Company: Esso Australia Pty. Ltd.
Well: HLA A16A
Field: Halibut
Rig: ISDL 453 State: Victoria

GeoVISION Density Neutron
1:200 Measured Depth
Recorded Memory

Total depth:	2568.0 m
Spud date:	06−MAR−2007
Runs:	1 To 1

Elevation

K.B.	Top Drive
G.L.	−77.00 m
D.F.	29.45 m

Permanent datum:	Mean Sea Level	Elev.: 0 m
Log measured from:	Drill Floor	29.45 m above Perm. datum
Depth reference:	Driller's Depth	

Location

Service Order no. 07ASQ0001	E 615286.986m N 5748514.171m	Longitude E 148°19'13.283" / Latitude S 38°24'15.028"

Rig:	ISDL 453
Field:	Halibut
Location:	Bass Strait
Well:	HLA A16A
Company:	Esso Australia Pty. Ltd.

Depth logged: 544.0 m To 2555.3 m	Mag decl: 13.23 deg.	Other services:
Date logged: 06−Mar−07 To 13−Mar−07	Mag dip: −68.86 deg.	D&I, APWD

Bore hole record

Hole size	from	to
8 ½ in.	544.0 m	2568.0 m

Casing record

Size	Density	from	to
10 ¾ in.	40.50 lb/ft	Surface	544.0 m

Mud record

Type	from	to
KCl/PHPA/Glycol	549.0 m	2568.0 m

Borehole deviation record

Min	Max	from	to
0.94 deg.	20.56 deg.	548.0 m	2568.0 m

Surface equipment

Unit	OLU−JA−9602
Depth system	DES−CA−ASQ04−01

Software record

IDEAL Wis	ID11_0C_01.1
SPM	HSPM11_0c_01
LWD	See Remarks
MWD	80C03

Bit Run Summary

Run number		1
Bit size	in	8.5
Bit start depth	m	549.0
Bit end depth	m	2568.0
Top interval logged	m	544.0
Bottom interval logged	m	2556.3
Begin log: time		10:20
Begin log: date		6/Mar/07
End log: time		05:09
End log: date		13/Mar/07
Mud data		
Depth	m	2195.0
Type		KCl/PHPA/Glycol
Mud weight	ppg	9.7
Solids	%	5.5
Chlorides	mg/L	53,000
Rm	Ohm−m@°C	0.09@21.8
Rmf	Ohm−m@°C	0.07@21.4
Rmc	Ohm−m@°C	0.13@22.6

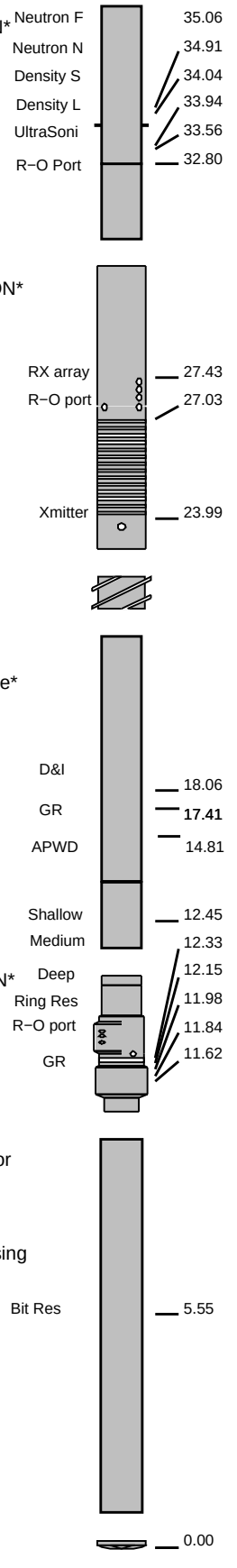
Potassium	%	4.7									
Environmental data											
GR											
Mud weight	ppg	9.7									
Bit size	in	8.5									
Resistivity											
Neutron porosity											
Hole Size	in	8.5									
Mud weight	ppg	9.7									
Temperature	°C	85.0									
Mud salinity	ppk	85.0									
Formation salinity											
Recording rate ADN/GVR	SEC	5									
Recording rate SONIC	SEC	10									
Filtering GR		3pt									
Filtering density		3pt									
Filtering Neutron		3pt									
Company representative		G.Cambell	B.Bigby								
Schlumberger D&M Personnel		R.Borjas	C.Skiba	A.Kohli	C.Cocks	M.Blacker					

OTHER SERVICES FOR RUN1	OTHER SERVICES FOR RUN	OTHER SERVICES FOR RUN
Directional Drilling Directional Surveys Annulus Pressure & Temperature Ultrasonic Caliper		
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER	REMARKS: RUN NUMBER
Depth is referenced to Driller's Depth . Gamma Ray is corrected for mud weight, tool size, bit size and potassium content. Resistivity is borehole compensated and environmentally corrected. Thermal Neutron Porosity is corrected for the effects of bit size, temperature, mud salinity, and mud hydrogen index (a factor of mud weight, mud temperature and pressure. Neutron porosity is calculated using a limestone matrix density of 2.71 g/cm3. Delta−T is borehole compensated. POOH at TD of HLA A16A		

EQUIPMENT DESCRIPTION

RUN1	RUN	RUN
DOWNHOLE EQUIPMENT		

DOWNHOLE EQUIPMENT



6−3/4 in. adnVISION* — 37.04
DHS: V8.3
BladeOD: 8−1/4 in.
S/N: AD09

6−3/4 in. sonicVISION* — 30.78
DHS: 6.6
S/N: 607

6−5/8 in. ILS — 23.19
BladeOD: 8−3/8 in.
S/N: 0SS0551299F

22.32
6−7/8 in. PowerPulse*
MDC: V875
MEC: 1281
MDI: 1751
MGR: AA−146
DHS: 8.0C03

6−3/4 in. GeoVISION* — 13.93
DHS: 6.2B01
Blade OD: 8−1/8 in.
S/N: 41380

7 in. PowePak* Motor — 10.28
A700GT 7:8
S/N: N7311
1.50 deg. Bent Housing

8−1/2 in. PDC Bit — 0.22
S73HPX
JT8946 A

Maximum string diameter 8.50 in.

All lengths in Metres

Variable Name	Variable Description	Run Name & Value
Run Number		1
General Information		
BHT_RM	Bottom Hole Temperature (RM)	85.000000
BSAL_RM	Mud Salinity (RM)	85.000000
BS_RM	Bit Size (RM)	8.500000
COEF_M	User Defined FEXP in Clean Sand	1.650000
C_WS	Overpressure correction to Sw and M	1.000000
FEXP	Formation Factor Exponent(RM)	2.000000
FNUM	Formation Factor Enumerator(RM)	1.000000
FPHI_RM	Formation Factor Porosity Source (RM)	XPLOT
MST_RM	Mud Sample temperature (RM)	21.800000
MW_RM	Mud Weight (RM)	9.700000
OBMF_RM	Oil Based Mud (RM)	NO
RHOF_RM	Mud Filtrate Density (RM)	1.000000
RHOM_RM	Matrix density (RM)	2.710000
RMS_RM	Resistivity of Mud Sample (RM)	0.097100
RWA_COMP_M	Rwa computation model	BASIC
RWA_DEN_AD	Rwa Density Input ADN	RHOB
RWA_DEN_CD	Rwa Density Input CDN	RHOB
RWA_DEN_IN	Rwa Density Input	RHOB
RWA_FORM_M	Rwa computation formation model	CLASTIC
RWA_RES_IN	Rwa computation resistivity input	RAB_RING
RWS_RM	Resistivity of Connate Water (RM)	1.000000
SHT_RM	Surface Hole Temperature (RM)	25.000000
TD_RM	Total Measured Depth (RM)	2568.000000
TWS_RM	Temperature of Connate Water (RM)	75.000000
VF_ILLI	Fraction of illite in shales	0.500000
VF_KAOL	Fraction of kaolinite in shales	0.500000
VF_MONT	Fraction of montmorillonite in shales	0.000000
XPDM_RM	Cross plot density porosity multiplier	0.675000
XPNM_RM	Cross plot neutron porosity multiplier	0.325000
ADN		
LWD_RM/STATION_FILE/PARAMETERStation	Time-frame file name	Station
ADN_CHASSI	ADN Chassis Type String	ADN
ADN_COLLAR	ADN Collar Type String	ADN
ADN_STAB_S	ADN Stabilizer Type String	ADN
ALPHA_COMP	Perform Density Enhanced Vertical Resolution process ?	NO
ALPHA_COMP	Perform Neutron Enhanced Vertical Resolution process ?	NO
AVE_ADN	ADN/Array Channels: perform averaging(RM) :	YES
A_DHS	ADN Down Hole Software Version String	YES
CHI_RM	Caliper High limit from BS (RM)	3.000000
CLO_RM	Caliper Low limit from BS (RM)	0.000000
DEVI	Well Section Deviation	15.890000
DTIK_SEL	ADN: Density Tick Channel Name	LSAZ
DTMUD	Delta-T for Mud	187.889999
DYN_IMG_CO	Generate Dynamic Normalized Image?	YES
ECC_CORR_A	Perform Eccentering Correction for TNPH?	YES
ENVCOR	Neutron Quadrant Processing: Environmental Correction?	YES
EVRL	EVR Process averaging number of samples (RM)	49
FCD	Future Casing (Outer) Diameter	7.000000
GCSE	Generalized Caliper Selection	BS
HPS	ADSE-EB (High Pressure Inconel Chassis)?	NO
IBS	Intergal Blade Stabilizer Collar?	YES
IDQT	Image Derived Quality Threshold	1.000000
IHVS	Integrated Hole Volume Start Value(RM)	0.000000
IMAGE_MAX_	Image SOA (Quadrant) Right Scale	2.500000
IMAGE_MAX_	Image PEF(Segment) Right Scale	6.000000
IMAGE_MAX_	Image RHOB(Segment) Right Scale	2.650000
IMAGE_MIN_	Image SOA (Quadrant) Left Scale	0.000000
IMAGE_MIN_	Image PEF(Segment) Left Scale	2.000000
IMAGE_MIN_	Image RHOB(Segment) Left Scale	2.050000
JSD_ADN	ADN Acquisition start date	2.050000
LITHO_TYPE	Lithology (RM)	LIME
N1FTU_6_RM	ADN: Neutron Bank 1 Far Tubes used :	1-2-3
N2FTU_6_RM	ADN: Neutron Bank 2 Far Tubes used :	1-2-3
NNTU_RM	ADN Neutron Near Banks Used	1-2
NTIK_SEL	ADN: Neutron Tick Channel Name	FR11
SHT_RM	Ground Level Temperature (Mud-Line When Offshore) (RM)	25.000000
SOCNL	Standoff Distance of the CNL Tool	1.000000
SSIZ_ADN	ADN Stabilizer Size	8.250000
STOH	ADN Density Top of Hole Sector (Left Boundary):	SECTOR_0
TRPM_RM	Average Tool Rotational Speed	20.000000
USMIN_RM	ADN:Minimum Ultrasonic standoff (RM)	0.180000
USWF_RM	ADN:Process Ultrasonic Waveform?	YES
VERS_ADN	ADN Downhole Software Version	8.300000
WSDI	Window Size of Dynamic Normalization Image	15.000000
RAB		
RAB/BTN_SLV_SIZE/PARAMETERRAB:	Button Sleeve Diameter	RAB6:
RAB/STAB_SIZE/PARAMETERRAB:	Stabilizer Diameter	RAB6:
BDBHCA	RAB: Button Deep Borehole A Factor	0.003555
BDBHCB	RAB: Button Deep Borehole B Factor	0.000000
BHA_COEF_V	RAB: BHA Coef Generator Version	2.000000
BITBHCA	RAB: Bit A Borehole Factor	0.057576
BITBHCB	RAB: Bit B Borehole Factor	0.000000
BIT_K_FACT	RAB: Bit K Factor	14.555807
BMBHCA	RAB: Button Medium Borehole A Factor	0.022478
BMBHCB	RAB: Button Medium Borehole B Factor	0.000000

BSBHCA	RAB: Button Shallow Borehole A Factor	0.021991
BSBHCB	RAB: Button Shallow Borehole B Factor	0.000000
BUT_KIMP_A	RAB: Button Impedance Coeff A	0.000000
BUT_KIMP_B	RAB: Button Impedance Coeff B	0.000000
DBUTTON_K_	RAB: Button Deep K factor	0.004594
GR_BHC_TOO	RAB: Gamma-Ray Borehole Coeff 1	6.750000
HI_CSDEPTH	RAB: Allow Hi-Resolution CS_DEPTH Image Data Output	YES
HI_DLIS_OU	RAB: Allow Hi-Resolution DLIS Image Data Output	YES
HI_RIVER_O	RAB: Allow Hi-Resolution River for Image Data Output	YES
IMAGE_MAX_	RAB: GR Image Maximum Scale Value	120.000000
IMAGE_MAX_	RAB: Image Maximum Resistivity Value	100.000000
IMAGE_MIN_	RAB: GR Image Minimum Scale Value	20.000000
IMAGE_MIN_	RAB: Image Minimum Resistivity Value	1.000000
JSD_RAB	RAB Acquisition start date	1.000000
KPER	Potassium Concentration (RM)	4.420000
MAG_DECL_R	RAB: Magnetic Declination	13.229998
MAG_INCL_R	RAB: Magnetic Dip	-68.859993
MBUTTON_K_	RAB: Button Medium K Factor	0.005263
OBM	RAB: Oil base Mud	NO
ORIENTATIO	Rab Image Orientation	TOH
RABBDA0	RAB: Button Deep A0 Coeff	-0.049596
RABBDA1	RAB: Button Deep A1 Coeff	0.019506
RABBDA2	RAB: Button Deep A2 Coeff	-0.004362
RABBDA3	RAB: Button Deep A3 Coeff	0.000455
RABBDA4	RAB: Button Deep A4 Coeff	-0.000017
RABBDA5	RAB: Button Deep A5 Coeff	0.000000
RABBDMIN	RAB: Button Deep Minimum Value	0.051084
RABBITA0	RAB: Bit A0 Coeff	3.854710
RABBITA1	RAB: Bit A1 Coeff	-4.215647
RABBITA2	RAB: Bit A2 Coeff	11.379987
RABBITA3	RAB: Bit A3 Coeff	-11.876939
RABBITA4	RAB: Bit A4 Coeff	4.796395
RABBITA5	RAB: Bit A5 Coeff	0.000000
RABBITMIN	RAB: Bit Minimum Value	21.114967
RABBMA0	RAB: Button Medium A0 Coeff	-0.059916
RABBMA1	RAB: Button Medium A1 Coeff	0.025609
RABBMA2	RAB: Button Medium A2 Coeff	-0.005951
RABBMA3	RAB: Button Medium A3 Coeff	0.000628
RABBMA4	RAB: Button Medium A4 Coeff	-0.000024
RABBMA5	RAB: Button Medium A5 Coeff	0.000000
RABBMMIN	RAB: Button Medium Minimum Value	0.059503
RABBSA0	RAB: Button Shallow A0 Coeff	-0.071702
RABBSA1	RAB: Button Shallow A1 Coeff	0.030312
RABBSA2	RAB: Button Shallow A2 Coeff	-0.006846
RABBSA3	RAB: Button Shallow A3 Coeff	0.000699
RABBSA4	RAB: Button Shallow A4 Coeff	-0.000026
RABBSA5	RAB: Button Shallow A5 Coeff	0.000000
RABBSMIN	**RAB: Button Shallow Minimum Value**	**0.086483**
RABDHS	**RAB Down Hole Software**	**4.000000**
RABEC	RAB: Resistivity Env-Cor	YES
RABRNGA0	RAB: RING A0 Coeff	-0.045486
RABRNGA1	RAB: RING A1 Coeff	0.017751
RABRNGA2	RAB: RING A2 Coeff	-0.004021
RABRNGA3	RAB: RING A3 Coeff	0.000427
RABRNGA4	RAB: RING A4 Coeff	-0.000016
RABRNGA5	RAB: RING A5 Coeff	0.000000
RABRNGMIN	RAB: Ring Minimum Value	1.696959
RAB_BIT_EC	Bit Resistivity for ECAL_RAB?	YES
RAB_BIT_IN	Input Bit Resistivity for Inversion? (Recommended at the bit)	NO
RAB_CALIPE	Compute ECAL_RAB?	YES
RAB_DEEPBT	Deep Button Resistivity for ECAL_RAB?	YES
RAB_DEEPBT	Input Deep Button Resistivity for Inversion?	YES
RAB_INVERS	Perform Rt Inversion?	YES
RAB_INVERS	RAB Bit Sensor Weight for Inversion[0,1]	0.000000
RAB_INVERS	Ending Depth for GR Cutoff in Zone1	100000.000000
RAB_INVERS	Continuity Multiplier[0,1]	0.500000
RAB_INVERS	RAB Deep Button Sensor Weight for Inversion[0,1]	1.000000
RAB_INVERS	RAB inversion for Dh?	NO
RAB_INVERS	RAB inversion for Di?	YES
RAB_INVERS	GR Cutoff for Shale Formation	75.000000
RAB_INVERS	GR Cutoff for Shale Formation in Zone1	75.000000
RAB_INVERS	GR Cutoff in Zone10	75.000000
RAB_INVERS	GR Cutoff in Zone2	75.000000
RAB_INVERS	GR Cutoff in Zone3	75.000000
RAB_INVERS	GR Cutoff in Zone4	75.000000
RAB_INVERS	GR Cutoff in Zone5	75.000000
RAB_INVERS	GR Cutoff in Zone6	75.000000
RAB_INVERS	GR Cutoff in Zone7	75.000000
RAB_INVERS	GR Cutoff in Zone8	75.000000
RAB_INVERS	GR Cutoff in Zone9	75.000000
RAB_INVERS	RAB Medium Button Sensor Weight for Inversion[0,1]	1.000000
RAB_INVERS	Resistivity Cutoff for Shale Formation	2.000000
RAB_INVERS	Resistive Invasion Allowed	NO
RAB_INVERS	RAB Ring Sensor Weight for Inversion[0,1]	0.000000
RAB_INVERS	RAB inversion for Rmud?	NO
RAB_INVERS	RAB inversion for Rt?	YES
RAB_INVERS	Rt to R-deepest separation penalty multiplier[0,1]	0.500000
RAB_INVERS	RAB inversion for Rxo?	YES
RAB_INVERS	RAB Shallow Button Sensor Weight for Inversion[0,1]	1.000000
RAB_INVERS	Inversion Threshold[0, 0.3]	0.010000
RAB_INVERS	Formation Water Resistivity	0.100000
RAB_INVERS	Formation Water Temperature	150.000000
RAB_MEDIUM	Medium Button Resistivity for ECAL_RAB?	YES
RAB_MEDIUM	Input Medium Button Resistivity for Inversion?	YES
RAB_QUAD	RAB: Process Quadrant data ?	YES
RAB_RIGMOD	Bit on Bottom?	YES

RAB_RIGMOD	Bit On Bottom?	YES
RAB_RING_E	Ring Resistivity for ECAL_RAB?	YES
RAB_RING_I	Imput RING Resistivity for Inversion?	NO
RAB_SHALLO	Shallow Button Resistivity for ECAL_RAB?	YES
RAB_SHALLO	Input Shallow Button Resistivity for Inversion?	YES
RAB_TAB	RAB: Compute TAB ?	YES
RAB_TECHLO	RAB: Generate Techlog ?	YES
RAB_TEMP_S	RAB Temperature Selection	MEASURED
RAB_TICKS	RAB: Generate Ticks ?	YES
READOUT_PO	RAB: ROP to Bit Face Distance	38.845112
RINGBHCA	RAB: Ring Borehole A Factor	0.159092
RINGBHCB	RAB: Ring Borehole B Factor	0.000000
RING_KIMP_	RAB: Ring Impedance Coeff A	0.000000
RING_KIMP_	RAB: Ring Impedance Coeff B	0.000000
RING_K_FAC	RAB: Ring K Factor	0.153555
SBUTTON_K_	RAB: Button Shallow K Factor	0.007135
SCALE_IMAG	RAB: Process Image Data	YES
STAB	RAB: Run with Stabilizer	YES
TFF_OFFSET	RAB Time-Frame File Time Offset	0.000000
TIMEFRAME_	RAB: Time Frame File Name	0.000000
TOOLTYPE	RAB: Azimuthal Tool	YES
VRAB6	Rab Tool type (ENP/PILOT)	RAB6_C_SERIES
WIN_SIZE_D	RAB: Window Size for Scaling Dynamic Image	3.000000
WRK	Way to Report Potassium Concentration (RM)	K_by_Wgt_%

ISONIC

FP_SD	First Sample delay	400.00
STC_CF	Center frequency of Filter	13.00
STC_BW	Bandwidth (kHz)	5.00 kHz
STC_RWI	Receiver waveform ignored	None
PM_TOFF	Tool Time offset from surface system	0.00
DT_COH	Delta-T Coherence Cutoff Value	0.70
PPC_PF	Porosity Formula	Raymer-Hunt
PPC_PS	Sonic Porosity Source	DTRA
PPC_MDT	Matrix Delta-T	55.50
PPC_FDT	Fluid Delta-T	189.00

IDEAL Version: ID12_0C_01

IDF

Format: GeoVISION Density Neutron Log **Vertical Scale: 1:200** **Graphics File Created: 15-Mar-2007 11:38**

PIP SUMMARY

Neutron Samples

Density Samples

Rate of Penetration, Averaged over Last 5ft (ROP5_RM)
200 (M/HR) 0

RAB Gamma Ray (GR_RAB)
0 (GAPI) 200

Vertical Hole Diameter (VERD)
6 (IN) 16

Horizontal Hole Diameter (HORD)
6 (IN) 16

Thermal Neutron Porosity (TNPH)
45 (PU) -15

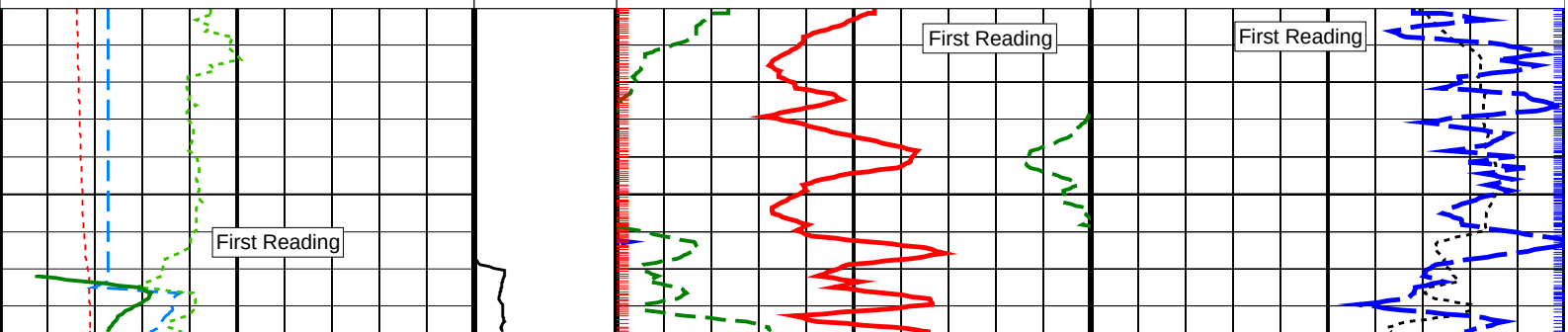
Bulk Density, Bottom (ROBB)
1.85 (G/C3) 2.85

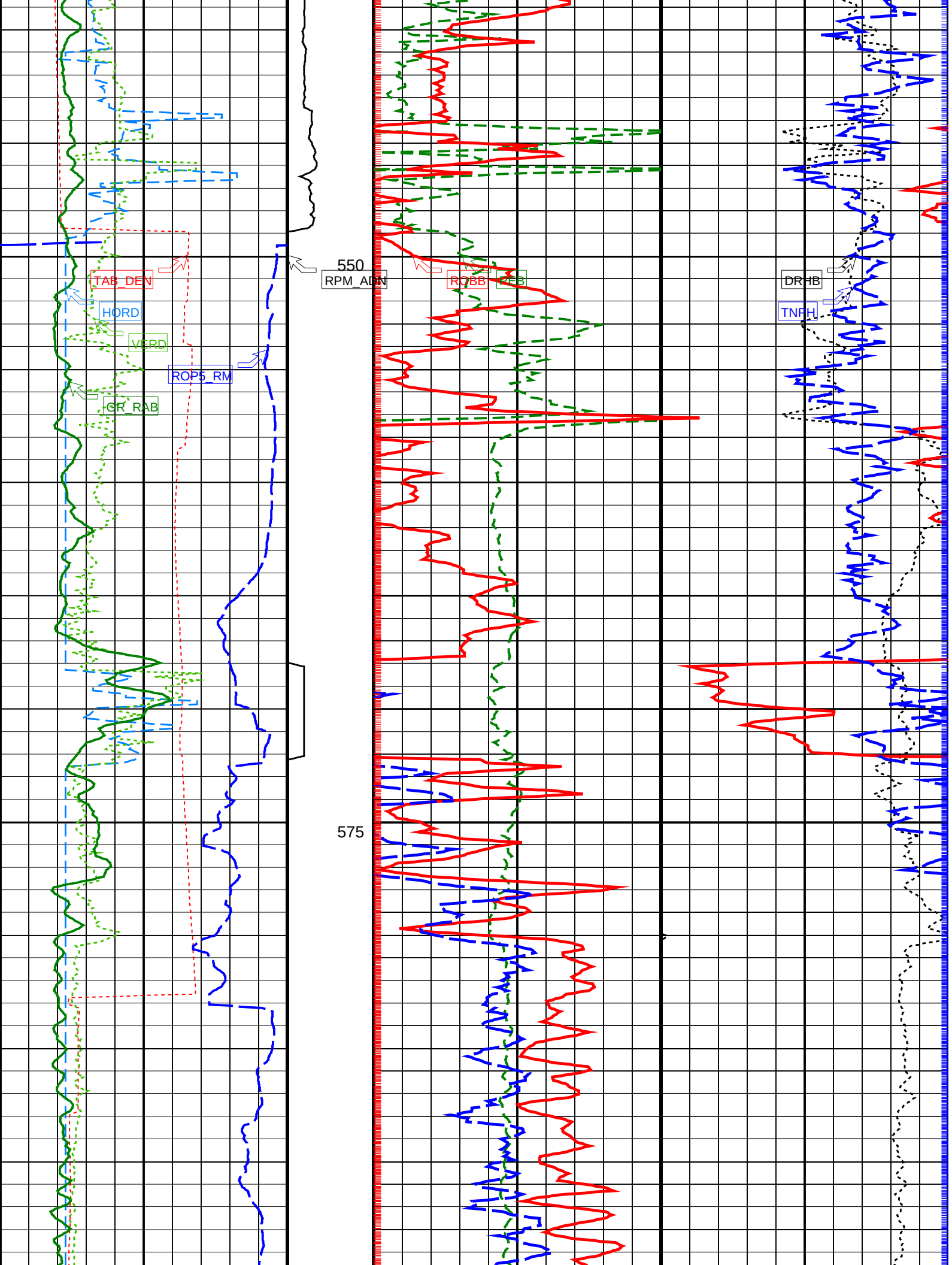
Density Time After Bit (TAB_DEN)
0 (HR) 10

ADN Rotational Speed (RPM_ADN) (RPM)
0 250

Photoelectric Factor, Bottom (PEB)
0 (---- 10

Bulk Density Correction, Bottom (DRHB)
-0.75 (G/C3) 0.25

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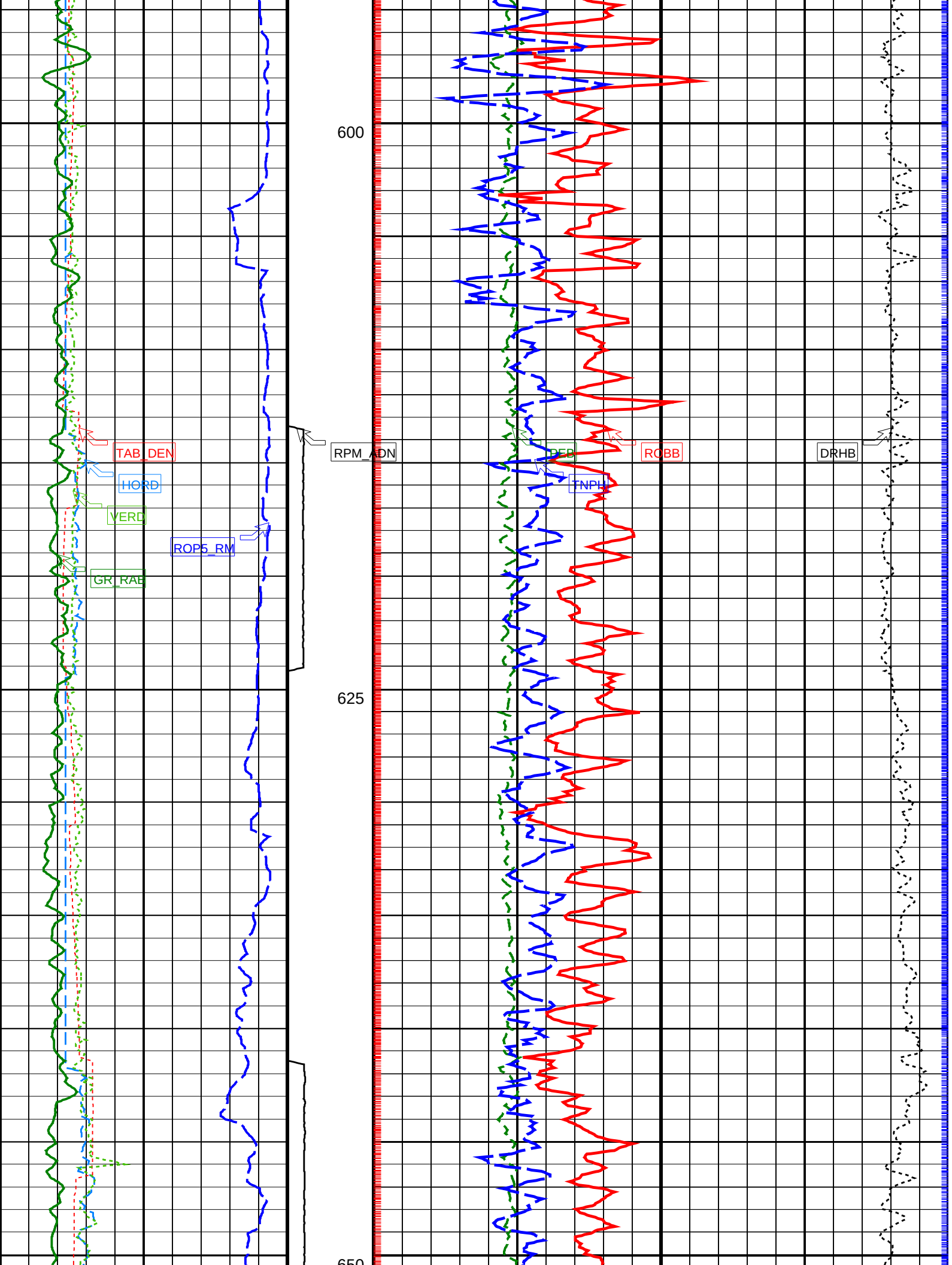
TAB_DEN
HORD
VERD
ROP5_RM
GR_RAB
ROBB
PEB
DRHB
TNPH
575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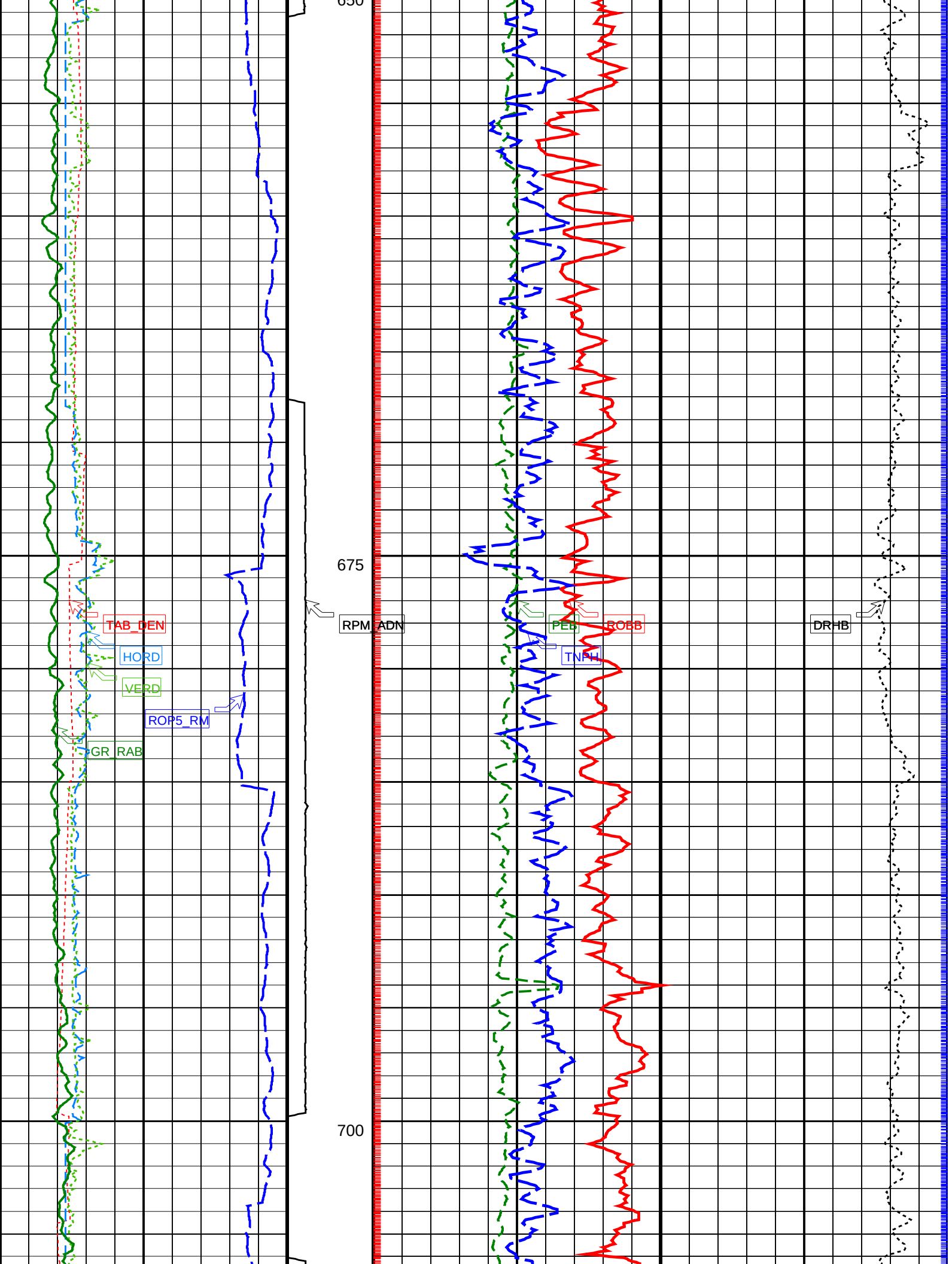
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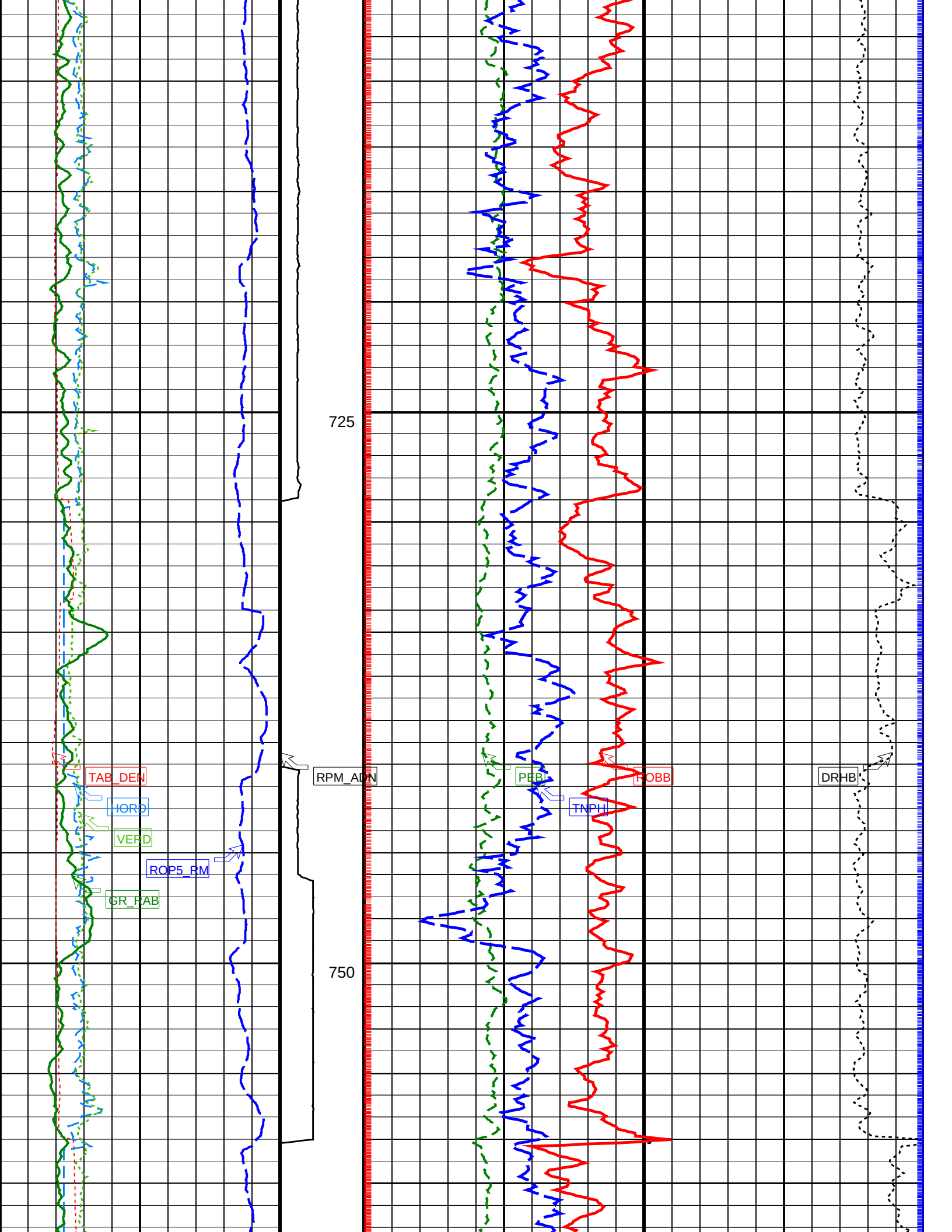
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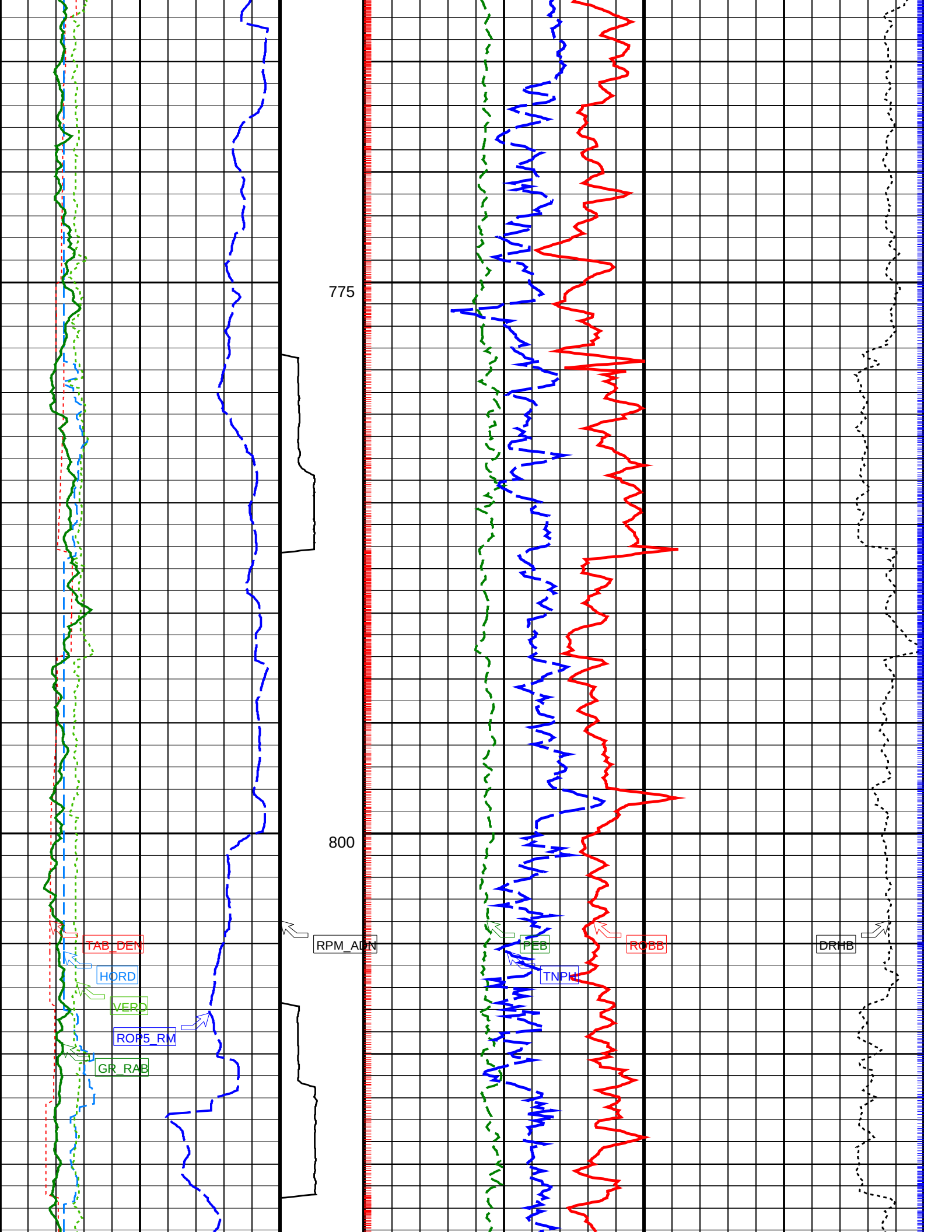
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VERD
ROP5_RM
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RPM_ADN
PEB
TNPH
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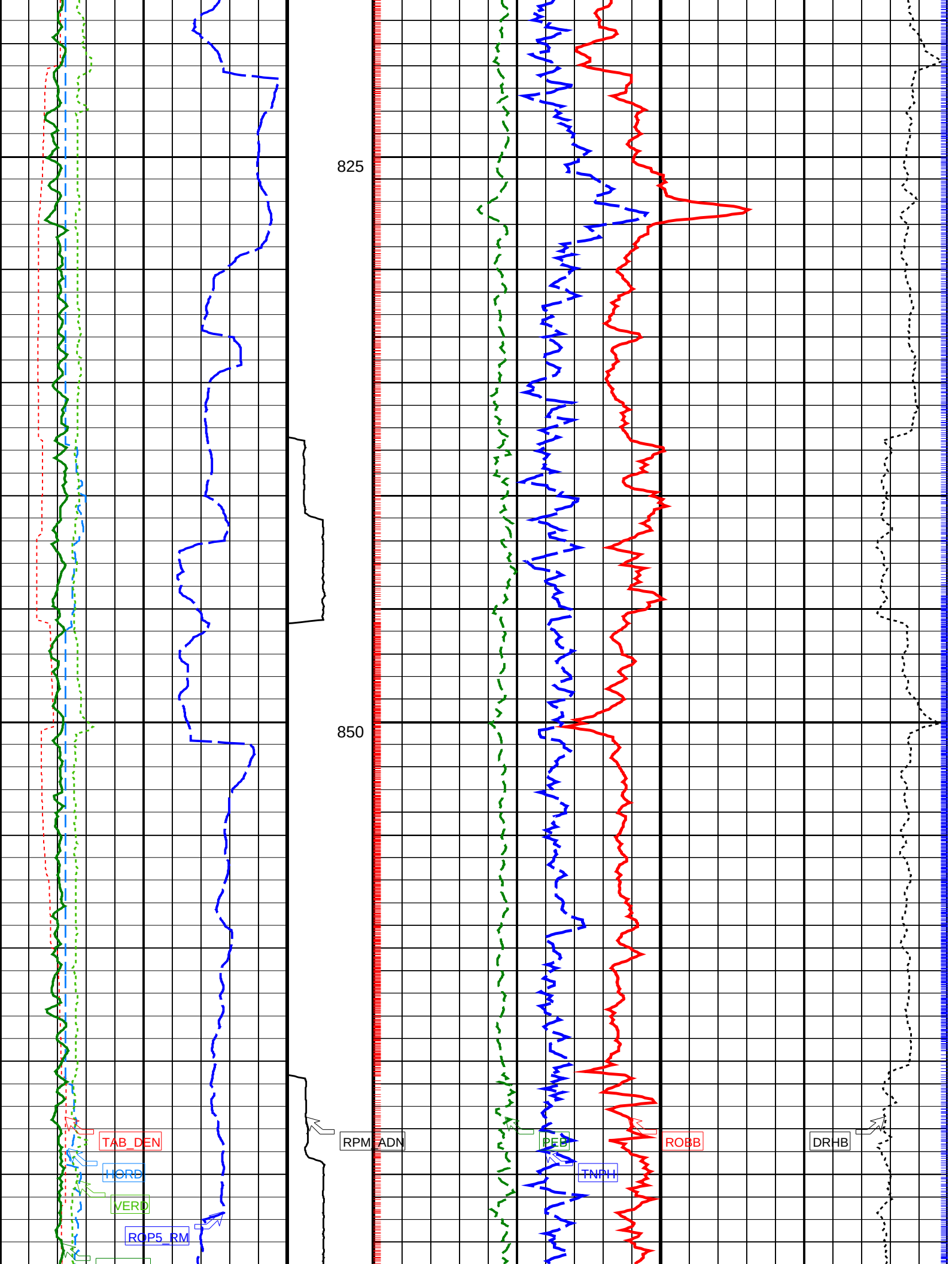
DRHB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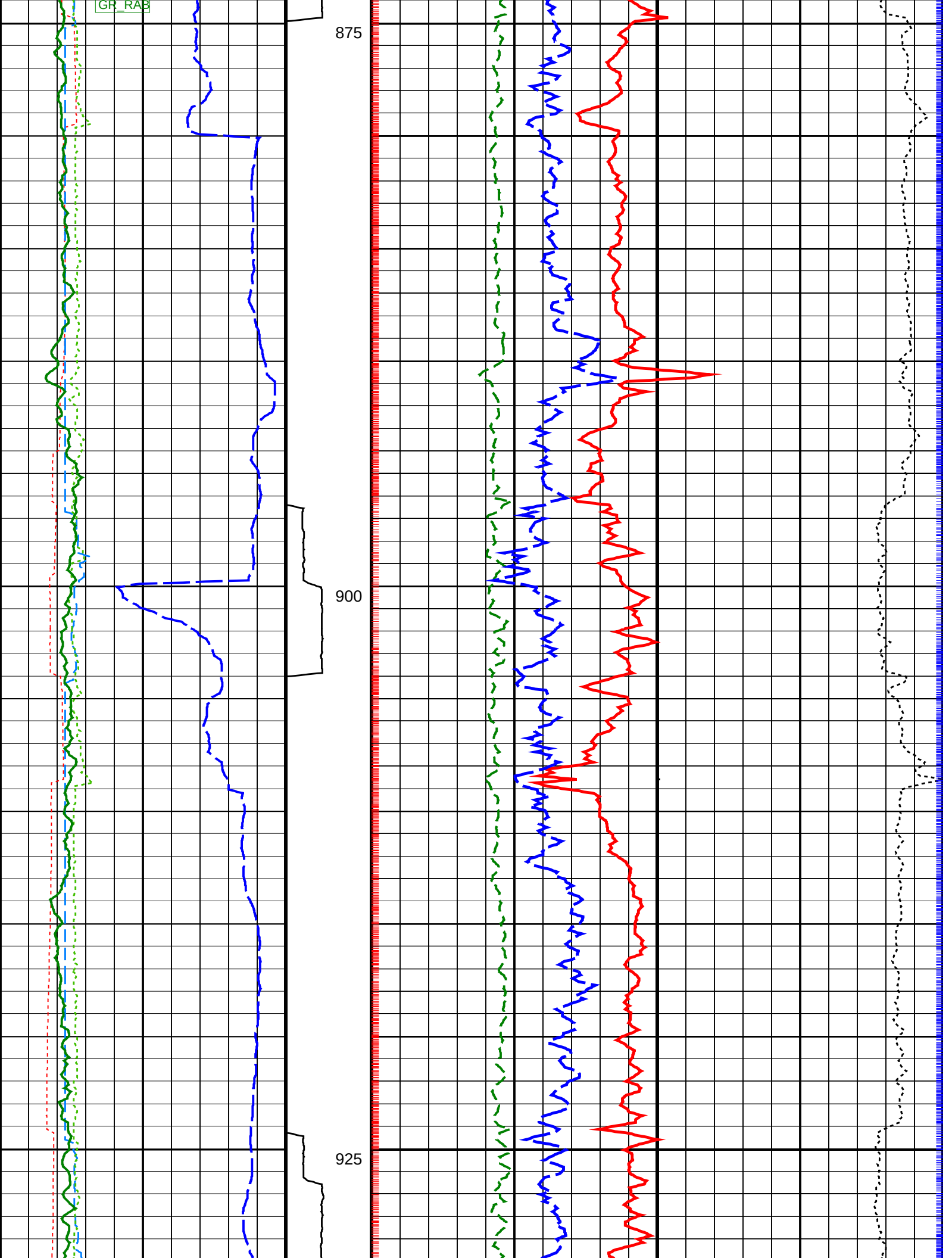
HORD
VERD
ROP5_RM
RPM_ADN
PEB
ROBB
TNPH
DRHB


GR_RAB
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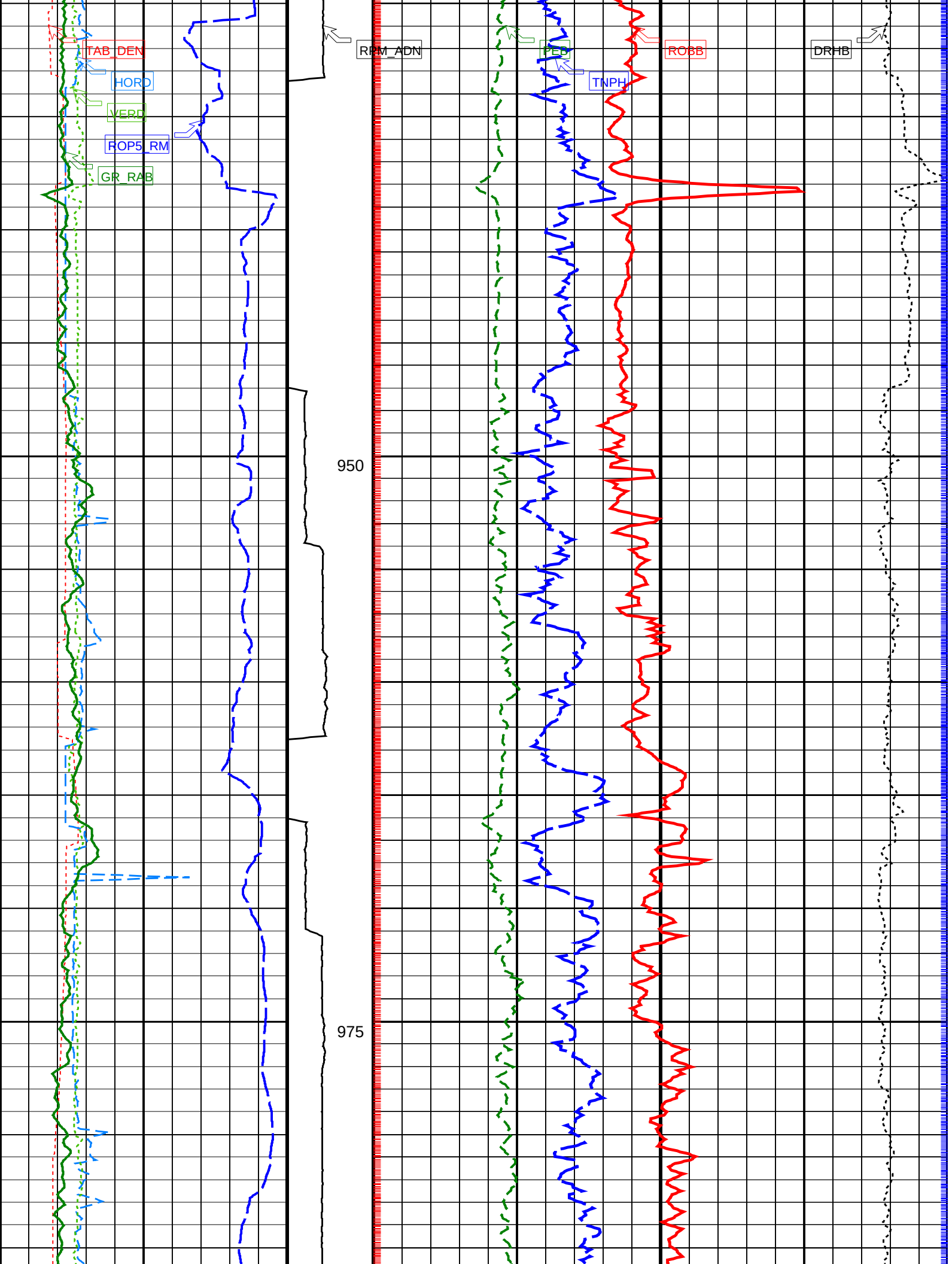
900
925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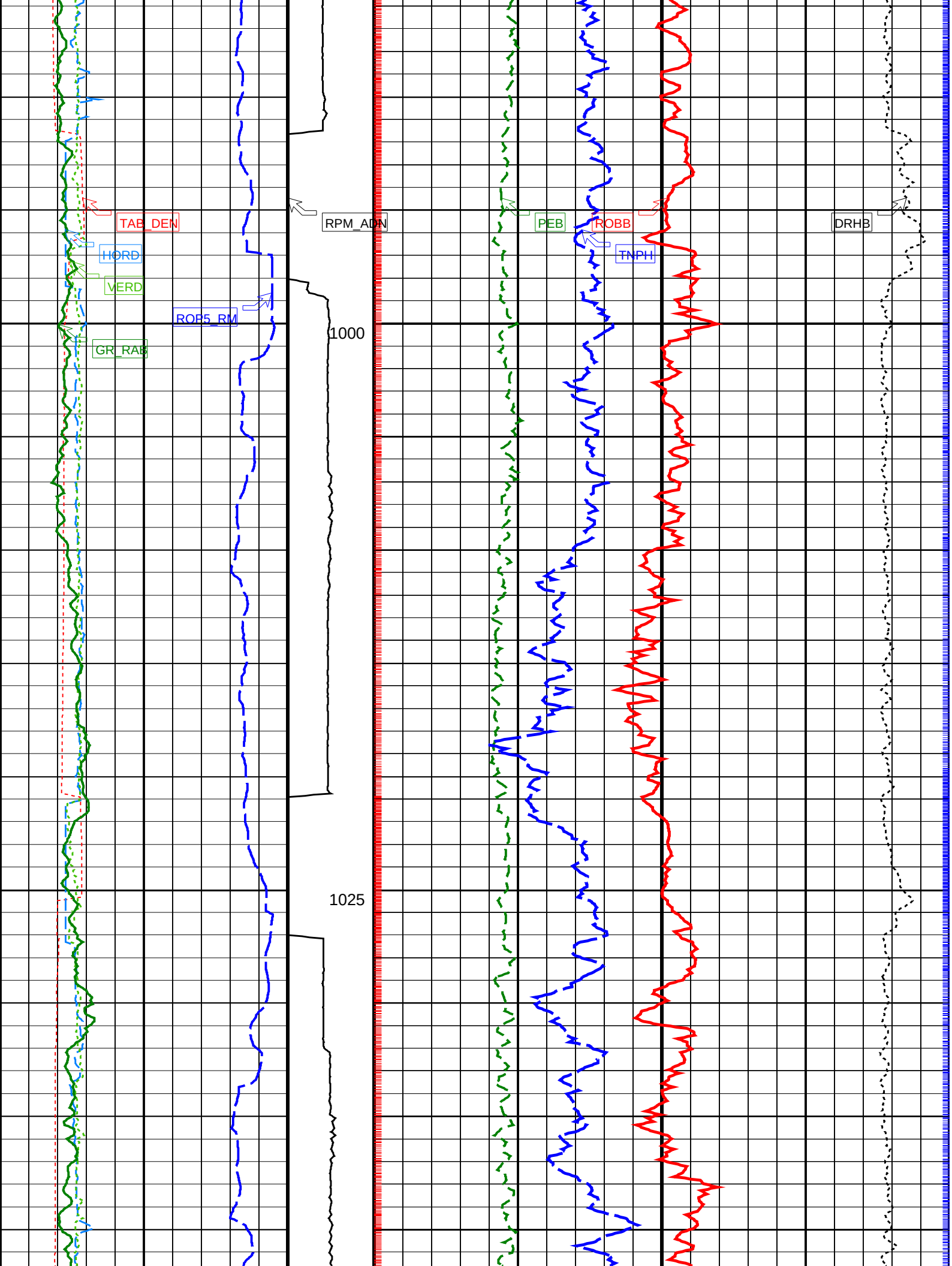
VERD
ROP5_RM
GR_RAB
RPM_ADN
PEB
TNPH
ROBB
DRHB
950
975


TAB_DEN
HORD
VERD
ROP5_RM
GR_RAB
RPM_ADN
PEB
ROBB
TNPH
DRHB
1000
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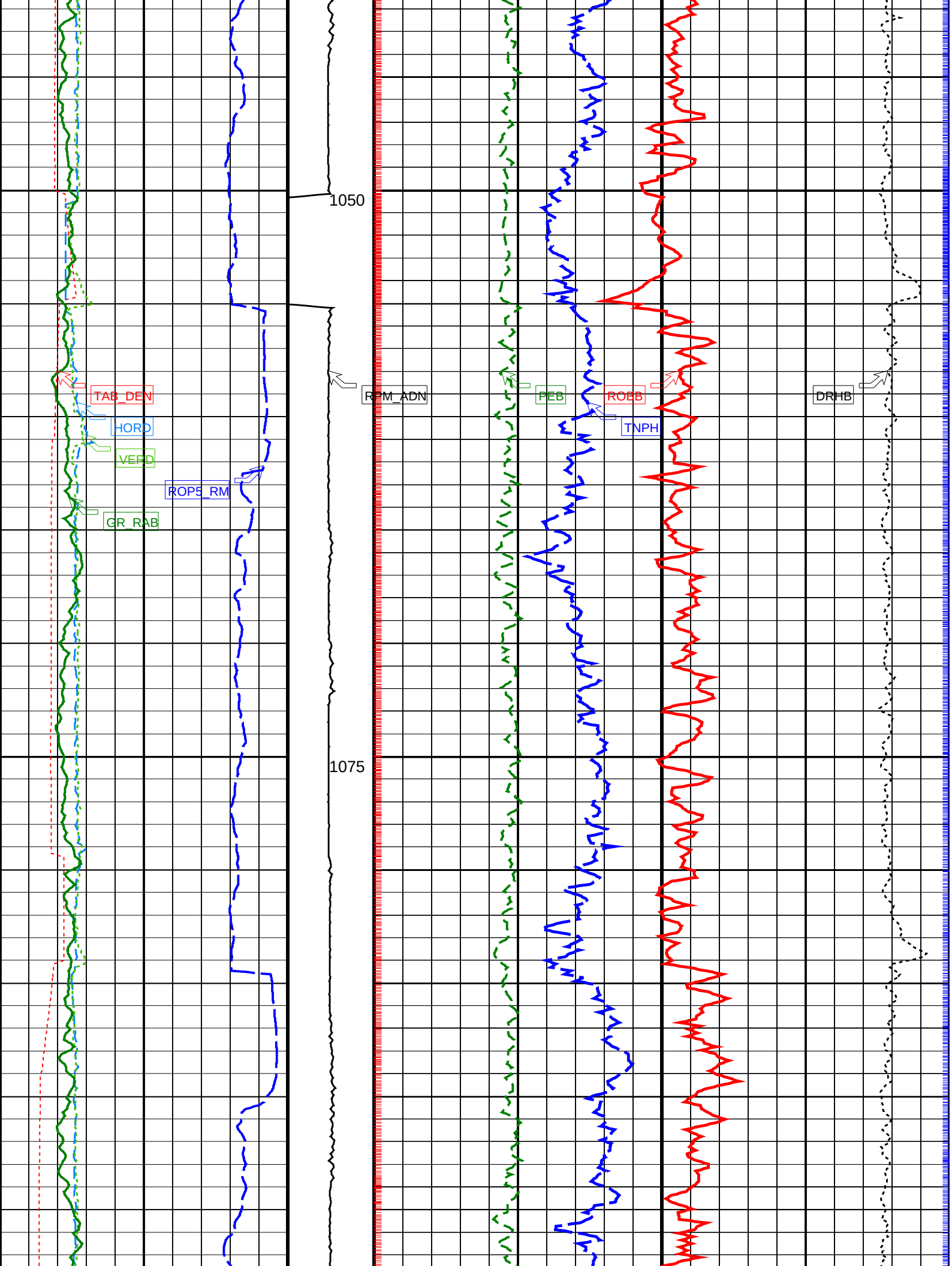
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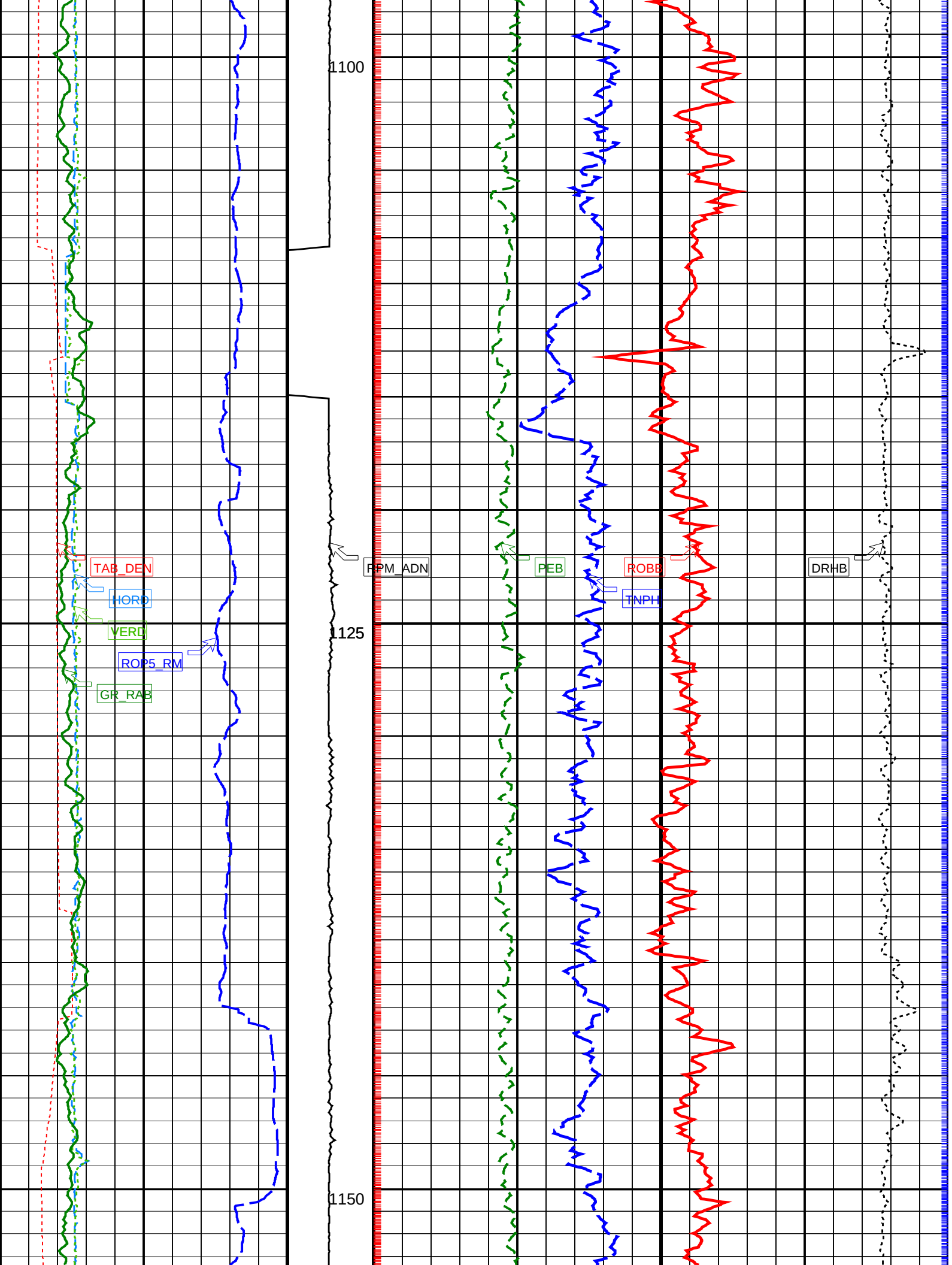
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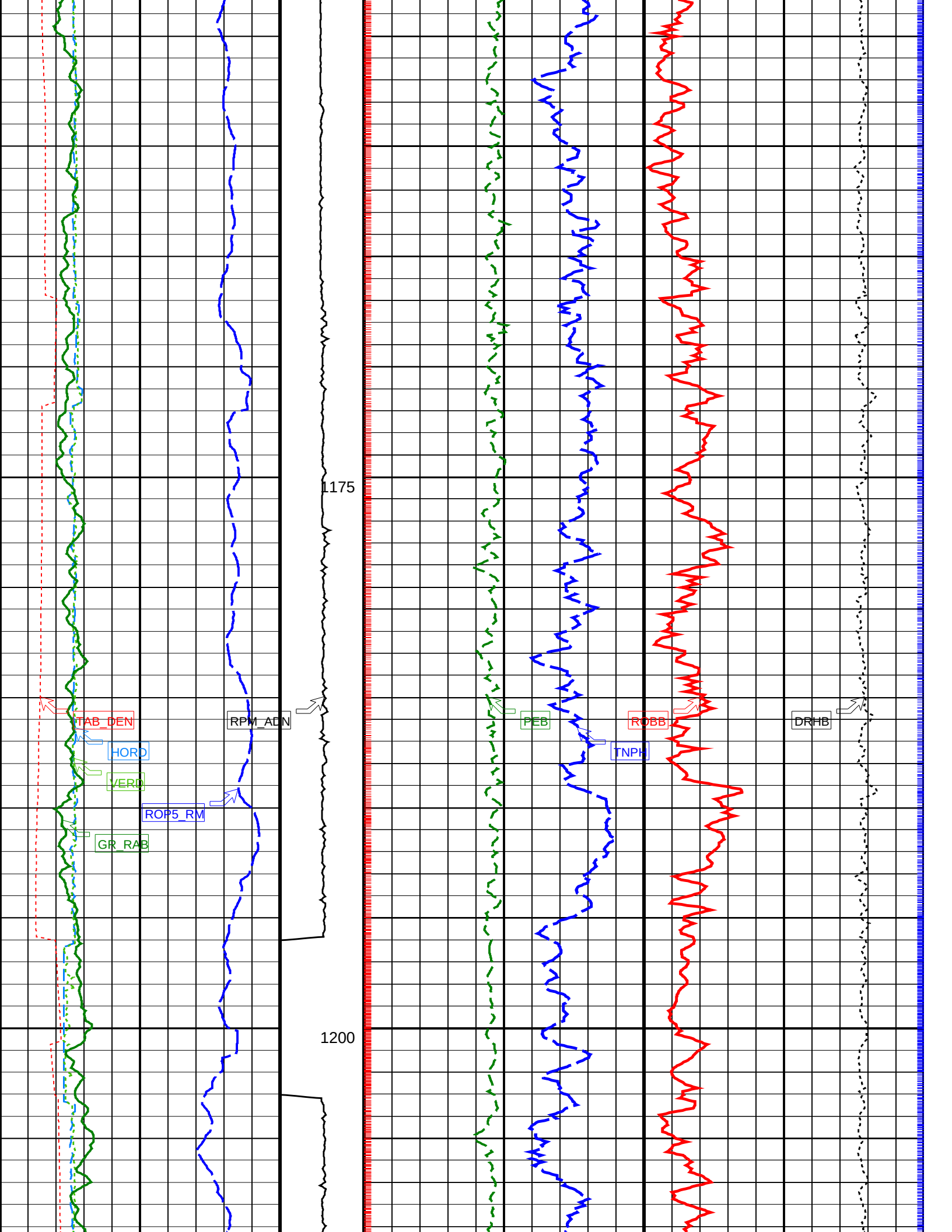
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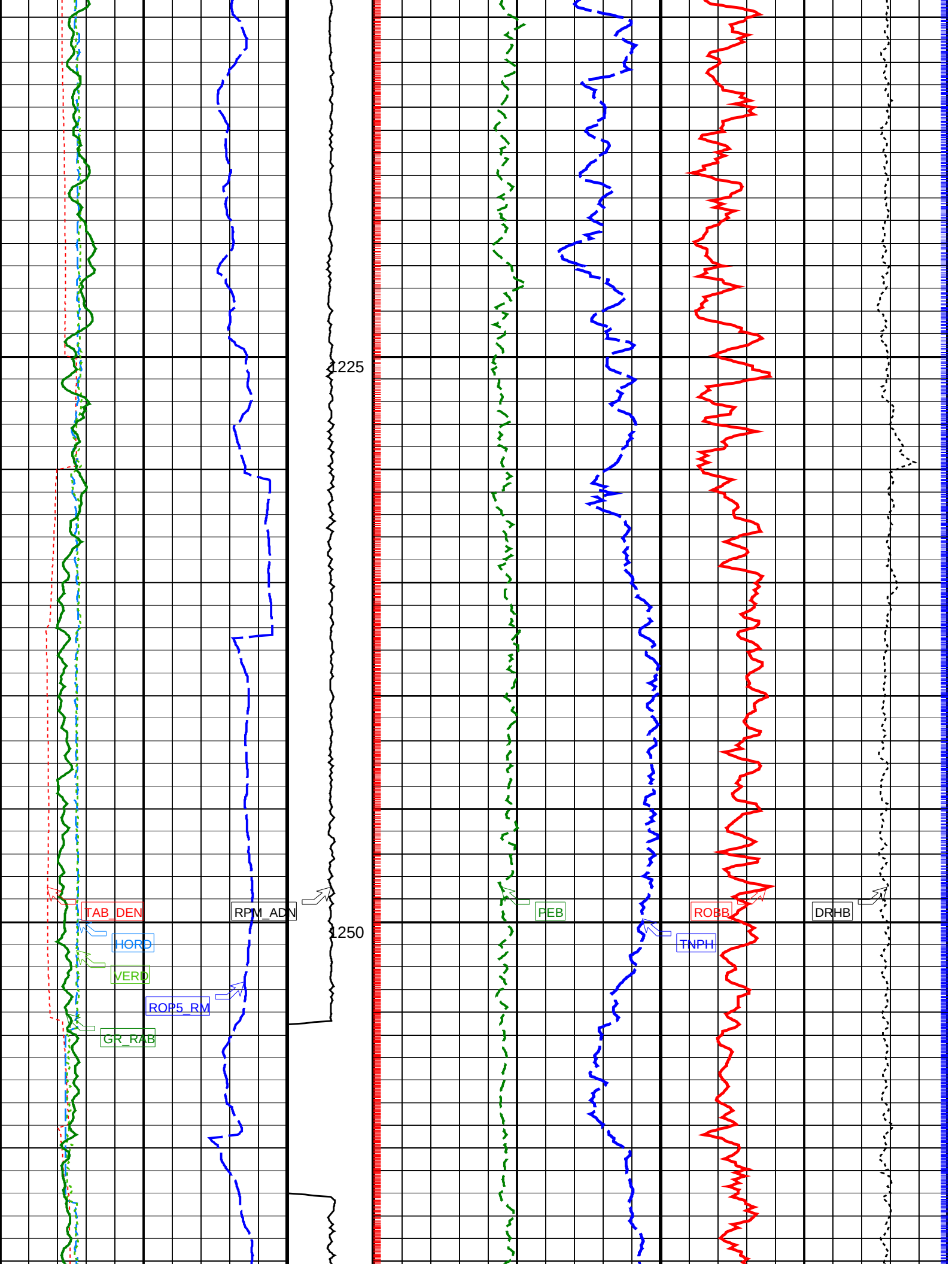
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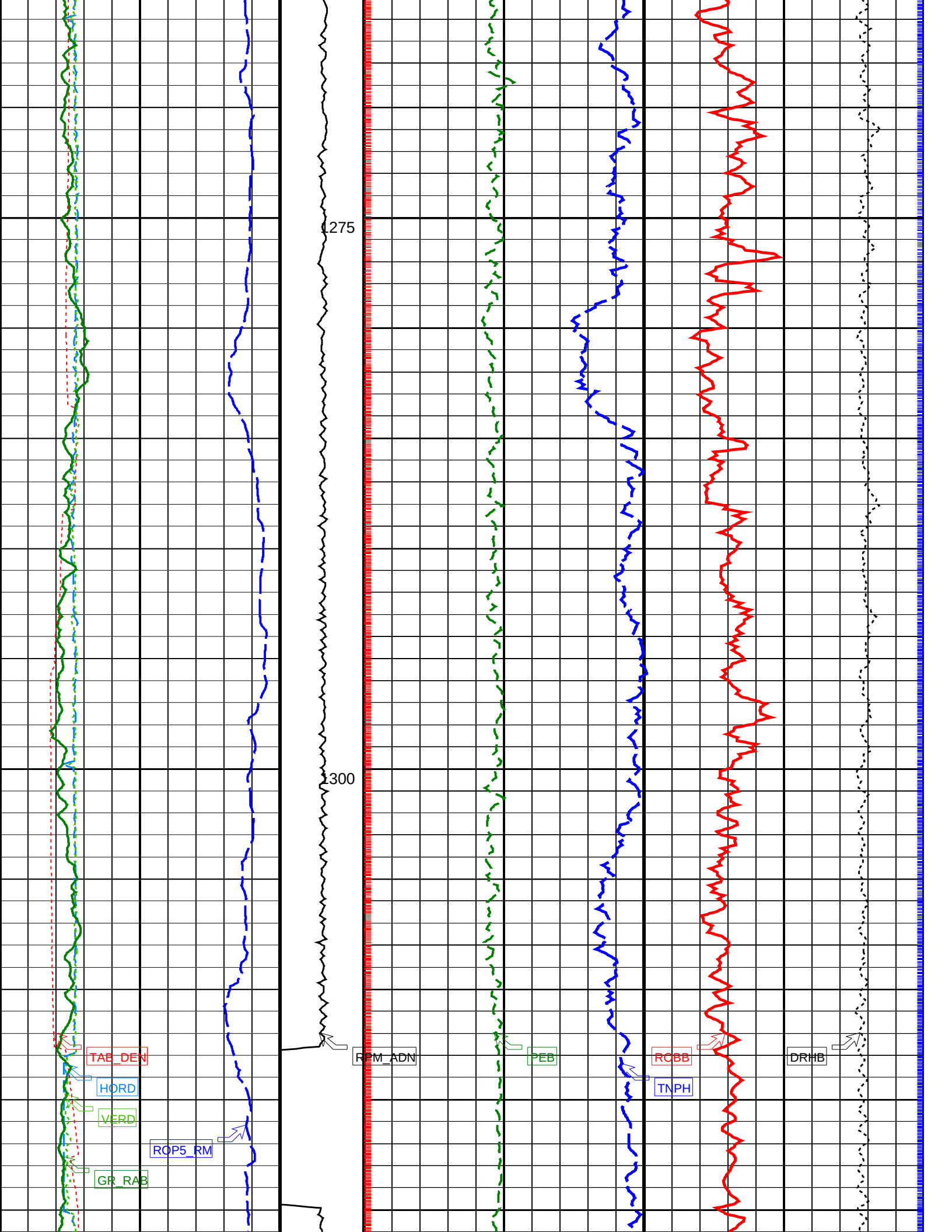
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RPM_ADN
PEB
ROBB
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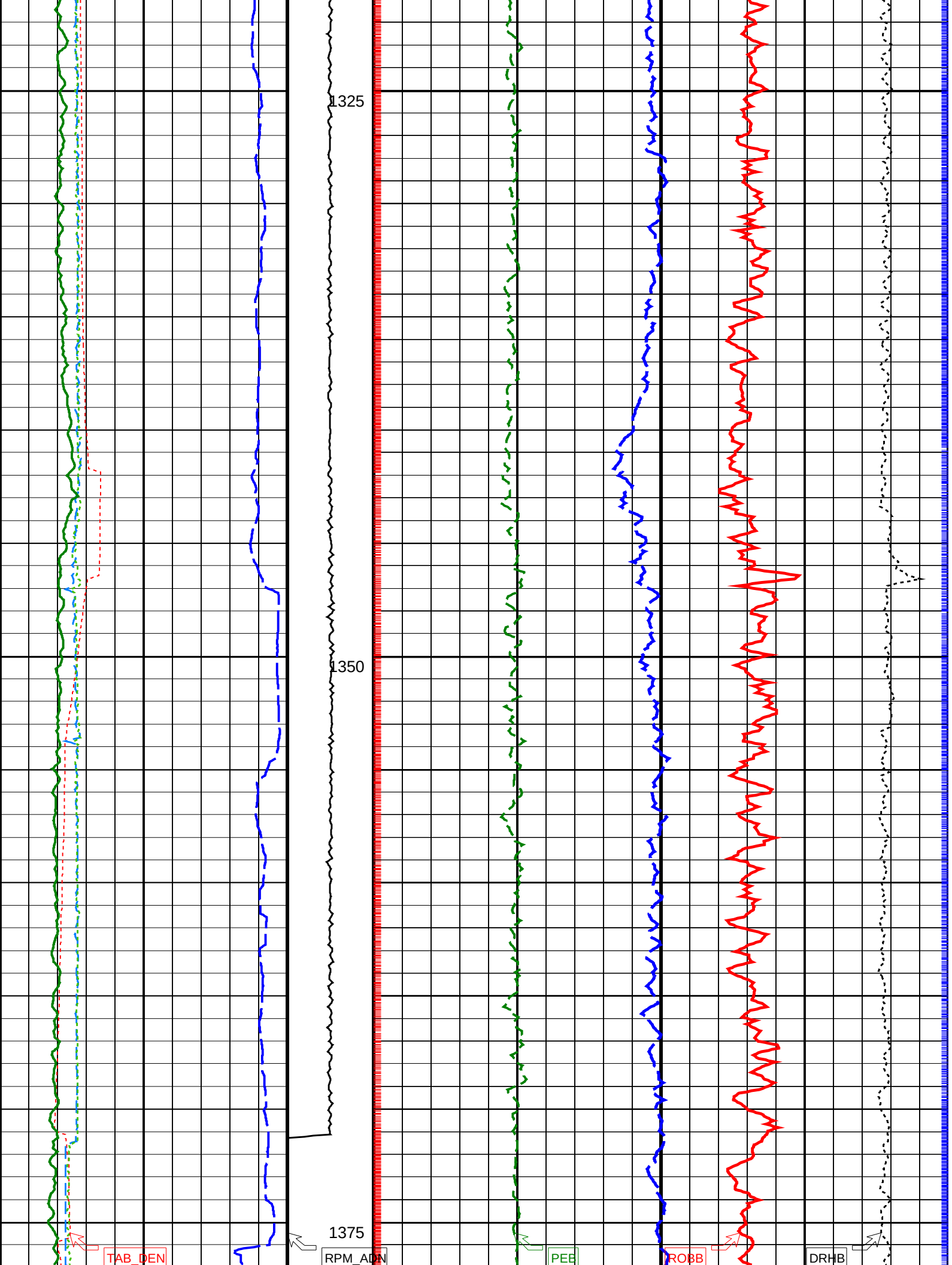
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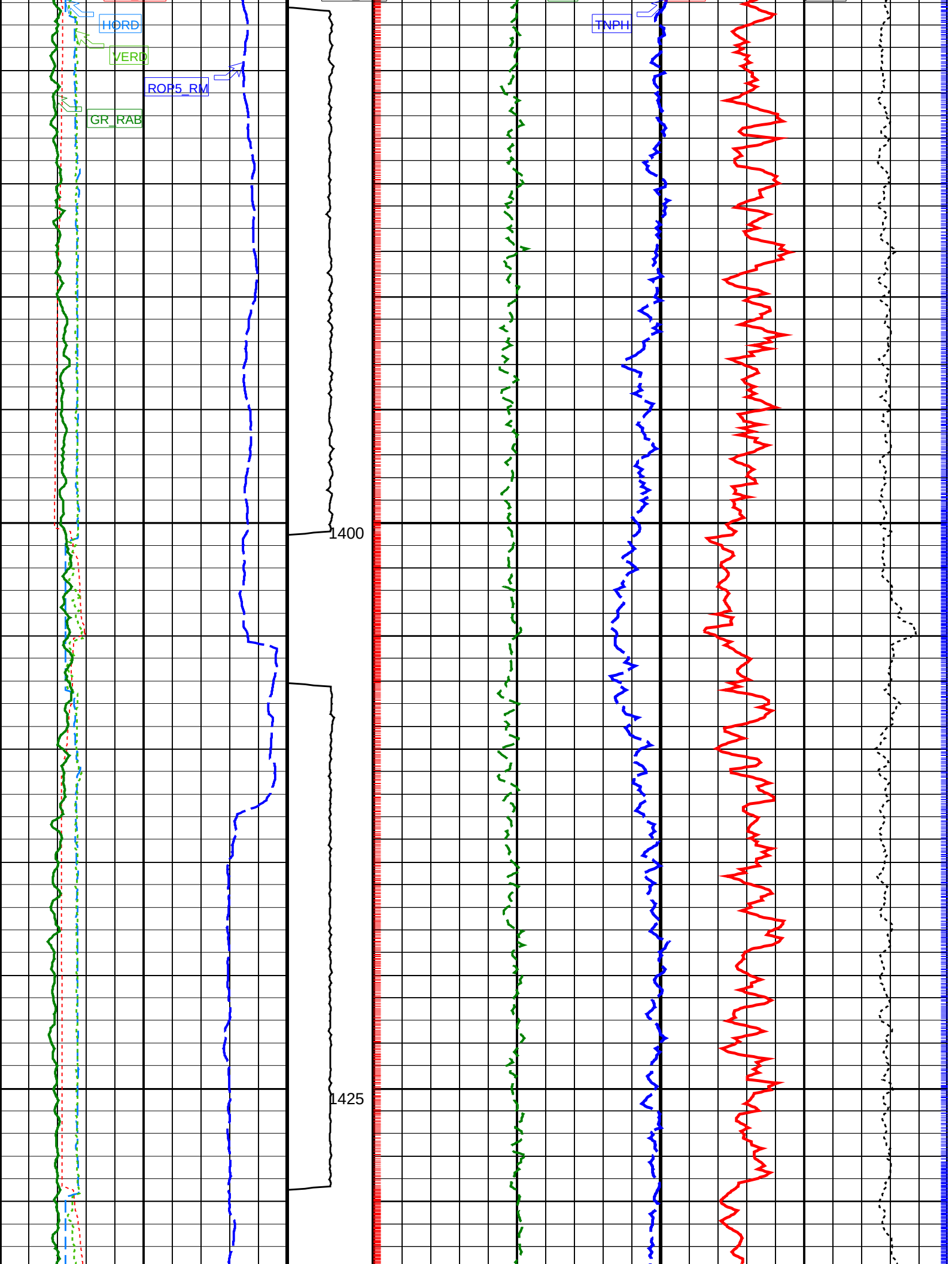
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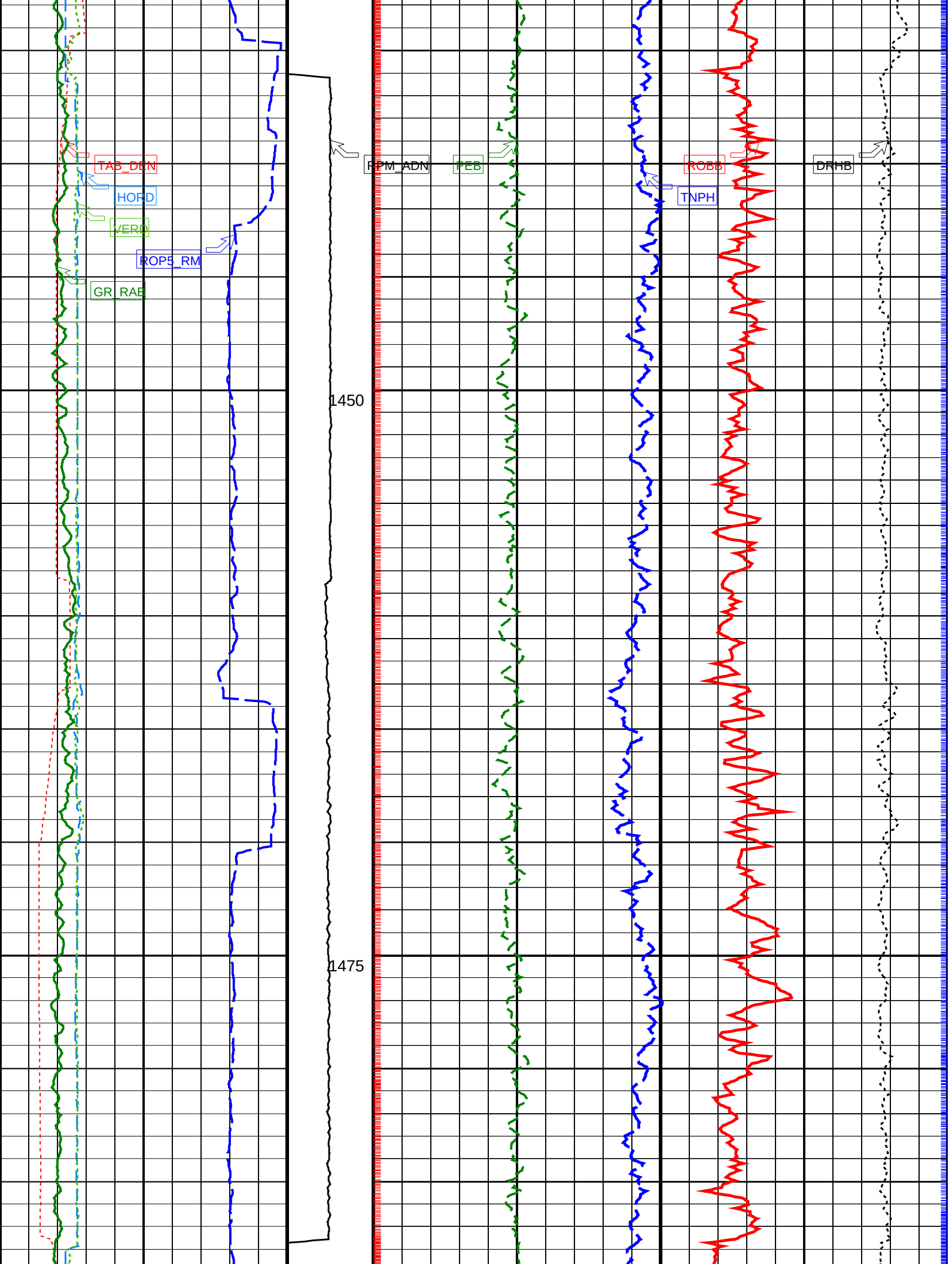
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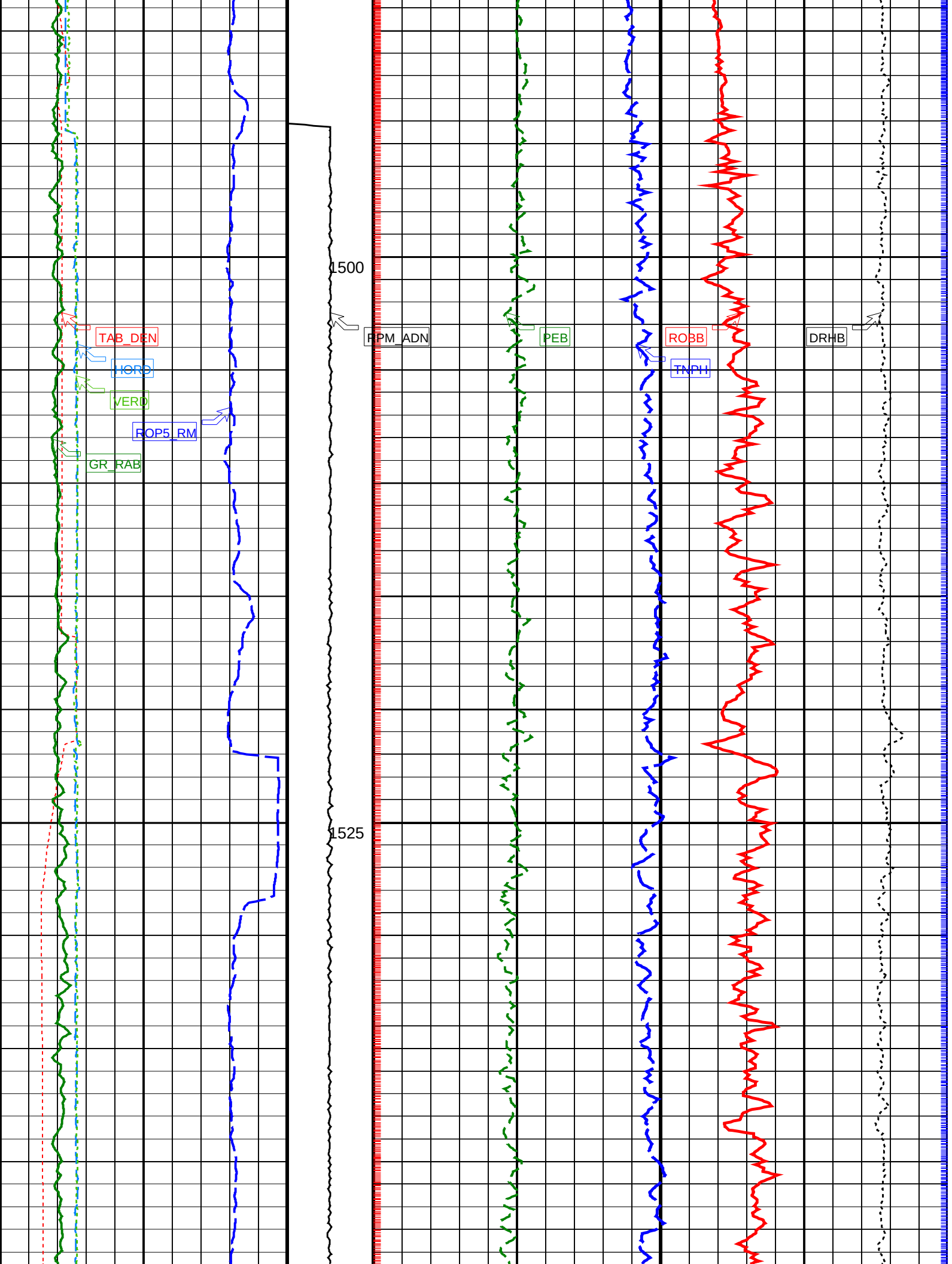
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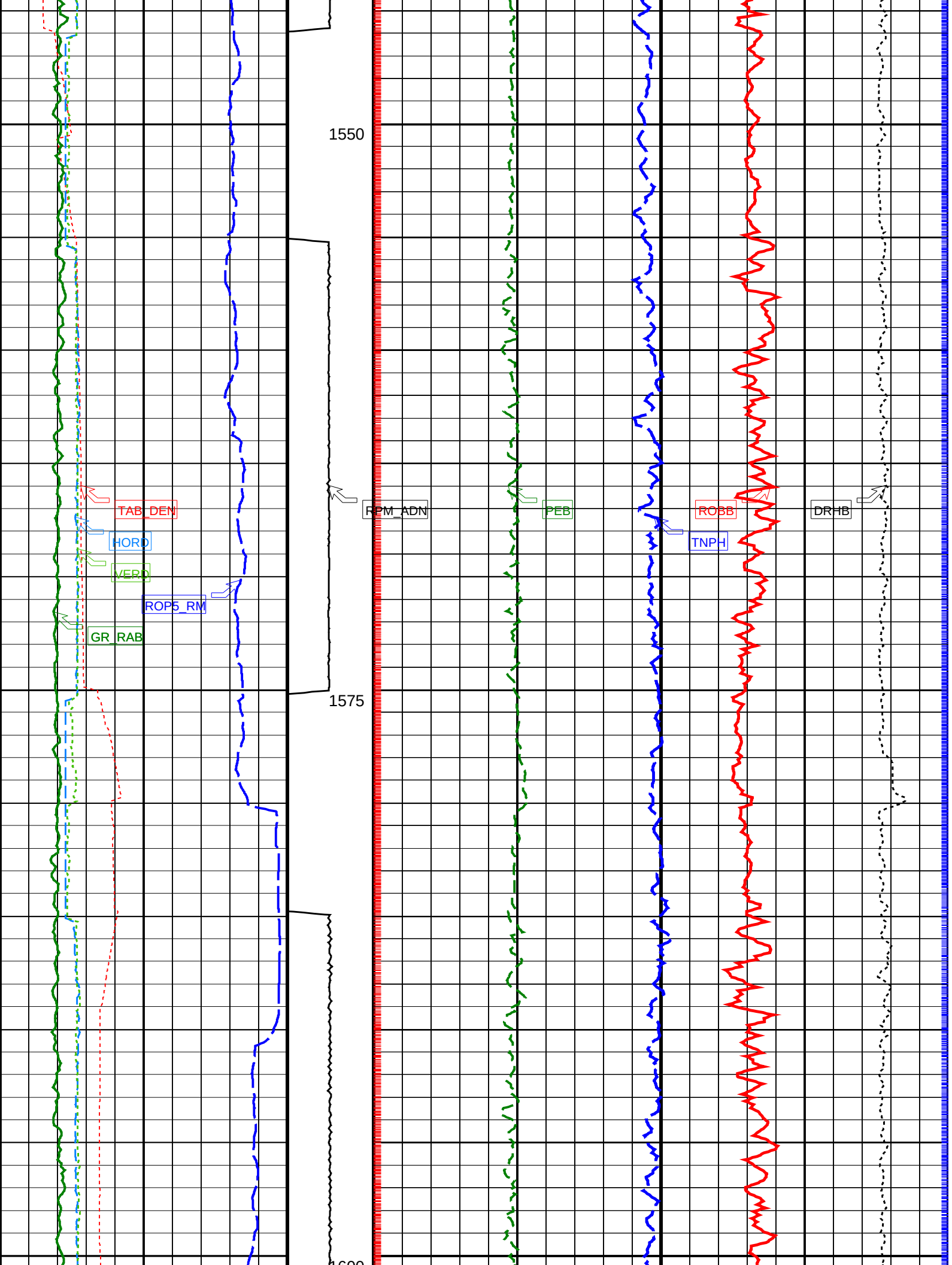
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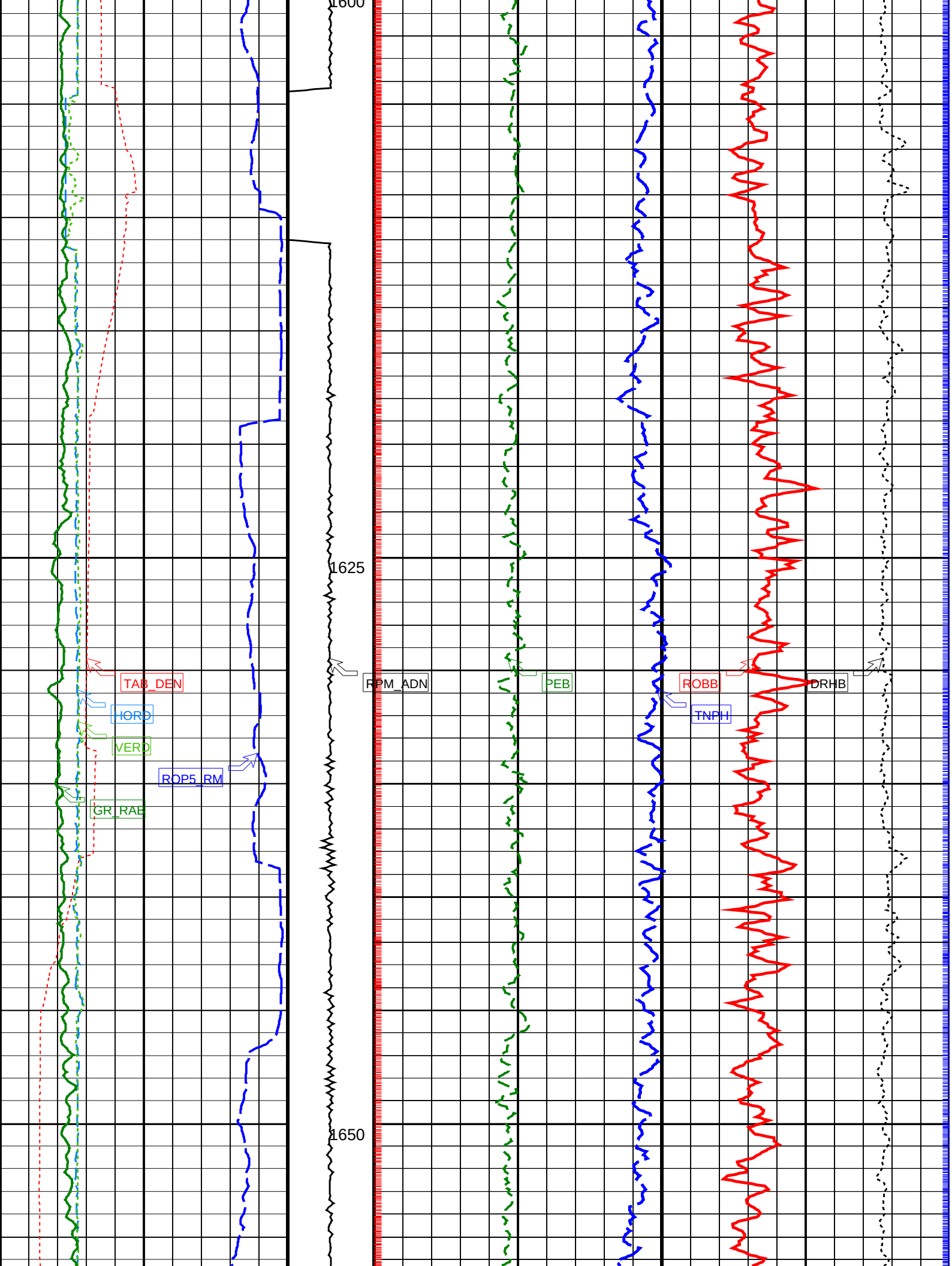
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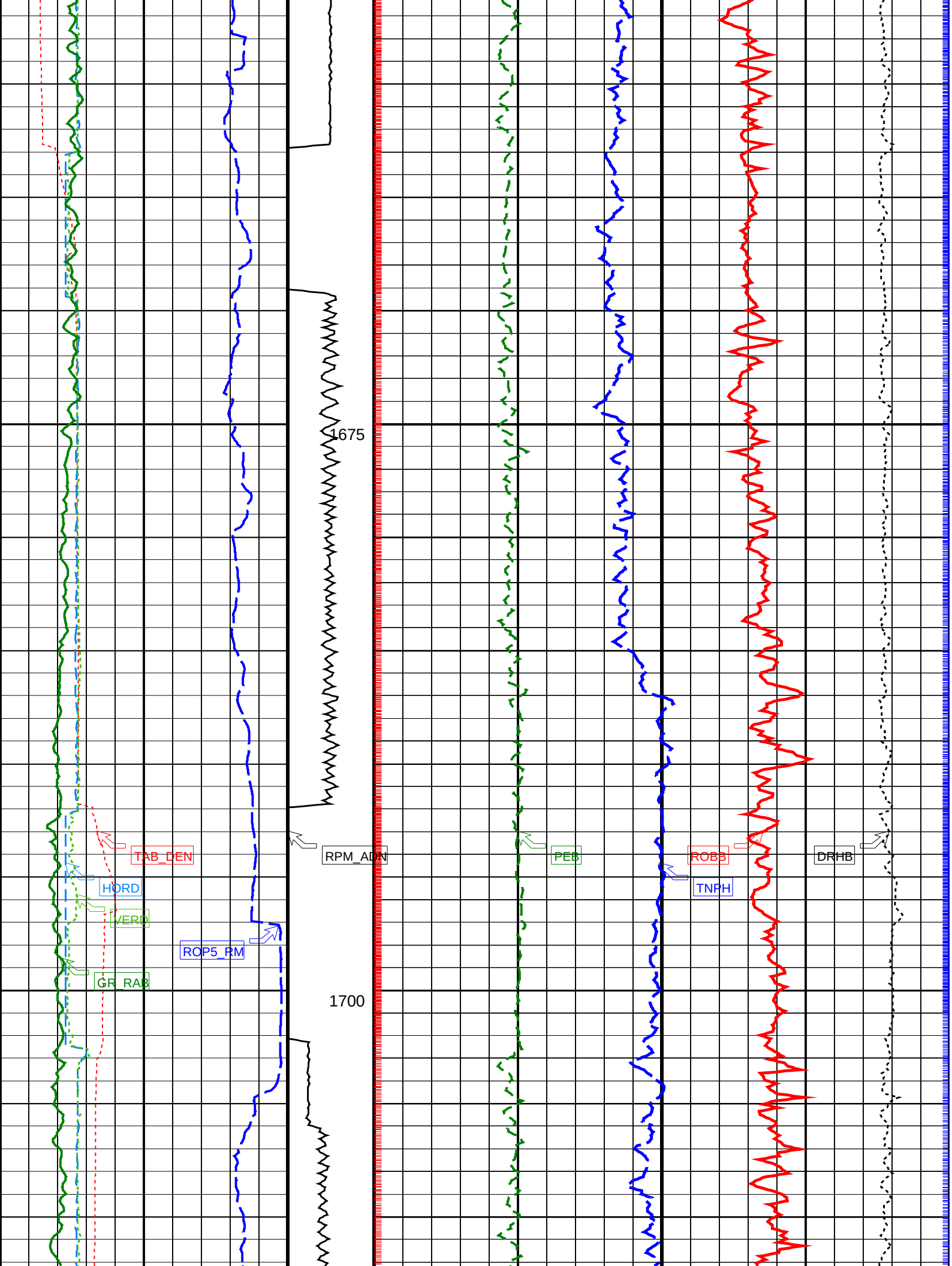
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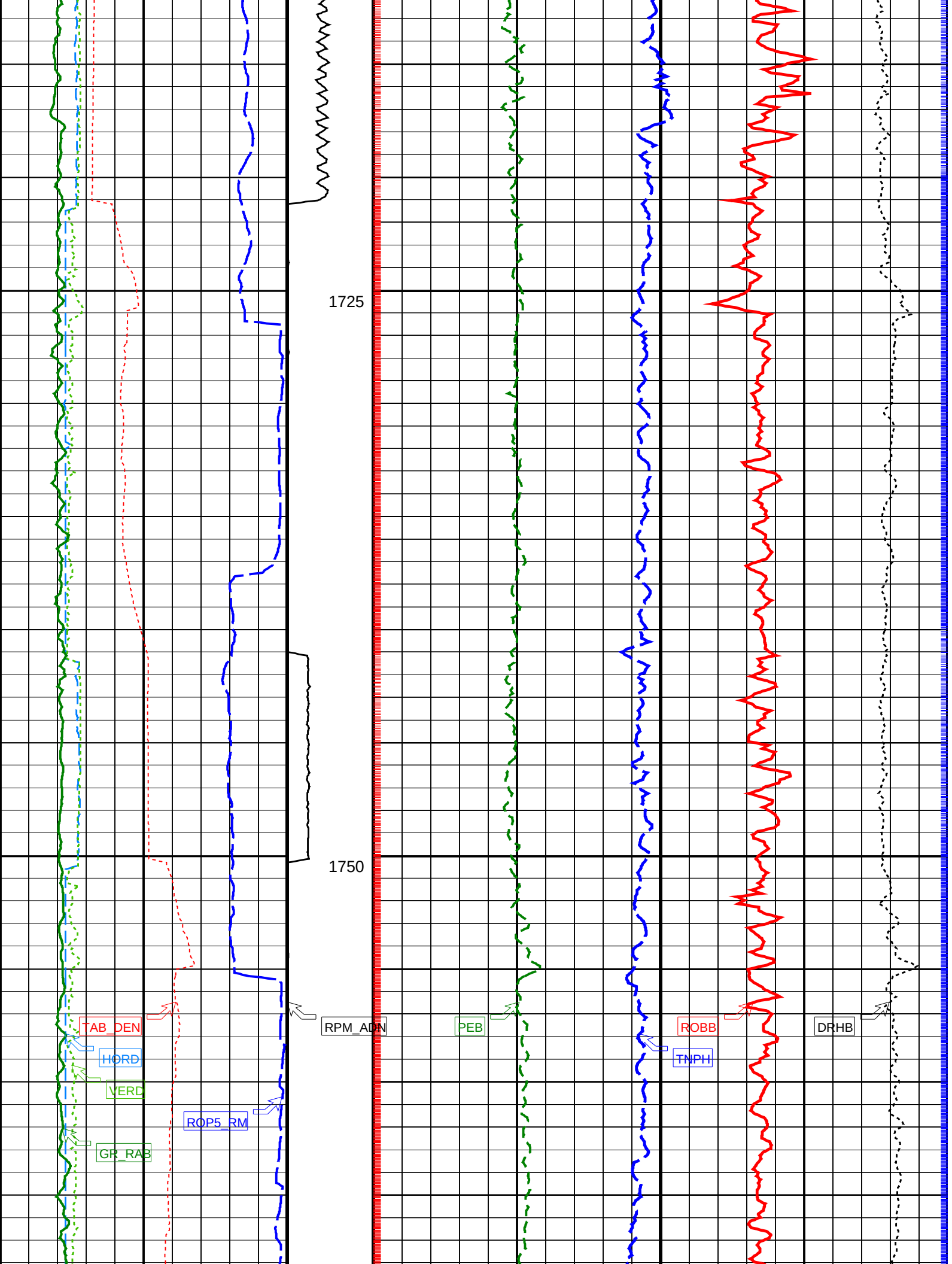
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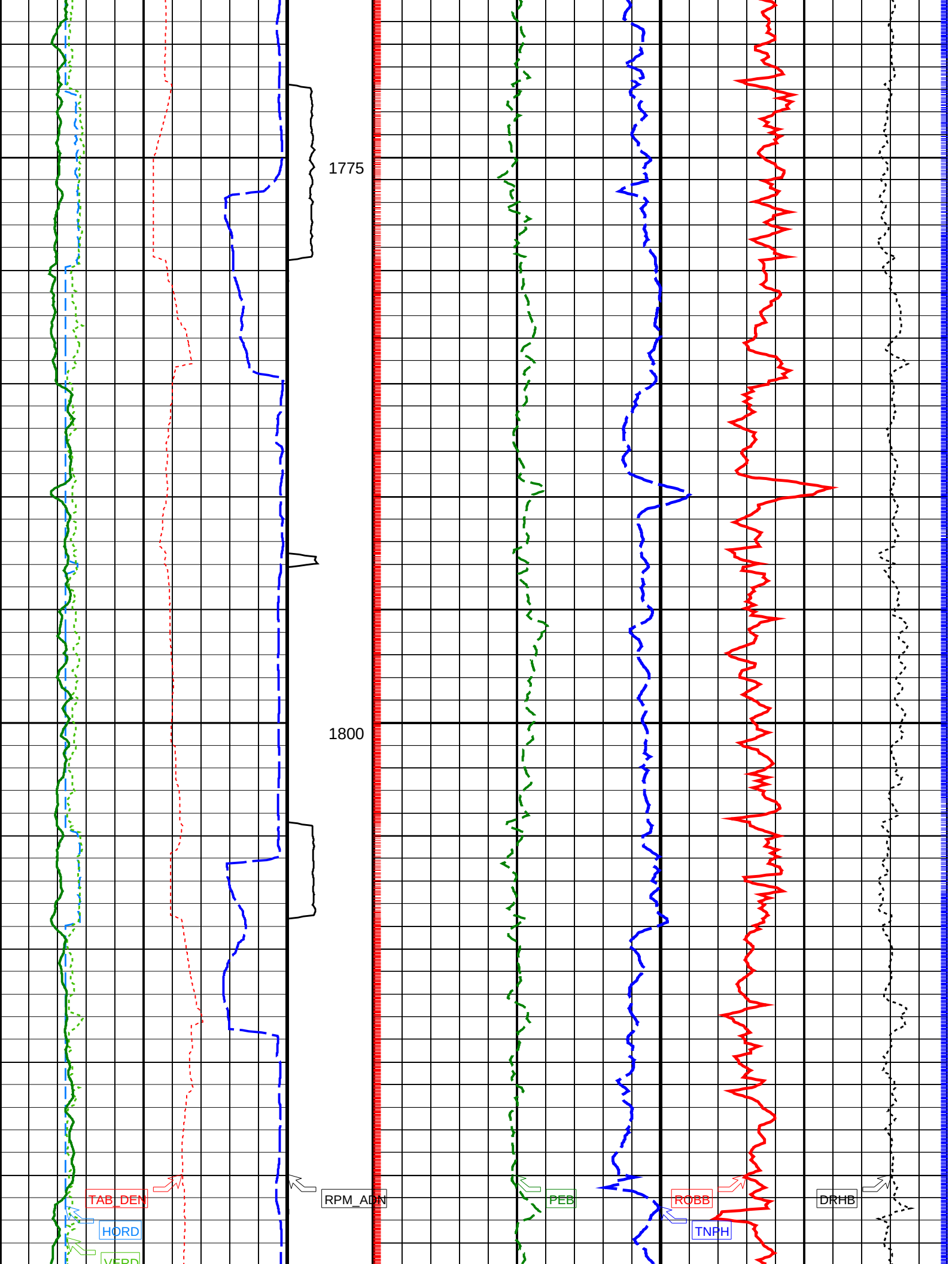
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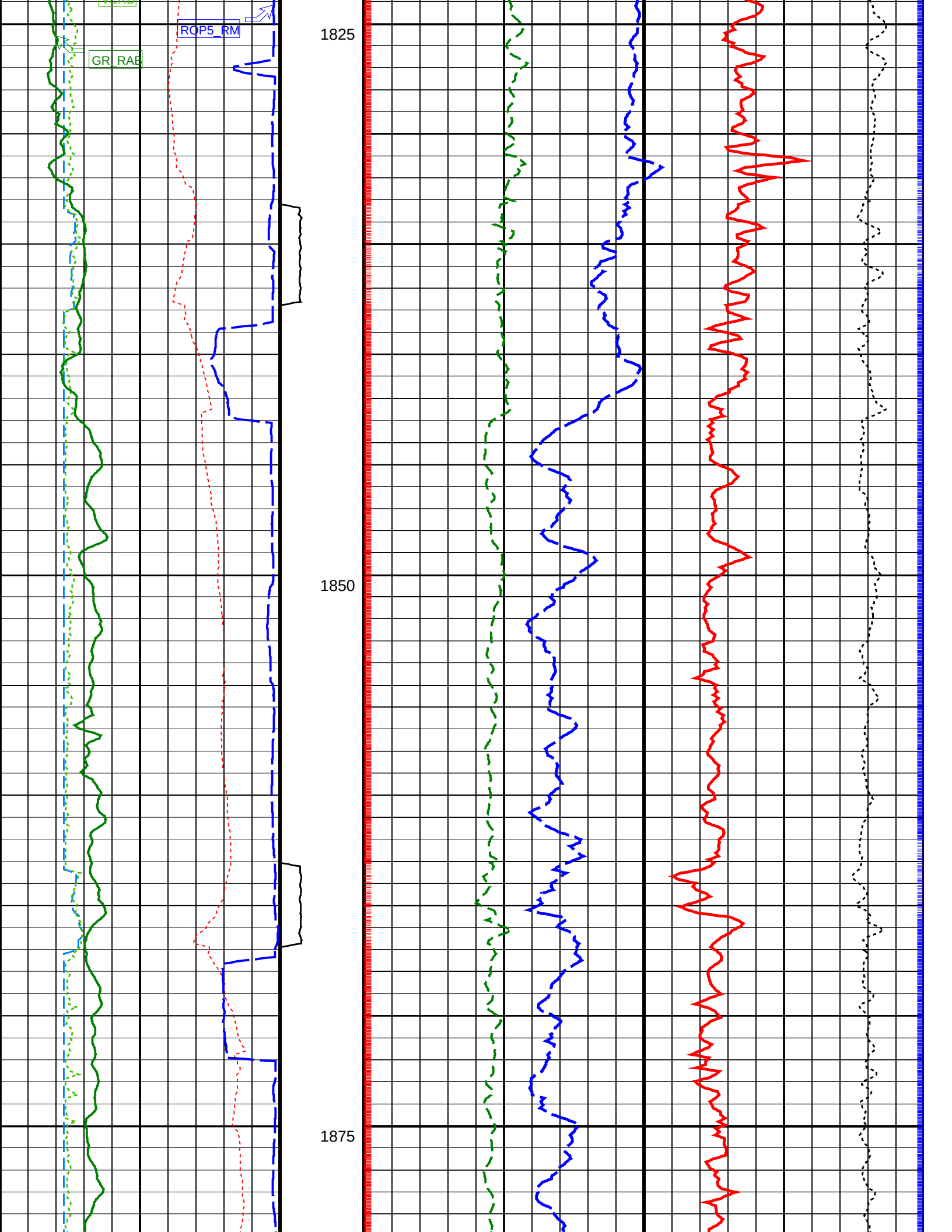
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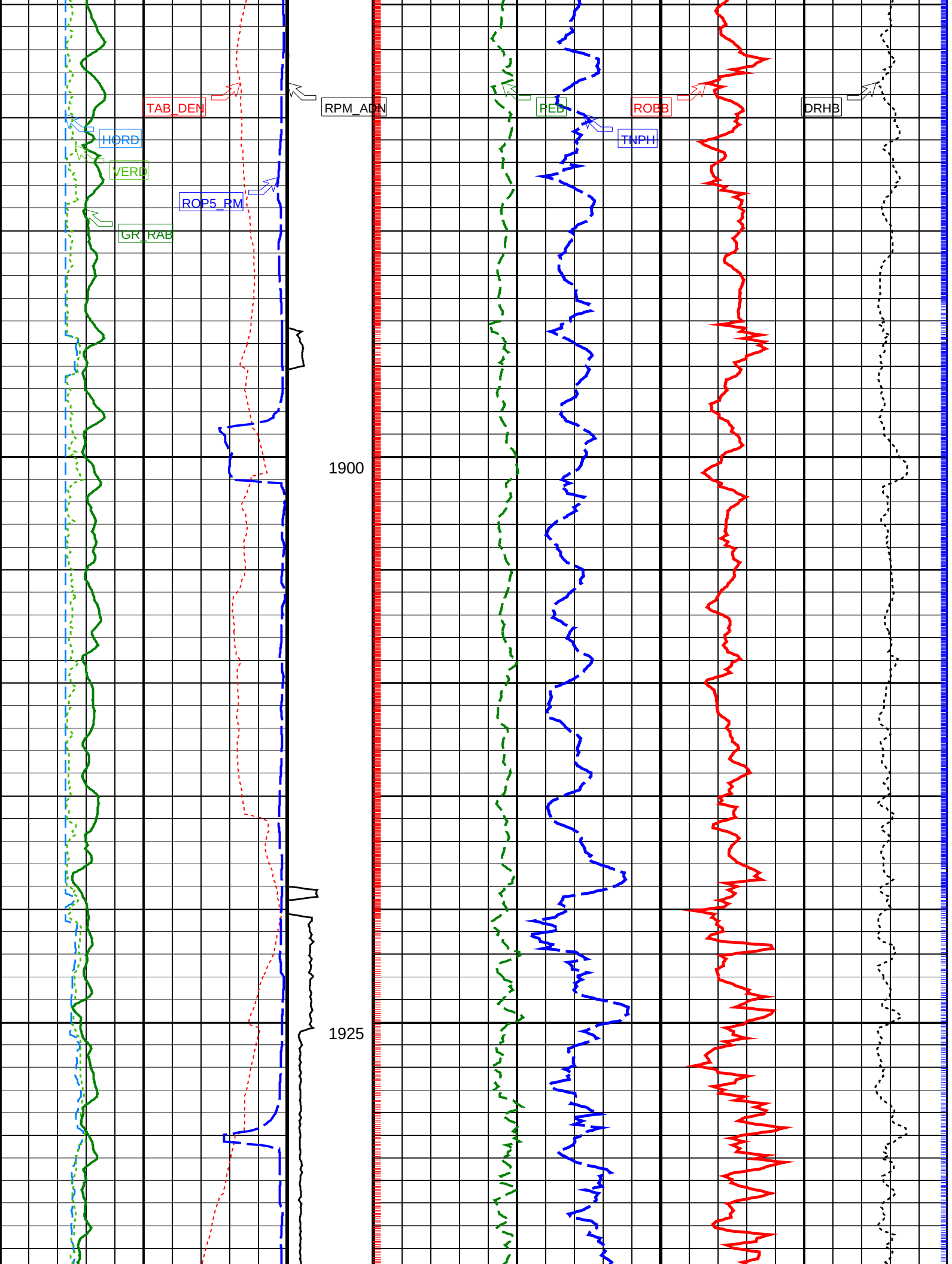
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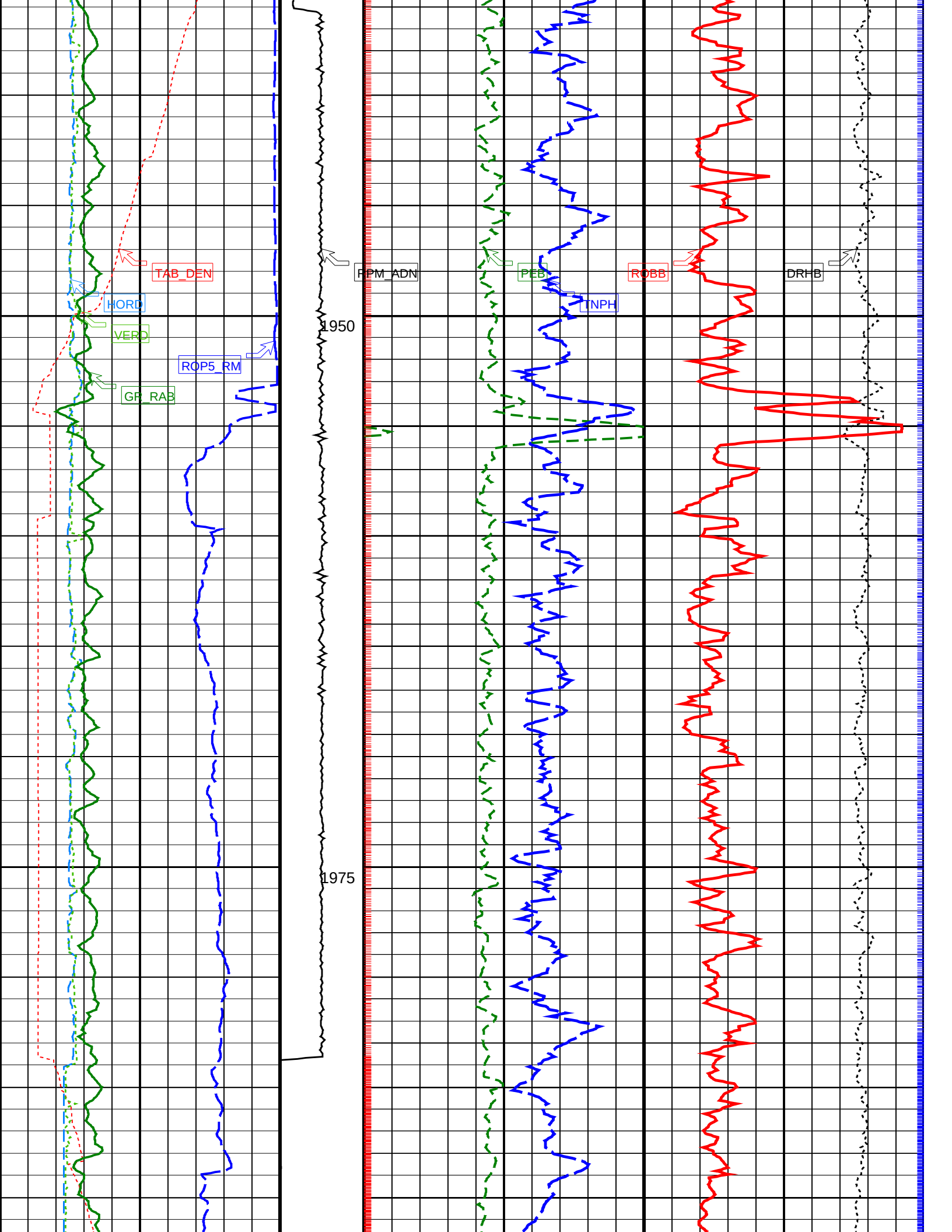
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TNPH
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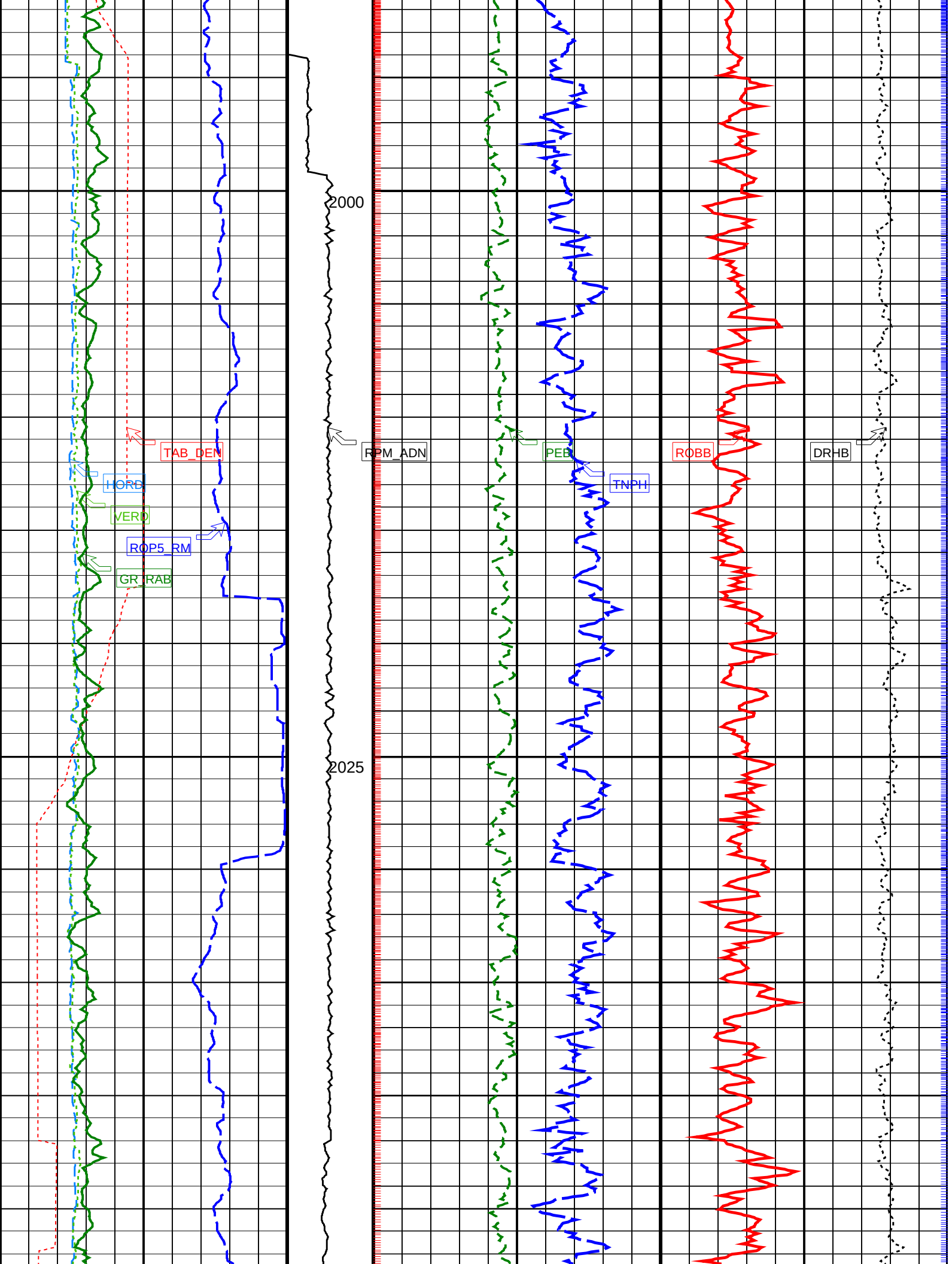
1975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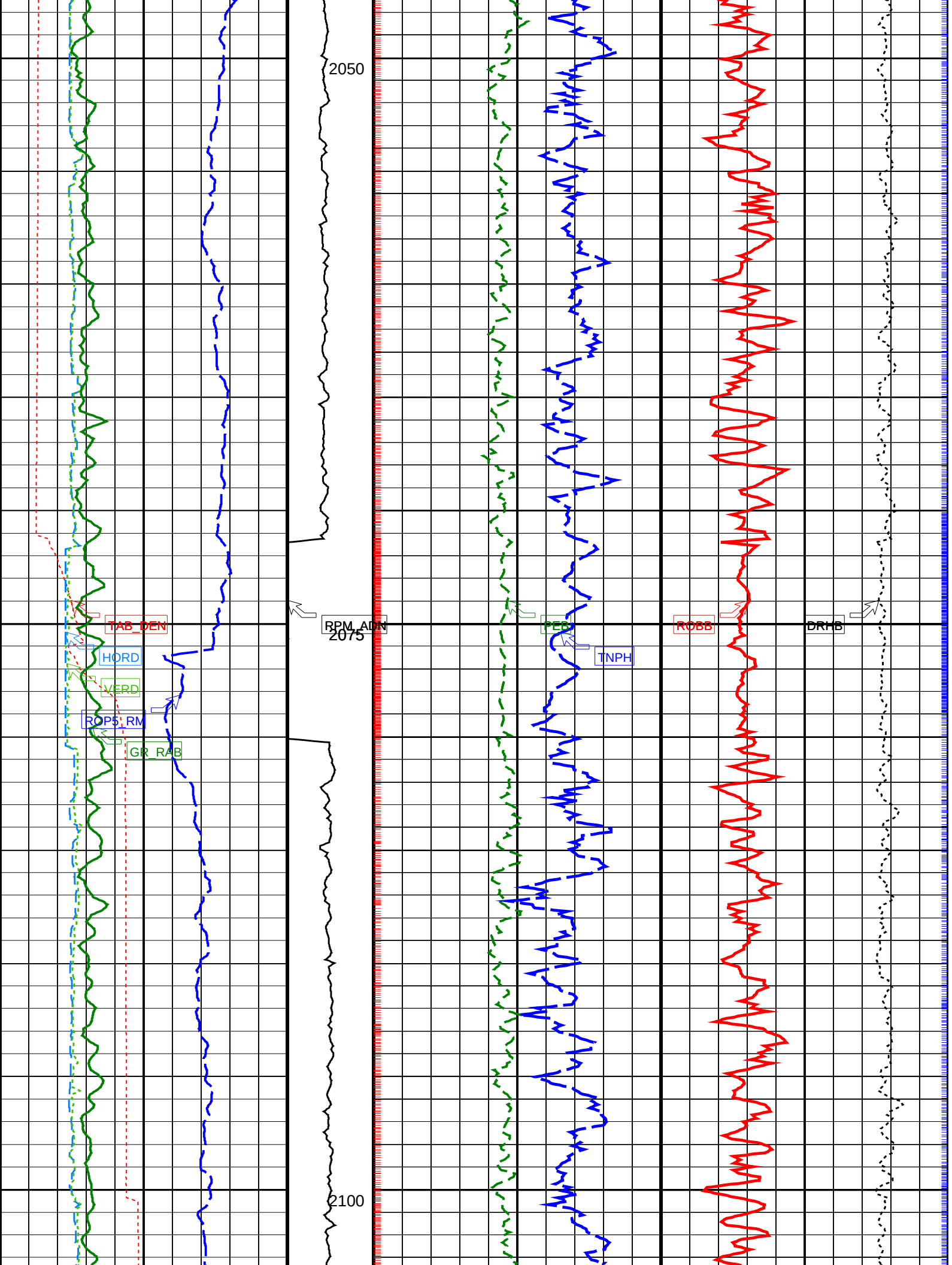
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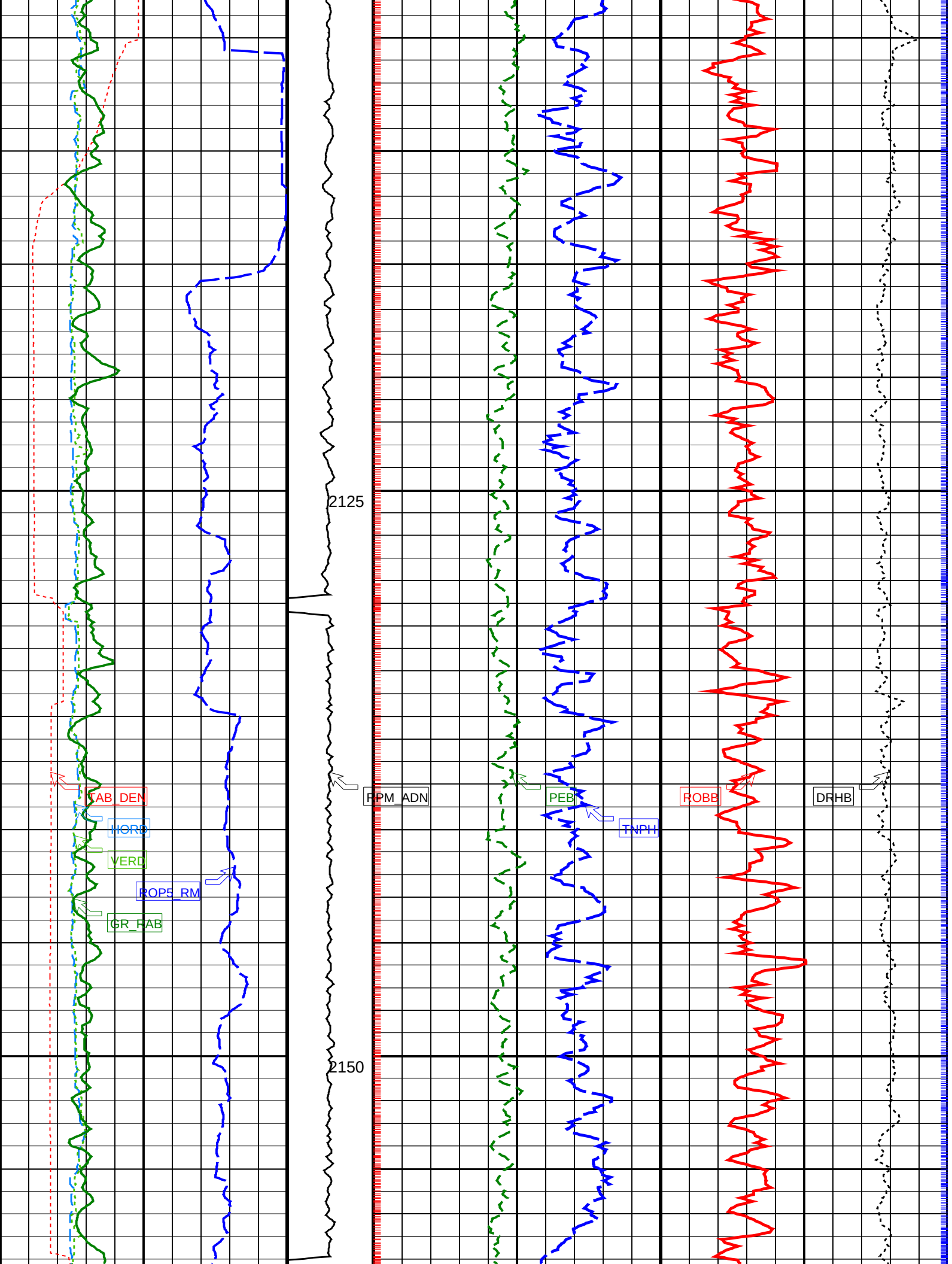
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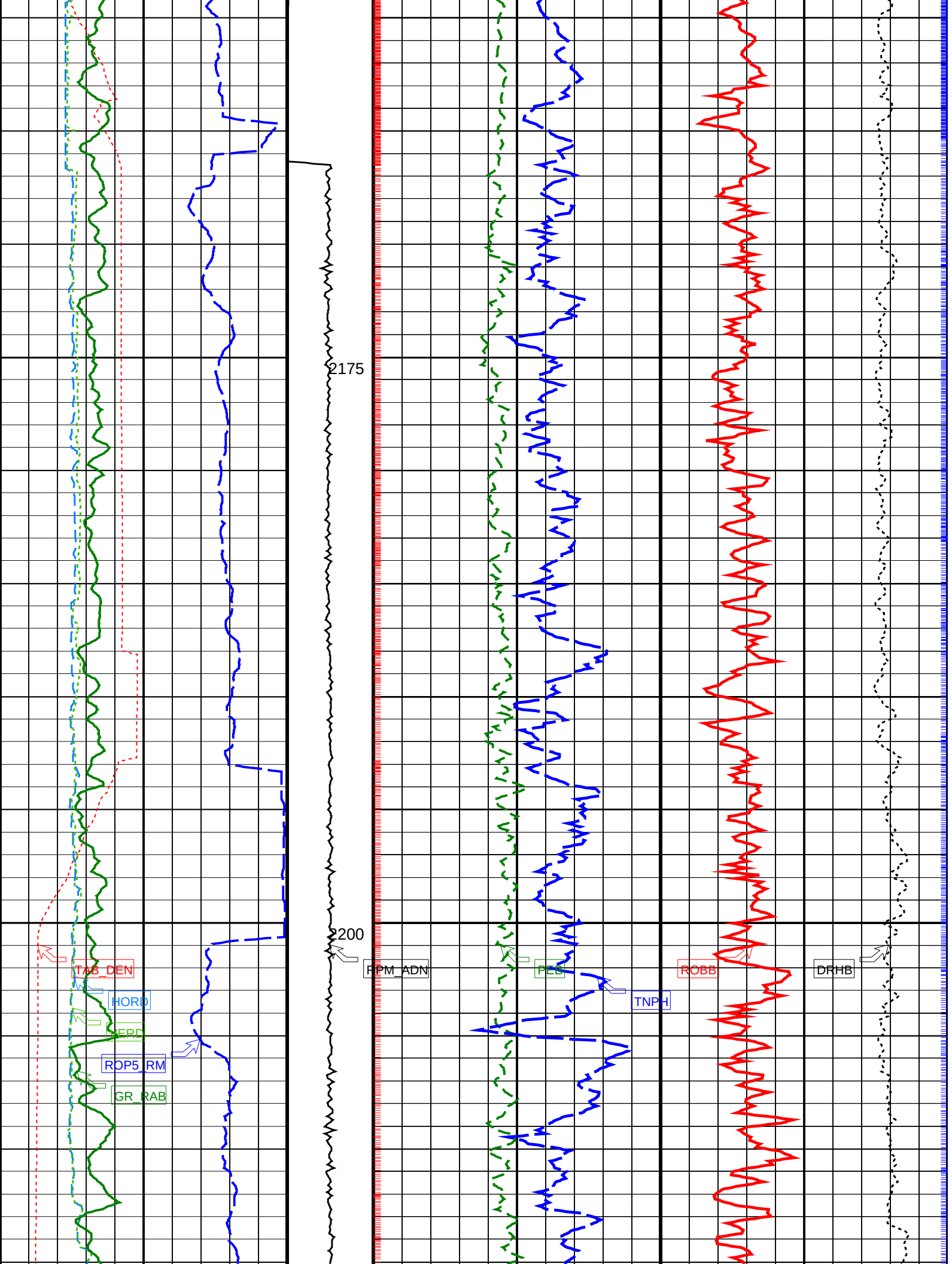
GR_RAB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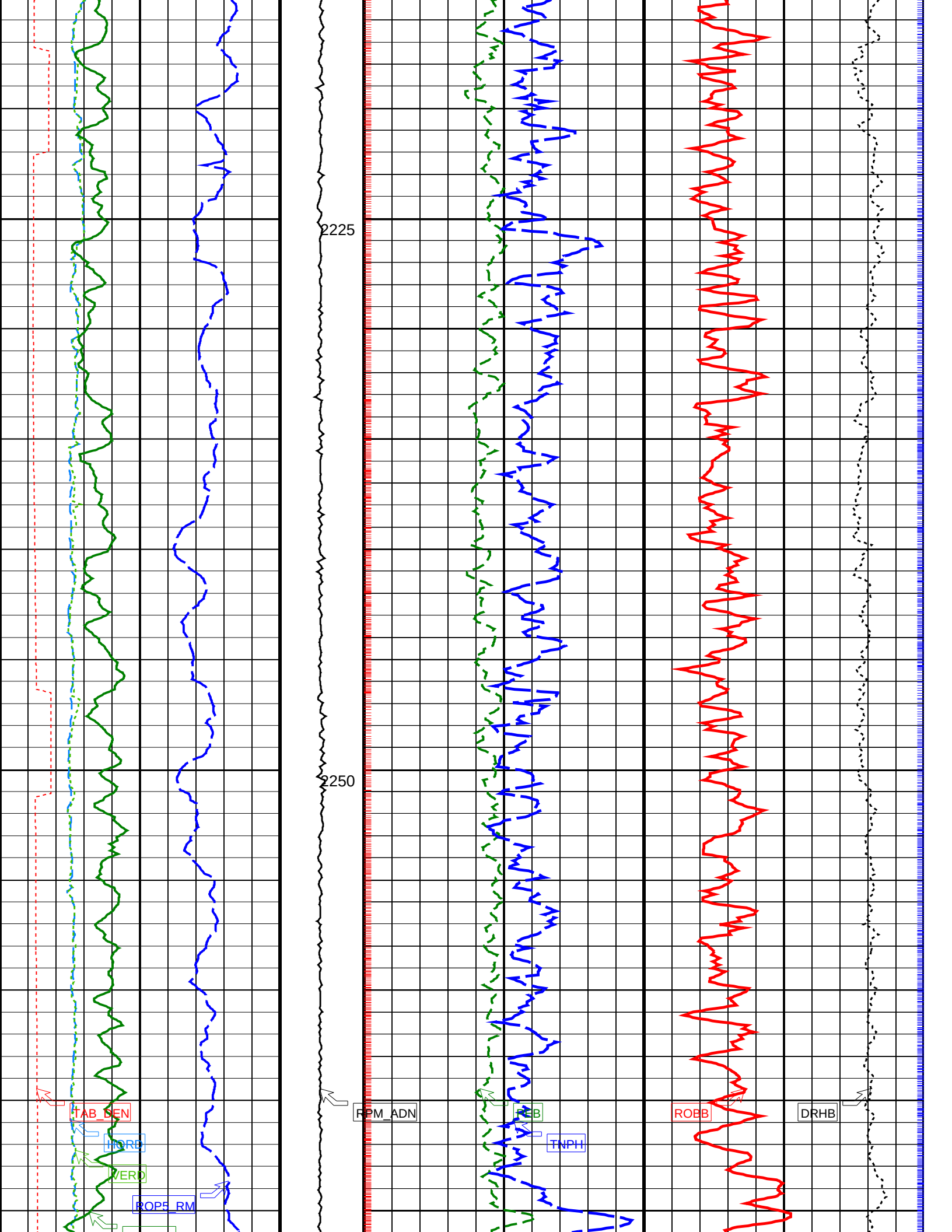
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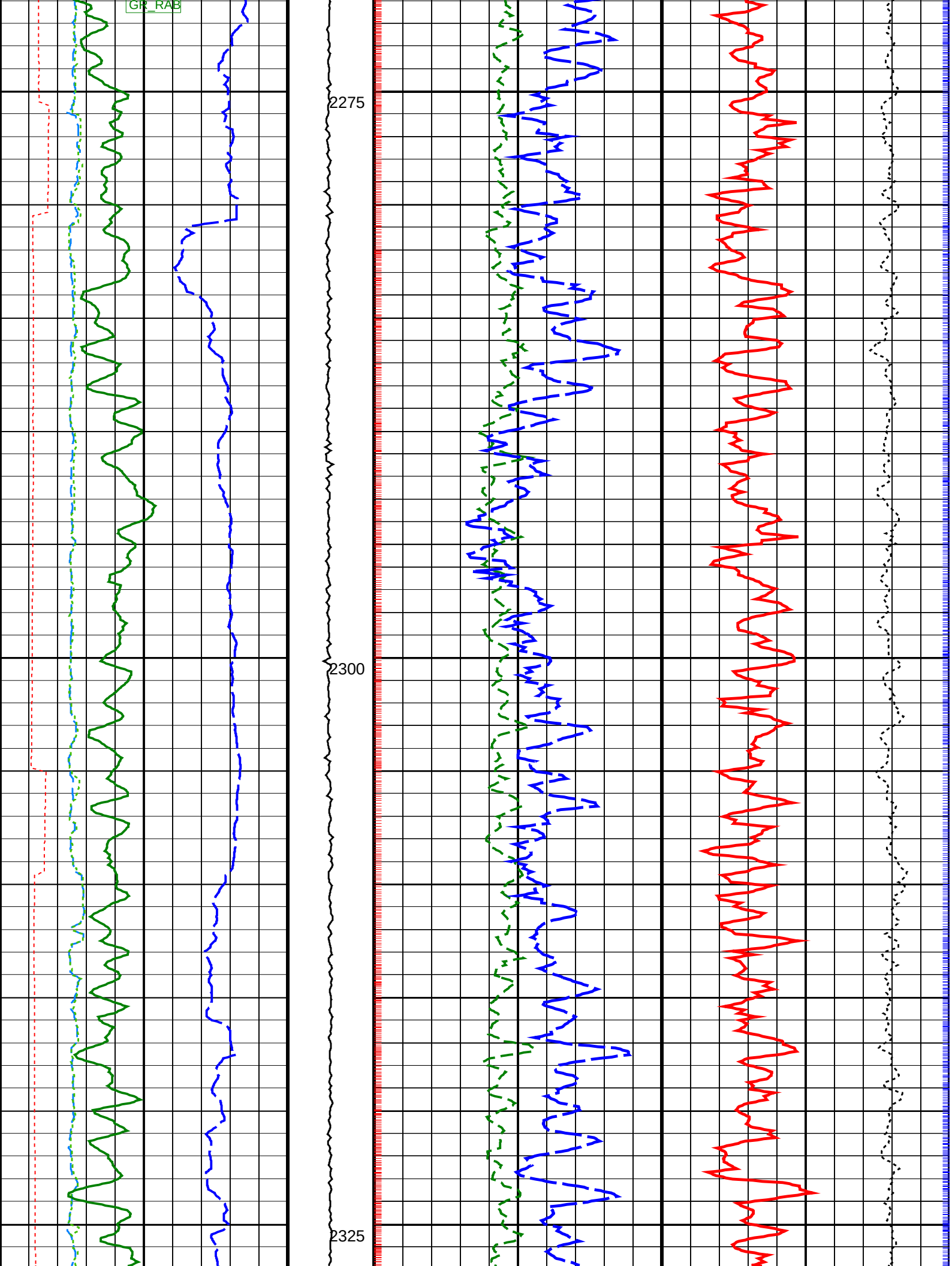
DRHB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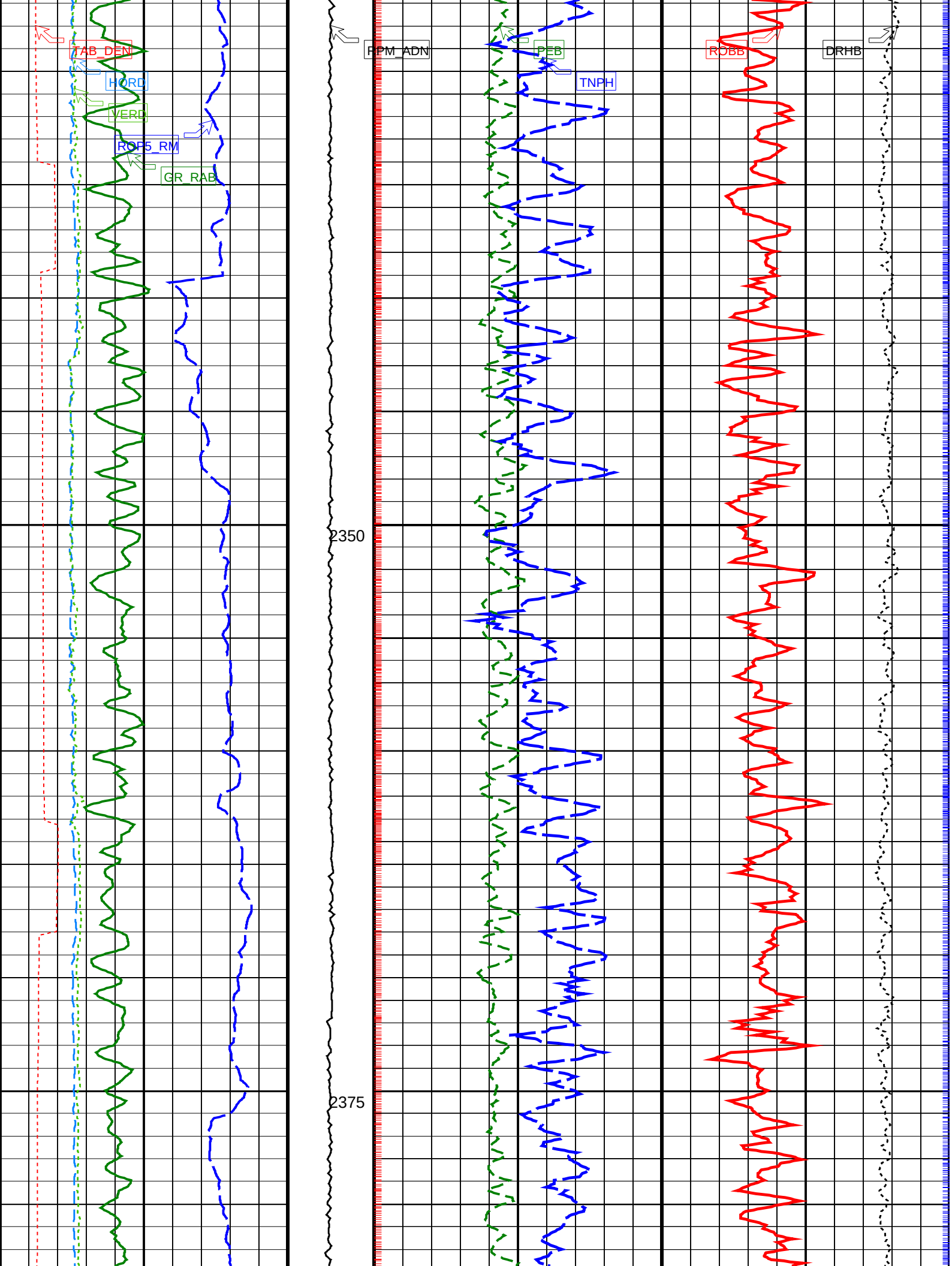
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DRHB
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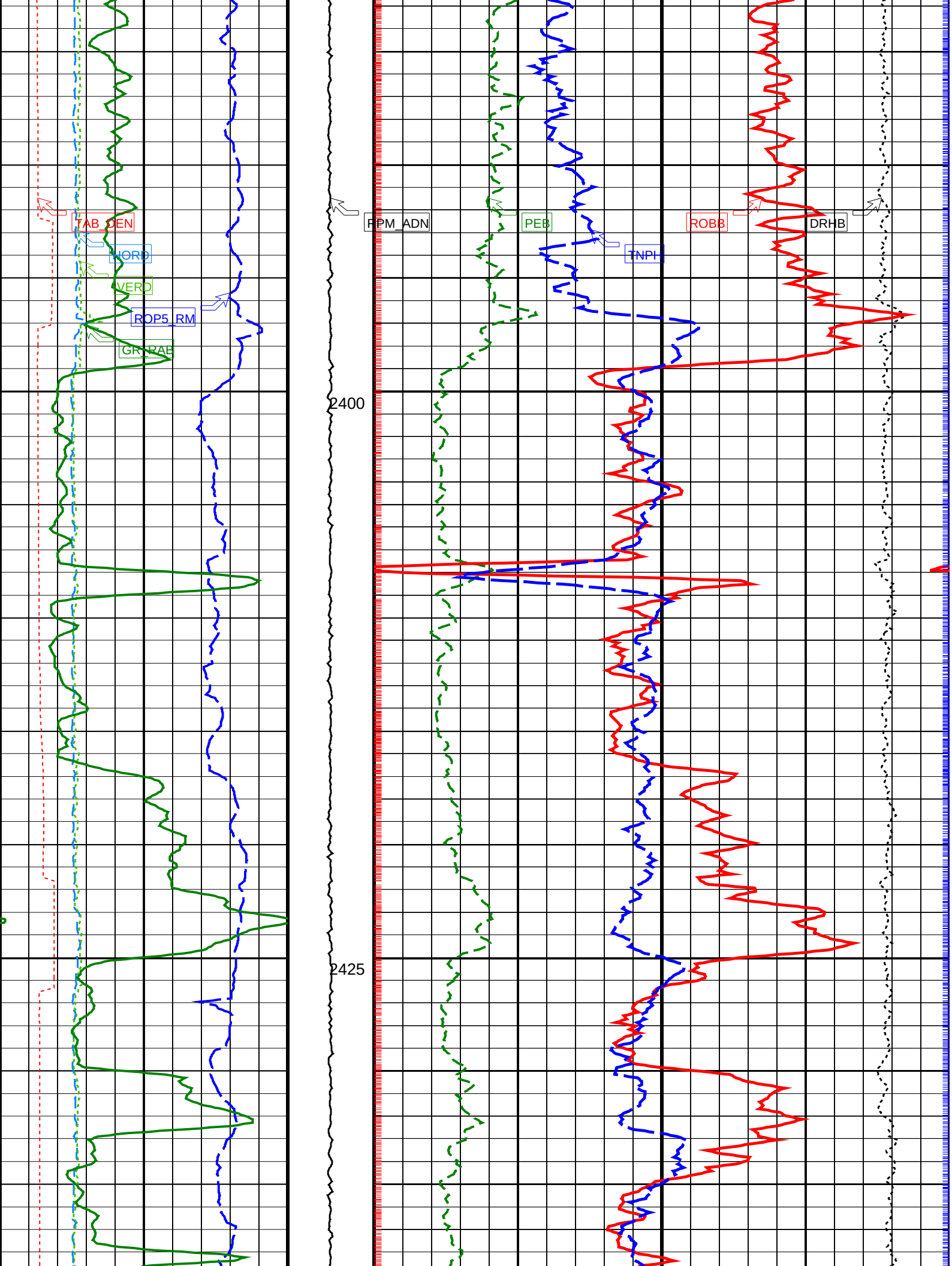
2375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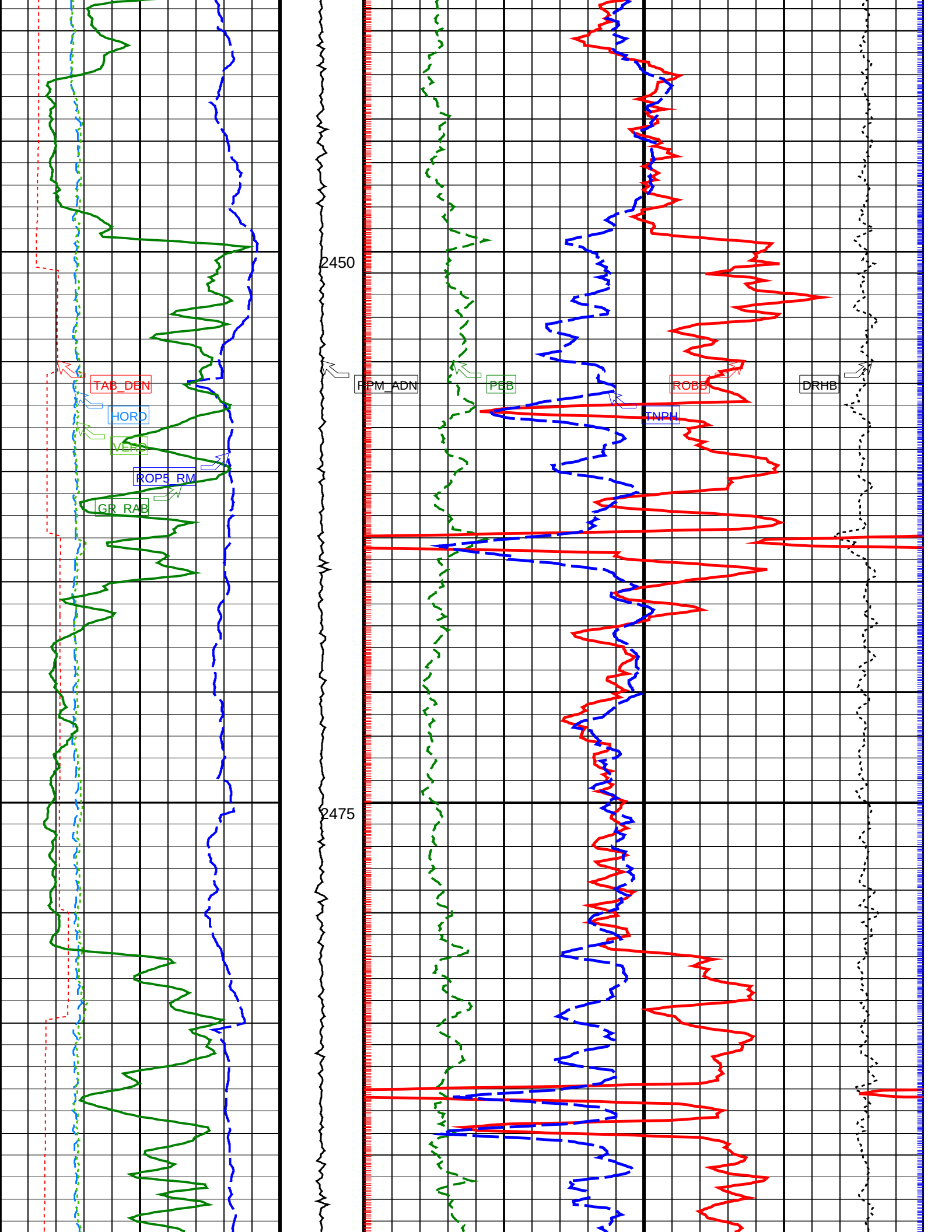
2400
2425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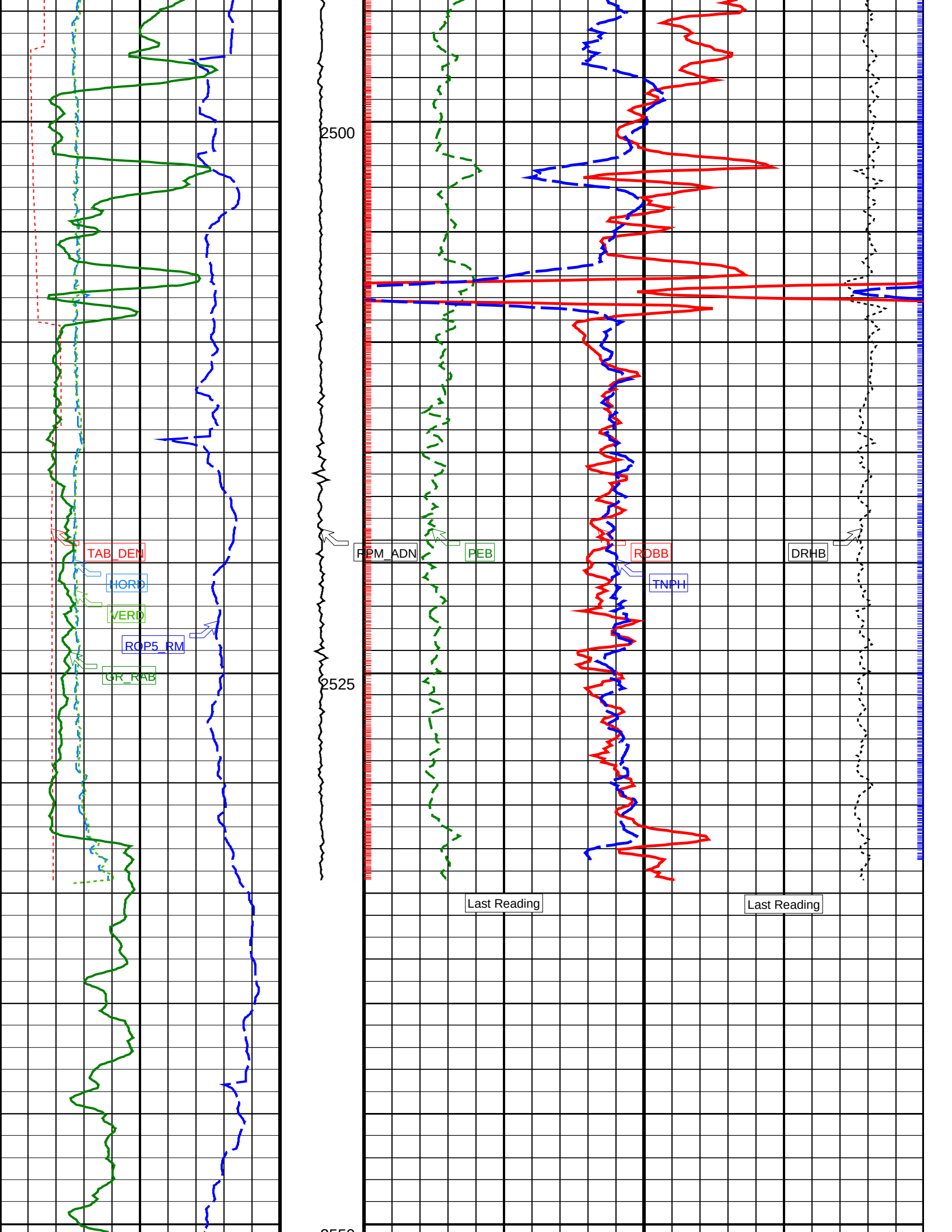
DRHB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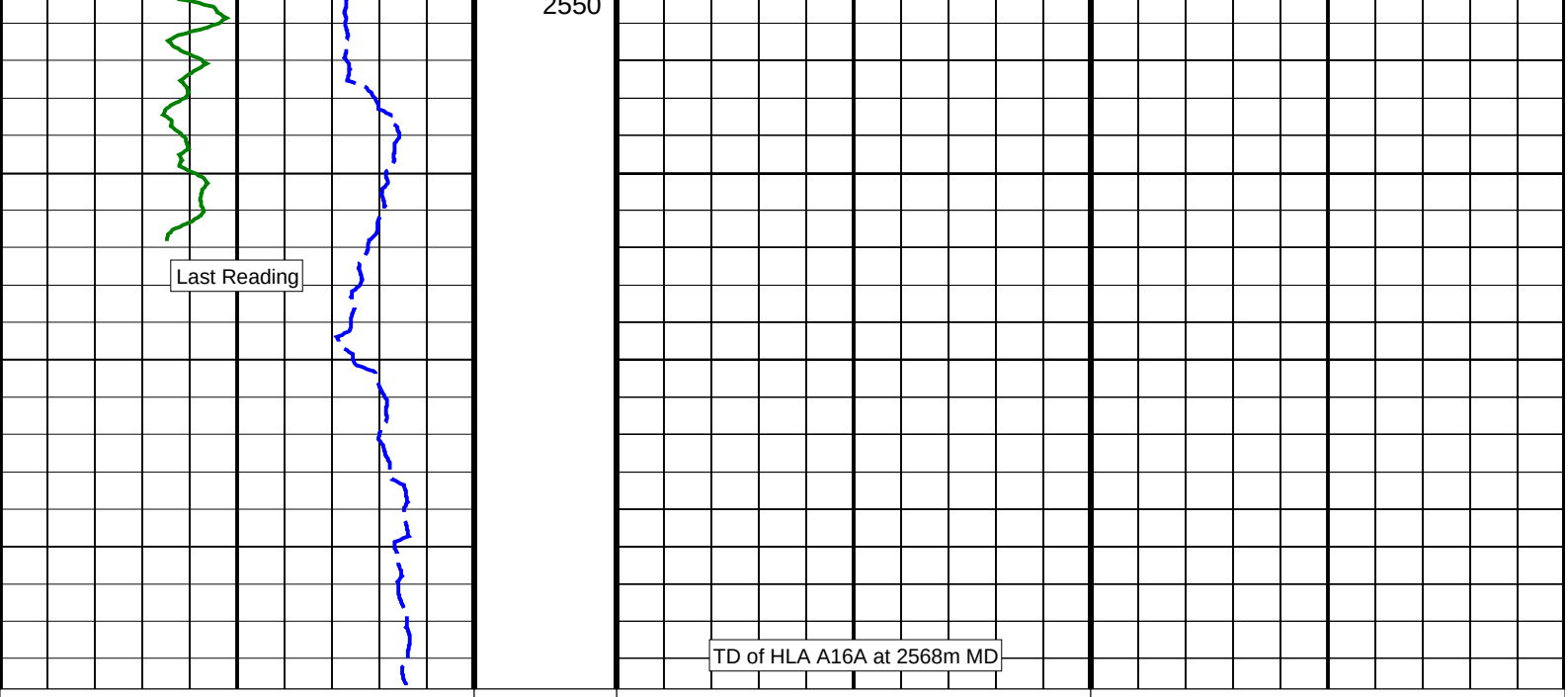
ROBB
TNPH
DRHB
Last Reading
Last Reading



Density Time After Bit (TAB_DEN) 0 (HR) 10	ADN Rotational Speed (RPM_ADN) (RPM) 0 250	Photoelectric Factor, Bottom (PEB) 0 (–––– 10
Bulk Density Correction, Bottom (DRHB) –0.75 (G/C3) 0.25		
Horizontal Hole Diameter (HORD) 6 (IN) 16		Bulk Density, Bottom (ROBB) 1.85 (G/C3) 2.85
Vertical Hole Diameter (VERD) 6 (IN) 16		Thermal Neutron Porosity (TNPH) 45 (PU) –15
RAB Gamma Ray (GR_RAB) 0 (GAPI) 200		
Rate of Penetration, Averaged over Last 5ft (ROP5_RM) 200 (M/HR) 0		

PIP SUMMARY

Neutron Samples

Density Samples

IDEAL Version: ID12_0C_01

IDF

6.75–in. Azimuthal Density Neutron / Equipment Identification

Primary Equipment:		
Tool Name and Serial Number	ADN6 – CA	425
Collar Type and Serial Number	ADDC – AA	AD09
Chassis Type and Serial Number	ADSE – EA	425
Stabilizer Type and Serial Number	–	1
Neutron Logging Source	NSR – M	202
Density Logging Source	GSR – J/Z	1994
Stabilizer Size	8.25 – in.	
Calibration Status	AUTO –	

Master: 28–Feb–2007 23:50

6.75–in. Azimuthal Density Neutron Calibration

Density: Magnesium Block

Phase	LS window 3 – Mg CPS	Value	Phase	SS window 1 – Mg CPS	Value	Phase	SS window 3 – Mg CPS	Value
Master		1005	Master		2496	Master		6180
250.0 (Minimum)	4125 (Nominal)	8000 (Maximum)	700.0 (Minimum)	9350 (Nominal)	18000 (Maximum)	2500 (Minimum)	23750 (Nominal)	45000 (Maximum)

Master: 28–Feb–2007 23:50

6.75−in. Azimuthal Density Neutron Calibration

Density: Aluminum Block

Phase	LS window 3 − Al CPS	Value
Master		149.7
	50.00 (Minimum) 725.0 (Nominal) 1400 (Maximum)	

Phase	SS window 1 − Al CPS	Value
Master		1268
	500.0 (Minimum) 4250 (Nominal) 8000 (Maximum)	

Phase	SS window 3 − Al CPS	Value
Master		3876
	1500 (Minimum) 15750 (Nominal) 30000 (Maximum)	

Master: 28−Feb−2007 23:50

6.75−in. Azimuthal Density Neutron Calibration

Density: Background

Phase	LS window 3 − Background CPS	Value
Master		47.52
	15.00 (Minimum) 82.50 (Nominal) 150.0 (Maximum)	

Phase	SS window 1 − Background CPS	Value
Master		117.5
	40.00 (Minimum) 220.0 (Nominal) 400.0 (Maximum)	

Phase	SS window 3 − Background CPS	Value
Master		523.7
	150.0 (Minimum) 825.0 (Nominal) 1500 (Maximum)	

Master: 28−Feb−2007 23:50

6.75−in. Azimuthal Density Neutron Calibration

Density: Water Block Check

Phase	Long spacing water density G/C3	Value
Master		1.032
	1.024 (Minimum) 1.039 (Nominal) 1.054 (Maximum)	

Phase	Short spacing water density G/C3	Value
Master		1.125
	1.096 (Minimum) 1.126 (Nominal) 1.156 (Maximum)	

Master: 28−Feb−2007 23:50

6.75−in. Azimuthal Density Neutron Calibration

Neutron: 3−Point Calibration

Phase	Far 1 tube 1 Air Point Measure CPS	Value
Master		18.01
	13.30 (Minimum) 19.05 (Nominal) 24.70 (Maximum)	

Phase	Far 1 tube 1 Rod Point Measure CPS	Value
Master		4.535
	3.400 (Minimum) 4.857 (Nominal) 6.200 (Maximum)	

Phase	Far 1 tube 1 H2O Point Measure CPS	Value
Master		2.126
	1.600 (Minimum) 2.363 (Nominal) 3.100 (Maximum)	

Phase	Far 1 tube 2 Air Point Measure CPS	Value
Master		18.34
	13.30 (Minimum) 19.05 (Nominal) 24.70 (Maximum)	

Phase	Far 1 tube 2 Rod Point Measure CPS	Value
Master		4.535
	3.400 (Minimum) 4.857 (Nominal) 6.200 (Maximum)	

Phase	Far 1 tube 2 H2O Point Measure CPS	Value
Master		2.176
	1.600 (Minimum) 2.363 (Nominal) 3.100 (Maximum)	

Phase	Far 1 tube 3 Air Point Measure CPS	Value
Master		17.81
	13.30 (Minimum) 19.05 (Nominal) 24.70 (Maximum)	

Phase	Far 1 tube 3 Rod Point Measure CPS	Value
Master		4.433
	3.400 (Minimum) 4.857 (Nominal) 6.200 (Maximum)	

Phase	Far 1 tube 3 H2O Point Measure CPS	Value
Master		2.125
	1.600 (Minimum) 2.363 (Nominal) 3.100 (Maximum)	

Phase	Far 2 tube 1 Air Point Measure CPS	Value
Master		18.37
	13.30 (Minimum) 19.05 (Nominal) 24.70 (Maximum)	

Phase	Far 2 tube 1 Rod Point Measure CPS	Value
Master		4.728
	3.400 (Minimum) 4.857 (Nominal) 6.200 (Maximum)	

Phase	Far 2 tube 1 H2O Point Measure CPS	Value
Master		2.159
	1.600 (Minimum) 2.363 (Nominal) 3.100 (Maximum)	

Phase	Far 2 tube 2 Air Point Measure CPS	Value
Master		17.76
	13.30 (Minimum) 19.05 (Nominal) 24.70 (Maximum)	

Phase	Far 2 tube 2 Rod Point Measure CPS	Value
Master		4.302
	3.400 (Minimum) 4.857 (Nominal) 6.200 (Maximum)	

Phase	Far 2 tube 2 H2O Point Measure CPS	Value
Master		2.050
	1.600 (Minimum) 2.363 (Nominal) 3.100 (Maximum)	

Phase	Far 2 tube 3 Air Point Measure CPS	Value
Master		17.51
	13.30 (Minimum) 19.05 (Nominal) 24.70 (Maximum)	

Phase	Far 2 tube 3 Rod Point Measure CPS	Value
Master		4.325
	3.400 (Minimum) 4.857 (Nominal) 6.200 (Maximum)	

Phase	Far 2 tube 3 H2O Point Measure CPS	Value
Master		2.167
	1.600 (Minimum) 2.363 (Nominal) 3.100 (Maximum)	

Phase	Near 1 tube 1 Air Point Measure CPS	Value
Master		475.5
	345.0 (Minimum) 487.5 (Nominal) 595.0 (Maximum)	

Phase	Near 1 tube 1 Rod Point Measure CPS	Value
Master		754.1
	535.0 (Minimum) 768.8 (Nominal) 925.0 (Maximum)	

Phase	Near 1 tube 1 H2O Point Measure CPS	Value
Master		330.0
	230.0 (Minimum) 343.7 (Nominal) 430.0 (Maximum)	

Phase	Near 2 tube 1 Air Point Measure CPS	Value
Master		465.6
	345.0 (Minimum) 487.5 (Nominal) 595.0 (Maximum)	

Phase	Near 2 tube 1 Rod Point Measure CPS	Value
Master		734.5
	535.0 (Minimum) 768.8 (Nominal) 925.0 (Maximum)	

Phase	Near 2 tube 1 H2O Point Measure CPS	Value
Master		316.1
	230.0 (Minimum) 343.7 (Nominal) 430.0 (Maximum)	

Master: 28−Feb−2007 23:50

6.75−in. Azimuthal Density Neutron Calibration

Neutron: Water Block Check

Phase	Far Neutron water porosity PU	Value
Master		98.45

90.00 (Minimum)	100.0 (Nominal)	125.0 (Maximum)

6.75−in. Resistivity At−the−Bit / Equipment Identification

Primary Equipment:

Tool Name and Serial Number	RAB6 − CA	223
Calibration Status	RAB6 − DC	41380

Master: 1−Mar−2007 8:22

6.75−in. Resistivity At−the−Bit Calibration

Resistivity: Fixture

Phase	Ring/T1 factor ----	Value
Master		0.9978
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	Ring/T2 factor ----	Value
Master		0.9996
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	M0/T1 factor ----	Value
Master		0.9888
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	M0/T2 factor ----	Value
Master		0.9900
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	M2/T1 factor ----	Value
Master		0.9906
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	M2/T2 factor ----	Value
Master		0.9913
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	BTN shallow/T1 factor ----	Value
Master		0.9958
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	BTN shallow/T2 factor ----	Value
Master		0.9970
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	BTN medium/T1 factor ----	Value
Master		0.9956
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	BTN medium/T2 factor ----	Value
Master		0.9967
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	BTN deep/T1 factor ----	Value
Master		0.9988
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Phase	BTN deep/T2 factor ----	Value
Master		1.000
0.9750 (Minimum)	1.000 (Nominal)	1.025 (Maximum)

Master: Calibration date not found

6.75−in. Resistivity At−the−Bit Calibration

Gamma Ray: Blanket

Phase	Gamma ray factor ----	Value
Master		1.065
0.7500 (Minimum)	1.000 (Nominal)	1.250 (Maximum)

SCHLUMBERGER

Survey report 13−Mar−2007 08:43:49 Page 1 of 4

Client.....: Esso Australia Pty. Ltd.
Field.....: Halibut

Well.....: HLA A16A
Service number.....: 07ASQ0001
Engineer.....: R. Borjas, C.Skiba, A. Kohli

Rig:.....: ISDL 453
State:.....: Victoria

----- Survey calculation methods----------
Method for positions.....: Minimum curvature
Method for DLS.....: Mason & Taylor

----- Depth reference ----------
Permanent datum.....: Mean Sea Level
Depth reference.....: Driller's Depth
GL above permanent.....: -73.46 m
KB above permanent.....: Top Drive
DF above permanent.....: 29.45 m

----- Vertical section origin----------
Latitude (+N/S-).....: -4.93 m
Departure (+E/W-).....: 22.42 m

Azimuth from Vsect Origin to target: 349.86 degrees

Spud date.....: 6-Mar-07
Last survey date.....: 13-Mar-07
Total accepted surveys...: 67
MD of first survey.....: 548.00 m
MD of last survey.....: 2568.00 m

----- Geomagnetic data ----------
Magnetic model.....: BGGM version 2006
Magnetic date.....: 04-Mar-2007
Magnetic field strength..: 1199.26 HCNT
Magnetic dec (+E/W-).....: 13.23 degrees
Magnetic dip.....: -68.86 degrees

----- MWD survey Reference Criteria ---------
Reference G.....: 1000.04 mGal
Reference H.....: 1199.26 HCNT
Reference Dip.....: -68.86 degrees
Tolerance of G.....: (+/-) 2.50 mGal
Tolerance of H.....: (+/-) 6.00 HCNT
Tolerance of Dip.....: (+/-) 0.45 degrees

----- Corrections ----------
Magnetic dec (+E/W-).....: 13.23 degrees
Grid convergence (+E/W-).: -0.82 degrees
Total az corr (+E/W-)....: 14.05 degrees
(Total az corr = magnetic dec - grid conv)
Survey Correction Type ...:
I=Sag Corrected Inclination

M=Schlumberger Magnetic Correction
S=Shell Magnetic Correction
F=Failed Axis Correction
R=Magnetic Resonance Tool Correction
D=Dmag Magnetic Correction

Seq #	Measured depth (m)	Incl angle (deg)	Azimuth angle (deg)	Course length (m)	TVD depth (m)	Vertical section (m)	Displ +N/S- (m)	Displ +E/W- (m)	Total displ (m)	At Azim (deg)	DLS (deg/ 100f)	Srvy tool type	Tool Corr (deg)
1	548.00	0.94	337.08	0.00	547.49	13.21	7.90	19.13	20.70	67.56	0.00	TIP	None
2	656.32	10.57	84.32	108.32	655.21	13.30	9.71	28.70	30.30	71.31	3.06	MWD	None
3	685.87	14.32	81.21	29.55	684.06	13.01	10.53	35.01	36.56	73.25	3.93	MWD	None
4	744.08	17.37	73.57	58.21	740.06	13.79	14.09	50.46	52.39	74.40	1.93	MWD	None
5	772.79	17.62	65.58	28.71	767.44	15.33	17.10	58.53	60.98	73.71	2.56	MWD	None
6	801.94	16.58	55.50	29.15	795.31	18.13	21.28	65.98	69.33	72.12	3.28	MWD	None
7	831.30	15.60	40.08	29.36	823.53	22.39	26.68	71.98	76.76	69.66	4.54	MWD	None
8	860.62	15.15	21.95	29.32	851.82	28.16	33.25	75.95	82.91	66.35	5.00	MWD	None
9	889.74	15.19	3.66	29.12	879.94	35.10	40.59	77.62	87.59	62.39	4.99	MWD	None
10	919.16	14.67	346.80	29.42	908.38	42.56	48.07	77.01	90.78	58.03	4.52	MWD	None
11	948.16	15.00	327.62	29.00	936.43	49.71	54.82	74.16	92.22	53.53	5.15	MWD	None
12	977.35	16.46	314.43	29.19	964.54	56.58	60.91	69.18	92.17	48.64	4.02	MWD	None
13	1006.69	17.00	311.99	29.34	992.63	63.35	66.69	63.03	91.76	43.38	0.92	MWD	None
14	1036.13	17.37	307.55	29.44	1020.76	70.00	72.24	56.34	91.62	37.95	1.41	MWD	None
15	1065.33	18.29	306.81	29.20	1048.56	76.57	77.65	49.22	91.93	32.37	0.99	MWD	None
16	1094.18	19.18	307.46	28.85	1075.88	83.38	83.24	41.83	93.16	26.68	0.97	MWD	None
17	1123.54	18.98	307.33	29.36	1103.63	90.46	89.07	34.21	95.41	21.01	0.21	MWD	None
18	1152.75	19.85	306.31	29.21	1131.18	97.55	94.89	26.43	98.50	15.57	0.97	MWD	None
19	1181.80	19.61	306.41	29.05	1158.52	104.66	100.70	18.54	102.39	10.43	0.25	MWD	None
20	1210.82	19.25	306.51	29.02	1185.89	111.68	106.44	10.77	106.98	5.78	0.38	MWD	None
21	1240.00	19.93	306.94	29.18	1213.38	118.82	112.29	2.93	112.33	1.49	0.73	MWD	None
22	1269.33	19.36	307.22	29.33	1241.00	126.05	118.23	-4.94	118.34	357.61	0.60	MWD	None
23	1298.55	20.02	307.69	29.22	1268.51	133.32	124.22	-12.75	124.87	354.14	0.71	MWD	None
24	1327.92	19.44	307.77	29.37	1296.16	140.68	130.29	-20.59	131.90	351.02	0.60	MWD	None
25	1356.83	19.95	308.74	28.91	1323.38	147.96	136.32	-28.24	139.22	348.30	0.64	MWD	None
26	1386.04	19.24	308.72	29.21	1350.89	155.34	142.45	-35.88	146.90	345.86	0.74	MWD	None
27	1415.27	19.39	308.30	29.23	1378.48	162.60	148.47	-43.45	154.70	343.69	0.21	MWD	None
28	1444.21	19.41	308.06	28.94	1405.78	169.78	154.41	-51.01	162.62	341.72	0.09	MWD	None
29	1473.38	19.67	307.38	29.17	1433.27	177.01	160.38	-58.72	170.79	339.89	0.36	MWD	None
30	1502.56	19.40	307.48	29.18	1460.77	184.22	166.31	-66.47	179.10	338.21	0.28	MWD	None

Seq #	Measured depth (m)	Incl angle (deg)	Azimuth angle (deg)	Course length (m)	TVD depth (m)	Vertical section (m)	Displ +N/S- (m)	Displ +E/W- (m)	Total displ (m)	At Azim (deg)	DLS (deg/ 100f)	Srvy tool type	Tool Corr (deg)
31	1531.60	19.72	307.18	29.04	1488.13	191.38	172.21	-74.20	187.51	336.69	0.35	MWD	None
32	1561.14	18.65	307.09	29.54	1516.03	198.51	178.07	-81.94	196.02	335.29	1.10	MWD	None
33	1590.33	19.23	308.40	29.19	1543.64	205.54	183.87	-89.43	204.46	334.06	0.75	MWD	None
34	1619.52	19.80	309.76	29.19	1571.15	212.92	190.01	-97.00	213.34	332.96	0.76	MWD	None
35	1648.64	20.19	310.80	29.12	1598.52	220.60	196.45	-104.60	222.56	331.97	0.55	MWD	None
36	1677.99	19.54	310.73	29.35	1626.12	228.34	202.96	-112.15	231.89	331.08	0.68	MWD	None
37	1707.19	19.61	312.18	29.20	1653.63	236.01	209.44	-119.48	241.12	330.30	0.51	MWD	None
38	1736.04	19.50	315.68	28.85	1680.82	243.82	216.14	-126.43	250.40	329.67	1.24	MWD	None
39	1765.24	19.46	320.51	29.20	1708.35	252.09	223.38	-132.93	259.94	329.24	1.68	MWD	None
40	1794.75	19.59	328.46	29.51	1736.17	260.98	231.39	-138.65	269.75	329.07	2.75	MWD	None
41	1823.72	18.91	336.29	28.96	1763.51	270.07	239.83	-143.07	279.26	329.18	2.81	MWD	None
42	1852.64	18.73	346.24	28.93	1790.90	279.26	248.63	-146.06	288.36	329.57	3.38	MWD	None
43	1881.73	18.99	356.48	29.09	1818.44	288.63	257.89	-147.47	297.08	330.24	3.47	MWD	None
44	1911.25	19.90	5.97	29.52	1846.28	298.23	267.69	-147.24	305.51	331.19	3.39	MWD	None
45	1940.24	20.56	15.85	28.99	1873.49	307.55	277.49	-145.33	313.25	332.36	3.65	MWD	None
46	1969.40	20.43	20.15	29.16	1900.81	316.54	287.20	-142.18	320.47	333.66	1.58	MWD	None
47	1998.50	20.09	19.94	29.10	1928.11	325.26	296.67	-138.73	327.50	334.94	0.36	MWD	None
48	2027.99	20.71	21.60	29.49	1955.75	334.07	306.27	-135.08	334.74	336.20	0.88	MWD	None
49	2056.89	20.27	22.08	28.90	1982.82	342.65	315.66	-131.32	341.89	337.41	0.50	MWD	None
50	2086.28	19.74	22.29	29.39	2010.44	351.15	324.97	-127.52	349.10	338.57	0.55	MWD	None
51	2115.81	20.17	21.11	29.53	2038.19	359.71	334.34	-123.80	356.52	339.68	0.61	MWD	None
52	2144.95	19.65	20.95	29.14	2065.59	368.20	343.60	-120.24	364.03	340.71	0.55	MWD	None
53	2173.94	19.08	20.83	28.99	2092.94	376.44	352.58	-116.81	371.43	341.67	0.60	MWD	None
54	2203.27	19.38	21.50	29.33	2120.64	384.69	361.59	-113.32	378.93	342.60	0.39	MWD	None
55	2232.55	18.75	22.03	29.28	2148.31	392.81	370.47	-109.77	386.39	343.50	0.68	MWD	None
56	2261.57	18.25	21.56	29.02	2175.83	400.63	379.02	-106.36	393.66	344.33	0.55	MWD	None
57	2290.92	17.77	21.06	29.35	2203.74	408.37	387.48	-103.06	400.95	345.11	0.52	MWD	None
58	2319.71	17.34	20.41	28.79	2231.19	415.82	395.60	-99.98	408.04	345.82	0.50	MWD	None
59	2348.52	16.83	20.03	28.81	2258.73	423.12	403.54	-97.06	415.05	346.48	0.55	MWD	None
60	2378.11	16.33	19.61	29.59	2287.09	430.44	411.48	-94.19	422.13	347.11	0.53	MWD	None

Seq #	Measured depth (m)	Incl angle (deg)	Azimuth angle (deg)	Course length (m)	TVD depth (m)	Vertical section (m)	Displ +N/S- (m)	Displ +E/W- (m)	Total displ (m)	At Azim (deg)	DLS (deg/ 100f)	Srvy tool type	Tool Corr (deg)

61	2406.95	16.08	19.04	28.84	2314.78	437.45	419.08	-91.53	428.96	347.68	0.31	MWD	None
62	2436.57	16.02	18.94	29.62	2343.25	444.60	426.82	-88.86	435.97	348.24	0.07	MWD	None
63	2465.76	15.72	18.83	29.19	2371.33	451.58	434.37	-86.28	442.86	348.77	0.31	MWD	None
64	2494.86	15.59	18.51	29.10	2399.35	458.46	441.81	-83.77	449.68	349.26	0.16	MWD	None
65	2524.08	15.38	18.63	29.22	2427.51	465.30	449.21	-81.28	456.50	349.74	0.22	MWD	None
66	2549.57	15.54	18.13	25.49	2452.07	471.27	455.66	-79.14	462.48	350.15	0.25	MWD	None
67	2568.00	15.50	18.00	18.43	2469.83	475.62	460.34	-77.61	466.84	350.43	0.09	Proj. to TD	

Company: **Esso Australia Pty. Ltd.**

Schlumberger

Well: **HLA A16A**

Field: **Halibut**

Rig: **ISDL 453**

State: **Victoria**

GeoVISION Density Neutron
1:200 Measured Depth
Recorded Memory