

Company:		Nighthawk Production LLC		Schlumberger	
Well:		Silverton 16-10			
Field:		Jolly Ranch			
County:		Lincoln		State: Colorado	
BHC Sonic					
Location:		Lat/Long : 39.539/-103.42 SHL : 1183' FSL X 922' FEL SESE		Elev. K.B. 5242.00 ft G.L. 5227.00 ft D.F. 5241.00 ft	
Permanent Datum:		Ground Level		Elev.: 5227.00 f	
Log Measured From:		Kelly Bushing		15.00 ft above Perm.Datum	
Drilling Measured From:		Kelly Bushing			
API Serial No.		Section: 10		Township: 6S	
05-073-06528-00				Range: 54W	
Logging Date		12-Jun-2013			
Run Number		Run 1			
Depth Driller		8450.00 ft			
Schlumberger Depth		8460.00 ft			
Bottom Log Interval		8460.00 ft			
Top Log Interval		345.00 ft			
Casing Driller Size @ Depth		8.625 in @ 334.00 ft			
Casing Schlumberger		345 ft			
Bit Size		7.875 in			
Type Fluid In Hole		Chemical Gel			
Density		Viscosity		68 s	
Fluid Loss		PH		7.3	
Source of Sample		Flowline			
RM @ Meas Temp		0.58 ohm.m @ 80 degF			
RMF @ Meas Temp		0.44 ohm.m @ 80 degF			
RMC @ Meas Temp		0.72 ohm.m @ 80 degF			
Source RMF		RMC		Calculated	
RM @ BHT		RMF @ BHT		0.25 @ 196 0.19 @ 196	
Max Recorded Temperatures		196 degF		196 196	
Circulation Stopped		Time		12-Jun-2013 13:30:00	
Logger on Bottom		Time		13-Jun-2013 21:40:23	
Unit Number		Location:		2135 Fort Morgan	
Recorded By		Arvin Shi			
Witnessed By		Anders Elgend / Jim Wier			

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.	

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Well Sketch

Driller Depth
0.00 ft

334.00 ft

Casing 8.625in
24lbm/ft

8450.00 ft

Open Hole 7.875in

Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	7.875					
Top Driller (ft)	334					
Top Logger (ft)	345					
Bottom Driller (ft)	8450					
Bottom Logger (ft)	8460					
Casing						
Size (in)	8.625					
Weight (lbm/ft)	24					
Inner Diameter (in)	8.099					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	334					
Bottom Logger (ft)	345					

Operational Run Summary

Parameter (unit)	Run 1					
Date Log Started	12-Jun-2013					
Time Log Started	22:42:13					
Date Log Finished	14-Jun-2013					
Time Log Finished	00:03:34					
Top Log Interval (ft)						
Bottom Log Interval (ft)						
Total Depth (ft)	8460.00					
Max Hole Deviation (deg)						
Azimuth of Max Deviation (deg)						
Bit Size (in)	7.875					
Logging Unit Number	2135					
Logging Unit Location	Fort Morgan					
Recorded By	Arvin Shi					
Witnessed By	Anders Elgerd / Jim Wier					
Service Order Number	C6VJ-00060					

Remarks and Equipment Summary				
Run 1: Toolstring				Run 1: Remarks
Equip name	Length	MP name	Offset	All Schlumberger depth measurement policies followed
LEH-QT	97.73			IDW used as primary depth measurement and Z-Chart as secondary depth measurement
LEH-QT				
AH-369	94.82			
EDTC-B:8593	93.39			
EDTH-B:8625				
EDTG-B:77756				
EDTC-B:8593				
		CTEM	89.89	
		ACCZ	0.00	
		HV	0.00	
		Gamma Ray	88.02	
		TelStatus	86.89	
		Temperature	86.87	
HGNS-H:4865	86.89			
HGNH:4817				
NPV-N		GR	86.15	
NSR-F:2554				
HMCA-H				
HACCZ-H:6991				
HGNS-H:4865				
		CNL Porosity	79.82	
		HGNS	77.48	
		HMCA	77.48	
		Accelerometer	0.00	
HDRS-H:3863	77.48			
ECH-MEB:2898				
HRCC-H:3828				
HRMS-H:3863				
Backscatter				
Short Spacing				
GPV-Q				
GSR-J:5471		HRCC	73.48	
Long Spacing:28620				
HRGD-H:3870				
		MCFL	68.05	
		Caliper	67.57	
		TLD Density	67.18	
HRLT-B	65.24			
HRUH-B				
HRUC-B				
HRLS-B				
HRLH-B				
HRLC-B				
AH-270				

Resistivity 53.47

AH-184[2]:28 41.04
29

MAST-B:8506 39.04
ECH-SF:8081
MAPC-BA:8081
MAMS-CA:8506

MAMS 23.6

AH-184[1]:75 18.00
7

AIT-H:398 16.00
AHIS:398
AHRM



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

Depth Summary

Depth Control Parameters		Run 1		
Conveyance Type		Wireline		
Rig Type		Land		
Depth Measuring Device		Run 1		
Type		IDW-B		
Wheel Correction 1		-7		
Wheel Correction 2		-5		
Tension Device		Run 1		
Type		CMTD-B/A		
Calibration Date		17-May-2013		
Calibrator Serial Number		78135		
Calibration Points		10		
Calibration RMS		13		
Calibration Peak Error		24		
Logging Cable		Run 1		
Type		7-46NT-XS		
Logging Cable Length (ft)		24000.00		

Run 1

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
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Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data
Run 1	Log[7]:Up	Up	105.88 ft	8480.06 ft	13-Jun-2013 9:41:24 PM	14-Jun-2013 12:02:54 AM	0.00 ft	

All depths are referenced to toolstring zero

Log

Run 1: Log[7]:Up

TIME_1900 - Time Marked every 60.00 (s)

ITT - Integrated Transit Time every 1.00 (ms)

ITT - Integrated Transit Time every 10.00 (ms)

Raw Gamma Ray (RGR) HGNS-H		
0	gAPI	150
Sonic Velocity (SVEL) MAST-B		
5000	ft/s	25000
Borehole Compensated Transit Time of Monopole Lower Transmitter (TT_BHC_ML[0]) MAST-B		
1200	us	200
Borehole Compensated Transit Time of Monopole Lower Transmitter (TT_BHC_ML[1]) MAST-B		
1200	us	200
Borehole Compensated Transit Time of Monopole Lower Transmitter (TT_BHC_ML[2]) MAST-B		
1200	us	200
Borehole Compensated Transit Time of Monopole Lower Transmitter (TT_BHC_ML[3]) MAST-B		
1200	us	200

Stuck Tool Indicator, Total (STIT)

0 ft 50

CableDrag

ToolDrag

Cable Tension (TENS)

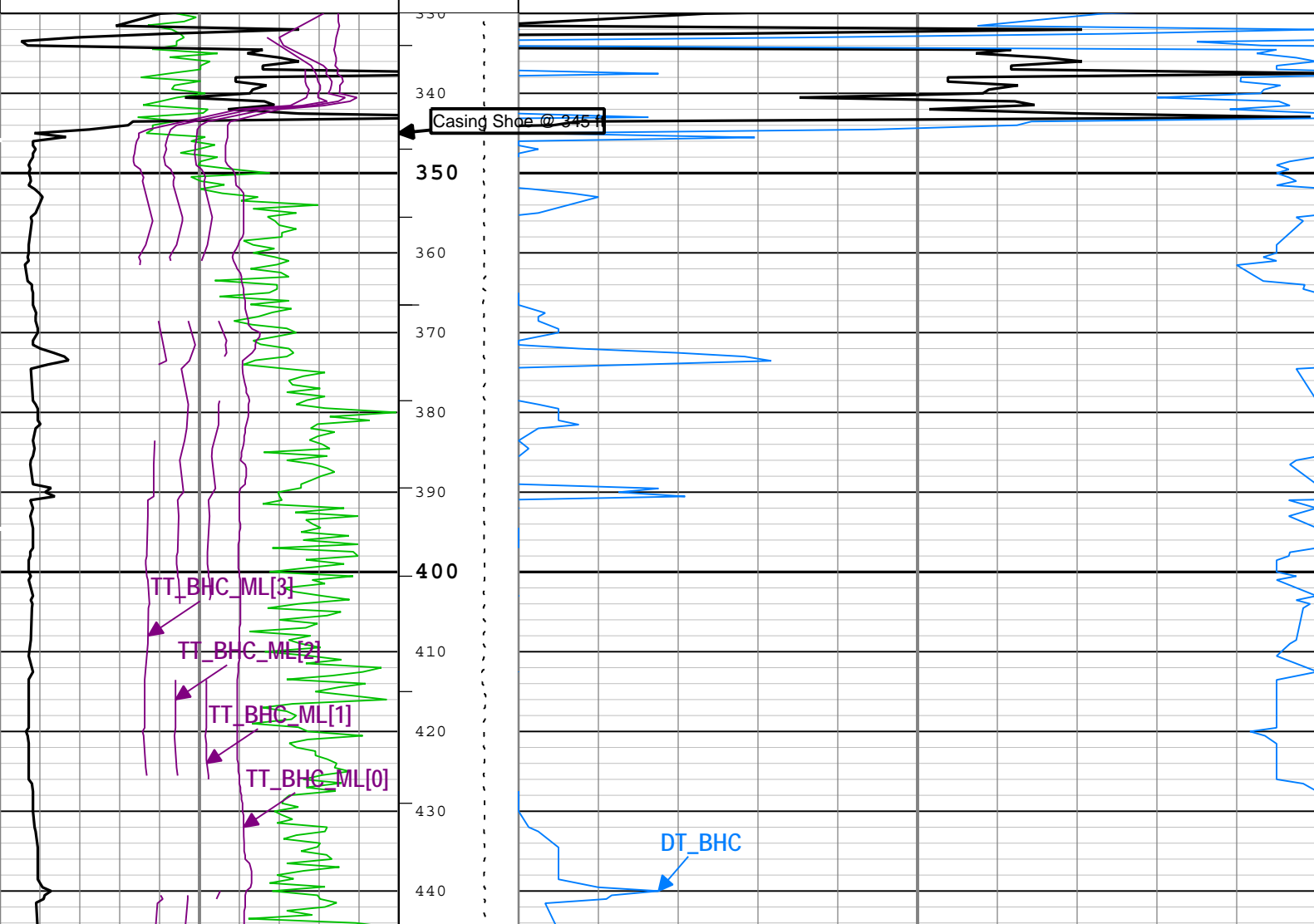
6000 lbf 0

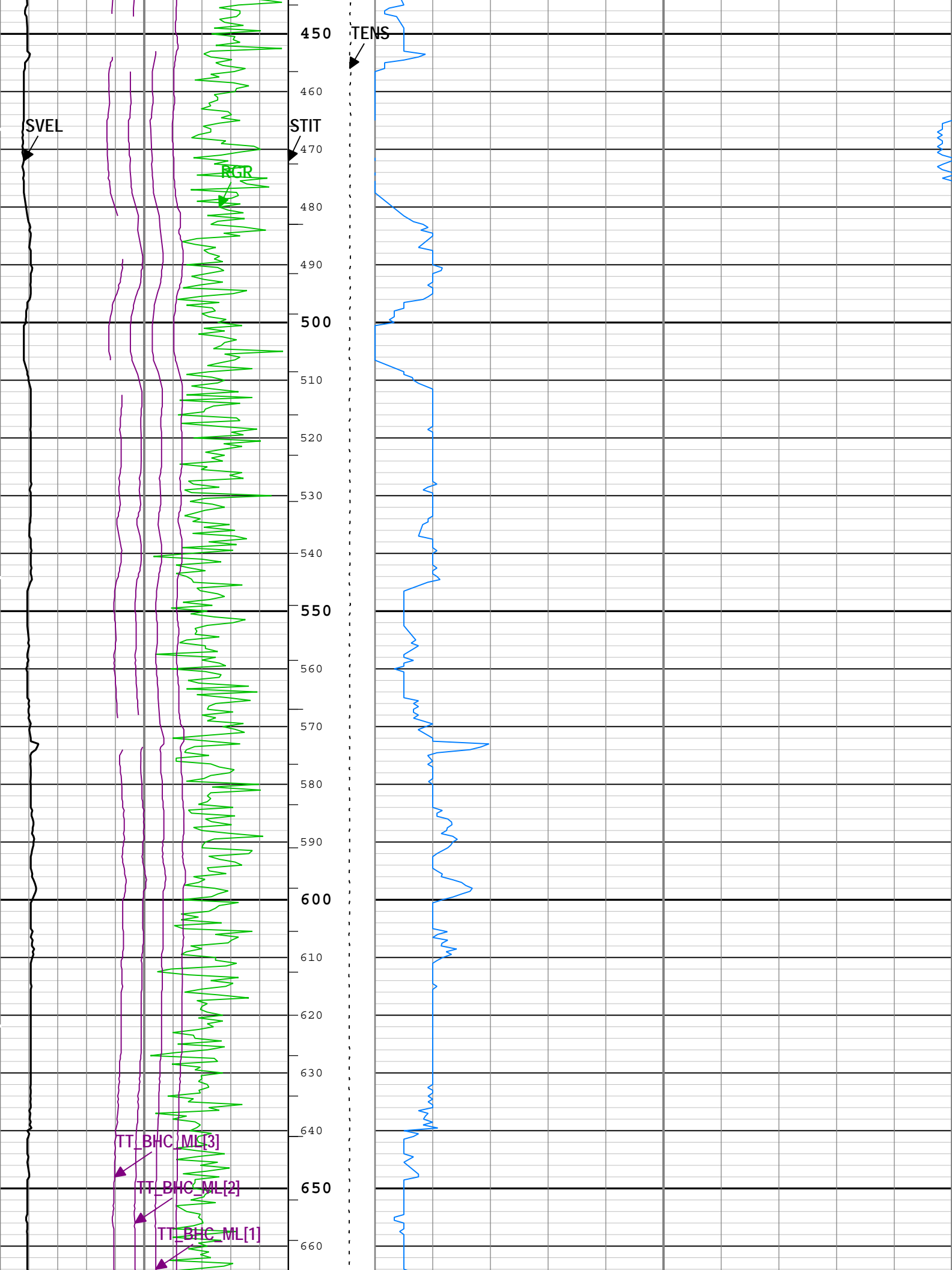
Sonic Porosity (SPHI) MAST-B

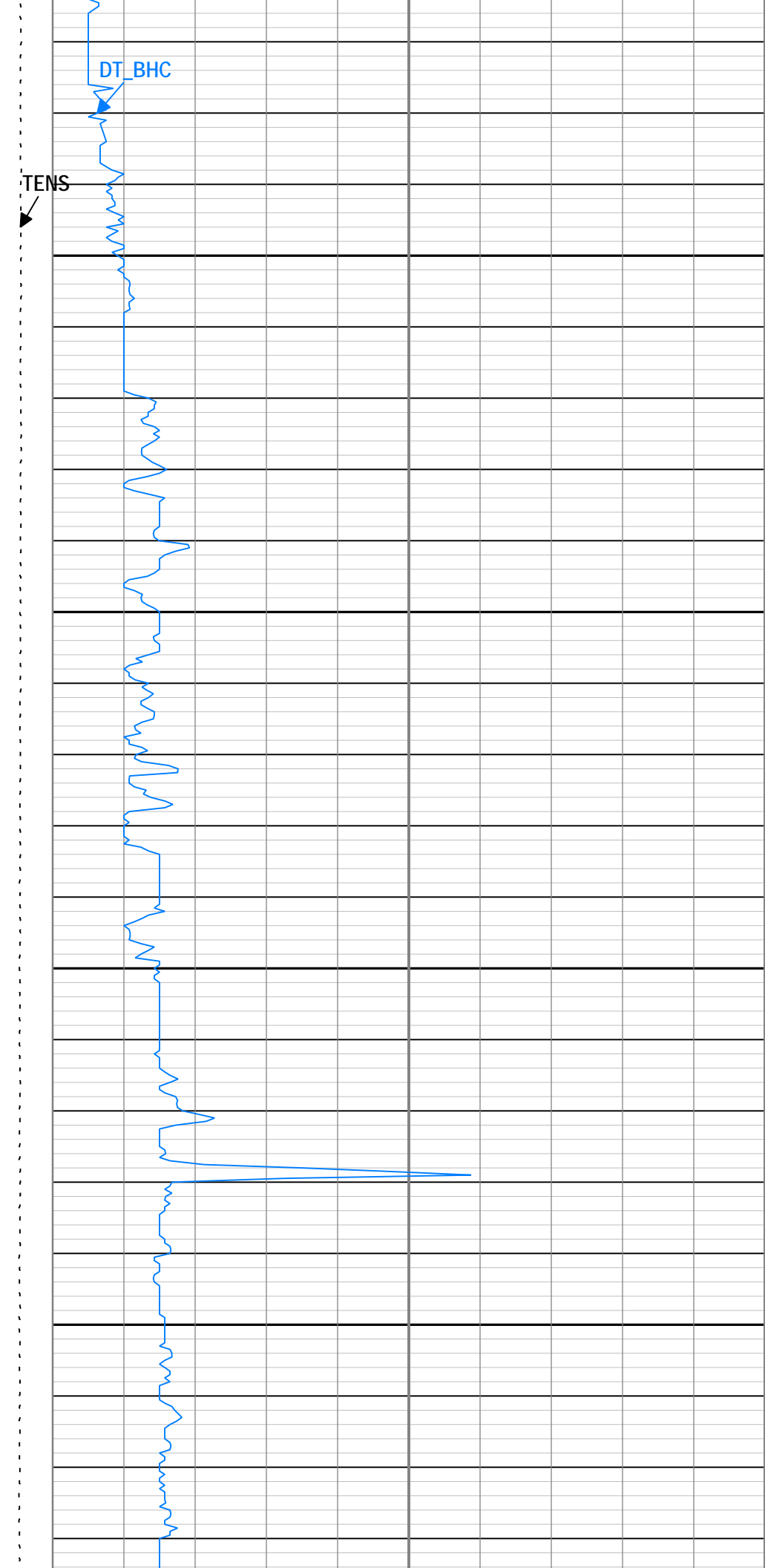
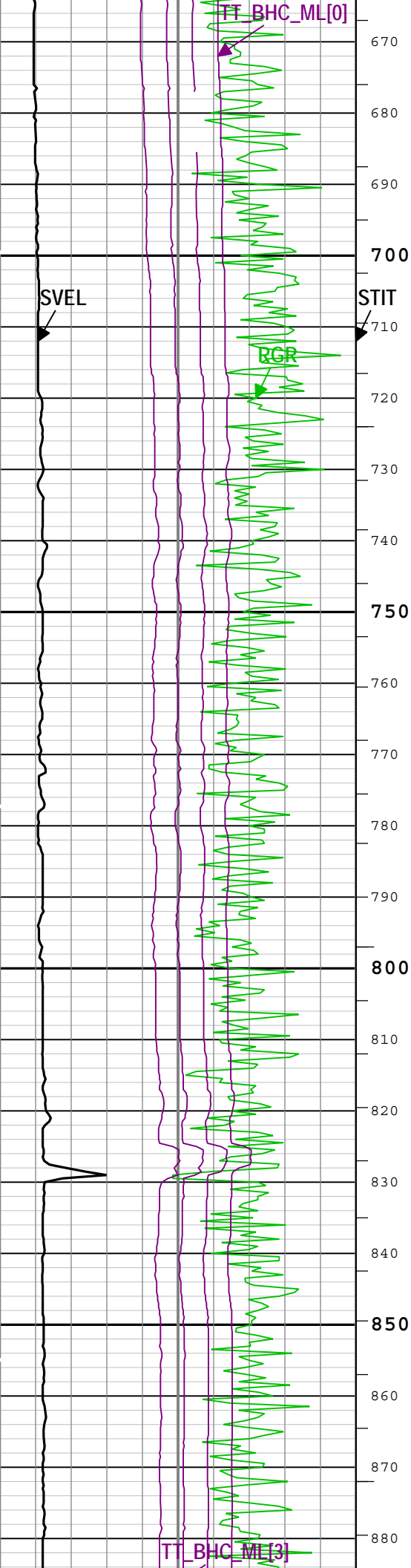
0.3 ft3/ft3 -0.1

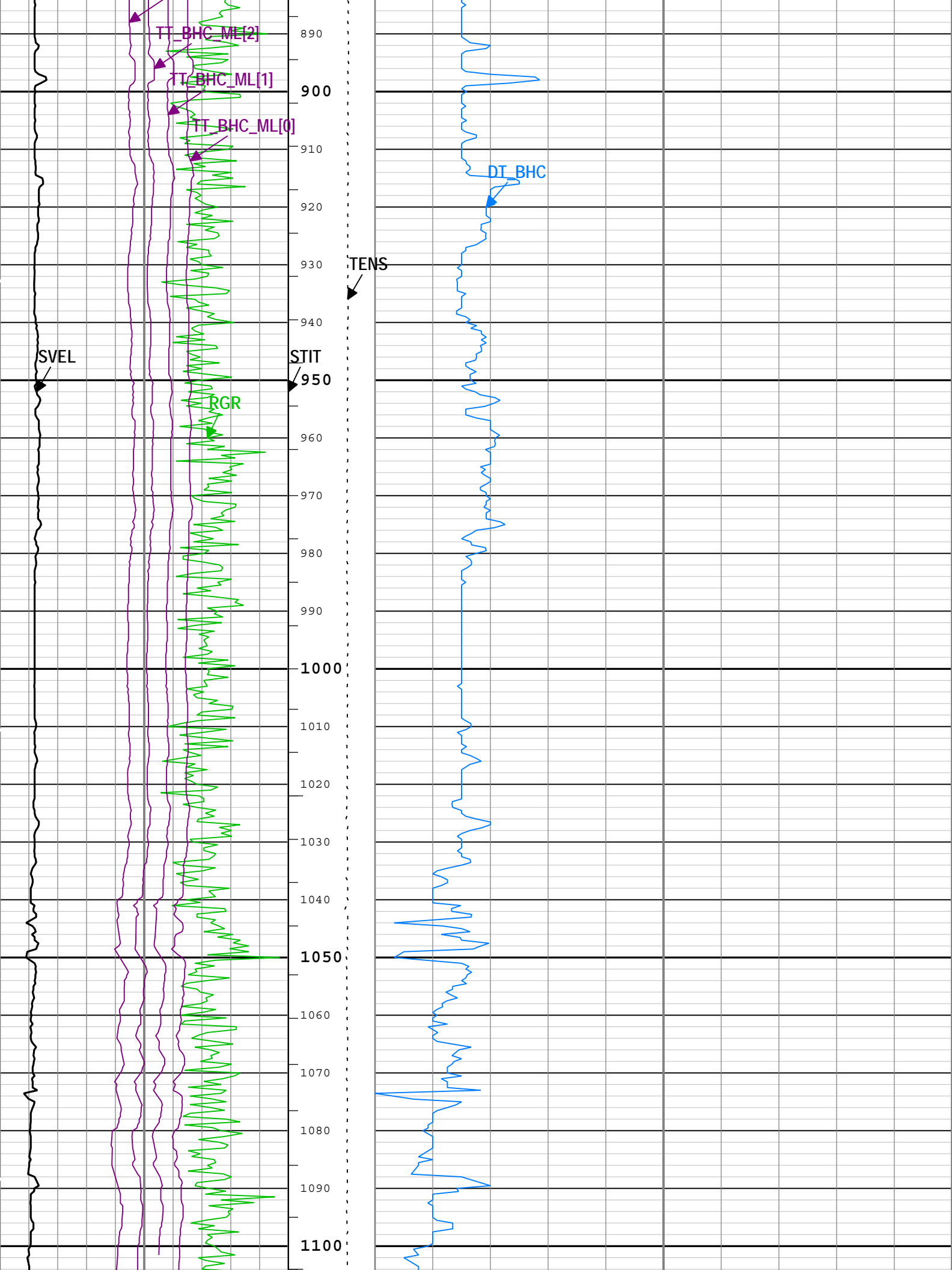
1.5 Feet Span Borehole Compensated Slowness from Near Spacing (DT_BHC) MAST-B

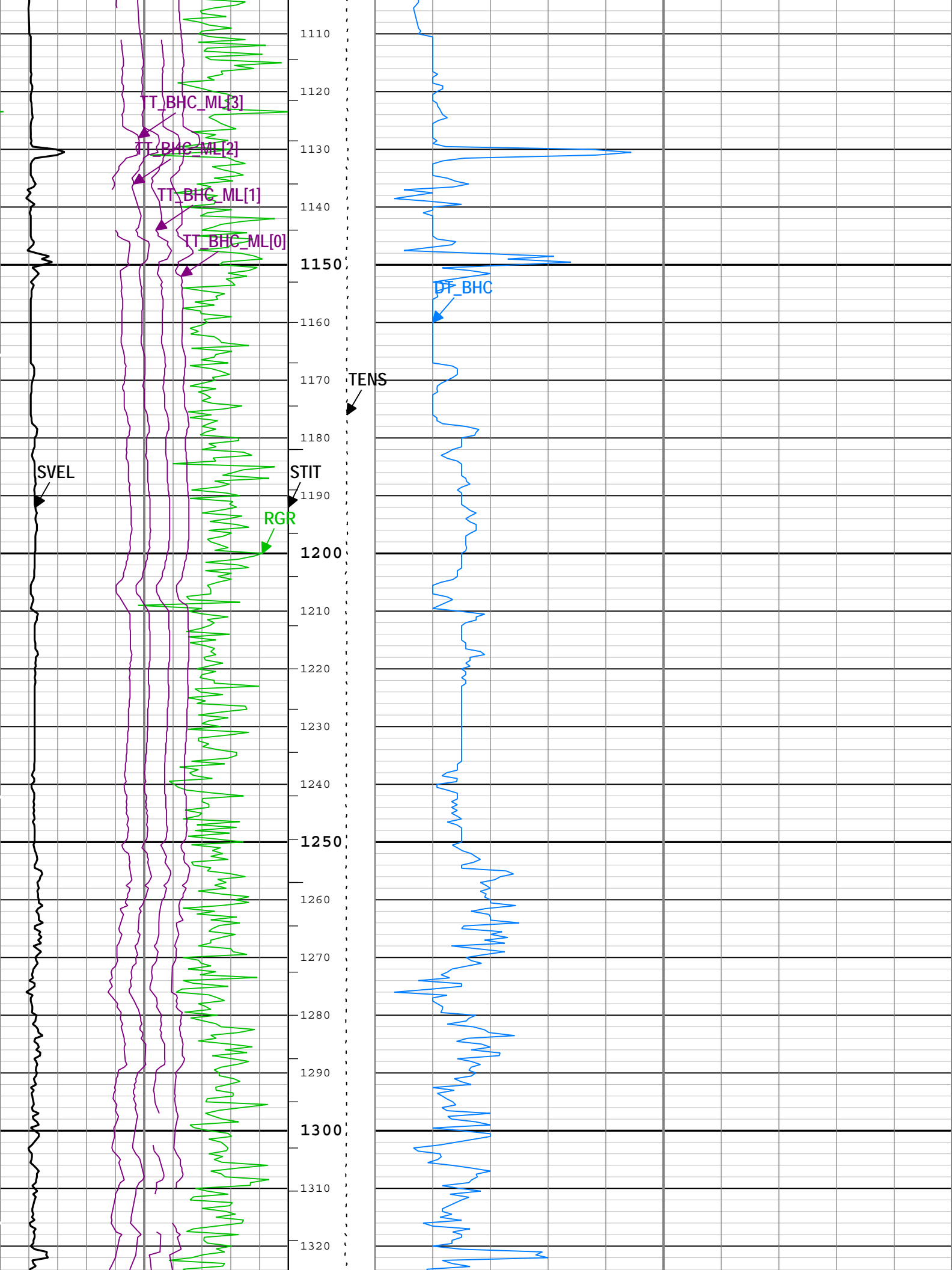
150 us/ft 50

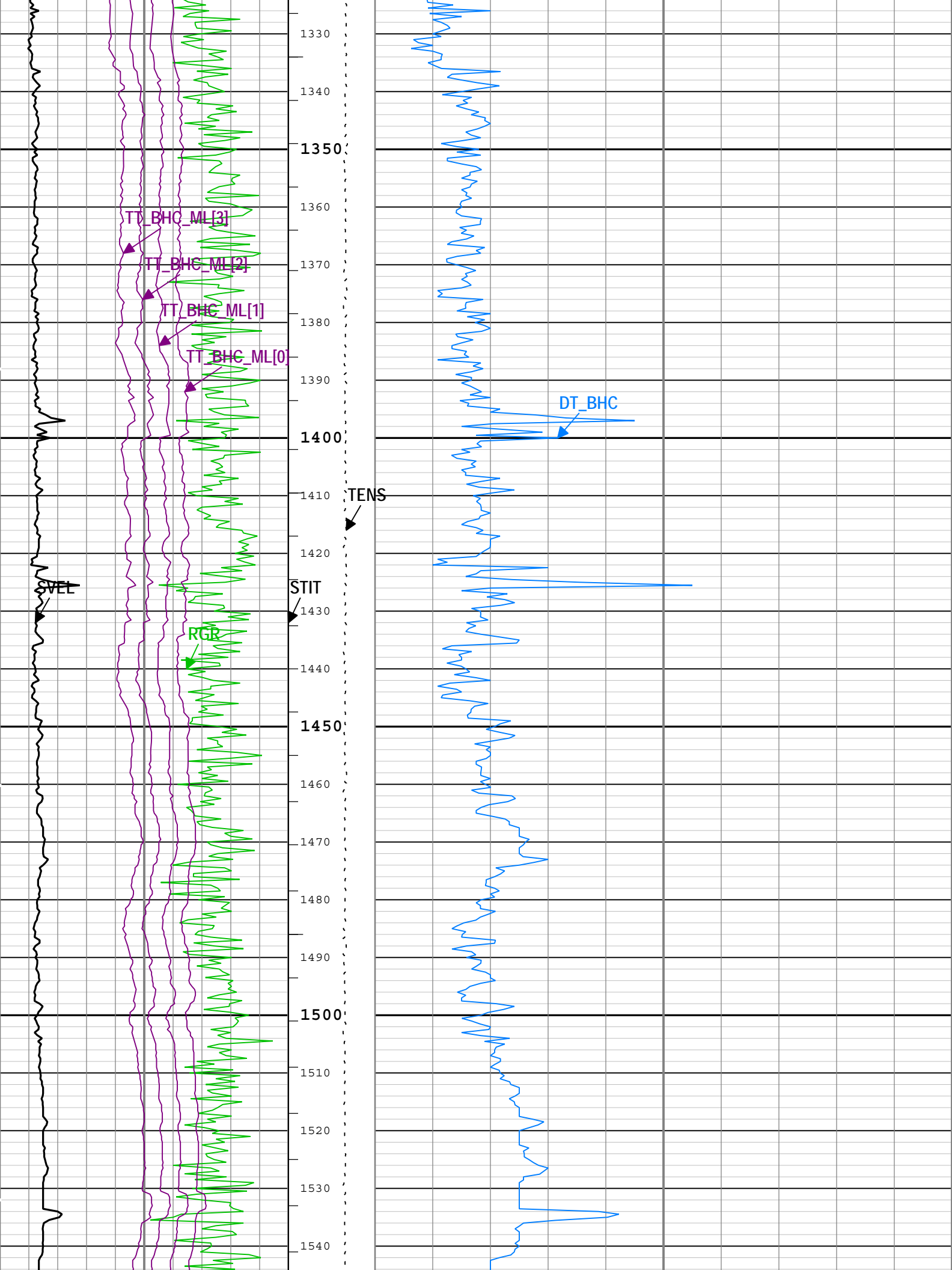


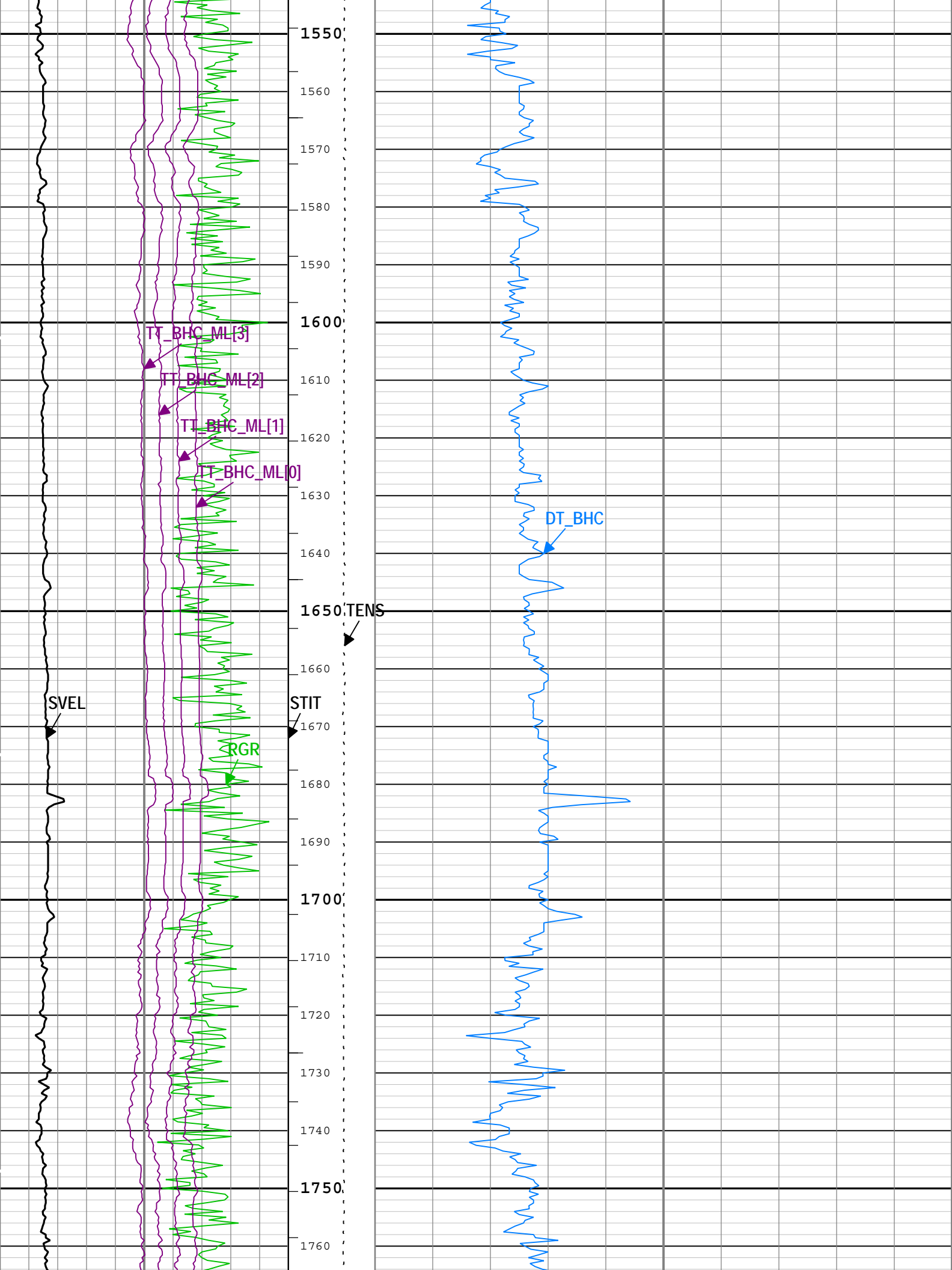


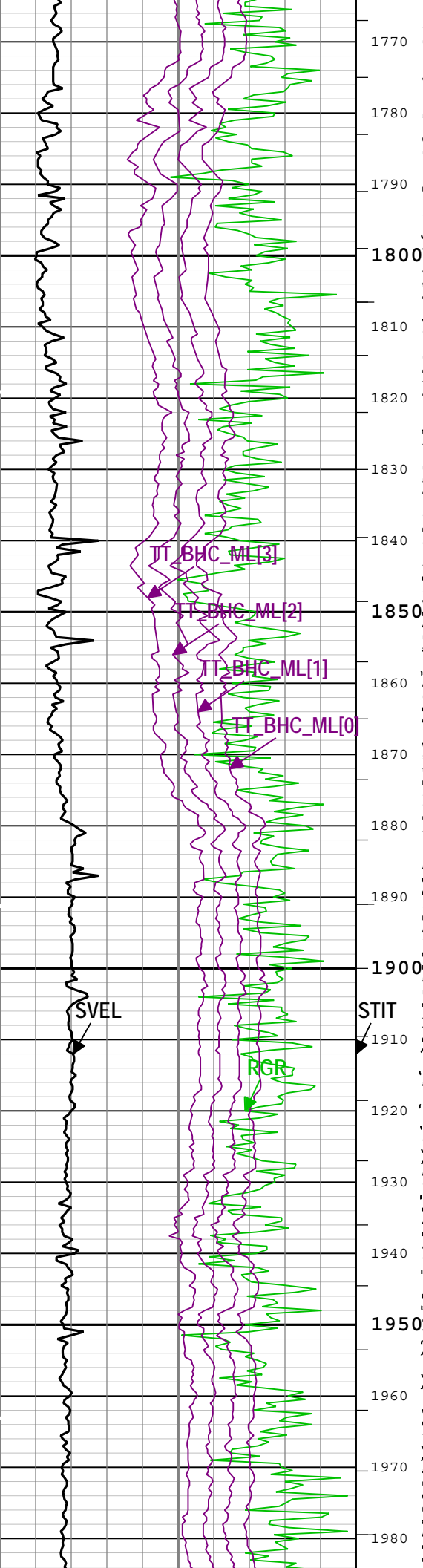






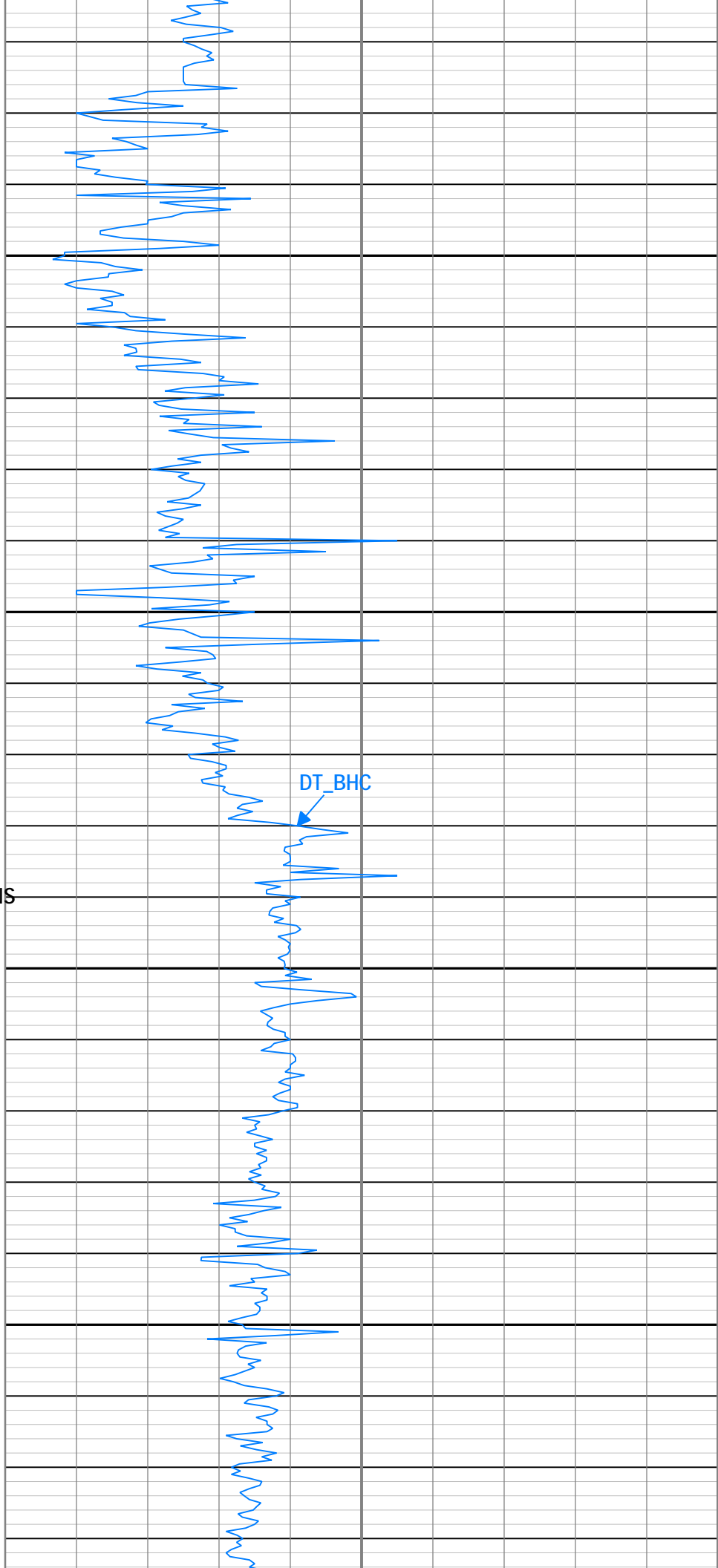


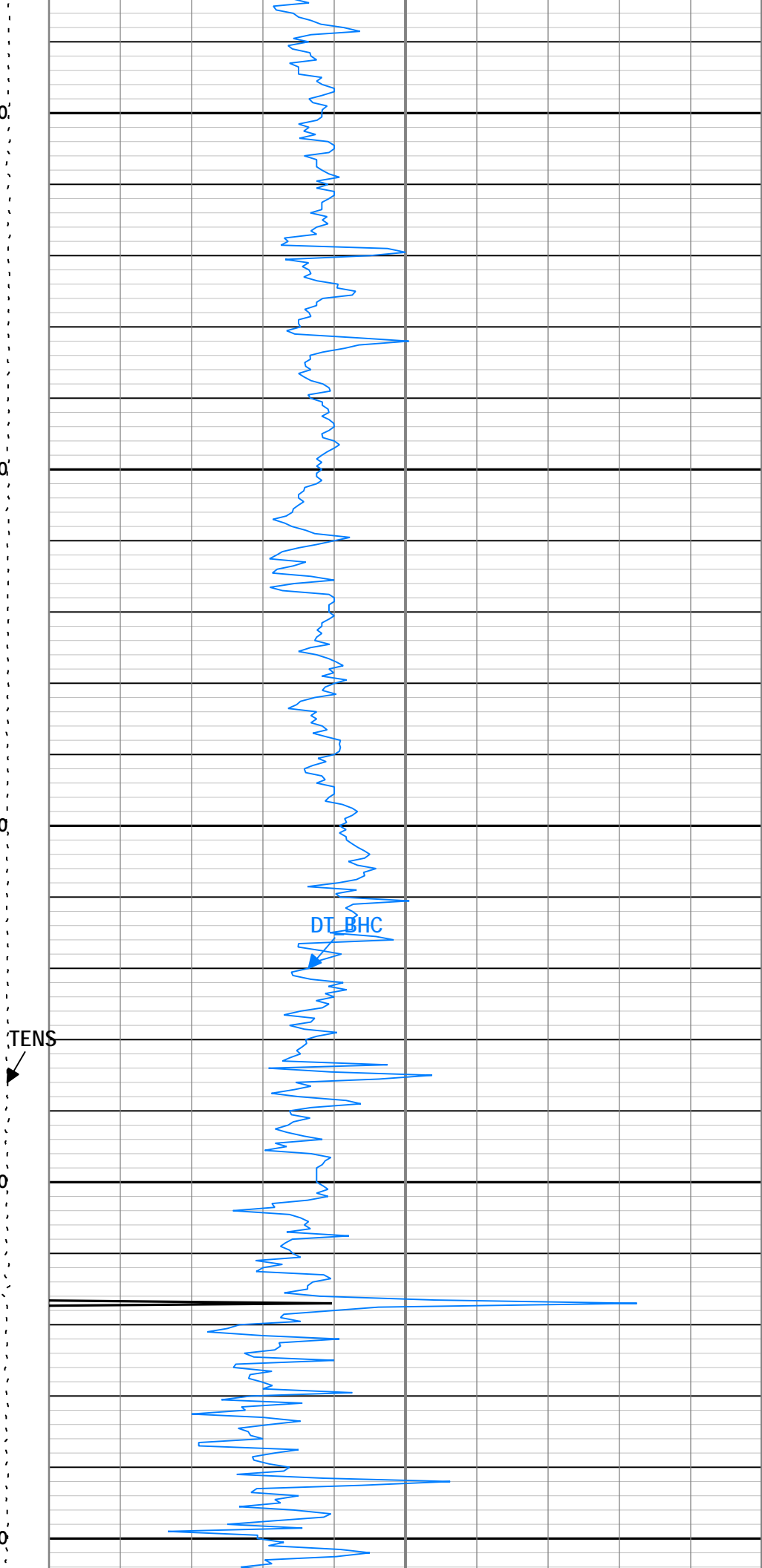
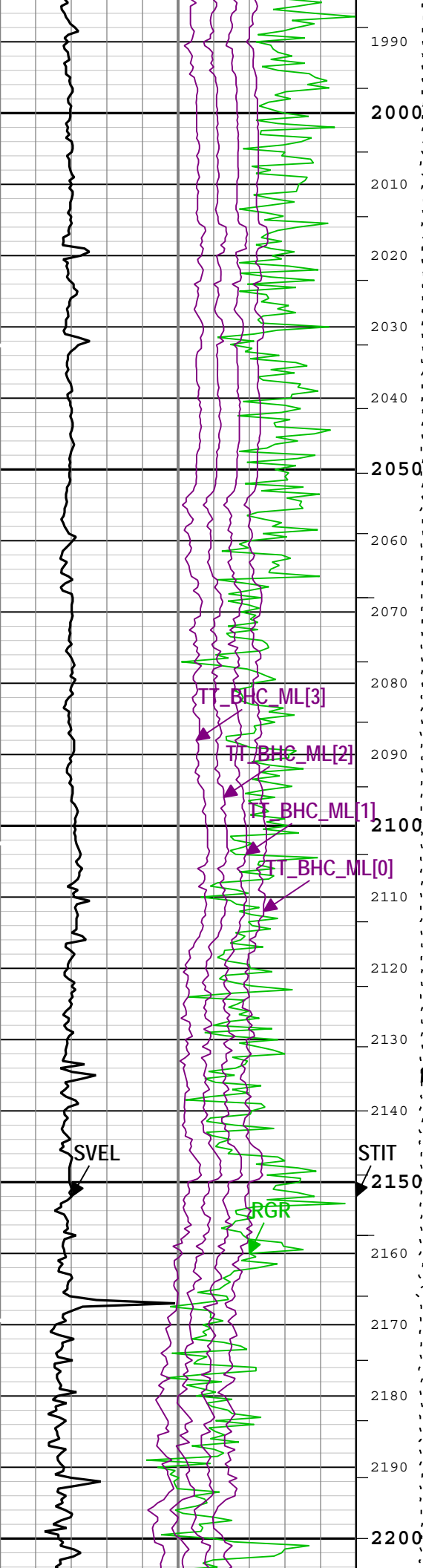


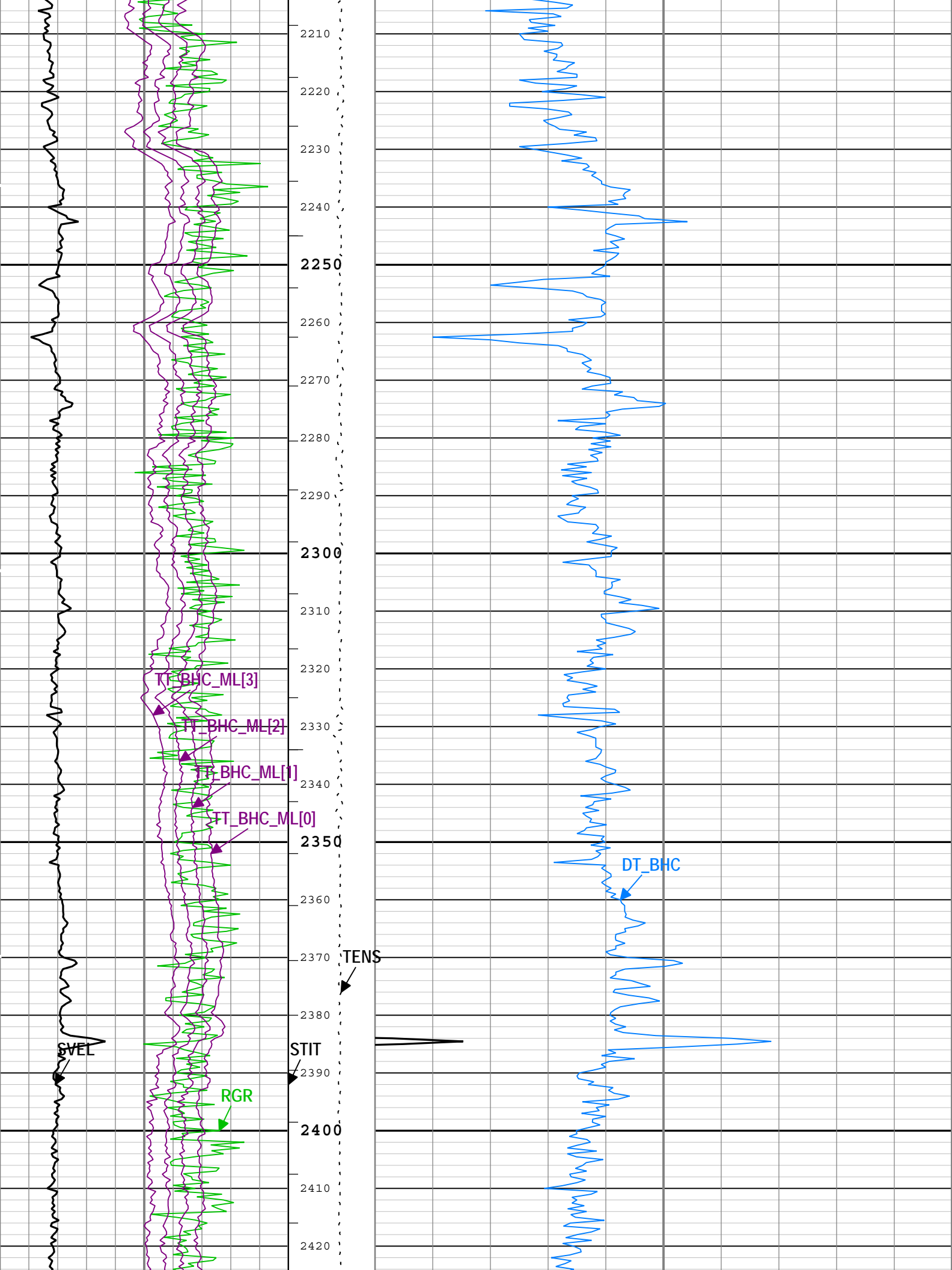


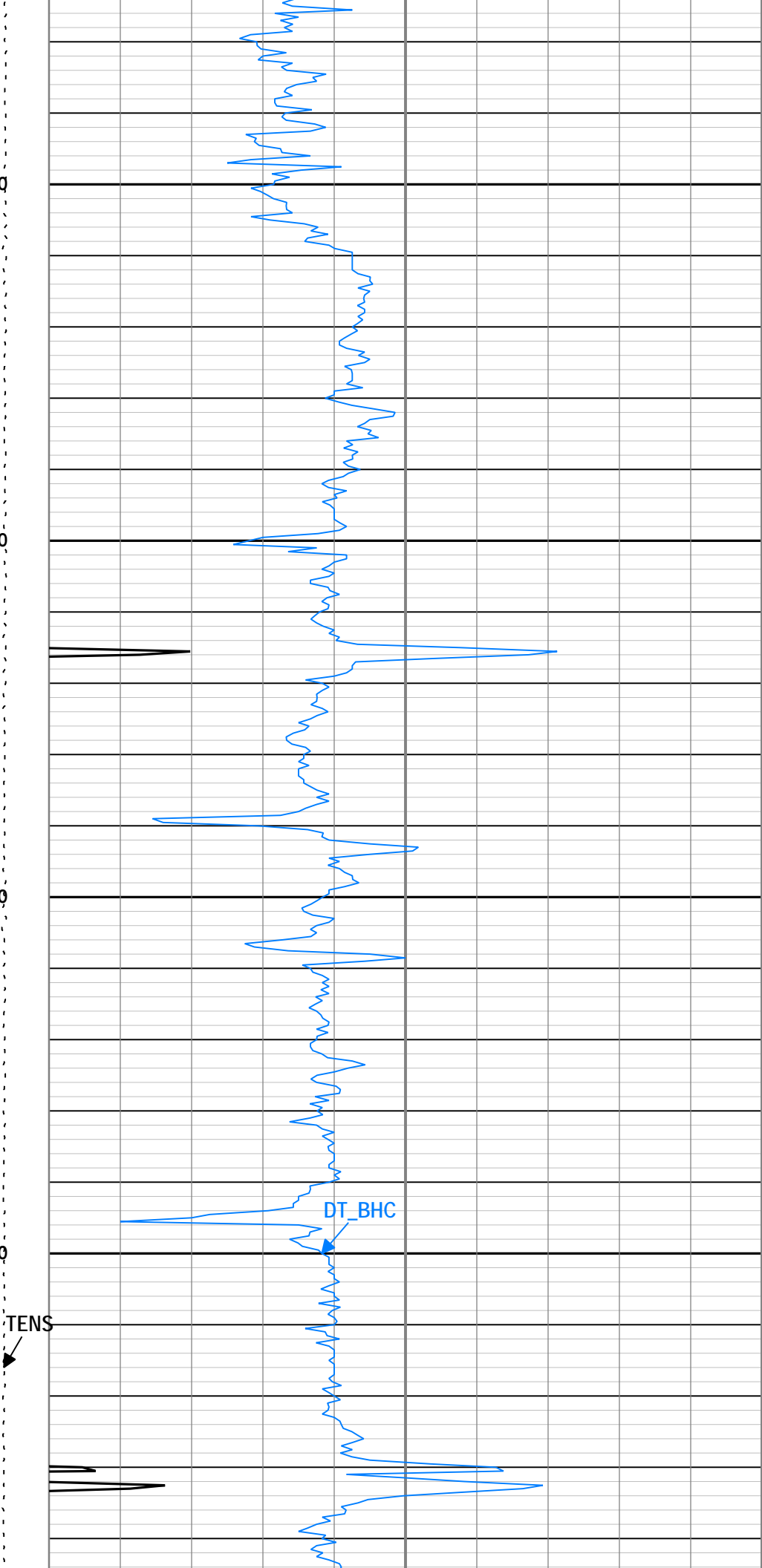
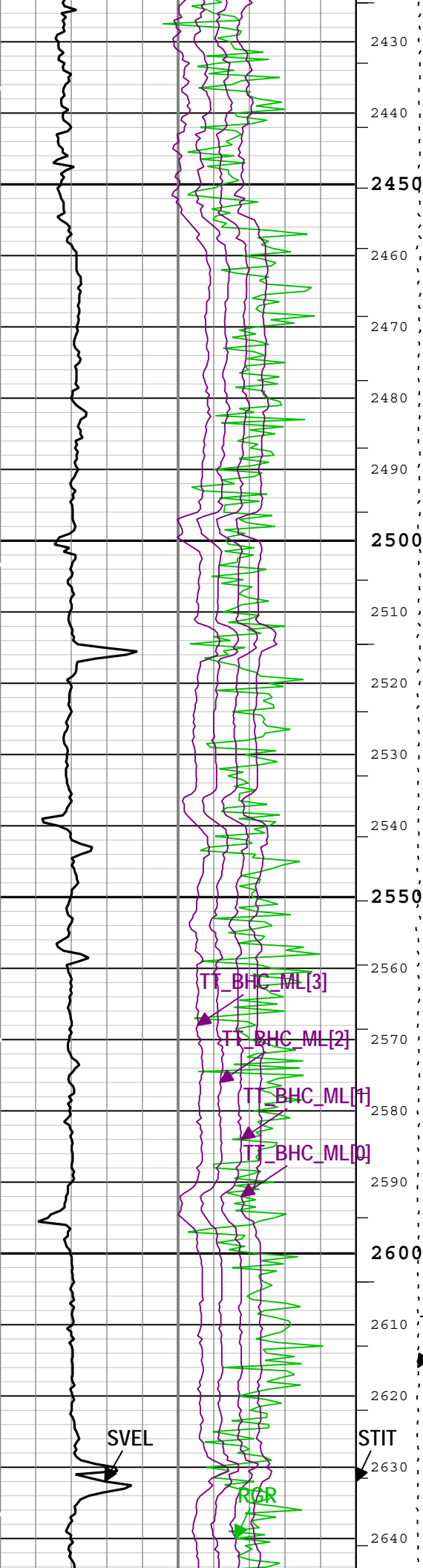
TENS

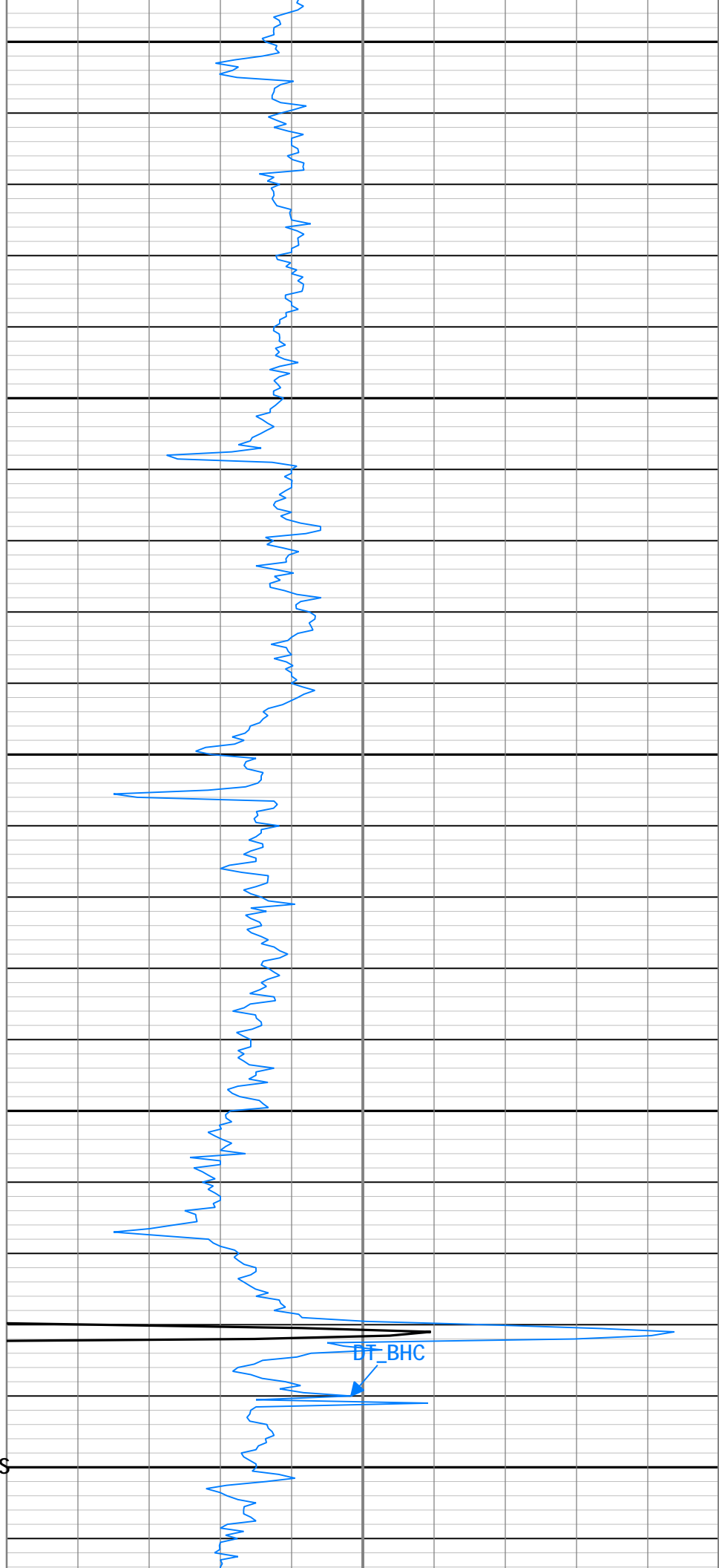
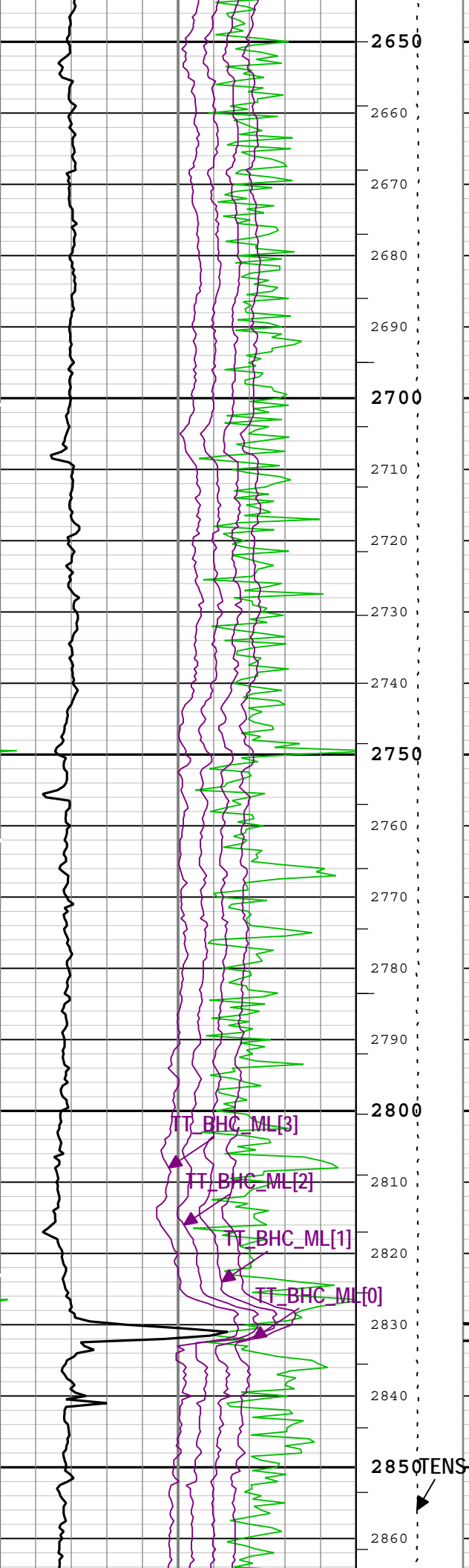
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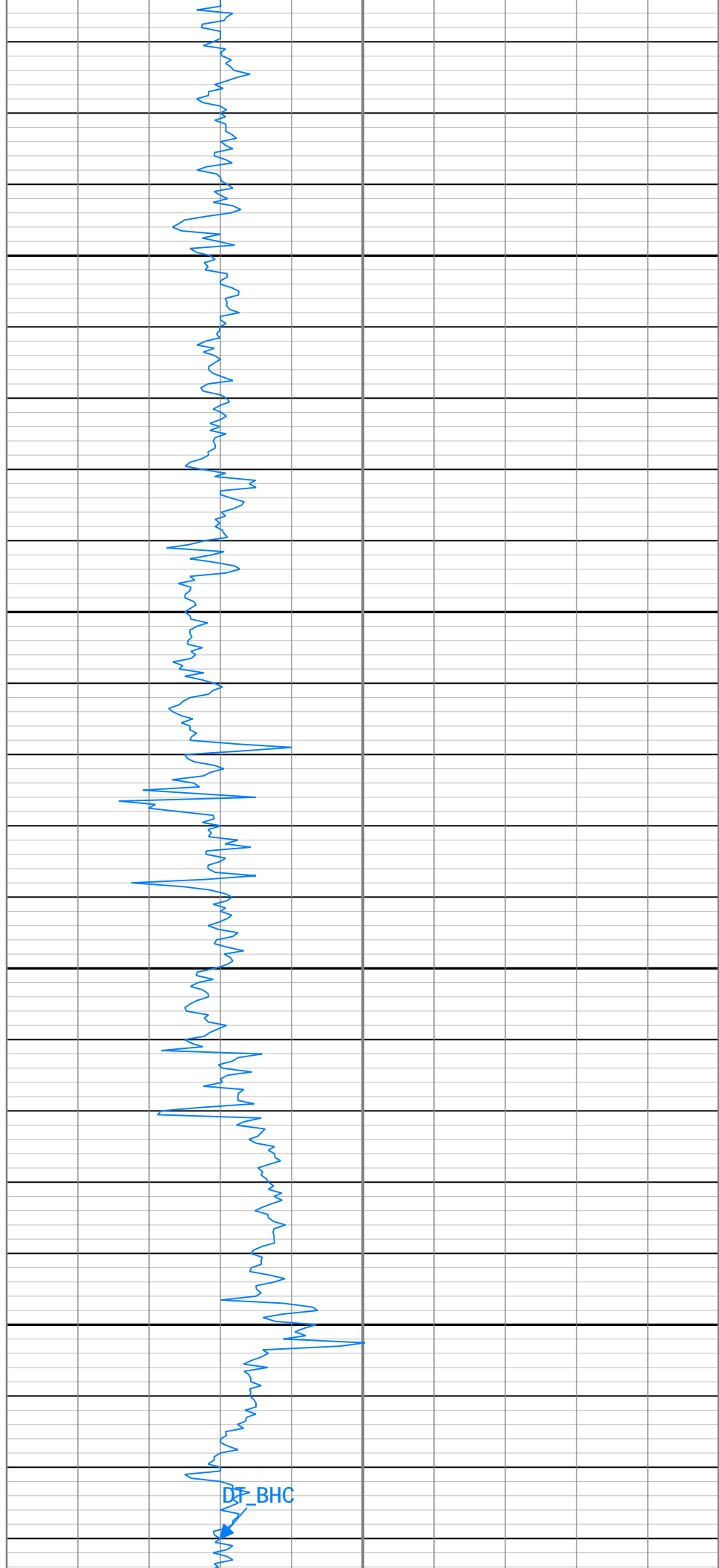
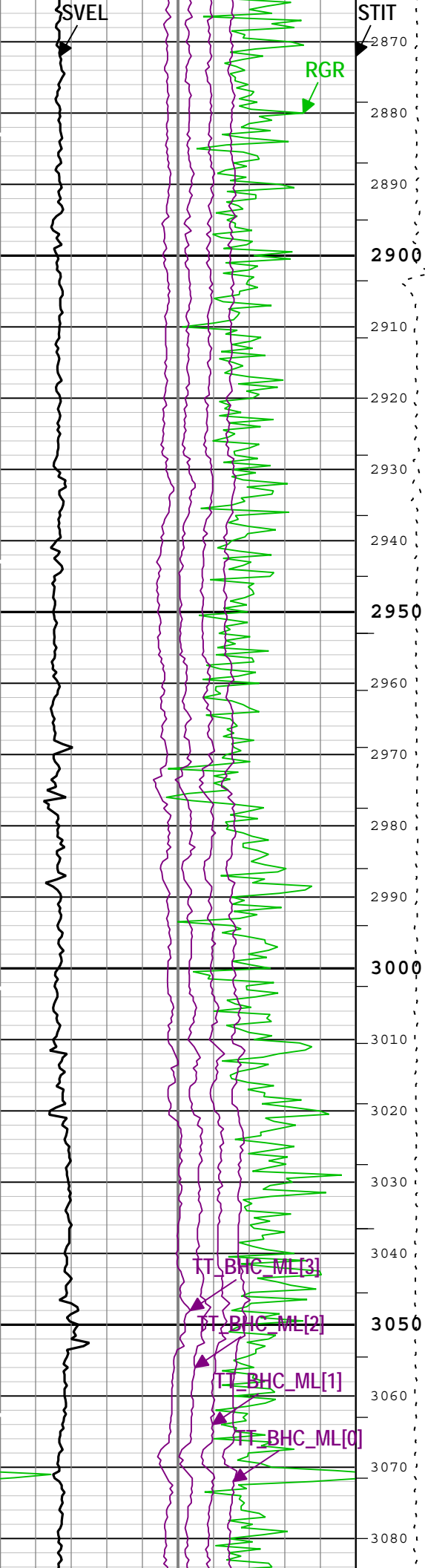


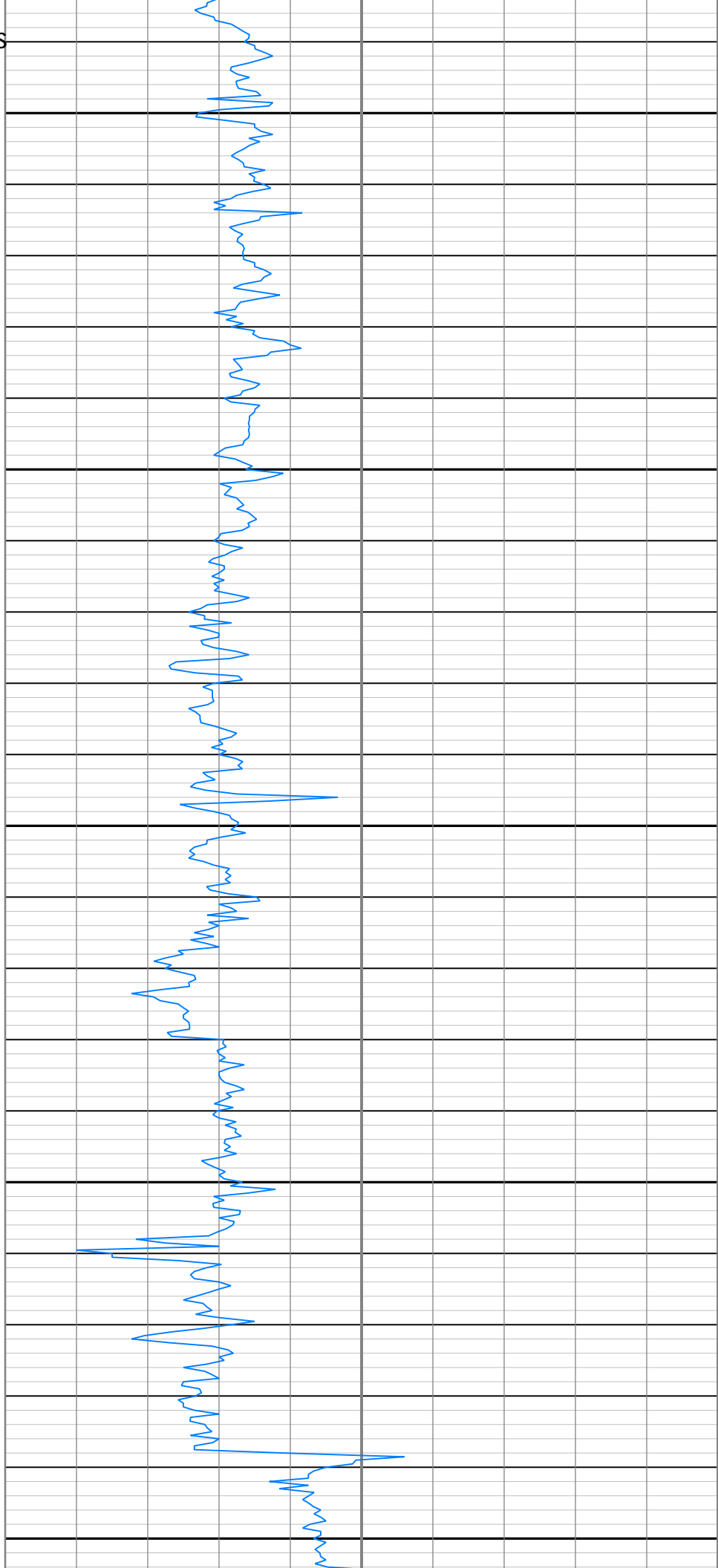
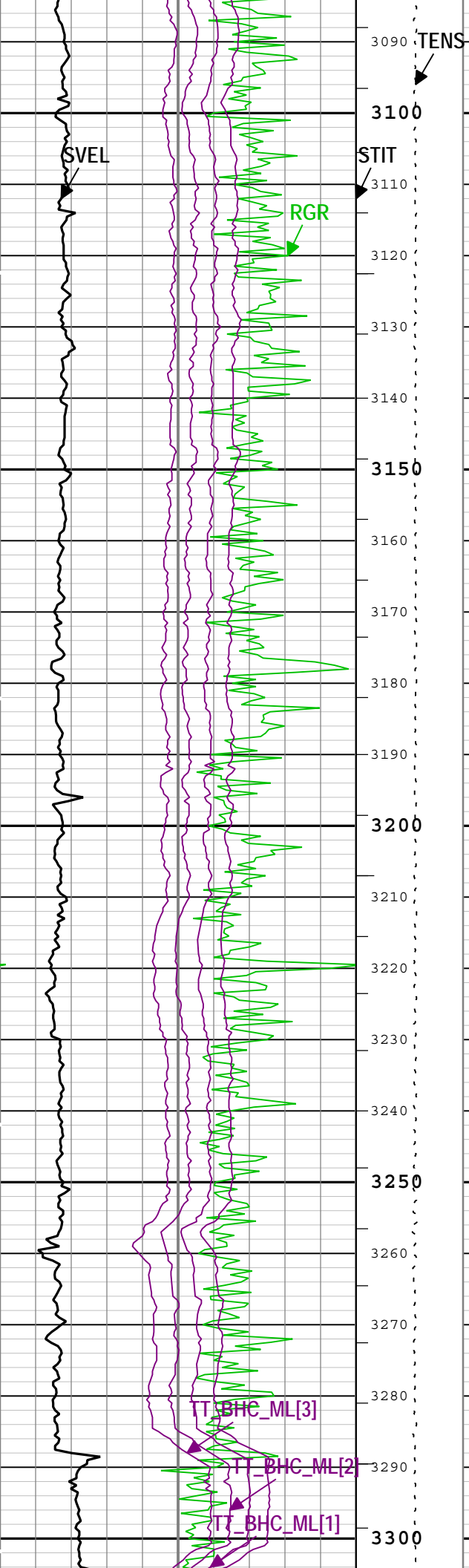


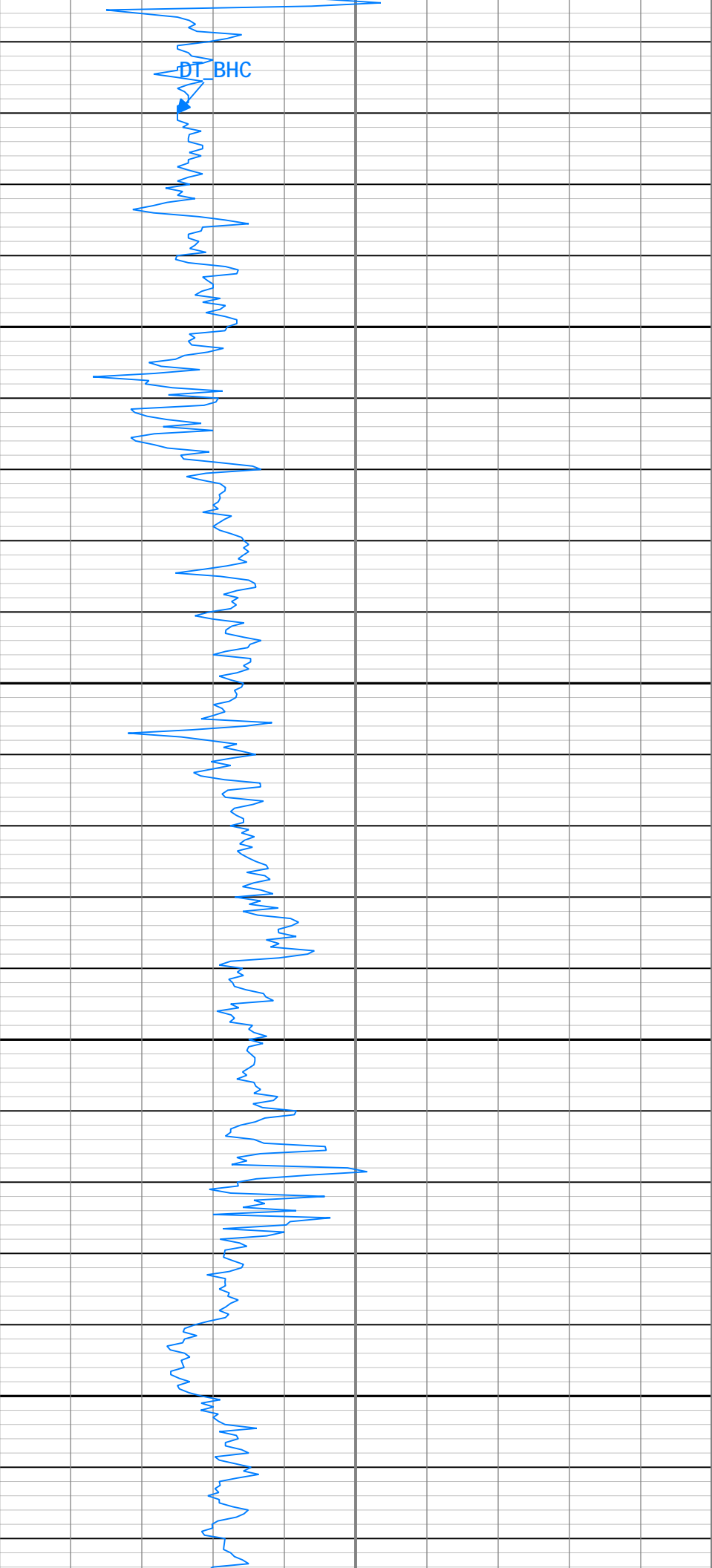
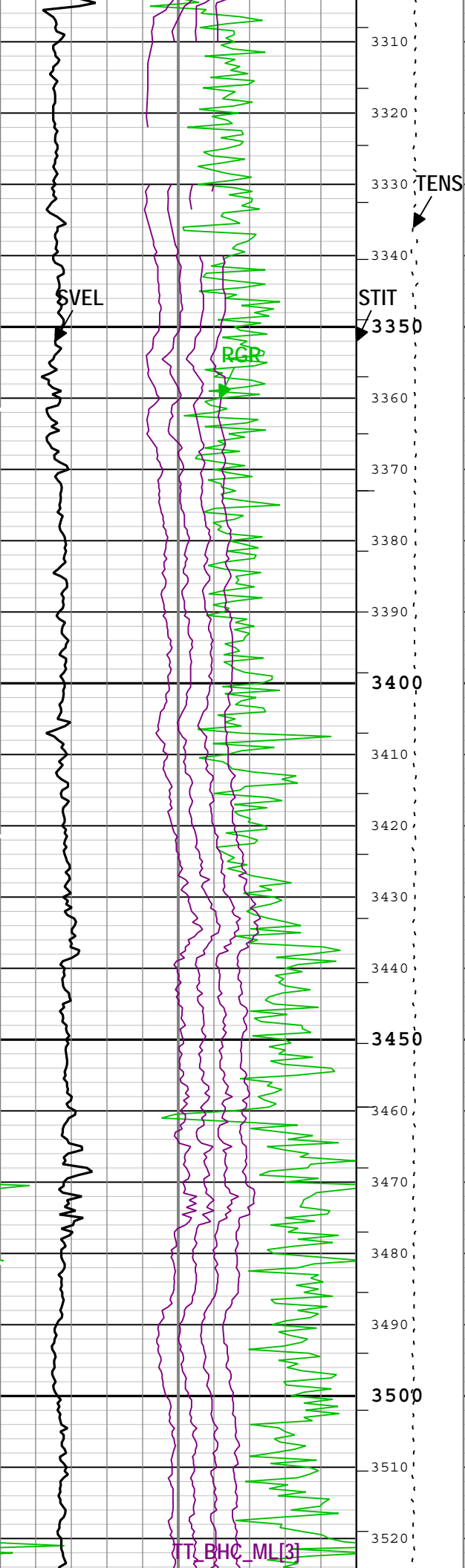


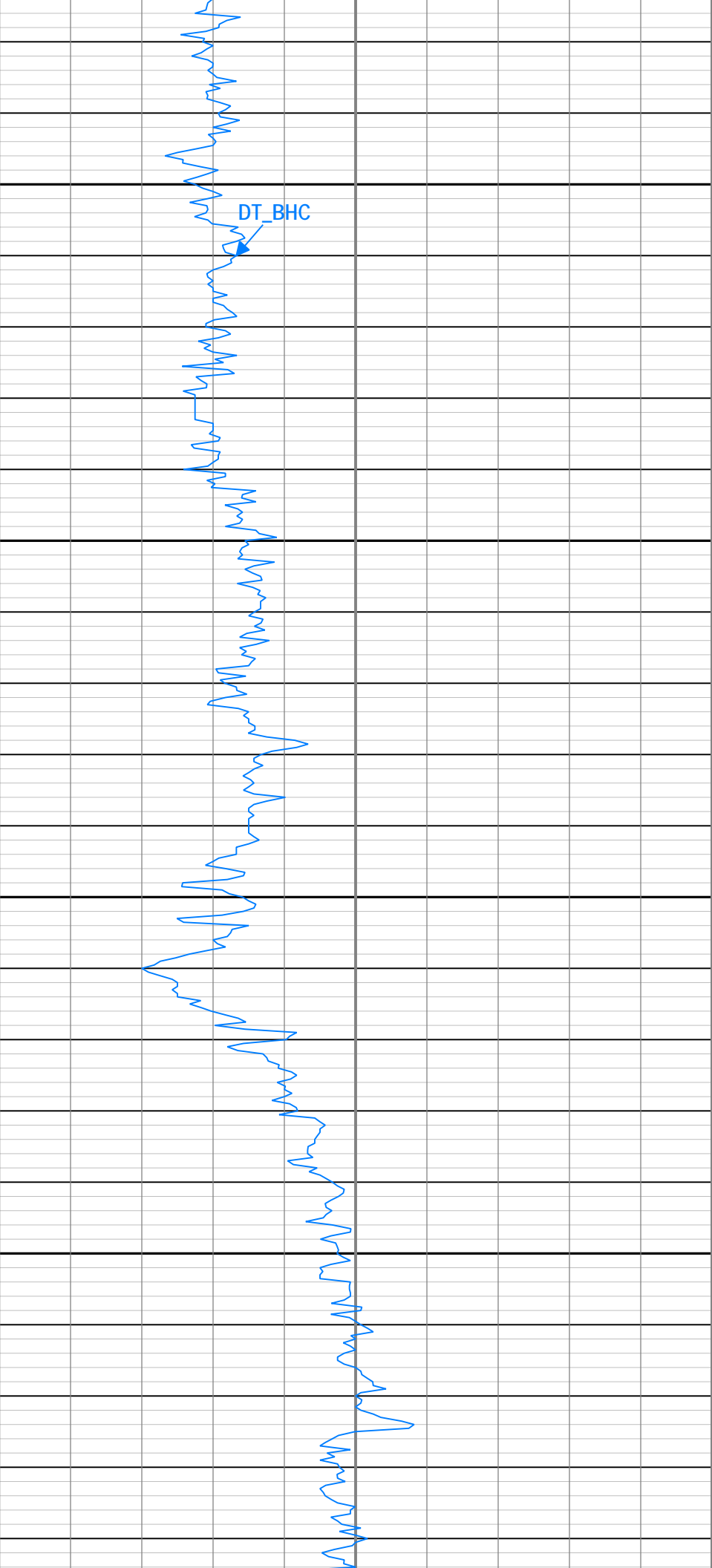
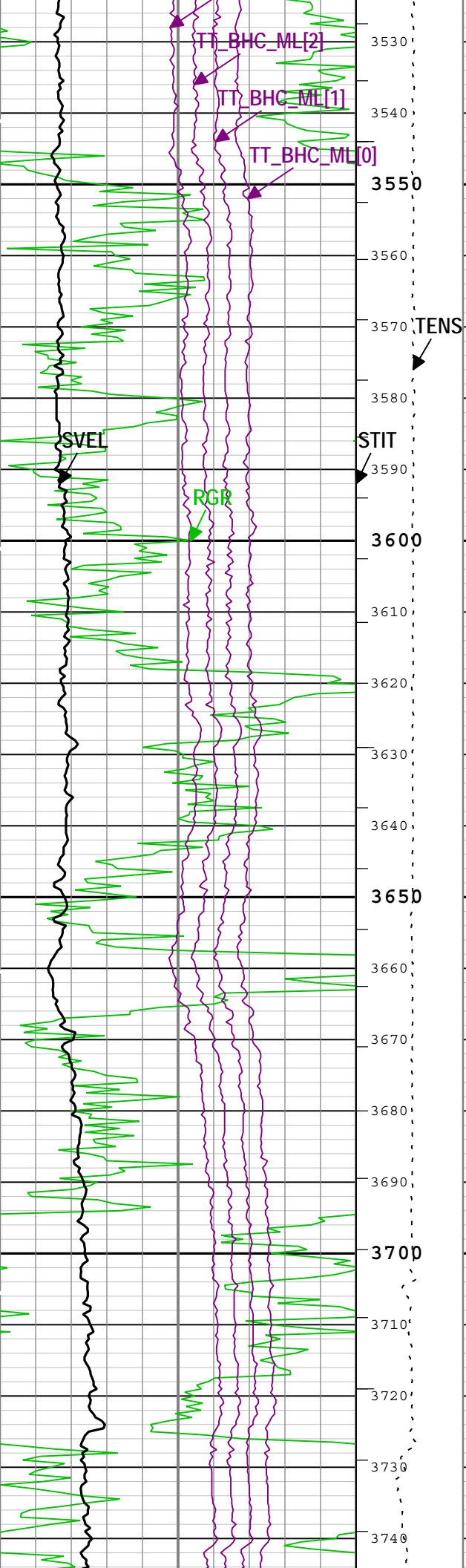


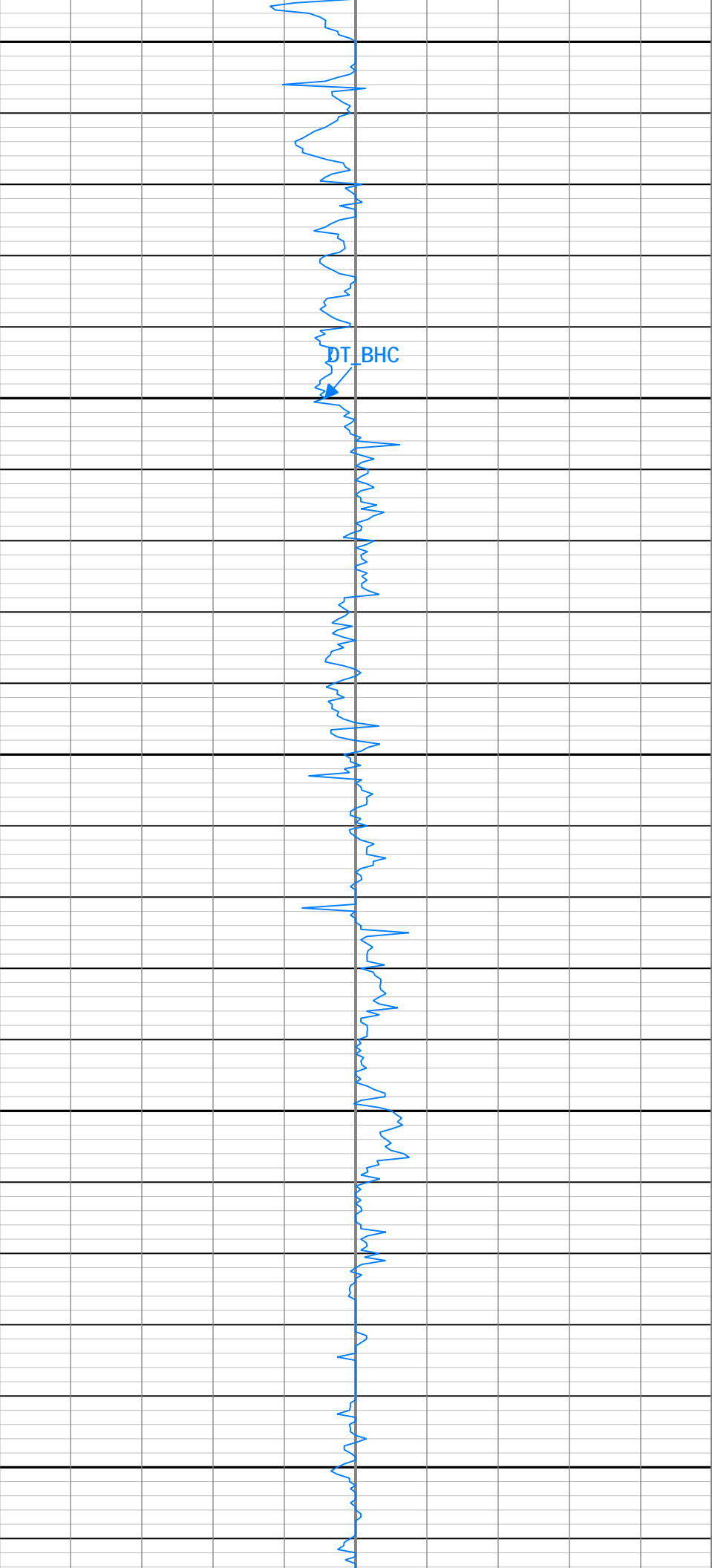
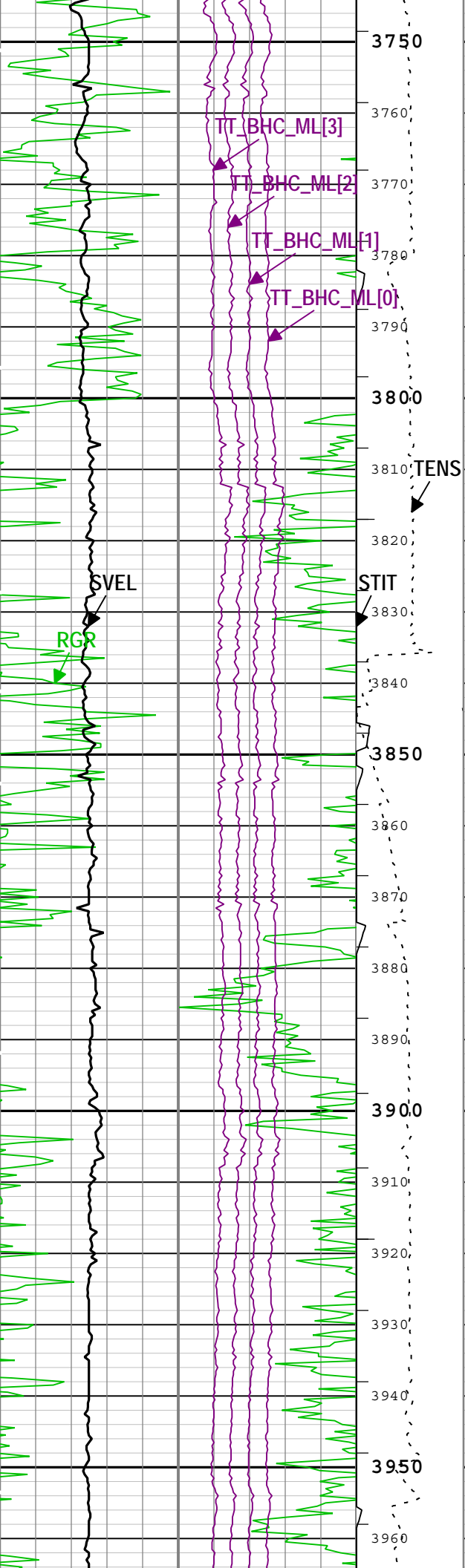


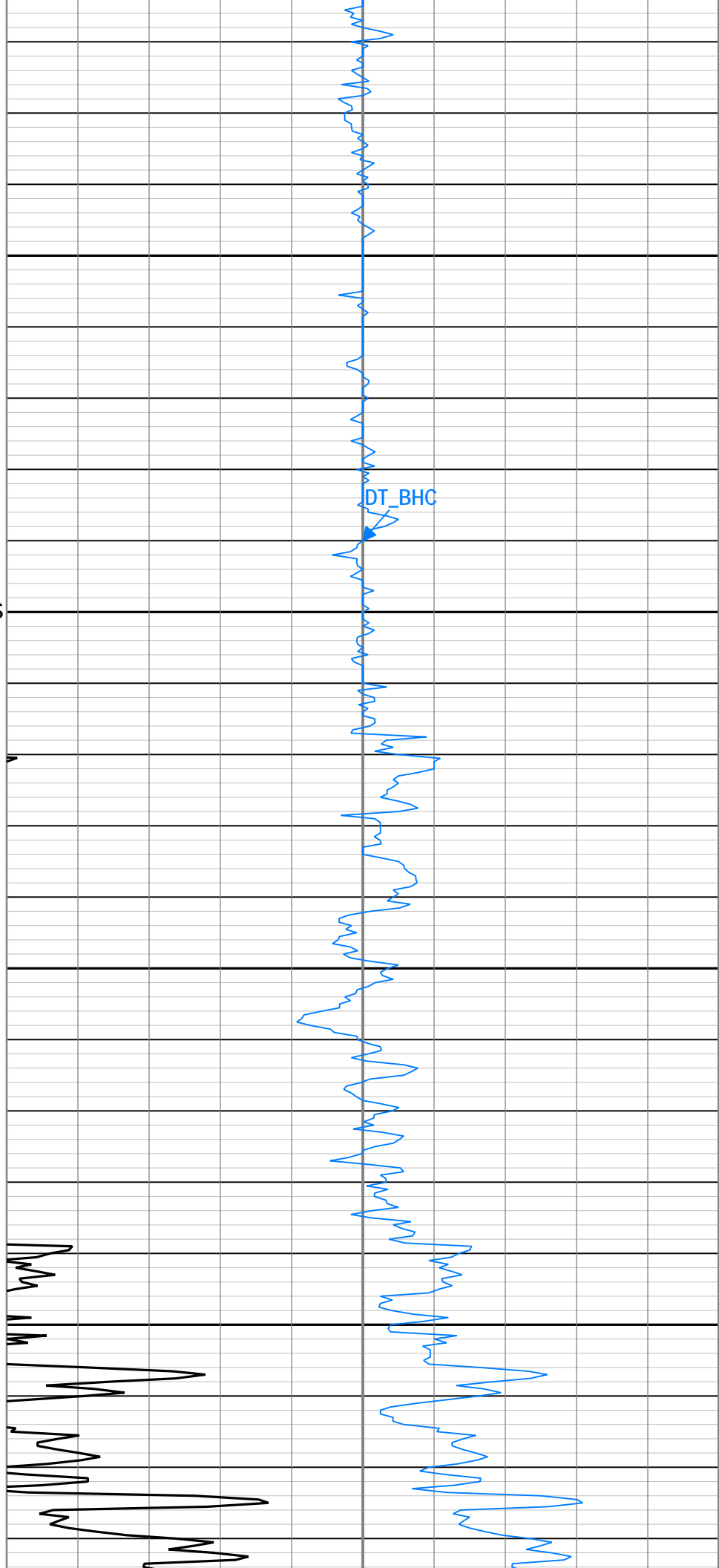
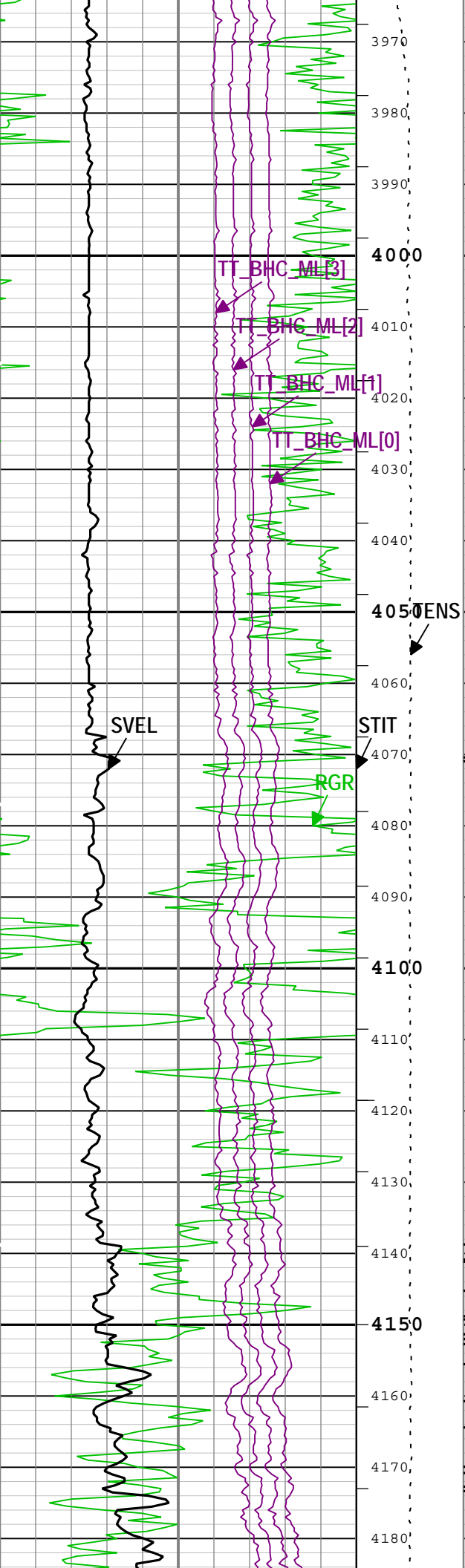


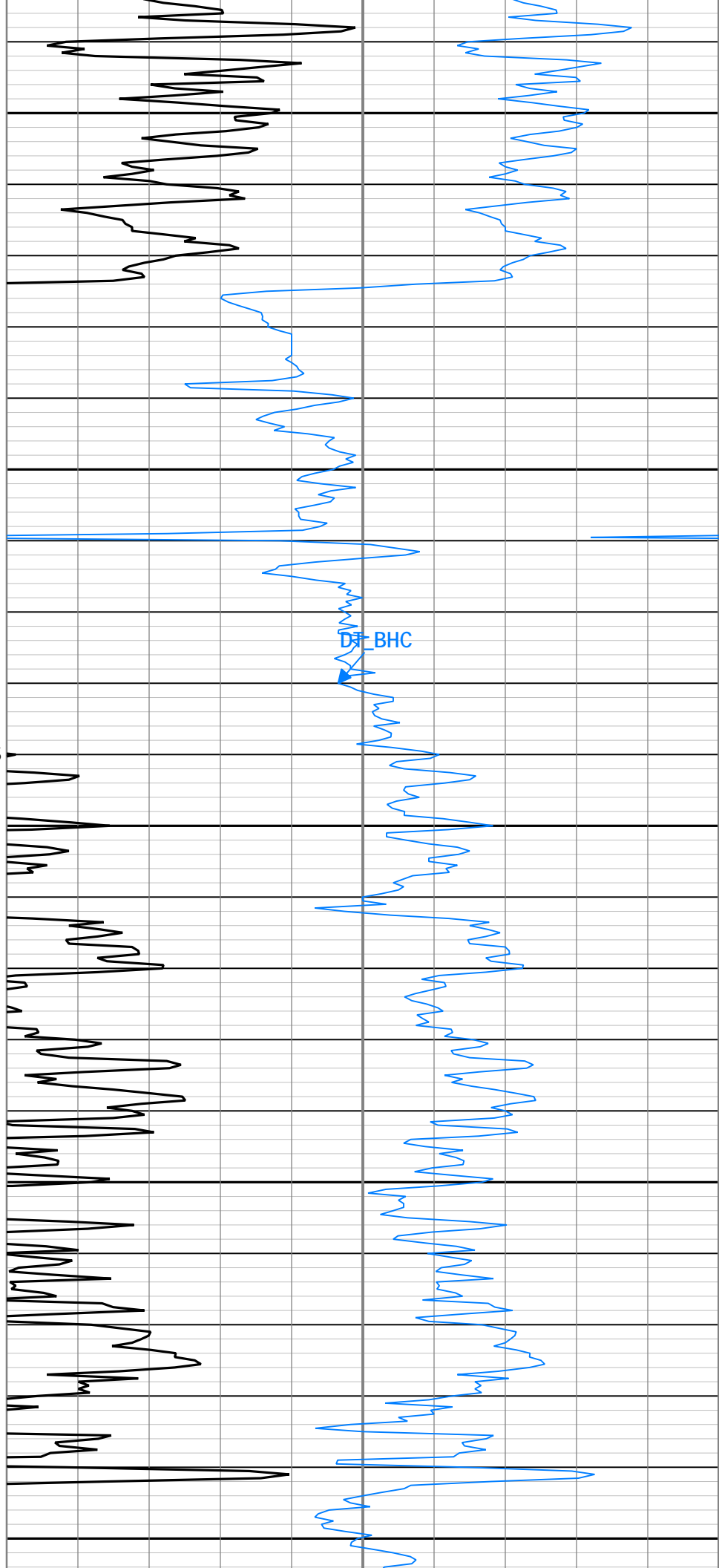
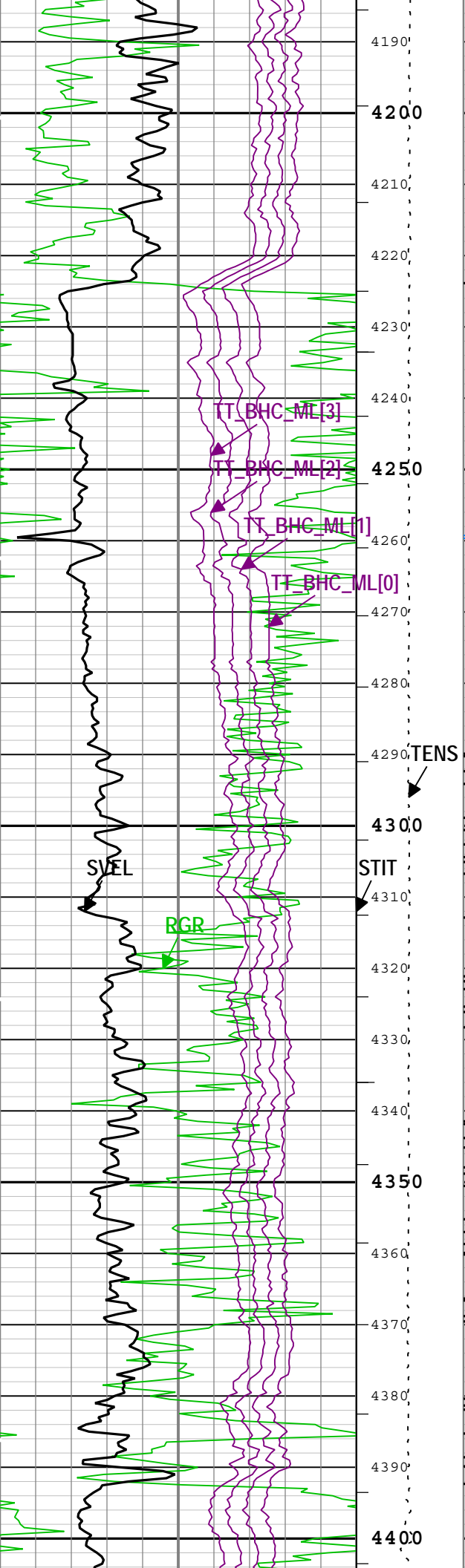


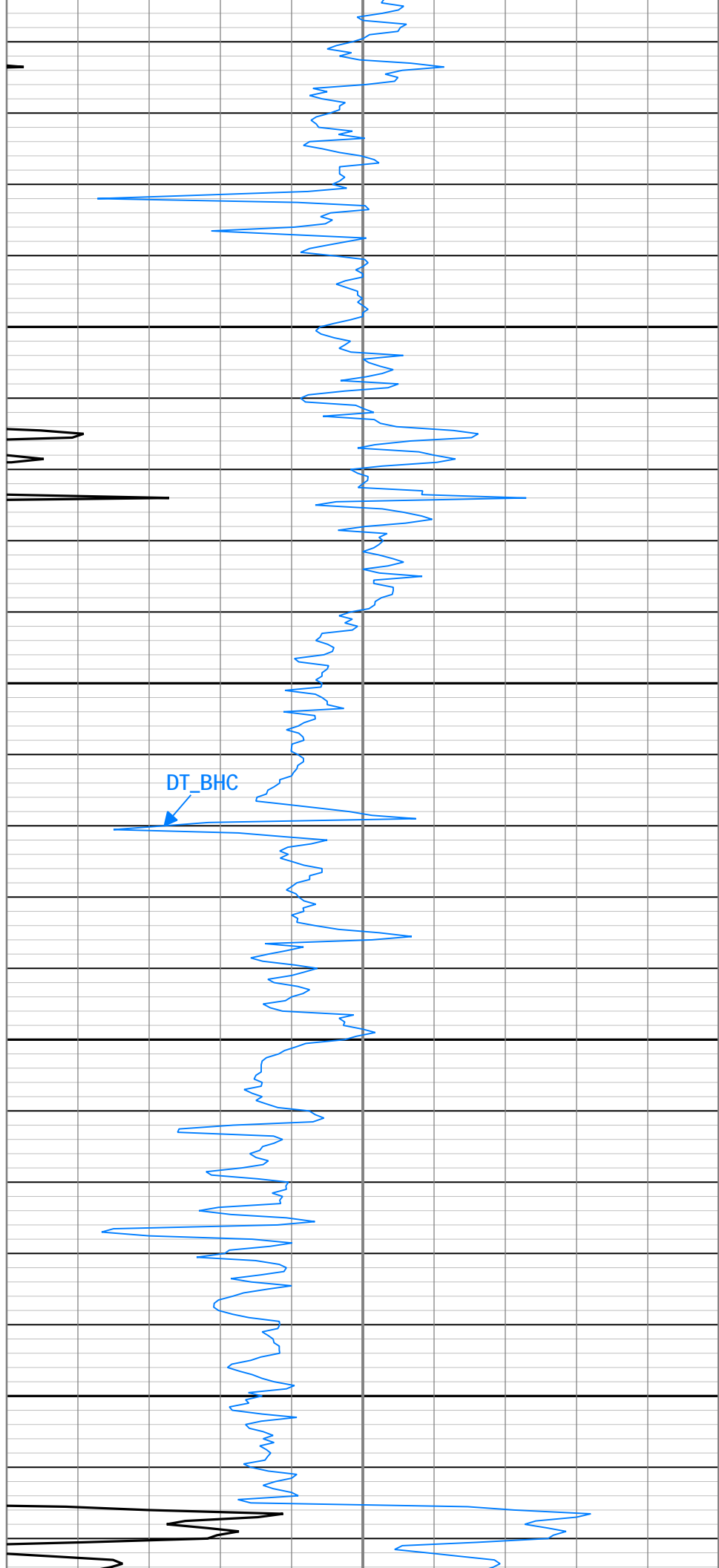
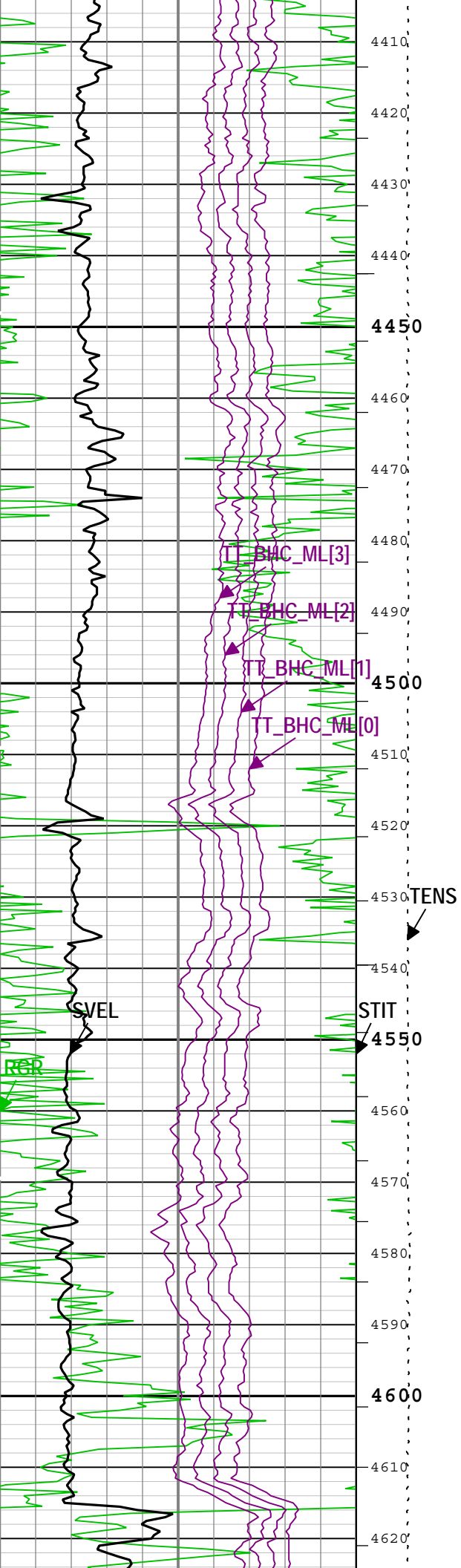


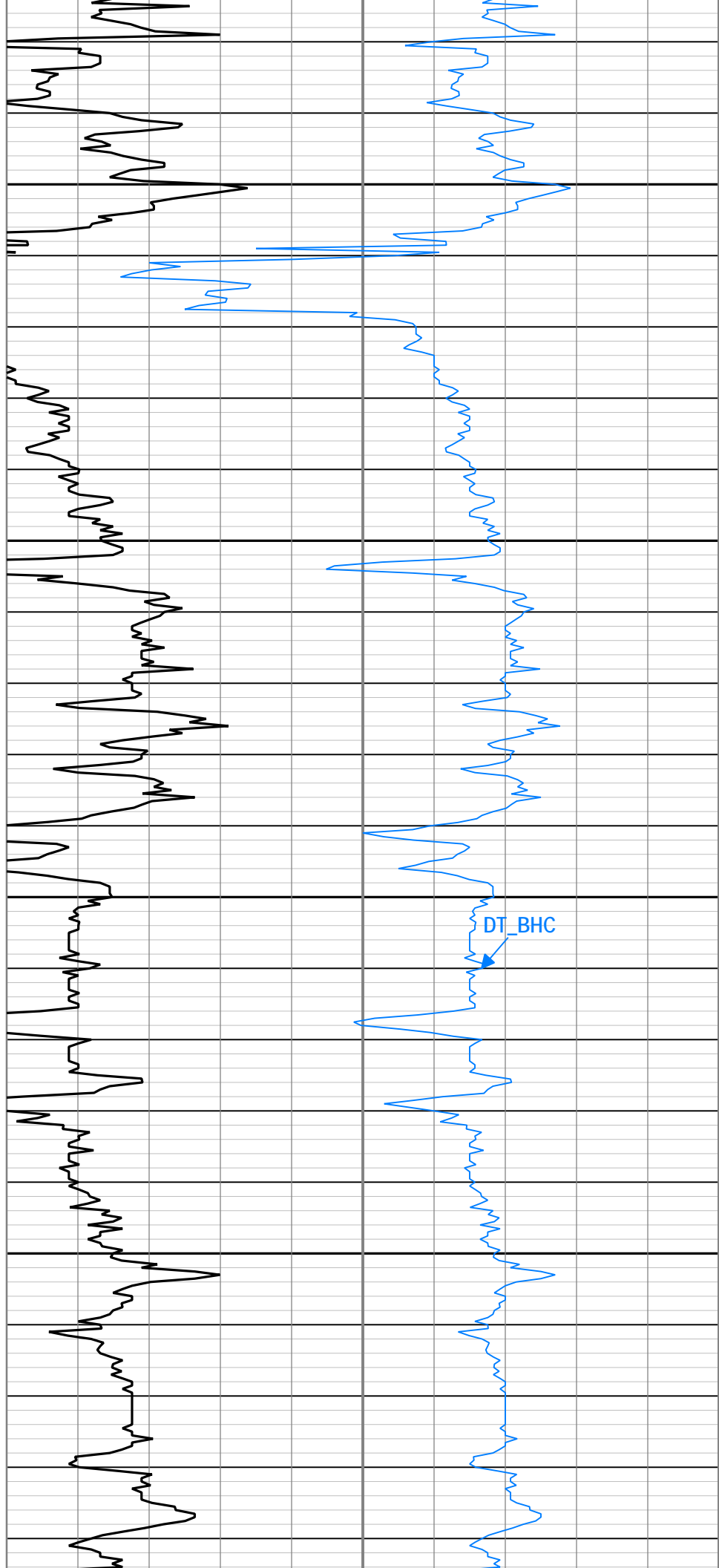
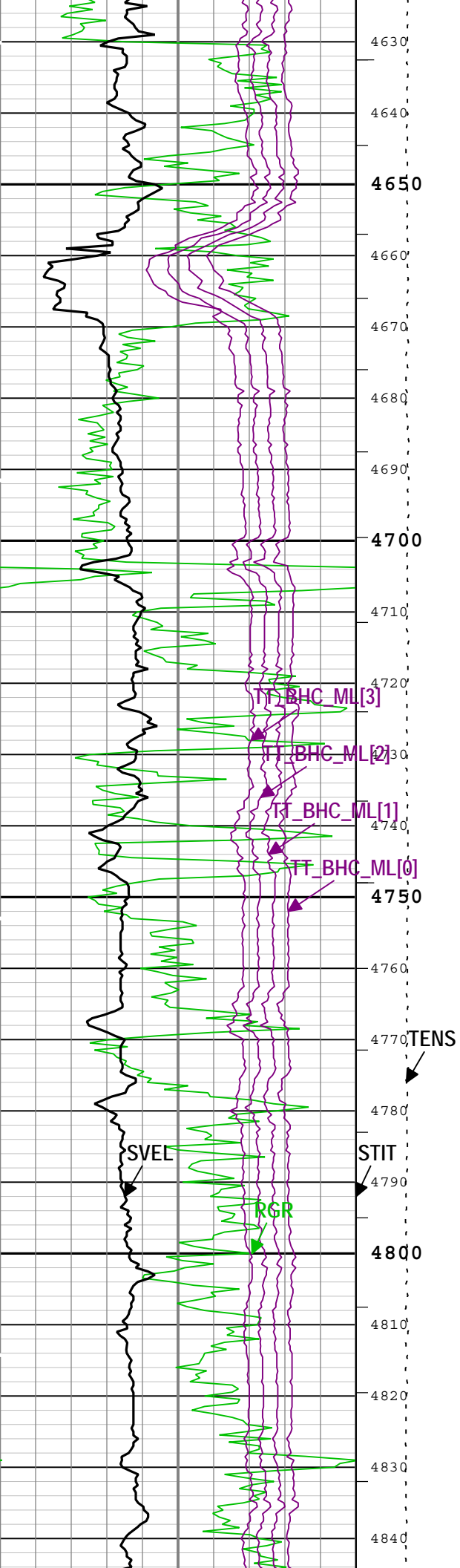


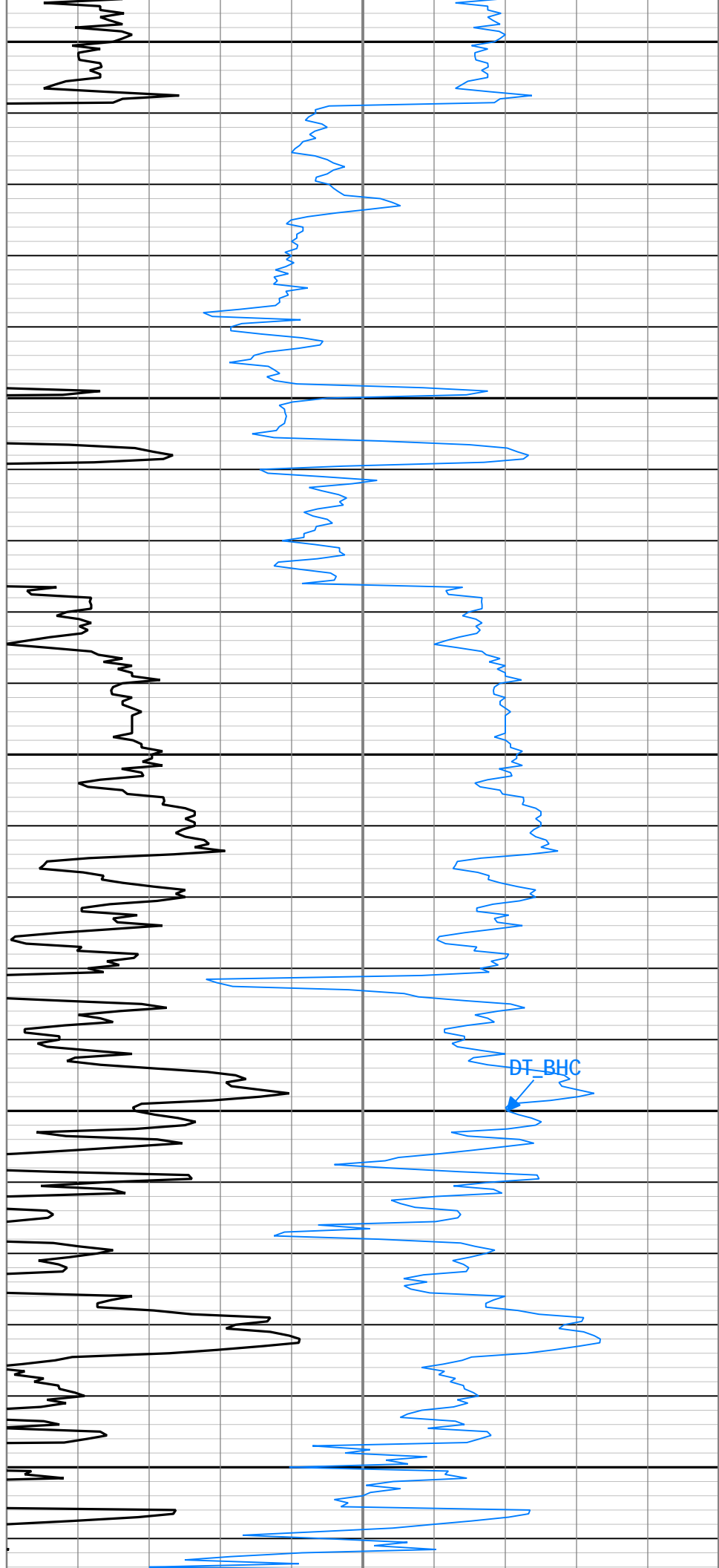
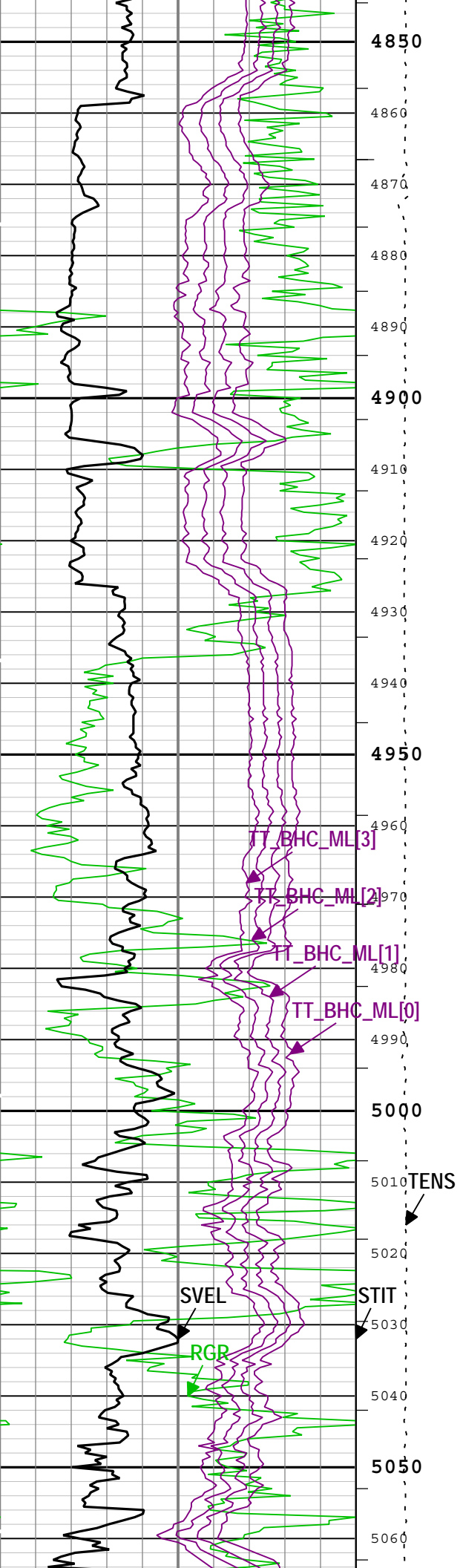


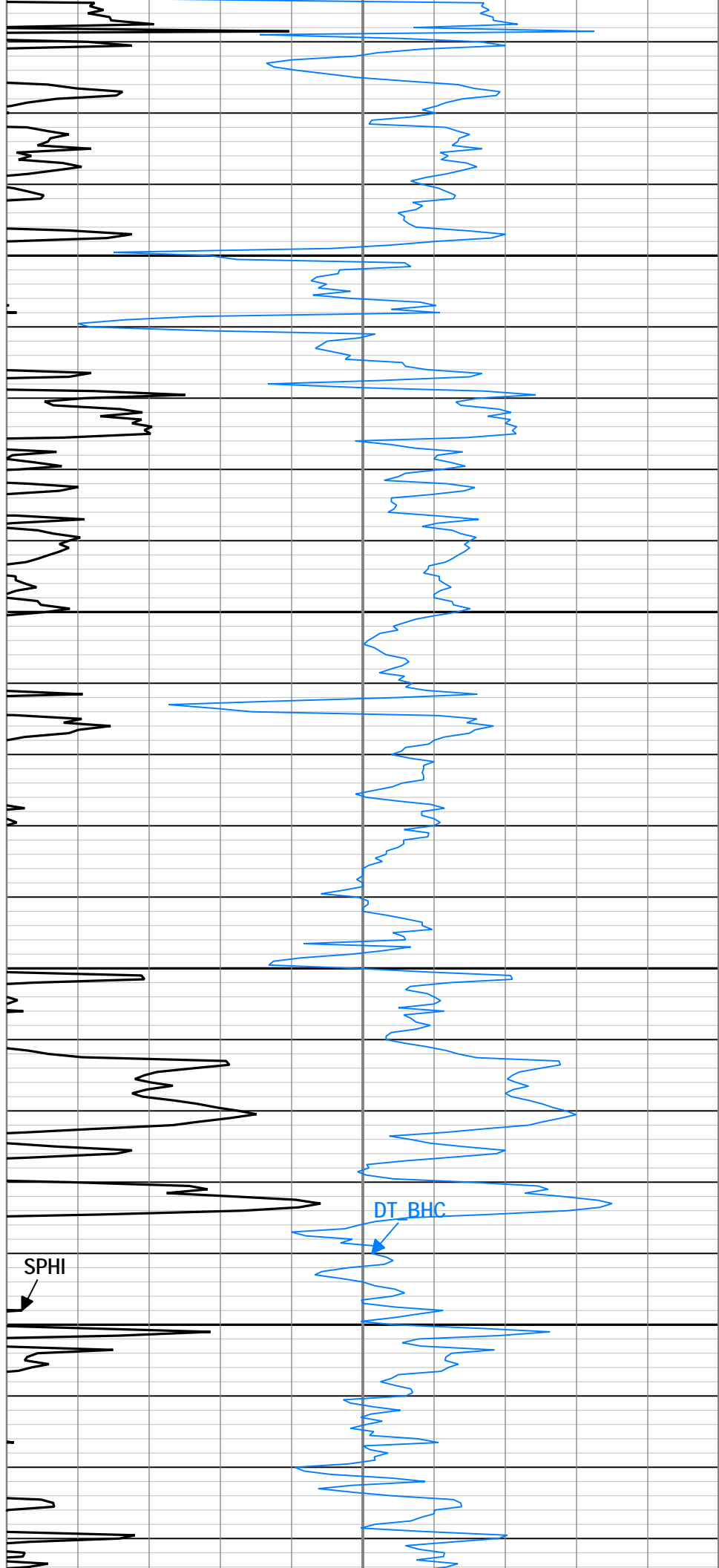
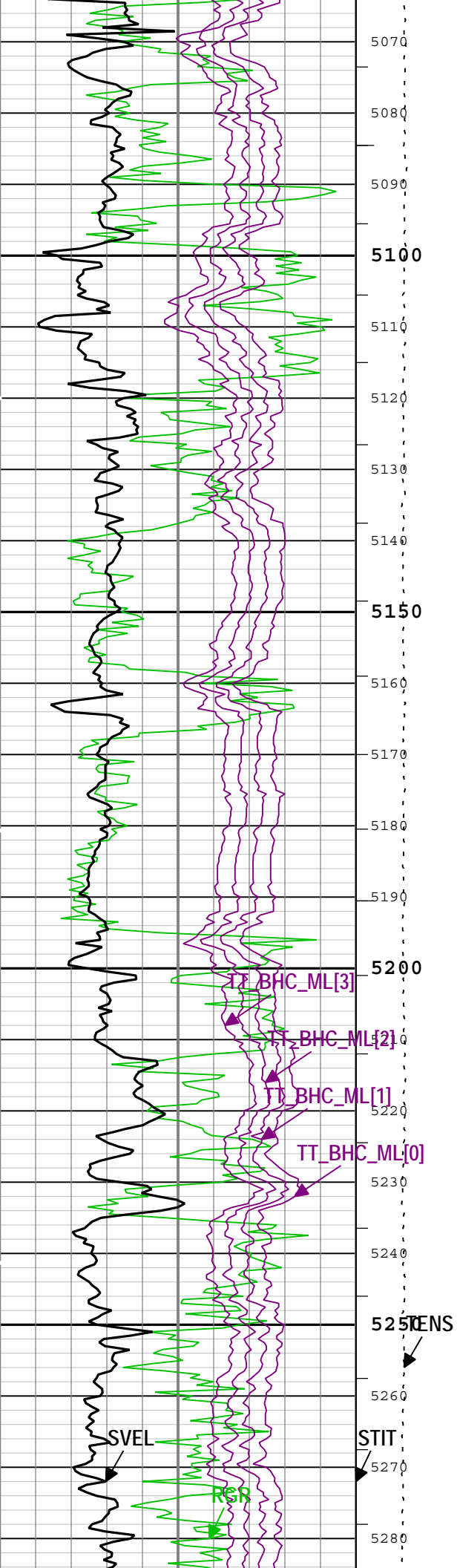


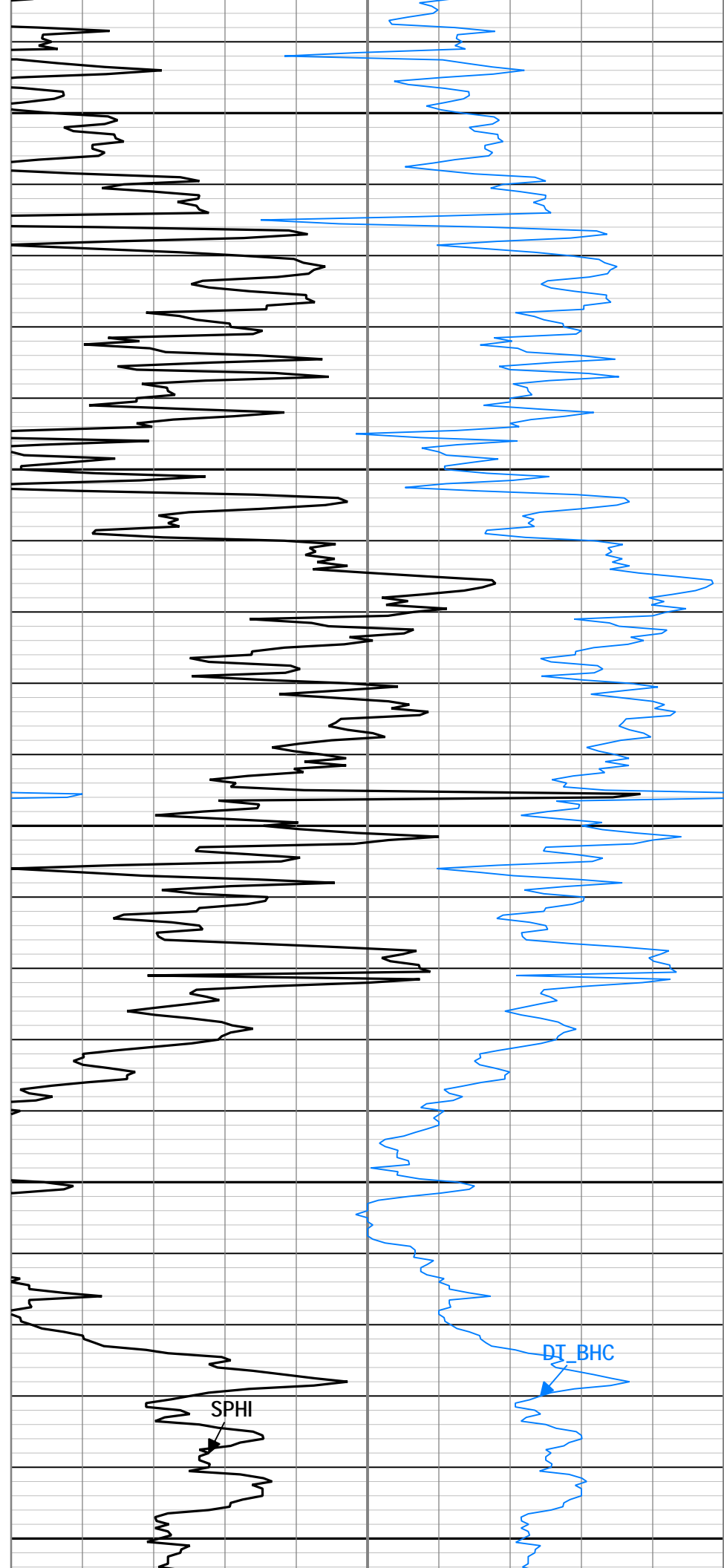
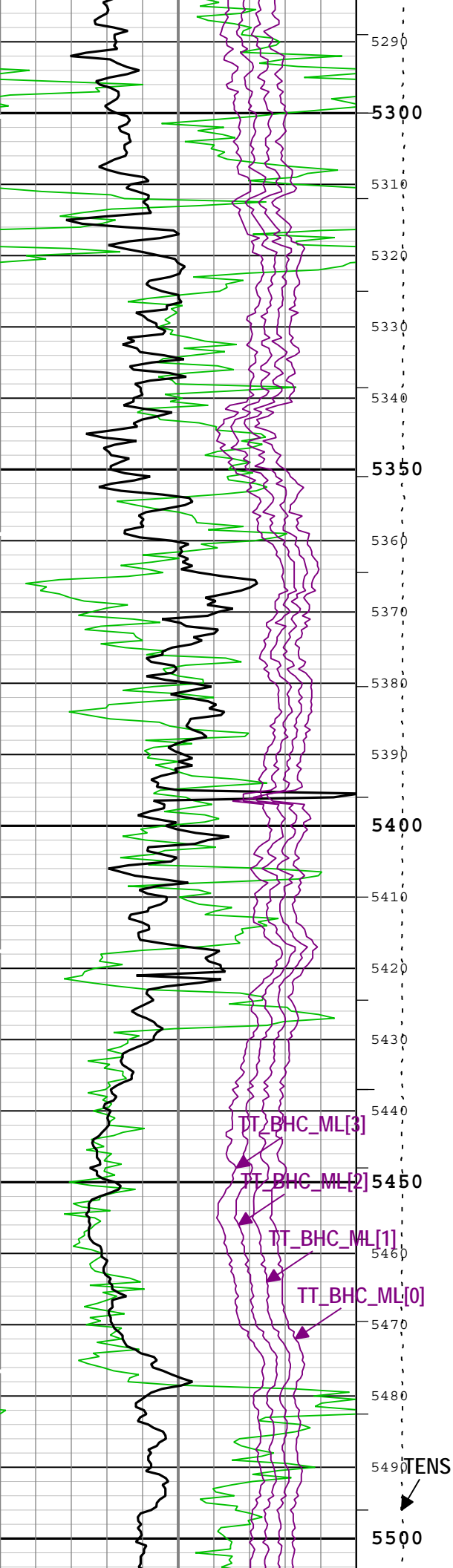


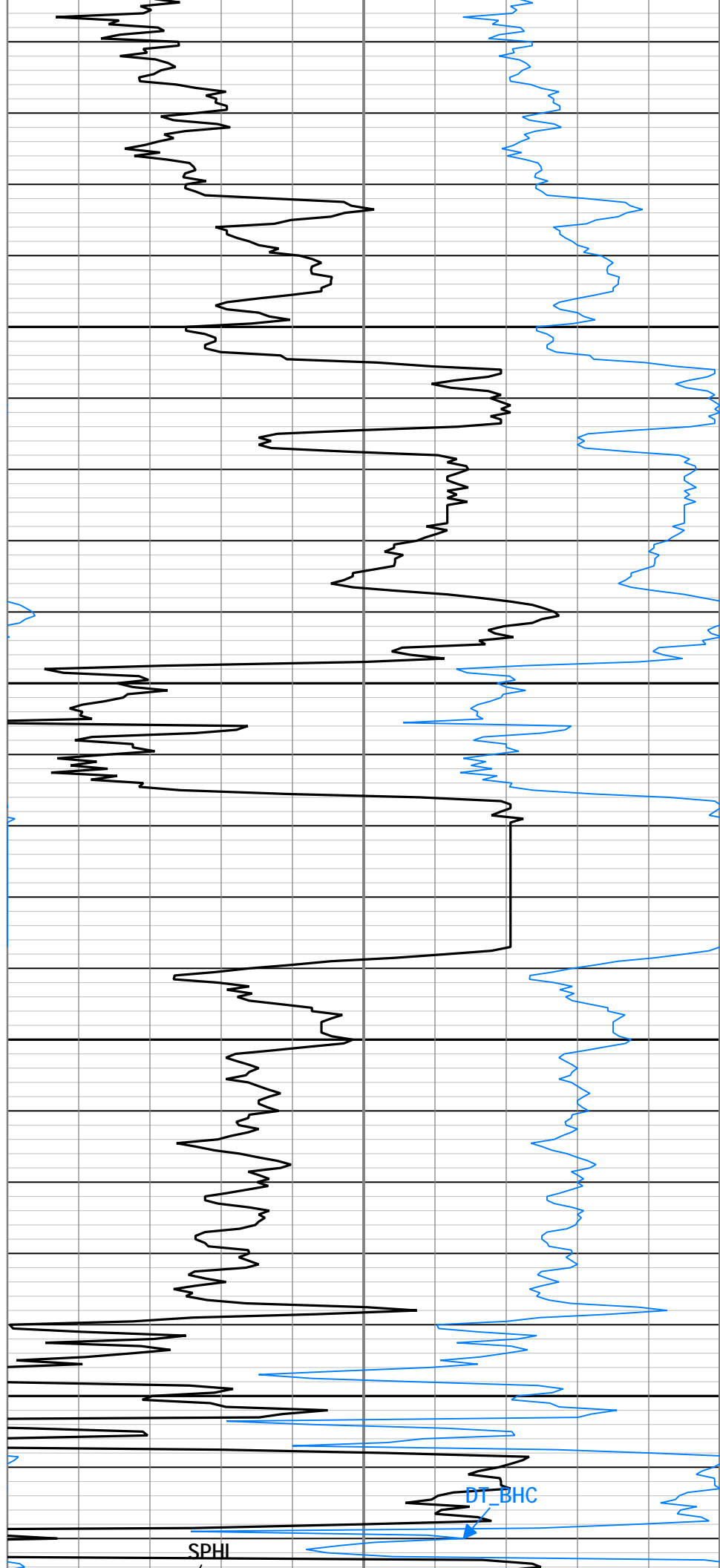
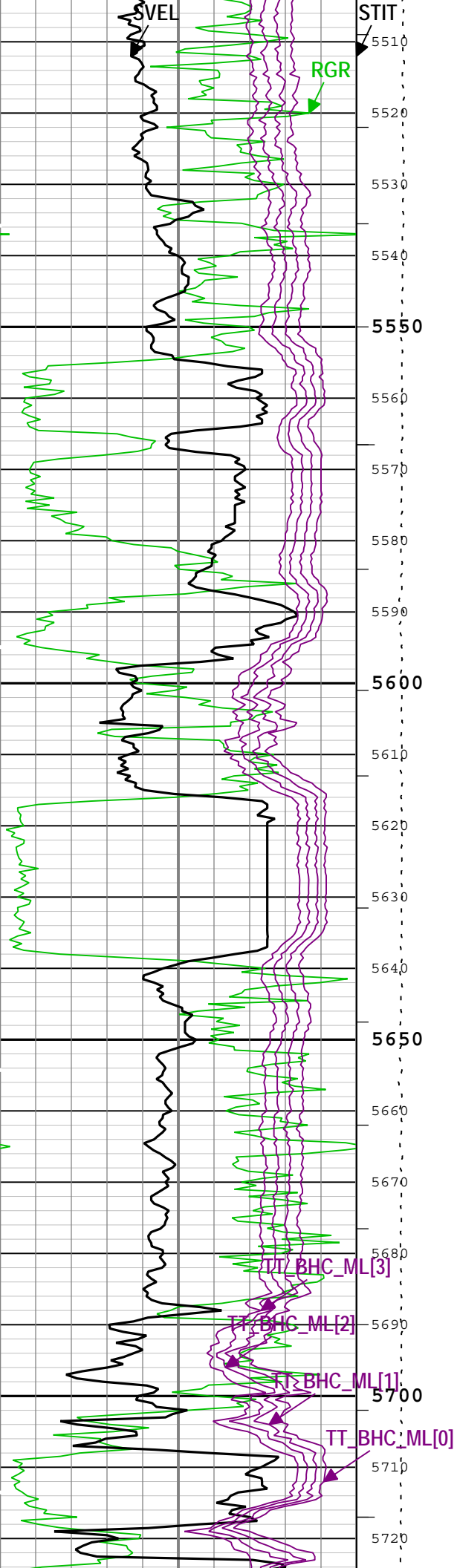


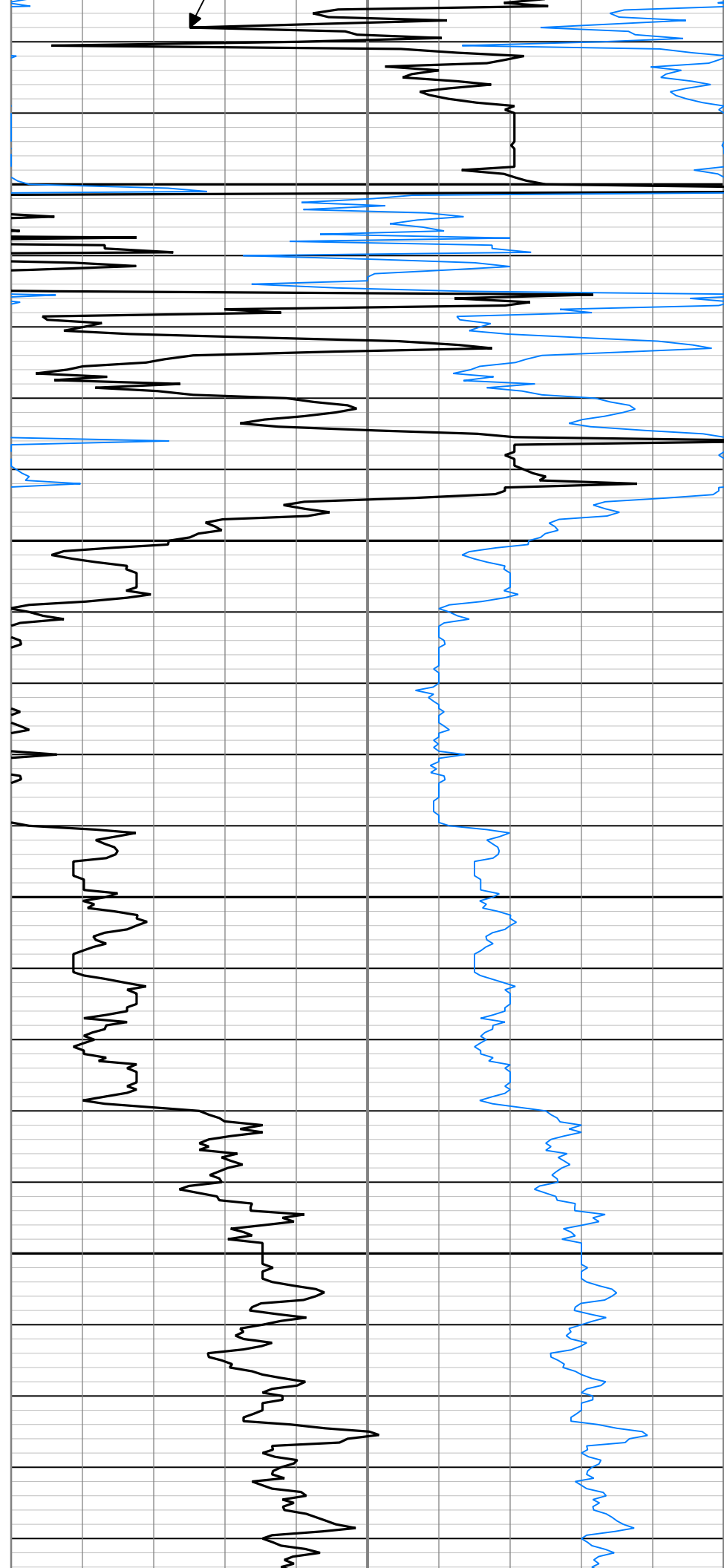
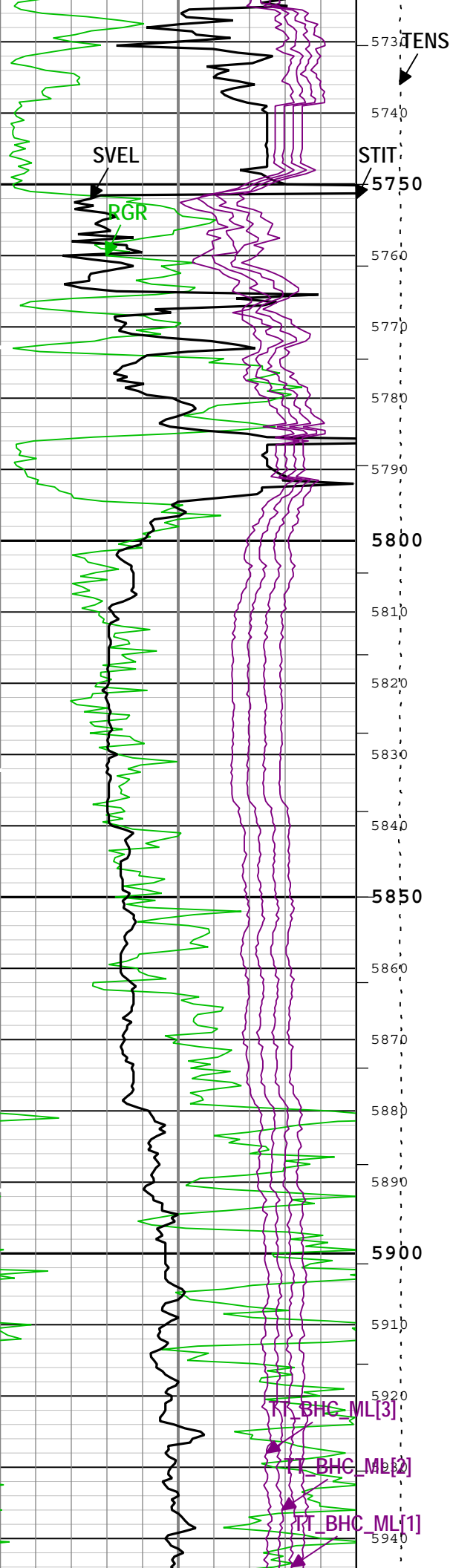


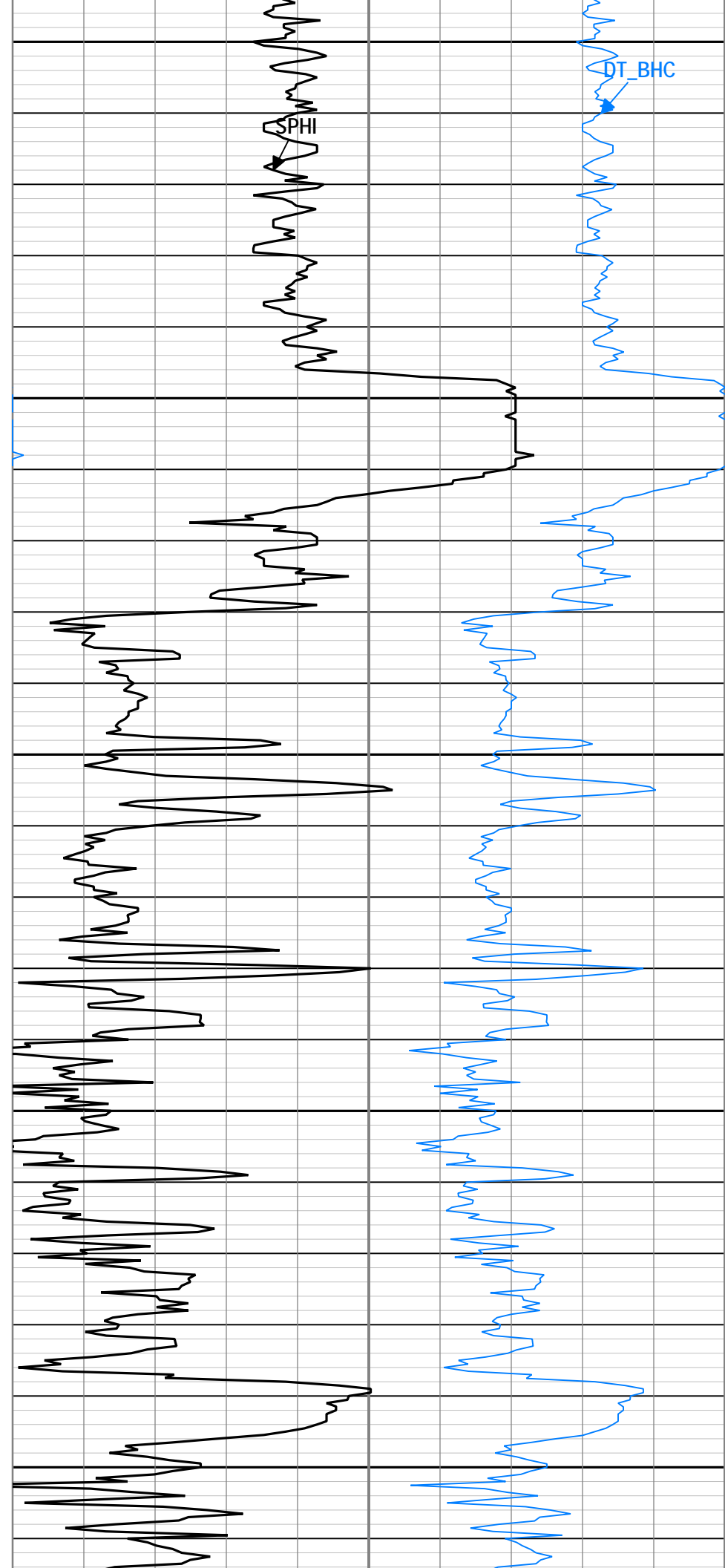
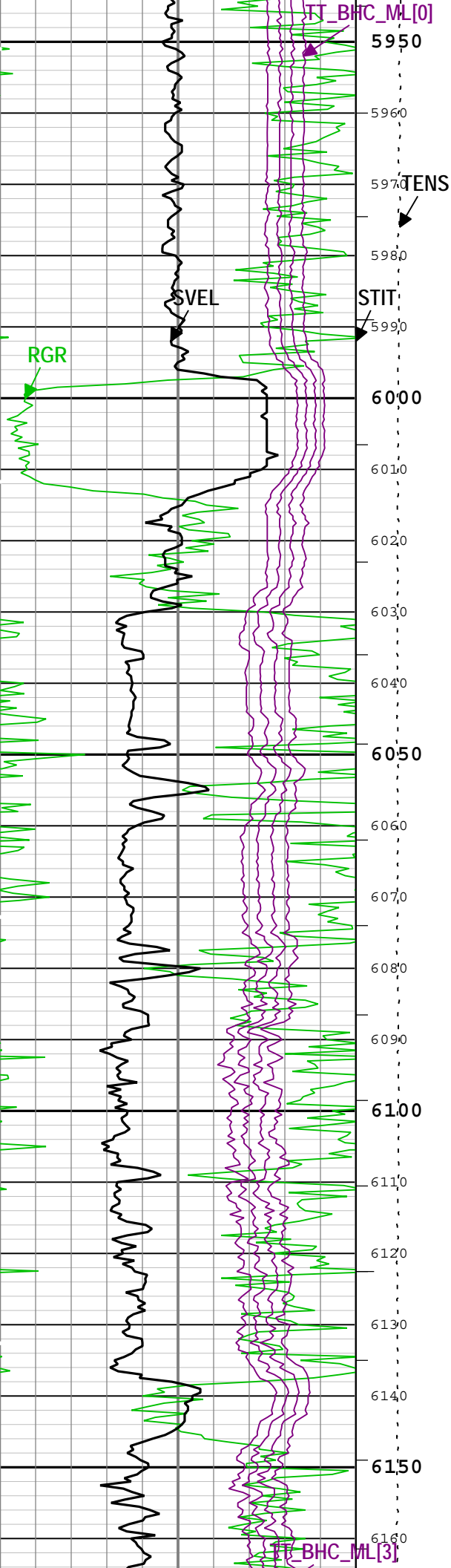


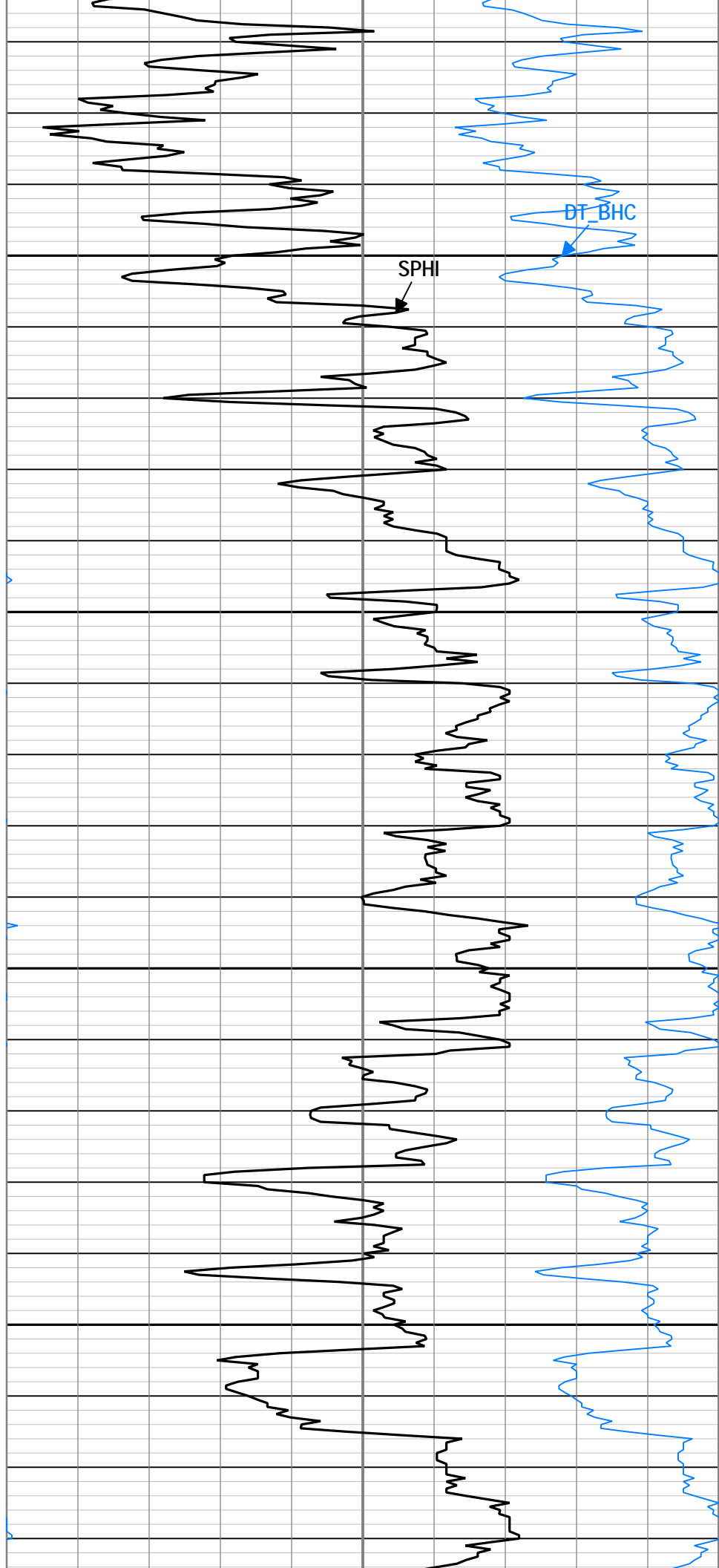
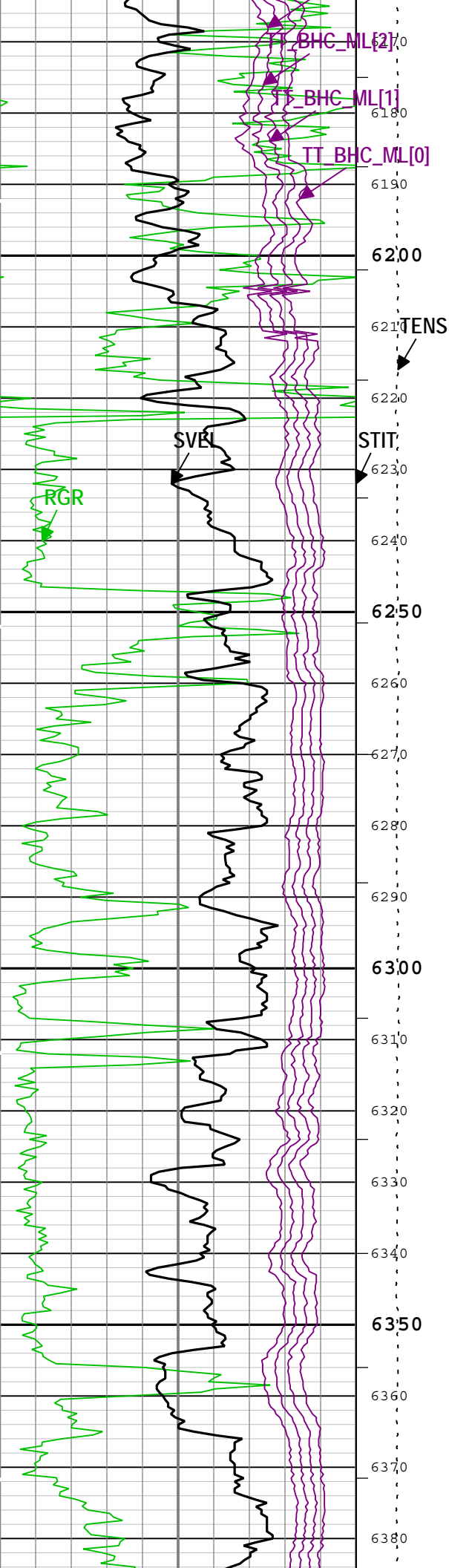


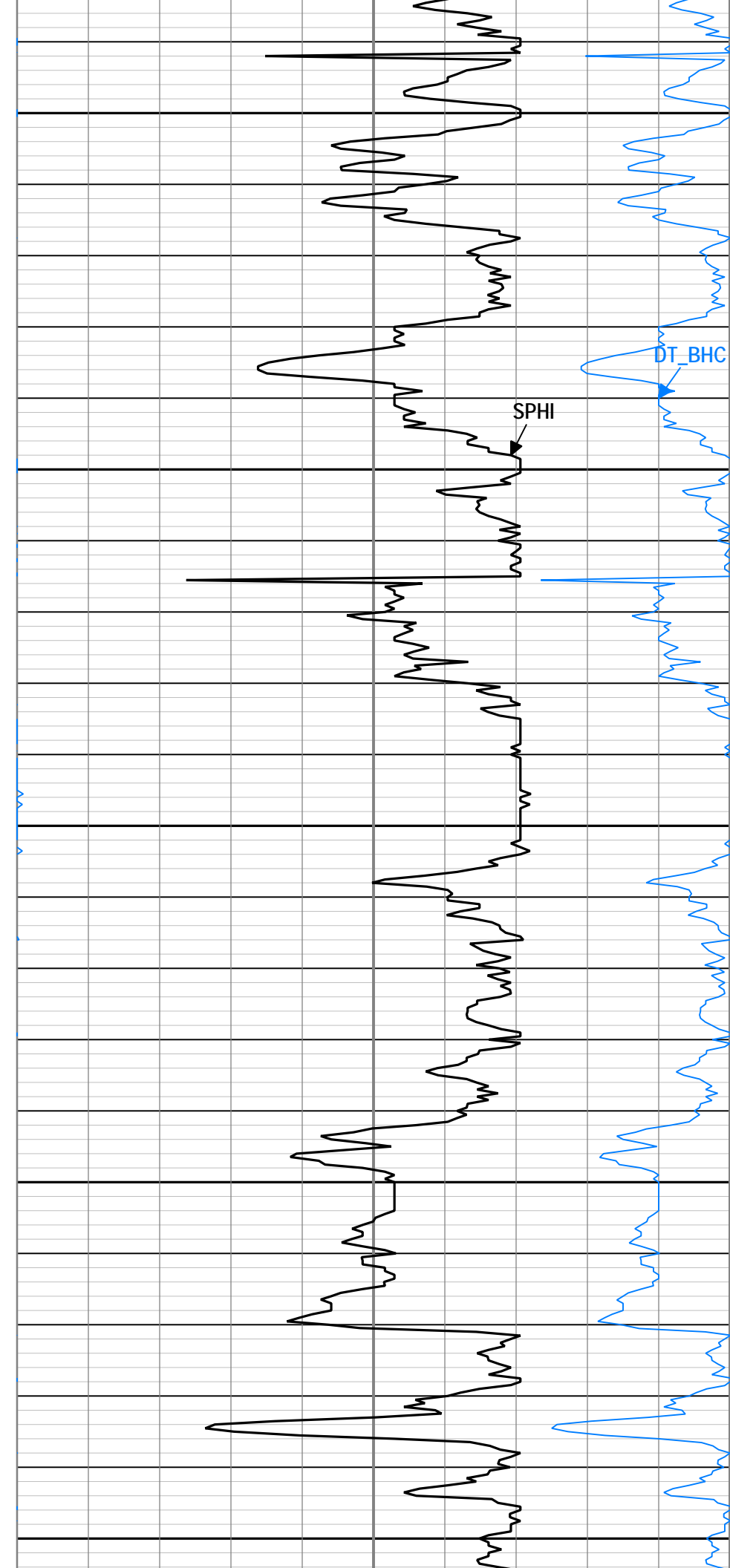
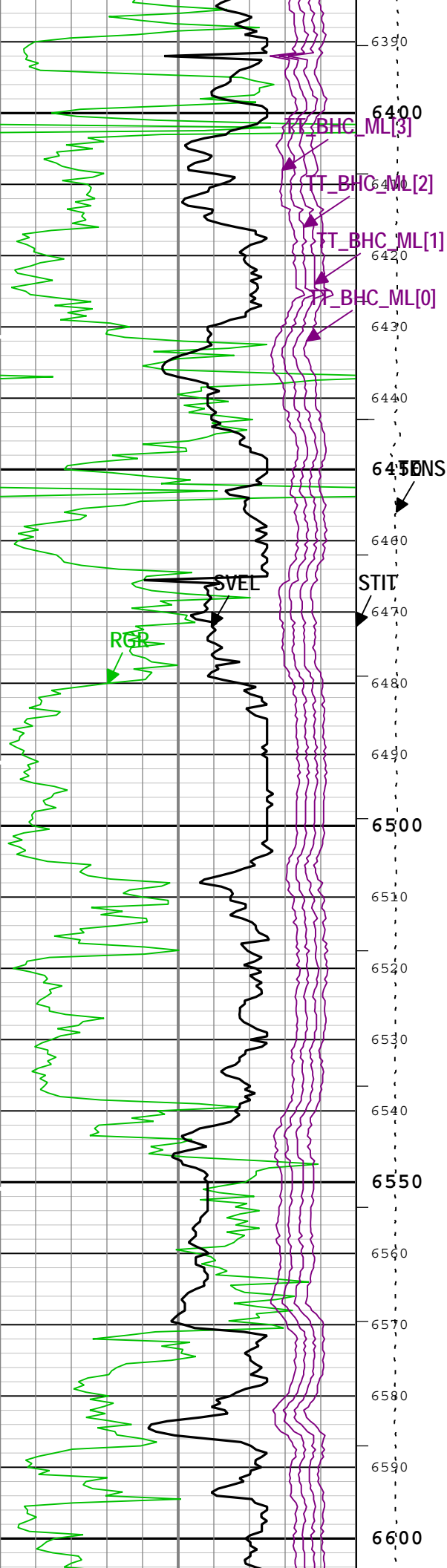


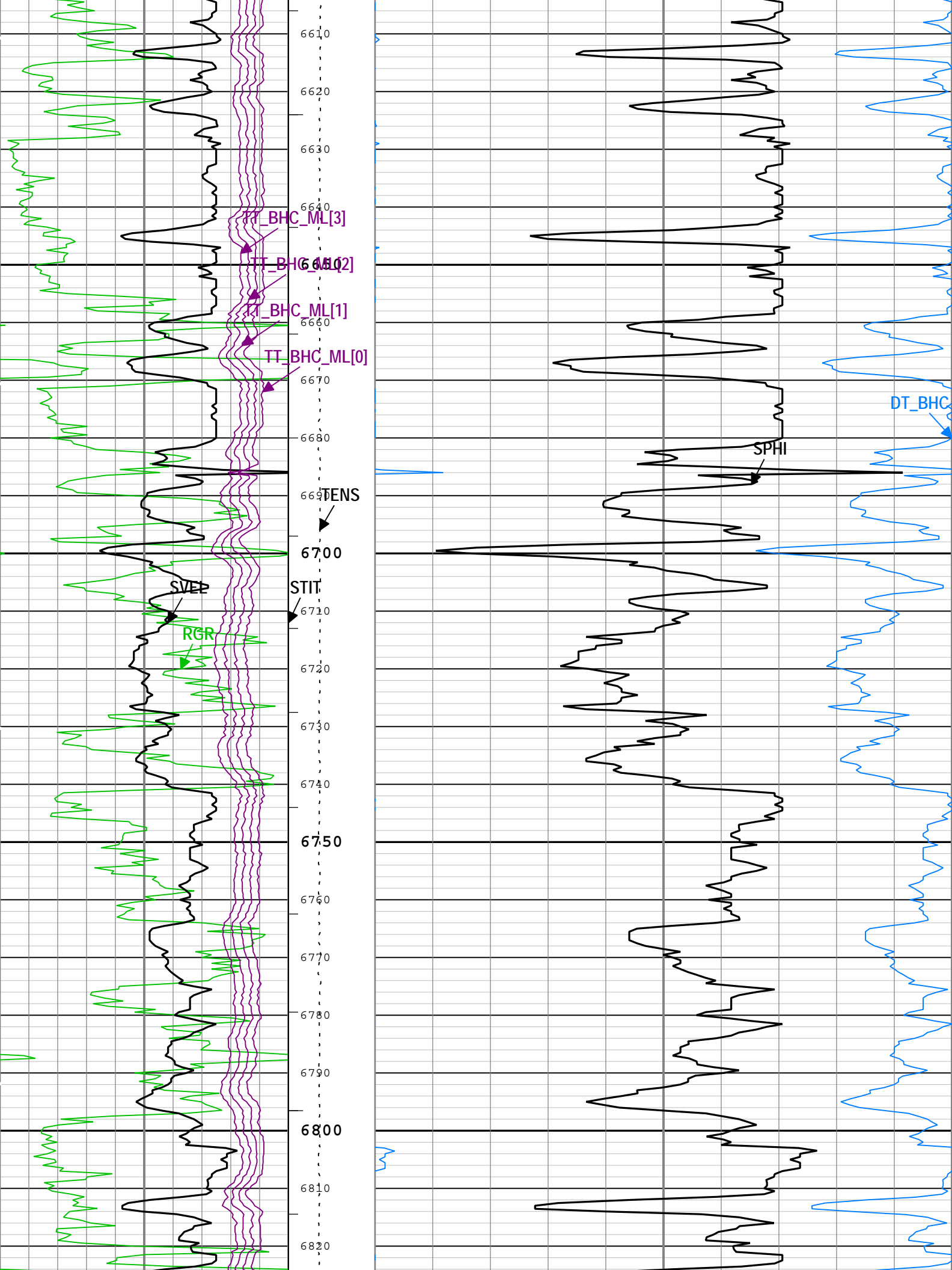


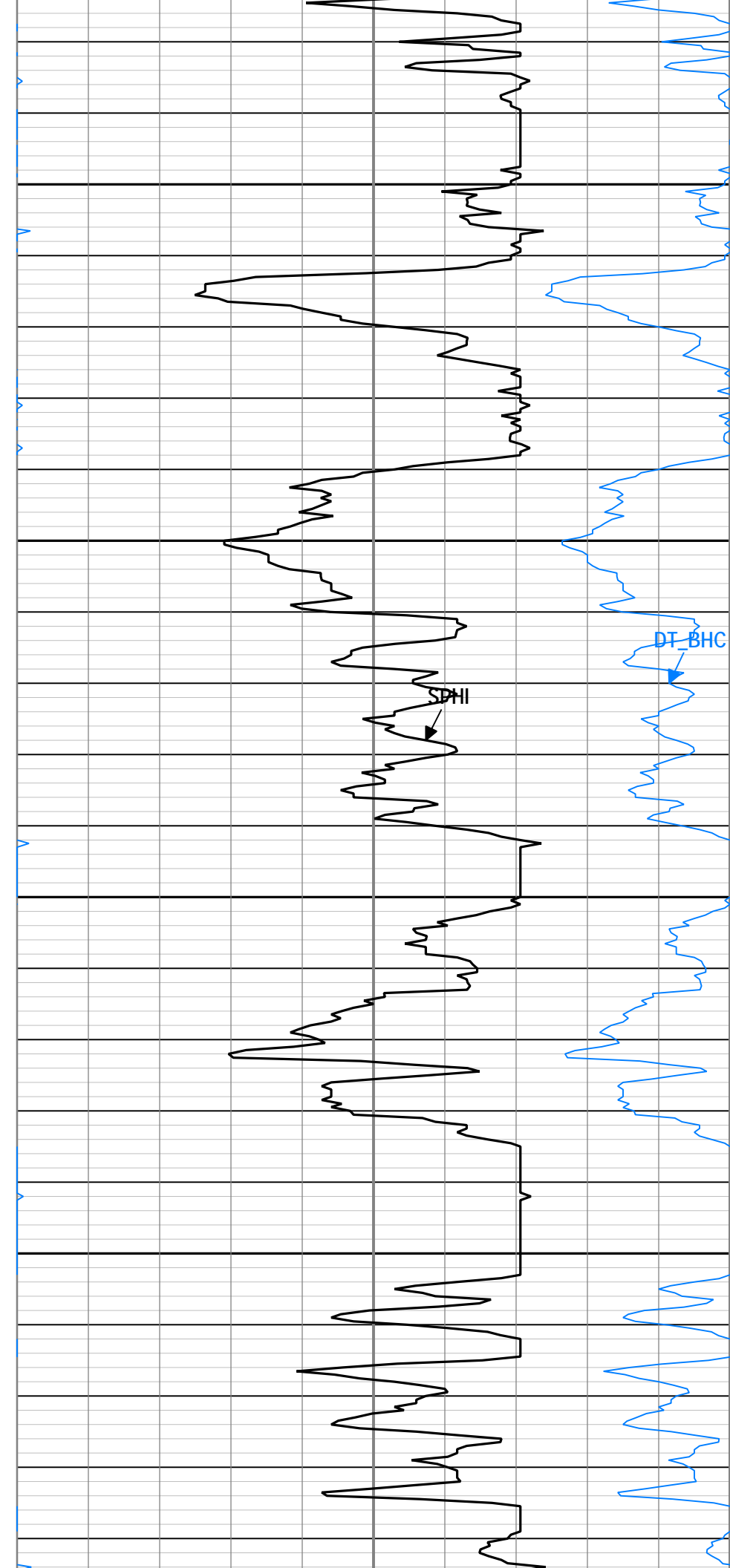
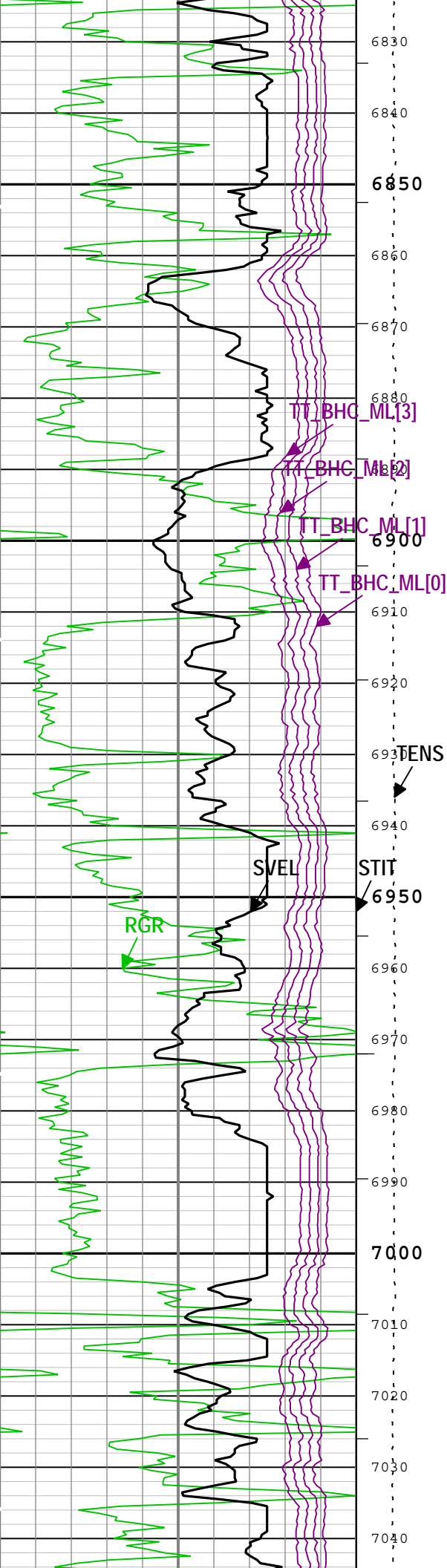


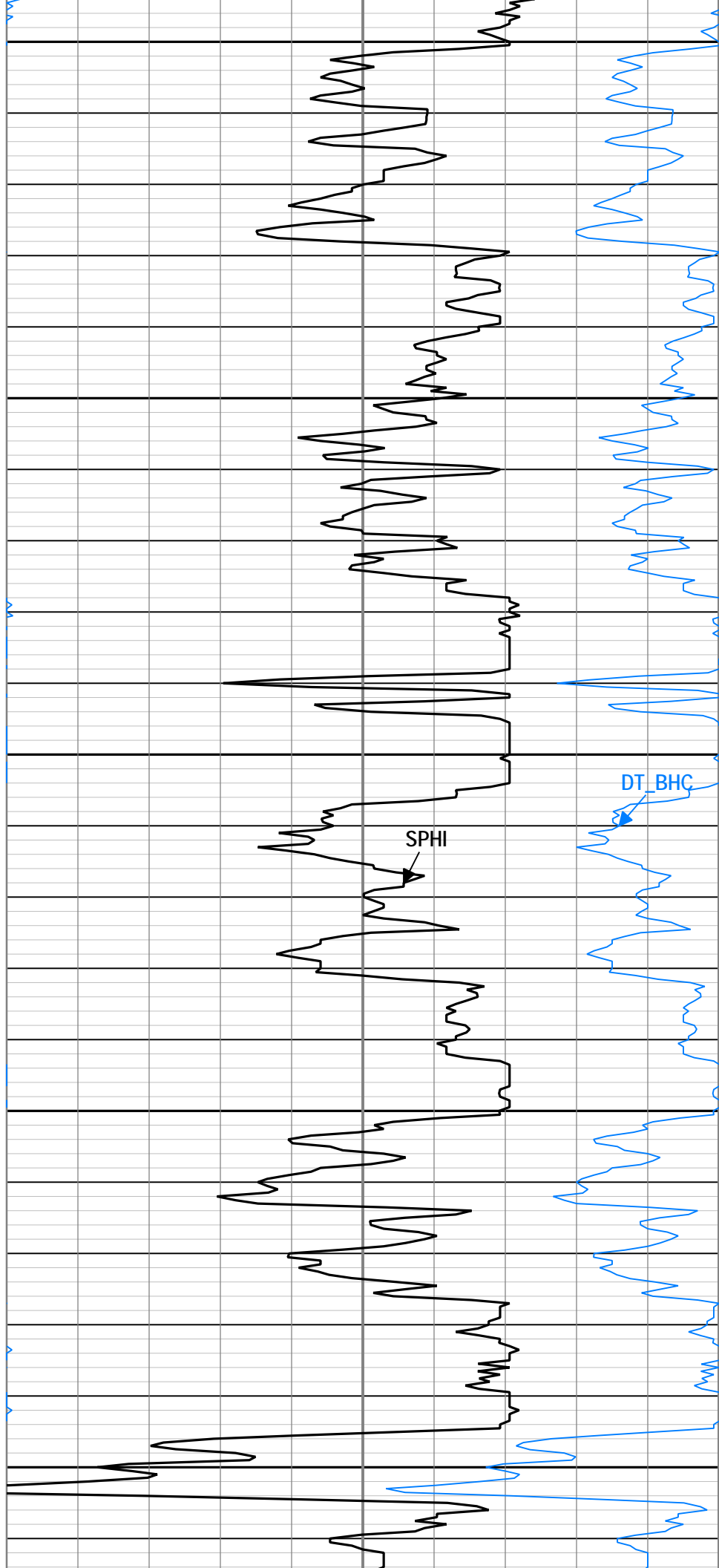
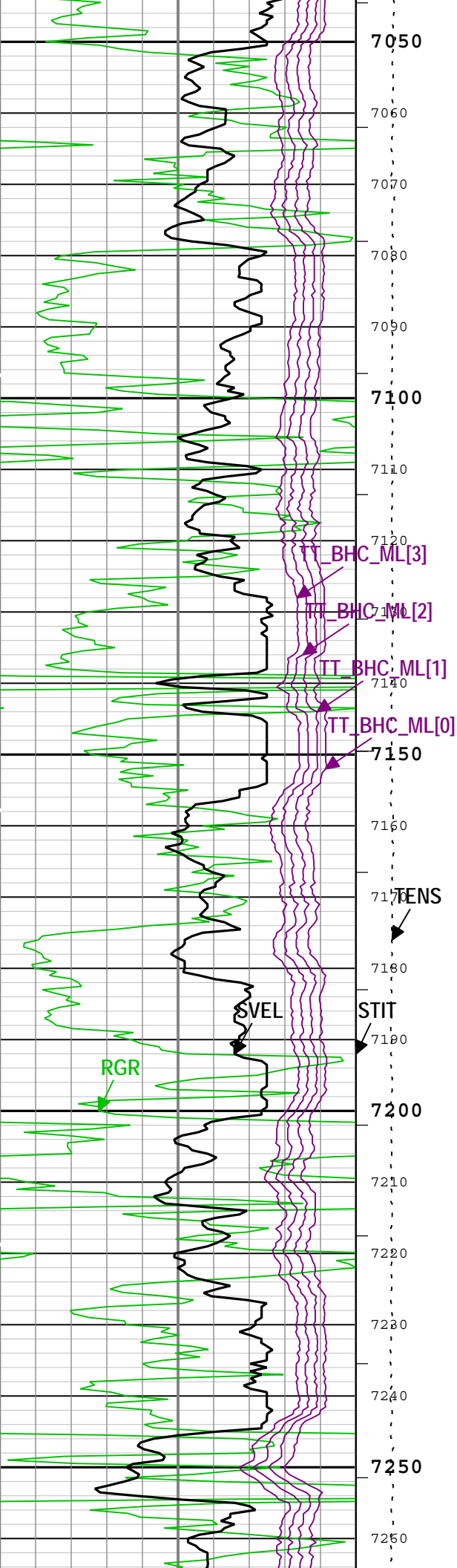


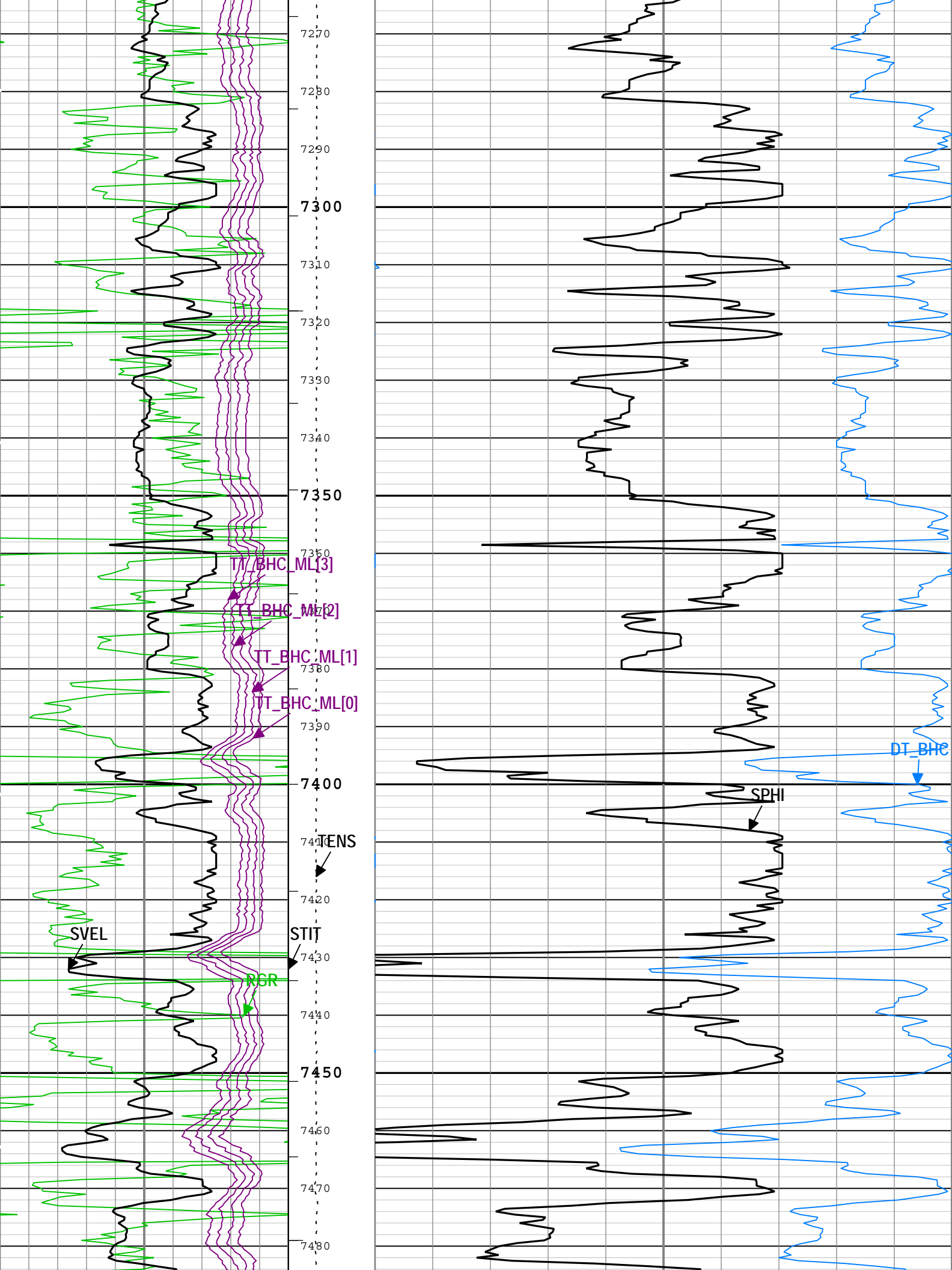


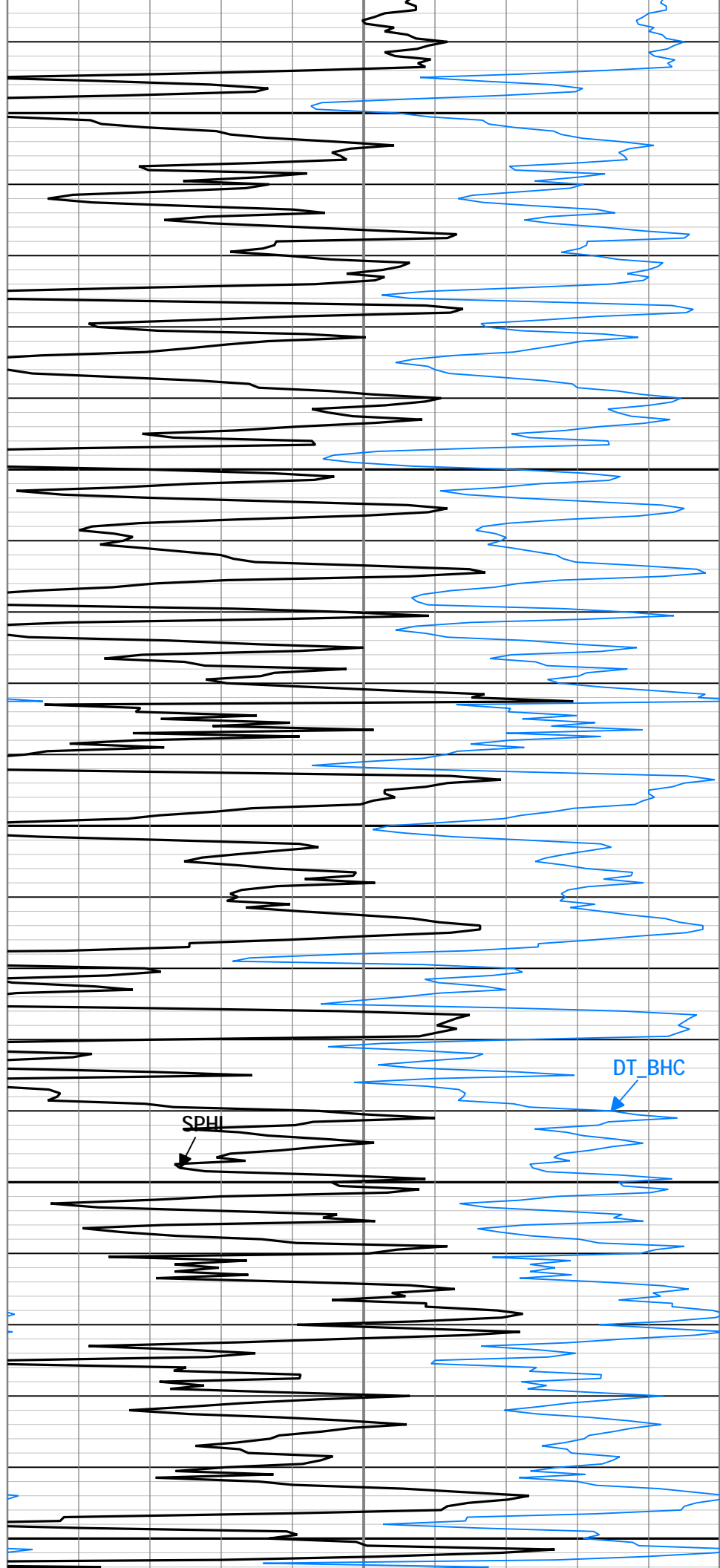
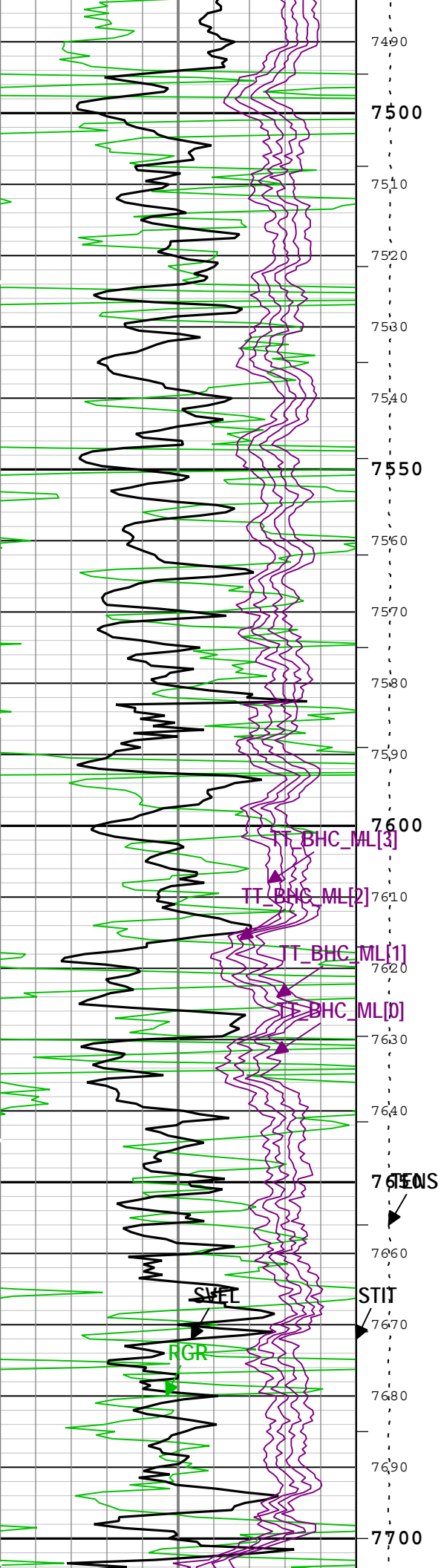


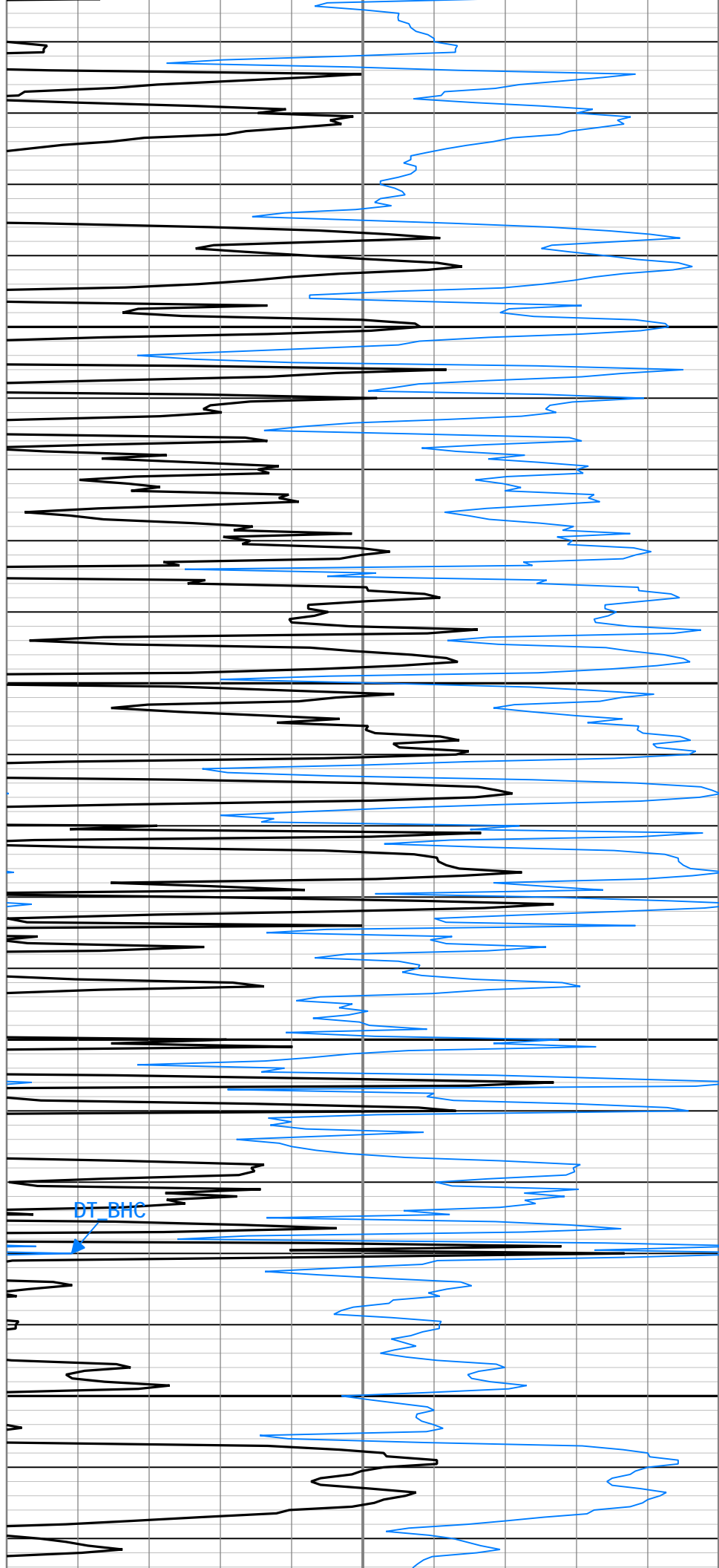
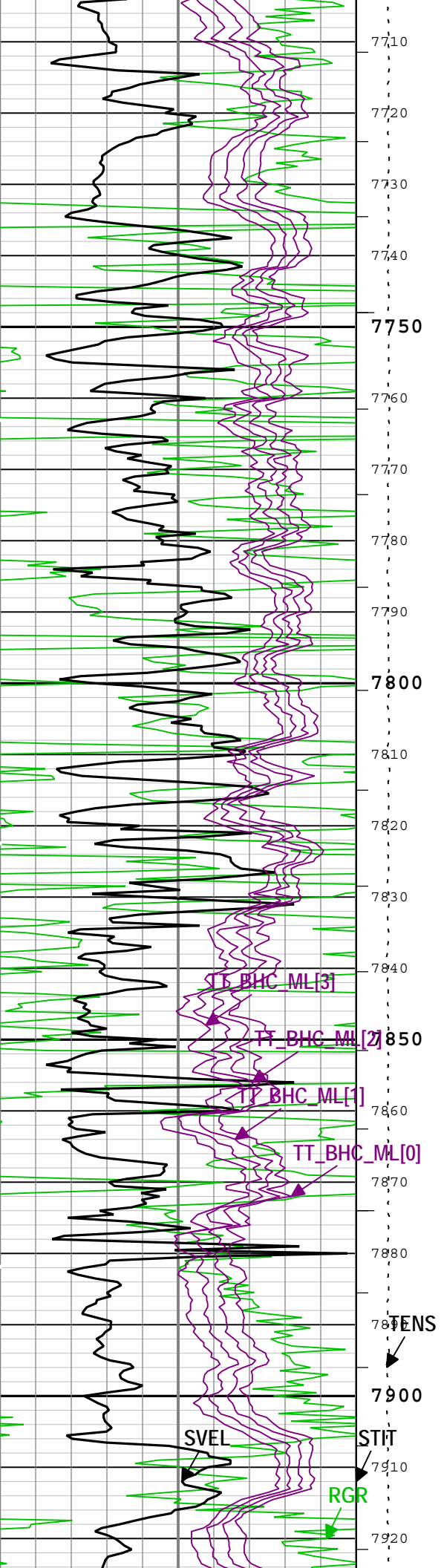


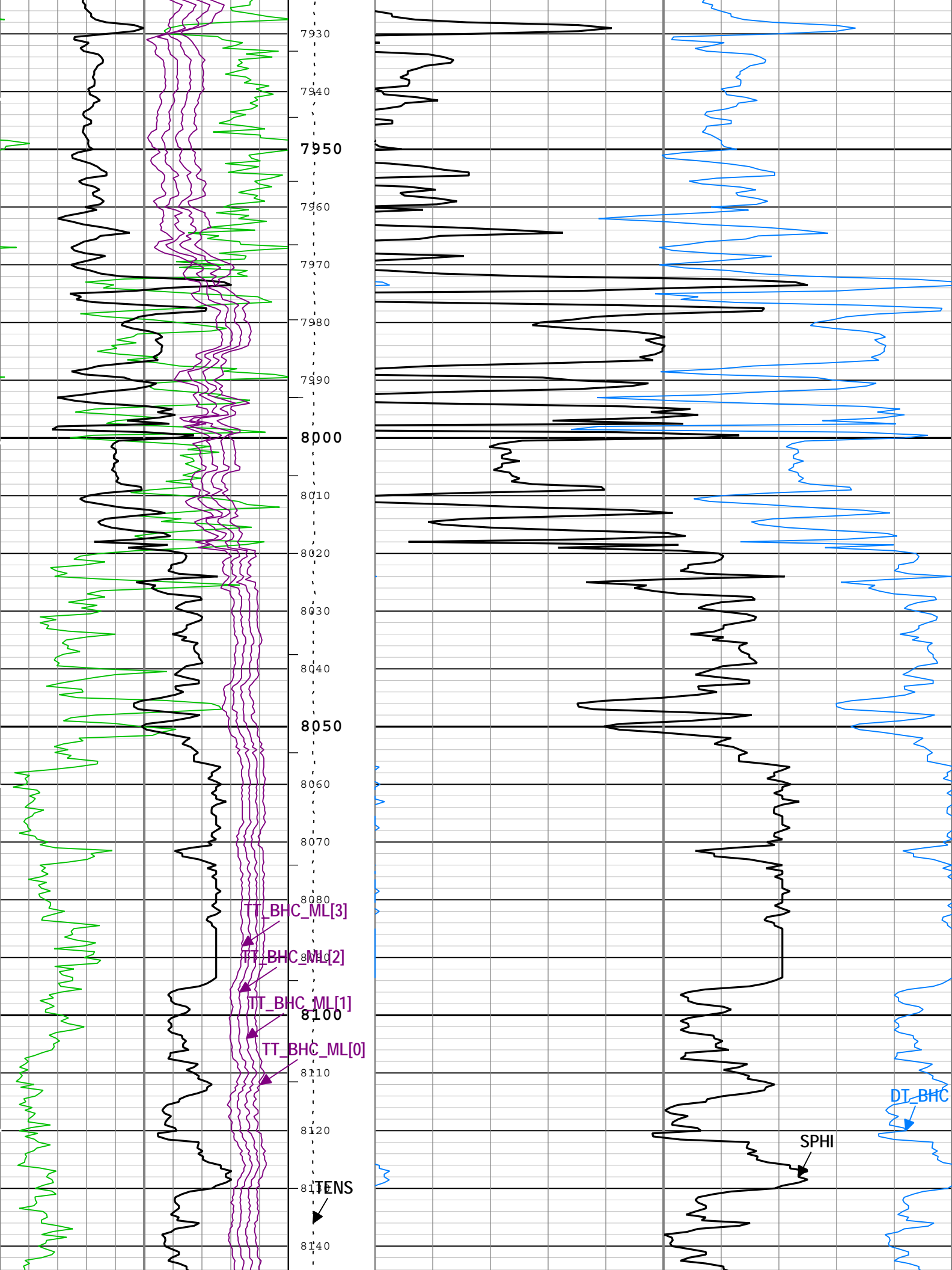


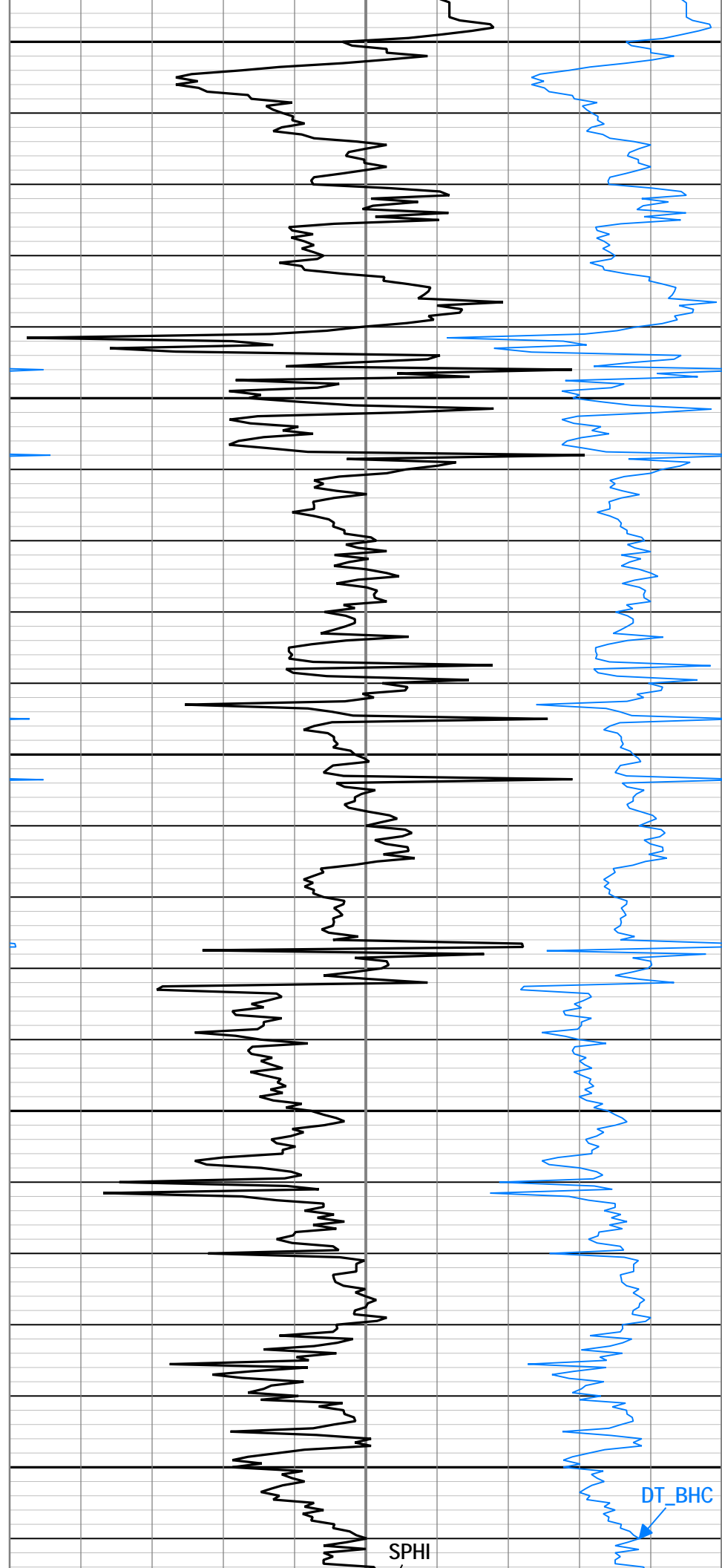
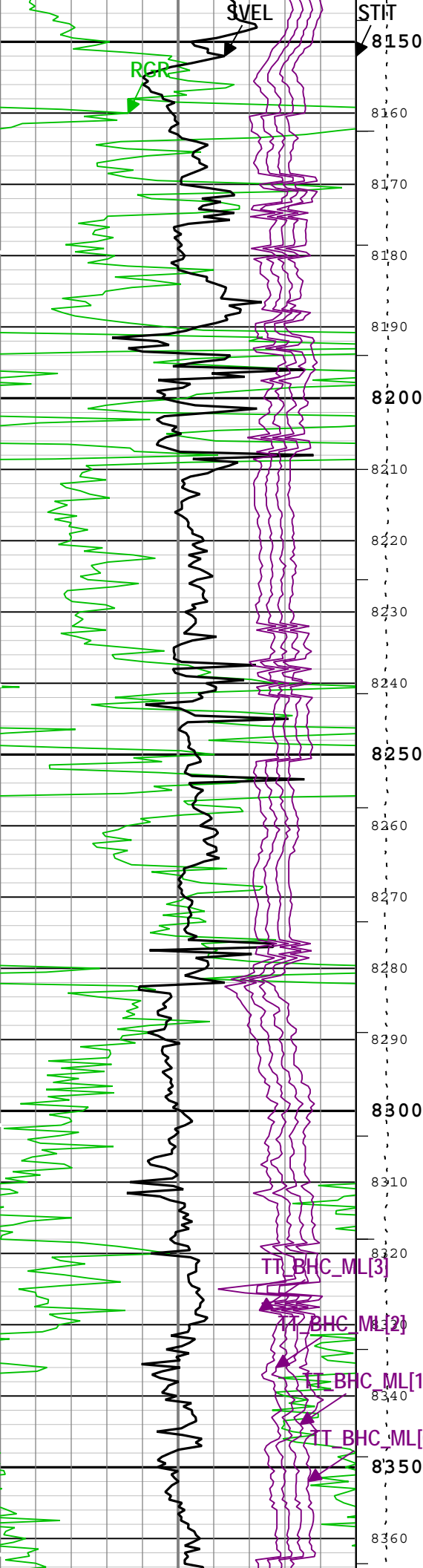


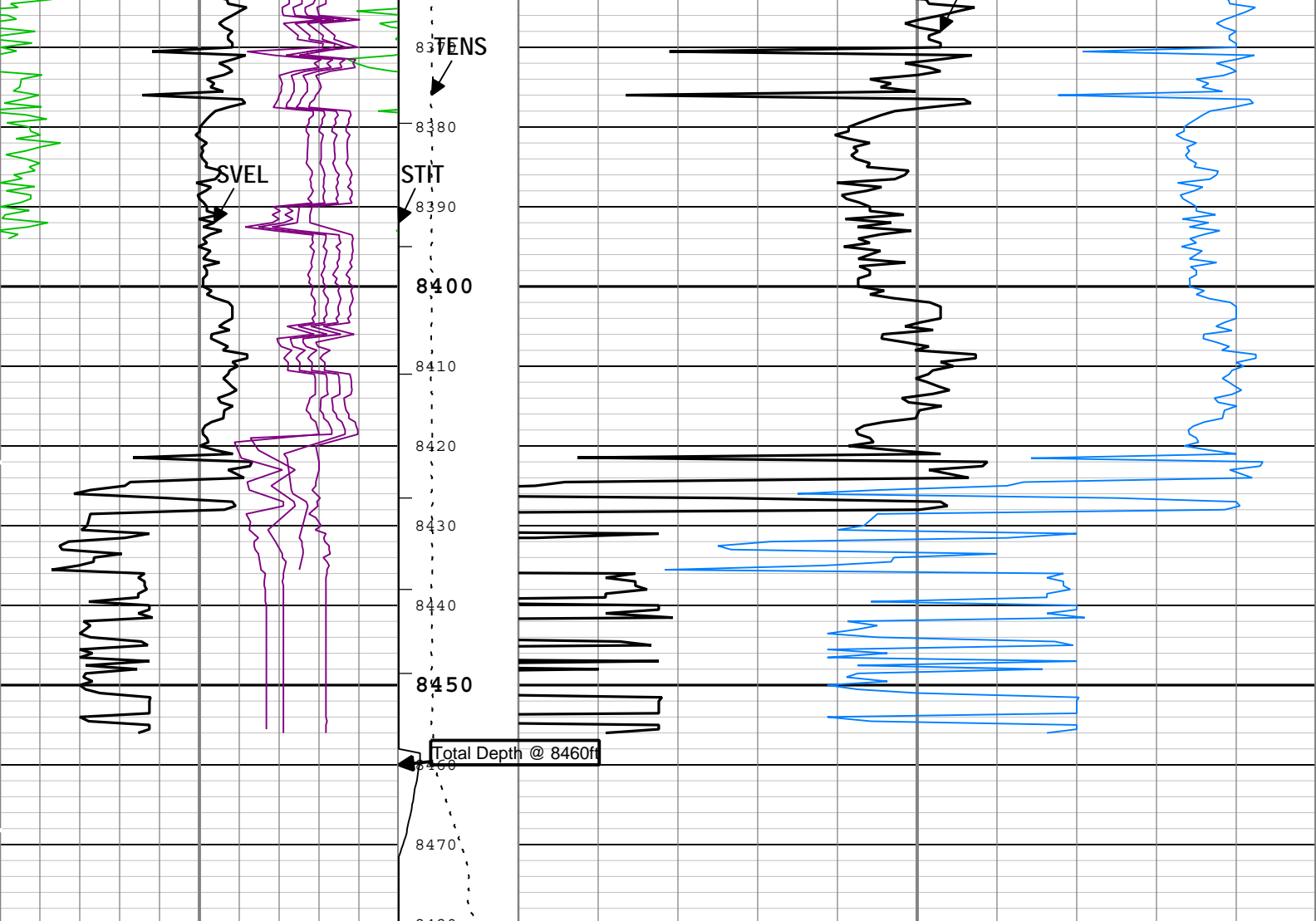












Raw Gamma Ray (RGR) HGNS-H		
0	gAPI	150
Sonic Velocity (SVEL) MAST-B		
5000	ft/s	25000
Borehole Compensated Transit Time of Monopole Lower Transmitter (TT_BHC_ML[0]) MAST-B		
1200	us	200
Borehole Compensated Transit Time of Monopole Lower Transmitter (TT_BHC_ML[1]) MAST-B		
1200	us	200
Borehole Compensated Transit Time of Monopole Lower Transmitter (TT_BHC_ML[2]) MAST-B		
1200	us	200
Borehole Compensated Transit Time of Monopole Lower Transmitter (TT_BHC_ML[3]) MAST-B		
1200	us	200

Stuck Tool Indicator, Total (STIT)
0 ft 50
CableDrag
ToolDrag
Cable Tension (TENS)
6000 lbf 0

Sonic Porosity (SPHI) MAST-B		
0.3	ft3/ft3	-0.1
1.5 Feet Span Borehole Compensated Slowness from Near Spacing (DT_BHC) MAST-B		
150	us/ft	50

— ITT - Integrated Transit Time every 10.00 (ms)
— ITT - Integrated Transit Time every 1.00 (ms)
TIME_1900 - Time Marked every 60.00 (s)

Channel Processing Parameters				
Parameter	Description	Tool	Value	Unit
BHCCTL	Borehole Compensated Processing Control Flag	MAST-B	On	
CDTS	Correction for Delta-T Shale, Empirical	Borehole	100	us/ft
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DET_STOP_MLM_M	Detection Stop Time for Monopole Lower Transmitter Mid Frequency Firing Monopole Component	MAST-B	583.33	us
DET_STOP_MUM_M	Detection Stop Time for Monopole Upper Transmitter Mid Frequency Firing Monopole Component	MAST-B	583.33	us
DET_STRT_MLM_M	Detection Start Time for Monopole Lower Transmitter Mid Frequency Firing Monopole Component	MAST-B	106.67	us
DET_STRT_MUM_M	Detection Start Time for Monopole Upper Transmitter Mid Frequency Firing Monopole Component	MAST-B	106.67	us
DTF	Delta-T Fluid	Borehole	189	us/ft
DTM	Delta-T Matrix	Borehole	47.5	us/ft
FMDCTL_MLM_M	First Motion Detection Processing Control Flag for Monopole Lower Transmitter Mid Frequency Firing Monopole Component	MAST-B	On	
FMDCTL_MUM_M	First Motion Detection Processing Control Flag for Monopole Upper Transmitter Mid Frequency Firing Monopole Component	MAST-B	On	
FMDRS_MLM_M	First Motion Detection Receiver Selection for Monopole Lower Transmitter Mid Frequency Firing Monopole Component	MAST-B	[1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0]	
FMDRS_MUM_M	First Motion Detection Receiver Selection for Monopole Upper Transmitter Mid Frequency Firing Monopole Component	MAST-B	[0, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1]	
MODALCTL_MUM	Modal Decomposition Processing Control Flag for Monopole Upper Transmitter Mid Frequency Firing	MAST-B	On	
SFTY	Slowness Formation Type (Fast, Intermediate, Slow, etc.)	Borehole	Intermediate	
SPFS	Sonic Porosity Formula	Borehole	Wyllie	
SSCCTL_MUM	Sensor Sensitivity Correction Processing Control Flag for Monopole Upper Transmitter Mid Frequency Firing	MAST-B	On	
TD	Total Measured Depth	Borehole	8460	ft

Tool Control Parameters				
Parameter	Description	Tool	Value	Unit
ACQ_DOMAIN	Custom Acquisition Domain Name	MAST-B	[UMMF, LMMF]	
CBOOTSTA_MAPC	MAMS Controller Boot Status	MAST-B	1	
CFWREV_MAPC	MAPC Firmware Revision of Controller Electronics	MAST-B	1840	
COMPCTL	Data Compression Control	MAST-B	[MZIPA, MZIPA]	
DHMODALCTL	Downhole/Surface Modal Computation Control	MAST-B	[OFF, OFF]	
DIGDEL	Waveform Digitizing Delay	MAST-B	[0, 0]	us
DIGDT	Sonic Waveform Digitizing Slowness	MAST-B	[0, 0]	us/ft
DIGTIME	Digitizing Time	MAST-B	[2550, 2550]	us
DIIN_WF_CHN	Dipole Inline Component Waveform Data Channel Name	MAST-B	[.]	
DIIN_WFN_CHN	Dipole Inline Component Waveform Normalization Data Channel Name	MAST-B	[.]	
DIOF_WF_CHN	Dipole Offline Component Waveform Data Channel Name	MAST-B	[.]	
DIOF_WFN_CHN	Dipole Offline Component Waveform Normalization Data Channel Name	MAST-B	[.]	
GNINT	Automatic Gain Selection Time Interval	MAST-B	[2550, 2550]	us
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h
MAX_TOOL_SPEED	Maximum service speed allowed for, or attained by, a logging tool.	MAST-B	Time Zoned	ft/h
MONO_WF_CHN	Monopole Component Waveform Data Channel Name	MAST-B	[RSWMUM_M, RSWMLM_M]	
MONO_WFN_CHN	Monopole Component Waveform Normalization Data Channel Name	MAST-B	[RSWMUMN_M, RSWMLMN_M]	
MSMT_LIST	Measurement List	MAST-B	[MUM, MLM]	
NUMMSMT	Number of active measurements	MAST-B	2	
PROD_CLASS	MAST Product Class Selection	MAST-B	BHC	
R10FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #10	MAST-B	1057	

R11FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #11	MAST-B	1057	
R12FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #12	MAST-B	1057	
R13FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #13	MAST-B	1057	
R1FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #1	MAST-B	1057	
R2FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #2	MAST-B	1057	
R3FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #3	MAST-B	1057	
R4FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #4	MAST-B	1057	
R5FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #5	MAST-B	1057	
R6FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #6	MAST-B	1057	
R7FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #7	MAST-B	1057	
R8FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #8	MAST-B	1057	
R9FWREV_MAPC	MAPC Firmware Revision of Sensor Electronics Station #9	MAST-B	1057	
RBOOTSTA_MAPC	MAMS Receiver Boot Status	MAST-B	1	
RXSEL	Receiver Station Select	MAST-B	[[Off, On], [Off, On], [Off, On], [Off, On], [On, On], [On, On], [On, On], [On, On], [On, On], [On, Off], [On, Off], [On, Off], [On, Off]]	
SAMINT	Sonic Waveform Sampling Interval	MAST-B	[10, 10]	
SERVICE_LIST	Service Selection List	MAST-B	[NMSTC, NMATD, BHC]	
SNSR_WF_CHN	Sensor Waveforms Data Channel Name	MAST-B	[RSWMUM, RSWMLM]	
SNSR_WFN_CHN	Sensor Waveforms Normalization Factor Channel Name	MAST-B	[SWMUMN, SWMLMN]	
SNSRSEL	Sensor Element Select	MAST-B	[[On, On], [Off, Off], [On, On], [Off, Off], [On, On], [Off, Off], [On, On], [Off, Off]]	
TX_AMP	Transmitter Amplitude Factor	MAST-B	[THREEQUARTER, THREEQUARTER]	
TXSEL	Transmitter Drive Selection	MAST-B	[UM, LM]	
WF_CR_CHN	Waveform Compression Rate Channel Name	MAST-B	[WCRMUM, WCRMLM]	
WF_DEPTH_CHN	Waveform Depth Channel Name	MAST-B	[WDMUM, WDMLM]	
WF_QI_CHN	Waveform Quality Indicator Channel Name	MAST-B	[WQMUM, WQMLM]	
WFSEL	Transmitter Drive Waveform Selection	MAST-B	[mp_mf_d, mp_mf_d]	

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
MAX_TOOL_SPEED	6320	13-Jun-2013 21:41:24	13-Jun-2013 21:51:06	8480.06	7934.57
MAX_TOOL_SPEED	6658	13-Jun-2013 21:51:06	13-Jun-2013 22:00:10	7934.57	7391.28
MAX_TOOL_SPEED	6320	13-Jun-2013 22:00:10	13-Jun-2013 22:20:18	7391.28	6173.78
MAX_TOOL_SPEED	6668	13-Jun-2013 22:20:18	13-Jun-2013 23:10:37	6173.78	3324.61
MAX_TOOL_SPEED	7125	13-Jun-2013 23:10:37	13-Jun-2013 23:14:38	3324.61	3083.77
MAX_TOOL_SPEED	6748	13-Jun-2013 23:14:38	13-Jun-2013 23:43:48	3083.77	1102.95
MAX_TOOL_SPEED	7133	13-Jun-2013 23:43:48	13-Jun-2013 23:45:49	1102.95	946.17
MAX_TOOL_SPEED	6748	13-Jun-2013 23:45:49	13-Jun-2013 23:53:52	946.17	350.41
MAX_TOOL_SPEED	6283	13-Jun-2013 23:53:52	13-Jun-2013 23:54:52	350.41	316.77
MAX_TOOL_SPEED	5968	13-Jun-2013 23:54:52	13-Jun-2013 23:56:53	316.77	268.61
MAX_TOOL_SPEED	6279	13-Jun-2013 23:56:53	13-Jun-2013 23:59:55	268.61	192.58
MAX_TOOL_SPEED	6669	13-Jun-2013 23:59:55	14-Jun-2013 00:01:55	192.58	138.83
MAX_TOOL_SPEED	7123	14-Jun-2013 00:01:55	14-Jun-2013 00:02:54	138.83	105.88
All depth are at tool zero.					

Well:	Silverton 16-10
Field:	Jolly Ranch
County:	Lincoln
State:	Colorado

BHC Sonic