



Company: **Manzano LLC.**

Well: **Cougar #1**

Field: **Oakdale**

County: **Huerfano**

State: **Colorado**

**Platform Express  
Triple Combo**

Field: **Oakdale**  
 Location: **1218' FNL & 1472' FWL**  
 Well: **Cougar #1**  
 Company: **Manzano LLC.**

<b>LOCATION</b>			
1218' FNL & 1472' FWL		Elev.: <b>K.B. 8043.00 ft</b>	
		G.L. <b>8031.00 ft</b>	
		D.F. <b>8042.00 ft</b>	
Permanent Datum: _____	GROUND LEVEL _____	Elev.: <b>8031.00 ft</b>	
Log Measured From: _____	Kelly Bushing _____	<b>12.00 ft above Perm. Datum</b>	
Drilling Measured From: _____	Kelly Bushing _____		
API Serial No. _____	Section <b>9</b>	Township <b>29S</b>	Range <b>69W</b>
05-055-06301-0C			

Logging Date	25-Oct-2008	
Run Number	1	
Depth Driller	6691 ft	
Schlumberger Depth	6700 ft	
Bottom Log Interval	6690 ft	
Top Log Interval	1209 ft	
Casing Driller Size @ Depth	9.625 in @ 1222 ft	
Casing Schlumberger	1209 ft	
Bit Size	8.750 in	
Type Fluid In Hole	Oil Based Mud	
Density	8 lbm/gal	55 s
Fluid Loss	PH	
Source Of Sample	Flowline	
RM @ Measured Temperature	39.180 ohm.m	@ 72 degF
RMF @ Measured Temperature	29.390 ohm.m	@ 72 degF
RMC @ Measured Temperature	58.770 ohm.m	@ 72 degF
Source RMF	Calculated	Calculated
RM @ MRT	15.684 @ 190	11.765 @ 190
Maximum Recorded Temperatures	190 degF	
Circulation Stopped	24-Oct-2008	12:15
Logger On Bottom	25-Oct-2008	1:36
Unit Number	7029	Farmingington
Recorded By	Jake Newhouse	
Witnessed By	Mr. John Worrall/ Mike Hanagan	

	Run 1	Run 2	Run 3
Logging Date			
Run Number			
Depth Driller			
Schlumberger Depth			
Bottom Log Interval			
Top Log Interval			
Casing Driller Size @ Depth			
Casing Schlumberger			
Bit Size			
Type Fluid In Hole			
Density			
Fluid Loss			
Source Of Sample			
RM @ Measured Temperature			
RMF @ Measured Temperature			
RMC @ Measured Temperature			
Source RMF			
RM @ MRT			
Maximum Recorded Temperatures			
Circulation Stopped			
Logger On Bottom			
Unit Number			
Recorded By			
Witnessed By			

## DEPTH SUMMARY LISTING

Date Created: 25-OCT-2008 3:19:59

### Depth System Equipment

Depth Measuring Device	Tension Device	Logging Cable
Type: IDW-B Serial Number: 8344 Calibration Date: Calibrator Serial Number: 1 Calibration Cable Type: 7-39P LXS Wheel Correction 1: -1 Wheel Correction 2: -6	Type: CMTD-B/A Serial Number: 2558 Calibration Date: 3-Oct-2008 Calibrator Serial Number: 1098 Number of Calibration Points: 9 Calibration RMS: 16 Calibration Peak Error: 30	Type: 7-39P LXS Serial Number: 7005 Length: 14000 FT Conveyance Method: Wireline Rig Type: LAND

### Depth Control Parameters

Log Sequence: First Log In the Well
Rig Up Length At Surface: 152.00 FT
Rig Up Length At Bottom: 150.00 FT
Rig Up Length Correction: 2.00 FT
Stretch Correction: 7.00 FT
Tool Zero Check At Surface: 0.30 FT

### Depth Control Remarks

1. Schlumberger Depth Policies Followed
2.
3.
4.
5.
6.

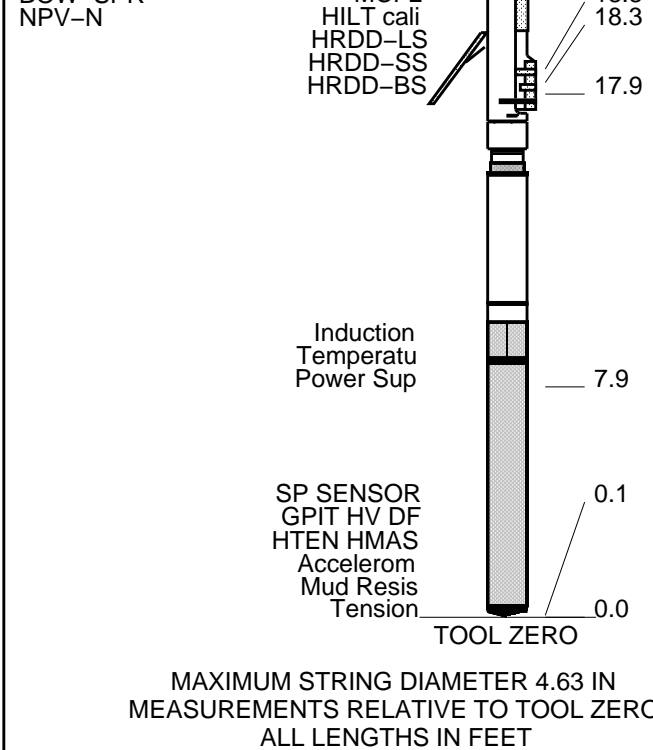
#### DISCLAIMER

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OTHER SERVICES1	OTHER SERVICES2
OS1: Cores	OS1:
OS2: OBMI	OS2:
OS3: XPT	OS3:
OS4:	OS4:
OS5:	OS5:

REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
ToolString Ran as per Toolsketch	
Log Processed on Sandstone Matrix with 2.65 Matrix Density	
Cement Volume Calculated with a 7" Future Casing	
Standoff Correction Used For Neutron	





Main Pass 5" = 100'

MAXIS Field Log

Company: Manzano LLC. Well: Cougar #1

Input DLIS Files

DEFAULT	SPLICE_AIT_TLD_MCFL_016	FN:1	PRODUCER	25-Oct-2008 03:35	6720.0 FT	56.7 FT
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Output DLIS Files

DEFAULT	AIT_TLD_MCFL_CNL_017PUP	FN:15	PRODUCER	25-Oct-2008 03:39
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OP System Version: 16C0-147

MCM

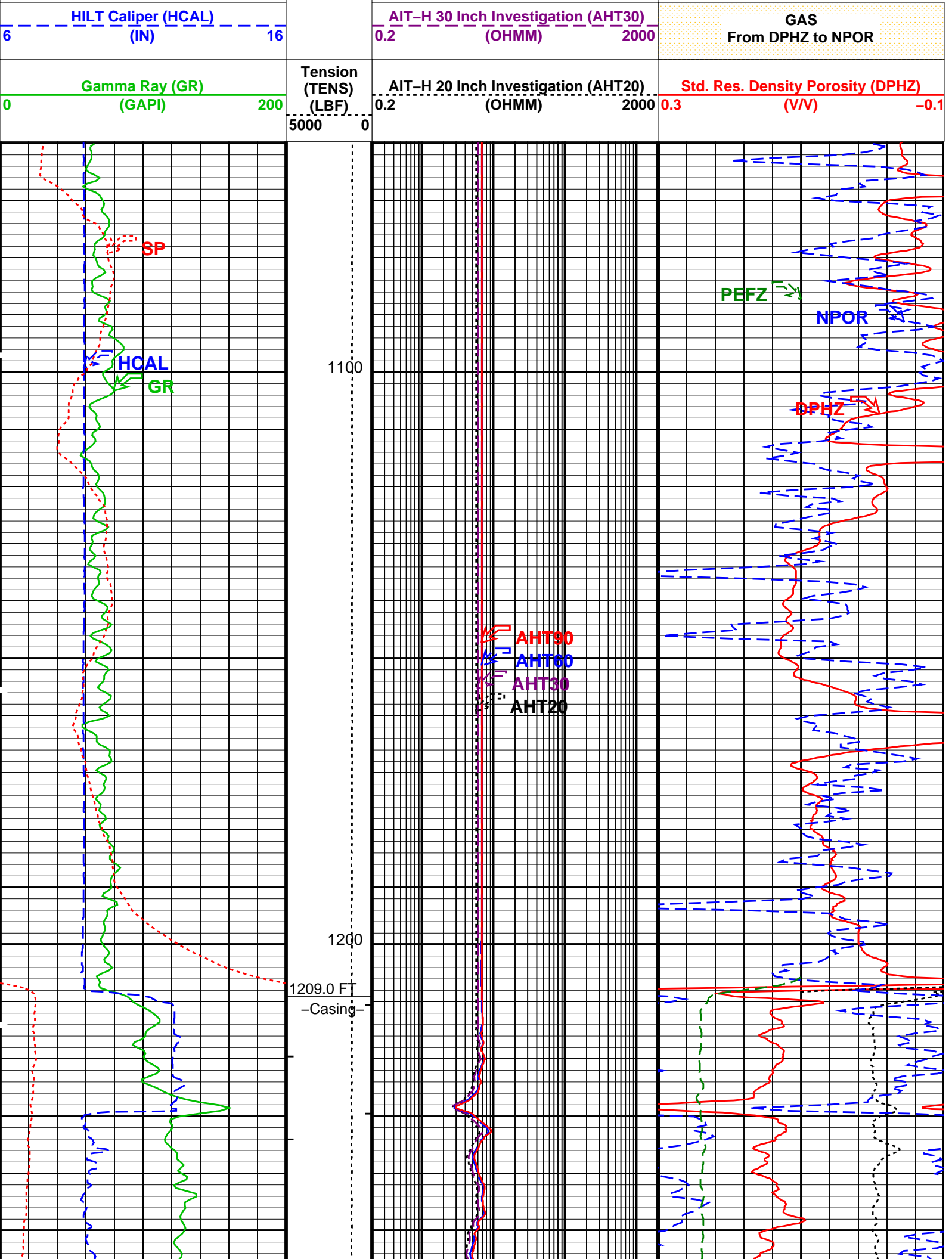
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DTC-H	16C0-147		

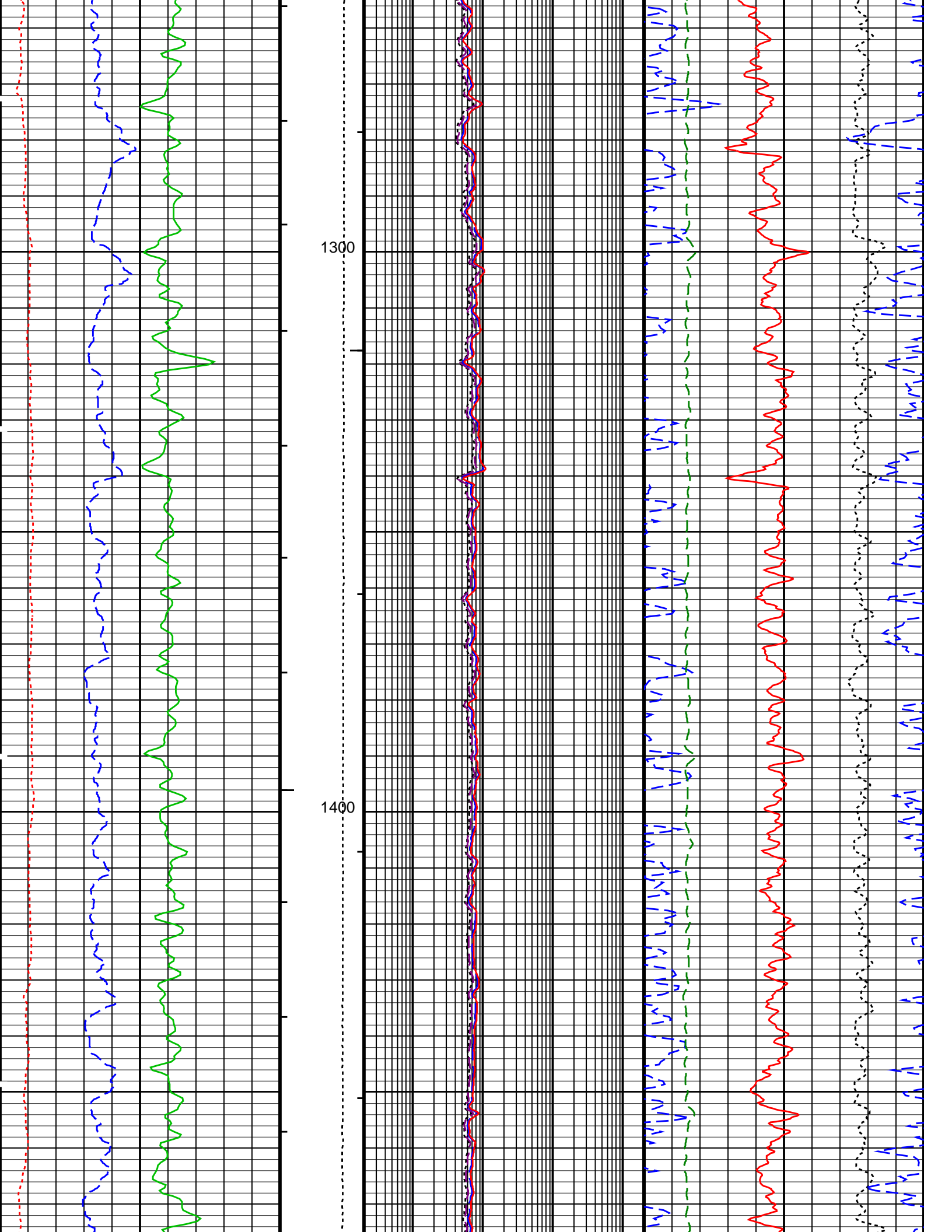
PIP SUMMARY

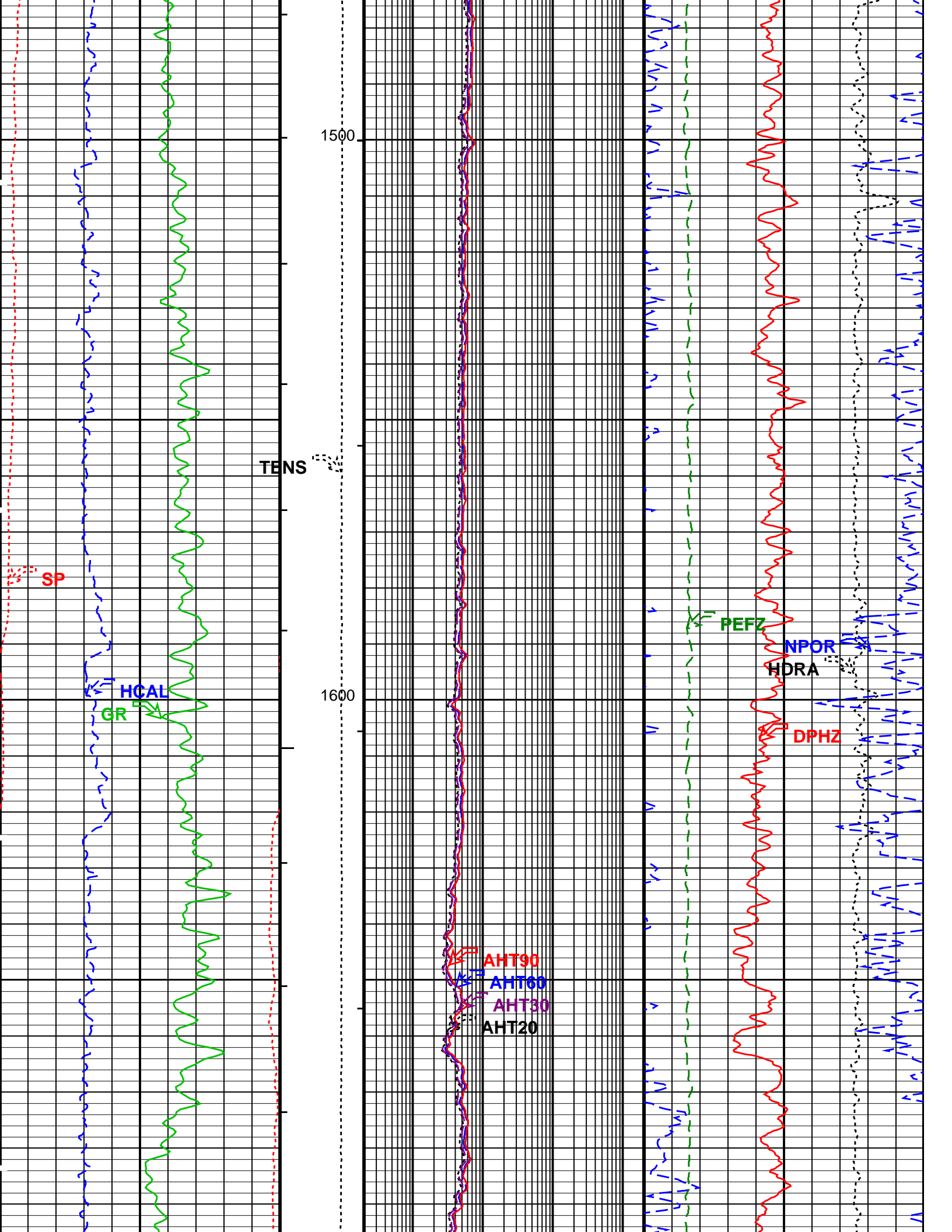
- ┆ Integrated Hole Volume Minor Pip Every 10 F3
- ┆ Integrated Hole Volume Major Pip Every 100 F3
  - ┆ Integrated Cement Volume Minor Pip Every 10 F3
  - ┆ Integrated Cement Volume Major Pip Every 100 F3

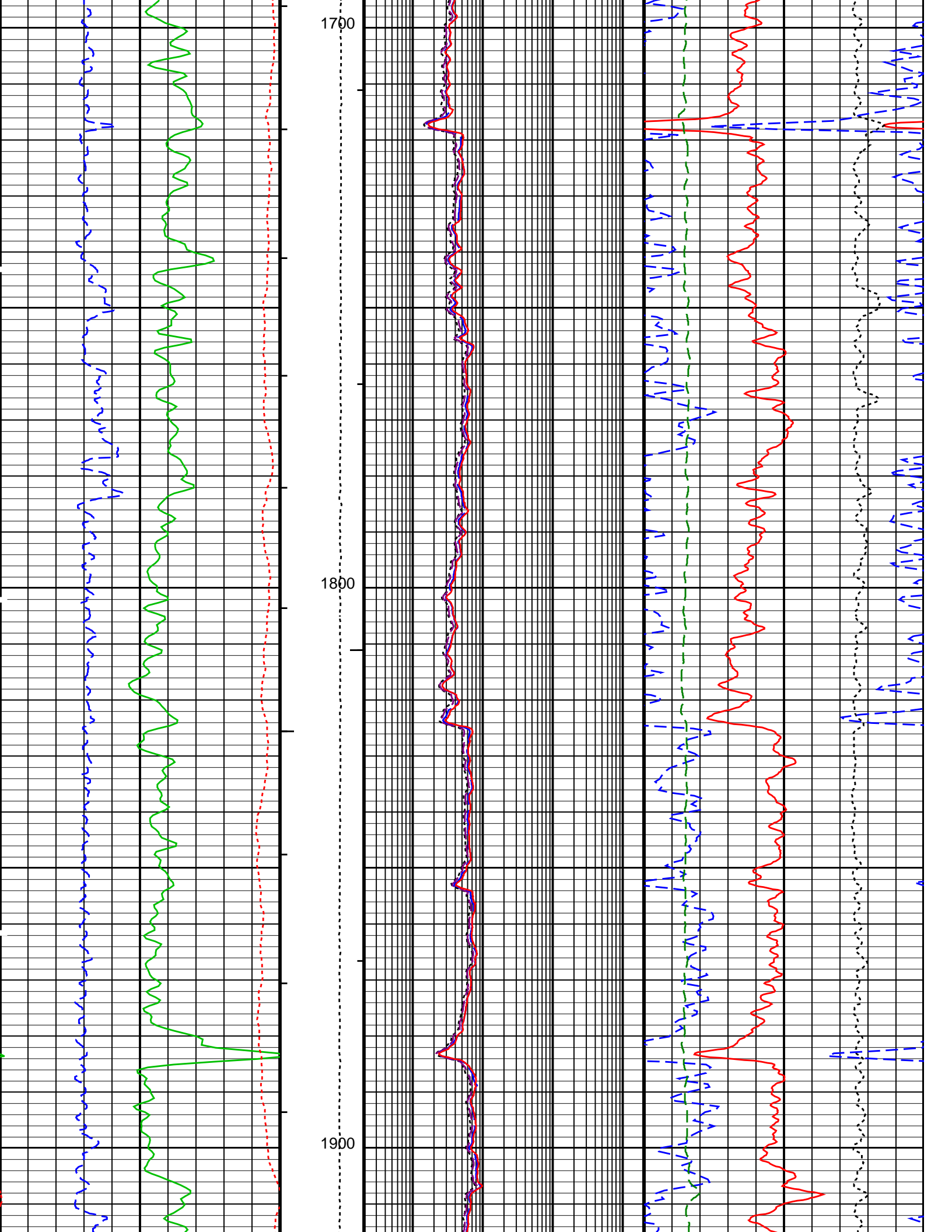
Time Mark Every 60 S

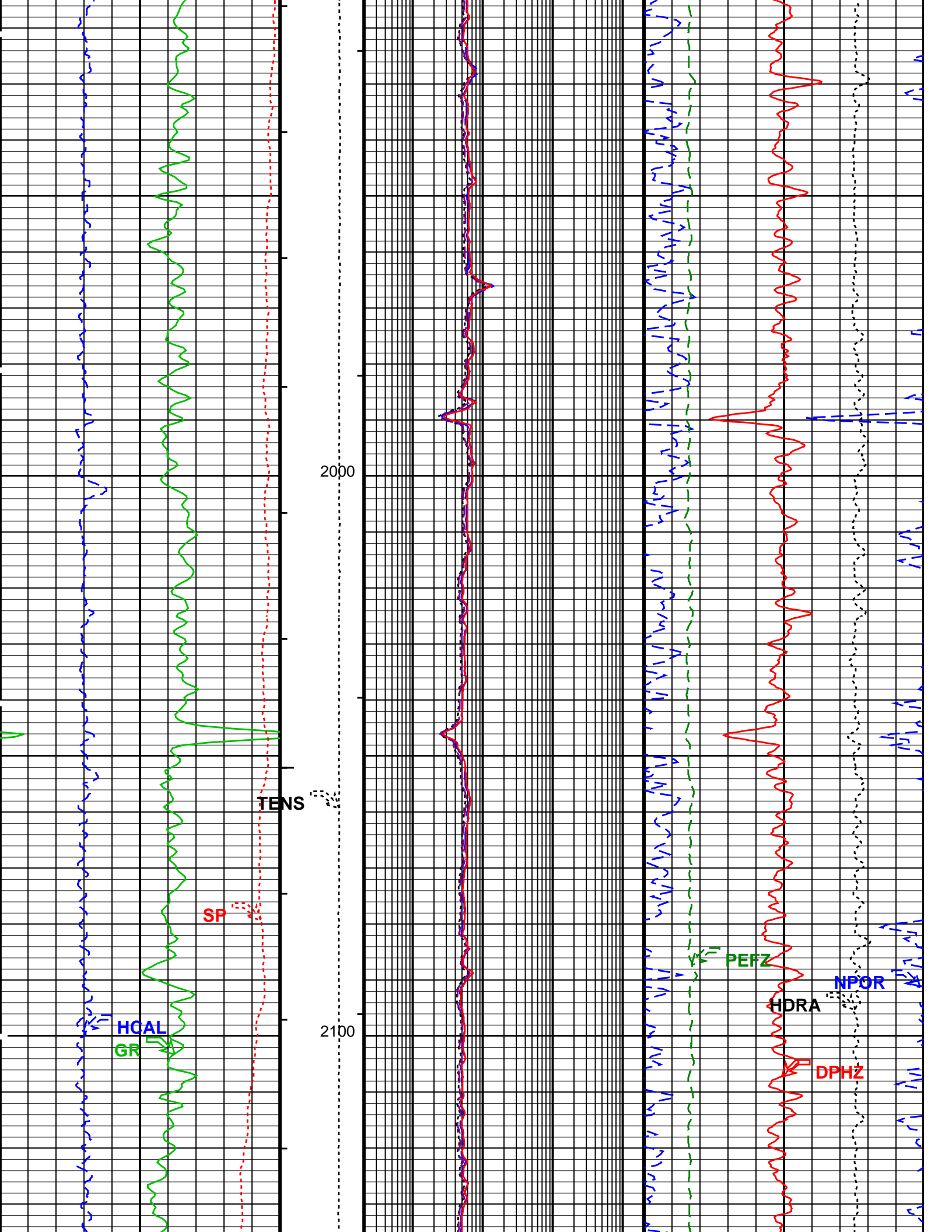
	<b>AIT-H 90 Inch Investigation (AHT90)</b>			<b>Std. Res. Formation</b>	<b>Density Correction</b>	
	0.2	(OHMM)	2000	Pe (PEFZ)	(HDRA)	
				0	(---- 10	-0.25 (G/C3) 0.25
	<b>AIT-H 60 Inch Investigation (AHT60)</b>			<b>Alpha Processed Neutron Porosity</b>		
	0.2	(OHMM)	2000	(NPOR)		
				0.3	(V/V)	-0.1

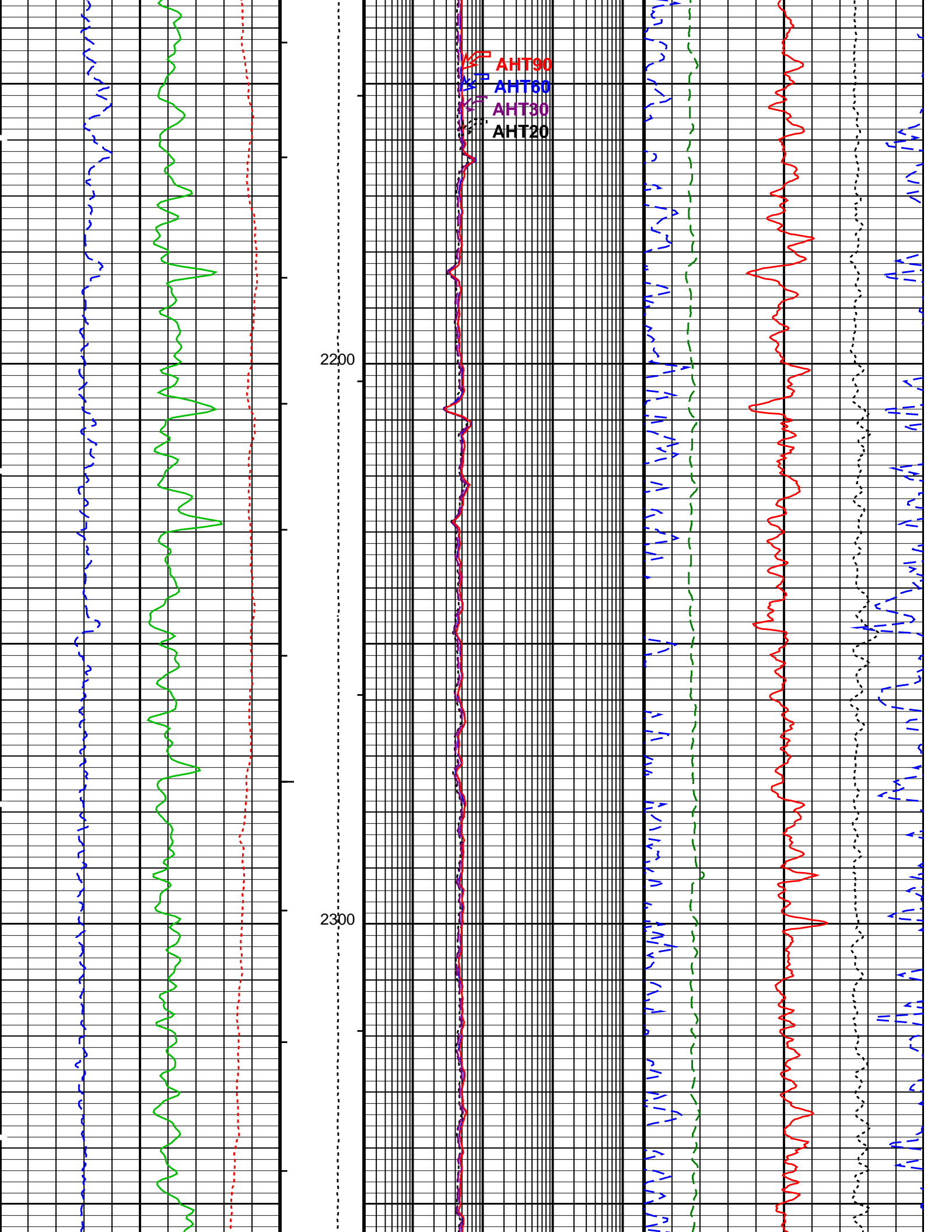


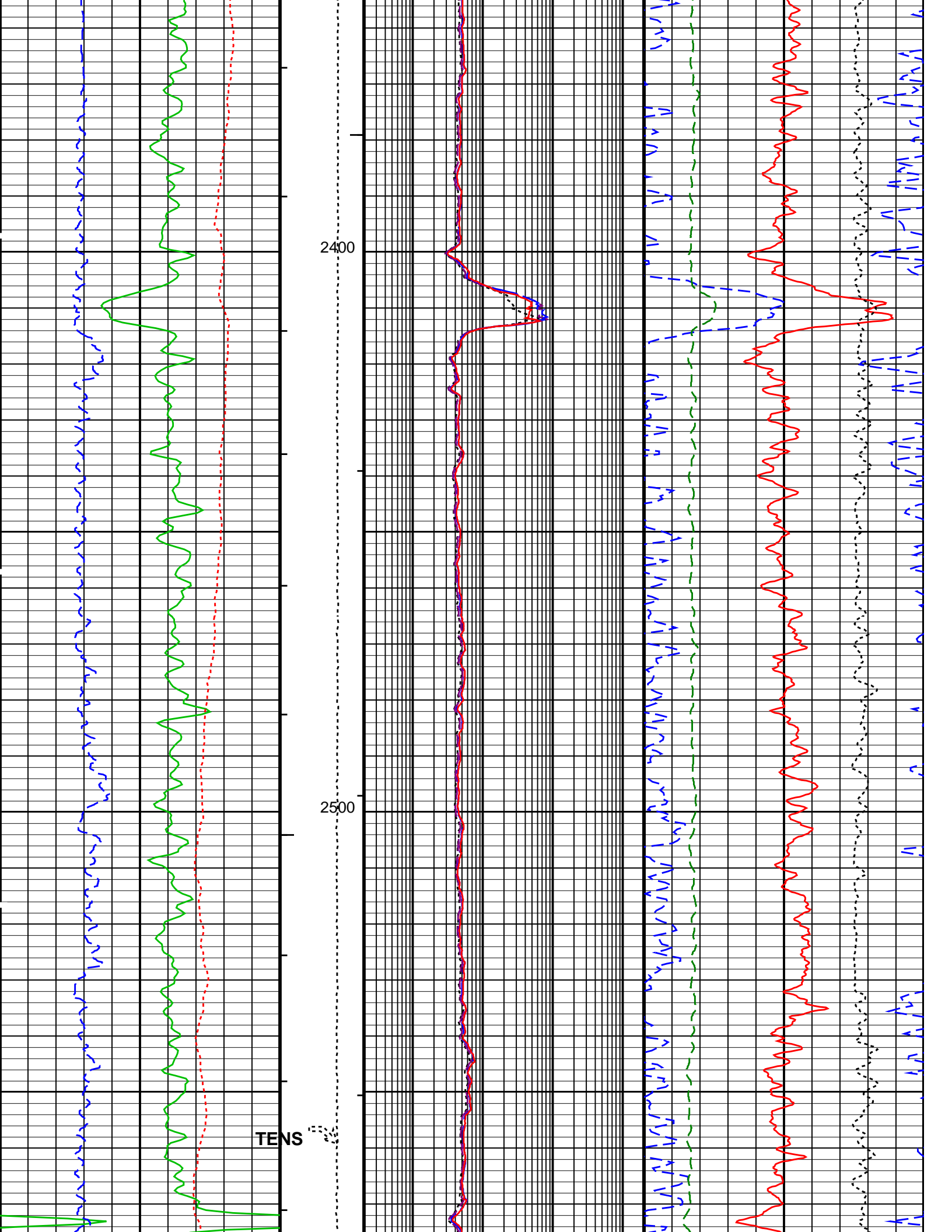


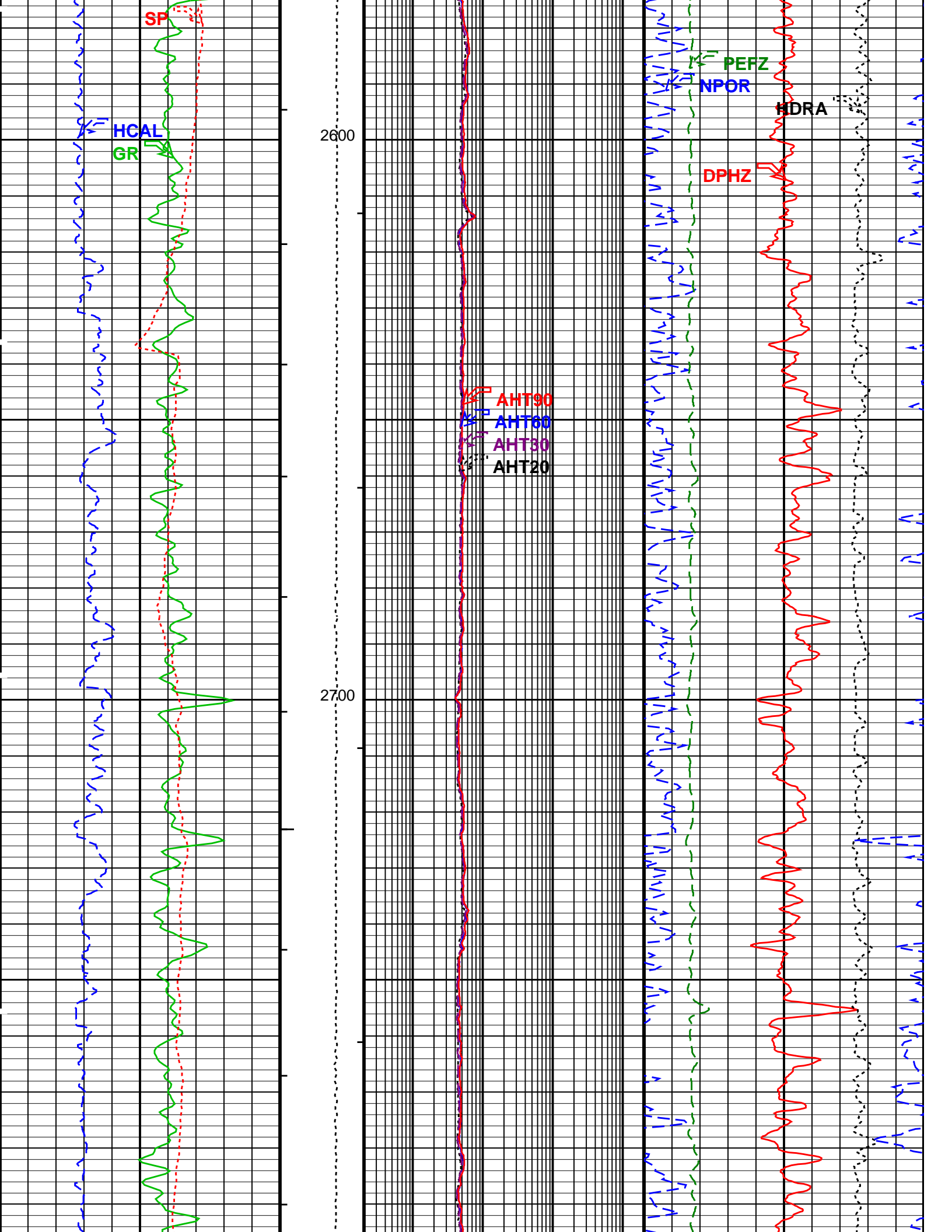


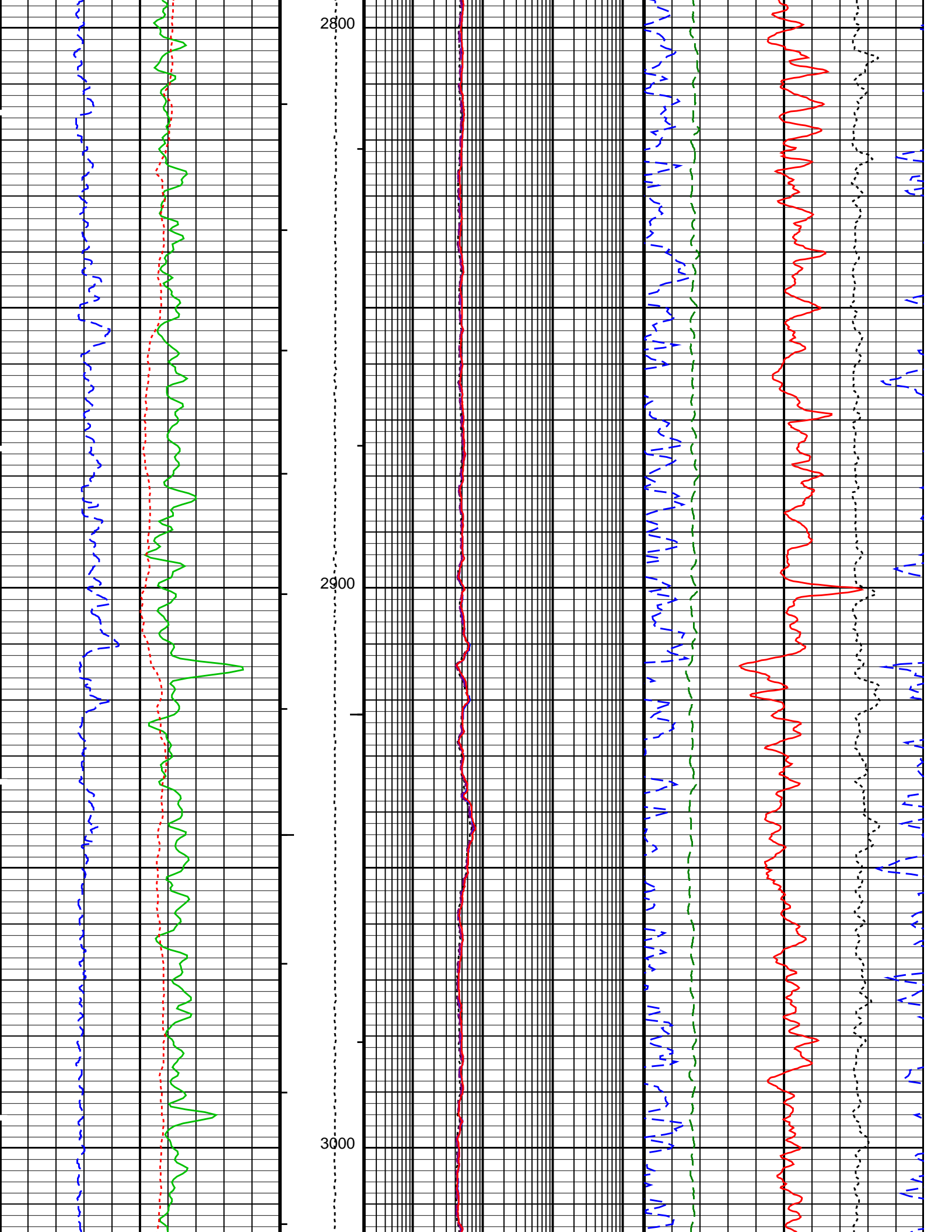


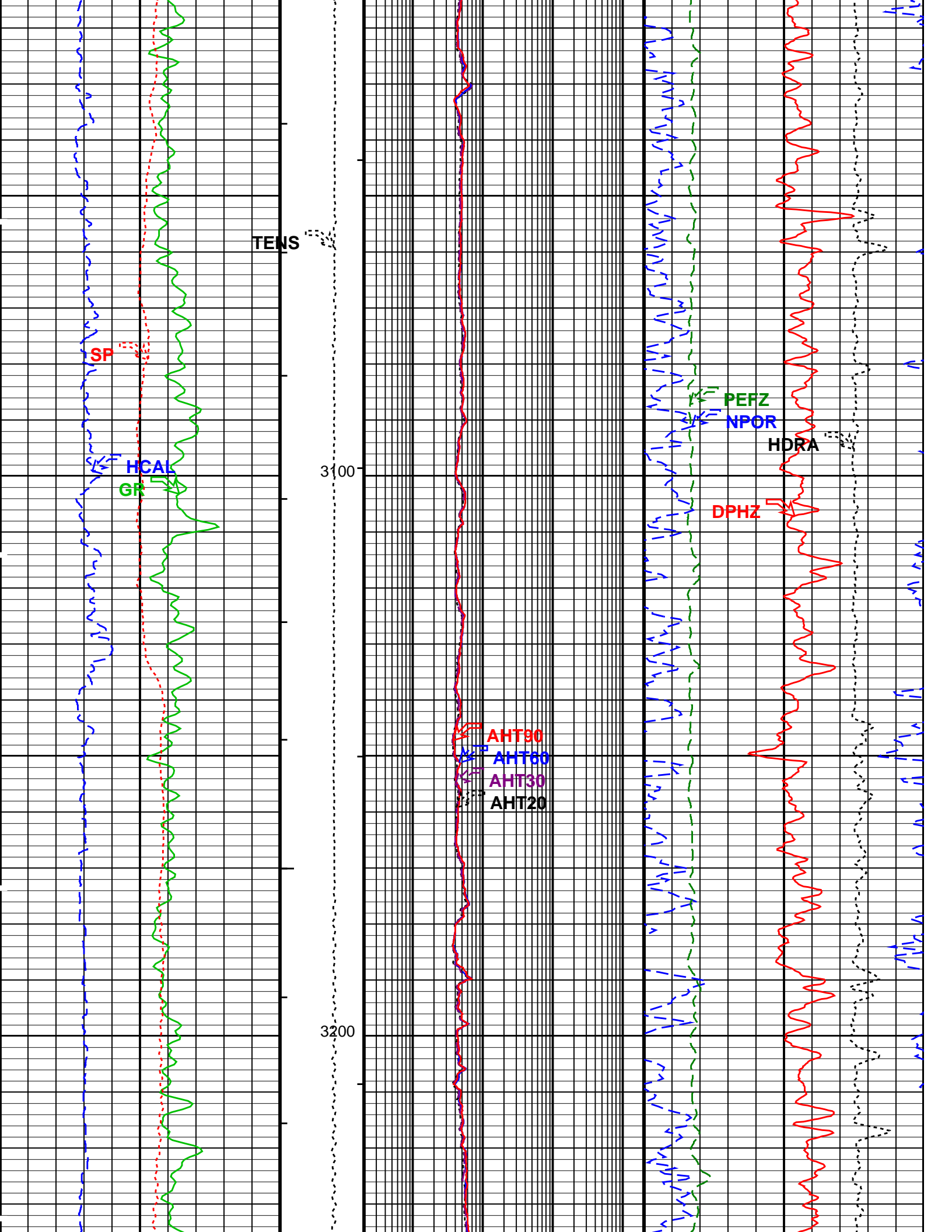


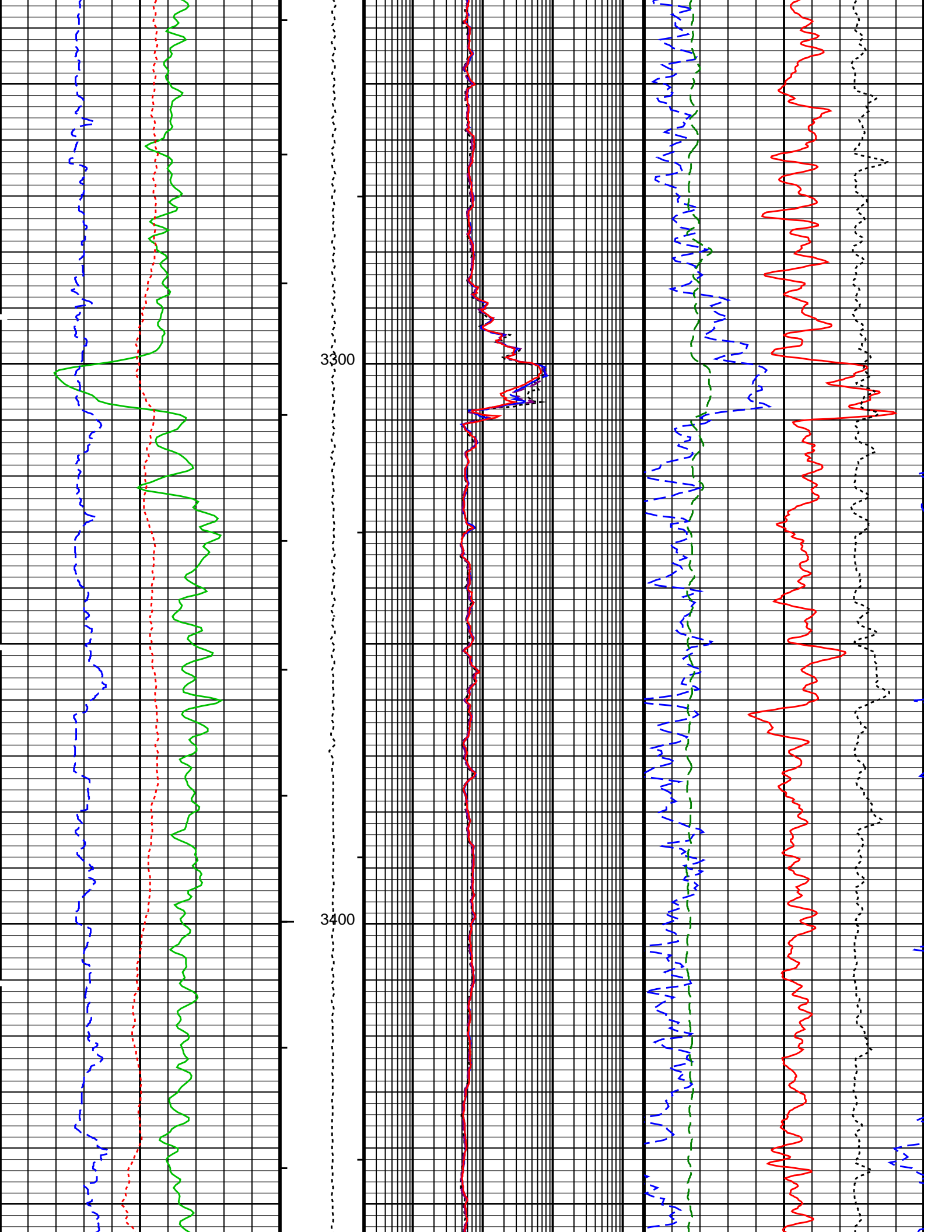


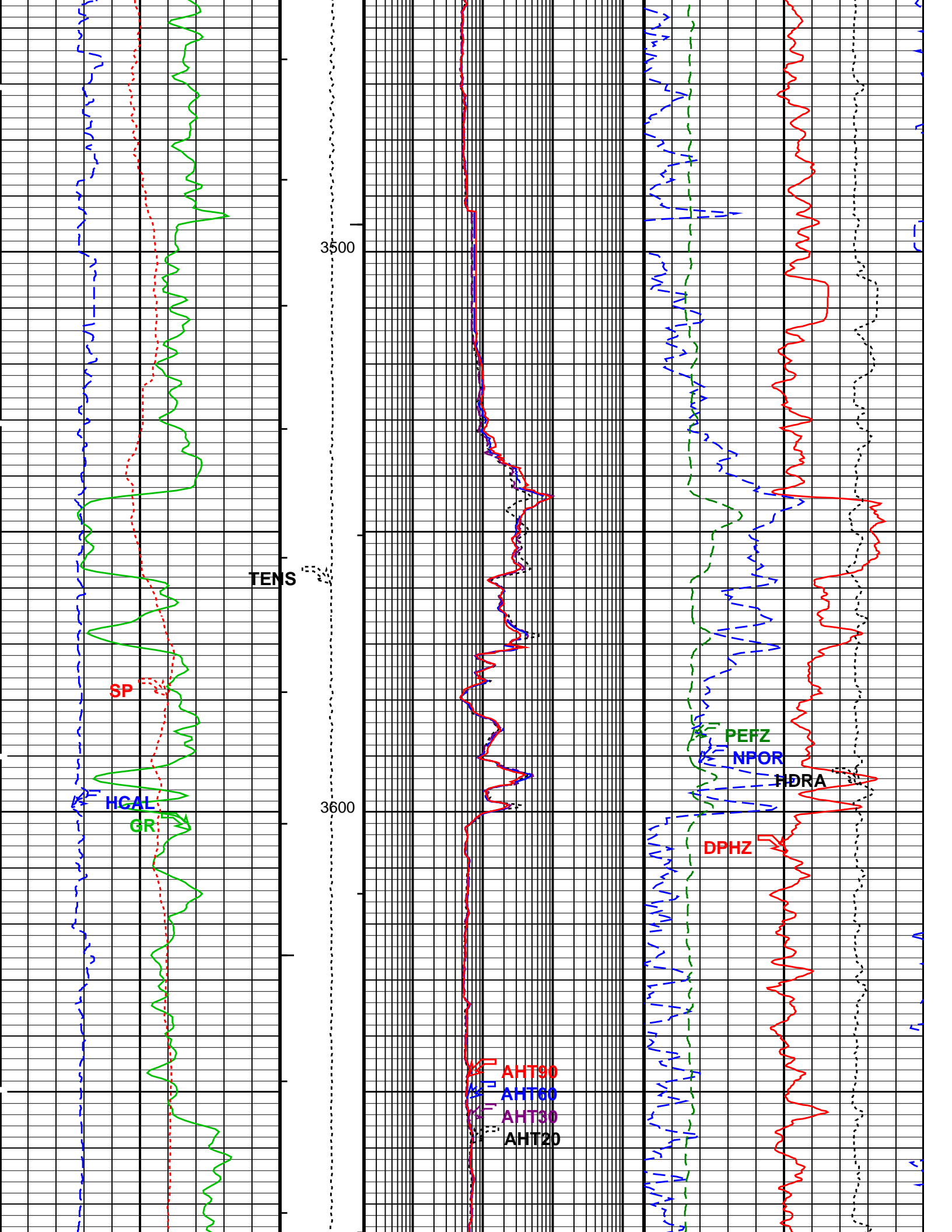


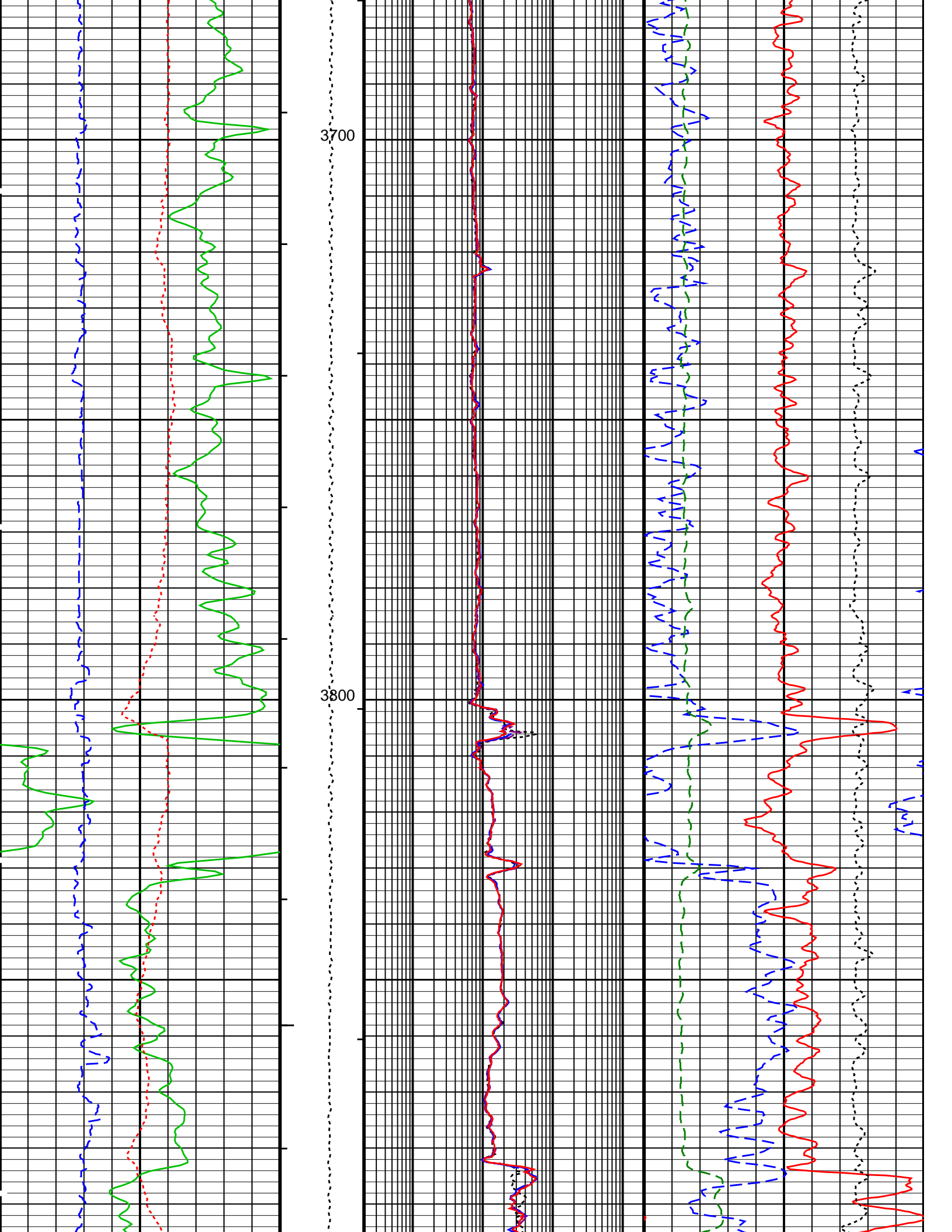


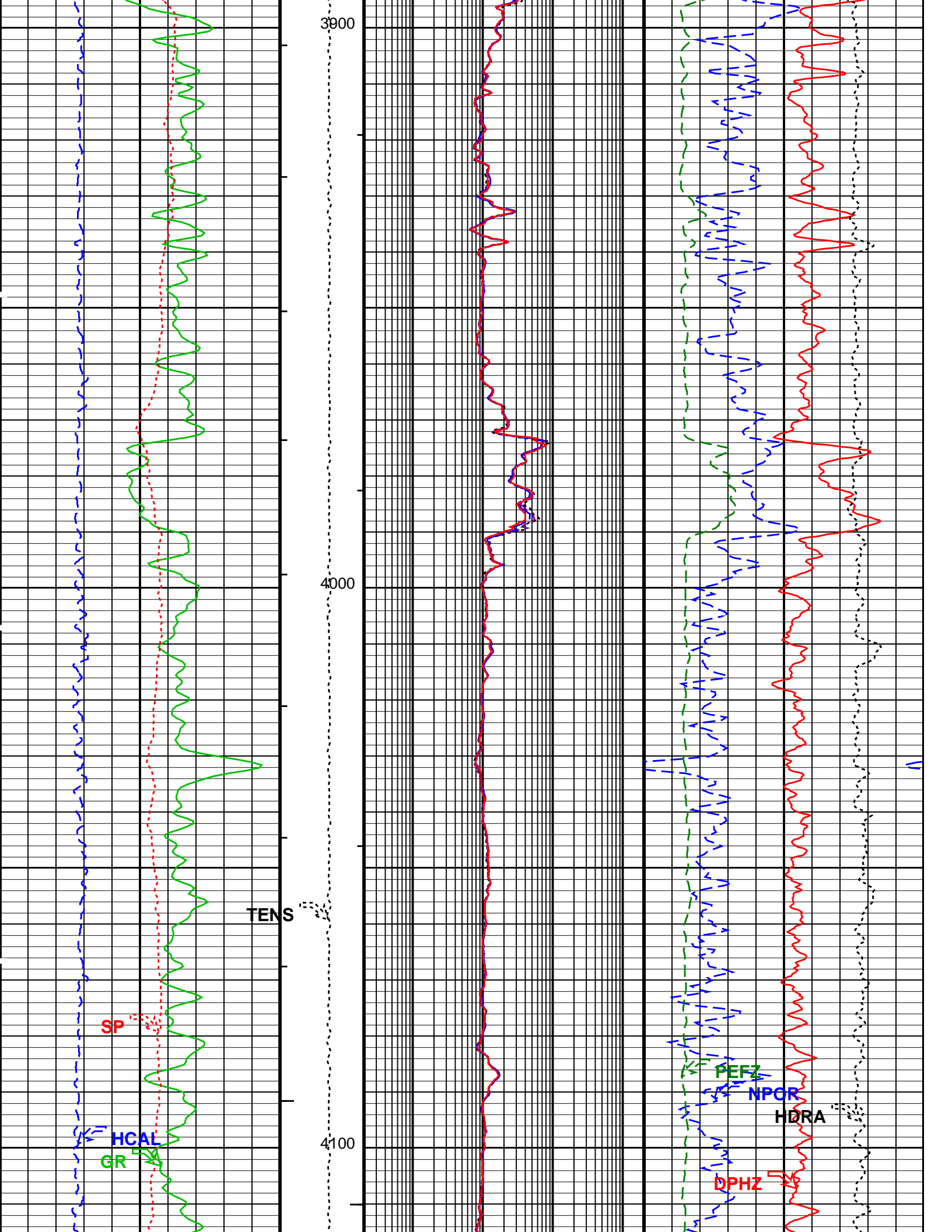


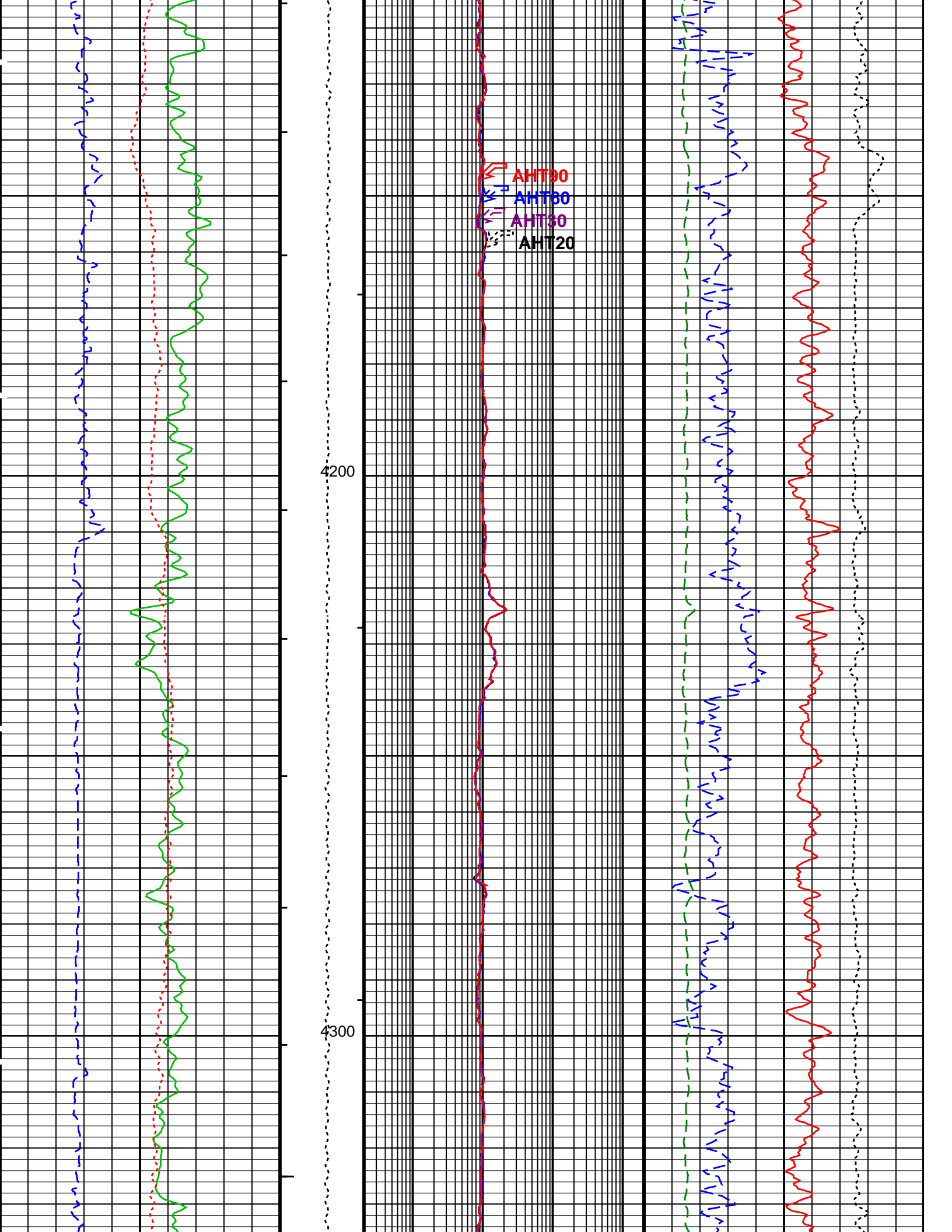


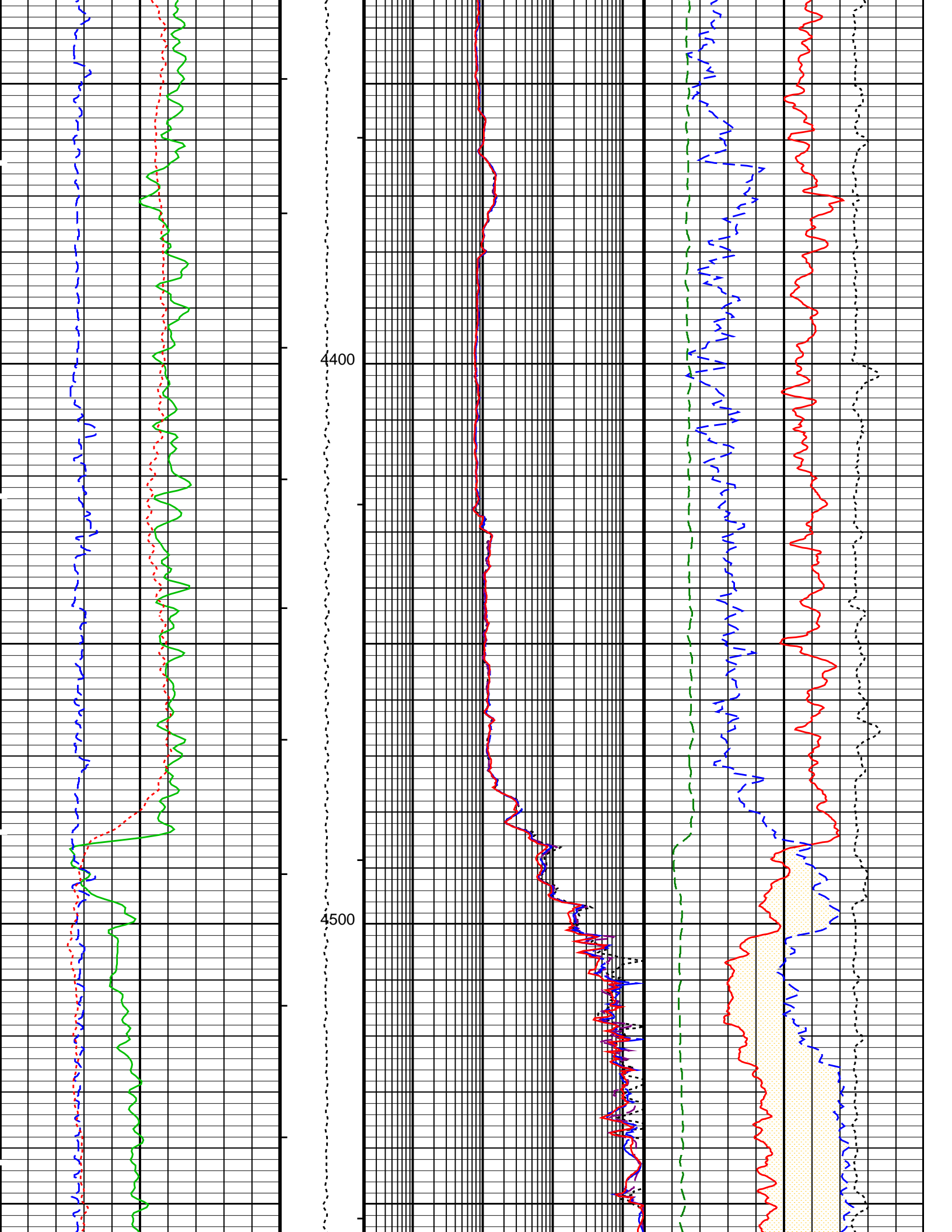


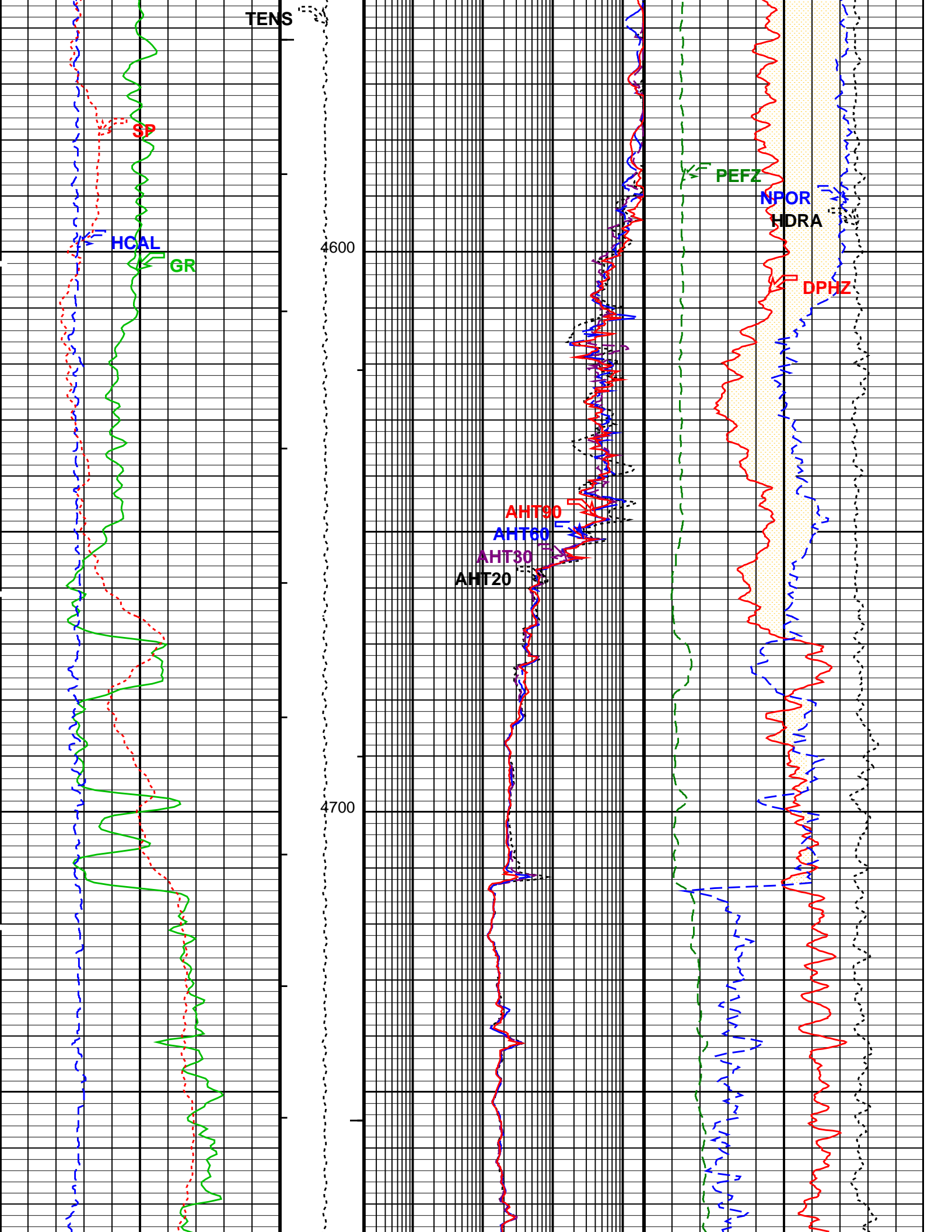


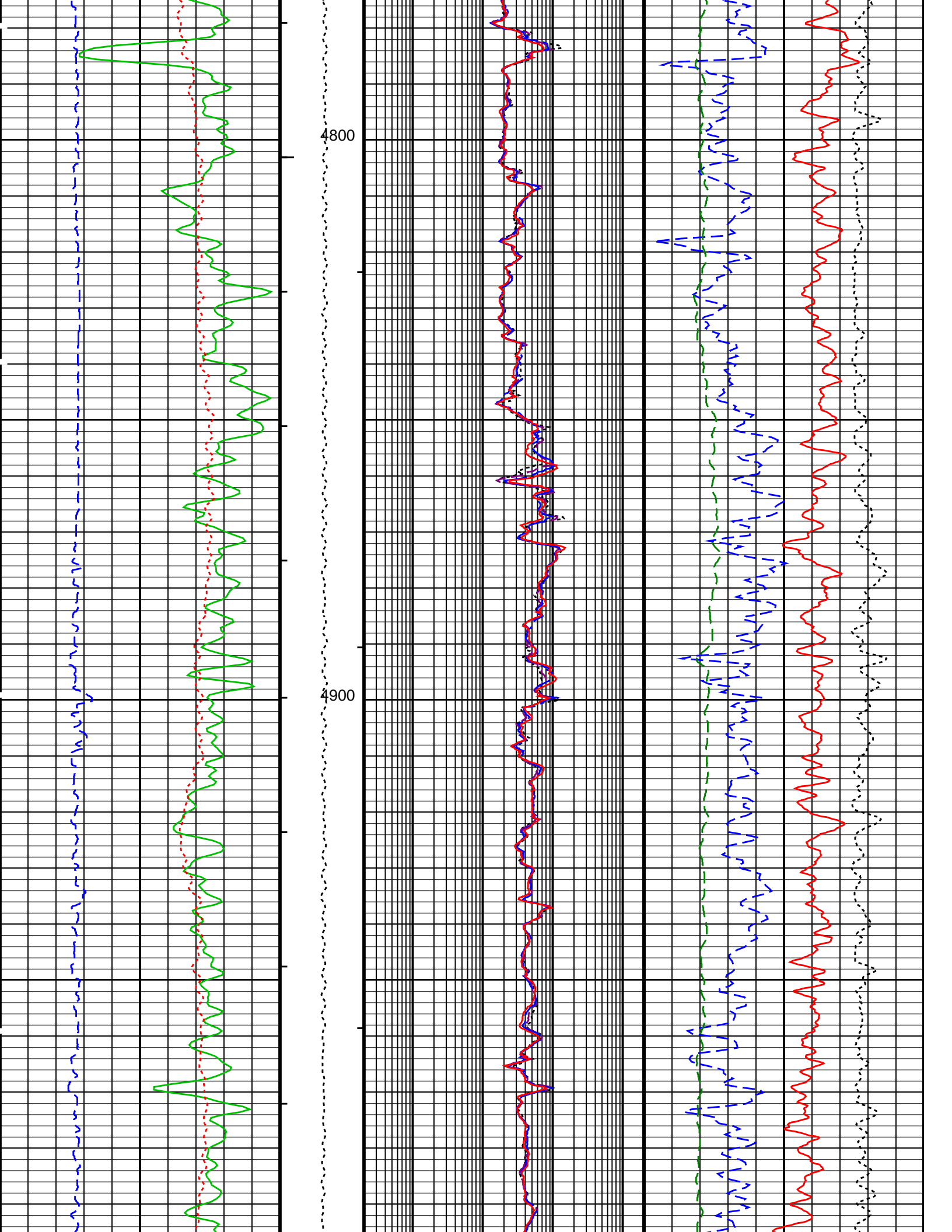


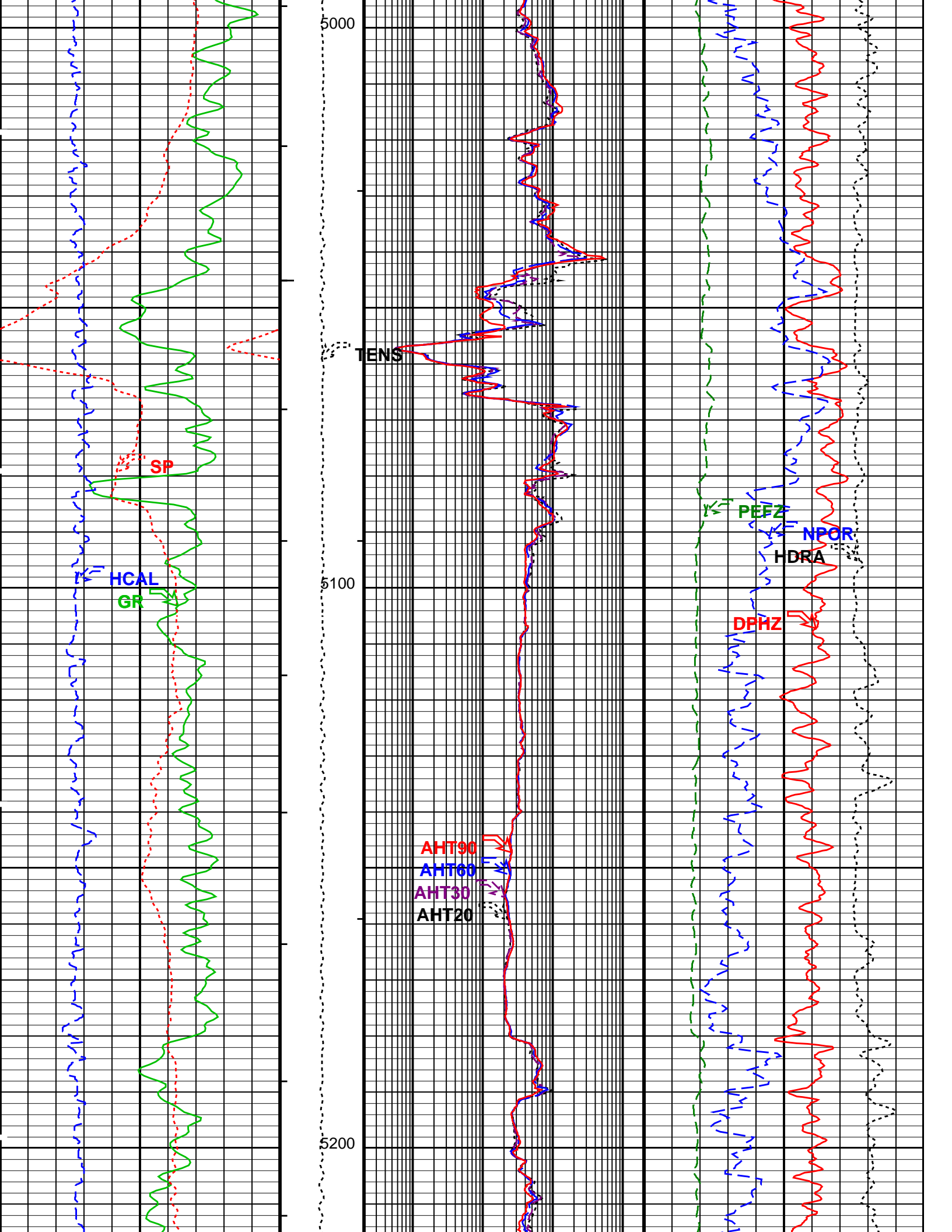


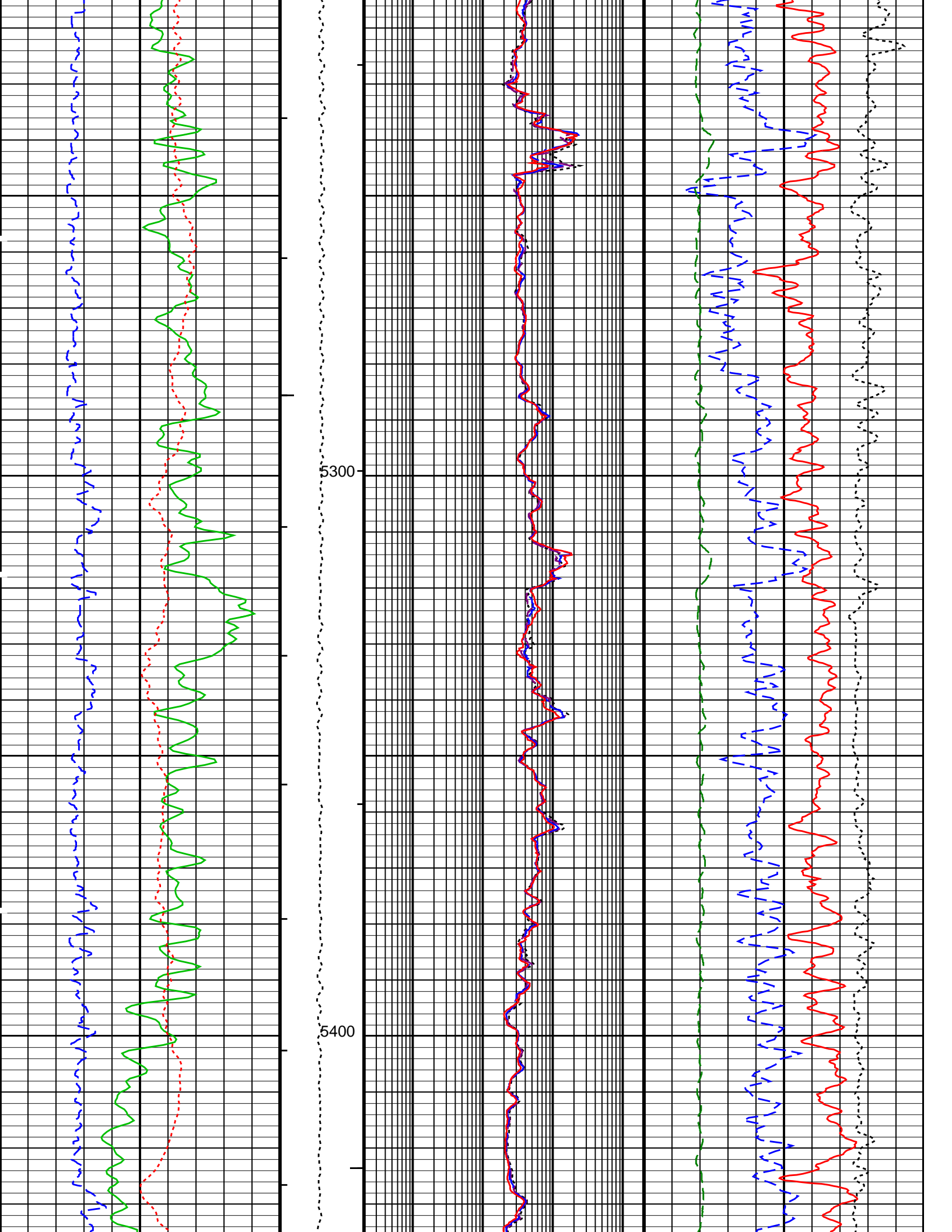


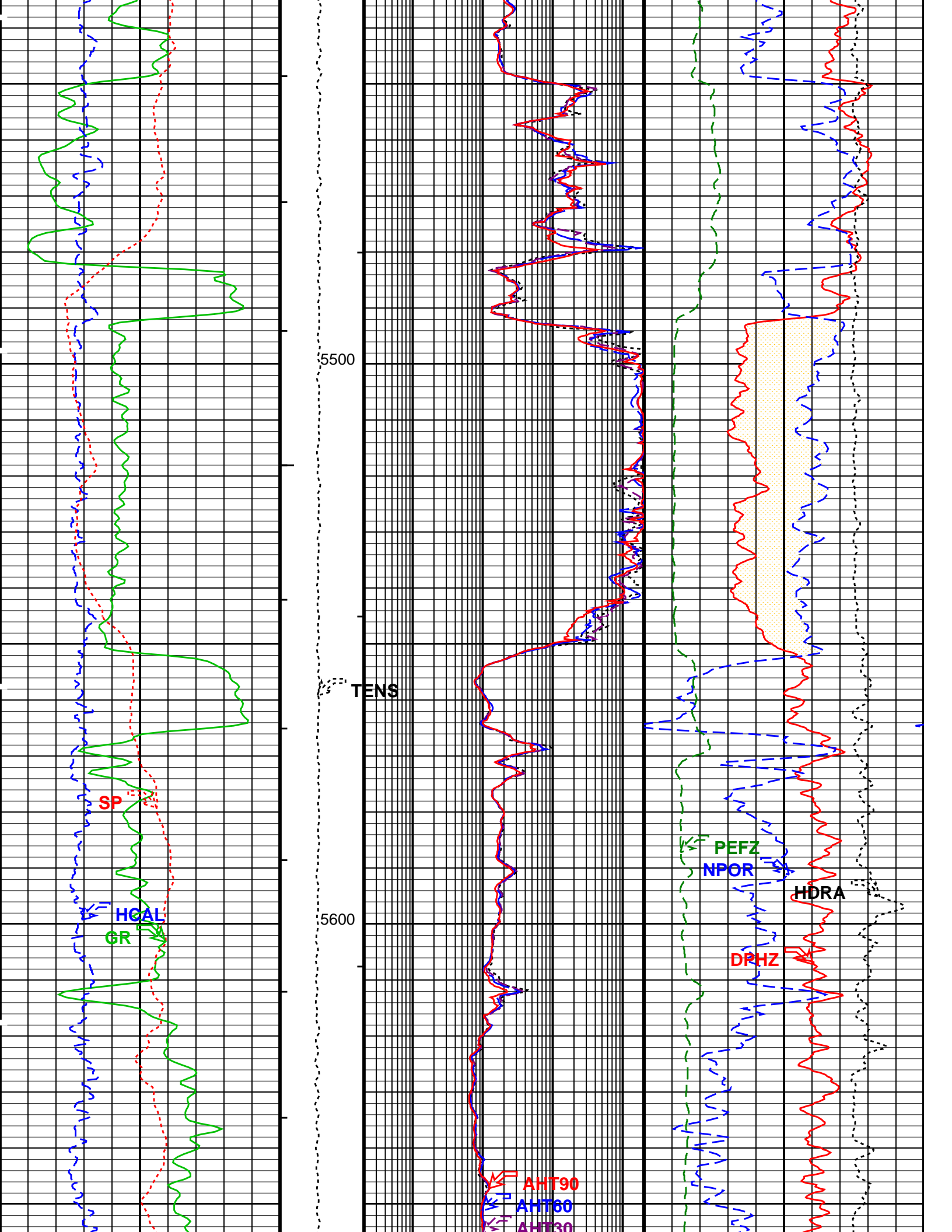


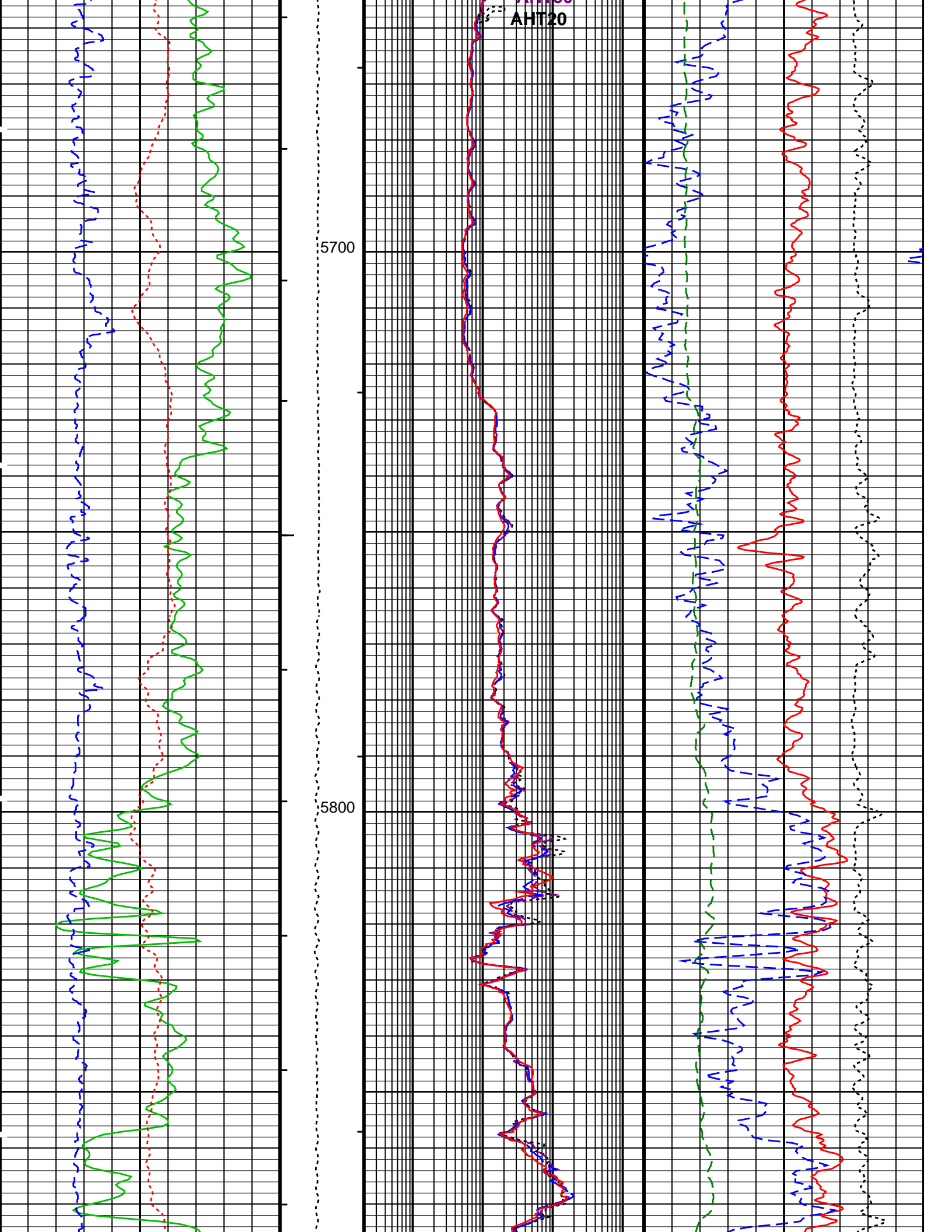


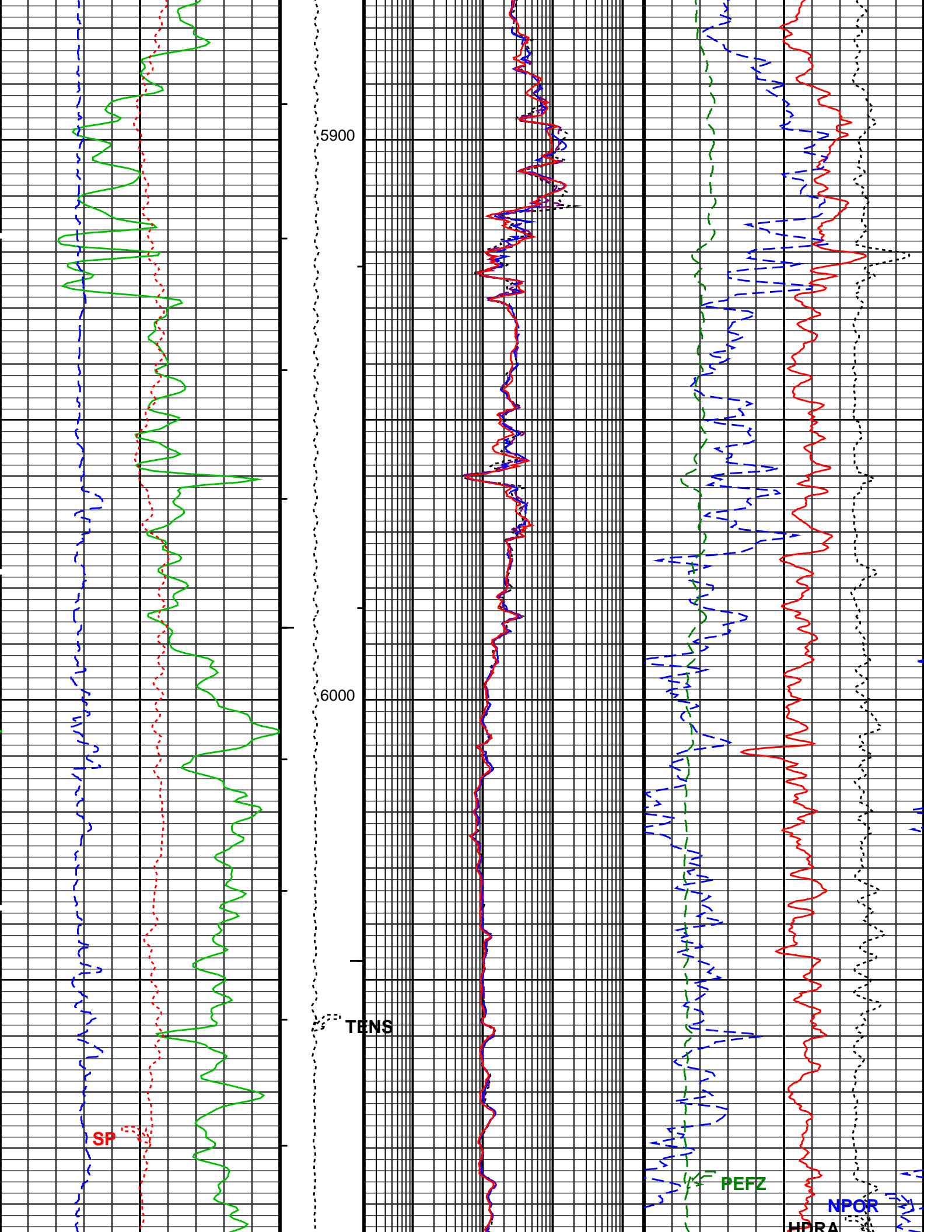


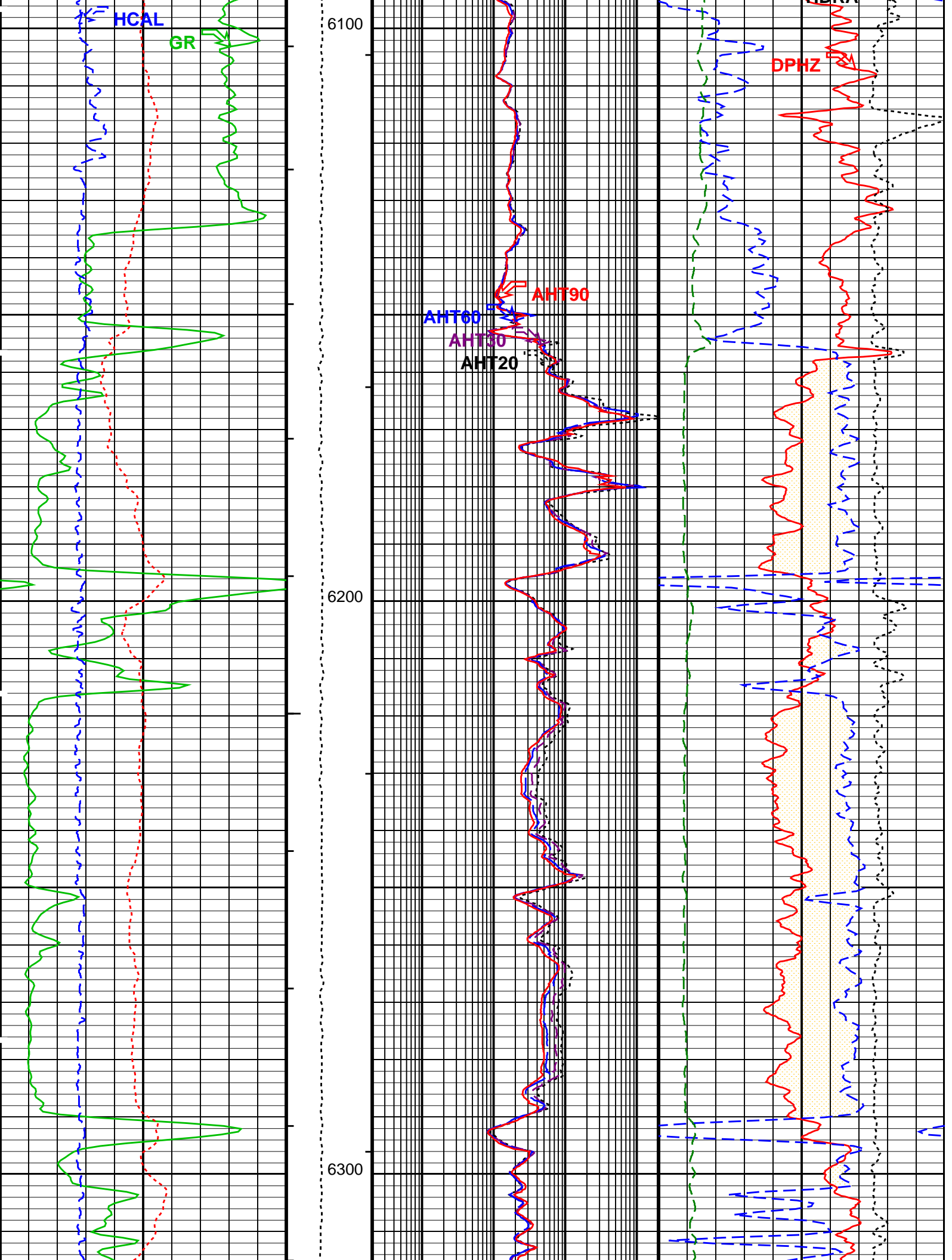


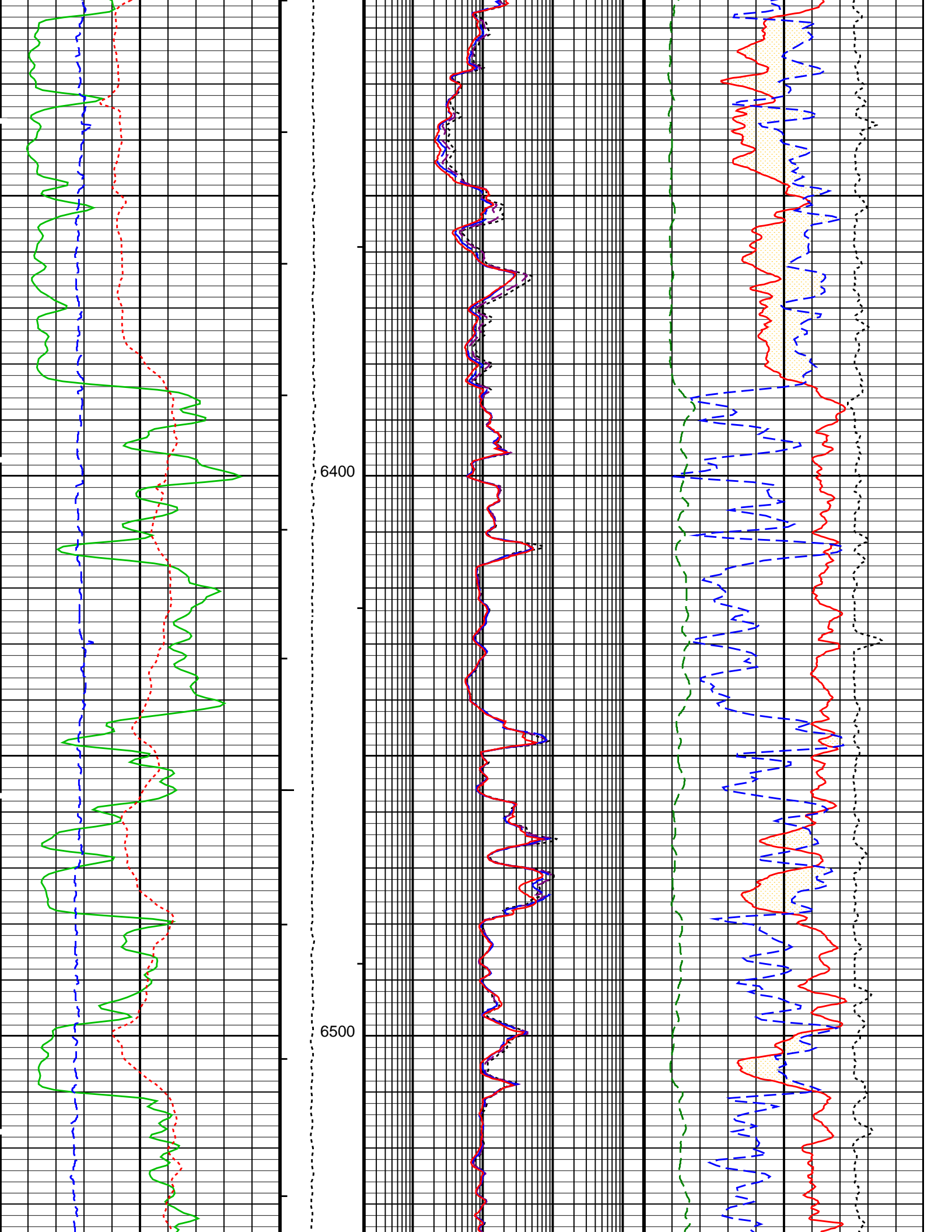


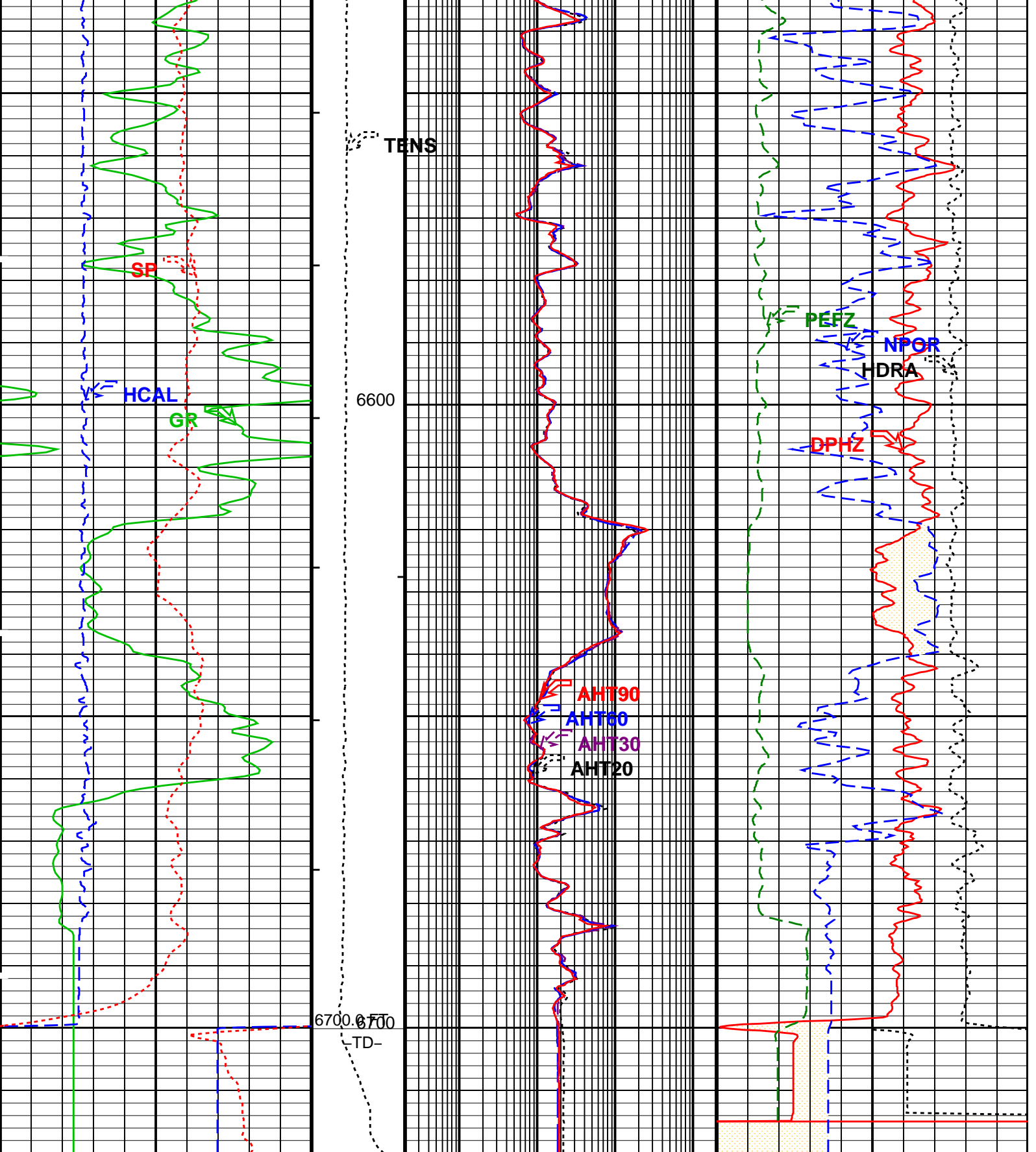












<p><b>Gamma Ray (GR)</b> (GAPI)</p> <p>0 200</p>	<p><b>Tension (TENS)</b> (LBF)</p> <p>5000 0</p>	<p><b>AIT-H 20 Inch Investigation (AHT20)</b> (OHMM)</p> <p>0.2 2000</p>	<p><b>Std. Res. Density Porosity (DPHZ)</b> (V/V)</p> <p>0.3 -0.1</p>
<p><b>HILT Caliper (HCAL)</b> (IN)</p> <p>6 16</p>		<p><b>AIT-H 30 Inch Investigation (AHT30)</b> (OHMM)</p> <p>0.2 2000</p>	<p><b>GAS</b> From DPHZ to NPOR</p>
<p><b>SP (SP)</b> (MV)</p> <p>-160 40</p>		<p><b>AIT-H 60 Inch Investigation (AHT60)</b> (OHMM)</p> <p>0.2 2000</p>	<p><b>Alpha Processed Neutron Porosity (NPOR)</b> (V/V)</p> <p>0.3 -0.1</p>

<b>AIT-H 90 Inch Investigation (AHT90)</b>		<b>Std. Res. Formation</b>	<b>Density Correction</b>
0.2	(OHMM)	2000	Pe (PEFZ) 10
		0	(HDRA) -0.25 (G/C3) 0.25

**PIP SUMMARY**

- ┆ Integrated Hole Volume Minor Pip Every 10 F3
- ┆ Integrated Hole Volume Major Pip Every 100 F3
  - ┆ Integrated Cement Volume Minor Pip Every 10 F3
  - ┆ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

AIT-H Answer Product Processing Summary. Data taken with Tool # 159 (AHTNO)

...Acquired data from HILT/HAIT

\*\*\*\*\* Borehole Correction \*\*\*\*\*

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)

Tool is run in ECCENTERED mode with a tool stand-off of 0.50 IN. Bit Size is 8.75 IN.

\*\*\*\*\* Input Selections to AIT-H Answer Product Processing \*\*\*\*\*

Caliper (GCSE): HCAL Mud Resistivity (GRSE): AHMF Temperature (GTSE): HTEM Porosity (FPHI): DPHZ

\*\*\*\*\* Other Parameters used by AIT-H Answer Product Processing \*\*\*\*\*

Form Factor Exponent (FEXP) 2.000 Form Factor Numerator (FNUM) 1.000  
 Mud Filtrate Sample Resistivity (RMFS) 29.390 OHMM Mud Filtrate Sample Temperature (MFST) 72.000 DEG F  
 Resistivity Connate Water (RW) 1.000 OHMM

\*\*\*\*\* AIT-H Answer Product Processing Control Parameters \*\*\*\*\*

Playback Mode: NORMAL

**Parameters**

DLIS Name	Description	Value
HILTB-FTB: High resolution Integrated Logging Tool-DTS		
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff
AHBHV	Array Induction Borehole Correction Code Version Number	900
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four
AHBLV	Array Induction Basic Logs Code Version Number	223
AHCDE	Array Induction Casing Detection Enable	Yes
AHCEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered
AHFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20
AHMRF	Array Induction Mud Resistivity Factor	1
AHORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20
AHRFV	Array Induction Radial Profiling Code Version Number	701
AHRPV	Array Induction Radial Parametrization Code Version Number	232
AHSTA	Array Induction Tool Standoff	0.5 IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20
BHFL	Borehole Fluid Type	OIL
BHFL_TLD	HILT Nuclear Mud Base	OIL
BHS	Borehole Status	OPEN
BHT	Bottom Hole Temperature (used in calculations)	195 DEG F
BSCO	Borehole Salinity Correction Option	NO
CCCO	Casing & Cement Thickness Correction Option	NO
DHC	Density Hole Correction	BS
FD	Fluid Density	1 G/C3
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	1
FSAL	Formation Salinity	-50000 PPM
FSCO	Formation Salinity Correction Option	NO
GCLF	Germany Coal-like Formation Option	NO
GCSE	Generalized Caliper Selection	HCAL
GDEV	Average Angular Deviation of Borehole from Normal	0 DEG
GGRD	Geothermal Gradient	0.01 DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST
GTSE	Generalized Temperature Selection	HSTS_HTEM
HSCO	Hole Size Correction Option	YES
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE
MCCO	Mud Cake Correction Option	NO
MCOR	Mud Correction	NATU
MDEN	Matrix Density	2.71 G/C3
MWCO	Mud Weight Correction Option	NO
NAAC	HRDD APS Activation Correction	OFF
NMT	HILT Nuclear Mud Type	NOBARITE
NPRM	HRDD Processing Mode	StdRes
NSAR	HRDD Depth Sampling Rate	1 IN
PTCO	Pressure/Temperature Correction Option	NO

SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	72	DEGF
SOCN	Standoff Distance	0.125	IN
SOCO	Standoff Correction Option	YES	
SPNV	SP Next Value	0	MV
<b>HOLEV: Integrated Hole/Cement Volume</b>			
BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	195	DEGF
FCD	Future Casing (Outer) Diameter	7	IN
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	72	DEGF
<b>STI: Stuck Tool Indicator</b>			
TDL	Total Depth - Logger	6700.00	FT
<b>System and Miscellaneous</b>			
BS	Bit Size	8.750	IN
BSAL	Borehole Salinity	10000.00	PPM
CSIZ	Current Casing Size	9.625	IN
CWEI	Casing Weight	36.00	LB/F
DFD	Drilling Fluid Density	8.00	LB/G
DO	Depth Offset for Playback	0.0	FT
FLEV	Fluid Level	0.00	FT
MST	Mud Sample Temperature	72.00	DEGF
PP	Playback Processing	NORMAL	
RMFS	Resistivity of Mud Filtrate Sample	29.3900	OHMM
TD	Total Depth	6700	FT

Format: TCOM\_5    Vertical Scale: 5" per 100'    Graphics File Created: 25-Oct-2008 03:39

**OP System Version: 16C0-147**  
MCM

HILTB-FTB	SRPC-3624-Q2_2008_OP16	GPIT-C	SRPC-3624-Q2_2008_OP16
DTC-H	16C0-147		

**Input DLIS Files**

DEFAULT	SPLICE_AIT_TLD_MCFL_016	FN:1	PRODUCER	25-Oct-2008 03:35	6720.0 FT	56.7 FT
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**Output DLIS Files**

DEFAULT	AIT_TLD_MCFL_CNL_017PUP	FN:15	PRODUCER	25-Oct-2008 03:39		
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**Repeat Section**

MAXIS Field Log

Company: Manzano LLC.    Well: Cougar #1

**Input DLIS Files**

HILTD .012	FN:11	25-Oct-2008 01:31	6721.0 FT	6372.3 FT
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**Output DLIS Files**

DEFAULT	AIT_TLD_MCFL_CNL_013LUP	FN:12	PRODUCER	25-Oct-2008 01:33		
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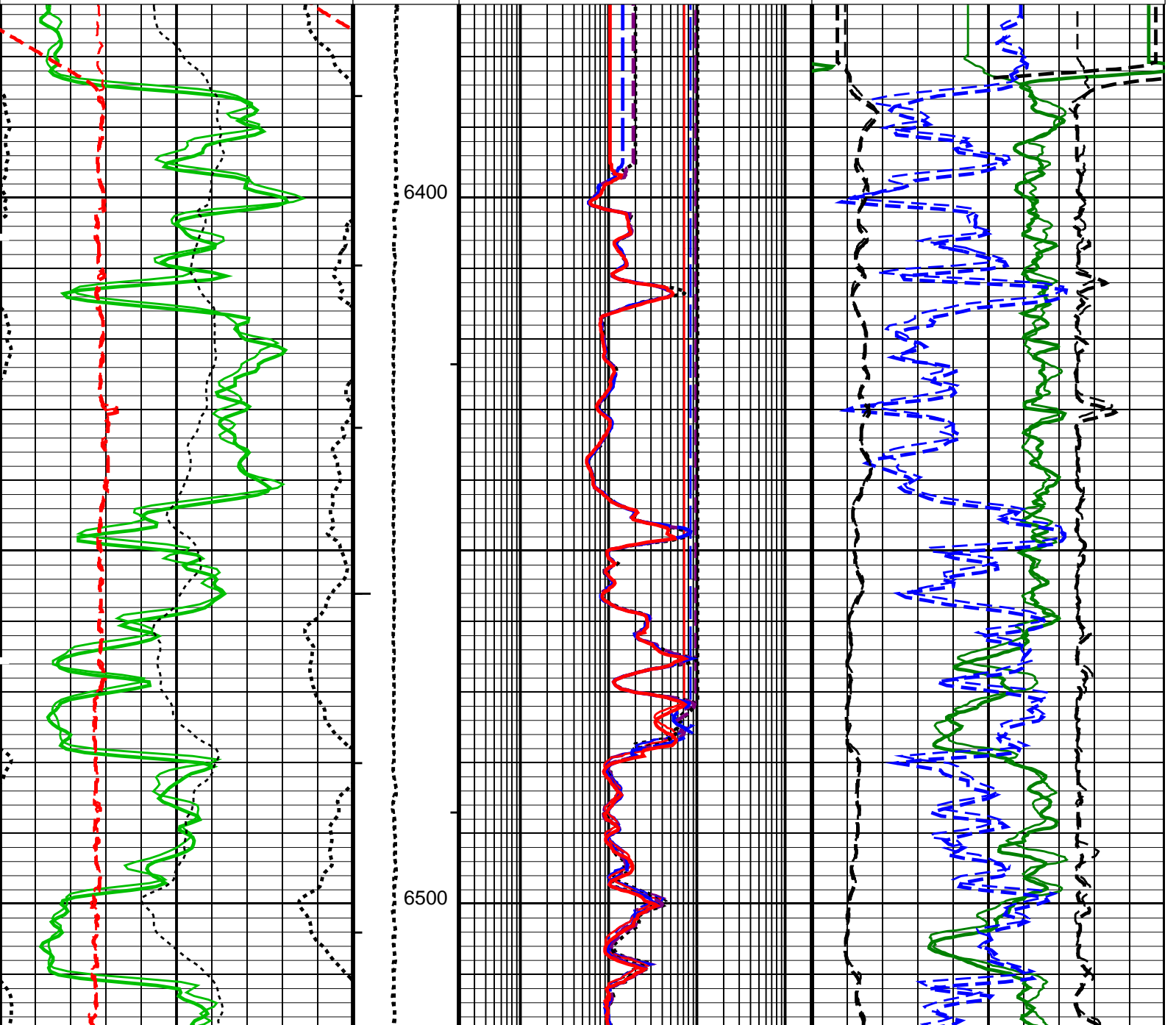
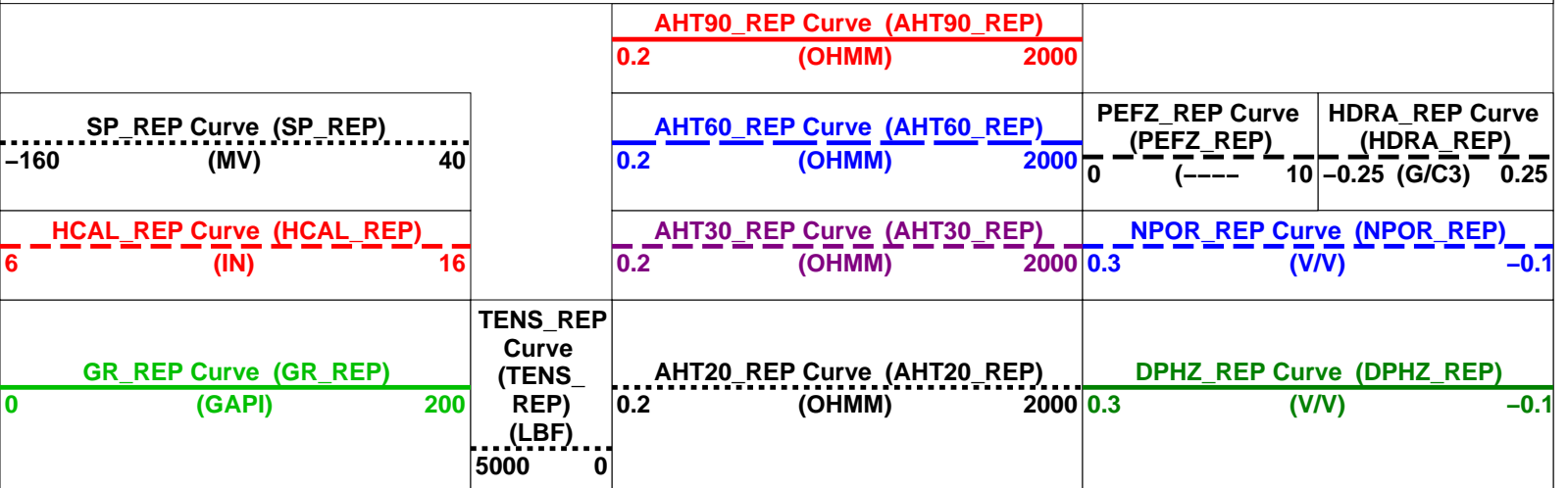
**OP System Version: 16C0-147**  
MCM

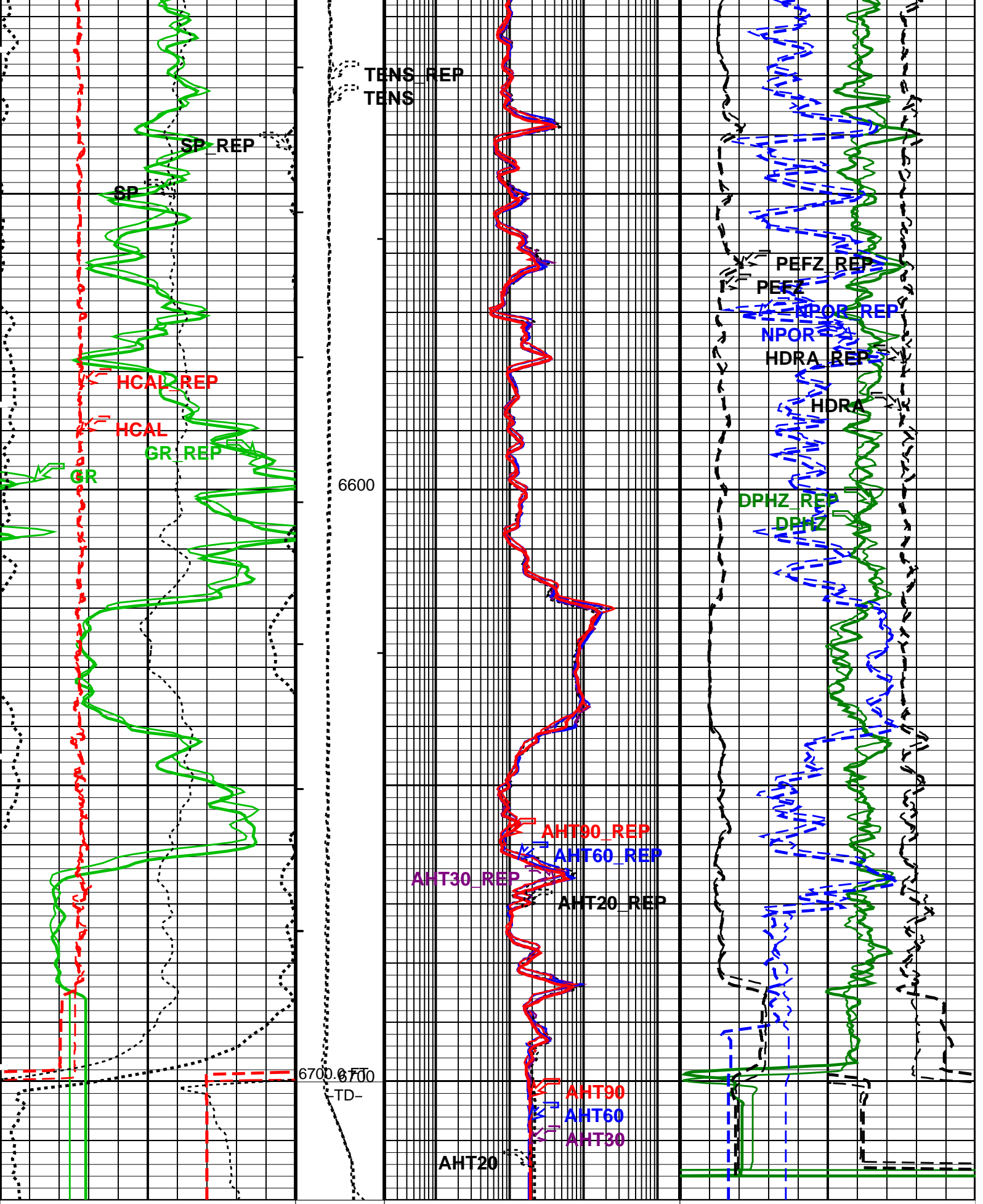
HILTB-FTB	SRPC-3624-Q2_2008_OP16	GPIT-C	SRPC-3624-Q2_2008_OP16
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PIP SUMMARY

- ┌ Integrated Hole Volume Minor Pip Every 10 F3
- ┌ Integrated Hole Volume Major Pip Every 100 F3
  - └ Integrated Cement Volume Minor Pip Every 10 F3
  - └ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S





<p>GR_REP Curve (GR_REP) (GAPI) 0 200</p>	<p>TENS_REP Curve (TENS_REP) (LBF)</p> <p>AHT20_REP Curve (AHT20_REP) (OHMM) 0.2 2000</p>	<p>DPHZ_REP Curve (DPHZ_REP) (V/V) 0.3 -0.1</p>
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5000			
<b>HCAL_REP Curve (HCAL_REP)</b> 6 (IN) 16	<b>AHT30_REP Curve (AHT30_REP)</b> 0.2 (OHMM) 2000	<b>NPOR_REP Curve (NPOR_REP)</b> 0.3 (V/V) -0.1	
<b>SP_REP Curve (SP_REP)</b> -160 (MV) 40	<b>AHT60_REP Curve (AHT60_REP)</b> 0.2 (OHMM) 2000	<b>PEFZ_REP Curve (PEFZ_REP)</b> 0 (----) 10	<b>HDRA_REP Curve (HDRA_REP)</b> -0.25 (G/C3) 0.25
	<b>AHT90_REP Curve (AHT90_REP)</b> 0.2 (OHMM) 2000		

**PIP SUMMARY**

- ┆ Integrated Hole Volume Minor Pip Every 10 F3
- ┆ Integrated Hole Volume Major Pip Every 100 F3
  - ┆ Integrated Cement Volume Minor Pip Every 10 F3
  - ┆ Integrated Cement Volume Major Pip Every 100 F3

Time Mark Every 60 S

AIT-H Answer Product Processing Summary. Data taken with Tool # 159 (AHTNO)

...Acquired data from HILT/HAIT

\*\*\*\*\* Borehole Correction \*\*\*\*\*

Effective Tool Standoff computed. Borehole diameter and mud res. taken as input (see GCSE and GRSE parameters)  
Tool is run in ECCENTERED mode with a tool stand-off of 0.50 IN. Bit Size is 8.75 IN.

\*\*\*\*\* Input Selections to AIT-H Answer Product Processing \*\*\*\*\*

Caliper (GCSE): HCAL Mud Resistivity (GRSE): AHMF Temperature (GTSE): HTEM Porosity (FPHI): DPHZ

\*\*\*\*\* Other Parameters used by AIT-H Answer Product Processing \*\*\*\*\*

Form Factor Exponent (FEXP) 2.000 Form Factor Numerator (FNUM) 1.000  
Mud Filtrate Sample Resistivity (RMFS) 29.390 OHMM Mud Filtrate Sample Temperature (MFST) 72.000 DEGF  
Resitivity Connate Water (RW) 1.000 OHMM

\*\*\*\*\* AIT-H Answer Product Processing Control Parameters \*\*\*\*\*

Playback Mode: NORMAL

**Parameters**

DLIS Name	Description	Value
HILTB-FTB: High resolution Integrated Logging Tool-DTS		
AHBHM	Array Induction Borehole Correction Mode	2_ComputeStandoff
AHBHV	Array Induction Borehole Correction Code Version Number	900
AHBLM	Array Induction Basic Logs Mode	6_One_Two_and_Four
AHBLV	Array Induction Basic Logs Code Version Number	223
AHCDE	Array Induction Casing Detection Enable	Yes
AHCEN	Array Induction Tool Centering Flag (in Borehole)	Eccentered
AHFRSV	Array Induction Response Set Version for Four ft Resolution	41.70.24.20
AHMRF	Array Induction Mud Resistivity Factor	1
AHORSV	Array Induction Response Set Version for One ft Resolution	41.70.24.20
AHRFV	Array Induction Radial Profiling Code Version Number	701
AHRPV	Array Induction Radial Parametrization Code Version Number	232
AHSTA	Array Induction Tool Standoff	0.5 IN
AHTRSV	Array Induction Response Set Version for Two ft Resolution	41.70.24.20
BHFL	Borehole Fluid Type	OIL
BHFL_TLD	HILT Nuclear Mud Base	OIL
BHS	Borehole Status	OPEN
BHT	Bottom Hole Temperature (used in calculations)	195 DEGF
BSCO	Borehole Salinity Correction Option	NO
CCCO	Casing & Cement Thickness Correction Option	NO
DHC	Density Hole Correction	BS
FD	Fluid Density	1 G/C3
FEXP	Form Factor Exponent	2
FNUM	Form Factor Numerator	1
FSAL	Formation Salinity	-50000 PPM
FSCO	Formation Salinity Correction Option	NO
GCLF	Germany Coal-like Formation Option	NO
GCSE	Generalized Caliper Selection	HCAL
GDEV	Average Angular Deviation of Borehole from Normal	0 DEG
GGRD	Geothermal Gradient	0.01 DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST
GTSE	Generalized Temperature Selection	HSTS_HTEM
HSCO	Hole Size Correction Option	YES
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE
MCCO	Mud Cake Correction Option	NO

MCOR	Mud Correction	NATU	
MDEN	Matrix Density	2.71	G/C3
MWCO	Mud Weight Correction Option	NO	
NAAC	HRDD APS Activation Correction	OFF	
NMT	HILT Nuclear Mud Type	NOBARITE	
NPRM	HRDD Processing Mode	StdRes	
NSAR	HRDD Depth Sampling Rate	1	IN
PTCO	Pressure/Temperature Correction Option	NO	
SDAT	Standoff Data Source	SOCN	
SHT	Surface Hole Temperature	72	DEGF
SOCN	Standoff Distance	0.125	IN
SOCO	Standoff Correction Option	YES	
SPNV	SP Next Value	0	MV
<b>HOLEV: Integrated Hole/Cement Volume</b>			
BHS	Borehole Status	OPEN	
BHT	Bottom Hole Temperature (used in calculations)	195	DEGF
FCD	Future Casing (Outer) Diameter	7	IN
GCSE	Generalized Caliper Selection	HCAL	
GDEV	Average Angular Deviation of Borehole from Normal	0	DEG
GGRD	Geothermal Gradient	0.01	DF/F
GRSE	Generalized Mud Resistivity Selection	AITH_RESIST	
GTSE	Generalized Temperature Selection	HSTS_HTEM	
HVCS	Integrated Hole Volume Caliper Selection	HCAL	
MATR	Rock Matrix for Neutron Porosity Corrections	LIMESTONE	
SHT	Surface Hole Temperature	72	DEGF
<b>STI: Stuck Tool Indicator</b>			
TDL	Total Depth - Logger	6700.00	FT
<b>System and Miscellaneous</b>			
BS	Bit Size	8.750	IN
BSAL	Borehole Salinity	10000.00	PPM
CSIZ	Current Casing Size	9.625	IN
CWEI	Casing Weight	36.00	LB/F
DFD	Drilling Fluid Density	8.00	LB/G
DORL	Depth Offset for Repeat Analysis	0.0	FT
FLEV	Fluid Level	0.00	FT
MST	Mud Sample Temperature	72.00	DEGF
RMFS	Resistivity of Mud Filtrate Sample	29.3900	OHMM
TD	Total Depth	6700	FT

Format: TCOM\_5\_REP    Vertical Scale: 5" per 100'    Graphics File Created: 25-Oct-2008 01:33

**OP System Version: 16C0-147**  
MCM

HILTB-FTB      SRPC-3624-Q2\_2008\_OP16      GPIT-C      SRPC-3624-Q2\_2008\_OP16  
DTC-H      16C0-147

**Input DLIS Files**

HILTD .012      FN:11      25-Oct-2008 01:31      6721.0 FT      6372.3 FT

**Output DLIS Files**

DEFAULT      AIT\_TLD\_MCFL\_CNL\_013LUP      FN:12      PRODUCER      25-Oct-2008 01:33



**Calibrations**

MAXIS Field Log

Calibration and Check Summary

Measurement	Nominal	Master	Before	After	Change	Limit	Units
-------------	---------	--------	--------	-------	--------	-------	-------

Thru Cal Magnitude - 0	0	0.6237	0.6276	N/A	N/A	N/A	V
Thru Cal Magnitude - 1	0	1.282	1.290	N/A	N/A	N/A	V
Thru Cal Magnitude - 2	0	0.6340	0.6381	N/A	N/A	N/A	V
Thru Cal Magnitude - 3	0	0.7181	0.7226	N/A	N/A	N/A	V
Thru Cal Magnitude - 4	0	1.344	1.352	N/A	N/A	N/A	V
Thru Cal Magnitude - 5	0	1.950	1.962	N/A	N/A	N/A	V
Thru Cal Magnitude - 6	0	1.951	1.964	N/A	N/A	N/A	V
Thru Cal Magnitude - 7	0	1.394	1.402	N/A	N/A	N/A	V
Phase - 0	0	56.20	55.90	N/A	N/A	N/A	DEG
Phase - 1	0	55.09	54.78	N/A	N/A	N/A	DEG
Phase - 2	0	51.35	51.03	N/A	N/A	N/A	DEG
Phase - 3	0	50.55	50.24	N/A	N/A	N/A	DEG
Phase - 4	0	44.22	43.89	N/A	N/A	N/A	DEG
Phase - 5	0	42.26	41.92	N/A	N/A	N/A	DEG
Phase - 6	0	42.23	41.89	N/A	N/A	N/A	DEG
Phase - 7	0	38.26	37.85	N/A	N/A	N/A	DEG

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Electronics Calibration Check - Auxilliary

Master: 16-Oct-2008 12:44 Before: 24-Oct-2008 14:53

Array Induction SPA Plus	990.5	993.7	993.6	N/A	N/A	N/A	MV
Array Induction SPA Zero	0	-0.2916	-0.3043	N/A	N/A	N/A	MV
Array Induction Temperature PI	0.9150	0.9206	0.9205	N/A	N/A	N/A	V
Array Induction Temperature Ze	0	-0.0002946	-0.0003001	N/A	N/A	N/A	V

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Test Loop Gain Correction

Master: 16-Oct-2008 12:44

Test Loop Gain Magnitude - 0	0	1.009	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 1	0	1.009	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 2	0	1.010	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 3	0	1.008	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 4	0	1.014	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 5	0	0.9844	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 6	0	0.9939	N/A	N/A	N/A	N/A	V
Test Loop Gain Magnitude - 7	0	1.003	N/A	N/A	N/A	N/A	V
Phase - 0	0	0.1281	N/A	N/A	N/A	N/A	DEG
Phase - 1	0	0.6843	N/A	N/A	N/A	N/A	DEG
Phase - 2	0	0.07216	N/A	N/A	N/A	N/A	DEG
Phase - 3	0	0.02622	N/A	N/A	N/A	N/A	DEG
Phase - 4	0	-0.003229	N/A	N/A	N/A	N/A	DEG
Phase - 5	0	-0.1930	N/A	N/A	N/A	N/A	DEG
Phase - 6	0	0.1945	N/A	N/A	N/A	N/A	DEG
Phase - 7	0	-0.2913	N/A	N/A	N/A	N/A	DEG

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Sonde Error Correction

Master: 16-Oct-2008 12:44

R Sonde Error Correction - 0	0	-108.0	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 1	0	162.8	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 2	0	112.3	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 3	0	64.95	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 4	0	29.10	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 5	0	11.91	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 6	0	9.717	N/A	N/A	N/A	N/A	MM/M
R Sonde Error Correction - 7	0	-2.818	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 0	0	51.34	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 1	0	-34.97	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 2	0	-116.0	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 3	0	-45.05	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 4	0	-35.56	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 5	0	1.613	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 6	0	5.644	N/A	N/A	N/A	N/A	MM/M
X Sonde Error Correction - 7	0	6.081	N/A	N/A	N/A	N/A	MM/M

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Mud Gain Correction

Master: 16-Oct-2008 12:44

Coarse - Mag, Real, Imag - 0	0	1.140	N/A	N/A	N/A	N/A	
Coarse - Mag, Real, Imag - 1	0	1.140	N/A	N/A	N/A	N/A	
Coarse - Mag, Real, Imag - 2	0	1.140	N/A	N/A	N/A	N/A	
Fine - Mag, Real, Imag - 0	0	1.140	N/A	N/A	N/A	N/A	
Fine - Mag, Real, Imag - 1	0	1.140	N/A	N/A	N/A	N/A	
Fine - Mag, Real, Imag - 2	0	1.140	N/A	N/A	N/A	N/A	

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Stab Measurement Summary

Before: 24-Oct-2008 14:52

BS Window Ratio	0.7386	N/A	0.7385	N/A	N/A	N/A	
BS Window Sum	10530	N/A	10530	N/A	N/A	N/A	CPS
SS Window Ratio	0.4913	N/A	0.4927	N/A	N/A	N/A	
SS Window Sum	9427	N/A	9444	N/A	N/A	N/A	CPS
LS Window Ratio	0.2969	N/A	0.3025	N/A	N/A	N/A	
LS Window Sum	1047	N/A	1048	N/A	N/A	N/A	CPS

High resolution Integrated Logging Tool-DTS Wellsite Calibration - Photo-multiplier High Voltages Calibrations

Before: 24 Oct 2008 14:52

Before: 24-Oct-2008 14:52	BS PM High Voltage (Command)	1727	N/A	1742	N/A	N/A	N/A	V
	SS PM High Voltage (Command)	1360	N/A	1370	N/A	N/A	N/A	V
	LS PM High Voltage (Command)	1743	N/A	1746	N/A	N/A	N/A	V
High resolution Integrated Logging Tool-DTS Wellsite Calibration – Crystal Quality Resolutions Calibration								
Before: 24-Oct-2008 14:52								
	BS Crystal Resolution	11.43	N/A	11.43	N/A	N/A	N/A	%
	SS Crystal Resolution	8.414	N/A	8.501	N/A	N/A	N/A	%
	LS Crystal Resolution	9.013	N/A	8.915	N/A	N/A	N/A	%
High resolution Integrated Logging Tool-DTS Wellsite Calibration – MCFL Calibration								
Before: 24-Oct-2008 14:53								
	Raw B0 Resistivity	3875	N/A	3870	N/A	N/A	N/A	OHMM
	Raw B1 Resistivity	3830	N/A	3826	N/A	N/A	N/A	OHMM
	Raw B2 Resistivity	3830	N/A	3831	N/A	N/A	N/A	OHMM
High resolution Integrated Logging Tool-DTS Wellsite Calibration – HILT Caliper Calibration								
Before: 24-Oct-2008 14:55								
	HILT Caliper Zero Measurement	8.000	N/A	8.288	N/A	N/A	N/A	IN
	HILT Caliper Plus Measurement	12.00	N/A	12.43	N/A	N/A	N/A	IN
High resolution Integrated Logging Tool-DTS Wellsite Calibration – Detector Calibration								
Before: 24-Oct-2008 14:51								
	Gamma Ray Background	30.00	N/A	47.49	N/A	N/A	N/A	GAPI
	Gamma Ray (Jig – Bkg)	165.9	N/A	165.9	N/A	N/A	15.08	GAPI
	Gamma Ray (Calibrated)	160.0	N/A	160.0	N/A	N/A	15.00	GAPI
High resolution Integrated Logging Tool-DTS Wellsite Calibration – Zero Measurement								
Master: 12-Aug-2008 15:47 Before: 24-Oct-2008 14:52								
	CNTC Background	26.01	26.01	25.72	N/A	N/A	3.902	CPS
	CFTC Background	28.65	28.65	30.47	N/A	N/A	4.298	CPS
High resolution Integrated Logging Tool-DTS Wellsite Calibration – Ratio Measurement								
Master: 12-Aug-2008 15:47								
	Thermal Near Corr. (Tank)	5800	5256	N/A	N/A	N/A	N/A	CPS
	Thermal Far Corr. (Tank)	2400	2234	N/A	N/A	N/A	N/A	CPS
	CNTC/CFTC (Tank)	2.159	2.353	N/A	N/A	N/A	N/A	
High resolution Integrated Logging Tool-DTS Wellsite Calibration – Accelerometer Calibration								
Before: 25-Oct-2008 0:34								
	Z-Axis Acceleration	32.19	N/A	32.39	N/A	N/A	N/A	F/S2
General Purpose Inclinator Wellsite Calibration – CROUZET ACCELEROMETER PROM HAS BEEN READ CORRECTLY								
Before: 25-Oct-2008 0:33								
	TEMPERATURE REFERENCE :	N/A	N/A	68	N/A	N/A	N/A	DEGF
	YEAR OF CALIBRATION :	N/A	N/A	97	N/A	N/A	N/A	
	MONTH OF CALIBRATION :	N/A	N/A	5	N/A	N/A	N/A	
	SERIAL NUMBER :	N/A	N/A	612	N/A	N/A	N/A	
General Purpose Inclinator Wellsite Calibration – CROUZET MAGNETOMETER PROM HAS BEEN READ CORRECTLY								
Before: 25-Oct-2008 0:33								
	TEMPERATURE REFERENCE :	N/A	N/A	70	N/A	N/A	N/A	DEGF
	YEAR OF CALIBRATION :	N/A	N/A	7	N/A	N/A	N/A	
	MONTH OF CALIBRATION :	N/A	N/A	9	N/A	N/A	N/A	
	SERIAL NUMBER :	N/A	N/A	788	N/A	N/A	N/A	

Density Master Calibration is obsolete !

The GLS-VJ source activity is acceptable.

The HGNS Neutron Master Calibration was done with the following parameters :

NCT-B Water Temperature 75.0 DEGF.  
 Thermal Housing Size 3.375 IN.  
 NSR-F serial number 5070

#### High resolution Integrated Logging Tool-DTS / Equipment Identification

##### Primary Equipment:

Array Induction Tool – H	AIT – H	
Rm/SP Bottom Nose	AHRM – A	
Array Induction Sonde	AHIS – BA	159
HILT high-Resolution Mechanical Sonde	HRMS – B	1914
HILT Rxo Gamma-ray Device	HRGD – B	930
HILT Micro Cylindrically Focused Log Dev	MCFL –	
SP	SP	1000

Auxiliary Equipment:

High resolution Integrated Logging Tool-DTS Wellsite Calibration							
Electronics Calibration Check - Thru Cal Mag. & Phase							
Idx	Phase	Value	Thru Cal Magnitude V	Nominal	Value	Phase DEG	Nominal
0	Master	0.6237		0.6050	56.20		71.00
	Before	0.6276			55.90		
1	Master	1.282		1.270	55.09		70.00
	Before	1.290			54.78		
2	Master	0.6340		0.6230	51.35		66.00
	Before	0.6381			51.03		
3	Master	0.7181		0.7040	50.55		65.00
	Before	0.7226			50.24		
4	Master	1.344		1.337	44.22		59.00
	Before	1.352			43.89		
5	Master	1.950		1.955	42.26		57.00
	Before	1.962			41.92		
6	Master	1.951		1.955	42.23		57.00
	Before	1.964			41.89		
7	Master	1.394		1.415	38.26		53.00
	Before	1.402			37.85		
		60.00 % (Minimum)	(Nominal)	140.0 % (Maximum)	Nom -60.00 (Minimum)	(Nominal)	Nom + 60.00 (Maximum)
Master: 16-Oct-2008 12:44				Before: 24-Oct-2008 14:53			

High resolution Integrated Logging Tool-DTS Wellsite Calibration					
Electronics Calibration Check - Auxilliary					
Phase	Array Induction SPA Plus MV	Value	Phase	Array Induction SPA Zero MV	Value
Master		993.7	Master		-0.2916
Before		993.6	Before		-0.3043
941.0 (Minimum)		990.5 (Nominal)	1040 (Maximum)	-50.00 (Minimum)    0 (Nominal)    50.00 (Maximum)	
Phase	Array Induction Temperature Plus V	Value	Phase	Array Induction Temperature Zero V	Value
Master		0.9206	Master		-0.0002946
Before		0.9205	Before		-0.0003001
0.8700 (Minimum)		0.9150 (Nominal)	0.9600 (Maximum)	-0.05000 (Minimum)    0 (Nominal)    0.05000 (Maximum)	
Master: 16-Oct-2008 12:44			Before: 24-Oct-2008 14:53		

High resolution Integrated Logging Tool-DTS Wellsite Calibration						
Test Loop Gain Correction						
Idx	Value	Test Loop Gain Magnitude V	Value	Phase DEG		
0	1.009		0.1281			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)    0 (Nominal)    3.000 (Maximum)	
1	1.009		0.6843			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)    0 (Nominal)    3.000 (Maximum)	
2	1.010		0.07216			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)    0 (Nominal)    3.000 (Maximum)	
3	1.008		0.02622			
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)    0 (Nominal)    3.000 (Maximum)	

4	1.014	0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-0.003229 (Minimum)	0 (Nominal)	3.000 (Maximum)
5	0.9844				-0.1930		
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
6	0.9939				0.1945		
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)
7	1.003				-0.2913		
		0.9500 (Minimum)	1.000 (Nominal)	1.050 (Maximum)	-3.000 (Minimum)	0 (Nominal)	3.000 (Maximum)

Master: 16-Oct-2008 12:44

High resolution Integrated Logging Tool-DTS Wellsite Calibration							
Sonde Error Correction							
Idx	Value	R Sonde Error Correction MM/M			Value	X Sonde Error Correction MM/M	
0	-108.0				51.34		
		-231.0 (Minimum)	-56.00 (Nominal)	119.0 (Maximum)	-2250 (Minimum)	0 (Nominal)	2250 (Maximum)
1	162.8				-34.97		
		114.0 (Minimum)	159.0 (Nominal)	204.0 (Maximum)	-625.0 (Minimum)	0 (Nominal)	625.0 (Maximum)
2	112.3				-116.0		
		66.00 (Minimum)	111.0 (Nominal)	156.0 (Maximum)	-350.0 (Minimum)	0 (Nominal)	350.0 (Maximum)
3	64.95				-45.05		
		39.00 (Minimum)	64.00 (Nominal)	89.00 (Maximum)	-250.0 (Minimum)	0 (Nominal)	250.0 (Maximum)
4	29.10				-35.56		
		15.00 (Minimum)	25.00 (Nominal)	35.00 (Maximum)	-63.00 (Minimum)	0 (Nominal)	63.00 (Maximum)
5	11.91				1.613		
		4.000 (Minimum)	14.00 (Nominal)	24.00 (Maximum)	-50.00 (Minimum)	0 (Nominal)	50.00 (Maximum)
6	9.717				5.644		
		5.000 (Minimum)	10.00 (Nominal)	15.00 (Maximum)	-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)
7	-2.818				6.081		
		-5.000 (Minimum)	0 (Nominal)	5.000 (Maximum)	-30.00 (Minimum)	0 (Nominal)	30.00 (Maximum)

Master: 16-Oct-2008 12:44

High resolution Integrated Logging Tool-DTS Wellsite Calibration							
Mud Gain Correction							
Idx	Value	Coarse - Mag, Real, Imag			Value	Fine - Mag, Real, Imag	
0	1.140				1.140		
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
1	1.140				1.140		
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)
2	1.140				1.140		
		0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)	0.8000 (Minimum)	1.000 (Nominal)	1.200 (Maximum)

Master: 16-Oct-2008 12:44

High resolution Integrated Logging Tool-DTS Wellsite Calibration														
Stab Measurement Summary														
Phase	BS Window Ratio			Value	Phase	SS Window Ratio			Value	Phase	LS Window Ratio			Value
Before				0.7385	Before				0.4927	Before				0.3025
	0.7017 (Minimum)	0.7386 (Nominal)	0.7756 (Maximum)			0.4668 (Minimum)	0.4913 (Nominal)	0.5159 (Maximum)			0.2821 (Minimum)	0.2969 (Nominal)	0.3118 (Maximum)	
Phase	BS Window Sum CPS			Value	Phase	SS Window Sum CPS			Value	Phase	LS Window Sum CPS			Value
Before				10530	Before				9444	Before				1048
	10000	10530	11050			8955	9427	9898			9914	1047	1098	

10000 (Minimum)	10500 (Nominal)	11000 (Maximum)	9300 (Minimum)	9427 (Nominal)	9550 (Maximum)	934.4 (Minimum)	1047 (Nominal)	1099 (Maximum)
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Before: 24-Oct-2008 14:52

High resolution Integrated Logging Tool-DTS Wellsite Calibration											
Photo-multiplier High Voltages Calibrations											
Phase	BS PM High Voltage (Command) V		Value	Phase	SS PM High Voltage (Command) V		Value	Phase	LS PM High Voltage (Command) V		Value
Before			1742	Before			1370	Before			1746
	1627 (Minimum)	1727 (Nominal)	1827 (Maximum)		1260 (Minimum)	1360 (Nominal)	1460 (Maximum)		1643 (Minimum)	1743 (Nominal)	1843 (Maximum)

Before: 24-Oct-2008 14:52

High resolution Integrated Logging Tool-DTS Wellsite Calibration											
Crystal Quality Resolutions Calibration											
Phase	BS Crystal Resolution %		Value	Phase	SS Crystal Resolution %		Value	Phase	LS Crystal Resolution %		Value
Before			11.43	Before			8.501	Before			8.915
	10.43 (Minimum)	11.43 (Nominal)	12.43 (Maximum)		7.414 (Minimum)	8.414 (Nominal)	9.414 (Maximum)		8.013 (Minimum)	9.013 (Nominal)	10.01 (Maximum)

Before: 24-Oct-2008 14:52

High resolution Integrated Logging Tool-DTS Wellsite Calibration											
MCFL Calibration											
Phase	Raw B0 Resistivity OHMM		Value	Phase	Raw B1 Resistivity OHMM		Value	Phase	Raw B2 Resistivity OHMM		Value
Before			3870	Before			3826	Before			3831
	3565 (Minimum)	3875 (Nominal)	4185 (Maximum)		3524 (Minimum)	3830 (Nominal)	4136 (Maximum)		3524 (Minimum)	3830 (Nominal)	4136 (Maximum)

Before: 24-Oct-2008 14:53

High resolution Integrated Logging Tool-DTS Wellsite Calibration							
HILT Caliper Calibration							
Phase	HILT Caliper Zero Measurement IN		Value	Phase	HILT Caliper Plus Measurement IN		Value
Before			8.288	Before			12.43
	6.000 (Minimum)	8.000 (Nominal)	10.00 (Maximum)		9.000 (Minimum)	12.00 (Nominal)	15.00 (Maximum)

Before: 24-Oct-2008 14:55

High resolution Integrated Logging Tool-DTS Wellsite Calibration											
Detector Calibration											
Phase	Gamma Ray Background GAPI		Value	Phase	Gamma Ray (Jig - Bkg) GAPI		Value	Phase	Gamma Ray (Calibrated) GAPI		Value
Before			47.49	Before			165.9	Before			160.0
	0 (Minimum)	30.00 (Nominal)	120.0 (Maximum)		150.8 (Minimum)	165.9 (Nominal)	181.0 (Maximum)		145.0 (Minimum)	160.0 (Nominal)	175.0 (Maximum)

Before: 24-Oct-2008 14:51

High resolution Integrated Logging Tool-DTS Wellsite Calibration							
Zero Measurement							
Phase	CNTC Background CPS		Value	Phase	CFTC Background CPS		Value
Master			26.01	Master			28.65
Before			25.72	Before			30.47
	5.000 (Minimum)	26.01 (Nominal)	40.00 (Maximum)		5.000 (Minimum)	28.65 (Nominal)	40.00 (Maximum)

Master: 12-Aug-2008 15:47      Before: 24-Oct-2008 14:52

High resolution Integrated Logging Tool-DTS Wellsite Calibration											
Ratio Measurement											
Phase	Thermal Near Corr. (Tank) CPS		Value	Phase	Thermal Far Corr. (Tank) CPS		Value	Phase	CNTC/CFTC (Tank)		Value
Master			5256	Master			2234	Master			2.353
	4700 (Minimum)	5800 (Nominal)	6900 (Maximum)		1900 (Minimum)	2400 (Nominal)	2900 (Maximum)		2.120 (Minimum)	2.159 (Nominal)	2.540 (Maximum)

Master: 12-Aug-2008 15:47

High resolution Integrated Logging Tool-DTS Wellsite Calibration		
Accelerometer Calibration		
Phase	Z-Axis Acceleration F/S2	Value
Before		23.20

