

Company: Mustang Creek Operating LLC

Well: Graham 1 13

Field: Wildcat

County: El Paso State: Colorado

Platform Express
Array Induction
with Linear Correlation

County:	El Paso
Field:	Wildcat
Location:	SHL: NWSW 1814' FSL & 934' FWL
Well:	Graham 1 13
Company:	Mustang Creek Operating LLC
Location:	
SHL: NWSW 1814' FSL & 934' FWL	Elev.: K.B. 6124.00 ft
Section 1, Township 13S, Range 60W	G.L. 6102.00 ft
Lat: 38.946070, Long: -104.068480	D.F. 6123.00 ft
Permanent Datum:	Ground Level Elev.: 6102.00 f
Log Measured From:	Kelly Bushing 22.00 ft above Perm.Datum
Drilling Measured From:	Kelly Bushing
API Serial No.	Section: 1
05-041-06082-00	Township: 13S
	Range: 60W

Logging Date	07-Feb-2014
Run Number	Run 1
Depth Driller	10985.00 ft
Schlumberger Depth	10954.00 ft
Bottom Log Interval	10954.00 ft
Top Log Interval	5044.00 ft
Casing Driller Size @ Depth	9.625 in @ 5050.00 ft
Casing Schlumberger	5044 ft
Bit Size	7.875 in
Type Fluid In Hole	Chemical Gel
Density	9.3 lbm/gal
Fluid Loss	4.4 cm3
PH	7.8
Source of Sample	Active Tank
RM @ Meas Temp	1.3 ohm.m @ 90 degF
RMF @ Meas Temp	0.99 ohm.m @ 90 degF
RMC @ Meas Temp	1.66 ohm.m @ 90 degF
Source RMF	Calculated
RM @ BHT	0.55 @ 220
RMF @ BHT	0.42 @ 220
Max Recorded Temperatures	220 degF
Circulation Stopped	06-Feb-2014 18:00:00
Logger on Bottom	07-Feb-2014 05:25:20
Unit Number	2135
Location:	Fort Morgan, CO
Recorded By	Max Pace
Witnessed By	Chris Hansen

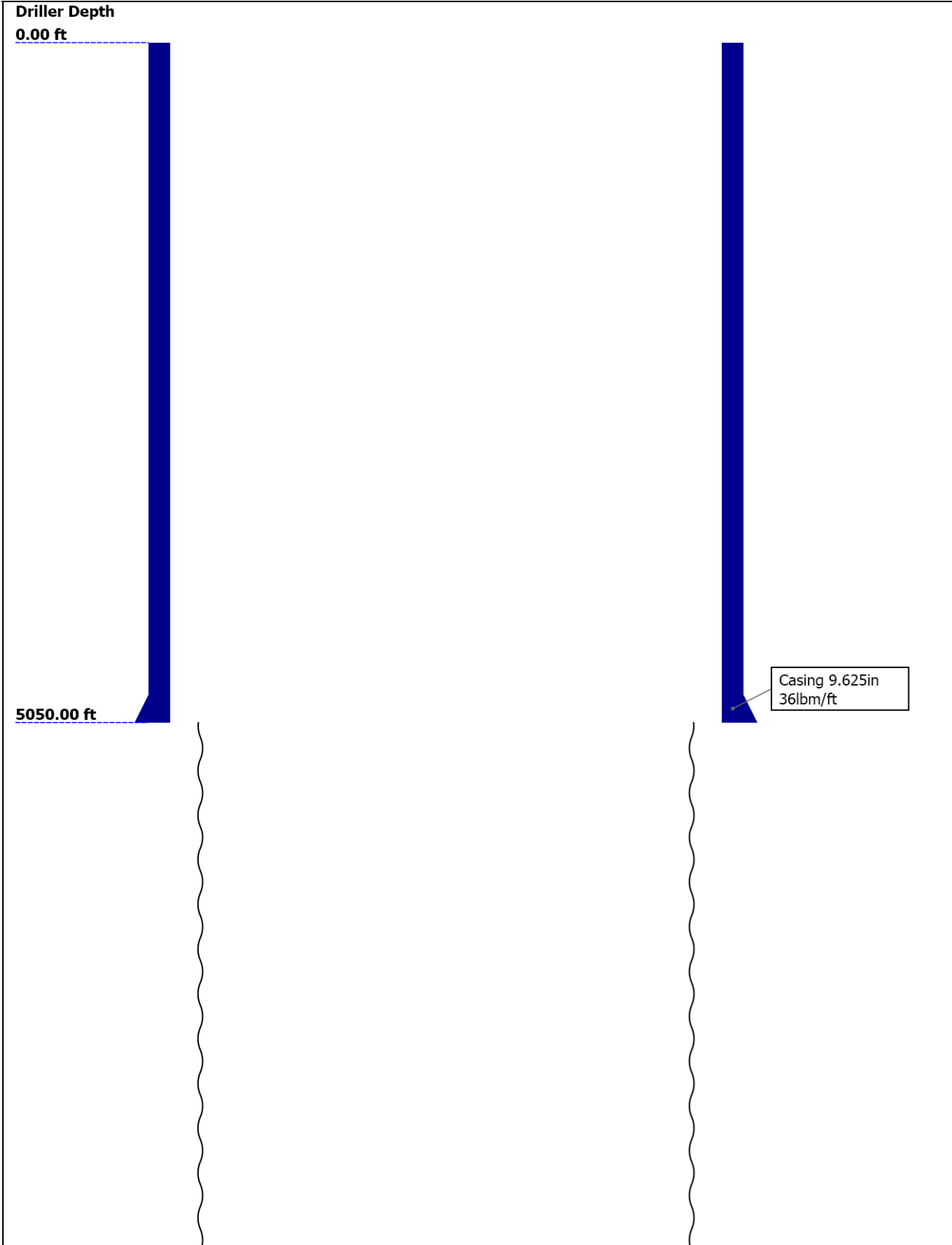
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Well Sketch



10985.00 ft

Open Hole 7.875in

Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	7.875					
Top Driller (ft)	5050					
Top Logger (ft)	5044					
Bottom Driller (ft)	10985					
Bottom Logger (ft)	10954					
Casing						
Size (in)	9.625					
Weight (lbm/ft)	36					
Inner Diameter (in)	8.921					
Grade	J55					
Top Driller (ft)	0					
Top Logger (ft)	0					
Bottom Driller (ft)	5050					
Bottom Logger (ft)	5044					

Borehole Fluids

Parameter(unit)	Run 1					
Fluid Type	Water					
Fluid Name	Chemical Gel					
Max Recorded Temperatures (degF)	220					
Source of Sample	Active Tank					
Salinity (ppm)	0					
Density (lbm/gal)	9.3					
Funnel Viscosity (s)	60					
Fluid Loss (cm3)	4.4					
PH	7.8					
Date/Time Circulation Stopped	06-Feb-2014 18:00:00					
Date Logger on Bottom	07-Feb-2014					
Time Logger on Bottom	05:25:20					
Source RMF	Calculated					
RMC	Calculated					
RM @ Meas Temp (ohm.m@degF)	1.3 @ 90					
RMF @ Meas Temp (ohm.m@degF)	0.99 @ 90					

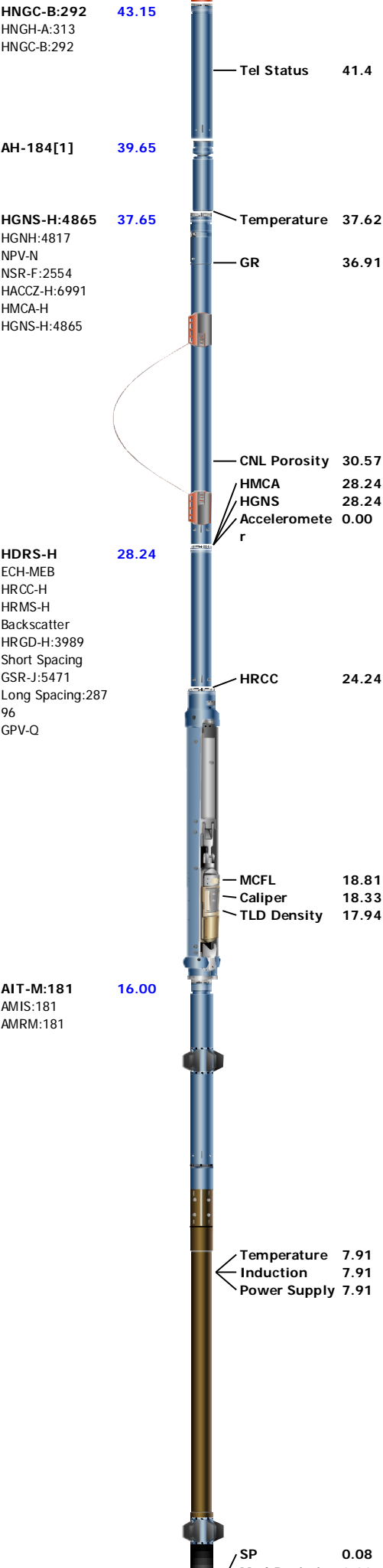
RMC @ Meas Temp (ohm.m@degF)	1.66 @ 90					
RM @ BHT (ohm.m@degF)	0.55 @ 220					
RMF @ BHT (ohm.m@degF)	0.42 @ 220					
RMC @ BHT (ohm.m@degF)	0.71 @ 220					
Total Solid (%)						
High Gravity Solids (%)						

Remarks and Equipment Summary

Run 1: Toolstring				Run 1: Remarks
Equip name LEH-QT LEH-QT	Length 117.08	MP name	Offset	All Schlumberger depth control procedures followed
				IDW used as primary depth reference
				Z chart used as secondary depth reference
EDTC-B EDTH-B EDTG-A EDTC-B	114.16			Limestone matrix (2.71 g/cm3) run as per client request
				Measurements effected by borehole rugosity
		CTEM ACCZ HV Gamma Ray TelStatus	110.66 0.00 0.00 108.79 107.66	This is the first run in hole
PPC-B[2]:8195 PPC-B:8195	107.66			Winch shut off at 6165 due to tight pull (500 pounds below MSP)
		PPC-B Caliper s	106.52	Logs spliced at 8500. Client requested change in sonic scanner mode to increase logging speed
MAST-B:8524 ECH-SF:8023 MAPC-BA:8023 MAMS-BA:8524 MASS-BA:8202 MAXS-BA:8078	101.14			
		MAMS	85.7	



PPC-B[1]:8193 PPC-B:8193	59.86	MAXS	59.86
		PPC-B Caliper s	58.71
AH-184[2]	53.34		
HNGS-BA:169 HEH-K:186 HNGS-BA:169	51.34		
		GR	48.35



Lengths are in ft
Maximum Outer Diameter = 5.000 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

Depth Measuring Device

Run 1

Type	
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Type	CMTD-B/A
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Type	
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Type	7-46NT-XS
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Log Sequence	First
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Log Sequence	First Log In the Well
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 UNIVERSITY OF NORTH CAROLINA
 CHAIRMAN'S OFFICE
 100 SOUTH CAMPUS DRIVE
 CARR SANFORD, NC 27510

Output Channel(s)	Output I
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Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
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Acquisition System

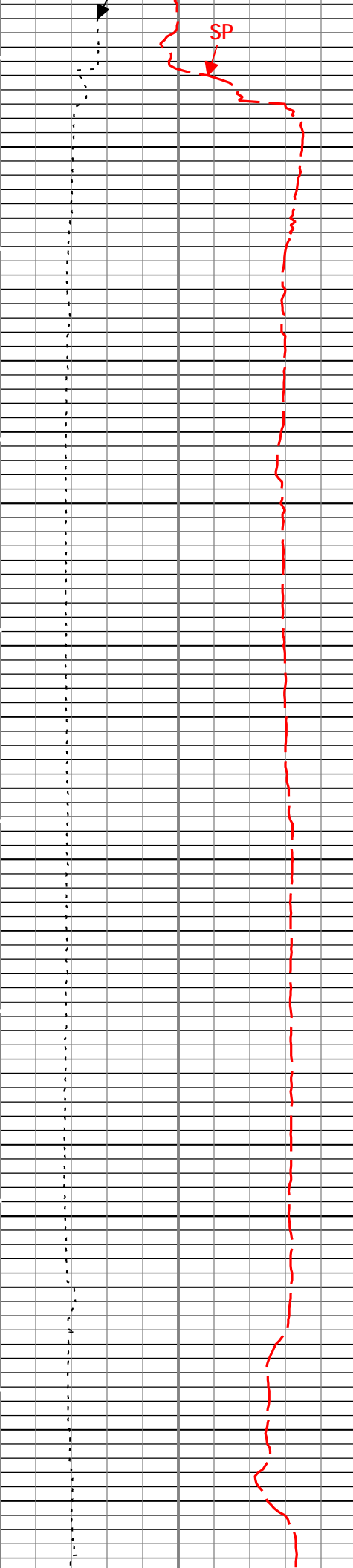
Acquisition System	Version
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Computation	Description	Version
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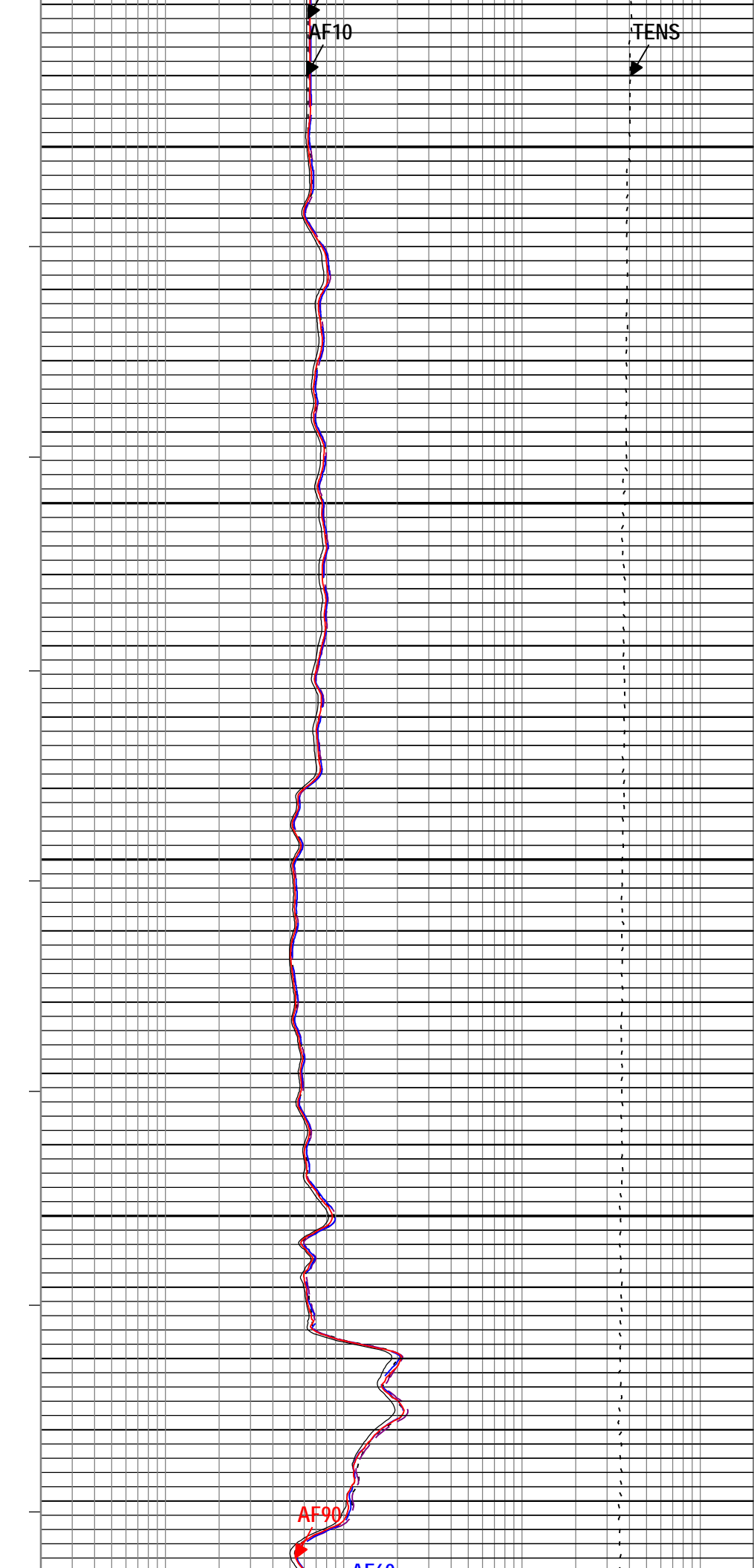
Tool Elements	Description	Software Version	Firmware Version
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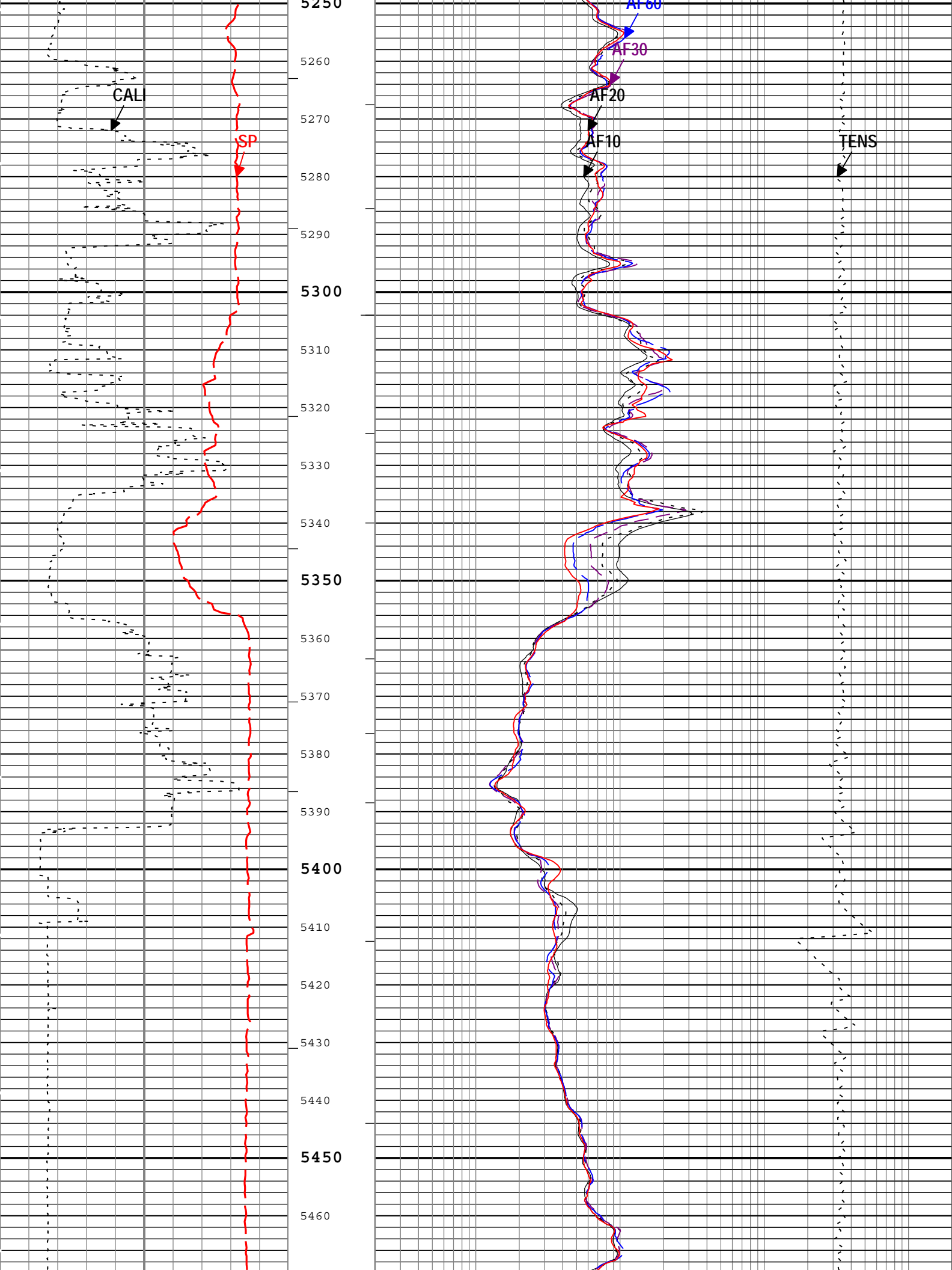
HRCC-H	HILT High-Resolution Control Cartridge, 150 degC	4.0.9231.3000	2.0
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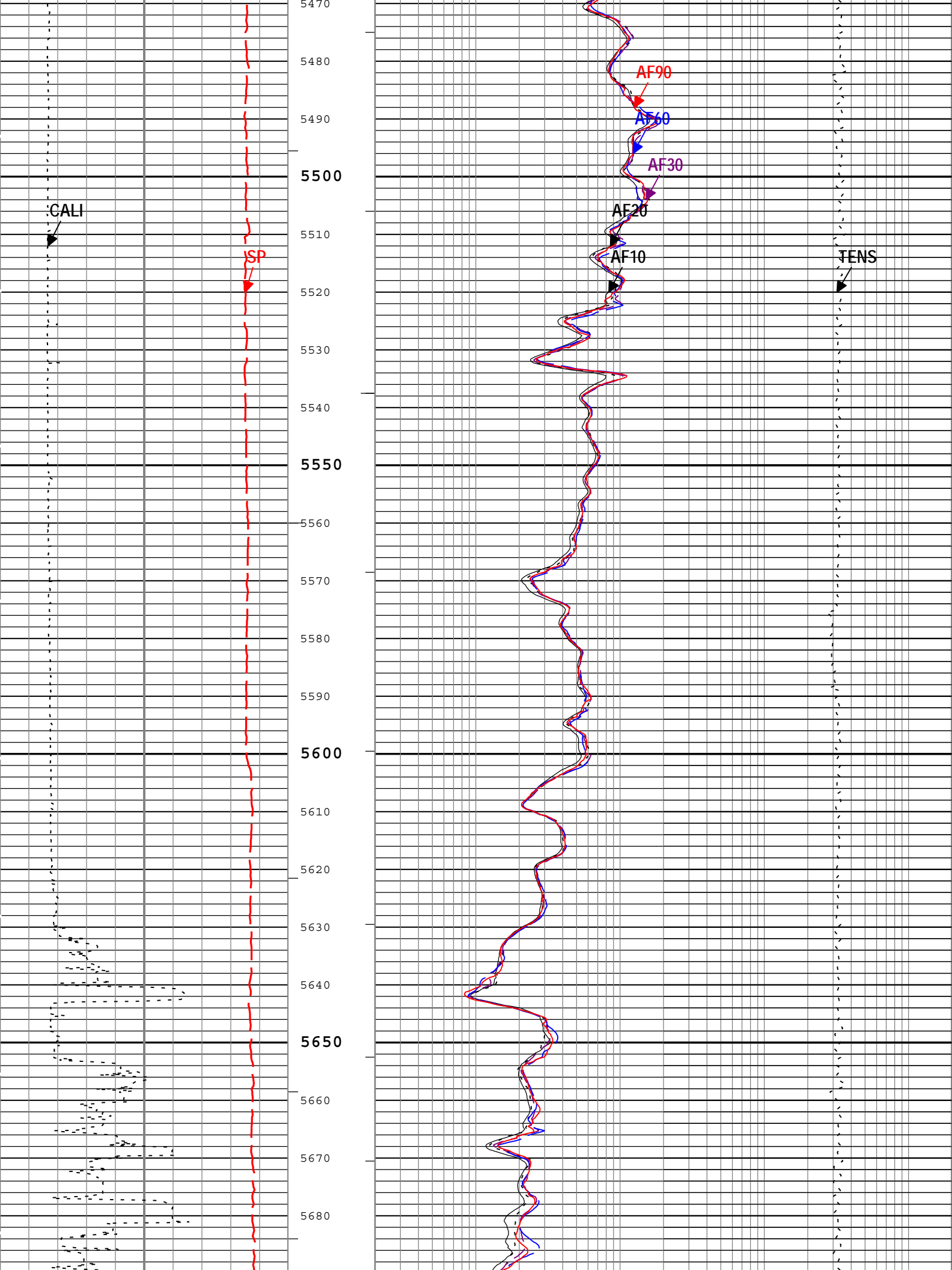
AMIS	Array Induction Sonde - M	4.0.9247.3000
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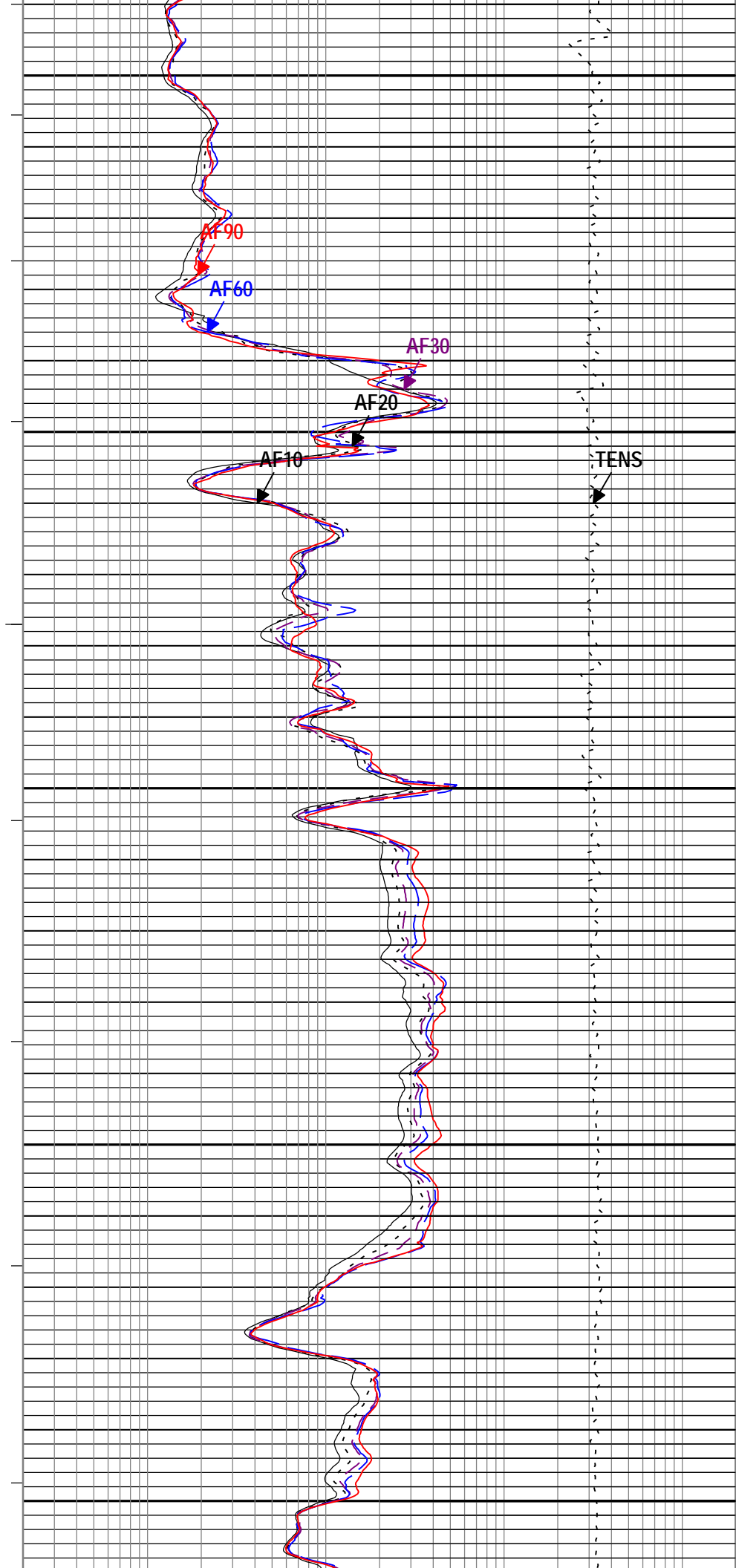
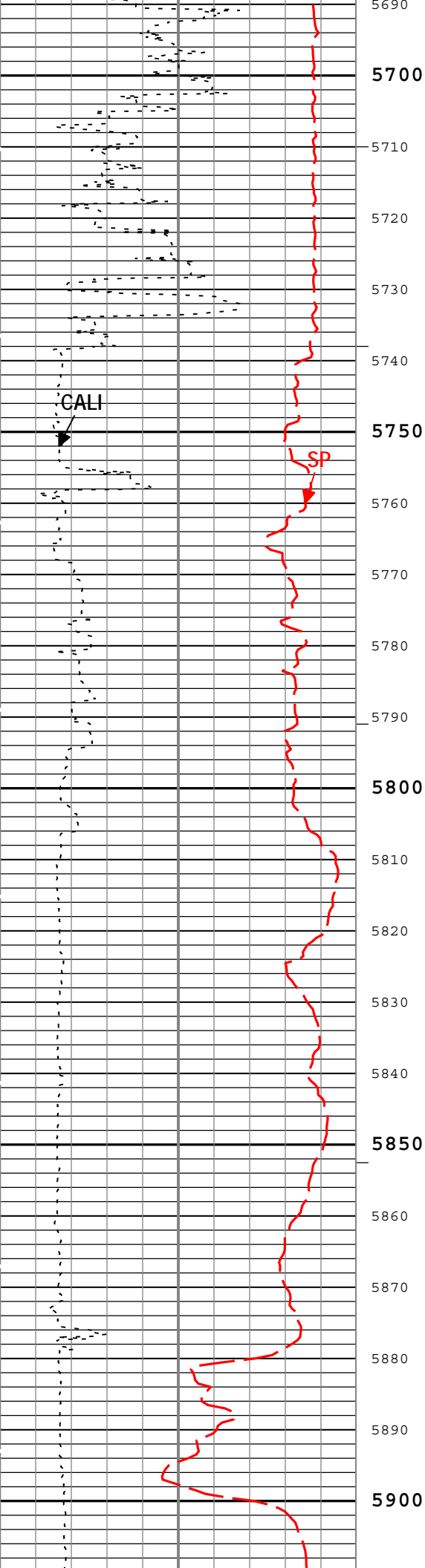


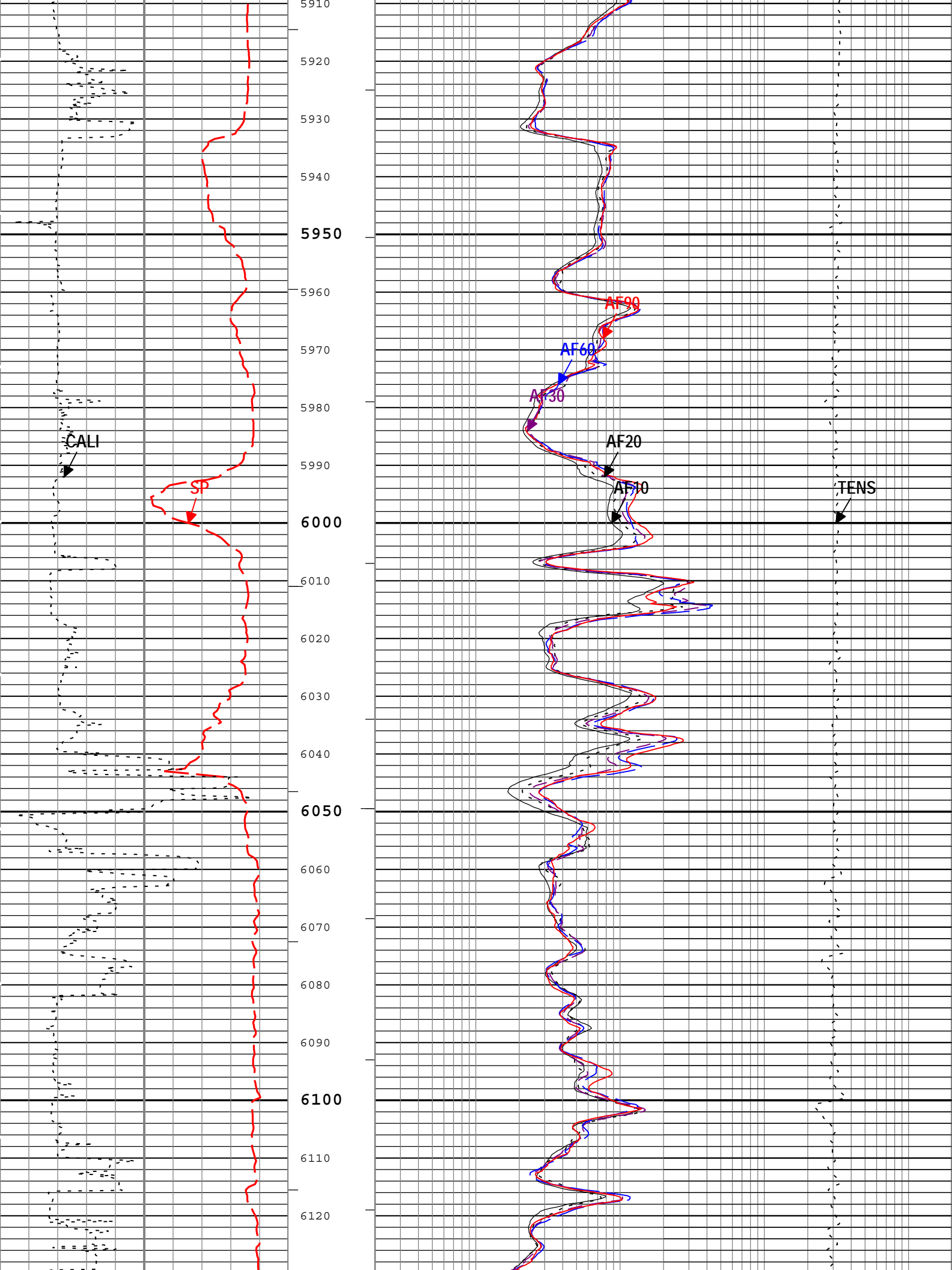
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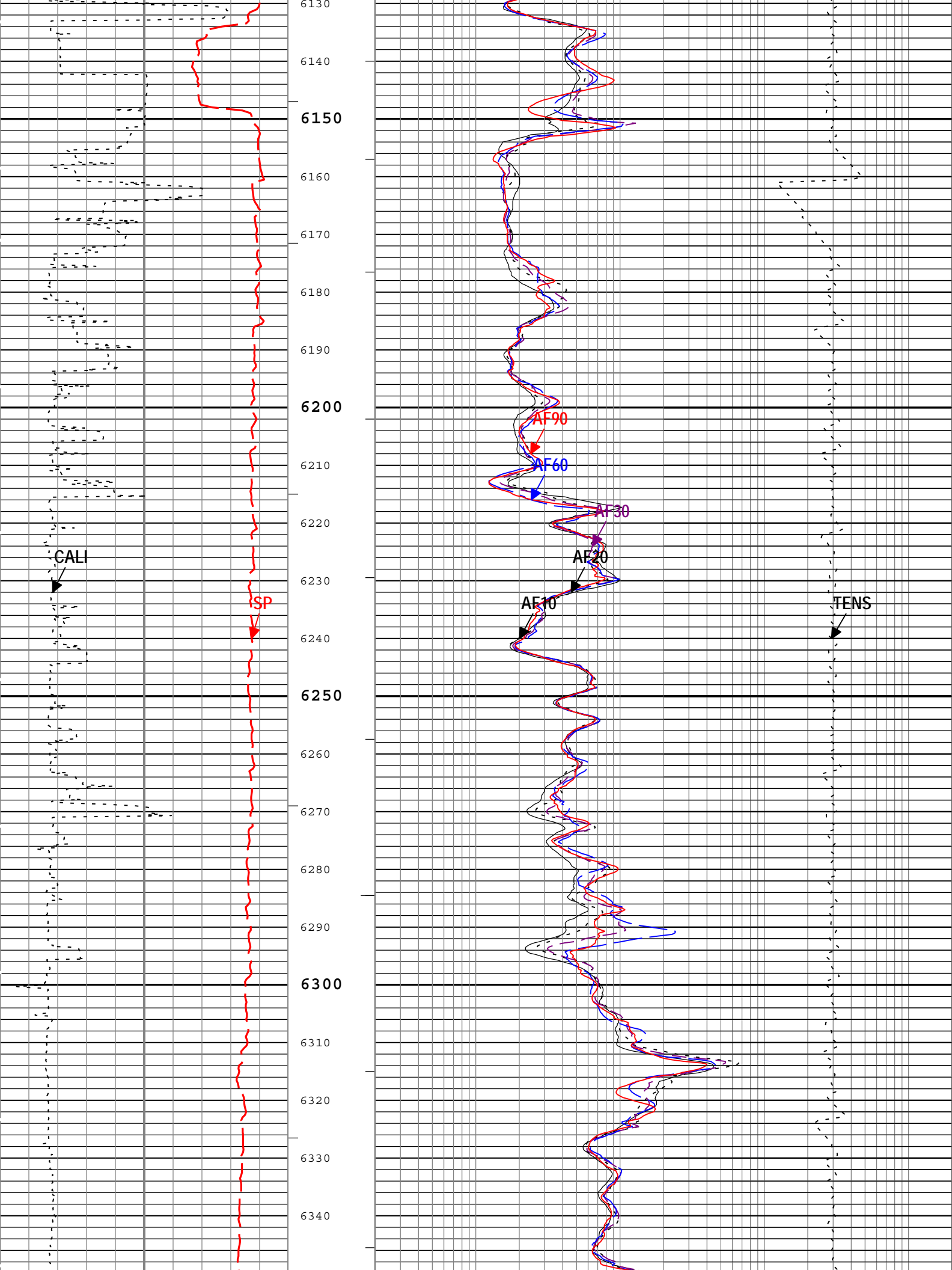


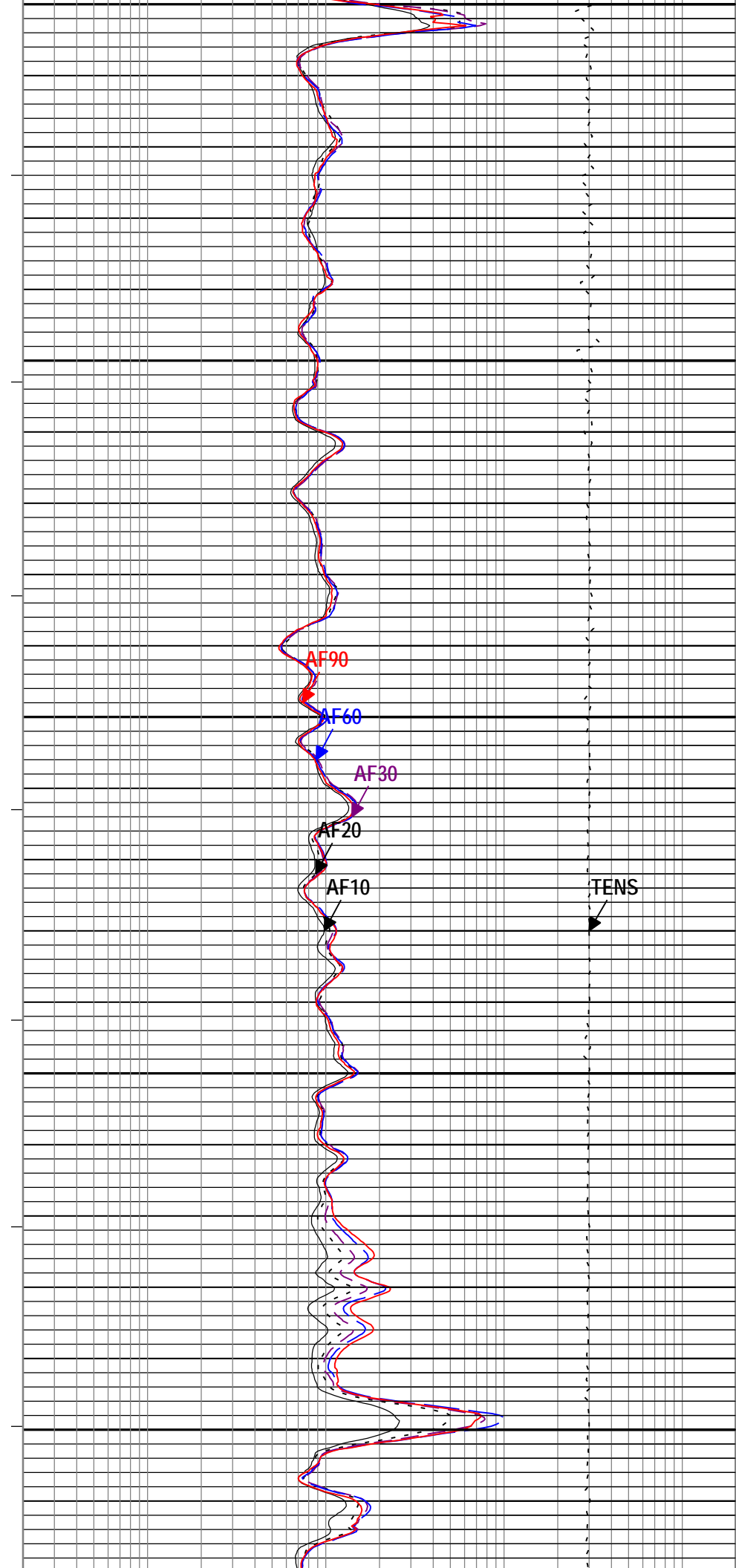
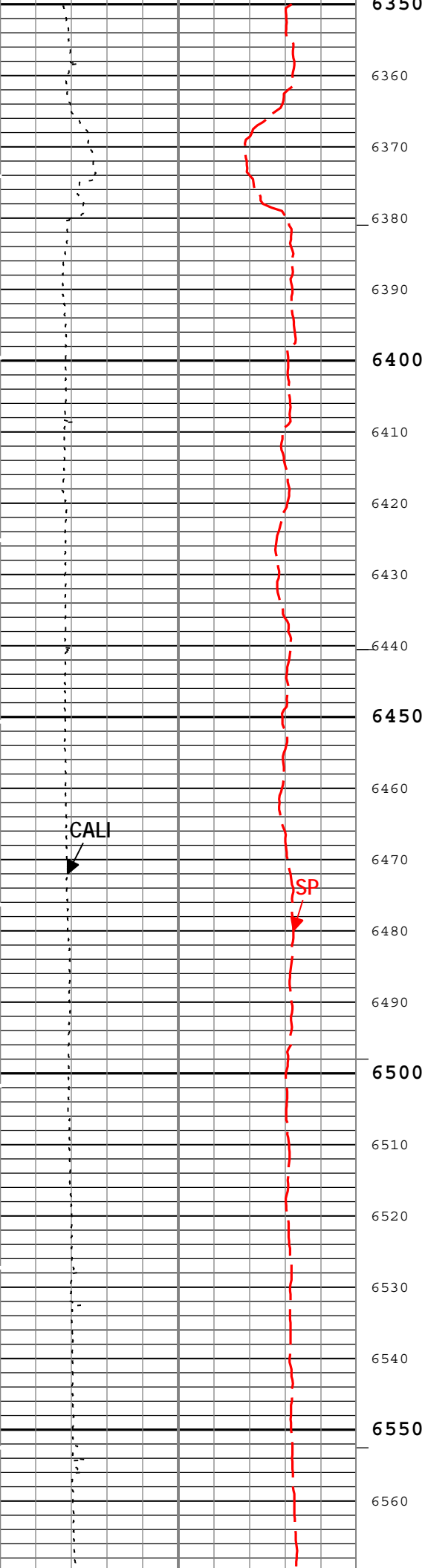


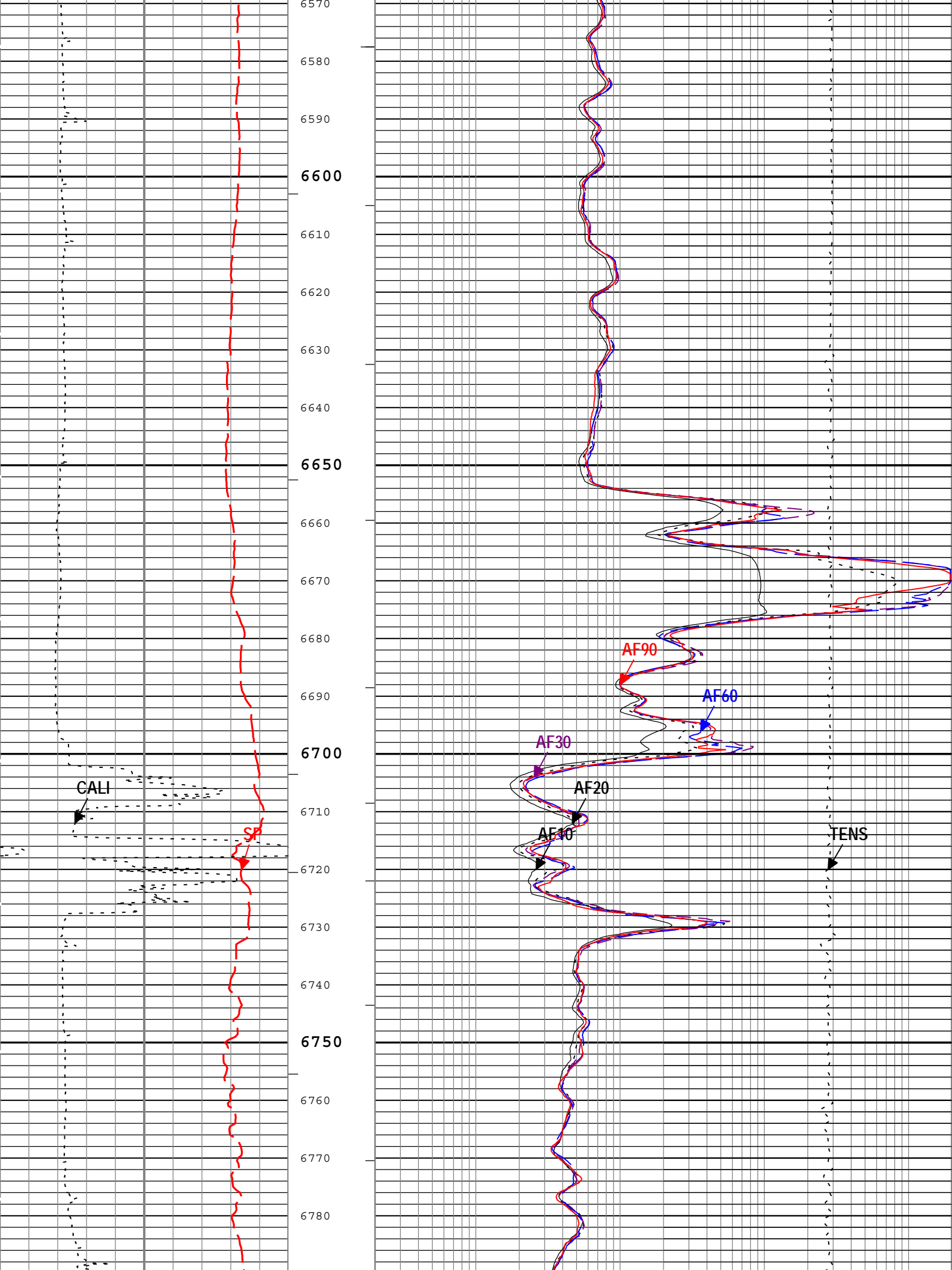


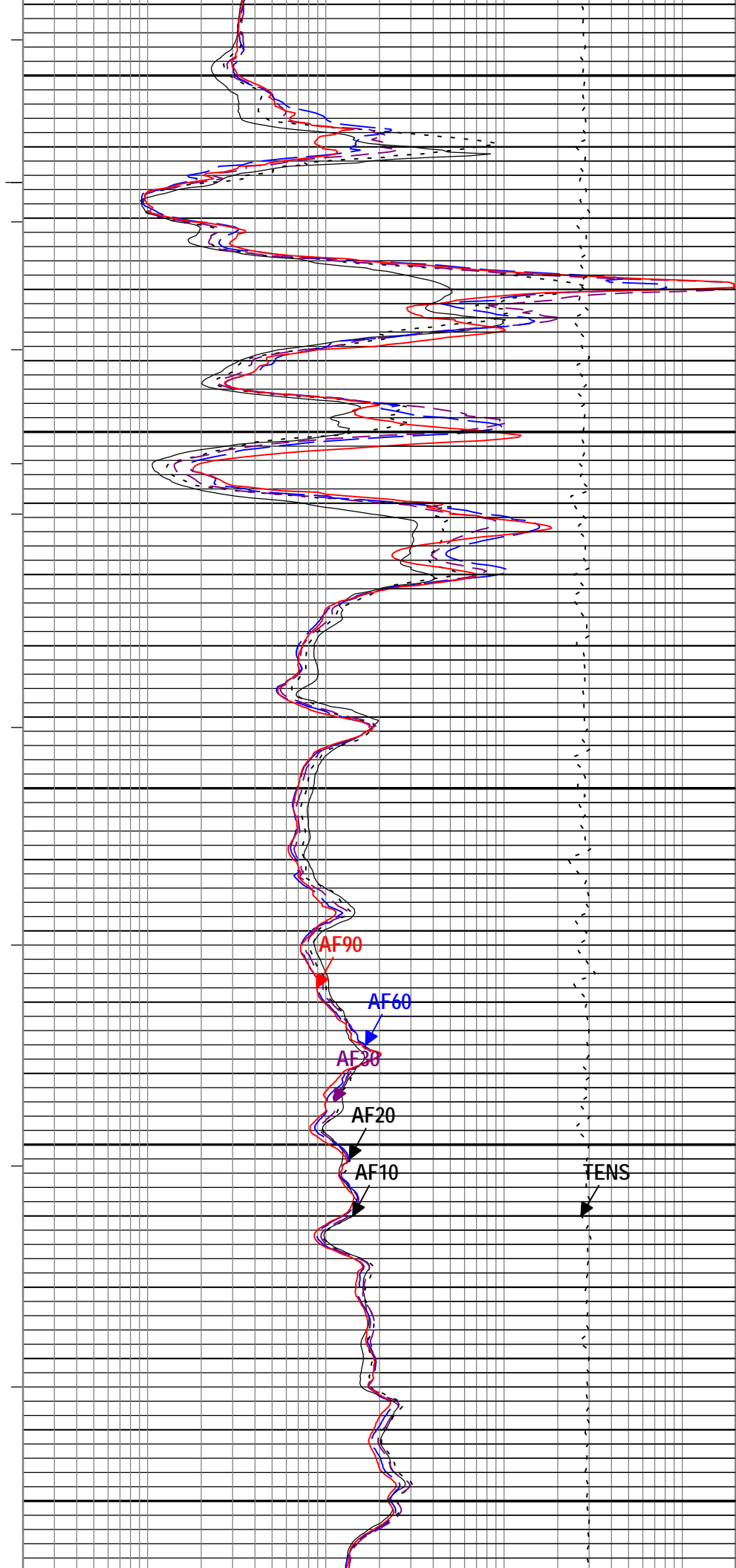
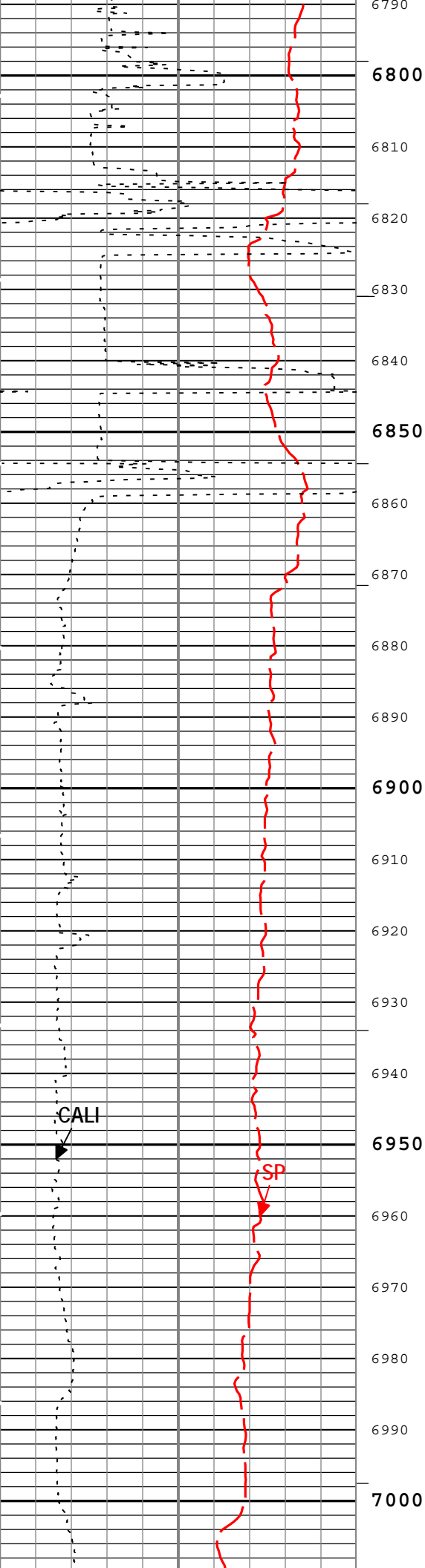


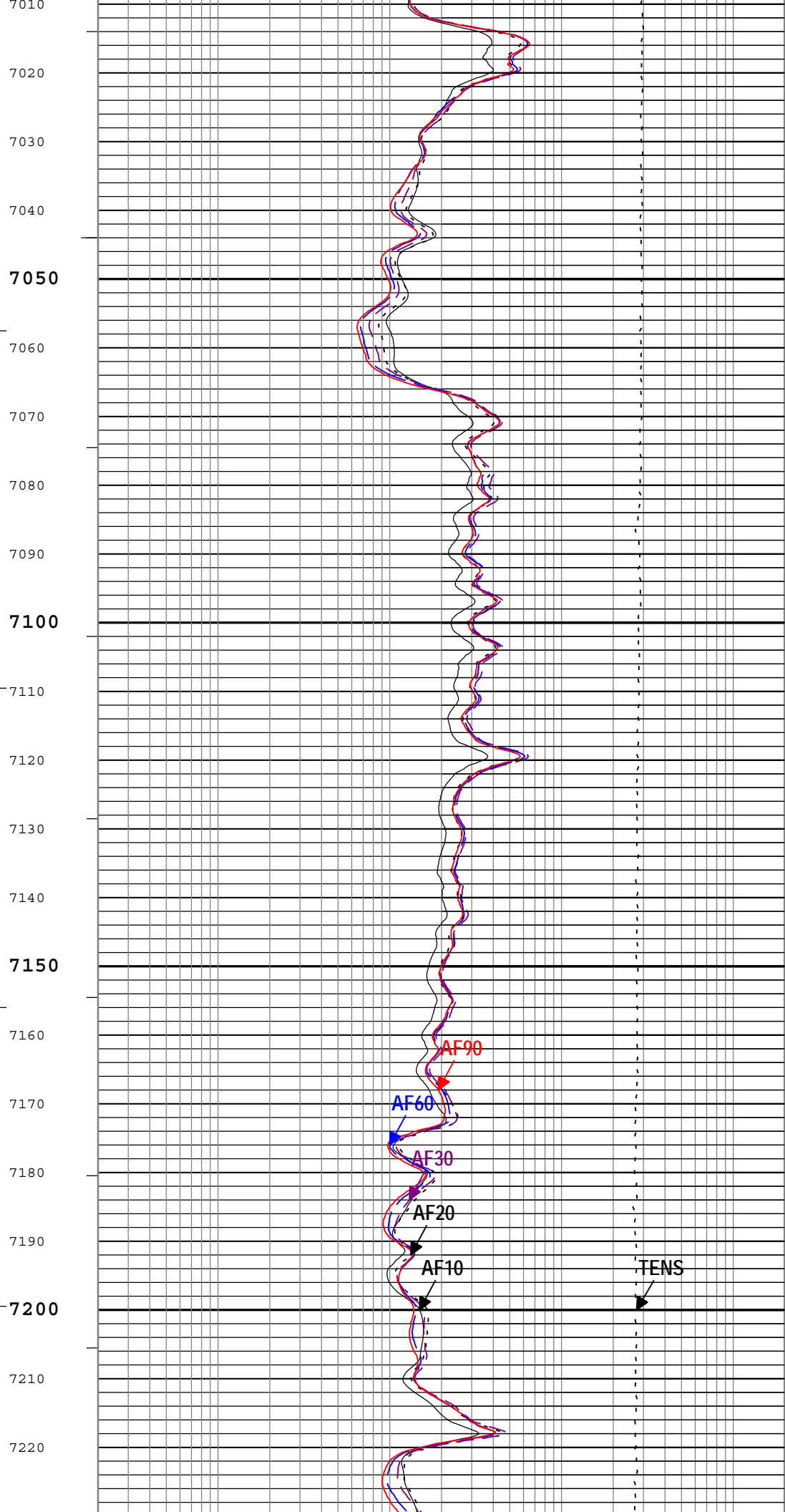
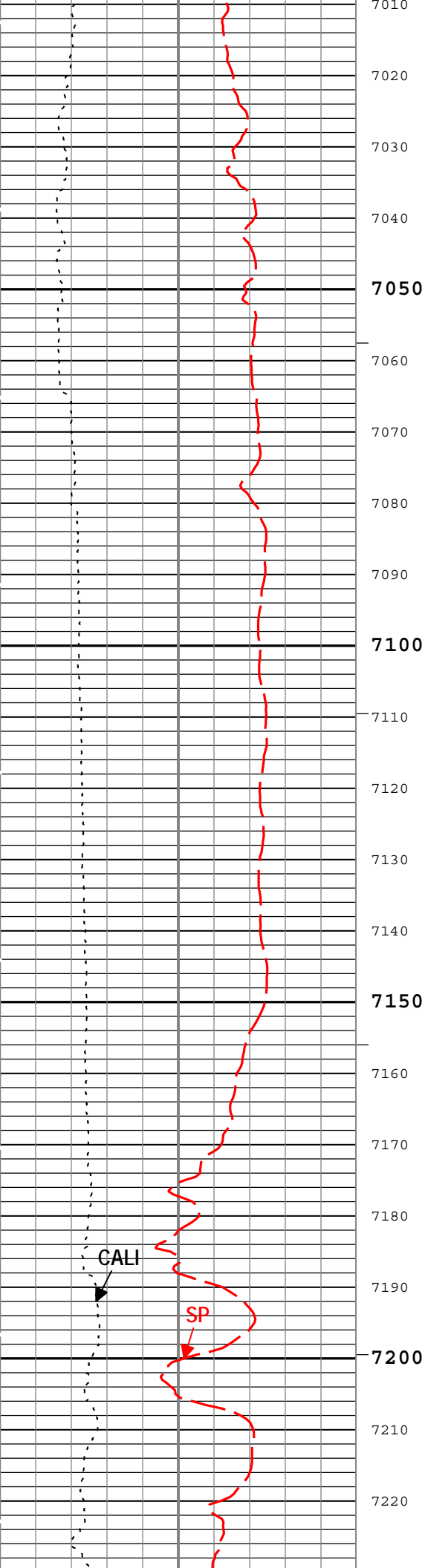


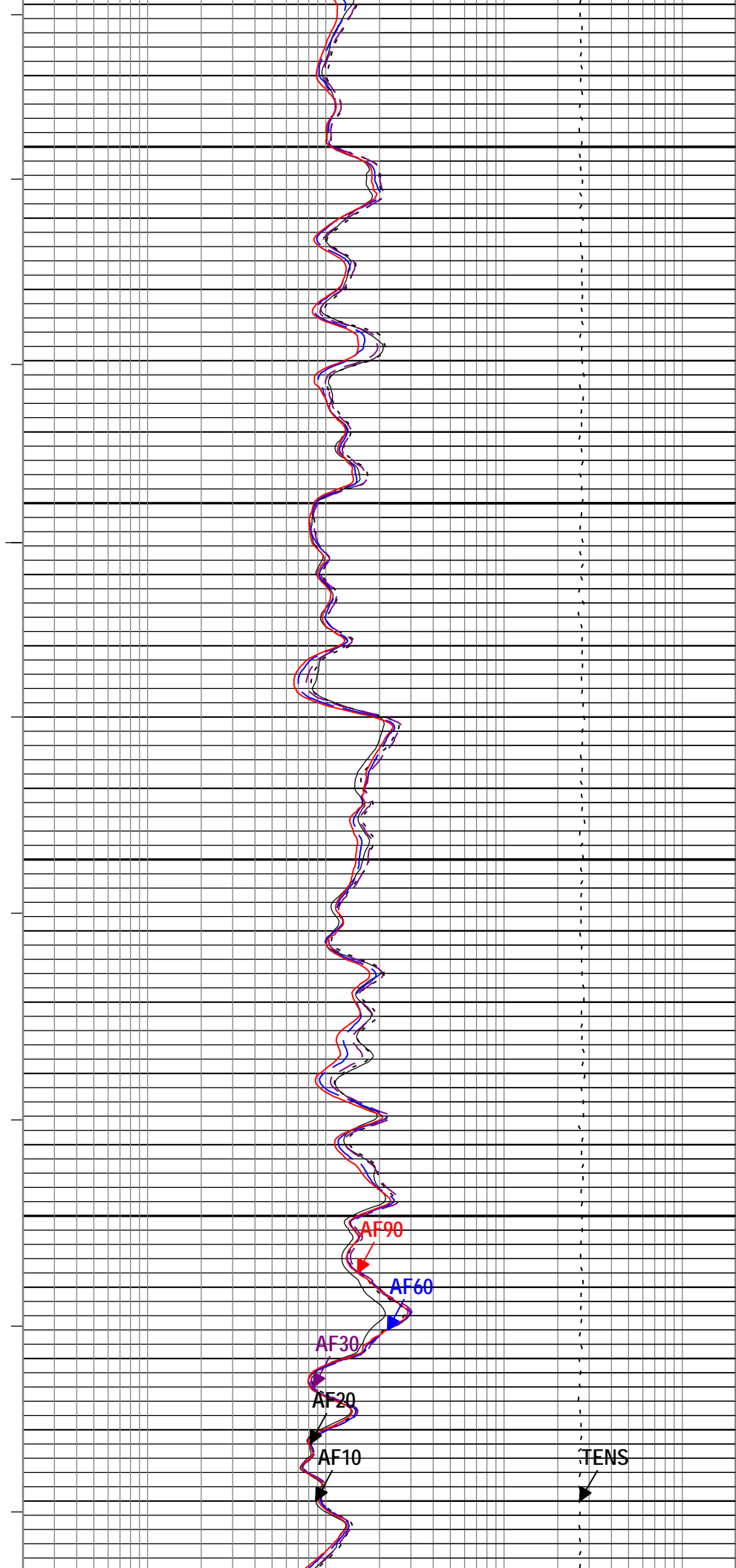
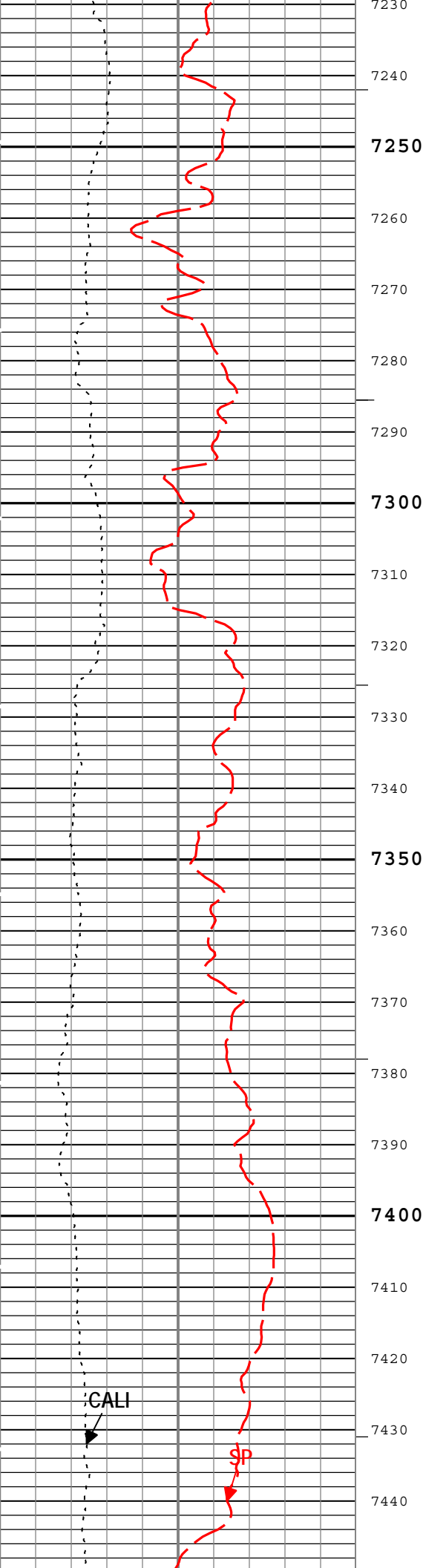


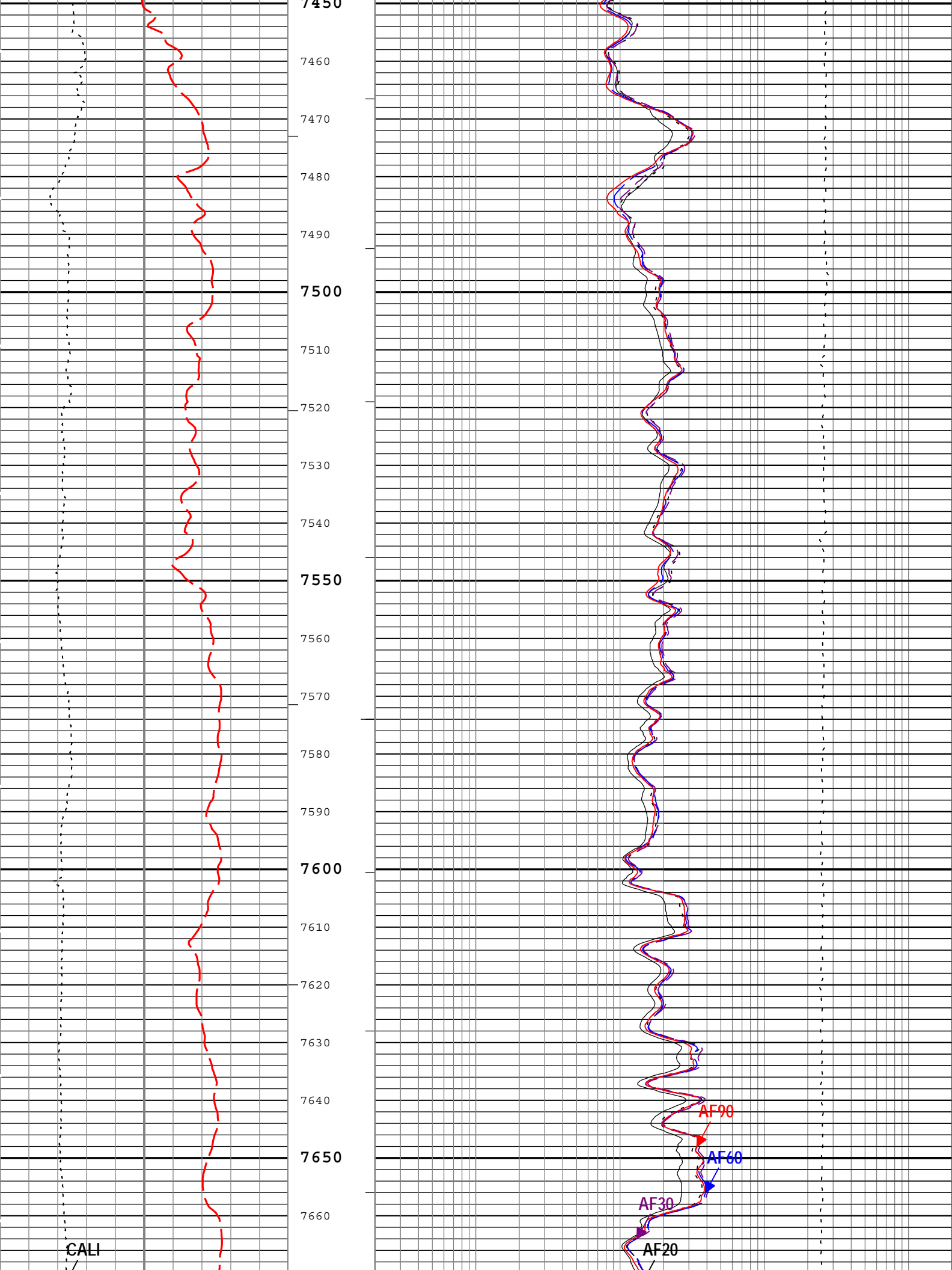


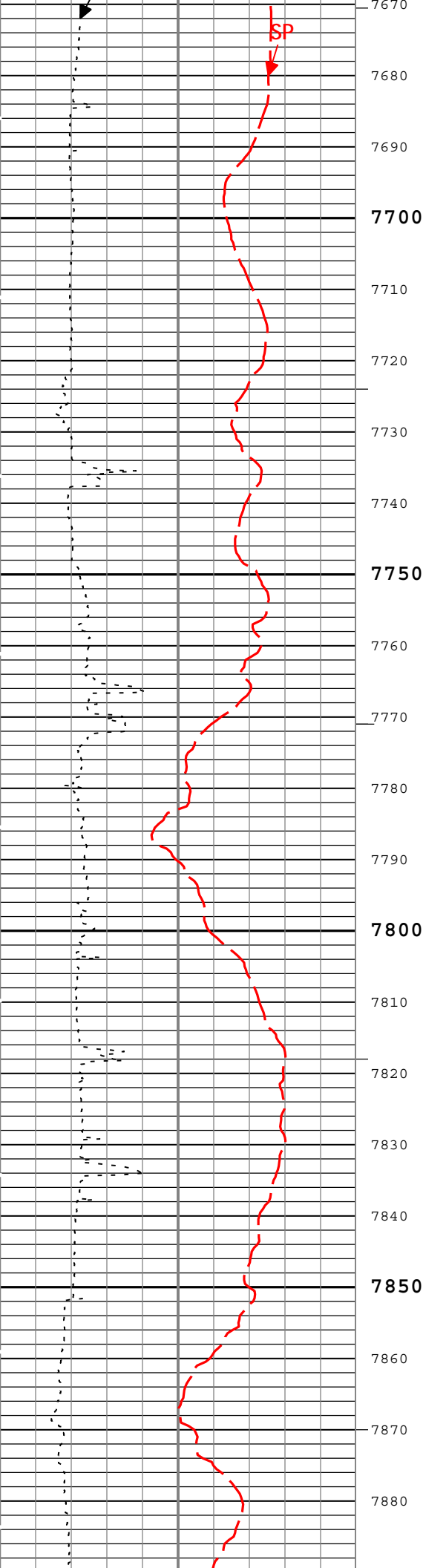




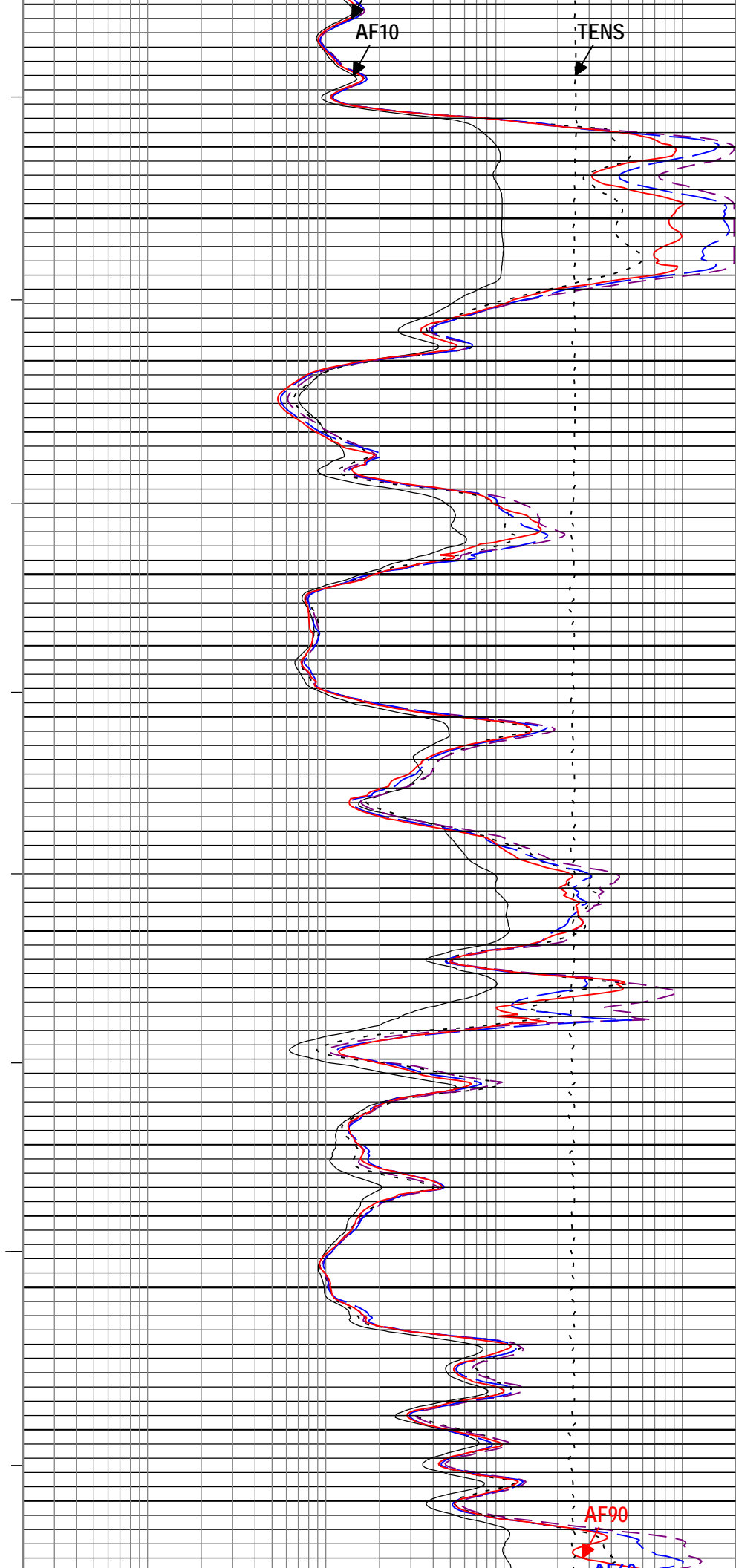








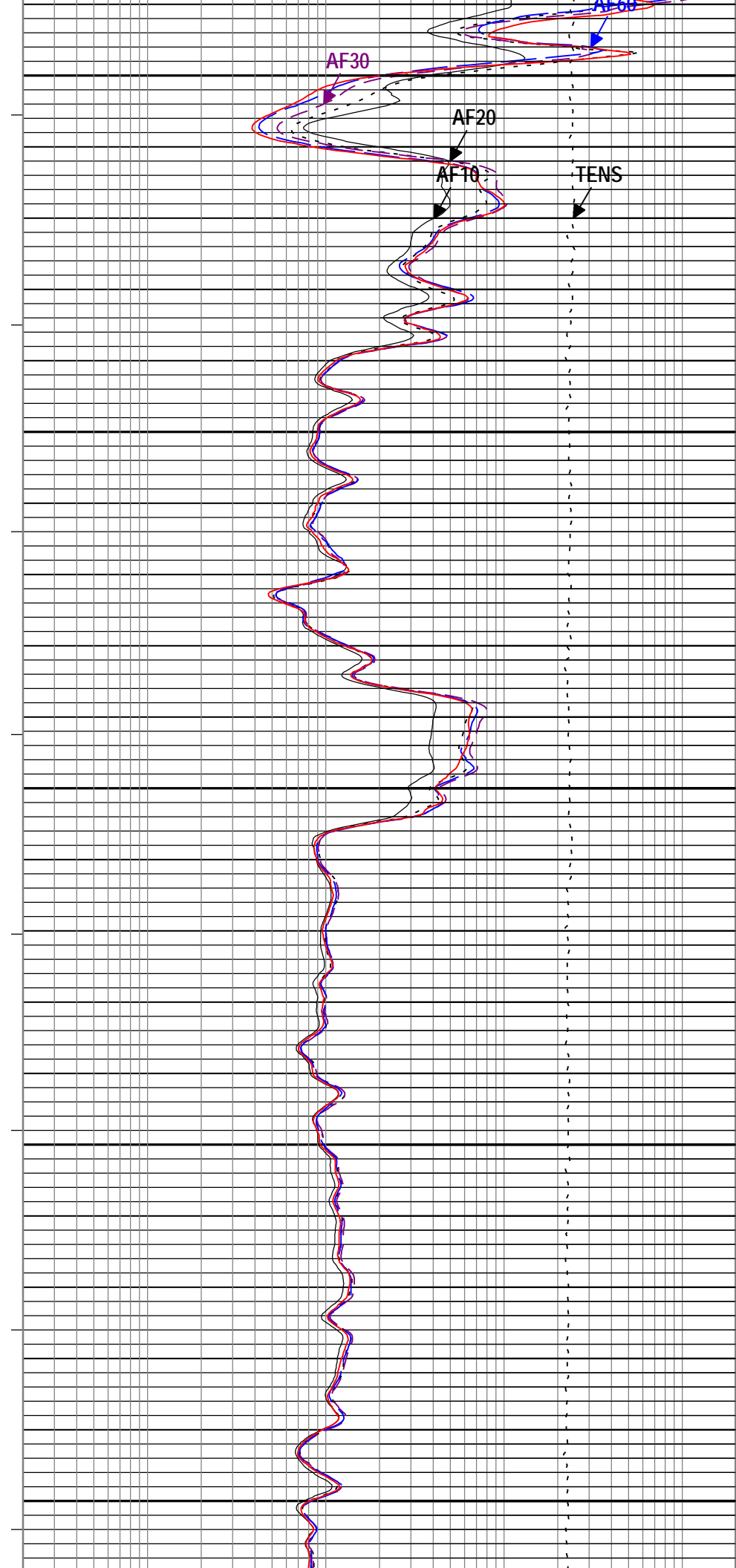
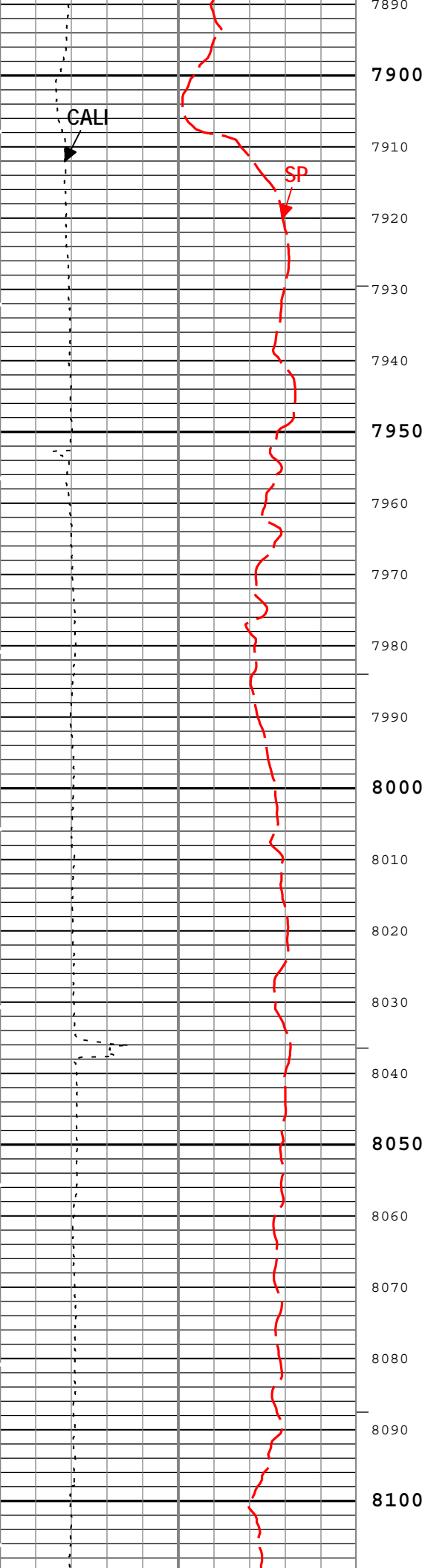
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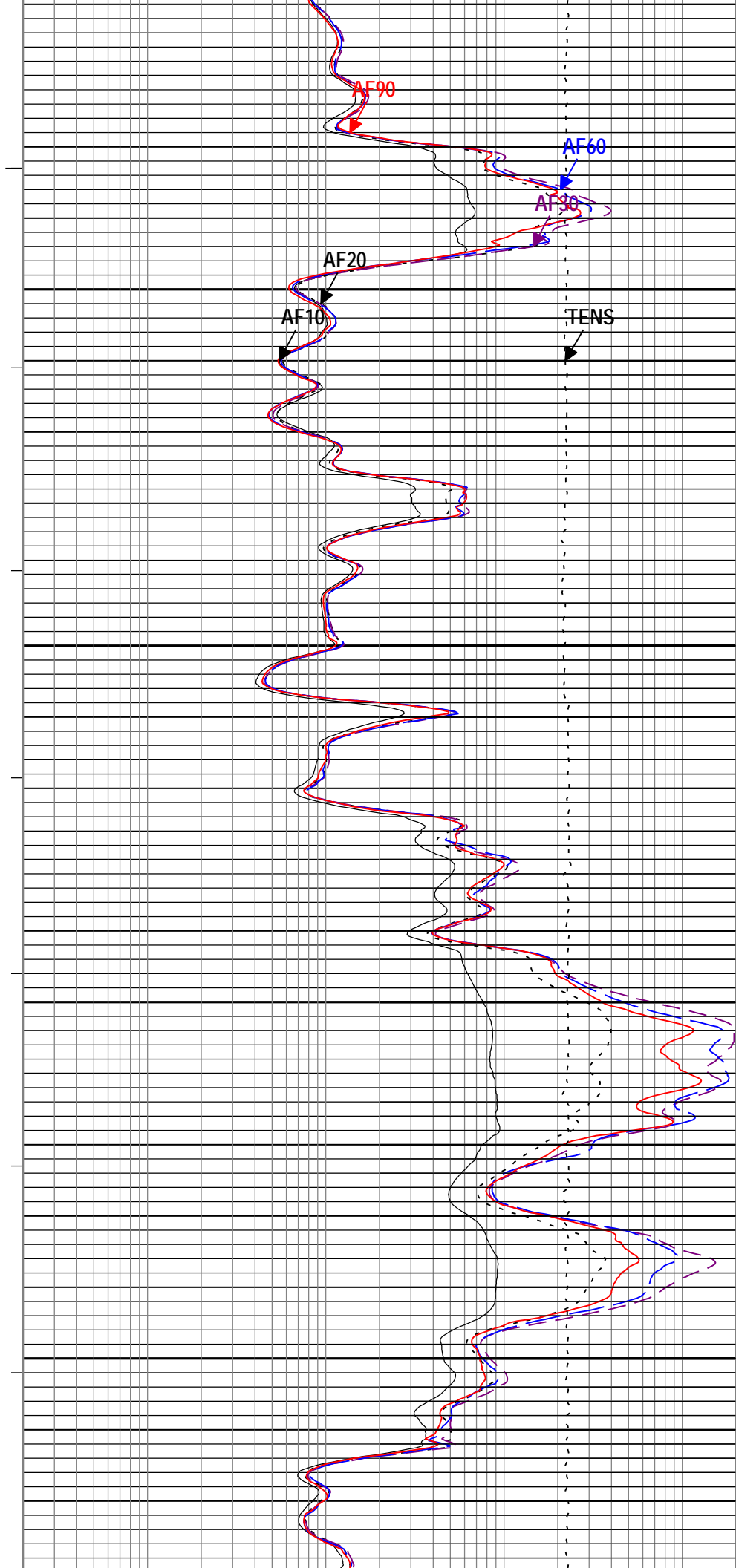
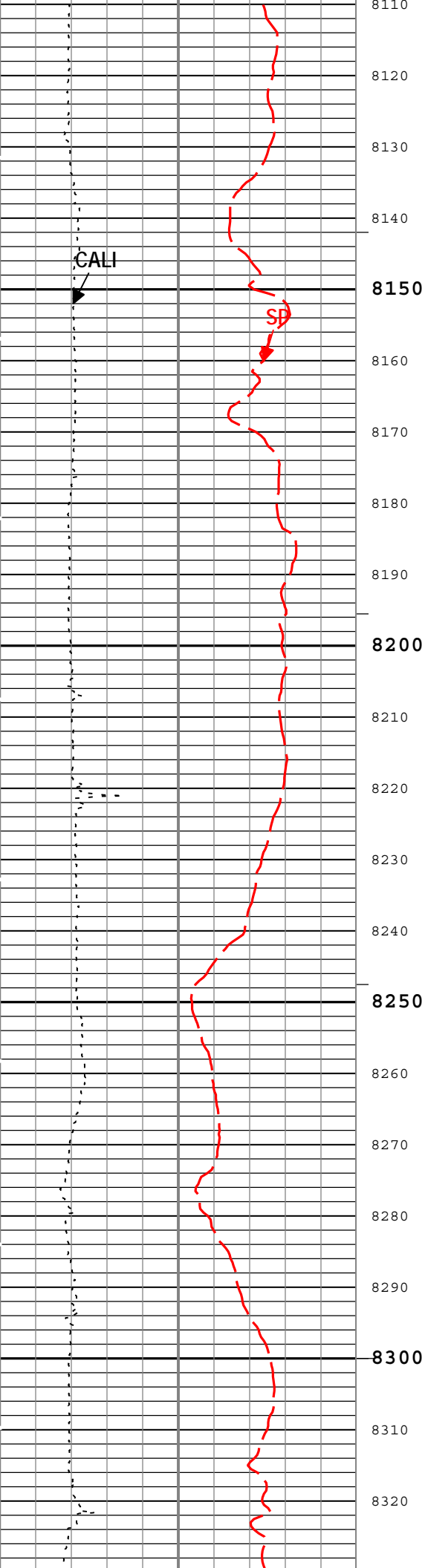


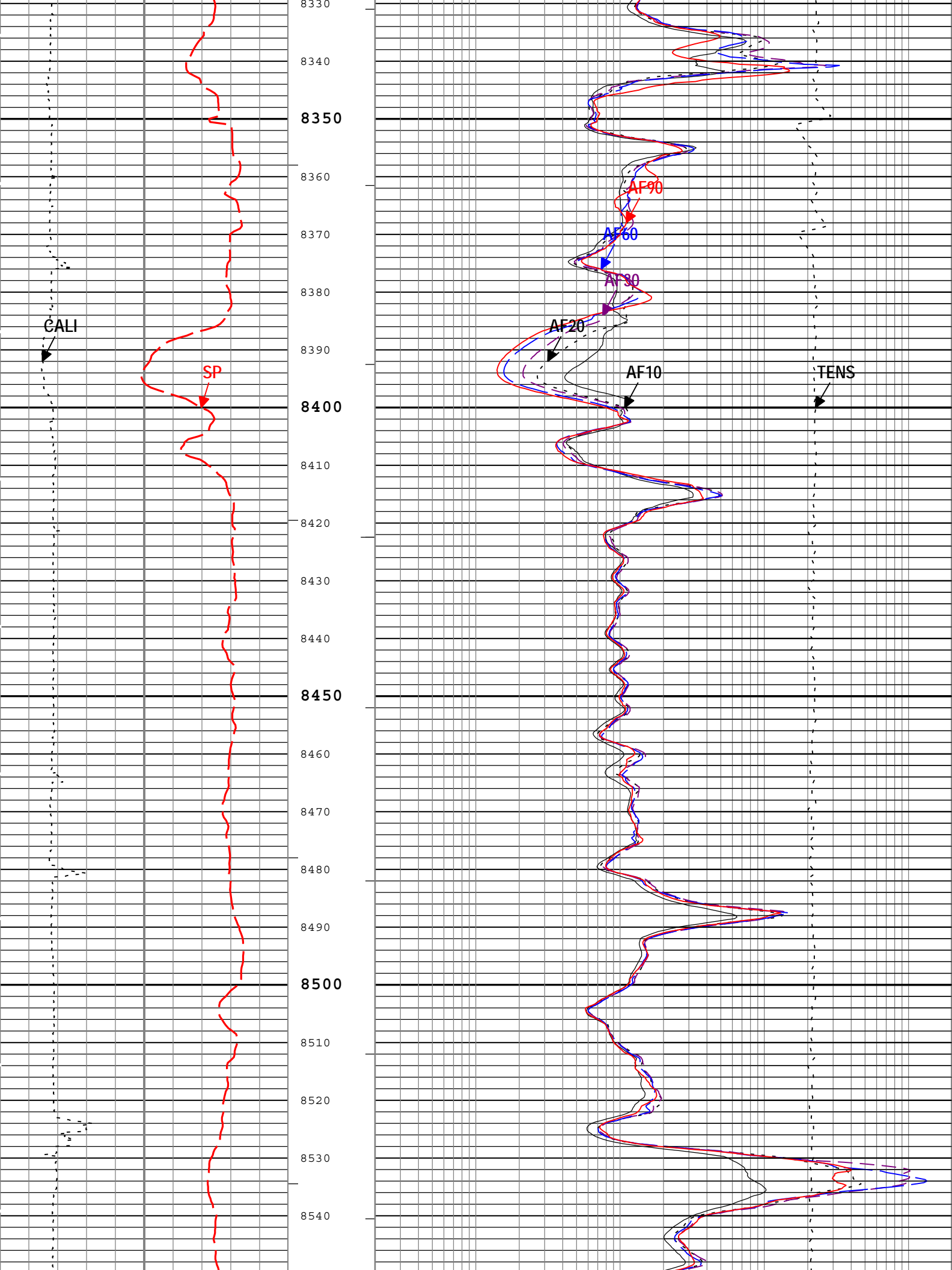
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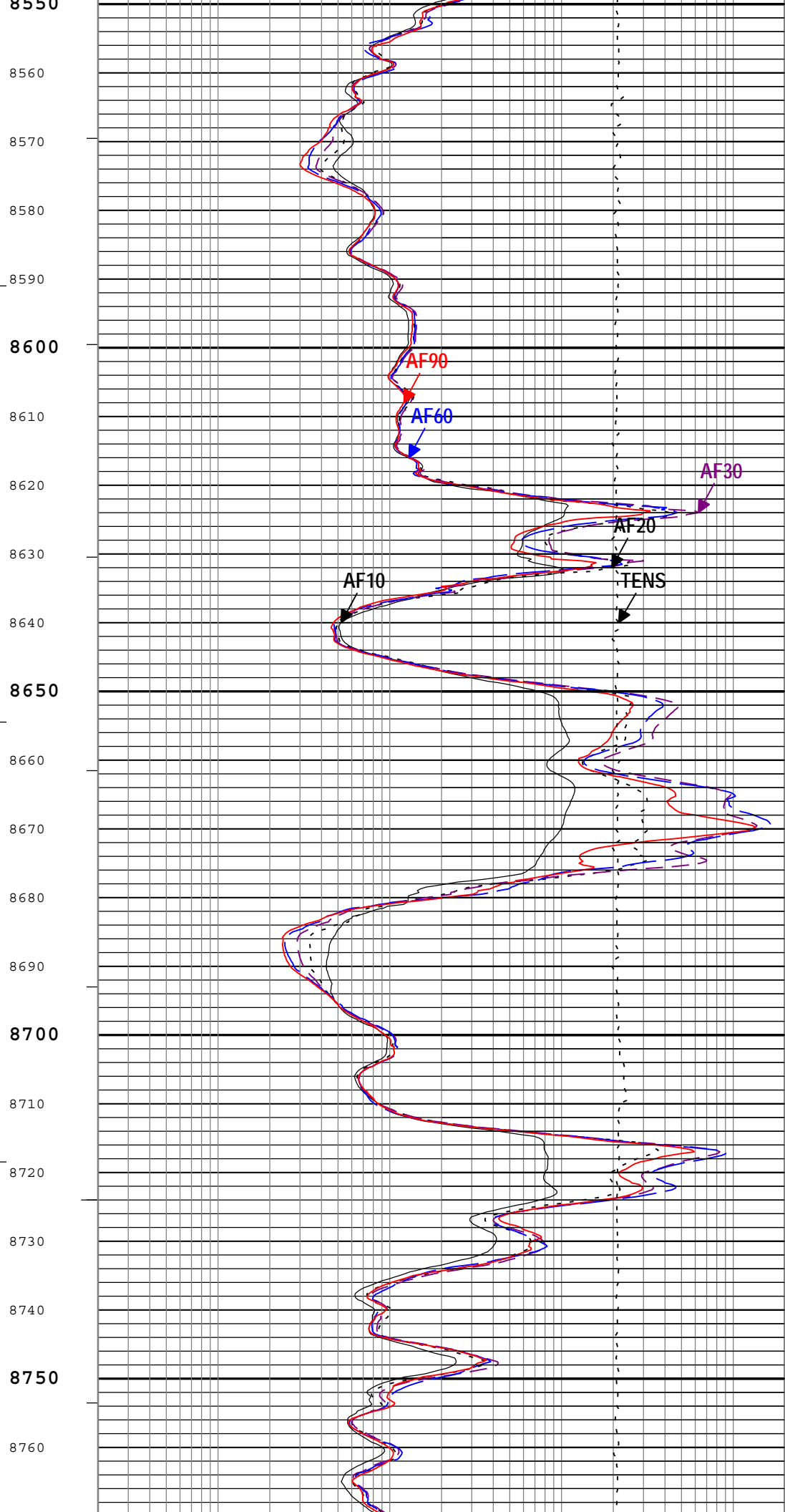
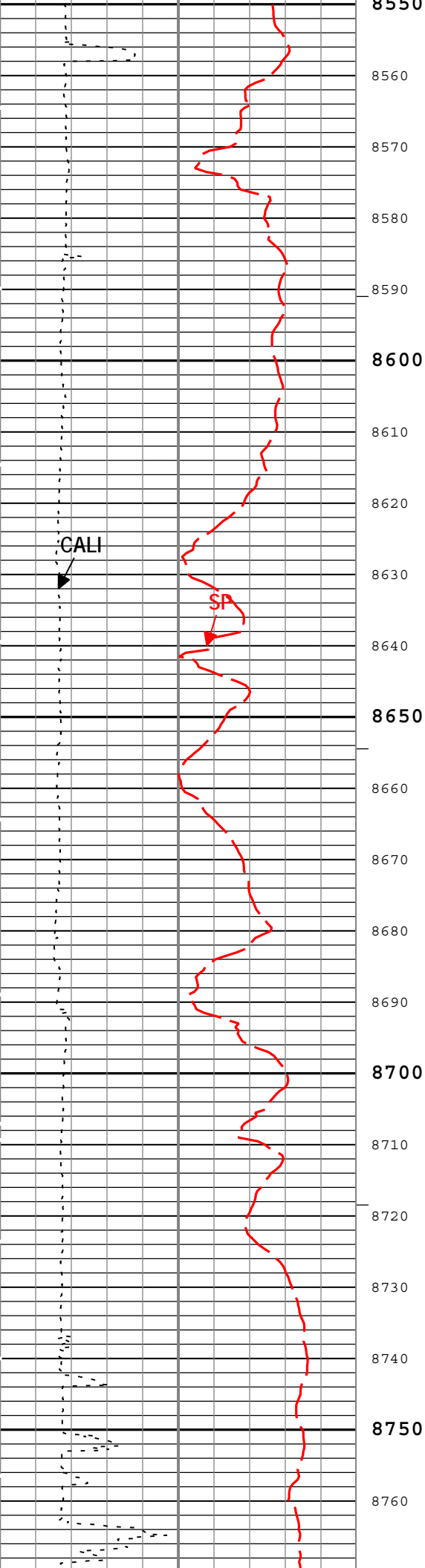
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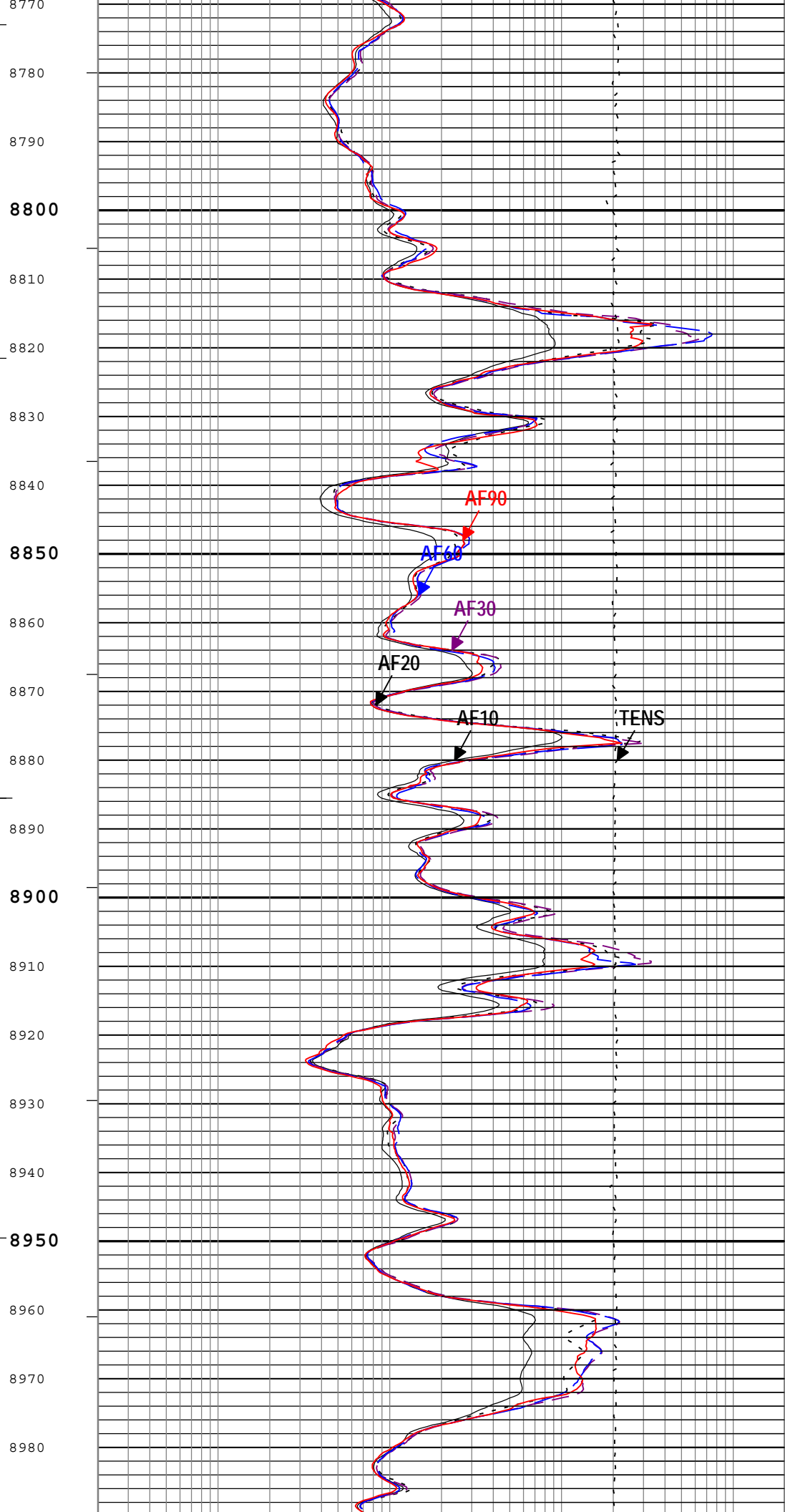
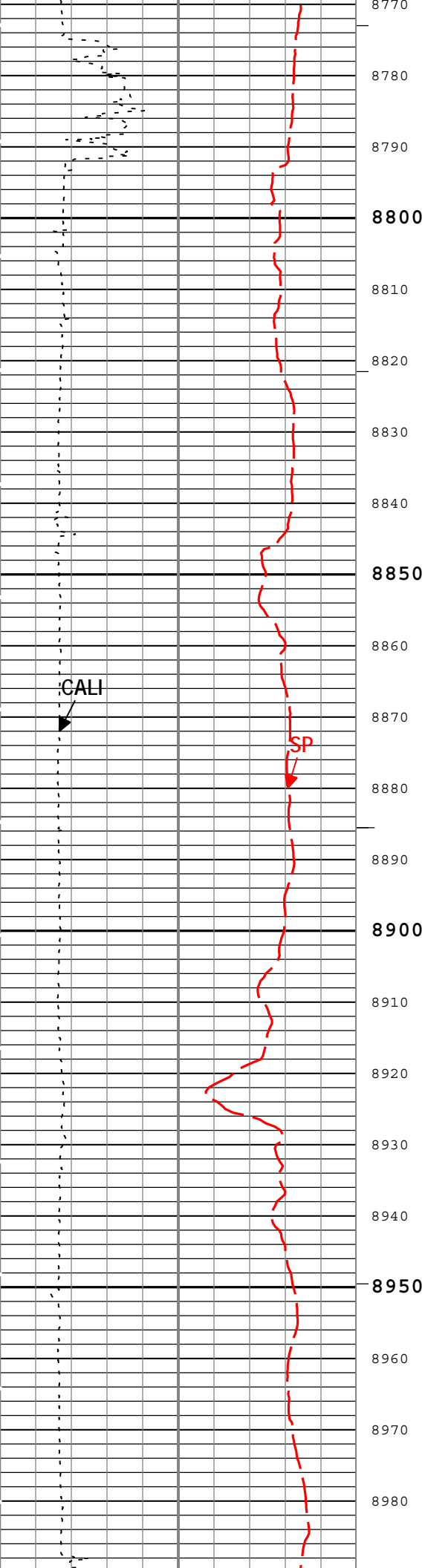
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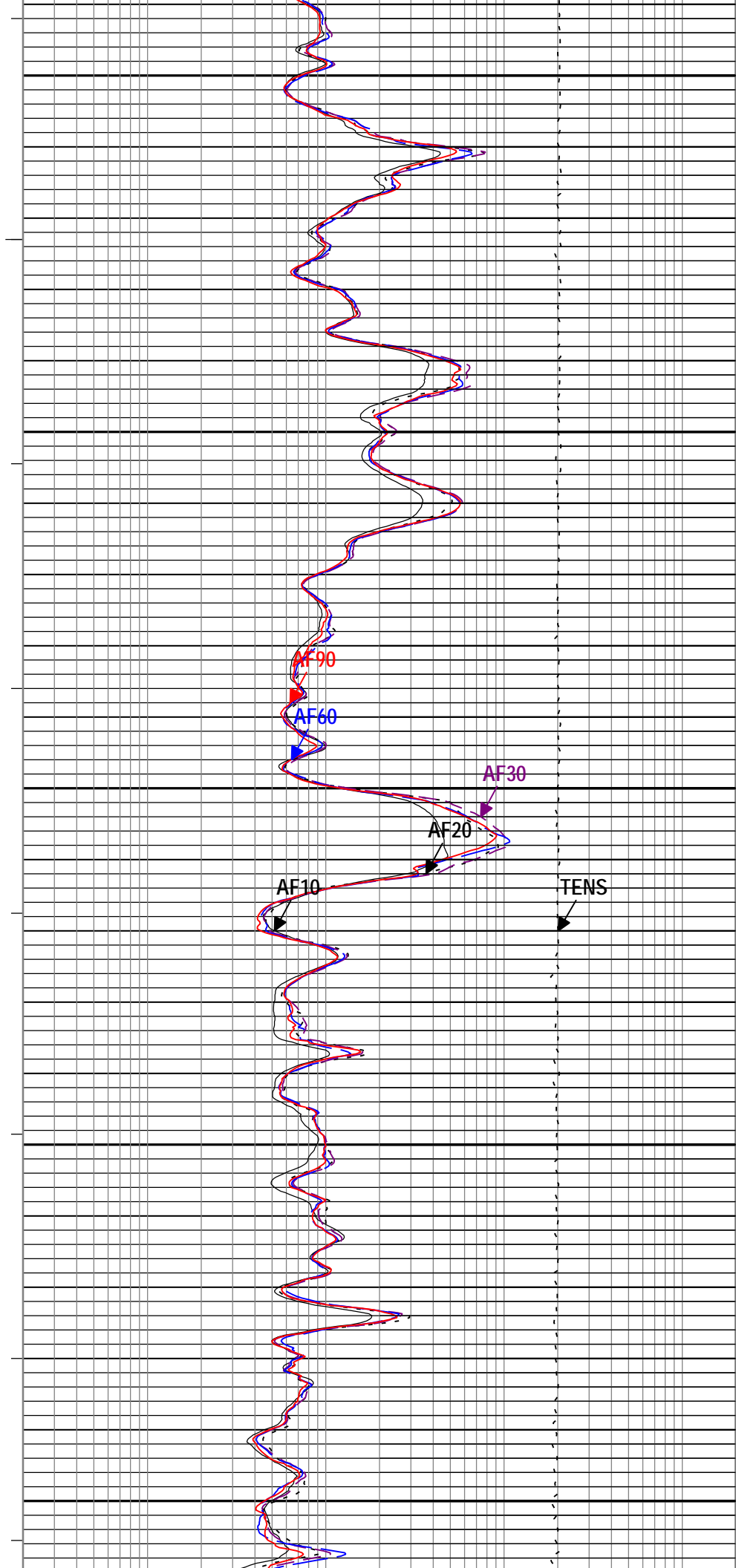
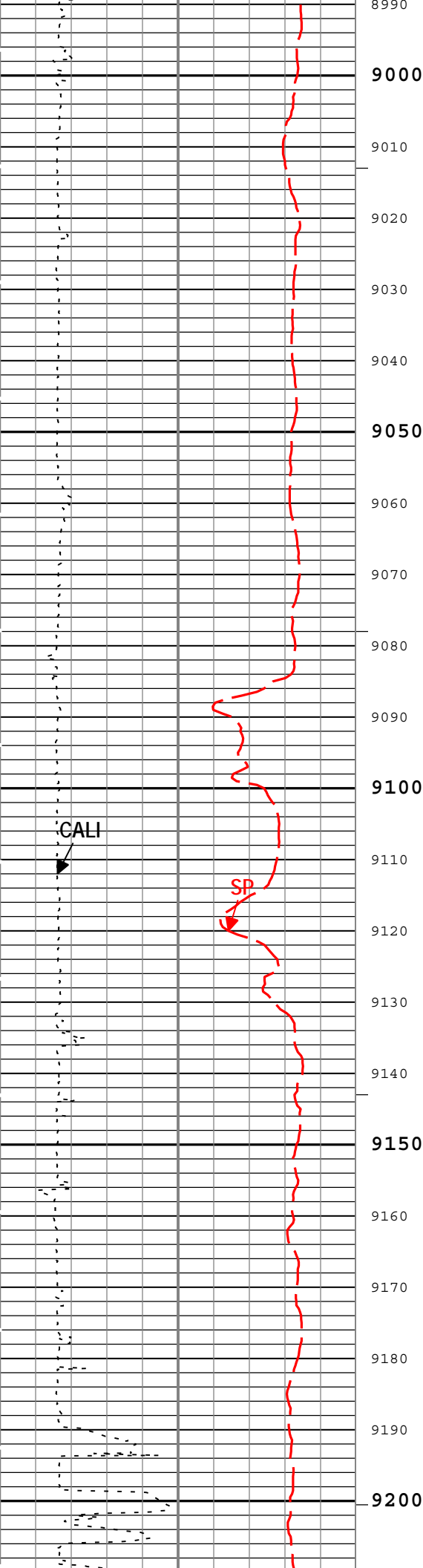


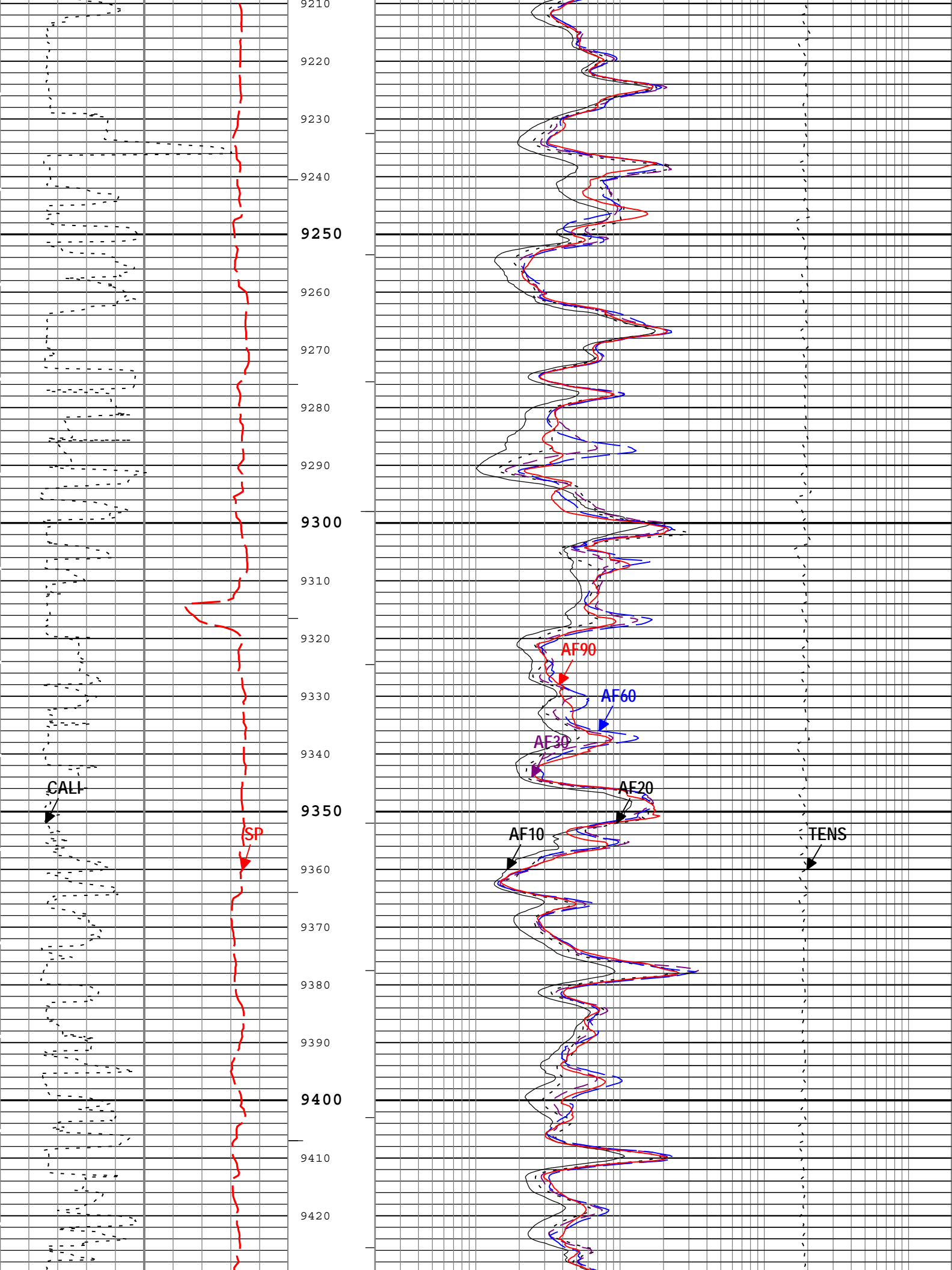


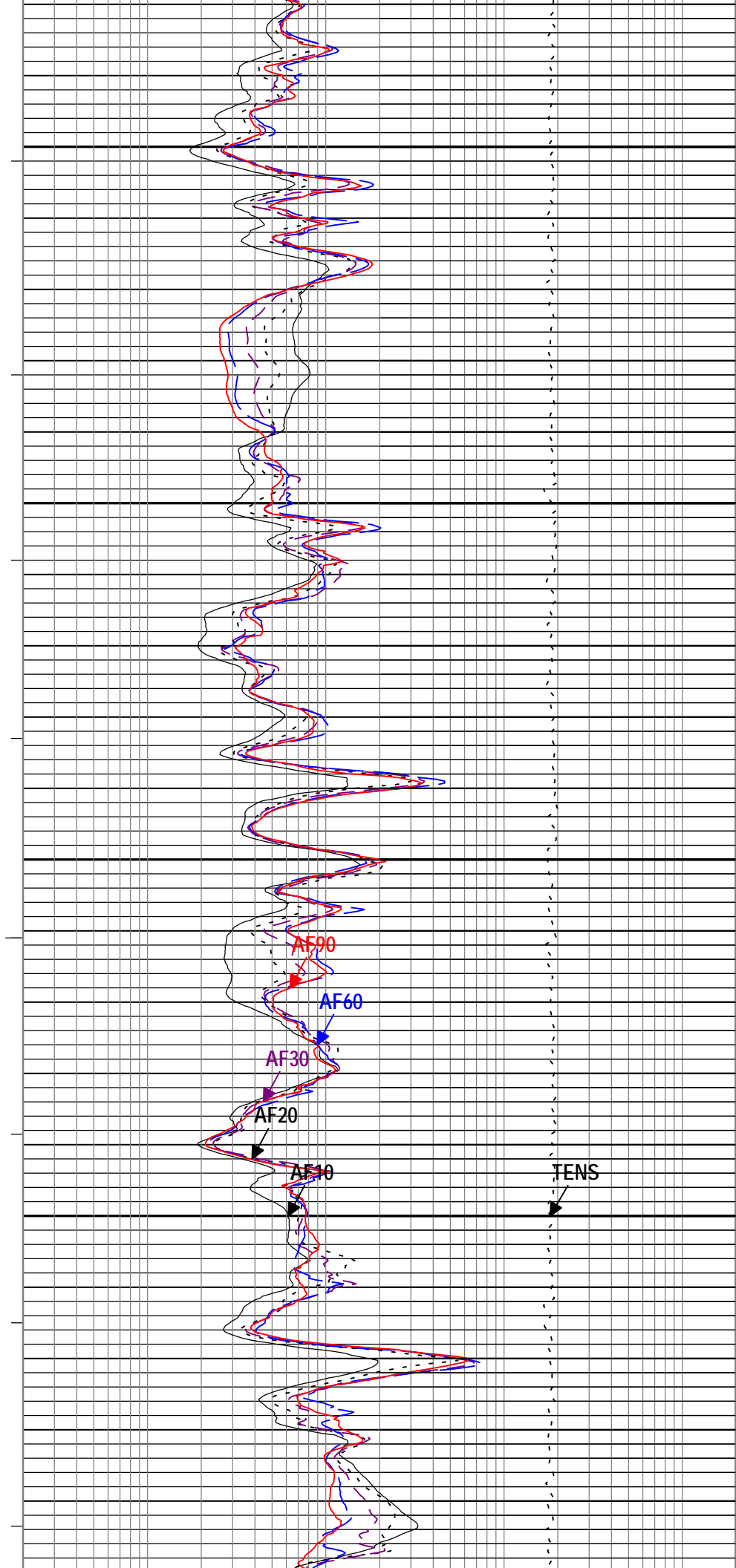
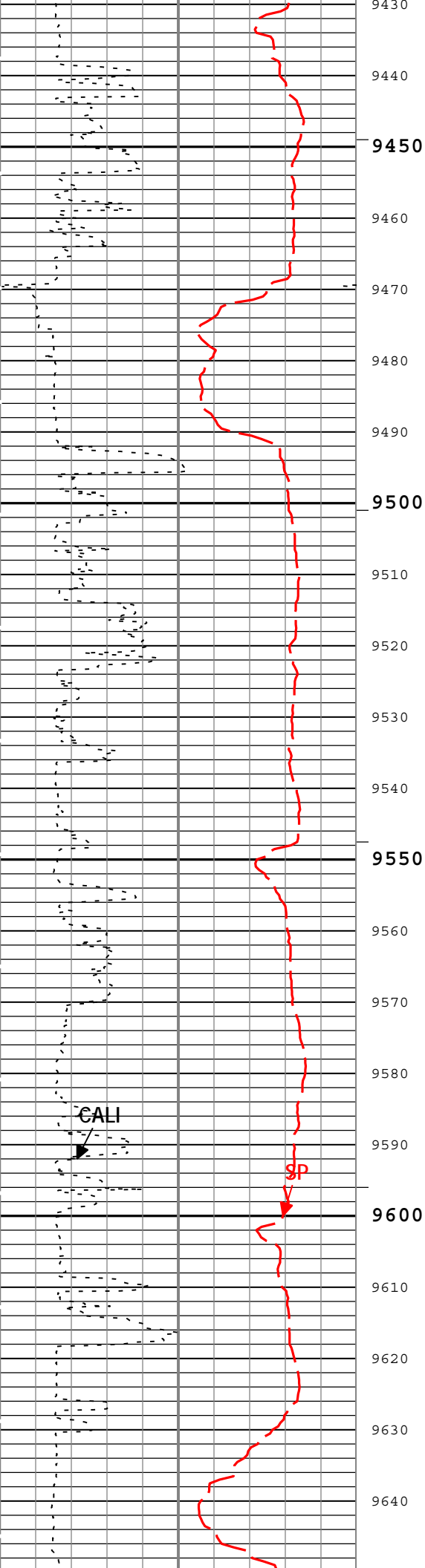


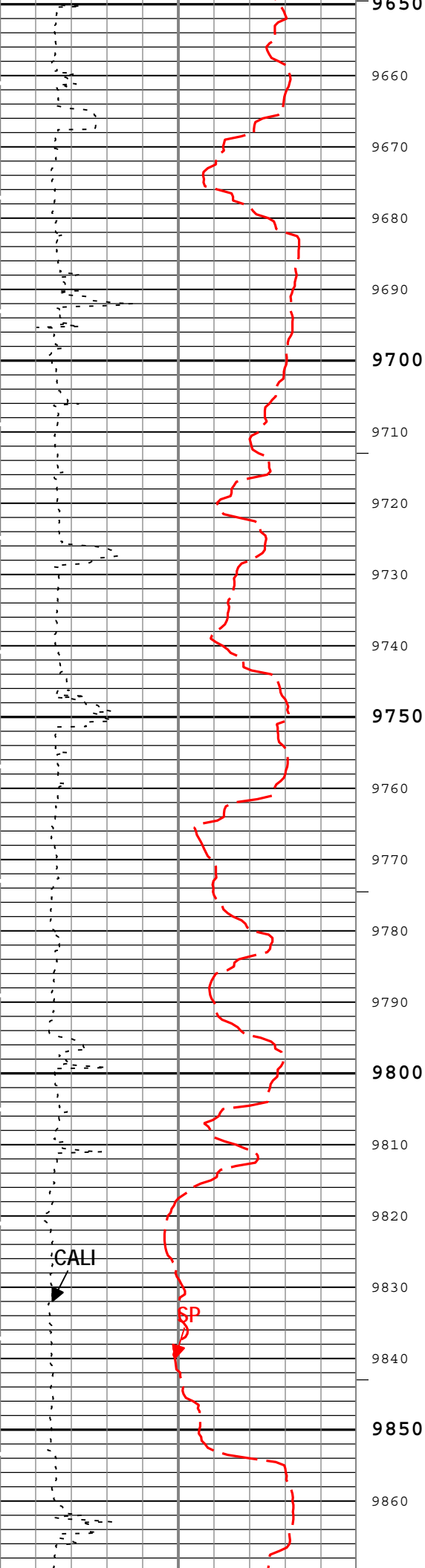




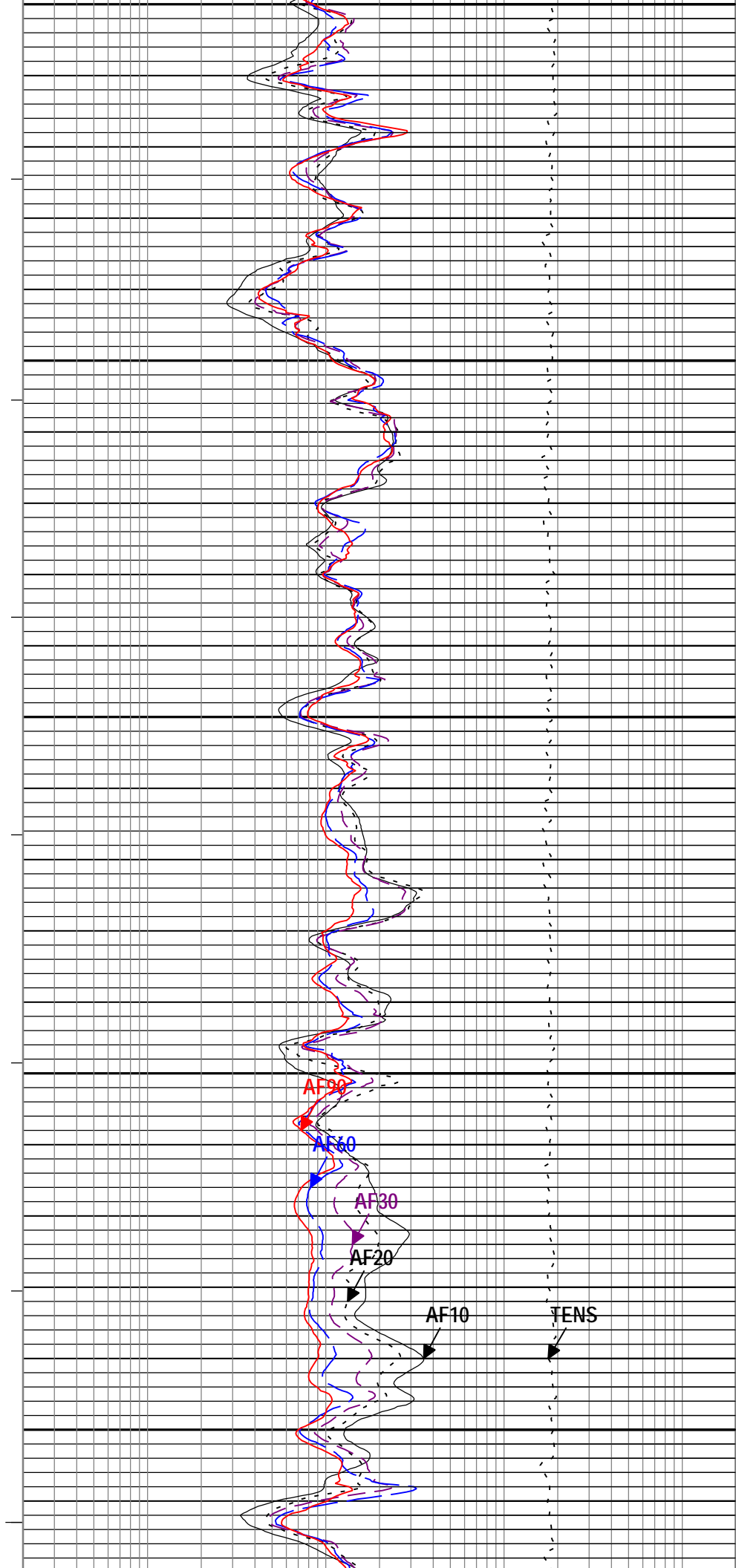


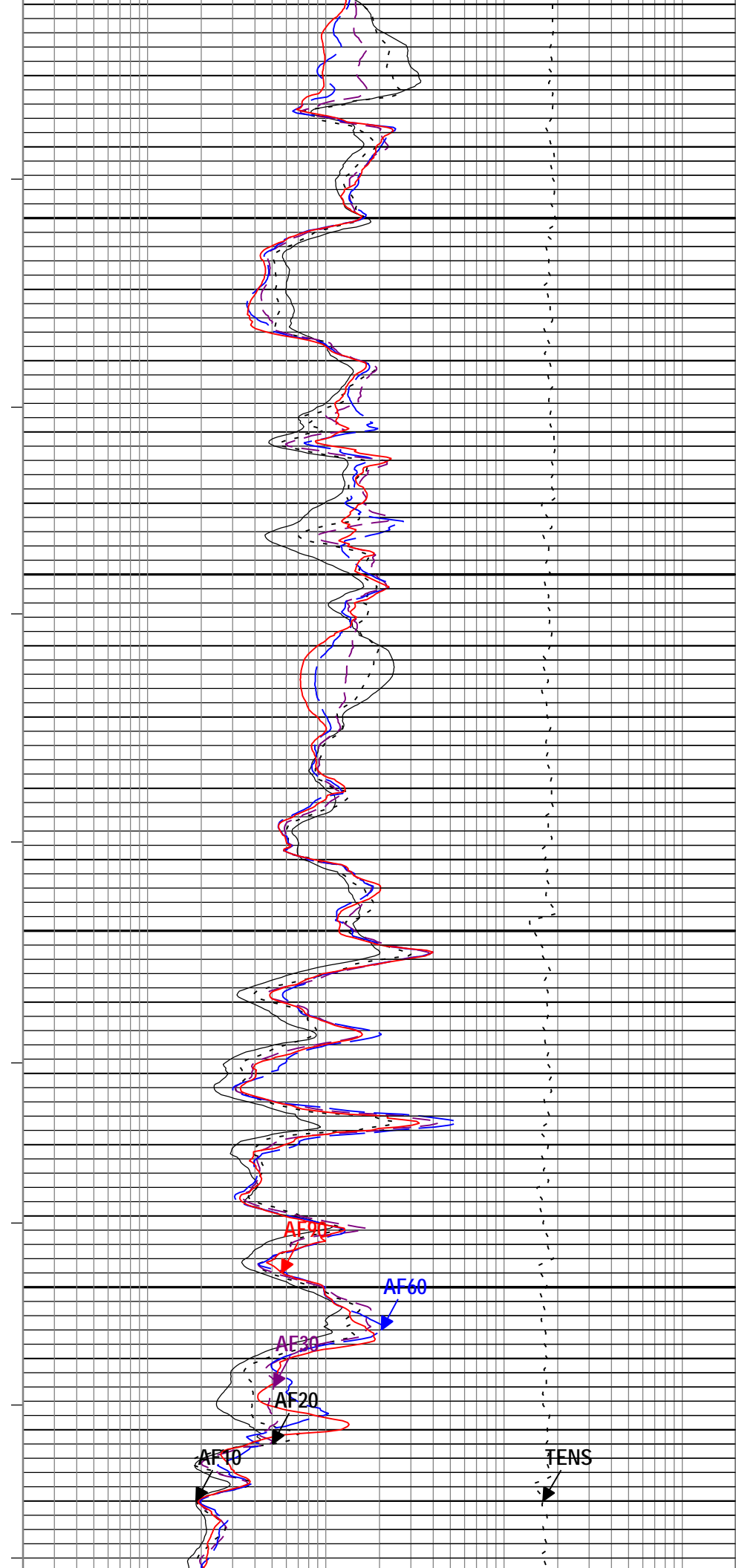
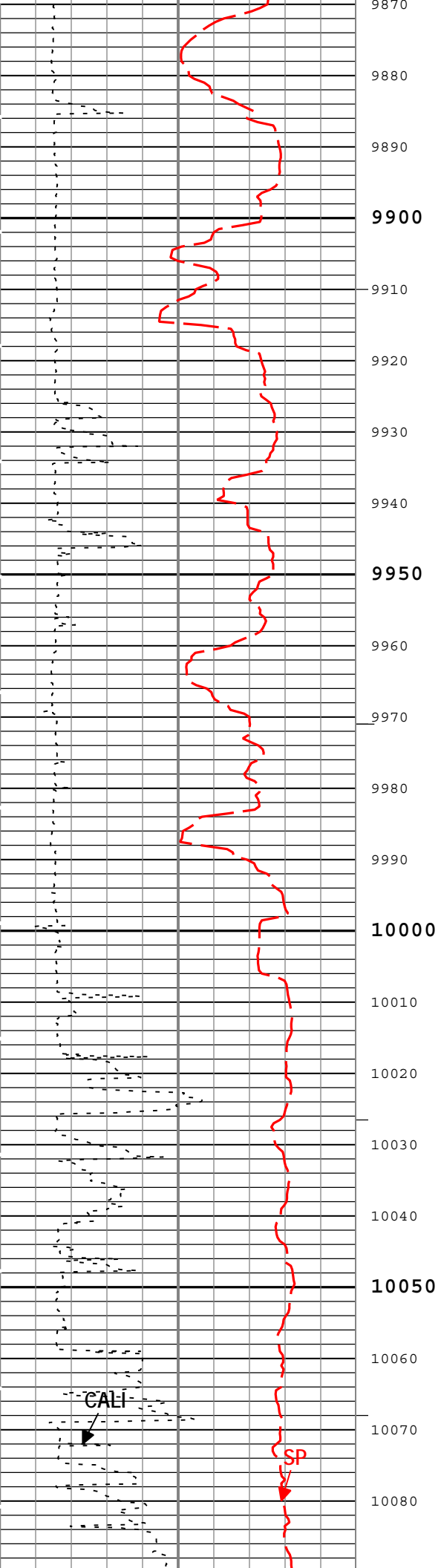


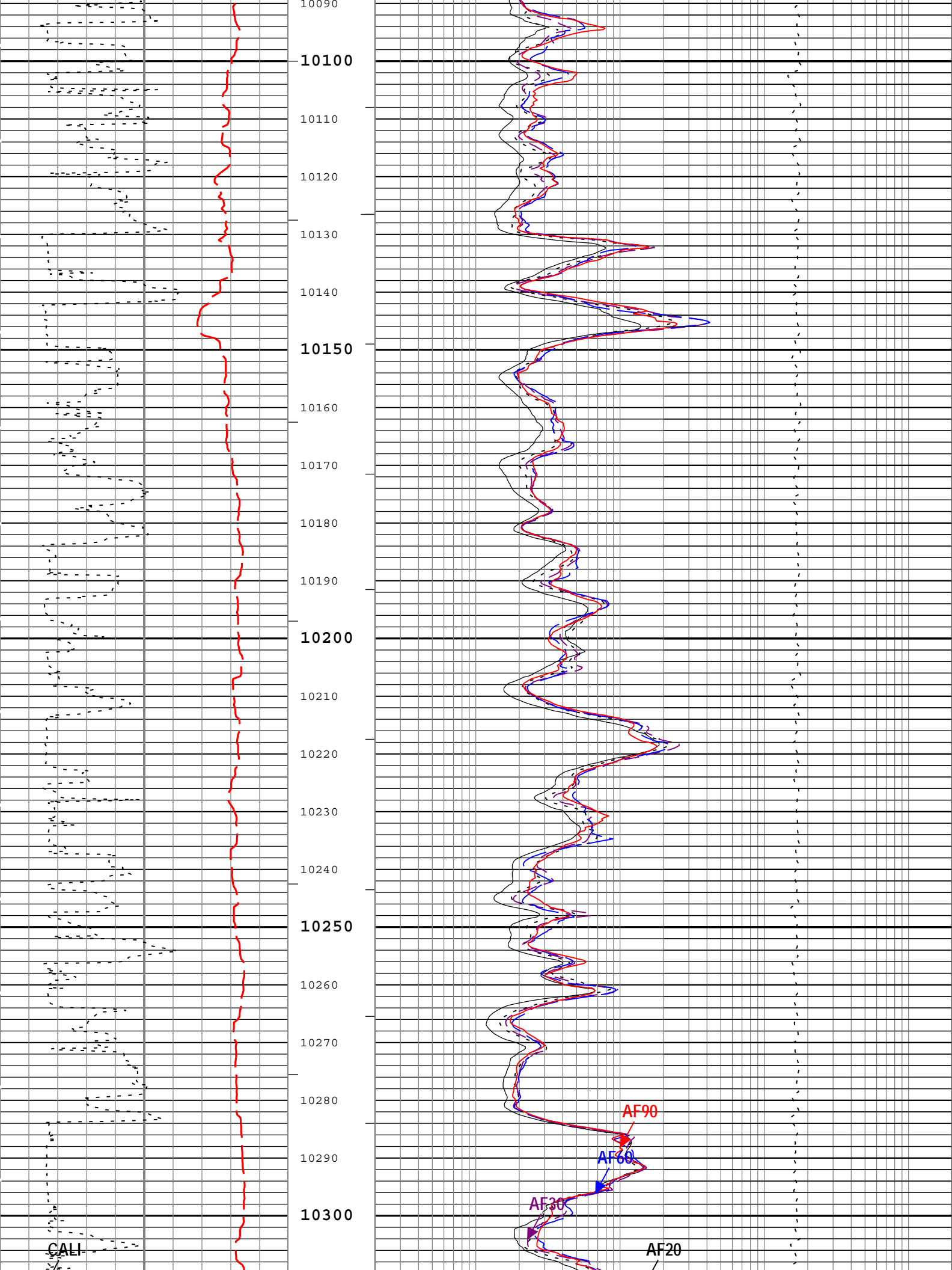


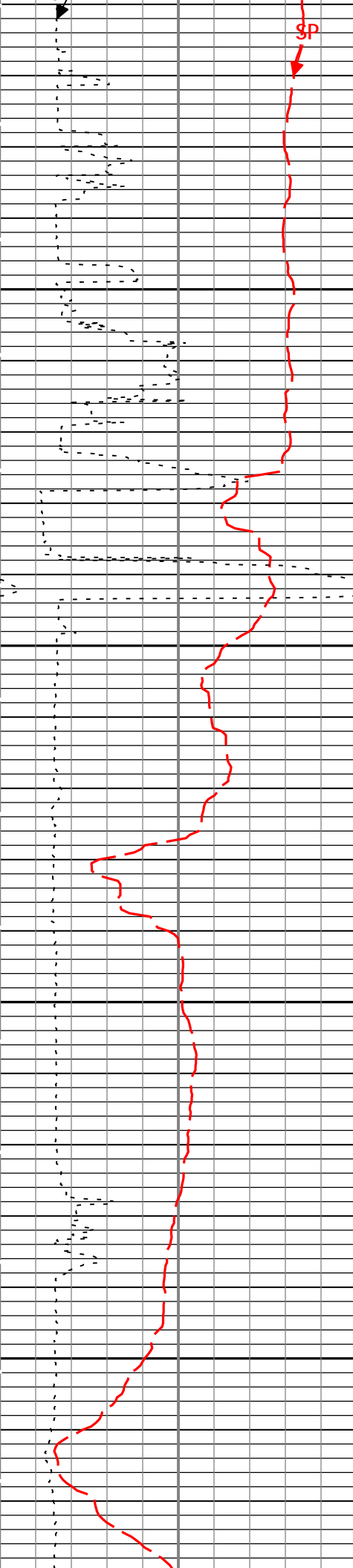


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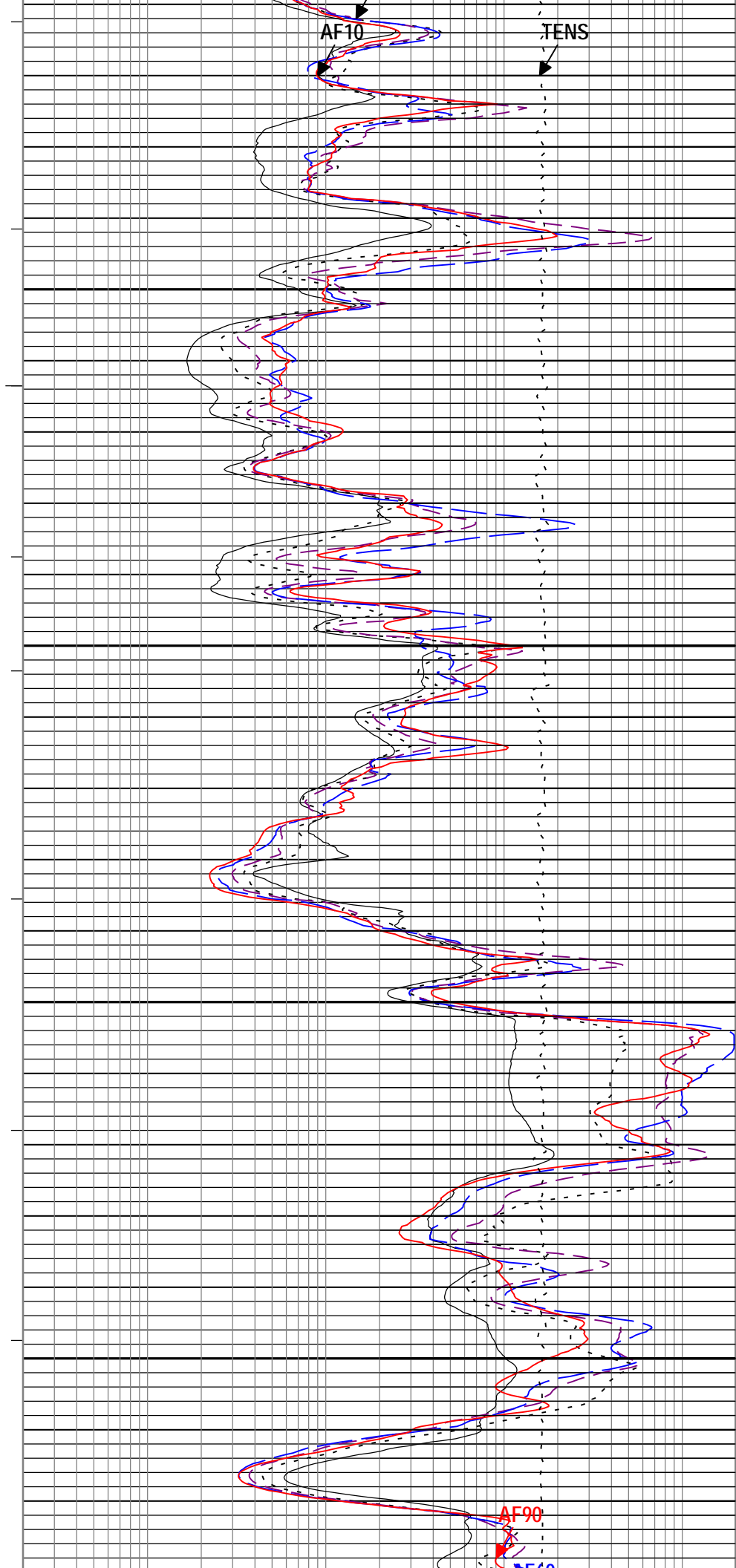


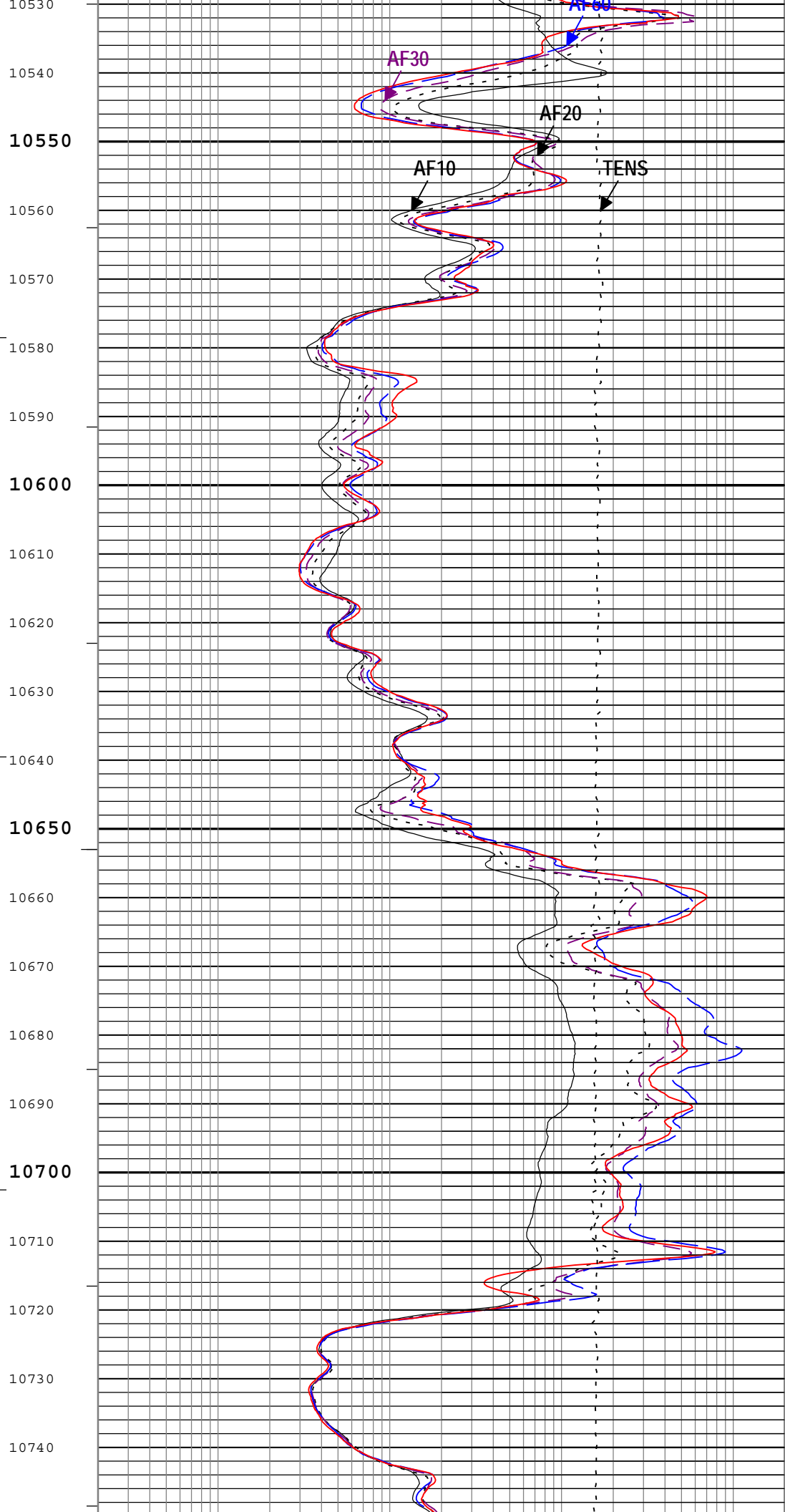
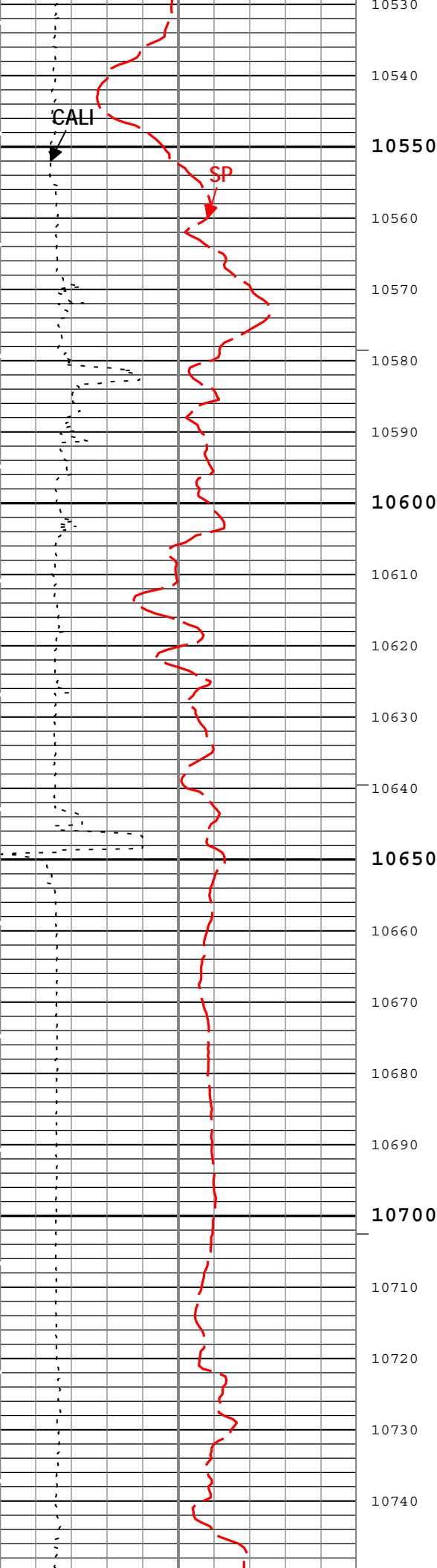


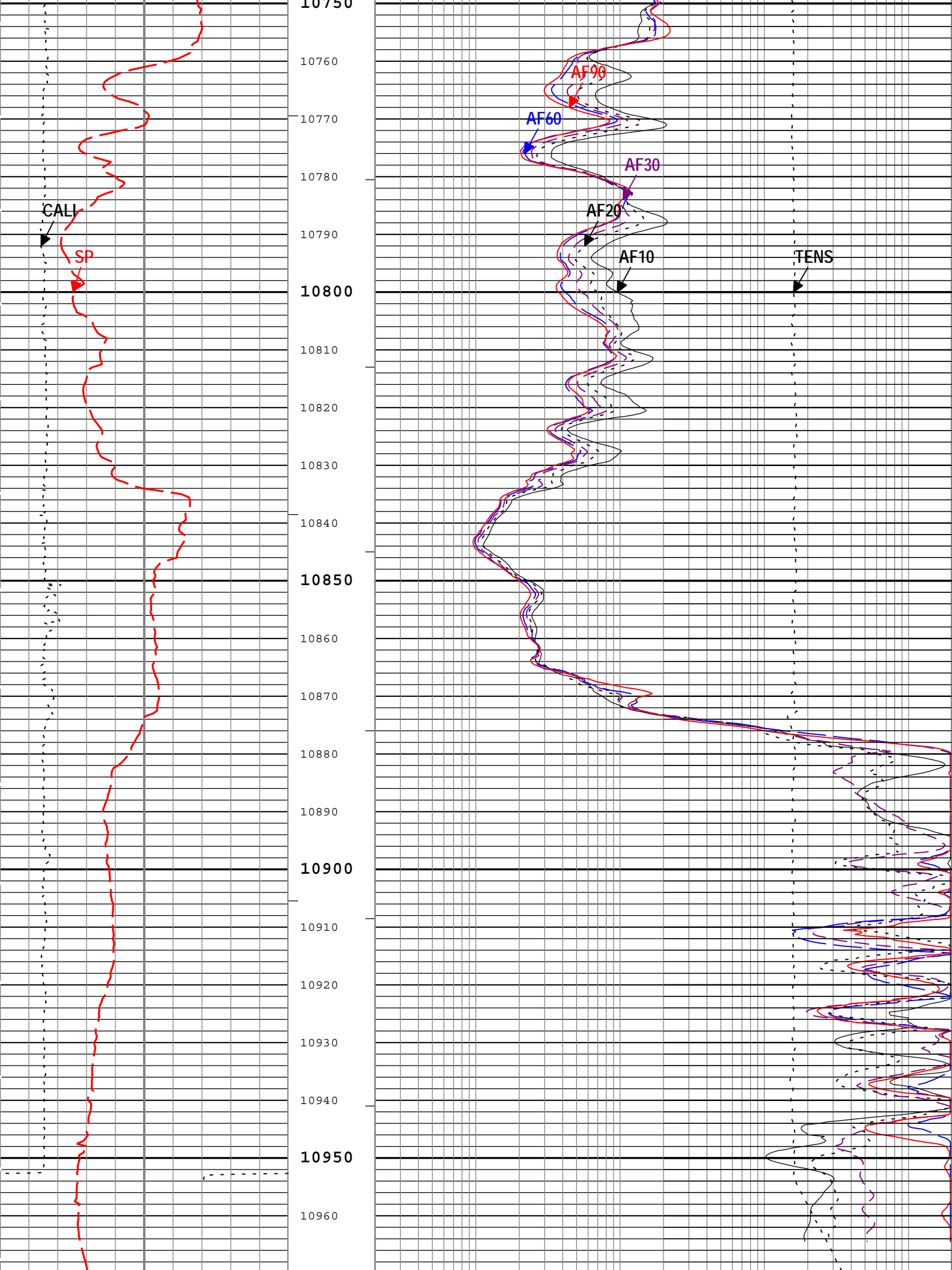




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Array Induction Four Foot Resistivity A10 (AF10) AIT_SpliceGroup[1]		
0.2	ohm.m	2000
Array Induction Four Foot Resistivity A20 (AF20) AIT_SpliceGroup[1]		
0.2	ohm.m	2000
Array Induction Four Foot Resistivity A30 (AF30) AIT_SpliceGroup[1]		
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Array Induction Four Foot Resistivity A60 (AF60) AIT_SpliceGroup[1]		
0.2	ohm.m	2000
Array Induction Four Foot Resistivity A90 (AF90) AIT_SpliceGroup[1]		
0.2	ohm.m	2000

Cable Tension (TENS)		
10000	lbf	0

— ICV - Integrated Cement Volume every 100.00 (ft3)

└ ICV - Integrated Cement Volume every 10.00 (ft3)

—IHV - Integrated Hole Volume every 100.00 (ft3)

—IHV - Integrated Hole Volume every 10.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

Description: AIT Basic Log Two	Format: Log (KM 5in Induction)	Index Scale: 5 in per 100 ft	Index Unit: ft	Index Type: Measured Depth	Creation Date: 07-Feb-2014 12:02:09
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Channel Processing Parameters

Run 1: Parameters

Parameter	Description	Tool	Value	Unit
ABHM	Array Induction Borehole Correction Mode	AIT-M	Compute Standoff	
ACDE	Array Induction Casing Detection Enable	AIT-M	Yes	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Depth Zoned	
BS	Bit Size	WLSESSION	7.875	in
CALI_SHIFT	CALI Supplementary Offset	HDRS-H	0	in
CBLO	Casing Bottom (Logger)	WLSESSION	5044	ft
CSODDRL	Casing Outer Diameter - Zoned along driller depths	WLSESSION	9.625	in
FCD	Future Casing (Outer) Diameter	WLSESSION	5.5	in
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	CALI	
GRSE	Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity	Borehole	AMF	
SPDR	SP Drift Per Foot	AIT-M	0	mV/ft

Run 1Depth Zoned Parameters

Parameter	Value	Start (ft)	Stop (ft)
BHS	Cased	4992.58	5050
BHS	Open	5050	10972.5

All depth are actual.

Tool Control Parameters

Run 1: Parameters

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

Run 1 Time Zoned Parameters

D M L 507 H

Pass Main[3]:Up

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
MAX_LOG_SPEED	985	07-Feb-2014 05:54:55	07-Feb-2014 05:58:36	10972.41	10926.05
MAX_LOG_SPEED	1040	07-Feb-2014 05:58:36	07-Feb-2014 06:06:55	10926.05	10787.15
MAX_LOG_SPEED	968	07-Feb-2014 06:06:55	07-Feb-2014 06:28:44	10787.15	10443.54
MAX_LOG_SPEED	1026	07-Feb-2014 06:28:44	07-Feb-2014 06:30:48	10443.54	10410.55
MAX_LOG_SPEED	970	07-Feb-2014 06:30:48	07-Feb-2014 06:34:57	10410.55	10343.68
MAX_LOG_SPEED	1030	07-Feb-2014 06:34:57	07-Feb-2014 07:05:03	10343.68	9852.37
MAX_LOG_SPEED	967	07-Feb-2014 07:05:03	07-Feb-2014 07:18:35	9852.37	9635.37
MAX_LOG_SPEED	1024	07-Feb-2014 07:18:35	07-Feb-2014 07:49:50	9635.37	9129.37
MAX_LOG_SPEED	960	07-Feb-2014 07:49:50	07-Feb-2014 08:12:43	9129.37	8760.99
MAX_LOG_SPEED	1042	07-Feb-2014 08:12:43	07-Feb-2014 08:13:45	8760.99	8744.07
MAX_LOG_SPEED	959	07-Feb-2014 08:13:45	07-Feb-2014 08:20:00	8744.07	8641.7
MAX_LOG_SPEED	1020	07-Feb-2014 08:20:00	07-Feb-2014 08:22:06	8641.7	8607.87
MAX_LOG_SPEED	958	07-Feb-2014 08:22:06	07-Feb-2014 08:29:15	8607.87	8503.07

Pass Log[4]:Up

MAX_LOG_SPEED	1538	07-Feb-2014 08:48:45	07-Feb-2014 08:50:29	8709.32	8700.86
MAX_LOG_SPEED	1436	07-Feb-2014 08:50:29	07-Feb-2014 08:51:31	8700.86	8676.32
MAX_LOG_SPEED	1516	07-Feb-2014 08:51:31	07-Feb-2014 08:59:44	8676.32	8469.87
MAX_LOG_SPEED	1601	07-Feb-2014 08:59:44	07-Feb-2014 09:03:50	8469.87	8365.1
MAX_LOG_SPEED	1503	07-Feb-2014 09:03:50	07-Feb-2014 09:14:06	8365.1	8103.53
MAX_LOG_SPEED	1590	07-Feb-2014 09:14:06	07-Feb-2014 09:16:09	8103.53	8051.73
MAX_LOG_SPEED	1509	07-Feb-2014 09:16:09	07-Feb-2014 09:17:11	8051.73	8026.14
MAX_LOG_SPEED	1591	07-Feb-2014 09:17:11	07-Feb-2014 09:19:14	8026.14	7974.91
MAX_LOG_SPEED	1471	07-Feb-2014 09:19:14	07-Feb-2014 09:22:19	7974.91	7900.12
MAX_LOG_SPEED	1549	07-Feb-2014 09:22:19	07-Feb-2014 09:24:22	7900.12	7849.8
MAX_LOG_SPEED	1465	07-Feb-2014 09:24:22	07-Feb-2014 09:25:24	7849.8	7824.46
MAX_LOG_SPEED	1552	07-Feb-2014 09:25:24	07-Feb-2014 09:27:27	7824.46	7774.27
MAX_LOG_SPEED	1472	07-Feb-2014 09:27:27	07-Feb-2014 09:29:31	7774.27	7723.07
MAX_LOG_SPEED	1556	07-Feb-2014 09:29:31	07-Feb-2014 09:43:53	7723.07	7357.64
MAX_LOG_SPEED	1643	07-Feb-2014 09:43:53	07-Feb-2014 09:50:03	7357.64	7195.28
MAX_LOG_SPEED	1559	07-Feb-2014 09:50:03	07-Feb-2014 09:58:13	7195.28	6980.25
MAX_LOG_SPEED	1676	07-Feb-2014 09:58:13	07-Feb-2014 10:00:15	6980.25	6926.35
MAX_LOG_SPEED	1587	07-Feb-2014 10:00:15	07-Feb-2014 10:01:17	6926.35	6899.08
MAX_LOG_SPEED	1506	07-Feb-2014 10:01:17	07-Feb-2014 10:02:18	6899.08	6872.28
MAX_LOG_SPEED	1603	07-Feb-2014 10:02:18	07-Feb-2014 10:07:27	6872.28	6740.12
MAX_LOG_SPEED	1449	07-Feb-2014 10:07:27	07-Feb-2014 10:09:29	6740.12	6689.02
MAX_LOG_SPEED	1571	07-Feb-2014 10:09:29	07-Feb-2014 10:23:48	6689.02	6328.04
MAX_LOG_SPEED	1660	07-Feb-2014 10:23:48	07-Feb-2014 10:40:12	6328.04	5914.22
MAX_LOG_SPEED	1564	07-Feb-2014 10:40:12	07-Feb-2014 10:45:19	5914.22	5780.35
MAX_LOG_SPEED	1718	07-Feb-2014 10:45:19	07-Feb-2014 10:53:32	5780.35	5559.07
MAX_LOG_SPEED	1620	07-Feb-2014 10:53:32	07-Feb-2014 10:55:35	5559.07	5504.02
MAX_LOG_SPEED	1735	07-Feb-2014 10:55:35	07-Feb-2014 10:59:40	5504.02	5392.69
MAX_LOG_SPEED	1561	07-Feb-2014 10:59:40	07-Feb-2014 11:00:42	5392.69	5365.48

MAX_LOG_SPEED	1661	07-Feb-2014 11:00:42	07-Feb-2014 11:10:55	5365.48	5092.87
MAX_LOG_SPEED	1527	07-Feb-2014 11:10:55	07-Feb-2014 11:14:02	5092.87	5010.91

All depth are at tool zero.

Run 1

5" Induction Repeat

Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	DSC Mode	Depth Shift	Include Parallel Data
Run 1	Repeat[2]:Up	Up	10620.13 ft	10968.87 ft	07-Feb-2014 5:24:50 AM	07-Feb-2014 5:46:39 AM	ON	10.00 ft	No
Run 1	Main[3]:Up	Up	8492.45 ft	10972.52 ft	07-Feb-2014 5:54:55 AM	07-Feb-2014 8:29:15 AM	ON	0.00 ft	No

All depths are referenced to toolstring zero

Log

Company:Mustang Creek Operating LLC Well:Graham 1 13
Run 1: Main[3]:Up:S008

Description: AIT Basic Log Two Format: Log (KM 5in Induction RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 07-Feb-2014 12:02:12

—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)
TIME_1900 - Time Marked every 60.00 (s)

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

0.2 ohm.m 2000

Main To Repeat

Repeat To Main

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

0.2 ohm.m 2000

Main To Repeat

Repeat To Main

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

0.2 ohm.m 2000

Main To Repeat

Repeat To Main

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

Main To Repeat

Repeat To Main

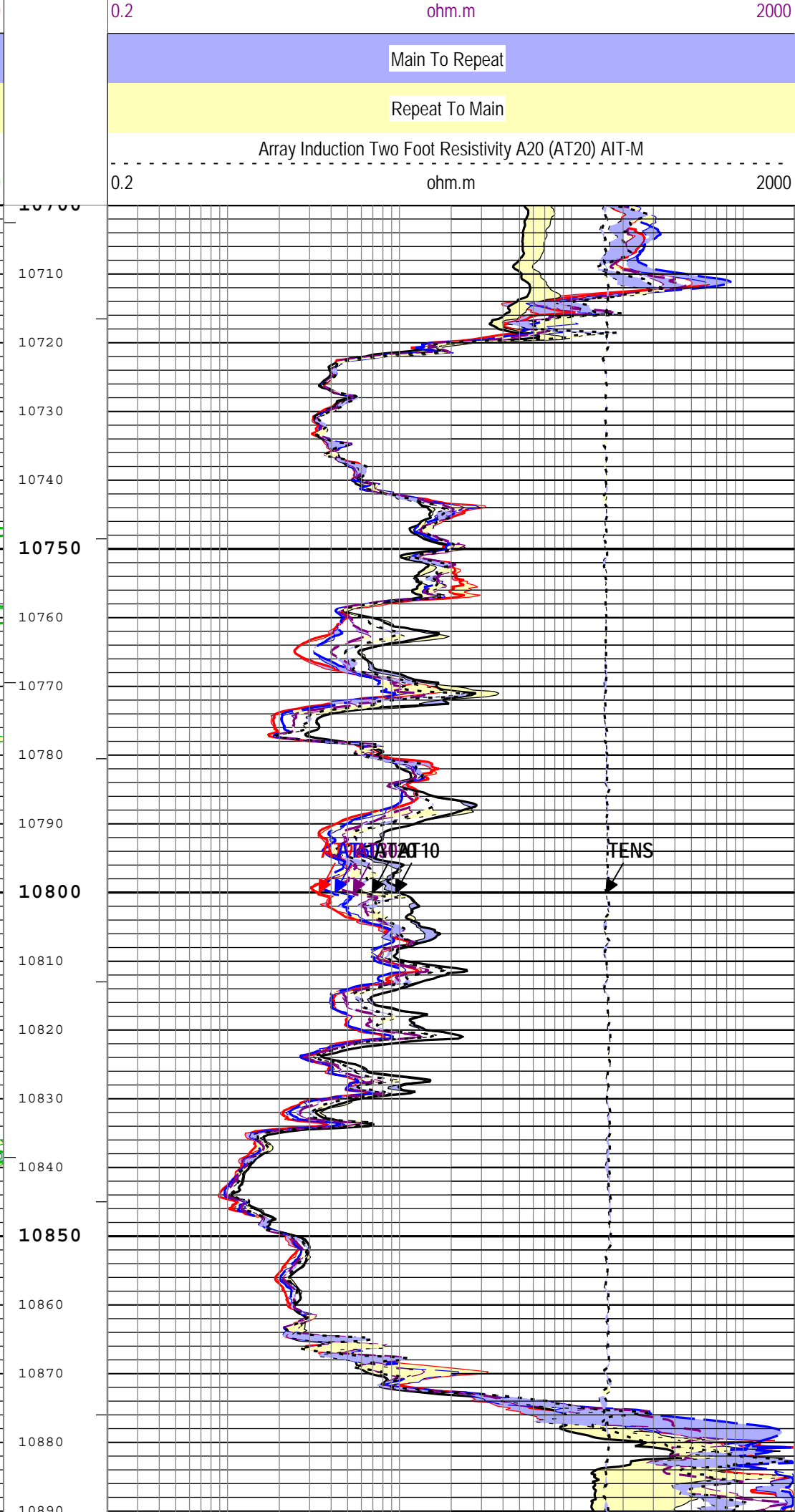
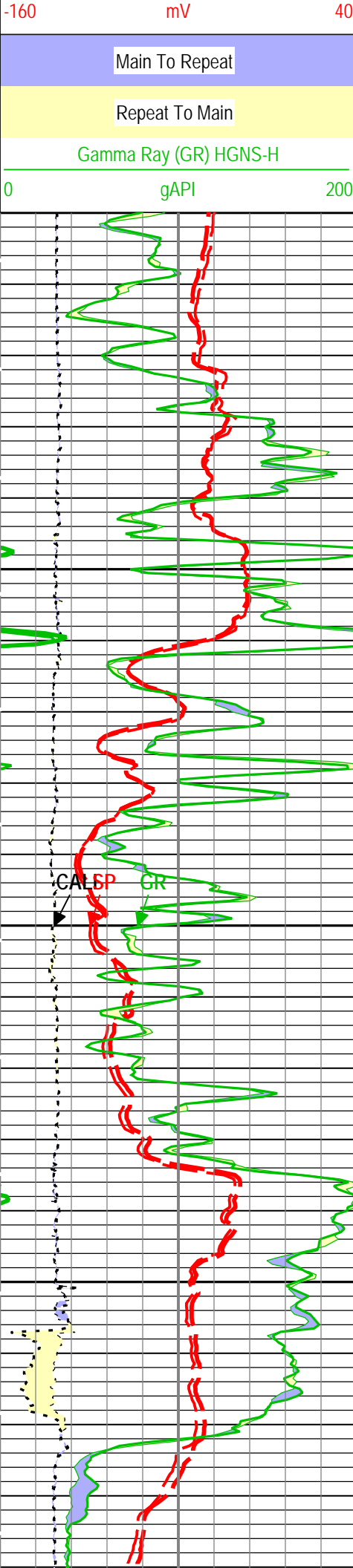
Caliper (CALI) HDRS-H

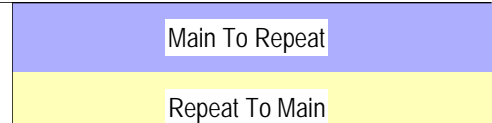
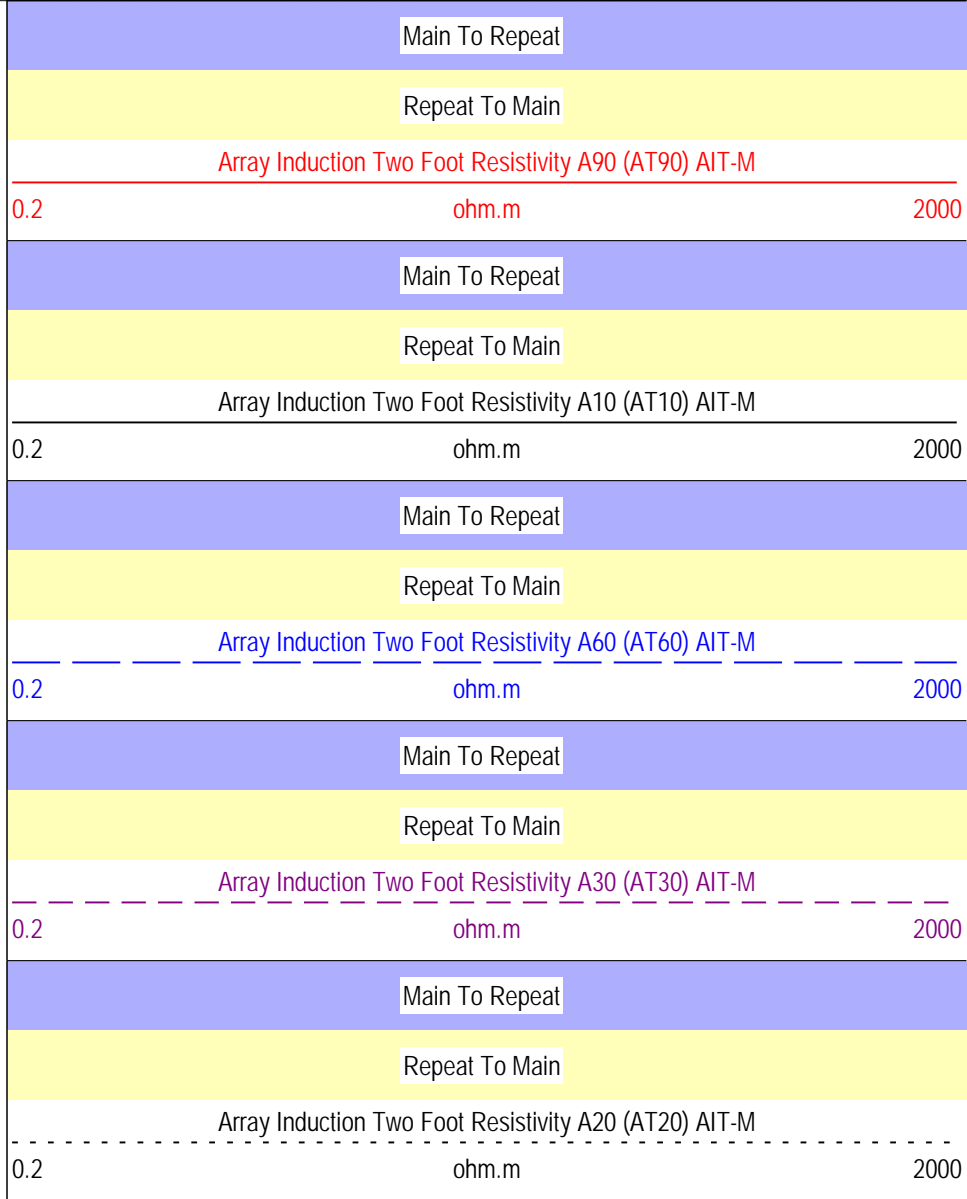
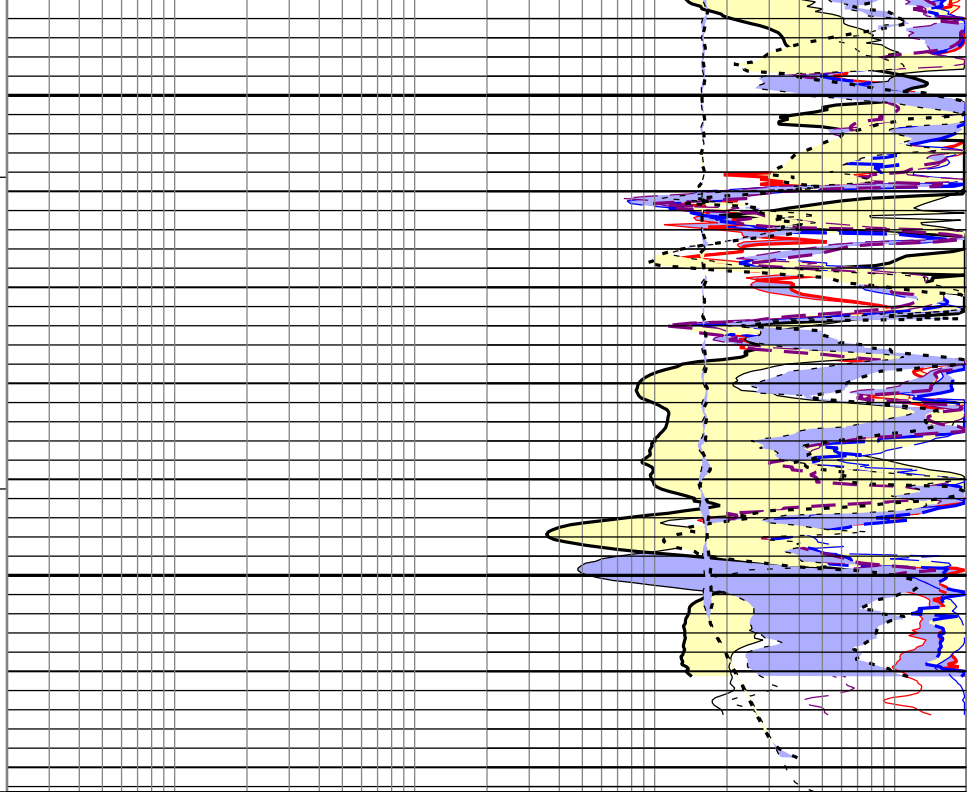
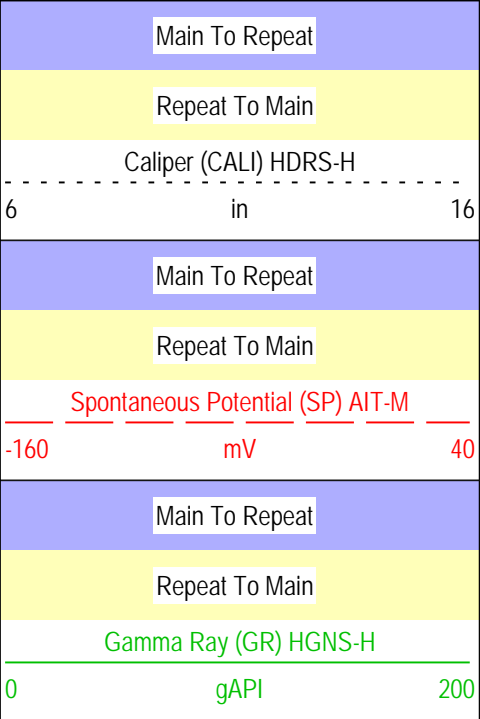
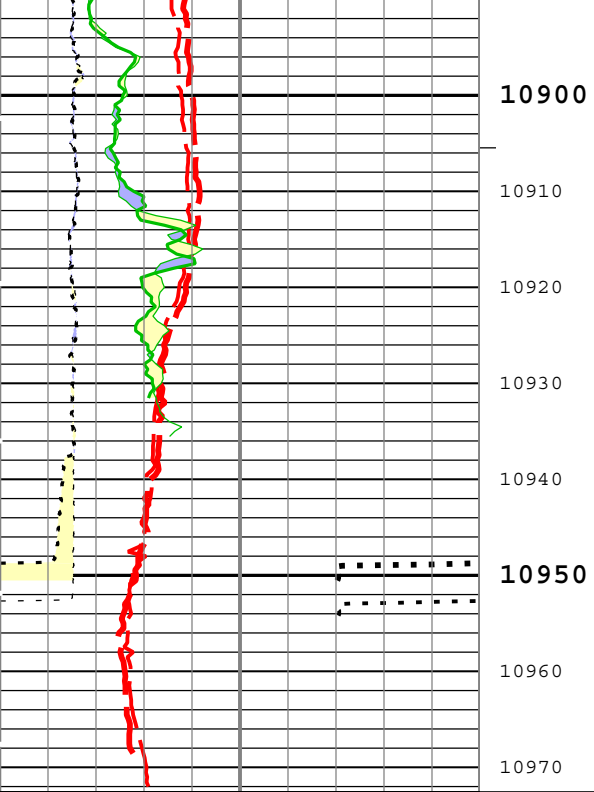
6 in 16

Main To Repeat

Repeat To Main

Spontaneous Potential (SP) AIT-M





Cable Tension (TENS)		
10000	lbf	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)

└─ IHV - Integrated Hole Volume every 100.00 (ft3)

└─ IHV - Integrated Hole Volume every 10.00 (ft3)

Description: AIT Basic Log Two Format: Log (KM 5in Induction RA) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation
Date: 07-Feb-2014 12:02:12

Company:	Mustang Creek Operating LLC	
Well:	Graham 1 13	
Field:	Wildcat	
County:	El Paso	
State:	Colorado	
Platform Express		
Array Induction		
with Linear Correlation		