Schlumberger

Company: St. Croix Operating Inc.

Well: Jack Creek #2

Field: Wildcat

County: Washington State: Colorado

Platform Expres

Array Induction

with Linear Correlation

Location:	SESE Sec. 4, T2S, R51W		Elev.:	K.B.	4612.60 ft
	SHL: 900' FSL & 600' FEL			G.L.	4594.00 ft
	Lat/Long: 39.905070 / -103.089550			D.F.	4612.60 ft
	Permanent Datum:	Ground Level	Elev.:		4594.00 f
	Log Measured From:	Kelly Bushing	18.60 ft		above Perm.Datum
	Drilling Measured From:	Kelly Bushing			

County:	Field:	Location:	Well:	Company:
Washington	Wildcat	SESE Sec. 4, T2S, R51W	Jack Creek #2	St. Croix Operating Inc.

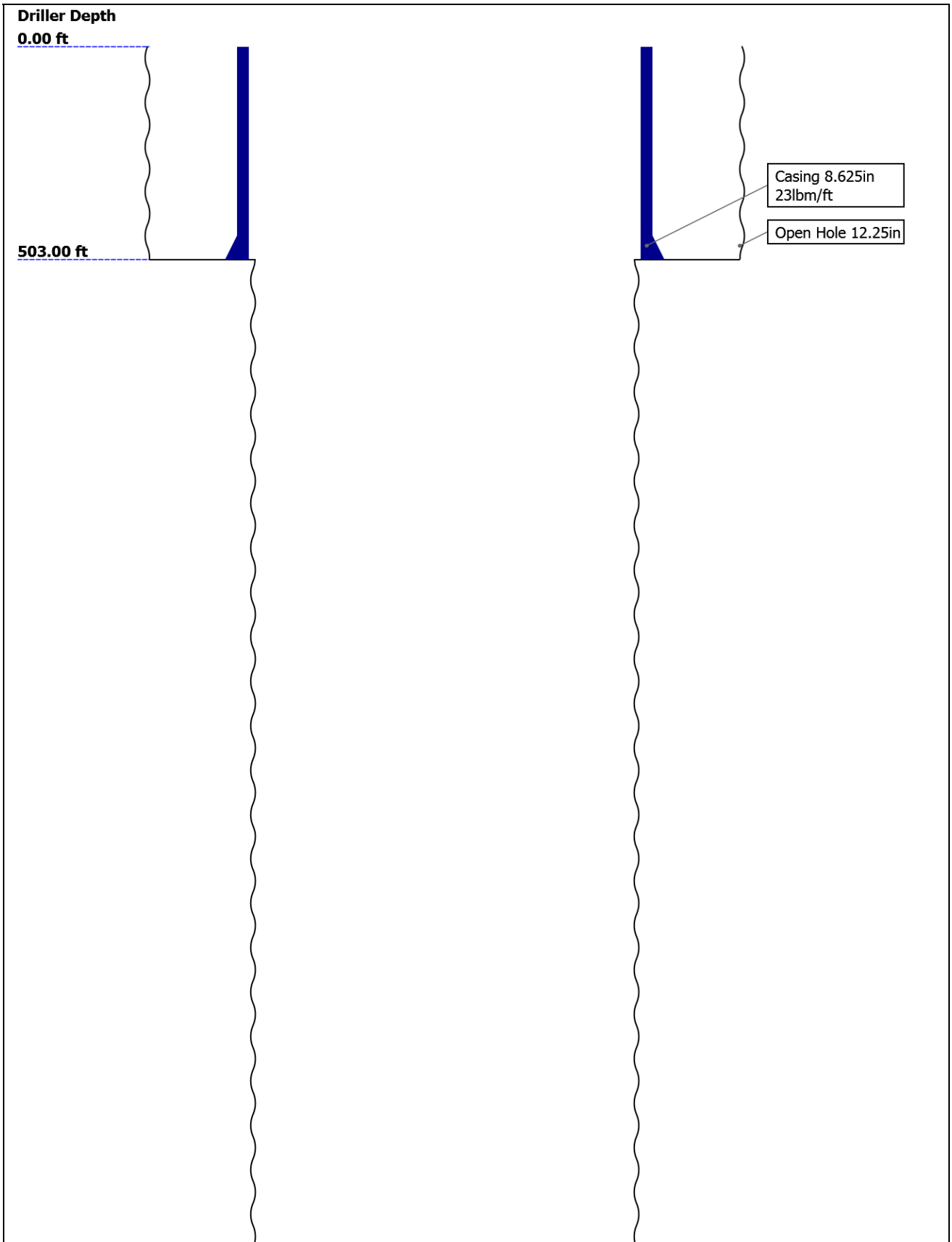
API Serial No.	Section:	Township:	Range:
05-121-11079	4	2S	51W

Logging Date			18-Dec-2018			
Run Number			ONE			
Depth Driller			4285.00 ft			
Schlumberger Depth			4285.00 ft			
Bottom Log Interval			4285.00 ft			
Top Log Interval			100.00 ft			
Casing Driller Size @ Depth			8.625 in @ 503.00 ft			
Casing Schlumberger			503.5 ft			
Bit Size			7.875 in			
Type Fluid In Hole			WBM			
MUD	Density	Viscosity	9.2 lbm/gal	55 s		
	Fluid Loss	PH				
	Source of Sample		Active Tank			
RM @ Meas Temp			0.2 ohm.m @ 68 degF			
RMF @ Meas Temp			0.15 ohm.m @ 68 degF			
RMC @ Meas Temp						
Source RMF	RMC			Pressed		
RM @ BHT	RMF @ BHT		0.12 @ 118	0.09 @ 118		
Max Recorded Temperatures			121 degF			
Circulation Stopped	Time		18-Dec-2018	11:15:00		
Logger on Bottom	Time		18-Dec-2018	14:53:00		
Unit Number	Location:		2161	Fort Morgan		
Recorded By			Ashley Rosacker			
Witnessed By			Phillip Wilcox			

Disclaimer

Contents

Well Sketch



Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	12.25	7.875				
Top Driller (ft)	0	503				
Top Logger (ft)	0	503				
Bottom Driller (ft)	503	4285				
Bottom Logger (ft)	503	4285				
Casing						
Size (in)	8.625					
Weight (lbm/ft)	23					
Inner Diameter (in)	8.122					
Grade	X52					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	503					
Bottom Logger (ft)	503.5					

Remarks and Equipment Summary

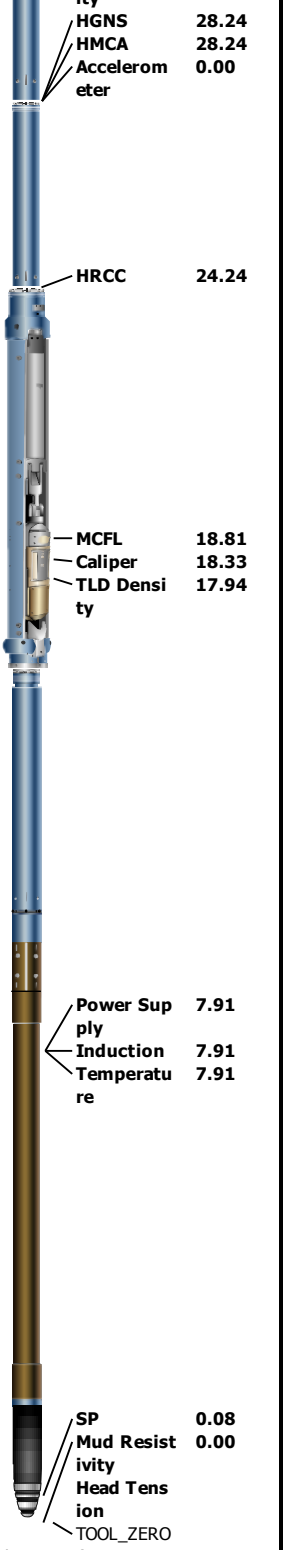
ONE: Toolstring

Equip name	Length
LEH-QT:3076	**47.64**
LEH-QT:3076	
EDTC-B:9038	**44.15**
EDTH-B:9046	
EDTG-B:7921	
5	
EDTC-B:9038	
HGNS-H:3730	**37.65**
HGNH:2742	
NPV-N	
NSR-F:5068	
HMCA-H	
HGNS-H:3730	
HACCZ-H:153	
7	

MP name	Offset
CTEM	**40.65**
ACCZ	**0.00**
HV	**0.00**
Gamma Ray	**38.78**
TelStatus	**37.65**
Temperature	**37.62**
GR	**36.91**
CNL Porosity	**30.57**

ONE: Remarks

Thank you for choosing Schlumberger!
This is the first log in the well.
Toolstring run as per toolsketch and client logging program.
Requested to run the tool slick with no bowspring or standoffs.
Matrix: Sandstone - 2.65 from TD to 4050 Limestone - 2.71 from 4050 to CS.
BHT: 118 degF
TD: 4282.5 ft Casing Shoe: 503.5 ft



HDRS-H:3951 **28.24**
ECH-MEB:3994
HRCC-H:3737
HRMS-H:3951
Short Spacing
Long Spacing
GPV-Q
HRGD-H:4882
Backscatter
GSR-J:5259

AIT-M:2562 **16.00**
AMIS:2562
AMRM:109

Lengths are in ft
Maximum Outer Diameter = 4.770 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Summary

	ONE		
Depth Measuring Device			
Type	IDW-B		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	0		

Wheel Correction 2	0		

Tension Device

Type	CMTD-B/A		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Number of Calibration Points	0		

Logging Cable

Type	7-46A-XS		
Serial Number			
Length	24000.00 ft		
Conveyance Type	Wireline		
Rig Type	Land		

ONE:Depth Control Parameters		Depth Control Remarks
Log Sequence	First Log In the Well	All Schlumberger depth control policies followed.
Rig Up Length At Surface		IDW used as primary depth reference.
Rig Up Length At Bottom		Z-Chart used as secondary depth reference.
Rig Up Length Correction		
Stretch Correction		
Tool Zero Check At Surface		

ONE

2" Induction

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	732.61	ft3

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[3]:Up	Up	43.65 ft	4299.46 ft	18-Dec-2018 3:06:10 PM	18-Dec-2018 4:27:30 PM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

Company:St. Croix Operating Inc. Well:Jack Creek #2

ONE: Log[3]:Up:S005

Description: AIT Basic Log Two Format: Log (Induction-2) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 18-Dec-2018 16:39:32

Channel	Source	Sampling
AT10	AIT-M:AMIS:AMIS	3in
AT60	AIT-M:AMIS:AMIS	3in
ATCO60	AIT-M:AMIS:AMIS	3in
CALI	HDRS-H:HRCC-H:HRCC-H	1in
GR	EDTC-B:EDTC-B:EDTC-B	6in
ICV	Borehole	6in - RT
SP	AIT-M:AMIS:AMIS	6in
TENS	WLWorkflow	6in

TENS WLWorkflow 0in

TIME_1900 WLWorkflow 0.1in

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

Gamma Ray Backup

Spontaneous Potential (SP) AIT-M

-80 mV 20

Caliper (HCAL) HDRS-H

6 in 16

Gamma Ray (ECGR_EDTC) EDTC-B

0 gAPI 200

Array Induction Two Foot Resistivity A10 (AT10) AIT-M

0 ohm.m 50

Array Induction Two Foot Resistivity A60 (AT60) AIT-M

0 ohm.m 50

Array Induction Two Foot Resistivity A10 (AT10) AIT-M

0 ohm.m 10

Cable Tension (TENS)

10000 lbf 0

Array Induction Two Foot Conductivity A60 (ATCO60) AIT-M

1000 mS/m 0

500

550

600

650

700

750

800

ECGR_EDTC

HCAL

SP

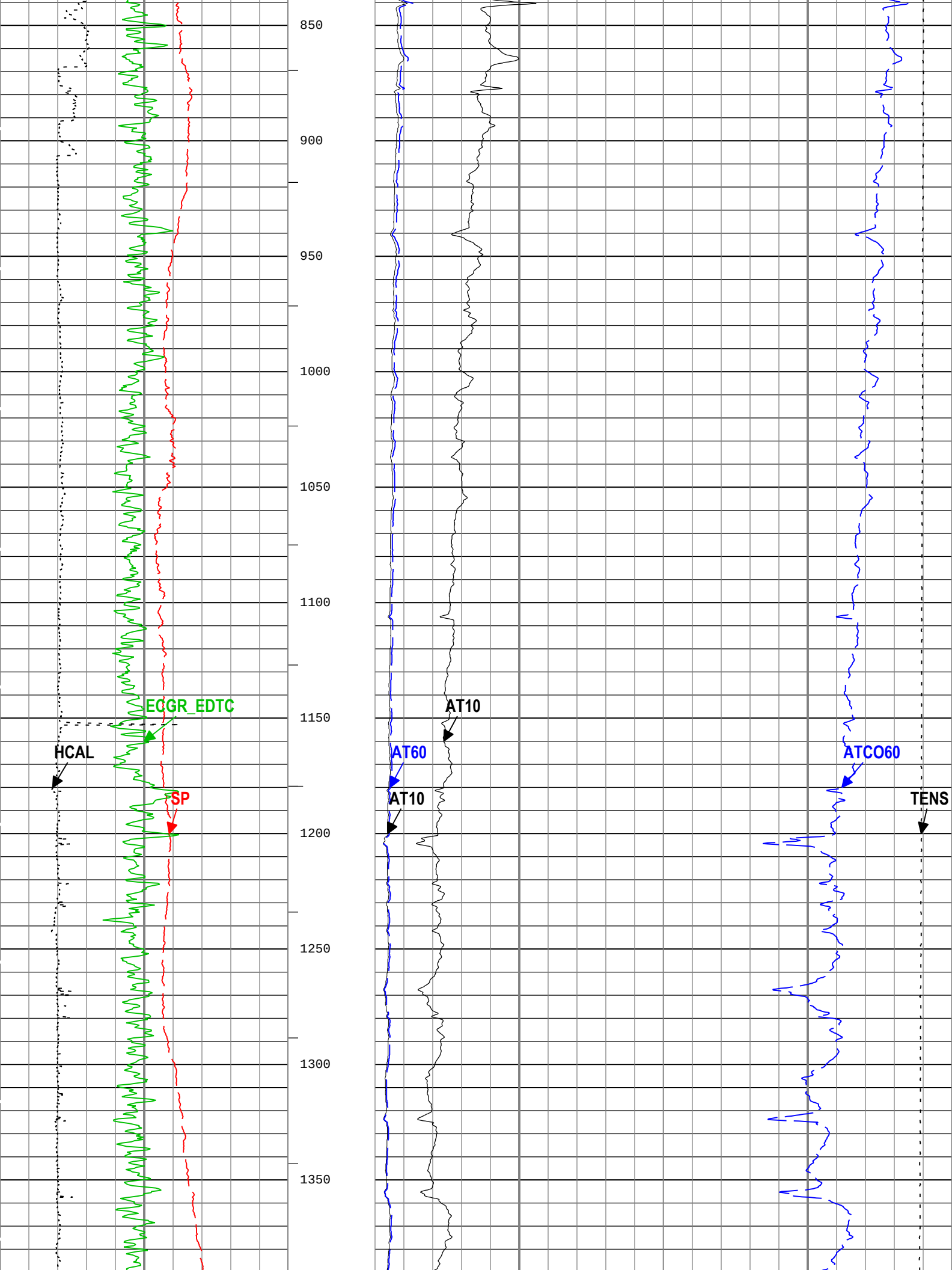
AT10

AT60

AT10

ATCO60

TENS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900
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1300
1350
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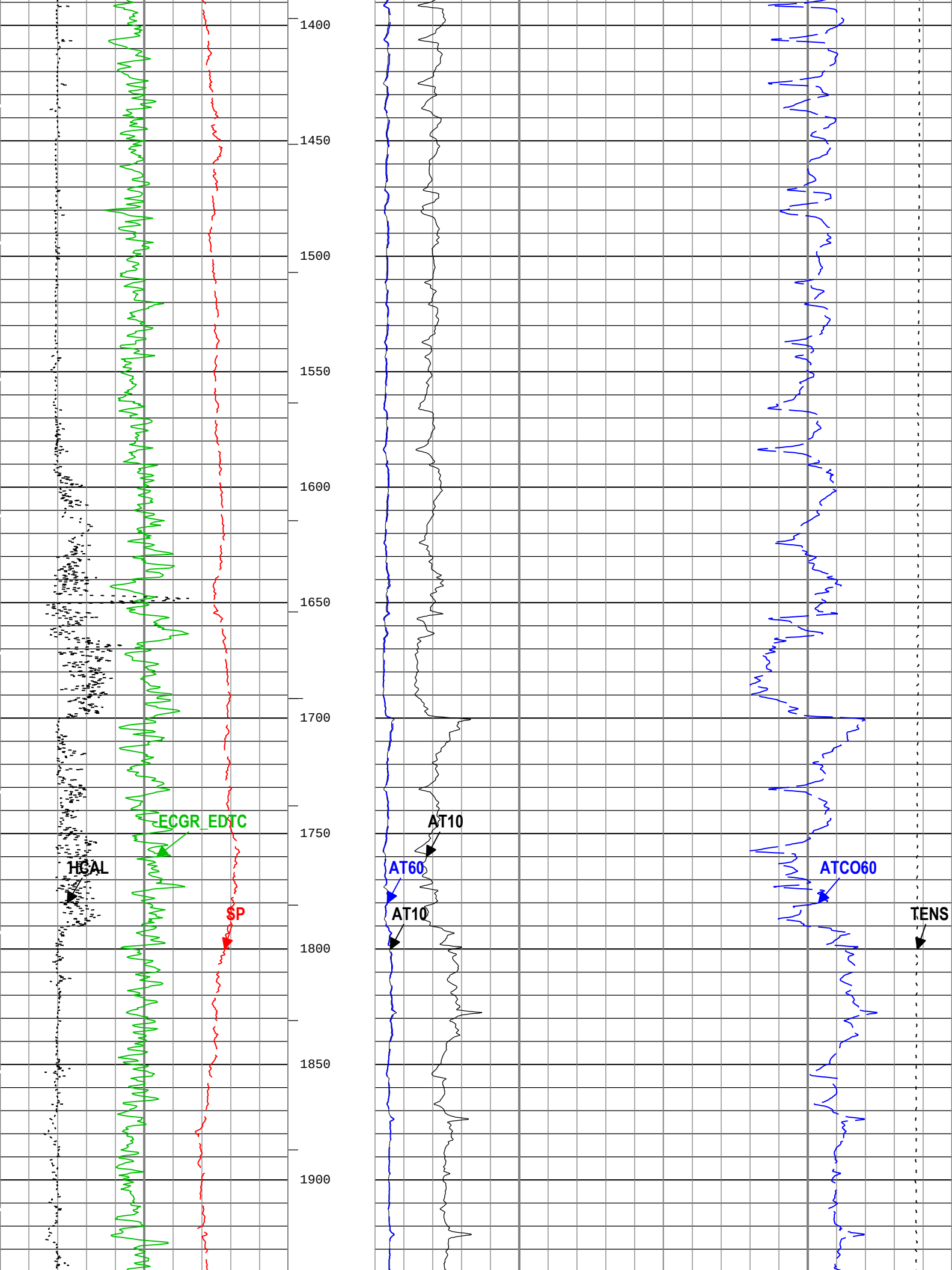
HCAL
SP
AT10
AT60
AT10
ATCO60
TENS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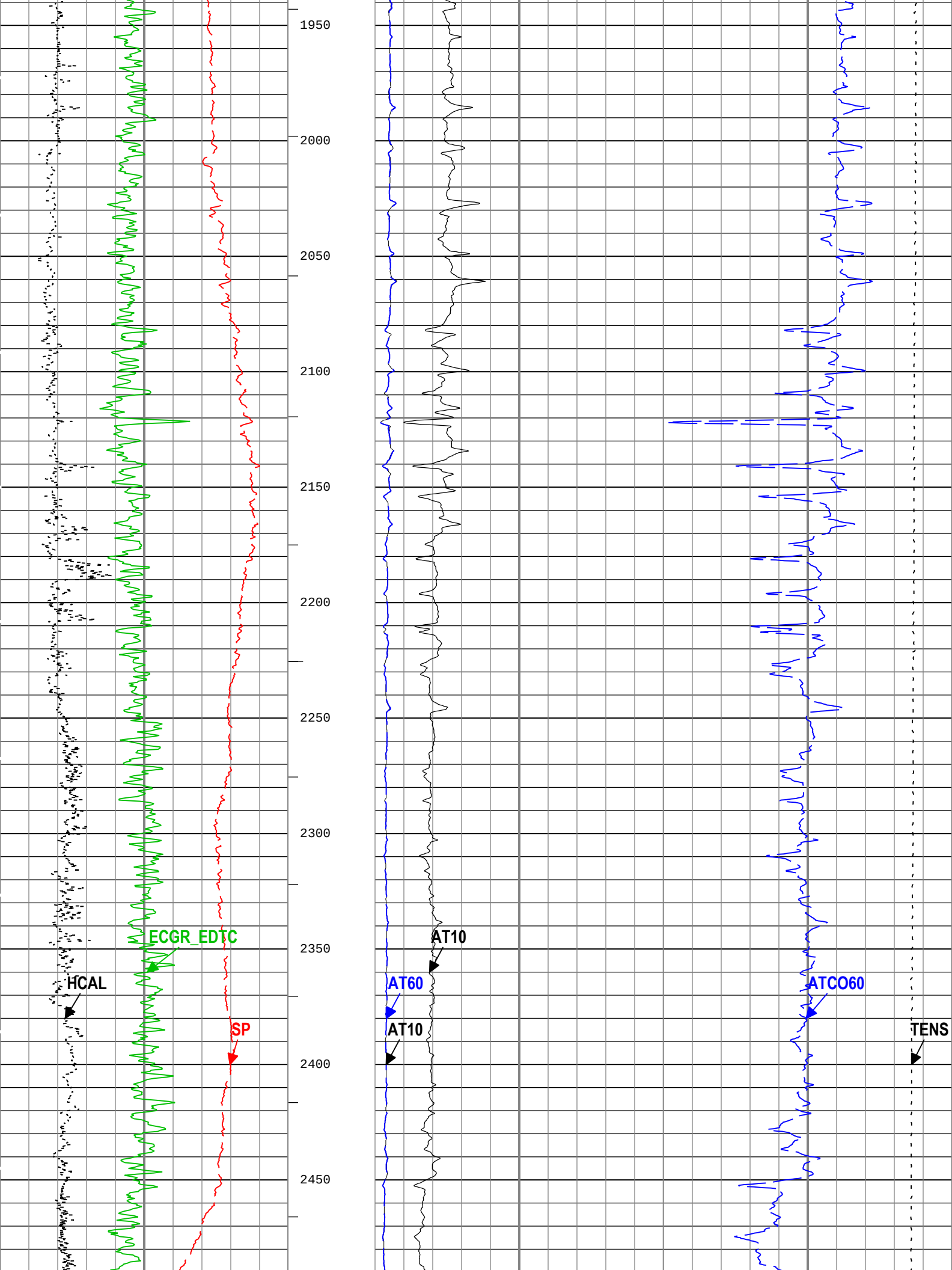
SP
AT10
AT60
AT10
ATCO60
TENS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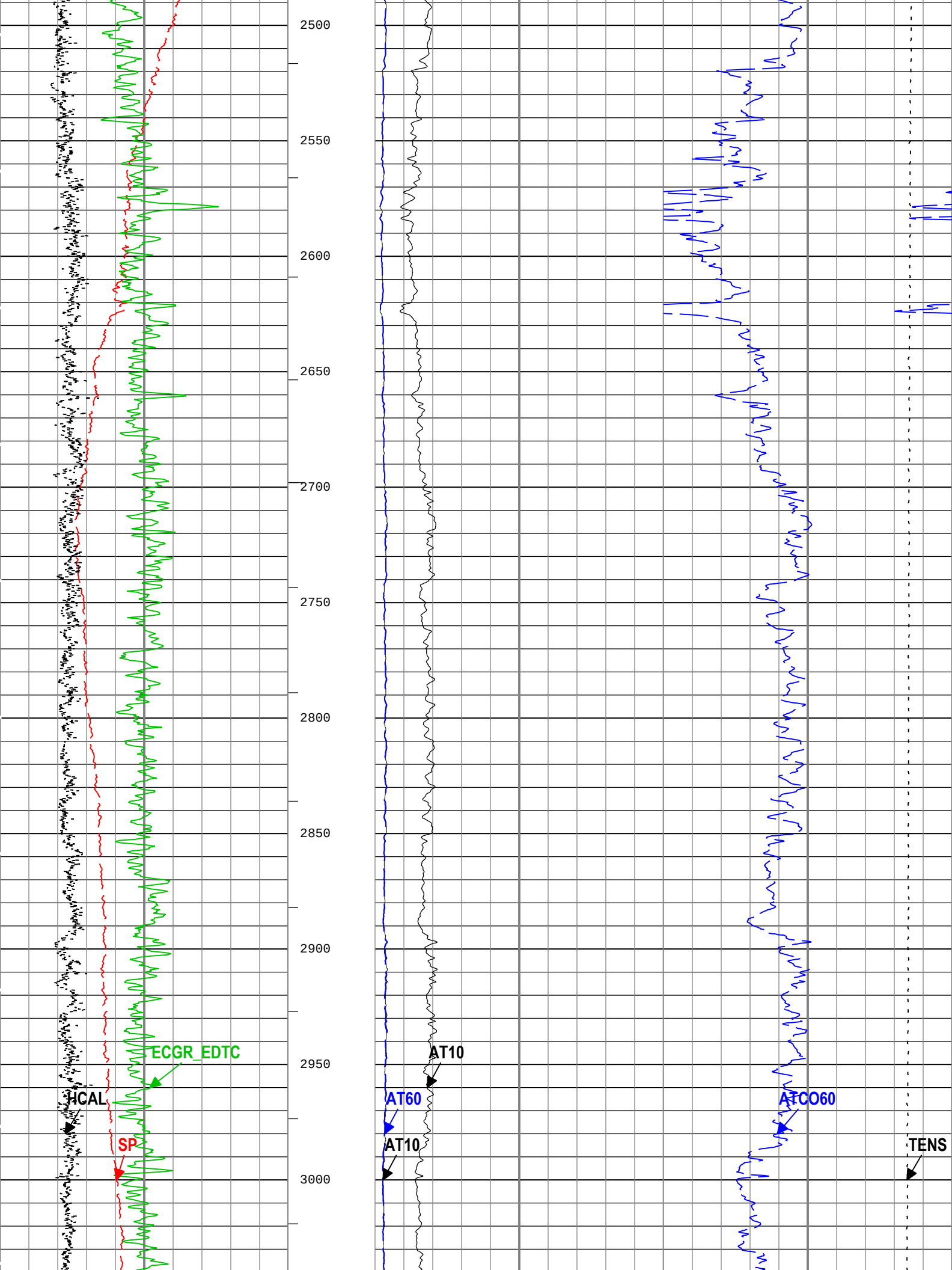
ATCO60
TENS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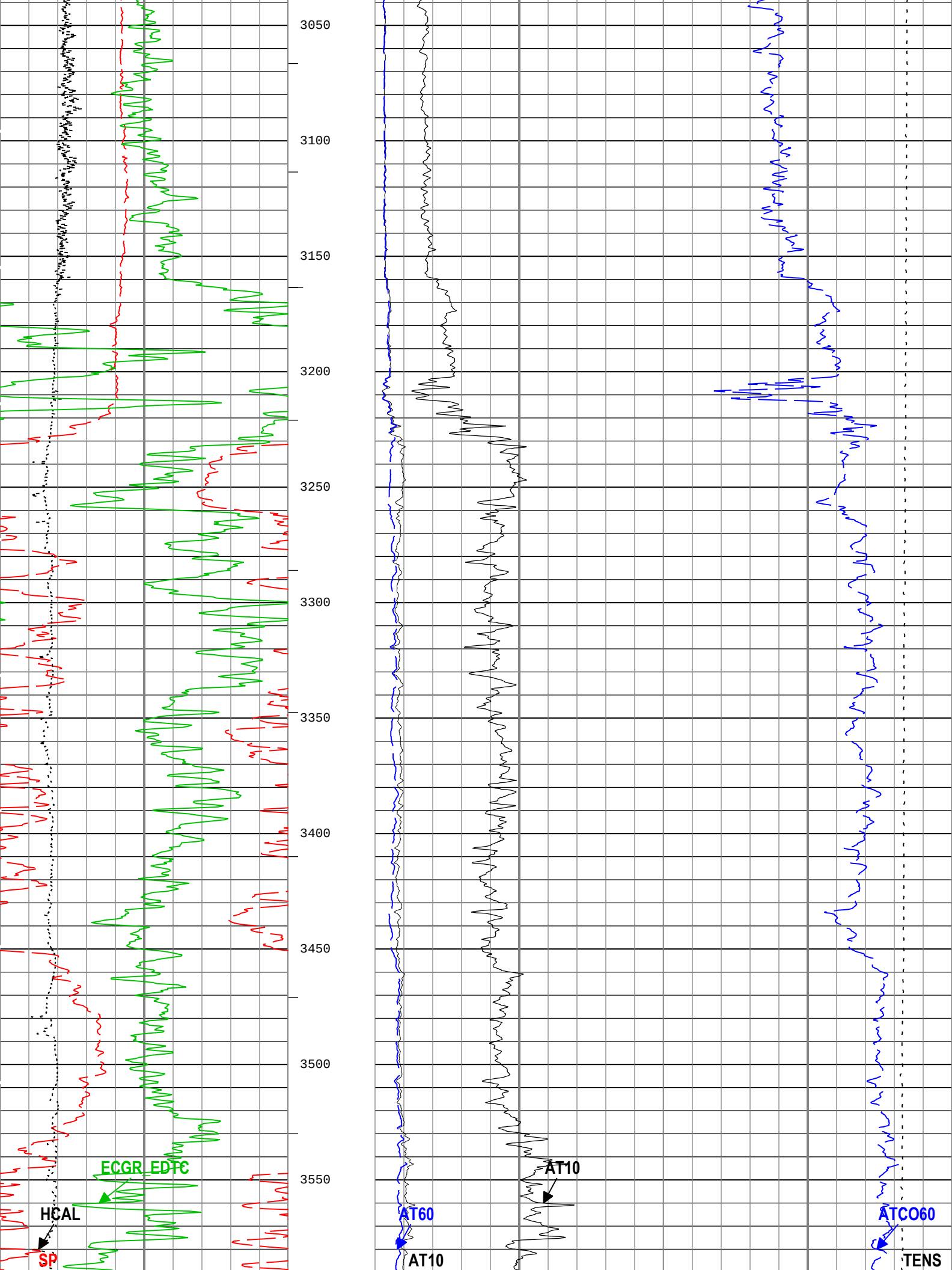
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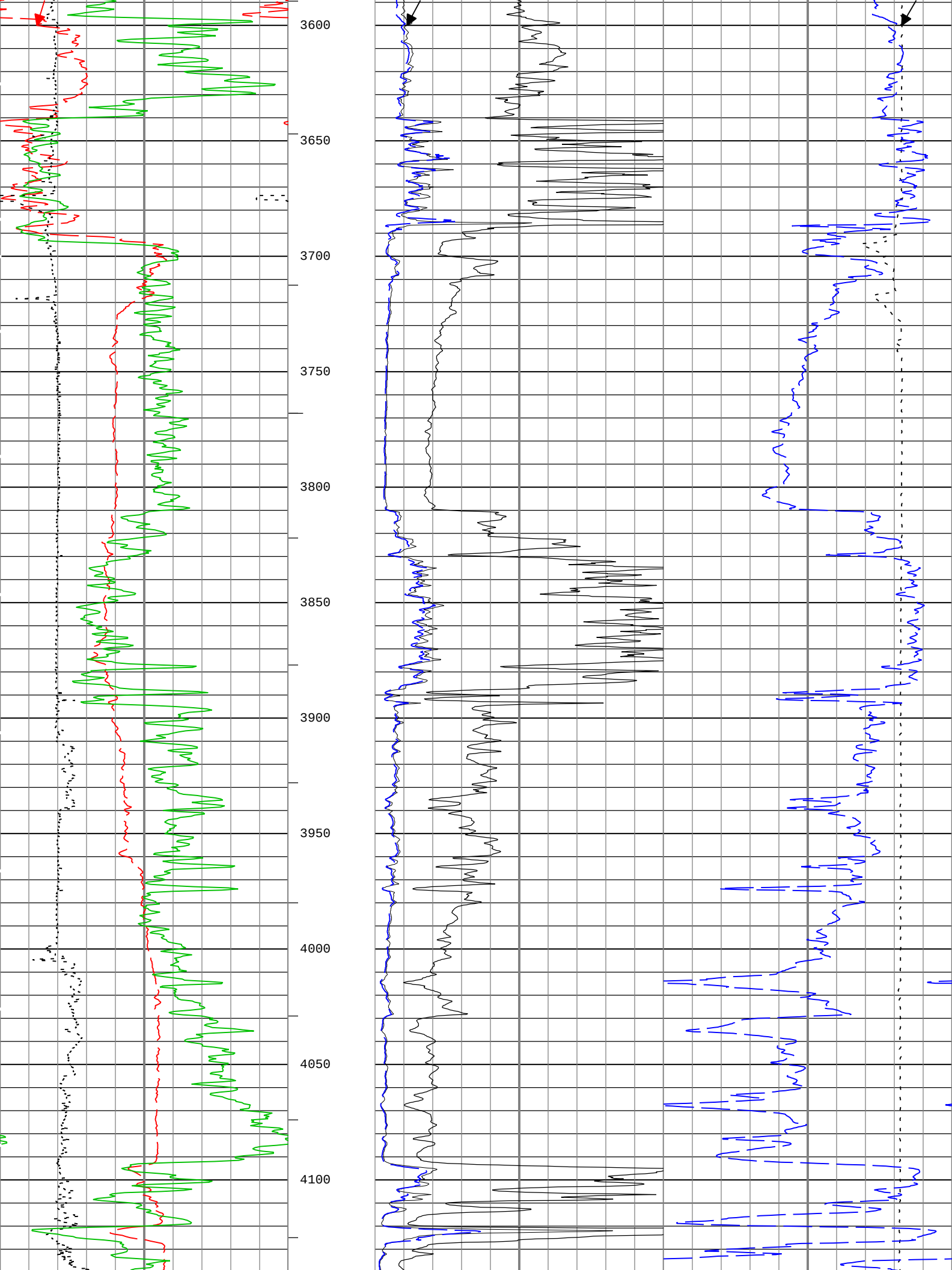
TENS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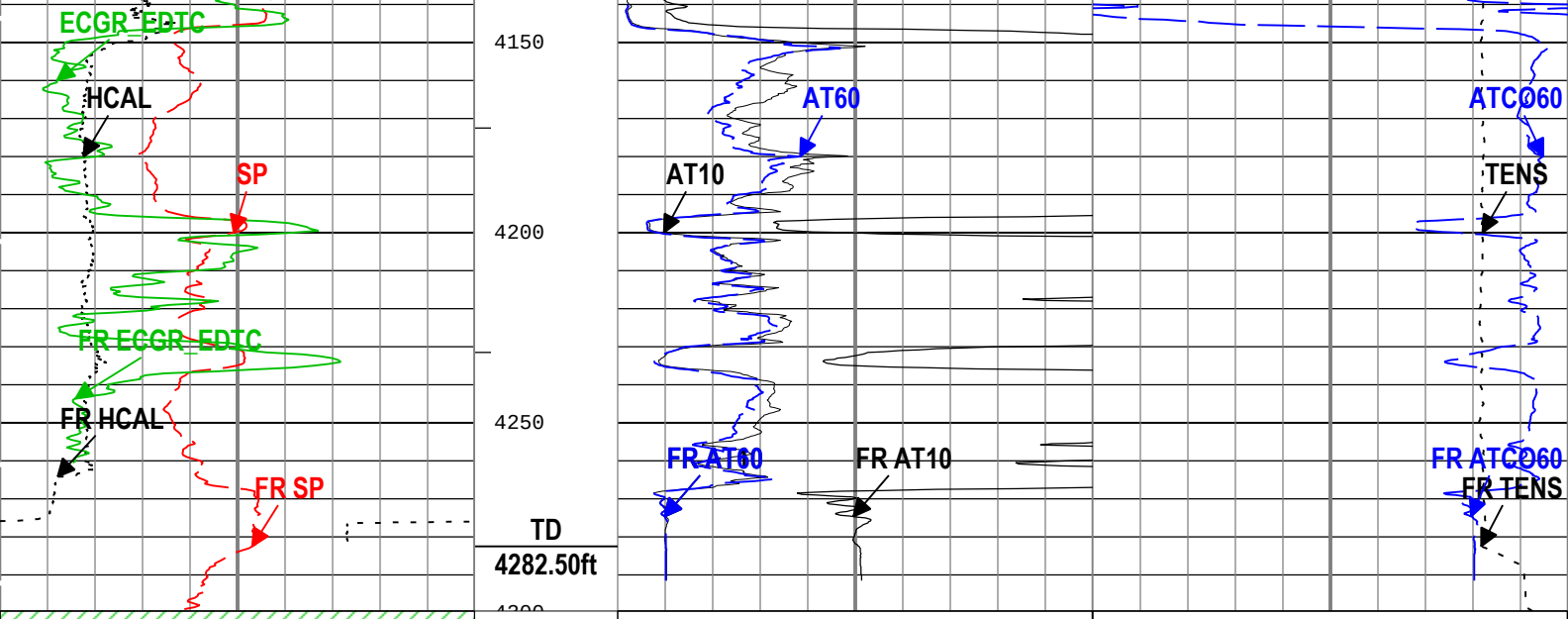


Gamma Ray Backup

Spontaneous Potential (SP) AIT-M
-80 mV 20

Caliper (HCAL) HDRS-H
6 in 16

Gamma Ray (ECGR_EDTC) EDTC-B
0 gAPI 200

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

Array Induction Two Foot Resistivity A60 (AT60) AIT-M
0 ohm.m 50

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

Cable Tension (TENS)
10000 lbf 0

Array Induction Two Foot Conductivity A60 (ATCO60) AIT-M
1000 mS/m 0

TIME_1900 - Time Marked every 60.00 (s)

ICV - Integrated Cement Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

Description: AIT Basic Log Two Format: Log (Induction-2) Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 18-Dec-2018 16:39:32

Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
ASTA	Array Induction Tool Standoff	AIT-M	0.125	in
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.516	in
CBLO	Casing Bottom (Logger)	WLSESSION	503.5	ft
CDEN	Cement Density	EDTC-B	2	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	8.625	in
DFD	Drilling Fluid Density	Borehole	9.2	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
FCD	Future Casing (Outer) Diameter	WLSESSION	5.5	in
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
SP_SHIFT	SP Shift	AIT-M	400	mV
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft

Depth Zone Parameters

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	12.25	450	503
BS	7.875	503	4285

All depth are actual.

Tool Control Parameters

ONE: Parameters

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

ONE

5" Induction

Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
ICV	Integrated Cement Volume	GCSE_UP_PASS, FCD	732.61	ft3
IHV	Integrated Hole Volume	GCSE_UP_PASS	1358.15	ft3

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[3]:Up	Up	43.65 ft	4299.46 ft	18-Dec-2018 3:06:10 PM	18-Dec-2018 4:27:30 PM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

Company:St. Croix Operating Inc. Well:Jack Creek #2

ONE: Log[3]:Up:S005

Description: AIT Basic Log Two Format: Log (Induction-5) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 18-Dec-2018 16:39:34

Channel	Source	Sampling
AT10	AIT-M:AMIS:AMIS	3in
AT20	AIT-M:AMIS:AMIS	3in
AT30	AIT-M:AMIS:AMIS	3in
AT60	AIT-M:AMIS:AMIS	3in
AT90	AIT-M:AMIS:AMIS	3in
CALI	HDRS-H:HRCC-H:HRCC-H	1in
GR	EDTC-B:EDTC-B:EDTC-B	6in
ICV	Borehole	6in - RT
IHV	Borehole	6in - RT
SP	AIT-M:AMIS:AMIS	6in
TENS	WLWorkflow	6in
TIME_1900	WLWorkflow	0.1in

TIME_1900 - Time Marked every 60.00 (s)

IHV - Integrated Hole Volume every 10.00 (ft3)

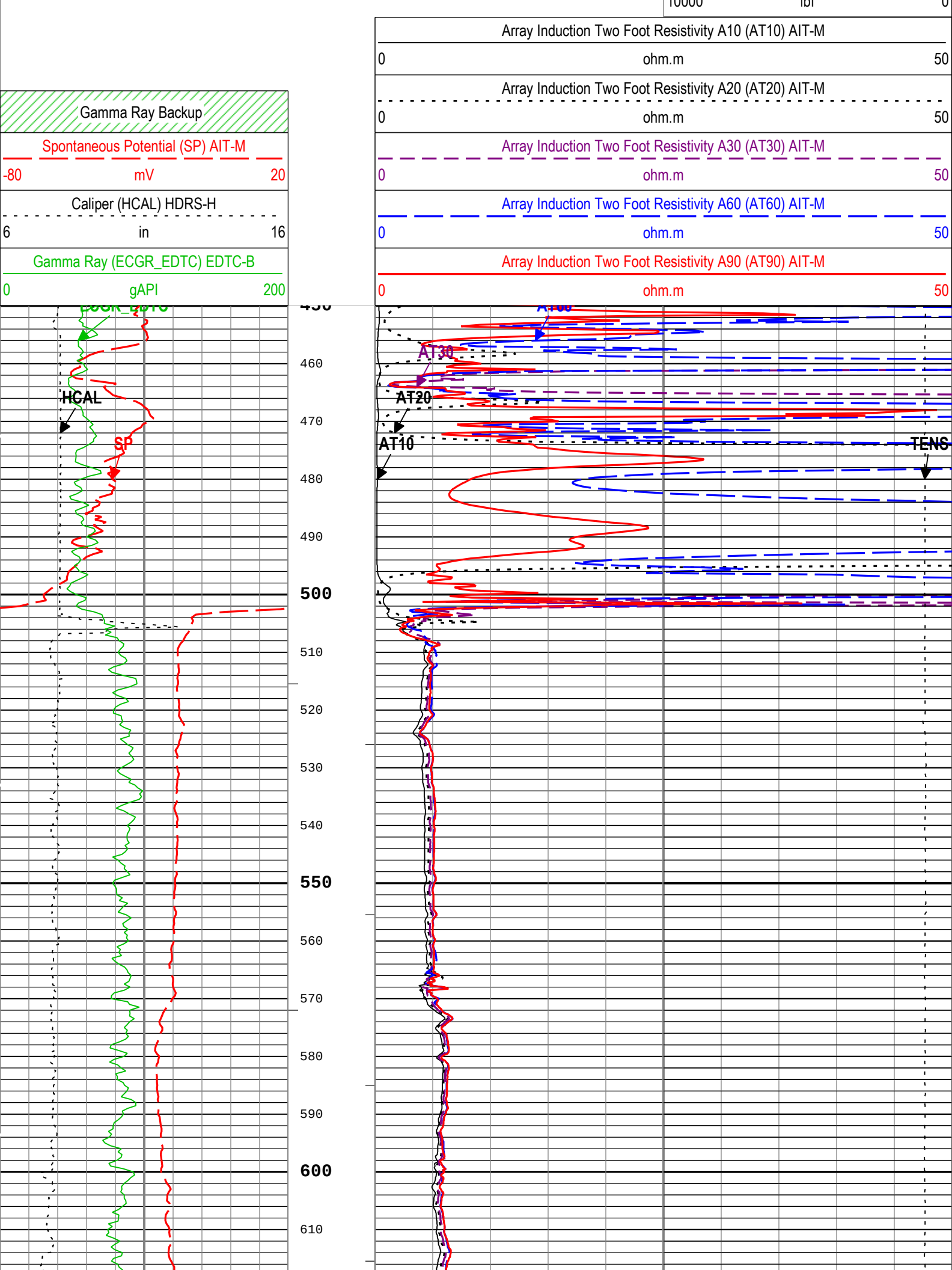
IHV - Integrated Hole Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

Cable Tension (TENS)

10000 lbf 0


Gamma Ray Backup
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20
Caliper (HCAL) HDRS-H
6
in
16
Gamma Ray (ECGR_EDTC) EDTC-B
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HCAL
SP
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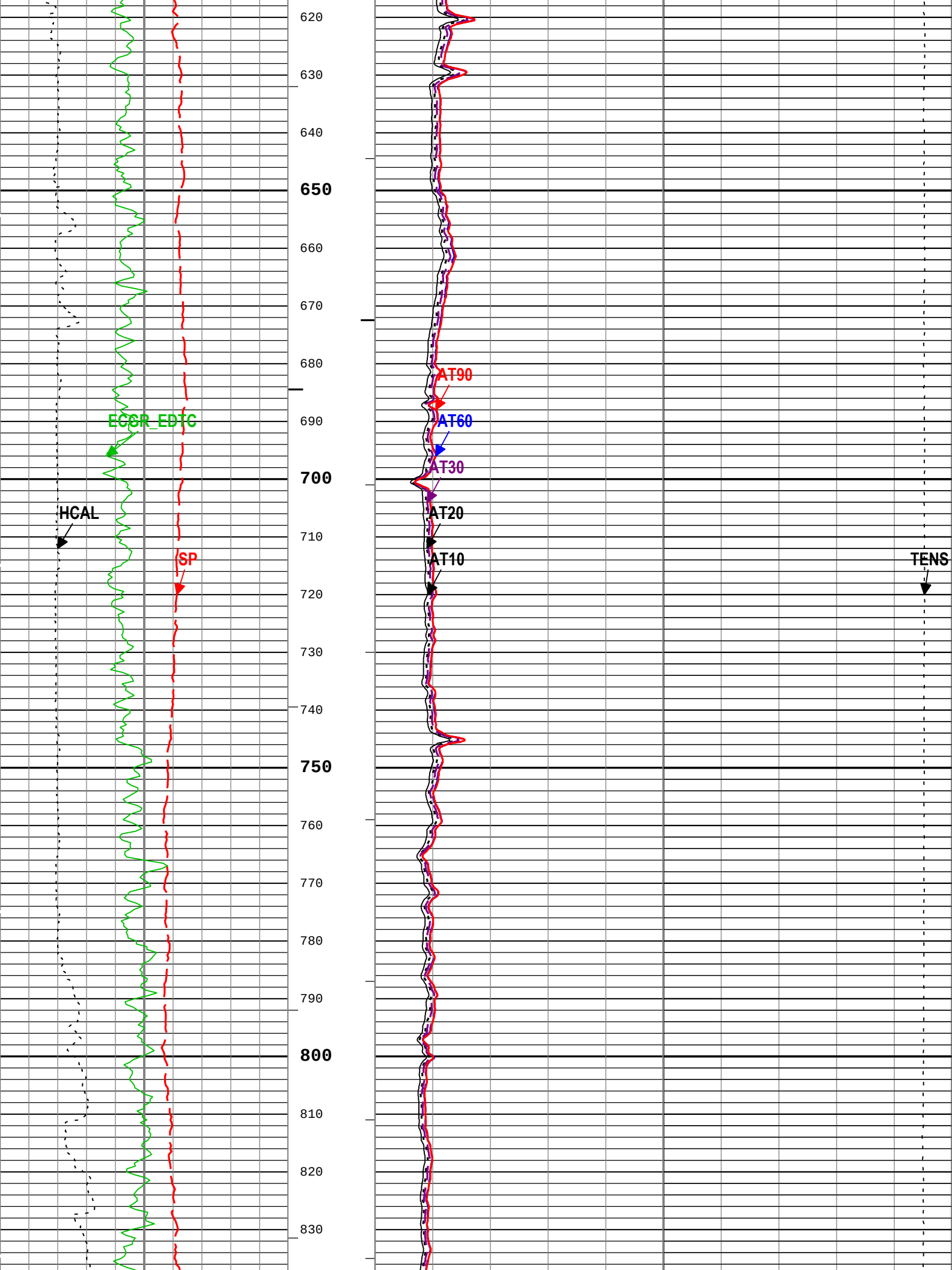
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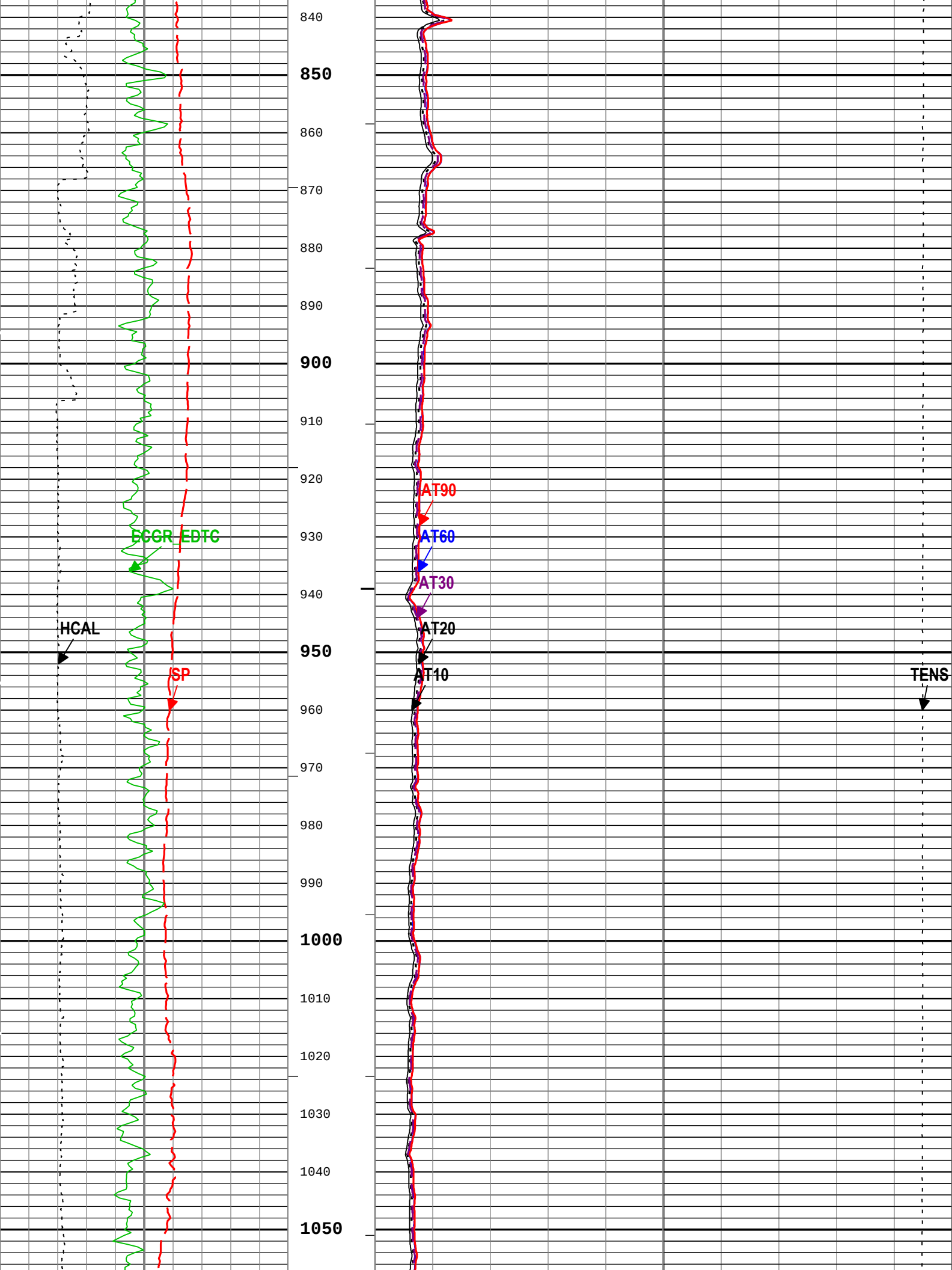
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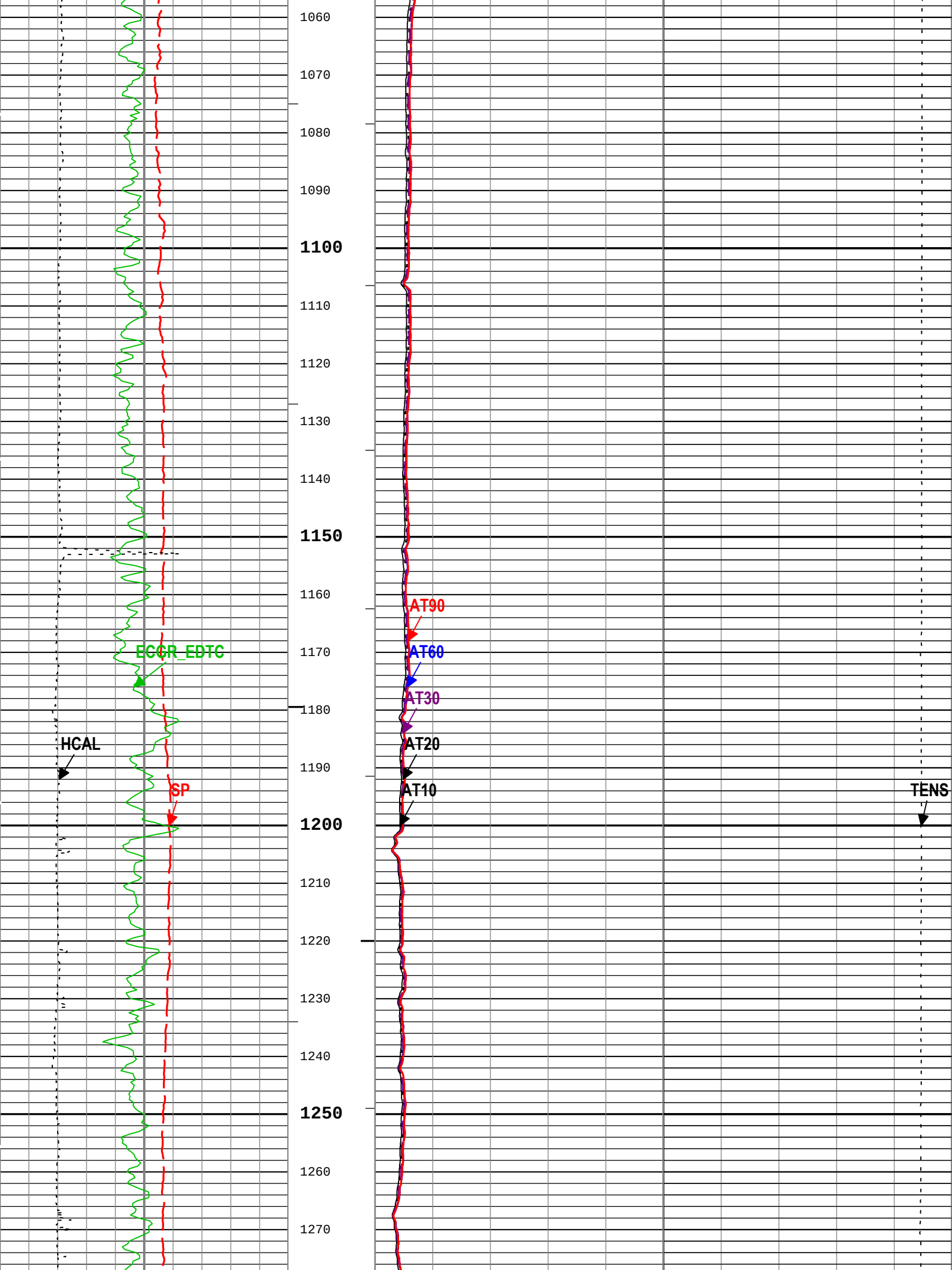
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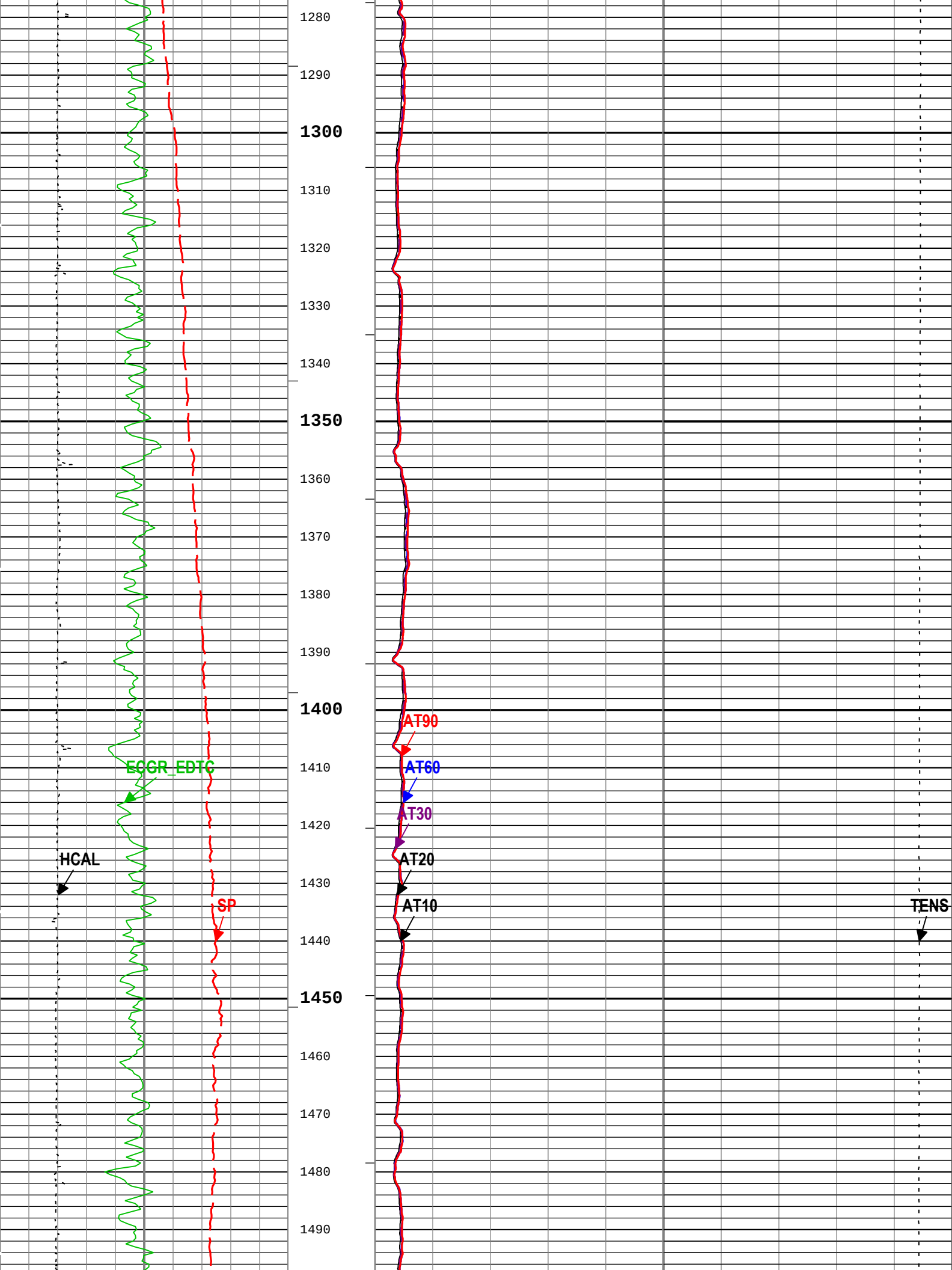
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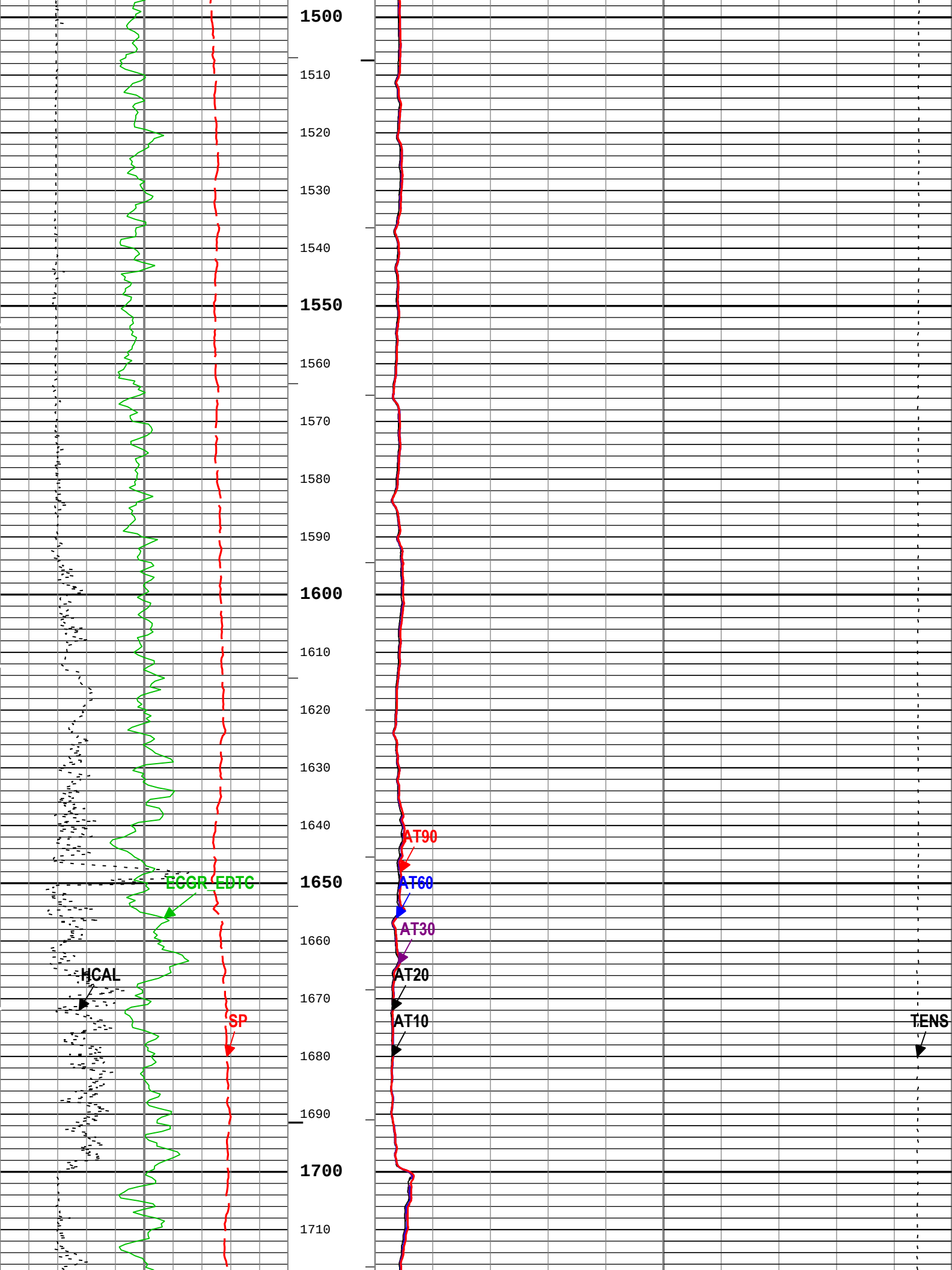
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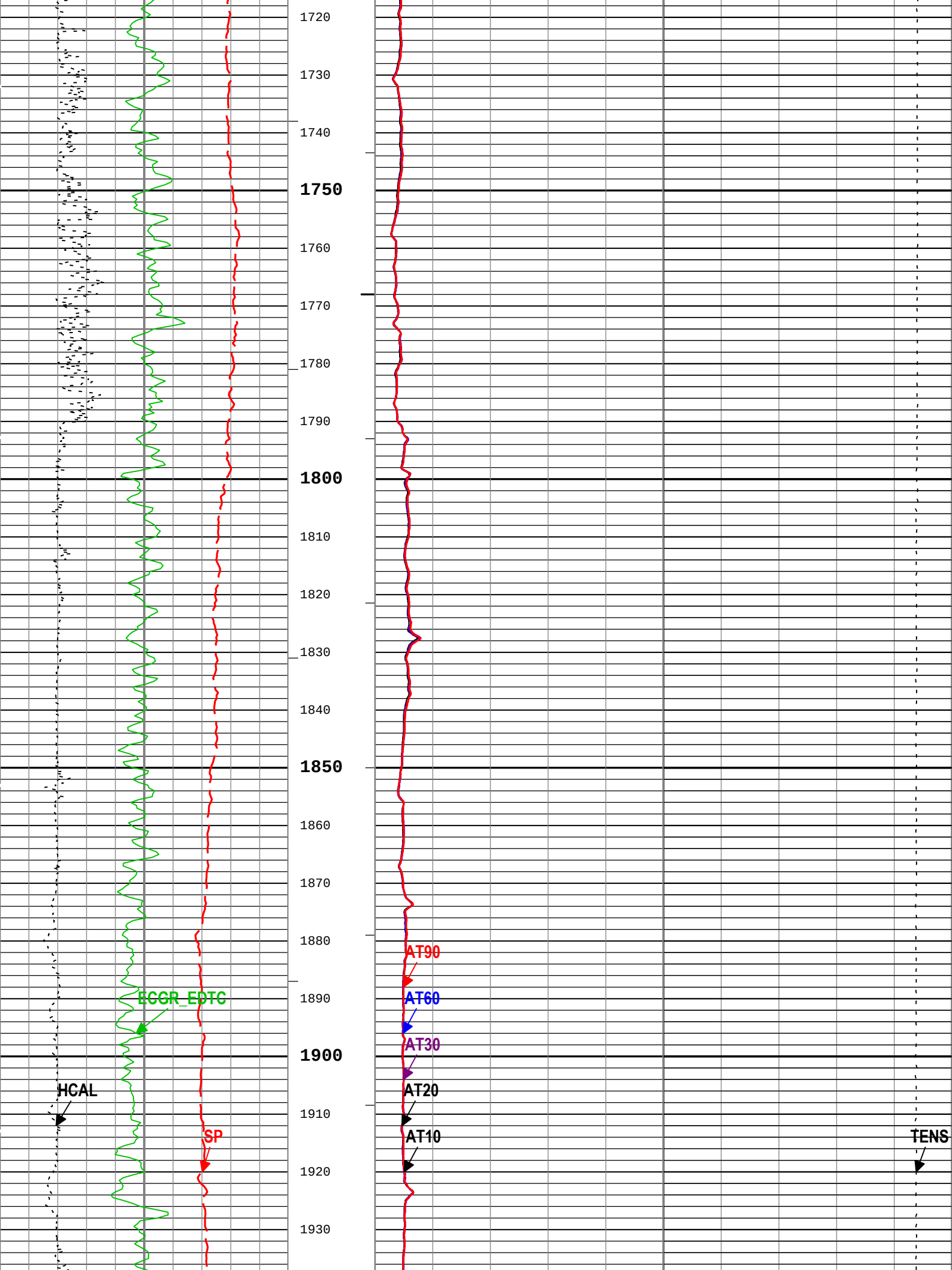
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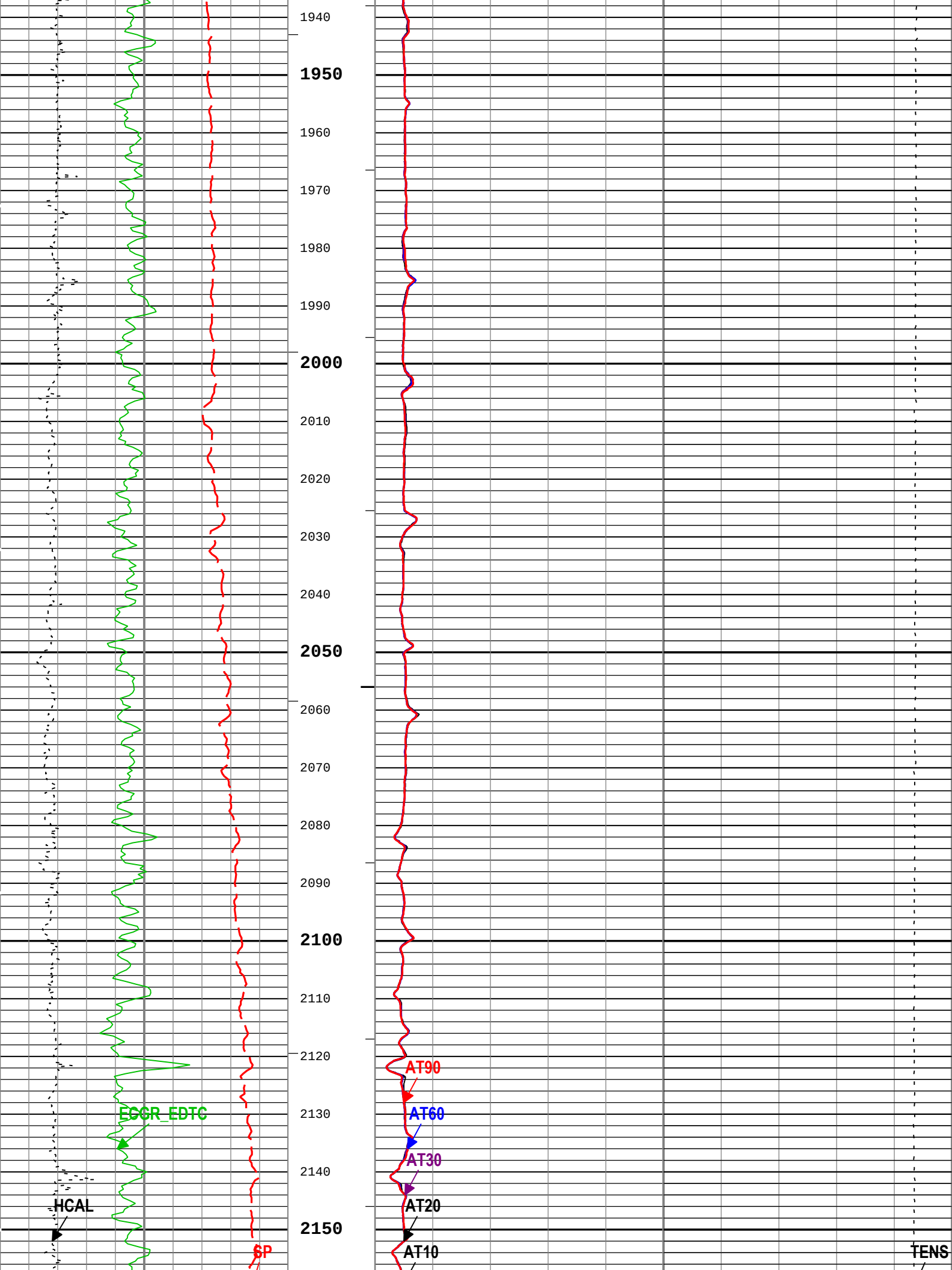
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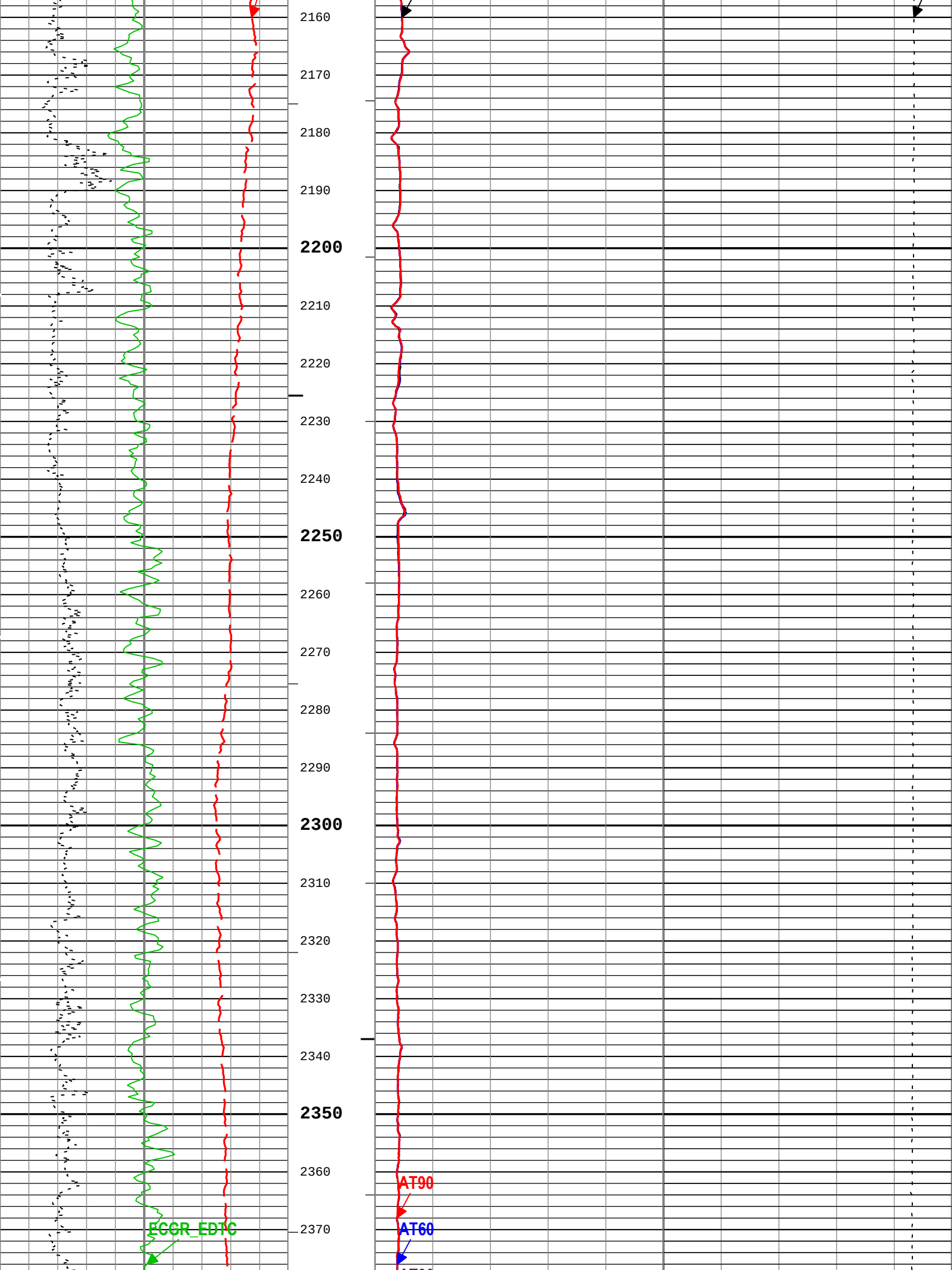
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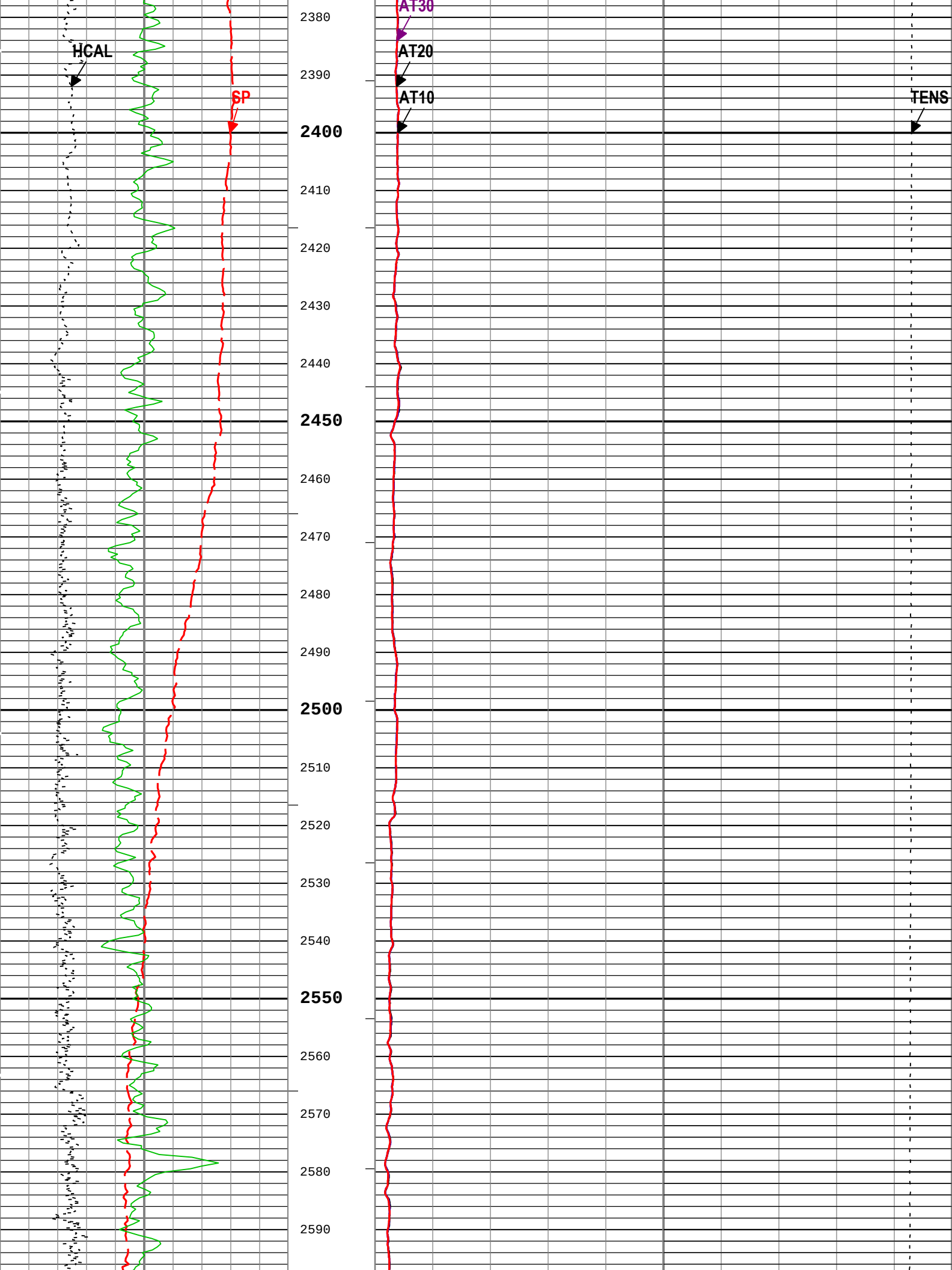
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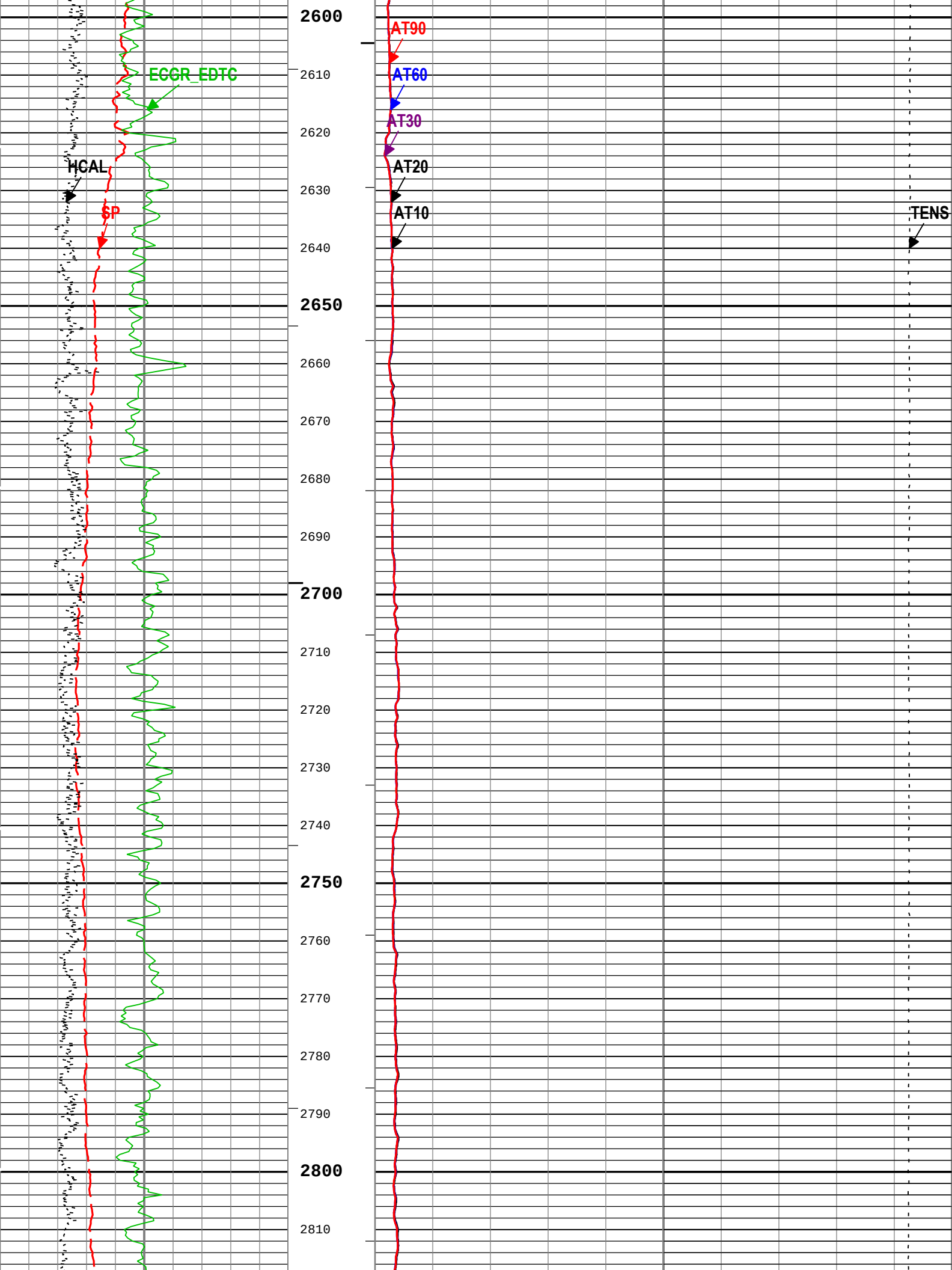
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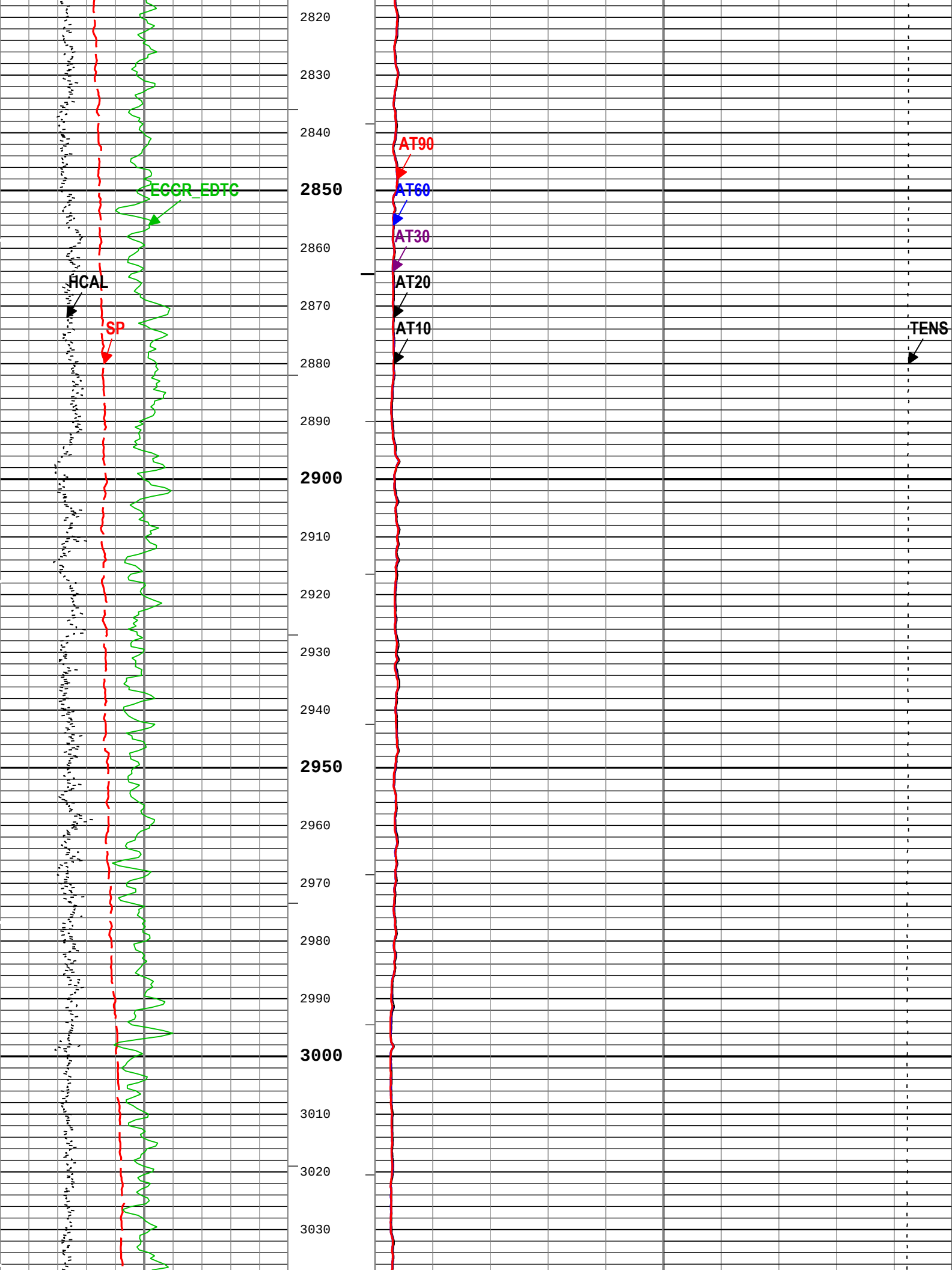
AT20
AT10
TENS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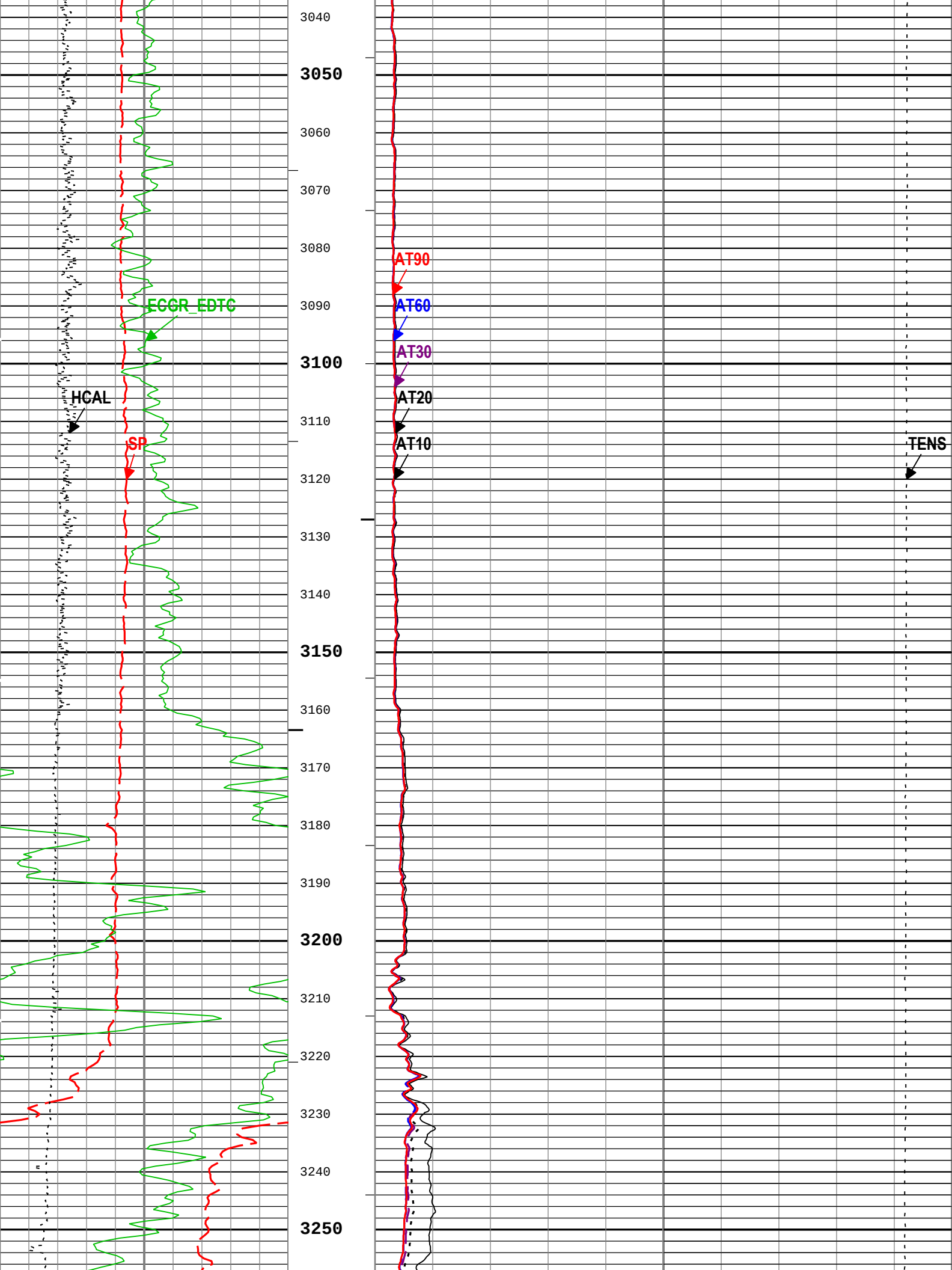
ECGR_EDTC
HCAL
SP
TENS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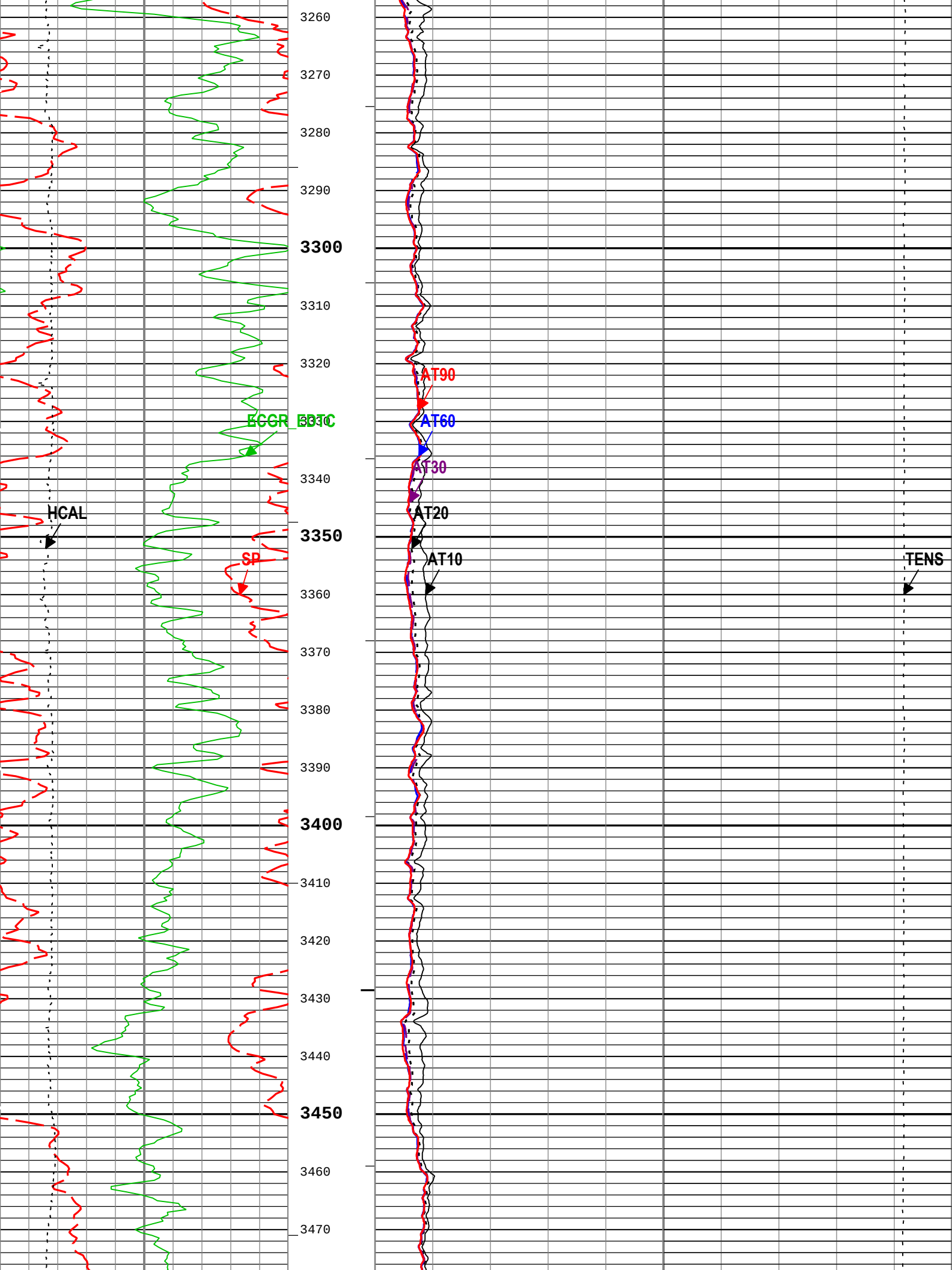
ECGR_EDTC
HCAL
SP
TENS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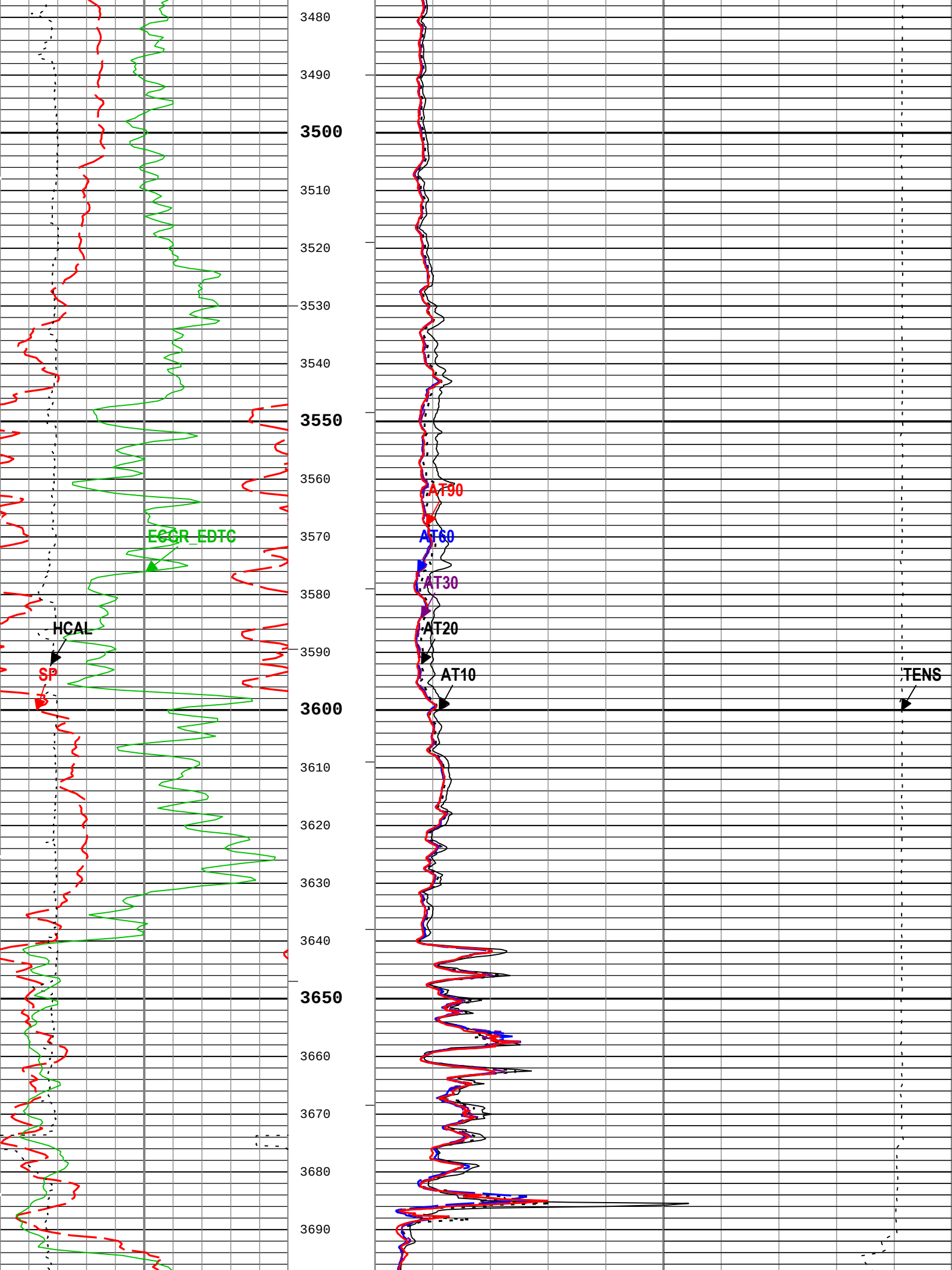
ECGR_EDTC
HCAL
SP
TENS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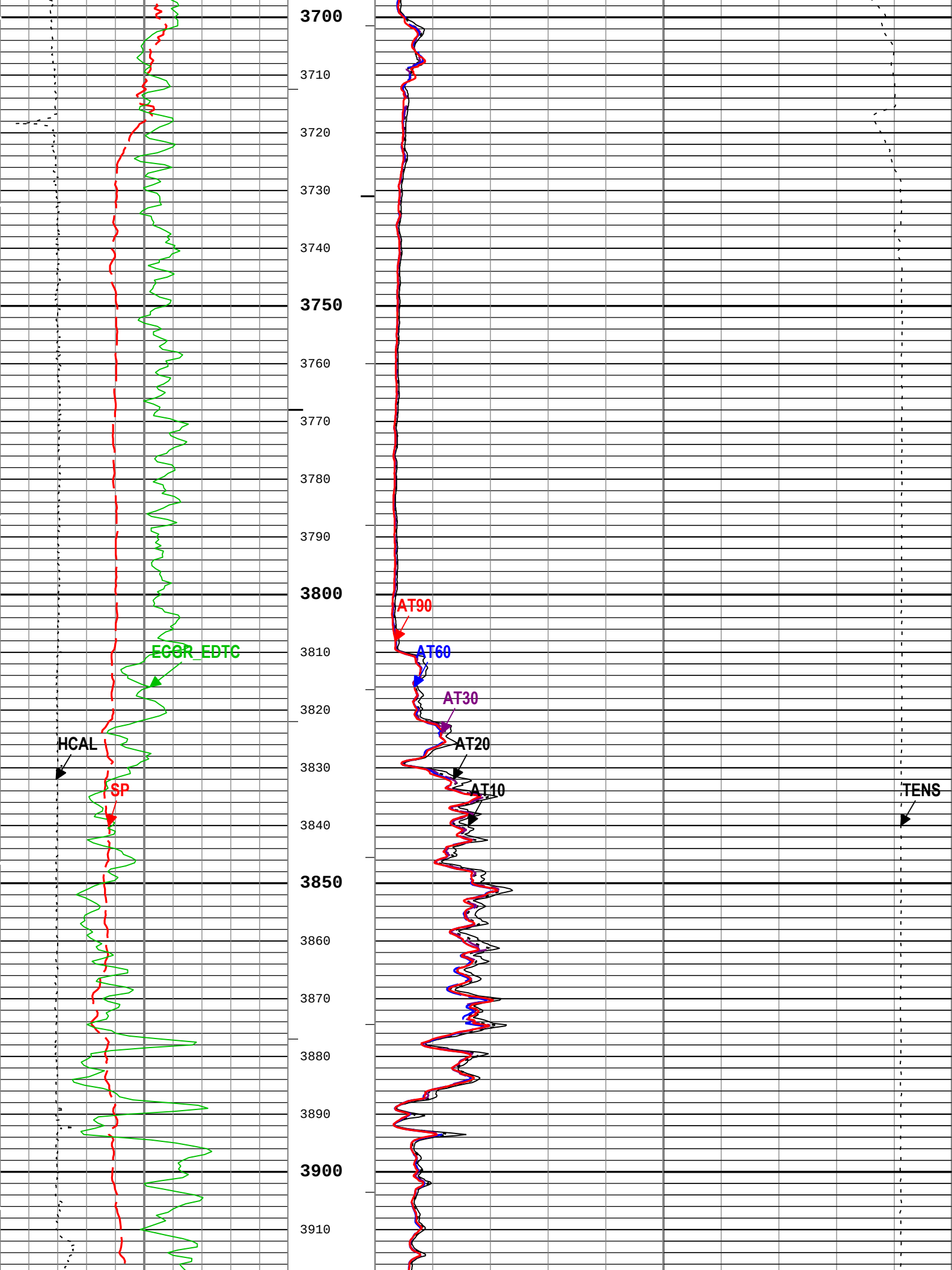
HCAL
SP
TENS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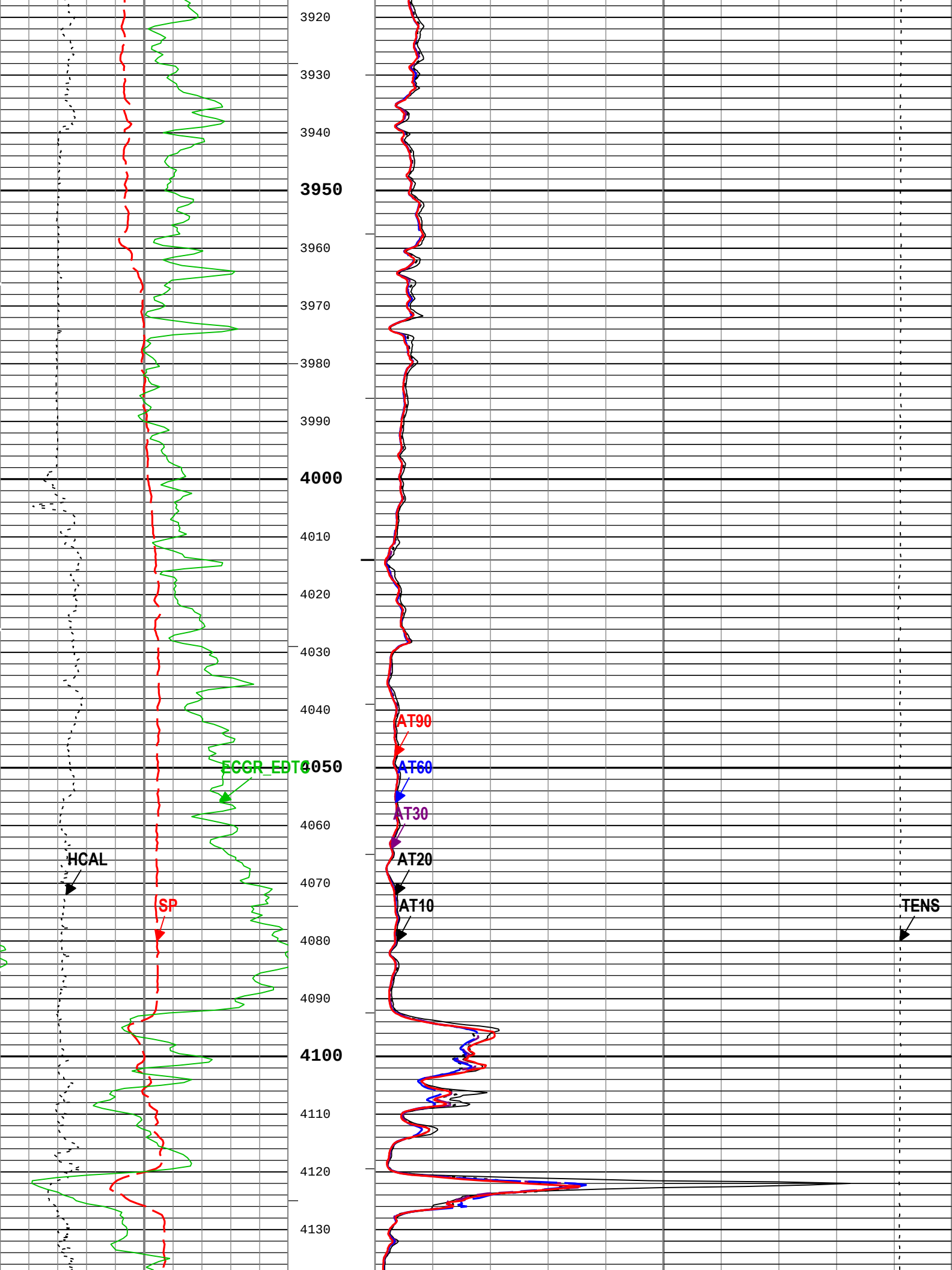
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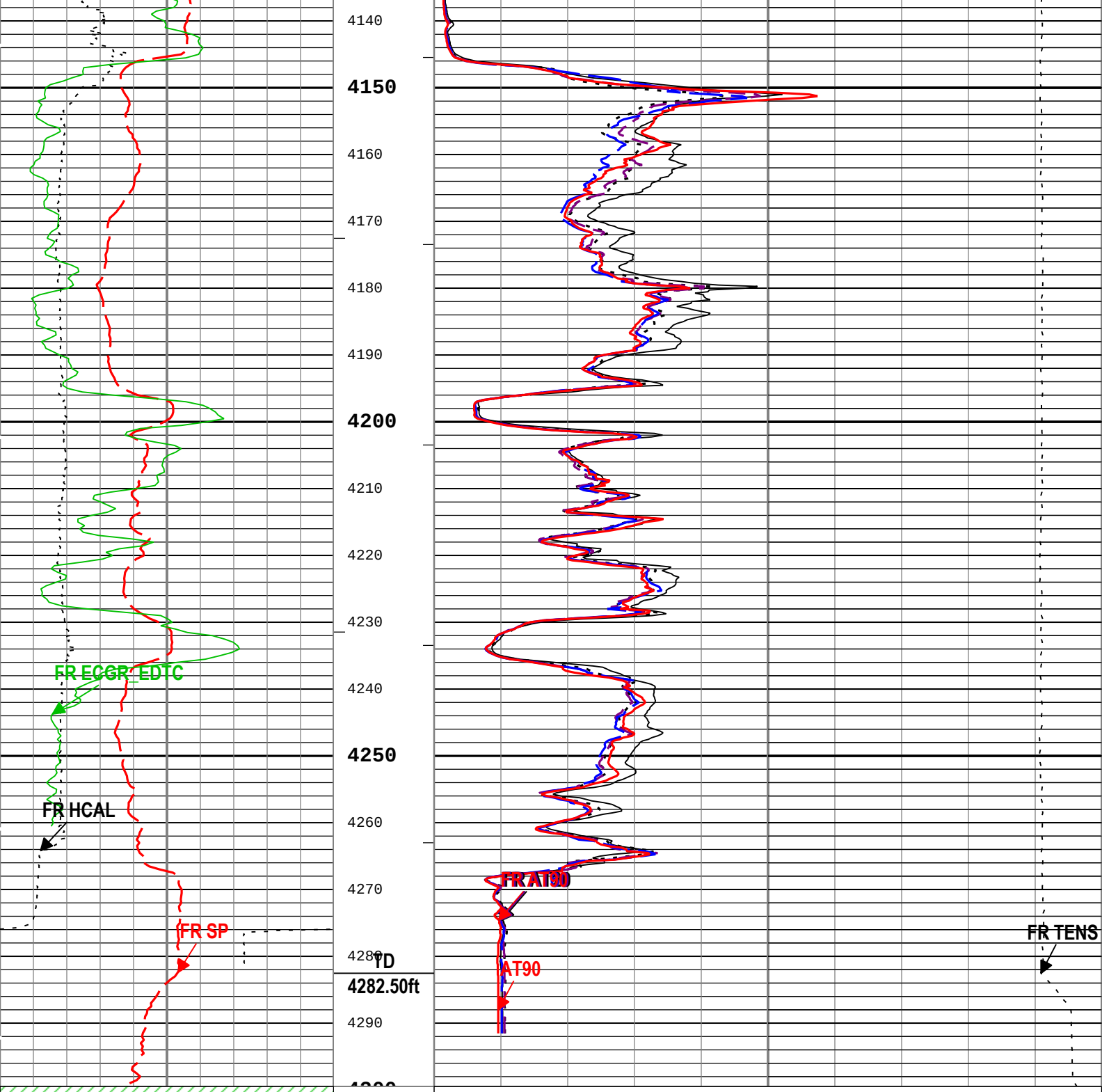
ECGR_EDTC
HCAL
SP
TENS



Gamma Ray Backup

Spontaneous Potential (SP) AIT-M

-80 mV 20

Caliper (HCAL) HDRS-H

6 in 16

Gamma Ray (ECGR_EDTC) EDTC-B

0 gAPI 200

Array Induction Two Foot Resistivity A10 (AT10) AIT-M

0 ohm.m 50

Array Induction Two Foot Resistivity A20 (AT20) AIT-M

0 ohm.m 50

Array Induction Two Foot Resistivity A30 (AT30) AIT-M

0 ohm.m 50

Array Induction Two Foot Resistivity A60 (AT60) AIT-M

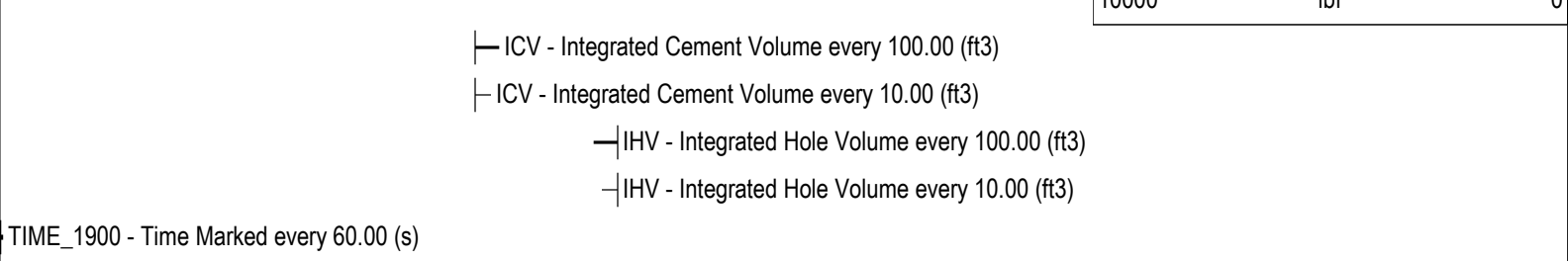
0 ohm.m 50

Array Induction Two Foot Resistivity A90 (AT90) AIT-M

0 ohm.m 50

Cable Tension (TENS)

10000 lbf 0



Description: AIT Basic Log Two Format: Log (Induction-5) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 18-Dec-2018 16:39:34

Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
ASTA	Array Induction Tool Standoff	AIT-M	0.125	in
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	Depth Zoned	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.516	in
CBLO	Casing Bottom (Logger)	WLSESSION	503.5	ft
CDEN	Cement Density	EDTC-B	2	g/cm3
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	8.625	in
DFD	Drilling Fluid Density	Borehole	9.2	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
FCD	Future Casing (Outer) Diameter	WLSESSION	5.5	in
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
SP_SHIFT	SP Shift	AIT-M	400	mV
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft

Depth Zone Parameters

Parameter	Value	Start (ft)	Stop (ft)
BS	12.25	450	503
BS	7.875	503	4285

All depth are actual.

Tool Control Parameters

ONE: Parameters

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

ONE

5" Induction

Software Version

Acquisition System	Version
Maxwell 2018 SP2	8.2.104493.3100

Pass Summary

Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
ONE	Log[2]:Up	Up	3874.70 ft	4300.59 ft	18-Dec-2018 2:53:22 PM	18-Dec-2018 3:03:18 PM	ON	0.00 ft	No
ONE	Log[3]:Up	Up	43.65 ft	4299.46 ft	18-Dec-2018	18-Dec-2018	ON	0.00 ft	No

					3:06:10 PM	4:27:30 PM			

All depths are referenced to toolstring zero

Log

Company:St. Croix Operating Inc. Well:Jack Creek #2

ONE: Log[3]:Up:S005

Description: AIT Basic Log Two Format: Log (Induction-5 RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 18-Dec-2018 16:39:38

TIME_1900 - Time Marked every 60.00 (s)

IHV - Integrated Hole Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

Main To Repeat

Repeat To Main

Cable Tension (TENS)

10000 lbf 0

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A90 (AT90) AIT-M

0 ohm.m 50

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A10 (AT10) AIT-M

0 ohm.m 50

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A60 (AT60) AIT-M

0 ohm.m 50

Main To Repeat

Repeat To Main

Caliper (HCAL) HDRS-H

6 in 16

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A30 (AT30) AIT-M

0 ohm.m 50

Main To Repeat

Repeat To Main

Gamma Ray (ECGR_EDTC) EDTC-B

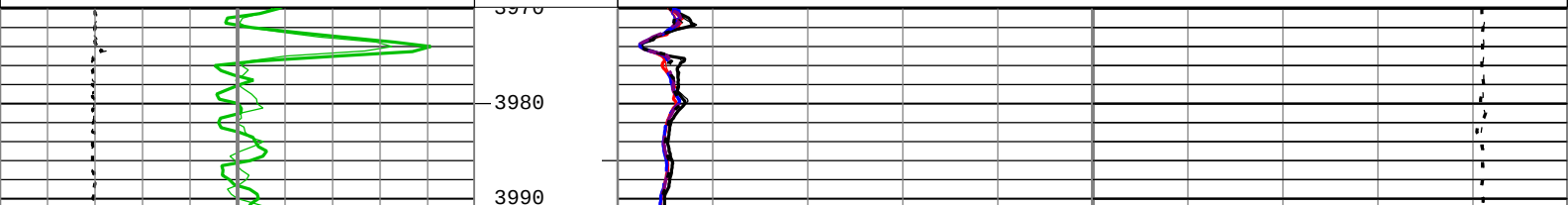
0 gAPI 200

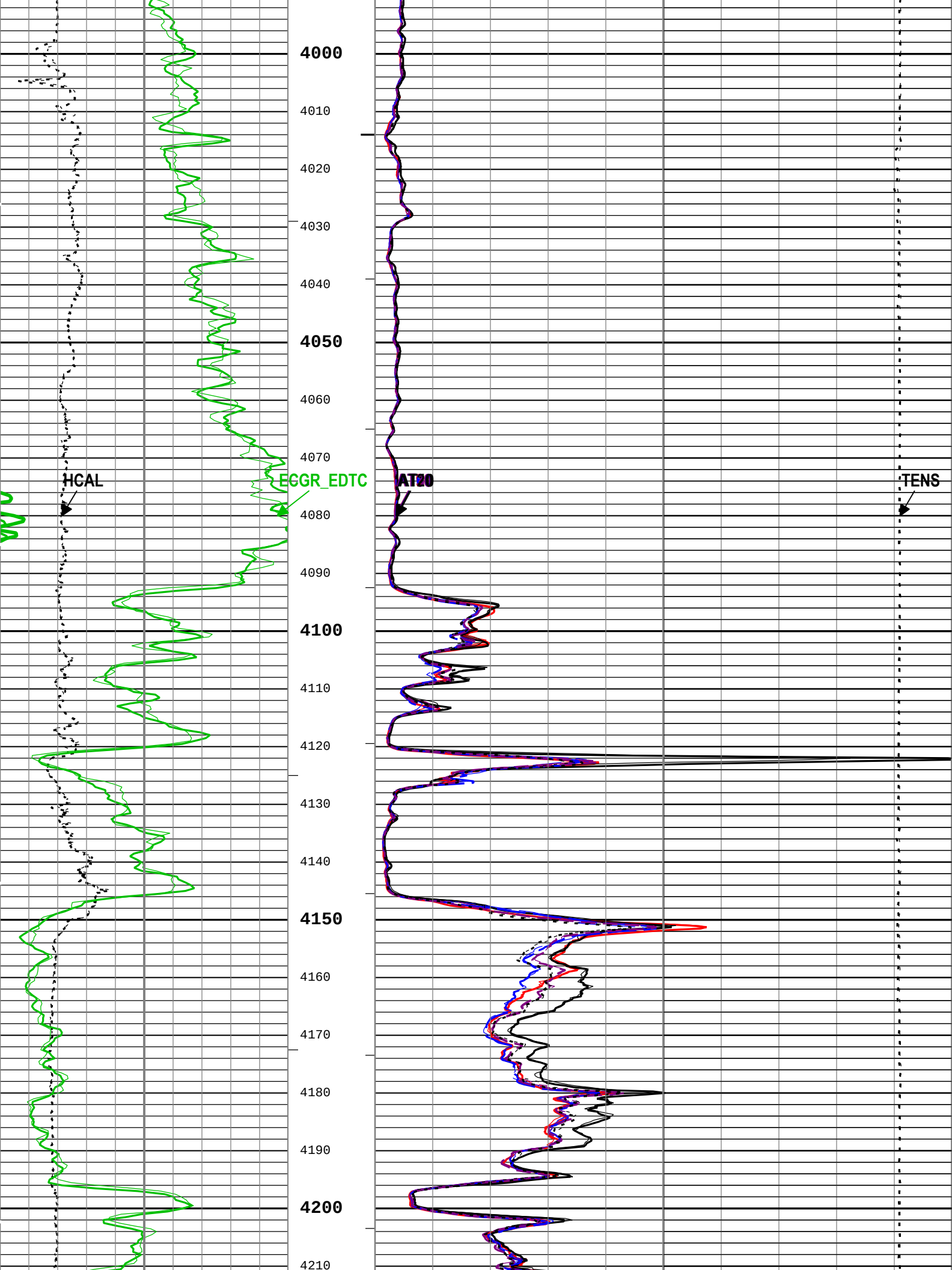
Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A20 (AT20) AIT-M

0 ohm.m 50

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HCAL
ECGR_EDTC
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TENS
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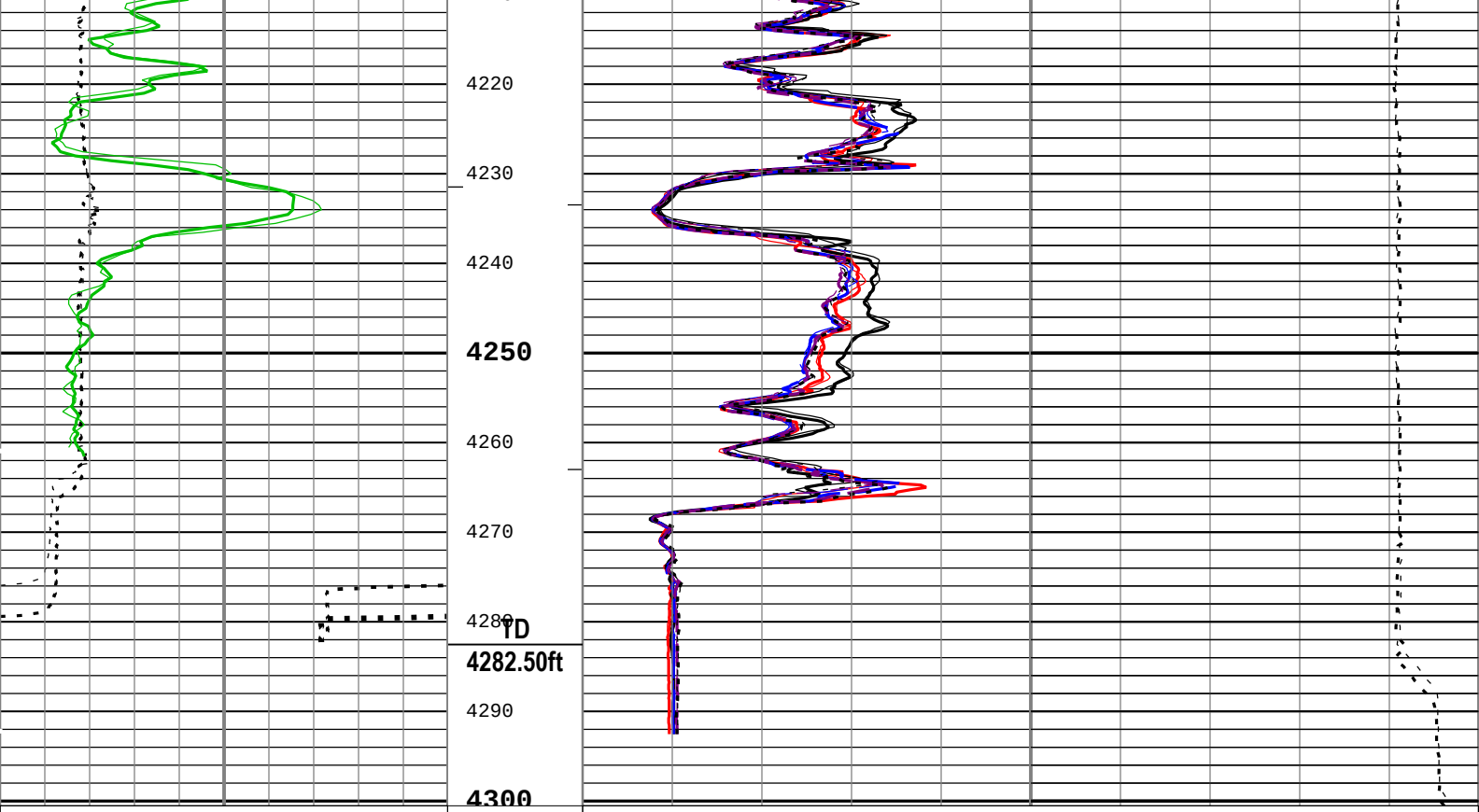

Main To Repeat

Repeat To Main

Caliper (HCAL) HDRS-H

6 in 16

Main To Repeat

Repeat To Main

Gamma Ray (ECGR_EDTC) EDTC-B

0 gAPI 200

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A90 (AT90) AIT-M

0 ohm.m 50

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A10 (AT10) AIT-M

0 ohm.m 50

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A60 (AT60) AIT-M

0 ohm.m 50

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A30 (AT30) AIT-M

0 ohm.m 50

Main To Repeat

Repeat To Main

Array Induction Two Foot Resistivity A20 (AT20) AIT-M

0 ohm.m 50

Main To Repeat

Repeat To Main

Cable Tension (TENS)

10000 lbf 0

ICV - Integrated Cement Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 100.00 (ft3)

IHV - Integrated Hole Volume every 10.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

Description: AIT Basic Log Two Format: Log (Induction-5 RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 18-Dec-2018 16:39:38

Channel Processing Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
ASTA	Array Induction Tool Standoff	AIT-M	0.125	in
BARI(ISSBAR)	Barite Mud Presence Flag	Borehole	No	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Open	
BS	Bit Size	WLSESSION	7.875	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0.516	in
CBLO	Casing Bottom (Logger)	WLSESSION	503.5	ft
CDEN	Cement Density	EDTC-B	2	g/cm3
DFD	Drilling Fluid Density	Borehole	9.2	lbm/gal
DFT_CATEGORY	Drilling Fluid Type	Borehole	Water	
FCD	Future Casing (Outer) Diameter	WLSESSION	5.5	in
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS(RT)	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	

Tool Control Parameters

ONE: Parameters

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

Calibration Report

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

Primary Equipment :

File code for AIT-MA Sonde Tool Element	AMIS	2562

Auxiliary Equipment :

AITM Rm/SP Bottom Nose	AMRM	109

AIT Sonde Calibration - Test Loop Gain

Master (EEPROM): 21:49:28 10-Mar-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Test Loop Gain - 0		Master	1.000	0.950	1.014	1.050
Test Loop Phase - 0	deg	Master	0	-3.000	0.524	3.000
Test Loop Gain - 1		Master	1.000	0.950	1.013	1.050
Test Loop Phase - 1	deg	Master	0	-3.000	0.644	3.000
Test Loop Gain - 2		Master	1.000	0.950	1.015	1.050
Test Loop Phase - 2	deg	Master	0	-3.000	0.108	3.000
Test Loop Gain - 3		Master	1.000	0.950	1.009	1.050
Test Loop Phase - 3	deg	Master	0	-3.000	0.144	3.000
Test Loop Gain - 4		Master	1.000	0.950	0.993	1.050

Test Loop Phase - 4	deg	Master	0	-3.000	0.110	3.000	
Test Loop Gain - 5		Master	1.000	0.950	0.989	1.050	
Test Loop Phase - 5	deg	Master	0	-3.000	-0.056	3.000	
Test Loop Gain - 6		Master	1.000	0.950	1.000	1.050	
Test Loop Phase - 6	deg	Master	0	-3.000	0.278	3.000	
Test Loop Gain - 7		Master	1.000	0.950	1.014	1.050	
Test Loop Phase - 7	deg	Master	0	-3.000	-0.041	3.000	

AIT Sonde Calibration - Sonde Error Correction

Master (EEPROM): 21:49:28 10-Mar-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Sonde Error Correction Real - 0	mS/m	Master	-----	-231.000	-90.511	119.000	
Sonde Error Correction Quad - 0		Master	-----	-2250.000	-12.770	2250.000	
Sonde Error Correction Real - 1	mS/m	Master	-----	114.000	165.326	204.000	
Sonde Error Correction Quad - 1		Master	-----	-625.000	-75.327	625.000	
Sonde Error Correction Real - 2	mS/m	Master	-----	66.000	104.659	156.000	
Sonde Error Correction Quad - 2		Master	-----	-350.000	63.282	350.000	
Sonde Error Correction Real - 3	mS/m	Master	-----	39.000	55.423	89.000	
Sonde Error Correction Quad - 3		Master	-----	-250.000	51.642	250.000	
Sonde Error Correction Real - 4	mS/m	Master	-----	15.000	26.570	35.000	
Sonde Error Correction Quad - 4		Master	-----	-63.000	-29.986	63.000	
Sonde Error Correction Real - 5	mS/m	Master	-----	4.000	11.103	24.000	
Sonde Error Correction Quad - 5		Master	-----	-50.000	-16.905	50.000	
Sonde Error Correction Real - 6	mS/m	Master	-----	5.000	6.462	15.000	
Sonde Error Correction Quad - 6		Master	-----	-30.000	-8.061	30.000	
Sonde Error Correction Real - 7	mS/m	Master	-----	-5.000	-4.924	5.000	
Sonde Error Correction Quad - 7		Master	-----	-30.000	-0.292	30.000	

AIT Mud Calibration - Mud Calibration Gain

Master (EEPROM): 21:49:28 10-Mar-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Coarse Gain		Master	1.000	0.800	1.024	1.200	
Fine Gain		Master	1.000	0.800	1.030	1.200	

AIT Electronics Check - Thru Calibration Check

Master (EEPROM): 21:49:28 10-Mar-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Thru Cal Mag - 0	V	Master	-----	0.366	0.641	0.854	
Thru Cal Phase - 0	deg	Master	-----	137.000	-175.189	-103.000	
Thru Cal Mag - 1	V	Master	-----	0.762	1.314	1.778	
Thru Cal Phase - 1	deg	Master	-----	136.000	-176.305	-104.000	
Thru Cal Mag - 2	V	Master	-----	0.372	0.651	0.868	
Thru Cal Phase - 2	deg	Master	-----	132.000	-179.892	-108.000	
Thru Cal Mag - 3	V	Master	-----	0.420	0.736	0.980	
Thru Cal Phase - 3	deg	Master	-----	131.000	179.337	-109.000	
Thru Cal Mag - 4	V	Master	-----	0.804	1.375	1.876	
Thru Cal Phase - 4	deg	Master	-----	125.000	173.125	-115.000	
Thru Cal Mag - 5	V	Master	-----	1.176	2.005	2.744	
Thru Cal Phase - 5	deg	Master	-----	122.000	171.443	-118.000	
Thru Cal Mag - 6	V	Master	-----	1.176	2.005	2.744	
Thru Cal Phase - 6	deg	Master	-----	121.000	171.455	-119.000	
Thru Cal Mag - 7	V	Master	-----	0.846	1.442	1.974	
Thru Cal Phase - 7	deg	Master	-----	115.000	170.747	-125.000	
SPA Zero	mV	Master		-50.000	0.350	50.000	
SPA Plus	mV	Master		941.000	990.193	1040.000	
Temperature Zero	V	Master		-0.050	0.000	0.050	
Temperature Plus	V	Master		0.870	0.918	0.960	

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

Primary Equipment :

HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	3737

HILT Resistivity Gamma-Ray Density Device, 150 degC	HRGD-H	4882

Auxiliary Equipment :

HRDD Backscatter Detector	Backscatter	
HRDD Long Spacing Detector	Long Spacing	
HRDD Short Spacing Detector	Short Spacing	
Cesium 137 Gamma-Ray Logging Source	GSR-J	5259
HILT High-Resolution Control Cartridge, 150 degC	HRCC-H	3737
HILT High-Resolution Mechanical Sonde, 150 degC	HRMS-H	3951

Calibration Parameter :

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

HDRS Density Calibration - Inversion Results

Master (EEPROM): 15:52:40 09-Dec-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Rho Aluminum	g/cm3	Master	2.596	2.586	2.597	2.606
Rho Magnesium	g/cm3	Master	1.686	1.676	1.686	1.696
Pe Aluminum		Master	2.570	2.470	2.541	2.670
Pe Magnesium		Master	2.650	2.550	2.641	2.750

HDRS Density Calibration - Deviation Summary

Master (EEPROM): 15:52:40 09-Dec-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Average Deviation	%	Master	0	-0.6000	0.4193	0.6000
BS Max Deviation	%	Master	0	-1.6000	0.9056	1.6000
SS Average Deviation	%	Master	0	-1.0000	0.4058	1.0000
SS Max Deviation	%	Master	0	-2.5000	1.0526	2.5000
LS Average Deviation	%	Master	0	-1.5000	0.6786	1.5000
LS Max Deviation	%	Master	0	-3.5000	1.5928	3.5000

HDRS Density Calibration - Background Summary

Master (EEPROM): 15:52:40 09-Dec-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Window Ratio		Master	1.0000		0.7416	
BS Window Sum	1/s	Master	1		27426	
SS Window Ratio		Master	1.0000		0.4741	
SS Window Sum	1/s	Master	1		10068	
LS Window Ratio		Master	1.0000		0.2938	
LS Window Sum	1/s	Master	1		1135	

HDRS Density Calibration - Photo-multiplier High Voltages

Master (EEPROM): 15:52:40 09-Dec-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS PM High Voltage	V	Master		1000	1493	2400
SS PM High Voltage	V	Master		1000	1484	2400
LS PM High Voltage	V	Master		1000	1739	2400

HDRS Density Calibration - Crystal Quality Resolutions

Master (EEPROM): 15:52:40 09-Dec-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
BS Crystal Resolution	%	Master		5.00	10.59	25.00
SS Crystal Resolution	%	Master		5.00	8.79	20.00
LS Crystal Resolution	%	Master		5.00	9.28	20.00

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

Primary Equipment :

HILT Gamma-Ray and Neutron Sonde, 150 degC	HGNS-H	3730

Auxiliary Equipment :

HGNS Accelerometer, 150 degC	HACCZ-H	1537

AmBe Neutron Logging Source | NSR-F | 5068

Calibration Parameter :

Water Temperature (Calibration Tank Water Temperature) 65.0

Housing Size (Thermal Housing Size) 3.37

JIG-BKG

HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM): 00:00:00 15-Mar-2002

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Accelerometer Manufacturer		Master			QAT_160	
Accelerometer Reference Temperature	degF	Master		30.2	77.0	122.0
Accelerometer Coefficients - 0		Master	-----	-----	-530.200	-----
Accelerometer Coefficients - 1		Master	-----	-----	-13.060	-----
Accelerometer Coefficients - 2		Master	-----	-----	-0.001	-----
Accelerometer Coefficients - 3		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 4		Master	-----	-----	2.722	-----
Accelerometer Coefficients - 5		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 6		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 7		Master	-----	-----	0.000	-----
Accelerometer Coefficients - 8		Master	-----	-----	298.900	-----
Accelerometer Coefficients - 9		Master	-----	-----	1.007	-----

HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM): 21:32:32 07-Nov-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Near Zero Measurement	1/s	Master	0	5.0	28.5	40.0
Far Zero Measurement	1/s	Master	0	5.0	27.4	40.0
Near Plus Measurement	1/s	Master	6031.0	4700.0	5307.0	6900.0
Far Plus Measurement	1/s	Master	2793.0	1900.0	2180.0	2900.0
Near Corrected Plus Measurement	1/s	Master		4700.0	5299.0	6900.0
Far Corrected Plus Measurement	1/s	Master		1900.0	2163.0	2900.0

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

Primary Equipment :

EDTC-B | EDTC-B | 9038

Calibration Parameter :

Plus Reference

EDTC-B Memory Data - EDTC-B Memory Data

Master (EEPROM): 14:30:48 18-Dec-2018

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit
Initial PMT HV	V	Master			1574.000	
Accelerometer Serial Number		Master			1206	
Accelerometer Coefficients - 0		Master	-----	-----	2.970E+000	-----
Accelerometer Coefficients - 1		Master	-----	-----	1.998E-004	-----
Accelerometer Coefficients - 2		Master	-----	-----	6.002E-007	-----
Accelerometer Coefficients - 3		Master	-----	-----	-3.225E-008	-----
Accelerometer Coefficients - 4		Master	-----	-----	8.128E-010	-----
Accelerometer Coefficients - 5		Master	-----	-----	-6.221E-012	-----
Accelerometer Coefficients - 6		Master	-----	-----	1.615E-014	-----
Accelerometer Coefficients - 7		Master	-----	-----	-4.416E-003	-----
Accelerometer Coefficients - 8		Master	-----	-----	4.347E-005	-----
Accelerometer Coefficients - 9		Master	-----	-----	-4.540E-008	-----
Accelerometer Coefficients - 10		Master	-----	-----	5.842E-013	-----
Accelerometer Coefficients - 11		Master	-----	-----	-1.668E-012	-----
Gamma-Ray Detector Serial Number		Master			79215	

Company:	St. Croix Operating Inc.
Well:	Jack Creek #2
Field:	Wildcat
County:	Washington
State:	Colorado

Schlumberger

Platform Expres
Array Induction
with Linear Correlation