ThruBit
A Schlumberger Company

ARRAY INDUCTION DENSITY / NEUTRON GAMMA RAY MEMORY LOG

Company	SHELL EXP. & PROD. CO., INC.
Well	SCHUPBACH 3510 16-1H
Field	ARROWHEAD
County	BARBER
State	KANSAS

Company SHELL EXP. & PROD. CO., INC.
Well SCHUPBACH 3510 16-1H
Field ARROWHEAD
County BARBER State KANSAS

Location: API # : 15-077-23927-01-00
SEC 16 TWP 35S RGE 10W

Other Services: SONIC LOG

Permanent Datum	G.L.	Elevation	1330'
Log Measured From	D.F.	23.5' ABOVE PERM DATUM	
Drilling Measured From	D.F.		

Elevation
K.B. 1353.5'
D.F. 1353.5'
G.L. 1330'

Date	10 NOVEMBER 2012			
Run Number	ONE			
Depth Driller	9956'			
Depth Logger	9841'			
Bottom Logged Interval	9831'			
Top Log Interval	5180'			
Casing Driller	7.0" @ 5182'			
Casing Logger	5180'			
Bit Size	6.125			
Type Fluid in Hole	WBM			
Density / Viscosity	8.6 / 29			
pH / Fluid Loss	7.7 / NA			
Source of Sample	MUD PIT			
Rm @ Meas. Temp	1.36 ohms @ 69 degf			
Rmf @ Meas. Temp	1.02 ohms @ 56 degf			
Rmc @ Meas. Temp	1.70 ohms @ 54 degf			
Source of Rmf / Rmc	MEASURED			
Rm @ BHT	0.59 ohms @ 134 degf			
Time Circulation Stopped	07:30			
Time Logger on Bottom	09:15			
Maximum Recorded Temperature	134 degf			
Equipment Number	T004			
Location	OKC, OK			
Recorded By	DENGLER			
Witnessed By	JOHN DYER			

<<< Fold Here >>>

Comments

SERVICE: LEVEL 4 HORIZONTAL PUMP DOWN MEMORY BIT DEPTH: 9728' LOGGED TO: 5180'
ALL SCALES AND PRESENTATIONS PER CLIENT REQUEST
LIMESTONE MATRIX, 2.71 g/cc. USED FOR POROSITY MEASUREMENTS
TOOLSTING RAN WITH SMALL DE-CENTRALIZER, SWIVEL, KNUCKLES, S. CENTRALIZER AND NO S
TBHV REPRESENTS TOTAL BORHOLE VOLUME, ft3
ABHV REPRESENTS ANNULAR HOLE VOLUME, CALCULATED FOR 4.5" CSG., ft3
RIGMINDER AND CANRIG USED TO ACQUIRE LOG DEPTH
LOG CORRELATED TO MWD
CL=2750 mg/l NaCl=3776 mg/l NO BARITE
CASING SIZE 7.00" 23.0 LB FT ID 6.241" CALI DIA 6.41" NO CORRECTION MADE
RIG: NABORS 180
CREW: J. DENGLER, J. JONES, J. DOTY,

Service Ticket No.	1556	API No.	15-007-2392701-00	PGM Ver	WARRIOR 7.0

The Well Name, Location, Borehole Description, and / or Cementing Data Furnished by Client

EQUIPMENT DATA

GAMMA RAY	NEUTRON	DENSITY	INDUCTION

Run No.	ONE	Run No.	ONE	Run No.	ONE	Run No.	ONE
Serial No.	ENP2T	Serial No.	PS5N	Serial No.	PS01D	Serial No.	PS28R
Model No.	ENP	Model No.	PS	Model No.	PS	Model No.	PS
Diameter	2.125"	Diameter	2.125"	Diameter	2.125"	Diameter	2.125"

LOGGING DATA

General Data

Pass	Depths		Well Head	Speed	Logging Run Comments
No.	From	To	Pressure	Ft/Min	
ONE	9841'	5180'		30	

	GAMMA RAY		NEUTRON		DENSITY		INDUCTION	
Pass	Scale		Scale		Scale		Scale	
No.	L	R	L	R	L	R	L	L
ONE	0 API	150 API	45%	-15%	1.95 g/cc	2.95 g/cc	0.2 ohm-m	2000 ohm-m

DIRECTIONAL INFORMATION

Maximum Deviation	92.37	deg. @	7442'	KOP	4282'	

Job Times□□□□
Job # :□1556□□□
Operator :□Shell Oil□□□
Well name :□SCHUPBACH 3510 16-1H□□□
Job level :□Level 4□□□
□□□□
TimelIne of Bit Times□□□□
Date□Start Time□Elapsed Time (HH:MM)□Time Code□Notes
□□□□
TimelIne of Crew / Logging Equipment Times□□□□
Date□Start Time□Elapsed Time (HH:MM)□Time Code□Notes
10 Nov 2012□01:30□□L00 : Time stamp - activity start□
10 Nov 2012□03:00□01:30□L03 : Job preparation □
10 Nov 2012□05:30□02:30□L01 : Logging eqt travel time□
10 Nov 2012□08:00□08:00□L20 : Logging eqt standby time□
10 Nov 2012□08:30□00:30□L31 : Logging rig up / down time□
10 Nov 2012□10:00□01:30□L30 : Logging operating time□"run in hole, release tools a
10 Nov 2012□10:30□00:30□L31 : Logging rig up / down time□
10 Nov 2012□14:30□04:00□L30 : Logging operating time□pull pipe from 8974 to 4094 a
10 Nov 2012□15:00□00:30□L31 : Logging rig up / down time□
10 Nov 2012□15:30□00:30□L30 : Logging operating time□"run in hole,try to retrieve
10 NOv 2012□16:00□02:30□L31 : Logging rig up / down time□rig down tools and equipm
10 Nov 2012□18:00□02:00□L80 : pull pipe to surface to retrieve tools unable to lat
10 Nov 2012□18:30□00:30□L01 : shut down for weather problems lightining in area
10 NOv 2012□22:00□03:30□L90 : processing time □
11 Nov 2012 01:00 03:00 L01 : Loggging eqt travel time
11 Nov 2012 05:00 04:00 L03 : job cleanup

ThruBit
A Schlumberger Company

MAIN PASS

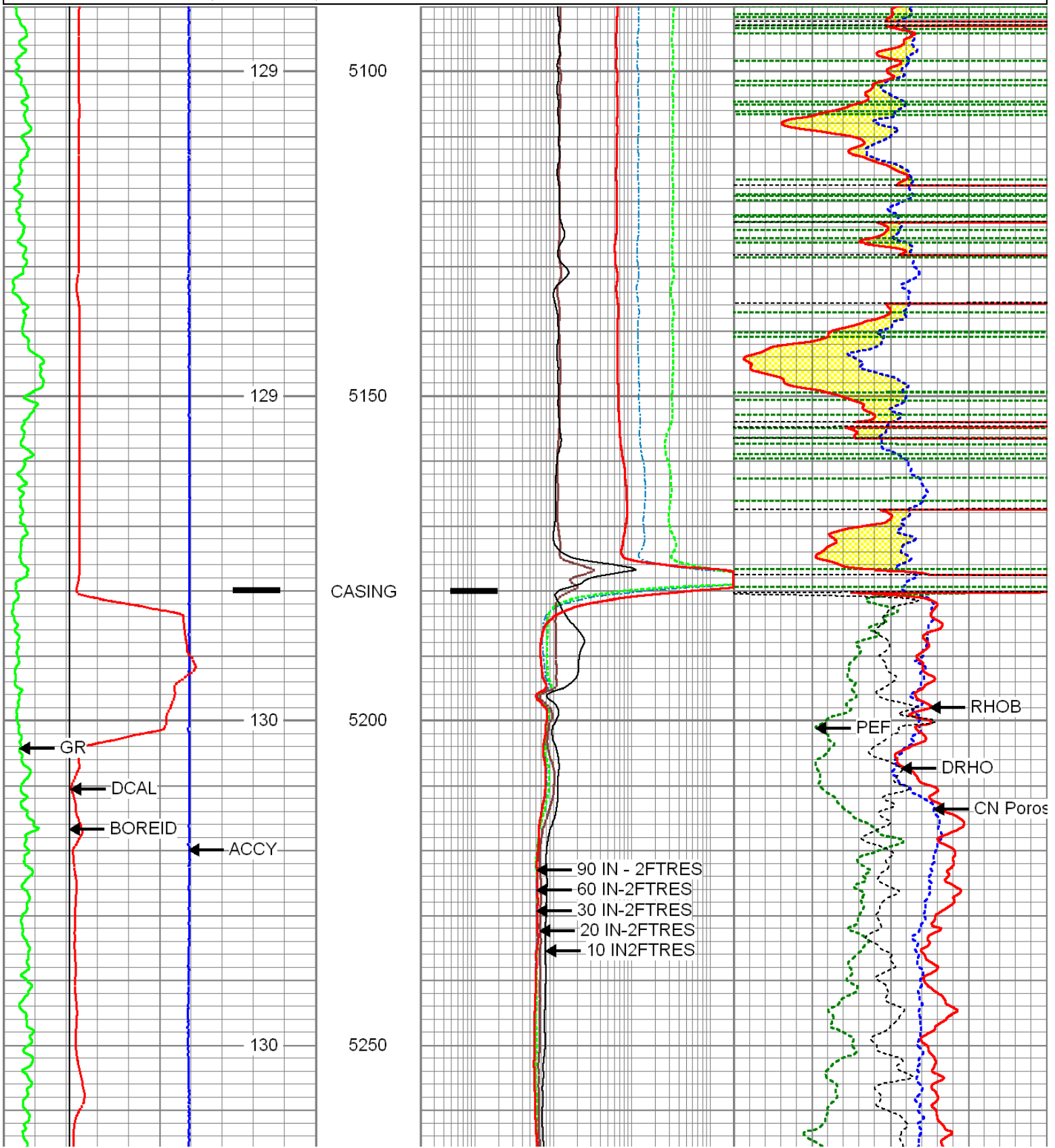
Database File: schupbach_mem.db

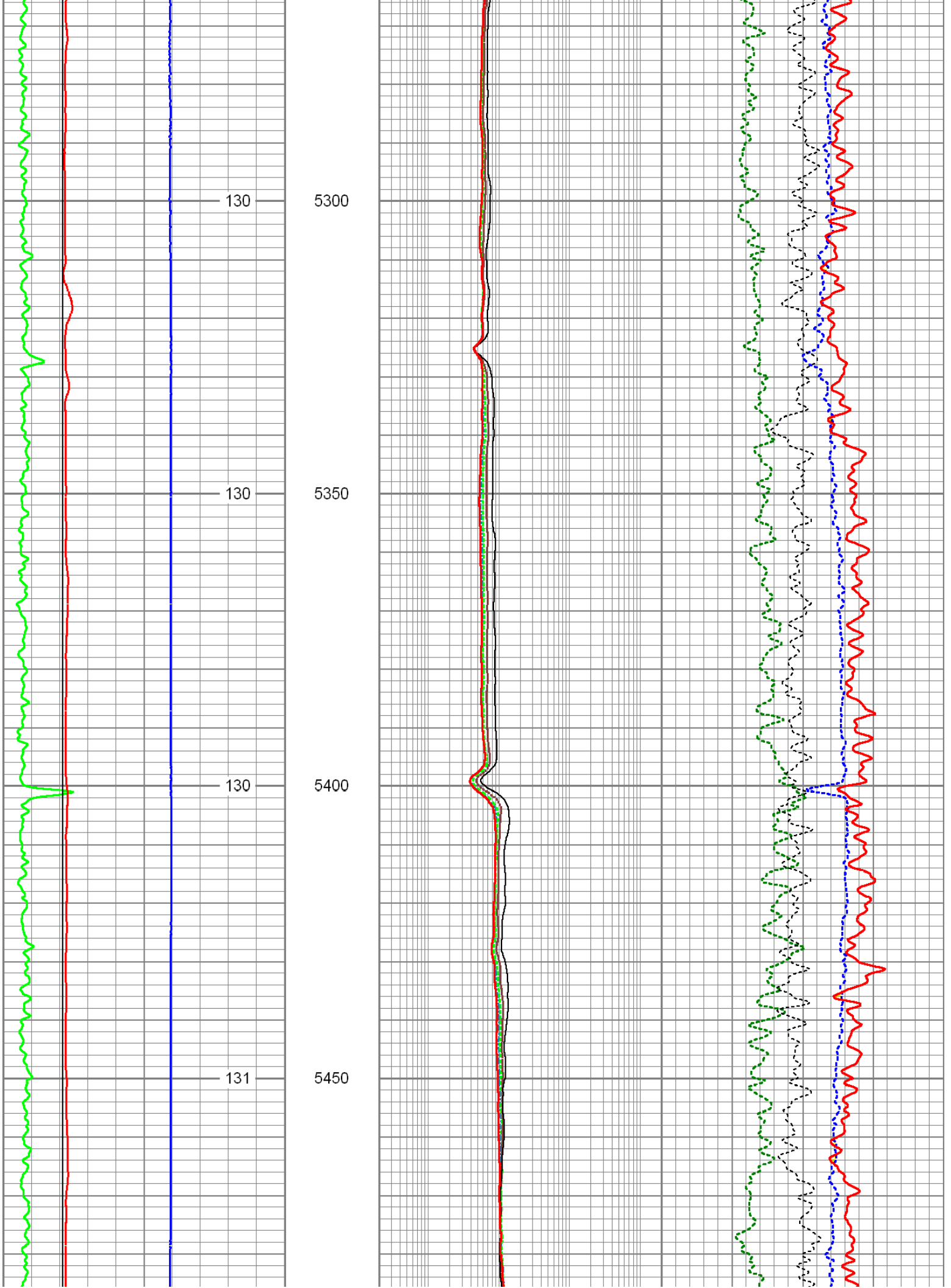
Database File:	schupbach_mem.db
Dataset Pathname:	proc1/pass1.3
Presentation Format:	6_SH_T~1
Dataset Creation:	Sat Nov 10 19:45:29 2012
Charted by:	Depth in Feet scaled 1:240

0	GR (GAPI)	150
-5	ACCY	5
4	DCAL (in)	14
4	BOREID (in)	14
	GRTEMP (degF)	

0.2	60 IN-2FTRES (Ohm-m)	2000
0.2	30 IN-2FTRES (Ohm-m)	2000
0.2	20 IN-2FTRES (Ohm-m)	2000
0.2	10 IN2FTRES (Ohm-m)	2000
0.2	90 IN - 2FTRES (Ohm-m)	2000

45	CN Porosity (pu)	-15
0	PEF (barn)	10
1.95	RHOB (g/cc)	2.95
-0.25	DRHO (g/cc)	0.25

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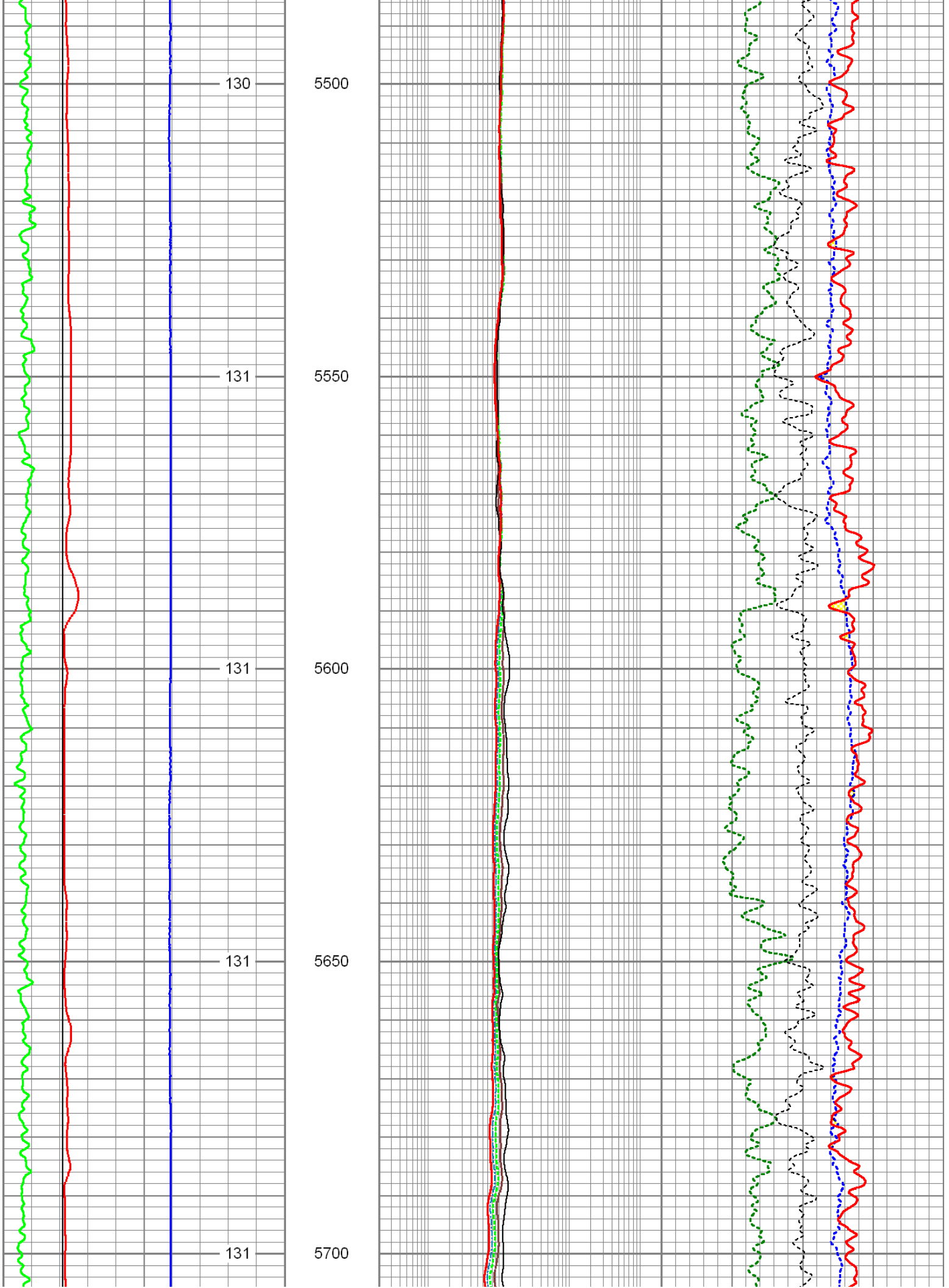
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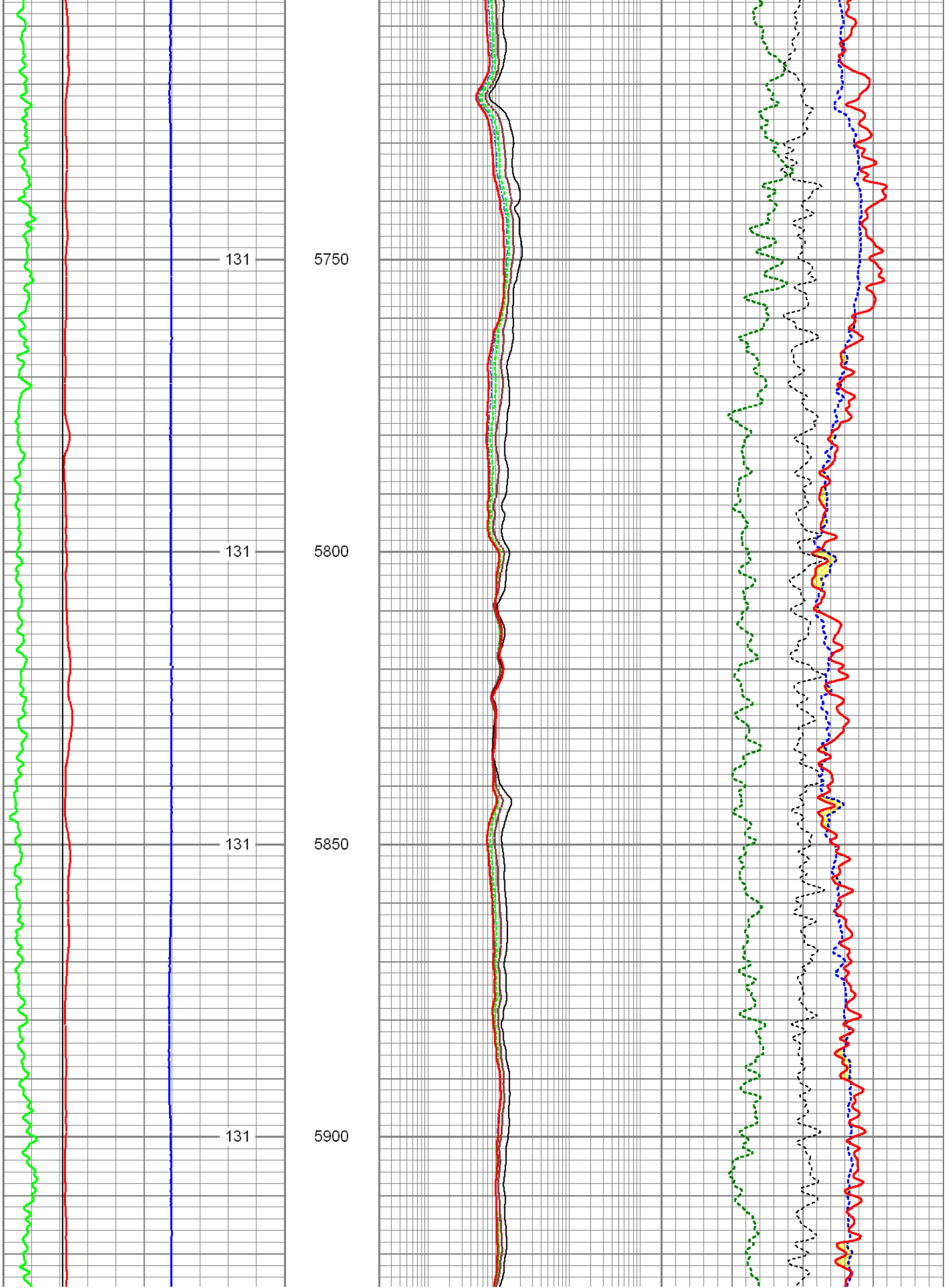
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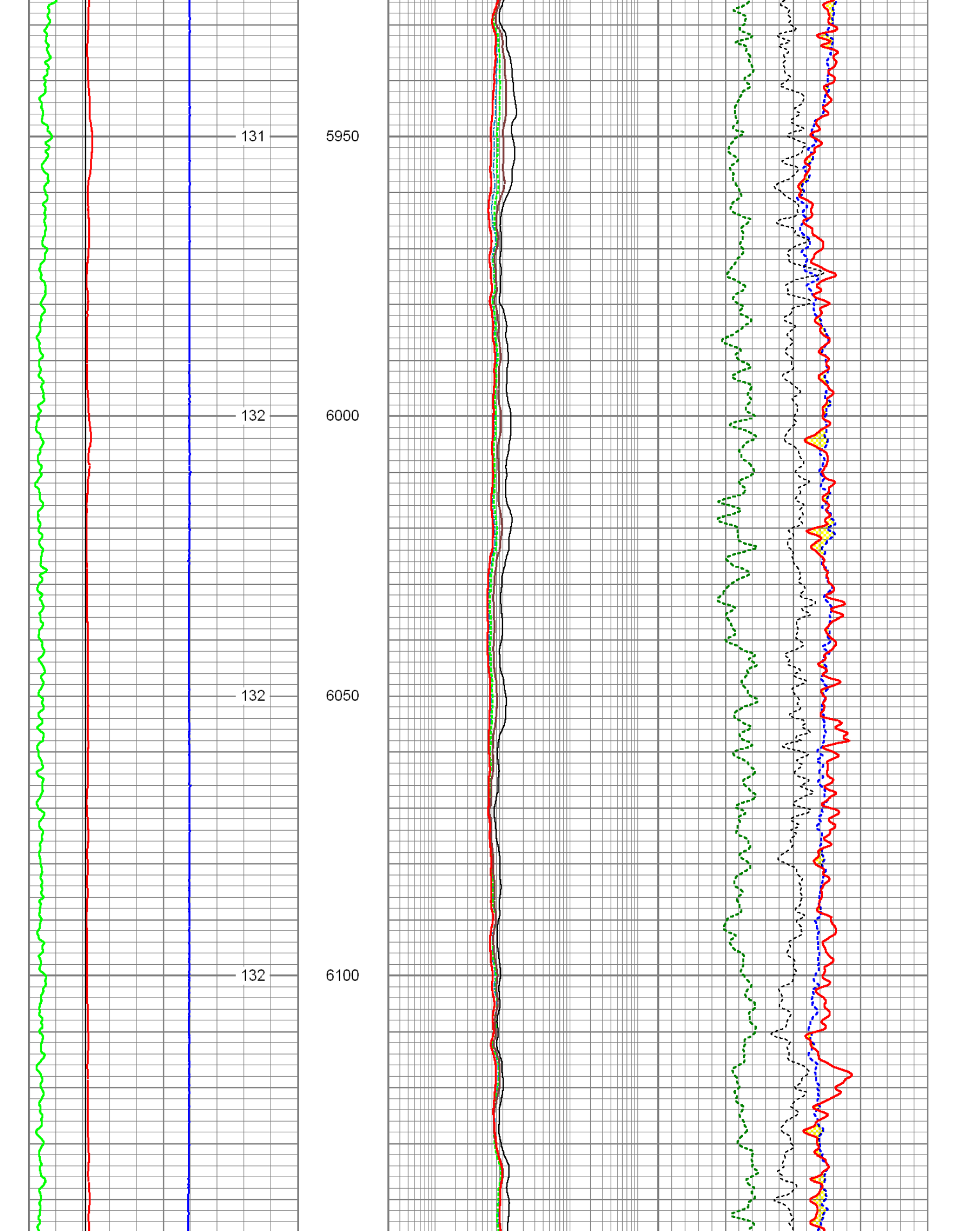
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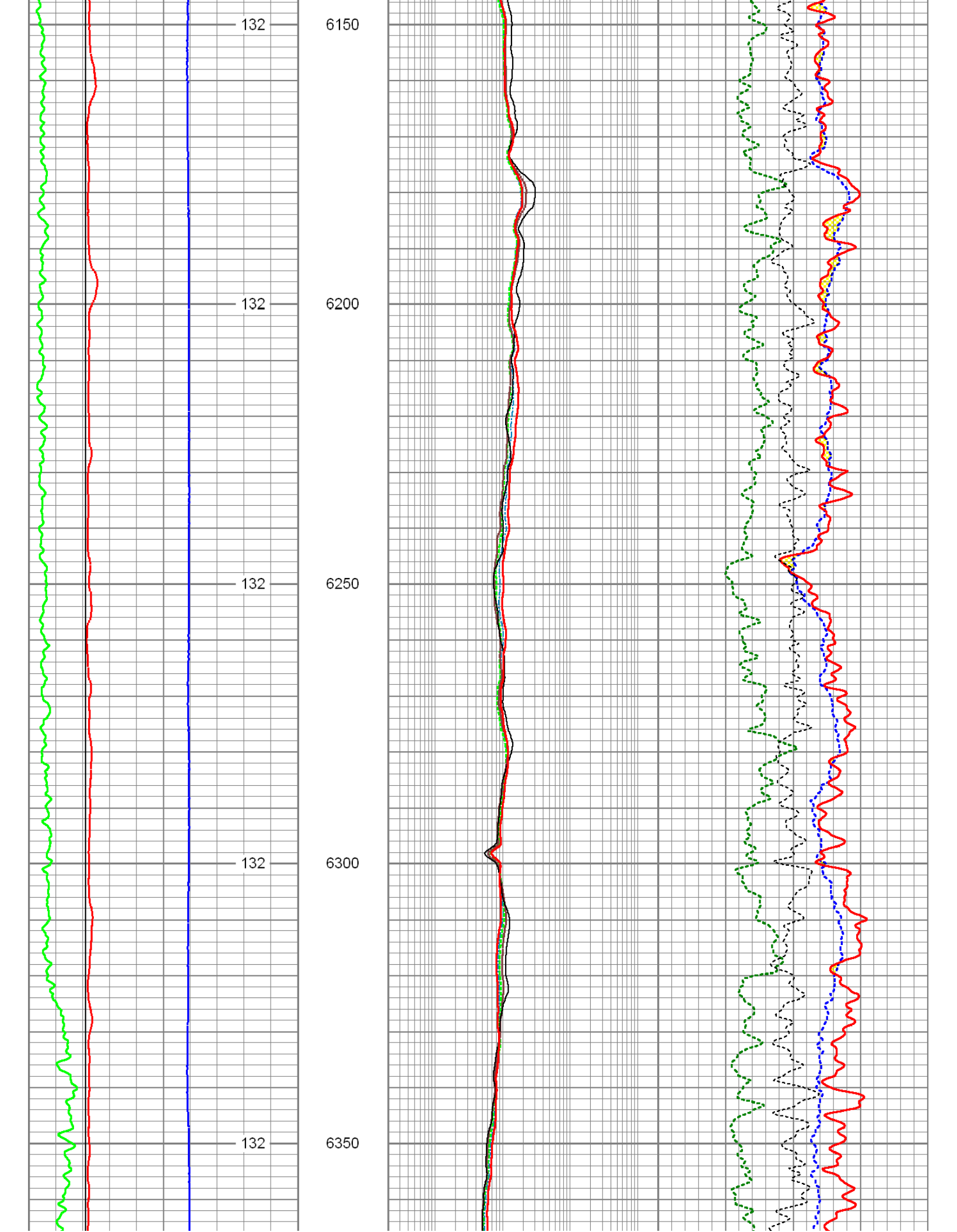
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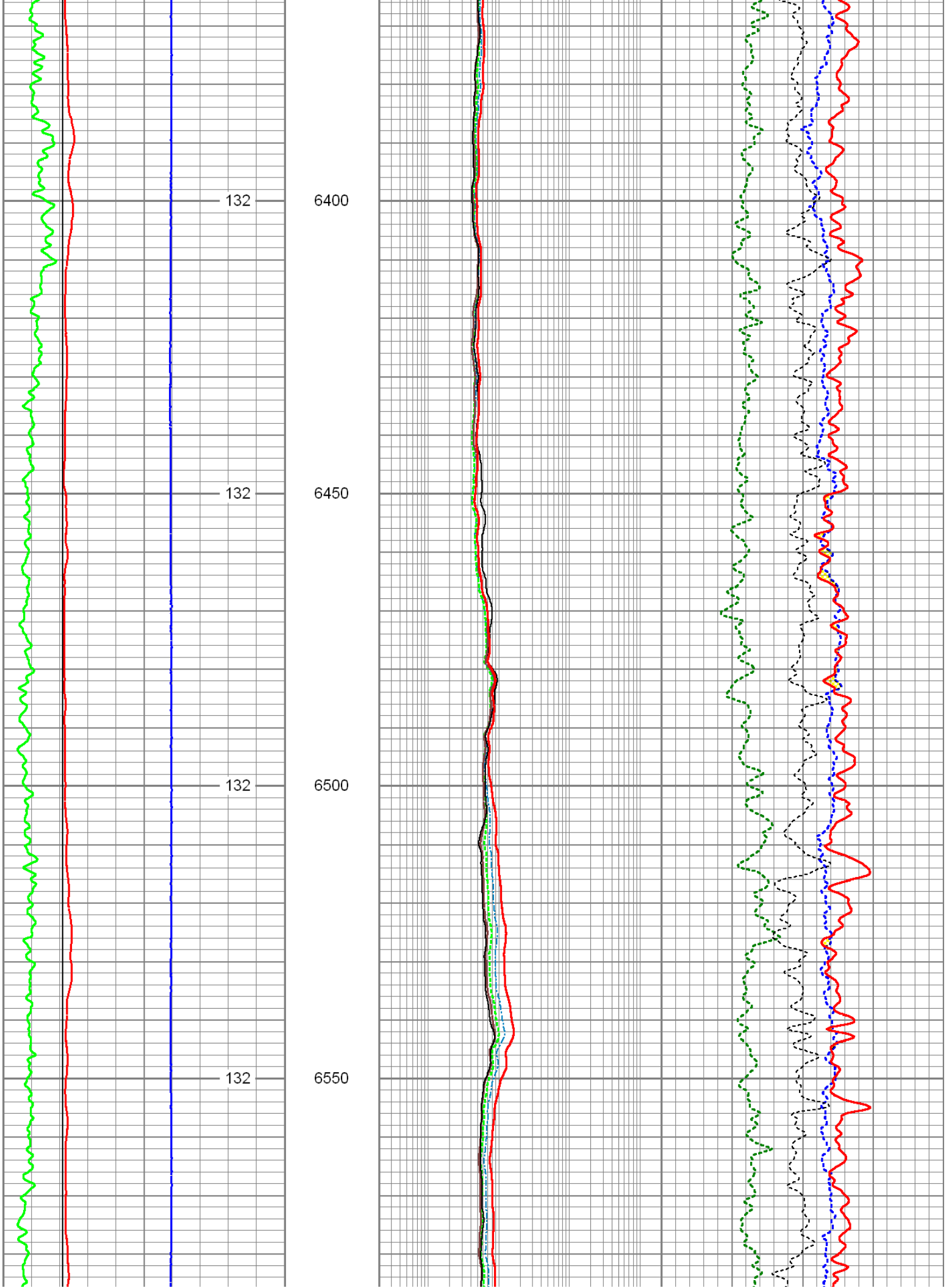
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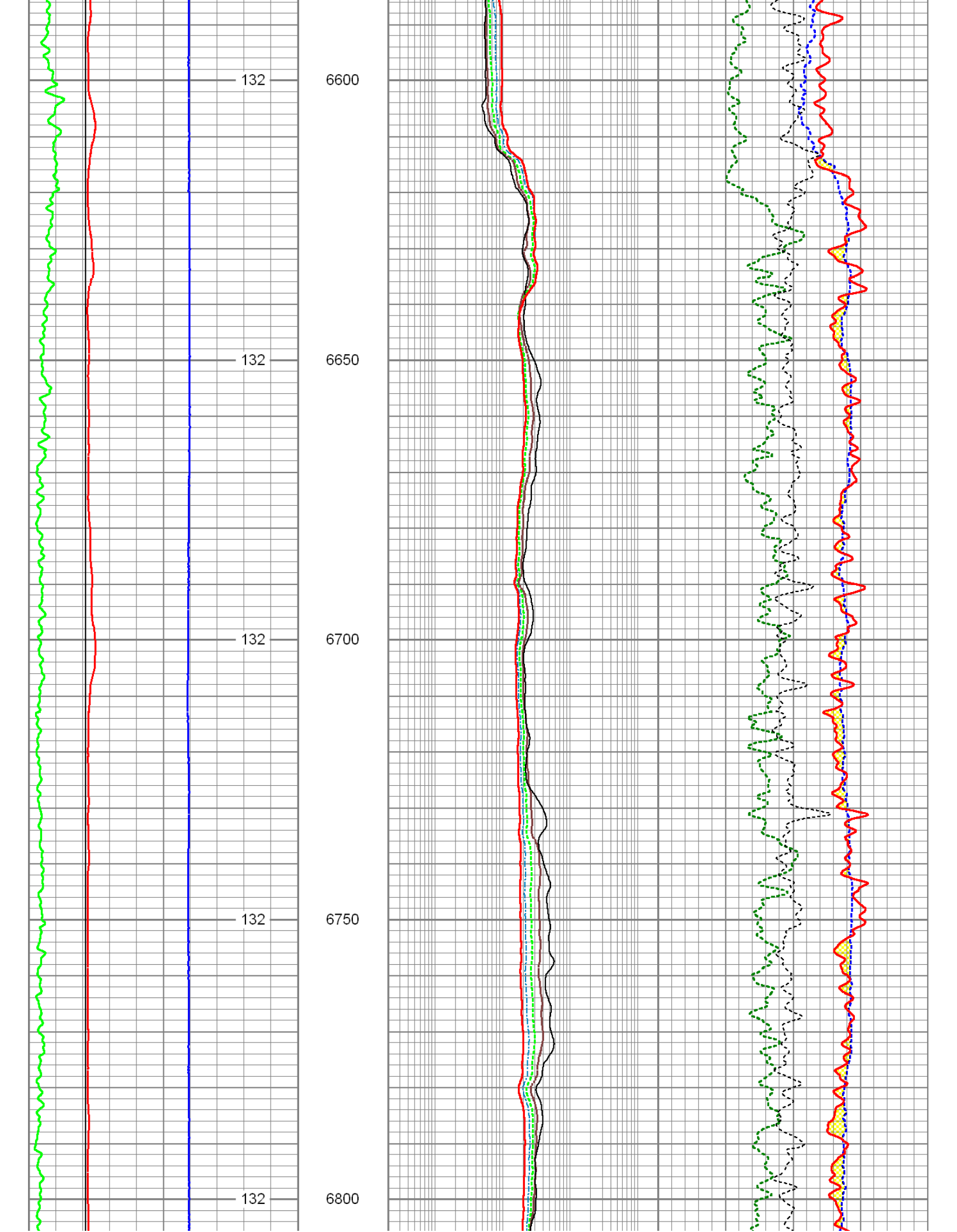
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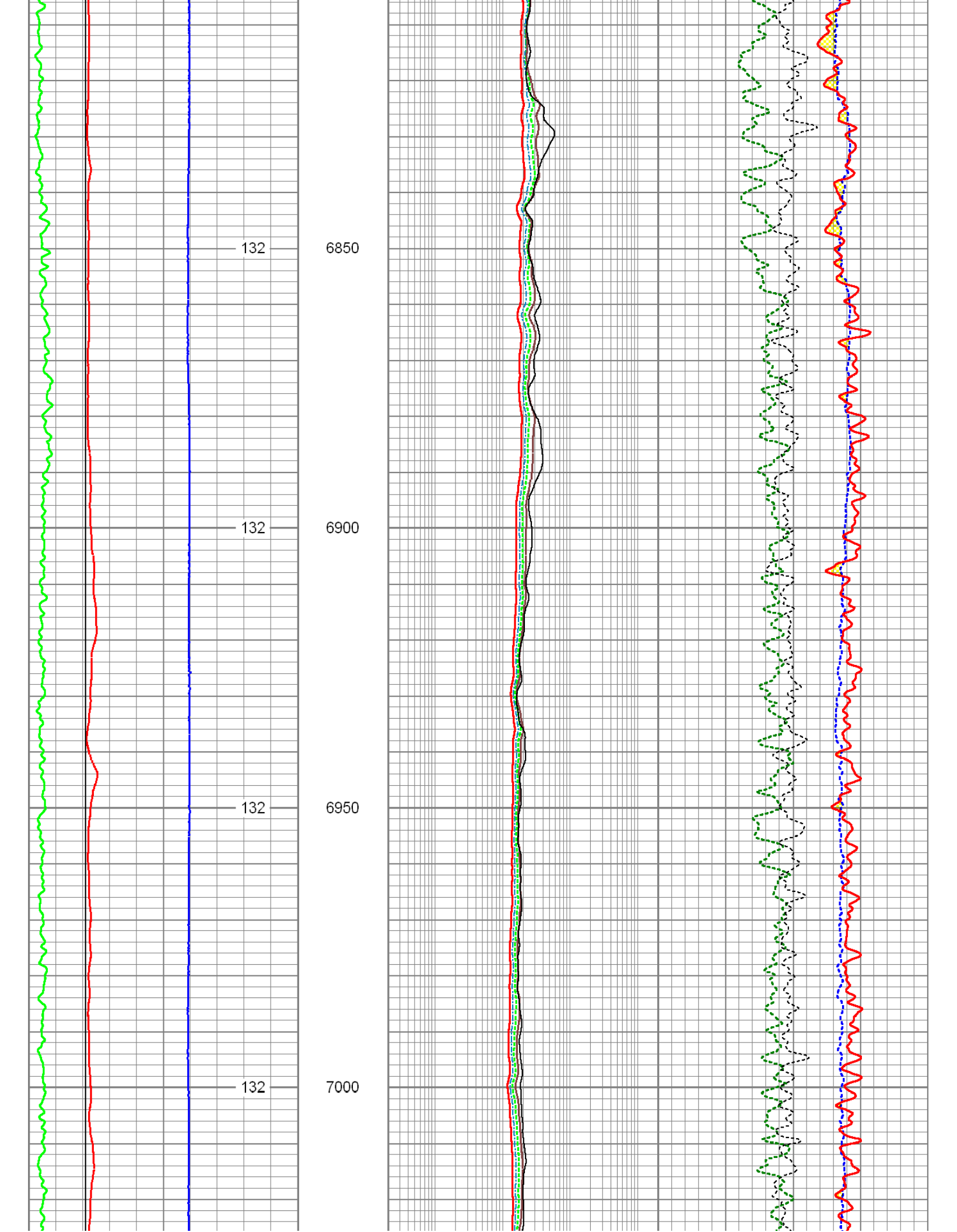
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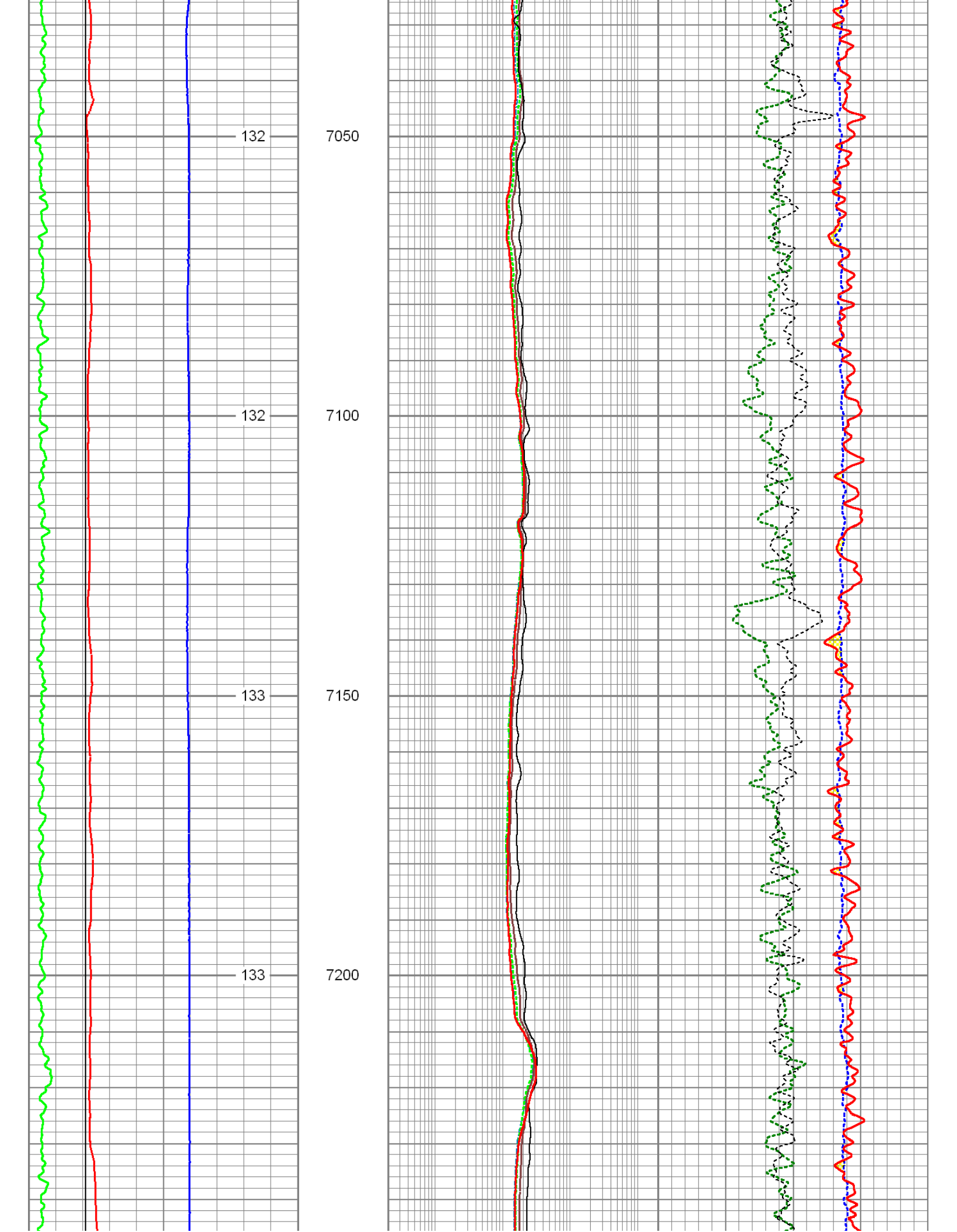
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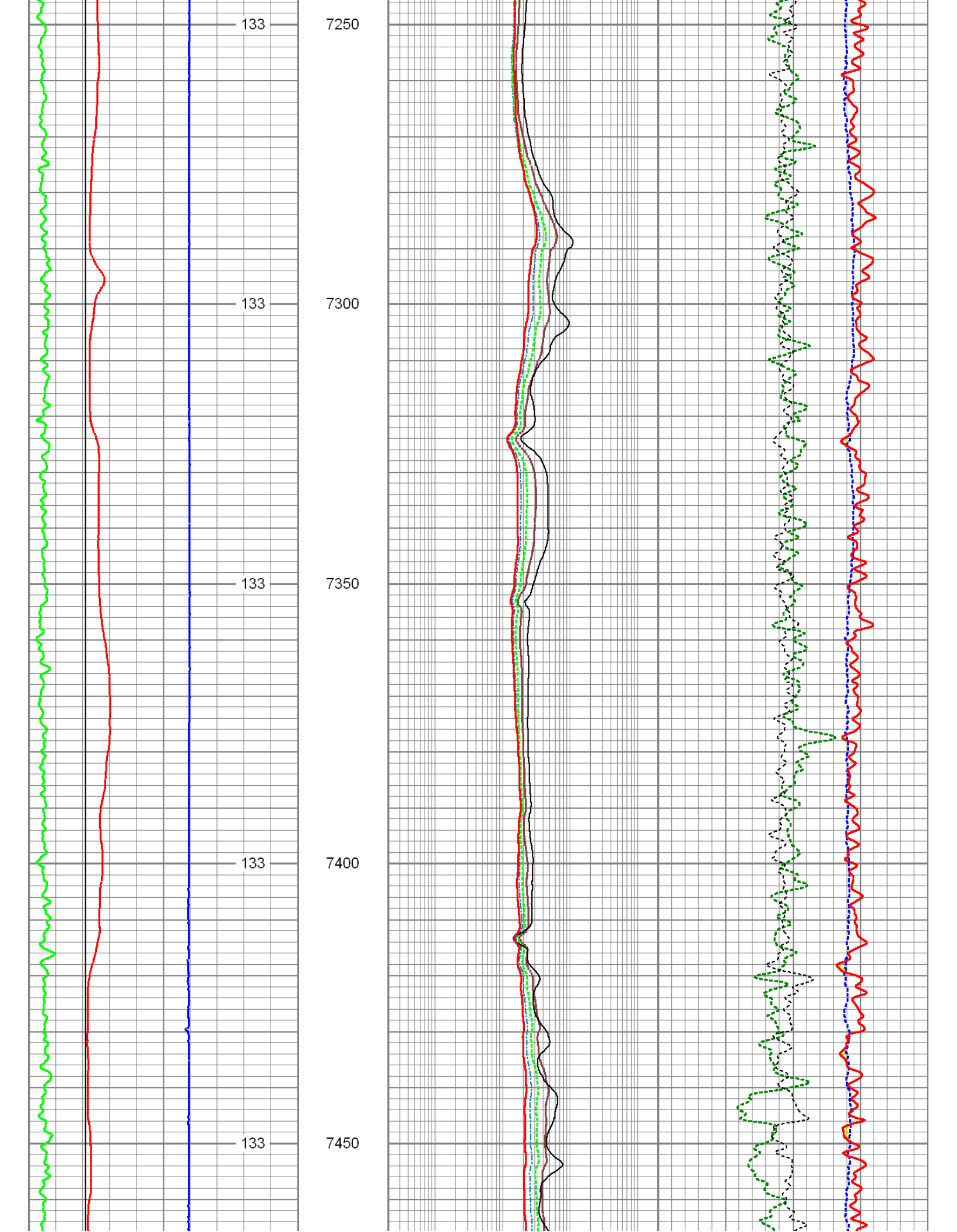
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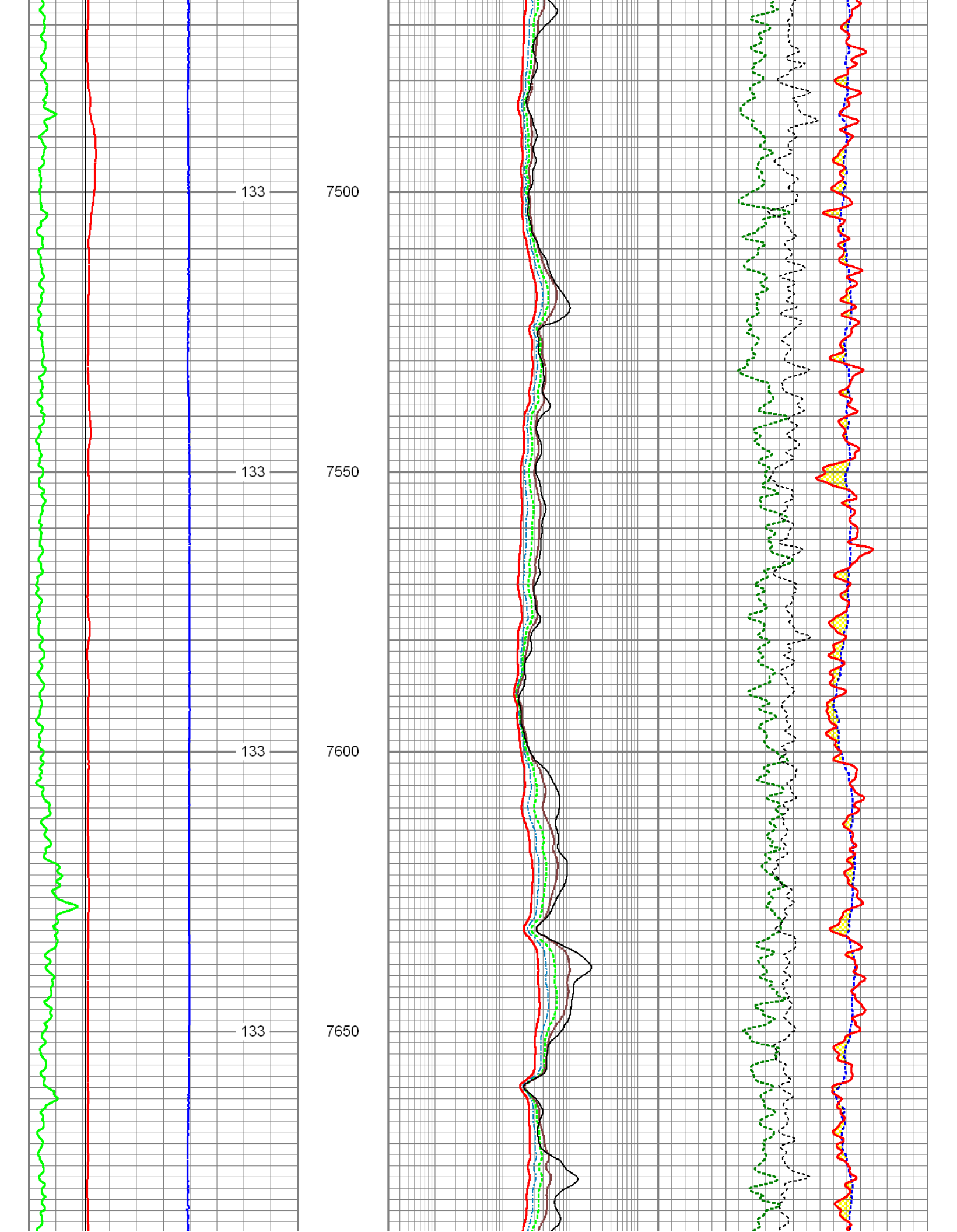
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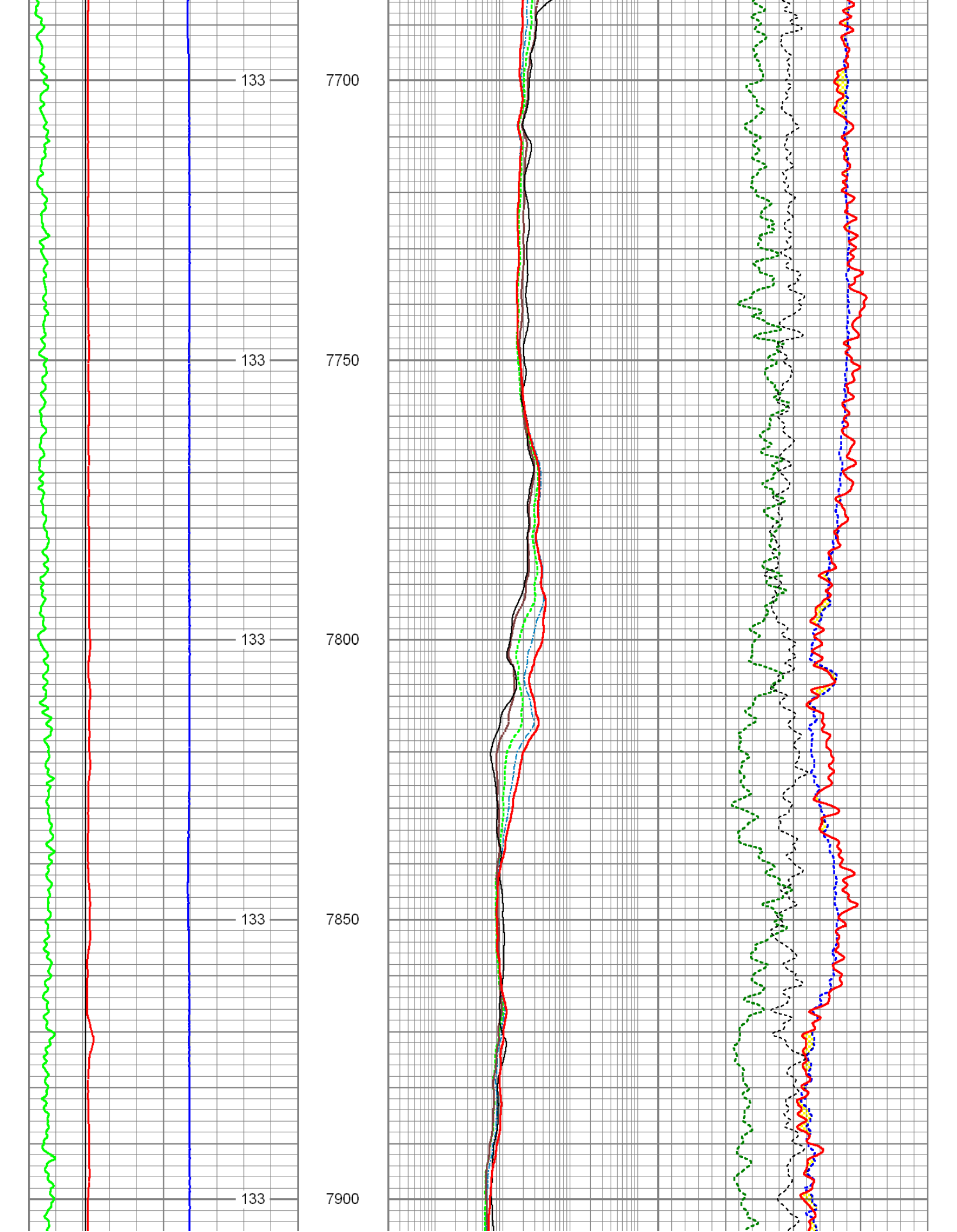
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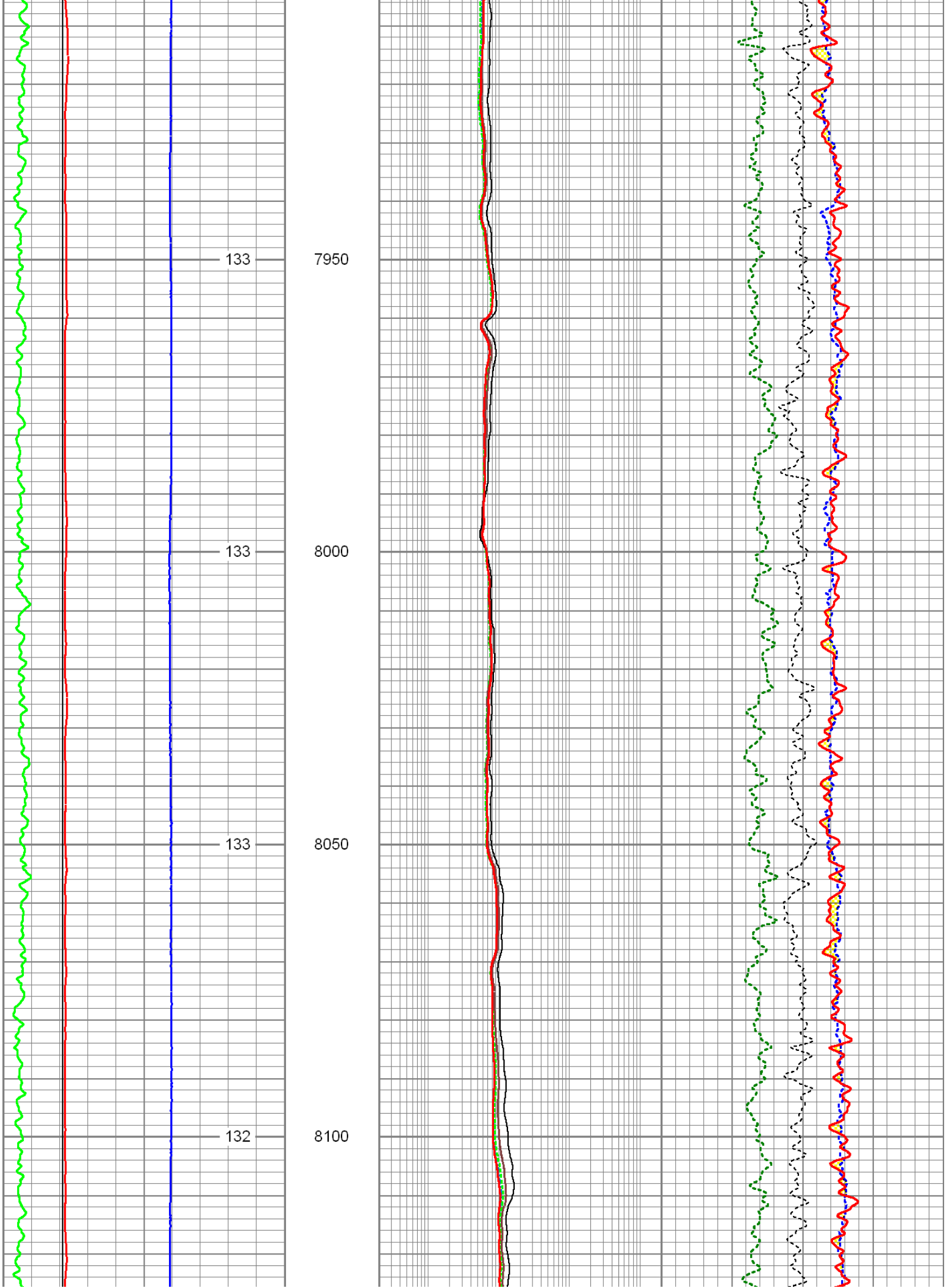
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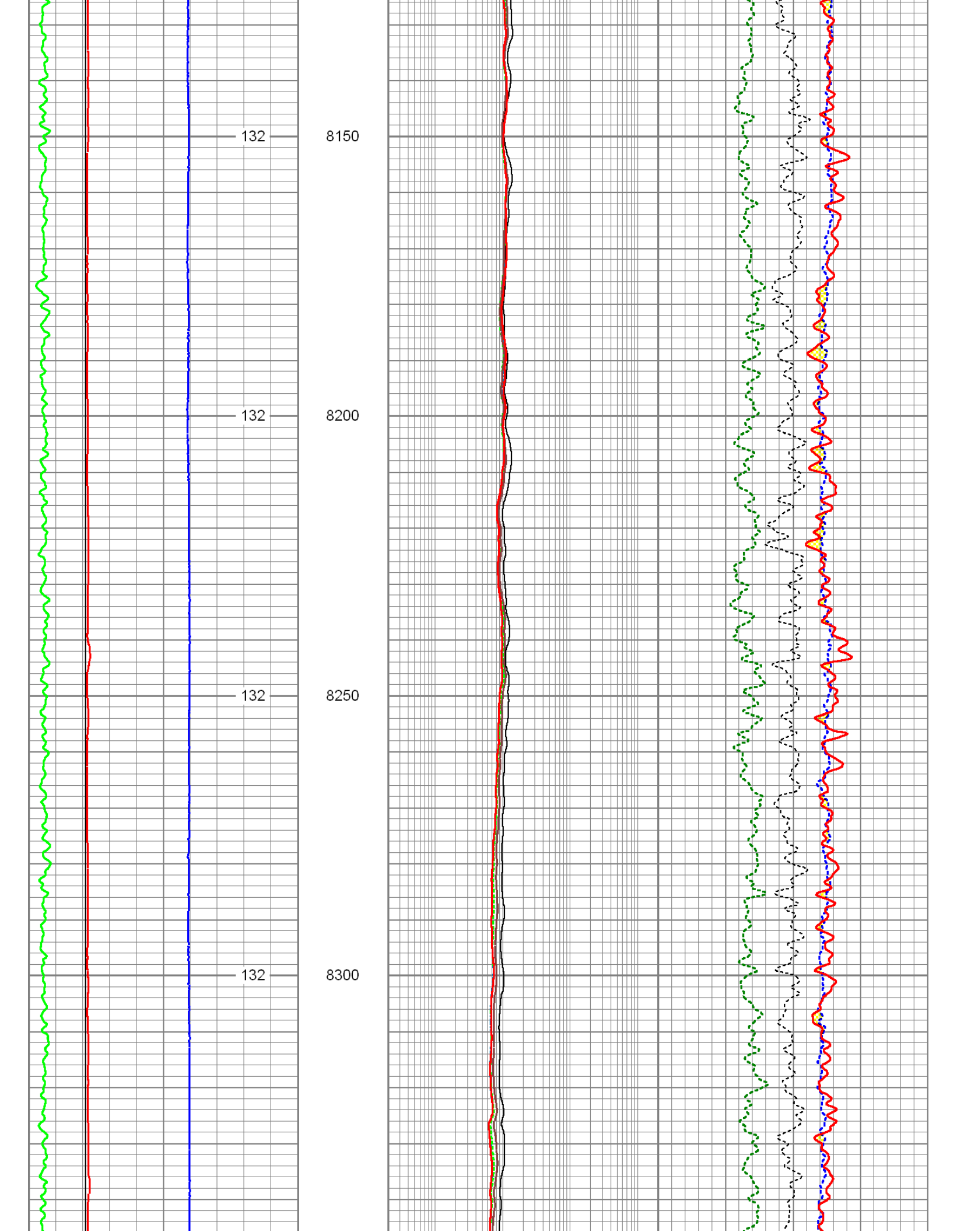
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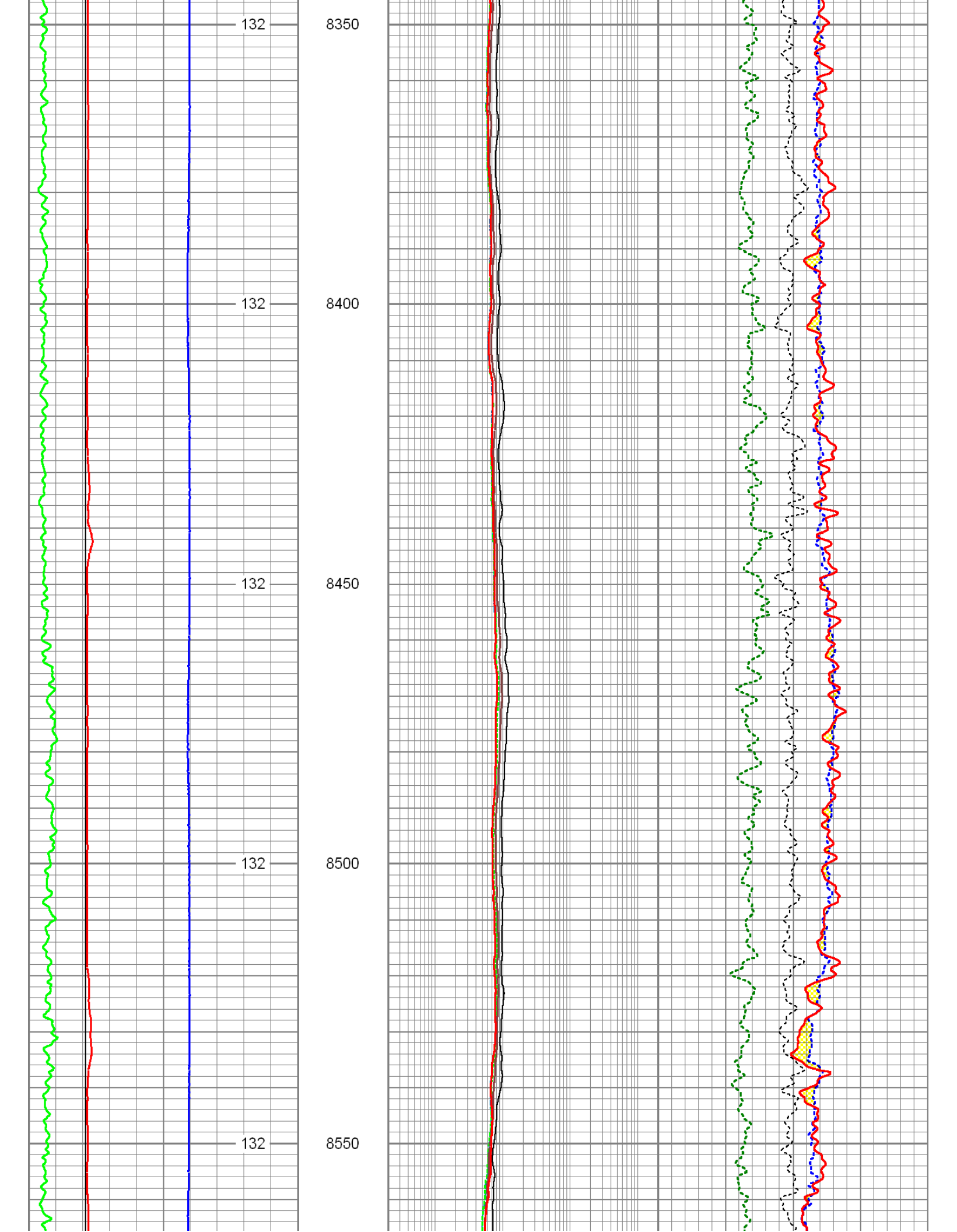
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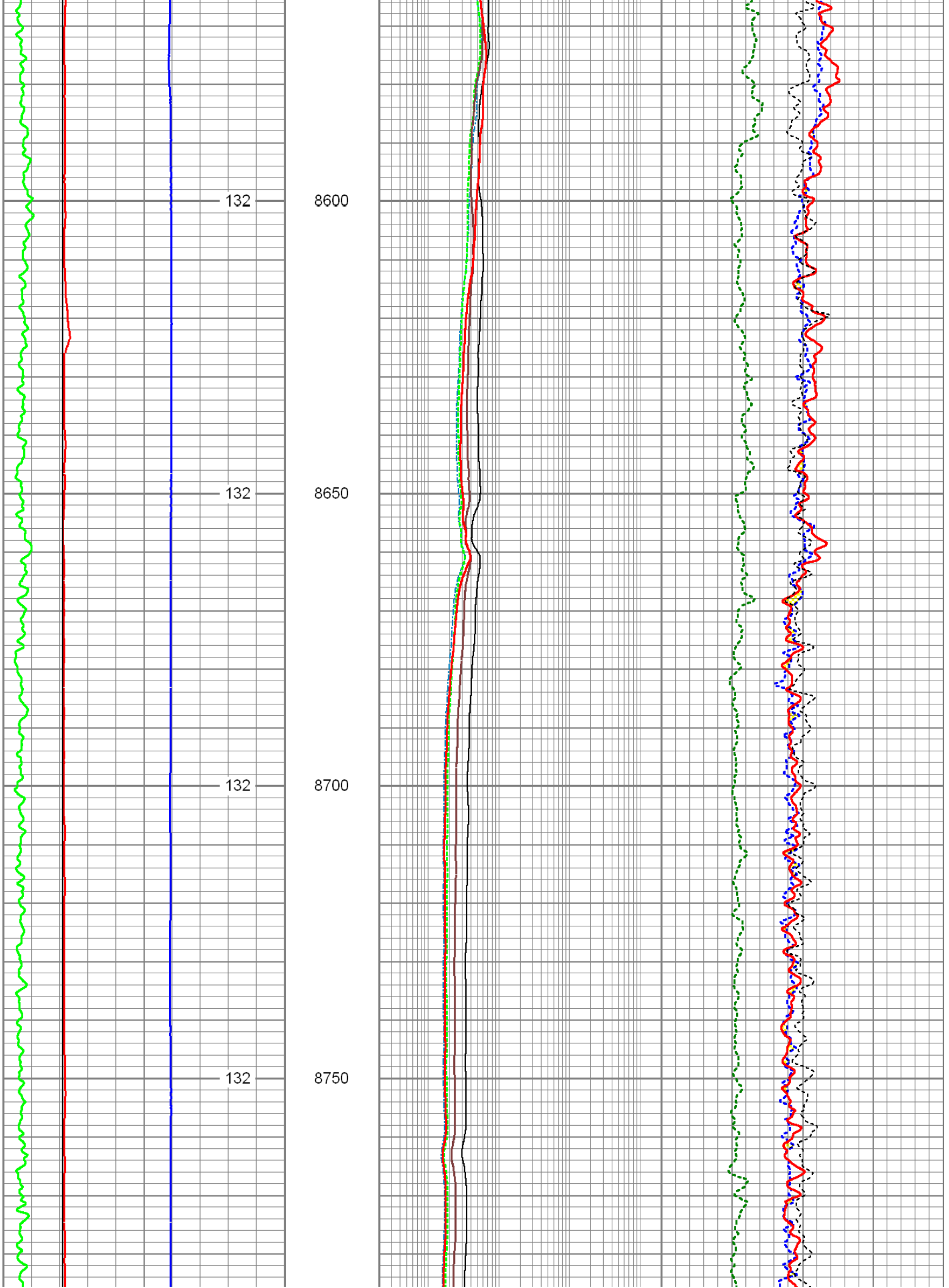
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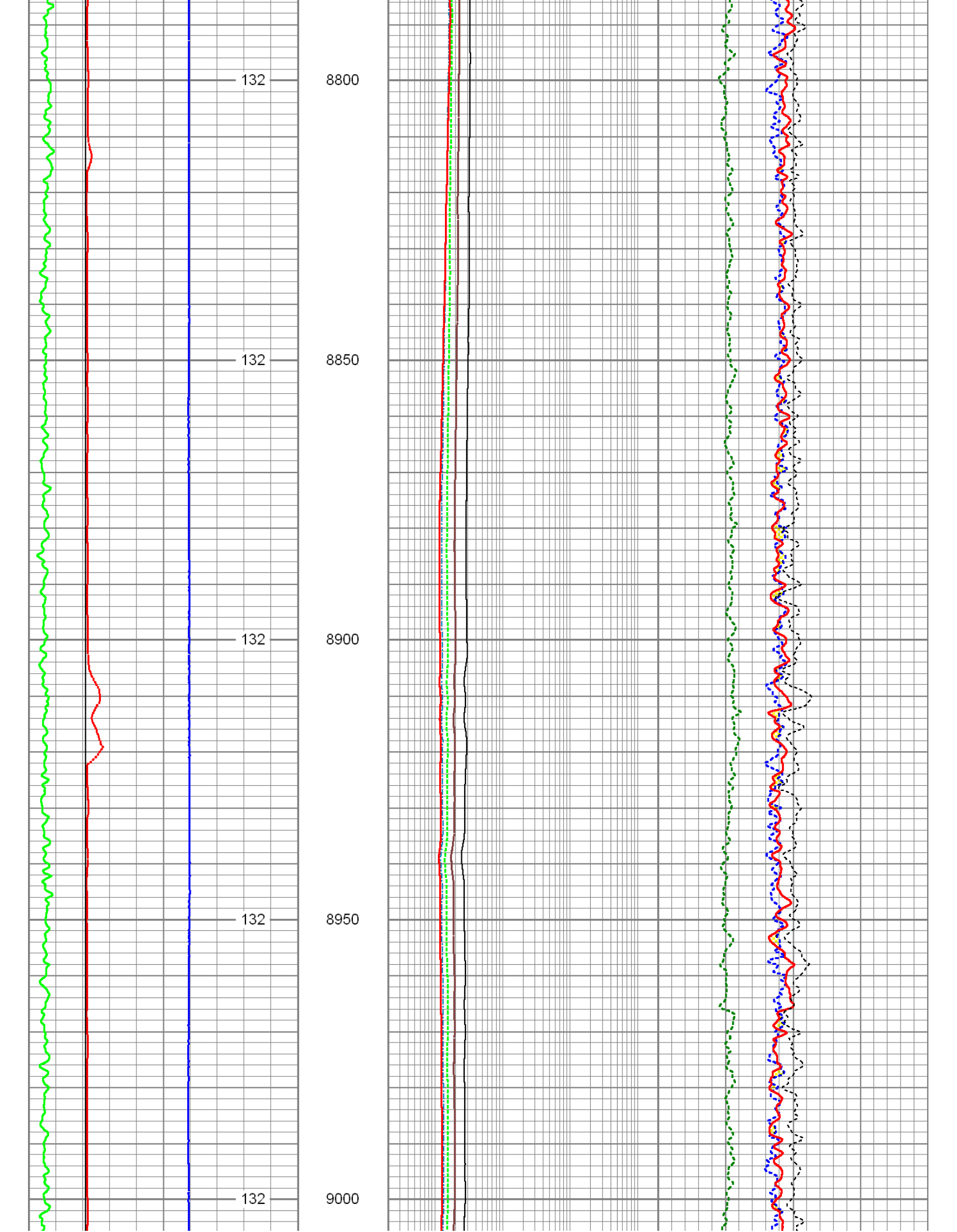
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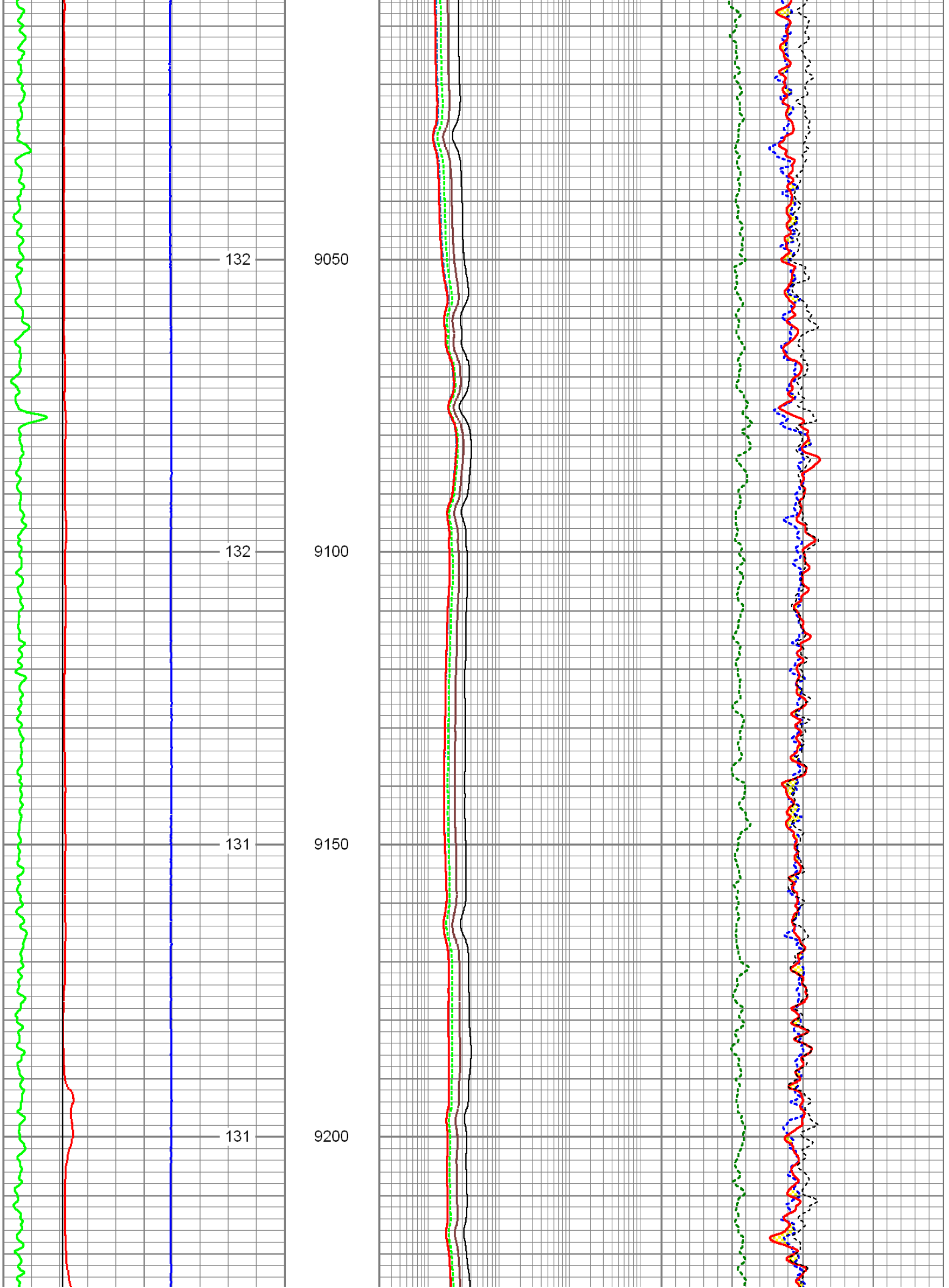
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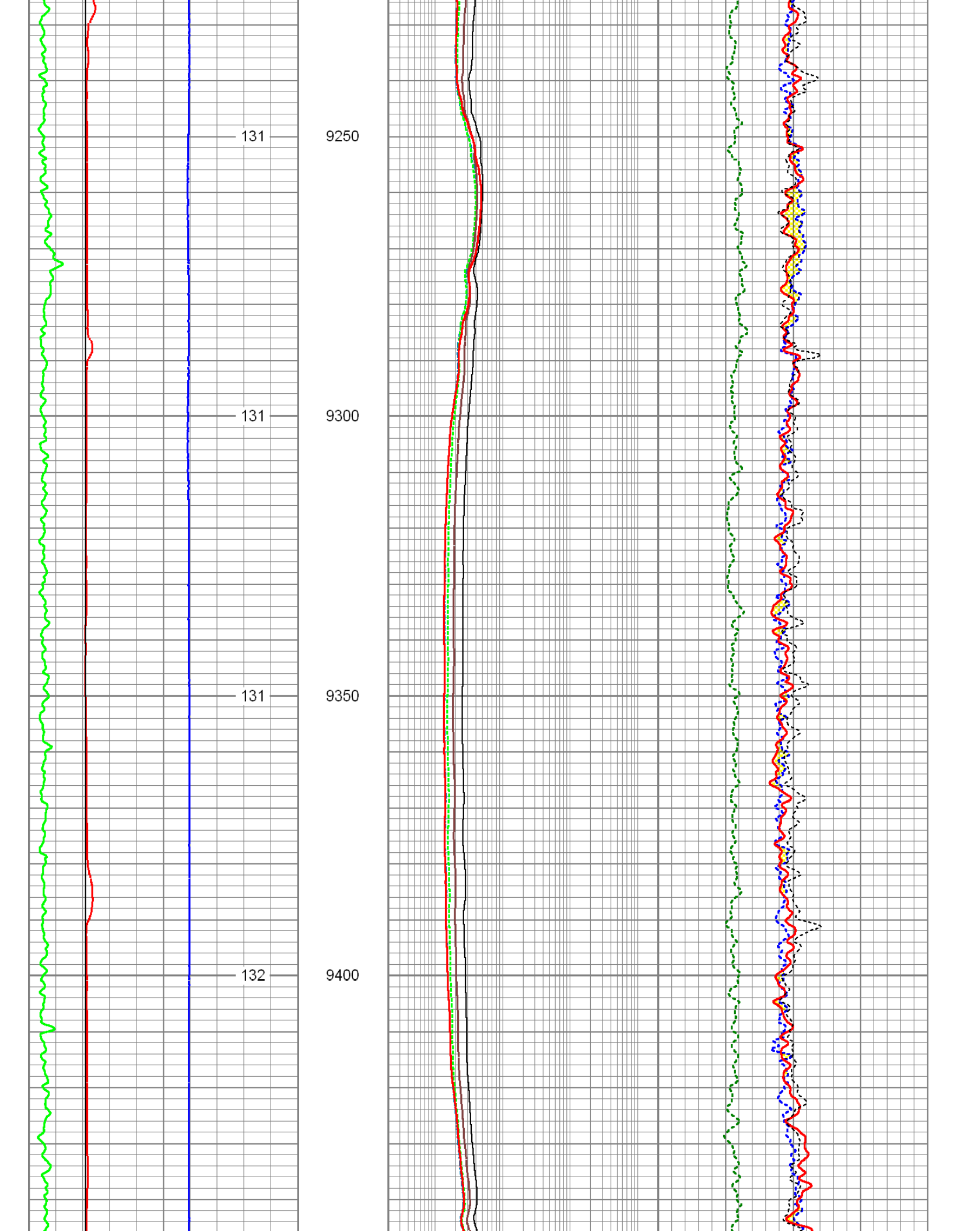
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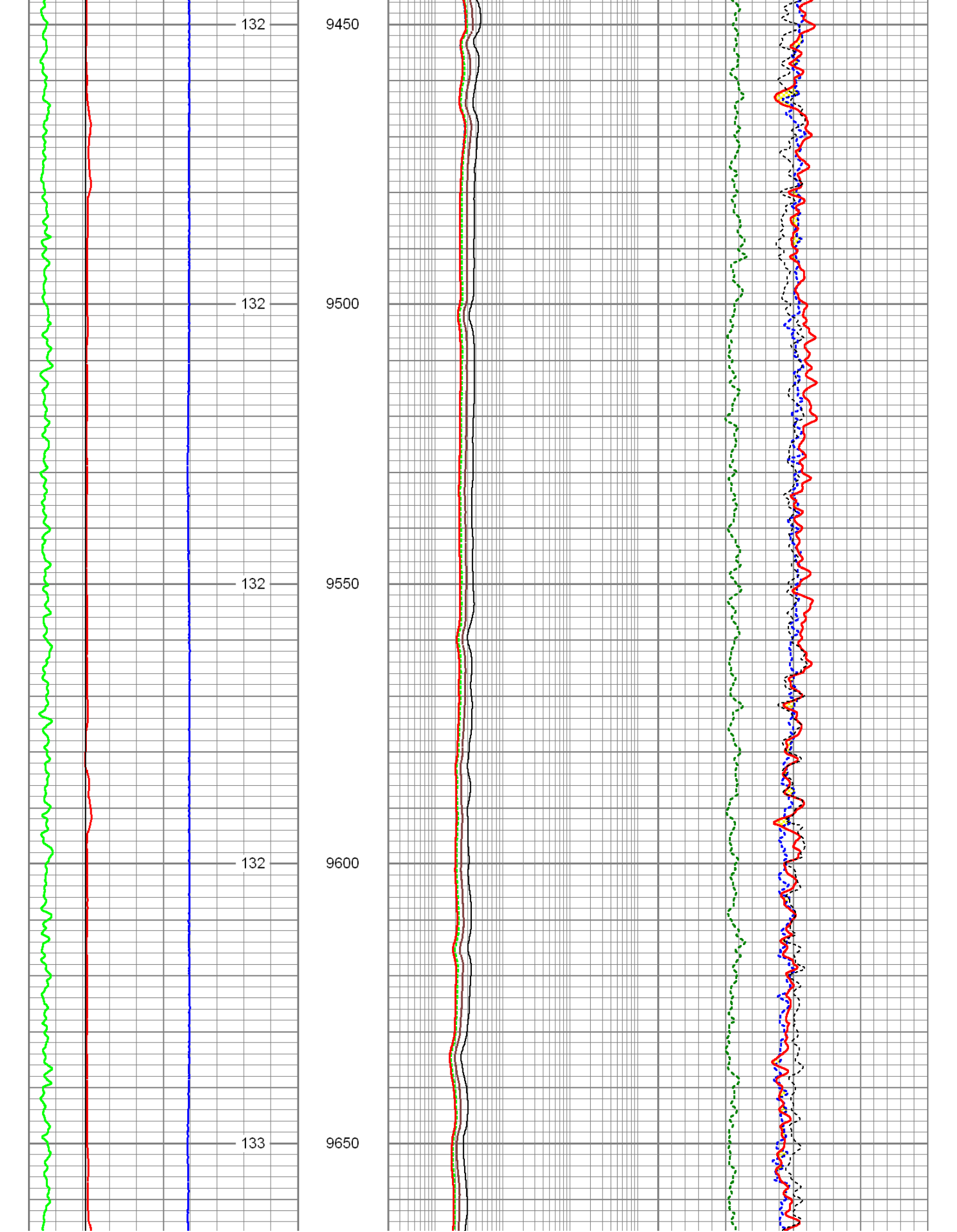
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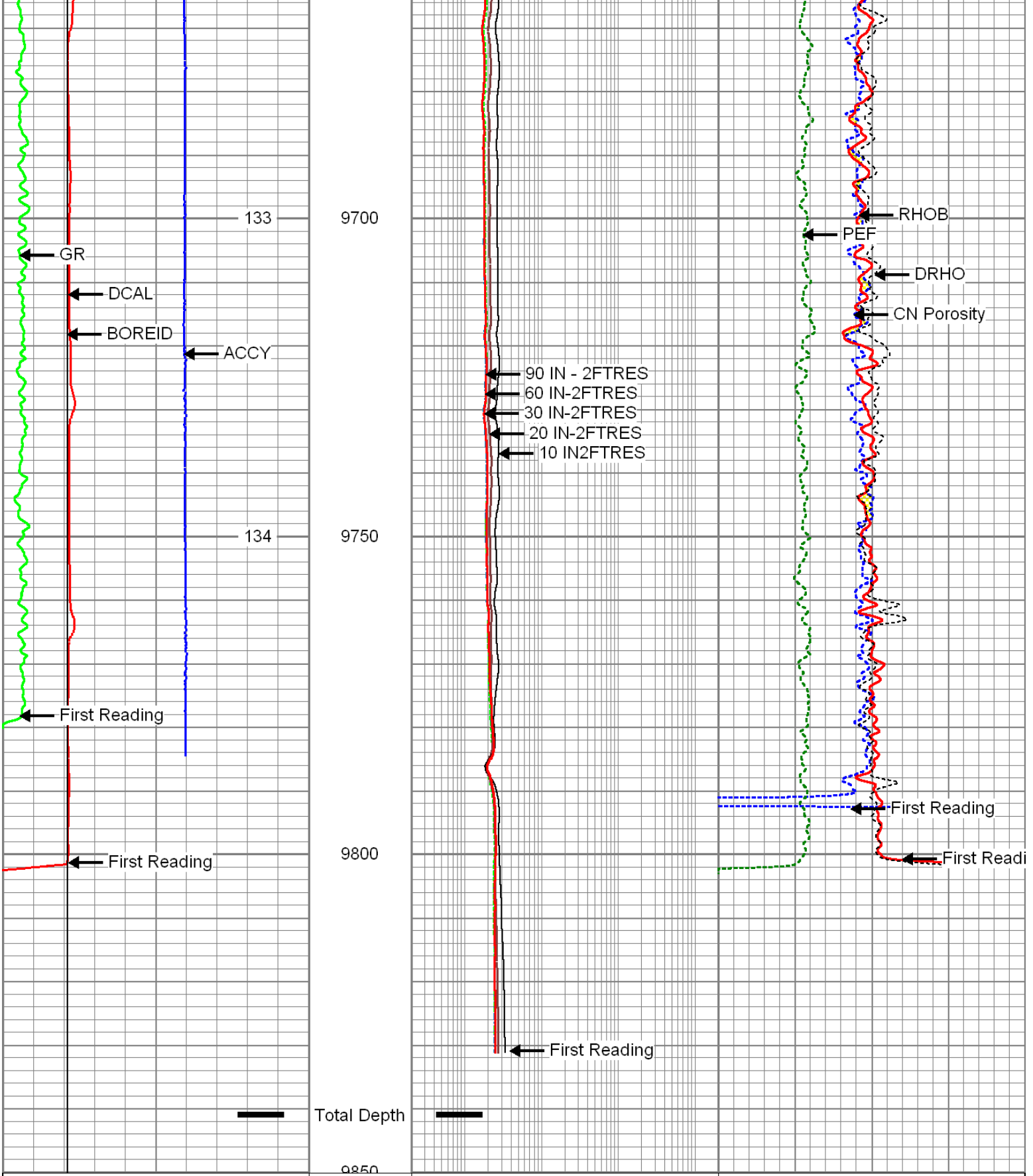


0	GR (GAPI)	150
-5	ACCY	5
4	DCAL (in)	14
4	BOREID (in)	14
	GRTEMP (degF)	

0.2	60 IN-2FTRES (Ohm-m)	2000
0.2	30 IN-2FTRES (Ohm-m)	2000
0.2	20 IN-2FTRES (Ohm-m)	2000
0.2	10 IN2FTRES (Ohm-m)	2000
0.2	90 IN - 2FTRES (Ohm-m)	2000

45	CN Porosity (pu)	-15
0	PEF (barn)	10
1.95	RHOB (g/cc)	2.95
-0.25	DRHO (g/cc)	0.25

Database:C:\Warrior\Data\schupbach_mem.db

Log Variables

Database:C:\Wamor\Data\schupbach_mem.db
Dataset: field/well/proc1/pass1.3

Top - Bottom

A	BHCOR	BHFL_TYPE	BHFLRES Ohm-m	BHFLRESSRC	BHIDSRC	BOREID in
1	On	WBM	1	MUDCELL	CURVE	6.125
BOTTEMP degF	CASED?	CASEOD in	CASETHCK in	CEMWATERSA kppm	CMNTTHCK in	DNBHC?
134	No	4.5	0	0	0	NO
DPORSEL	FLUIDDEN g/cc	FRMSALIN kppm	LATNOR	M	MATRXDEN g/cc	MUDSALIN kppm
RHOB	1	0	Off	2	2.71	2.75
MudWgt lb/gal	NPORSEL	PEBHC?	PERFS	RESTMPSRC	SO in	SRFTEMP degF
8.6	Limestone	YES	0	INTERNAL	0.5	65
SZCOR	TDEPTH ft	TMPCOR	TOOLPOS			
On	9956	On	Ec-centered			

Calibration Report

Database File: schupbach_mem.db
Dataset Pathname: proc1/pass1.3
Dataset Creation: Sat Nov 10 19:45:29 2012

ThruBit Induction Calibration Report

Tool Model-Serial Number: PS-PS28R

Shop Calibration Performed: Tue Oct 16 13:50:45 2012

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-473.4210	[-500.00, -400.00]	221.1340	[-500.00, 500.00]
A2	-133.0640	[-180.00, -100.00]	291.9300	[-500.00, 500.00]
A3	-23.8718	[-50.00, -10.00]	113.2870	[-500.00, 500.00]
A4	-14.0762	[-30.00, -10.00]	249.2590	[-500.00, 500.00]
A5	-13.8572	[-30.00, -10.00]	120.9920	[-500.00, 500.00]
Freq 2				
A1	-248.3670	[-280.00, -180.00]	115.3690	[-500.00, 500.00]
A2	-85.7732	[-130.00, -50.00]	159.6910	[-500.00, 500.00]
A3	-18.0839	[-50.00, -10.00]	22.6353	[-500.00, 500.00]
A4	-17.4304	[-30.00, -10.00]	75.7074	[-500.00, 500.00]
A5	-18.4883	[-30.00, -10.00]	-18.9884	[-500.00, 500.00]
Freq 3				
A1	-156.4960	[-180.00, -80.00]	10.1153	[-500.00, 500.00]
A2	-65.5881	[-130.00, -30.00]	73.0404	[-500.00, 500.00]
A3	-14.1592	[-50.00, -10.00]	-39.9473	[-500.00, 500.00]
A4	-18.6539	[-30.00, -10.00]	-38.6724	[-500.00, 500.00]
A5	-19.6652	[-30.00, -10.00]	-121.3590	[-500.00, 500.00]
Freq 4				
A1	-84.8673	[-120.00, -40.00]	-151.9120	[-500.00, 500.00]
A2	-47.5404	[-110.00, -10.00]	-41.7424	[-500.00, 500.00]
A3	-12.1496	[-50.00, -10.00]	-132.8180	[-500.00, 500.00]
A4	-22.1207	[-30.00, -10.00]	-208.8670	[-500.00, 500.00]

A5	-25.1949	[-30.00, -10.00]	-294.3110	[-500.00, 500.00]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9905	[0.95, 1.05]	0.0008	[-0.05, 0.05]
A2	0.9919	[0.95, 1.05]	0.0029	[-0.05, 0.05]
A3	0.9969	[0.95, 1.05]	-0.0043	[-0.05, 0.05]
A4	0.9913	[0.95, 1.05]	0.0053	[-0.05, 0.05]
A5	1.0149	[0.95, 1.05]	0.0030	[-0.05, 0.05]
Freq 2				
A1	0.9844	[0.95, 1.05]	-0.0073	[-0.05, 0.05]
A2	0.9856	[0.95, 1.05]	-0.0056	[-0.05, 0.05]
A3	0.9848	[0.95, 1.05]	-0.0057	[-0.05, 0.05]
A4	0.9865	[0.95, 1.05]	-0.0039	[-0.05, 0.05]
A5	1.0106	[0.95, 1.05]	-0.0062	[-0.05, 0.05]
Freq 3				
A1	1.0048	[0.95, 1.05]	-0.0009	[-0.05, 0.05]
A2	1.0063	[0.95, 1.05]	0.0005	[-0.05, 0.05]
A3	1.0052	[0.95, 1.05]	0.0003	[-0.05, 0.05]
A4	1.0066	[0.95, 1.05]	0.0017	[-0.05, 0.05]
A5	1.0328	[0.95, 1.05]	0.0006	[-0.05, 0.05]
Freq 4				
A1	0.9953	[0.95, 1.05]	-0.0012	[-0.05, 0.05]
A2	0.9965	[0.95, 1.05]	-0.0000	[-0.05, 0.05]
A3	0.9972	[0.95, 1.05]	-0.0023	[-0.05, 0.05]
A4	0.9988	[0.95, 1.05]	0.0009	[-0.05, 0.05]
A5	1.0302	[0.95, 1.05]	-0.0020	[-0.05, 0.05]
Temperature	28.3966 degC			

ThruBit Density Calibration Report

Tool Model-Serial Number:	PS-PS01D
Source Number:	
Shop Calibration Performed:	Thu Oct 18 14:06:27 2012

REFERENCE

	Density	Units
Aluminium	2.607	g/cc
Magnesium	1.752	g/cc

READINGS

Outputs	Counts	Units	Expected
SS1 Background	124.24	cps	[130.00, 170.00]
LS1 Background	131.57	cps	[130.00, 170.00]
LS4 Background	27.09	cps	[27.00, 35.00]
SS1 Aluminium	4301.04	cps	[4500.00, 5500.00]
LS1 Aluminium	813.27	cps	[750.00, 950.00]
LS4 Aluminium	907.66	cps	[843.00, 1068.00]
SS1 Magnesium	7137.73	cps	[7000.00, 9000.00]
LS1 Magnesium	5309.22	cps	[5250.00, 6250.00]

LS1 Al + Fe	693.74	cps	[650.00, 800.00]
LS4 Al + Fe	408.13	cps	[382.00, 471.00]

RESULTS

SS Slope	1.65	[1.52, 1.77]
LS Slope	0.42	[0.38, 0.45]
PEF K Factor	4.915	[3.510, 6.170]
PEF B Factor	-0.543	[-0.700, -0.410]

Caliper Shop Calibration performed: Thu Oct 18 14:06:27 2012

RESULTS

Reference	Reading	Units
12.00	1859.22	in
9.00	2026.75	in
6.00	2187.57	in

DENSITY PRE-SURVEY CHECK Performed: Thu Nov 08 08:36:04 2012

Outputs	Counts	Units	Expected
SS1 Background	124.84	cps	[120.52, 127.97]
LS1 Background	131.61	cps	[127.62, 135.52]
LS4 Background	26.42	cps	[25.46, 28.71]

CALIPER PRE-SURVEY CHECK Performed: Thu Nov 08 08:41:23 2012

Reference	Readings	Units	Expected
9.00	9.16	in	[8.80, 9.20]

Compensated Neutron Calibration Report

Tool Model-Serial Number:	PS-PS05N
Source Number:	
Calibration Tank Temperature:	71.4 degF
Shop Calibration Performed:	Tue Oct 16 12:19:22 2012

BACKGROUND MEASUREMENT

Outputs	Measured	Units	Expected
SS Counts	0.1	cps	<10
LS Counts	0.1	cps	<4

WATER TANK REFERENCE

Outputs	Measured	Units	Expected
SS Counts	806.7	cps	
LS Counts	26.7	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	30.2449	SS/LS	
Tank Ratio Gain	1.0236		[0.85, 1.15]

ALUMINUM SLEEVE REFERENCE

Outputs	Measured	Units	Expected
SS Counts	8929.8	cps	
LS Counts	854.8	cps	
Al Ratio Ref	10.797	SS/LS	
Al Ratio	10.693	SS/LS	
Al Ratio Gain	1.01		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed: Thu Nov 08 08:41:03 2012

Outputs	Measured	Units	Expected
SS Counts	0.0	cps	<10
LS Counts	0.1	cps	<4

Gamma Ray Calibration Report

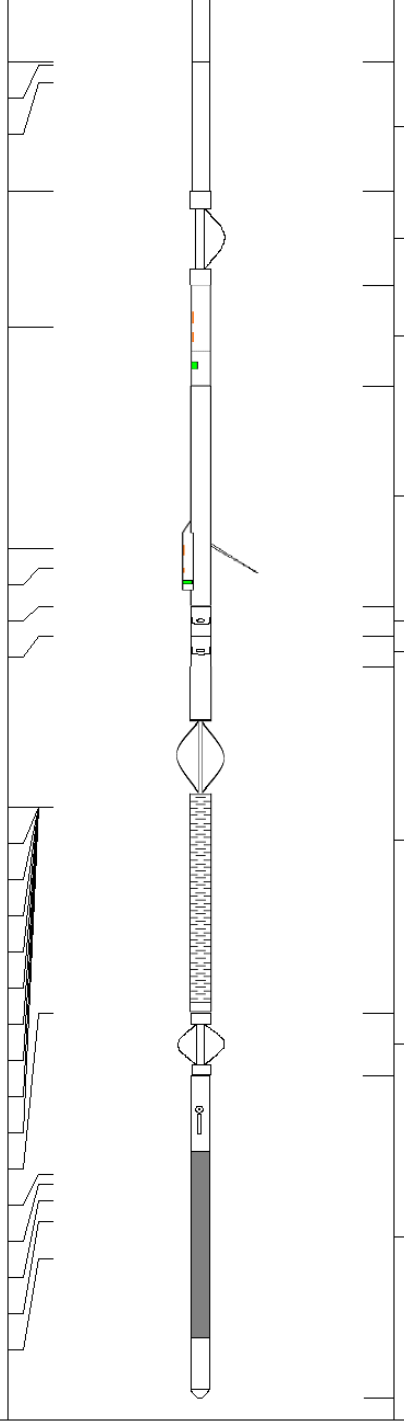
Tool Model-Serial Number:	ENP-ENP2T	
Performed:	Tue Oct 16 12:25:48 2012	
Calibrator Value:	170.6	GAPI
Background Reading:	72.9	cps
Calibrator Reading:	480.6	cps
Sensitivity:	0.3850	GAPI/cps

Inclinometer Calibration Report

Performed: Sun Jun 13 14:33:21 1993

	Low Read.	High Read.	Low Ref.	High Ref.	
X Accelerometer	0.00	1.00	0.00	1.00	gee
Y Accelerometer	0.00	1.00	0.00	1.00	gee
Z Accelerometer	0.00	1.00	0.00	1.00	gee

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	Wt (lb)
Thrubit	89.84		Cablehead-S	2.31	2.13	5.00
Thrubit	87.53		Solid Weakpoint			
			PSBDOT	3.87	2.25	35.00
Thrubit	83.66					
			HangOff_Tool	5.00	2.38	60.00
Thrubit	78.66					
			Swivel	2.25	2.06	25.00
Thrubit	76.41		10-1	0.75	2.13	3.95
TBBAT	75.66					
			TBBAT-A (PS07B)	6.13	2.13	38.20
			Thrubit Battery			
TBBAT2	69.54					
			TBBAT2-A (PS13B)	6.13	2.13	40.00



		Thrubit Battery			
TMG	63.41				
GR	63.29				
GRTEMP	62.45	TMG-ENP (ENP2T) ThruBit Telemetry Gamma Ray	6.13	2.13	45.00
Thrubit	57.29				
		Decentralizer Decentralizer (Small)	4.50	2.13	70.00
CNLSC	50.85	TBN-PS (PS05N) ThruBit Neutron	4.77	2.13	63.00
		TBD-PS (PS01D) Thrubit Density	10.48	2.13	91.00
LSW1	40.29				
DCAL	39.38				
Thrubit	37.54	Knuckle	1.42	2.13	11.50
Thrubit	36.13	Knuckle	1.42	2.13	11.50
DT	28.04				
TT	28.04	TBS-A (TBS11) Thrubit Sonic -- Initial Support	16.46	2.13	75.00
RmbPk	28.04				
WVF1	28.04				
WVF2	28.04				
WVF3	28.04				
WVF4	28.04	Sonic Centralizer	2.96	2.13	22.60
WVF5	28.04				
WVF6	28.04				
WVF7	28.04				
Thrubit	18.25				
A1_P	10.60				
A2_P	10.10	TBI-PS (PS28R) Thrubit Induction	15.29	2.13	94.00
A3_P	9.35				
A4_P	8.35				
A5_P	6.60				

Dataset:	schupbach_mem.db: field/well/proc1/pass1.3
Total Length:	89.84 ft
Total Weight:	690.75 lb
O.D.	2.38 in

ThruBit
A Schlumberger Company

Company	SHELL EXP. & PROD. CO., INC.
Well	SCHUPBACH 3510 16-1H
Field	ARROWHEAD
County	HARPER
State	KANSAS