COMPANY: Conoco Phillips Company
WELL: Tebo3−1P
FIELD: Wildcat
County: Arapahoe
State: Colorado
COUNTRY: USA

WELL: Tebo3−1P
FIELD: Wildcat
County: Arapahoe
State: Colorado
COUNTRY: USA

API No: 05−005−07197 Job No.: CCN1−00002

Other Services:
Sonic Scanner
HNGS

LOCATION
Field: NENE Sec. 3, T5S, R64W
SHL: 599' FNL X 400' FEL
Section: 3 Township: 5S Range: 64W
Latitude: 39.650019 Longitude: 104.529994

Permanent Datum: Ground Level Elev: 5875 ft
Log Measured From: Kelly Bushing 24 ft above Perm. Datum
Drilling Measured From: Kelly Bushing

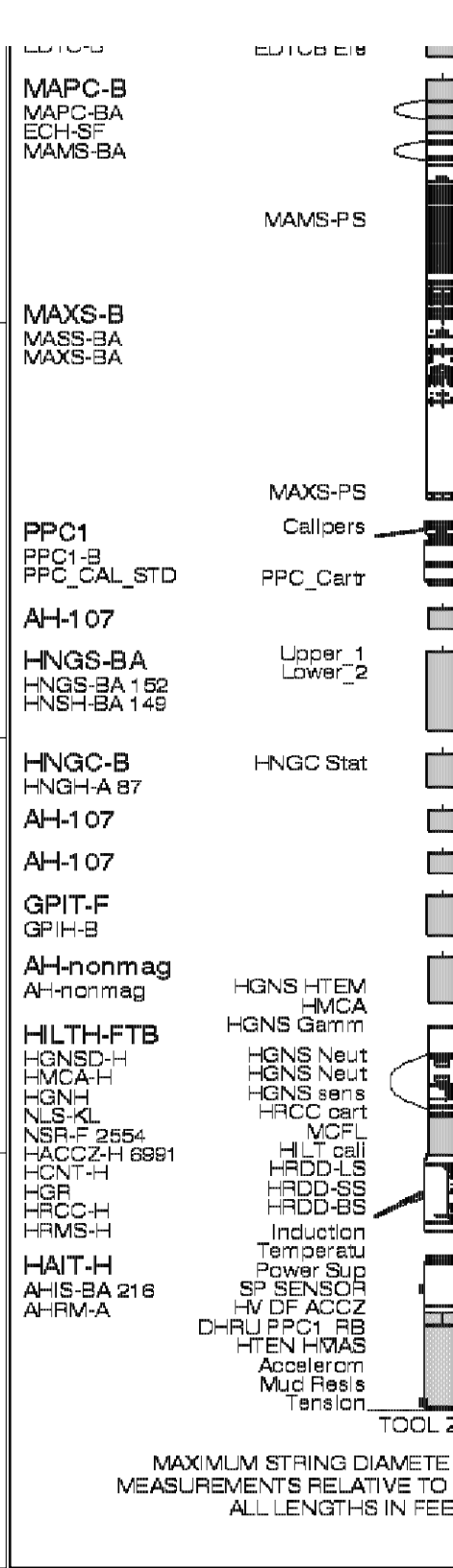
Elevations:
K.B. 5899 ft
D.F. 5898 ft
G.L. 5875 ft

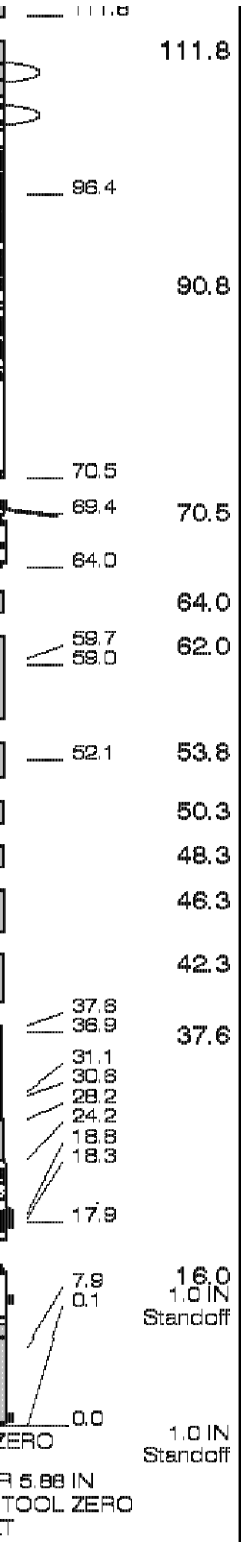
Date		2012/11/20			
Run No.		1			
Depth Driller		7983 ft			
Depth Logger (Schl)		7992 ft			
Btm. Log Interval		7984 ft			
Top Log Interval		2207 ft			
Casing−Driller		7 in @ 2205 ft			
Casing−Logger		−999.25 ft			
Bit Size		8.75 in			
Type fluid in hole		Oil Based Mud			
Dens.	Visc.	9.2 lbm/gal	50 s		
pH	Fluid Loss	−999.25	−999.25 in3		
Source of Sample					
Rm @ Meas. Temp.		−999.25 ohm.m @ −999			
Rmf @ Meas. Temp.		−999.25 ohm.m @ −999			
Rmc @ Meas. Temp.		−999.25 ohm.m @ −999			
Source: Rmf	Rmc				
Rm @ BHT		−999.25 ohm.m @ 213			
Circulation Stopped		6:00			
Logger on Bottom		17:15			
Max. Rec. Temp.		213 degF			
Equip.	Location	3022	Ft. Morgan,		
Recorded by:		Tim Hoffman			
Witnessed by:		Frank Holubec			

FOLD HERE

The well name, location and borehole reference data were furnished by

Center: Denver
Process Date: November 26, 2012
OP Vers.: 19C1−222
Ser. Order # CCN1−00002





it contained good information where the borehole conditions
reprocessing was required to achieve good formation arriva

PROCESSING DETAILS:

DT−Compressional was processed from the monopole wav
DT−Shear was processed from the X−Dipole waveform usi
program. In both cases an intermediate formation type filte
Receiver mode with multishot processing was employed in
Receiver mode with multishot processing was employed on

RESULTS:

DT−Comp.: The monopole waveforms contain good forma
the top of the logged section, the DTCO results are good. T
was labeled following the earliest arrivals found in the Far M

DT−Shear: The dipole waveforms contain good formation a
lowest possible frequency.

s were good. Otherwise, some
ls.

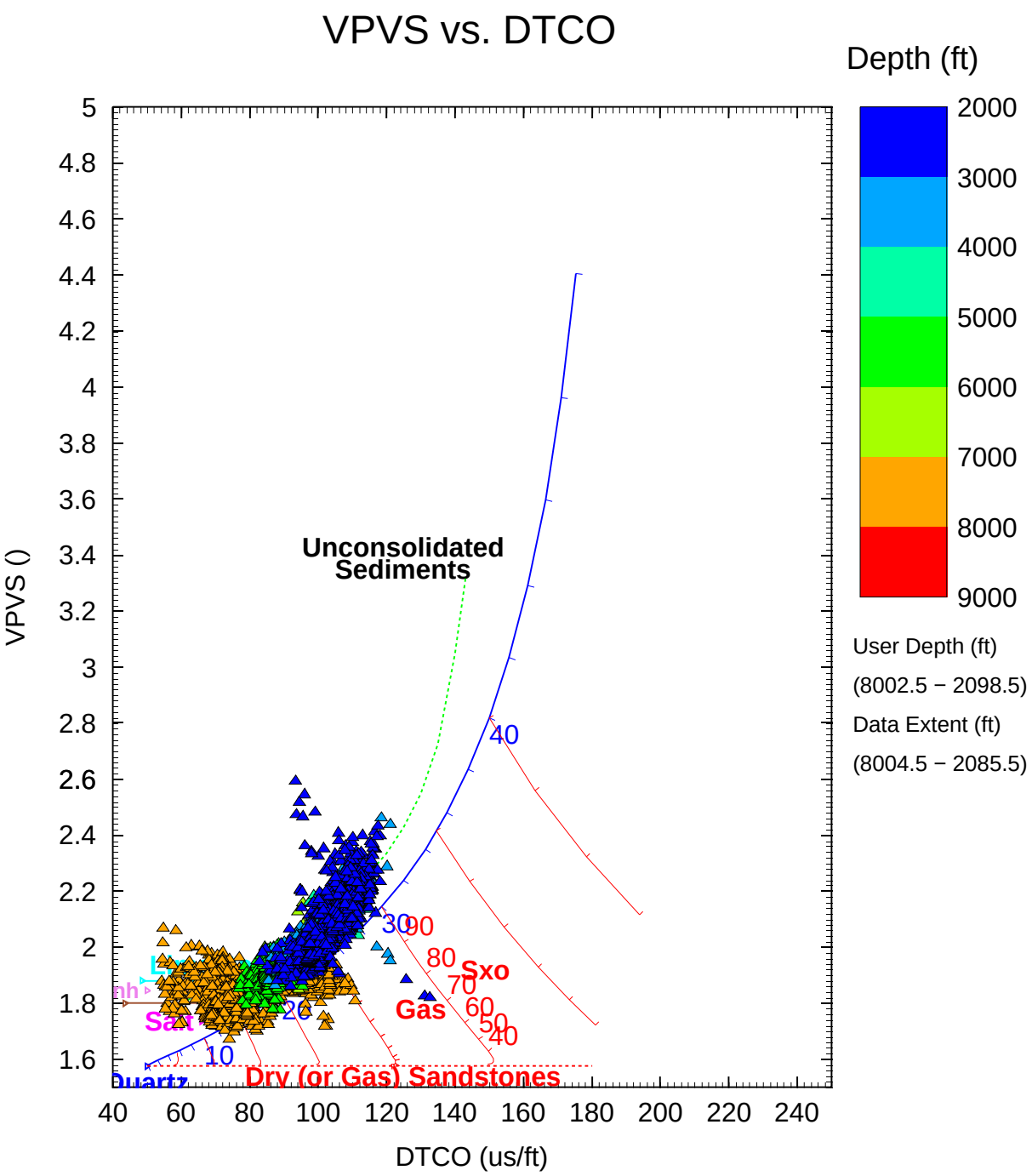
eforms using the "Best DT" program.
ng the "Best DT"
r was used.
the processing of the compressional.
the X−Dipole.

tion arrivals. From TD to
The DT−Compressional
Monopole.

rrival. In general, it tracked the

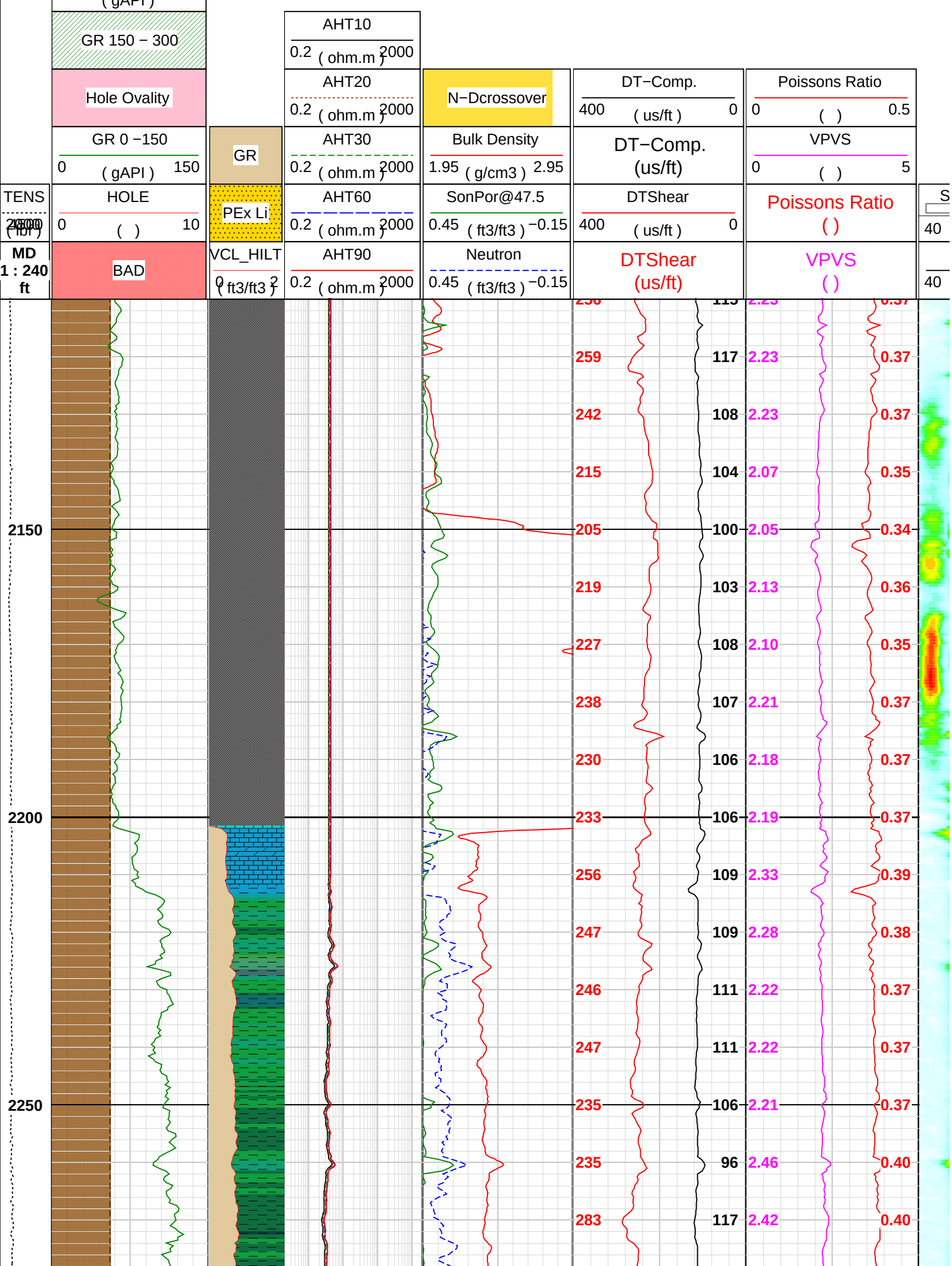
Graphic Illustration Captions:

Figure 1−
Vp/Vs vs. DTCO shows normal character over the entire log and indicates an "Intermediate" formation type.



Template: empirical relationship for vertical wells (vertically polarized compressional, horizontally polarized shear)

Mudcake
Washout
Hole Diam 1 5 (in) 15
BS 5 (in) 15
Hole Diam 2 5 (in) 15
GR 150 − 300 150 (gAPI) 300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Hole Ovality
GR 0 −150
0 (gAPI) 150
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(lbf)
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AHT20
0.2 (ohm.m) 2000
AHT30
0.2 (ohm.m) 2000
AHT60
0.2 (ohm.m) 2000
AHT90
0.2 (ohm.m) 2000
GR
PEx Li
VCL_HILT
0 (ft3/ft3) 2
N−Dcrossover
Bulk Density
1.95 (g/cm3) 2.95
SonPor@47.5
0.45 (ft3/ft3) −0.15
Neutron
0.45 (ft3/ft3) −0.15
DT−Comp.
400 (us/ft) 0
DT−Comp.
(us/ft)
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400 (us/ft) 0
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(us/ft)
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Poissons Ratio
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219 103 2.13 0.36
227 108 2.10 0.35
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230 106 2.18 0.37
233 106 2.19 0.37
256 109 2.33 0.39
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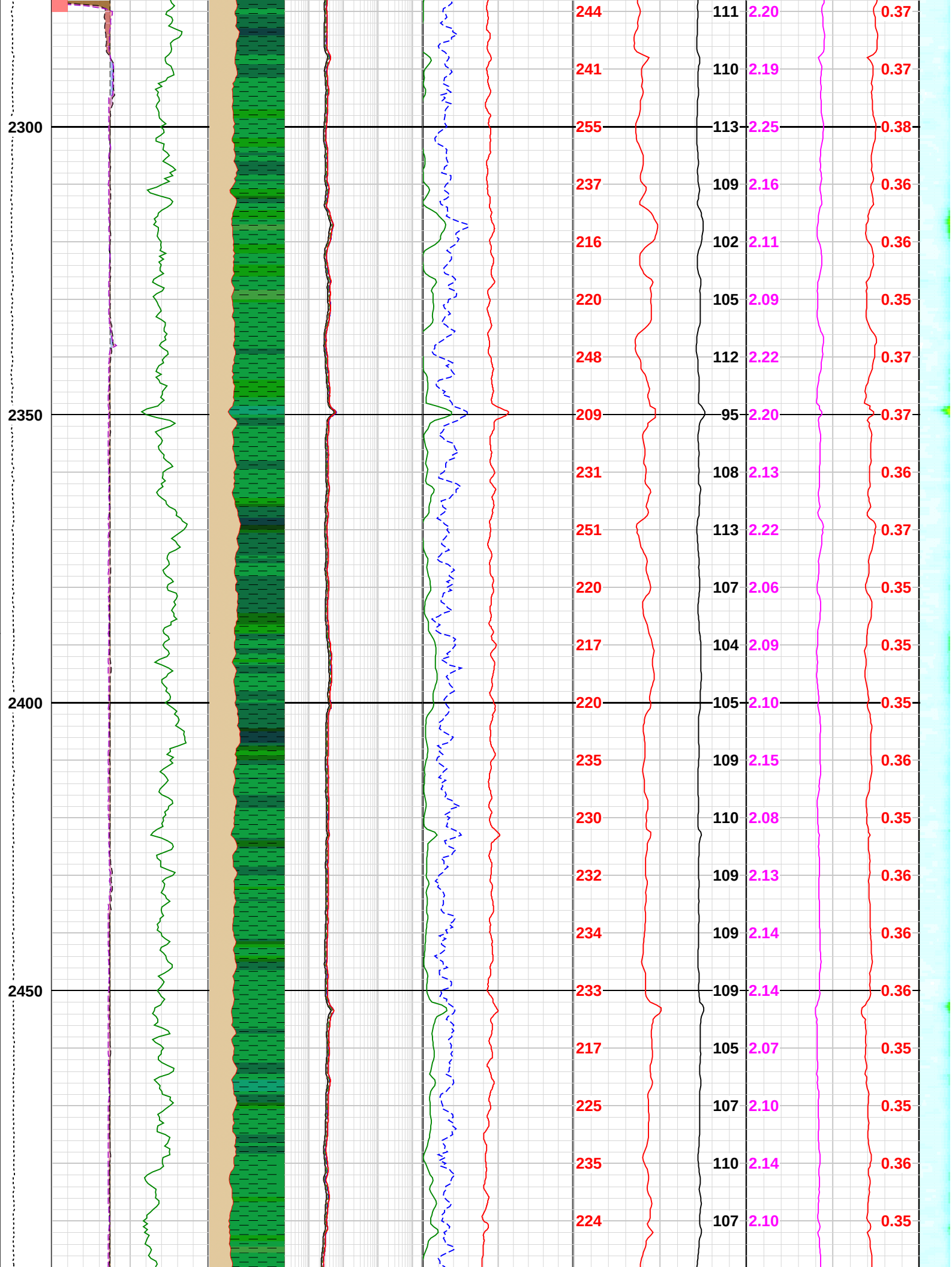
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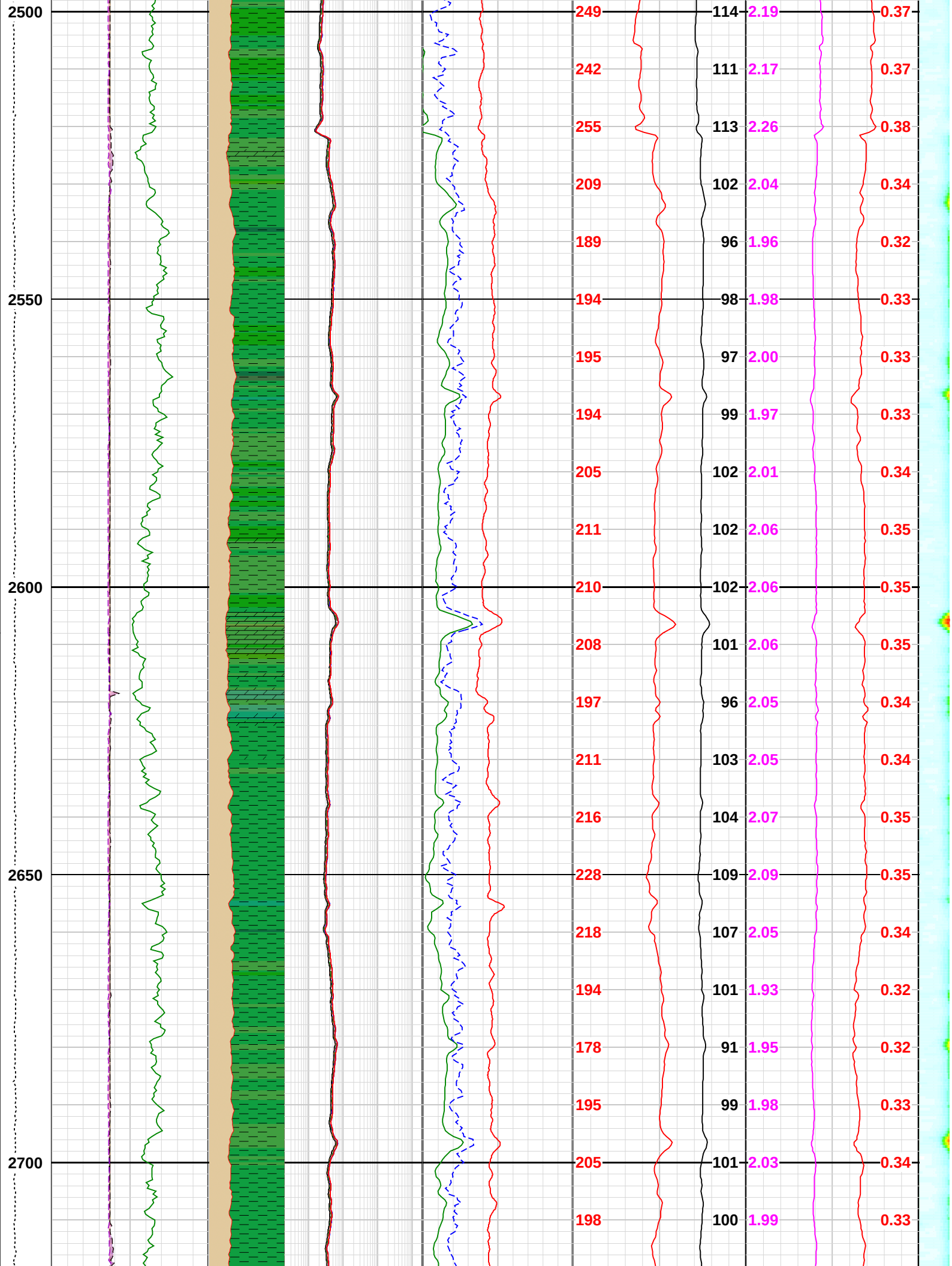
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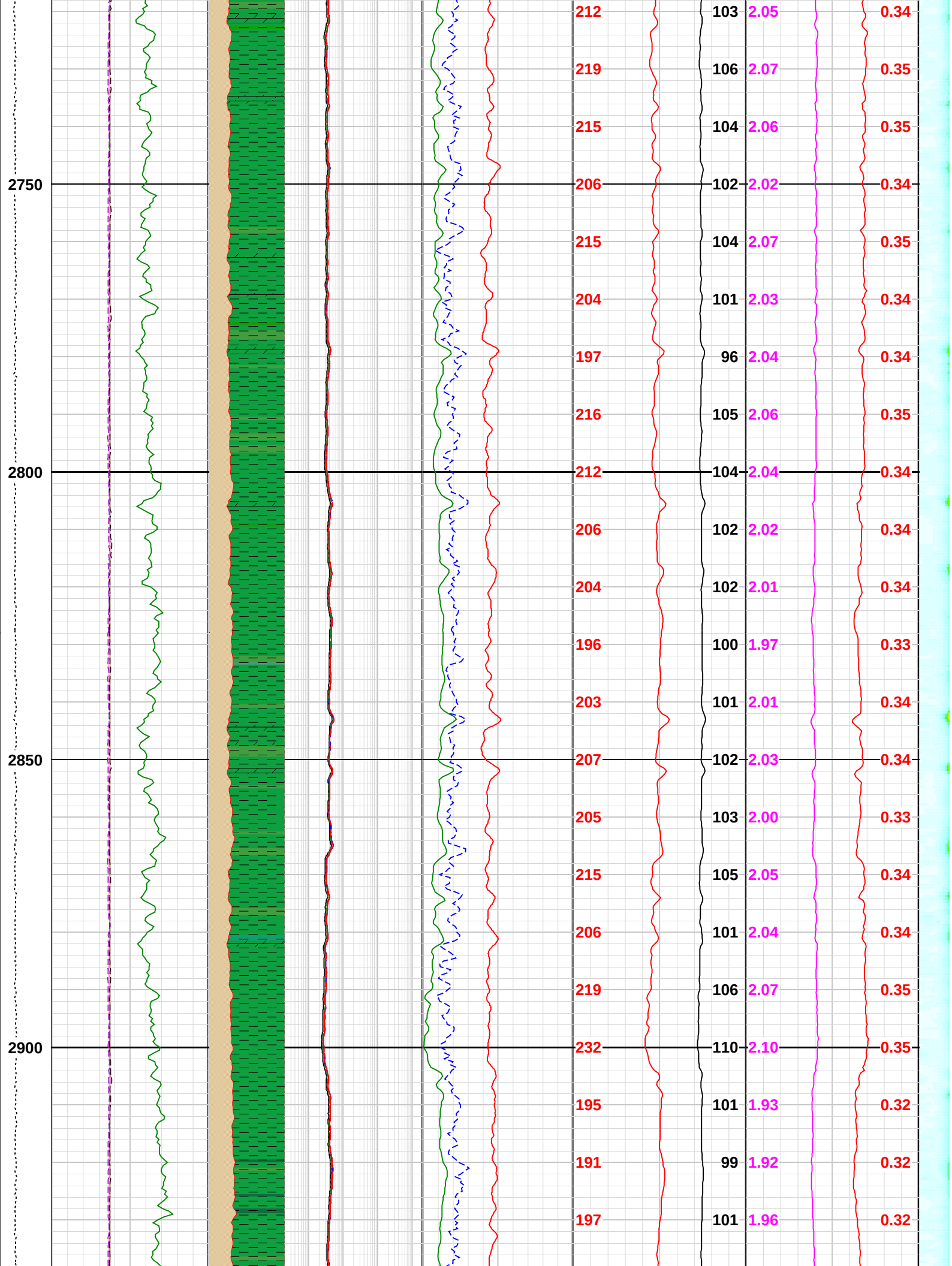
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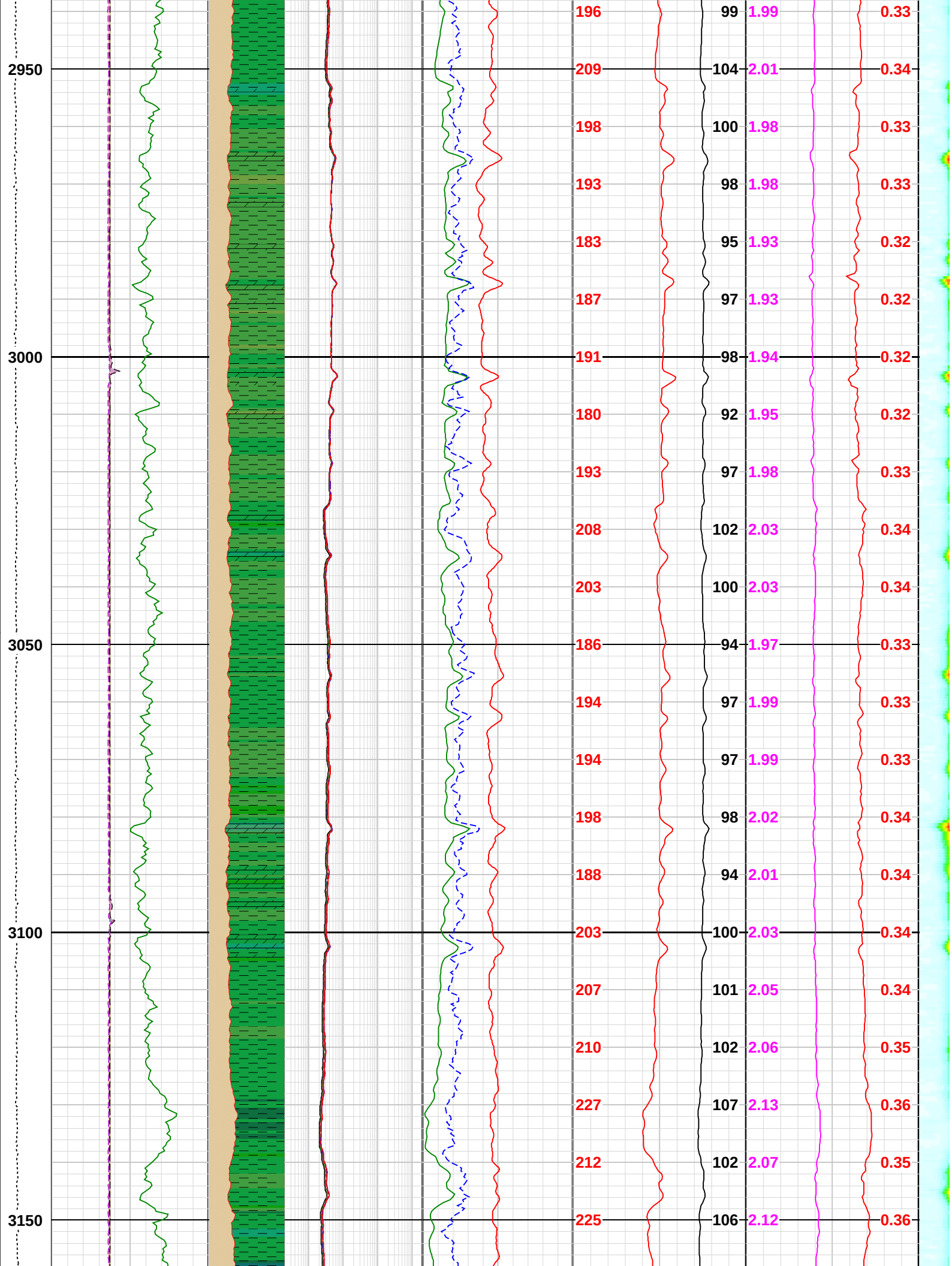
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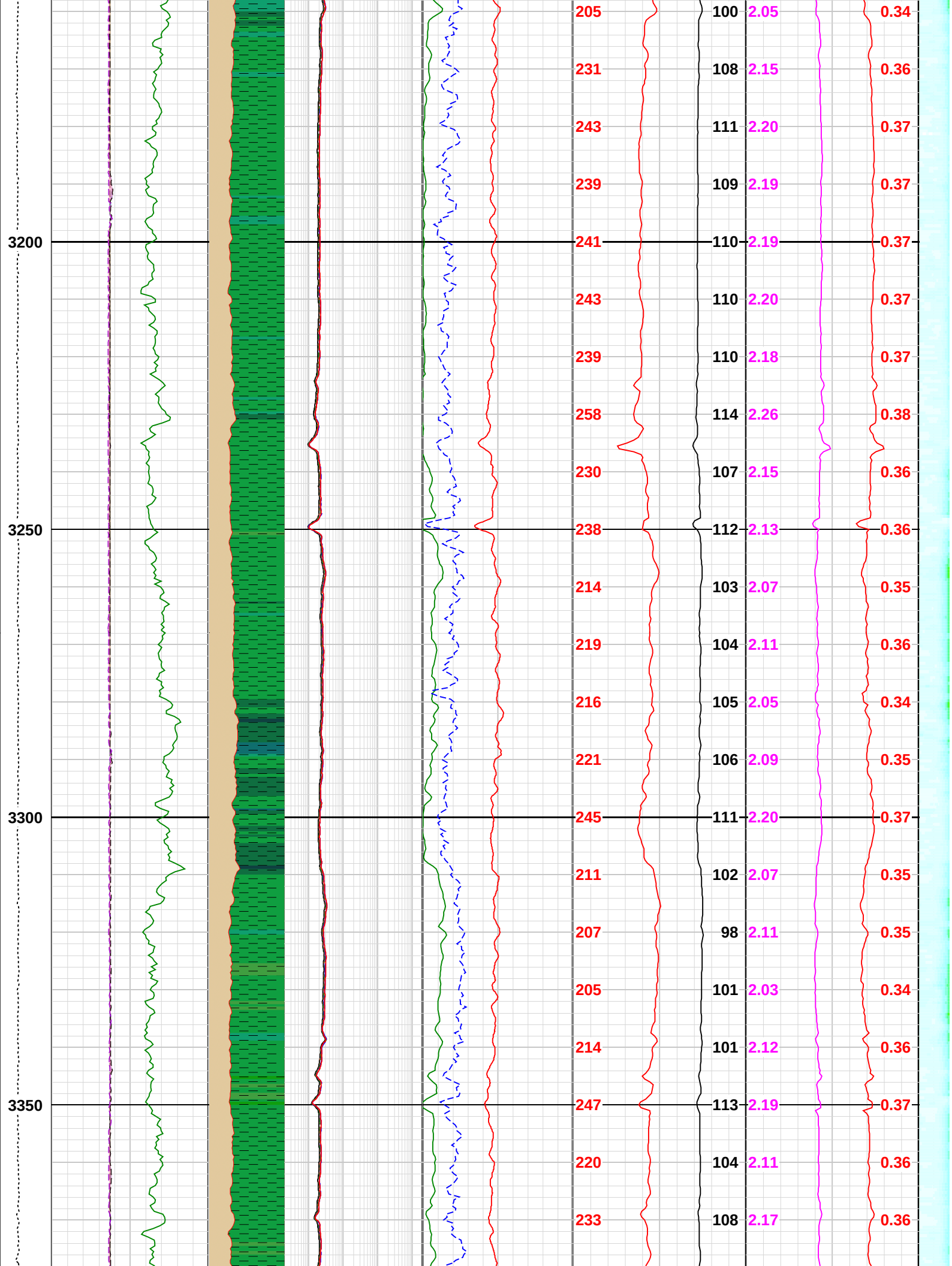
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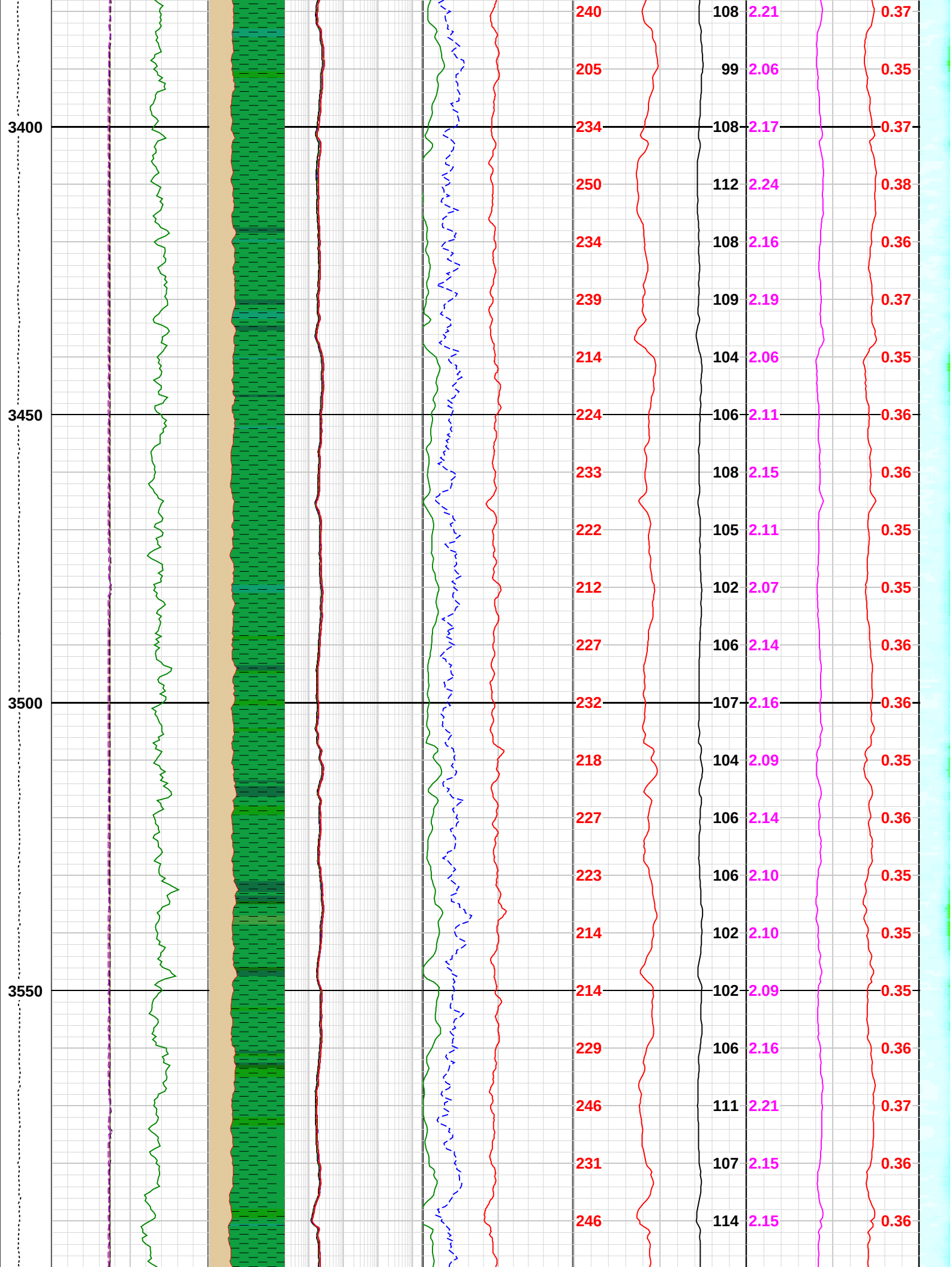
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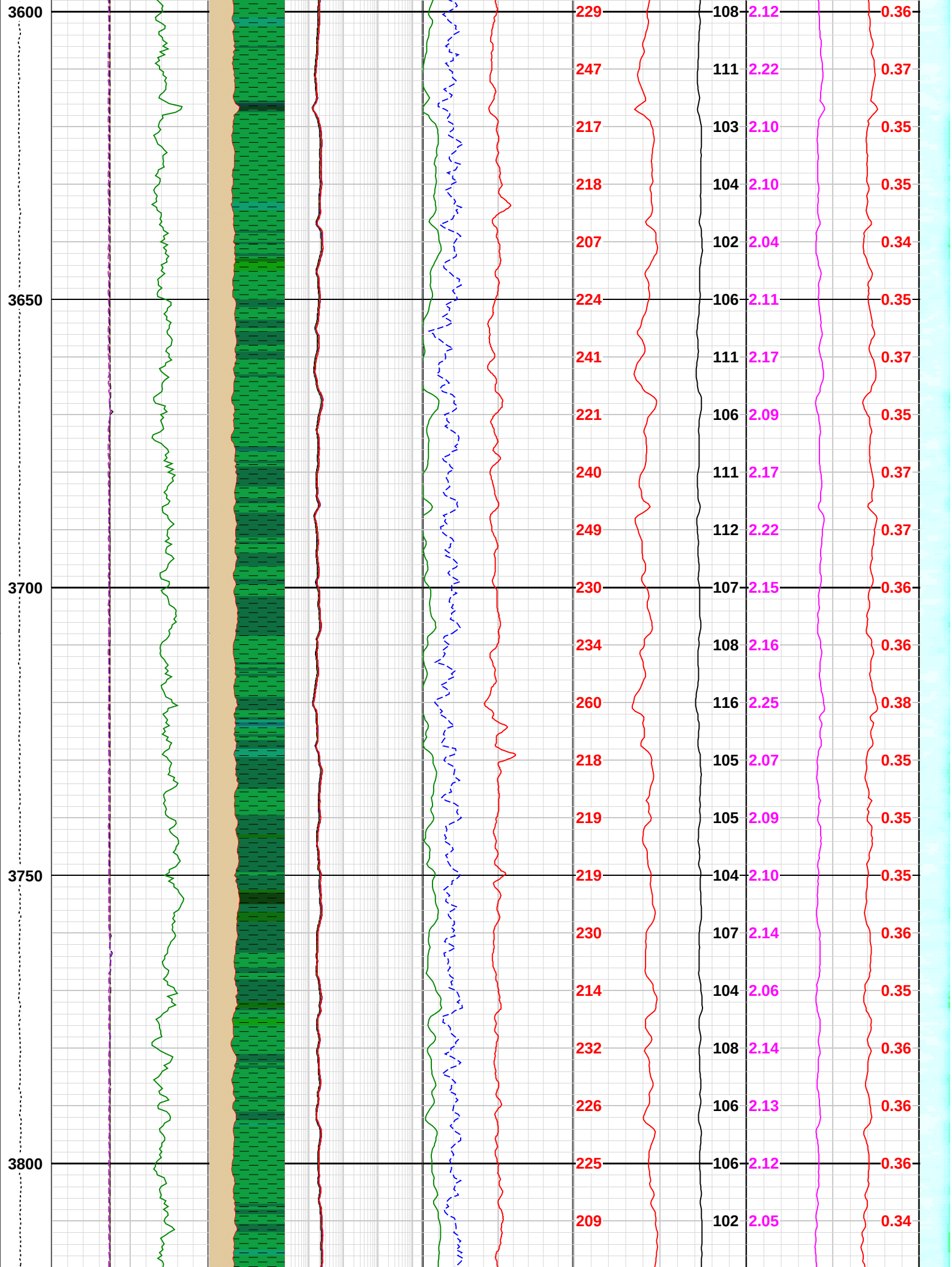
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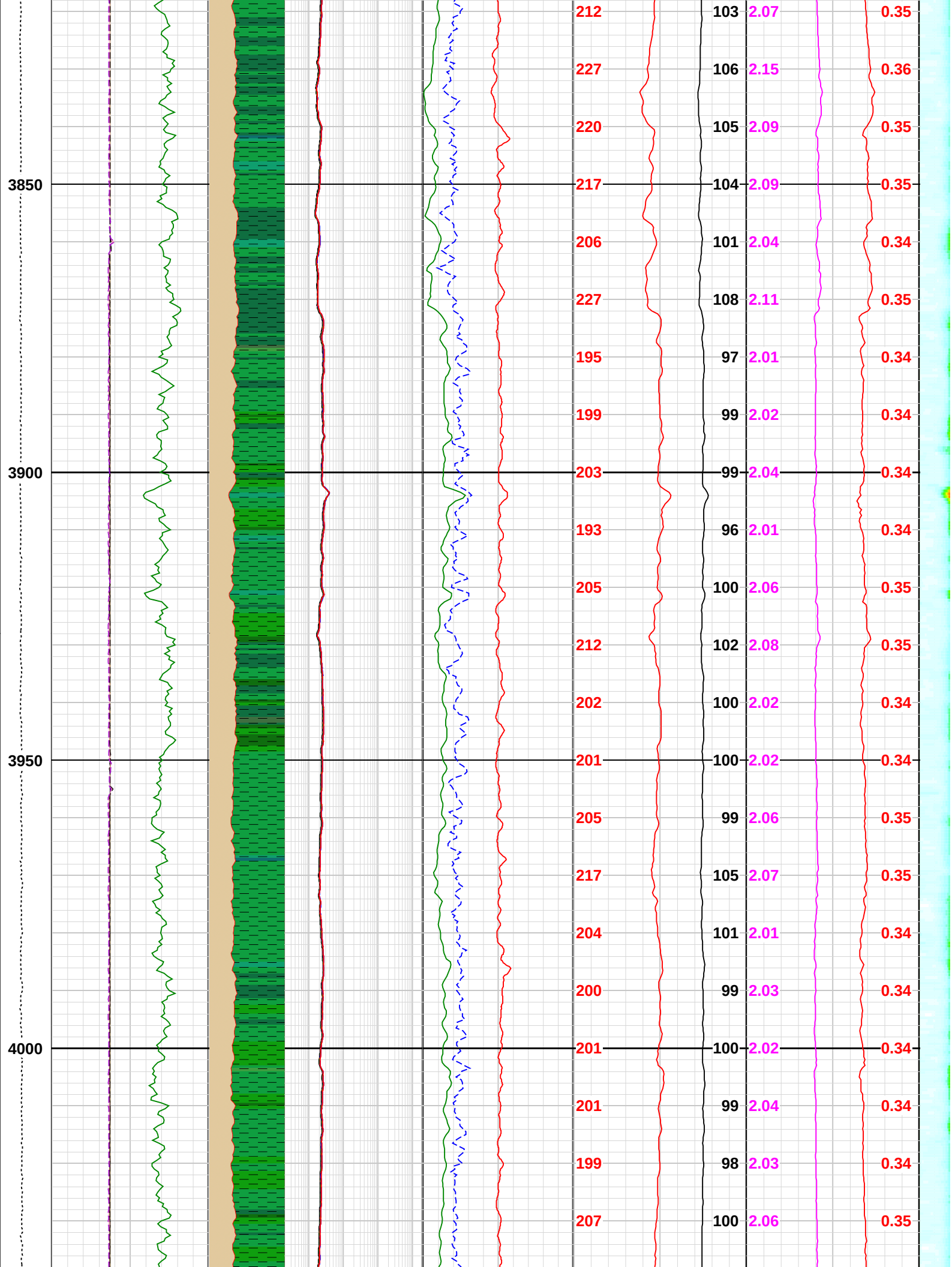
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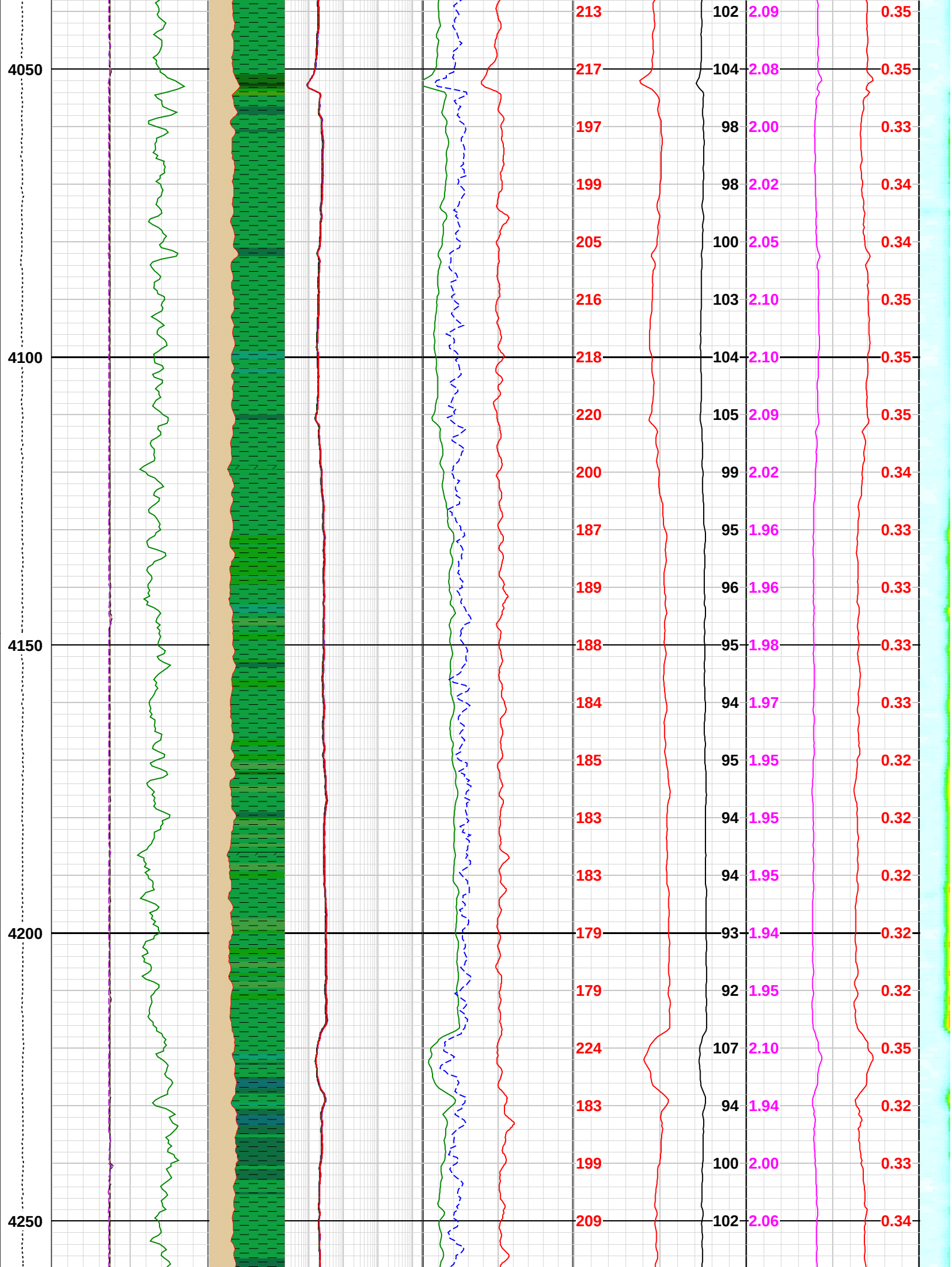
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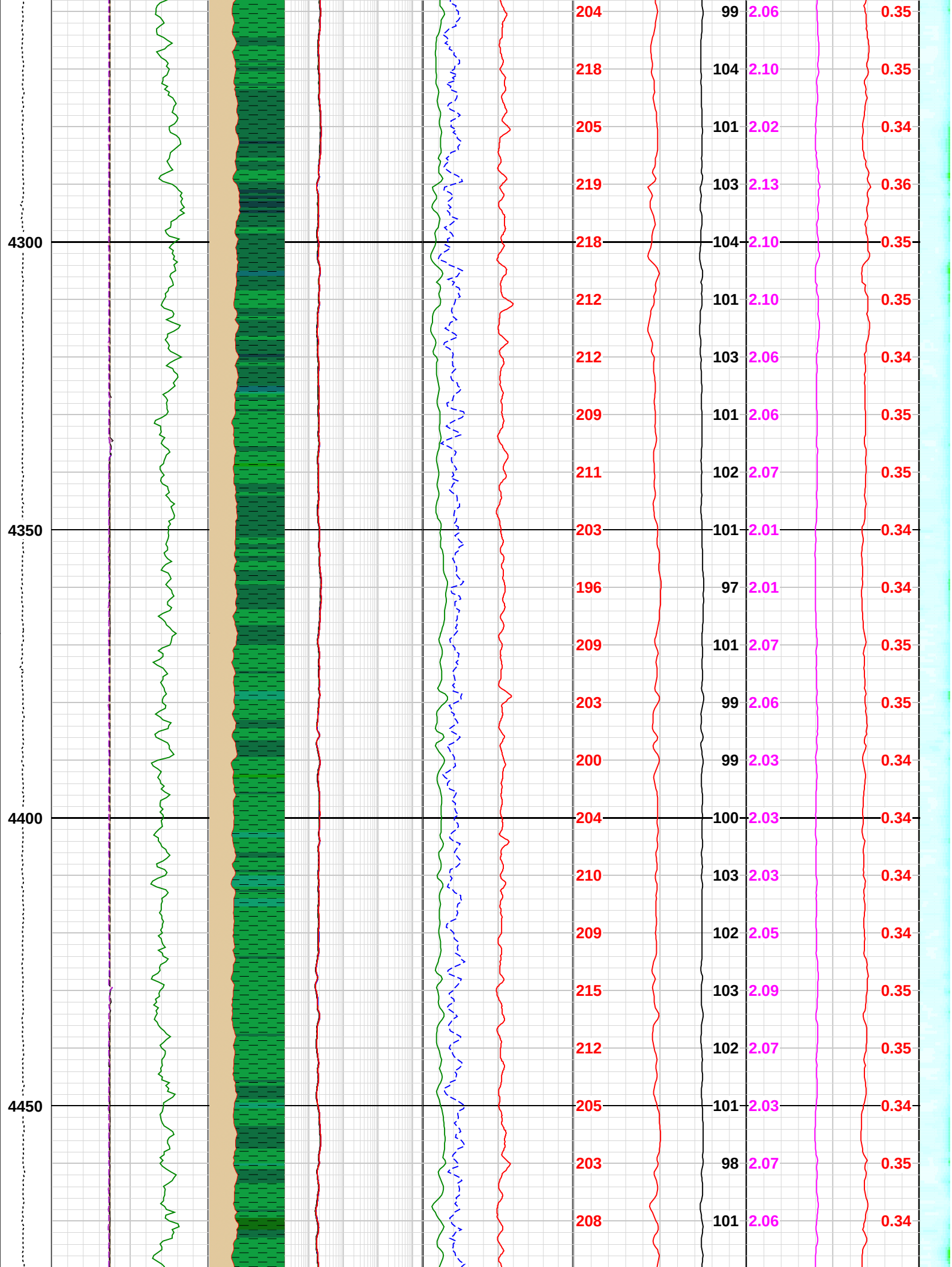
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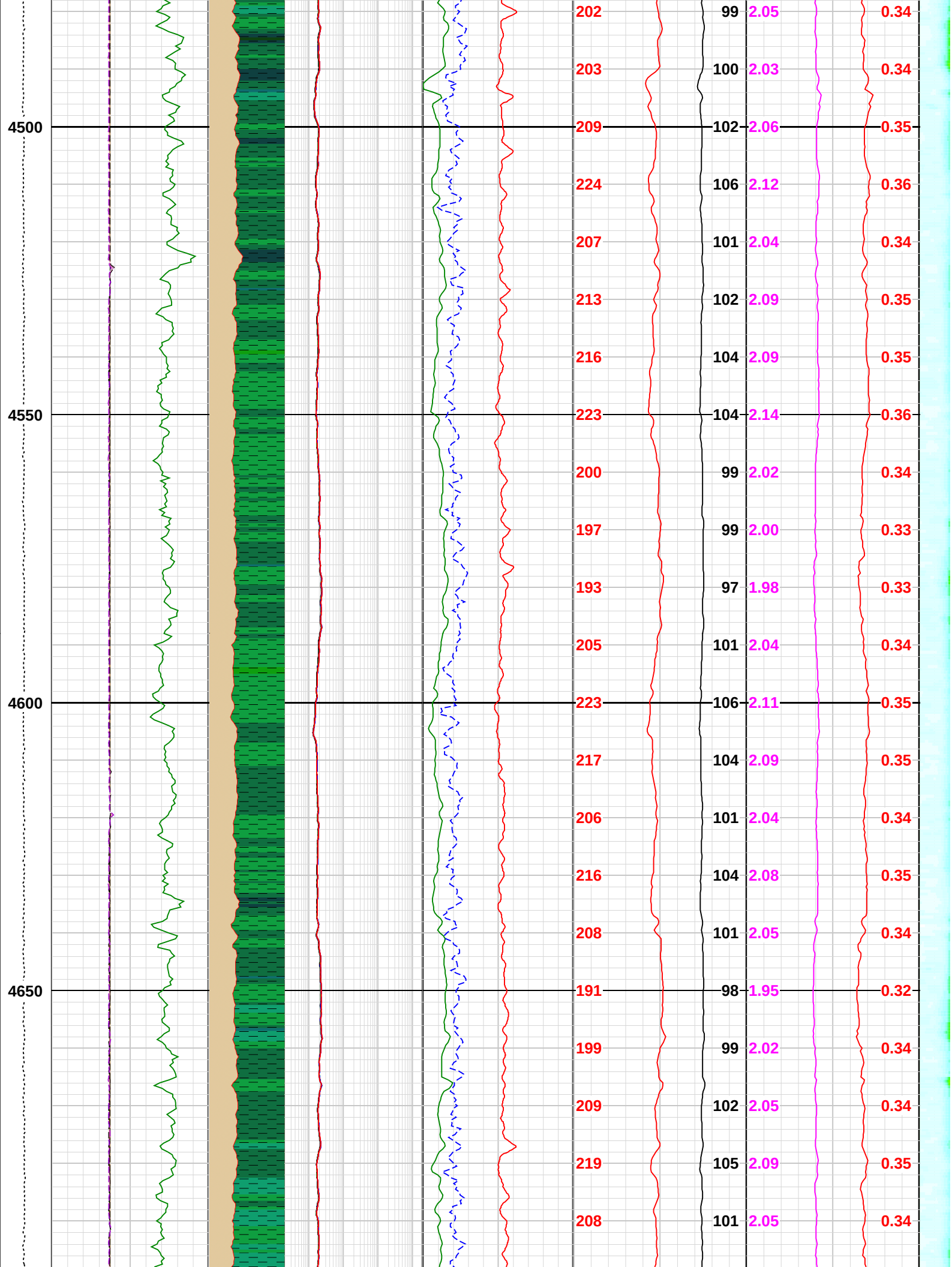
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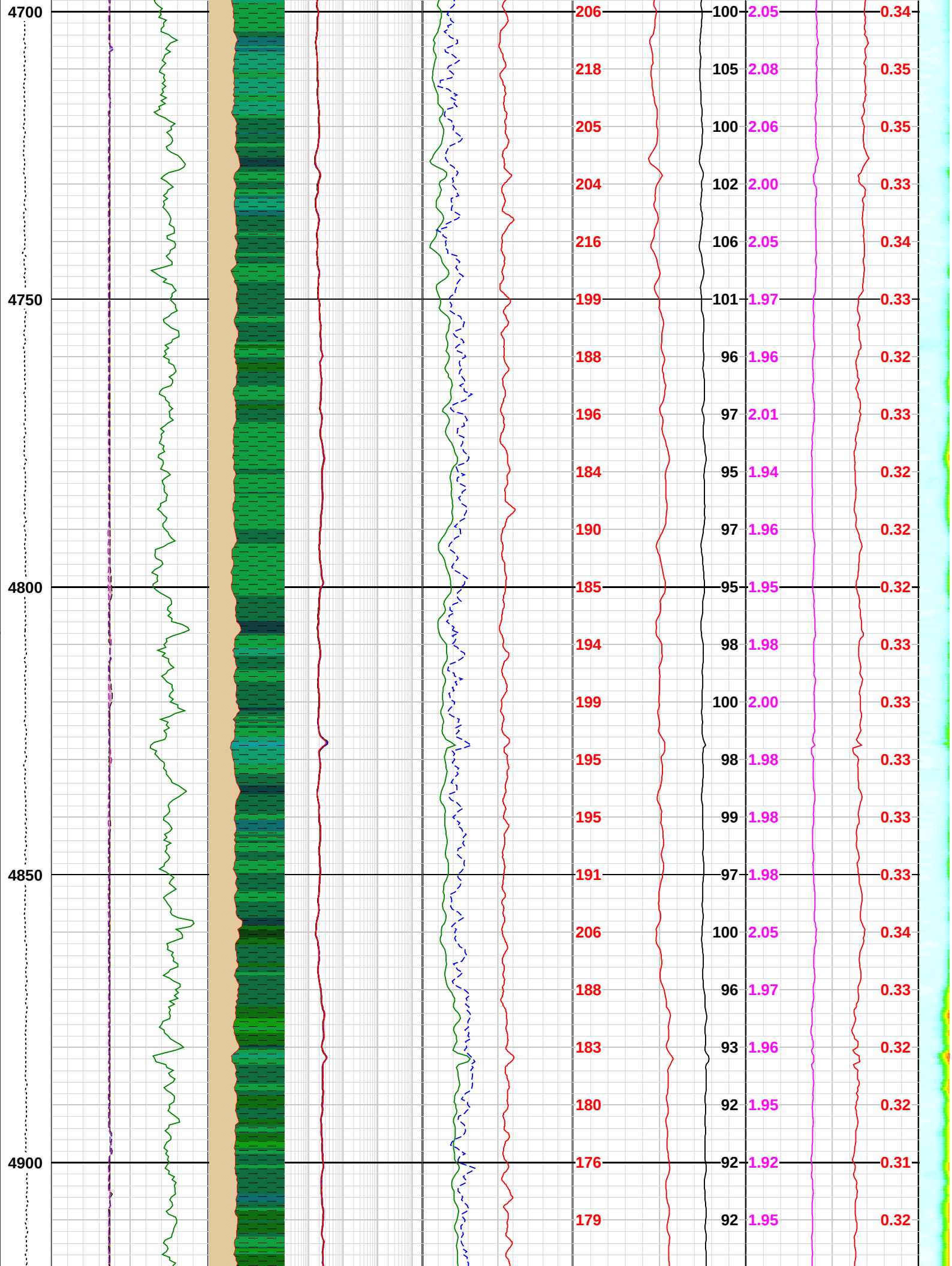
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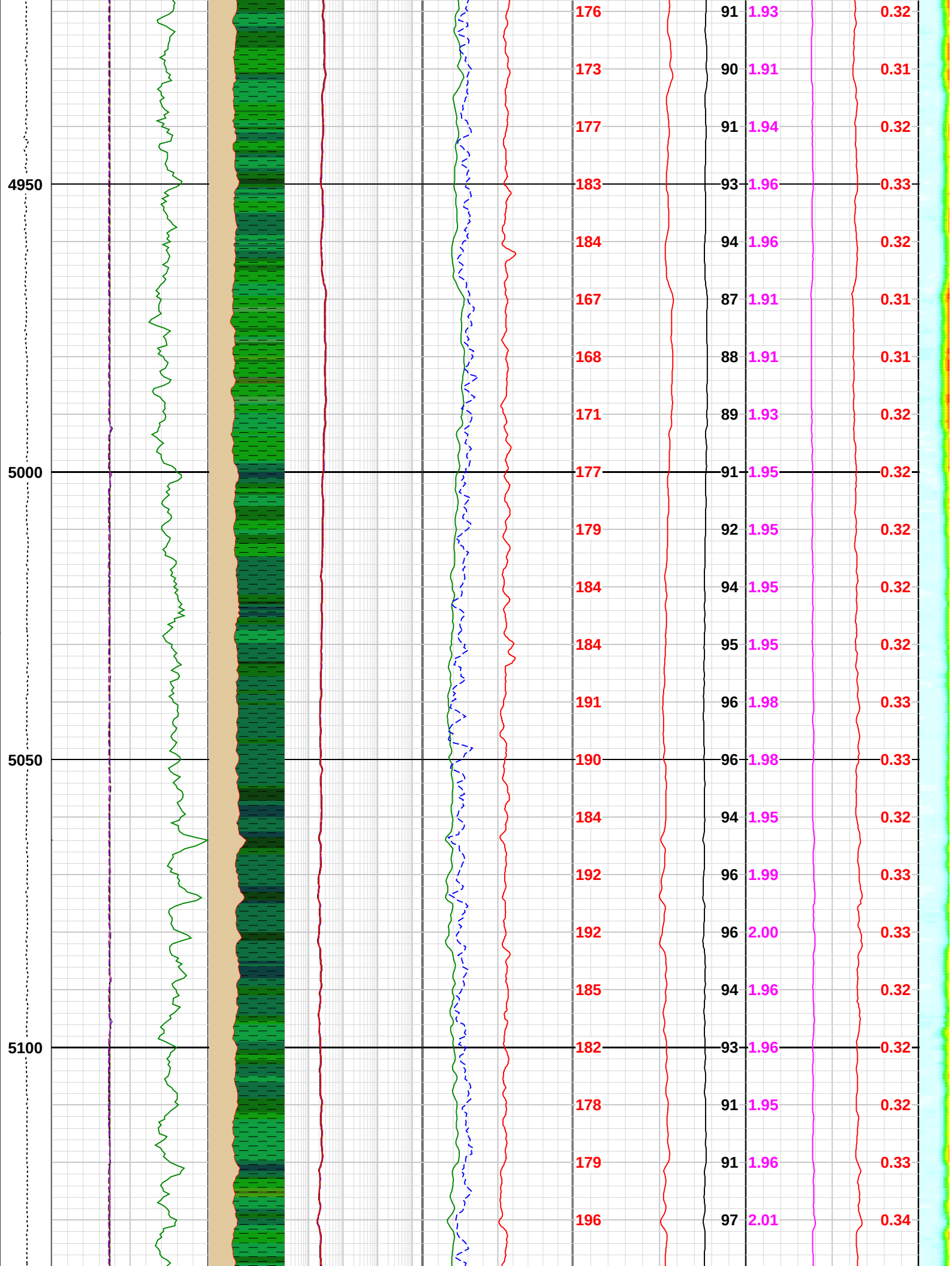
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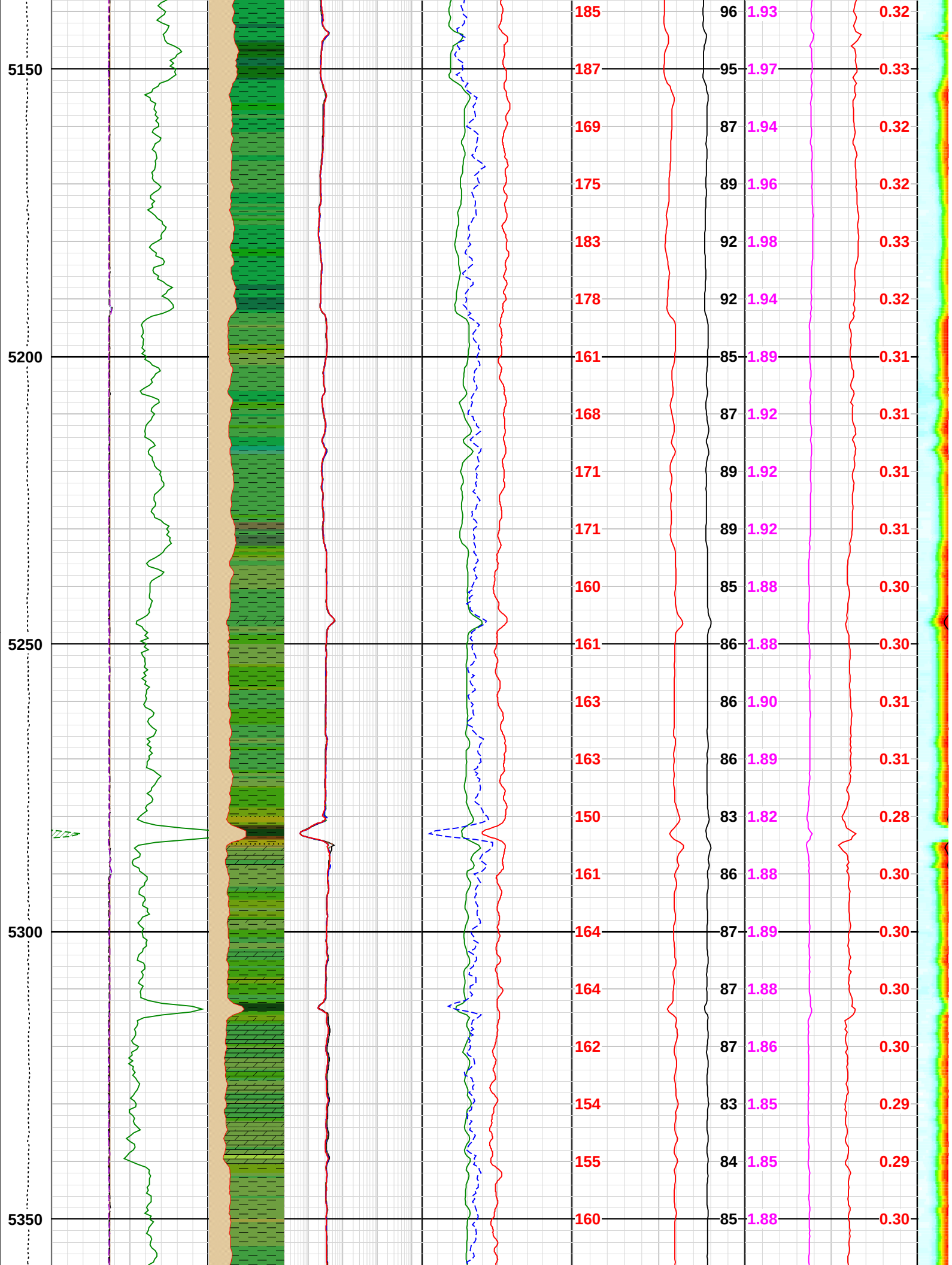
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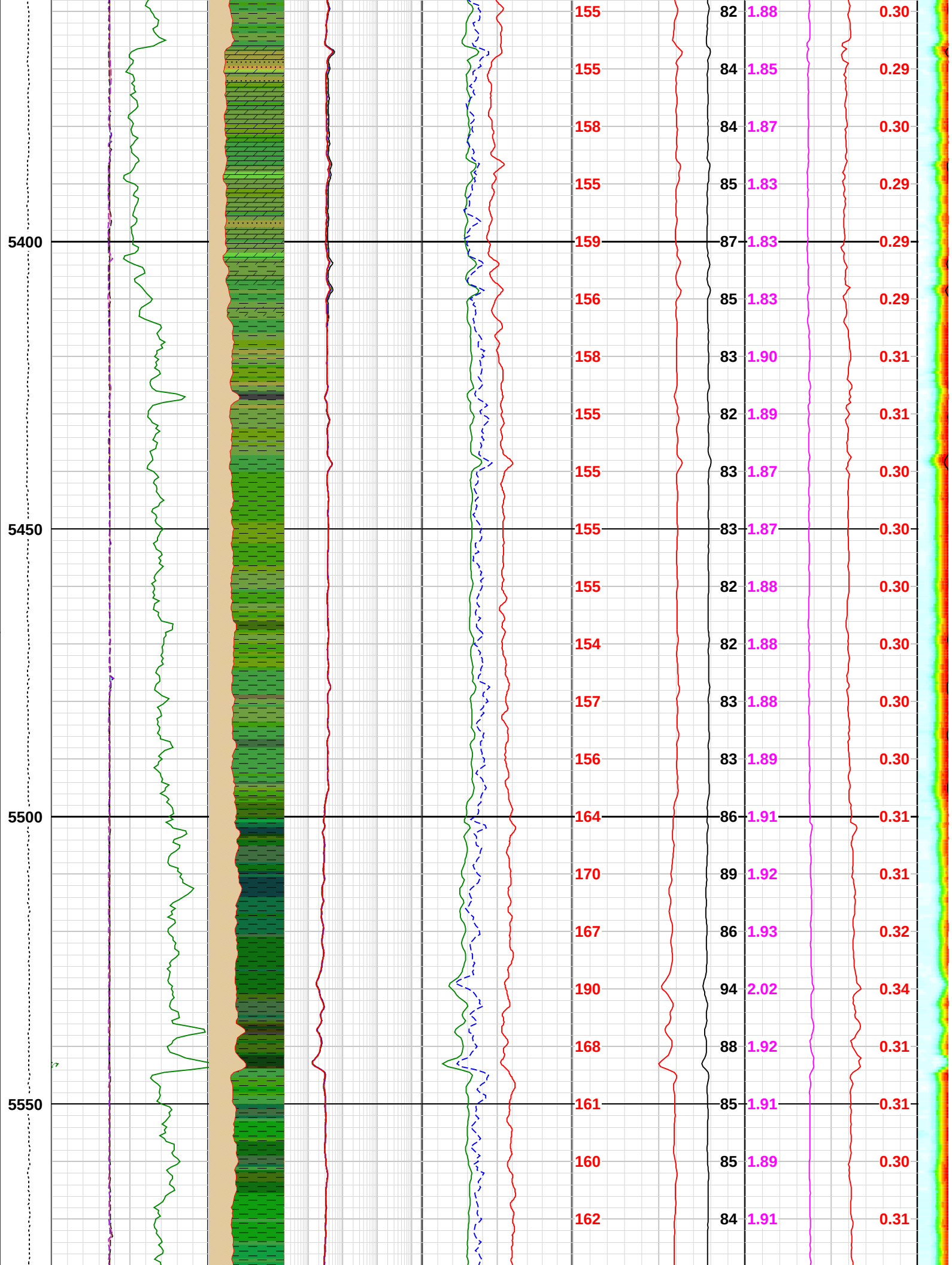
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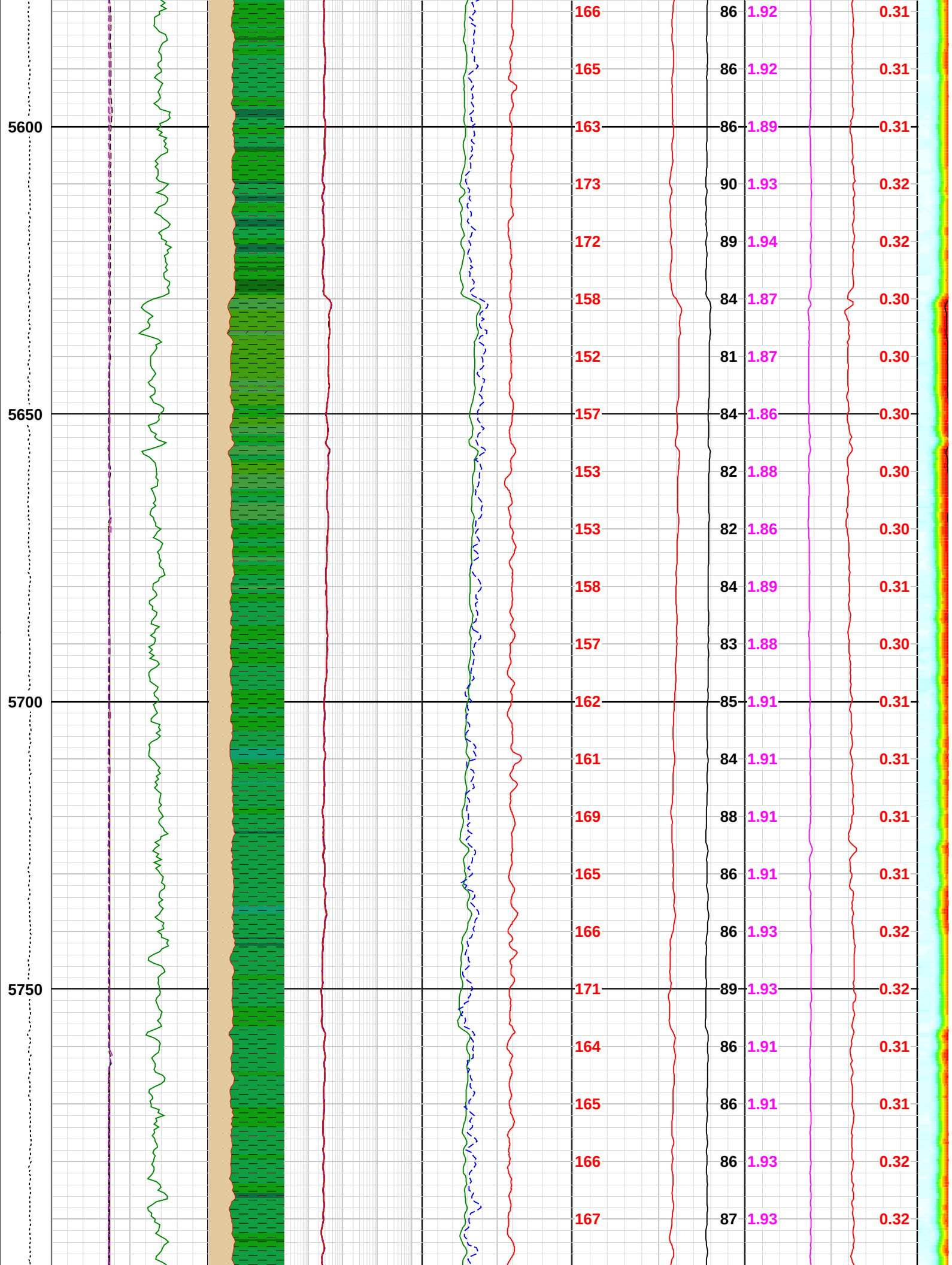
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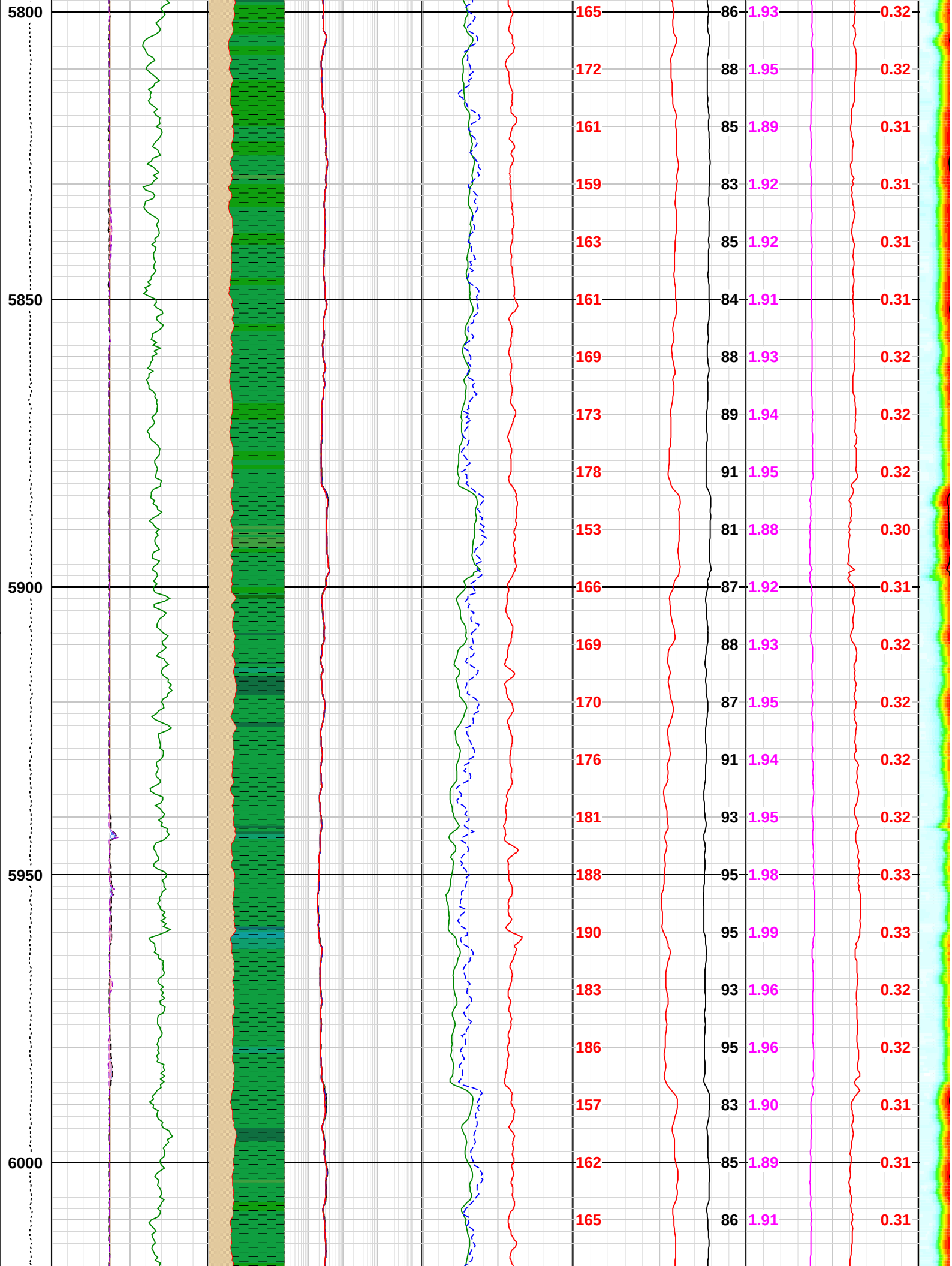
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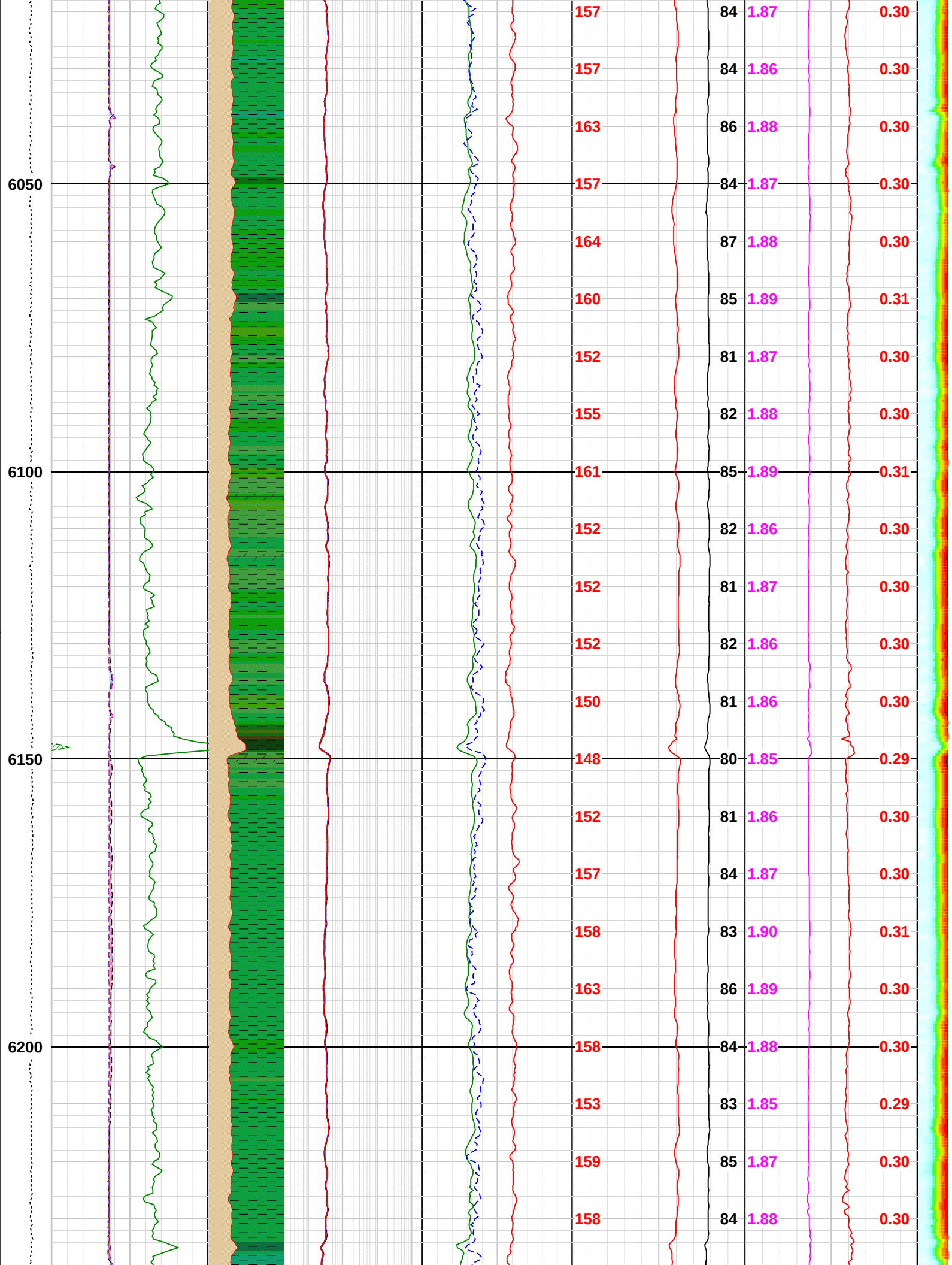
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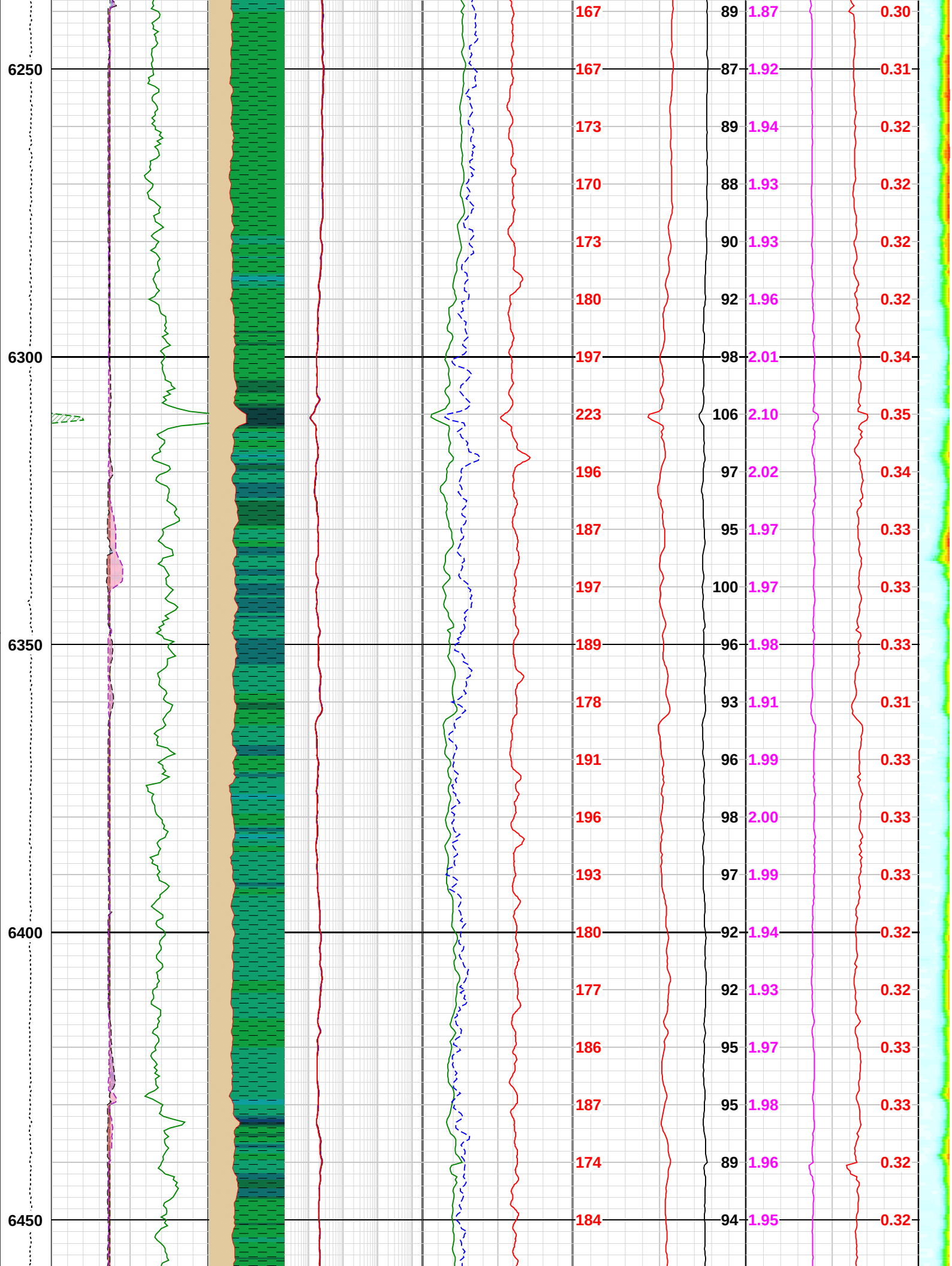
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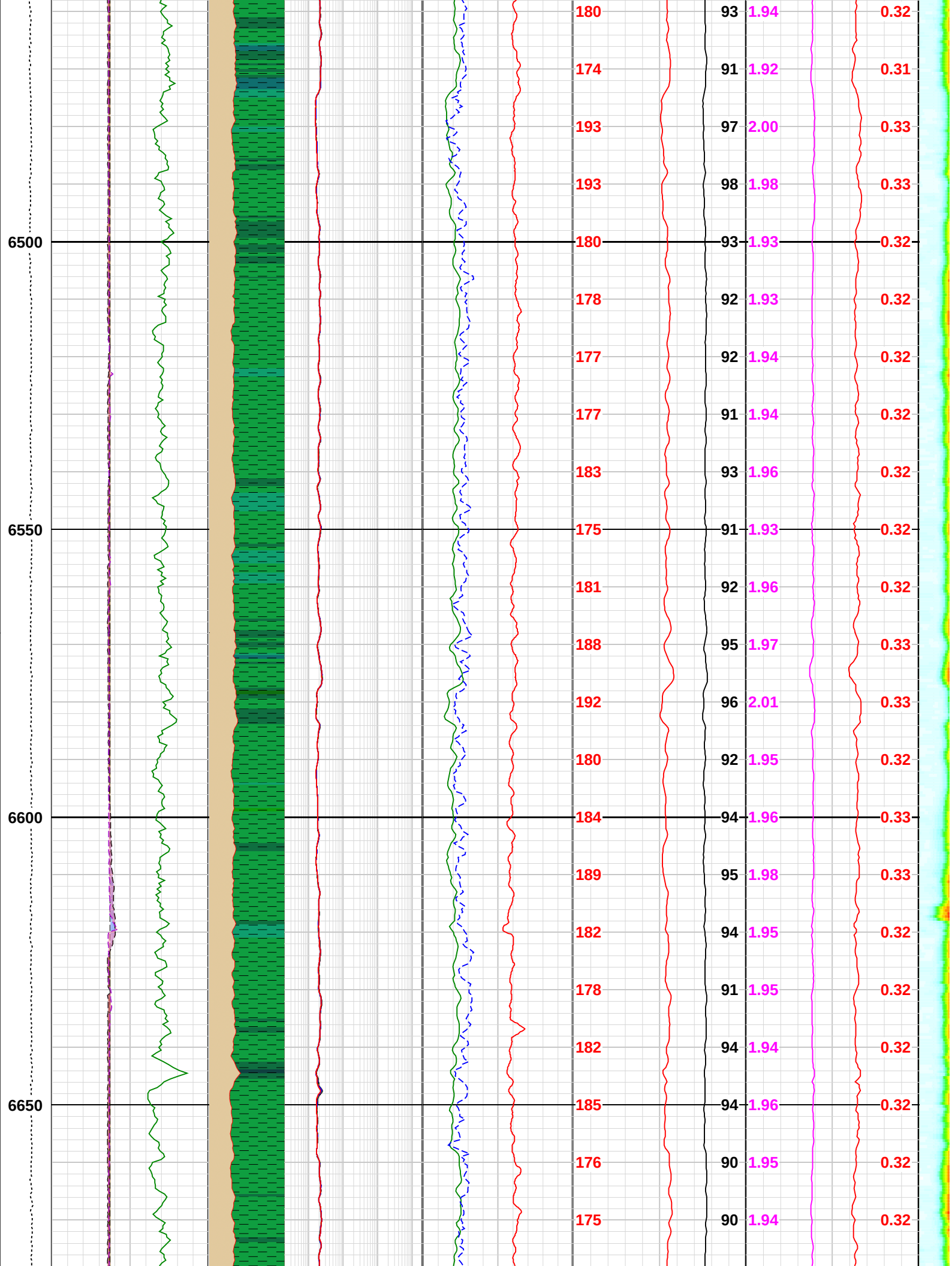
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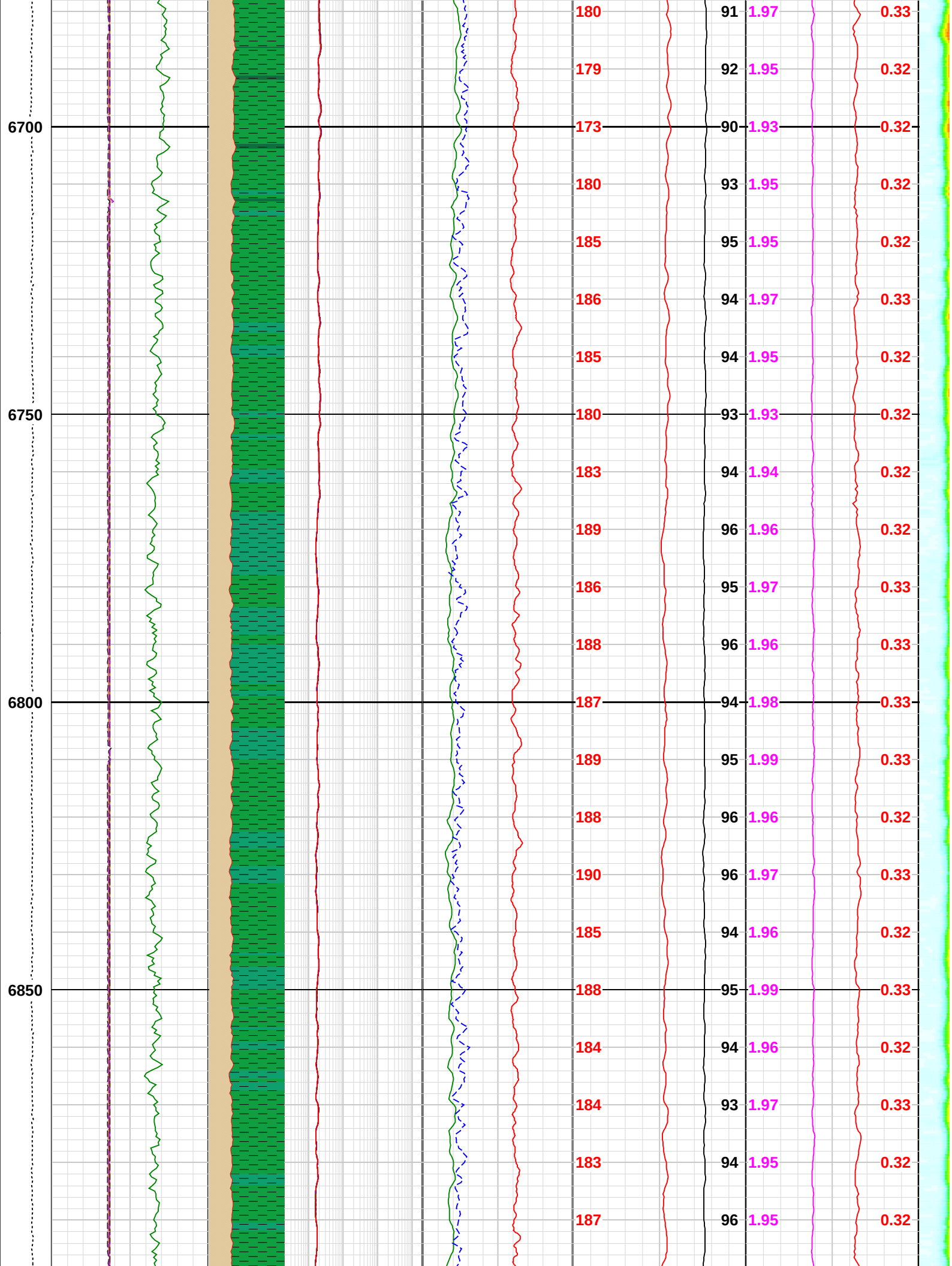
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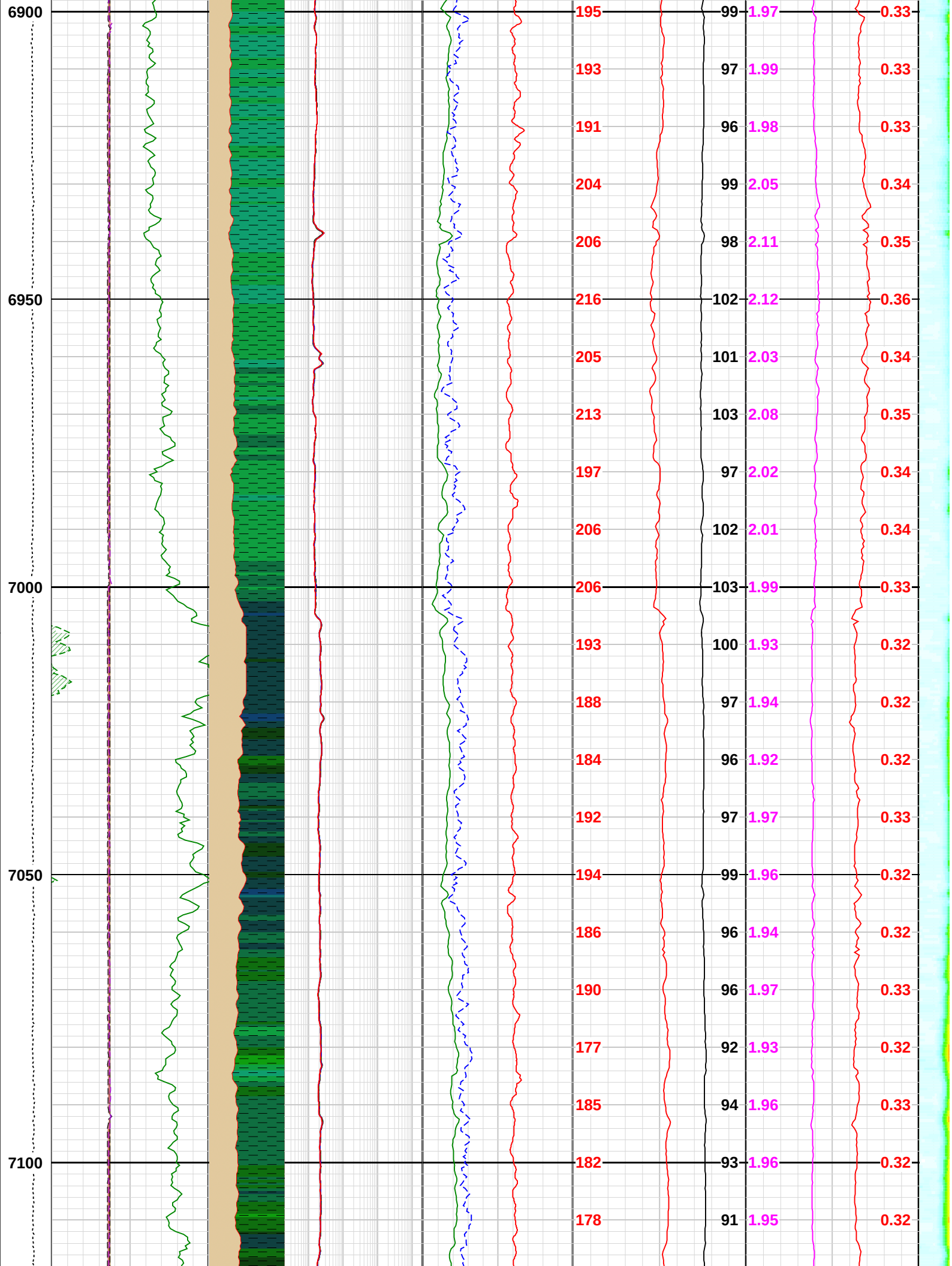
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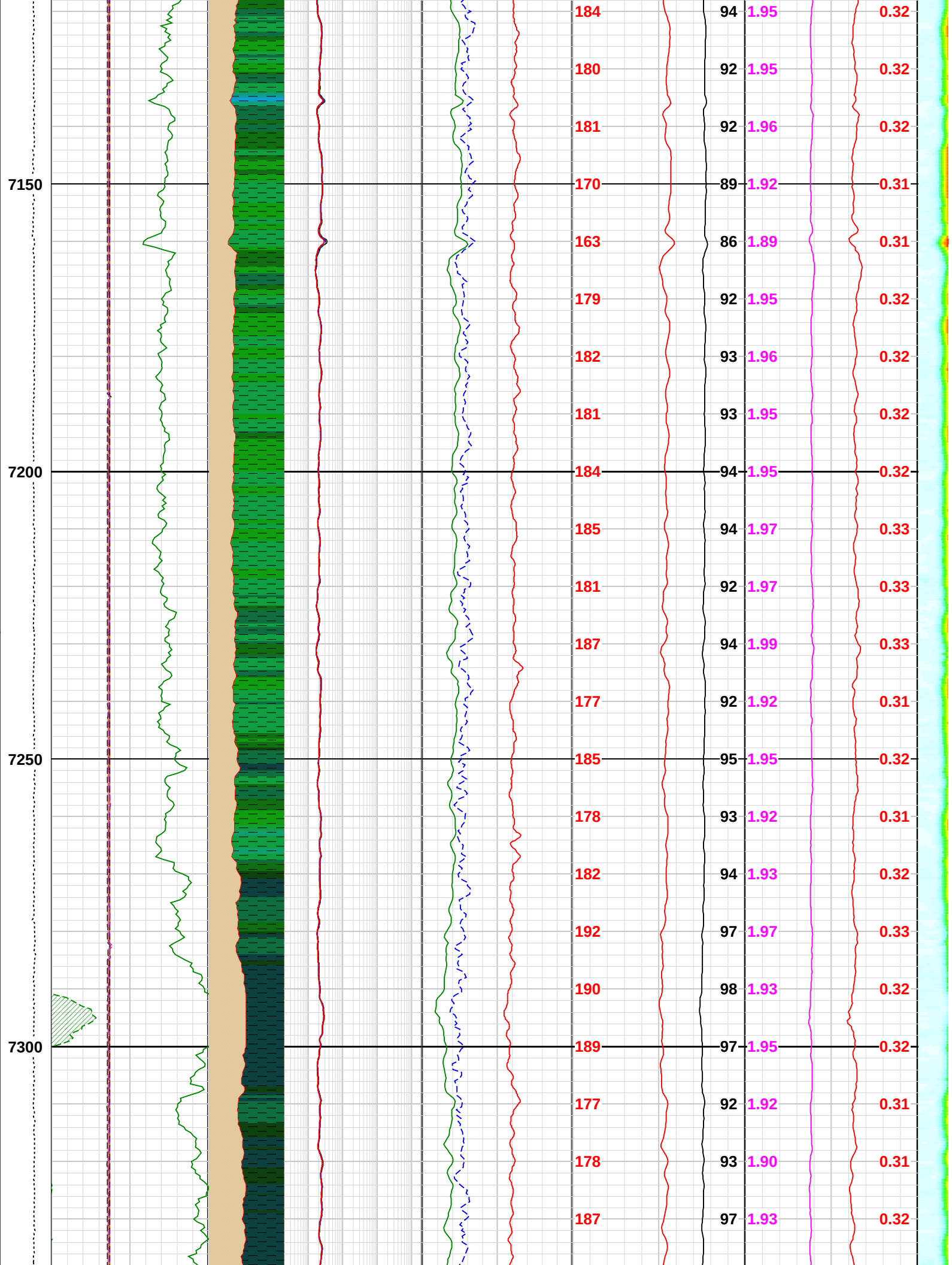
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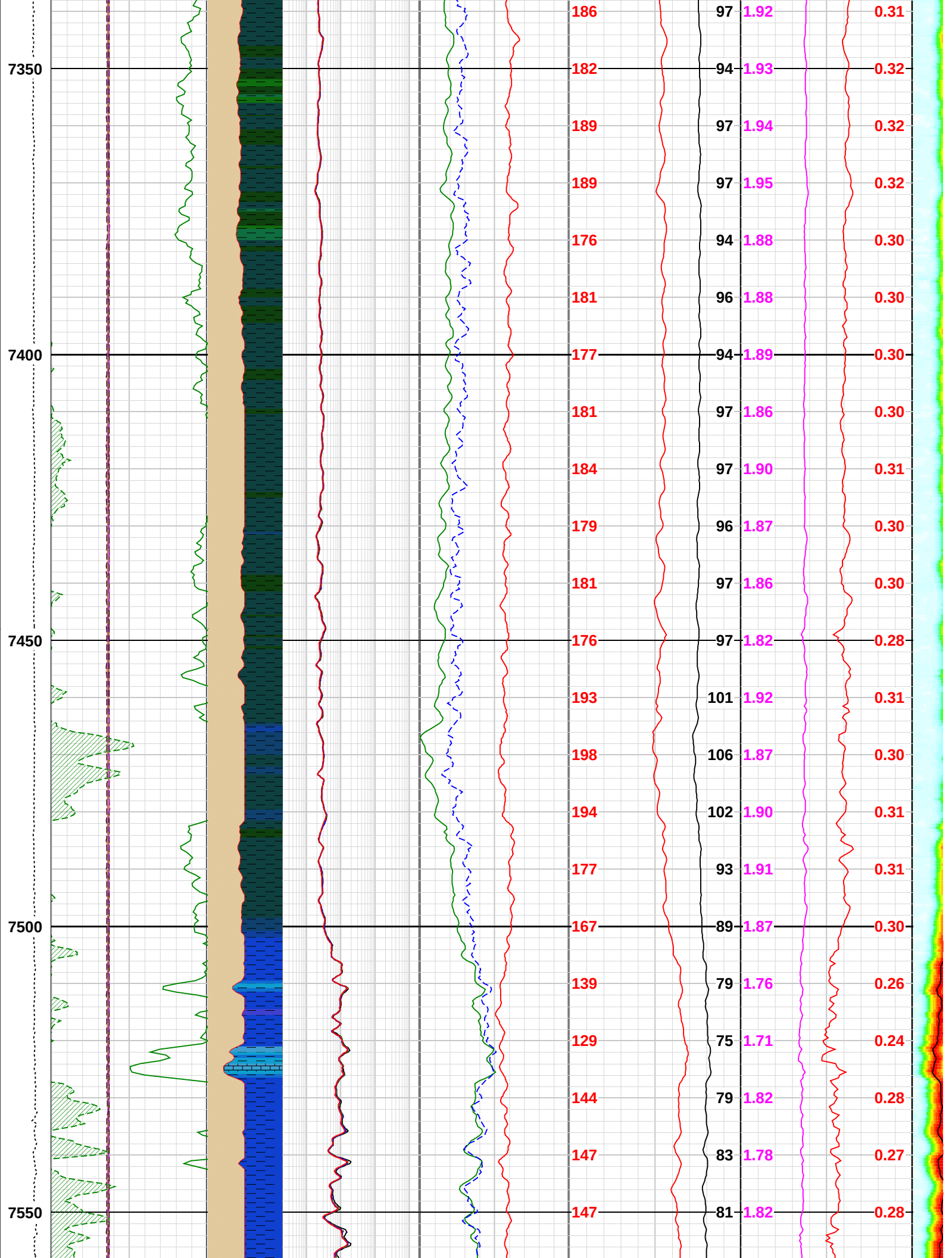
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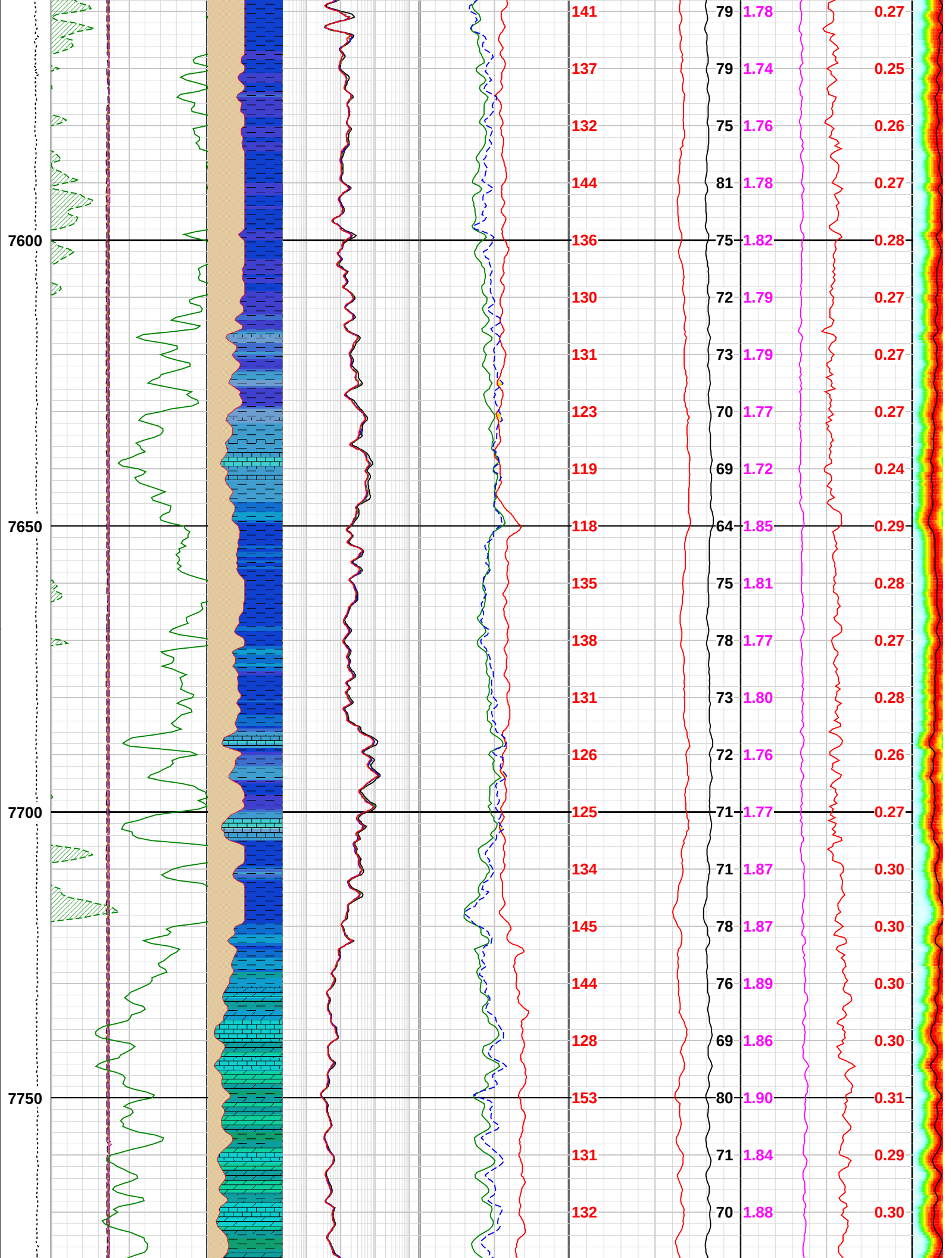
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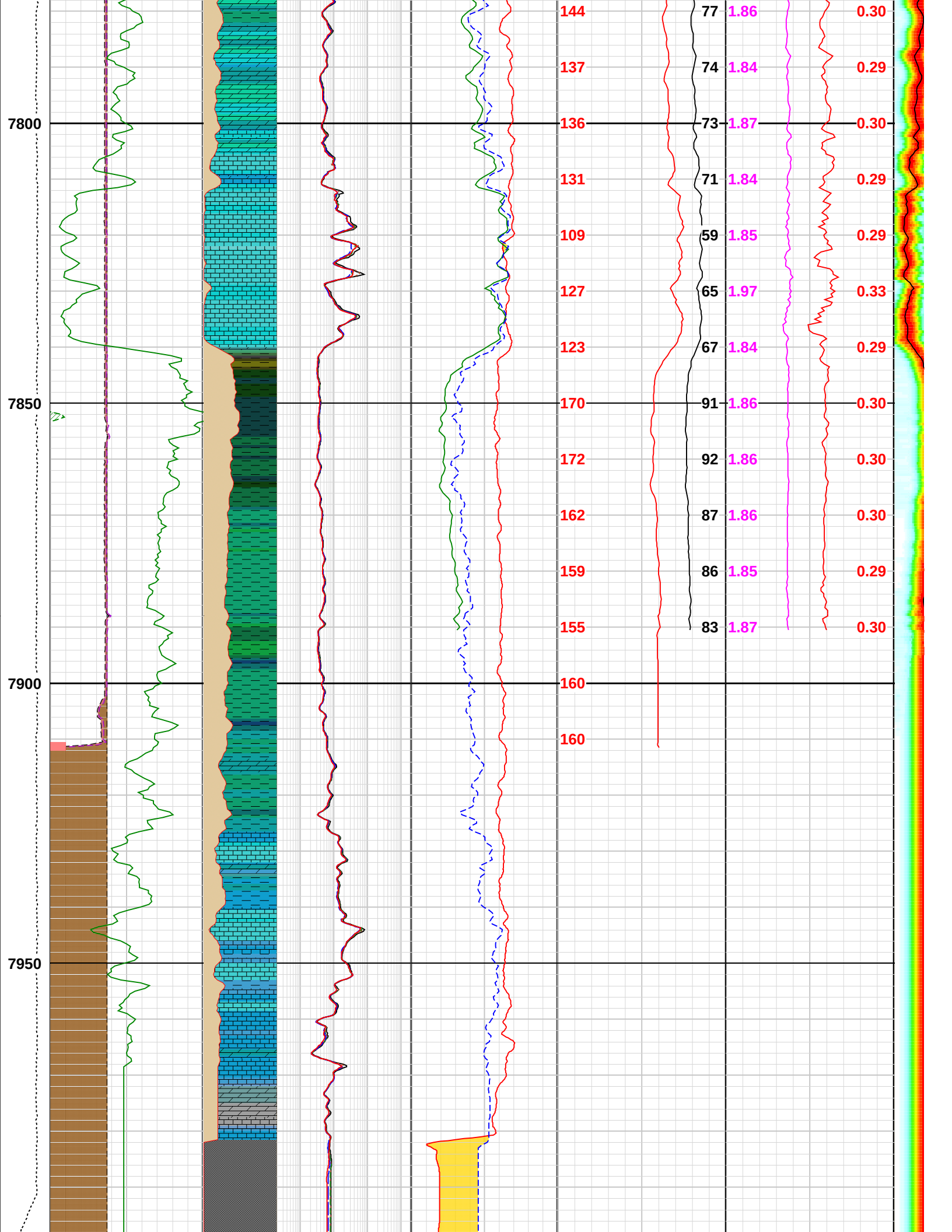
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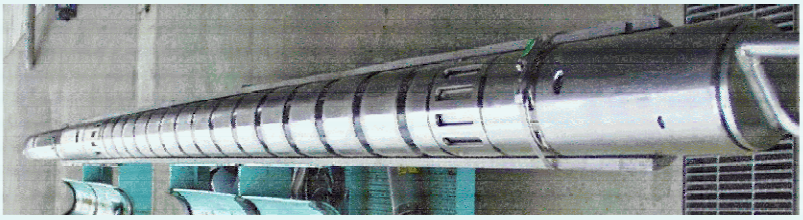
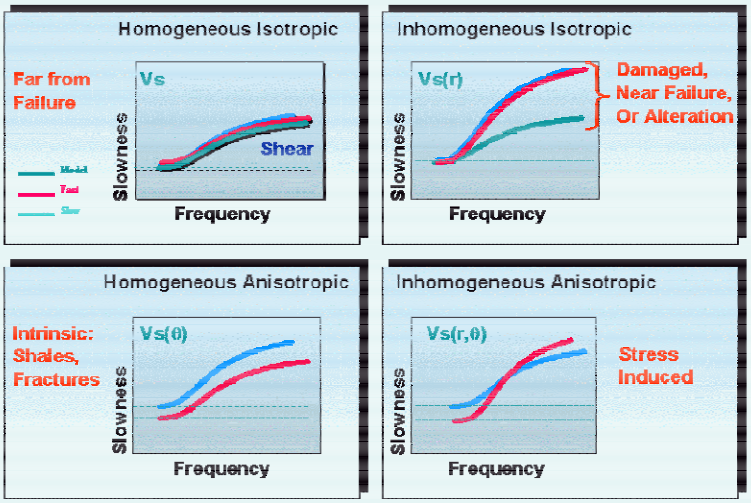
8000

MD 1 : 240 ft							
	BAD	PEx Li	AHT90 0.2 (ohm.m) 2000	Neutron 0.45 (ft3/ft3) −0.15	DTShear (us/ft)	VPVS ( )	40
TENS (lbf)	HOLE 0 ( ) 10	VCL_HILT 0 (ft3/ft3) 2	AHT60 0.2 (ohm.m) 2000	SonPor@47.5 0.45 (ft3/ft3) −0.15	DTShear 400 (us/ft) 0	Poissons Ratio ( )	S 40
	GR 0 −150 0 (gAPI) 150	GR	AHT30 0.2 (ohm.m) 2000	Bulk Density 1.95 (g/cm3) 2.95	DT−Comp. (us/ft)	VPVS 0 ( ) 5	
	Hole Ovality		AHT20 0.2 (ohm.m) 2000	N−Dcrossover	DT−Comp. 400 (us/ft) 0	Poissons Ratio 0 ( ) 0.5	
	GR 150 − 300		AHT10 0.2 (ohm.m) 2000				
	GR 150 − 300 150 (gAPI) 300						
	Hole Diam 2 5 (in) 15						
	BS 5 (in) 15						
	Hole Diam 1 5 (in) 15						
	Washout						
	Mudcake						





Modular Sonic Imaging Platfo

Tool Concept −

- **A wide−frequency−band tool that enables formation characterizatio**
  - **homogeneous or inhomoge**
  - **isotropic or anisotropic**
- **Long and Short monopole transm receiver spacing**
- **A tool that is fully characterized v predictable acoustics**

Geophysics **Geomechanics** **Petro**

Applications

- Improved seismic tie
- Improved time/depth relationship
- Better 3D seismic analysis
- Polar anisotropy (VTI)
- Shear synthetics

Applications

- Sanding prediction
- Wellbore stability
- Rock mechanics
- Selective perforating (sand control)

Appl

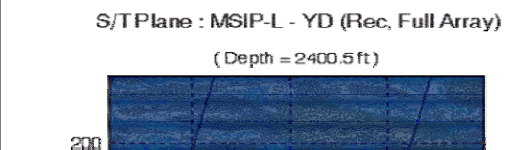
- Alteration
- Radial prof
- Mechanica
- Gas detect

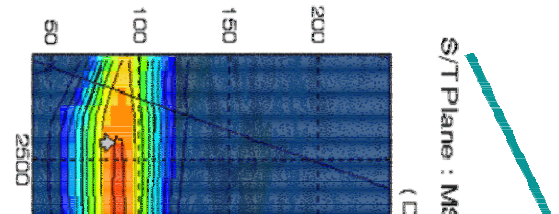
Features

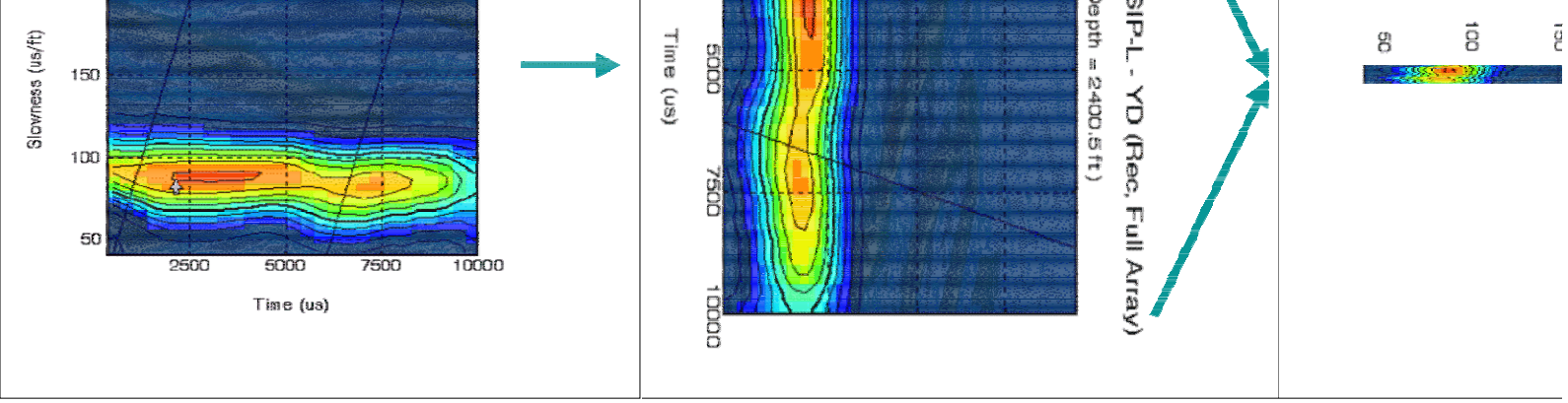
- Robust measurement of compressional and shear slowness (ΔT_c and ΔT_s)
- Increased logging speed
- Multiple monopole transmitter and receiver spacing
- High fidelity wideband waveform s and dispersion curves
- Large receiver array
- Predictable acoustics
- Cement bond log (CBL) and variable density log (VDL) measurement
- Improved behind casing measurement with CBL/VDL simultaneous acquisition
- Extremely robust electronic package

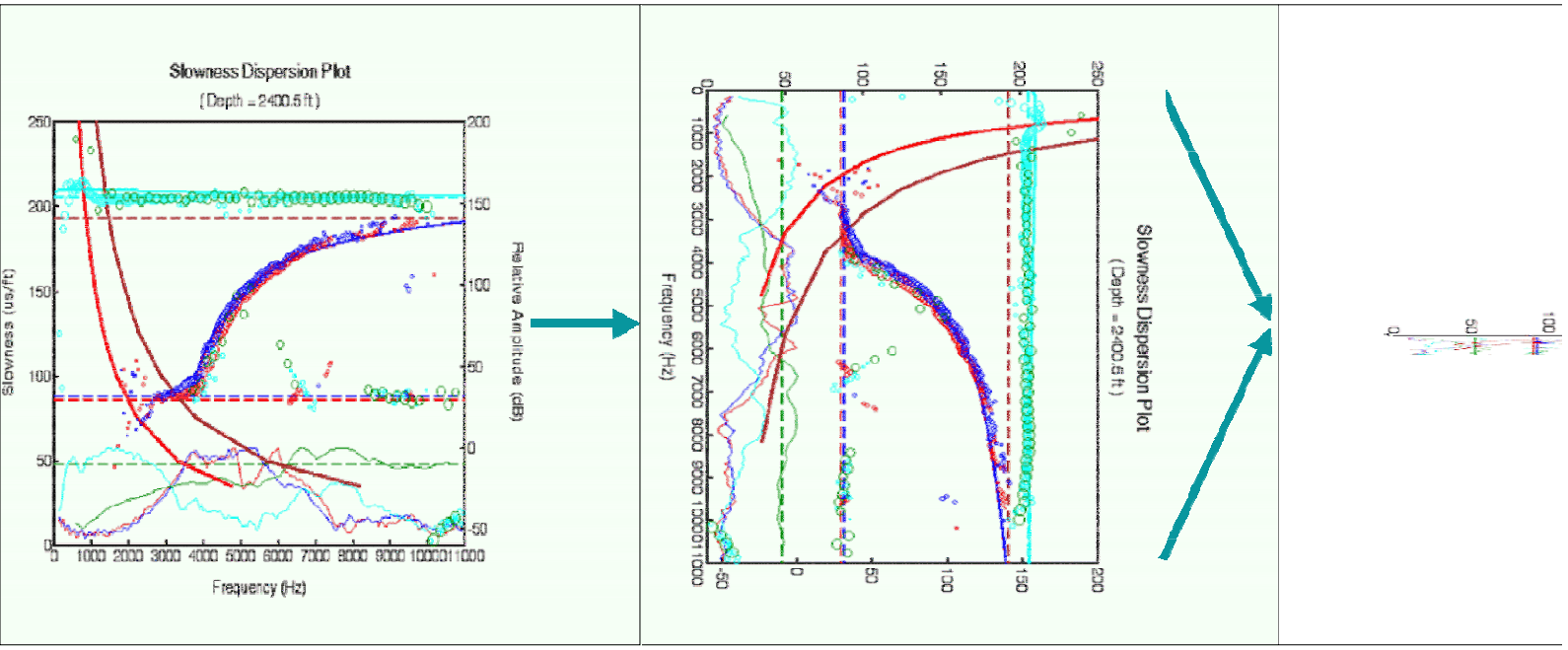
- Reduced
- Decrease
- Eliminate
- Fewer "n
- Reduction
- Eliminate
- Real-time wellsite q
- Real-time

Quality Control Projectio









Technical Paper References:

SPWLA 1884889
"A Modular Wireline Sonic Tool for Measurements of 3D (Aimuthal, Radial, and Axial), Formation Acous
New Orleans, Louisiana, USA, June 26−29, 2005.

SPWLA 1534256
"Slowness−Frequency Projection Logs: A New QC Method for Accurate Sonic Slowness Evaluation";
and D. Murray; 46th Annual SPWLA in New Orleans, Louisiana, USA, June 26−29, 2005.

Output Channels From This Processing:

```
DESCRIPTION OF BASIC MSIP OUTPUT CURVES
---------------------------------
```

```
Name                Description

DT1R---         DT-Shear from Y-Dipole - Receiver Array
DT1T---         DT-Shear from Y-Dipole - Transmitter Array
CHR1---         Peak Coherence for Y-Dipole   Receiver Array
CHT1---         Peak Coherence for Y-Dipole   Transmitter Array
SPR1---         STC Slowness Projection for Y-Dipole   Receiver Array
SPT1---         STC Slowness Projection for Y-Dipole   Transmitter Array

DT1R---         DT-Shear from X-Dipole - Receiver Array
DT1T---         DT-Shear from X-Dipole - Transmitter Array
CHR2---         Peak Coherence for X-Dipole   Receiver Array
CHT2---         Peak Coherence for X-Dipole   Transmitter Array
SPR2---         STC Slowness Projection for X-Dipole   Receiver Array
SPT2---         STC Slowness Projection for X-Dipole   Transmitter Array

DT3R---         DT-Stoneley from Monopole-Far-LF - Receiver Array
DT3T---         DT-Stoneley from Monopole-Far-LF - Transmitter Array
DTST---         DT-Stoneley from Monopole-Far-LF - Average of Receiver and Transmitter Arrays
CHR3---         Peak Coherence for Monopole-Far-LF   Receiver Array
CHT3---         Peak Coherence for Monopole-Far-LF   Transmitter Array
SPR3---         STC Slowness Projection for Monopole-Far-LF   Receiver Array
SPT3---         STC Slowness Projection for Monopole-Far-LF   Transmitter Array

DT4P---         DT-Compressional from Monopole-Far-8K - Average of Receiver and Transmitter Arrays
DT4S---         DT-Shear from Monopole-Far-8K - Average of Receiver and Transmitter Arrays
DTRP---         DT-Compressional from Monopole-Far-8K - Receiver Array
DTTP---         DT-Compressional from Monopole-Far-8K - Transmitter Array
DTRS---         DT-Shear from Monopole-Far-8K - Receiver Array
DTTS---         DT-Shear from Monopole-Far-8K - Transmitter Array
CHRP---         Peak Coherence for Monopole-Far-8K   Receiver Array
CHTP---         Peak Coherence for Monopole-Far-8K   Transmitter Array
SPR4---         STC Slowness Projection for Monopole-Far-8K   Receiver Array
SPT4---         STC Slowness Projection for Monopole-Far-8K   Transmitter Array

DTSM---         A general name for DT-Shear
DTCO---         A general name for DT-Compressional

DTEXR---         DT-Shear from Fast or Slow dipole waveforms processing in BestDt - Receiver Array
DTEXT---         DT-Shear from Fast or Slow dipole waveforms processing in BestDt - Transmitter Array
DTSM_FAST---         Fast DT-Shear from "Post-Anisotropy" processing
DTSM_SLOW---         Slow DT-Shear from "Post-Anisotropy" processing
CHREX---         Peak Coherence for Fast or Slow dipole waveforms processing in BestDt -  Receiver Ar
CHTEX---         Peak Coherence for Fast or Slow dipole waveforms processing in BestDt - Transmitter
SPREX---         STC Slowness Projection for Fast or Slow dipole waveforms processing in BestDt -  Re
SPTEX---         STC Slowness Projection for  Fast or Slow dipole waveforms processing in BestDt - Tr

TISH----         Shear Total Travel Time
TICO----         Compressional Total Travel Time

VPVS----         (DT-Shear/Dt-Compressional ratio)
PR------         (POISSON RATIO =((0.5*VPVS*VPVS)-1)/((VPVS*VPVS) -1))


>>>>>>LOGGING MODES>>>>>>

BASIC CONFIGURATION / CONCISE MODE:
        MU -- Monopole Upper
        ML -- Monopole Lower

FULL CONFIGURATION / ALL MODE:
        MU -- Monopole Upper
        ML -- Monopole Lower
        MF -- Monopole Far
        XD_DIIN -- X-Dipole In-Line
        XD_DIOF -- X-Dipole Off-Line
        YD_DIIN -- Y-Dipole In-Line
        YD_DIOF -- Y-Dipole Off-Line

(Note: Availability of XDIN, XDOF, YDIN and YDOF waveforms are necessary for Anisotropy analysis).
```

COMPANY:	**Conoco Phillips Company**
WELL:	**Tebo3−1P**
FIELD:	**Wildcat**
County:	**Arapahoe**
State:	**Colorado**
COUNTRY:	**USA**

API No.: 05−005−07197 **Job No.: CCN1−00002**