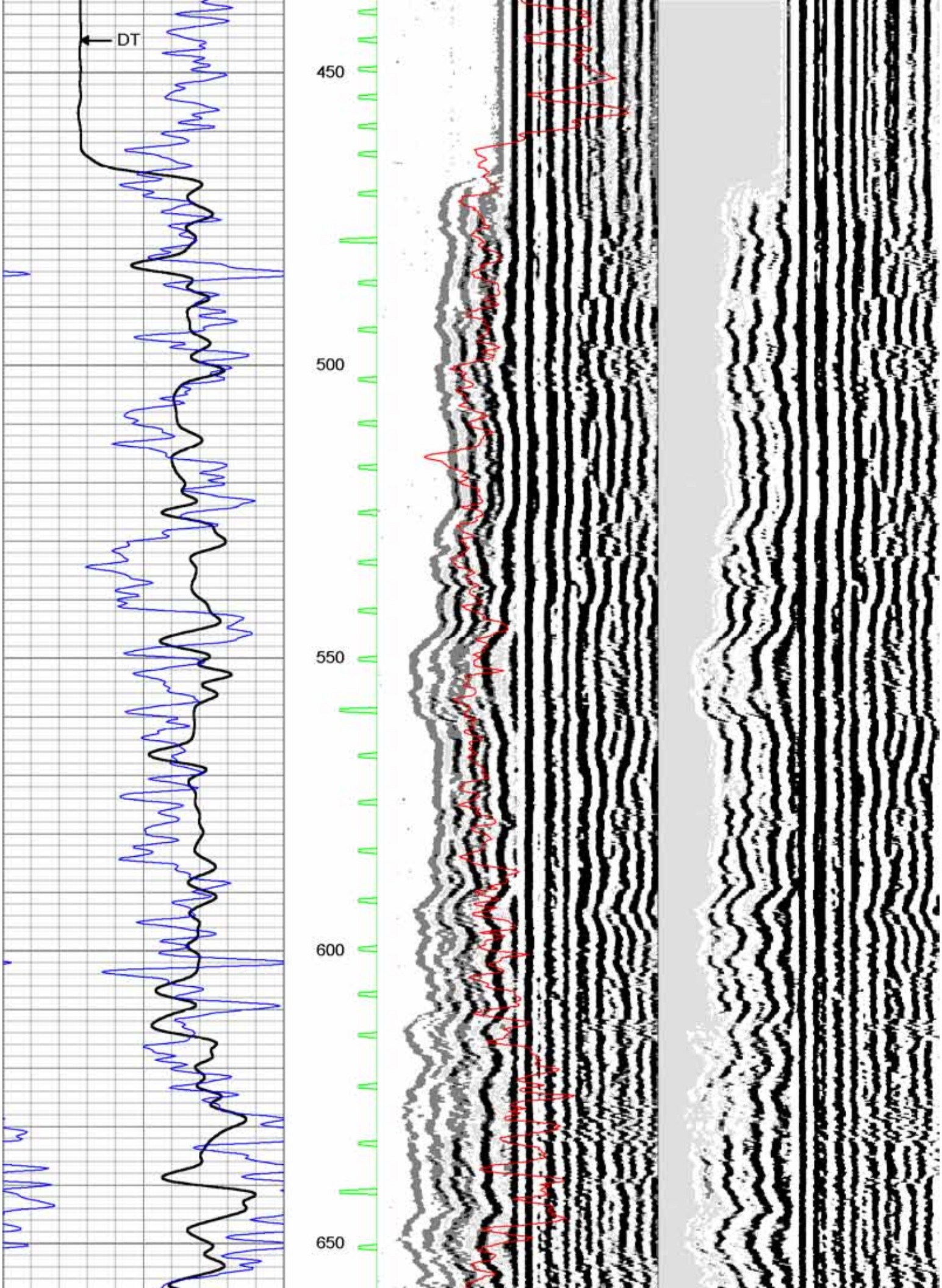
Comments

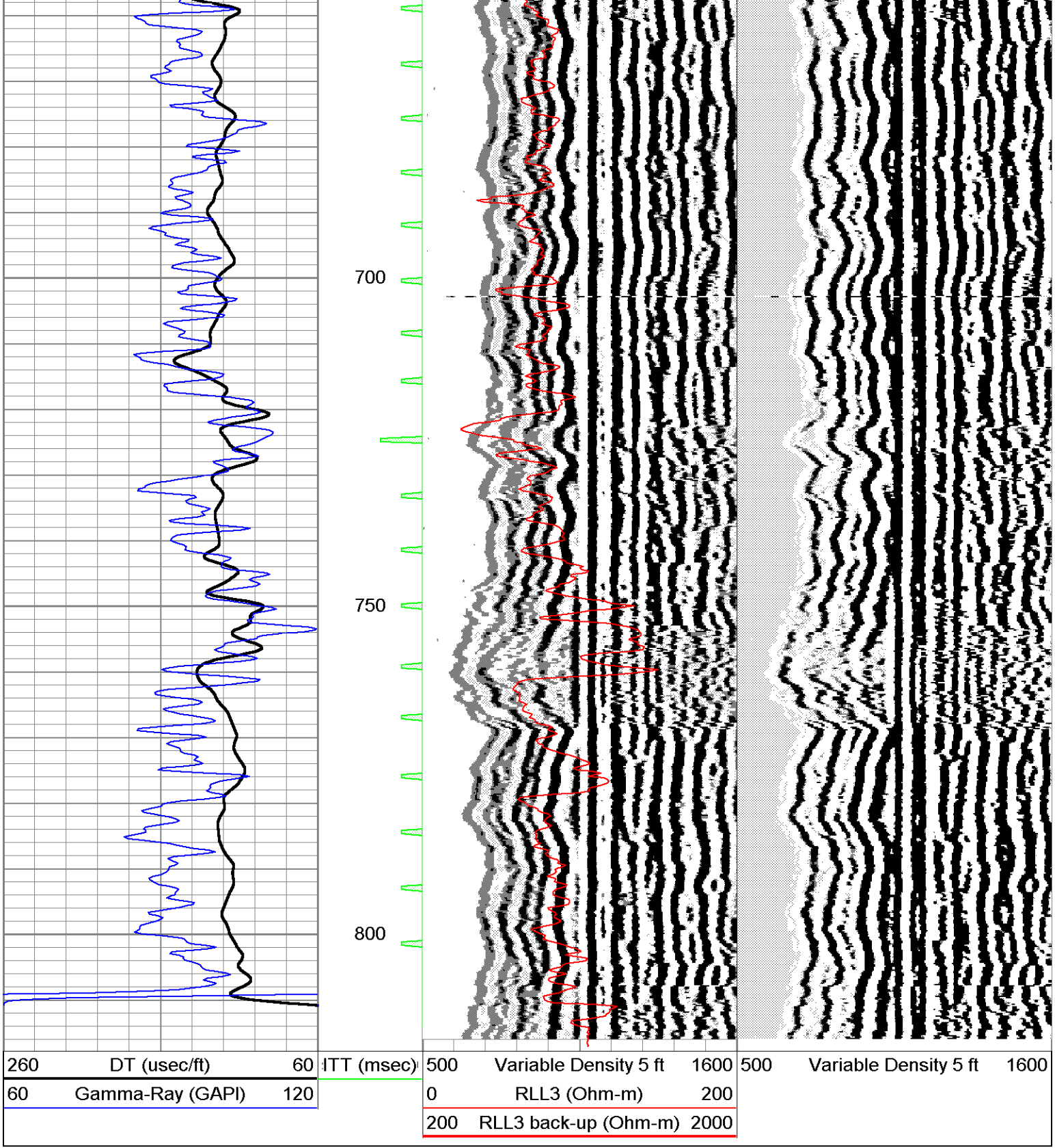
Database File: 14817.db
Dataset Pathname: SNC
Presentation Format: SLT
Dataset Creation: Tue Aug 18 20:11:08 2009 by Log Warrior Version 6.6
Charted by: Depth in Feet scaled 1:240

260	DT (usec/ft)	60	ITT (msec)	500	Variable Density 5 ft	1600	500	Variable Density 5 ft	1600
60	Gamma-Ray (GAPI)	120		0	RLL3 (Ohm-m)	200			


Gamma Ray (GAPI)
200 RLL3 back-up (Ohm-m) 2000
Surface Casing
50
100
150
200


250
300
350
400
RLL3
ITT
Gamma-Ray


DT
450
500
550
600
650


700
750
800
260 DT (usec/ft) 60
60 Gamma-Ray (GAPI) 120
ITT (msec)
500 Variable Density 5 ft 1600
0 RLL3 (Ohm-m) 200
200 RLL3 back-up (Ohm-m) 2000
500 Variable Density 5 ft 1600

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA RAY

Job No. 14882

Company BEST DRILLING & PUMP

Well EPA MP-5

Field RIALTO

County SAN BERNARDINO State CA

Location:

N34*06.513' W117*23.016'

Sec. Twp. Rge.

Other Services:

GR/LL3
SONIC/VDL
CALIPER

			Elevation
Permanent Datum	G.L.	Elevation above perm. datum	K.B.
Log Measured From	G.L.	0'	D.F.
Drilling Measured From	G.L.		G.L.

Date	9-23-2009		
Run Number	ONE		
Depth Driller	831'		
Depth Logger	831'		
Bottom Logged Interval	831'		
Top Log Interval	0'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	10.2 @ 77F		
Rmf @ Meas. Temp	11.4 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HOURS		
Time Logger on Bottom	4:10 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	ABREAU/NELSON		
Witnessed By	B.J LECHLER		

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Comments

ELOG Calibration Report

Serial: D1
Model: DTQ

Shop Calibration Performed: Fri Aug 28 11:42:28 2009
Before Survey Verification Performed: Mon Aug 06 11:54:10 2007
After Survey Verification Performed: Mon Aug 06 11:54:38 2007

Shop Calibration

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	11.208	103.455		10.200	102.200	Ohm-m	0.997	-0.978
Long	3.344	89.080		10.200	102.200	Ohm-m	1.073	-19.746
IEE	30.037	6022.654	counts	0.033	6.591	A		
VSN	98.194	6827.093	counts	1.873	130.218	V		
VLN	83.806	1710.224	counts	1.598	32.620	V		

Before Survey Verification

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	183.906	100.821		9.828	100.799	Ohm-m	-1.095	211.190
Long	422.542	101.924		101.776	101.776	Ohm-m	-0.317	134.130
IEE	59.028	6394.075	counts	0.065	6.998	A		
VSN	121.963	7242.794	counts	2.326	138.147	V		
VLN	70.056	1830.495	counts	1.336	34.914	V		

After Survey Verification

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	117.548	100.824		183.906	100.821	Ohm-m	4.968	-400.076
Long	271.705	101.931		101.924	101.924	Ohm-m	1.888	-90.571
IEE	92.849	6387.565	counts	0.102	6.991	A		
VSN	122.623	7235.648	counts	2.339	138.011	V		
VLN	70.858	1828.759	counts	1.352	34.881	V		

After Survey Verification compared to Before Survey Calibration

	Zero Before	Zero After		Cal Before	Cal After	
Short	9.828	183.906	Ohm-m	100.799	100.821	Ohm-m
Long	0.000	422.542	Ohm-m	101.776	101.924	Ohm-m

Gamma Ray Calibration Report

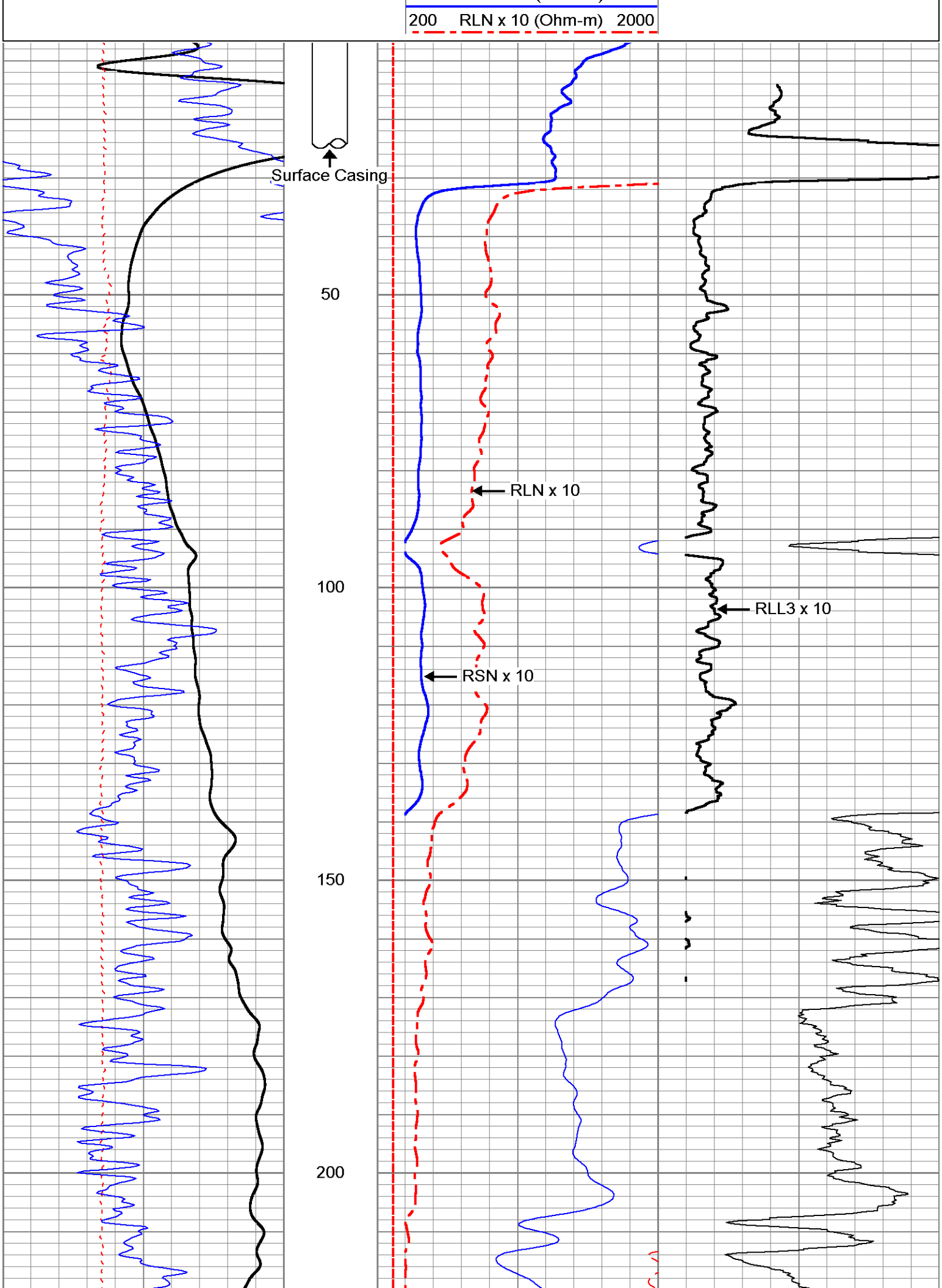
Serial Number:	D1	
Tool Model:	ELOG	
Performed:	Mon Sep 29 13:55:50 2008	
Calibrator Value:	162	GAPI
Background Reading:	151.12	cps
Calibrator Reading:	599.794	cps
Sensitivity:	0.361064	GAPI/cps

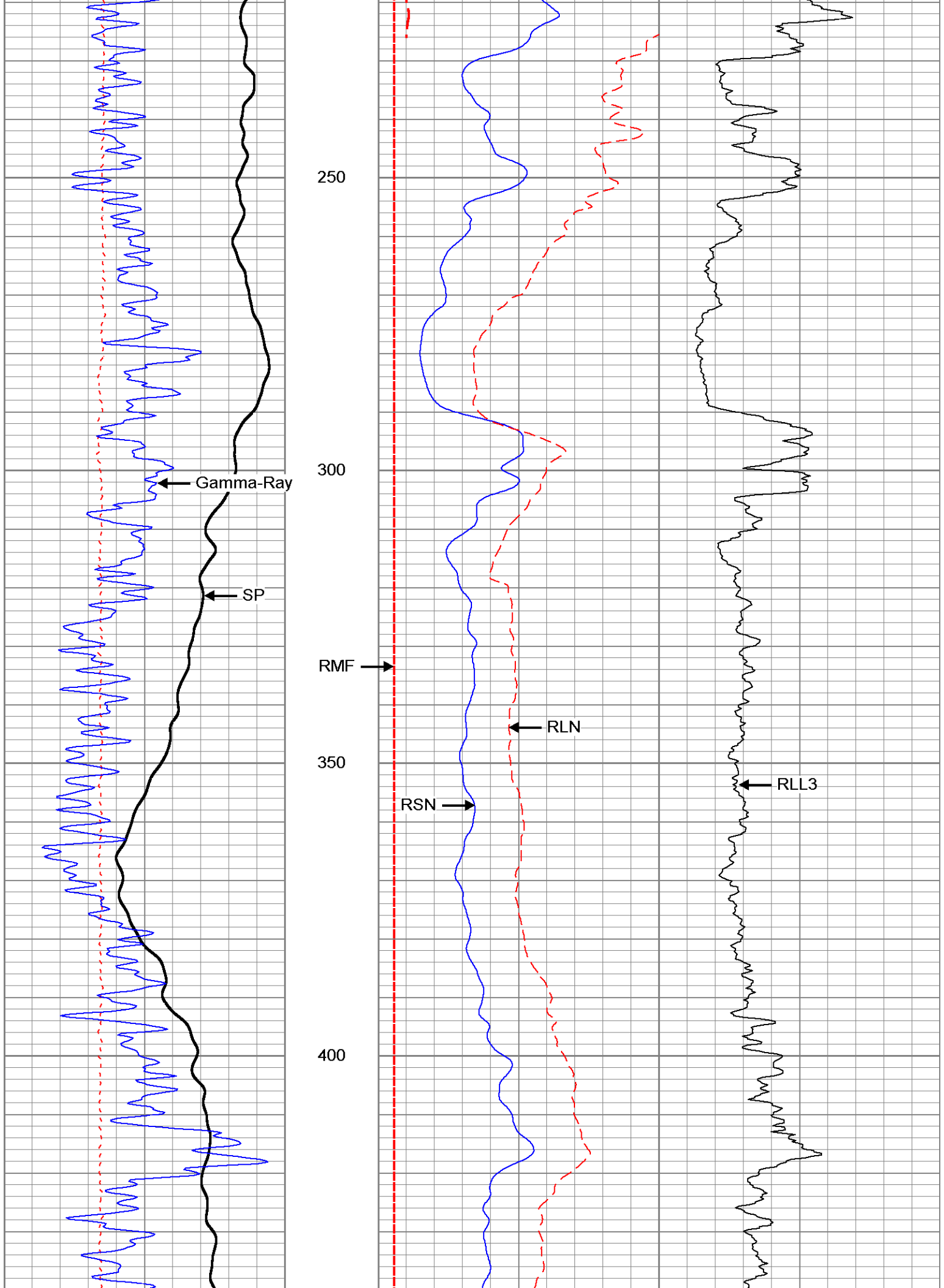
Database File:	14882.db
Dataset Pathname:	elog
Presentation Format:	ELOG
Dataset Creation:	Wed Sep 23 16:11:25 2009 by Log Warrior Version 6.6
Charted by:	Depth in Feet scaled 1:240

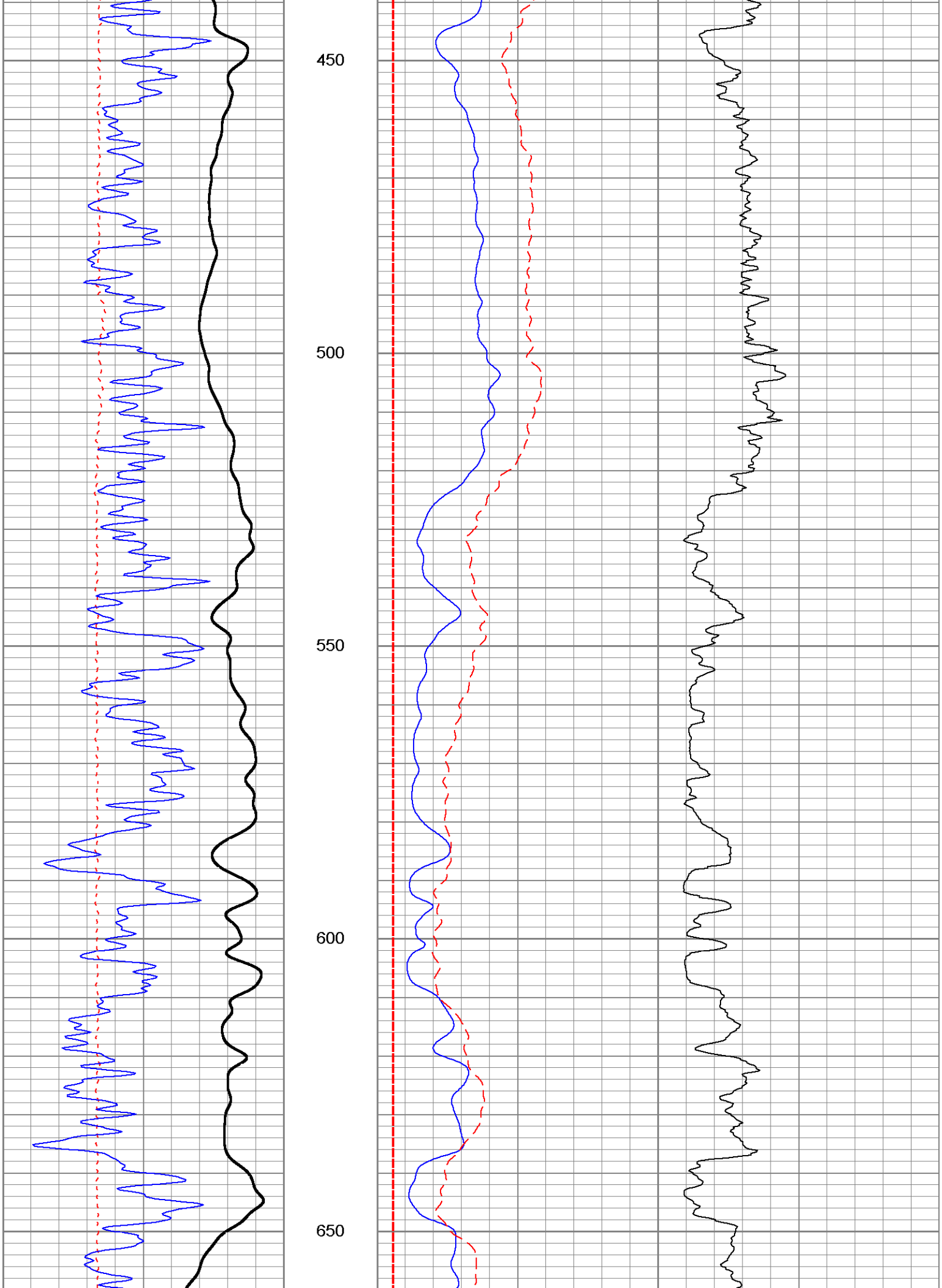
-90	SP (mV)	60
0	Line Speed (ft/min)	100
60	Gamma-Ray (GAPI)	120

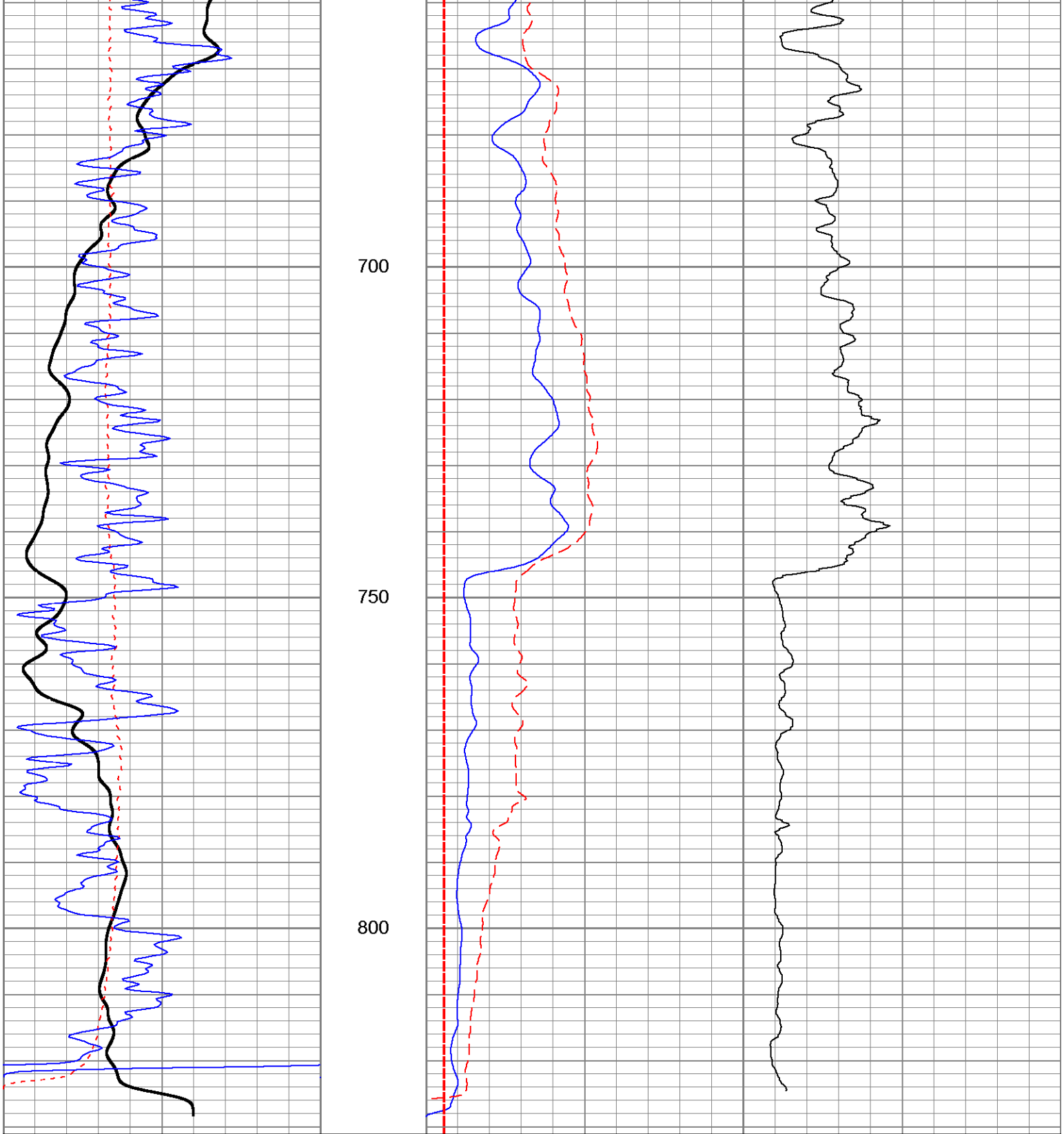
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000

0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000


200 RLN x 10 (Ohm-m) 2000
Surface Casing
50
100
150
200
RLN x 10
RSN x 10
RLL3 x 10


250
300
350
400
Gamma-Ray
SP
RMF
RSN
RLN
RLL3


450
500
550
600
650


700
750
800
-90 SP (mV) 60
0 Line Speed (ft/min) 100
60 Gamma-Ray (GAPI) 120
0 RSN (Ohm-m) 200
0 RLN (Ohm-m) 200
0 RMF (Ohm-m) 200
200 RSN x 10 (Ohm-m) 2000
200 RLN x 10 (Ohm-m) 2000
0 RLL3 (Ohm-m) 200
200 RLL3 x 10 (Ohm-m) 2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA RAY

Job No.
14882

Company BEST DRILLING & PUMP
Well EPA MP-5
Field RIALTO
County SAN BERNARDINO State CA

Location:

N34*06.513' W117*23.016'

Sec. Twp. Rge.

Other Services:

ELOG
SONIC/VDL
CALIPER

			Elevation
Permanent Datum	G.L.	Elevation above perm. datum	K.B.
Log Measured From	G.L.	0'	D.F.
Drilling Measured From	G.L.		G.L.

Date	9-23-2009		
Run Number	ONE		
Depth Driller	831'		
Depth Logger	831'		
Bottom Logged Interval	831'		
Top Log Interval	0'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	10.2 @ 77F		
Rmf @ Meas. Temp	11.4 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HOURS		
Time Logger on Bottom	4:10 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	ABREAU/NELSON		
Witnessed By	B.J LECHLER		

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Comments

Gamma Ray Calibration Report

Serial Number: 13
Tool Model: GROH
Performed: Mon Sep 29 14:35:52 2008

Calibrator Value: 162 GAPI

Background Reading:	36.9056	
Calibrator Reading:	160.261	
Sensitivity:	1.31328	GAPI/

Simplec Long Guard Calibration Report

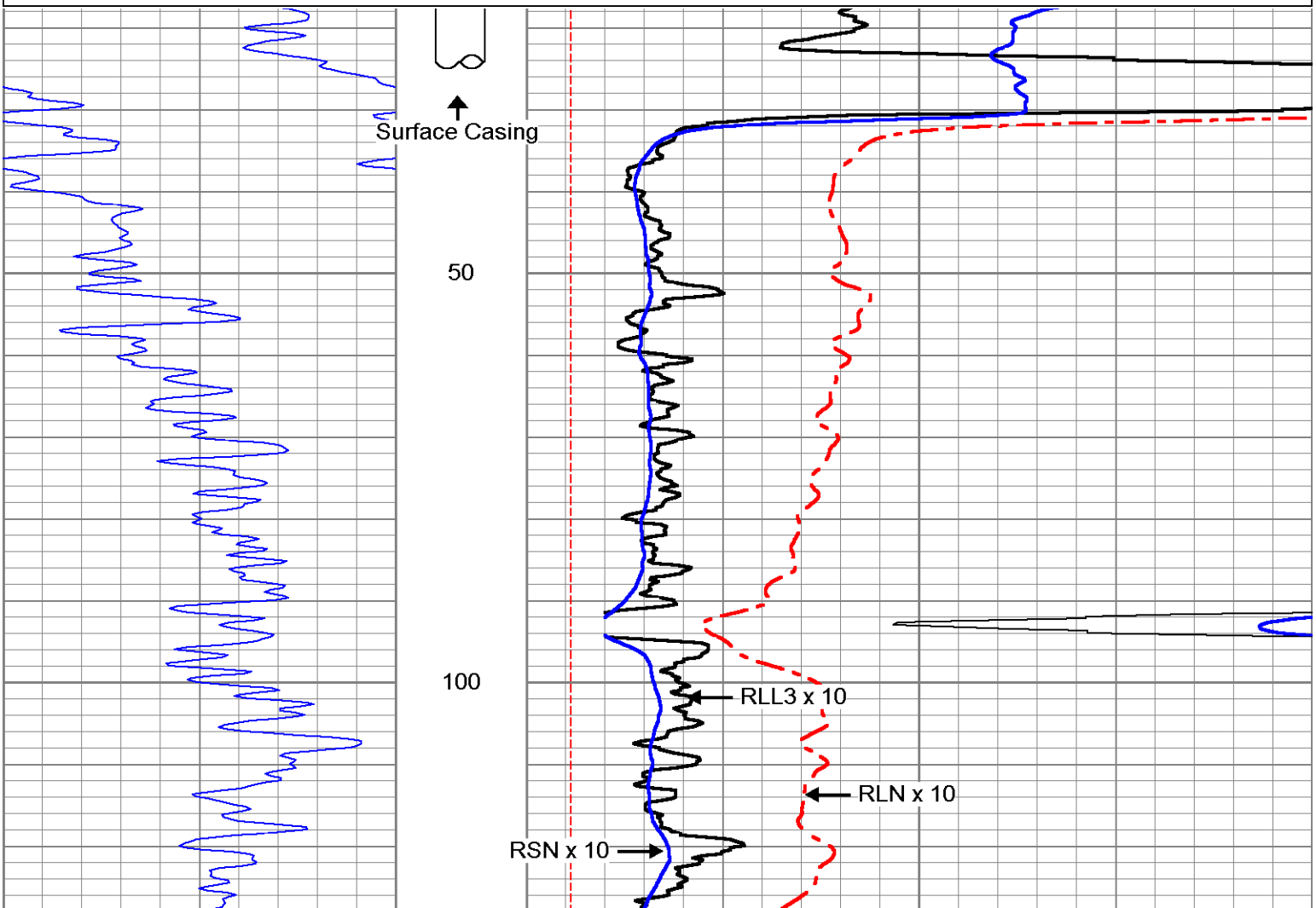
Serial Number:	81
Tool Model:	M&W
Performed:	Fri Aug 28 10:19:47 2009

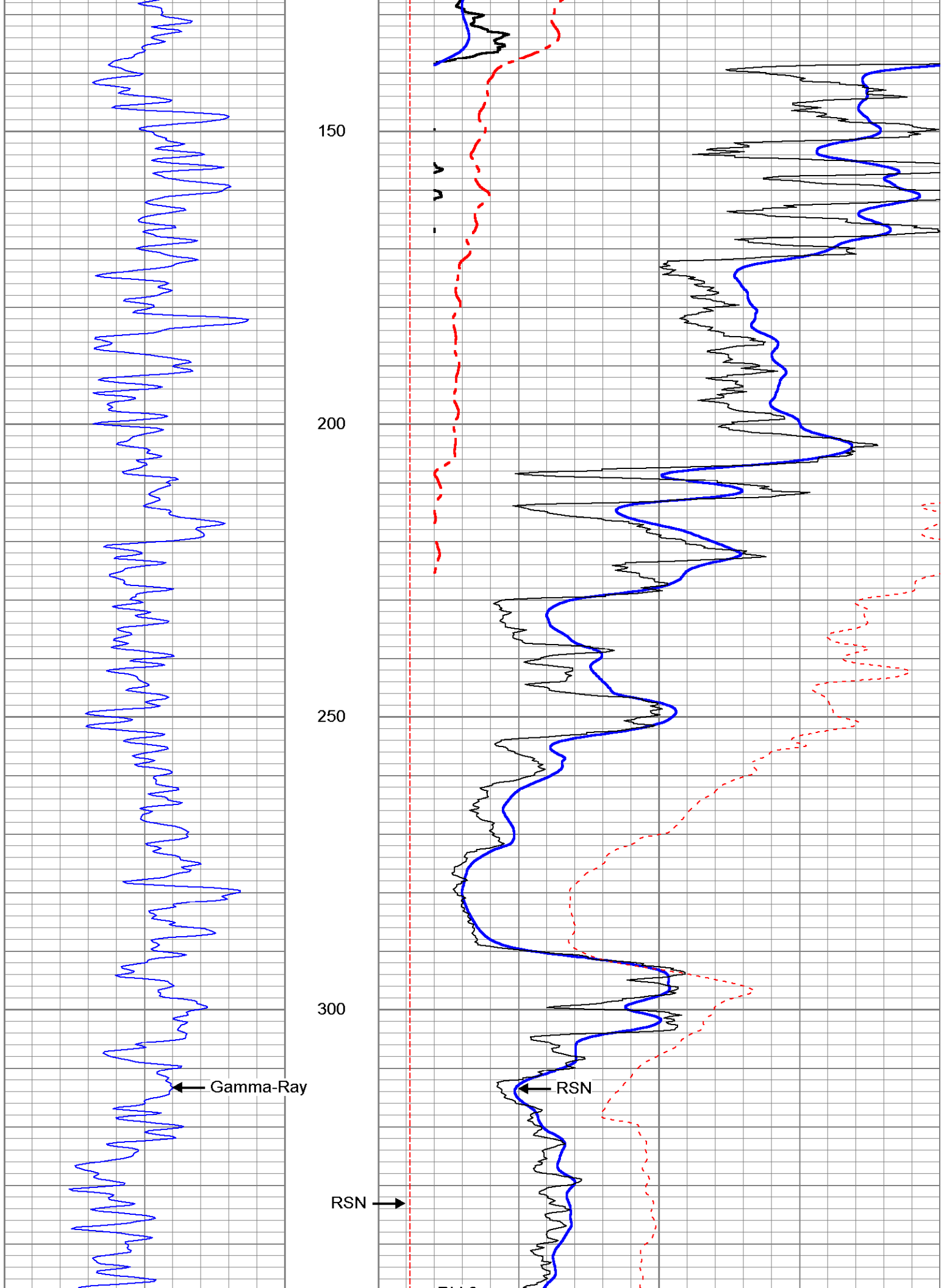
System Reading	Calibration Reference	
0.311	2.500	Ohm-m
0.613	5.000	
5.855	50.000	
28.787	250.000	
55.822	500.000	

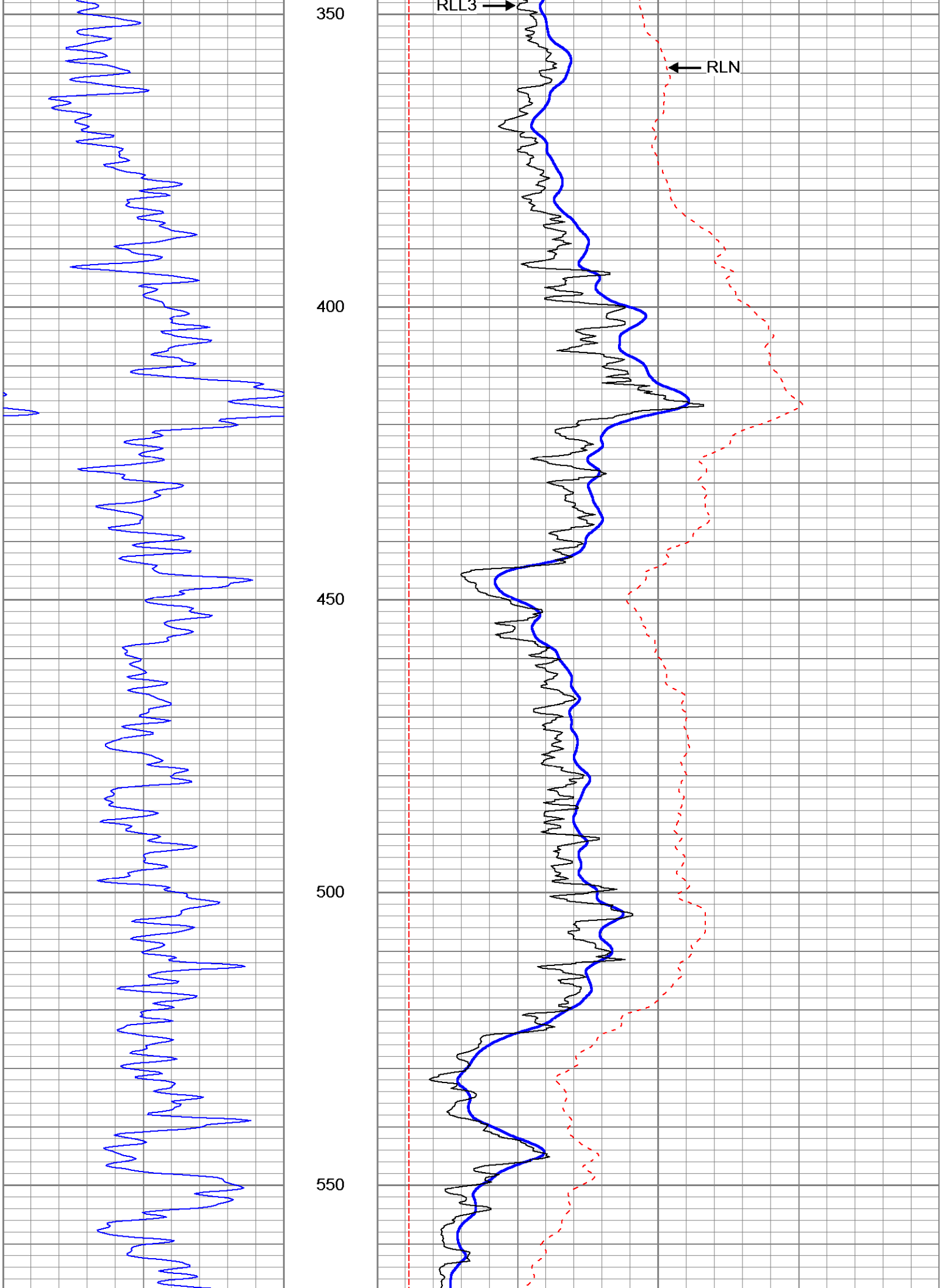
Database File:	14882.db
Dataset Pathname:	LL3
Presentation Format:	GUARD
Dataset Creation:	Wed Sep 23 18:27:36 2009 by Log Warrior Version 6.6
Charted by:	Depth in Feet scaled 1:240

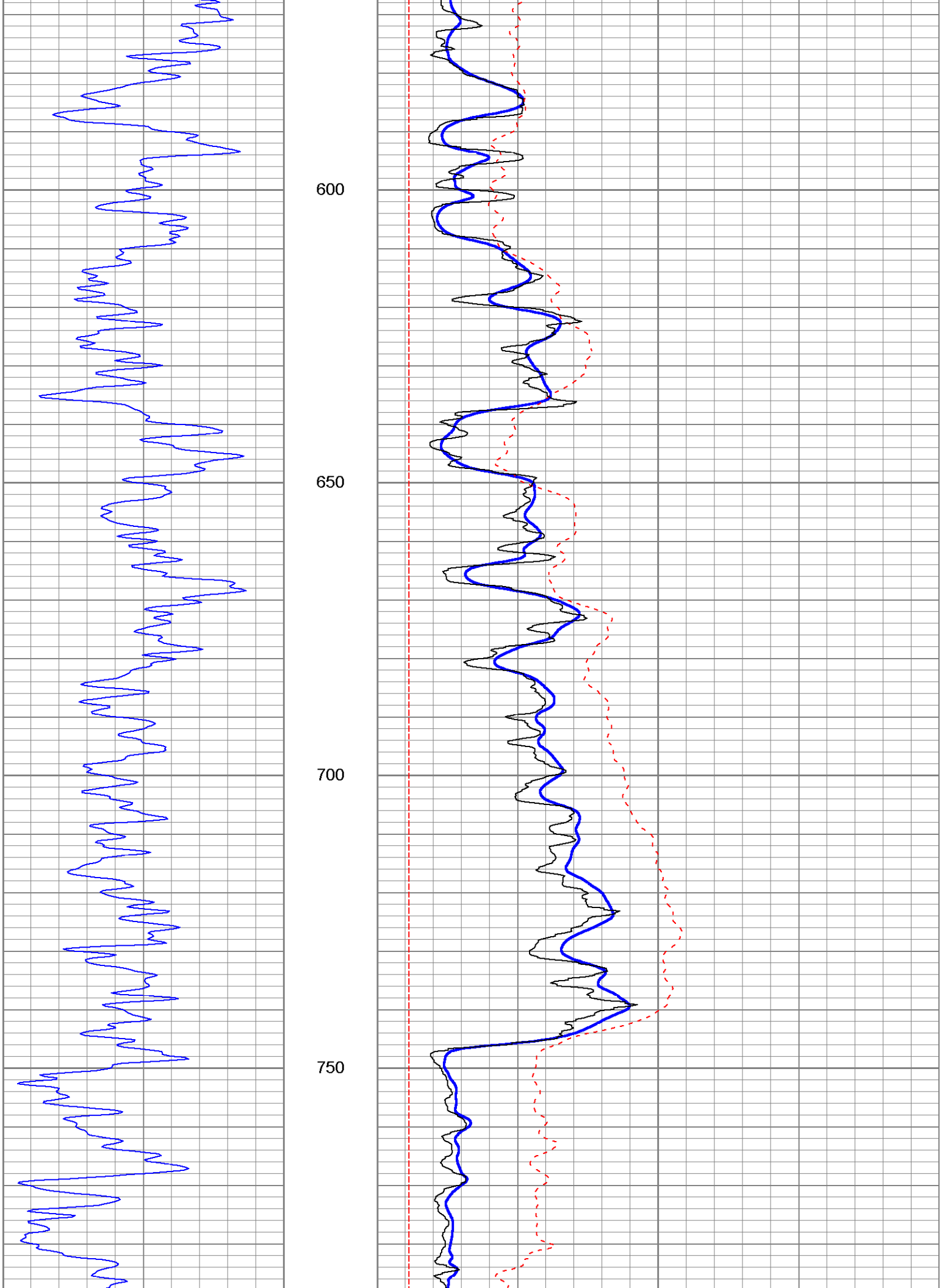
60	Gamma-Ray (GAPI)	110

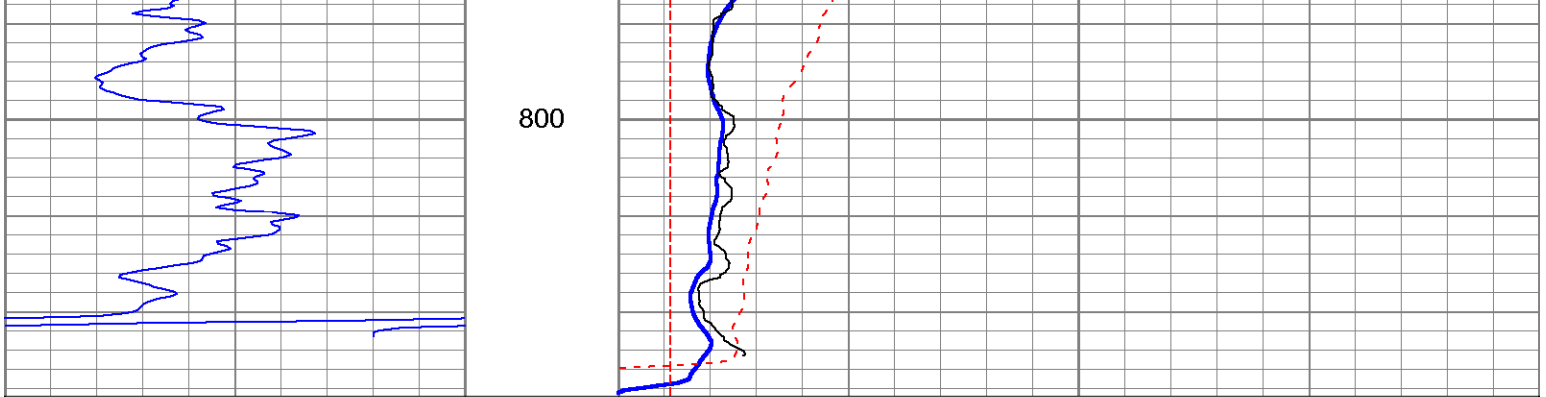
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000




150
200
250
300
Gamma-Ray
RSN
RSN


RLL3
RLN
350
400
450
500
550


600
650
700
750



60	Gamma-Ray (GAPI)	110
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	RLL3 (Ohm-m)	200
200	RLL3 x 10 (Ohm-m)	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No. 14882

Company BEST DRILLING & PUMP

Well EPA MP-5

Field RIALTO

County SAN BERNARDINO State CA

Location:

N34*06.513' W117*23.016'

Sec. Twp. Rge.

Other Services:

ELOG
CALIPER
GR/LL3

			Elevation
Permanent Datum	G.L.	Elevation above perm. datum	K.B.
Log Measured From	G.L.	0'	D.F.
Drilling Measured From	G.L.		G.L.

Date	9-23-2009		
Run Number	ONE		
Depth Driller	831'		
Depth Logger	831'		
Bottom Logged Interval	831'		
Top Log Interval	0'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	10.2 @ 77F		
Rmf @ Meas. Temp	11.4 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HOURS		
Time Logger on Bottom	4:10 PM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-1		
Location	L.A.		
Recorded By	ABREAU/NELSON		
Witnessed By	B.J LECHLER		

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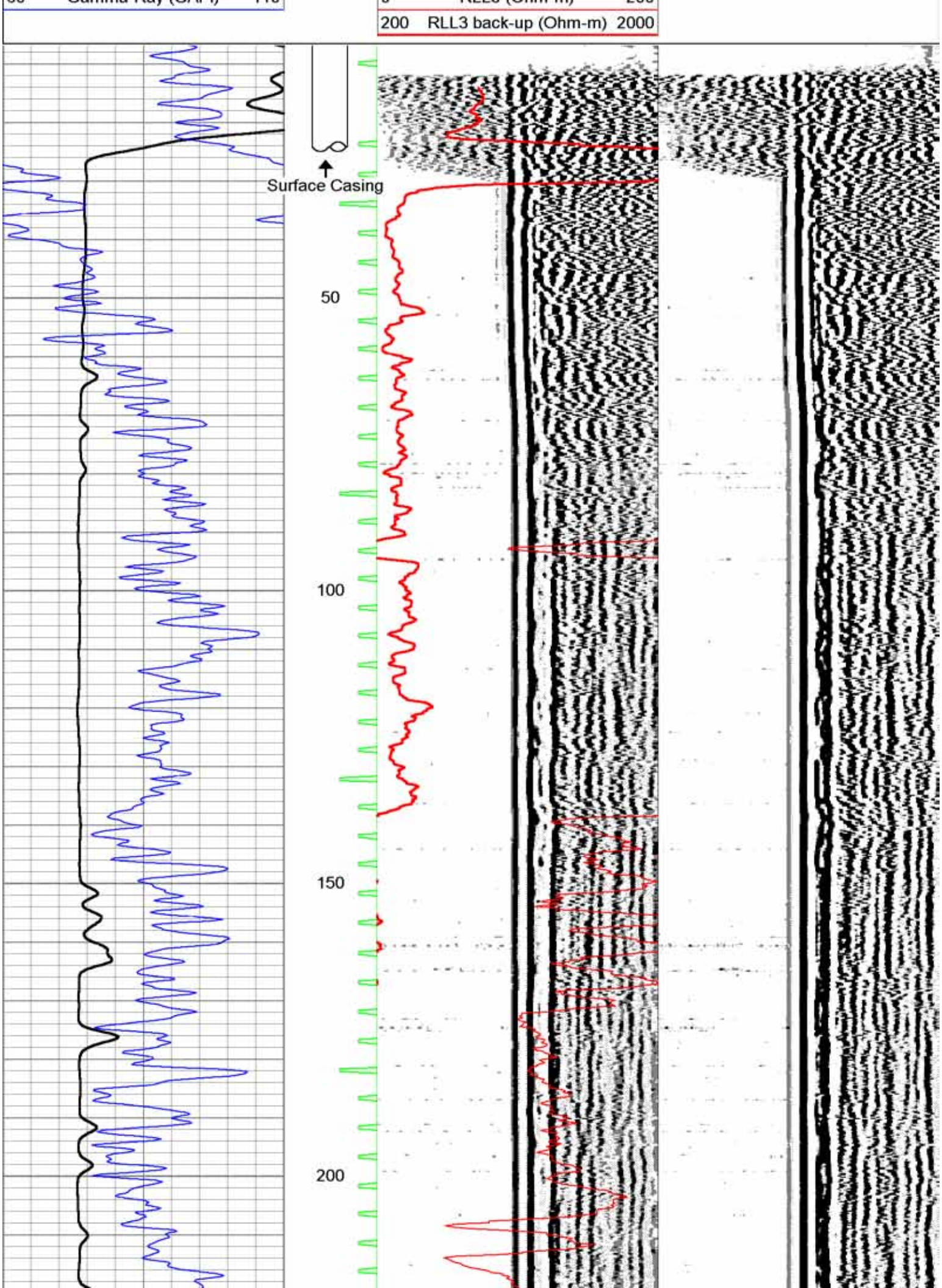
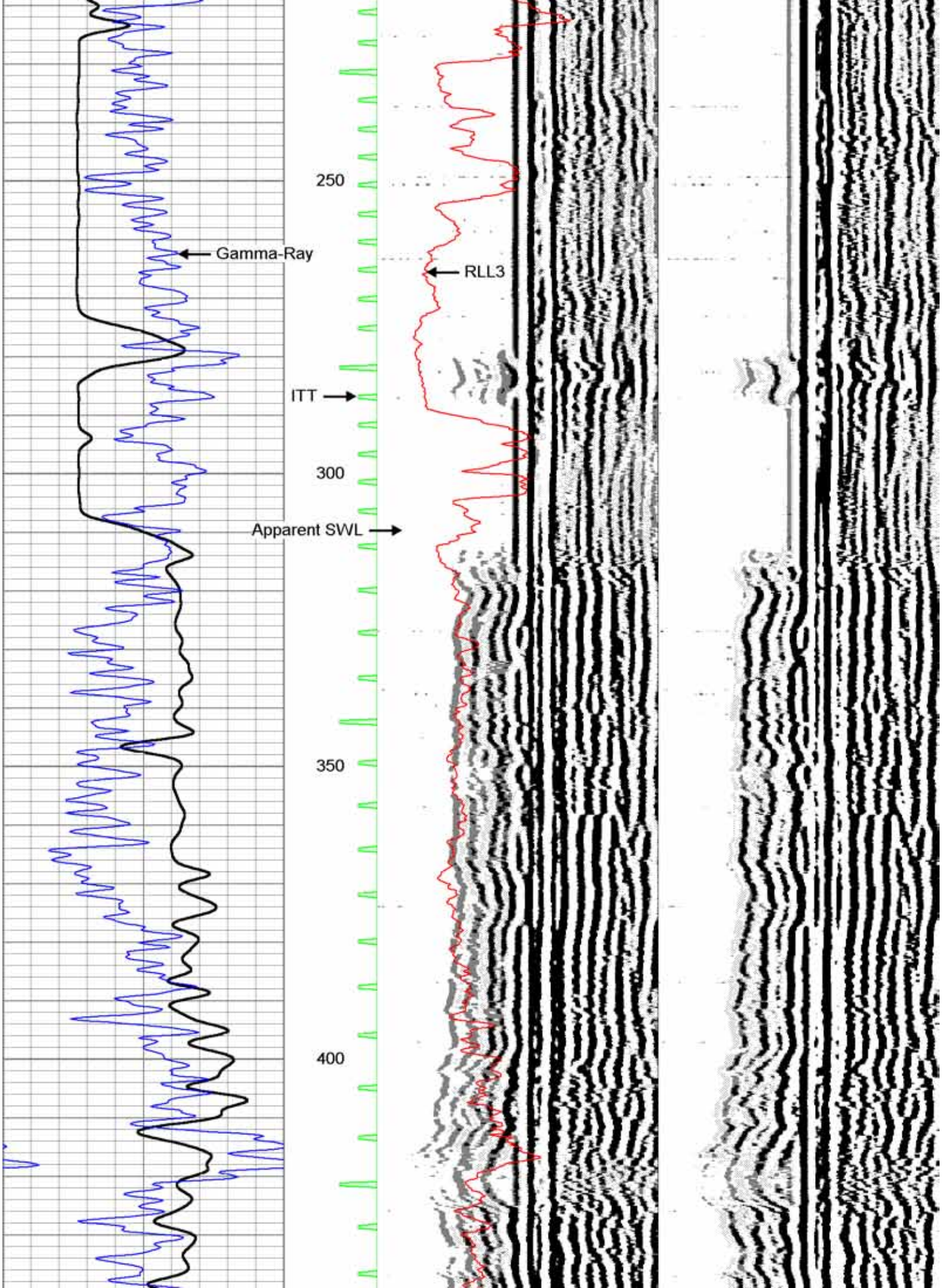
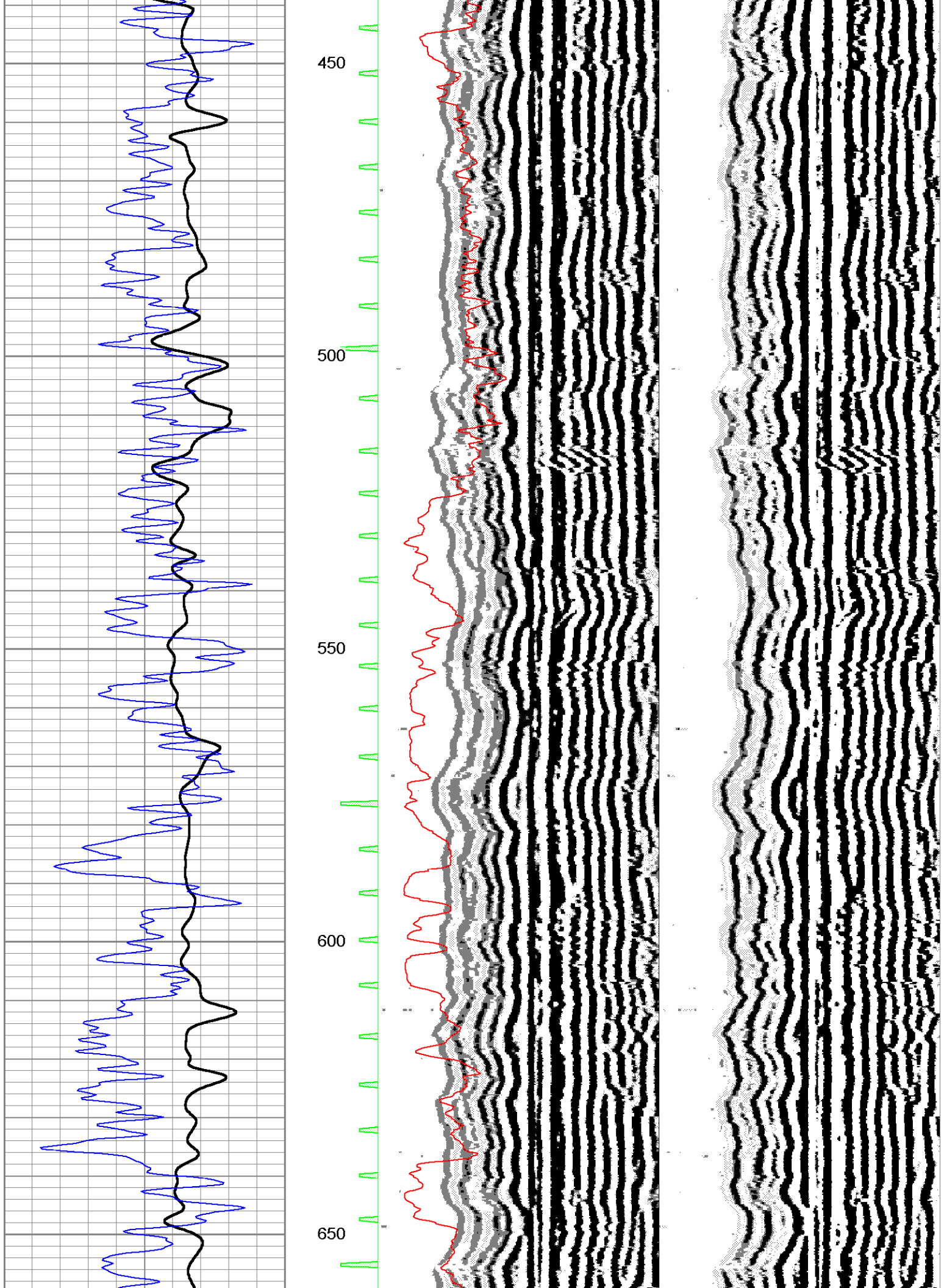
Comments

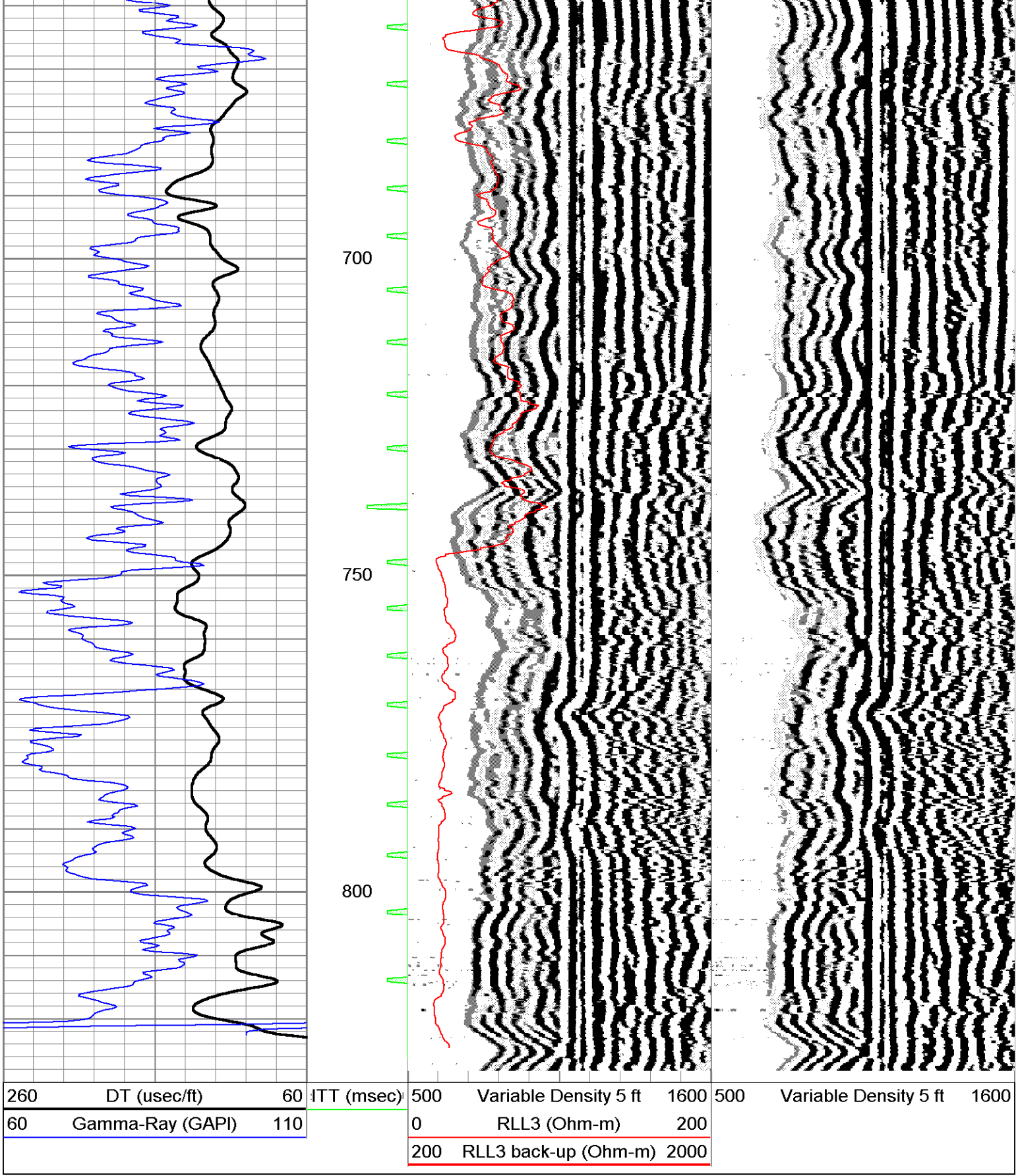
Database File: 14882.db
Dataset Pathname: SNC
Presentation Format: SLT
Dataset Creation: Wed Sep 23 17:43:12 2009 by Log Warrior Version 6.6
Charted by: Depth in Feet scaled 1:240

260	DT (usec/ft)	60	ITT (msec)	500	Variable Density 5 ft	1600	1600	500	Variable Density 5 ft
60	Gamma-Ray (GAPI)	110		0	RLL3 (Ohm-m)	200			


200 RLL3 back-up (Ohm-m) 2000
Surface Casing
50
100
150
200


250
Gamma-Ray
RLL3
ITT
300
Apparent SWL
350
400


450
500
550
600
650


700
750
800
260 DT (usec/ft) 60
60 Gamma-Ray (GAPI) 110
ITT (msec)
500 Variable Density 5 ft 1600
0 RLL3 (Ohm-m) 200
200 RLL3 back-up (Ohm-m) 2000
500 Variable Density 5 ft 1600

PACIFIC SURVEYS

ELECTRIC LOG
LATEROLOG 3
GAMMA-RAY

Job No. 14949

File No.

Company BEST DRILLING AND PUMP

Well EPA-MP6

Field RIALTO

County SAN BERNARDINO State CA

Location:

ETIWANDA, EAST OF ACACIA
GPS: N34o 06.843' W117o 21.643'

Sec. Twp. Rge.

Other Services:

SONIC/VDL
GR/LL3
CALIPER

Permanent Datum G.L. Elevation above perm. datum 0' Elevation K.B.
Log Measured From G.L. D.F.
Drilling Measured From G.L. G.L.

Date	10-28-09		
Run Number	ONE		
Depth Driller	864'		
Depth Logger	864'		
Bottom Logged Interval	863.5'		
Top Log Interval	25'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	9.8 @ 77F		
Rmf @ Meas. Temp	9.09 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	2 HRS		
Time Logger on Bottom	18:45		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	LA.		
Recorded By	RIDDER		
Witnessed By	BJ LECHLER		

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Comments

Calibration Report

Database File: 14949.db
Dataset Pathname: Best/well/run1/elog
Dataset Creation: Wed Oct 28 19:30:38 2009 by Log Open-Cased 090629

ELOG Calibration Report

Serial:	D4
Model:	DTQ
Shop Calibration Performed:	Fri Aug 28 12:52:06 2009
Before Survey Verification Performed:	Sun Sep 09 13:17:43 2007
After Survey Verification Performed:	Sun Sep 09 13:17:48 2007

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	11.616	103.967		10.200	102.200	Ohm-m	0.996	-1.372
Long	3.387	88.648		10.200	102.200	Ohm-m	1.079	-17.311
IEE	7719.620	7710.740	counts	8.448	8.439	A		
VSN	8785.840	8777.420	counts	167.579	167.419	V		
VLN	2227.000	2224.480	counts	42.477	42.429	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.249	101.201		40.505	101.206	Ohm-m	0.996	0.422
Long	142.638	102.842		102.858	102.858	Ohm-m	1.024	-2.408
IEE	212.960	7070.960	counts	0.233	7.738	A		
VSN	96.300	8039.720	counts	1.837	153.348	V		
VLN	85.320	2042.520	counts	1.627	38.959	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.270	101.200		40.249	101.201	Ohm-m	1.000	-0.035
Long	142.491	102.843		102.842	102.842	Ohm-m	1.004	-0.383
IEE	213.380	7077.580	counts	0.234	7.746	A		
VSN	96.540	8047.160	counts	1.841	153.490	V		
VLN	85.400	2044.440	counts	1.629	38.995	V		

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	40.505	40.249	Ohm-m	101.206	101.201	Ohm-m
Long	143.592	142.638	Ohm-m	102.858	102.842	Ohm-m

Gamma Ray Calibration Report

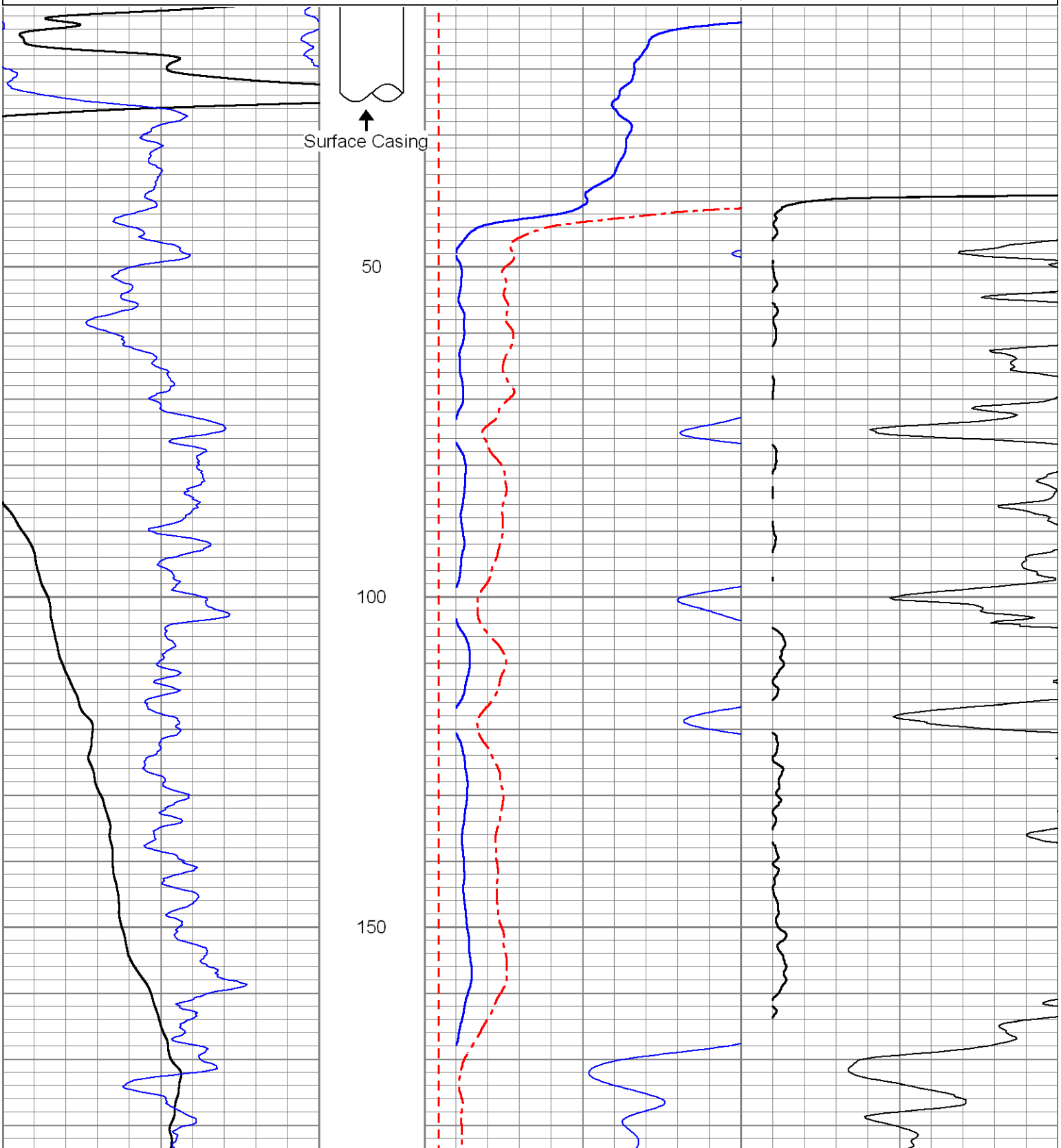
Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Sun Sep 09 13:17:55 2007	
Calibrator Value:	162.0	GAPI
Background Reading:	172.5	cps
Calibrator Reading:	717.9	cps
Sensitivity:	0.2970	GAPI/cps

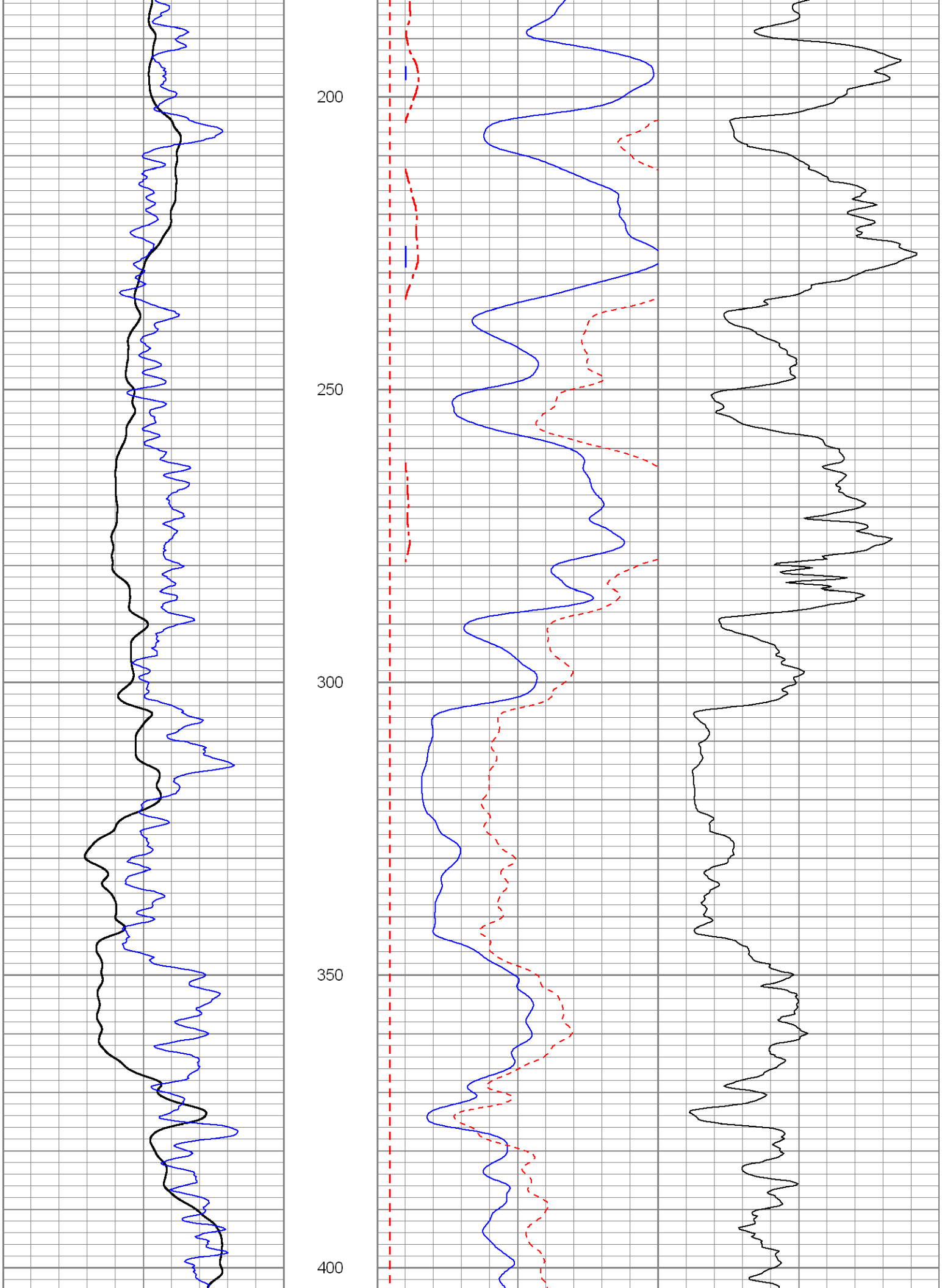
Database File:	14949.db
Dataset Pathname:	Best/well/run1/elog
Presentation Format:	elog
Dataset Creation:	Wed Oct 28 19:30:38 2009 by Log Open-Cased 090629
Charted by:	Depth in Feet scaled 1:240

-20	SP (mV)	100
0	Line Speed (ft/min)	100
40	Gamma-Ray (GAPI)	110

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

0	*RLL3 (Ohm-m)*	200
200	*RLL3 (Ohm-m)*	2000

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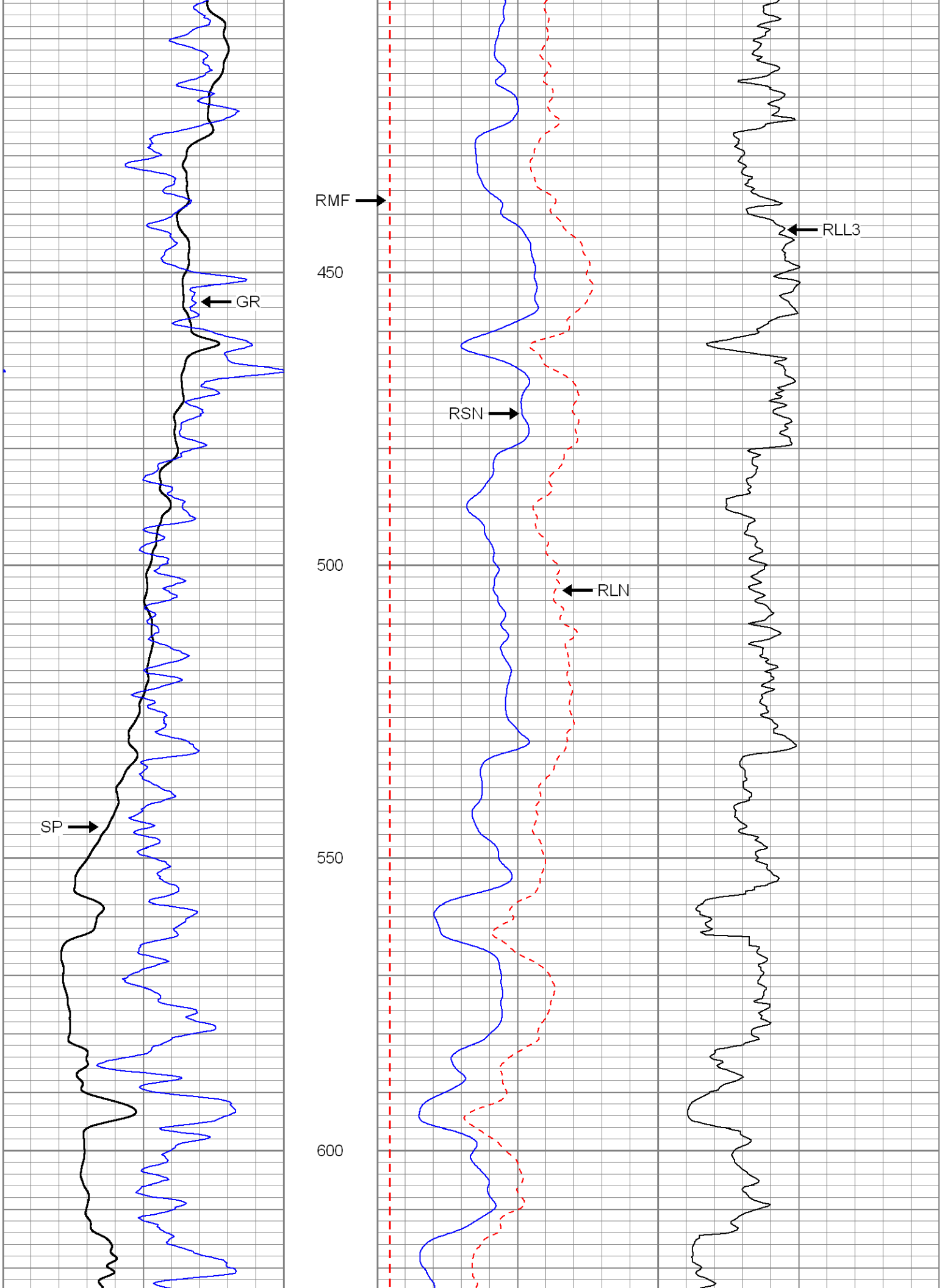
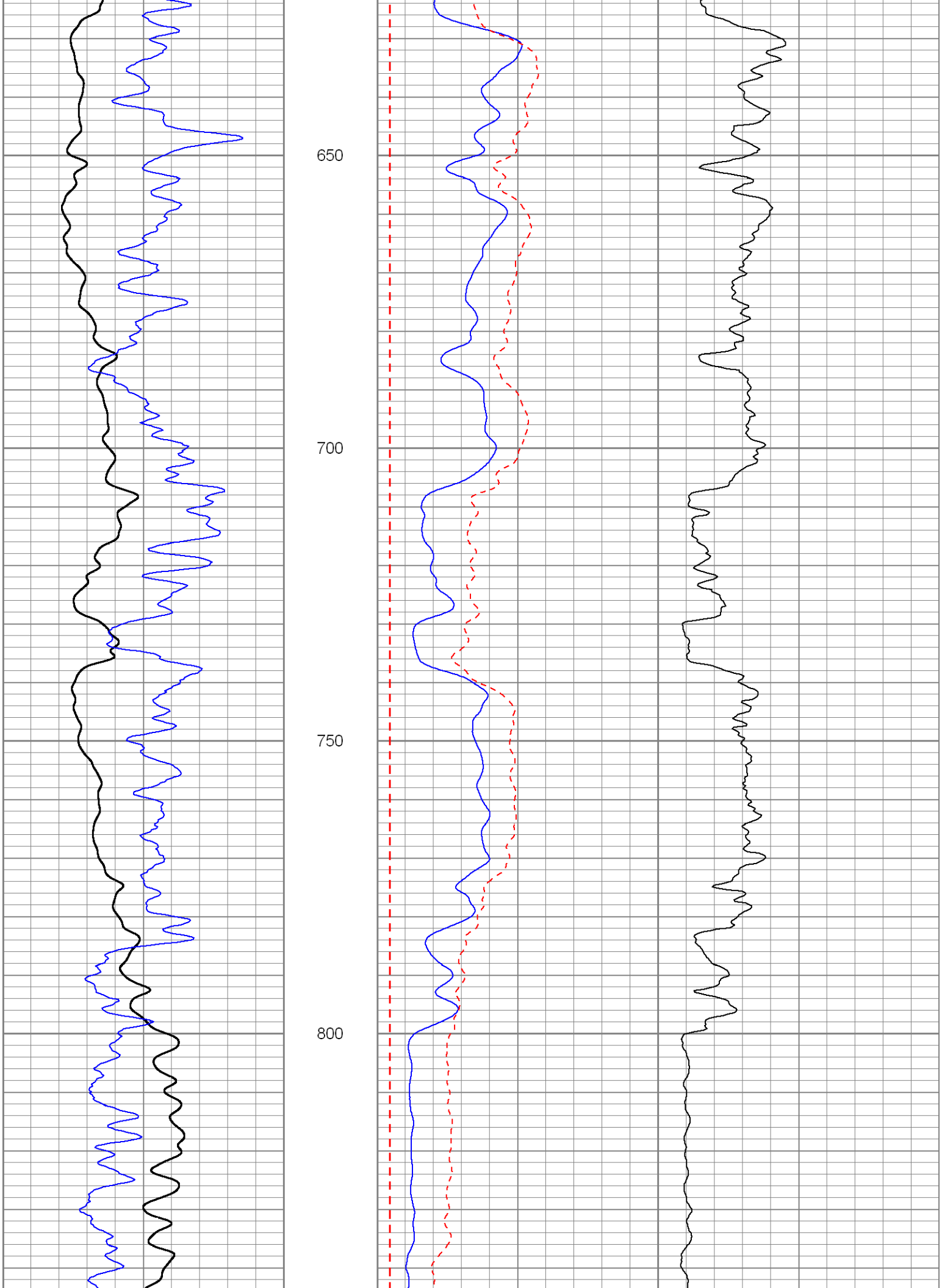
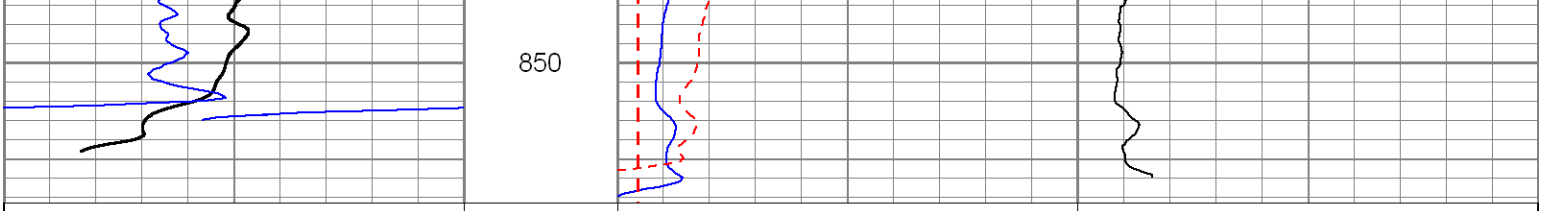
250
300
350
400


RMF
RLL3
450
GR
RSN
500
RLN
SP
550
600


650
700
750
800



-20	SP (mV)	100
0	Line Speed (ft/min)	100
40	Gamma-Ray (GAPI)	110

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

0	*RLL3 (Ohm-m)*	200
200	*RLL3 (Ohm-m)*	2000

PACIFIC SURVEYS

LATEROLOG 3
GAMMA-RAY

Job No. 14949

File No.

Company BEST DRILLING AND PUMP

Well EPA-MP6

Field RIALTO

County SAN BERNARDINO State CA

Location:

ETIWANDA, EAST OF ACACIA
GPS: N34o 06.843' W117o 21.643'

Other Services:

SONIC/VDL
ELOG
CALIPER

Sec. Twp. Rge.

Permanent Datum	G.L.	0'	Elevation above perm. datum	K.B.
Log Measured From	G.L.			D.F.
Drilling Measured From	G.L.			G.L.

Date	10-28-09		
Run Number	ONE		
Depth Driller	864'		
Depth Logger	864'		
Bottom Logged Interval	863.5'		
Top Log Interval	25'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	9.8 @ 77F		
Rmf @ Meas. Temp	9.09 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	2 HRS		
Time Logger on Bottom	18:45		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	LA.		
Recorded By	RIDDER		
Witnessed By	BJ LECHLER		

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Comments

Calibration Report

Database File: 14949.db
Dataset Pathname: Best/well/run1/LL3
Dataset Creation: Wed Oct 28 20:14:15 2009 by Log Open-Cased 090629

Gamma Ray Calibration Report

Serial Number:	12	
Tool Model:	GROH	
Performed:	Tue Jun 23 13:28:35 2009	
Calibrator Value:	162.0	GAPI
Background Reading:	55.8	
Calibrator Reading:	203.8	
Sensitivity:	1.0948	GAPI/

RLL3 (Resistivity Laterolog 3) Calibration Report:

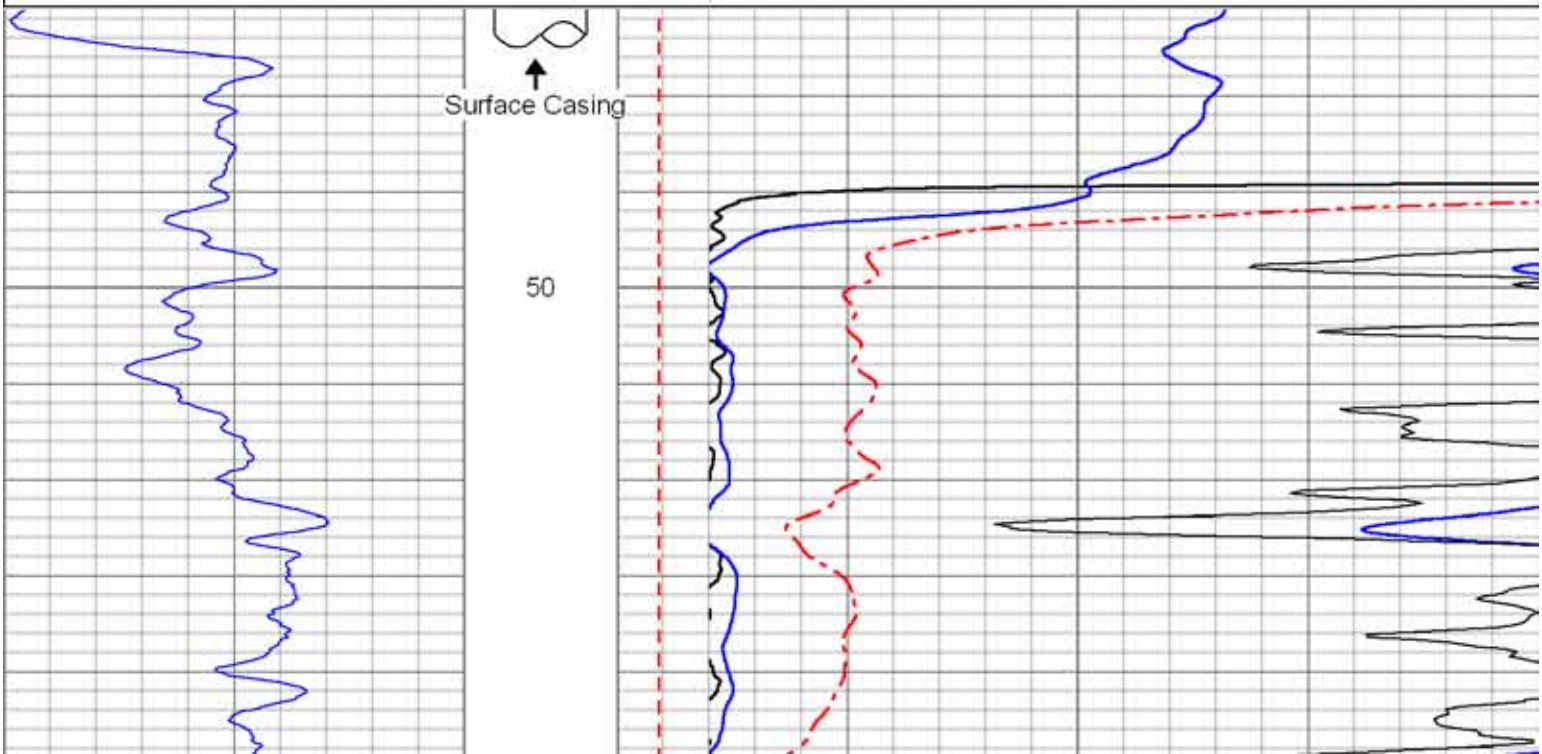
Serial Number:	231
Tool Model:	M&W
Performed:	Wed Aug 26 16:09:23 2009

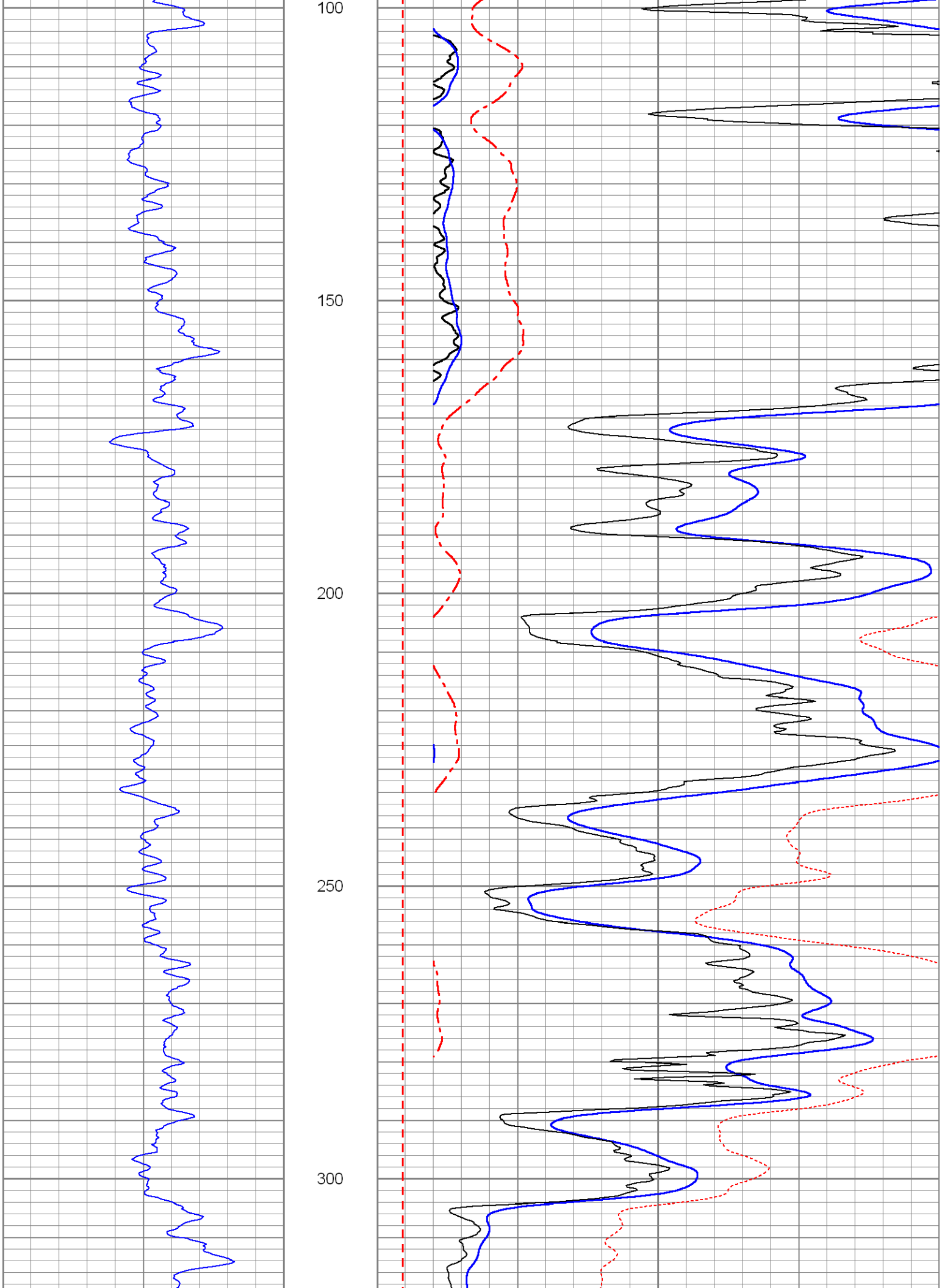
System Reading	Calibration Reference	
0.005	2.500	Ohm-m
0.009	5.000	
0.091	50.000	
0.471	250.000	
0.932	500.000	

Database File:	14949.db
Dataset Pathname:	Best/well/run1/LL3
Presentation Format:	guard
Dataset Creation:	Wed Oct 28 20:14:15 2009 by Log Open-Cased 090629
Charted by:	Depth in Feet scaled 1:240

40	Gamma-Ray (GAPI)	110

0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	*RLL3 (Ohm-m)*	200
200	*RLL3 x 10 (Ohm-m)*	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

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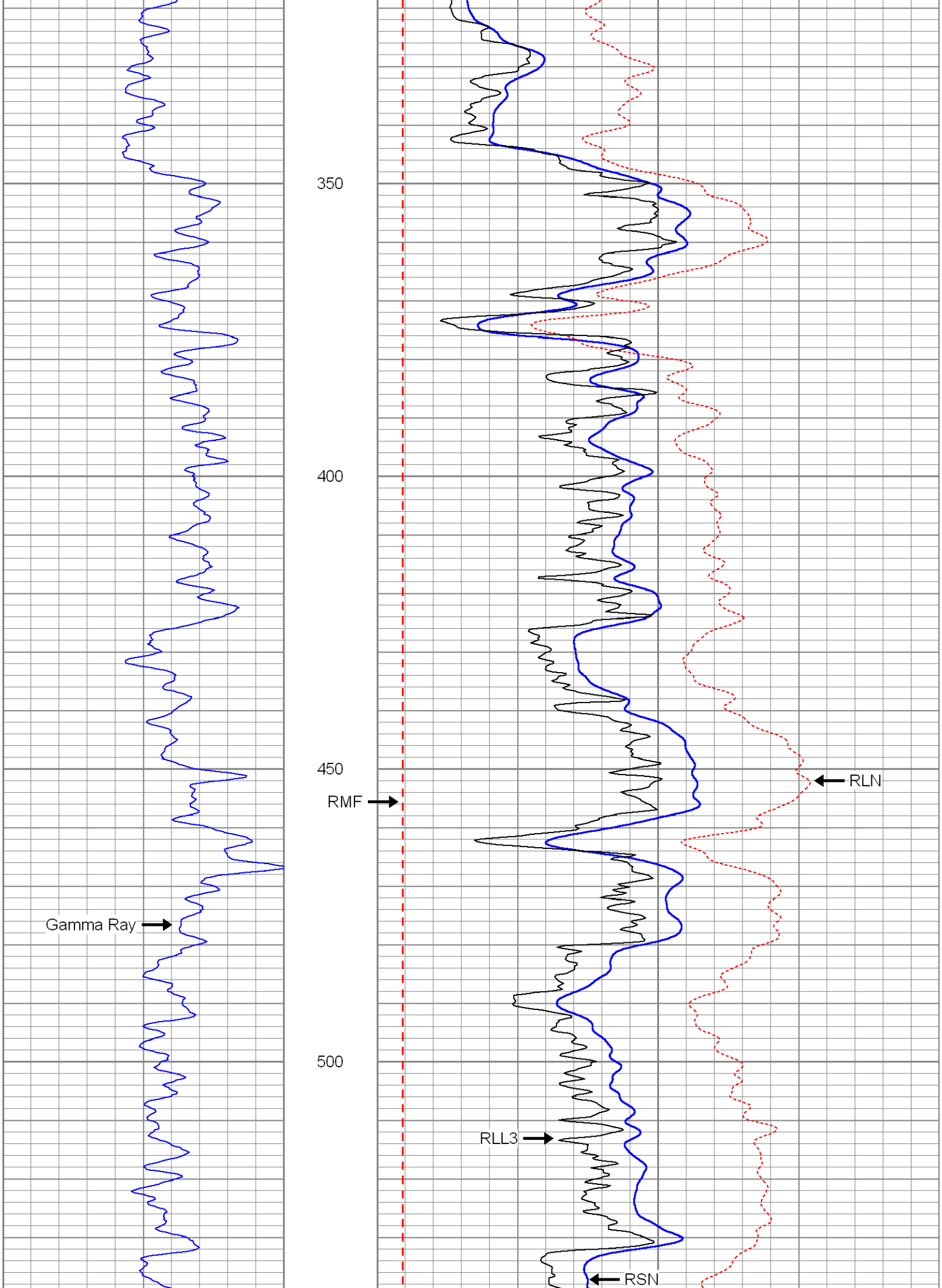
250
300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400
450
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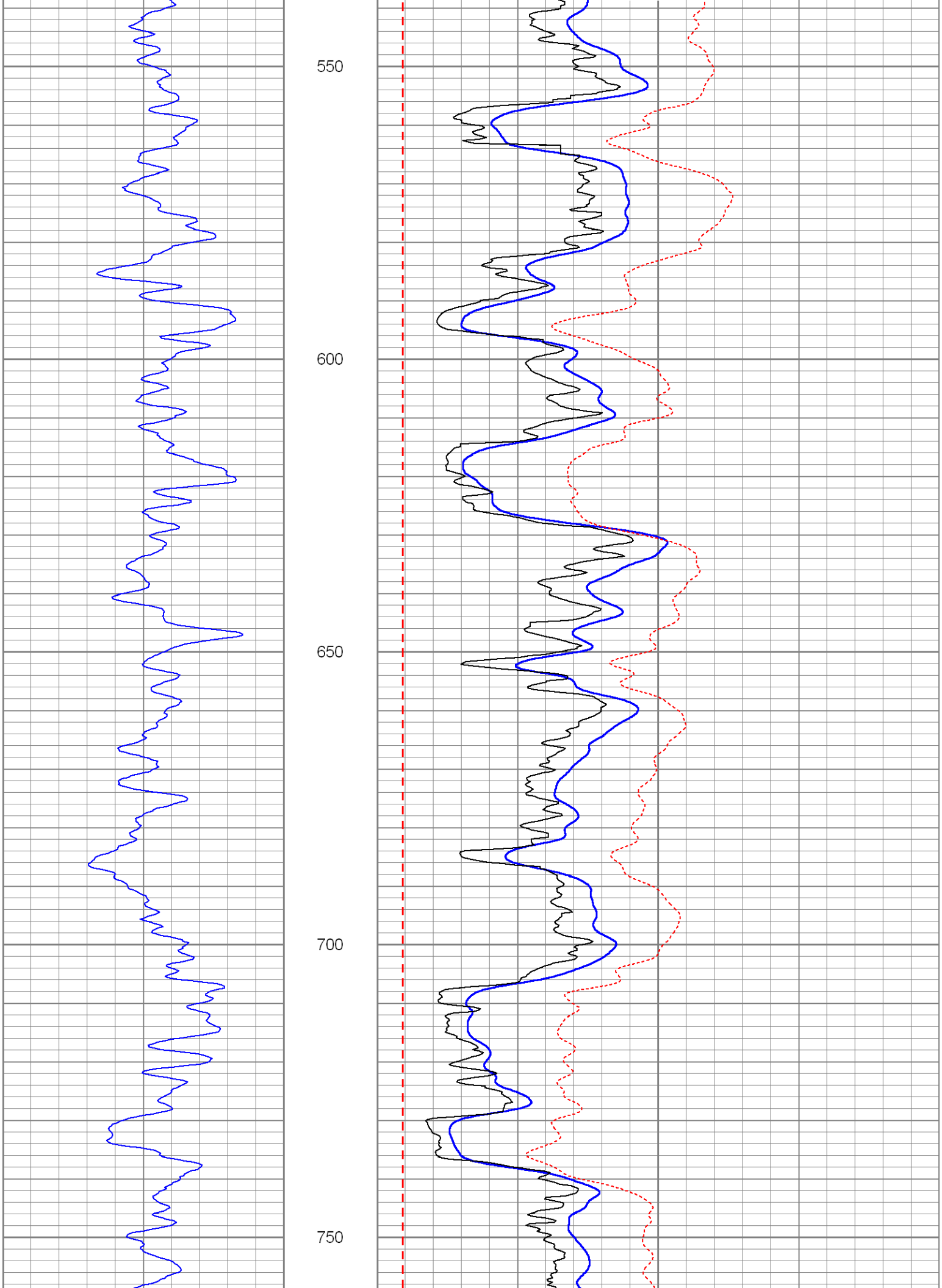
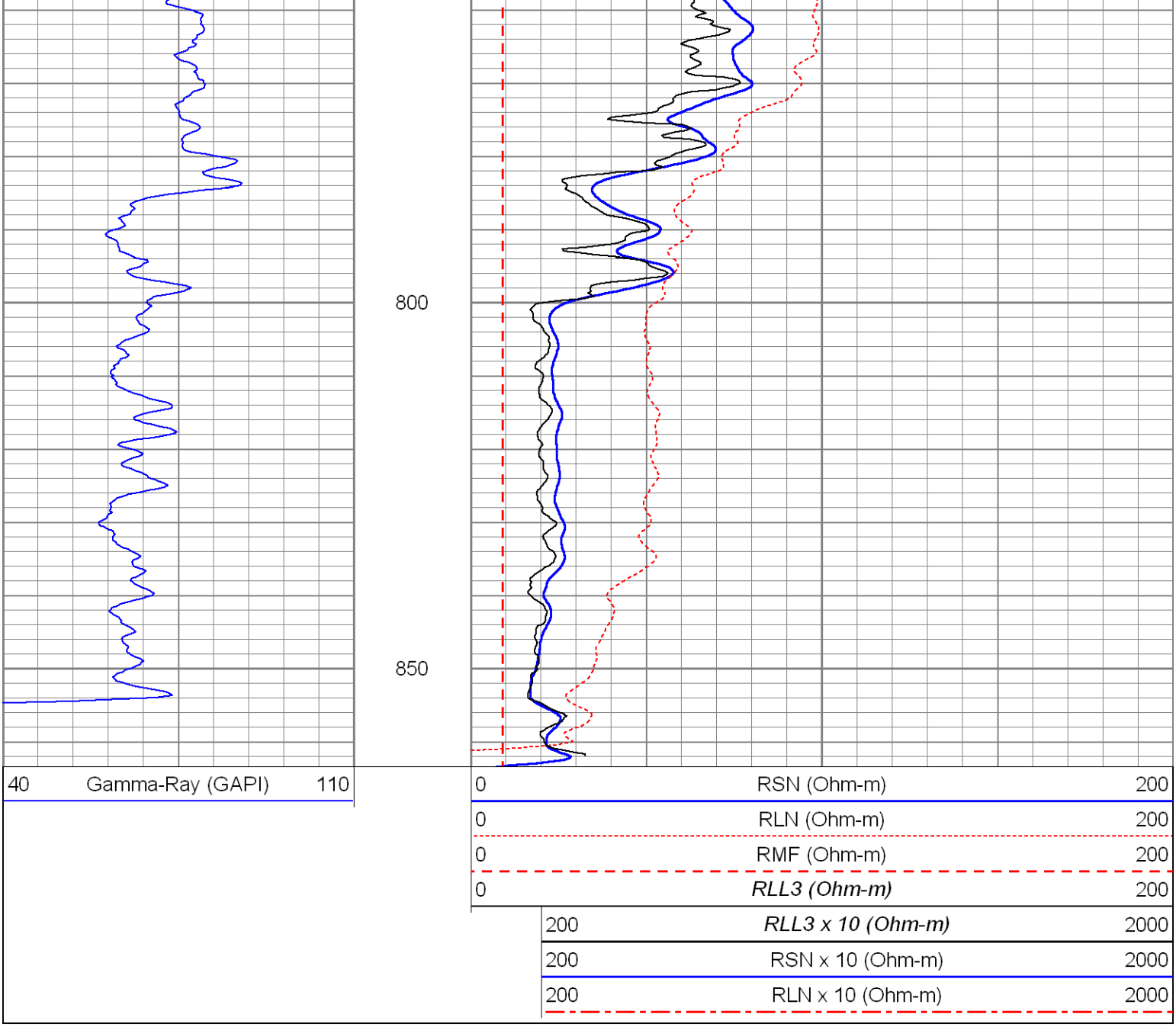
RMF
RLN
Gamma Ray
RLL3
RSN


550
600
650
700
750



40	Gamma-Ray (GAPI)	110
0	RSN (Ohm-m)	200
0	RLN (Ohm-m)	200
0	RMF (Ohm-m)	200
0	*RLL3 (Ohm-m)*	200
200	*RLL3 x 10 (Ohm-m)*	2000
200	RSN x 10 (Ohm-m)	2000
200	RLN x 10 (Ohm-m)	2000

PACIFIC SURVEYS

SONIC VELOCITY VARIABLE DENSITY

Job No. 14949

File No.

Company BEST DRILLING AND PUMP

Well EPA-MP6

Field RIALTO

County SAN BERNARDINO State CA

Location:

ETIWANDA, EAST OF ACACIA
GPS: N34o 06.843' W117o 21.643'

Sec. Twp. Rge.

Other Services:

ELOG
GR/LL3
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation K.B.
Log Measured From	G.L.	0'	D.F.
Drilling Measured From	G.L.		G.L.

Date	10-28-09		
Run Number	ONE		
Depth Driller	864'		
Depth Logger	864'		
Bottom Logged Interval	863.5'		
Top Log Interval	25'		
Casing Driller	16" @ 25'		
Casing Logger	25'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	9.8 @ 77F		
Rmf @ Meas. Temp	9.09 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	2 HRS		
Time Logger on Bottom	18:45		
Max. Recorded Temperature	N/A		
Equipment Number	PS-3		
Location	L.A.		
Recorded By	RIDDER		
Witnessed By	BJ LECHLER		

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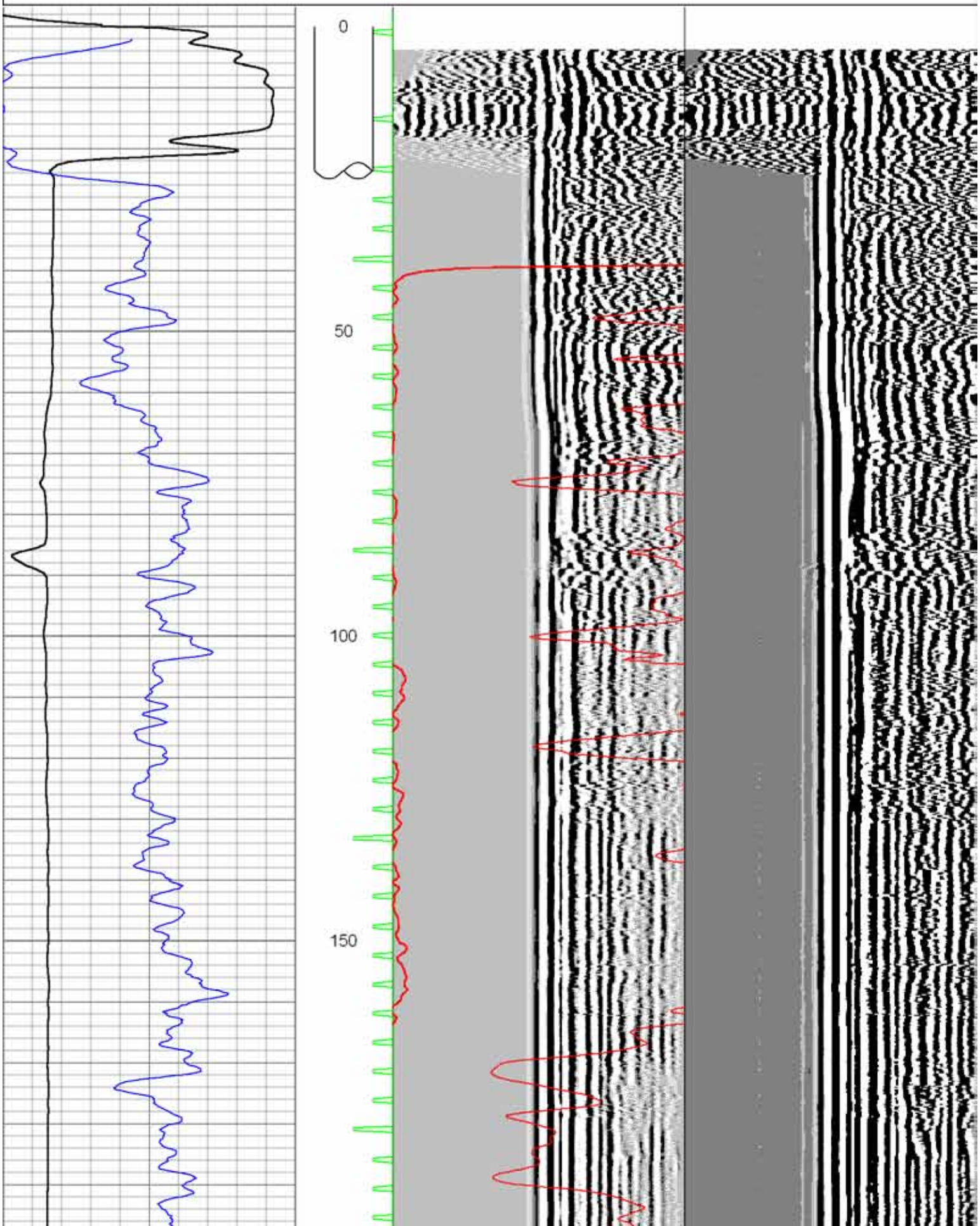
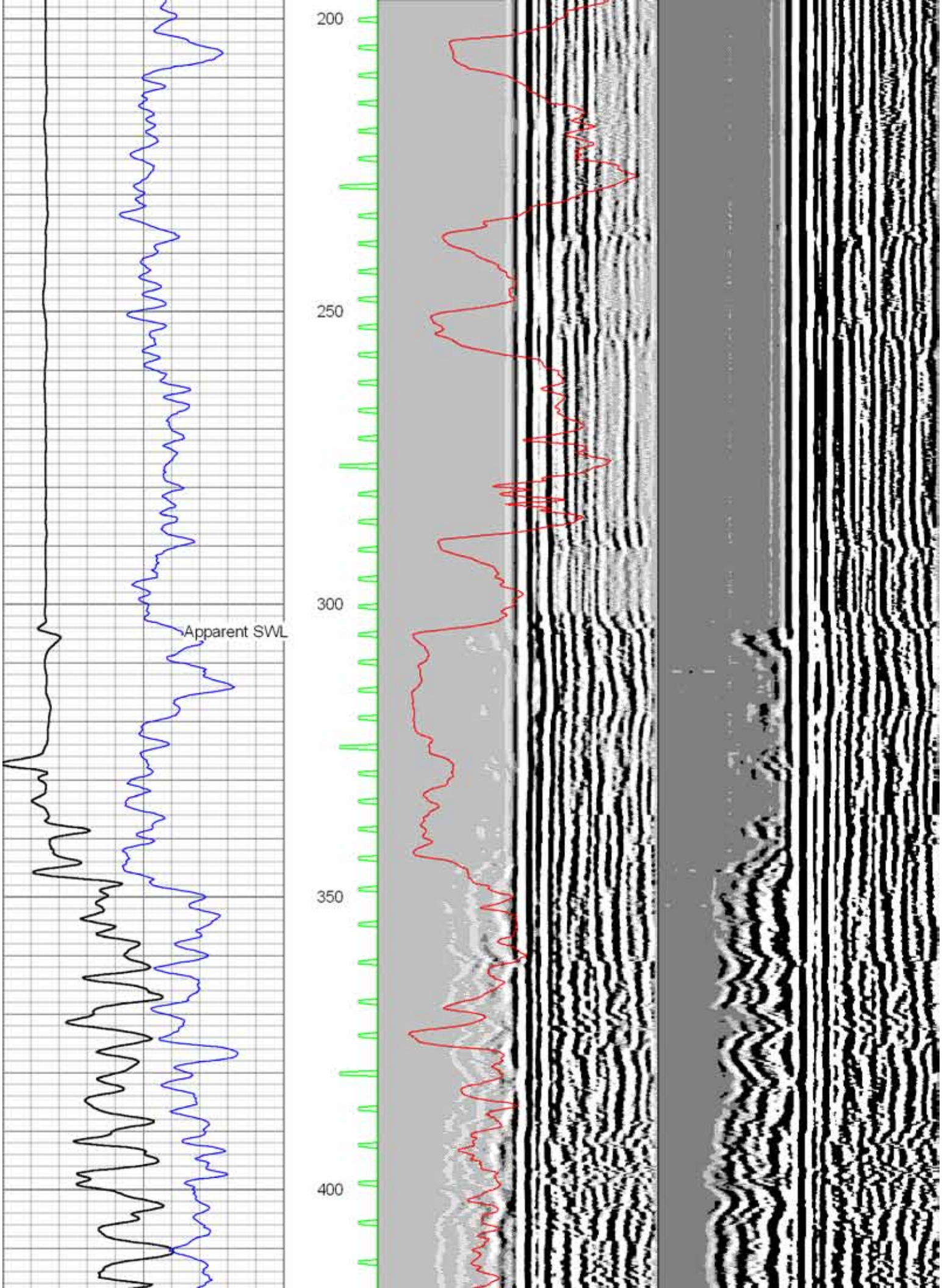
Comments

Database File: 14949.db
Dataset Pathname: Best/well/run1/Sonic_merg
Presentation Format: slt
Dataset Creation: Wed Oct 28 19:17:24 2009
Charted by: Depth in Feet scaled 1:240

240	DT (usec/ft)	40	ITT		500	Variable Density 5 ft	1600	500	Variable Density 5 ft	1600
40	Gamma-Ray (GAPI)	110	5 (msec) 0		0	*RLL3 (Ohm-m)*	200			
160	GR back-up (GAPI)	560			200	*RLL3 back-up (Ohm-m)*	2000			




Apparent SWL
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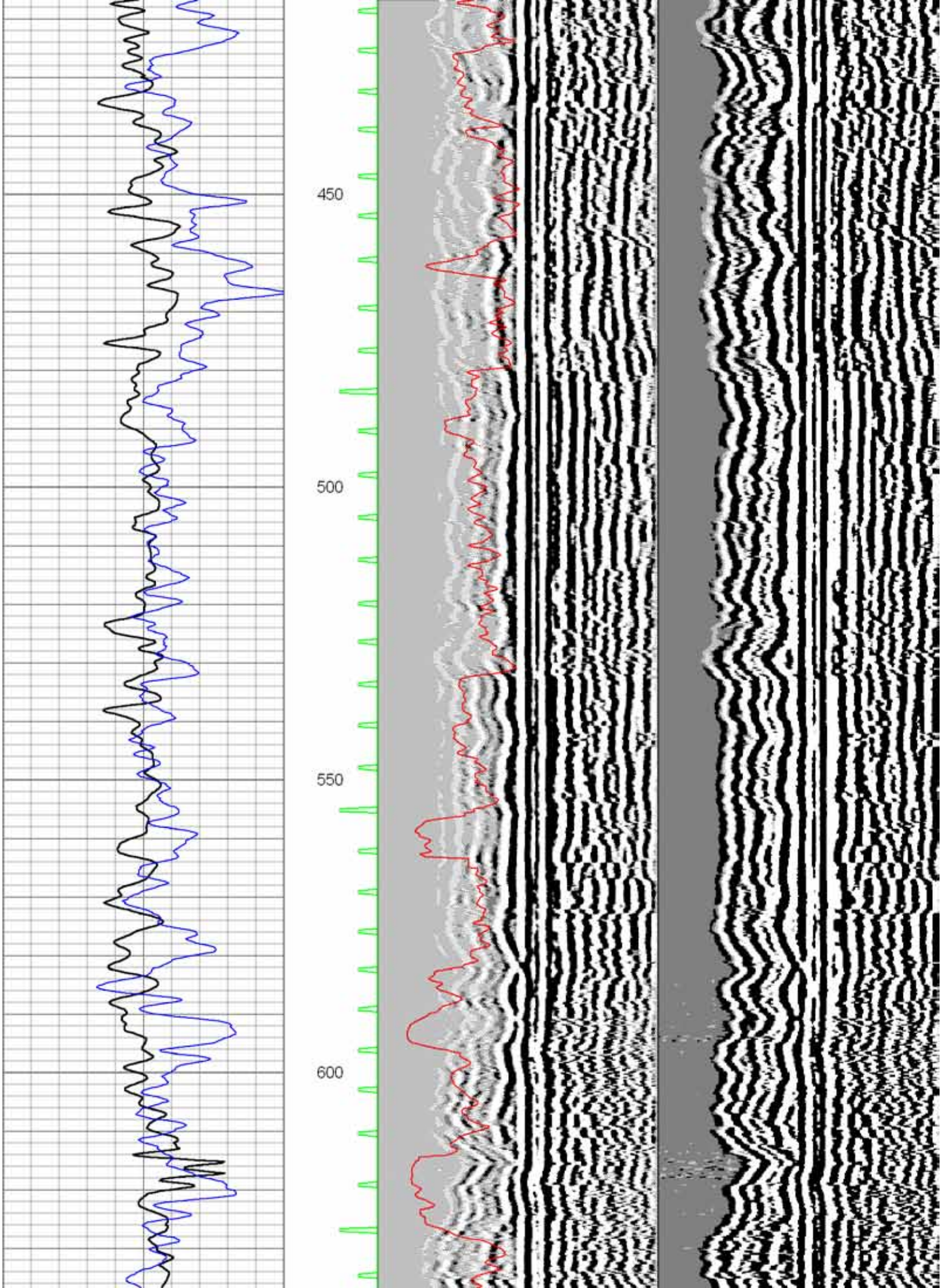
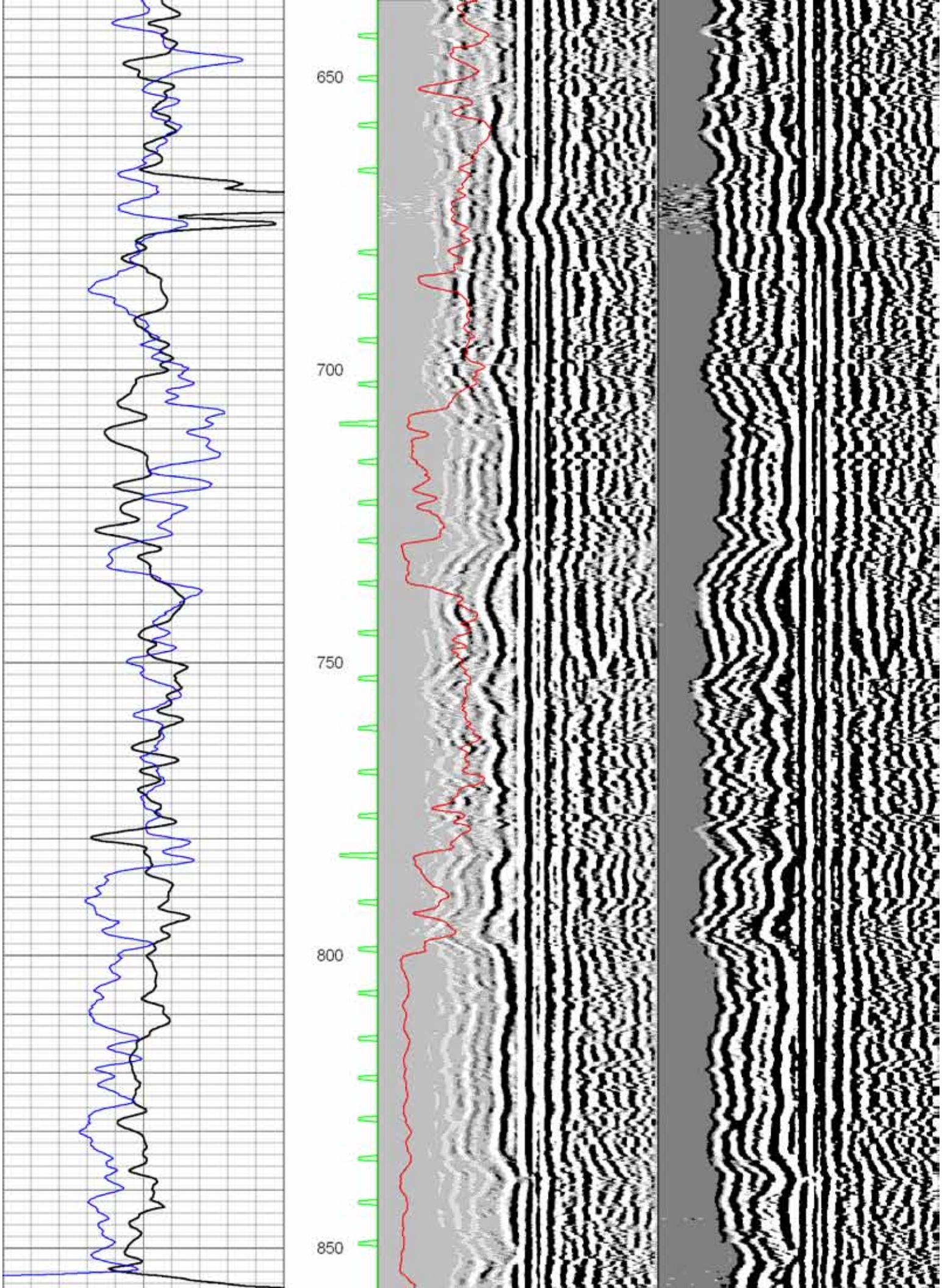
300
350
400


450
500
550
600


650
700
750
800
850

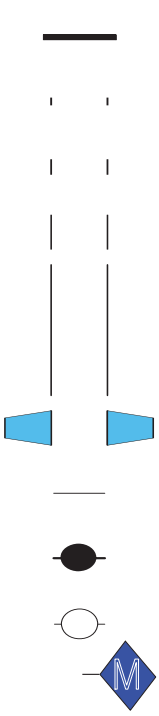
240	DT (usec/ft)	40	ITT	500	Variable Density 5 ft	1600	500	Variable Density 5 ft	1600
40	Gamma-Ray (GAPI)	110	5 (msec) 0	0	*RLL3 (Ohm-m)*	200			
160	GR back-up (GAPI)	560		200	*RLL3 back-up (Ohm-m)*	2000			

Appendix C
Westbay Construction Diagrams

Legend

MP Components

(Library - WD Library 7/27/00)



0203 - MP38 End Cap

020101 - MP38 Casing 4 (1F/0.3M)

020102 - MP38 Casing 3 (2F/0.6M)

020105 - MP38 Casing 2 (5F/1.5M)

020110 - MP38 Casing 1 (10F/3M)

0239 - MP38 Packer 82mm (5F/1.5M)

0202 - MP38 Regular Coupling

0205 - MP38 Measurment Port

0224 - MP38 Pumping Port

0216 - Magnetic Location Collar

Geology

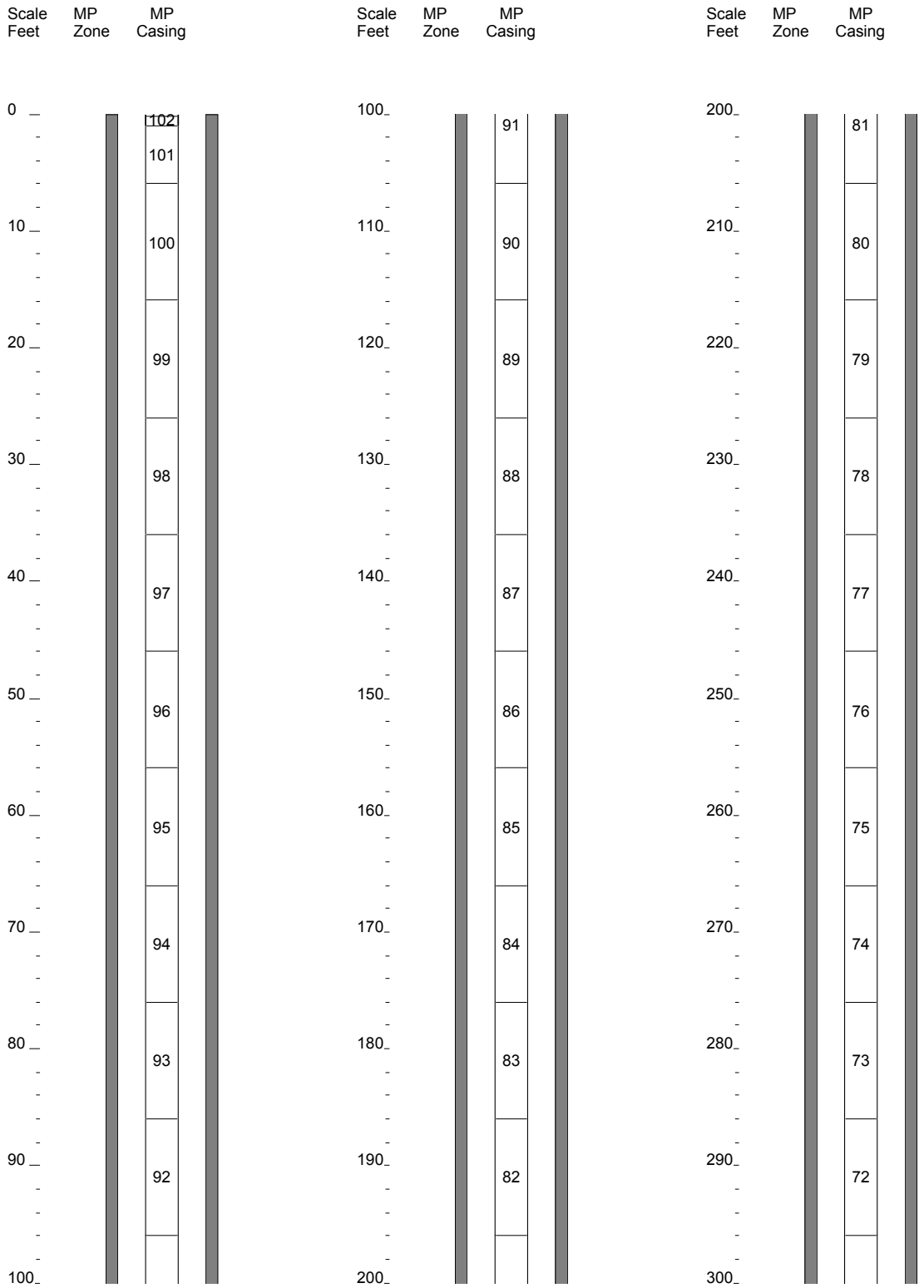
Backfill/Casing

Steel Casing

Well Screen

Summary Casing Log
Best Drilling/CH2M Hill

Job No: WB885
Well: EPA-MP1



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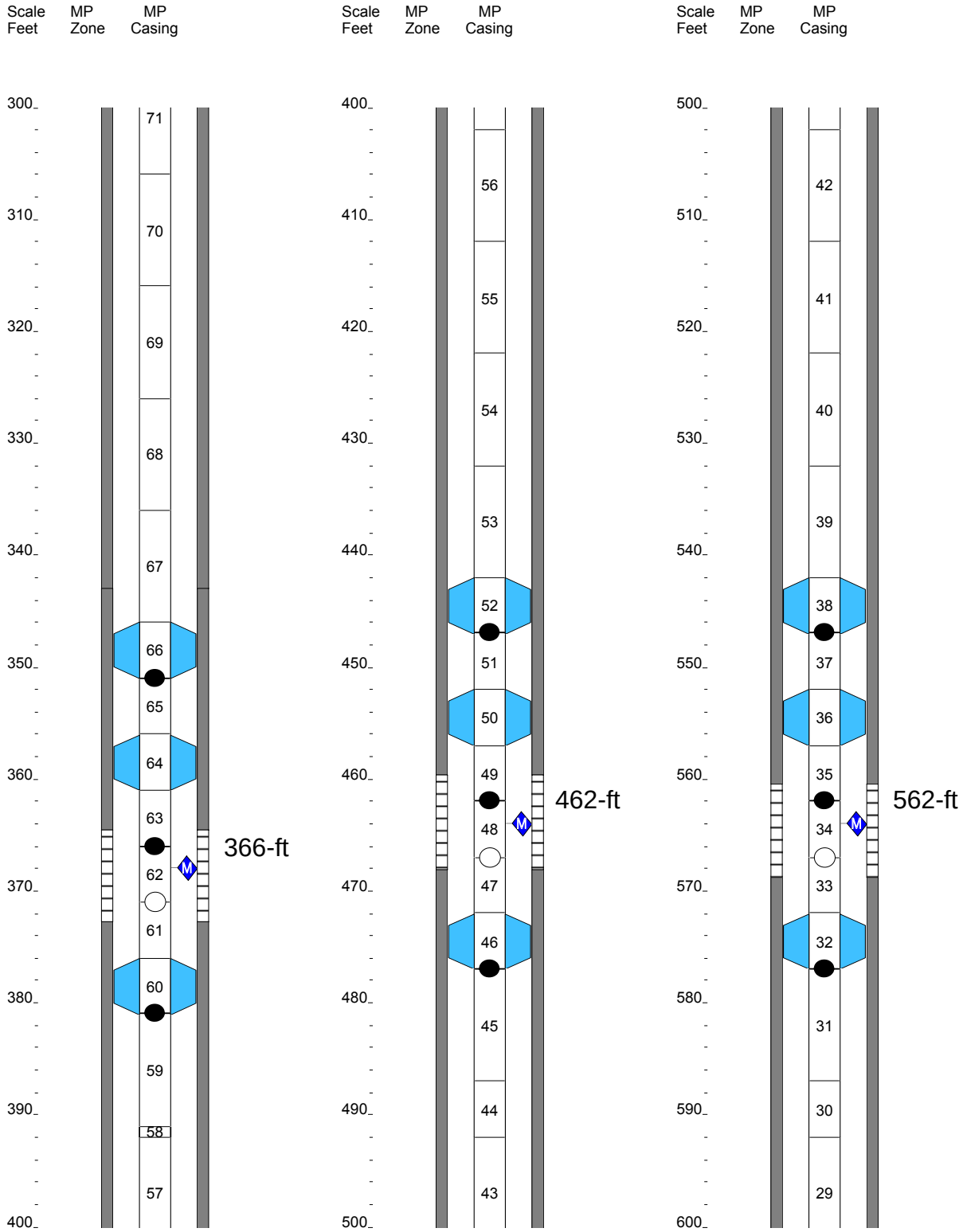
Summary Casing Log
Best Drilling/CH2M Hill

Job No: WB885
Well: EPA-MP1



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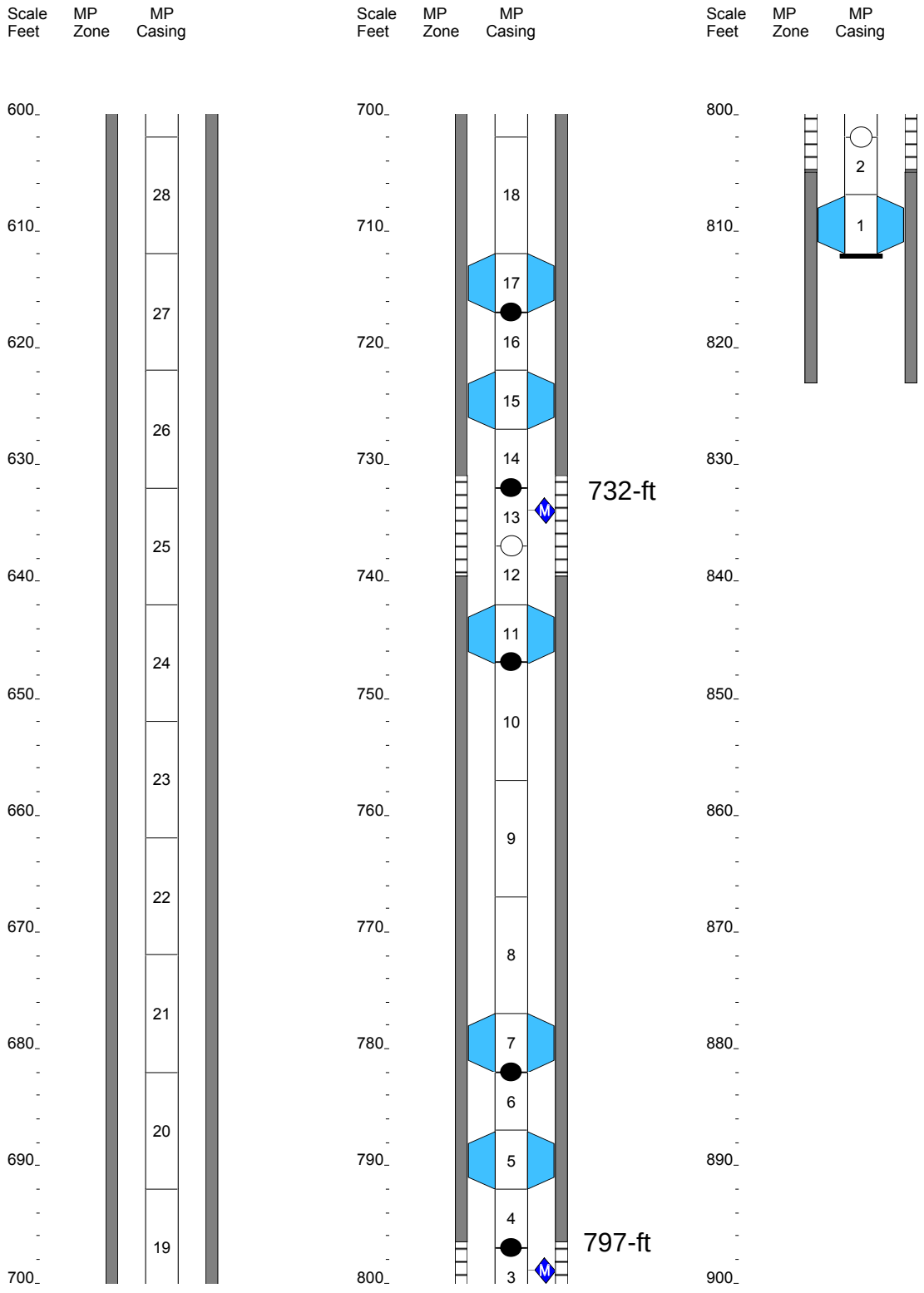
Summary Casing Log
Best Drilling/CH2M Hill

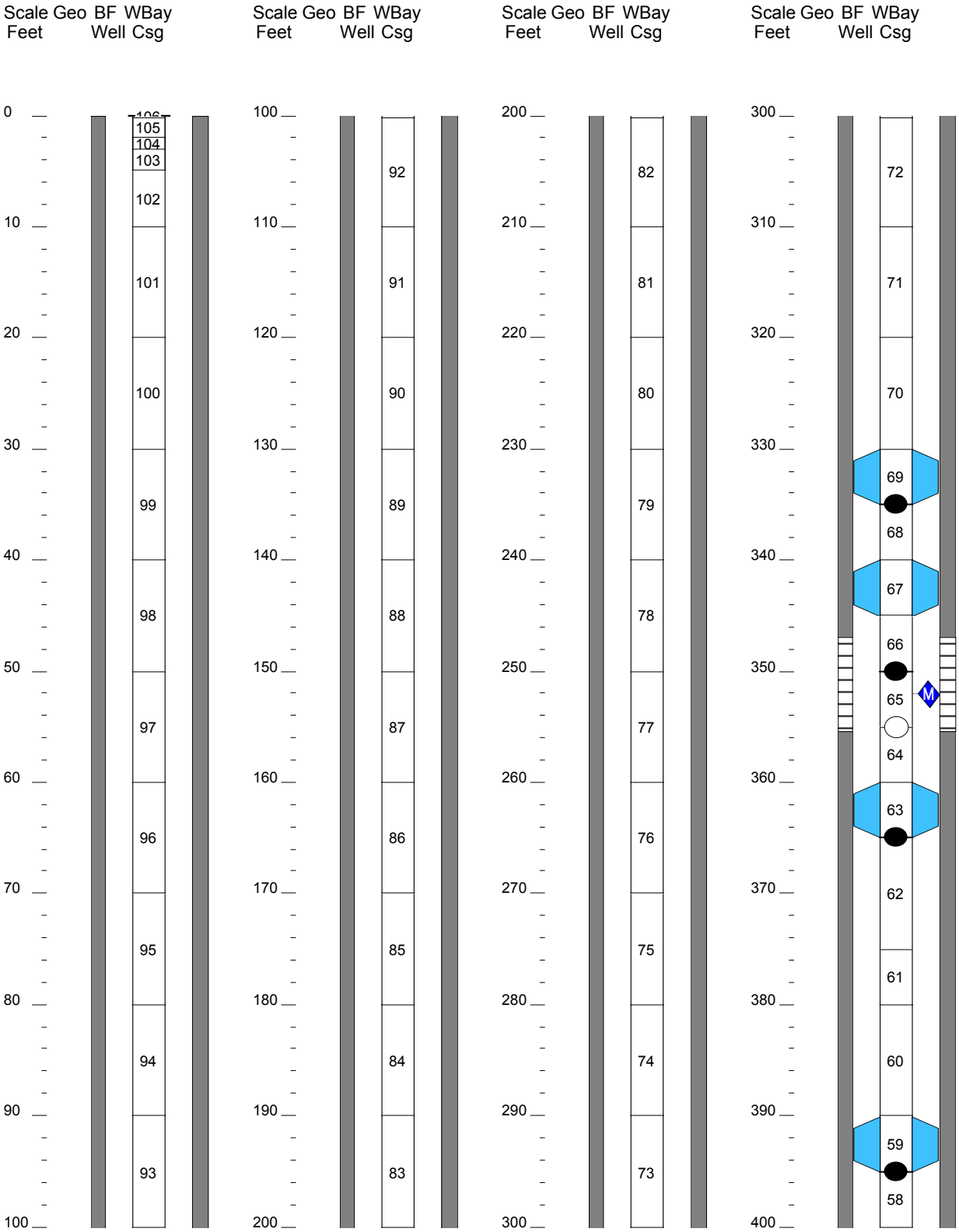
Job No: WB885
Well: EPA-MP1



Fri Jun 19 11:03:48 2009

Summary Log
Best Drilling/CH2M Hill

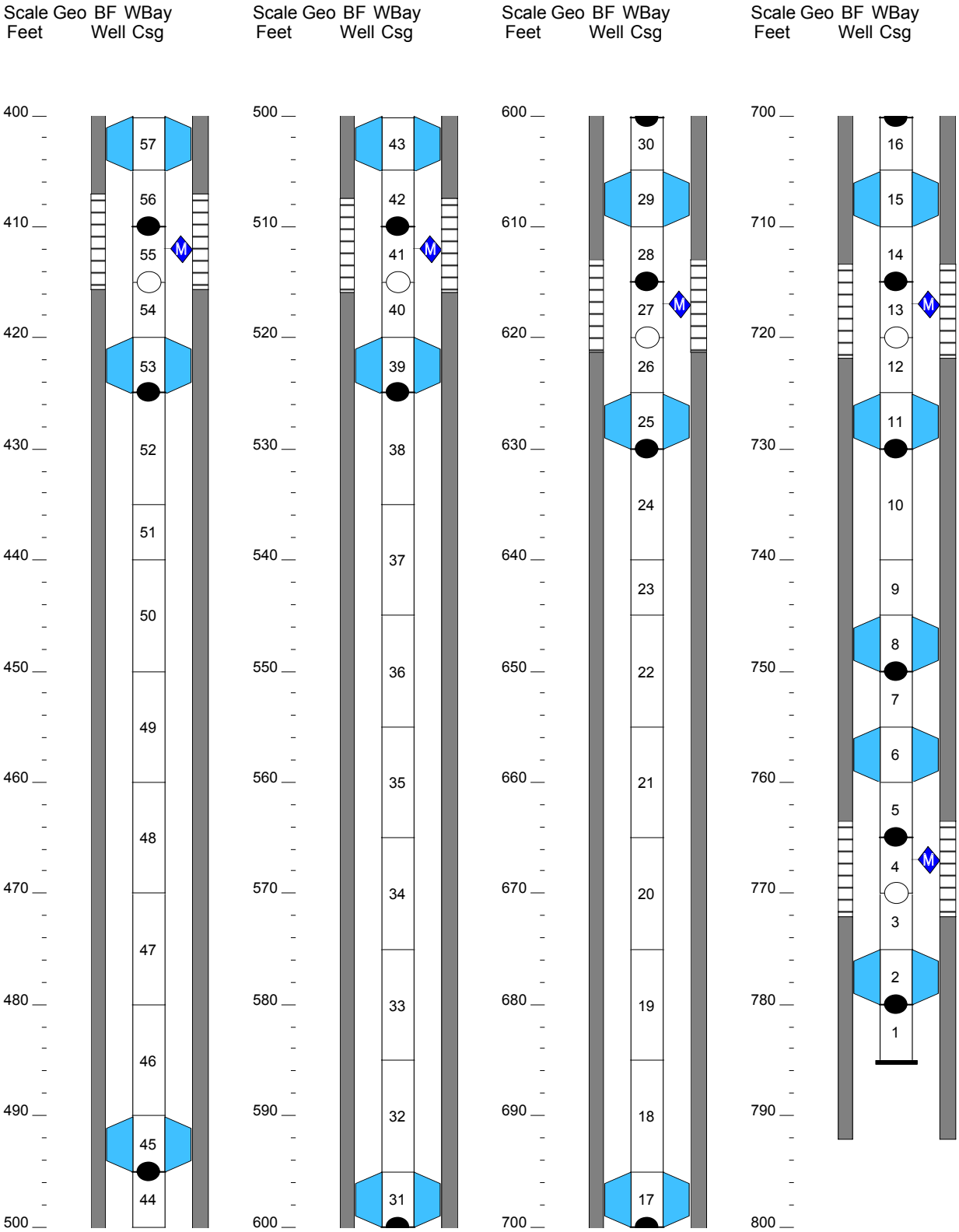
Job No: WB885
Well: EPA-MP2



Tue Jul 28 14:59:19 2009

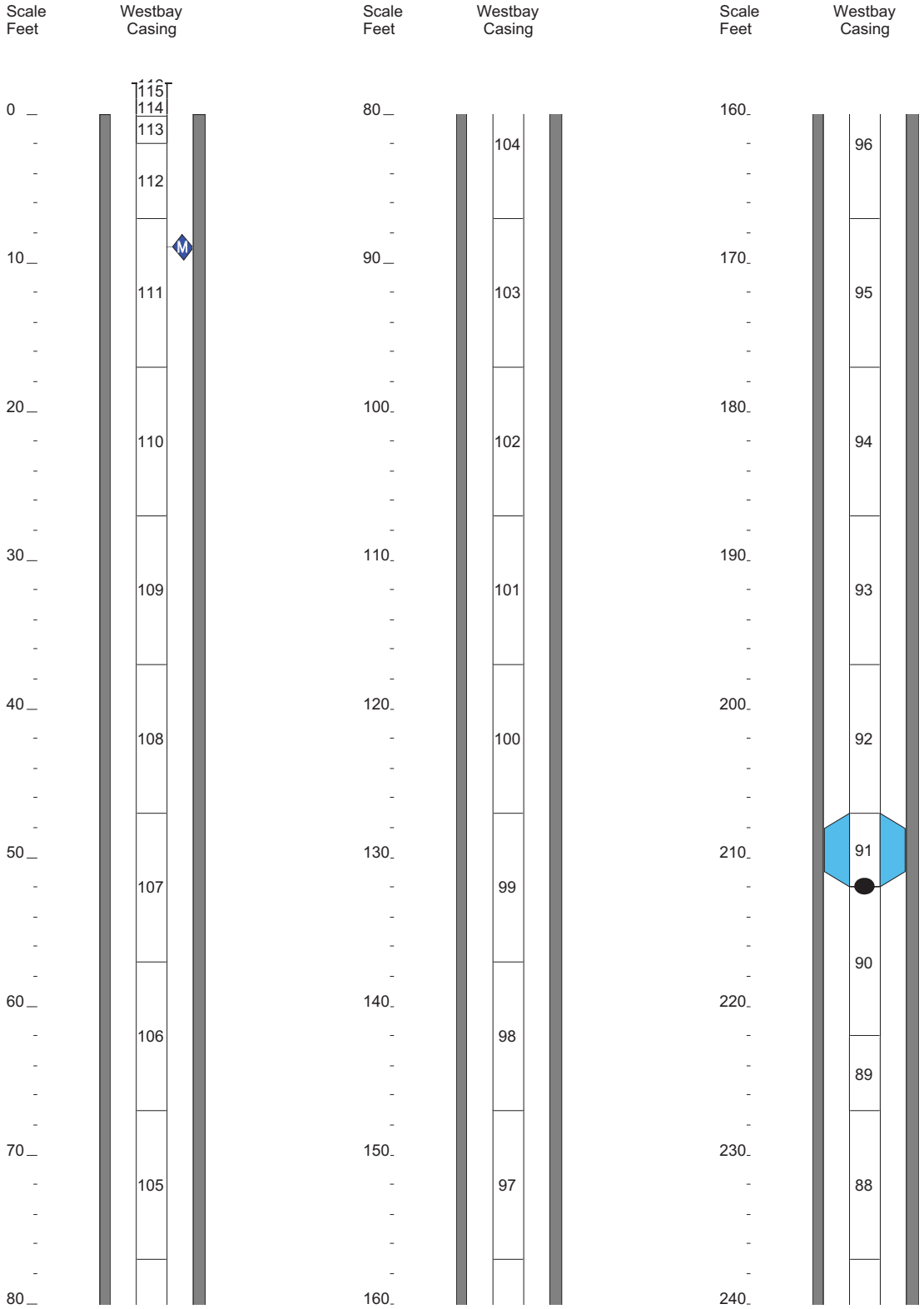
Summary Log
Best Drilling/CH2M Hill

Job No: WB885
Well: EPA-MP2



Summary Casing Log
Best Drilling/CH2M Hill

Job No: WB885
Well: EPA-MP3



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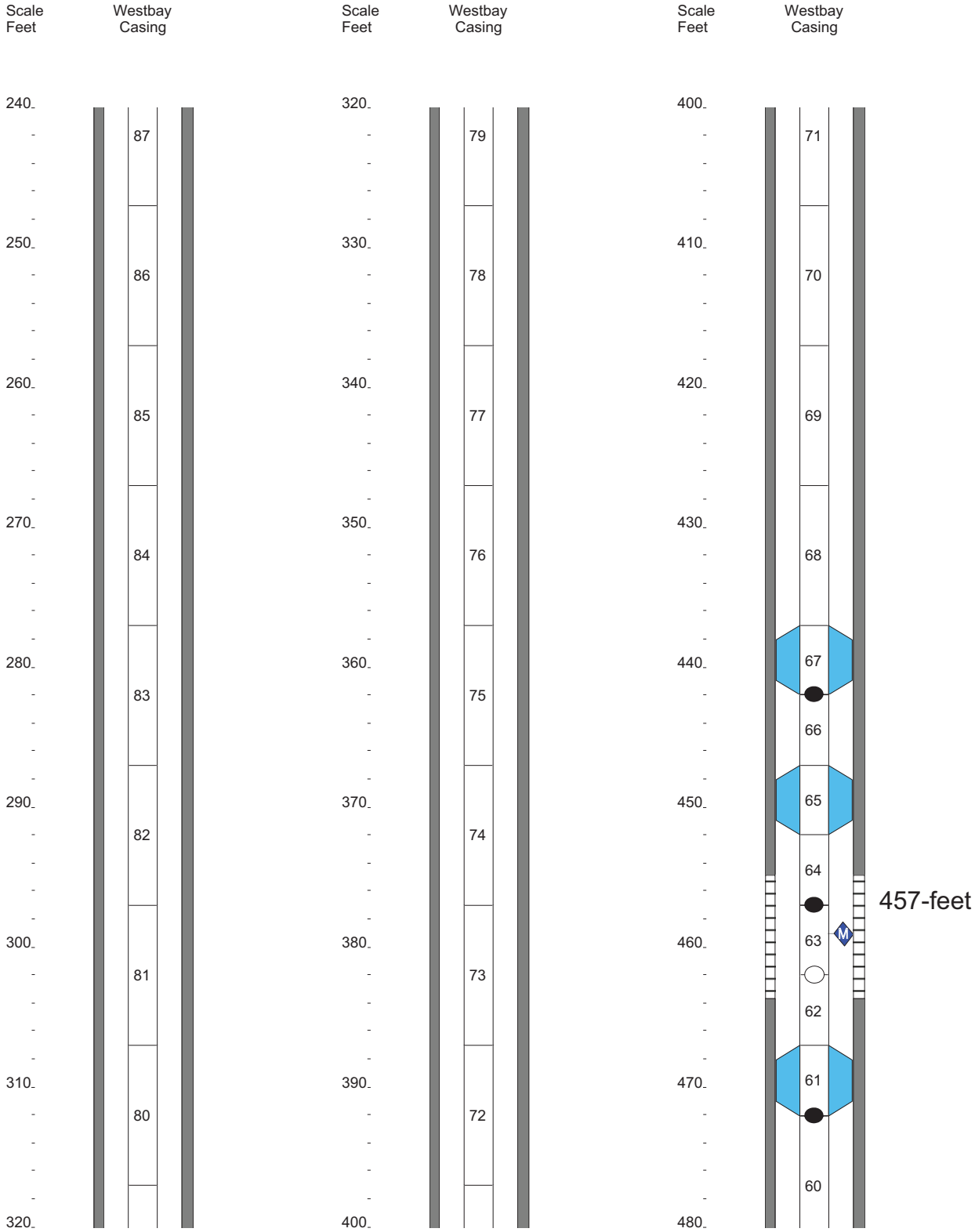
Summary Casing Log
Best Drilling/CH2M Hill

Job No: WB885
Well: EPA-MP3



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Summary Casing Log
Best Drilling/CH2M Hill

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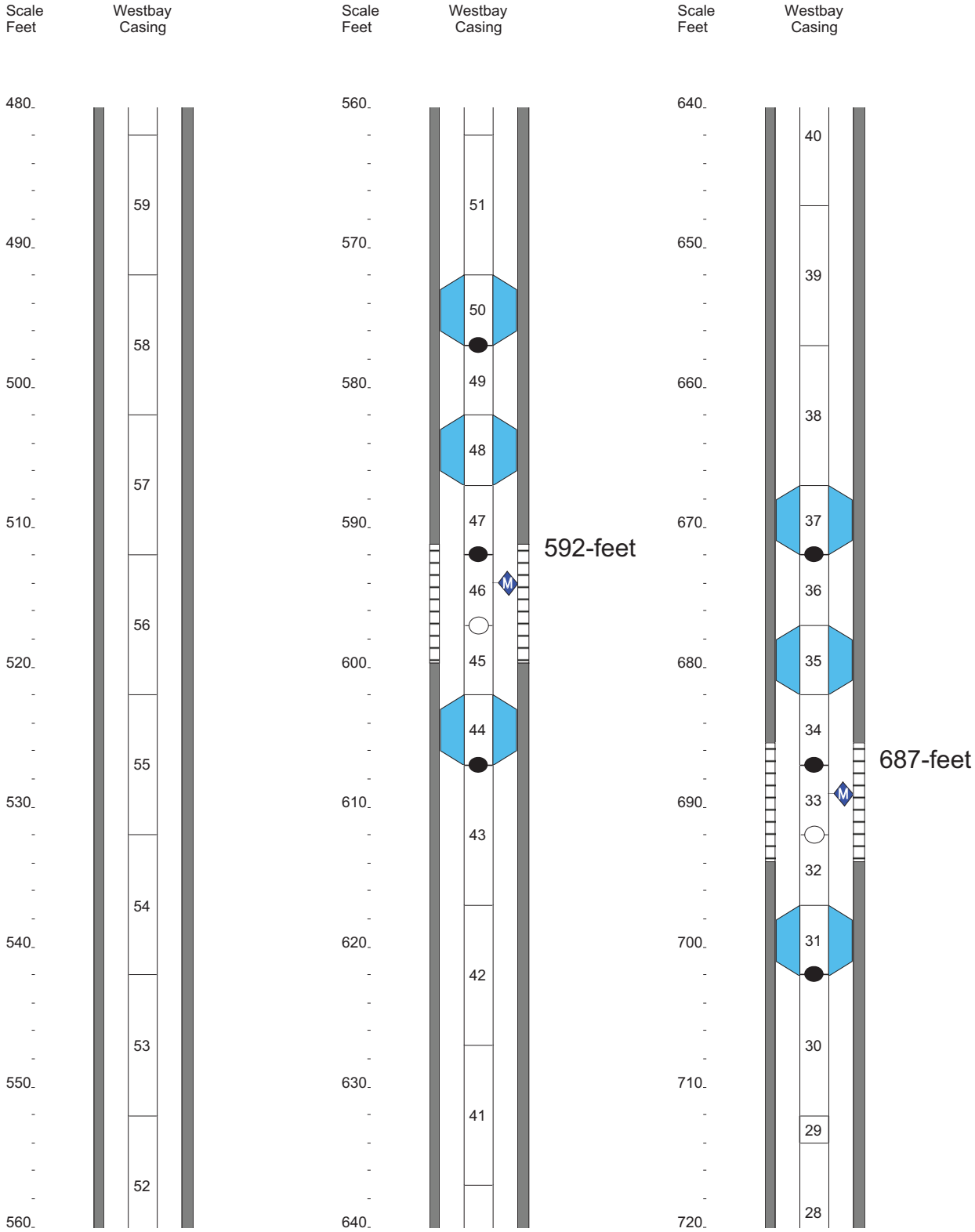
Well: EPA-MP3



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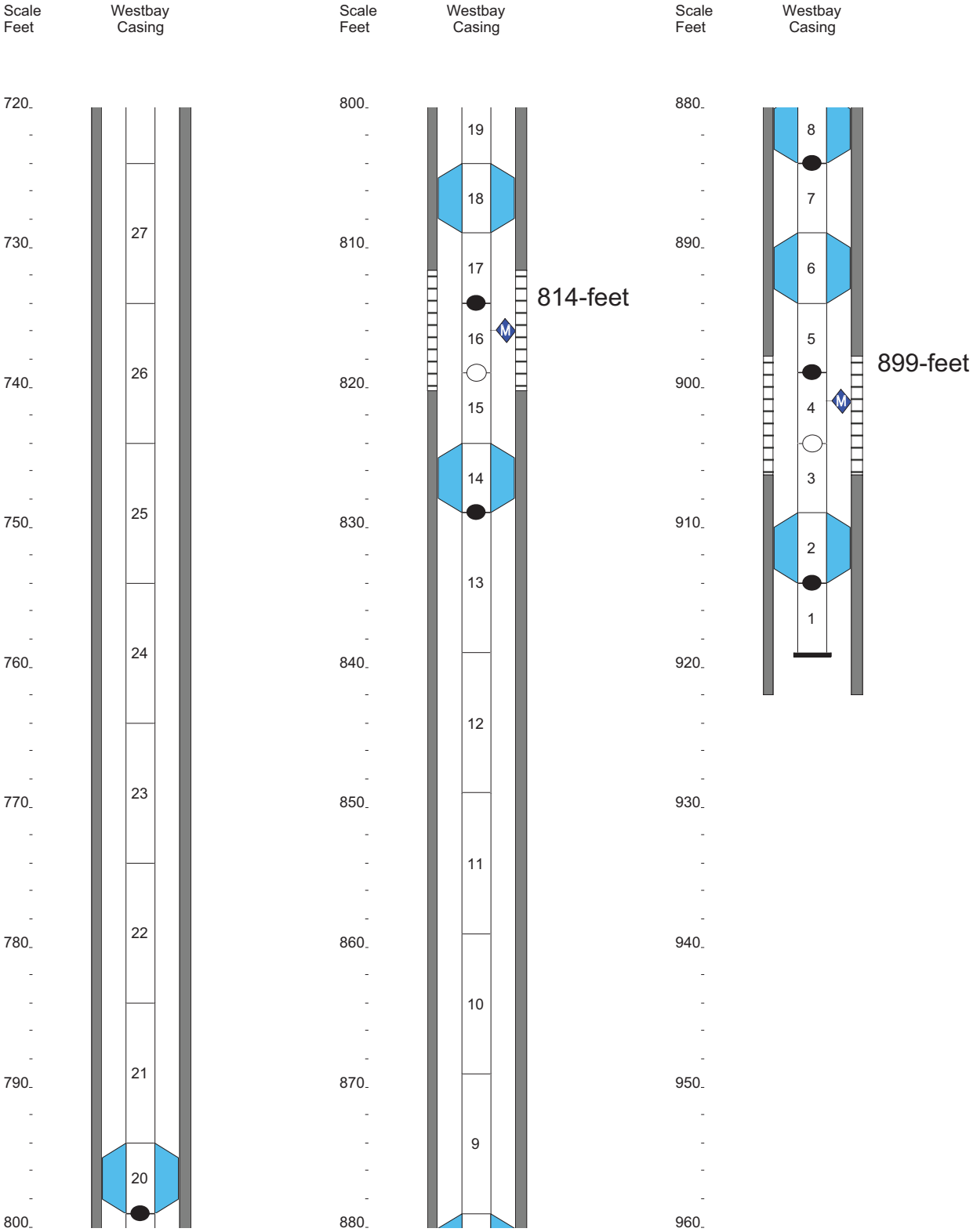
Summary Casing Log
Best Drilling/CH2M Hill

Job No: WB885
Well: EPA-MP3



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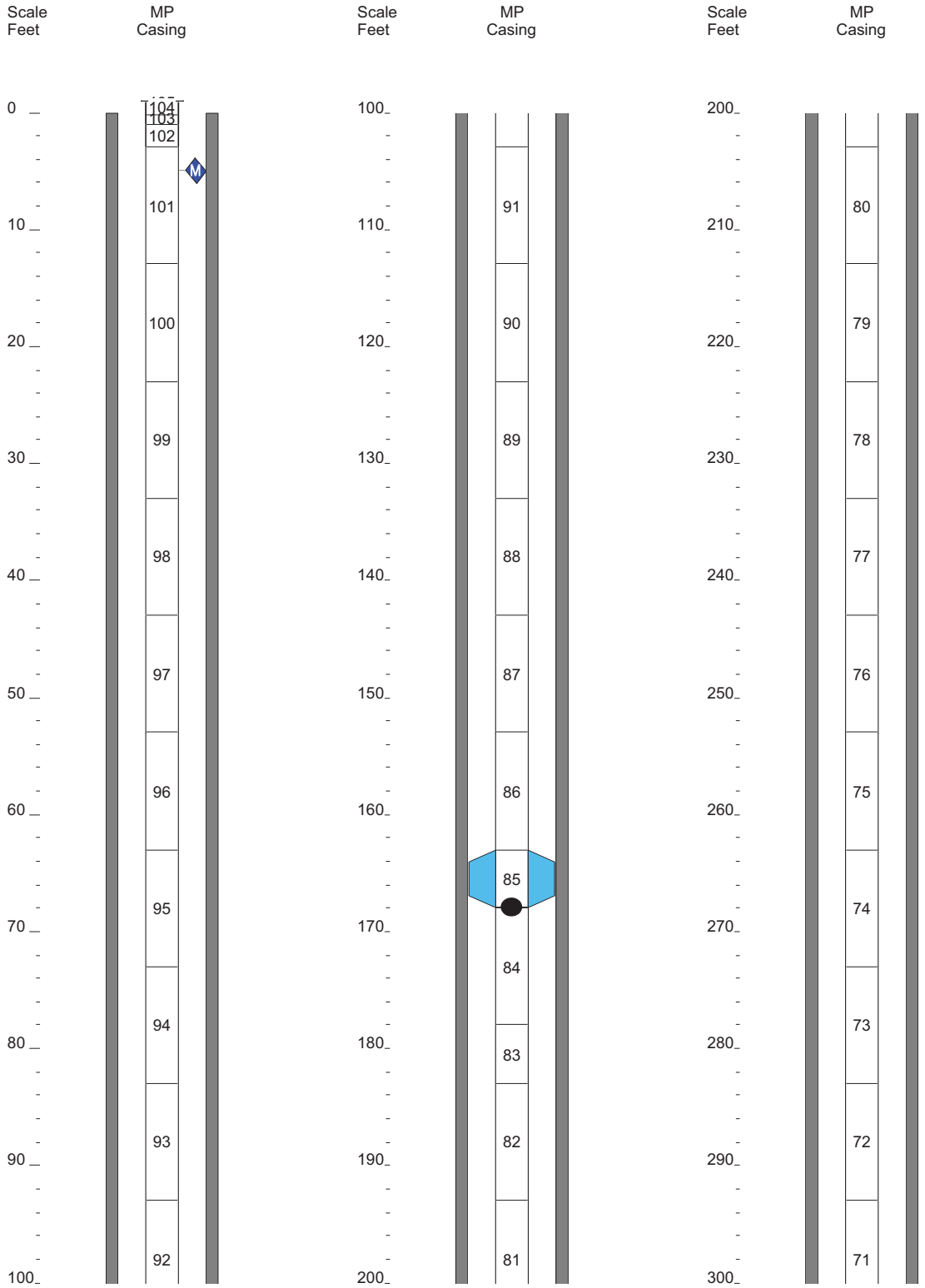
Summary Casing Log
Best Drilling / CH2M Hill

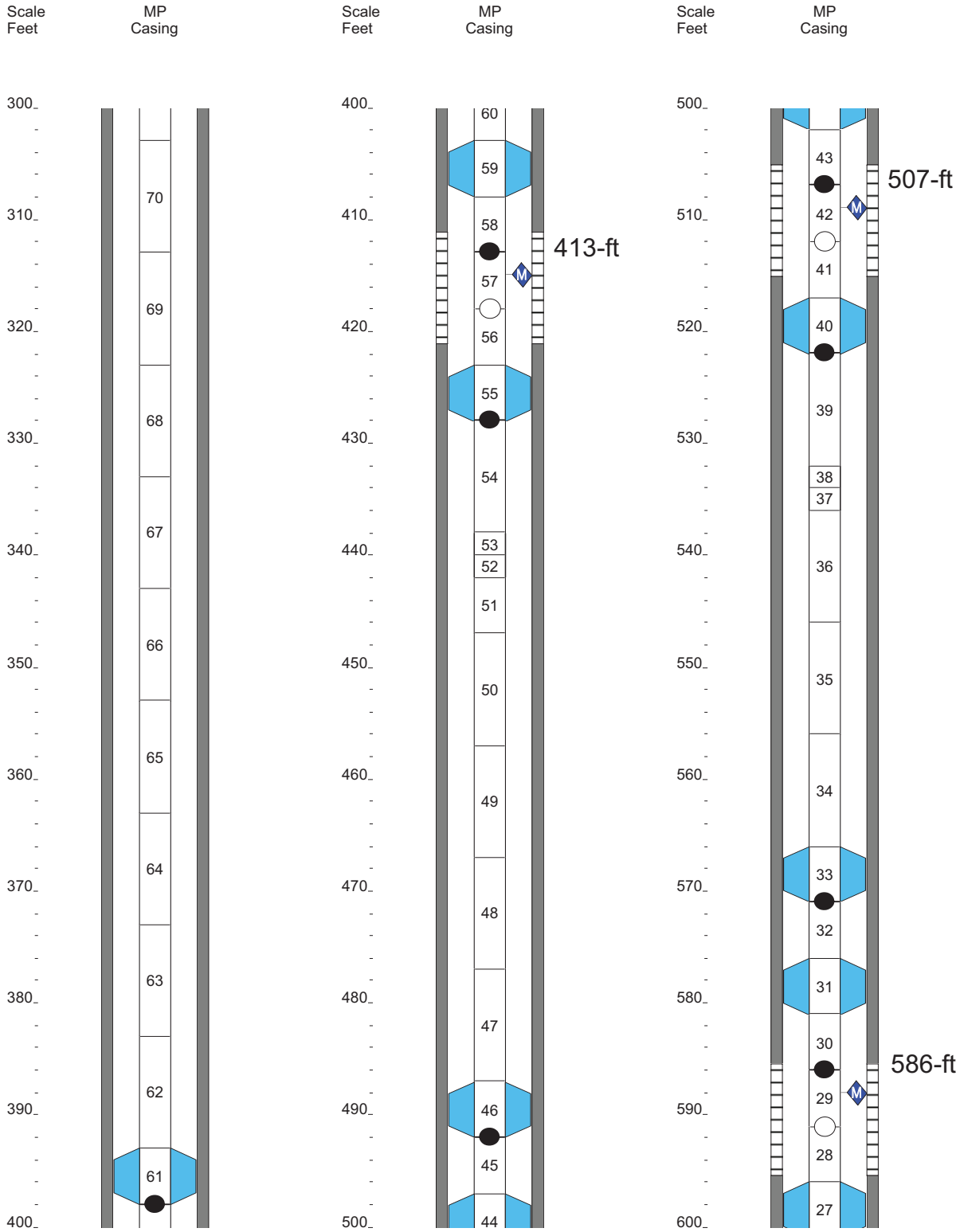
Job No: WB885
Well: EPA-MP4



Mon Sep 28 14:09:30 2009

Summary Casing Log
Best Drilling / CH2M Hill

Job No: WB885
Well: EPA-MP4



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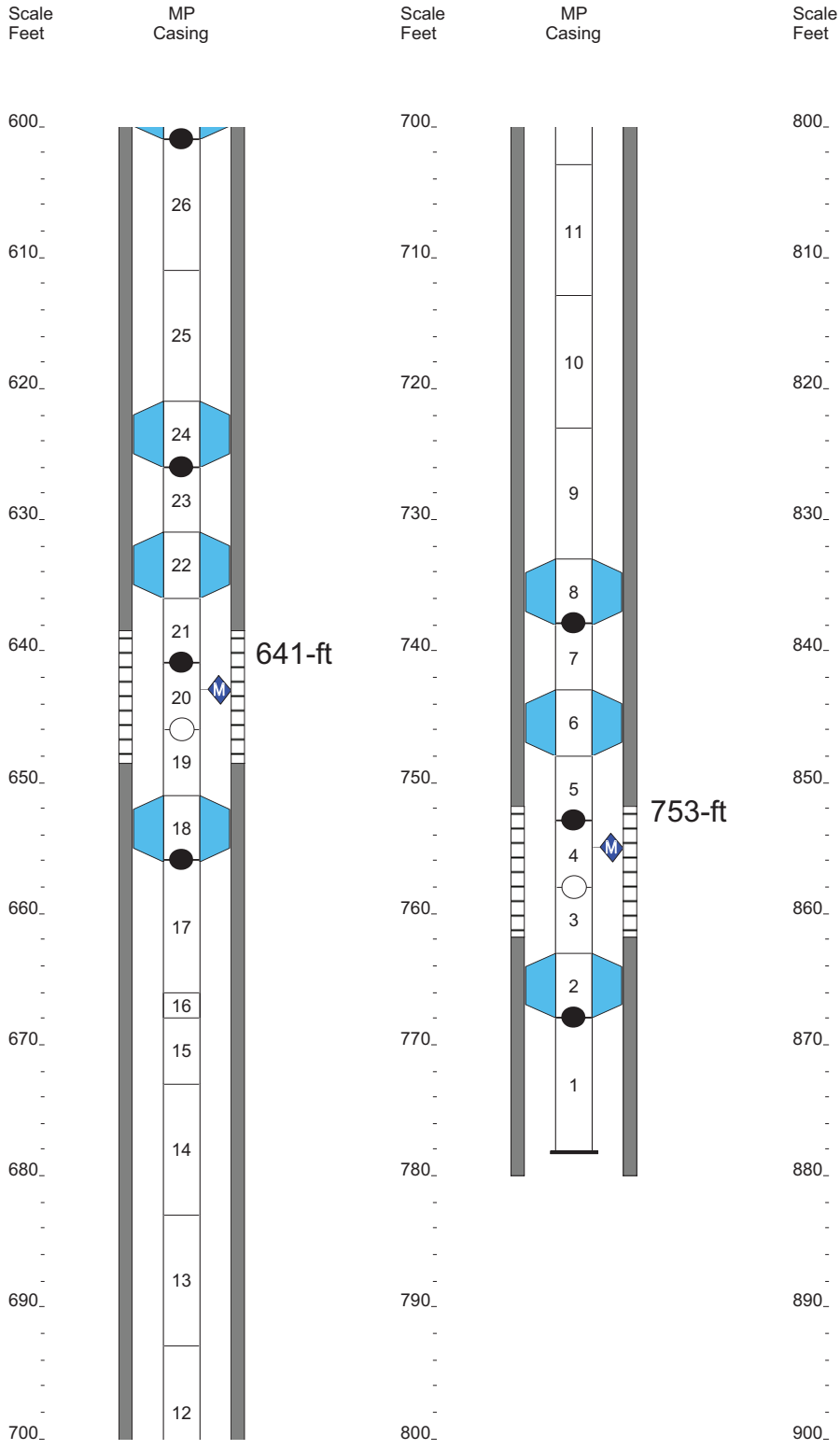
Summary Casing Log
Best Drilling / CH2M Hill

Job No: WB885
Well: EPA-MP4



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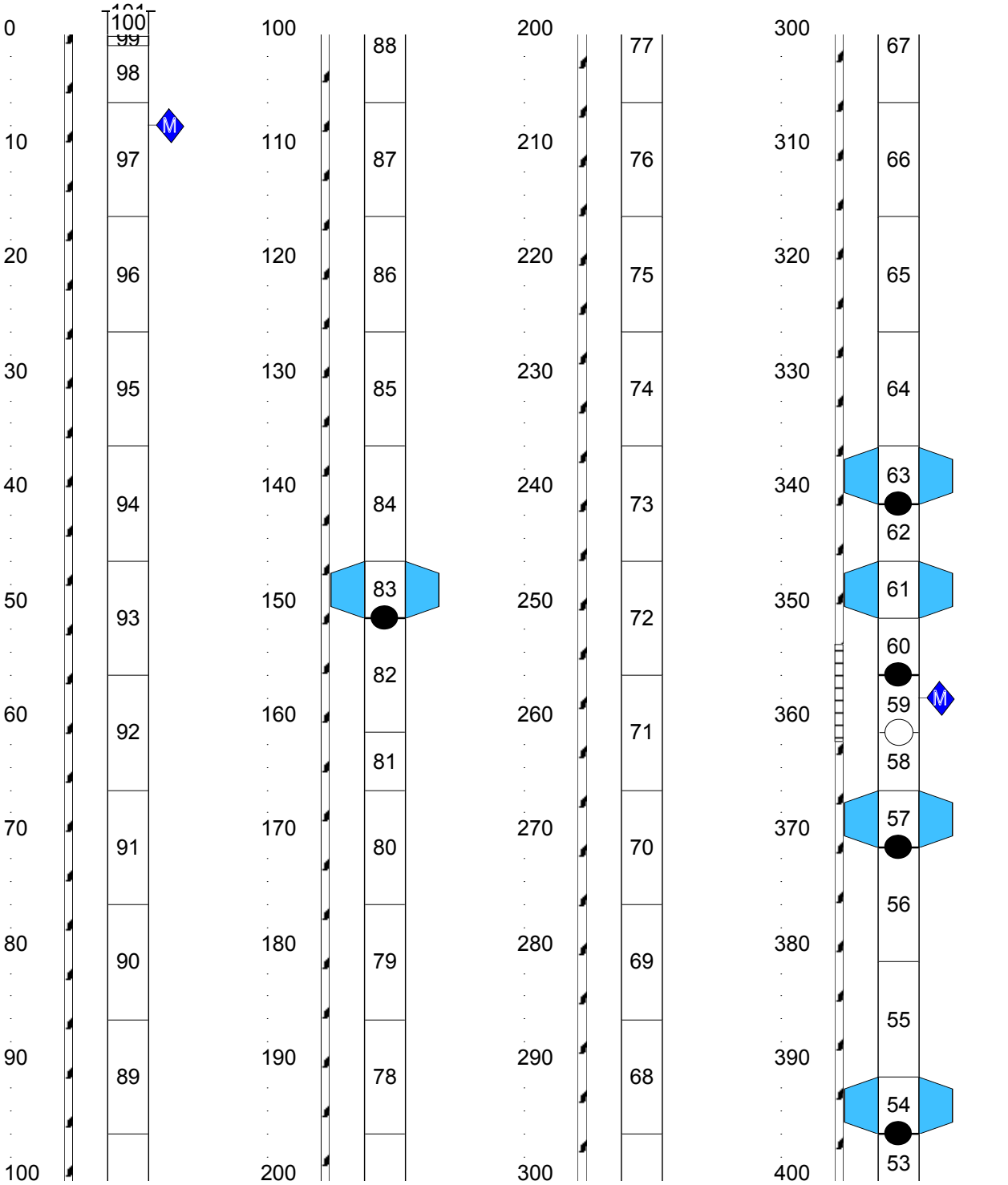
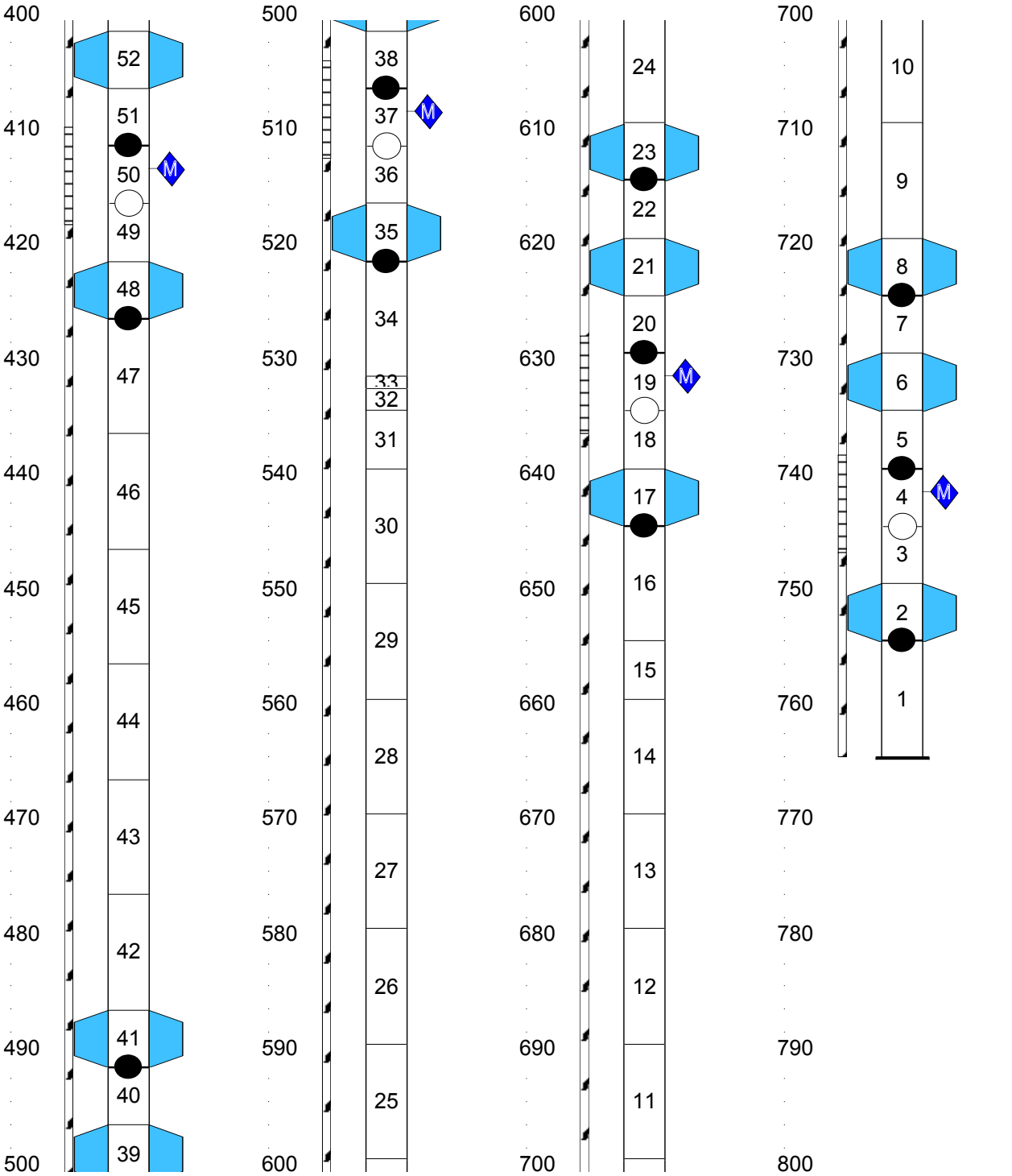
Summary Casing Log
Best Drilling / CH2M Hill

Job No: WB885
Well: EPA-MP5



Summary Casing Log
Best Drilling / CH2M Hill

Job No: WB885
Well: EPA-MP5



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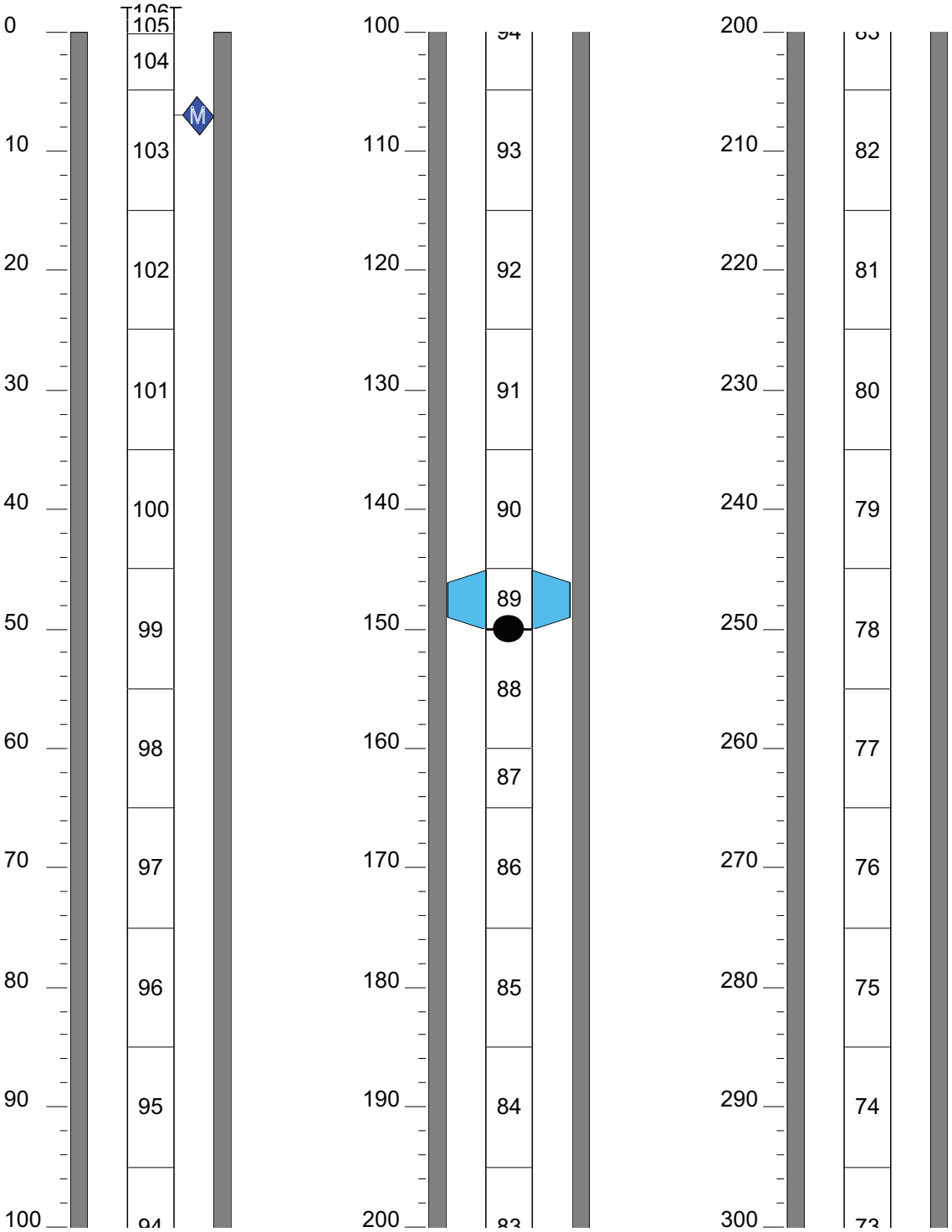
Summary Casing Log
Best Drilling / CH2M Hill

Job No: WB885
Well: EPA-MP6



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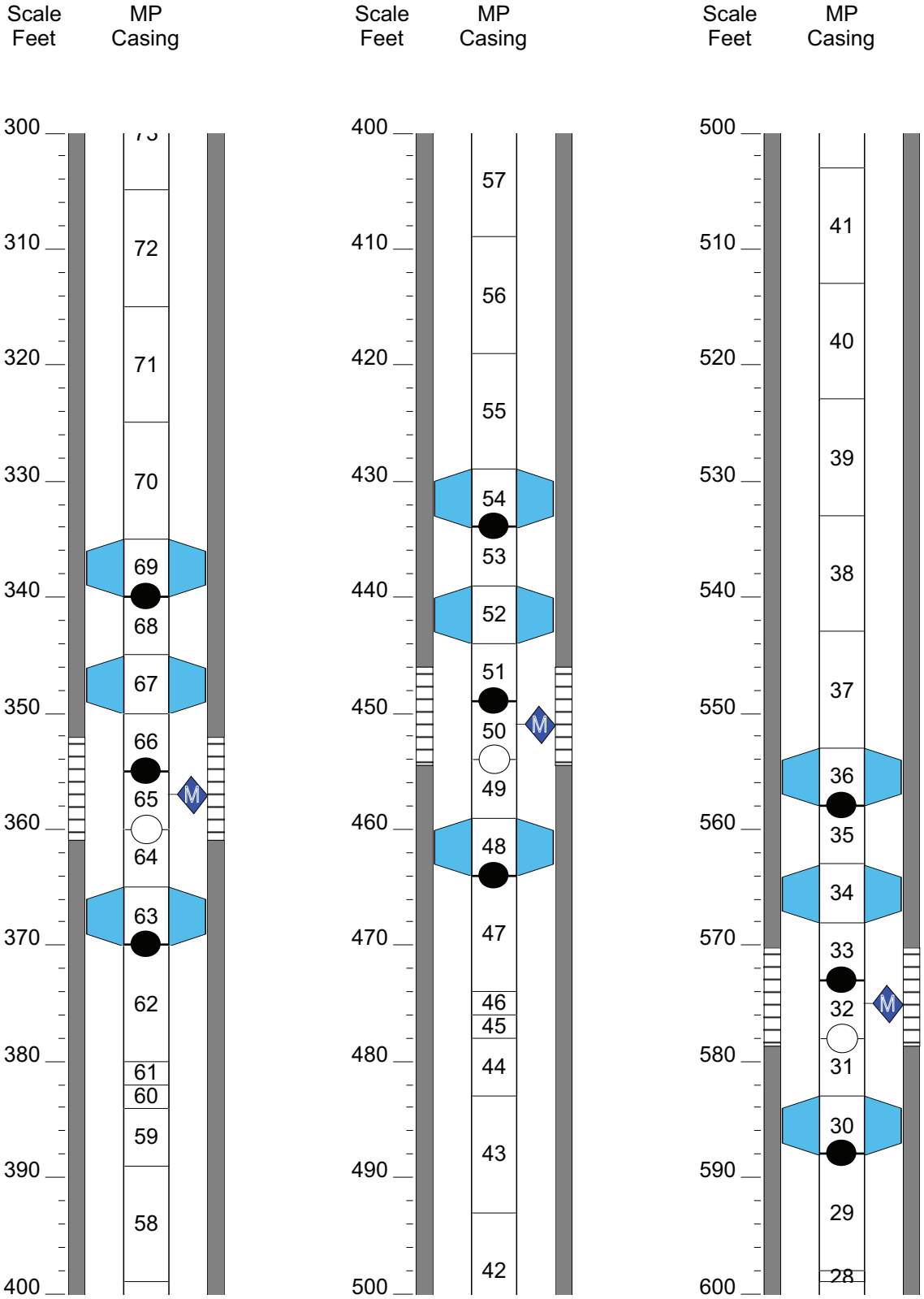
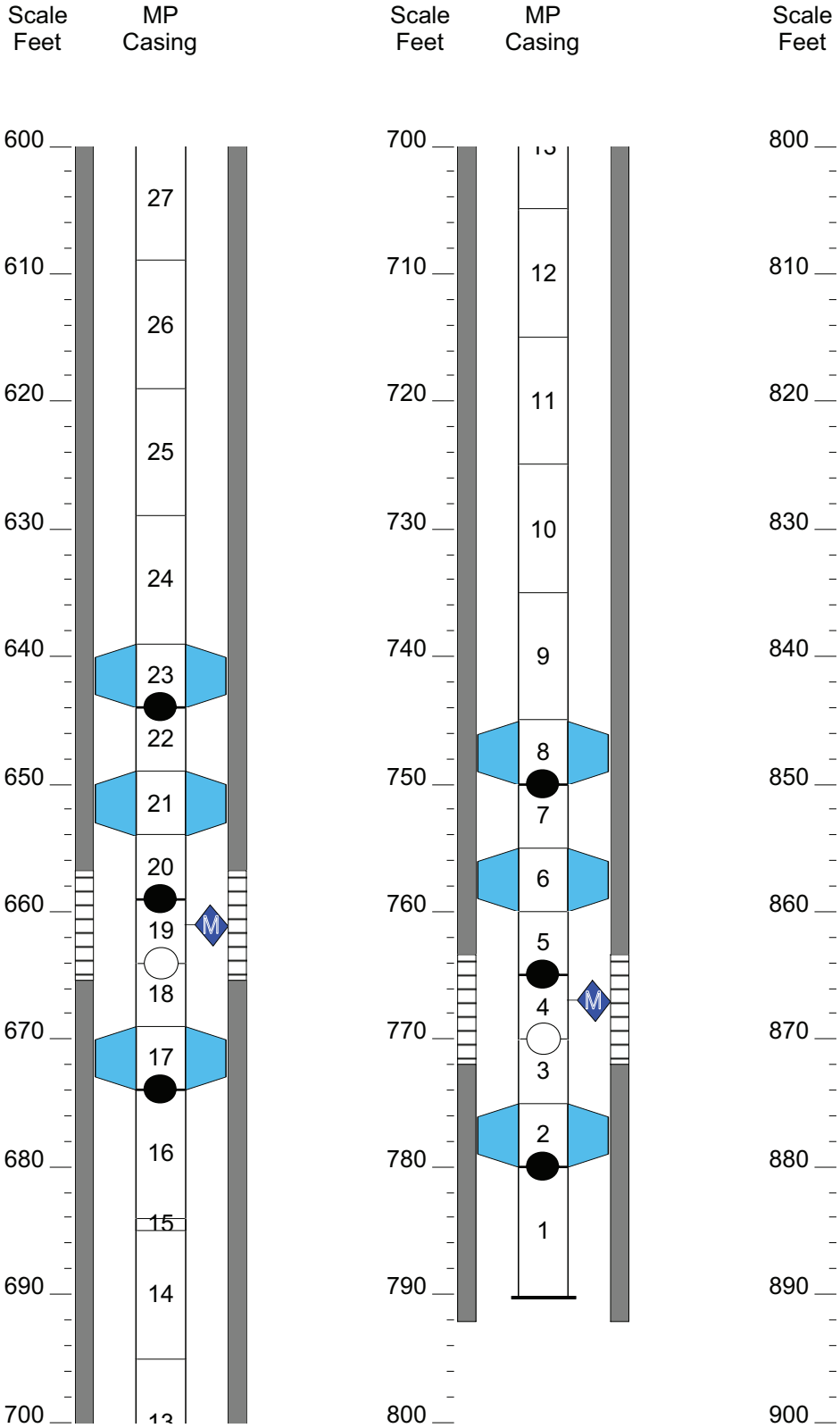
Summary Casing Log
Best Drilling / CH2M Hill

Job No: WB885
Well: EPA-MP6



Summary Casing Log
Best Drilling / CH2M Hill

Job No: WB885
Well: EPA-MP6



Appendix D
Summary of Groundwater Analytical Results

TABLE D1

Summary of Perchlorate and Volatile Organic Compounds in Groundwater

BF Goodrich Site, San Bernardino County, California

Analyte	Location	EPA-MP1A	EPA-MP1B	EPA-MP1C	EPA-MP1D	EPA-MP1E	EPA-MP2A	EPA-MP2B	EPA-MP2B (FD)	EPA-MP2C	EPA-MP2D	EPA-MP2E	EPA-MP2F	EPA-MP3A	EPA-MP3B	EPA-MP3C	EPA-MP3D	EPA-MP3E	EPA-MP4A	EPA-MP4A	EPA-MP4A (FD)	EPA-MP4B	EPA-MP4C	EPA-MP4D	EPA-MP4E
	Date	12/16/2009	12/16/2009	12/16/2009	12/16/2009	12/16/2009	12/15/2009	12/15/2009	12/15/2009	12/15/2009	12/15/2009	12/15/2009	12/15/2009	12/14/2009	12/14/2009	12/14/2009	12/14/2009	12/14/2009	12/17/2009	12/17/2009	12/17/2009	12/17/2009	12/16/2009	12/16/2009	12/16/2009
	Units																								
Perchlorate	ug/L	<2	<2	<2	<2	<2	**3.5**	**3.3**	**7.3**	<2	<2	<2	<2	**7.9**	**1.7 J**	**2.1**	<2	<2	<2	<2	<4	<2	<2	<2	<2
Volatile Organic Compounds (VOCs)																									
1,1,1-Trichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-Trichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dibromo-3-chloropropane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dibromoethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Butanone	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Hexanone	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-pentanone	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acetone	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon disulfide	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon tetrachloride	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorodibromomethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.25 J**	<0.5	<0.5	<0.5
cis-1,2-Dichloroethene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cyclohexane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Freon 11	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Freon 113	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Freon 12	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Isopropylbenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m,p-Xylene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl acetate	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl tert-butyl ether	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylcyclohexane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.66**	**0.59**	**0.93**	<0.5
Vinyl chloride	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:

Detected results are **bolded**

FD: Field Duplicate

ug/L: micrograms per liter

J = Estimated result

< = Non detect at the reporting limit

TABLE D1

Summary of Perchlorate and Volatile Organic Compounds in Groundwater

BF Goodrich Site, San Bernardino County, California

Analyte	Location / Date / Units	EPA-MP5A 12/17/2009	EPA-MP5B 12/17/2009	EPA-MP5C 12/17/2009	EPA-MP5D 12/17/2009	EPA-MP5E 12/17/2009	EPA-MP6A 12/18/2009	EPA-MP6B 12/18/2009	EPA-MP6C 12/18/2009	EPA-MP6D 12/18/2009	EPA-MP6E 12/18/2009	EPA-MP6E (FD) 12/18/2009
Perchlorate	ug/L	**7**	**4.5**	<2	<2	<2	**26**	**2.5**	<2	<2	<2	<2
Volatile Organic Compounds (VOCs)												
1,1,1-Trichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-Trichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dibromo-3-chloropropane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dibromoethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Butanone	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
2-Hexanone	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
4-Methyl-2-pentanone	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Acetone	ug/L	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Benzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromochloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon disulfide	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon tetrachloride	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorodibromomethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform	ug/L	<0.5	<0.5	**0.23 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloroethene	ug/L	<0.5	**0.31 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cyclohexane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Freon 11	ug/L	<0.5	**0.20 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Freon 113	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Freon 12	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Isopropylbenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m,p-Xylene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl acetate	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl tert-butyl ether	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylcyclohexane	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methylene Chloride	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene	ug/L	<0.5	**2.7**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	ug/L	<0.5	**0.26 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:

Detected results are **bolded**

FD: Field Duplicate

ug/L: micrograms per liter

J = Estimated result

< = Non detect at the reporting limit

Appendix E
Summary of Investigation Derived Waste Analytical Results

TABLE E1
Summary of Soil and Drilling Mud Investigation Derived Waste Results
BF Goodrich Site, San Bernardino County, California

Analyte	Location / Sample / Date	Units	EPA-MP1 EPA-MP1-SOIL1 4/30/2009	EPA-MP1 EPA-MP1-SOIL2 4/30/2009	EPA-MP1 EPA-MP1-Mud 5/11/2009	EPA-MP2 EPA-MP2-SOIL1 6/9/2009	EPA-MP2 EPA-MP2-SOIL2 6/9/2009	EPA-MP2 EPA-MP2-Mud 6/18/2009	EPA-MP3 EPA-MP3-SOIL 1 7/15/2009	EPA-MP3 EPA-MP3-SOIL 2 7/15/2009	EPA-MP3 EPA-MP3-Mud 7/29/2009	EPA-MP4 EPA-MP4-SOIL1 8/20/2009	EPA-MP4 EPA-MP4-SOIL2 8/20/2009	EPA-MP4 EPA-MP4-Mud 9/2/2009	EPA-MP5 EPA-MP5-SOIL1 9/29/2009	EPA-MP5 EPA-MP5-SOIL2 9/29/2009	EPA-MP5 EPA-MP5-Mud 10/13/2009	EPA-MP6 EPA-MP6-SOIL1 10/28/2009	EPA-MP6 EPA-MP6-SOIL2 10/28/2009	EPA-MP6 EPA-MP6-Mud 11/19/2009
Perchlorate		ug/kg	<11	<12	<83	<23	<25	<250	<20	<23	<140	<22	<21	<20	<23	<24	<2500	<20	<20	<20
pH		pH units	**8.9**	**8.6**	**8.4**	**9.09**	**9.2**	**8.81**	**11**	**8.6**	**9.5**	**9.6**	**9**	**8.9**	**9.73**	**9.6 J**	**8.8 J**	**9.06**	**9.3**	**8.9 J**
Metals																				
Antimony		mg/kg	<1.1	<1.2	<8.3	<2.3	<2.5	<25	<2	<2.3	<14	<2.2	<2.1	<14	<2.3	<2.4	<25	<2	<2	<2
Arsenic		mg/kg	**4.4**	**4.1**	**8.7**	**3.7**	**4.5**	**32**	**4.3**	**3.4**	**14**	**4**	**4**	**17**	**3.5**	**2.1 J**	**25**	**3.4**	**3**	**2.6**
Barium		mg/kg	**61**	**68**	**180**	**39**	**61**	**570**	**50**	**29**	**160**	**48**	**28**	**180**	**55**	**33**	**400**	**40**	**27**	**32**
Beryllium		mg/kg	**0.22**	**0.24**	**0.91**	**0.24**	**0.33**	**3.5**	**0.34**	**0.2**	**1.1**	**0.22**	**0.22**	**1.1**	**0.25**	**0.24**	**2.4**	**0.23**	**0.21**	**0.19**
Cadmium		mg/kg	<0.27	<0.3	<2.1	<0.57	<0.62	<6.2	<0.51	<0.57	<3.6	<0.55	<0.53	<0.5	<0.57	<0.59	<6.2	<0.5	<0.5	<0.5
Chromium		mg/kg	**10**	**11**	**30**	**10**	**12**	**150**	**16**	**10**	**38**	**11**	**16**	**58**	**8.6**	**11**	**120**	**9.8**	**10**	**8.9**
Cobalt		mg/kg	**3.7**	**3.7**	**10**	**3.3**	**4.9**	**50**	**6.7**	**3.8**	**13 J**	**4.4**	**4.8**	**20**	**3.8**	**4.2**	**49**	**3.8**	**3.9**	**3**
Copper		mg/kg	**12**	**8.3**	**26**	**11**	**8.5**	**130**	**19**	**6.6**	**99**	**21**	**9.6**	**37**	**14**	**11**	**150**	**13**	**7.9**	**8.5**
Lead		mg/kg	**3.6**	<1.8	**6.2 J**	**2.8 J**	**2.7 J**	**21 J**	**3.6**	**2.7 J**	**12 J**	**3.2 J**	**2.1 J**	**13 J**	**3.5**	**2.3 J**	**28 J**	**3 J**	**2 J**	**3 J**
Mercury		mg/kg	<0.013	<0.015	<0.1	<0.028	<0.031	<0.31	<0.025	<0.028	<0.18	<0.027	<0.027	<0.025	<0.029	<0.029	<0.31	<0.025	<0.025	<0.025
Molybdenum		mg/kg	<2.7	<3	<21	<5.7	<6.2	<62	<5.1	<5.7	<36	<5.5	<5.3	<5	<5.7	<5.9	<62	<5	<5	<5
Nickel		mg/kg	**6.9**	**6.8**	**19 J**	**6.6**	**8**	**100**	**12**	**5.7 J**	**27 J**	**10**	**6.2**	**33 J**	**6.5**	**7.4**	**87**	**8**	**6.1**	**6**
Selenium		mg/kg	<1.1	<1.2	<8.3	<2.3	<2.5	<25	<2	<2.3	<14	<2.2	<2.1	<14	<2.3	<2.4	<25	<2	<2	<2
Silver		mg/kg	<0.54	<0.61	<4.2	<1.1	<1.2	<12	<1	<1.1	<7.1	<1.1	<1.1	<1	<1.1	<1.2	<12	<1	<1	<1
Thallium		mg/kg	<2.7	<3	<21	<5.7	<6.2	<62	<5.1	<5.7	<36	<5.5	<5.3	<5	<5.7	<5.9	<62	<5	<5	<5
Vanadium		mg/kg	**27**	**26**	**50**	**21**	**25**	**230**	**33**	**20**	**57**	**22**	**21**	**88**	**26**	**24**	**180**	**22**	**20**	**12**
Zinc		mg/kg	**22**	**22**	**67**	**21**	**24**	**310**	**33**	**44**	**81**	**24**	**16**	**93**	**24**	**16**	**210**	**23**	**16**	**17**
Total Petroleum Hydrocarbons (TPH)																				
TPH as Diesel		mg/kg	<5.4	<6.1	**6.6 J**	<5.7	<6.2	**21 J**	<5.1	<5.7	<22	<5.5	<5.3	<22	<5.7	<5.9	<37	<5	<5	<3
TPH as Gasoline		mg/kg	**2 J**	<2.8	**7.8 J**	<8.6	<5.9	<90	<6.2	<5.5	<390	<4.9	<5	<51	<5	<5.5	<87	<5	<4.5	<6.5
TPH as Motor Oil		mg/kg	**41**	**22 J**	**40 J**	**19 J**	**24 J**	<150	**32**	**15 J**	**54 J**	<22	**43**	<87	<23	<24	<150	<20	<20	<12
Volatile Organic Compounds (VOCs)																				
1,1,1,2-Tetrachloroethane		ug/kg	---	---	---	---	---	---	---	---	---	---	---	---	---	---	<4100	---	---	---
1,1,1-Trichloroethane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,1,2,2-Tetrachloroethane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,1,2-Trichloroethane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,1-Dichloroethane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,1-Dichloroethene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,1-Dichloropropene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,2,3-Trichloropropane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,2-Dibromo-3-chloropropane		ug/kg	<540	<610	<5300	<570	<580	<18000	<1100	<1100	<67	<540	<500	<10000	<1100	<1100	<17000	<1000	<890	<1300
1,2-Dibromoethane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,2-Dichloro benzene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,2-Dichloroethane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,2-Dichloropropane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,3-Dichloro benzene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,3-Dichloropropane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
1,4-Dichloro benzene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
2-Butanone		ug/kg	<1100	<1200	<11000	<1100	<1200	<36000	<2200	<2200	<130	<1100	<1000	<20000	<2100	<2200	<33000	<2000	<1800	<2700
2-Hexanone		ug/kg	<1100	<1200	<11000	<1100	<1200	<36000	<2200	<2200	<130	<1100	<1000	<20000	<2100	<2200	<33000	<2000	<1800	<2700
4-Methyl-2-pentanone		ug/kg	<1100	<1200	<11000	<1100	<1200	<36000	<2200	<2200	<130	<1100	<1000	<20000	<2100	<2200	<33000	<2000	<1800	<2700
Acetone		ug/kg	<1100	<1200	<11000	<1100	<1200	<36000	<2200	<2200	<130	<1100	<1000	<20000	<2100	<2200	<33000	<2000	<1800	<2700

TABLE E1
Summary of Soil and Drilling Mud Investigation Derived Waste Results
BF Goodrich Site, San Bernardino County, California

Analyte	Location / Sample / Date	Units	EPA-MP1 EPA-MP1-SOIL1 4/30/2009	EPA-MP1 EPA-MP1-SOIL2 4/30/2009	EPA-MP1 EPA-MP1-Mud 5/11/2009	EPA-MP2 EPA-MP2-SOIL1 6/9/2009	EPA-MP2 EPA-MP2-SOIL2 6/9/2009	EPA-MP2 EPA-MP2-Mud 6/18/2009	EPA-MP3 EPA-MP3-SOIL 1 7/15/2009	EPA-MP3 EPA-MP3-SOIL 2 7/15/2009	EPA-MP3 EPA-MP3-Mud 7/29/2009	EPA-MP4 EPA-MP4-SOIL1 8/20/2009	EPA-MP4 EPA-MP4-SOIL2 8/20/2009	EPA-MP4 EPA-MP4-Mud 9/2/2009	EPA-MP5 EPA-MP5-SOIL1 9/29/2009	EPA-MP5 EPA-MP5-SOIL2 9/29/2009	EPA-MP5 EPA-MP5-Mud 10/13/2009	EPA-MP6 EPA-MP6-SOIL1 10/28/2009	EPA-MP6 EPA-MP6-SOIL2 10/28/2009	EPA-MP6 EPA-MP6-Mud 11/19/2009
Benzene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Bromo methane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Bromodichloro methane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Bromoform		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Carbon disulfide		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Carbon tetrachloride		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Chloro benzene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Chloro methane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Chlorodibromo methane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Chloroethane		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Chloroform		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
cis-1,2-Dichloro ethene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
cis-1,3-Dichloro propene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Ethyl benzene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Ethyl tert-Butyl Ether		ug/kg	<540	<610	<5300	<570	<580	<18000	<1100	<1100	<67	<540	<500	<10000	<1100	<1100	<17000	<1000	<890	<1300
Freon 11		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Freon 113		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Freon 12		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
m,p-Xylene		ug/kg	<270	<300	<2600	<280	<290	<9000	<540	<540	<34	<270	<250	<5000	<540	<560	<8300	<500	<450	<670
Methyl tert-butyl ether		ug/kg	<540	<610	<5300	<570	<580	<18000	<1100	<1100	<67	<540	<500	<10000	<1100	<1100	<17000	<1000	<890	<1300
Methylene Chloride		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	**9.8 J**	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
o-Xylene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Styrene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Tert-amyl methyl ether		ug/kg	<540	<610	<5300	<570	<580	<18000	<1100	<1100	<67	<540	<500	<10000	<1100	<1100	<17000	<1000	<890	<1300
Tetrachloro ethene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Toluene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
trans-1,2-Dichloroethene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
trans-1,3-Dichloropropene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Trichloro ethene		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340
Vinyl chloride		ug/kg	<130	<150	<1300	<140	<140	<4500	<270	<270	<17	<140	<130	<2500	<270	<280	<4100	<250	<220	<340

Notes:

Detected results are **bolded**
mg/kg: milligrams per kilogram
ug/kg: micrograms per kilogram
J = Estimated result
< = Non detect at the reporting limit

TABLE E2

Summary of Water Investigation Derived Waste Results

BF Goodrich Site, San Bernardino County, California

Analyte	Location / Sample / Date	Units	EPA-MP1 IDW-WATER-05132009 5/13/2009	EPA-MP2 EPA-MP2-water 6/18/2009	EPA-MP3 EPA-MP3-water 7/29/2009	EPA-MP4 EPA-MP4-water 9/2/2009	EPA-MP5 EPA-MP5-Water 10/13/2009	EPA-MP6 EPA-MP6-water 11/19/2009
Perchlorate		ug/L	<2	**3.2**	**3.2**	<2	**2.1**	**2.4**
pH		pH units	**8.16**	**8.4**	**8.7**	**8.6**	**8.6 J**	**8.9 J**
Metals								
Antimony		ug/L	<20	<20	<20	<20	<20	<20
Arsenic		ug/L	<20	<20	<20	<20	**10 J**	**17 J**
Barium		ug/L	**43**	**38**	**21**	**19**	**30**	**160**
Beryllium		ug/L	<1	<1	<1	<1	<1	**0.97 J**
Cadmium		ug/L	<5	<5	<5	<5	<5	<5
Chromium		ug/L	<10	<10	<10	<10	<10	**27**
Cobalt		ug/L	<10	<10	<10	<10	<10	**16**
Copper		ug/L	<10	<10	<10	<10	<10	**22**
Lead		ug/L	<20	<20	<20	<20	<20	**10 J**
Mercury		ug/L	<0.03	<0.03	<0.03	<0.03	<0.03	**0.03 J**
Molybdenum		ug/L	**18 J**	**16 J**	**62**	**14 J**	**48**	**34**
Nickel		ug/L	<10	<10	<10	<10	<10	**19**
Selenium		ug/L	<20	<20	<20	<20	<20	<20
Silver		ug/L	<10	<10	<10	<10	<10	<10
Thallium		ug/L	<20	<20	<20	<20	<20	<20
Vanadium		ug/L	<10	<10	**9.7 J**	<10	**16**	**52**
Zinc		ug/L	<10	**5.4 J**	**11**	<10	<10	**57**
Total Petroleum Hydrocarbons (TPH)								
TPH as Diesel		ug/L	<230	<140	<150	<250	<250	<250
TPH as Gasoline		ug/L	<50	**27 J**	<50	<50	<50	<50
TPH as Motor Oil		ug/L	**770**	**380 J**	**550 J**	<1000	<1000	<1000
Volatile Organic Compounds (VOCs)								
1,1,1,2-Tetrachloroethane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloropropene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-Trichloro benzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-Trichloropropane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trichloro benzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,4-Trimethyl benzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dibromo-3-chloropropane		ug/L	<2	<2	<2	<2	<2	<2
1,2-Dibromoethane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloro benzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3,5-Trimethylbenzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloro benzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,3-Dichloropropane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dichloro benzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,2-dichloropropane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

TABLE E2

Summary of Water Investigation Derived Waste Results

BF Goodrich Site, San Bernardino County, California

Analyte	Location / Sample / Date	Units	EPA-MP1 IDW-WATER-05132009 5/13/2009	EPA-MP2 EPA-MP2-water 6/18/2009	EPA-MP3 EPA-MP3-water 7/29/2009	EPA-MP4 EPA-MP4-water 9/2/2009	EPA-MP5 EPA-MP5-Water 10/13/2009	EPA-MP6 EPA-MP6-water 11/19/2009
2-Butanone		ug/L	<4	**6.9**	<4	<4	<4	<4
2-Chlorotoluene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4-Chlorotoluene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acetone		ug/L	**4.6**	**6.7**	<4	**2.4 J**	**3.7 J**	<4
Benzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromo methane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromobenzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromochloro methane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloro methane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon tetrachloride		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloro benzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloro methane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	**0.3 J**
Chlorodibromo methane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroform		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,2-Dichloro ethene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
cis-1,3-Dichloro propene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromomethane		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethyl benzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Freon 11		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Freon 113		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Freon 12		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobutadiene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Isopropyl benzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m,p-Xylene		ug/L	<1	<1	<1	<1	<1	<1
Methyl tert-butyl ether		ug/L	<2	<2	<2	<2	<2	<2
Methylene Chloride		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Naphthalene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
n-Butylbenzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
n-Propylbenzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
o-Xylene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
p-Isopropyltoluene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
sec-Butylbenzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
tert-Butylbenzene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloro ethene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene		ug/L	**0.3 J**	**0.7**	<0.5	<0.5	<0.5	<0.5
trans-1,2-Dichloroethene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
trans-1,3-Dichloropropene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloro ethene		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl chloride		ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Notes:

Detected results are **bolded**

ug/L: micrograms per liter

J = Estimated result

< = Non detect at the reporting limit