

Company: Expedition Water Solutions LLC

Well: EWS 4

Field: Wattenburg

County: Weld State: Colorado

Platform Express  
Array Induction  
with Linear Correlation

County:	Weld			
Field:	Wattenburg			
Location:	NE SE 18-2N-63W			
Well:	EWS 4			
Company:	Expedition Water Solutions LLC			
Location:		NE SE 18-2N-63W		Elev.: K.B. 4869.00 ft G.L. 4856.00 ft D.F. 4869.00 ft
		Permanent Datum:	Ground Level	Elev.: 4856.00 f
		Log Measured From:	Kelly Bushing	13.00 ft above Perm.Datum
		Drilling Measured From:	Kelly Bushing	
API Serial No.		Section:	Township:	Range:
05-123-44167		18	2N	63W

Logging Date 22-Feb-2017

Run Number ONE

Depth Driller 10204.00 ft

Schlumberger Depth 10201.00 ft

Bottom Log Interval 10204.00 ft

Top Log Interval 8548.00 ft

Casing Driller Size @ Depth 7 in @ 8547.00 ft

Casing Schlumberger 8552 ft

Bit Size 6:125 in

Type Fluid In Hole Fresh Water

Density 9.1 lbm/gal 43 s

Fluid Loss PH 5.2 cm3 8.8

MUD Source of Sample Active Tank

RM @ Meas Temp 0.5 ohm.m @ 68 degF

RMF @ Meas Temp 0.48 ohm.m @ 68 degF

RMC @ Meas Temp 0.36 ohm.m @ 68 degF

Source RMF RMC Calculated Calculated

RM @ BHT RMF @ BHT 0.17 @ 212 0.16 @ 212

Max Recorded Temperatures 258 degF

Circulation Stopped 21-Feb-2017 21:30:00

Logger on Bottom Time 22-Feb-2017 05:35:00

Unit Number Location: OSLC-AR2 2161 Ft. Morgan

Recorded By L. Awalt

Witnessed By Jeremiah Demuth

Disclaimer

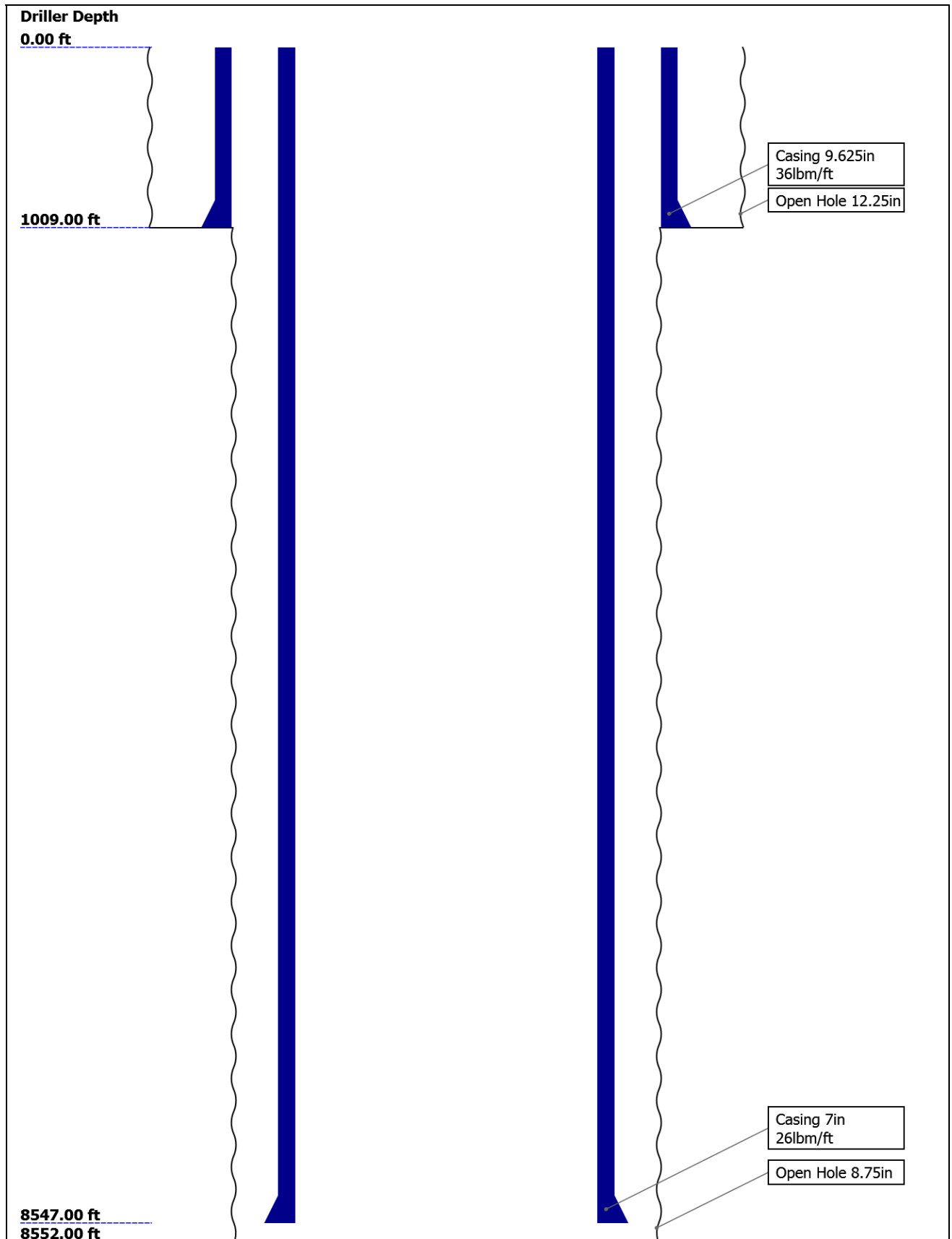
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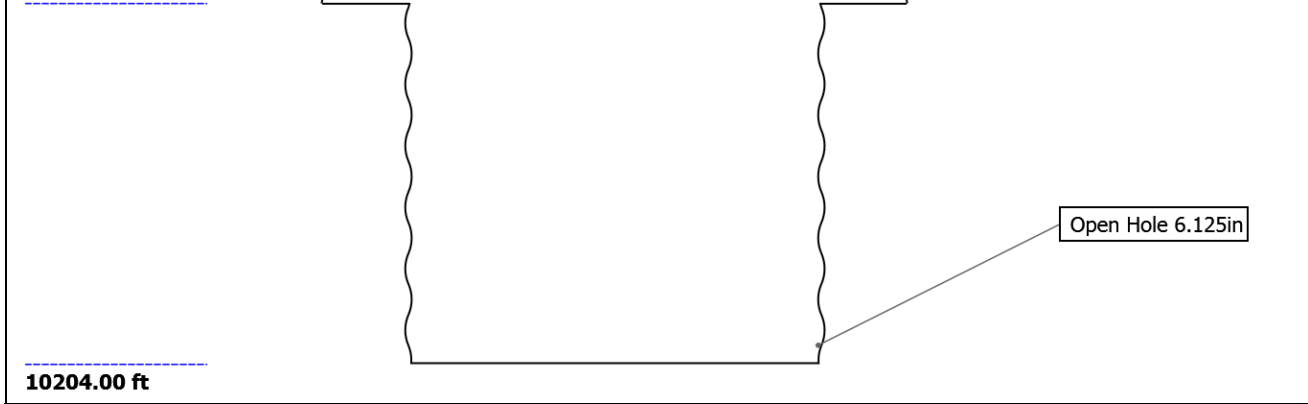
Contents

- 1. Header
- 2. Disclaimer
- 3. Contents
- 4. Well Sketch
- 5. Borehole Size/Casing/Tubing Record
- 6. Remarks and Equipment Summary
- 7. Depth Summary
- 8. ONE 5" Induction
  - 8.1 Integration Summary
  - 8.2 Software Version
  - 8.3 Composite Summary
  - 8.4 Log ( Induction-5 )
  - 8.5 Parameter Listing
- 9. ONE 5" Induction
  - 9.1 Integration Summary
  - 9.2 Software Version
  - 9.3 Composite Summary

- 9.4 Log ( Induction-5 )
- 9.5 Parameter Listing
- 10. ONE 5" Induction
  - 10.1 Composite Summary
  - 10.2 Log ( Induction-5 RA )
- 11. Calibration Report
- 12. Tail

## Well Sketch





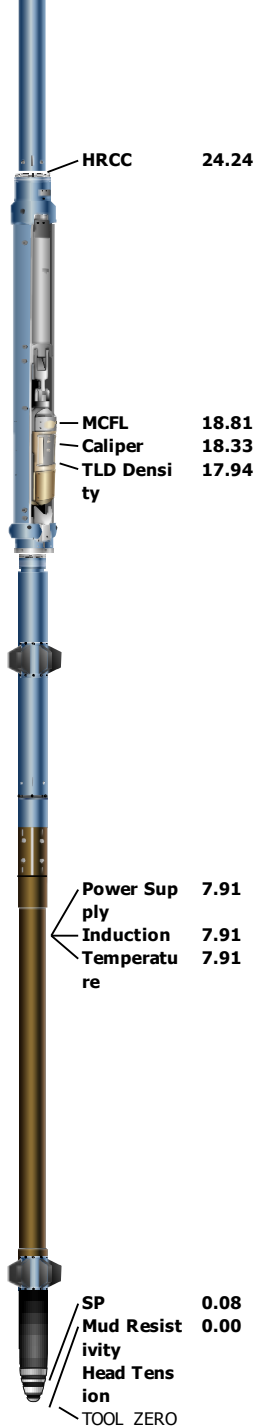
Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	12.25	8.75	6.125			
Top Driller ( ft )	0	1009	8552			
Top Logger ( ft )	0	1009	8552			
Bottom Driller ( ft )	1009	8552	10204			
Bottom Logger ( ft )	1009	8552	10201			
Casing						
Size ( in )	9.625	7				
Weight ( lbm/ft )	36	26				
Inner Diameter ( in )	8.921	6.276				
Grade	N/A	N/A				
Top Driller ( ft )	0	0				
Top Logger ( ft )	0	0				
Bottom Driller ( ft )	1009	8547				
Bottom Logger ( ft )	1009	8552				

Remarks and Equipment Summary

ONE: Toolstring				ONE: Remarks	
Equip name	Length	MP name	Offset	Thank you for choosing Schlumberger!	
LEH-QT	43.57			Run ONE: Log ran for open hole formation evaluation	
				Run ONE: Tool ran eccentralized as per tool sketch	
DTC-H	40.65	CTEM HV	39.75 0.00	Run ONE: Sandstone Matrix of 2.65g/cc used for TD-9800 & 8780 - Surface as per client req	
		TelStatus	37.65	Run ONE: Limestone Matrix of 2.71g/cc used for 9800-8780 as per client request.	
		ToolStatus	37.65	Run TWO: Log ran for casing and cement evaluation	
		Temperature	37.62	Run TWO: Tool ran centralized with two knuckles as per tool sketch	
HGNS-H	37.65	GR	36.91		
HGNH					
NPV-N					
NSR-F:5069					
HMCA-H					
HGNS-H					
HACCZ-H					
		CNL Porosity	30.57		
		HGNS	28.24		
		HMCA	28.24		
		Accelerometer	0.00		
HDPS-H	28.24				

HRMS-H  
ECH-MEB  
HRCC-H  
HRMS-H  
Backscatter  
GPV-Q  
Short Spacing  
:27786  
Long Spacing  
GSR-J:5471  
HRGD-H:4899



Lengths are in ft  
Maximum Outer Diameter = 9.000 in  
Line: Sensor Location, Value: Gating Offset  
All measurements are relative to TOOL\_ZERO

Depth Summary

ONE		
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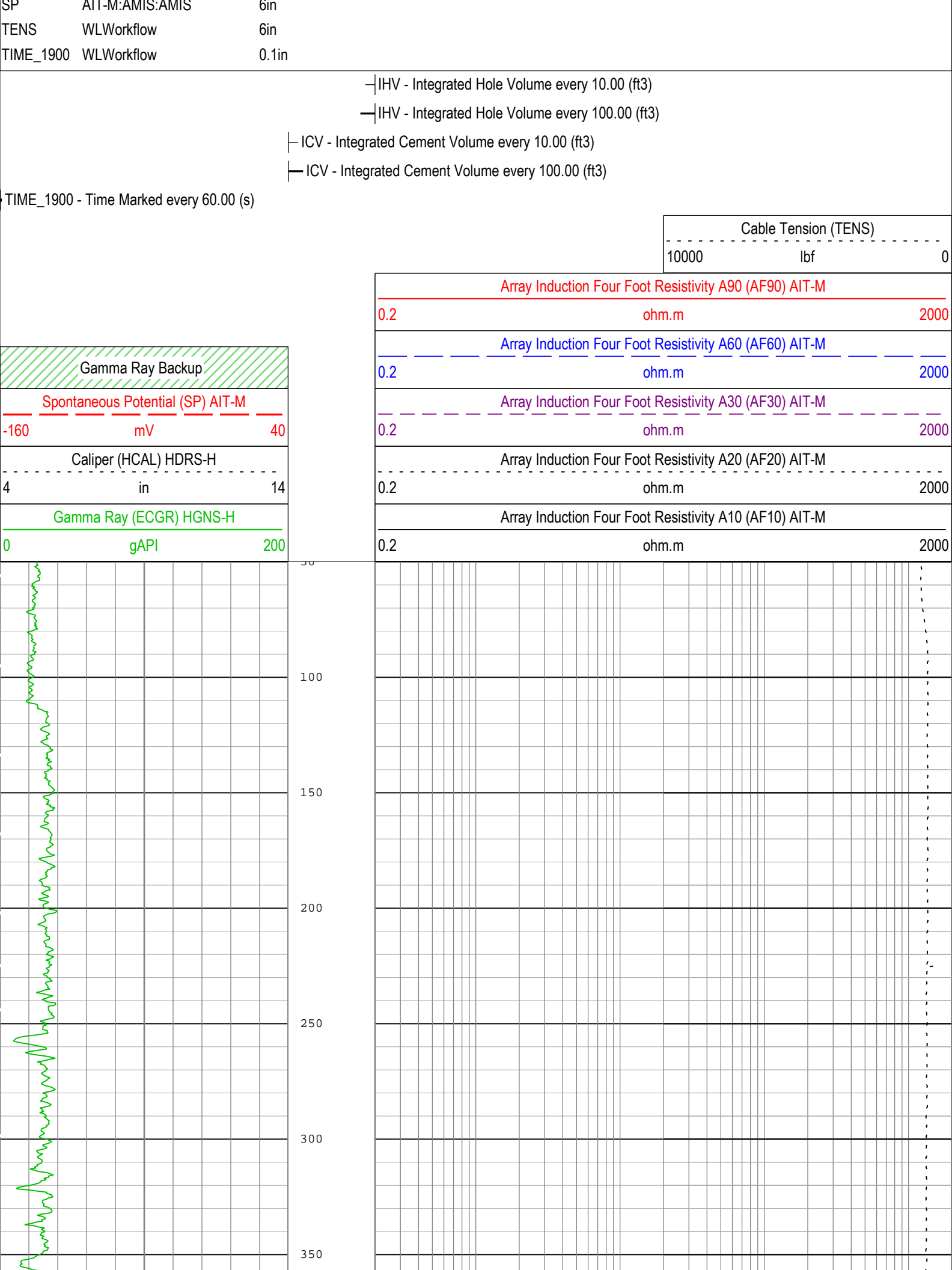
Depth Measuring Device

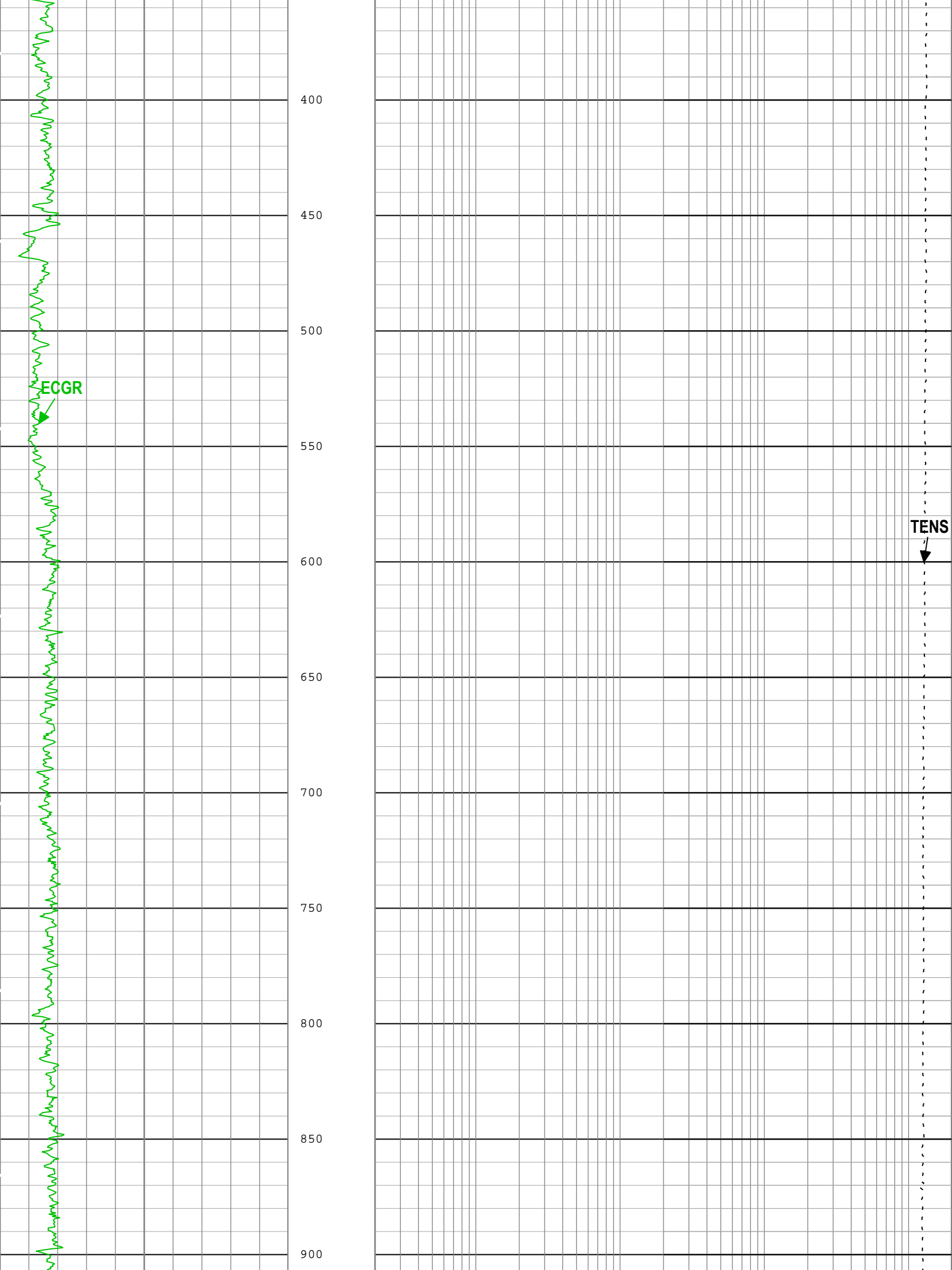
Type	IDW-B		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	0		
Wheel Correction 2	0		

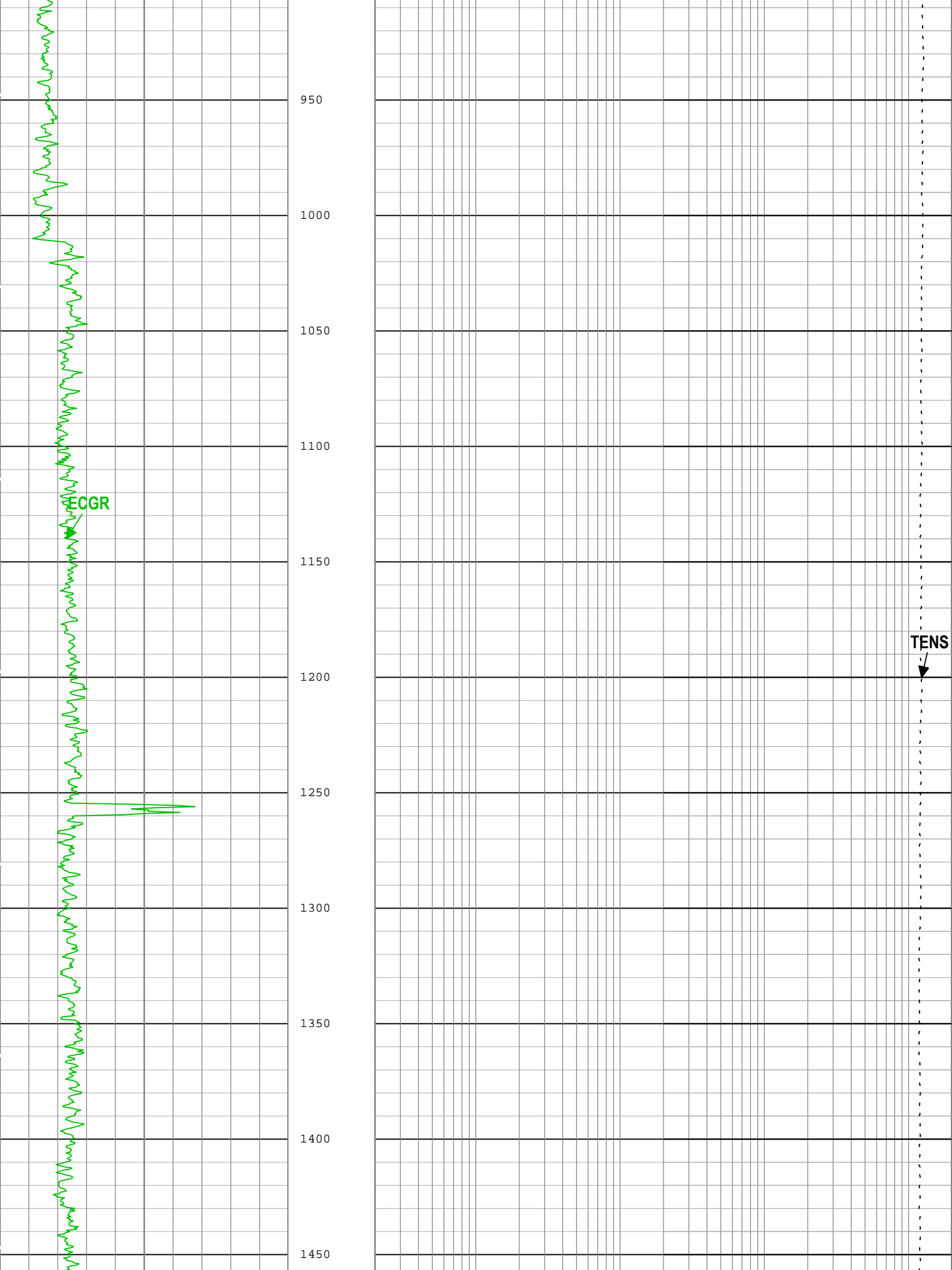
Tension Device

Type	CMTD-B/A		
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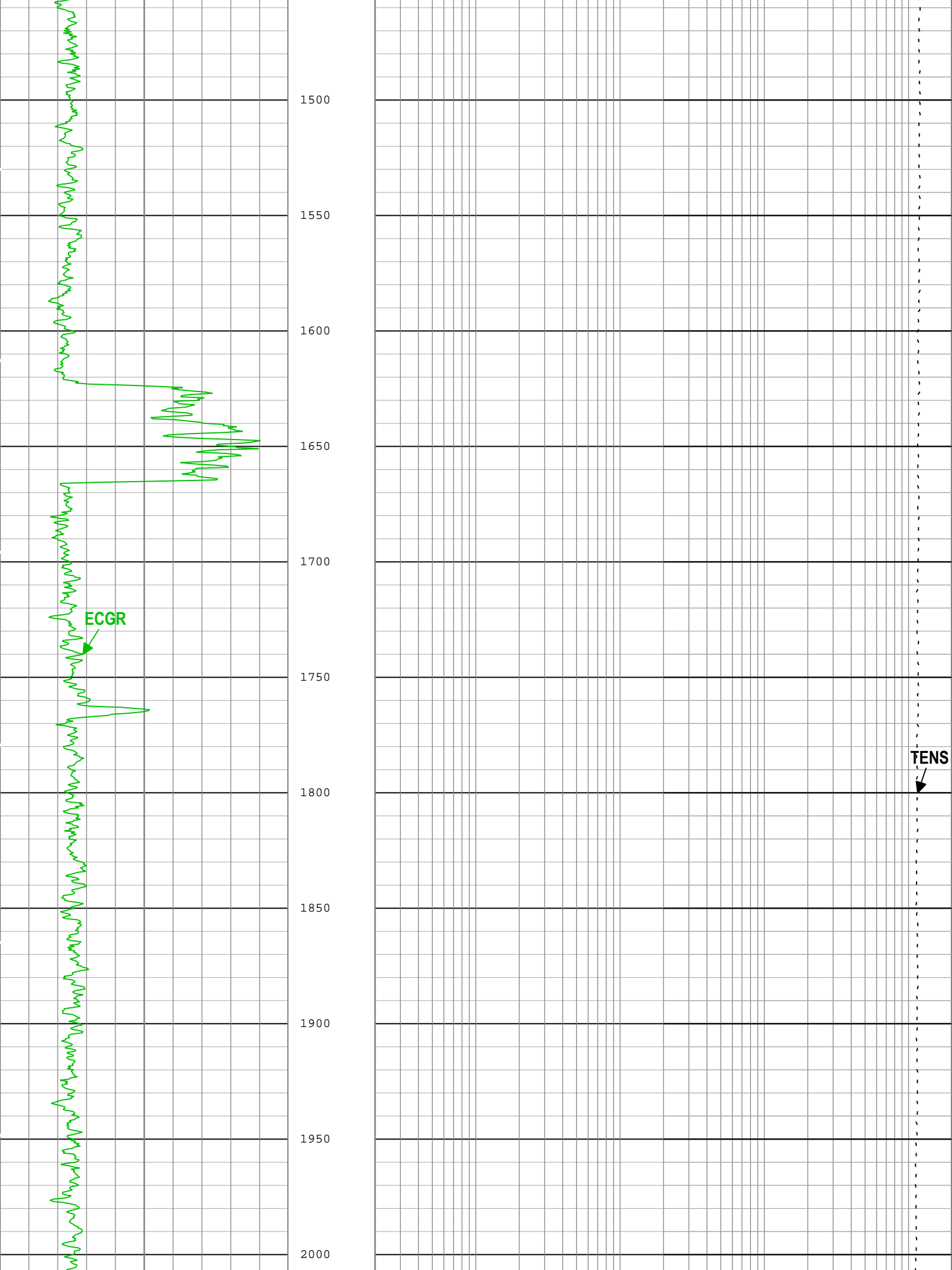
Serial Number									
Calibration Date									
Calibrator Serial Number									
Number of Calibration Points	0								
Logging Cable									
Type	7-46NT-XS								
Serial Number									
Length	24000.00 ft								
Conveyance Type	Wireline								
Rig Type	Ensign 121								
ONE:Depth Control Parameters		Depth Control Remarks							
Log Sequence	First Log In the Well								
Rig Up Length At Surface									
Rig Up Length At Bottom									
Rig Up Length Correction									
Stretch Correction									
Tool Zero Check At Surface									
ONE									
5" Induction									
Integration Summary									
Output Channel(s)	Output Description	Input Parameter	Output Value	Unit					
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	195.51	ft3					
IHV	Integrated Hole Volume	GCSE_UP_PASS	379.8	ft3					
Software Version									
Acquisition System			Version						
Maxwell 2017 SP1			7.1.82245.3100						
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[3]:Up	Up	13.94 ft	10220.98 ft	22-Feb-2017 5:31:59 AM	22-Feb-2017 8:02:44 AM	ON	-0.03 ft	Yes
All depths are referenced to toolstring zero									
Log	Company:Expedition Water Solutions LLC      Well:EWS 4 ONE: Log[3]:Up:S015								
Description: AIT Basic Log Two    Format: Log ( Induction-5 )    Index Scale: 2 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 24-Feb-2017 08:55:41									
Channel	Source	Sampling							
AF10	AIT-M:AMIS:AMIS	3in							
AF20	AIT-M:AMIS:AMIS	3in							
AF30	AIT-M:AMIS:AMIS	3in							
AF60	AIT-M:AMIS:AMIS	3in							
AF90	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	3in							

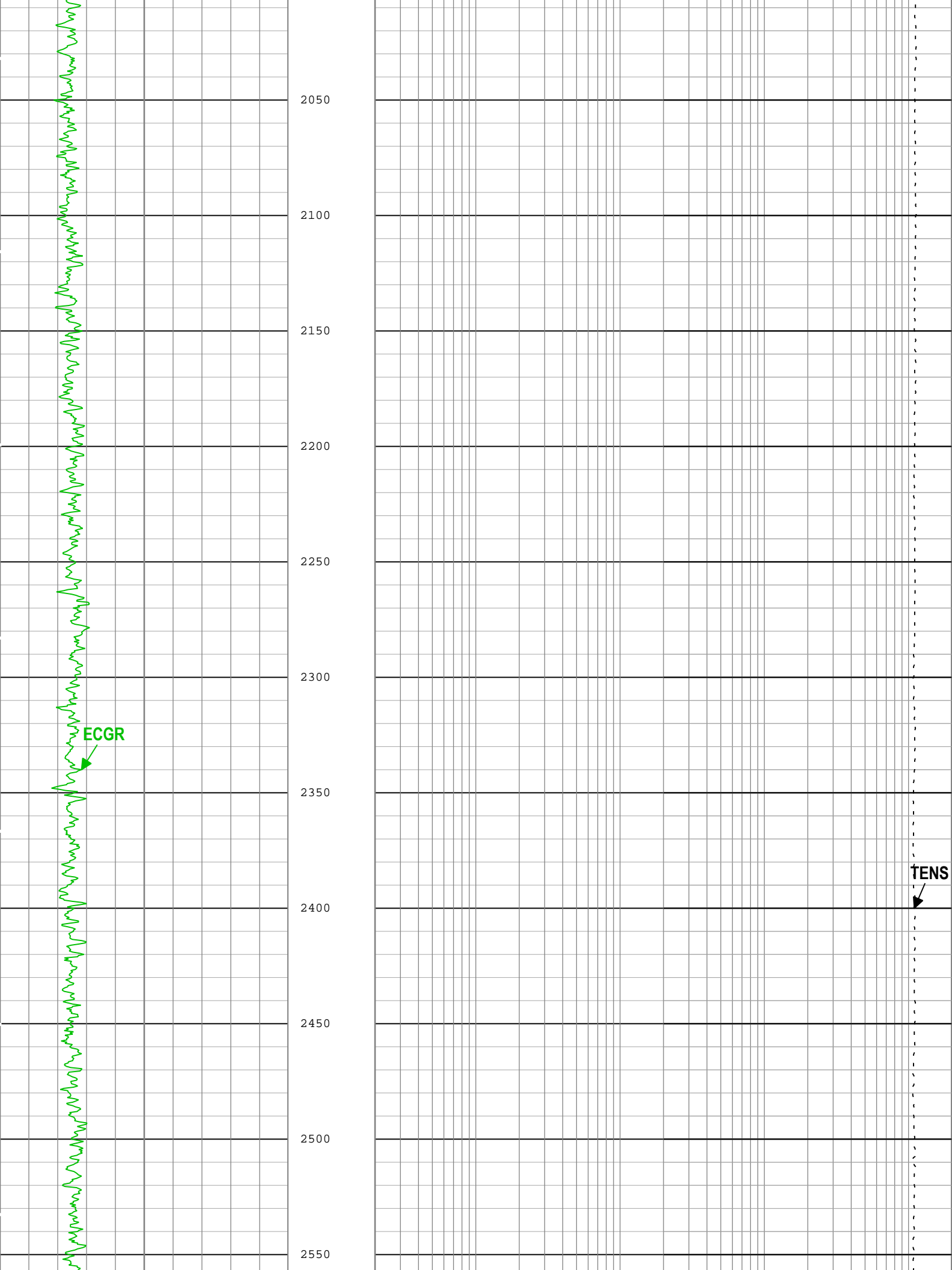


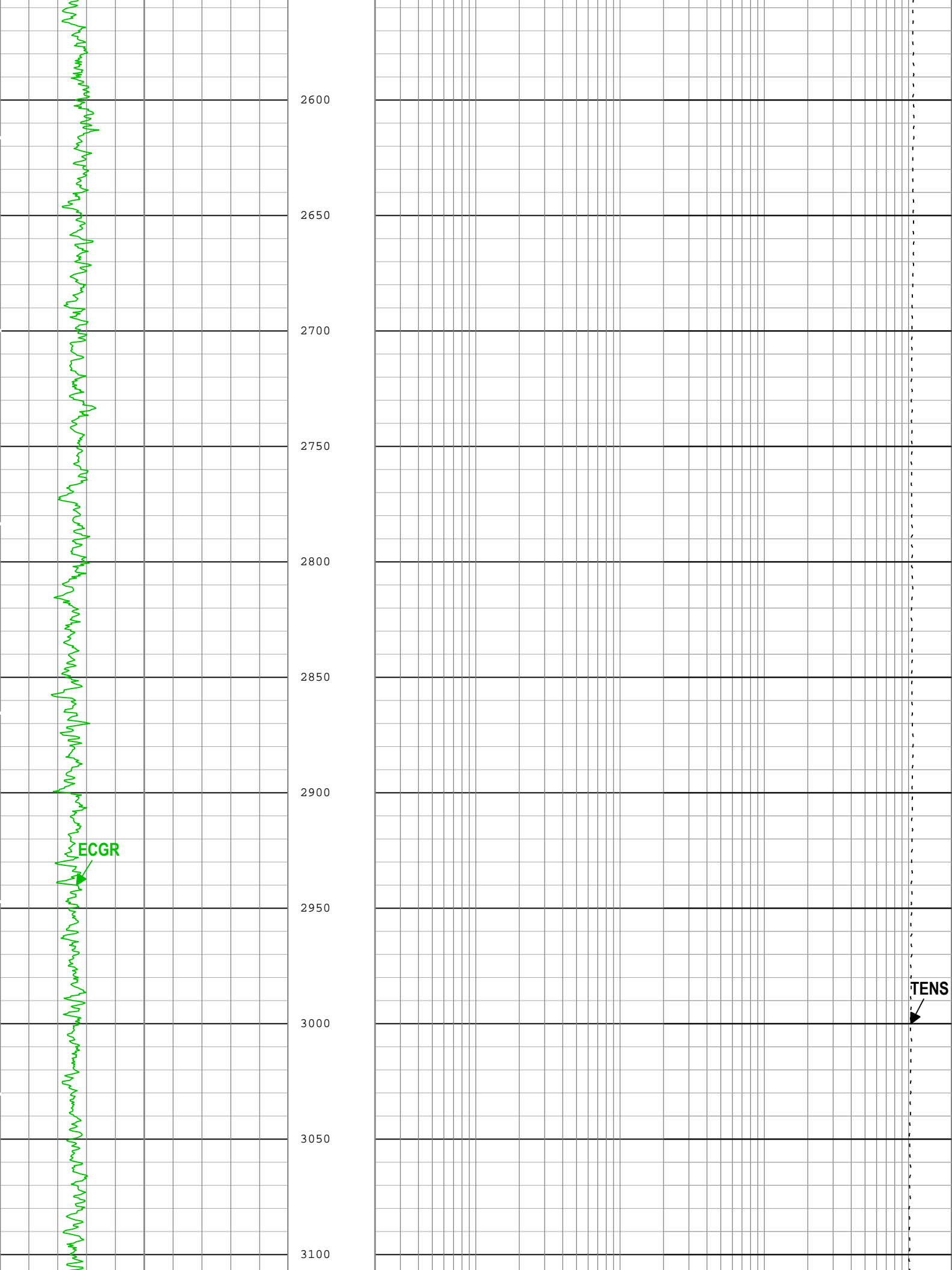


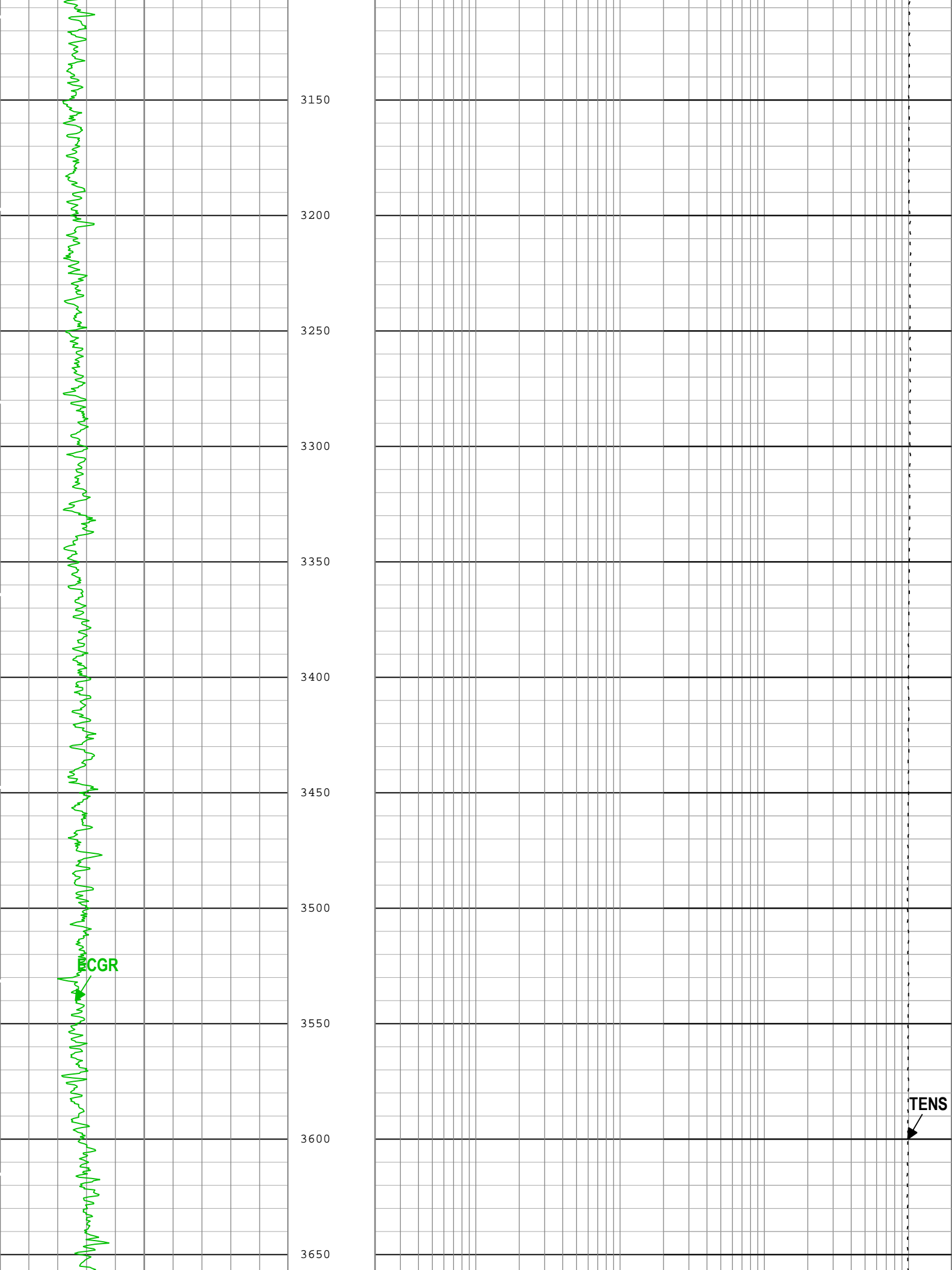


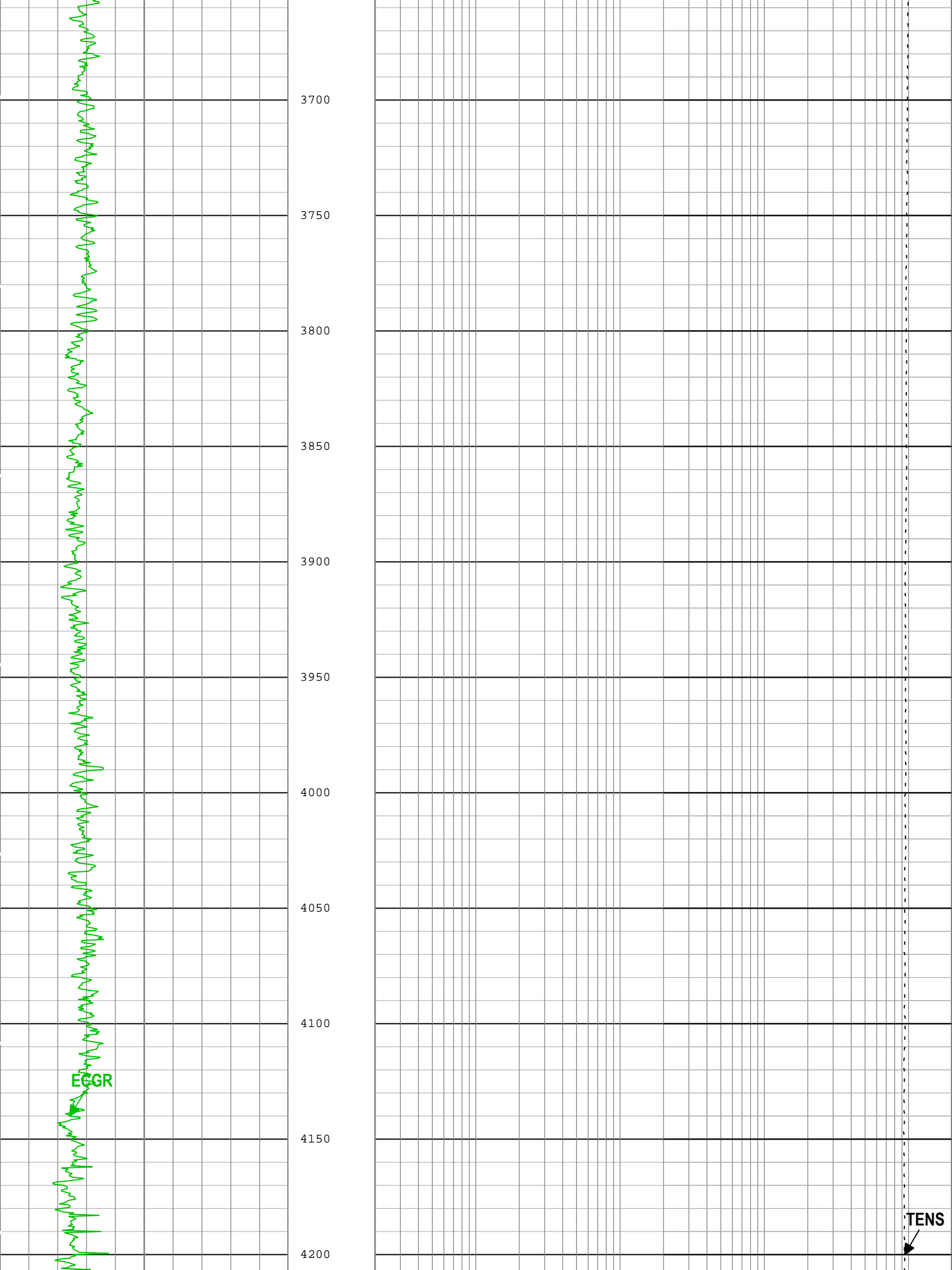


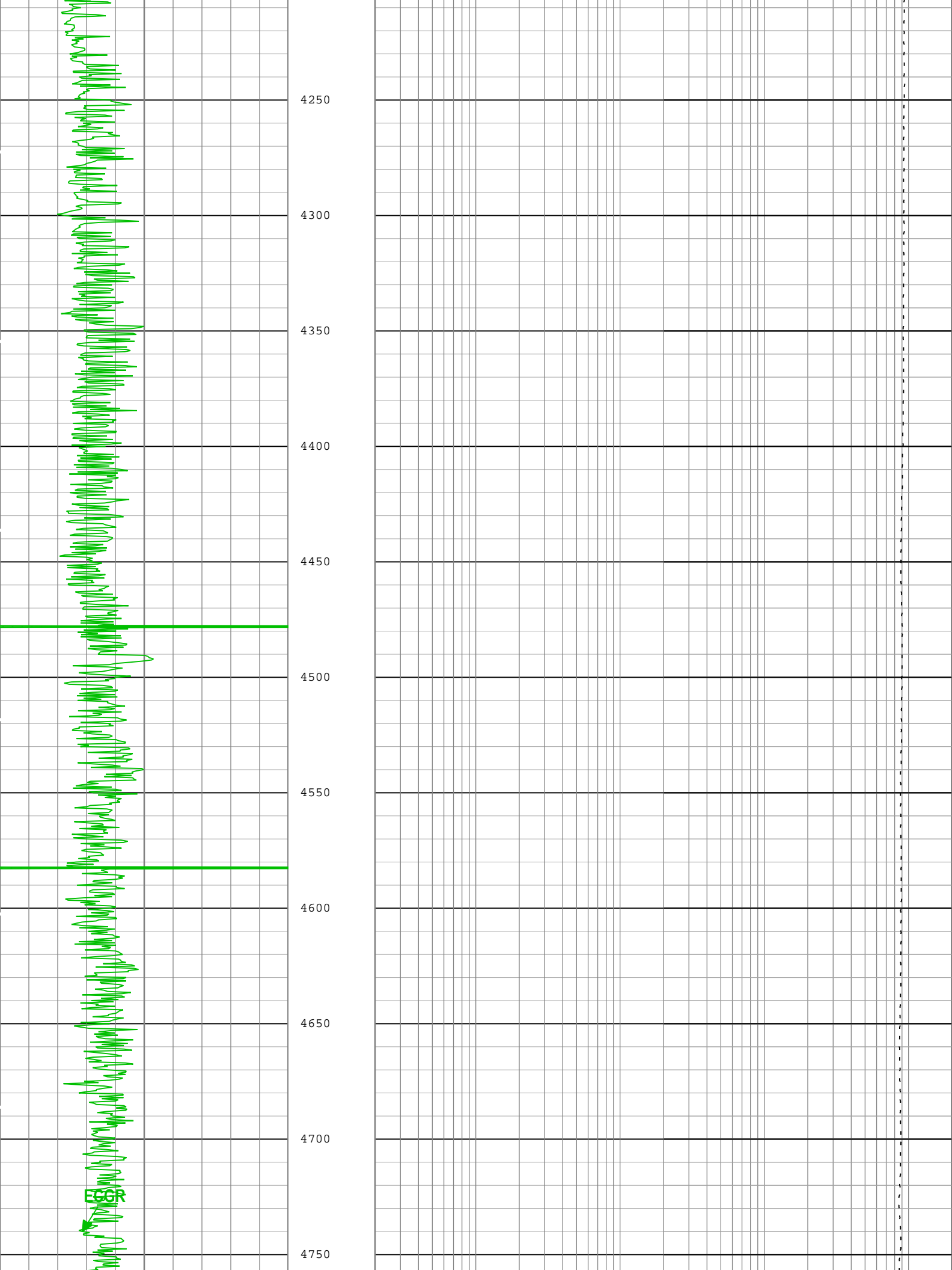


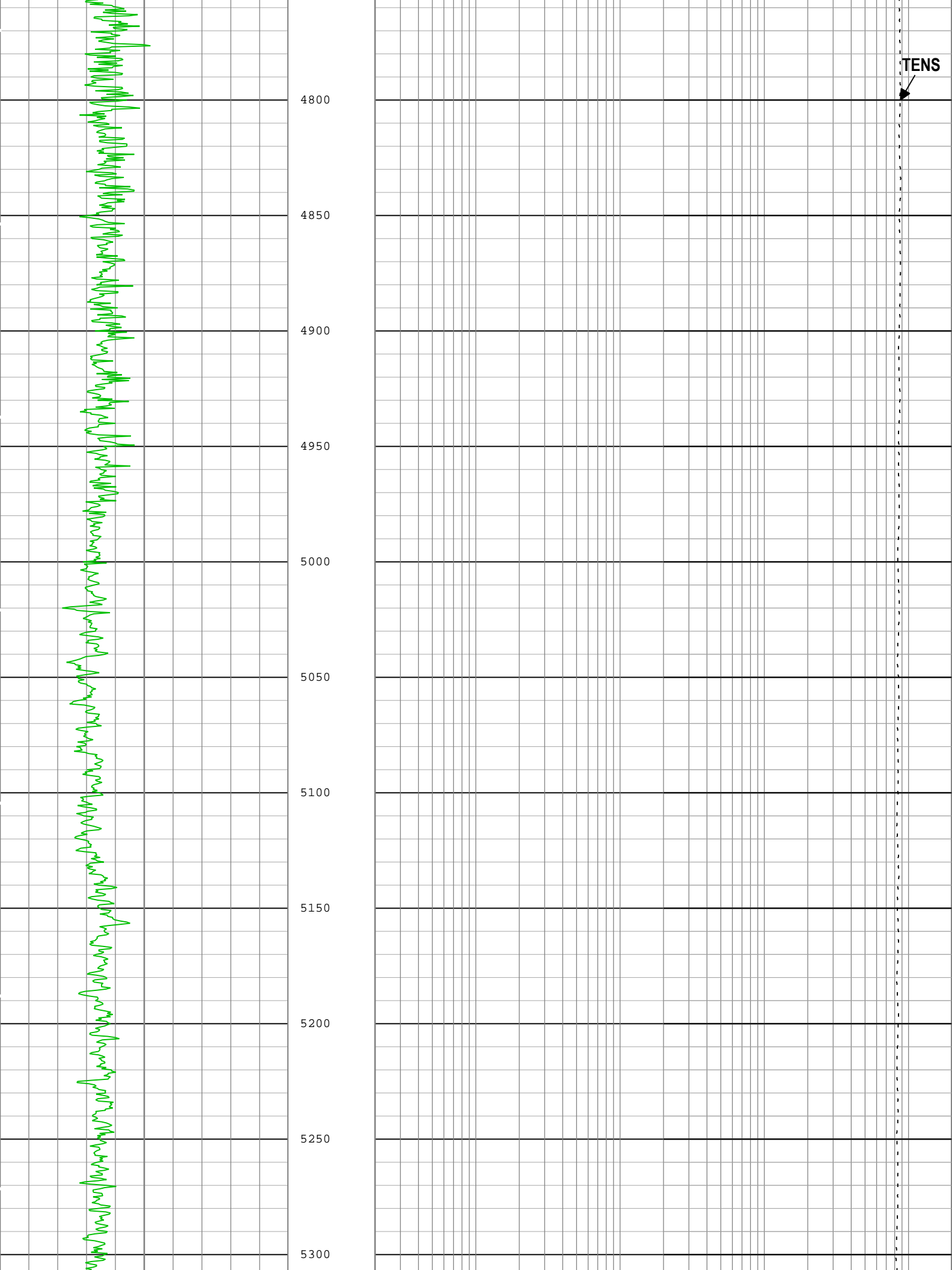


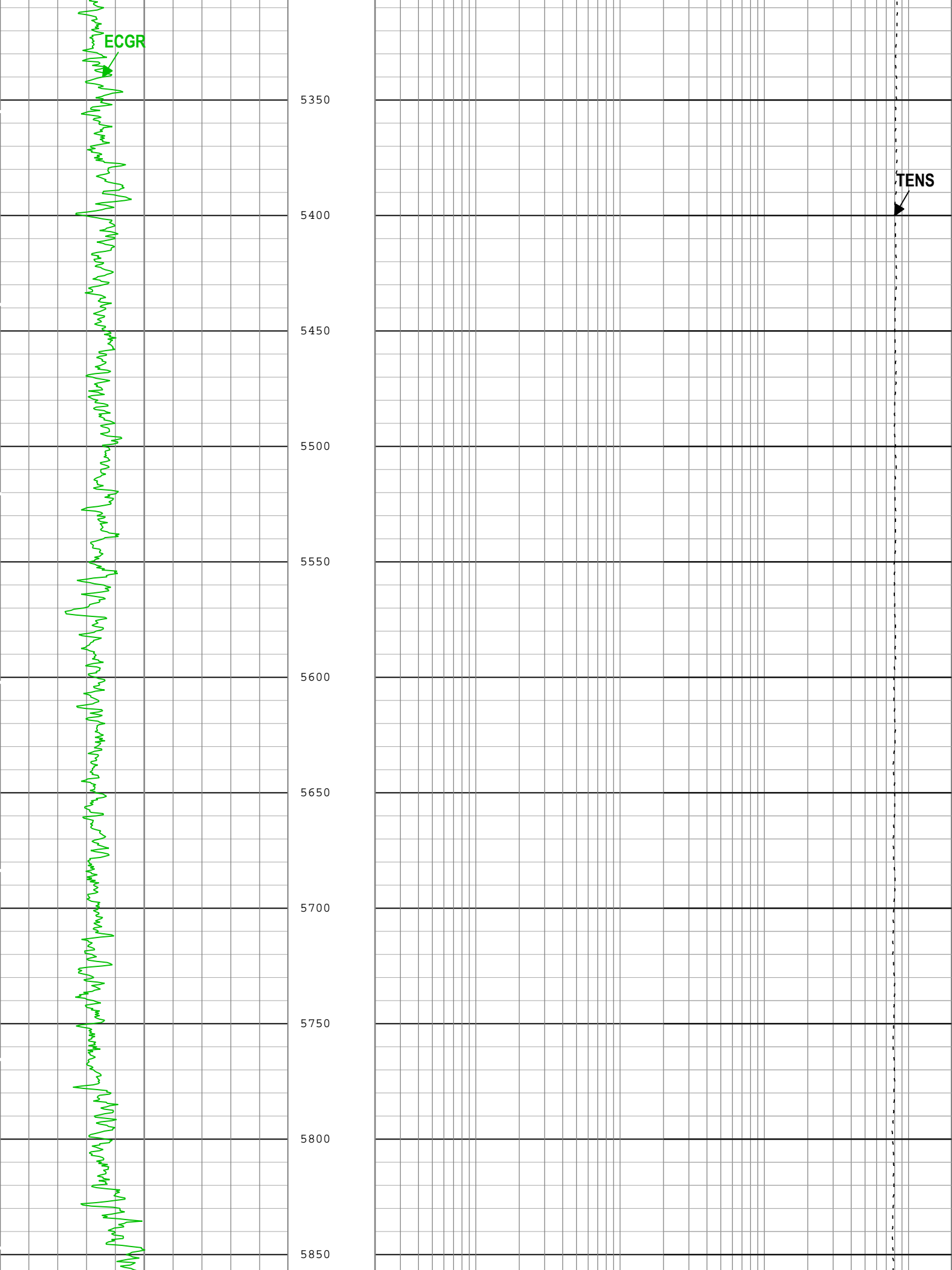




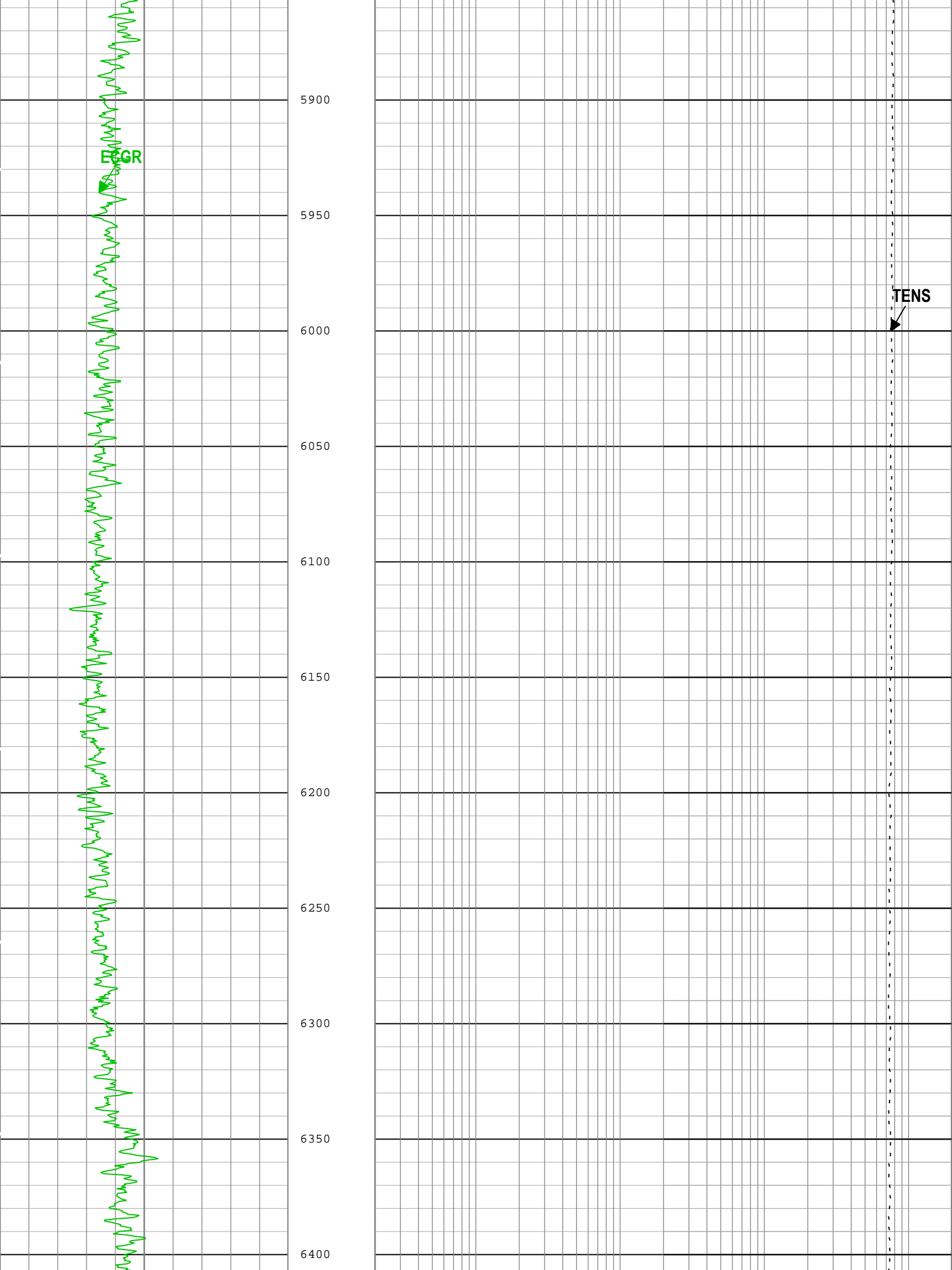


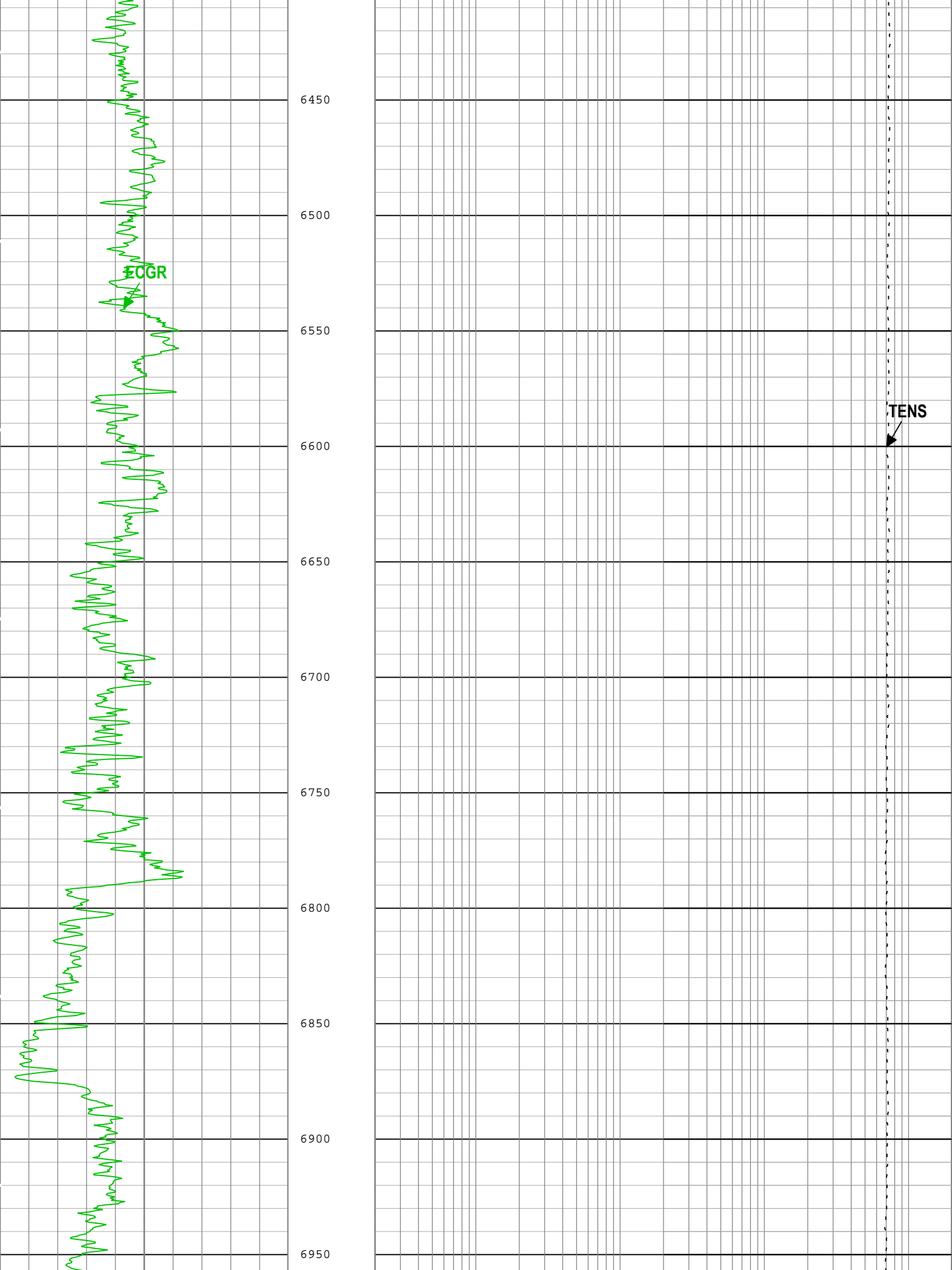


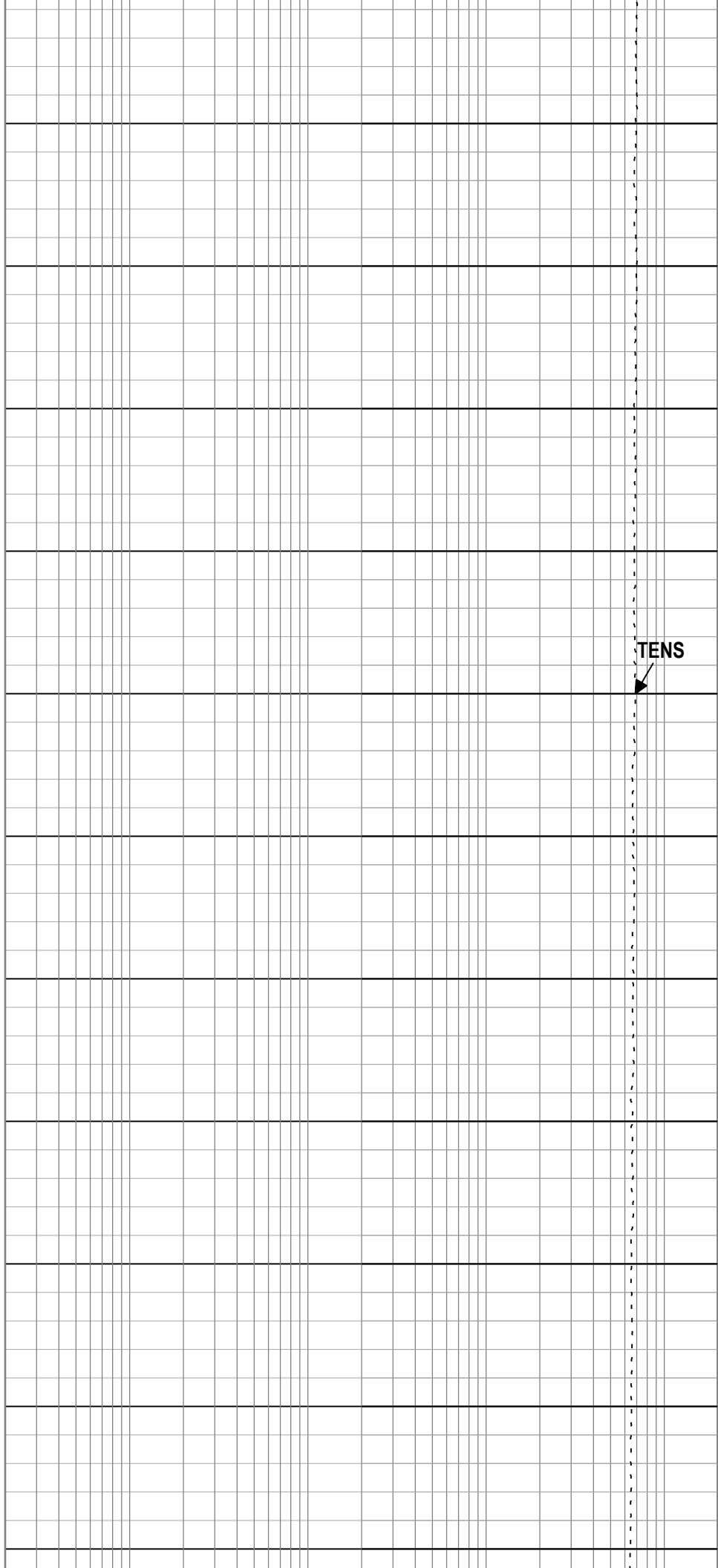
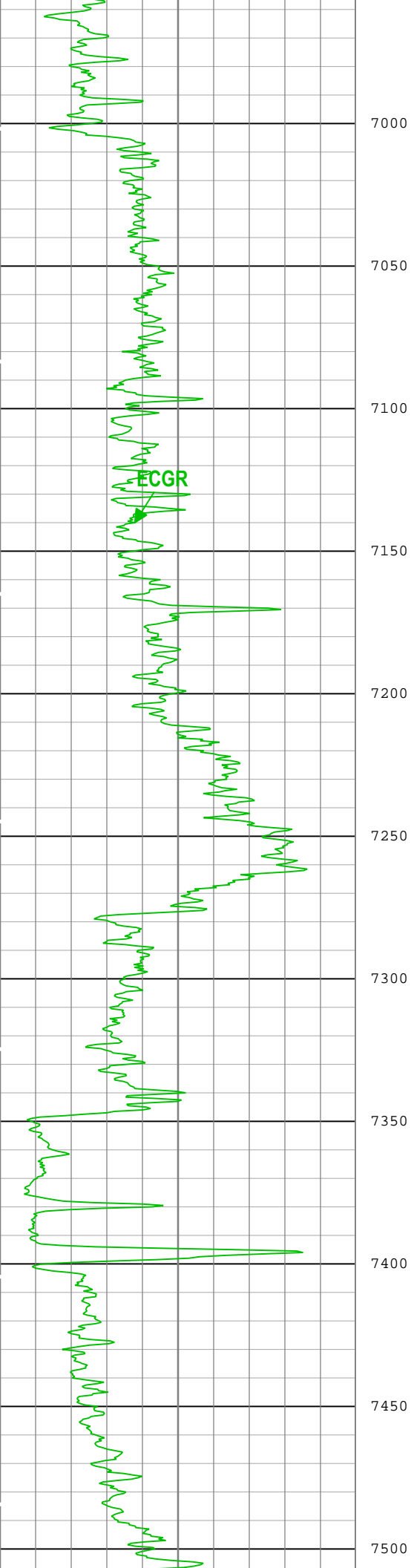


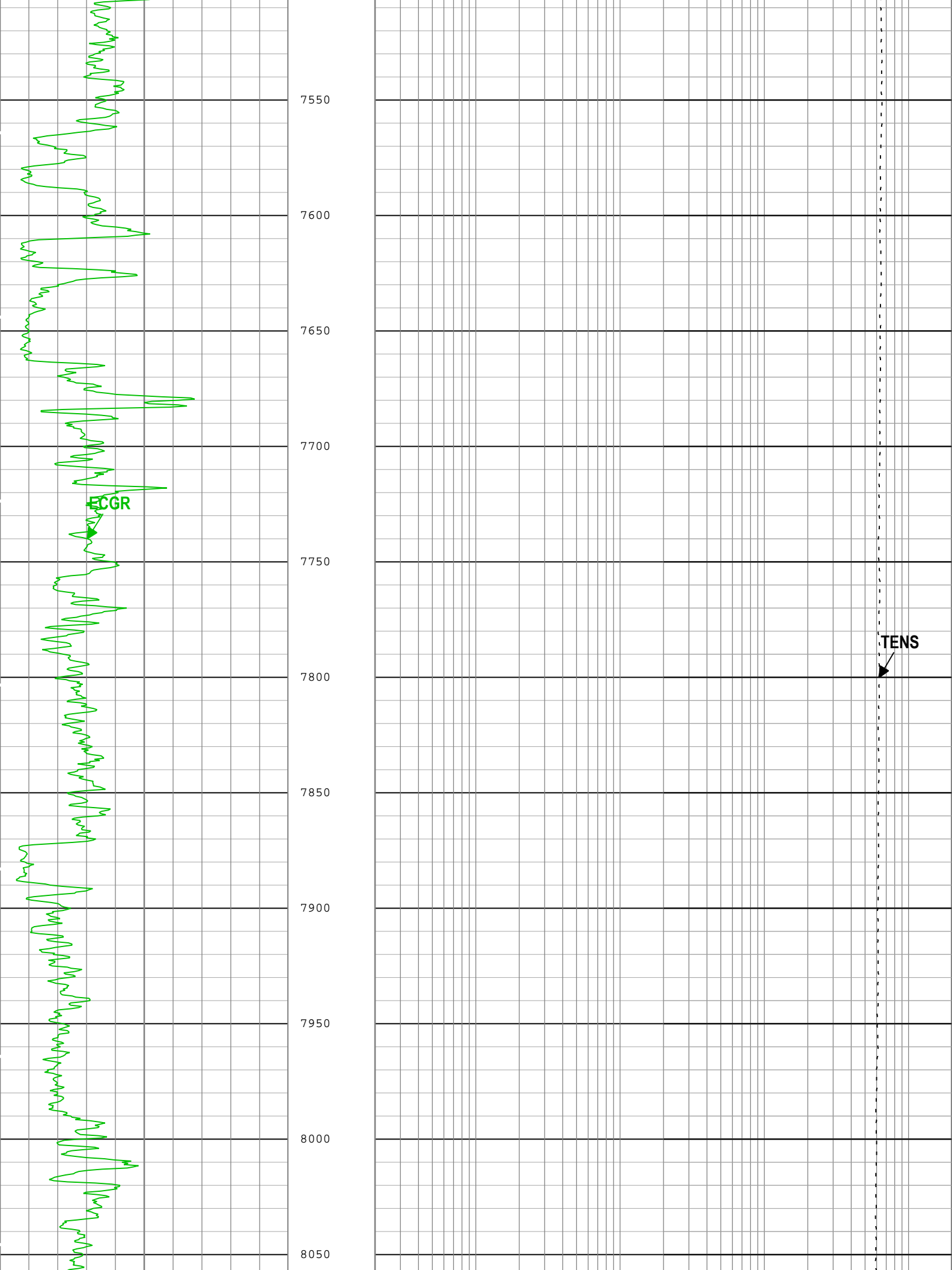


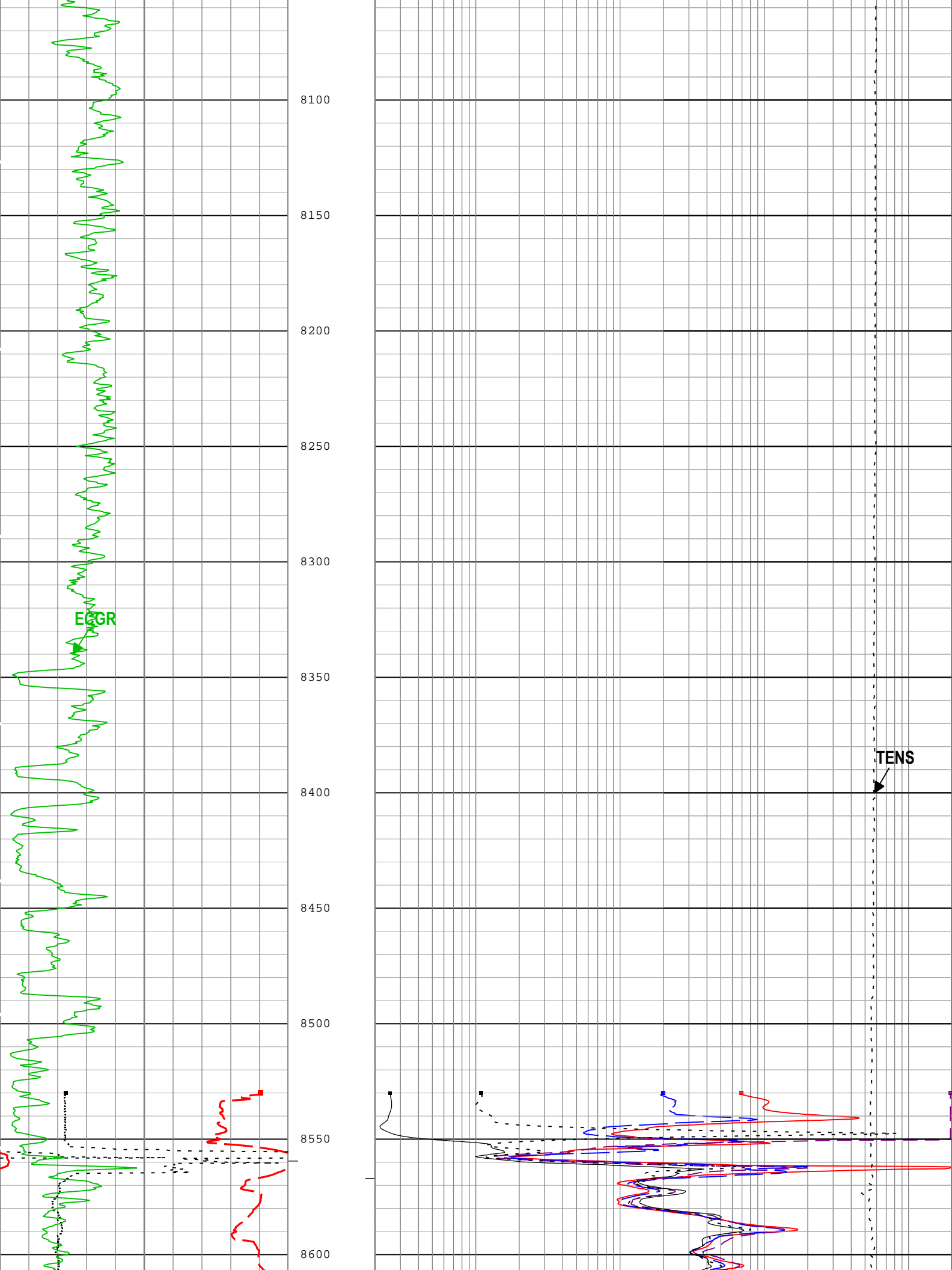


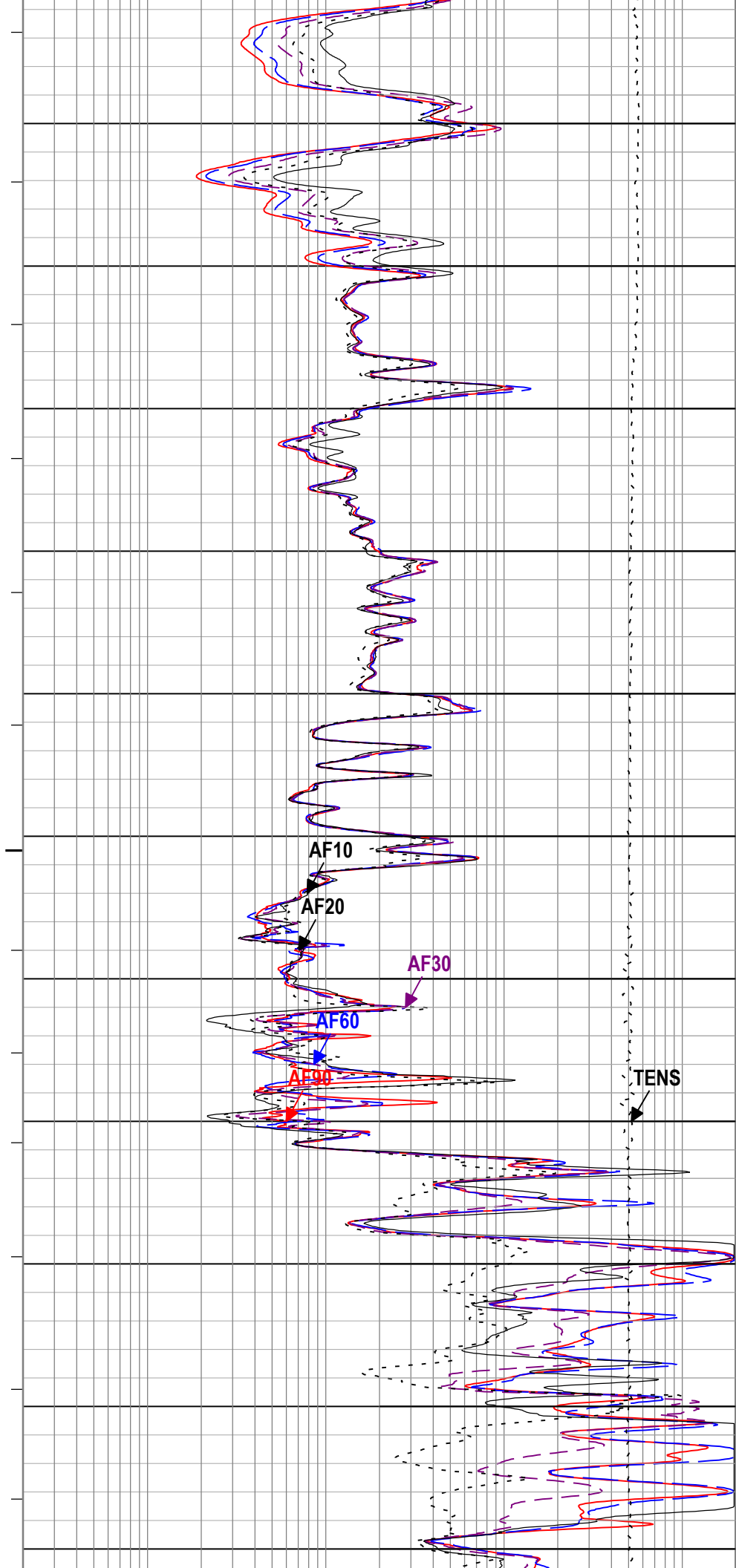
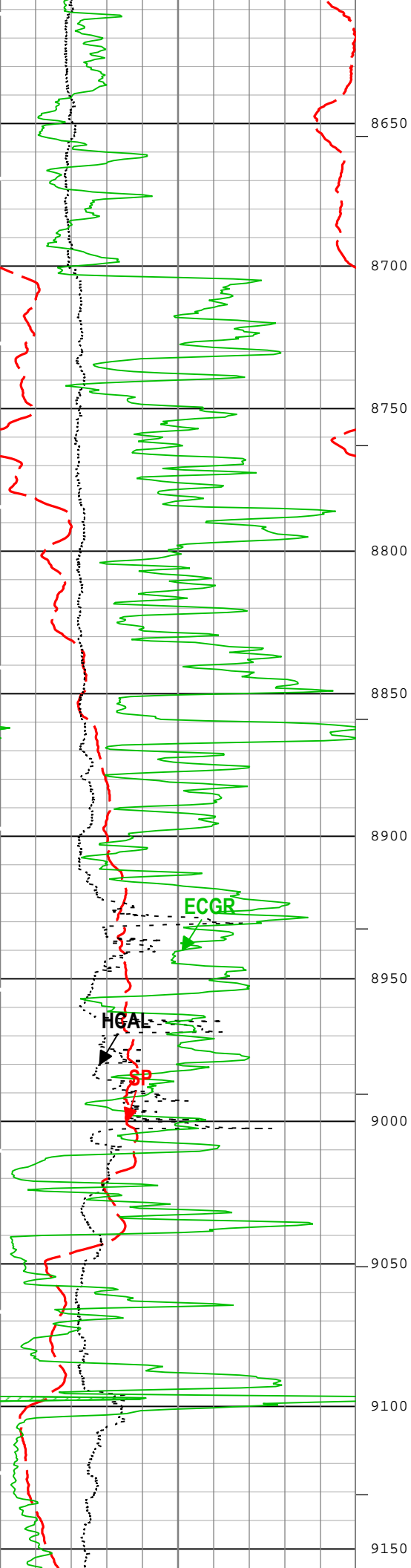


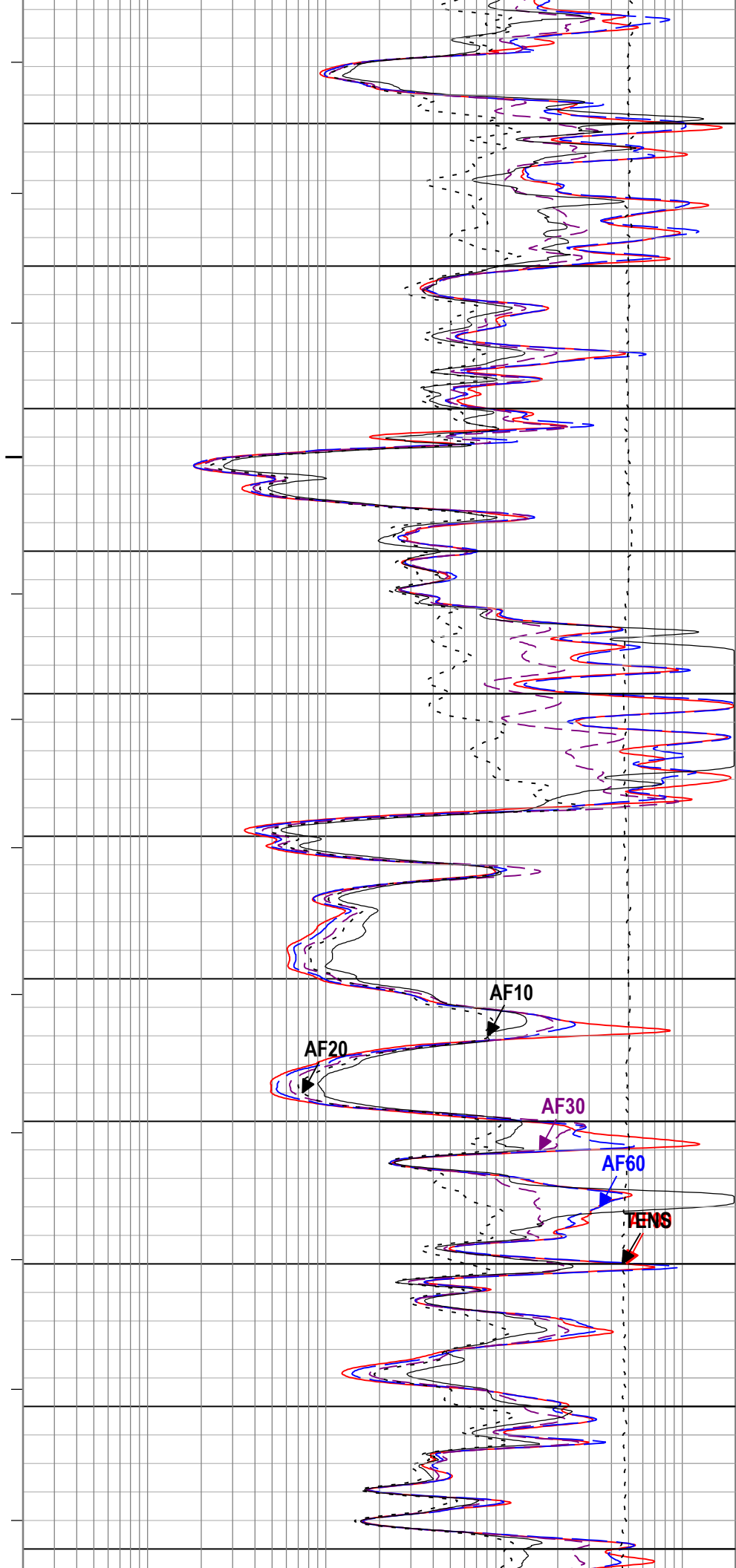
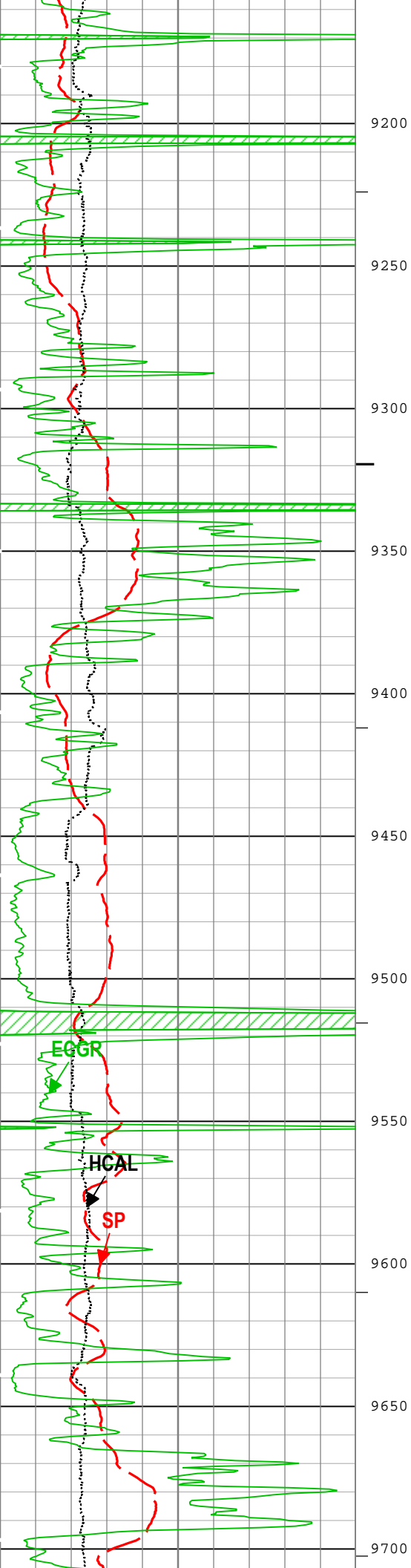


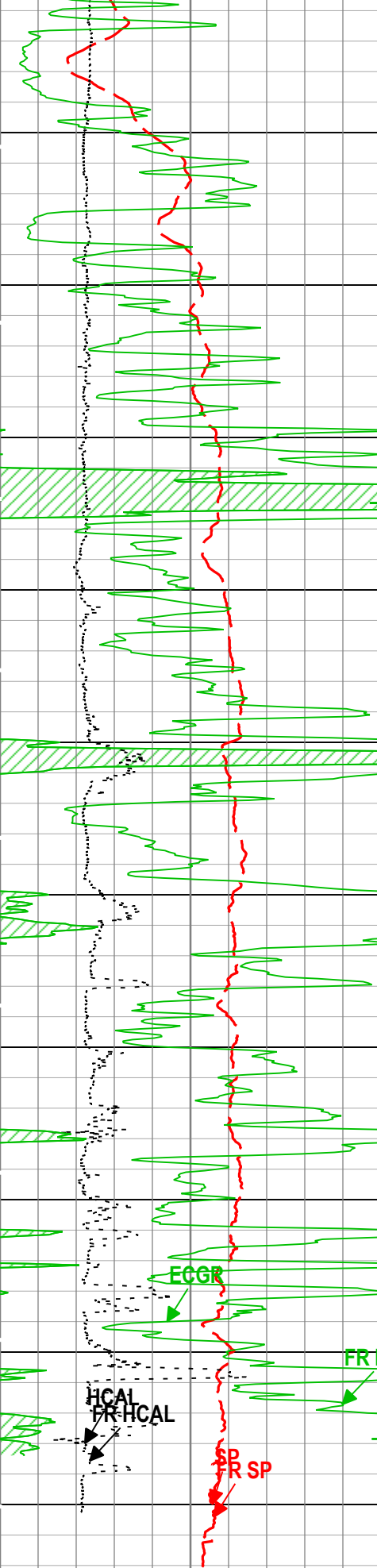




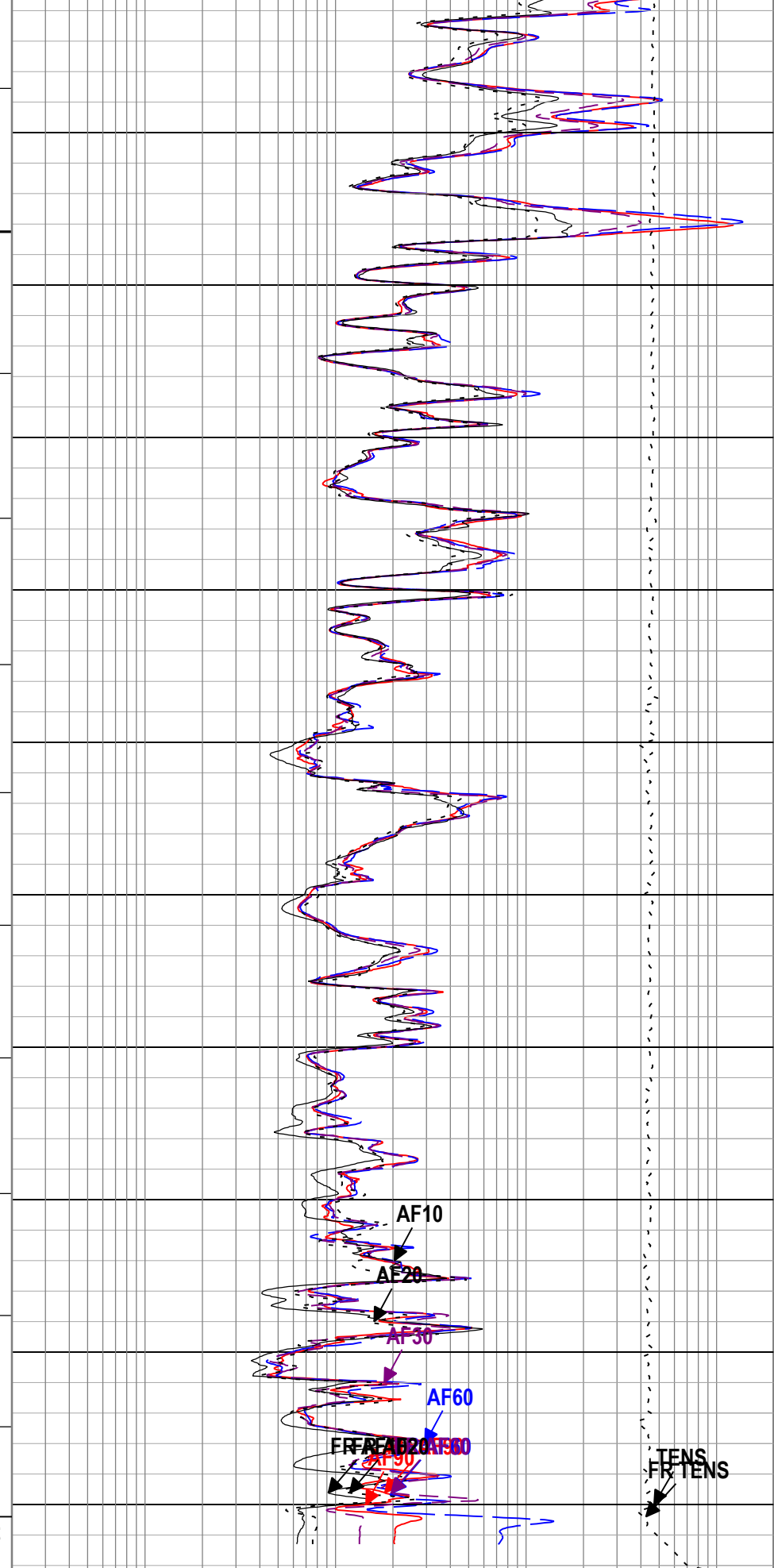
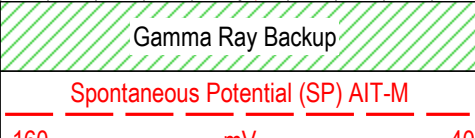








9750  
9800  
9850  
9900  
9950  
10000  
10050  
10100  
10204.00ft





0.0	mv	40
Caliper (HCAL) HDRS-H		
4	in	14
Gamma Ray (ECGR) HGNS-H		
0	gAPI	200

0.2	ohm.m	2000
Array Induction Four Foot Resistivity A30 (AF30) AIT-M		
0.2	ohm.m	2000
Array Induction Four Foot Resistivity A20 (AF20) AIT-M		
0.2	ohm.m	2000
Array Induction Four Foot Resistivity A10 (AF10) AIT-M		
0.2	ohm.m	2000
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 ( Induction-5 )    Index Scale: 2 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 24-Feb-2017 08:55:41

## Channel Processing Parameters

### ONE: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
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	-0.01	in
CBLO	Casing Bottom (Logger)	WLSESSION	8552	ft
CDEN	Cement Density	HGNS-H	1.58	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	7	in
DFD	Drilling Fluid Density	Borehole	9.1	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
FCD	Future Casing (Outer) Diameter	WLSESSION	4.5	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	50	1009
BS	8.75	1009	8552
BS	6.125	8552	10201

All depth are actual.

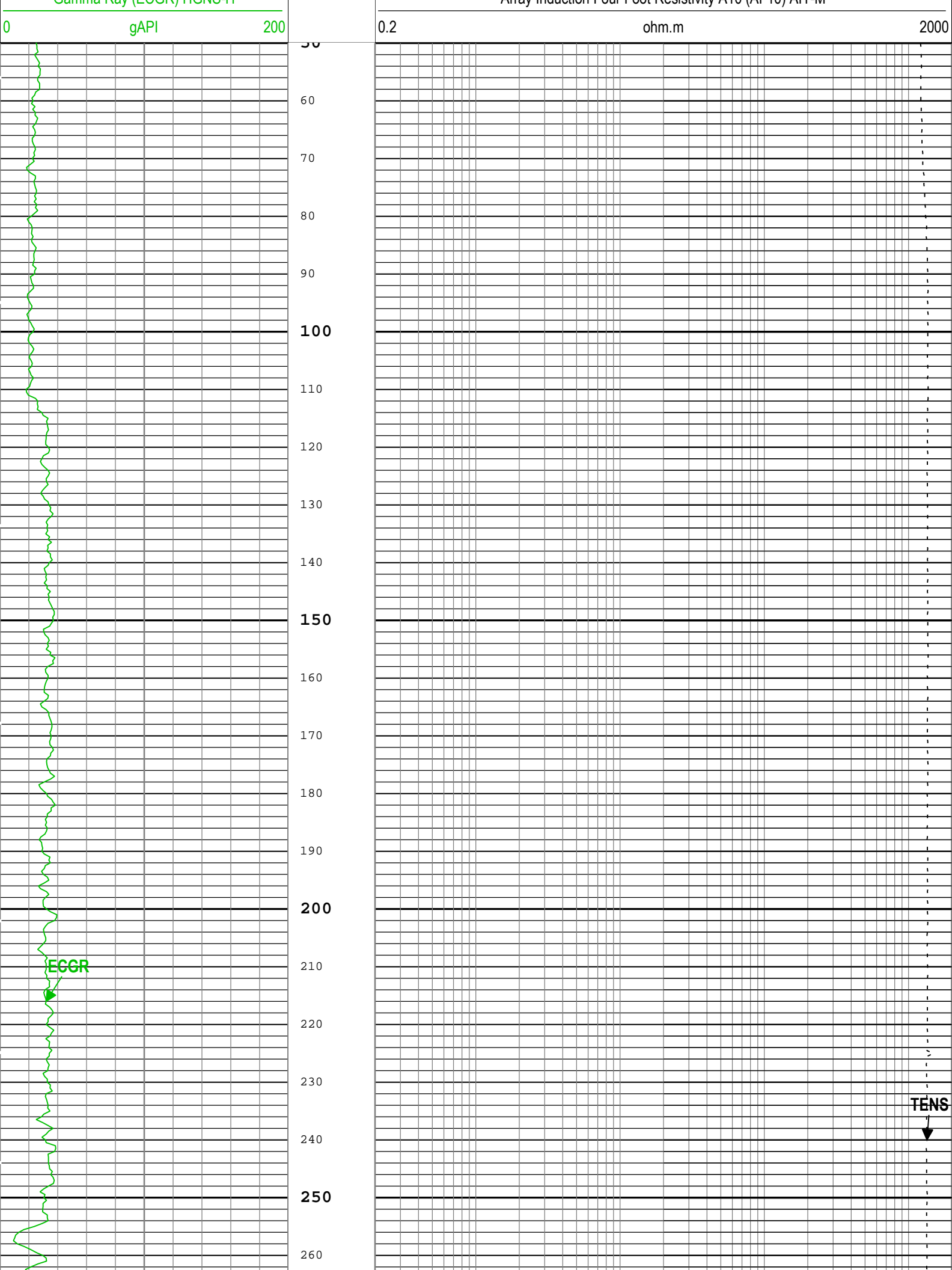
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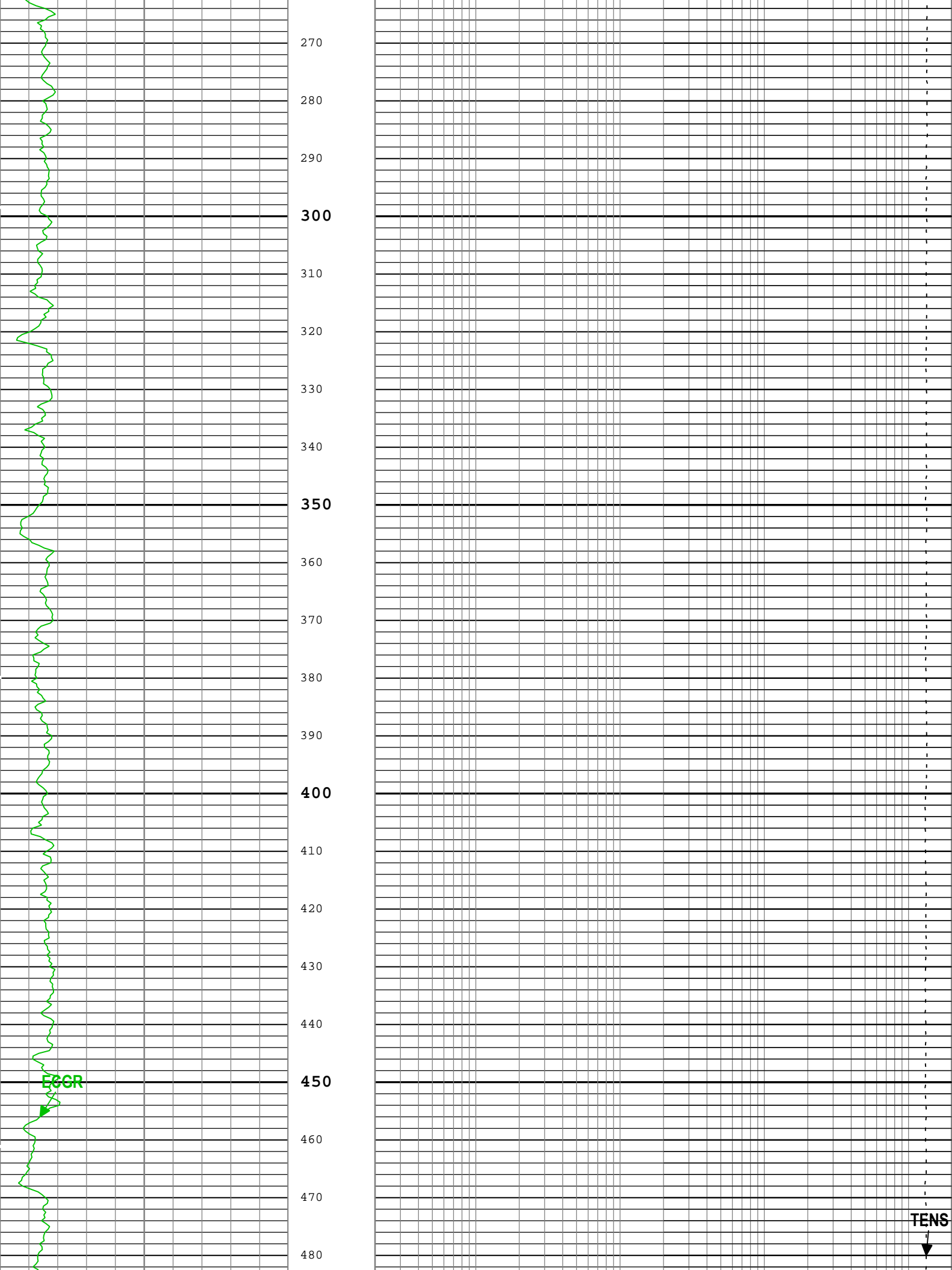
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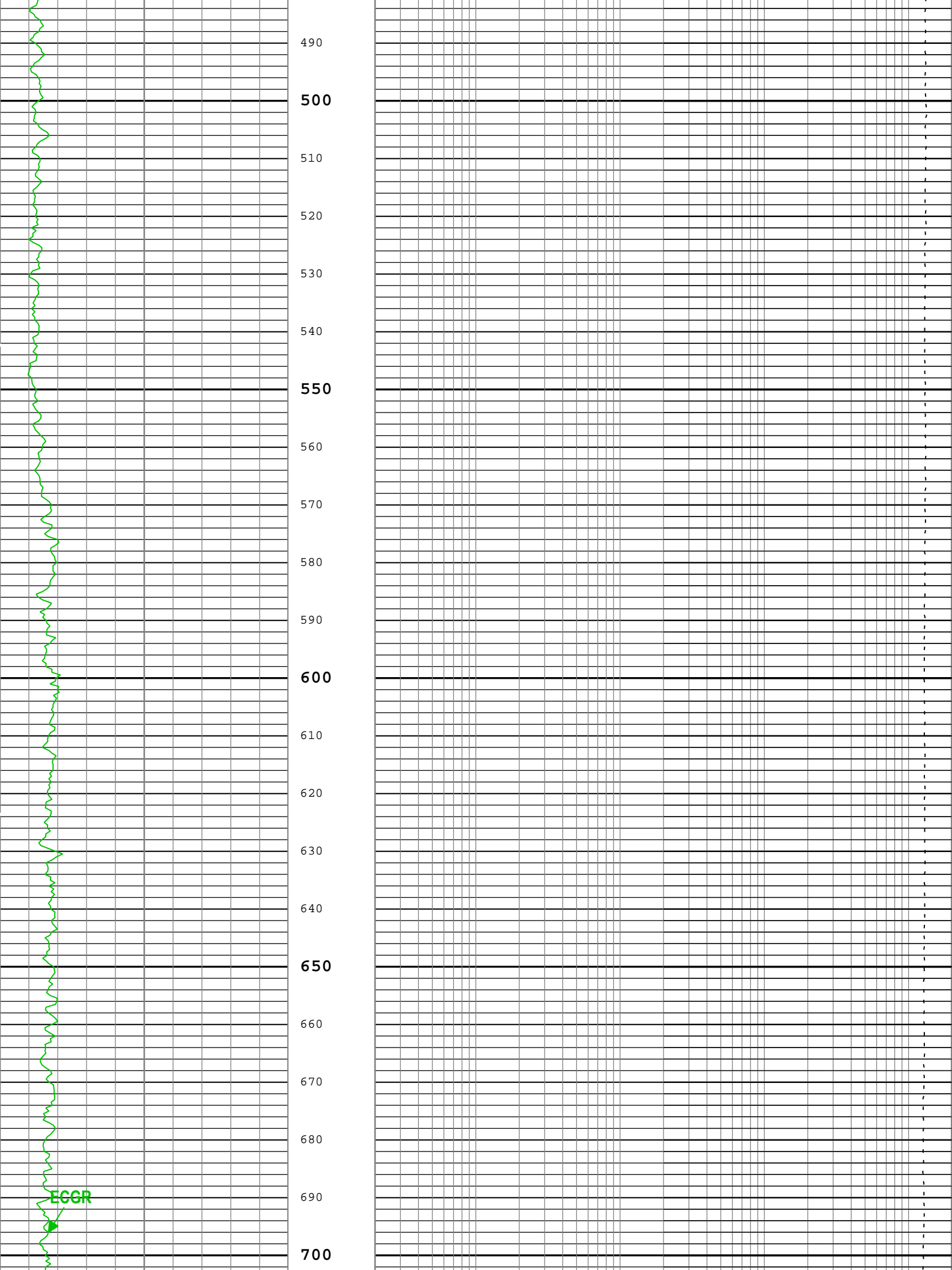
Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h

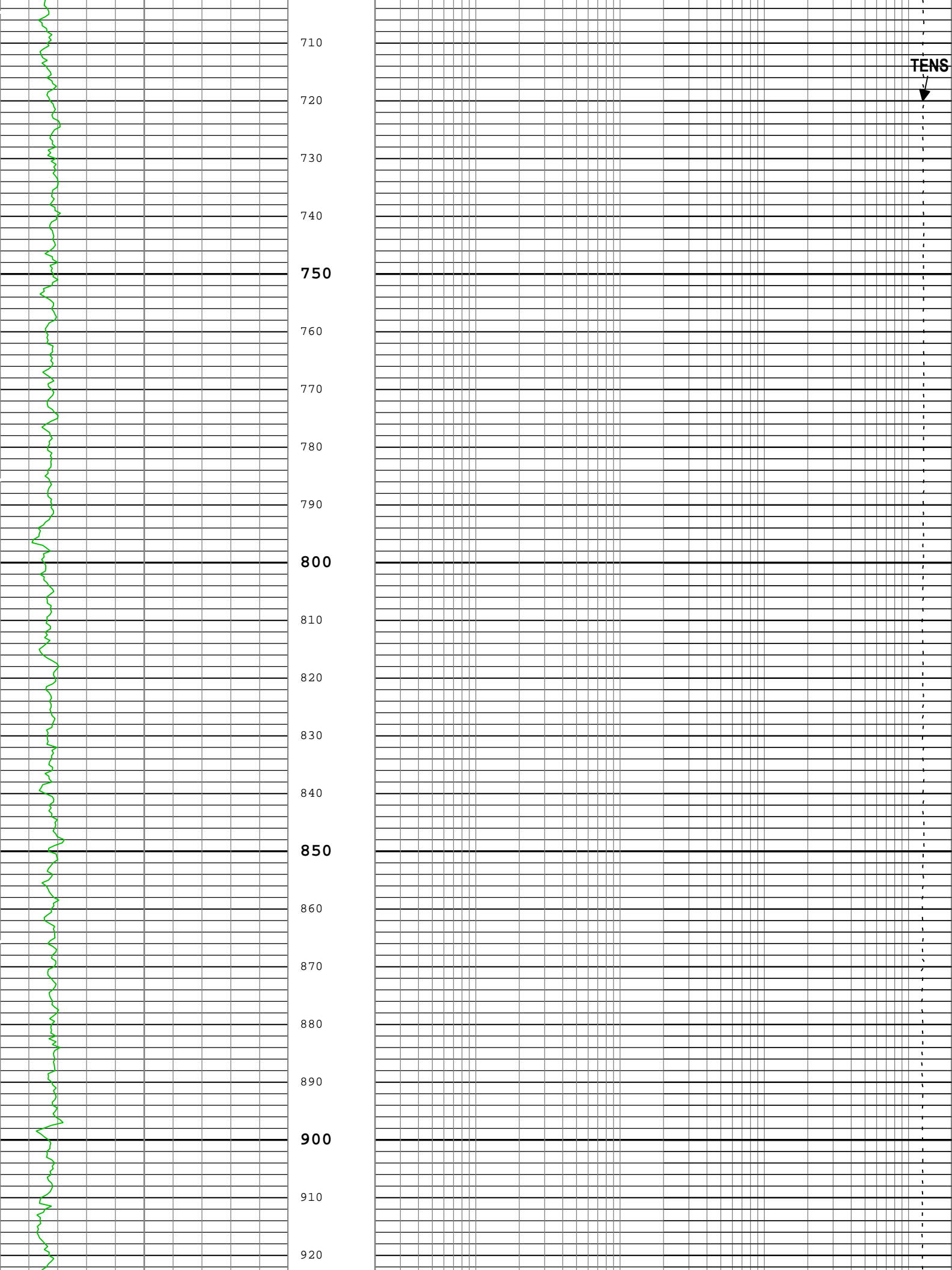
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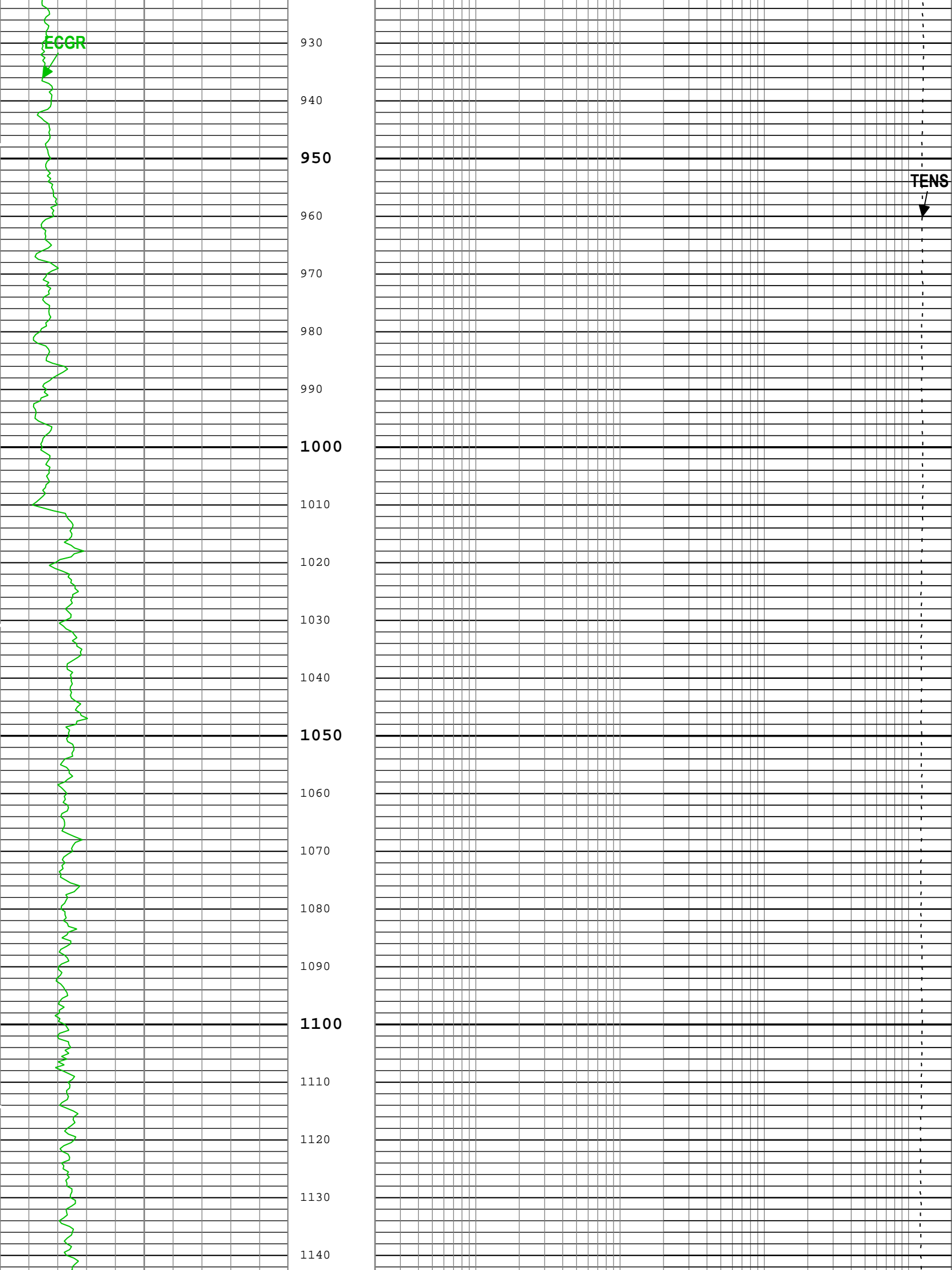


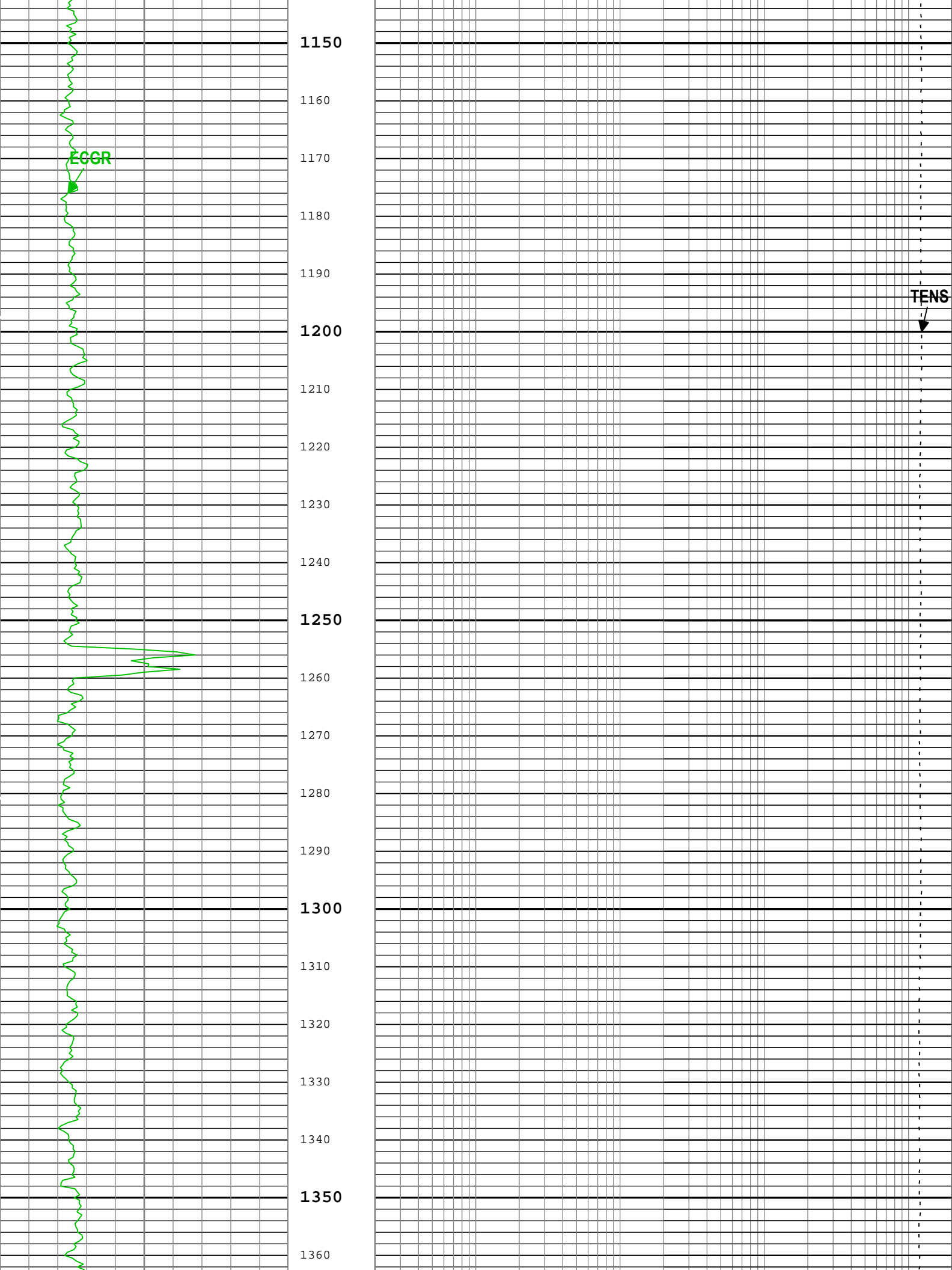




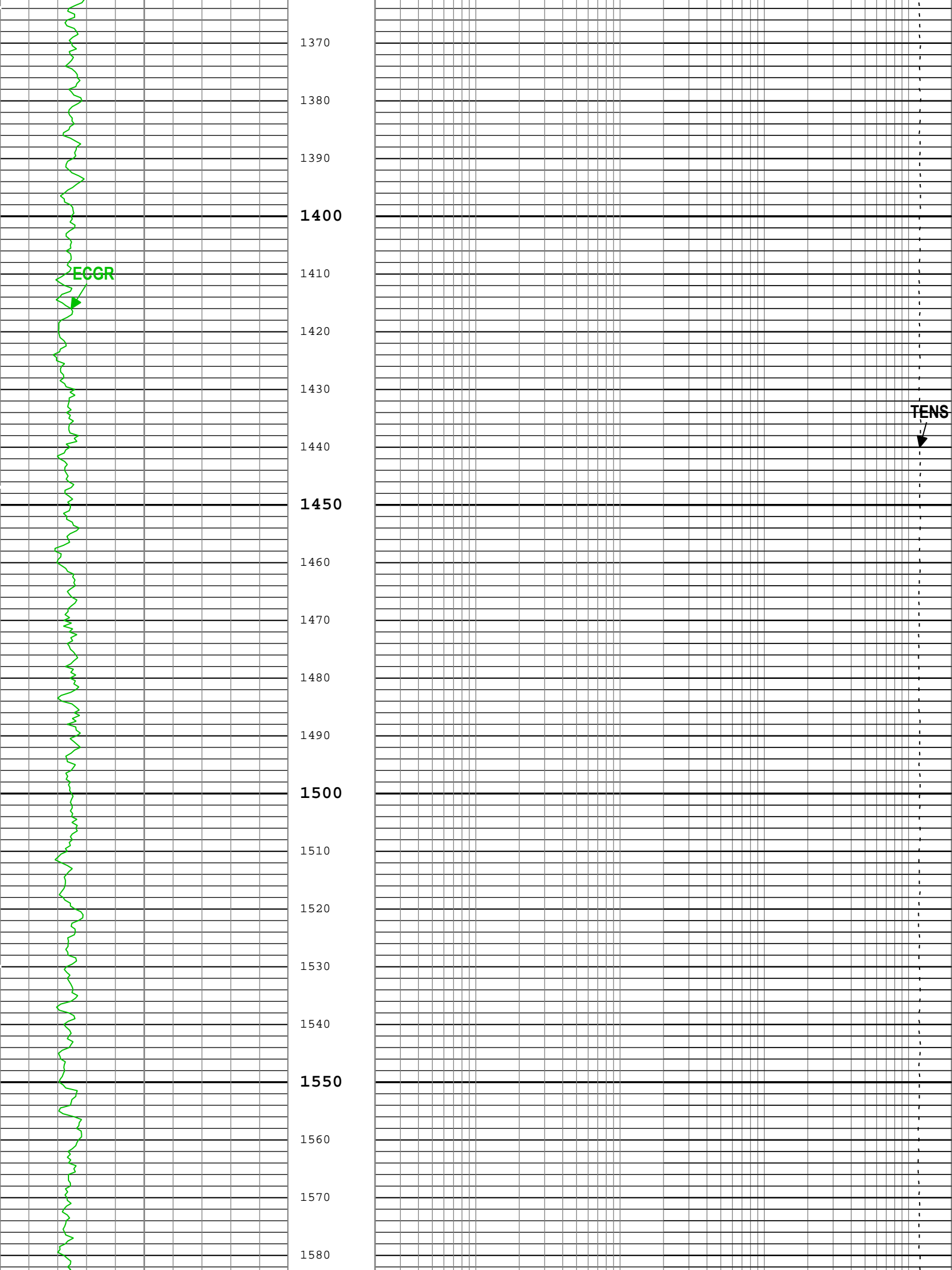


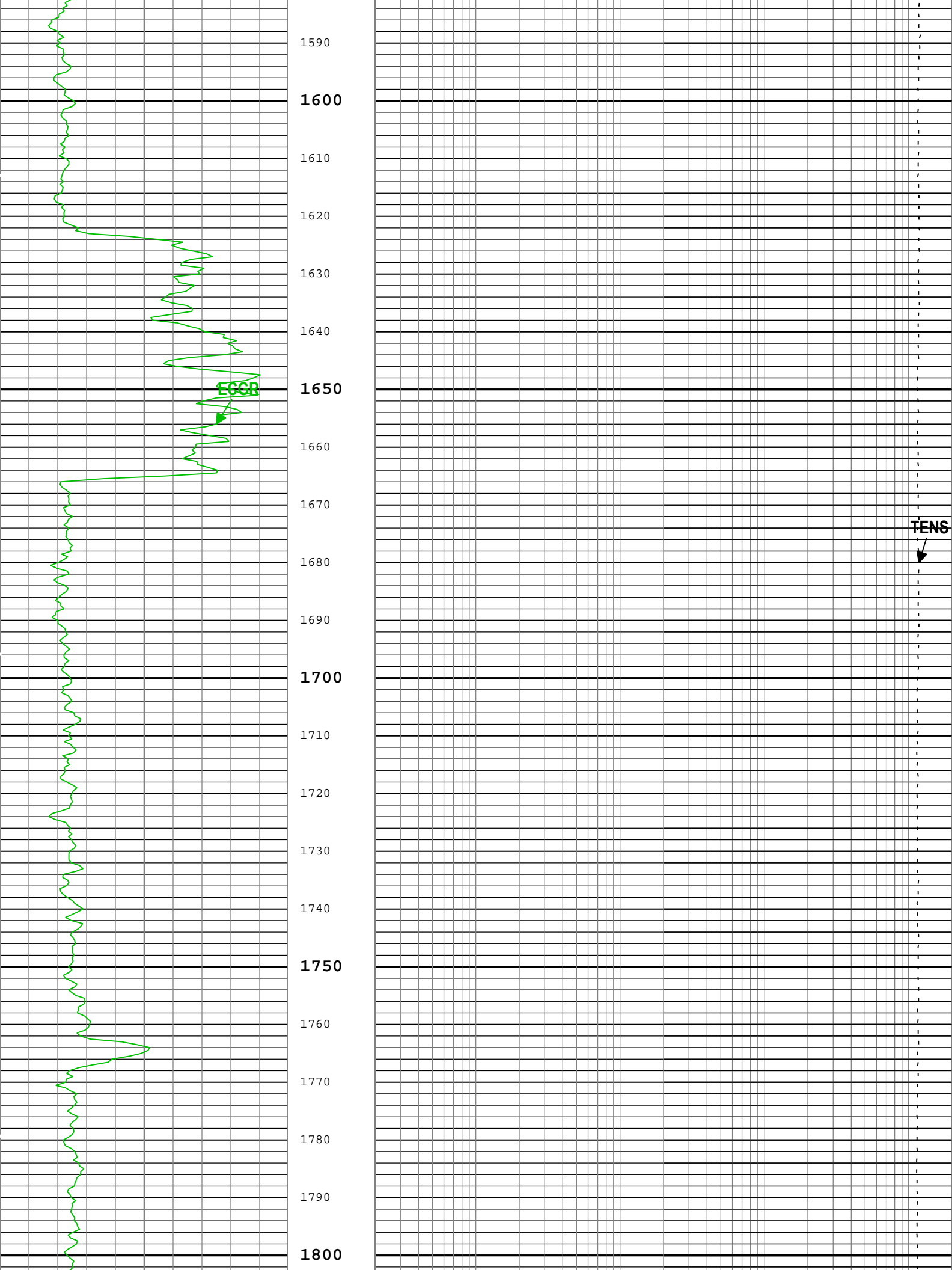


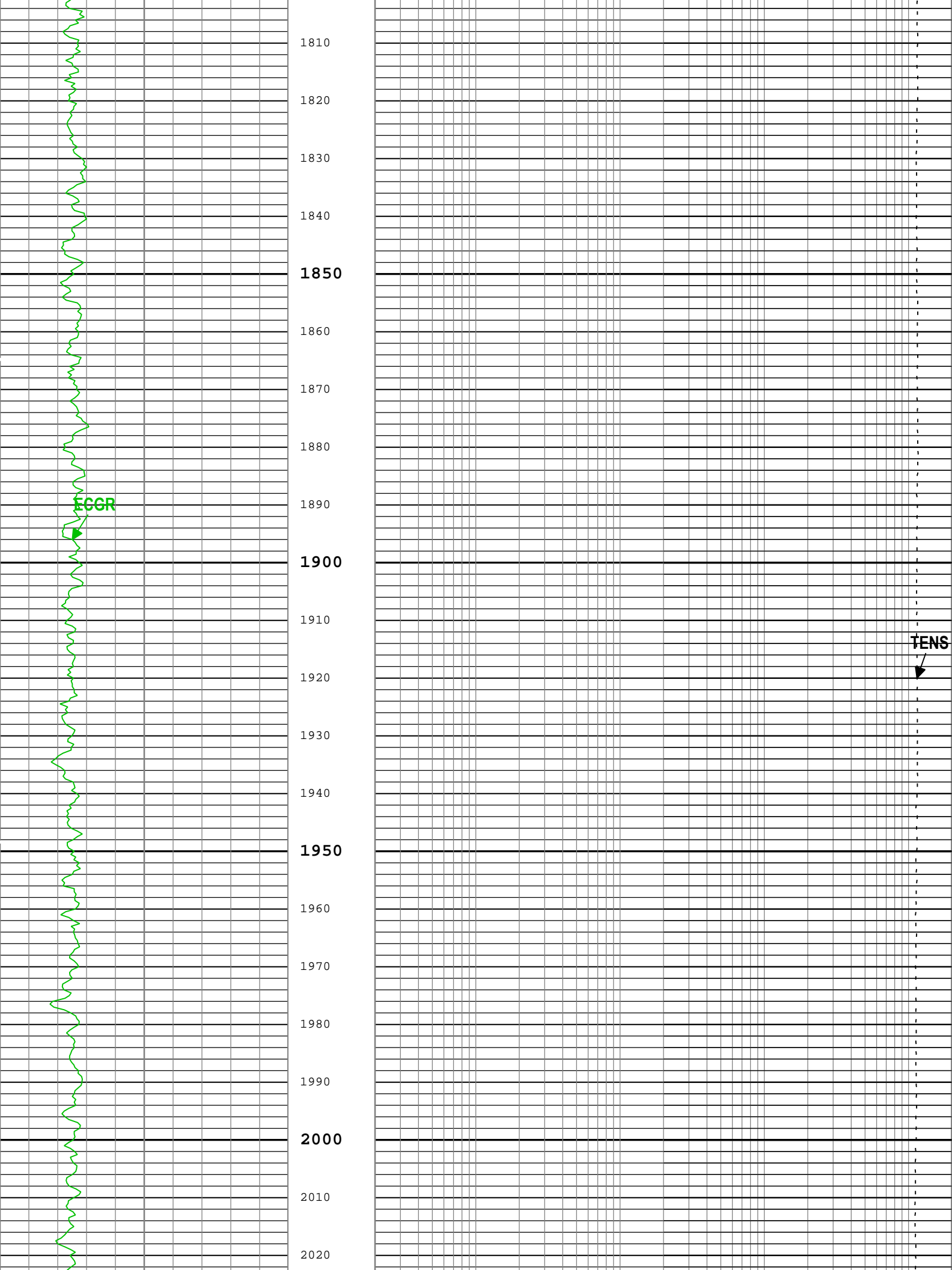


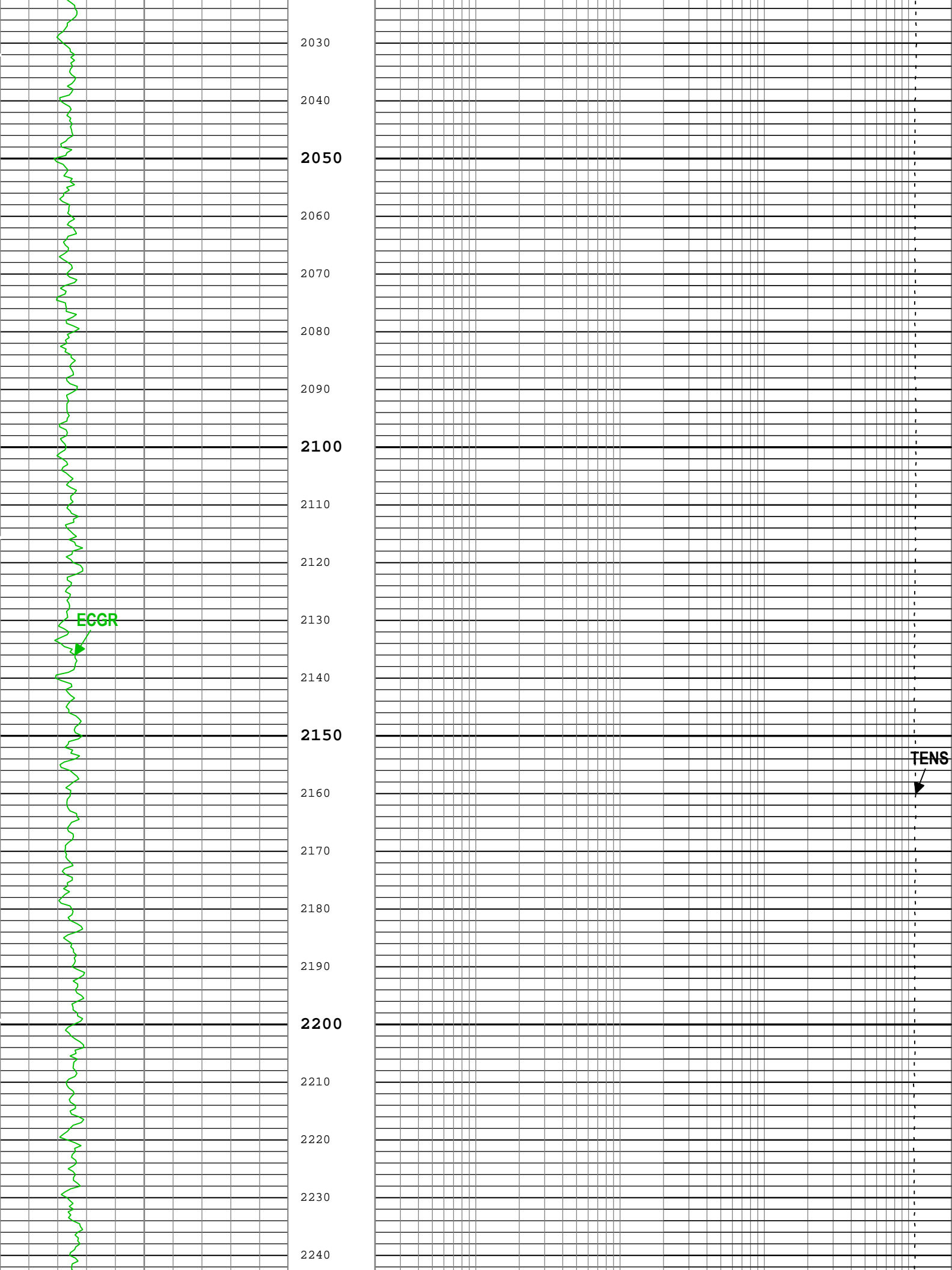


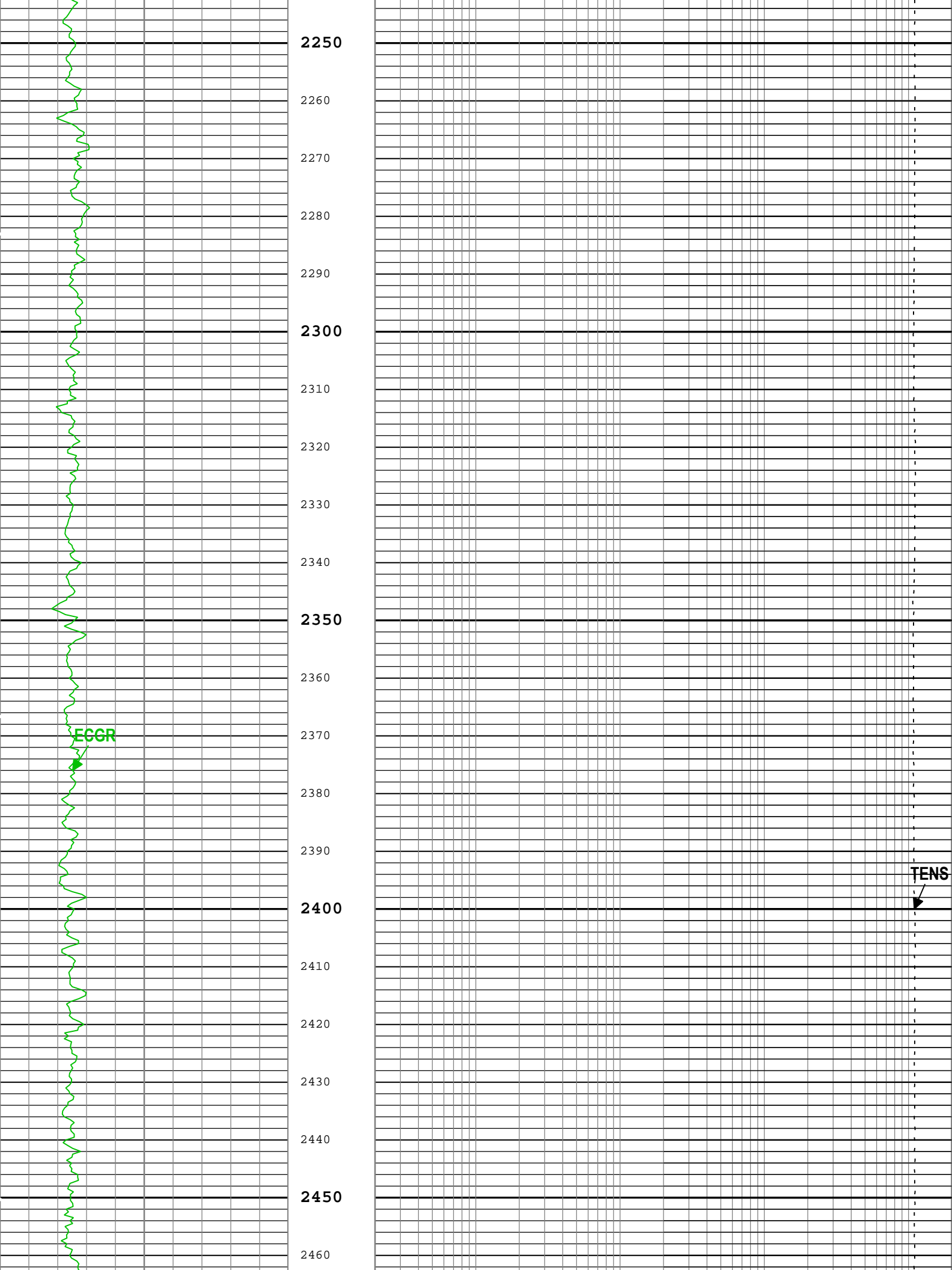


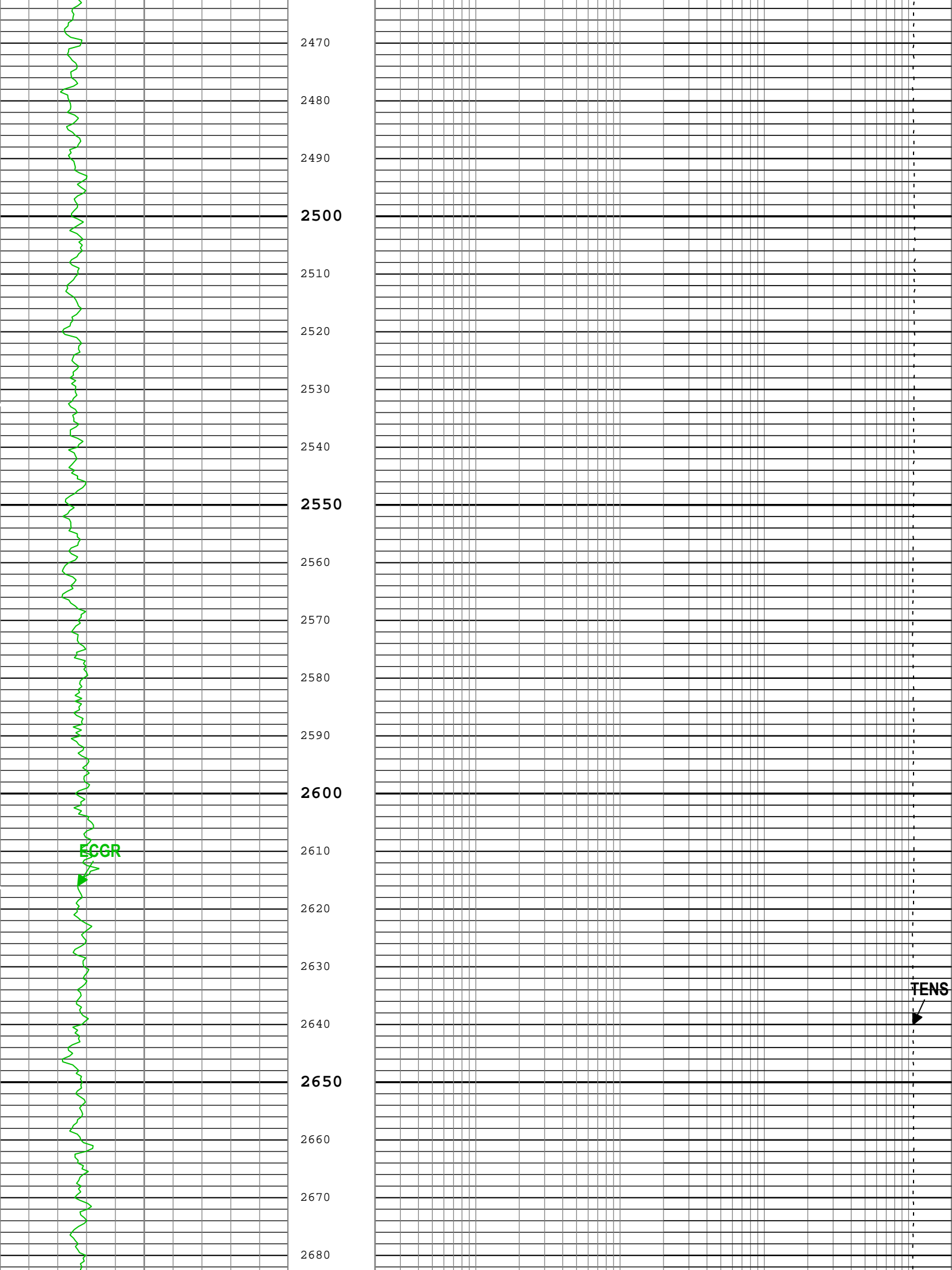


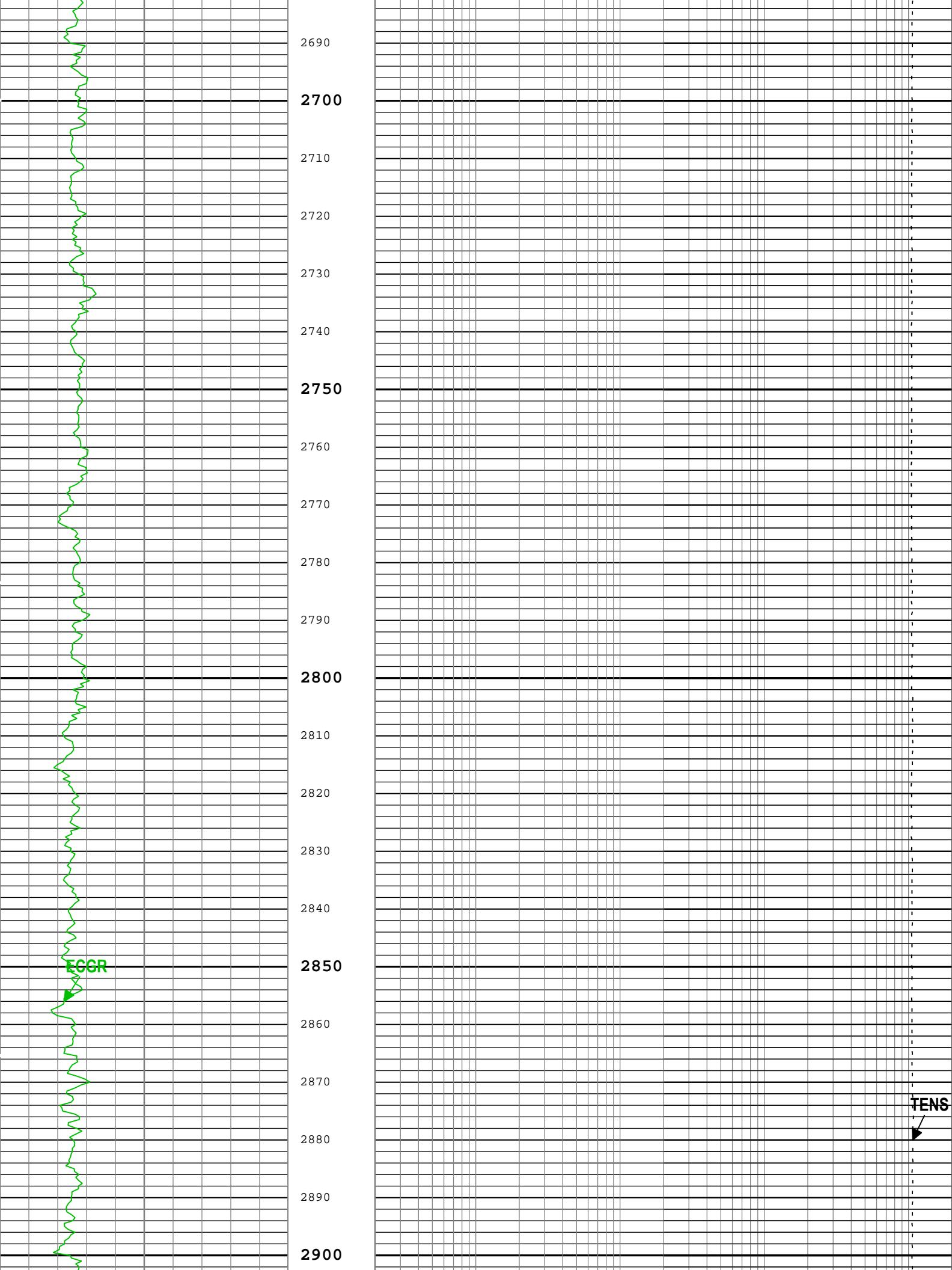


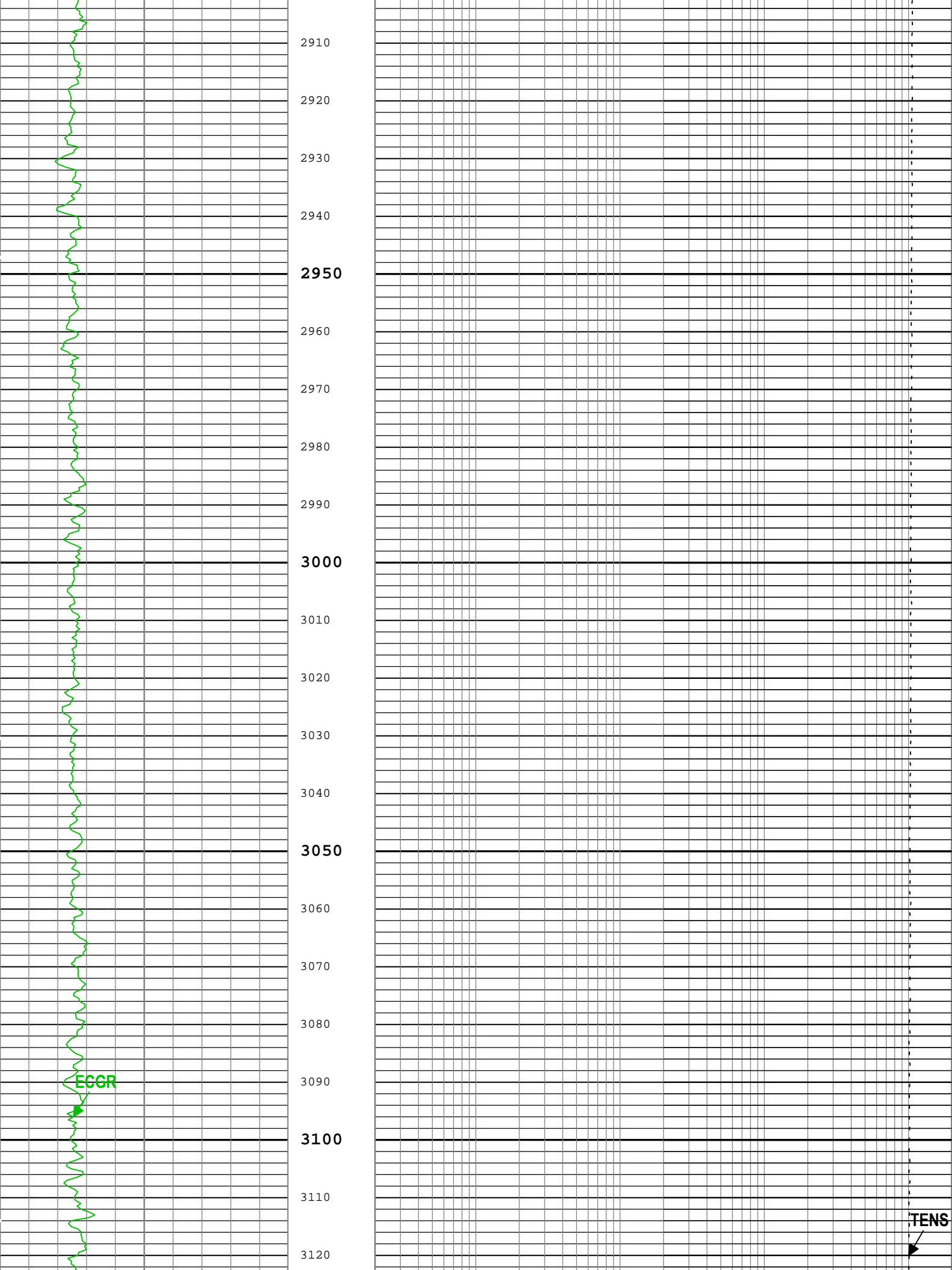




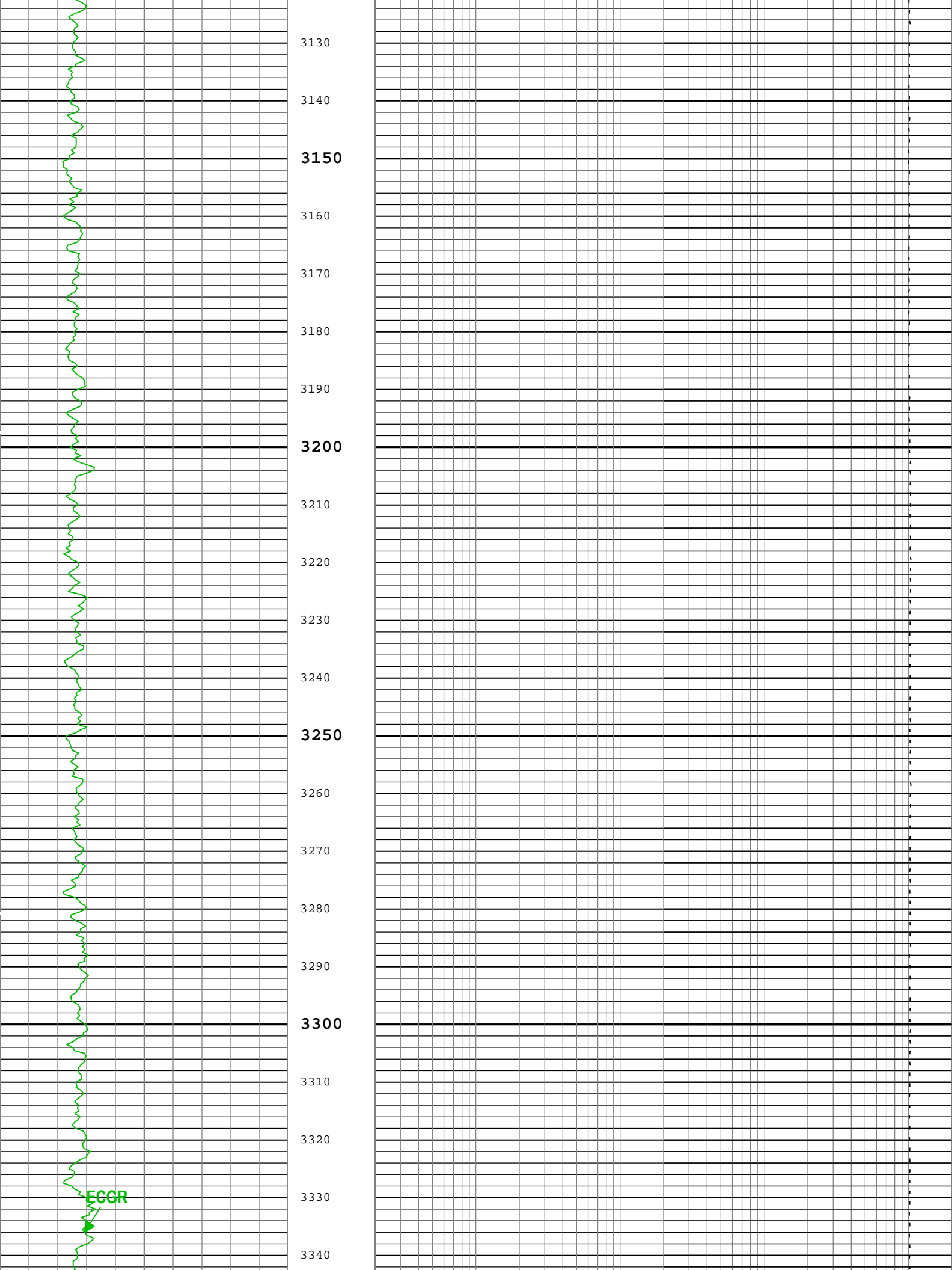


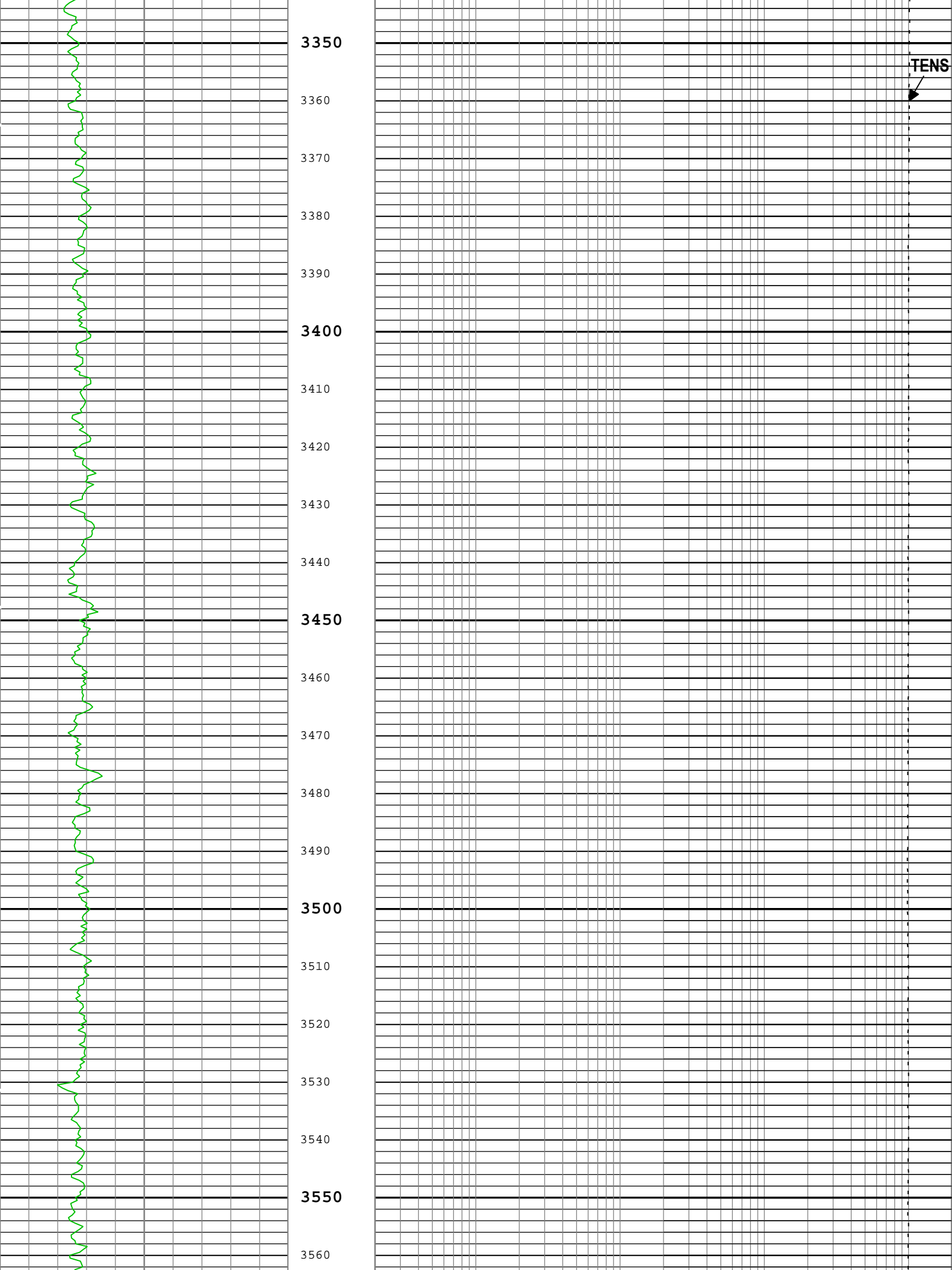


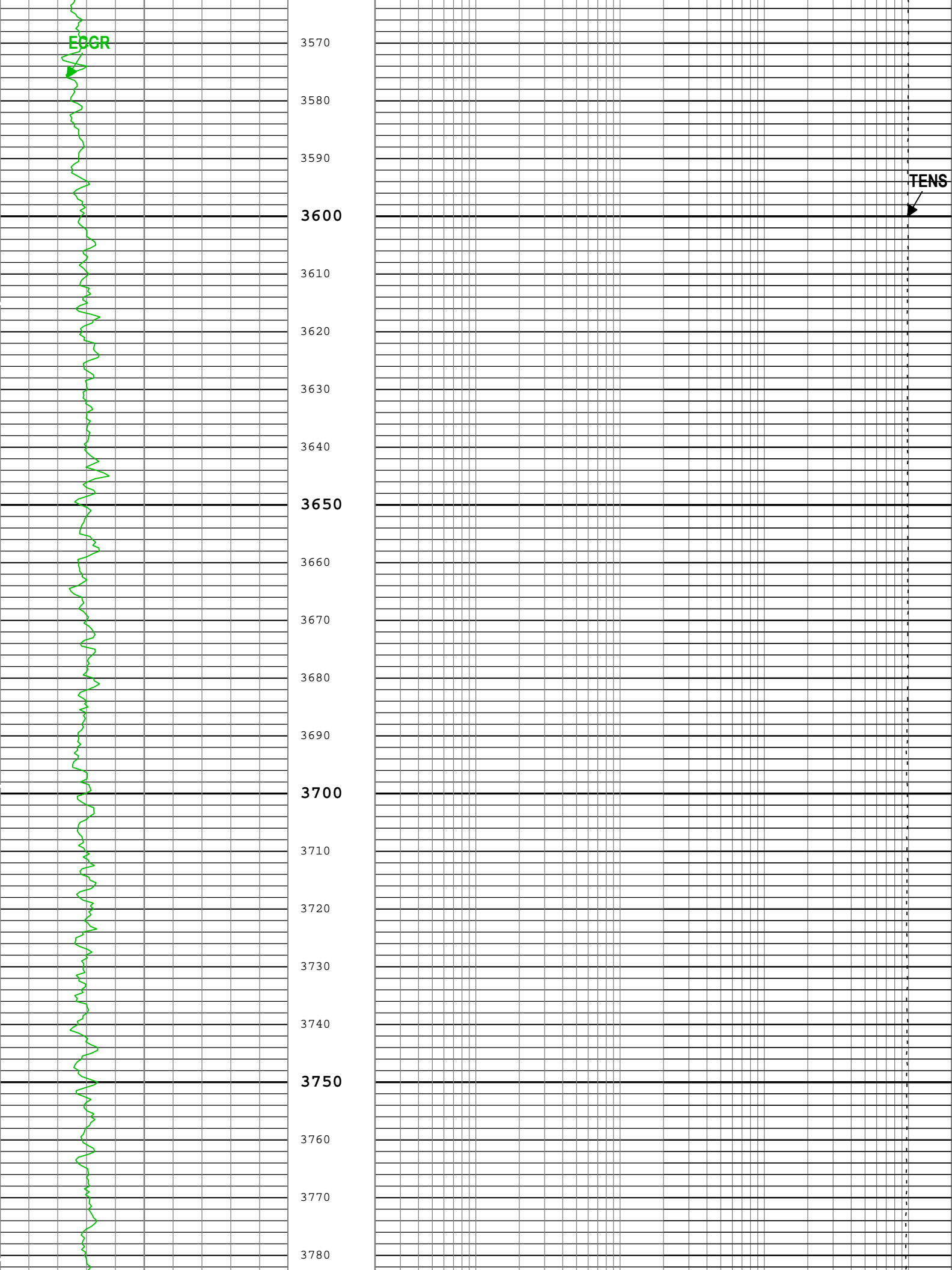


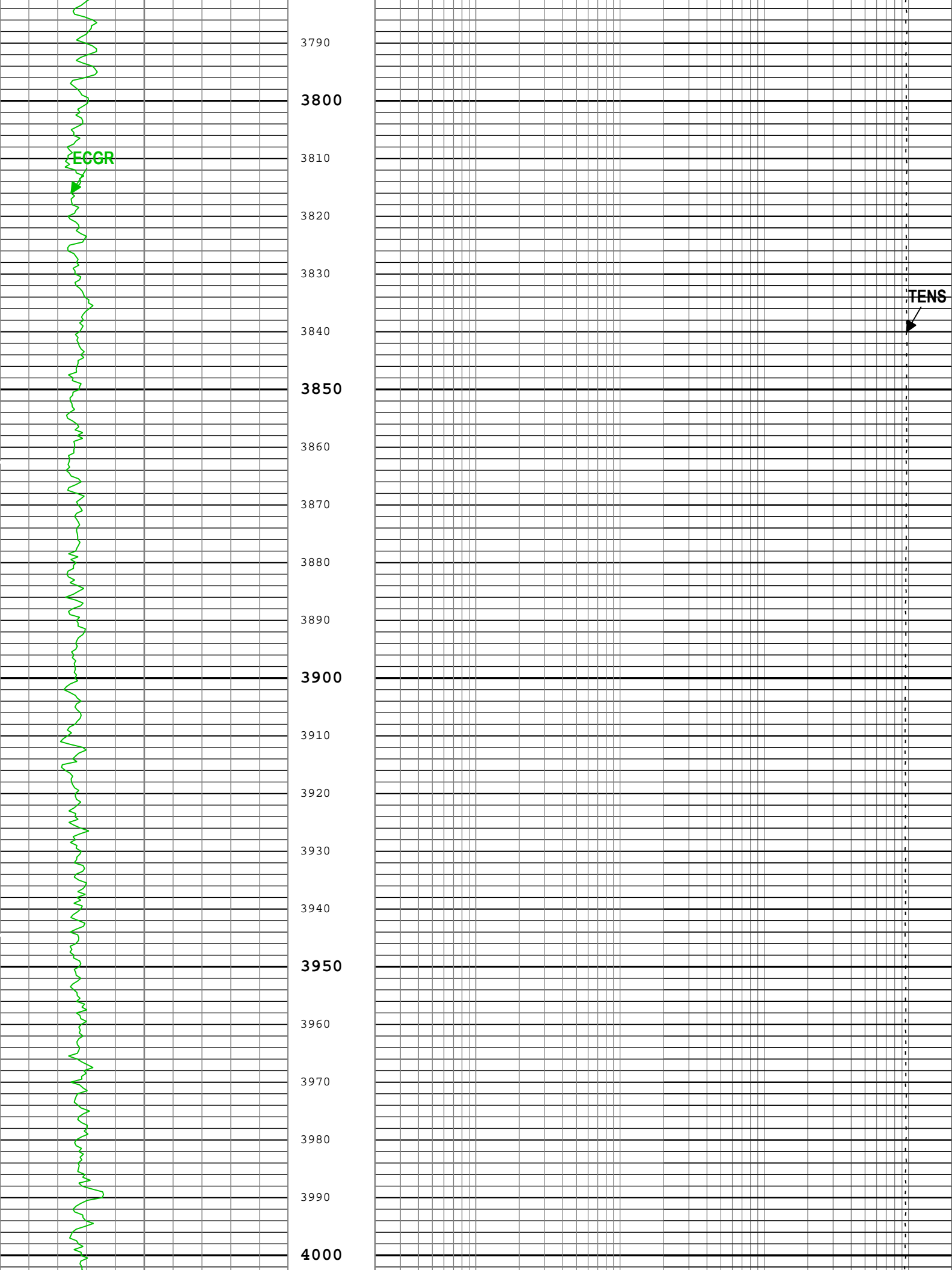


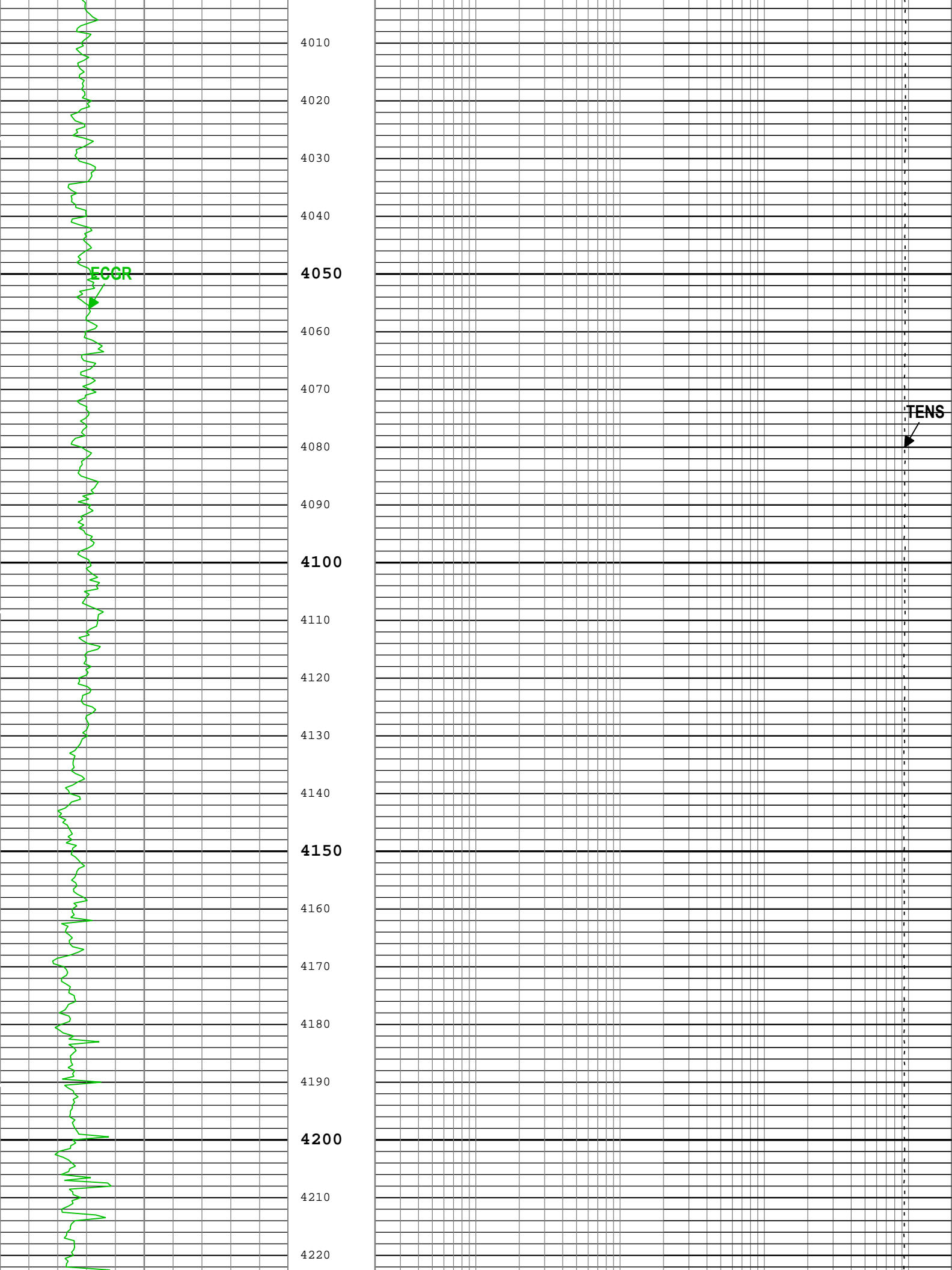


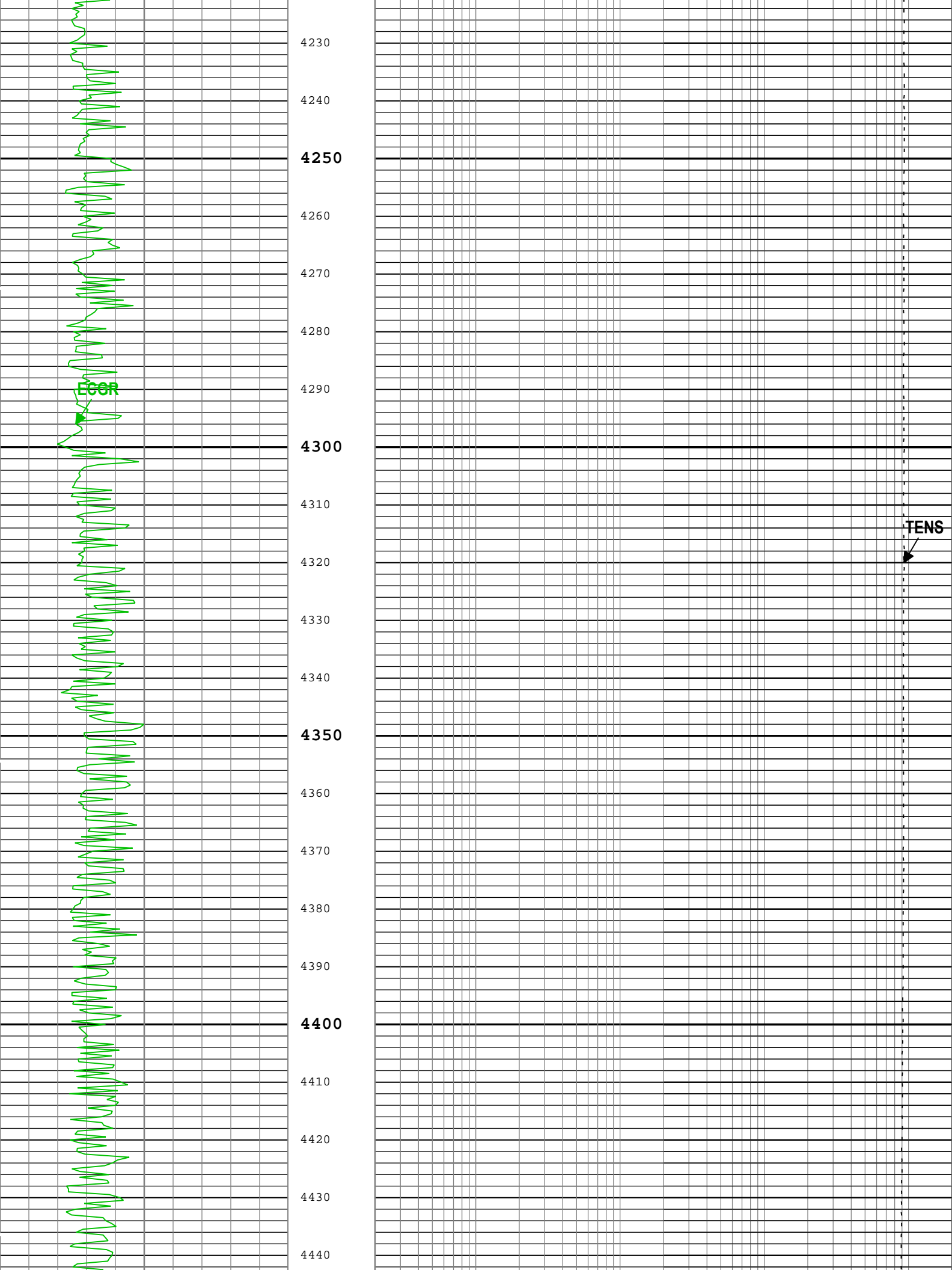


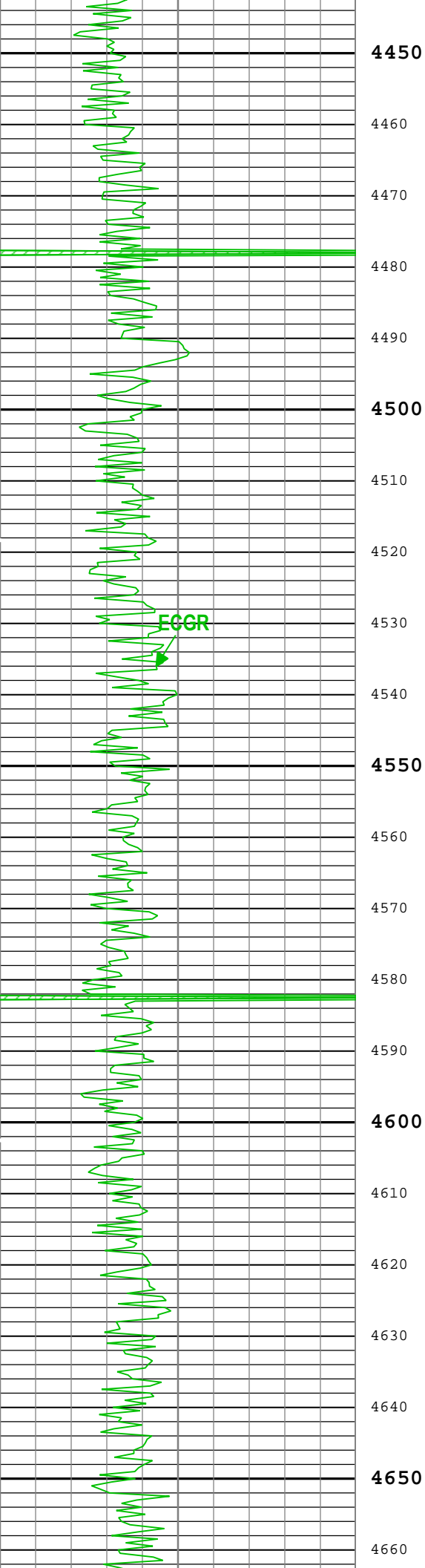






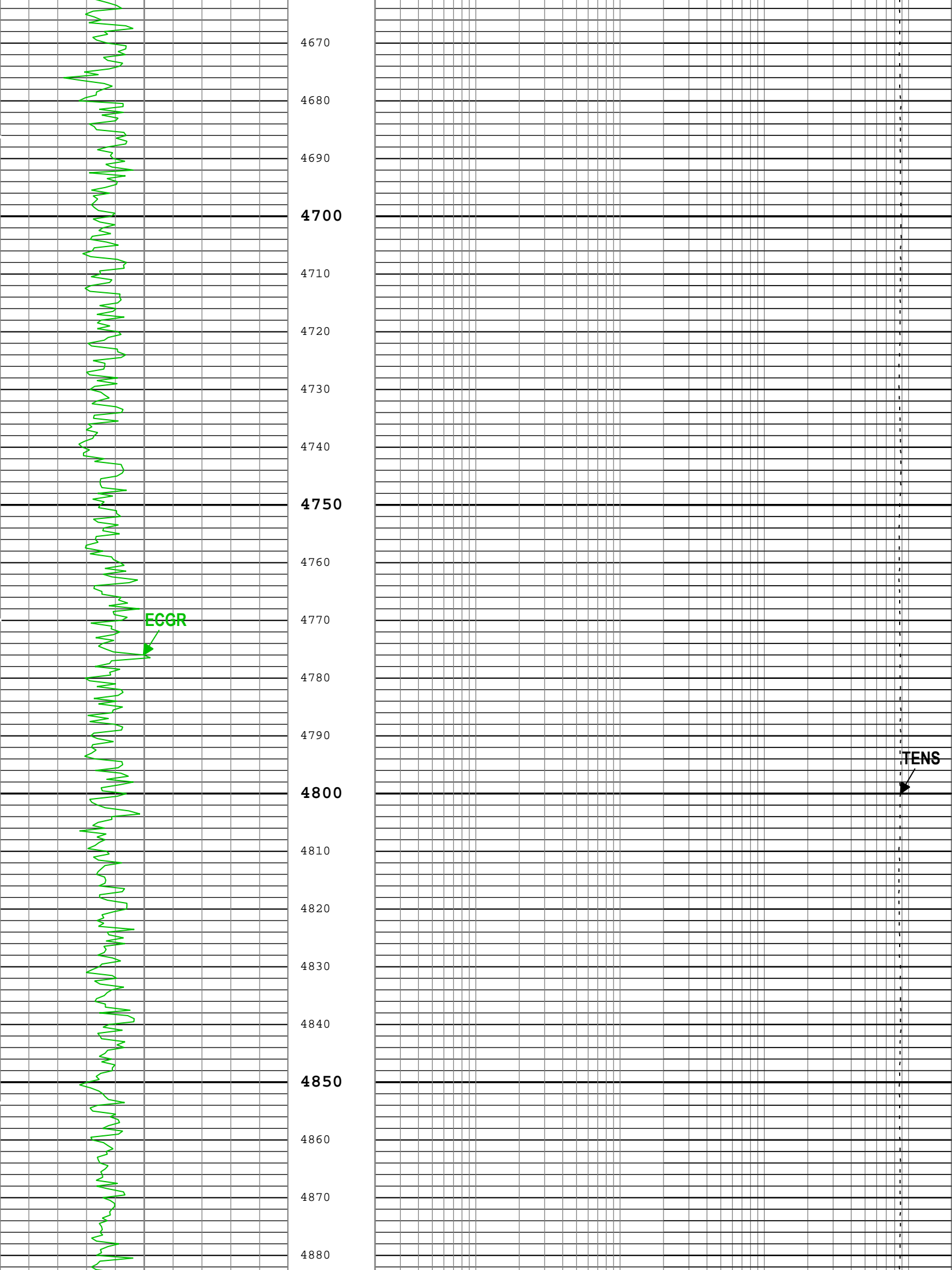




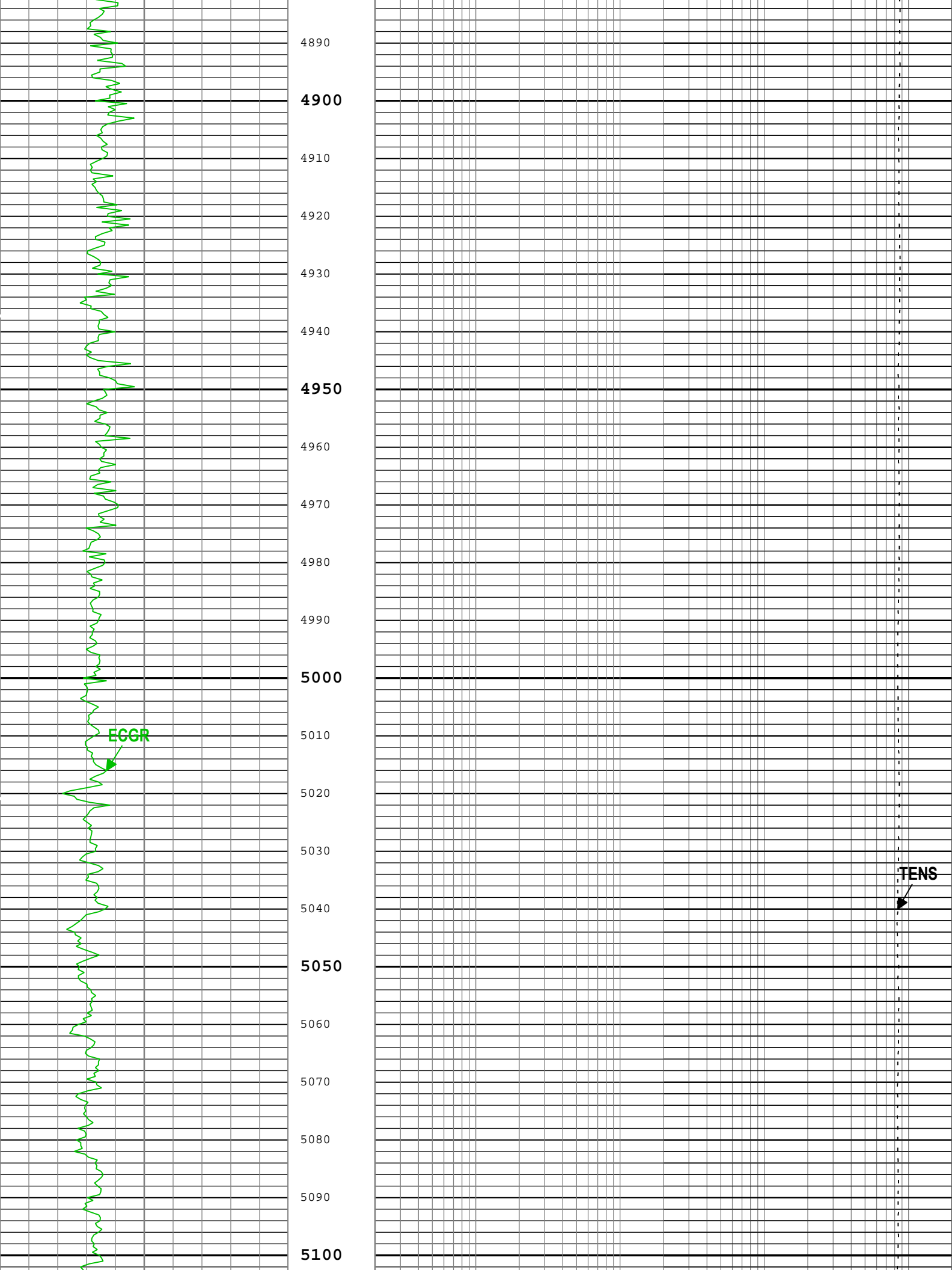


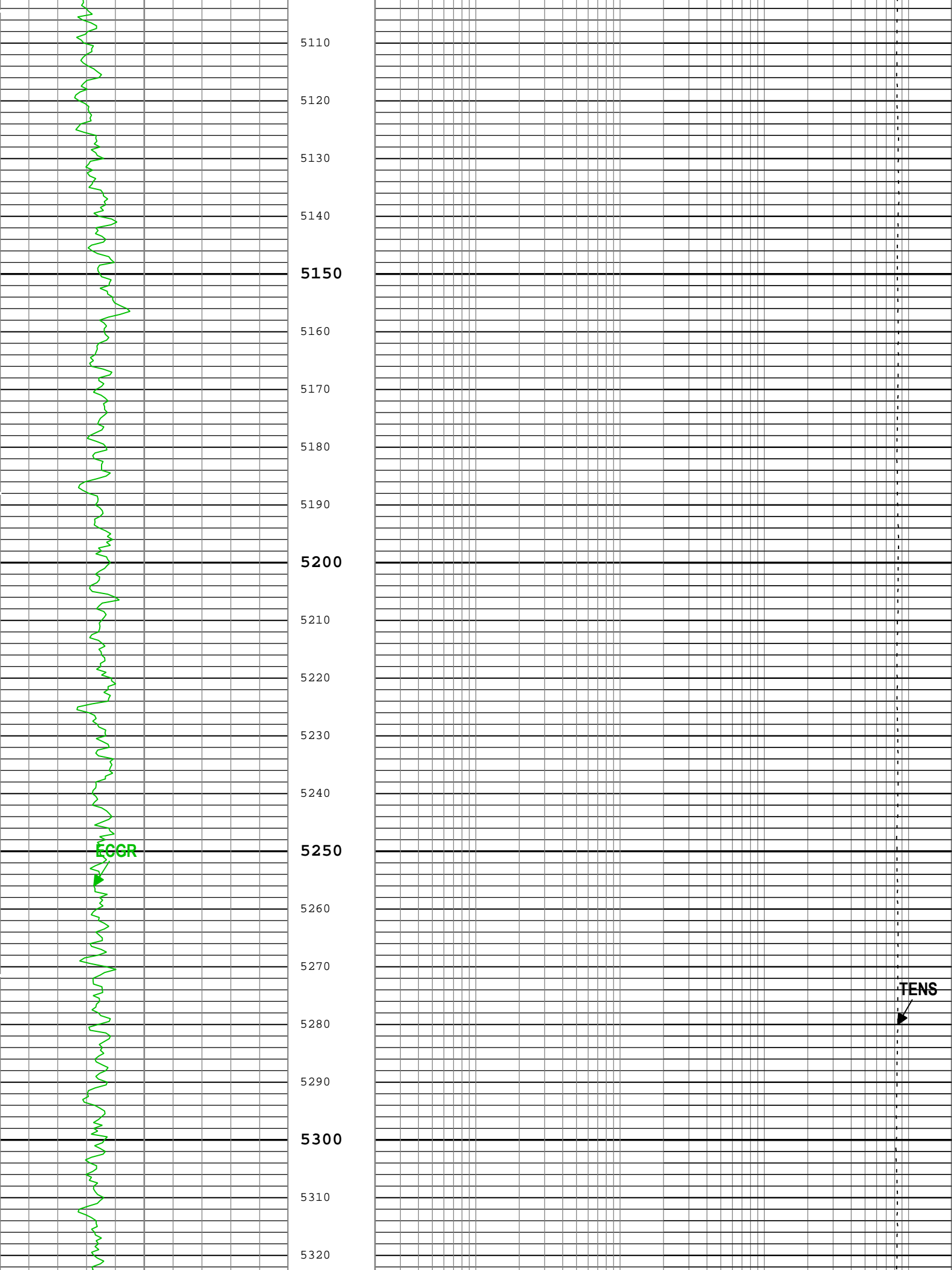
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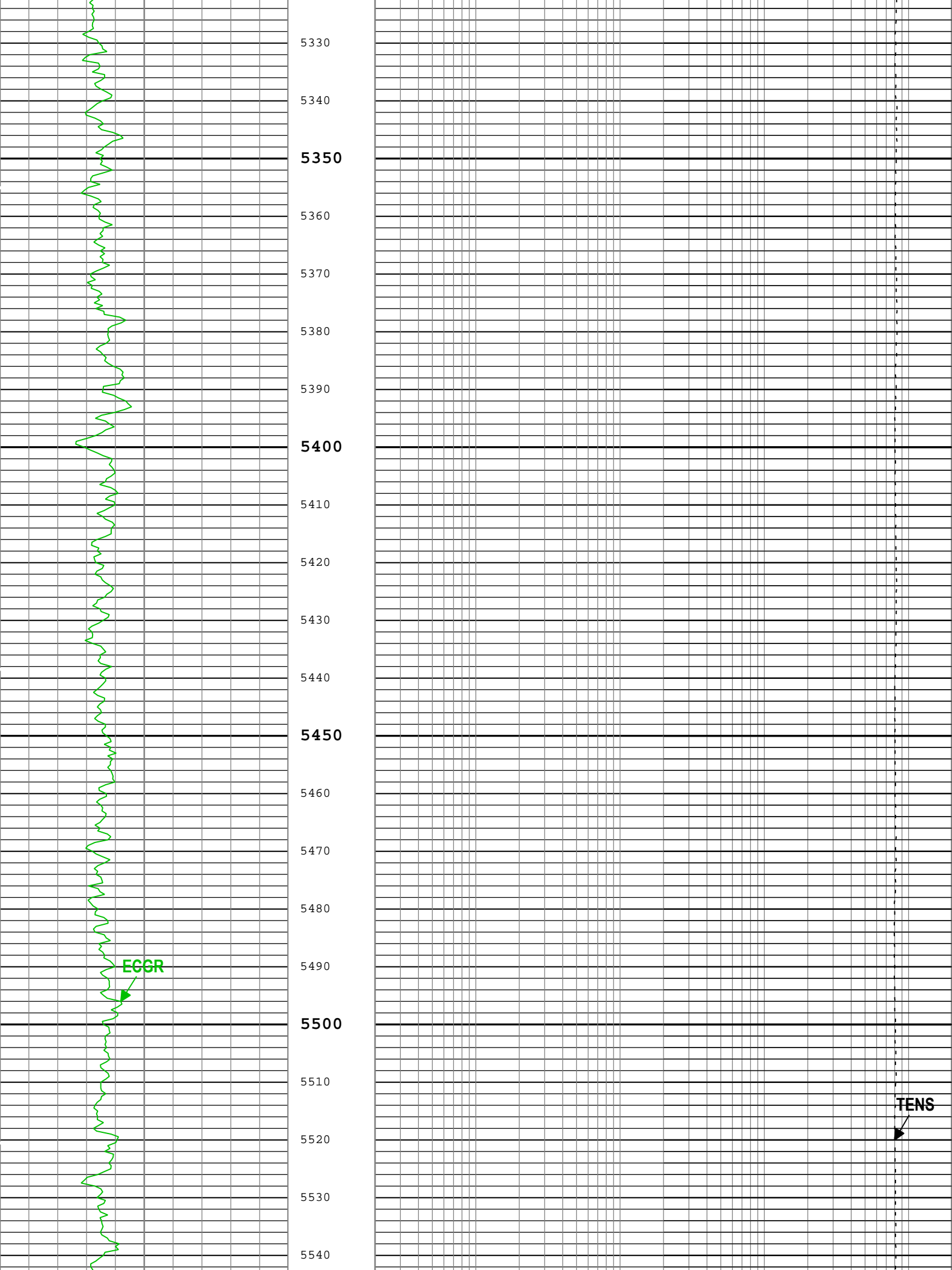
TENS

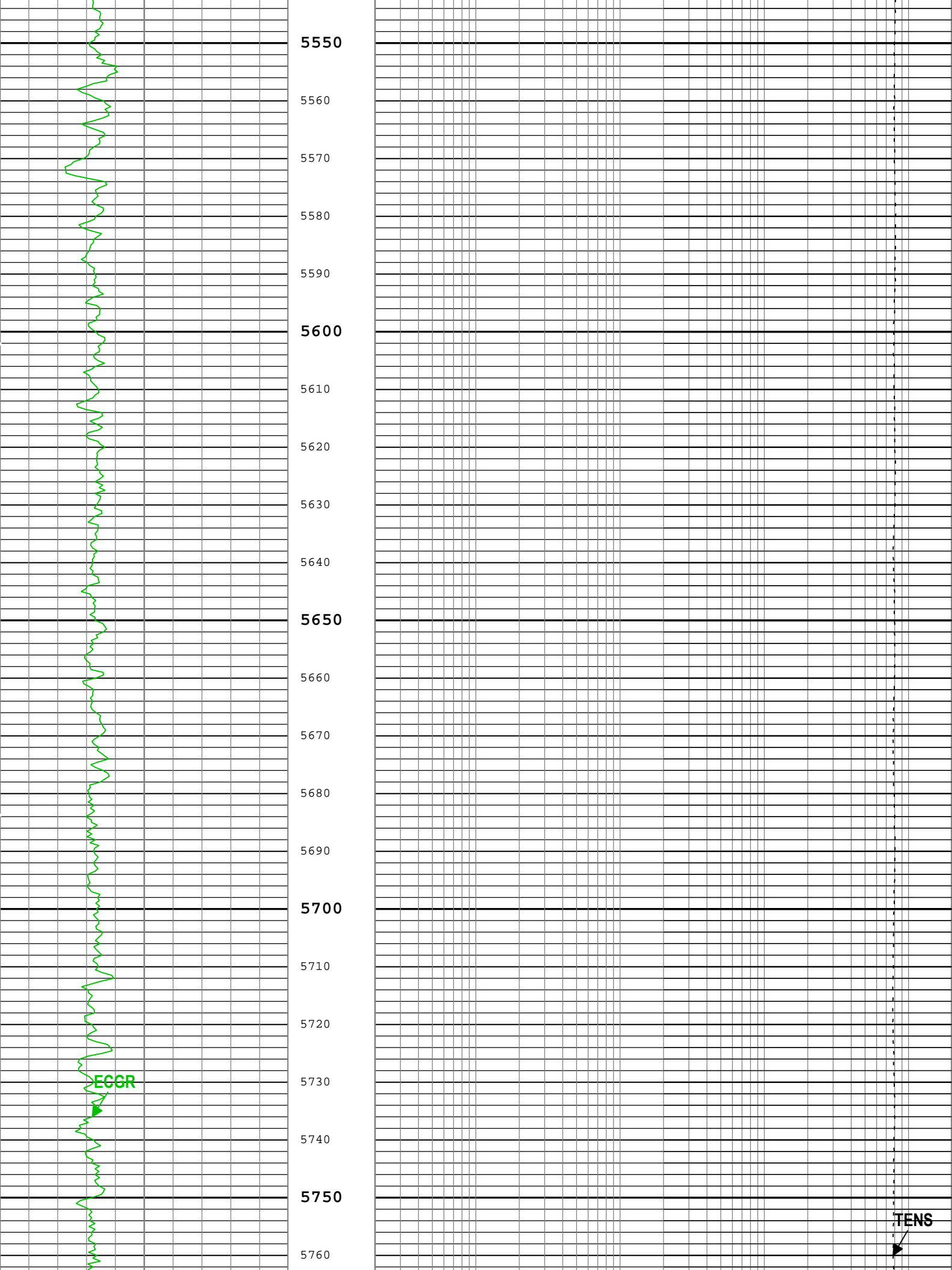


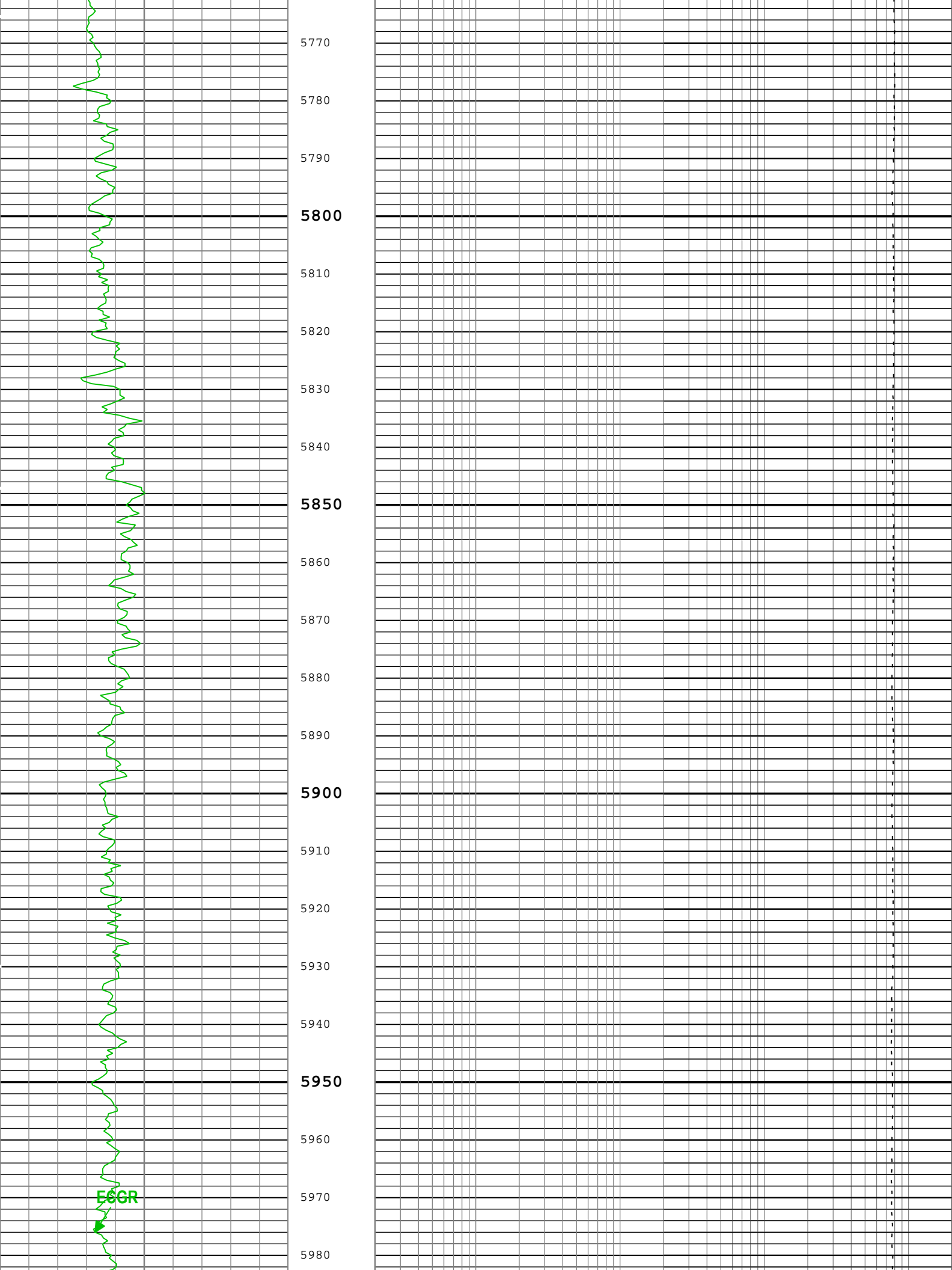


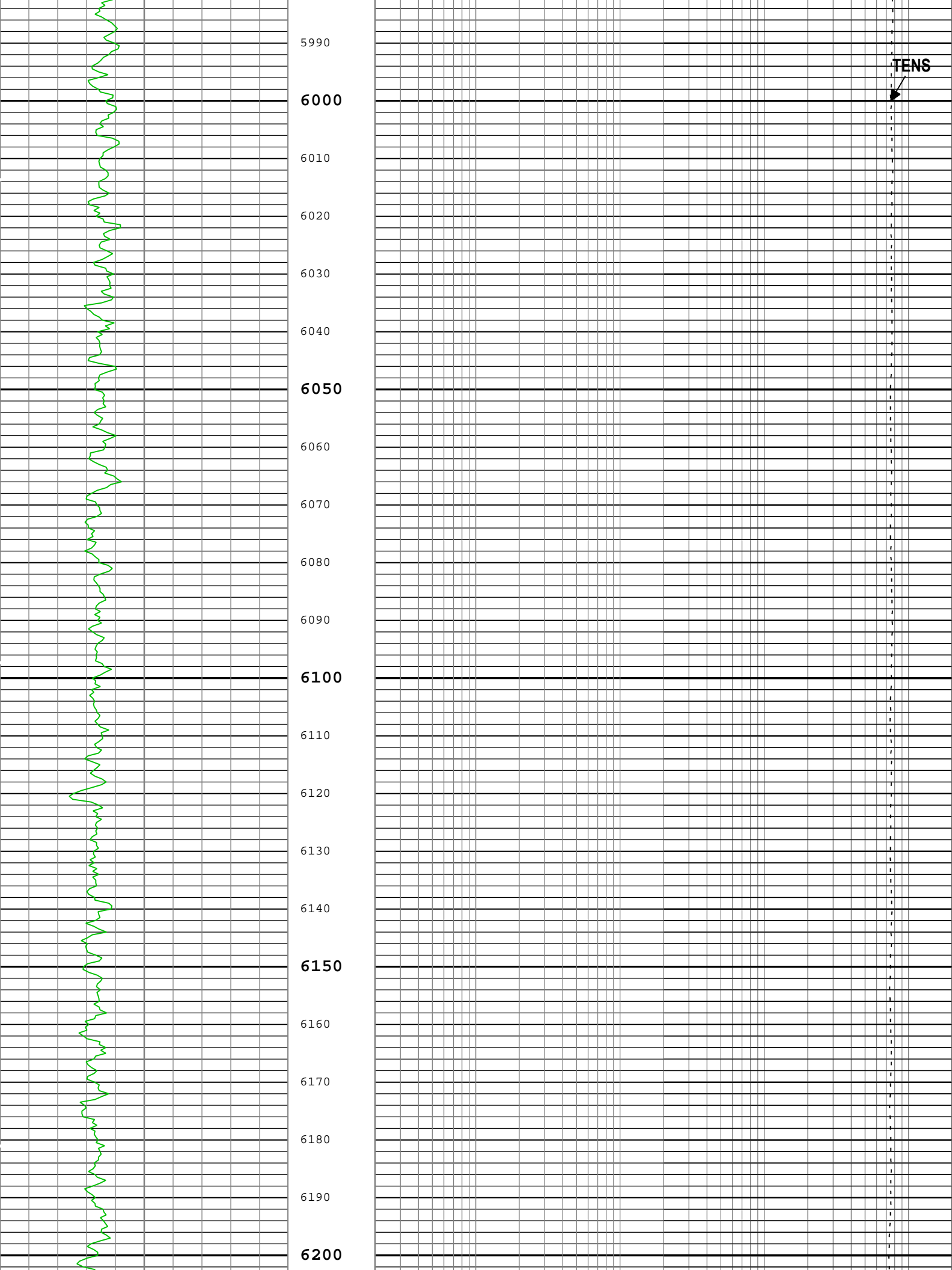


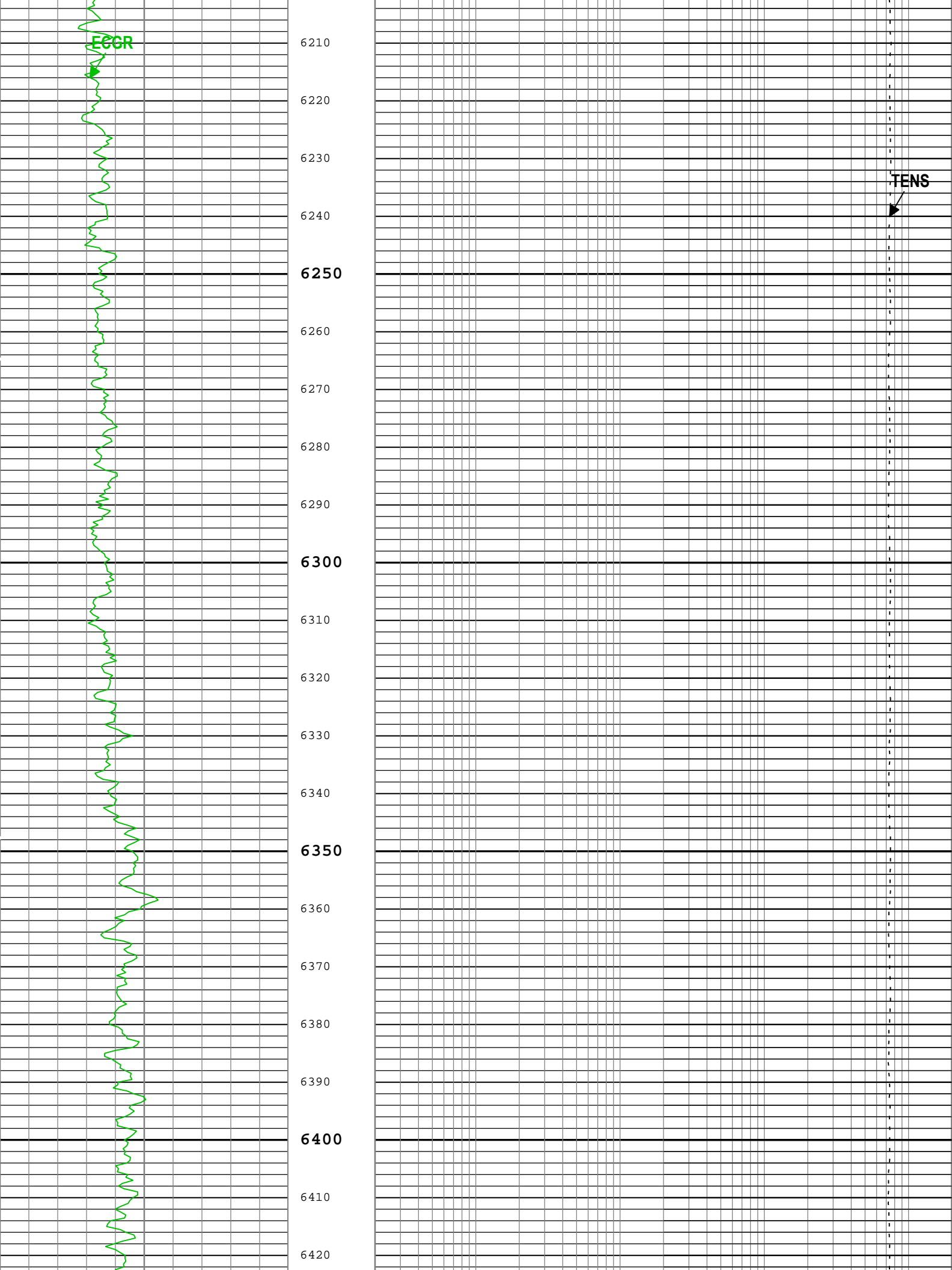


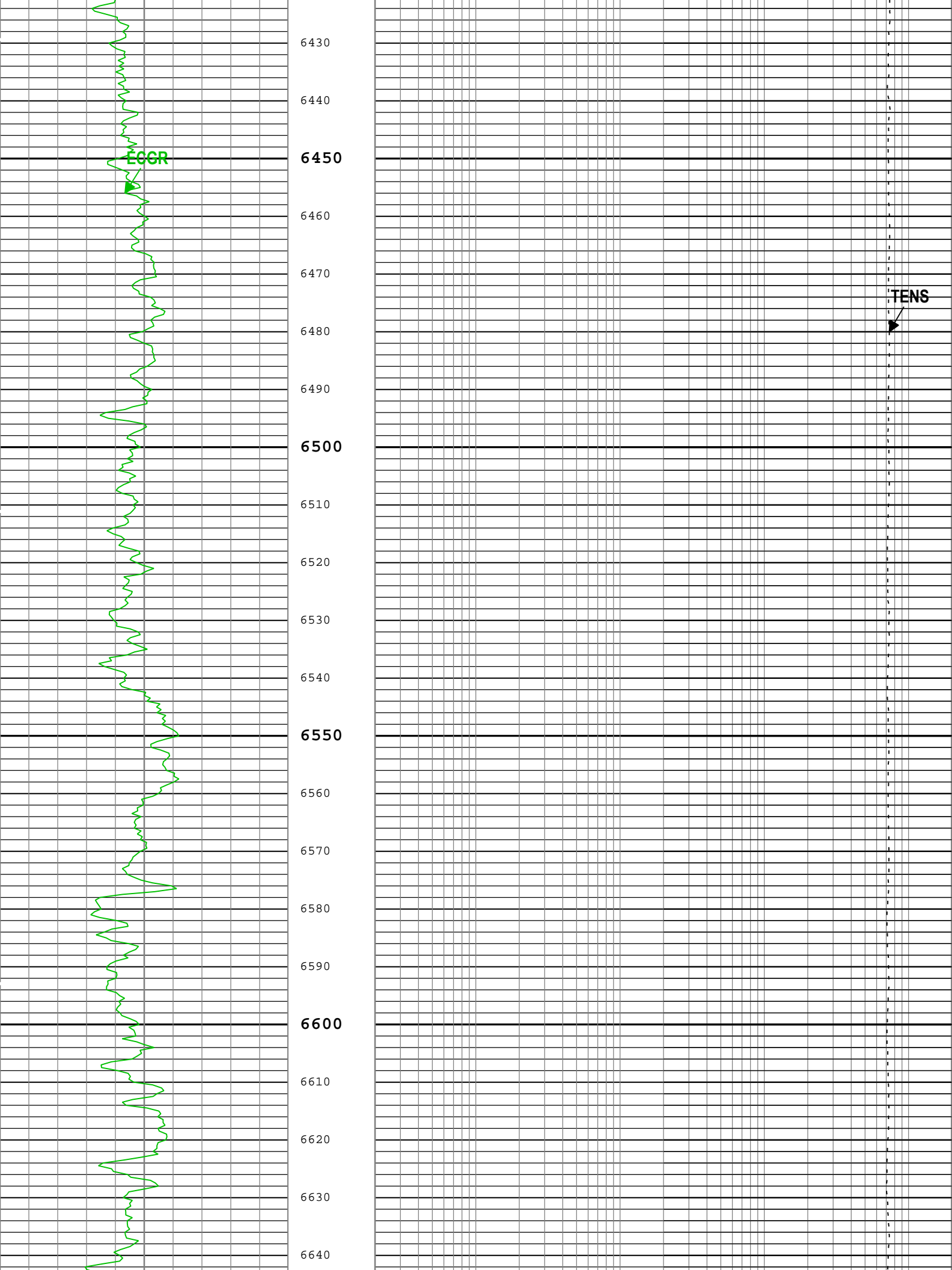




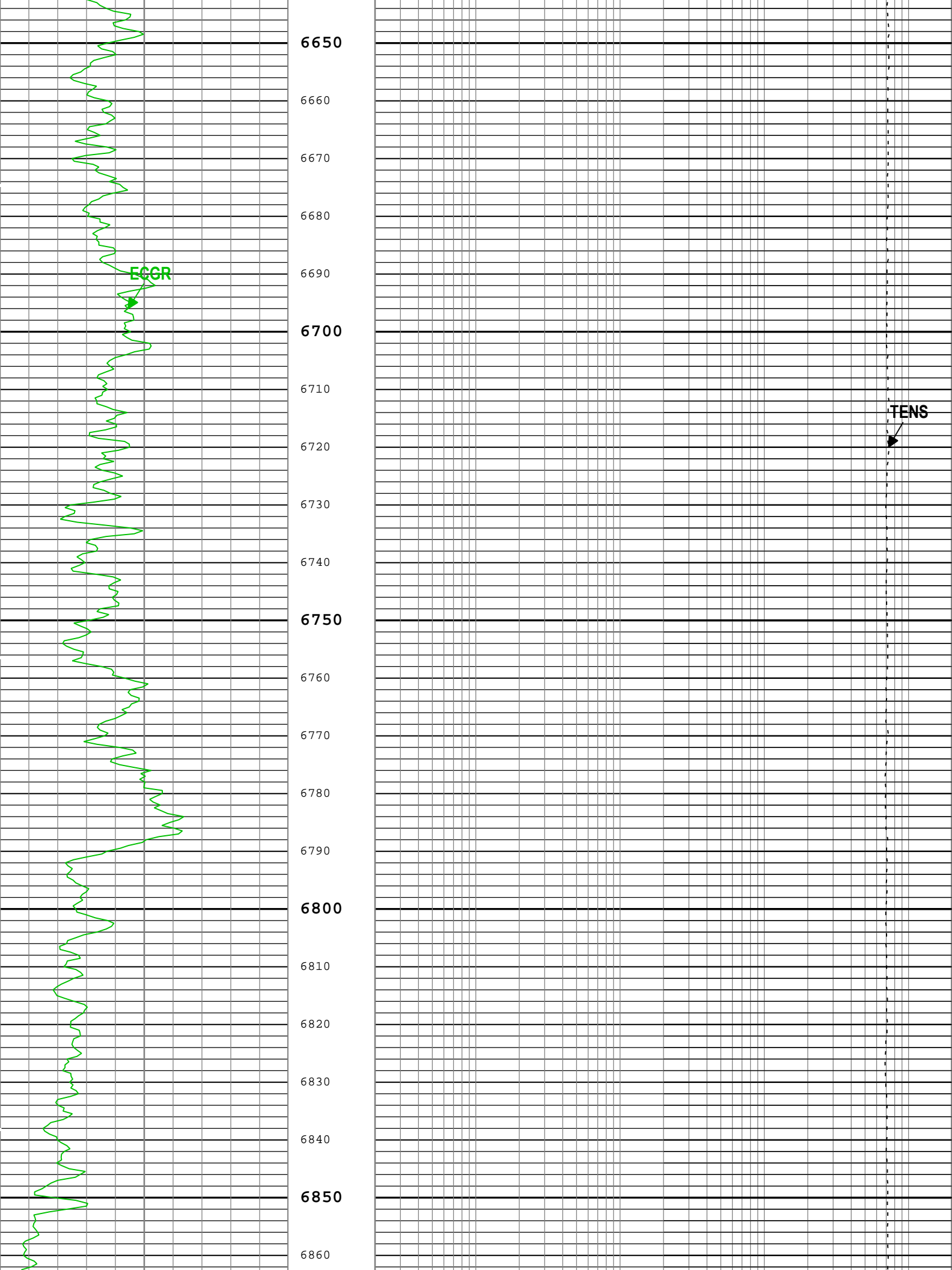


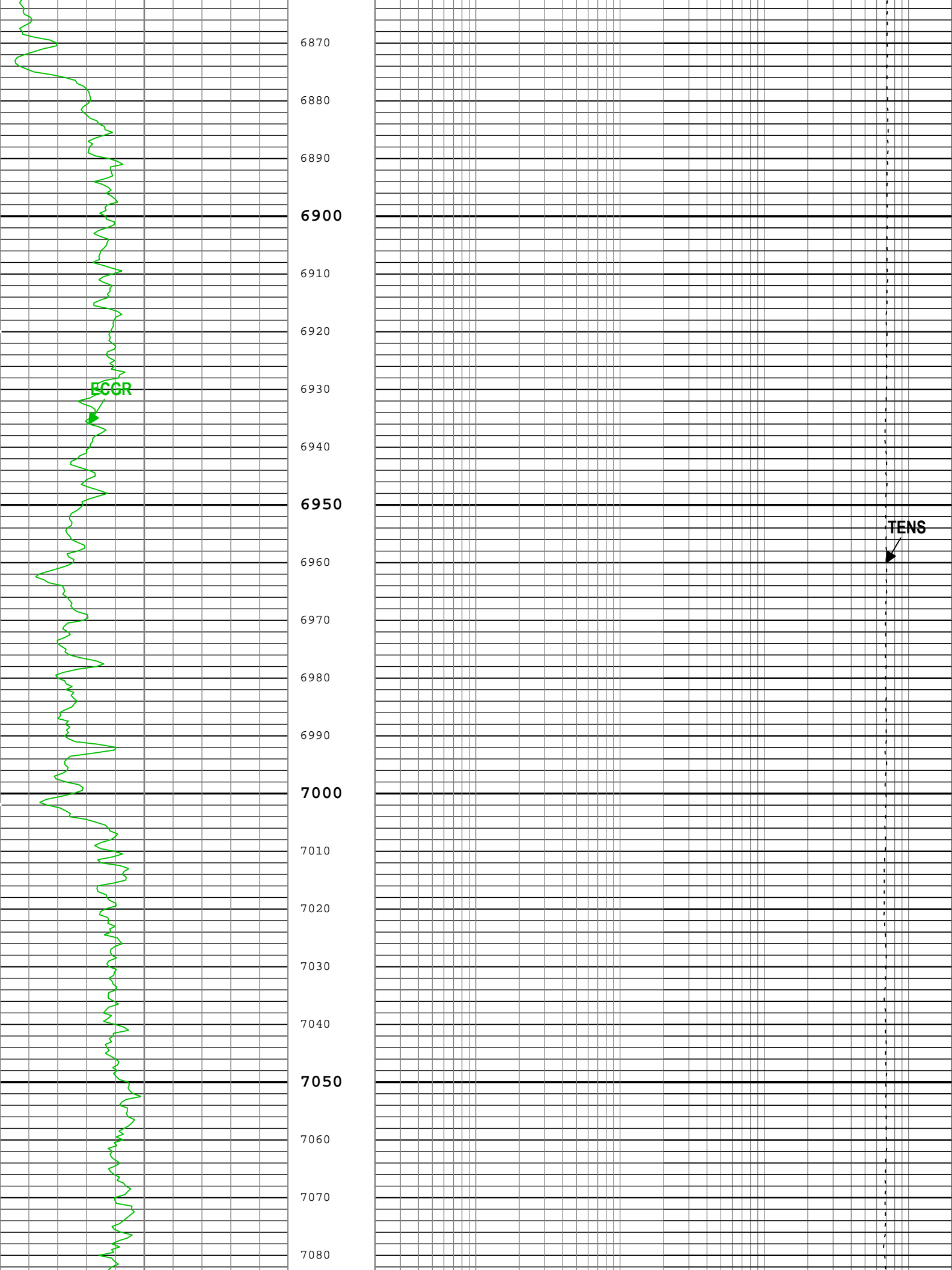


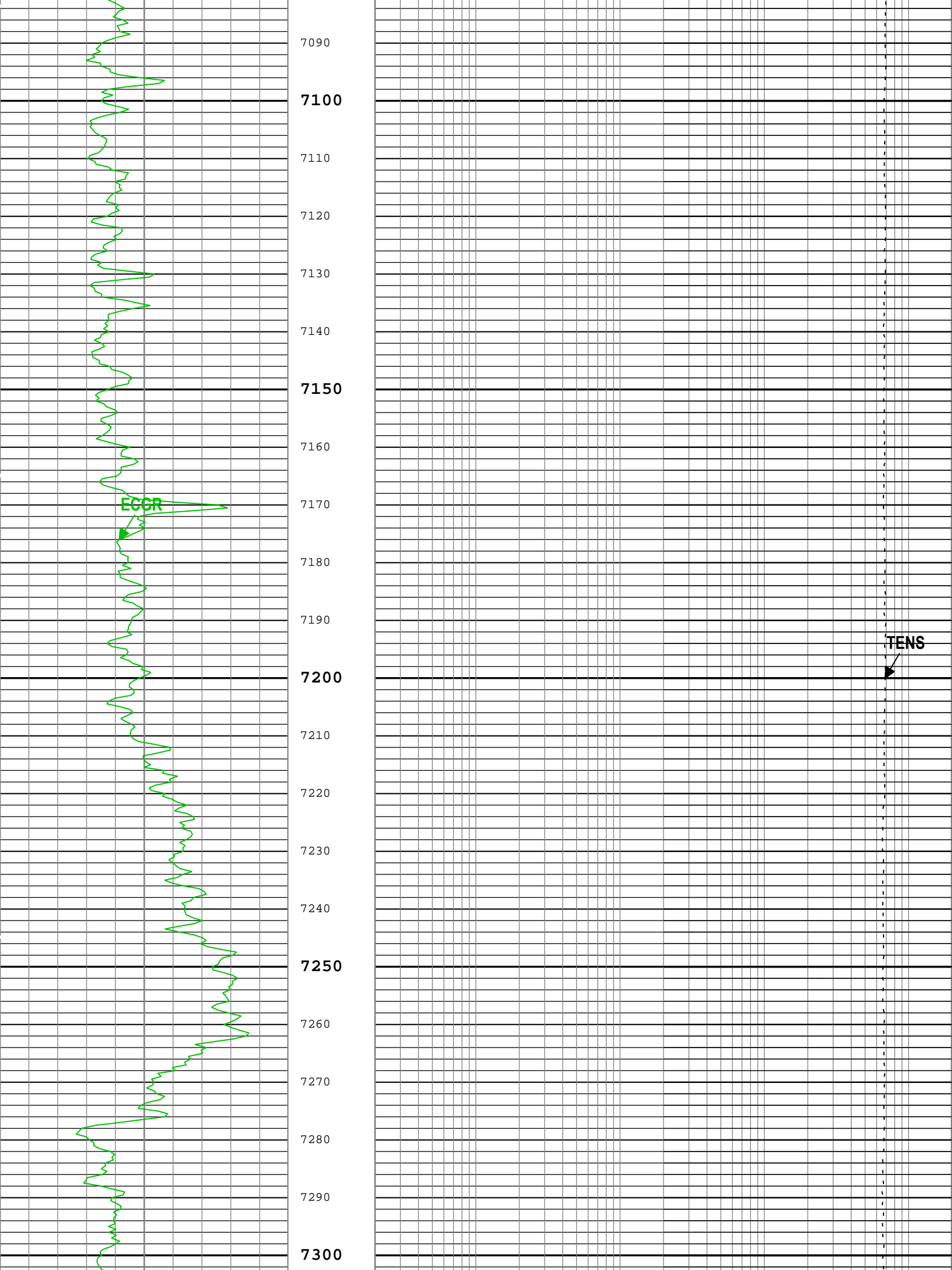


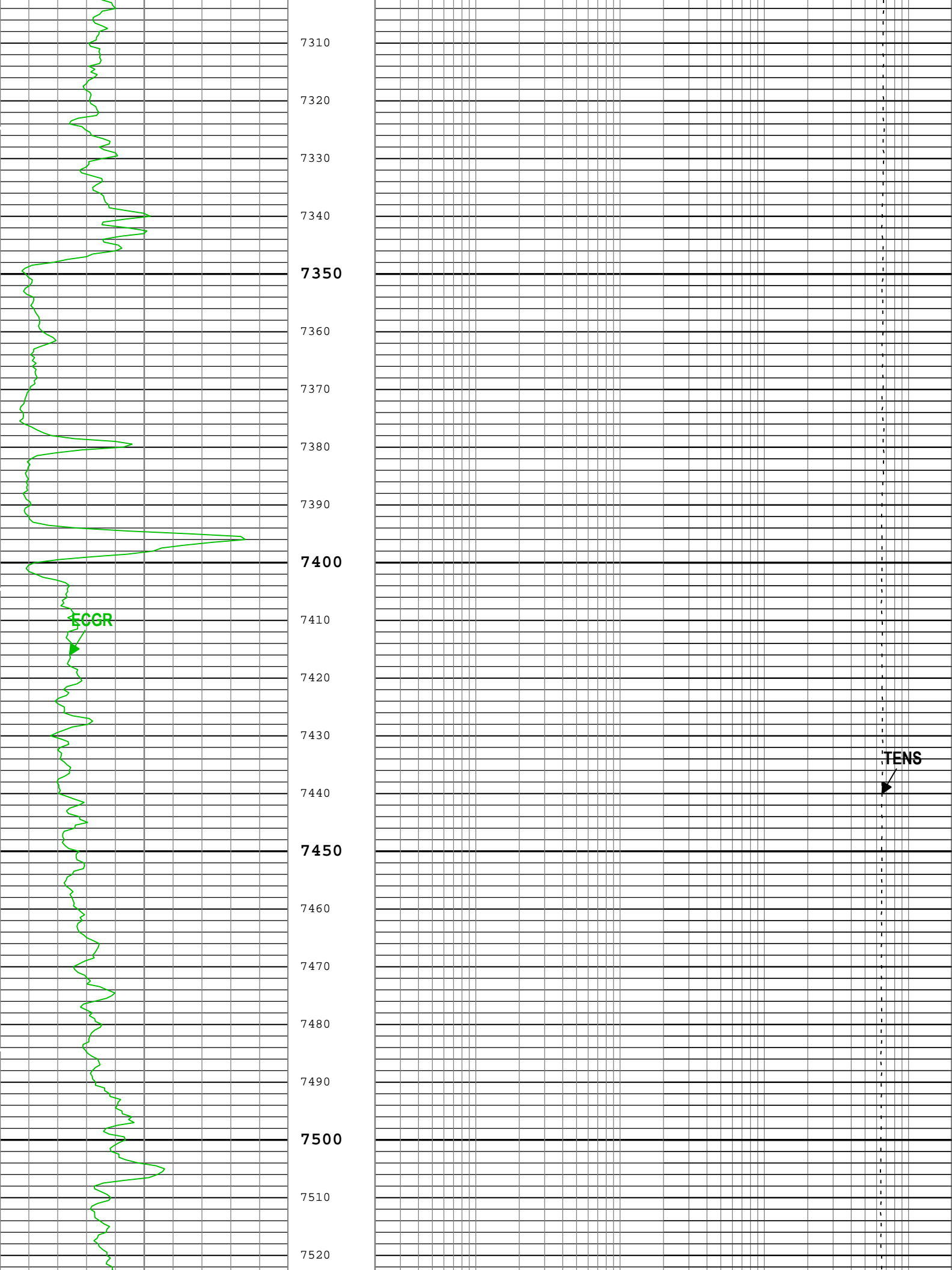


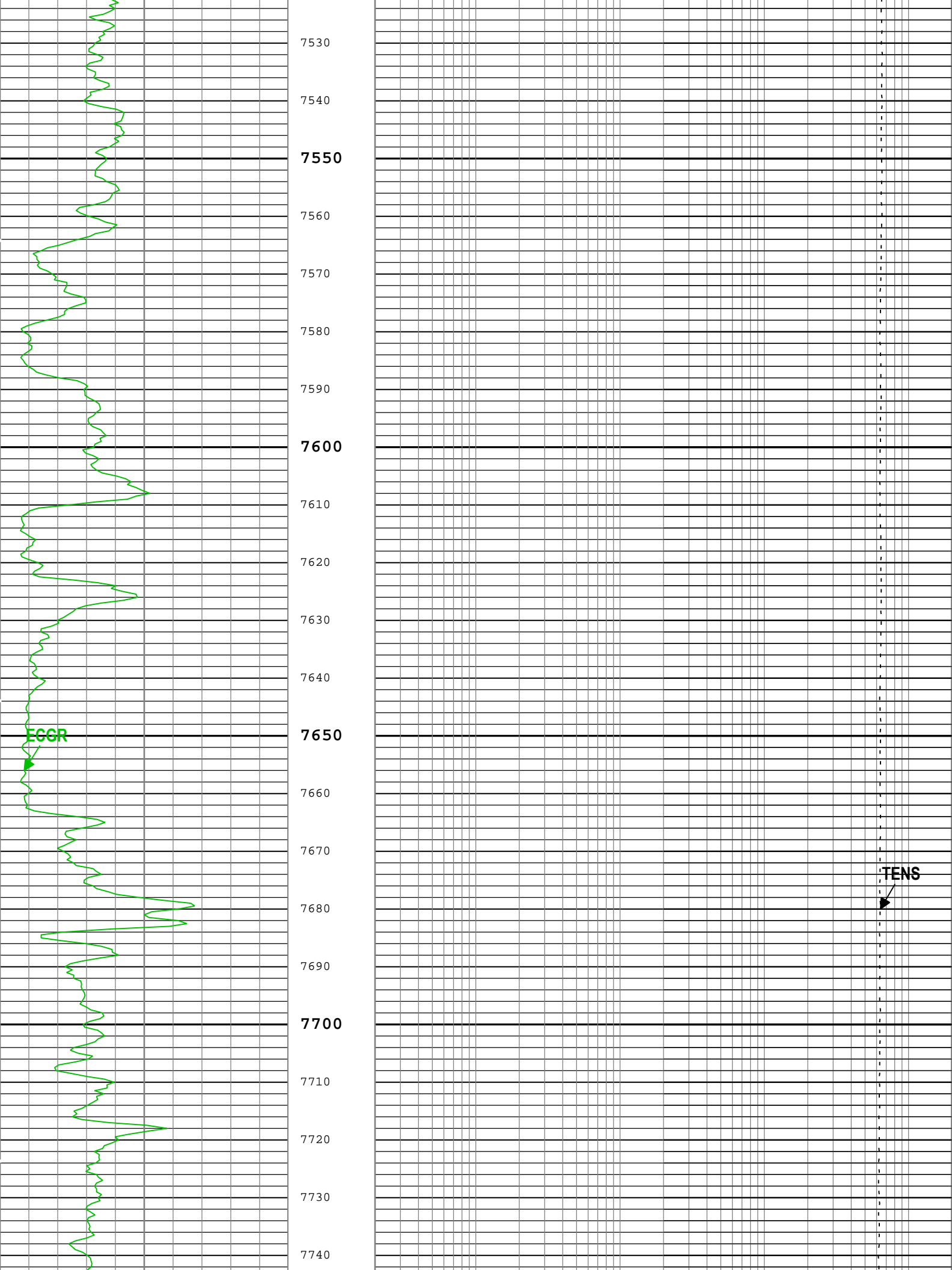


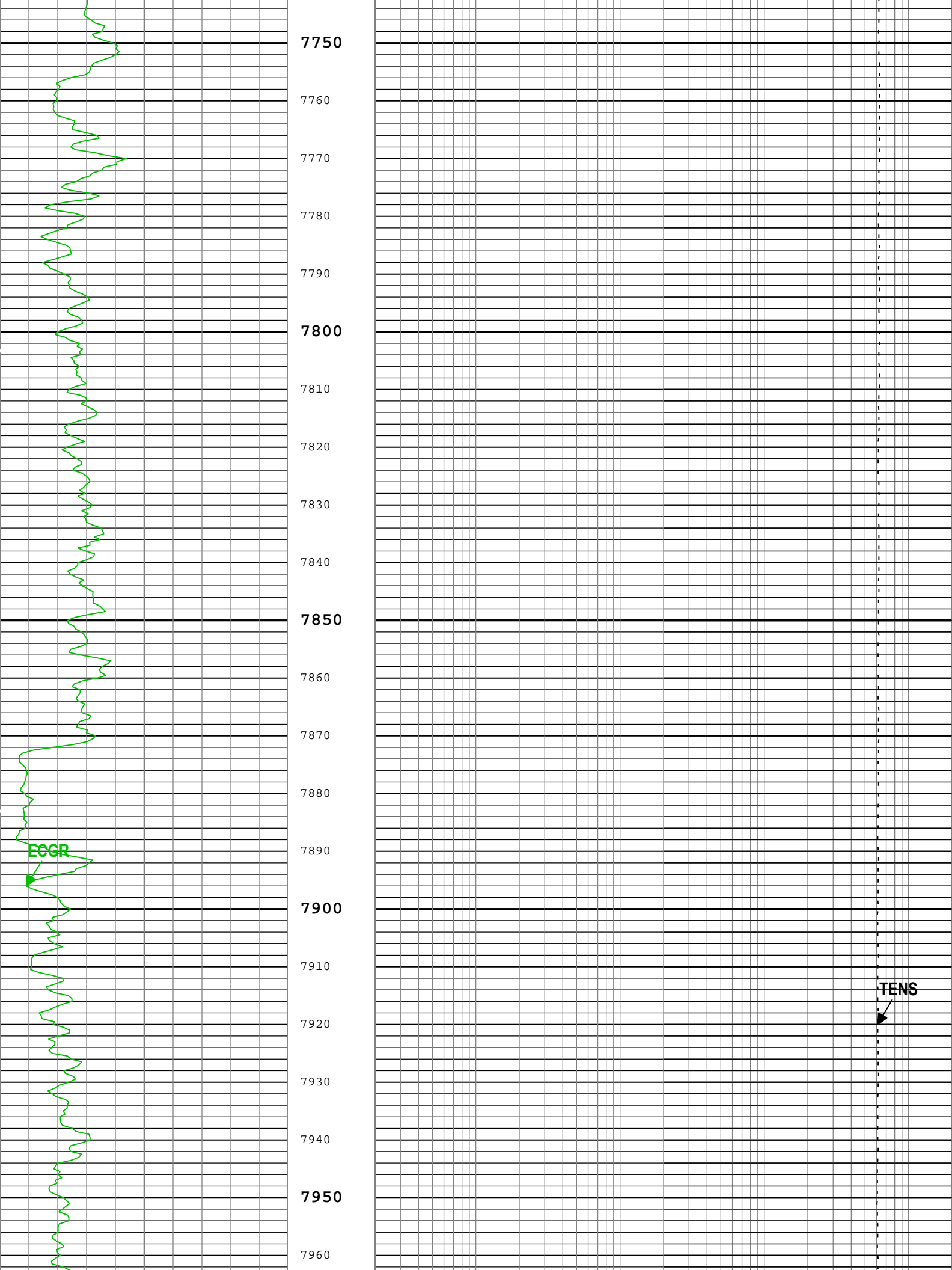


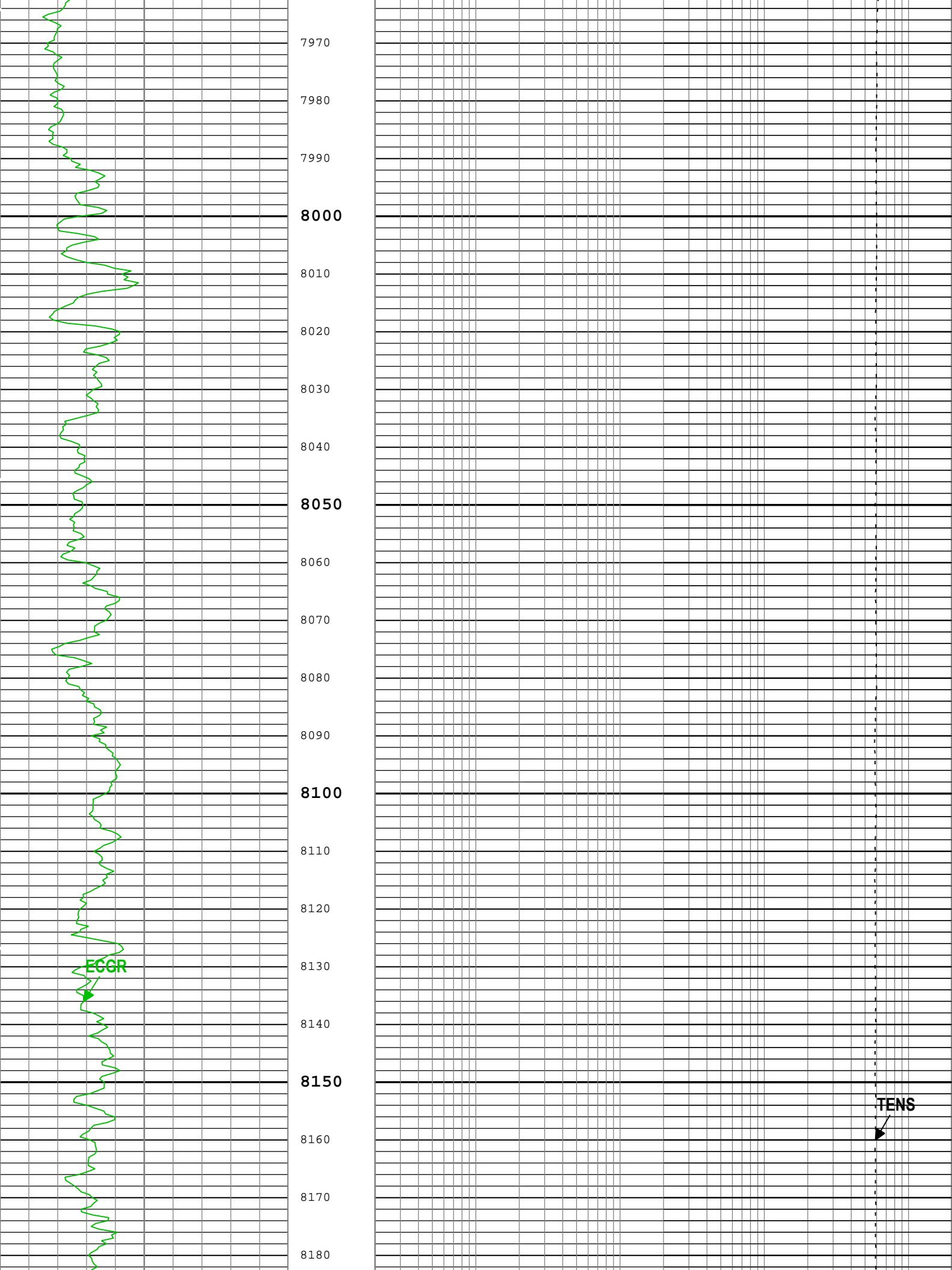


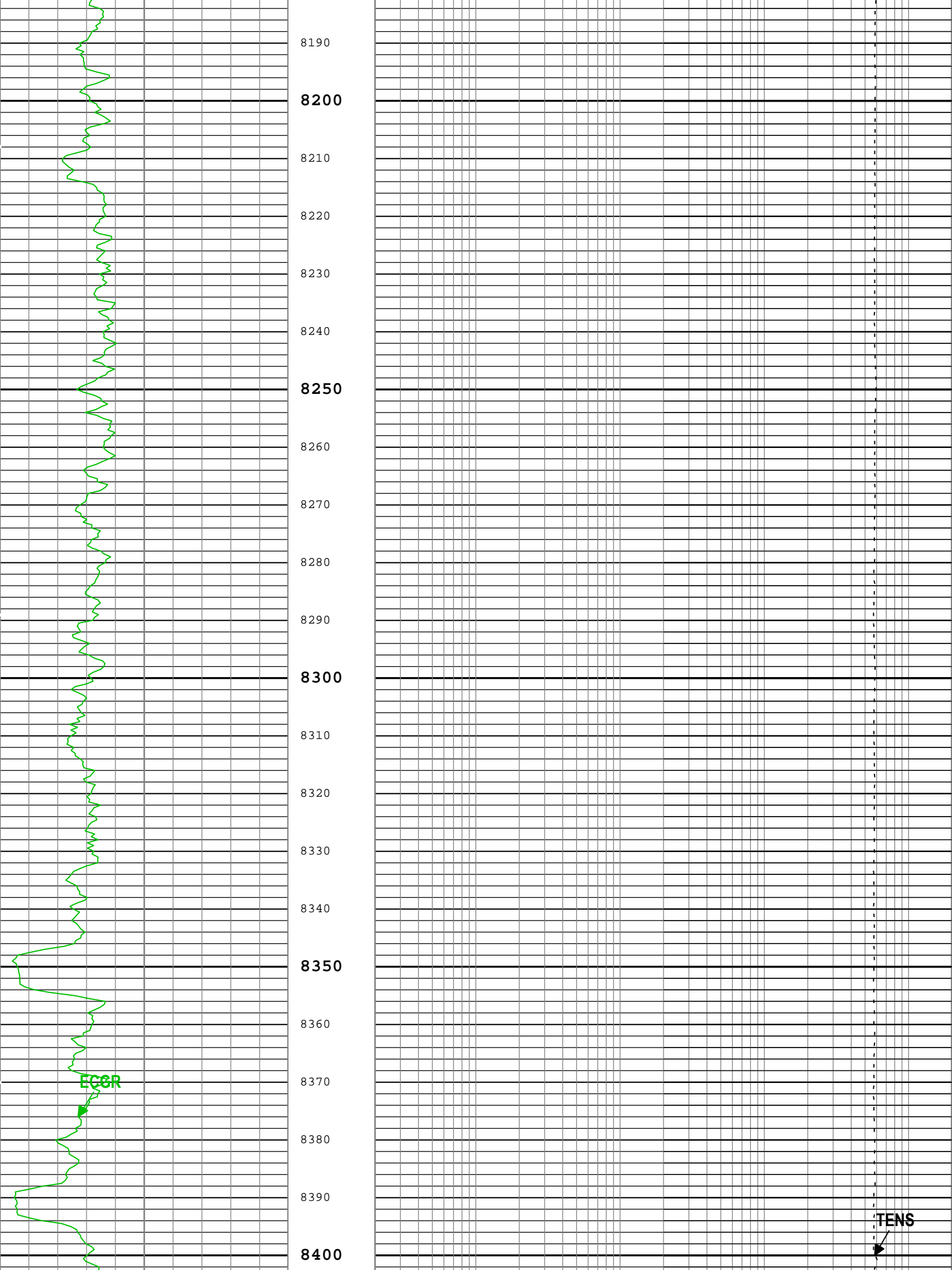




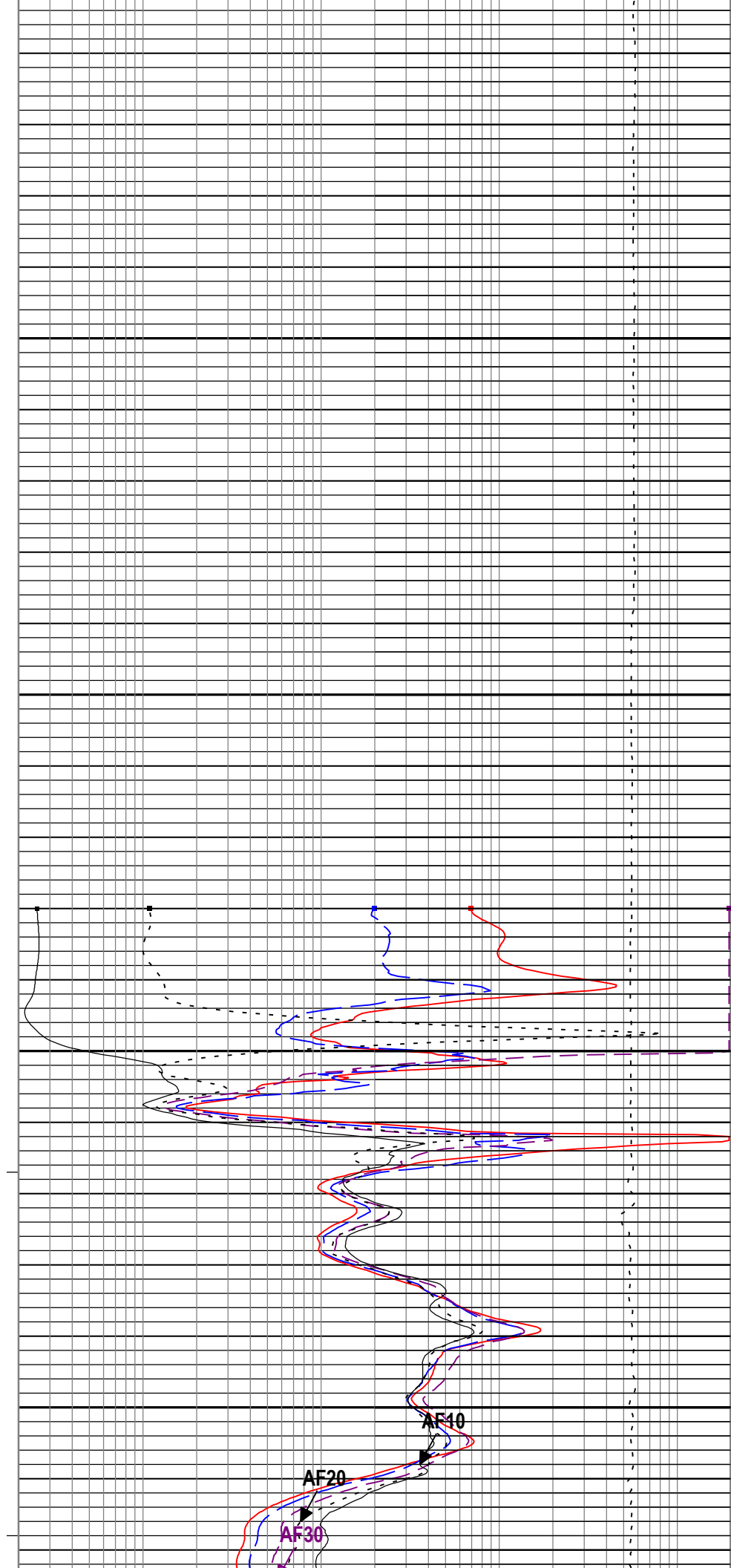
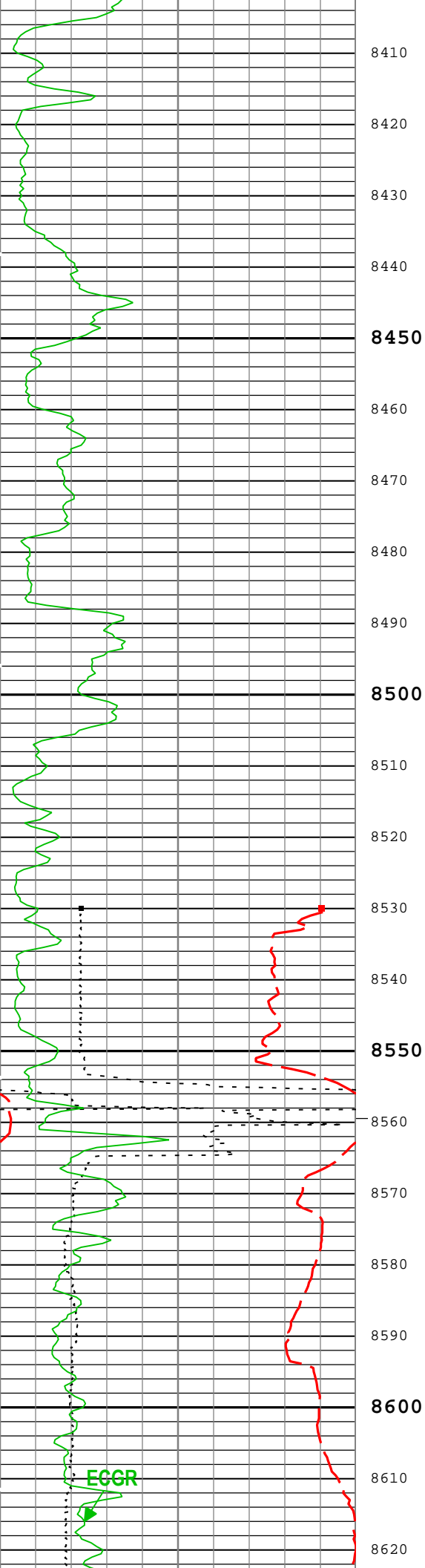


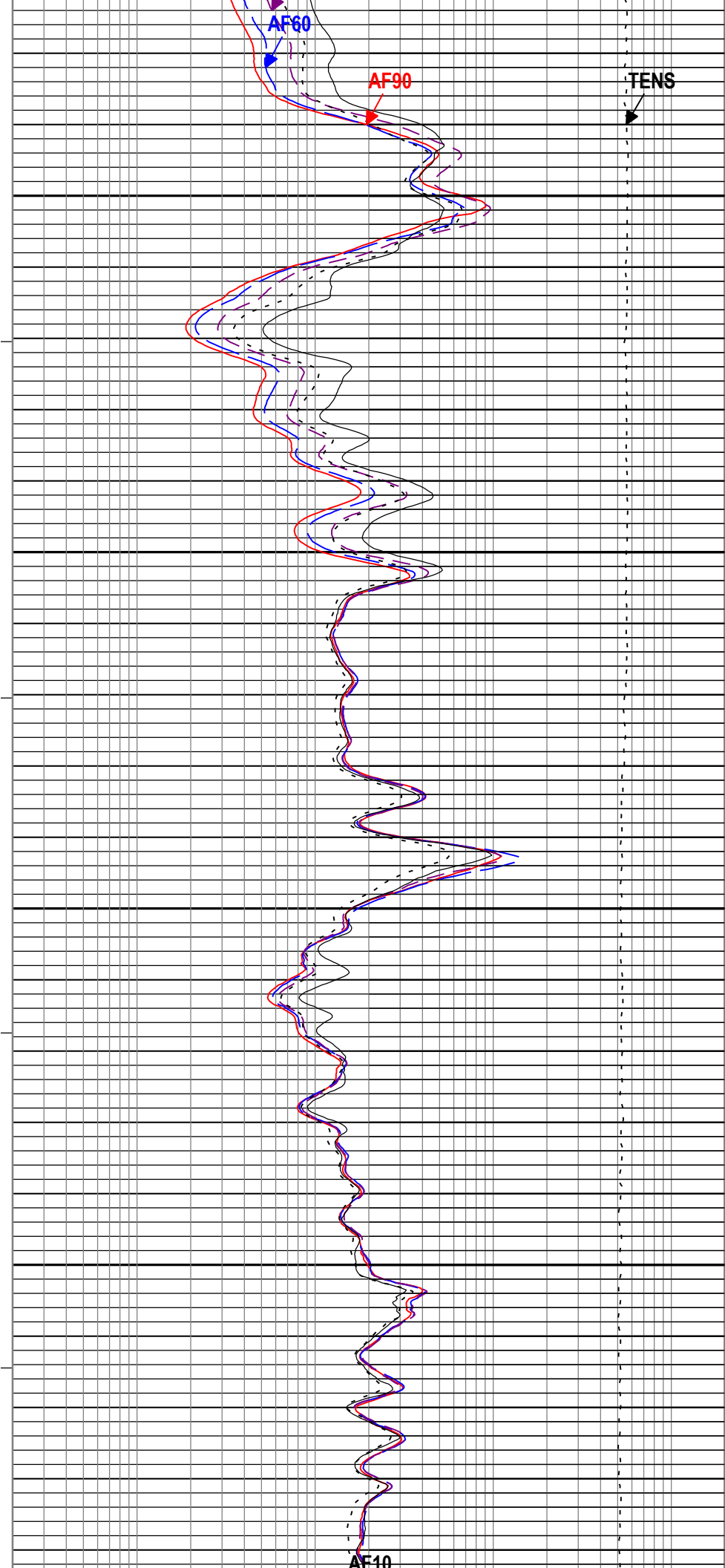
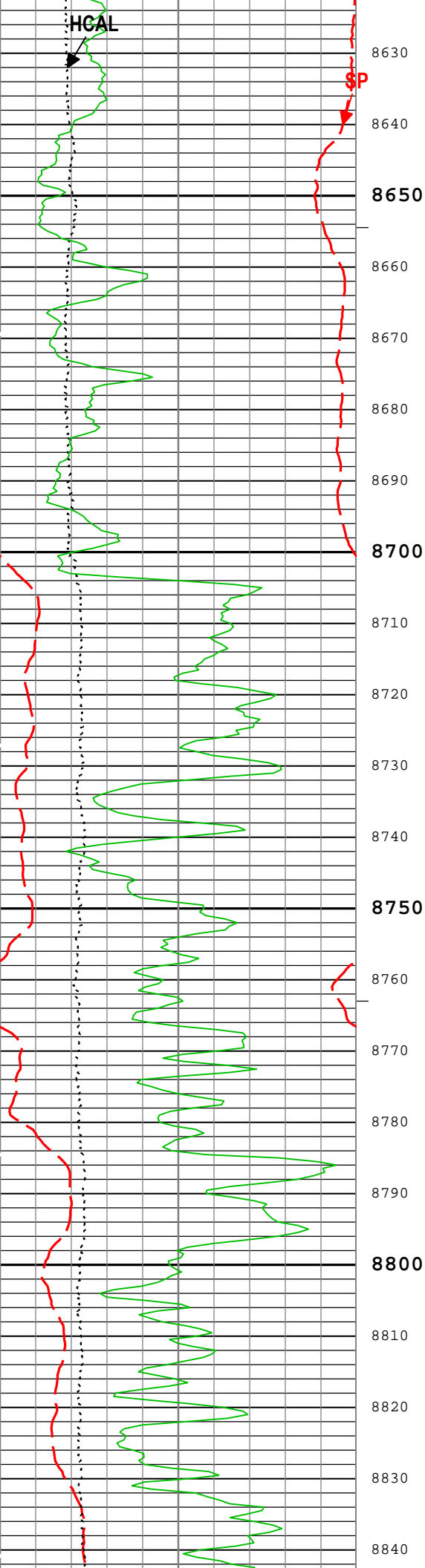


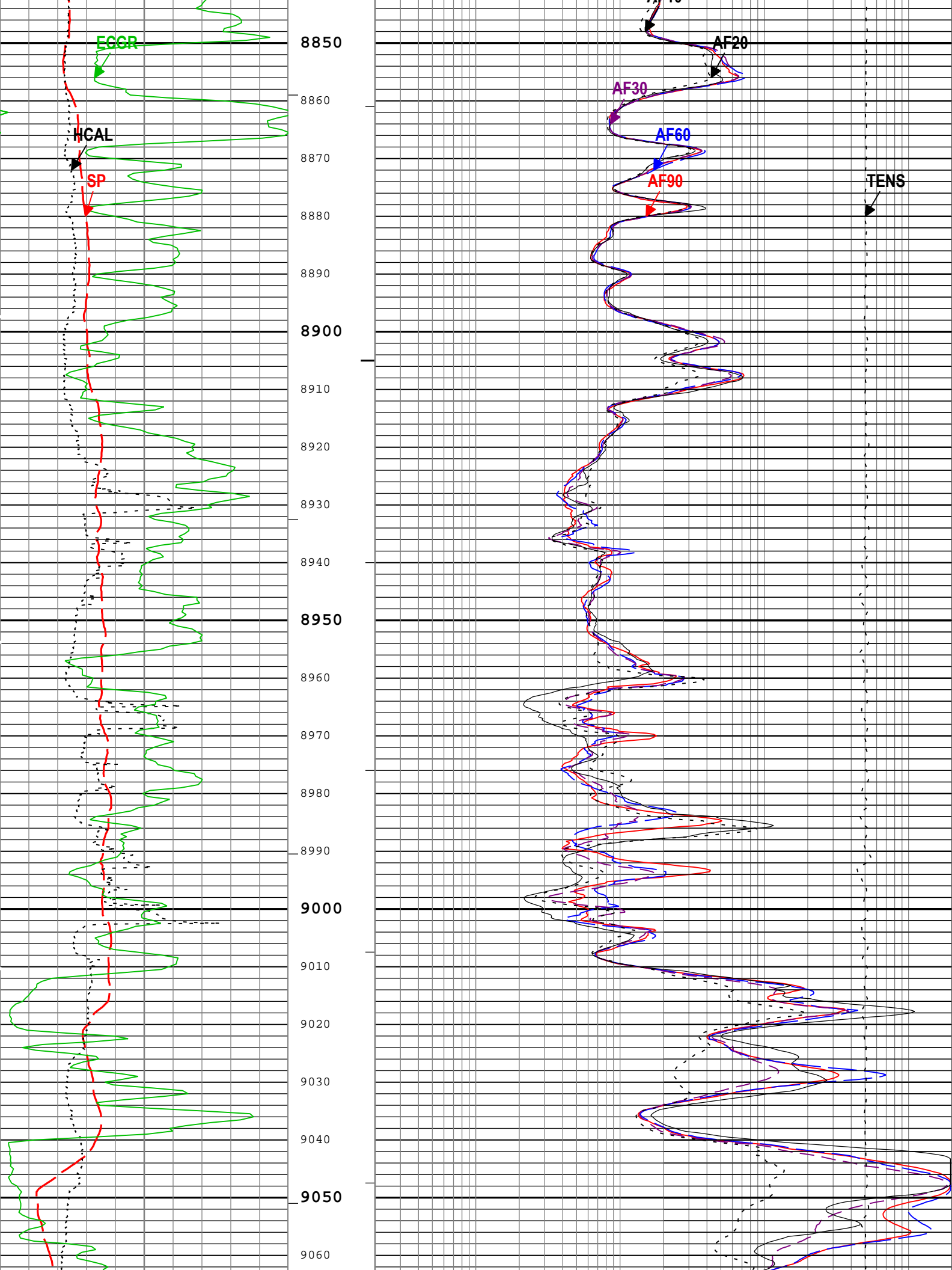


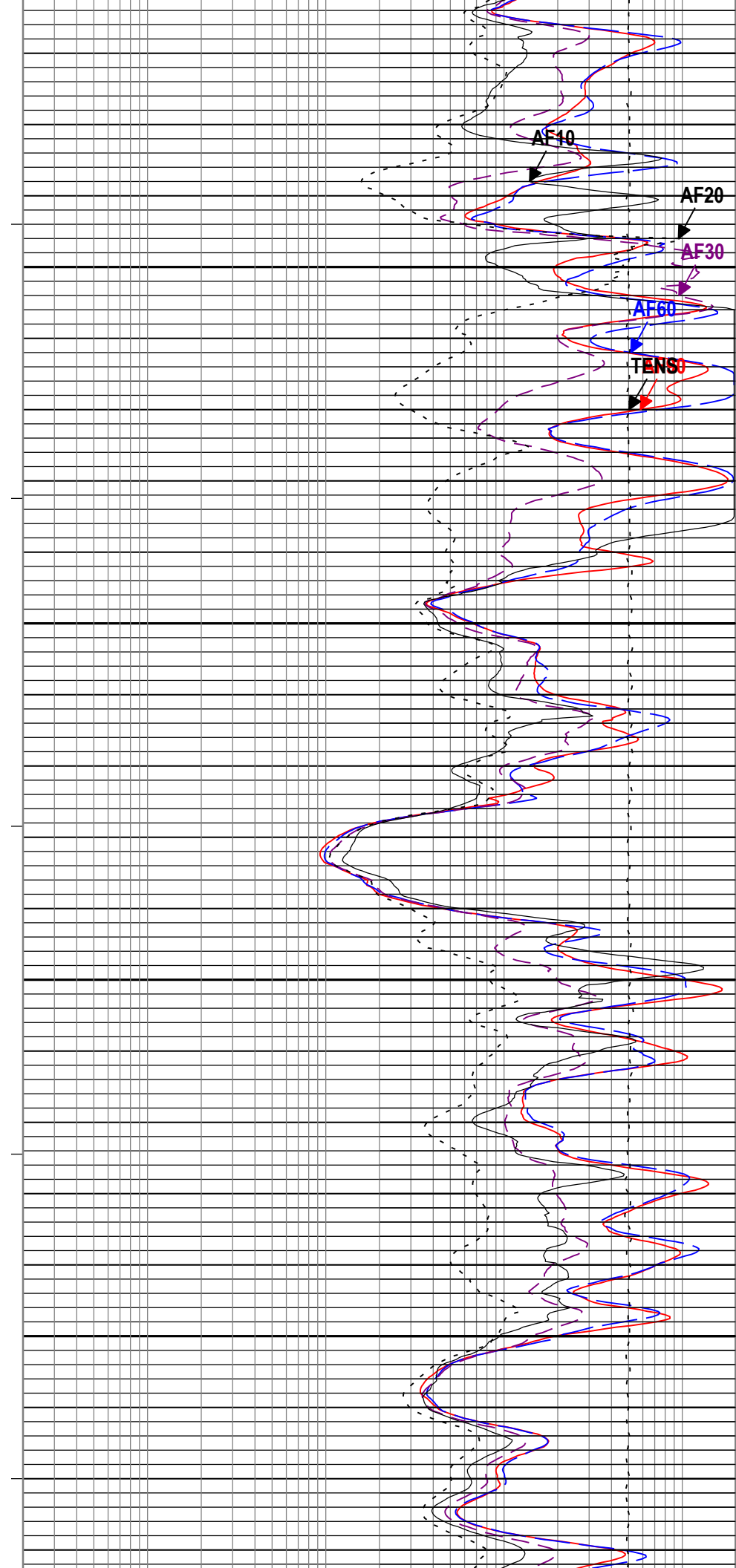
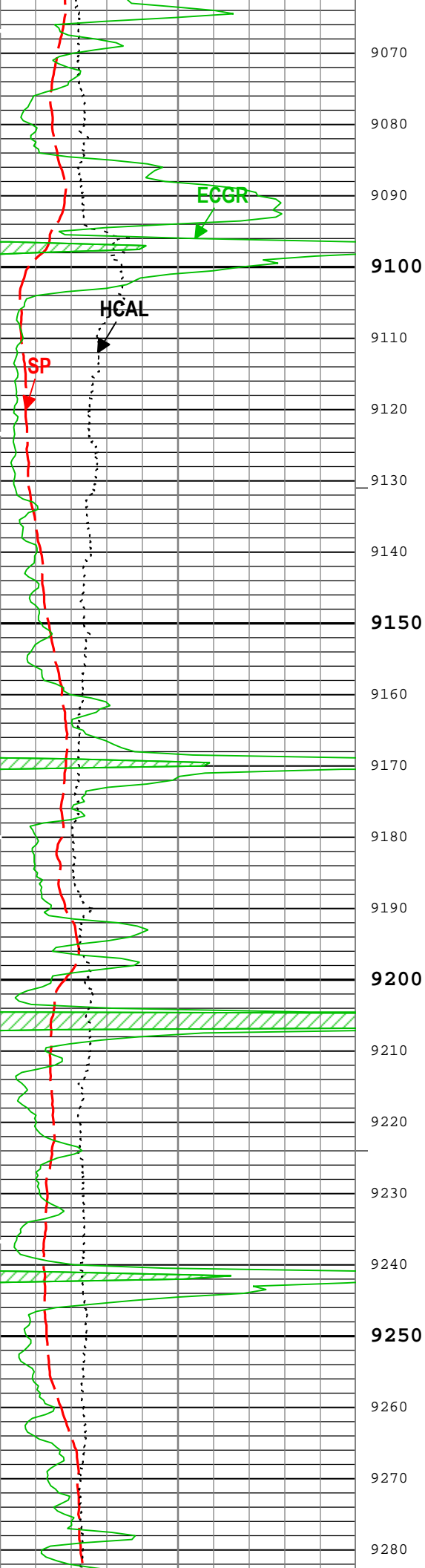


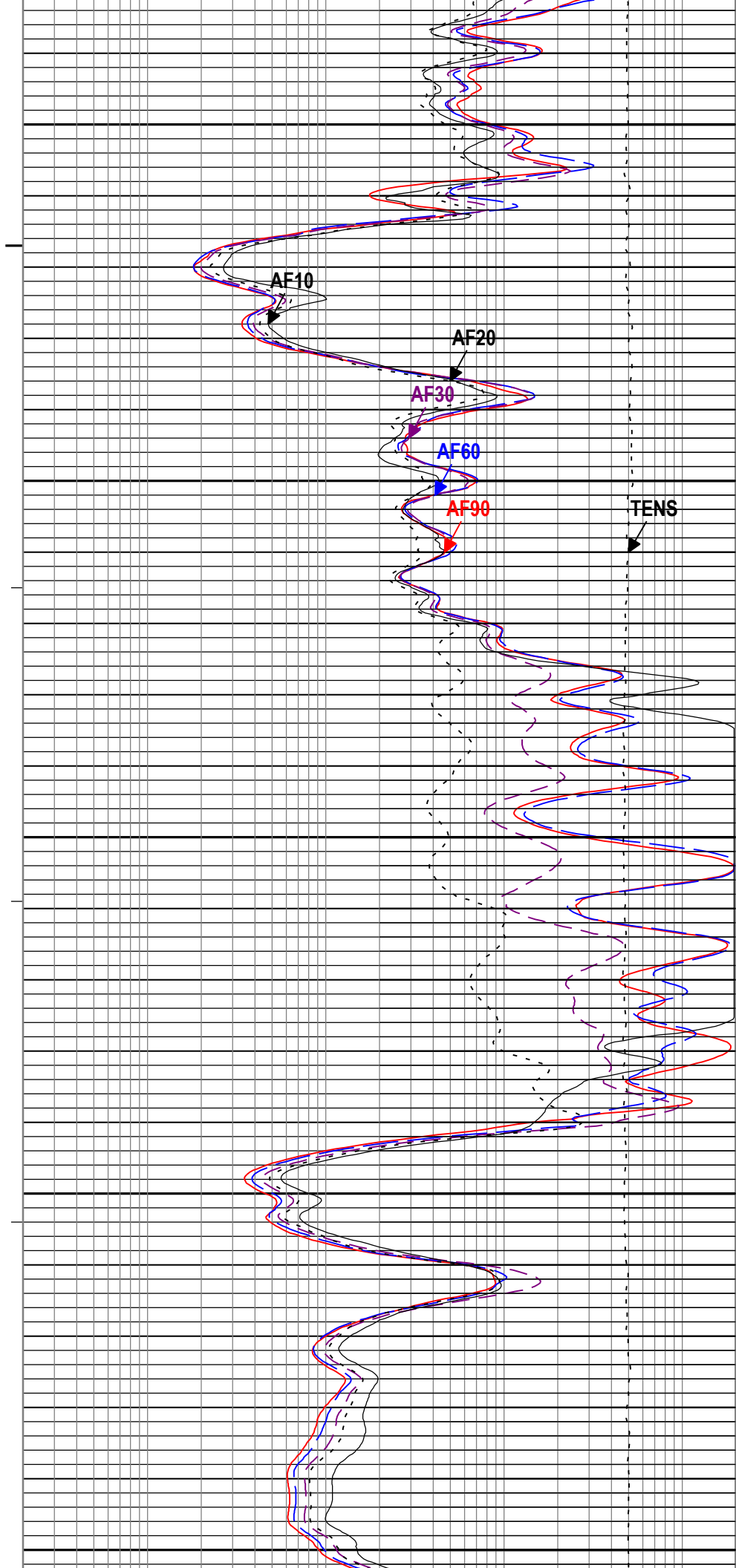
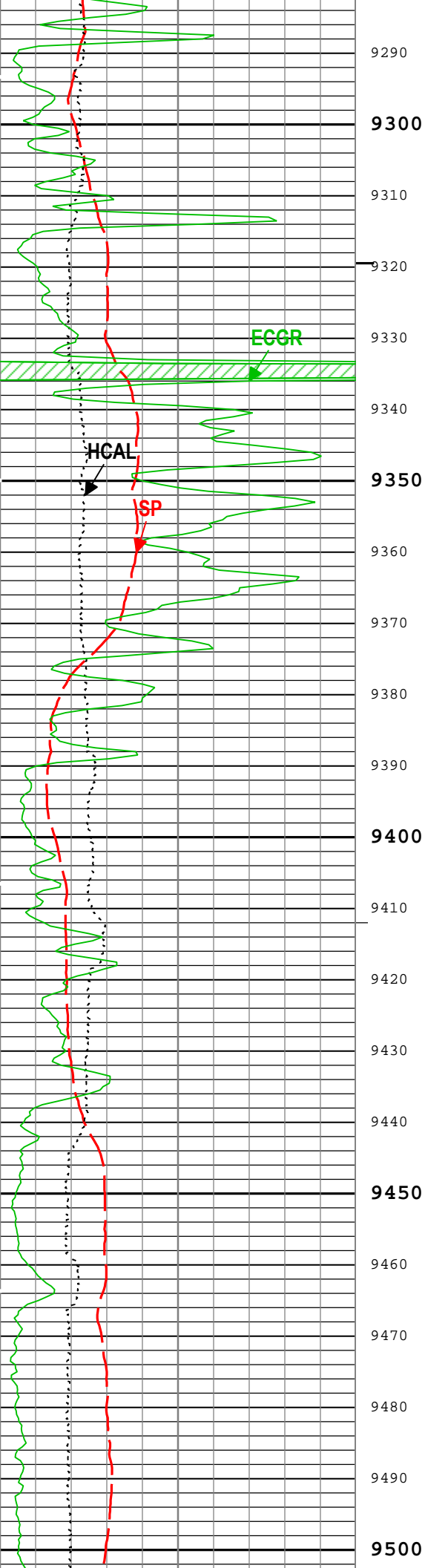


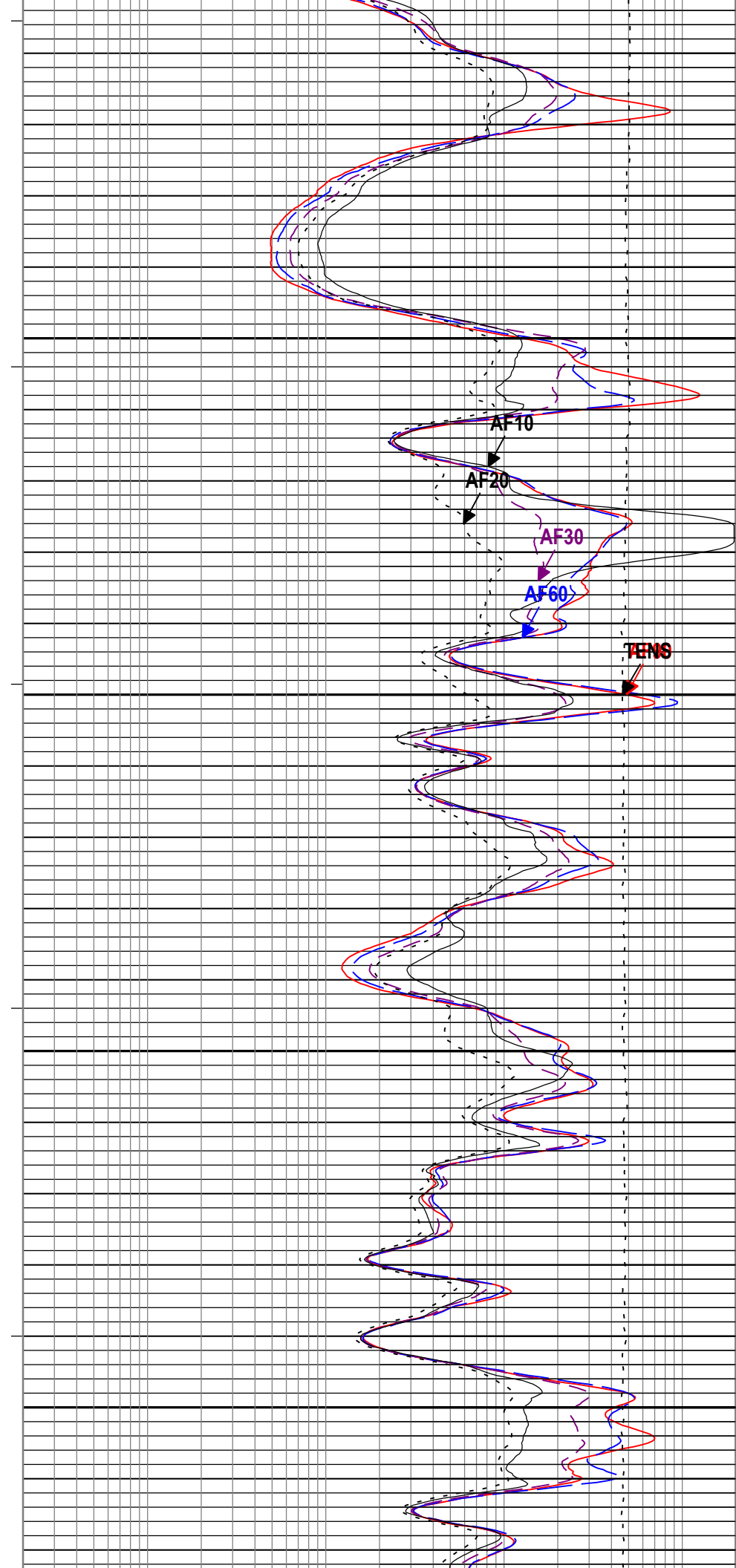
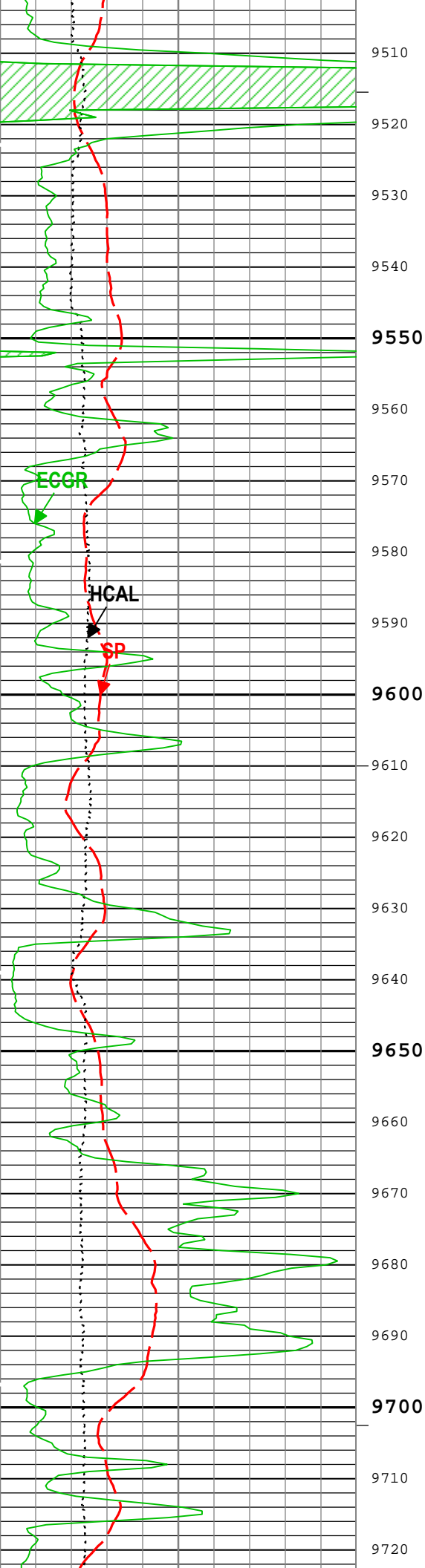


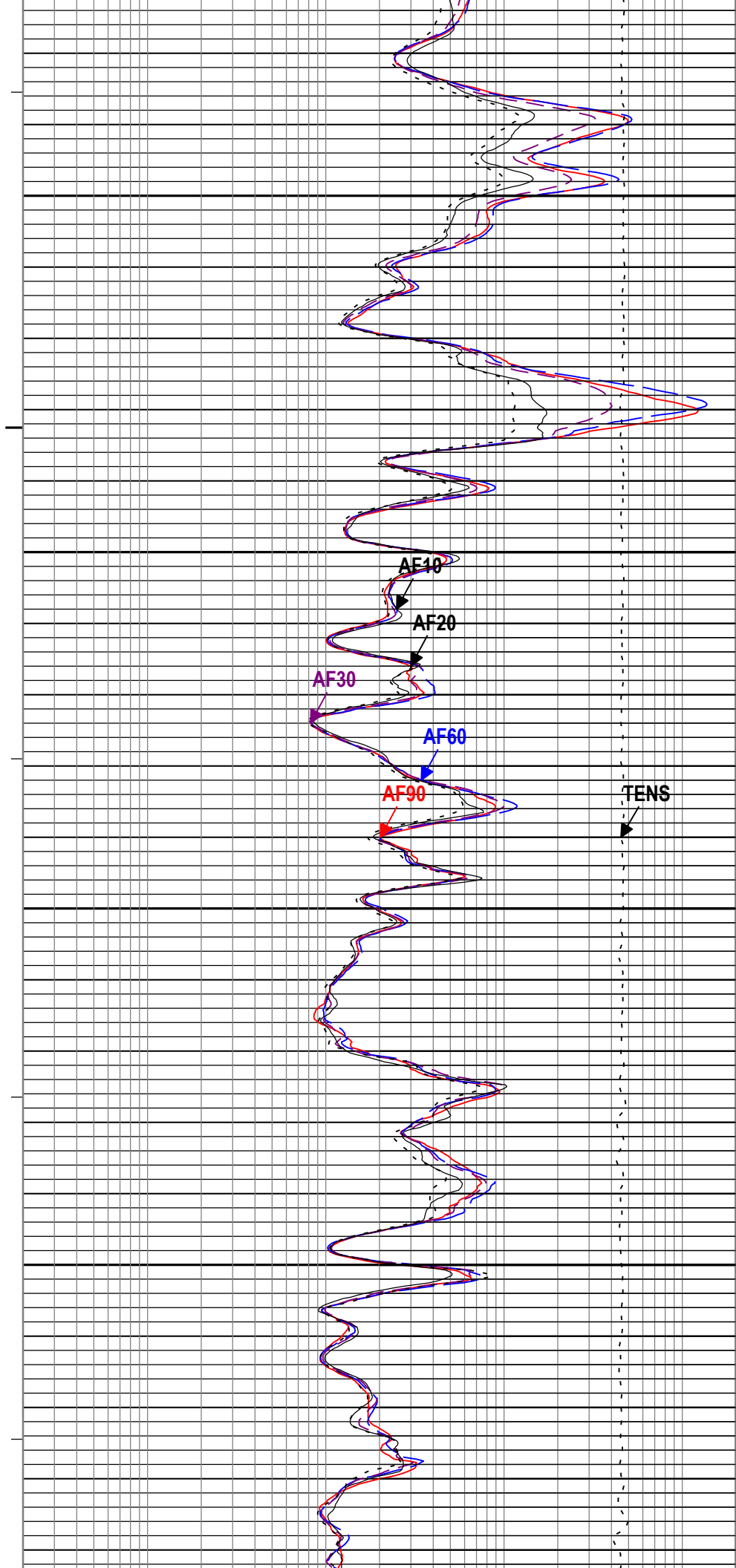
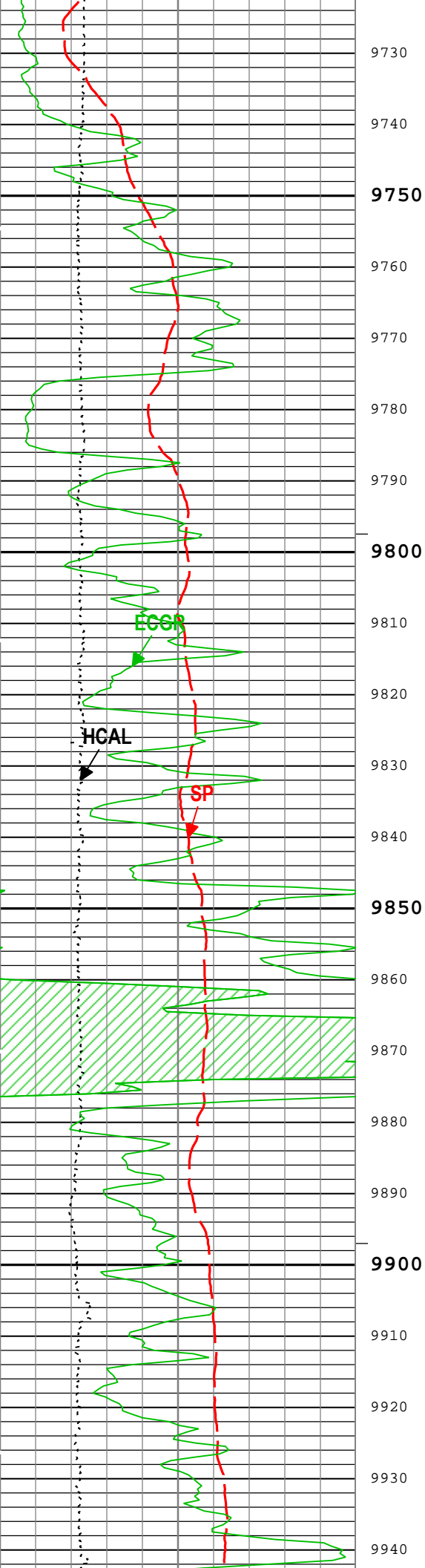


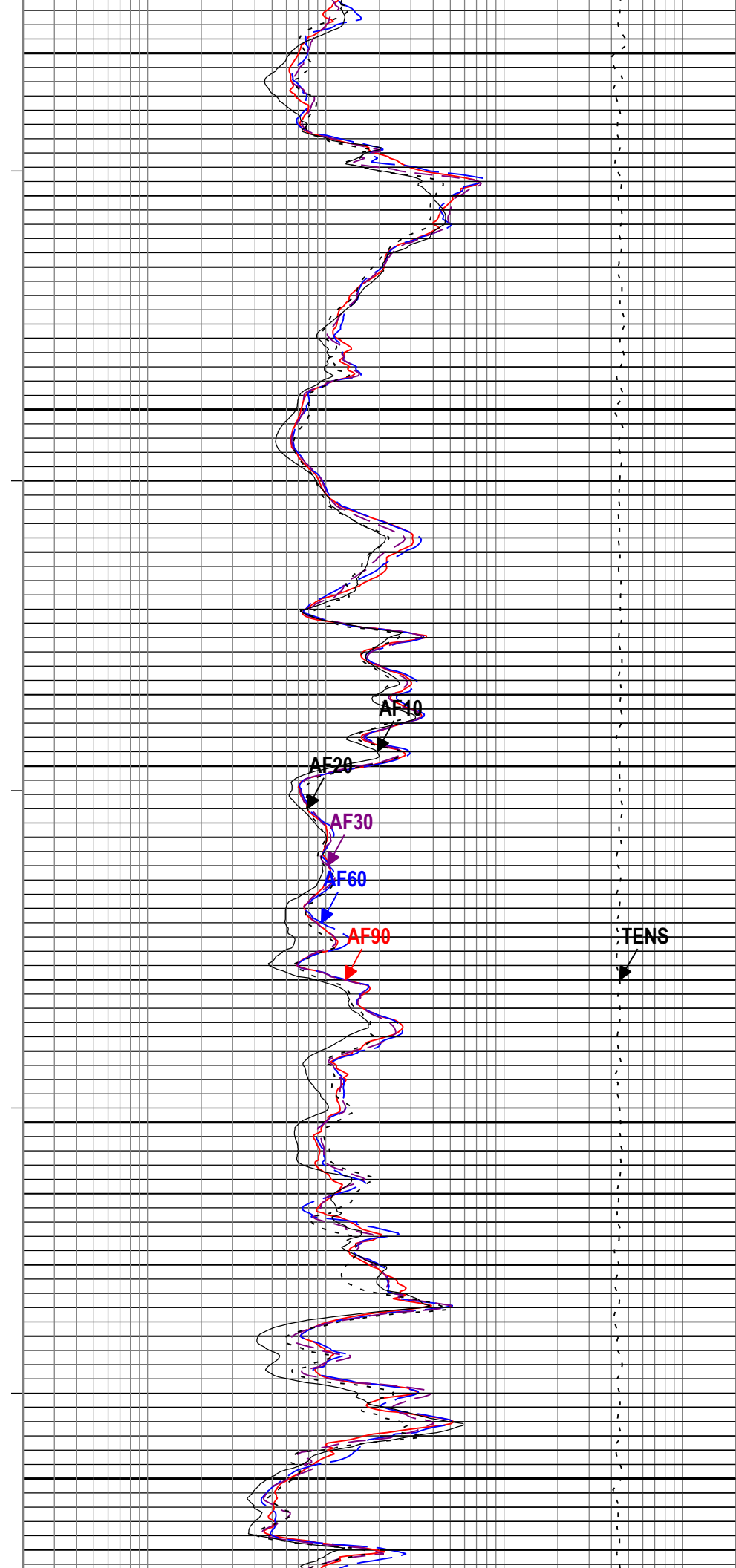
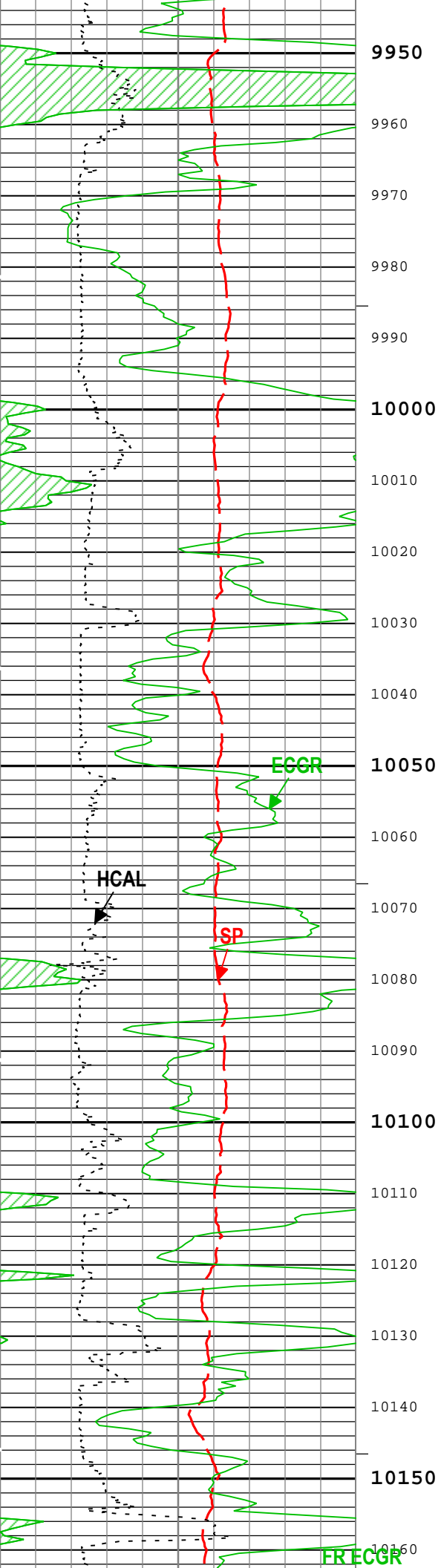




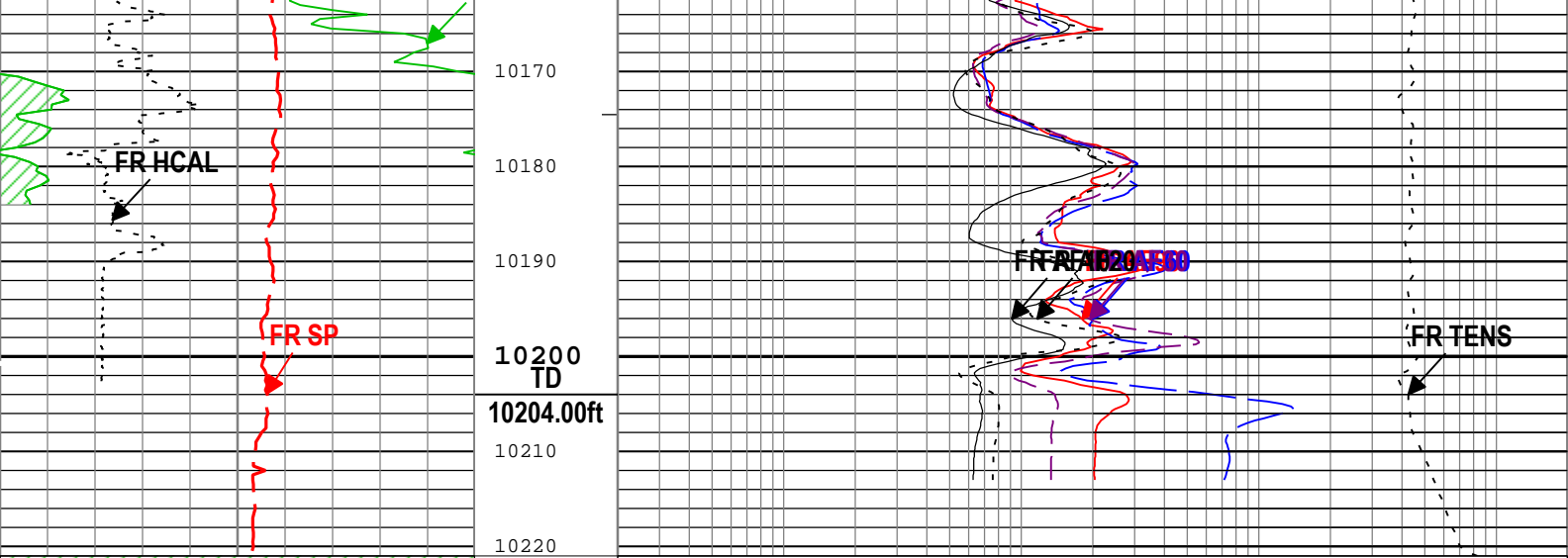












Gamma Ray Backup		
Spontaneous Potential (SP) AIT-M		
-160	mV	40
Caliper (HCAL) HDRS-H		
4	in	14
Gamma Ray (ECGR) HGNS-H		
0	gAPI	200

Array Induction Four Foot Resistivity A90 (AF90) AIT-M		
0.2	ohm.m	2000
Array Induction Four Foot Resistivity A60 (AF60) AIT-M		
0.2	ohm.m	2000
Array Induction Four Foot Resistivity A30 (AF30) AIT-M		
0.2	ohm.m	2000
Array Induction Four Foot Resistivity A20 (AF20) AIT-M		
0.2	ohm.m	2000
Array Induction Four Foot Resistivity A10 (AF10) AIT-M		
0.2	ohm.m	2000
Cable Tension (TENS)		
10000	lbf	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)

— IHV - Integrated Hole Volume every 100.00 (ft3)

— IHV - Integrated Hole Volume every 10.00 (ft3)

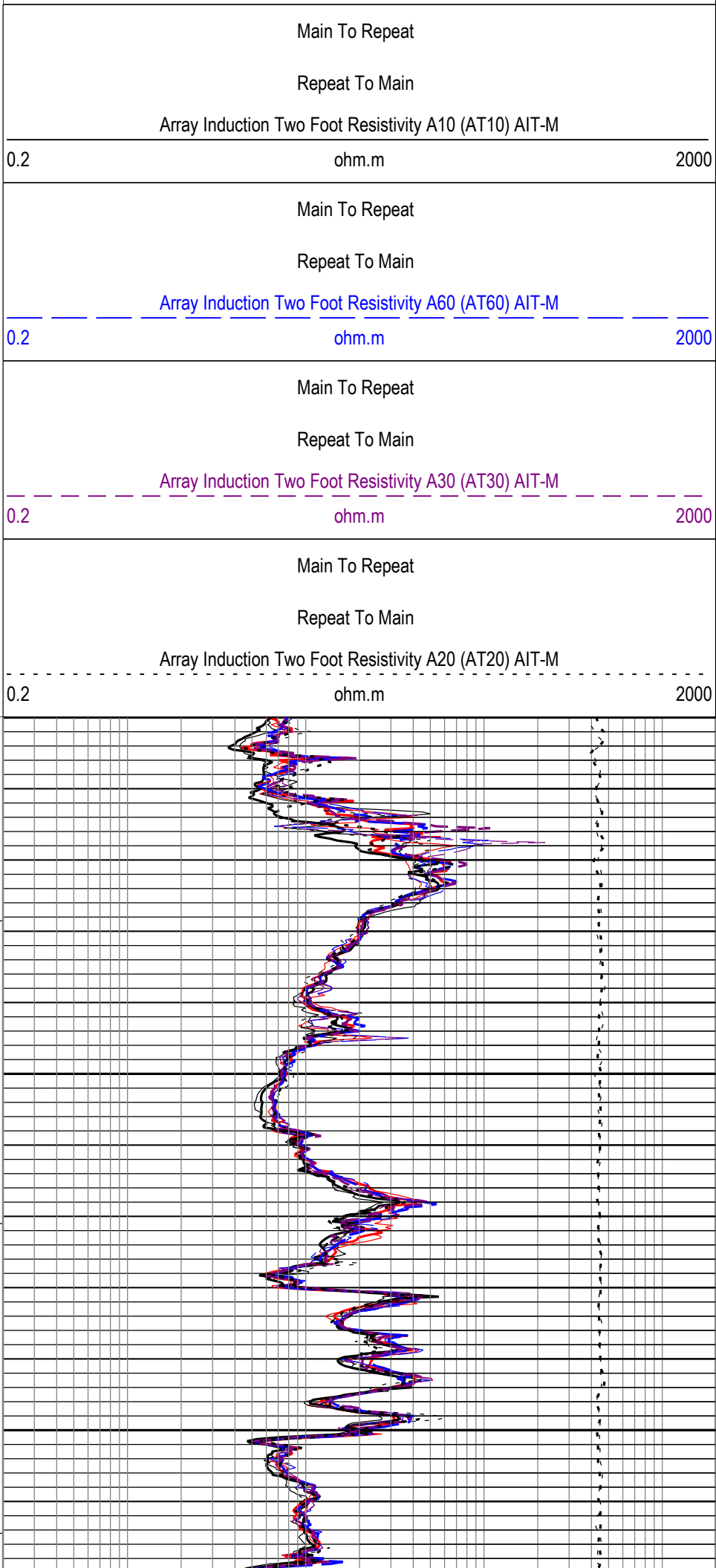
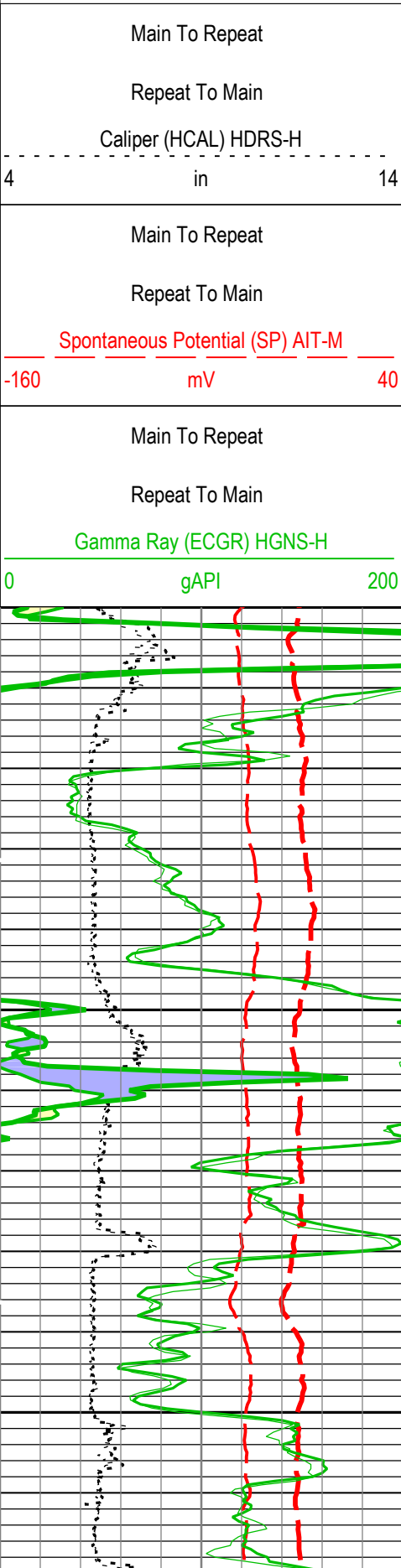
Description: AIT Basic Log Two    Format: Log ( Induction-5 )    Index Scale: 5 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 24-Feb-2017 08:55:46

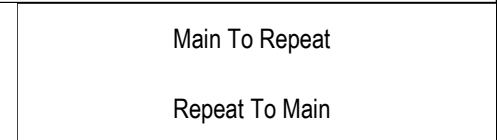
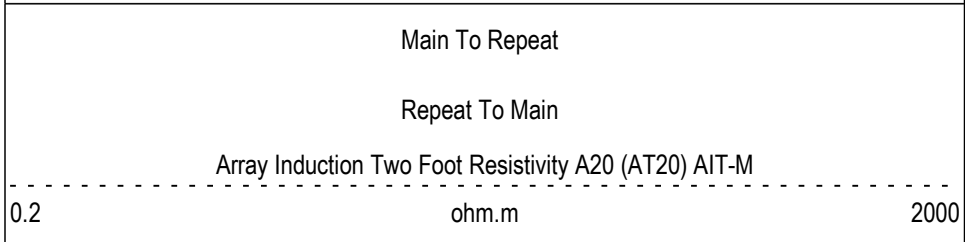
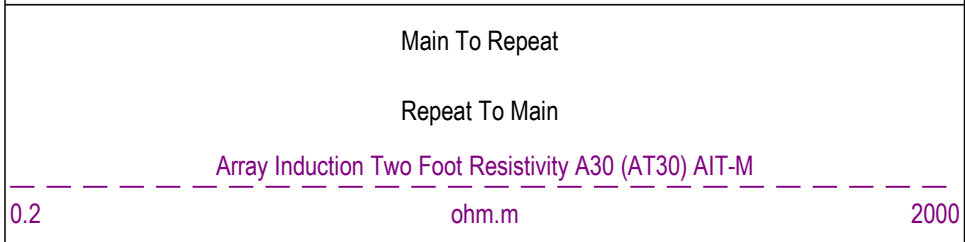
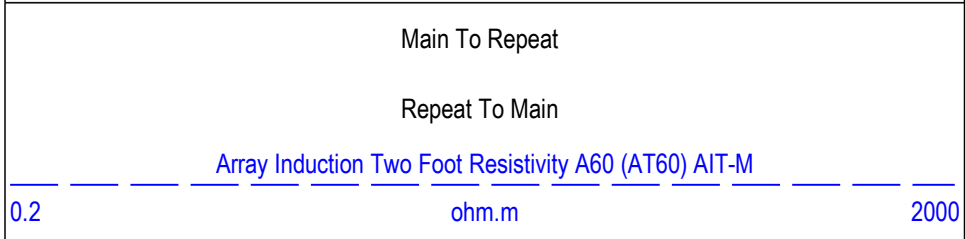
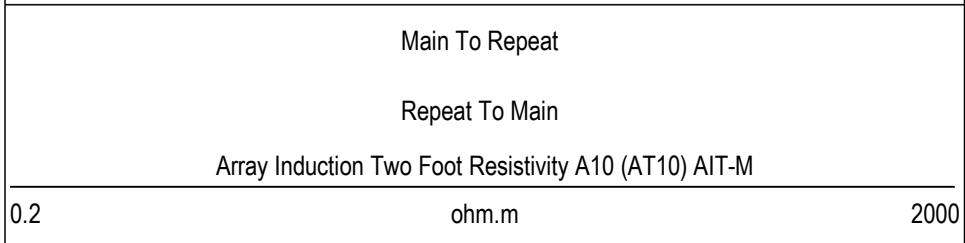
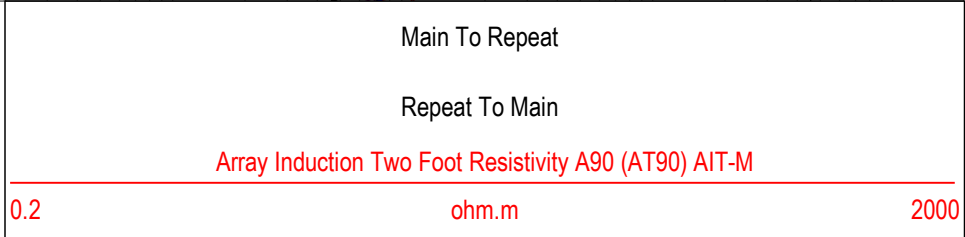
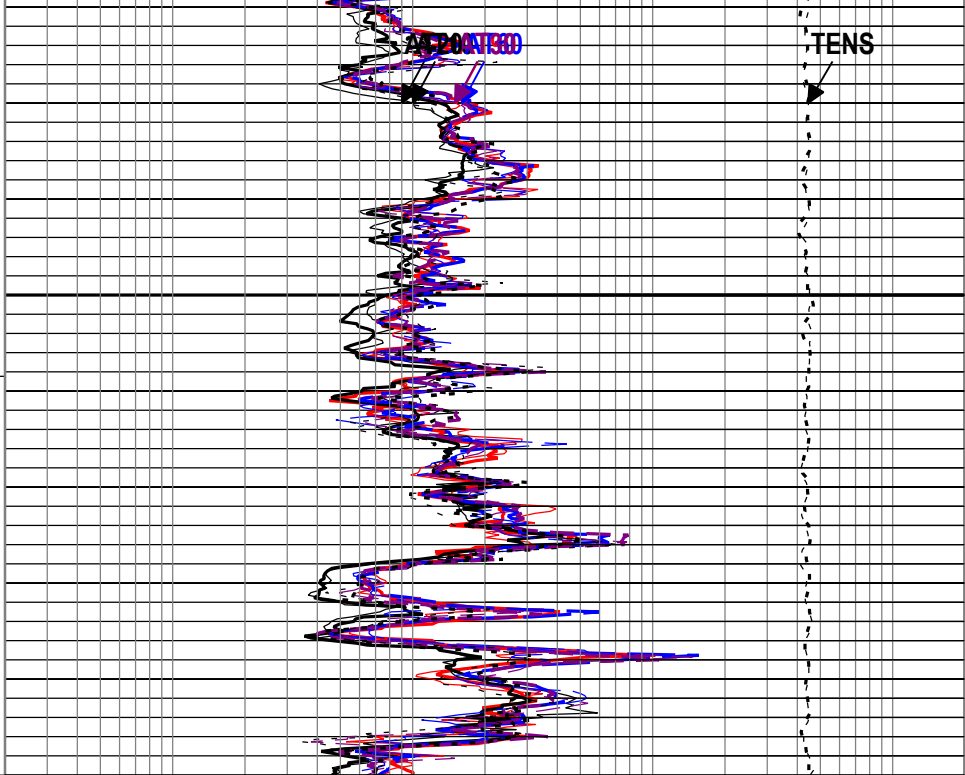
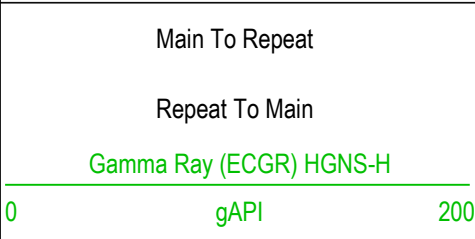
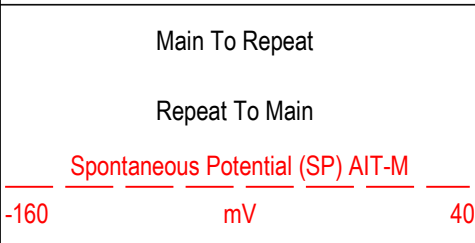
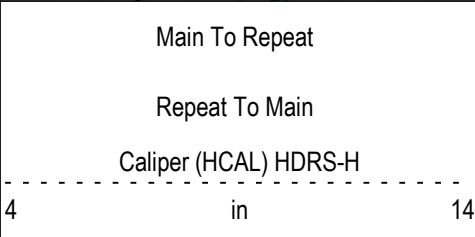
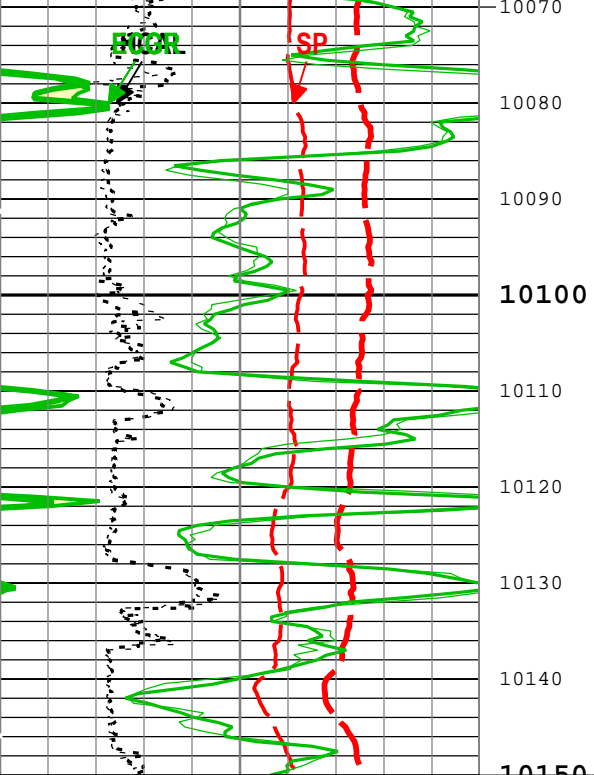
## Channel Processing Parameters

### ONE: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
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	-0.01	in
CBLO	Casing Bottom (Logger)	WLSESSION	8552	ft
CDEN	Cement Density	HGNS-H	1.58	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	7	in
DFD	Drilling Fluid Density	Borehole	9.1	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
FCD	Future Casing (Outer) Diameter	WLSESSION	4.5	in
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	







Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	6.125	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	-0.01	in
CBLO	Casing Bottom (Logger)	WLSESSION	8552	ft
CDEN	Cement Density	HGNS-H	1.58	g/cm3
DFD	Drilling Fluid Density	Borehole	9.1	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
FCD	Future Casing (Outer) Diameter	WLSESSION	4.5	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

Tool Control Parameters

ONE: Parameters

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

Calibration Report

AIT-M (Array Induction Tool - M) Calibration - Run ONE

Primary Equipment :			
File code for AIT-MA Sonde Tool Element	AMIS	1305	
Auxiliary Equipment :			
File code for AIT Bottom Nose Tool Element	AMRM	1305	

AIT Sonde Calibration - Test Loop Gain

Master (EEPROM):19:45:52 30-Aug-2016

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Test Loop Gain - 0		Master	1.000	0.950	1.019	1.050	
Test Loop Phase - 0	deg	Master	0	-3.000	0.457	3.000	
Test Loop Gain - 1		Master	1.000	0.950	1.018	1.050	
Test Loop Phase - 1	deg	Master	0	-3.000	0.485	3.000	
Test Loop Gain - 2		Master	1.000	0.950	1.017	1.050	
Test Loop Phase - 2	deg	Master	0	-3.000	-1.158	3.000	
Test Loop Gain - 3		Master	1.000	0.950	1.014	1.050	
Test Loop Phase - 3	deg	Master	0	-3.000	-0.716	3.000	
Test Loop Gain - 4		Master	1.000	0.950	0.999	1.050	

Test Loop Gain - 4		Master	1.000	0.990	0.999	1.050	
Test Loop Phase - 4	deg	Master	0	-3.000	-0.186	3.000	
Test Loop Gain - 5		Master	1.000	0.950	0.997	1.050	
Test Loop Phase - 5	deg	Master	0	-3.000	-0.244	3.000	
Test Loop Gain - 6		Master	1.000	0.950	1.007	1.050	
Test Loop Phase - 6	deg	Master	0	-3.000	0.209	3.000	
Test Loop Gain - 7		Master	1.000	0.950	1.031	1.050	
Test Loop Phase - 7	deg	Master	0	-3.000	0.072	3.000	

## AIT Sonde Calibration - Sonde Error Correction

Master (EEPROM):		19:45:52 30-Aug-2016					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Sonde Error Correction Real - 0	mS/m	Master	-----	-231.000	-82.274	119.000	
Sonde Error Correction Quad - 0		Master	-----	-2250.000	-11.750	2250.000	
Sonde Error Correction Real - 1	mS/m	Master	-----	114.000	189.132	204.000	
Sonde Error Correction Quad - 1		Master	-----	-625.000	-99.398	625.000	
Sonde Error Correction Real - 2	mS/m	Master	-----	66.000	91.987	156.000	
Sonde Error Correction Quad - 2		Master	-----	-350.000	-163.766	350.000	
Sonde Error Correction Real - 3	mS/m	Master	-----	39.000	56.787	89.000	
Sonde Error Correction Quad - 3		Master	-----	-250.000	10.774	250.000	
Sonde Error Correction Real - 4	mS/m	Master	-----	15.000	27.318	35.000	
Sonde Error Correction Quad - 4		Master	-----	-63.000	-9.964	63.000	
Sonde Error Correction Real - 5	mS/m	Master	-----	4.000	11.520	24.000	
Sonde Error Correction Quad - 5		Master	-----	-50.000	21.600	50.000	
Sonde Error Correction Real - 6	mS/m	Master	-----	5.000	10.623	15.000	
Sonde Error Correction Quad - 6		Master	-----	-30.000	-5.057	30.000	
Sonde Error Correction Real - 7	mS/m	Master	-----	-5.000	-1.679	5.000	
Sonde Error Correction Quad - 7		Master	-----	-30.000	3.884	30.000	

## AIT Mud Calibration - Mud Calibration Gain

Master (EEPROM):		19:45:52 30-Aug-2016					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Coarse Gain		Master	1.000	0.800	1.152	1.200	
Fine Gain		Master	1.000	0.800	1.147	1.200	

## AIT Electronics Check - Thru Calibration Check

Master (EEPROM):		19:45:52 30-Aug-2016 Expired by 85 days					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Thru Cal Mag - 0	V	Master	-----	0.366	0.608	0.854	
Thru Cal Phase - 0	deg	Master	-----	137.000	-172.932	-103.000	
Thru Cal Mag - 1	V	Master	-----	0.762	1.246	1.778	
Thru Cal Phase - 1	deg	Master	-----	136.000	-173.870	-104.000	
Thru Cal Mag - 2	V	Master	-----	0.372	0.617	0.868	
Thru Cal Phase - 2	deg	Master	-----	132.000	-177.254	-108.000	
Thru Cal Mag - 3	V	Master	-----	0.420	0.699	0.980	
Thru Cal Phase - 3	deg	Master	-----	131.000	-177.987	-109.000	
Thru Cal Mag - 4	V	Master	-----	0.804	1.309	1.876	
Thru Cal Phase - 4	deg	Master	-----	125.000	176.206	-115.000	
Thru Cal Mag - 5	V	Master	-----	1.176	1.906	2.744	
Thru Cal Phase - 5	deg	Master	-----	122.000	174.647	-118.000	
Thru Cal Mag - 6	V	Master	-----	1.176	1.904	2.744	
Thru Cal Phase - 6	deg	Master	-----	121.000	174.679	-119.000	
Thru Cal Mag - 7	V	Master	-----	0.846	1.375	1.974	
Thru Cal Phase - 7	deg	Master	-----	115.000	173.699	-125.000	
SPA Zero	mV	Master		-50.000	-0.126	50.000	
SPA Plus	mV	Master		941.000	1004.288	1040.000	
Temperature Zero	V	Master		-0.050	0.000	0.050	
Temperature Plus	V	Master		0.870	0.930	0.960	

## HDRS-H (HILT Density and Rxo Sonde, 150 degC) Calibration - Run ONE

Primary Equipment :							
HILT High-Resolution Control Cartridge, 150 degC		HRCC-H					

## Auxiliary Equipment :

HRDD Backscatter Detector	Backscatter	
HRDD Long Spacing Detector	Long Spacing	
HRDD Short Spacing Detector	Short Spacing	27786
Cesium 137 Gamma-Ray Logging Source	GSR-J	5471
HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	
HILT High-Resolution Mechanical Sonde, 150 degC	HRMS-H	

## Calibration Parameter :

Small Ring Size (Caliper Calibration Small Ring)	8.00
Large Ring Size (Caliper Calibration Large Ring)	12.00

## HDRS Caliper Calibration - Caliper Accumulations

Before (Measured): 17:13:38 20-Feb-2017 Expired by 1 days

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
Small Ring	in	Before	8.00	6.00	7.25	10.00		
Large Ring	in	Before	12.00	9.00	10.96	15.00		

## HDRS Density Calibration - Inversion Results

Master (EEPROM): 15:35:40 17-Feb-2017

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
Rho Aluminum	g/cm3	Master	2.596	2.586	2.602	2.606		
Rho Magnesium	g/cm3	Master	1.686	1.676	1.682	1.696		
Pe Aluminum		Master	2.570	2.470	2.572	2.670		
Pe Magnesium		Master	2.650	2.550	2.618	2.750		

## HDRS Density Calibration - Deviation Summary

Master (EEPROM): 15:35:40 17-Feb-2017

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
BS Average Deviation	%	Master	0	-0.6000	0.3901	0.6000		
BS Max Deviation	%	Master	0	-1.6000	0.8354	1.6000		
SS Average Deviation	%	Master	0	-1.0000	0.2566	1.0000		
SS Max Deviation	%	Master	0	-2.5000	0.8468	2.5000		
LS Average Deviation	%	Master	0	-1.5000	0.9914	1.5000		
LS Max Deviation	%	Master	0	-3.5000	2.1815	3.5000		

## HDRS Density Calibration - Background Summary

Master (EEPROM): 15:35:40 17-Feb-2017

Before:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
BS Window Ratio		Master	1.0000		0.7373			
		Before			NOT DONE			
		Before-Master	----	----	----	----		
BS Window Sum	1/s	Master	1		25188			
		Before			NOT DONE			
		Before-Master	----	----	----	----		
SS Window Ratio		Master	1.0000		0.4824			
		Before			NOT DONE			
		Before-Master	----	----	----	----		
SS Window Sum	1/s	Master	1		10929			
		Before			NOT DONE			
		Before-Master	----	----	----	----		
LS Window Ratio		Master	1.0000		0.3002			
		Before			NOT DONE			
		Before-Master	----	----	----	----		
LS Window Sum	1/s	Master	1		1214			
		Before			NOT DONE			
		Before-Master	----	----	----	----		

## HDRS Density Calibration - Photo-multiplier High Voltages

Master (EEPROM): 15:35:40 17-Feb-2017

Before:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit		
-------------	------	-------	---------	-----------	--------	------------	--	--

BS PM High Voltage	V	Master Before Before-Master	----- ----- -----	1000 ----- -----	1504 ----- -----	2400 ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
SS PM High Voltage	V	Master Before Before-Master	----- ----- -----	1000 ----- -----	1448 ----- -----	2400 ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
LS PM High Voltage	V	Master Before Before-Master	----- ----- -----	1000 ----- -----	1496 ----- -----	2400 ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>

## HDRS Density Calibration - Crystal Quality Resolutions

Master (EEPROM):		15:35:40 17-Feb-2017		Before:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
BS Crystal Resolution	%	Master Before Before-Master	----- ----- -----	5.00 ----- -----	11.92 ----- -----	25.00 ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
SS Crystal Resolution	%	Master Before Before-Master	----- ----- -----	5.00 ----- -----	10.52 ----- -----	20.00 ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
LS Crystal Resolution	%	Master Before Before-Master	----- ----- -----	5.00 ----- -----	8.22 ----- -----	20.00 ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>

## HDRS MCFL Calibration - MCFL Accumulations

Before:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
Main Resistivity - 0	ohm.m	Before	-----	-----	-----	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Deep Resistivity - 0	ohm.m	Before	-----	-----	-----	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Shallow Resistivity - 0	ohm.m	Before	-----	-----	-----	-----	<div><div></div><div></div><div></div><div></div><div></div></div>

## HGNS-H (HILT Gamma-Ray and Neutron Sonde, 150 degC) Calibration - Run ONE

Primary Equipment :			
HILT Gamma-Ray and Neutron Sonde, 150 degC		HGNS-H	
Auxiliary Equipment :			
AmBe Neutron Logging Source		NSR-F	5069
Calibration Parameter :			
Water Temperature (Calibration Tank Water Temperature)		54.0	
Housing Size (Thermal Housing Size)		3.38	
JIG-BKG (Jig minus background reference)		165	

## HGNS Accelerometer Calibration - Accelerometer Accumulations

Before:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
AZ Vertical Measurement - 0	ft/s2	Before	-----	-----	-----	-----	<div><div></div><div></div><div></div><div></div><div></div></div>

## HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Manufacturer		Master			NOT DONE		<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Reference Temperature		Master		-1.0	NOT DONE	50.0	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Coefficients - 0		Master	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Coefficients - 1		Master	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Coefficients - 2		Master	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Coefficients - 3		Master	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Coefficients - 4		Master	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Coefficients - 5		Master	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Coefficients - 6		Master	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Coefficients - 7		Master	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Coefficients - 8		Master	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div><div></div><div></div></div>
Accelerometer Coefficients - 9		Master	-----	-----	NOT DONE	-----	<div><div></div><div></div><div></div><div></div><div></div></div>



Accelerometer Coefficients - 9		Master	----		NOT DONE	----	
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# HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM):		16:09:48 04-Feb-2017		Before:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Near Zero Measurement	1/s	Master	0	5.0	27.7	40.0	
		Before	----	----	----	----	
		Before-Master	----	----	----	----	
Far Zero Measurement	1/s	Master	0	5.0	27.4	40.0	
		Before	----	----	----	----	
		Before-Master	----	----	----	----	
Near Plus Measurement	1/s	Master	6031.0	4700.0	4965.0	6900.0	
		Before	----	----	----	----	
		Before-Master	----	----	----	----	
Far Plus Measurement	1/s	Master	2793.0	1900.0	2052.0	2900.0	
		Before	----	----	----	----	
		Before-Master	----	----	----	----	
Near Corrected Plus Measurement	1/s	Master		4700.0	5042.0	6900.0	
		Before	----	----	----	----	
		Before-Master	----	----	----	----	
Far Corrected Plus Measurement	1/s	Master		1900.0	2091.0	2900.0	
		Before	----	----	----	----	
		Before-Master	----	----	----	----	

# HGNS Gamma-Ray Calibration - Gamma-Ray Accumulations

Before (Measured):		17:13:52 20-Feb-2017 Expired by 1 days					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Zero Measurement	gAPI	Before	30.0	0	92.3	120.0	
RGR Plus Measurement	gAPI	Before	185.4	157.1	196.5	206.3	
GR Calibration Gain		Before	0.89	0.80	0.84	1.05	

Company:	Expedition Water Solutions LLC	<b>Schlumberger</b>
Well:	EWS 4	
Field:	Wattenburg	
County:	Weld	
State:	Colorado	
Platform Expres Array Induction with Linear Correlation		