

Company: Nighthawk Production LLC

Well: Snow King 9-32

Field: Arikaree Creek

County: Lincoln Country: United States

Platform Express Field Print									
Triple Combo									
Induction & Nuclear									
County:		Lincoln							
Field:		Arikaree Creek							
Location:		NESE Sec. 32, T 6S, R 54 W							
Well:		Snow King 9-32							
Company:		Nighthawk Production LLC							
Logging Date		Location:		NESE Sec. 32, T 6S, R 54 W		Elev.:		K.B. 5339.00 ft	
		Permanent Datum:		SHL: 2540' FSL & 660' FEL		G.L.		5324.00 ft	
		Log Measured From:		Lat: 39.483560/ Long: -103.456070		D.F.		5338.00 ft	
		Drilling Measured From:		Ground Level		Elev.:		5324.00 f	
API Serial No.		Section:		Kelly Bushing		15.00 ft		above Perm.Datum	
05-073-06637-0000		32		Kelly Bushing		6S		Range: 54W	
Run Number		Run 1							
Depth Driller		8510.00 ft							
Schlumberger Depth		8510.00 ft							
Bottom Log Interval		8522.50 ft							
Top Log Interval		393.83 ft							
Casing Driller Size @ Depth		8.625 in @ 391.00 ft							
Casing Schlumberger		391 ft							
Bit Size		7.875 in							
Type Fluid In Hole		Water							
MUD		Density		9.25 lbm/gal		78 s			
		Fluid Loss		5.6 cm3		8.3			
Source of Sample		Flowline							
RM @ Meas Temp		1.65 ohm.m @ 50 degF							
RMF @ Meas Temp		1.24 ohm.m @ 50 degF							
RMC @ Meas Temp		2.06 ohm.m @ 50 degF							
Source RMF		Calculated		Calculated					
RM @ BHT		0.47 @ 194.38		0.35 @ 194.38					
Max Recorded Temperatures		194.38 degF							
Circulation Stopped		08-Jan-2014 00:30:00							
Logger on Bottom		08-Jan-2015 15:05:00							
Unit Number		2135		Fort Morgan, CO					
Recorded By		MK Henrikson/B Mamon							
Witnessed By		J Weir							

Disclaimer

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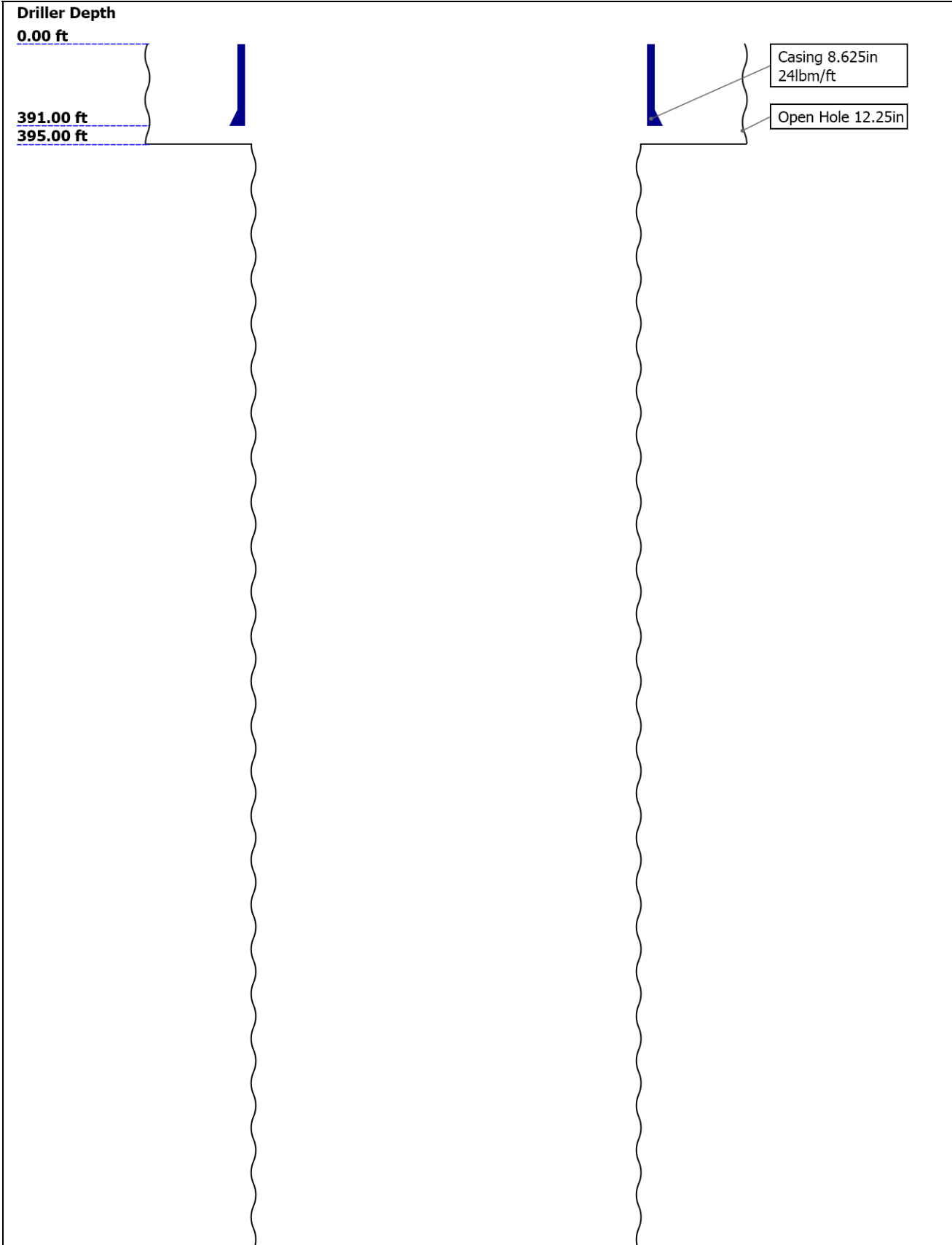
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Well Sketch





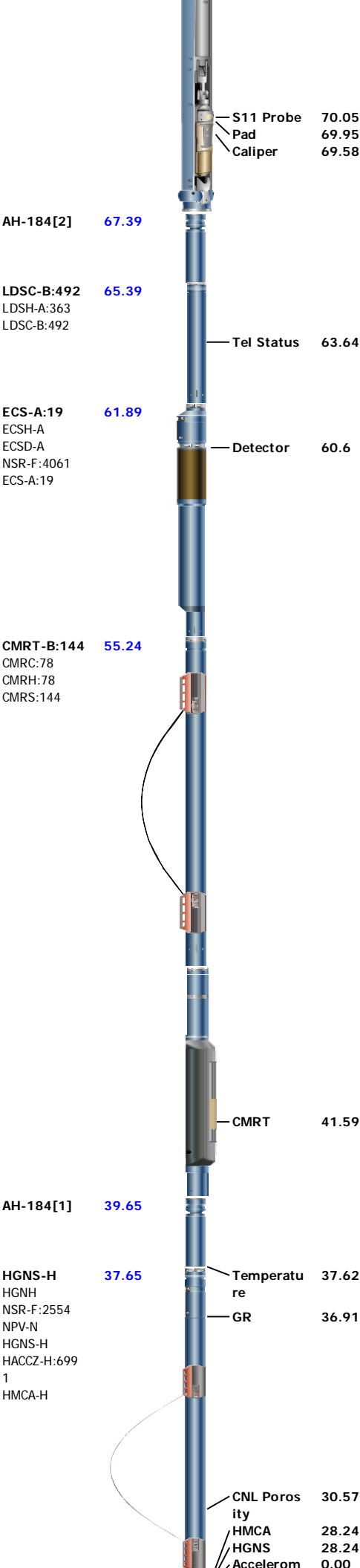
Borehole Size/Casing/Tubing Record

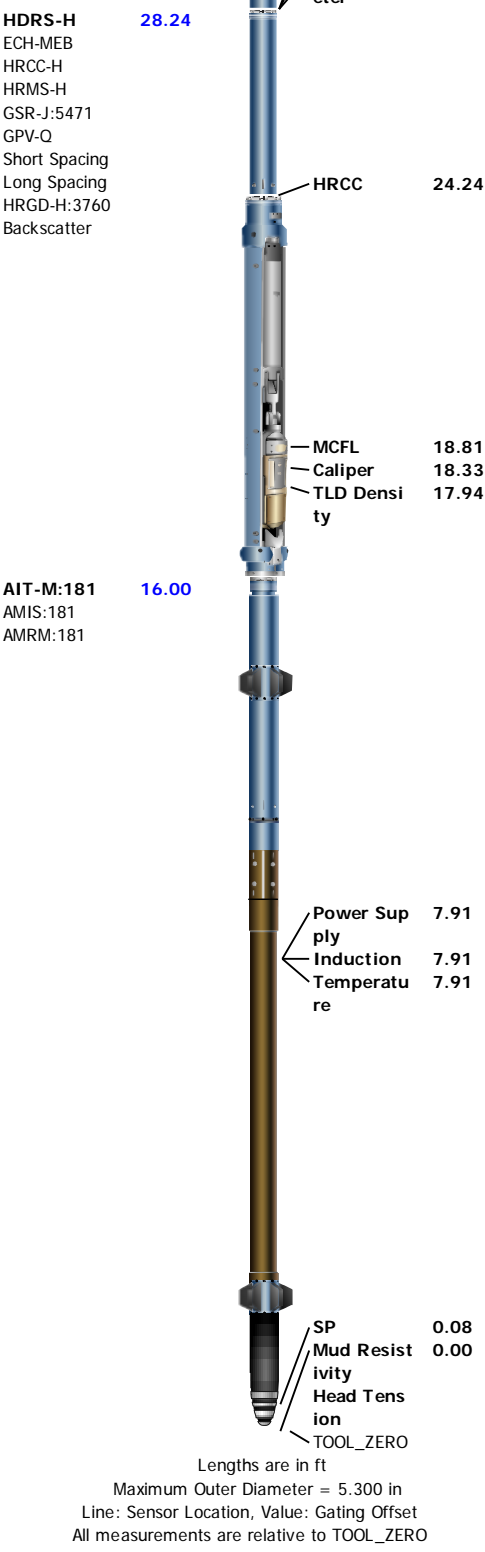
Bit						
Bit Size (in)	12.25	7.875				
Top Driller (ft)	0	395				
Top Logger (ft)	0	395				
Bottom Driller (ft)	395	8510				
Bottom Logger (ft)	395	8510				
Casing						
Size (in)	8.625					
Weight (lbm/ft)	24					
Inner Diameter (in)	8.289					
Grade	J55					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	391					
Bottom Logger (ft)	391					

Operational Run Summary

Parameter (unit)	Run 1					
Date Log Started	08-Jan-2015					
Time Log Started	09:45:58					
Date Log Finished	08-Jan-2015					
Time Log Finished	22:09:39					
Top Log Interval (ft)	393.83					
Bottom Log Interval (ft)	8522.50					
Total Depth (ft)	8522.50					
Max Hole Deviation (deg)	0.00					
Azimuth of Max Deviation (deg)	0.00					
Bit Size (in)	7.875					
Logging Unit Number	2135					
Logging Unit Location	Fort Morgan, CO					
Recorded By	MK Henrikson/B Marmon					

Witnessed By	J Weir					
Service Order Number	CWFK-00020					
Borehole Fluids						
Parameter(unit)	Run 1					
Fluid Type	Water					
Max Recorded Temperatures (degF)	194.38					
Source of Sample	Flowline					
Salinity (ppm)	0					
Density (lbm/gal)	9.25					
Funnel Viscosity (s)	78					
Fluid Loss (cm3)	5.6					
PH	8.3					
Date/Time Circulation Stopped	08-Jan-2014 00:30:00					
Date Logger on Bottom	08-Jan-2015					
Time Logger on Bottom	15:05:00					
Source RMF	Calculated					
RMC	Calculated					
RM @ Meas Temp (ohm.m@degF)	1.65 @ 50					
RMF @ Meas Temp (ohm.m@degF)	1.24 @ 50					
RMC @ Meas Temp (ohm.m@degF)	2.06 @ 50					
RM @ BHT (ohm.m@degF)	0.47 @ 194.38					
RMF @ BHT (ohm.m@degF)	0.35 @ 194.38					
RMC @ BHT (ohm.m@degF)	0.58 @ 194.38					
Total Solid (%)	6.5					
High Gravity Solids (%)						
Remarks and Equipment Summary						
Run 1 : Toolstring		Run 1 : Remarks				
Equip name	Length	MP name	Offset	This is first run in hole.		
LEH-QT	88.33			Toolstring run as per tool sketch.		
LEH-QT				Tool readings affected by borehole rugosity.		
EDTC-B	85.42			Matrix: Limestone. MDEN: 2.71 g/cm3.		
EDTH-B				Crew: MK Henrikson, G Lapp, S Palisoc, B Marmon, T Ludgate		
EDTG-A				SP measurement was working for repeat pass, but stopped working for main pass. Discussed with client, decided to continue log.		
EDTC-B				Bottom hole temperature from HGNS was 194.38 deg F.		
				Log was correlated at bottom.		
ADT-CB:774	78.92					
HECH-KDB:785						
ADC-C:771						
ADS-C:774						
ADP-CB:747						





Depth Summary

	Run 1		
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Depth Measuring Device

Type	IDW-JA		
Serial Number	6433		
Calibration Date	23-SEP-2014		
Calibrator Serial Number			
Calibration Cable Type	7-46 PL XS		
Wheel Correction 1	-3		
Wheel Correction 2	-2		

Tension Device

Type	CMTD-B/A		
Serial Number	1919		

Logging Cable			
Type	7-46P-XS		
Serial Number			
Length	18200.00 ft		
Conveyance Type	Wireline		
Rig Type	Land		

Run 1

Software Version	
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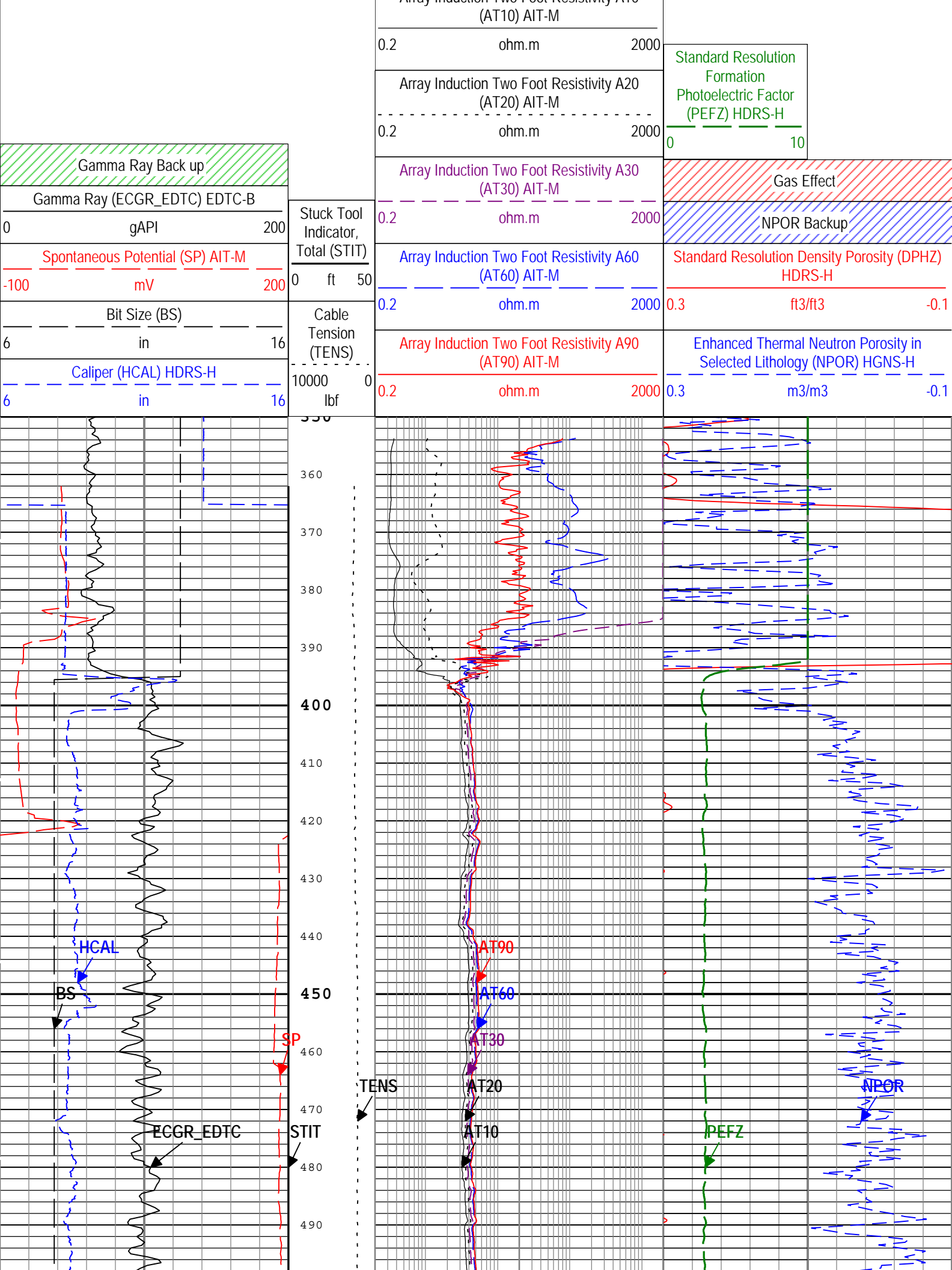
Pass Summary	
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3	100%
4	100%
5	100%
6	100%
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11	100%
12	100%
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100	100%

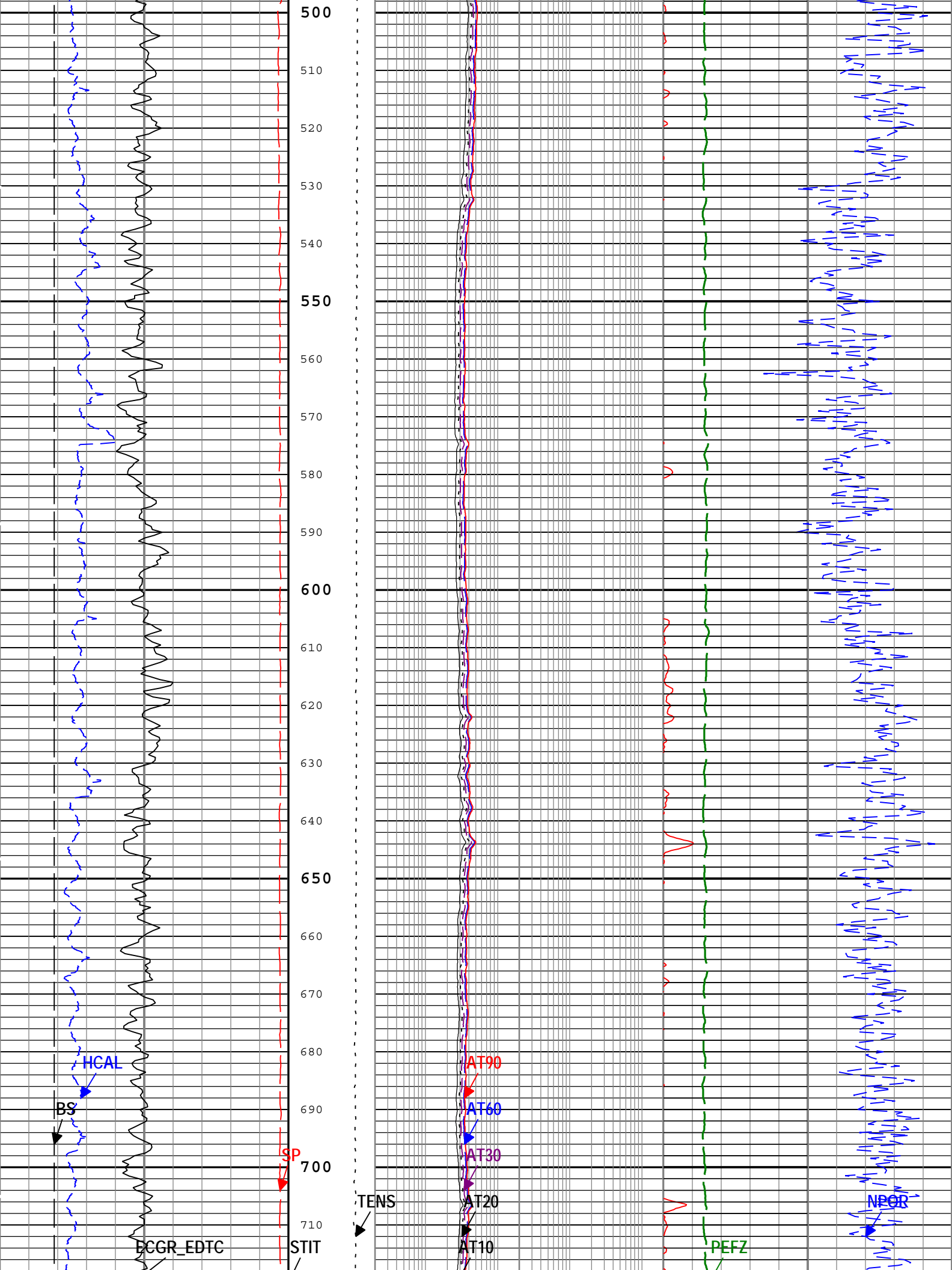
All depths are referenced to toolstring zero

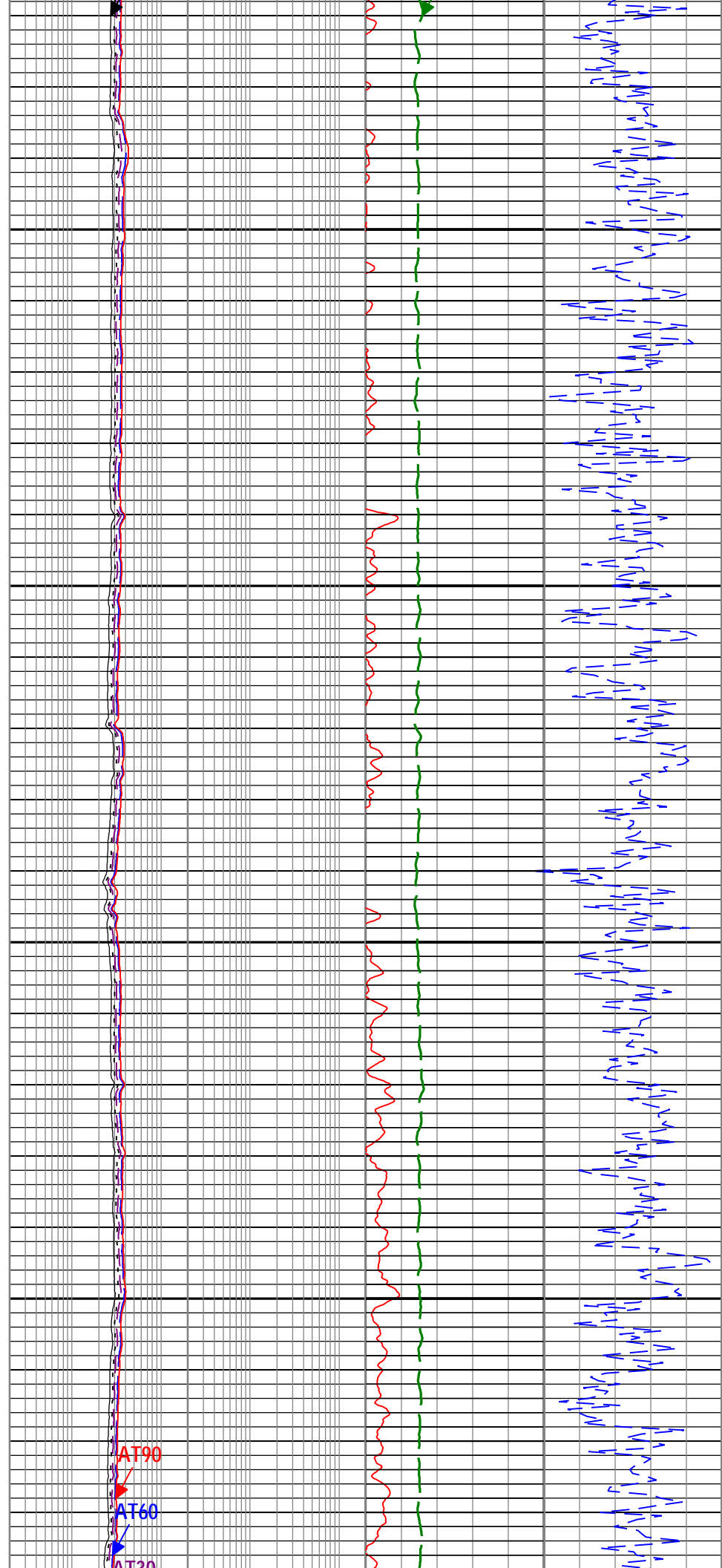
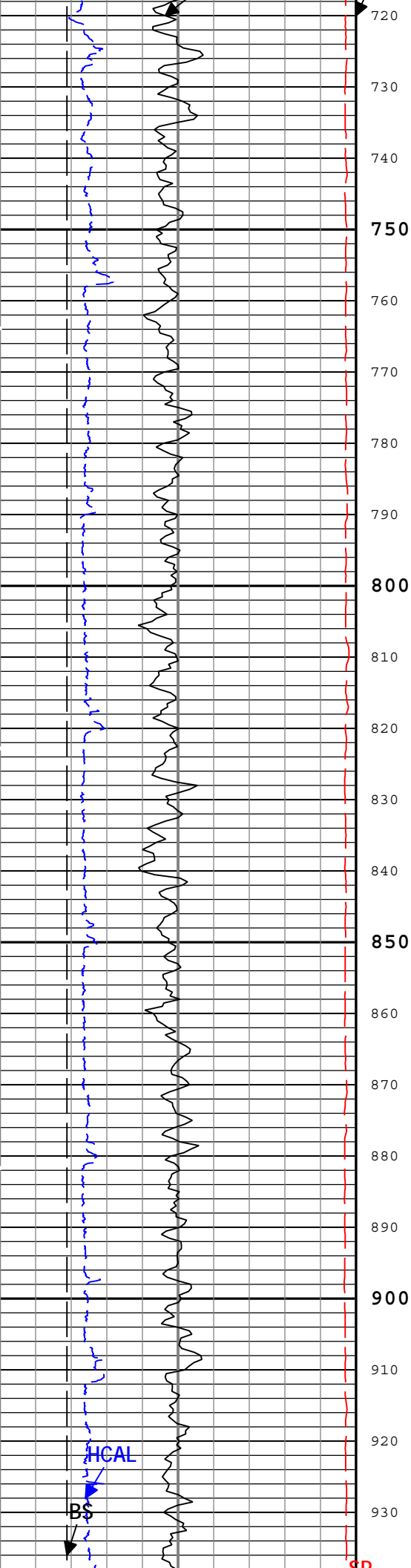
Description: HGNS standard resolution porosities for Platform Express Format: Log (EMD 5in Triple Combo Linear) Index Scale: 5 in per 100 ft Index Unit: in
Measured Depth Creation Date: 08-Jan-2015 23:39:50

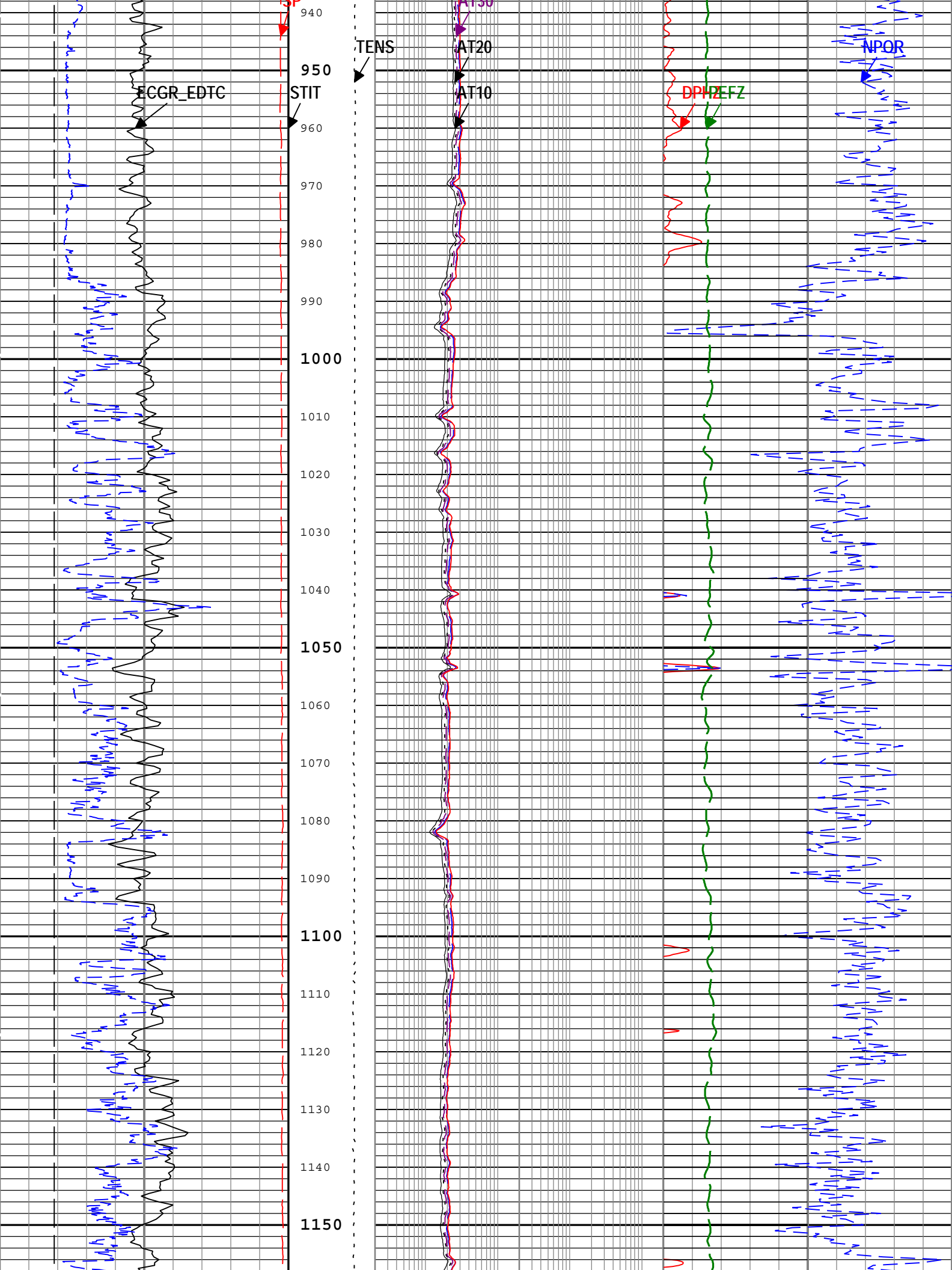
TIME_1900 - Time Marked every 60.00 (s)

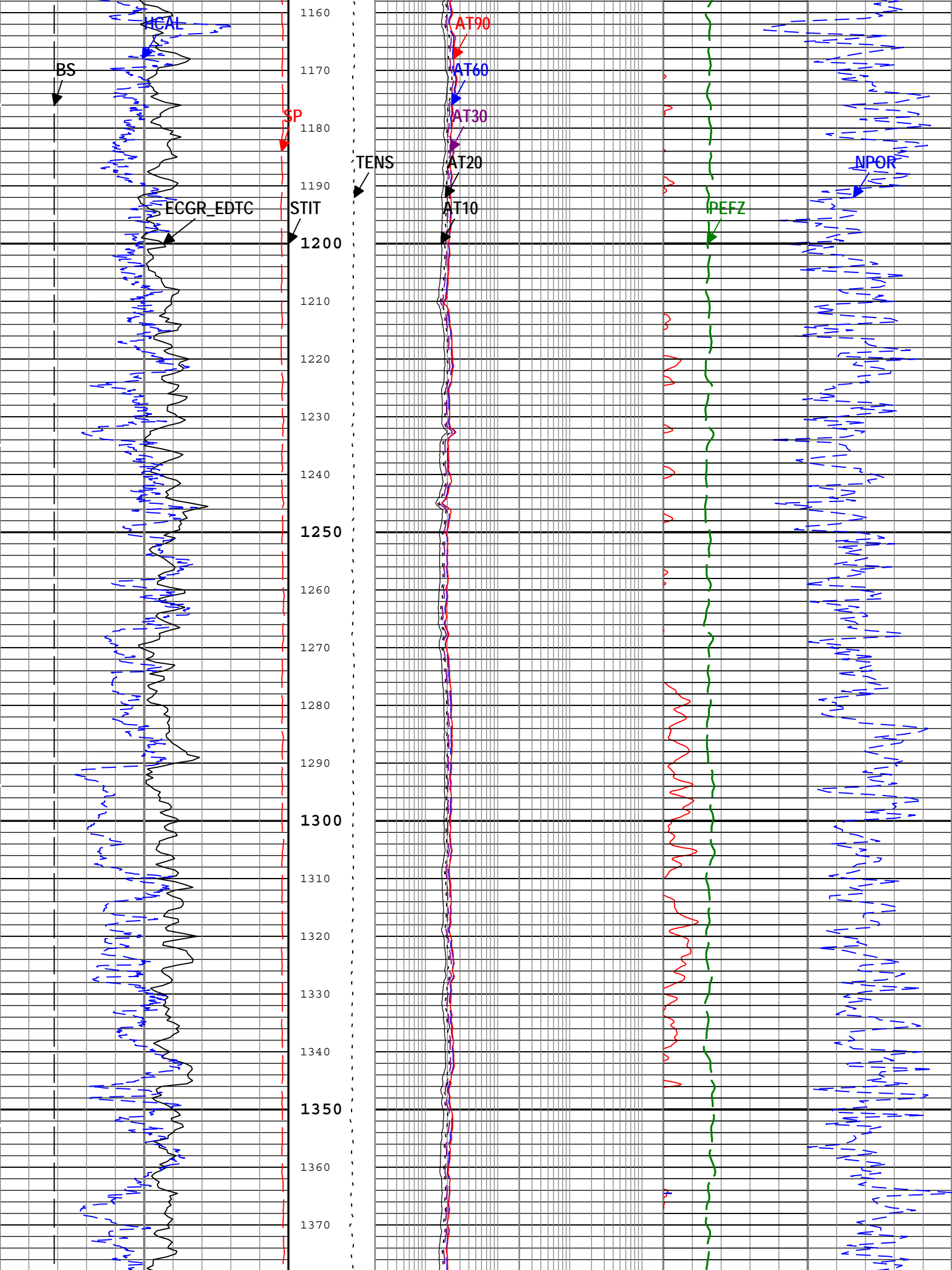
Array Induction Two Foot Resistivity A10

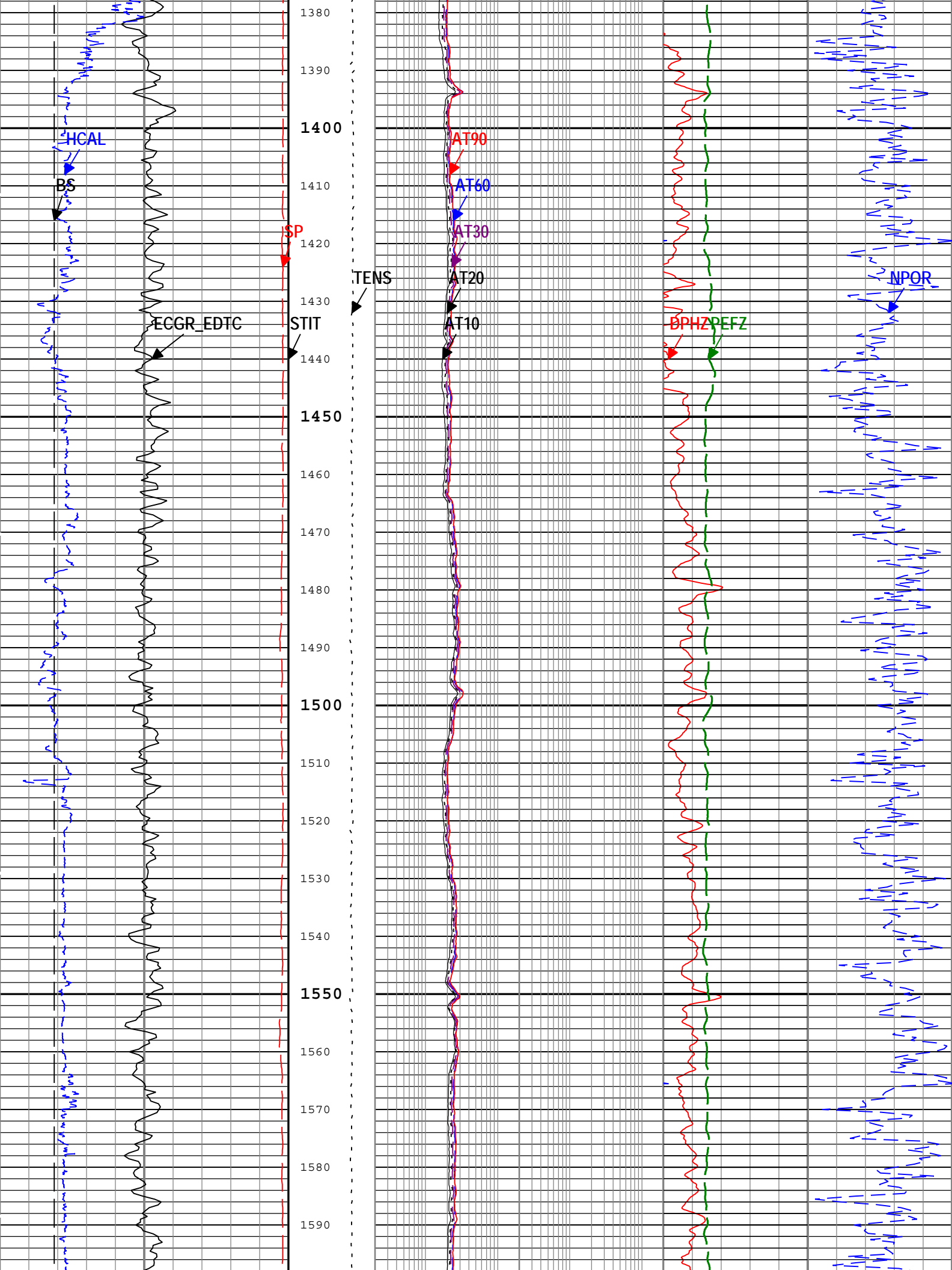


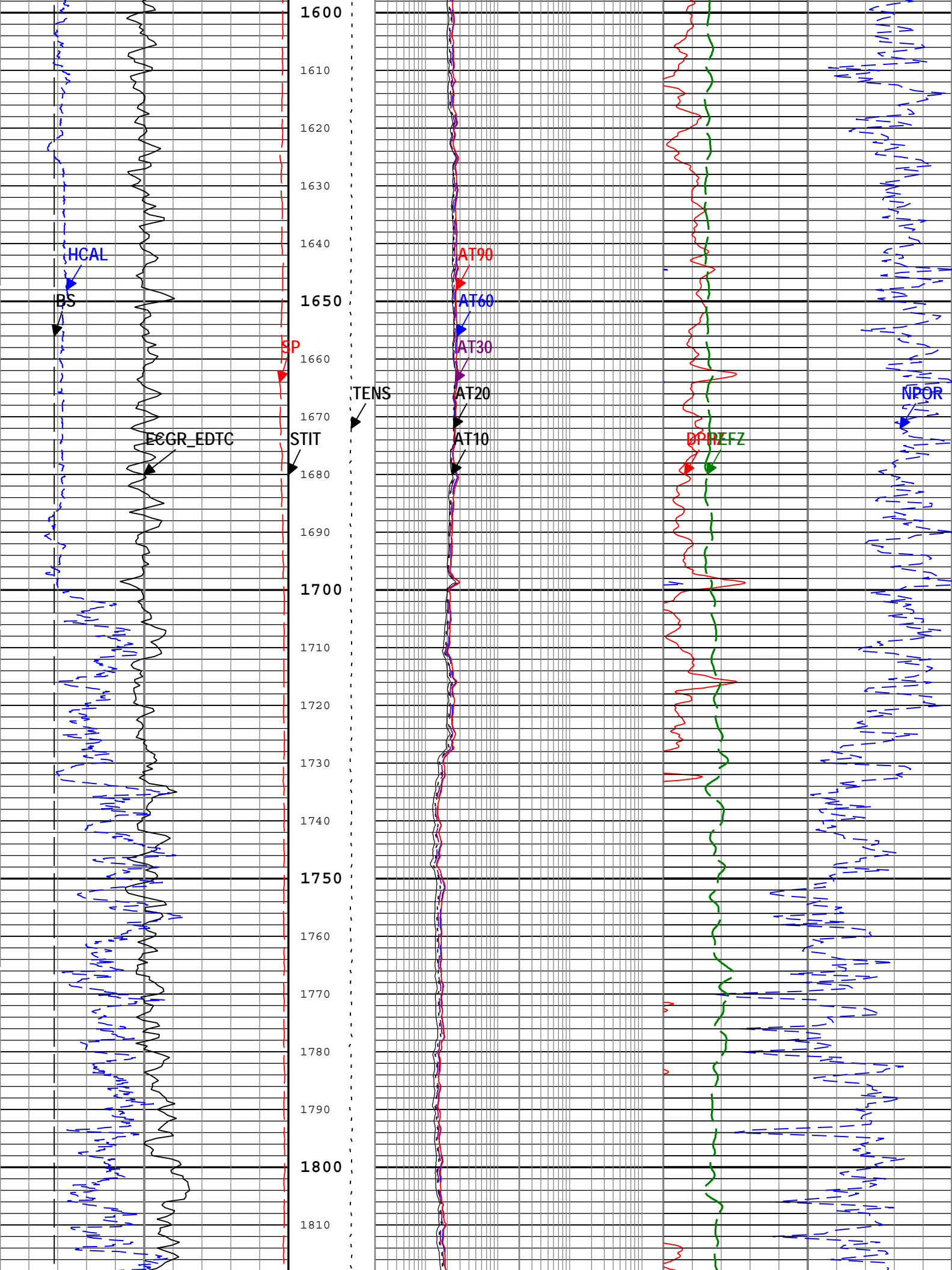


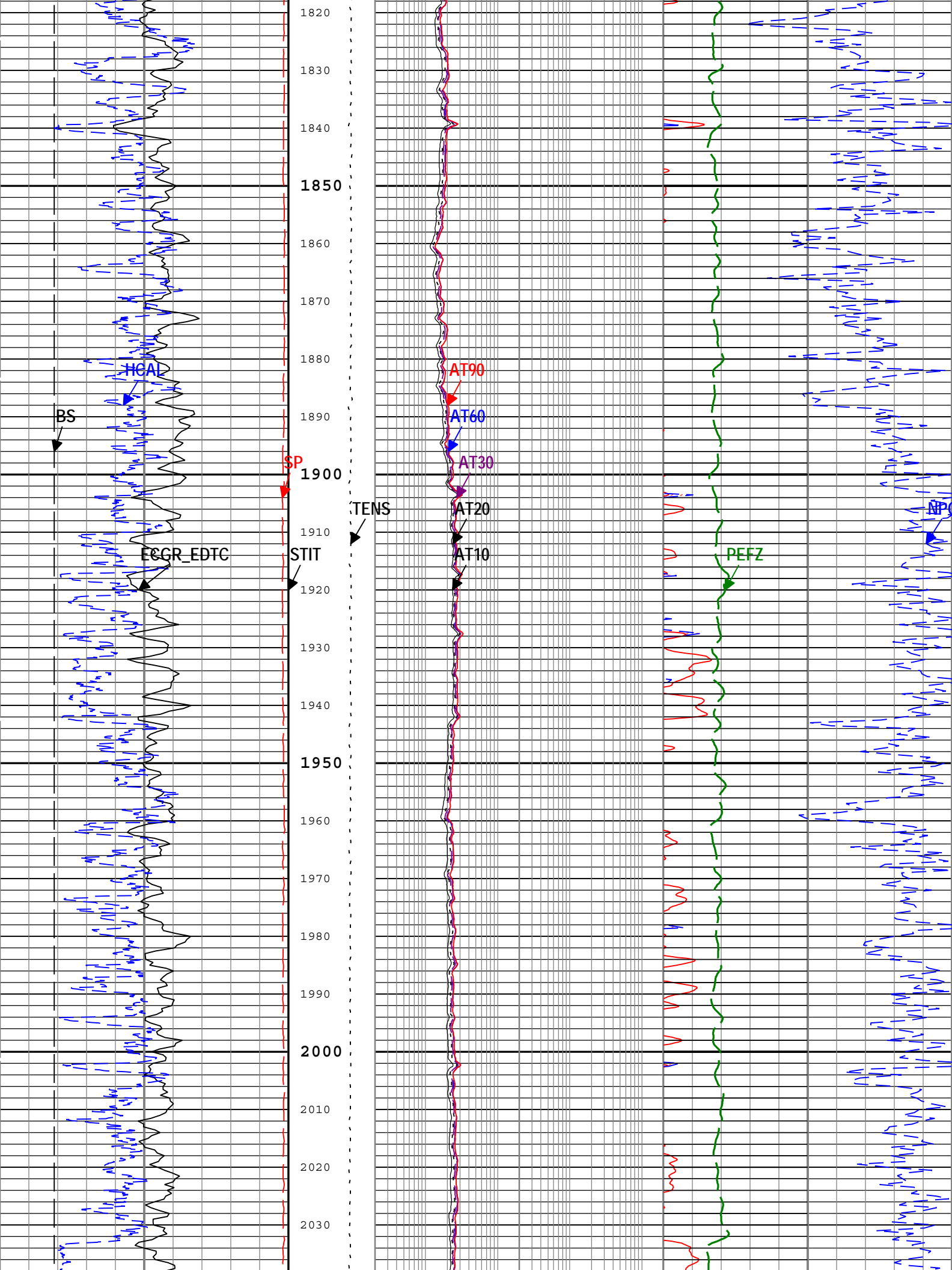


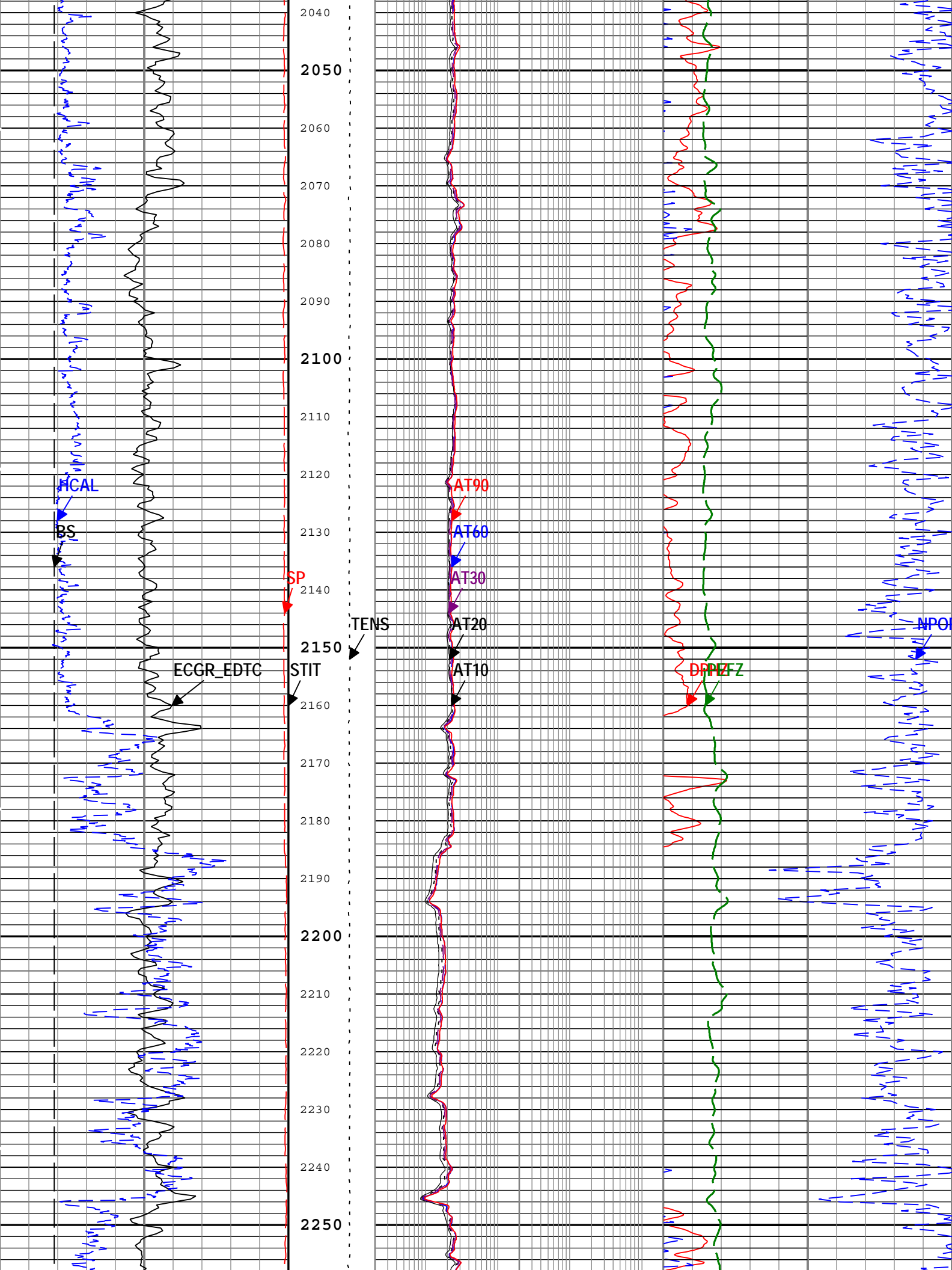


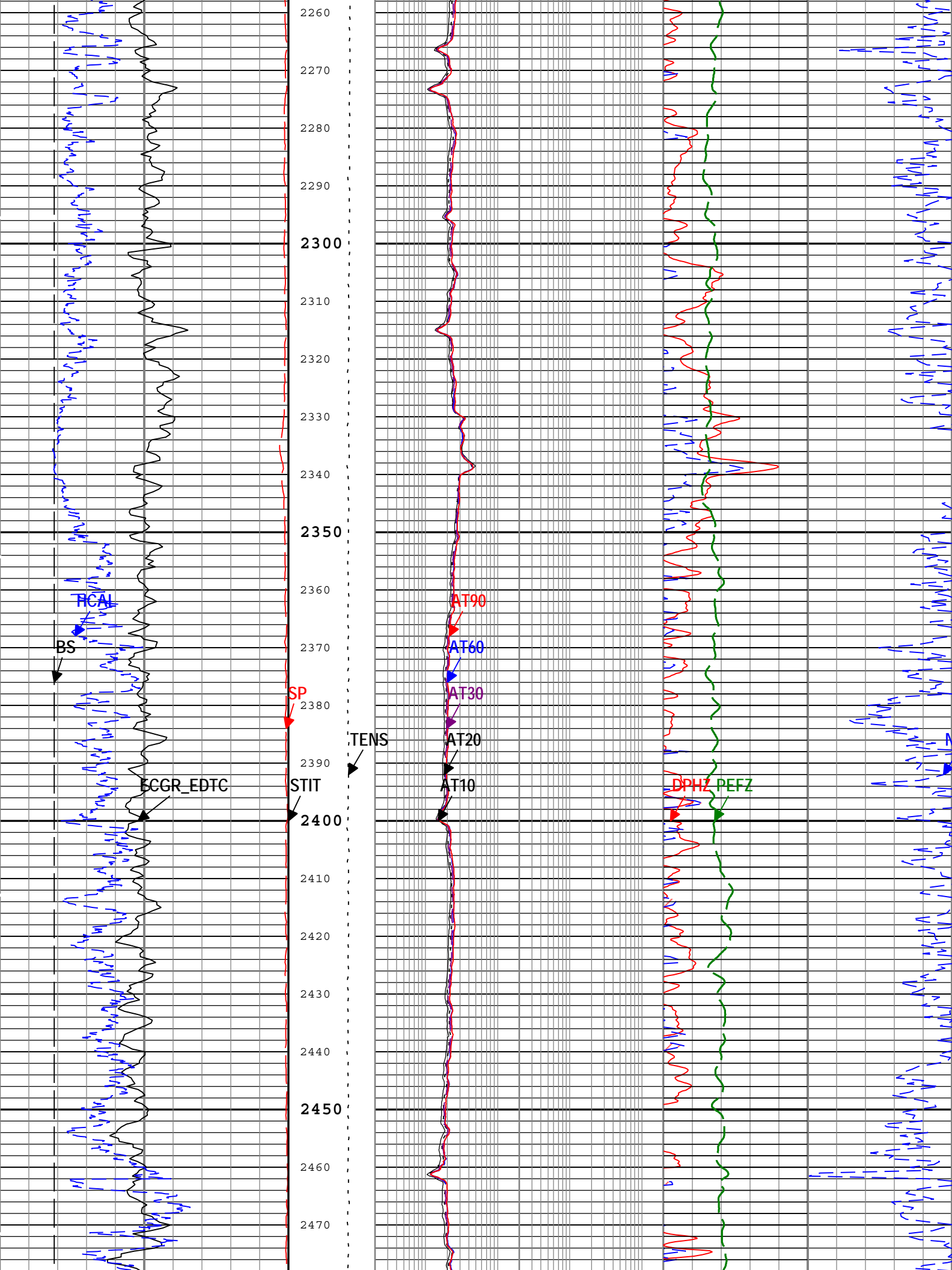


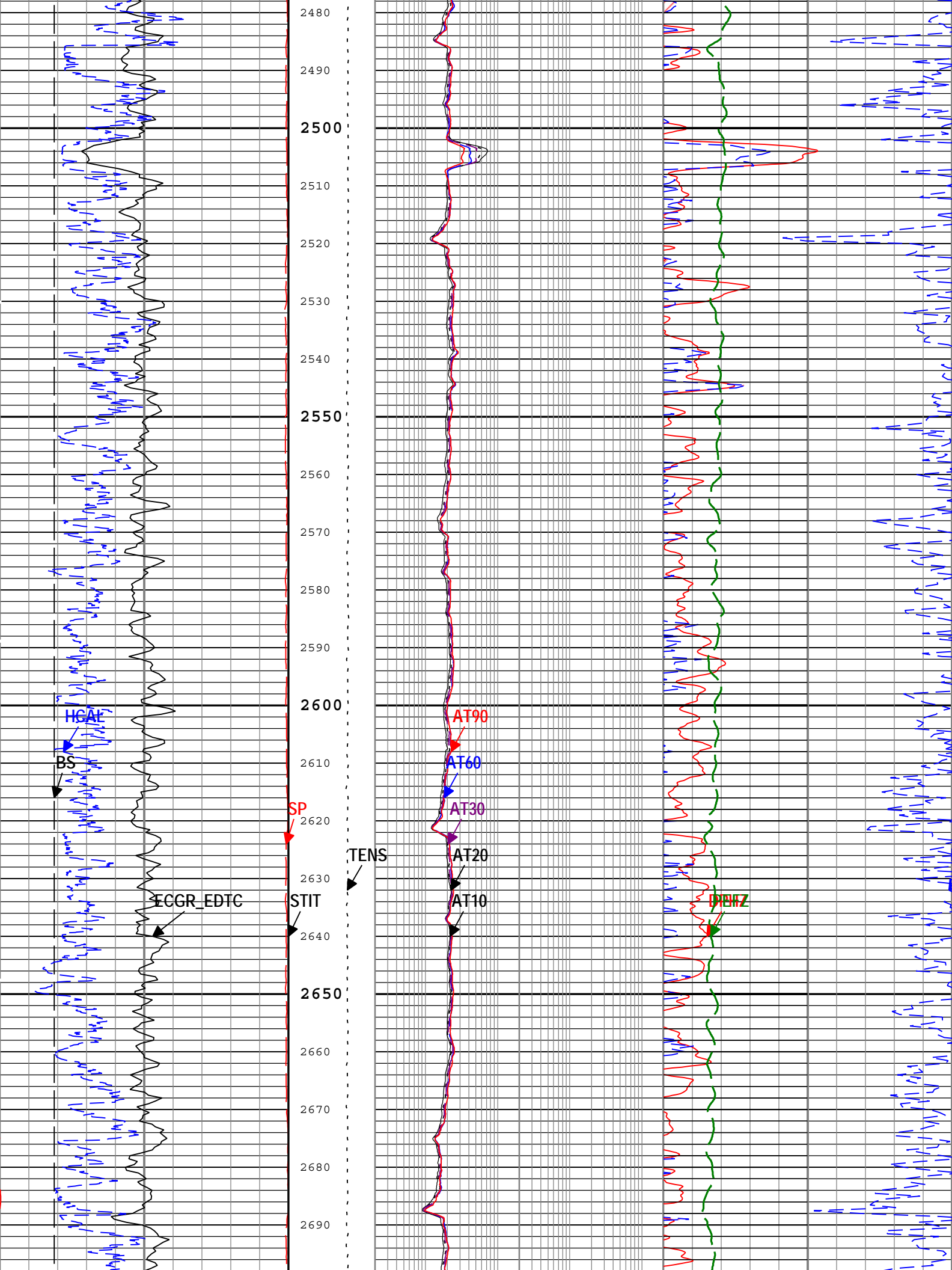


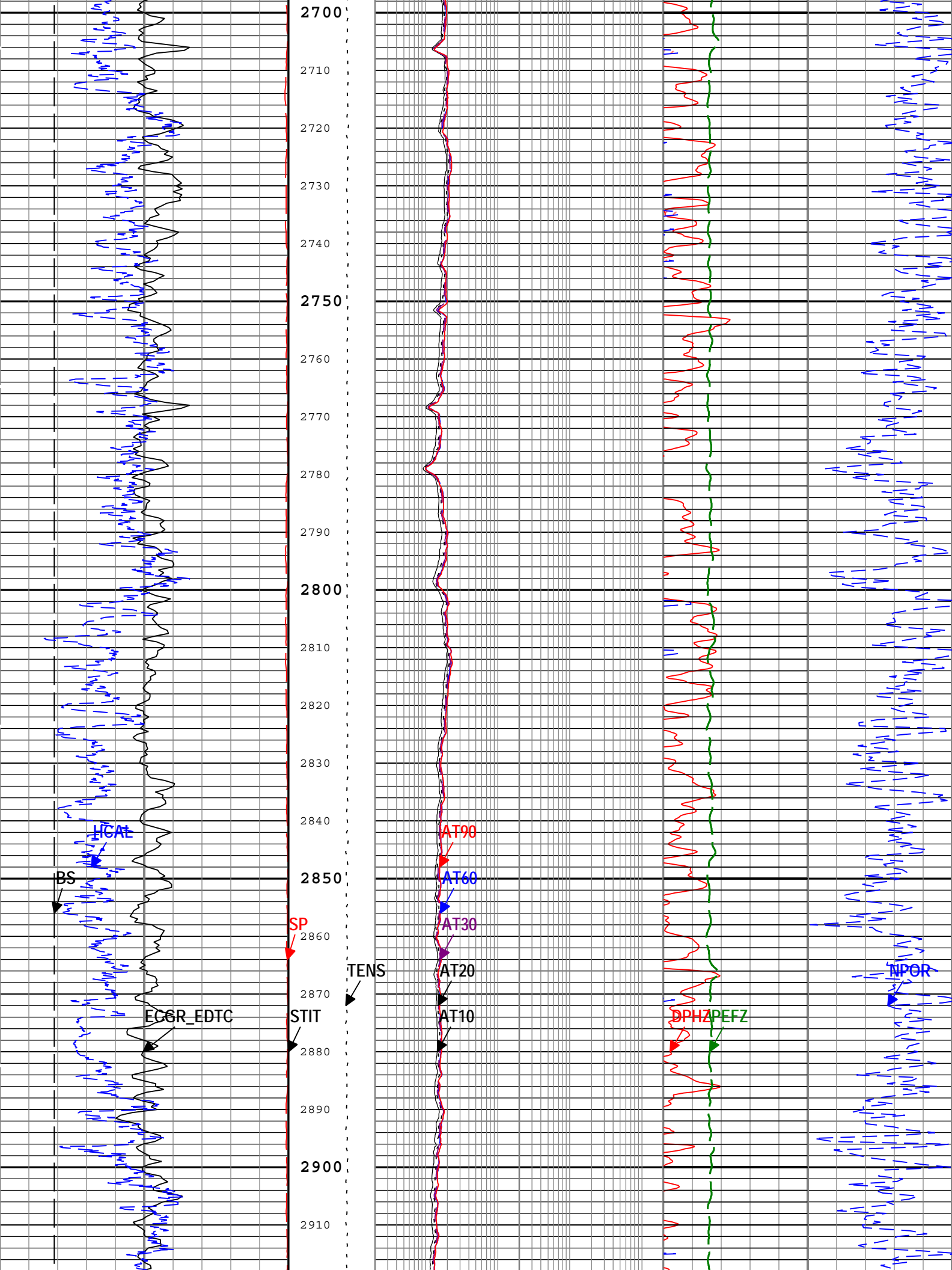


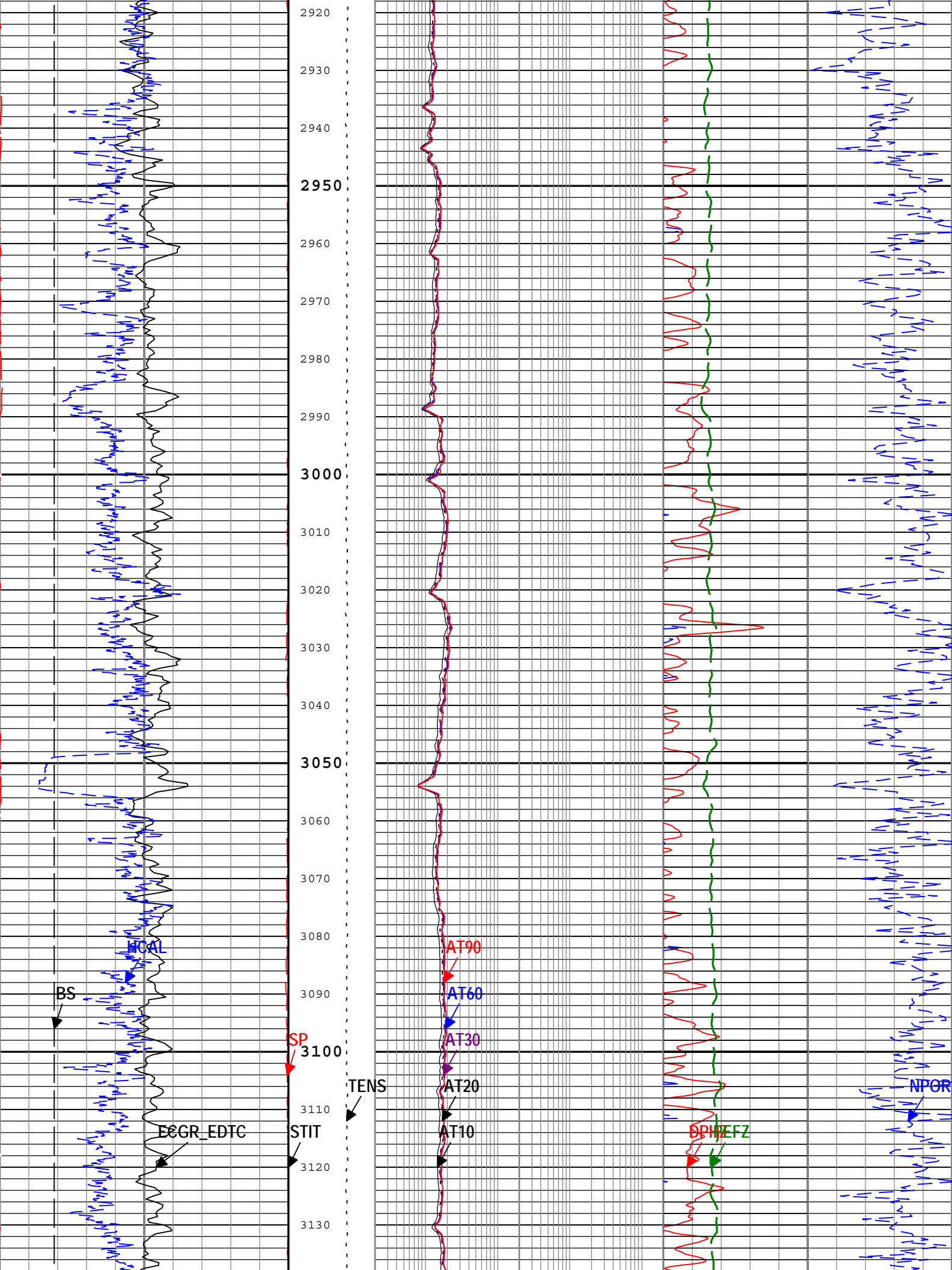


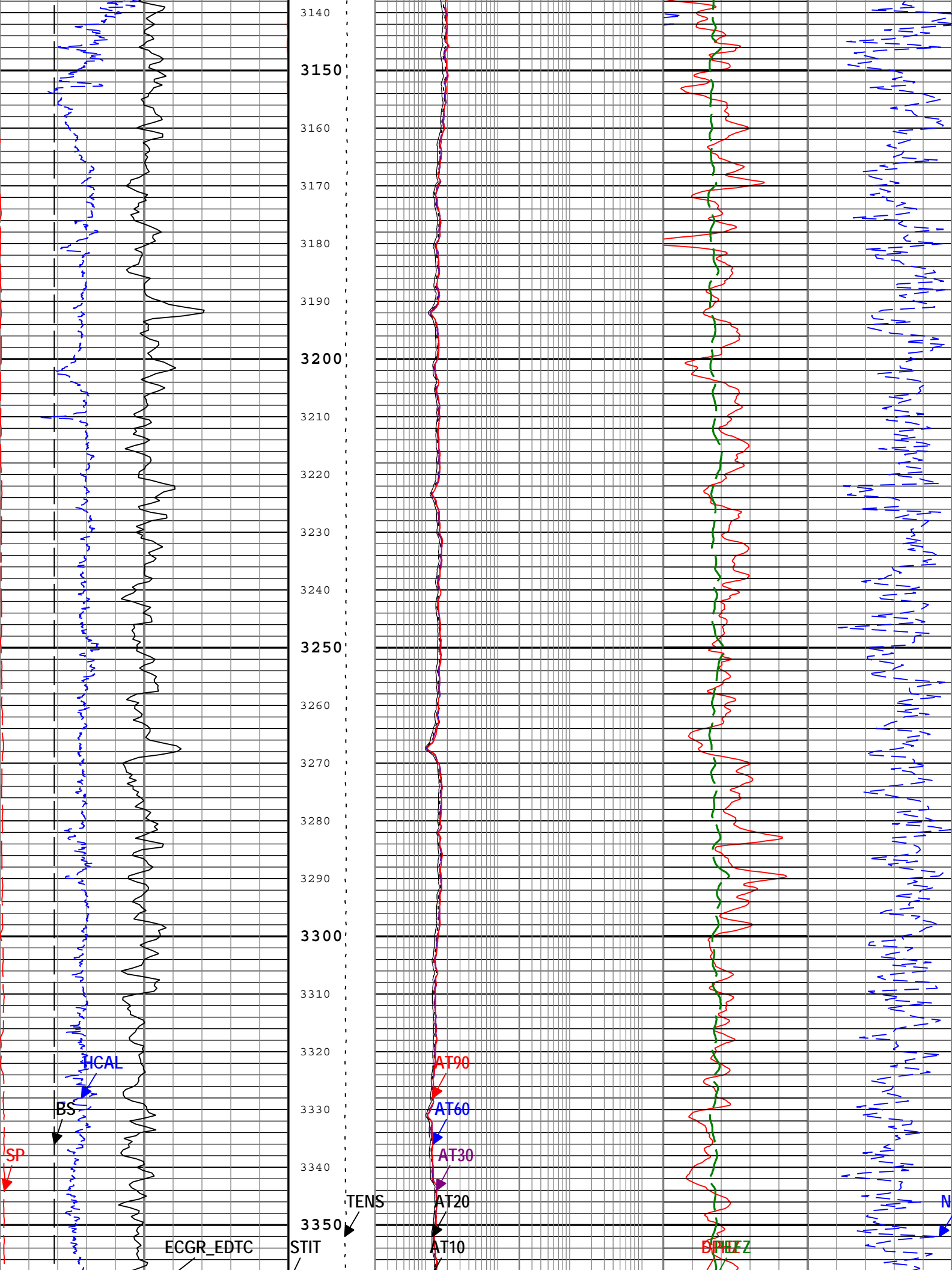


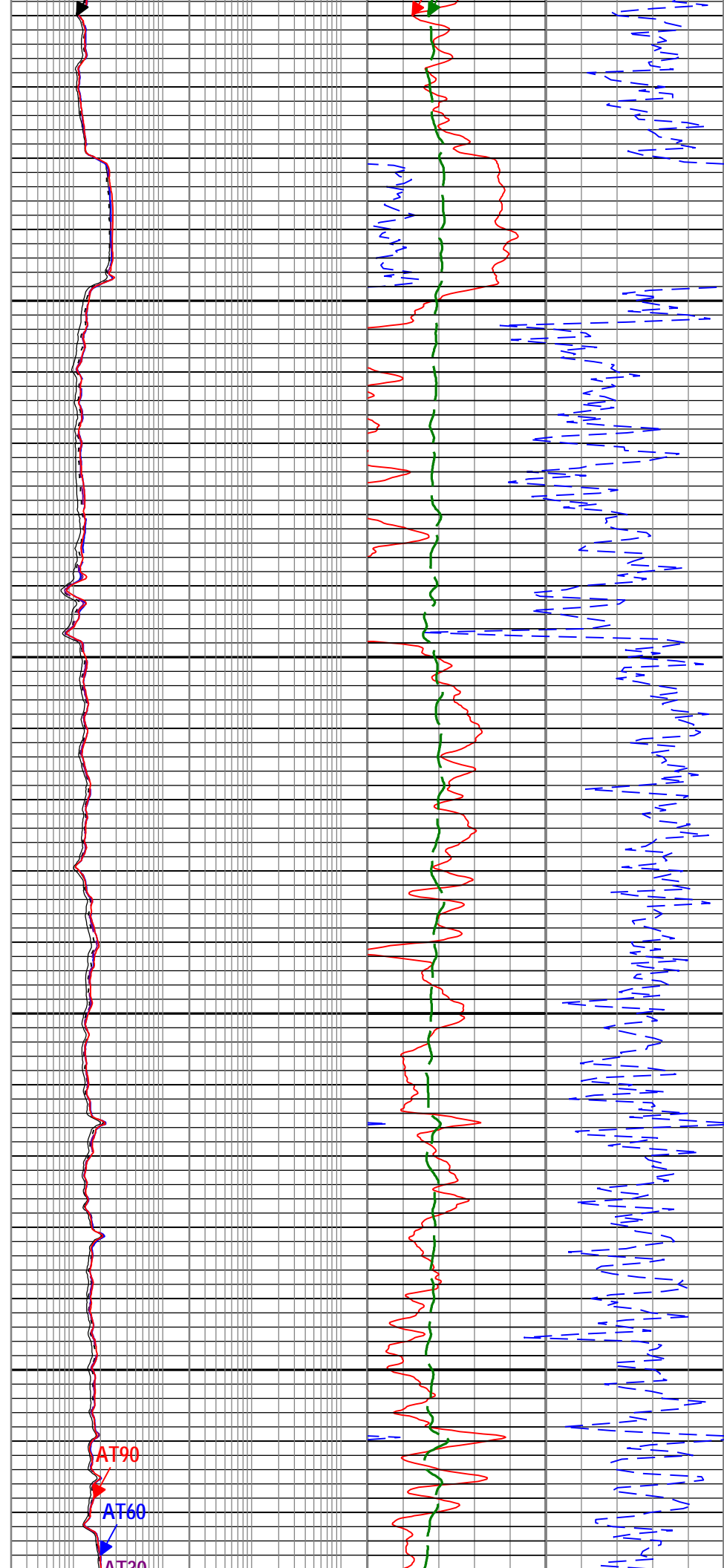
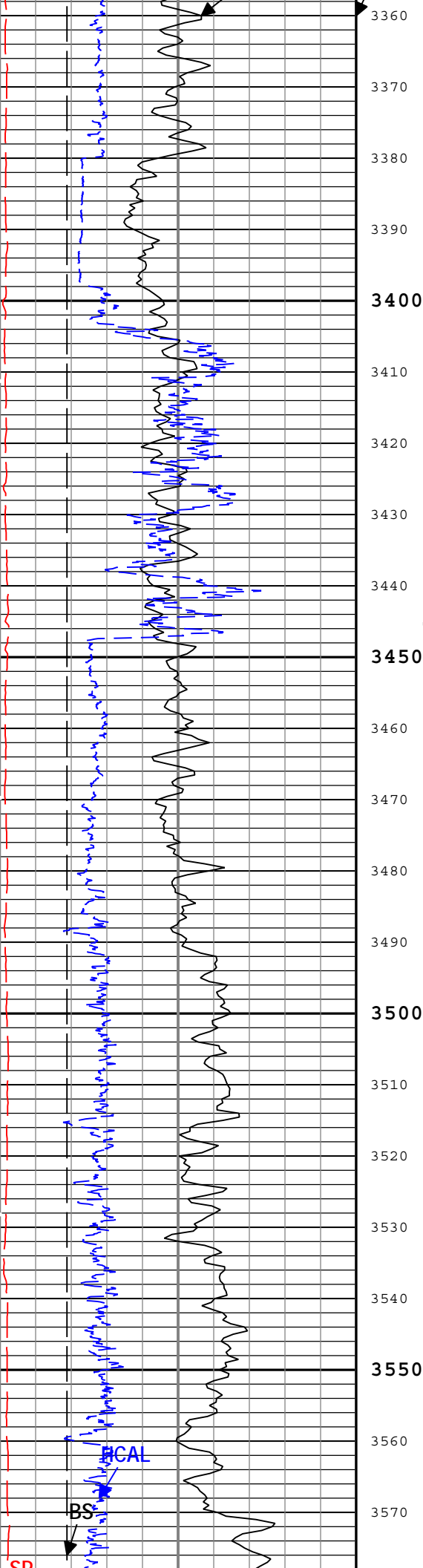


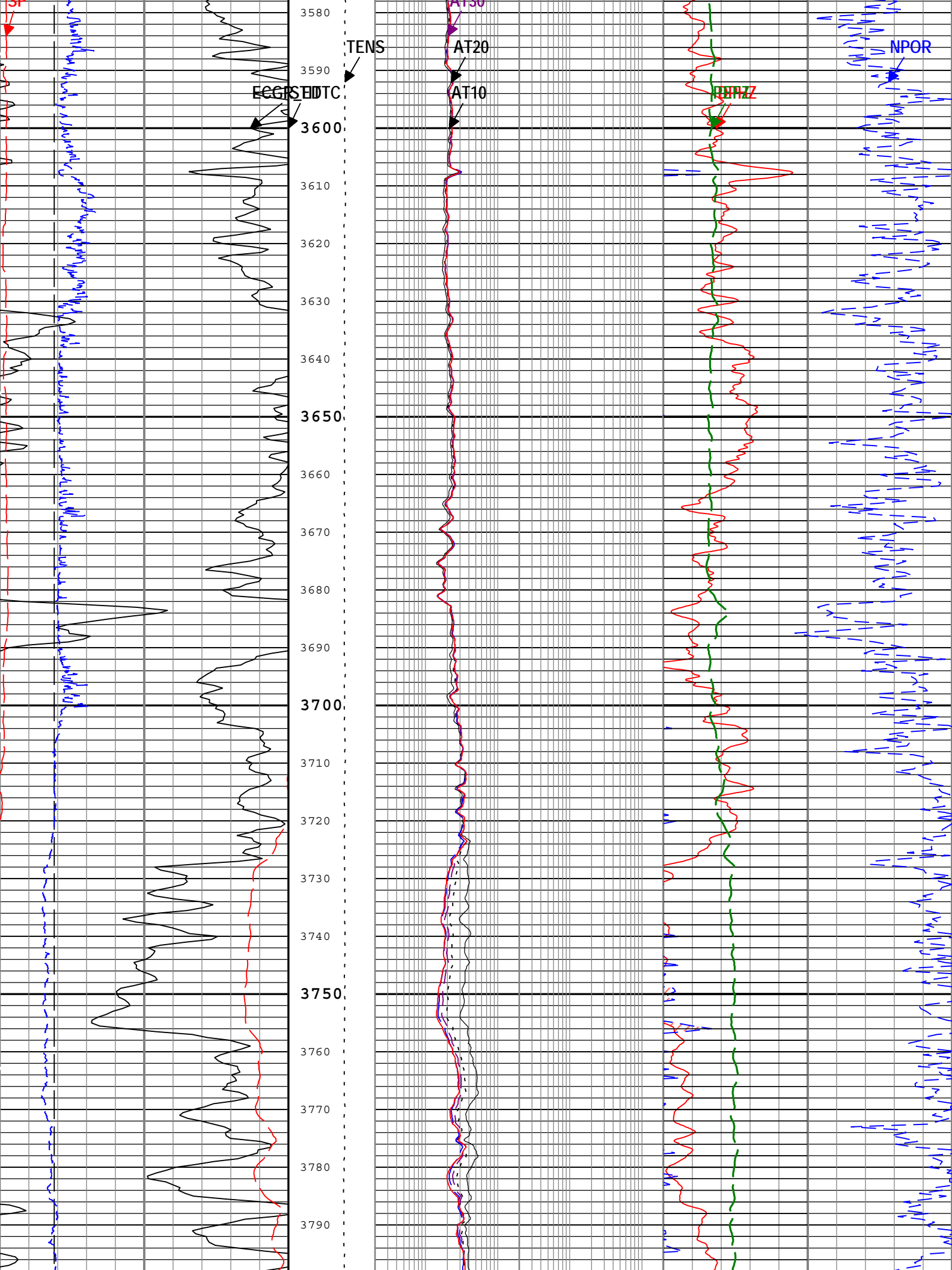


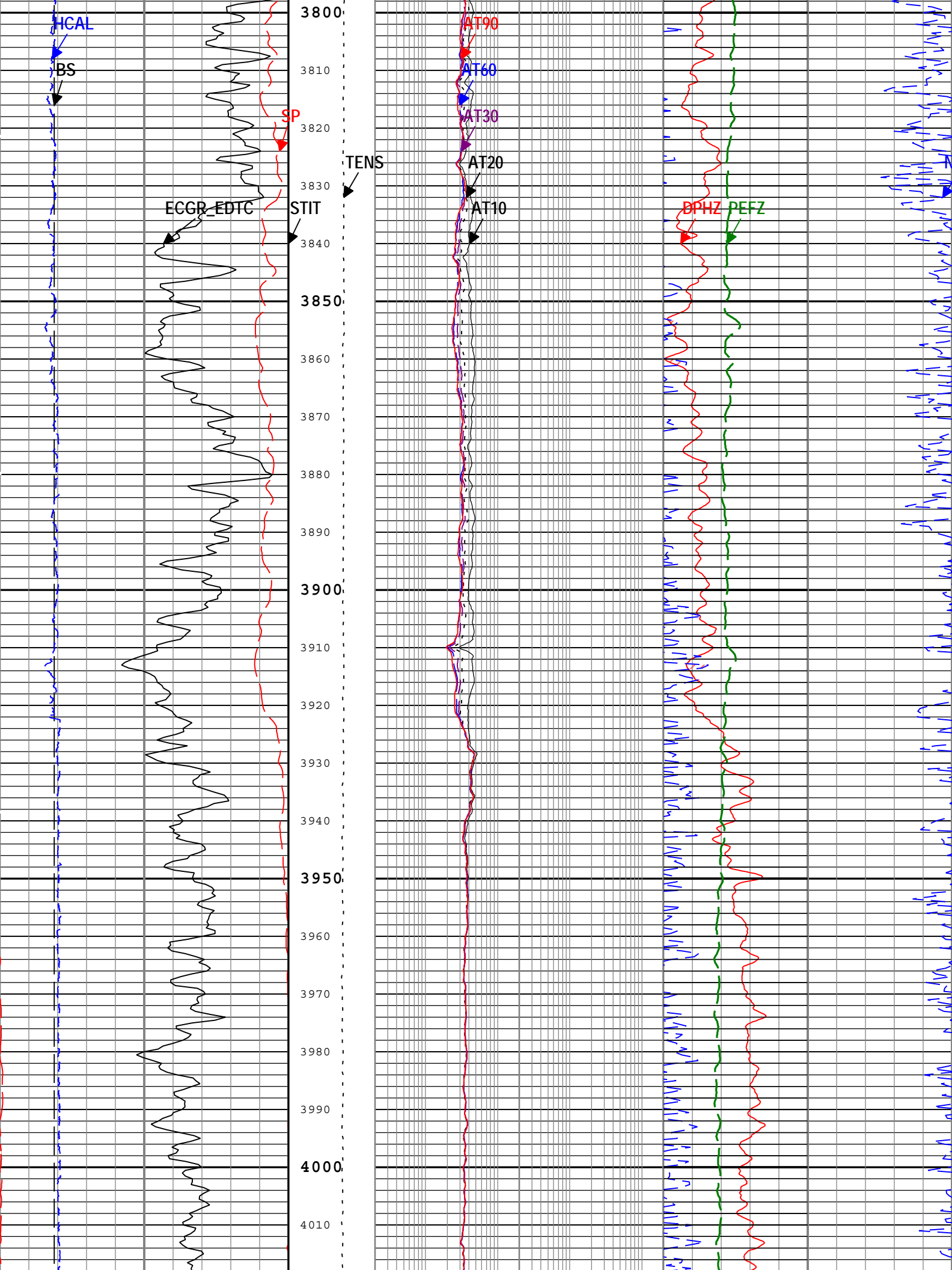


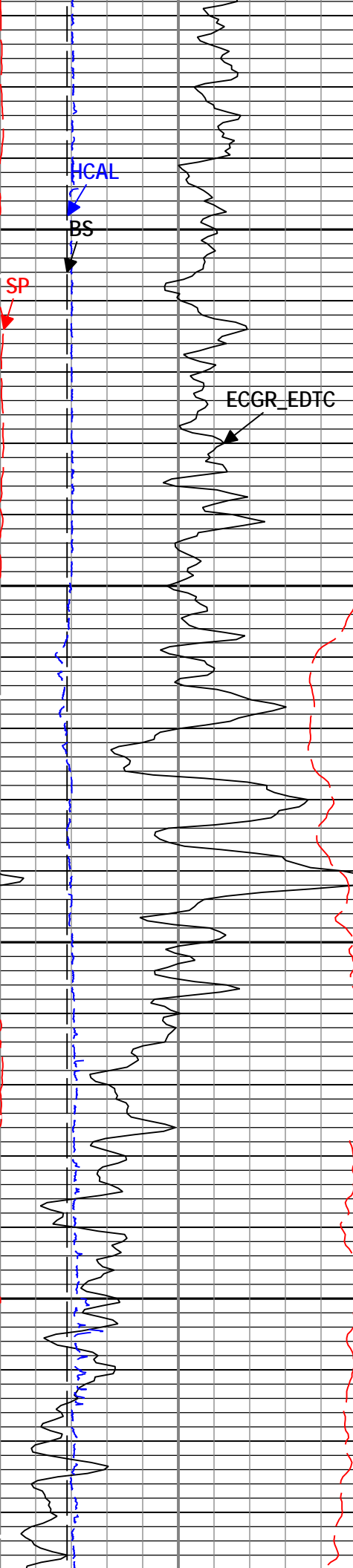




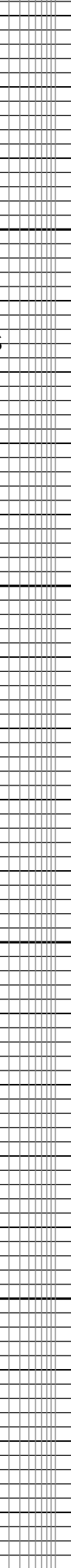
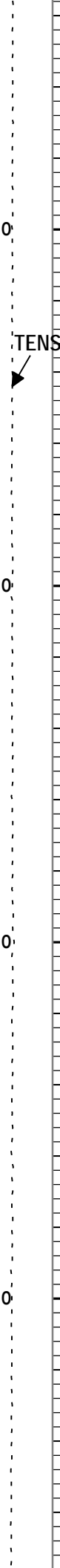


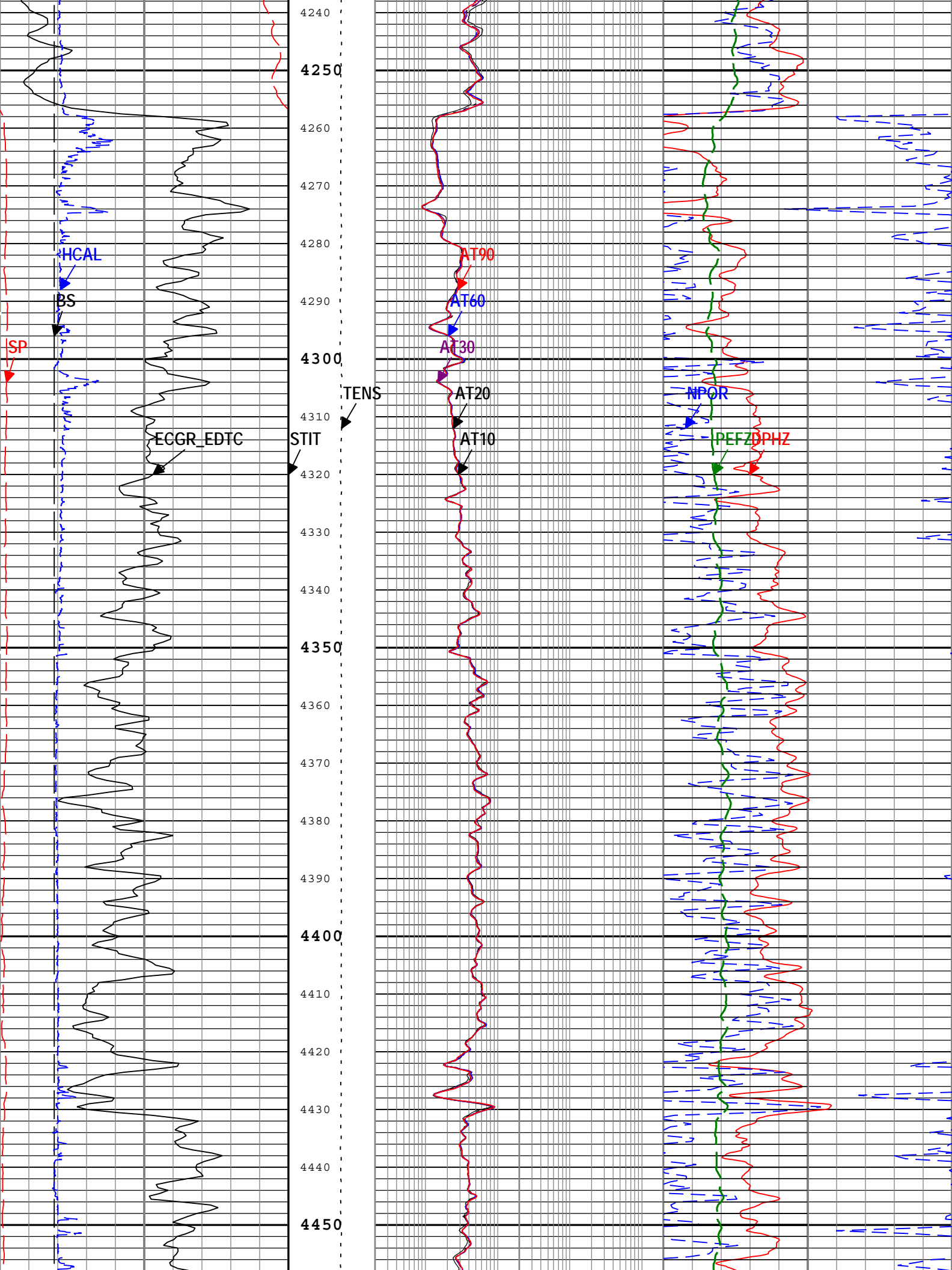


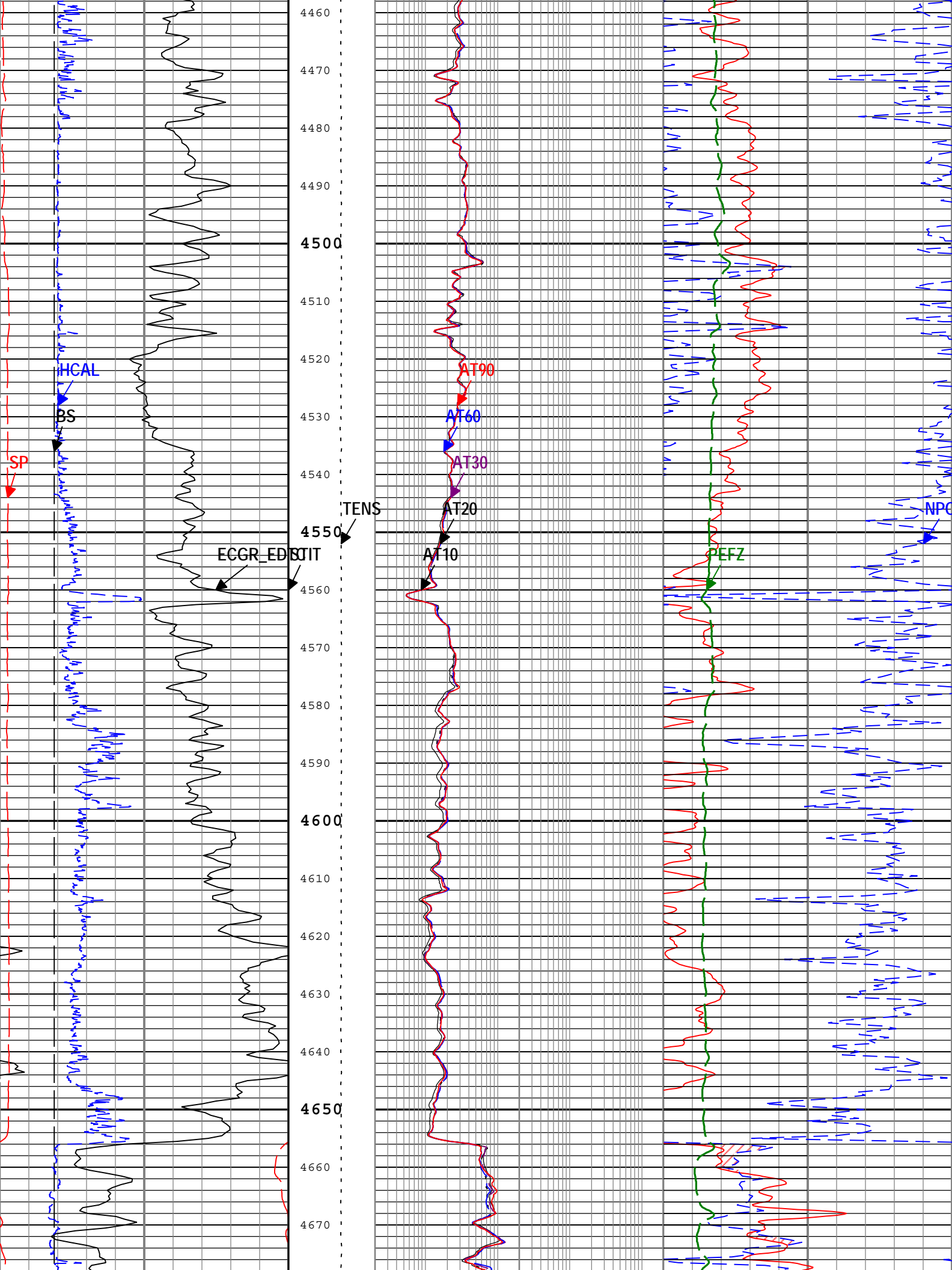


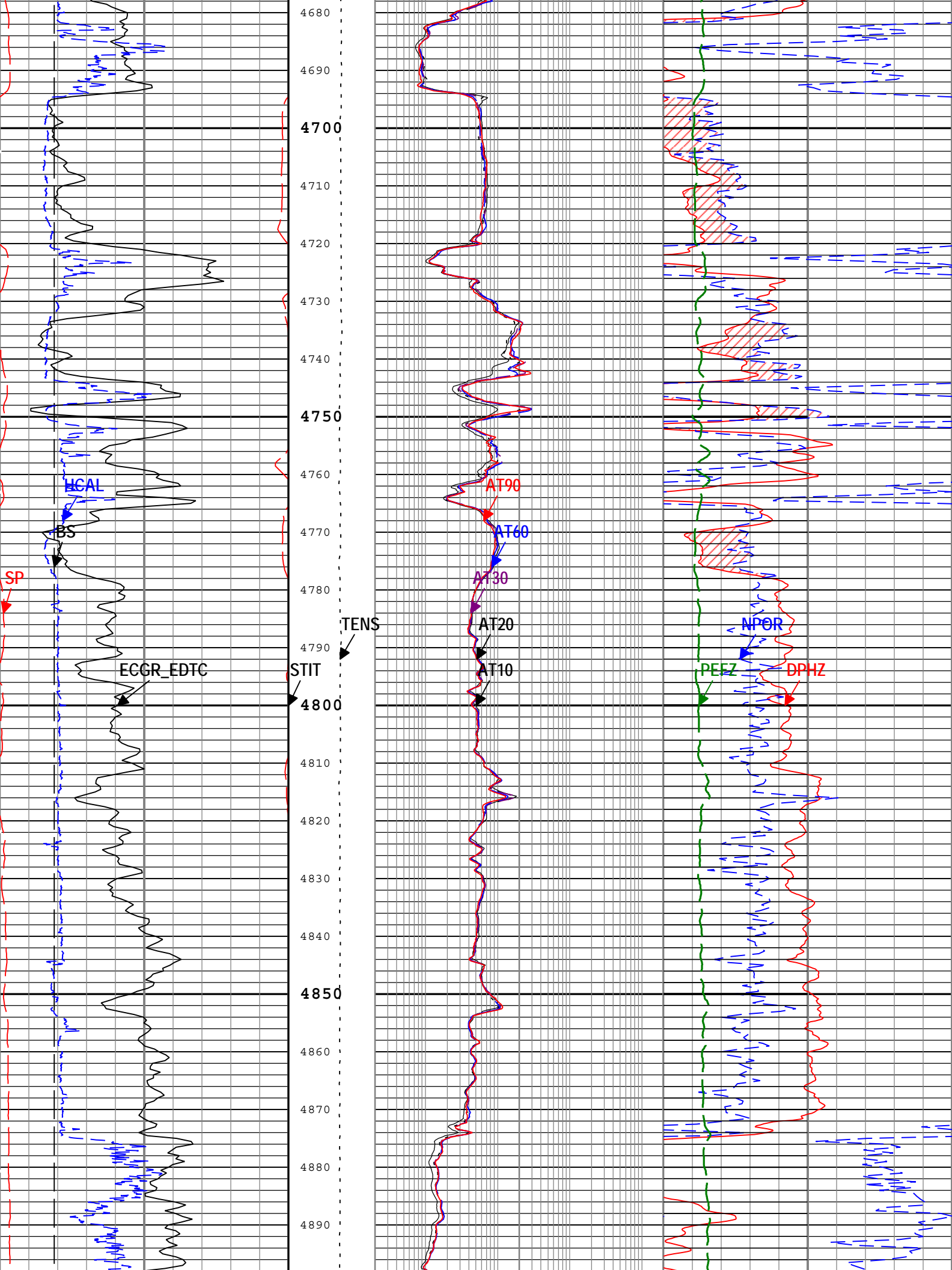


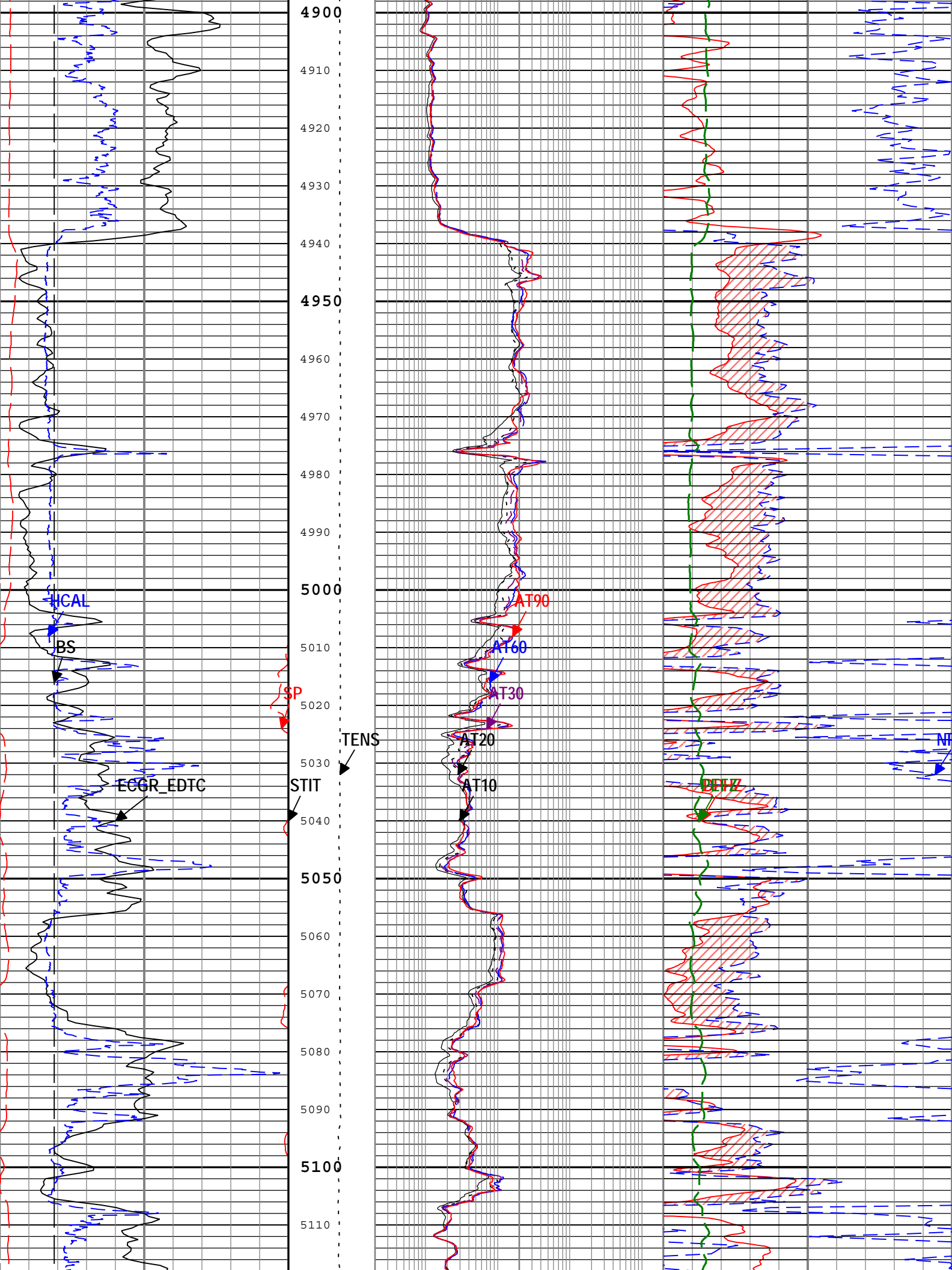
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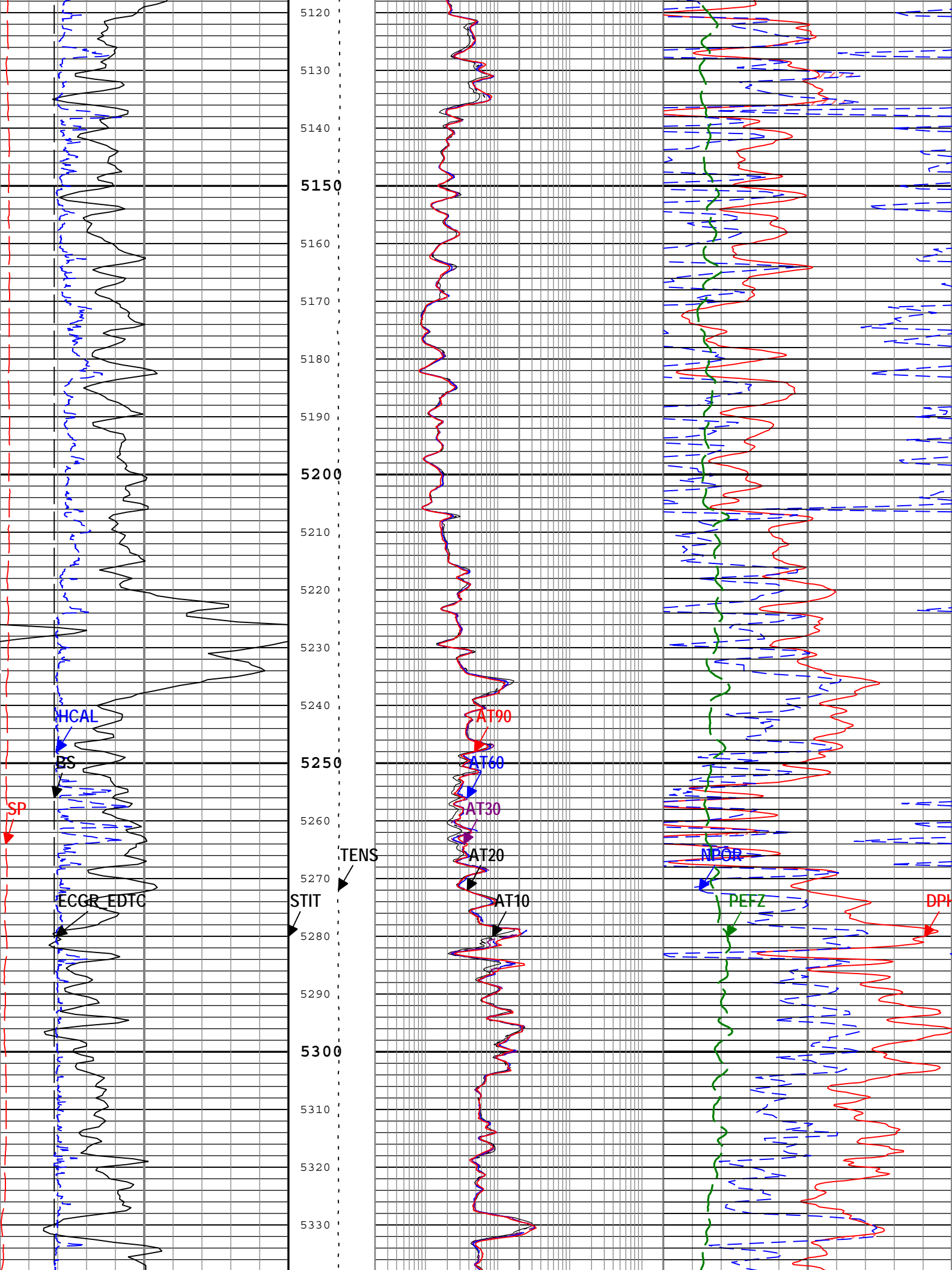


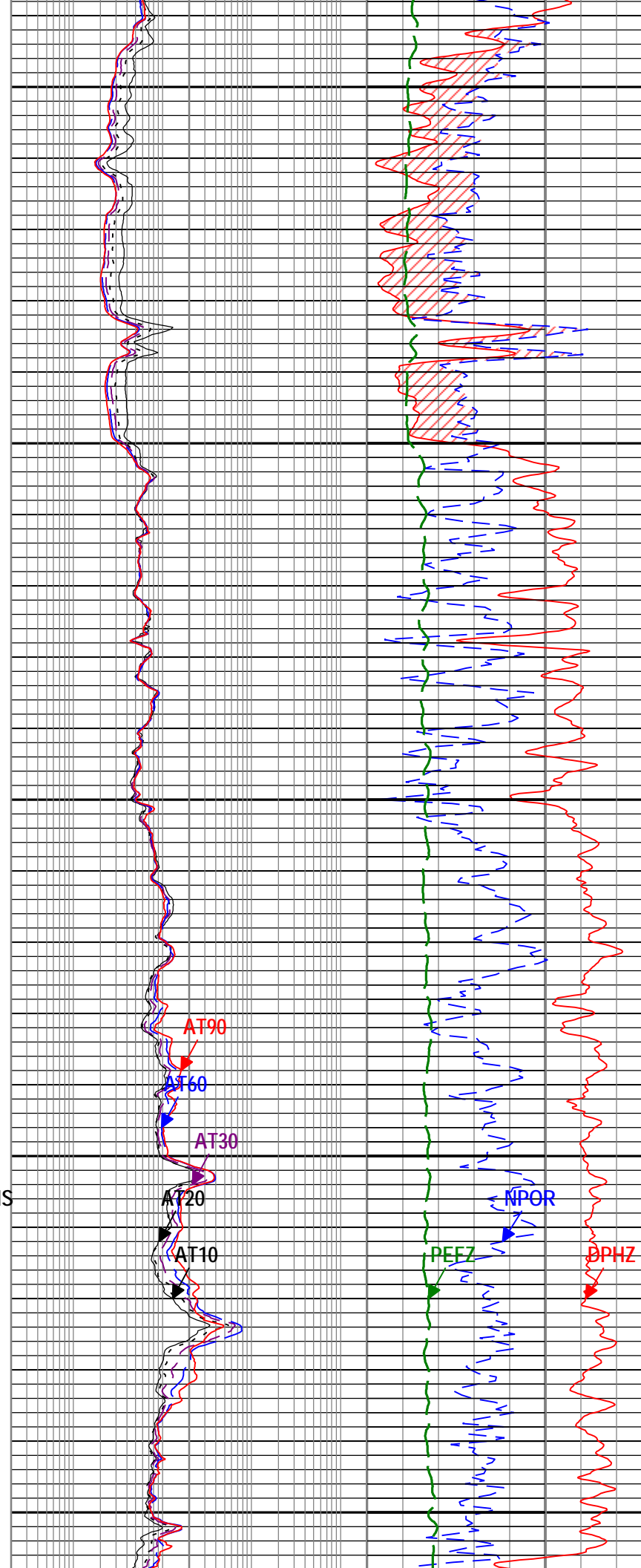
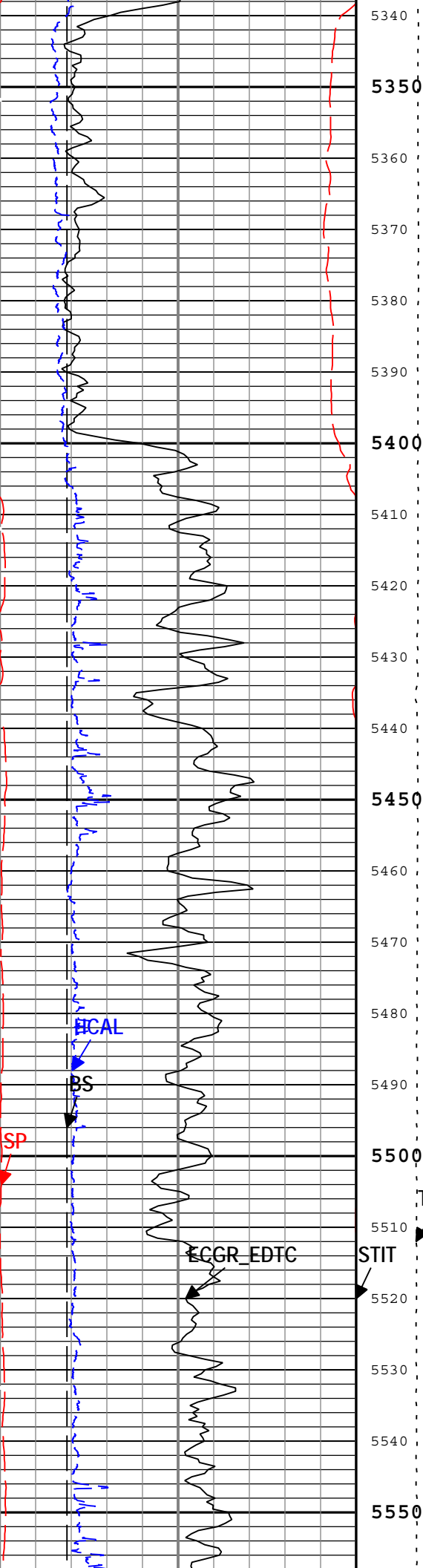


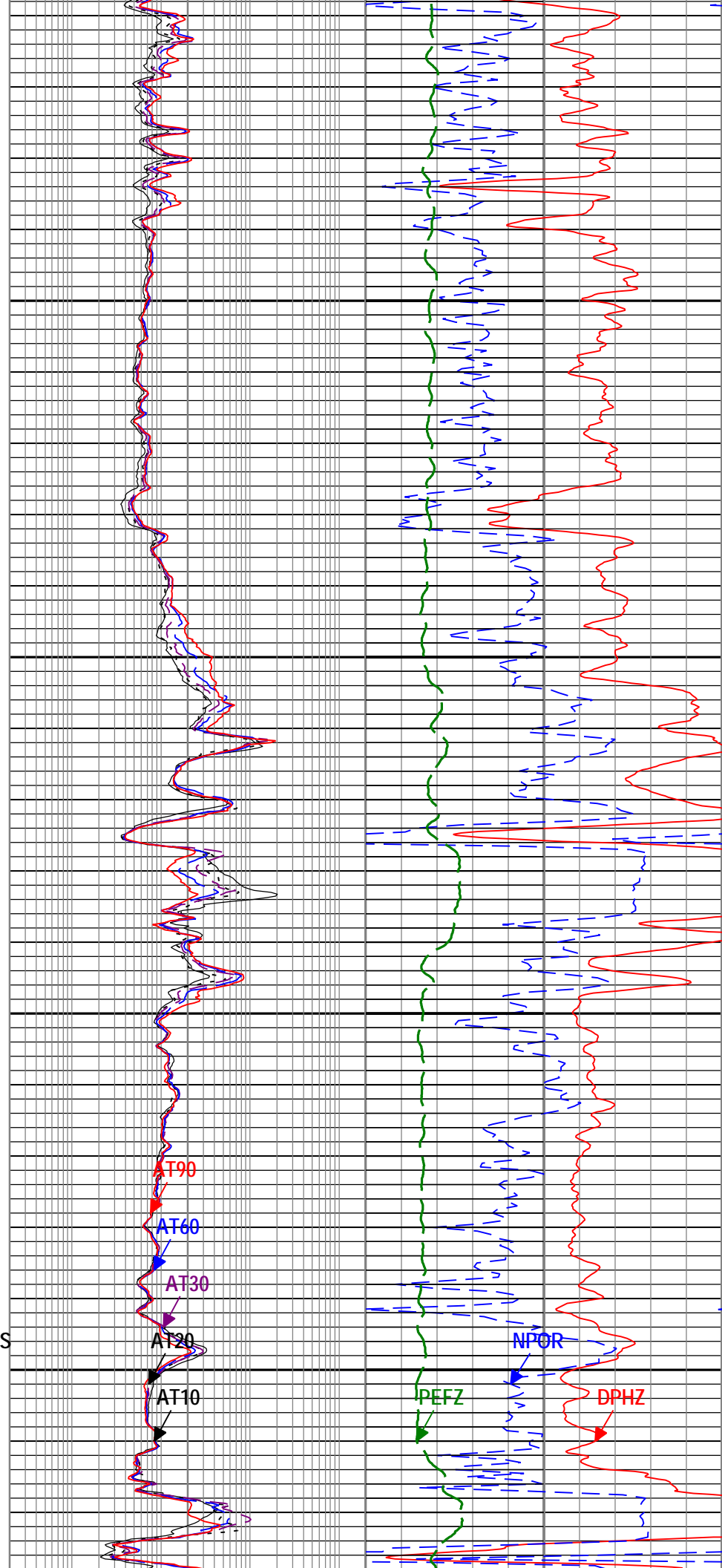
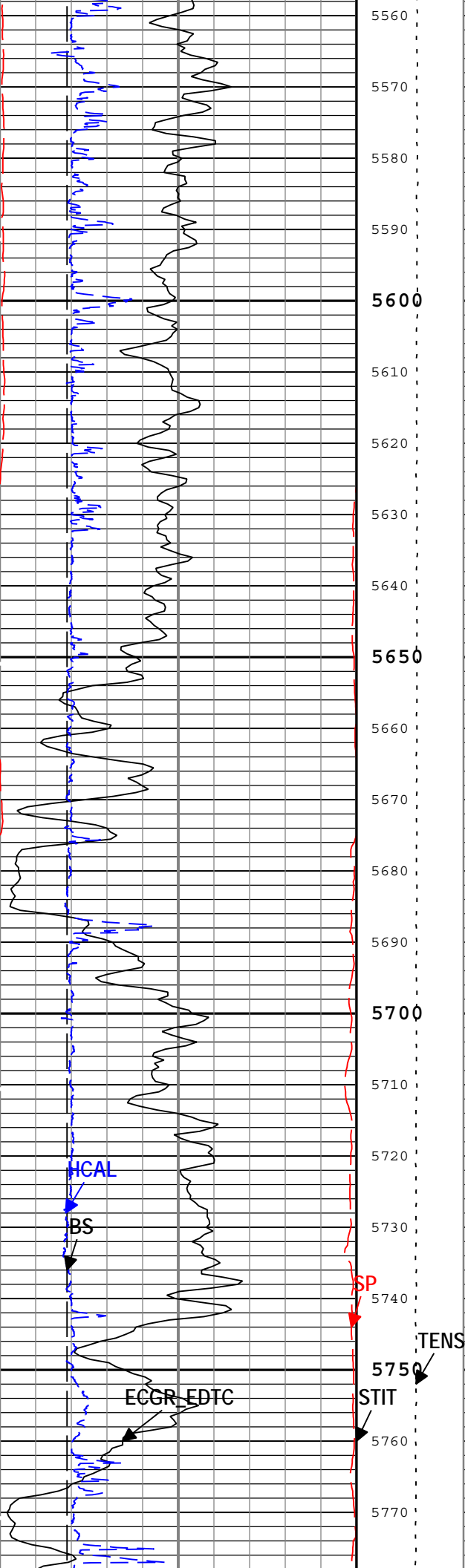


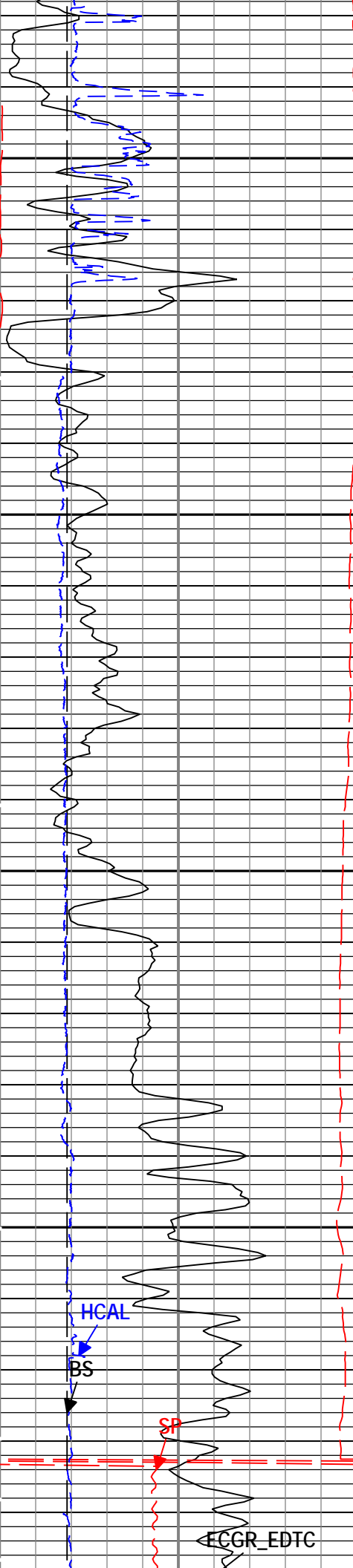




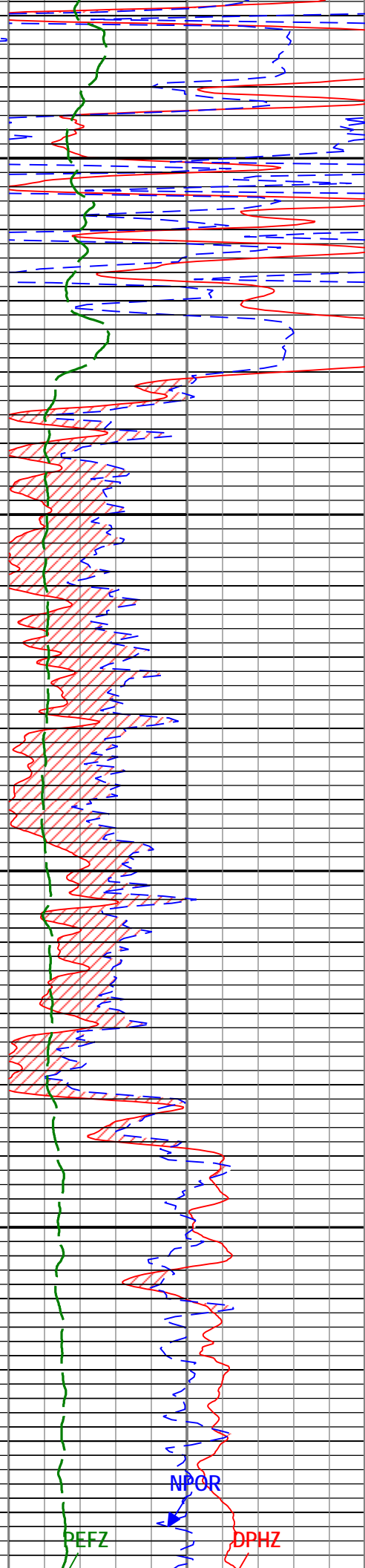
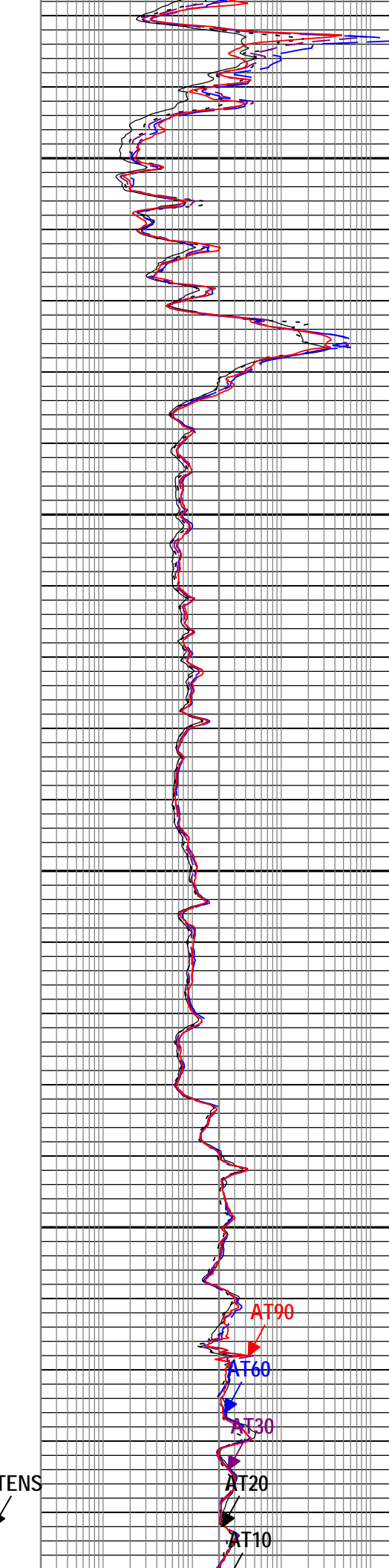


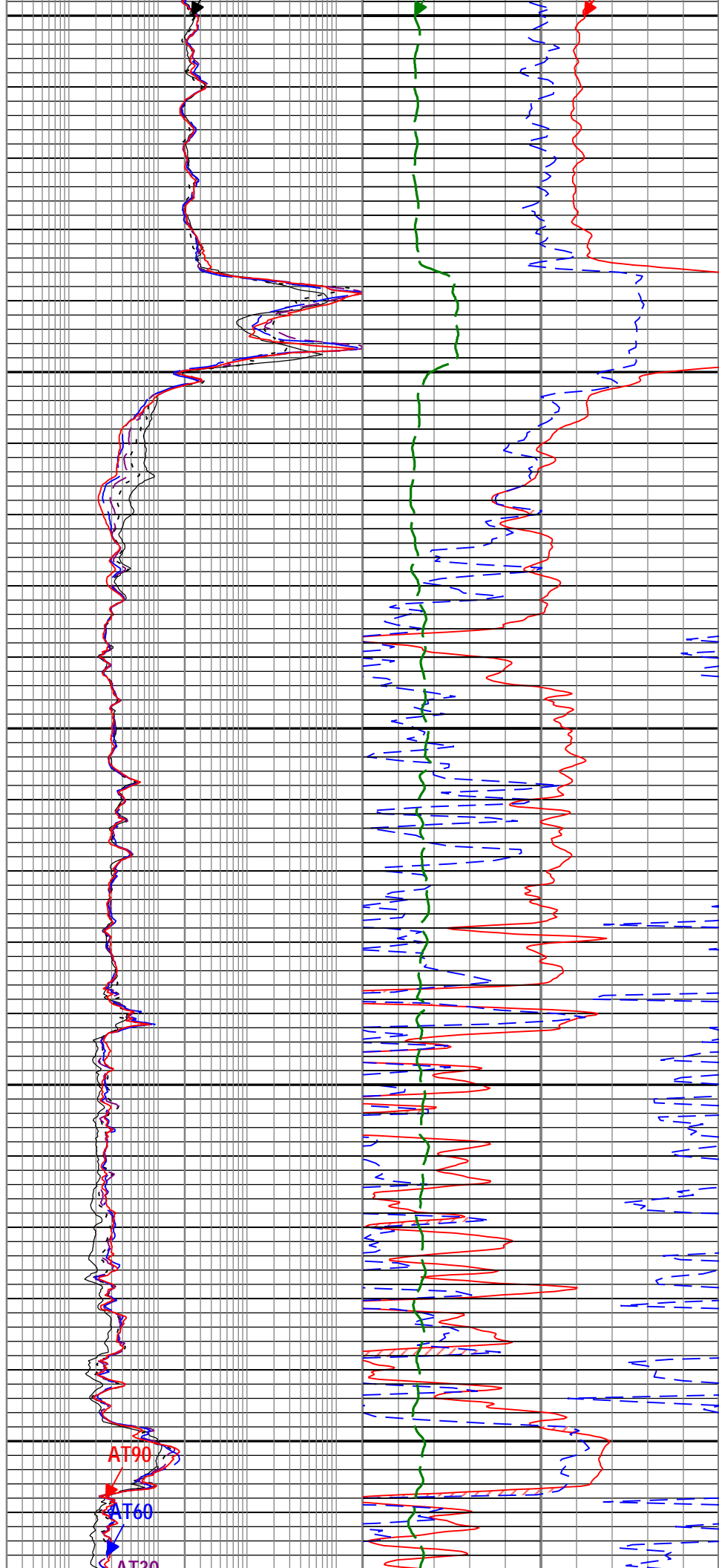
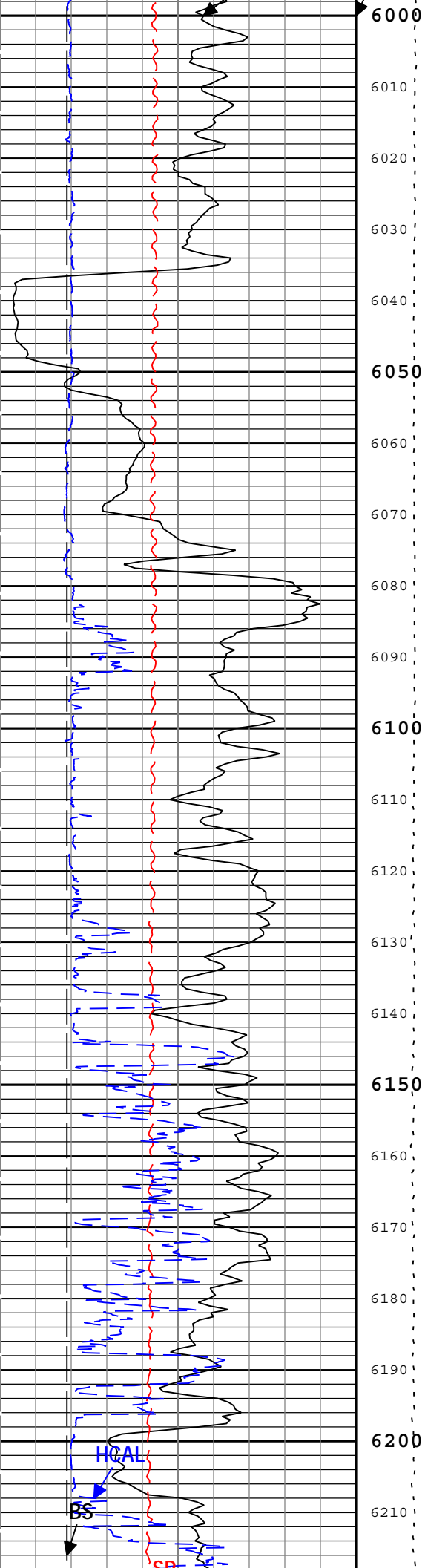


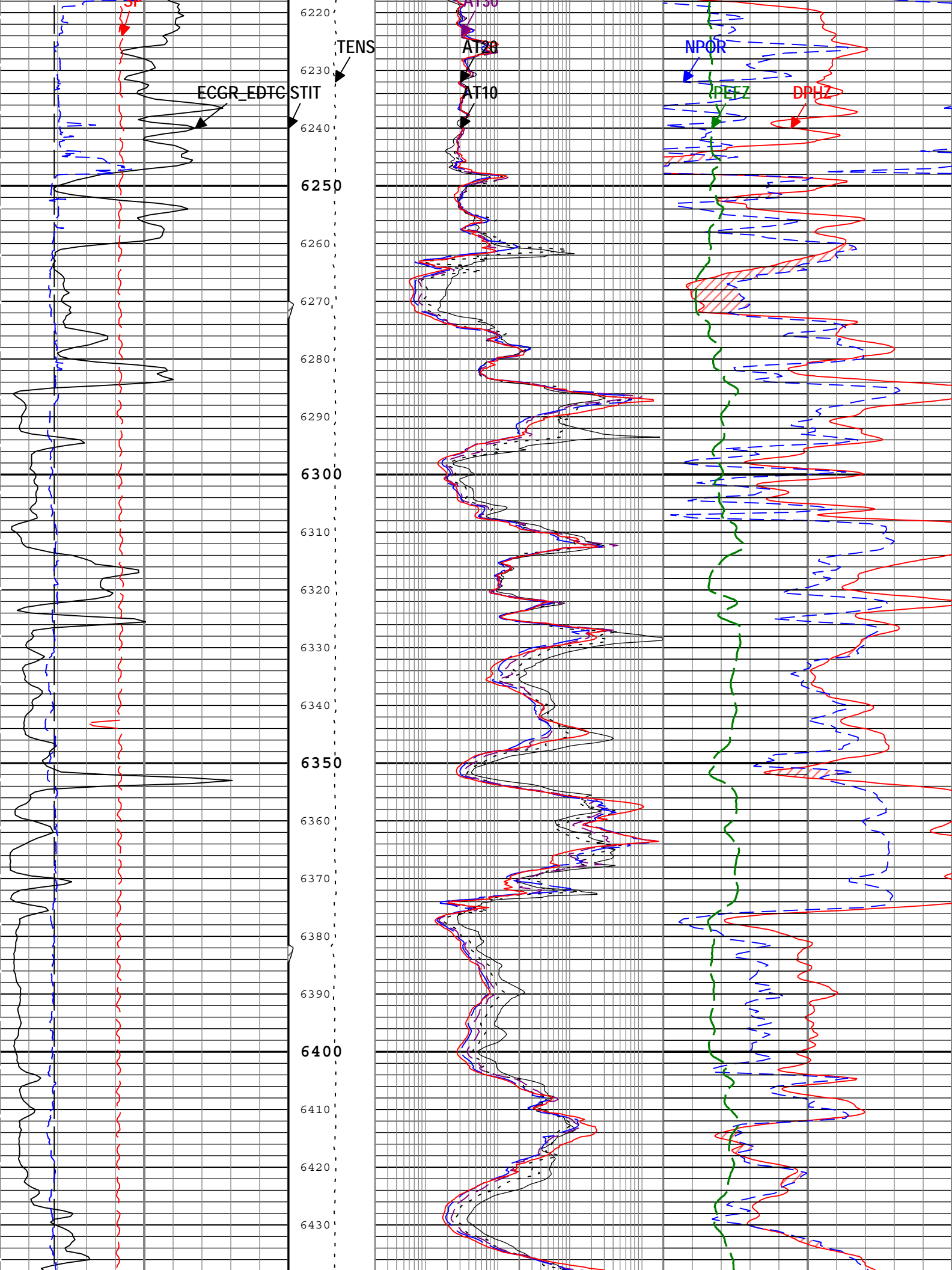


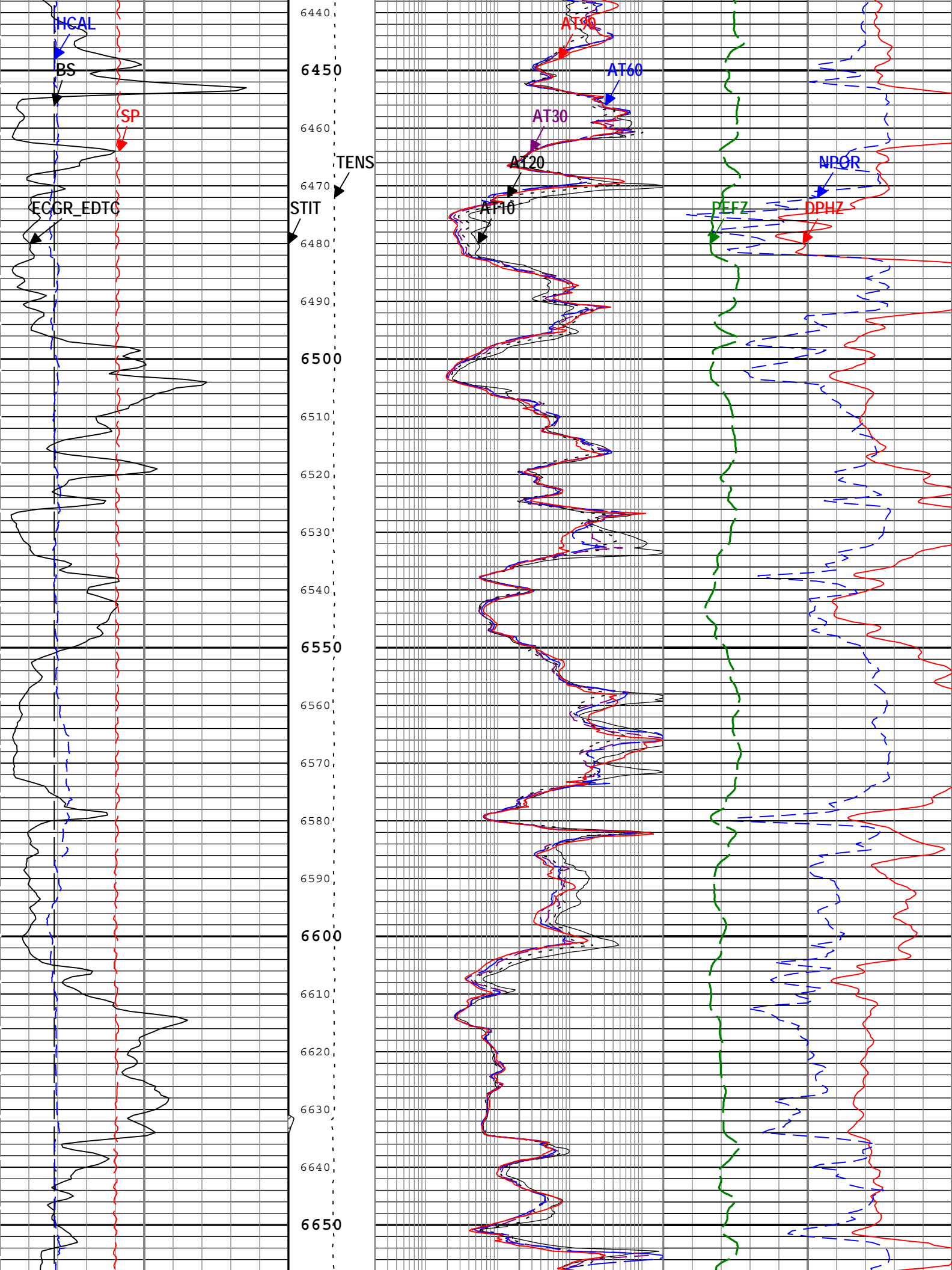


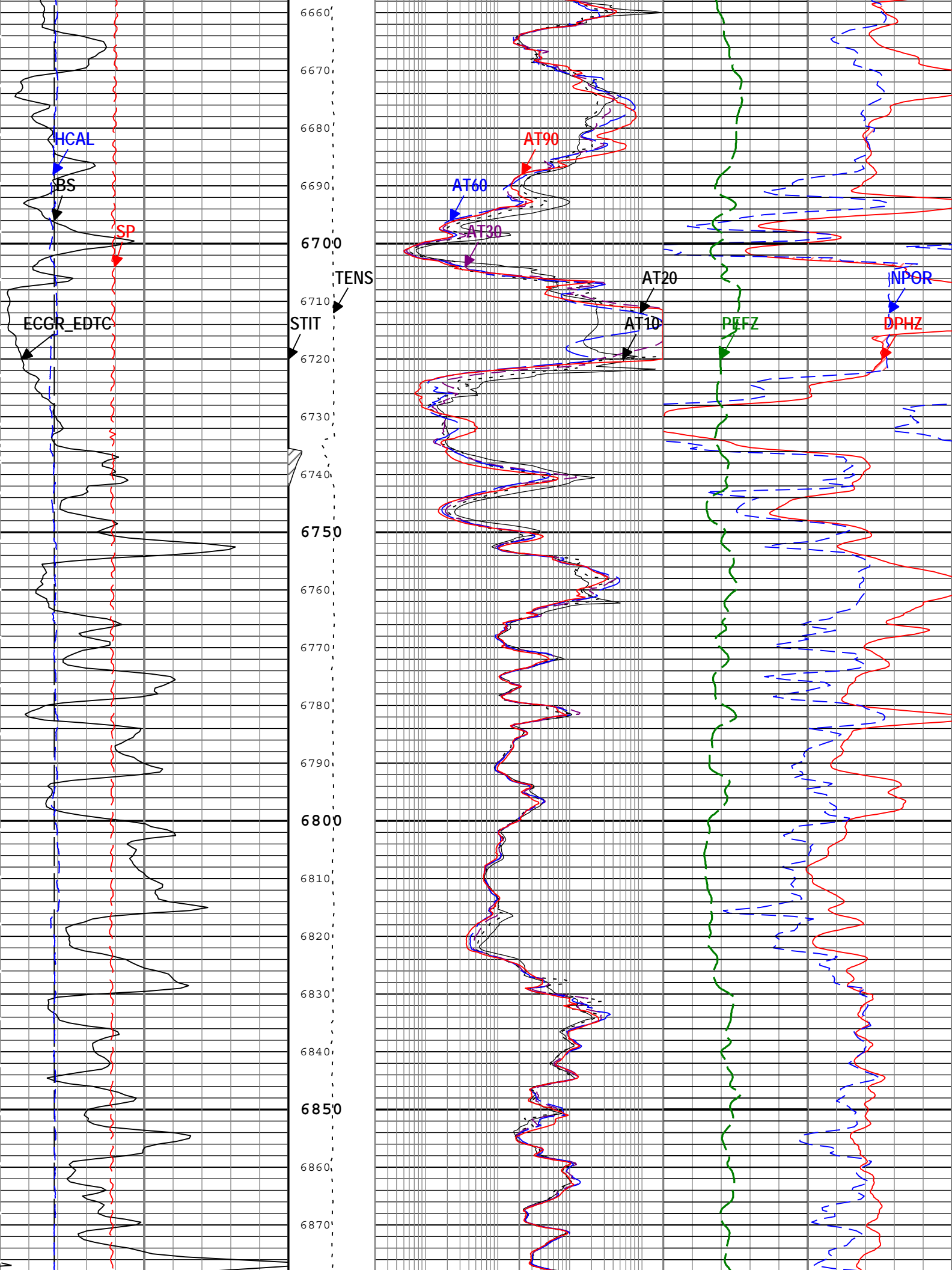
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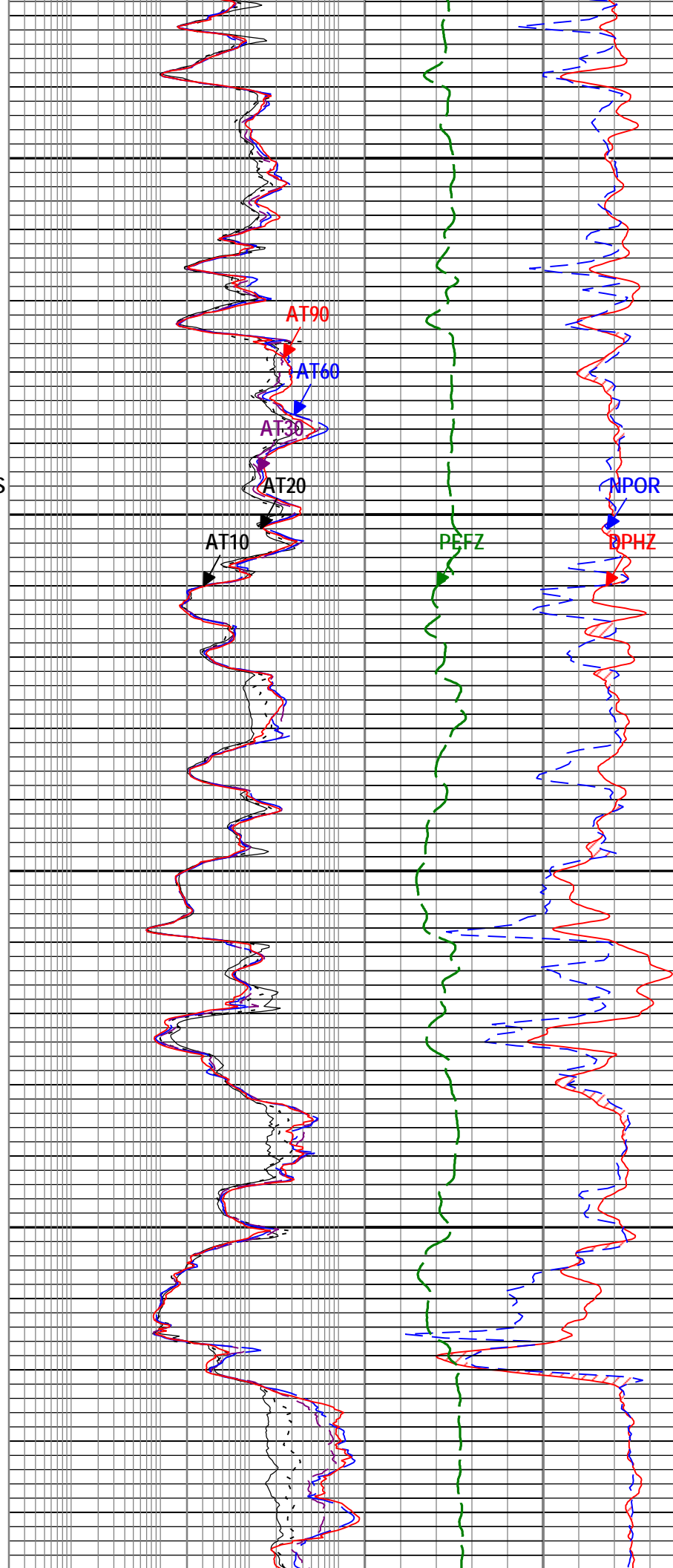
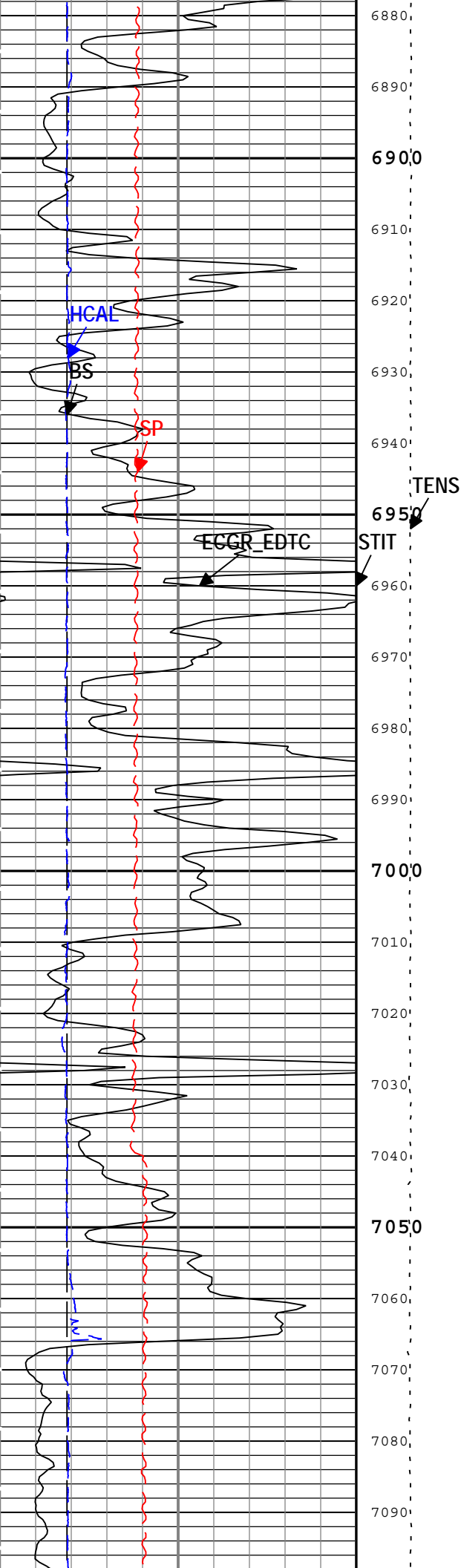


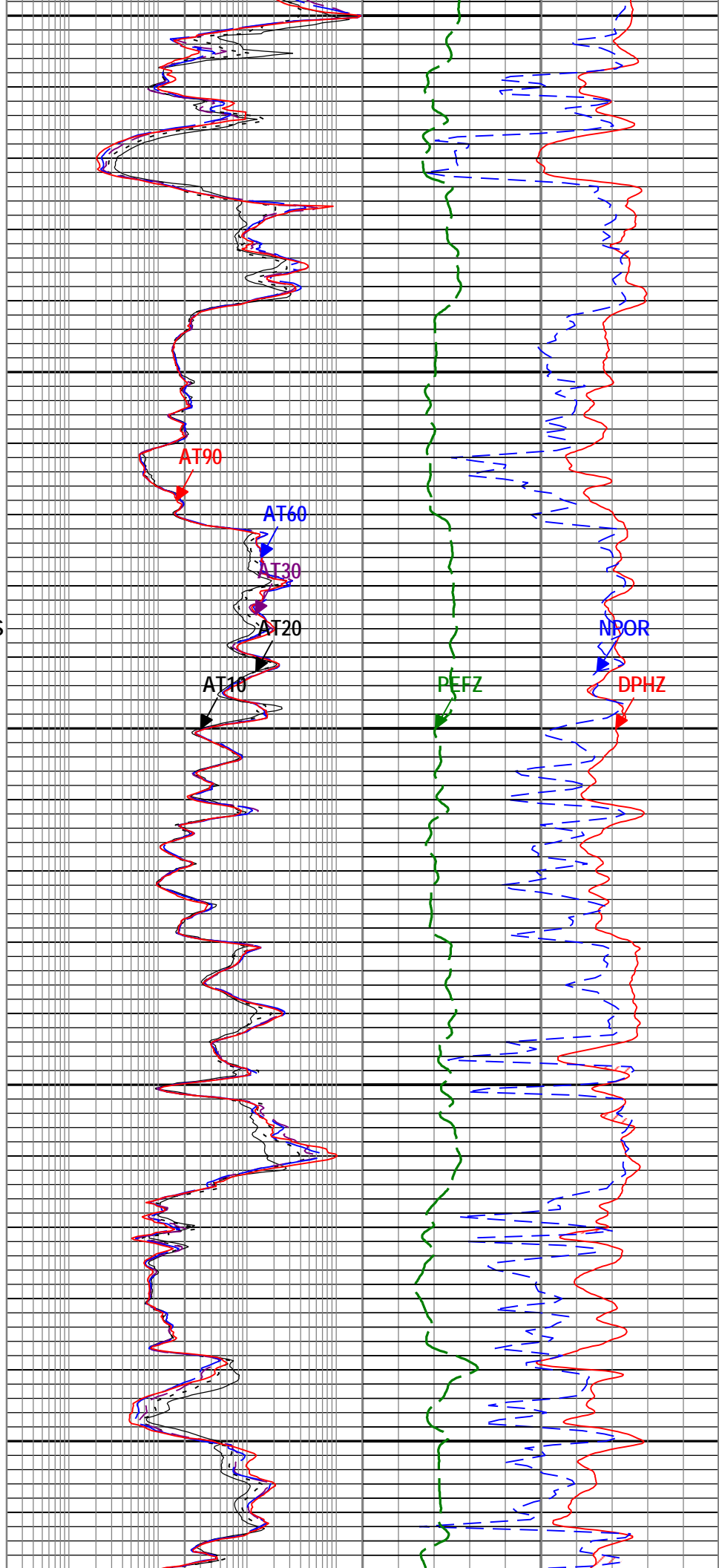
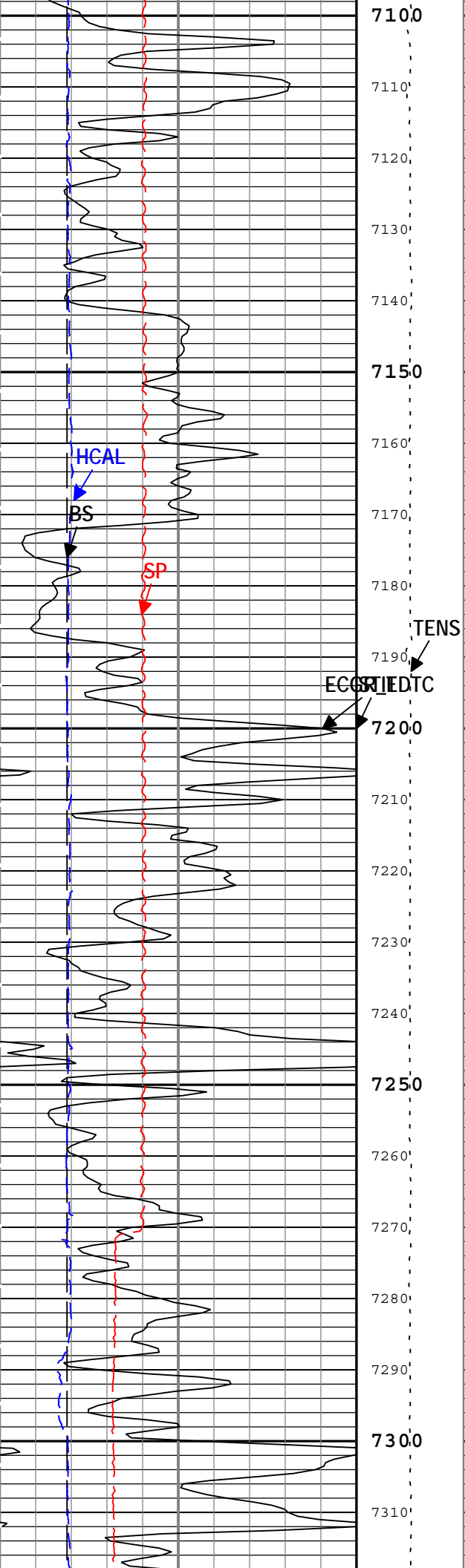


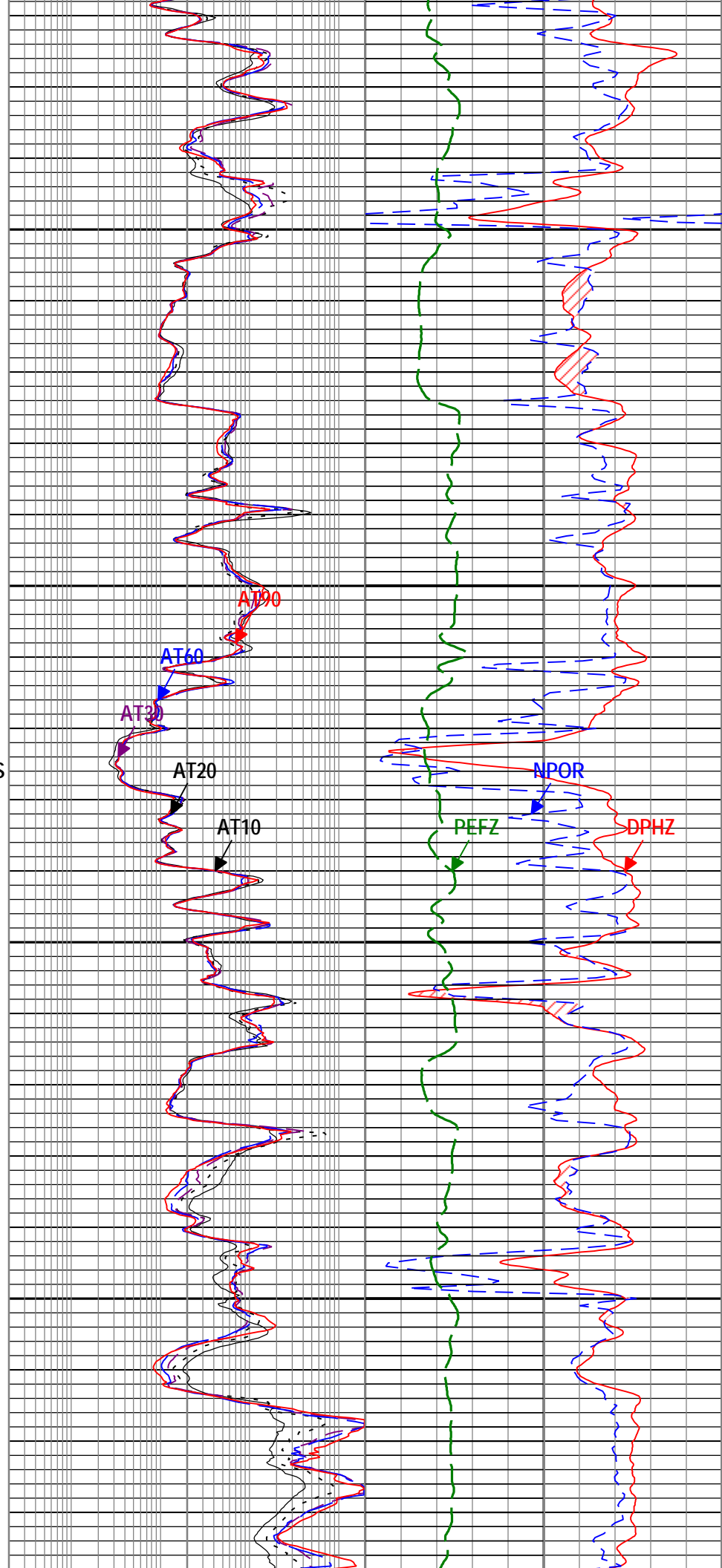
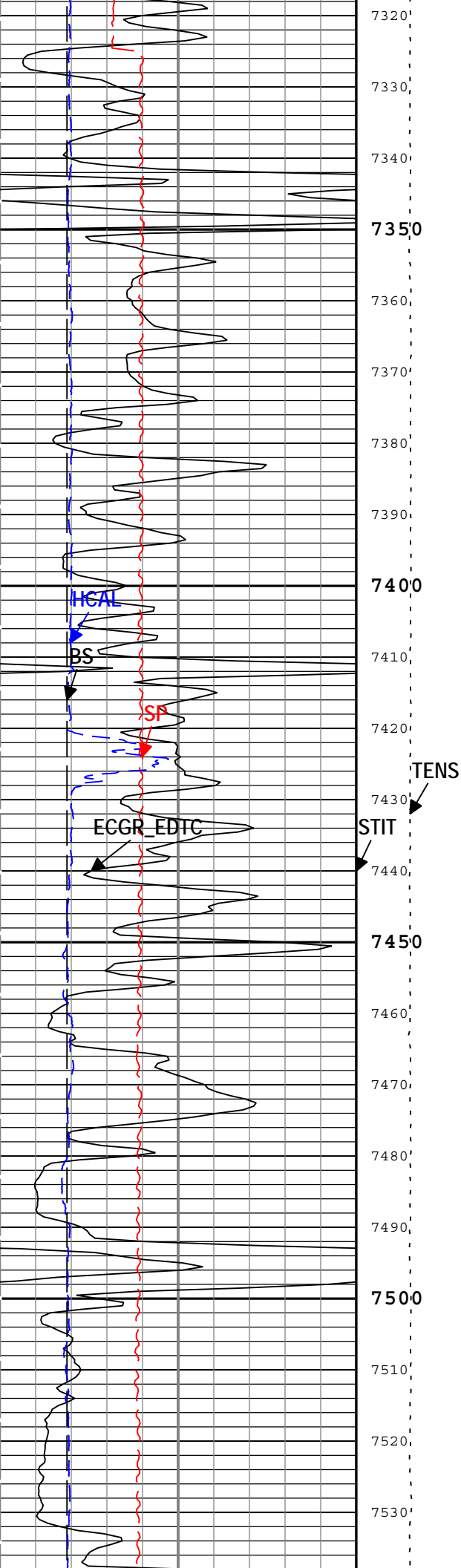


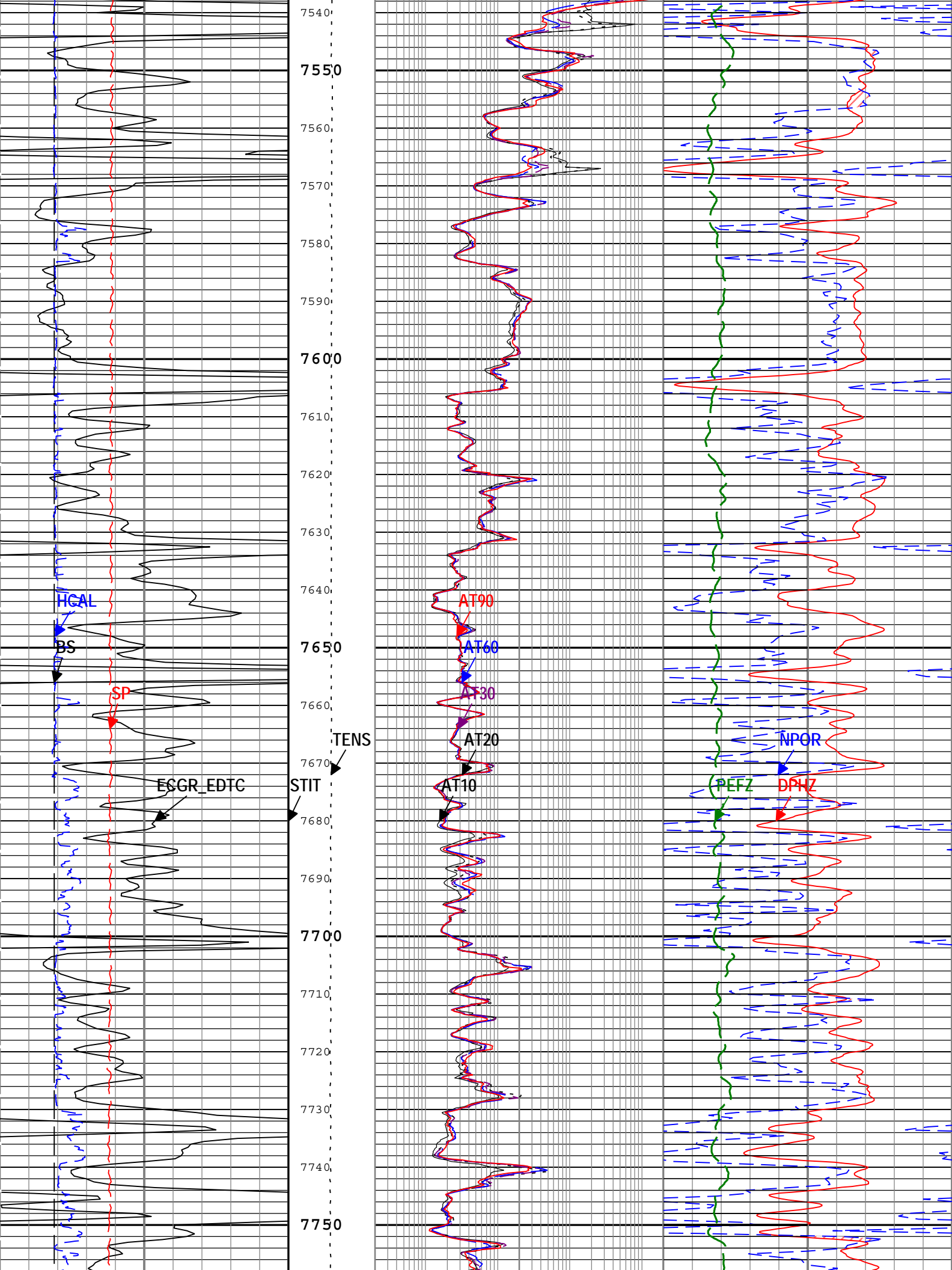


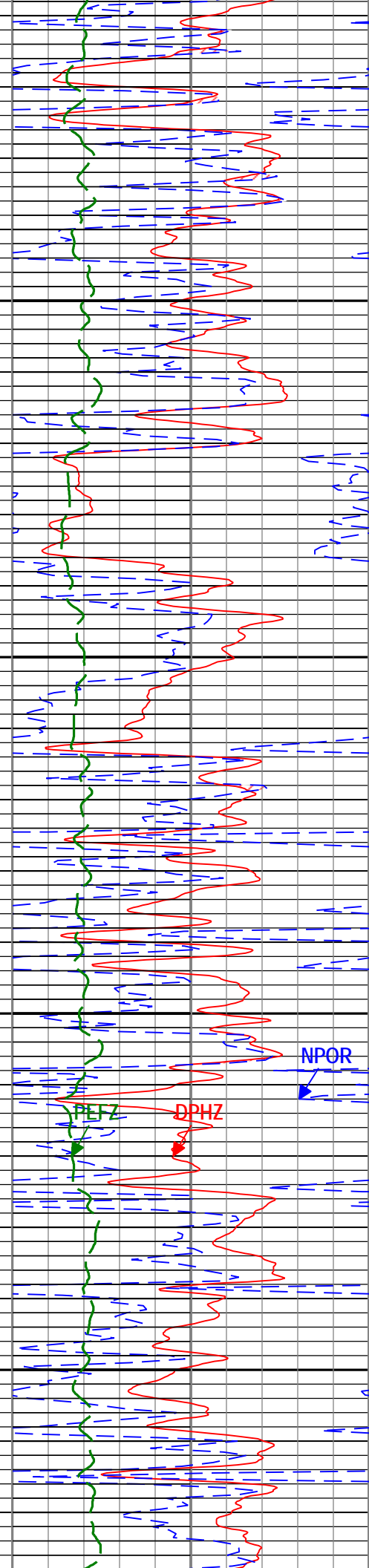
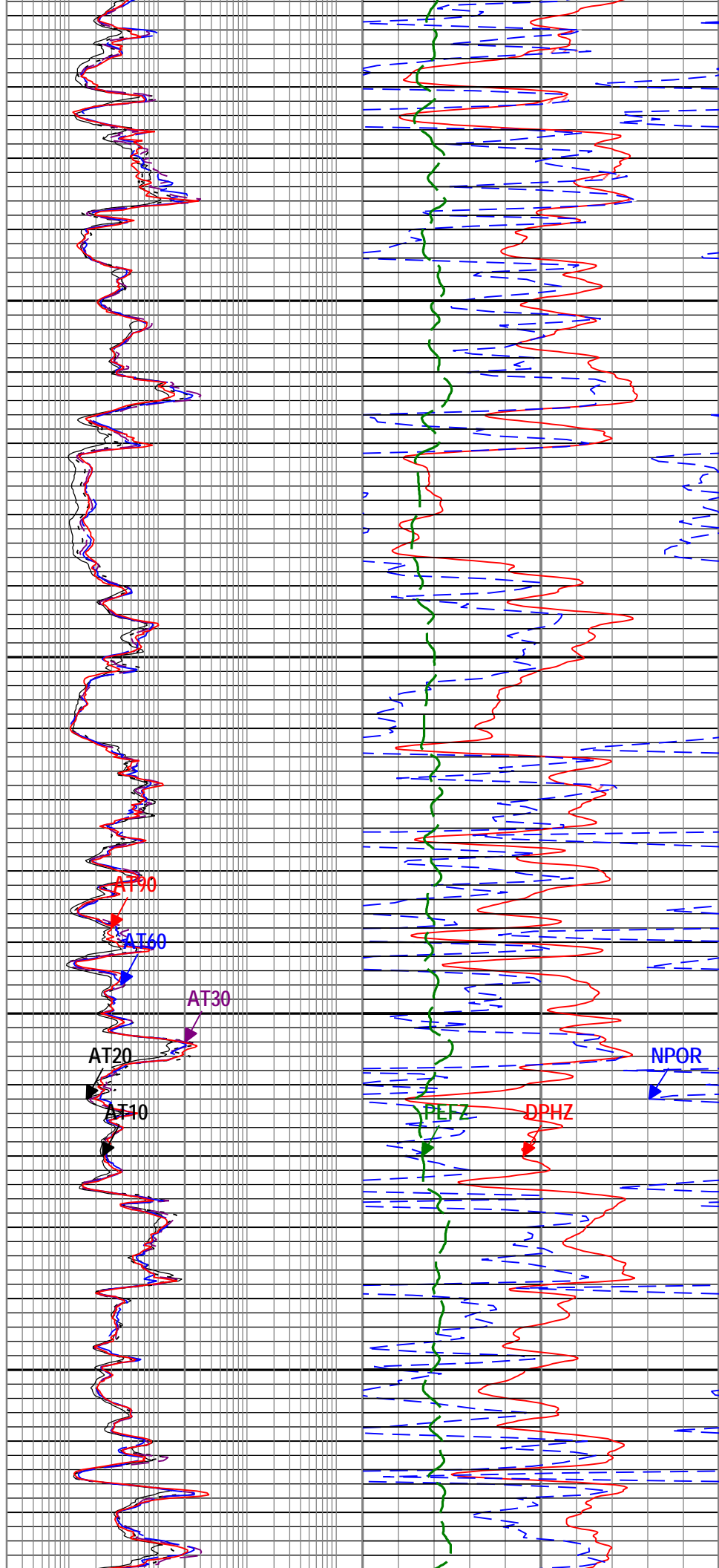
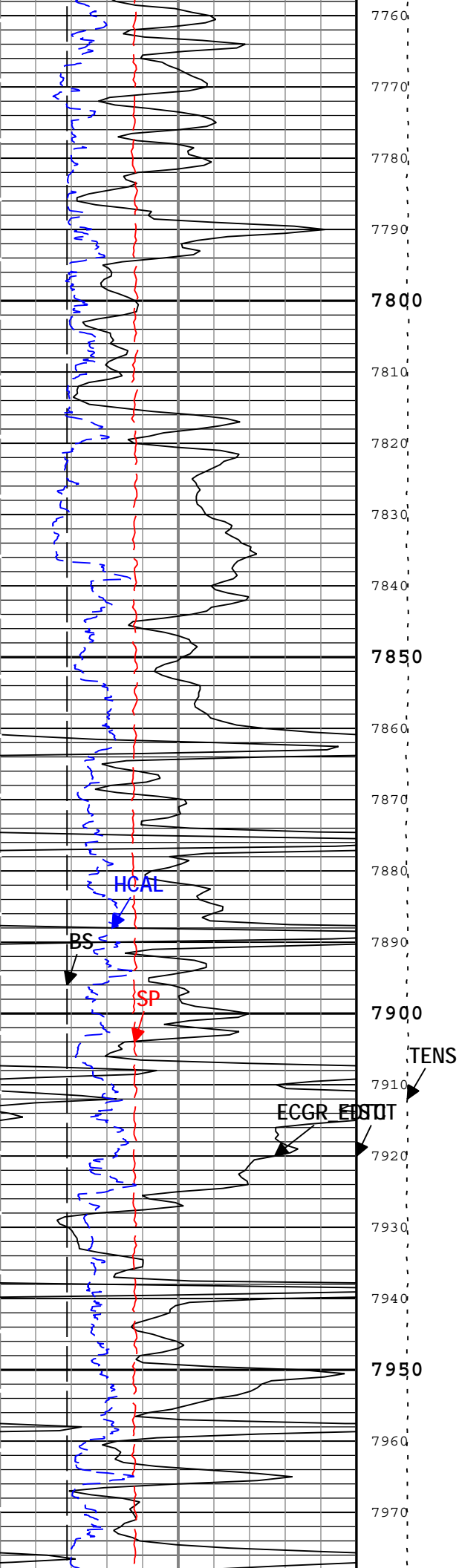


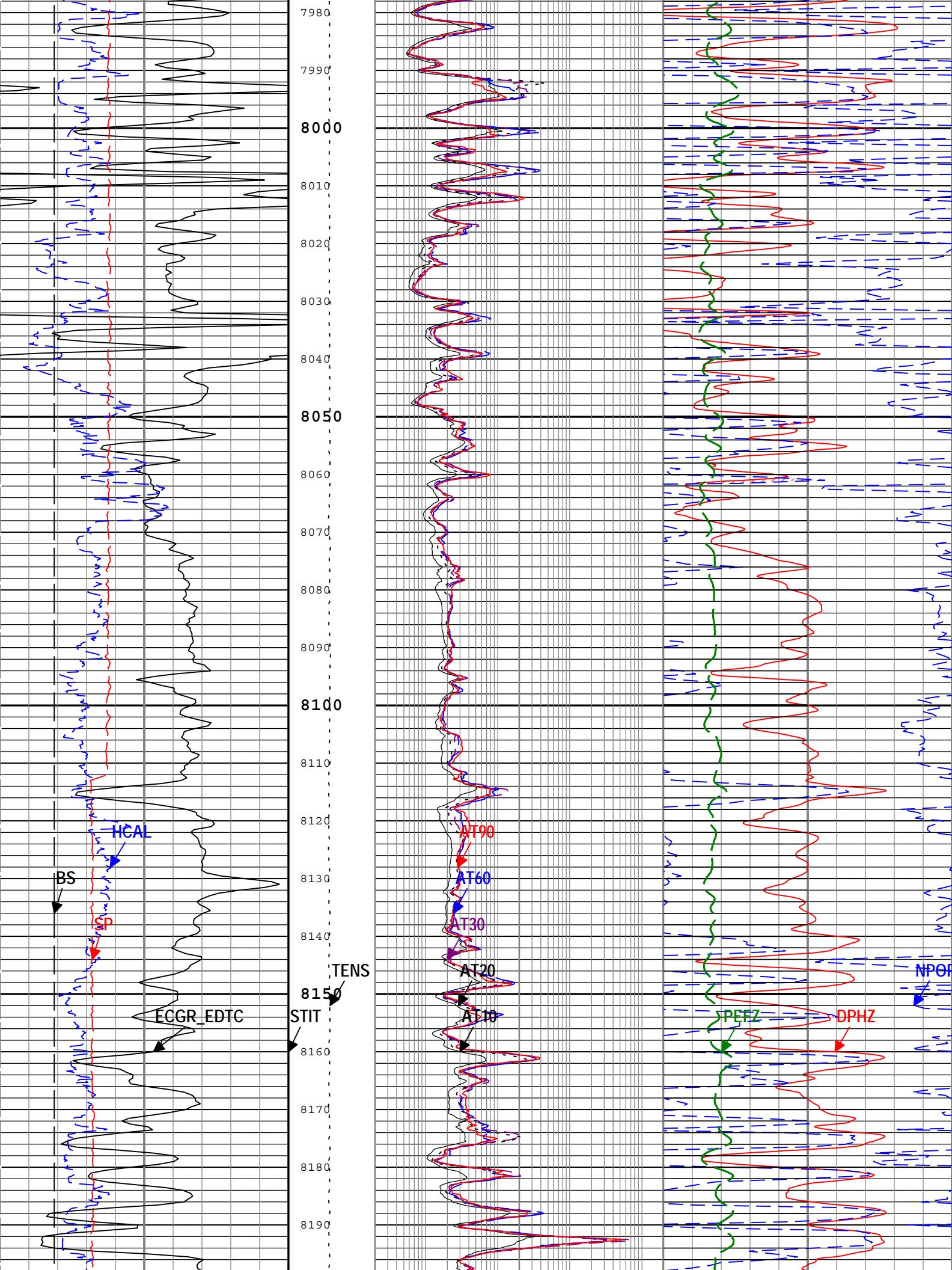


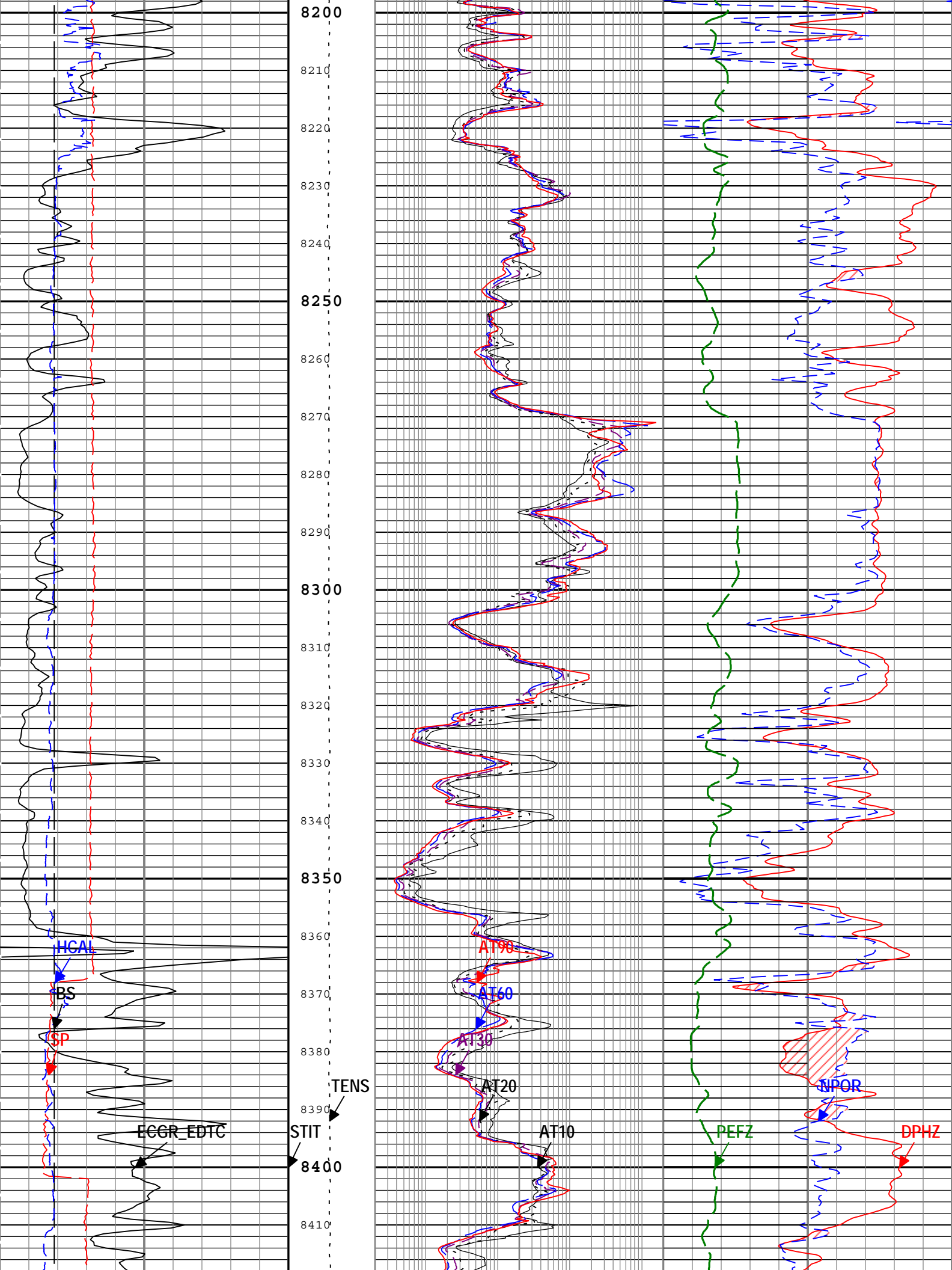


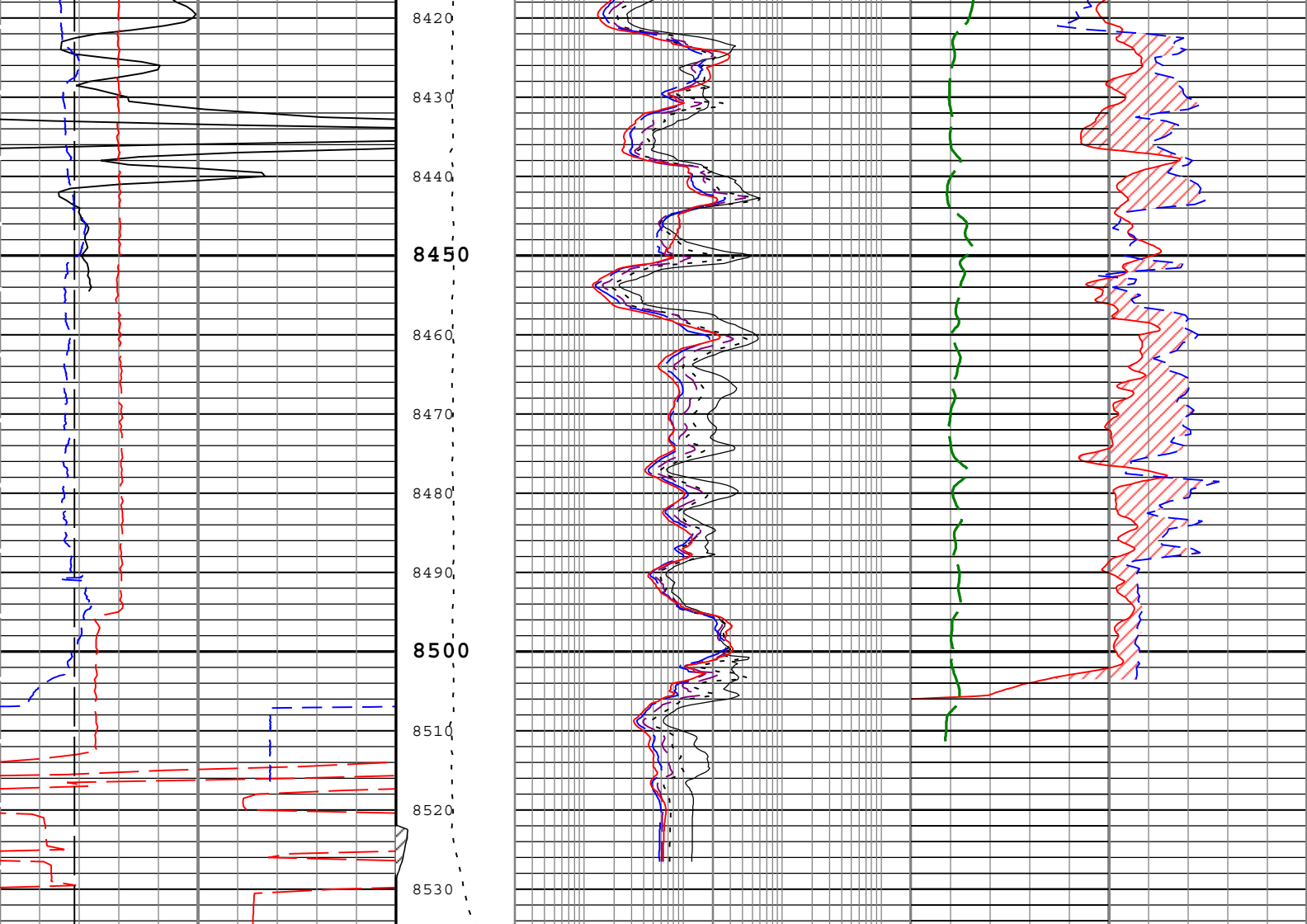












Gamma Ray Back up			Stuck Tool Indicator, Total (STIT)	Array Induction Two Foot Resistivity A10 (AT10) AIT-M			Gas Effect		
Gamma Ray (ECGR_EDTC) EDTC-B				0.2 ohm.m 2000			NPOR Backup		
0 gAPI 200			0 ft 50	Array Induction Two Foot Resistivity A20 (AT20) AIT-M			Standard Resolution Density Porosity (DPHZ) HDRS-H		
Spontaneous Potential (SP) AIT-M			Cable Tension (TENS)	0.2 ohm.m 2000			0.3 ft3/ft3 -0.1		
-100 mV 200									
Bit Size (BS)			10000 lbf 0	Array Induction Two Foot Resistivity A30 (AT30) AIT-M			Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H		
6 in 16				0.2 ohm.m 2000			0.3 m3/m3 -0.1		
Caliper (HCAL) HDRS-H				Array Induction Two Foot Resistivity A60 (AT60) AIT-M			Standard Resolution Formation Photoelectric Factor (PEFZ) HDRS-H		
6 in 16				0.2 ohm.m 2000			0 10		
				Array Induction Two Foot Resistivity A90 (AT90) AIT-M					
				0.2 ohm.m 2000					

TIME_1900 - Time Marked every 60.00 (s)

Description: HGNS standard resolution porosities for Platform Express Format: Log (EMD 5in Triple Combo Linear) Index Scale: 5 in per 100 ft Index Unit: Measured Depth Creation Date: 08-Jan-2015 23:39:50

Channel Processing Parameters				
Run 1 : Parameters				
Parameter	Description	Tool	Value	Unit

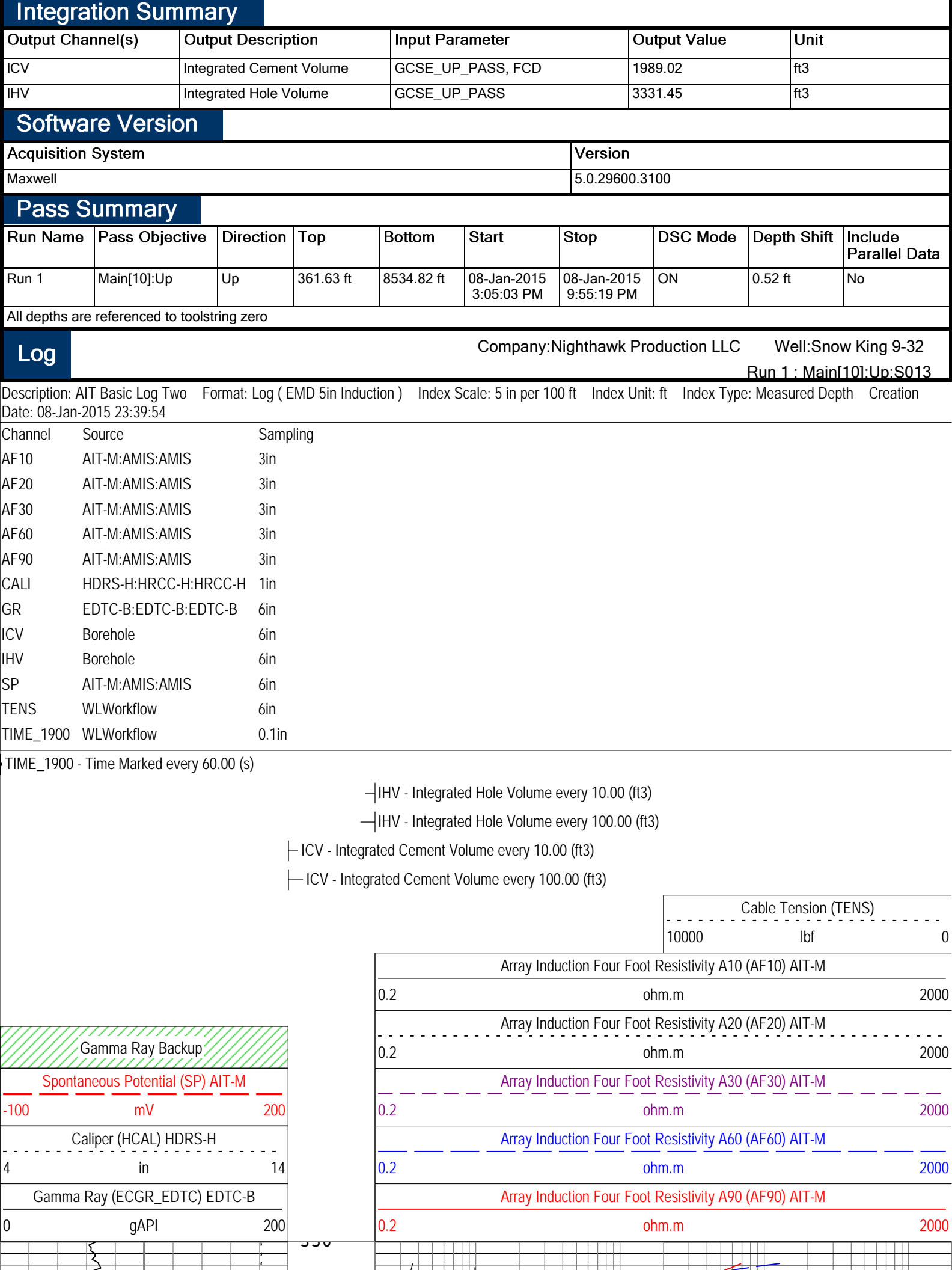
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BHT	Bottom Hole Temperature	Borehole	194.38	degF
BS	Bit Size	WLSESSION	Depth Zoned	in
BSAL	Borehole Salinity	Borehole	0	ppm
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.183	in
CBLO	Casing Bottom (Logger)	WLSESSION	391	ft
CDEN	Cement Density	EDTC-B	2	g/cm3
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	9.25	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DHC	Density Hole Correction	HDRS-H	Bit Size	
EDF	Elevation of Derrick Floor Above Permanent Datum	WLSESSION	14	ft
EPD	Elevation of Permanent Datum (PDAT) above Mean Sea Level	WLSESSION	5324	ft
FD	Fluid Density	Borehole	1	g/cm3
FSAL	Formation Salinity	Borehole	0	ppm
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	REMS	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST	
HSCO	Hole Size Correction Option	HGNS-H	Yes	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	LIMESTONE	
MDEN	Matrix Density for Density Porosity	Borehole	2.71	g/cm3
MFST	Mud Filtrate Sample Temperature	Borehole	50	degF
MST	Mud Sample Temperature	Borehole	50	degF
PDAT	Permanent Datum	WLSESSION	GL	
RMFS	Resistivity of Mud Filtrate Sample	Borehole	1.24	ohm.m
RMS	Resistivity of Mud Sample	Borehole	1.65	ohm.m
SHT	Surface Hole Temperature	Borehole	30	degF
SOCO	Standoff Correction Option	HGNS-H	Yes	
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft
TD	Total Measured Depth	Borehole	8522.5	ft

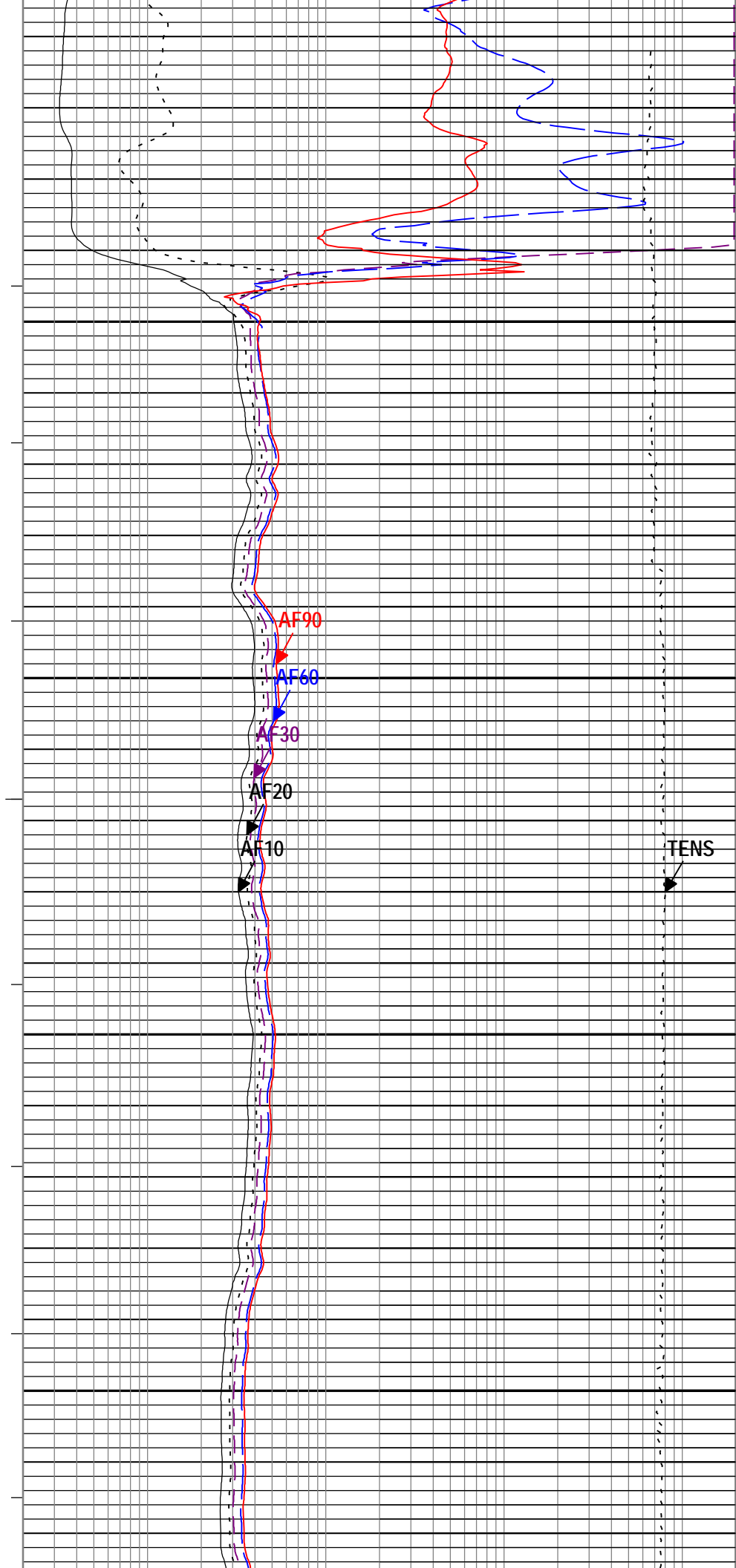
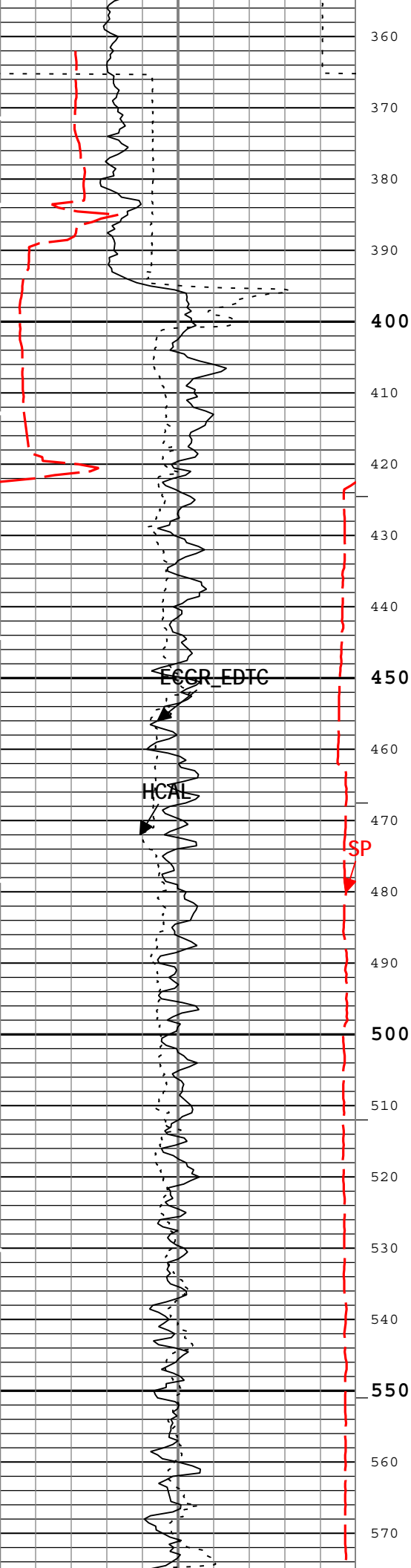
Depth Zone Parameters				
Parameter	Value	Start (ft)	Stop (ft)	
BS	12.25	350	395	
BS	7.875	395	8510	
All depth are actual.				

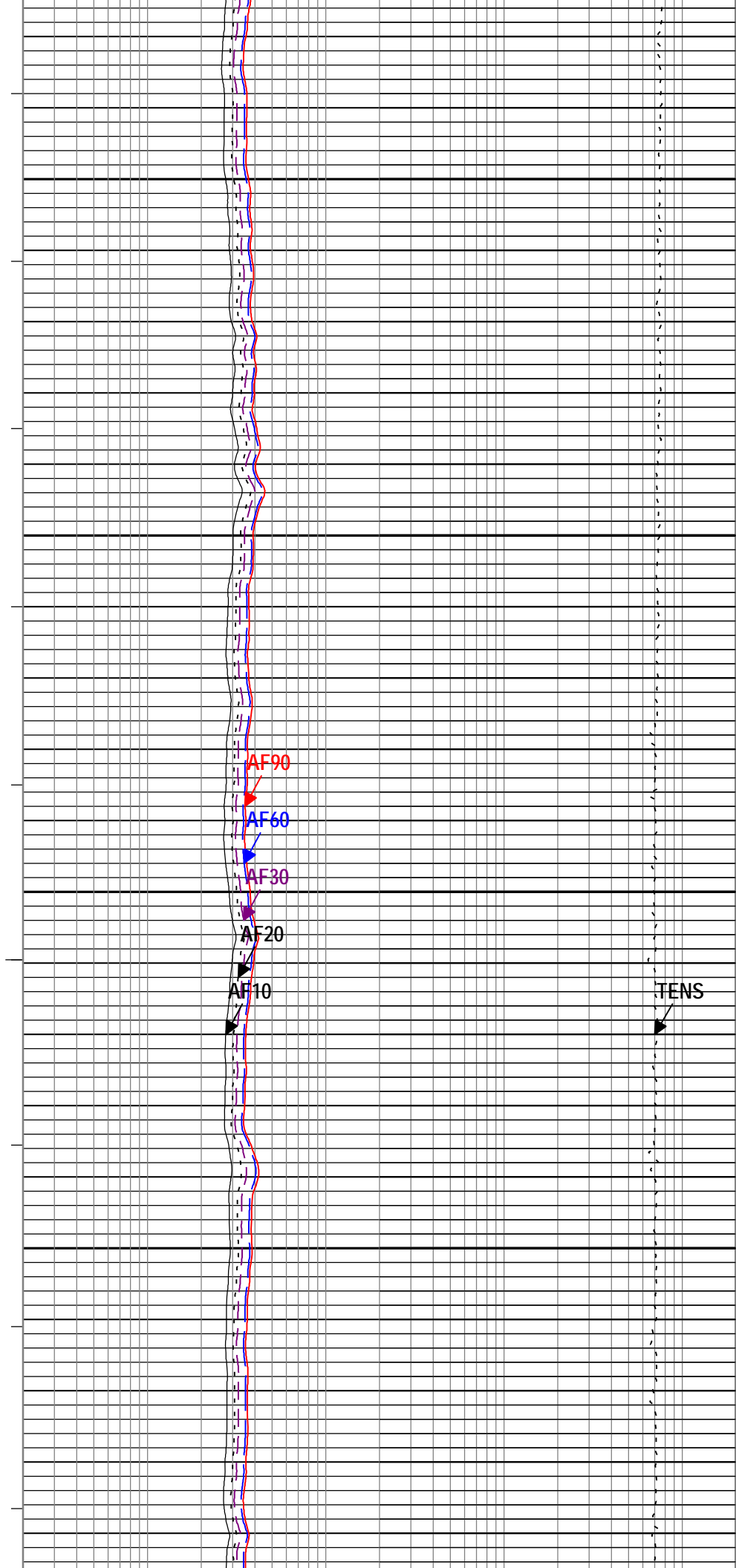
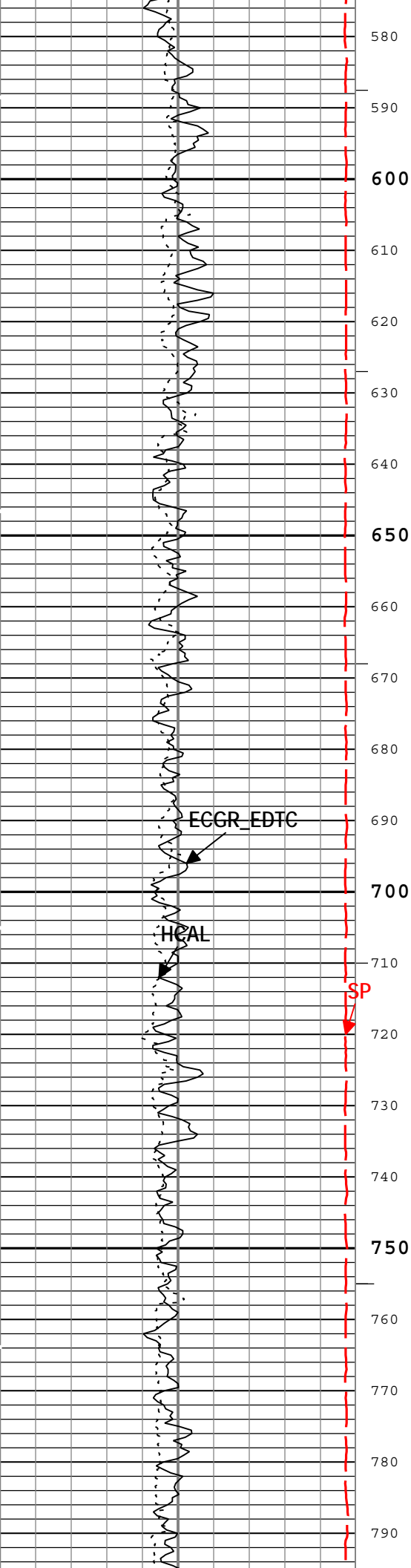
Tool Control Parameters	
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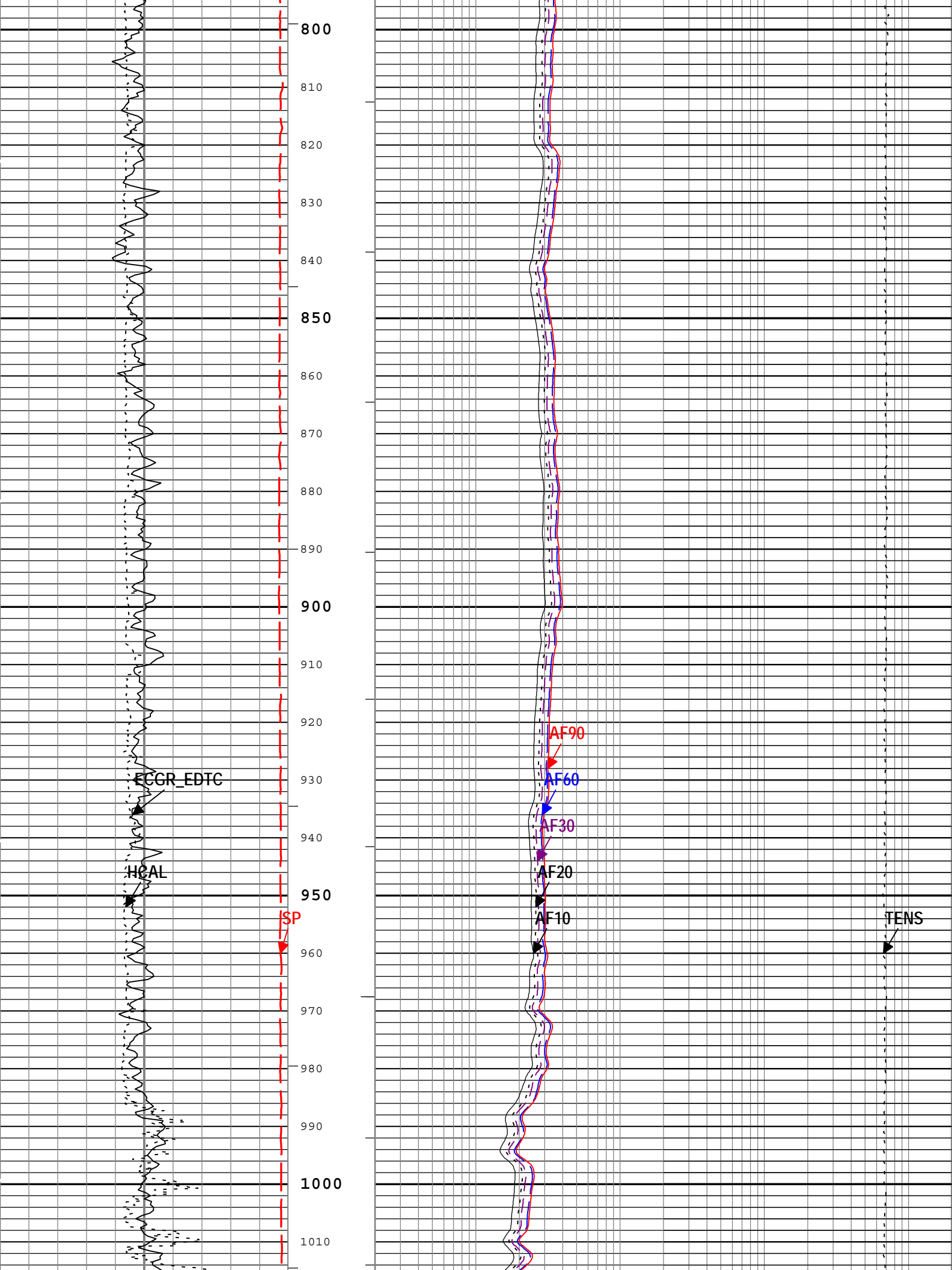
Run 1 : Parameters				
Parameter	Description	Tool	Value	Unit
HRGD_BOARD_TYPE	HRGD Board Type	HDRS-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	600	ft/h

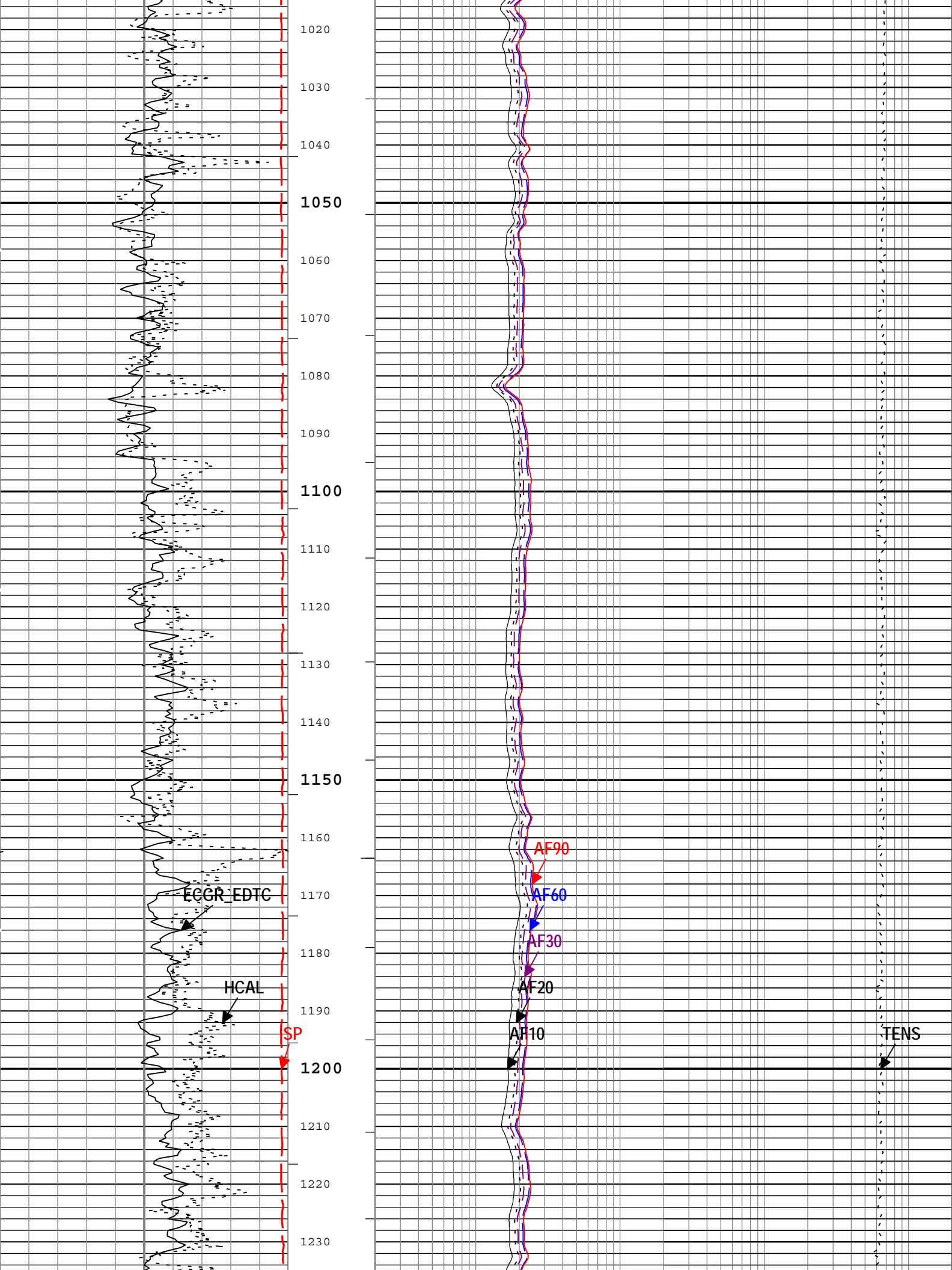
Run 1				
5" Induction				

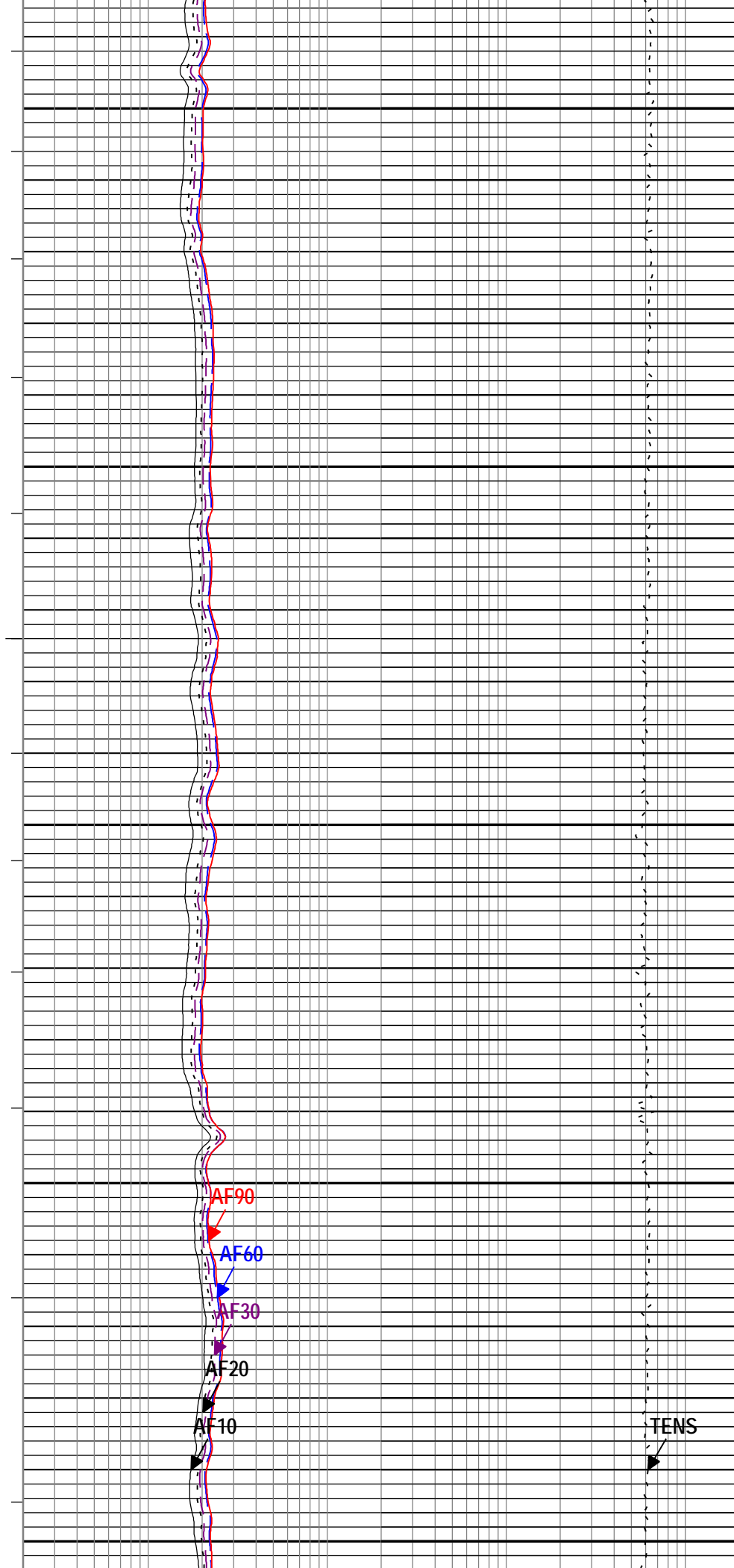
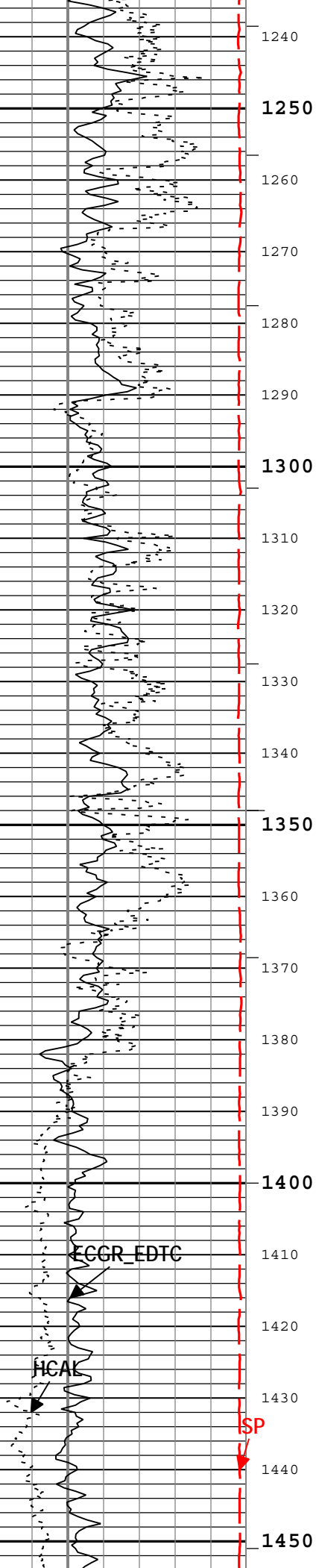


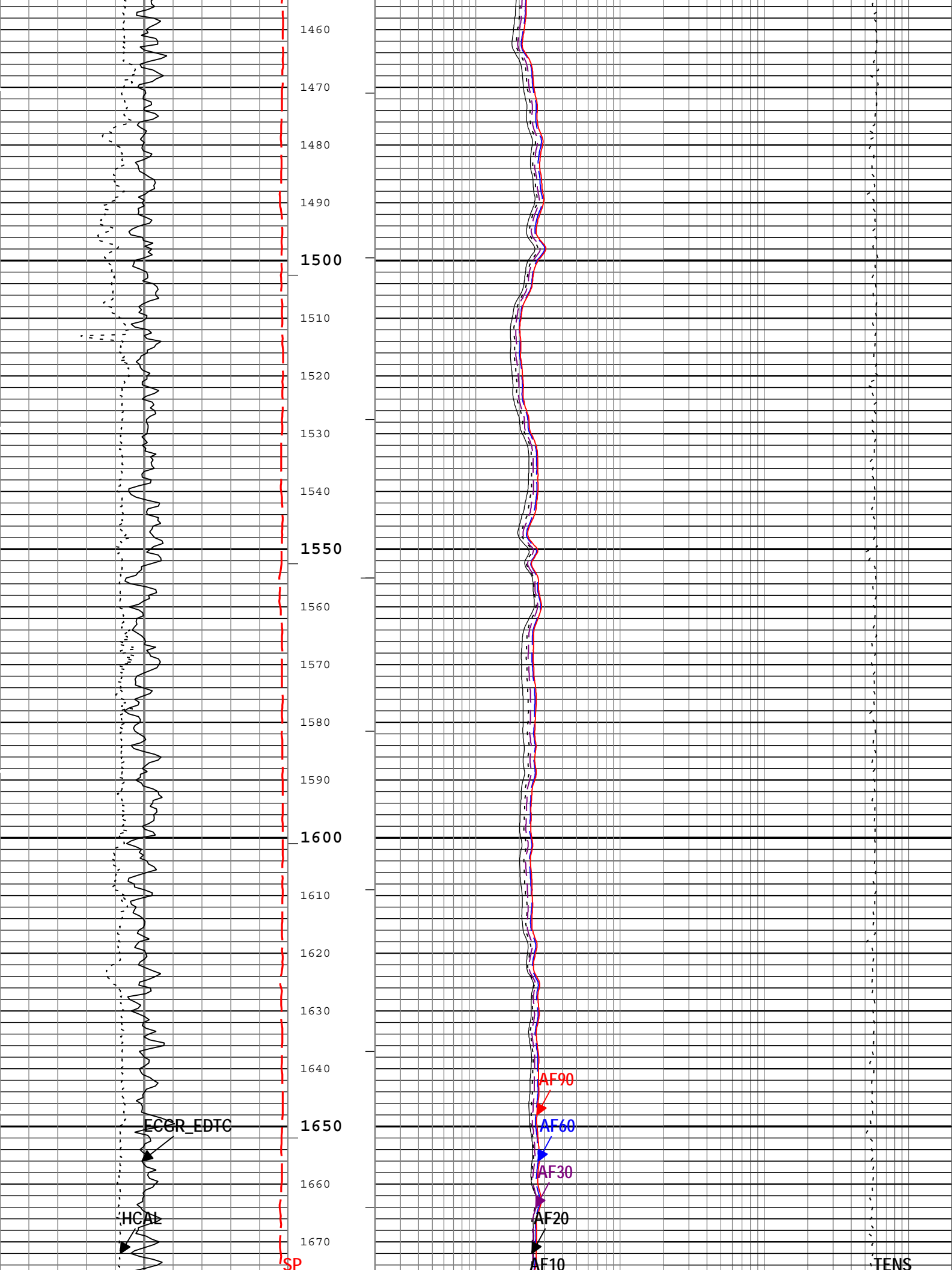


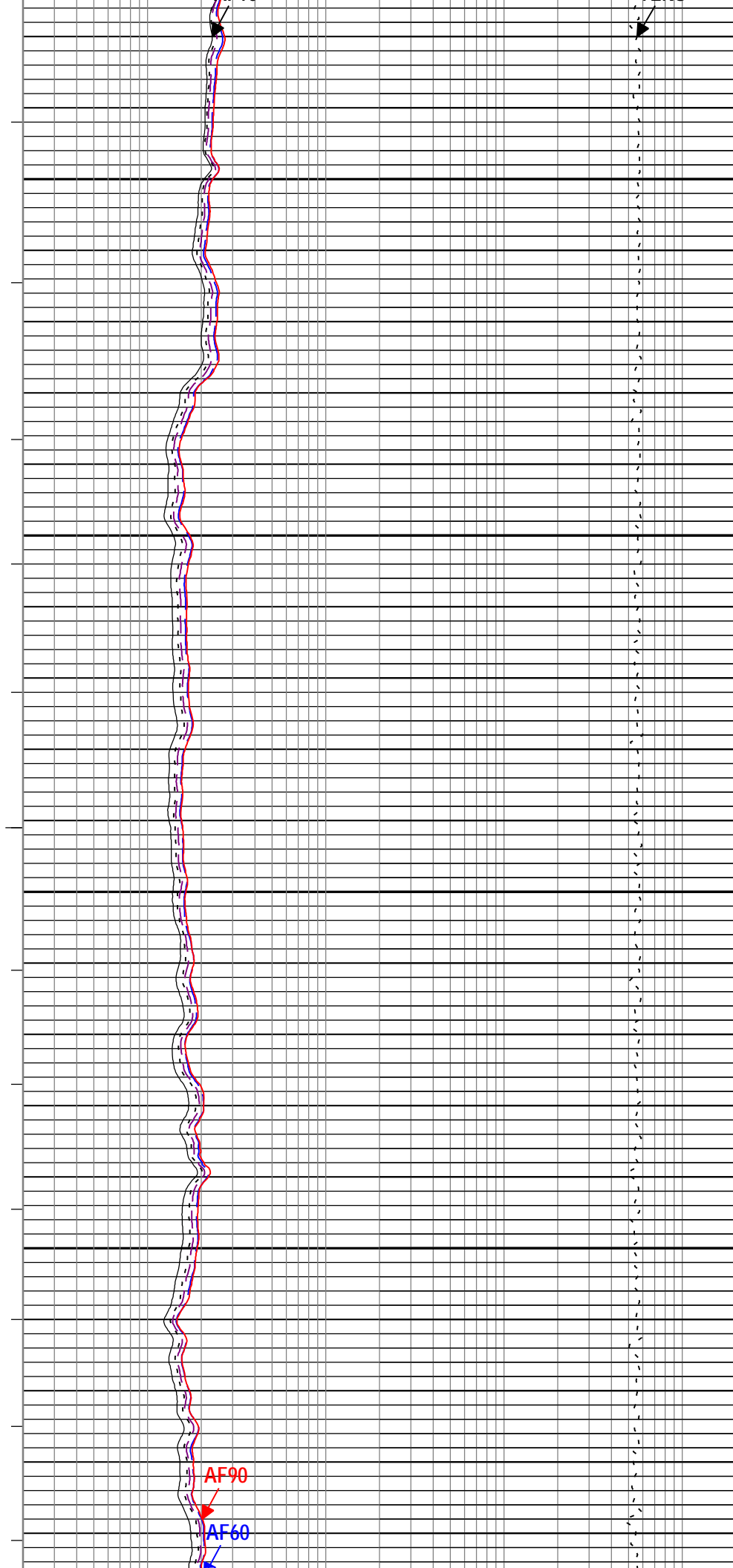
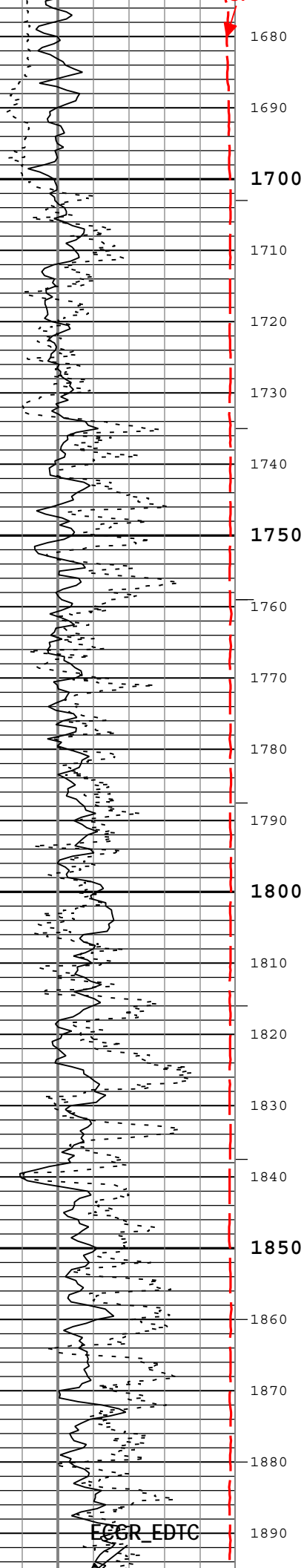


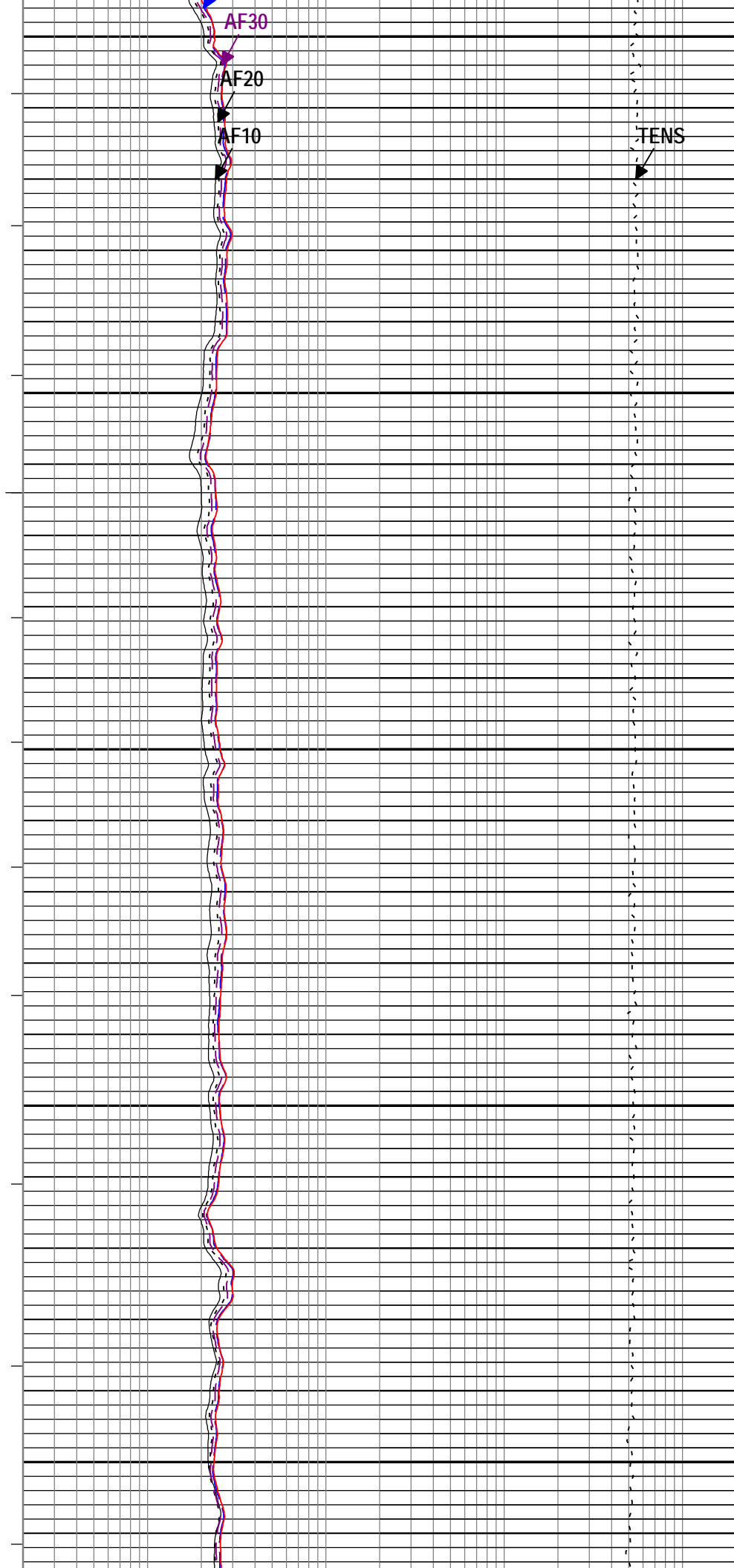
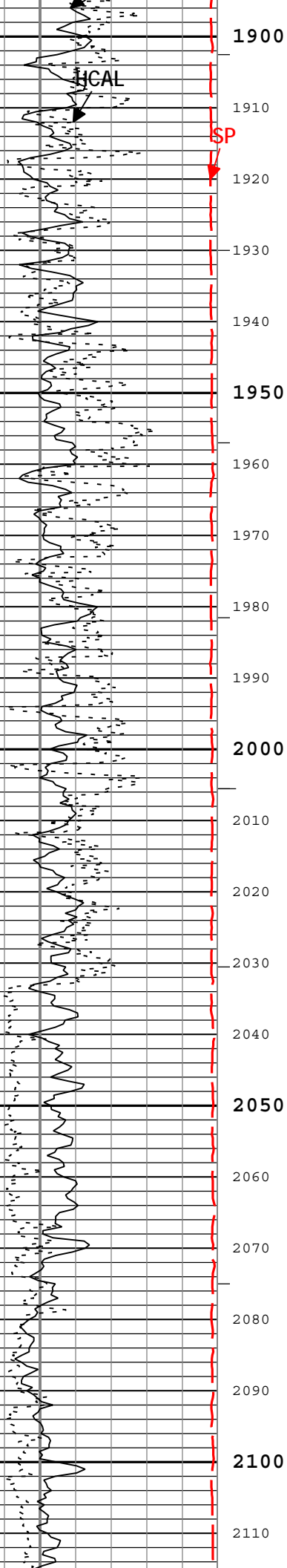


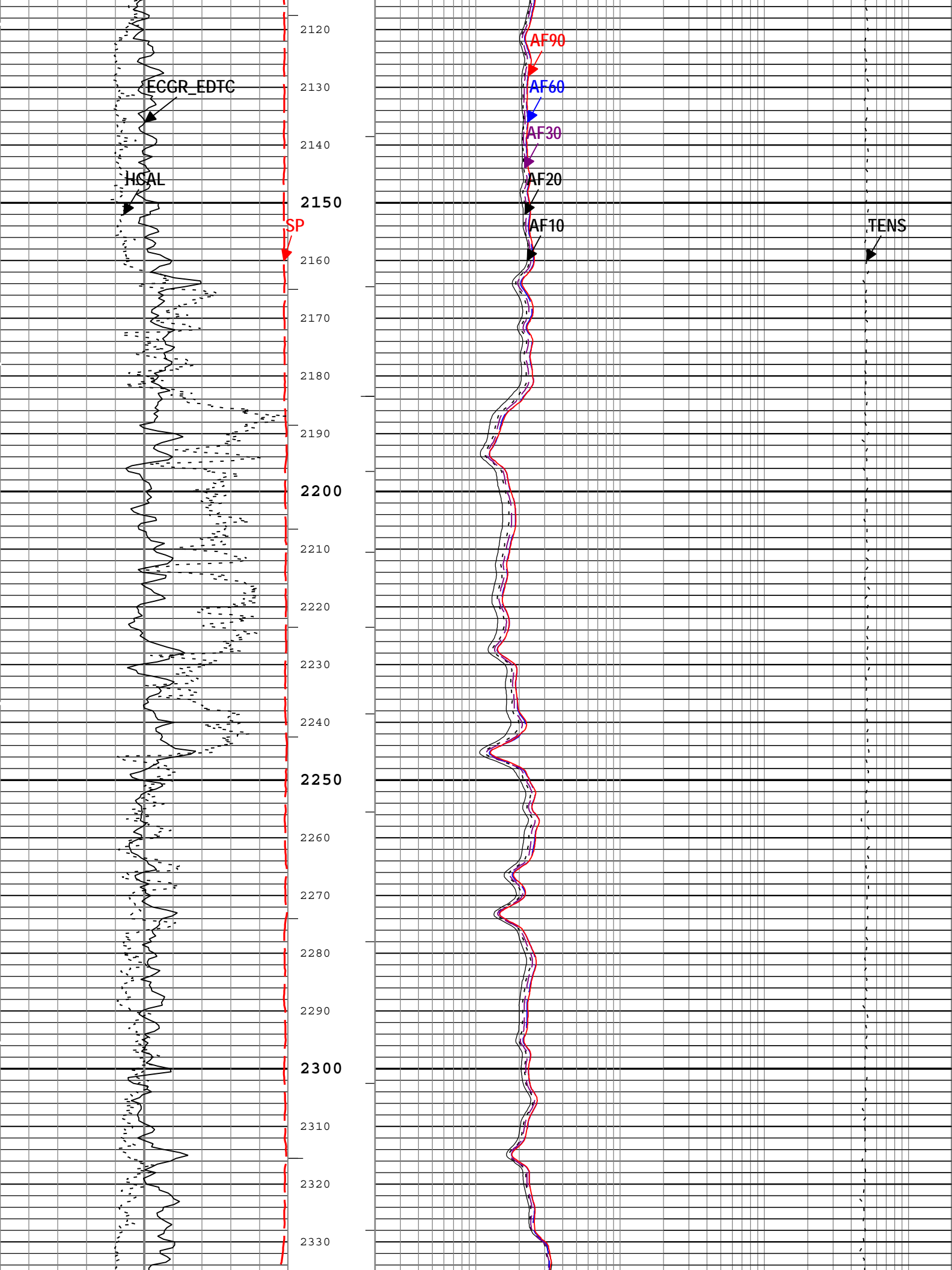


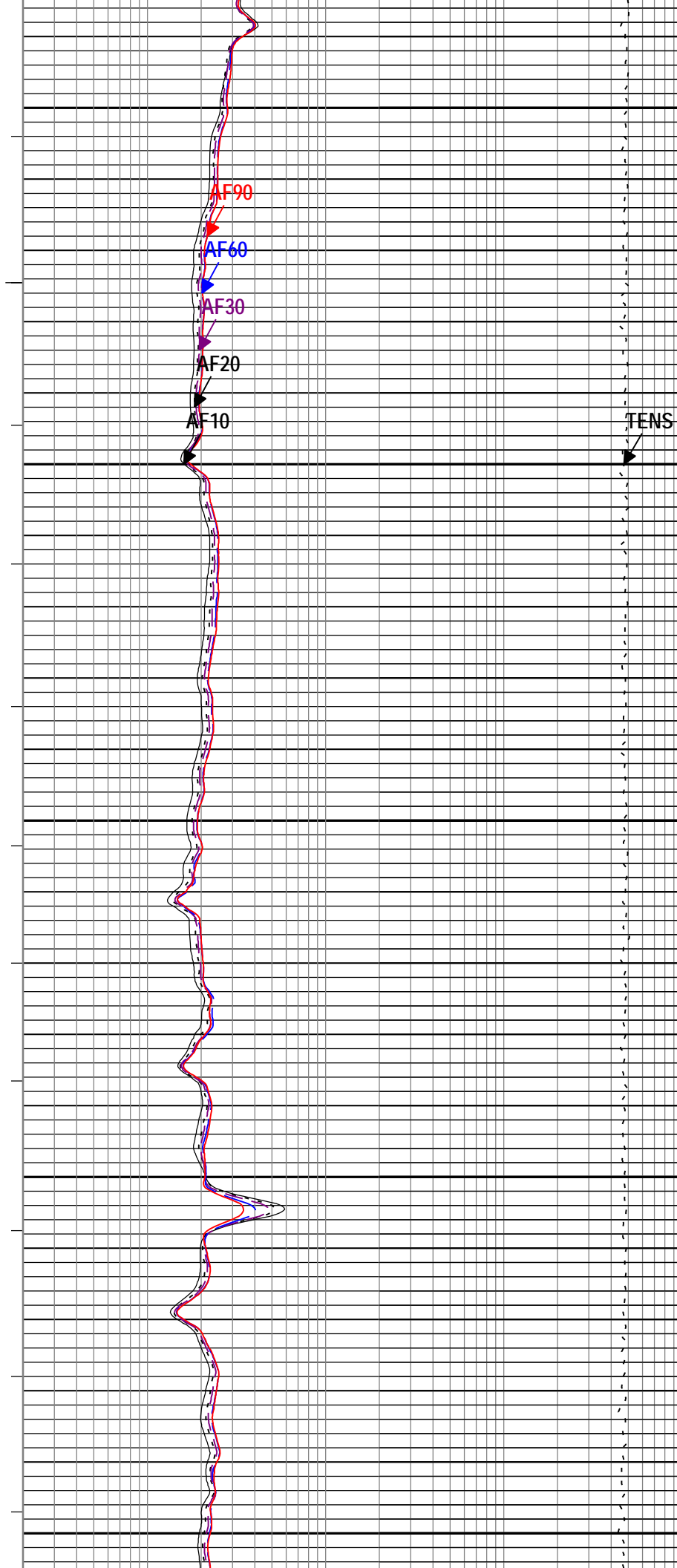
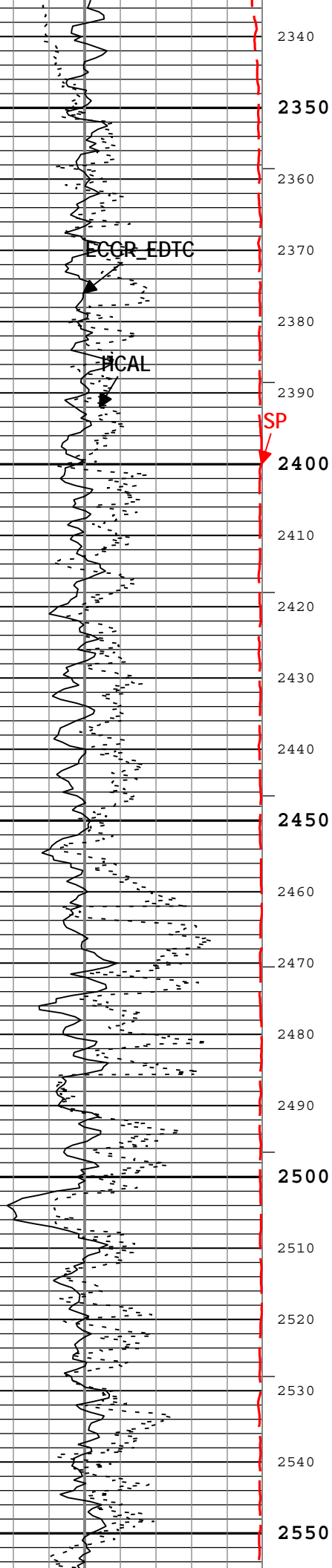


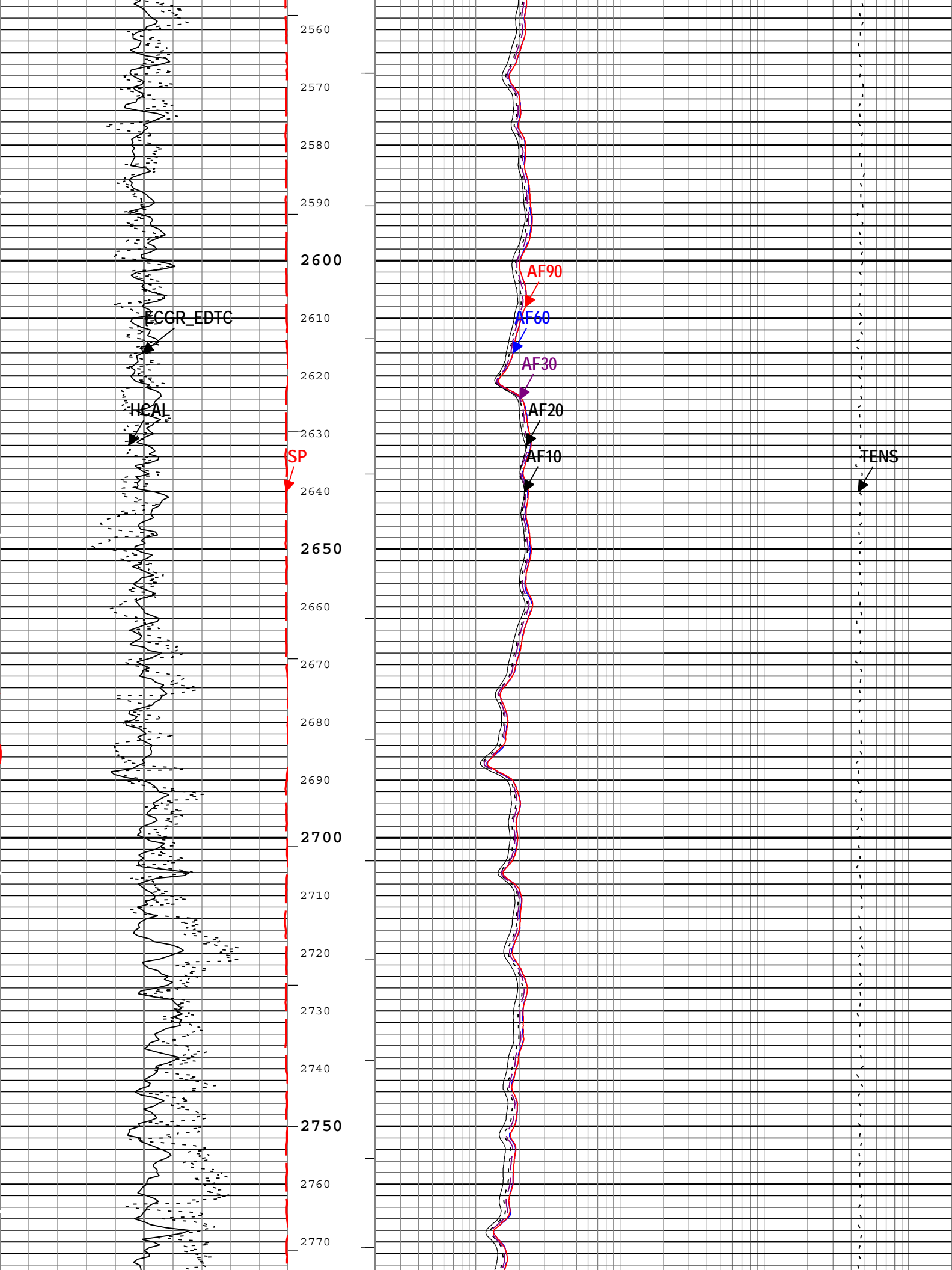


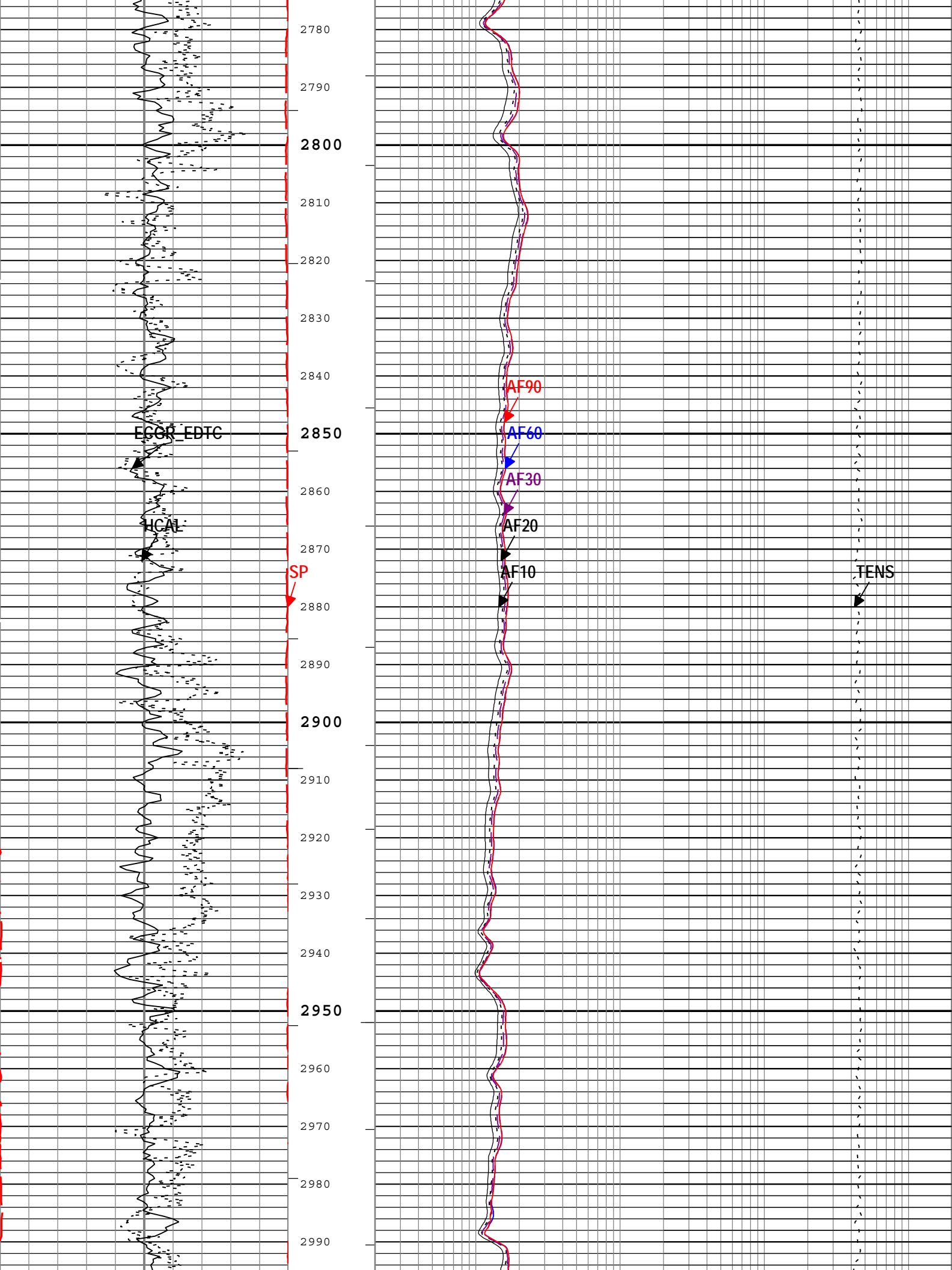


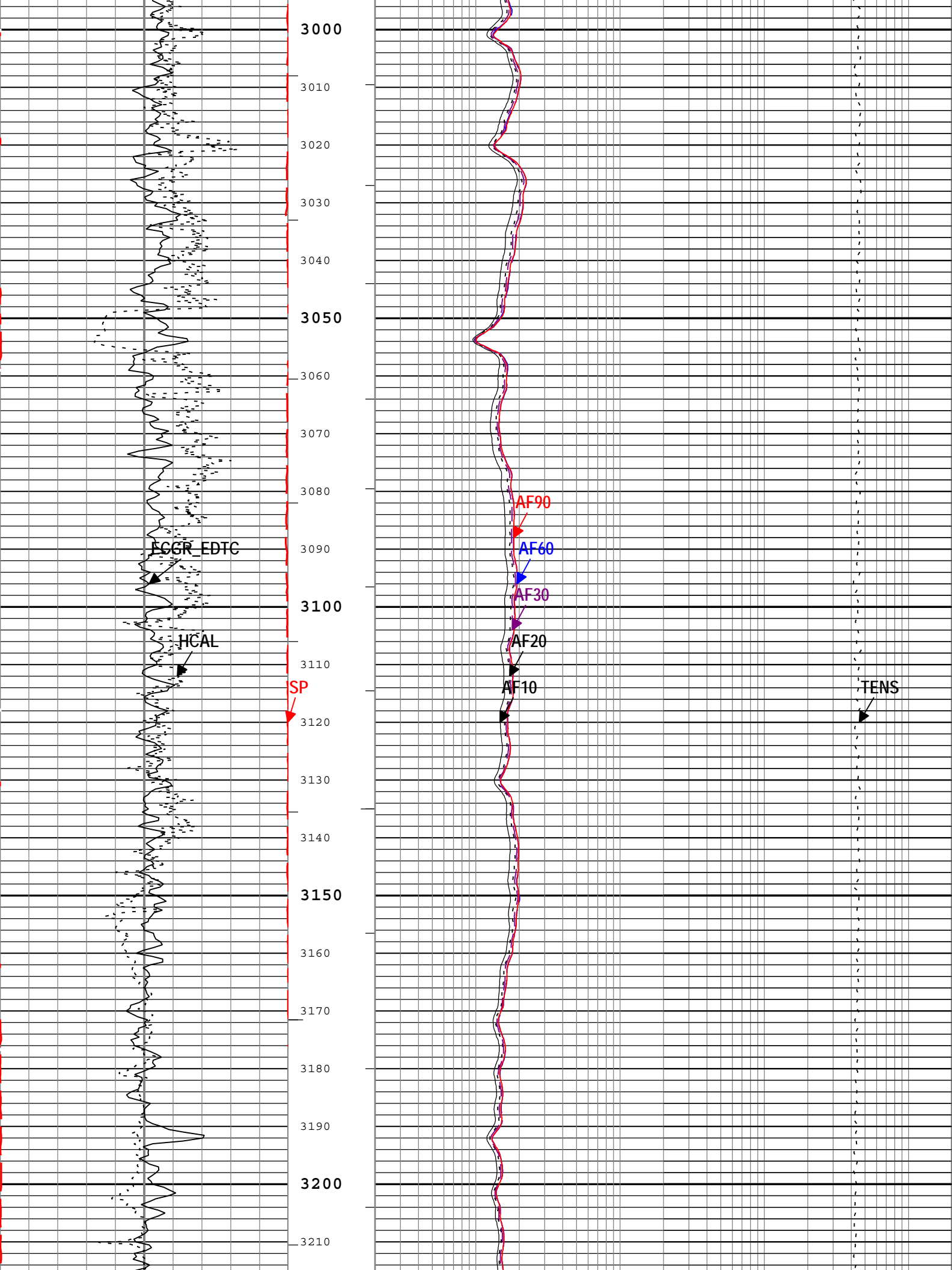


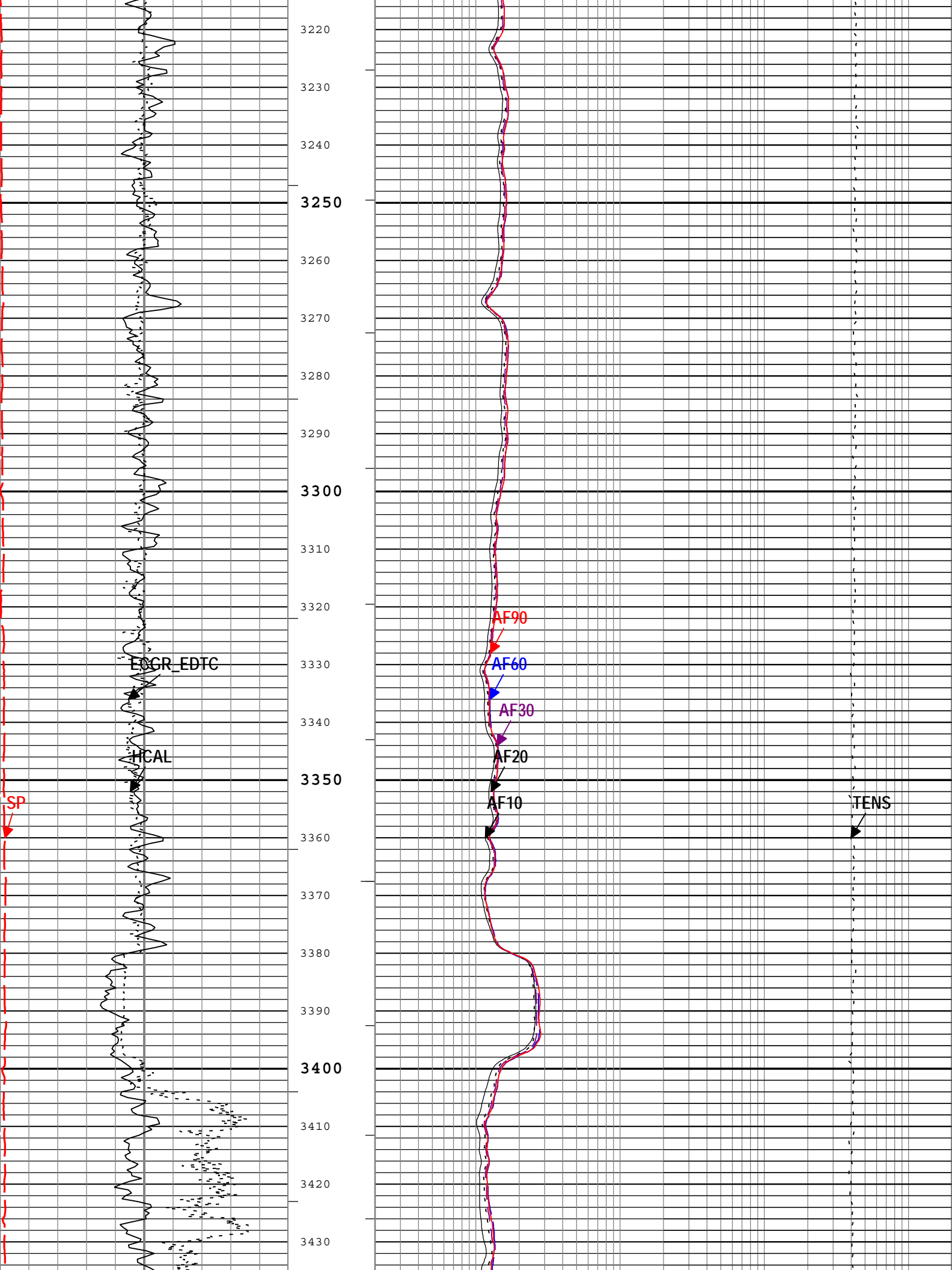


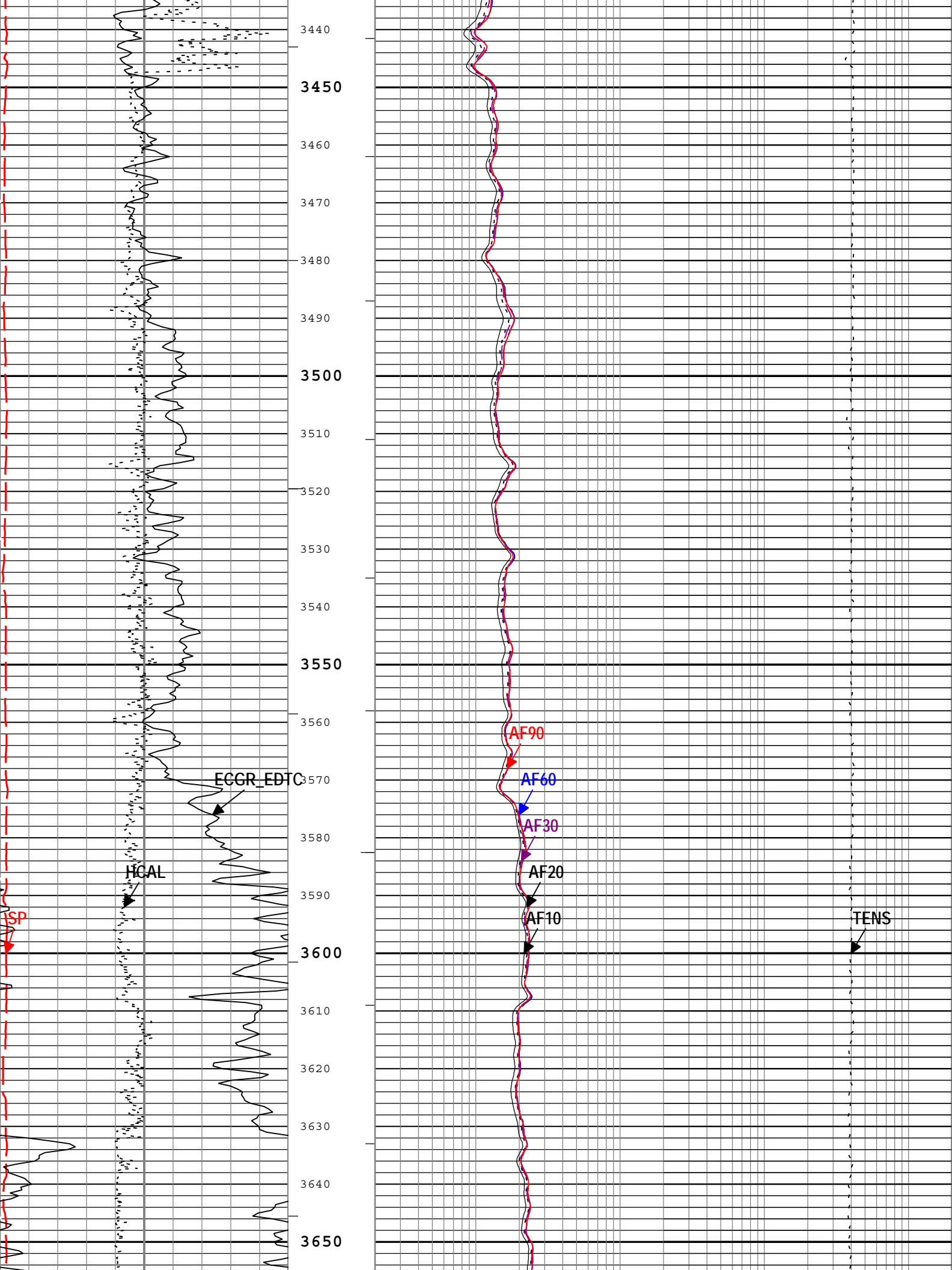


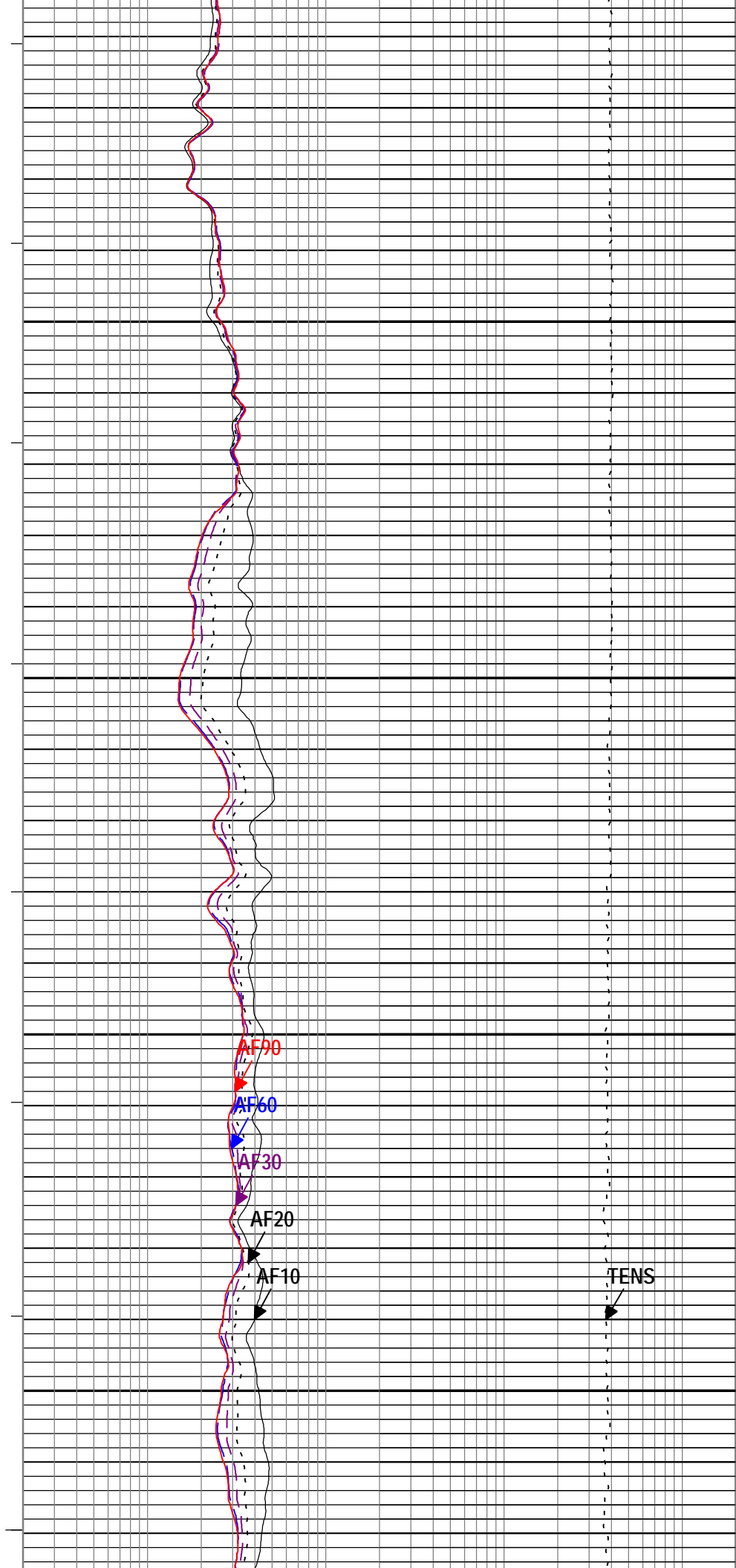
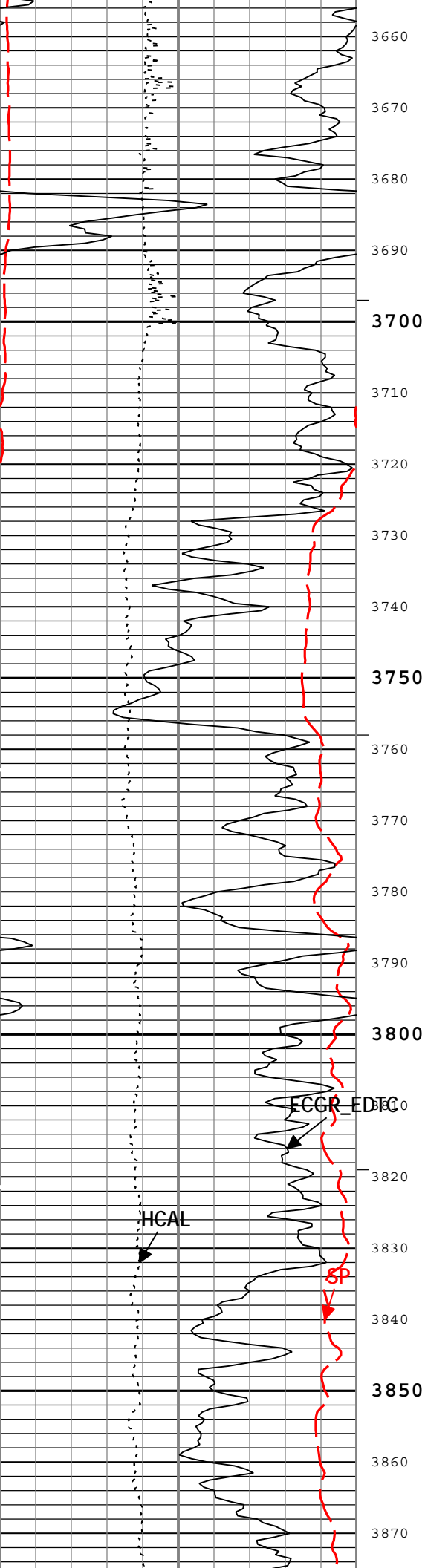


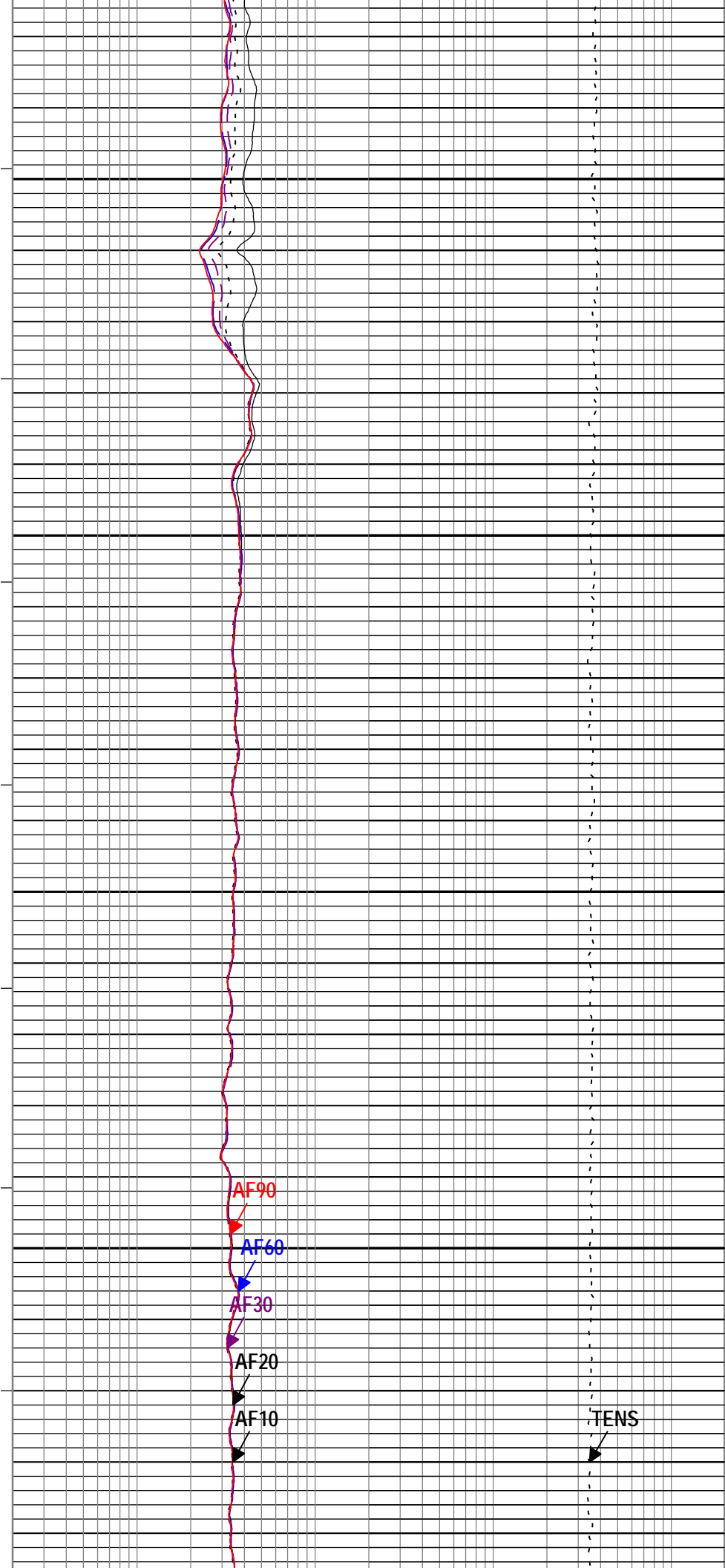
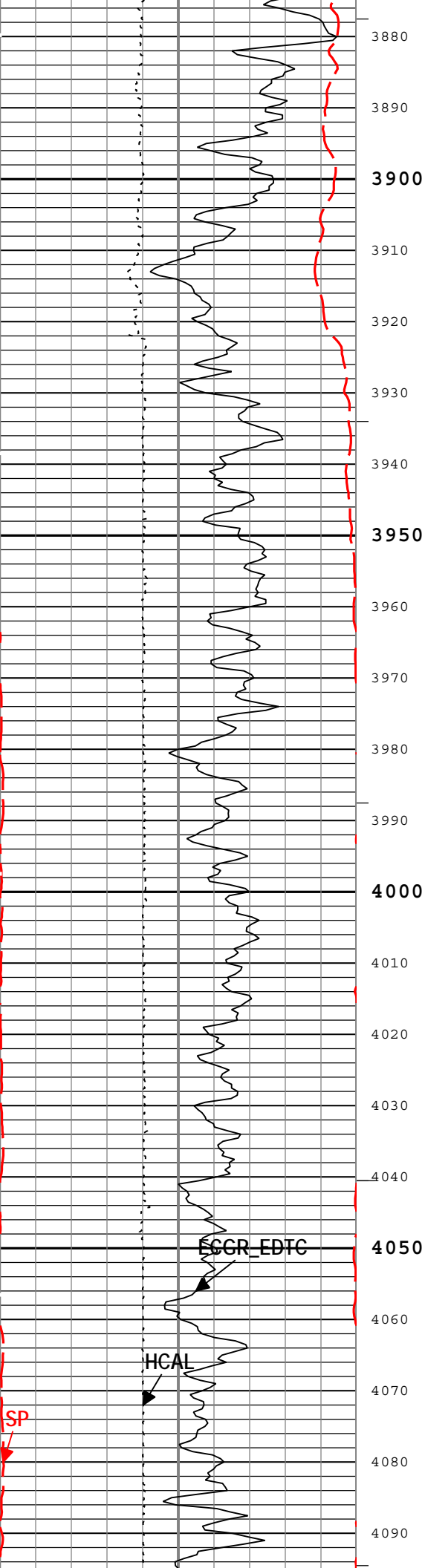


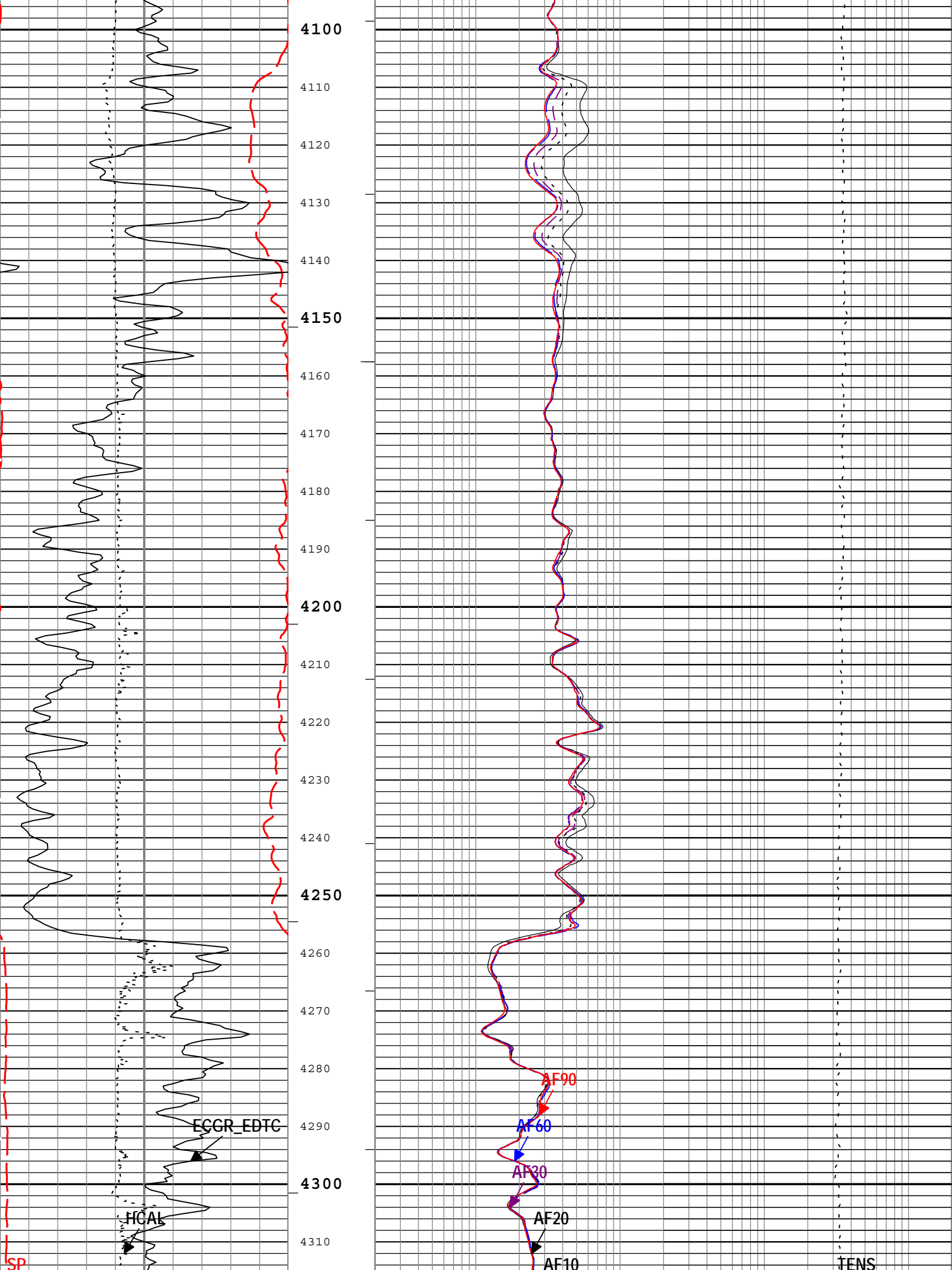


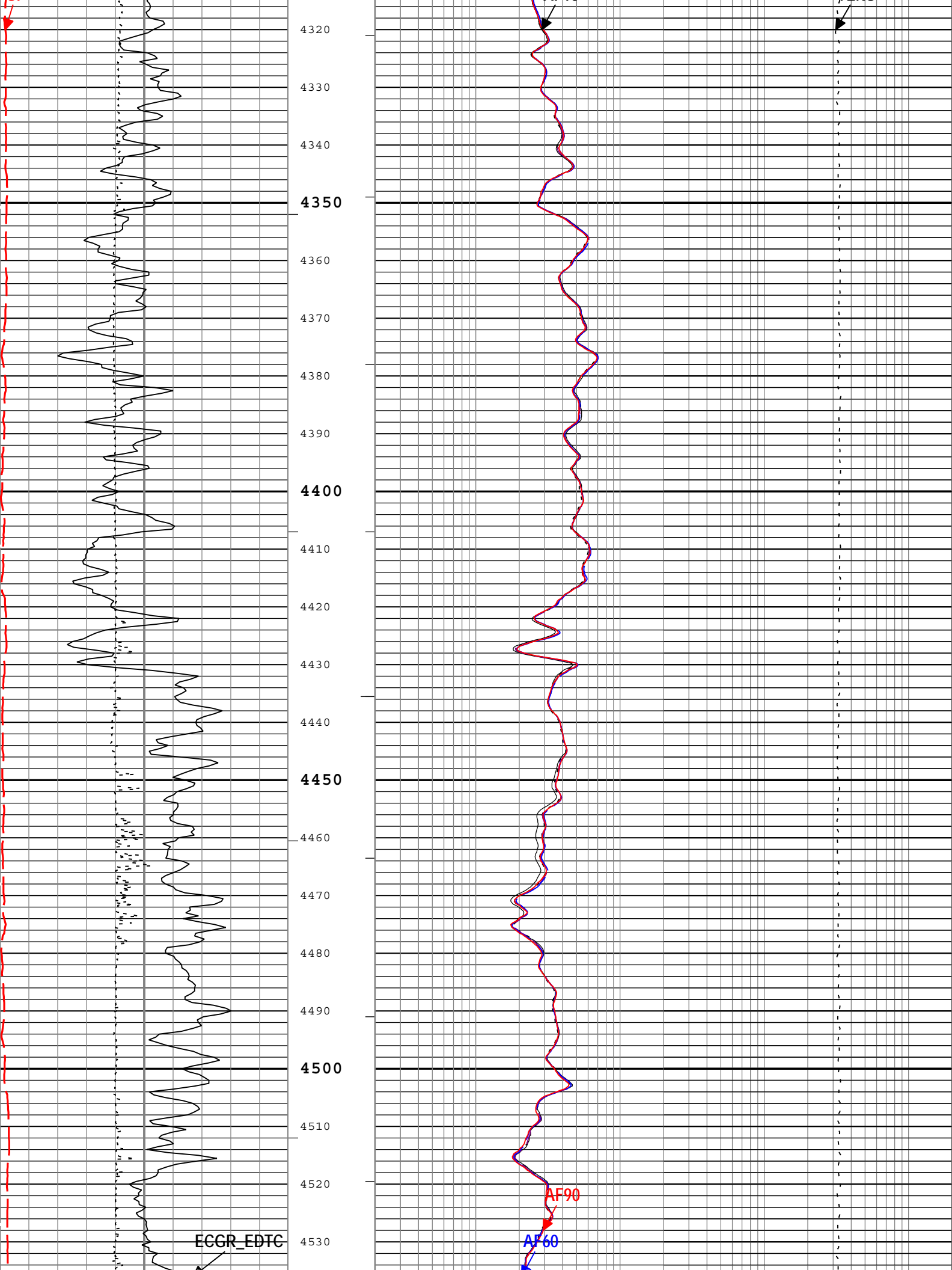


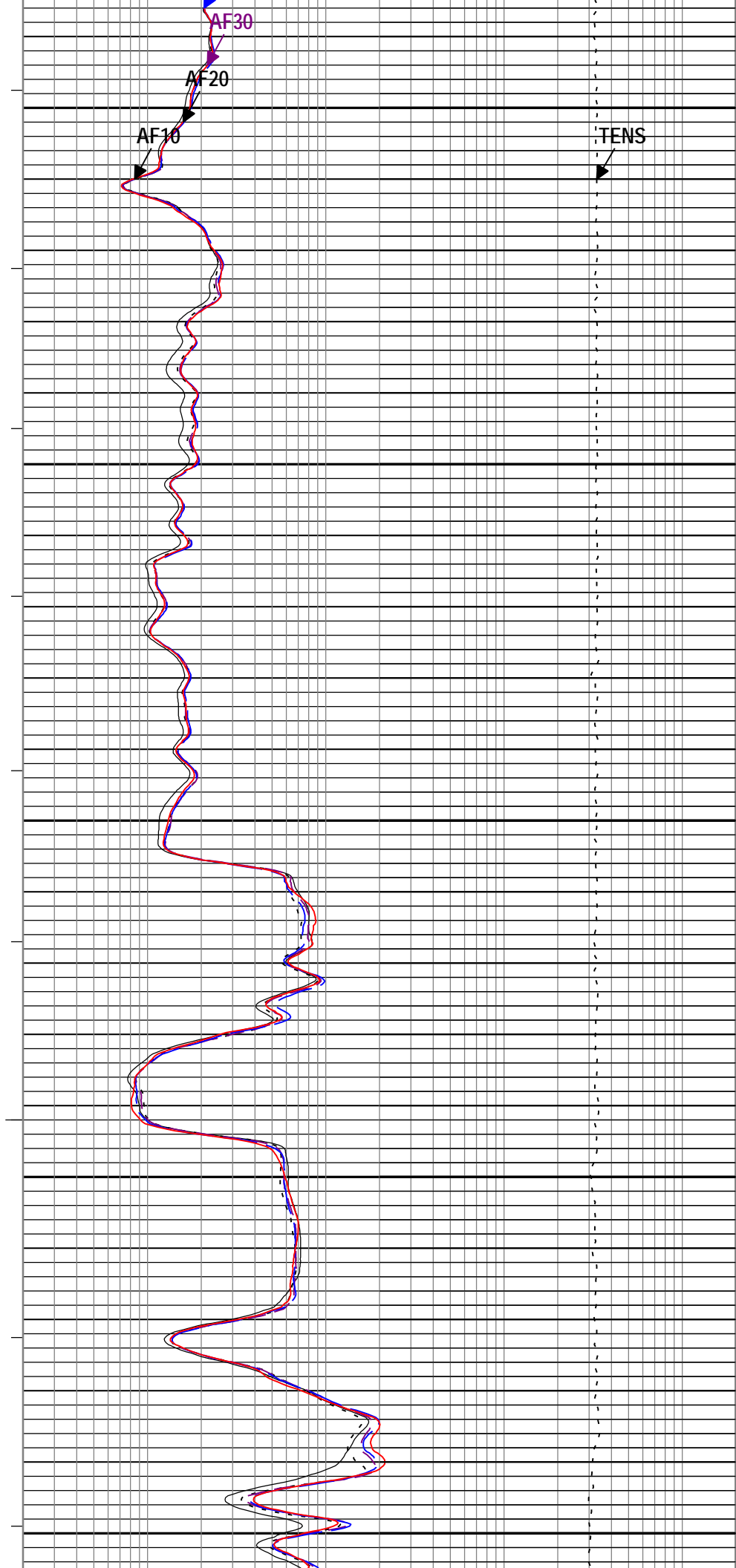
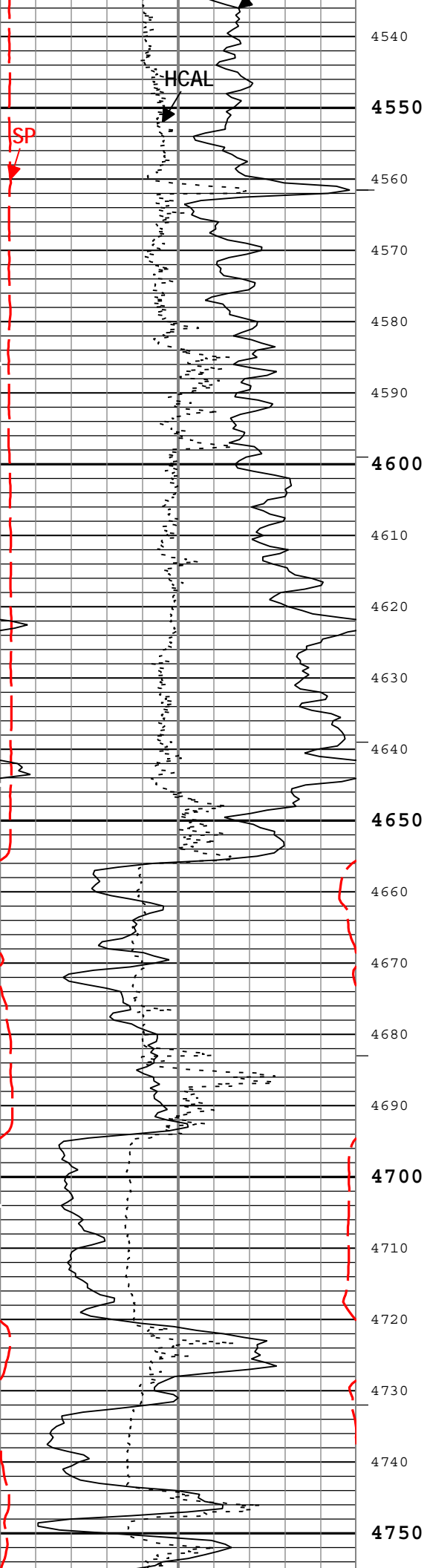


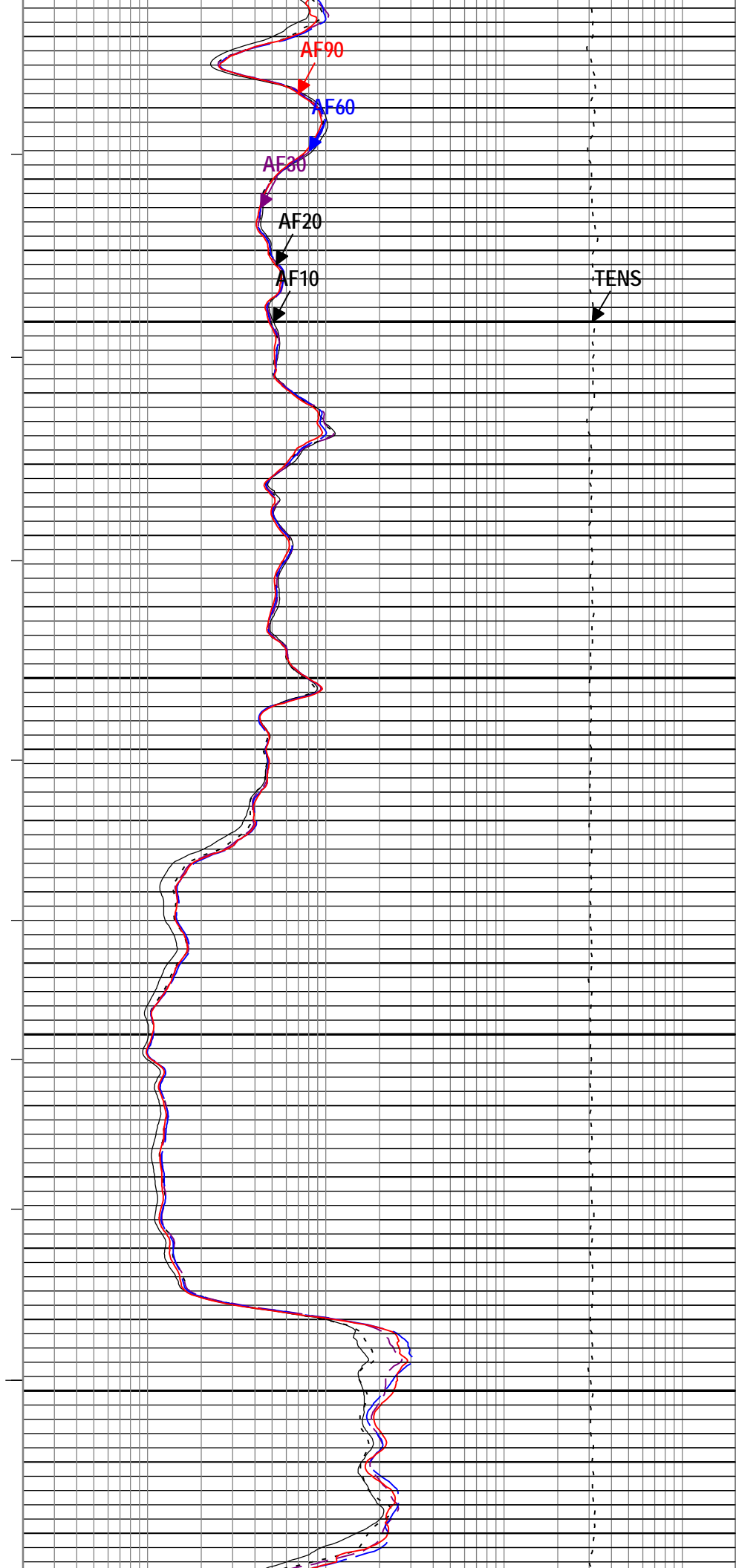
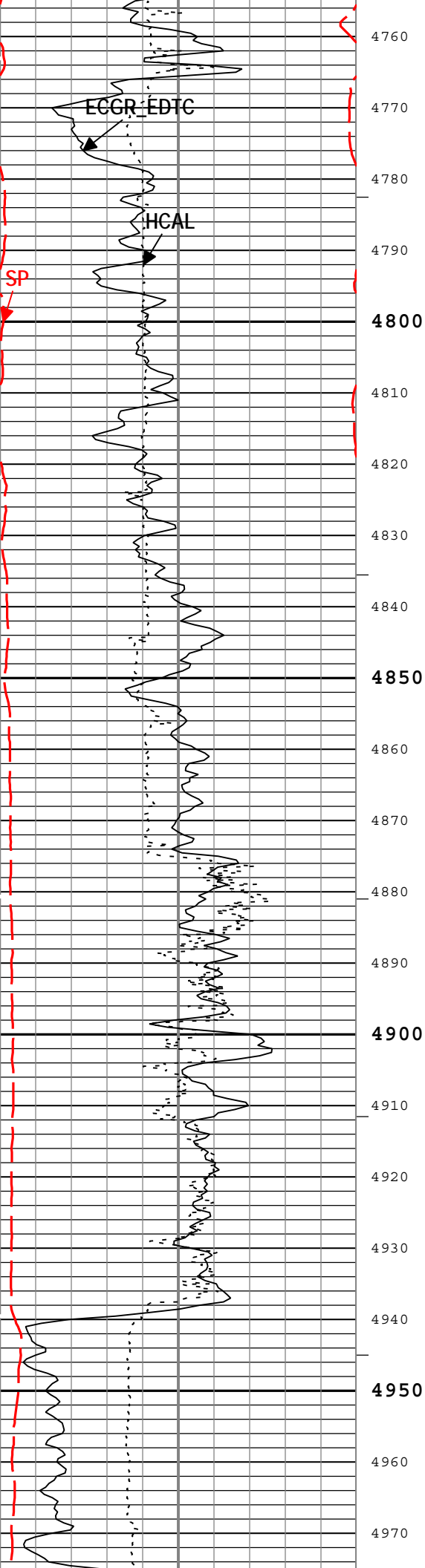


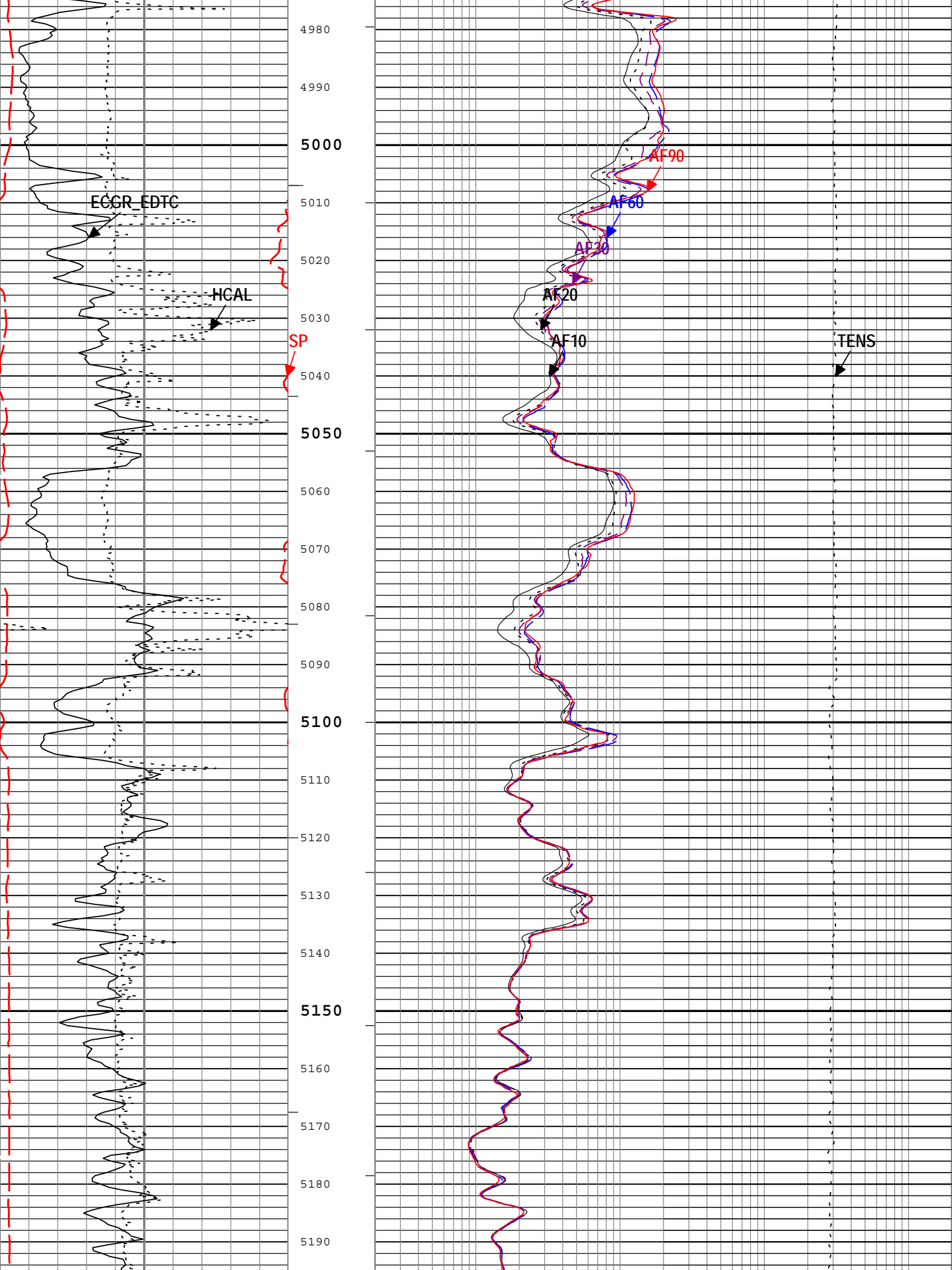


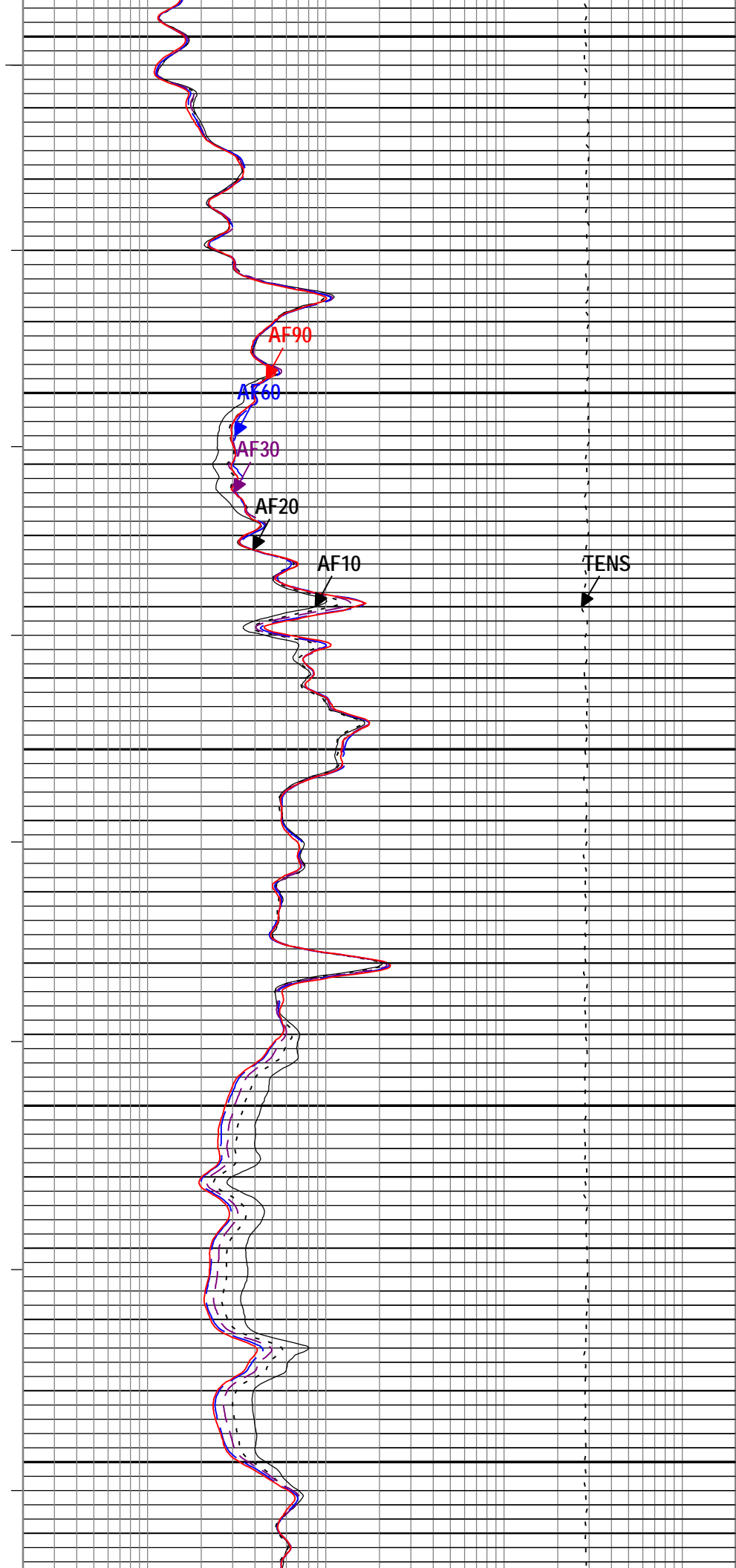
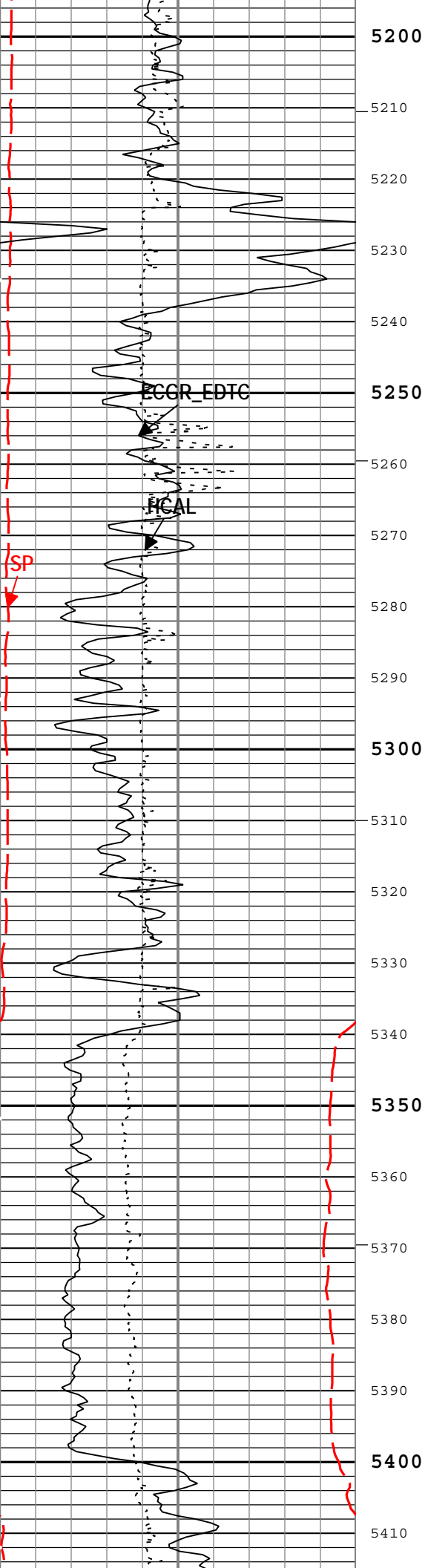


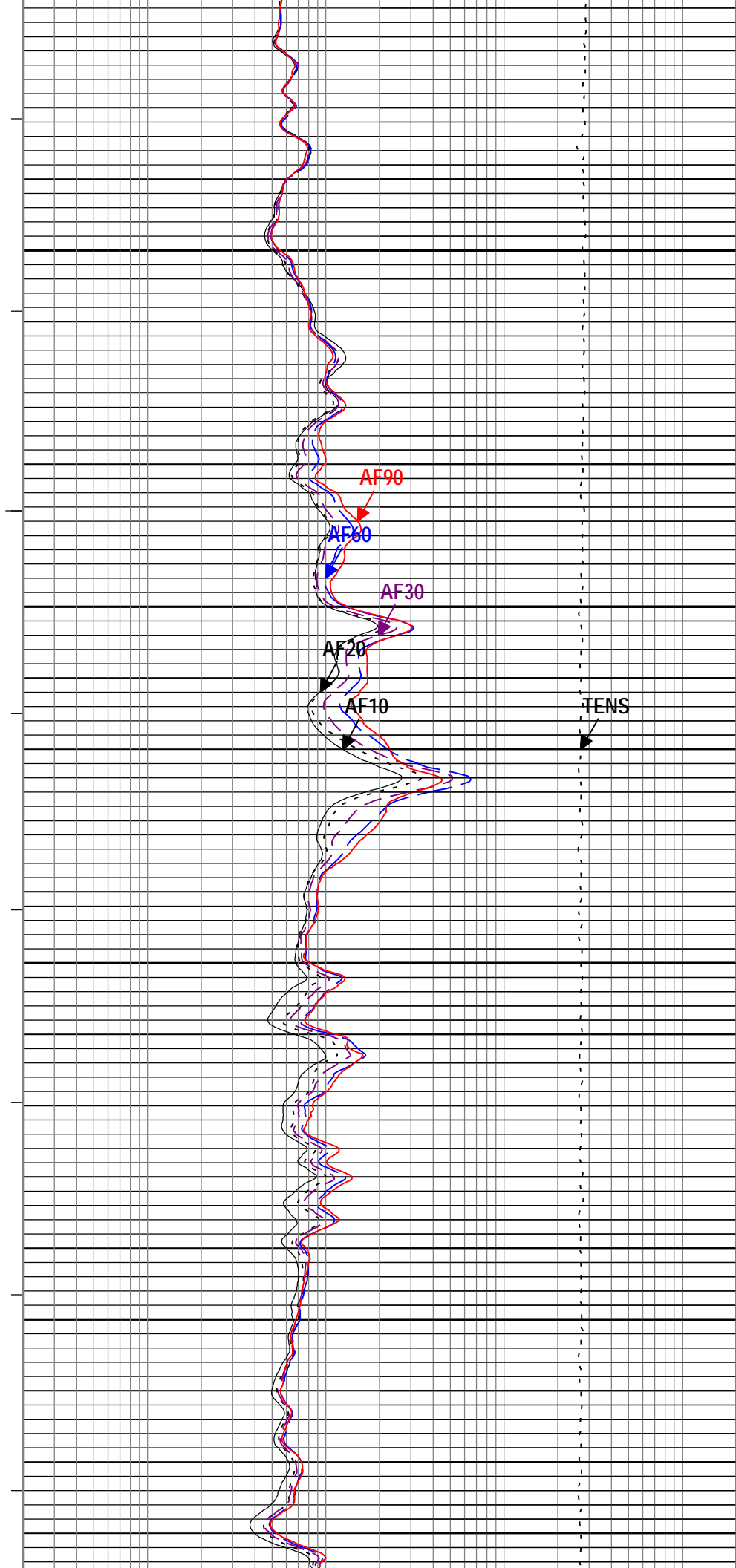
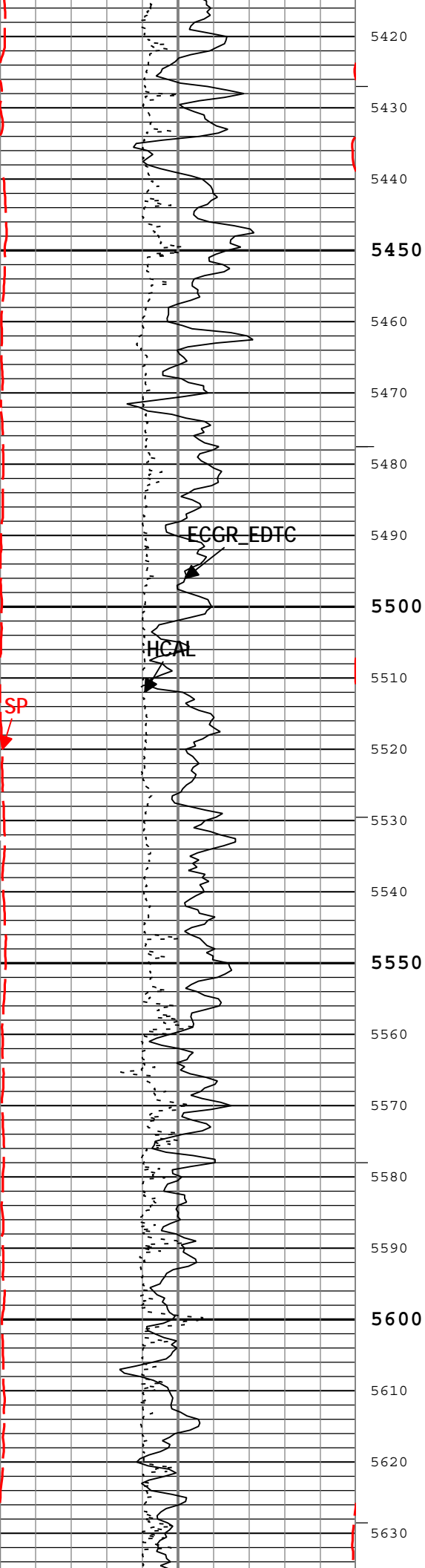


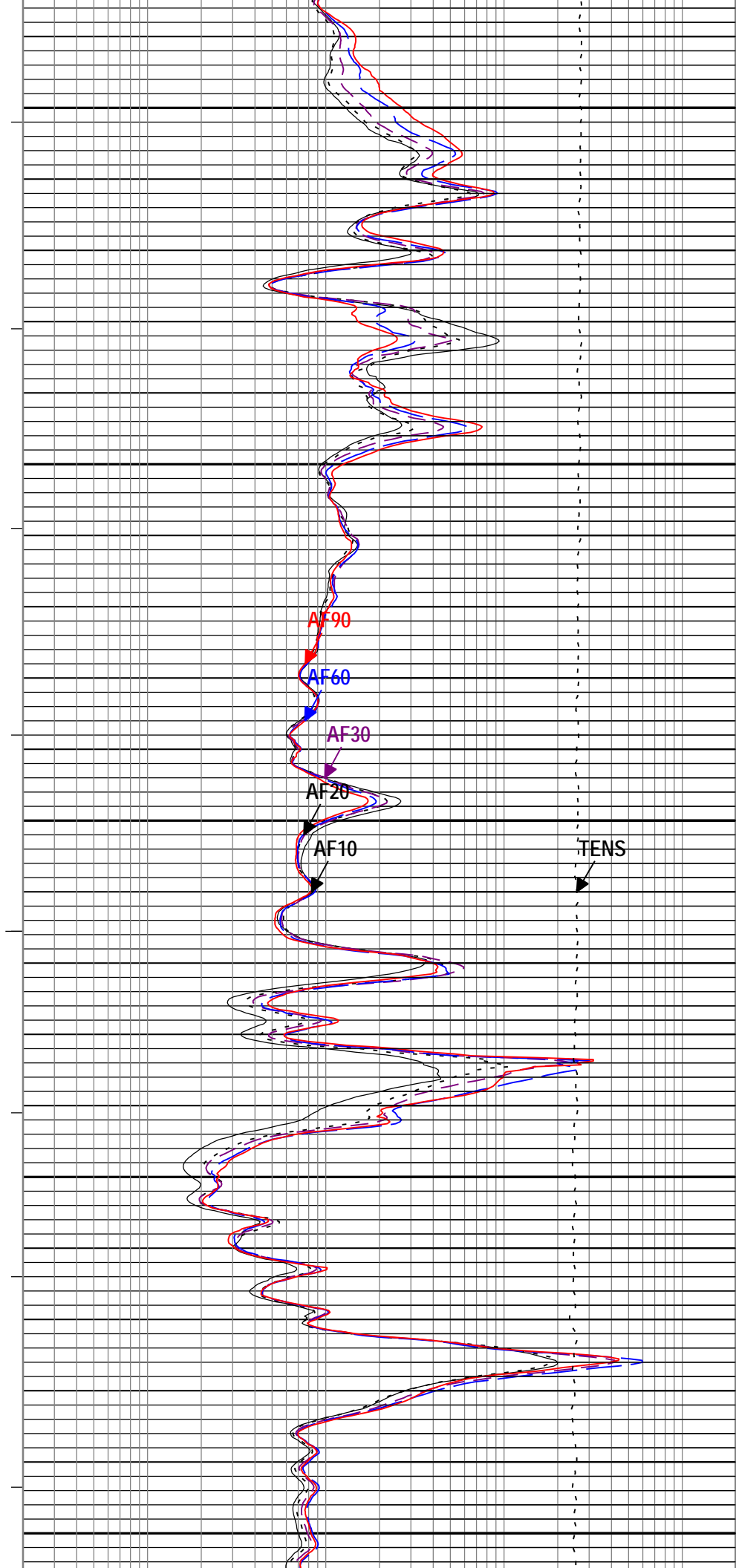
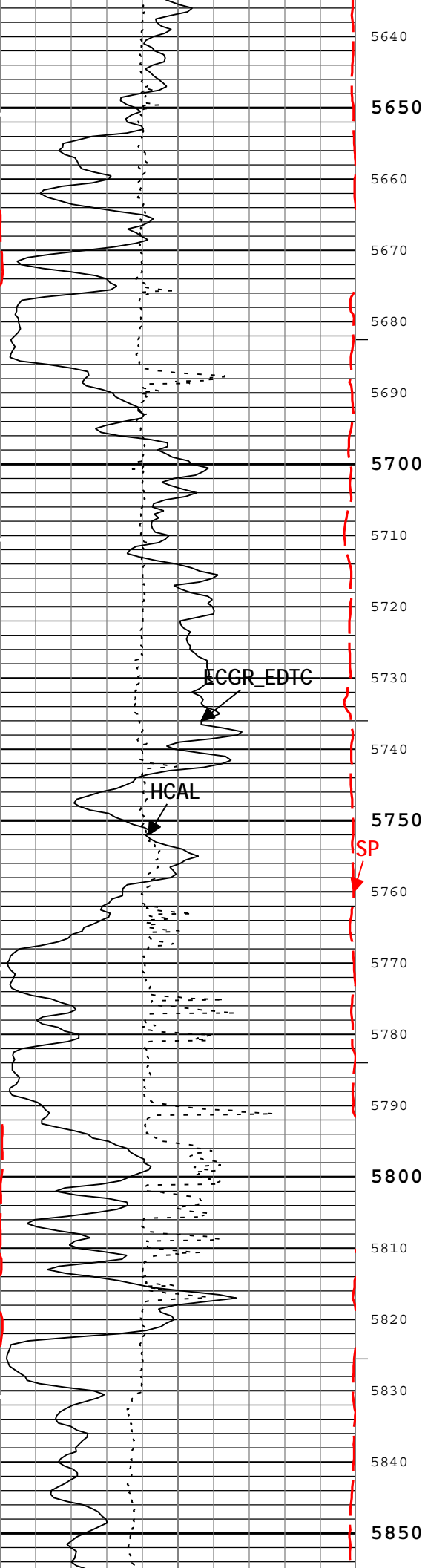


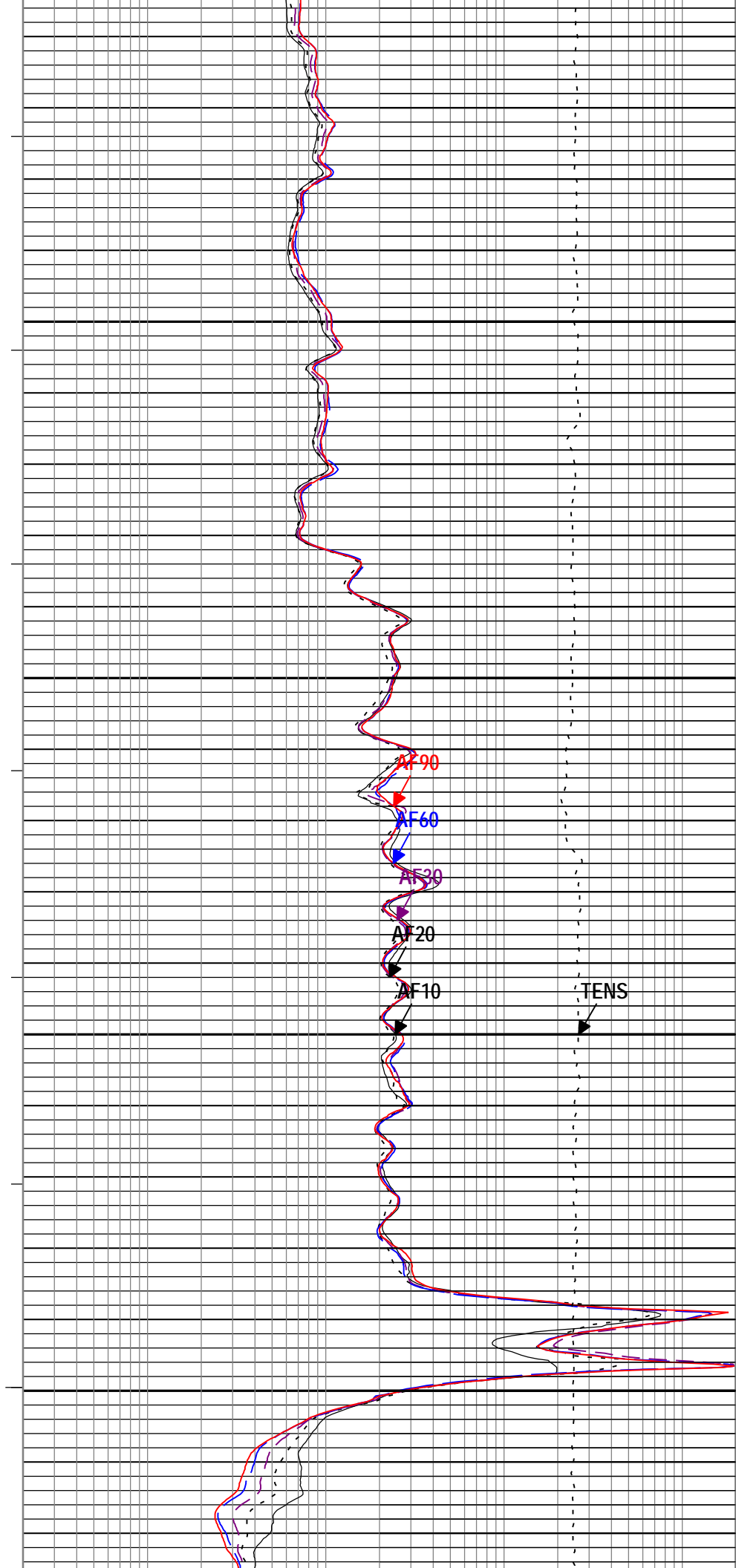
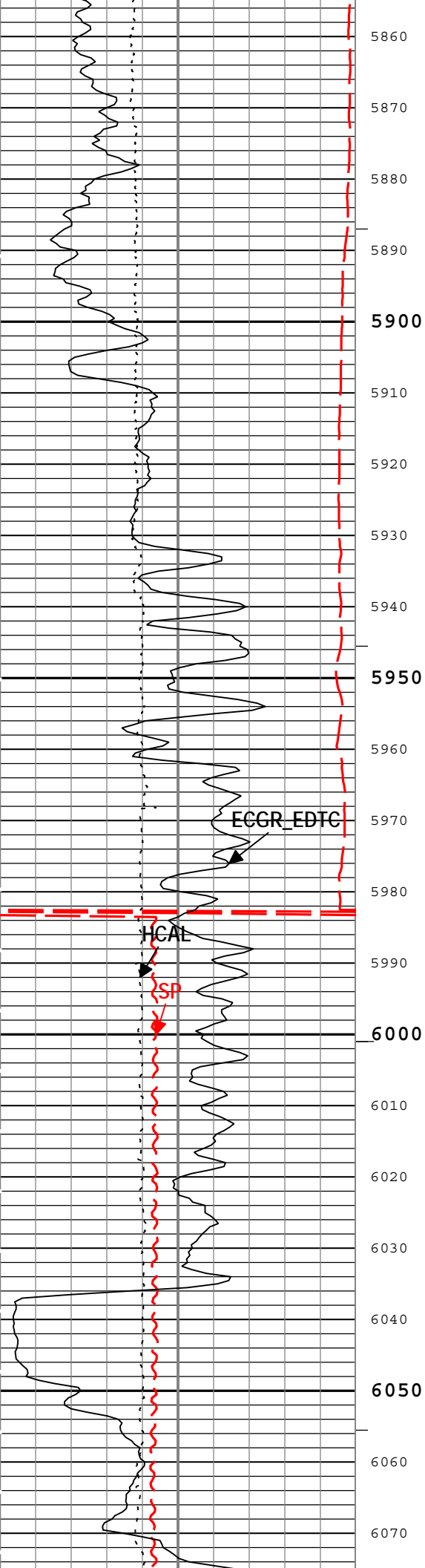


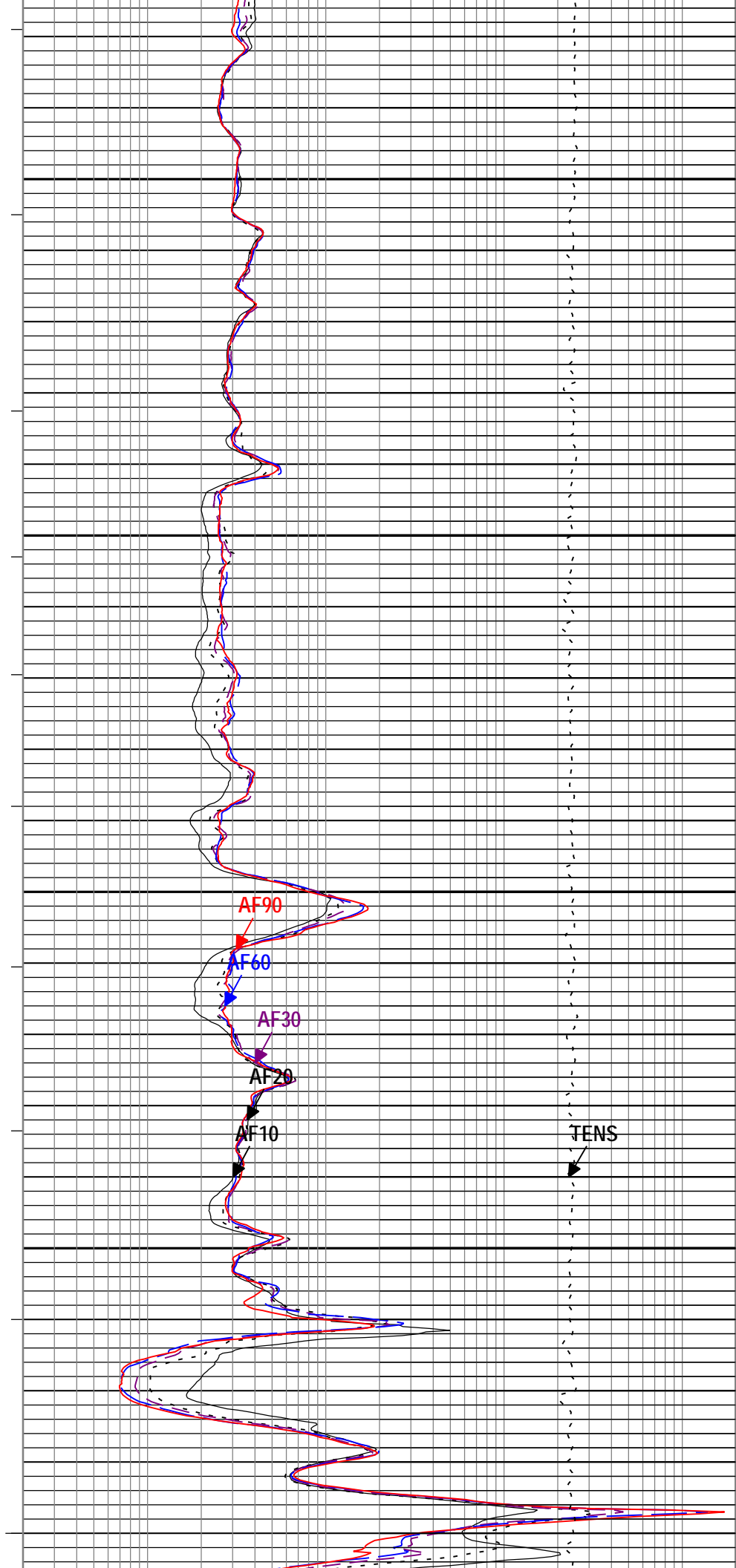
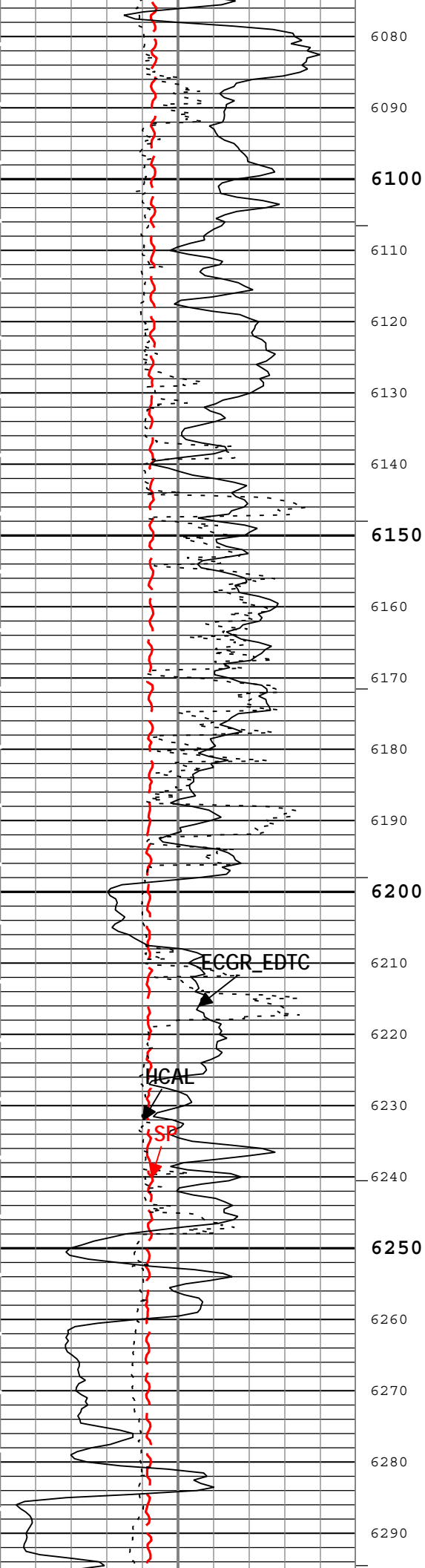


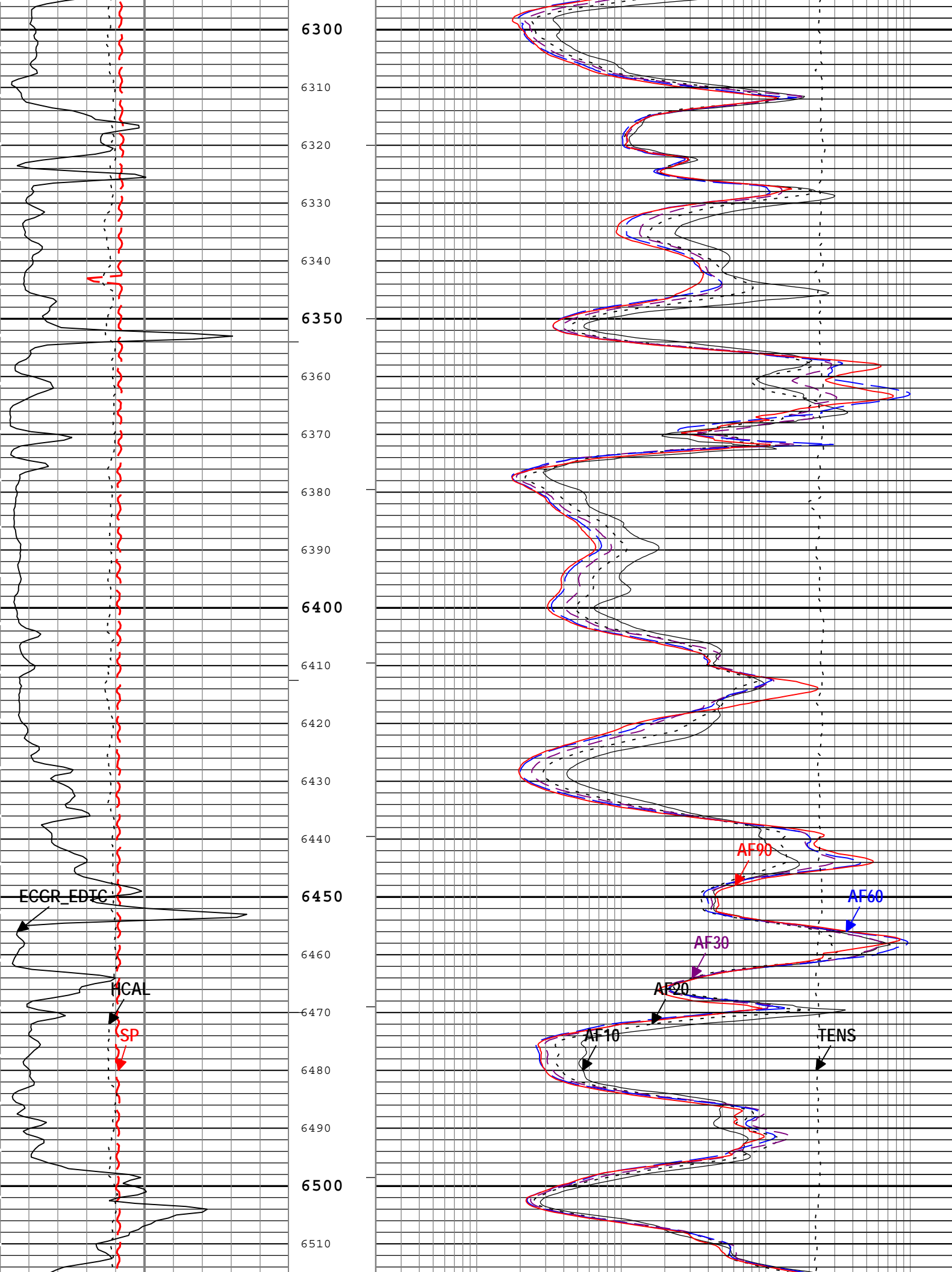


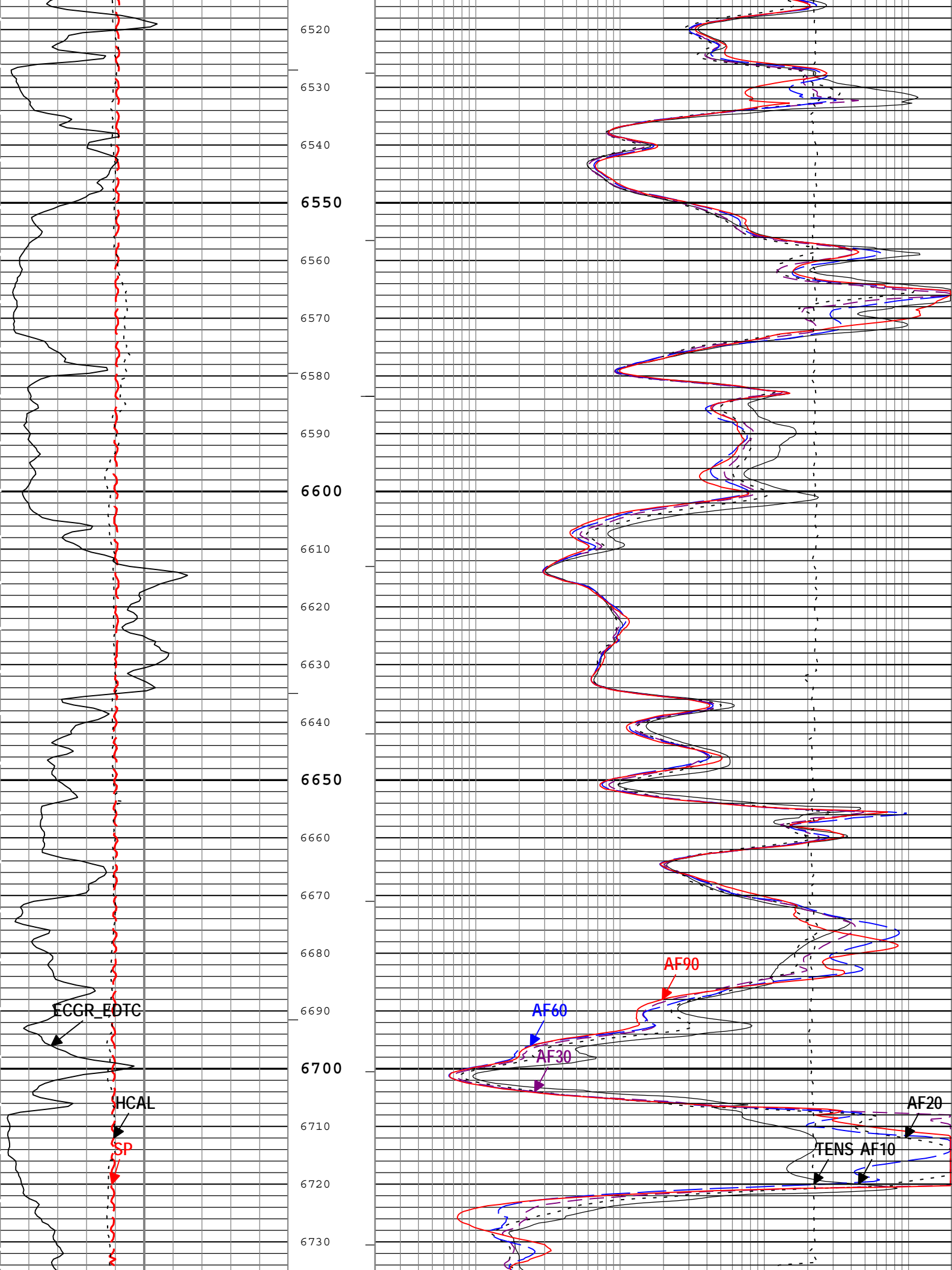


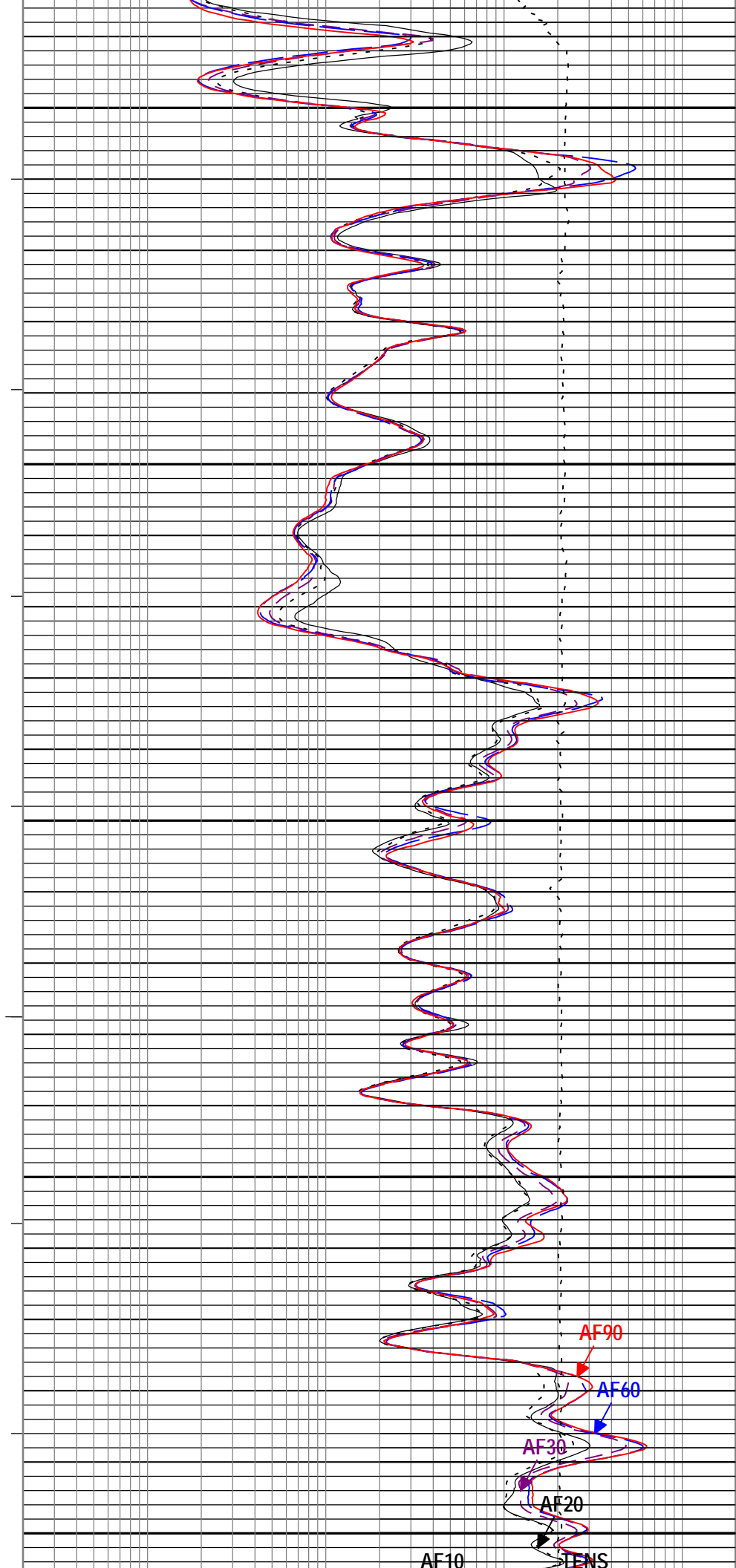
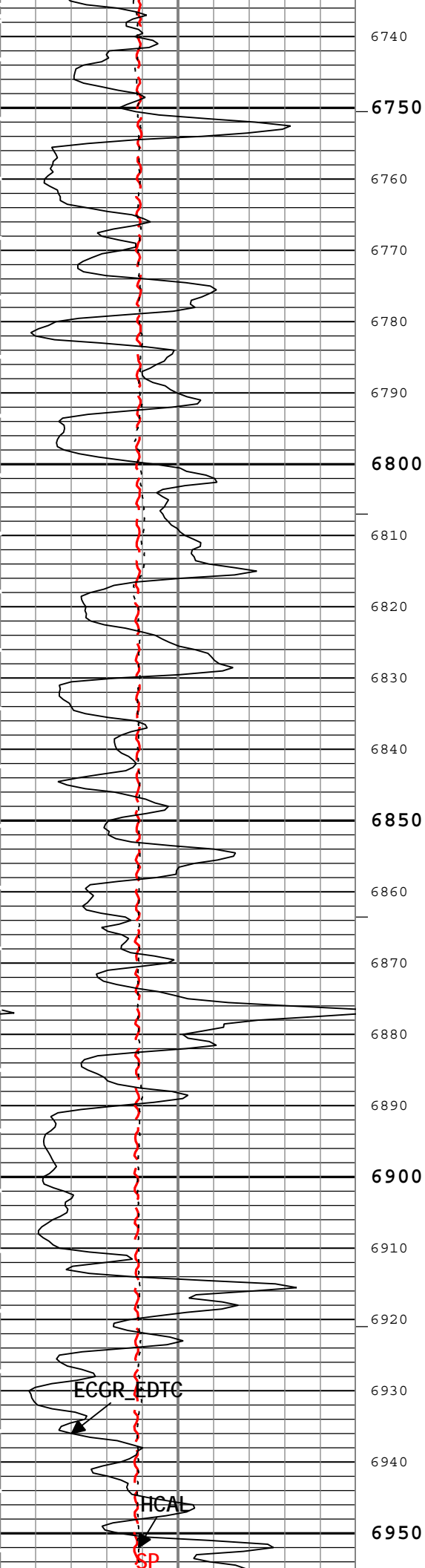


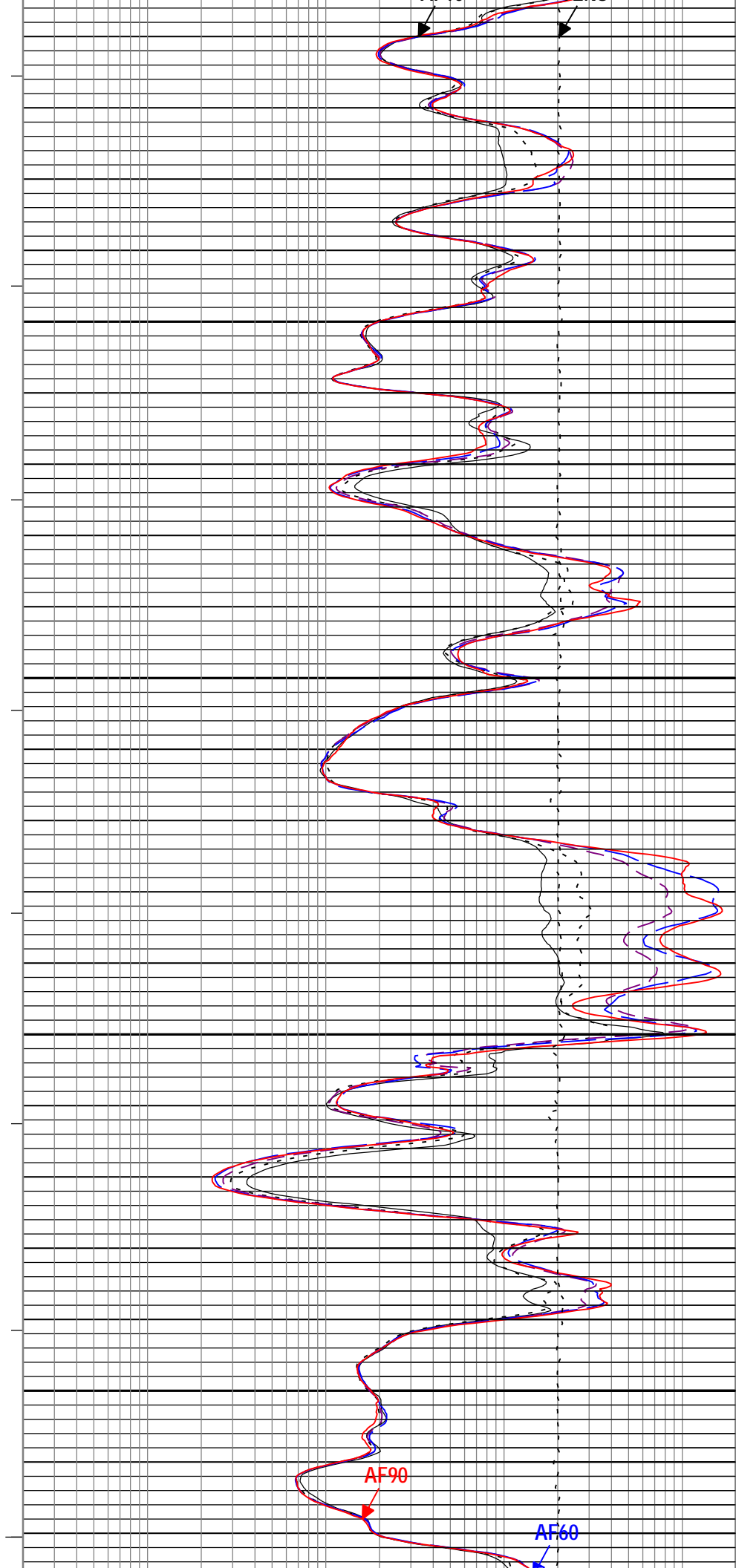
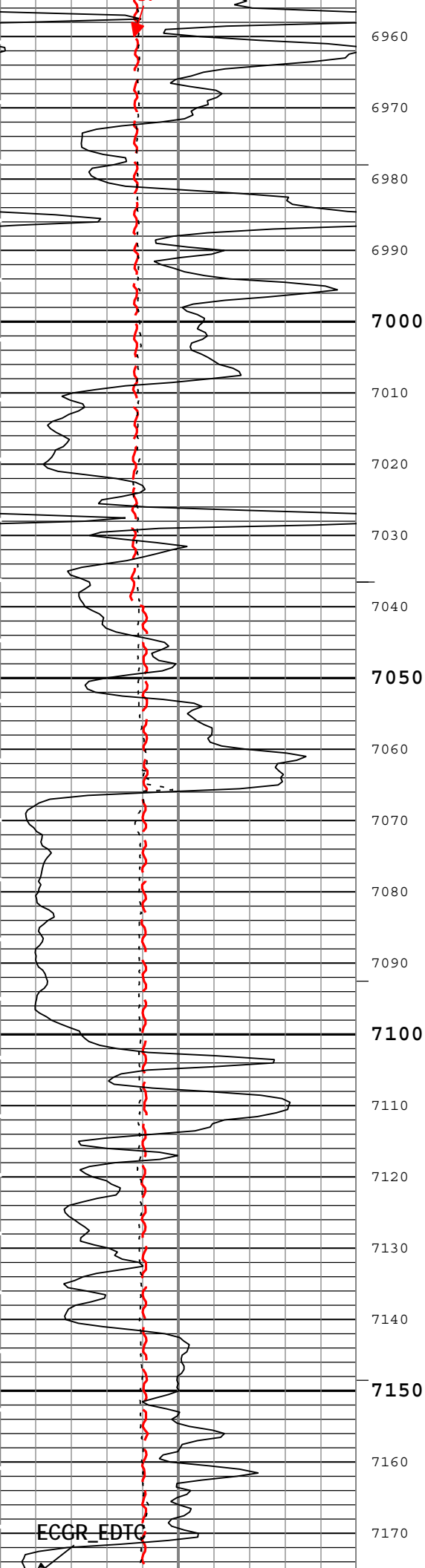


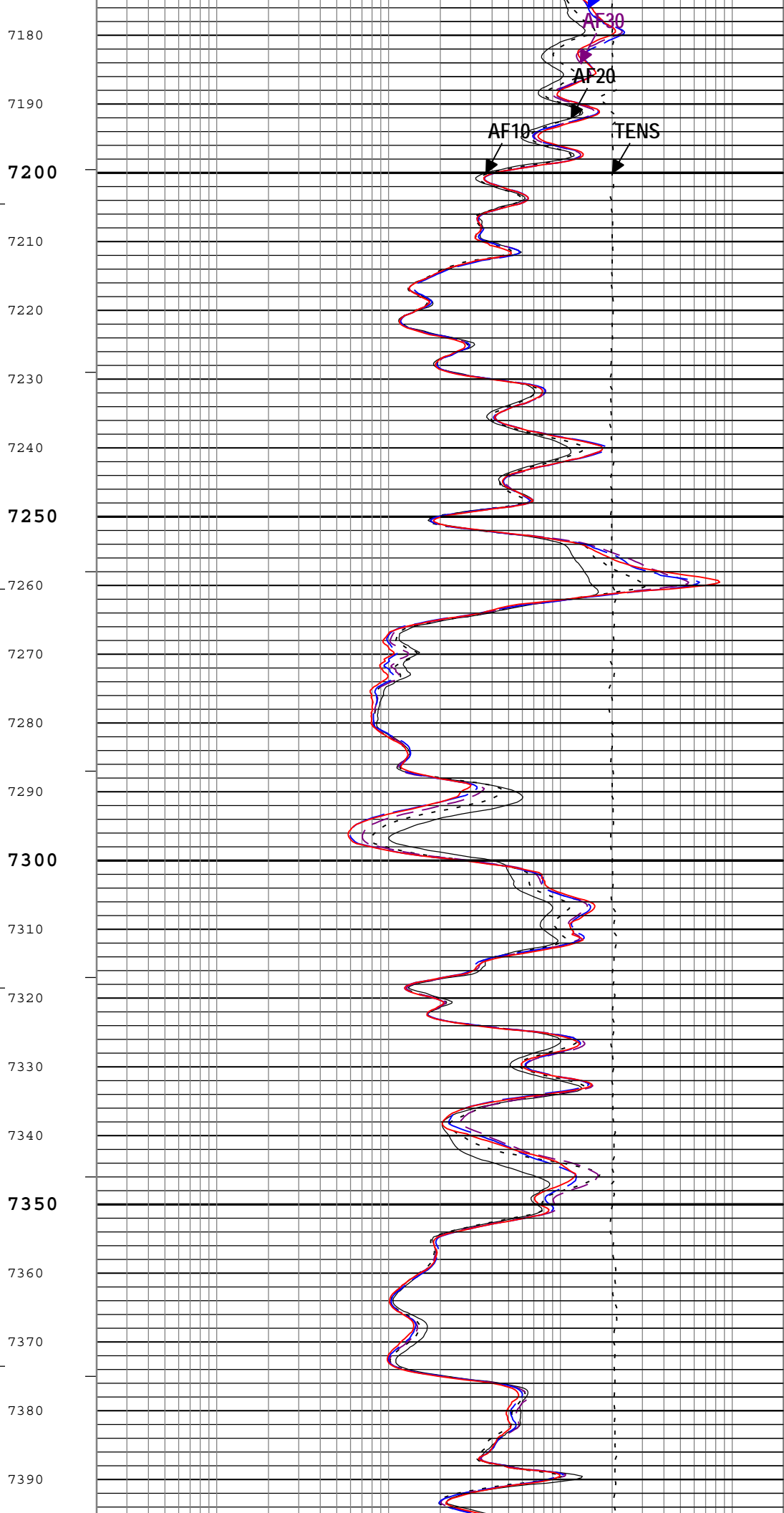
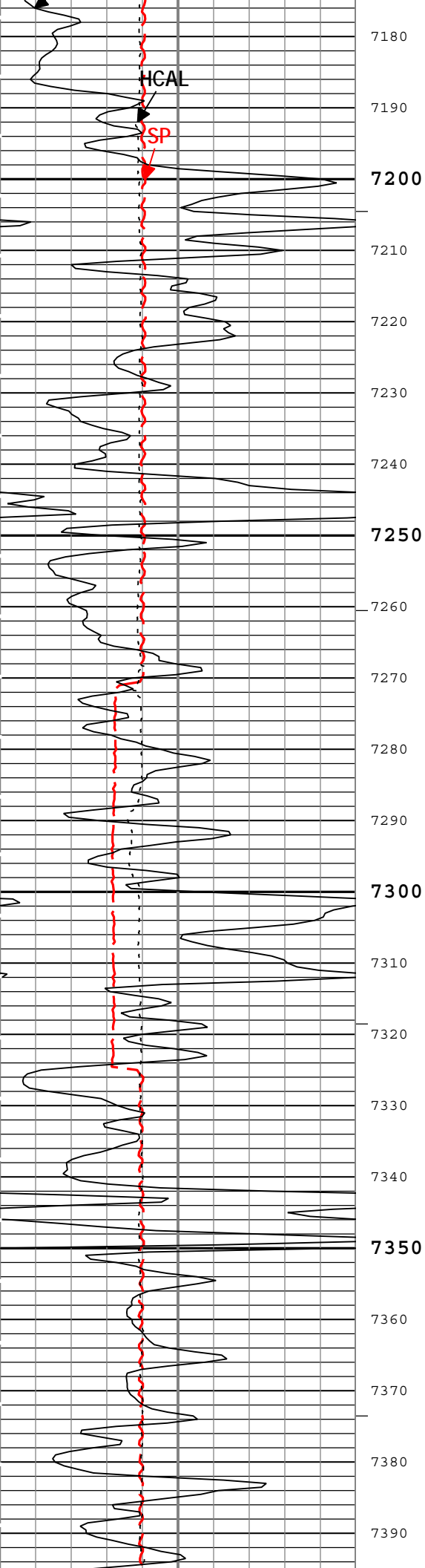


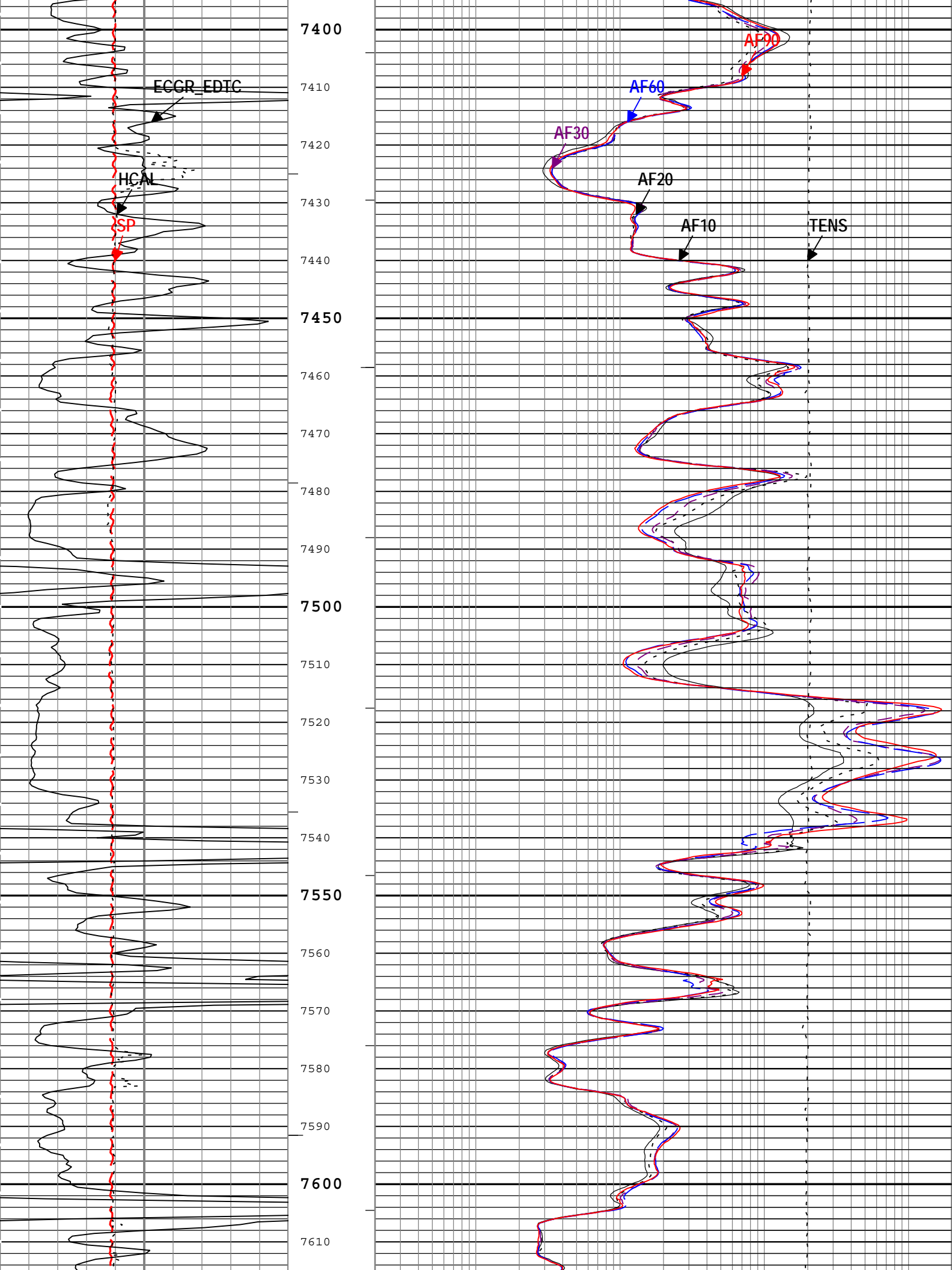


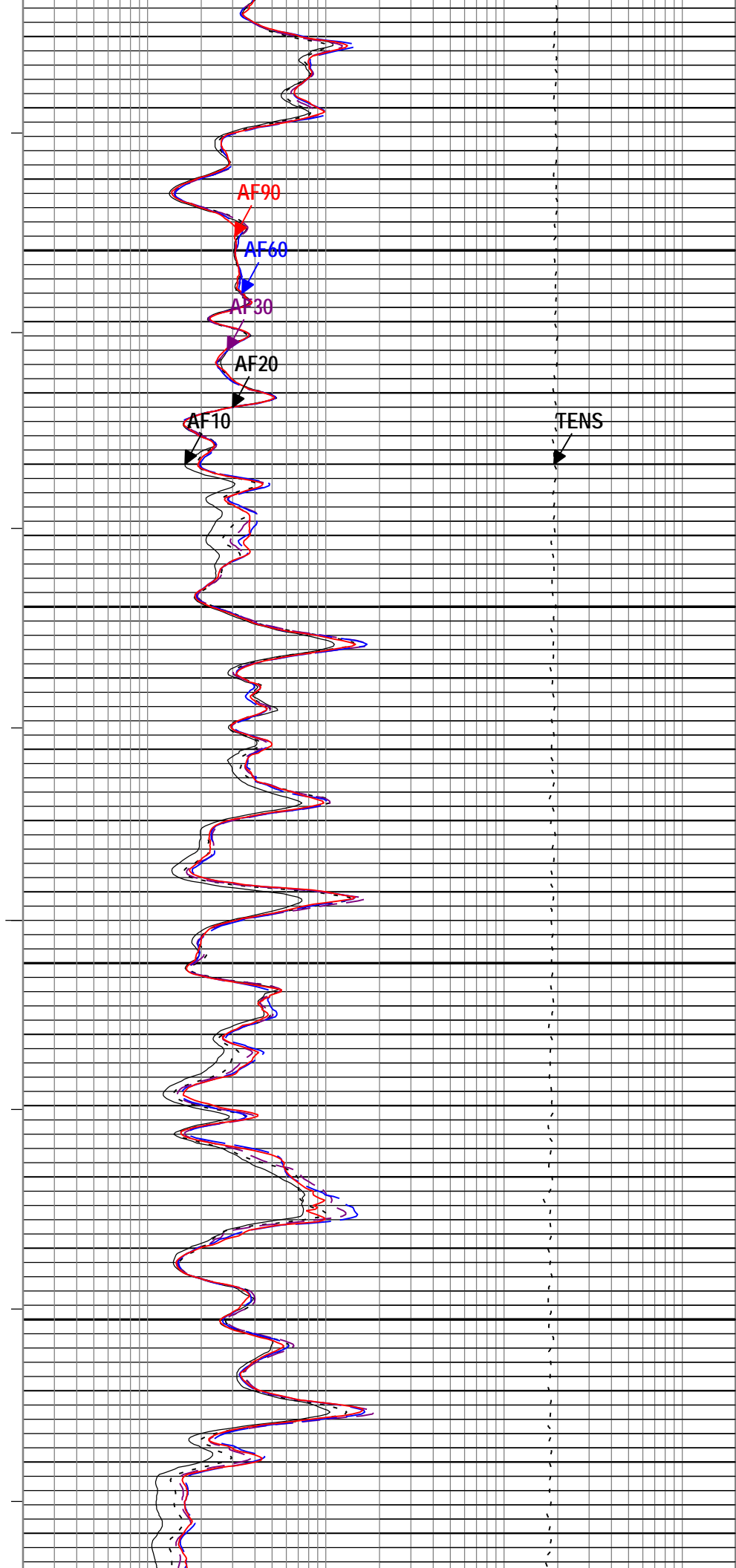
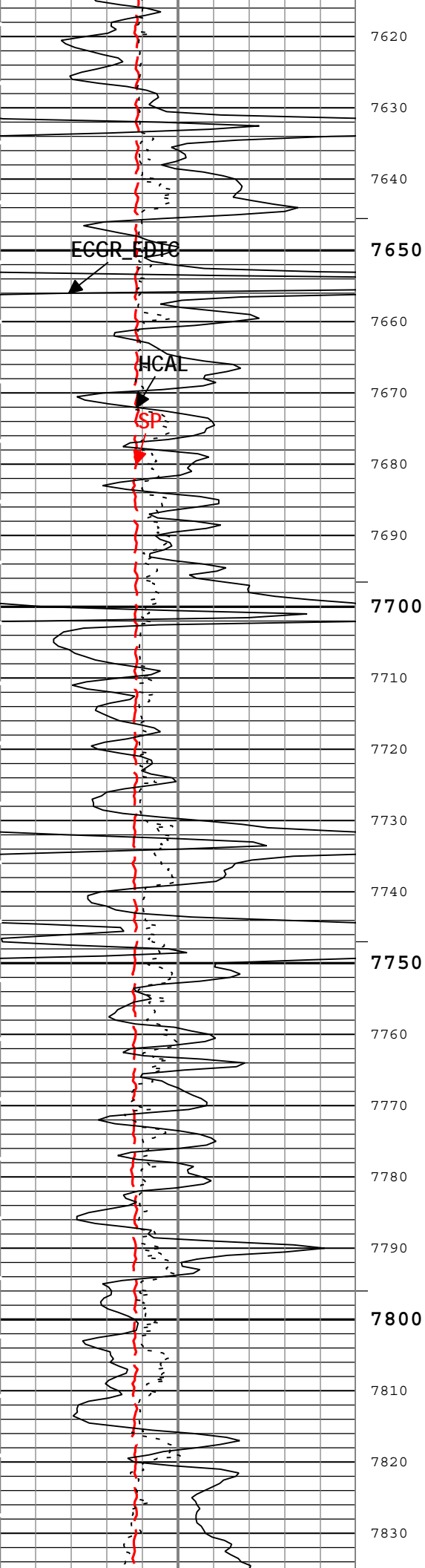


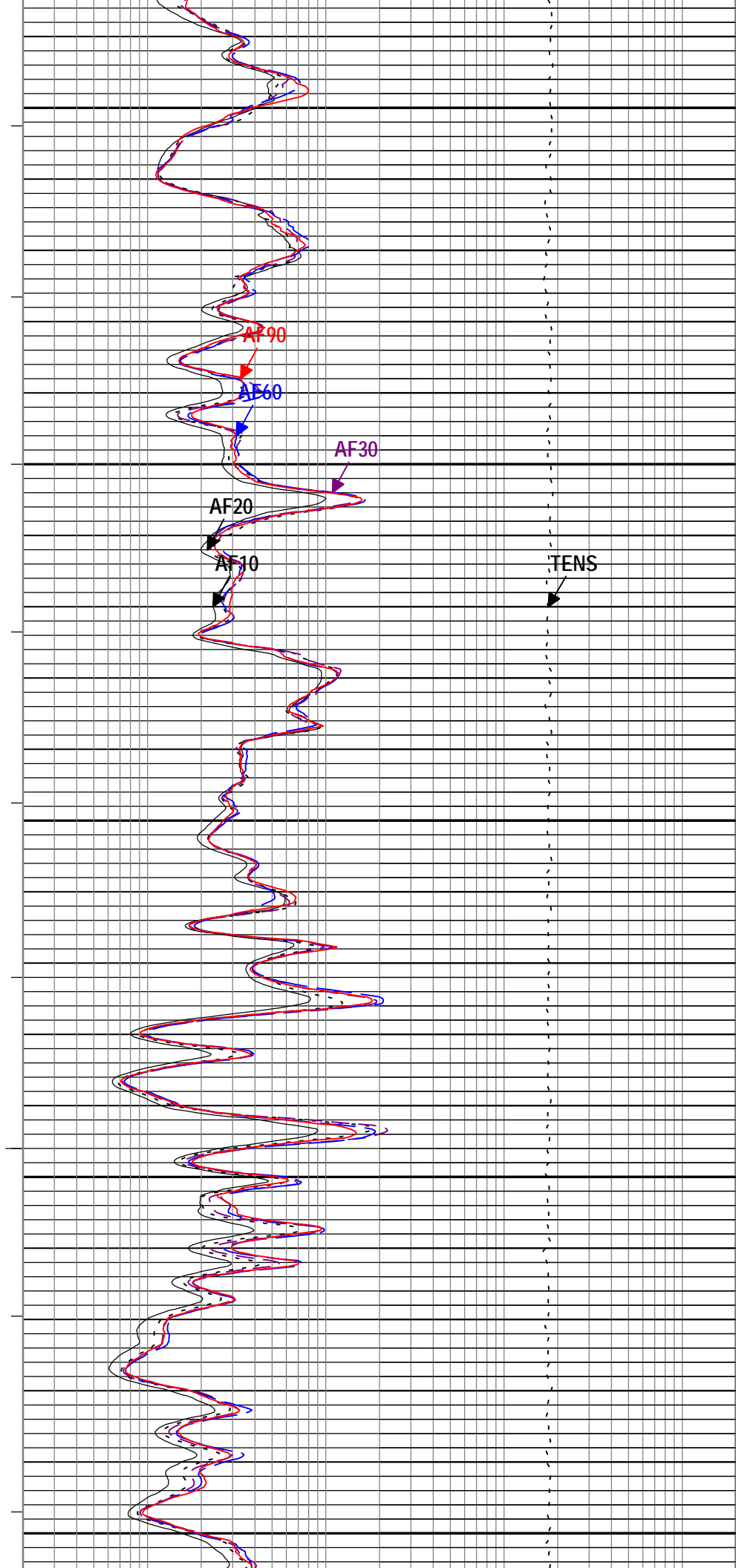
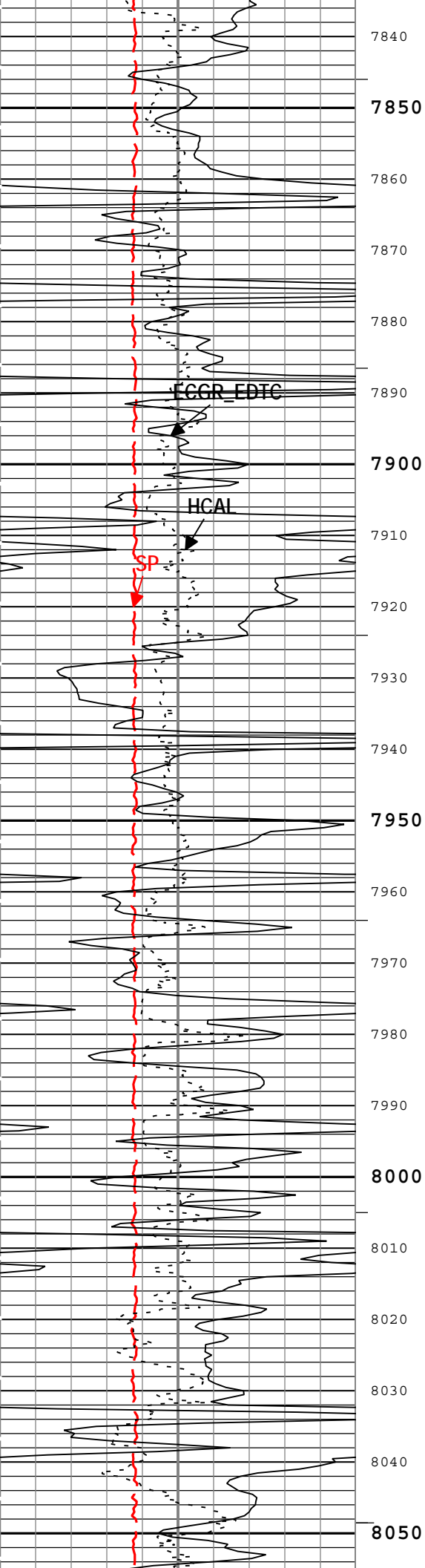


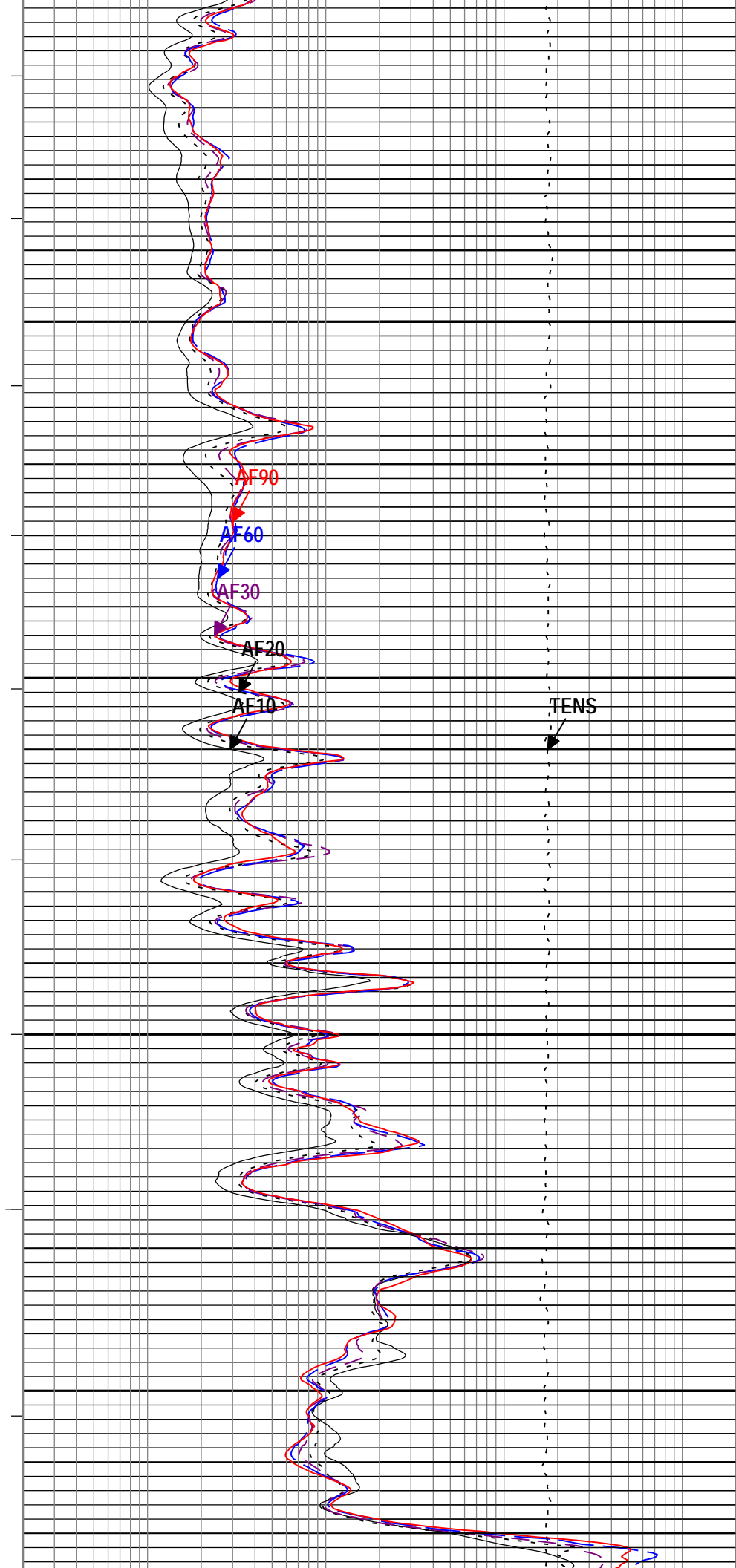
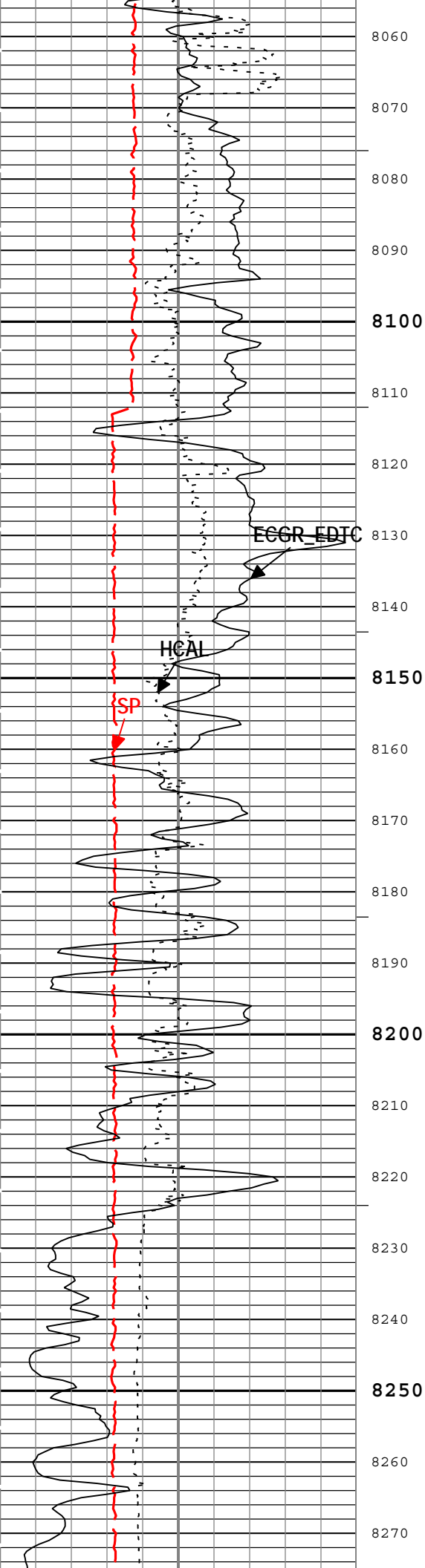


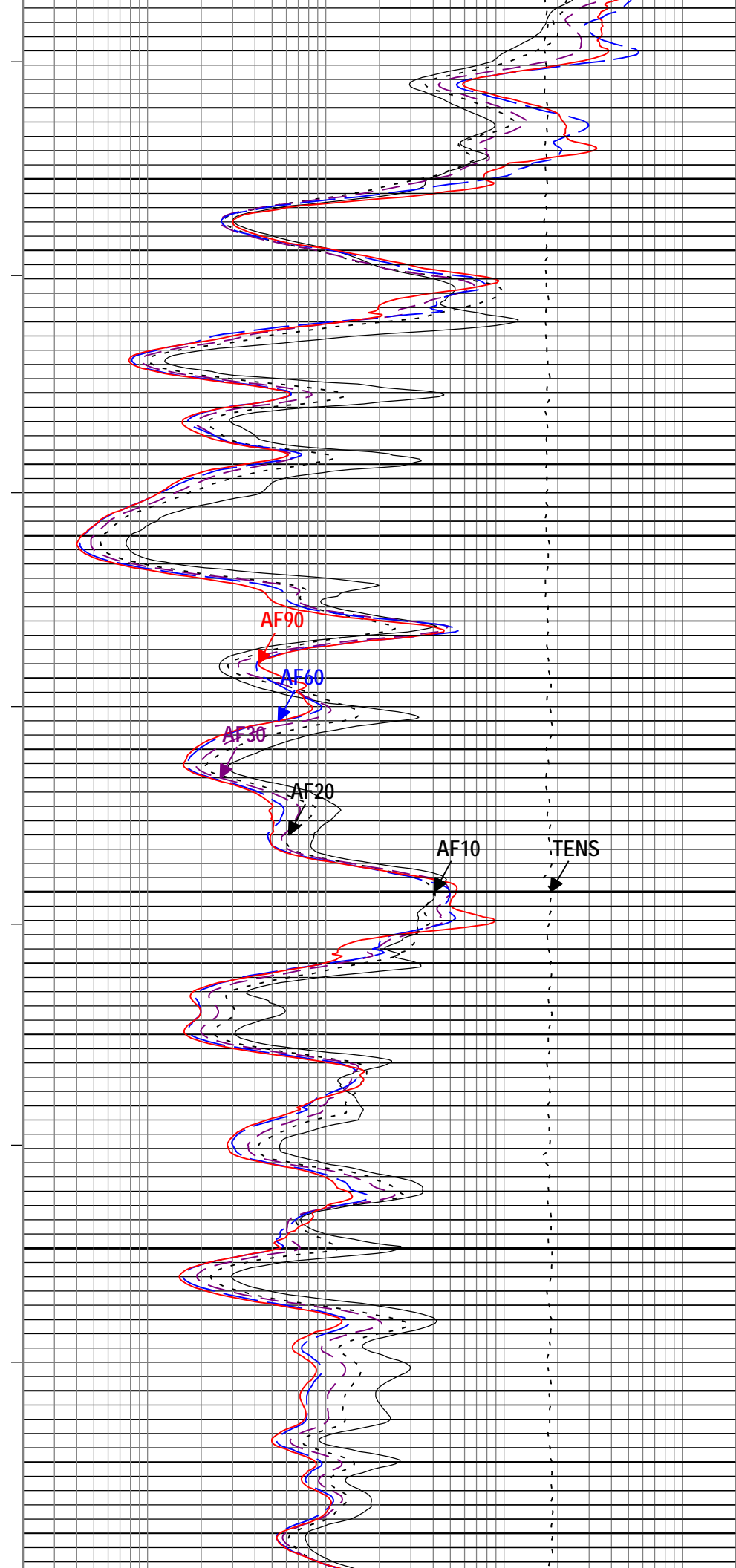
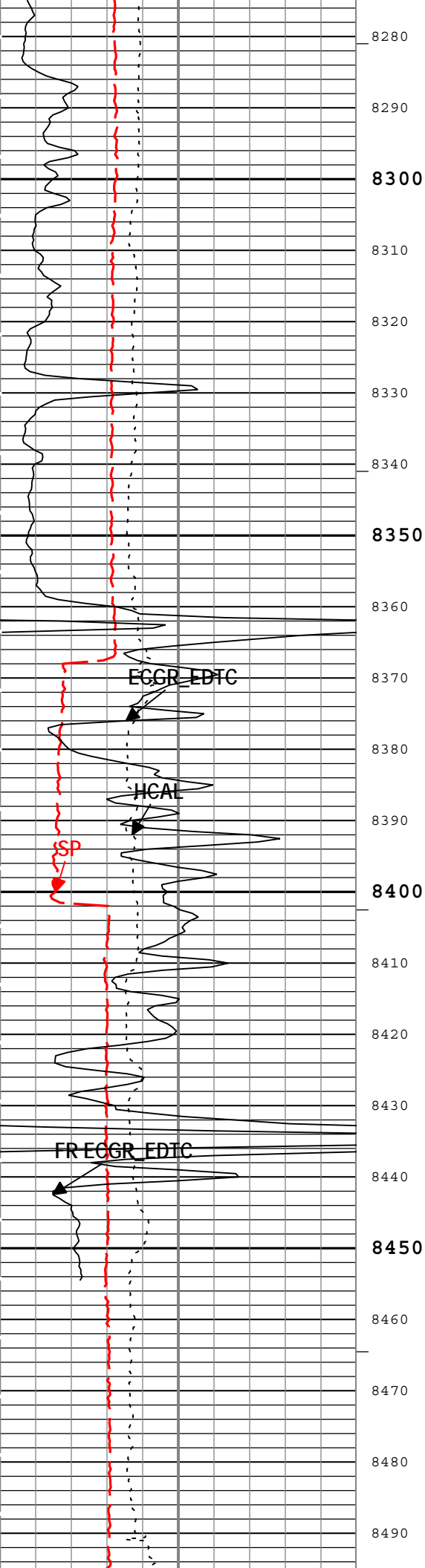


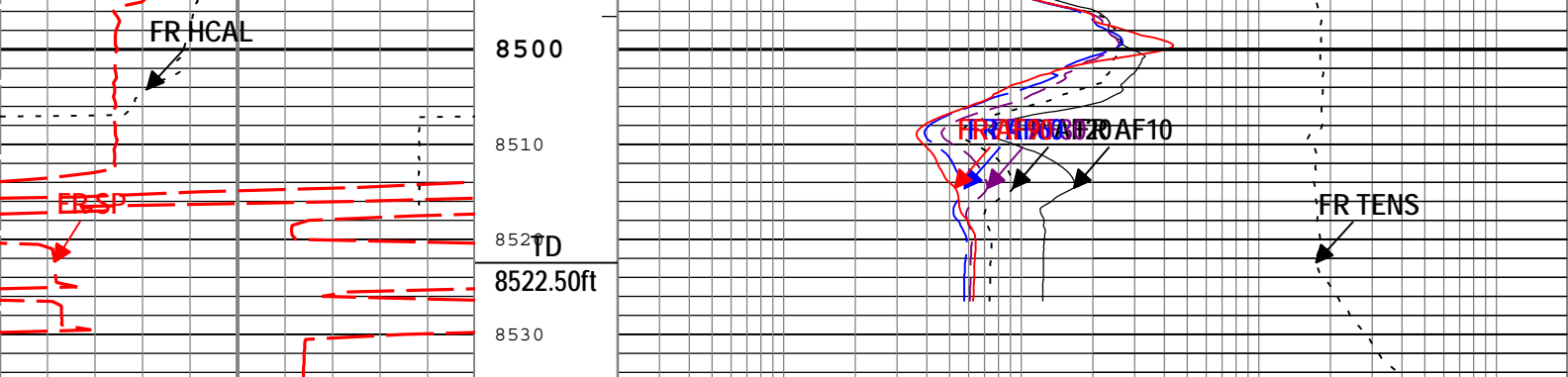












Gamma Ray Backup		
Spontaneous Potential (SP) AIT-M		
-100	mV	200
Caliper (HCAL) HDRS-H		
4	in	14
Gamma Ray (ECGR_EDTC) EDTC-B		
0	gAPI	200

Array Induction Four Foot Resistivity A10 (AF10) 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 A30 (AF30) 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 A90 (AF90) 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)
- IHV - Integrated Hole Volume every 100.00 (ft3)
- IHV - Integrated Hole Volume every 10.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

Description: AIT Basic Log Two Format: Log (EMD 5in Induction) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 08-Jan-2015 23:39:54

Channel Processing Parameters

Run 1 : 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	
BHT	Bottom Hole Temperature	Borehole	194.38	degF
BS	Bit Size	WLSESSION	Depth Zoned	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.183	in
CBLO	Casing Bottom (Logger)	WLSESSION	391	ft
CDEN	Cement Density	EDTC-B	2	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	8.625	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	9.25	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
EDF	Elevation of Derrick Floor Above Permanent Datum	WLSESSION	14	ft
EPD	Elevation of Permanent Datum (PDAT) above Mean Sea Level	WLSESSION	5324	ft
FCD	Future Casing (Outer) Diameter	WLSESSION	5.5	in
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	

GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	REMS	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST	
MST	Mud Sample Temperature	Borehole	50	degF
PDAT	Permanent Datum	WLSESSION	GL	
RMS	Resistivity of Mud Sample	Borehole	1.65	ohm.m
SHT	Surface Hole Temperature	Borehole	30	degF
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft
TD	Total Measured Depth	Borehole	8522.5	ft

Depth Zone Parameters				
Parameter	Value	Start (ft)	Stop (ft)	
BS	12.25	350	395	
BS	7.875	395	8510	
All depth are actual.				

Tool Control Parameters	
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Run 1 : Parameters				
Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	600	ft/h

Run 1				
5" Porosity				

Software Version	
Acquisition System	Version
Maxwell	5.0.29600.3100

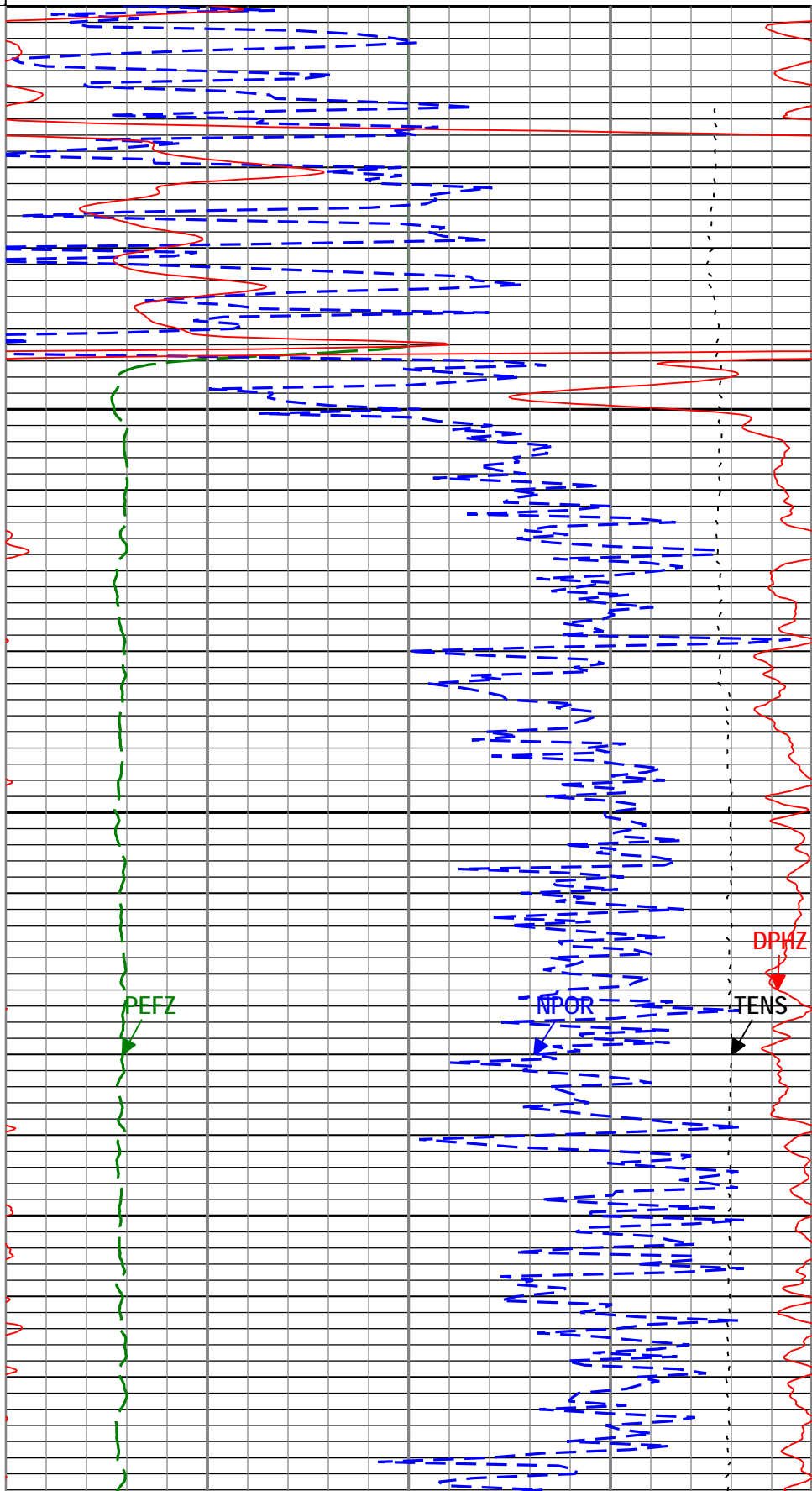
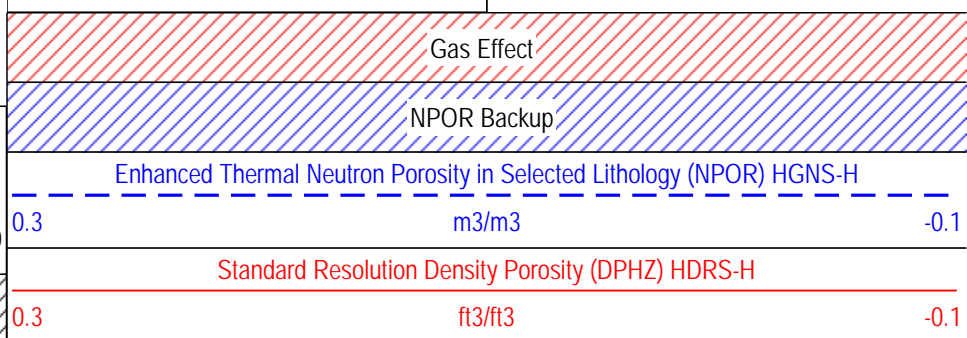
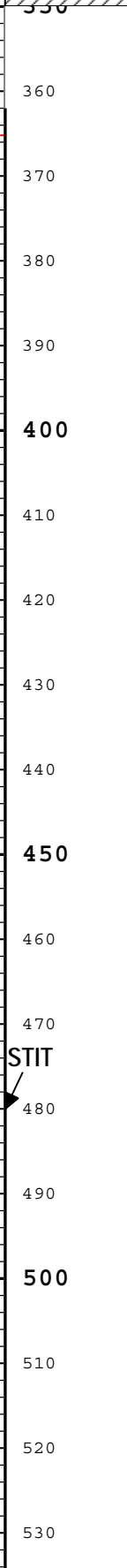
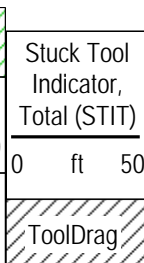
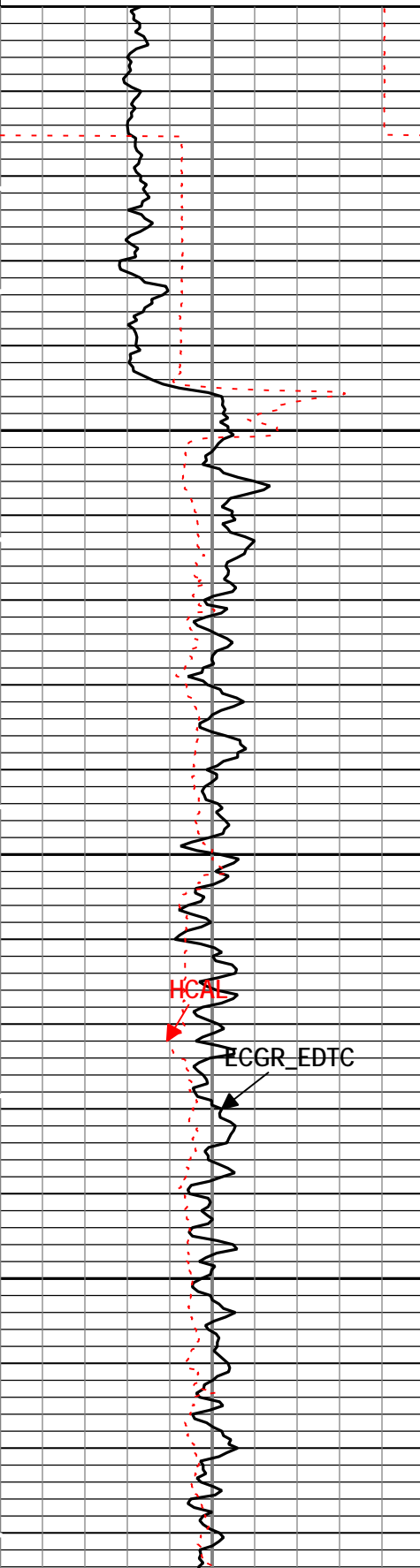
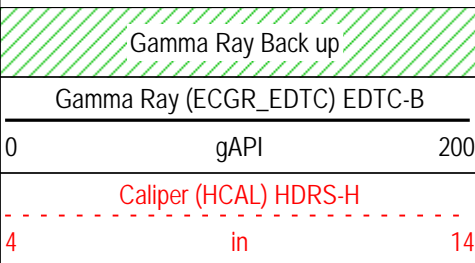
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Main[10]:Up	Up	361.63 ft	8534.82 ft	08-Jan-2015 3:05:03 PM	08-Jan-2015 9:55:19 PM	ON	0.52 ft	No

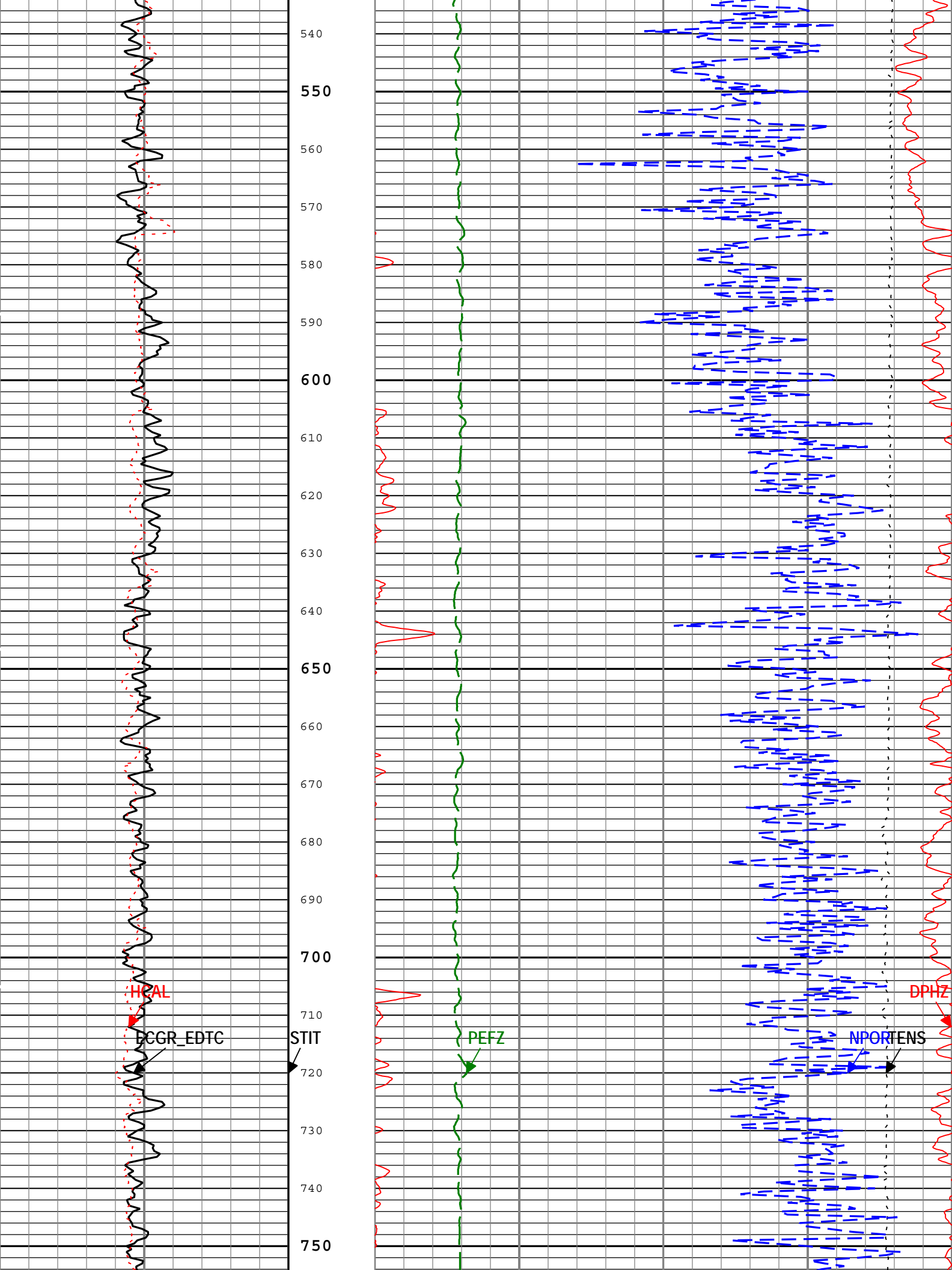
All depths are referenced to toolstring zero									
Log	<div> <div>Company:Nighthawk Production LLC</div> <div>Well:Snow King 9-32</div> <div>Run 1 : Main[10]:Up:S013</div> </div>								

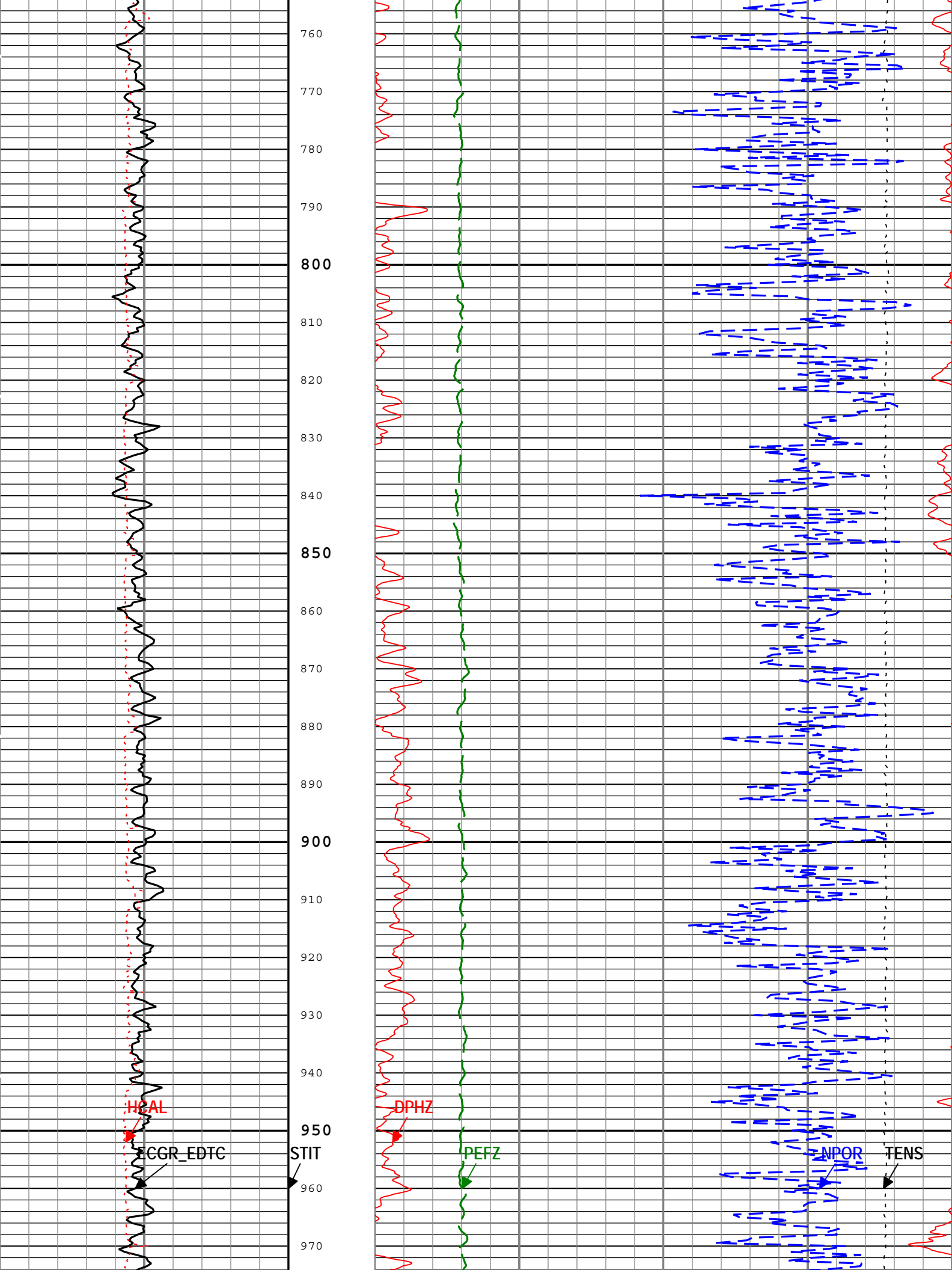
Description: HGNS standard resolution porosities for Platform Express
 Format: Log (EMD 5in Porosity)
 Index Scale: 5 in per 100 ft
 Index Unit: ft
 Index Type: Measured Depth
 Creation Date: 08-Jan-2015 23:39:57

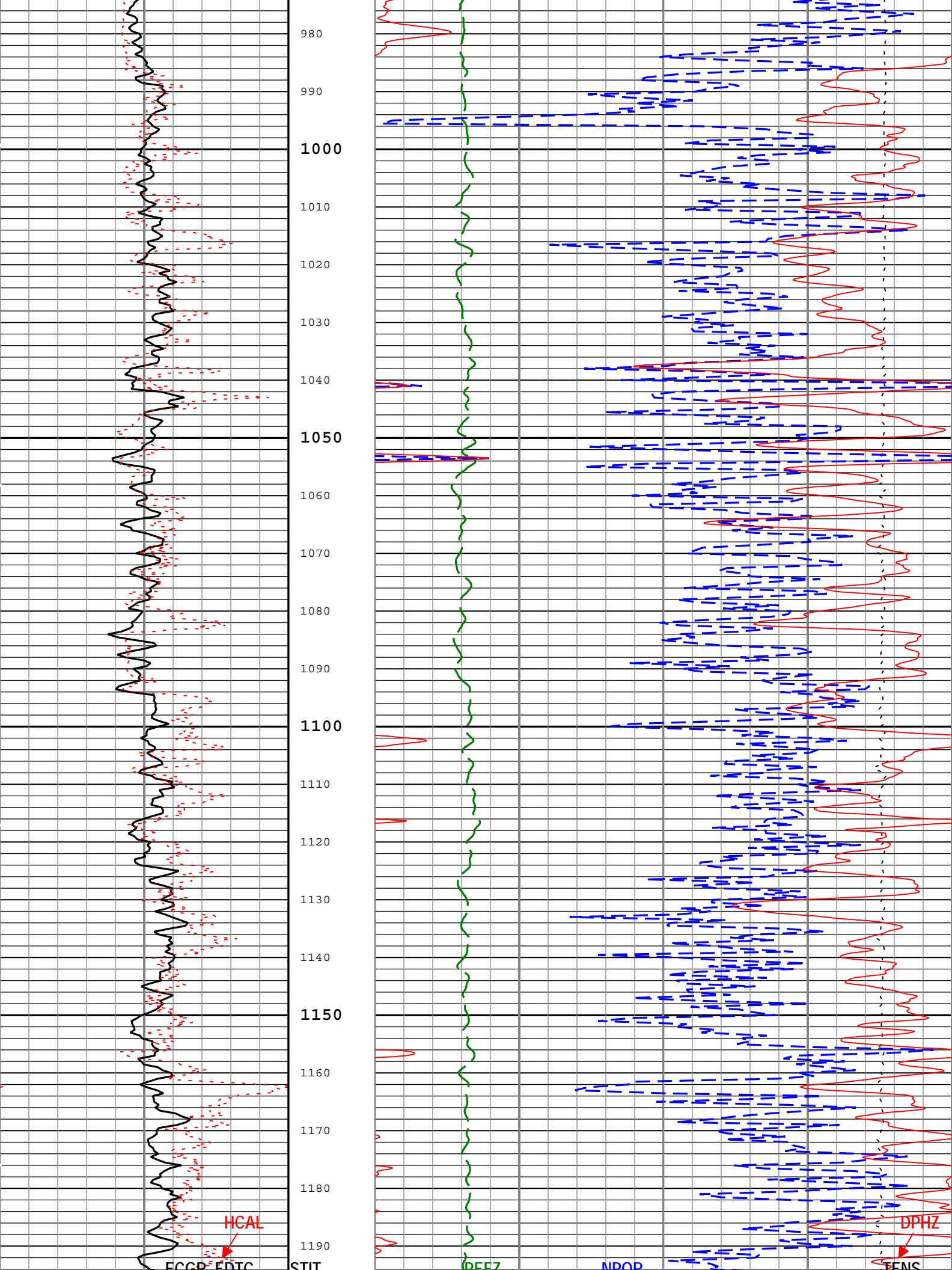
Channel	Source	Sampling
CALI	HDRS-H:HRCC-H:HRCC-H	1in
DPHZ	HDRS-H:HRMS-H:HRGD-H	2in
GR	EDTC-B:EDTC-B:EDTC-B	6in
NPOR	HGNS-H:HGNS-H:HGNS-H	6in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
STIT	DepthCorrection	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in

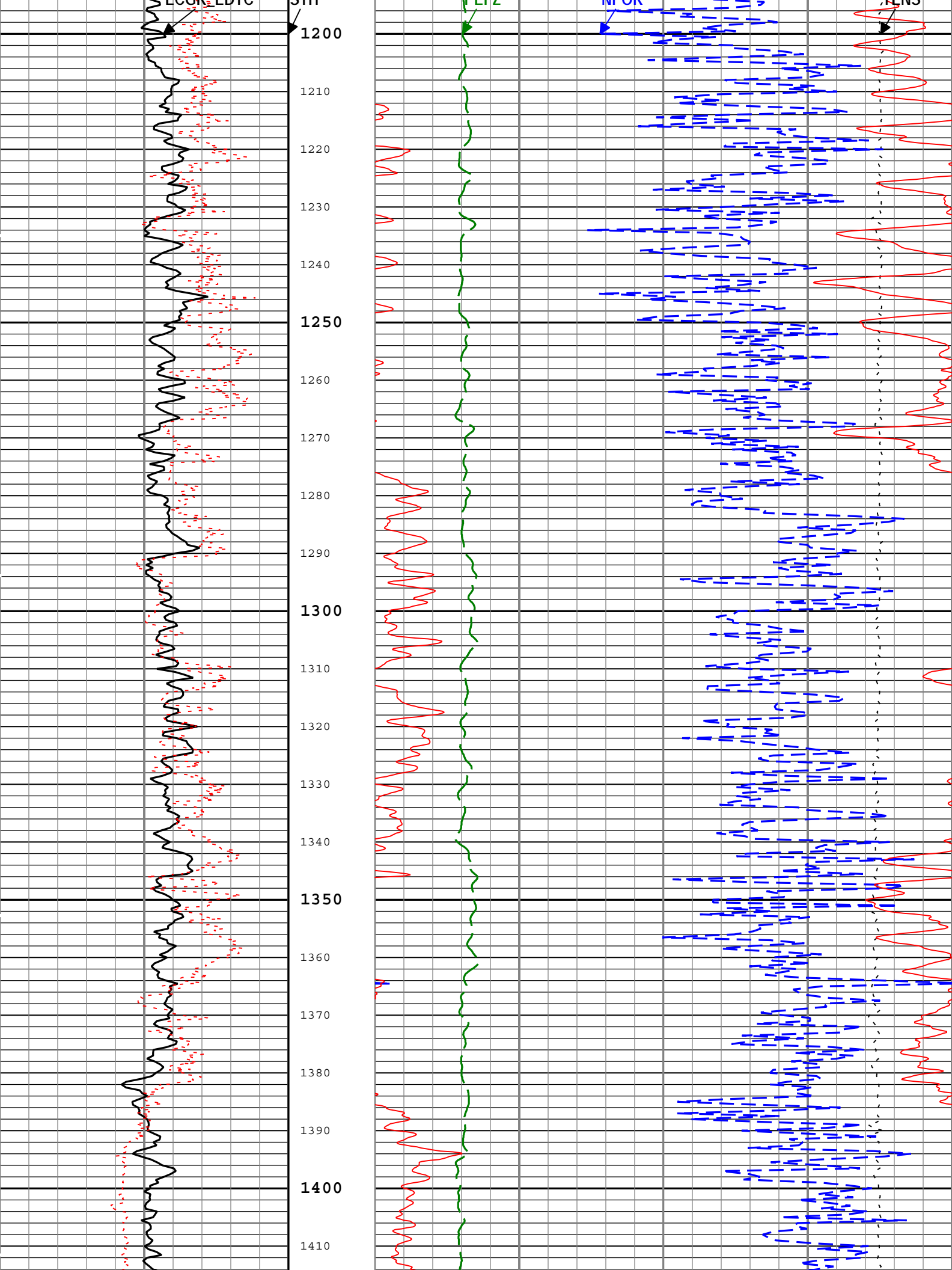


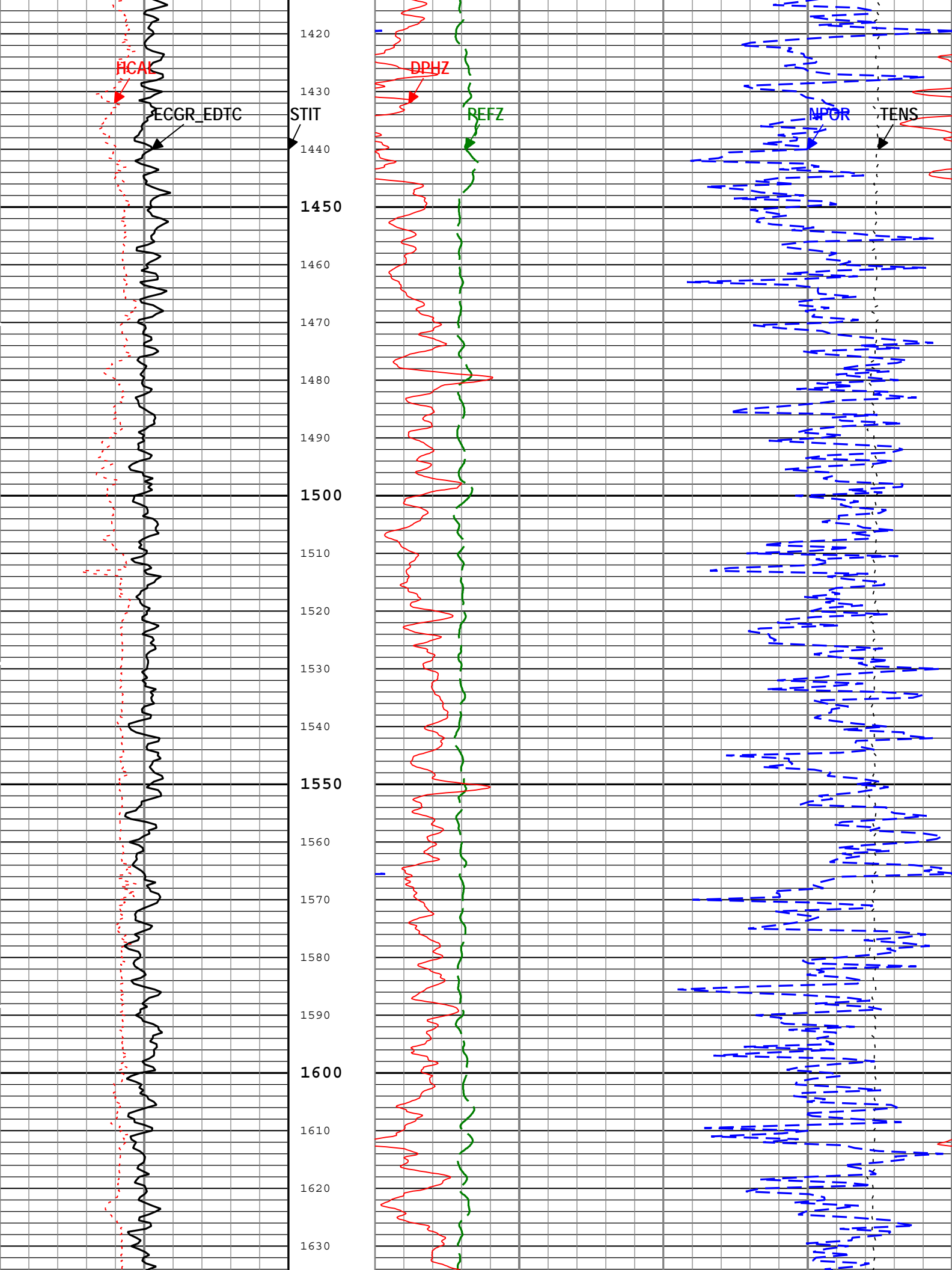


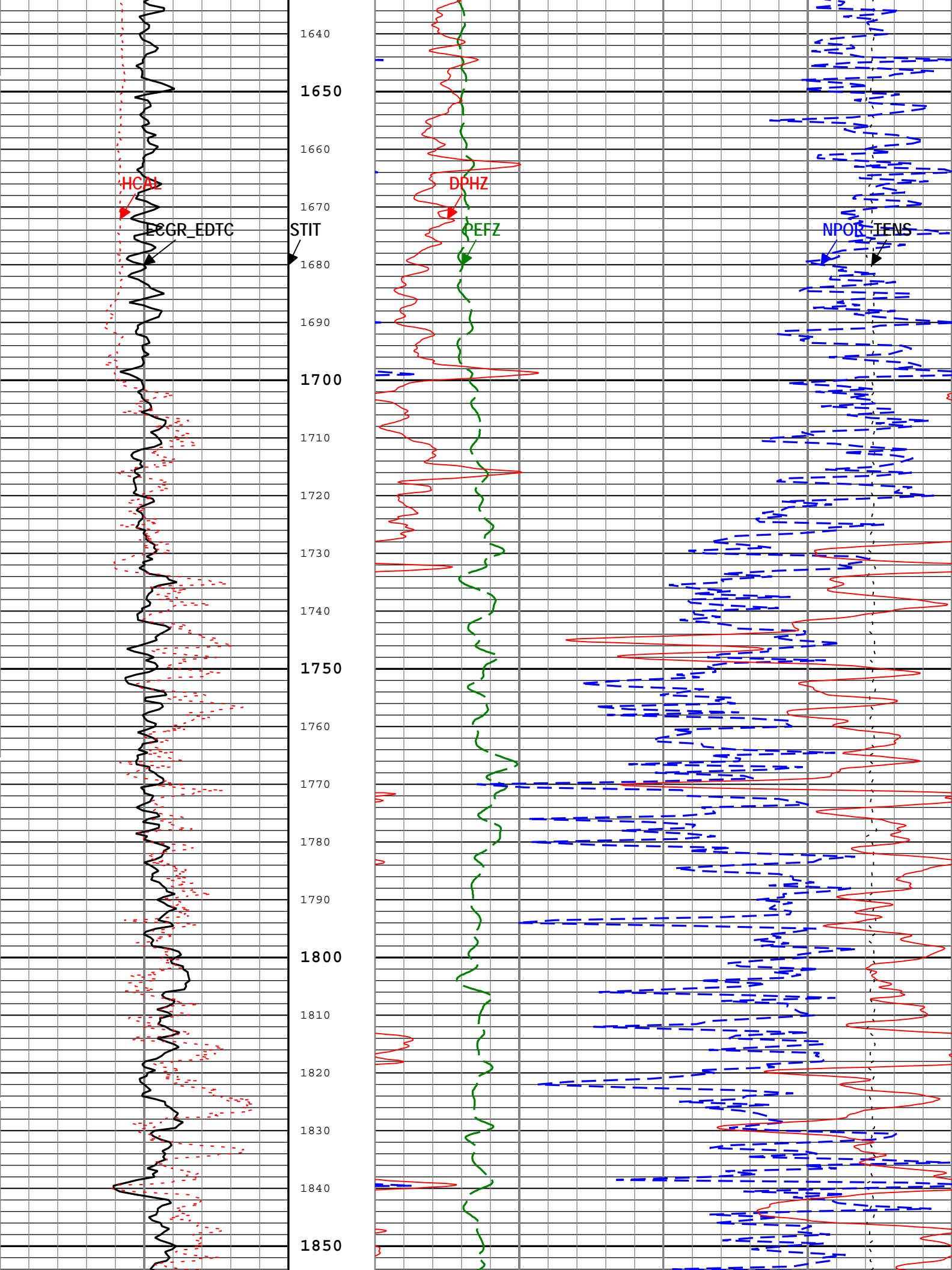


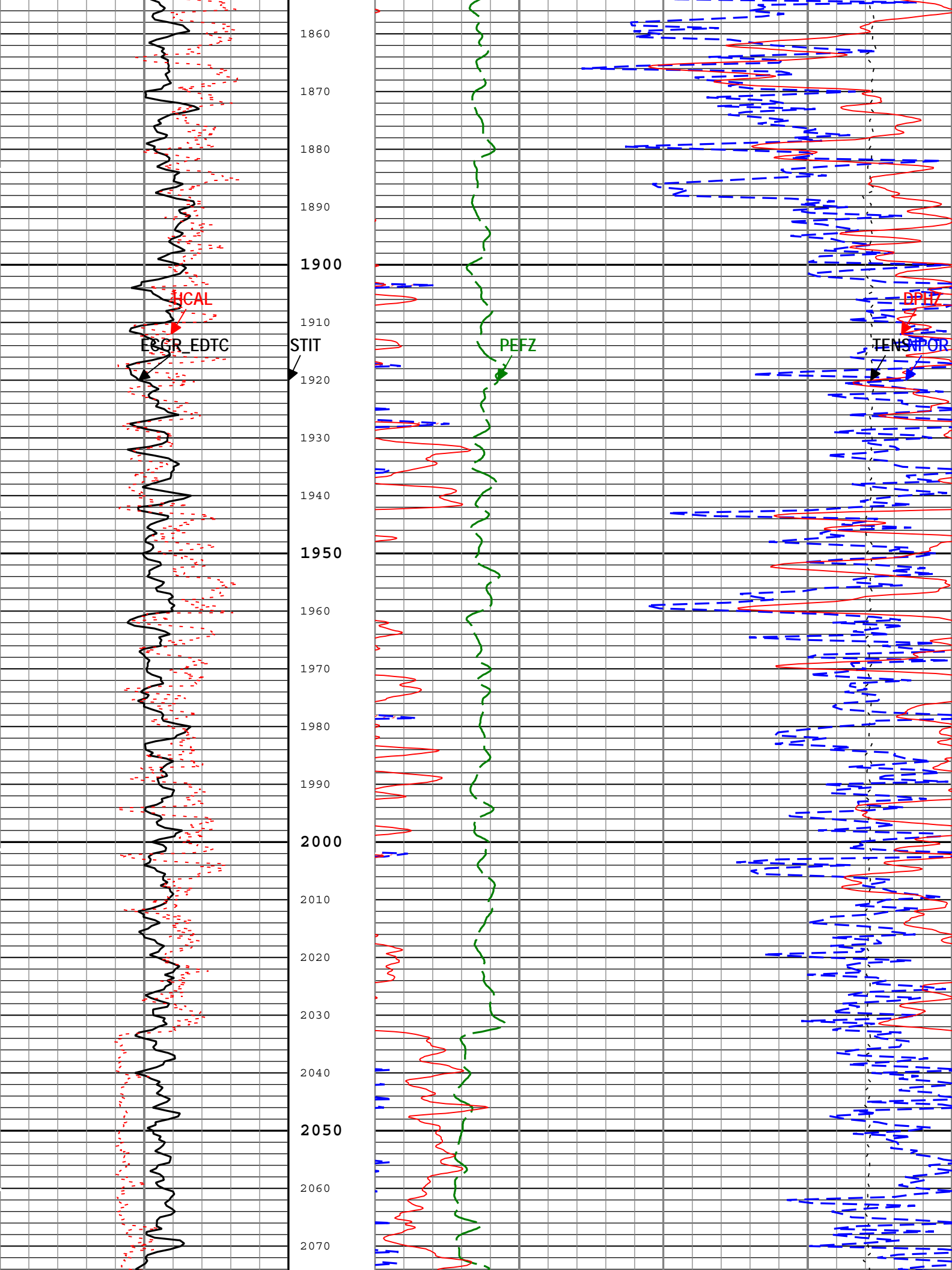


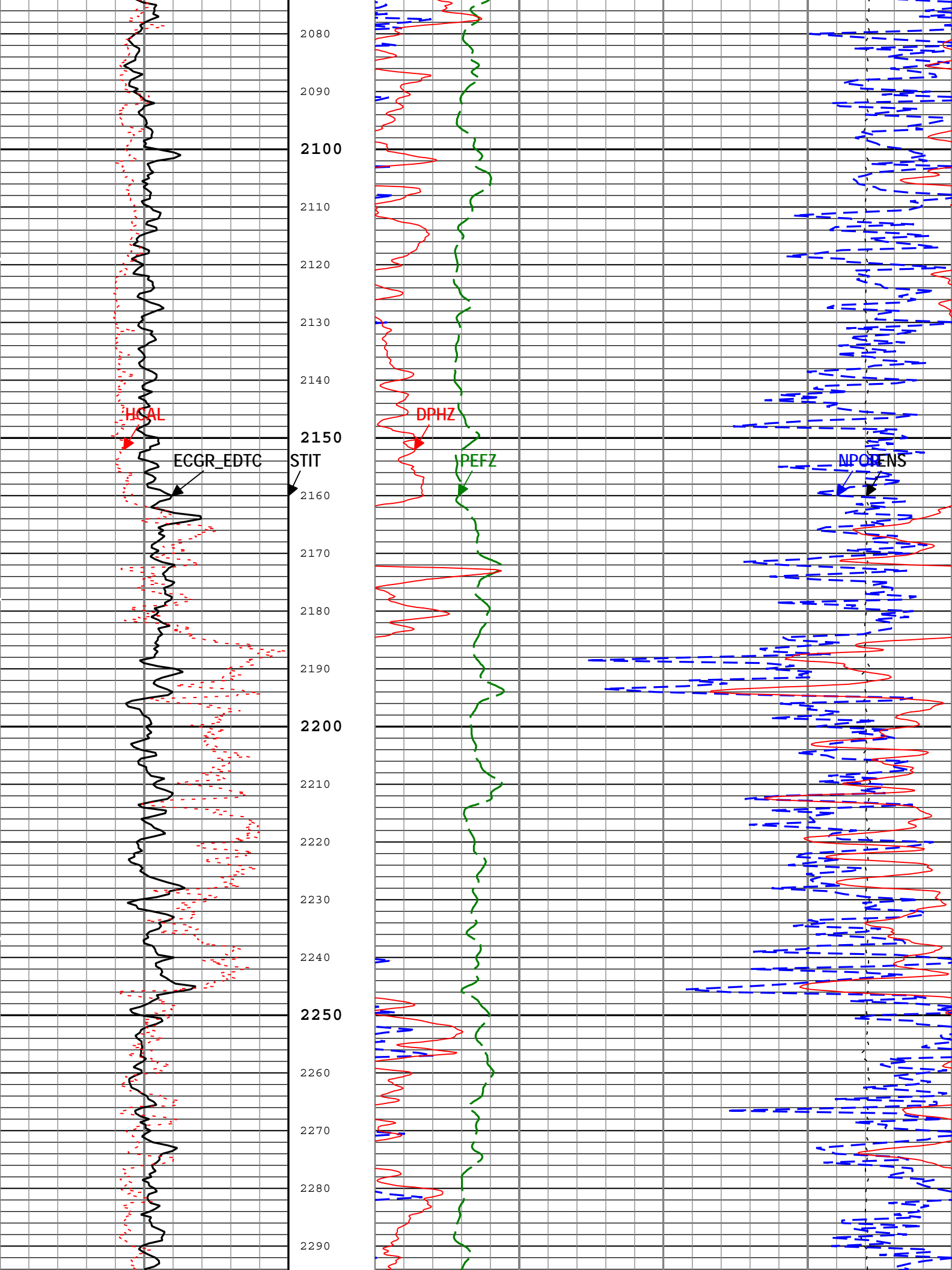


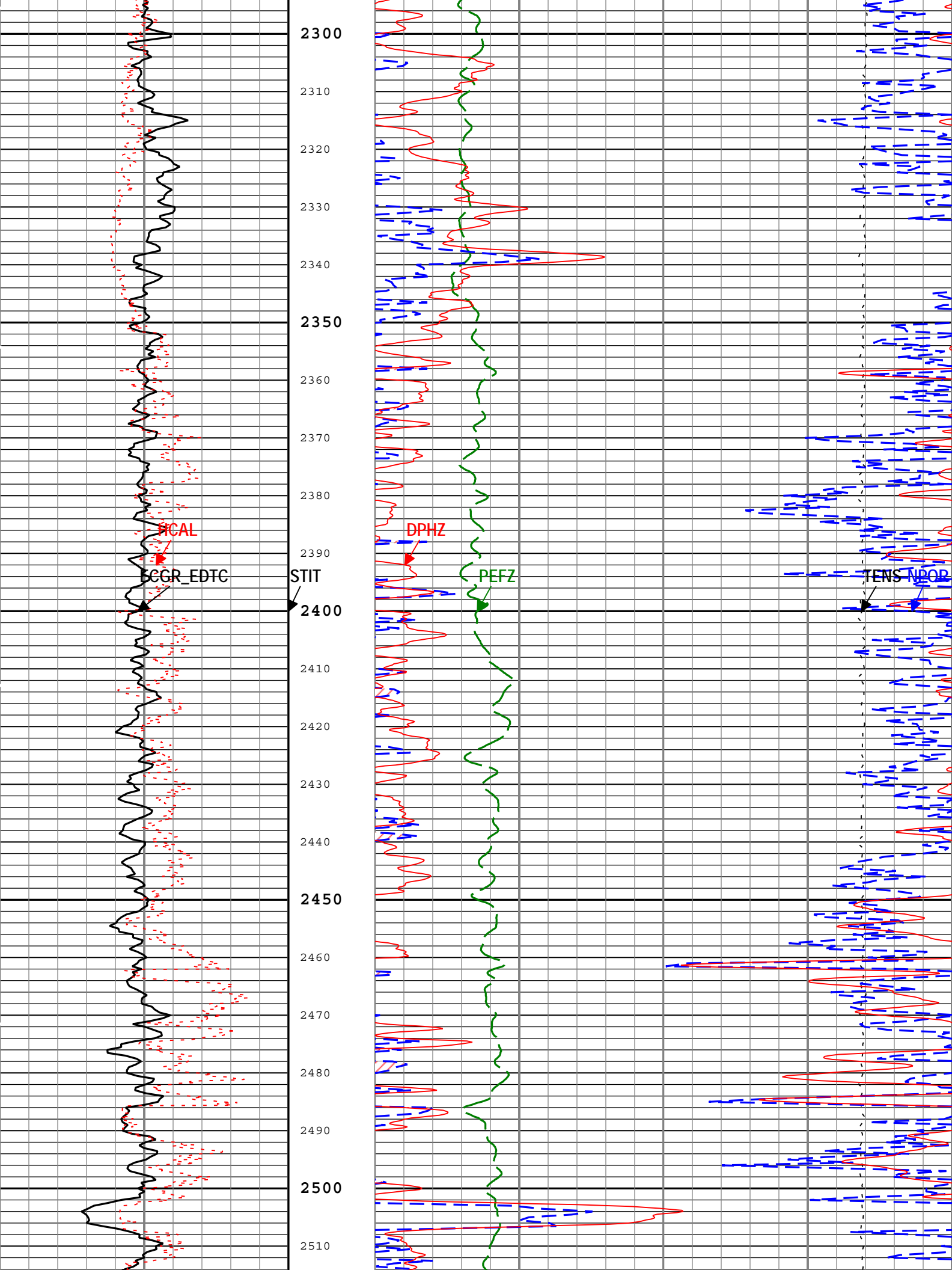


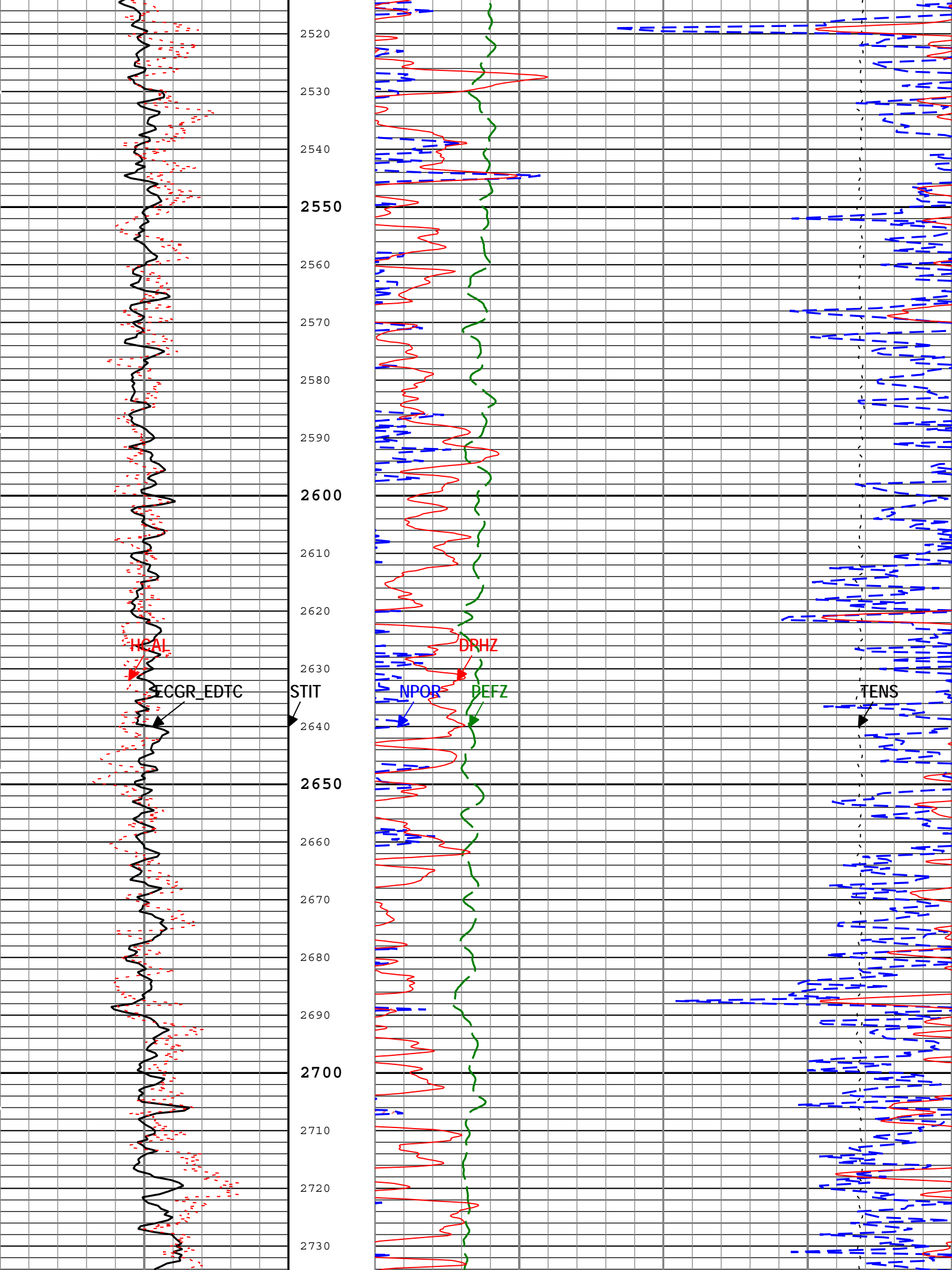


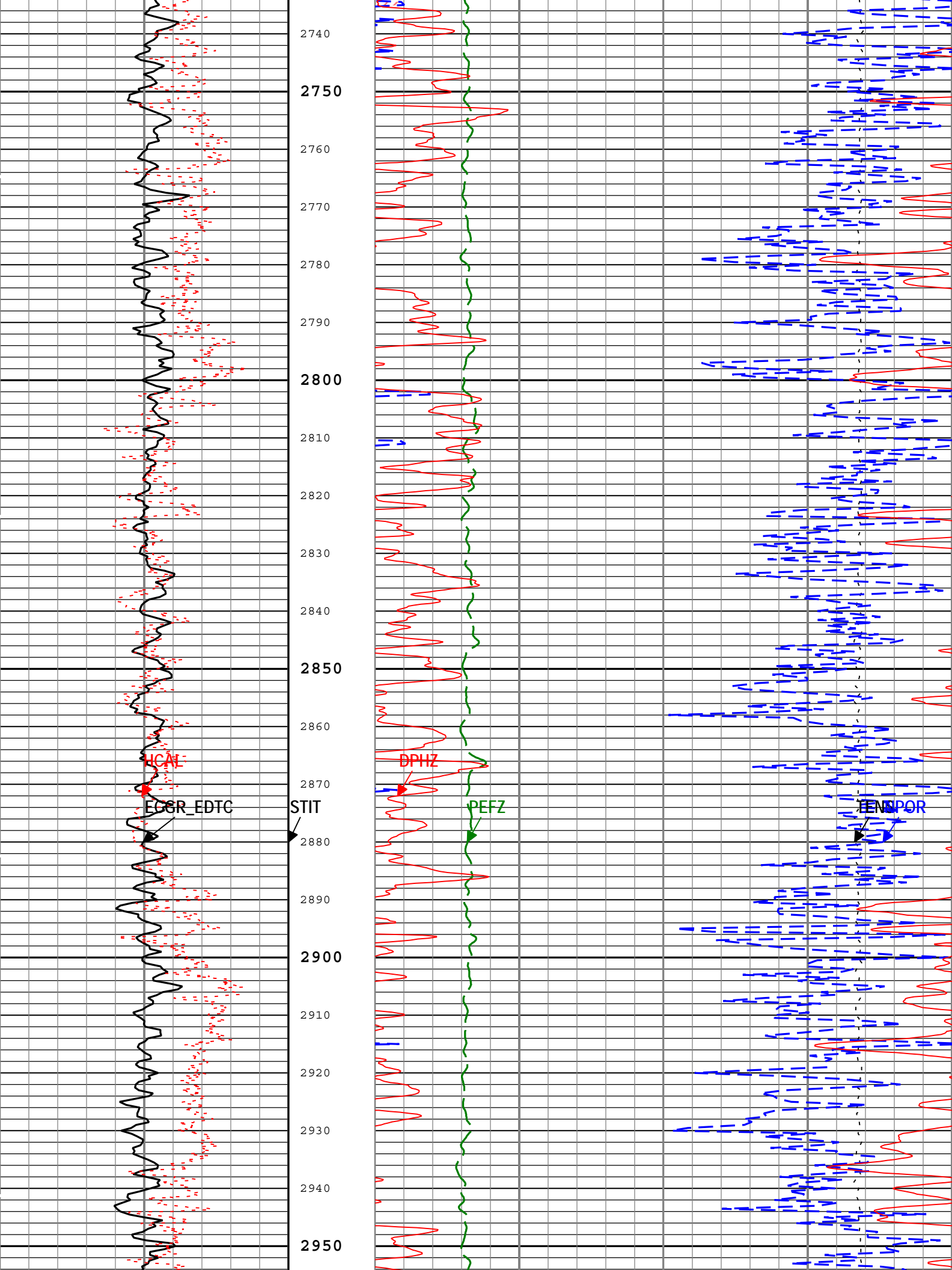


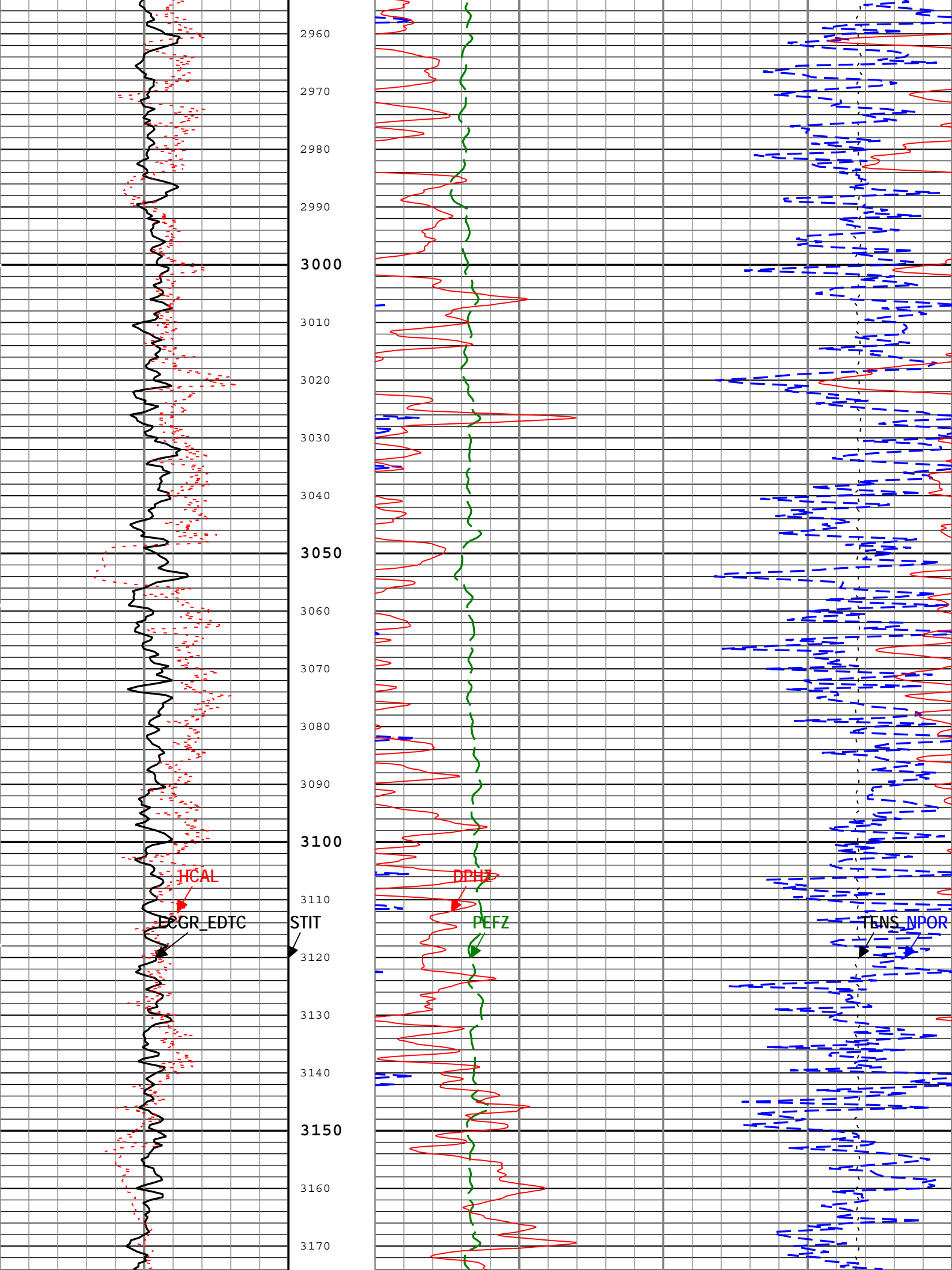


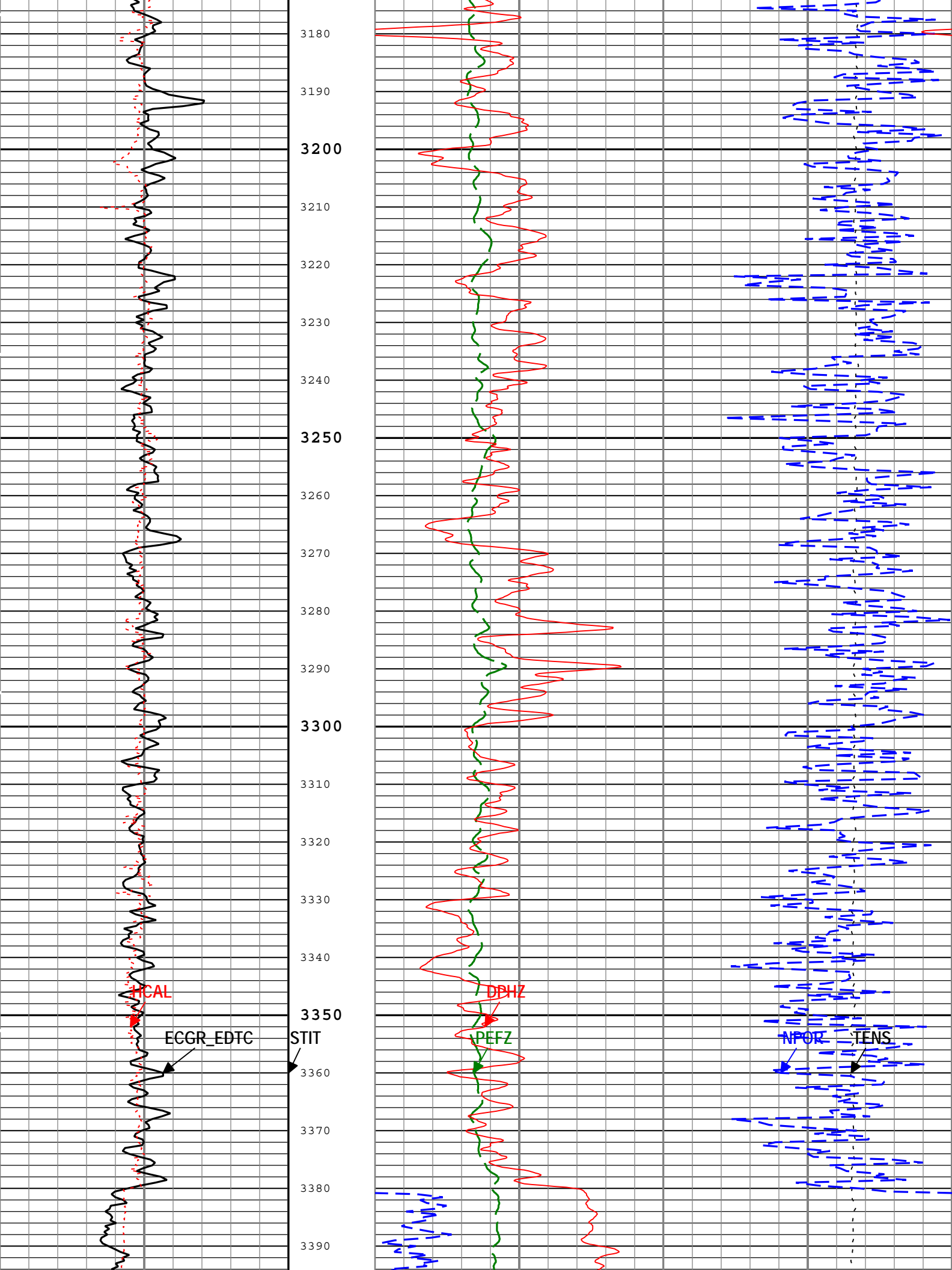


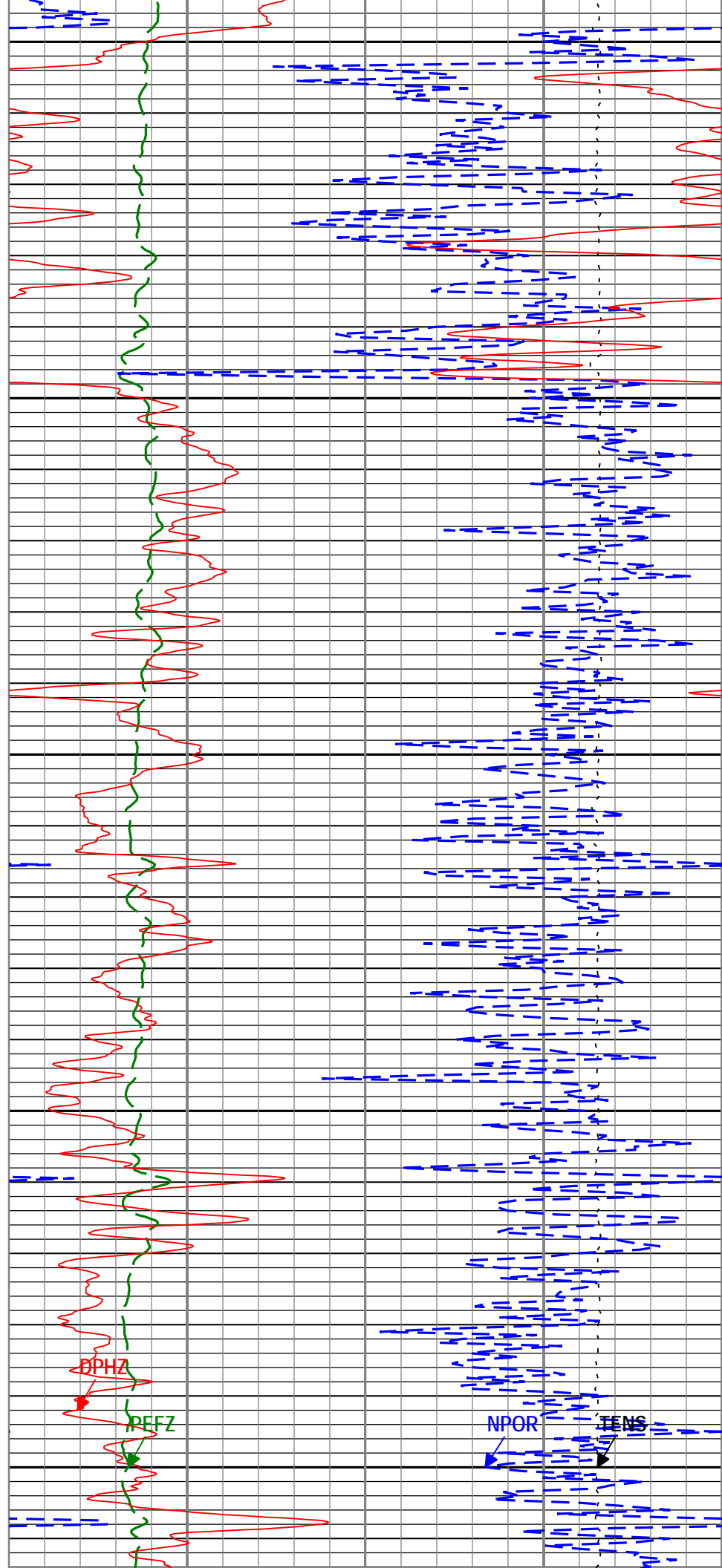
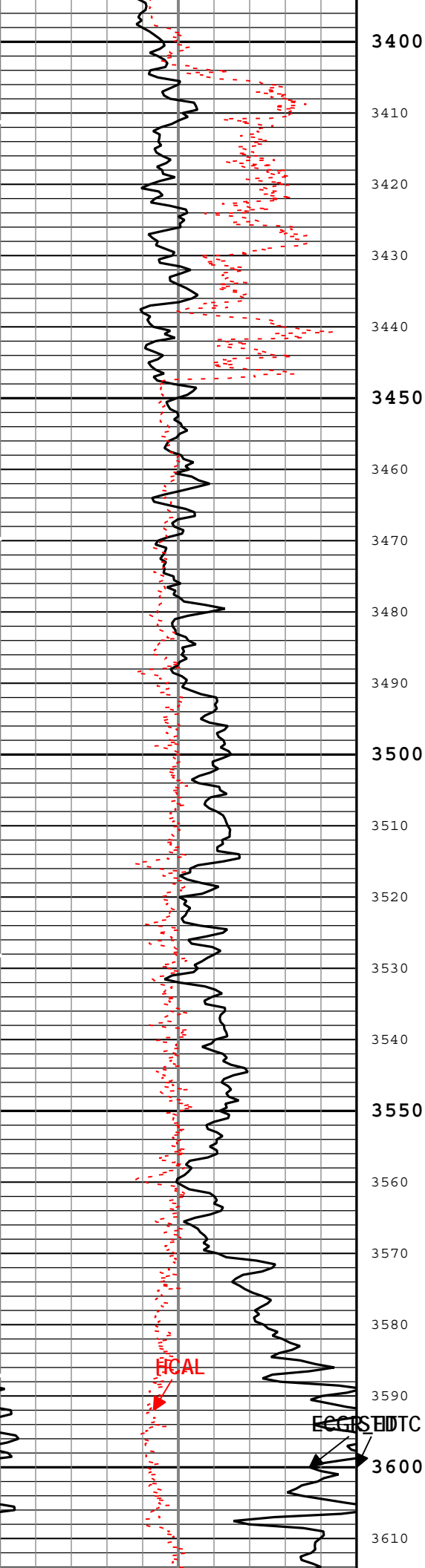


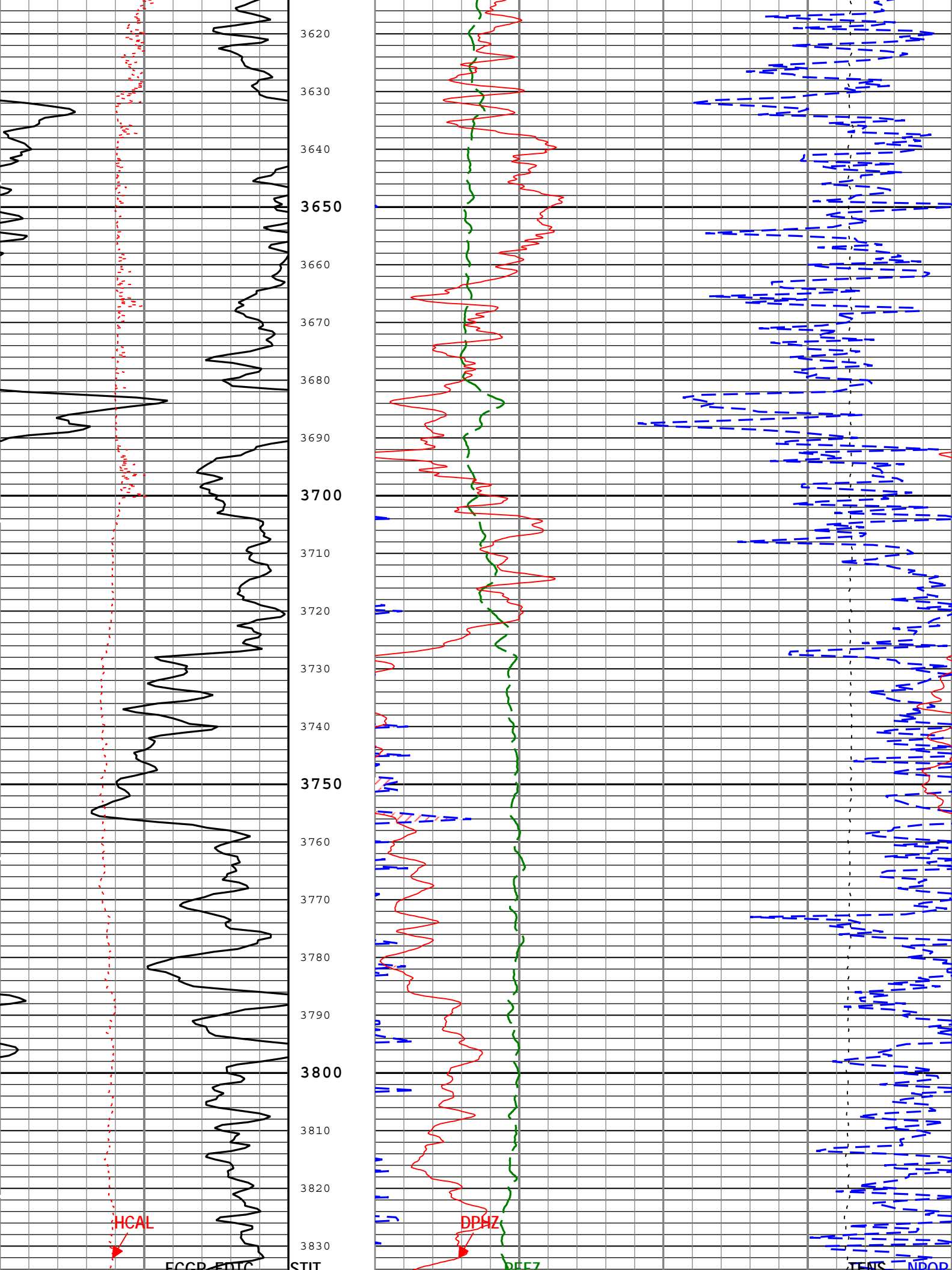


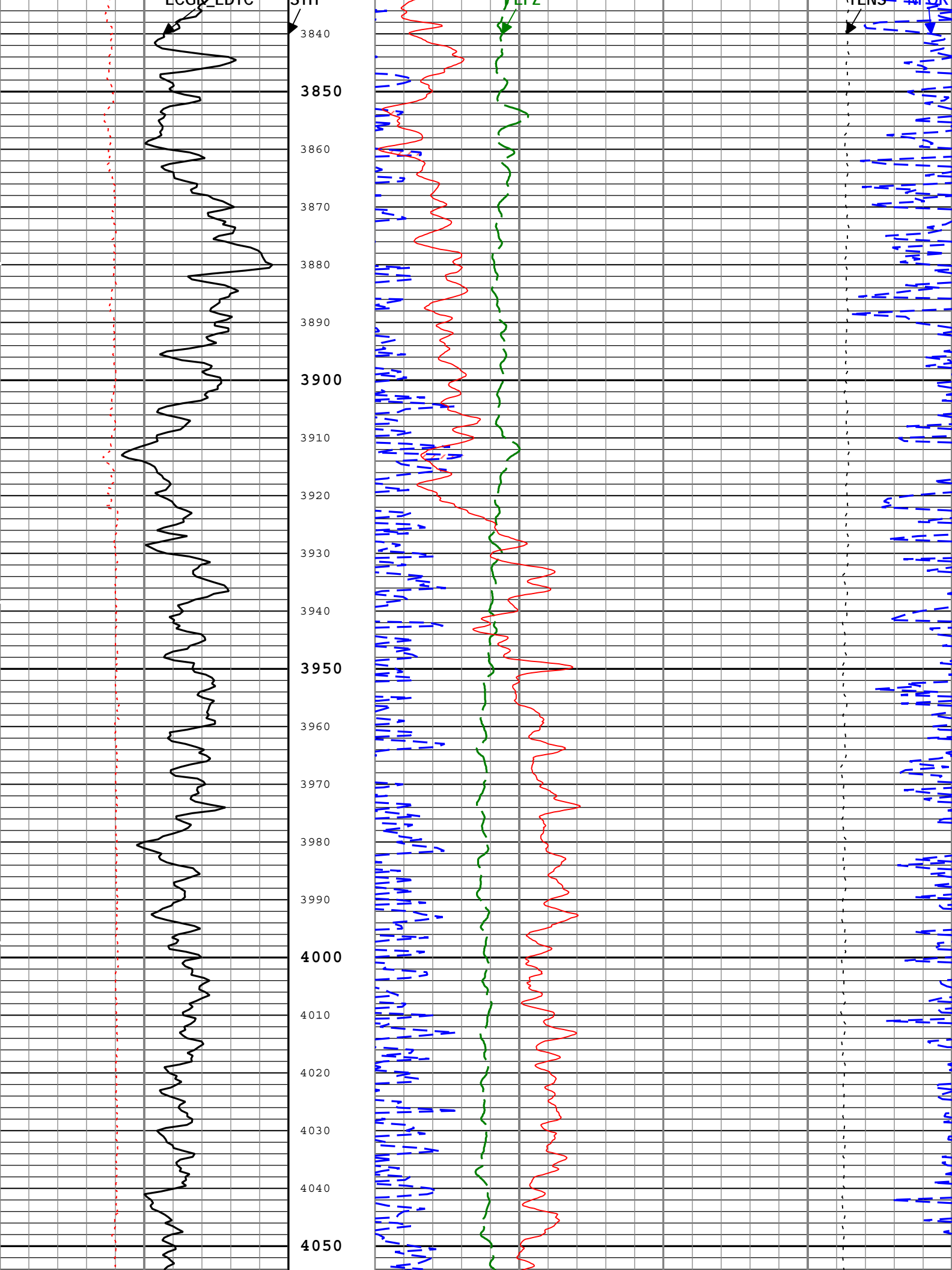


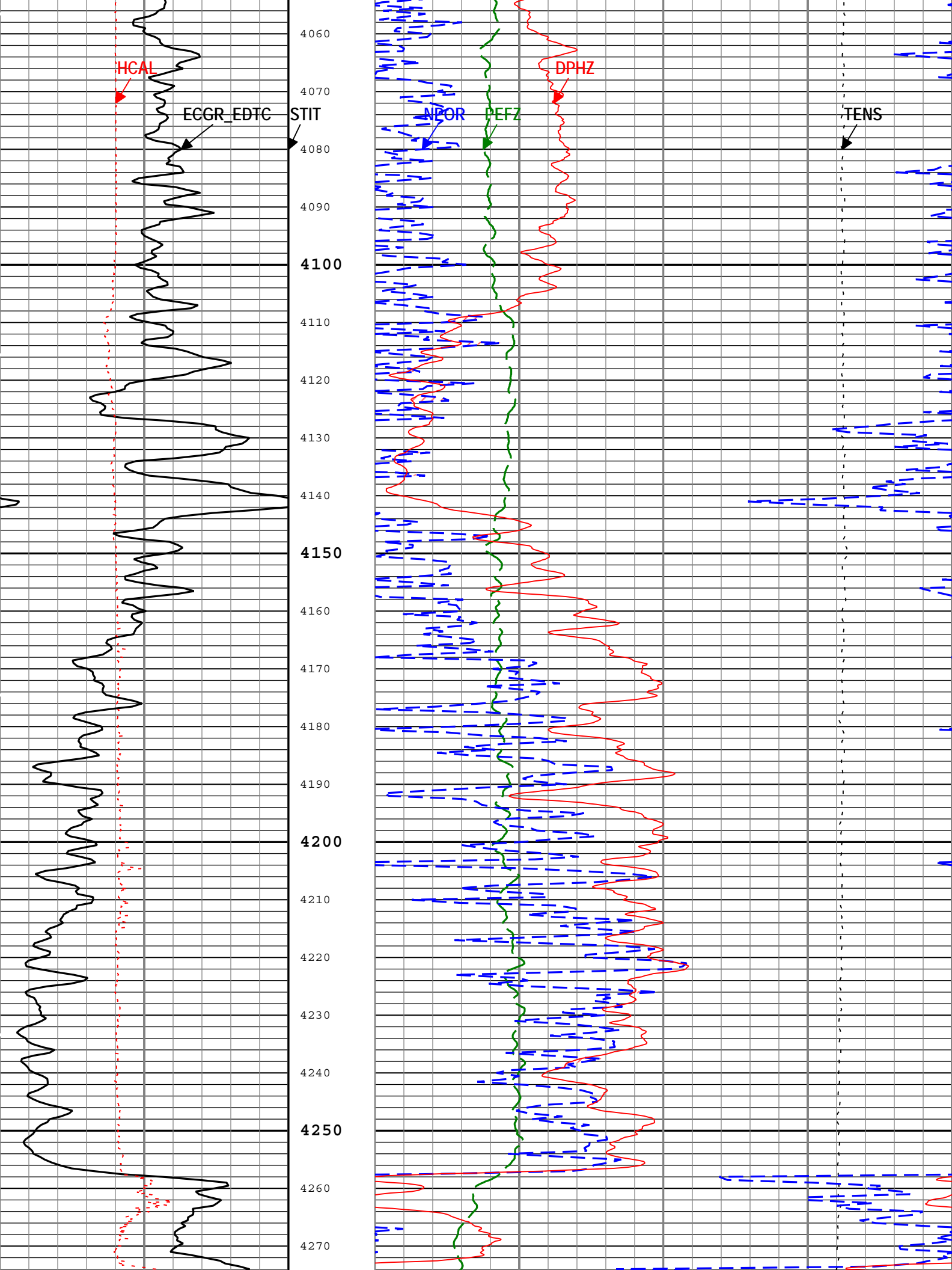


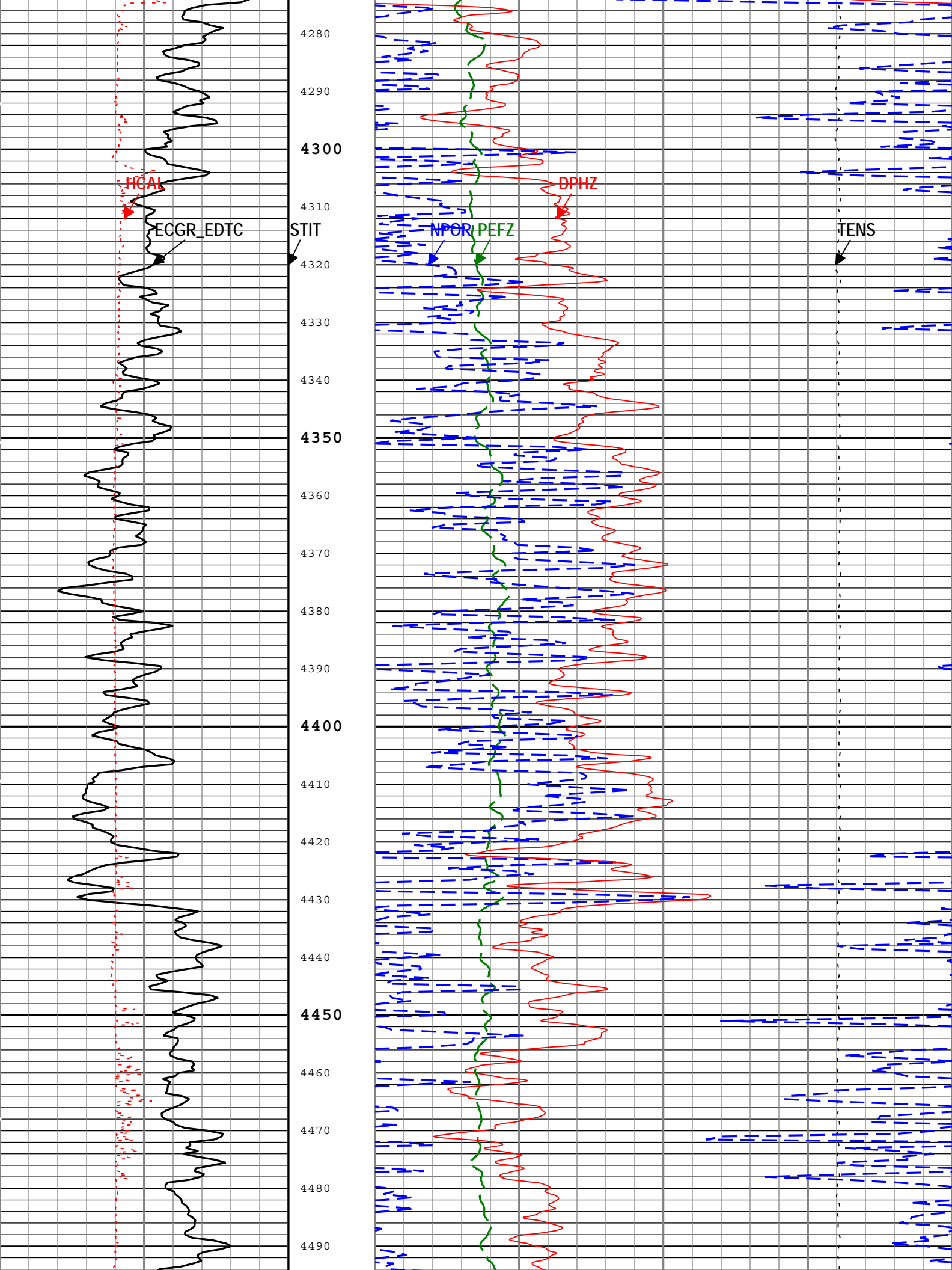


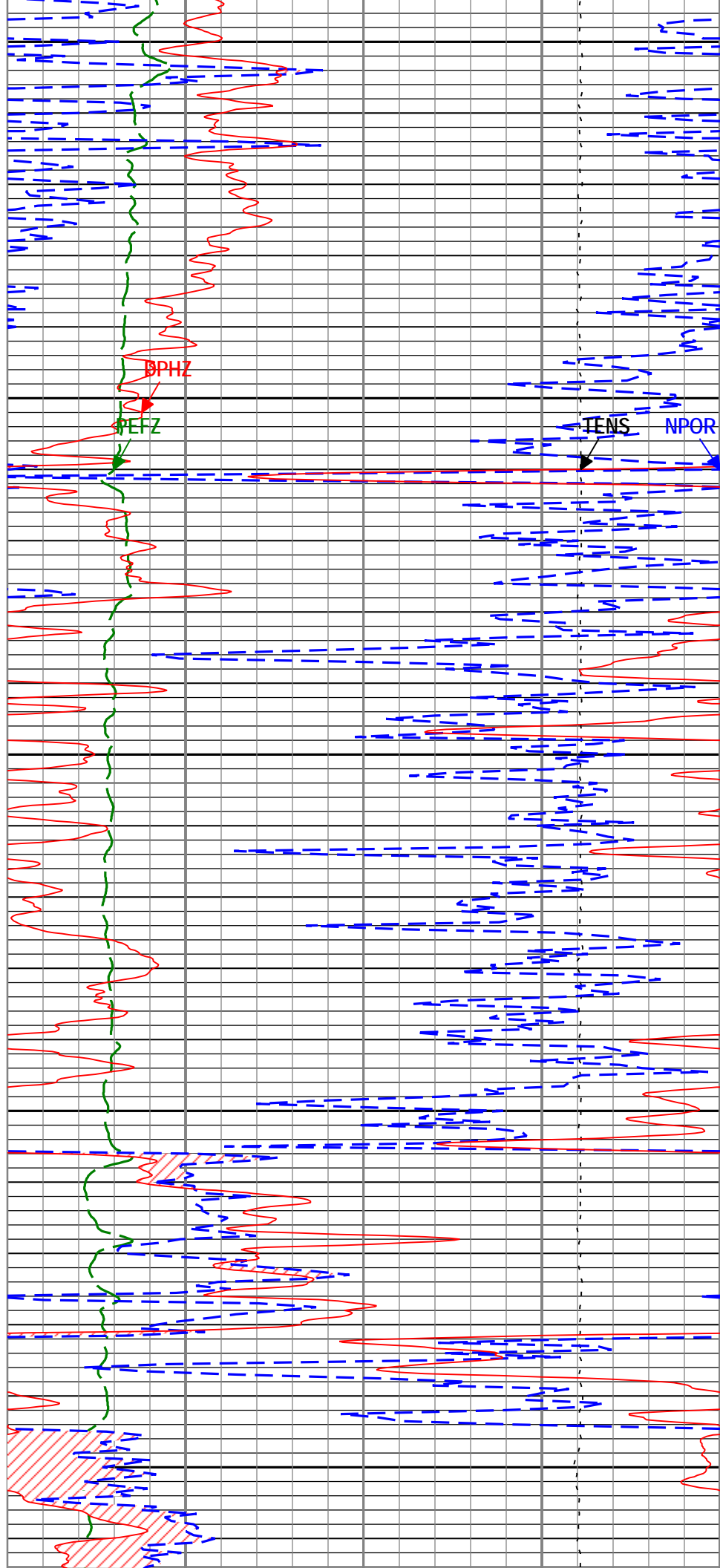
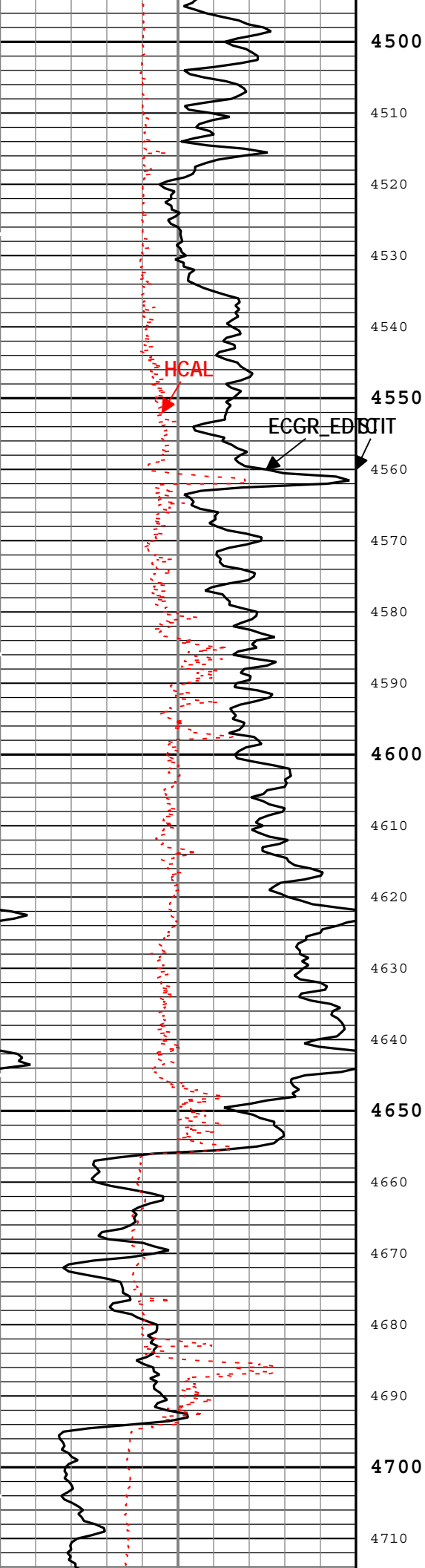


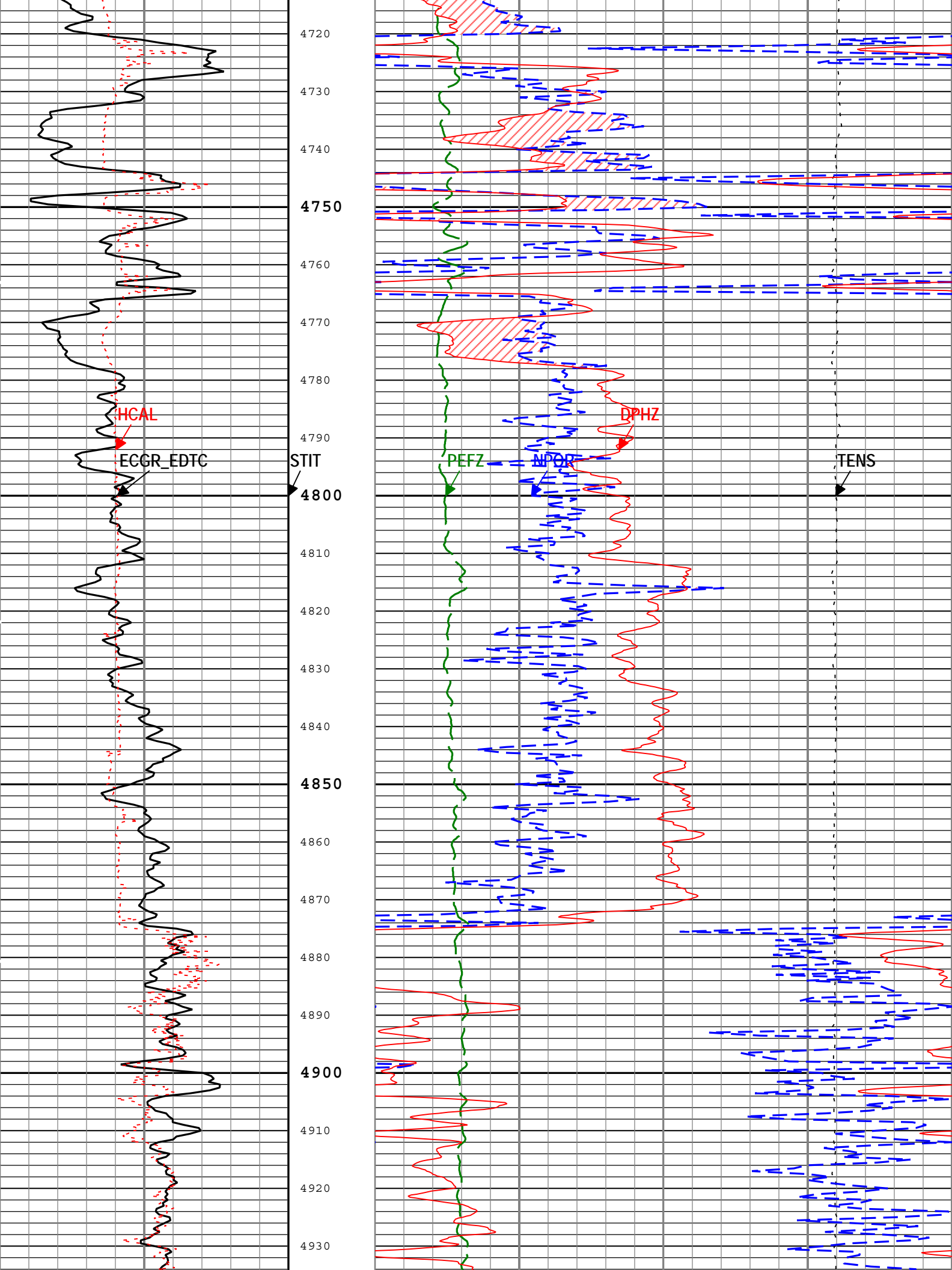


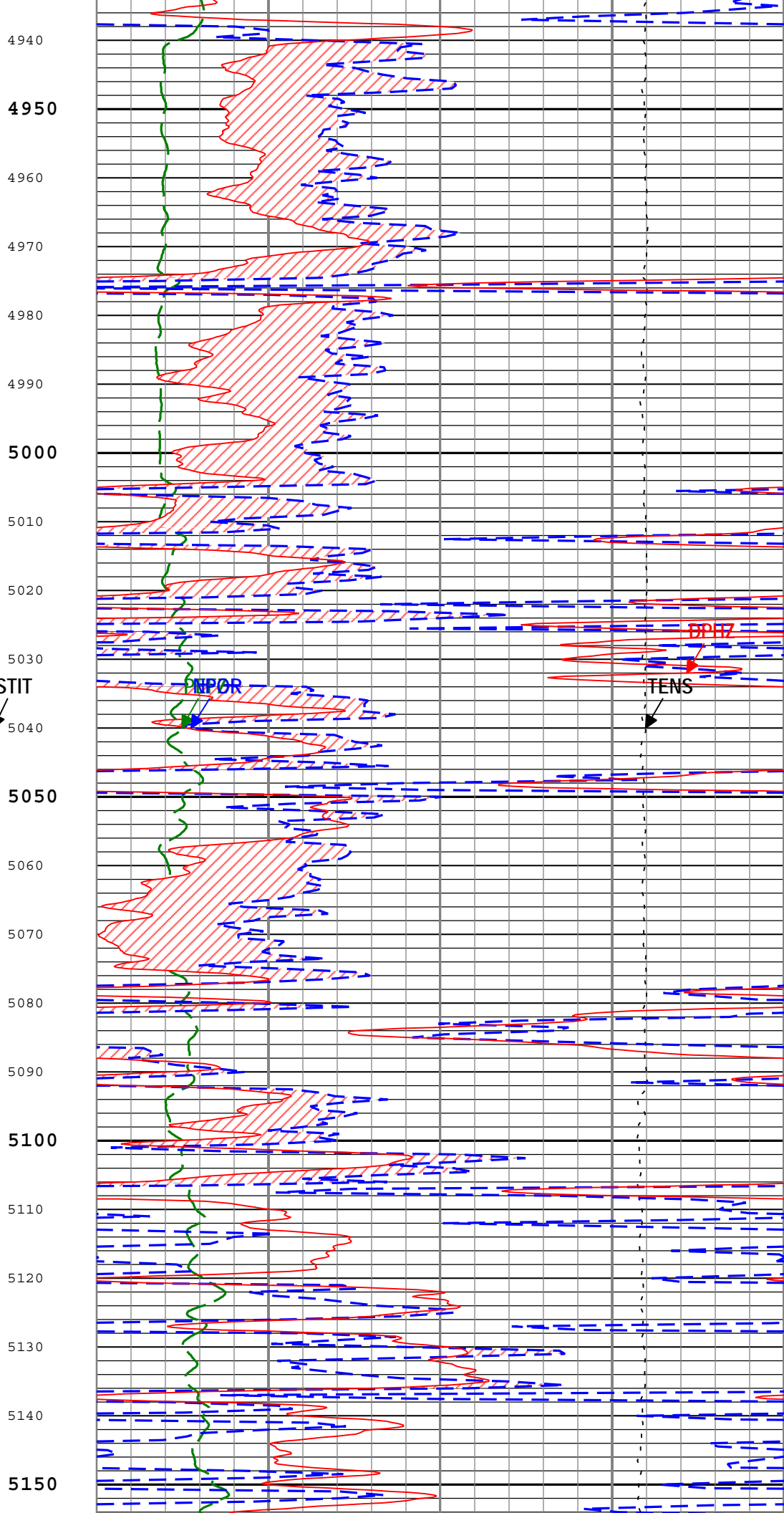
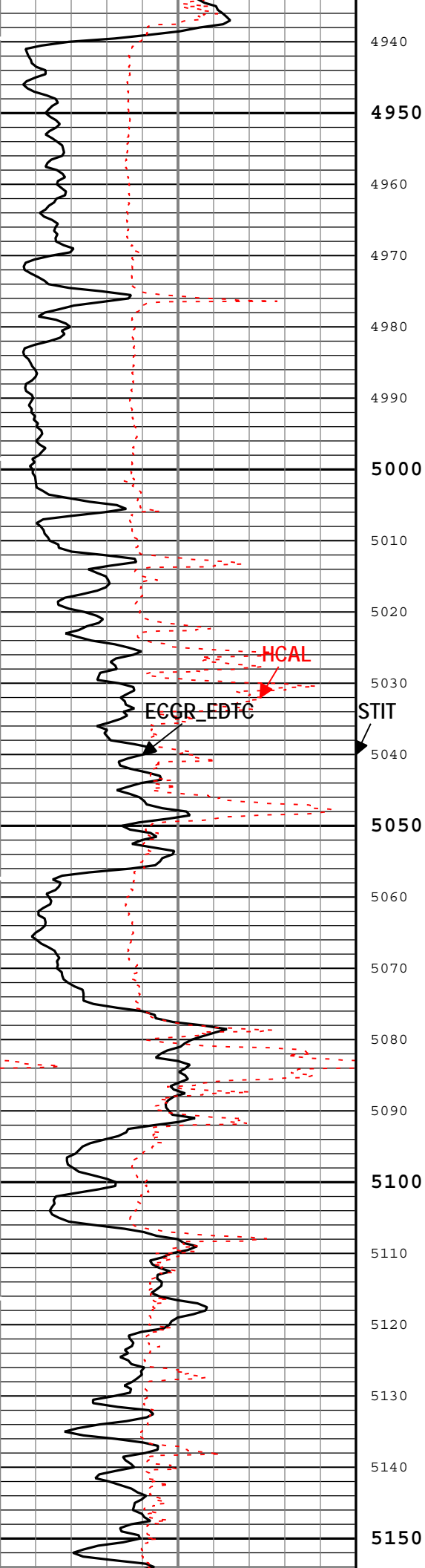


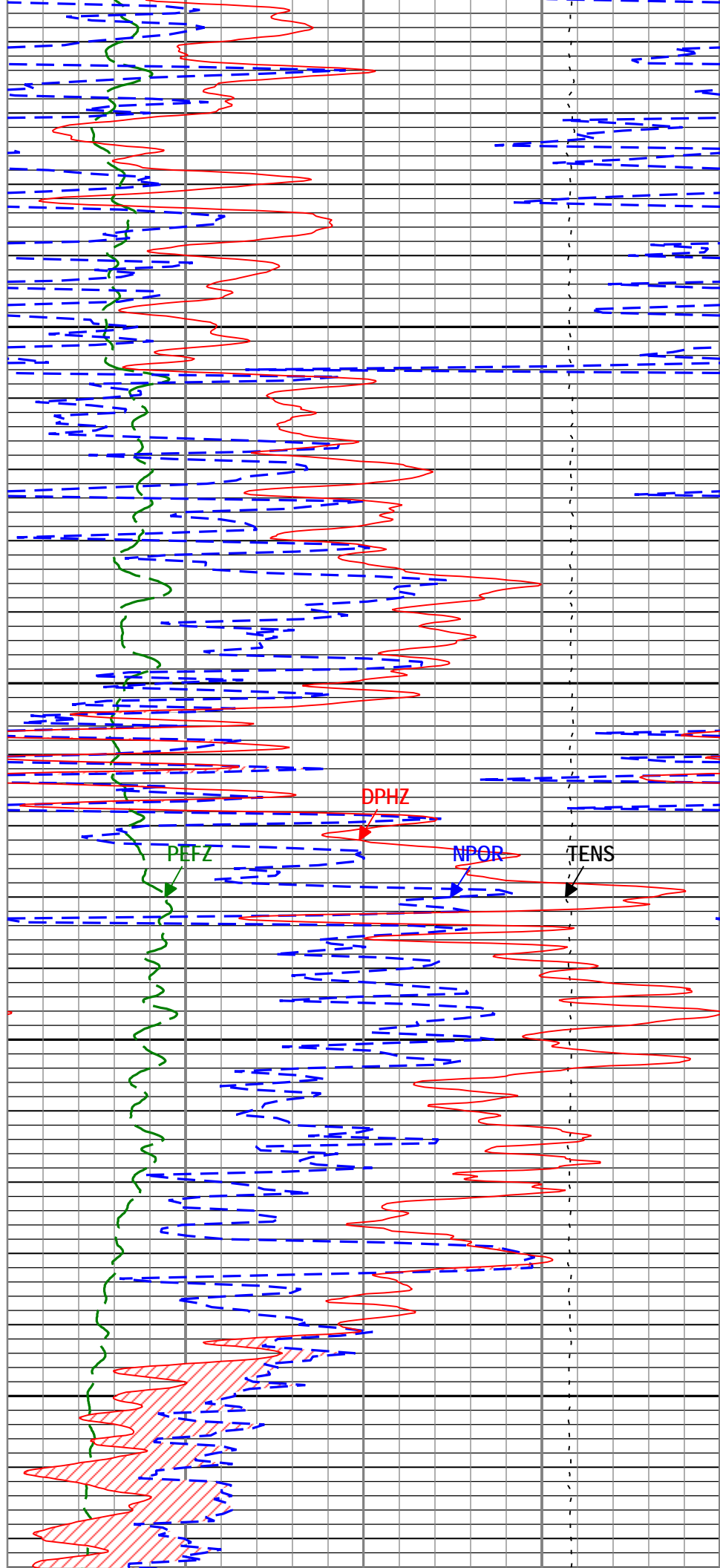
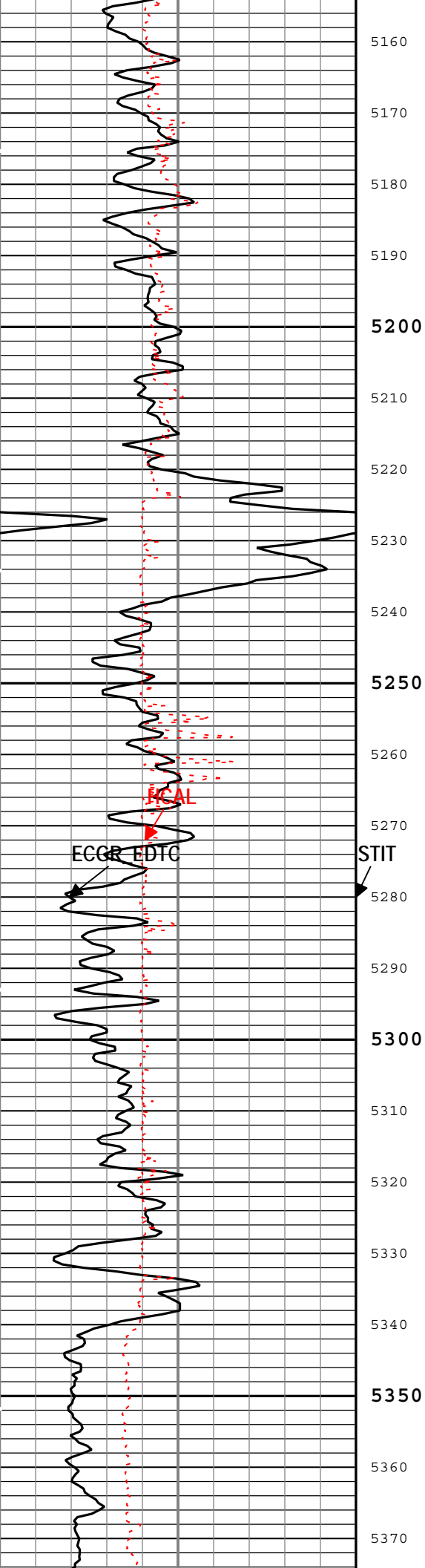


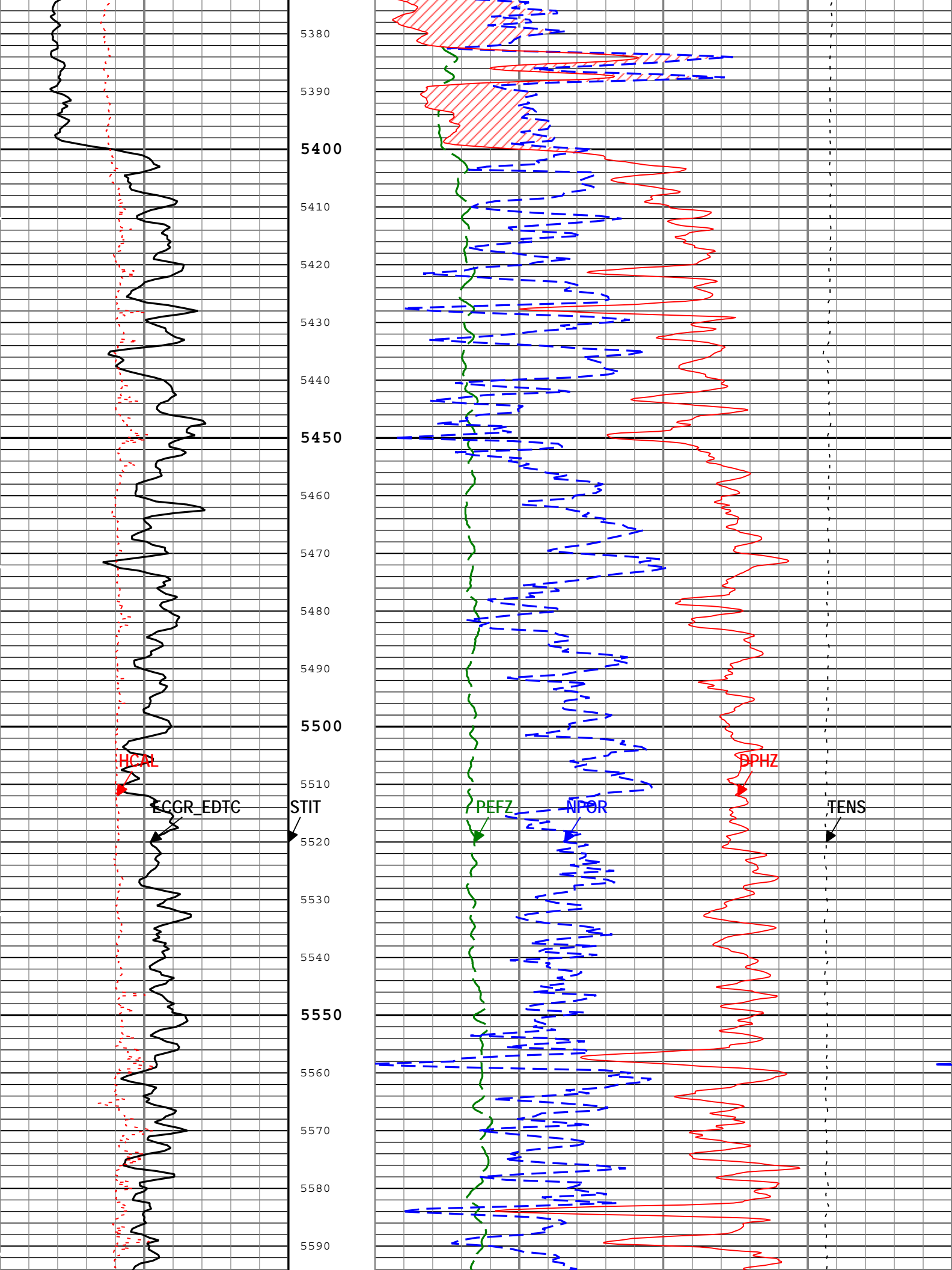


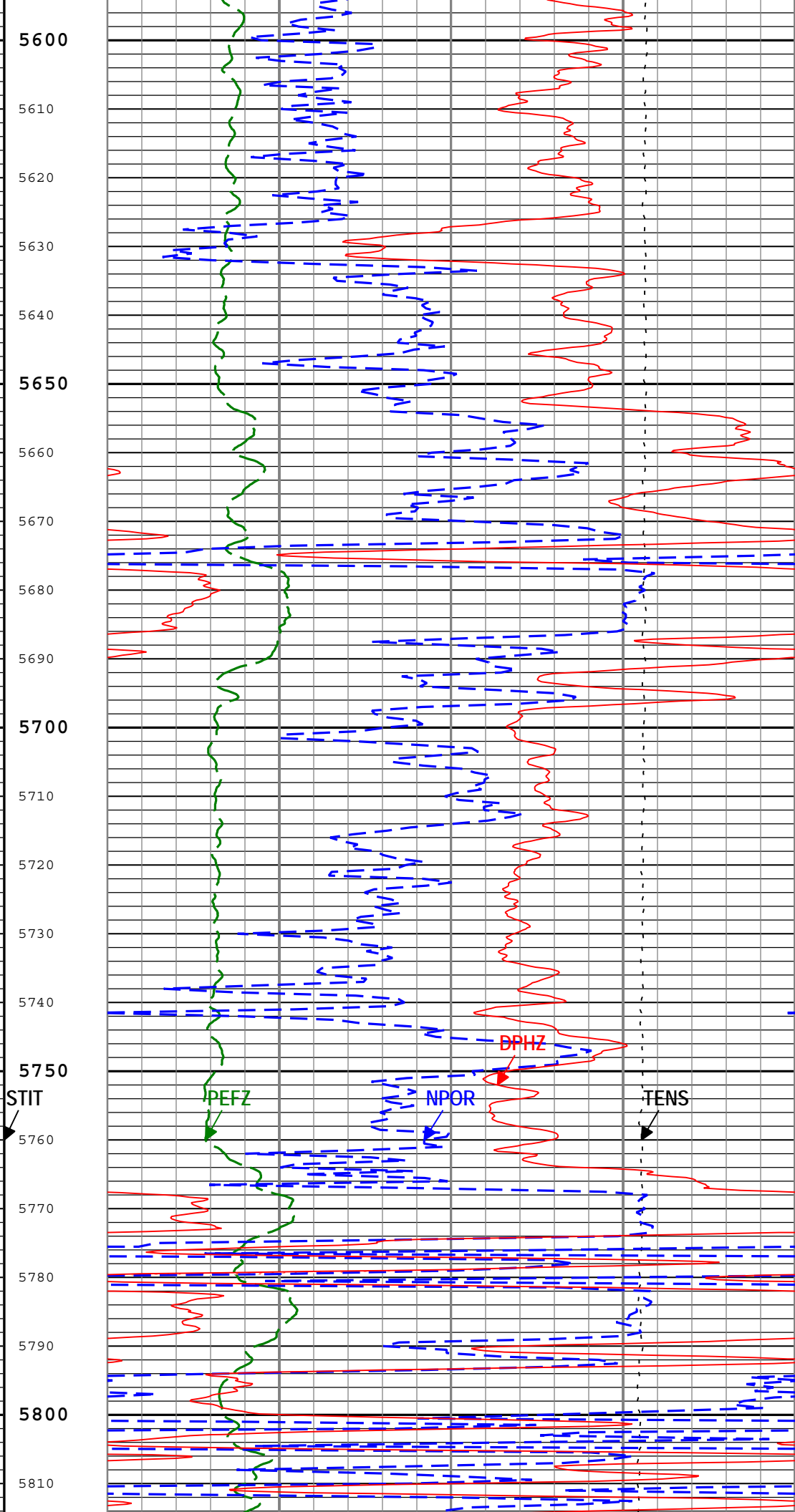
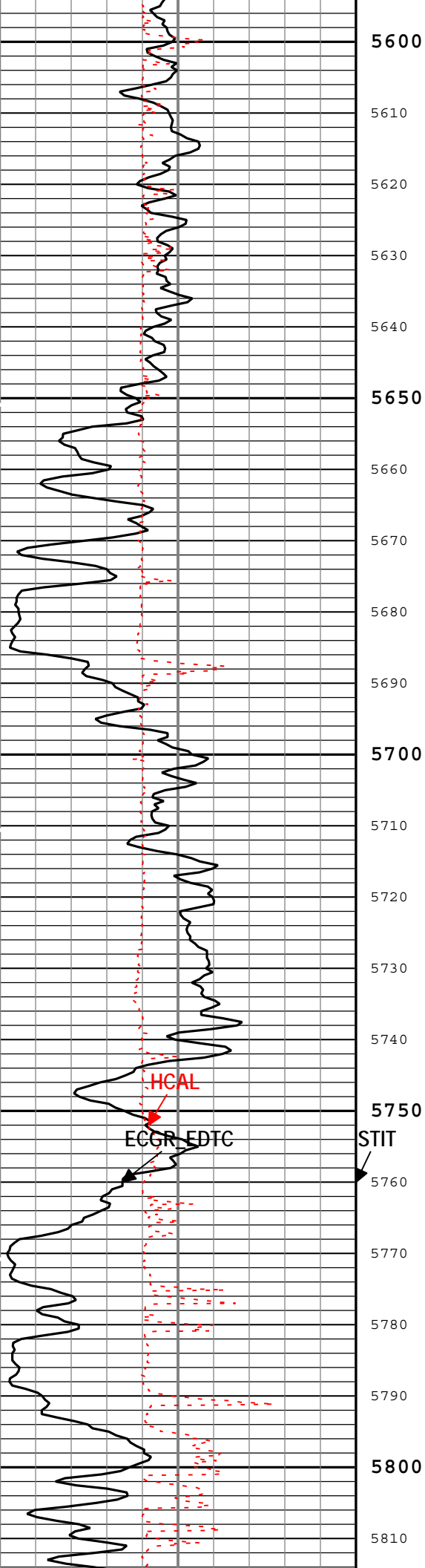


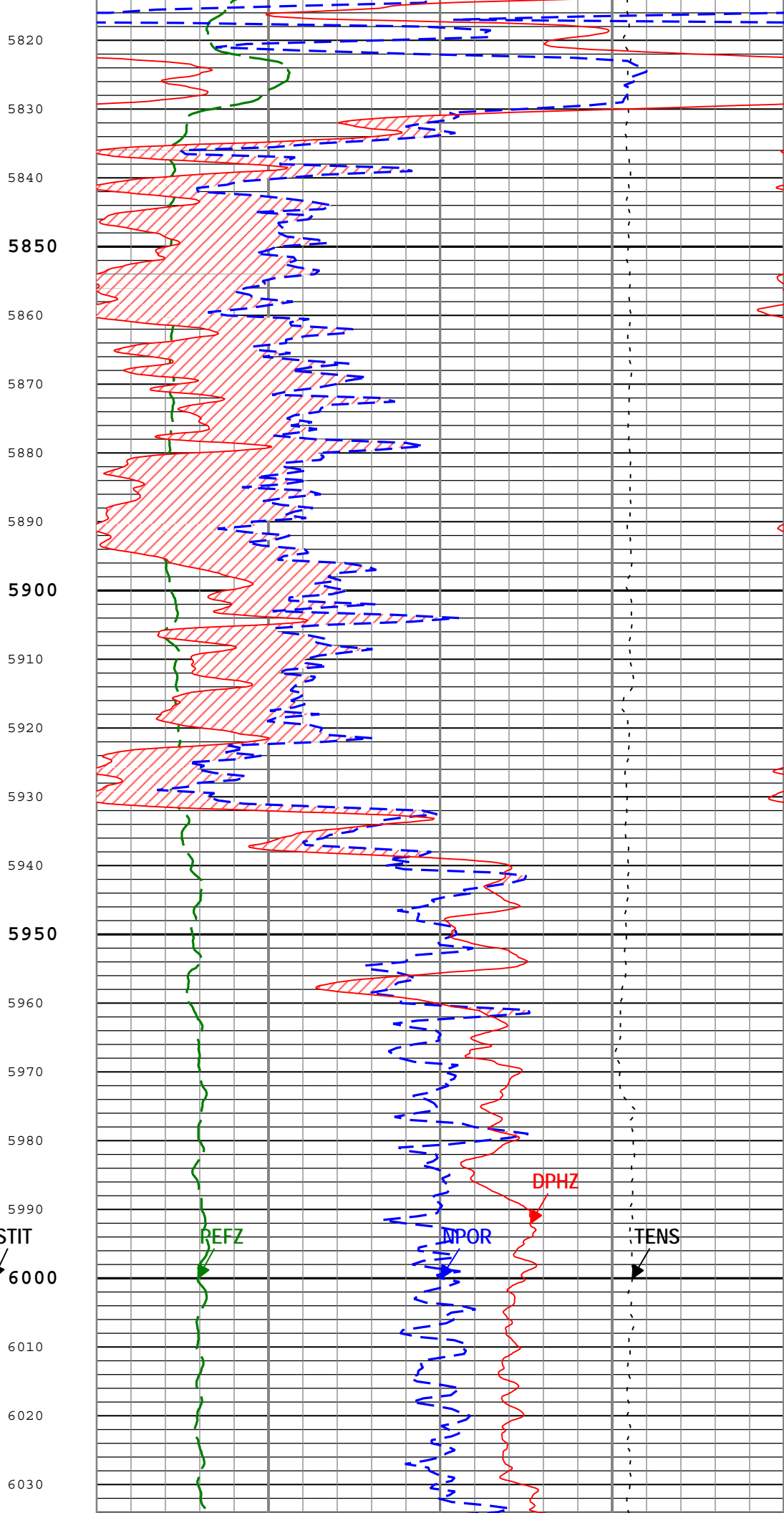
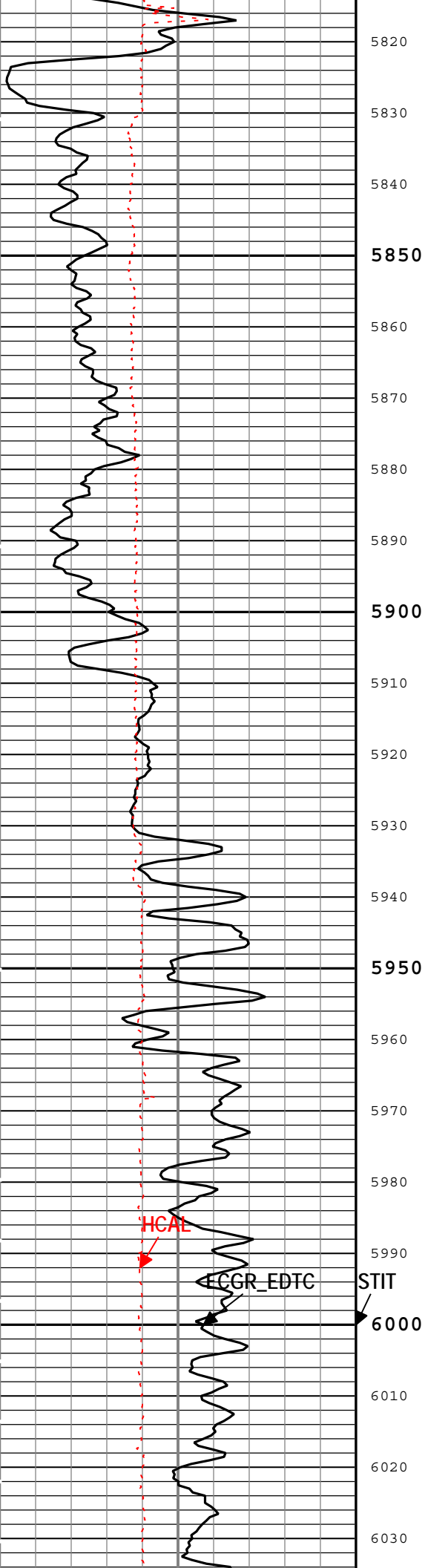


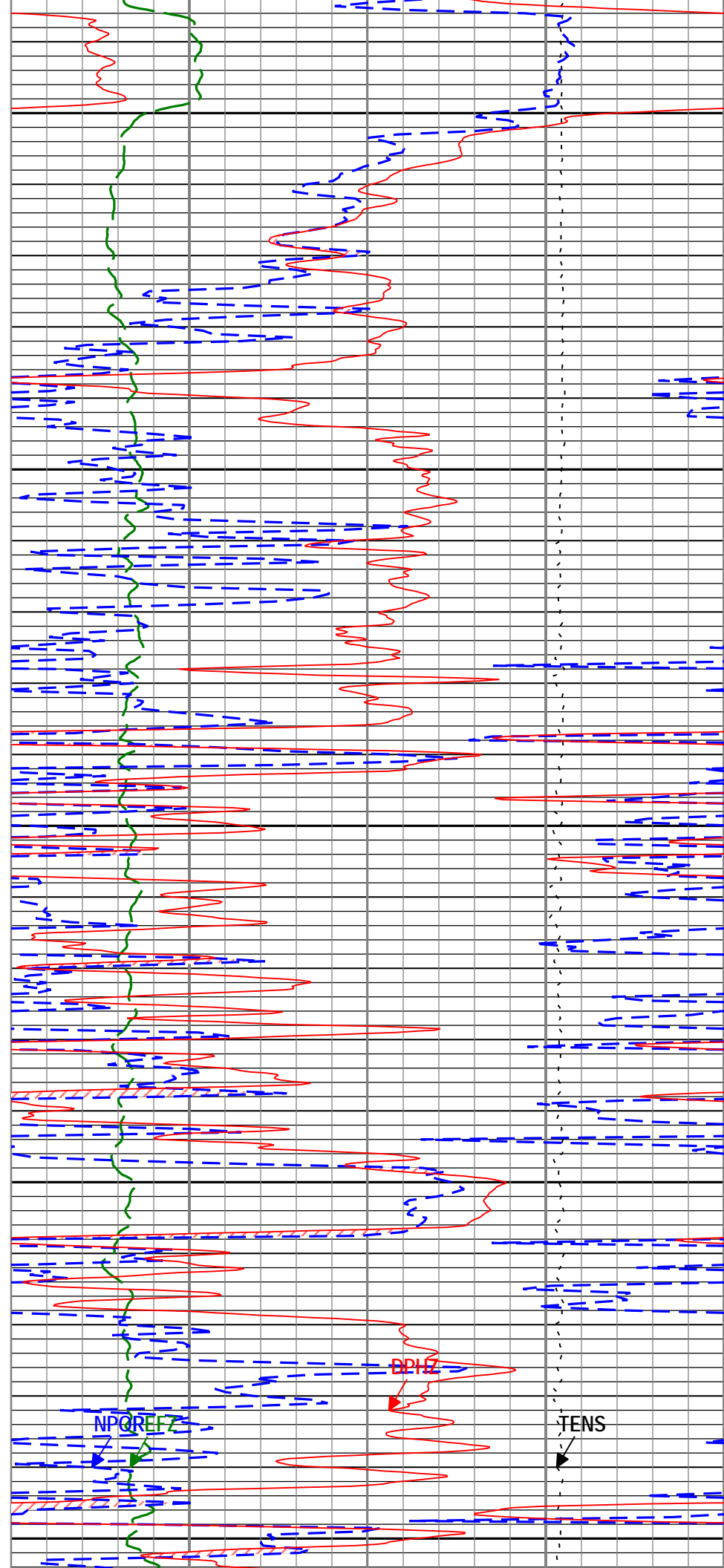
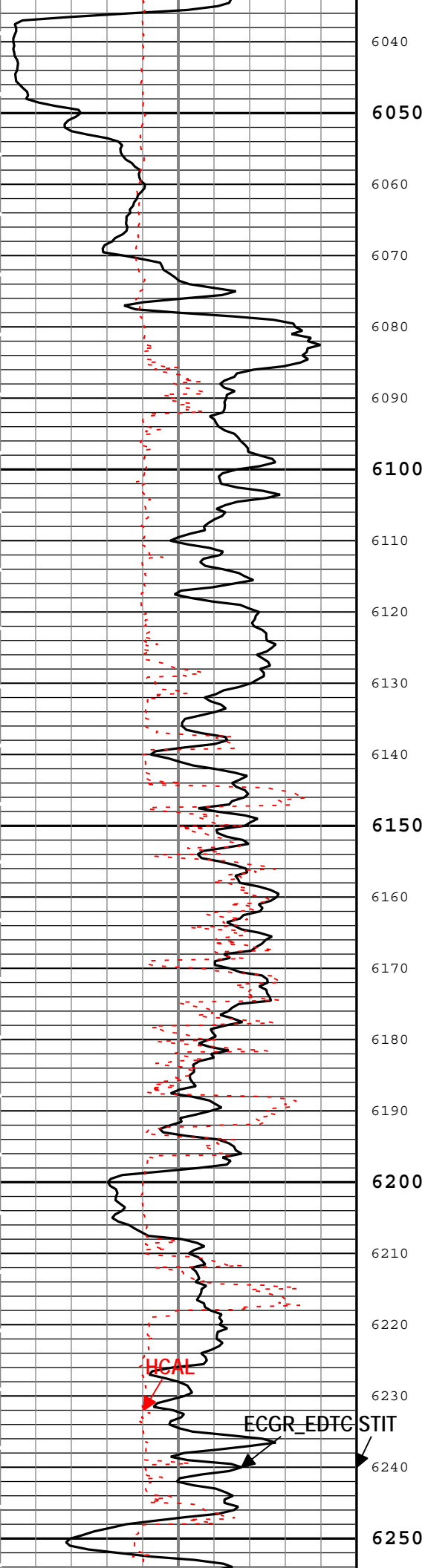


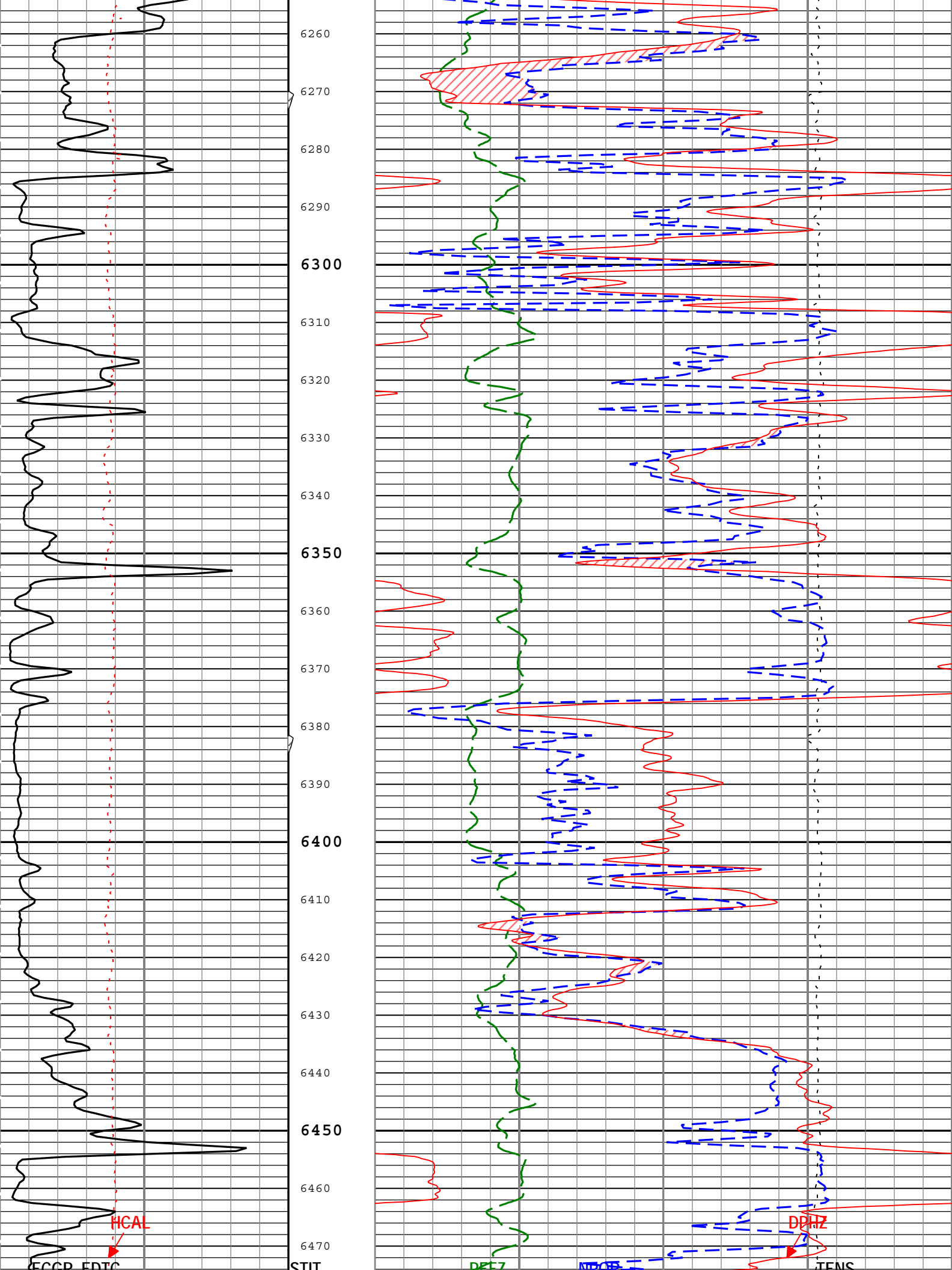


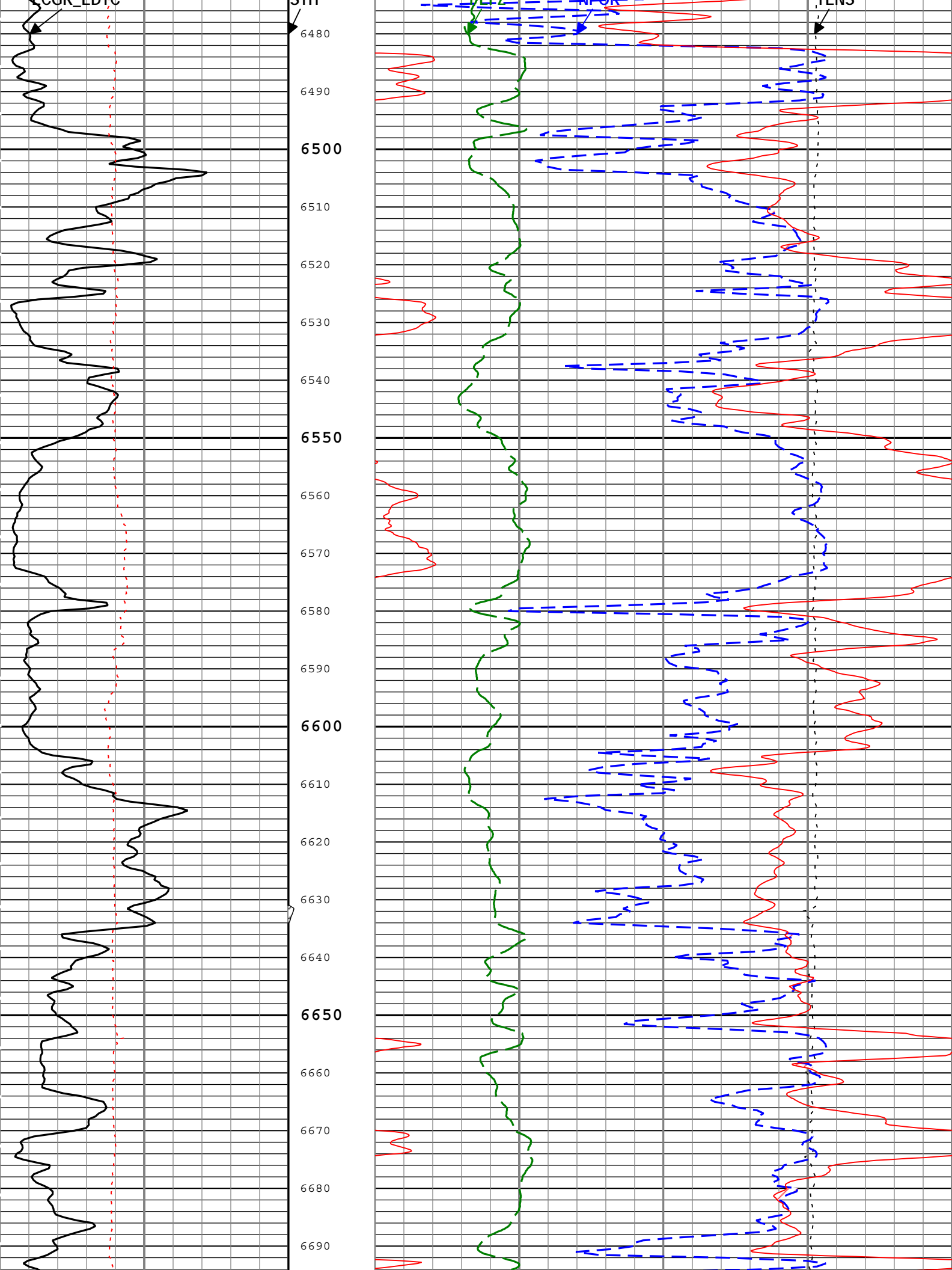


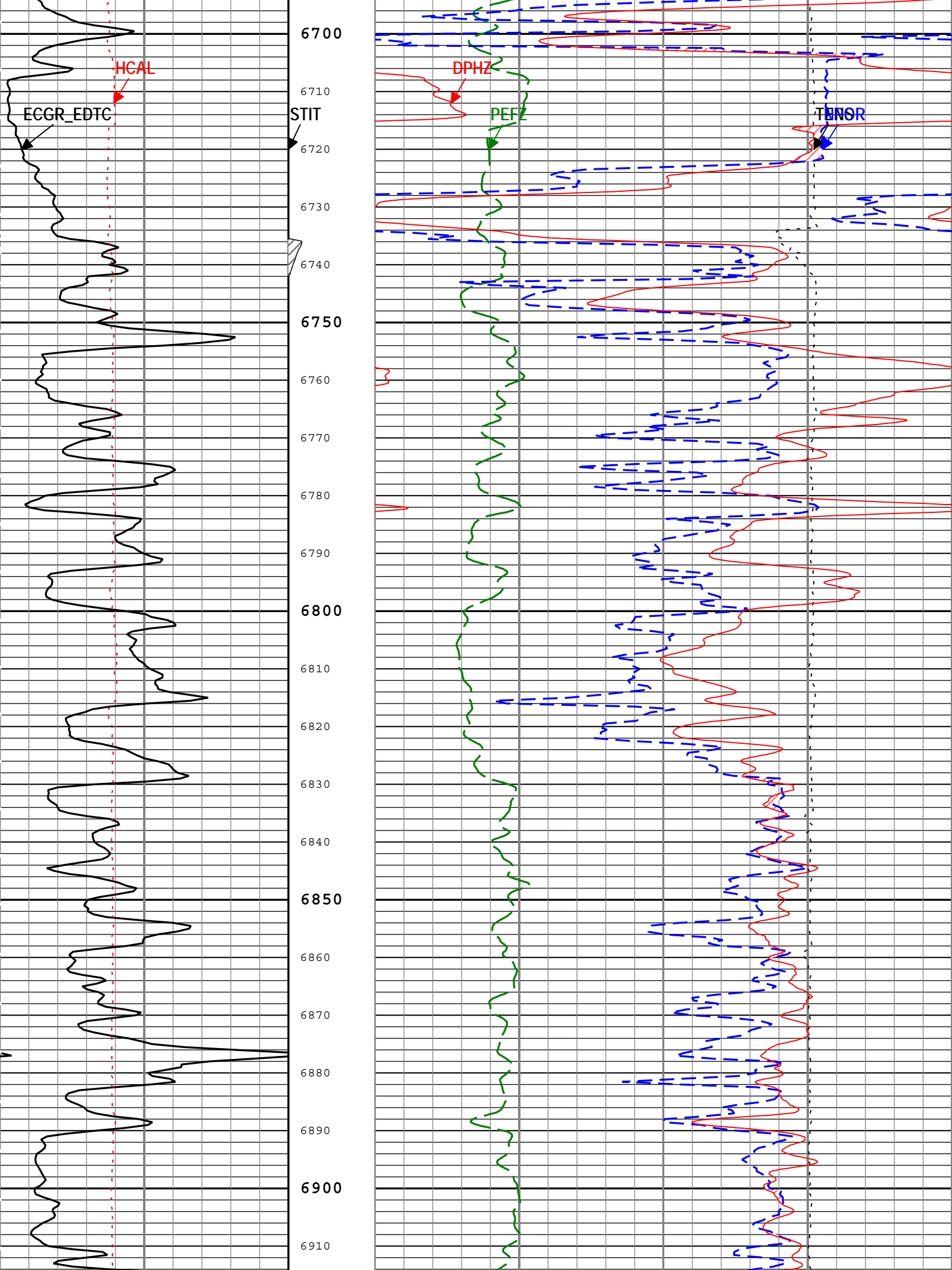


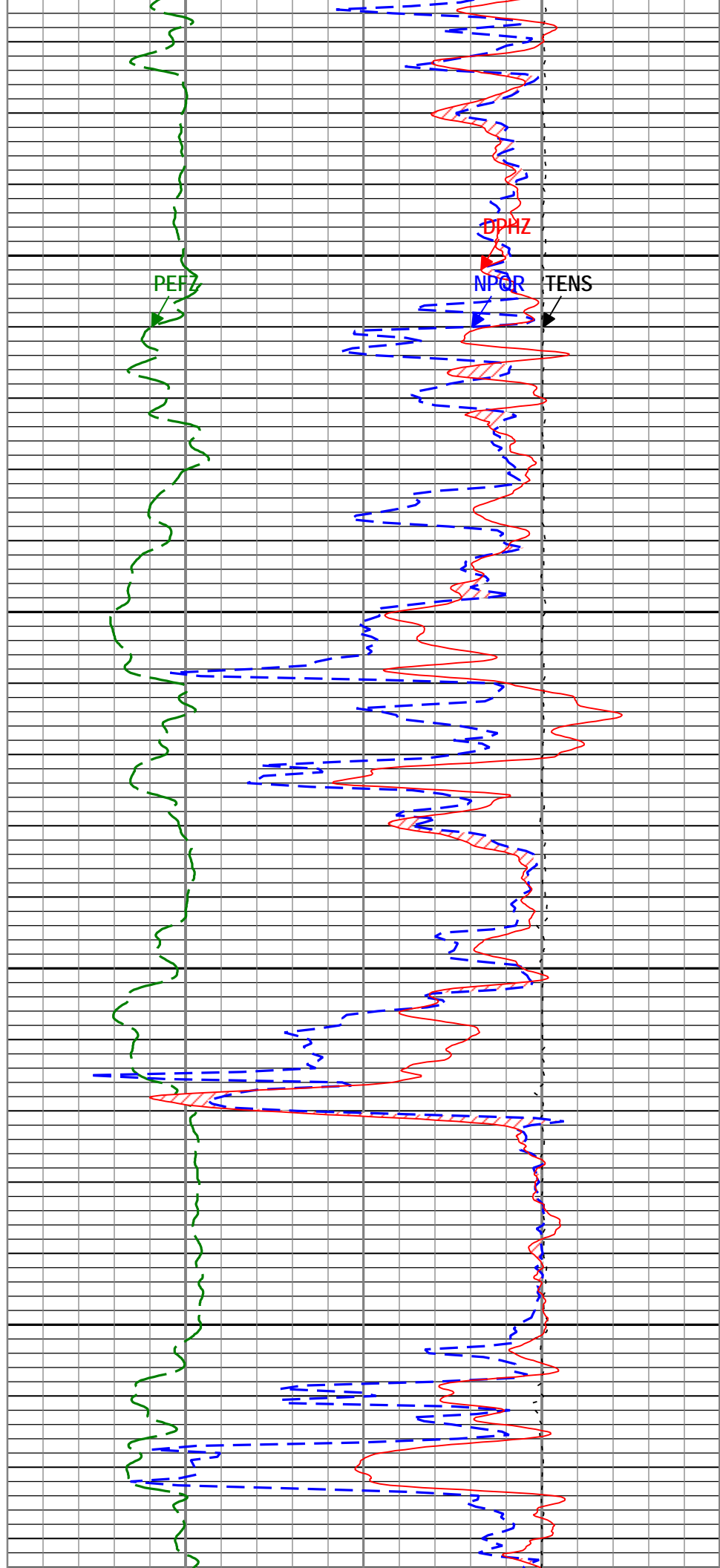
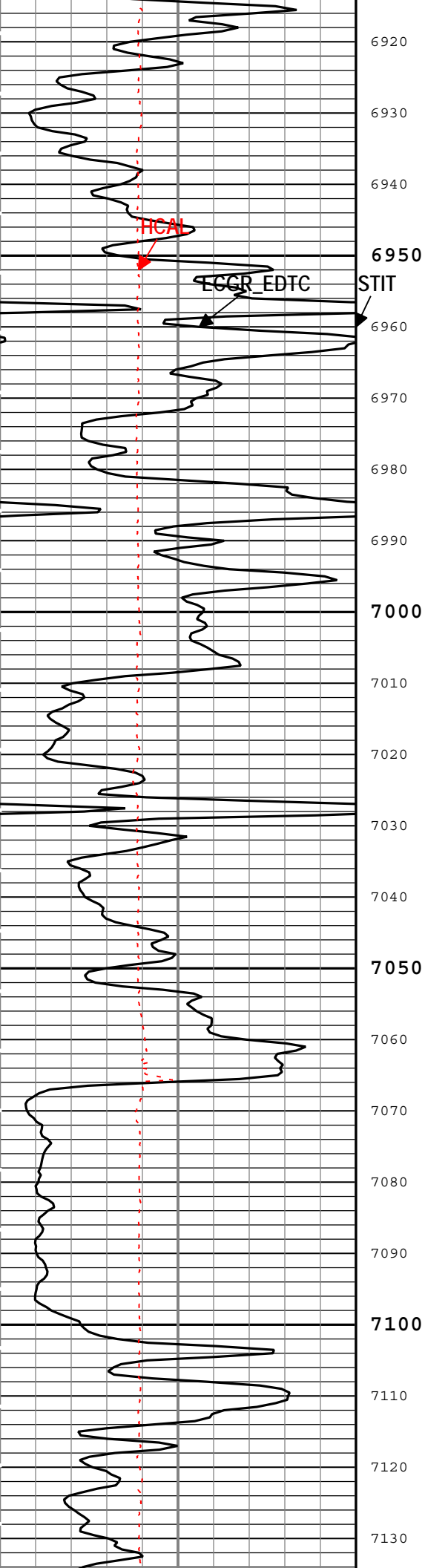


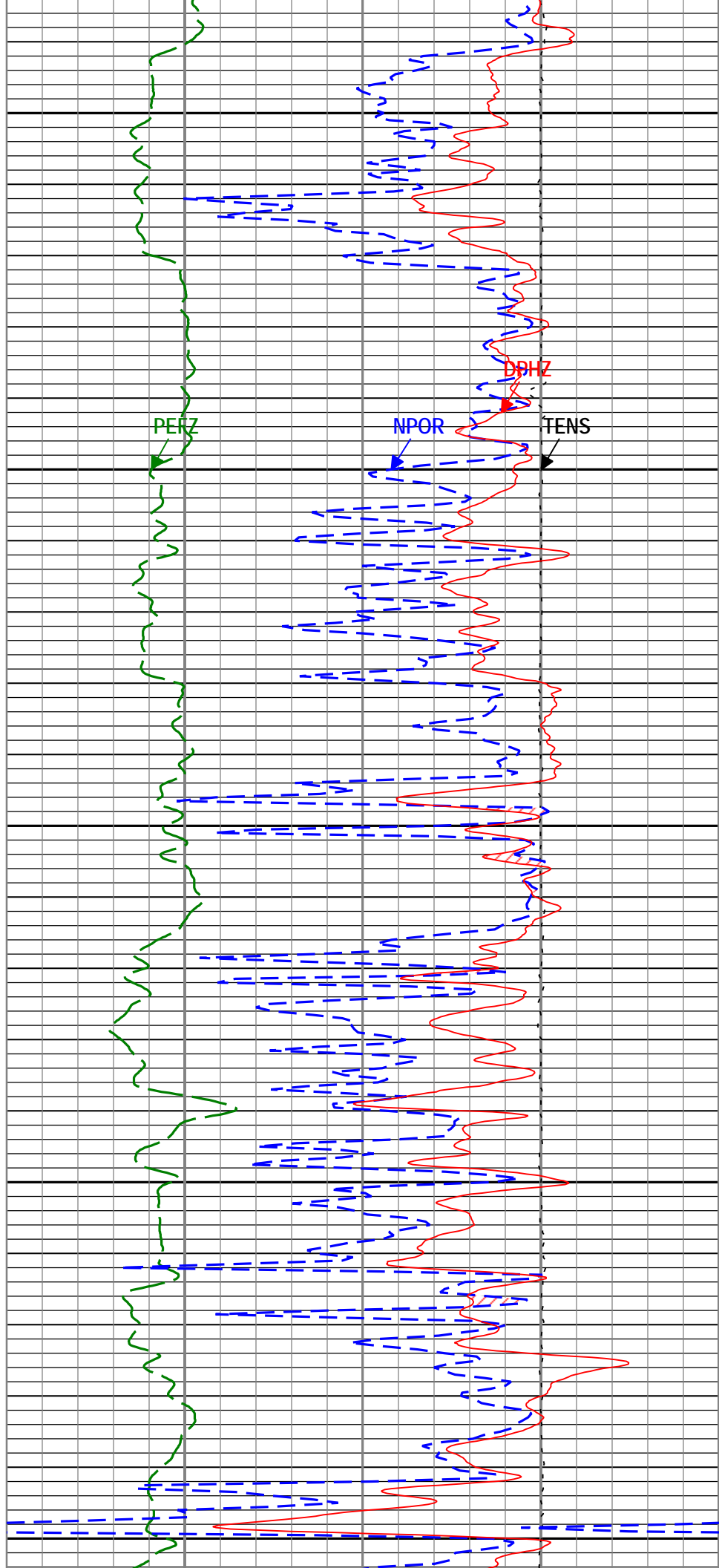
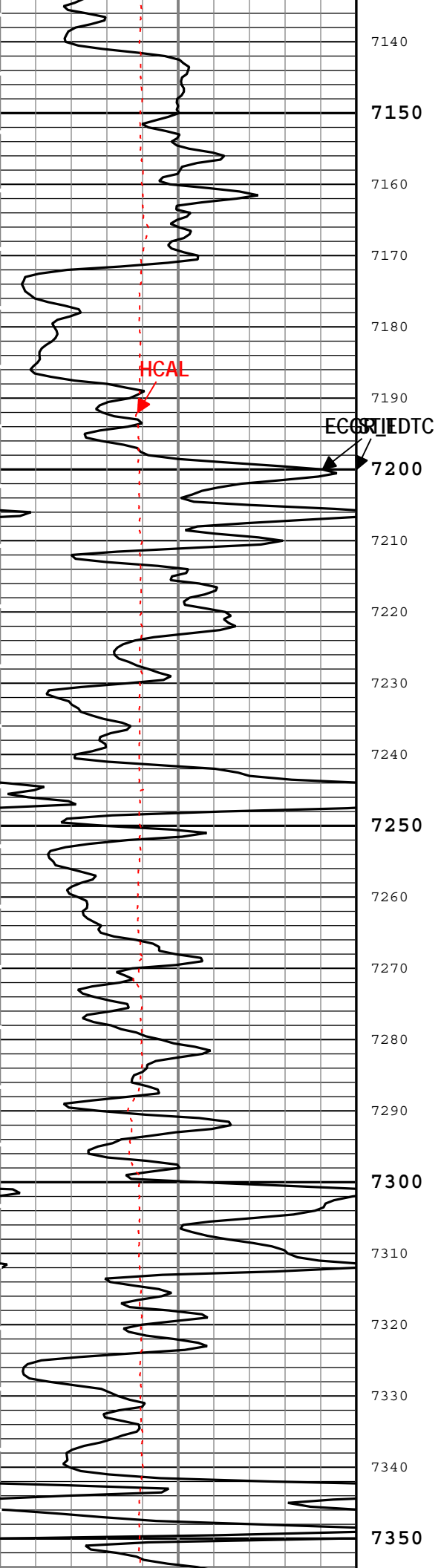


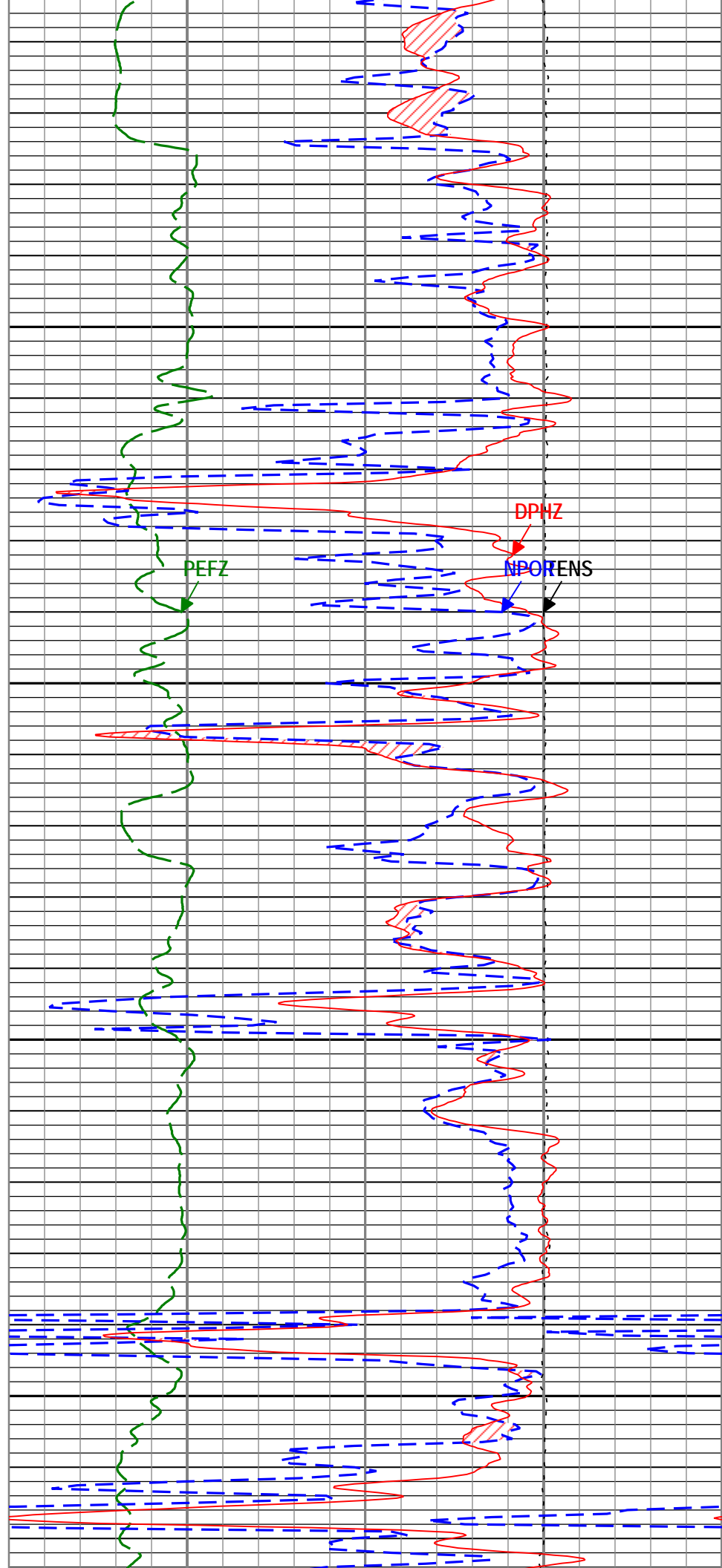
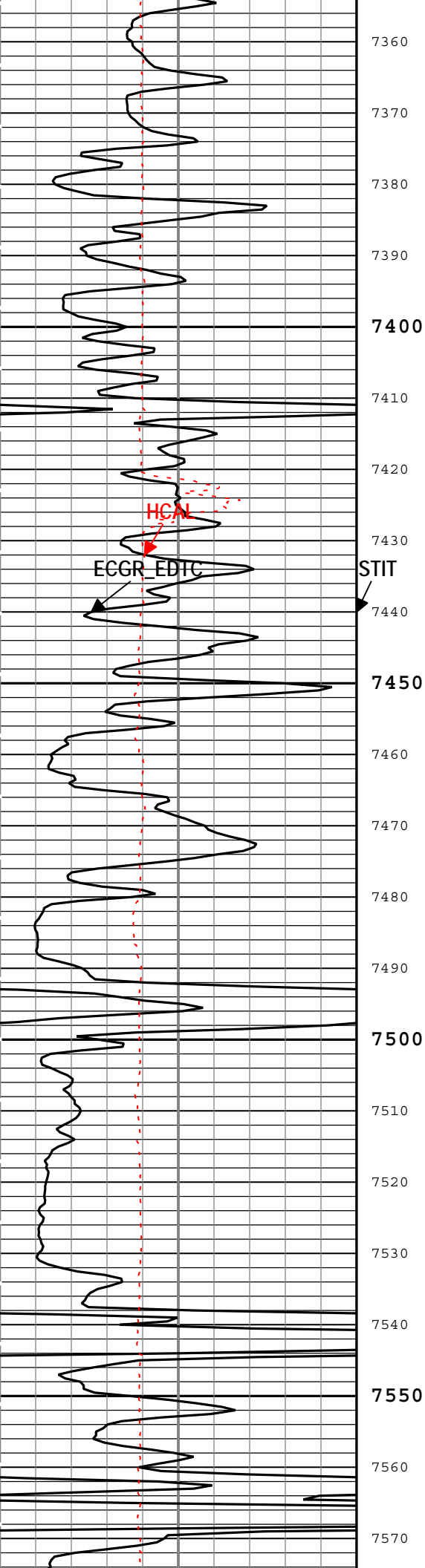


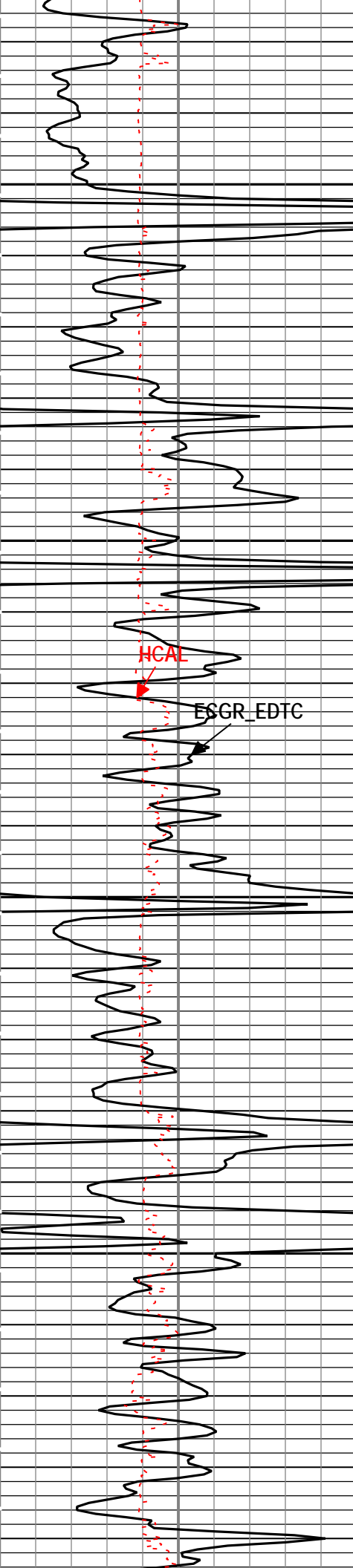




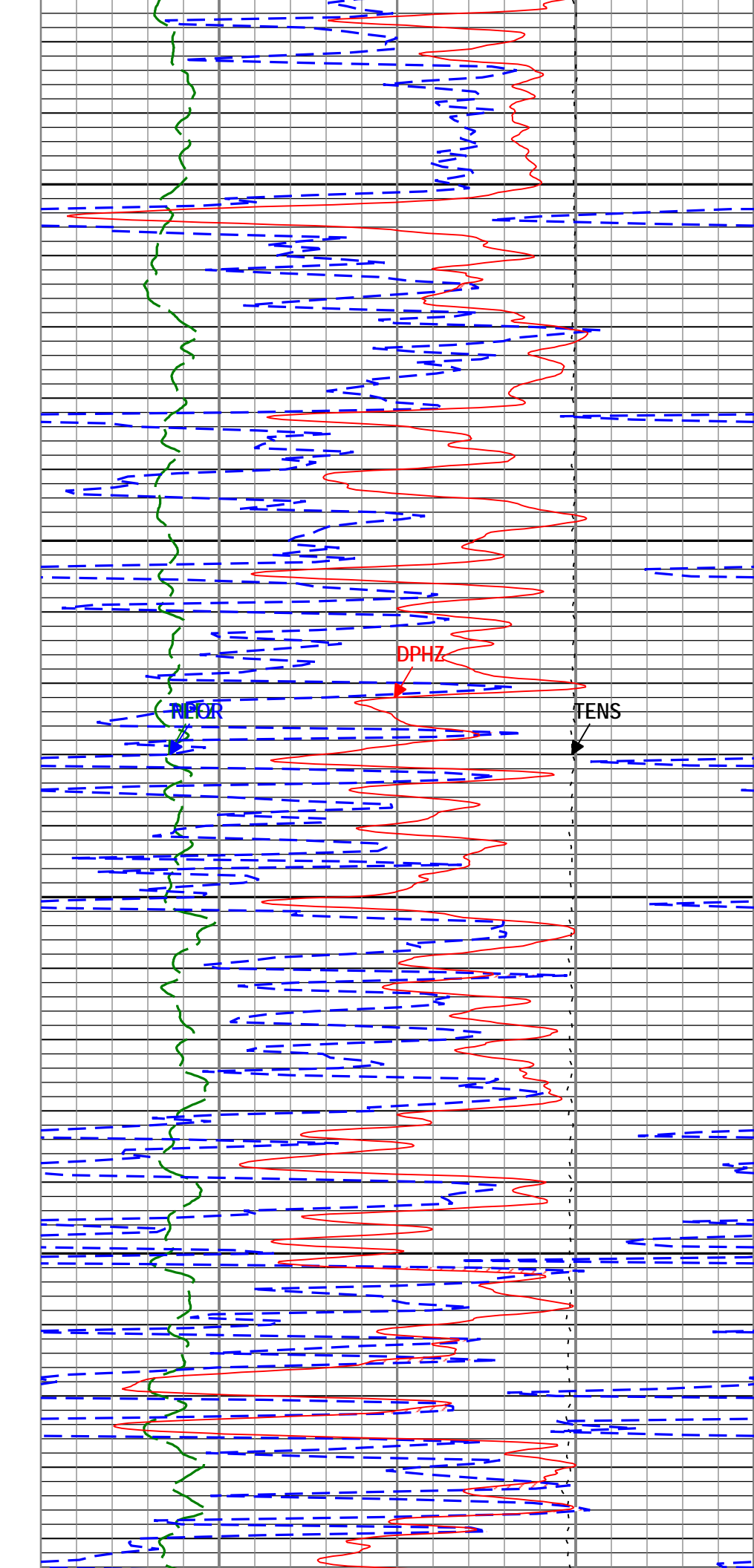


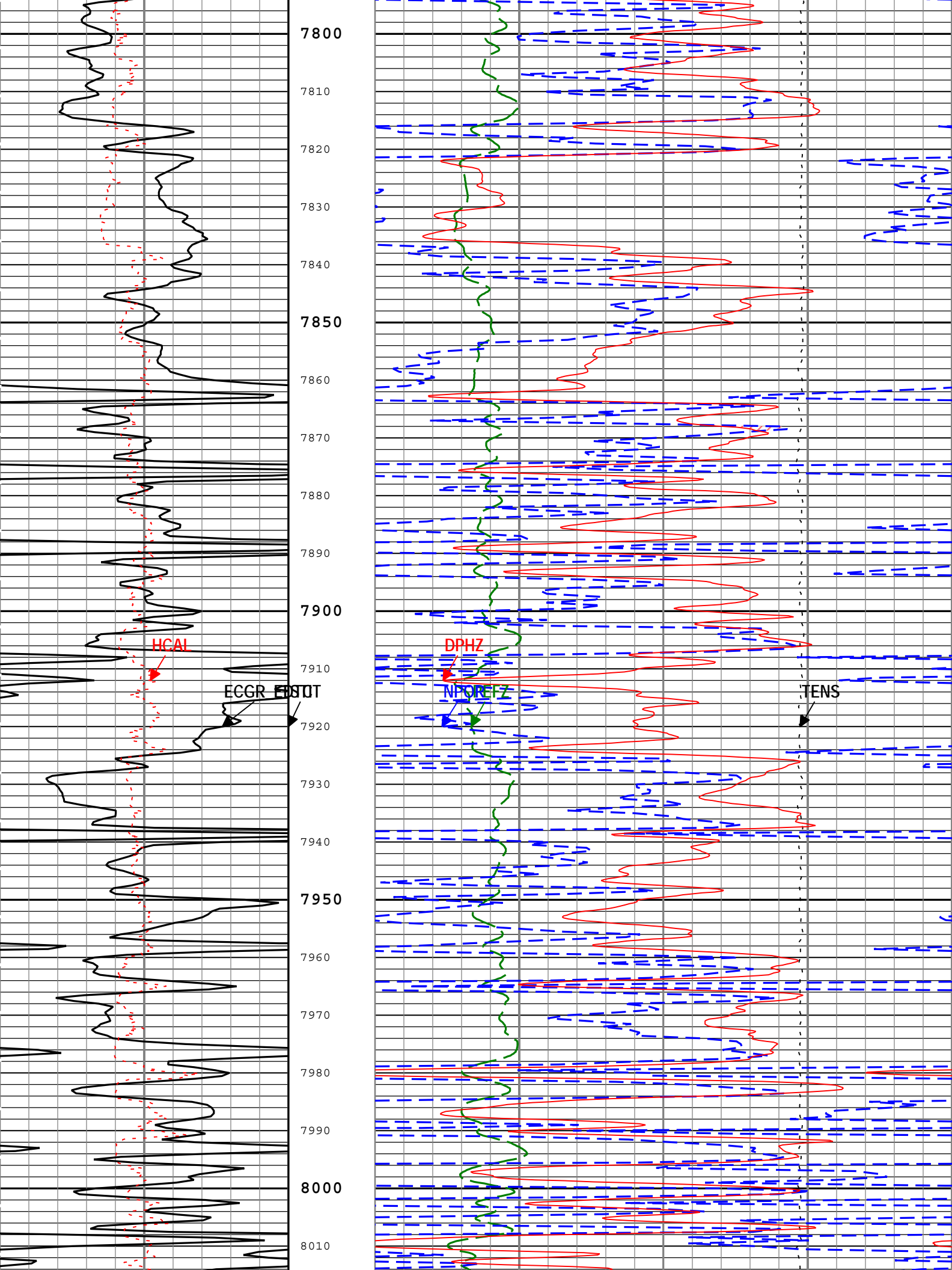


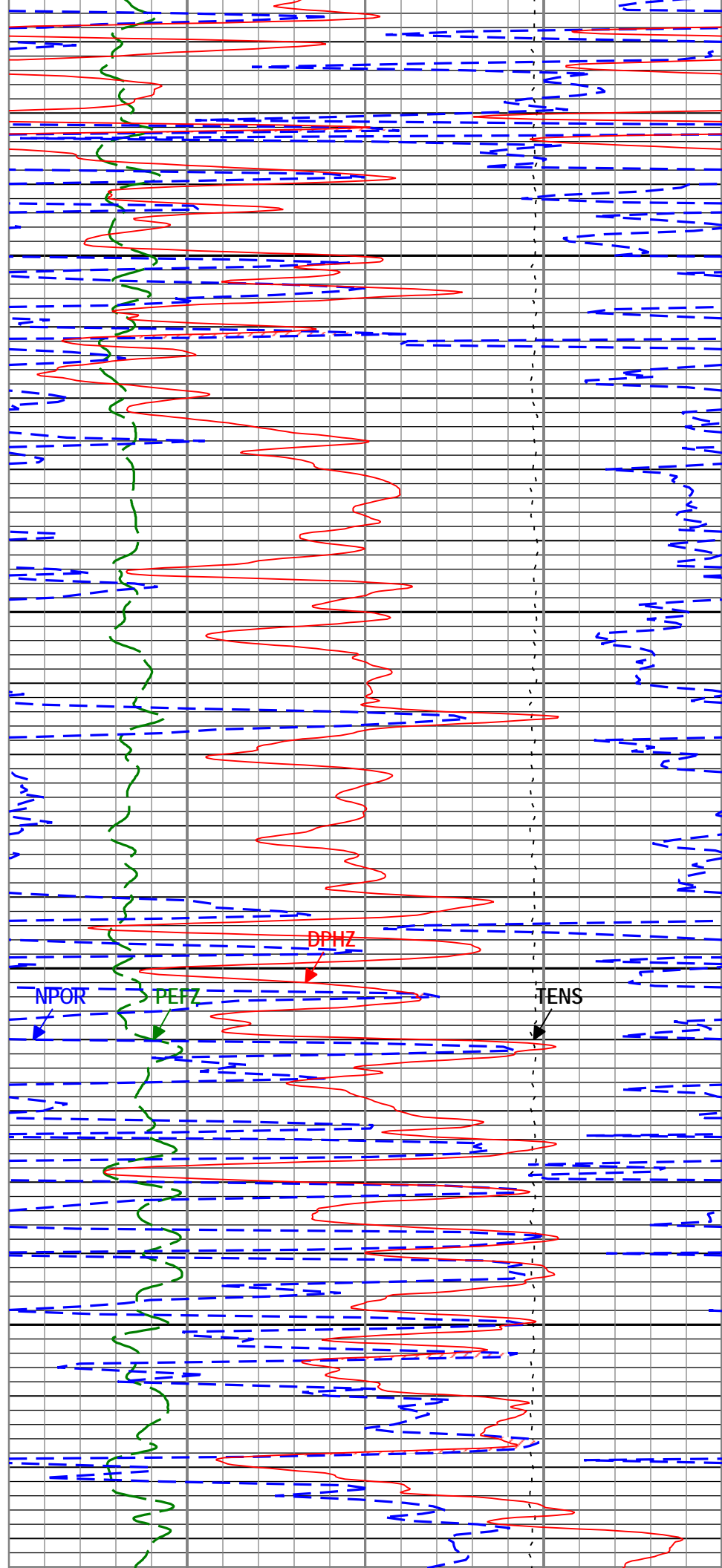
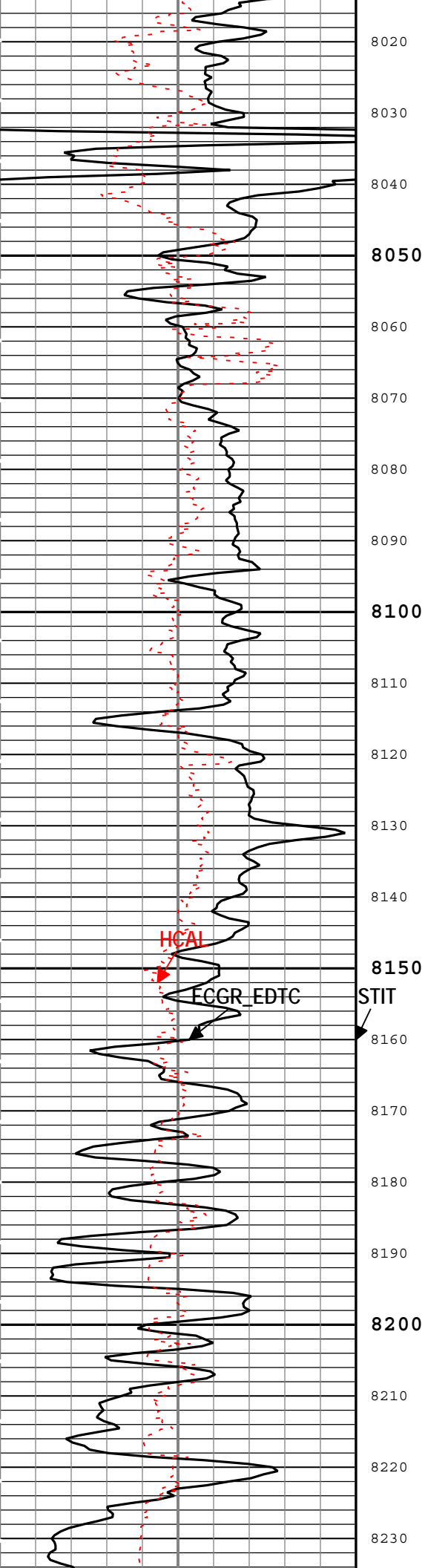


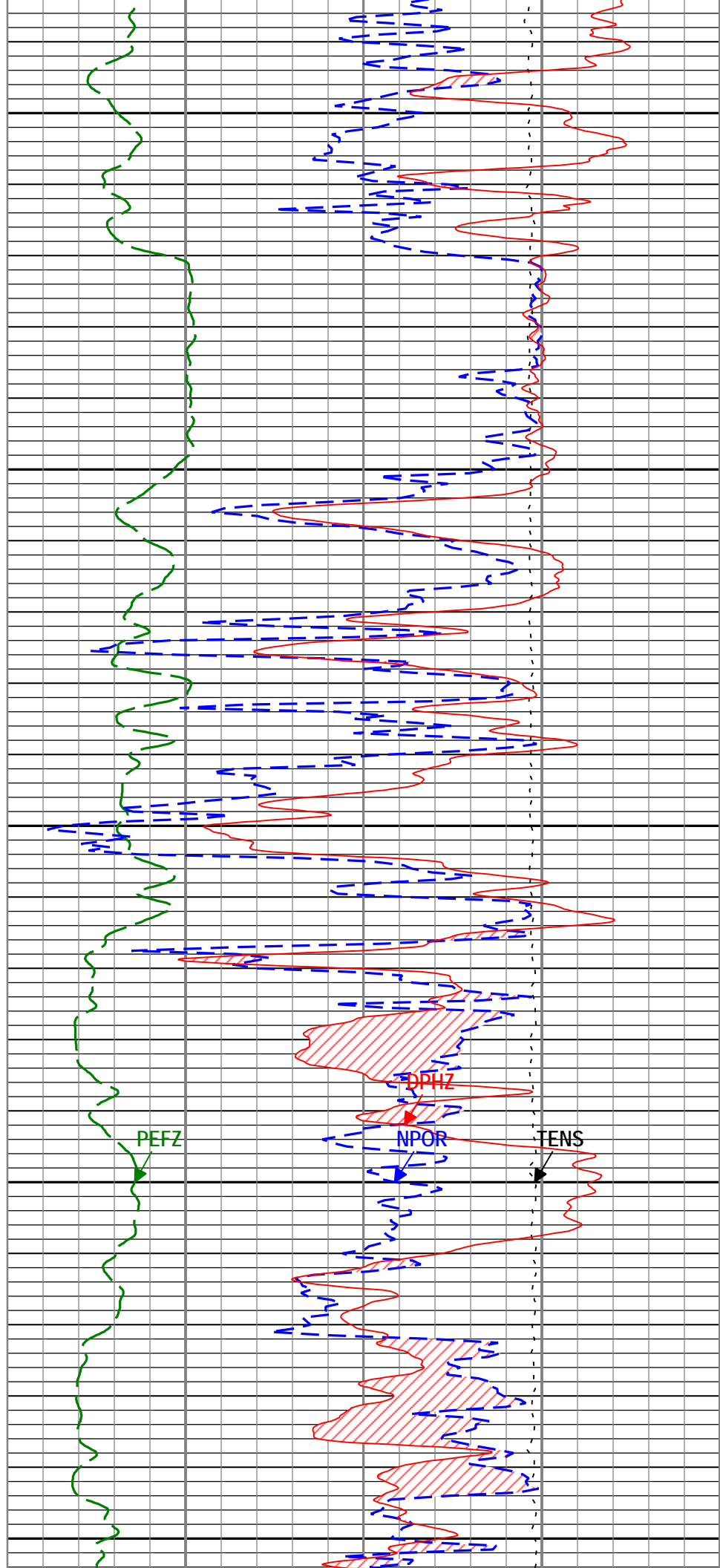
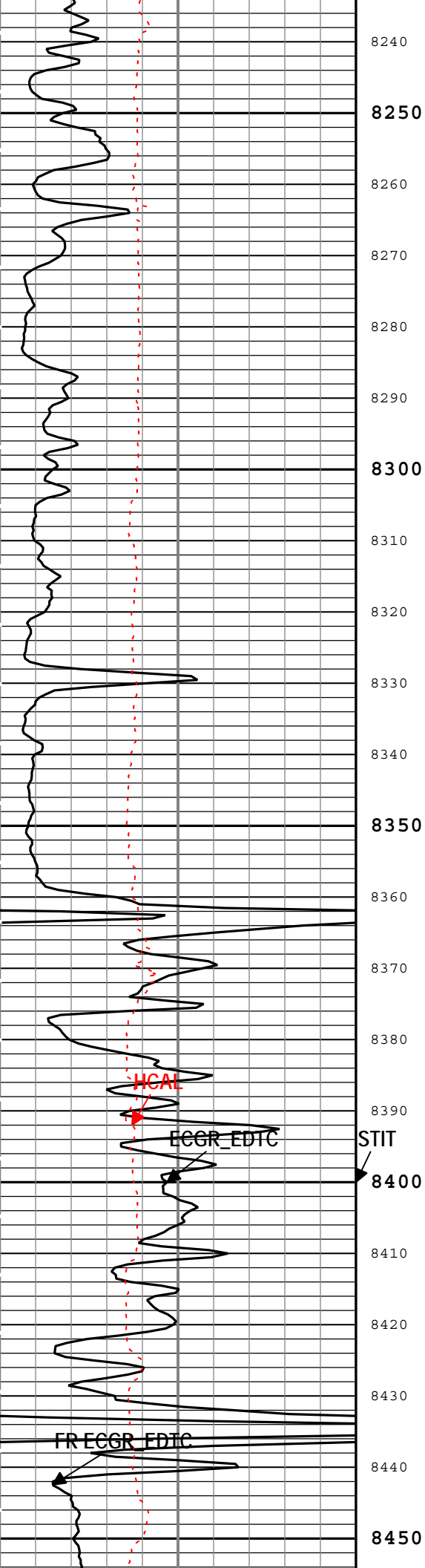


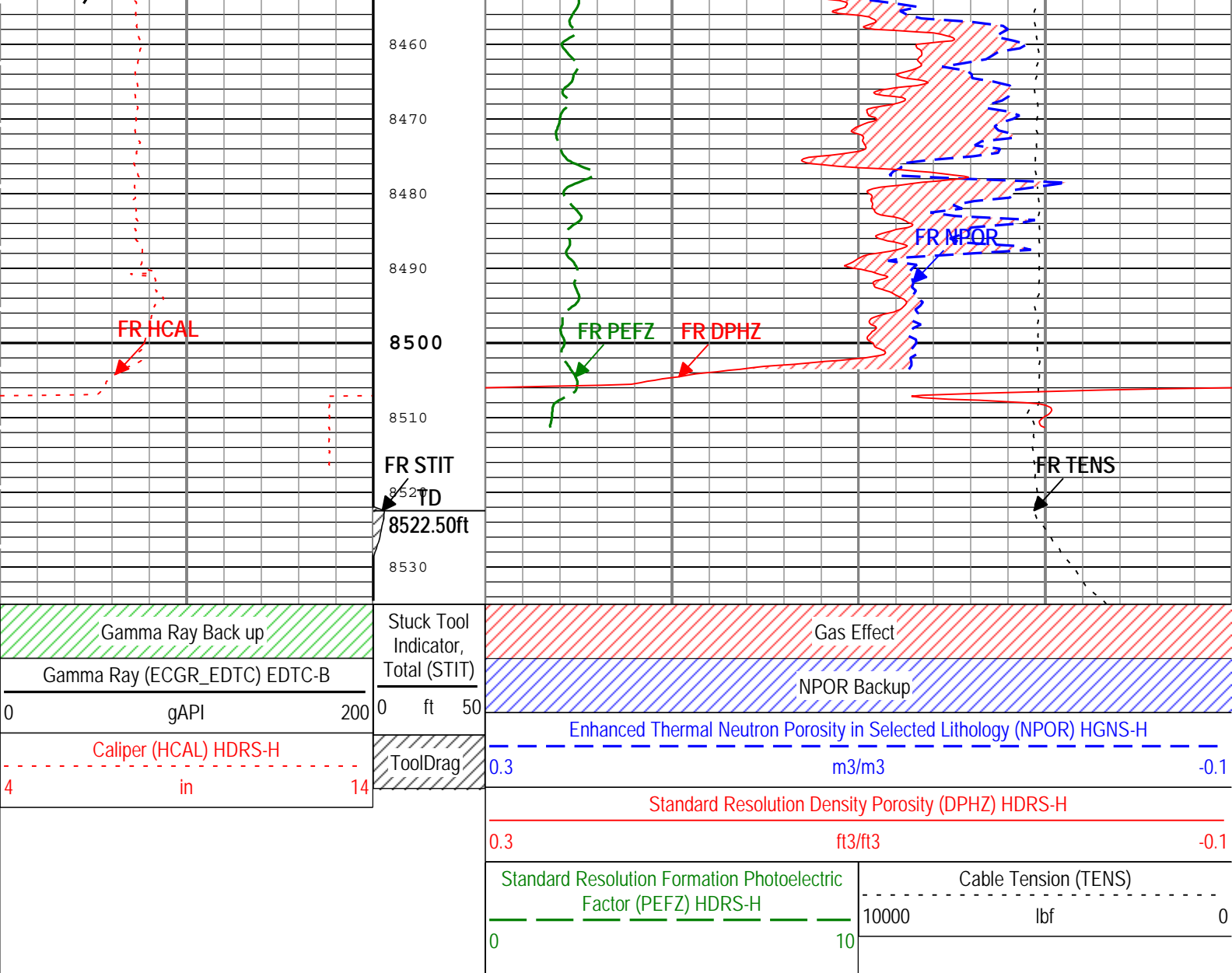
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TIME_1900 - Time Marked every 60.00 (s)

Description: HGNS standard resolution porosities for Platform Express Format: Log (EMD 5in Porosity) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 08-Jan-2015 23:39:57

Channel Processing Parameters				
Run 1 : Parameters				
Parameter	Description	Tool	Value	Unit
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BHT	Bottom Hole Temperature	Borehole	194.38	degF
BS	Bit Size	WLSESSION	Depth Zoned	in
BSAL	Borehole Salinity	Borehole	0	ppm
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.183	in
CBLO	Casing Bottom (Logger)	WLSESSION	391	ft
CDEN	Cement Density	EDTC-B	2	g/cm3
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	9.25	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DHC	Density Hole Correction	HDRS-H	Bit Size	
EDF	Elevation of Derrick Floor Above Permanent Datum	WLSESSION	14	ft
EPD	Elevation of Permanent Datum (PDAT) above Mean Sea	WLSESSION	5324	ft

	Level			
FD	Fluid Density	Borehole	1	g/cm3
FSAL	Formation Salinity	Borehole	0	ppm
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	REMS	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST	
HSCO	Hole Size Correction Option	HGNS-H	Yes	
MATR	Rock Matrix for Neutron Porosity Corrections	Borehole	LIMESTONE	
MDEN	Matrix Density for Density Porosity	Borehole	2.71	g/cm3
MFST	Mud Filtrate Sample Temperature	Borehole	50	degF
MST	Mud Sample Temperature	Borehole	50	degF
PDAT	Permanent Datum	WLSESSION	GL	
RMFS	Resistivity of Mud Filtrate Sample	Borehole	1.24	ohm.m
RMS	Resistivity of Mud Sample	Borehole	1.65	ohm.m
SHT	Surface Hole Temperature	Borehole	30	degF
SOCO	Standoff Correction Option	HGNS-H	Yes	
TD	Total Measured Depth	Borehole	8522.5	ft

Depth Zone Parameters				
Parameter	Value	Start (ft)	Stop (ft)	
BS	12.25	350	395	
BS	7.875	395	8510	
All depth are actual.				

Tool Control Parameters				
Run 1 : Parameters				
Parameter	Description	Tool	Value	Unit
HRGD_BOARD_TYPE	HRGD Board Type	HDRS-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	600	ft/h
Run 1				
2" Induction				

Integration Summary				
Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	1989.02	ft3

Software Version				
Acquisition System		Version		
Maxwell		5.0.29600.3100		

Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Main[10]:Up	Up	361.63 ft	8534.82 ft	08-Jan-2015 3:05:03 PM	08-Jan-2015 9:55:19 PM	ON	0.52 ft	No
All depths are referenced to toolstring zero									

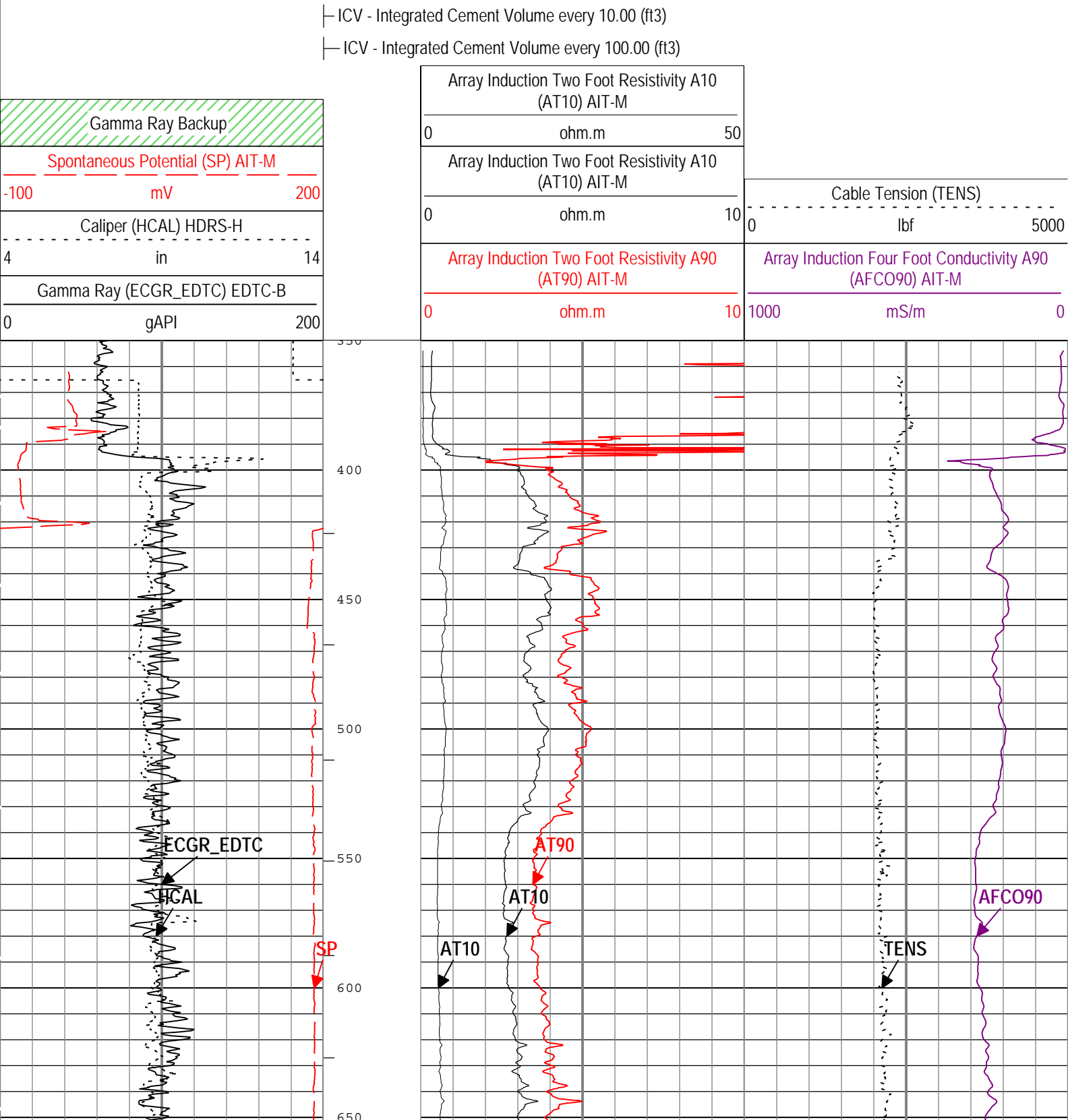
Log	<div> <div>Company:Nighthawk Production LLC</div> <div>Well:Snow King 9-32</div> <div>Run 1 : Main[10]:Up:S013</div> </div>								
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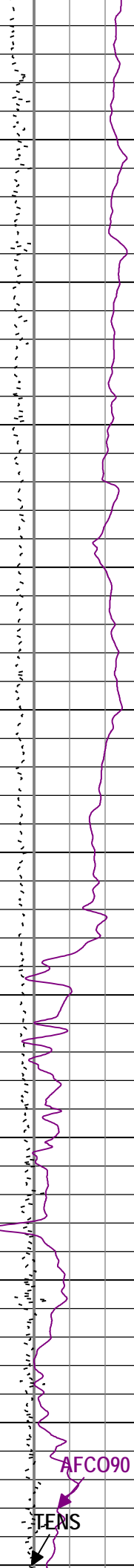
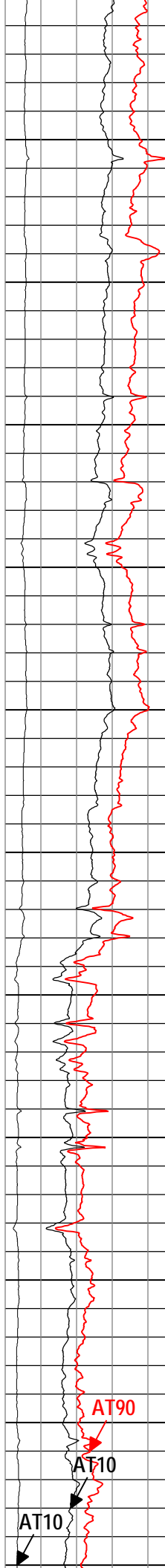
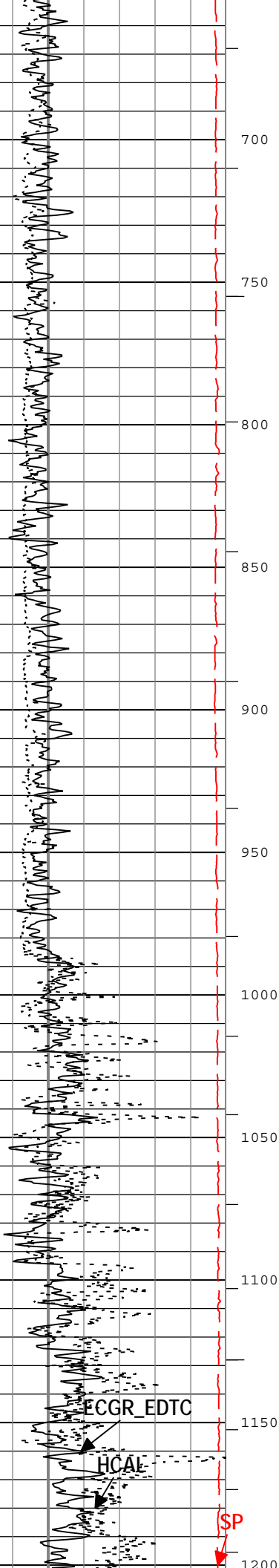
Description: AIT Basic Log Two
Format: Log (EMD 2in Induction)
Index Scale: 2 in per 100 ft
Index Unit: ft
Index Type: Measured Depth
Creation Date: 08-Jan-2015 23:40:01

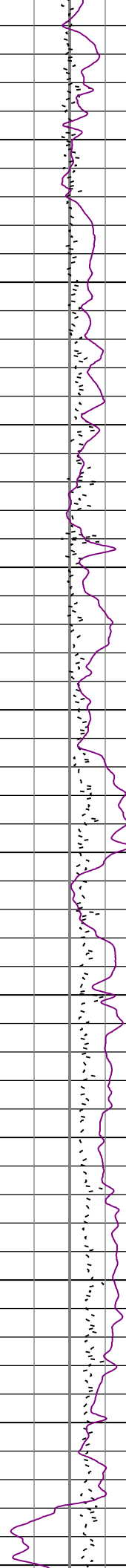
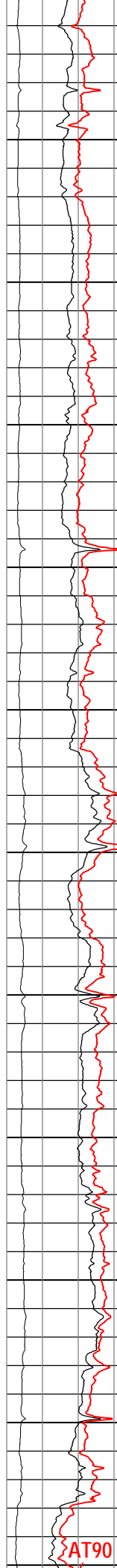
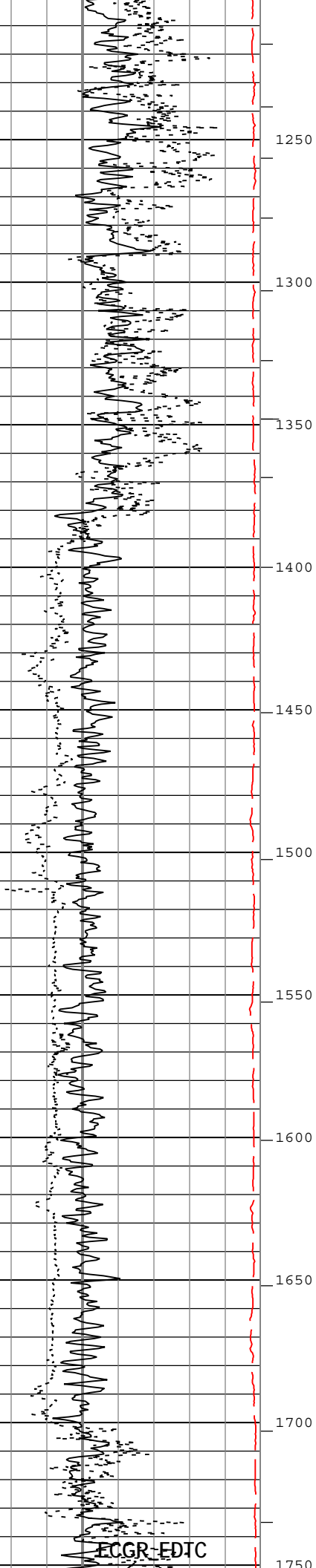
Channel:
Source:
Sampling:

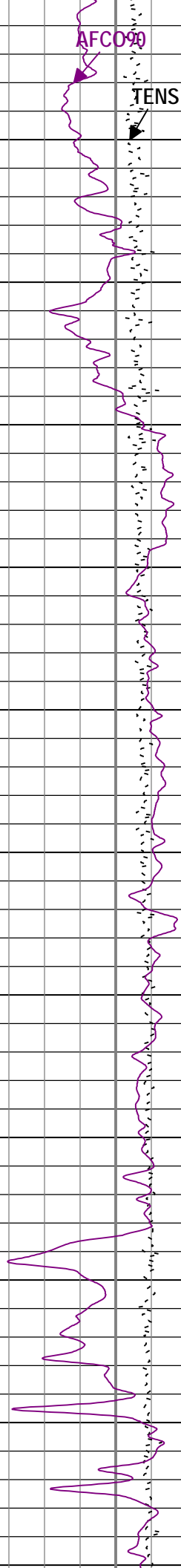
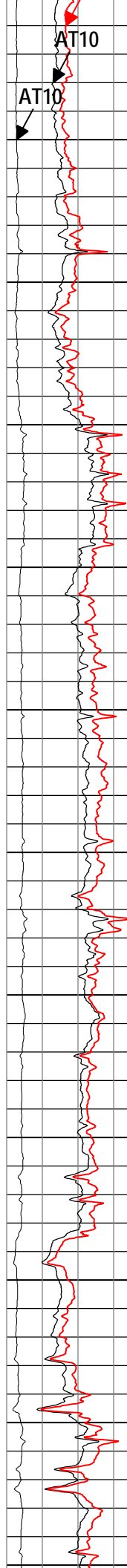
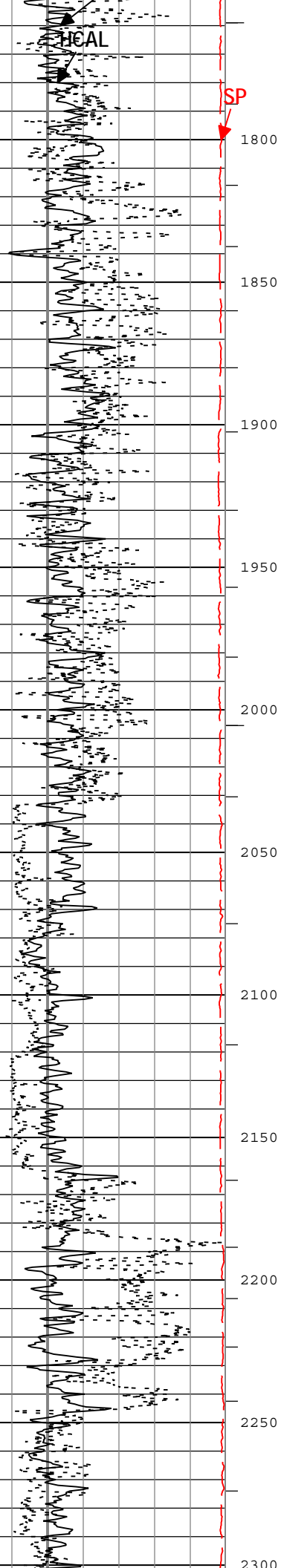
Channel	Source	Sampling
AFCO90	AIT-M:AMIS:AMIS	3in
AT10	AIT-M:AMIS:AMIS	3in
AT90	AIT-M:AMIS:AMIS	3in
CALI	HDRS-H:HRCC-H:HRCC-H	1in
GR	EDTC-B:EDTC-B:EDTC-B	6in
ICV	Borehole	6in
SP	AIT-M:AMIS:AMIS	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in

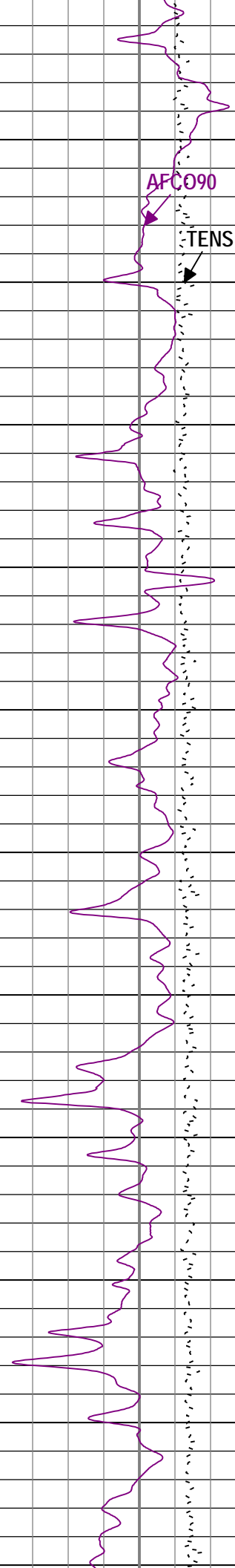
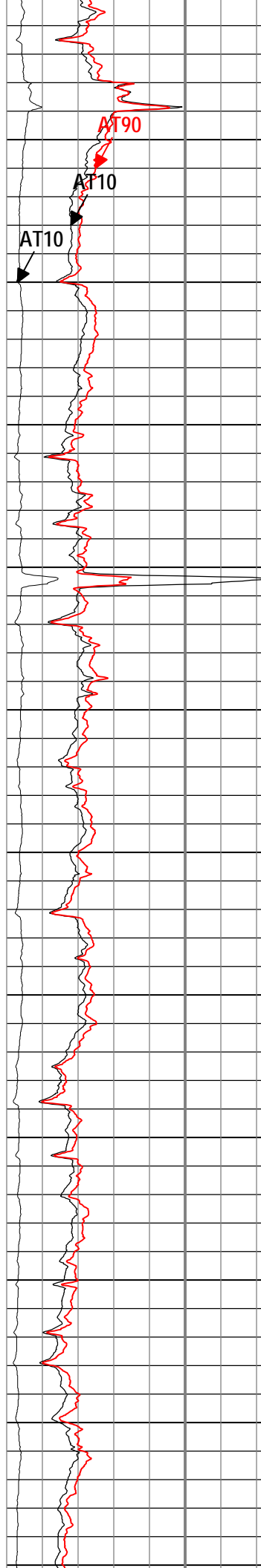
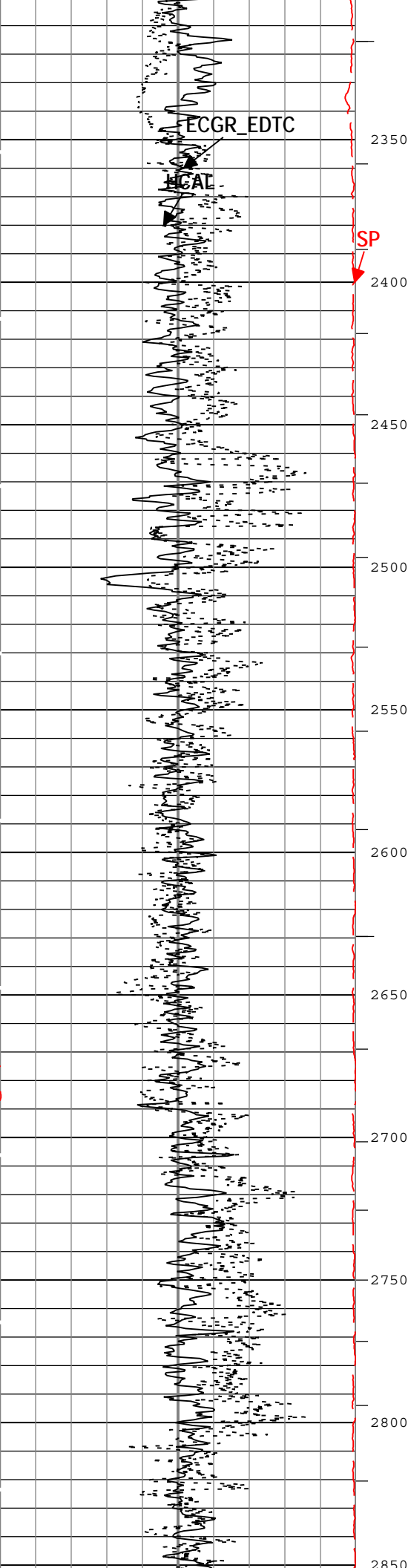
TIME_1900 - Time Marked every 60.00 (s)

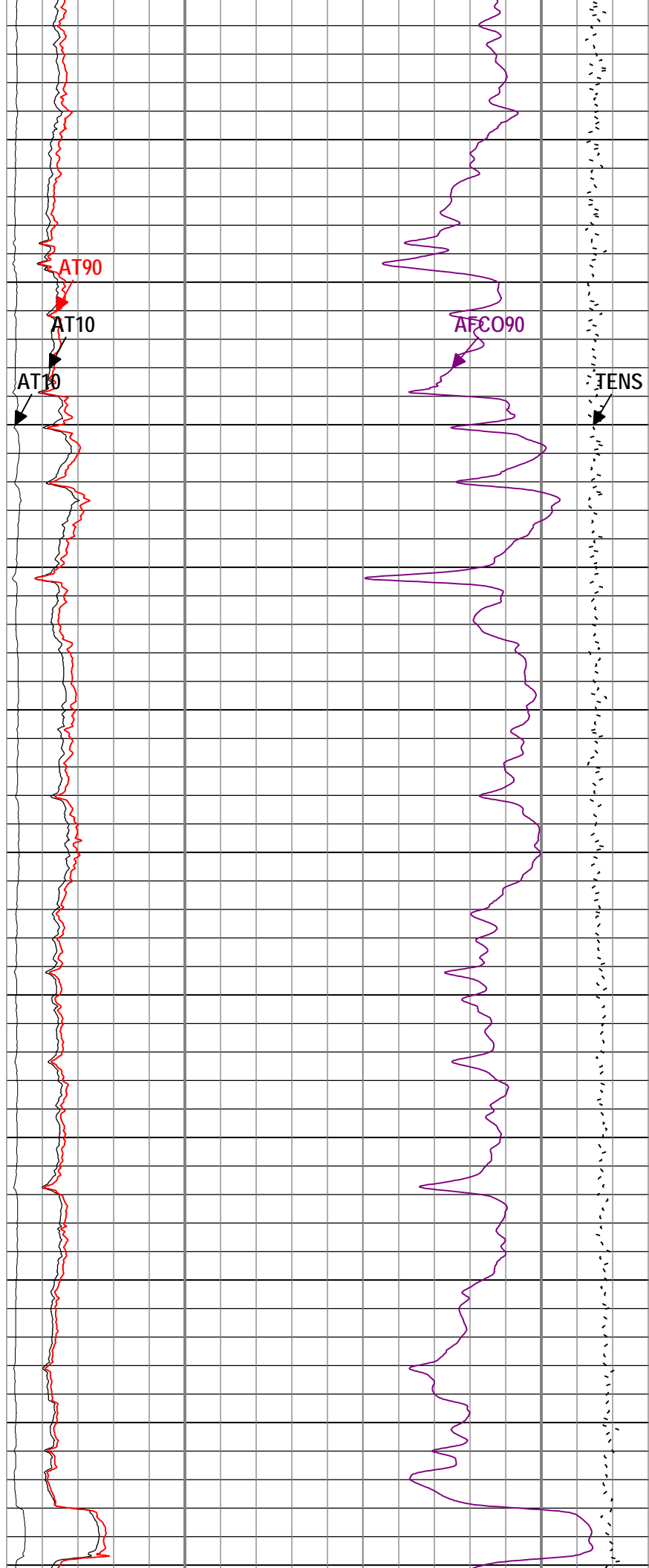
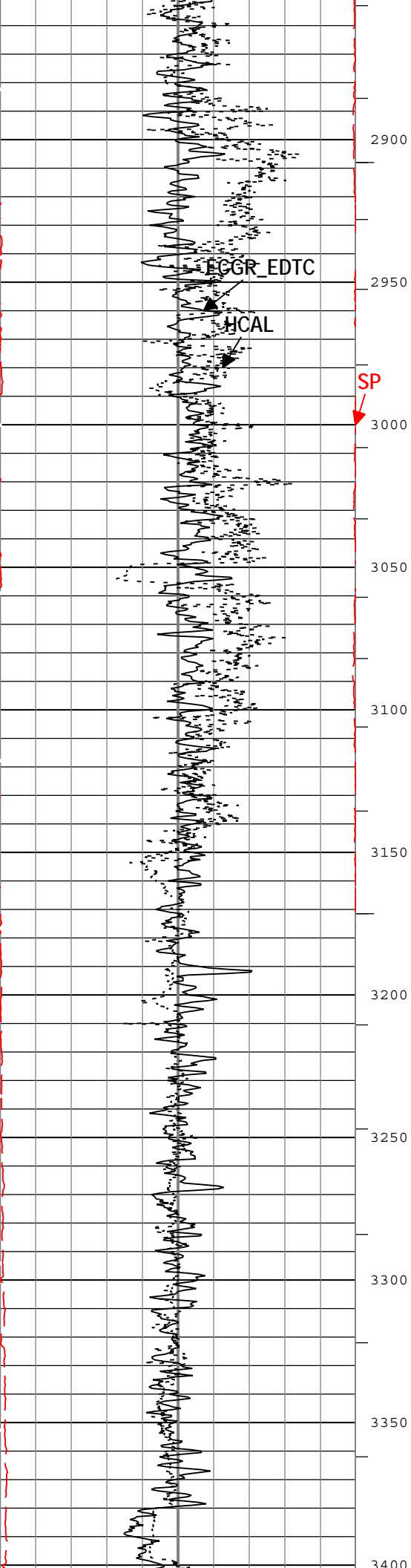


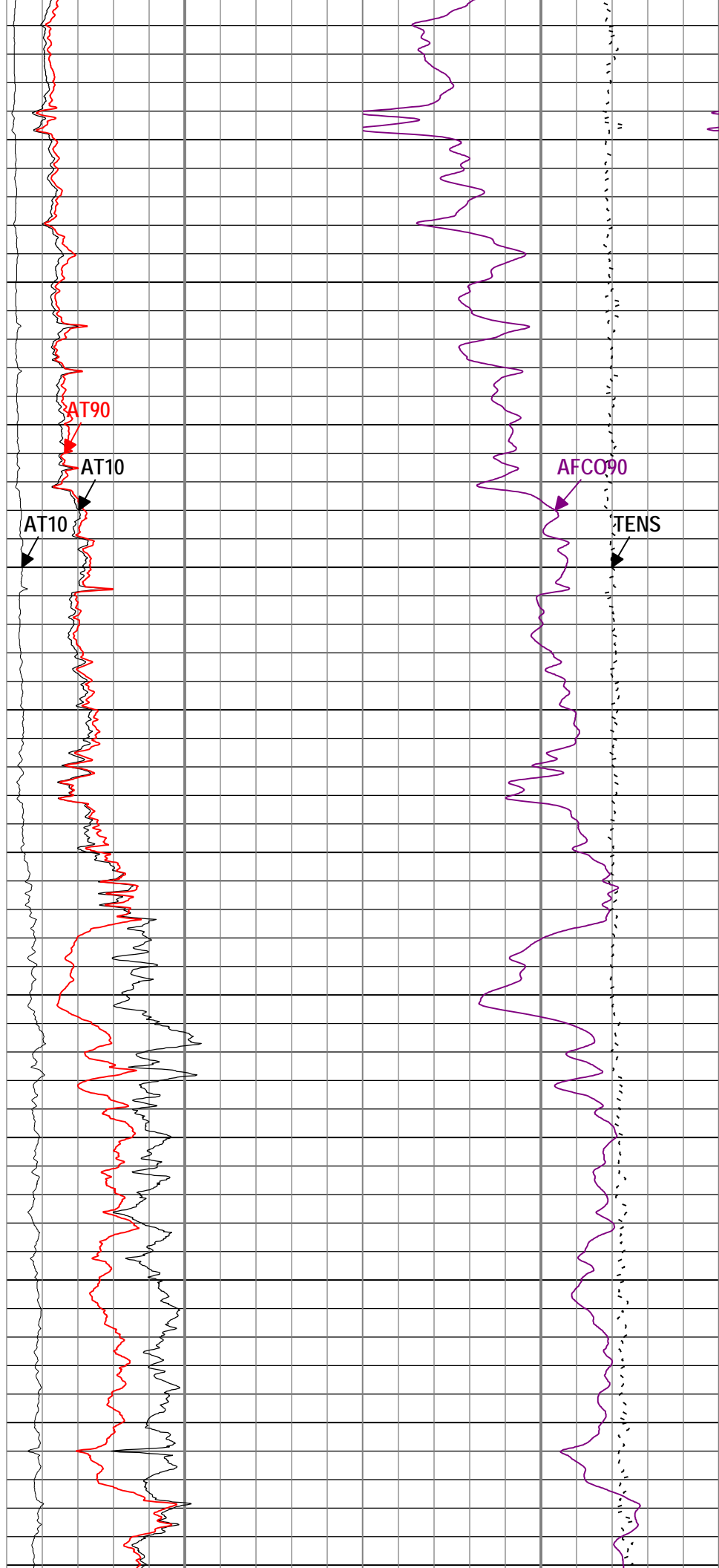
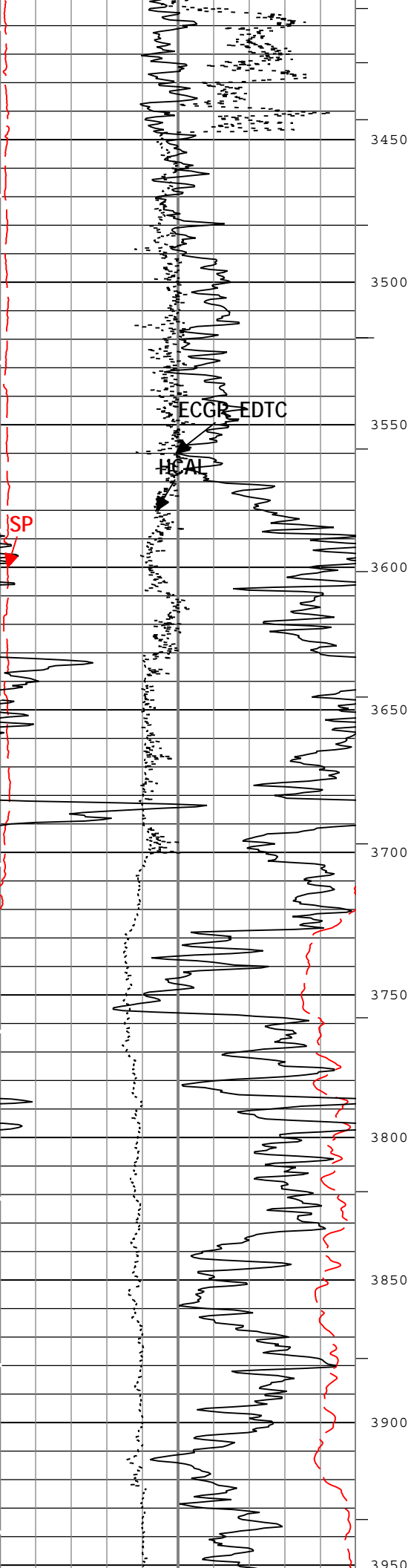


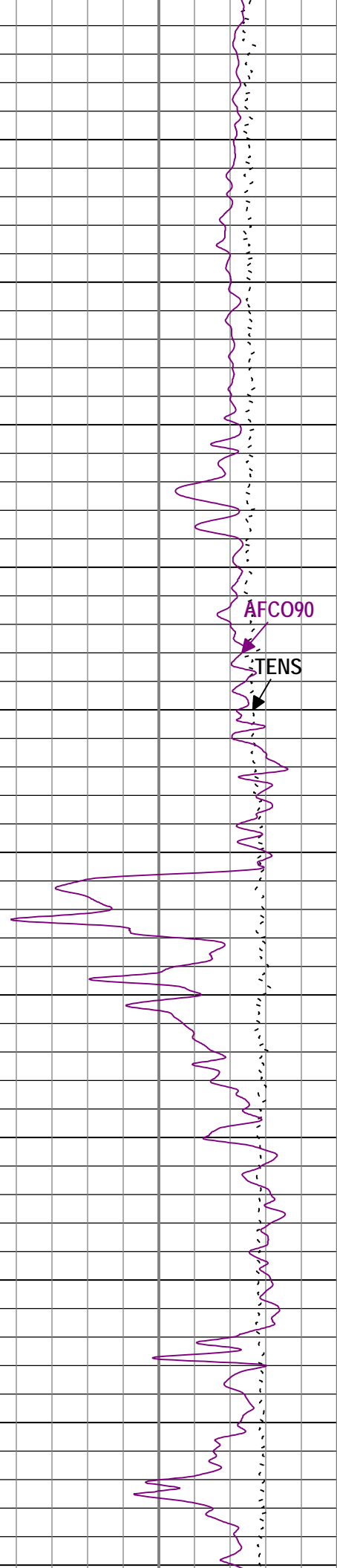
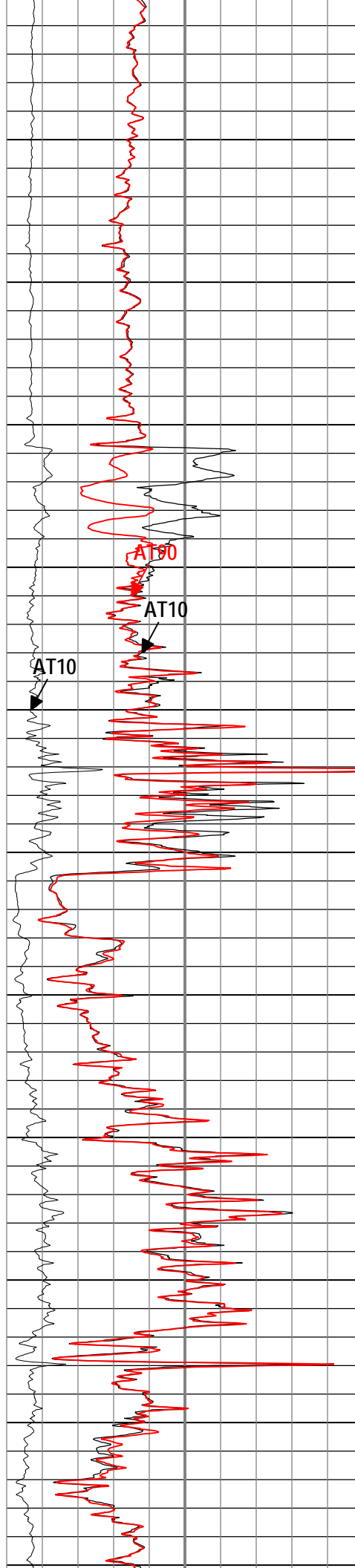
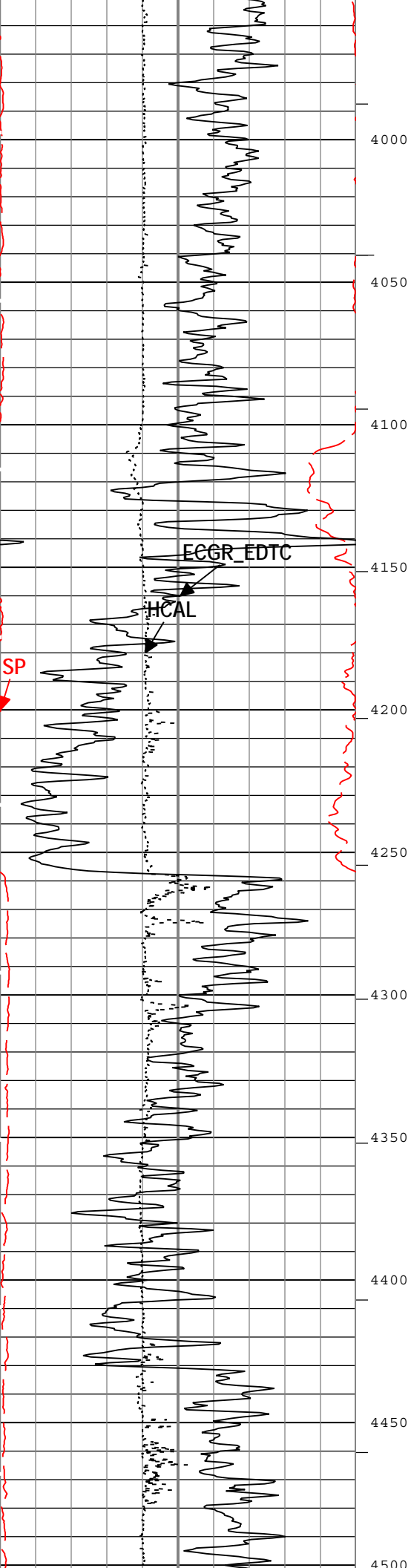


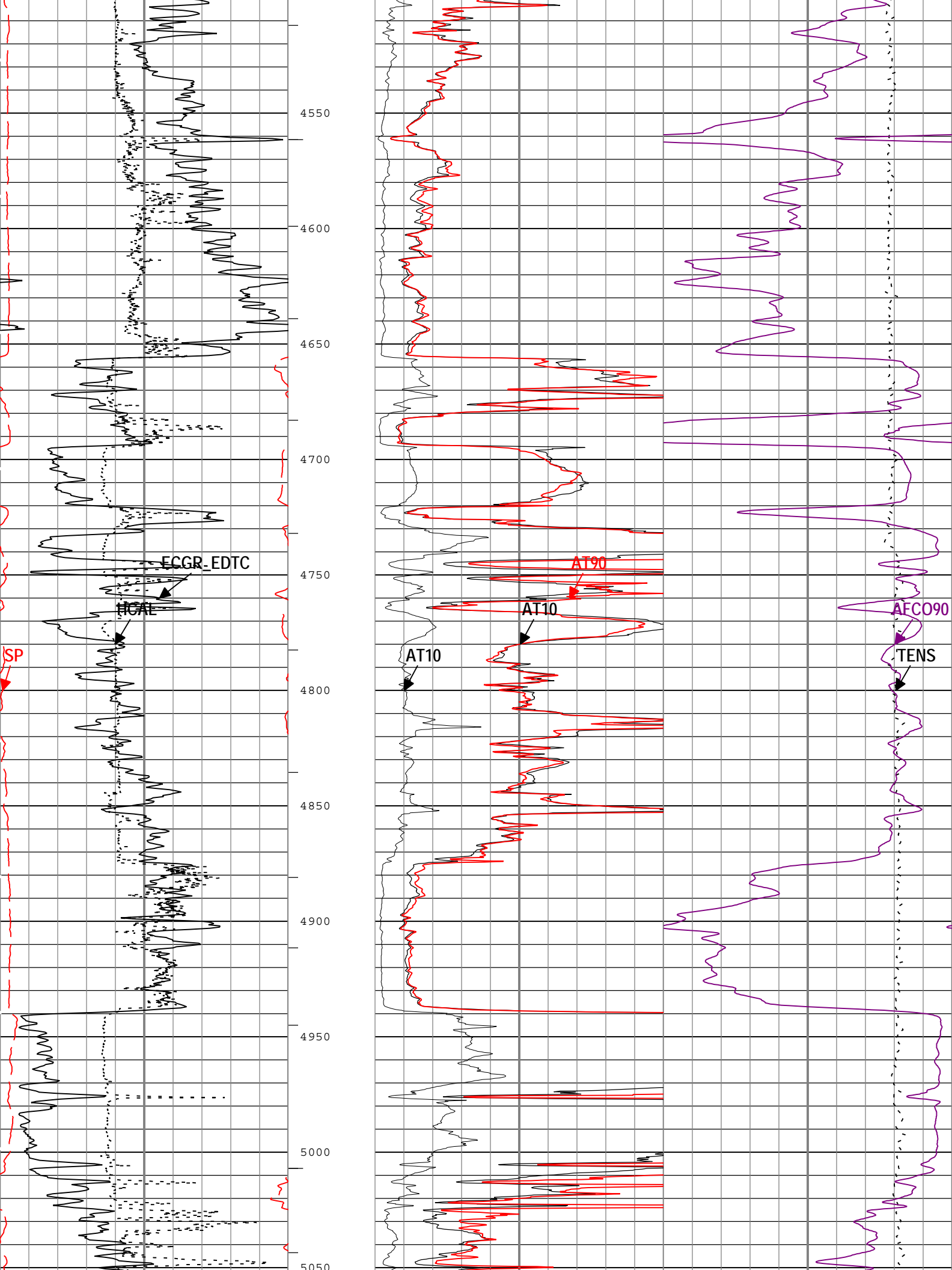


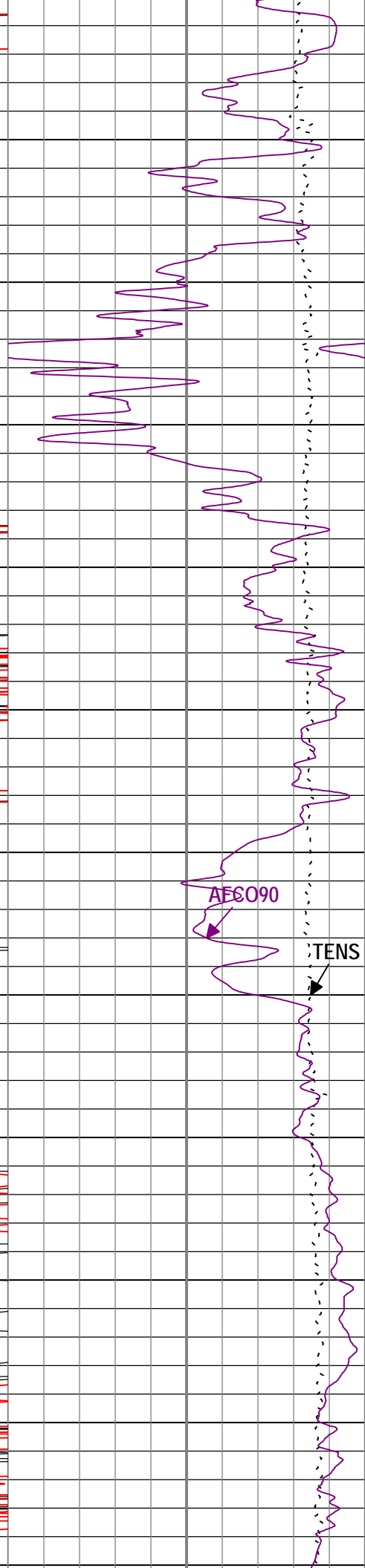
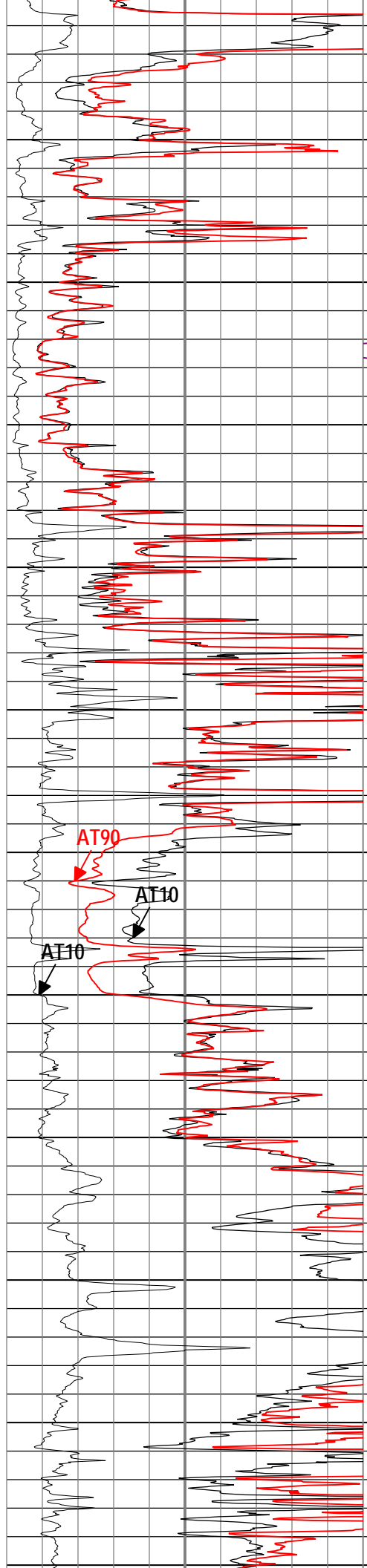
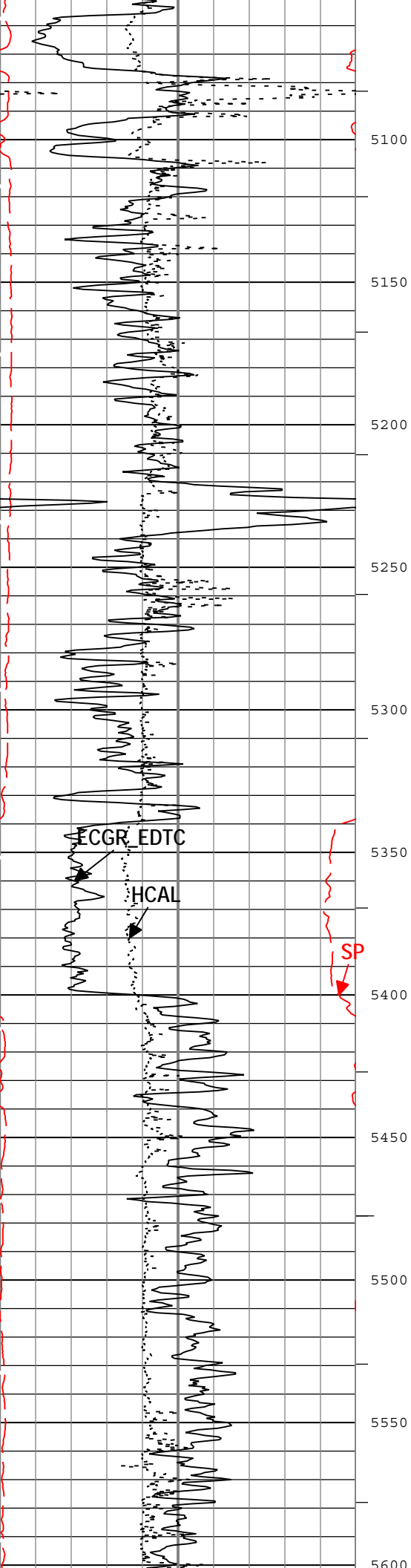


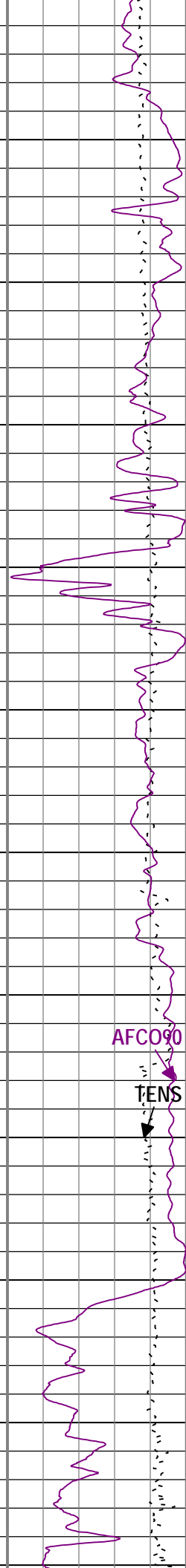
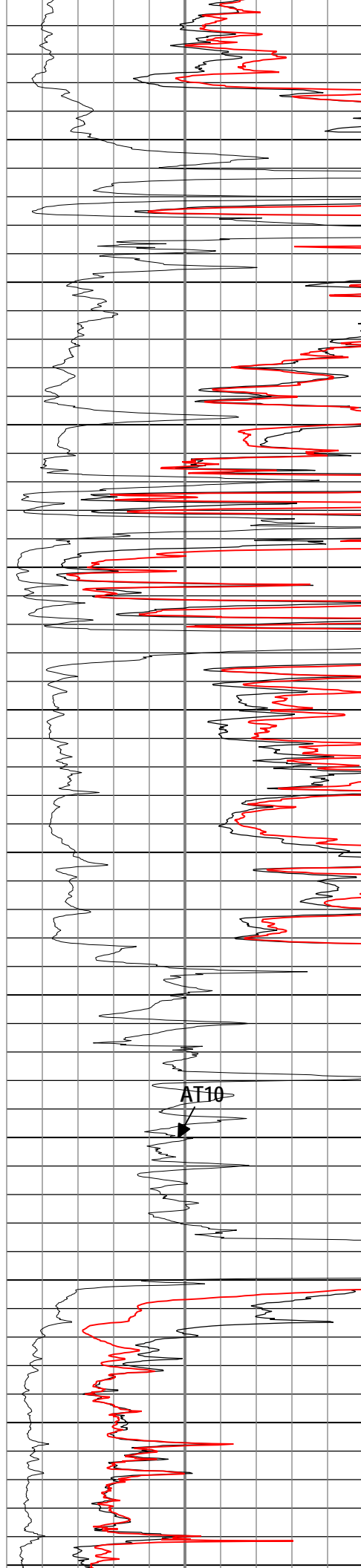
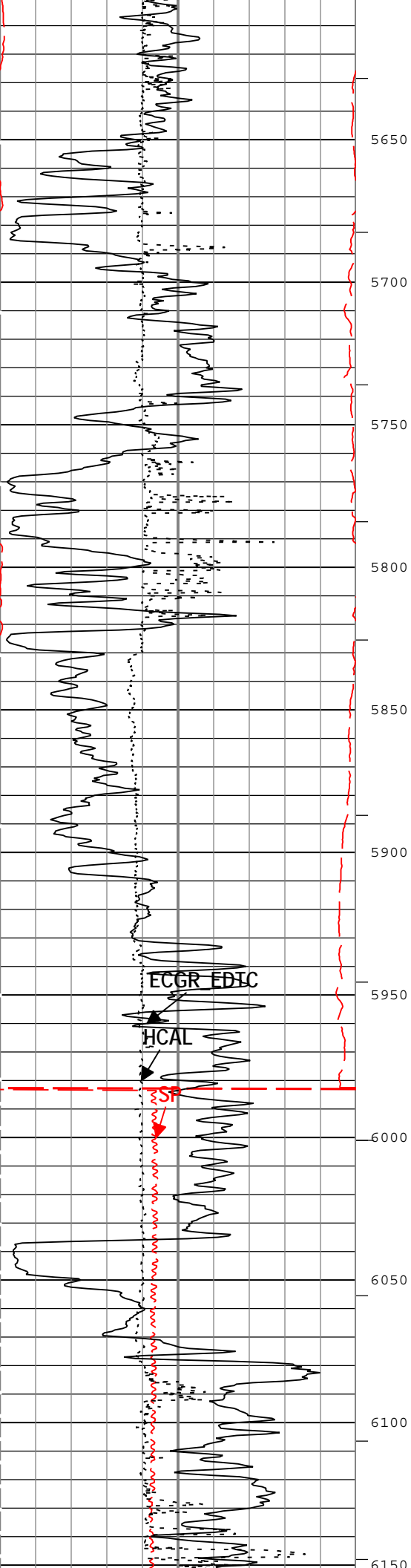


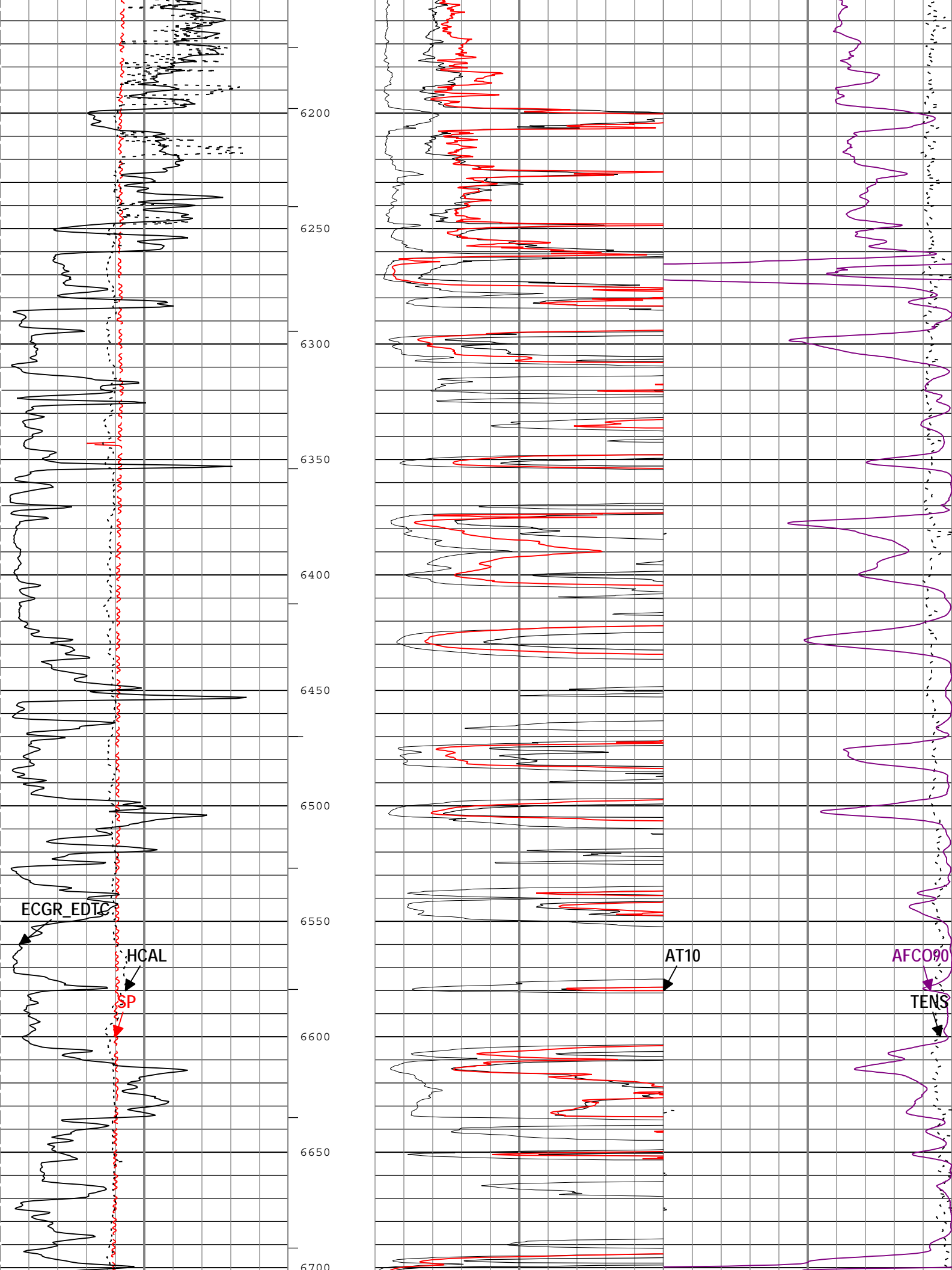


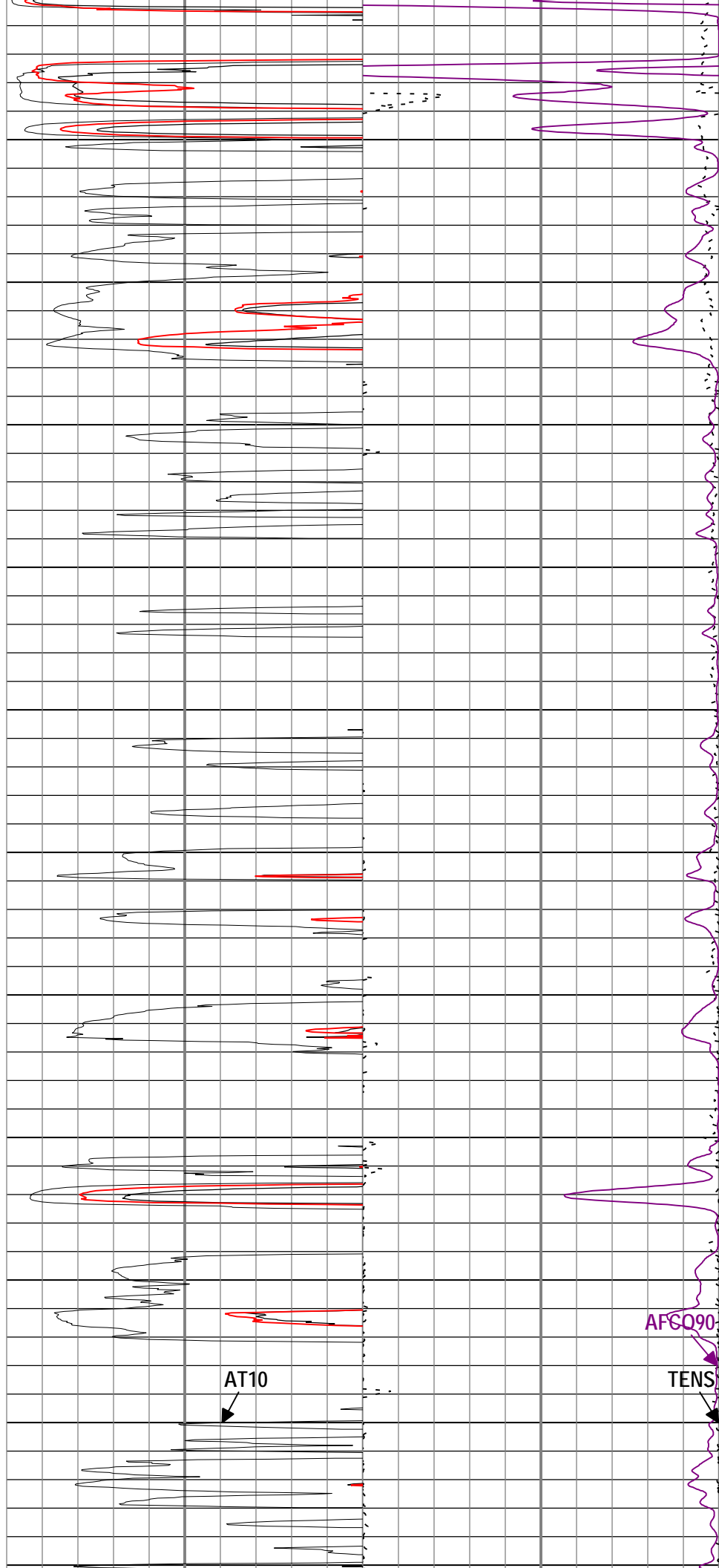
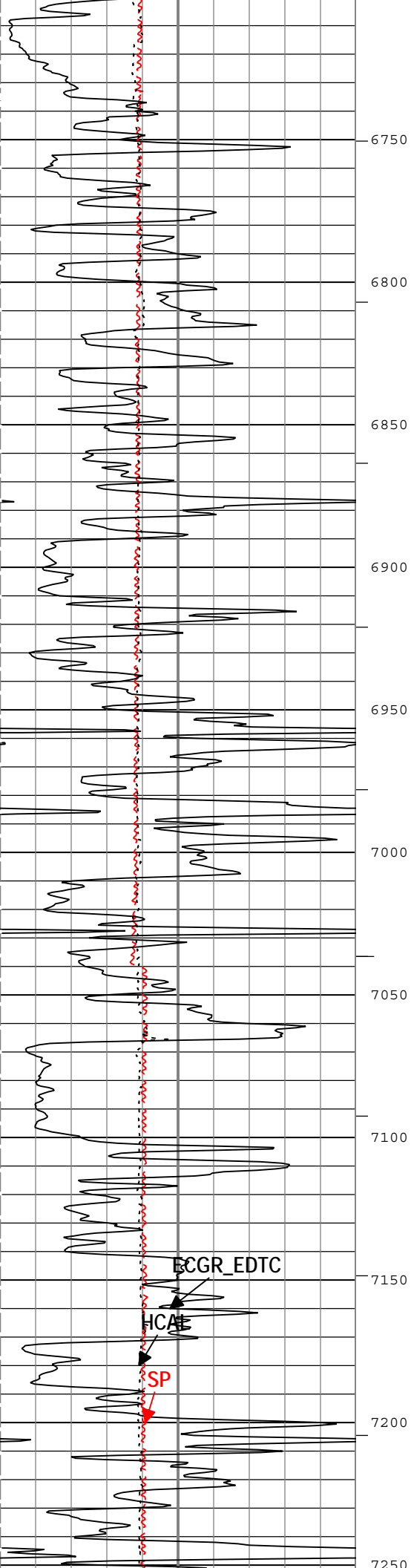


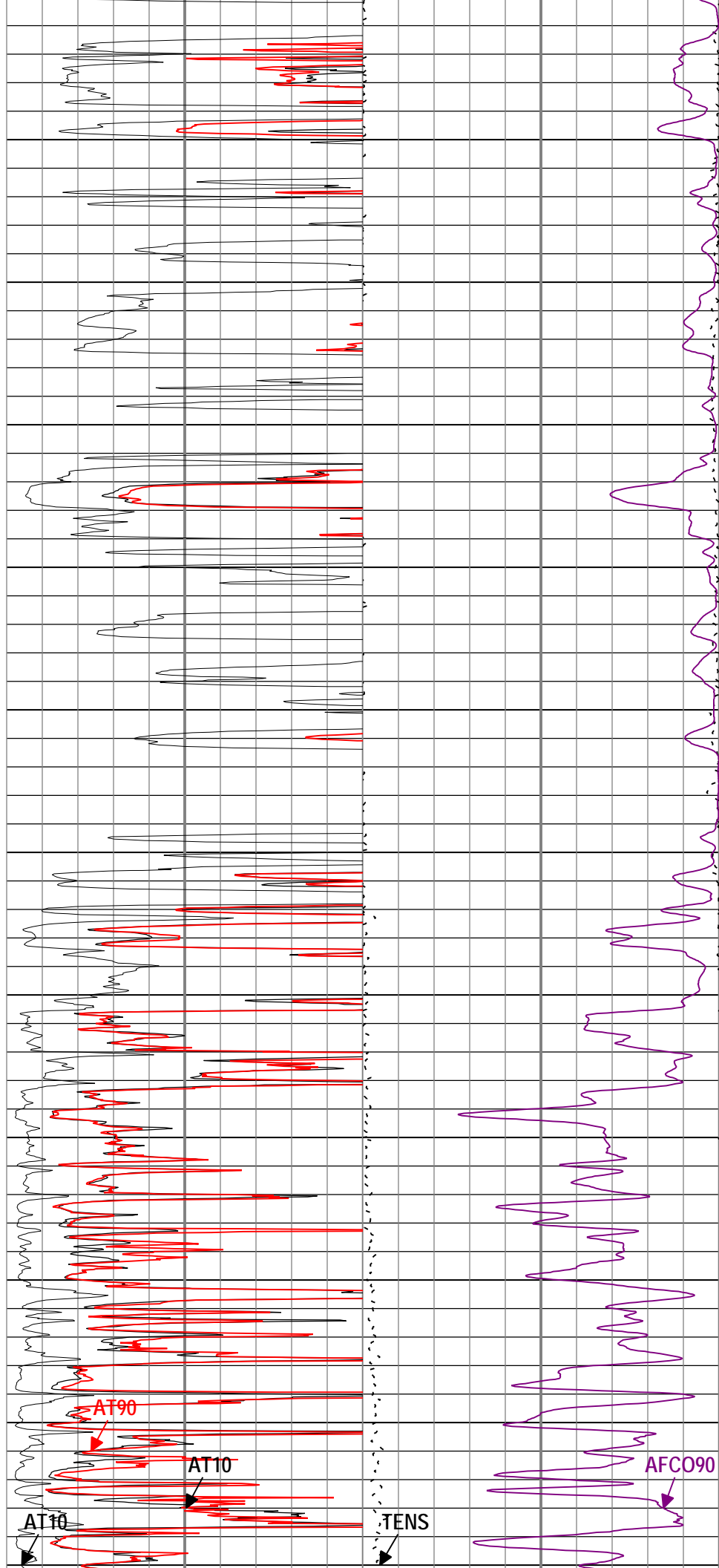
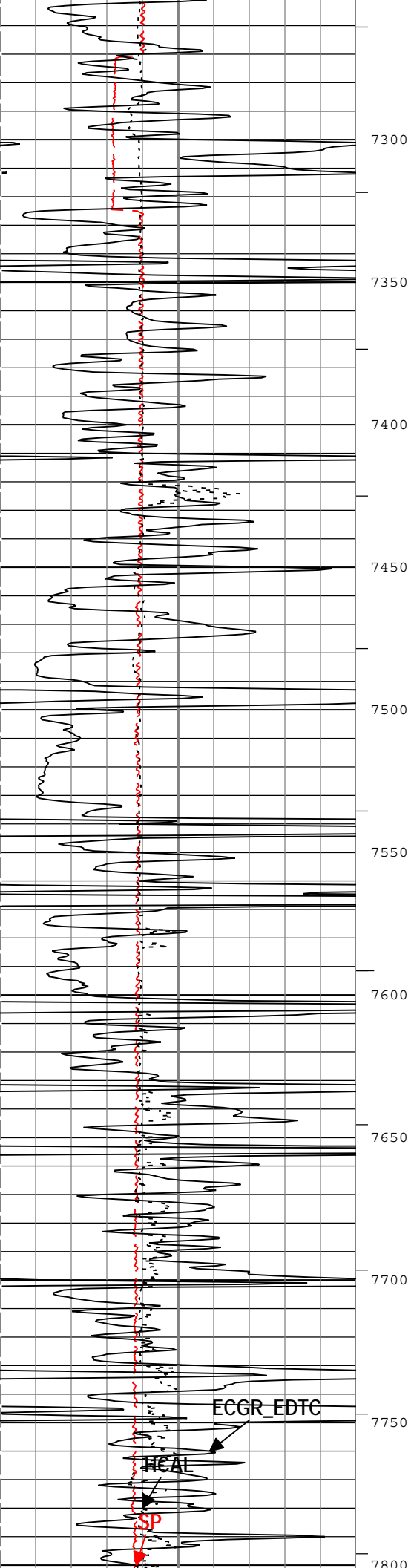


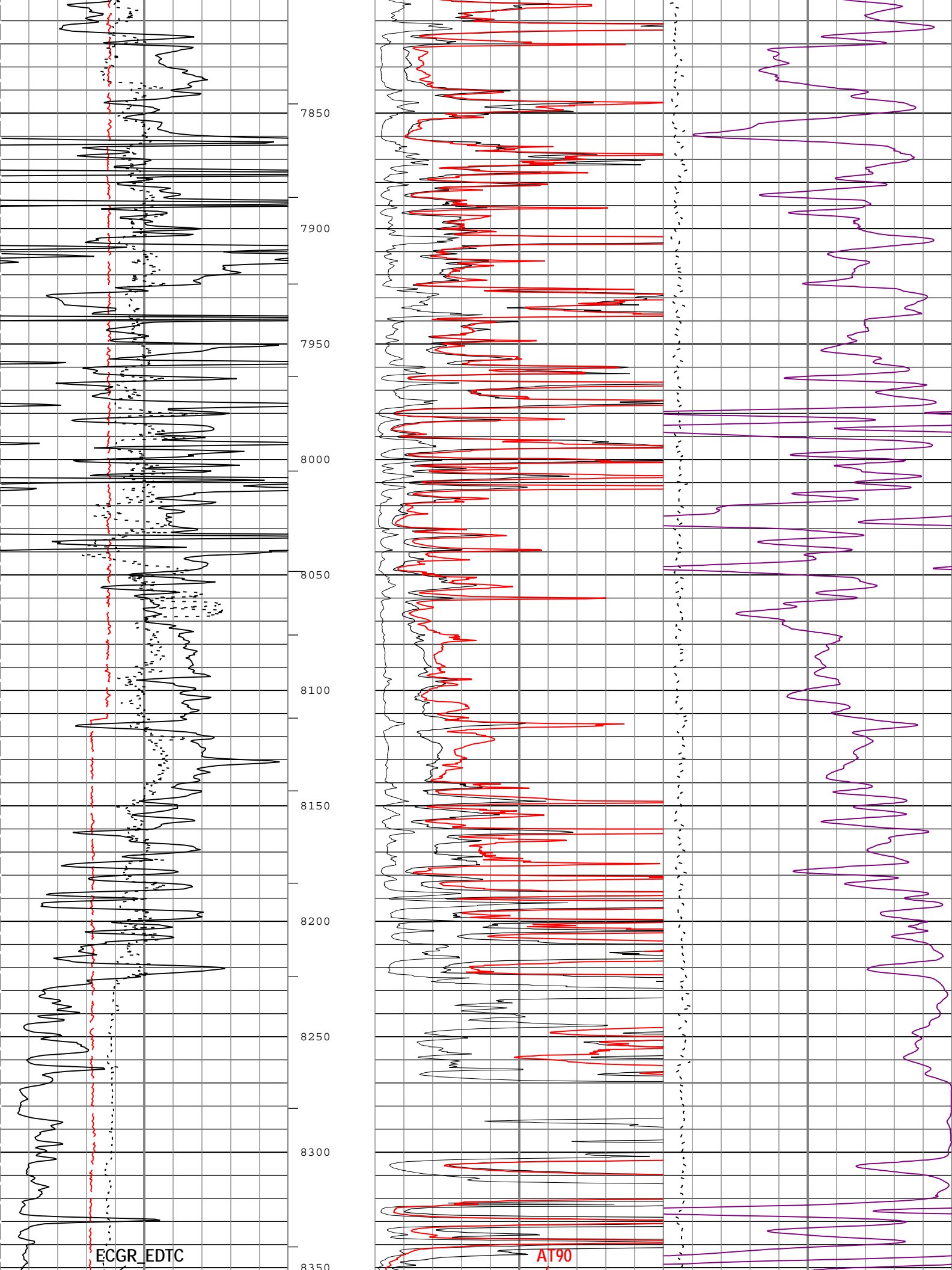


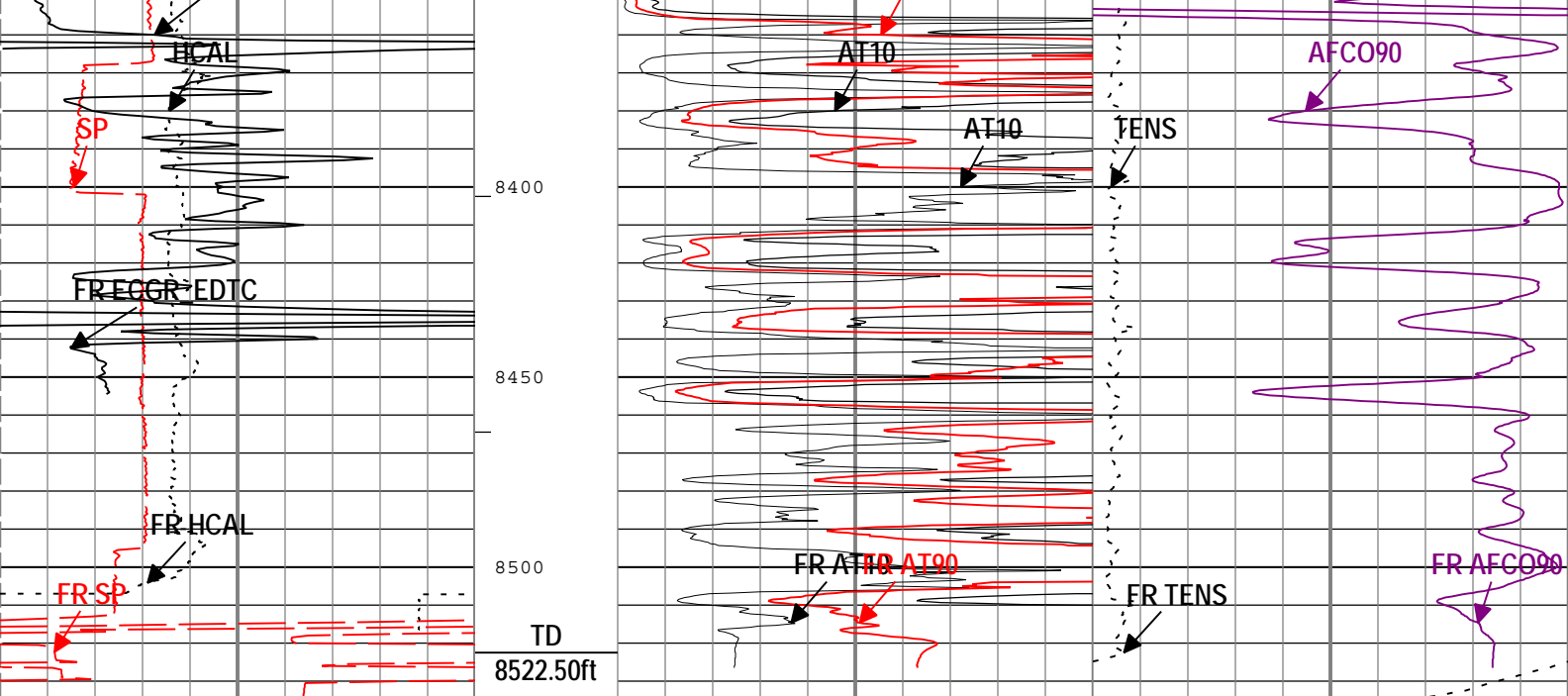












Gamma Ray Backup		
Spontaneous Potential (SP) AIT-M		
-100	mV	200
Caliper (HCAL) HDRS-H		
4	in	14
Gamma Ray (ECGR_EDTC) EDTC-B		
0	gAPI	200

Array Induction Two Foot Resistivity A10 (AT10) AIT-M		
0	ohm.m	50
Array Induction Two Foot Resistivity A10 (AT10) AIT-M		
0	ohm.m	10
Array Induction Two Foot Resistivity A90 (AT90) AIT-M		
0	ohm.m	10

Cable Tension (TENS)		
0	lbf	5000
Array Induction Four Foot Conductivity A90 (AFCO90) 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 2in Induction) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 08-Jan-2015 23:40:01

Channel Processing Parameters

Run 1 : 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	
BHT	Bottom Hole Temperature	Borehole	194.38	degF
BS	Bit Size	WLSESSION	Depth Zoned	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.183	in
CBLO	Casing Bottom (Logger)	WLSESSION	391	ft
CDEN	Cement Density	EDTC-B	2	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	8.625	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	9.25	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
EDF	Elevation of Derrick Floor Above Permanent Datum	WLSESSION	14	ft
EPD	Elevation of Permanent Datum (PDAT) above Mean Sea Level	WLSESSION	5324	ft
FCD	Future Casing (Outer) Diameter	WLSESSION	5.5	in

GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	REMS	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST	
MST	Mud Sample Temperature	Borehole	50	degF
PDAT	Permanent Datum	WLSESSION	GL	
RMS	Resistivity of Mud Sample	Borehole	1.65	ohm.m
SHT	Surface Hole Temperature	Borehole	30	degF
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft
TD	Total Measured Depth	Borehole	8522.5	ft

Depth Zone Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	12.25	350	395
BS	7.875	395	8510
All depth are actual.			

Tool Control Parameters	
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Run 1 : Parameters				
Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	600	ft/h

Run 1

5" Density

Software Version	
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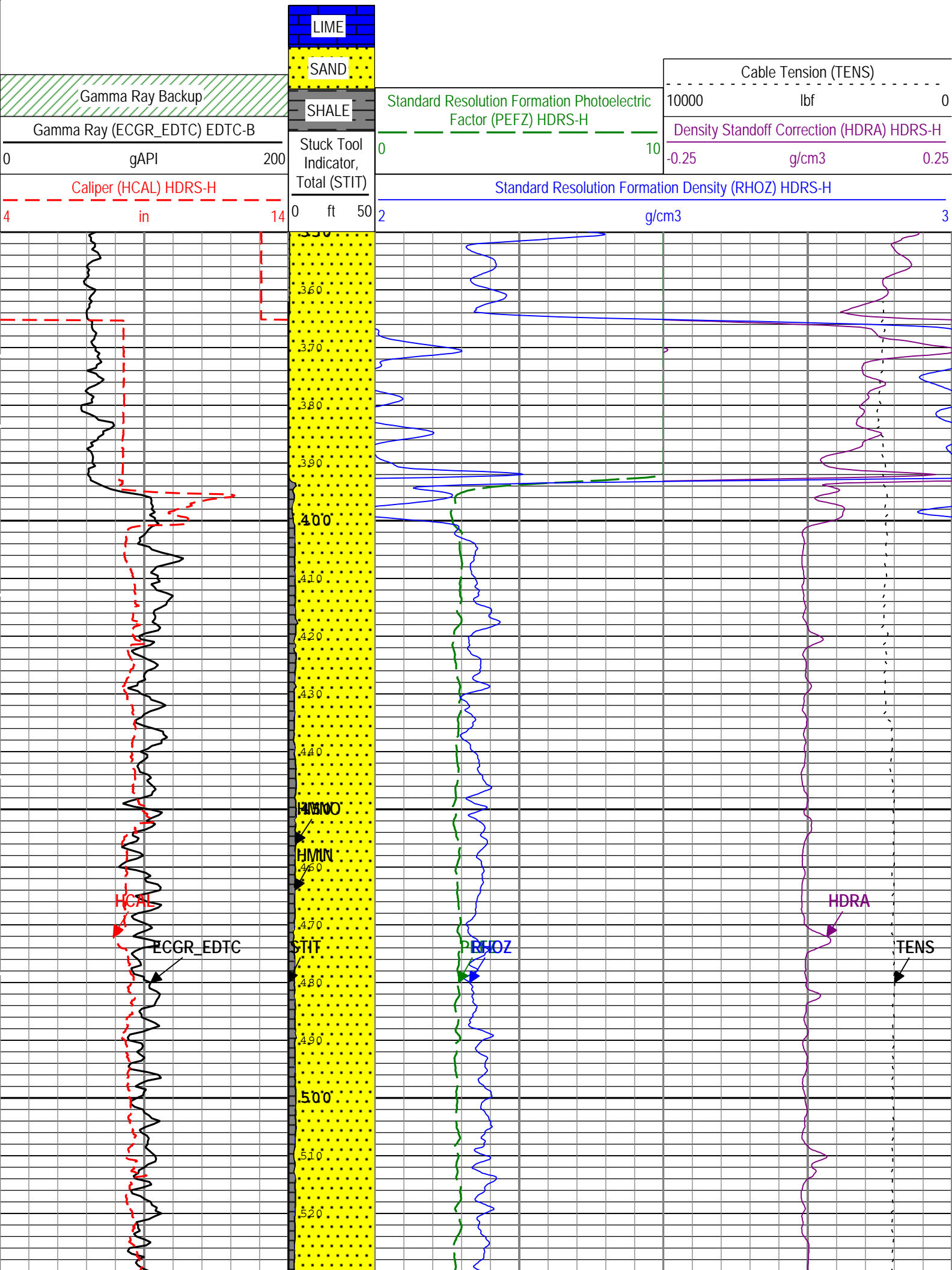
Acquisition System	Version
Maxwell	5.0.29600.3100

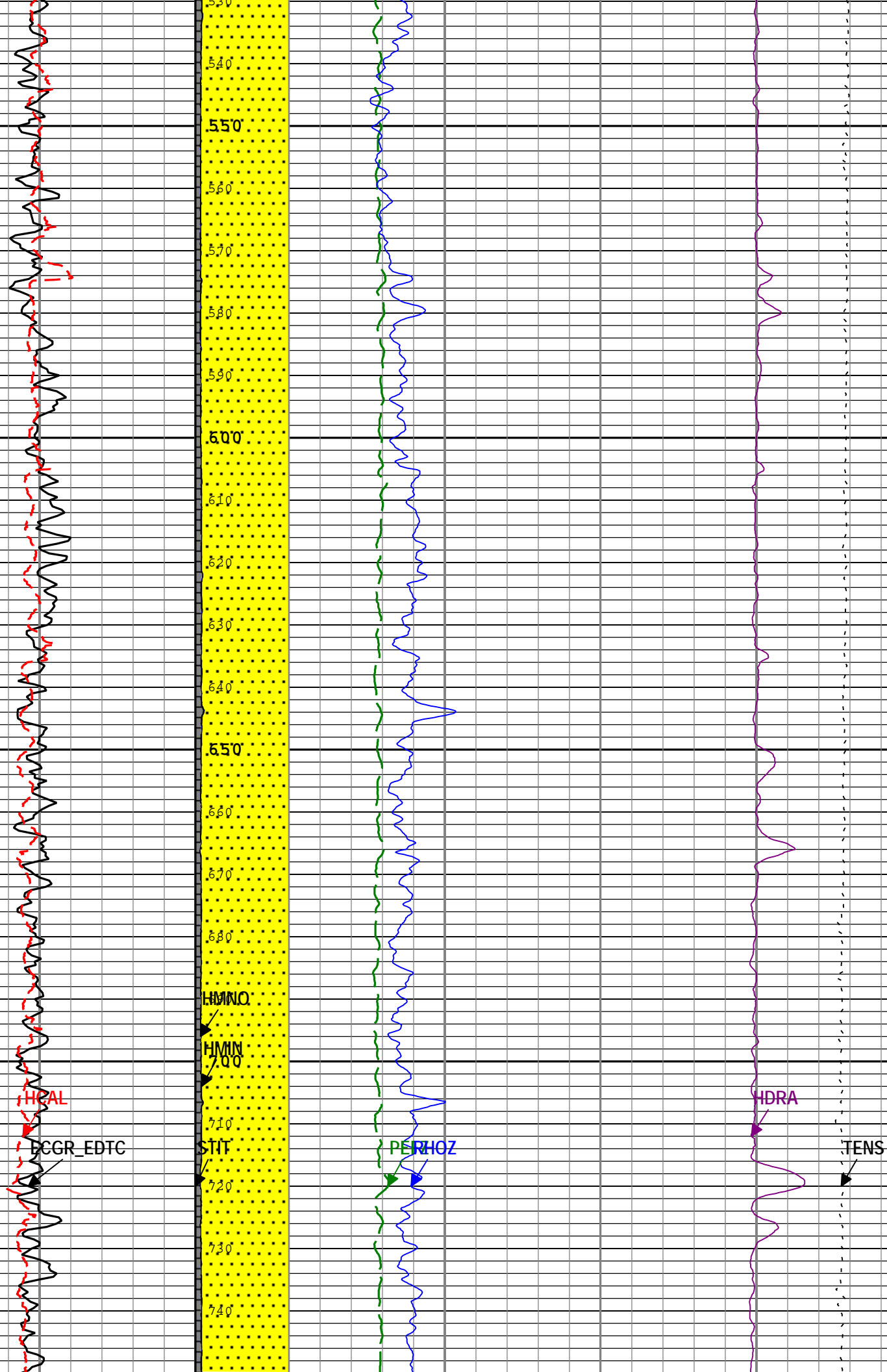
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Main[10]:Up	Up	361.63 ft	8534.82 ft	08-Jan-2015 3:05:03 PM	08-Jan-2015 9:55:19 PM	ON	0.52 ft	No
All depths are referenced to toolstring zero									

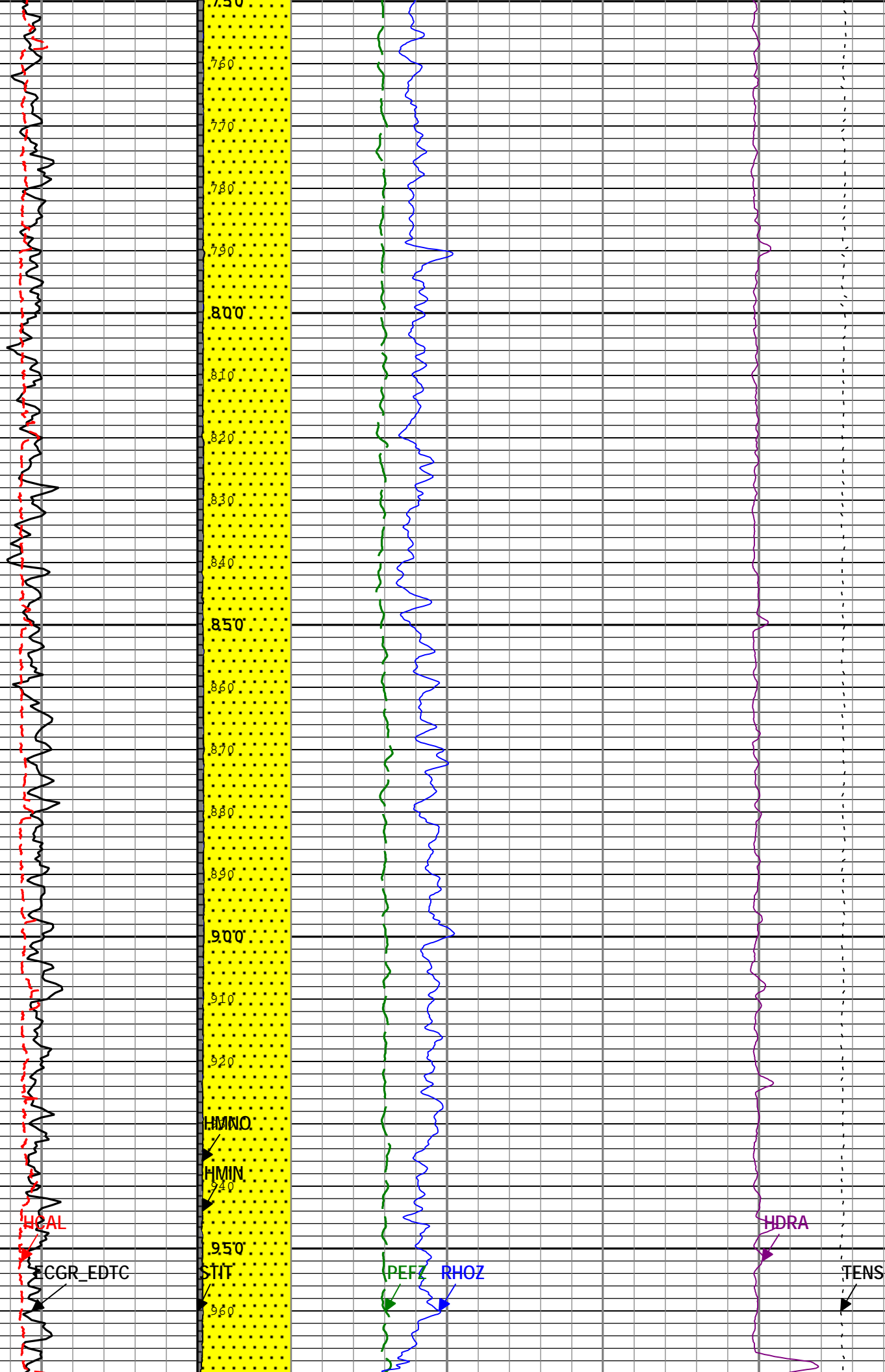
Log	Company:Nighthawk Production LLC Well:Snow King 9-32 Run 1 : Main[10]:Up:S013
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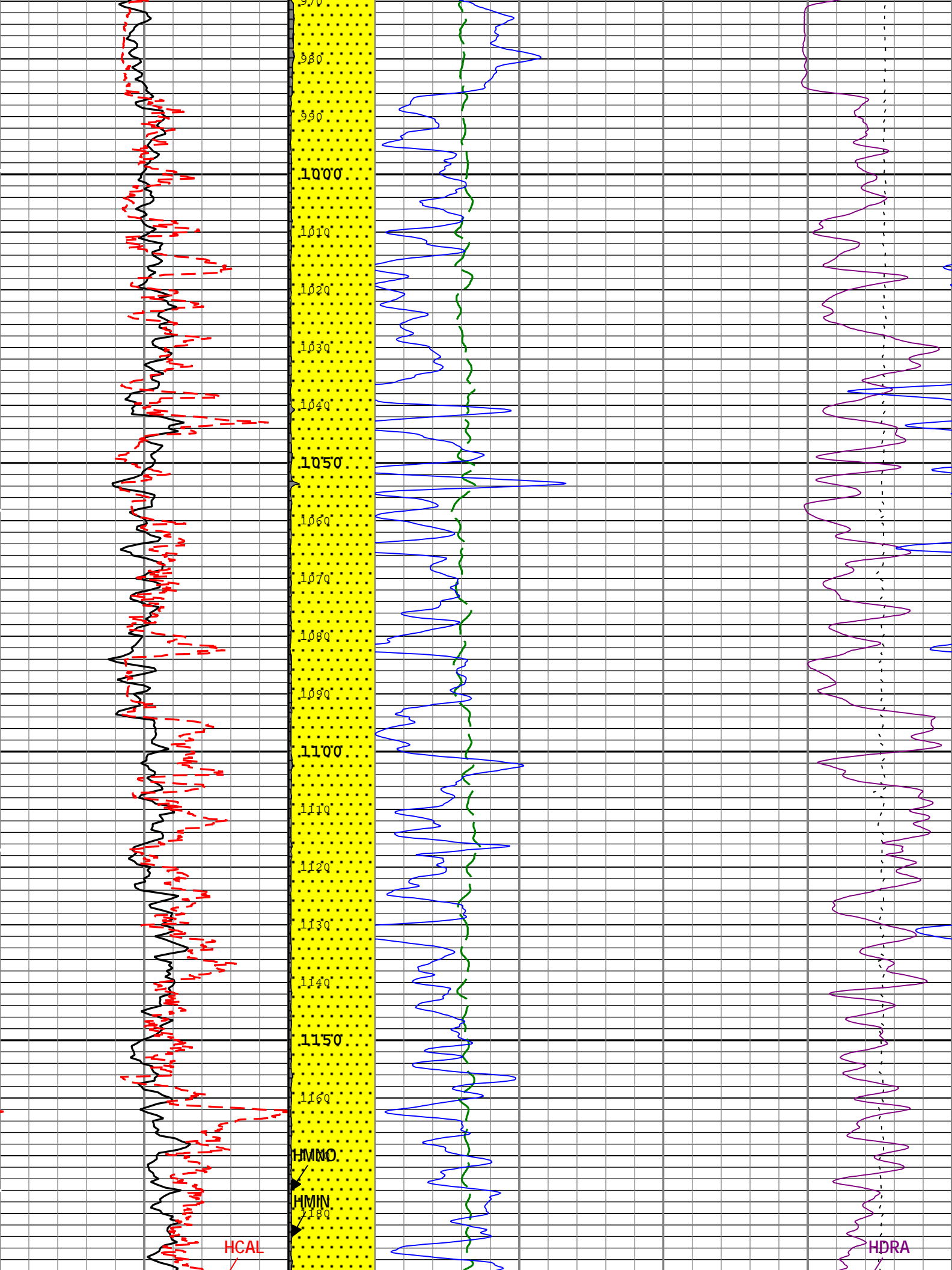
Description: HGNS standard resolution porosities for Platform Express Format: Log (EMD 5in Density) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 08-Jan-2015 23:40:03

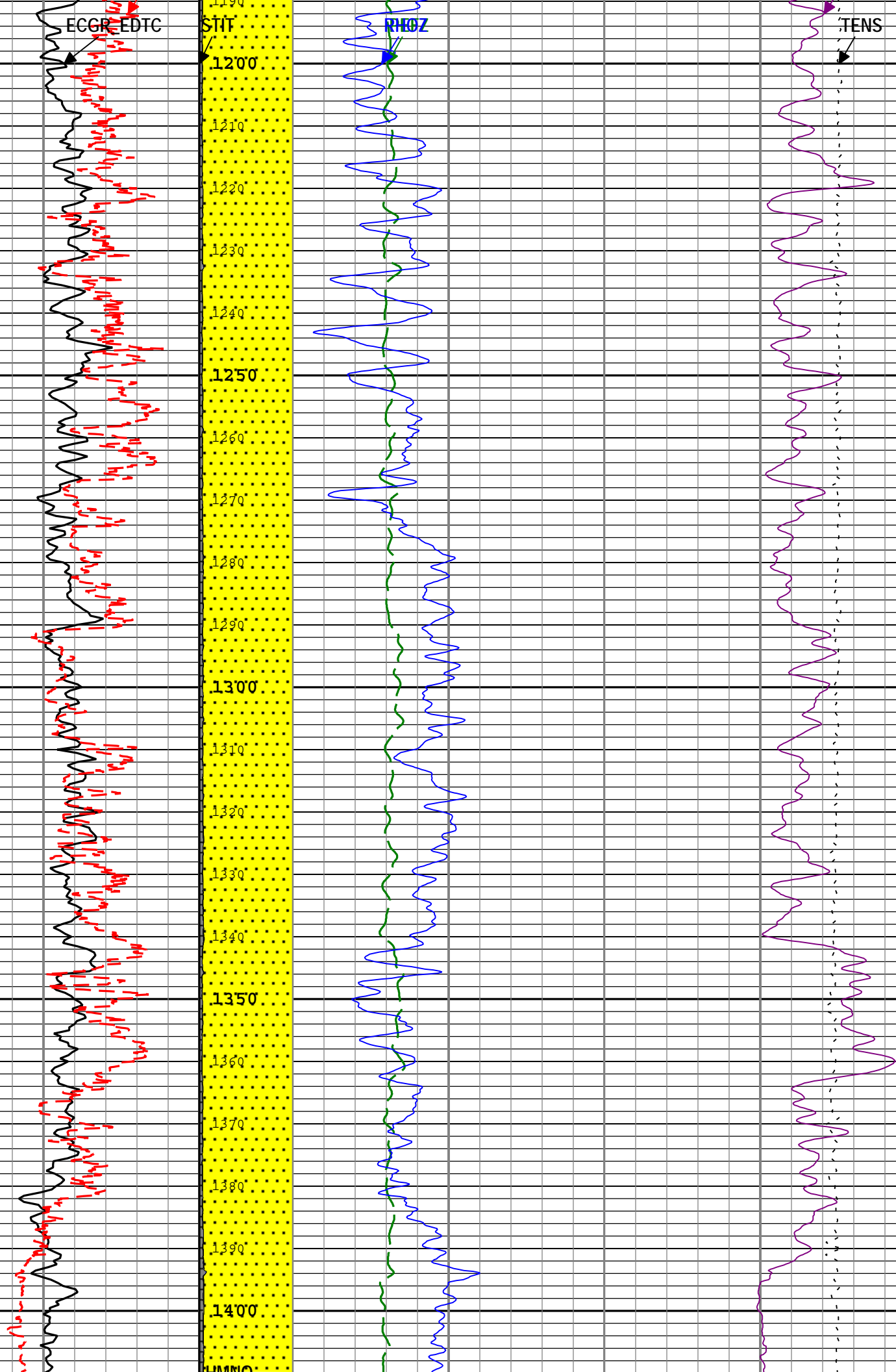
Channel	Source	Sampling
CALI	HDRS-H:HRCC-H:HRCC-H	1in
GR	EDTC-B:EDTC-B:EDTC-B	6in
HDRA	HDRS-H:HRMS-H:HRGD-H	2in
PEFZ	HDRS-H:HRMS-H:HRGD-H	2in
RHOZ	HDRS-H:HRMS-H:HRGD-H	2in
SMIN	HDRS-H:HRMS-H:HRGD-H	2in
SMNO	HDRS-H:HRMS-H:HRGD-H	2in
STIT	DepthCorrection	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in
TIME_1900 - Time Marked every 60.00 (s)		

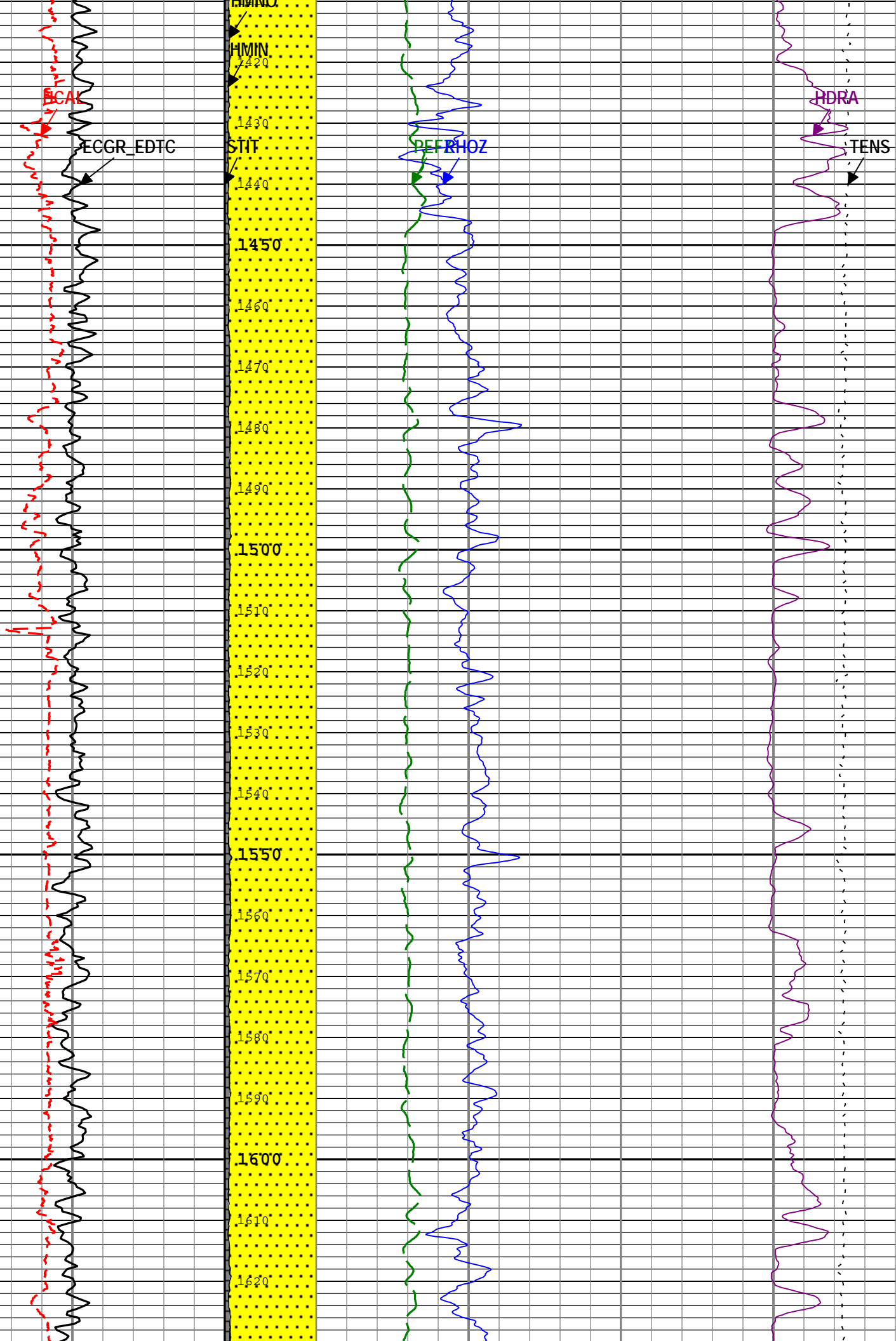


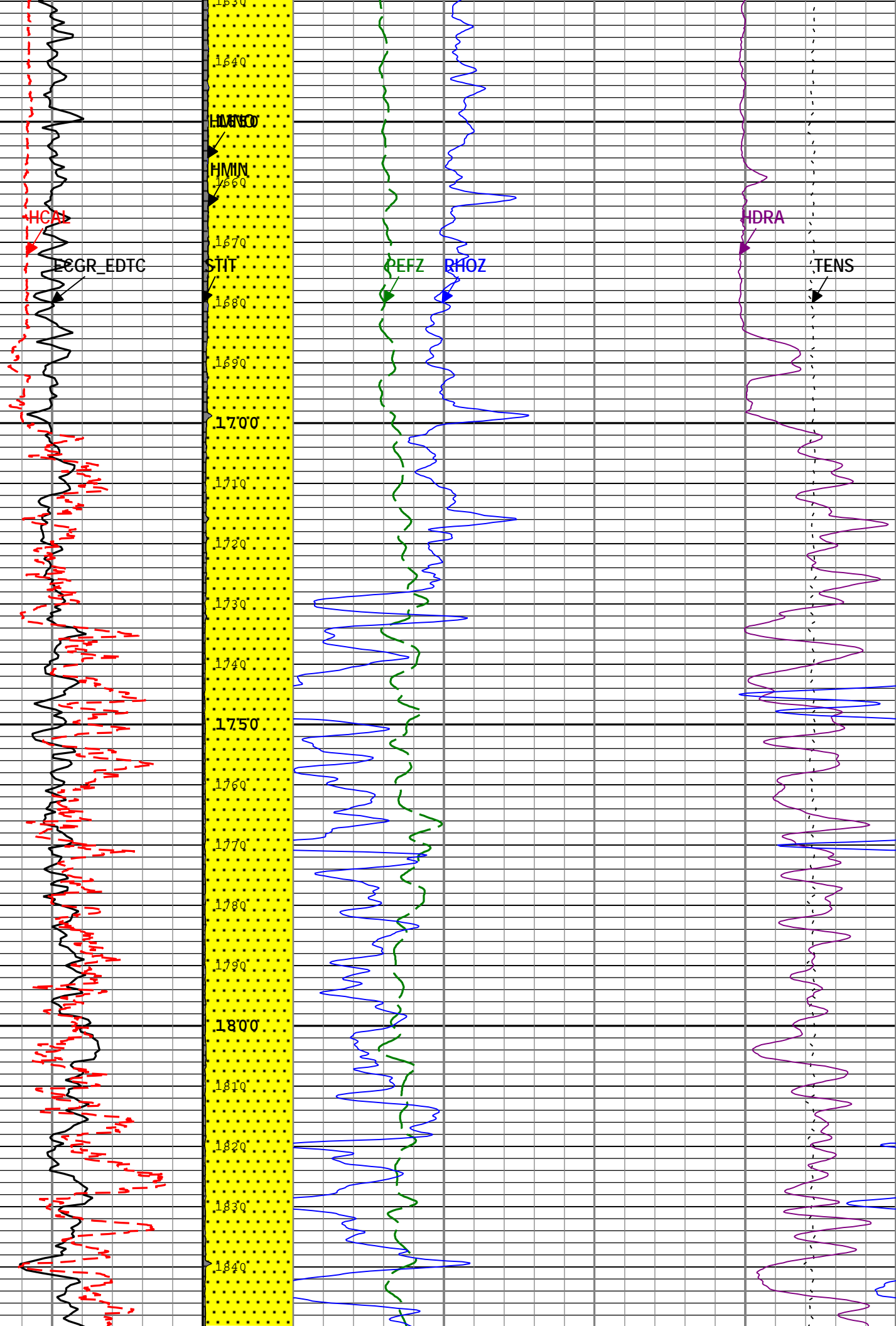


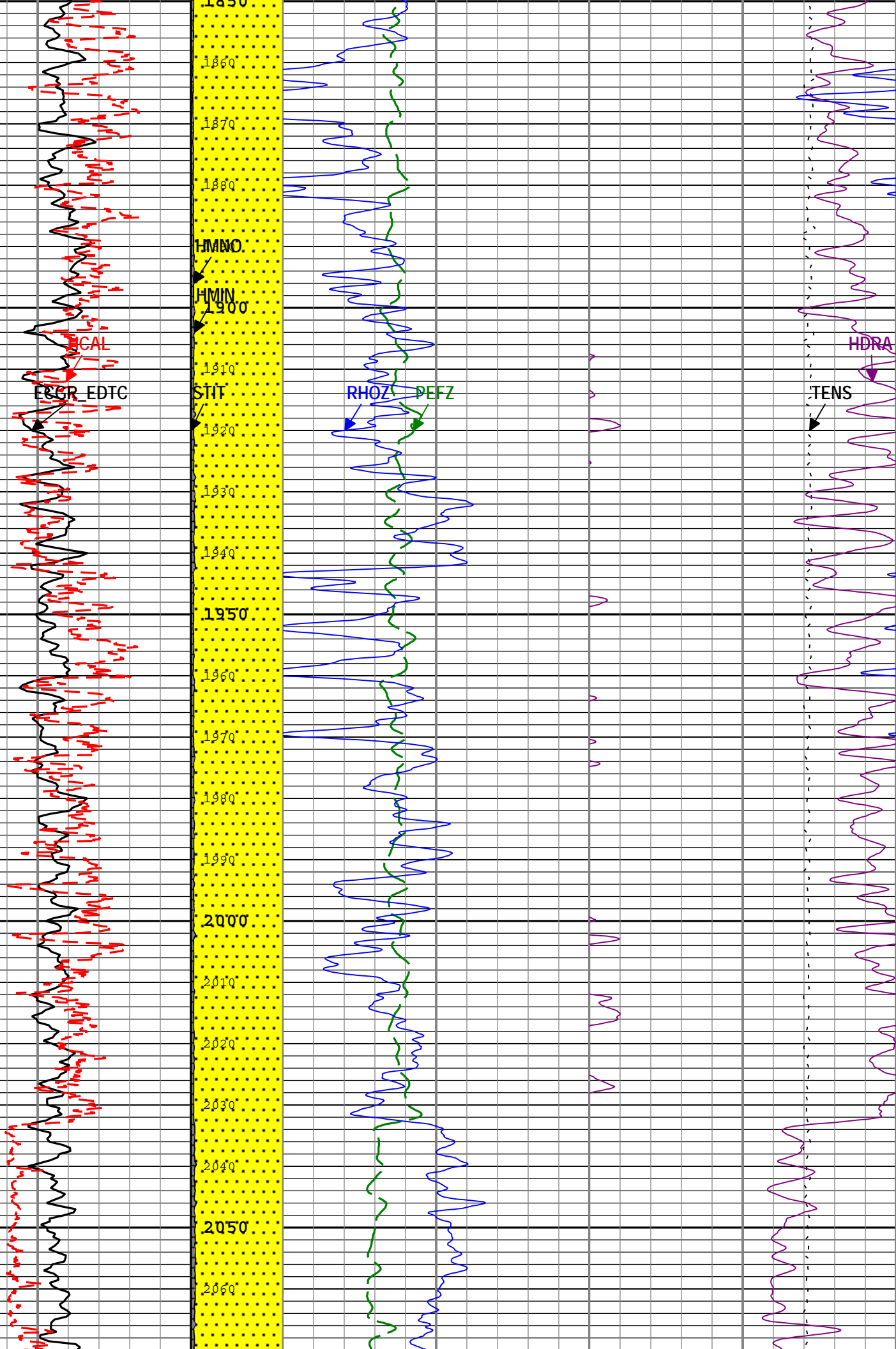


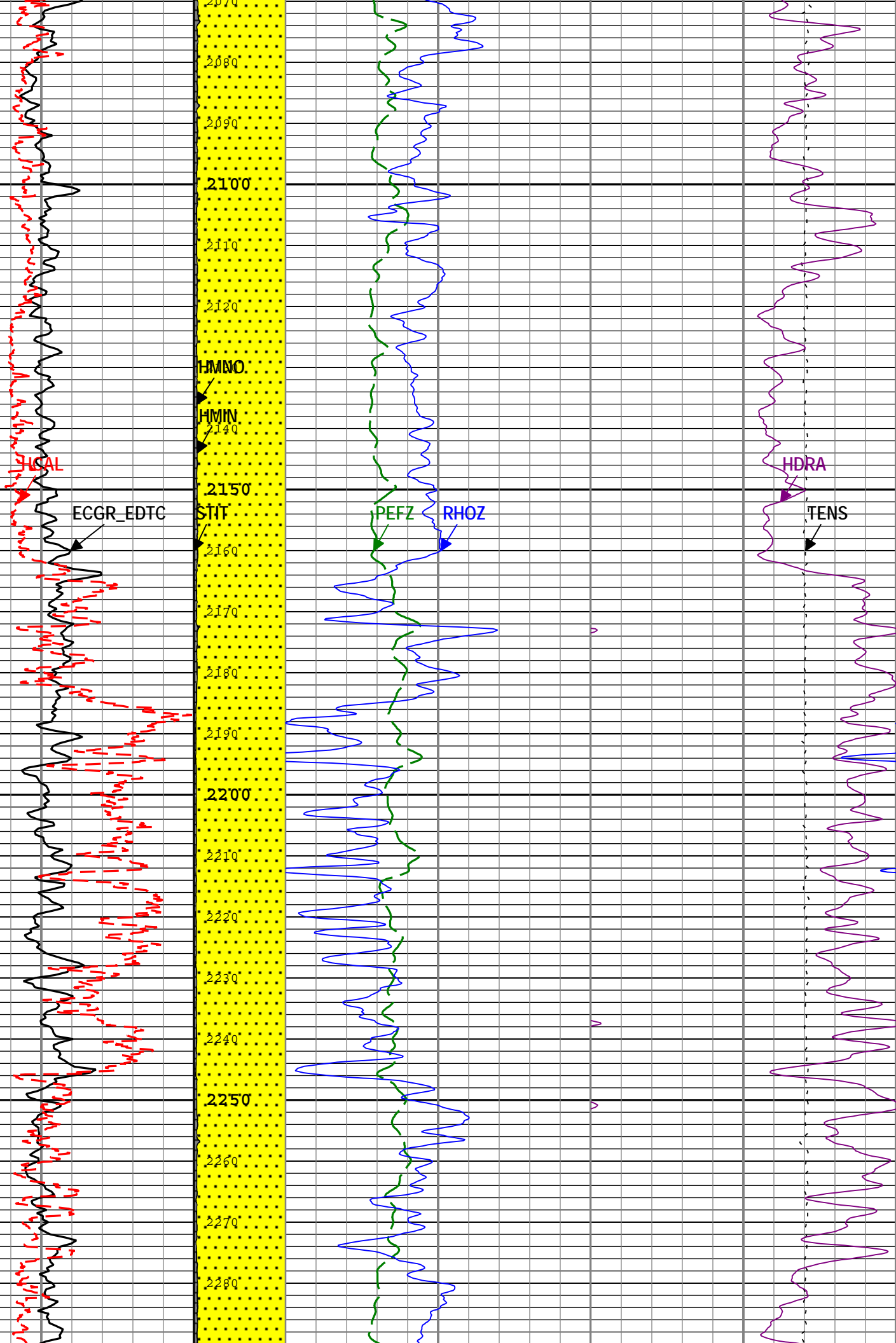


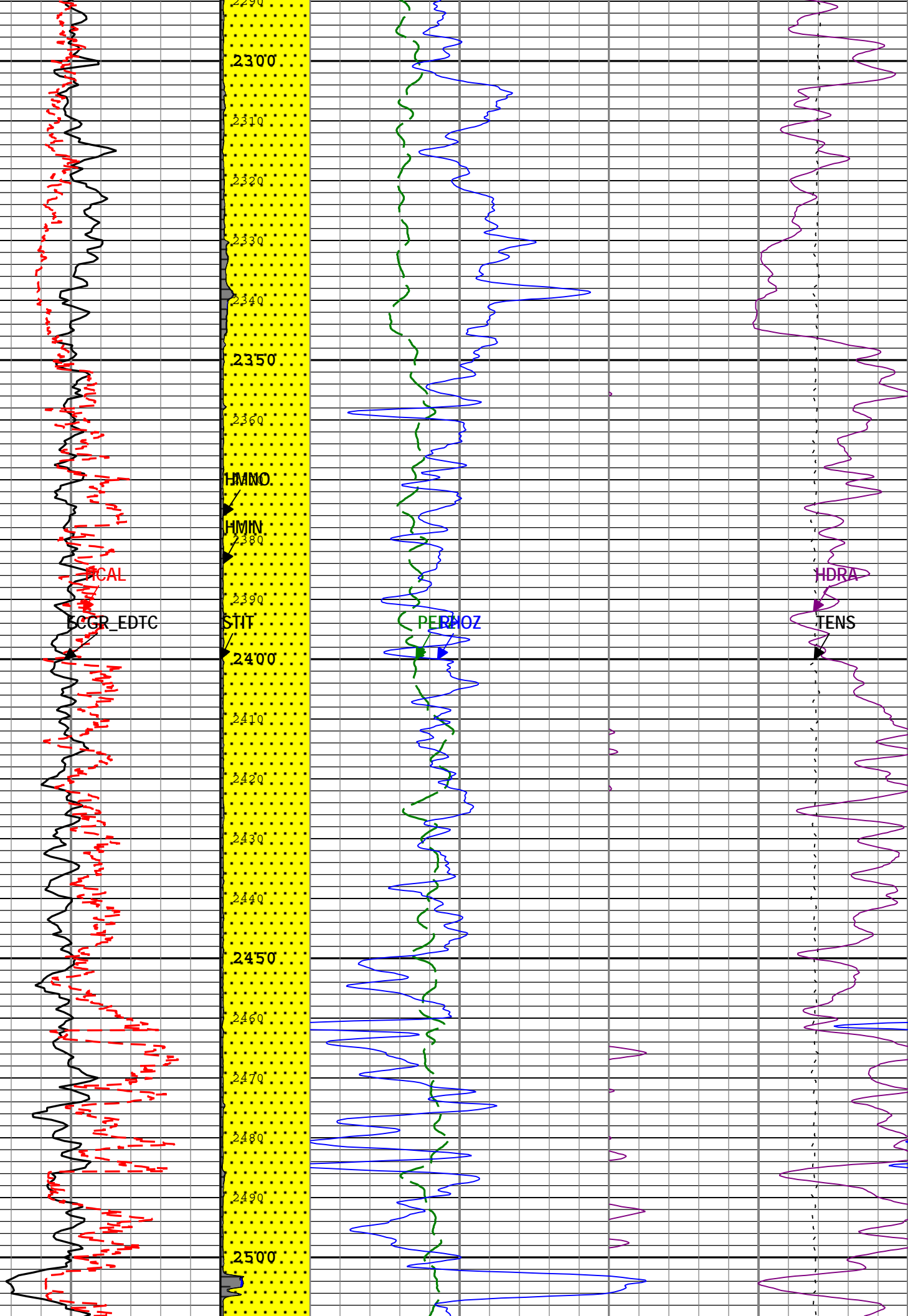


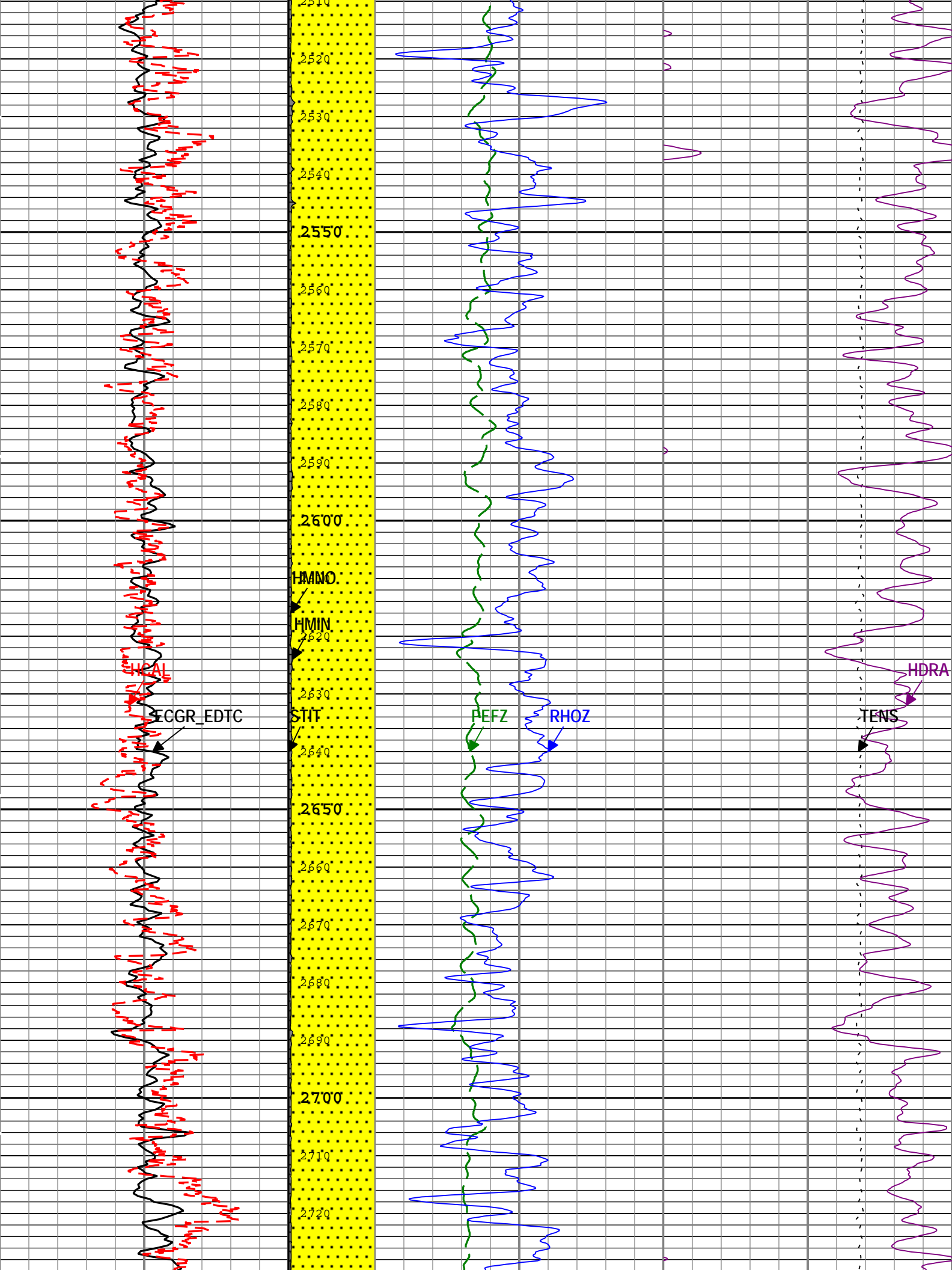


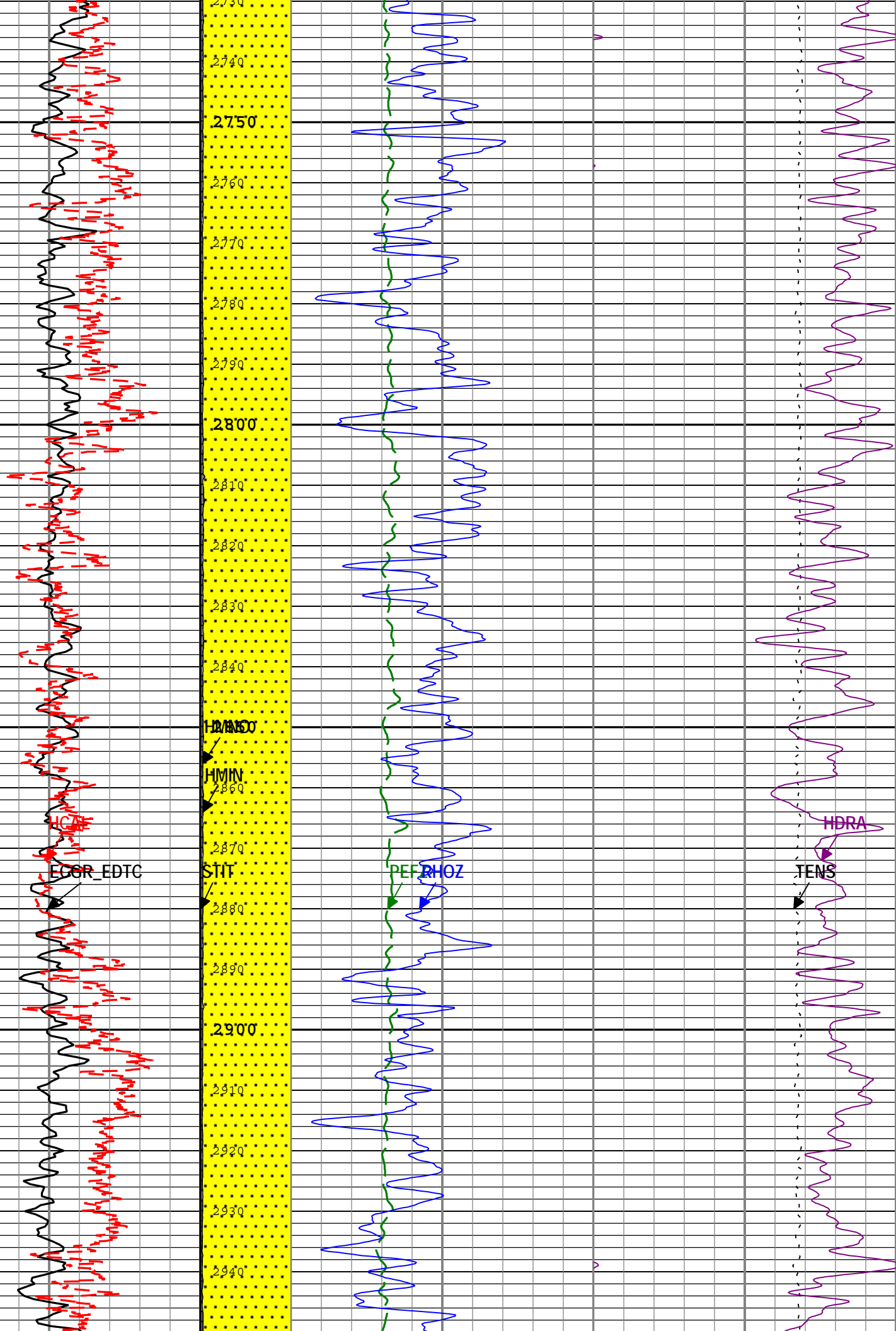


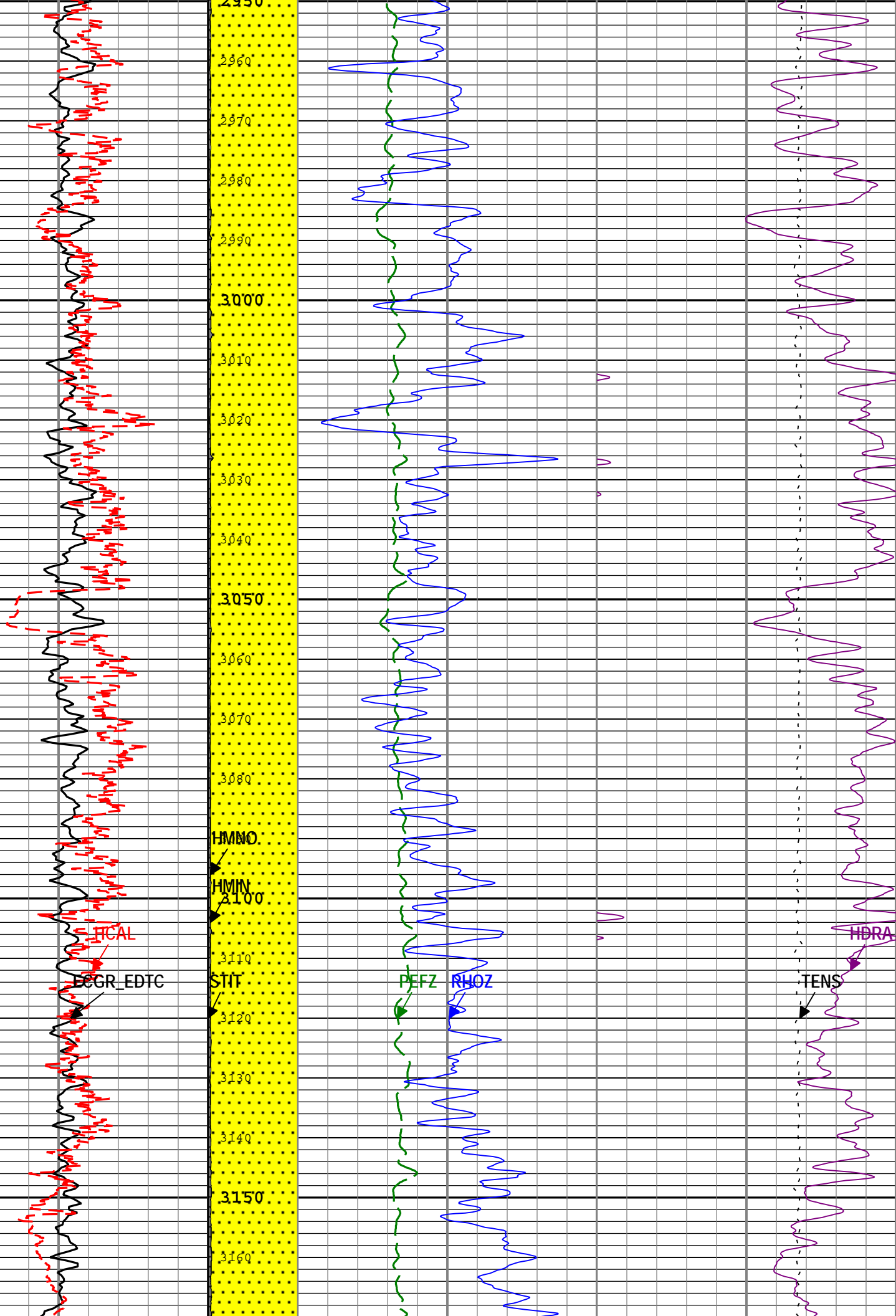


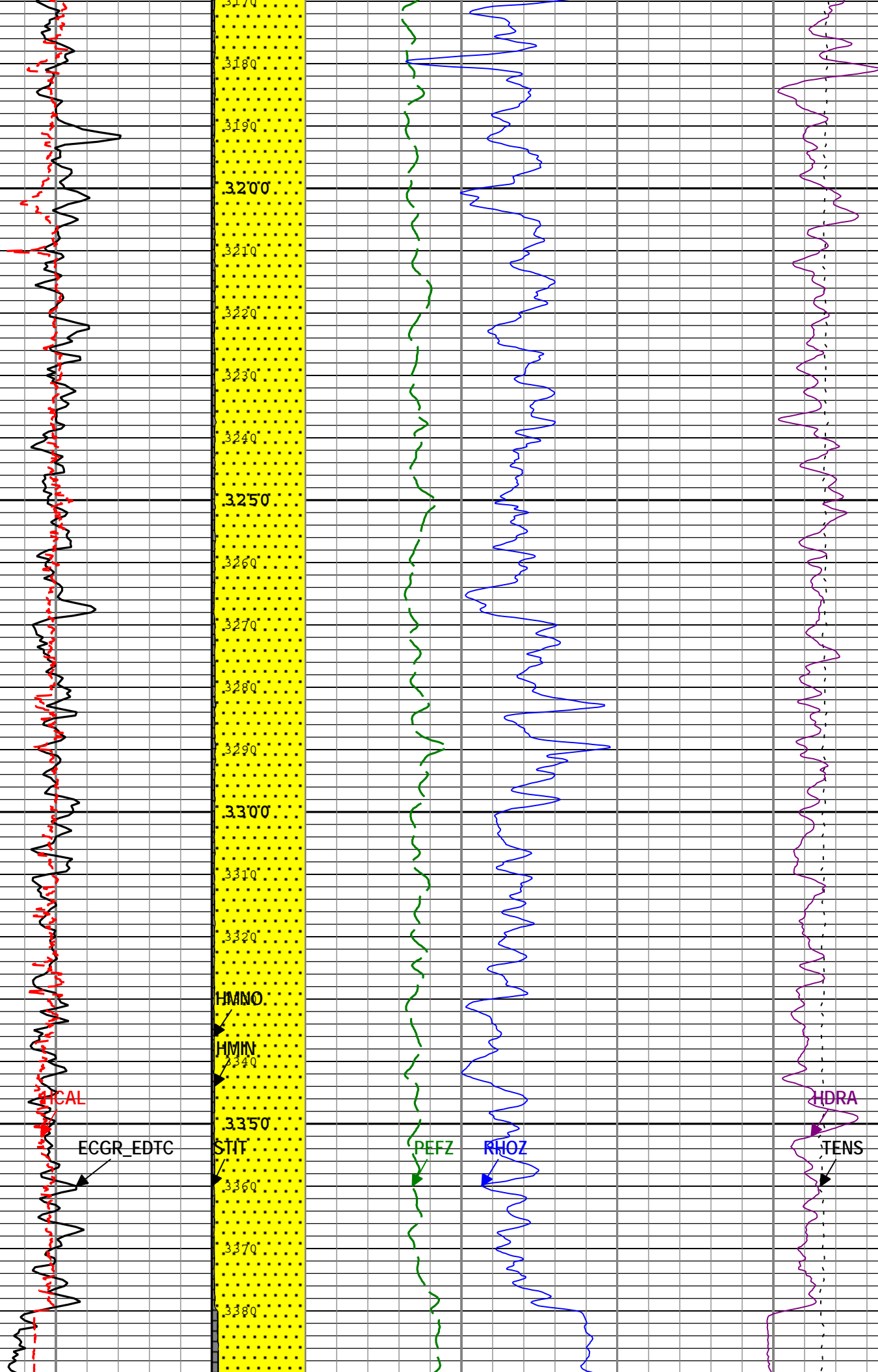


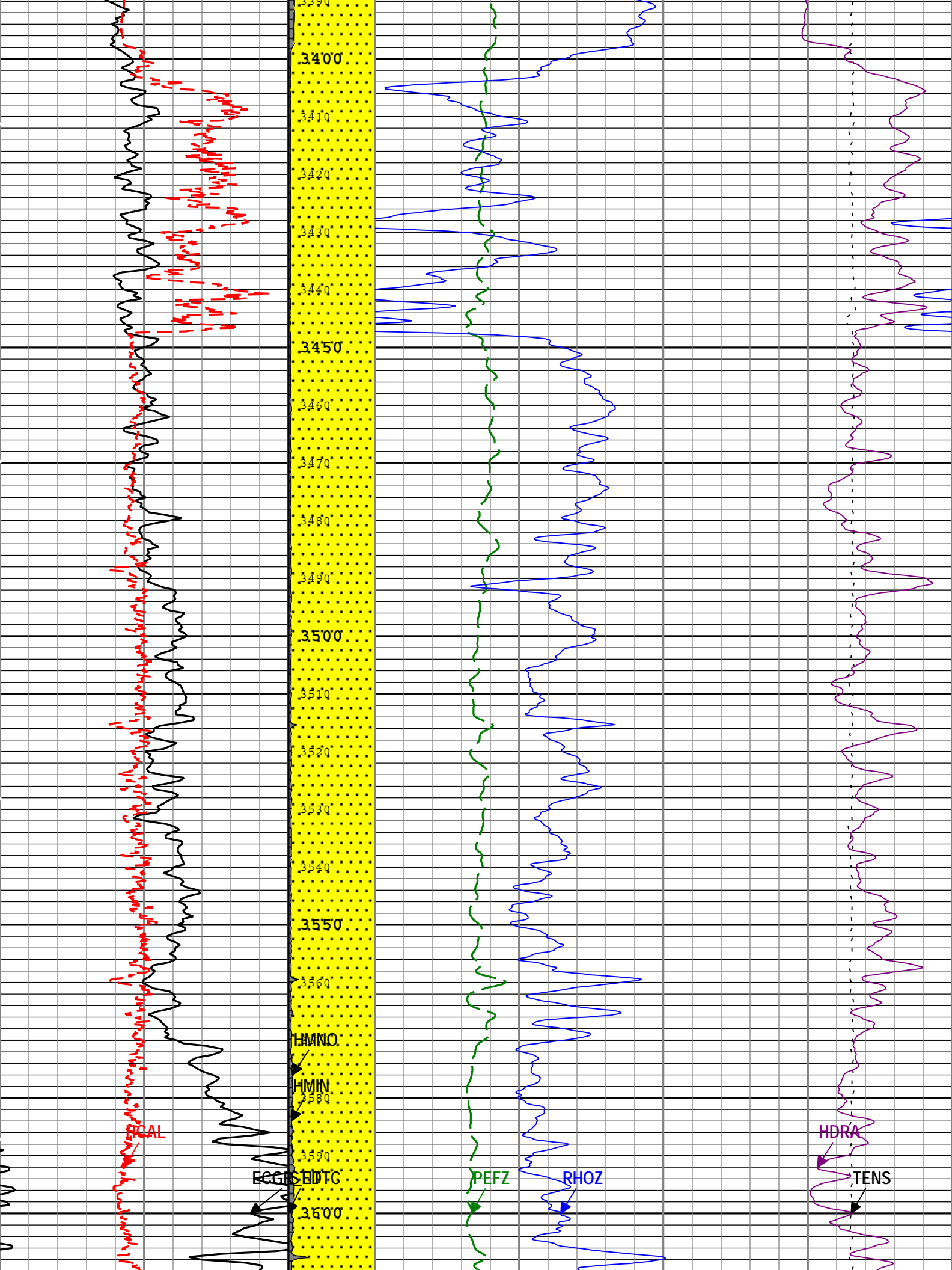


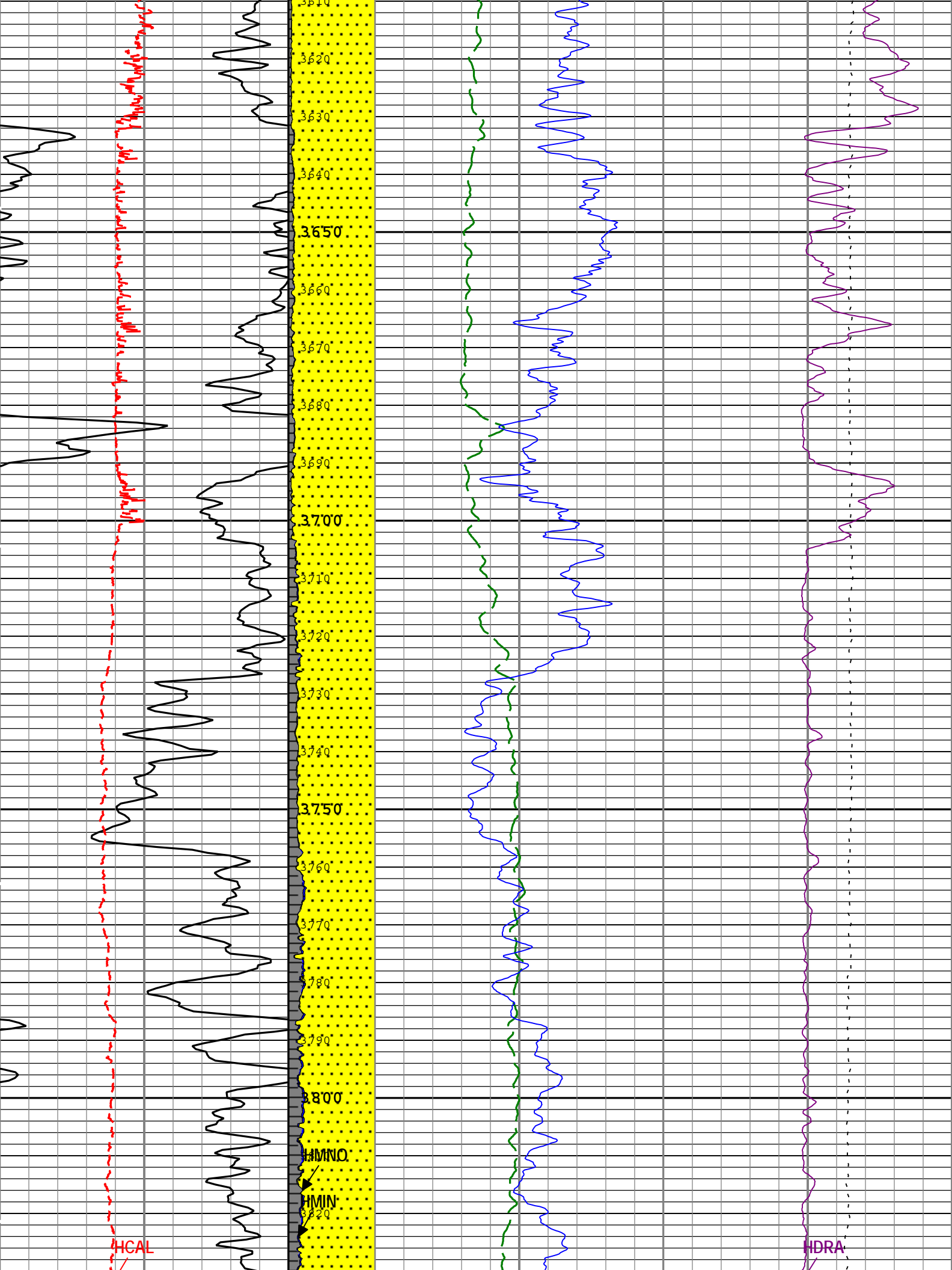


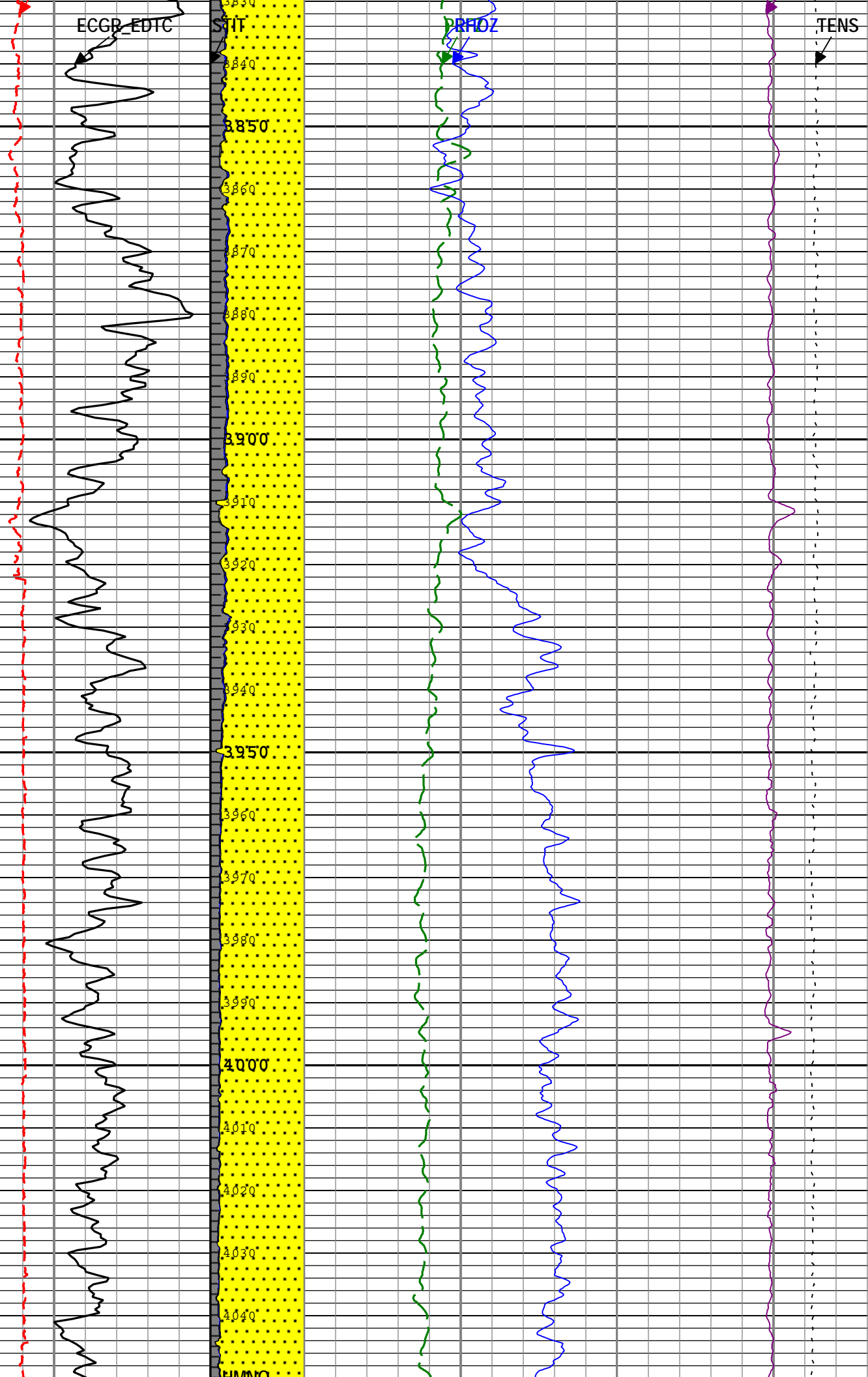


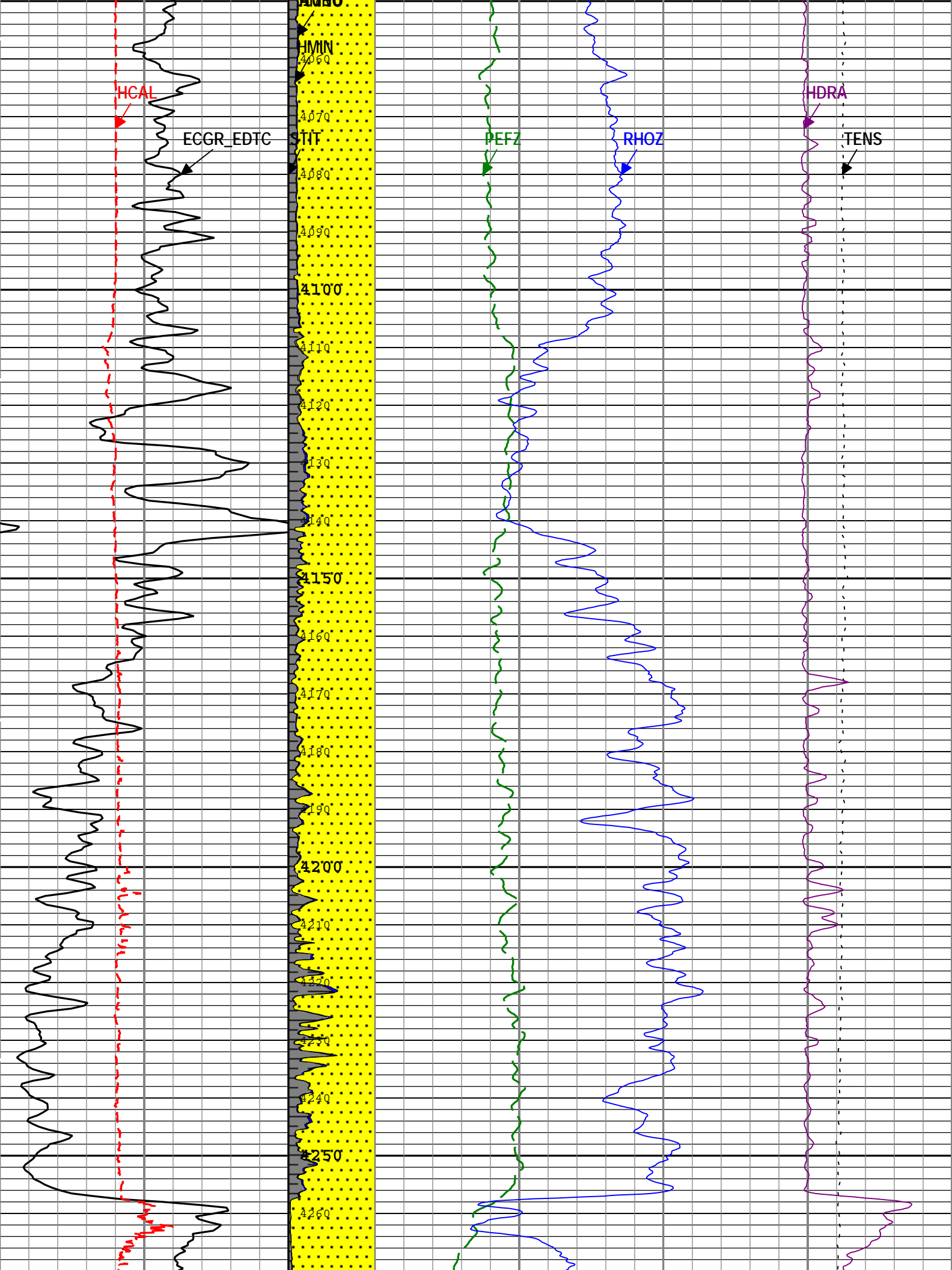


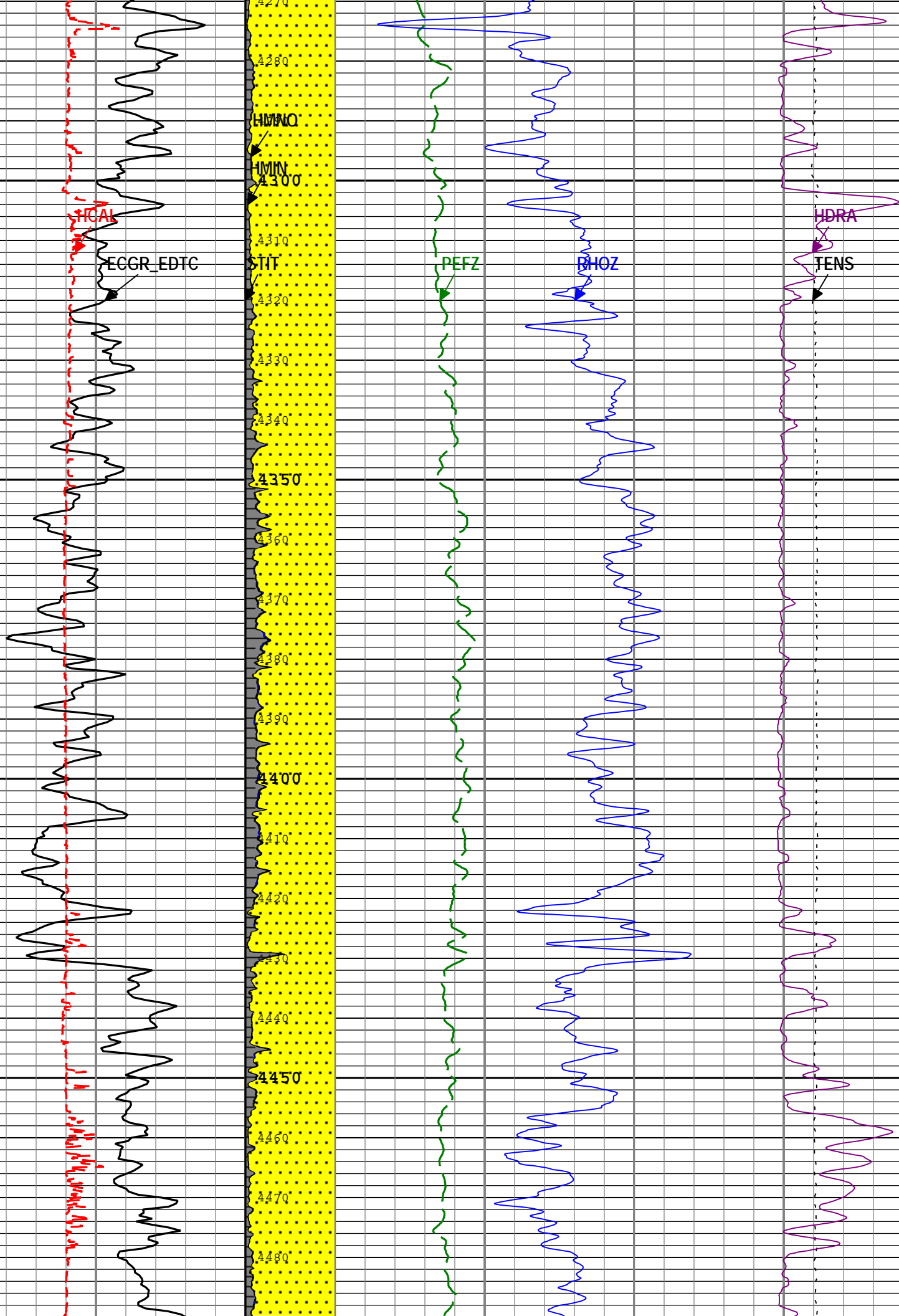


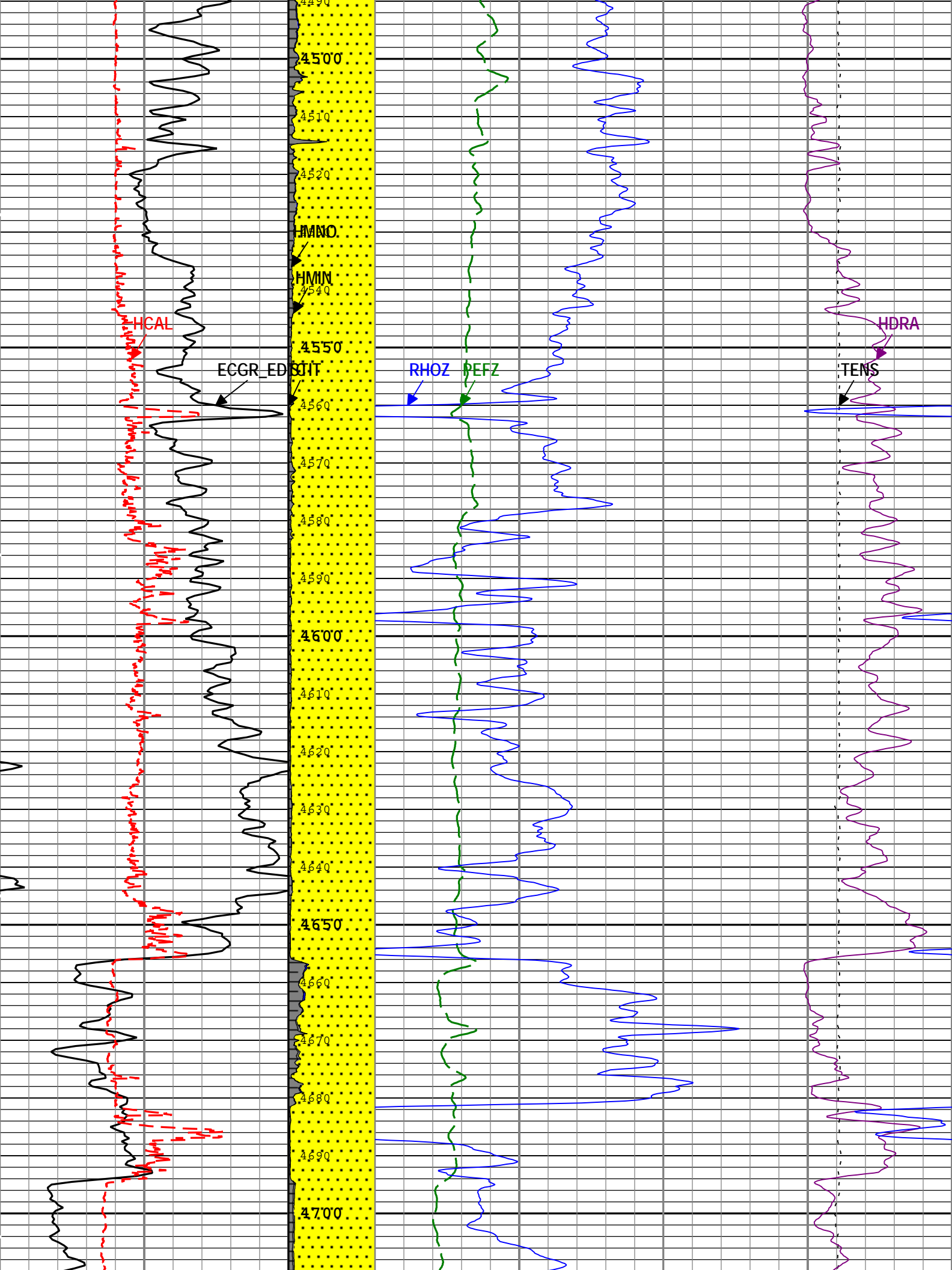


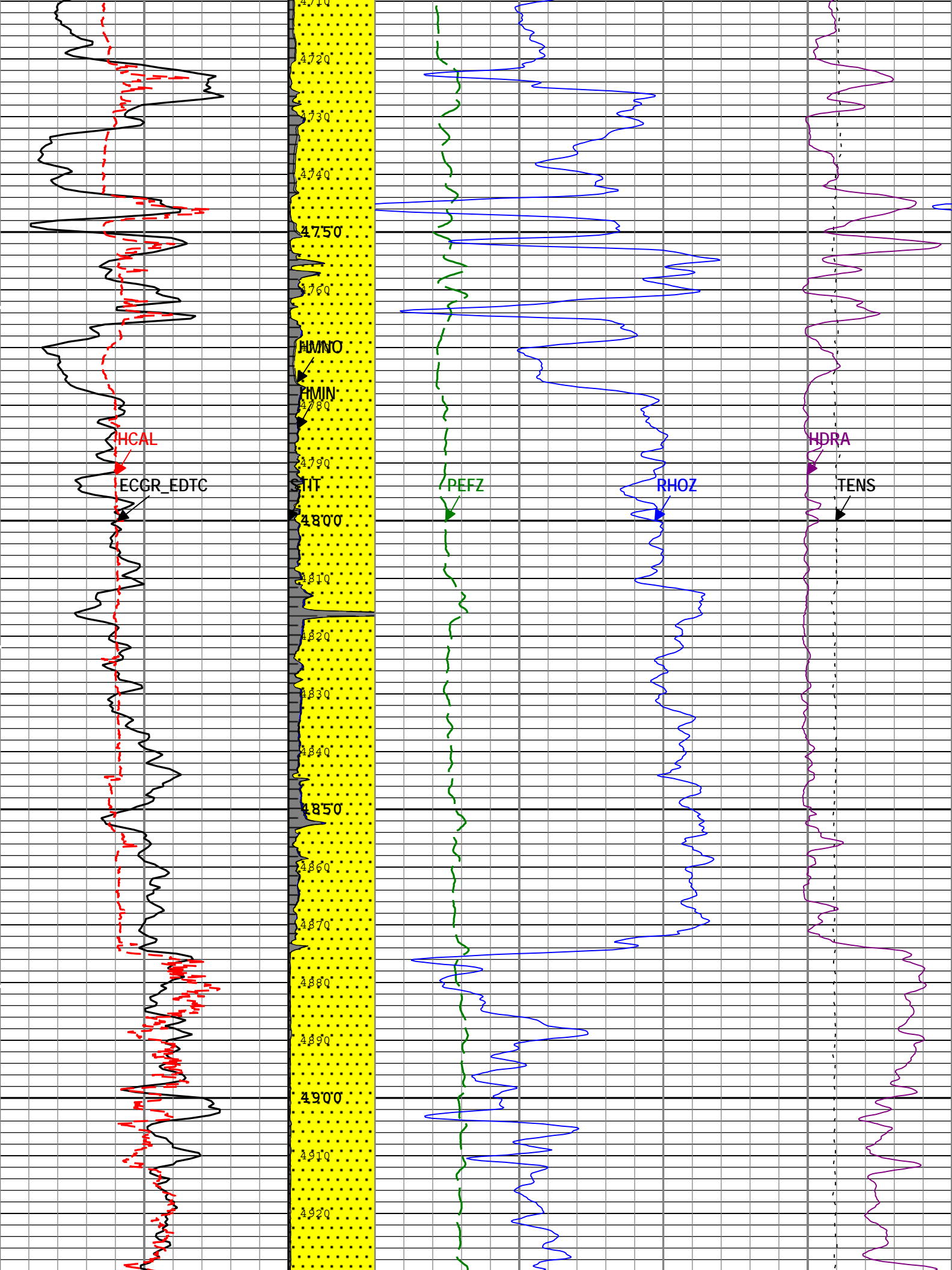


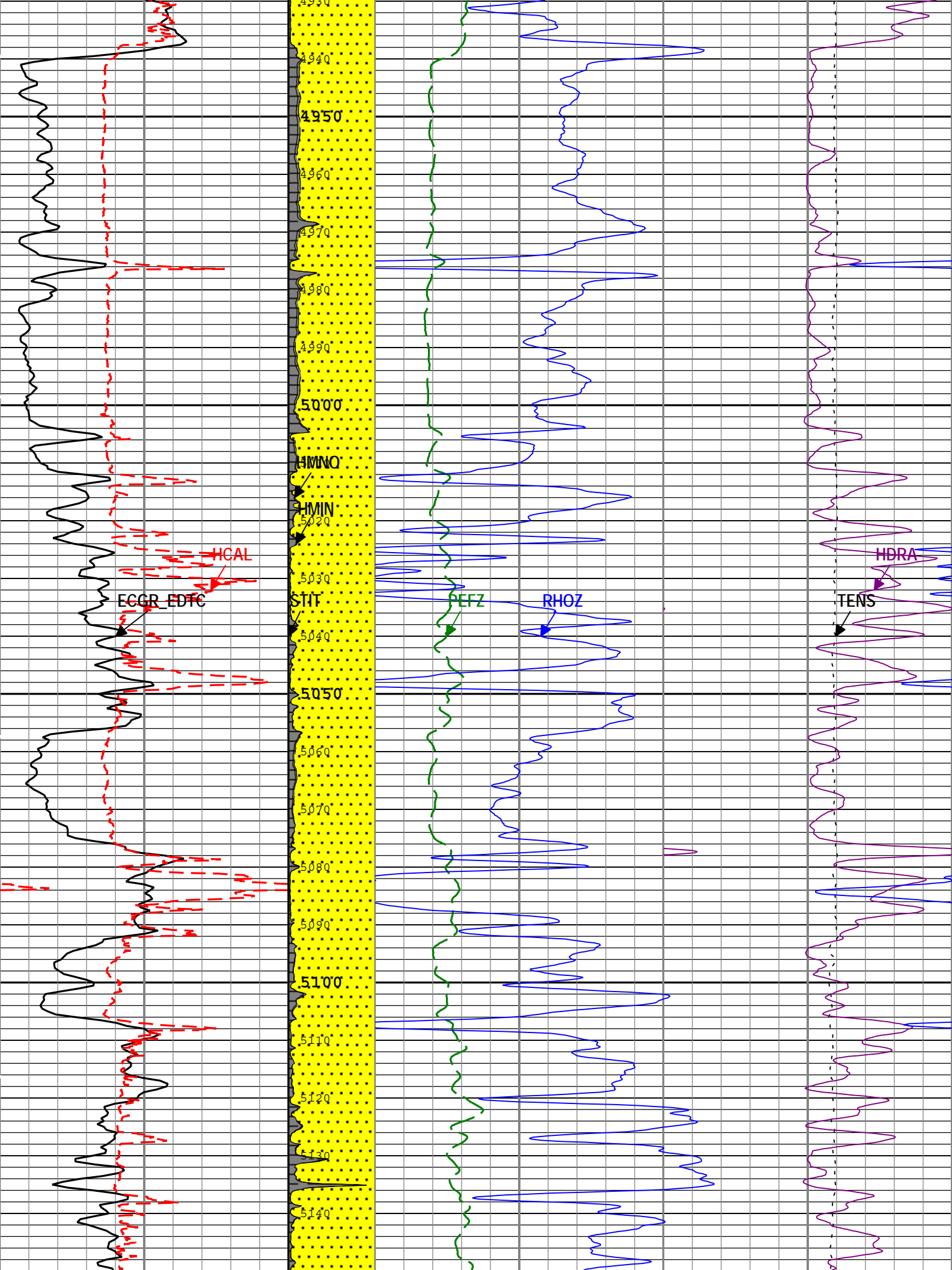


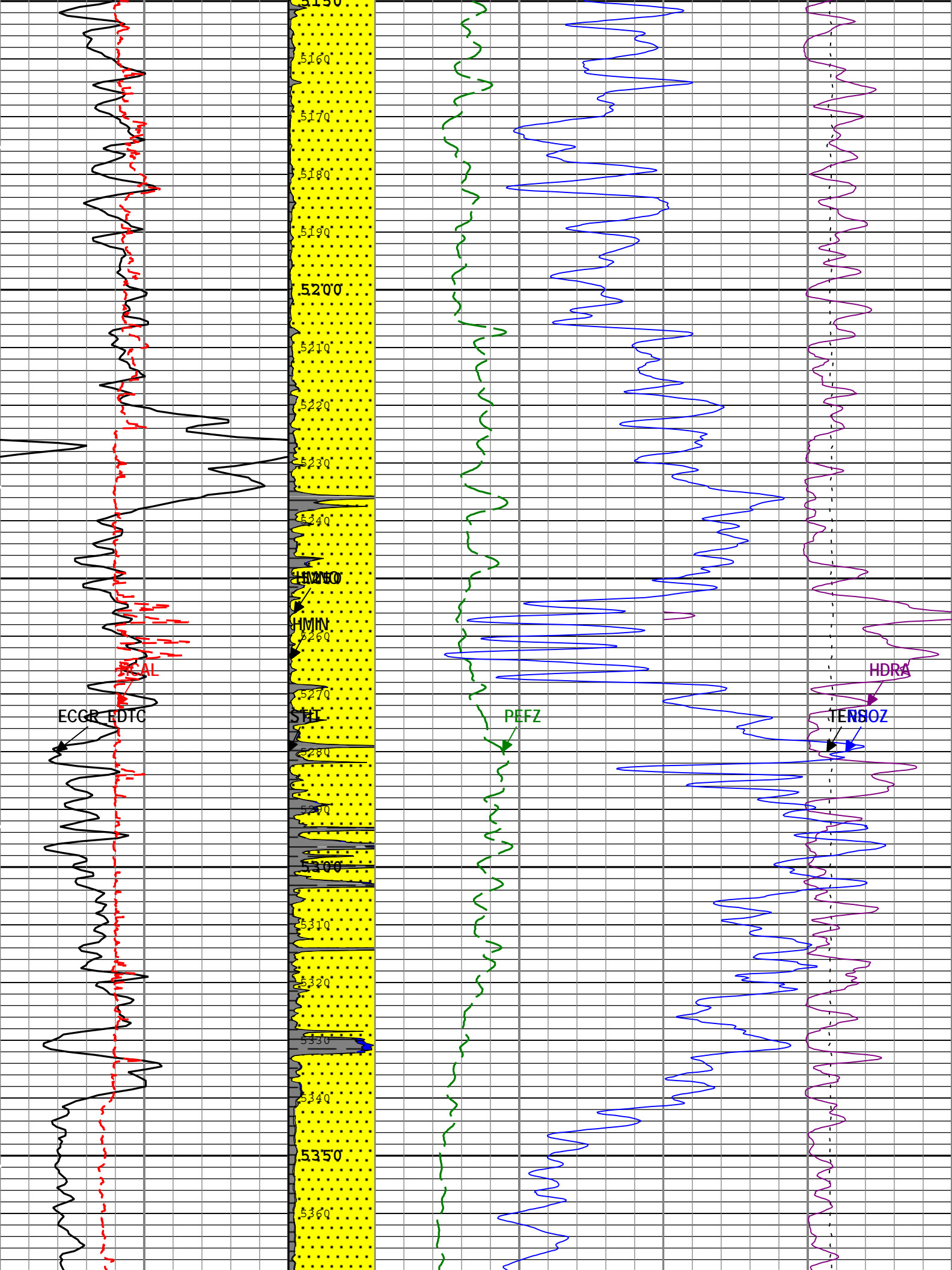


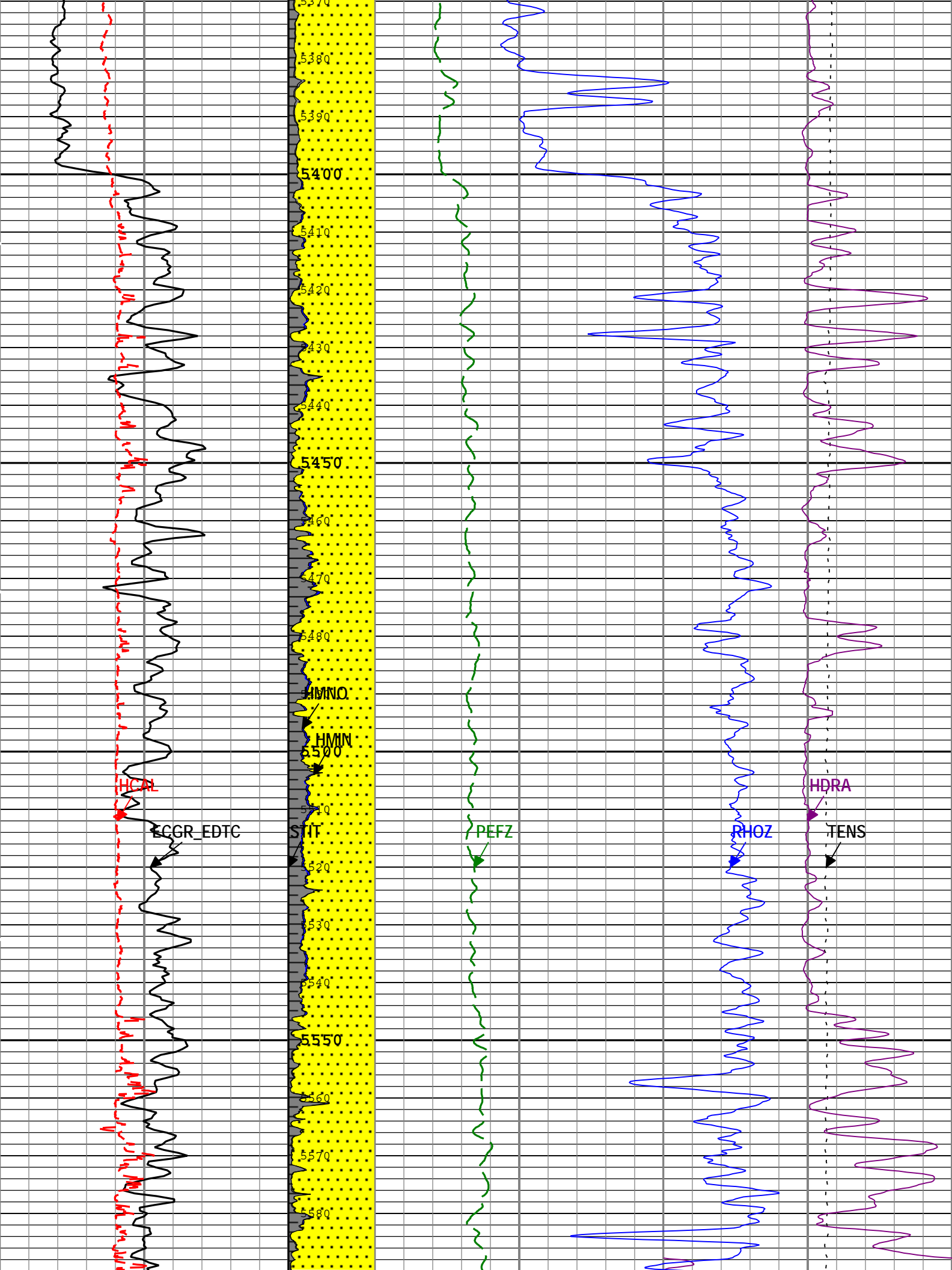


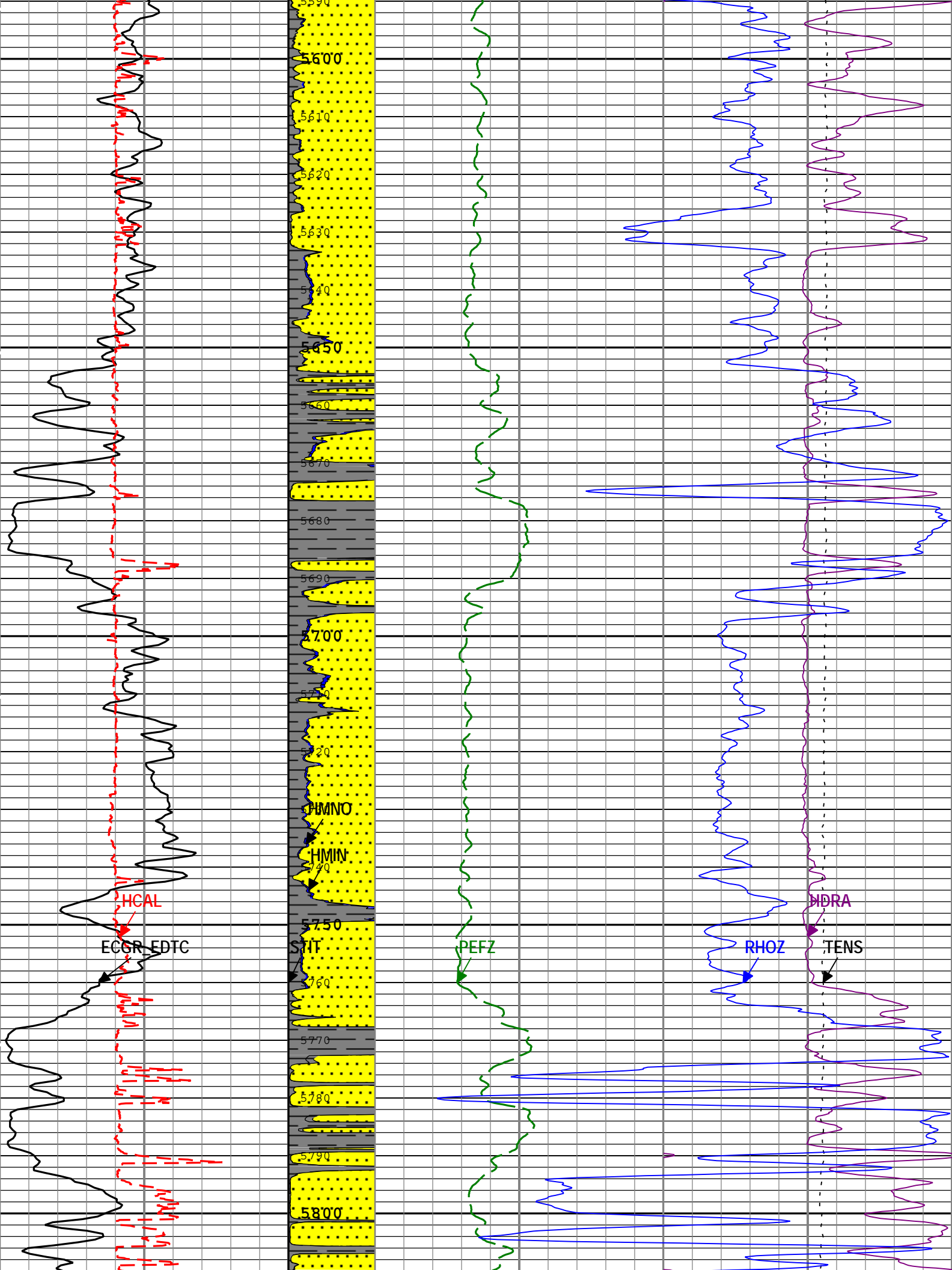


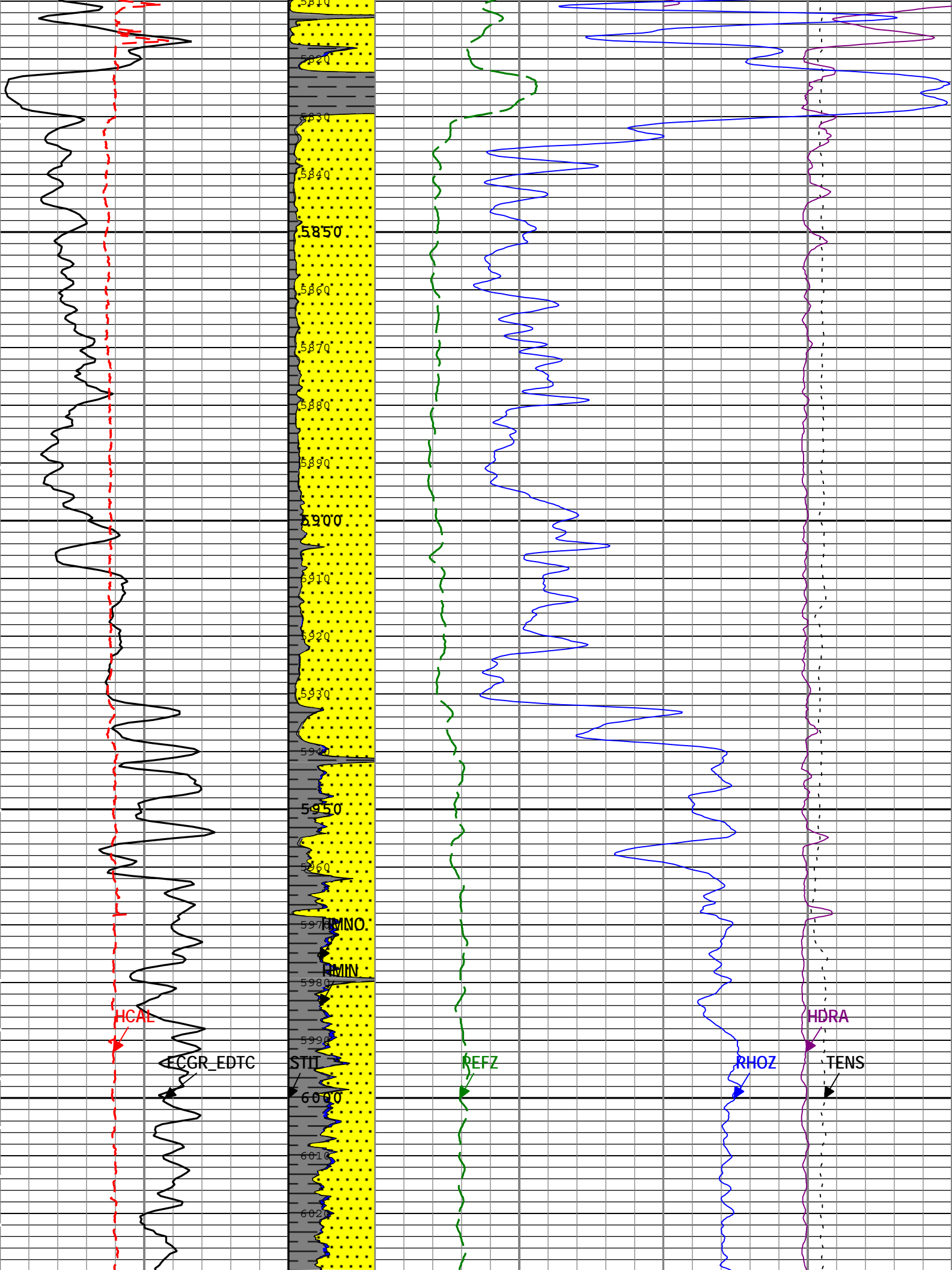


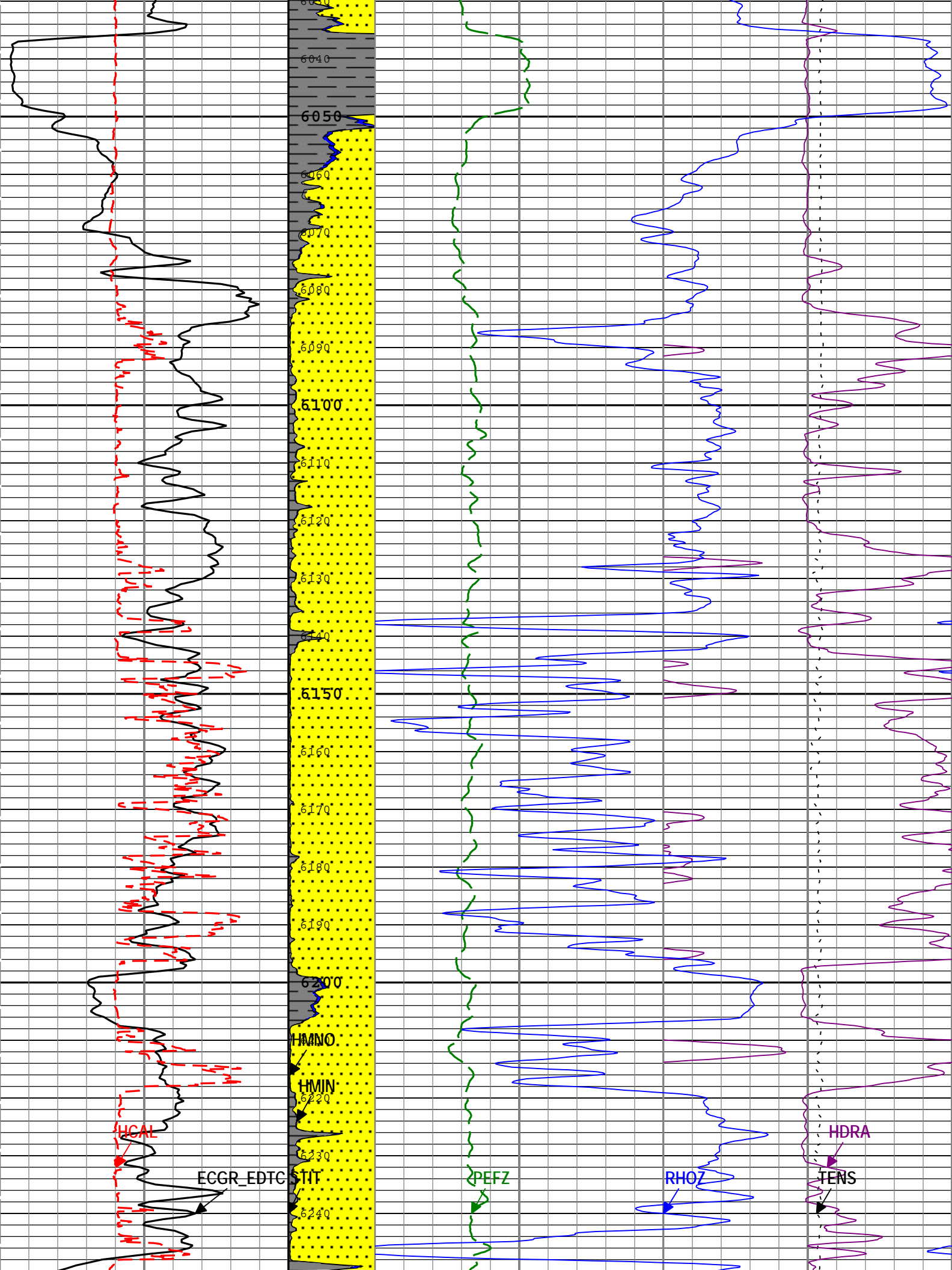


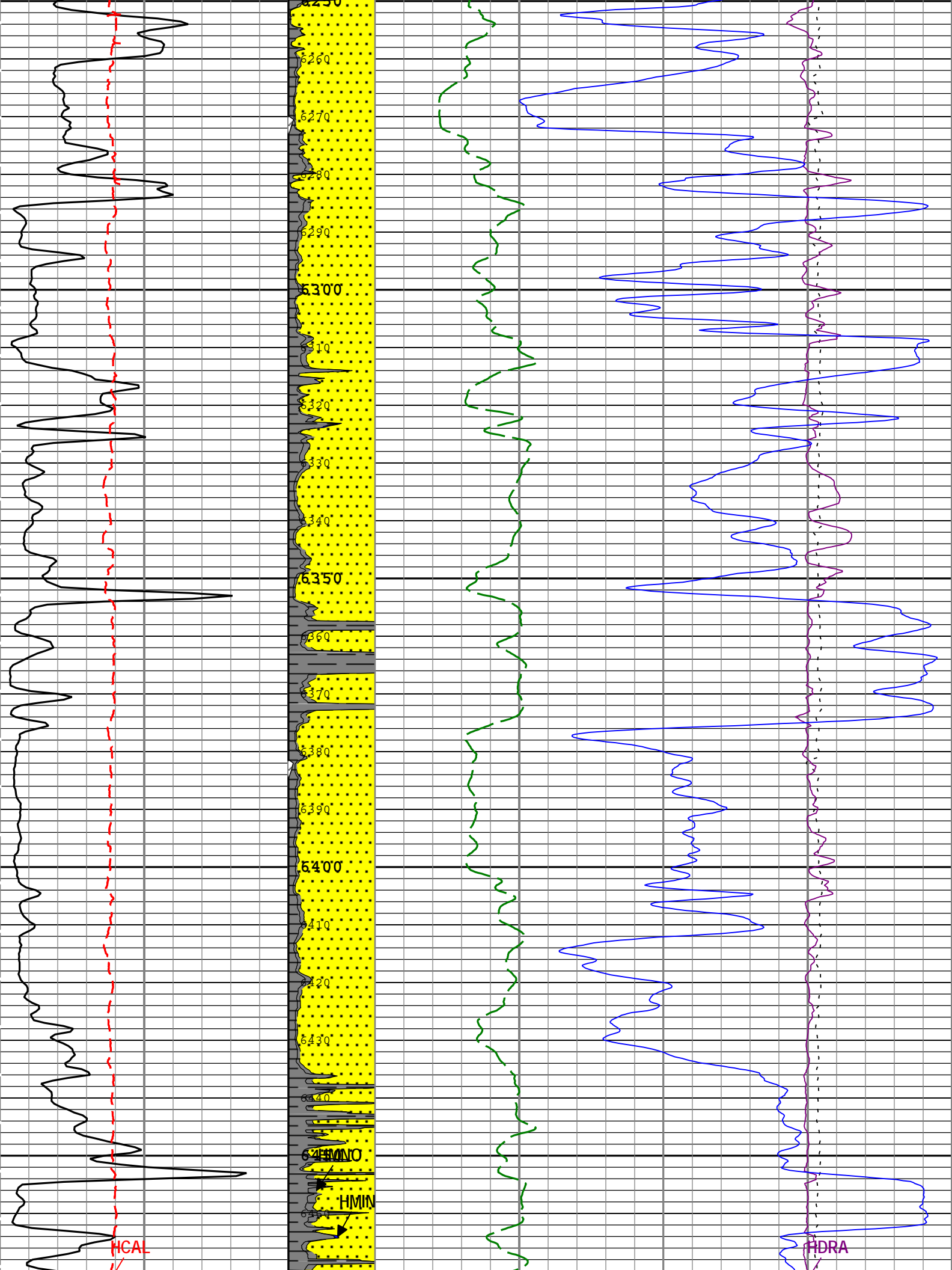


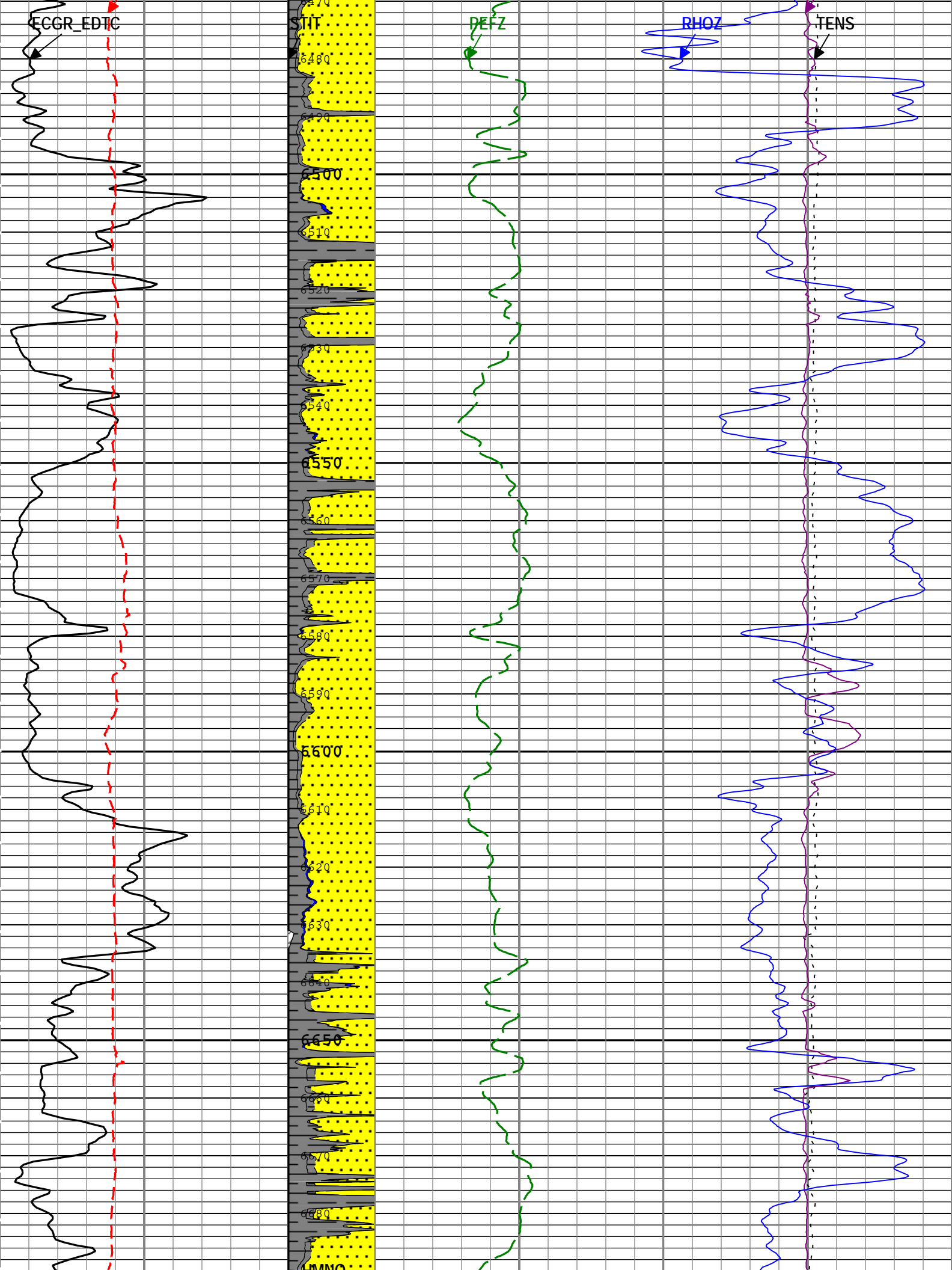


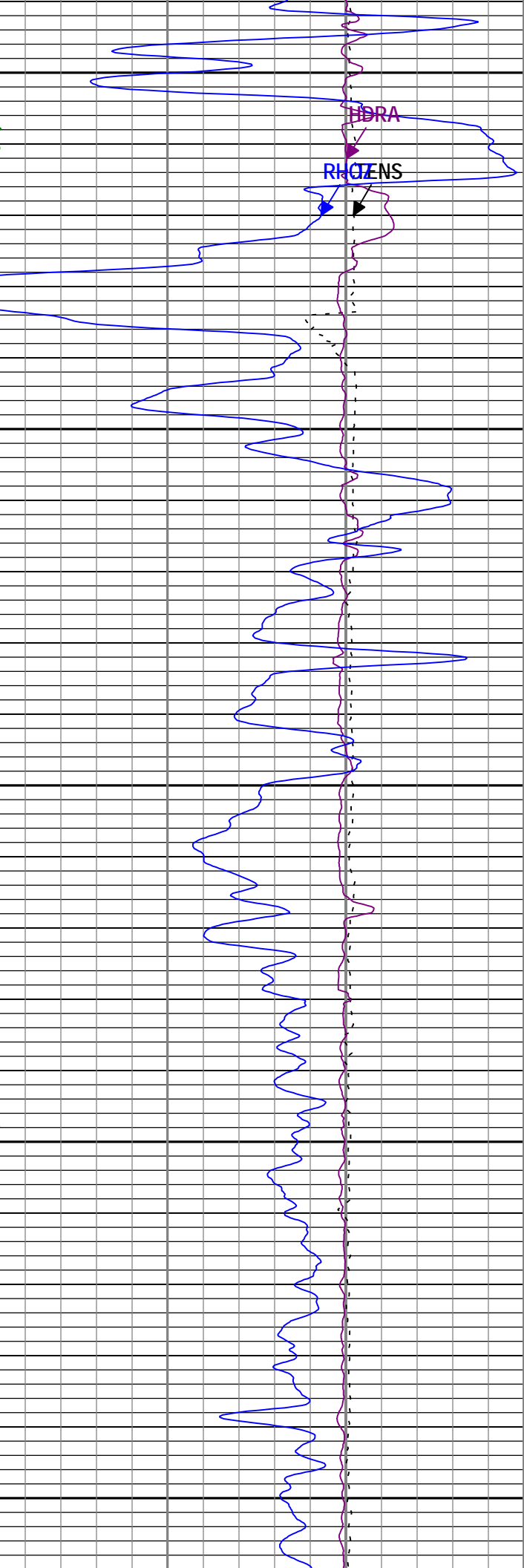
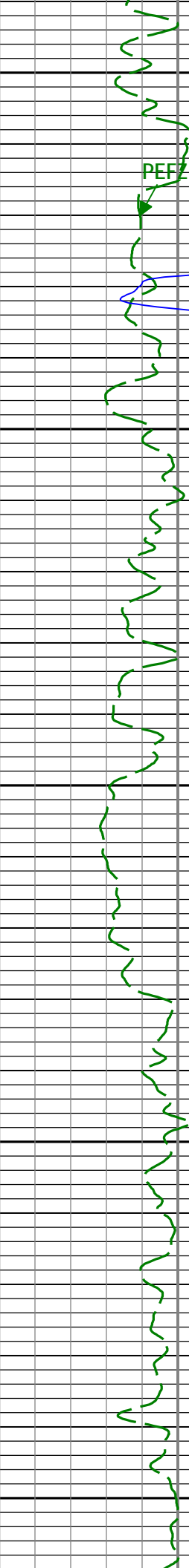
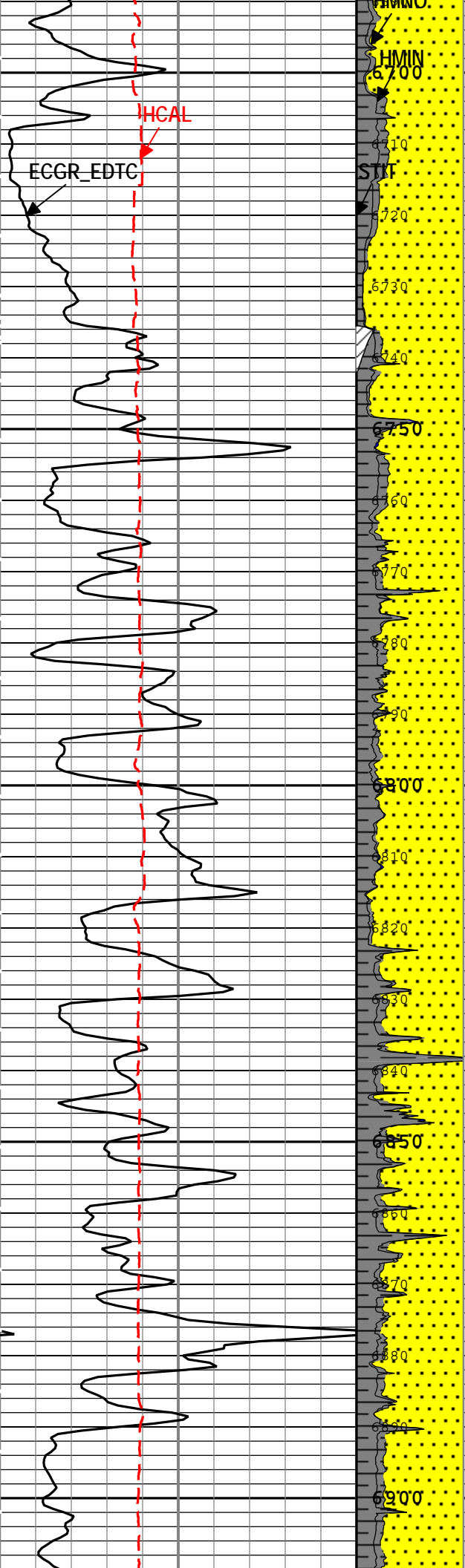


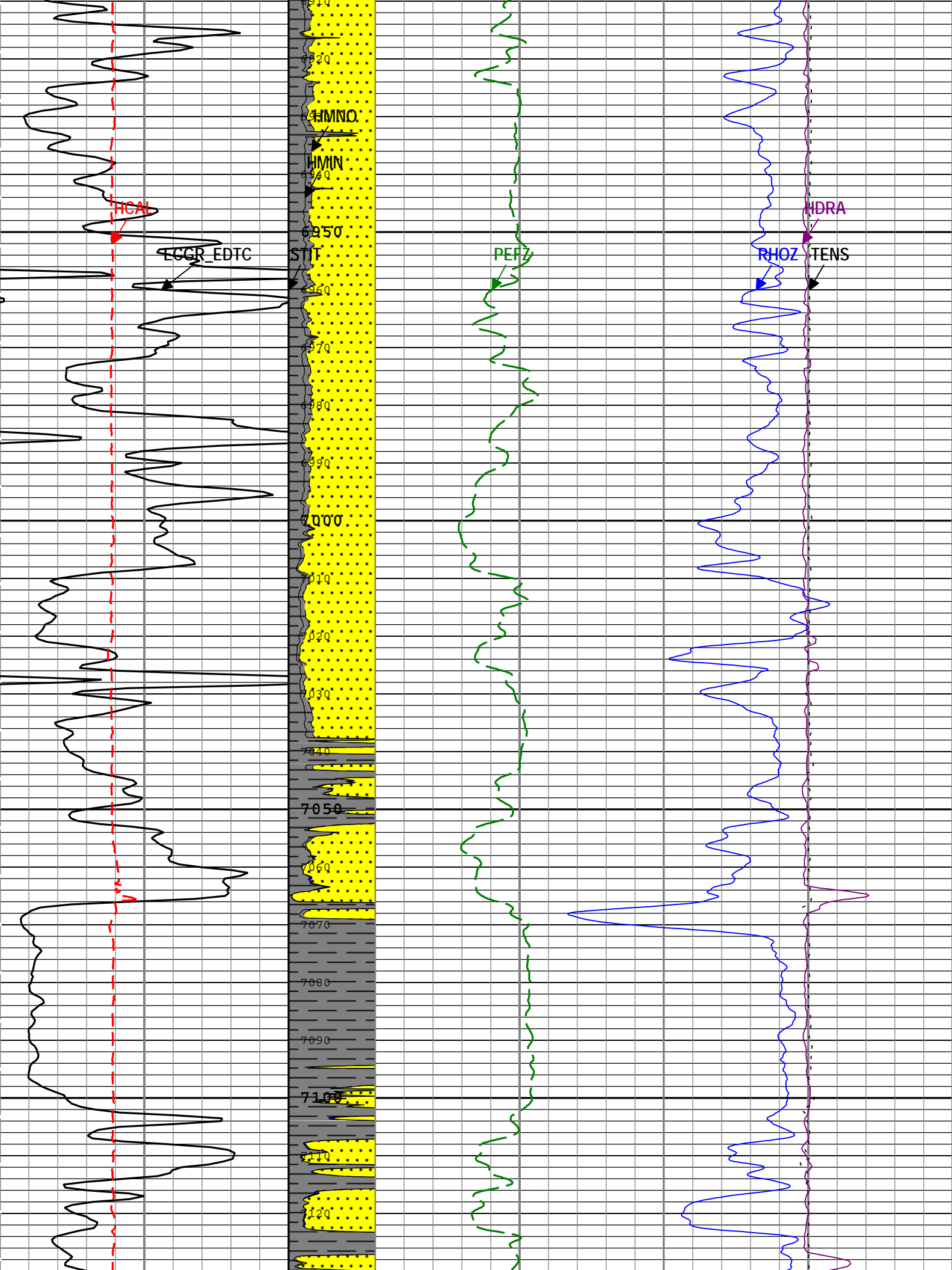


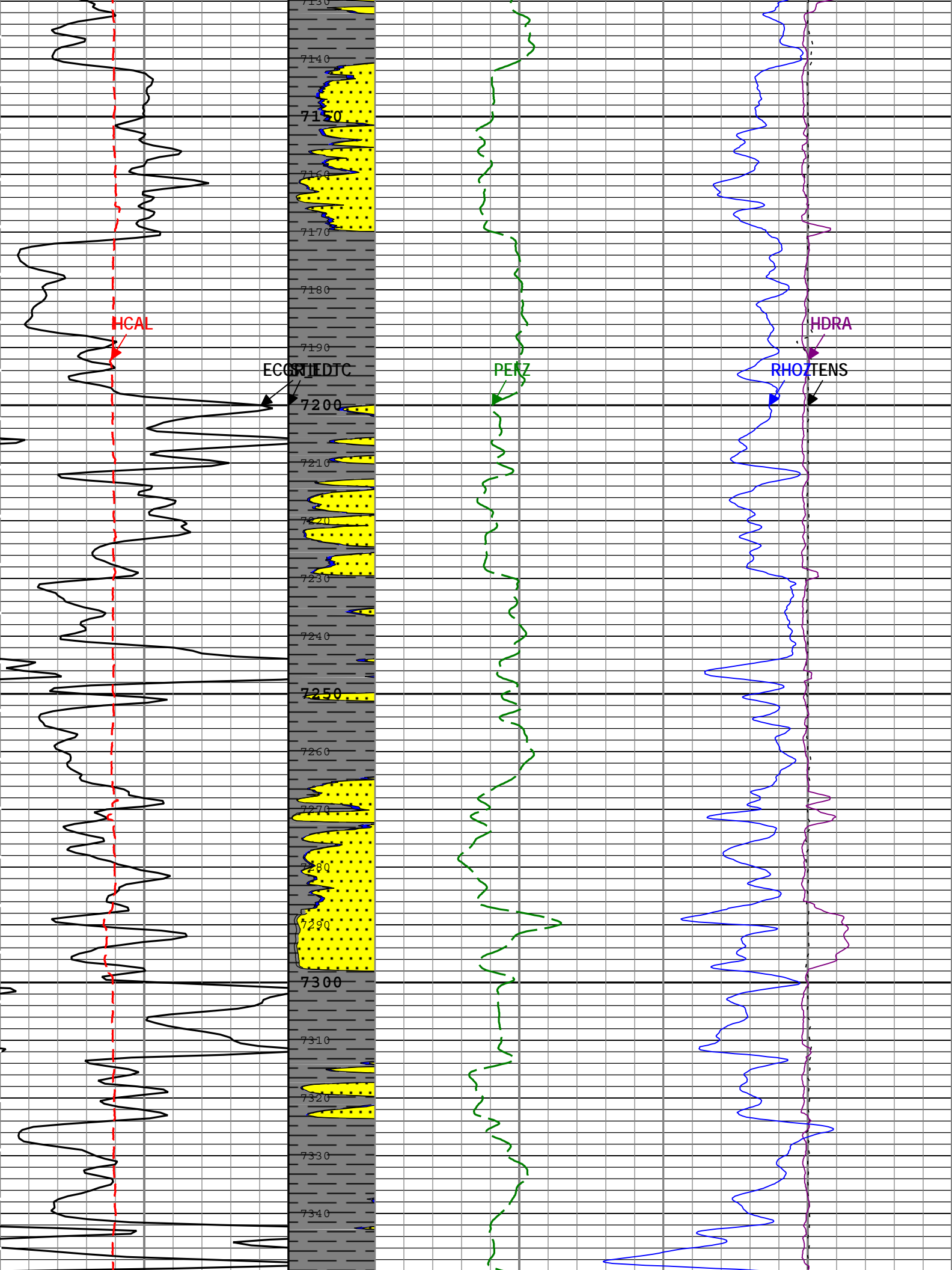


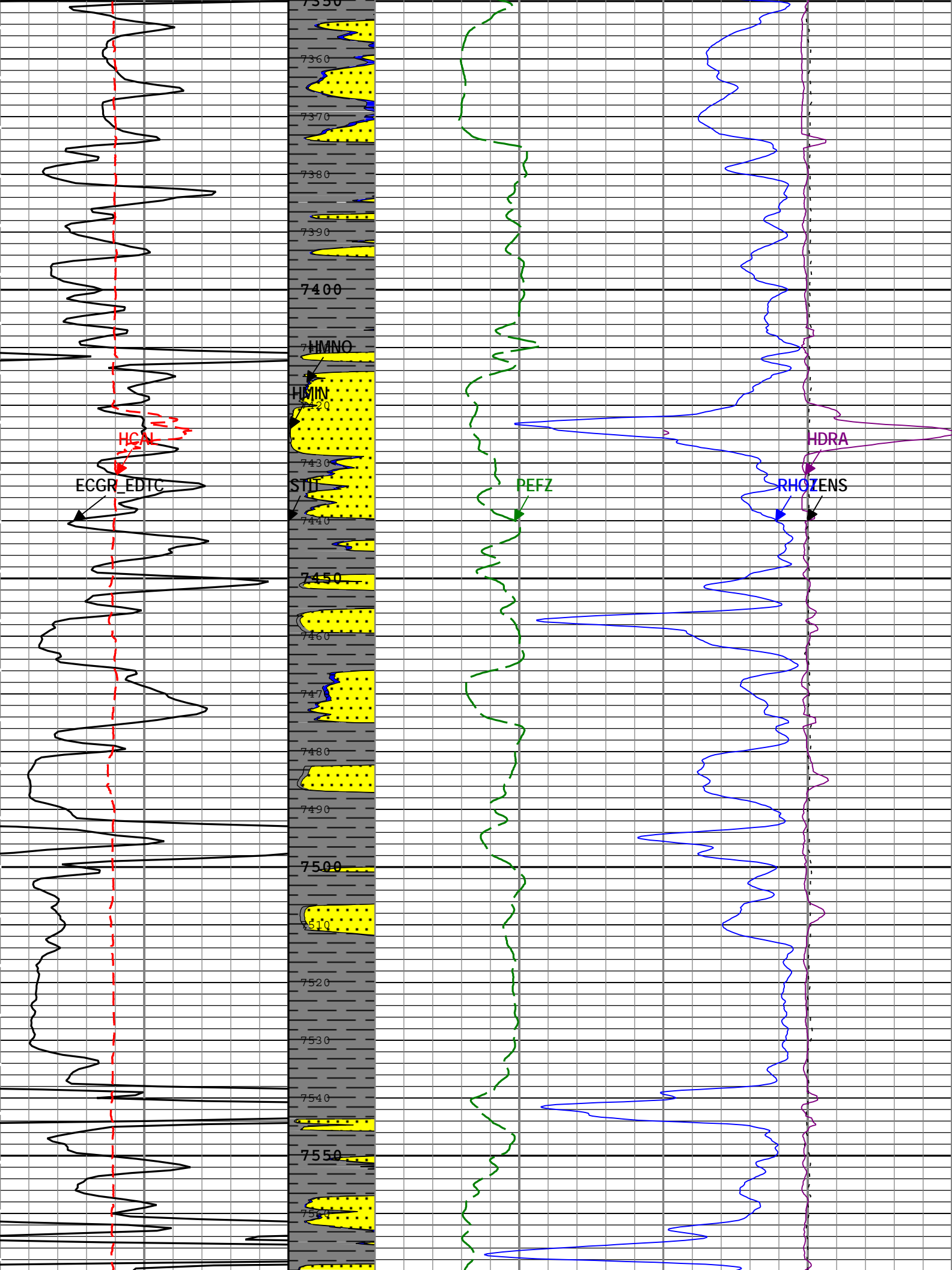


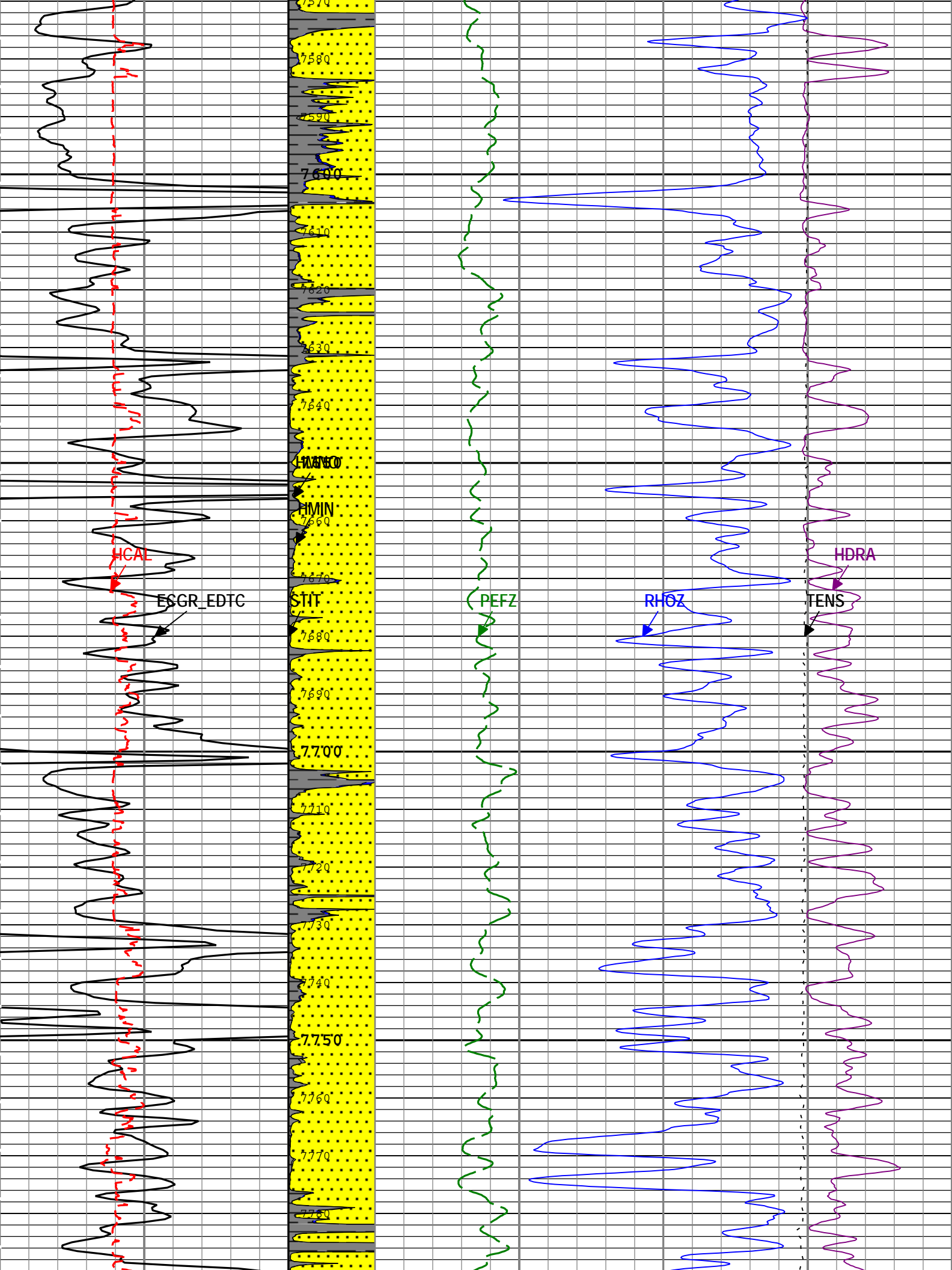


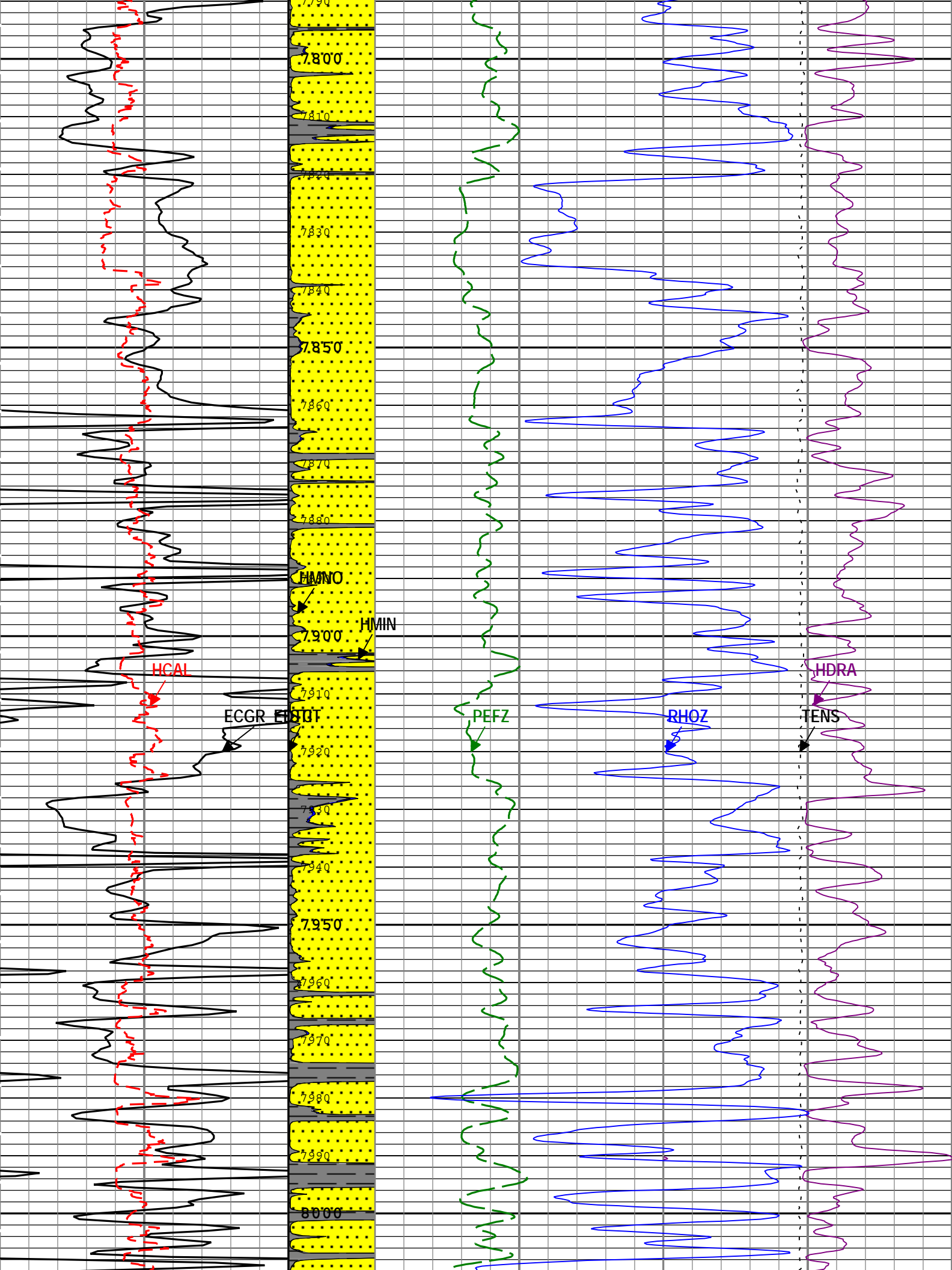


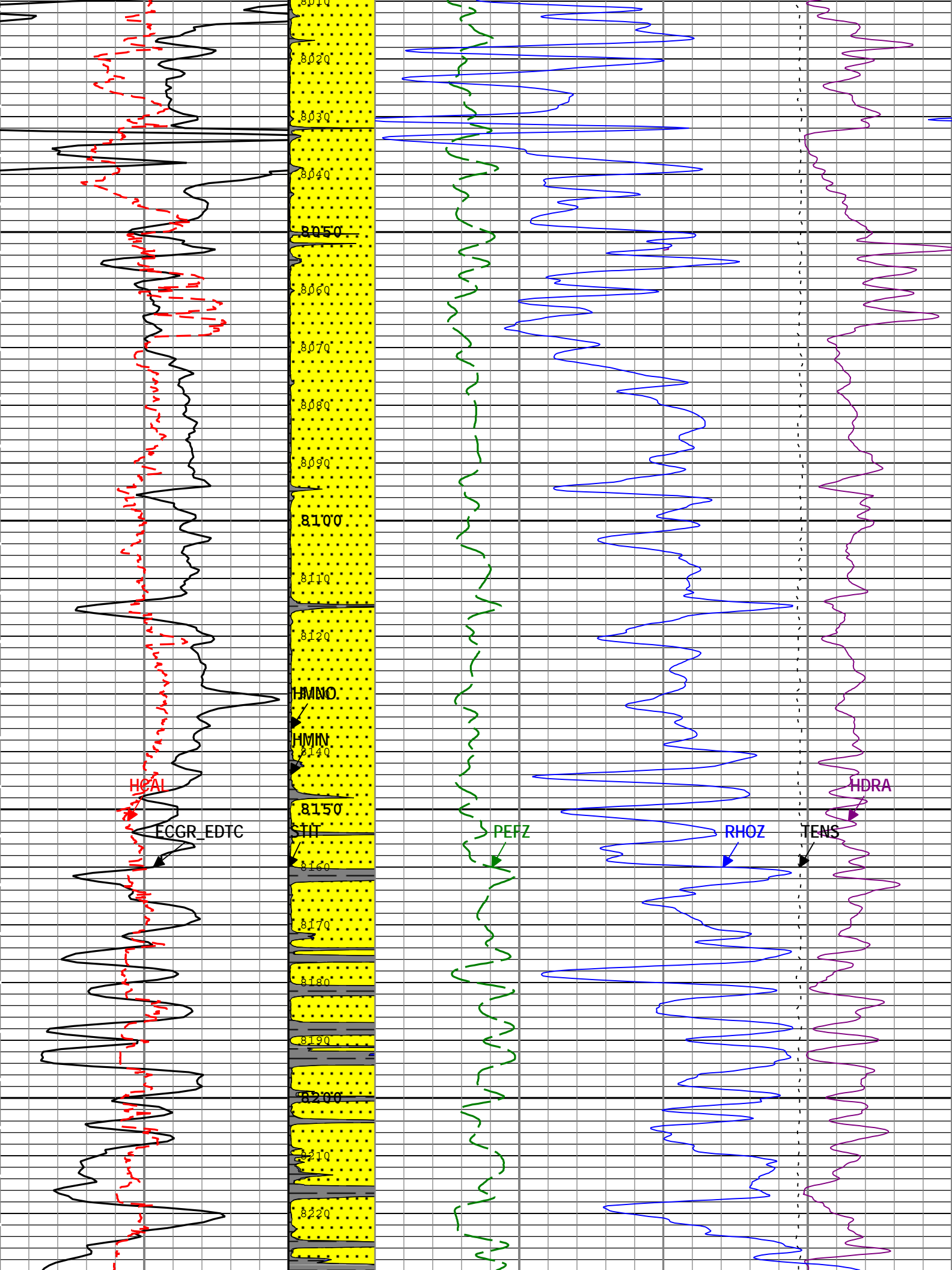


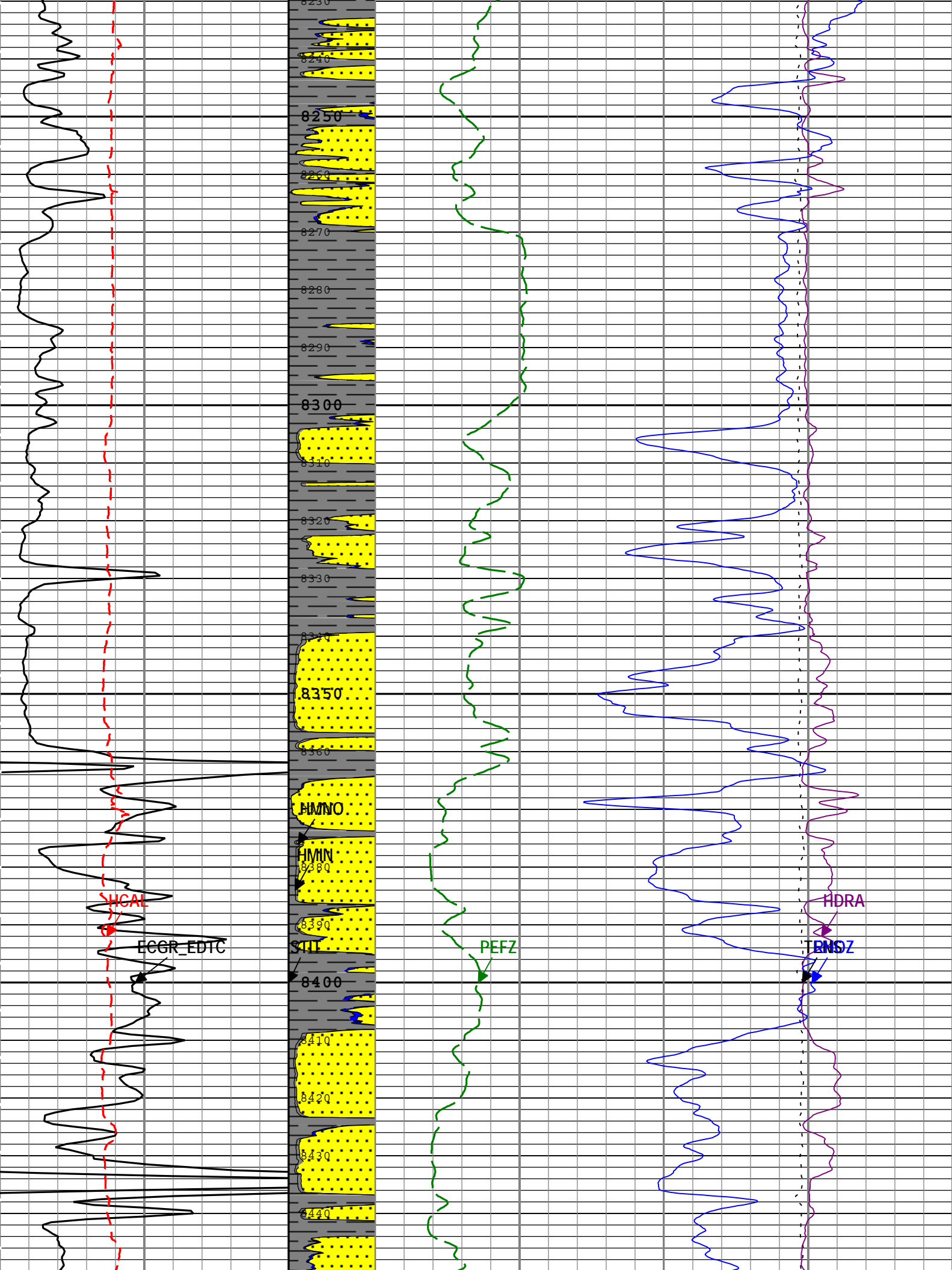


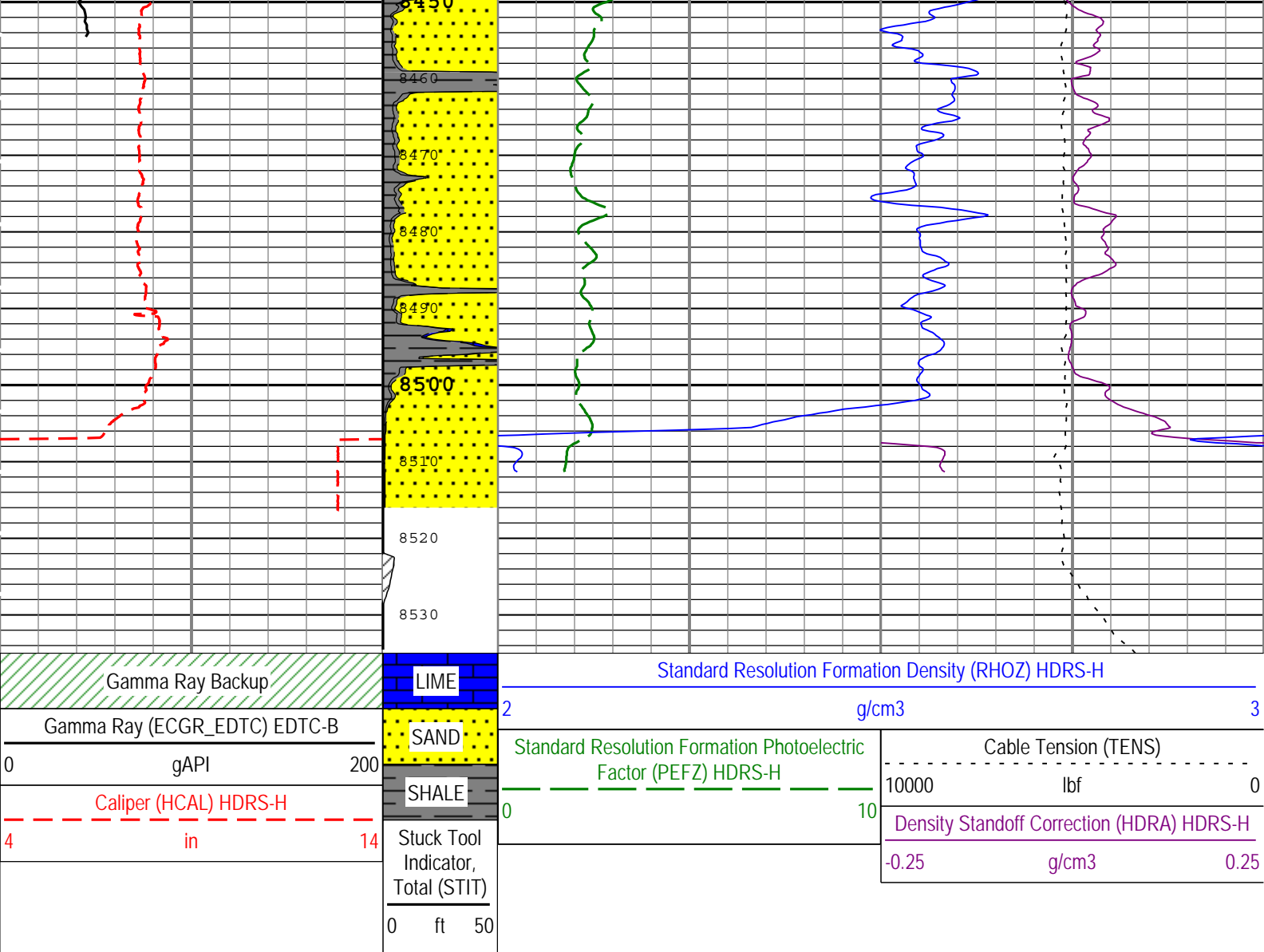












GGRD	Geothermal Gradient	Borehole	1	0.01 degF/ft
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	REMS	
GTSE	Generalized Temperature Selection, from Measured or Computed Temperature	Borehole	GTEM_LINEST	
MST	Mud Sample Temperature	Borehole	50	degF
PDAT	Permanent Datum	WLSESSION	GL	
RMS	Resistivity of Mud Sample	Borehole	1.65	ohm.m
SHT	Surface Hole Temperature	Borehole	30	degF
TD	Total Measured Depth	Borehole	8522.5	ft

Depth Zone Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	12.25	350	395
BS	7.875	395	8510
All depth are actual.			

Tool Control Parameters	
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Run 1 : Parameters				
Parameter	Description	Tool	Value	Unit
HRGD_BOARD_TYPE	HRGD Board Type	HDRS-H	WITH_HET	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	600	ft/h

Run 1									
5" Repeat Anaylsis									

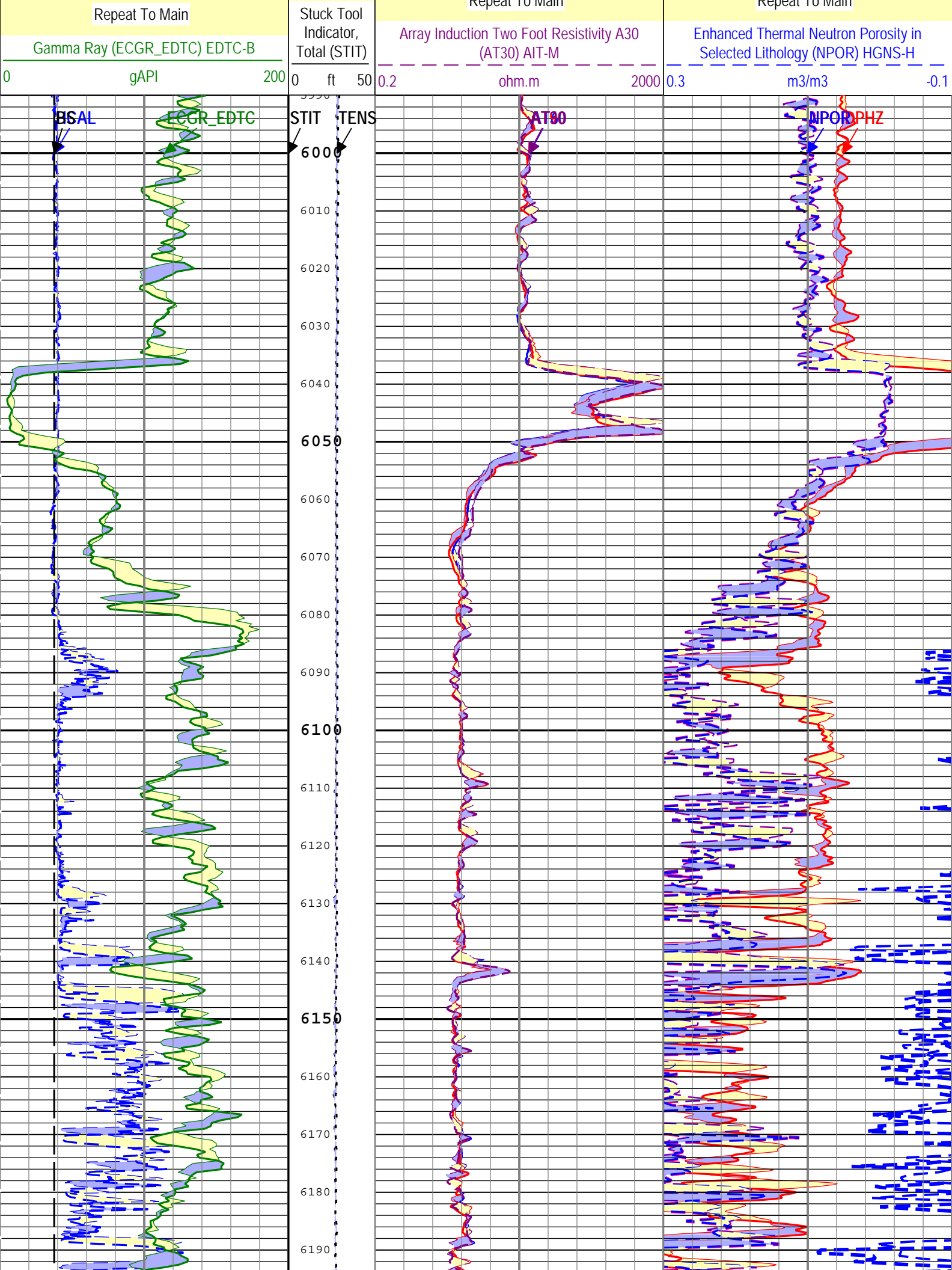
Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Repeat[4]:Up	Up	5953.20 ft	8538.64 ft	08-Jan-2015 12:00:31 PM	08-Jan-2015 12:51:06 PM	ON	10.16 ft	No
Run 1	Main[10]:Up	Up	361.63 ft	8534.82 ft	08-Jan-2015 3:05:03 PM	08-Jan-2015 9:55:19 PM	ON	0.52 ft	No

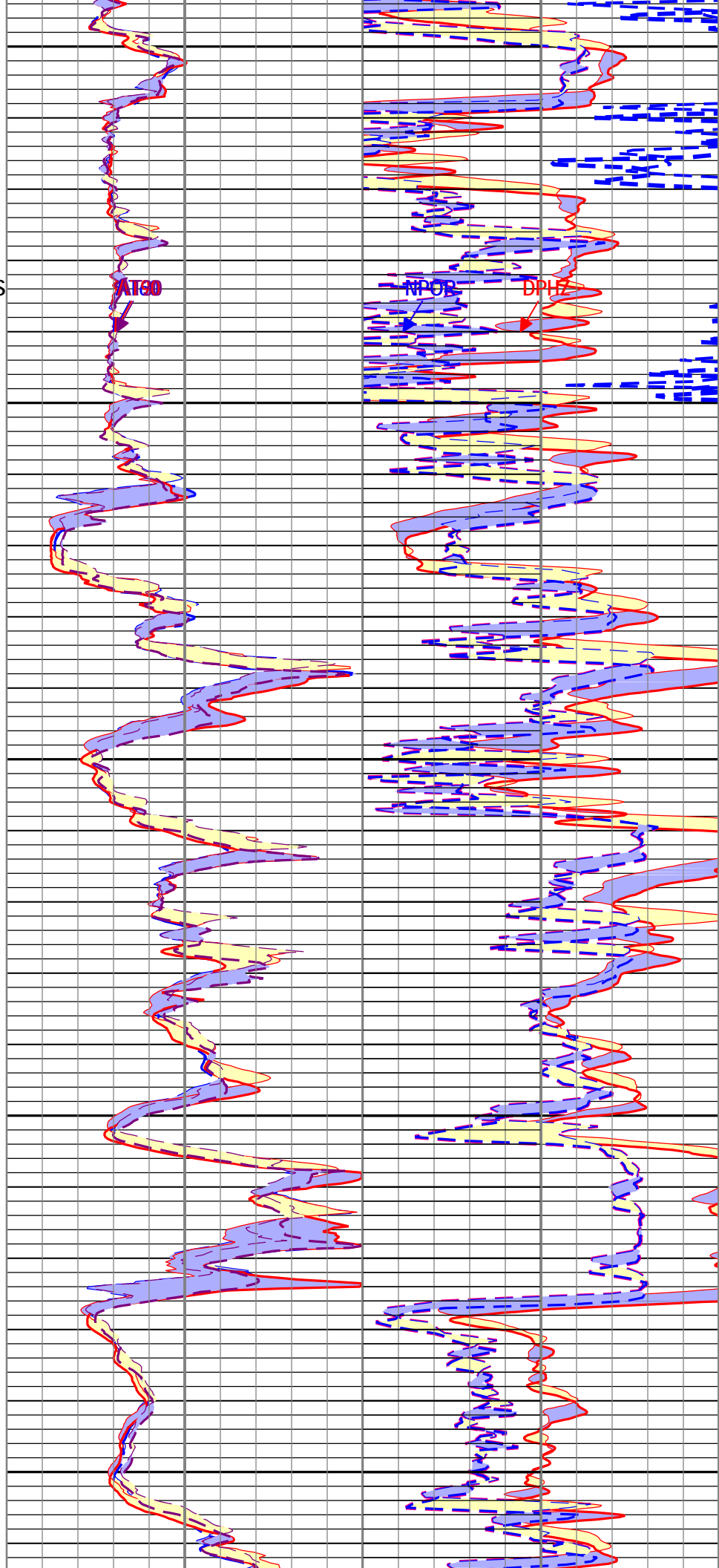
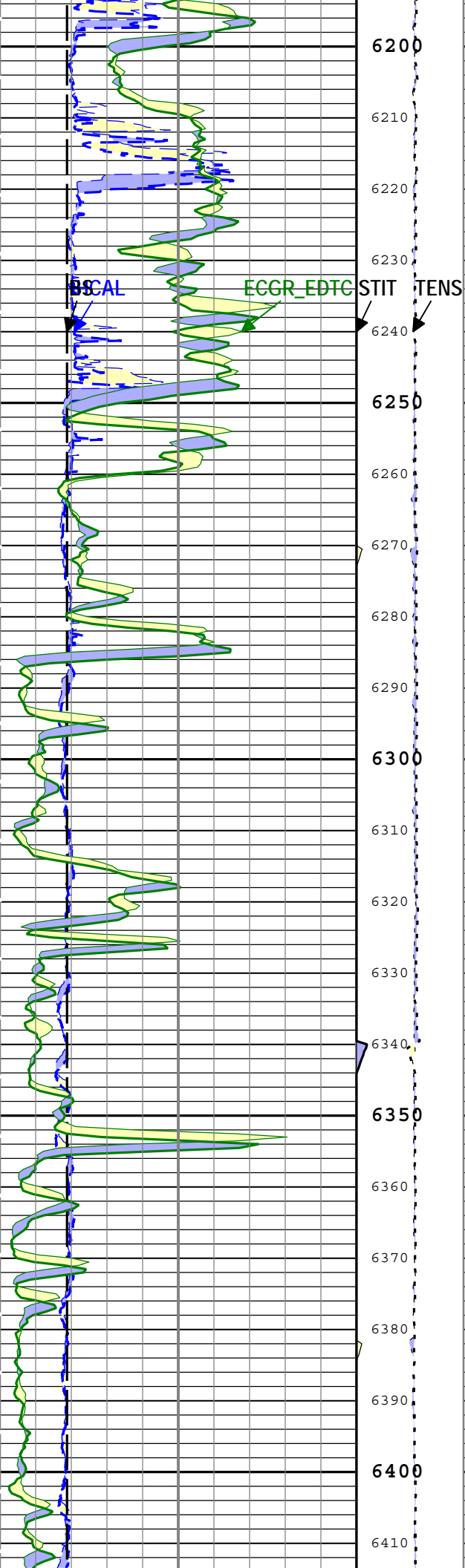
All depths are referenced to toolstring zero									
--	--	--	--	--	--	--	--	--	--

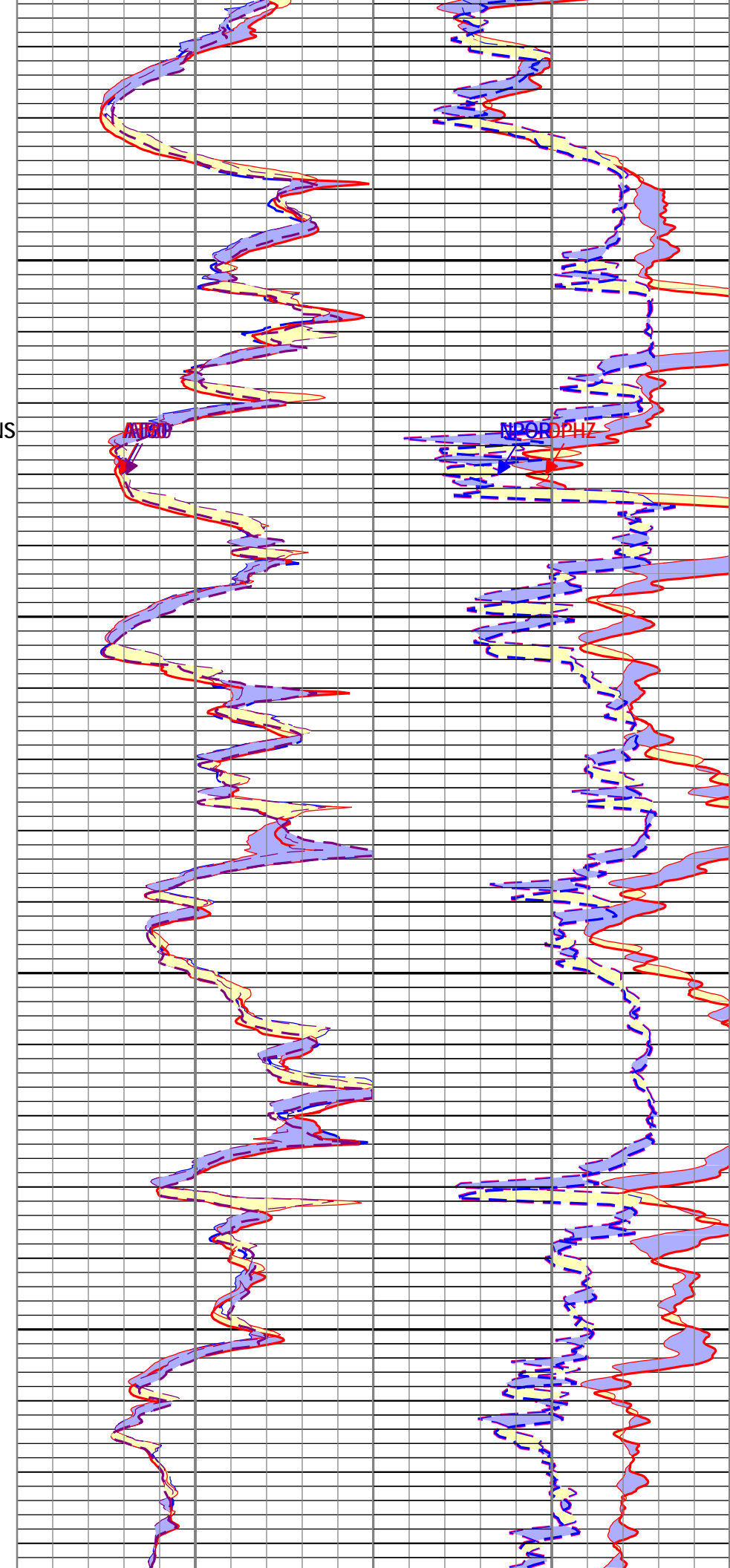
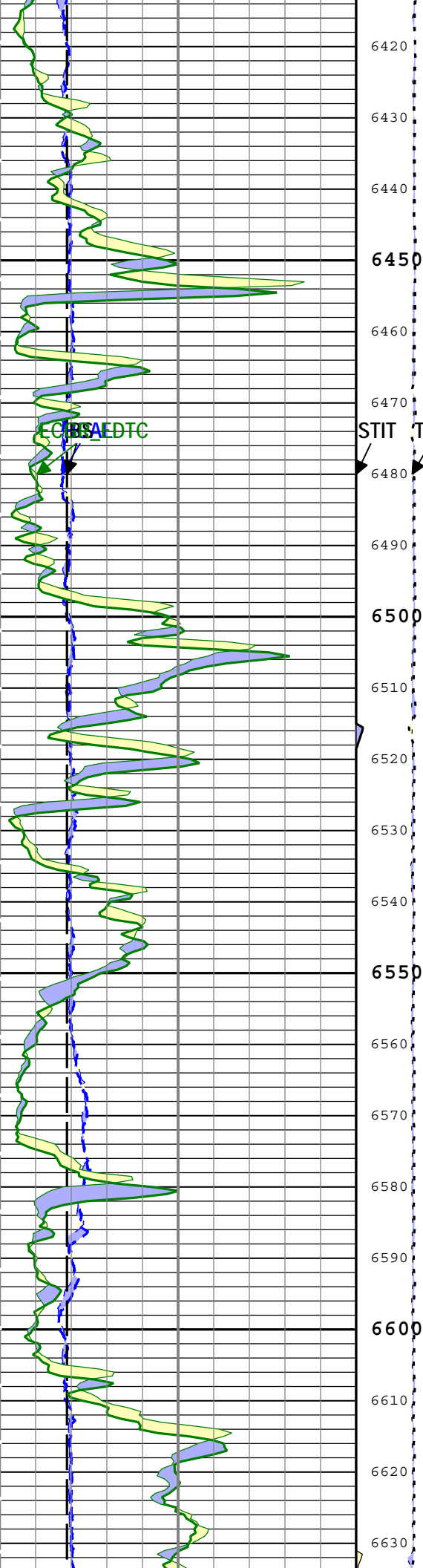
Log	Company:Nighthawk Production LLC Well:Snow King 9-32 Run 1 : Main[10]:Up:S013								
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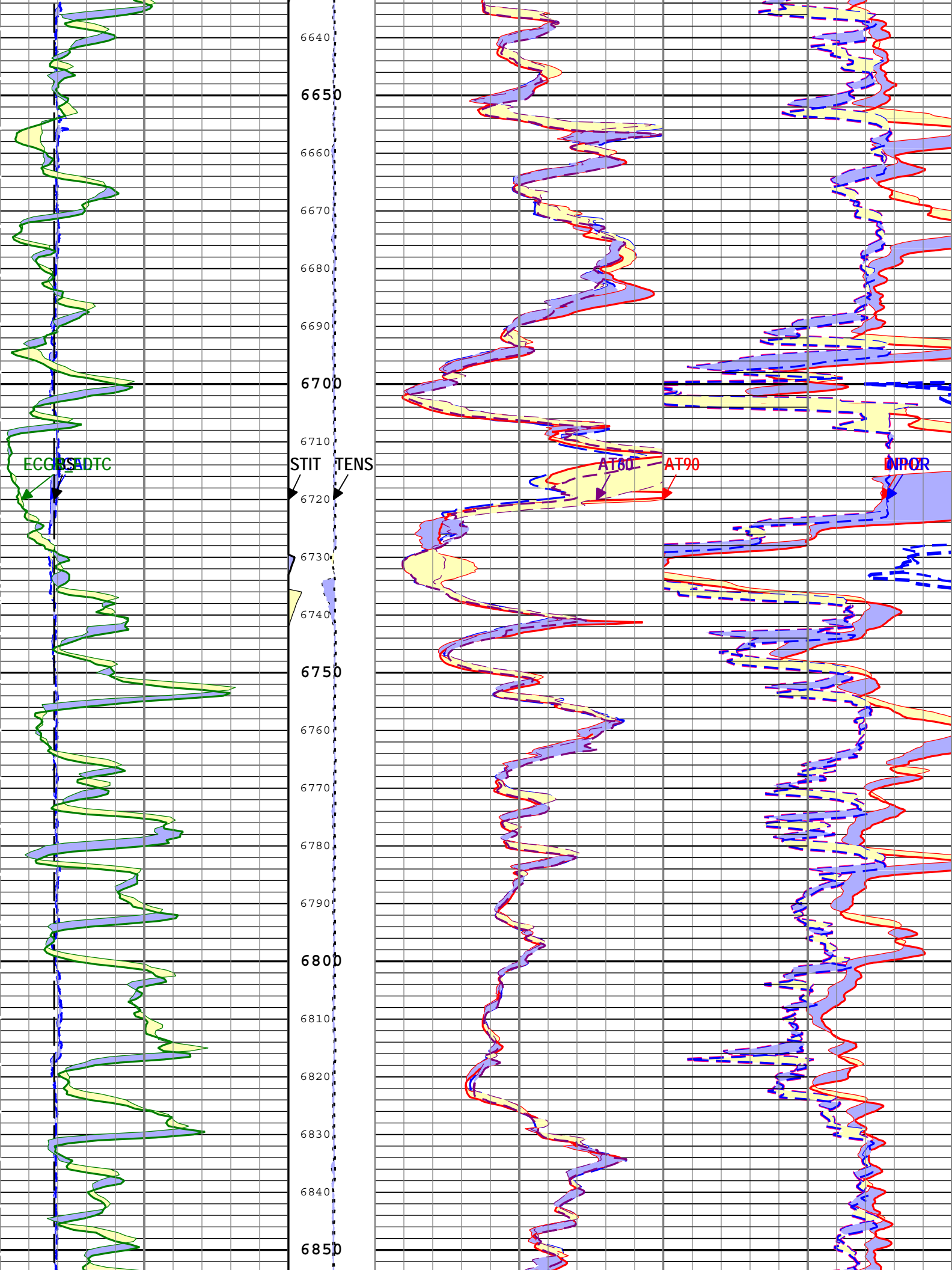
Description: HGNS standard resolution porosities for Platform Express Format: Log (EMD 5in Triple Combo Linear RA_1) Index Scale: 5 in per 100 ft									
Index Unit: ft Index Type: Measured Depth Creation Date: 08-Jan-2015 23:40:07									

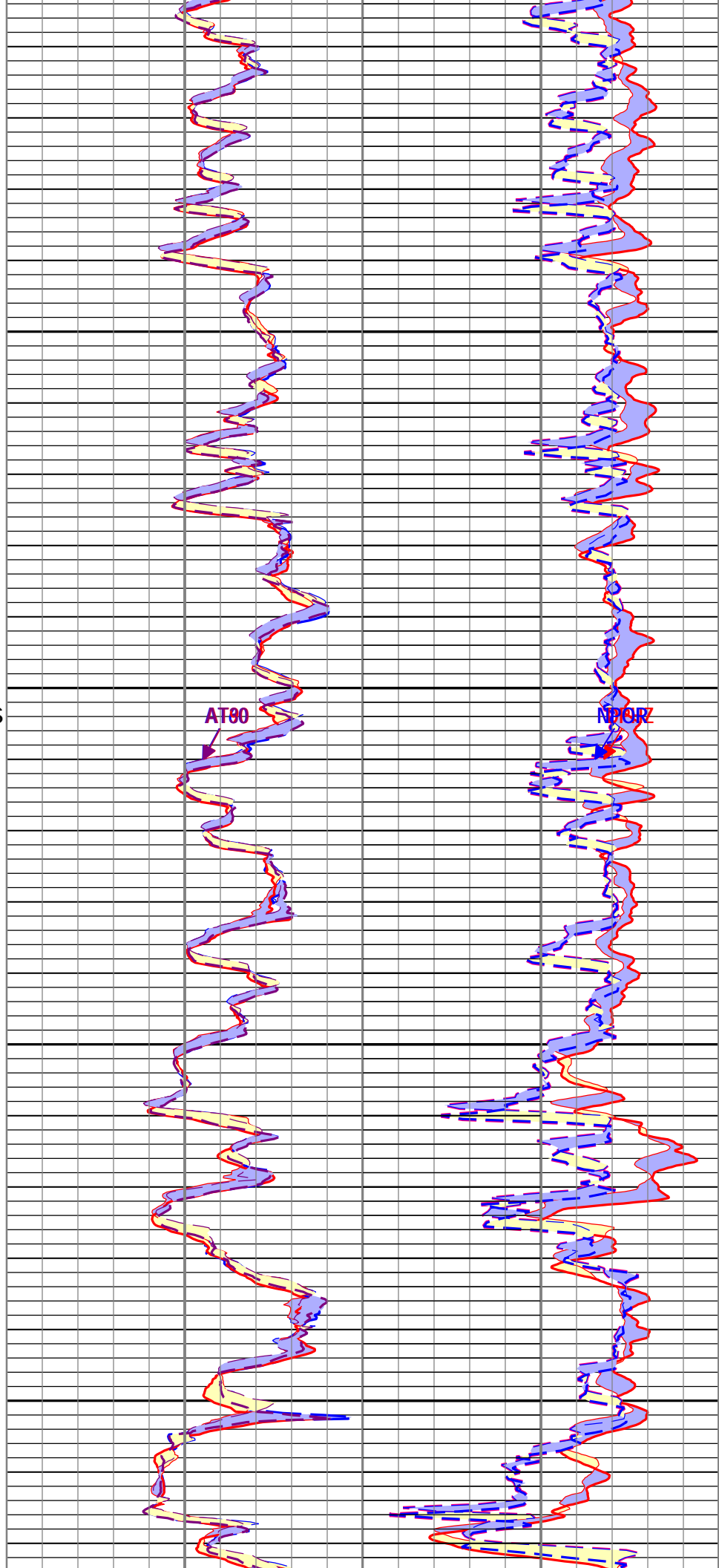
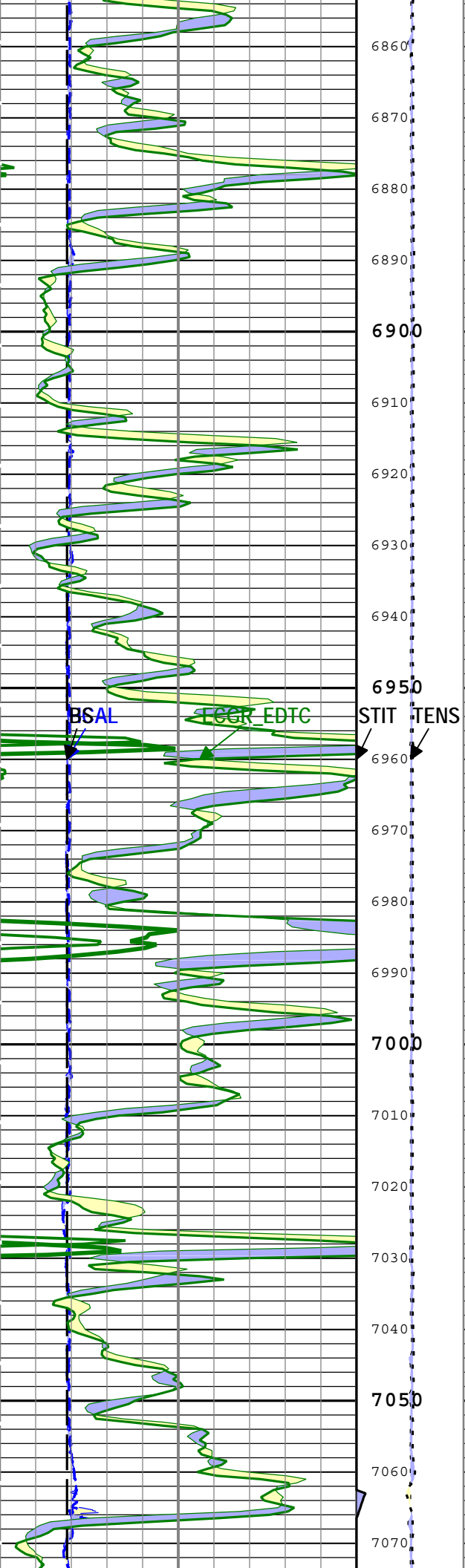
TIME_1900 - Time Marked every 60.00 (s)									
			Main To Repeat	Main To Repeat			Main To Repeat		
Main To Repeat			Repeat To Main	Repeat To Main			Repeat To Main		
Repeat To Main			Caliper (HCAL) HDRS-H 6 in 16	Array Induction Two Foot Resistivity A60 (AT60) AIT-M			Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H		
				0.2 ohm.m 2000	-0.1 ft3/ft3 -0.5				
			Cable Tension (TENS) 10000 lbf	Main To Repeat			Main To Repeat		
Main To Repeat				Repeat To Main			Repeat To Main		
Repeat To Main			Main To Repeat	Array Induction Two Foot Resistivity A90 (AT90) AIT-M			Standard Resolution Density Porosity (DPHZ) HDRS-H		
Bit Size (BS) 6 in 16				0.2 ohm.m 2000	0.3 ft3/ft3 -0.1				
Main To Repeat			Repeat To Main	Main To Repeat			Main To Repeat		
				Repeat To Main			Repeat To Main		

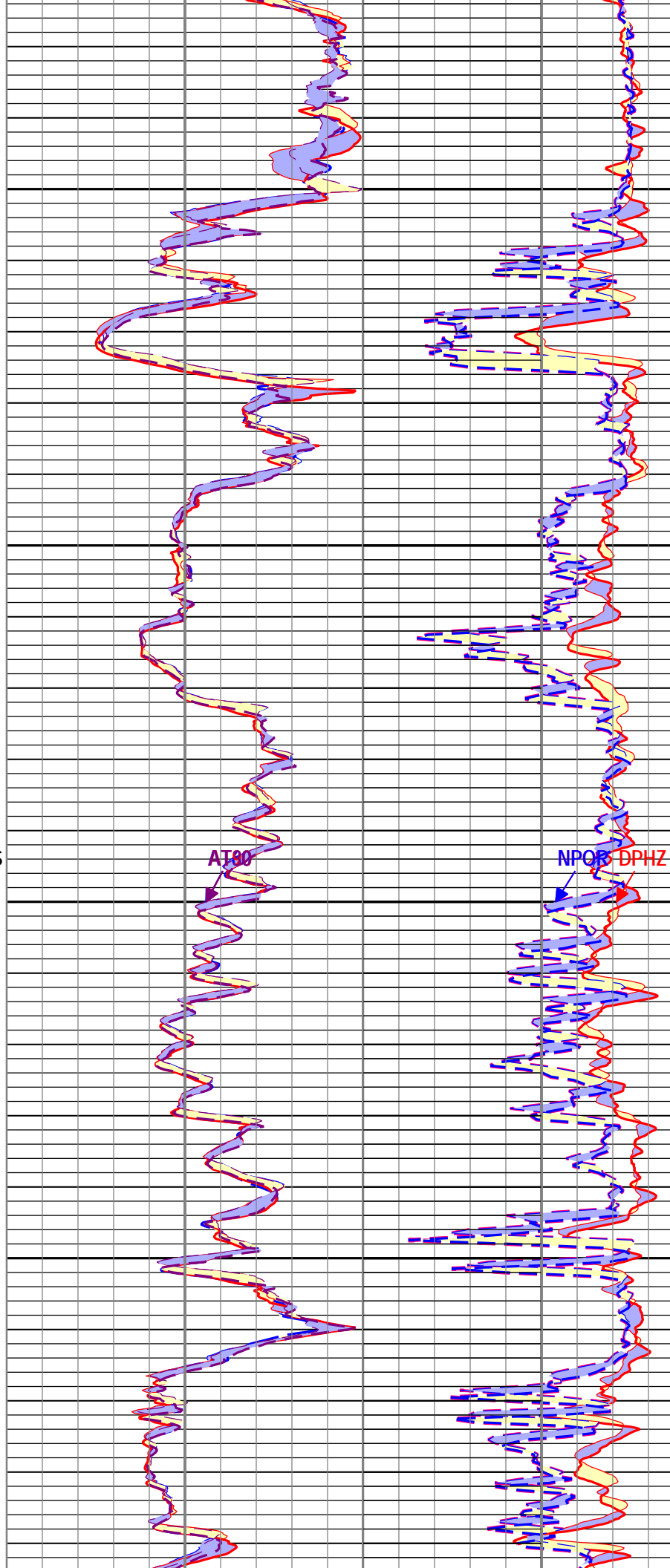
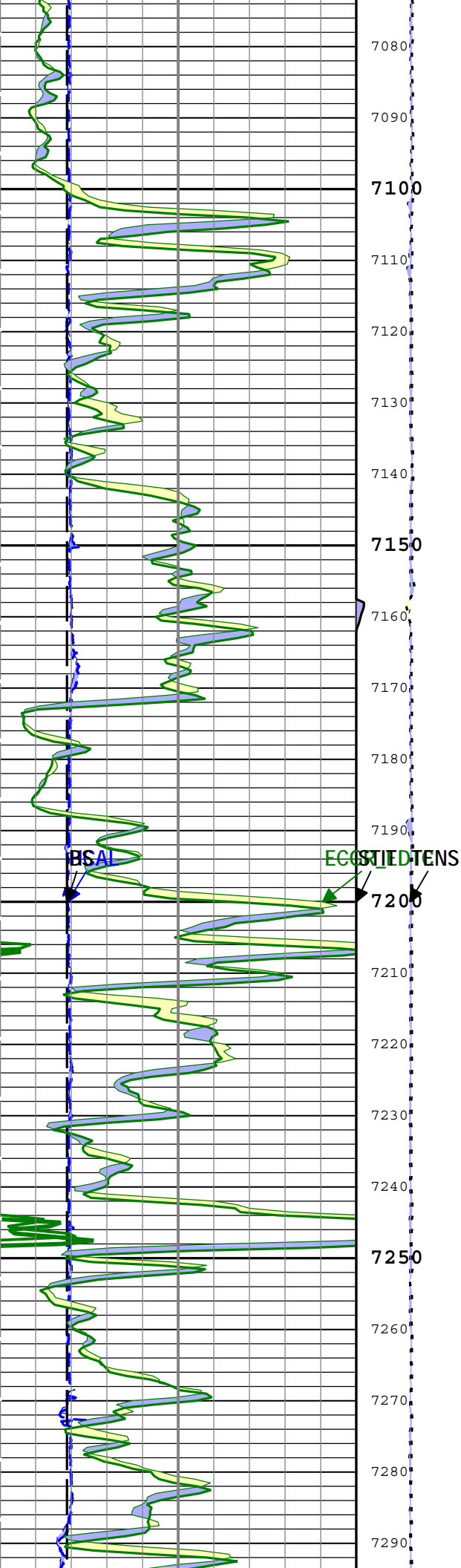


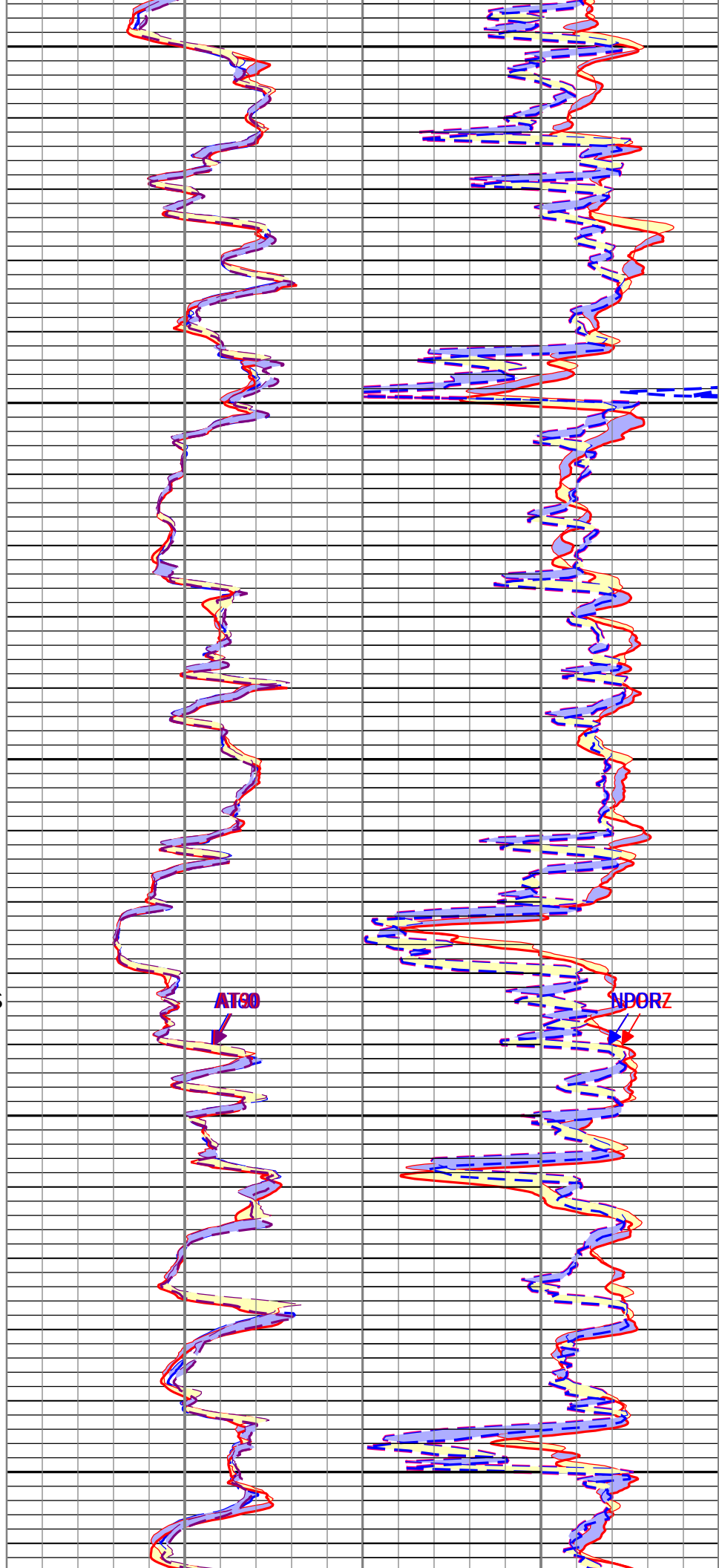
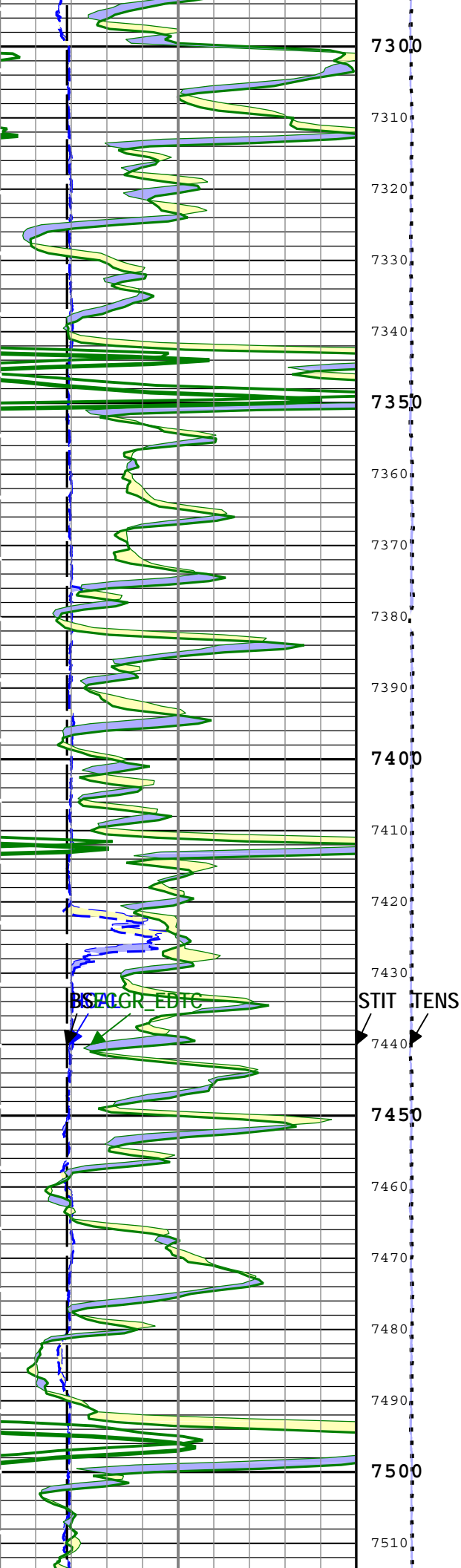


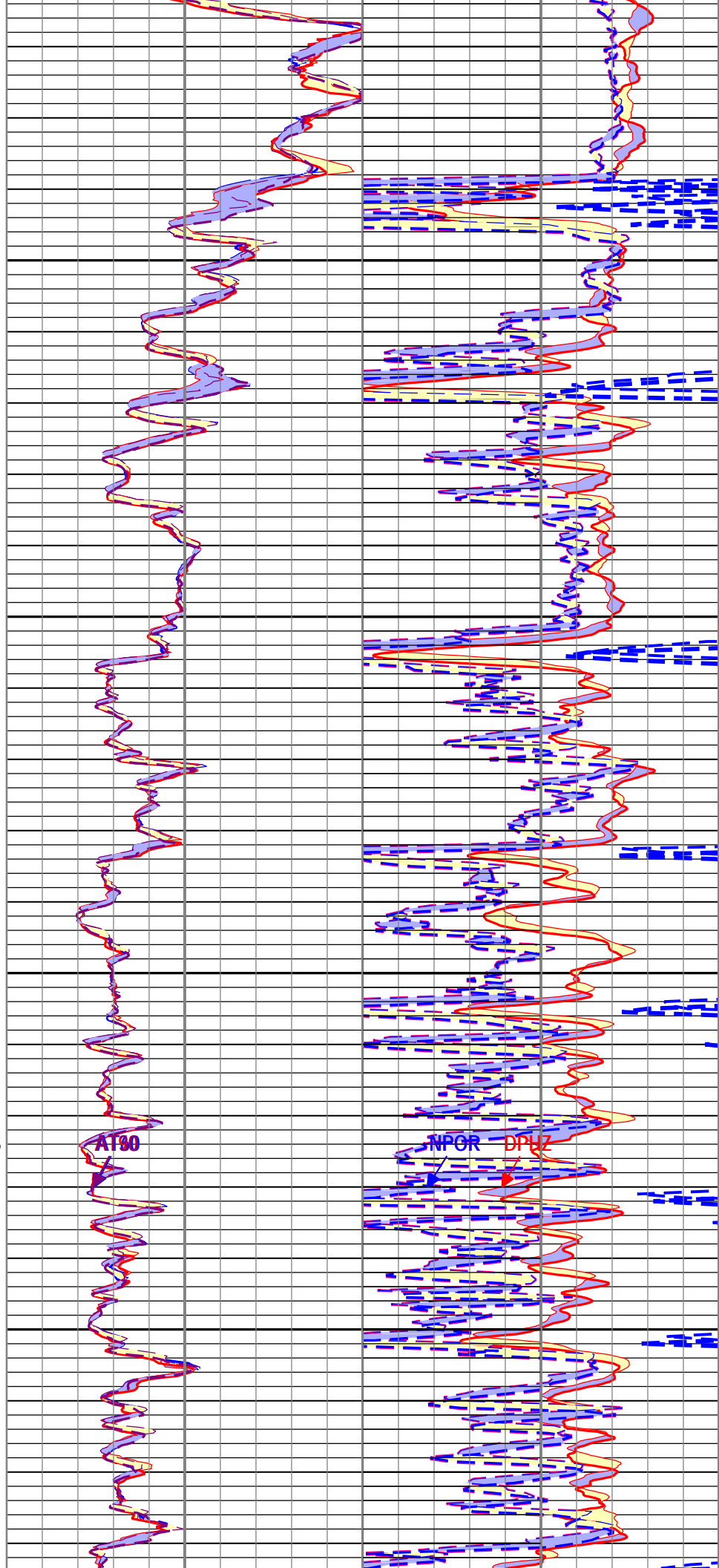
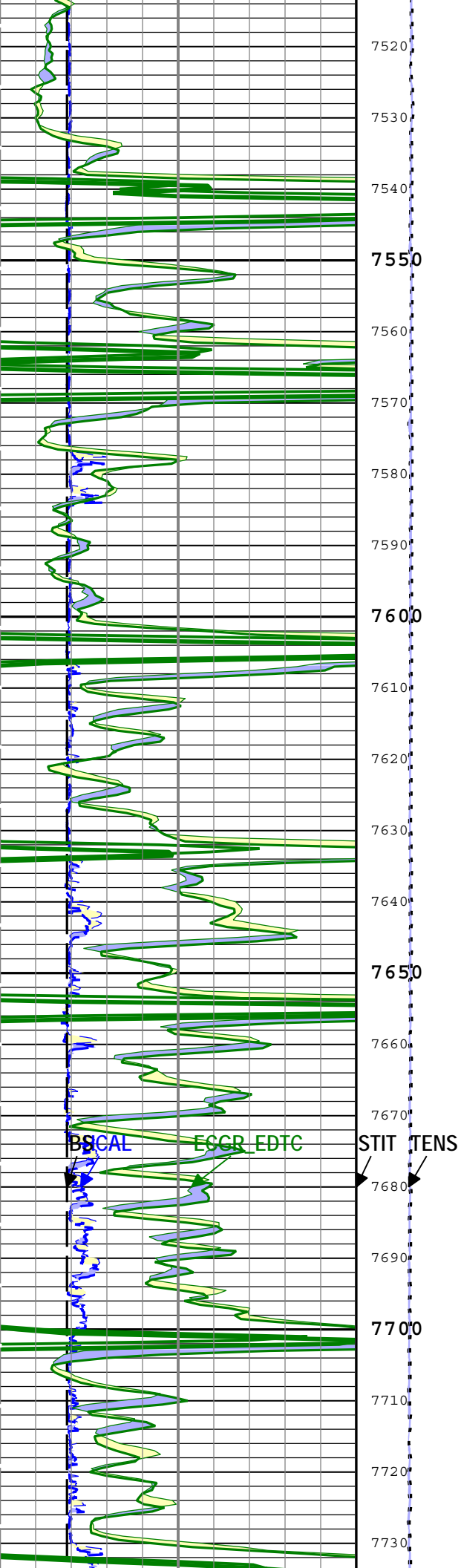


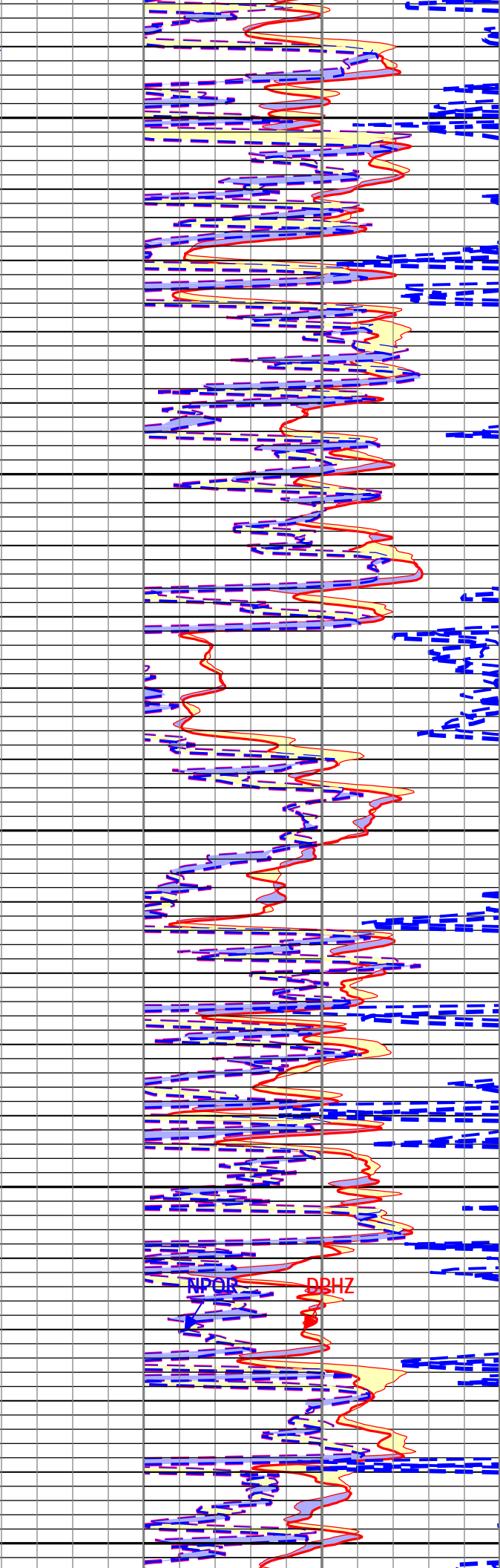
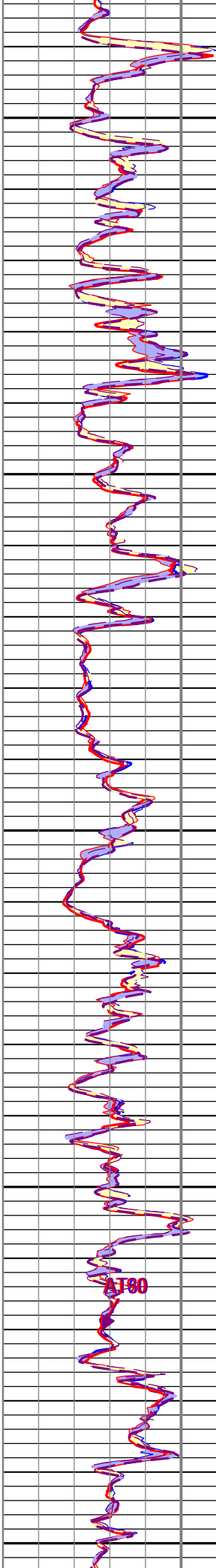
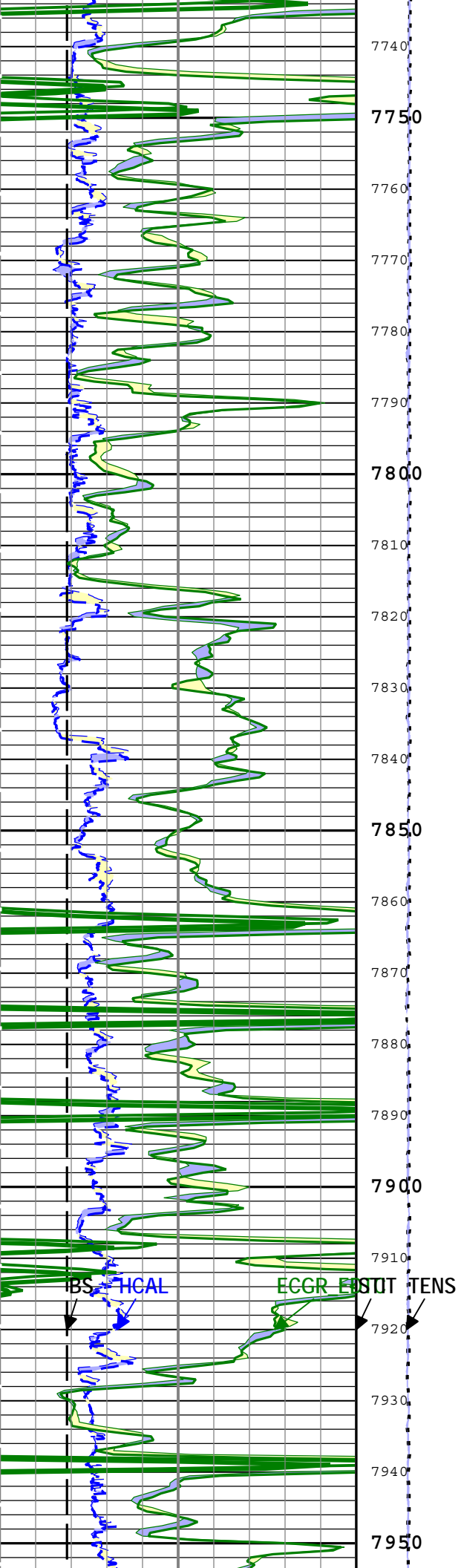


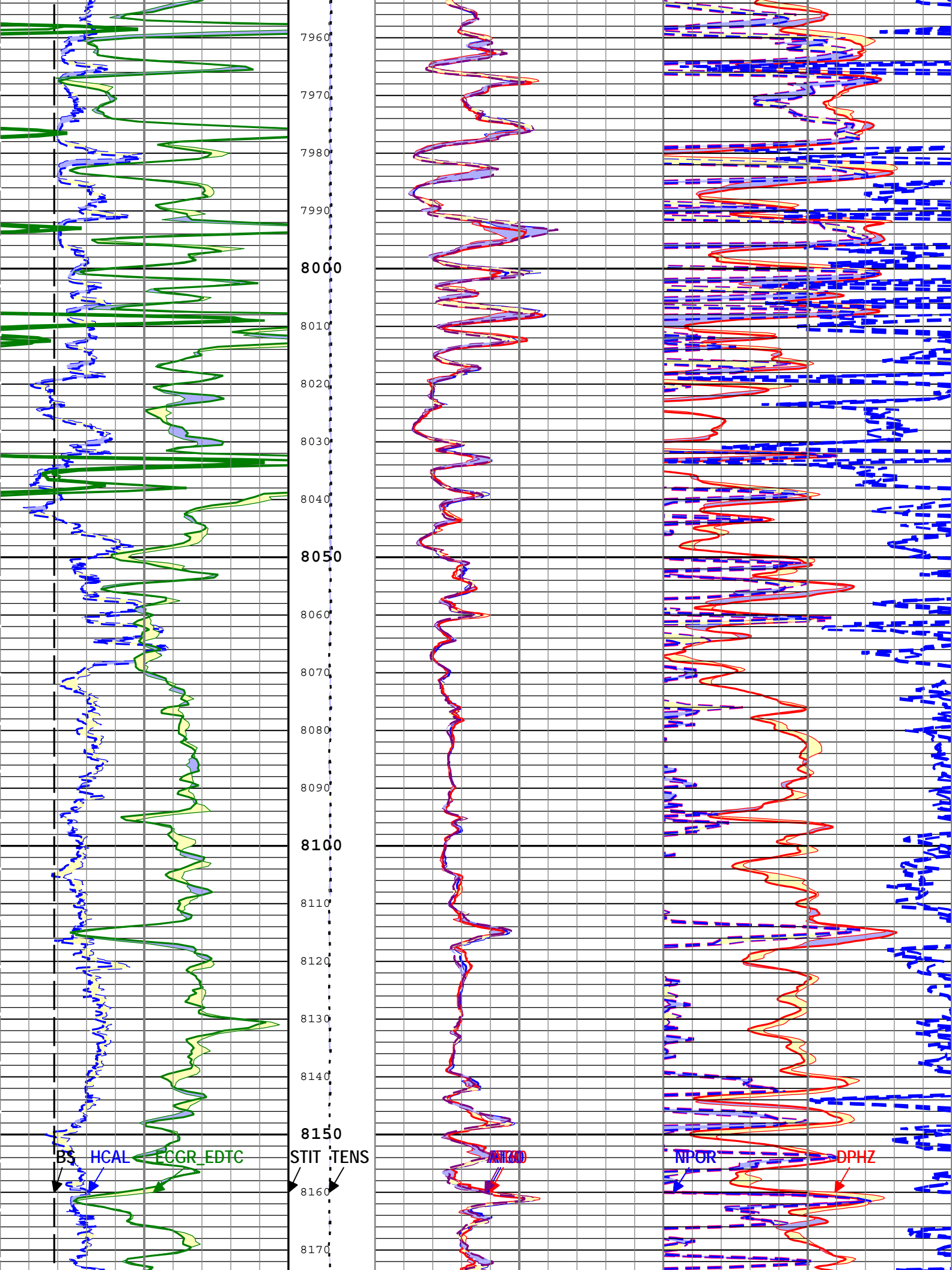


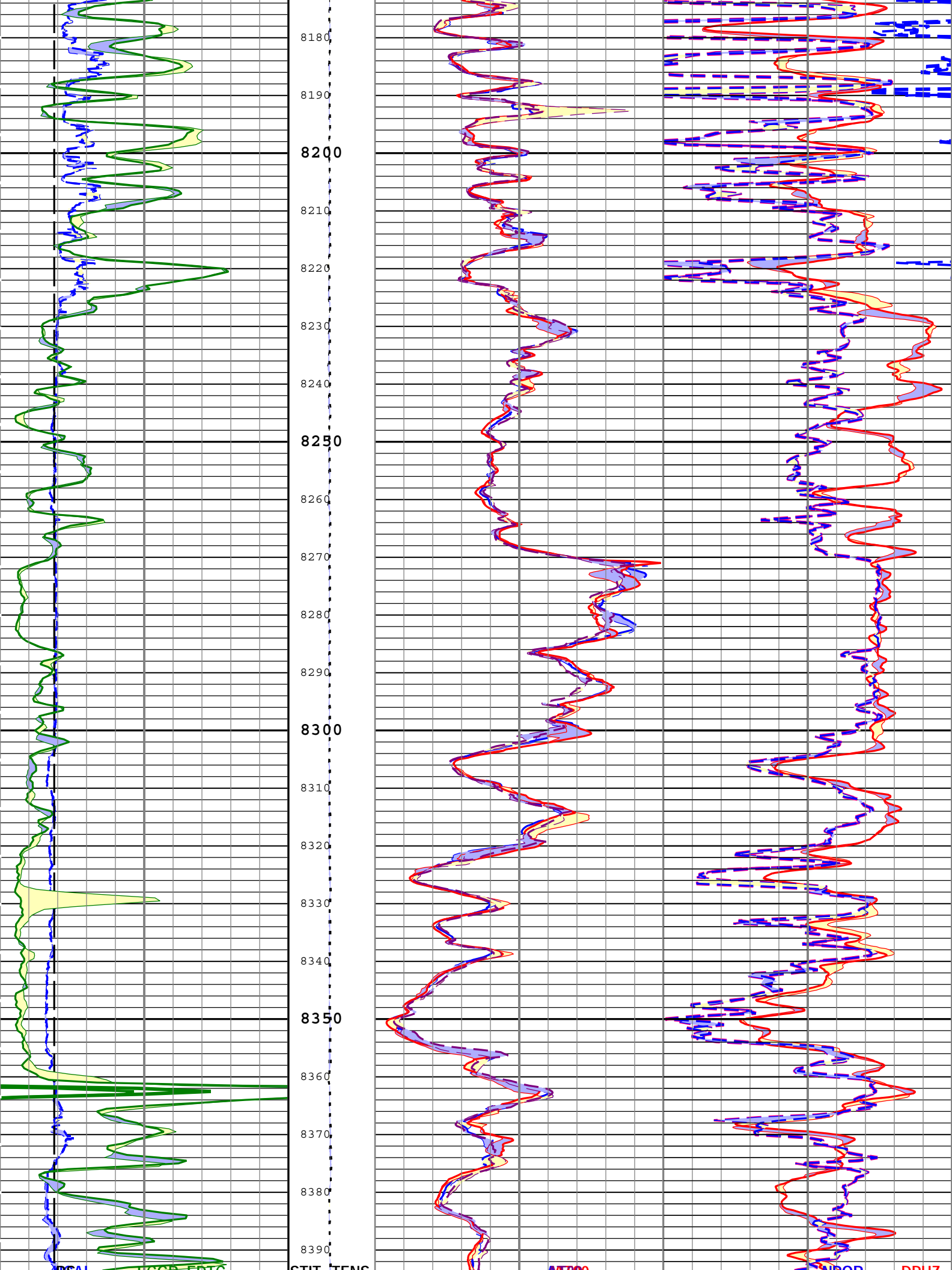


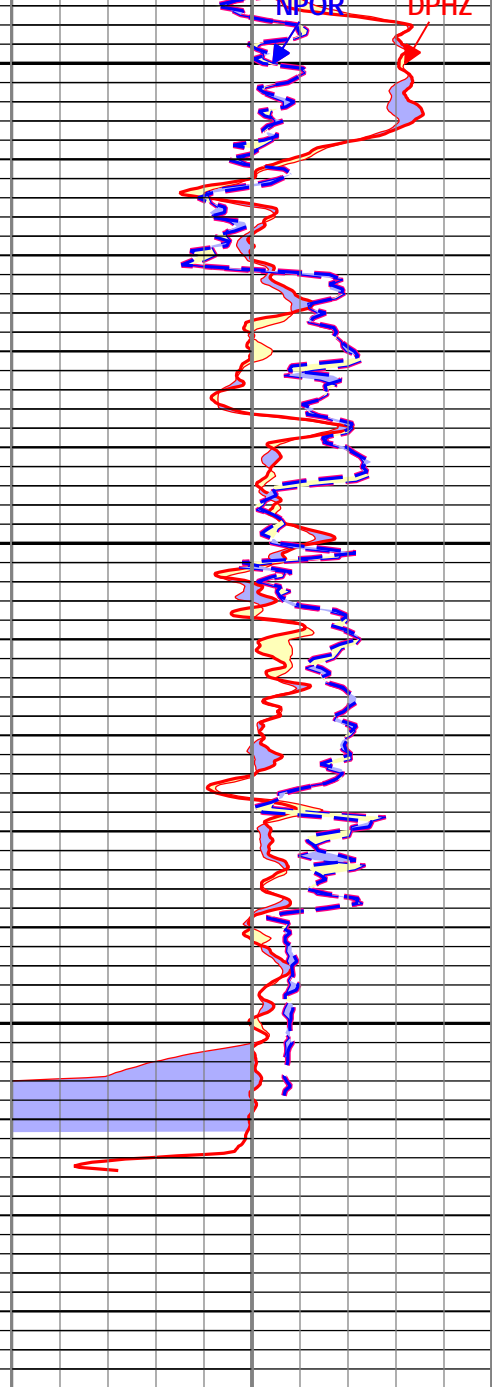
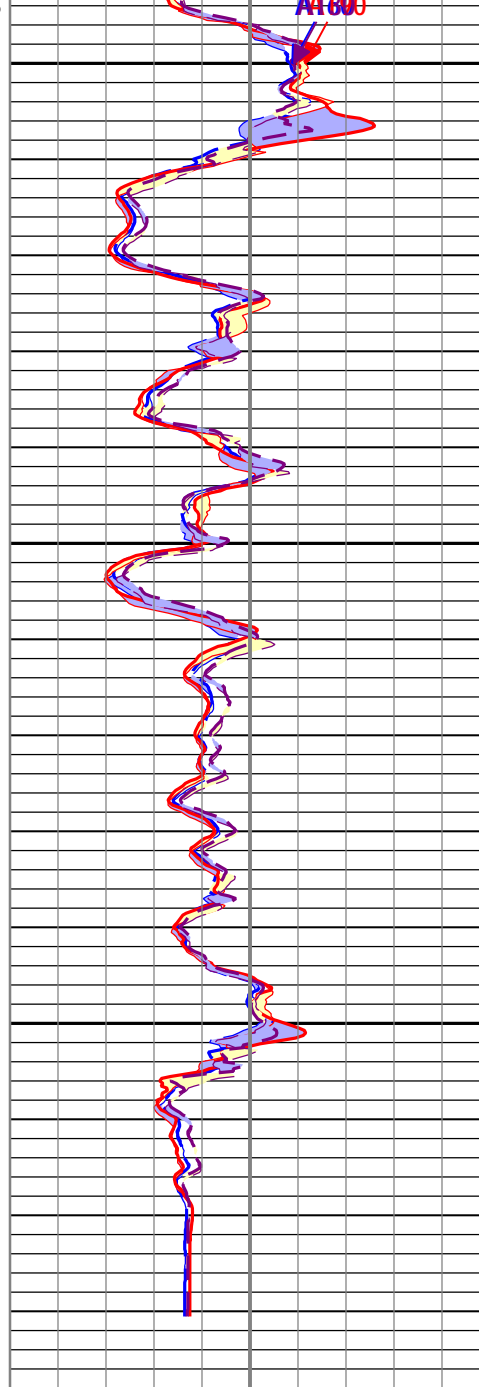
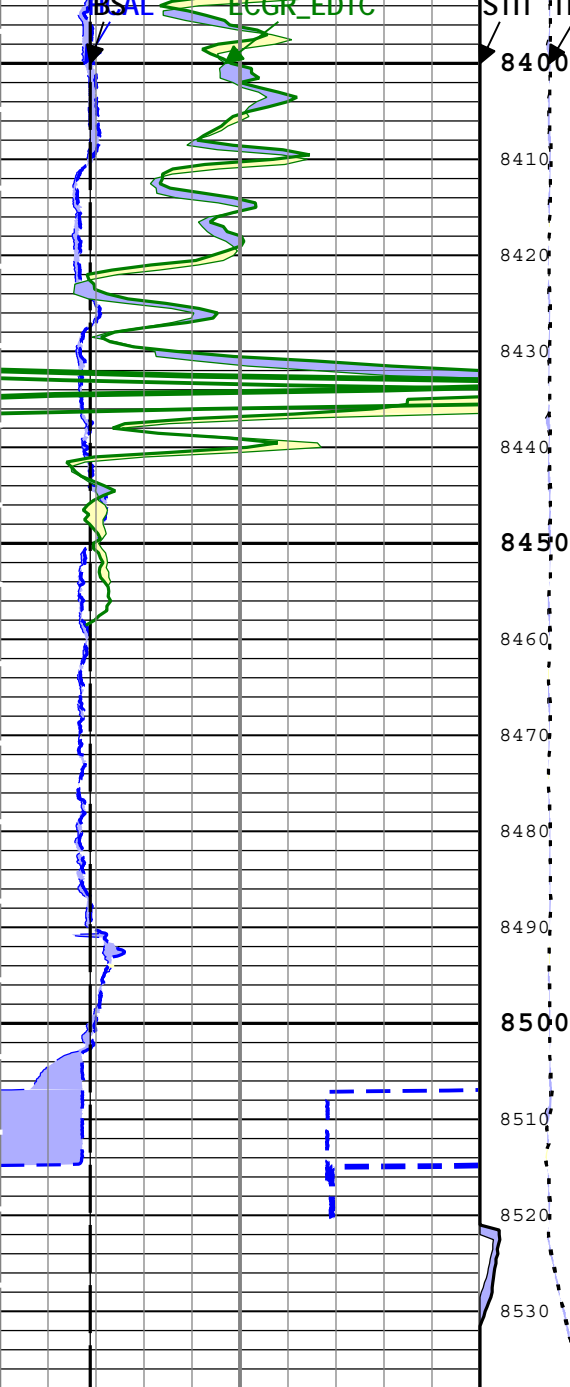












Main To Repeat
Repeat To Main
Caliper (HCAL) HDRS-H
6 in 16
Main To Repeat
Repeat To Main
Bit Size (BS)
6 in 16
Main To Repeat
Repeat To Main
Gamma Ray (ECGR_EDTC) EDTC-B
0 gAPI 200

Main To Repeat
Repeat To Main
Cable Tension (TENS)
10000 lbf 0
Main To Repeat
Repeat To Main
Stuck Tool Indicator, Total (STIT)

Main To Repeat
Repeat To Main
Array Induction Two Foot Resistivity A60 (AT60) AIT-M
0.2 ohm.m 2000
Main To Repeat
Repeat To Main
Array Induction Two Foot Resistivity A90 (AT90) AIT-M
0.2 ohm.m 2000
Main To Repeat
Repeat To Main
Array Induction Two Foot Resistivity A30 (AT30) AIT-M

Main To Repeat
Repeat To Main
Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H
-0.1 ft3/ft3 -0.5
Main To Repeat
Repeat To Main
Standard Resolution Density Porosity (DPHZ) HDRS-H
0.3 ft3/ft3 -0.1
Main To Repeat
Repeat To Main
Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H

TIME_1900 - Time Marked every 60.00 (s)

Description: HGNS standard resolution porosities for Platform Express Format: Log (EMD 5in Triple Combo Linear RA_1) Index Scale: 5 in per 100 ft
Index Unit: ft Index Type: Measured Depth Creation Date: 08-Jan-2015 23:40:07

Calibration Report

AIT-M (Array Induction Tool - M) Calibration - Run Run 1

Primary Equipment :			
File code for AIT-MA Sonde Tool Element	AMIS	181	
Auxiliary Equipment :			
AITM Rm/SP Bottom Nose	AMRM	181	

AIT Sonde Calibration - Test Loop Gain

Master (EEPROM):		15:29:38 17-Dec-2014					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Test Loop Gain - 0		Master	1.000	0.950	1.016	1.050	
Test Loop Phase - 0	deg	Master	0	-3.000	0.617	3.000	
Test Loop Gain - 1		Master	1.000	0.950	1.017	1.050	
Test Loop Phase - 1	deg	Master	0	-3.000	0.696	3.000	
Test Loop Gain - 2		Master	1.000	0.950	1.017	1.050	
Test Loop Phase - 2	deg	Master	0	-3.000	0.142	3.000	
Test Loop Gain - 3		Master	1.000	0.950	1.016	1.050	
Test Loop Phase - 3	deg	Master	0	-3.000	0.203	3.000	
Test Loop Gain - 4		Master	1.000	0.950	0.996	1.050	
Test Loop Phase - 4	deg	Master	0	-3.000	0.151	3.000	
Test Loop Gain - 5		Master	1.000	0.950	0.990	1.050	
Test Loop Phase - 5	deg	Master	0	-3.000	-0.037	3.000	
Test Loop Gain - 6		Master	1.000	0.950	0.997	1.050	
Test Loop Phase - 6	deg	Master	0	-3.000	0.286	3.000	
Test Loop Gain - 7		Master	1.000	0.950	1.010	1.050	
Test Loop Phase - 7	deg	Master	0	-3.000	0.038	3.000	

AIT Sonde Calibration - Sonde Error Correction

Master (EEPROM):		15:29:38 17-Dec-2014					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Sonde Error Correction Real - 0	mS/m	Master	-----	-231.000	-108.530	119.000	
Sonde Error Correction Quad - 0		Master	-----	-2250.000	126.707	2250.000	
Sonde Error Correction Real - 1	mS/m	Master	-----	114.000	158.972	204.000	
Sonde Error Correction Quad - 1		Master	-----	-625.000	-129.079	625.000	
Sonde Error Correction Real - 2	mS/m	Master	-----	66.000	116.372	156.000	
Sonde Error Correction Quad - 2		Master	-----	-350.000	-129.713	350.000	
Sonde Error Correction Real - 3	mS/m	Master	-----	39.000	50.201	89.000	
Sonde Error Correction Quad - 3		Master	-----	-250.000	-3.030	250.000	
Sonde Error Correction Real - 4	mS/m	Master	-----	15.000	25.970	35.000	
Sonde Error Correction Quad - 4		Master	-----	-63.000	-11.892	63.000	
Sonde Error Correction Real - 5	mS/m	Master	-----	4.000	10.938	24.000	
Sonde Error Correction Quad - 5		Master	-----	-50.000	18.763	50.000	
Sonde Error Correction Real - 6	mS/m	Master	-----	5.000	10.206	15.000	
Sonde Error Correction Quad - 6		Master	-----	-30.000	1.748	30.000	
Sonde Error Correction Real - 7	mS/m	Master	-----	-5.000	-1.494	5.000	
Sonde Error Correction Quad - 7		Master	-----	-30.000	-0.398	30.000	

AIT Mud Calibration - Mud Calibration Gain

Master (EEPROM):		15:29:38 17-Dec-2014					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Coarse Gain		Master	1.000	0.800	0.976	1.200	
Fine Gain		Master	1.000	0.800	0.975	1.200	

AIT Electronics Check - Thru Calibration Check

Master (EEPROM):		15:29:38 17-Dec-2014		Before (Measured):		10:02:29 08-Jan-2015		After:	
Measurement		Unit	Phase	Nominal	Low Limit	Actual	High Limit		

Thru Cal Mag - 0	V	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	0.366 0.366 ----- ----- -----	0.574 0.575 ----- 0.001 -----	0.854 0.854 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Phase - 0	deg	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	137.000 137.000 ----- ----- -----	-167.880 -168.375 ----- -0.495 -----	-103.000 -103.000 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Mag - 1	V	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	0.762 0.762 ----- ----- -----	1.177 1.178 ----- 0.001 -----	1.778 1.778 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Phase - 1	deg	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	136.000 136.000 ----- ----- -----	-168.977 -169.473 ----- -0.496 -----	-104.000 -104.000 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Mag - 2	V	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	0.372 0.372 ----- ----- -----	0.584 0.585 ----- 0.001 -----	0.868 0.868 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Phase - 2	deg	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	132.000 132.000 ----- ----- -----	-172.619 -173.114 ----- -0.495 -----	-108.000 -108.000 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Mag - 3	V	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	0.420 0.420 ----- ----- -----	0.660 0.660 ----- 0.000 -----	0.980 0.980 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Phase - 3	deg	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	131.000 131.000 ----- ----- -----	-173.395 -173.891 ----- -0.496 -----	-109.000 -109.000 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Mag - 4	V	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	0.804 0.804 ----- ----- -----	1.232 1.233 ----- 0.001 -----	1.876 1.876 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Phase - 4	deg	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	125.000 125.000 ----- ----- -----	-179.652 179.847 ----- 359.499 -----	-115.000 -115.000 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Mag - 5	V	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	1.176 1.176 ----- ----- -----	1.793 1.795 ----- 0.002 -----	2.744 2.744 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Phase - 5	deg	Master Before After Before-Master After-Before	----- ----- ----- ----- -----	122.000 122.000 ----- ----- -----	178.702 178.197 ----- -0.505 -----	-118.000 -118.000 ----- ----- -----	<div><div></div><div></div><div></div><div></div><div></div></div>
Thru Cal Mag - 6	V	Master Before After Before-Master	----- ----- ----- -----	1.176 1.176 ----- -----	1.793 1.794 ----- 0.001	2.744 2.744 ----- -----	<div><div></div><div></div><div></div><div></div></div>

		After-Before	----	----	----	----	
Thru Cal Phase - 6	deg	Master	----	121.000	178.710	-119.000	
		Before	----	121.000	178.206	-119.000	
		After	----	----	----	----	
		Before-Master	----	----	-0.504	----	
		After-Before	----	----	----	----	
Thru Cal Mag - 7	V	Master	----	0.846	1.294	1.974	
		Before	----	0.846	1.295	1.974	
		After	----	----	----	----	
		Before-Master	----	----	0.001	----	
		After-Before	----	----	----	----	
Thru Cal Phase - 7	deg	Master	----	115.000	178.076	-125.000	
		Before	----	115.000	177.521	-125.000	
		After	----	----	----	----	
		Before-Master	----	----	-0.555	----	
		After-Before	----	----	----	----	
SPA Zero	mV	Master		-50.000	0.112	50.000	
		Before		-50.000	0.129	50.000	
		After	----	----	----	----	
		Before-Master	----	----	0.017	----	
		After-Before	----	----	----	----	
SPA Plus	mV	Master		941.000	992.148	1040.000	
		Before		941.000	992.291	1040.000	
		After	----	----	----	----	
		Before-Master	----	----	0.143	----	
		After-Before	----	----	----	----	
Temperature Zero	V	Master		-0.050	0.000	0.050	
		Before		-0.050	0.000	0.050	
		After	----	----	----	----	
		Before-Master	----	----	0.000	----	
		After-Before	----	----	----	----	
Temperature Plus	V	Master		0.870	0.919	0.960	
		Before		0.870	0.919	0.960	
		After	----	----	----	----	
		Before-Master	----	----	0.000	----	
		After-Before	----	----	----	----	

HDRS-H (HILT Density and Rxo Sonde, 150 degC) Calibration - Run Run 1			
Primary Equipment :			
HILT High-Resolution Control Cartridge, 150 degC	HRCC-H		
HILT Resistivity Gamma-Ray Density Device, 150 degC	HRGD-H	3760	
Auxiliary Equipment :			
HRDD Backscatter Detector	Backscatter		
HRDD Long Spacing Detector	Long Spacing		
HRDD Short Spacing Detector	Short Spacing		
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): 15:00:00 05-Jan-2015 Expired by 1 days							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Small Ring	in	Before	8.00	6.00	8.28	10.00	
Large Ring	in	Before	12.00	9.00	12.55	15.00	

HDRS Density Calibration - Inversion Results

Master (EEPROM):		14:15:32 03-Jan-2015					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div></div>
Rho Aluminum	g/cm3	Master	2.596	2.586	2.601	2.606	<div><div></div><div></div><div></div></div>
Rho Magnesium	g/cm3	Master	1.686	1.676	1.688	1.696	<div><div></div><div></div><div></div></div>
Pe Aluminum		Master	2.570	2.470	2.569	2.670	<div><div></div><div></div><div></div></div>
Pe Magnesium		Master	2.650	2.550	2.587	2.750	<div><div></div><div></div><div></div></div>
HDRS Density Calibration - Deviation Summary							
Master (EEPROM):		14:15:32 03-Jan-2015					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div></div>
BS Average Deviation	%	Master	0	-0.6000	0.3321	0.6000	<div><div></div><div></div><div></div></div>
BS Max Deviation	%	Master	0	-1.6000	0.6133	1.6000	<div><div></div><div></div><div></div></div>
SS Average Deviation	%	Master	0	-1.0000	0.2434	1.0000	<div><div></div><div></div><div></div></div>
SS Max Deviation	%	Master	0	-2.5000	0.6507	2.5000	<div><div></div><div></div><div></div></div>
LS Average Deviation	%	Master	0	-1.5000	0.9271	1.5000	<div><div></div><div></div><div></div></div>
LS Max Deviation	%	Master	0	-3.5000	1.9420	3.5000	<div><div></div><div></div><div></div></div>
HDRS Density Calibration - Background Summary							
Master (EEPROM):		14:15:32 03-Jan-2015		Before (Measured):		15:00:05 05-Jan-2015 Expired by 1 days	
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div></div>
BS Window Ratio		Master	1.0000		0.7379		<div><div></div><div></div></div>
		Before	0.7379	0.7010	0.7377	0.7748	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-----	-0.0002	-----	<div><div></div><div></div><div></div></div>
BS Window Sum	1/s	Master	1		23739		<div><div></div><div></div></div>
		Before	23739	22552	23736	24926	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-----	-3	-----	<div><div></div><div></div><div></div></div>
SS Window Ratio		Master	1.0000		0.4859		<div><div></div><div></div></div>
		Before	0.4859	0.4616	0.4884	0.5102	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-----	0.0025	-----	<div><div></div><div></div><div></div></div>
SS Window Sum	1/s	Master	1		9675		<div><div></div><div></div></div>
		Before	9675	9191	9659	10159	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-----	-16	-----	<div><div></div><div></div><div></div></div>
LS Window Ratio		Master	1.0000		0.3003		<div><div></div><div></div></div>
		Before	0.3003	0.2853	0.3033	0.3153	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-----	0.0030	-----	<div><div></div><div></div><div></div></div>
LS Window Sum	1/s	Master	1		1170		<div><div></div><div></div></div>
		Before	1170	1112	1162	1229	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-----	-8	-----	<div><div></div><div></div><div></div></div>
HDRS Density Calibration - Photo-multiplier High Voltages							
Master (EEPROM):		14:15:32 03-Jan-2015		Before (Measured):		15:00:05 05-Jan-2015 Expired by 1 days	
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div></div>
BS PM High Voltage	V	Master		1000	1363	2400	<div><div></div><div></div><div></div></div>
		Before		1000	1389	2400	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-100	26	100	<div><div></div><div></div><div></div></div>
SS PM High Voltage	V	Master		1000	1662	2400	<div><div></div><div></div><div></div></div>
		Before		1000	1676	2400	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-100	14	100	<div><div></div><div></div><div></div></div>
LS PM High Voltage	V	Master		1000	1203	2400	<div><div></div><div></div><div></div></div>
		Before		1000	1204	2400	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-100	1	100	<div><div></div><div></div><div></div></div>
HDRS Density Calibration - Crystal Quality Resolutions							
Master (EEPROM):		14:15:32 03-Jan-2015		Before (Measured):		15:00:05 05-Jan-2015 Expired by 1 days	
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div><div></div><div></div></div>
BS Crystal Resolution	%	Master		5.00	10.52	25.00	<div><div></div><div></div><div></div></div>
		Before		5.00	10.60	25.00	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-1.00	0.08	1.00	<div><div></div><div></div><div></div></div>
SS Crystal Resolution	%	Master		5.00	9.63	20.00	<div><div></div><div></div><div></div></div>
		Before		5.00	9.80	20.00	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-1.00	0.17	1.00	<div><div></div><div></div><div></div></div>
LS Crystal Resolution	%	Master		5.00	8.51	20.00	<div><div></div><div></div><div></div></div>
		Before		5.00	8.55	20.00	<div><div></div><div></div><div></div></div>
		Before-Master	-----	-1.00	0.04	1.00	<div><div></div><div></div><div></div></div>

HD RS MCFL Calibration - MCFL Accumulations

Before (Measured):		10:10:44 08-Jan-2015					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div></div>
Main Resistivity	ohm.m	Before	3875	3565	3860	4185	<div></div>
Deep Resistivity	ohm.m	Before	3830	3524	3796	4136	<div></div>
Shallow Resistivity	ohm.m	Before	3830	3524	3814	4136	<div></div>

HGNS-H (HILT Gamma-Ray and Neutron Sonde, 150 degC) Calibration - Run Run 1

Primary Equipment :			
HILT Gamma-Ray and Neutron Sonde, 150 degC		HGNS-H	
Auxiliary Equipment :			
HGNS Accelerometer, 150 degC		HACCZ-H	6991
AmBe Neutron Logging Source		NSR-F	2554
Calibration Parameter :			
Water Temperature			
Housing Size			
JIG-BKG (Jig minus background reference)		165	

HGNS Accelerometer Calibration - Accelerometer Accumulations

Before (Measured):		10:02:50 08-Jan-2015					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div></div>
AZ Vertical Measurement	ft/s2	Before	32.2	31.5	32.1	32.8	<div></div>

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM):		00:00:00 15-May-2007					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div></div>
Accelerometer Manufacturer		Master			QAT_160		<div></div>
Accelerometer Reference Temperature	degF	Master		30.2	77.0	122.0	<div></div>
Accelerometer Coefficients - 0		Master	----	----	-4298.000	----	<div></div>
Accelerometer Coefficients - 1		Master	----	----	50.180	----	<div></div>
Accelerometer Coefficients - 2		Master	----	----	-0.002	----	<div></div>
Accelerometer Coefficients - 3		Master	----	----	0.000	----	<div></div>
Accelerometer Coefficients - 4		Master	----	----	2.754	----	<div></div>
Accelerometer Coefficients - 5		Master	----	----	0.000	----	<div></div>
Accelerometer Coefficients - 6		Master	----	----	0.000	----	<div></div>
Accelerometer Coefficients - 7		Master	----	----	0.000	----	<div></div>
Accelerometer Coefficients - 8		Master	----	----	300.500	----	<div></div>
Accelerometer Coefficients - 9		Master	----	----	0.994	----	<div></div>

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM):		16:20:48 22-Oct-2014	Before (Measured):		14:58:35 05-Jan-2015	After:	
					Expired by 1 days		
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	<div></div>
Near Zero Measurement	1/s	Master	0	5.0	28.0	40.0	<div></div>
		Before	0	5.0	26.5	40.0	<div></div>
		After	----	----	----	----	<div></div>
		Before-Master	----	-4.2	-1.5	4.2	<div></div>
		After-Before	----	----	----	----	<div></div>
Far Zero Measurement	1/s	Master	0	5.0	27.3	40.0	<div></div>
		Before	0	5.0	27.0	40.0	<div></div>
		After	----	----	----	----	<div></div>
		Before-Master	----	-4.1	-0.3	4.1	<div></div>
		After-Before	----	----	----	----	<div></div>
Near Plus Measurement	1/s	Master	6031.0	4700.0	5698.0	6900.0	<div></div>
		Before	----	----	----	----	<div></div>
		After	----	----	----	----	<div></div>
		Before-Master	----	----	----	----	<div></div>
		After-Before	----	----	----	----	<div></div>
Far Plus Measurement	1/s	Master	2793.0	1900.0	2348.0	2900.0	<div></div>

		Before	----	----	----	----	
		After	----	----	----	----	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	
Near Corrected Plus Measurement	1/s	Master		4700.0	5673.0	6900.0	
		Before	----	----	----	----	
		After	----	----	----	----	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	
Far Corrected Plus Measurement	1/s	Master		1900.0	2321.0	2900.0	
		Before	----	----	----	----	
		After	----	----	----	----	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	

HGNS Gamma-Ray Calibration - Gamma-Ray Accumulations

Before (Measured): 14:59:46 05-Jan-2015 Expired by 1 days After:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Zero Measurement	gAPI	Before	30.0	0	74.4	120.0	
		After	----	----	----	----	
		After-Before	----	----	----	----	
RGR Plus Measurement	gAPI	Before	185.4	157.1	169.5	206.3	
		After	----	----	NOT DONE	----	
		After-Before	----	----	----	----	
GR Calibration Gain		Before	0.89	0.80	0.97	1.05	
		After	----	----	----	----	
		After-Before	----	----	----	----	

CMRT-B (Combinable Magnetic Resonance Tool - BA/BB/VA/BAH) Calibration - Run Run 1

Primary Equipment :			
CMRT Normal Pressure Sonde	CMRS	144	
Auxiliary Equipment :			
CMRT Cartridge Element 30kpsi	CMRC	78	

CMRT Water Bottle Calibration - Water Bottle Calibration

Master (EEPROM): 12:30:00 05-Jan-2015		Before:		After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Reciprocal of the MC Amplitude Corrected to 25 degC		Master	0.030	0.020	0.038	0.040	
		Before	0.030	0.020	NOT DONE	0.040	
		After	0.030	0.020	NOT DONE	0.040	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	
Test Loop Amplitude During MC		Master	2350.000	1500.000	1687.442	3200.000	
		Before	2350.000	1500.000	NOT DONE	3200.000	
		After	2350.000	1500.000	NOT DONE	3200.000	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	
Oper Freq During MC	kHz	Master	2240.000	2130.000	2277.000	2350.000	
		Before	2240.000	2130.000	NOT DONE	2350.000	
		After	2240.000	2130.000	NOT DONE	2350.000	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	
Sonde Temp During MC	degF	Master	80.600	50.000	36.030	111.200	
		Before	80.600	50.000	NOT DONE	111.200	
		After	80.600	50.000	NOT DONE	111.200	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	
Noise Per Echo - 0	ft3/ft3	Master	----	----	----	----	
		Before	0.100	0	NOT DONE	0.200	
		After	0.100	0	NOT DONE	0.200	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	

Signal-to-Noise Ratio for MC - 0		Master	----	----	----	----	
		Before	675.000	350.000	NOT DONE	1000.000	
		After	675.000	350.000	NOT DONE	1000.000	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	
Log Mean of the T2 Dist - 0	ms	Master	----	----	----	----	
		Before	52.500	45.000	NOT DONE	60.000	
		After	52.500	45.000	NOT DONE	60.000	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	

ECS-A (Elemental Capture Spectroscopy Tool) Calibration - Run Run 1

Primary Equipment :			
	The ECS sonde is used to measure elemental concentrations.	ECS-A	19
Auxiliary Equipment :			
	Litho-Density Spectroscopy Cartridge	LDSC-B	492
	Housing for the LDSC	LDSH-A	363
	Housing to contain the ECS Sonde Assembly	ECSH-A	
	The gamma ray BGO detector is used to detect prompt capture gamma rays for spectroscopy measurement.	ECSD-A	
	The AmBe source provides neutrons for the prompt capture spectroscopy measurement.	NSR-F	4061

ECS Background Measurement Check - ECS Calibration Check

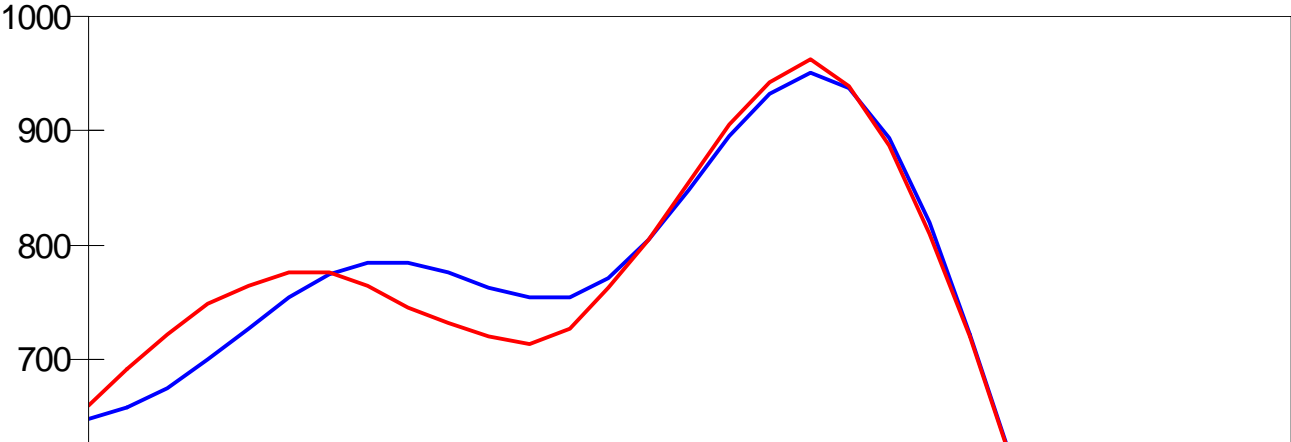
Master (EEPROM):		Before (Measured):		After:			
18:47:47 16-Feb-2013		15:01:54 05-Jan-2015					
Expired by 325 days		Expired by 1 days					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Detector resolution (20 DegC) - 0	%	Master	----	----	----	----	
		Before	13.000	11.200	12.557	14.000	
		After	13.000	11.200	NOT DONE	14.000	
		Before-Master	----	----	----	----	
		After-Before	----	----	----	----	

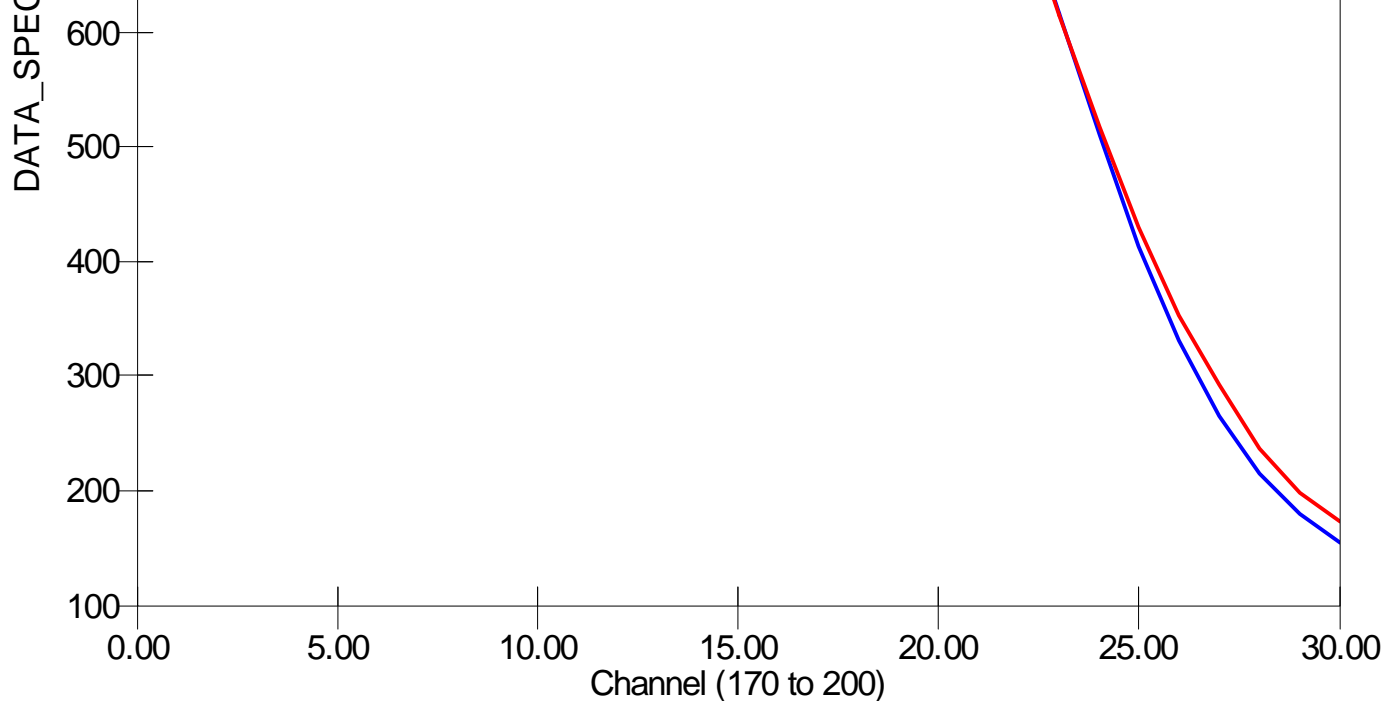
ECS Spectral Calibration - ECS Spectral Calibration

Master (EEPROM):		10:38:56 08-Jan-2015					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Spectral Shift Factor		Master	1.000	-0.500	1.445	1.500	

Spectrum Without Shift Plot
SHOP

FITTED_SPEC (FITTED_SPEC)
DATA_SPEC (DATA_SPEC)

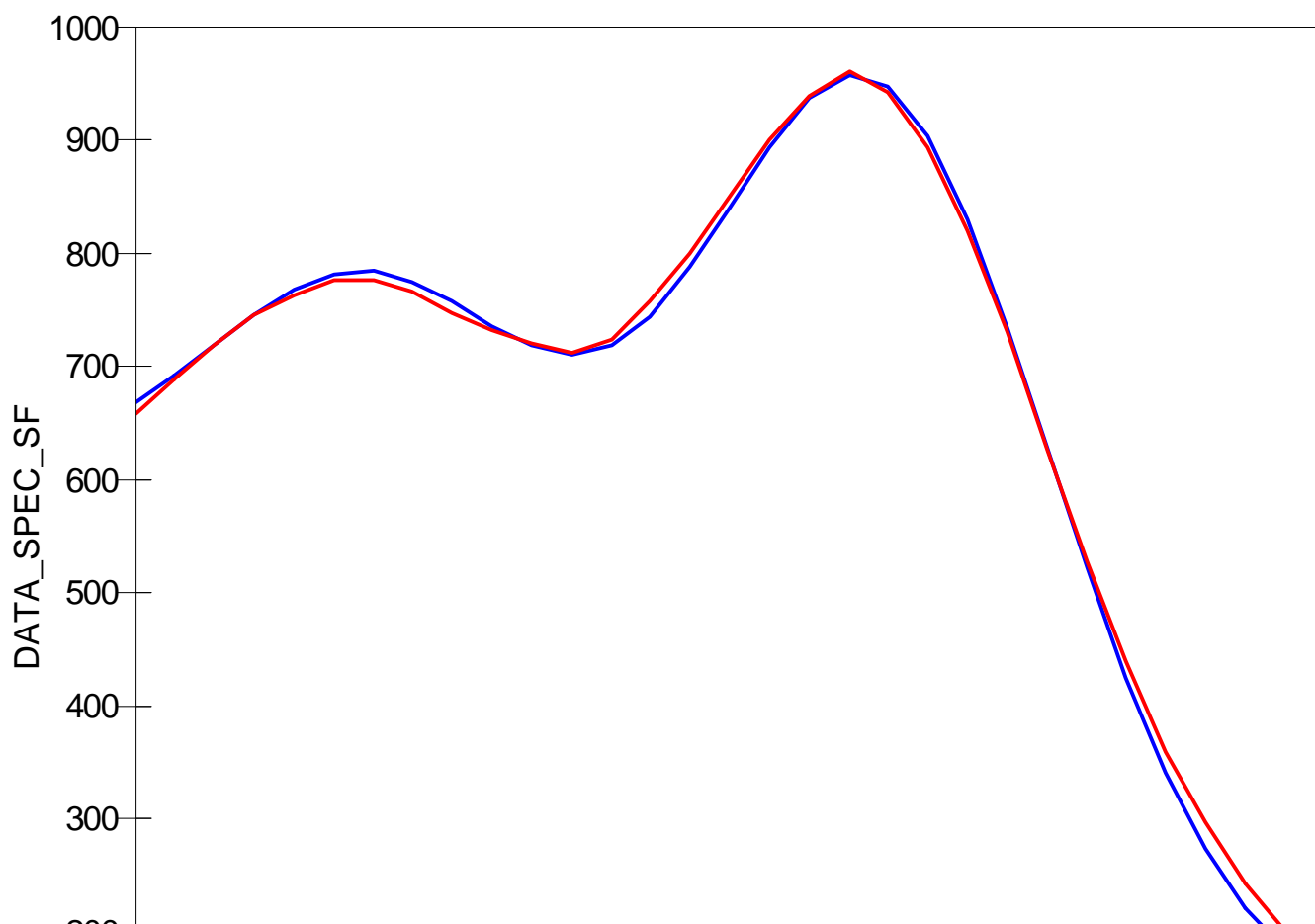


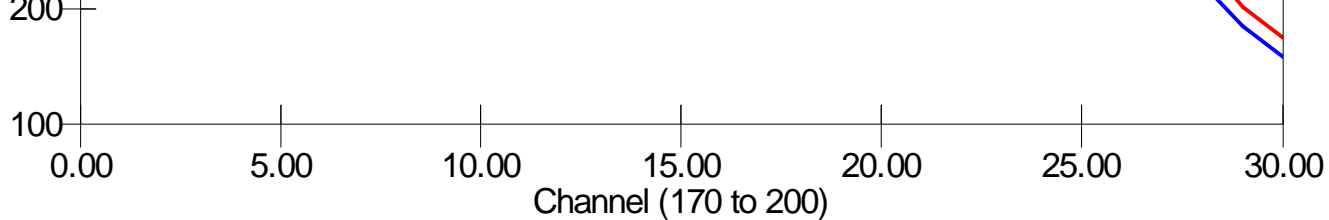


Spectrum With Shift Plot

SHOP

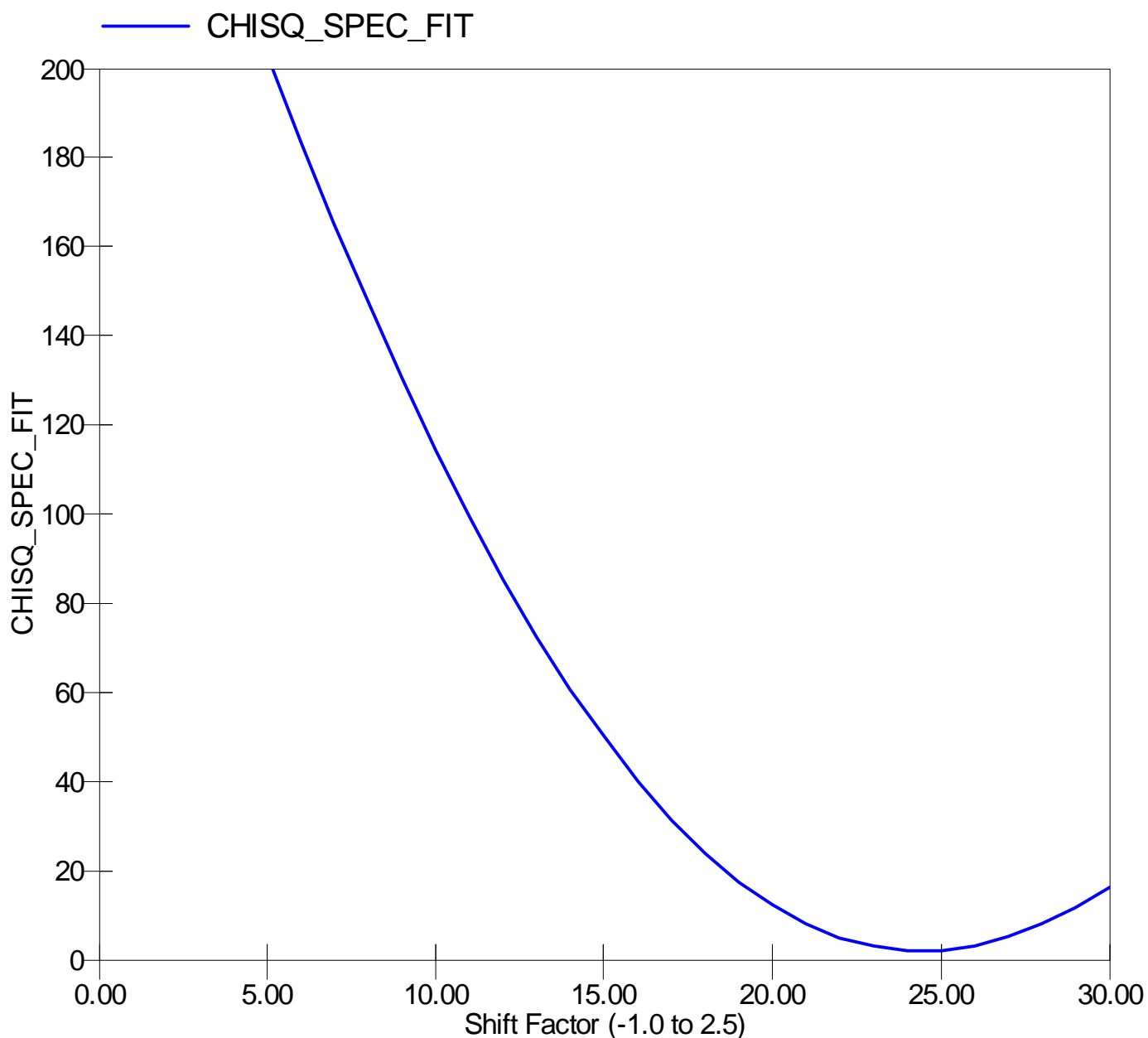
— FITTED_SPEC_SF (FITTED_SPEC_SF)
— DATA_SPEC_SF (DATA_SPEC_SF)





Chi Square for Spectral Fit Plot

SHOP



Calibration Parameter :

Small Ring Size (Caliper Calibration Small Ring)

8.00

Large Ring Size (Caliper Calibration Large Ring)

12.00

ADT Caliper Calibration - Caliper Accumulations

Before (Measured): 15:01:23 05-Jan-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Small Ring RCAL	in	Before	8.00	4.00	7.79	12.00	
Large Ring RCAL	in	Before	12.00	6.00	11.57	18.00	

EDTC-B (Enhanced Digital Telemetry Cartridge - Version B) Calibration - Run Run 1

Primary Equipment :

EDTC-B

EDTC-B

Calibration Parameter :

Plus Reference (Jig minus background reference)

165

EDTC-B Accelerometer Calibration - EDTC-B Accelerometer Calibration

Before (Measured): 10:03:03 08-Jan-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
AZ Vertical Measurement	ft/s2	Before	32.19	31.53	32.47	32.84	

EDTC-B Memory Data - EDTC-B Memory Data

Master (EEPROM): 09:59:58 08-Jan-2015

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Initial PMT HV	V	Master			1537.000		
Accelerometer Serial Number		Master			230		
Accelerometer Coefficients - 0		Master	----	----	2.980	----	
Accelerometer Coefficients - 1		Master	----	----	0.000	----	
Accelerometer Coefficients - 2		Master	----	----	0.000	----	
Accelerometer Coefficients - 3		Master	----	----	0.000	----	
Accelerometer Coefficients - 4		Master	----	----	0.000	----	
Accelerometer Coefficients - 5		Master	----	----	0.000	----	
Accelerometer Coefficients - 6		Master	----	----	0.000	----	
Accelerometer Coefficients - 7		Master	----	----	0.006	----	
Accelerometer Coefficients - 8		Master	----	----	0.000	----	
Accelerometer Coefficients - 9		Master	----	----	0.000	----	
Accelerometer Coefficients - 10		Master	----	----	0.000	----	
Accelerometer Coefficients - 11		Master	----	----	0.000	----	
Gamma-Ray Detector Serial Number		Master			65535		

EDTC-B Gamma-Ray Calibration - Gamma Ray Coefficients

Before (Measured): 14:59:37 05-Jan-2015

After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Gain		Before	1.000	0.900	1.049	1.100	
		After	----	----	----	----	
		After-Before	----	----	----	----	

EDTC-B Gamma-Ray Calibration - Gamma Ray Accumulations

Before (Measured): 14:59:37 05-Jan-2015

After:

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Zero Measurement	gAPI	Before		0	78.911	120.000	
		After	----	----	----	----	
		After-Before	----	----	----	----	
RGR Plus Measurement	gAPI	Before	165.000	150.000	157.248	180.000	
		After			NOT DONE		
		After-Before	----	----	----	----	

Company:	Nighthawk Production LLC	Schlumberger
Well:	Snow King 9-32	
Field:	Arikaree Creek	
County:	Lincoln	
Country:	United States	
Platform Express Field Print		
Triple Combo		
Induction & Nuclear		