ThruBit
A Schlumberger Company

ARRAY INDUCTION
DENSITY / NEUTRON
GAMMA RAY
MEMORY LOG

Company	SHELL EXP. & PROD. CO., INC.
Well	HARRIS FARMS 3407 8-2H
Field	ARROWHEAD
County	HARPER
State	KANSAS

Company SHELL EXP. & PROD. CO., INC.
Well HARRIS FARMS 3407 8-2H
Field ARROWHEAD
County HARPER State KANSAS
Location: API #: 15-077-21847-01-00
SHL: 2165' FWL & 330' FNL
PBHL: 1613' FWL & 330' FSL
SEC 8 TWP 34S RGE 07W

Other Services
THRUBIT
PORTAL BIT

Permanent Datum G.L. Elevation 1348'
Log Measured From D.F. 26.7' ABOVE PERM DATUM
Drilling Measured From D.F.

Elevation
K.B. 1374.7'
D.F. 1374.7'
G.L. 1348'

Date	10 OCTOBER 2012		
Run Number	ONE		
Depth Driller	9095'		
Depth Logger	9047'		
Bottom Logged Interval	9037'		
Top Log Interval	4966'		
Casing Driller	7.0" @ 4962'		
Casing Logger	4966'		
Bit Size	6.125		
Type Fluid in Hole	WBM		
Density / Viscosity	8.4 / 34		
pH / Fluid Loss	7.0 / 15		
Source of Sample	MUD PIT		
Rm @ Meas. Temp	1.12 ohms @ 72 degf		
Rmf @ Meas. Temp	0.84 ohms @ 66 degf		
Rmc @ Meas. Temp	1.40 ohmS @ 64 degf		
Source of Rmf / Rmc	MEASURED		
Rm @ BHT	0.51 ohms @ 137 degf		
Time Circulation Stopped	19:00		
Time Logger on Bottom	20:30		
Maximum Recorded Temperature	137 degf		
Equipment Number	T004		
Location	OKC, OK		
Recorded By	DENGLER		
Witnessed By	MR. D.H. JOHNSON		

<<< Fold Here >>>

Comments

SERVICE: LEVEL 4 HORIZONTAL PUMP DOWN MEMORY BIT DEPTH: 8974 ' LOGGED TO: 4966'
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=6000 mg/l NaCl=8240 mg/l NO BARITE
CASING SIZE 7.00" 23.0 LB FT ID 6.366" CALI DIA 6.5" NO CORRECTION MADE
SONIC TOOL FAILED DURING LOG AND CUSTOMER DECIDED NOT TO RELOG WELL
RIG: NABORS F01
CREW: J. DENGLER, J. JONES, J. DOTY

Service Ticket No.	1480	API No.	15-007-21847-01-00	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.	PS41D	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	9047'	4966'		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	94.7	deg. @	7482'	KOP	4074'	

```
Job Times□□□□
Job # :□1480□□□
Operator :□Shell Oil□□□
Well name :□Harris Farms 3407 8-2H□□□
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
09 Oct 2012□06:30□□L00 : Time stamp - activity start□
09 Oct 2012□08:00□01:30□L03 : Job preparation □
09 Oct 2012□11:30□03:30□L01 : Logging eqt travel time□
09 Oct 2012□19:00□07:30□L20 : Logging eqt standby time□
09 Oct 2012□19:30□00:30□L31 : Logging rig up / down time□
09 Oct 2012□21:00□01:30□L30 : Logging operating time□"run in hole, release tools a
09 Oct 2012□21:30□00:30□L31 : Logging rig up / down time□
10 Oct 2012□01:30□04:00□L30 : Logging operating time□pull pipe from 8974 to 4094 a
10 Oct 2012□02:00□00:30□L31 : Logging rig up / down time□
10 Oct 2012□02:30□00:30□L30 : Logging operating time□"run in hole, retrieve tools
10 Oct 2012□03:00□00:30□L31 : Logging rig up / down time□rig down tools abd equipm
10 Oct 2012□06:30□03:30□L80 : Data processing time□processed logs and emailed data
10 Oct 2012□10:00□03:30□L01 : Logging eqt travel time□return to shop
10 Oct 2012□15:00□05:00□L90 : Job cleanup □
```

ThruBit
A Schlumberger Company

MAIN PASS

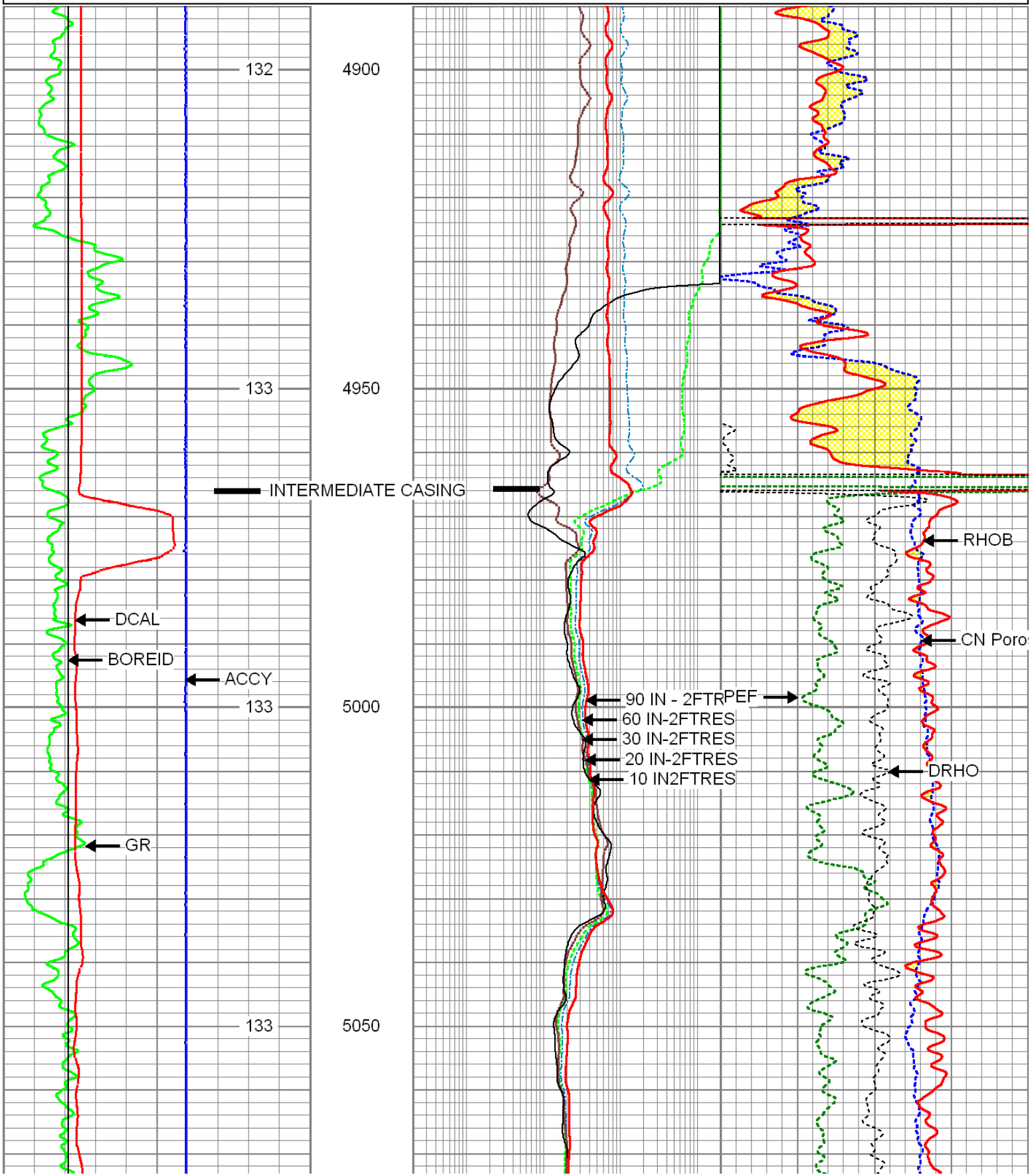
Database File: harris_farms_mem.db
Dataset Pathname: proc1/pass1.3
Presentation Format: 6_SH_T~1

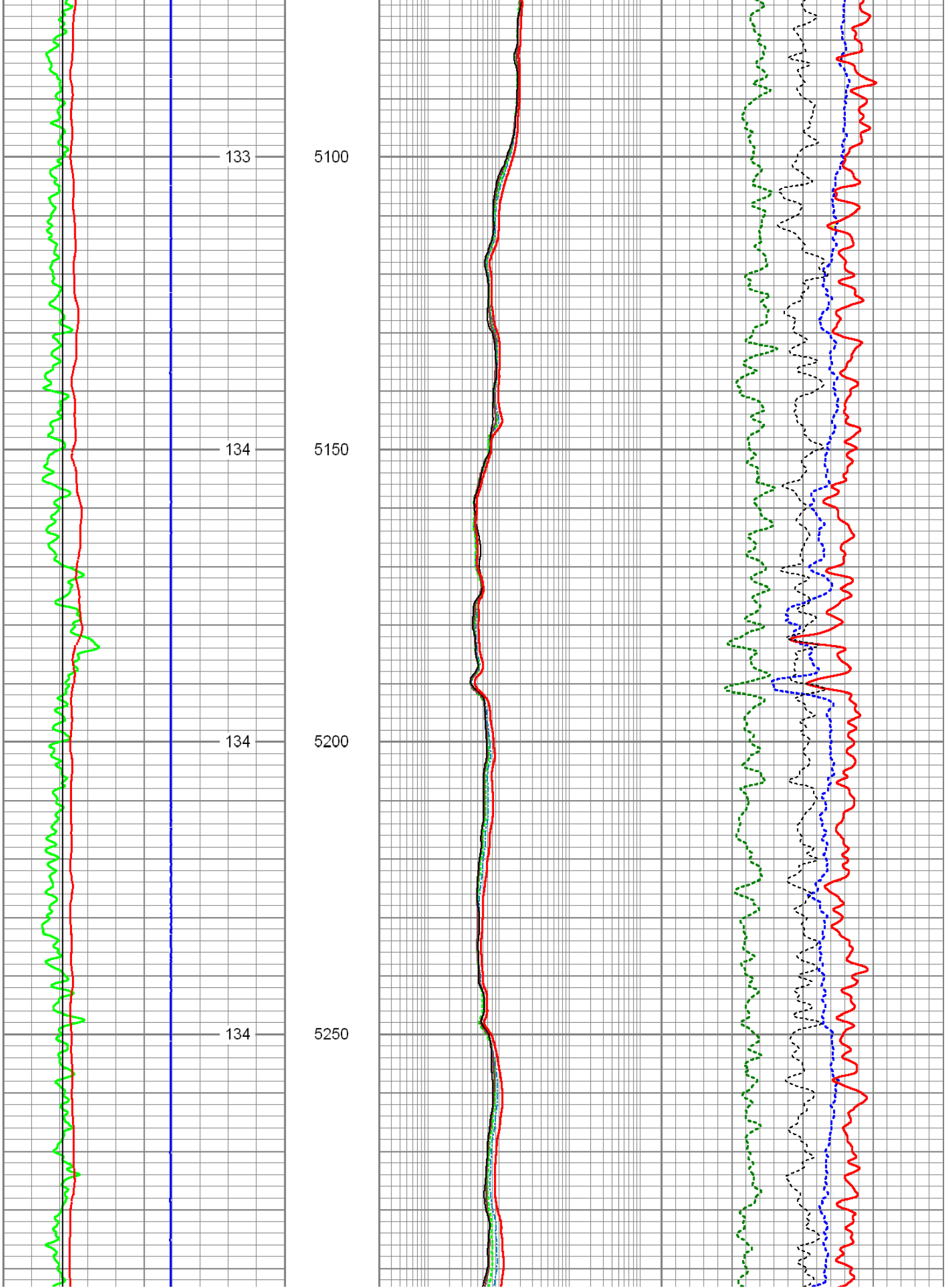
Dataset Creation: Wed Oct 10 05:09:53 2012
Charted by: Depth in Feet scaled 1:240

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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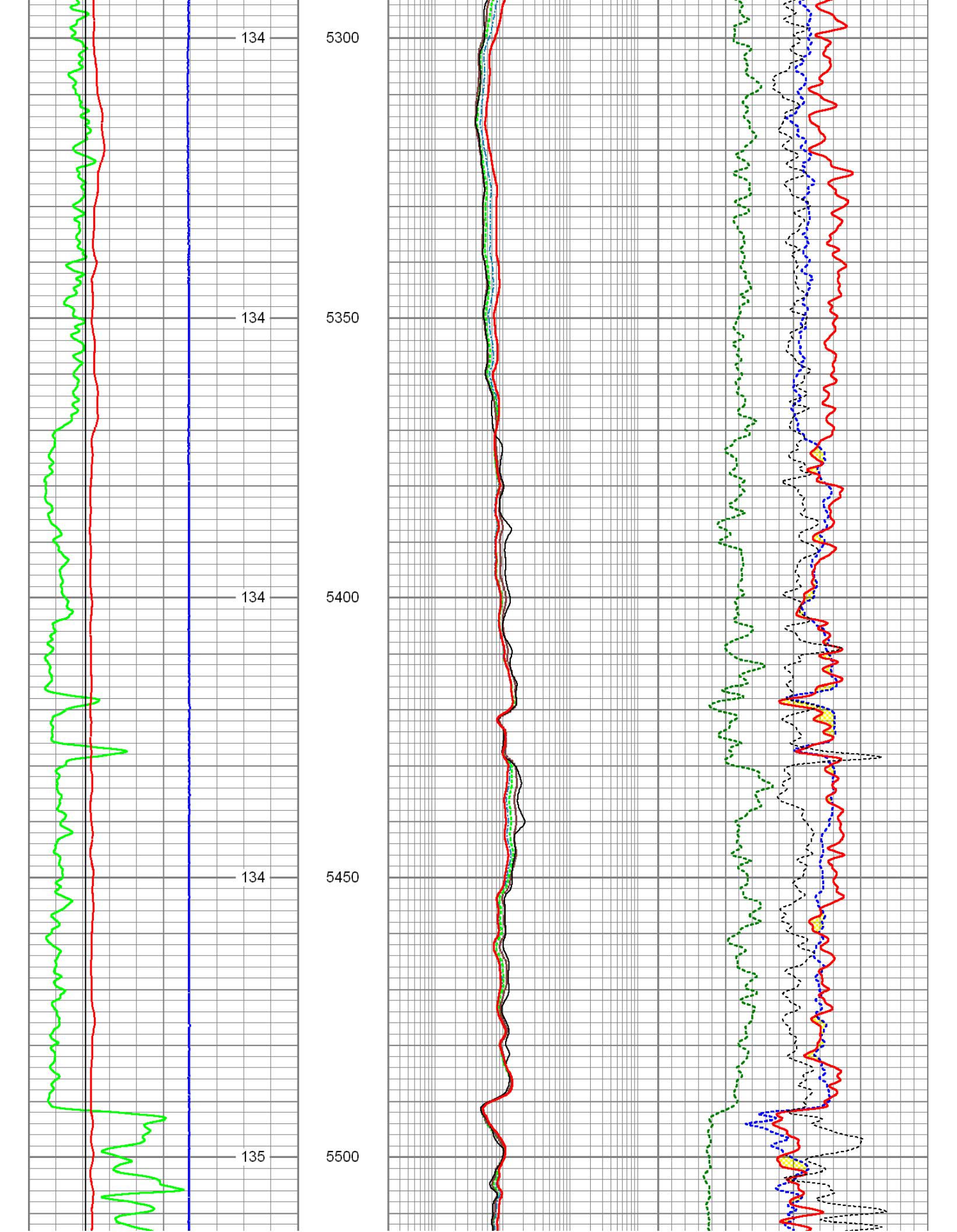
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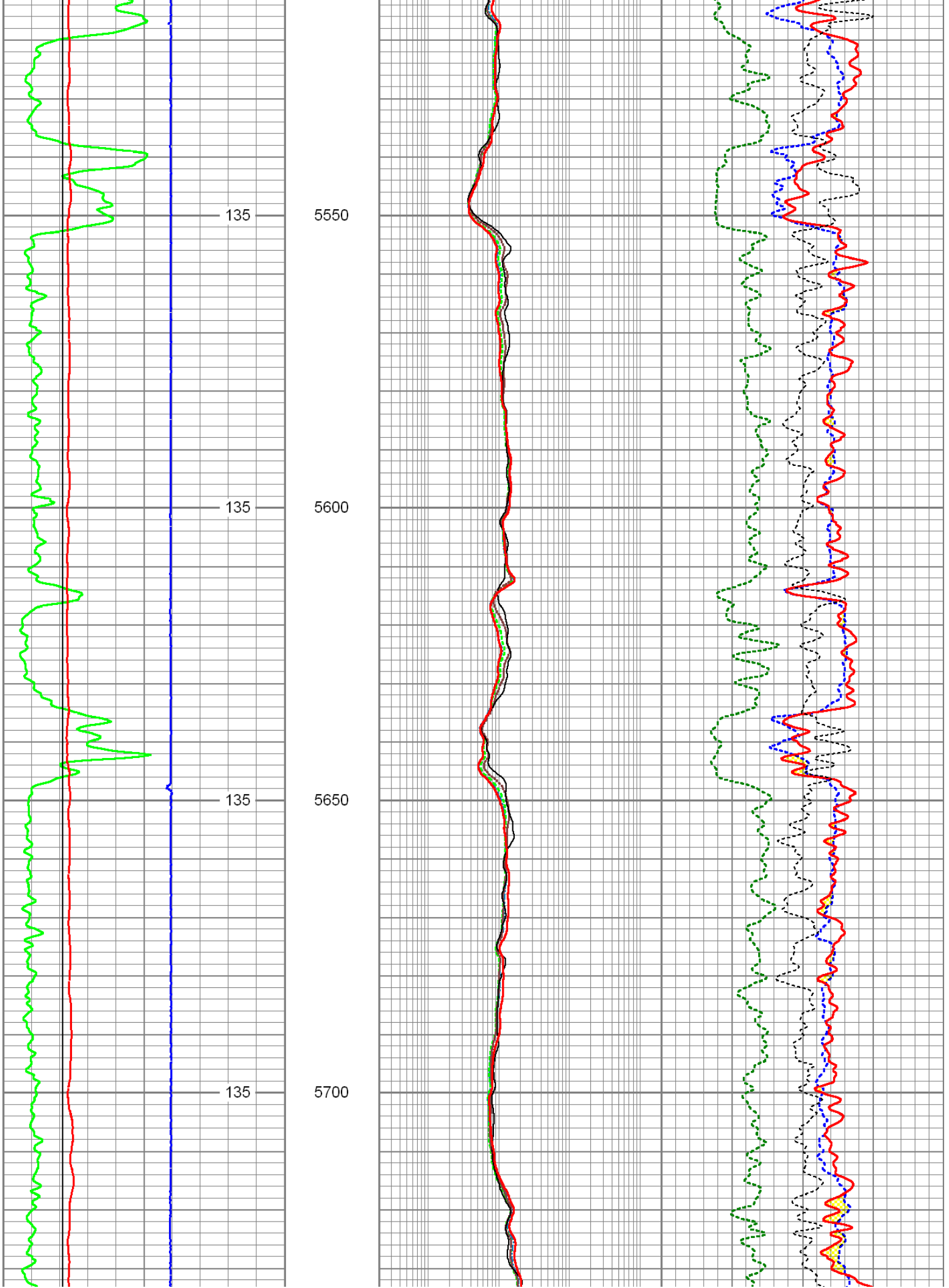
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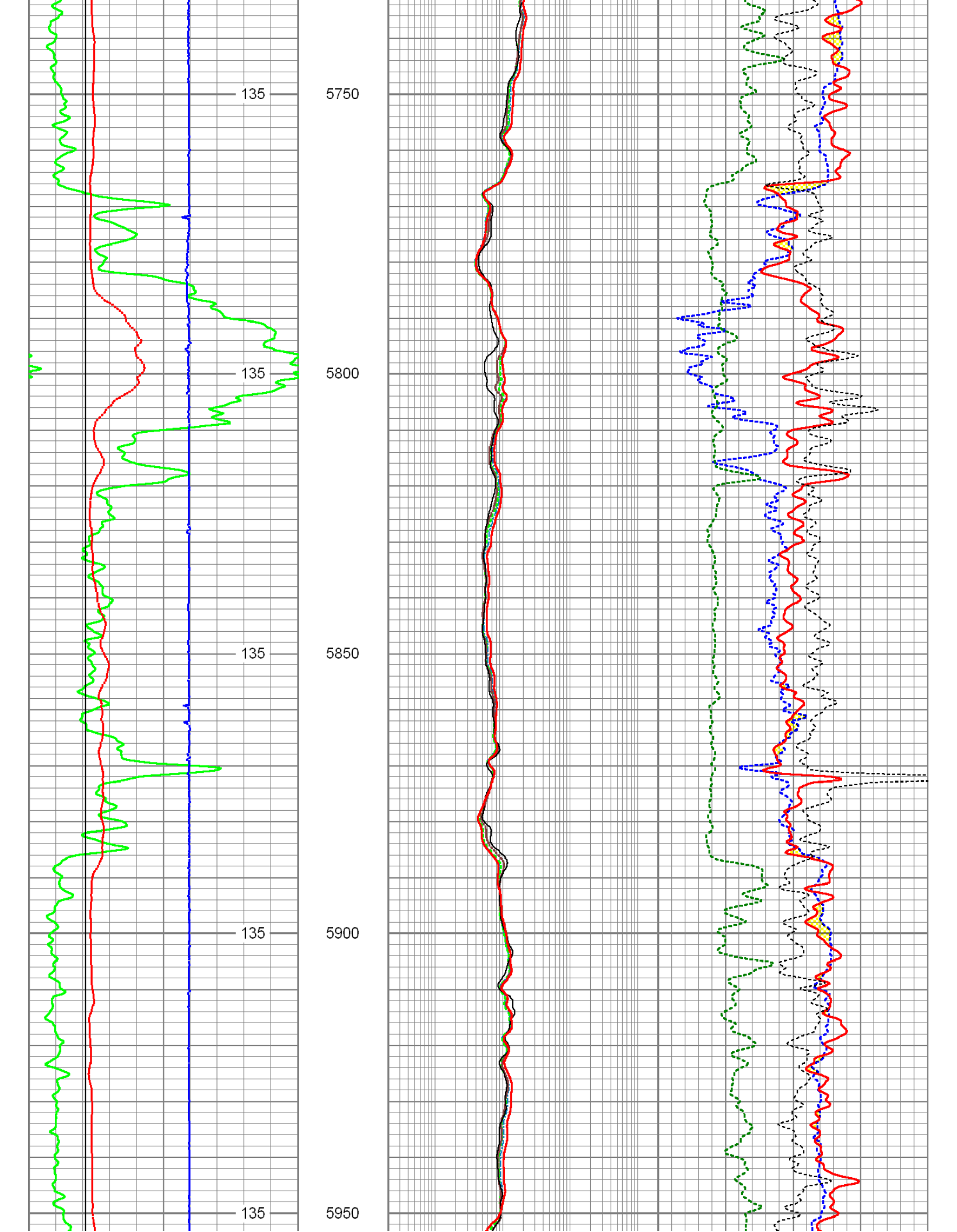
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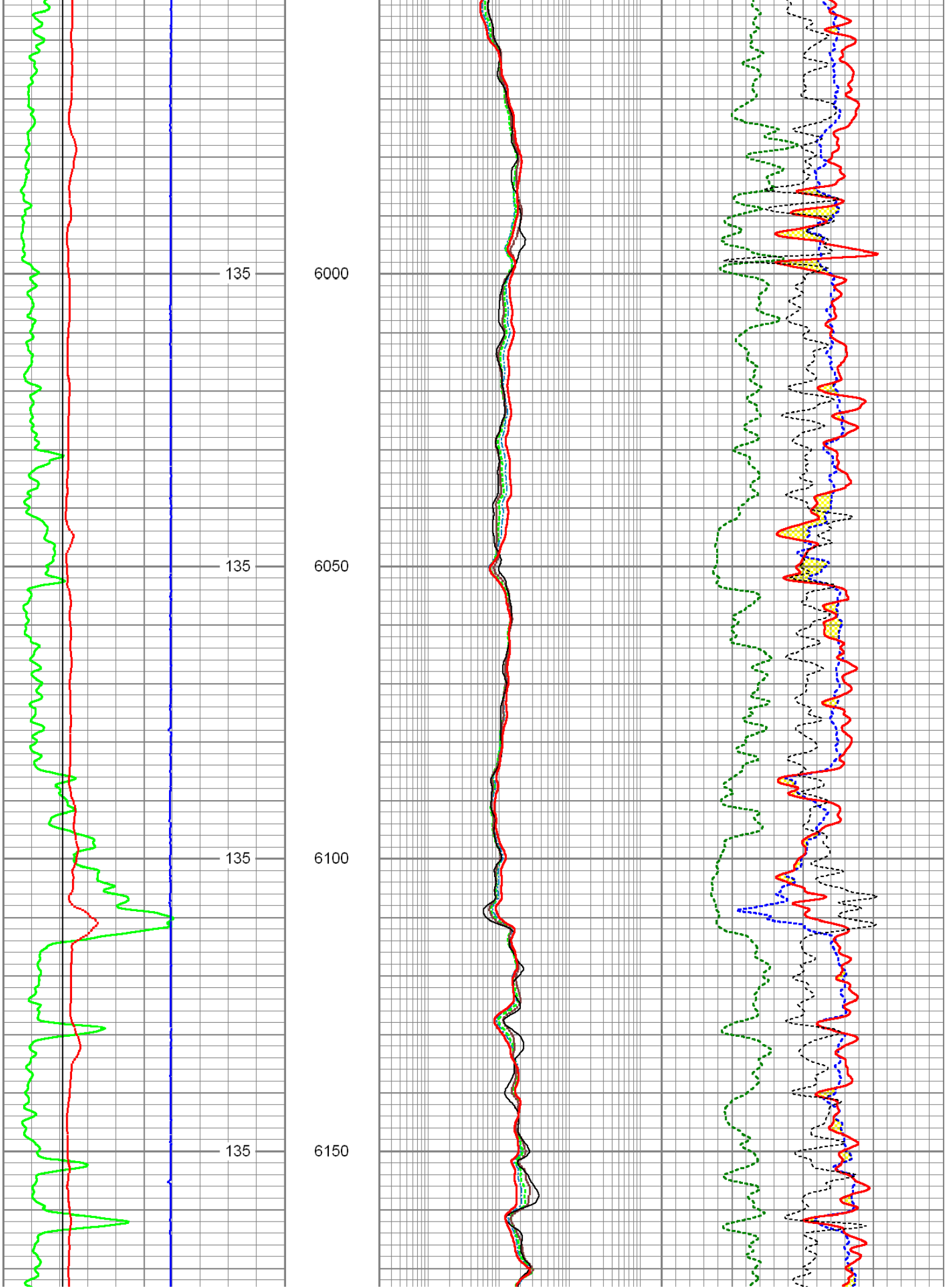
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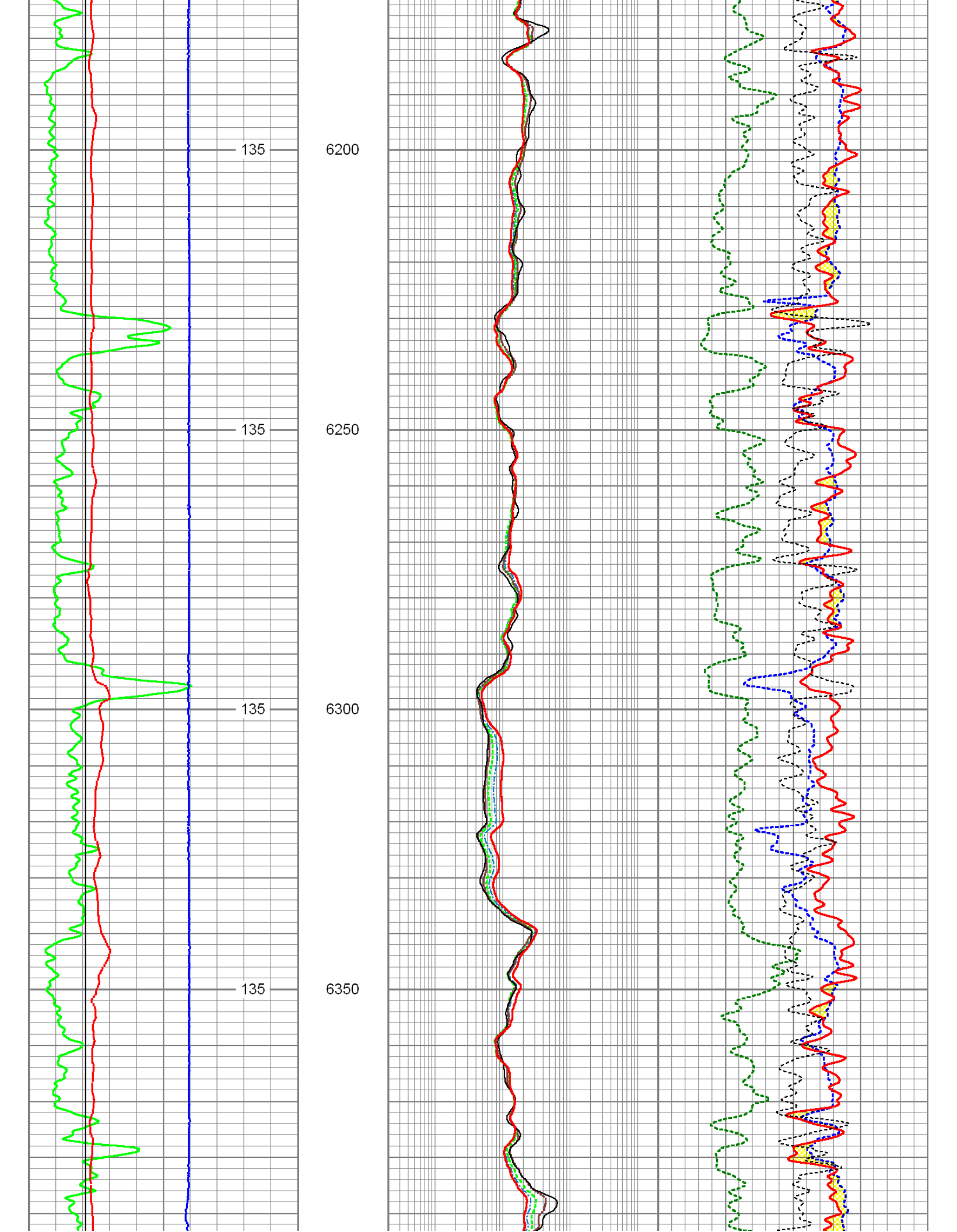
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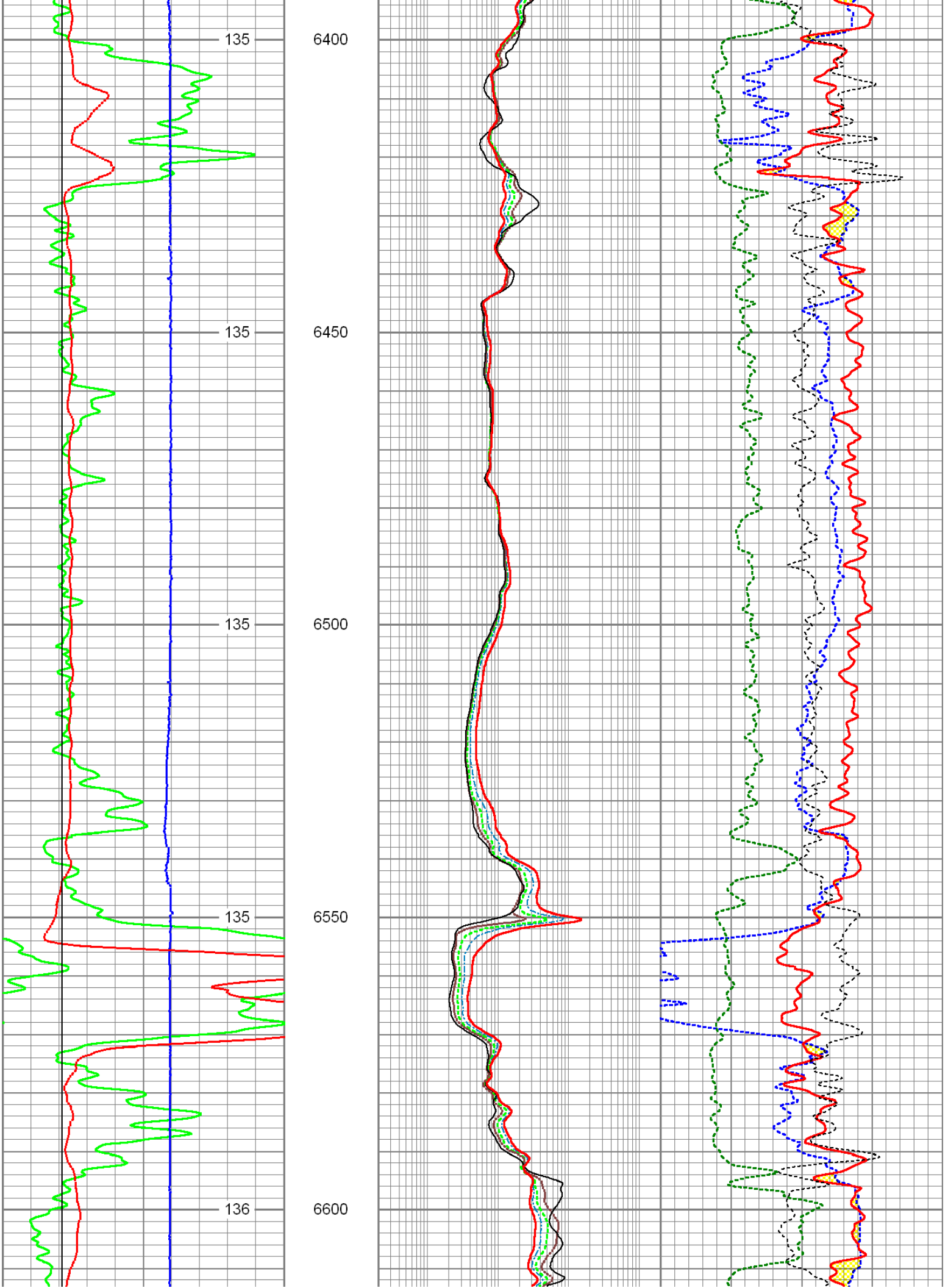
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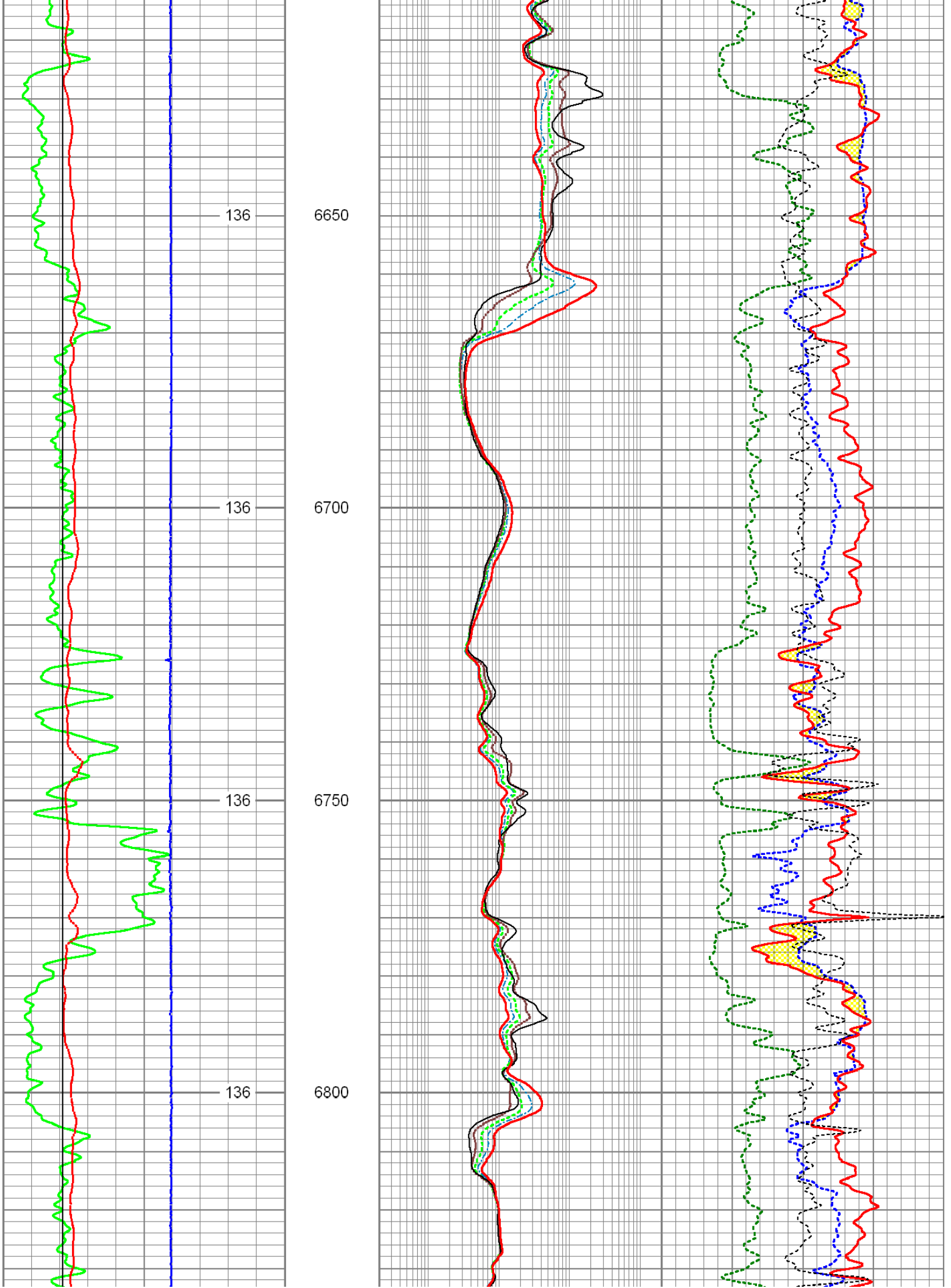
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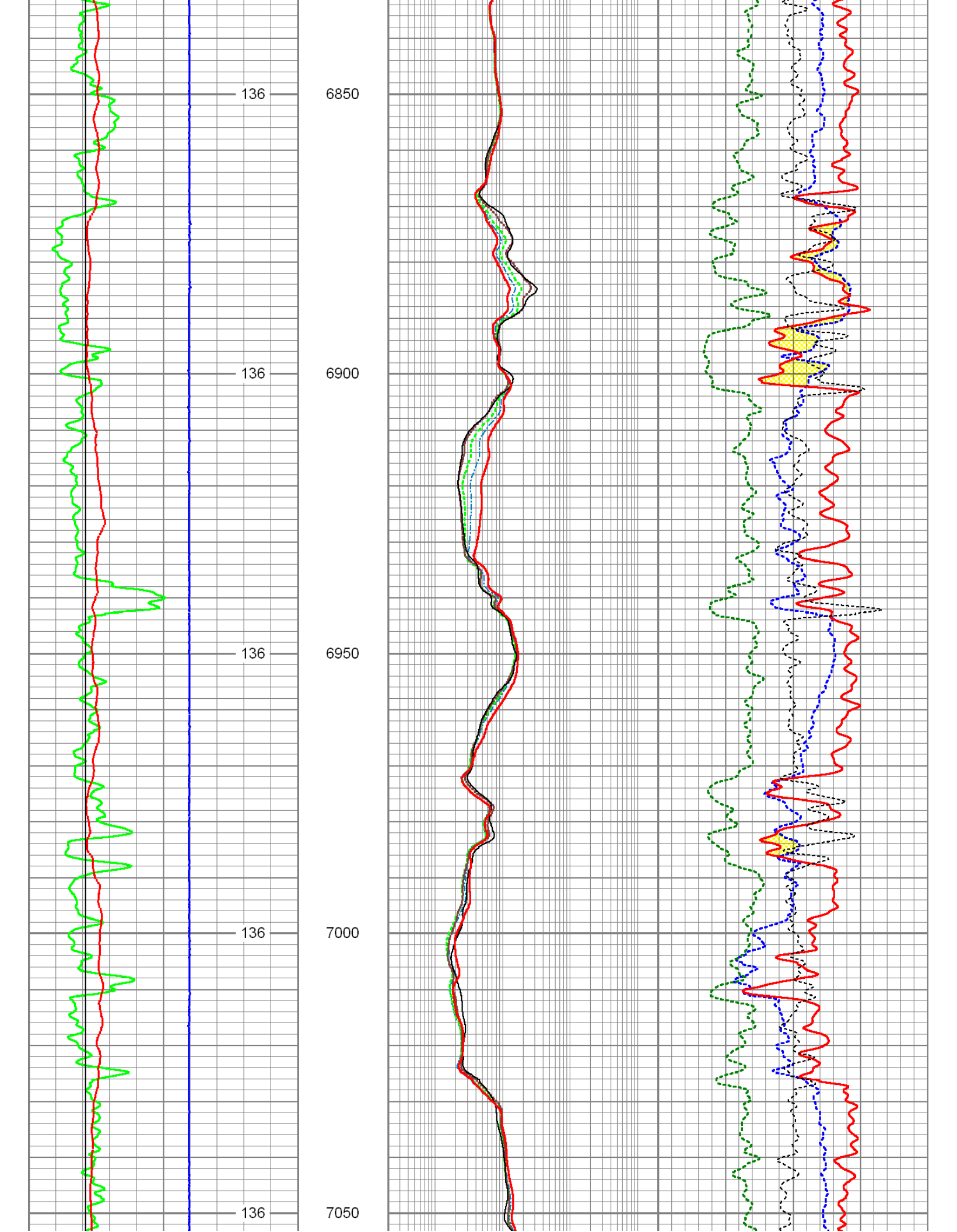
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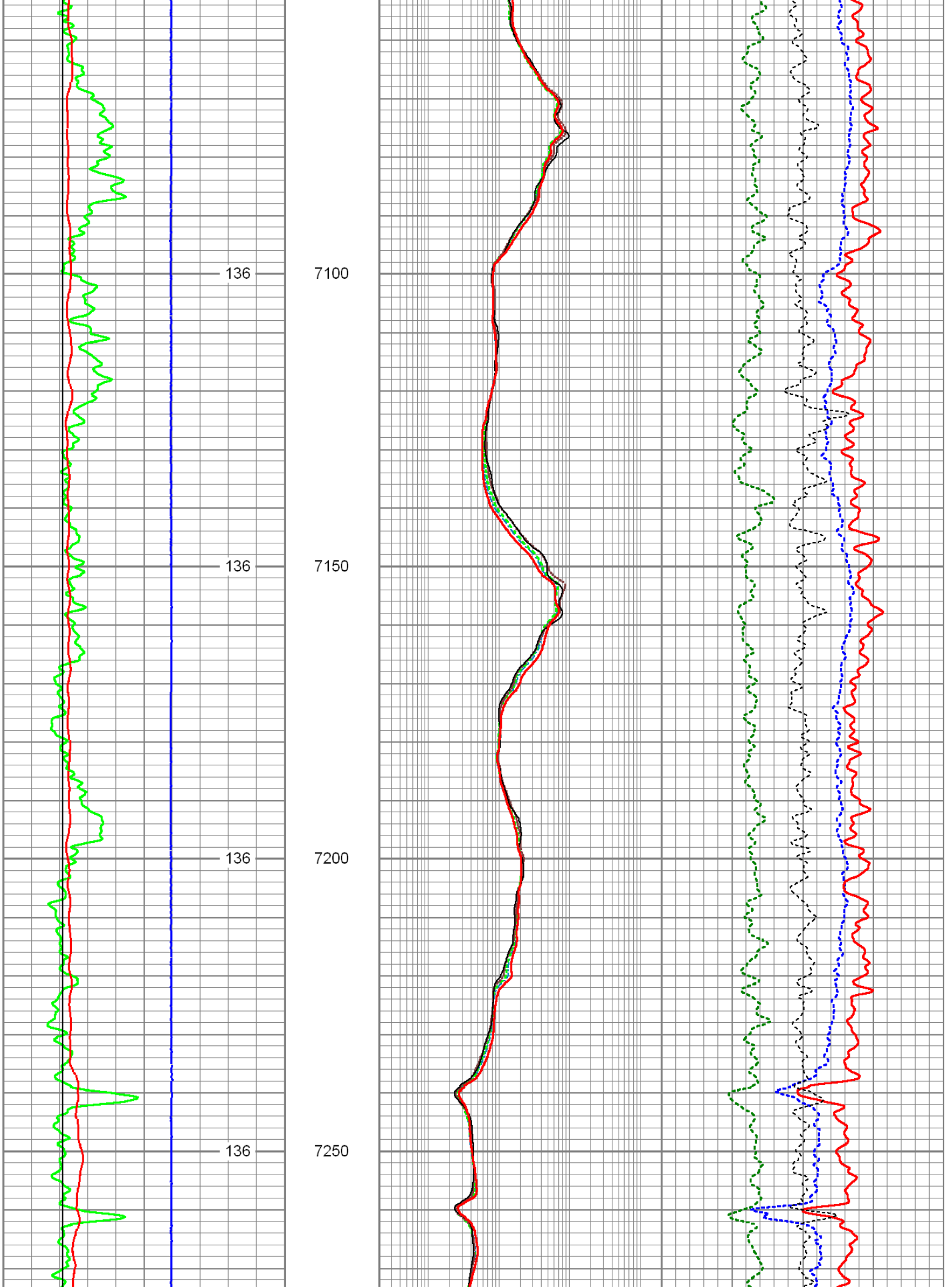
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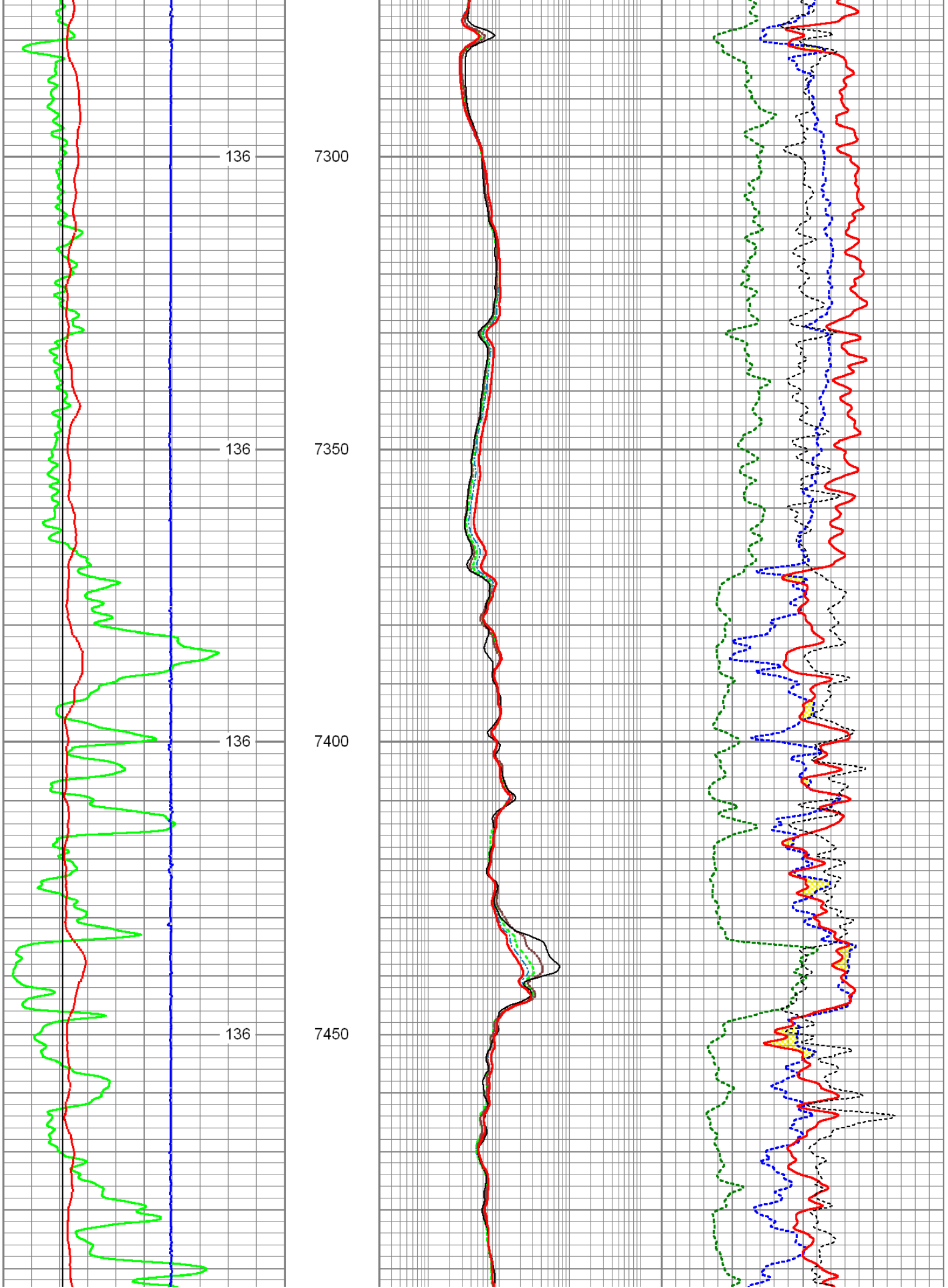
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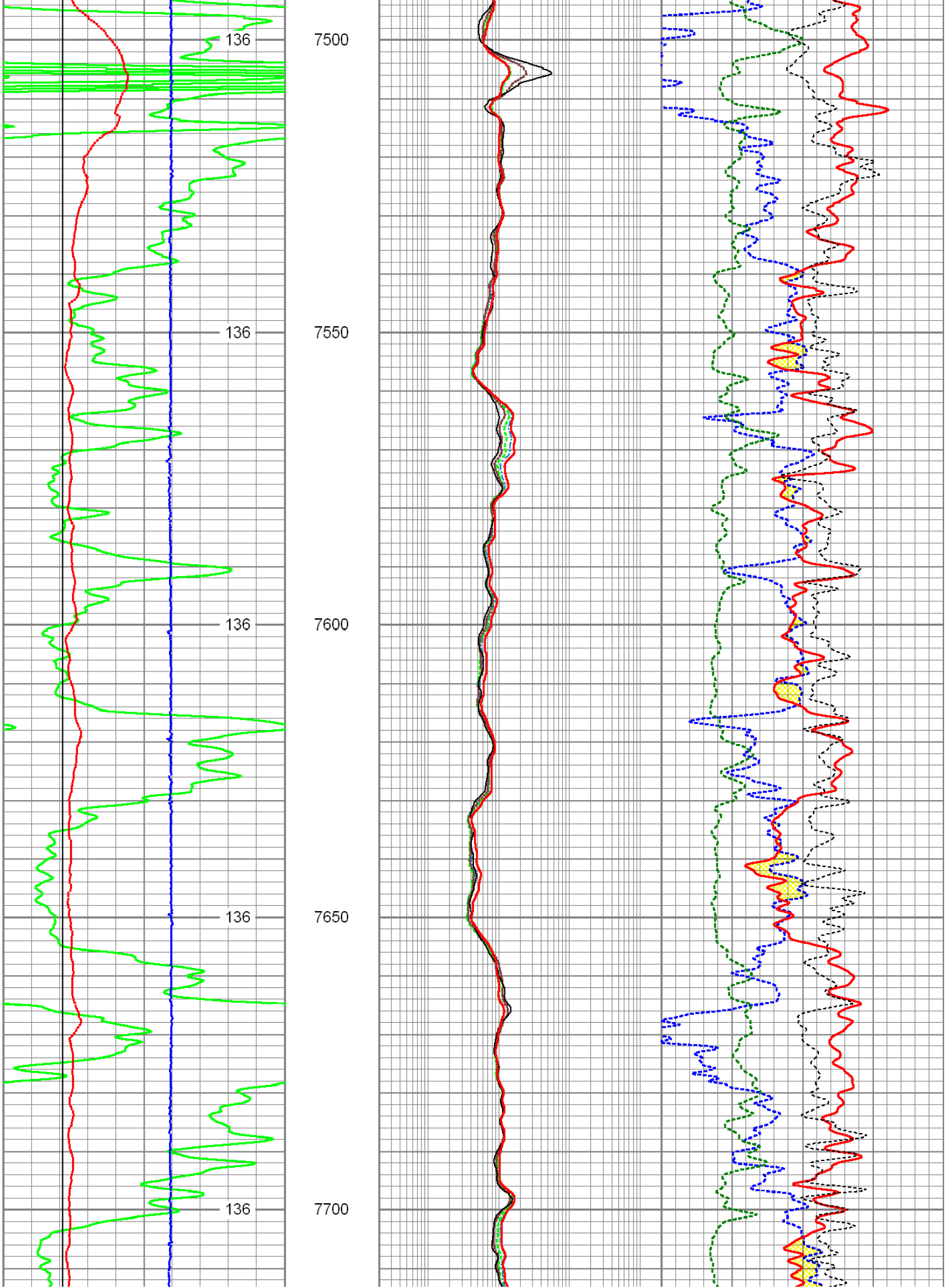
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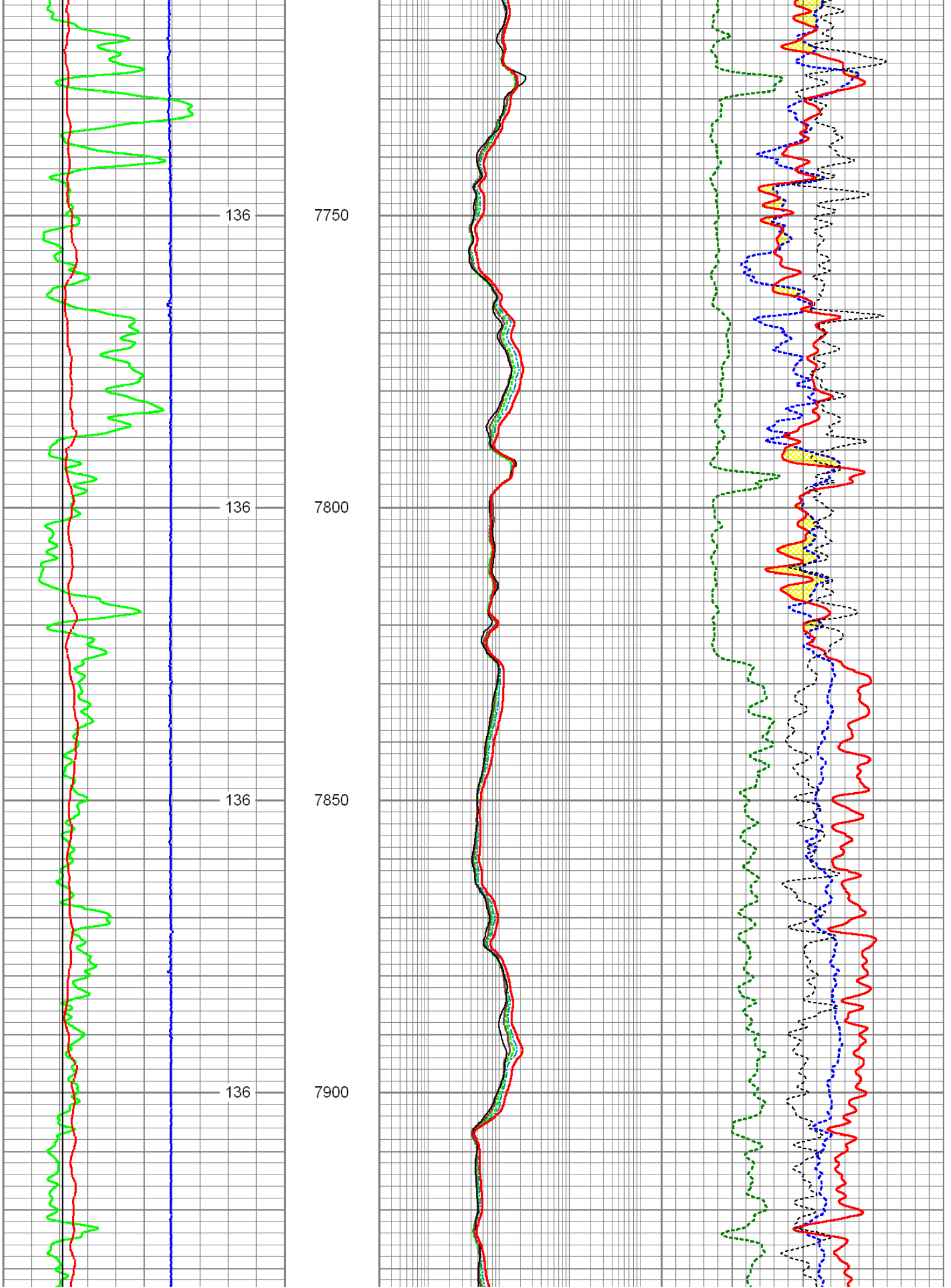
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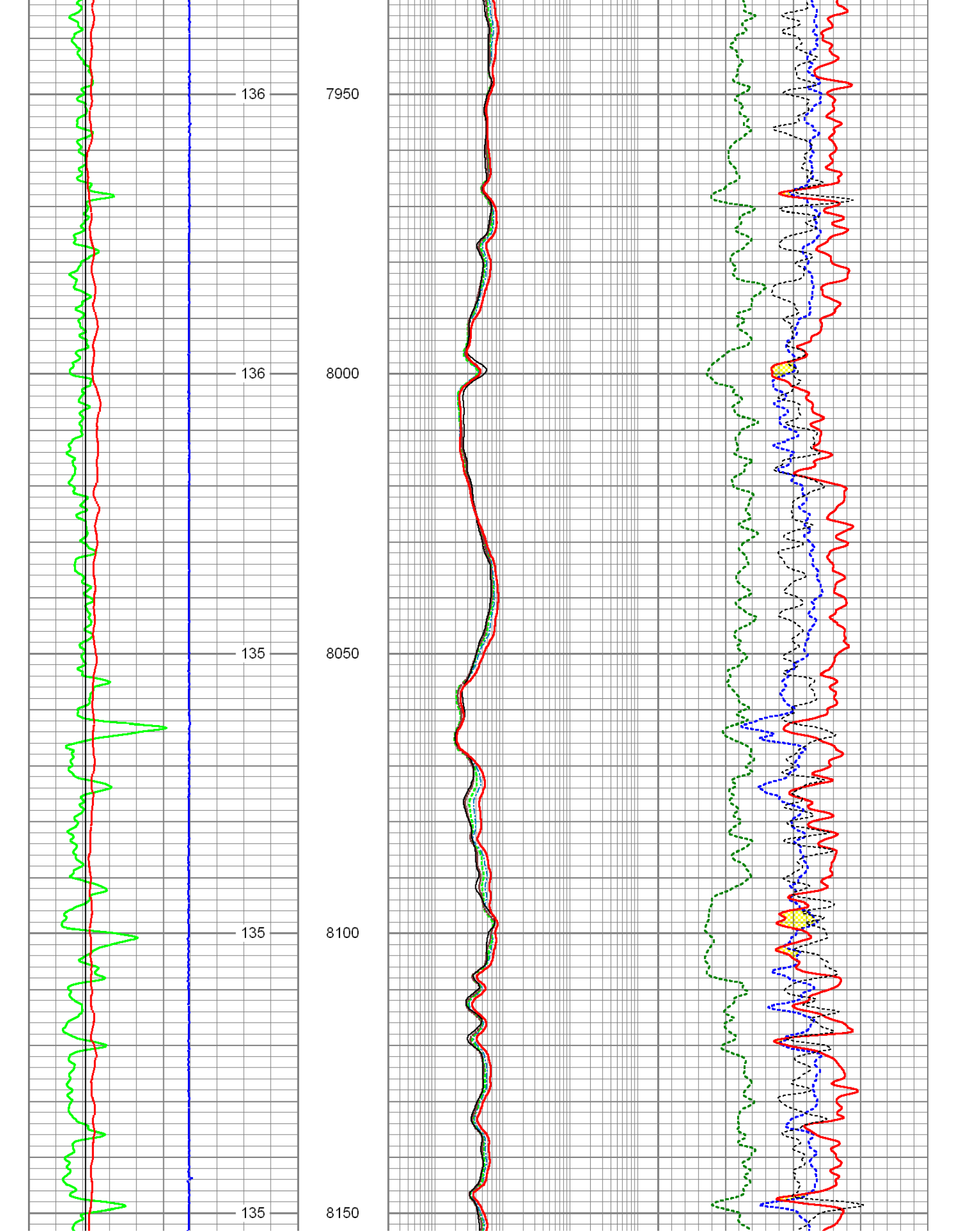
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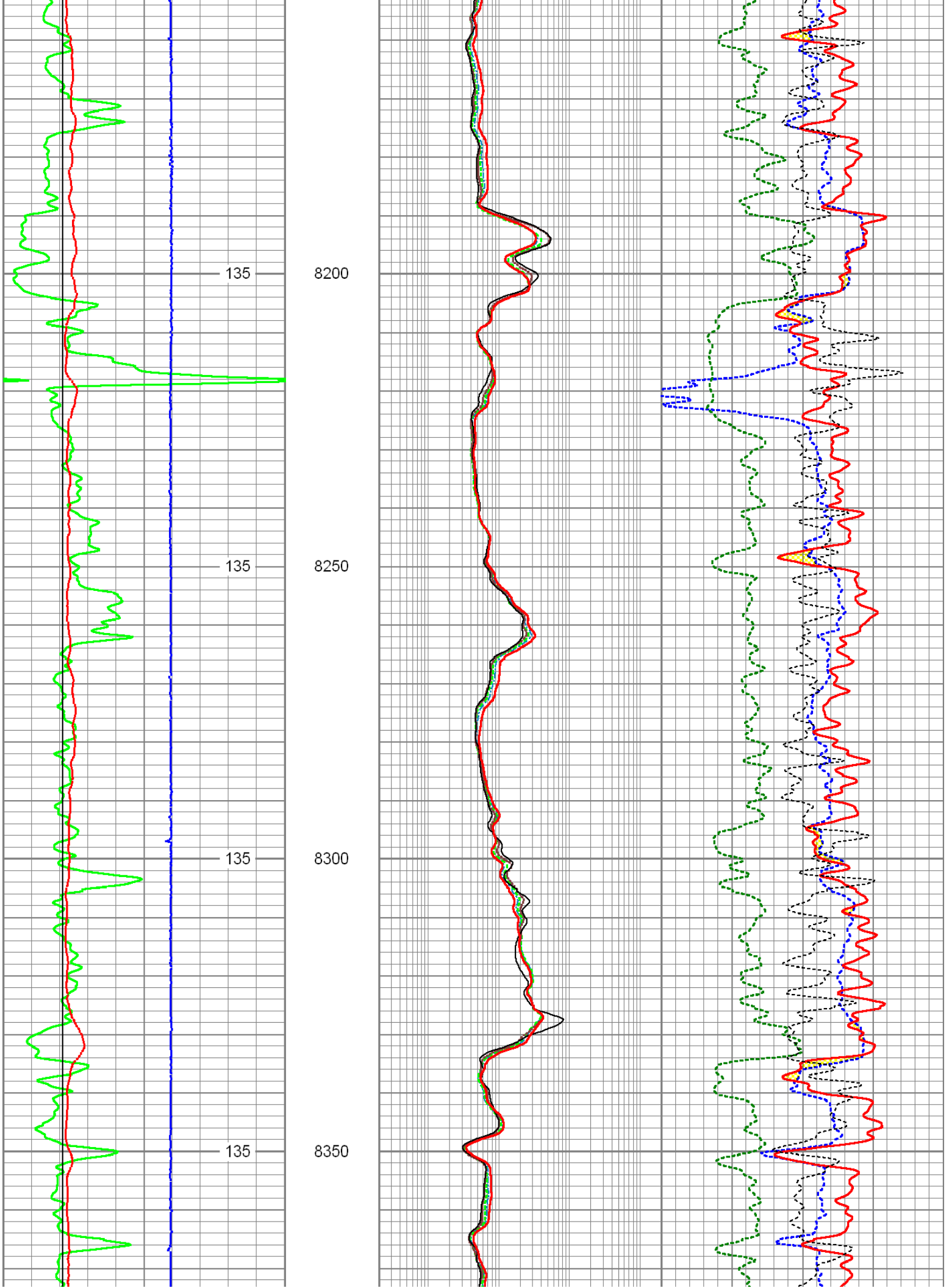
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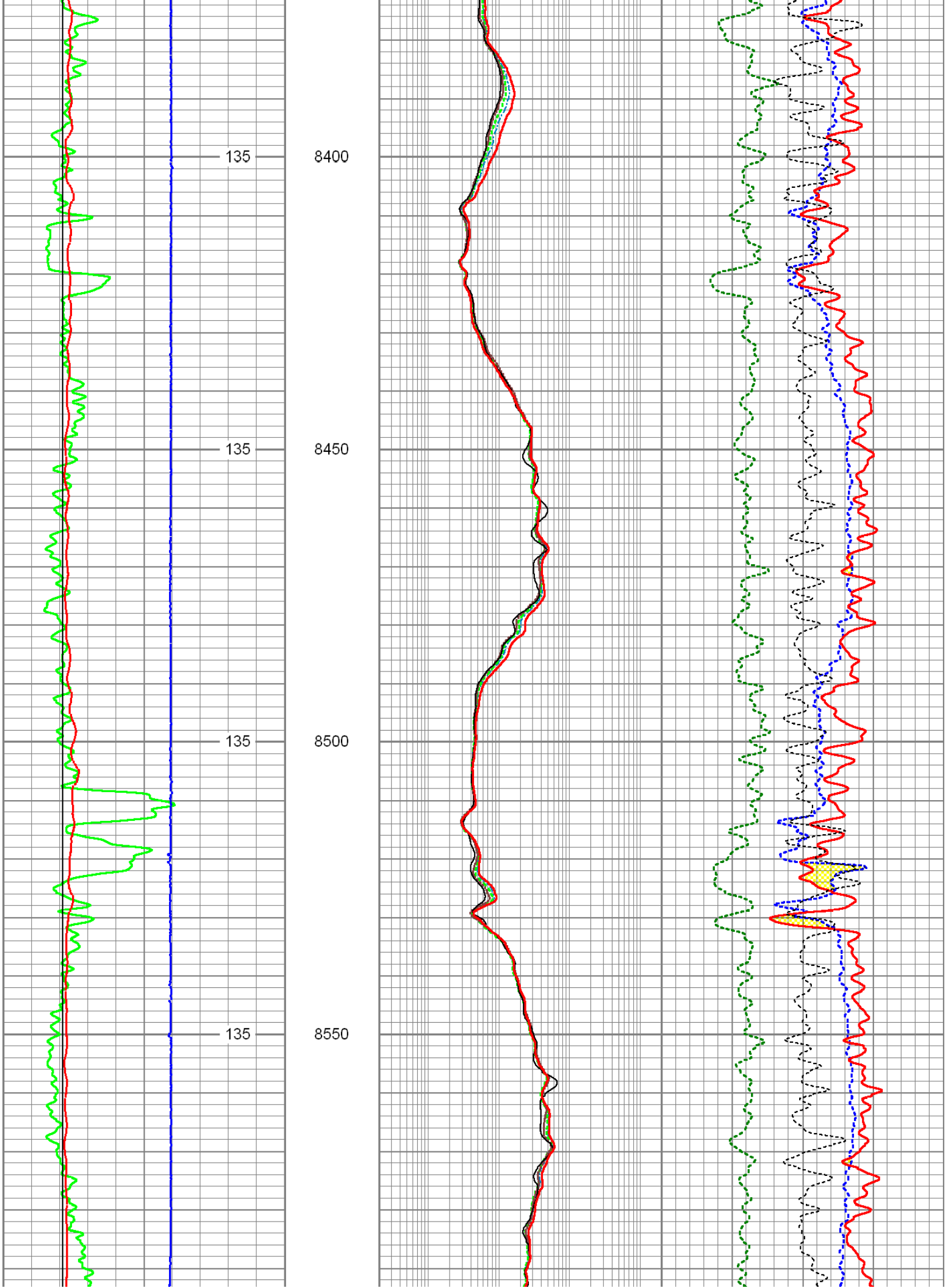
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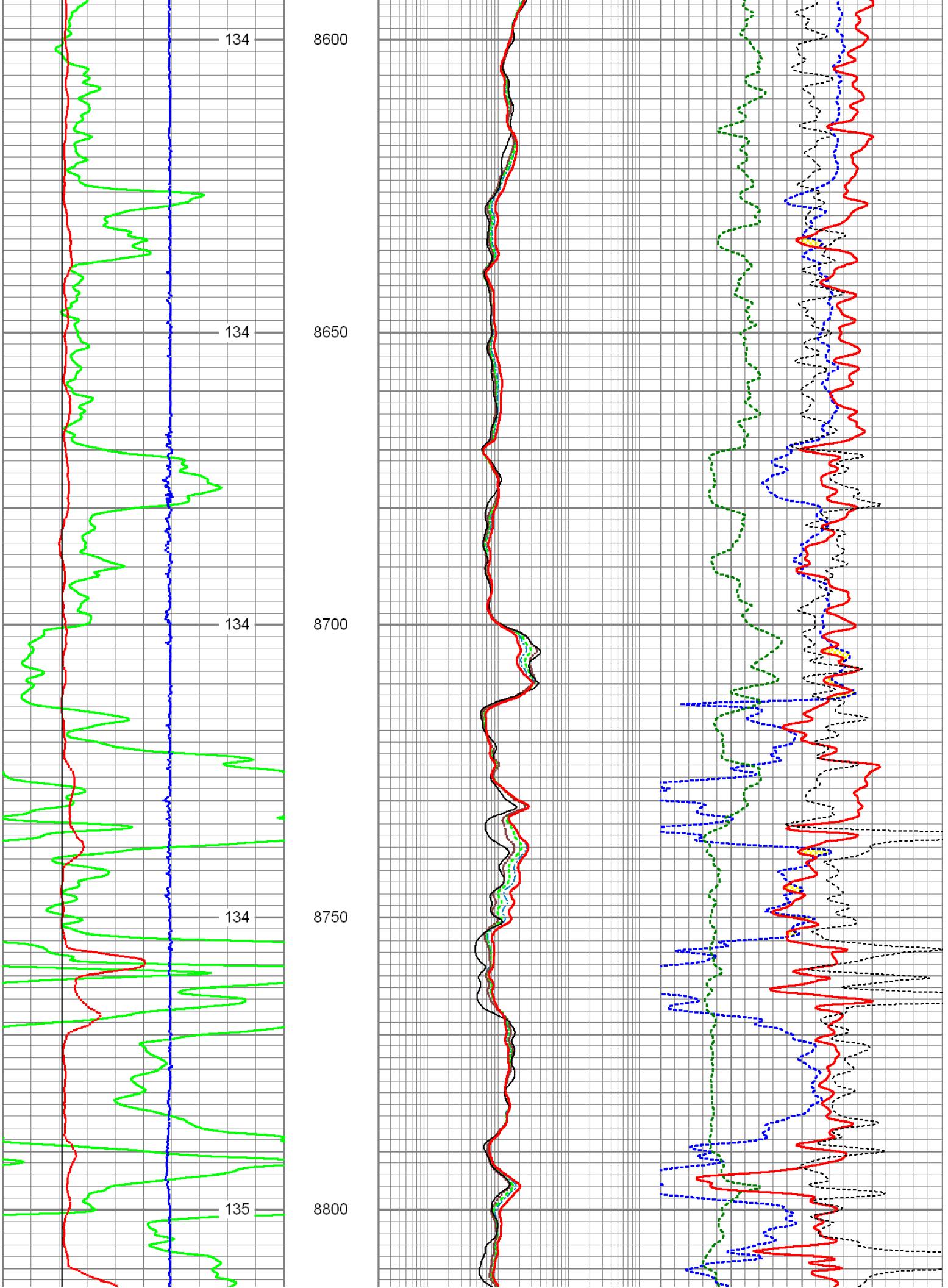
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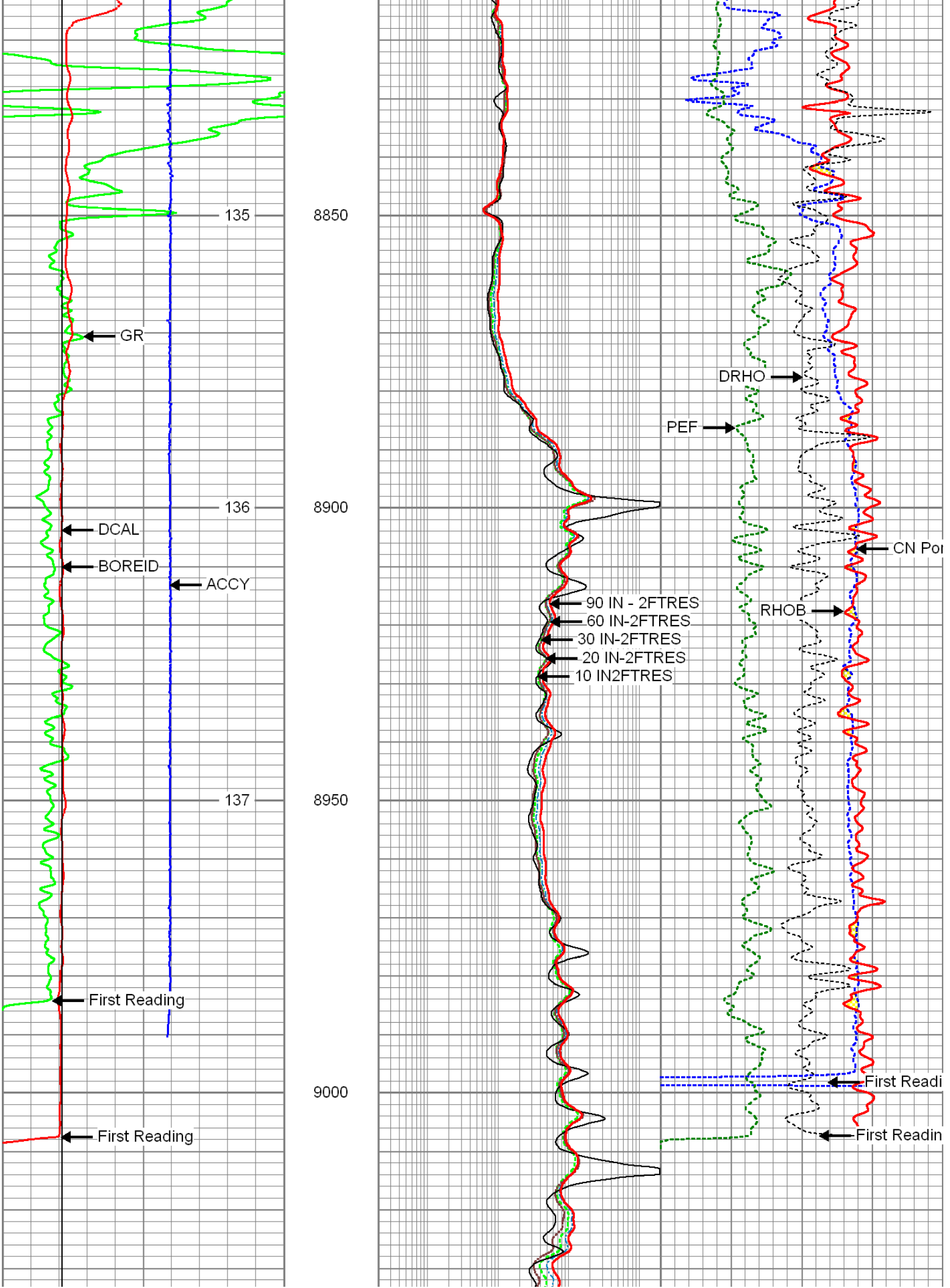
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First Reading
First Reading
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30 IN-2FTRES
20 IN-2FTRES
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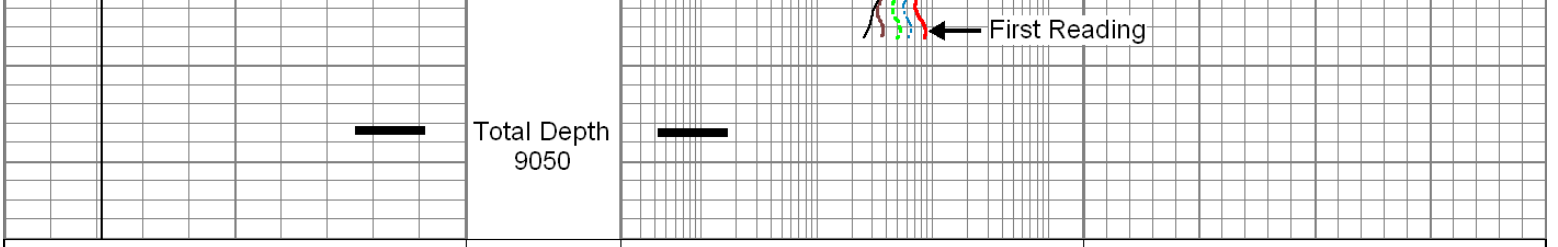


0	GR (GAPI)	150		0.2	60 IN-2FTRES (Ohm-m)	2000	45	CN Porosity (pu)	-15
-5	ACCY	5		0.2	30 IN-2FTRES (Ohm-m)	2000	0	PEF (barn)	10
4	DCAL (in)	14		0.2	20 IN-2FTRES (Ohm-m)	2000	1.95	RHOB (g/cc)	2.95
4	BOREID (in)	14		0.2	10 IN2FTRES (Ohm-m)	2000	-0.25	DRHO (g/cc)	0.25
	GRTEMP (degF)			0.2	90 IN - 2FTRES (Ohm-m)	2000			

Log Variables

Database:C:\Warrior\Data\harris_farms_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?**
137	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	6
MudWgt lb/gal	**NPORSEL**	**PEBHC?**	**PERFS**	**RESTMPSRC**	**SO in**	**SRFTEMP degF**
8.4	Limestone	YES	0	INTERNAL	0.5	65
SZCOR	**TDEPTH ft**	**TMPCOR**	**TOOLPOS**			
On	9095	On	Ec-centered			

Calibration Report

Database File: harris_farms_mem.db
Dataset Pathname: proc1/pass1.3
Dataset Creation: Wed Oct 10 05:09:53 2012

ThruBit Induction Calibration Report

Tool Model-Serial Number: PS-PS28R

Shop Calibration Performed: Wed Jul 18 08:34:18 2012

BASELINE

	R	Expected	X	Expected
Freq 1				
A1	-470.6010	[-500.00, -400.00]	431.3580	[-500.00, 500.00]
A2	-132.1350	[-180.00, -100.00]	324.4270	[-500.00, 500.00]
A3	-22.8796	[-50.00, -10.00]	120.7910	[-500.00, 500.00]
A4	-13.5561	[-30.00, -10.00]	253.5500	[-500.00, 500.00]
A5	-12.3674	[-30.00, -10.00]	118.4800	[-500.00, 500.00]

Freq 2				
A1	-245.4520	[-280.00, -180.00]	255.0510	[-500.00, 500.00]
A2	-84.9942	[-130.00, -50.00]	181.0010	[-500.00, 500.00]
A3	-17.6024	[-50.00, -10.00]	27.4555	[-500.00, 500.00]
A4	-16.9413	[-30.00, -10.00]	79.3693	[-500.00, 500.00]
A5	-17.1391	[-30.00, -10.00]	-18.1150	[-500.00, 500.00]
Freq 3				
A1	-154.6260	[-180.00, -80.00]	114.8480	[-500.00, 500.00]
A2	-64.9929	[-130.00, -30.00]	89.0047	[-500.00, 500.00]
A3	-13.6178	[-50.00, -10.00]	-36.1076	[-500.00, 500.00]
A4	-18.2614	[-30.00, -10.00]	-34.9519	[-500.00, 500.00]
A5	-18.7199	[-30.00, -10.00]	-117.8370	[-500.00, 500.00]
Freq 4				
A1	-83.3030	[-120.00, -40.00]	-82.4238	[-500.00, 500.00]
A2	-47.3494	[-110.00, -10.00]	-31.3377	[-500.00, 500.00]
A3	-11.7928	[-50.00, -10.00]	-130.2940	[-500.00, 500.00]
A4	-22.0521	[-30.00, -10.00]	-204.6810	[-500.00, 500.00]
A5	-24.7190	[-30.00, -10.00]	-286.7100	[-500.00, 500.00]

CALIBRATION COEFFICIENTS

	R	Expected	X	Expected
Freq 1				
A1	0.9892	[0.95, 1.05]	0.0017	[-0.05, 0.05]
A2	0.9915	[0.95, 1.05]	0.0036	[-0.05, 0.05]
A3	0.9962	[0.95, 1.05]	-0.0037	[-0.05, 0.05]
A4	0.9881	[0.95, 1.05]	0.0052	[-0.05, 0.05]
A5	0.9891	[0.95, 1.05]	0.0031	[-0.05, 0.05]
Freq 2				
A1	0.9832	[0.95, 1.05]	-0.0065	[-0.05, 0.05]
A2	0.9849	[0.95, 1.05]	-0.0051	[-0.05, 0.05]
A3	0.9838	[0.95, 1.05]	-0.0053	[-0.05, 0.05]
A4	0.9828	[0.95, 1.05]	-0.0039	[-0.05, 0.05]
A5	0.9822	[0.95, 1.05]	-0.0054	[-0.05, 0.05]
Freq 3				
A1	1.0029	[0.95, 1.05]	-0.0058	[-0.05, 0.05]
A2	1.0053	[0.95, 1.05]	-0.0043	[-0.05, 0.05]
A3	1.0006	[0.95, 1.05]	-0.0023	[-0.05, 0.05]
A4	1.0023	[0.95, 1.05]	-0.0028	[-0.05, 0.05]
A5	1.0053	[0.95, 1.05]	-0.0038	[-0.05, 0.05]
Freq 4				
A1	0.9934	[0.95, 1.05]	-0.0036	[-0.05, 0.05]
A2	0.9954	[0.95, 1.05]	-0.0025	[-0.05, 0.05]
A3	0.9956	[0.95, 1.05]	-0.0046	[-0.05, 0.05]
A4	0.9952	[0.95, 1.05]	-0.0015	[-0.05, 0.05]
A5	1.0041	[0.95, 1.05]	-0.0046	[-0.05, 0.05]
Temperature	31.0160 degC			

ThruBit Density Calibration Report

Tool Model-Serial Number:	PS-PS41D
Source Number:	
Shop Calibration Performed:	Wed Oct 03 12:56:50 2012

REFERENCE

	Density	Units

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

READINGS

Outputs	Counts	Units	Expected
SS1 Background	144.61	cps	[130.00, 170.00]
LS1 Background	159.83	cps	[130.00, 170.00]
LS4 Background	32.98	cps	[27.00, 35.00]
SS1 Aluminium	4674.39	cps	[4500.00, 5500.00]
LS1 Aluminium	843.82	cps	[750.00, 950.00]
LS4 Aluminium	919.47	cps	[843.00, 1068.00]
SS1 Magnesium	7760.27	cps	[7000.00, 9000.00]
LS1 Magnesium	5403.32	cps	[5250.00, 6250.00]
LS1 Al + Fe	732.62	cps	[650.00, 800.00]
LS4 Al + Fe	418.34	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	4.981	[3.510, 6.170]
PEF B Factor	-0.526	[-0.700, -0.410]

Caliper Shop Calibration performed: Wed Oct 03 12:56:50 2012

RESULTS

Reference	Reading	Units
12.00	1860.44	in
9.00	2027.13	in
6.00	2189.47	in

DENSITY PRE-SURVEY CHECK Performed: Sun Oct 07 18:59:22 2012

Outputs	Counts	Units	Expected
SS1 Background	144.76	cps	[140.27, 148.95]
LS1 Background	159.13	cps	[155.04, 164.63]
LS4 Background	33.66	cps	[31.00, 34.96]

CALIPER PRE-SURVEY CHECK Performed: Mon Oct 08 12:30:05 2012

Reference	Readings	Units	Expected
9.00	8.93	in	[8.80, 9.20]

Compensated Neutron Calibration Report

Tool Model-Serial Number: PS-PS05N
Source Number:

Calibration Tank Temperature: 90.6 degF
Shop Calibration Performed: Thu Sep 06 13:38:31 2012

BACKGROUND MEASUREMENT

Outputs	Measured	Units	Expected

SS Counts	0.0	cps	<10
LS Counts	0.1	cps	<4

WATER TANK REFERENCE

Outputs	Measured	Units	Expected
SS Counts	856.4	cps	
LS Counts	28.4	cps	
Tank Ratio Ref	30.9580	SS/LS	
Tank Ratio	30.1747	SS/LS	
Tank Ratio Gain	1.0260		[0.85, 1.15]

ALUMINUM SLEEVE REFERENCE

Outputs	Measured	Units	Expected
SS Counts	9376.9	cps	
LS Counts	906.5	cps	
Al Ratio Ref	10.797	SS/LS	
Al Ratio	10.613	SS/LS	
Al Ratio Gain	1.02		[0.90, 1.10]
Sleeve Porosity	14.46	pu	

PRE-SURVEY BACKGROUND CHECK Performed: Sun Oct 07 19:07:23 2012

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

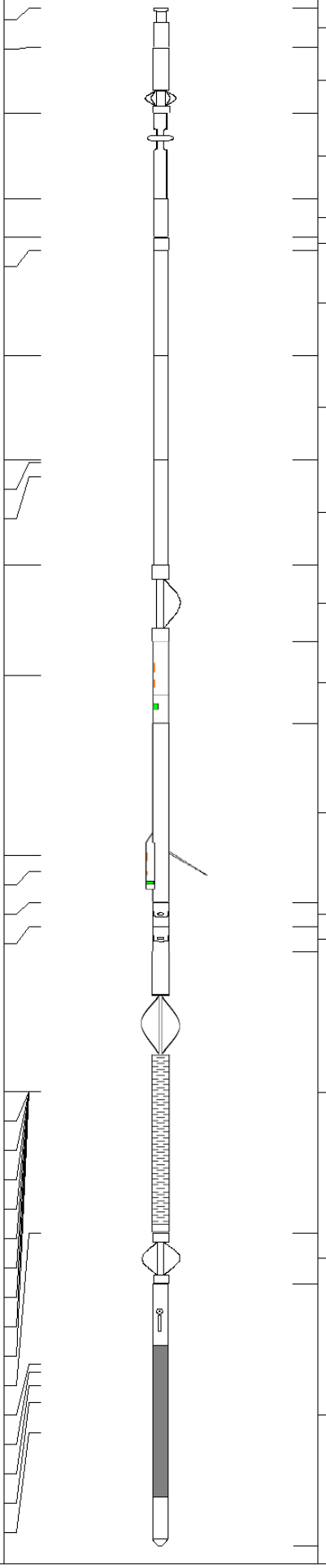
Gamma Ray Calibration Report

Tool Model-Serial Number:	ENP-ENP2T	
Performed:	Thu Sep 06 14:53:24 2012	
Calibrator Value:	170.8	GAPI
Background Reading:	62.6	cps
Calibrator Reading:	476.3	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 Solid Weakpoint	2.31	2.13	5.00
Thrubit	87.53		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) Thrubit Battery	6.13	2.13	38.20
TBBAT2	69.54		TBBAT2-A (PS13B) Thrubit Battery	6.13	2.13	40.00
TMG	63.41		TMG-ENP (ENP2T) ThruBit Telemetry Gamma Ray	6.13	2.13	45.00
GR	63.29					
GRTEMP	62.45					
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 (PS41D) 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	26.54		TBS-A (TBS13) Thrubit Sonic -- Initial Support	16.46	2.13	75.00
TT	26.54					
RmbPk	26.54					
WVF1	26.54					
WVF2	26.54					
WVF3	26.54		Sonic Centralizer	2.96	2.13	22.60
WVF4	26.54					
WVF5	26.54					
WVF6	26.54					
WVF7	26.54					
Thrubit	18.25					
A1_P	10.60		TBI-PS (PS28R) Thrubit Induction	15.29	2.13	94.00
A2_P	10.10					
A3_P	9.35					
A4_P	8.35					
A5_P	6.60					

Dataset: harris_farms_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	HARRIS FARMS 3407 8-2H
Field	ARROWHEAD
County	HARPER
State	KANSAS