

# HALLIBURTON

ARRAY COMPENSATED  
TRUE RESISTIVITY  
SPECTRAL DENSITY  
DUAL SPACED NEUTRON

COMPANY		KERR-MCGEE OIL & GAS ONSHORE LP	
WELL		BADDING 12-35SX	
FIELD		WATTENBERG	
COUNTY		WELD	
STATE		CO	
Permanent Datum		GL	
Log measured from		KB	
Drilling measured from		KB	
Date		11-May-11	
Run No.		ONE	
Depth - Driller		5380.00 ft	
Depth - Logger		5386.0 ft	
Bottom - Logged Interval		5384 ft	
Top - Logged Interval		1161 ft	
Casing - Driller		8.625 in @ 1190.0 ft	
Casing - Logger		1161.0 ft	
Bit Size		7.875 in	
Type Fluid in Hole		WATER BASED MUD	
Density		8.4 ppq	
Viscosity		26.00 s/qt	
PH		7.00 pH	
Fluid Loss			
Source of Sample		MUD CELL	
Rm @ Meas. Temperature		1.490 ohmm @ 62.90 degF	
Rmf @ Meas. Temperature		1.09 ohmm @ 75.00 degF	
Rmc @ Meas. Temperature		1.121 ohmm @ 75.00 degF	
Source Rmf		CHART	
Rmc		CHART	
Rm @ BHT		0.60 ohmm @ 165.0 degF	
Time Since Circulation		4.0 hr	
Time on Bottom		11-May-11 07:30	
Max. Rec. Temperature		165.0 degF @ 5386.0 ft	
Equipment		10800785	
Location		BRIGHTON	
Recorded By		R. TWEETEN	
Witnessed By		R. TUCKER	
F. LODER			

Fold here

Service Ticket No.: 8162842				API Serial No.: 05123320400000				PGM Version: WL INSITE R3.2.5 (Build 2)											
CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE								RESISTIVITY SCALE CHANGES											
Date		Sample No.						Type Log		Depth		Scale Up Hole		Scale Down Hole					
Depth-Driller																			
Type Fluid in Hole																			
Density		Viscosity																	
Ph		Fluid Loss																	
Source of Sample								RESISTIVITY EQUIPMENT DATA											
Rm @ Meas. Temp		@		@				Run No.		Tool Type & No.		Pad Type		Tool Pos.		Other			
Rmf @ Meas. Temp.		@		@				ONE		ACRt		N/A		1.5" S.O.		N/A			
Rmc @ Meas. Temp.		@		@						E5787-S5797									
Source Rmf		Rmc																	
Rm @ BHT		@		@															
Rmf @ BHT		@		@															
Rmc @ BHT		@		@															
EQUIPMENT DATA																			
GAMMA				ACOUSTIC				DENSITY				NEUTRON							
Run No.		ONE		Run No.				Run No.		ONE		Run No.		ONE					
Serial No.		11215095		Serial No.				Serial No.		I332M319		Serial No.		11219332					
Model No.		GTET		Model No.				Model No.		SDLT		Model No.		DSNT					
Diameter		3.625"		No. of Cent.				Diameter		4.5"		Diameter		3.625"					
Detector Model No.		GTET		Spacing				Log Type		GAM-GAM		Log Type		NEU-NEU					
Type		SCINT						Source Type		CS-137		Source Type		AM241BE					
Length		8"		LSA [Y/N]				Serial No.		5256GW		Serial No.		DSN430					
Distance to Source		9'		FWDA [Y/N ]				Strength		1.78 CI		Strength		15 CI					
LOGGING DATA																			
GENERAL				GAMMA				ACOUSTIC				DENSITY				NEUTRON			

GENERAL			GAMMA		ACOUSTIC		DENSITY		NEUTRON						
Run	Depth		Speed	Scale		Scale		Matrix	Scale		Matrix	Scale		Matrix	
No.	From	To	ft/min	L	R	L	R		L	R		L	R		
ONE	5386	1161	REC	0	200				20	0	2.71	20	0	LIME	
DIRECTIONAL INFORMATION															
Maximum Deviation									@		KOP				@
Remarks: RWCH-GTET-DSNT-SDLT-ACRt RUN IN COMBINATION.															
ANNULAR HOLE VOLUME CALCULATED USING 4.5-INCH PRODUCTION CASING.															
TENSION PULLS AND BOREHOLE RUGOSITY AFFECT LOG RESPONSE.															
YOUR CREW TODAY: J. WALKER, M. BURNETT															
RIG: XTREME 15															
THANK YOU FOR USING HALLIBURTON LOGGING SERVICES - BRIGHTON, CO - (303) 825-4346															
HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF.															
HALLIBURTON															

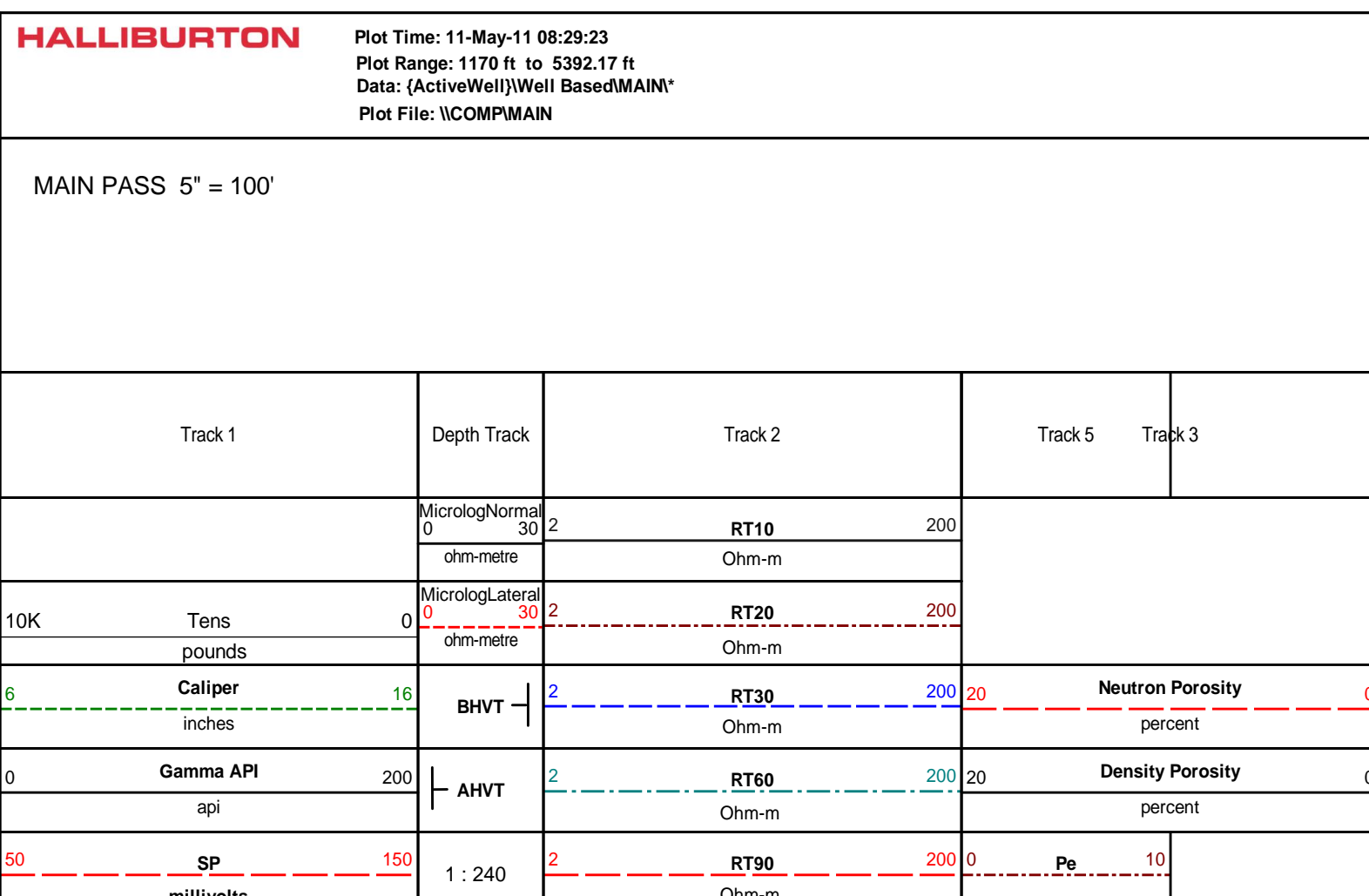
HALLIBURTON

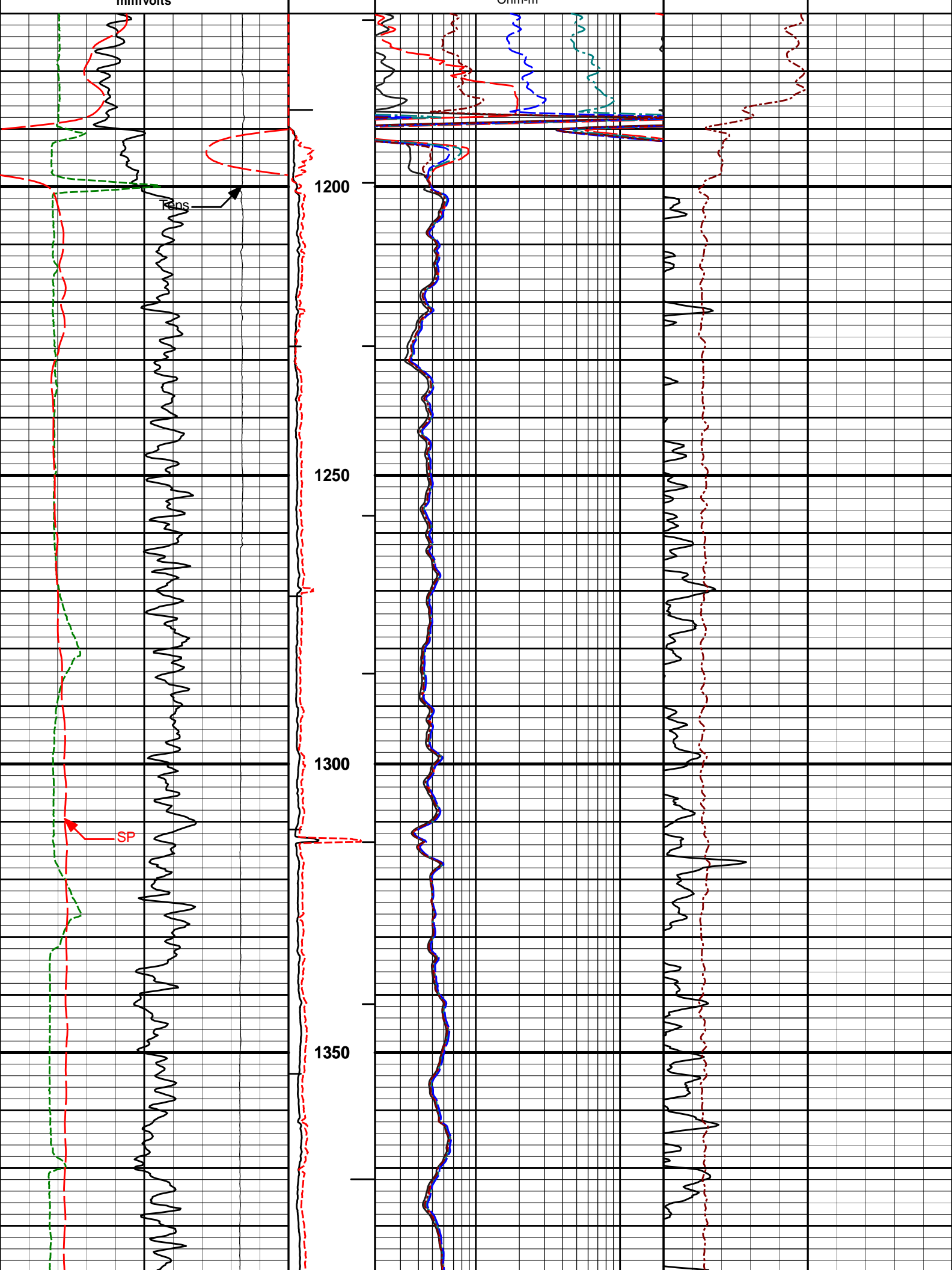
PARAMETERS REPORT

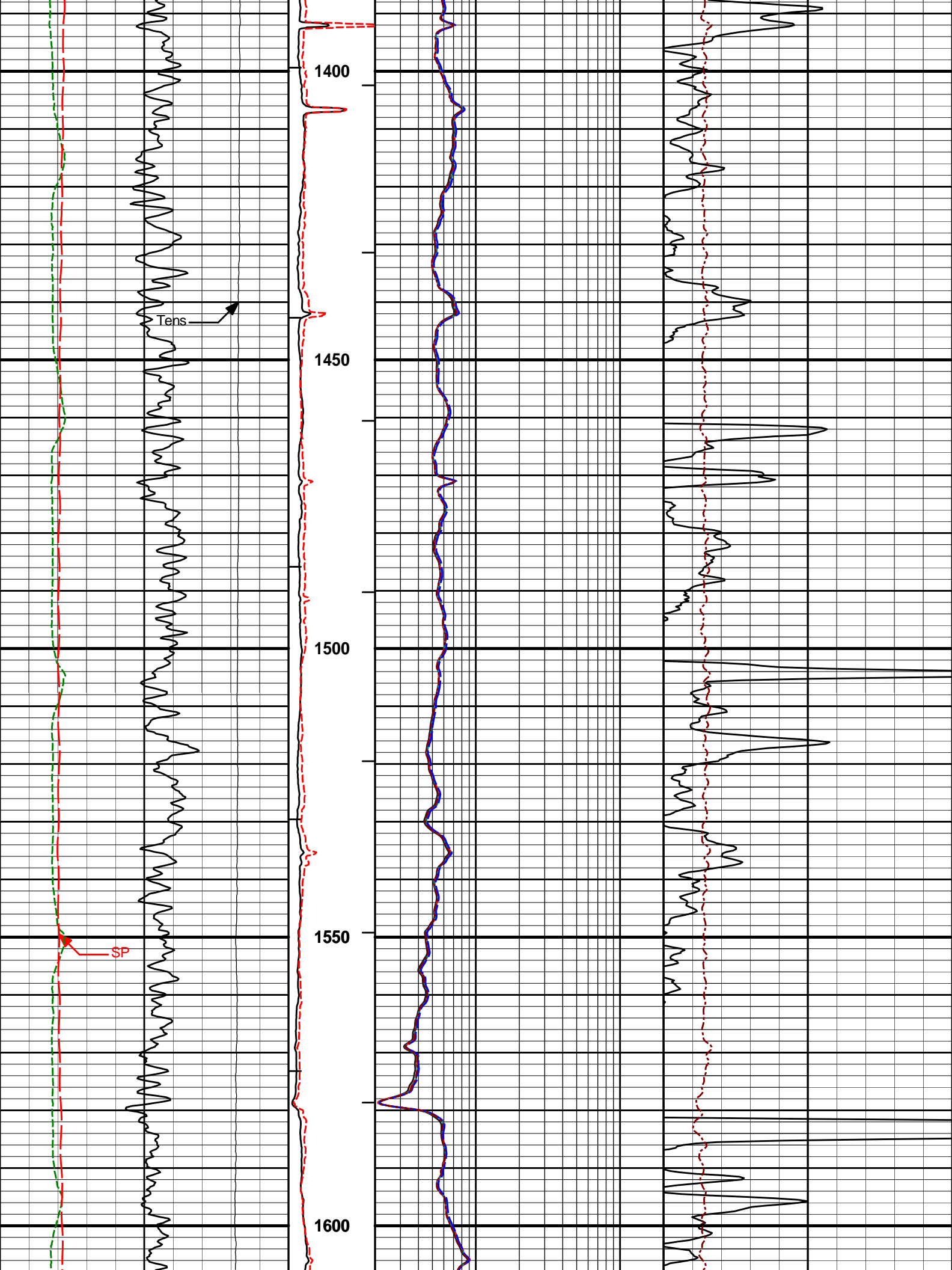
Depth (ft)	Tool Name	Mnemonic	Description	Value	Units
TOP					
	SHARED	BS	Bit Size	7.875	in
	SHARED	UBS	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	MDBS	Mud Base	Water	
	SHARED	MDWT	Borehole Fluid Weight	8.400	ppg
	SHARED	WAGT	Weighting Agent	Natural	
	SHARED	BSAL	Borehole salinity	0.00	ppm
	SHARED	FSAL	Formation Salinity NaCl	0.00	ppm
	SHARED	KPCT	Percent K in Mud by Weight?	0.00	%
	SHARED	RMUD	Mud Resistivity	2.000	ohmm
	SHARED	TRM	Temperature of Mud	75.0	degF
	SHARED	CSD	Logging Interval is Cased?	No	
	SHARED	ICOD	AHV Casing OD	4.500	in
	SHARED	ST	Surface Temperature	75.0	degF
	SHARED	TD	Total Well Depth	5380.00	ft
	SHARED	BHT	Bottom Hole Temperature	200.0	degF
	SHARED	SVTM	Navigation and Survey Master Tool	NONE	
	SHARED	AZTM	High Res Z Accelerometer Master Tool	GTET	
	SHARED	TEMM	Temperature Master Tool	NONE	
	SHARED	BHSM	Borehole Size Master Tool	NONE	
	GTET	GROK	Process Gamma Ray?	Yes	
	GTET	GRSO	Gamma Tool Standoff	0.000	in
	GTET	GEOK	Process Gamma Ray EVR?	No	
	GTET	TPOS	Tool Position	Eccentered	
	DSNT	DNOK	Process DSNT	Yes	

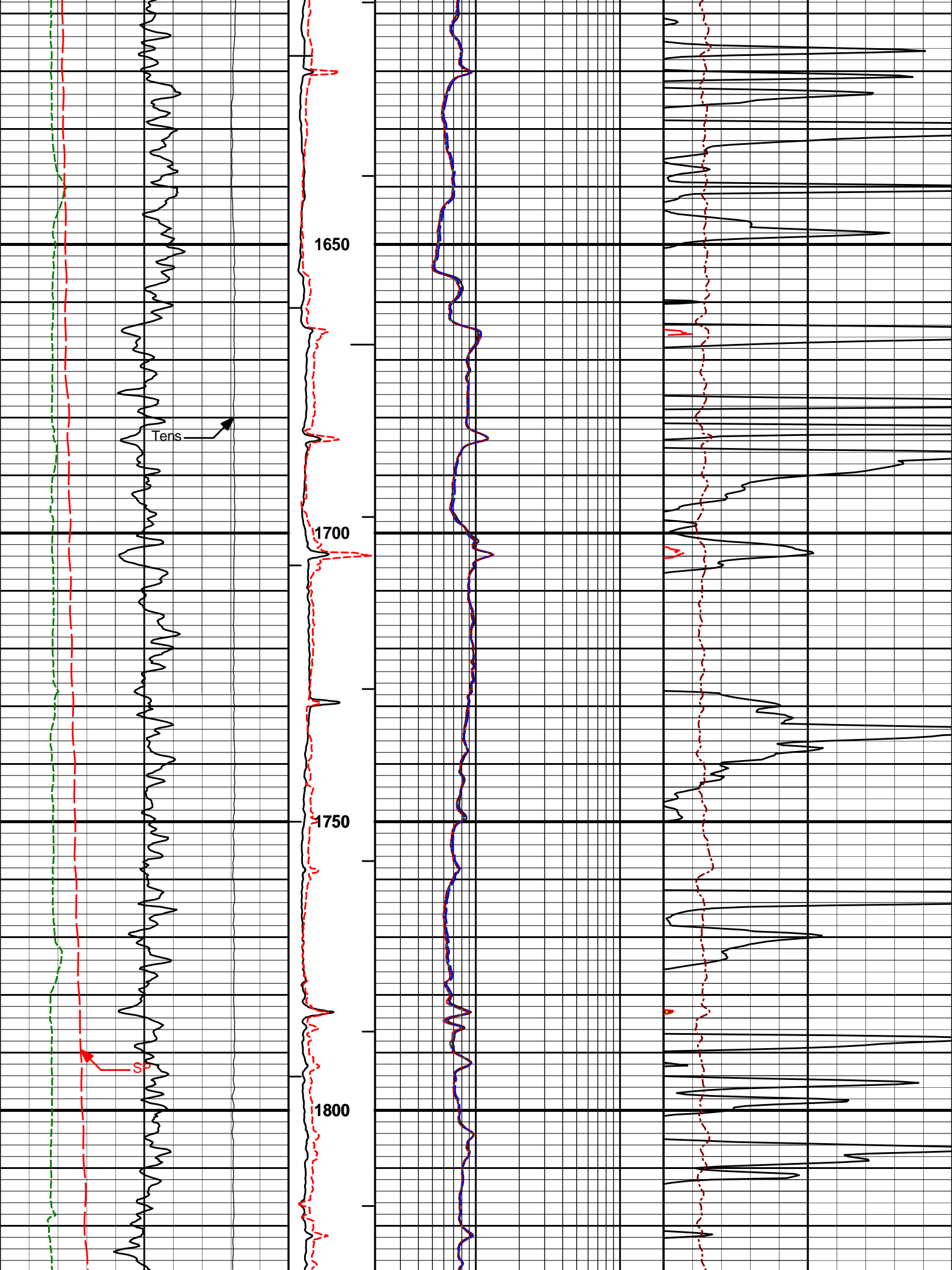
DSNT	DNOK	Process DSN?	Yes	
DSNT	DEOK	Process DSN EVR?	No	
DSNT	NLIT	Neutron Lithology	Limestone	
DSNT	DNSO	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.250	in
DSNT	DNTP	Temperature Correction Type	None	
DSNT	DPRS	DSN Pressure Correction Type	None	
DSNT	SHCO	View More Correction Options	No	
DSNT	UTVD	Use TVD for Gradient Corrections?	No	
DSNT	LHWT	Logging Horizontal Water Tank?	No	
SDLT	DNOK	Process Density?	Yes	
SDLT	DNOK	Process Density EVR?	No	
SDLT	CB	Logging Calibration Blocks?	No	
SDLT	SPVT	SDLT Pad Temperature Valid?	Yes	
SDLT	DTWN	Disable temperature warning	No	
SDLT	DMA	Formation Density Matrix	2.710	g/cc
SDLT	DFL	Formation Density Fluid	1.000	g/cc
SDLT	CLOK	Process Caliper Outputs?	Yes	
SDLT	MLOK	Process MicroLog Outputs?	Yes	
ACRt	RTOK	Process ACRt?	Yes	
ACRt	MNSO	Minimum Tool Standoff	1.50	in
ACRt	TCS1	Temperature Correction Source	FP Lwr & FP Up	
ACRt	TPOS	Tool Position	Eccentered	
ACRt	RMOP	Rmud Source	Mud Cell	
ACRt	RMIN	Minimum Resistivity for MAP	0.20	ohmm
ACRt	RMIN	Maximum Resistivity for MAP	200.00	ohmm
ACRt	THQY	Threshold Quality	0.50	
BOTTOM				

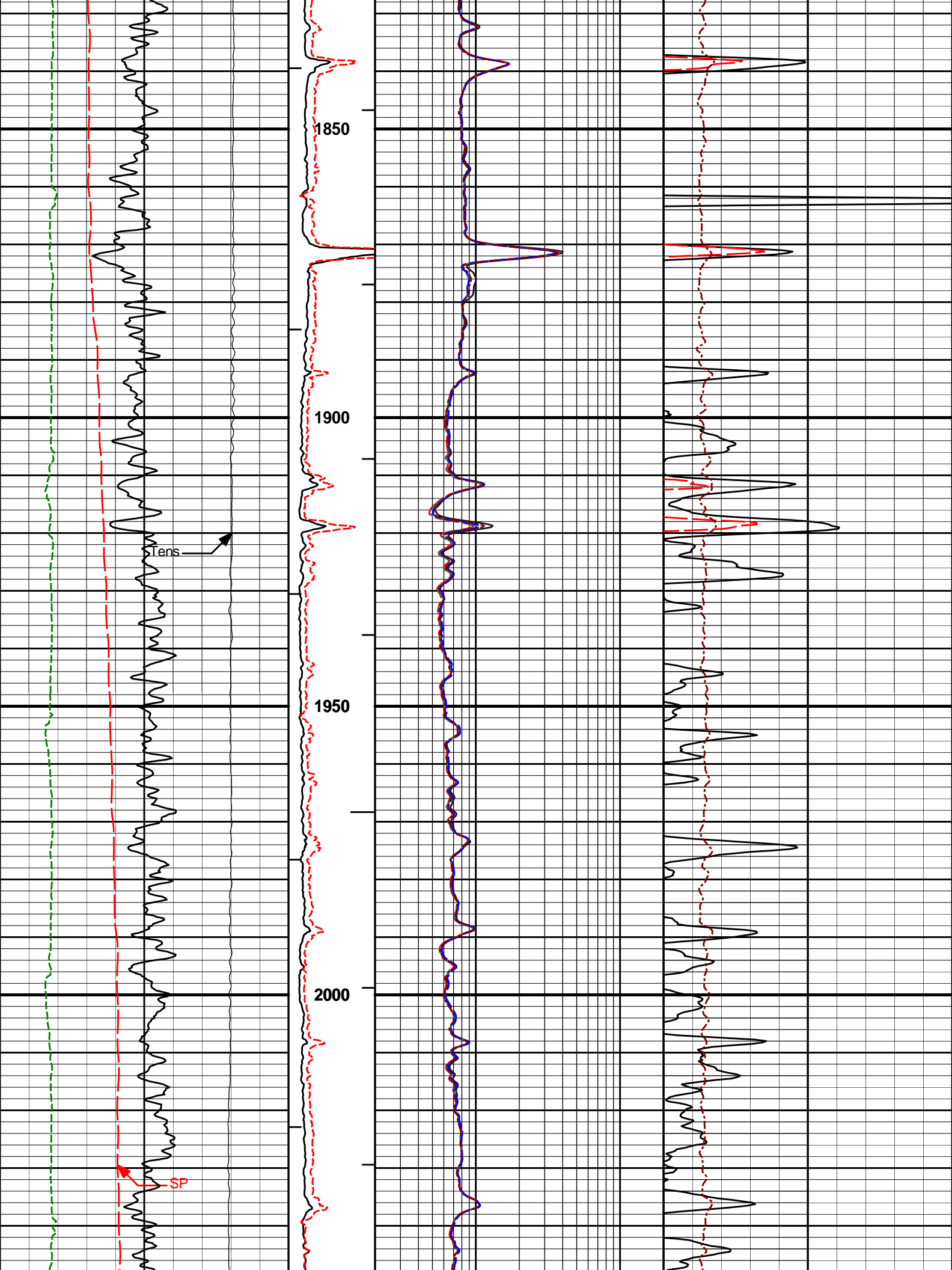
Data: BADDING\_12-35SX\0001 TRIPLE\003 11-May-11 07:30 Up @5392.3f
Date: 11-May-11 07:44:21





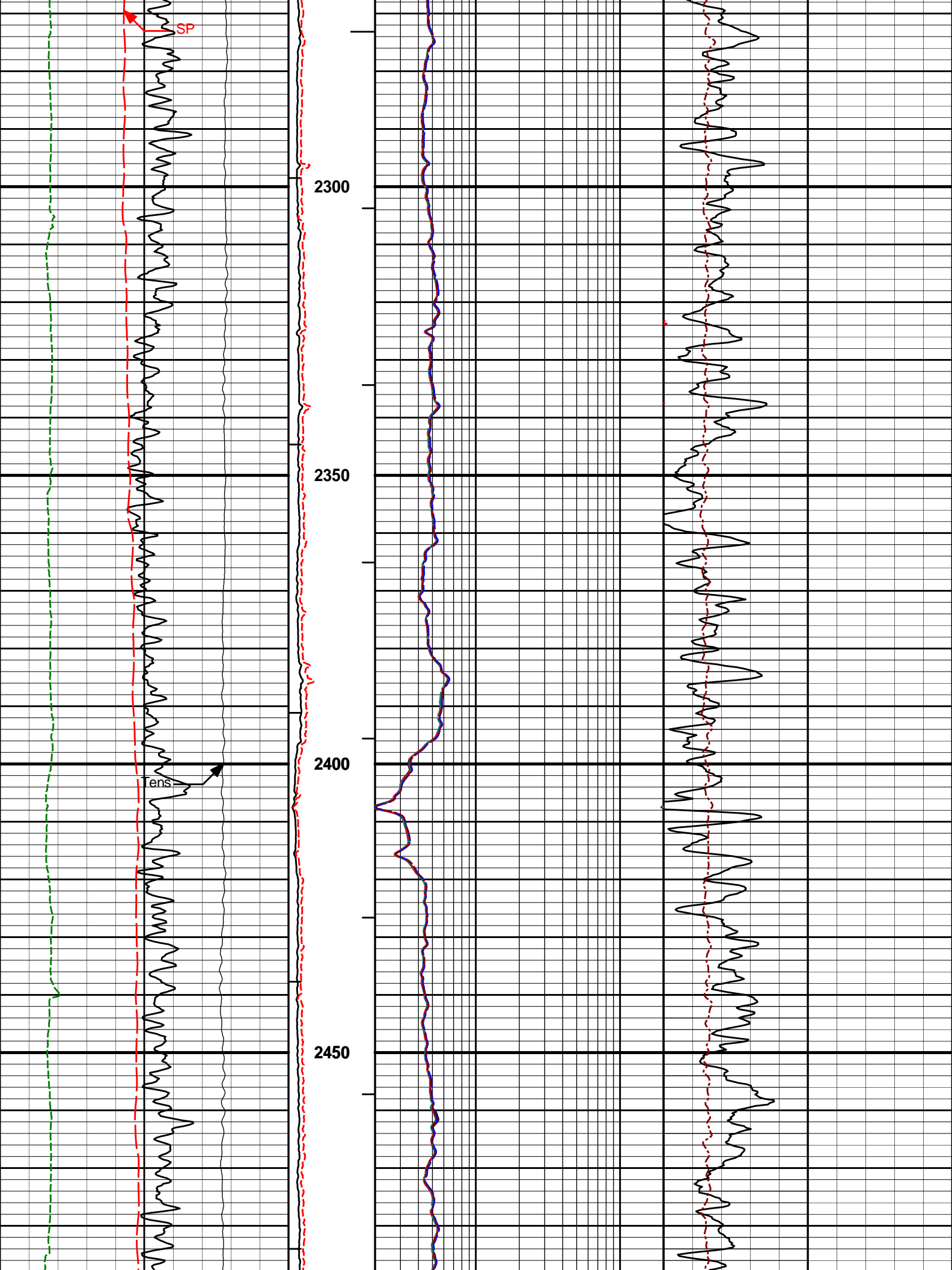


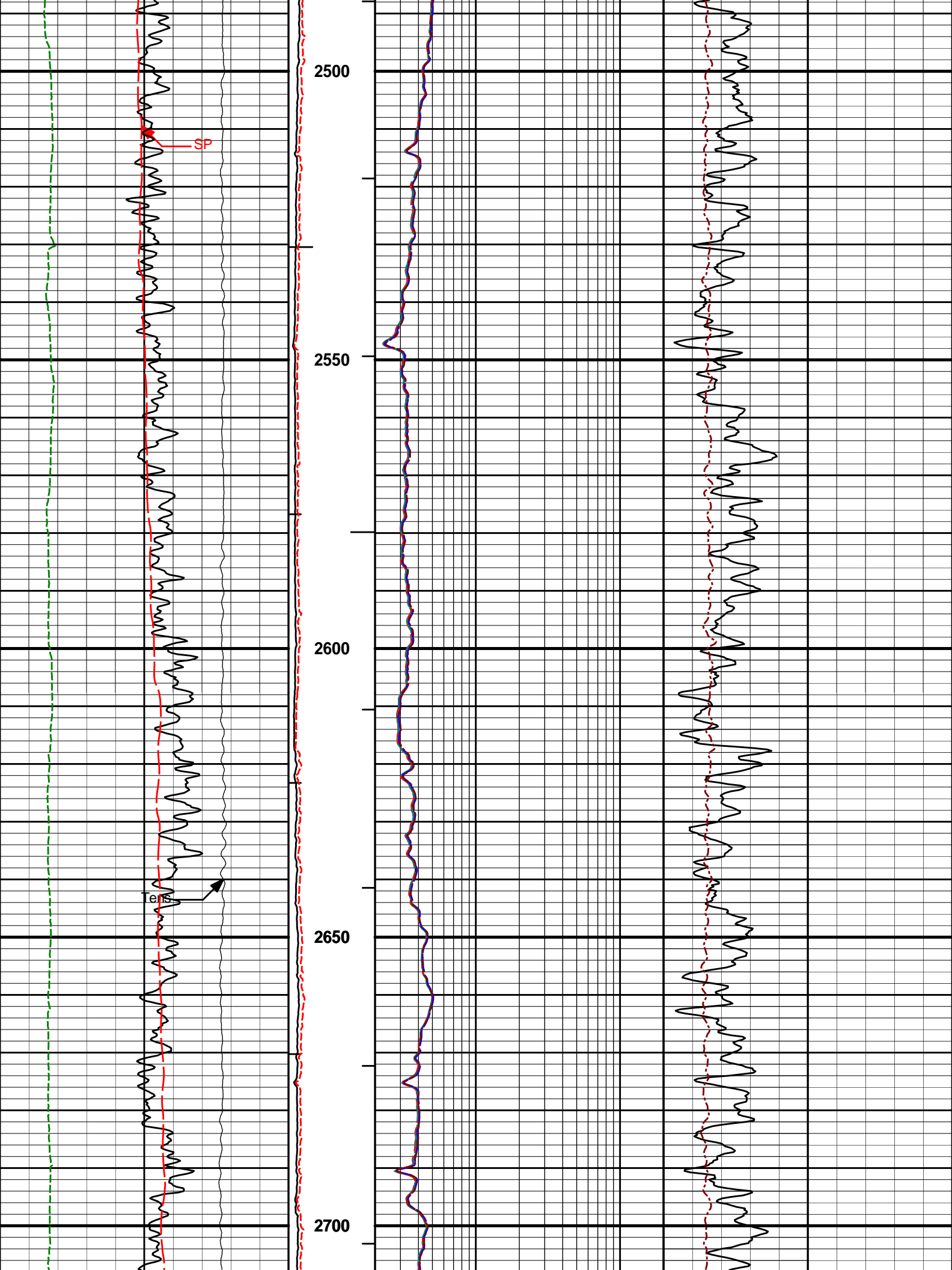


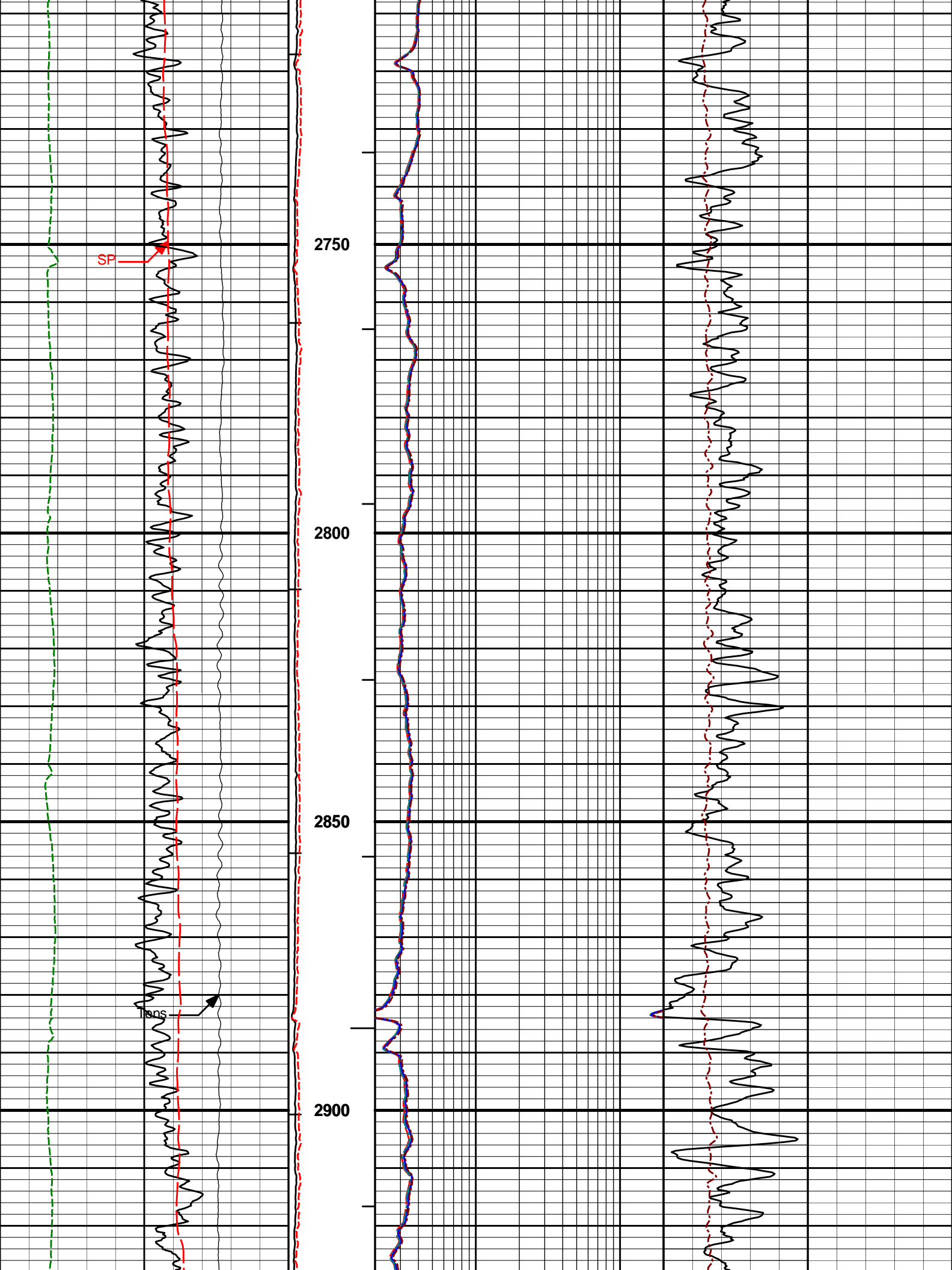




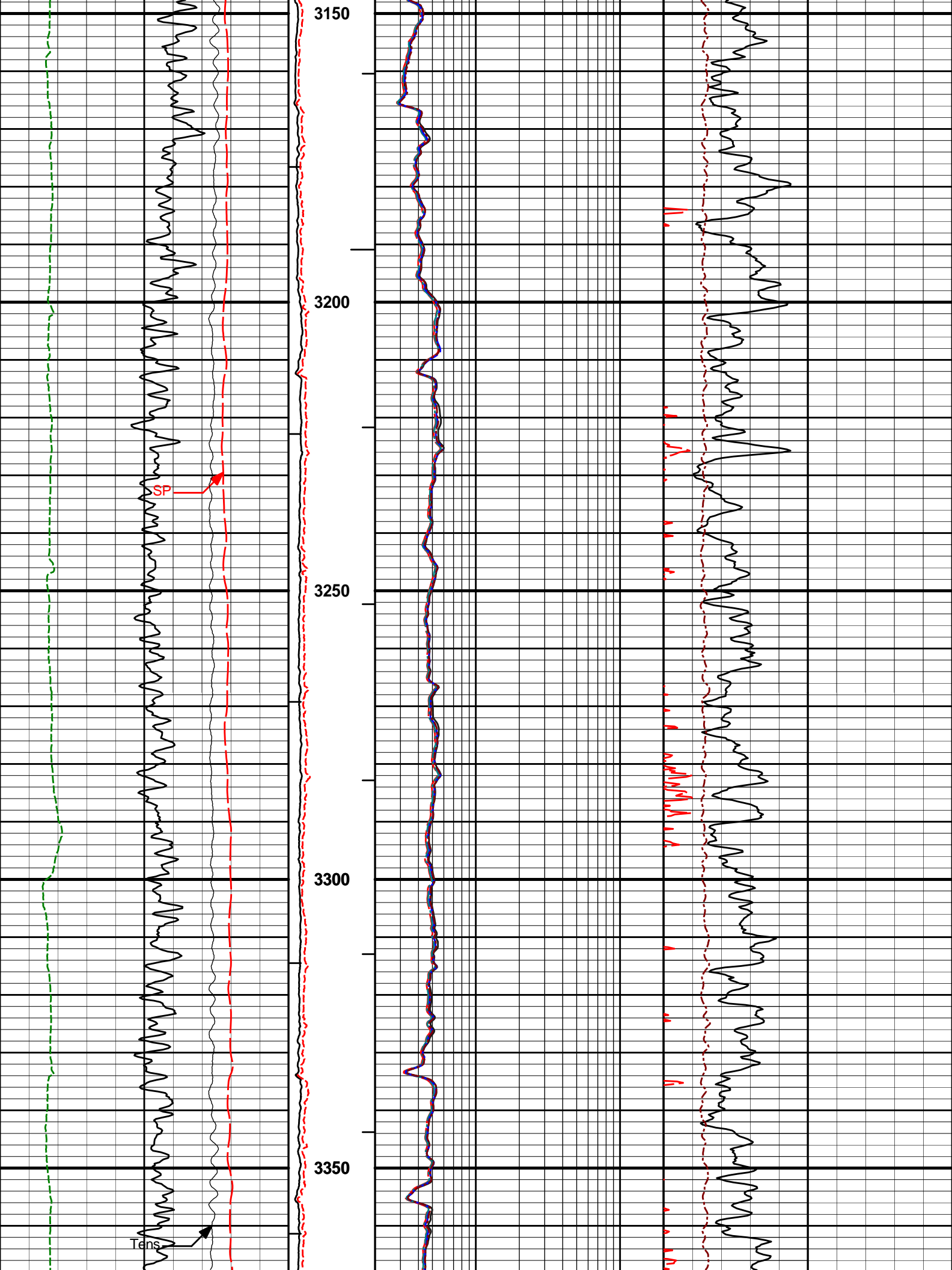


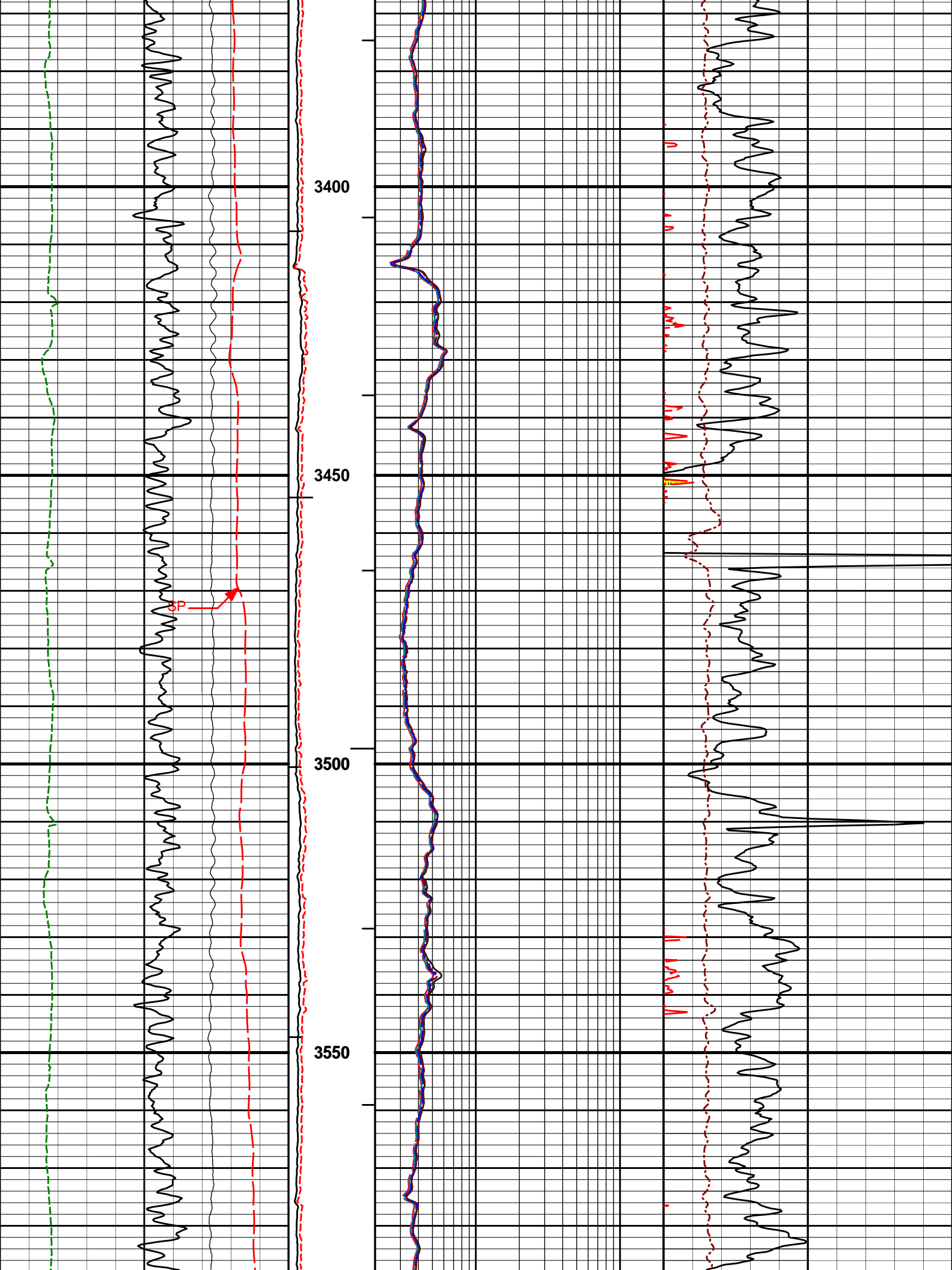


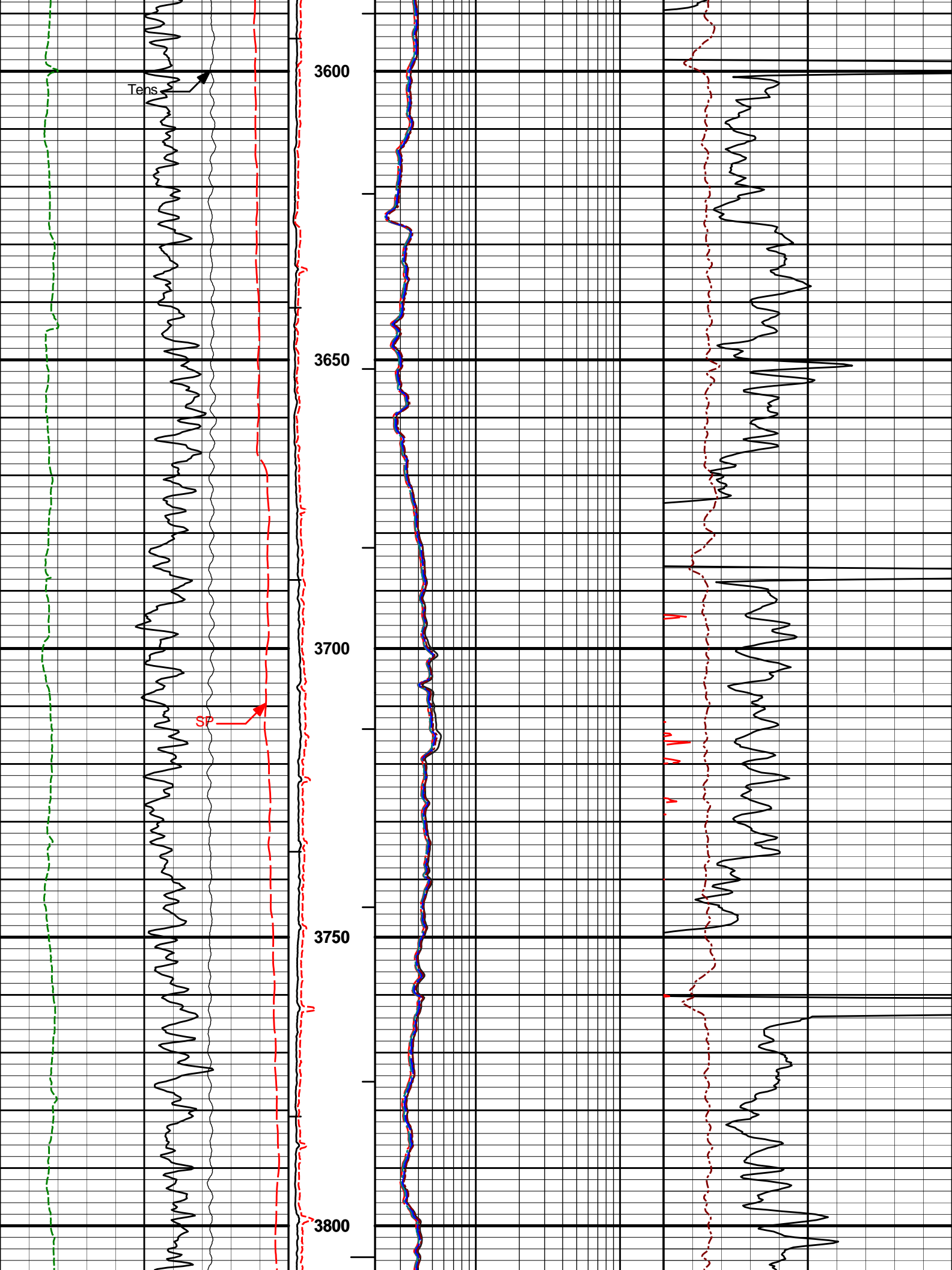






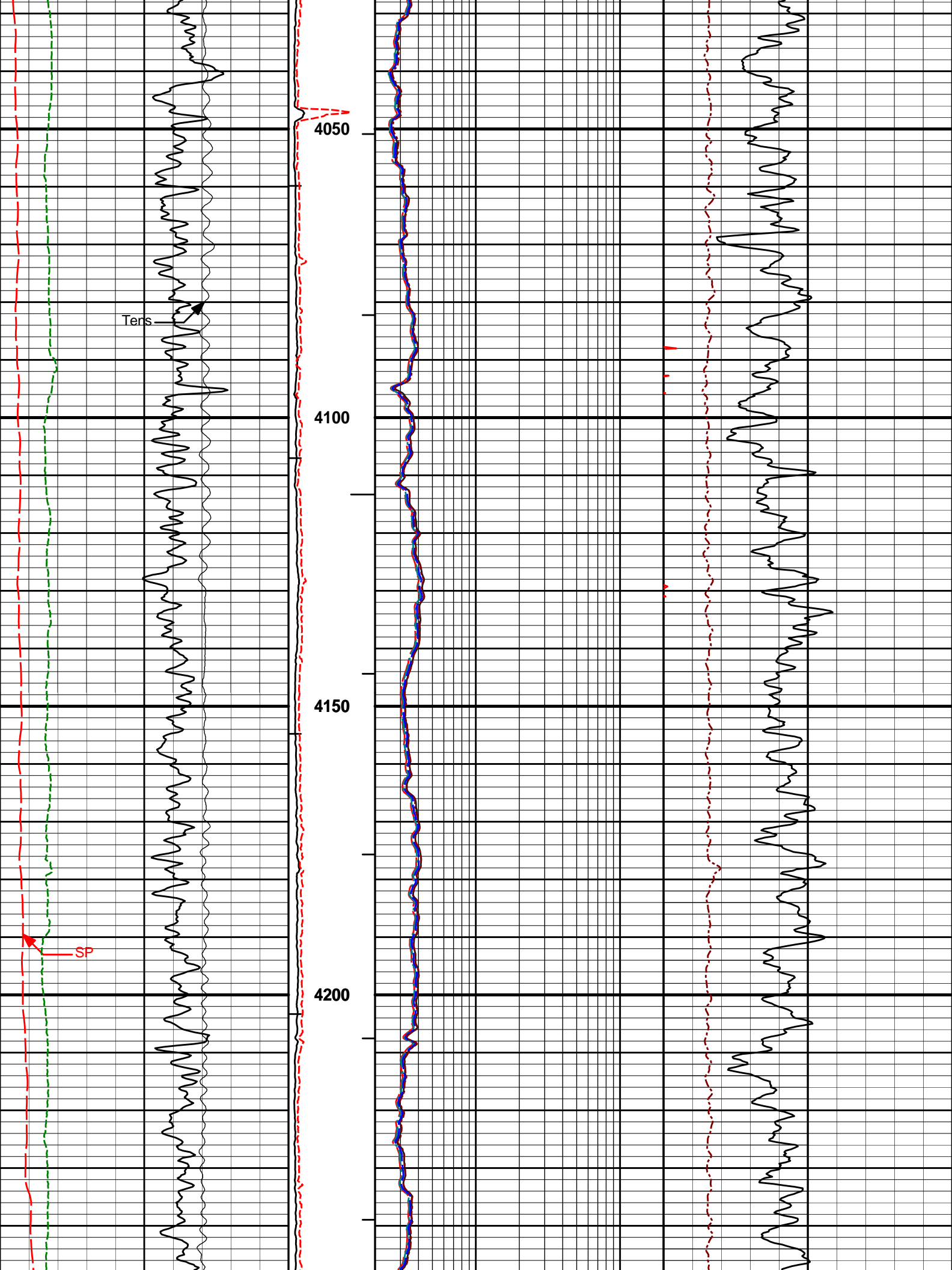


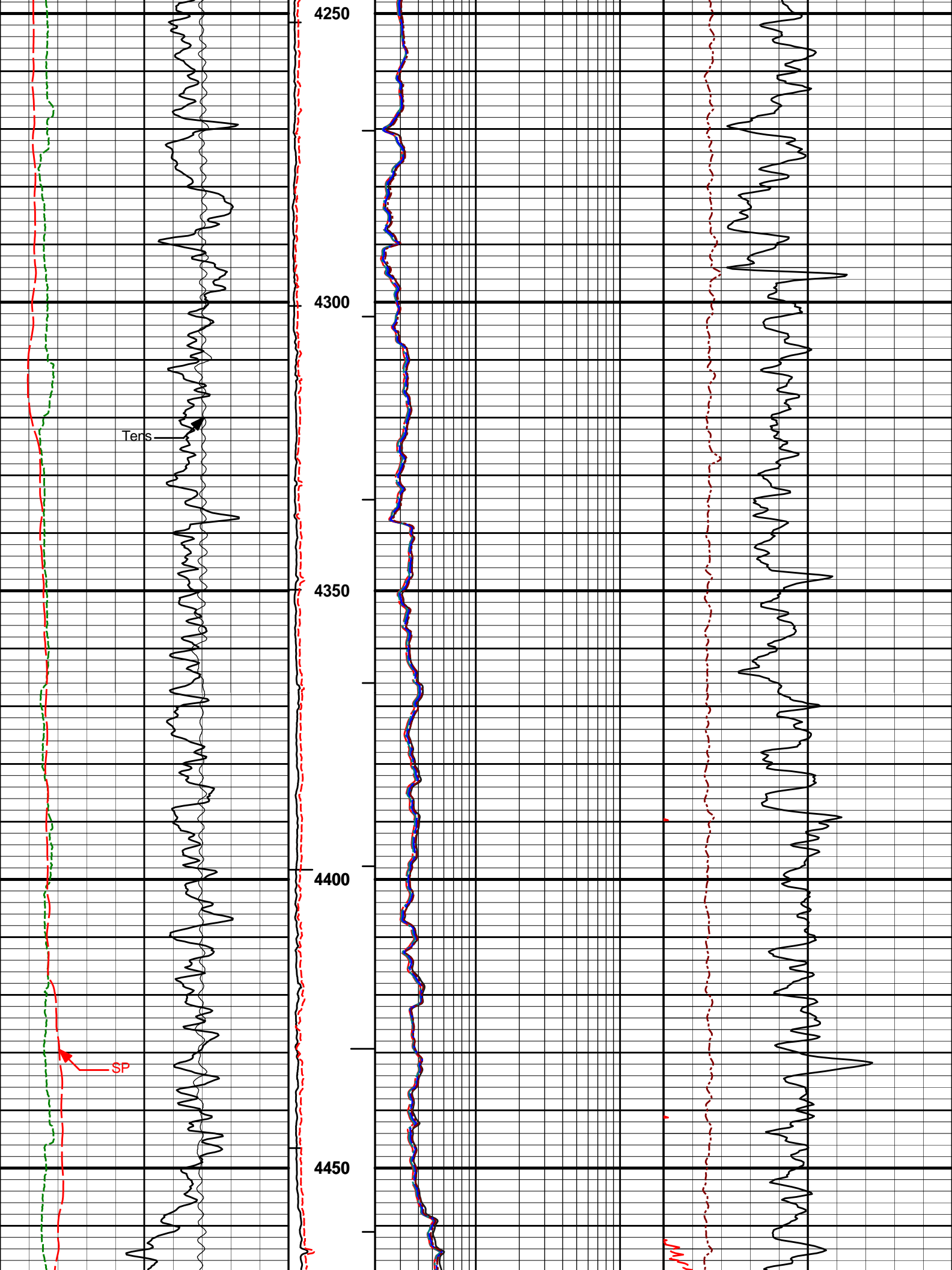


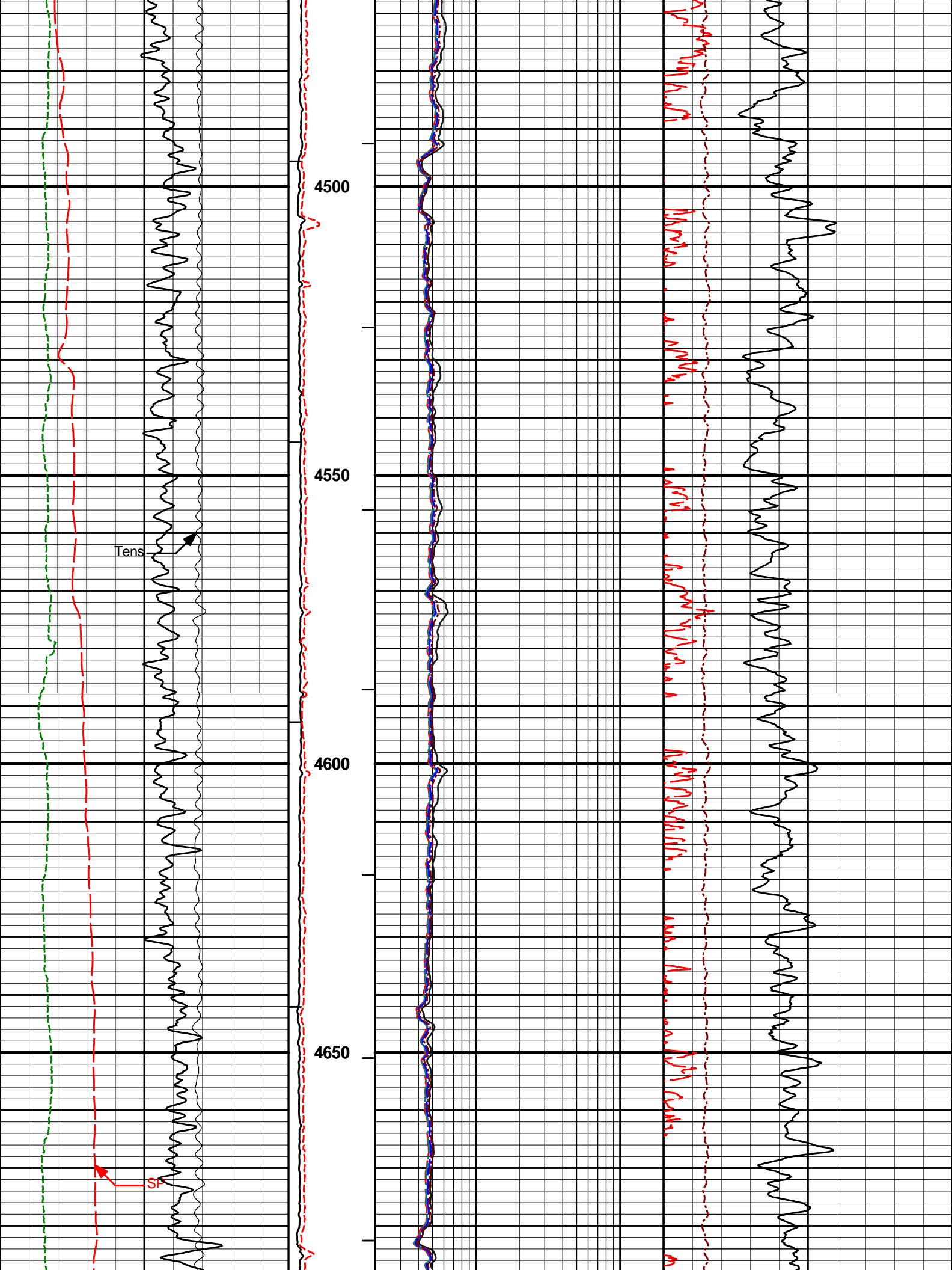


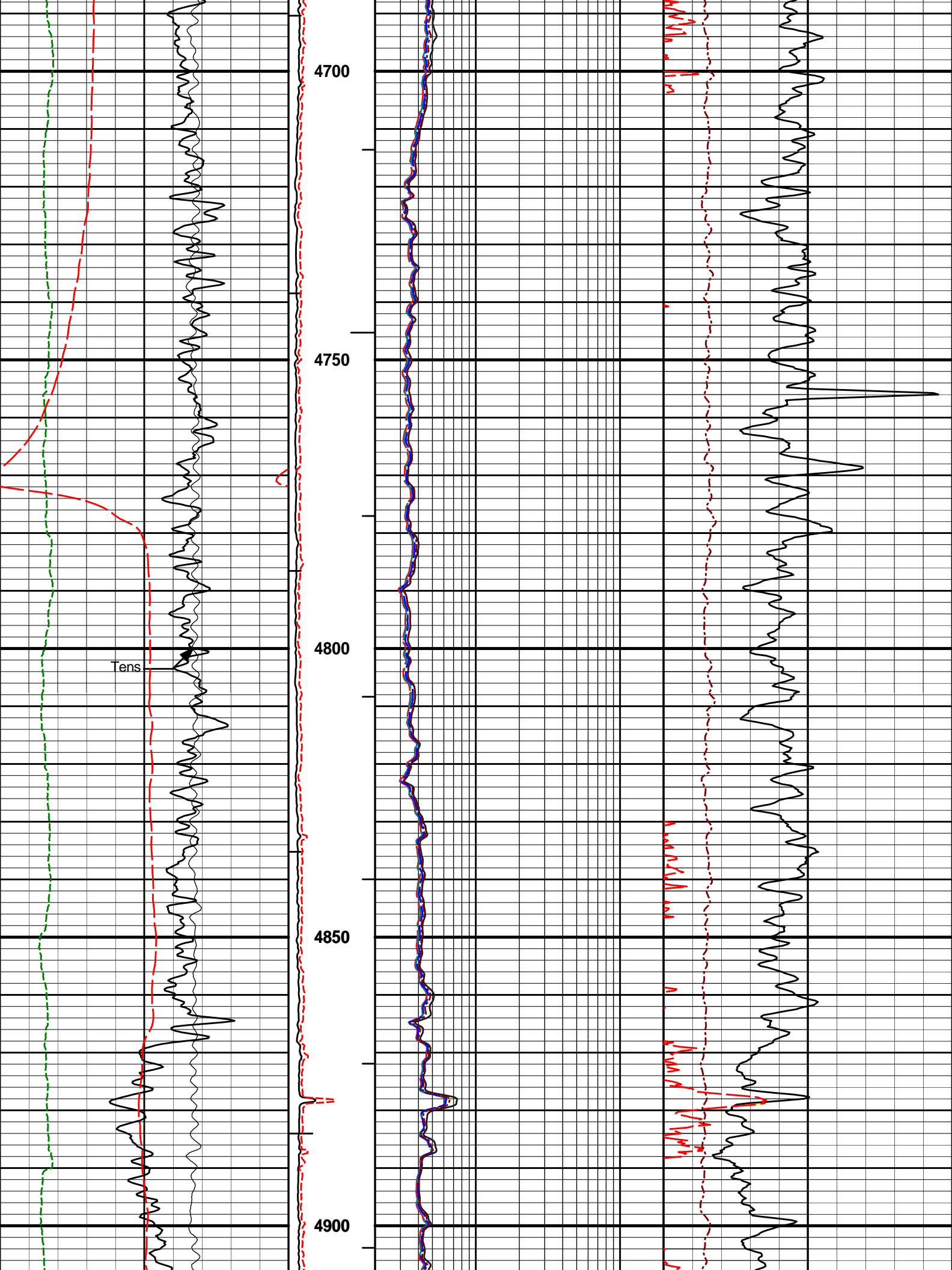








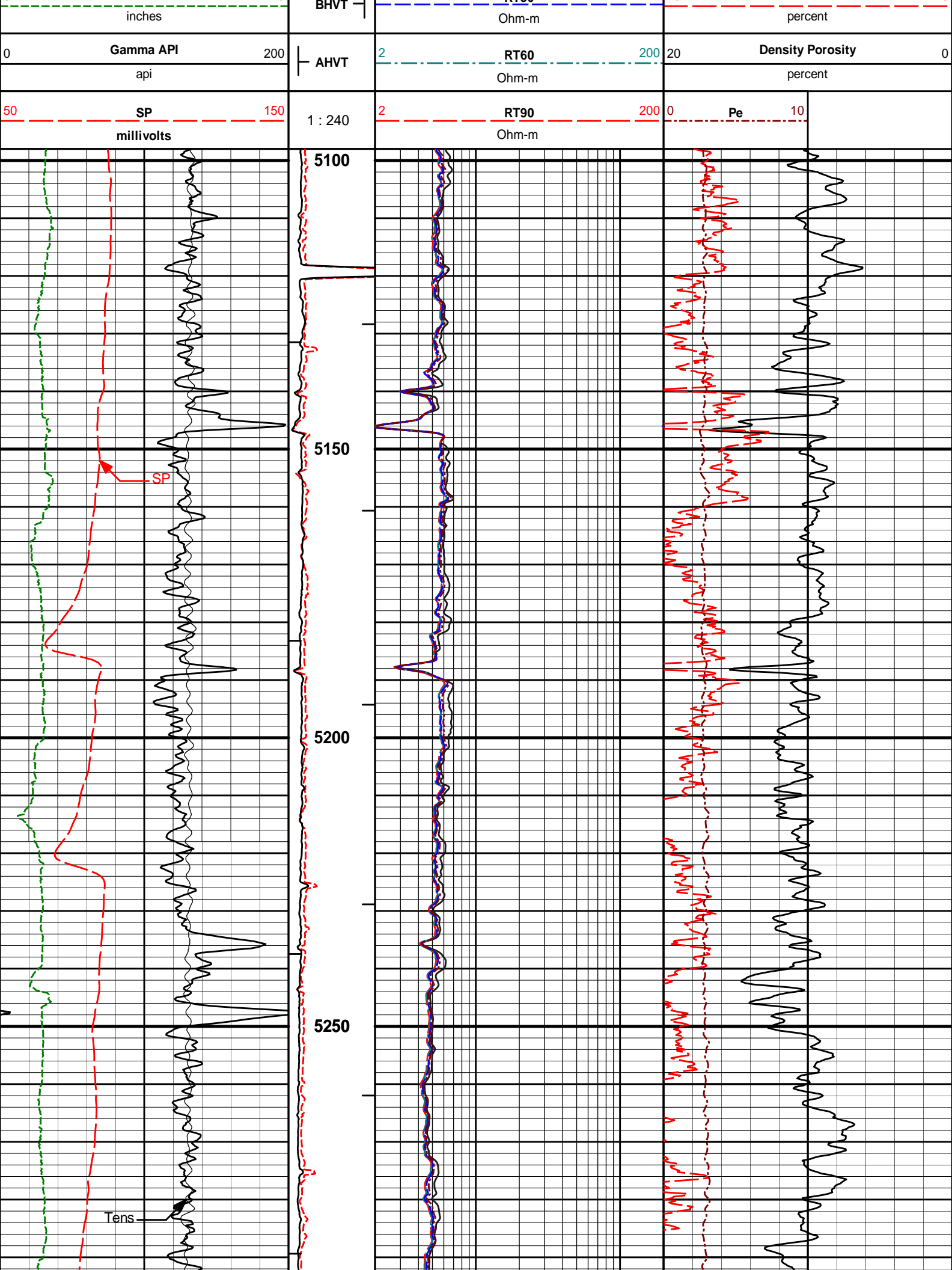




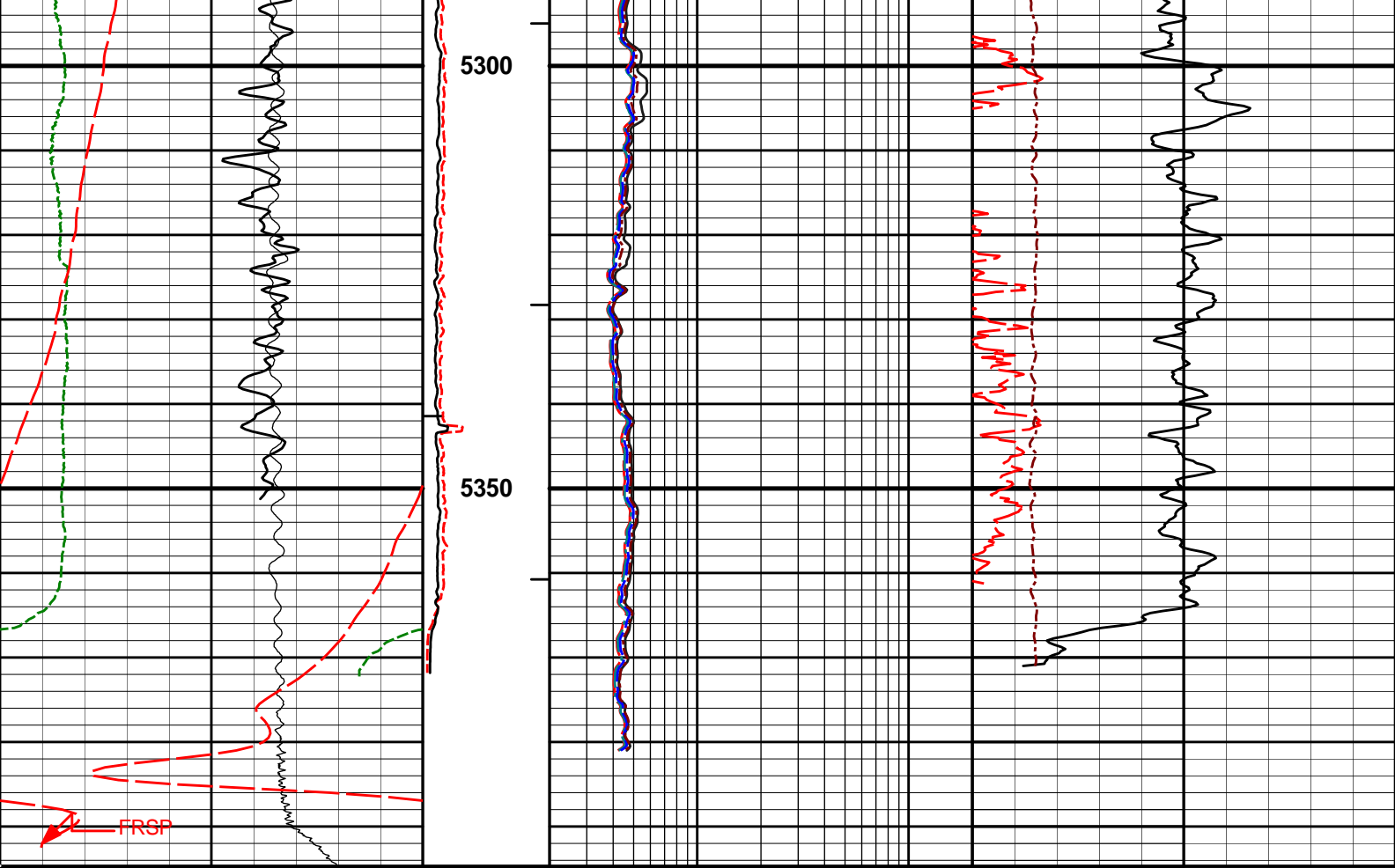












50	SP	150	1 : 240	2	RT90	200	0	Pe	10
	millivolts				Ohm-m				
0	Gamma API	200	AHVT	2	RT60	200	20	Density Porosity	0
	api				Ohm-m			percent	
6	Caliper	16	BHVT	2	RT30	200	20	Neutron Porosity	0
	inches				Ohm-m			percent	
10K	Tens	0	MicrologLateral	2	RT20	200			
	pounds		ohm-metre		Ohm-m				
			MicrologNormal	2	RT10	200			
			ohm-metre		Ohm-m				

**HALLIBURTON**

Plot Time: 11-May-11 08:29:32  
Plot Range: 5098 ft to 5394.67 ft  
Data: {ActiveWell}\Well Based\DAQ-0001-002\  
Plot File: \COMP\REPEAT

REPEAT PASS 5" = 100'

**HALLIBURTON**

# CALIBRATION REPORT

## NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET 11215095 Reference Calibration Date: 01 May 11 15:34:58

Tool Name:	GTET - 11215095	Reference Calibration Date:	01-May-11 15:34:38
Engineer:	R. TWEETEN	Calibration Date:	01-May-11 15:38:52
Software Version:	WL INSITE R3.2.5 (Build 2)	Calibration Version:	1

Calibrator Source S/N: TB290  
 Calibrator API Reference:235.00 api  
 Equivalent Calibrator API Reference:239.1 api

Measurement	Measured	Calibrated	Units
Background	70.9	73.9	api
Background + Calibrator	296.3	308.9	api
Calibrator	238.0	235.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION			
Tool Name:	GTET - 11215095	Reference Calibration Date:	01-May-11 15:38:52
Engineer:	R. TWEETEN	Calibration Date:	11-May-11 05:14:10
Software Version:	WL INSITE R3.2.5 (Build 2)	Calibration Version:	1

Calibrator Source S/N: TB290  
 Calibrator API Reference:235.00 api  
 Equivalent Calibrator API Reference:239.1 api

Field Verification	Shop	Field	Units
Background	73.9	106.1	api
Background + Calibrator	308.9	348.5	api
Calibrator	235.0	242.4	api

Shop	Field	Difference	Tolerance
235.0	242.4	-7.4	+/- 9.00

DUAL SPACED NEUTRON SHOP CALIBRATION			
Tool Name:	DSNT - 11219332	Reference Calibration Date:	22-Apr-11 16:55:57
Engineer:	C. BLUE	Calibration Date:	22-Apr-11 17:08:36
Software Version:	WL INSITE R3.2.5 (Build 2)	Calibration Version:	1

Logging Source S/N: DSN430  
 Tank Serial Number: BRIGHTON  
 Reference value assigned to Tank: 55.000  
 Snow Block S/N: BRIGHTON  
 Calibration Tank Water Temperature: 68 degF  
 Min. Tool Housing Outside Diameter: 3.625 in

CALIBRATION CONSTANTS			
Measurement	Prev. Value	New Value	Control Limit On New Value
Gain:	1.005	1.004	0.900 - 1.100

WATER TANK SUMMARY (Horizontal Water Tank)				
Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change
Porosity (decp):	0.2301	0.2295	0.0005	+/- 0.0020
Calibrated Ratio:	10.37	10.35	0.017	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0839	0.02000 - 0.09000

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MICRO LOG SHOP CALIBRATION						
Tool Name:     SDLT - I332M319			Reference Calibration Date:   02-May-11 17:09:49			
Engineer:     C. BLUE			Calibration Date:     06-May-11 06:39:39			
Software Version:   WL INSITE R3.2.5 (Build 2)			Calibration Version:   1			
	CALIBRATION COEFFICIENT SUMMARY					
	Measurement	Micro Log Normal		Micro Log Lateral		Units
		Measured	Calibrated	Measured	Calibrated	
	Tool Zero	-0.07	-0.08	-0.00	-0.00	ohmm
	Calibration Point #1	0.00	0.00	0.00	0.00	ohmm
	Calibration Point #2	19.95	20.00	19.95	20.00	ohmm
	Internal Reference	19.88	19.93	19.95	19.99	ohmm
	Measurement	Micro Log Normal Tool Value		Micro Log Lateral Tool Value		Units
	Tool Zero	-0.42		-0.15		V
	Calibration Point #1	19.60		1.54		V
	Calibration Point #2	5333.42		6884.53		V
	Internal Reference	5314.93		6882.08		V
	MICRO LOG FIELD CHECK					
Tool Name:     SDLT - I332M319			Reference Calibration Date:   06-May-11 06:39:39			
Engineer:     R. TWEETEN			Calibration Date:     11-May-11 05:13:37			
Software Version:   WL INSITE R3.2.5 (Build 2)			Calibration Version:   1			
	Measurement	Micro Log Normal		Micro Log Lateral		Units
		Shop	Field	Shop	Field	
	Tool Zero	-0.08	-0.07	-0.00	-0.00	ohmm
	Internal Reference	19.93	19.93	19.99	19.99	ohmm
	Summary					
	Signal	Shop	Field	Difference	Tolerance	
	Microlog Normal	19.93	19.93	0.00	+/- 0.80	
	Microlog Lateral	19.99	19.99	0.00	+/- 0.80	
DENSITY CALIPER SHOP CALIBRATION						
Tool Name:     SDLT - I332M319			Reference Calibration Date:   02-May-11 16:57:11			
Engineer:     R. TWEETEN			Calibration Date:     02-May-11 17:03:47			
Software Version:   WL INSITE R3.2.5 (Build 2)			Calibration Version:   1			
	CALIBRATION COEFFICIENTS					
	Measurement	Previous Value	New Value	Control Limit On New Value		
	Pad Offset	-2517.95	-2794.48	-7000.00 - -1000.00		
	Pad Gain	0.0003749	0.0003856	0.000200 - 0.000600		
	Arm Offset	-3453.71	-3099.26	-5000.00 - 3000.00		
	Arm Gain	0.0005819	0.0005596	0.000300 - 0.000700		
	Arm Power	-0.000008429	-0.000007406	-0.000010 - 0.000010		
	The ring diameter is computed from: DIAMETER = PAD EXTENSION + ARM EXTENSION + TOOL DIAMETER					
	Tool Diameter: 4.50 in					
	CALIBRATION RINGS					
	Measurement	Current Reading (Previous Coeff.)	Calibrated (New Coeff.)	Change	Control Limit On New Value	
	PAD EXTENSION:					
	Small Ring (in)	2.05	2.00	-0.05	+/- 0.20	

Medium Ring (in)		3.75	3.75	0.00	+/- 0.20
RING DIAMETER:					
Small Ring (in)		6.47	6.50	0.03	+/- 0.20
Medium Ring (in)		8.29	8.25	-0.04	+/- 0.20
Large Ring (in)		15.09	15.00	-0.09	+/- 0.20
PASS/FAIL SUMMARY					
Calibration-Coefficients Range Check:				Passed	
Ring-Measurement Check:				Passed	
PASS/FAIL SUMMARY					
Calibration-Coefficients Range Check:				Passed	

SDLT CALIPER FIELD CALIBRATION					
Tool Name:		SDLT - I332M319		Reference Calibration Date: 02-May-11 17:03:47	
Engineer:		R. TWEETEN		Calibration Date: 11-May-11 05:16:20	
Software Version:		WL INSITE R3.2.5 (Build 2)		Calibration Version: 1	

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.75	-0.00	+/- 0.10
Ring Diameter	8.25	8.24	-0.01	+/- 0.15
PASS/FAIL SUMMARY				
Pad Extension Check:			Passed	
Diameter Check:			Passed	

ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION					
Tool Name:		ACRt - E5787-S5797		Reference Calibration Date: 24-Jan-11 09:43:38	
Engineer:		Prakash		Calibration Date: 24-Jan-11 09:49:20	
Software Version:		WL INSITE R3.2.0 (Build 7)		Calibration Version: 1	

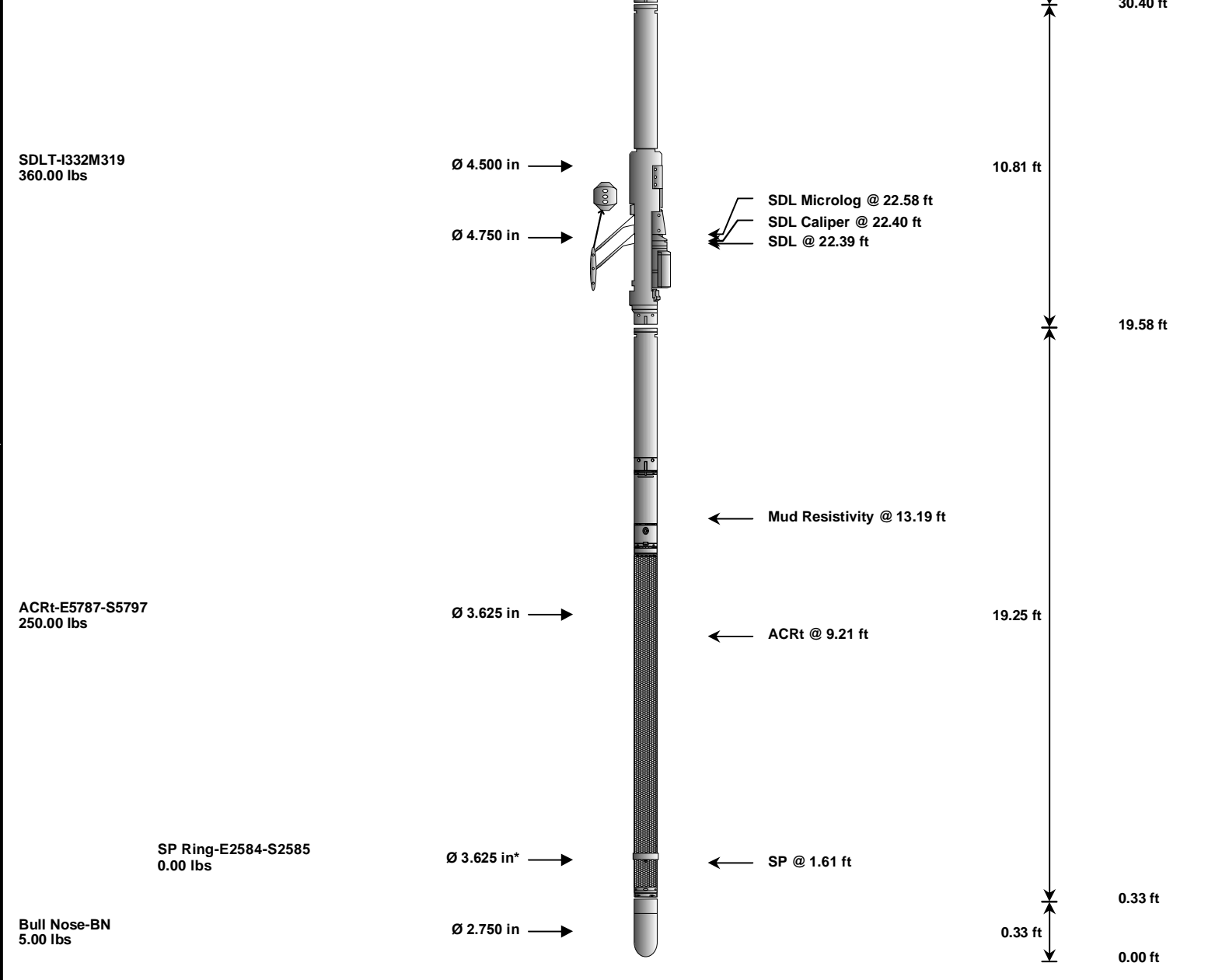
TYPICAL GAIN RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0038	1.05	0.95	1.0067	1.05	0.95	1.0052	1.05
A2 (50")	0.95	1.0052	1.05	0.95	1.0085	1.05	0.95	1.0104	1.05
A3 (29")	0.95	0.9979	1.05	0.95	1.0004	1.05	0.95	1.0002	1.05
A4 (17")	0.95	0.9940	1.05	0.95	0.9939	1.05	0.95	0.9967	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9931	1.05	0.95	0.9945	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9808	1.05	0.95	0.9816	1.05

TYPICAL SONDE OFFSET RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	-5	-0.883	2	-6	-3.862	-2	-8	-4.735	-2
A2 (50")	-7	-1.758	-1	-6	-3.248	-2	-7	-4.350	-2
A3 (29")	-27	-14.816	-9	-9	-4.039	-3	-7	-3.128	-1
A4 (17")	-180	-101.960	-60	-45	-29.395	-15	-39	-24.259	-13
A5 (10")	N/A	N/A	N/A	-150	-79.653	-50	-80	-44.165	-10
A6 (6")	N/A	N/A	N/A	175	277.762	525	90	145.450	270

TRANSMITTER CURRENT GAIN					R-MUD VERIFICATION				
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Signal	Lower	R	Upper	Signal	Lower (ohm-m)	Measured (ohm-m)	Upper (ohm-m)
12K	0.6	0.8745	1.3	Mud Cell	0.95	1.005	1.05
36K	1.0	1.8086	2.0				
72K	1.0	1.1234	2.0				
CALIBRATION SUMMARY							
Sensor	Shop	Field	Post	Difference	Tolerance	Units	
GTET-11215095							
Gamma Ray Calibrator	235.0	242.4	-----	-7.4	+/- 9.00	api	
DSNT-11219332							
Snow-Block Porosity	0.0839	0.0783	-----	0.0056	+/- 0.0150	decp	
SDLT-I332M319							
Near(B+D+P+L)	1539.193	1532.668	-----	6.525	+/-15.796	cps	
Far(B+D+P+L)	922.468	928.680	-----	-6.212	+/-16.454	cps	
MicroLog Normal	19.93	19.93	-----	0.00	+/-0.80	ohmm	
MicroLog Lateral	19.99	19.99	-----	0.00	+/-0.80	ohmm	
Pad Extension	3.75	3.75	-----	0.00	+/-0.10	in	
Ring Diameter	8.25	8.24	-----	0.010	+/-0.15	in	
ACRt-E5787-S5797							
Mud Cell	1.005	-----	-----	0.000	-----	ohm-m	
Data: BADDING_12-35SX\0001 TRIPLE\IDLE							
Date: 11-May-11 07:43:30							

<div>HALLIBURTON</div> <div>TOOL STRING DIAGRAM REPORT</div>							
Description	Overbody Description	O.D.	Diagram	Sensors @ Delays	Length	Accumulated Length	
RWCH-11078326 135.00 lbs		Ø 3.625 in →		← Load Cell @ 51.17 ft ← BH Temperature @ 50.60 ft	6.25 ft	54.85 ft	
				← GammaRay @ 42.54 ft	8.52 ft	48.60 ft	
GTET-11215095 165.00 lbs		Ø 3.625 in →				40.08 ft	
DSNT-11219332 174.00 lbs		Ø 3.625 in →		← DSN Far @ 33.15 ft ← DSN Near @ 32.40 ft	9.69 ft	29.40 ft	



Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	11078326	135.00	6.25	48.60	300.00
GTET	Gamma Telemetry Tool	11215095	165.00	8.52	40.08	60.00
DSNT	Dual Spaced Neutron	11219332	174.00	9.69	30.40	60.00
SDLT	Spectral Density Tool	I332M319	360.00	10.81	19.58	60.00
ACRt	Array Compensated True Resistivity	E5787-S5797	250.00	19.25	0.33	300.00
SP	SP Ring	E2584-S2585	0.00	0.25	*	300.00
BLNS	Bull Nose	BN	5.00	0.33	0.00	300.00

<b>Total</b>			<b>1,089.00</b>	<b>54.85</b>		
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\* Not included in Total Length and Length Accumulation.

<b>Data: BADDING_12-35SX\0001 TRIPLEVIDLE</b>	<b>Date: 11-May-11 06:56:38</b>
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COMPANY	KERR-MCGEE OIL & GAS ONSHORE LP
WELL	BADDING 12-35SX
FIELD	WATTENBERG
COUNTY	WELD
STATE	CO

ARRAY COMPENSATED



**HALLIBURTON**

TRUE RESISTIVITY  
SPECTRAL DENSITY  
DUAL SPACED NEUTRON