



# Memorandum

**To:** Emmanuel Martin (Public Works – City of Torrance, CA)  
John Dettle (Public Works – City of Torrance, CA)

**From:** Brian Partington (URS – Santa Ana, CA)

**Date:** September 9, 2013

**Subject:** **ZONE TESTING FOR PILOT BORING NO. 12**  
**185<sup>th</sup> Street (West of Purche Avenue)**  
**(TORRANCE, CALIFORNIA)**

**Cc:** Project Files (URS – Santa Ana, CA)  
Jon Sanks (URS – Santa Ana, CA)  
Project Number 29869072

This memorandum provides a summary of the agreed upon zone testing program for Pilot Boring No. 12 located on 185<sup>th</sup> Street west of Purche Avenue (the Site). The program was discussed via conference call on September 9, 2013.

South West Pump & Drilling (SWPD) completed the pilot boring to a total depth of approximately 774 feet below ground surface (ft bgs) on September 9, 2013. Upon completion, URS field staff observed geophysical logging activity performed by Pacific Surveys (Claremont, California). The geophysical logs are included in Attachment A.

URS identified three potential water bearing zones that generally correlate with the aquifer depths anticipated beneath the Site. The aquifers listed in order of depth (shallow to deep) include the Gardena, Lynwood, and Silverado. Based on our discussions, a water quality testing program will be implemented per the contract and will evaluate water quality from four intervals using a zone testing tool as follows:

<b>Zone</b>	<b>Aquifer</b>	<b>Proposed Screen Depth (ft bgs)</b>
#3	Gardena	160 - 180
#2	Lynwood	425 - 445
#1	Silverado	665 - 685

Note: The proposed screen depths may change slightly based on available pipe lengths supplied by SWPD.

The preliminary designs are included for each zone in Attachment B.

URS also recommends the bottom portion of the pilot boring be abandoned properly according to the permit conditions provided by the Los Angeles County Department of Public Health (LACDPH). It's our understanding you will confirm this with LACDPH. The City will also communicate the abandonment procedures with SWPD.



# Memorandum

If you have any questions regarding this memorandum please do not hesitate to contact me at (714) 648-2803.

Sincerely,

URS CORPORATION



Brian Partington, PG, CHg  
Project Manager / Principal Hydrogeologist

**Attachments:**

- Attachment A Geophysical Logs
- Attachment B Zone Testing (Preliminary)

**ATTACHEMENT A**

**Geophysical Logs**

# PACIFIC SURVEYS

## ELECTRIC LOG LATEROLOG 3 GAMMA-RAY

Job No. 17651	Company SOUTH WEST PUMP & DRILLING
Well WELL #12	
Field TORRANCE	
File No.	County LOS ANGELES
	State CA

Location:  
18413 PURCHE AVE.  
GPS: N330 51.82134' W1180 19.22916'

Other Services:  
GRLL3  
SONIC/VDL

Permanent Datum	G.L.	Elevation	Elevation
Log Measured From	G.L.	above perm. datum	K.B. D.F. G.L.
Drilling Measured From	G.L.		
Date	09-09-2013		
Run Number	ONE		
Depth Driller	773'		
Depth Logger	774.3		
Bottom Logged Interval	774'		
Top Log Interval	50'		
Casing Driller	36" @ 50'		
Casing Logger	50'		
Bit Size	17.5"		
Type Fluid in Hole	WATER		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PT		
Rm @ Meas. Temp	7.75 @ 77F		
Rmf @ Meas. Temp	7.75 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HRS		
Time Logger on Bottom	06:15		
Max. Recorded Temperature	N/A		
Equipment Number	PS-7		
Location	LA		
Recorded By	RIDDER		
Witnessed By	N. MONTROY		

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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

### Calibration Report

Database File 17651.db  
 Dataset Pathname Elog.1  
 Dataset Creation Mon Sep 09 06:55:09 2013

Serial:  
Model:

D4  
DTQ

Shop Calibration Performed:  
Before Survey Verification Performed:  
After Survey Verification Performed:

Fri Oct 19 10:46:05 2012  
Fri Oct 19 10:41:51 2012  
Thu Oct 18 11:57:06 2012

Shop Calibration

	Readings		References			Results	
	Zero	Cal	Zero	Cal		Gain	Offset
Short	9.537	101.083	10.200	102.200	Ohm-m	1.005	0.616
Long	8.898	98.443	10.200	102.200	Ohm-m	1.027	-17.000
IEE							
VSN							
VLN							

Before Survey Verification

	Readings		References			Results	
	Zero	Cal	Zero	Cal		Gain	Offset
Short	178.827	100.801	295.888	100.783	Ohm-m	2.501	-151.272
Long	934.011	103.172	103.094	103.094	Ohm-m	0.483	53.212
IEE							
VSN							
VLN							

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							
VSN							
VLN							

After Survey Verification compared to Before Survey Calibration

	Zero			Cal		
	Before	After		Before	After	
Short	295.888	40.249	Ohm-m	100.783	101.201	Ohm-m
Long	504.790	142.638	Ohm-m	103.094	102.842	Ohm-m

Gamma Ray Calibration Report

Serial Number: D4  
 Tool Model: ELOG  
 Performed: Thu Oct 18 11:57:13 2012

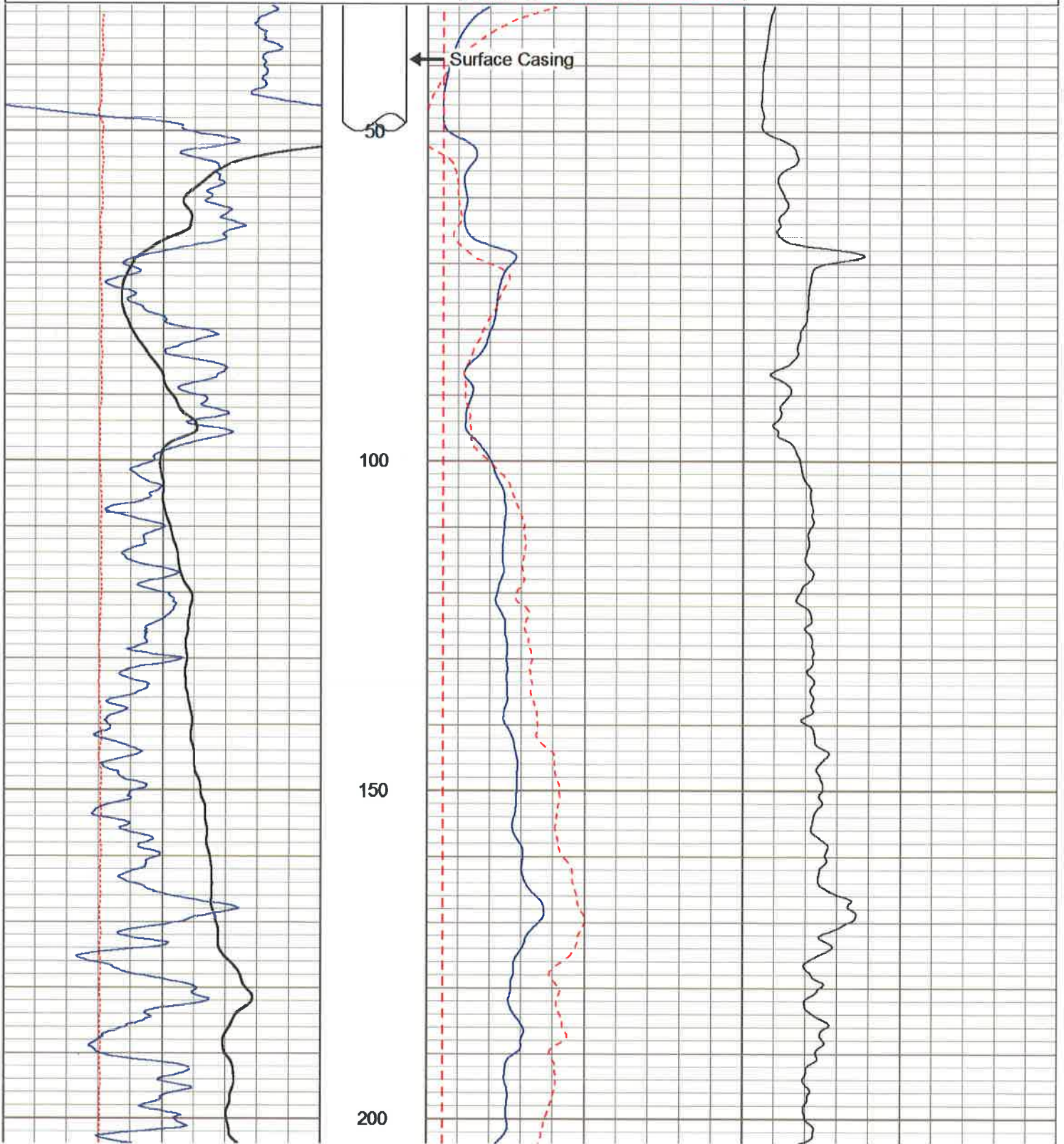
Calibrator Value: 162.0 GAPI

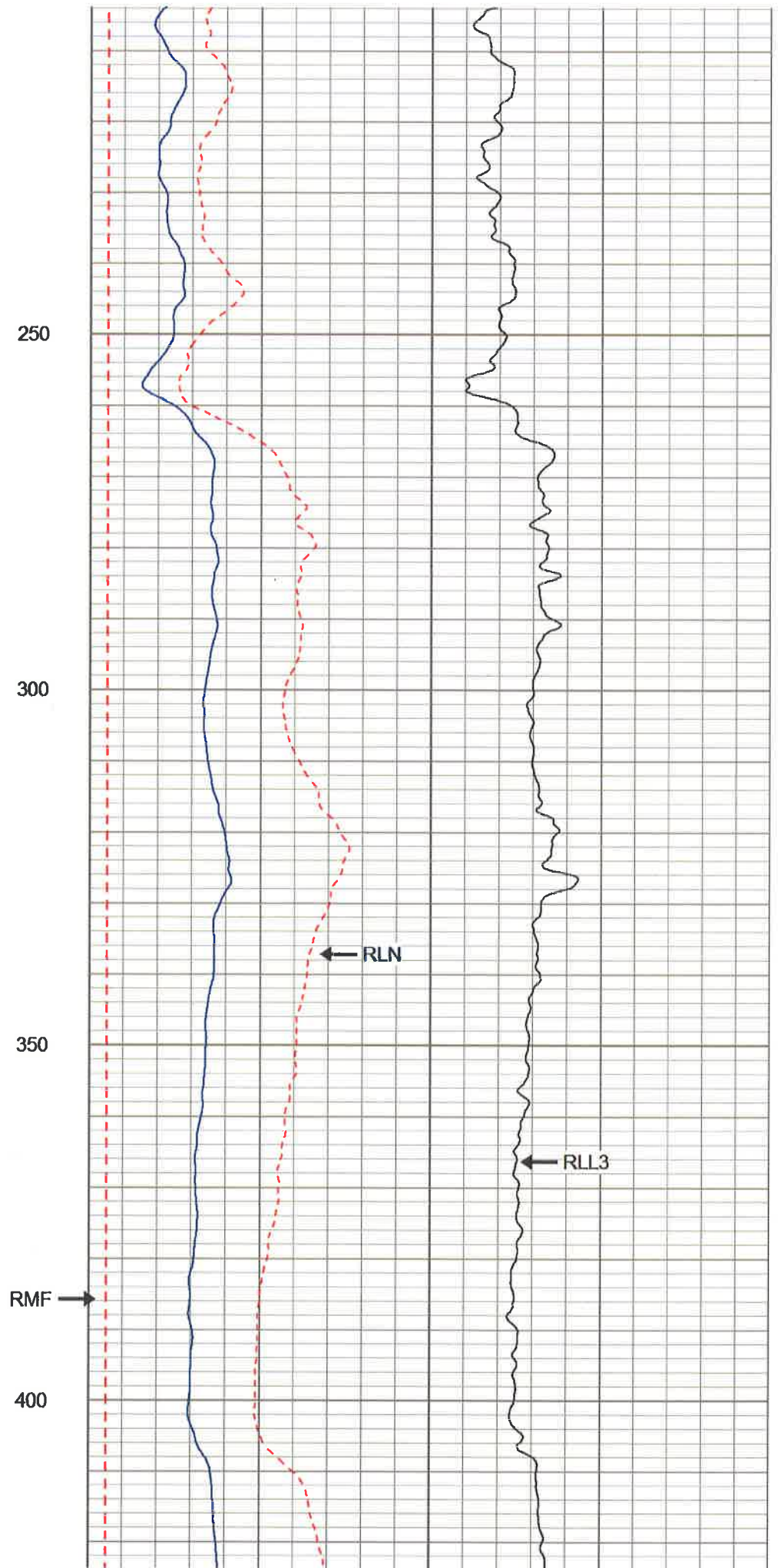
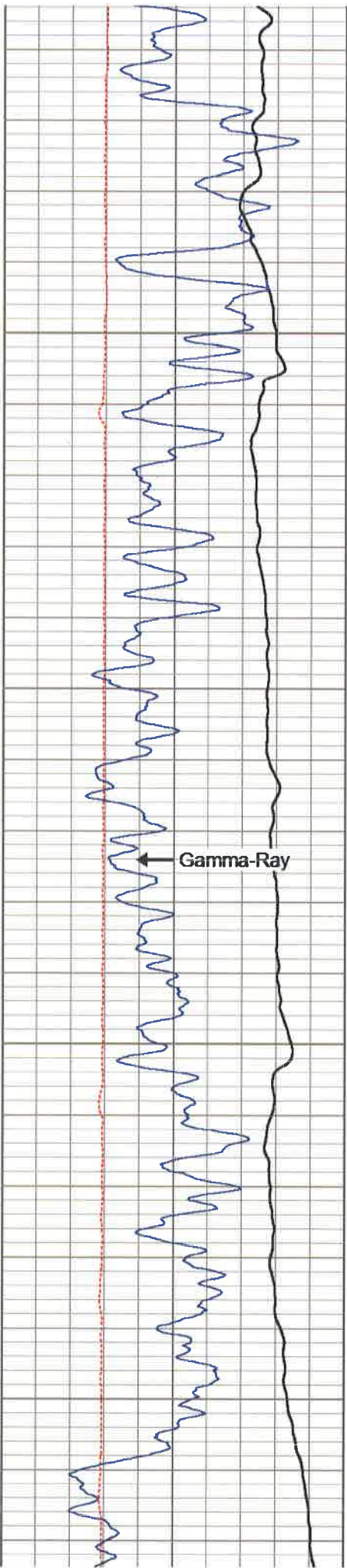
Background Reading: 173.2 cps  
 Calibrator Reading: 678.3 cps

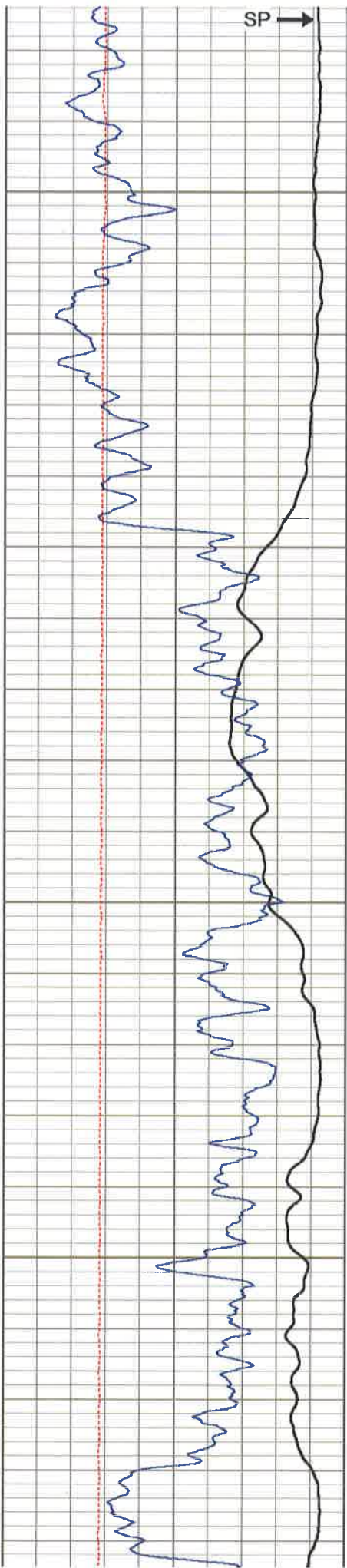
Sensitivity: 0.3207 GAPI/cps

Database File 17651.db  
 Dataset Pathname Elog.1  
 Presentation Format elog  
 Dataset Creation Mon Sep 09 06:55:09 2013  
 Charted by Depth in Feet scaled 1:240

-40	SP (mV)	60	0	RSN (Ohm-m)	150	0	RLL3 (Ohm-m)	150
0	Line Speed (ft/min)	-100	0	RLN (Ohm-m)	150	150 RLL3 back-up (Ohm-m)1500		
30	Gamma-Ray (GAPI)	80	0	RMF (Ohm-m)	150			
			150	RSN x 10 (Ohm-m)	1500			
			150	RLN x 10 (Ohm-m)	1500			





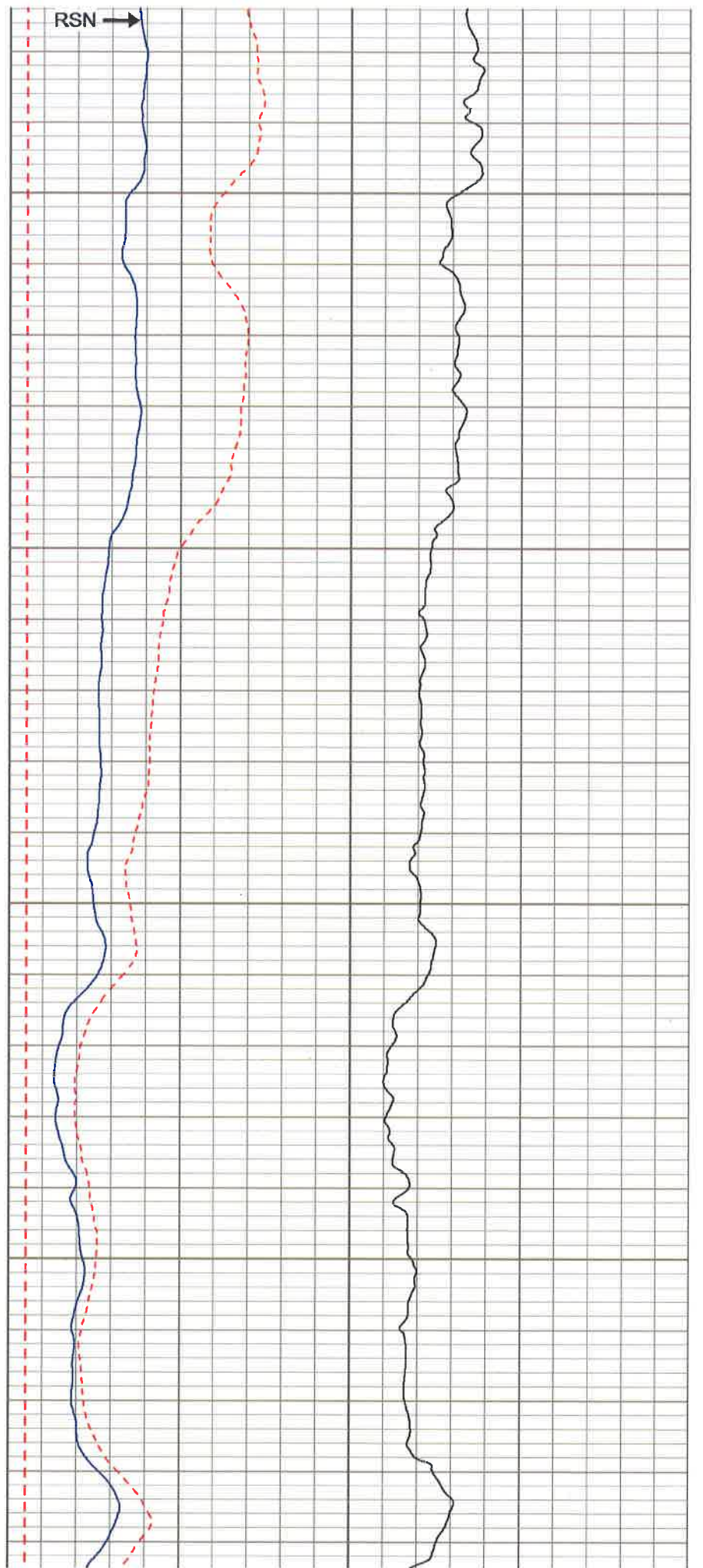


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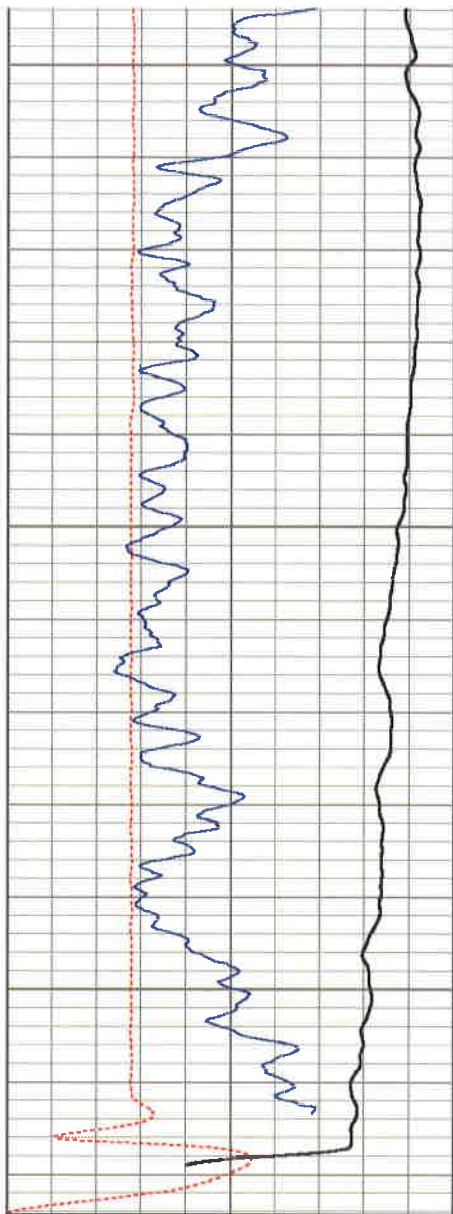
500

550

600





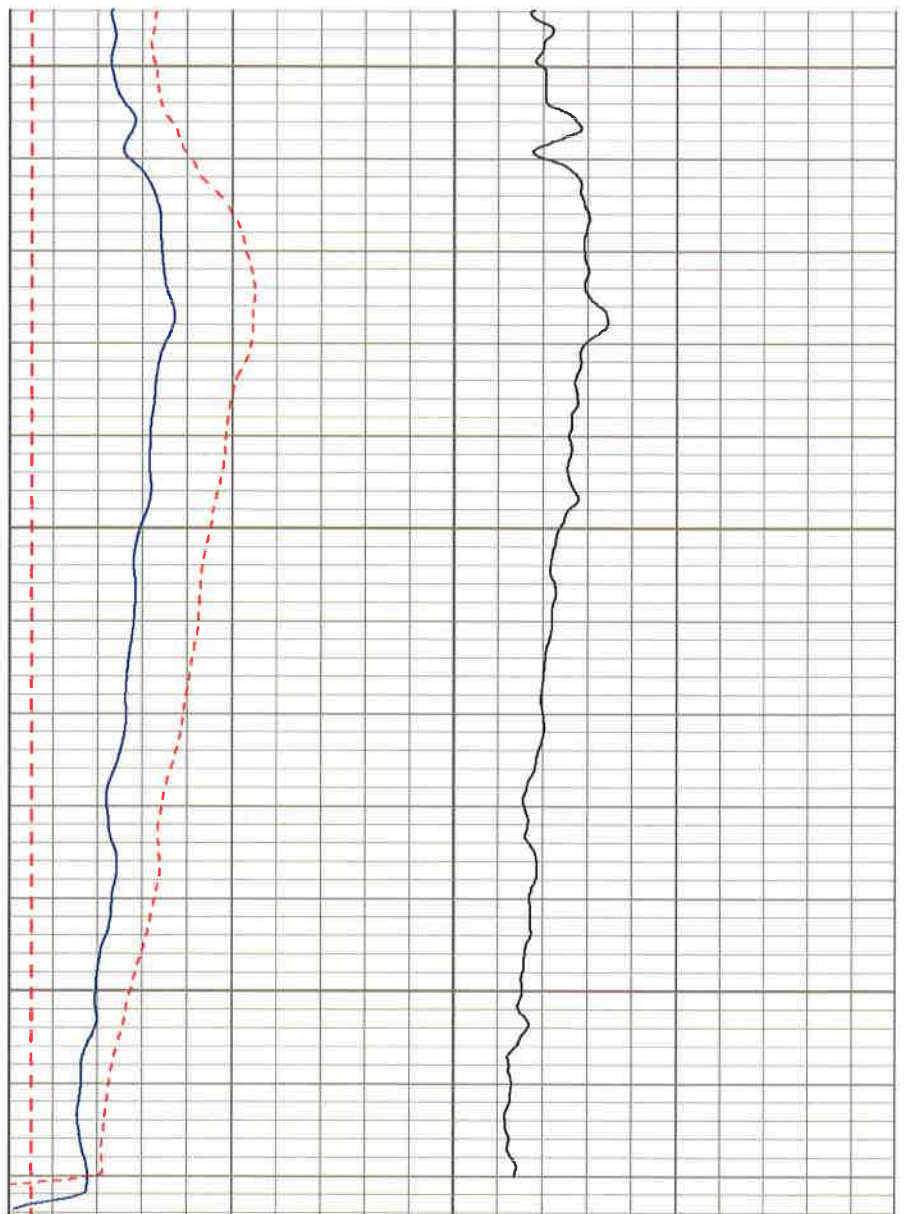


-40	SP (mV)	60
0	Line Speed (ft/min)	-100
30	Gamma-Ray (GAPI)	80

650

700

750



0	RSN (Ohm-m)	150	0	RLL3 (Ohm-m)	150
0	RLN (Ohm-m)	150	150 RLL3 back-up (Ohm-m) 1500		
0	RMF (Ohm-m)	150			
150	RSN x 10 (Ohm-m)	1500			
150	RLN x 10 (Ohm-m)	1500			

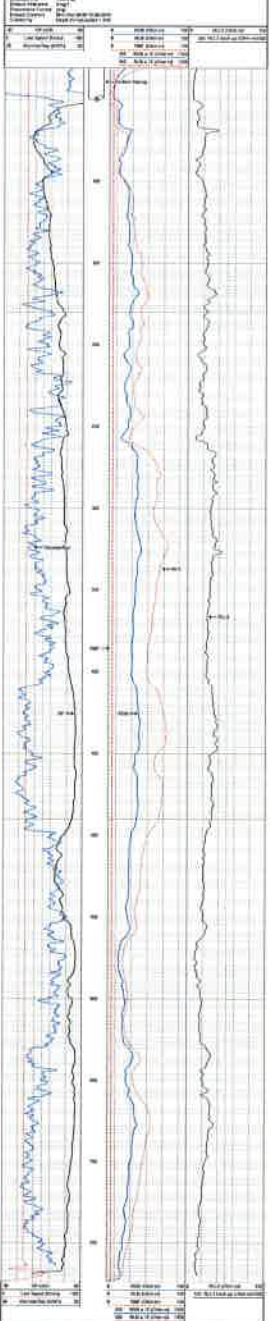
**U.S. GEOLOGICAL SURVEY**  
**WATER RESOURCES DIVISION**  
**GROUNDWATER ANALYSIS**

**REPORT NUMBER:** GWR-100-100  
**DATE:** 10/10/10  
**PROJECT:** GROUNDWATER ANALYSIS  
**WELL:** GWR-100-100  
**LOCATION:** GWR-100-100

Parameter	Value	Unit
Temperature	12.5	°C
pH	7.5	
Dissolved Oxygen	8.5	mg/L
Total Dissolved Solids	150	mg/L
Calcium	80	mg/L
Magnesium	70	mg/L
Sulfate	100	mg/L
Chloride	50	mg/L
Nitrate	10	mg/L
Ammonia	0.5	mg/L
Phosphate	0.2	mg/L
Iron	0.5	mg/L
Copper	0.1	mg/L
Zinc	0.1	mg/L
Lead	0.01	mg/L
Cadmium	0.001	mg/L
Mercury	0.0001	mg/L
Fluoride	1.0	mg/L
Silica	10	mg/L
Barium	0.5	mg/L
Strontium	0.1	mg/L
Selenium	0.01	mg/L
Vanadium	0.01	mg/L
Cobalt	0.01	mg/L
Nickel	0.01	mg/L
Manganese	0.5	mg/L
Chromium	0.01	mg/L
Molybdenum	0.01	mg/L
Antimony	0.01	mg/L
Bismuth	0.01	mg/L
Thallium	0.01	mg/L
Lead	0.01	mg/L
Cadmium	0.001	mg/L
Mercury	0.0001	mg/L
Fluoride	1.0	mg/L
Silica	10	mg/L
Barium	0.5	mg/L
Strontium	0.1	mg/L
Selenium	0.01	mg/L
Vanadium	0.01	mg/L
Cobalt	0.01	mg/L
Nickel	0.01	mg/L
Manganese	0.5	mg/L
Chromium	0.01	mg/L
Molybdenum	0.01	mg/L
Antimony	0.01	mg/L
Bismuth	0.01	mg/L
Thallium	0.01	mg/L

**Flow Rate**

Time	Flow Rate (L/min)
0:00	1.0
0:15	1.0
0:30	1.0
0:45	1.0
1:00	1.0
1:15	1.0
1:30	1.0
1:45	1.0
2:00	1.0
2:15	1.0
2:30	1.0
2:45	1.0
3:00	1.0
3:15	1.0
3:30	1.0
3:45	1.0
4:00	1.0
4:15	1.0
4:30	1.0
4:45	1.0
5:00	1.0
5:15	1.0
5:30	1.0
5:45	1.0
6:00	1.0
6:15	1.0
6:30	1.0
6:45	1.0
7:00	1.0
7:15	1.0
7:30	1.0
7:45	1.0
8:00	1.0
8:15	1.0
8:30	1.0
8:45	1.0
9:00	1.0
9:15	1.0
9:30	1.0
9:45	1.0
10:00	1.0
10:15	1.0
10:30	1.0
10:45	1.0
11:00	1.0
11:15	1.0
11:30	1.0
11:45	1.0
12:00	1.0
12:15	1.0
12:30	1.0
12:45	1.0
13:00	1.0
13:15	1.0
13:30	1.0
13:45	1.0
14:00	1.0
14:15	1.0
14:30	1.0
14:45	1.0
15:00	1.0
15:15	1.0
15:30	1.0
15:45	1.0
16:00	1.0
16:15	1.0
16:30	1.0
16:45	1.0
17:00	1.0
17:15	1.0
17:30	1.0
17:45	1.0
18:00	1.0
18:15	1.0
18:30	1.0
18:45	1.0
19:00	1.0
19:15	1.0
19:30	1.0
19:45	1.0
20:00	1.0
20:15	1.0
20:30	1.0
20:45	1.0
21:00	1.0
21:15	1.0
21:30	1.0
21:45	1.0
22:00	1.0
22:15	1.0
22:30	1.0
22:45	1.0
23:00	1.0
23:15	1.0
23:30	1.0
23:45	1.0
24:00	1.0



Job No. 17651  
 Company SOUTH WEST PUMP & DRILLING  
 Well WELL #12  
 Field TORRANCE  
 File No. County LOS ANGELES State CA

Location: 18413 PURCHE AVE.  
 GPS: N83o 51.82134' W118o 19.22916'  
 Sec. Twp. Rge. Other Services: ELOG SONICV/DL

Permanent Datum	GL.	Elevation	Elevation
Log Measured From	G.L.	above perm. datum	K.B. D.F. G.L.
Drilling Measured From	G.L.		
Date	09-09-2013		
Run Number	ONE		
Depth Driller	773'		
Depth Logger	774.3		
Bottom Logged Interval	774'		
Top Log Interval	50'		
Casing Driller	36" @ 50'		
Casing Logger	50'		
Bit Size	17.5"		
Type Fluid in Hole	WATER		
Density / Viscosity	N/A		
pH / Fluid Loss	N/A		
Source of Sample	PIT		
Rm @ Meas. Temp	7.75 @ 77F		
Rmf @ Meas. Temp	7.75 @ 77F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEAS		
Rm @ BHT	N/A		
Time Circulation Stopped	3 HRS		
Time Logger on Bottom	06:15		
Max. Recorded Temperature	N/A		
Equipment Number	PS-7		
Location	LA		
Recorded By	RIDDER		
Witnessed By	N. MONTROY		

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**Comments**

**Calibration Report**

Database File 17651.db  
 Dataset Pathname LL3\_2  
 Dataset Creation Mon Sep 09 07:51:46 2013

Serial Number: 12  
 Tool Model: GROH  
 Performed: Fri Apr 15 07:10:16 2011  
  
 Calibrator Value: 162.0 GAPI  
  
 Background Reading: 43.7  
 Calibrator Reading: 168.2  
  
 Sensitivity: 1.3020 GAPI/

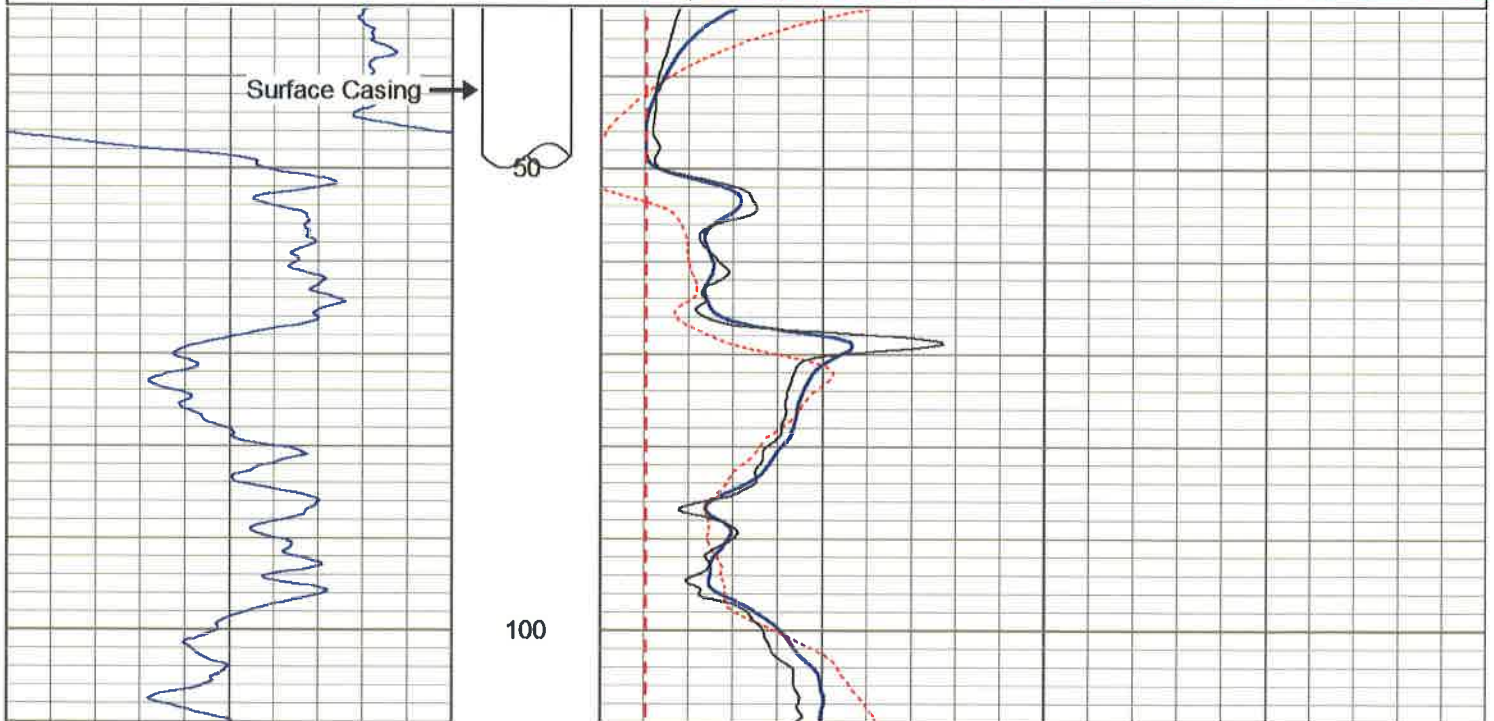
RLL3 (Resistivity Laterolog 3) Calibration Report:

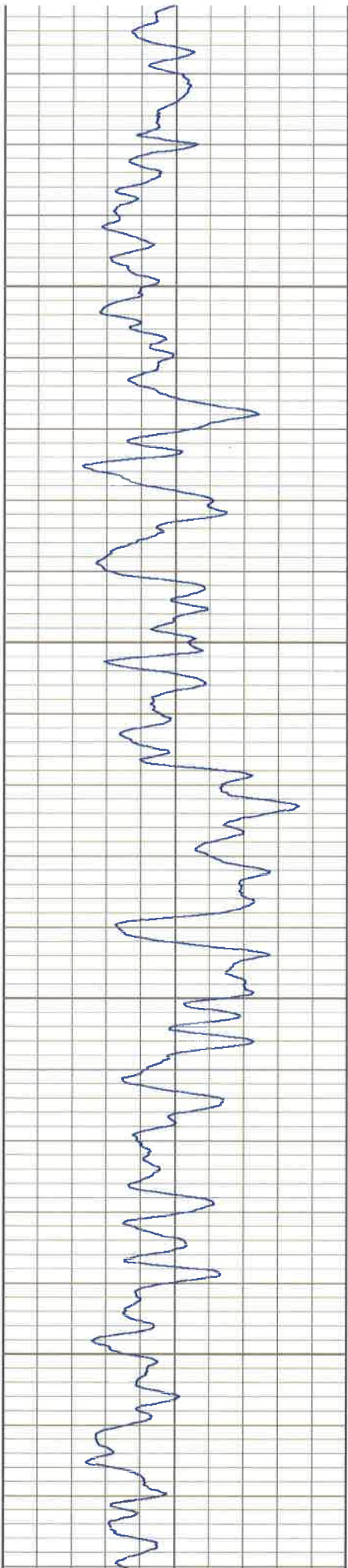
Serial Number: 883  
 Tool Model: M&W  
 Performed: Fri Oct 19 11:07:08 2012

System Reading	Calibration Reference
0.014	2.500 Ohm-m
0.027	5.000
0.254	50.000
1.169	250.000
2.121	500.000

Database File 17651.db  
 Dataset Pathname LL3\_2  
 Presentation Format guard  
 Dataset Creation Mon Sep 09 07:51:46 2013  
 Charted by Depth in Feet scaled 1:240

30	Gamma-Ray (GAPI)	80	0	RSN (Ohm-m)	150
			0	RLN (Ohm-m)	150
			0	RMF (Ohm-m)	150
			0	RLL3 (Ohm-m)	150
			150	RLL3 x 10 (Ohm-m)	1500
			150	RSN x 10 (Ohm-m)	1500
			150	RLN x 10 (Ohm-m)	1500



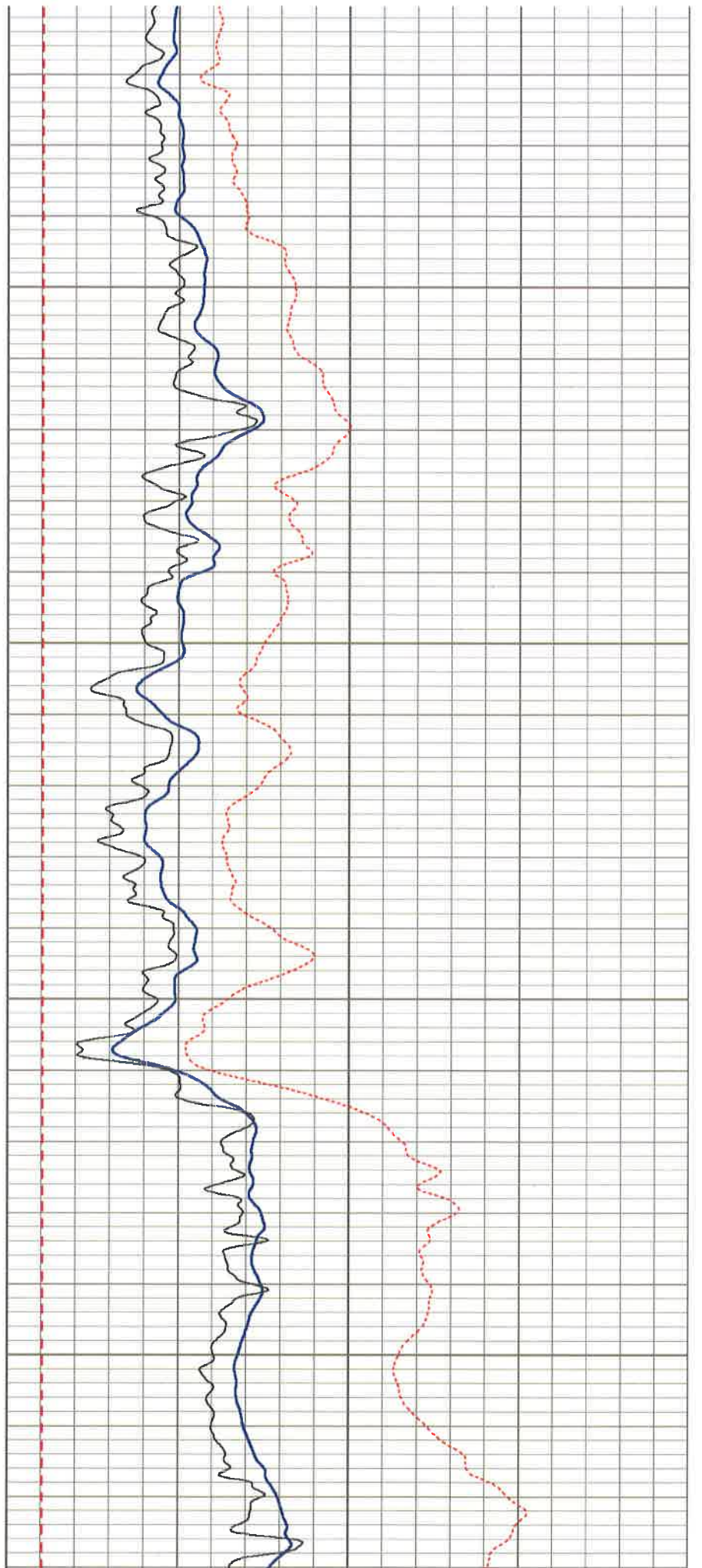


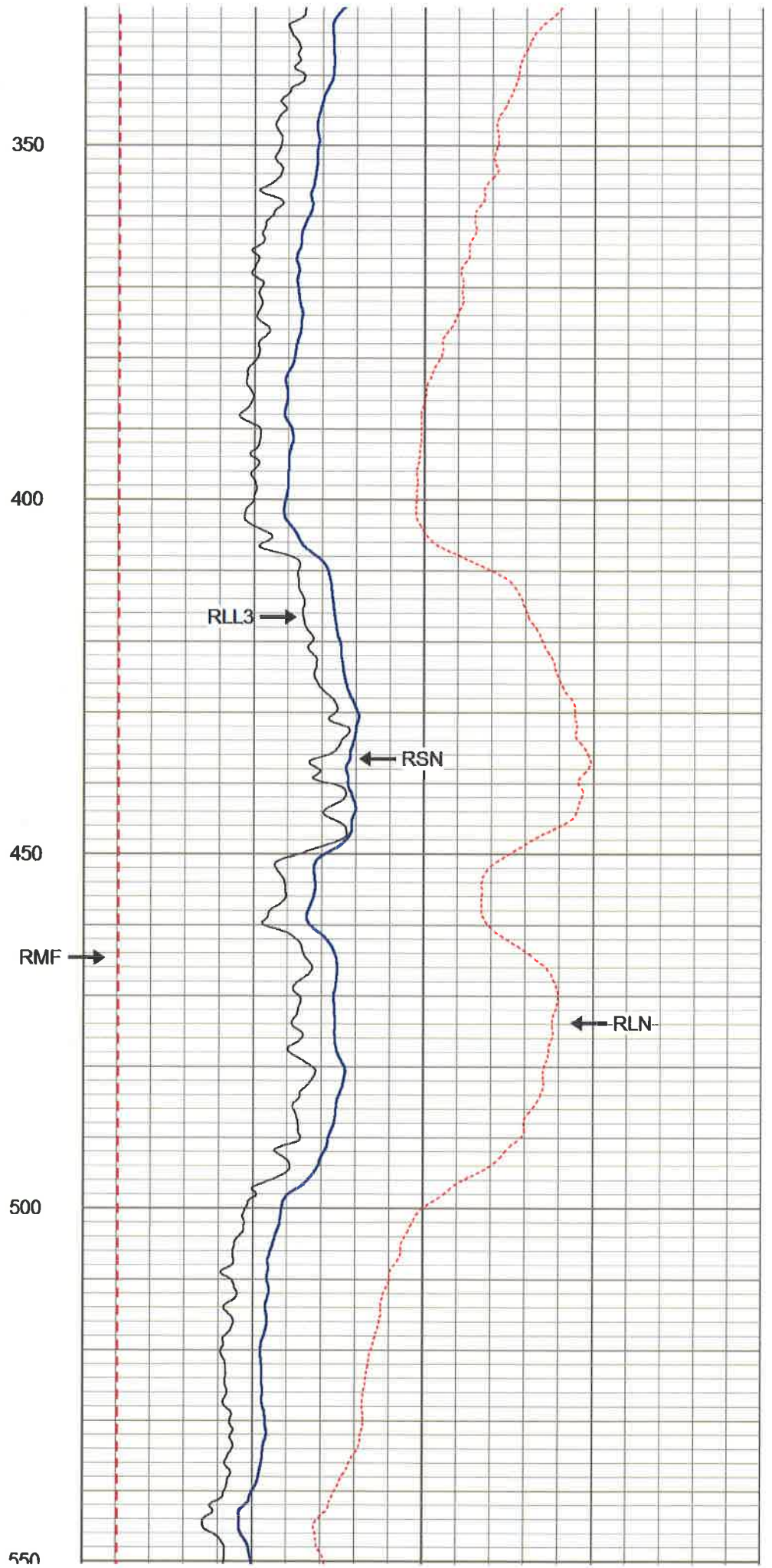
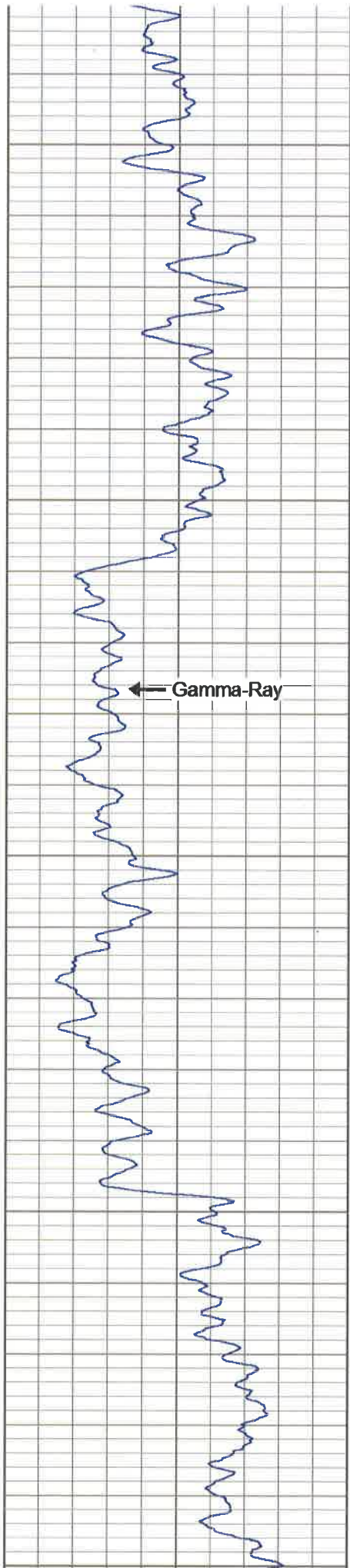
150

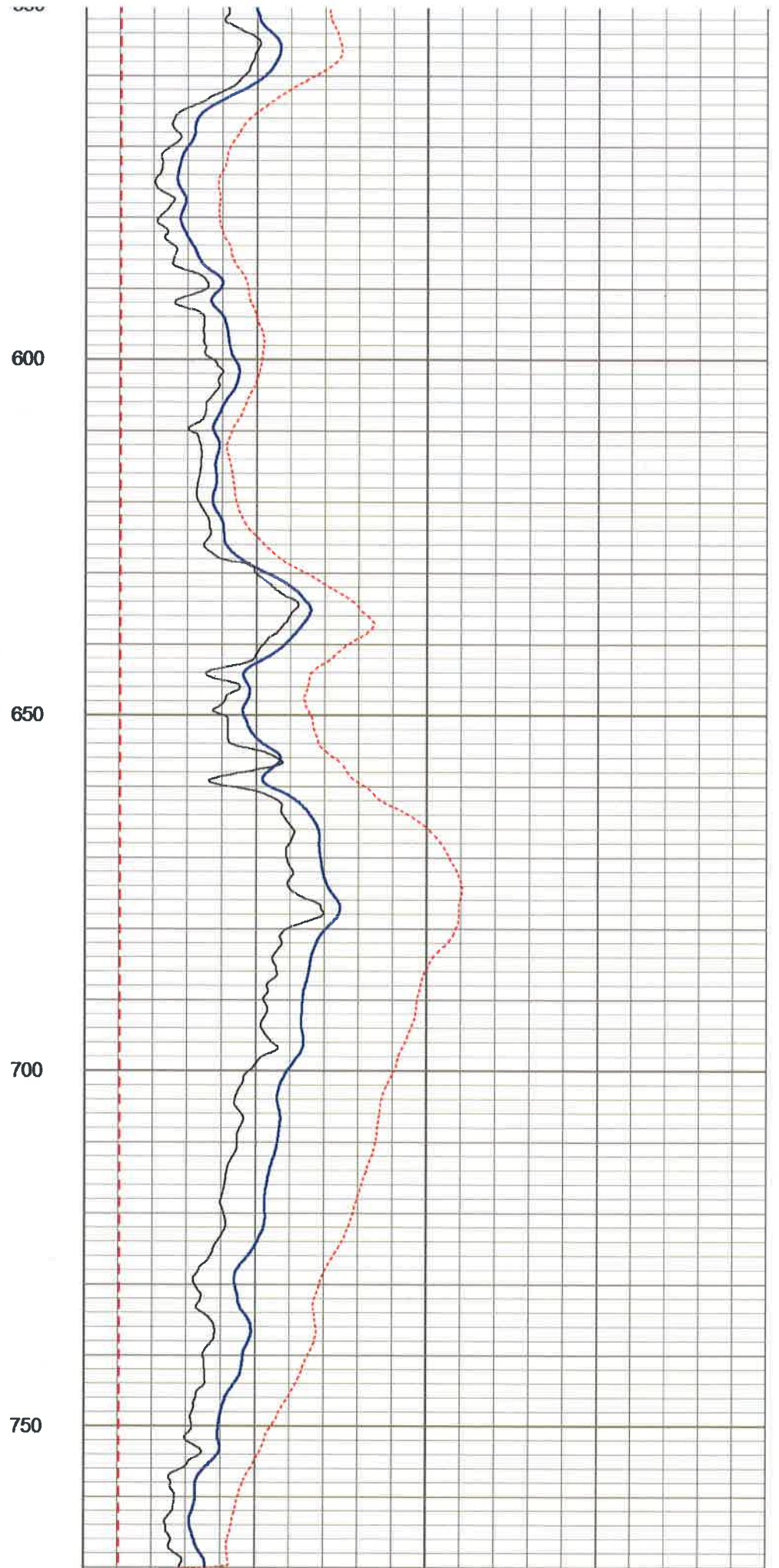
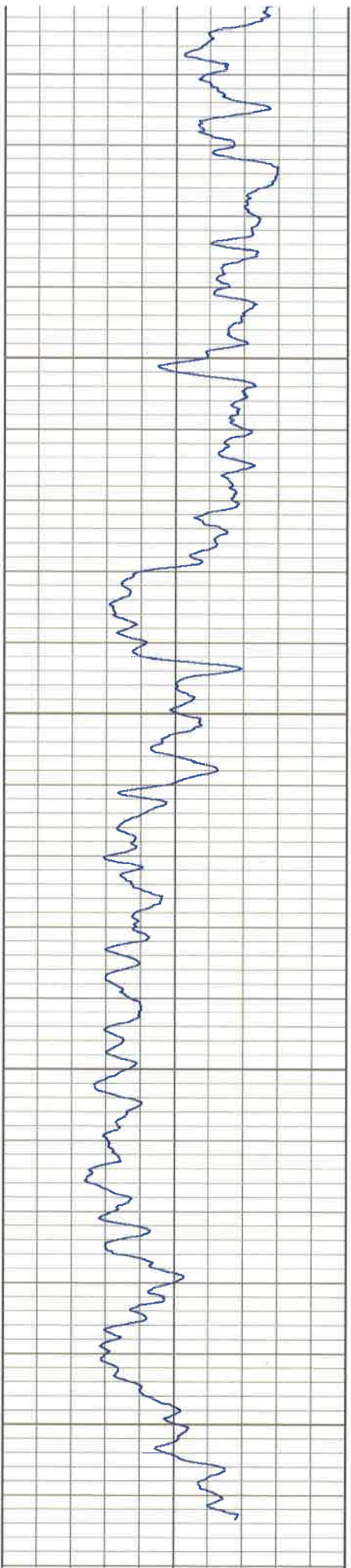
200

250

300







30	Gamma-Ray (GAPI)	80
----	------------------	----

0	RSN (Ohm-m)	150
0	RLN (Ohm-m)	150
0	RMF (Ohm-m)	150
0	RLL3 (Ohm-m)	150
150	RLL3 x 10 (Ohm-m)	1500
150	RSN x 10 (Ohm-m)	1500
150	RLN x 10 (Ohm-m)	1500



**LABORATORIO 3**  
**QUÍMICA**

**COMPUESTO: ACETILFENOL (C<sub>8</sub>H<sub>10</sub>O)**

**FECHA:** 10/11/2017

**ALUMNO:** [Nombre]

**GRUPO:** [Grupo]

**LABORANTE:** [Nombre]

**PROFESOR:** [Nombre]

**OBJETIVO:** [Objetivo]

**RESUMEN:** [Resumen]

**CONDICIONES DE LA PRUEBA:**

**Temperatura:** [Temperatura]

**Presión:** [Presión]

**Velocidad de flujo:** [Velocidad de flujo]

**Concentración de muestra:** [Concentración de muestra]

**Concentración de estándar:** [Concentración de estándar]

**Repeticiones:** [Repeticiones]

**Resultados:**

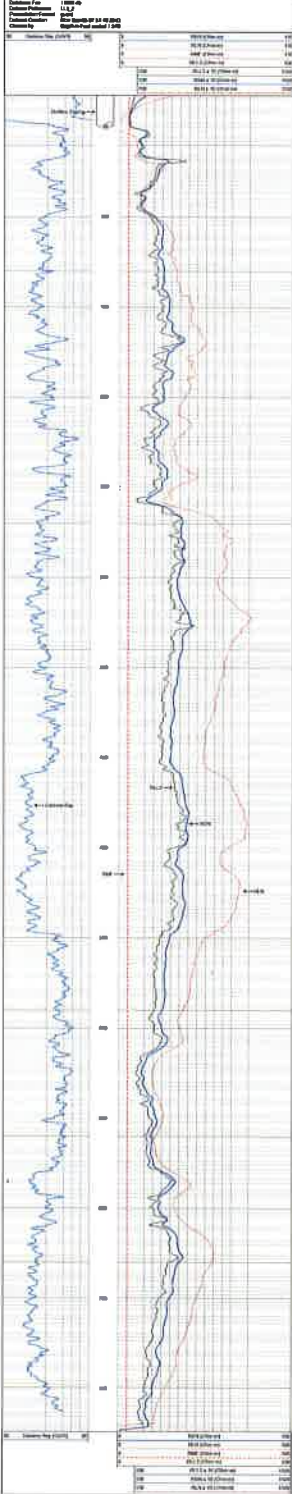
**Área:** [Área]

**Concentración:** [Concentración]

**Concentración real:** [Concentración real]

**Concentración calculada:** [Concentración calculada]

**Concentración %:** [Concentración %]



**SONIC VELOCITY  
VARIABLE DENSITY**

Job No. 17651  
 Company SOUTH WEST PUMP & DRILLING  
 Well WELL #12  
 Field TORRANCE  
 File No. County LOS ANGELES State CA

Location: 18413 PURCHE AVE.  
 GPS: N83o 51.82134' W118o 19.22916'  
 Sec. Twp. Rge. Other Services: ELOG GRLL3

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		09-09-2013	
Run Number		ONE	
Depth Driller		773'	
Depth Logger		774.3	
Bottom Logged Interval		774'	
Top Log Interval		50'	
Casing Driller		36" @ 50'	
Casing Logger		50'	
Bit Size		17.5"	
Type Fluid in Hole		WATER	
Density / Viscosity		N/A	
pH / Fluid Loss		N/A	
Source of Sample		PIT	
Rm @ Meas. Temp		7.75 @ 77F	
Rmf @ Meas. Temp		7.75 @ 77F	
Rmc @ Meas. Temp		N/A	
Source of Rmf / Rmc		MEAS	
Rm @ BHT		N/A	
Time Circulation Stopped		3 HRS	
Time Logger on Bottom		06:15	
Max. Recorded Temperature		N/A	
Equipment Number		PS-7	
Location		L.A	
Recorded By		RIDDER	
Witnessed By		N. MONTROY	

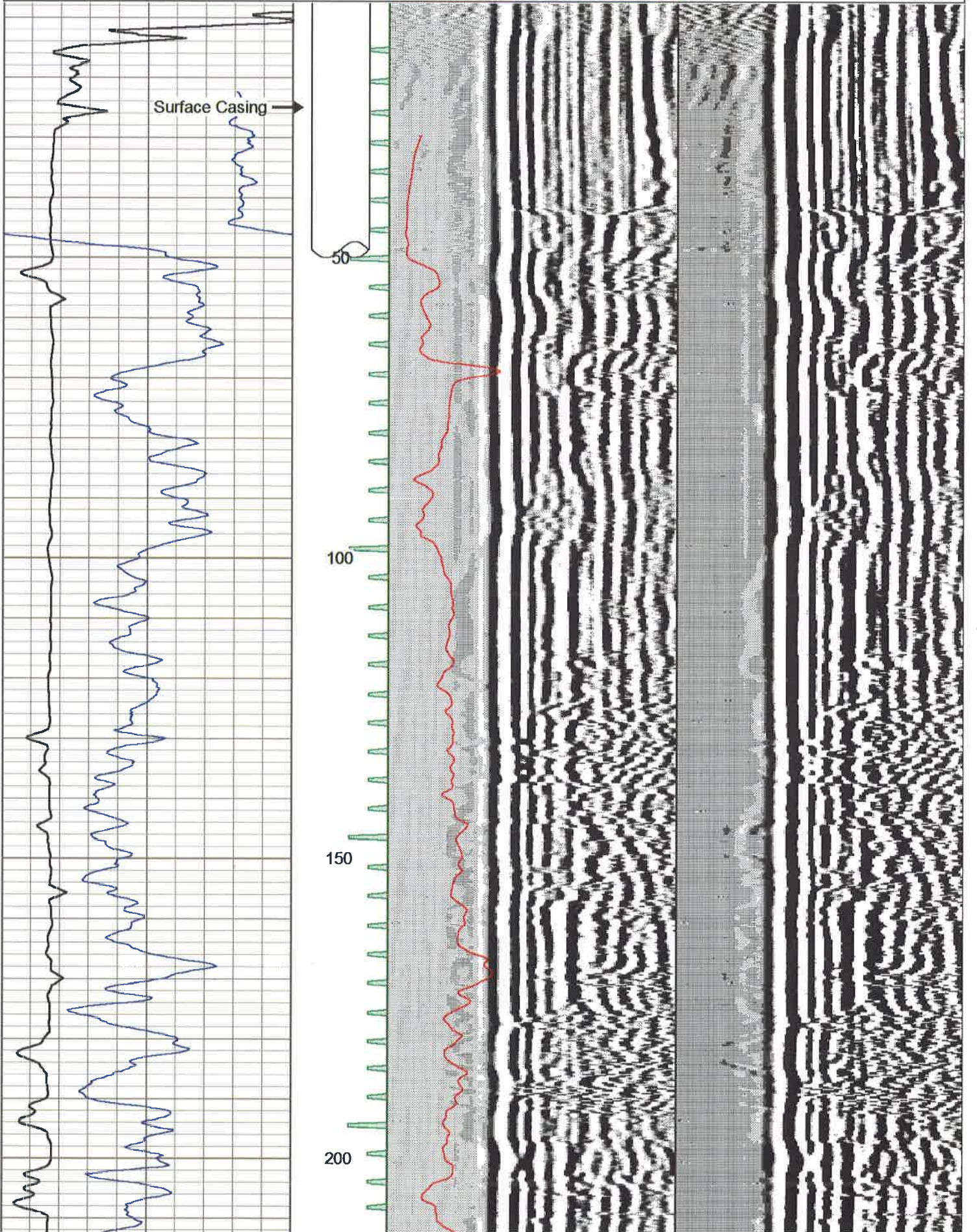
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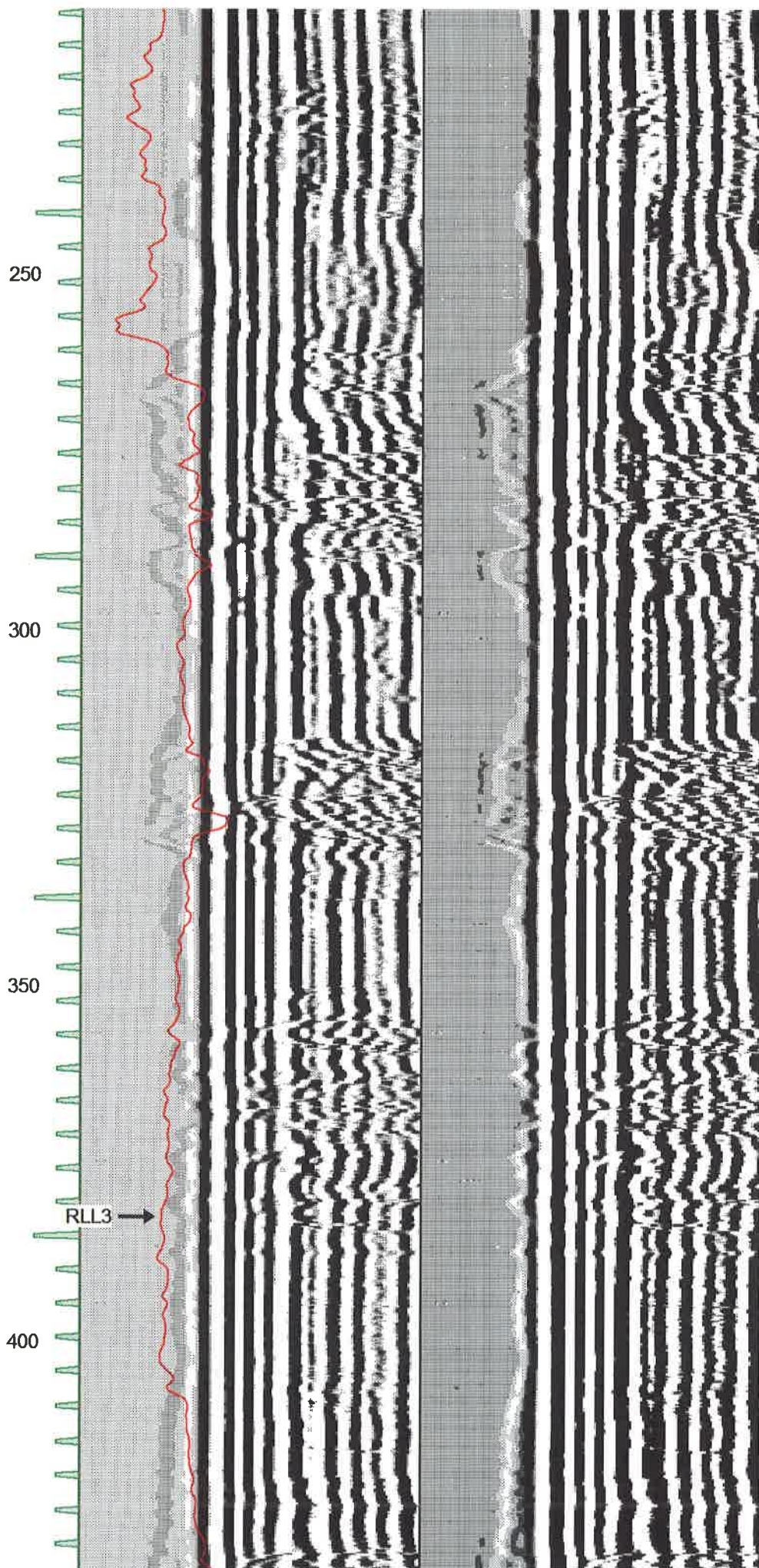
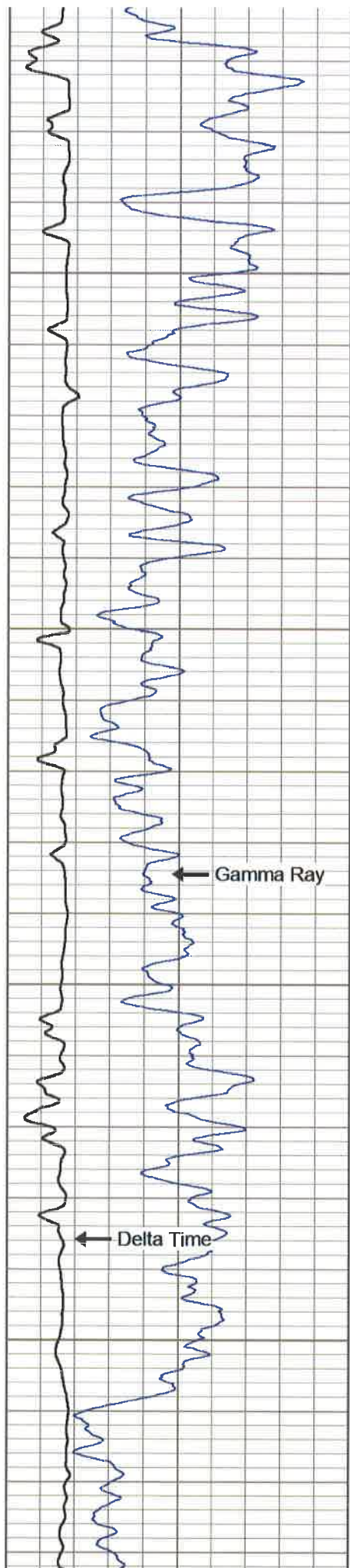
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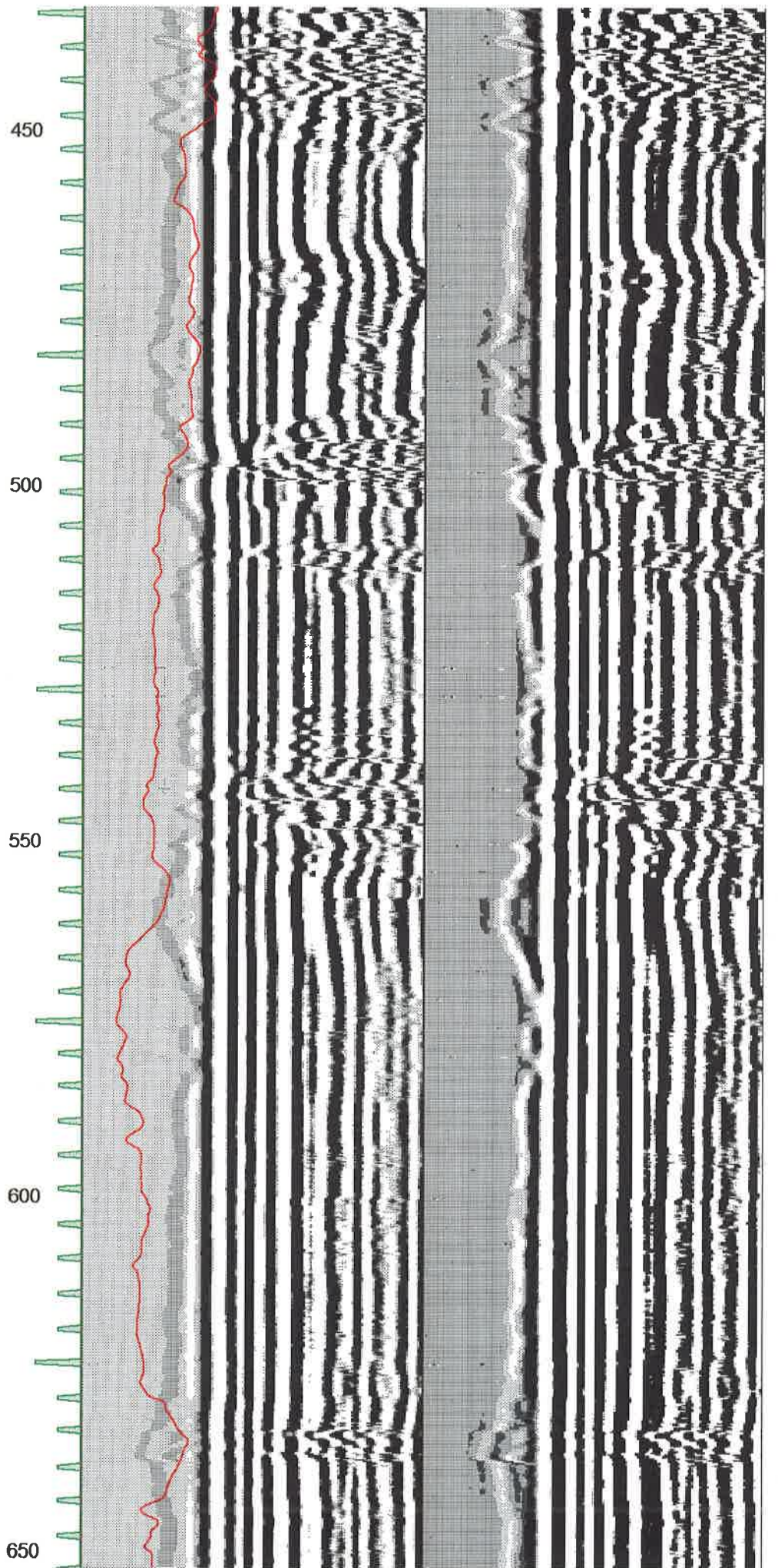
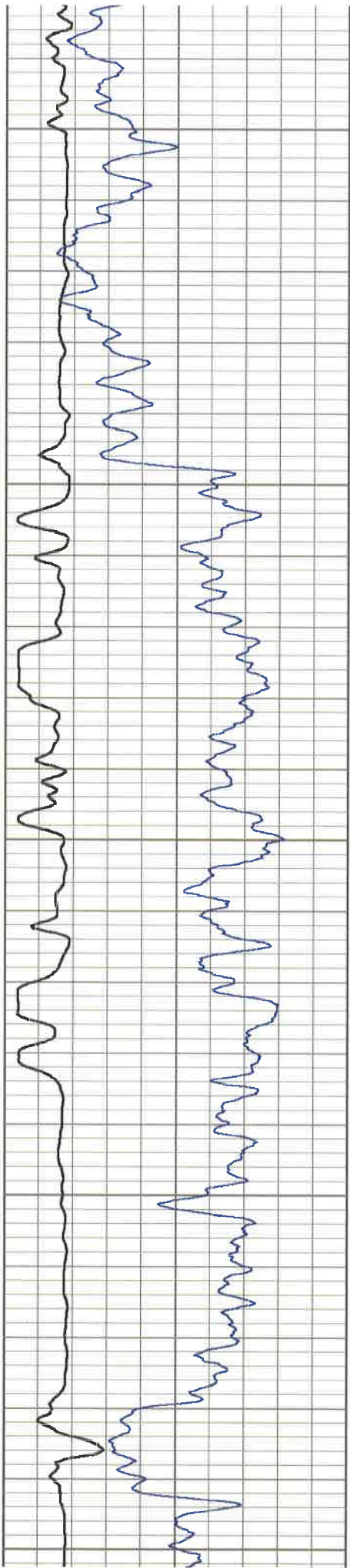
Comments

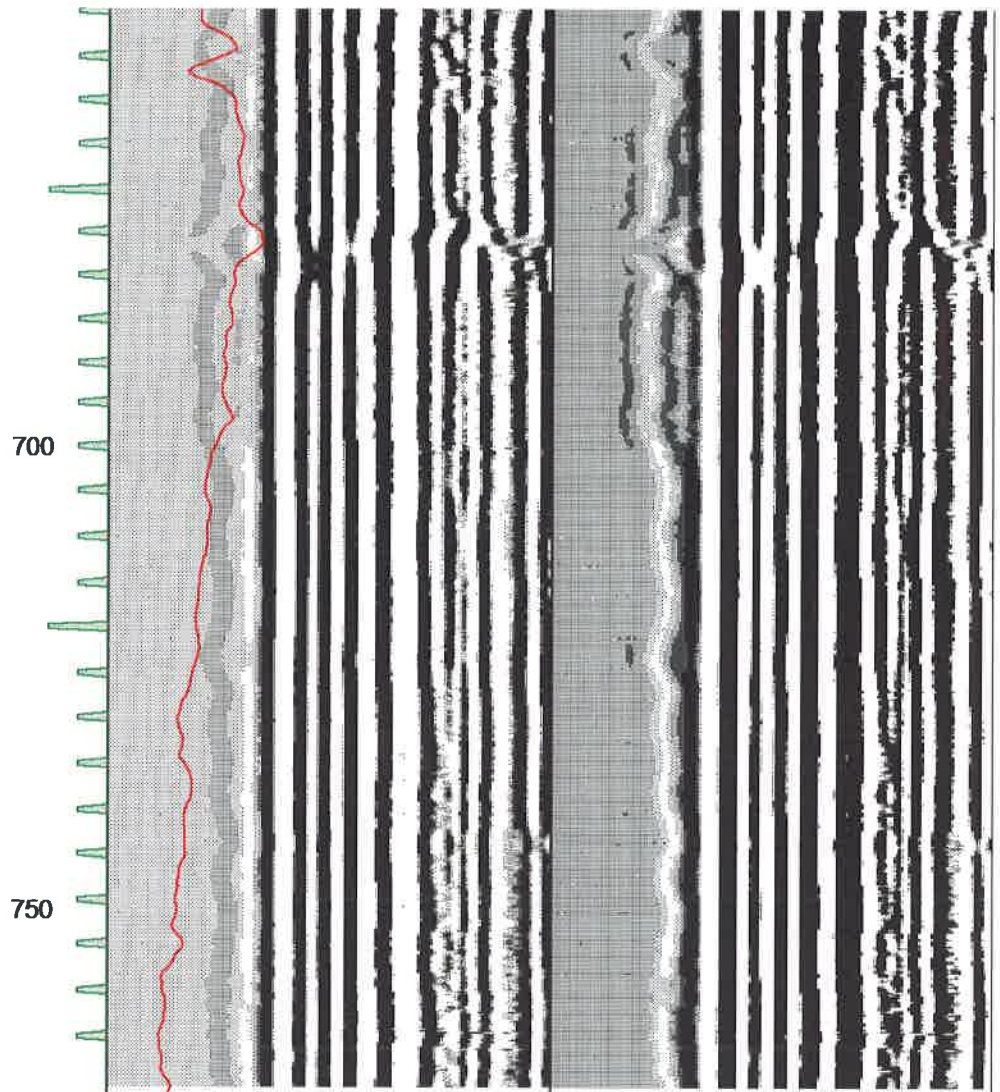
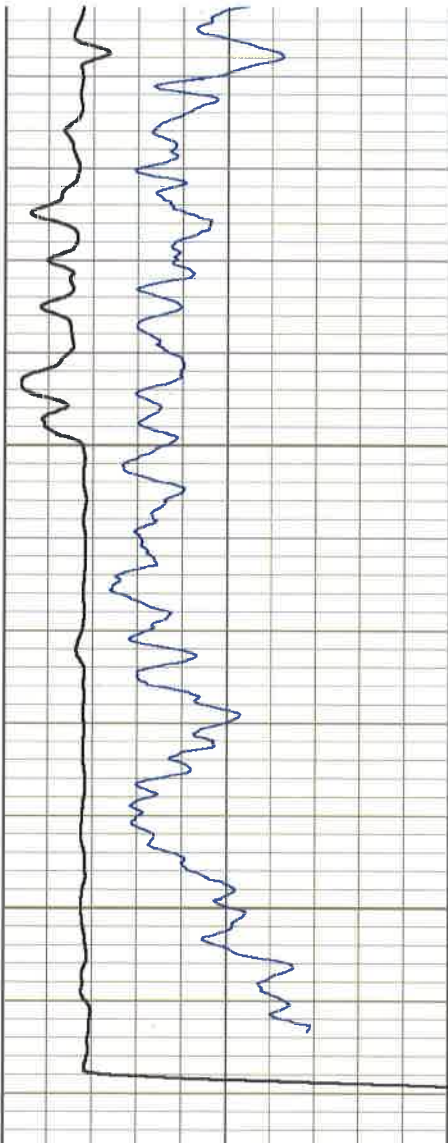
Database File 17651.db  
 Dataset Pathname SONIC2  
 Presentation Format sonic\_ps  
 Dataset Creation Mon Sep 09 09:00:10 2013  
 Charted by Depth in Feet scaled 1:240

240	Delta Time (usec/ft)	40	ITT	800	Variable Density 5 ft	1500	800	Variable Density 5 ft	1500
30	Gamma-Ray (GAPI)	80	5 (msec) 0	0	RLL3 (Ohm-m)	150			
					RLL3 back-up (Ohm-m)	1500			









240	Delta Time (usec/ft)	40	ITT	800	Variable Density 5 ft	1500	800	Variable Density 5 ft	1500
30	Gamma-Ray (GAPI)	80	5 (msec)	0	RLL3 (Ohm-m)	150			
					<u>RLL3 back-up (Ohm-m)</u>	<u>150</u>			<u>1500</u>



**ATTACHEMENT B**  
**Zone Testing (Preliminary)**



Ground Surface

ZONE TESTING 665 ft bgs to 685 ft bgs

PRELIMINARY DESIGN

ACTUAL CONSTRUCTION

635 FT BGS

\_\_\_\_\_ FT BGS

Bentonite Seal

20 FT

\_\_\_\_\_ FT

Bentonite Seal

655 FT BGS

\_\_\_\_\_ FT BGS

Gravel Pack

10 FT

\_\_\_\_\_ FT

Gravel Pack

665 FT BGS

\_\_\_\_\_ FT BGS

Perforated Tool in Gravel Pack

20 FT

\_\_\_\_\_ FT

Perforated Tool in Gravel Pack

685 FT BGS

\_\_\_\_\_ FT BGS

Gravel Pack

10 FT

\_\_\_\_\_ FT

Gravel Pack

695 FT BGS

\_\_\_\_\_ FT BGS

Bentonite Seal

20 FT

\_\_\_\_\_ FT

Bentonite Seal

715 FT BGS

\_\_\_\_\_ FT BGS

Depth of Boring 774 FT BGS

Boring Dia. 17 1/2 Inches

Depth of Boring 774 FT BGS

**URS**

Zone Testing – Construction Details for  
City of Torrance – Well #12

Zone No. 1

Ground Surface

ZONE TESTING 425 ft bgs to 445 ft bgs

PRELIMINARY DESIGN

ACTUAL CONSTRUCTION

395 FT BGS

\_\_\_\_\_ FT BGS

Bentonite Seal

20 FT

\_\_\_\_\_ FT

Bentonite Seal

415 FT BGS

\_\_\_\_\_ FT BGS

Gravel Pack

10 FT

\_\_\_\_\_ FT

Gravel Pack

425 FT BGS

\_\_\_\_\_ FT BGS

Perforated Tool in Gravel Pack

20 FT

\_\_\_\_\_ FT

Perforated Tool in Gravel Pack

445 FT BGS

\_\_\_\_\_ FT BGS

Gravel Pack

10 FT

\_\_\_\_\_ FT

Gravel Pack

455 FT BGS

\_\_\_\_\_ FT BGS

Bentonite Seal

20 FT

\_\_\_\_\_ FT

Bentonite Seal

475 FT BGS

\_\_\_\_\_ FT BGS

Depth of Boring 774 FT BGS

Boring Dia. 17 1/2 Inches

Depth of Boring 774 FT BGS

**URS**

Zone Testing – Construction Details for  
City of Torrance – Well #12

Zone No. 2

Ground Surface

ZONE TESTING 160 ft bgs to 180 ft bgs

**PRELIMINARY DESIGN**

**ACTUAL CONSTRUCTION**

130 FT BGS

\_\_\_\_\_ FT BGS

Bentonite Seal

20 FT

\_\_\_\_\_ FT

Bentonite Seal

150 FT BGS

\_\_\_\_\_ FT BGS

Gravel Pack

10 FT

\_\_\_\_\_ FT

Gravel Pack

160 FT BGS

\_\_\_\_\_ FT BGS

Perforated Tool in Gravel Pack

20 FT

\_\_\_\_\_ FT

Perforated Tool in Gravel Pack

180 FT BGS

\_\_\_\_\_ FT BGS

Gravel Pack

10 FT

\_\_\_\_\_ FT

Gravel Pack

190 FT BGS

\_\_\_\_\_ FT BGS

Bentonite Seal

20 FT

\_\_\_\_\_ FT

Bentonite Seal

210 FT BGS

\_\_\_\_\_ FT BGS

Depth of Boring 774 FT BGS

Boring Dia. 17 1/2 Inches

Depth of Boring 774 FT BGS

**URS**

Zone Testing – Construction Details for  
City of Torrance – Well #12

Zone No. 3