

Company: North East Natural Energy LLC

Well: Boggress 17H

Field: Wildcat

County: Monongalia State: West Virginia

HOSTILE NATURAL GAMMA SPECTROSCOPY

GAMMA RAY / CALIPER

County:	Monongalia		
Field:	Wildcat		
Location:	Lat and Long:		
Well:	Boggress 17H		
Company:	North East Natural Energy LLC		
		Lat and Long:	Elev.:
		39:40:12.6 N	K.B. 1296.00 ft
		80:5:35.8 W	G.L. 1268.00 ft
			D.F. 1296.00 ft
		Permanent Datum:	Ground Level
		Log Measured From:	Kelly Bushing
		Drilling Measured From:	Kelly Bushing
		API Serial No.	District
		47-061-01812-00-00	Clay
			Township:
			Core
			Blacksville

Logging Date	15-Apr-2019		
Run Number	1A		
Depth Driller	8400.00 ft		
Schlumberger Depth	8400.00 ft		
Bottom Log Interval	8400.00 ft		
Top Log Interval	2543.00 ft		
Casing Driller Size @ Depth	9.625 in @ 2538.00 ft		
Casing Schlumberger	2543 ft		
Bit Size	8.5 in		
Type Fluid In Hole	Water		
Density	9.5 lbm/gal		
Fluid Loss	PH		
MUD			
Source of Sample	Active Tank		
RM @ Meas Temp	0.04 ohm.m @ 103 degF		
RMF @ Meas Temp	0.03 ohm.m @ 103 degF		
RMC @ Meas Temp	0.04 ohm.m @ 102 degF		
Source RMF	RMC		
RM @ BHT	0.04 @ 158 0.02 @ 158		
Max Recorded Temperatures	158 degF		
Circulation Stopped	14-Apr-2019 23:00:00		
Logger on Bottom	15-Apr-2019 09:04:00		
Unit Number	3703		
Recorded By	Elizabeth Morrone		
Witnessed By	BJ Vamey		

Disclaimer

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

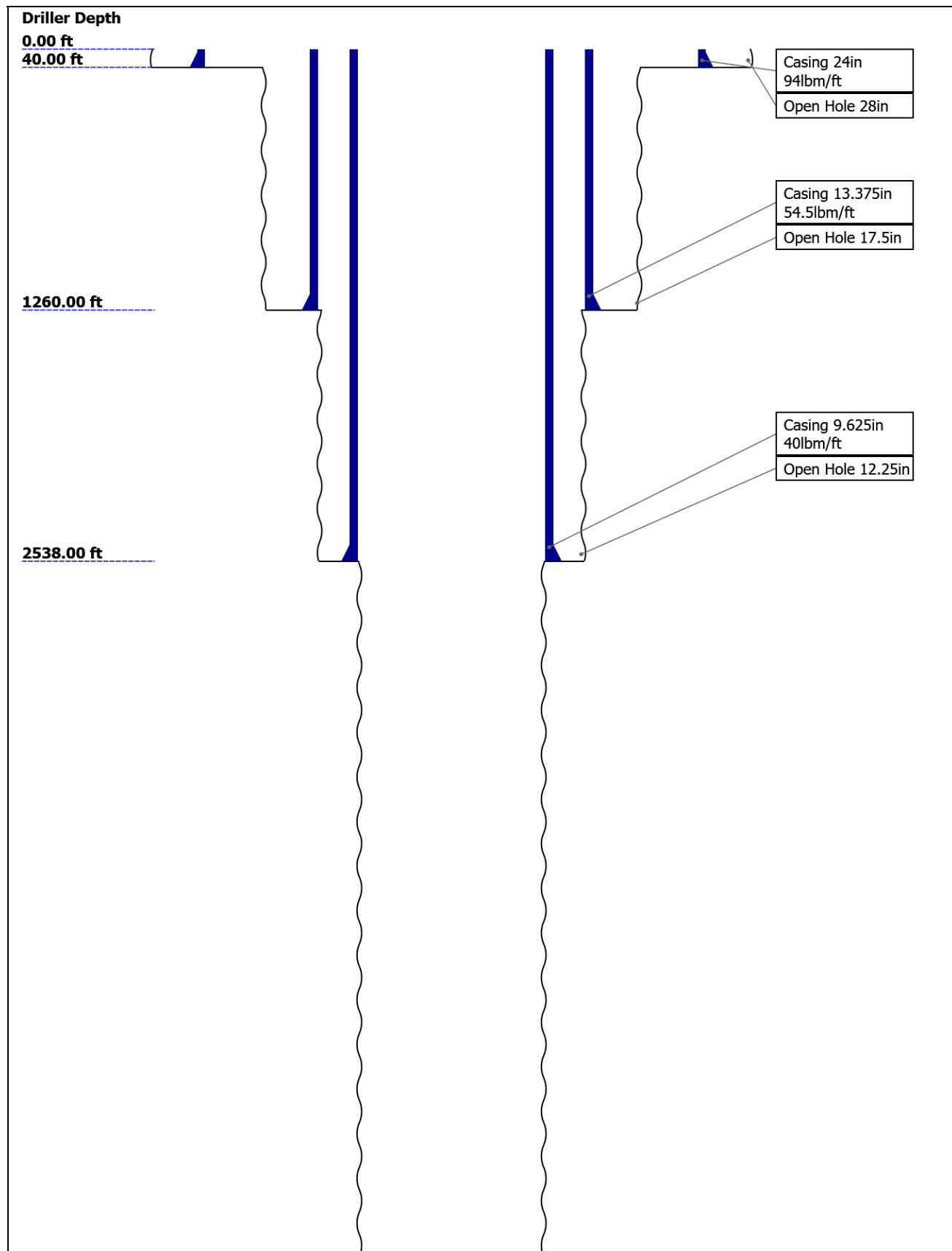
Contents

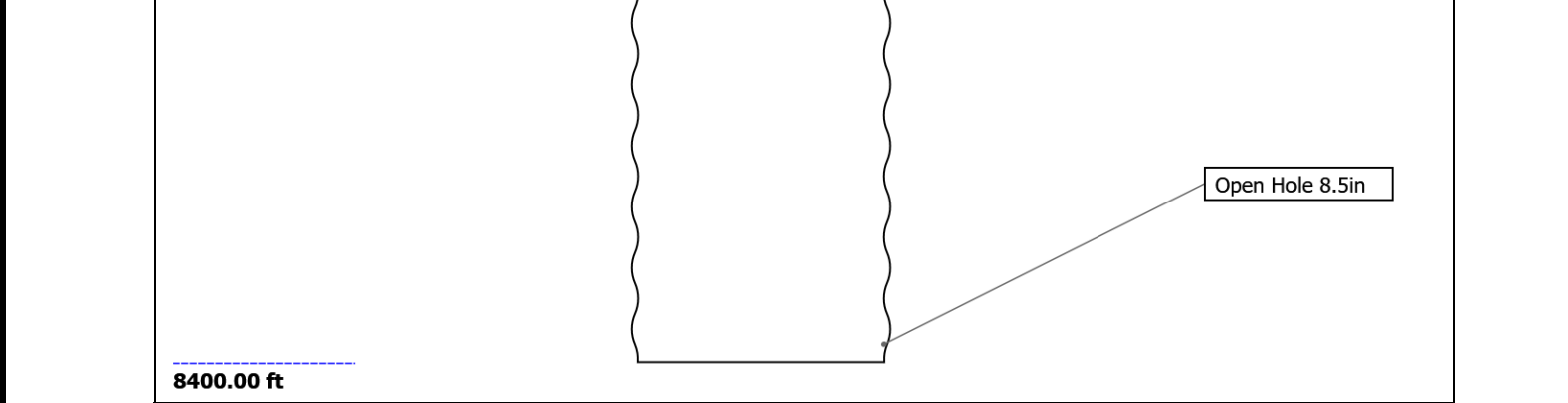
- 1. Header
- 2. Disclaimer
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- 4. Well Sketch
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- 6. Remarks and Equipment Summary
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Well Sketch



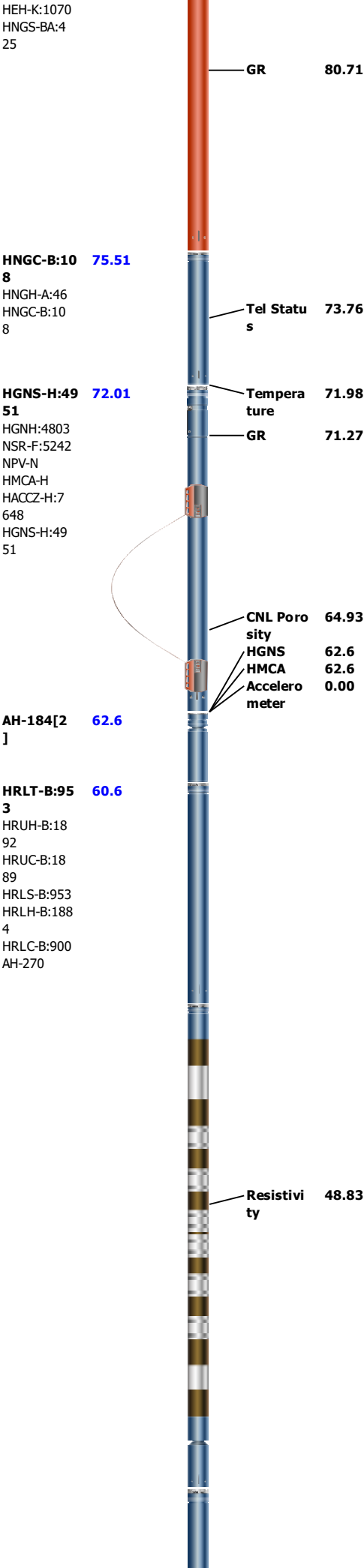


Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	28	17.5	12.25	8.5		
Top Driller (ft)	0	40	1260	2538		
Top Logger (ft)	0	40	1260	2543		
Bottom Driller (ft)	40	1260	2538	8400		
Bottom Logger (ft)	40	1260	2543	8400		
Casing						
Size (in)	24	13.375	9.625			
Weight (lbm/ft)	94	54.5	40			
Inner Diameter (in)	23.272	12.615	8.835			
Grade	N/A	N/A	N/A			
Top Driller (ft)	0	0	0			
Top Logger (ft)	0	0	0			
Bottom Driller (ft)	40	1260	2538			
Bottom Logger (ft)	40	1260	2543			

Remarks and Equipment Summary

1A: Toolstring				1A: Remarks	
Equip name LEH-MT LEH-MT Length 99.63  Mud Tem perature 97.69 SAH-F 96.48	Thank you for choosing Schlumberger!				
		Crew: Morrone, Kornacki, Shirley			
		Tool ran per tool sketch; 6" standoffs placed on HRUC and HRLC			
		Main pass recorded from TD to casing shoe and repeat pass recorded from TD to 7700 ft			
AH-369 91.63 EDTC-B:92 31 EDTH-B:929 1 EDTG-B:794 27 EDTC-B:923 1  CTEM 86.7 ACCZ 0.00 HV 0.00 Gamma R 84.83 ay TelStatu s 83.7 HNGS-BA:4 25 83.7					



AH-184[1 36.4]

HDRS-H:3 34.4

791
ECH-MEB:3
963
HRCC-H:49
45
HRMS-H:37
91
Long Spacing
HRGD-H:39
21
GSR-J:5542
Short Spacing
Backscatter
GPV-Q

HRCC 30.4

MCFL 24.97
Caliper 24.48
TLD Density 24.09

NEXT-A:4 22.16

NEXH-A:4
PNG-G
NEXS-A:4

Spect 16.28

Status 14.87

ILE-F 8.46

BNS-STD 0.46

Head Tension
TOOL_ZERO

Lengths are in ft
Maximum Outer Diameter = 6.370 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Summary

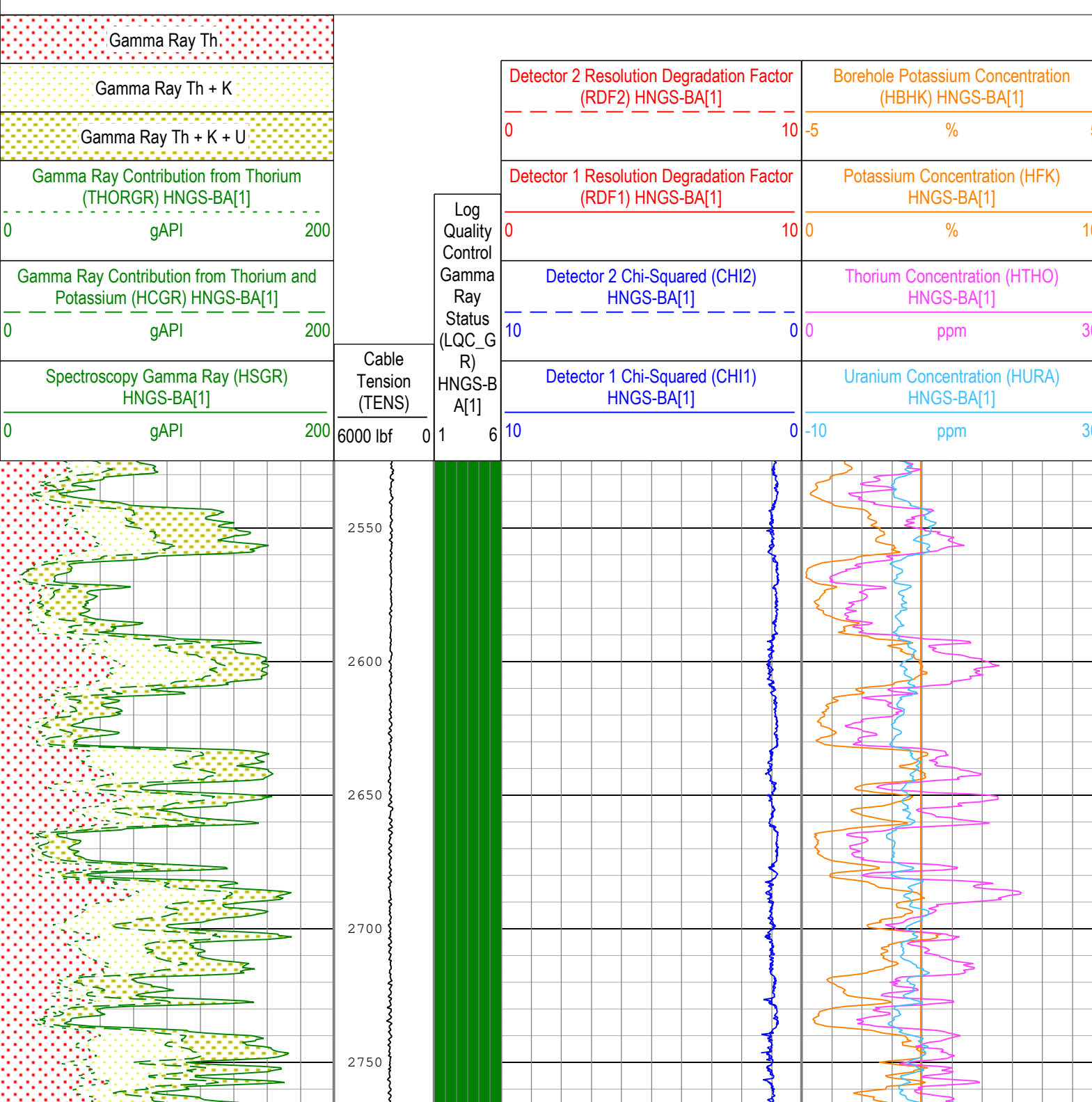
1A

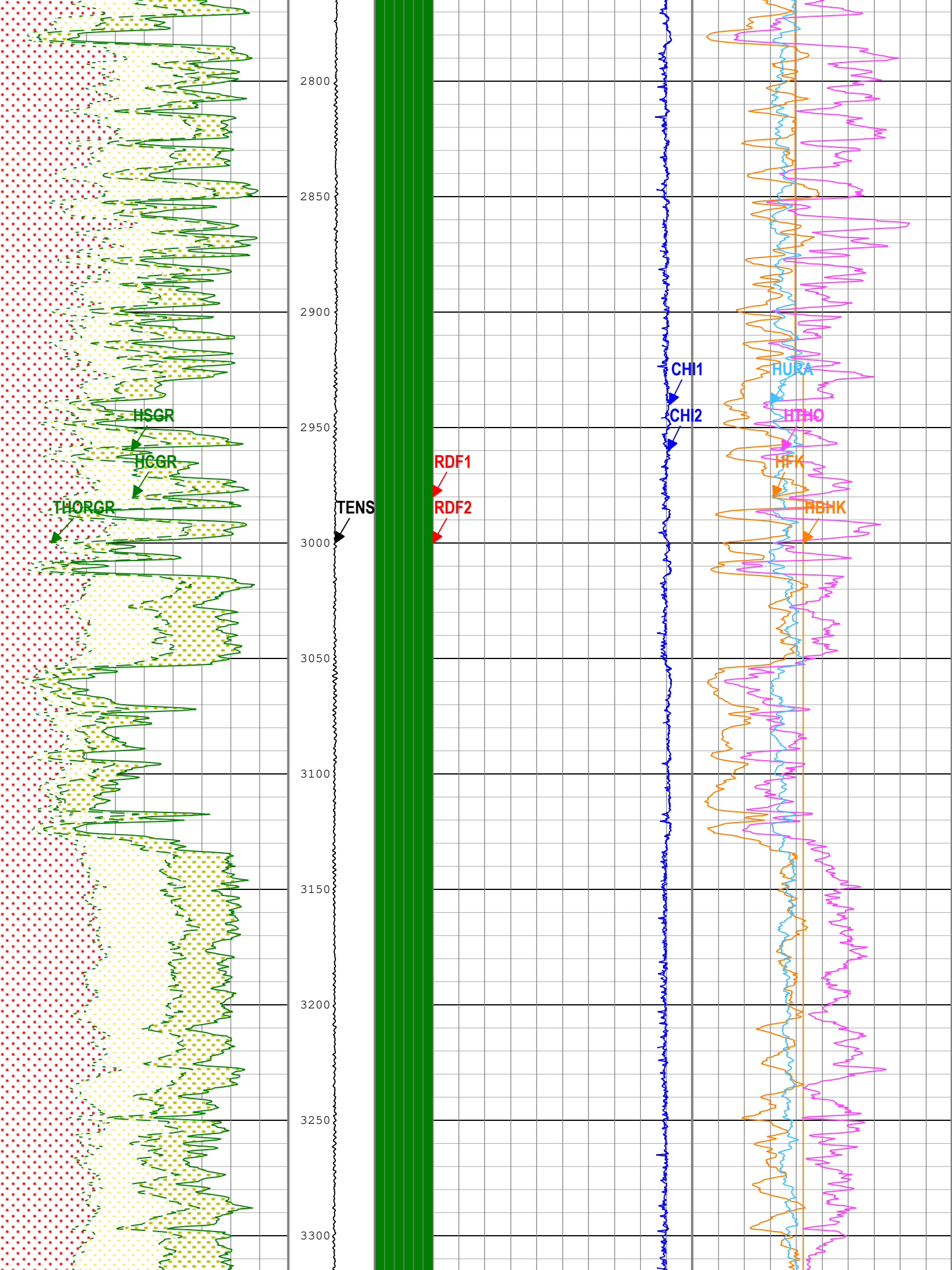
Depth Measuring Device

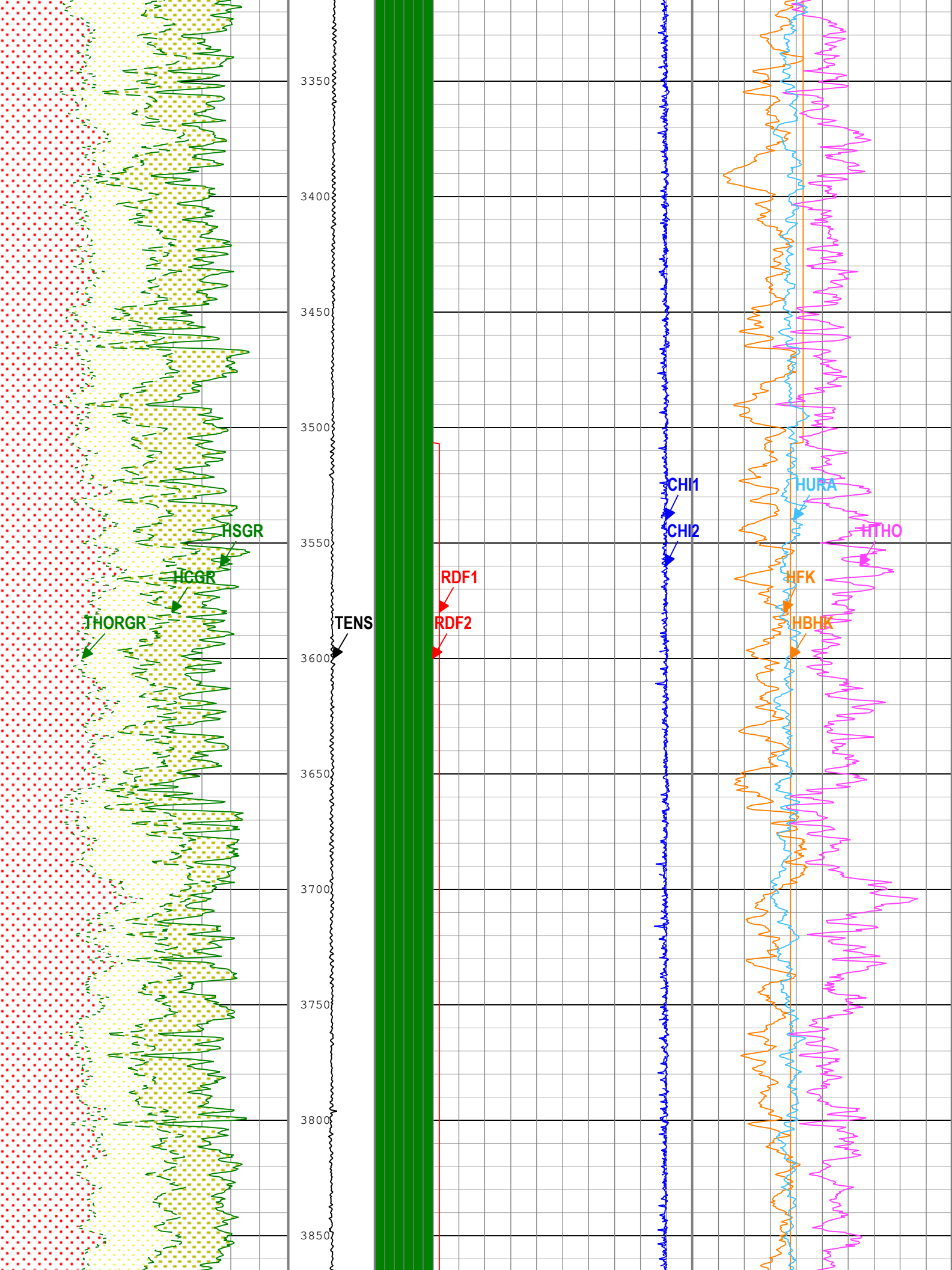
TIME_1900 - Time Marked every 60.00 (s)

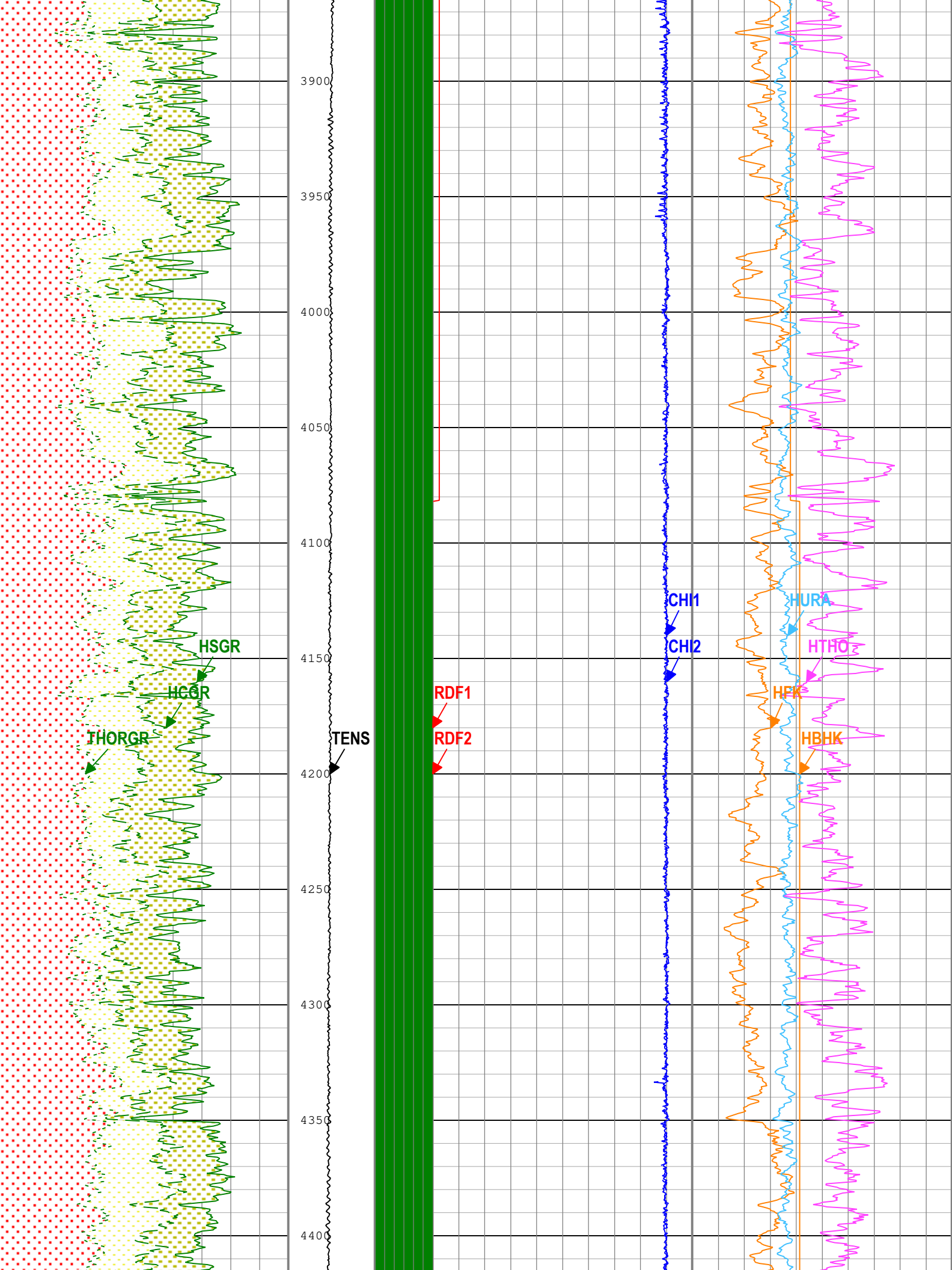
Log Quality Control Gamma Ray Status (LQC_GR) HNGS-BA[1]

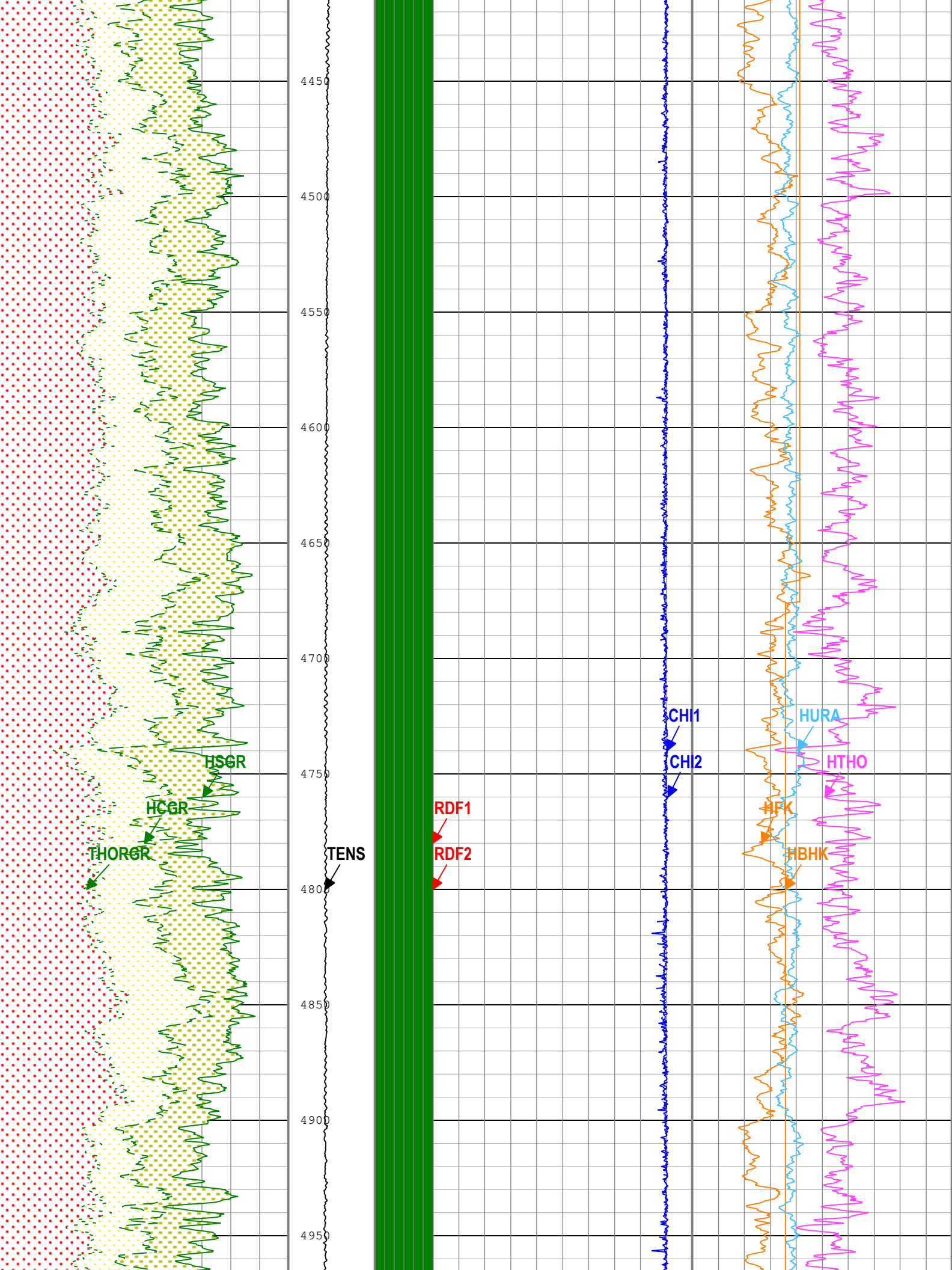
1 - Det1TempStatus - Detector 1 Temperature Status :	Detector 1 Temperature < 50 °C	50 °C <= Detector 1 Temperature < 80 °C
	Detector 1 Temperature >= 80 °C	
2 - Det2TempStatus - Detector 2 Temperature Status :	Detector 2 Temperature < 50 °C	50 °C <= Detector 2 Temperature < 80 °C
	Detector 2 Temperature >= 80 °C	
3 - Det1CtrlLoopStatus - Detector 1 Control Loop Status :	Detector 1 Control Loop: Normal	Detector 1 Control Loop: Warning
	Detector 1 Control Loop: Error	
4 - Det2CtrlLoopStatus - Detector 2 Control Loop Status :	Detector 2 Control Loop: Normal	Detector 2 Control Loop: Warning
	Detector 2 Control Loop: Error	
5 - Det1ChiSqrStatus - Detector 1 Chi Squared Status :	Detector 1 Chi Squared <= 3.0	Detector 1 Chi Squared > 3.0
6 - Det2ChiSqrStatus - Detector 2 Chi Squared Status :	Detector 2 Chi Squared <= 3.0	Detector 2 Chi Squared > 3.0

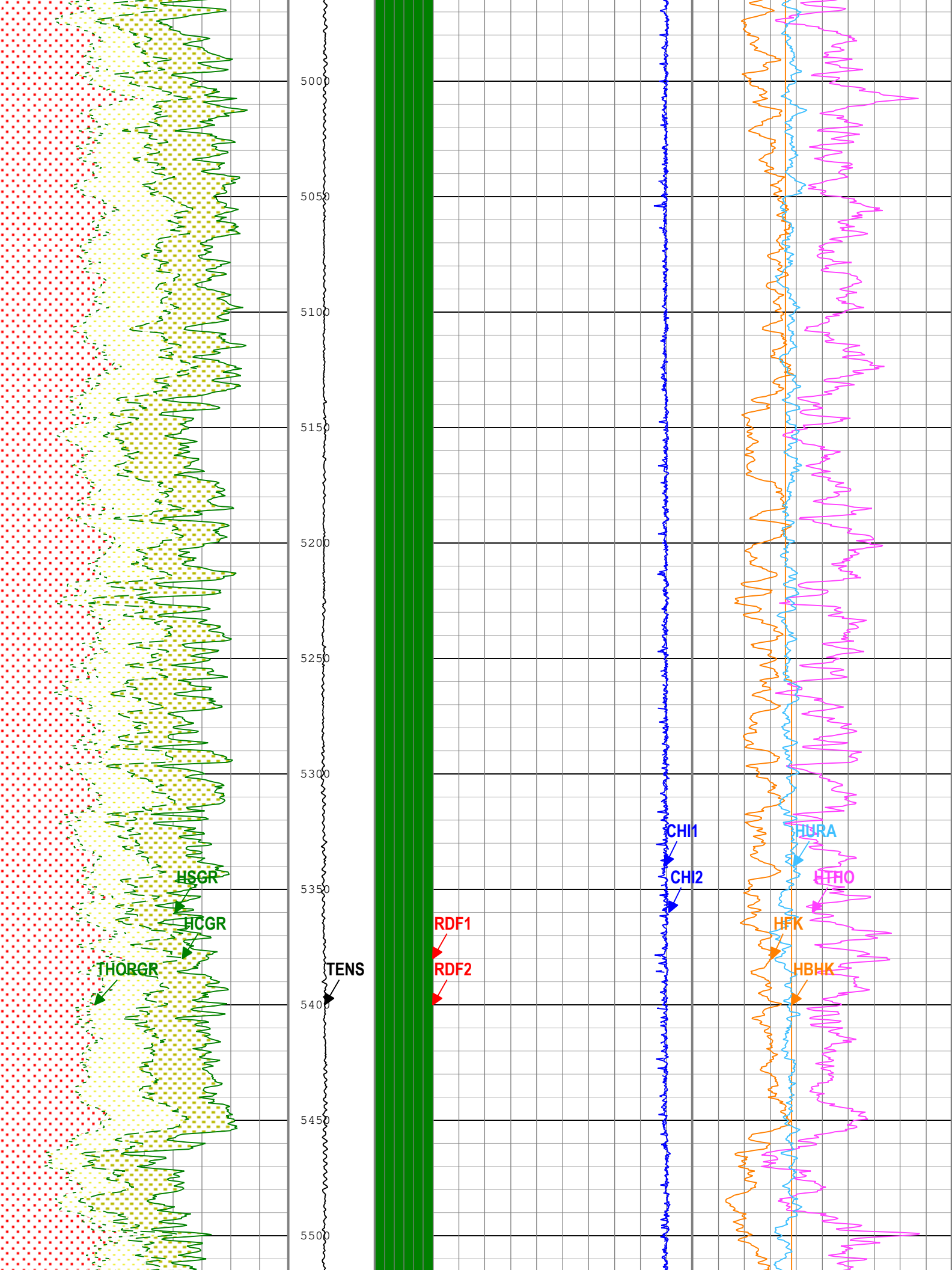


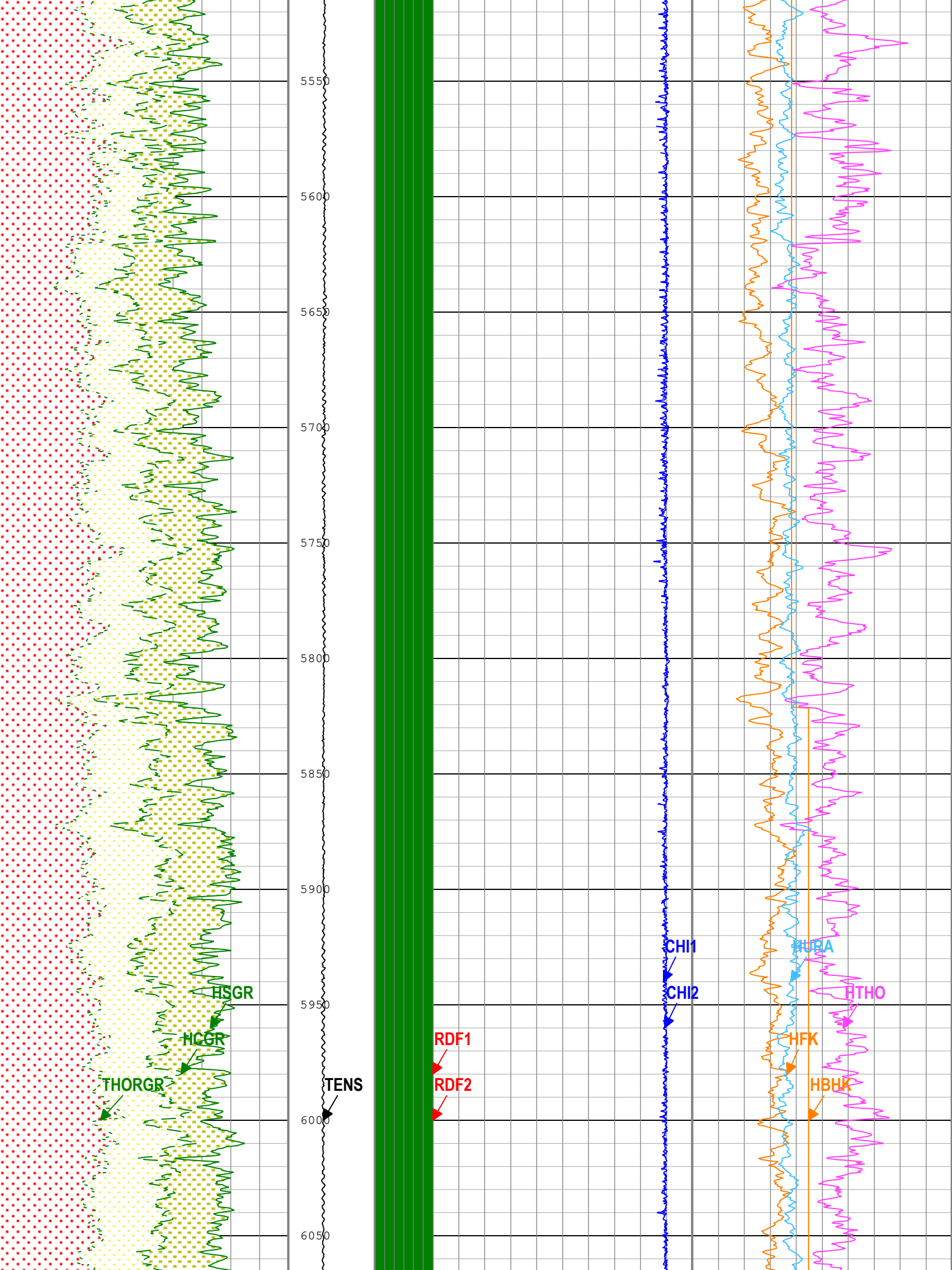


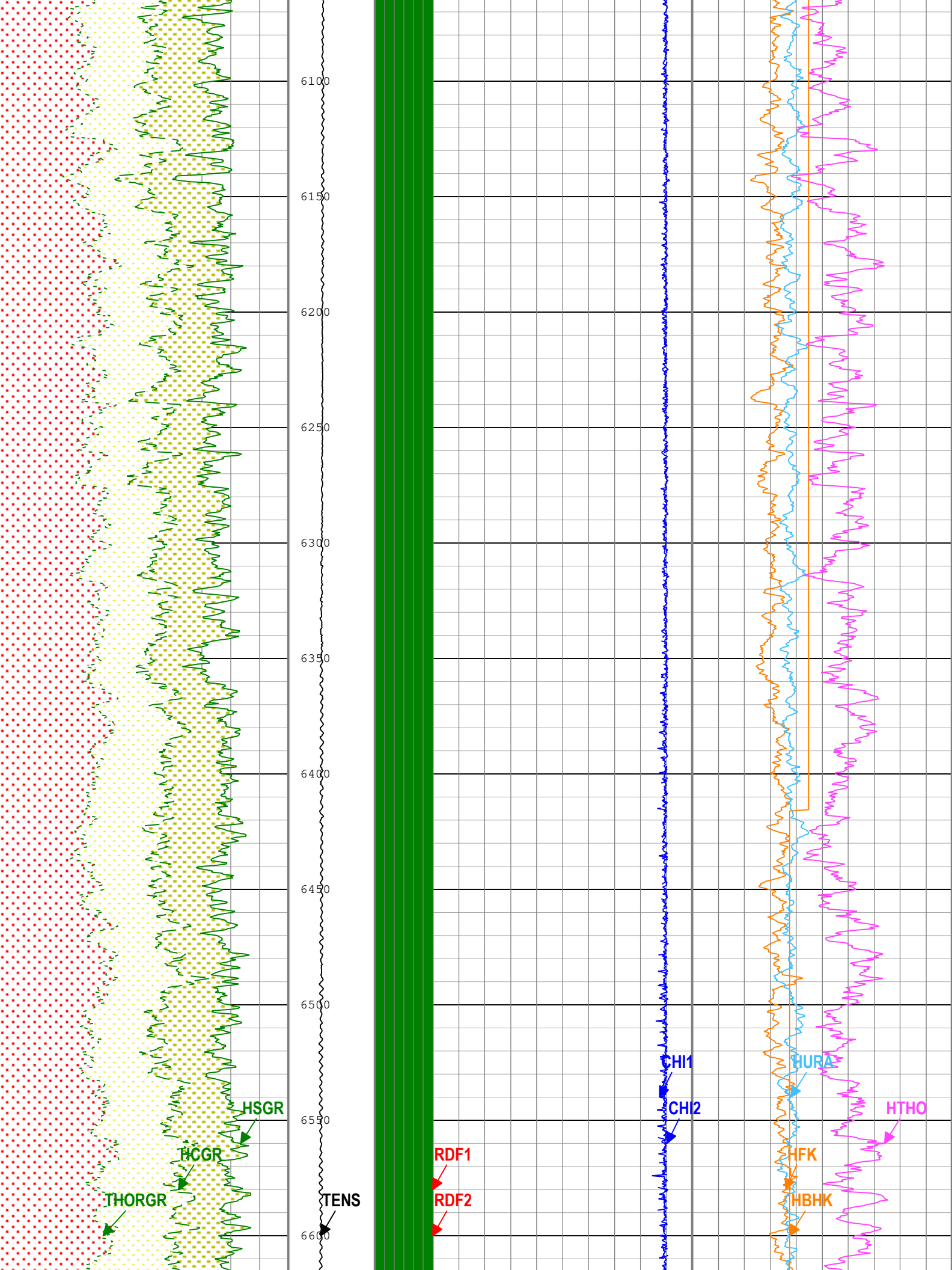


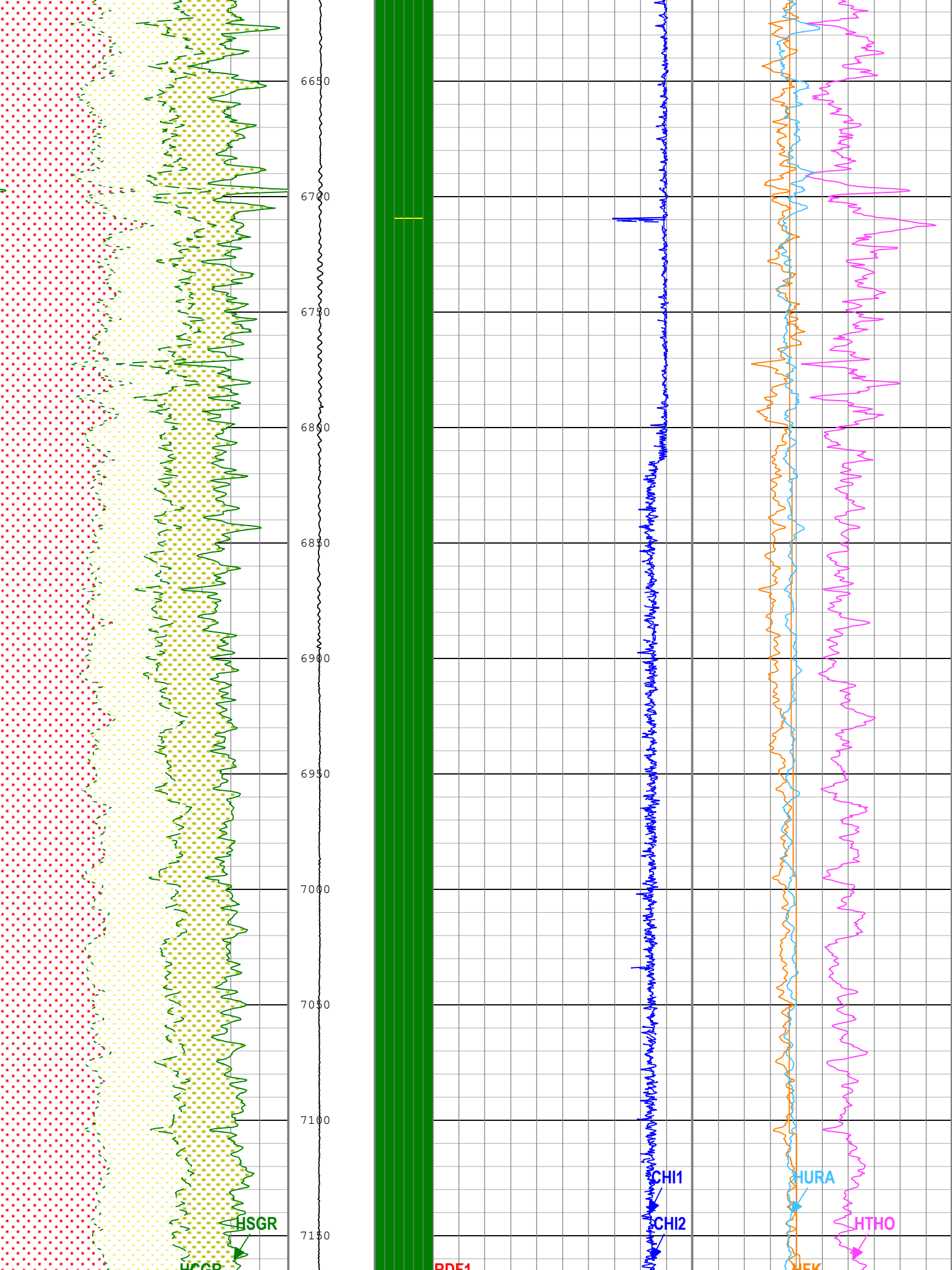


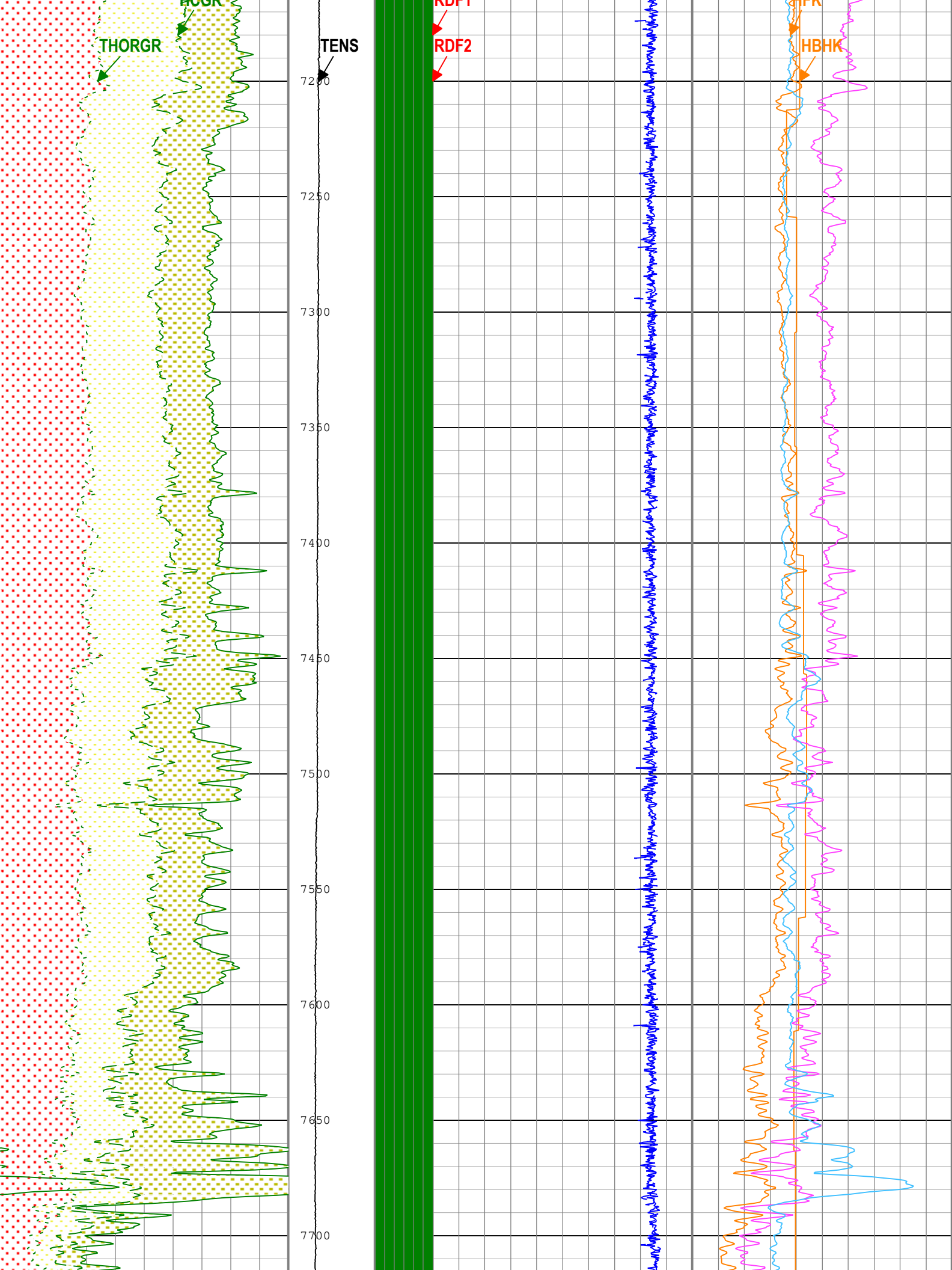


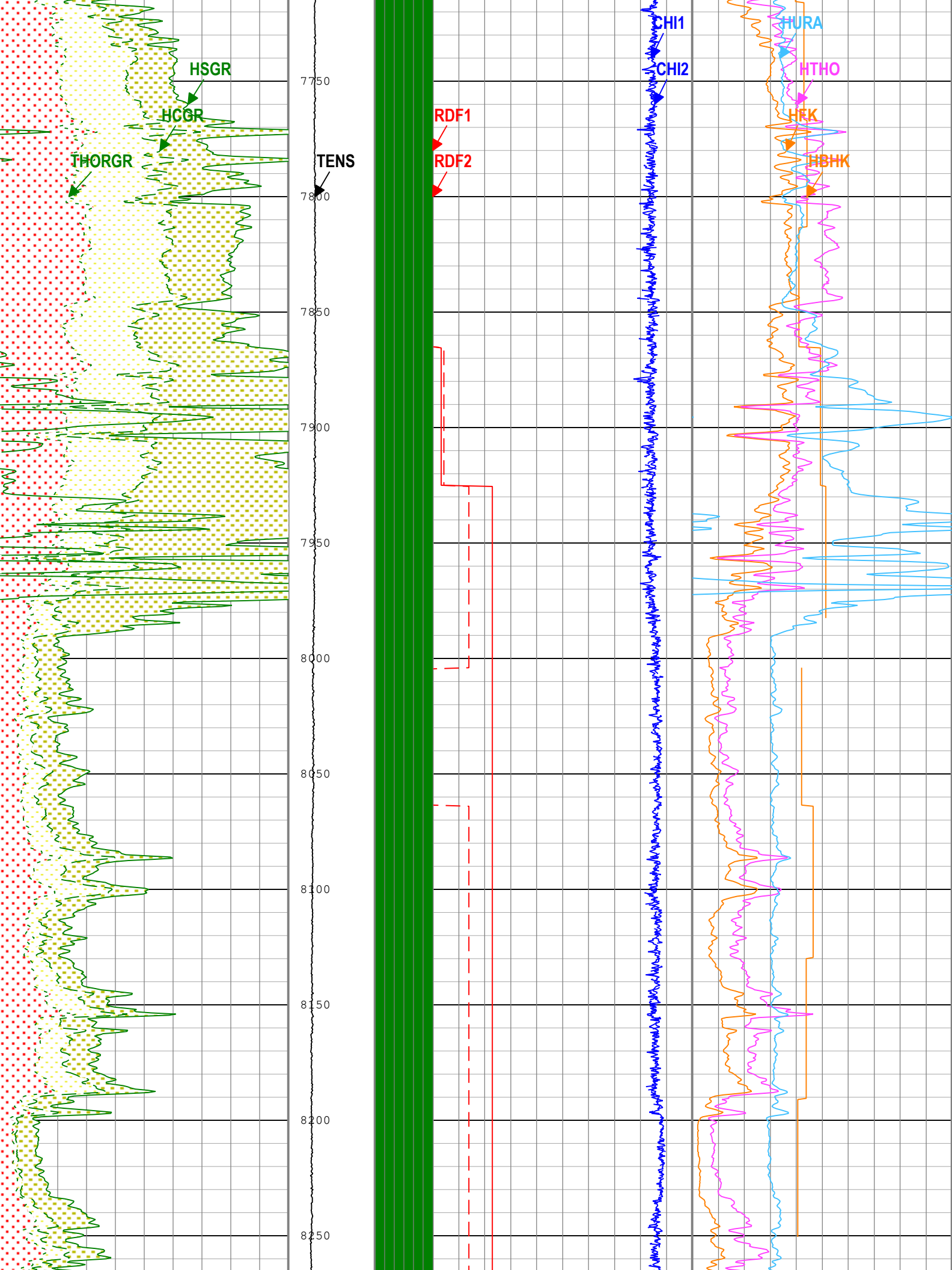


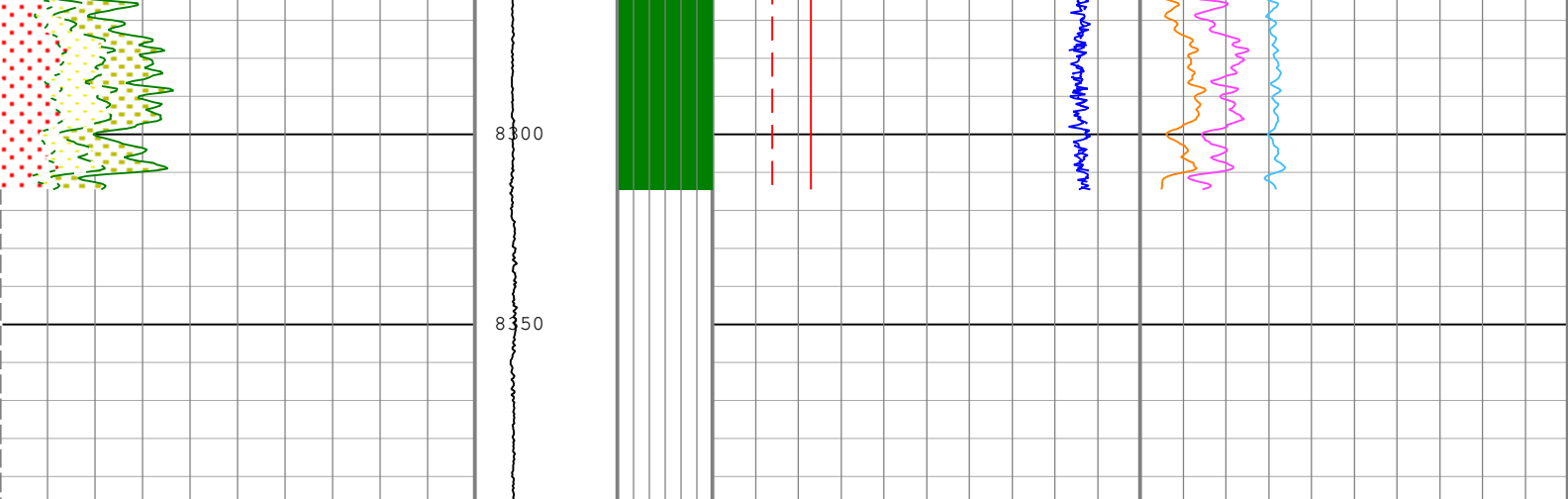












Gamma Ray Th	Cable Tension (TENS)	Log Quality Control Gamma Ray Status (LQC_GR) HNGS-BA[1]	Detector 2 Resolution Degradation Factor (RDF2) HNGS-BA[1]	Borehole Potassium Concentration (HBHK) HNGS-BA[1]
Gamma Ray Th + K	6000 lbf	0	0 10	-5 % 5
Gamma Ray Th + K + U			Detector 1 Resolution Degradation Factor (RDF1) HNGS-BA[1]	Potassium Concentration (HFK) HNGS-BA[1]
Gamma Ray Contribution from Thorium (THORGR) HNGS-BA[1]			0 10	0 % 10
0 gAPI 200			Detector 2 Chi-Squared (CHI2) HNGS-BA[1]	Thorium Concentration (HTHO) HNGS-BA[1]
Gamma Ray Contribution from Thorium and Potassium (HCGR) HNGS-BA[1]			10 0	0 ppm 30
0 gAPI 200			Detector 1 Chi-Squared (CHI1) HNGS-BA[1]	Uranium Concentration (HURA) HNGS-BA[1]
Spectroscopy Gamma Ray (HSGR) HNGS-BA[1]			10 0	-10 ppm 30
0 gAPI 200				

Log Quality Control Gamma Ray Status (LQC_GR) HNGS-BA[1]

1 - Det1TempStatus - Detector 1 Temperature Status :	Detector 1 Temperature < 50 °C	50 °C <= Detector 1 Temperature < 80 °C
2 - Det2TempStatus - Detector 2 Temperature Status :	Detector 1 Temperature >= 80 °C	50 °C <= Detector 2 Temperature < 80 °C
3 - Det1CtrlLoopStatus - Detector 1 Control Loop Status :	Detector 2 Temperature < 50 °C	50 °C <= Detector 2 Temperature < 80 °C
4 - Det2CtrlLoopStatus - Detector 2 Control Loop Status :	Detector 2 Temperature >= 80 °C	Detector 1 Control Loop: Warning
5 - Det1ChiSqrdStatus - Detector 1 Chi Squared Status :	Detector 1 Control Loop: Normal	Detector 2 Control Loop: Warning
6 - Det2ChiSqrdStatus - Detector 2 Chi Squared Status :	Detector 1 Control Loop: Error	Detector 1 Chi Squared > 3.0
	Detector 2 Control Loop: Normal	Detector 2 Chi Squared > 3.0
	Detector 2 Control Loop: Error	

TIME_1900 - Time Marked every 60.00 (s)

Description: HNGS Software Format: Log (BRADFORD HNGS Component Image) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured
Depth Creation Date: 15-Apr-2019 18:10:02

Channel Processing Parameters				
1A: Parameters				
Parameter	Description	Tool	Value	Unit
BAR(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHK	Drilling Fluid Potassium Concentration	Borehole	0	%
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.446	in

CBLO	Casing Bottom (Logger)	WLSESSION	2543	ft
DBCC	Barite Constant Correction Flag	HNGS-BA	None	
DFD	Drilling Fluid Density	Borehole	9.5	lbm/gal
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
HCRB	Apply Borehole Potassium Correction	HNGS-BA	None	
HEMA	Hematite Presence Flag	Borehole	No	
SGRC	Standard Gamma Ray Correction Flag	HNGS-BA	Yes	

1ADepth Zoned Parameters			
Parameter	Value	Start (ft)	Stop (ft)
BS	12.25	2525	2543
BS	8.5	2543	8396.5
All depth are actual.			

Tool Control Parameters	
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1A: Parameters				
Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	1800	ft/h

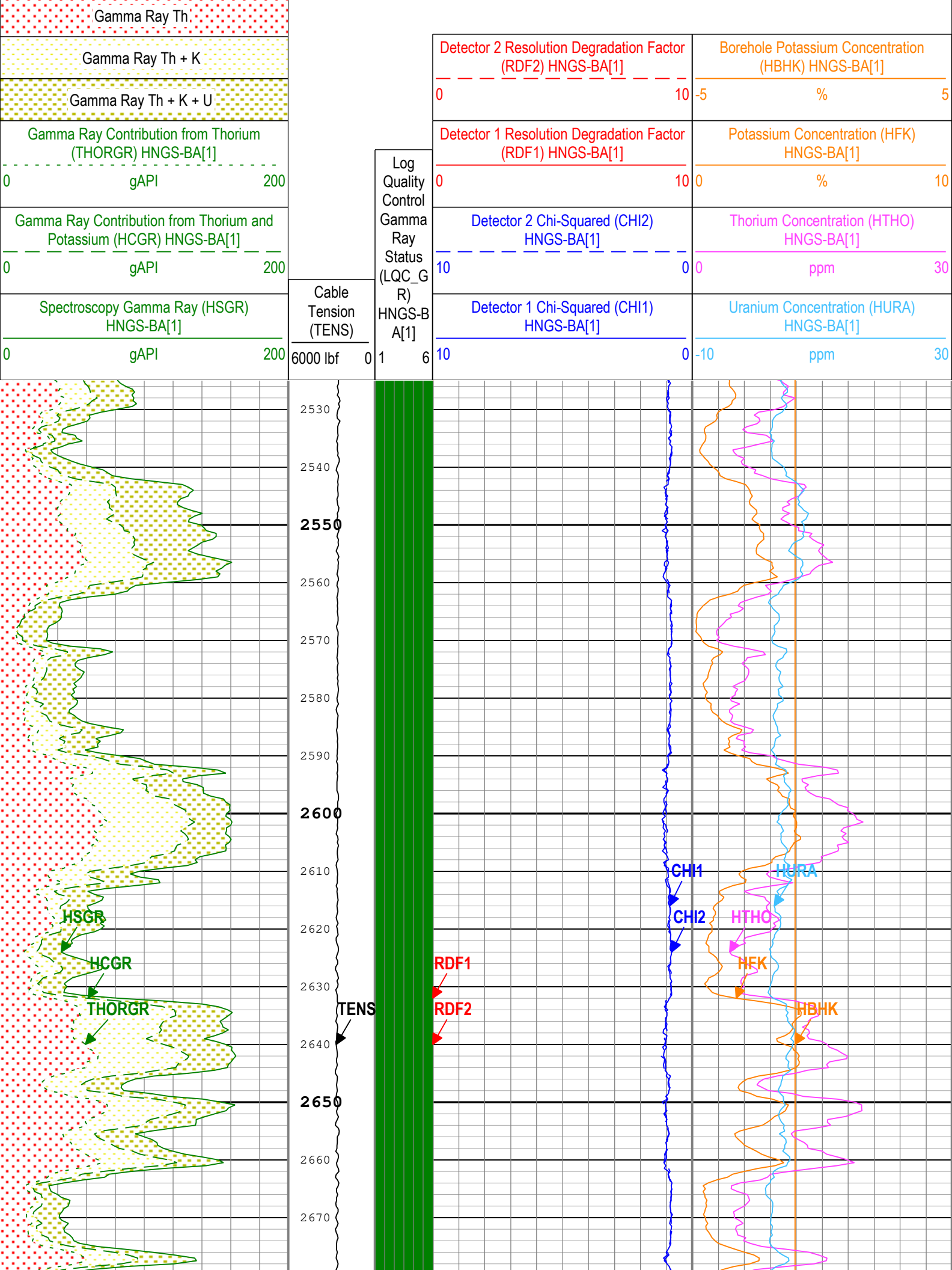
Main Pass									
MAIN PASS 5"=100'									

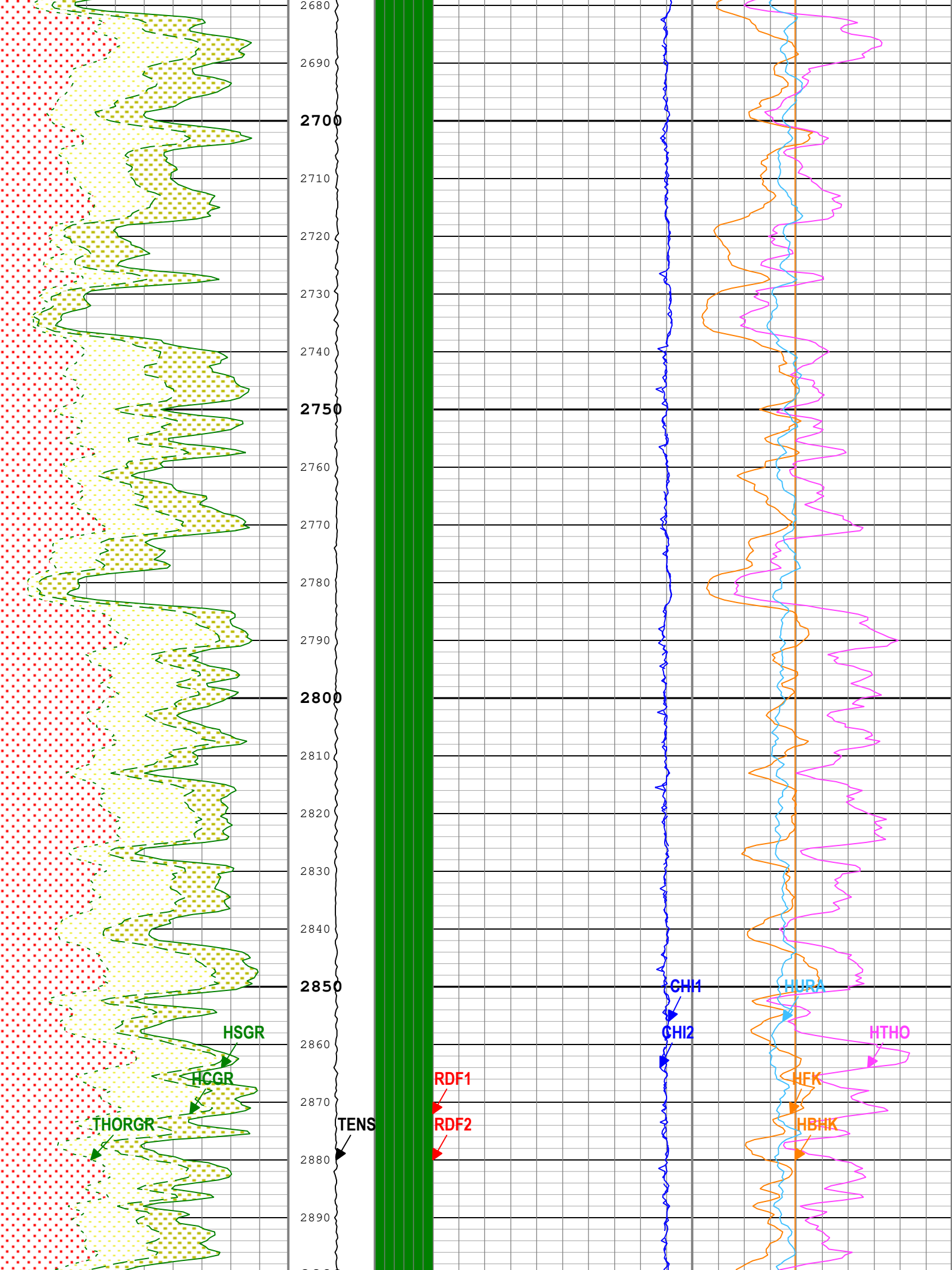
Software Version	
Acquisition System	Version
Maxwell 2019	9.0.106845.3100

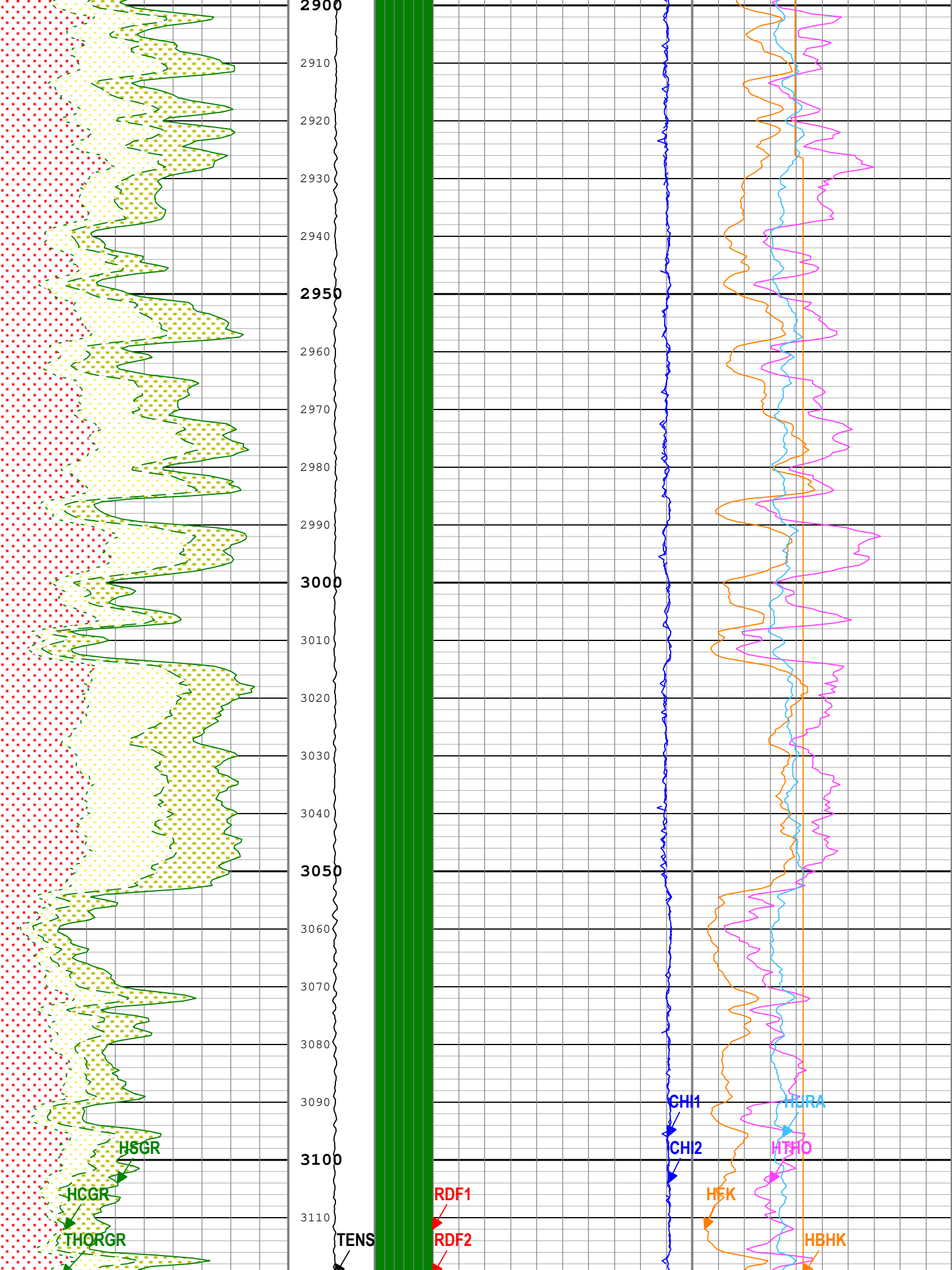
Composite Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1A	Log[2]:Up	Up	8266.17 ft	8396.38 ft	15-Apr-2019 7:56:45 AM	15-Apr-2019 8:17:05 AM	ON	2.60 ft	Yes
1A	Log[8]:Up	Up	8021.42 ft	8407.18 ft	15-Apr-2019 9:44:04 AM	15-Apr-2019 10:51:09 AM	ON	3.12 ft	Yes
1A	Log[9]:Up	Up	2500.63 ft	8126.68 ft	15-Apr-2019 10:57:49 AM	15-Apr-2019 4:11:56 PM	ON	4.17 ft	Yes
All depths are referenced to toolstring zero									

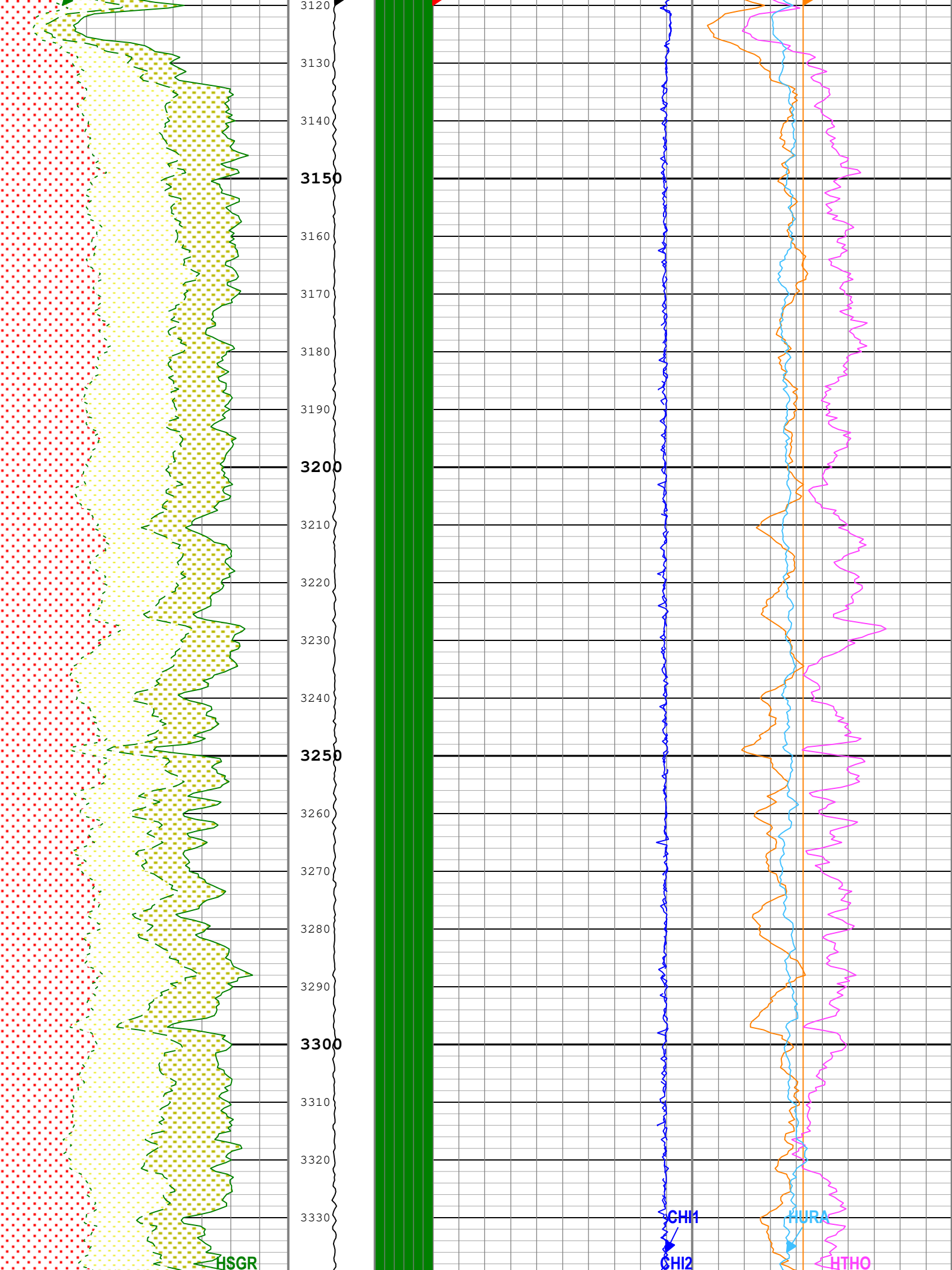
Log	Company:North East Natural Energy LLC Well:Boggess 17H Main Pass:S012
Description: HNGS Software Format: Log (BRADFORD HNGS Component Image) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 15-Apr-2019 18:10:09	

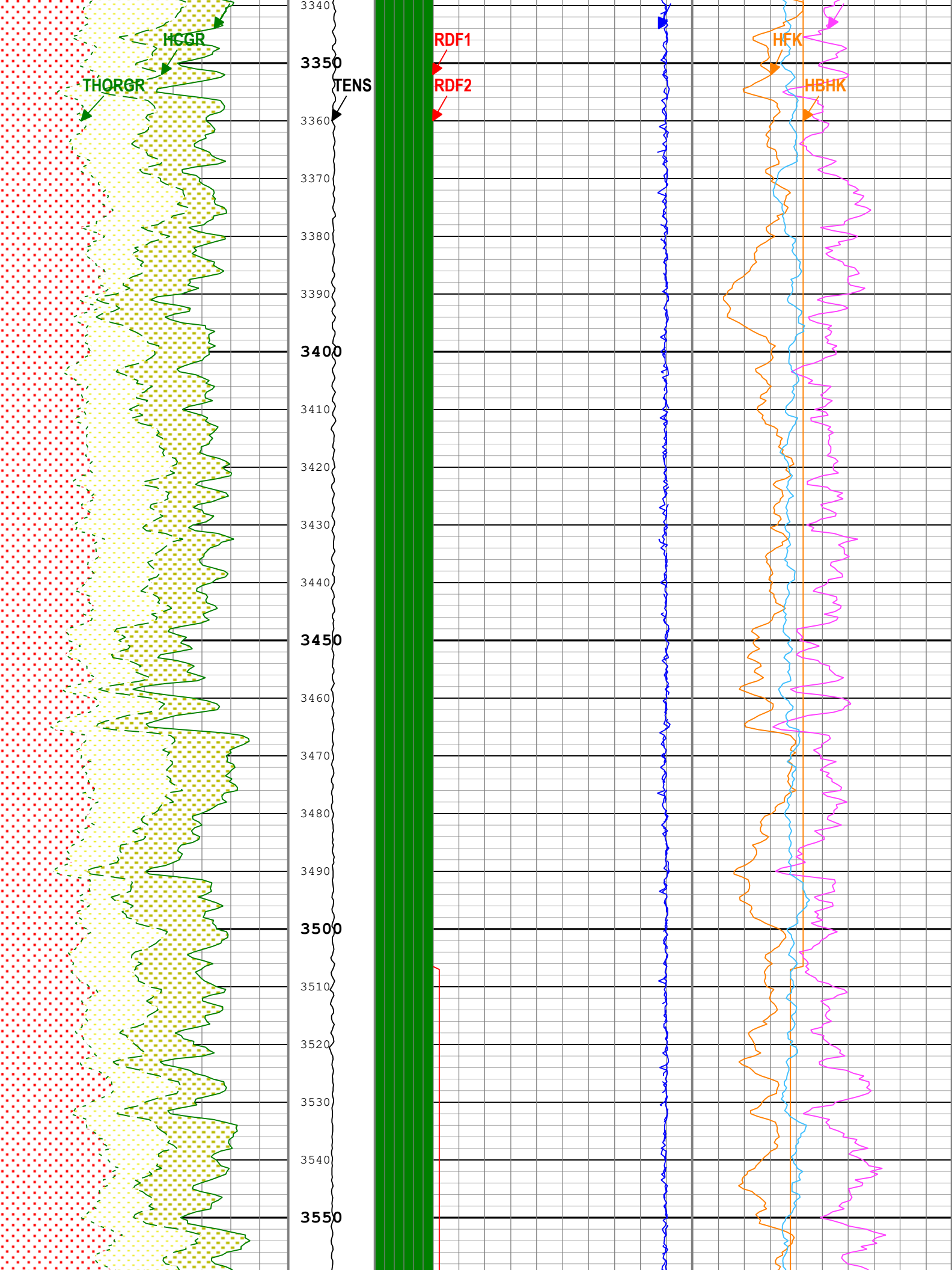
TIME_1900 - Time Marked every 60.00 (s)		
Log Quality Control Gamma Ray Status (LQC_GR) HNGS-BA[1]		
1 - Det1TempStatus - Detector 1 Temperature Status :	Detector 1 Temperature < 50 °C Detector 1 Temperature >= 80 °C	50 °C <= Detector 1 Temperature < 80 °C
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4 - Det2CtrlLoopStatus - Detector 2 Control Loop Status :	Detector 2 Control Loop: Normal Detector 2 Control Loop: Error	Detector 2 Control Loop: Warning
5 - Det1ChiSqrdStatus - Detector 1 Chi Squared Status :	Detector 1 Chi Squared <= 3.0	Detector 1 Chi Squared > 3.0
6 - Det2ChiSqrdStatus - Detector 2 Chi Squared Status :	Detector 2 Chi Squared <= 3.0	Detector 2 Chi Squared > 3.0

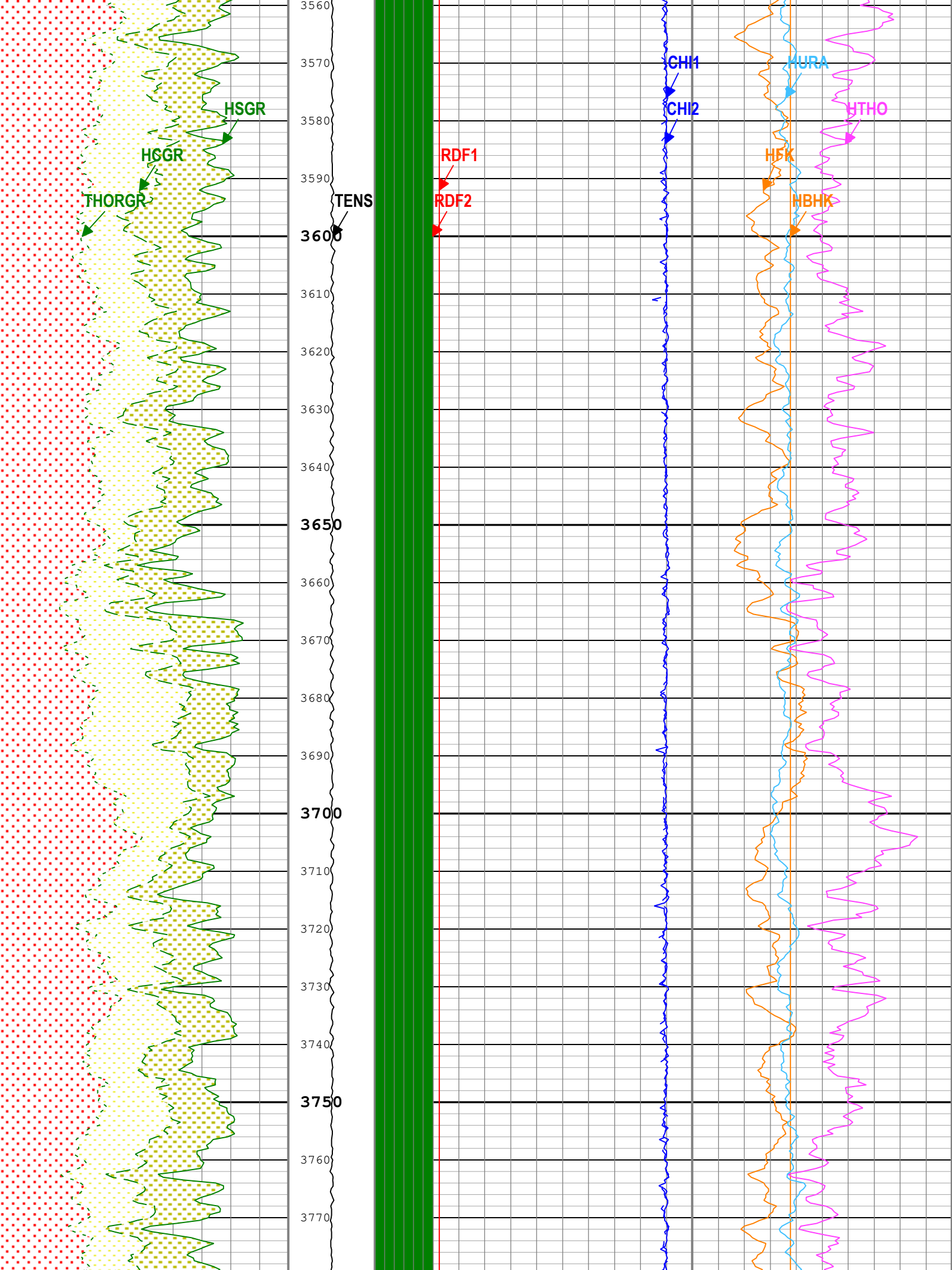


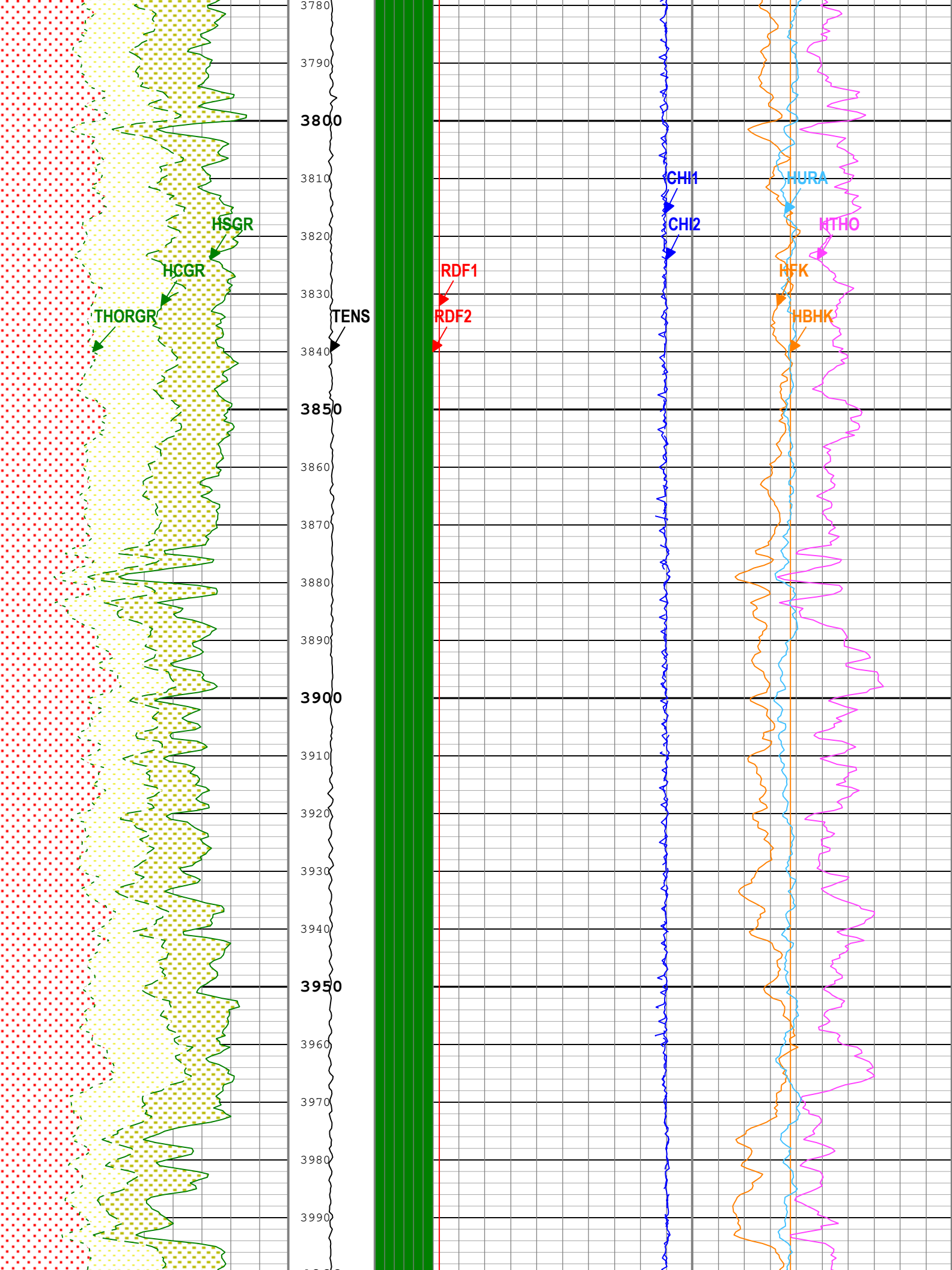


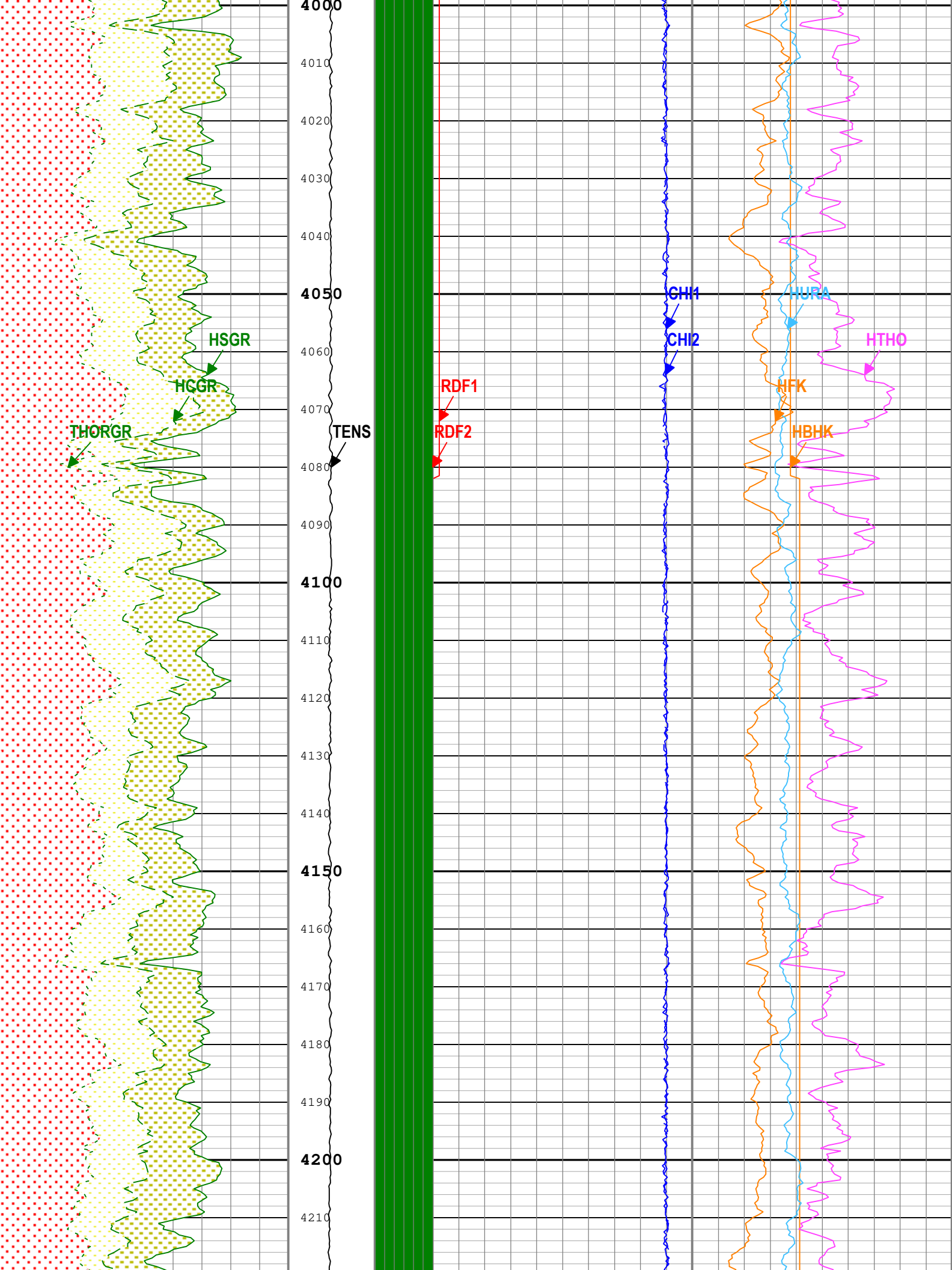


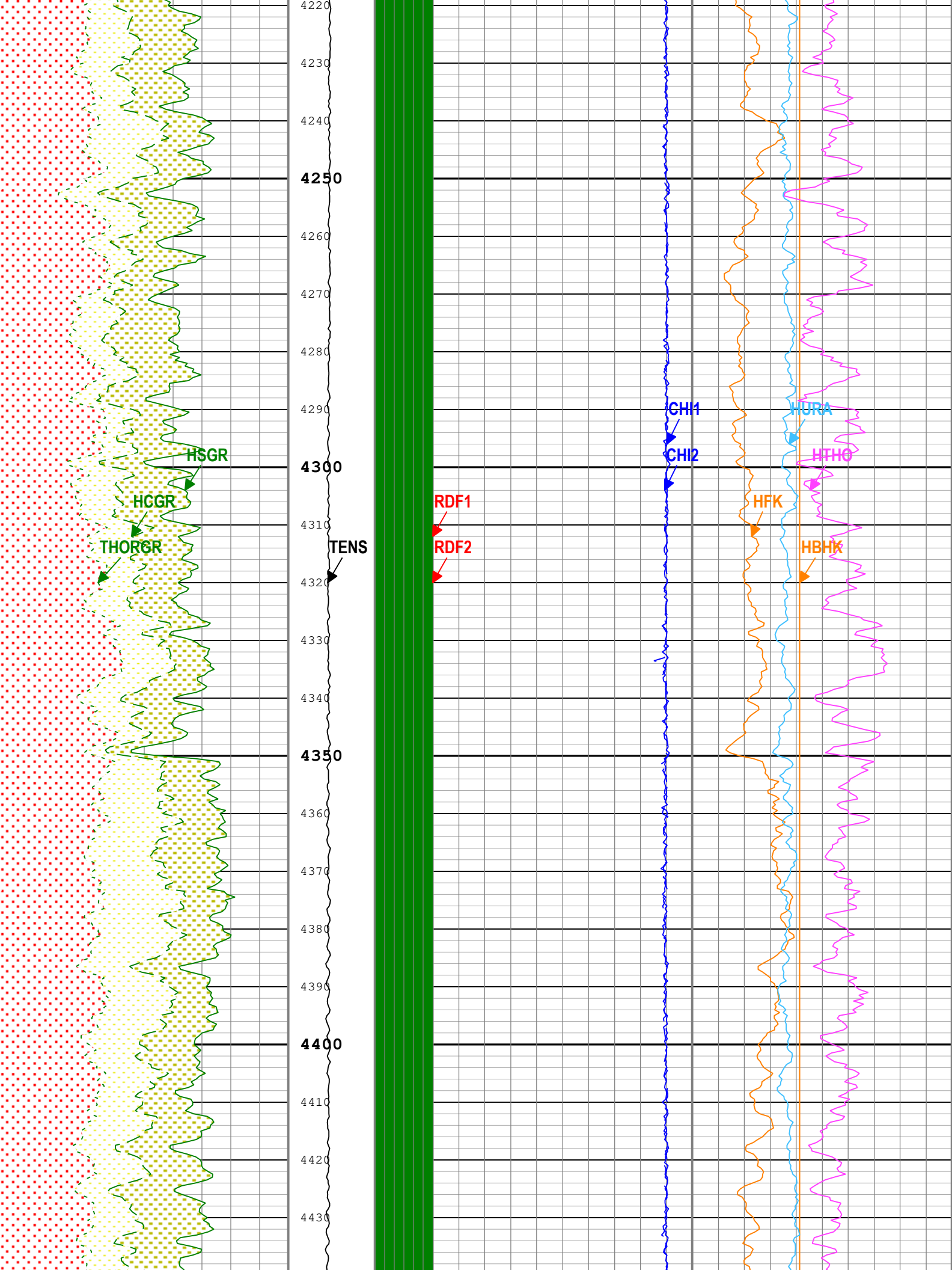


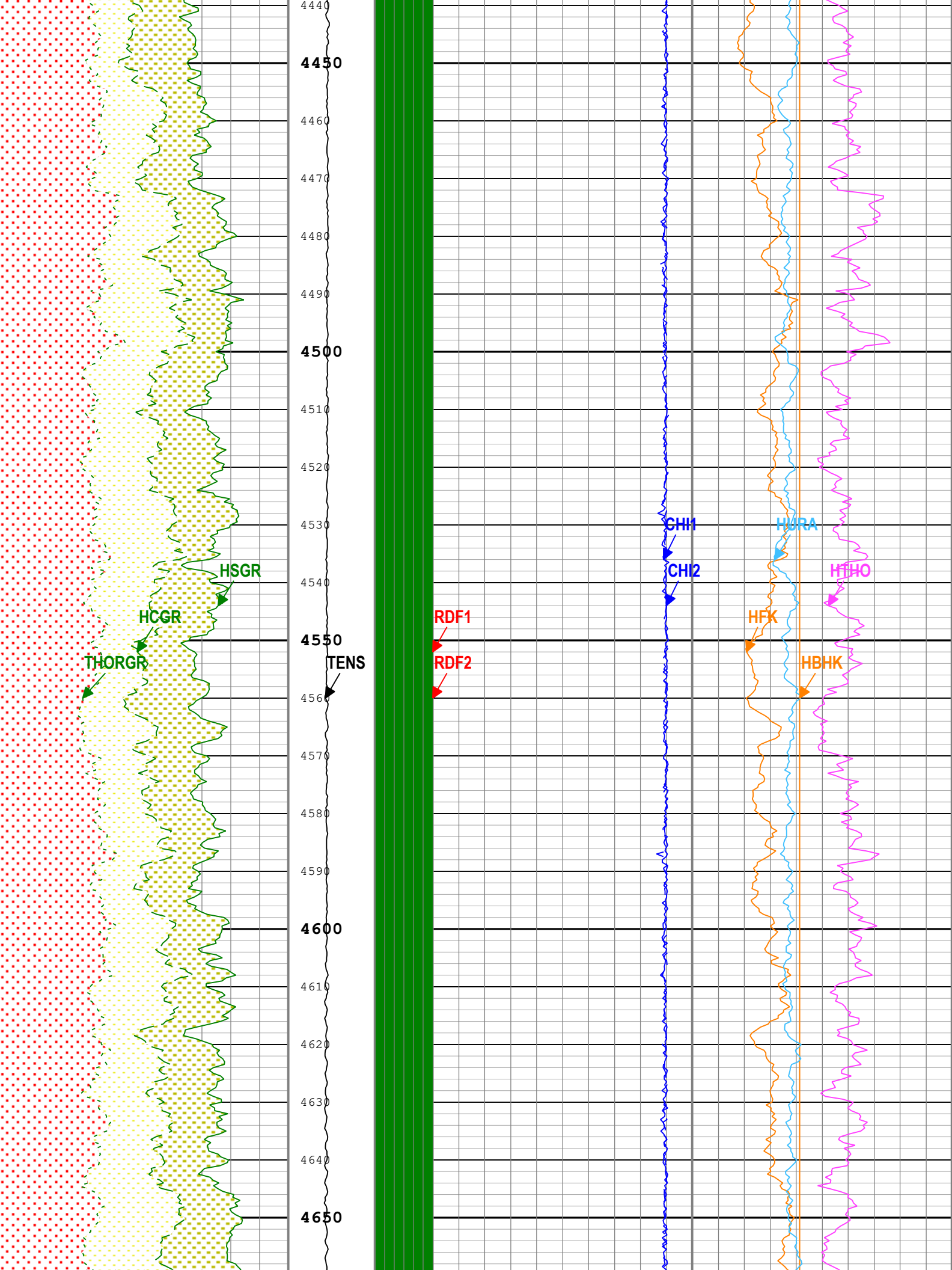


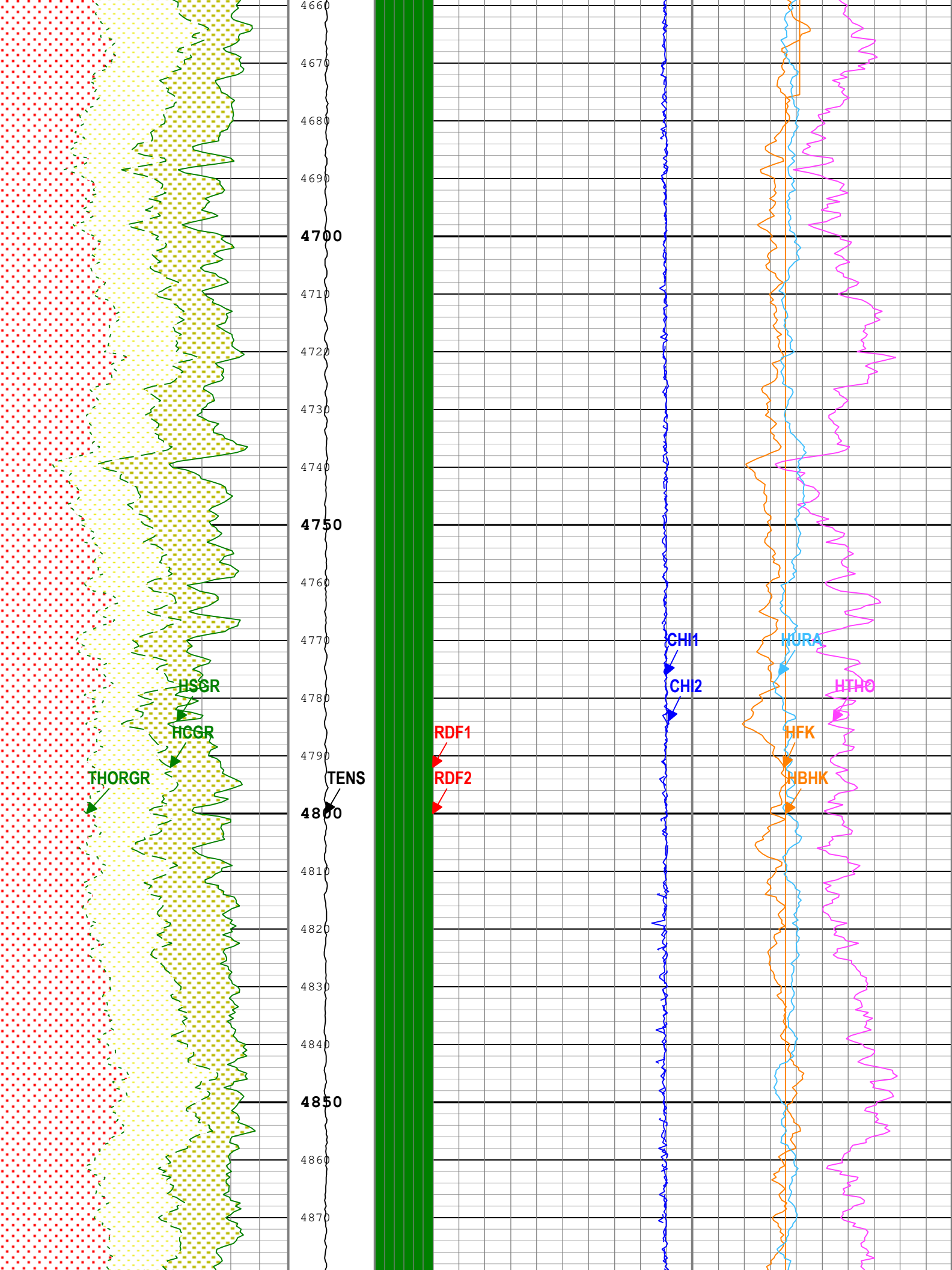


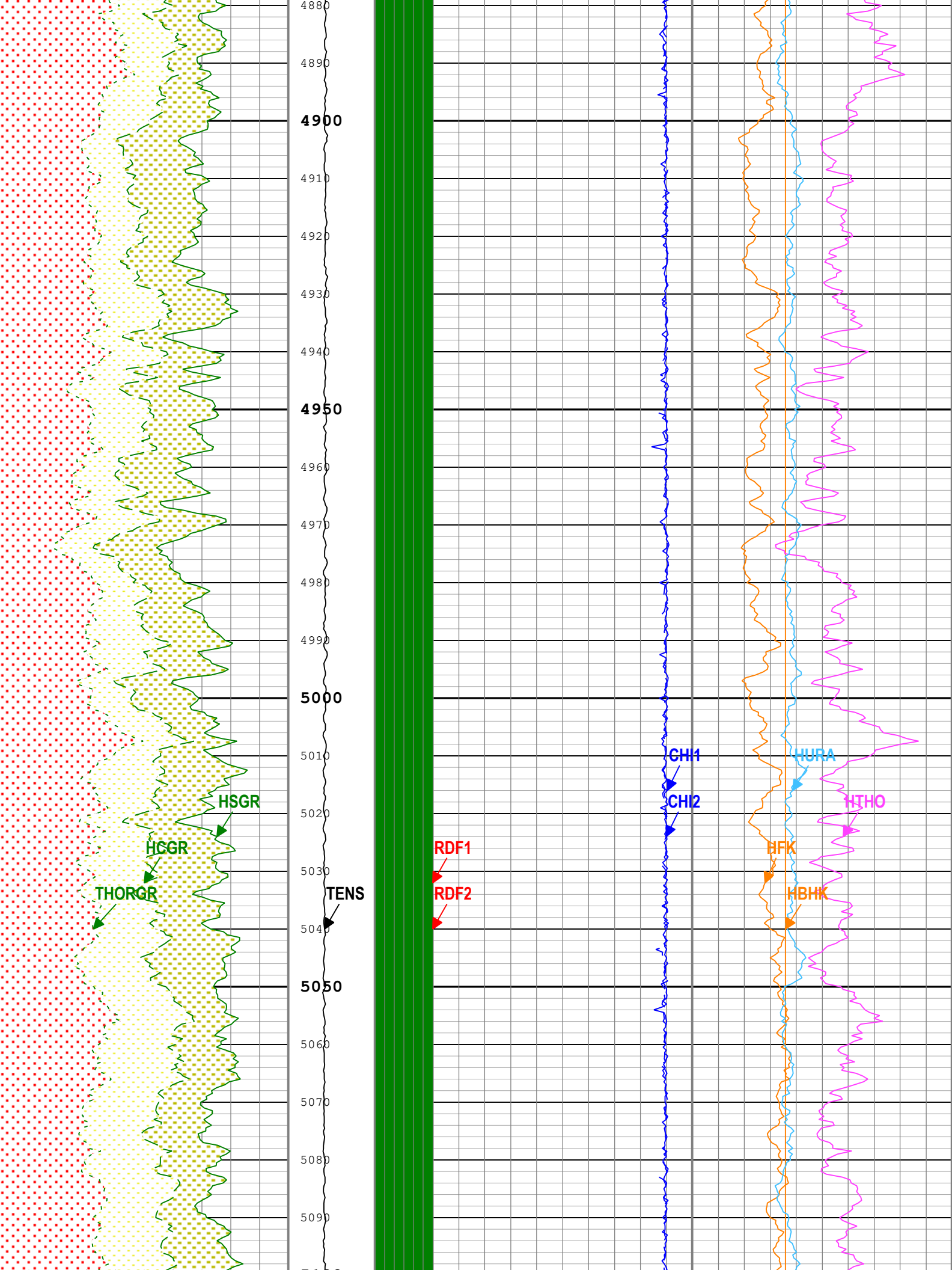


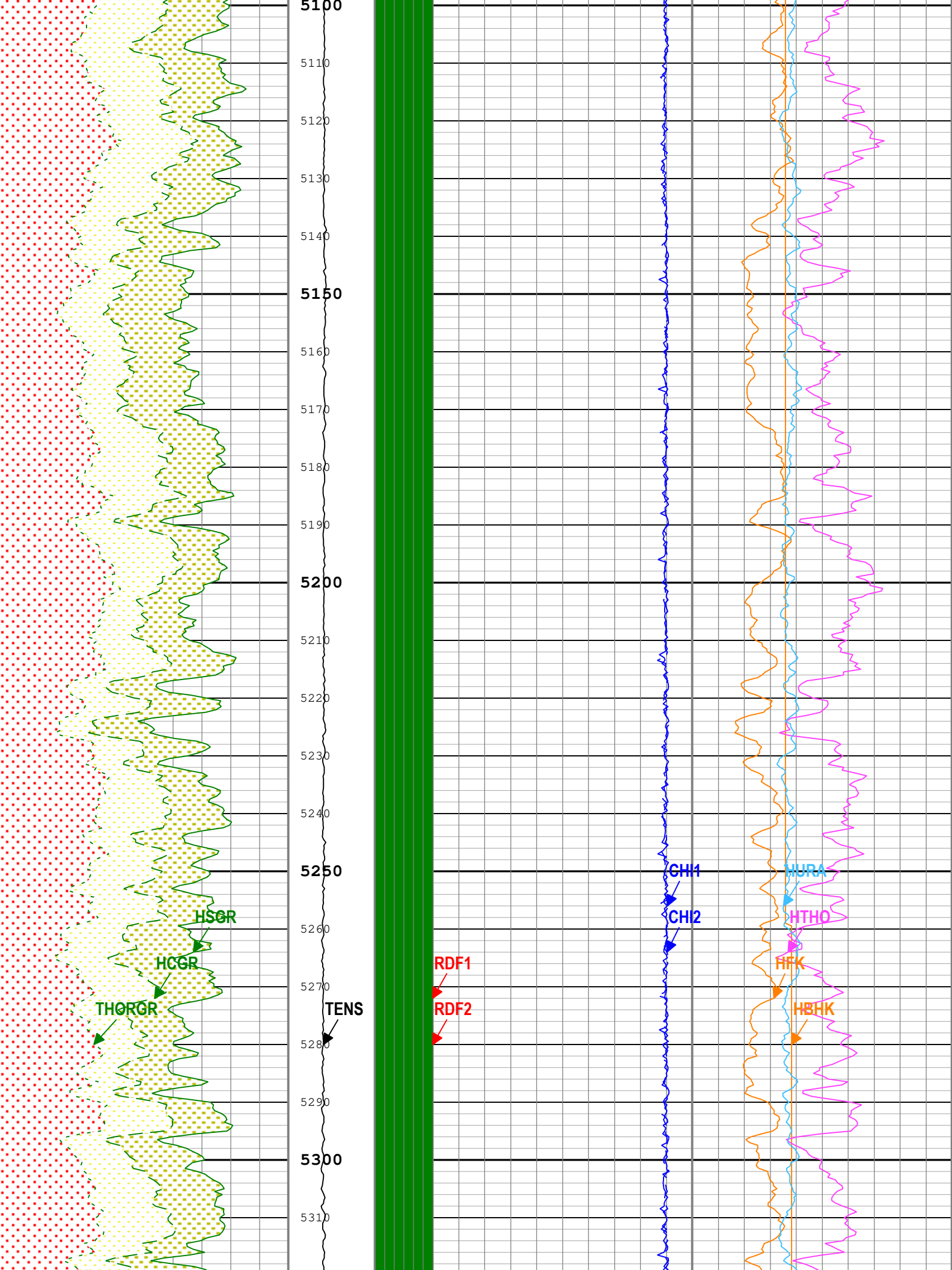


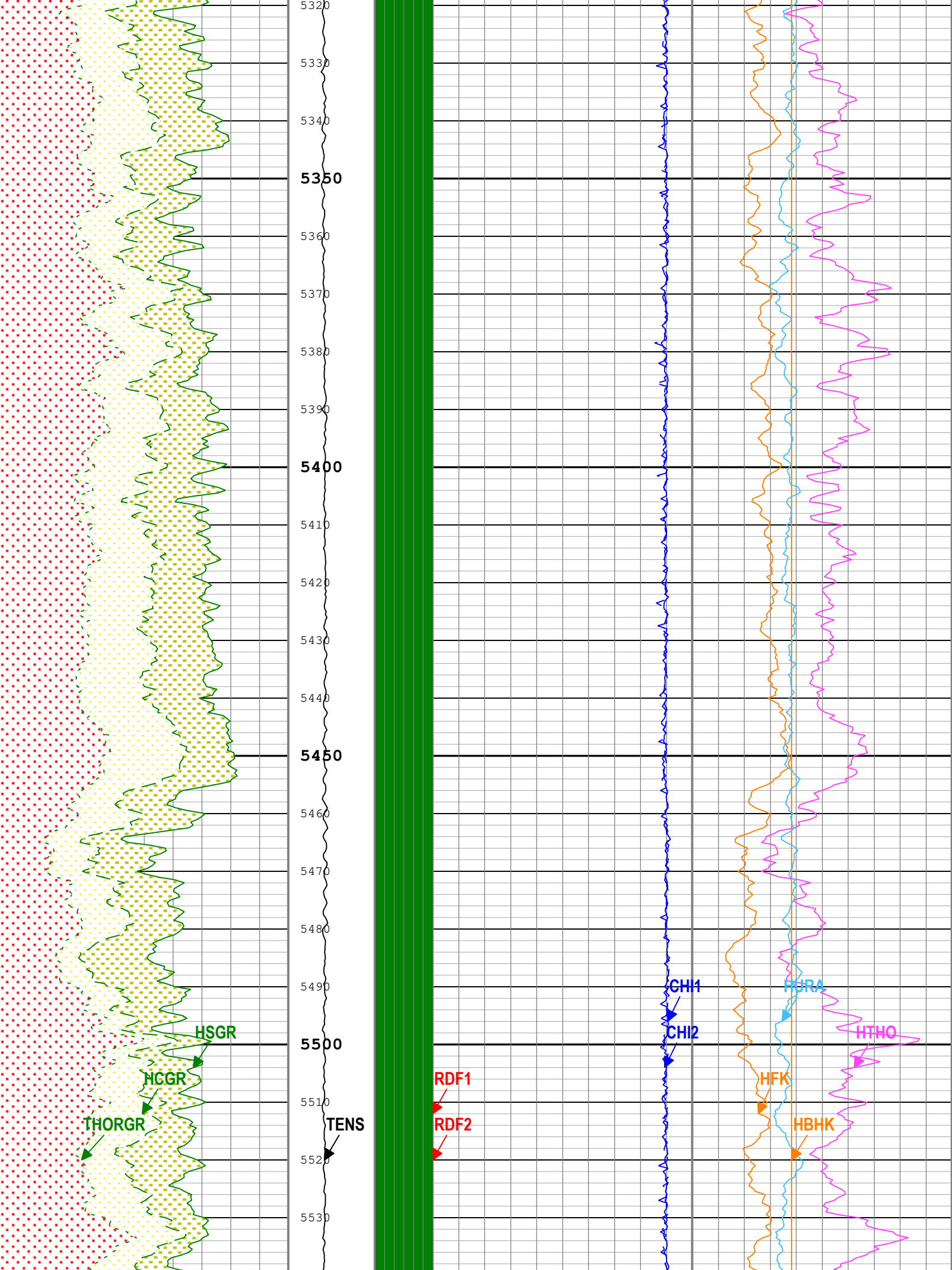


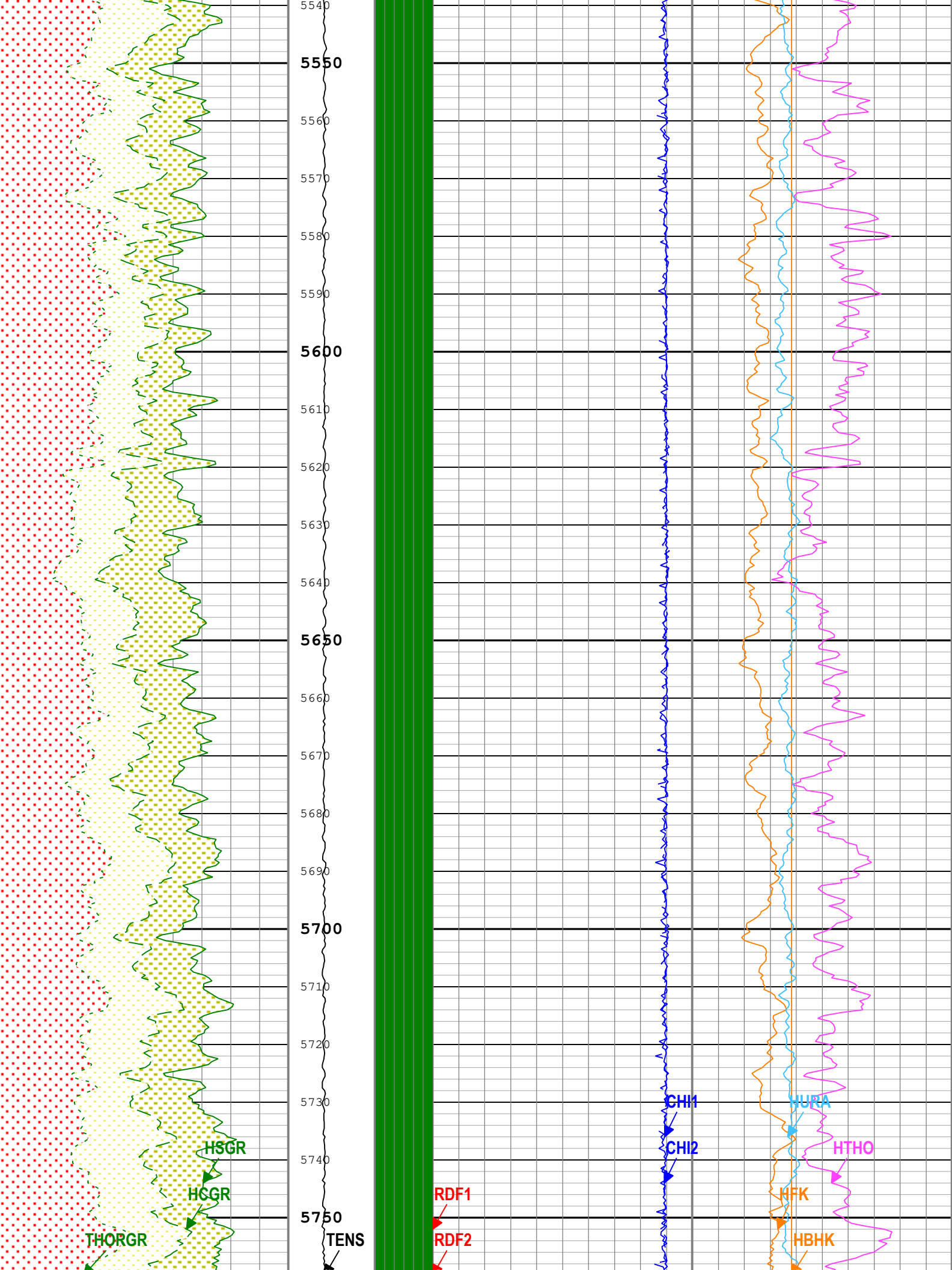


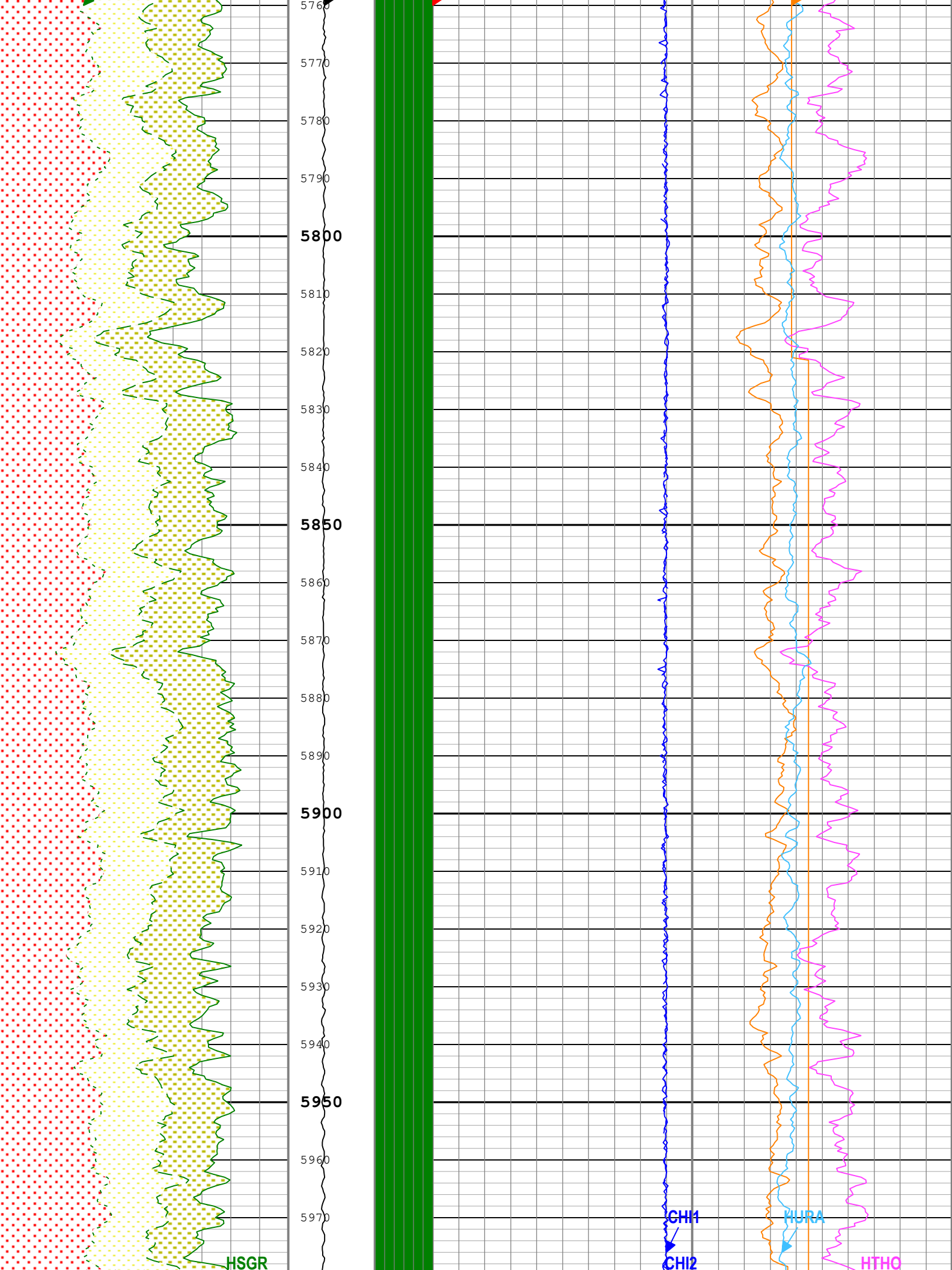


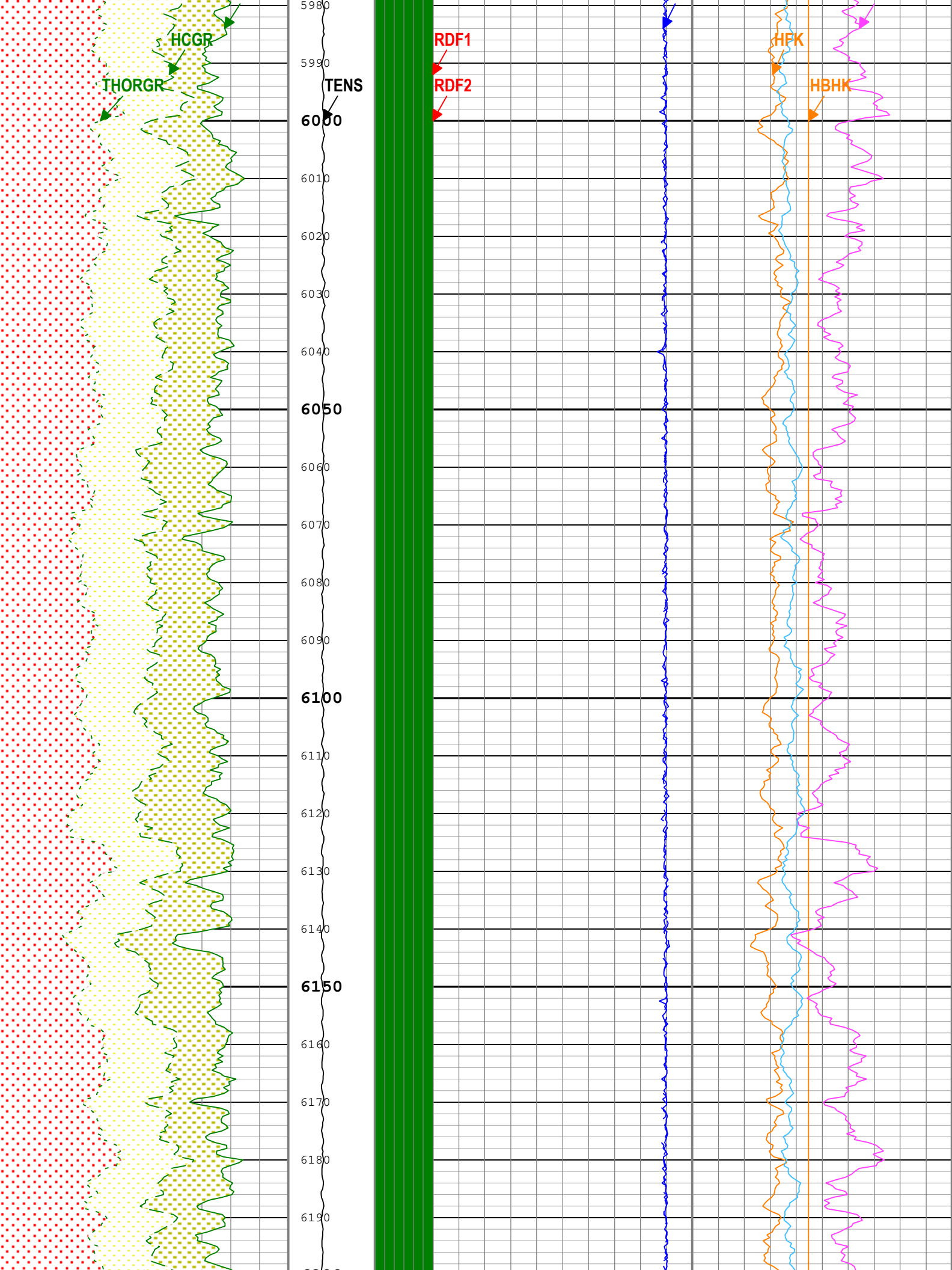


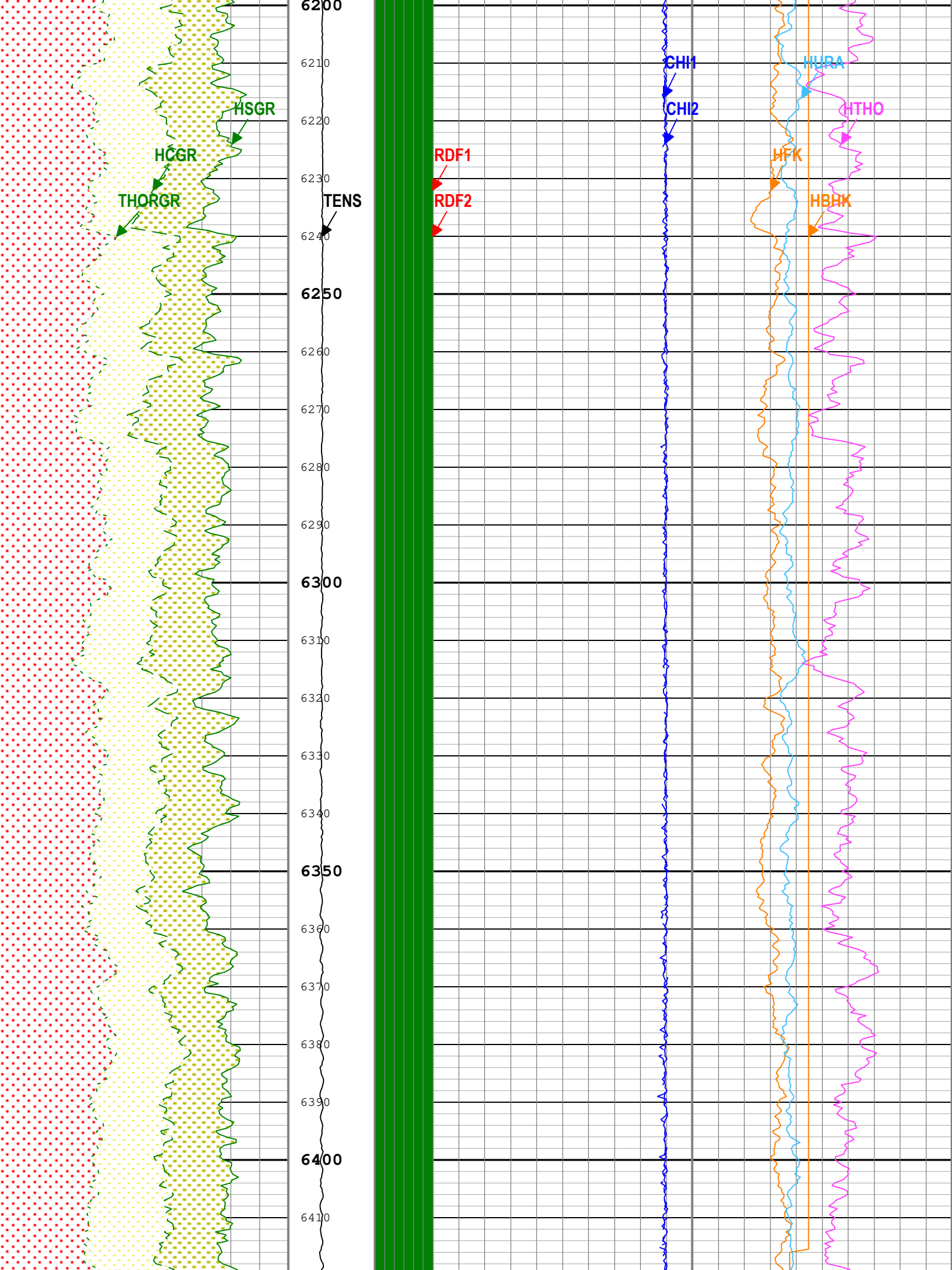


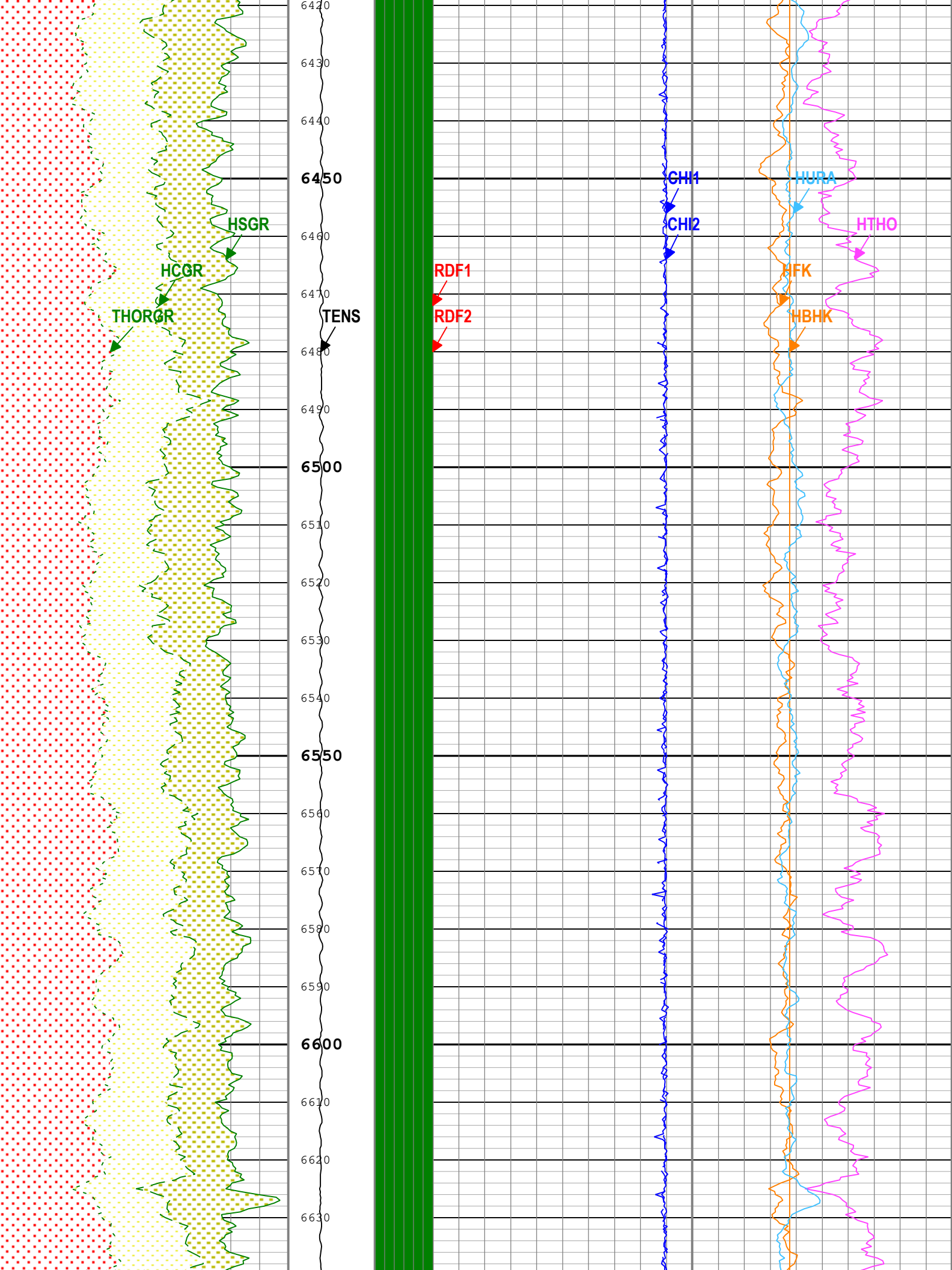


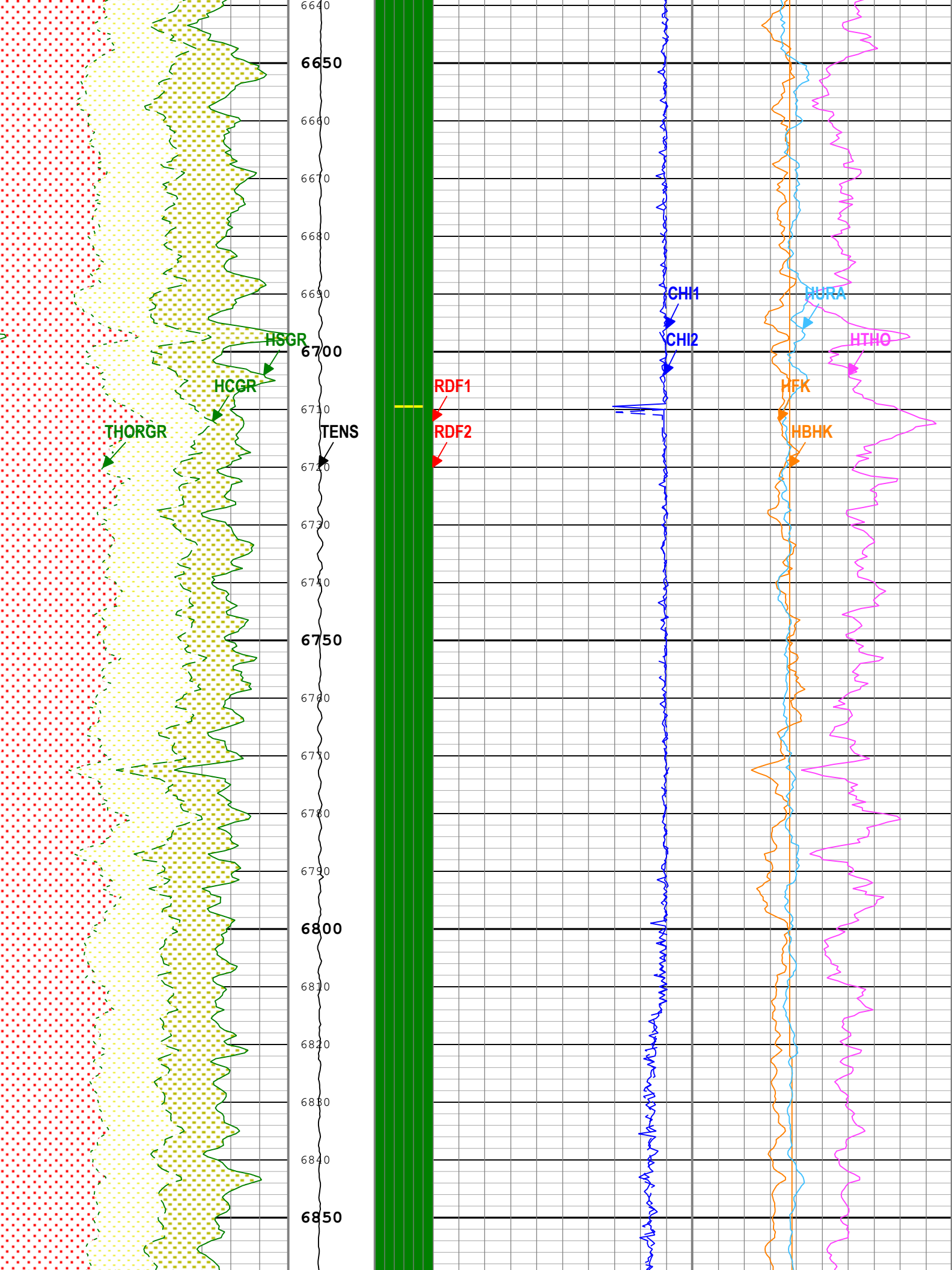


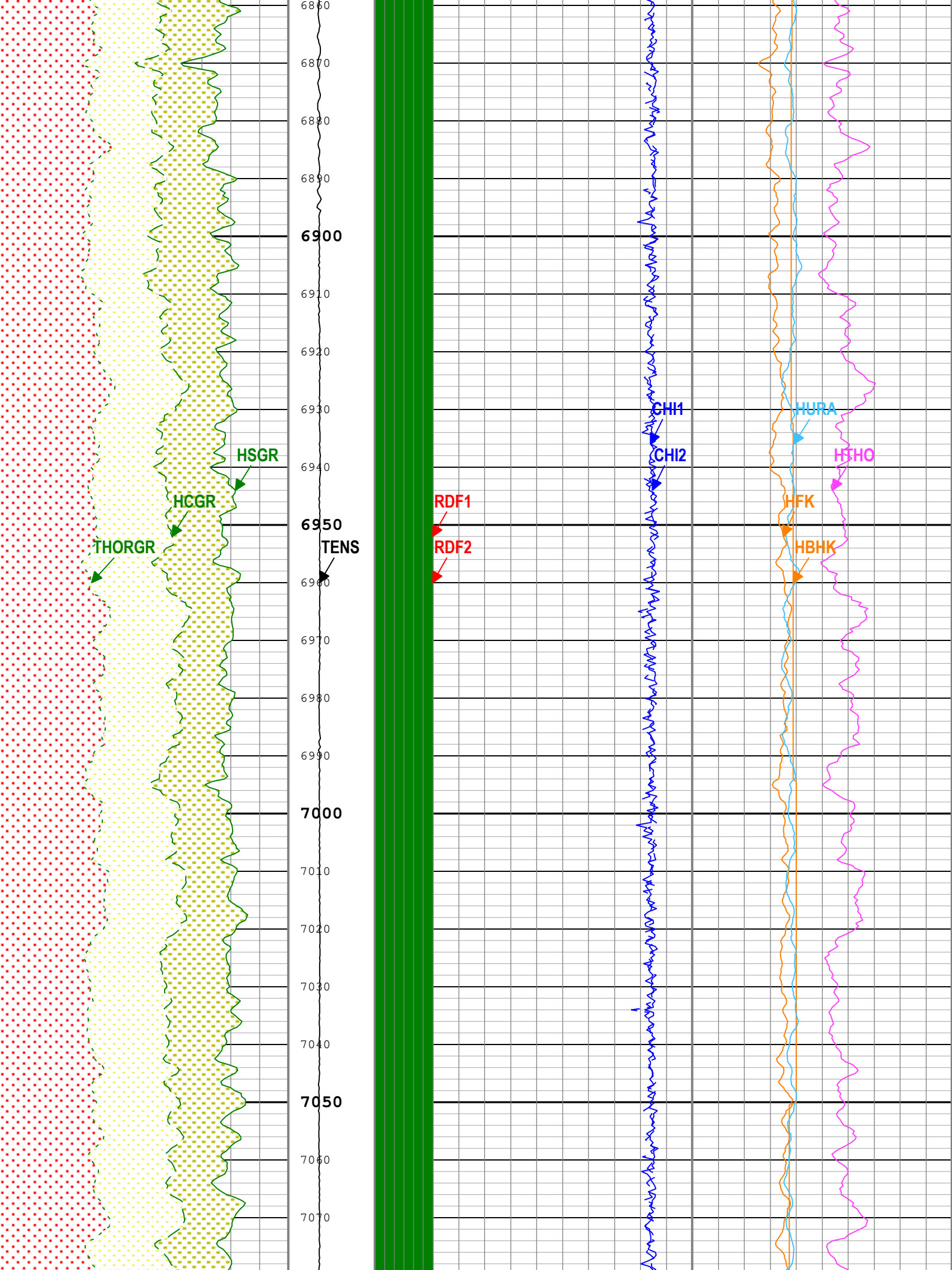


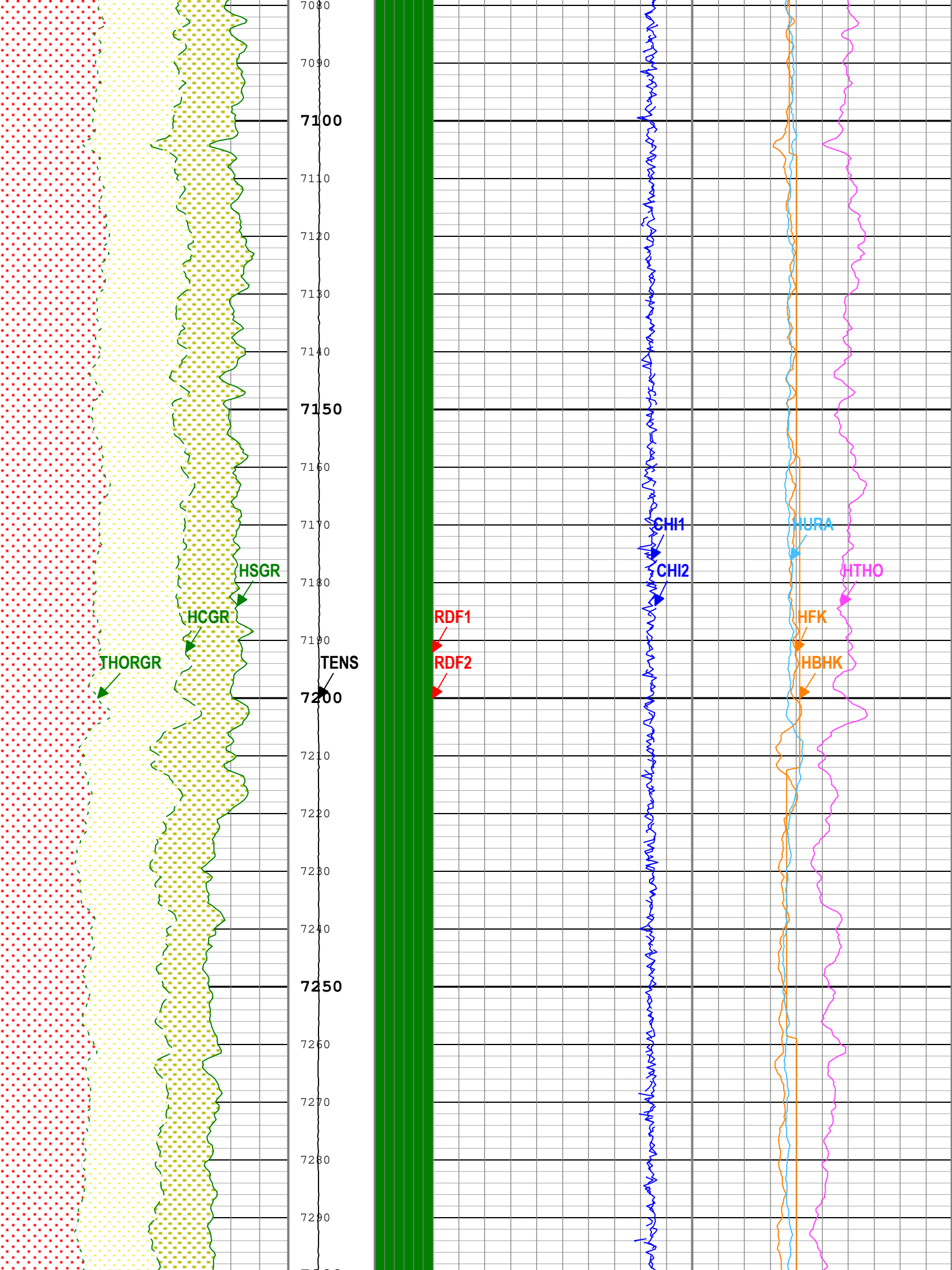


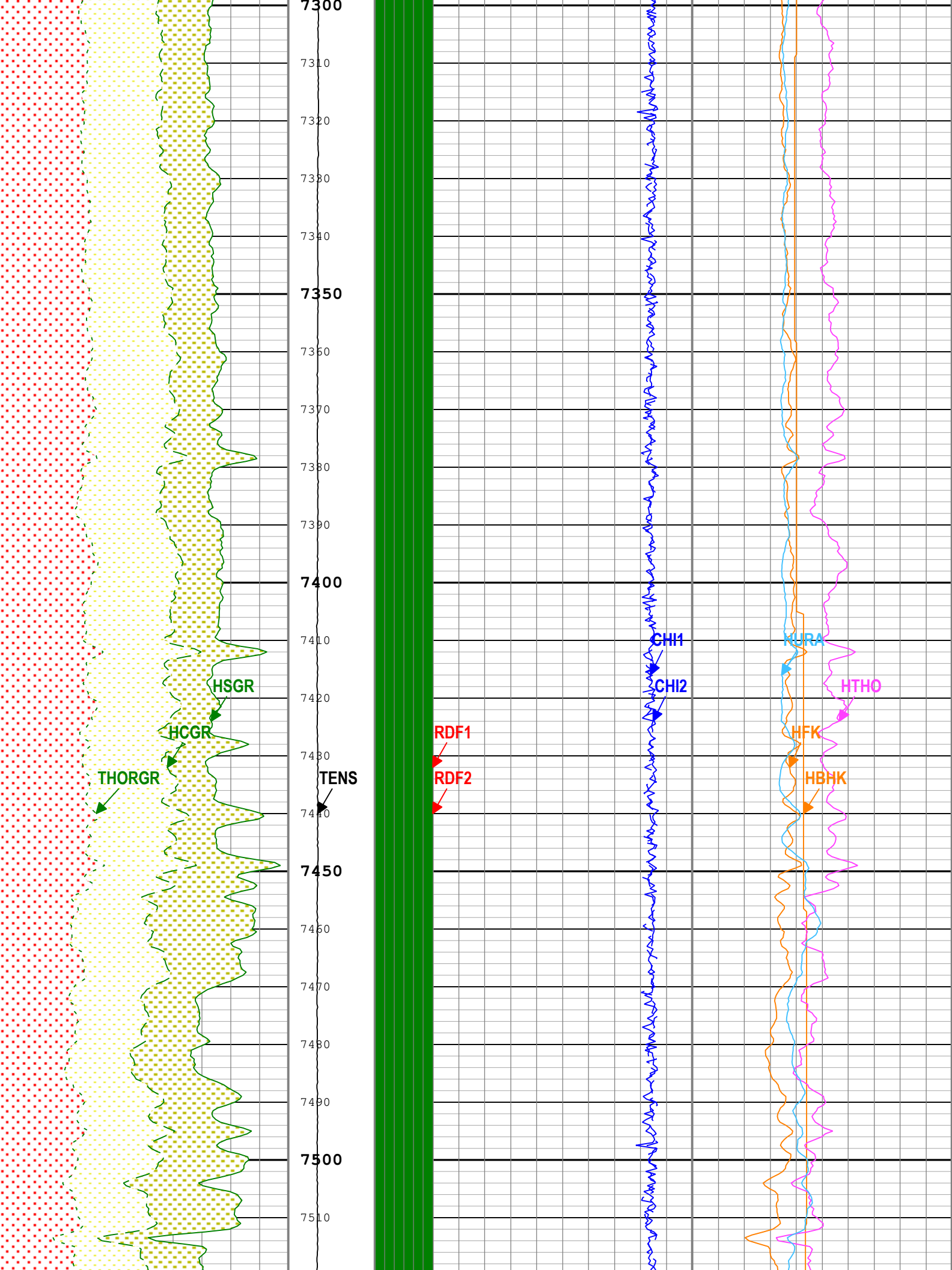


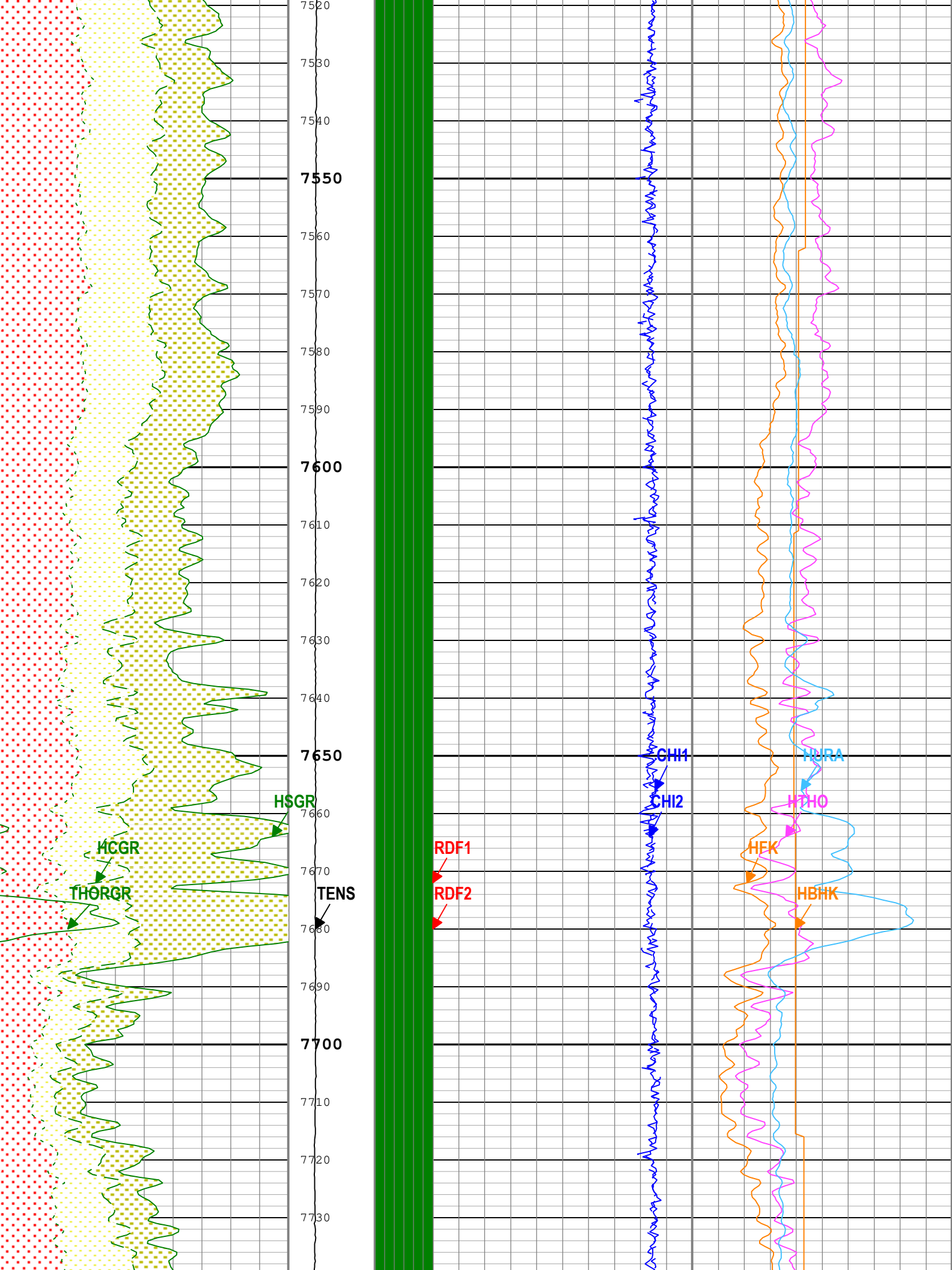


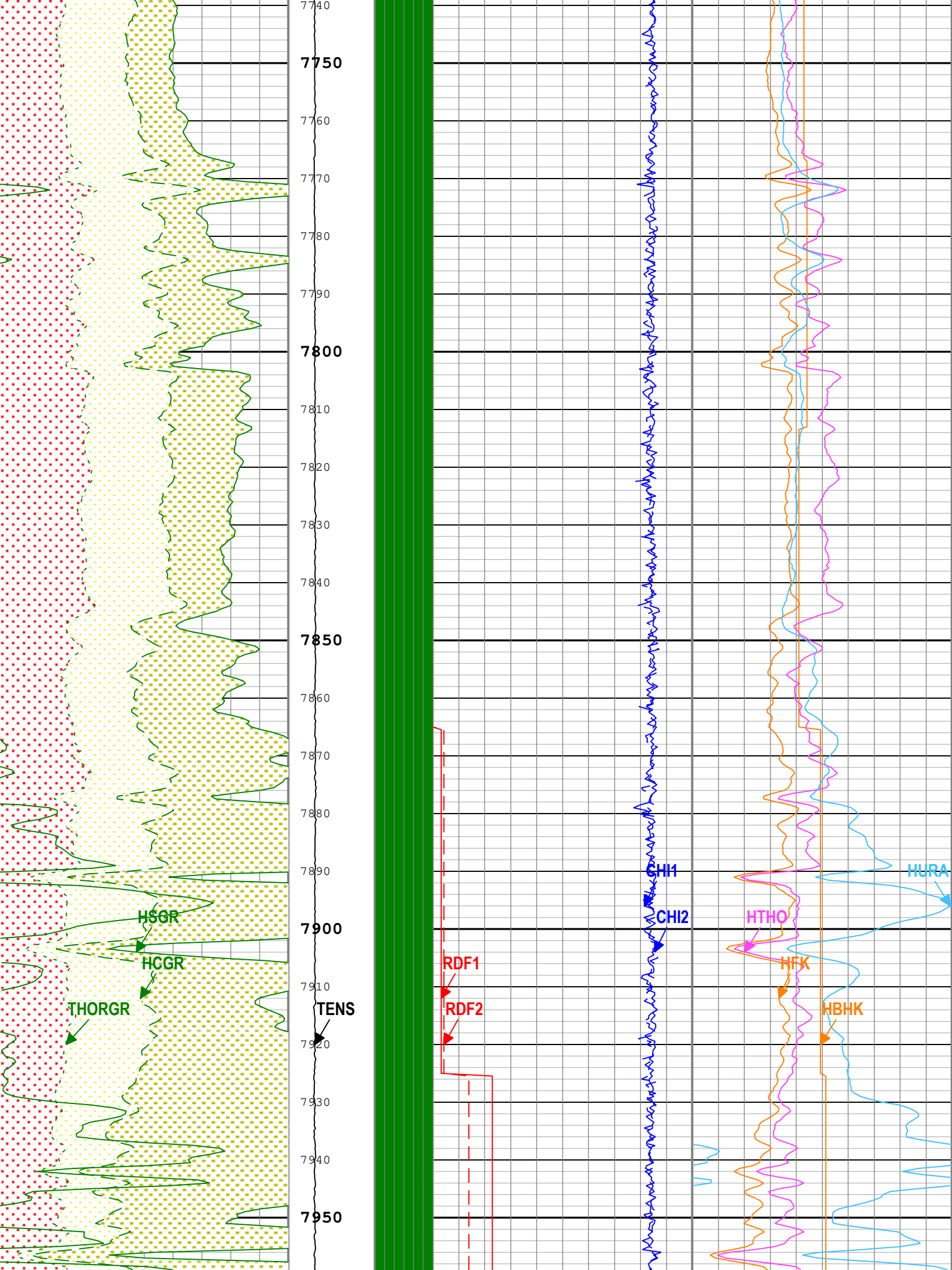


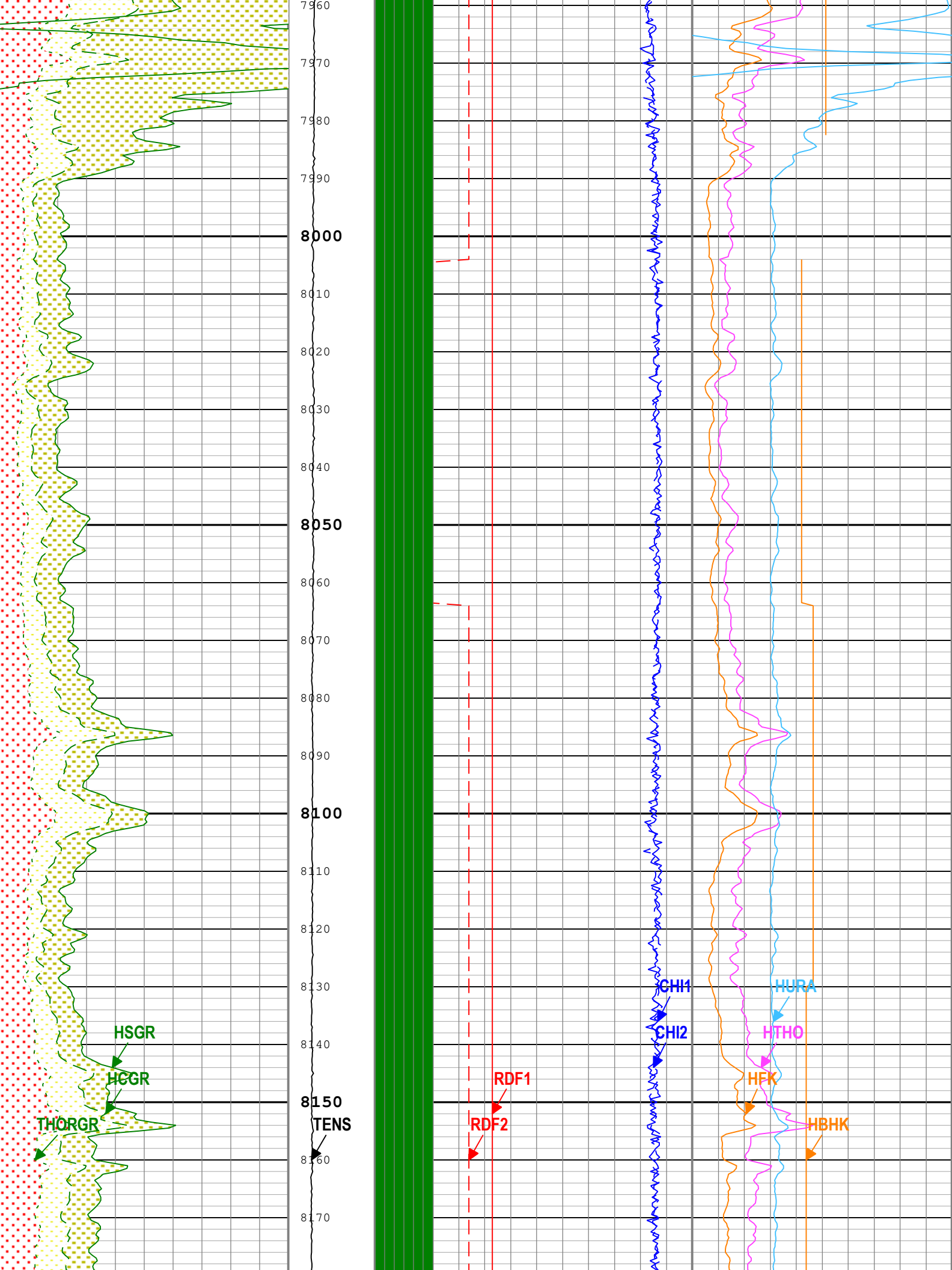


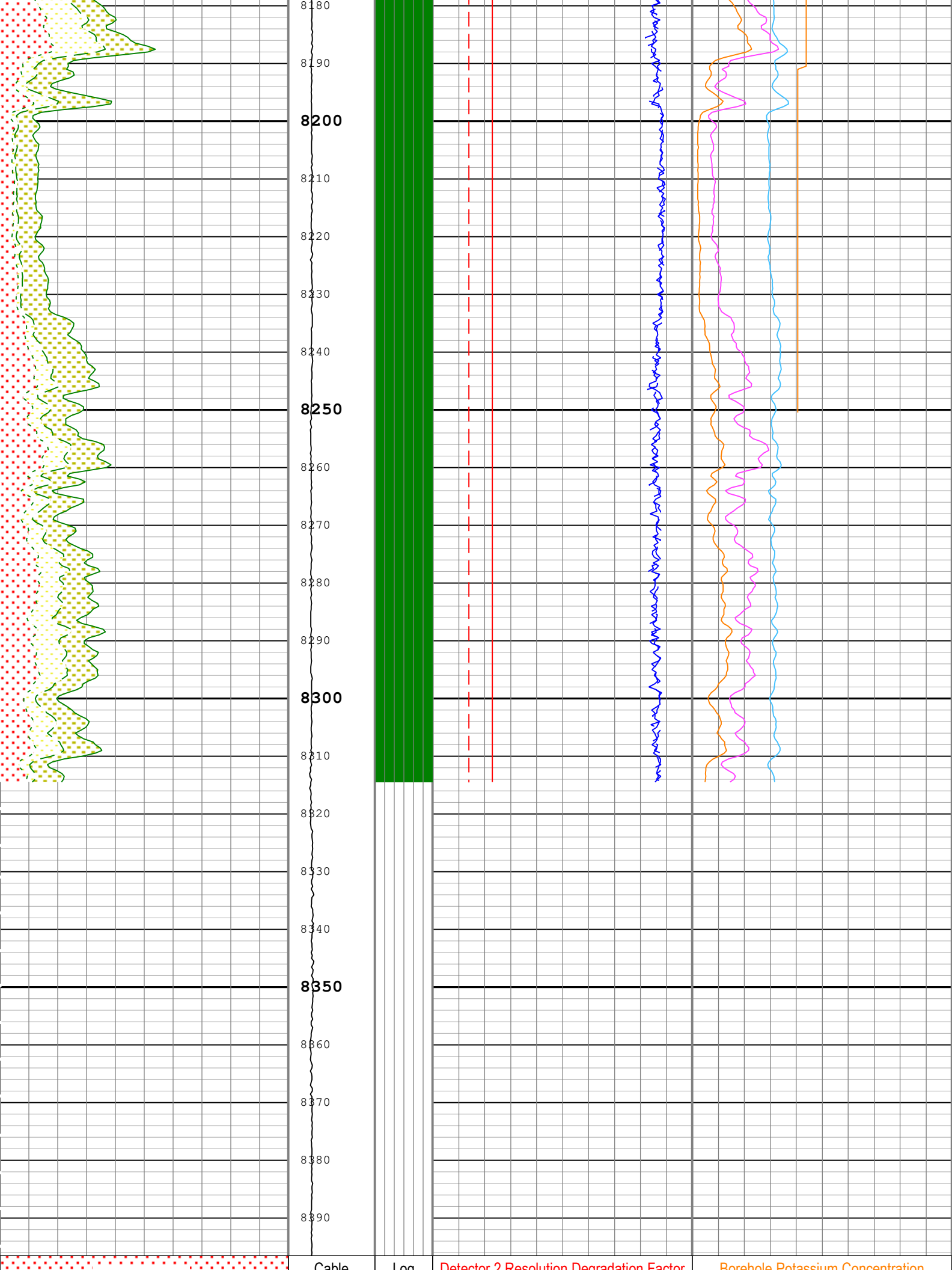












Gamma Ray Th	Cable Tension (TENS)	Log Quality Control Gamma Ray Status (LQC_GR) HNGS-BA[1]	Detector 2 Resolution Degradation Factor (RDF2) HNGS-BA[1]	Borehole Potassium Concentration (HBHK) HNGS-BA[1]
Gamma Ray Th + K	6000 lbf	0	010	-5%
Gamma Ray Th + K + U			Detector 1 Resolution Degradation Factor (RDF1) HNGS-BA[1]	Potassium Concentration (HFK) HNGS-BA[1]
Gamma Ray Contribution from Thorium (THORGR) HNGS-BA[1]			010	0%
gAPI200			Detector 2 Chi-Squared (CHI2) HNGS-BA[1]	Thorium Concentration (HTHO) HNGS-BA[1]
Gamma Ray Contribution from Thorium and Potassium (HCGR) HNGS-BA[1]			100	0ppm
gAPI200			Detector 1 Chi-Squared (CHI1) HNGS-BA[1]	Uranium Concentration (HURA) HNGS-BA[1]
Spectroscopy Gamma Ray (HSGR) HNGS-BA[1]			100	-10ppm
gAPI200				

Log Quality Control Gamma Ray Status (LQC_GR) HNGS-BA[1]		
1 - Det1TempStatus - Detector 1 Temperature Status :		50 °C <= Detector 1 Temperature < 80 °C
2 - Det2TempStatus - Detector 2 Temperature Status :		50 °C <= Detector 2 Temperature < 80 °C
3 - Det1CtrlLoopStatus - Detector 1 Control Loop Status :		Detector 1 Control Loop: Warning
4 - Det2CtrlLoopStatus - Detector 2 Control Loop Status :		Detector 2 Control Loop: Warning
5 - Det1ChiSqrStatus - Detector 1 Chi Squared Status :		Detector 1 Chi Squared > 3.0
6 - Det2ChiSqrStatus - Detector 2 Chi Squared Status :		Detector 2 Chi Squared > 3.0

TIME_1900 - Time Marked every 60.00 (s)
Description: HNGS Software Format: Log (BRADFORD HNGS Component Image) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured
Depth Creation Date: 15-Apr-2019 18:10:09

Channel Processing Parameters				
1A: Parameters				
Parameter	Description	Tool	Value	Unit
BAR1	Detector 1 Barite Constant	HNGS-BA	1	
BAR2	Detector 2 Barite Constant	HNGS-BA	1	
BAR1(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHK	Drilling Fluid Potassium Concentration	Borehole	0	%
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.446	in
CBLO	Casing Bottom (Logger)	WLSESSION	2543	ft
DBCC	Barite Constant Correction Flag	HNGS-BA	None	
DFD	Drilling Fluid Density	Borehole	9.5	lbm/gal
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
H1P	Detector 1 Allow/Disallow in Processing	HNGS-BA	Allow	
H2P	Detector 2 Allow/Disallow in Processing	HNGS-BA	Allow	
HALF	Alpha Filter Length	HNGS-BA	60	in
HATIM	Marquardt Accumulation Time	HNGS-BA	600	s
HCRB	Apply Borehole Potassium Correction	HNGS-BA	None	
HEMA	Hematite Presence Flag	Borehole	No	

SGRC	Standard Gamma Ray Correction Flag	HNGS-BA	Yes	
TPOS	Tool Position: Centered or Eccentered	HNGS-BA	Eccentered	

1ADepth Zoned Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	12.25	2525	2543
BS	8.5	2543	8396.5

All depth are actual.

Tool Control Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	1800	ft/h

1A

REPEAT PASS 5"=100"

Software Version

Acquisition System	Version
Maxwell 2019	9.0.106845.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
1A	Log[10]:Up	Up	7693.14 ft	8410.89 ft	15-Apr-2019 4:41:25 PM	15-Apr-2019 5:26:23 PM	ON	10.94 ft	Yes

All depths are referenced to toolstring zero

Log	Company:North East Natural Energy LLC	Well:Boggess 17H
		1A: Log[10]:Up:S012

Description: HNGS Software Format: Log (BRADFORD HNGS Component Image) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured
Depth Creation Date: 15-Apr-2019 18:10:16

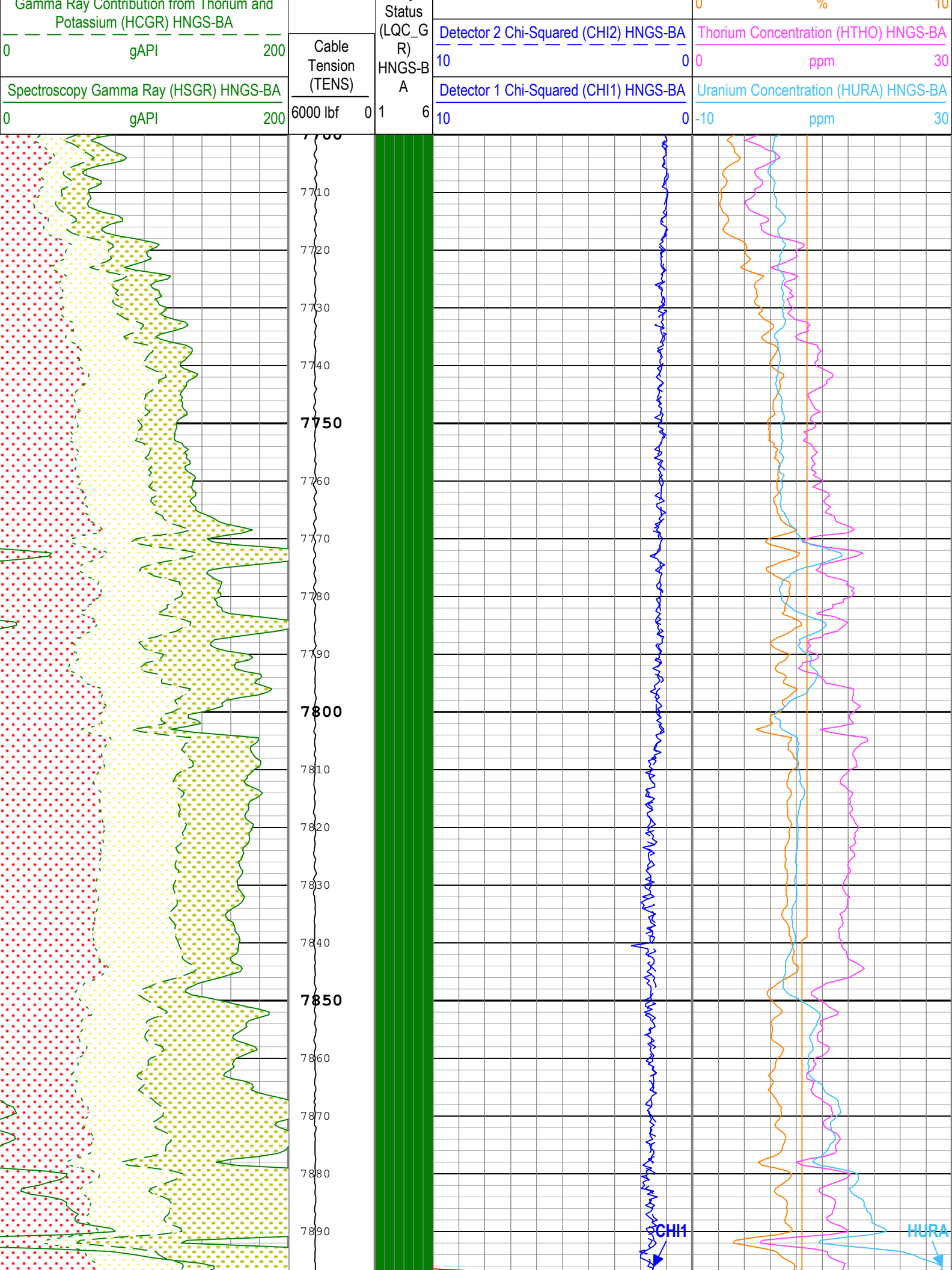
TIME_1900 - Time Marked every 60.00 (s)

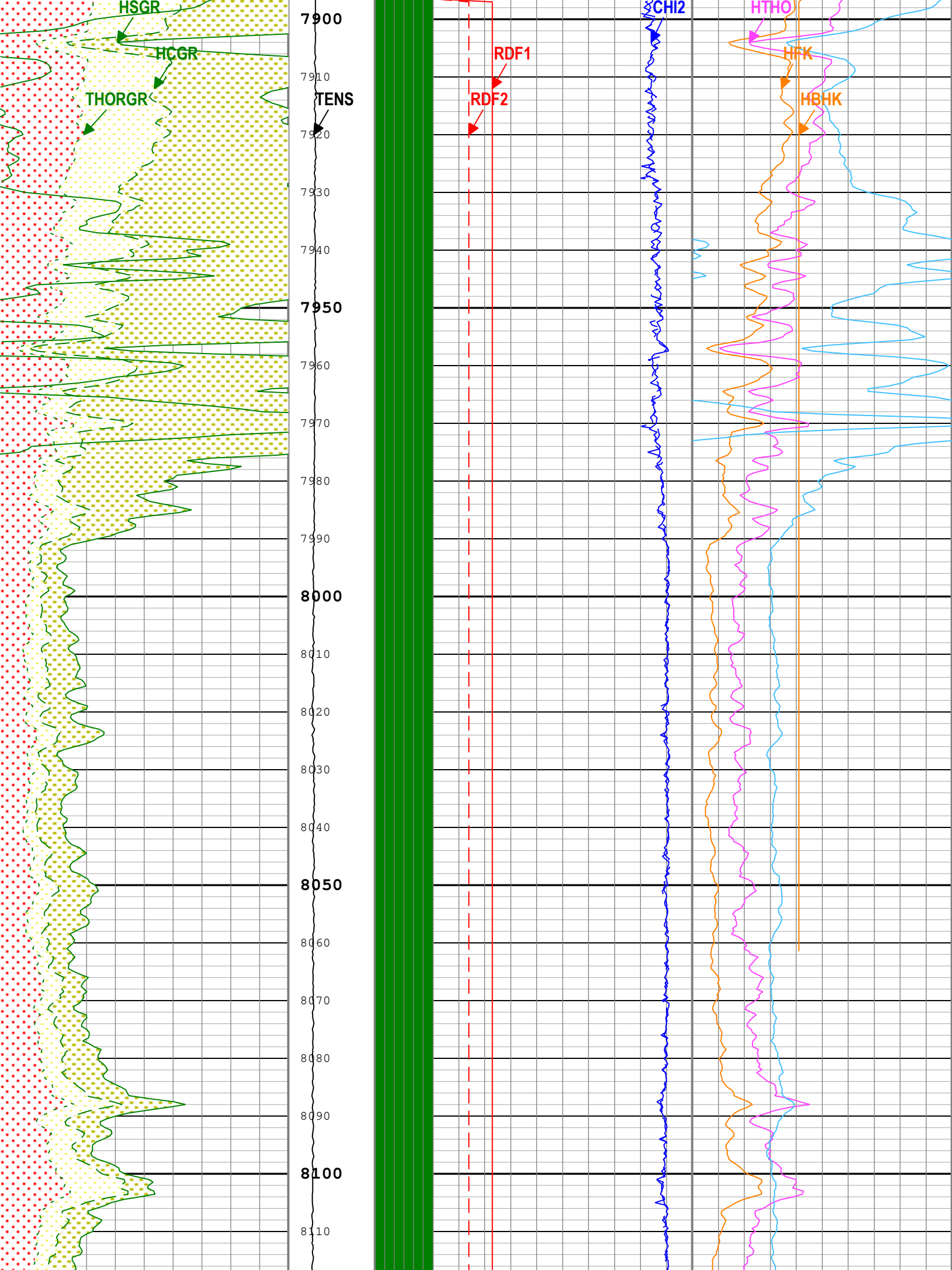
Log Quality Control Gamma Ray Status (LQC_GR) HNGS-BA

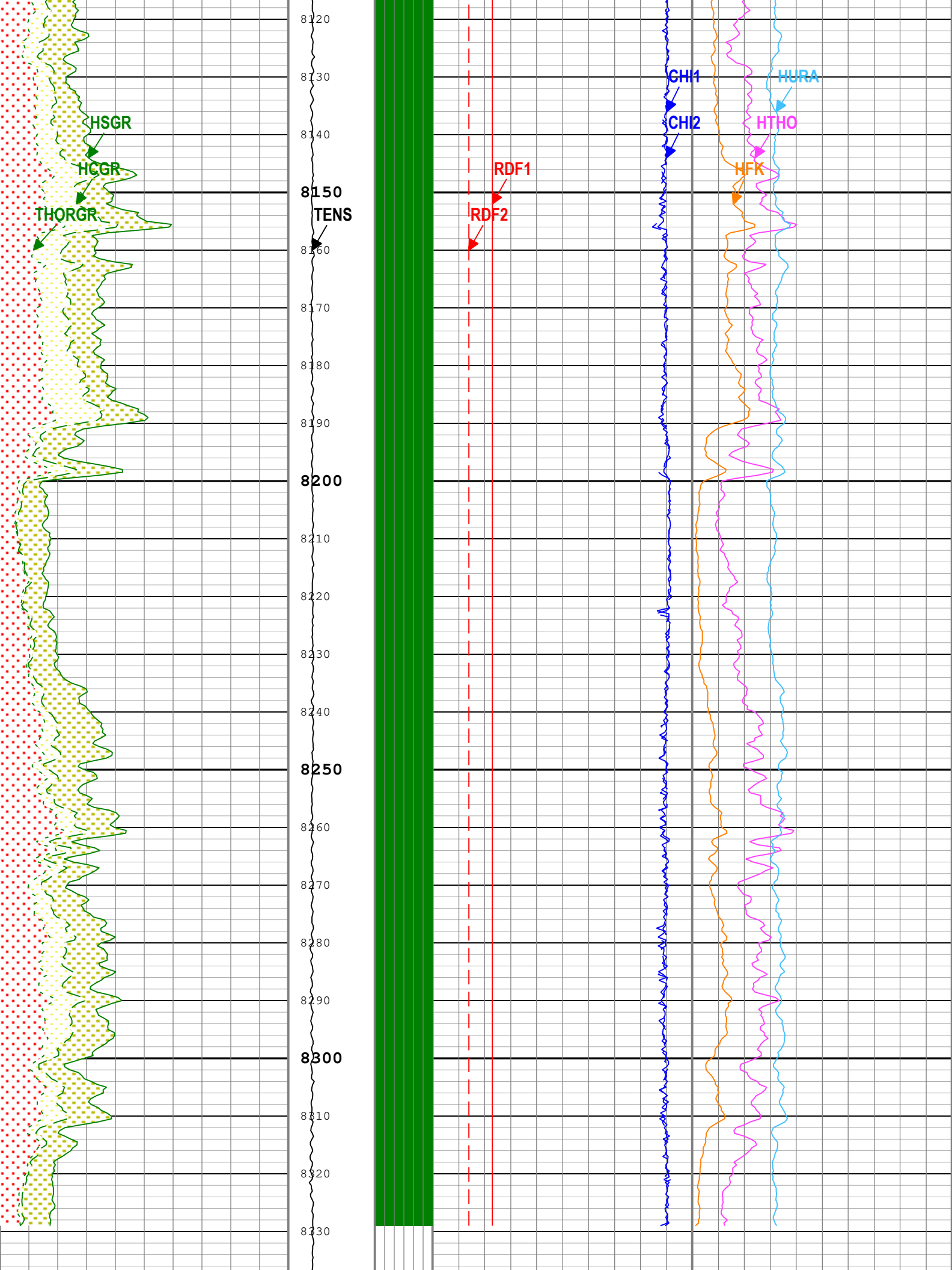
1 - Det1TempStatus - Detector 1 Temperature Status :	Detector 1 Temperature < 50 °C	50 °C <= Detector 1 Temperature < 80 °C
2 - Det2TempStatus - Detector 2 Temperature Status :	Detector 2 Temperature < 50 °C	50 °C <= Detector 2 Temperature < 80 °C
3 - Det1CtrlLoopStatus - Detector 1 Control Loop Status :	Detector 1 Control Loop: Normal	Detector 1 Control Loop: Warning
4 - Det2CtrlLoopStatus - Detector 2 Control Loop Status :	Detector 2 Control Loop: Normal	Detector 2 Control Loop: Warning
5 - Det1ChiSqrdStatus - Detector 1 Chi Squared Status :	Detector 1 Chi Squared <= 3.0	Detector 1 Chi Squared > 3.0
6 - Det2ChiSqrdStatus - Detector 2 Chi Squared Status :	Detector 2 Chi Squared <= 3.0	Detector 2 Chi Squared > 3.0

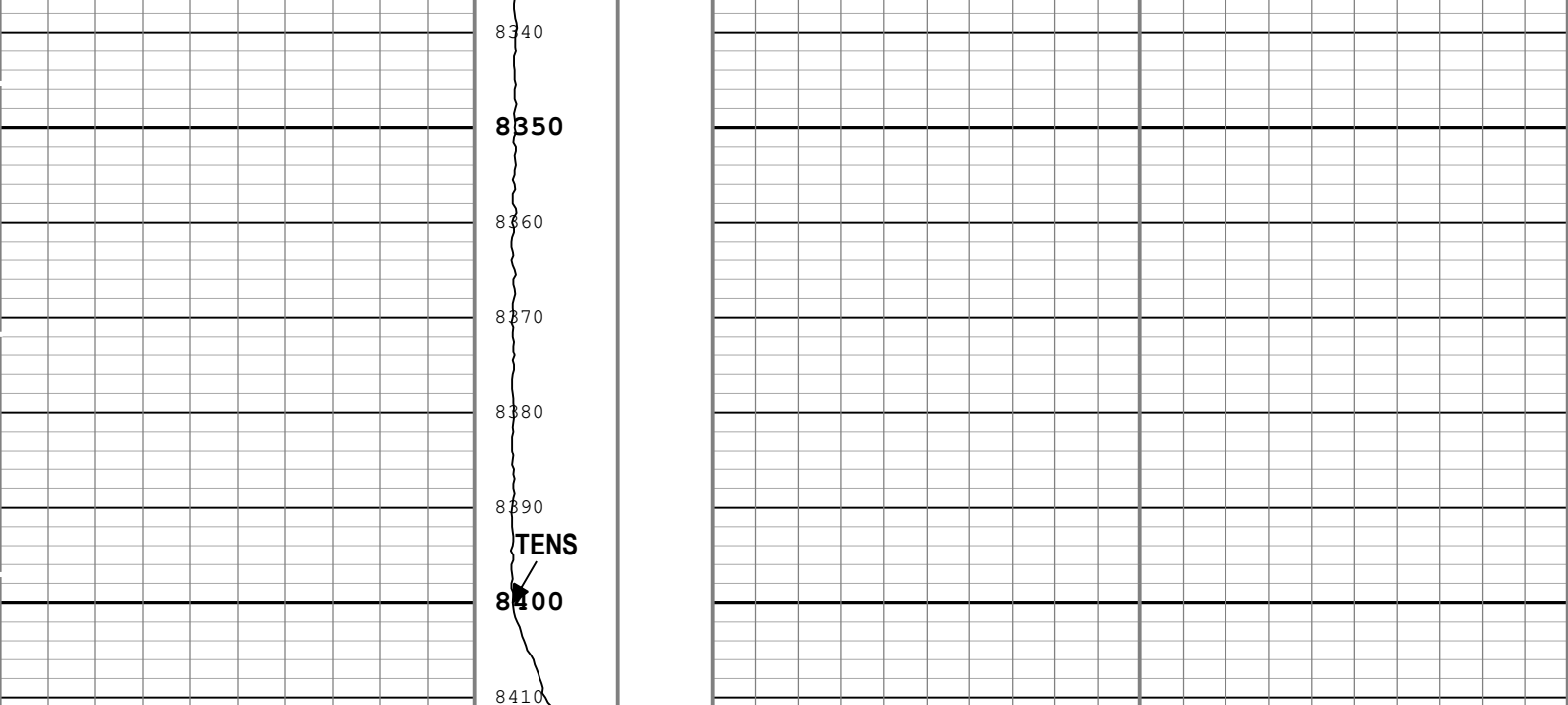
Gamma Ray Th
Gamma Ray Th + K
Gamma Ray Th + K + U
Gamma Ray Contribution from Thorium (THORGR) HNGS-BA
0gAPI200

Log Quality Control Gamma Ray	Detector 2 Resolution Degradation Factor (RDF2) HNGS-BA		Borehole Potassium Concentration (HBHK) HNGS-BA
	010		-5%5
	Detector 1 Resolution Degradation Factor (RDF1) HNGS-BA		Potassium Concentration (HFK) HNGS-BA
	010		0%









Gamma Ray Th	Cable Tension (TENS)	Log Quality Control Gamma Ray Status (LQC_GR) HNGS-BA	Detector 2 Resolution Degradation Factor (RDF2) HNGS-BA	Borehole Potassium Concentration (HBHK) HNGS-BA
Gamma Ray Th + K	6000 lbf	0	0	-5
Gamma Ray Th + K + U	0	1	10	%
Gamma Ray Contribution from Thorium (THORGR) HNGS-BA			Detector 1 Resolution Degradation Factor (RDF1) HNGS-BA	Potassium Concentration (HFK) HNGS-BA
0			0	0
gAPI			10	%
200				10
Gamma Ray Contribution from Thorium and Potassium (HCGR) HNGS-BA			Detector 2 Chi-Squared (CHI2) HNGS-BA	Thorium Concentration (HTHO) HNGS-BA
0			10	0
gAPI			0	ppm
200				30
Spectroscopy Gamma Ray (HSGR) HNGS-BA			Detector 1 Chi-Squared (CHI1) HNGS-BA	Uranium Concentration (HURA) HNGS-BA
0			10	-10
gAPI			0	ppm
200				30

Log Quality Control Gamma Ray Status (LQC_GR) HNGS-BA		
1 - Det1TempStatus - Detector 1 Temperature Status :	Detector 1 Temperature < 50 °C Detector 1 Temperature >= 80 °C	50 °C <= Detector 1 Temperature < 80 °C
2 - Det2TempStatus - Detector 2 Temperature Status :	Detector 2 Temperature < 50 °C Detector 2 Temperature >= 80 °C	50 °C <= Detector 2 Temperature < 80 °C
3 - Det1CtrlLoopStatus - Detector 1 Control Loop Status :	Detector 1 Control Loop: Normal Detector 1 Control Loop: Error	Detector 1 Control Loop: Warning
4 - Det2CtrlLoopStatus - Detector 2 Control Loop Status :	Detector 2 Control Loop: Normal Detector 2 Control Loop: Error	Detector 2 Control Loop: Warning
5 - Det1ChiSqrdStatus - Detector 1 Chi Squared Status :	Detector 1 Chi Squared <= 3.0	Detector 1 Chi Squared > 3.0
6 - Det2ChiSqrdStatus - Detector 2 Chi Squared Status :	Detector 2 Chi Squared <= 3.0	Detector 2 Chi Squared > 3.0

TIME_1900 - Time Marked every 60.00 (s)

Description: HNGS Software Format: Log (BRADFORD HNGS Component Image) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured
Depth Creation Date: 15-Apr-2019 18:10:16

Channel Processing Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	

BHK	Drilling Fluid Potassium Concentration	Borehole	0	%
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	8.5	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.446	in
CBLO	Casing Bottom (Logger)	WLSESSION	2543	ft
DBCC	Barite Constant Correction Flag	HNGS-BA	None	
DFD	Drilling Fluid Density	Borehole	9.5	lbm/gal
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
HCRB	Apply Borehole Potassium Correction	HNGS-BA	None	
HEMA	Hematite Presence Flag	Borehole	No	
SGRC	Standard Gamma Ray Correction Flag	HNGS-BA	Yes	

Tool Control Parameters

1A: Parameters

Parameter	Description	Tool	Value	Unit
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	1800	ft/h

Calibration Report

HNGS-BA (Hostile-environment Natural Gamma-ray Sonde) Calibration - Run 1A

Primary Equipment :

HNGS Sonde Element HNGS-BA 425

Auxiliary Equipment :

Hostile Natural Gamma Ray Cartridge HNGC-B 108

HNGS Housing Element HEH-K 1070

0

Calibration History - Calibration History

Master:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
- 0		Master	----	----	----	----	

HNGS Background and Na22 Set Point Determination - Detector 1 Check

Master (EEPROM):		13:40:25 26-Oct-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Na 511 Peak Location		Master	40.000	37.500	38.569	42.500	
Na 511 Peak Resolution	%	Master	15.500	12.000	13.853	19.000	
High Voltage DAC Value	V	Master			932.830		
Na 1785 Peak Location		Master	142.650	135.000	139.621	150.300	
Na 1785 Peak Resolution	%	Master	8.500	6.500	8.477	11.000	
Temperature - 0	degF	Master	----	----	----	----	
Na Count Rate	CPS	Master	45.000	15.000	21.874	100.000	

HNGS Background and Na22 Set Point Determination - Detector 2 Check

Master (EEPROM):		13:40:25 26-Oct-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Na 511 Peak Location		Master	40.000	37.500	38.688	42.500	
Na 511 Peak Resolution	%	Master	15.500	12.000	14.863	19.000	
High Voltage DAC Value	V	Master			932.385		
Na 1785 Peak Location		Master	142.650	135.000	139.138	150.300	
Na 1785 Peak Resolution	%	Master	8.500	6.500	7.905	11.000	
Temperature - 0	degF	Master	----	----	----	----	
Na Count Rate	CPS	Master	45.000	15.000	21.259	100.000	

HNGS Background and Na22 Set Point Determination - Ratio of Detector 1 to Detector 2

Master (EEPROM):		13:40:25 26-Oct-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Coincidence Count Rate Ratio		Master			1.030		

HNGS Background and Na22 Set Point Determination - Detector 1 Calibration							
Master (EEPROM):		13:40:25 26-Oct-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Th Peak Location		Master	209.630	201.000	208.272	218.250	
Th Peak Resolution	%	Master	7.000	5.000	7.280	9.000	
Background Count Rate	CPS	Master			78.744		
Gain Ratio		Master	1.000	0.940	1.027	1.060	

HNGS Background and Na22 Set Point Determination - Detector 2 Calibration							
Master (EEPROM):		13:40:25 26-Oct-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Th Peak Location		Master	209.630	201.000	207.627	218.250	
Th Peak Resolution	%	Master	7.000	5.000	6.663	9.000	
Background Count Rate	CPS	Master			77.082		
Gain Ratio		Master	1.000	0.940	1.021	1.060	

HNGS Background and Na22 Set Point Determination - Detector 1 Calibration							
Master (EEPROM):		13:40:25 26-Oct-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Na 511 Peak Set Point		Master	40.000	38.000	40.000	43.500	

HNGS Background and Na22 Set Point Determination - Detector 2 Calibration							
Master (EEPROM):		13:40:25 26-Oct-2018					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Na 511 Peak Set Point		Master	40.000	38.000	40.000	43.500	

EDTC-B (Enhanced Digital Telemetry Cartridge - Version B) Calibration - Run 1A			
Primary Equipment :			
EDTC-B		EDTC-B	9231
Calibration Parameter :			
Plus Reference (Jig minus background reference)		165	

EDTC-B Memory Data - EDTC-B Memory Data							
Master (EEPROM):		09:57:01 15-Apr-2019					
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Initial PMT HV	V	Master			1395.000		
Accelerometer Serial Number		Master			144		
Accelerometer Coefficients - 0		Master	----	----	2.938E+000	----	
Accelerometer Coefficients - 1		Master	----	----	2.077E-004	----	
Accelerometer Coefficients - 2		Master	----	----	7.563E-007	----	
Accelerometer Coefficients - 3		Master	----	----	-2.103E-008	----	
Accelerometer Coefficients - 4		Master	----	----	5.623E-010	----	
Accelerometer Coefficients - 5		Master	----	----	-4.367E-012	----	
Accelerometer Coefficients - 6		Master	----	----	1.152E-014	----	
Accelerometer Coefficients - 7		Master	----	----	-1.113E-003	----	
Accelerometer Coefficients - 8		Master	----	----	2.612E-005	----	
Accelerometer Coefficients - 9		Master	----	----	1.450E-007	----	
Accelerometer Coefficients - 10		Master	----	----	-1.743E-009	----	
Accelerometer Coefficients - 11		Master	----	----	3.857E-012	----	
Gamma-Ray Detector Serial Number		Master			79427		

Company: North East Natural Energy LLC

Schlumberger

Well: Boggess 17H

Field: Wildcat

County: Monongalia

State: West Virginia

HOSTILE NATURAL GAMMA SPECTROSCOPY
GAMMA RAY / CALIPER