

**SPECTRAL DENSITY
DUAL SPACED NEUTRON
ARRAY COMPENSATED
TRUE RESISTIVITY**

COMPANY	NOBLE
WELL	DF RANCH 1161-9-24
FIELD	WATTENBERG
COUNTY	WELD
STATE	CO

COMPANY	NOBLE				
WELL	DF RANCH 1161-9-24				
FIELD	WATTENBERG				
COUNTY	WELD	STATE	CO		
API No.	05123310090000	Other			
Location	SHL: 1980' FNL & 1980' FWL LAT: 40.93804° LONG: -104.21278°	RWM GTE IDT CSN BSA ICT			
Sect. 9	Twp. 11N	Rge. 61W			

Services:

Permanent Datum log measured from	GL KB KB	Elev. 5265.0 ft 11.0 ft above perm. Datum KB	Elev.: KB. D.F. GL.	5276.0 ft 5276.0 ft 5265.0 ft
Drilling measured from				

Date	22-Apr-10					
Run No.	ONE					
Depth - Driller	7940.00 ft					
Depth - Logger	7930.0 ft					
Bottom - Logged Interval	7921 ft					
Top - Logged Interval	1063 ft					
Casing - Driller	8.625 in @ 1057.0 ft					
Casing - Logger	1063.0 ft					
Bolt Size	7.875 in @					
Type Fluid in Hole	WB/M					
Density	8.7 ppq		33.00 s/qt			
pH	9.50 pH		9.6 cp/m			
Source of Sample	FLOWLINE					

Rm @ Meas. Temperature	2.25 ohmm	@ 90.10 degF	@	
Rnrf @ Meas. Temperature	2.42 ohmm	@ 75.00 degF	@	@
Rmc @ Meas. Temperature	2.16 ohmm	@ 75.00 degF	@	@
Source Rnrf	CHART	CHART		
Rm @ BHT	1.00 ohmm	@ 212.0 degF	@	@
Time Since Circulation	5.0 hr			
Time on Bottom	22-Apr-10 12:36			
Max. Rec. Temperature	212.0 degF	@ 7930.0 ft	@	@
Equipment	10549597	BRIGHTON		
Recorded By	C. BLUE			
Witnessed By	SHANE HEARD	ROBIN BRACKMAN		

Service Ticket No.: 7321186 API Serial No.: 05123310090000 PGM Version: WL INSITE R2.4 (Build 20)

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 817-353	N/A	1.5" S.O.	N/A
Rmc @ Meas. Temp.		@		@						
Source Rmf	Rmc									
Rm @ BHT		@		@						
Rmf @ BHT		@		@						
Rmc @ BHT		@		@						

LOGGING DATA

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	7930	7559	REC	0	250	30%	-15%	55.5 us/ft	20%	0%	2.65 g/cc	20%	0%	SAND
ONE	7559	7138	REC	0	250	30%	-15%	55.5 us/ft	20%	0%	2.68 g/cc	20%	0%	SAND

ONE	7559	7138	REC	0	250	30%	-15%	55.5 us/ft	20%	0%	2.68 g/cc	20%	0%	SAND
ONE	7138	6700	REC	0	250	30%	-15%	47.6 us/ft	20%	0%	2.71 g/cc	20%	0%	LIME
ONE	6700	1063	REC	0	250	30%	-15%	55.5 us/ft	20%	0%	2.68 g/cc	20%	0%	SAND
DIRECTIONAL INFORMATION														
Maximum Deviation @									KOP @					
Remarks:														
RWCH/GTET/IDT/CSNG/DSNT/SDLT/ICT/BSAT/ACRT RAN IN COMBINATION														
ANNULAR HOLE VOLUME CALCULATED FOR 5.5 INCH PRODUCTION CASING														
TENSION PULLS AFFECT TOOL RESPONSE														
CREW: T. BINEAU, J. WALKER RIG: FORT DRILLING 5														
THANK YOU FOR CHOOSING HALLIBURTON ENERGY 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														

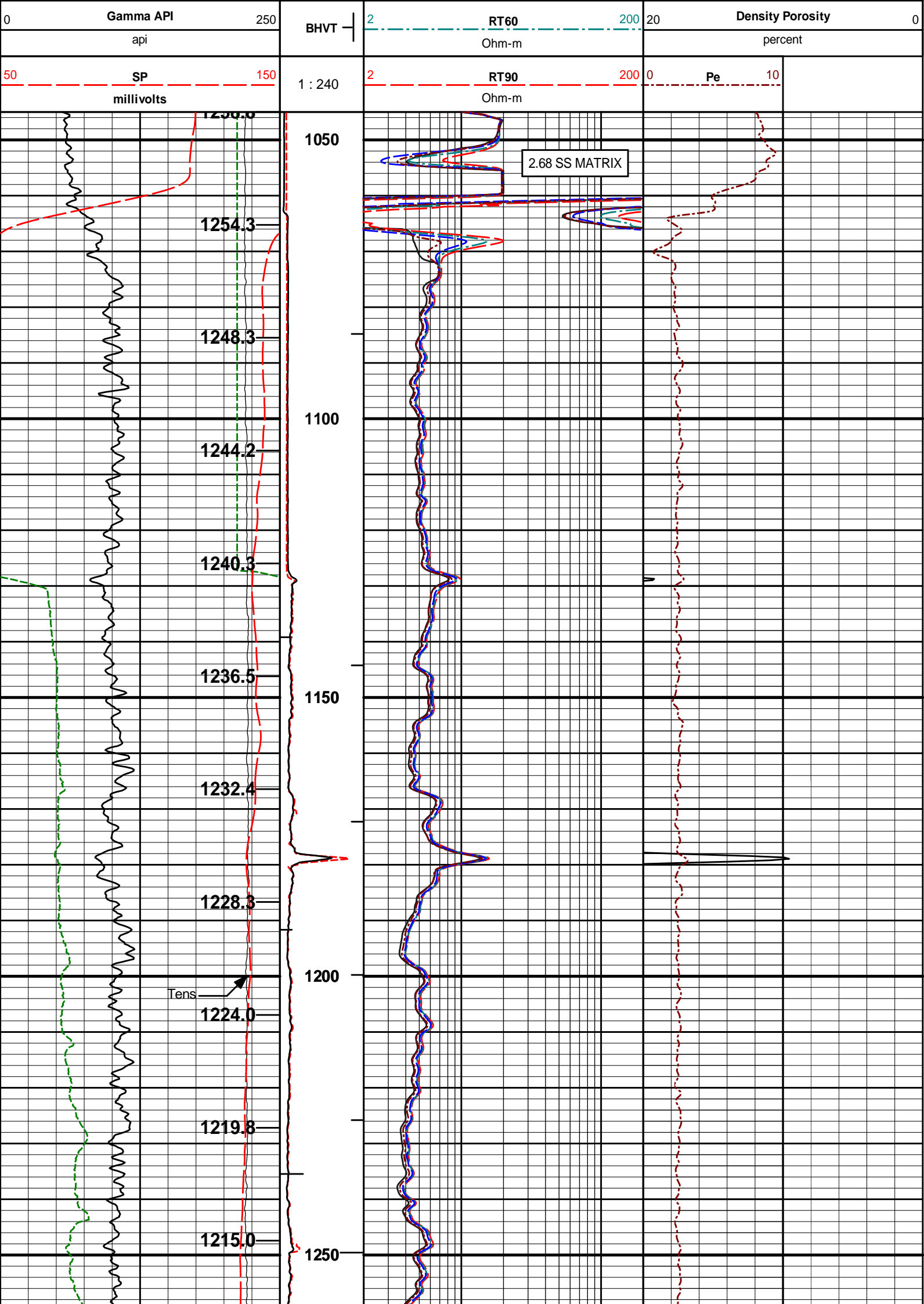


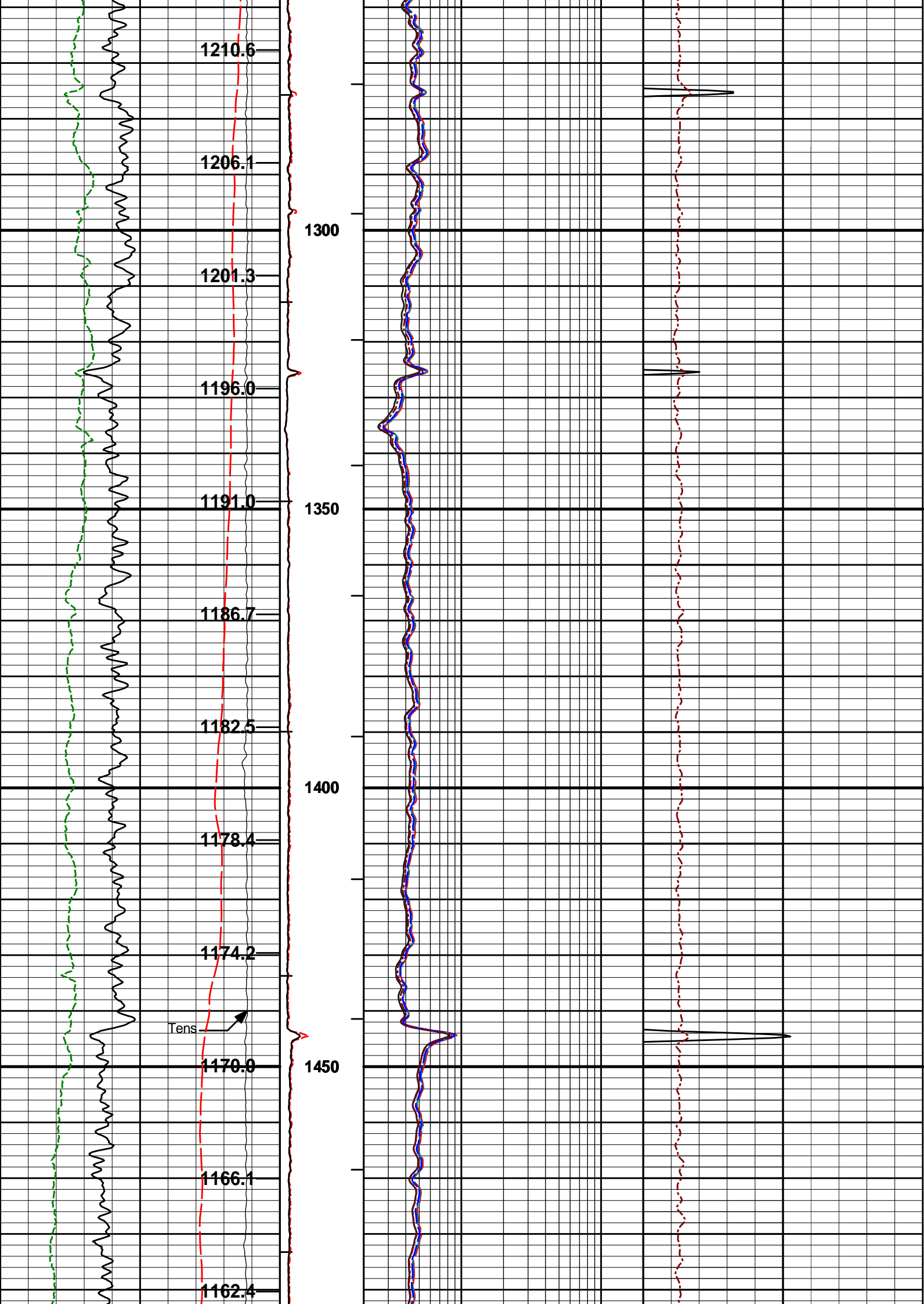
PARAMETERS REPORT

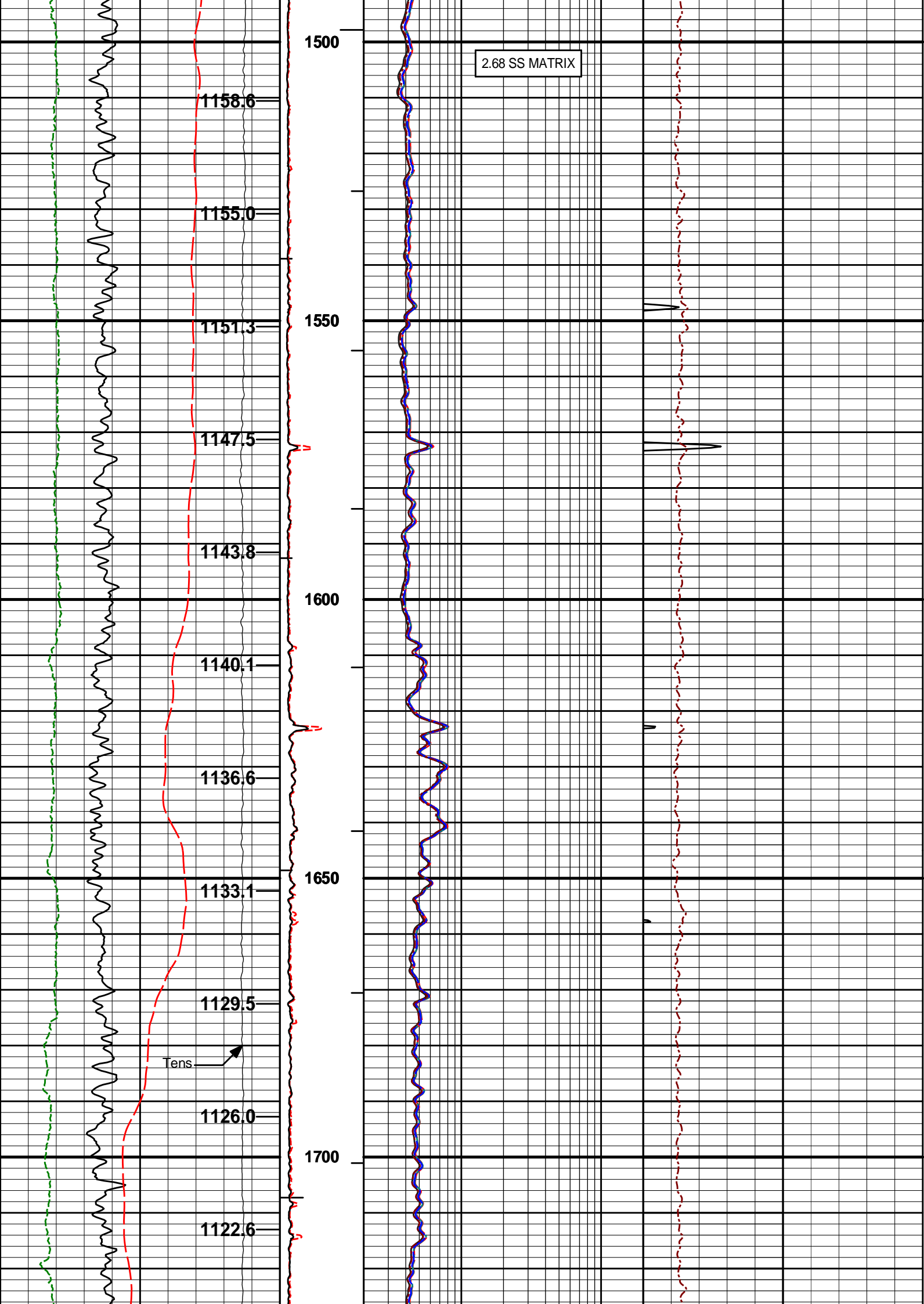
Depth (ft)	Tool Name	Description	Value	Units
TOP				
	DSNT	Neutron Lithology	Sandstone	
	SDLT	Formation Density Matrix	2.680	g/cc
	BSAT	Delta -T Matrix Type	Sandstone 55.5	
6700.00				
	DSNT	Neutron Lithology	Limestone	
	SDLT	Formation Density Matrix	2.710	g/cc
	BSAT	Delta -T Matrix Type	User define	
	BSAT	Delta -T Matrix	47.60	uspf
7138.00				
	SDLT	Formation Density Matrix	2.680	g/cc
7559.00				
	SHARED	Bit Size	7.875	in
	SHARED	Use Bit Size instead of Caliper for all applications.	No	
	SHARED	Borehole Fluid Weight	8.700	ppg
	SHARED	Mud Resistivity	2.250	ohmm
	SHARED	Temperature of Mud	90.1	degF
	SHARED	Oil Based Mud System?	No	
	SHARED	Logging Interval is Cased?	No	
	SHARED	AHV Casing OD	5.500	in
	SHARED	Surface Temperature	50.0	degF
	SHARED	Total Well Depth	7930.00	ft
	SHARED	Bottom Hole Temperature	212.0	degF
	GTET	Process Gamma Ray?	Yes	
	GTET	Gamma Tool Standoff	0.000	in
	GTET	Process Gamma Ray EVR?	No	
	IDT	Survey Writing Interval	30	ft
	CSNG	Process CSNG Data?	Yes	
	CSNG	Is Tool Centralized?	No	
	CSNG	Mud Type?	Natural	
	CSNG	Percent K in Mud by Weight?	0.00	%

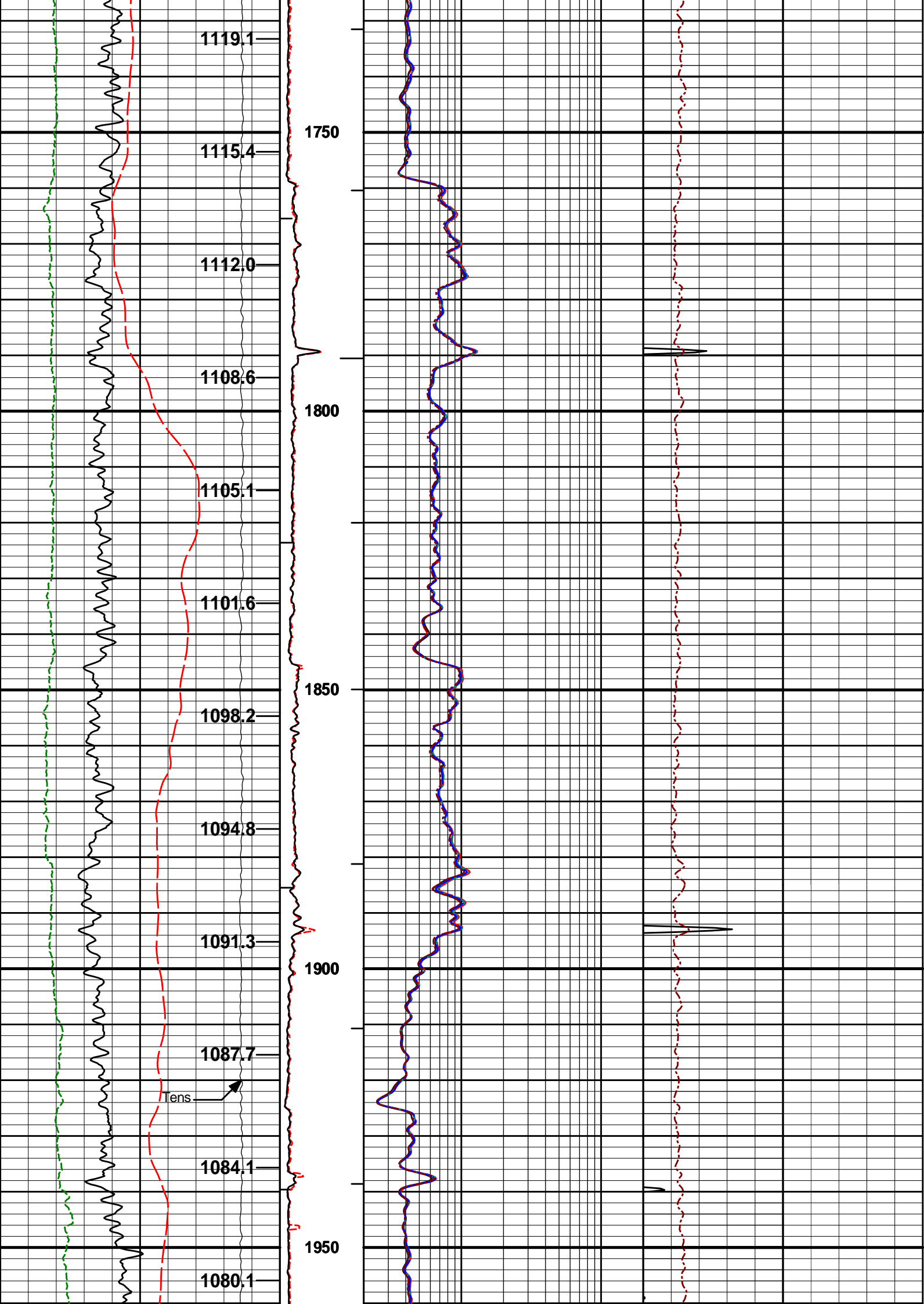
CSNG	Process R in Mud by Weight?	0.00	%
CSNG	Gamma Enviromental Corrections?	Yes	
CSNG	Barite Correction Factor	1.0	
DSNT	Process DSN?	Yes	
DSNT	Process DSN EVR?	No	
DSNT	Neutron Lithology	Sandstone	
DSNT	DSN Standoff - 0.25 in (6.35 mm) Recommended	0.000	in
DSNT	Temperature Correction Type	None	
DSNT	DSN Pressure Correction Type	None	
DSNT	View More Correction Options	No	
DSNT	Use TVD for Gradient Corrections?	No	
DSNT	Logging Horizontal Water Tank?	No	
SDLT	Process Density?	Yes	
SDLT	Process Density EVR?	No	
SDLT	Is Hole Air Drilled?	No	
SDLT	Use Calibration Blocks?	No	
SDLT	SDLT Pad Temperature Valid?	Yes	
SDLT	Disable temperature warning	No	
SDLT	Weighted Mud Correction Type?	None	
SDLT	Formation Density Matrix	2.650	g/cc
SDLT	Formation Density Fluid	1.000	g/cc
SDLT	Process Caliper Outputs?	Yes	
SDLT	Process MicroLog Outputs?	Yes	
ICT	Process Caliper Outputs?	Yes	
BSAT	Compute BCAS Results?	Yes	
BSAT	Semblance Filter Low Pass Value?	5000	Hz
BSAT	Semblance Filter High Pass Value?	27000	Hz
BSAT	Delta -T Fluid	189.00	uspf
BSAT	Delta -T Matrix Type	Sandstone 55.5	
BSAT	Delta -T Shale	100.00	uspf
BSAT	Acoustic Porosity Equation	Wylie	
ACRt	Process ACRt?	Yes	
ACRt	Minimum Tool Standoff	1.50	in
ACRt	Temperature Correction Source	FP Lwr & FP Up	
ACRt	Tool Position	Free Hanging	
ACRt	Rmud Source	Mud Cell	
ACRt	Minimum Resistivity for MAP	0.20	ohmm
ACRt	Maximum Resistivity for MAP	200.00	ohmm
BOTTOM			
Data: DF_RANCH\0001 QUAD-IDT-ICT-CSNG\003.01 22-Apr-10 13:53 Up			Date: 22-Apr-10 13:55:36

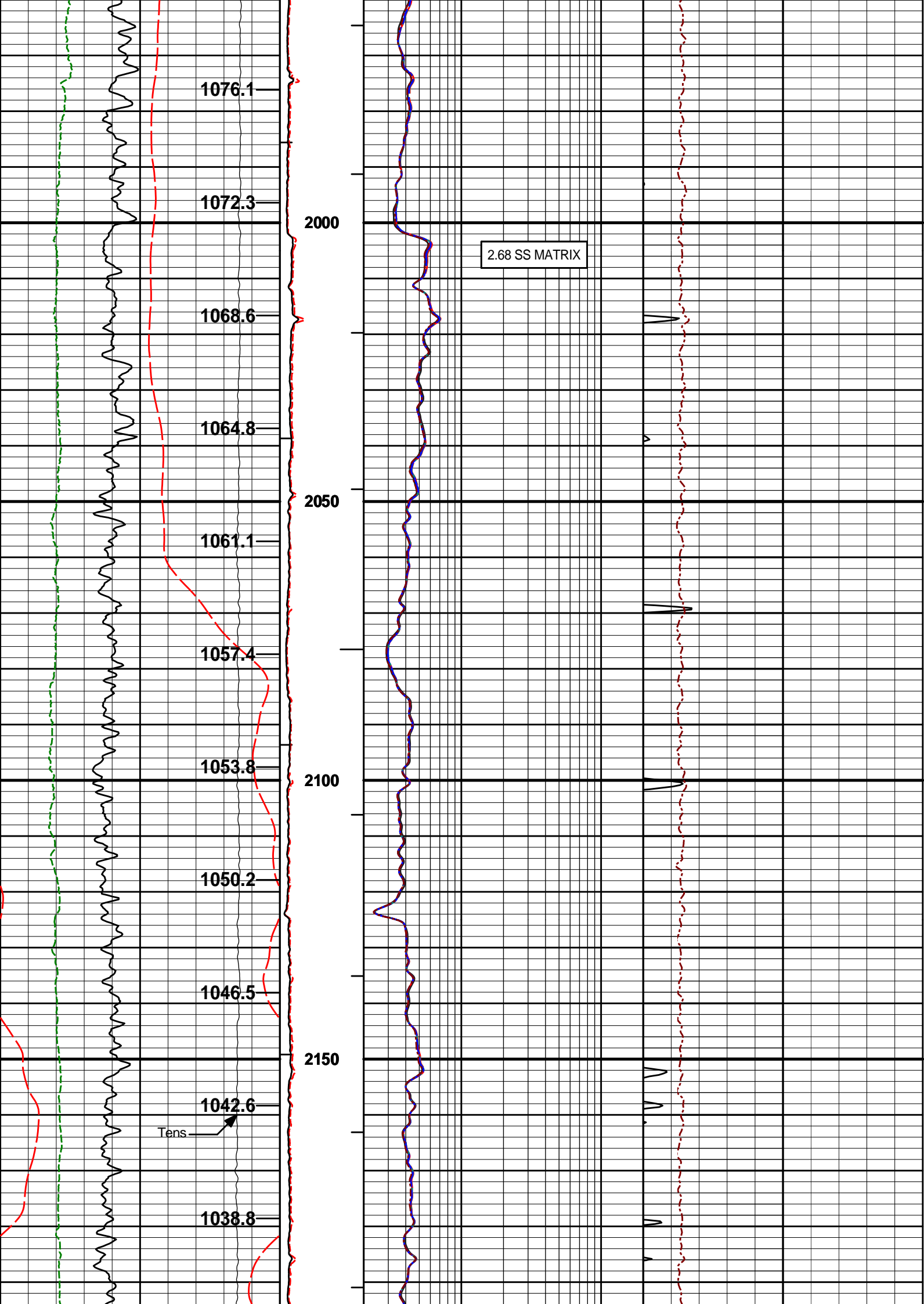
<div> <div>HALLIBURTON</div> <div> Plot Time: 22-Apr-10 15:22:25 Plot Range: 1045 ft to 7935.92 ft Data: DF_RANCH\Well Based\MAIN* Plot File: \\COMP\MAIN </div> </div>			
MAIN PASS 5" = 100'			
<div> <div>Annular Volume Total</div> <div>—</div> </div>		<div> <div>MicrologNormal</div> <div>0302</div> <div>ohm-metre</div> </div>	<div> <div>RT10</div> <div>200</div> <div>Ohm-m</div> </div>
10K	<div> <div>Tens</div> <div>0</div> <div>pounds</div> </div>	<div> <div>MicrologLateral</div> <div>0302</div> <div>ohm-metre</div> </div>	<div> <div>RT20</div> <div>200</div> <div>Ohm-m</div> </div>
6	<div> <div>Caliper</div> <div>16</div> <div>inches</div> </div>	<div> <div>AHVT</div> <div>—</div> </div>	<div> <div>RT30</div> <div>200</div> <div>Ohm-m</div> </div>
		20	<div> <div>Neutron Porosity</div> <div>0</div> <div>percent</div> </div>

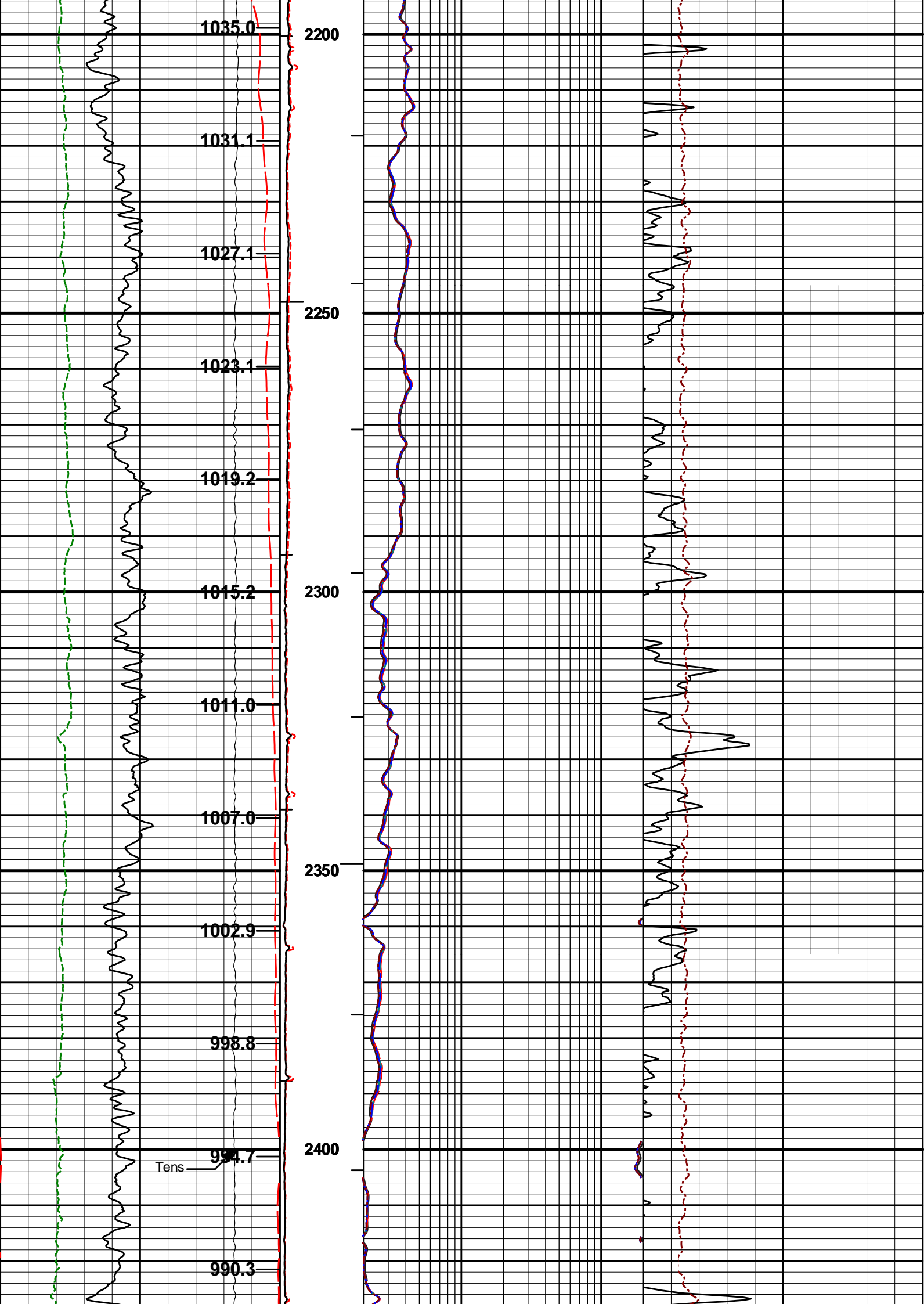


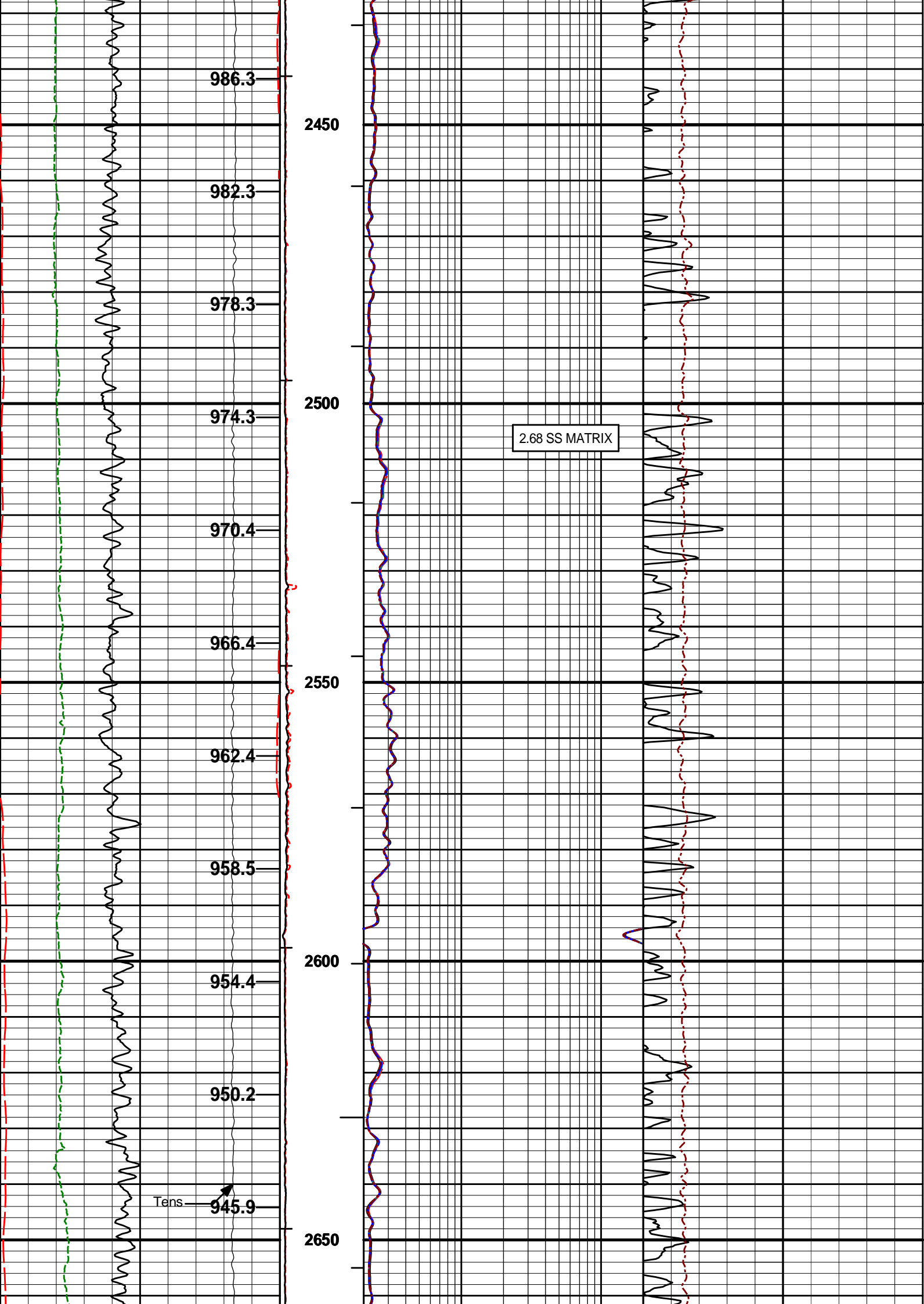


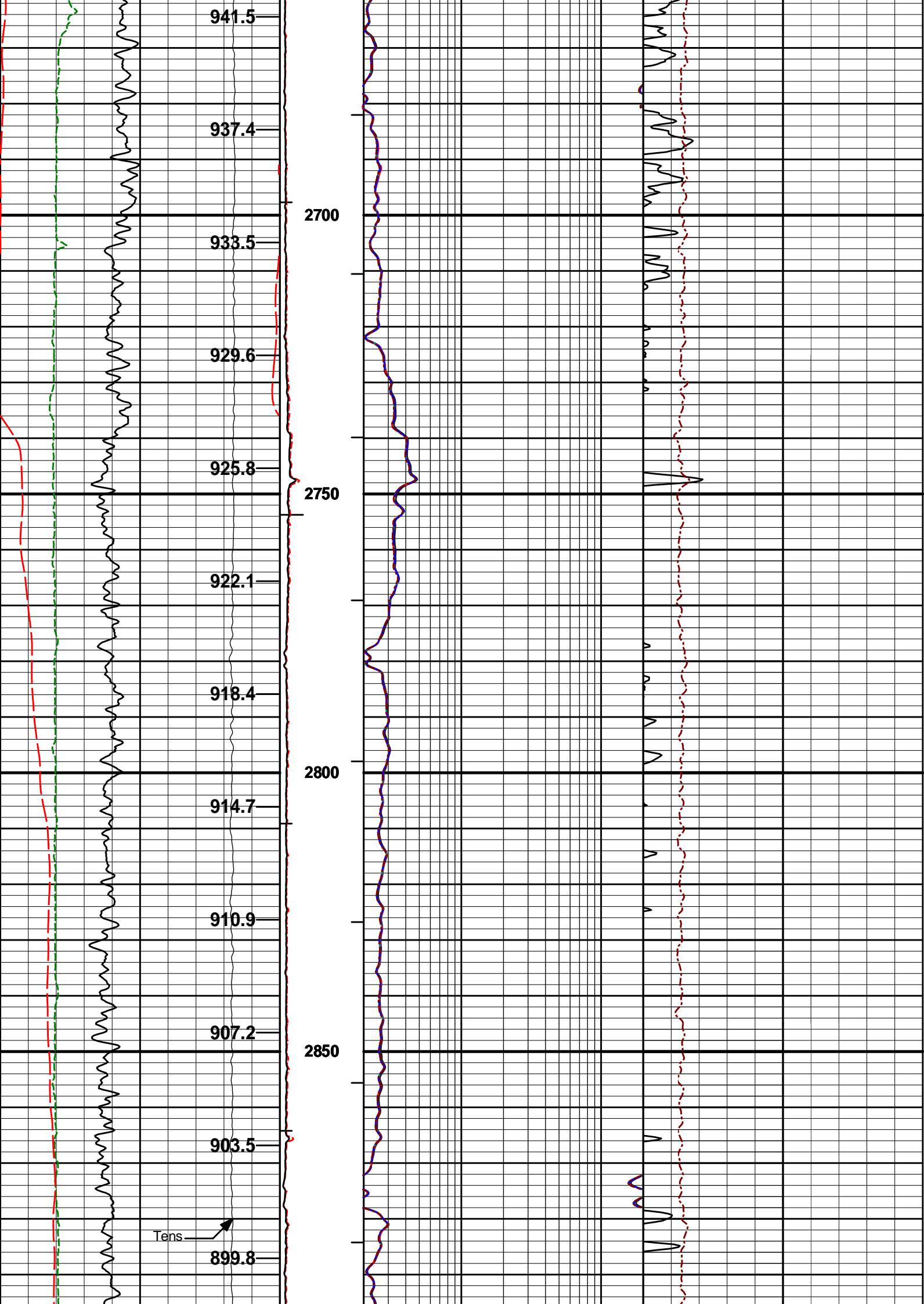


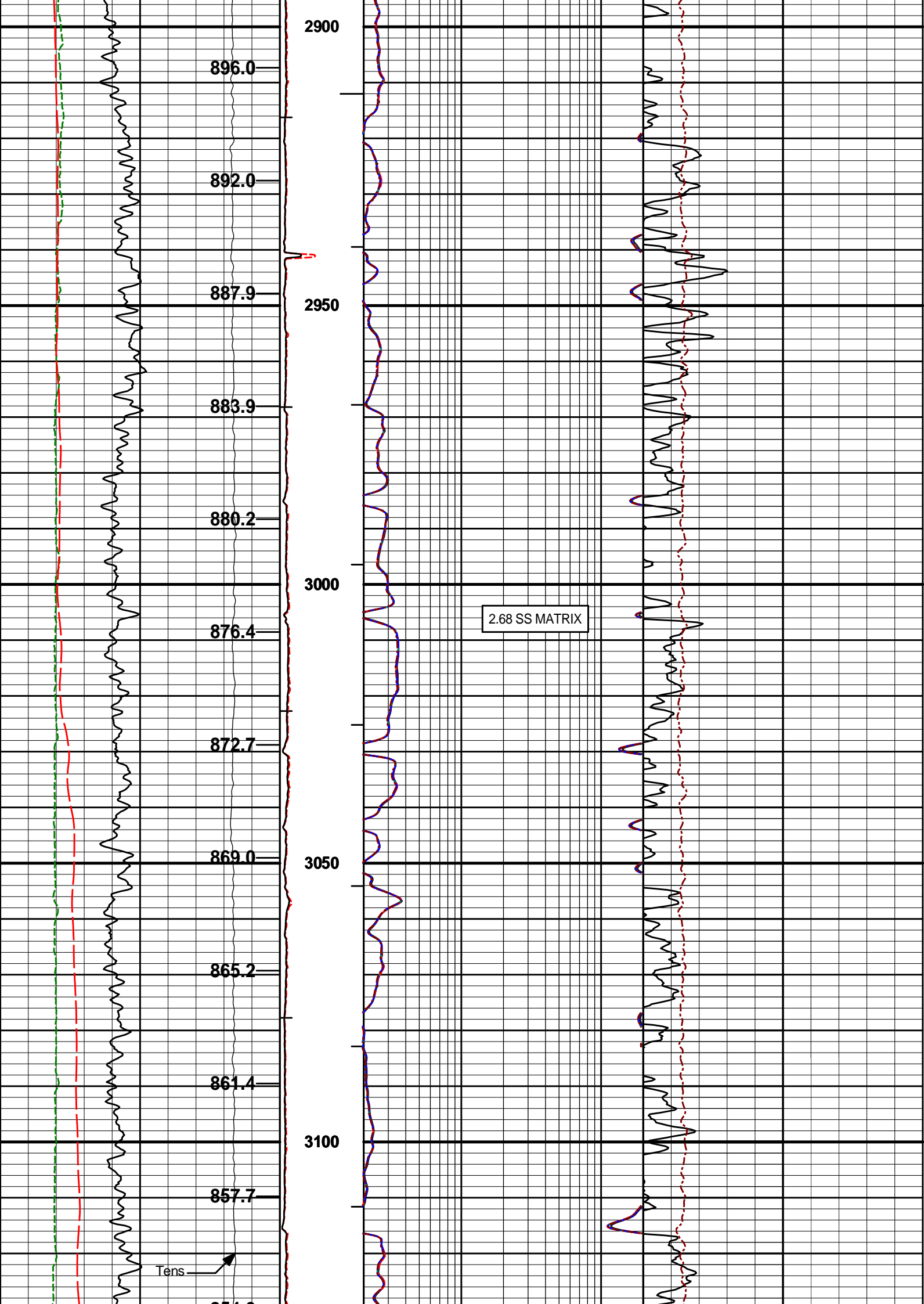


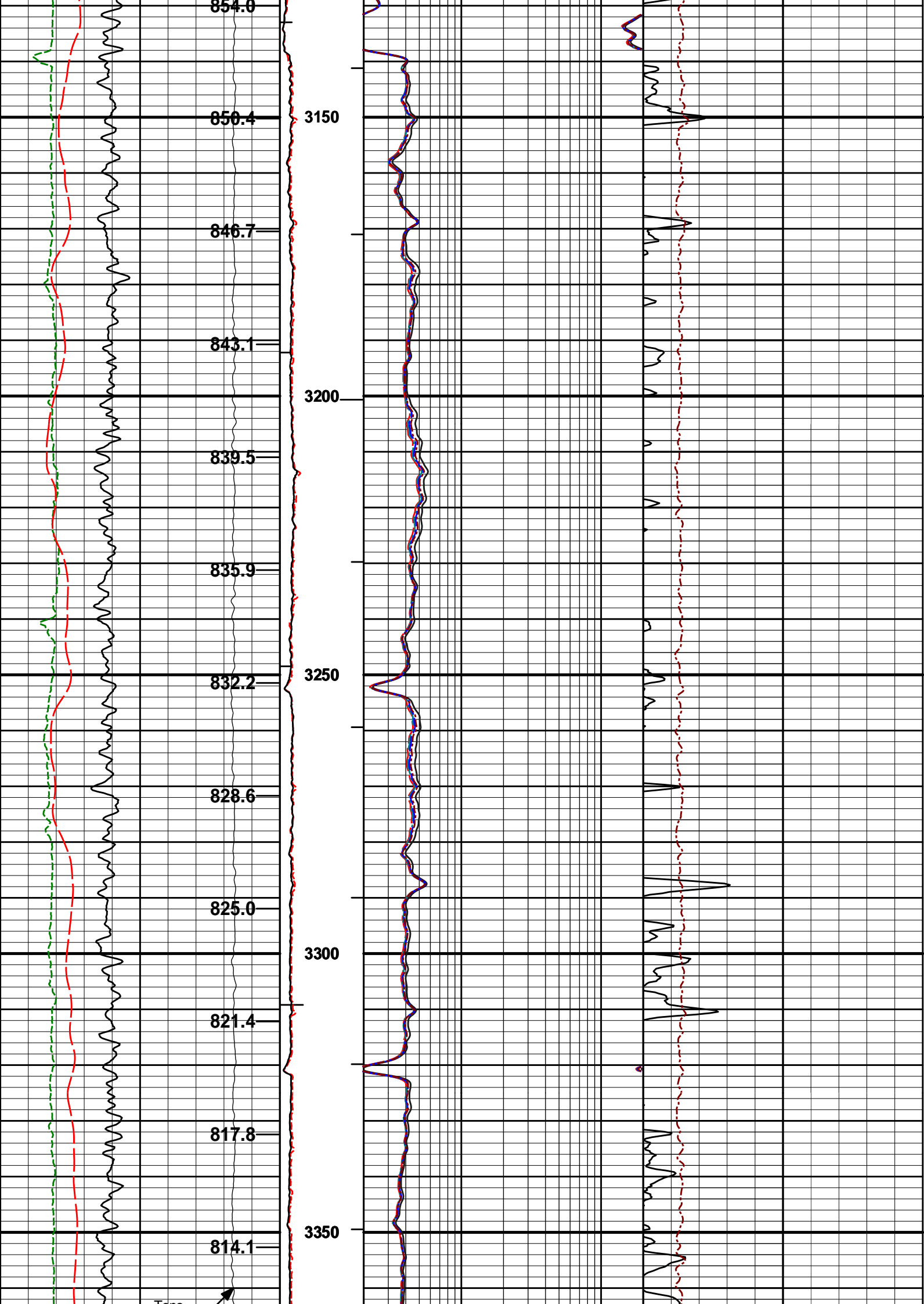


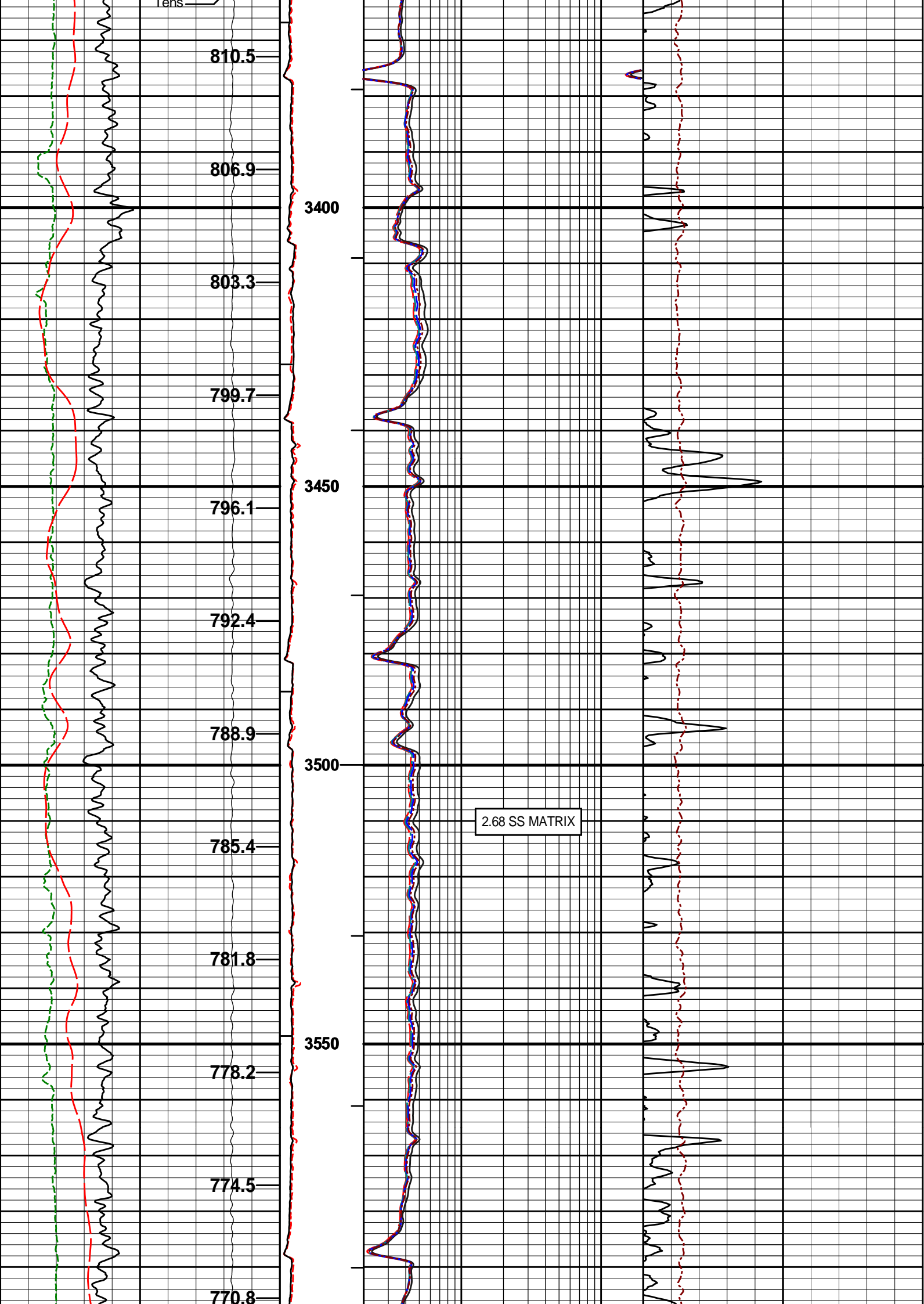


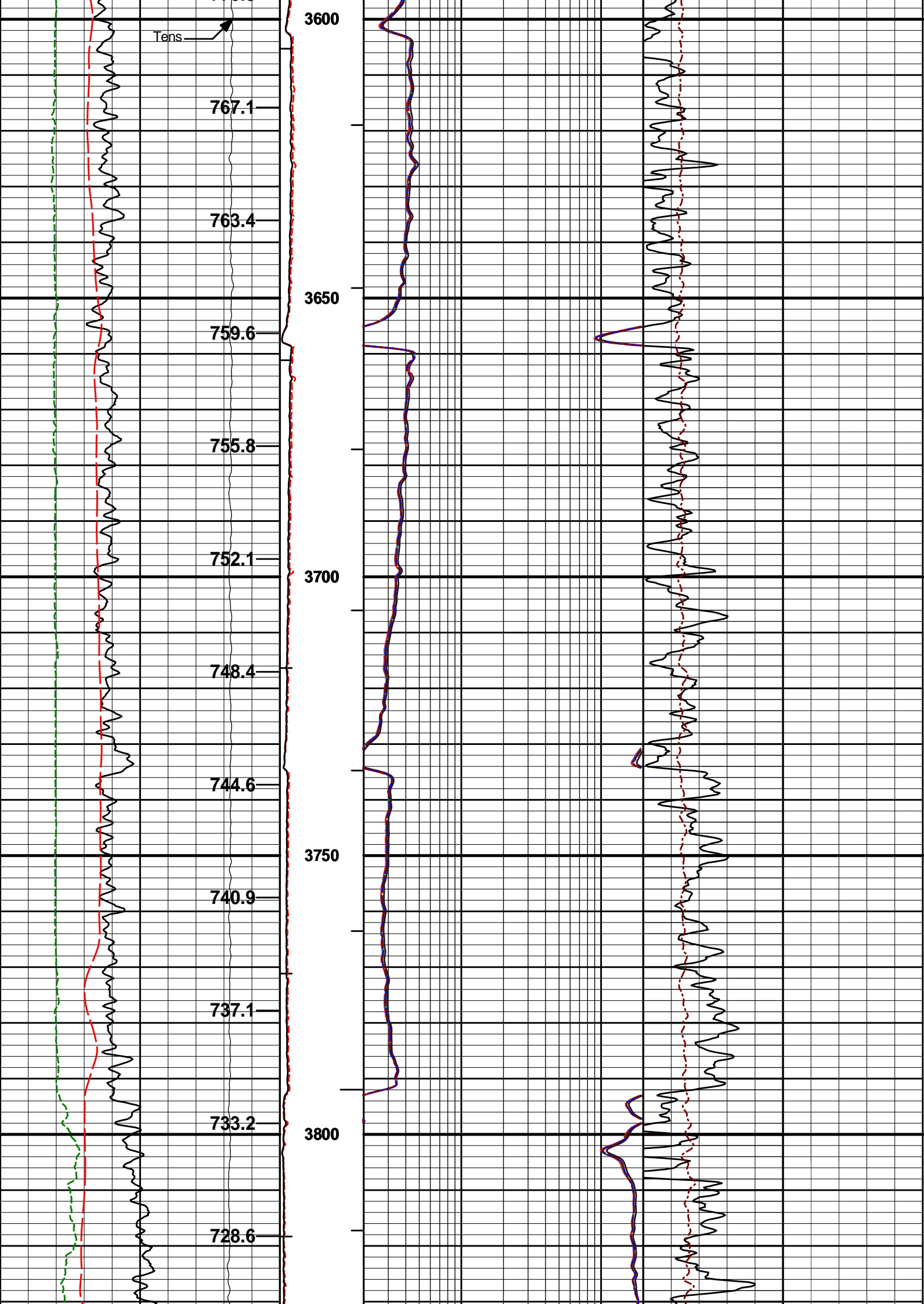


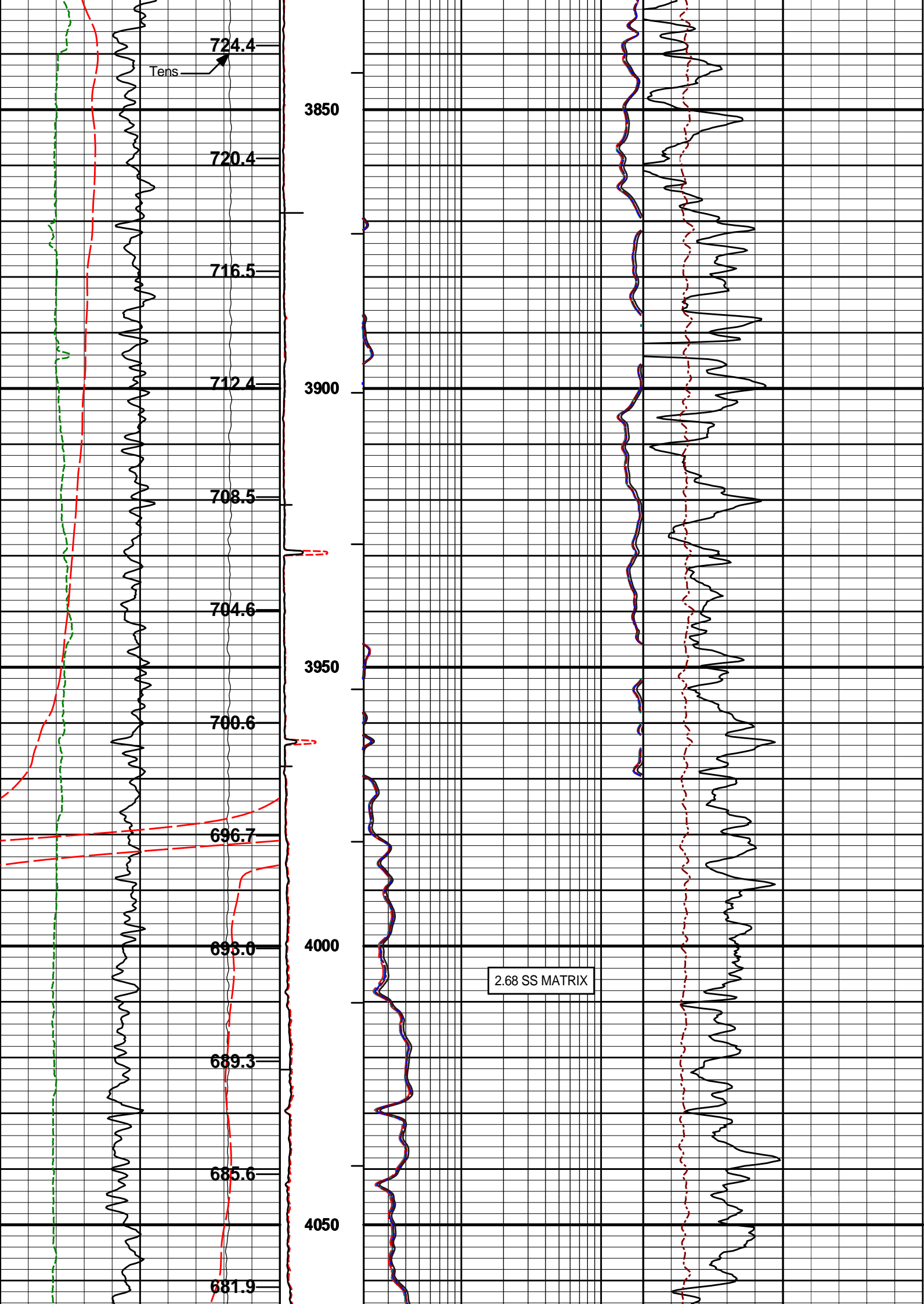


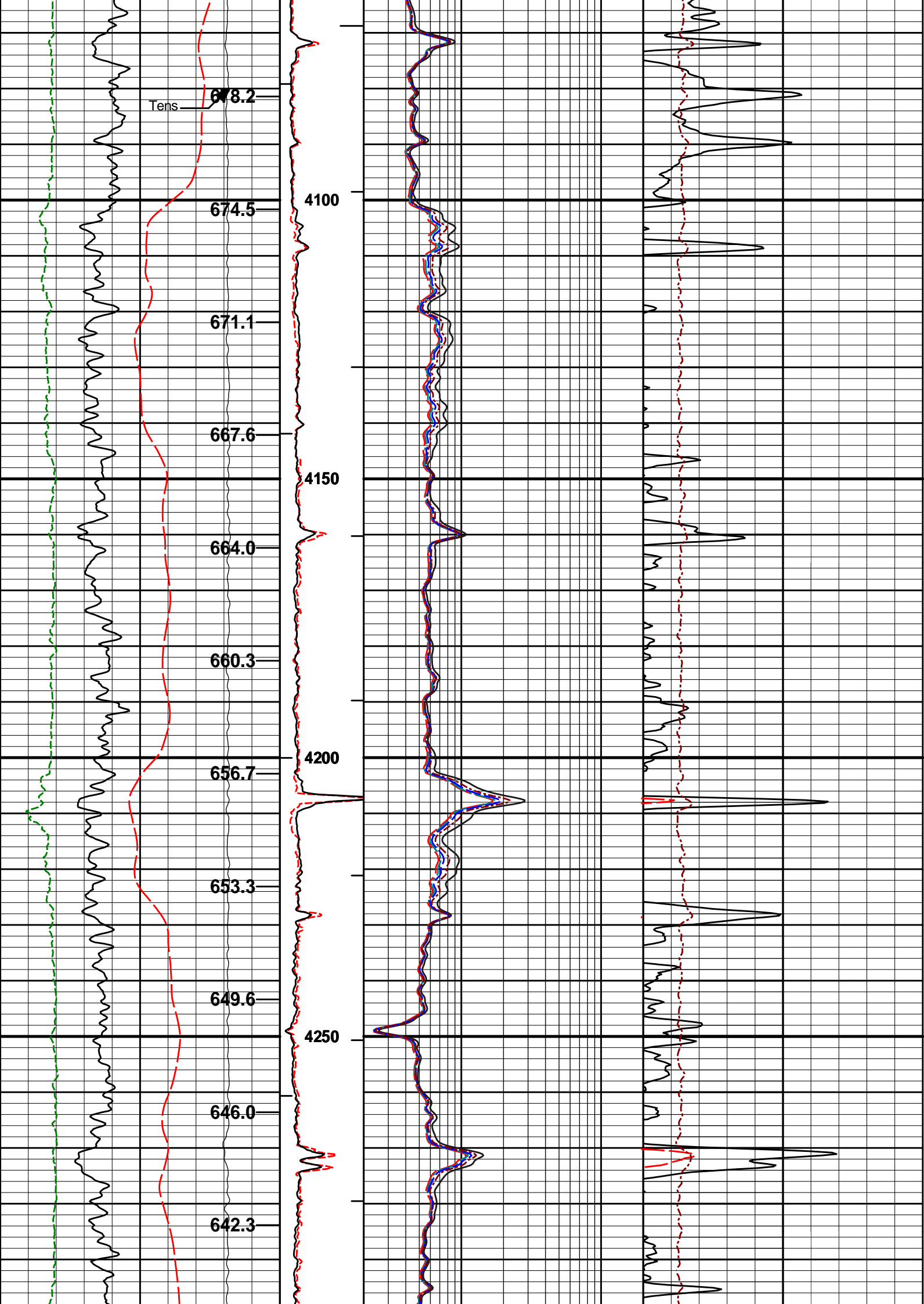


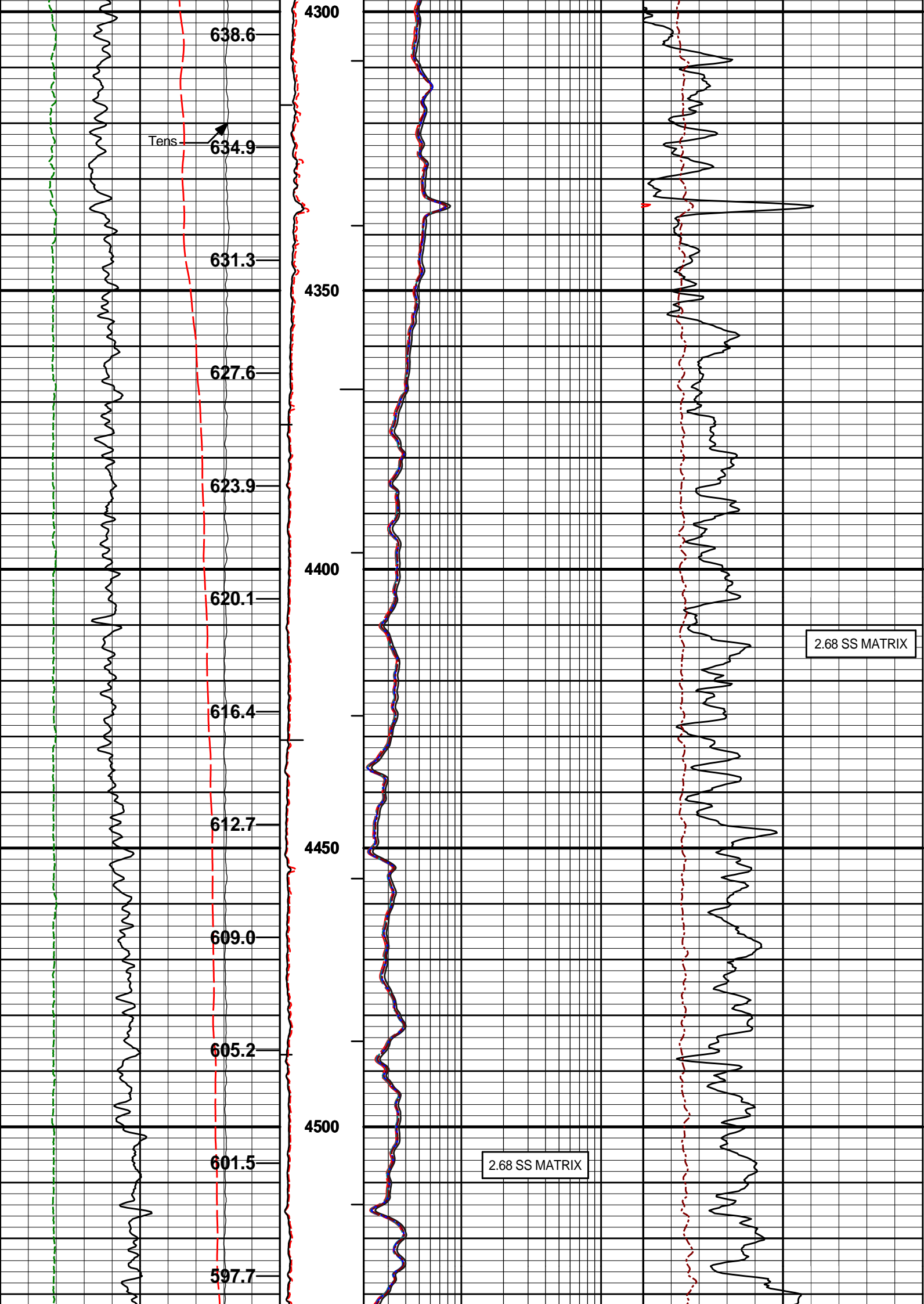


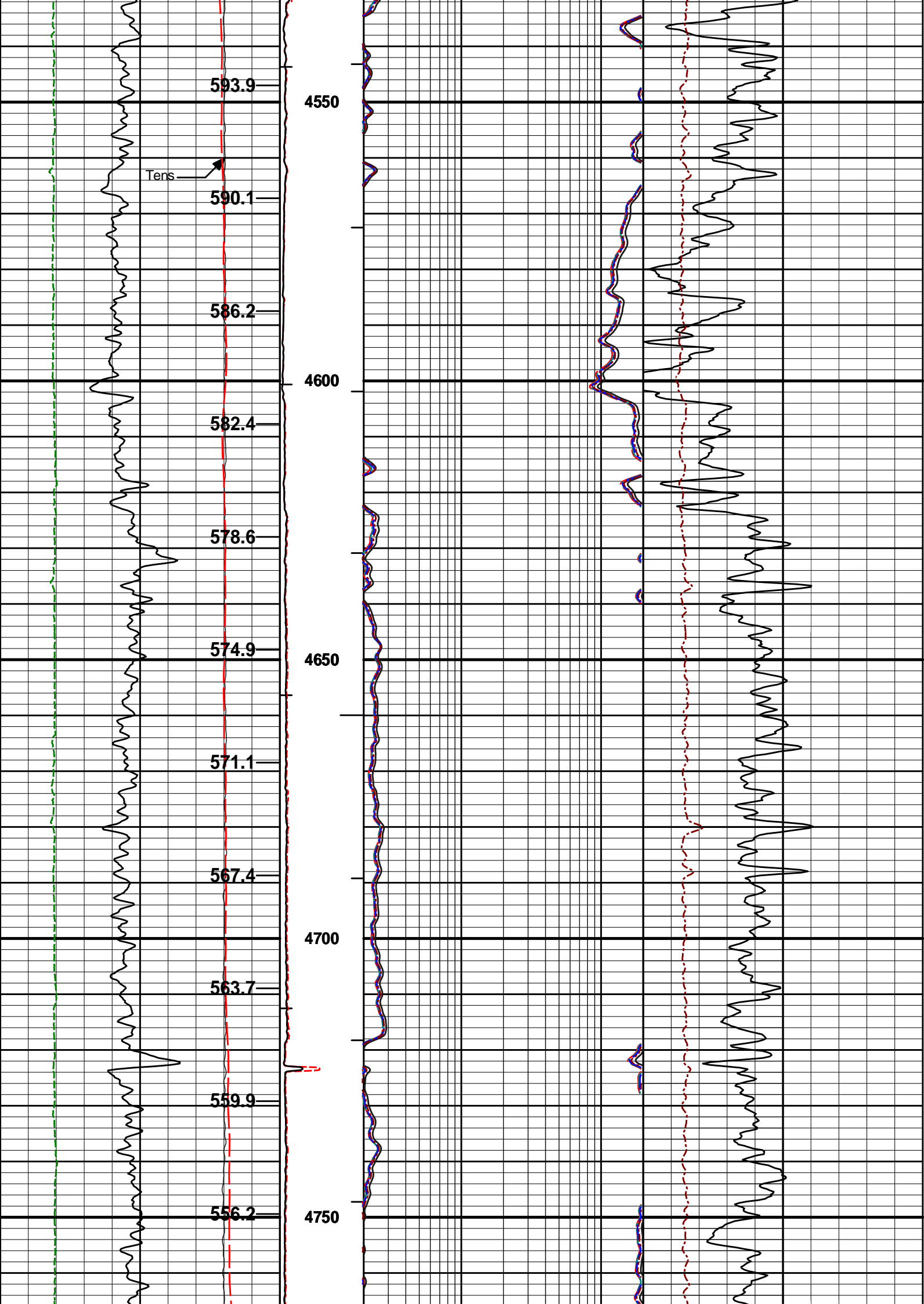


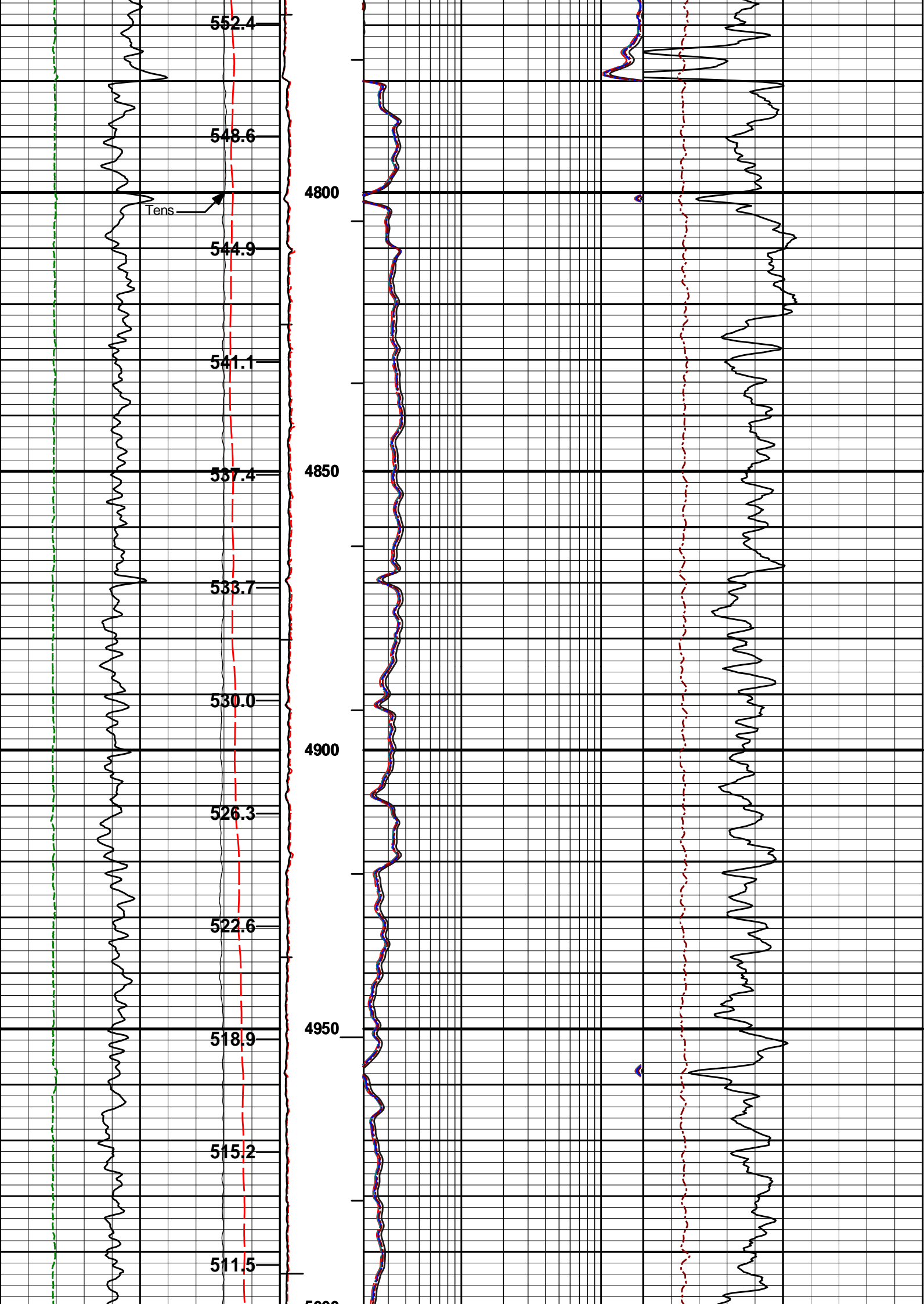


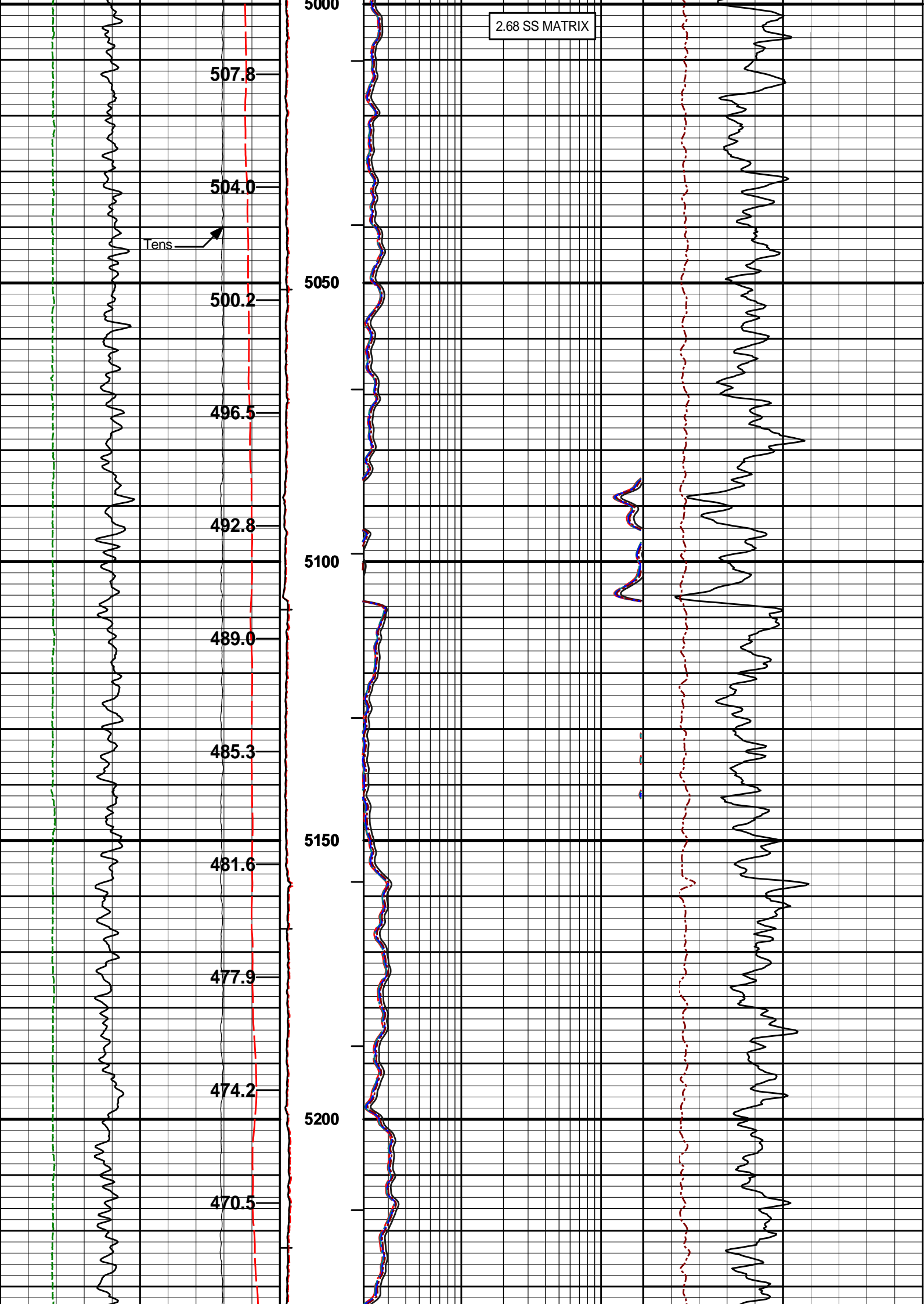


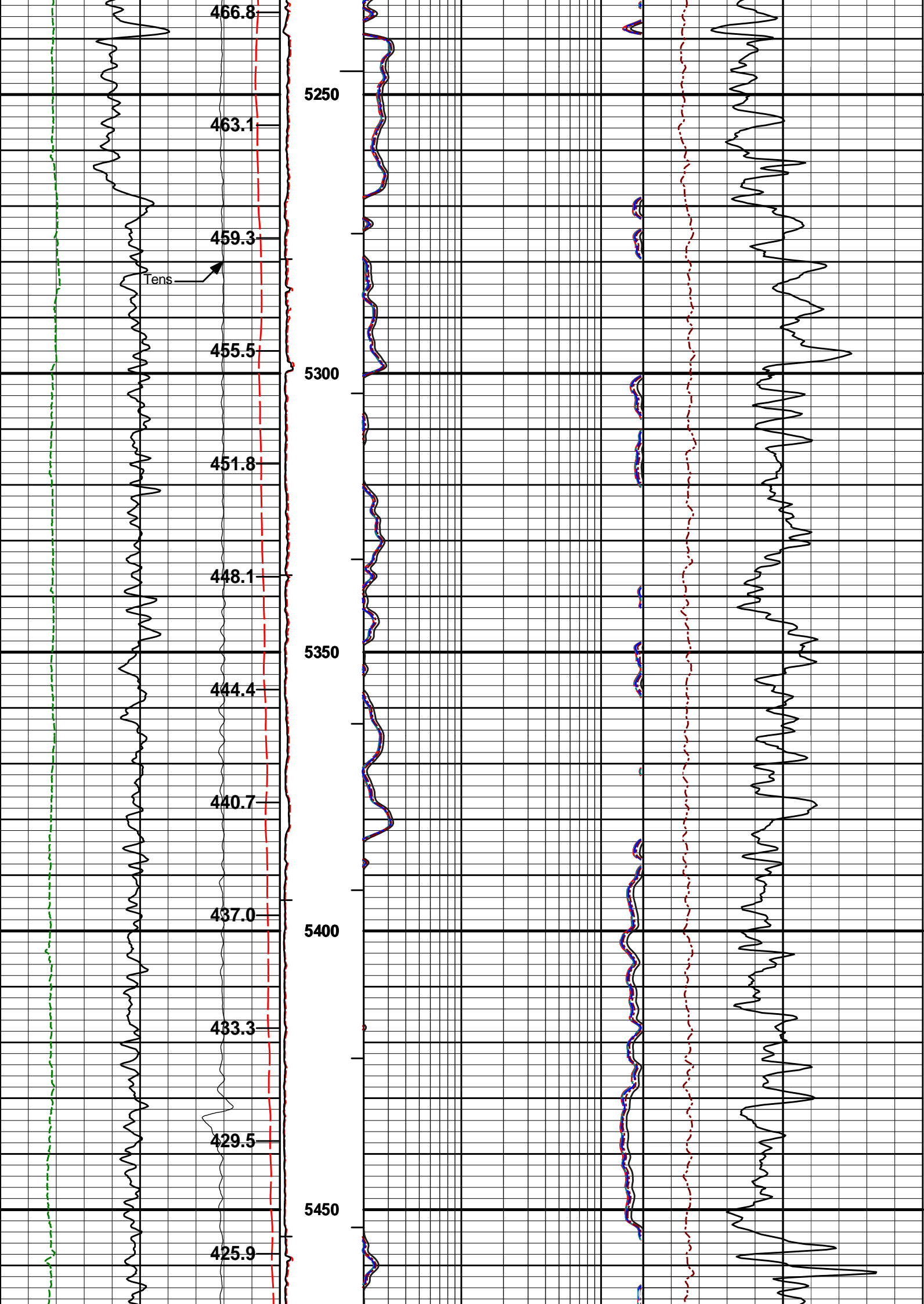


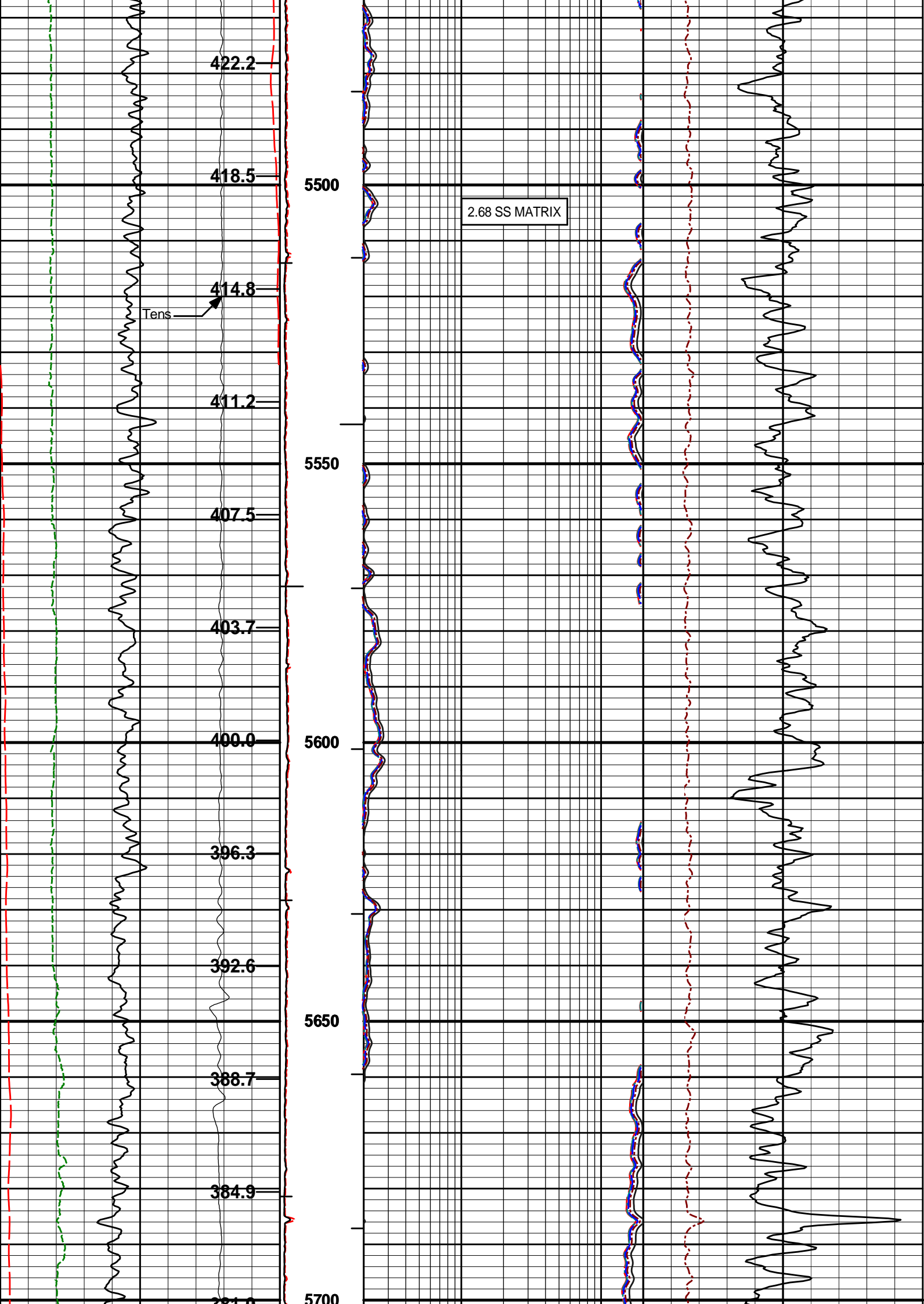


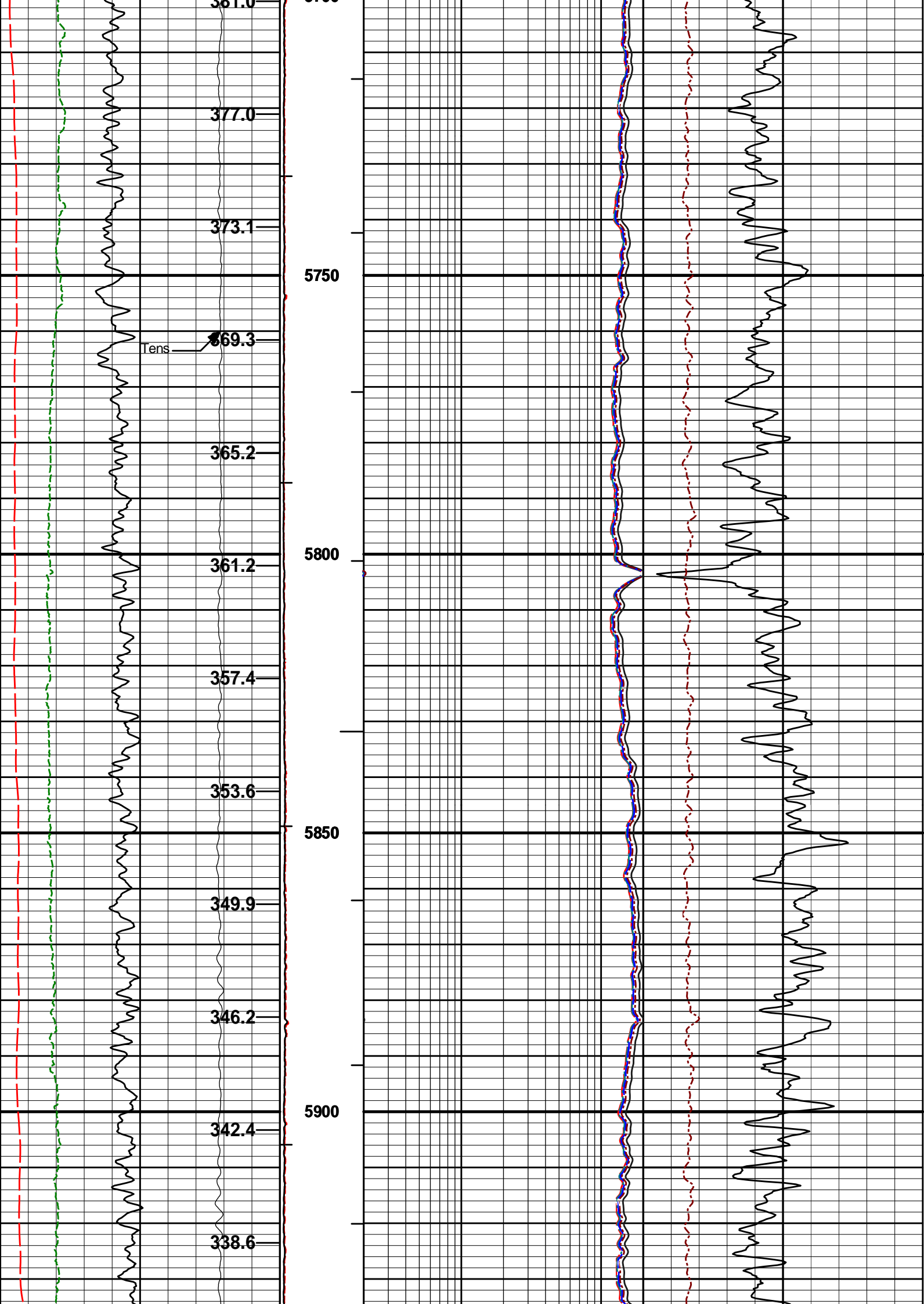


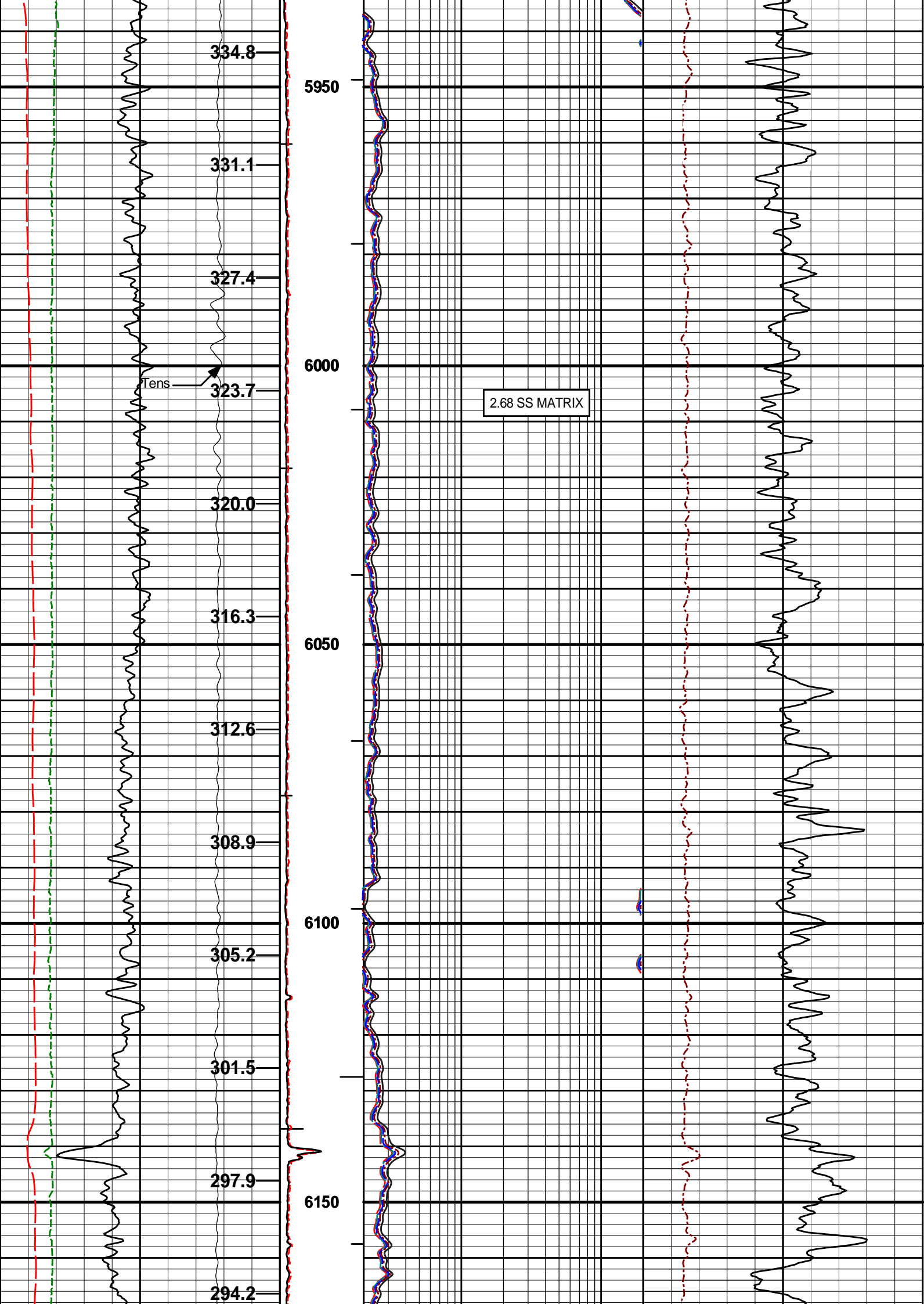


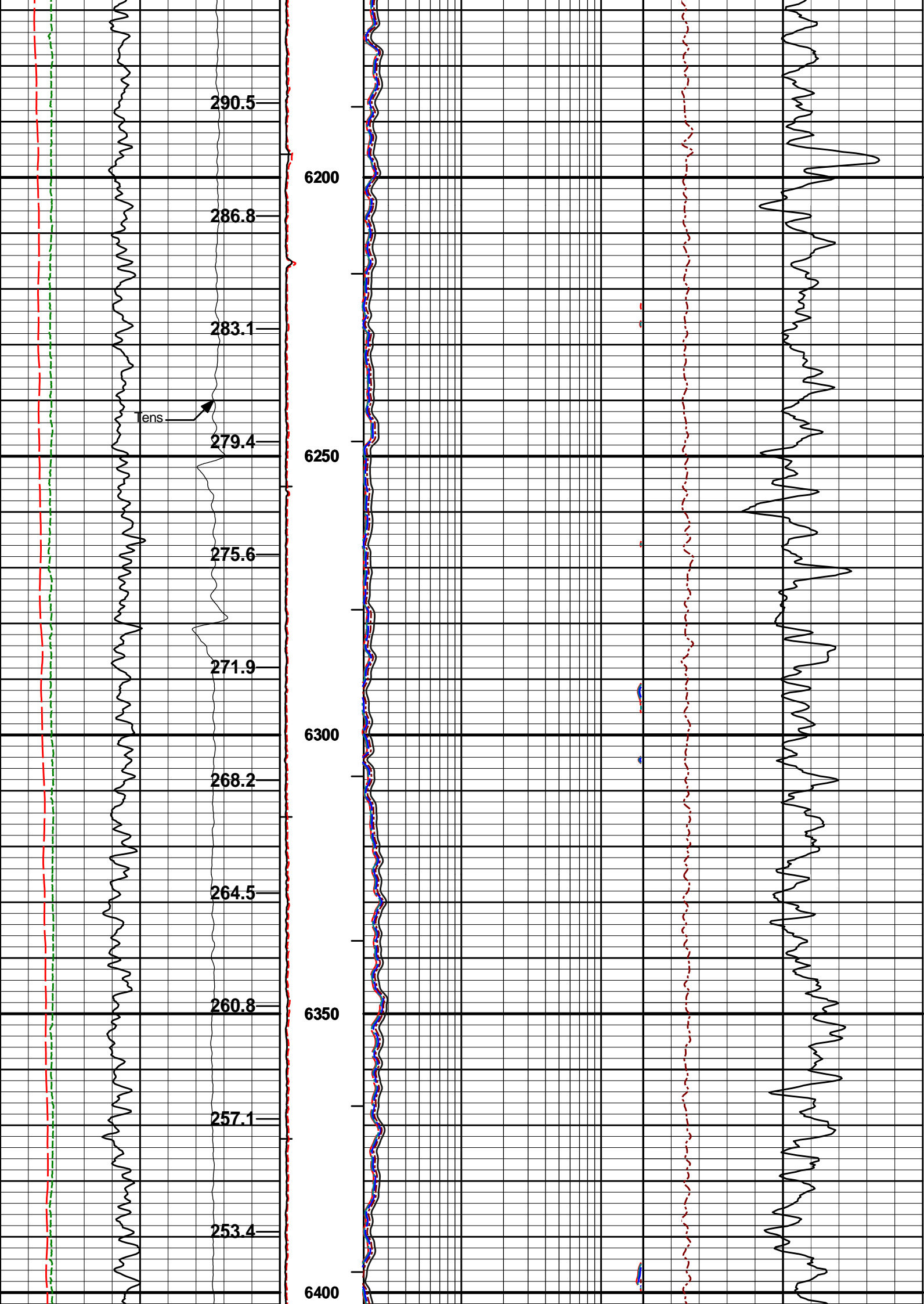


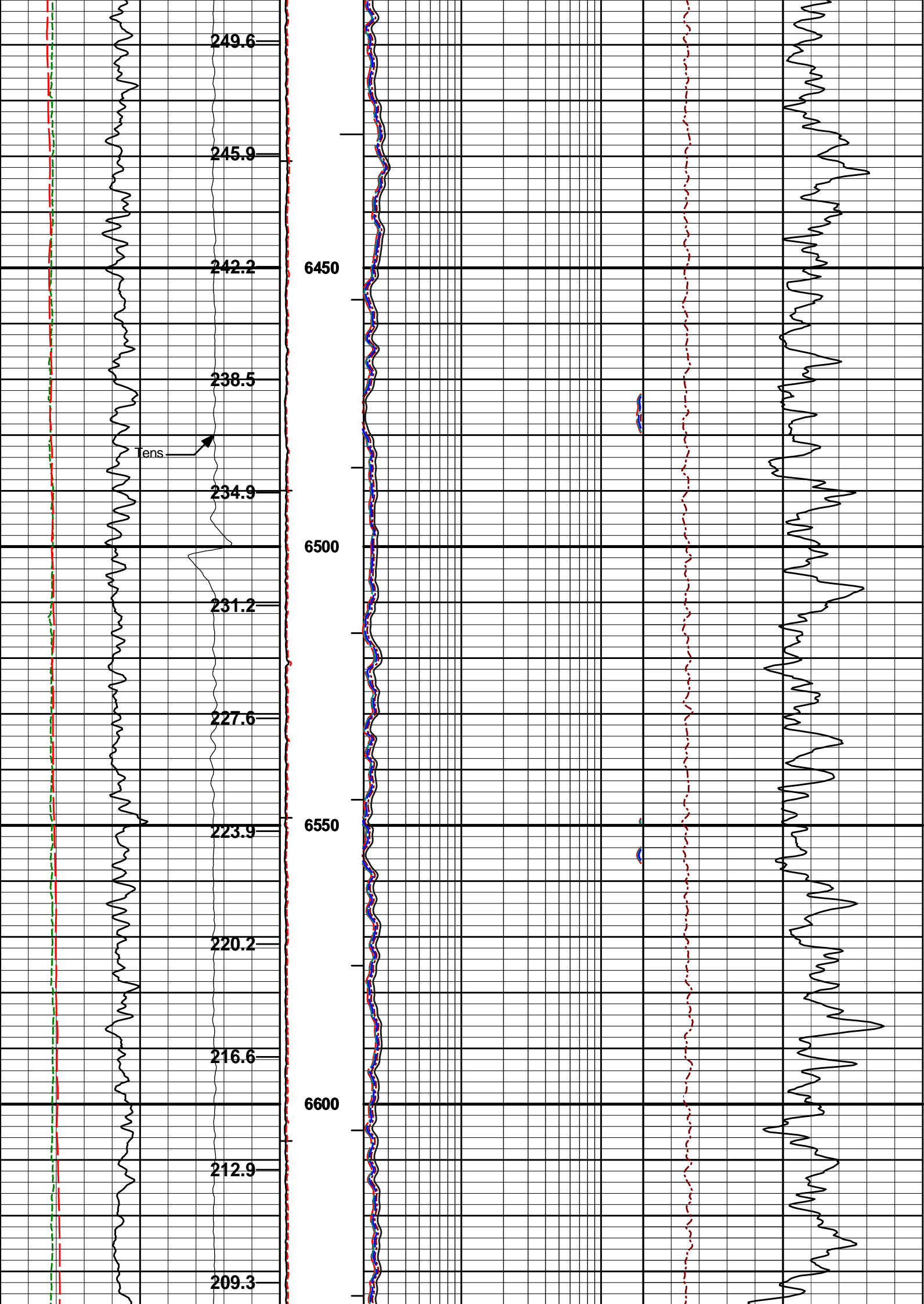


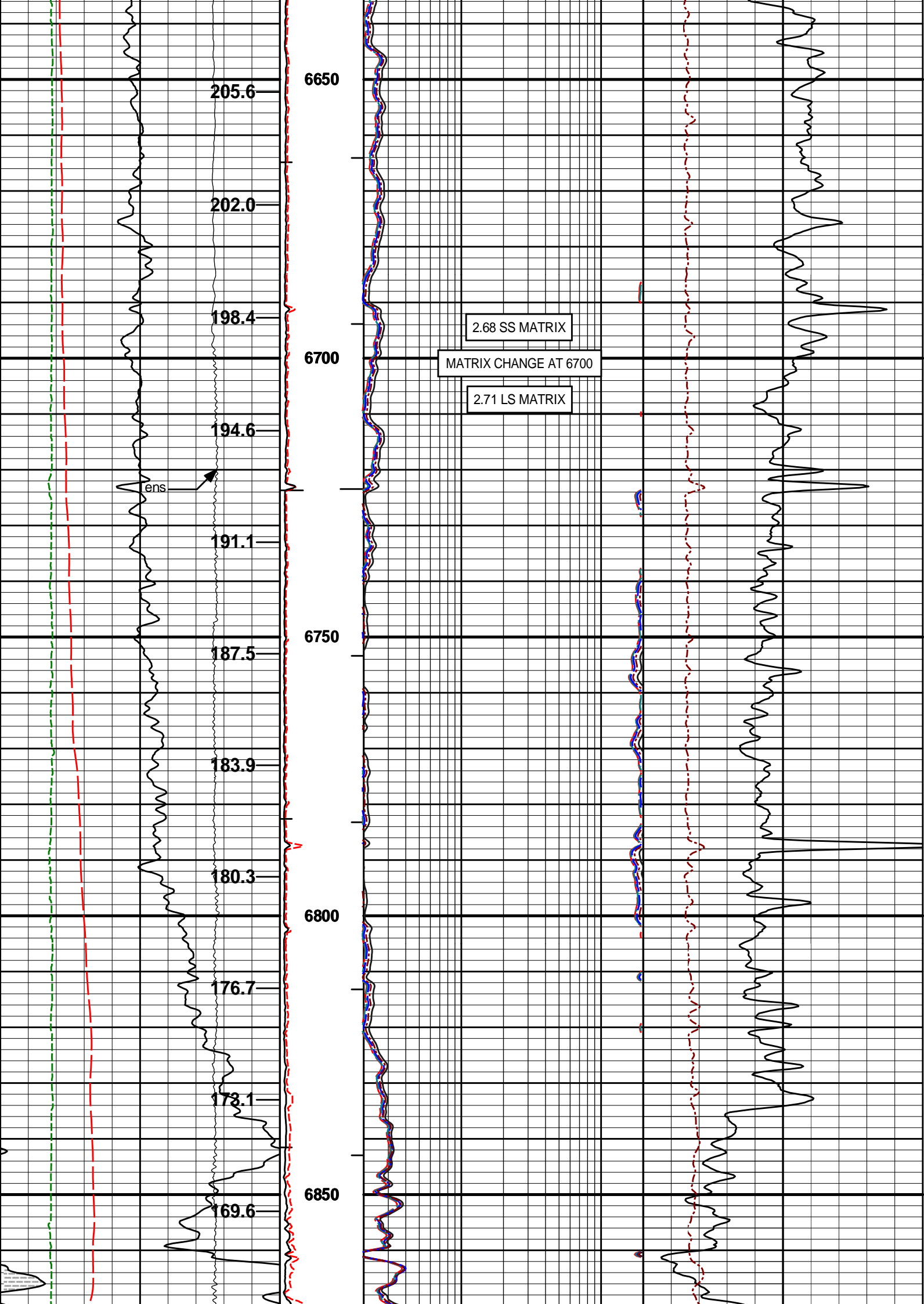


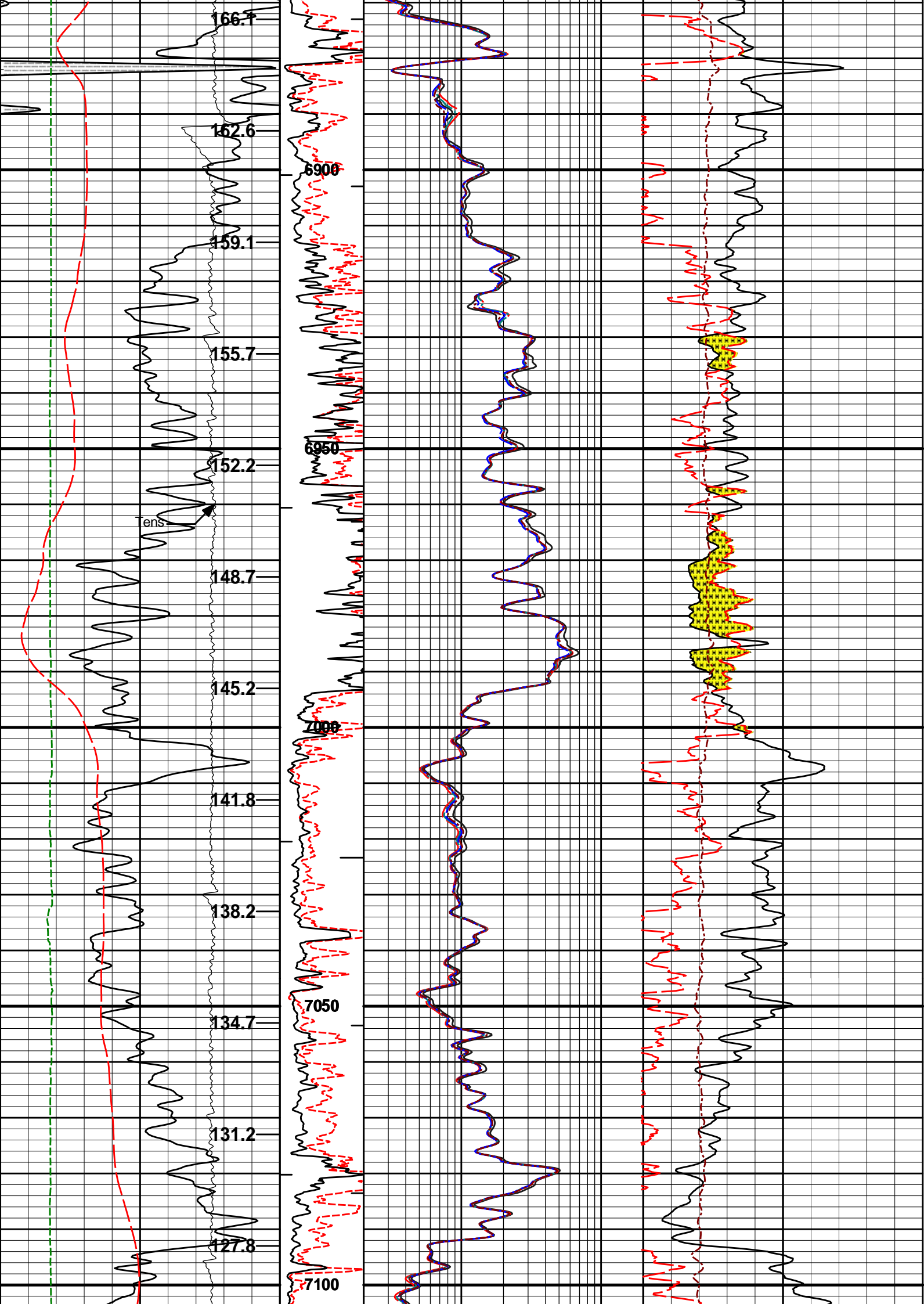


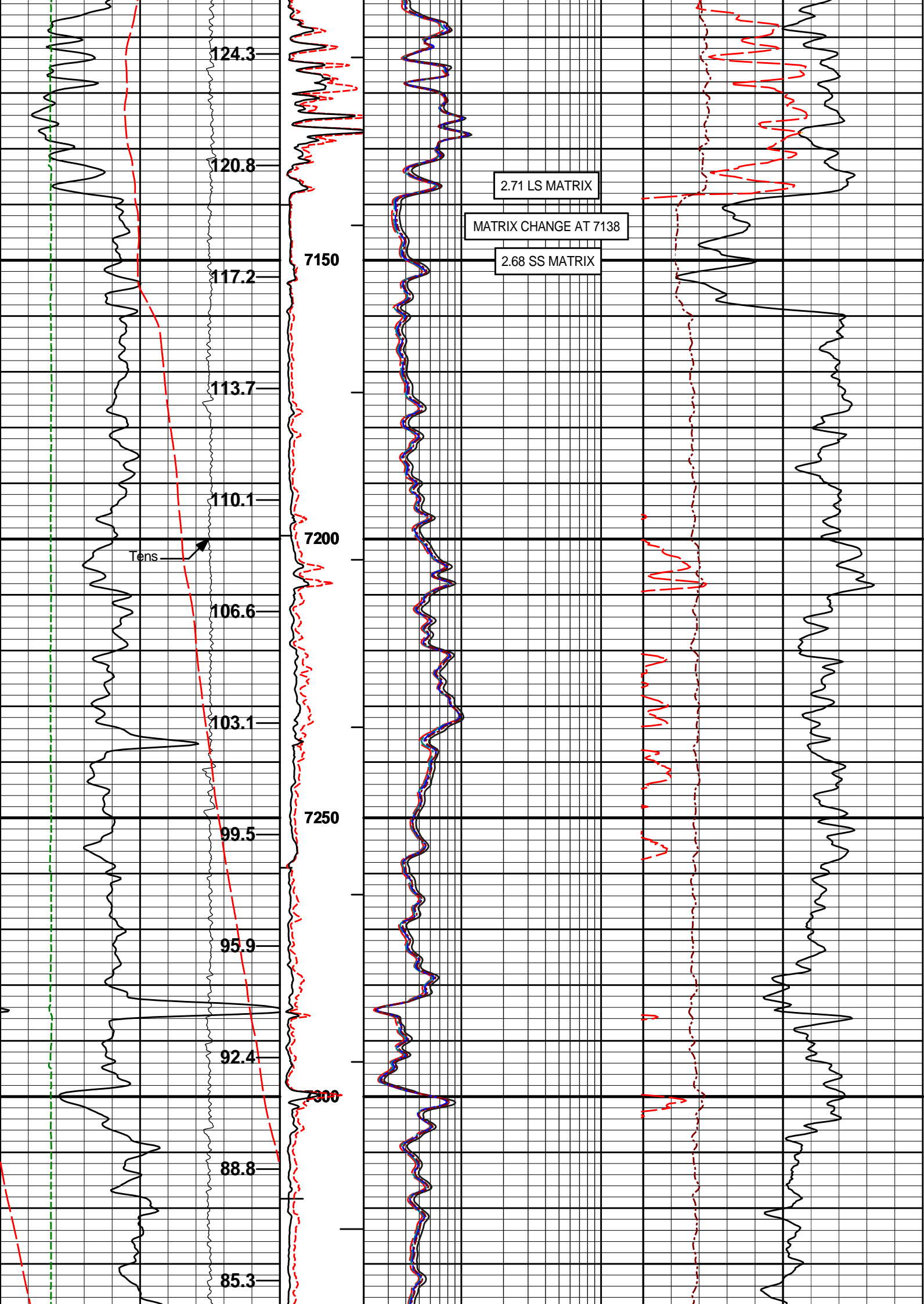


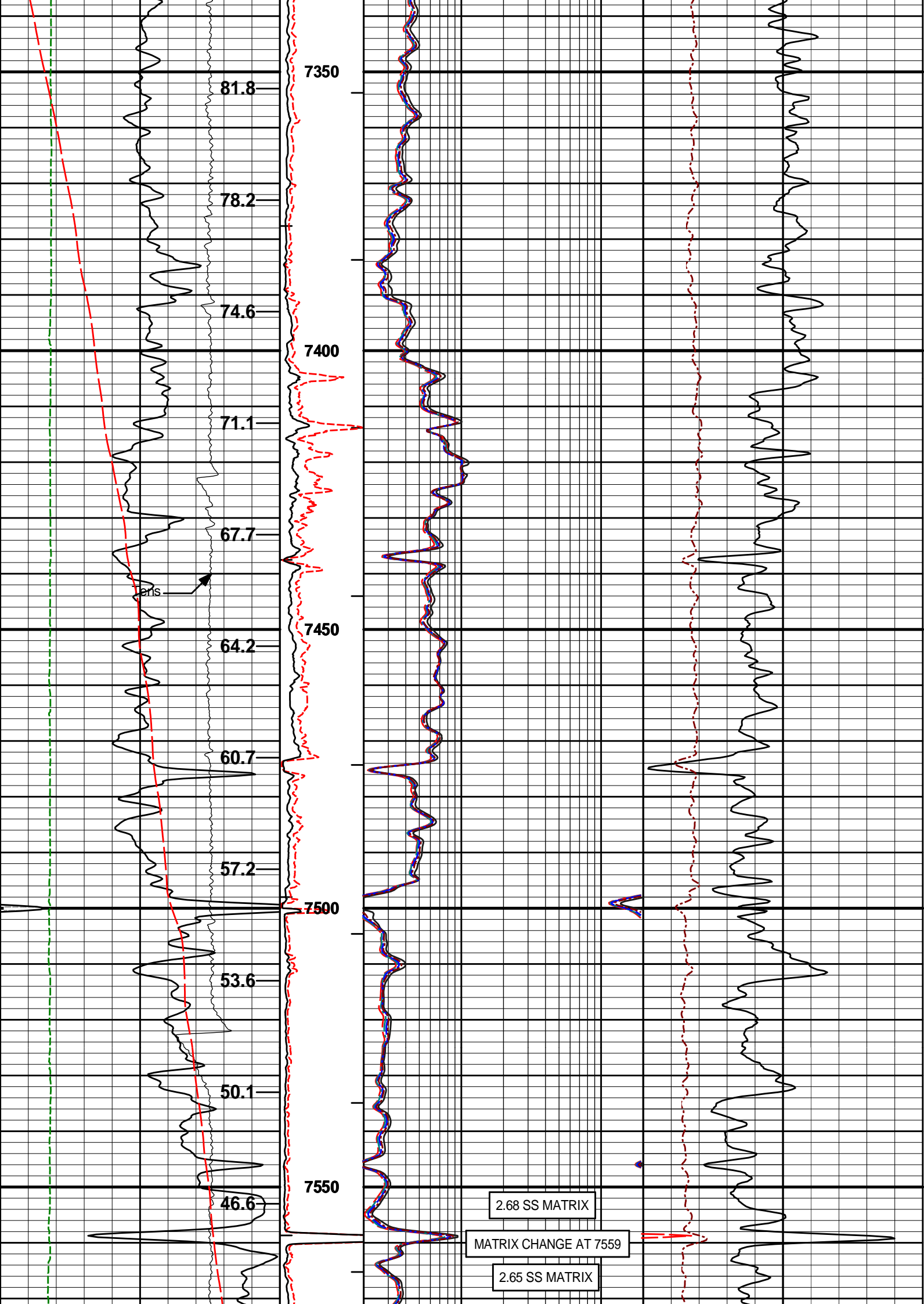


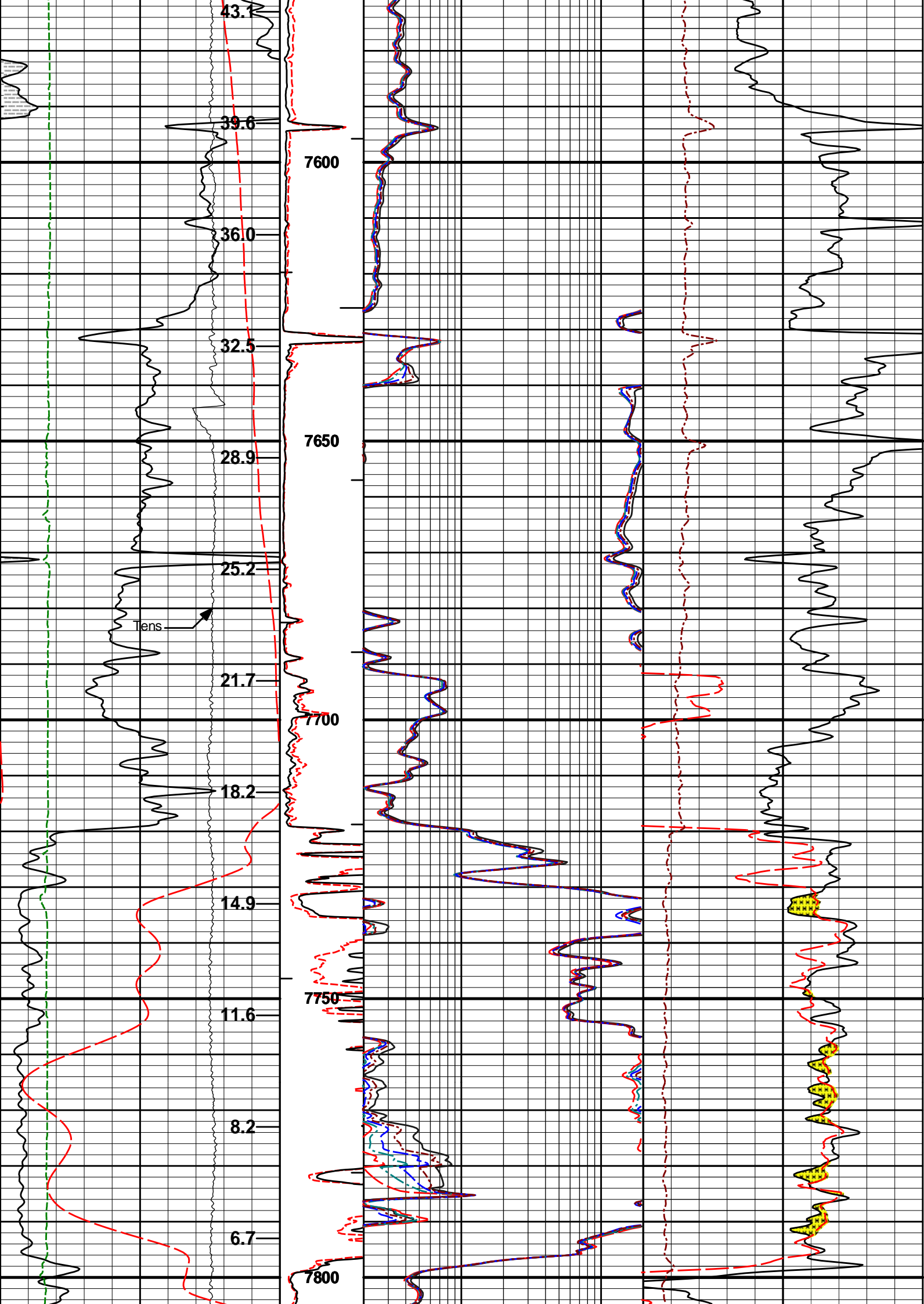


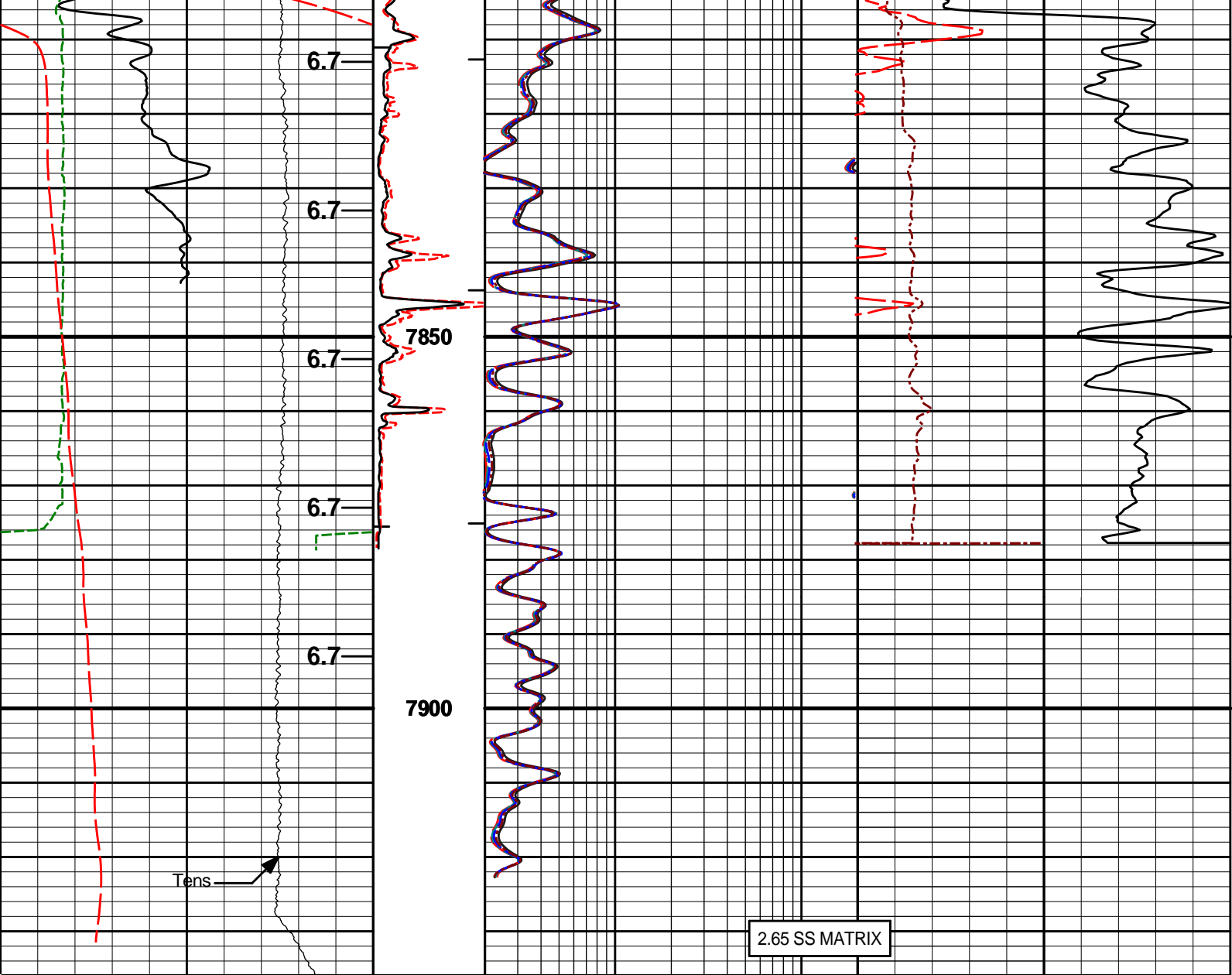












50	SP	150	1 : 240	2	RT90	200	0	Pe	10
	millivolts				Ohm-m				
0	Gamma API	250	BHVT	2	RT60	200	20	Density Porosity	0
	api				Ohm-m			percent	
6	Caliper	16	AHVT	2	RT30	200	20	Neutron Porosity	0
	inches				Ohm-m			percent	
10K	Tens	0	MicrologLateral	2	RT20	200			
	pounds		0 30 ohm-metre		Ohm-m				
	Annular Volume Total		MicrologNormal	2	RT10	200			
			0 30 ohm-metre		Ohm-m				

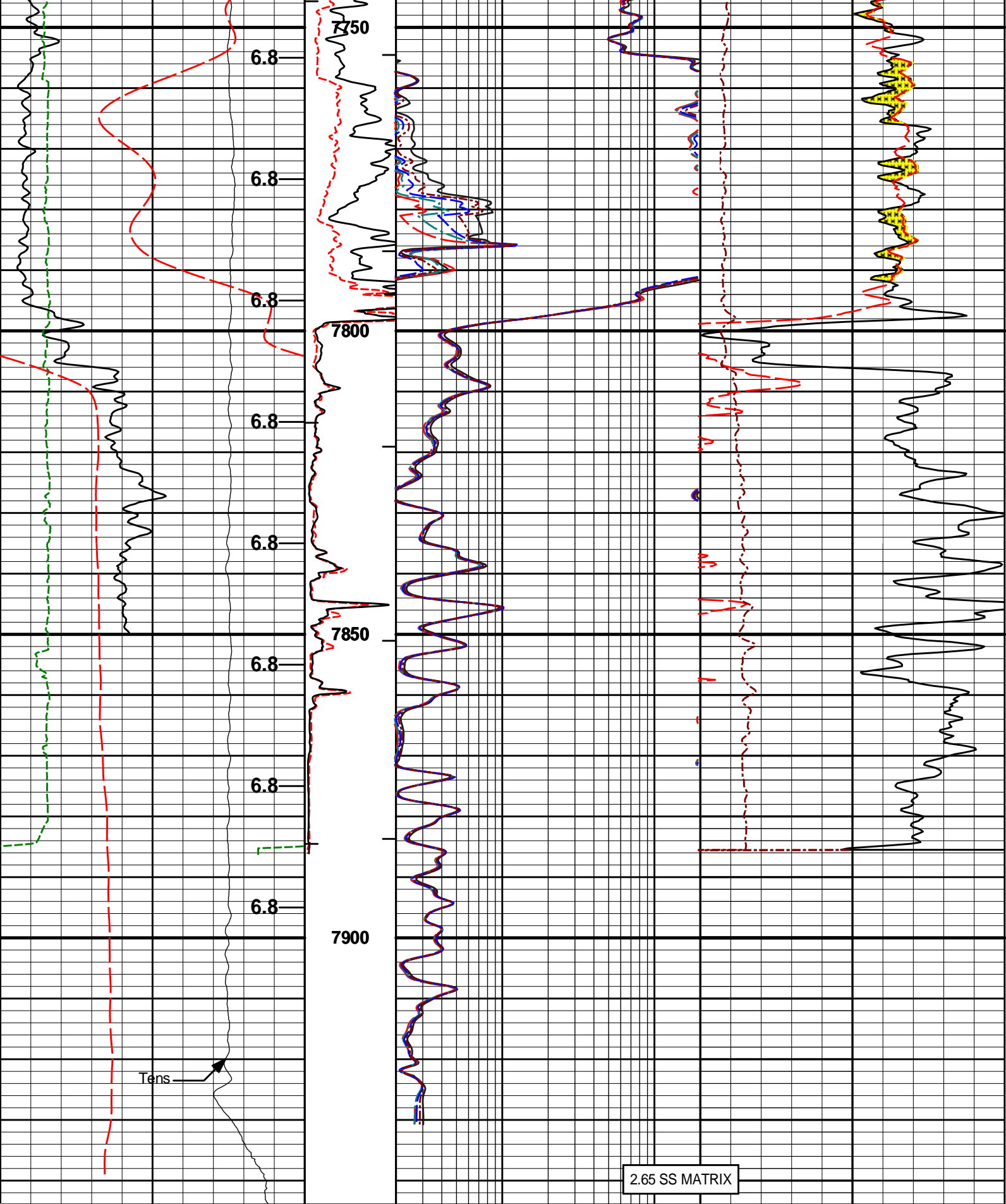
HALLIBURTON

Plot Time: 22-Apr-10 15:22:41
Plot Range: 1045 ft to 7935.92 ft
Data: DF_RANCH\Well Based\MAIN*
Plot File: \COMP\MAIN

MAIN PASS 5" = 100'

HALLIBURTON

Plot Time: 22-Apr-10 15:22:42
Plot Range: 7595 ft to 7943.92 ft
Data: DF_RANCH\Well Based\REPEAT*



50	SP	150	1 : 240	2	RT90	200	0	Pe	10
millivolts			BHVT	Ohm-m					
0	Gamma API	250		2	RT60	200	20	Density Porosity	0
api			AHVT	Ohm-m			percent		
6	Caliper	16		2	RT30	200	20	Neutron Porosity	0
inches			MicrologLateral	Ohm-m			percent		
10K	Tens	0		2	RT20	200			
			0						

pounds		ohm-metre	Ohm-m	
Annular Volume Total	MicrologNormal	0 30 2	RT10	200
	ohm-metre		Ohm-m	

HALLIBURTON

Plot Time: 22-Apr-10 15:22:43
Plot Range: 7595 ft to 7943.92 ft
Data: DF_RANCH\Well Based\REPEAT\
Plot File: \COMP\REPEAT

REPEAT SECTION 5" = 100'

HALLIBURTON

CALIBRATION REPORT

NATURAL GAMMA RAY TOOL SHOP CALIBRATION

Tool Name: GTET - 11294346

Reference Calibration Date: 10-Mar-10 14:30:52

Engineer: C. BLUE

Calibration Date: 06-Apr-10 09:14:39

Software Version: WL INSITE R2.4 (Build 20)

Calibration Version: 1

Calibrator Source S/N: KW-290
Calibrator API Reference:230.00 api

Measurement	Measured	Calibrated	Units
Background	149.2	144.8	api
Background + Calibrator	386.1	374.8	api
Calibrator	225.6	230.0	api

NATURAL GAMMA RAY TOOL FIELD CALIBRATION

Tool Name: GTET - 11294346

Reference Calibration Date: 06-Apr-10 09:14:39

Engineer: C. BLUE

Calibration Date: 21-Apr-10 10:30:30

Software Version: WL INSITE R2.4 (Build 20)

Calibration Version: 1

Calibrator Source S/N: KW-290
Calibrator API Reference:230.00 api

Field Verification	Shop	Field	Units
Background	144.8	109.7	api
Background + Calibrator	374.8	337.6	api
Calibrator	230.0	227.9	api

Shop	Field	Difference	Tolerance
230.0	227.9	2.1	+/- 9.00

ACCELEROMETER AND MAGNETOMETER SHOP CALIBRATION

Tool Name: IDT - 11277453

Reference Calibration Date: 01-Jan-70 00:00:00

Engineer: Lito

Calibration Date: 18-Dec-08 10:33:15

Software Version: WL INSITE R2.2 (Build 9)

Calibration Version: 1

Reference Gravity Field: 1.0000 g
Reference Magnetic Field: 42252.1719 nT

* QF : value of 0 is shown for bad quality if | data - reference | > (2 * standard deviation) or > (0.5% of reference value)

ACCELEROMETER CALIBRATION RAW DATA VALUE					
Raw Acc X	Raw Acc Y	Raw Acc Z	Quality(Gravity)	Quality Error(%)	QF
0.5639	0.4499	-0.0254	0.9979	0.0021	1
0 0241	-0 7097	-0 0183	0 9995	0 0005	1

0.0211	0.1551	0.0100	0.9999	0.0000	1
-0.7264	0.1572	-0.0198	0.9986	0.0014	1
0.0321	0.7394	-0.0273	1.0008	0.0008	1
0.0087	0.7385	-0.0409	0.9997	0.0003	1
-0.0193	0.7287	0.0487	1.0002	0.0002	1
-0.0188	0.7411	-0.0166	1.0006	0.0006	1
0.7038	-0.0854	0.0044	1.0015	0.0015	1
-0.0222	-0.7110	-0.0119	1.0000	0.0000	1
-0.7419	-0.0072	-0.0271	1.0012	0.0012	1
-0.0052	0.0177	0.3463	0.9999	0.0001	1
-0.1420	0.1556	-0.3685	1.0001	0.0001	1

ACCELEROMETER QUALITY SUMMARY		
Average Calculated Gravity Field	1.0000	g
Standard Deviation Calculated Gravity Field	0.0010	g

ACCELEROMETER GAIN AND OFFSET		
	GAIN	OFFSET
ACC X	1.3768593073	0.0210890602
ACC Y	1.3775787354	-0.0203358047
ACC Z	2.7496292591	0.0477359891

* QF : value of 0 is shown for bad quality if | data - reference | > (3 * standard deviation) or > (1% of reference value)

MAGNETOMETER CALIBRATION RAW DATA VALUE					
Raw Mag X	Raw Mag Y	Raw Mag Z	Quality(Magnetic)	Quality Error(%)	QF
-0.4154	1.0229	-0.0950	42024.7539	0.0054	1
1.0528	-0.2167	0.2776	42074.7891	0.0042	1
-0.4415	-1.0055	0.2475	42539.5195	0.0068	1
-1.0086	0.3168	0.2225	41896.5000	0.0084	1
0.1035	0.2138	1.1679	42187.0156	0.0015	1
-0.2684	0.0751	-1.1534	43752.5820	0.0355	1
0.0233	0.2698	-1.1548	43518.4336	0.0300	1
0.2384	0.1877	-1.0735	40961.8242	0.0305	1
0.2729	-0.2633	-1.0552	41254.2813	0.0236	1
-0.2686	-0.2420	-1.0537	41232.5859	0.0241	1
1.0859	-0.1058	-0.2452	42784.8086	0.0126	1
-0.4976	-0.9440	0.3454	42315.6367	0.0015	1

MAGNETOMETER QUALITY SUMMARY		
Average Calculated Magnetic Field	42211.8945	nT
Standard Deviation Calculated Magnetic Field	859.1619	nT

MAGNETOMETER GAIN AND OFFSET		
	GAIN	OFFSET
MAG X	38687.1679687500	-510.5658569336
MAG Y	37591.9726562500	-65.9105224609
MAG Z	35998.0312500000	-764.1088867188

Noise Level Value: 0.000000 cnts

Noise Level Cal Value: 0.0000 g

CSNG-FS SHOP CALIBRATION

Tool Name:	CSNG - 10965402	Reference Calibration Date:	10-Mar-10 17:15:40
Engineer:	C. BLUE	Calibration Date:	06-Apr-10 13:29:42
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1
Source SN:	KW-290		

TITANIUM CASE	Measured	Calibrated	Units
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TITANIUM CASE	Measured	Calibrated	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	22.8	22.8	Channel #
583 KEV Peak Channel #	51.6	51.6	Channel #
2614 KEV Peak Channel #	212.2	211.8	Channel #
Calibrate Temperature	68.9	88.2	degF

Pass/Fail Summary	Centroid
239 KEV Peak	Passed
583 KEV Peak	Passed
2614 KEV Peak	Passed

Blanket Reference Value: 230.00 API
 Calibrator Value: 261.2 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1754.8	CPS	365.4	342.5	API
Background	416.4	CPS	104.2	81.3	API

Gamma Ray Gain: 0.98

CSNG-FS FIELD CALIBRATION

Tool Name:	CSNG - 10965402	Reference Calibration Date:	06-Apr-10 13:29:42
Engineer:	C. BLUE	Calibration Date:	21-Apr-10 11:15:10
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1
Source SN:			

TITANIUM CASE	Shop	Field	Units
60 KEV Peak Channel #	48.0	48.0	Channel #
239 KEV Peak Channel #	22.8	22.9	Channel #
583 KEV Peak Channel #	51.6	51.7	Channel #
2614 KEV Peak Channel #	211.8	212.5	Channel #
Calibrate Temperature	88.2	78.3	degF

Pass/Fail Summary	Centroid
239 KEV Peak	Passed
583 KEV Peak	Passed
2614 KEV Peak	Passed

Blanket Reference Value: 230.00 API
 Calibrator Value: 261.2 API

	Counts	Units	Measured	Calibrated	Units
Thorium Blanket	1879.5	CPS	342.5	349.6	API
Background	475.1	CPS	81.3	88.4	API

Gamma Ray Gain: 0.94

DUAL SPACED NEUTRON SHOP CALIBRATION

Tool Name:	DSNT - 11301132	Reference Calibration Date:	16-Mar-10 21:54:57
Engineer:	C. BLUE	Calibration Date:	16-Mar-10 22:06:47
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1

Logging Source S/N: CASPER 434
 Tank Serial Number: 11068236
 Reference value assigned to Tank: 53.720
 Snow Block S/N: CASPER IQ

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:	0.990	0.988	0.900 - 1.100
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WATER TANK SUMMARY (Horizontal Water Tank)				
Measurement	Current Reading (Previous Coef.)	Calibrated (New Coef.)	Change	Control Limit On Change
Porosity (decp):	0.2229	0.2224	0.0006	+/- 0.0020
Calibrated Ratio:	10.13	10.11	0.020	+/- 0.050

VERIFIER		
Measurement	Value	Control Limit
Snow-Block Porosity (decp):	0.0798	0.02000 - 0.09000

PASS/FAIL SUMMARY	
Background Check:	Passed
Gain-Range Check:	Passed
Snow-Block Check:	Passed

DUAL SPACED NEUTRON FIELD CALIBRATION

Tool Name:	DSNT - 11301132	Reference Calibration Date:	16-Mar-10 22:06:47
Engineer:	C. BLUE	Calibration Date:	22-Apr-10 07:39:18
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1

Logging Source S/N: CASPER 434
Snow Block S/N: CASPER IQ

NEUTRON FIELD-CHECK SUMMARY				
	Shop	Field	Difference	Control Limit On Change
Snow-Block Porosity (decp):	0.0798	0.0796	-0.0001	+/- 0.0150

PASS/FAIL SUMMARY	
Block Change Check:	Passed
Snow Block Stat Check:	Passed
Temperature Check:	Passed

SPECTRAL DENSITY SHOP CALIBRATION

Tool Name:	SDLT - I132M302	Reference Calibration Date:	16-Mar-10 18:12:09
Engineer:	C. BLUE	Calibration Date:	07-Apr-10 11:49:07
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1

Logging Source S/N: 2770 GW
Aluminum Block S/N: BRIGHTON ALUMINUM BLOCK Density: 2.600g/cc
Magnesium Block S/N: BRIGHTON MAGNESIUM BLOCK Density: 1.680g/cc

DENSITY CALIBRATION SUMMARY			
Measurement	Previous Value	New Value	Control Limit
Near Bar Gain	1.0655	1.0945	0.90 - 1.10
Near Dens Gain	1.0265	1.0469	0.90 - 1.10
Near Peak Gain	1.0258	1.0482	0.90 - 1.10
Near Lith Gain	0.9981	1.0222	0.90 - 1.10
Far Bar Gain	1.0225	1.0251	0.90 - 1.10
Far Dens Gain	1.0072	1.0119	0.90 - 1.10
Far Peak Gain	1.0015	1.0068	0.90 - 1.10

Far Lith Gain	0.9743	0.9791	0.90 - 1.10
Near Bar Offset	-0.3486	-0.6057	NONE
Near Dens Offset	-0.0056	-0.1783	NONE
Near Peak Offset	-0.0004	-0.1809	NONE
Near Lith Offset	0.2051	0.0132	NONE
Far Bar Offset	0.0115	-0.0045	NONE
Far Dens Offset	0.1284	0.0888	NONE
Far Peak Offset	0.1433	0.1009	NONE
Far Lith Offset	0.3056	0.2685	NONE
Near Bar Background	961.28	958.81	700 - 1450
Near Dens Background	319.18	316.93	230 - 480
Near Peak Background	137.07	136.46	100 - 210
Near Lith Background	166.97	167.96	125 - 260
Far Bar Background	507.92	507.91	450 - 900
Far Dens Background	204.98	202.36	175 - 345
Far Peak Background	79.01	79.43	70 - 140
Far Lith Background	82.87	82.25	75 - 145

CALIBRATION BLOCK SUMMARY				
Measurement	Current Reading (Previous Coef)	Calibrated (New Coef)	Change	Control Limit On Change
MAGNESIUM				
Density (g/cc)	1.675	1.680	0.005	+/- 0.015
Pe	2.610	2.594	-0.016	+/- 0.150
ALUMINUM				
Density (g/cc)	2.595	2.600	0.005	+/- 0.01500
Pe	3.107	3.100	-0.007	+/- 0.150

TOOL SUMMARY				
Measurement	Near Detector		Far Detector	
	Value	Control Limits	Value	Control Limits
QUALITY				
Background	-0.0020	+/- 0.0110	0.0008	+/- 0.0140
Magnesium Block	-0.0007	+/- 0.0110	-0.0024	+/- 0.0140
Aluminum Block	-0.0008	+/- 0.0110	0.0003	+/- 0.0140
Resolution	8.90	6.00 - 11.50	9.78	6.00 - 11.50
Internal Verifier(B+D+P+L)	1580	1200 - 2700	872	800 - 1700

PASS/FAIL SUMMARY	
Background Quality Check:	Passed
Background Range Check:	Passed
Background Resolution Check:	Passed
Background Verification Check:	Passed
Magnesium Quality Check:	Passed
Aluminum Quality Check:	Passed
Gains Check:	Passed
Changes in Calibration Blocks:	Passed

SPECTRAL DENSITY FIELD CHECK			
Tool Name:	SDLT - I132M302	Reference Calibration Date:	07-Apr-10 11:49:07
Engineer:	C. BLUE	Calibration Date:	22-Apr-10 07:29:41
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1

DENSITY FIELD CALIBRATION SUMMARY				
Measurement	Shop	Field	Change	Control Limit +/-
Near (B+D+P+L) cps	1580.156	1589.558	9.402	15.991
Far (B+D+P+L) cps	871.943	879.282	7.339	16.136
Near Resolution	8.90	9.12	0.220	0.50
Far Resolution	9.78	10.78	1.000	1.00

PASS/FAIL SUMMARY	
Bkg Quality Check:	Passed
Bkg Resolution Check:	Passed
Bkg Verification Check:	Passed

MICRO LOG SHOP CALIBRATION			
Tool Name:	SDLT - I132M302	Reference Calibration Date:	10-Apr-10 11:58:53
Engineer:	C. BLUE	Calibration Date:	21-Apr-10 15:43:54
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1

CALIBRATION COEFFICIENT SUMMARY					
Measurement	Micro Log Normal		Micro Log Lateral		Units
	Measured	Calibrated	Measured	Calibrated	
Tool Zero	-0.11	-0.09	-0.01	-0.01	ohmm
Calibration Point #1	-0.02	0.00	0.00	0.00	ohmm
Calibration Point #2	19.88	20.00	19.93	20.00	ohmm
Internal Reference	19.86	19.98	19.95	20.02	ohmm

Measurement	Micro Log Normal Tool Value	Micro Log Lateral Tool Value	Units
Tool Zero	-0.35	-0.74	V
Calibration Point #1	24.19	2.04	V
Calibration Point #2	5351.14	6995.30	V
Internal Reference	5346.18	7003.83	V

MICRO LOG FIELD CHECK			
Tool Name:	SDLT - I132M302	Reference Calibration Date:	21-Apr-10 15:43:54
Engineer:	C. BLUE	Calibration Date:	22-Apr-10 07:30:20
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1

Measurement	Micro Log Normal		Micro Log Lateral		Units
	Shop	Field	Shop	Field	
Tool Zero	-0.09	-0.09	-0.01	0.01	ohmm
Internal Reference	19.98	19.97	20.02	20.01	ohmm

Summary				
Signal	Shop	Field	Difference	Tolerance
Microlog Normal	19.98	19.97	0.01	+/- 0.80
Microlog Lateral	20.02	20.01	0.01	+/- 0.80

DENSITY CALIPER SHOP CALIBRATION			
Tool Name:	SDLT - I132M302	Reference Calibration Date:	16-Mar-10 18:57:30
Engineer:	C. BLUE	Calibration Date:	07-Apr-10 12:16:22
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1

CALIBRATION COEFFICIENTS			
Measurement	Previous Value	New Value	Control Limit On New Value
Pad Offset	-1042.23	-1217.68	-7000.00 - -1000.00

Pad Gain	0.0003728	0.0003777	0.000200 - 0.000600
Arm Offset	-1263.19	-1367.51	-5000.00 - 3000.00
Arm Gain	0.0005228	0.0005322	0.000300 - 0.000700
Arm Power	-0.000005649	-0.000006641	-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)	2.04	2.00	-0.04	+/- 0.20
Medium Ring (in)	3.77	3.75	-0.02	+/- 0.20
RING DIAMETER:				
Small Ring (in)	6.59	6.50	-0.09	+/- 0.20
Medium Ring (in)	8.33	8.25	-0.08	+/- 0.20
Large Ring (in)	15.19	15.00	-0.19	+/- 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 - I132M302	Reference Calibration Date:	07-Apr-10 12:16:22
Engineer:	C. BLUE	Calibration Date:	22-Apr-10 07:36:02
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1

MEASURED CALIPER VALUES				
Measurement	Shop	Field	Change	Control Limit On New Value
Pad Extension	3.75	3.73	-0.02	+/- 0.10
Ring Diameter	8.25	8.15	-0.10	+/- 0.15

PASS/FAIL SUMMARY	
Pad Extension Check:	Passed
Diameter Check:	Passed

ICT SHOP CALIBRATION

Tool Name:	ICT - 11294350	Reference Calibration Date:	21-Jan-10 09:21:06
Engineer:	C. BLUE	Calibration Date:	06-Apr-10 13:20:00
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1

CALIPERS AND RINGS			
Ring	Measured	Calibrated	Units
CALIPER 1:			
Small Ring	3.63	3.63	in
Medium Ring	8.08	8.00	in
Large Ring	15.09	15.00	in
X-Large Ring	20.99	21.00	in
CALIPER 2:			
Small Ring	3.67	3.63	in
Medium Ring	8.11	8.00	in
Large Ring	15.15	15.00	in
X-Large Ring	21.05	21.00	in
CALIPER 3:			
Small Ring	3.63	3.63	in
Medium Ring	8.04	8.00	in

Large Ring	15.04	15.00	in
X-Large Ring	20.99	21.00	in
CALIPER 4:			
Small Ring	3.64	3.63	in
Medium Ring	8.04	8.00	in
Large Ring	15.01	15.00	in
X-Large Ring	21.04	21.00	in
CALIPER 5:			
Small Ring	3.60	3.63	in
Medium Ring	8.03	8.00	in
Large Ring	14.97	15.00	in
X-Large Ring	21.06	21.00	in
CALIPER 6:			
Small Ring	3.69	3.63	in
Medium Ring	8.06	8.00	in
Large Ring	15.03	15.00	in
X-Large Ring	21.03	21.00	in

ICT FIELD CALIBRATION			
Tool Name:	ICT - 11294350	Reference Calibration Date:	06-Apr-10 13:20:00
Engineer:	C. BLUE	Calibration Date:	21-Apr-10 11:04:03
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1

CALIPERS				
Caliper	Shop	Field	Units	
Caliper 1	8.00	7.96	in	
Caliper 2	8.00	8.08	in	
Caliper 3	8.00	8.08	in	
Caliper 4	8.00	8.07	in	
Caliper 5	8.00	7.93	in	
Caliper 6	8.00	7.92	in	

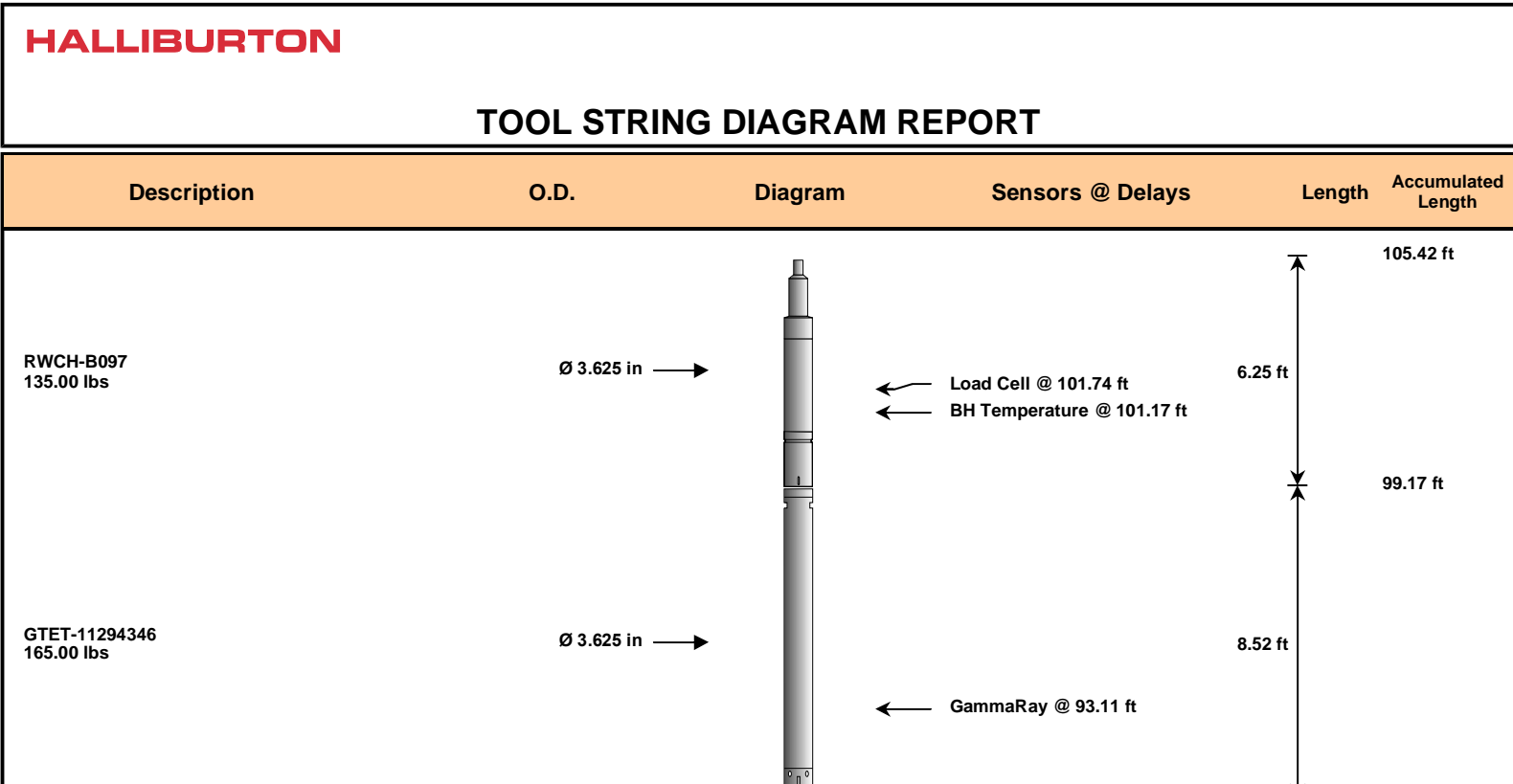
ARRAY COMPENSATED TRUE RESISTIVITY SHOP CALIBRATION				
Tool Name:	ACRt - 90199477-E2817-S4353	Reference Calibration Date:	14-Apr-10 10:45:08	
Engineer:	C. BLUE	Calibration Date:	14-Apr-10 10:59:55	
Software Version:	WL INSITE R2.4 (Build 20)	Calibration Version:	1	

TYPICAL GAIN RANGE									
Subarray	R12KHz			R36KHz			R72KHz		
	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper	Lower	(mmho/m)	Upper
A1 (80")	0.95	1.0035	1.05	0.95	1.0074	1.05	0.95	1.0054	1.05
A2 (50")	0.95	1.0102	1.05	0.95	1.0142	1.05	0.95	1.0148	1.05
A3 (29")	0.95	1.0033	1.05	0.95	1.0060	1.05	0.95	1.0035	1.05
A4 (17")	0.95	1.0065	1.05	0.95	1.0067	1.05	0.95	1.0075	1.05
A5 (10")	N/A	N/A	N/A	0.95	0.9957	1.05	0.95	0.9949	1.05
A6 (6")	N/A	N/A	N/A	0.95	0.9826	1.05	0.95	0.9817	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	-1.158	2	-6	-4.357	-2	-8	-4.686	-2
A2 (50")	-7	-1.911	-2	-6	-2.967	-2	-7	-4.615	-2
A3 (29")	-27	-12.876	-9	-9	-3.485	-3	-7	-3.402	-1
A4 (17")	-180	-91.122	-60	-45	-29.375	-15	-39	-24.941	-13
A5 (10")	N/A	N/A	N/A	-150	-86.818	-50	-80	-42.414	-10
A6 (6")	N/A	N/A	N/A	175	316.205	525	90	158.894	270

TRANSMITTER CURRENT GAIN					R-MUD VERIFICATION				
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TRANSMITTER CURRENT DATA				RECEIVER VERIFICATION			
Signal	Lower	R	Upper	Signal	Lower (ohm-m)	Measured (ohmm)	Upper (ohm-m)
12K	0.6	0.8991	1.3	Mud Cell	0.95	0.997	1.05
36K	1.0	1.8313	2.0				
72K	1.0	1.1404	2.0				
CALIBRATION SUMMARY							
Sensor	Shop	Field	Post	Difference	Tolerance	Units	
GTET-11294346							
Gamma Ray Calibrator	230.0	227.9	-----	2.1	+/- 9.00	api	
CSNG-10965402							
60 KEV Peak Channel #	48.0	48.0	-----	0.0	-----	Channel #	
239 KEV Peak Channel #	22.8	22.9	-----	-0.1	-----	Channel #	
583 KEV Peak Channel #	51.6	51.7	-----	-0.1	-----	Channel #	
2614 KEV Peak Channel #	211.8	212.5	-----	-0.7	-----	Channel #	
DSNT-11301132							
Snow-Block Porosity	0.0798	0.0796	-----	0.0002	+/- 0.0150	decp	
SDLT-I132M302							
Near(B+D+P+L)	1580.156	1589.558	-----	-9.402	+/-15.991	cps	
Far(B+D+P+L)	871.943	879.282	-----	-7.339	+/-16.136	cps	
MicroLog Normal	19.98	19.97	-----	0.01	+/-0.80	ohmm	
MicroLog Lateral	20.02	20.01	-----	0.01	+/-0.80	ohmm	
Pad Extension	3.75	3.73	-----	0.02	+/-0.10	in	
Ring Diameter	8.25	8.15	-----	0.100	+/-0.15	in	
ICT-11294350							
Caliper 1	8.00	7.96	-----	0.04	+/-0.25	in	
Caliper 2	8.00	8.08	-----	-0.08	+/-0.25	in	
Caliper 3	8.00	8.08	-----	-0.08	+/-0.25	in	
Caliper 4	8.00	8.07	-----	-0.07	+/-0.25	in	
Caliper 5	8.00	7.93	-----	0.07	+/-0.25	in	
Caliper 6	8.00	7.92	-----	0.08	+/-0.25	in	
ACRt-90199477-E2817-S4353							
Mud Cell	0.997	-----	-----	0.000	-----	ohmm	
Data: DF_RANCH\0001 QUAD-IDT-ICT-CSNG\003 22-Apr-10 12:35 Up @7937.5f							
Date: 22-Apr-10 13:46:03							



IDT-11277453
150.00 lbs

Ø 3.625 in →

7.58 ft

90.65 ft

CSNG-10965402
114.00 lbs

Ø 3.625 in →

8.17 ft

83.07 ft

← CSNG @ 77.44 ft

DSNT-11301132
174.00 lbs

Ø 3.625 in →

9.69 ft

74.90 ft

← DSN Far @ 67.97 ft

← DSN Near @ 67.22 ft

65.22 ft

SDLT-I132M302
360.00 lbs

Ø 4.500 in →

10.81 ft

Ø 4.750 in →

SDL Microlog @ 57.40 ft

SDL Caliper @ 57.22 ft

SDL @ 57.21 ft

54.40 ft

Flex Joint - Pressure Comp-KW-BLACK
140.00 lbs

Ø 3.625 in →

5.97 ft

48.43 ft

ICT-11294350
330.00 lbs

Ø 3.625 in →

12.83 ft

35.60 ft

← ICT Caliper @ 38.39 ft

BSAT-11105780
300.00 lbs

Ø 3.625 in →

← Sonic Receivers @ 27.09 ft

15.77 ft

19.83 ft

ACRt-90199477-E2817-S4353
250.00 lbs

Ø 3.625 in →

← Mud Resistivity @ 13.44 ft

← ACRt @ 9.46 ft

19.25 ft

← SP @ 1.86 ft

Cabbage Head-KW_1
10.00 lbs

Ø 3.625 in →
Ø 6.000 in →

0.58 ft
0.58 ft
0.00 ft

Mnemonic	Tool Name	Serial Number	Weight (lbs)	Length (ft)	Accumulated Length (ft)	Max.Log. Speed (fpm)
RWCH	Releasable Wireline Cable Head	B097	135.00	6.25	99.17	300.00
GTET	Natural Gamma Ray Tool	11294346	165.00	8.52	90.65	60.00
IDT	Insite Directional Tool	11277453	150.00	7.58	83.07	30.00
CSNG	Compensated Spectral Natural Gamma	10965402	114.00	8.17	74.90	15.00
DSNT	Dual Spaced Neutron	11301132	174.00	9.69	65.22	60.00
DCNT	DSN Decentralizer	10860047	50.00	5.13	* 68.55	300.00
SDLT	Spectral Density Tool	1132M302	360.00	10.81	54.40	60.00
FLEX	Flex Joint	KW-BLACK	140.00	5.97	48.43	300.00
ICT	Six Independent Arm Caliper	11294350	330.00	12.83	35.60	30.00
OBCEN	Centralizer - 29 in.Overbody	C	12.00	2.42	* 45.17	300.00
BCAS	Borehole Sonic Array Tool	11105780	300.00	15.77	19.83	60.00
OBCEN	Centralizer - 29 in.Overbody	A	12.00	2.42	* 32.55	300.00
ACRt	Array Compensated True Resistivity	90199477-E2817-S4353	250.00	19.25	0.58	300.00
SP	SP Ring	PROTO1	0.00	0.25	* 1.86	300.00
OBCEN	Centralizer - 29 in.Overbody	B	12.00	2.42	* 16.33	300.00
CBHD	Cabbage Head	KW_1	10.00	0.58	0.00	300.00

Total				2,214.00	105.42	* Not included in Total Length and Length Accumulation.	
Data: DF_RANCH0001 QUAD-IDT-ICT-CSNGVDLE						Date: 22-Apr-10 11:13:45	

WELL	DF RANCH 1161-9-24		
FIELD	WATTENBERG		
COUNTY	WELD	STATE	CO
HALLIBURTON		SPECTRAL DENSITY DUAL SPACED NEUTRON ARRAY COMPENSATED TRUE RESISTIVITY	