

Company: St. Croix Operating, Inc.

Well: Pronghorn #1

Field: Wildcat

County: Washington State: Colorado

Platform Express
Array Induction with 5" Linear
with Linear Correlation

County: Washington
Field: Wildcat
Location: SE SE
Well: Pronghorn #1
Company: St. Croix Operating, Inc.

Location:	SE SE	Elev.:	K.B.	4666.60 ft
	900' FSL, 600FEL		G.L.	4648.00 ft
	LAT: 39.787700 , LONG: -103.084680			
	D.F.			4666.60 ft
Permanent Datum:		Ground Level	Elev.:	4648.00 f
Log Measured From:		Kelly Bushing	18.60 ft	above Perm.Datum
Drilling Measured From:		Kelly Bushing		
API Serial No.	Section:	Township:	Range:	
05-121-11082	4	T2S	R51W	

Logging Date	02-Jan-2019			
Run Number	ONE			
Depth Driller	4200.00 ft			
Schlumberger Depth	4200.00 ft			
Bottom Log Interval	4198.00 ft			
Top Log Interval	0.00 ft			
Casing Driller Size @ Depth	8.625 in @ 503.00 ft			
Casing Schlumberger	502 ft			
Bit Size	7.875 in			
Type Fluid In Hole	GEL POLYMER			
Density	Viscosity	35 s		
Fluid Loss	PH	9.5		
Source of Sample	Active Tank			
RM @ Meas Temp	0.2 ohm.m @ 68 degF			
RMF @ Meas Temp	0.15 ohm.m @ 68 degF			
RMC @ Meas Temp				
Source RMF	RMC	Pressed		
RM @ BHT	RMF @ BHT	0.07 @ 212	0.05 @ 212	
Max Recorded Temperatures				
Circulation Stopped		Time	23:00:05	
Logger on Bottom		Time	04-Jan-2019 16:00:00	
Unit Number	Location:	9102	Fort Morgan	
Recorded By	Ali AlRamadhan / Evan Grzecki			
Witnessed By	Tom Thomas			

Disclaimer

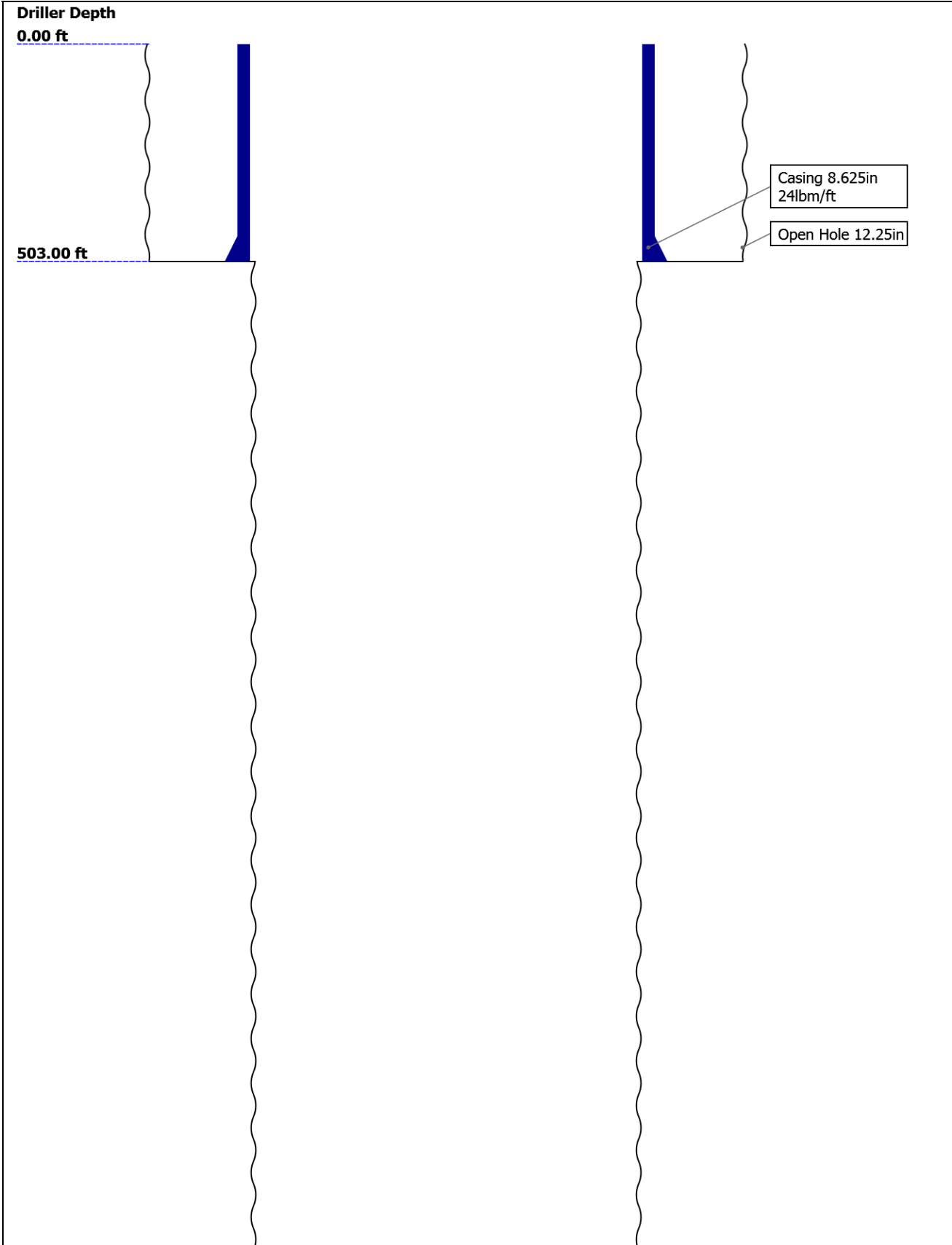
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Well Sketch



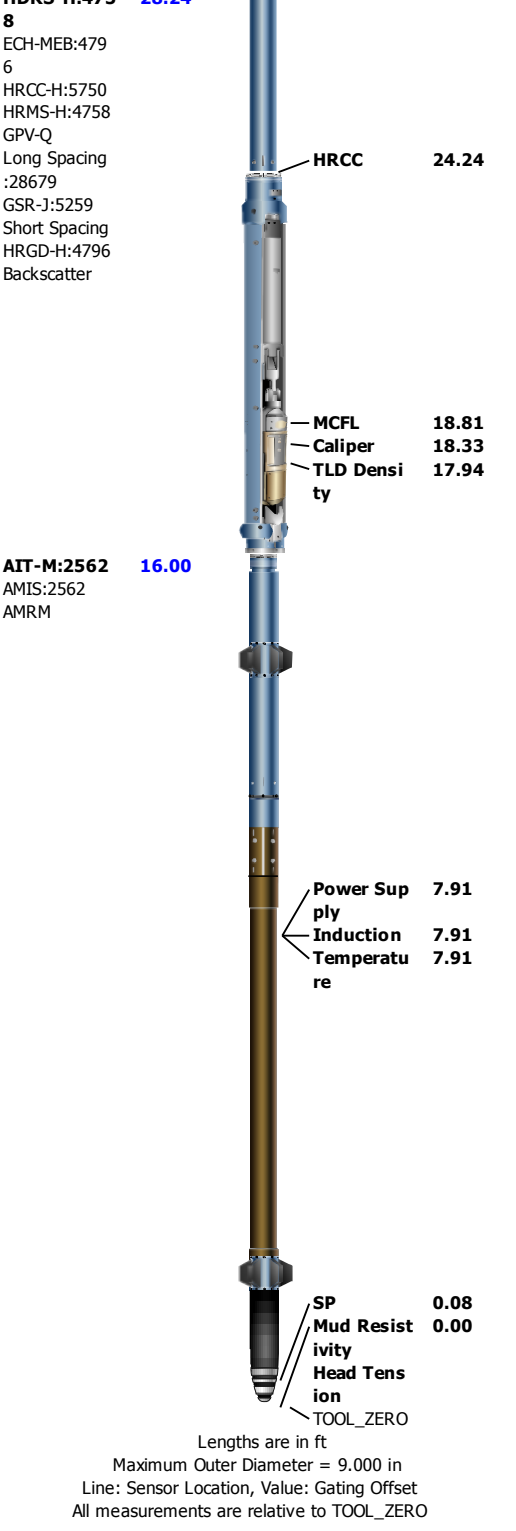


Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	12.25	7.875				
Top Driller (ft)	0	503				
Top Logger (ft)	0	503				
Bottom Driller (ft)	503	4200				
Bottom Logger (ft)	503	4200				
Casing						
Size (in)	8.625					
Weight (lbm/ft)	24					
Inner Diameter (in)	8.097					
Grade	J55					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	503					
Bottom Logger (ft)	502					

Remarks and Equipment Summary

ONE: Toolstring				ONE: Remarks	
Equip name	Length	MP name	Offset	THANK YOU FOR CHOOSING SCHLUMBERGER!	
LEH-QT:2353	44.14			TOOLSTRING RUN AS PER TOOLSKETCH AND CLIENT LOGGING PROGRAM.	
3				REQUESTED TO RUN THE TOOL SLICK WITH NO BOWSPRING OR STANDOFFS.	
LEH-QT:2353				MATRIX: SANDSTONE: 2.65 FROM TD TO 4000 & LIMESTONE:2.71 2.65 FROM 4000 TO SC.	
DTC-H:9486	40.65	CTEM HV	39.75	TD: 4168 FT.	
ECH-KC:1058			0.00	BHT: 101.7 DEG F.	
5					
DTC-H:9486					
HGNS-H:3730	37.65	TelStatus	37.65		
HGNH:2742		ToolStatus	37.65		
NSR-F:5068		Temperature	37.62		
NPV-N		GR	36.91		
HMCA-H					
HACCZ-H:153					
7					
HGNS-H:3730					
		CNL Porosity	30.57		
		HGNS	28.24		
		HMCA	28.24		
		Accelerometer	0.00		
HDPS-H:475	28.24				



Depth Summary

	ONE		
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Depth Measuring Device

Type	IDW-B		
Serial Number	5822		
Calibration Date	14-aug-2018		
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	-2		
Wheel Correction 2	-2		

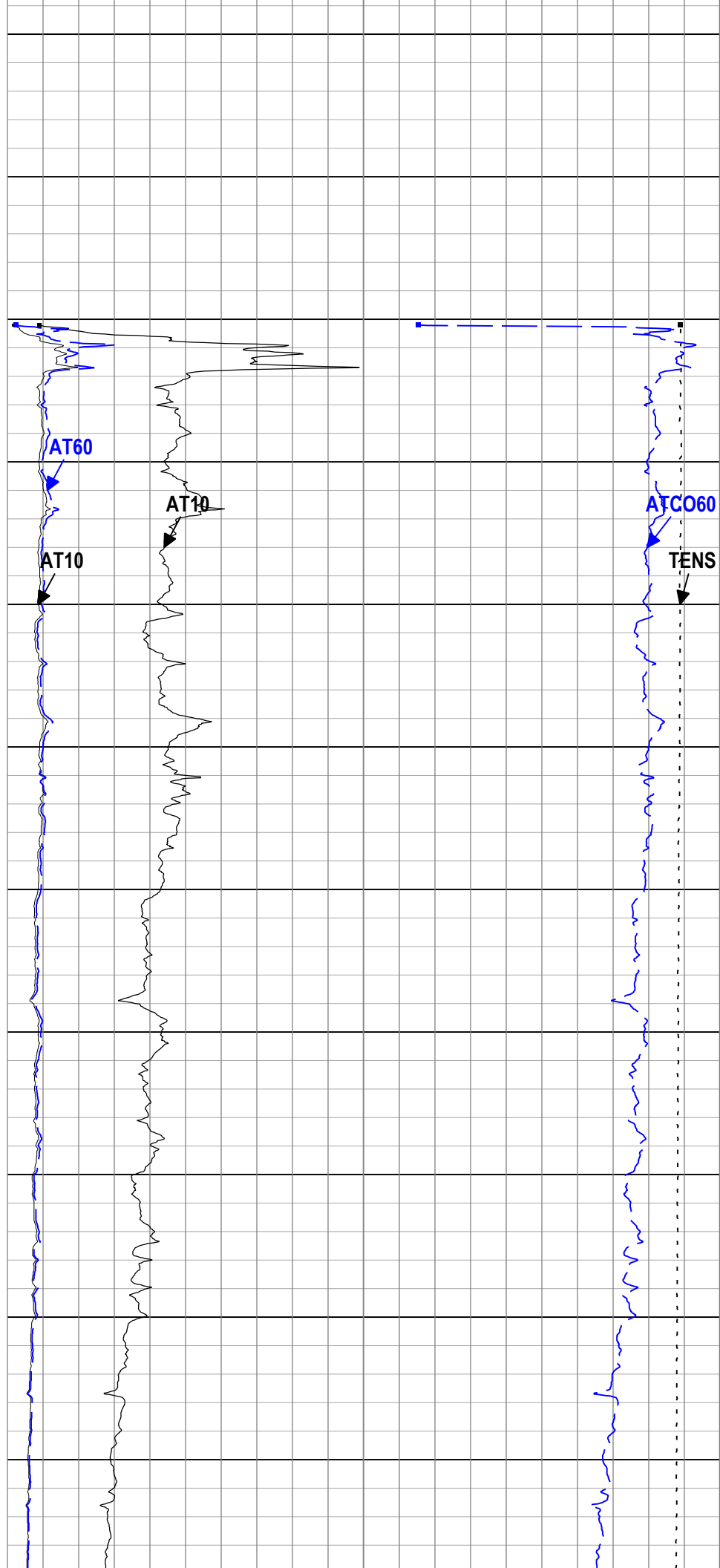
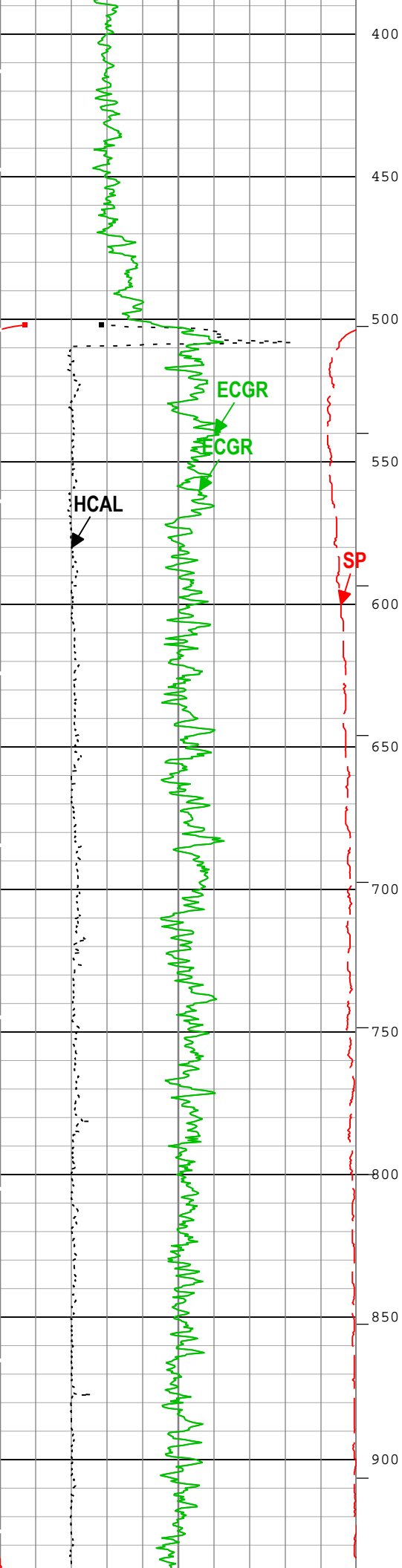
Tension Device

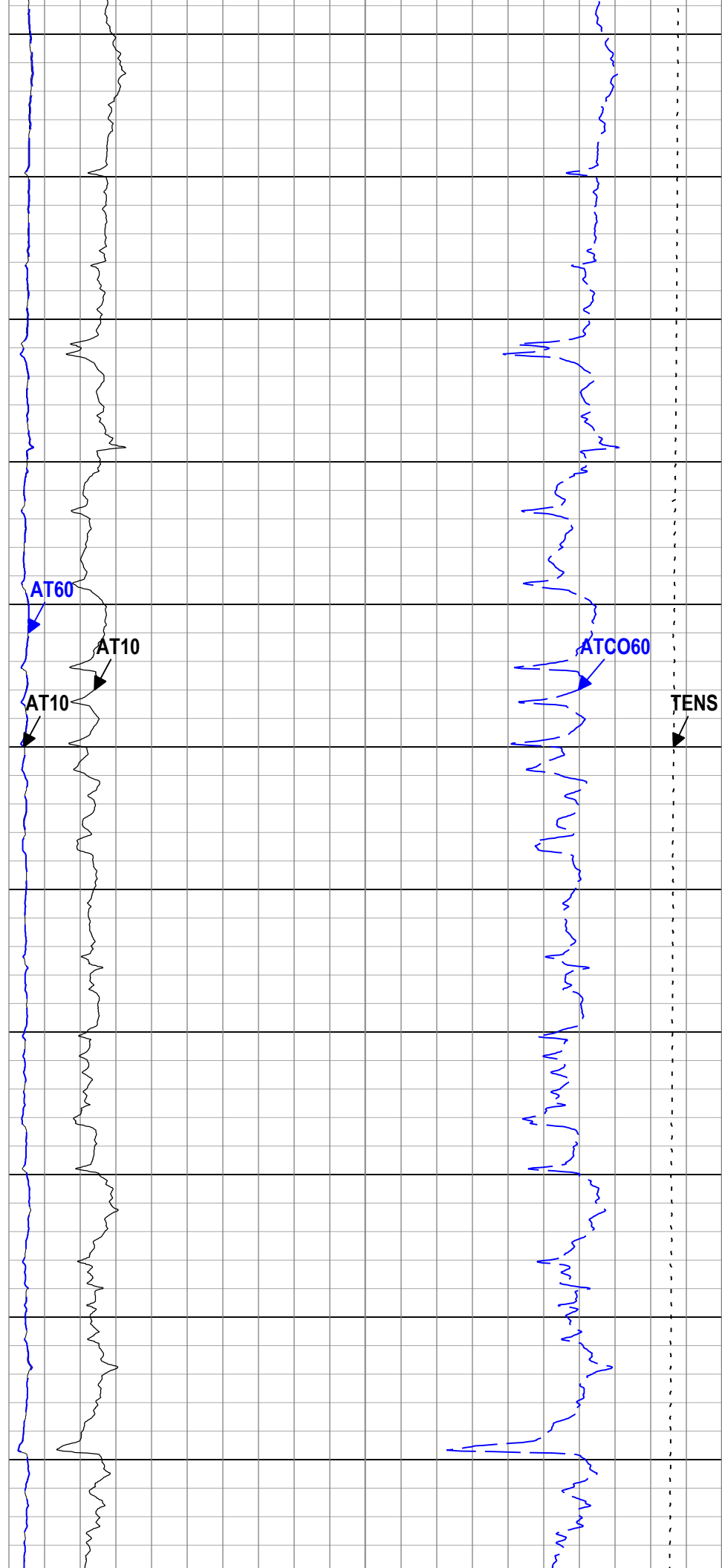
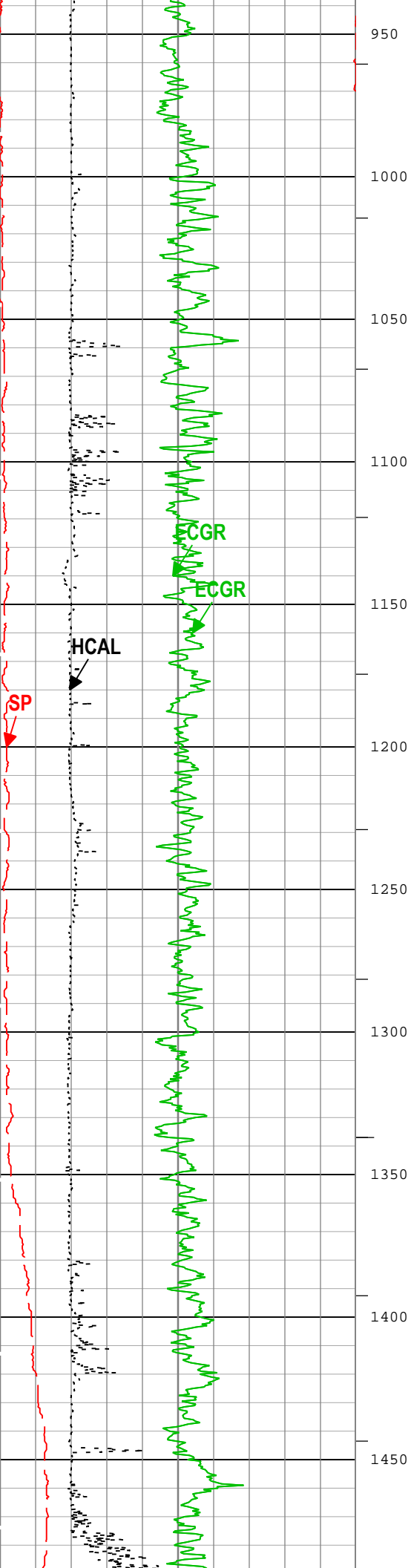
Type	CMTD-B/A		
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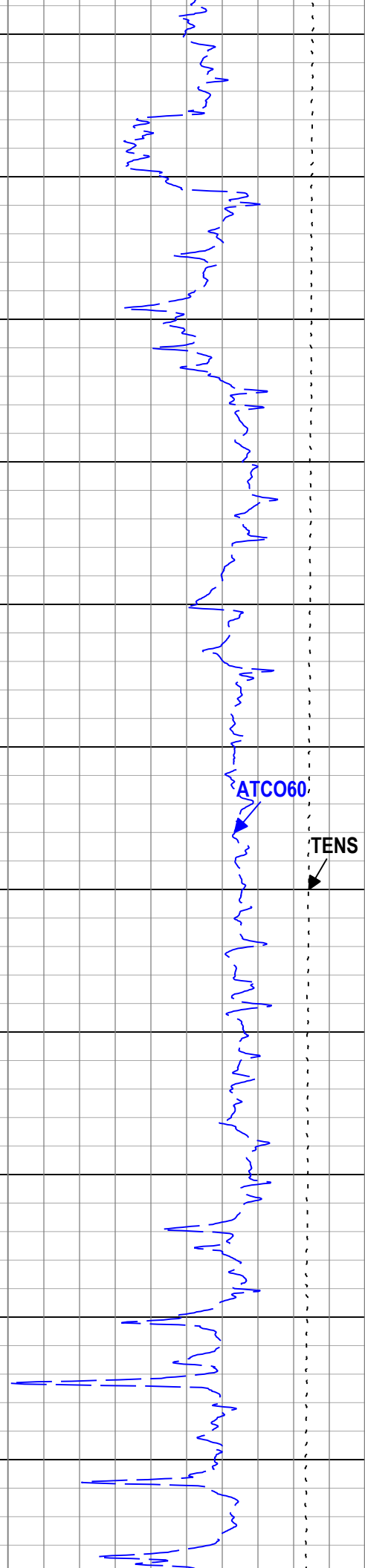
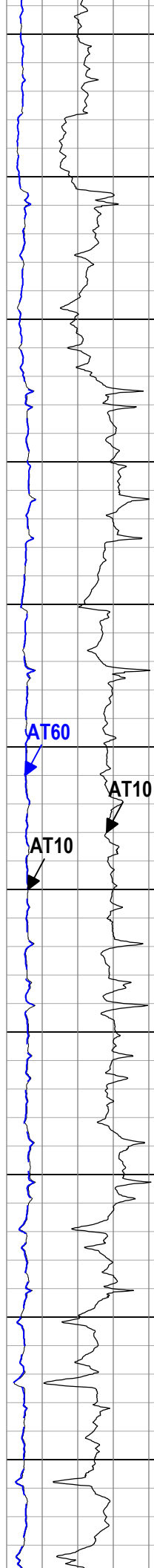
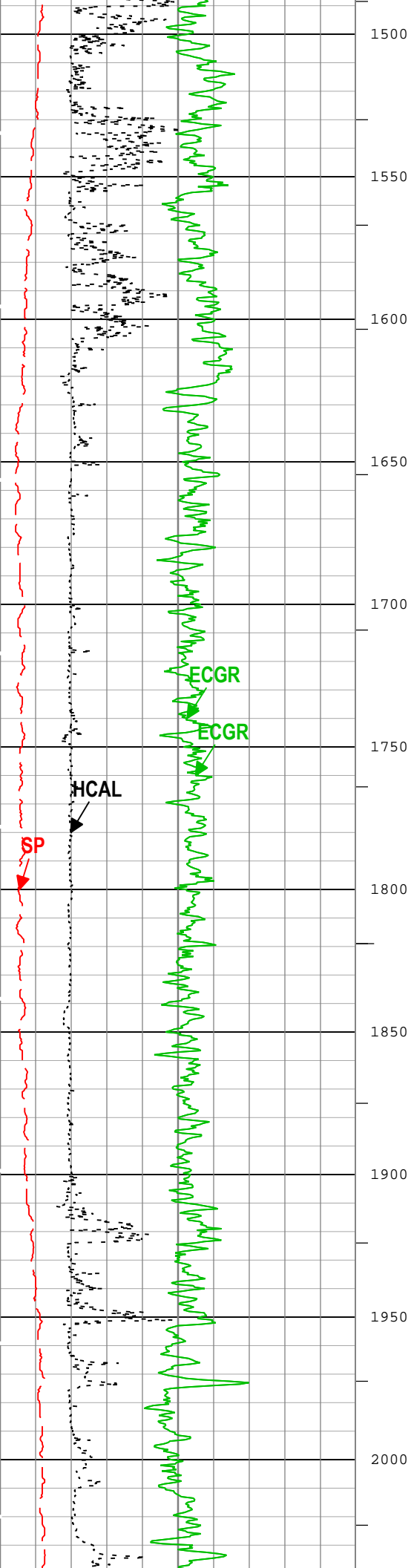
Serial Number									
Calibration Date									
Calibrator Serial Number									
Number of Calibration Points		0							
Logging Cable									
Type	7-46NT-XS								
Serial Number									
Length	24000.00 ft								
Conveyance Type	Wireline								
Rig Type	LAND								
ONE:Depth Control Parameters			Depth Control Remarks						
Log Sequence	First Log In the Well		ALL SCHLUMBERGER DEPTH PROCRDURES FOLLOWED.						
Rig Up Length At Surface			IDW IS USED AS PRIMARY DEPTH CONTROL.						
Rig Up Length At Bottom			Z-CHART USED AS SECONDARY DEPTH CONTROL						
Rig Up Length Correction									
Stretch Correction	1.40 ft								
Tool Zero Check At Surface									
ONE									
2" Induction									
Integration Summary									
Output Channel(s)	Output Description	Input Parameter	Output Value	Unit					
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	760.07	ft3					
Software Version									
Acquisition System			Version						
Maxwell 2018 SP2			8.2.104493.3100						
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[8]:Up	Up	13.12 ft	4210.87 ft	04-Jan-2019 4:32:05 AM	04-Jan-2019 6:03:08 AM	ON	1.44 ft	No
All depths are referenced to toolstring zero									
Log	Company:St. Croix Operating, Inc. Well:Pronghorn #1 ONE: Log[8]:Up:S011								
Description: AIT Basic Log Two Format: Log (EMD 1in Induction) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 04-Jan-2019 06:32:49									
Channel	Source	Sampling							
AT10	AIT-M:AMIS:AMIS	3in							
AT60	AIT-M:AMIS:AMIS	3in							
ATCO60	AIT-M:AMIS:AMIS	3in							
CALI	HDRS-H:HRCC-H:HRCC-H	1in							
GR	HGNS-H:HGNS-H:HGNS-H	6in							
ICV	Borehole	6in - RT							
SP	AIT-M:AMIS:AMIS	6in							
TENS	WLWorkflow	6in							
TIME_1900	WLWorkflow	0.1in							
TIME 1900 - Time Marked every 60.00 (s)									

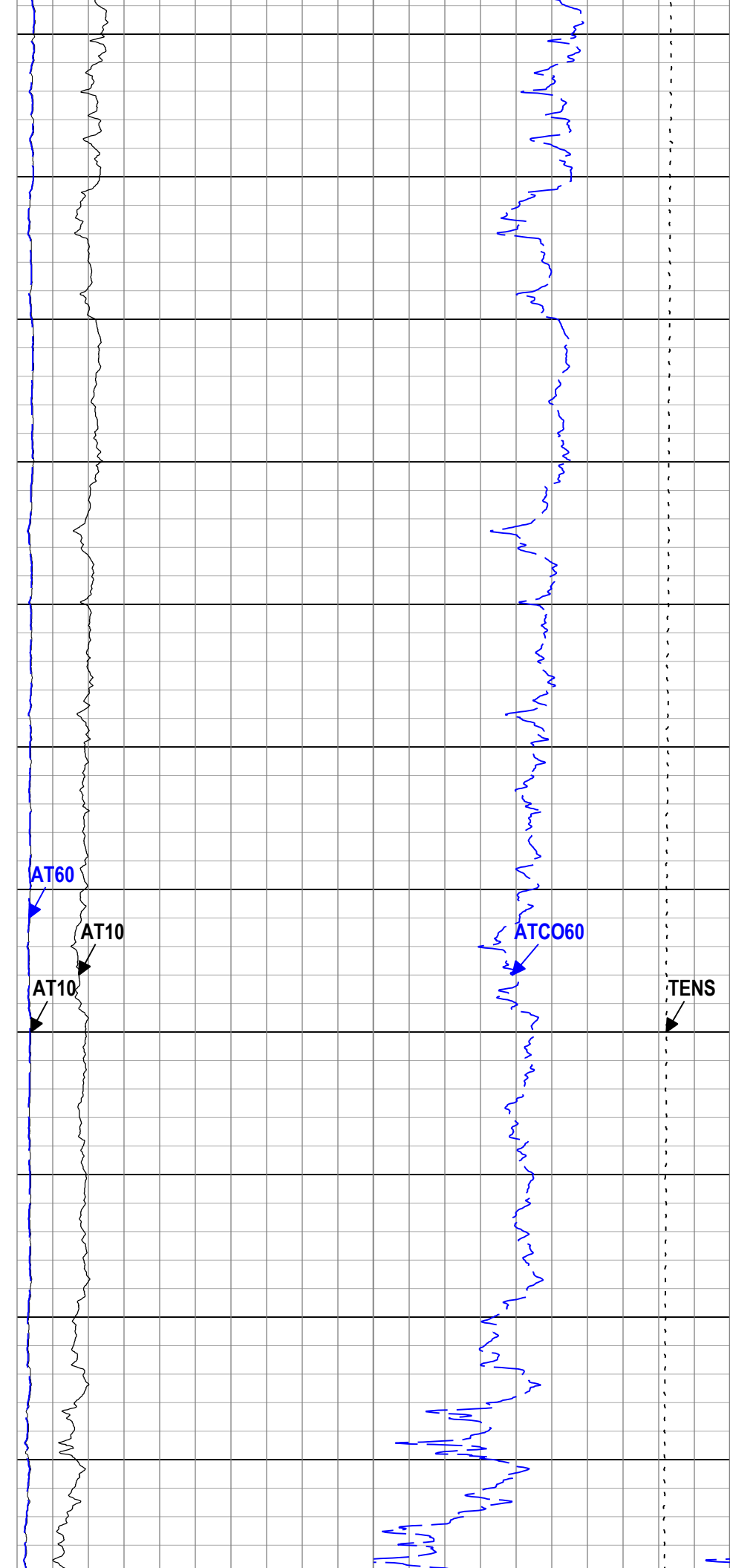
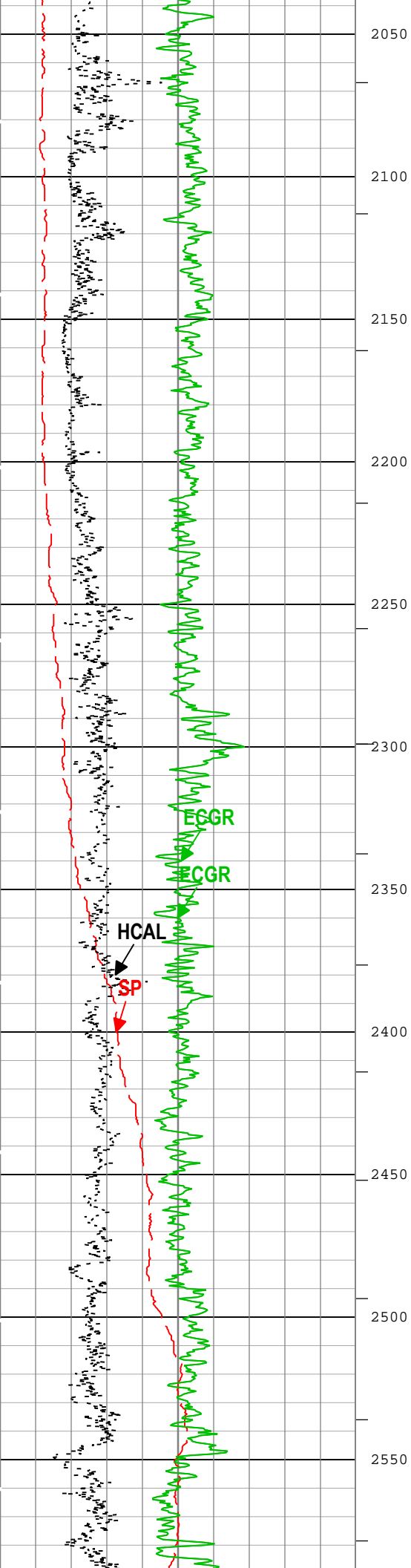
— ICV - Integrated Cement Volume every 100.00 (ft3)

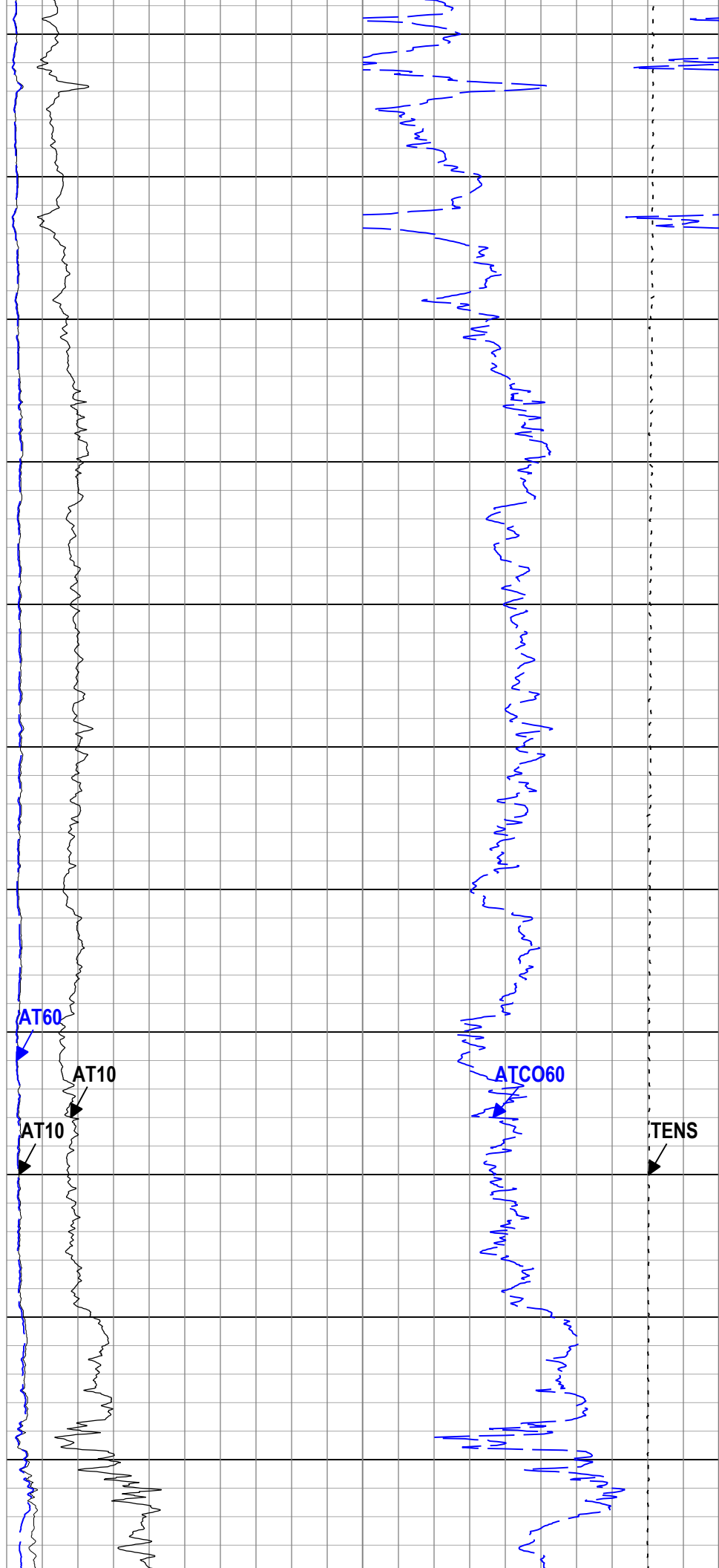
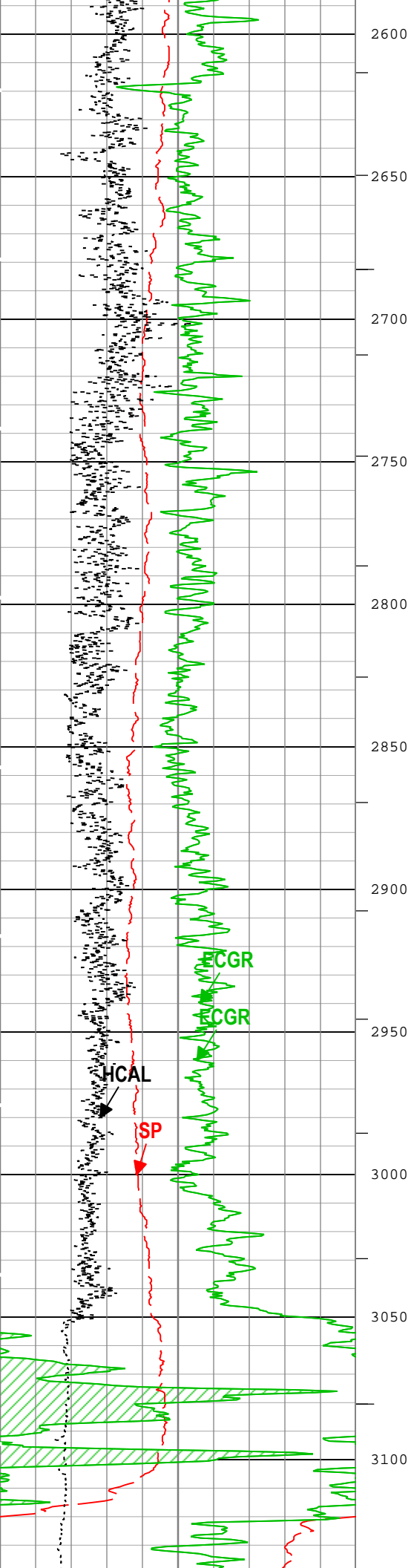
	Cable Tension (TENS)	
10000	lbf	0
	Array Induction Two Foot Conductivity A60 (ATCO60) AIT-M	
1000	mS/m	0

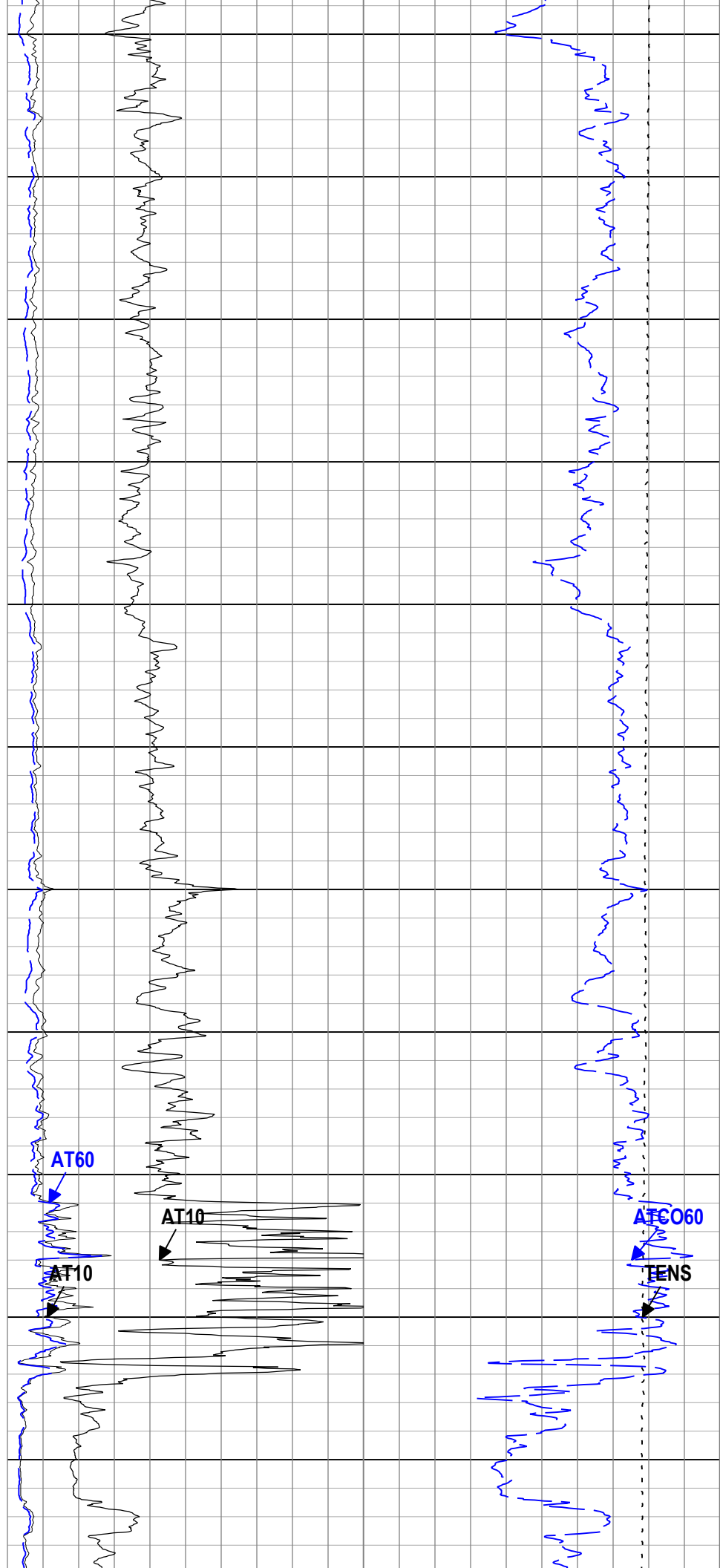
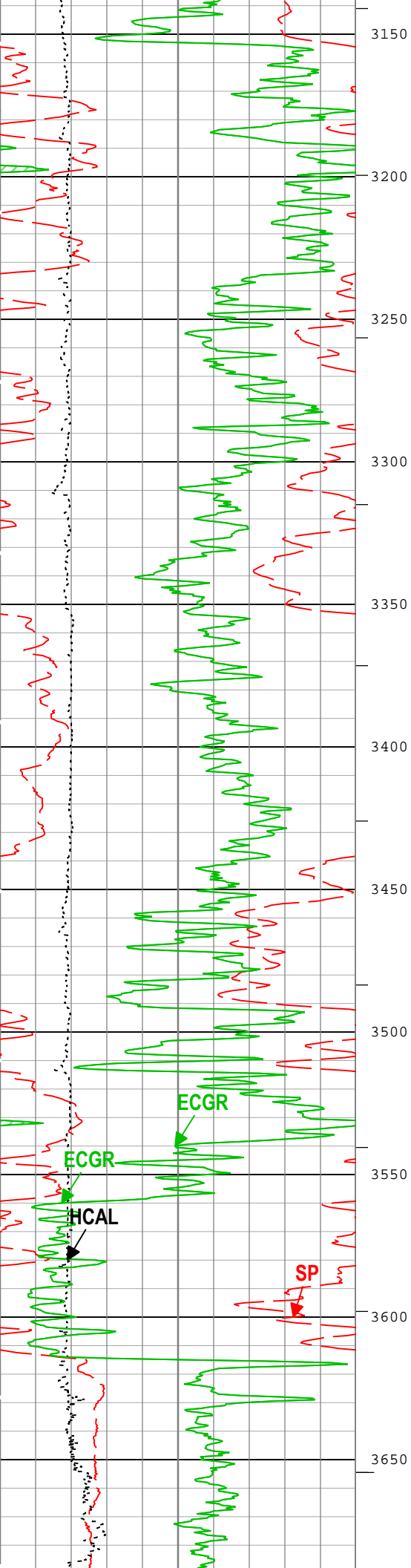


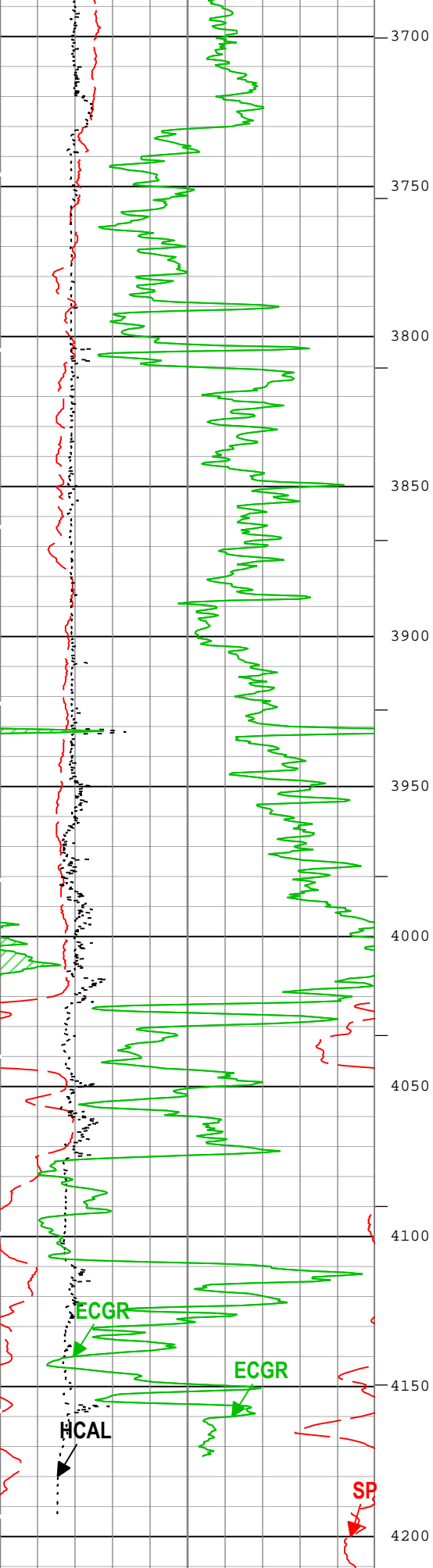






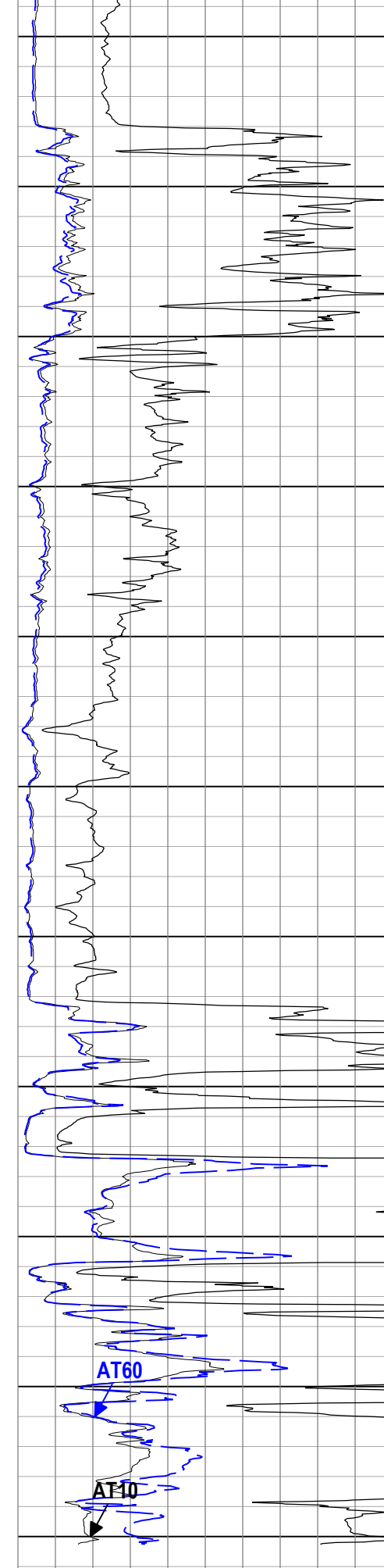






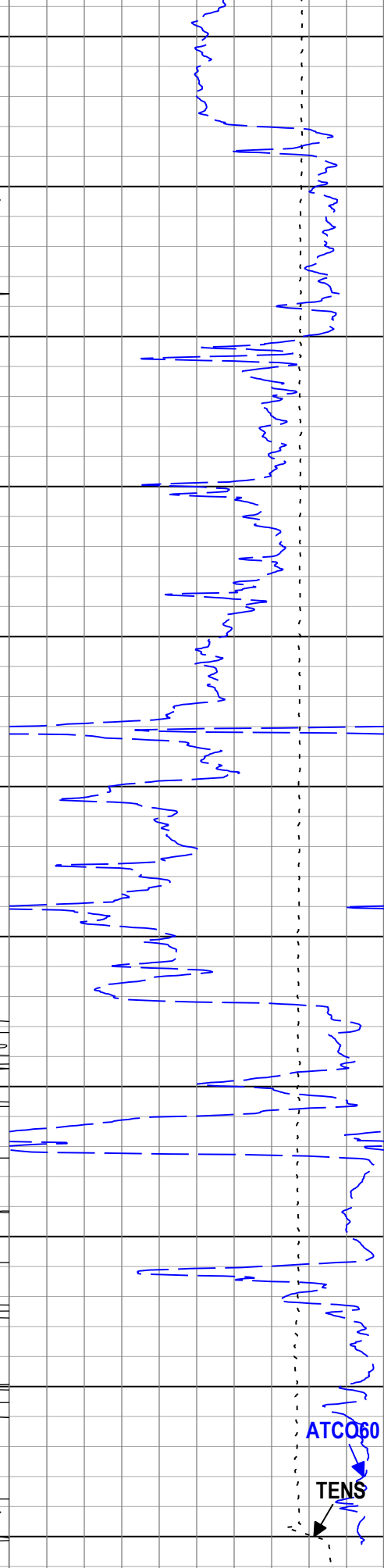
Gamma Ray Backup

Spontaneous Potential (SP) AIT-M



Array Induction Two Foot Resistivity A10 (AT10) AIT-M

ohm m



Cable Tension (TENS)

lbf

-80	mV	20
Caliper (HCAL) HDRS-H		
6	in	16
Gamma Ray (ECGR) HGNS-H		
0	gAPI	200

Array Induction Two Foot Resistivity A10 (AT10) AIT-M		
0	ohm.m	10
Array Induction Two Foot Resistivity A60 (AT60) AIT-M		
0	ohm.m	50

Array Induction Two Foot Conductivity A60 (ATCO60) AIT-M		
1000	mS/m	0

└─ ICV - Integrated Cement Volume every 100.00 (ft3)
└─ ICV - Integrated Cement Volume every 10.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

Description: AIT Basic Log Two Format: Log (EMD 1in Induction) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 04-Jan-2019 06:32:49

Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Mud Resistivity	
ASTA	Array Induction Tool Standoff	AIT-M	0.125	in
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	-0.152	in
CBLO	Casing Bottom (Logger)	WLSESSION	502	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	8.625	in
DFD	Drilling Fluid Density	Borehole	9.2	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
FCD	Future Casing (Outer) Diameter	WLSESSION	5.5	in
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	AMF	
SOCO	Standoff Correction Option	HGNS-H	Yes	
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	12.25	0	503
BS	7.875	503	4200

All depth are actual.

Tool Control Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h

ONE

5" Induction

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
ICV	Integrated Cement Volume	GCSE_UP_PASS_FCD	760.07	ft3

ICV	Integrated Cement Volume	GCSE_UP_PASS, PCD	760.07	ft3
IHV	Integrated Hole Volume	GCSE_UP_PASS	1371.92	ft3

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[8]:Up	Up	13.12 ft	4210.87 ft	04-Jan-2019 4:32:05 AM	04-Jan-2019 6:03:08 AM	ON	1.44 ft	No

All depths are referenced to toolstring zero

Log

Company: St. Croix Operating, Inc. Well: Pronghorn #1
ONE: Log[8]: Up: S011

Description: AIT Basic Log Two Format: Log (EMD 5in Induction Upper) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 04-Jan-2019 06:32:52

Channel	Source	Sampling
AT10	AIT-M:AMIS:AMIS	3in
AT20	AIT-M:AMIS:AMIS	3in
AT30	AIT-M:AMIS:AMIS	3in
AT60	AIT-M:AMIS:AMIS	3in
AT90	AIT-M:AMIS:AMIS	3in
CALI	HDRS-H:HRCC-H:HRCC-H	1in
GR	HGNS-H:HGNS-H:HGNS-H	6in
ICV	Borehole	6in - RT
IHV	Borehole	6in - RT
SP	AIT-M:AMIS:AMIS	6in
TENS	WLWorkflow	6in
TIME 1900	WLWorkflow	0.1in

—IHV - Integrated Hole Volume every 10.00 (ft3)

—IHV - Integrated Hole Volume every 100.00 (ft3)

└ ICV - Integrated Cement Volume every 10.00 (ft3)

— ICV - Integrated Cement Volume every 100.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

Cable Tension (TENS)

10000 lbf

Array Induction Two Foot Resistivity A10 (AT10) AIT-M		
0	ohm.m	50

Array Induction Two Foot Resistivity A20 (AT20) AIT-M

Array Induction Two Foot Resistivity A30 (AT30) AIT-M

Array Induction Two Foot Resistivity A60 (AT60) AIT-M

0 ohm.m 50

Array Induction Two Foot Resistivity A90 (AT90) AIT-M		
0	ohm.m	50

Gamma Ray Backup

Spontaneous Potential (SP) AIT-M

-80 mV 20

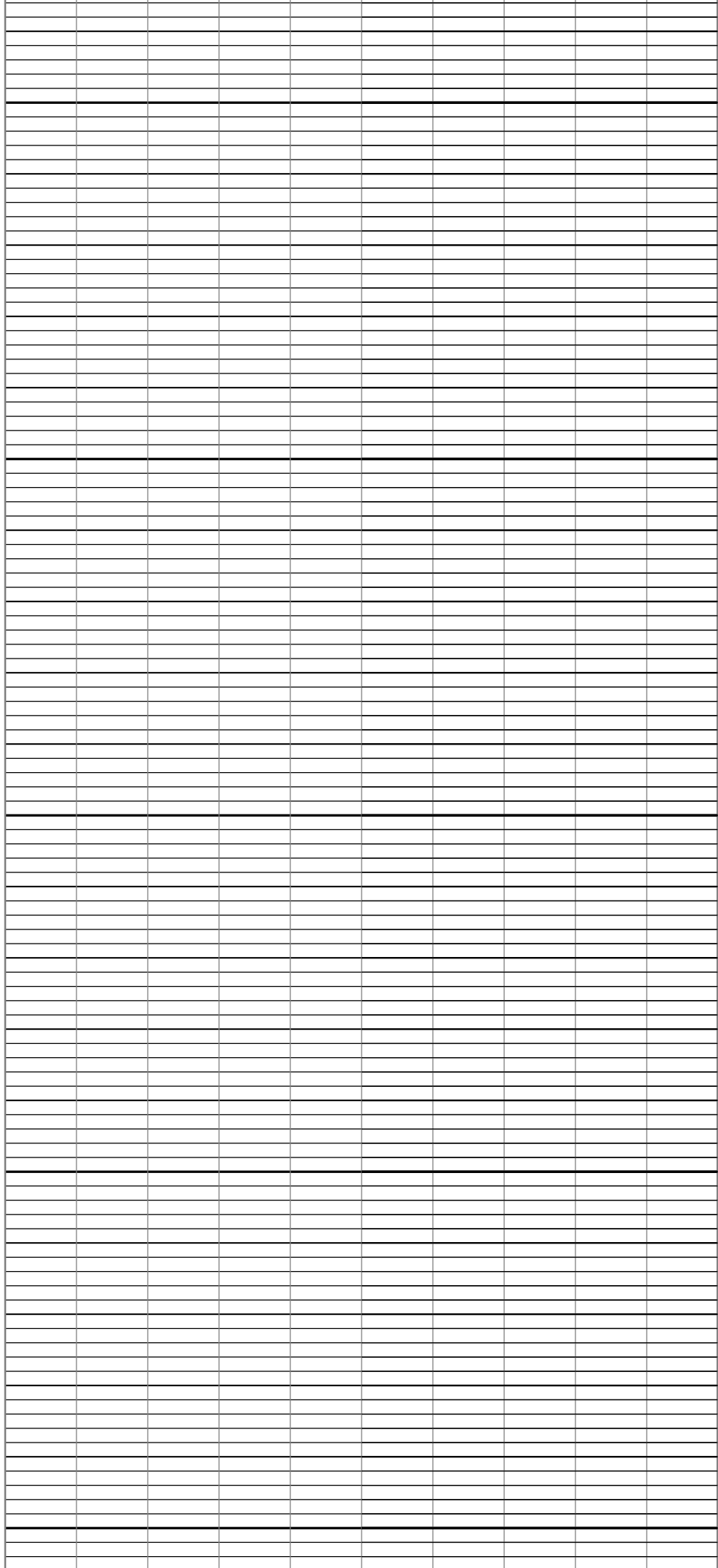
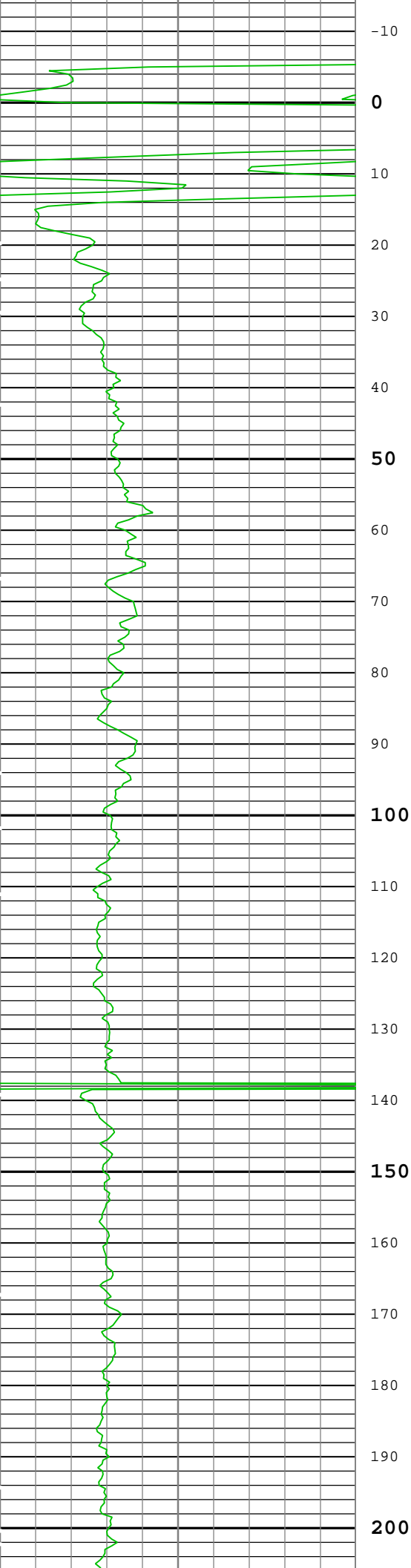
Caliper (HCAL) HDRS-H

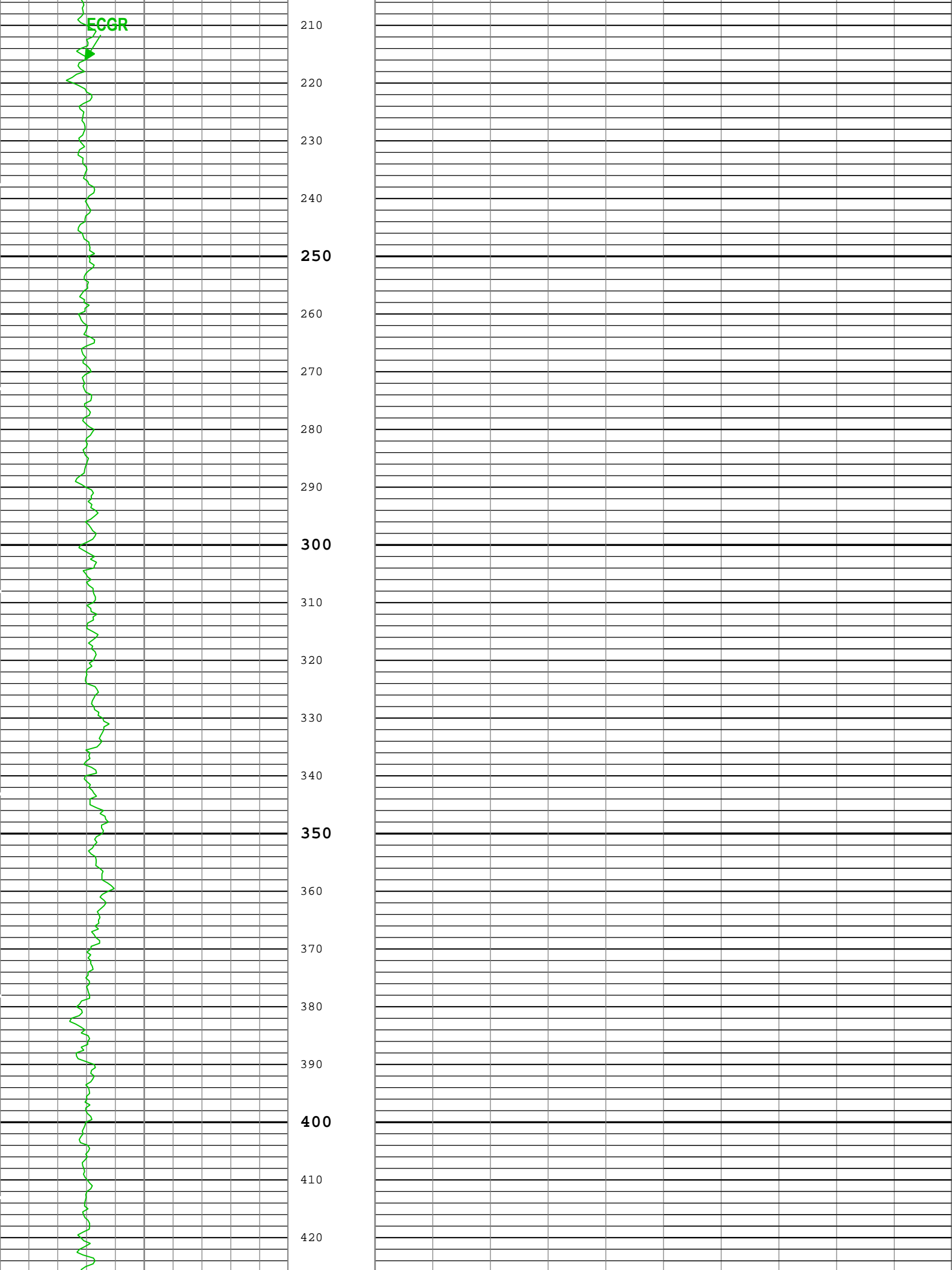
6 in 16

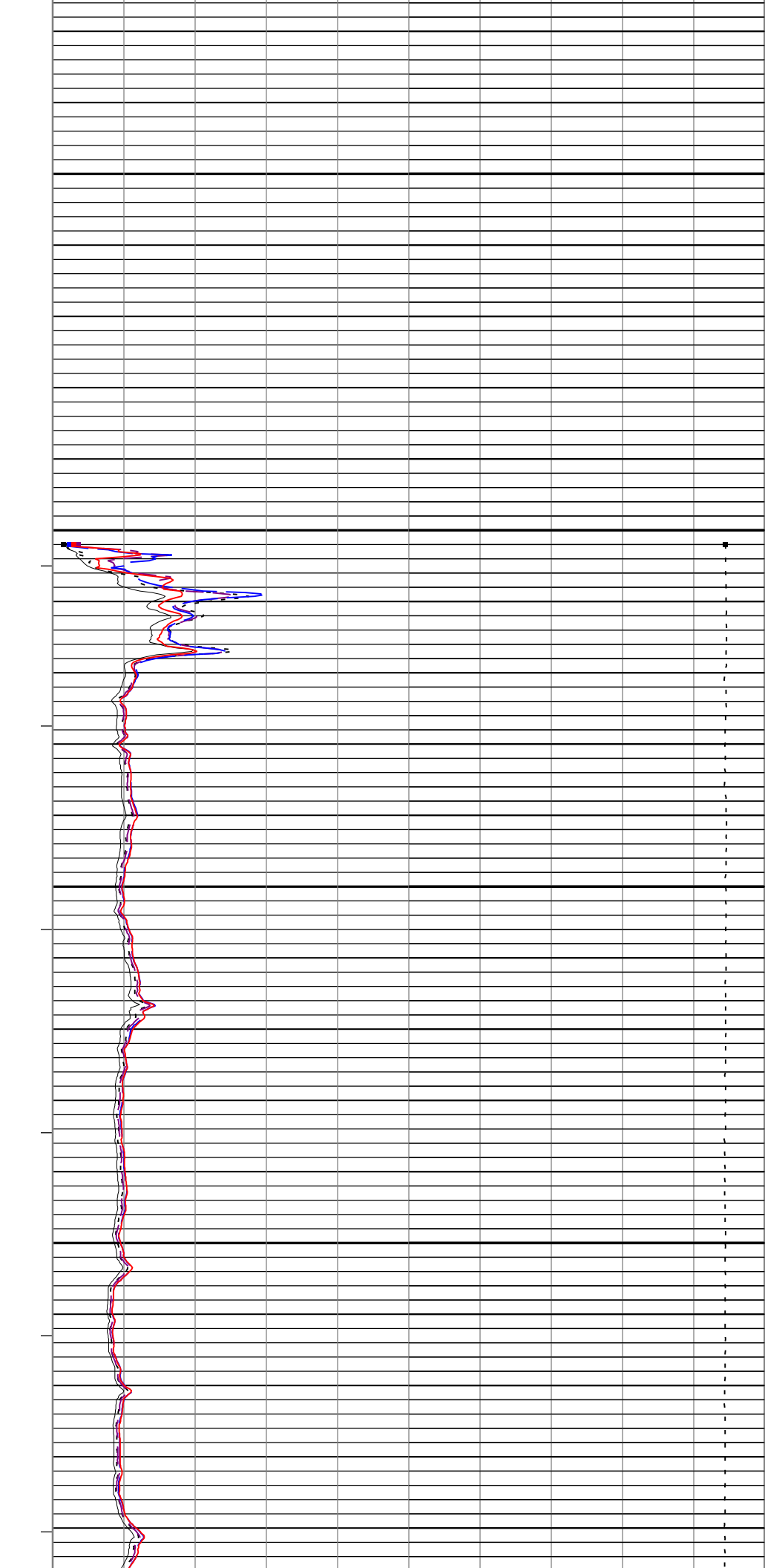
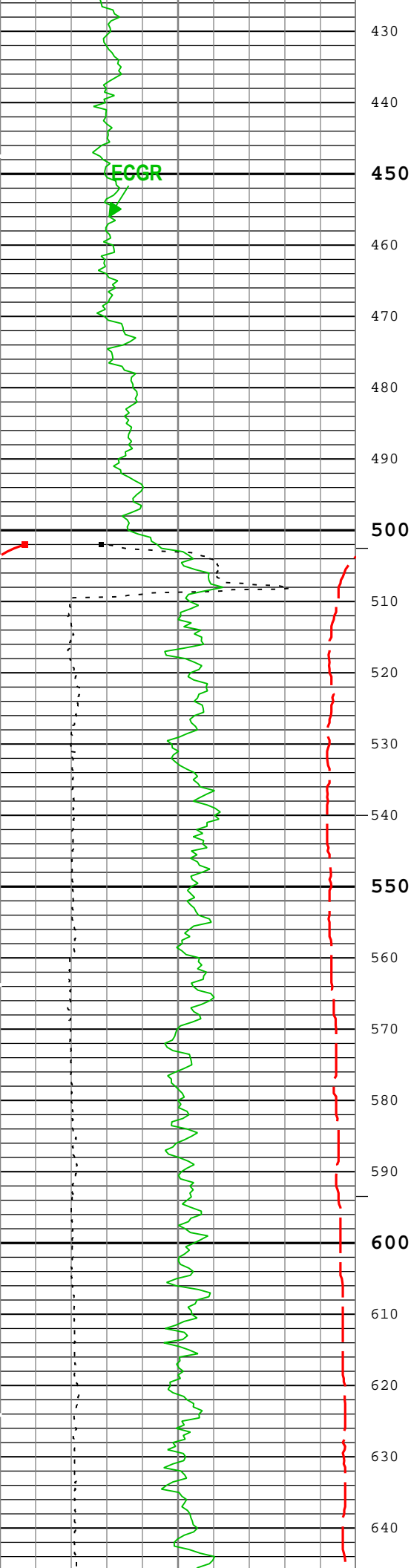
Gamma Ray (ECGR) HGNS-H

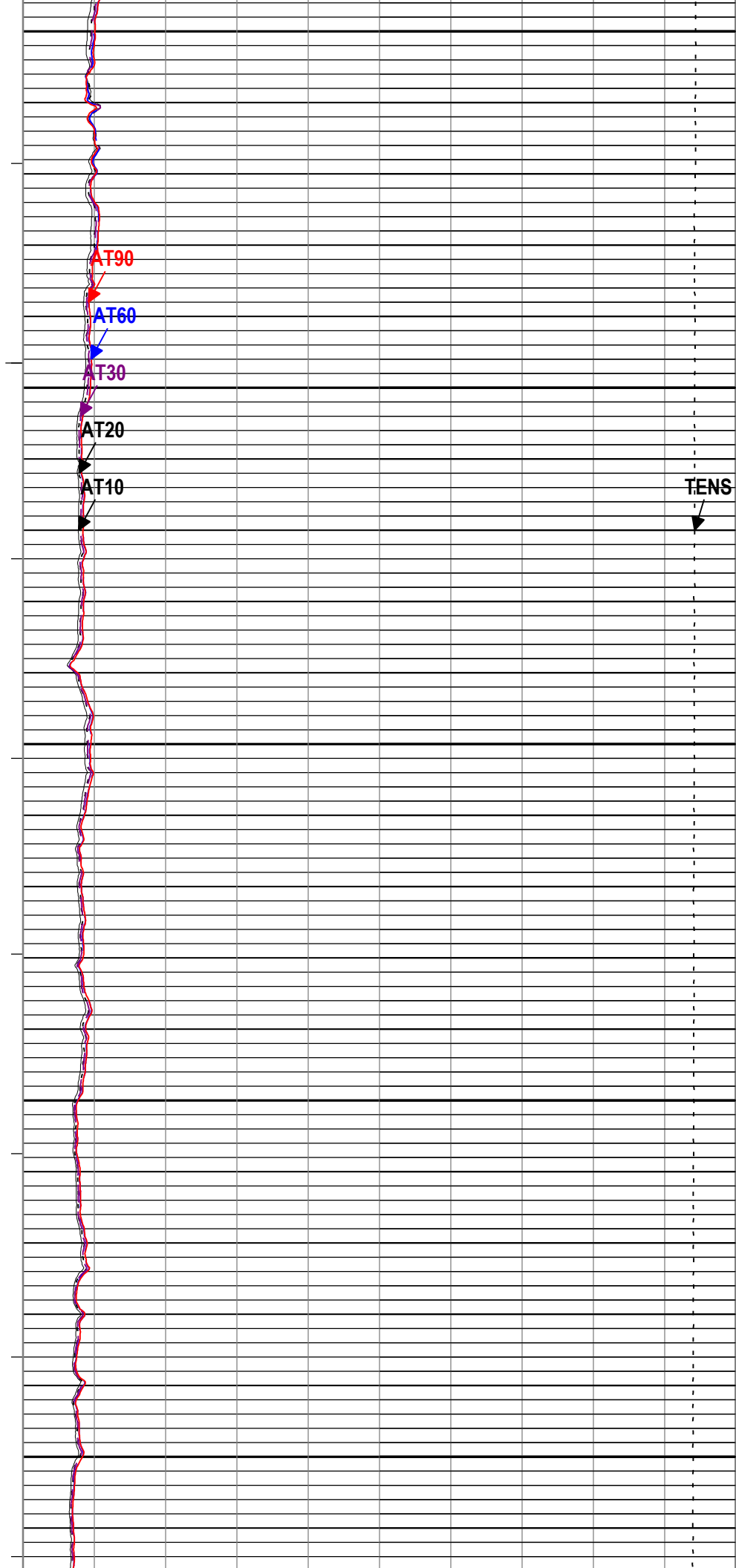
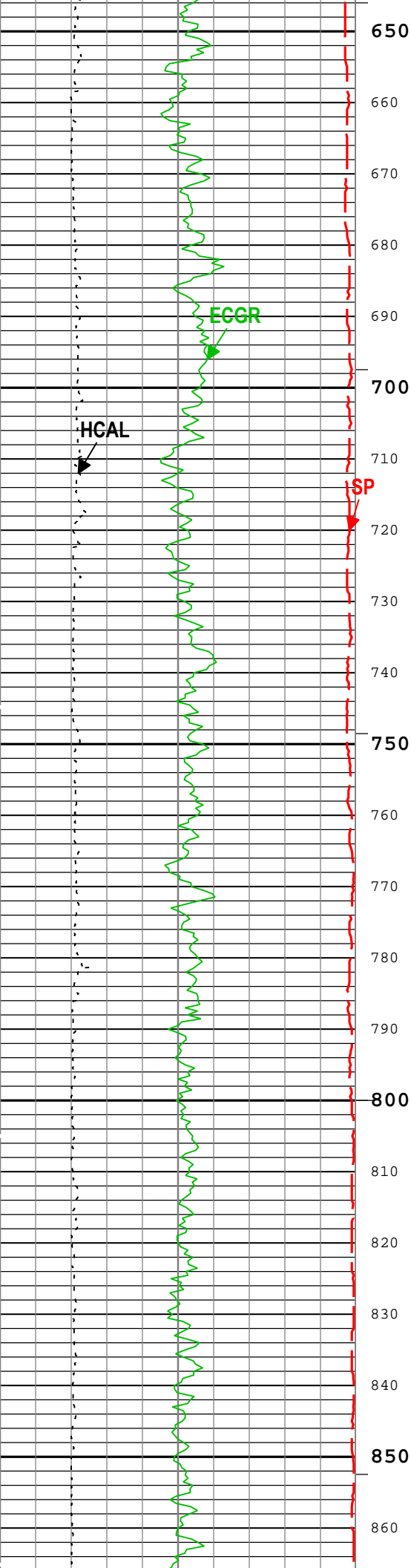
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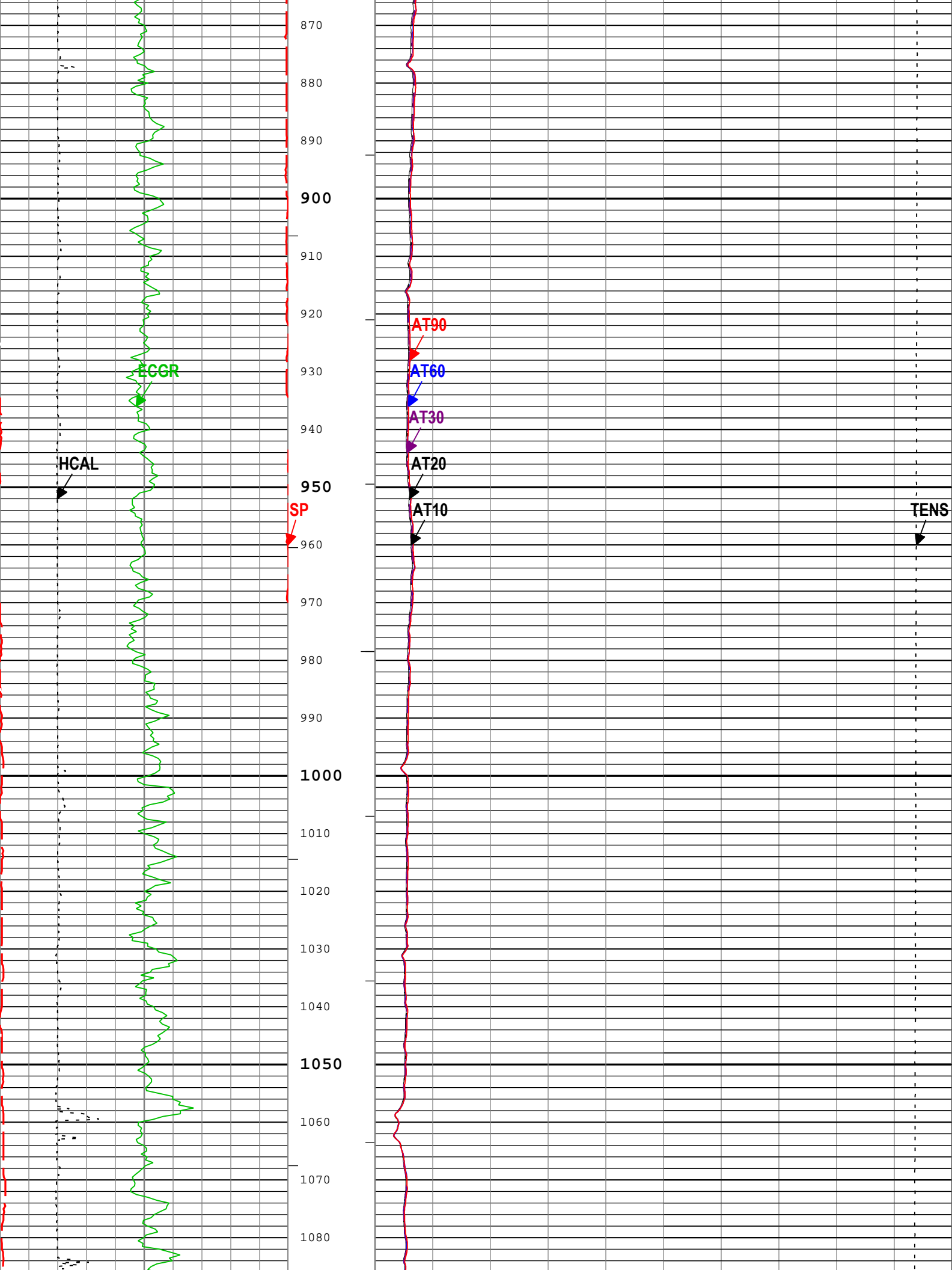
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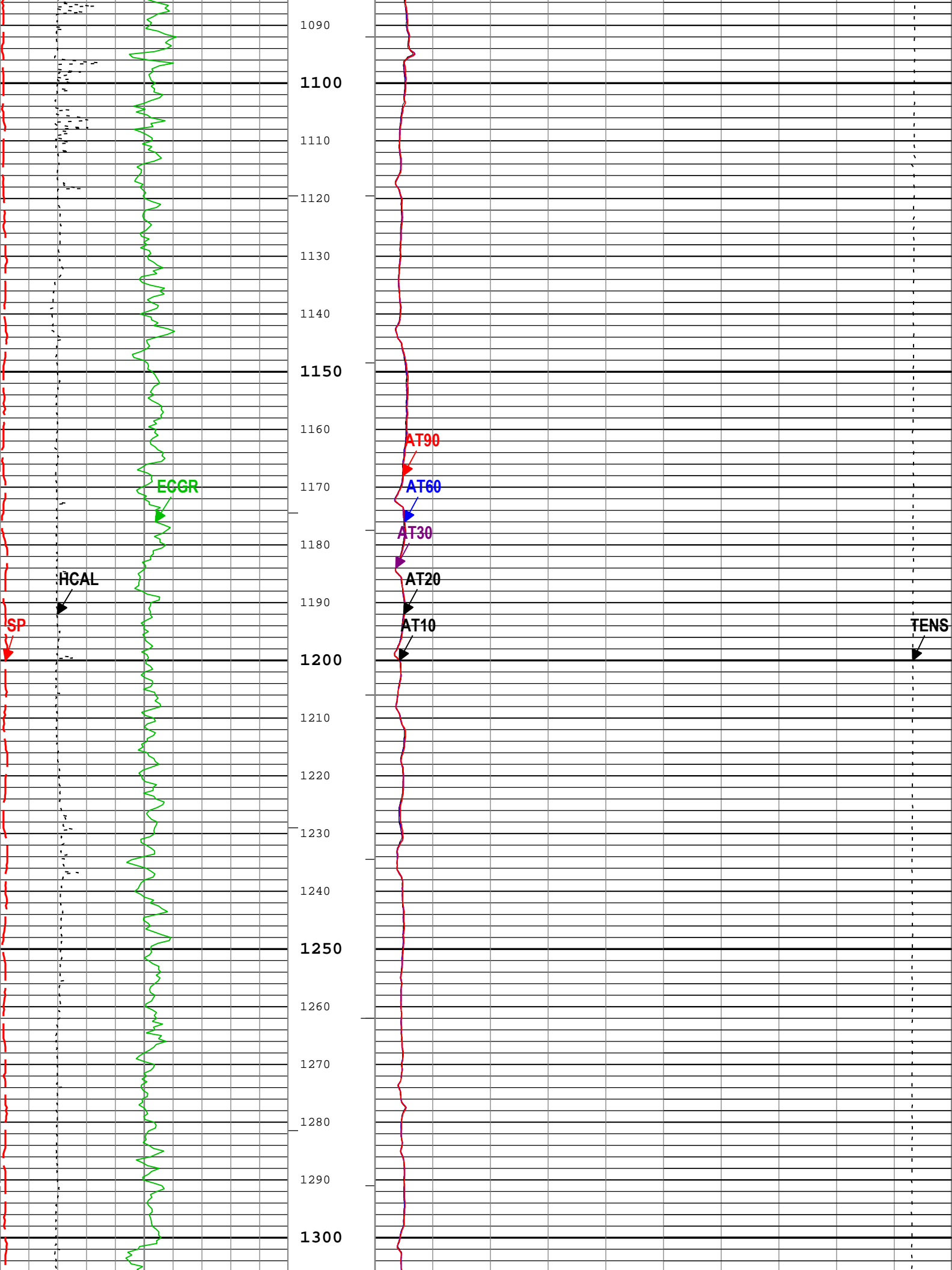


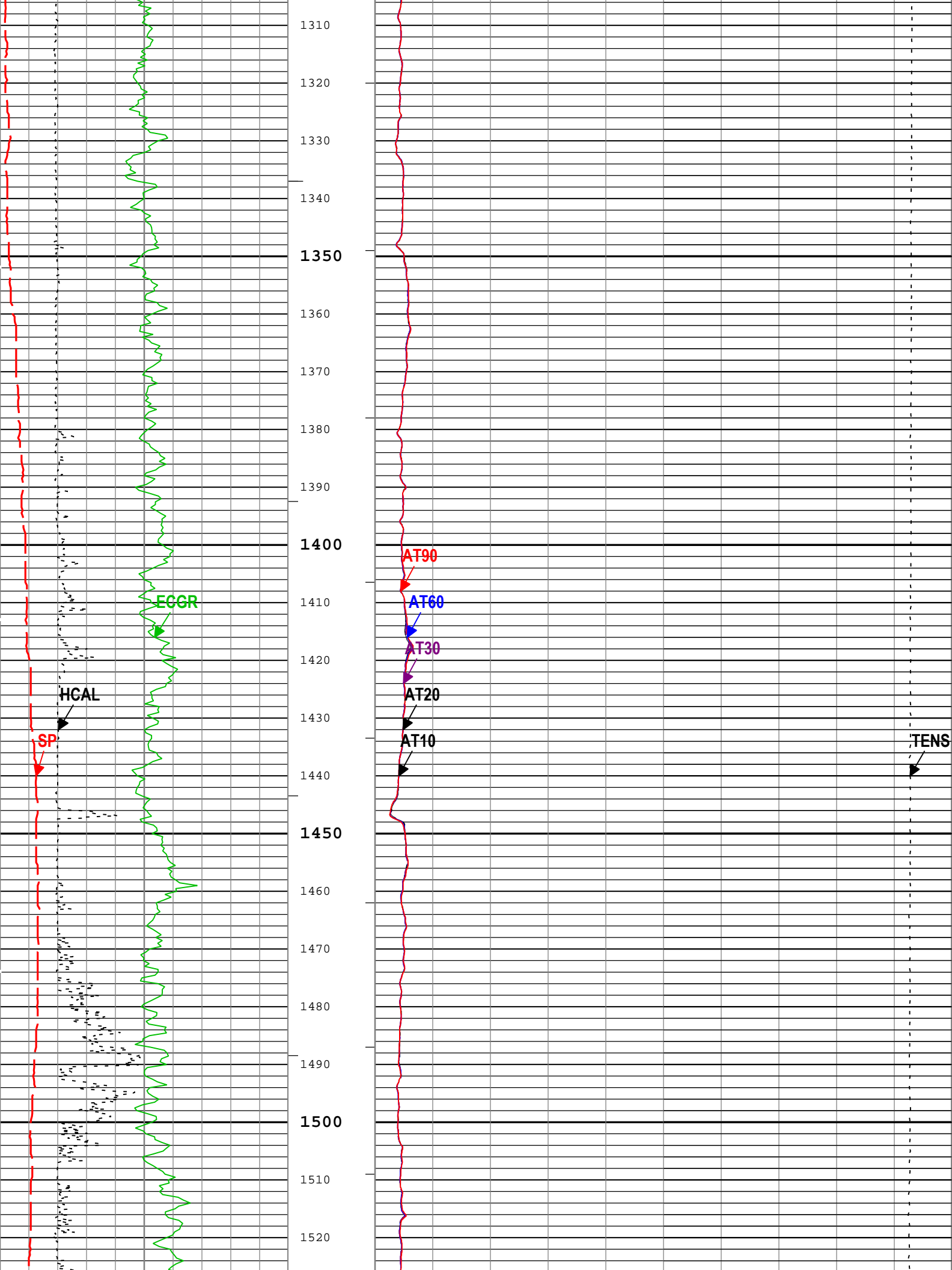


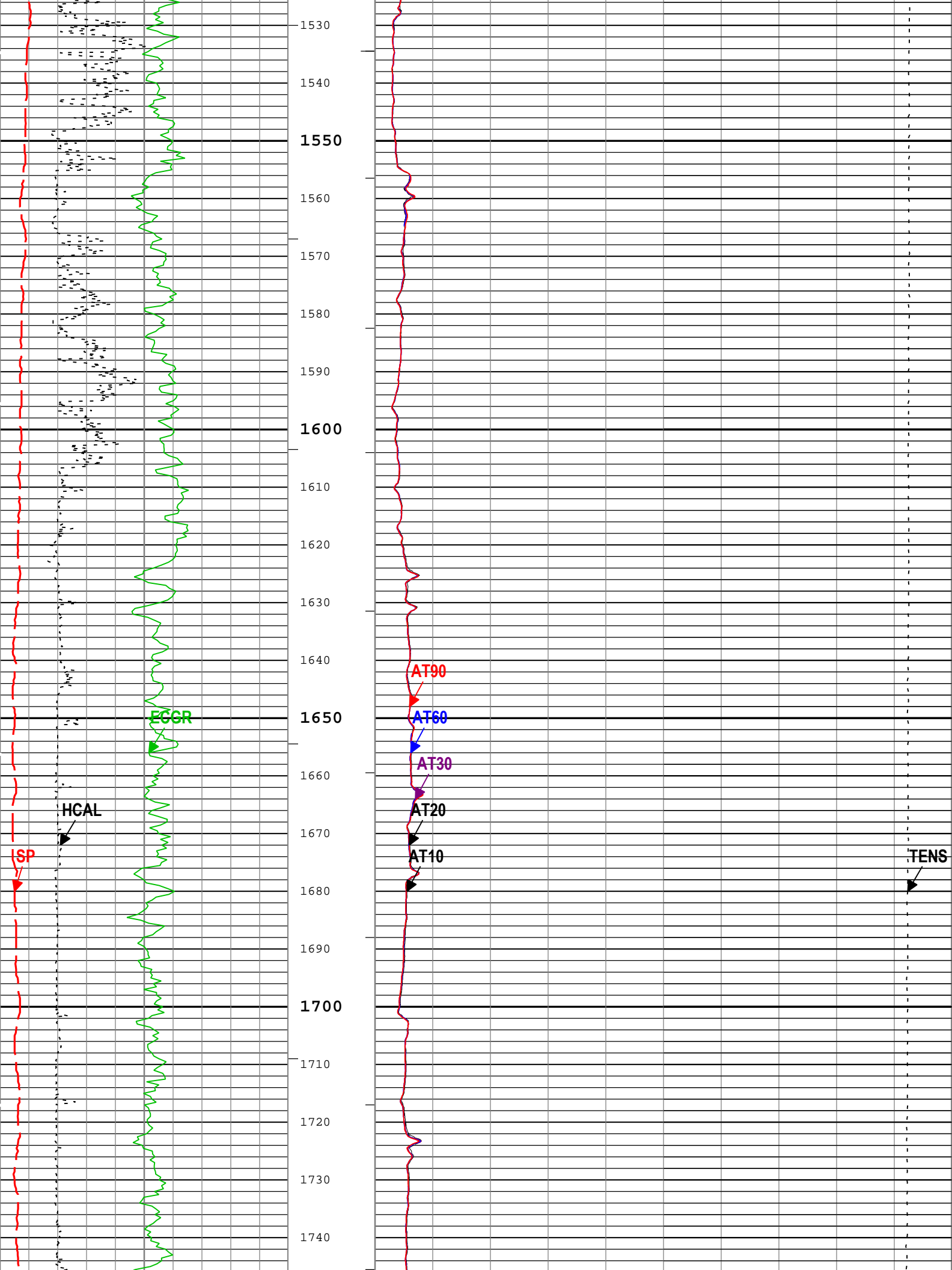


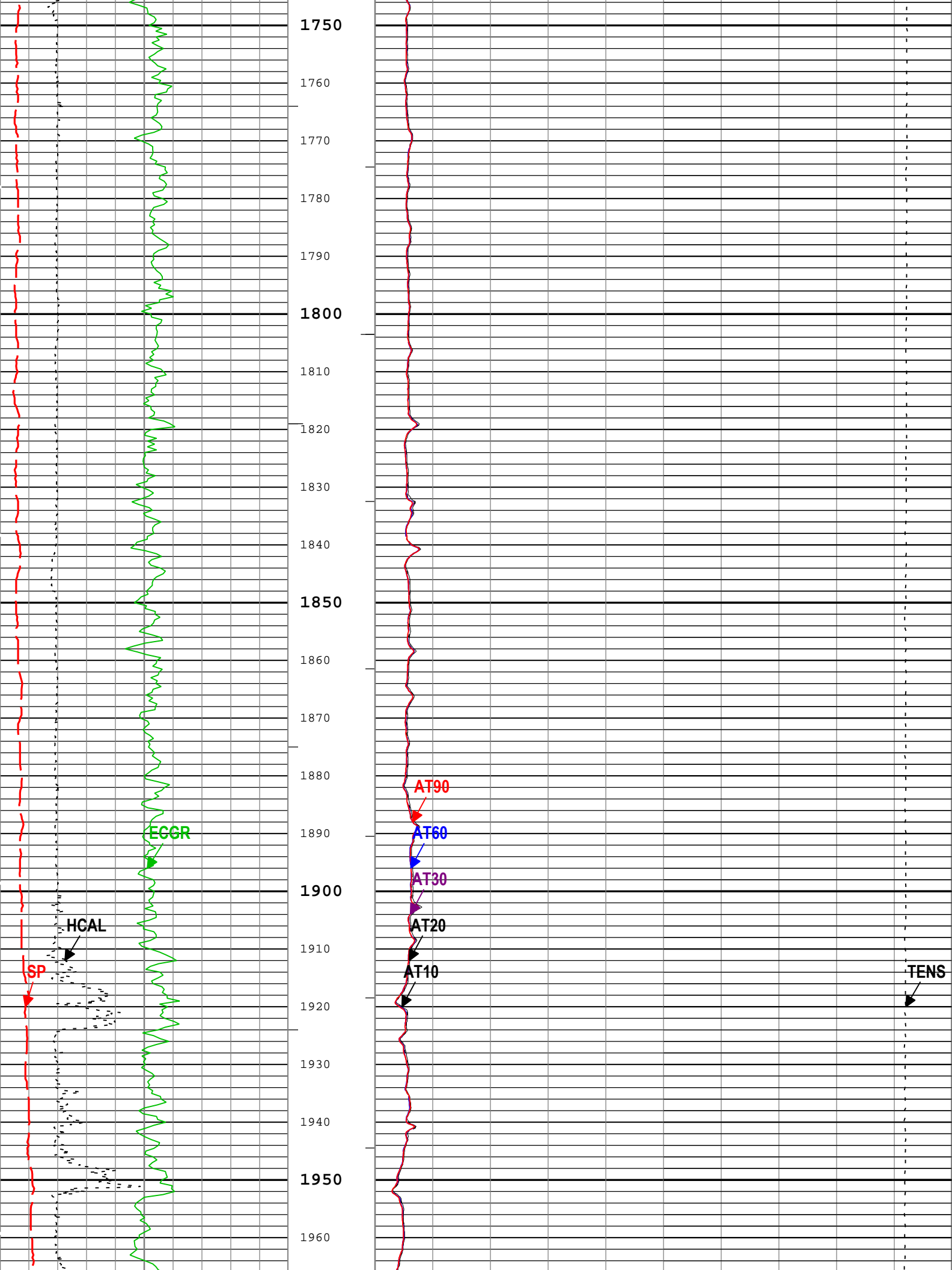


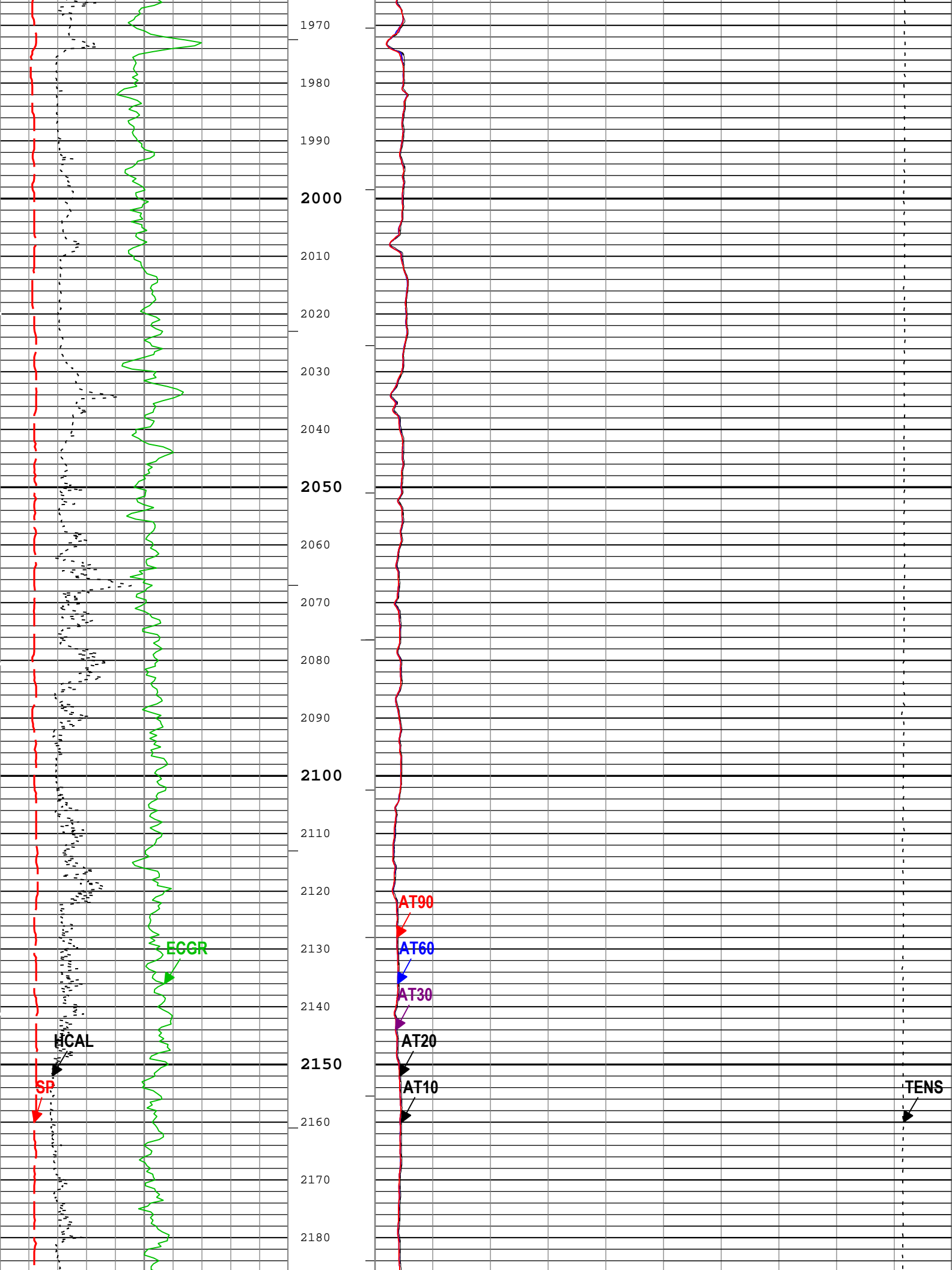


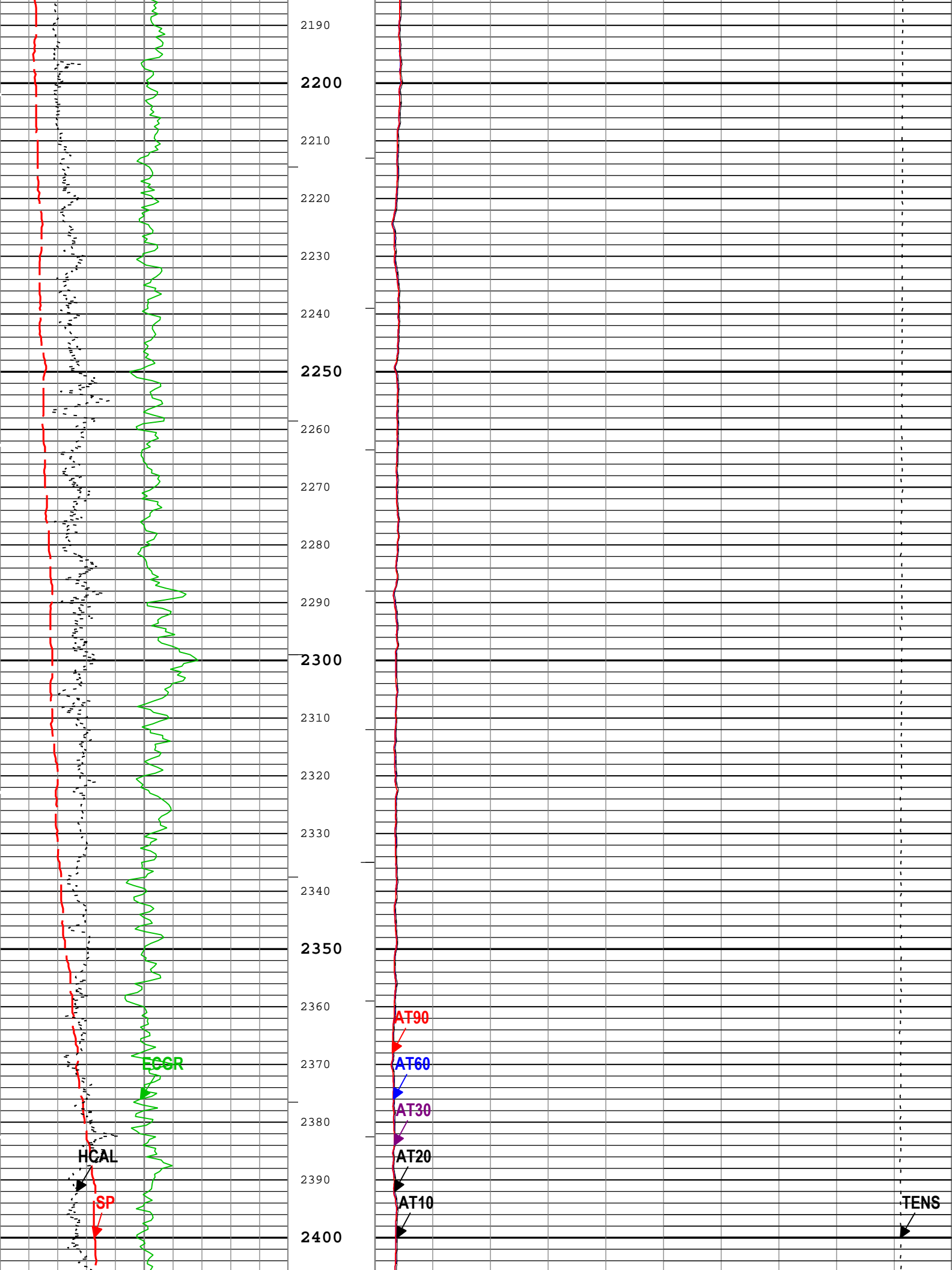


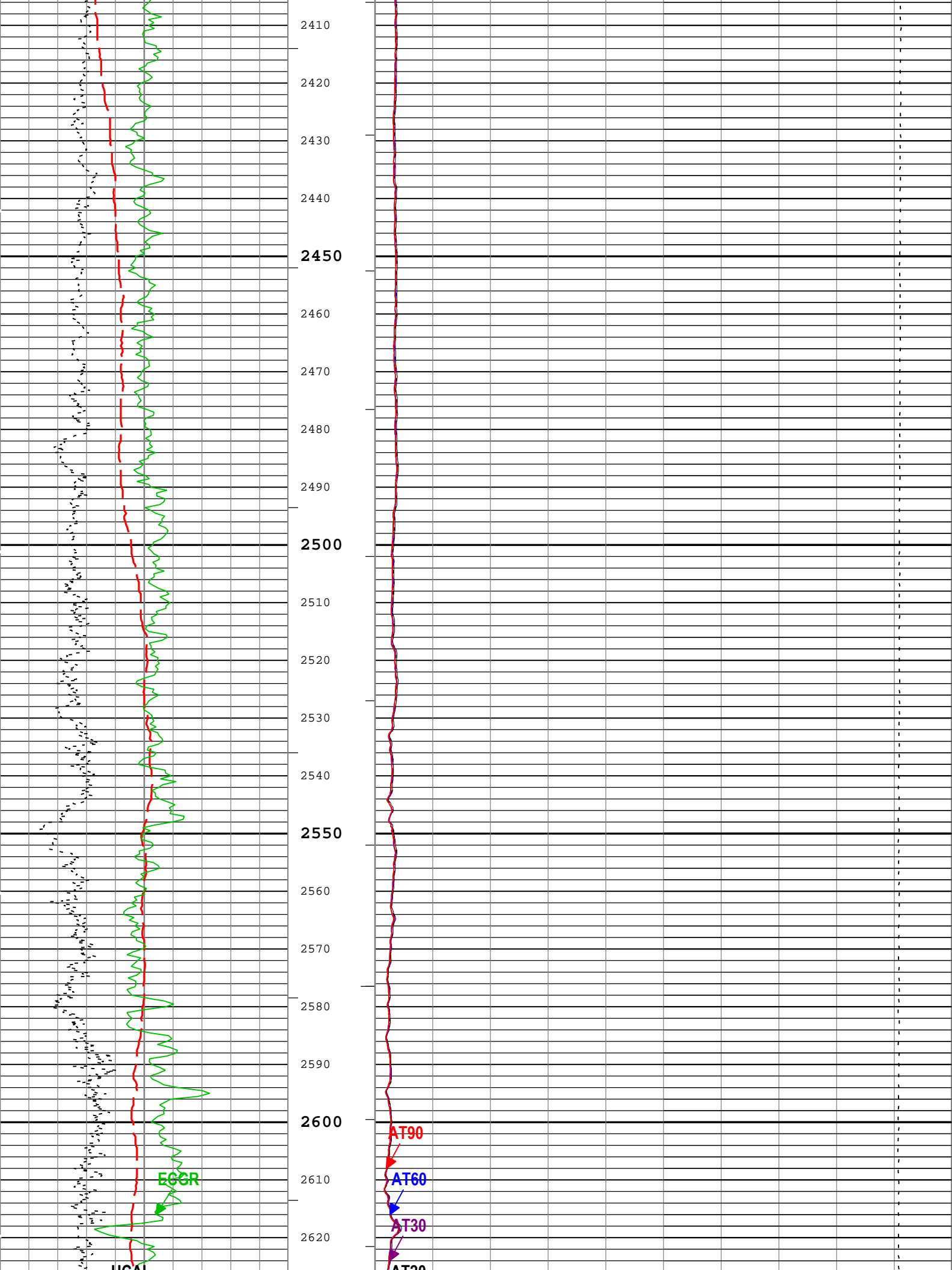


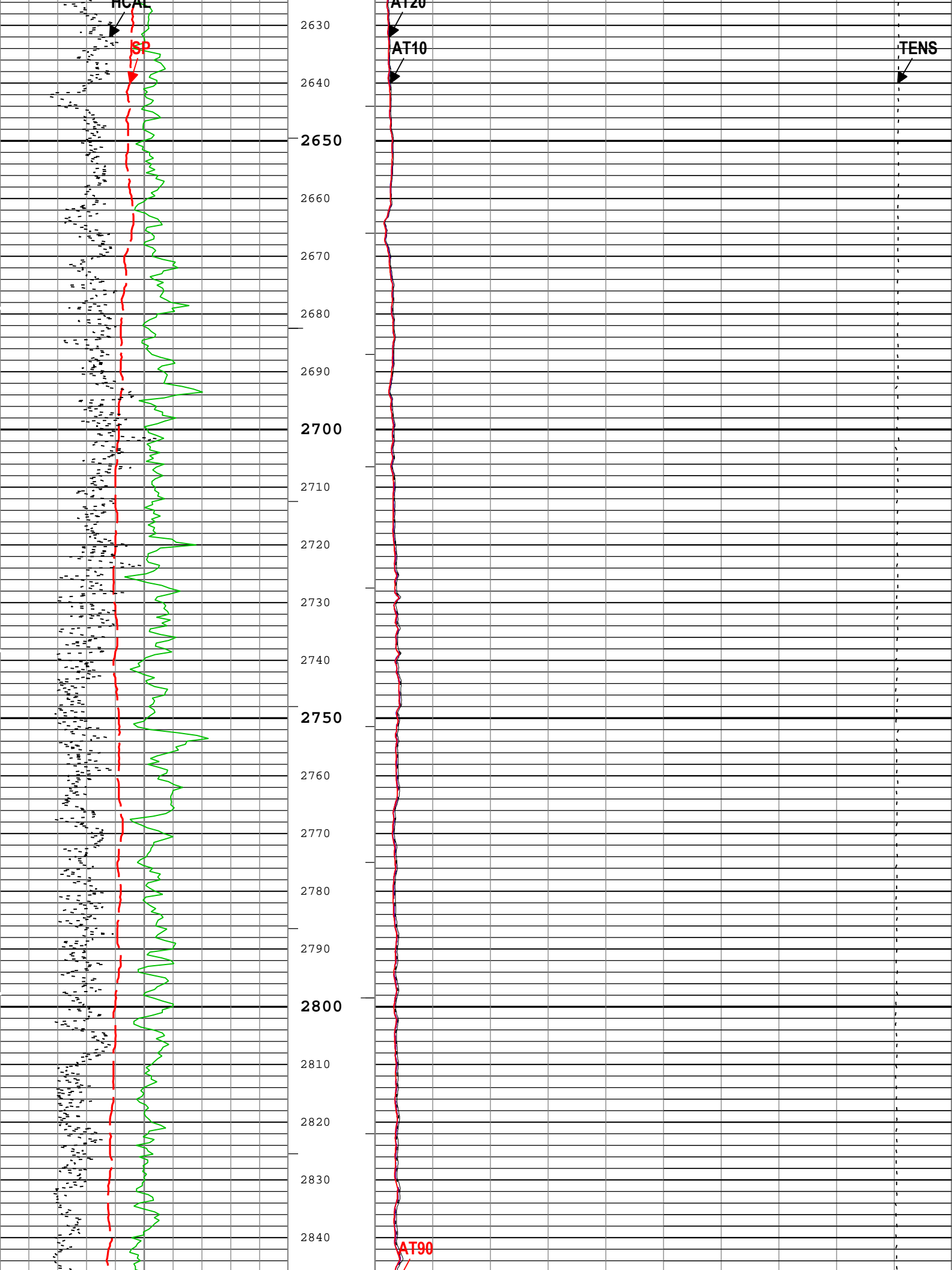


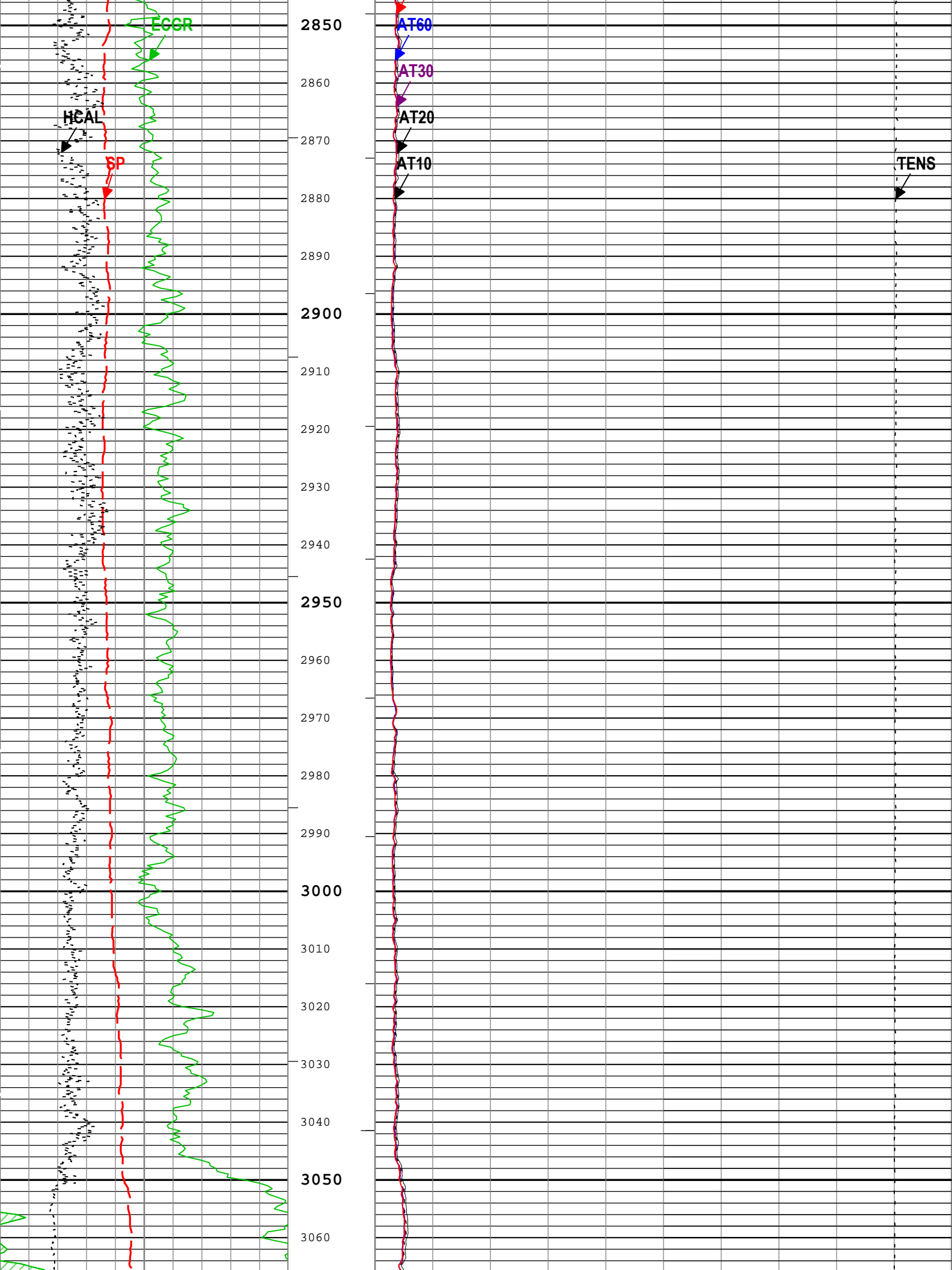


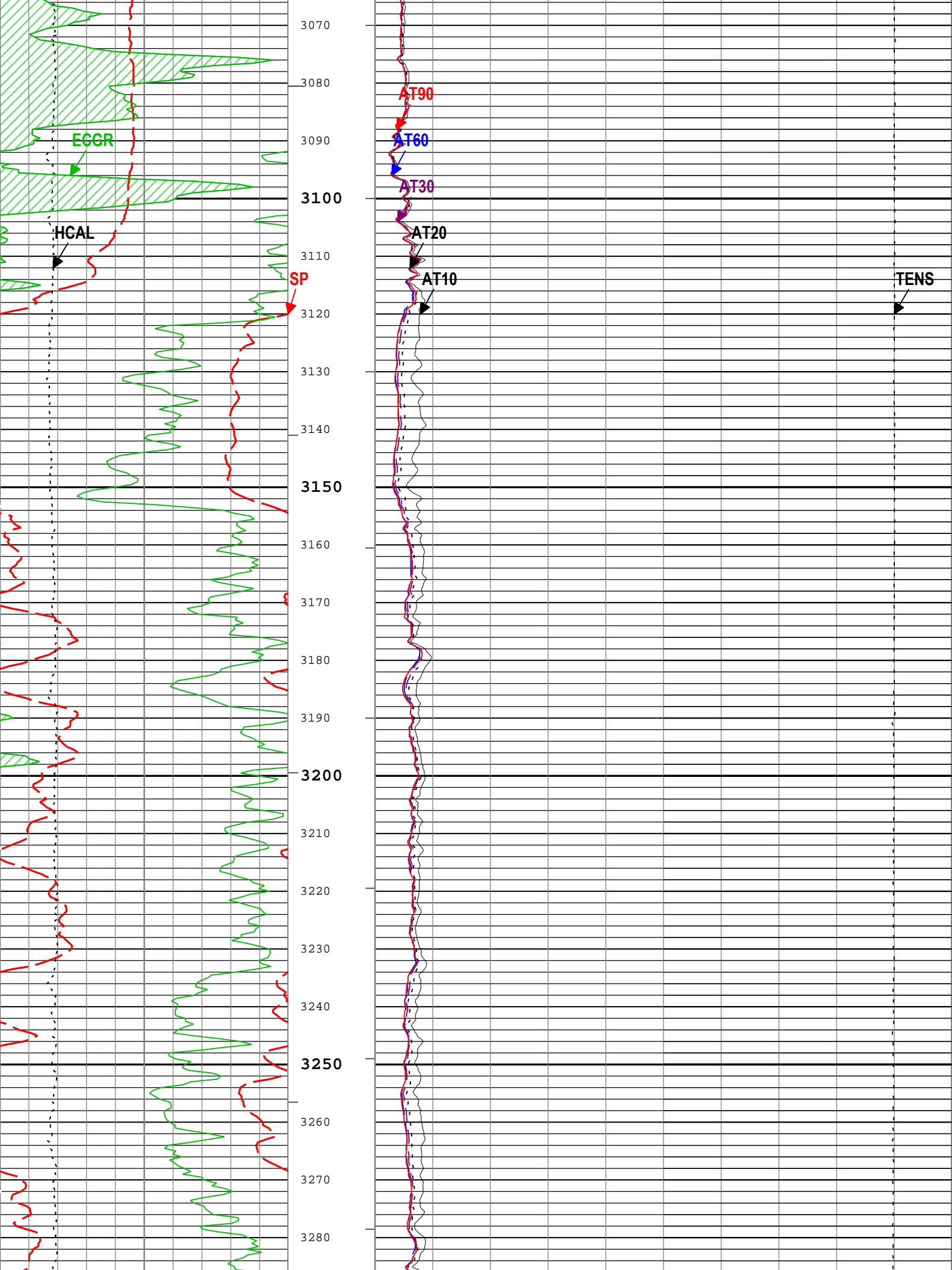


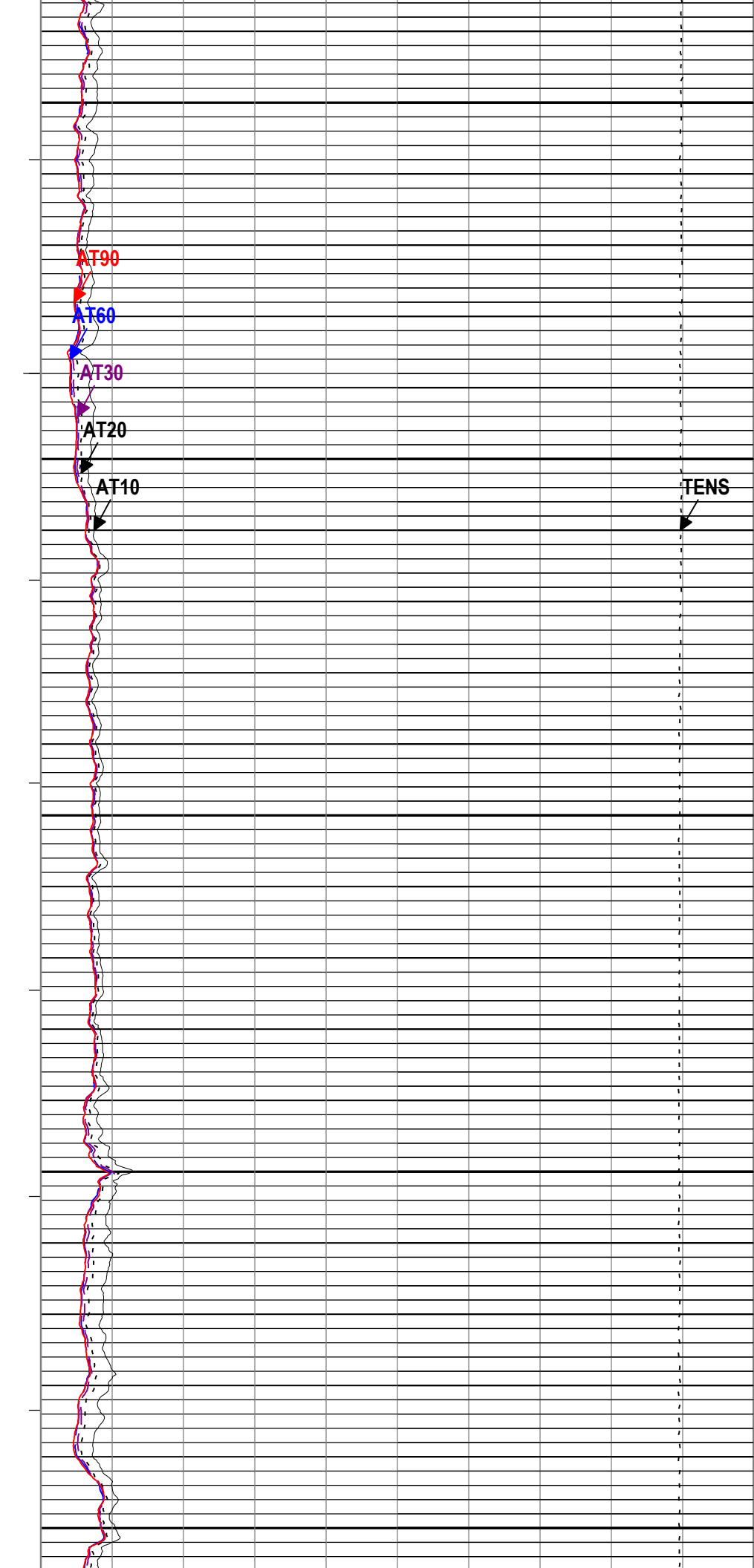
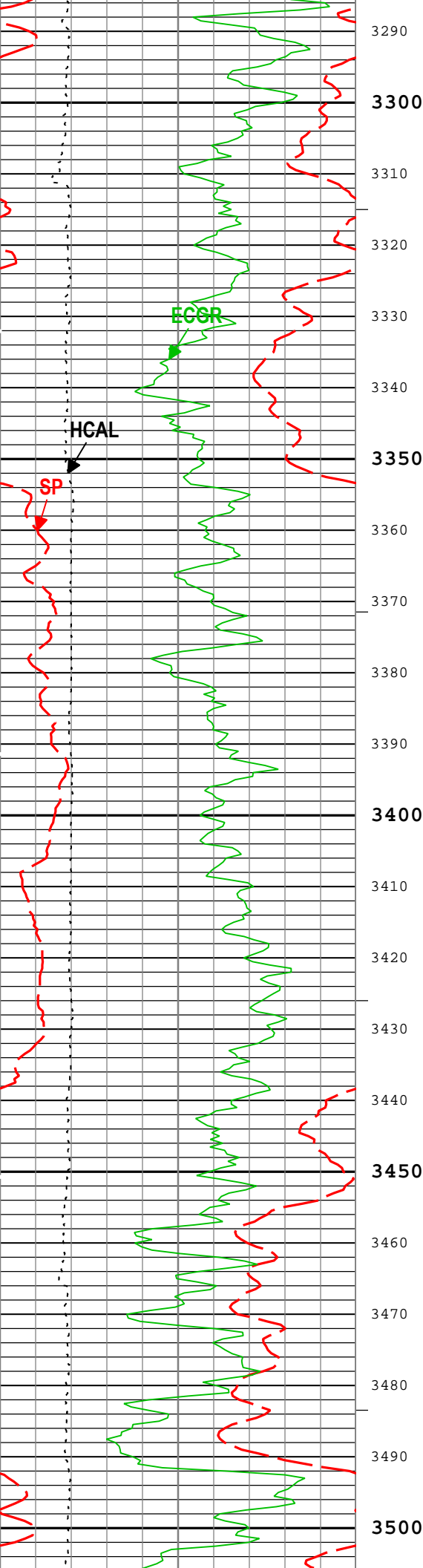


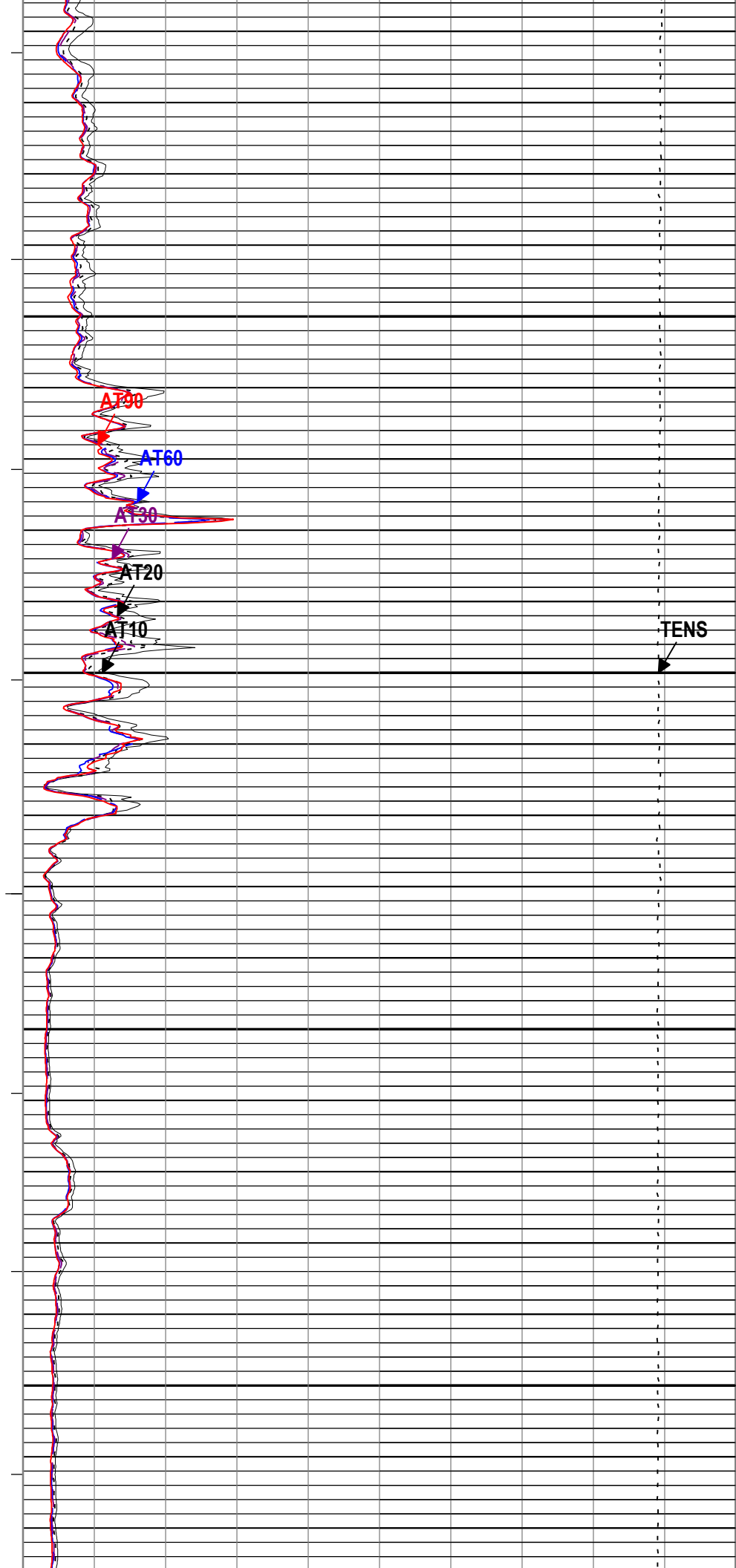
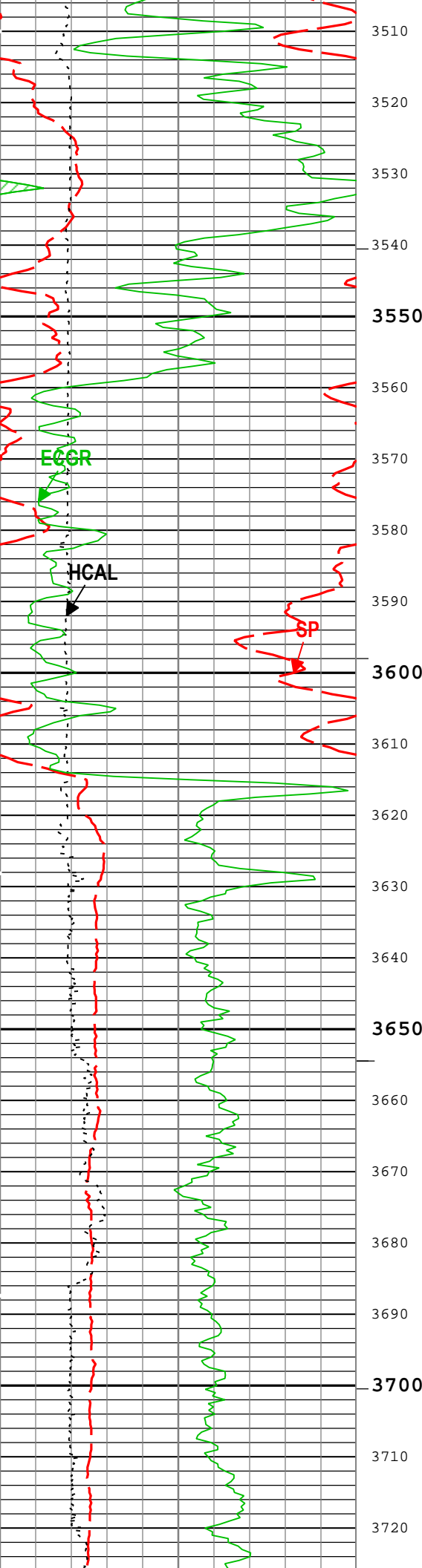


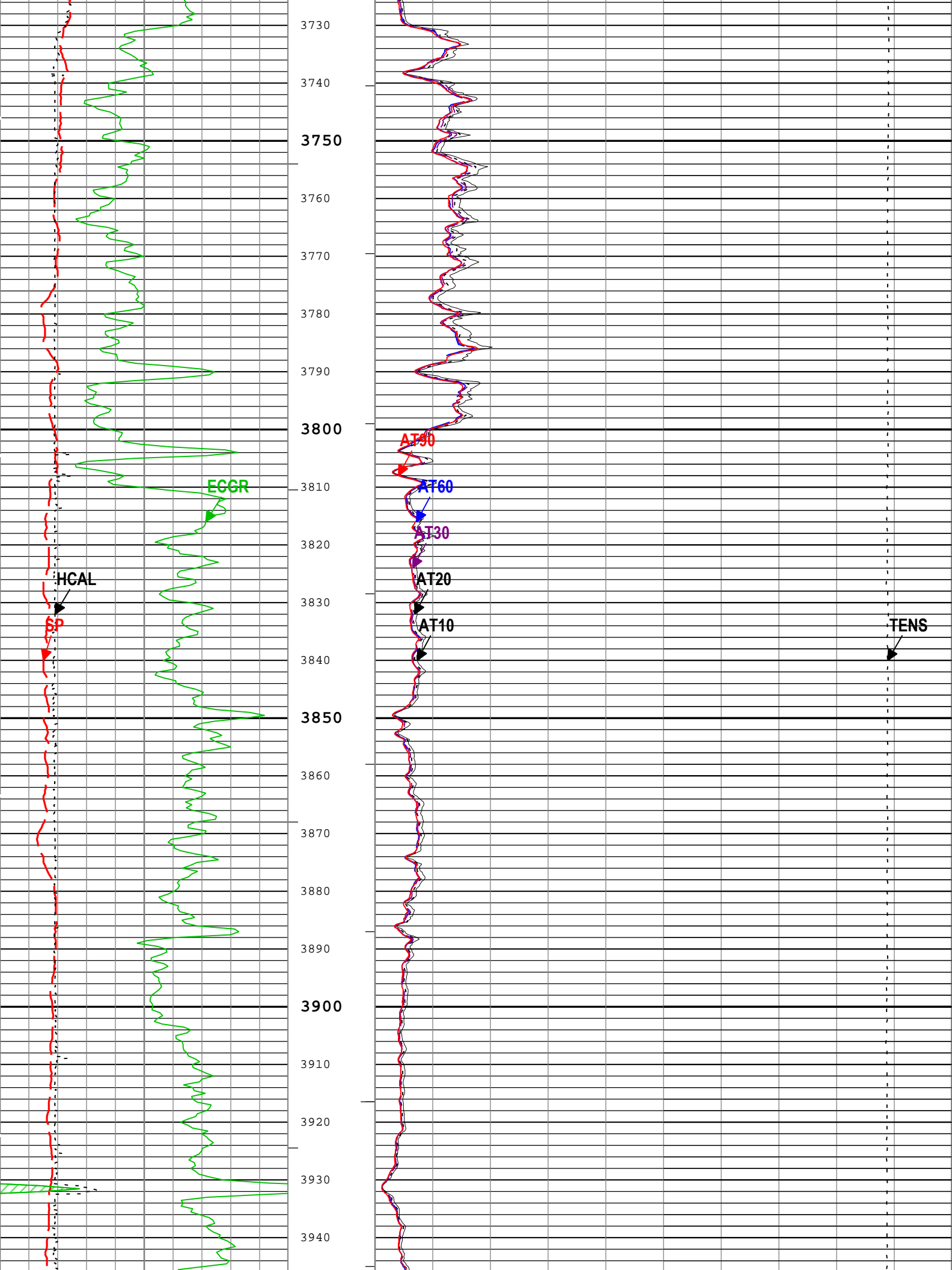


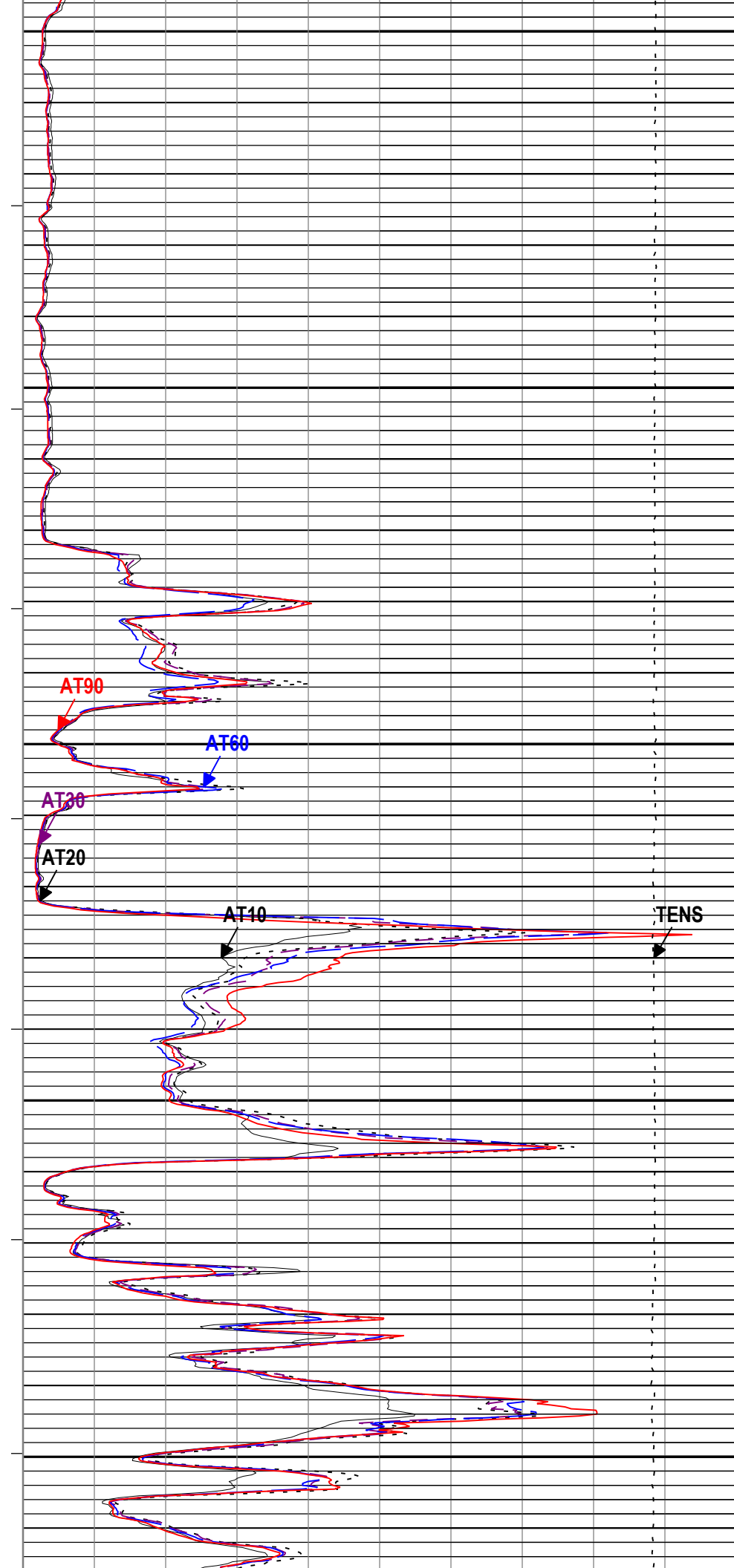
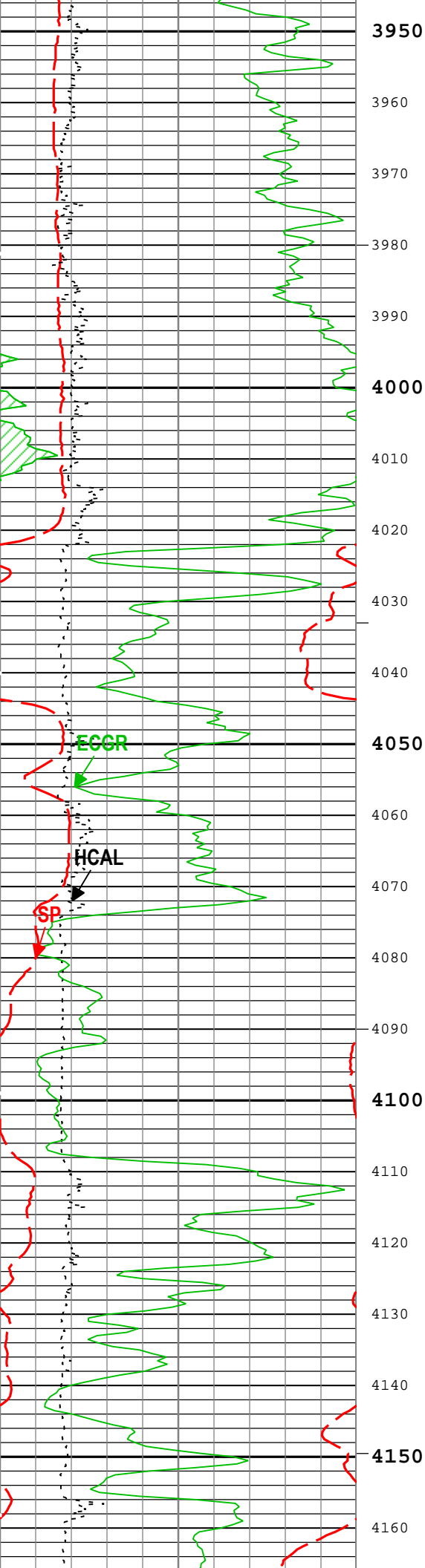


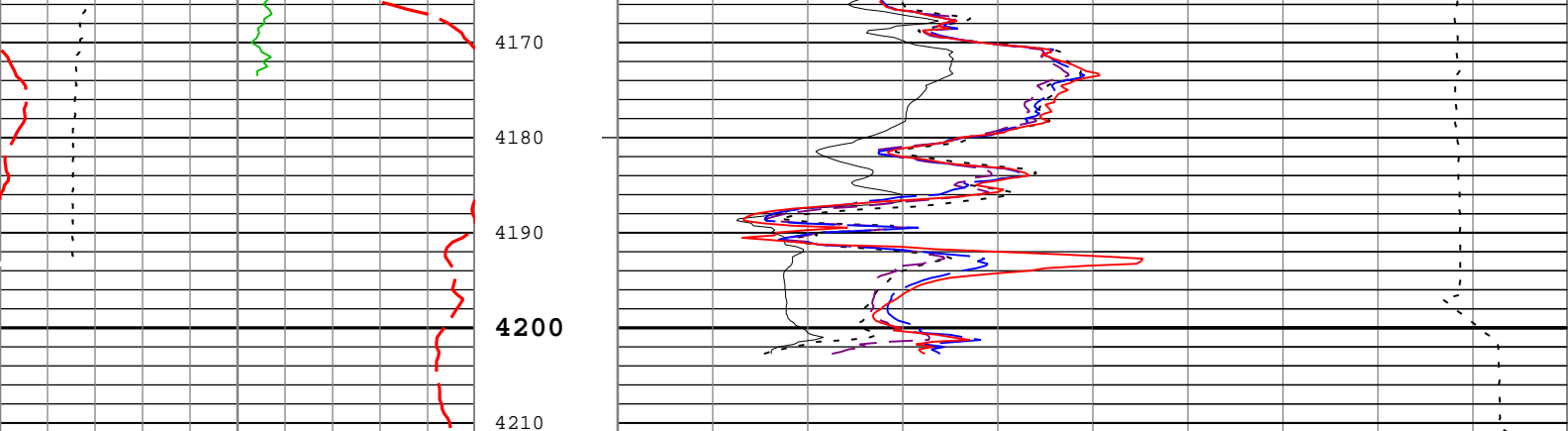












Gamma Ray Backup		
Spontaneous Potential (SP) AIT-M		
-80	mV	20
Caliper (HCAL) HDRS-H		
6	in	16
Gamma Ray (ECGR) HGNS-H		
0	gAPI	200

Array Induction Two Foot Resistivity A10 (AT10) AIT-M		
0	ohm.m	50
Array Induction Two Foot Resistivity A20 (AT20) AIT-M		
0	ohm.m	50
Array Induction Two Foot Resistivity A30 (AT30) AIT-M		
0	ohm.m	50
Array Induction Two Foot Resistivity A60 (AT60) AIT-M		
0	ohm.m	50
Array Induction Two Foot Resistivity A90 (AT90) AIT-M		
0	ohm.m	50

Cable Tension (TENS)		
10000	lbf	0

TIME_1900 - Time Marked every 60.00 (s)

— ICV - Integrated Cement Volume every 100.00 (ft3)

— ICV - Integrated Cement Volume every 10.00 (ft3)

— IHV - Integrated Hole Volume every 100.00 (ft3)

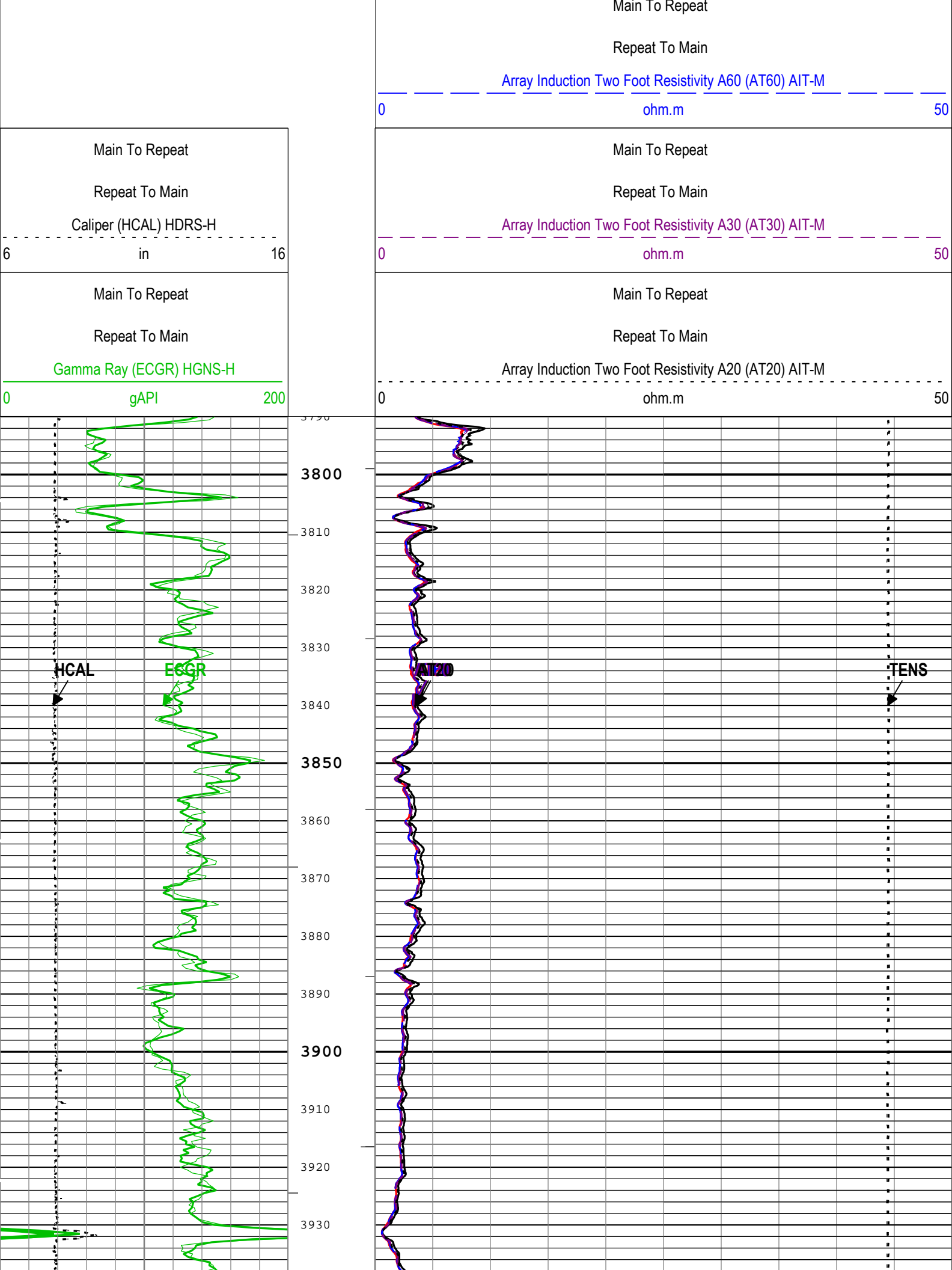
— IHV - Integrated Hole Volume every 10.00 (ft3)

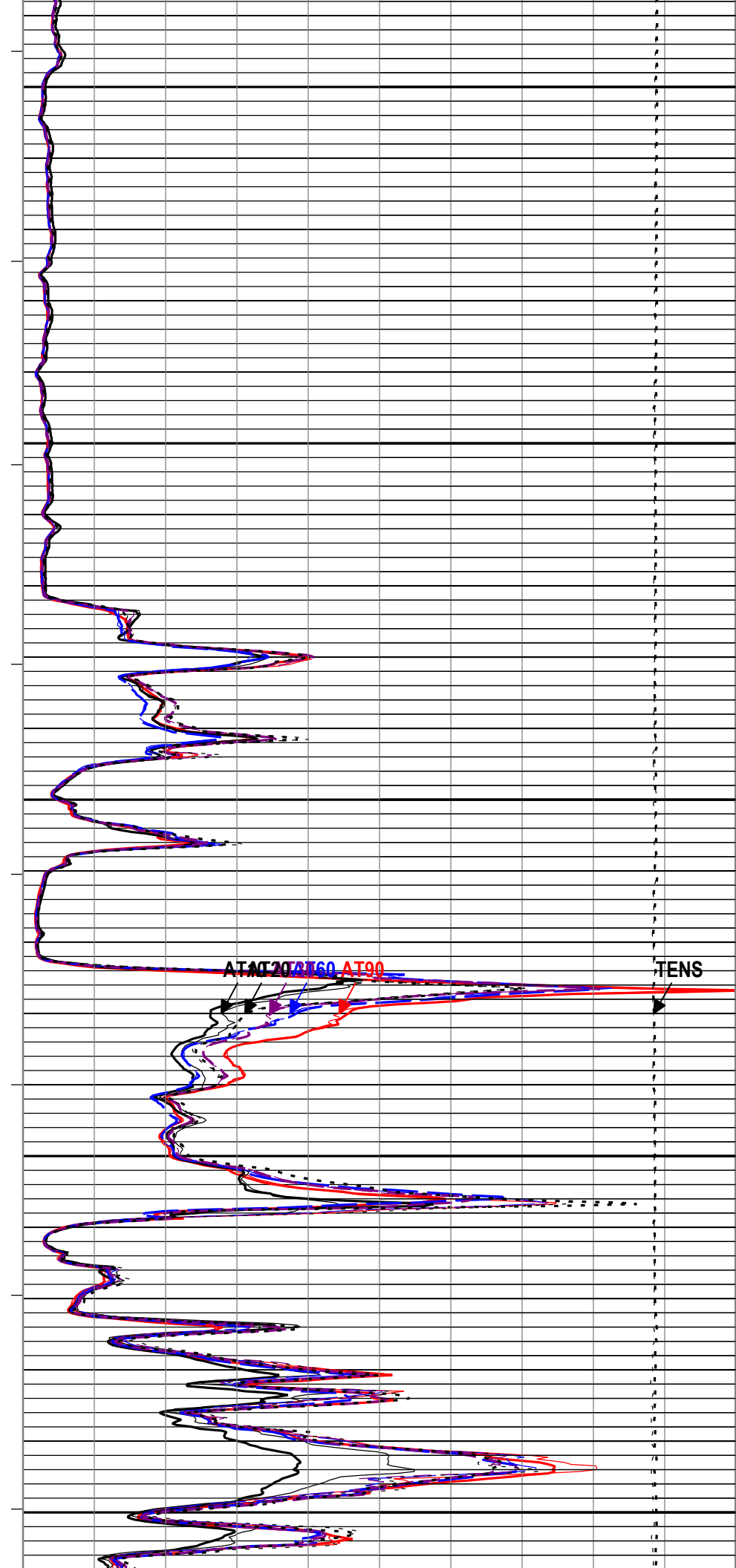
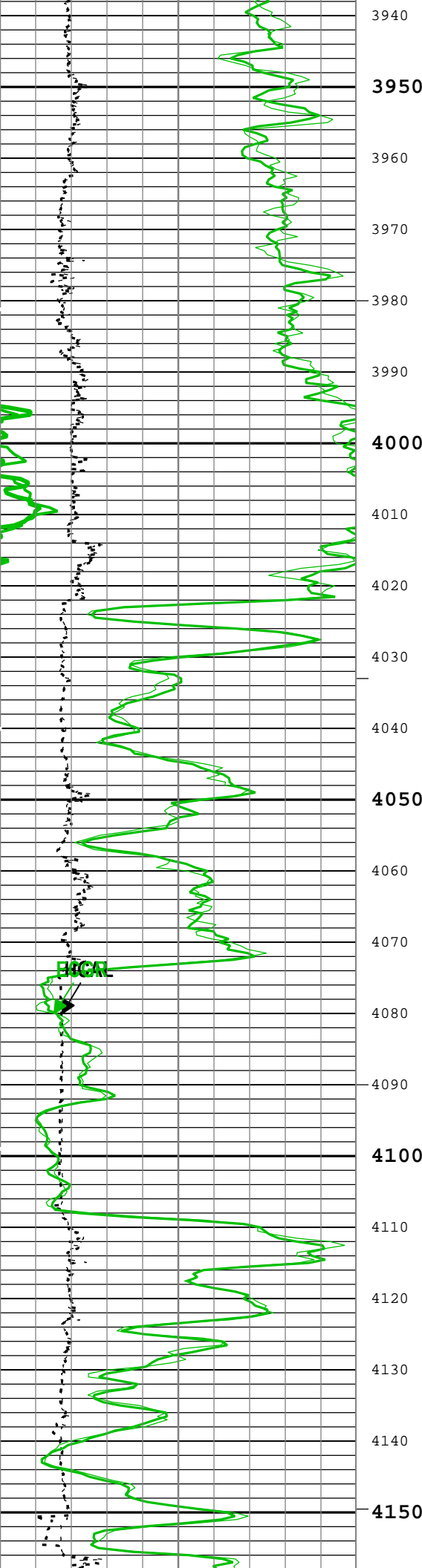
Description: AIT Basic Log Two Format: Log (EMD 5in Induction Upper) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 04-Jan-2019 06:32:52

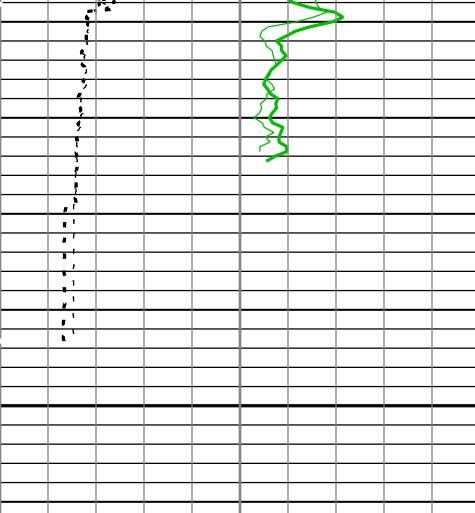
Channel Processing Parameters

ONE: Parameters

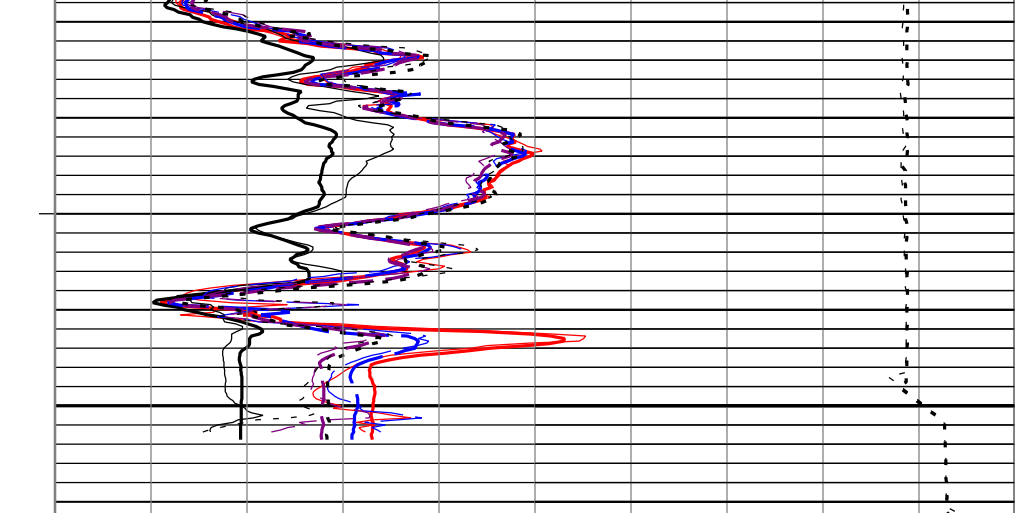
Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Mud Resistivity	
ASTA	Array Induction Tool Standoff	AIT-M	0.125	in
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	-0.152	in
CBLO	Casing Bottom (Logger)	WLSESSION	502	ft
CDEN	Cement Density	HGNS-H	2	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	8.625	in
DFD	Drilling Fluid Density	Borehole	9.2	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
FCD	Future Casing (Outer) Diameter	WLSESSION	5.5	in
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	AMF	







4160
4170
4180
4190
4200
4210



Main To Repeat		
Repeat To Main		
Caliper (HCAL) HDRS-H		
6	in	16
Main To Repeat		
Repeat To Main		
Gamma Ray (ECGR) HGNS-H		
0	gAPI	200

Main To Repeat		
Repeat To Main		
Array Induction Two Foot Resistivity A90 (AT90) AIT-M		
0	ohm.m	50
Main To Repeat		
Repeat To Main		
Array Induction Two Foot Resistivity A10 (AT10) AIT-M		
0	ohm.m	50
Main To Repeat		
Repeat To Main		
Array Induction Two Foot Resistivity A60 (AT60) AIT-M		
0	ohm.m	50
Main To Repeat		
Repeat To Main		
Array Induction Two Foot Resistivity A30 (AT30) AIT-M		
0	ohm.m	50
Main To Repeat		
Repeat To Main		
Array Induction Two Foot Resistivity A20 (AT20) AIT-M		
0	ohm.m	50

Main To Repeat		
Repeat To Main		
Cable Tension (TENS)		
10000	lbf	0

TIME_1900 - Time Marked every 60.00 (s)

ICV - Integrated Cement Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

—IHV - Integrated Hole Volume every 100.00 (ft3)
—IHV - Integrated Hole Volume every 10.00 (ft3)

Description: AIT Basic Log Two Format: Log (EMD 5in Induction Upper RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth
Creation Date: 04-Jan-2019 06:32:55

Company:	St. Croix Operating, Inc.	Schlumberger
Well:	Pronghorn #1	
Field:	Wildcat	
County:	Washington	
State:	Colorado	
Platform Express		
Array Induction with 5" Linear		
with Linear Correlation		