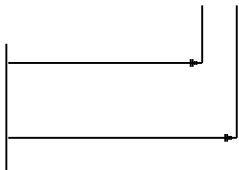



SlimPulse & AWR - GR & RES											
1 in./ 100 ft, Measured Depth											
Recorded Mode, Composite Log											
PATHFINDER											
A Schlumberger Company											
Company:		Noble Energy Inc.									
Well:		Wells Ranch AA11-637									
Field:		Wattenburg									
County:		Weld									
State:		Colorado									
Country:		USA									
Section:		11		APIN:		05-123-41253					
Township:		06N		Rig Name:		H&P 326					
Range:		63W		Rig Type:		Top Drive					
FL:		NAD83 Colorado State Plane, Norther Zone, US Feet									
FL1:		Latitude: N 40° 29' 55.104" Northing: 1426409.415 ftUS									
FL2:		Longitude: W 104° 23' 42.324" Easting: 3307273.172 ftUS									
<div>Log Measured From: - Drill Floor: 4885.00 ft</div> <div>Ground Level: 4855.00 ft</div> <div></div>											
Permanent Datum: - Mean Sea Level											
Acquisition Dates:		03-Jun-2015		Other Services:							
Log Interval:		1790.00(ft) -- 13827.00(ft)		Surveys / Continuous D&I							
Index Types:		Measured Depth		Downhole Temperature							
Index Scales:		1:1200 1" / 100'		Downhole Shocks							
Depth Source:		Driller's Depth		Directional Drilling							
Depth Sensor:		PASON									
Print Type:		Final									
Spud Date:		31-MAY-2015									

Disclaimer

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

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- Merge Composite
 - Integration Summary
 - Software Version
 - Composite Summary
 - Log (GR and Res - MD)
 - Parameter Listing
- Calibration Report
- Tail



Borehole Size/Casing Record						
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Bit						
Bit Size (in)	13.5	8.75	8.5			
Top Driller (ft)	0	1861	7227			
Bottom Driller (ft)	1861	7227	13827.5			
Casing						
Size (in)	9.625					
Weight (lbm/ft)	36					
Inner Diameter (in)	8.921					
Grade	P110					
Top Driller (ft)	0					
Bottom Driller (ft)	1850					

Operational Run Summary						
-------------------------	--	--	--	--	--	--

Parameter (unit)	Run02	Imported Run 2	Imported Run 5	Imported Run 6		
Date Log Started	03-Jun-2015					
Time Log Started	16:38:33					
Date Log Finished	06-Jun-2015					
Time Log Finished	08:22:53					
Bit Size (in)	8.500					
Bit Start Depth (ft)	7227.00					
Bit Stop Depth (ft)	13827.00					
Top Log Interval (ft)	7174.00					
Bottom Log Interval (ft)	13784.00					
Max Hole Deviation (deg)	91.24					
Azimuth of Max Deviation (deg)	268.59					
Logging Unit Number	Command Center	Command Center	Command Center	Command Center		
Logging Unit Location	Zone 2	Zone 2	Zone 2	Zone 2		
Recorded By	Mark Wilson					
Witnessed By	John Drahota					
Service Order Number	15CCO0477	15CCO0477	15CCO0477	15CCO0477		

Borehole Fluids						
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Parameter(unit)	Run02	Imported Run 2	Imported Run 5	Imported Run 6		
Fluid Type	Water					
Max Recorded Temperatures	233.6					

(degF)						
Source of Sample	Active Tank					
Salinity (ppm)	34972.17					
Density (lbm/gal)	10					
Funnel Viscosity (s)	38					
Fluid Loss (cm3)						
PH	10.1					
Source RMF						
RMC	Pressed					
RM @ Meas Temp (ohm.m@degF)	0.2 @ 68					
RMF @ Meas Temp (ohm.m@degF)	0.15 @ 68					
RMC @ Meas Temp (ohm.m@degF)						
RM @ BHT (ohm.m@degF)	0.07 @ 212					
RMF @ BHT (ohm.m@degF)	0.05 @ 212					
RMC @ BHT (ohm.m@degF)	NaN @ 212					
Total Solid (%)	10.2					
High Gravity Solids (%)						

Remarks and Equipment Summary

Data presented is from tool memory and acquired while drilling from 7227.0 ft to 13827.0 ft MD

Depth Reference: Driller's Depth

Environmental Corrections: Gamma Ray is corrected for bit size, mud weight, and tool collar thickness. Barite and Potassium in the mud affect Gamma Ray readings.

Run02: Remarks	Imported Run 2: Remarks	Imported Run 5: Remarks
Run Objective: Drill the lateral section		
Bit to GR: 43.06 ft Bit to DNI: 40.03 ft		
Drilled from: 7227 ft MD to 13827 ft MD Logged from: 7184 ft MD to 13784 ft MD		
SlimPulse Software Version: Version 11 SlimPulse GR Calibrated: 14-Nov-2014 SlimPulse UDI Callibrated: 05-Mar-2014		
PathFinder, a Schlumberger Co., Personnel: DD: Charles Mitchell, Brian Walker MWD: Mark Wilson, Eric Sloyer		
Reason for POOH: Well TD		

Run02: Toolstring	Imported Run 2: Toolstring	Imported Run 5: Toolstring
<div> <div> <div>Equip name</div> <div>NMDC: 6 3/4":DR8 626</div> </div> <div> <div>Length</div> <div>121.72</div> </div> <div> <div>MP name</div> <div></div> </div> <div> <div>Offset</div> <div></div> </div>  <div> <div>Motor:675084</div> <div>92.00</div> <div>675 PF Motor 7/8_5.0_288 rpg</div> </div> </div>		

UBHO: 6 3/4":675U 17.28
231

PDORBIT_675:EXP 14.47
09
PD675CC
PDCU
Impeller Set
PDORB675BU:EXP09

Azimuth 13.13
D&I 10.93
Anchor Bolt 7.73

Bit: 8 1/2":JJ5522 1.03
SDI516
TOOL_ZERO

Lengths are in ft
Maximum Outer Diameter = 8.500 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Imported Run 6: Remarks

Imported Run 6: Toolstring

--	--

Merge Composite

Software Version	
Acquisition System	Version
Maxwell	5.2.42572.3100
Application Patch	Maxwell_NPD-DMM-MW2014-SP2_5.2.43132

Composite Summary							
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Include Parallel Data
Imported Run 5	LasFileLap	Down	1800.00 ft	6451.50 ft			No
Imported Run 6	LasFileLap	Down	1800.00 ft	6451.50 ft			No
Imported Run 2	LasFileLap	Down	700.00 ft	7227.50 ft			No
Run02	Drilling	Down	7159.50 ft	13827.50 ft	03-Jun-2015 10:55:54 PM	06-Jun-2015 8:22:53 AM	No

All depths are referenced to toolstring zero

Log	Company:Noble Energy Inc. Well:Wells Ranch AA11-637 Merge Composite:S223
-----	--

Description: Format: Log (GR and Res - MD) Index Scale: 1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 08-Jun-2015 10:38:13

GR_SPULSE_BHC.2 - Gamma Ray SPULSE-GEN RM

GR.2 - Gamma Ray RT

P34H.2 - Phase Shift Resistivity 34 inch Spacing at 2 MHz, Environmentally Corrected.

Resistivity Time After Bit (TAB_RES)

0h5

Rate of penetration averaged over the last 5 ft (1.5 m) (ROP5)

1500ft/h0

Instance - 1 (6" RT) (ROP5)

Instance - 2 (6" RT) (ROP5)

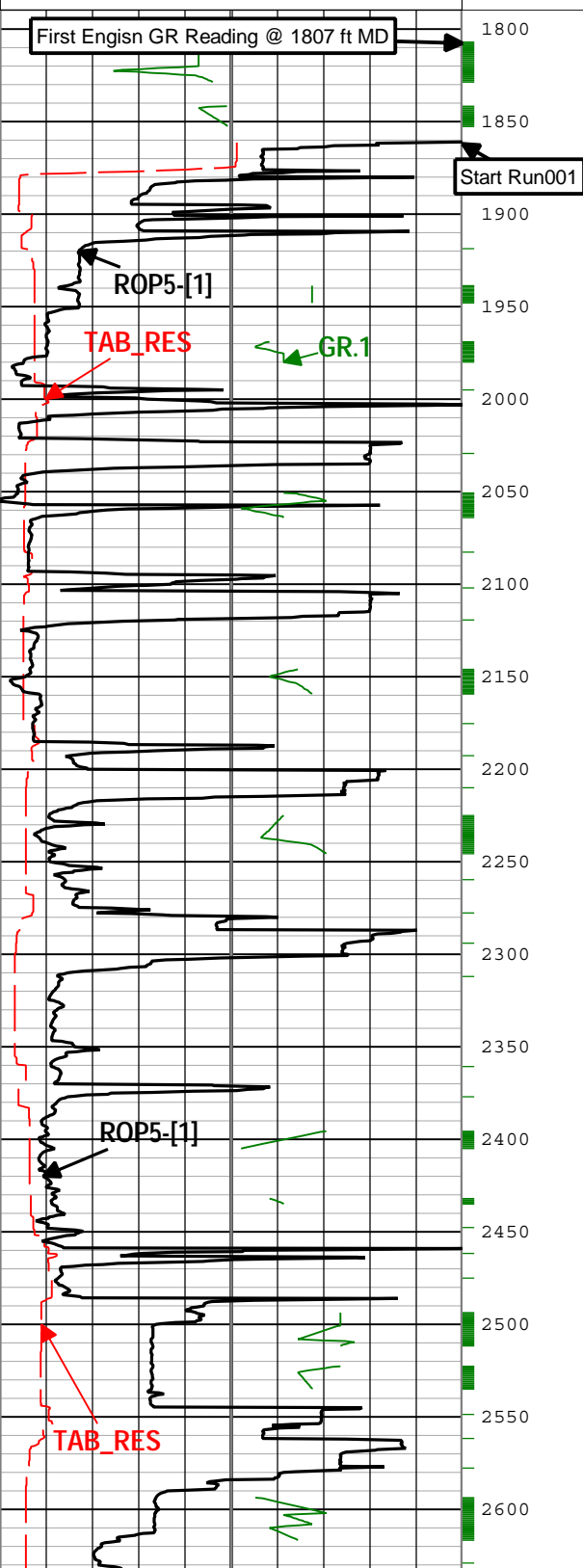
Shock Risk (SHKRSK_RT) SPULSE-GEN RT

003

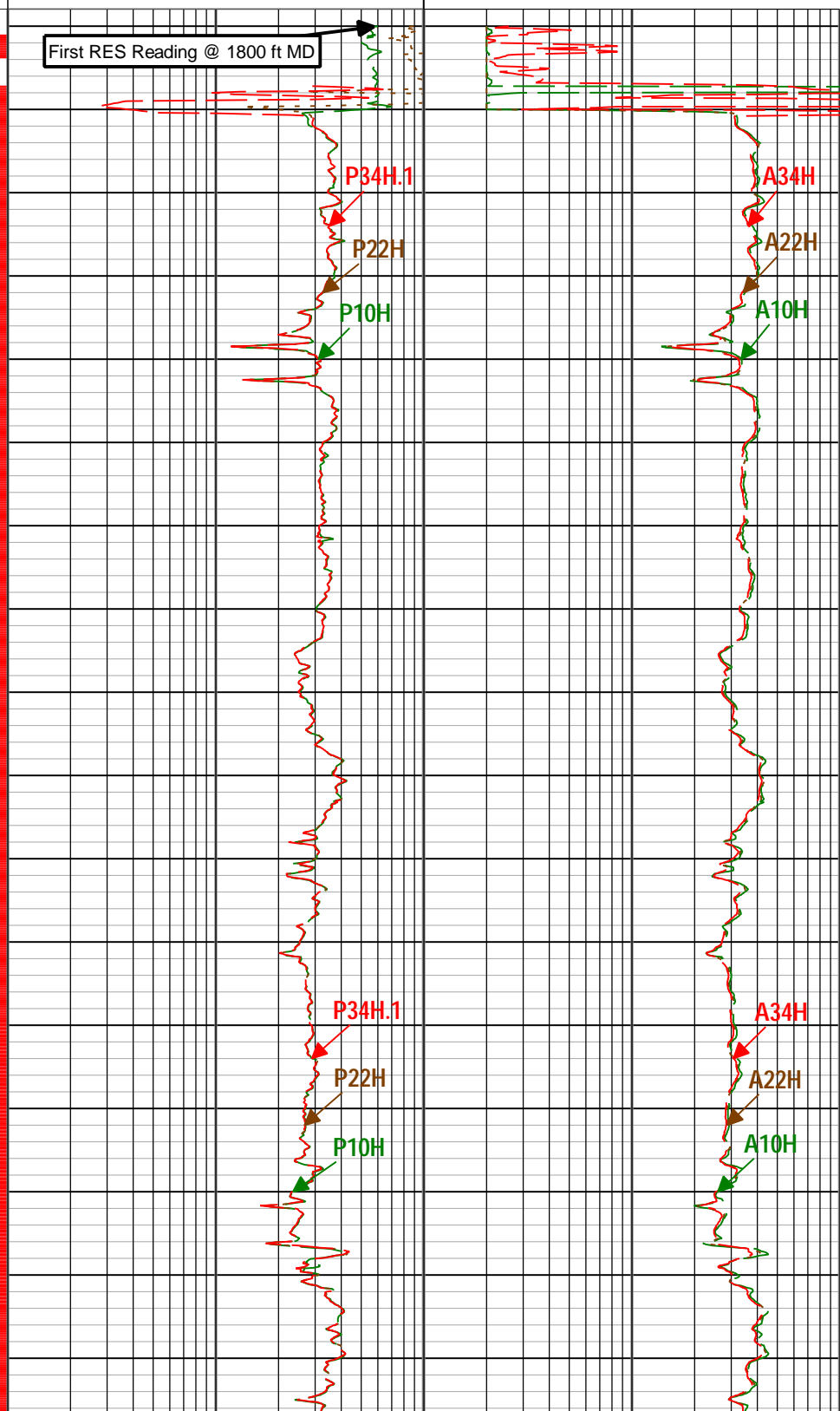
Gamma Ray (GR_SPULSE_BHC).3 SPULSE-GEN RM

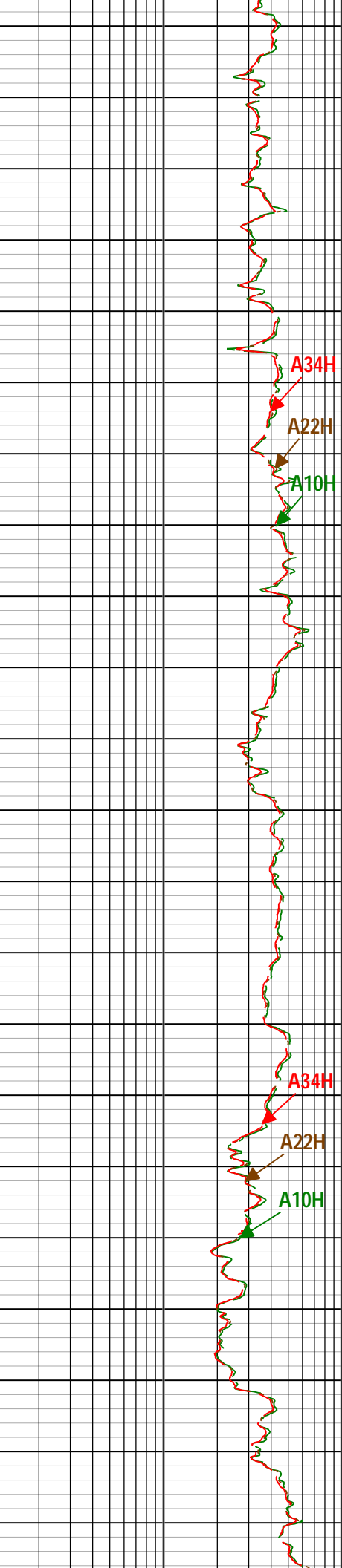
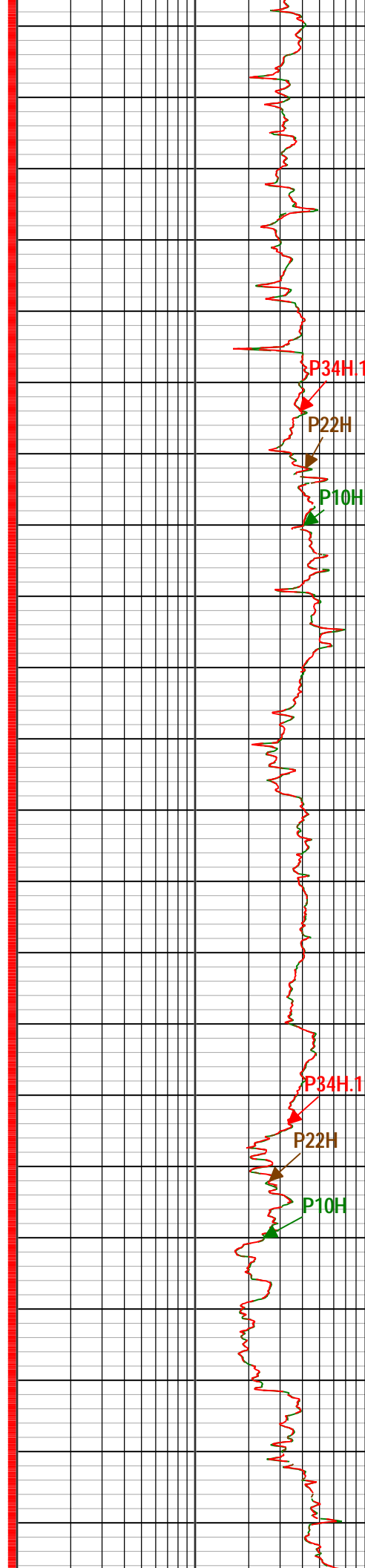
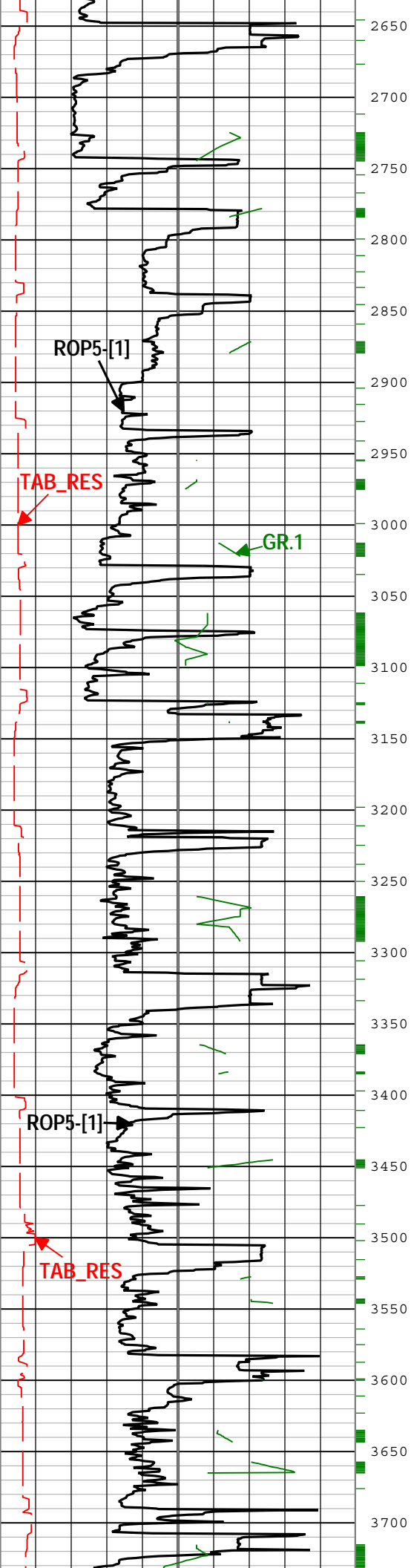
0gAPI150

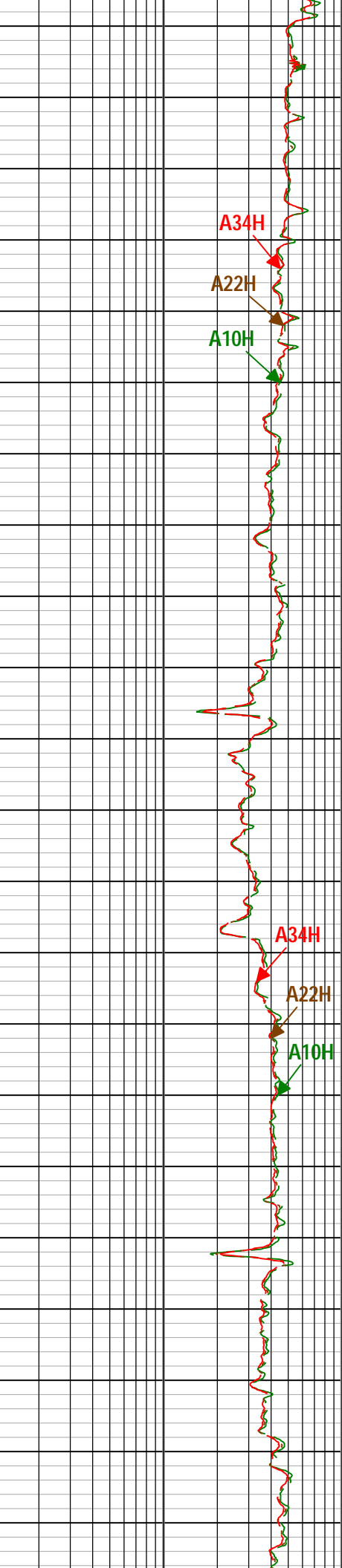
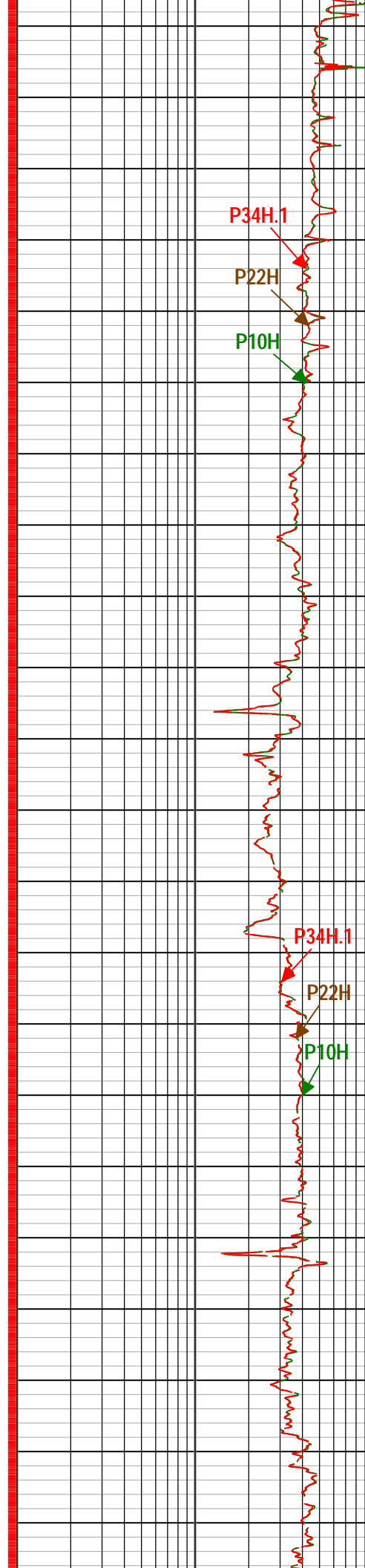
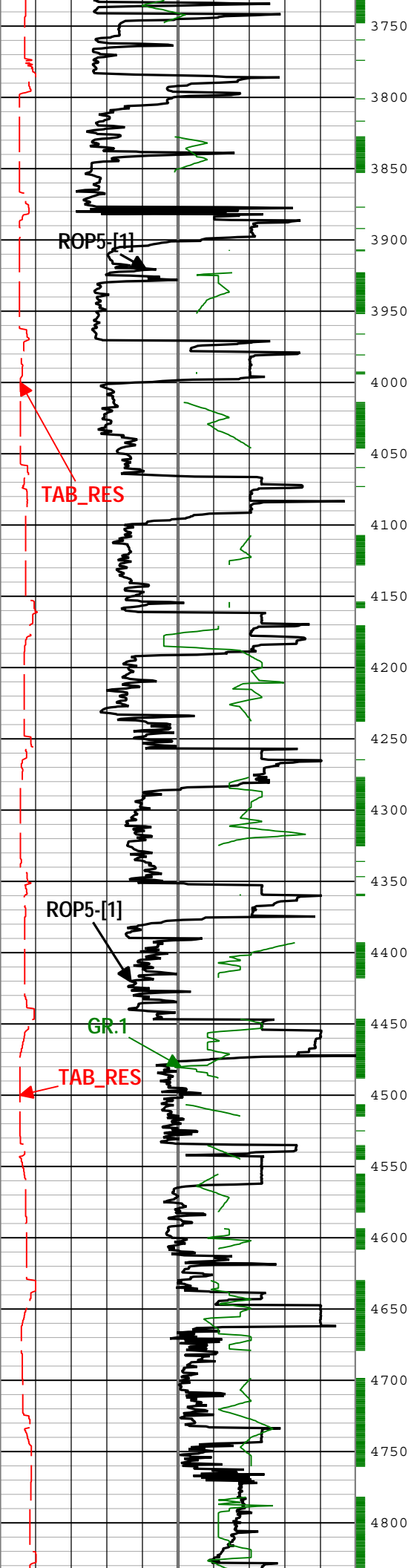
Gamma Ray (GR_SPULSE_BHC).3 SPULSE-GEN RM		
150	gAPI	300
Gamma Ray (GR).1 RT		
0	gAPI	150
Gamma Ray (GR).1 RT		
150	gAPI	300
Tool Temperature (DHTEMP) SPULSE-GEN RM		
150	degF	250

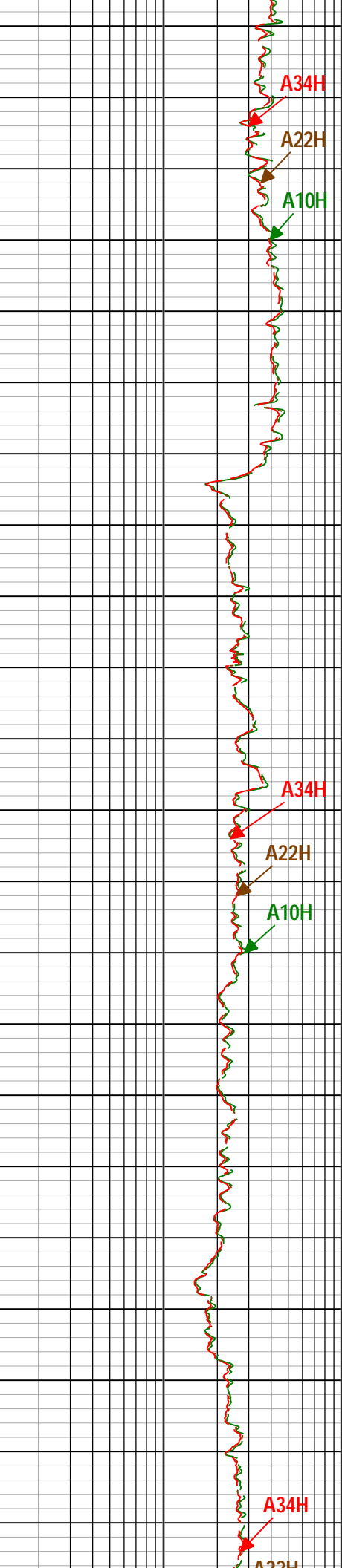
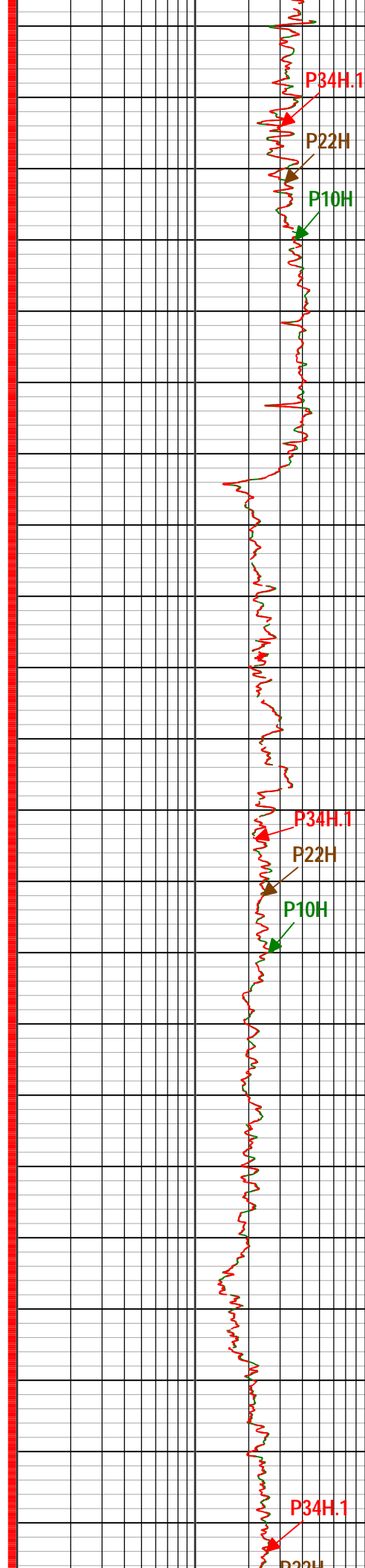
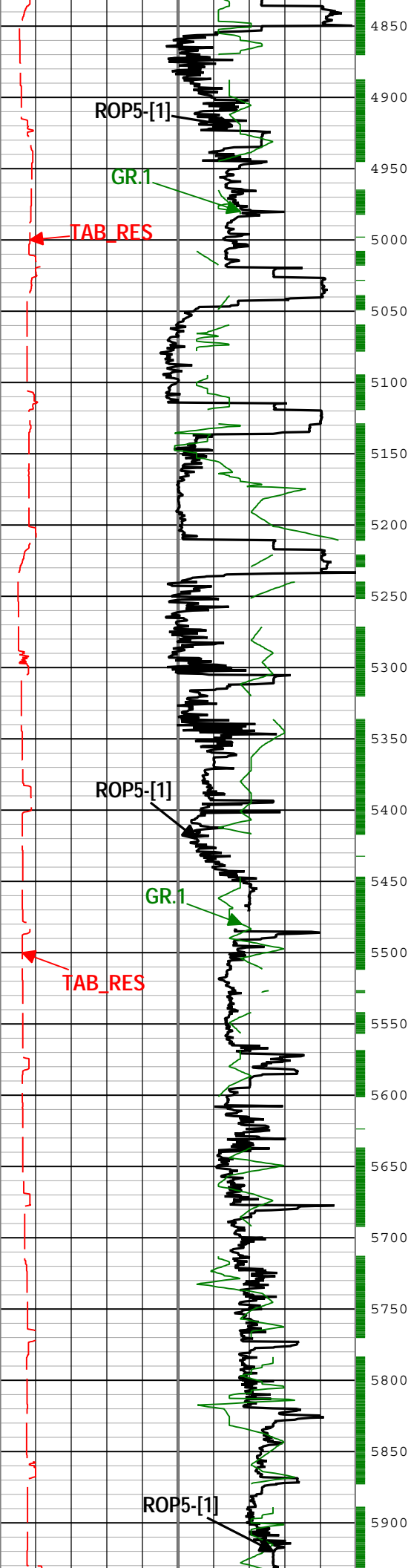


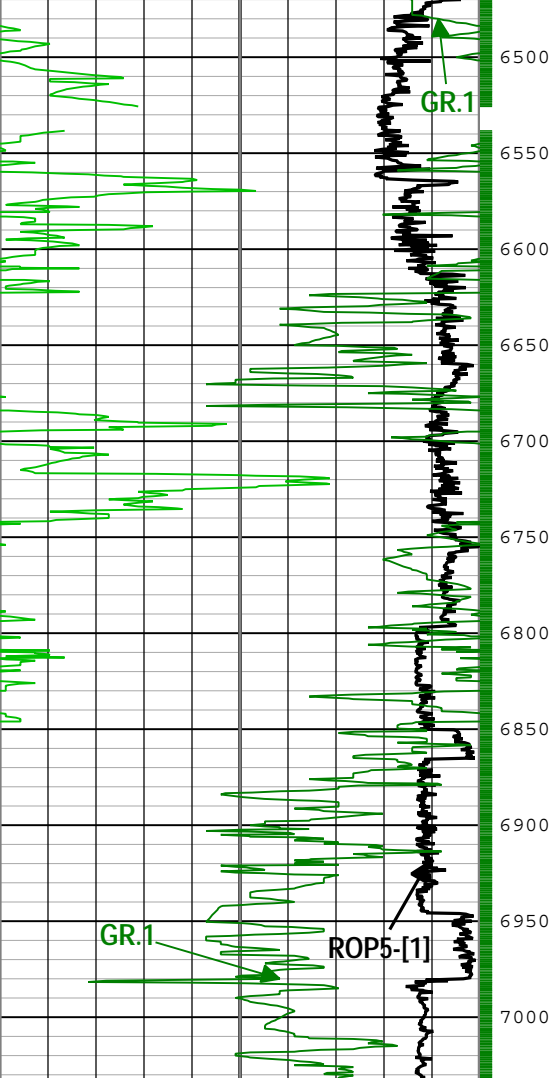
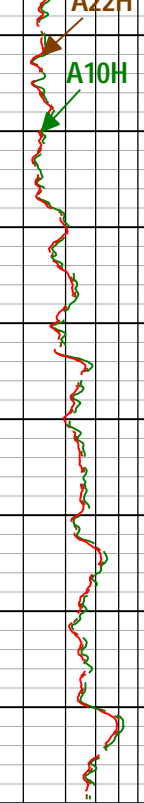
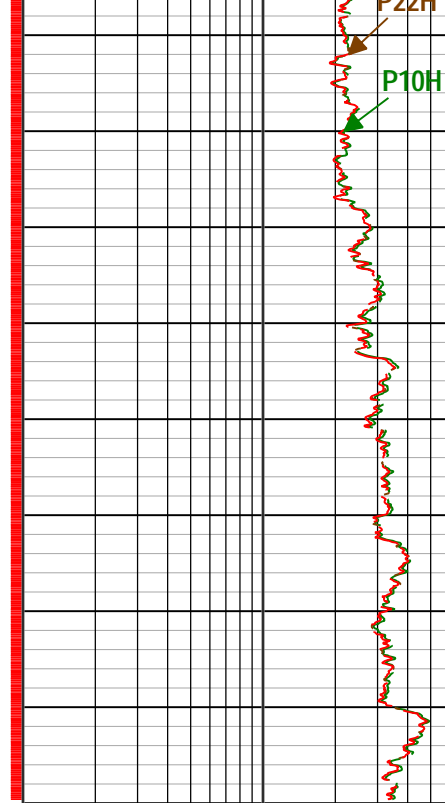
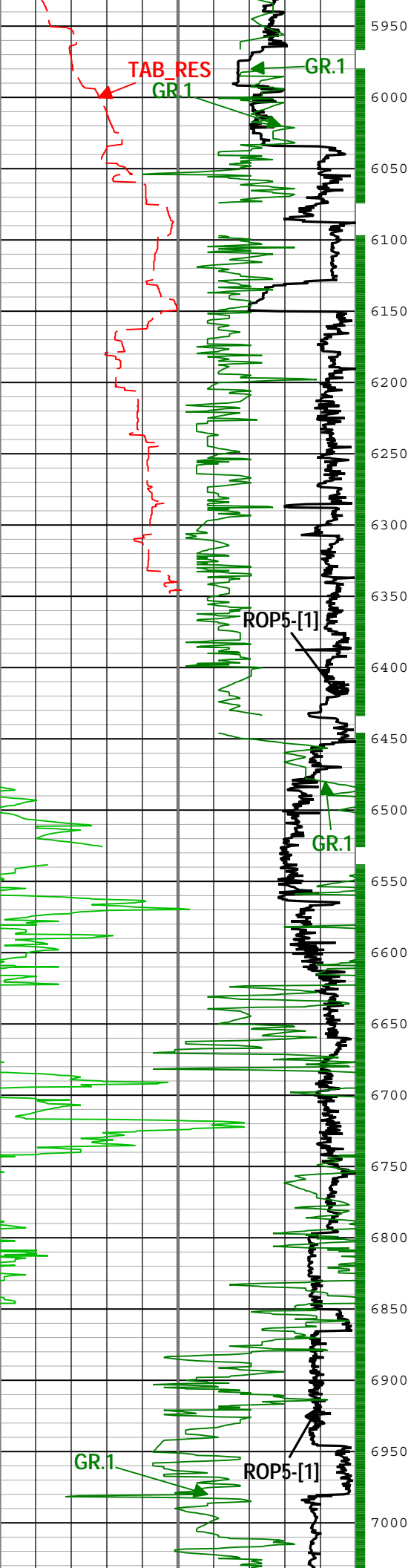
Phase Shift Resistivity 10 inch Spacing at 2 MHz, Environmentally Corrected. (P10H)		
0.1	ohm.m	10
Phase Shift Resistivity 22 inch Spacing at 2 MHz, Environmentally Corrected. (P22H)		
0.1	ohm.m	10
Phase Shift Resistivity 34 inch Spacing at 2 MHz, Environmentally Corrected. (P34H).1		
0.1	ohm.m	10
Attenuation Resistivity 10 inch Spacing at 2 MHz, Environmentally Corrected (A10H)		
0.1	ohm.m	10
Attenuation Resistivity 22 inch Spacing at 2 MHz, Environmentally Corrected (A22H)		
0.1	ohm.m	10
Attenuation Resistivity 34 inch Spacing at 2 MHz, Environmentally Corrected (A34H)		
0.1	ohm.m	10

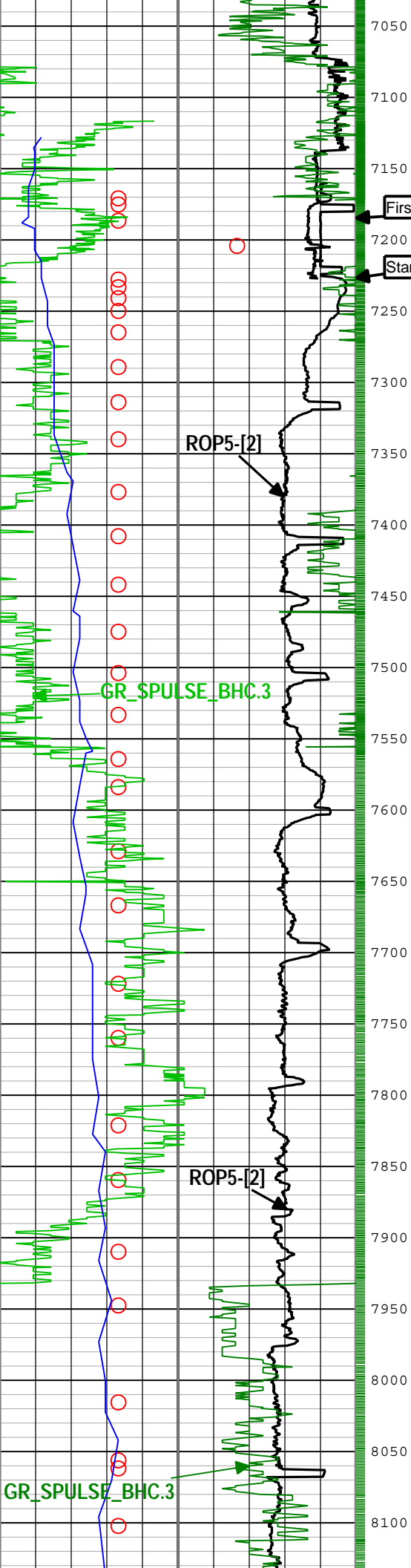












7050
7100
7150
7200
7250
7300
7350
7400
7450
7500
7550
7600
7650
7700
7750
7800
7850
7900
7950
8000
8050
8100

First PathFinder GR Reading @ 7184 ft MD

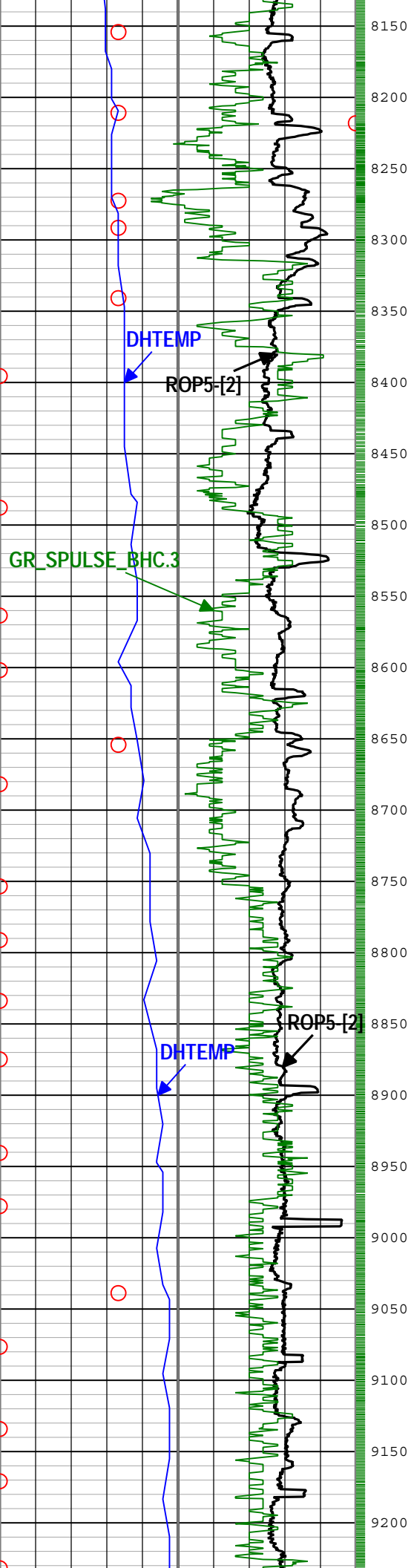
Start Run003

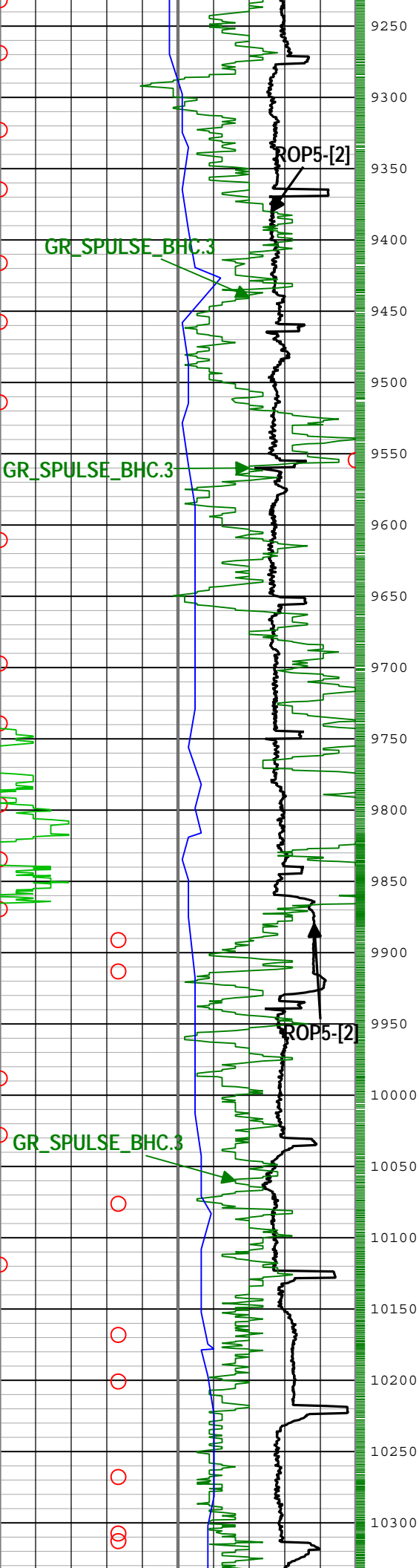
ROP5-[2]

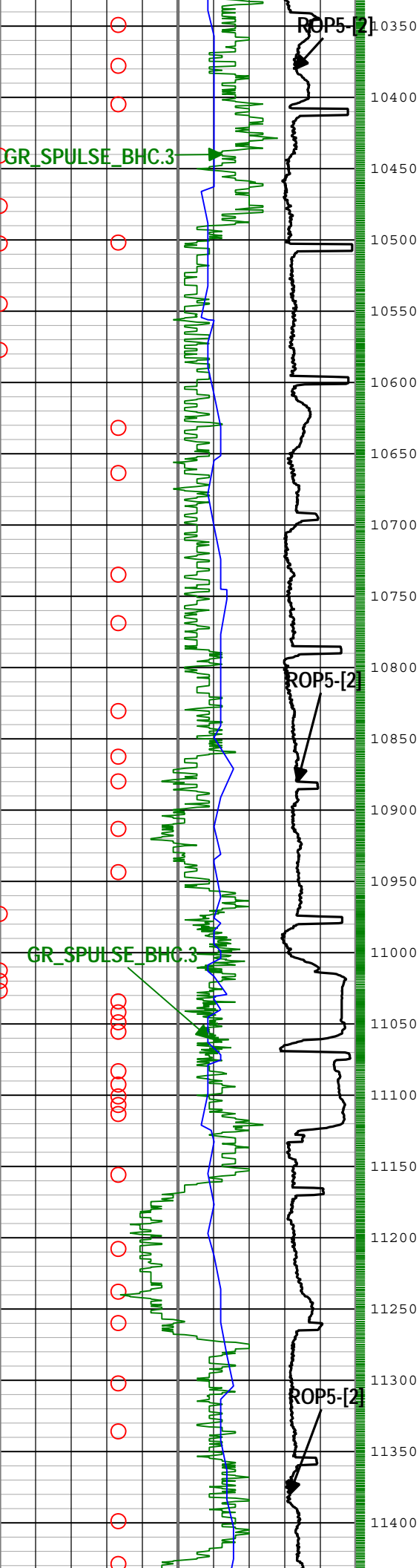
GR_PULSE_BHC.3

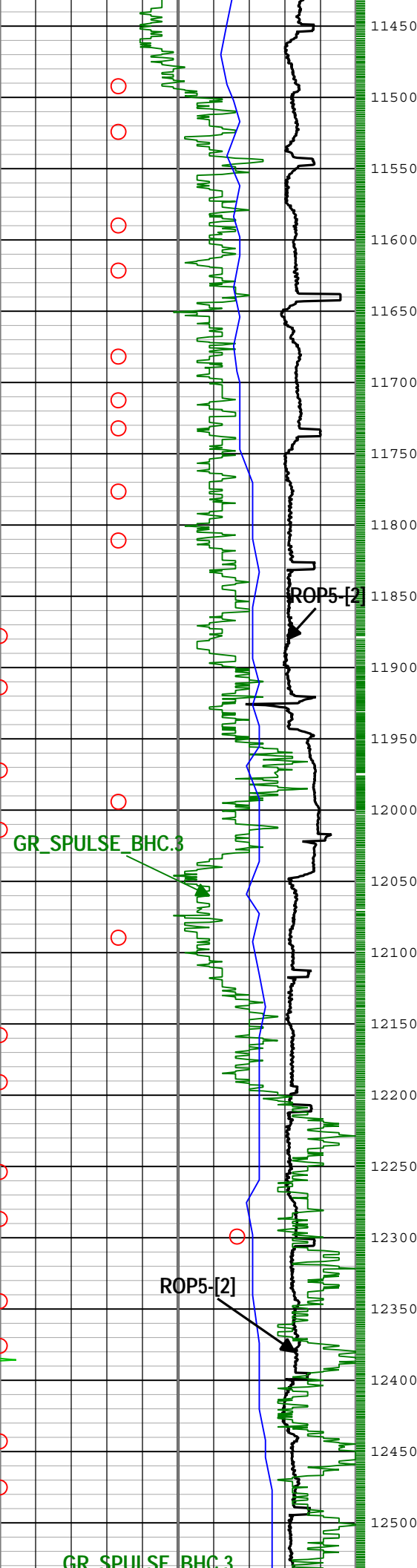
ROP5-[2]

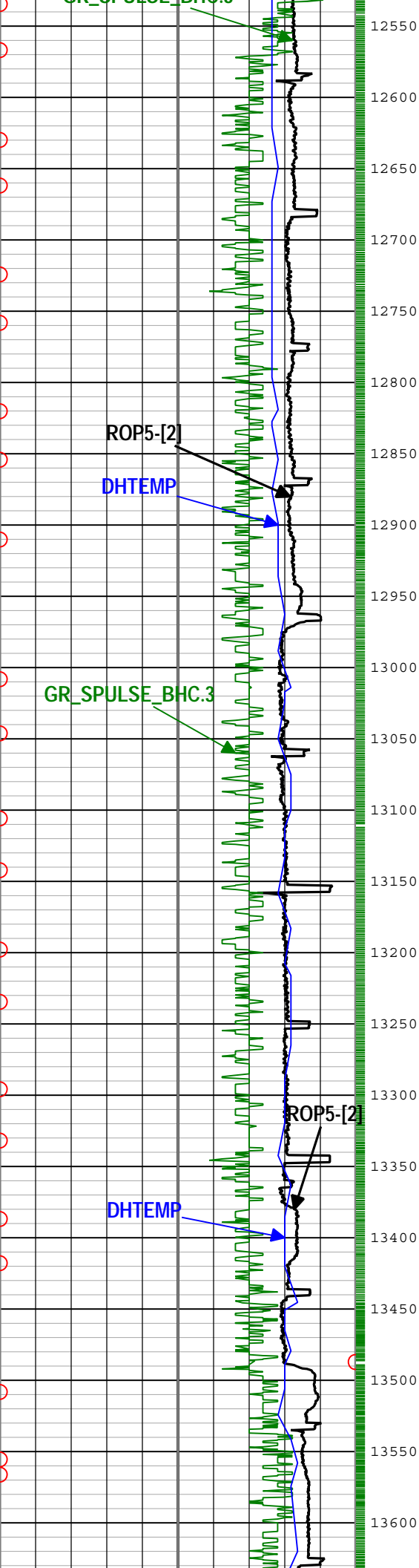
GR_PULSE_BHC.3

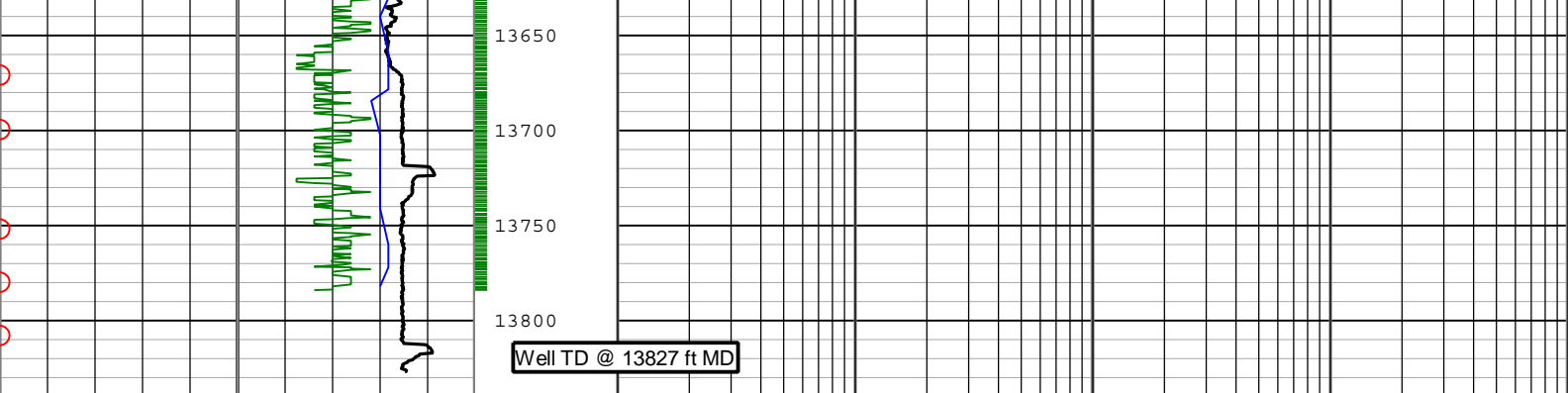












Resistivity Time After Bit (TAB_RES)		
0	h	5
Rate of penetration averaged over the last 5 ft (1.5 m) (ROP5)		
1500	ft/h	0
Instance - 1 (6" RT) (ROP5)		
Instance - 2 (6" RT) (ROP5)		
Shock Risk (SHKRSK_RT) SPULSE-GEN RT		
0		3
Gamma Ray (GR_SPULSE_BHC).3 SPULSE-GEN RM		
0	gAPI	150
Gamma Ray (GR_SPULSE_BHC).3 SPULSE-GEN RM		
150	gAPI	300
Gamma Ray (GR).1 RT		
0	gAPI	150
Gamma Ray (GR).1 RT		
150	gAPI	300
Tool Temperature (DHTEMP) SPULSE-GEN RM		
150	degF	250

Phase Shift Resistivity 10 inch Spacing at 2 MHz, Environmentally Corrected. (P10H)		
0.1	ohm.m	10
Phase Shift Resistivity 22 inch Spacing at 2 MHz, Environmentally Corrected. (P22H)		
0.1	ohm.m	10
Phase Shift Resistivity 34 inch Spacing at 2 MHz, Environmentally Corrected. (P34H).1		
0.1	ohm.m	10
Attenuation Resistivity 10 inch Spacing at 2 MHz, Environmentally Corrected (A10H)		
0.1	ohm.m	10
Attenuation Resistivity 22 inch Spacing at 2 MHz, Environmentally Corrected (A22H)		
0.1	ohm.m	10
Attenuation Resistivity 34 inch Spacing at 2 MHz, Environmentally Corrected (A34H)		
0.1	ohm.m	10

—P34H.2 - Phase Shift Resistivity 34 inch Spacing at 2 MHz, Environmentally Corrected.

—GR.2 - Gamma Ray RT

—GR_SPULSE_BHC.2 - Gamma Ray SPULSE-GEN RM

Description: Format: Log (GR and Res - MD) Index Scale: 1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 08-Jun-2015 10:38:13

Channel Processing Parameters

Run02: Parameters

Parameter	Description	Tool	Value	Unit
BS	Bit Size	DNMSESSION	Depth Zoned	in
DFD	Drilling Fluid Density	Borehole	10	lbm/gal
GR_SRC	GR Source Selection	SPULSE-GEN	GAMMA_EXT	

Run02Depth Zoned Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	8.75	7037.78	7227

BS	8.5	7227	13827.5				
All depth are actual.							
Tool Control Parameters							
Calibration Report							
SPULSE-GEN (SlimPulse with Generic Collar) Calibration - Run Run02							
Primary Equipment :							
Elec. cartridge, 150C max with GR		SPEC	HH750				
GRGain - Gamma Ray: Blanket							
Master (Time Frame File): 12:00:00 28-May-2015							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div></div>
Gamma Ray Calibration Gain		Master	1.0000	0.9000	1.0208	1.1000	<div></div>

Company: Noble Energy Inc.

Well: Wells Ranch AA11-637

Field: Wattenburg

County: Weld

State: Colorado

Country: USA



SlimPulse & AWR - GR & RES

1 in./ 100 ft, Measured Depth

Recorded Mode, Composite Log