

HALLIBURTON

DUAL SPACED NEUTRON
SPECTRAL DENSITY
FIELD PRINT

| | | | |
|--------------------------|-------------------------|------------------------------------|------|
| COMPANY | | KERR-MCGEE OIL & GAS ONSHORE LP | |
| WELL | | CANNON 22-3 | |
| FIELD | | WATTENBERG | |
| COUNTY | | WELD | |
| STATE | | CO | |
| Permanent Datum | | GL | |
| Log measured from | | KB | |
| Drilling measured from | | KB | |
| Date | 12-Jul-11 | | |
| Run No. | ONE | | |
| Depth - Driller | 8086.00 ft | | |
| Depth - Logger | 8030.0 ft | | |
| Bottom - Logged Interval | 8007 ft | | |
| Top - Logged Interval | CSG | | |
| Casing - Driller | 8.625 in @ 747.0 ft | | |
| Casing - Logger | 3525.0 ft | | |
| Bit Size | 7.875 in | | |
| Type Fluid in Hole | WATER BASED MUD | | |
| Density | 8.4 ppq | 26.00 | s/qt |
| PH | 26.00 pH | 0.0 | cp/m |
| Source of Sample | MUD CELL | | |
| Rm @ Meas. Temperature | 0.950 ohmm @ 75.00 degF | @ | |
| Rmf @ Meas. Temperature | 0.80 ohmm @ 75.00 degF | @ | |
| Rmc @ Meas. Temperature | 0.867 ohmm @ 75.00 degF | @ | |
| Source Rmf | CHART | CHART | |
| Rm @ BHT | 0.37 ohmm @ 205.0 degF | @ | |
| Time Since Circulation | 10.0 hr | | |
| Time on Bottom | 12-Jul-11 11:38 | | |
| Max. Rec. Temperature | 205.0 degF @ 8035.0 ft | @ | |
| Equipment | 11454566 | BRIGHTON | |
| Recorded By | F. LODER | | |
| Witnessed By | J. ADAMS | W. TEKELL | |

| | |
|-----------------|---|
| COMPANY | KERR-MCGEE OIL & GAS ONSHORE LP |
| WELL | CANNON 22-3 |
| FIELD | WATTENBERG |
| COUNTY | WELD |
| STATE | CO |
| API No. | 05123325590000 |
| Location | SURFACE: 2006' FNL & 631' FWL FMNW BOTTOM: 2408' FNL & 1368' FWL SENW LAT: 40.169143° LONG: -104.656954° |
| Other Services: | |

| | | | | | | | | | | |
|-------|---|------|----|------|-----|-------|-----------|-------|-----------|-----------|
| Sect. | 3 | Twp. | 2N | Rge. | 65W | Elev. | 4847.0 ft | Elev. | K.B. | 4861.0 ft |
| | | | | | | D.F. | 4860.0 ft | G.L. | 4847.0 ft | |

Fold here

| | | | | | | | | | | | | | | | |
|---|--|------------|--|--------------------------------|--|--|--|---|--|-----------------|--|---------------|--|-----------------|--|
| Service Ticket No.: 8311650 | | | | API Serial No.: 05123325590000 | | | | PGM Version: WL INSITE R3.2.5 (Build 2) | | | | | | | |
| CHANGE IN MUD TYPE OR ADDITIONAL SAMPLE | | | | | | | | RESISTIVITY SCALE CHANGES | | | | | | | |
| Date | | Sample No. | | | | | | Type Log | | Depth | | Scale Up Hole | | Scale Down Hole | |
| Depth-Driller | | | | | | | | | | | | | | | |
| Type Fluid in Hole | | | | | | | | | | | | | | | |
| Density | | Viscosity | | | | | | | | | | | | | |
| Ph | | Fluid Loss | | | | | | | | | | | | | |
| Source of Sample | | | | | | | | RESISTIVITY EQUIPMENT DATA | | | | | | | |
| Rm @ Meas. Temp | | @ | | @ | | | | Run No. | | Tool Type & No. | | Pad Type | | Tool Pos. | |
| Rmf @ Meas. Temp. | | @ | | @ | | | | OEN | | SACRt 714-718 | | N/A | | FREE | |
| Rmc @ Meas. Temp. | | @ | | @ | | | | | | | | | | | |
| Source Rmf | | Rmc | | | | | | | | | | | | | |
| Rm @ BHT | | @ | | @ | | | | | | | | | | | |
| Rmf @ BHT | | @ | | @ | | | | | | | | | | | |
| Rmc @ BHT | | @ | | @ | | | | | | | | | | | |
| EQUIPMENT DATA | | | | | | | | | | | | | | | |
| GAMMA | | | | ACOUSTIC | | | | DENSITY | | | | NEUTRON | | | |
| Run No. | | ONE | | Run No. | | | | Run No. | | ONE | | Run No. | | ONE | |
| Serial No. | | 11577722 | | Serial No. | | | | Serial No. | | M43P31N34 | | Serial No. | | 11581734 | |
| Model No. | | S4TG | | Model No. | | | | Model No. | | SSDL | | Model No. | | SDSN | |
| Diameter | | 2.35" | | No. of Cent. | | | | Diameter | | 2.35" | | Diameter | | 2.35" | |
| Detector Model No. | | 2G8BICORN | | Spacing | | | | Log Type | | GAM-GAM | | Log Type | | NEU-NEU | |
| Type | | SCINT | | | | | | Source Type | | Cs137 | | Source Type | | Am241Be | |
| Length | | 8" | | LSA [Y/N] | | | | Serial No. | | 5265GW | | Serial No. | | DSN434 | |
| Distance to Source | | 10' | | FWDA [Y/N] | | | | Strength | | 1.5 Ci | | Strength | | 15 Ci | |
| LOGGING DATA | | | | | | | | | | | | | | | |
| GENERAL | | | | GAMMA | | | | ACOUSTIC | | | | DENSITY | | | |
| | | | | | | | | | | | | | | | |

| GENERAL | | | GAMMA | | ACOUSTIC | | DENSITY | | NEUTRON | | | | | | | | | | |
|---|-------|-------|--------|-------|----------|-------|---------|--------|---------|-----|-----------|-------|-----|--------|--------------------|---|--|--|--|
| Run | Depth | | Speed | Scale | | Scale | | Matrix | Scale | | Matrix | Scale | | Matrix | | | | | |
| No. | From | To | ft/min | L | R | L | R | | L | R | | L | R | | | | | | |
| ONE | 8030' | 3525' | REC | 0 API | 200 API | | | | 20 % | 0 % | 2.71 g/cc | 20 % | 0 % | LIME | | | | | |
| | | | | | | | | | | | | | | | | | | | |
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| DIRECTIONAL INFORMATION | | | | | | | | | | | | | | | | | | | |
| Maximum Deviation | | | | | | | | @ | KOP | | | | | | | @ | | | |
| Remarks: SCH-S4TG-SDSN-SSDL-SACT RAN IN COMBINATION | | | | | | | | | | | | | | | | | | | |
| TENSION PULLS AND BOREHOLE RUGOSITY AFFECT LOG RESPONSE | | | | | | | | | | | | | | | | | | | |
| ANNULAR HOLE VOLUME CALCULATED USING 4.5 INCH PRODUCTION CASING | | | | | | | | | | | | | | | | | | | |
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| CREW: M. BURNETT, R. PERSHALL | | | | | | | | | | | | | | | RIG: PATTERSON 189 | | | | |
| THANK YOU FOR USING HALLIBURTON ENERGY SERVICES -- BRIGHTON, CO -- 303.825.4346 | | | | | | | | | | | | | | | | | | | |
| HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OR WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS, OR RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF. | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | HALLIBURTON | | | | |



PARAMETERS REPORT

| Depth (ft) | Tool Name | Mnemonic | Description | Value | Units |
|------------|-----------|----------|---|------------|-------|
| TOP | | | | | |
| | SHARED | BS | Bit Size | 7.875 | in |
| | SHARED | UBS | Use Bit Size instead of Caliper for all applications. | No | |
| | SHARED | MDBS | Mud Base | Water | |
| | SHARED | MDWT | Borehole Fluid Weight | 8.400 | ppg |
| | SHARED | WAGT | Weighting Agent | Natural | |
| | SHARED | BSAL | Borehole salinity | 0.00 | ppm |
| | SHARED | FSAL | Formation Salinity NaCl | 0.00 | ppm |
| | SHARED | KPCT | Percent K in Mud by Weight? | 0.00 | % |
| | SHARED | RMUD | Mud Resistivity | 0.950 | ohmm |
| | SHARED | TRM | Temperature of Mud | 75.0 | degF |
| | SHARED | CSD | Logging Interval is Cased? | No | |
| | SHARED | ICOD | AHV Casing OD | 4.500 | in |
| | SHARED | ST | Surface Temperature | 80.0 | degF |
| | SHARED | TD | Total Well Depth | 8066.00 | ft |
| | SHARED | BHT | Bottom Hole Temperature | 200.0 | degF |
| | SHARED | SVTM | Navigation and Survey Master Tool | NONE | |
| | SHARED | AZTM | High Res Z Accelerometer Master Tool | S4TG | |
| | SHARED | TEMM | Temperature Master Tool | NONE | |
| | SHARED | BHSM | Borehole Size Master Tool | NONE | |
| | S4TG | GROK | Process Gamma Ray? | Yes | |
| | S4TG | GRSO | Gamma Tool Standoff | 0.000 | in |
| | S4TG | GEOK | Process Gamma Ray EVR? | No | |
| | S4TG | TPOS | Tool Position | Eccentered | |
| | SDSN | DNOK | Process DSN? | Yes | |

| | | | | |
|-------|------|-------------------------------------|----------------|------|
| SDSN | DNOK | Process DSN? | Yes | |
| SDSN | DEOK | Process DSN EVR? | No | |
| SDSN | NLIT | Neutron Lithology | Limestone | |
| SDSN | DSNO | DSNTool Standoff | 0.000 | in |
| SDSN | DNTP | Temperature Correction Type | None | |
| SDSN | DPRS | DSN Pressure Correction Type | None | |
| SDSN | SHCO | View More Correction Options | No | |
| SDSN | UTVD | Use TVD for Gradient Corrections? | No | |
| SDSN | LHWT | Logging Horizontal Water Tank? | No | |
| SDSN | UCLA | Classic Neutron Parameter utilized? | No | |
| SSDL | DNOK | Process Density? | Yes | |
| SSDL | DNOK | Process Density EVR? | No | |
| SSDL | CB | Logging Calibration Blocks? | No | |
| SSDL | SPVT | SDLT Pad Temperature Valid? | Yes | |
| SSDL | DTWN | Disable temperature warning | No | |
| SSDL | MLPE | Higher PE Accuracy? | No | |
| SSDL | DMA | Formation Density Matrix | 2.710 | g/cc |
| SSDL | DFL | Formation Density Fluid | 1.000 | g/cc |
| SSDL | CLOK | Process Caliper Outputs? | Yes | |
| SACRT | RTOK | Process ACRT? | Yes | |
| SACRT | MNSO | Minimum Tool Standoff | 1.50 | in |
| SACRT | TCS1 | Temperature Correction Source | FP Lwr & FP Up | |
| SACRT | TPOS | Tool Position | Free Hanging | |
| SACRT | RMOP | Rmud Source | Mud Cell | |
| SACRT | RMIN | Minimum Resistivity for MAP | 0.20 | ohmm |
| SACRT | RMIN | Maximum Resistivity for MAP | 200.00 | ohmm |
| SACRT | THQY | Threshold Quality | 0.50 | |

BOTTOM

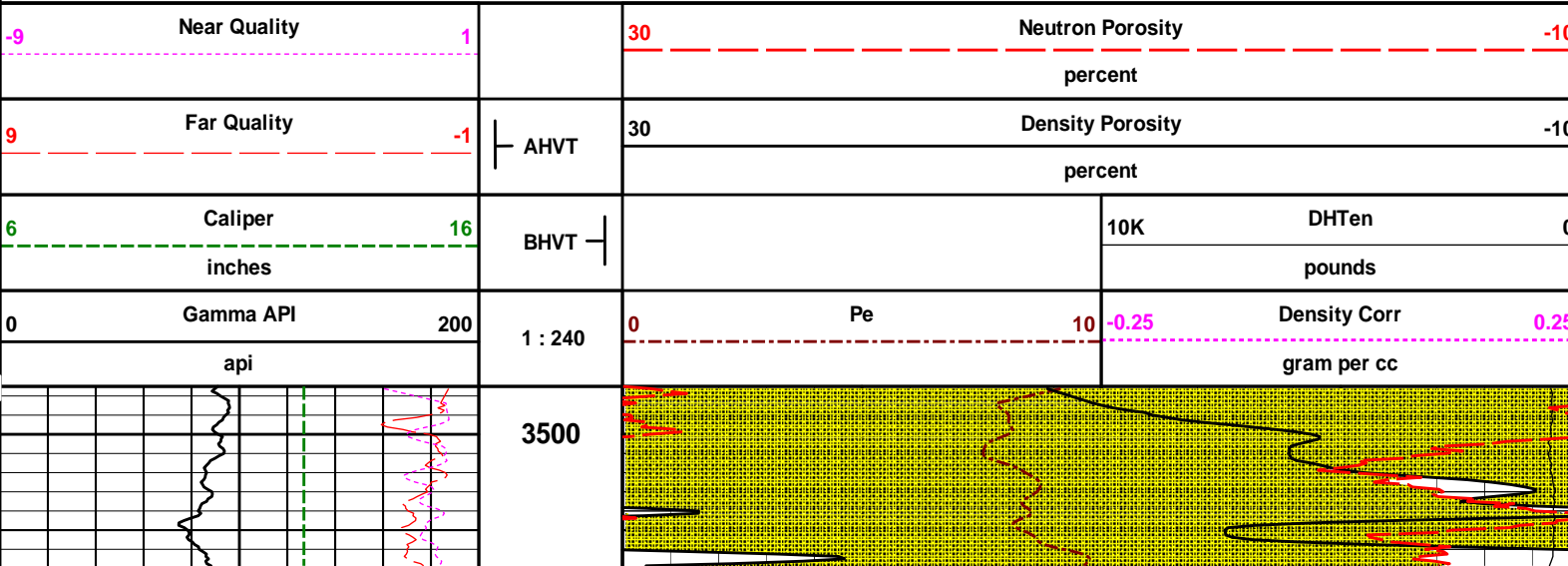
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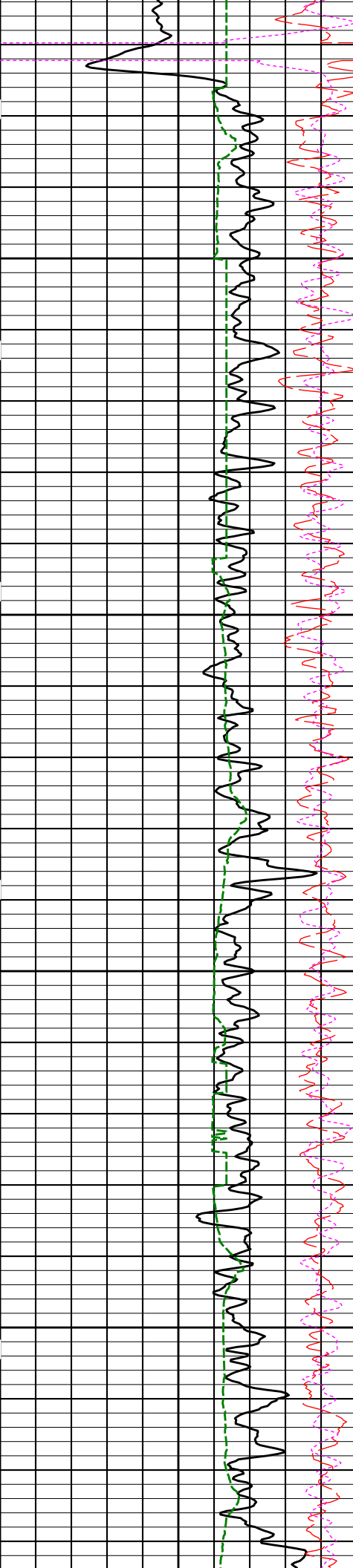
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HALLIBURTON

Plot Time: 12-Jul-11 16:48:17
Plot Range: 3495 ft to 8027.42 ft
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Plot File: \\PORO\Q_POROSITY_5IN_RM

MAIN PASS 5" = 100'



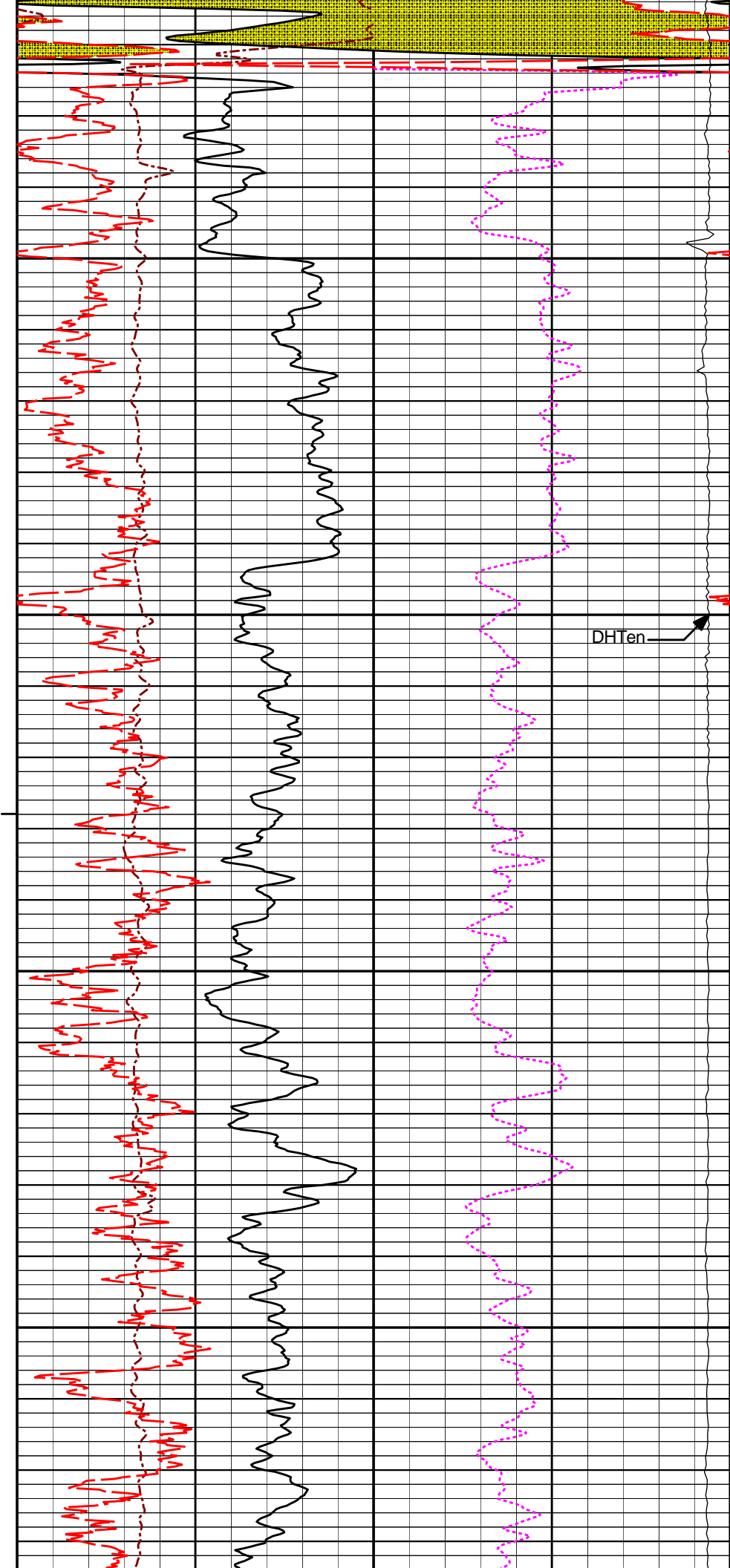


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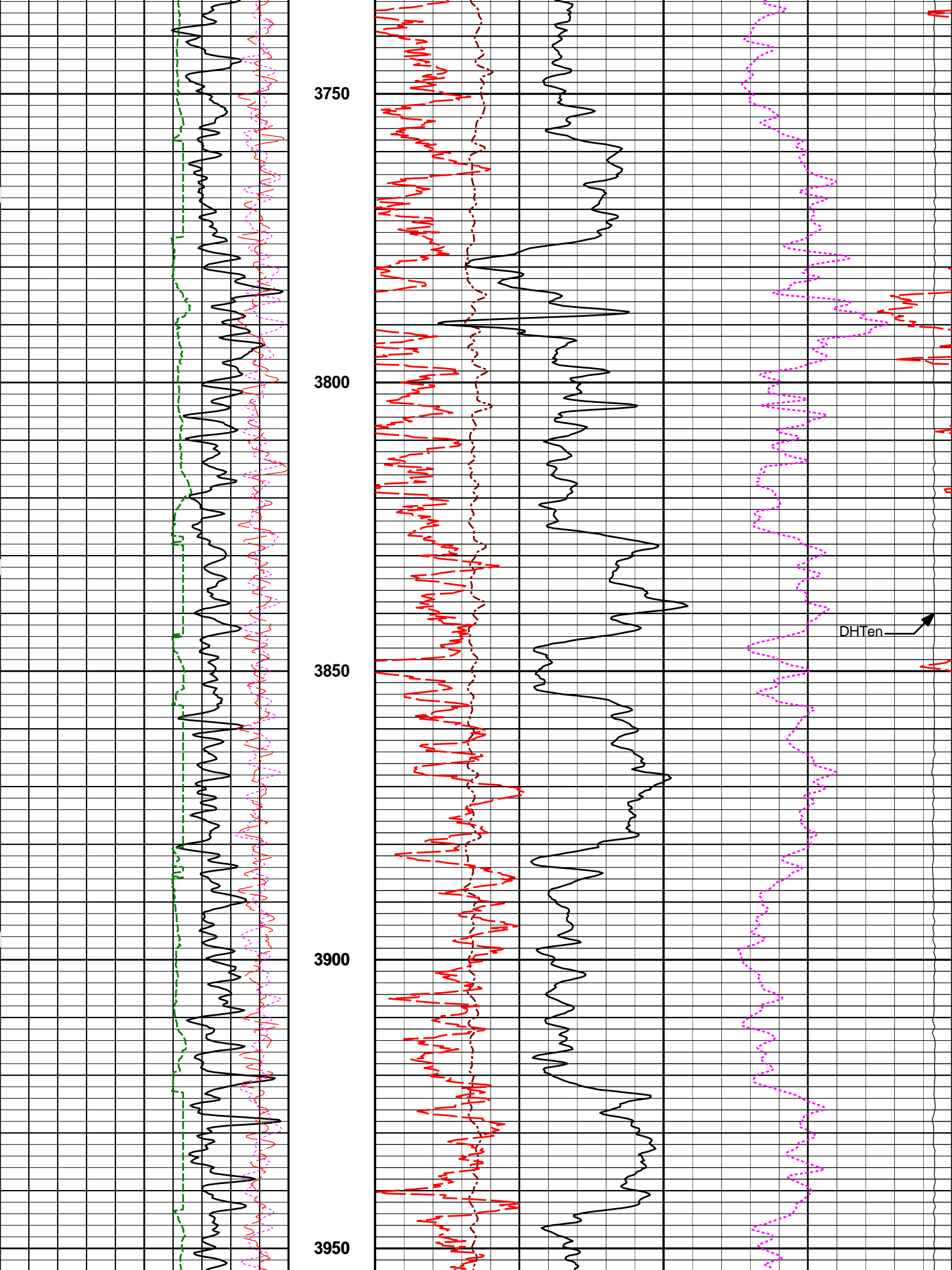
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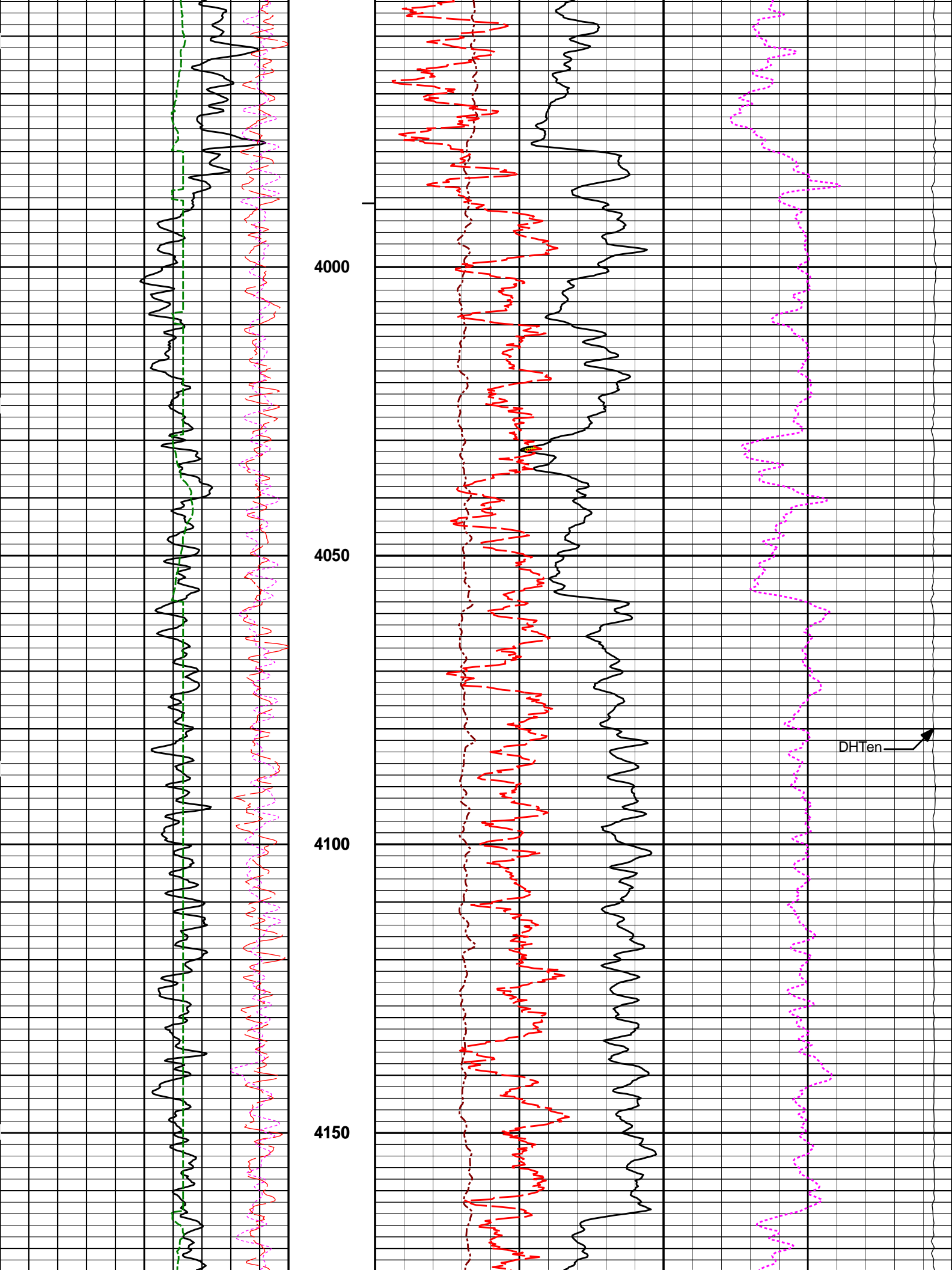
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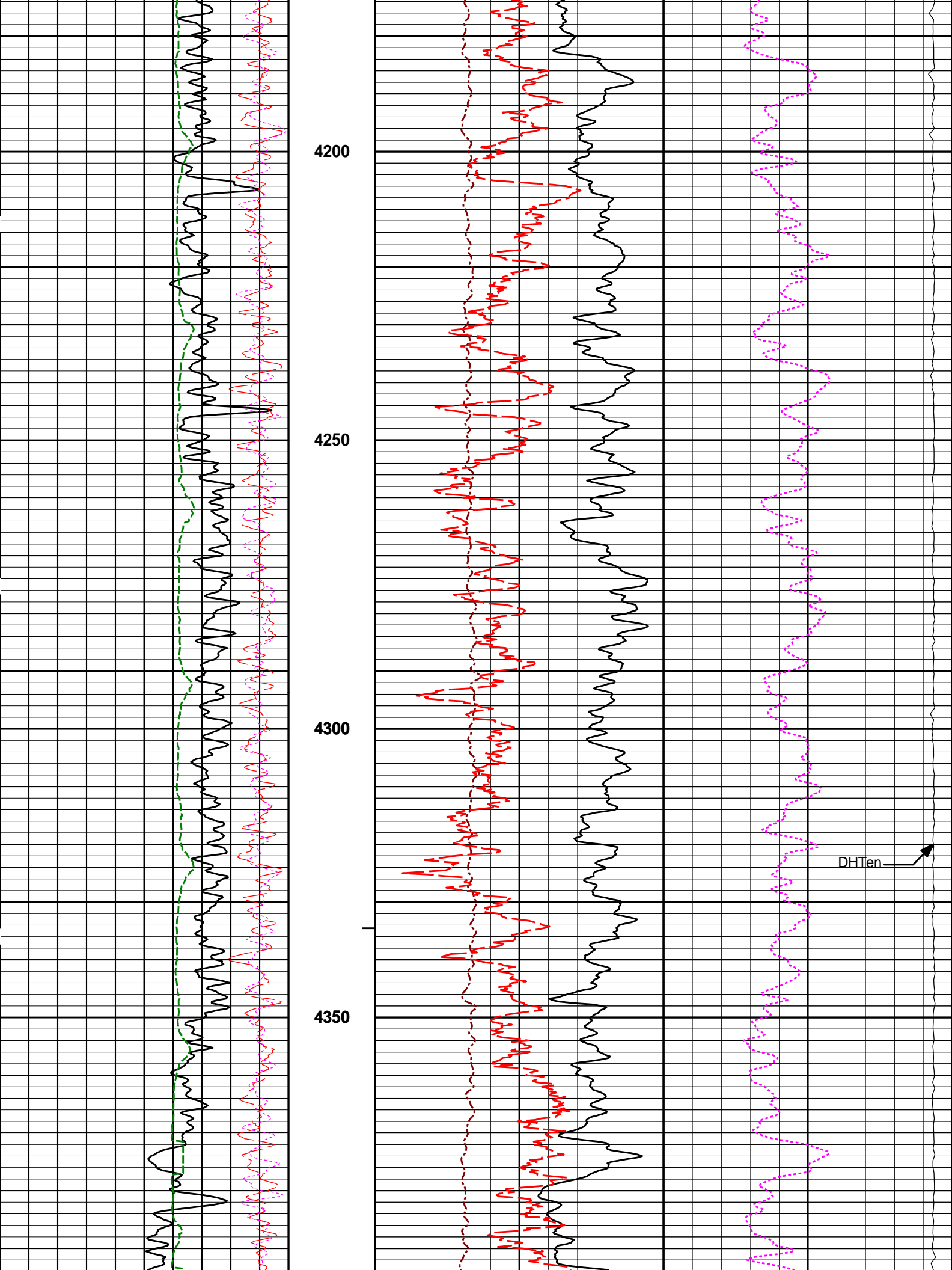
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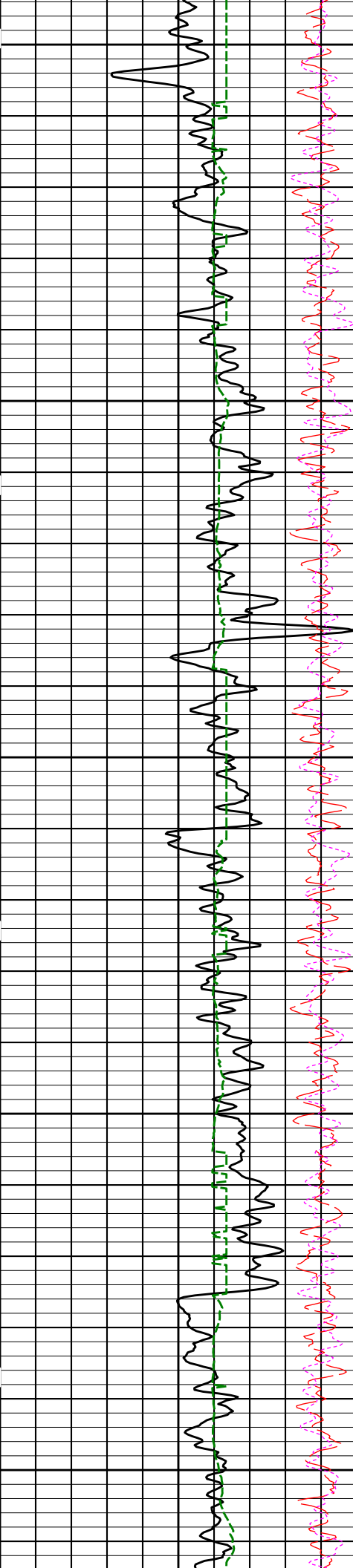


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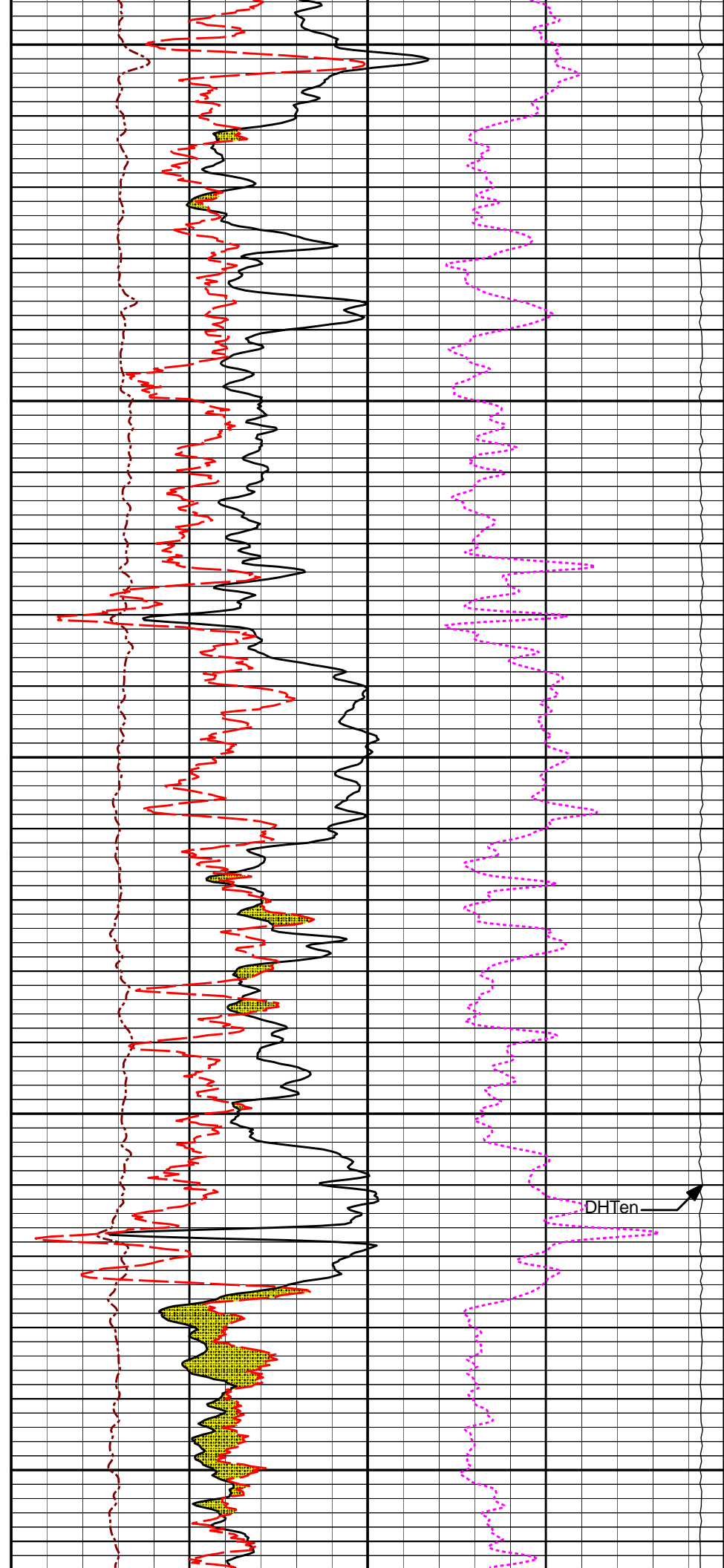
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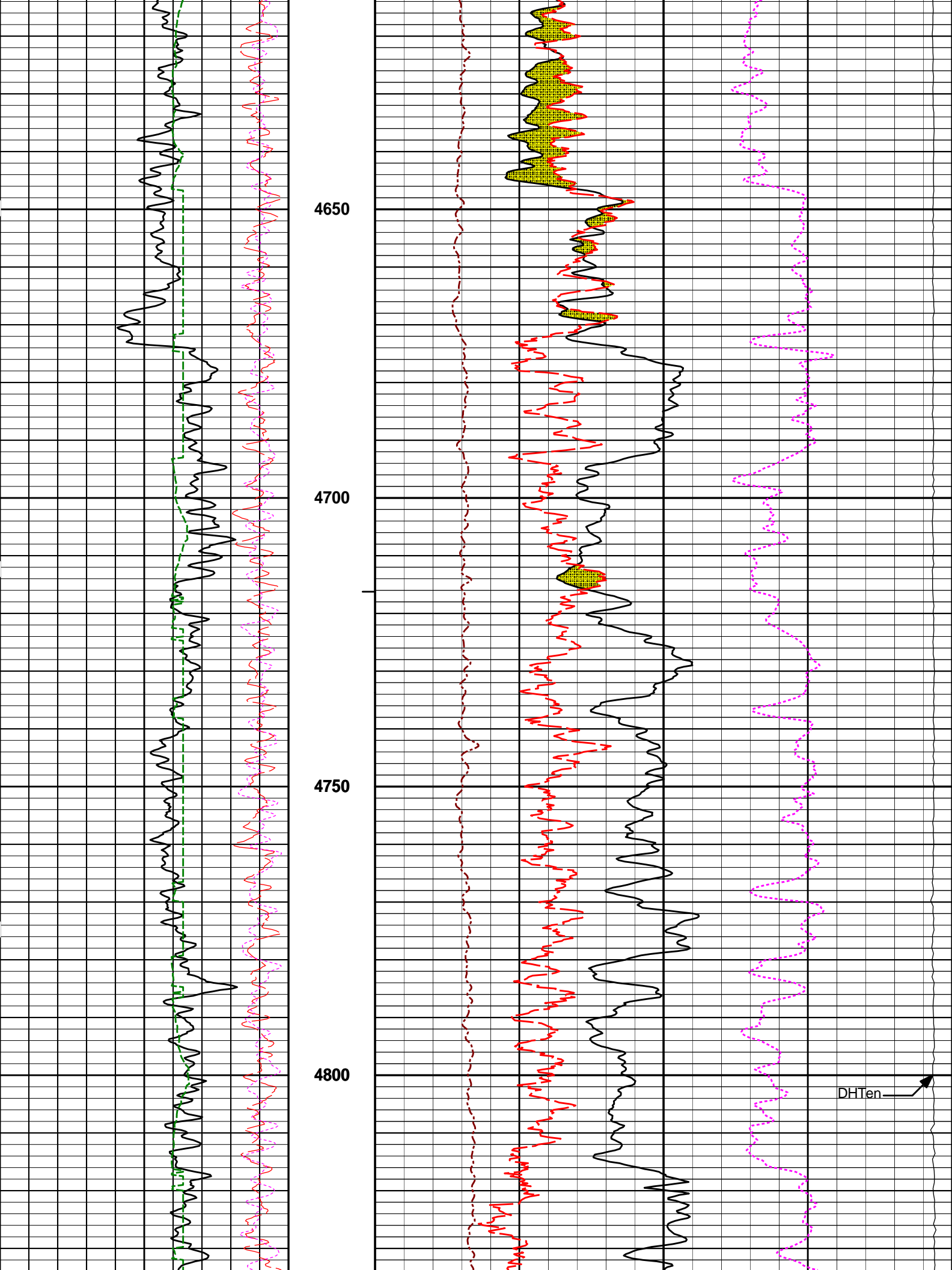
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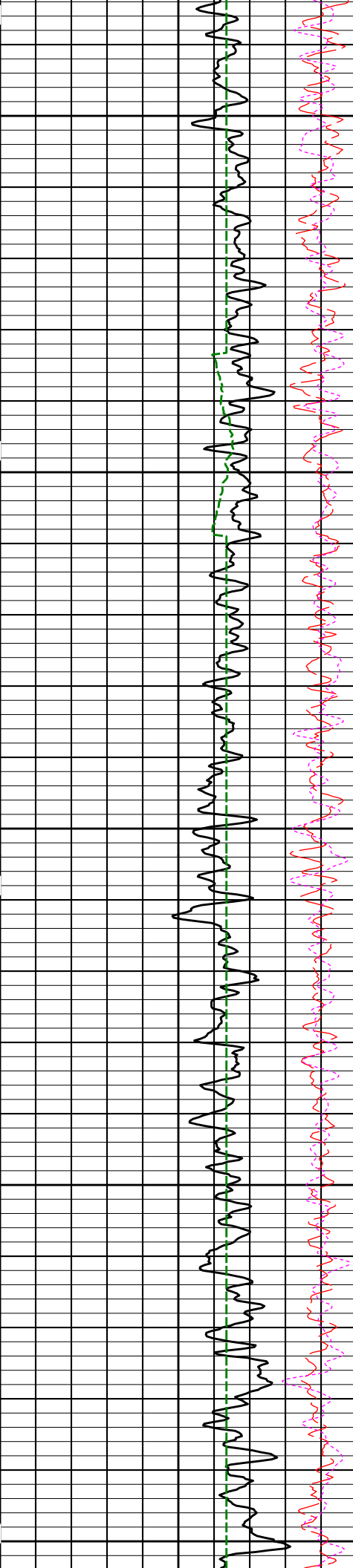
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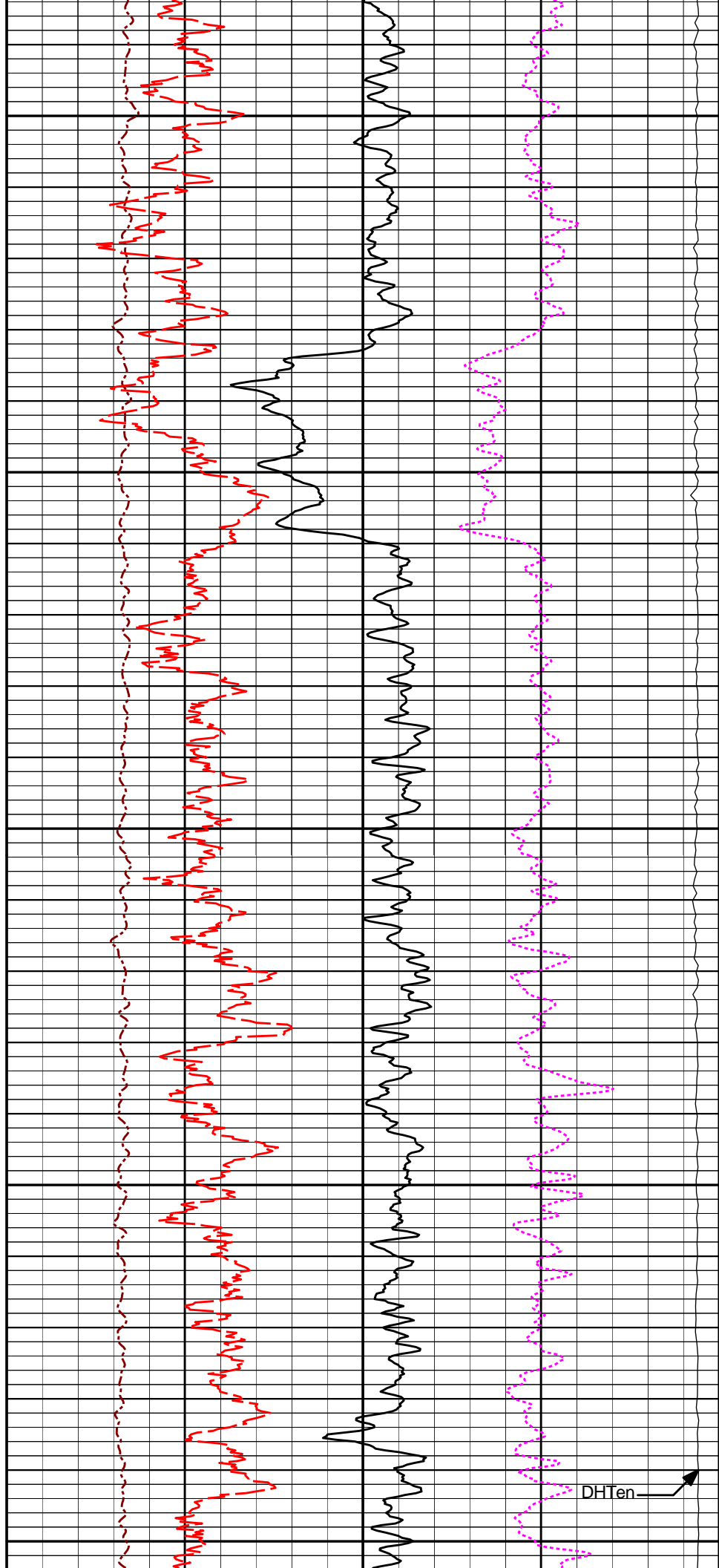
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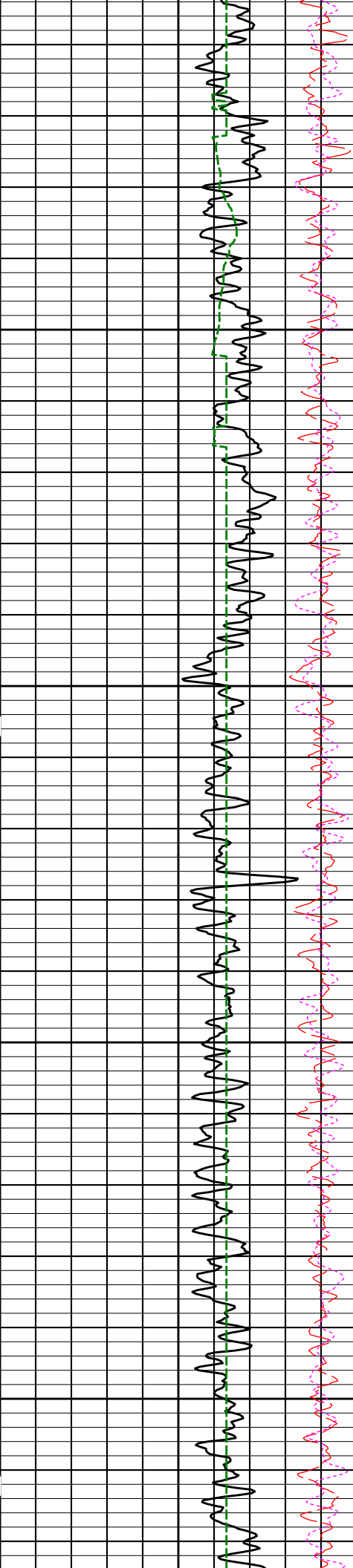
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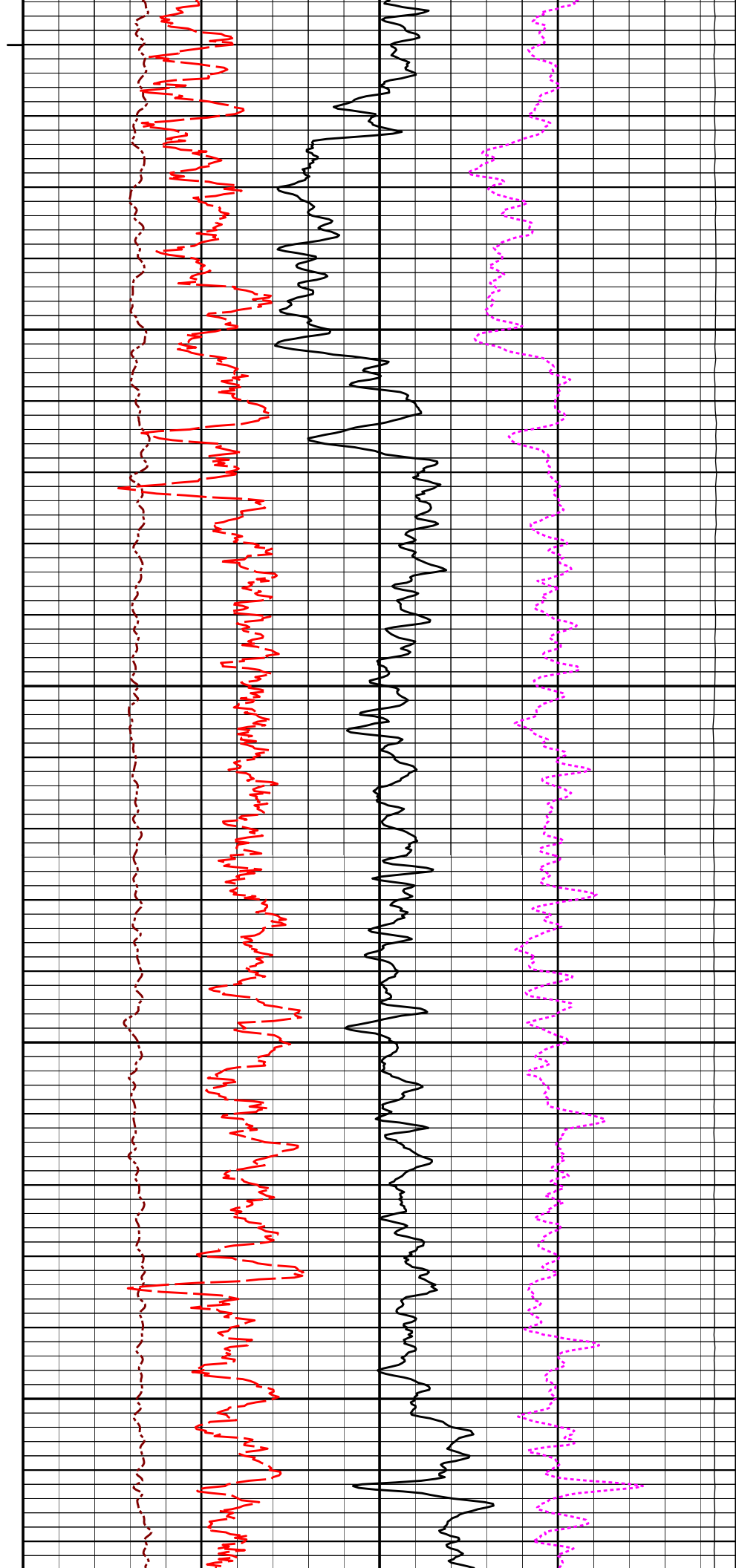


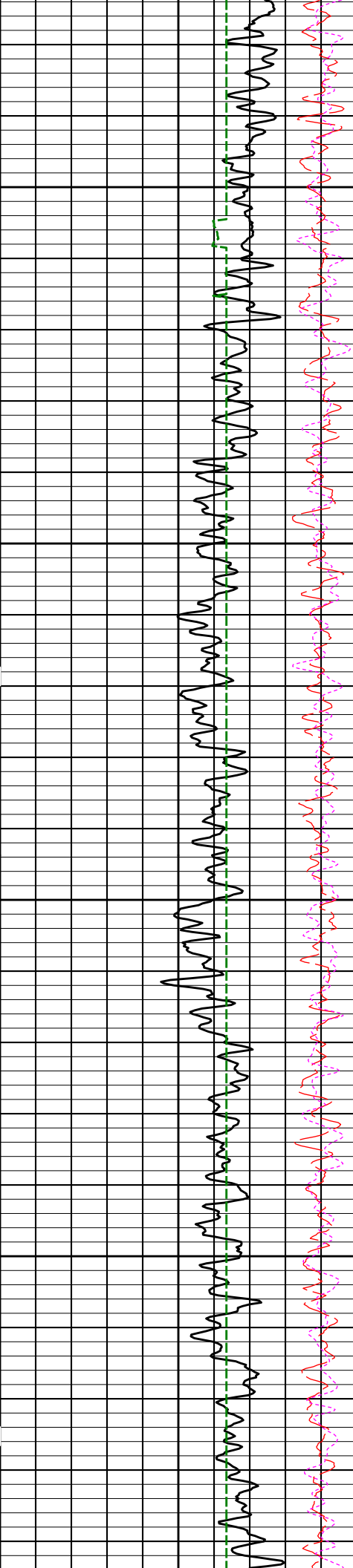
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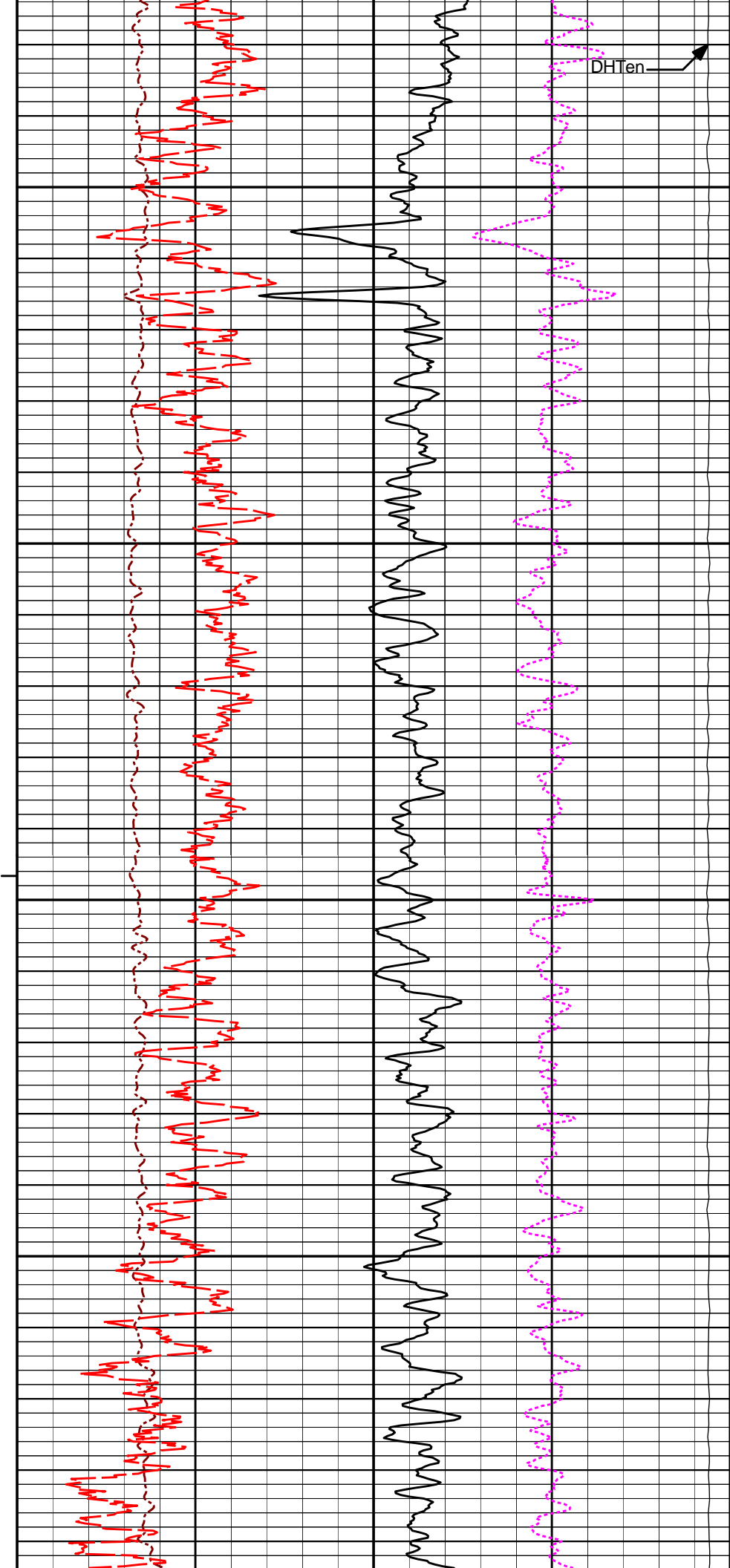


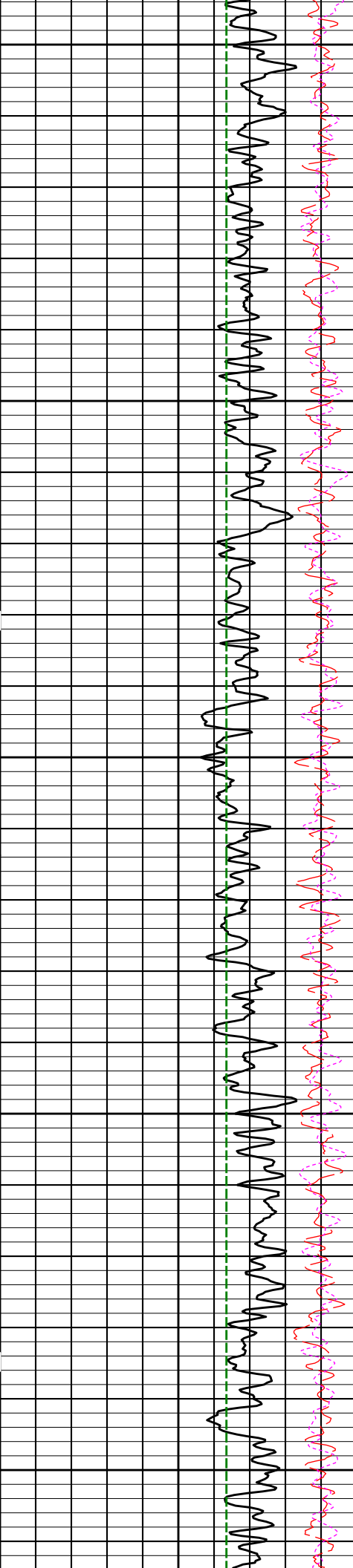
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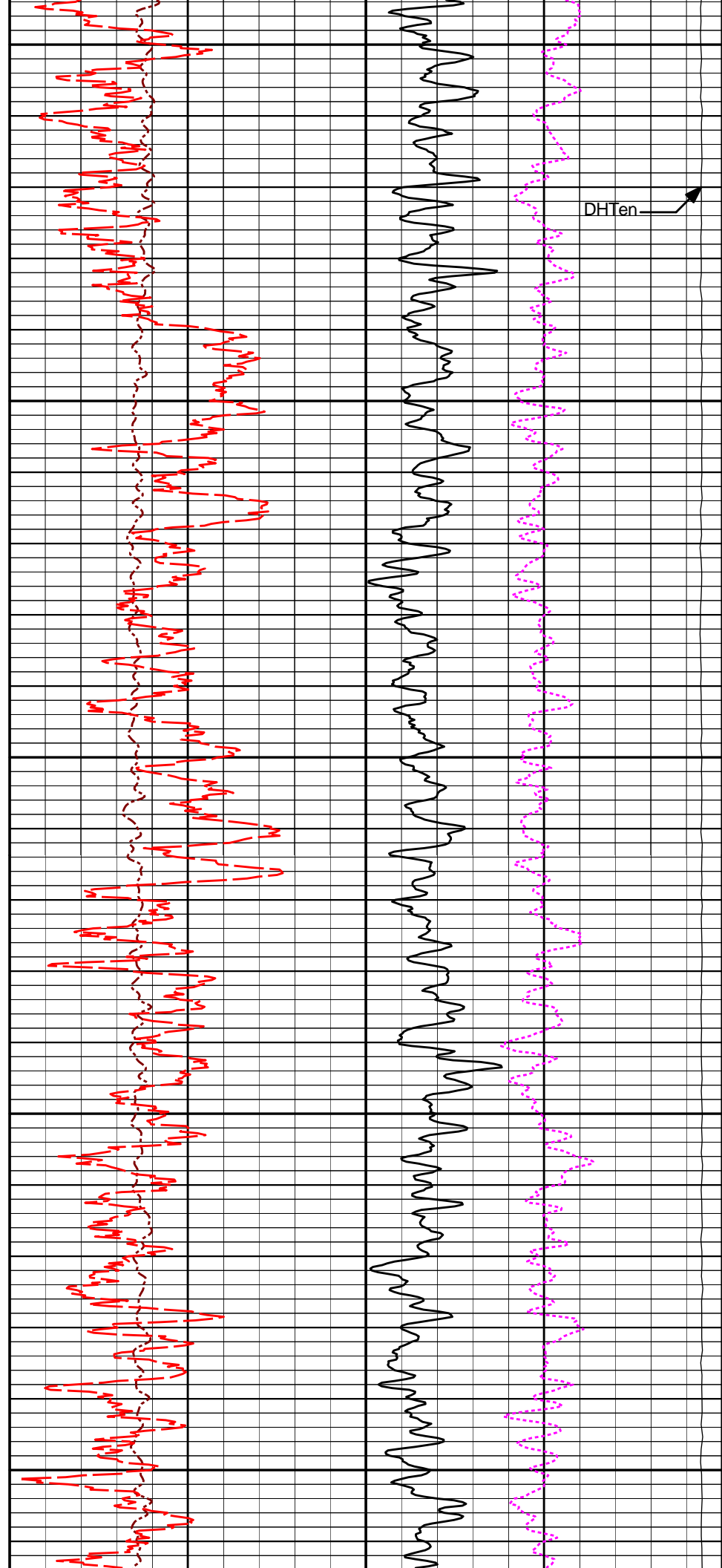
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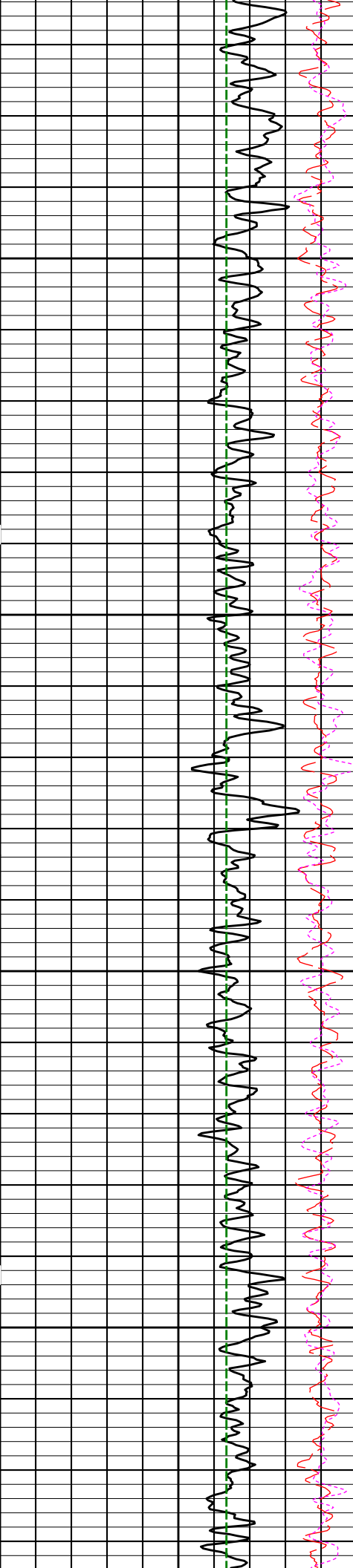
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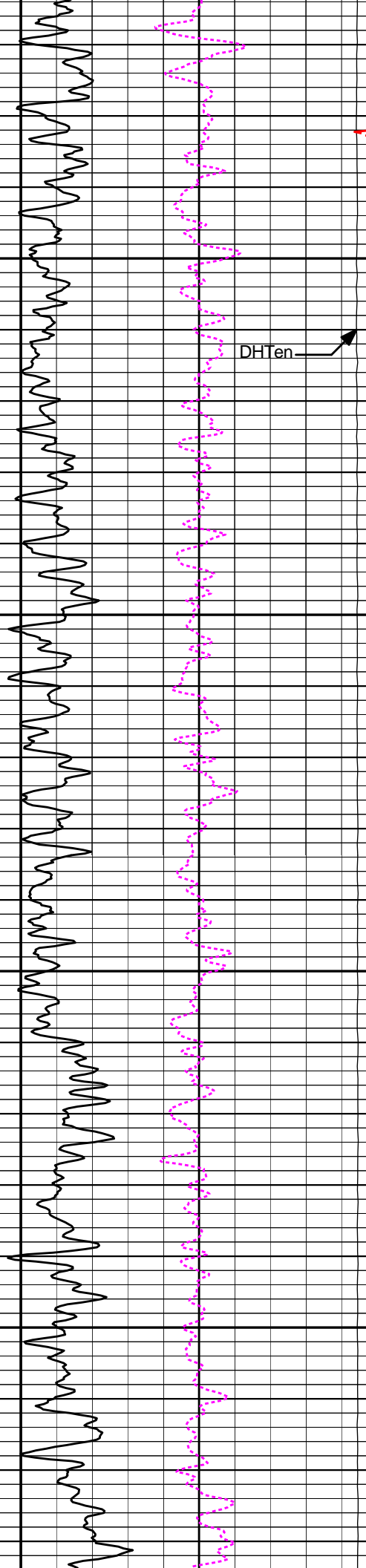
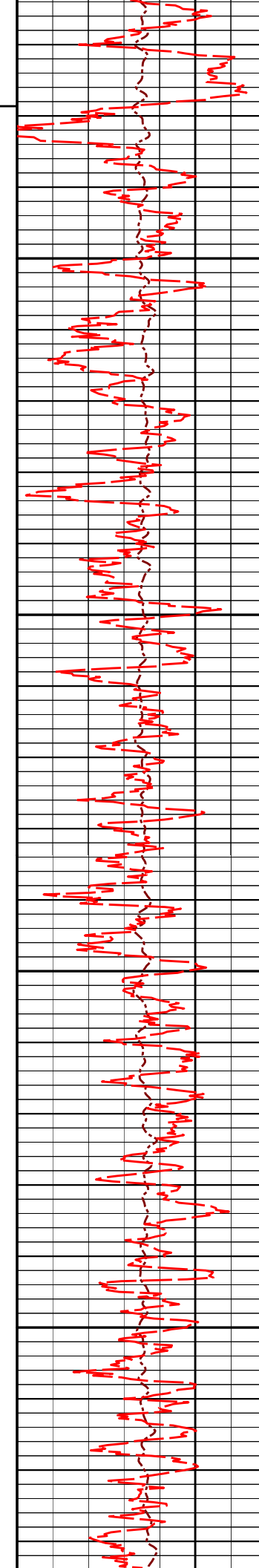


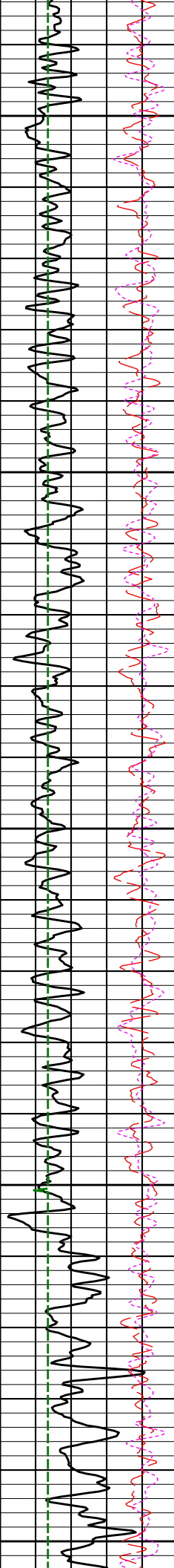
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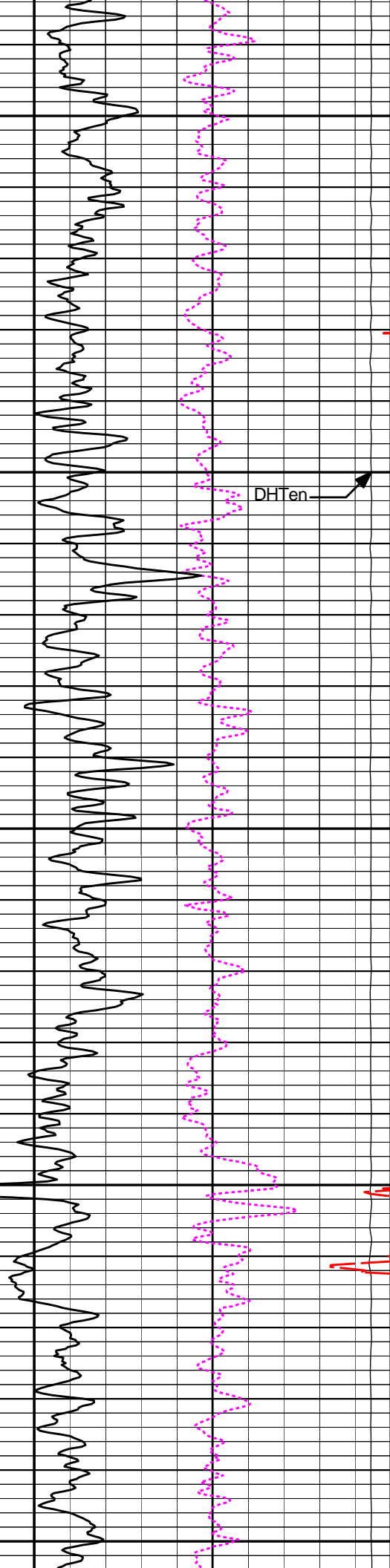
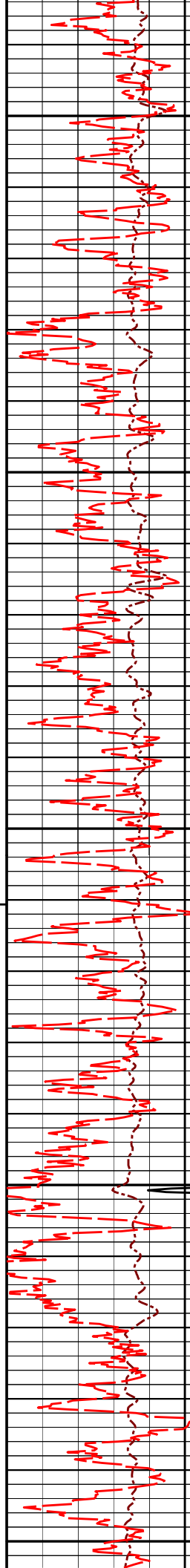
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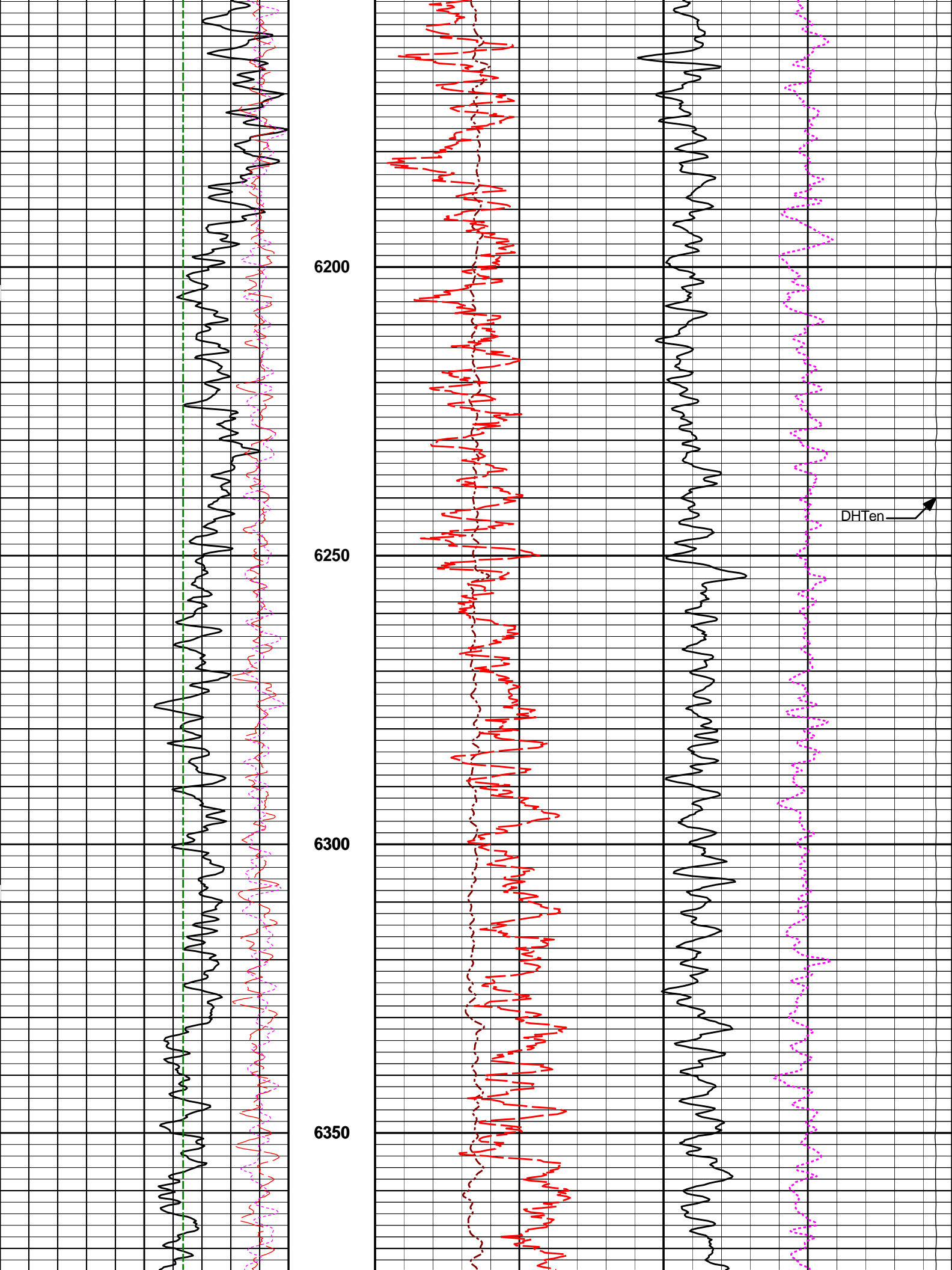
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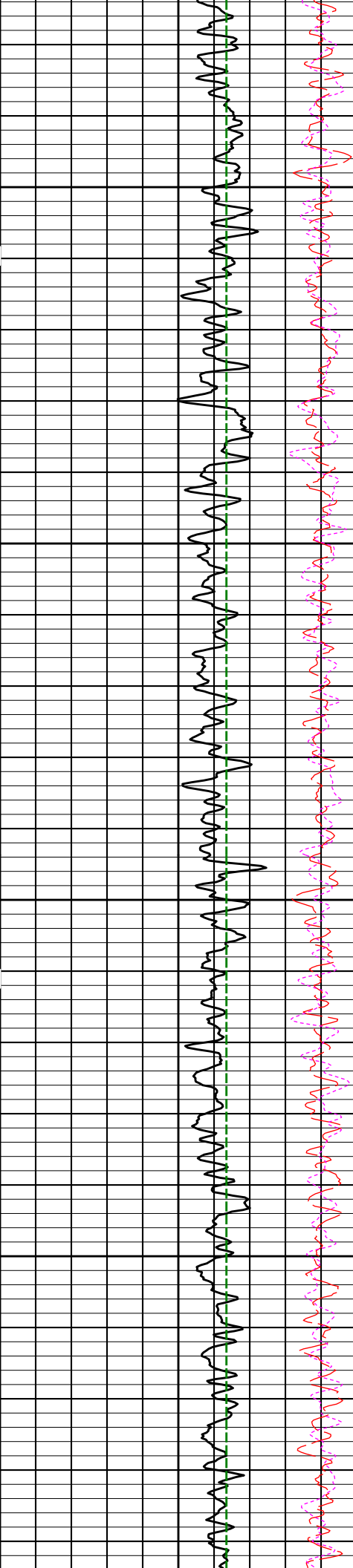
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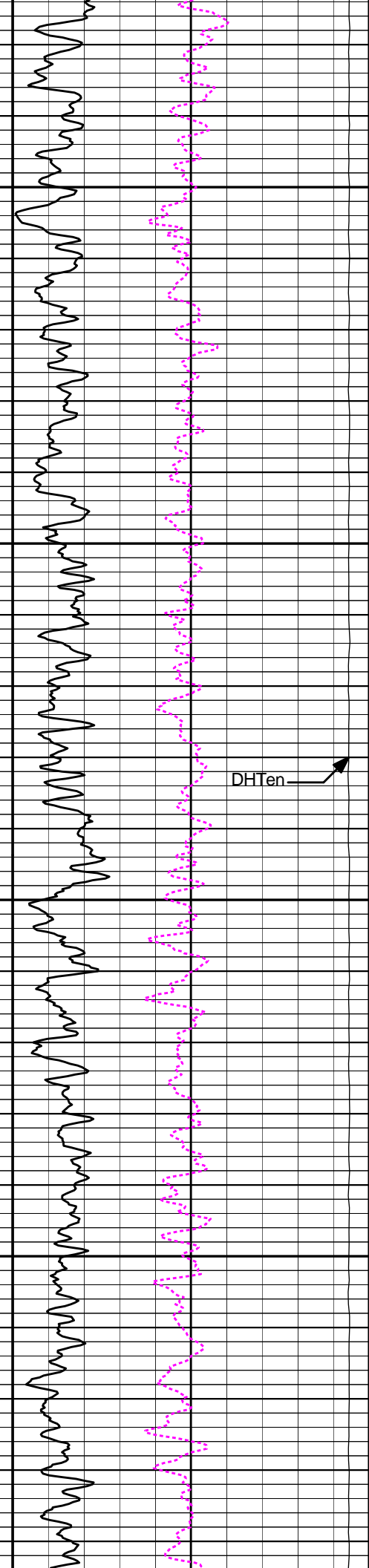
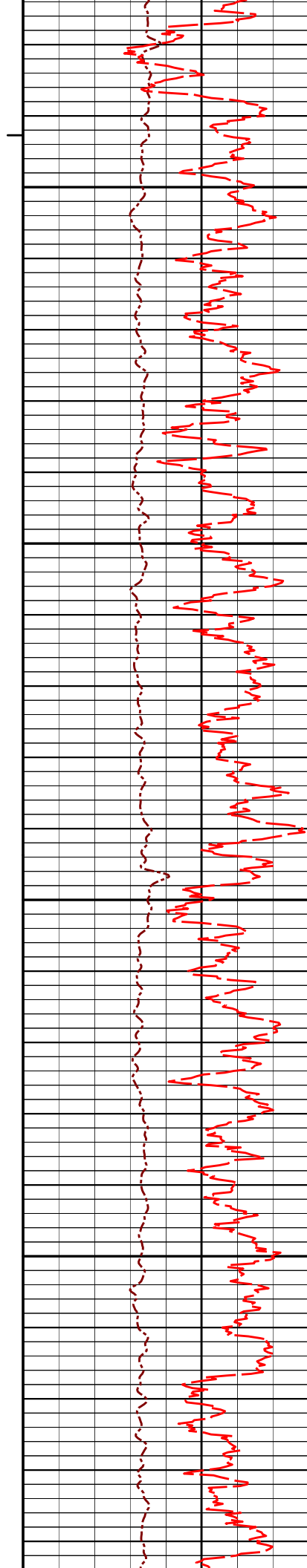


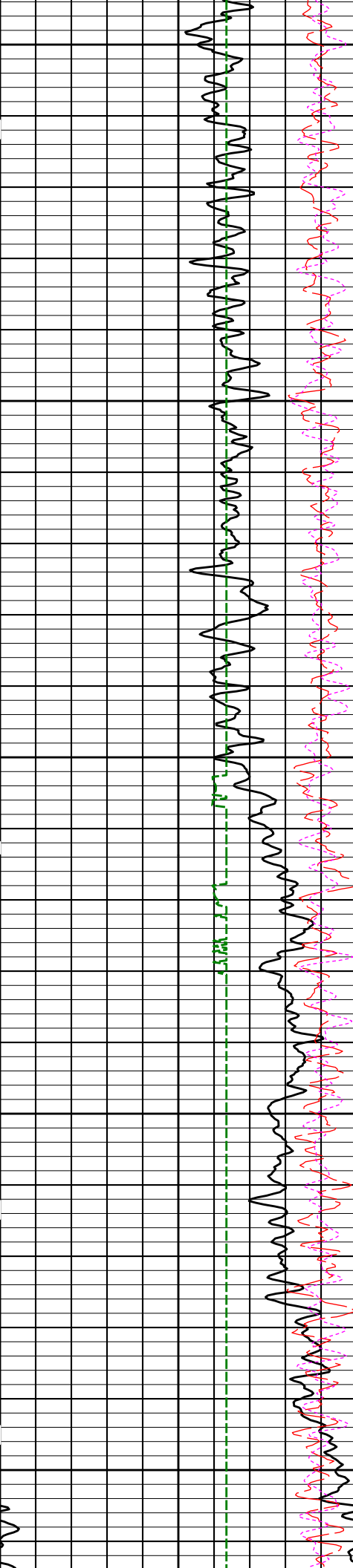
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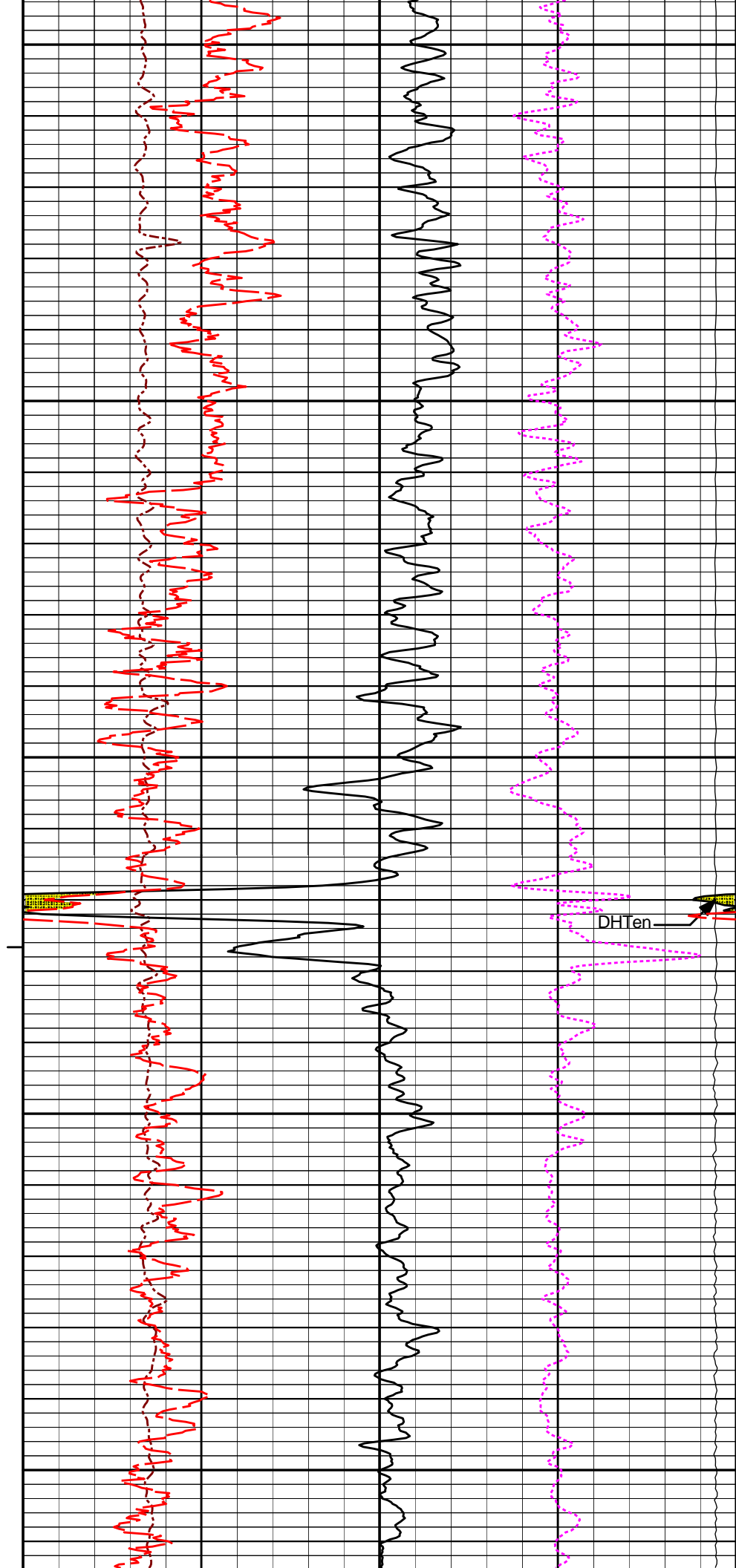
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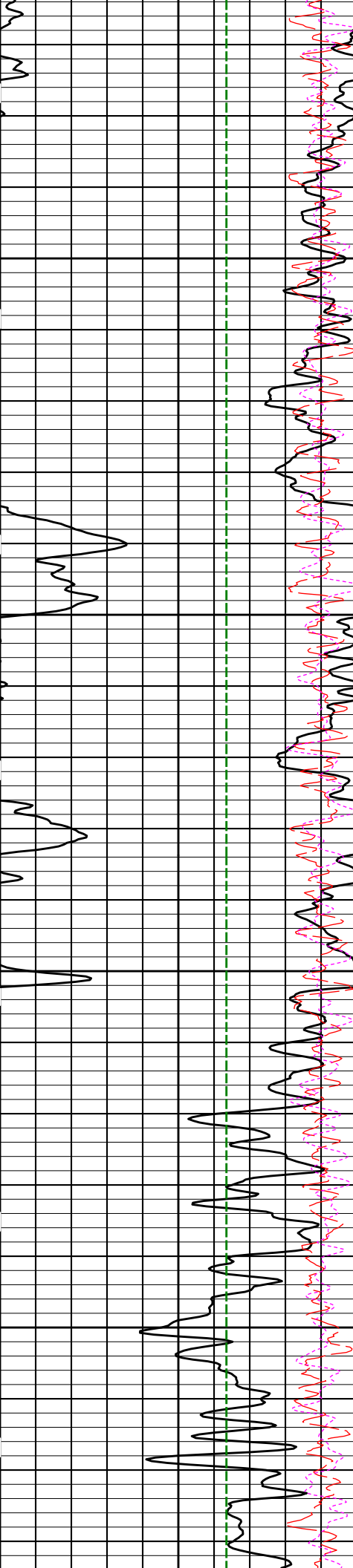
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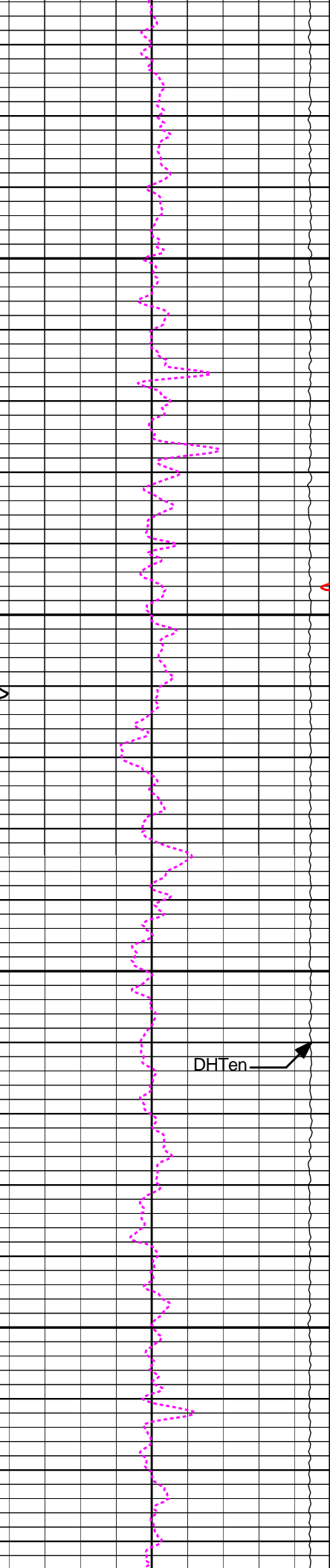
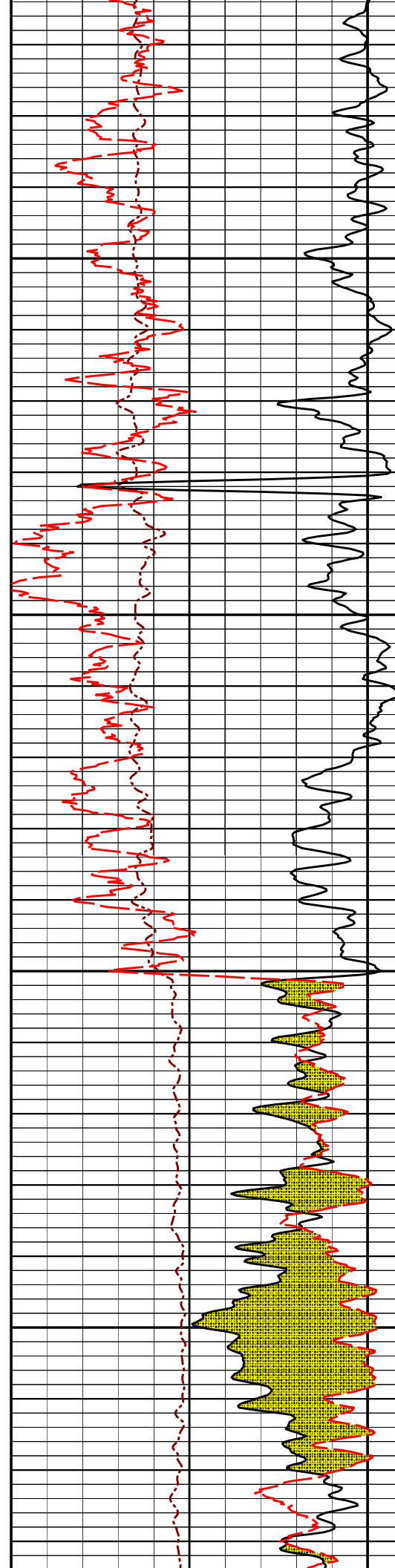


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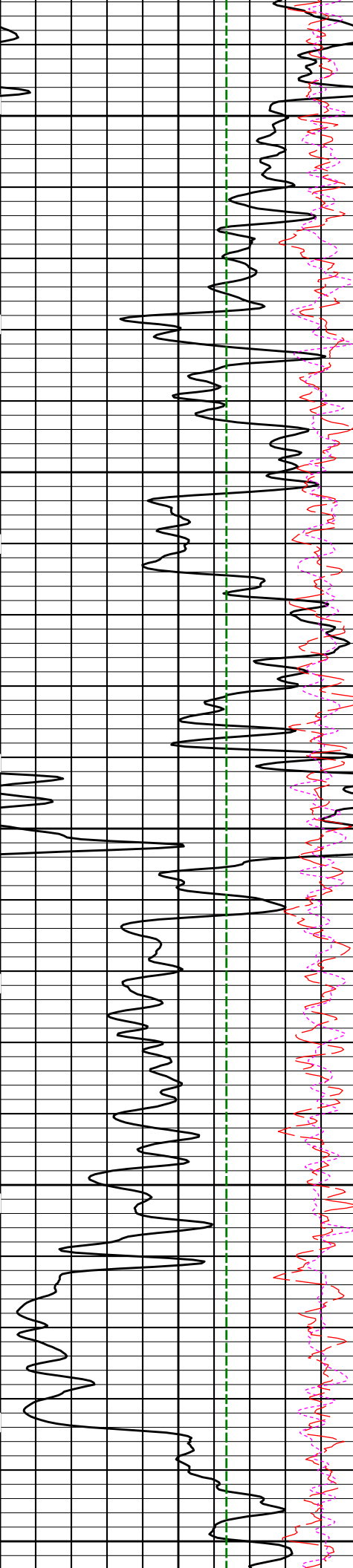
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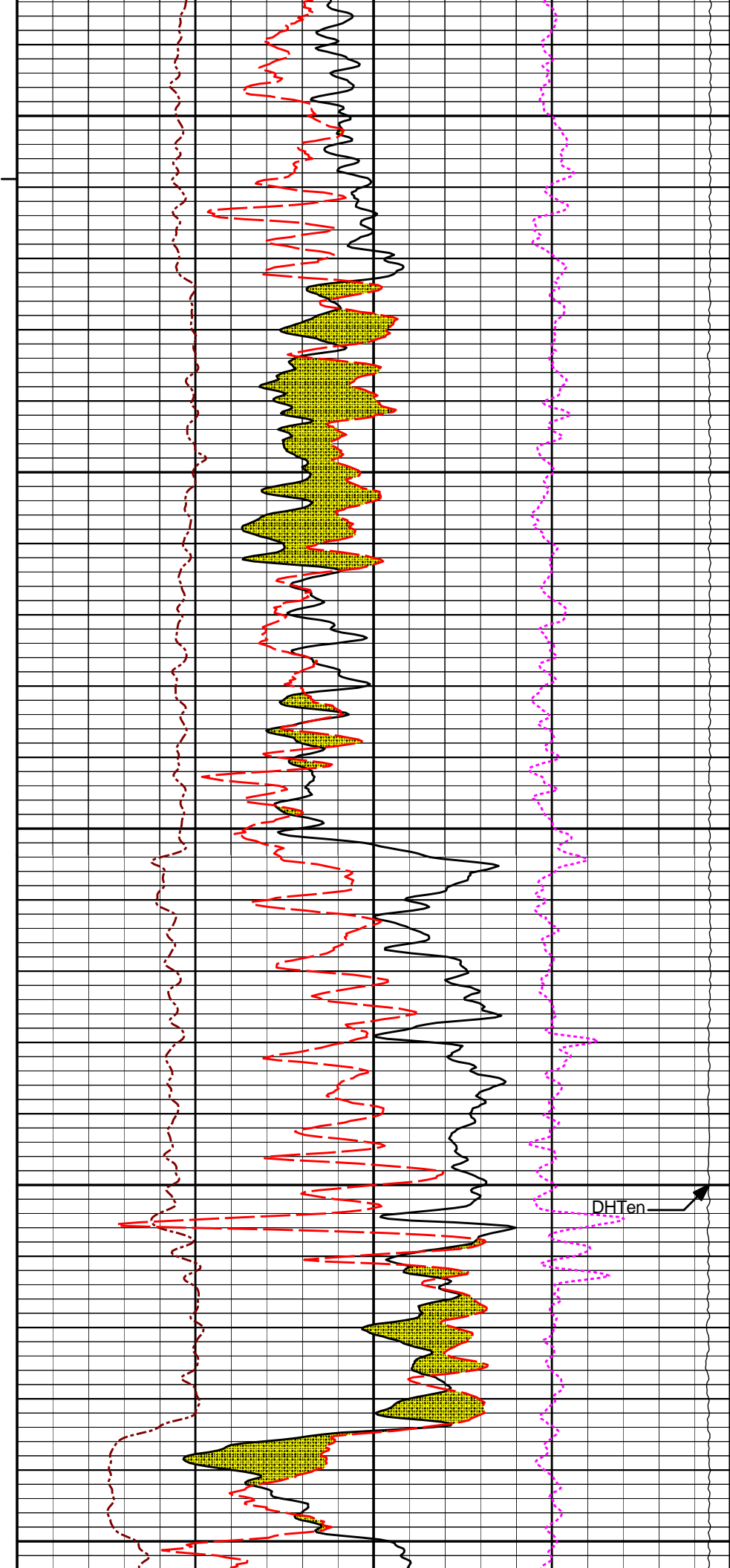
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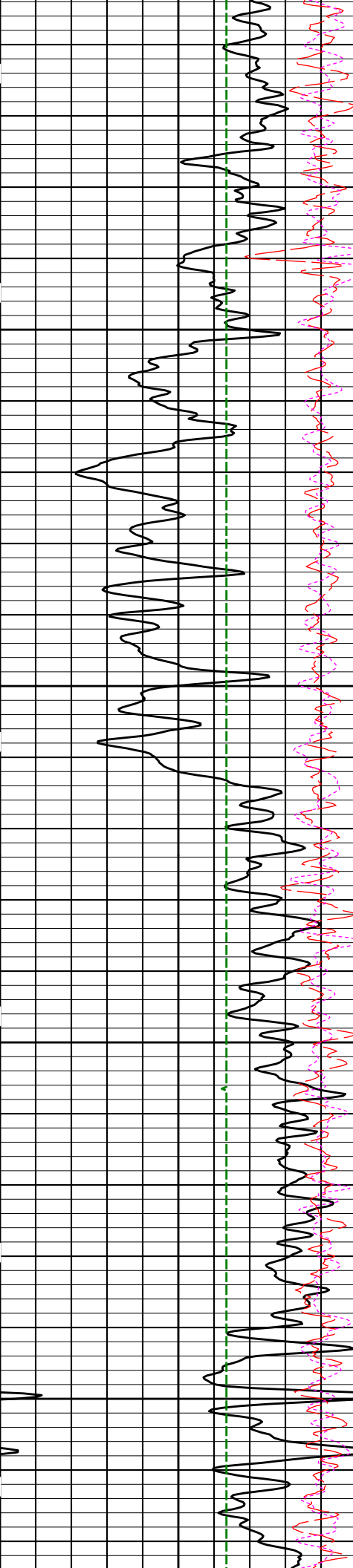
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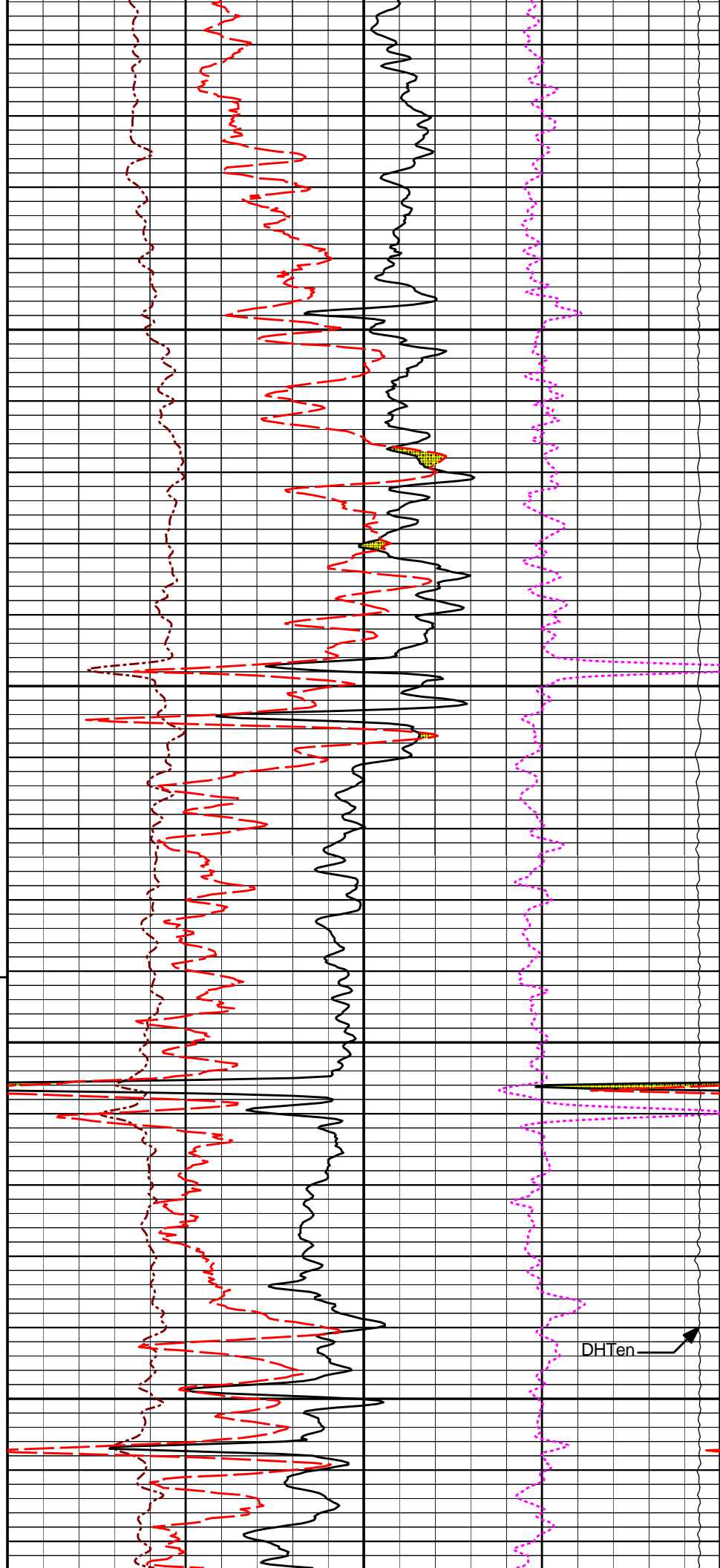


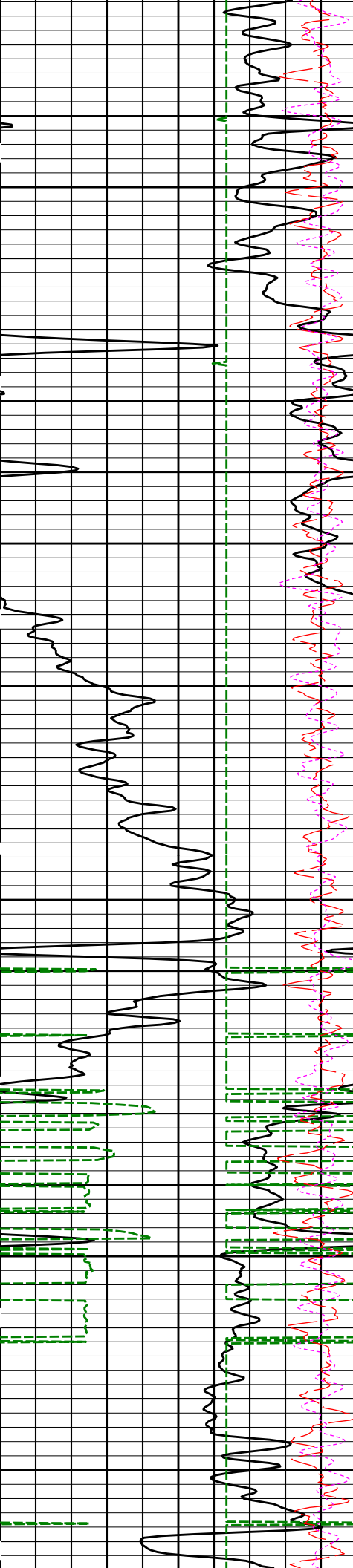
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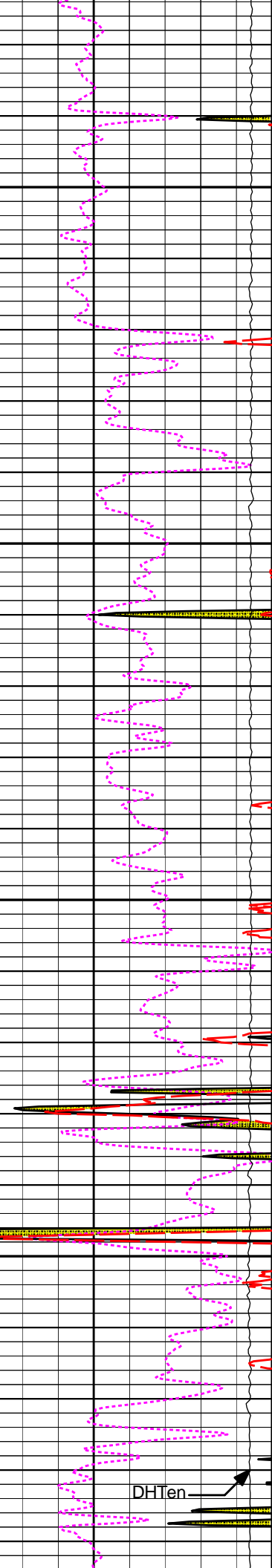
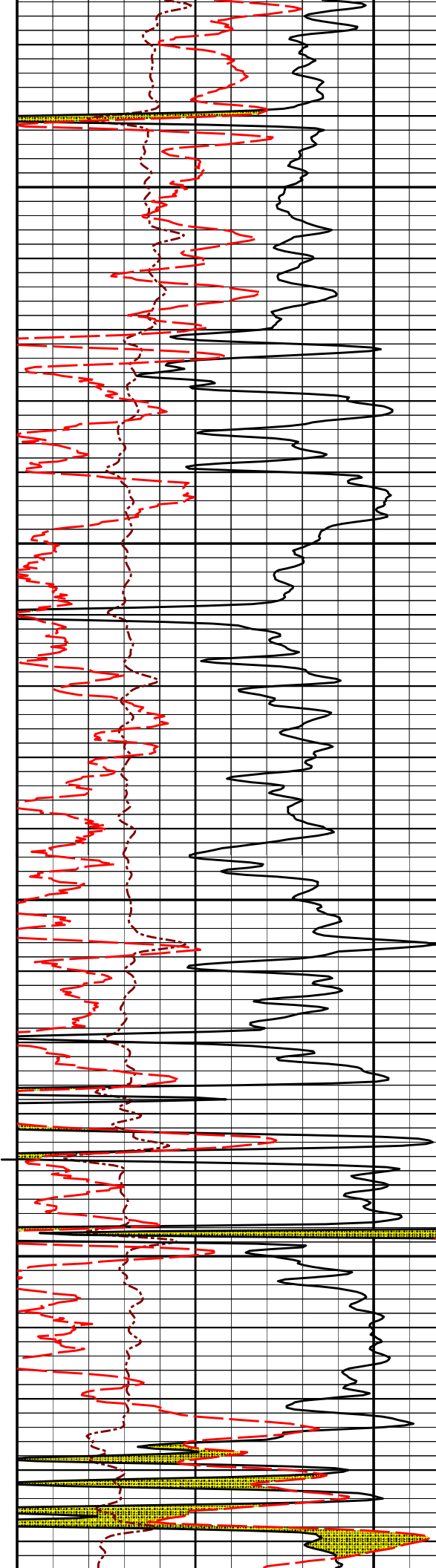


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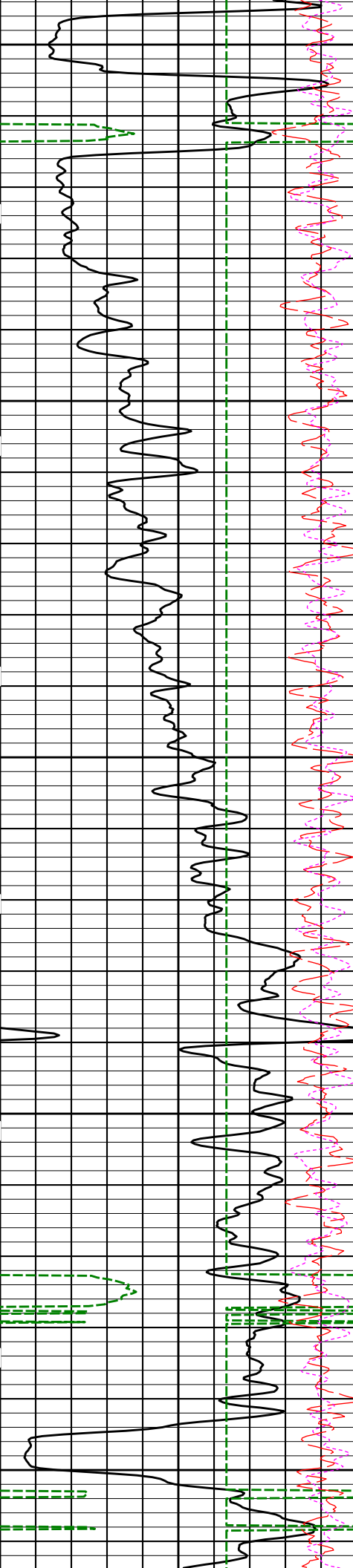
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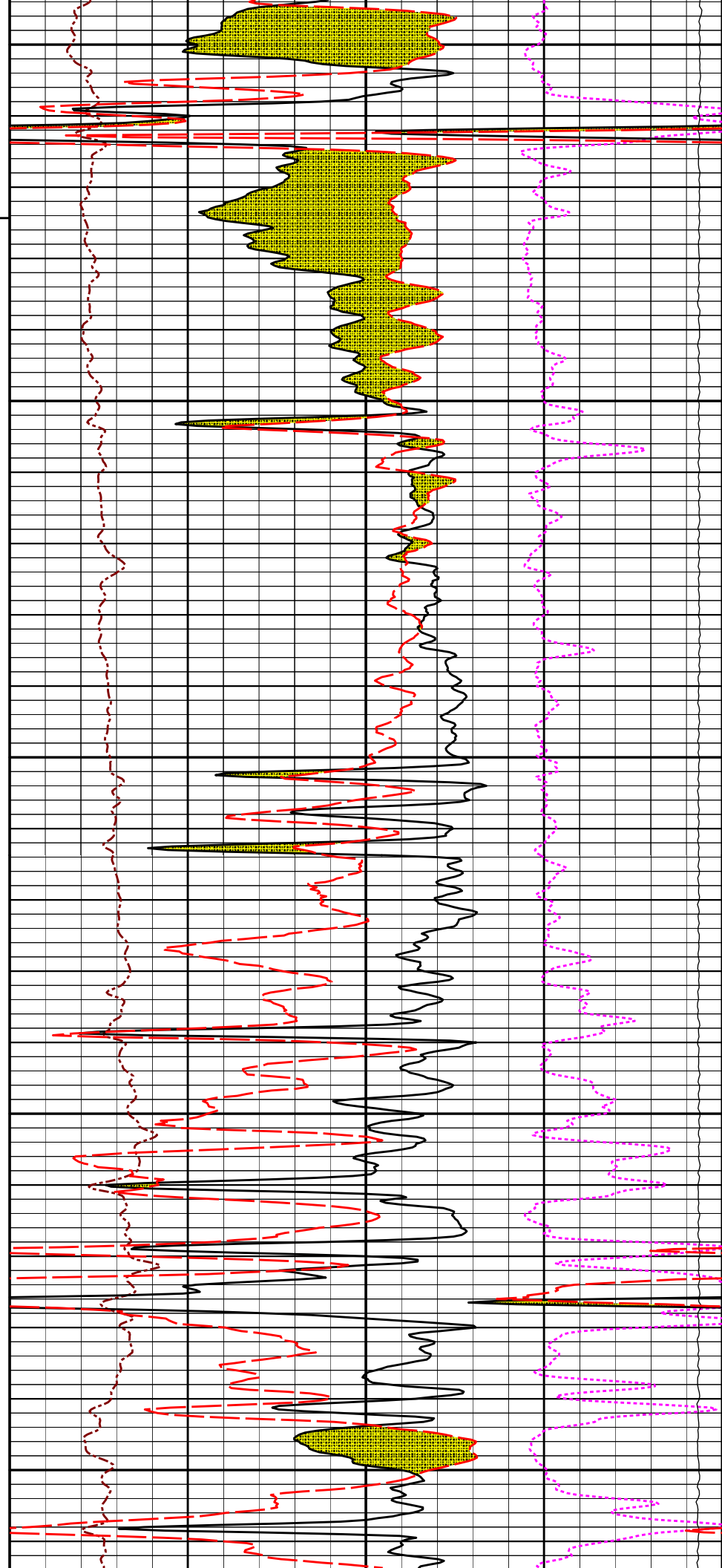
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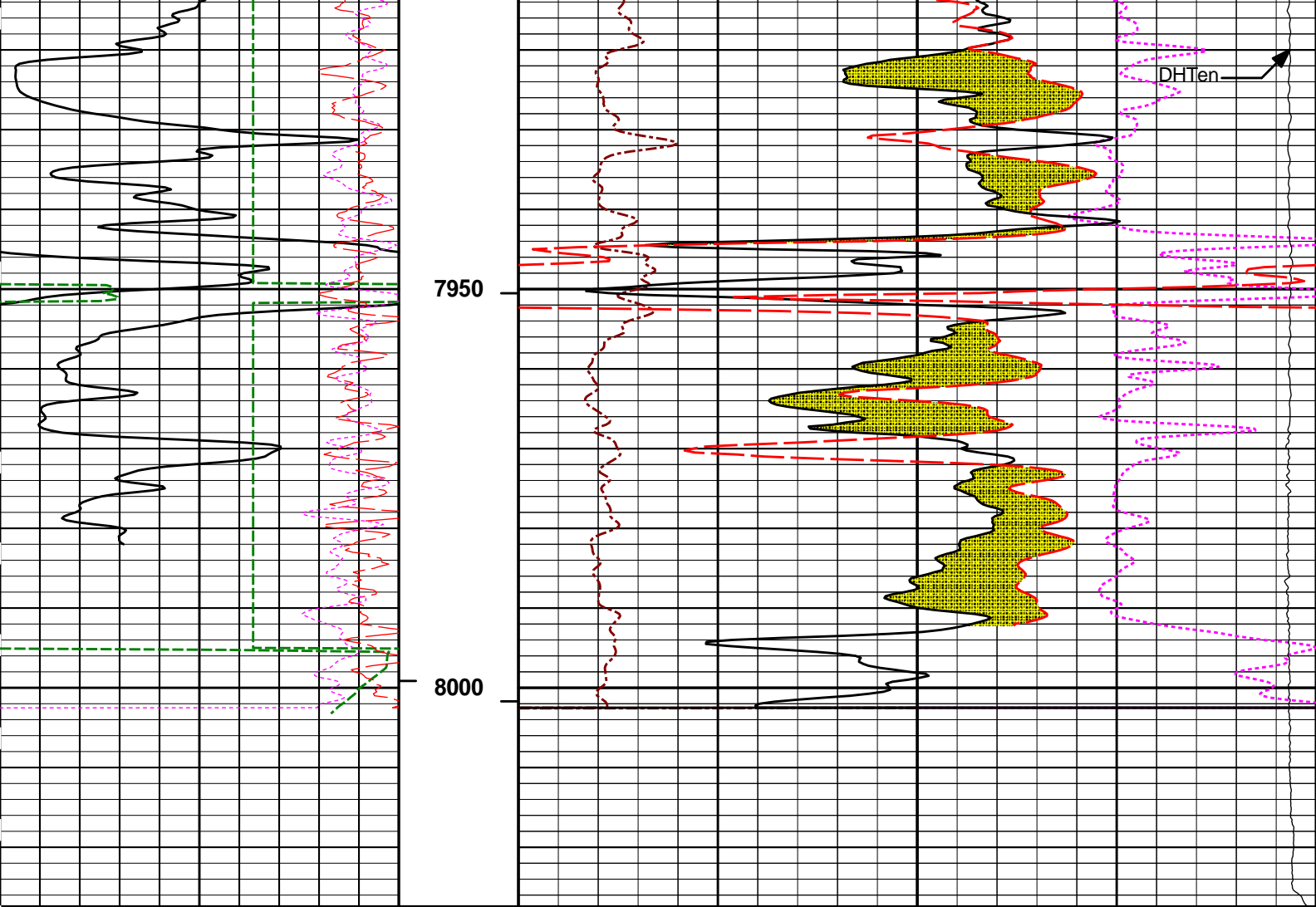
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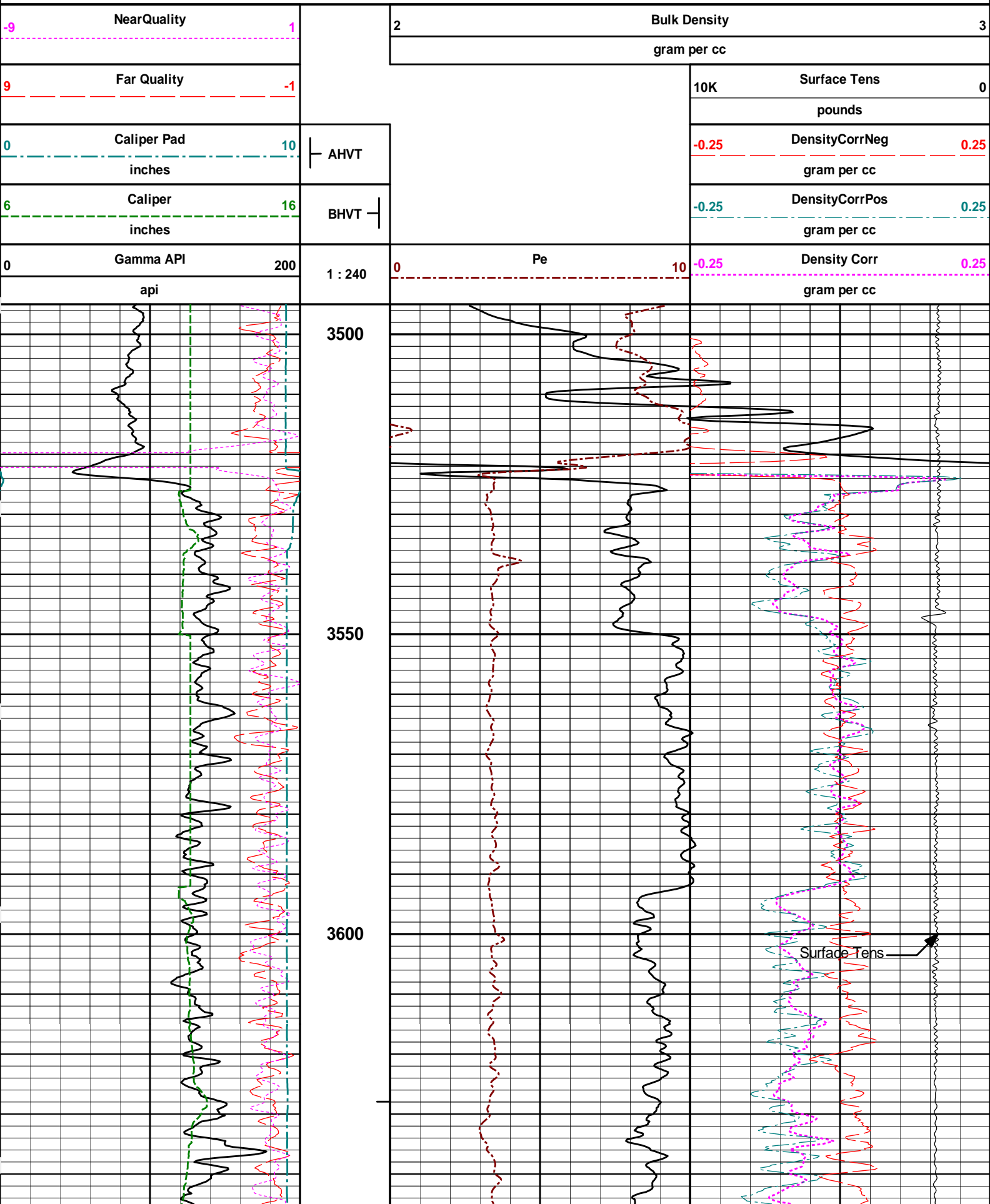
| | | | | | | | | | |
|----|--------------|-----|---------|----|------------------|----|-------|--------------|------|
| 0 | Gamma API | 200 | 1 : 240 | 0 | Pe | 10 | -0.25 | Density Corr | 0.25 |
| | api | | | | | | | gram per cc | |
| 6 | Caliper | 16 | BHVT | | | | 10K | DHTen | 0 |
| | inches | | | | | | | pounds | |
| 9 | Far Quality | -1 | AHVT | 30 | Density Porosity | | | | -10 |
| | | | | | percent | | | | |
| -9 | Near Quality | 1 | | 30 | Neutron Porosity | | | | -10 |
| | | | | | percent | | | | |

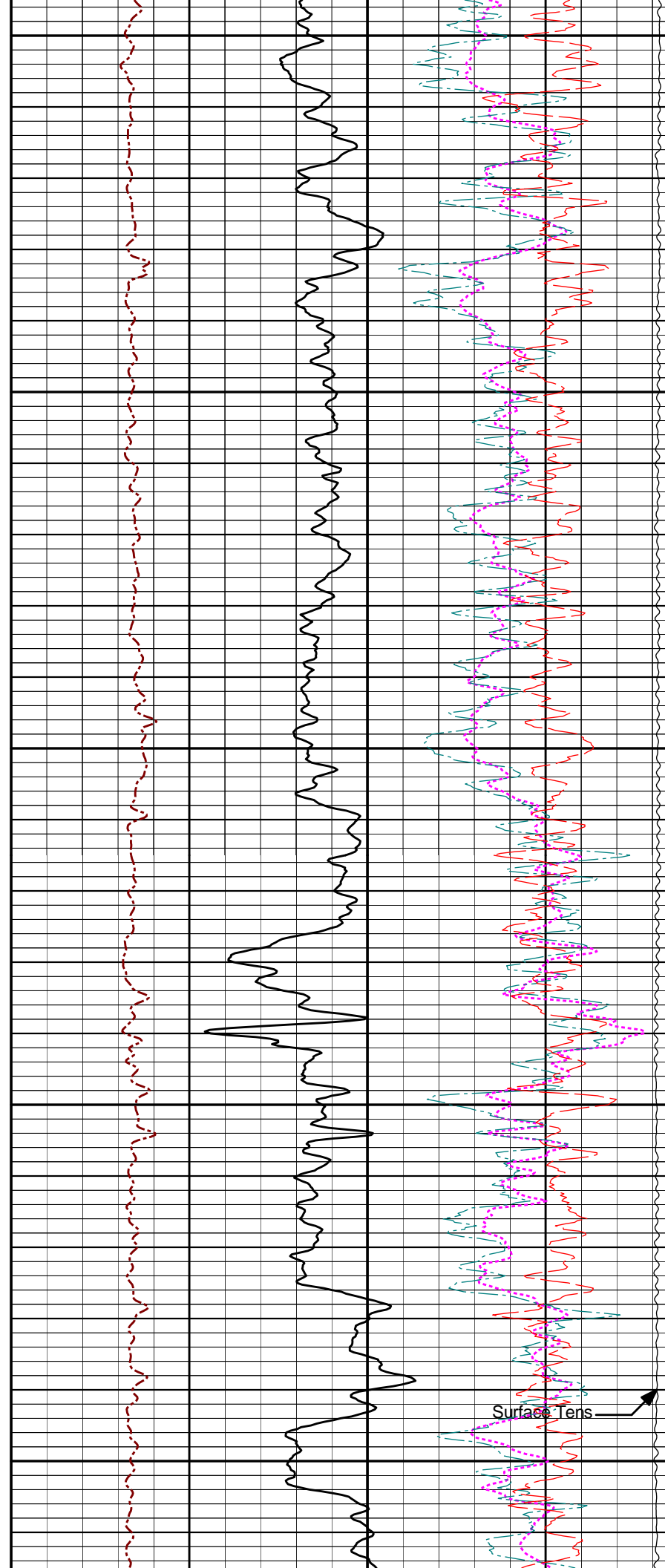
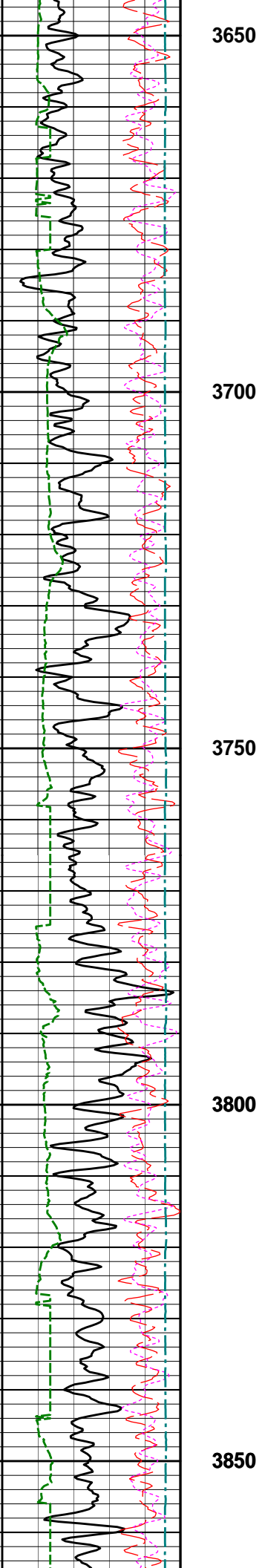
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 Plot File: \\PORO\IQ_POROSITY_5IN_RM

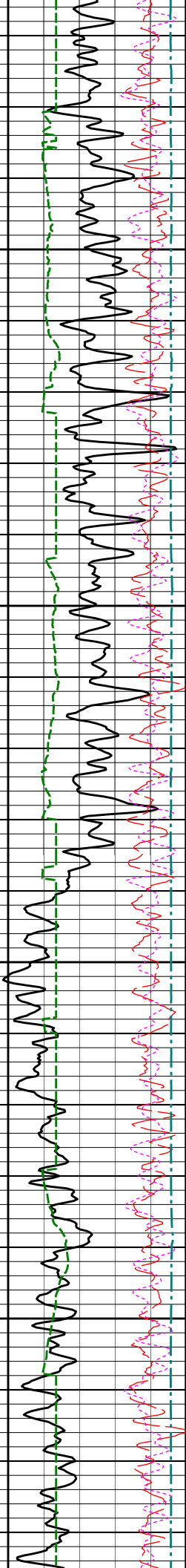
MAIN PASS 5" = 100'

HALLIBURTON Plot Time: 12-Jul-11 16:48:22
 Plot Range: 3495 ft to 8027.42 ft
 Data: {ActiveWell}\Well Based\MAIN*
 Plot File: \\PORO\IQ_RHOB_5IN_RM

MAIN PASS 5" = 100'





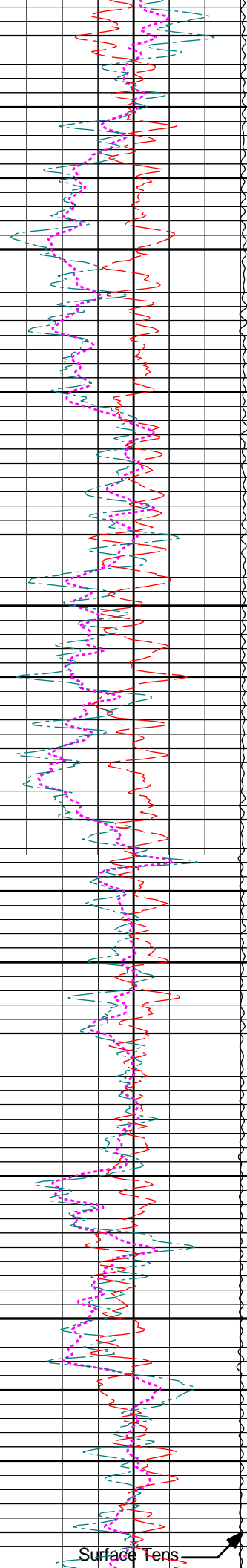
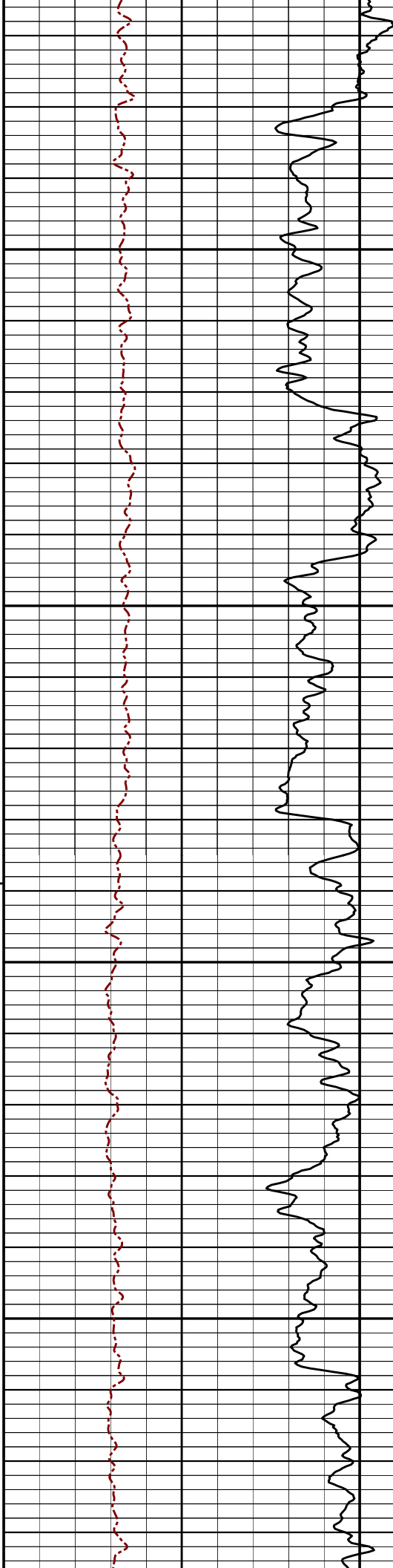


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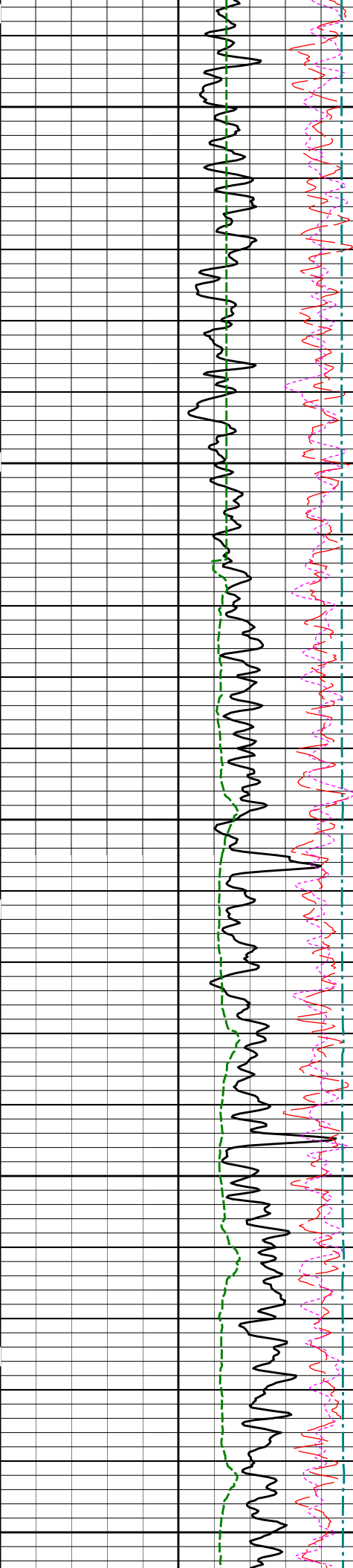
3950

4000

4050



Surface Tens.



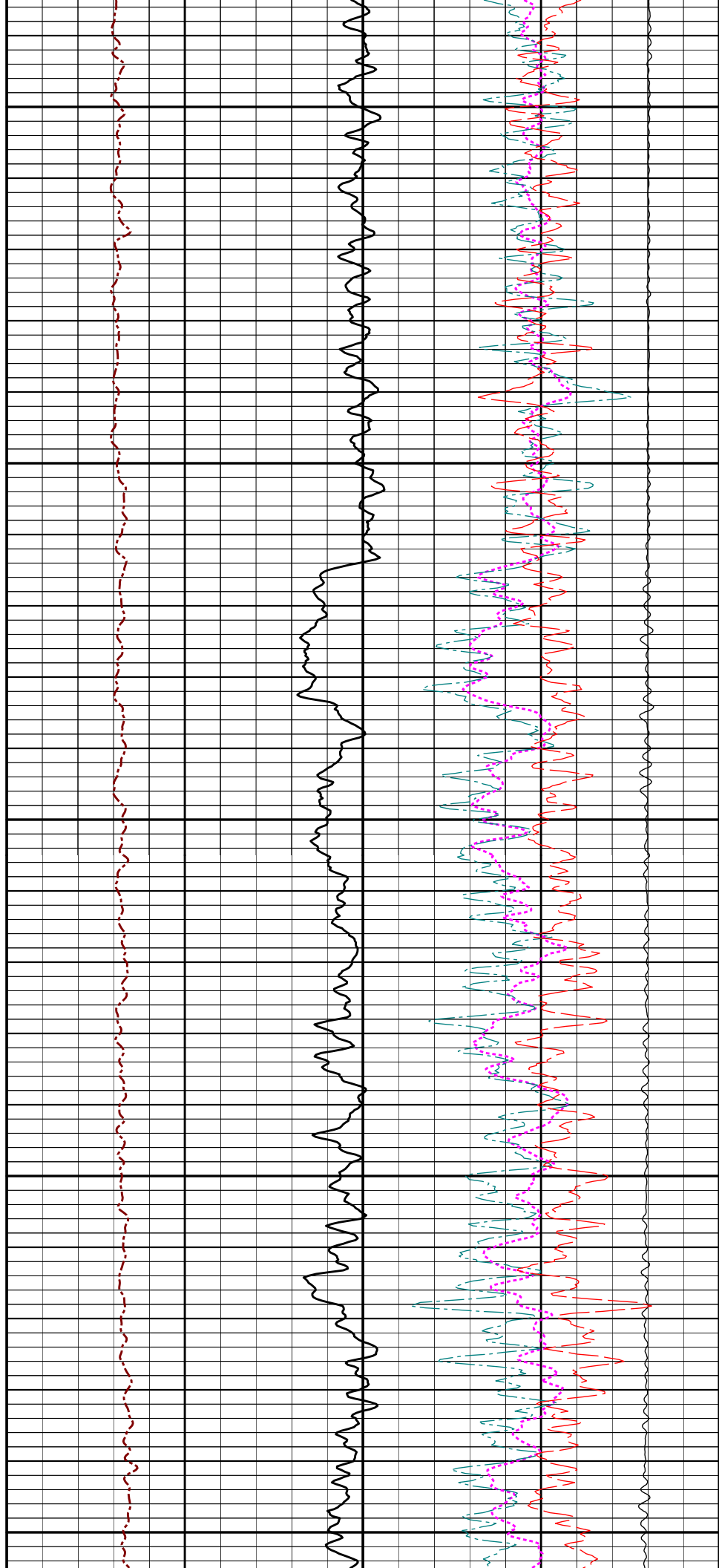
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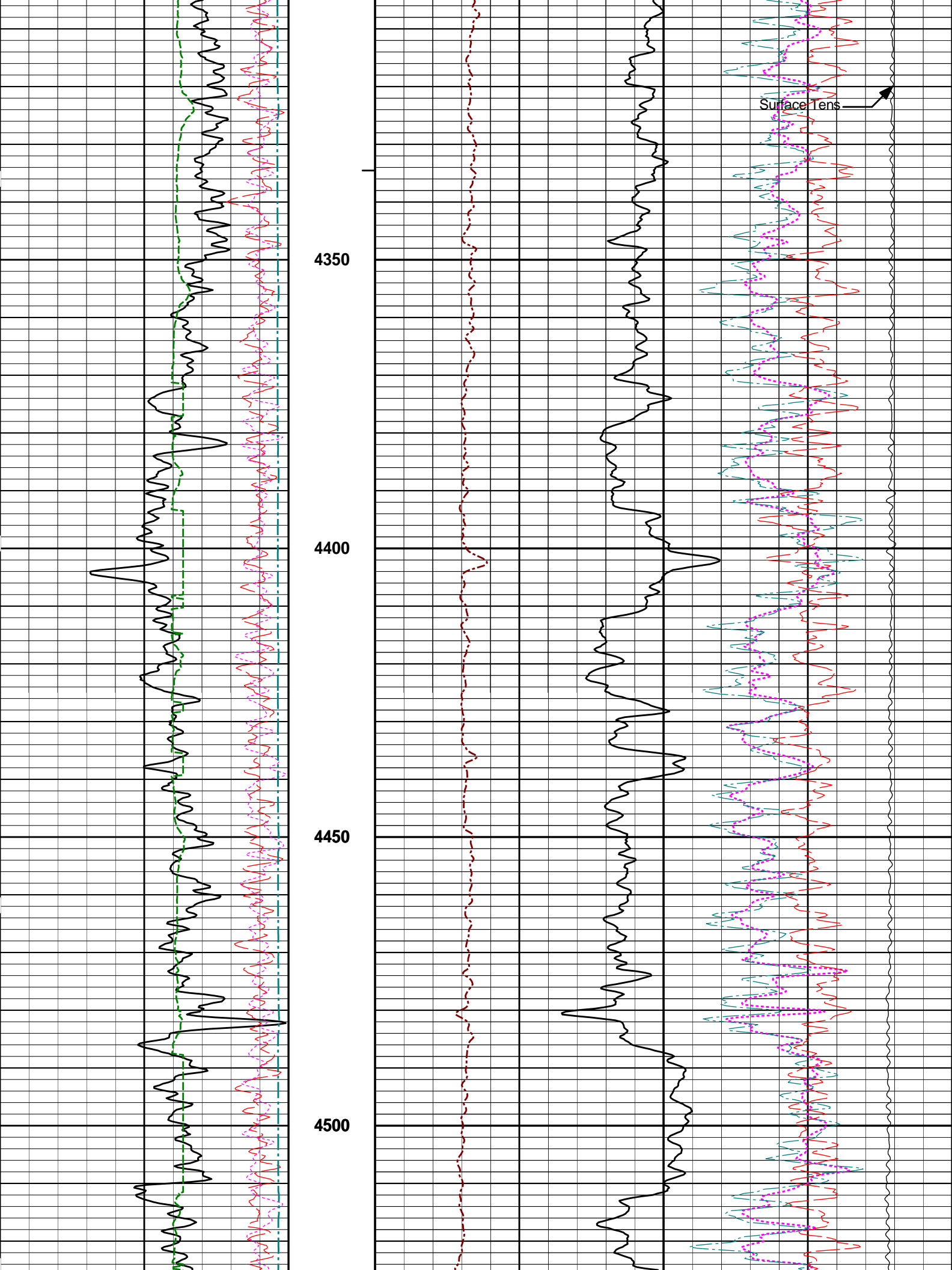
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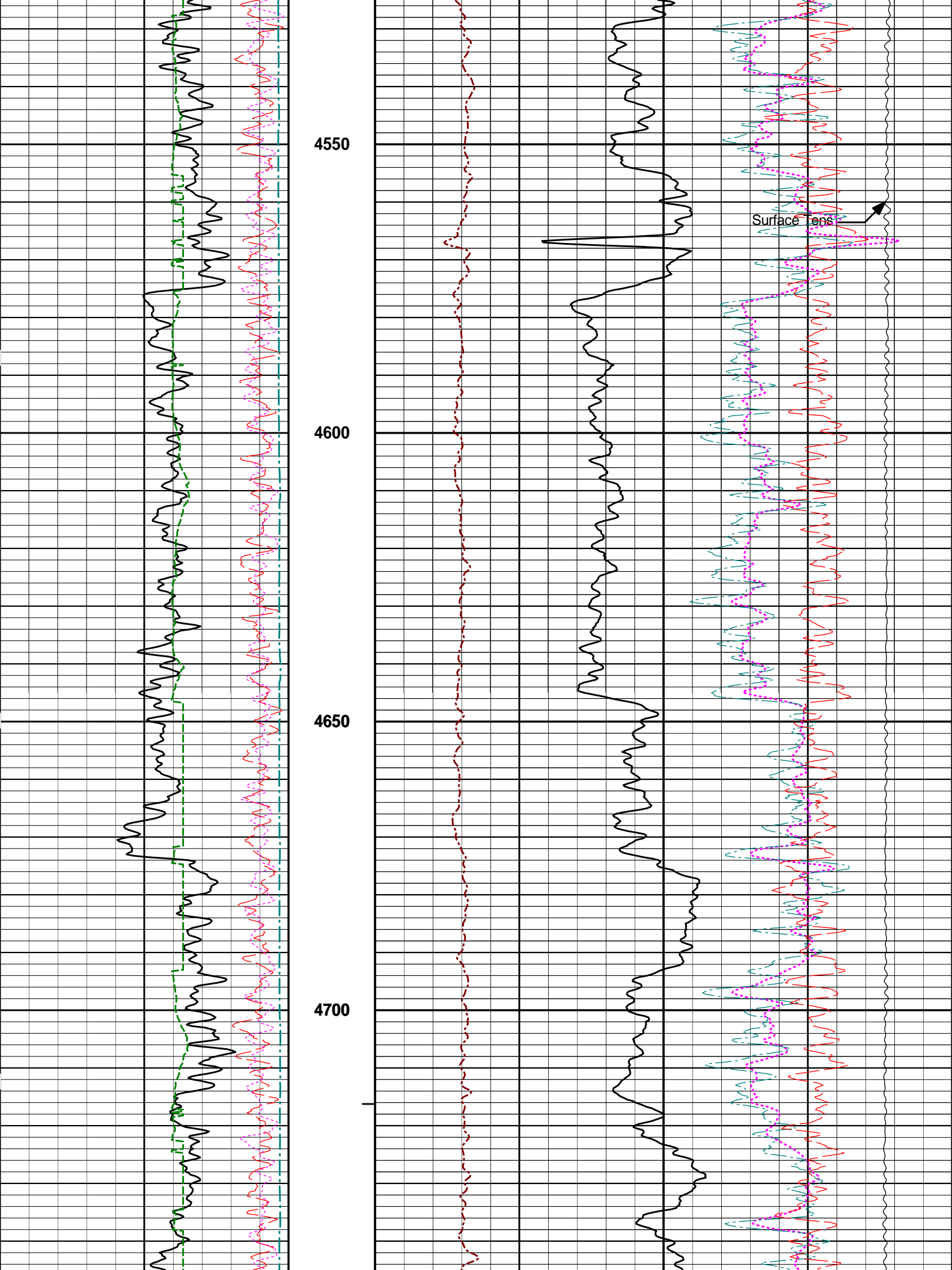
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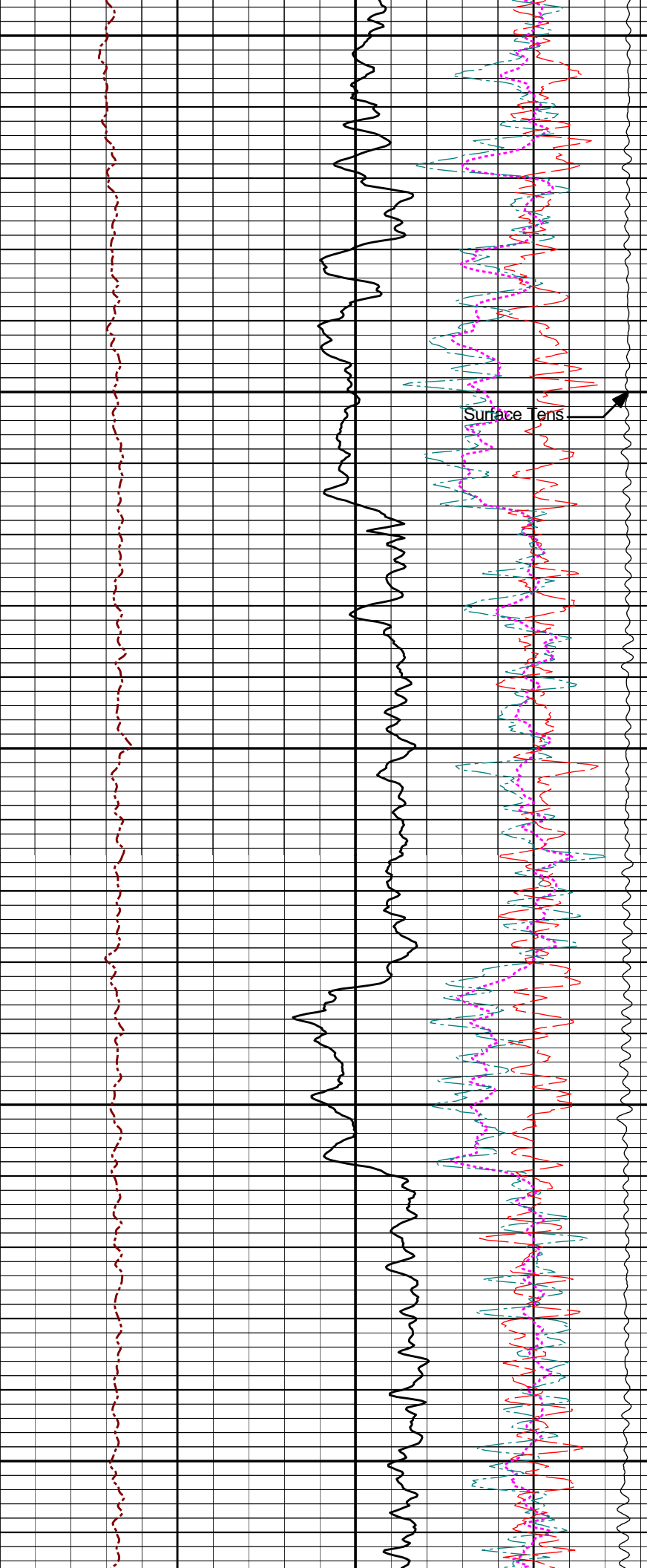
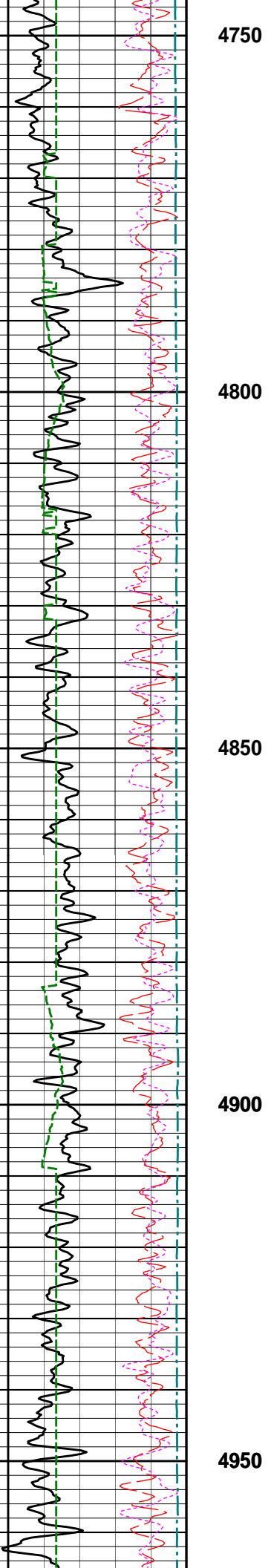
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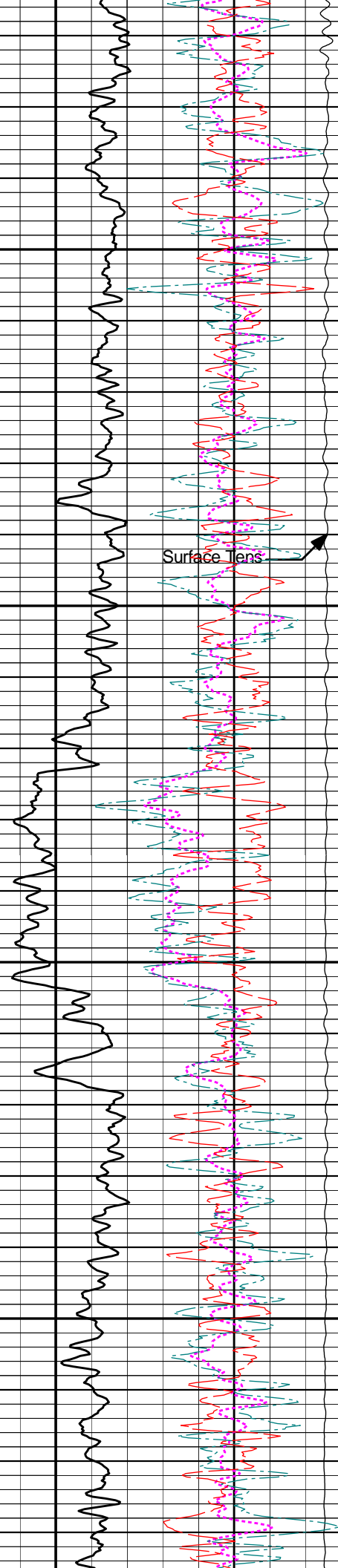
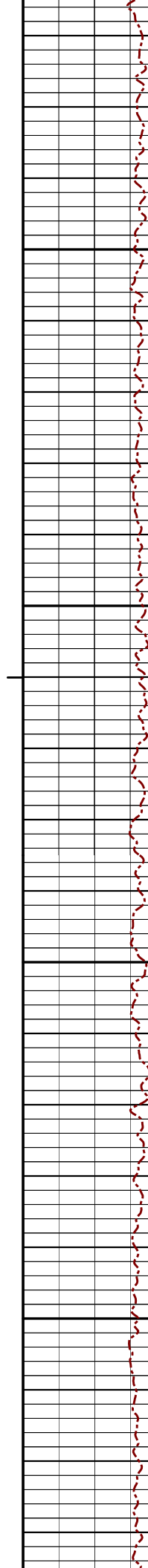
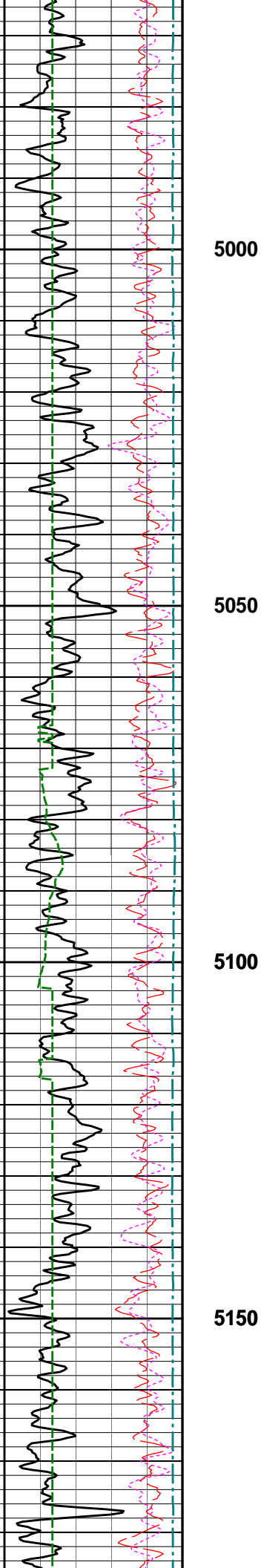
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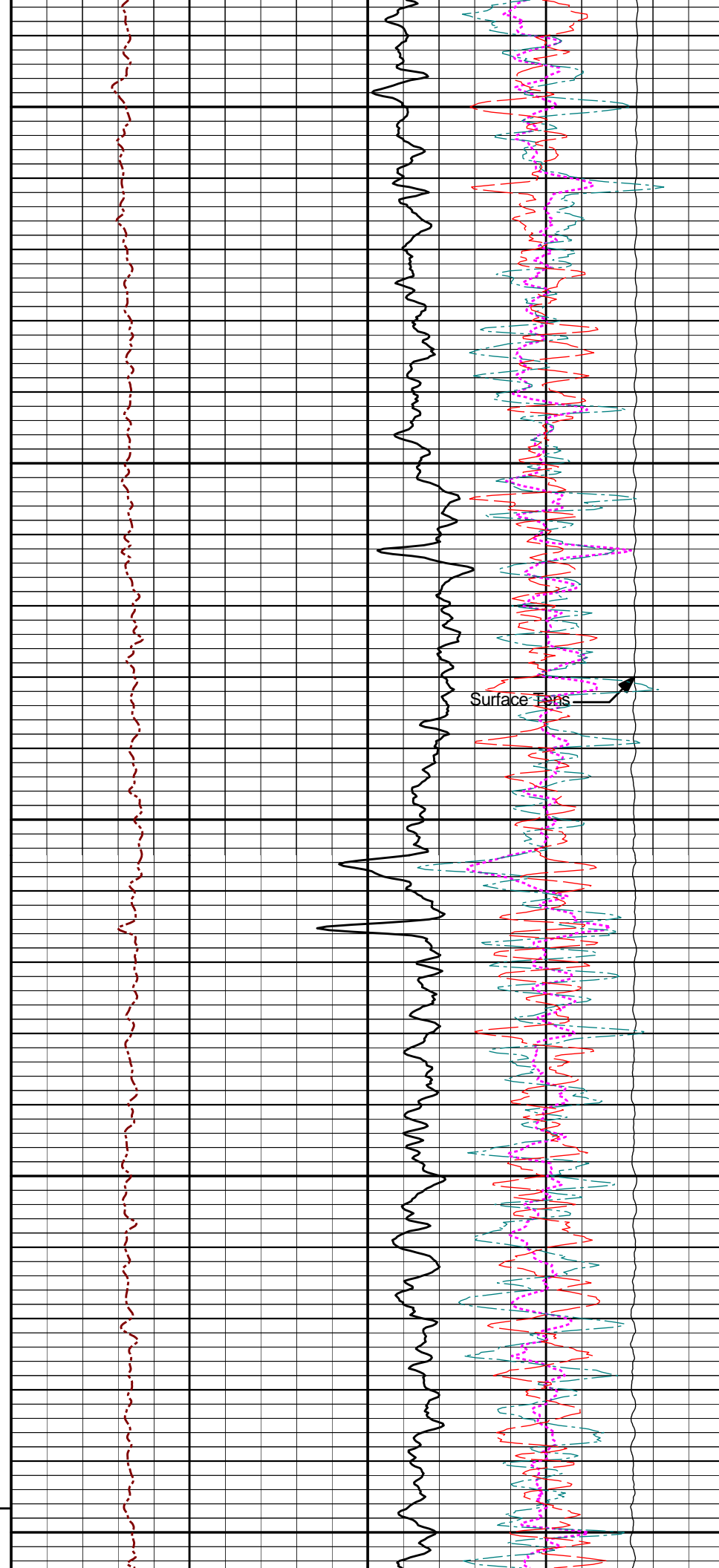
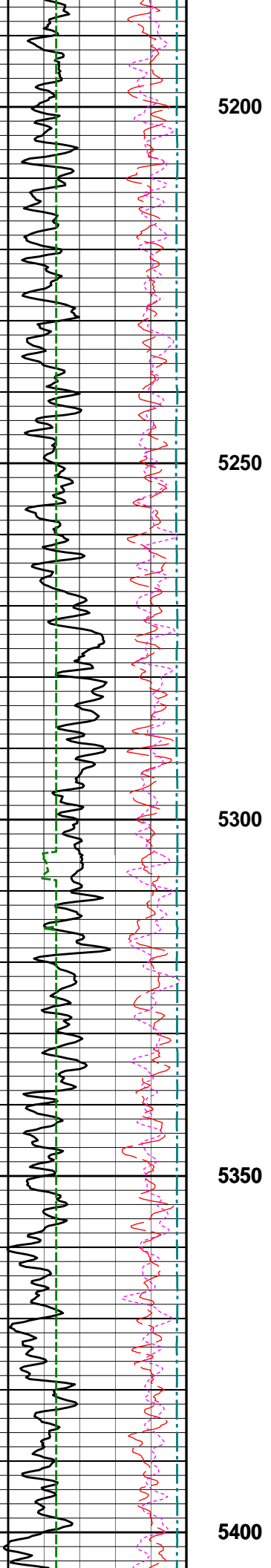


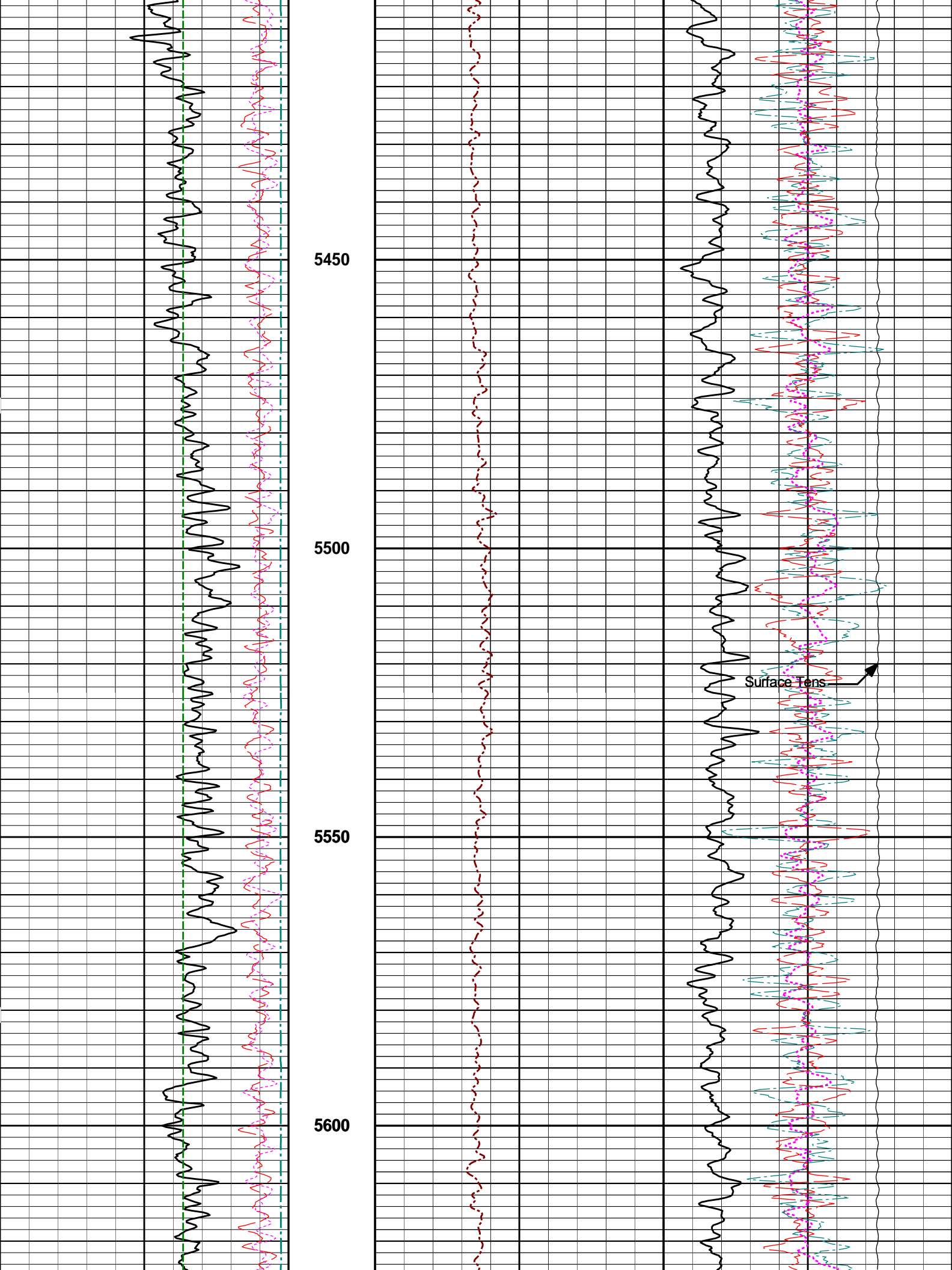


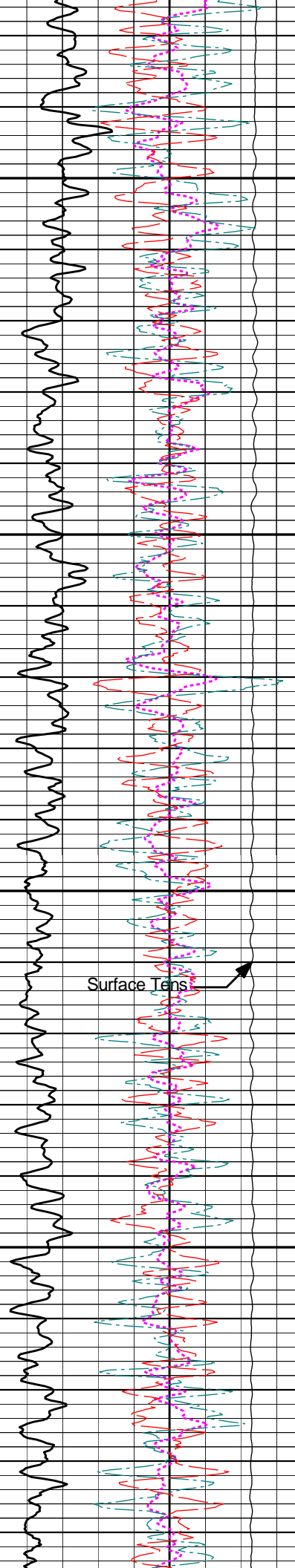
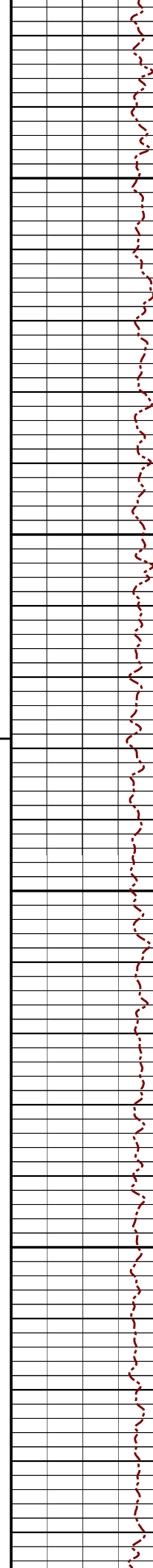
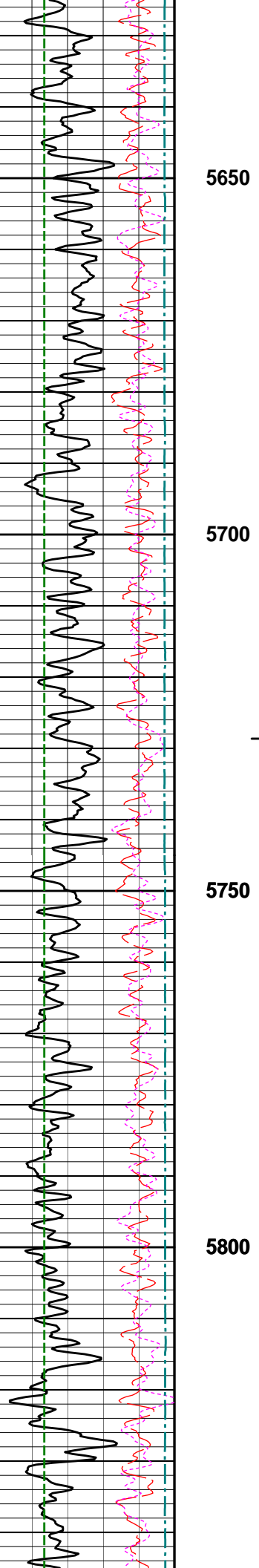


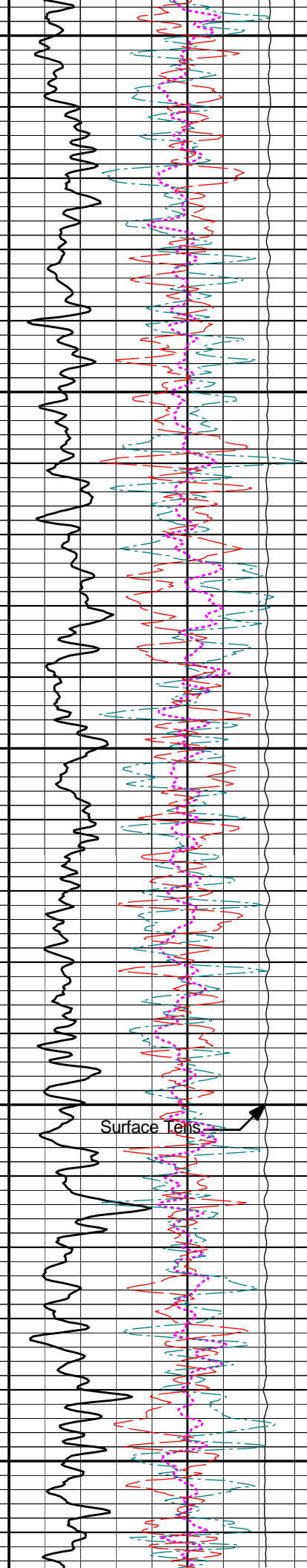
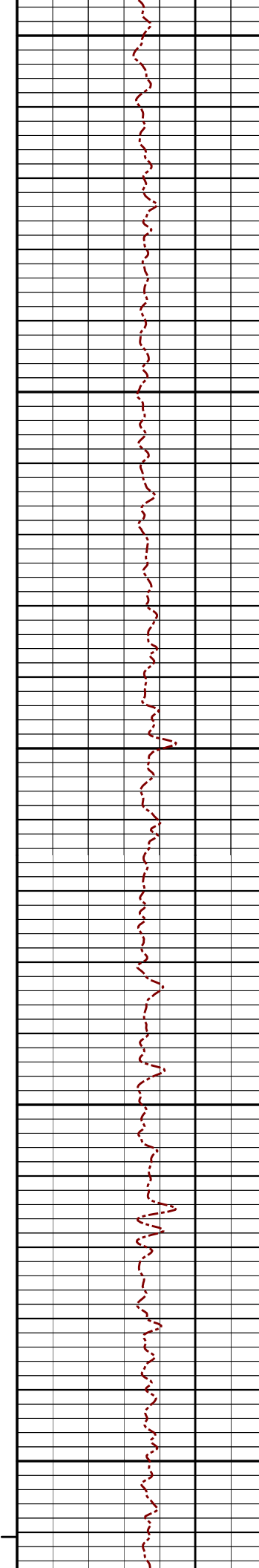
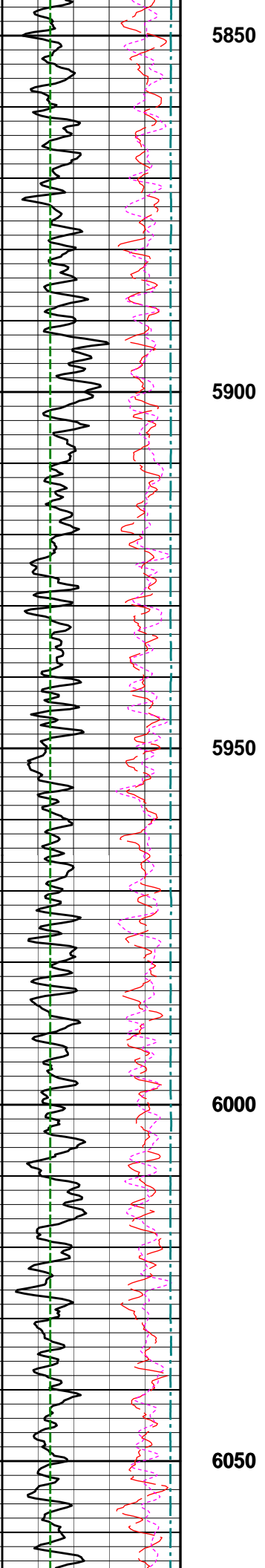


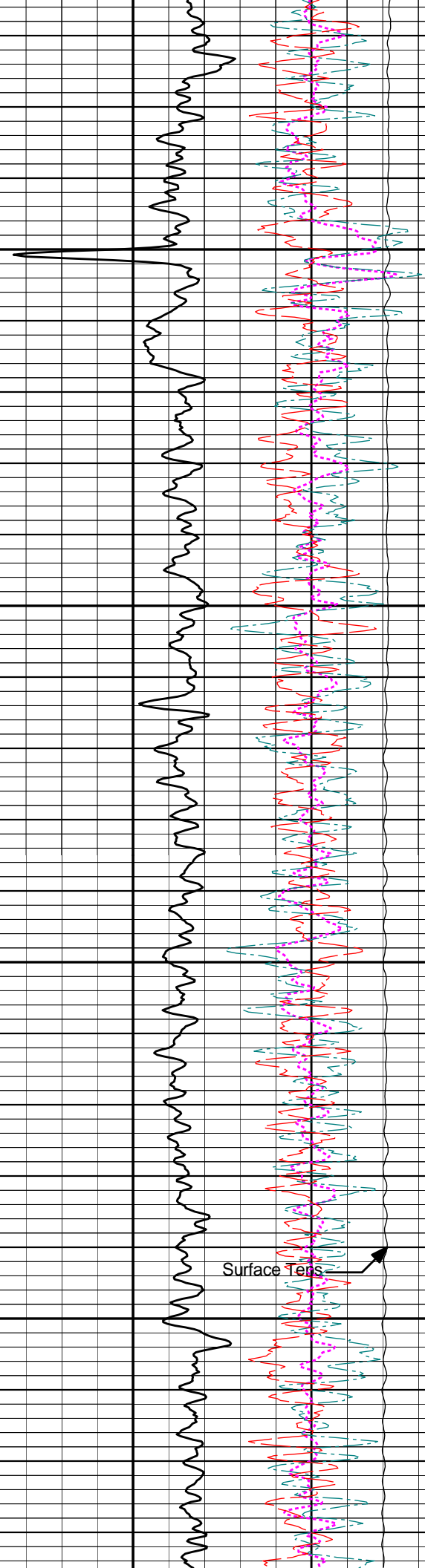
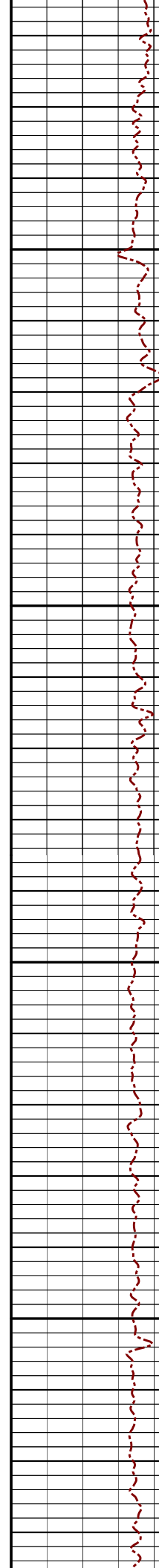
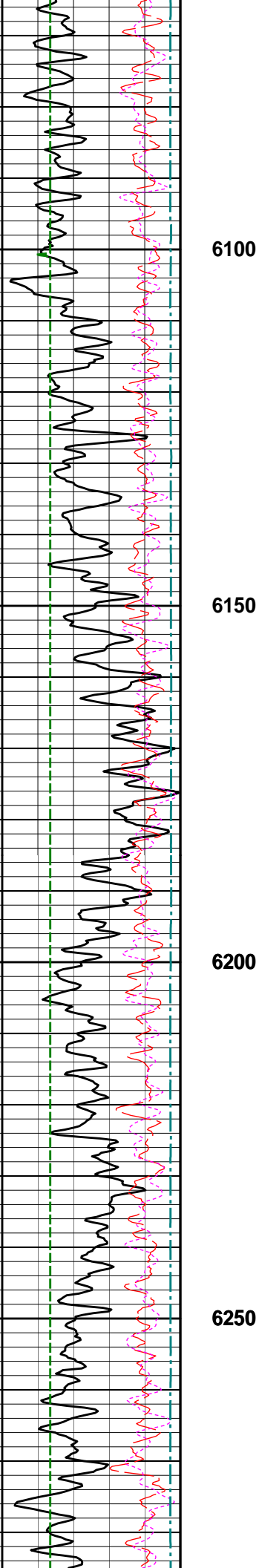
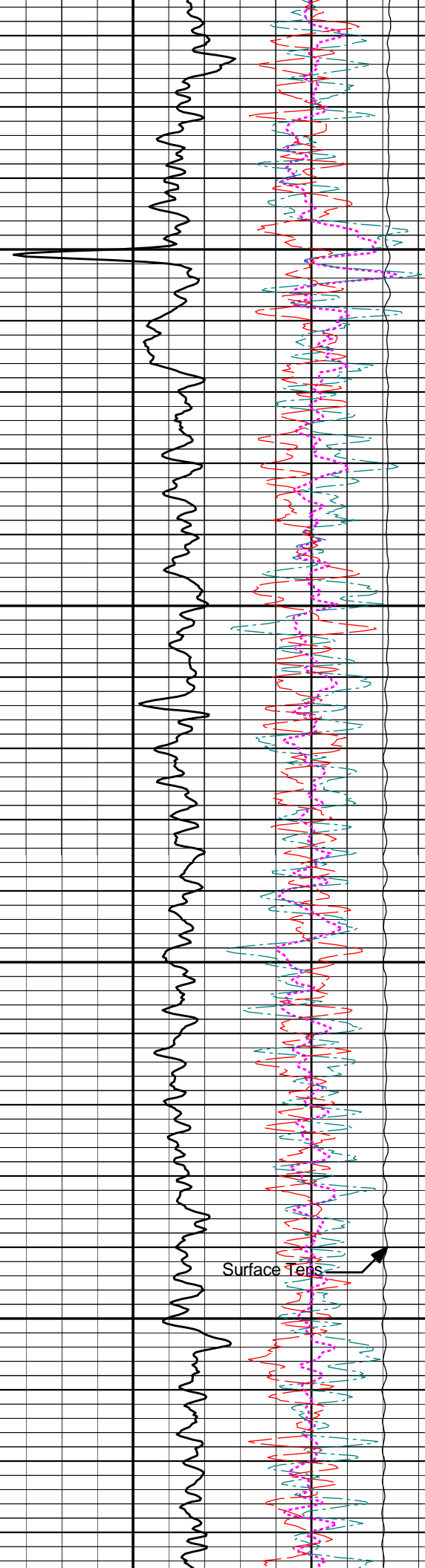
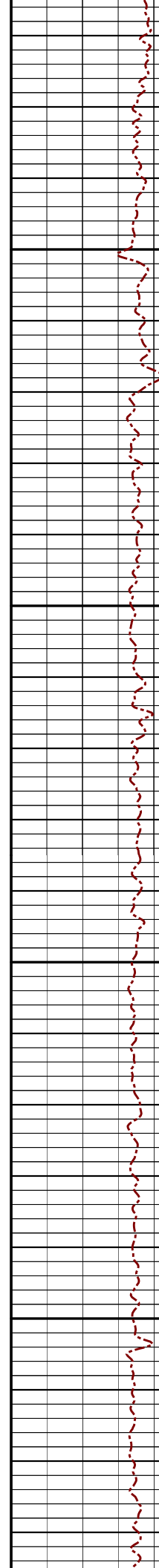
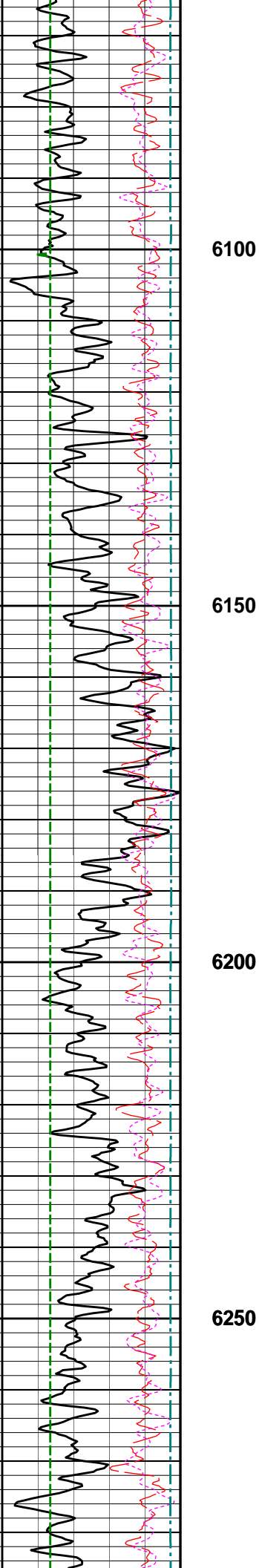


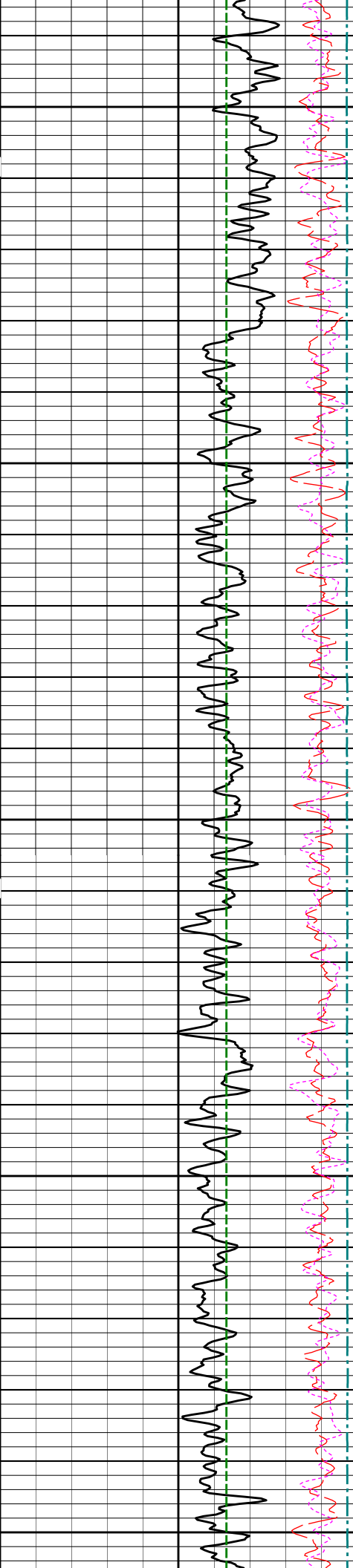












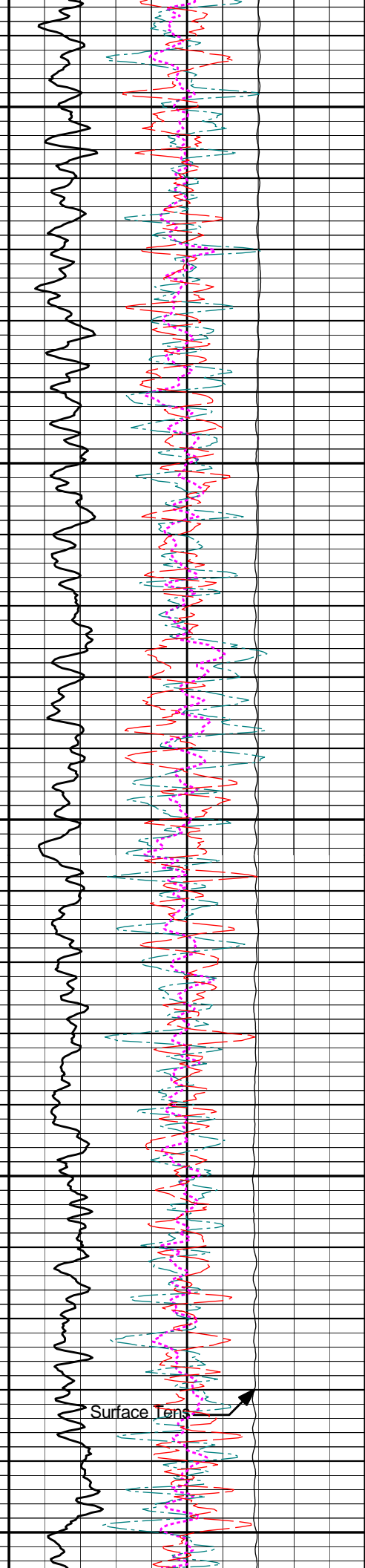
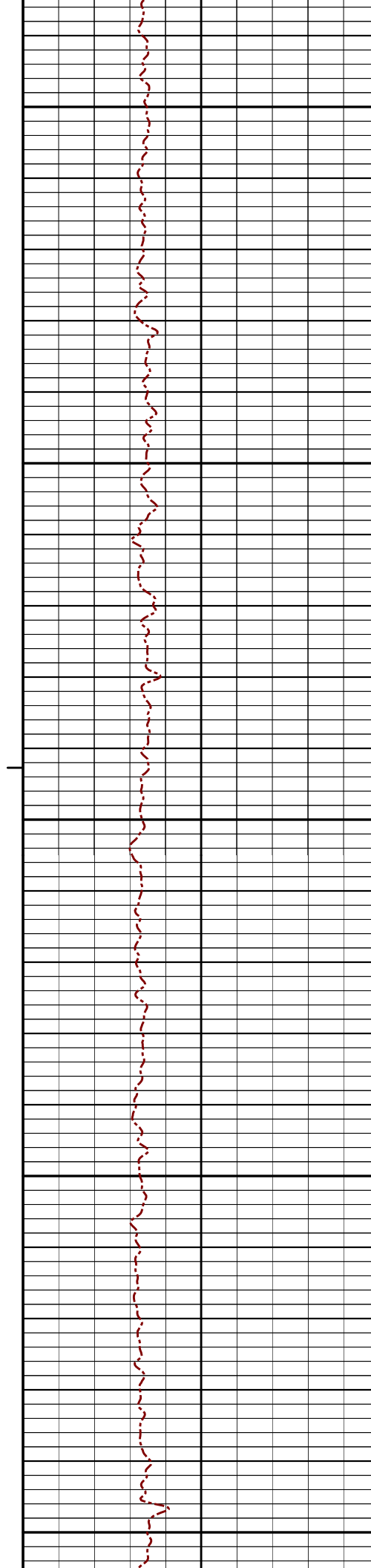
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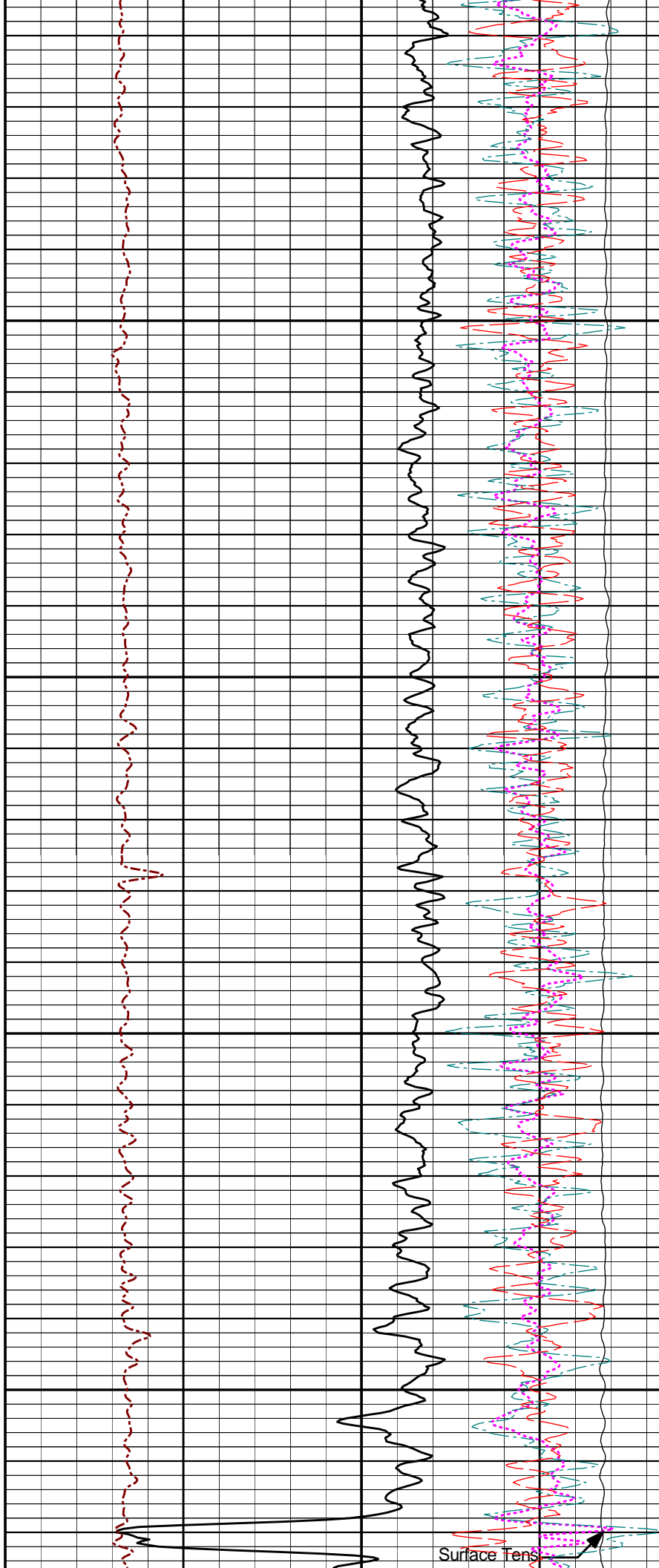
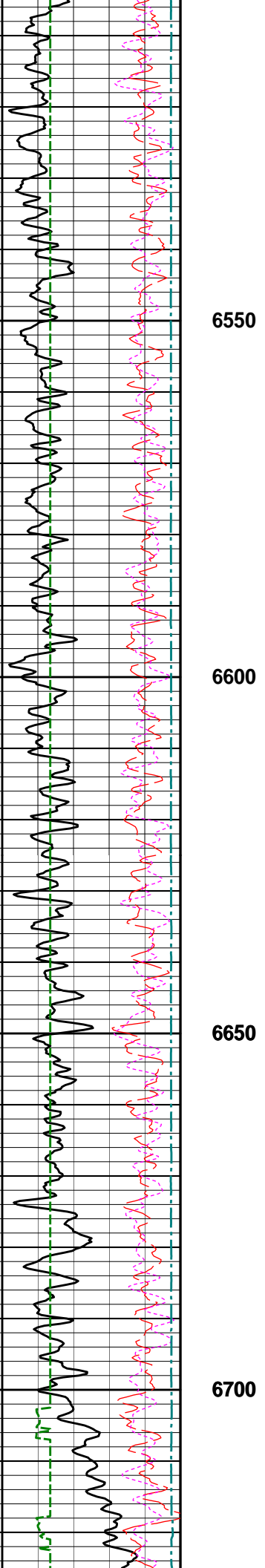
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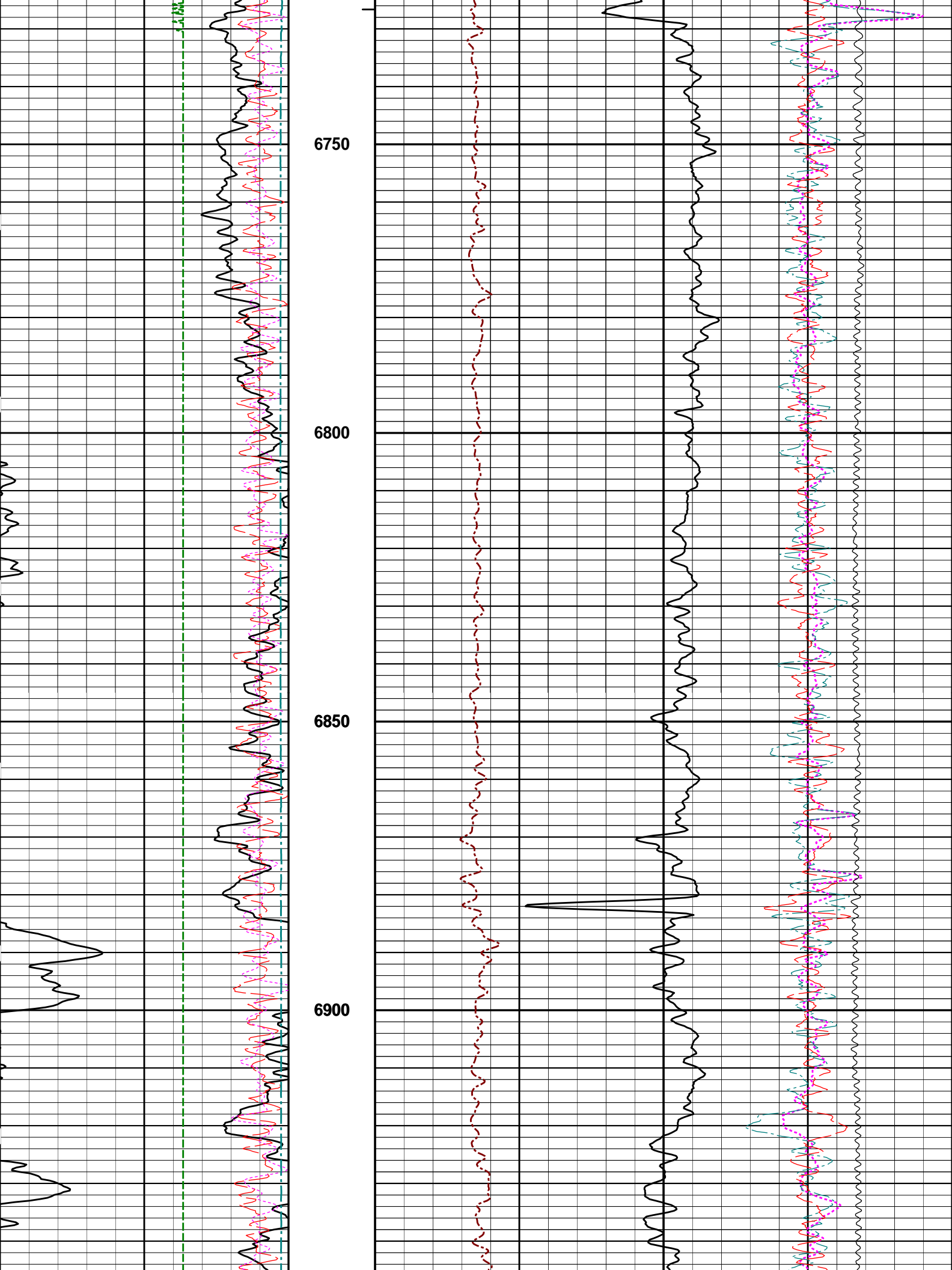
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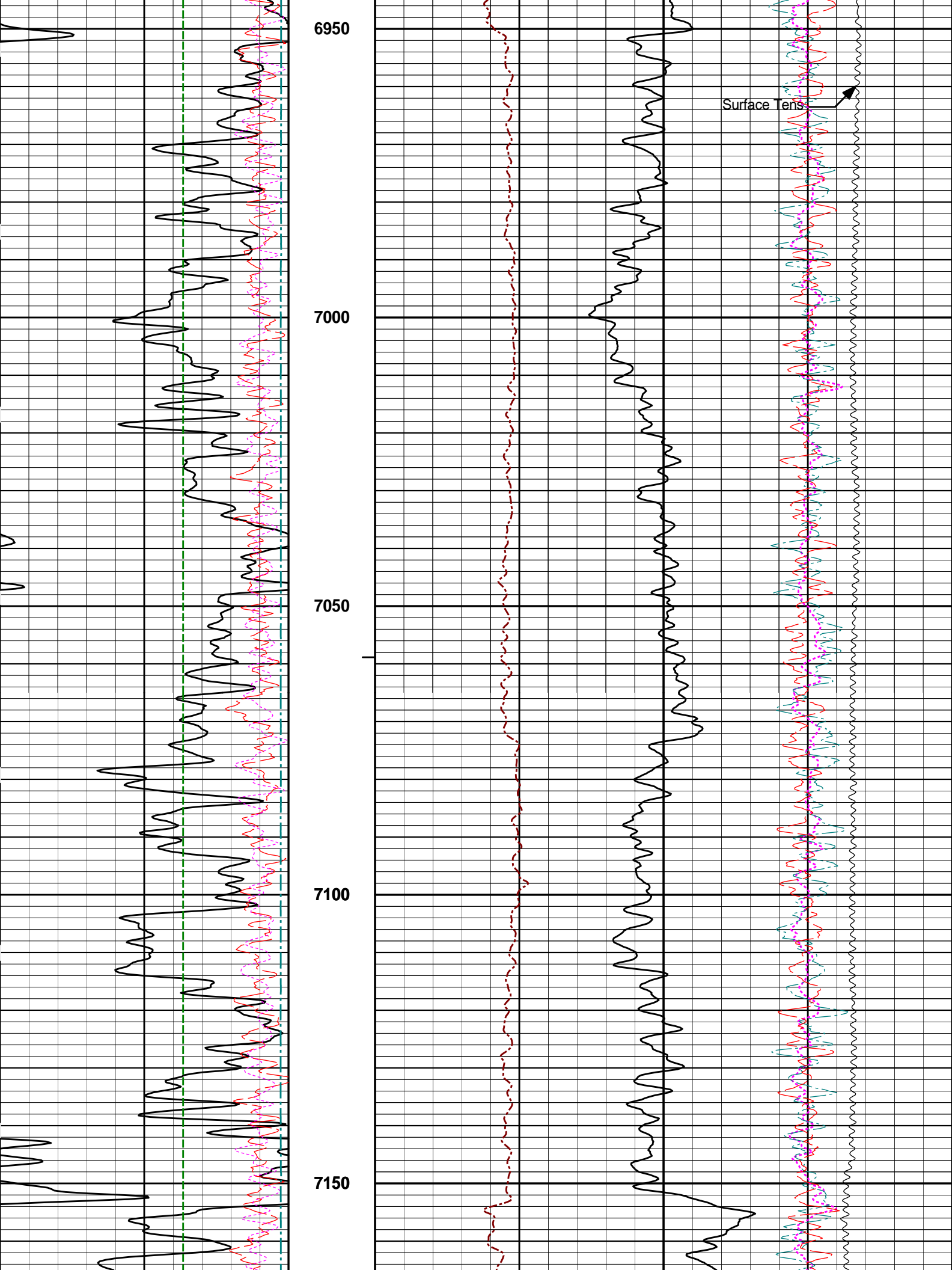
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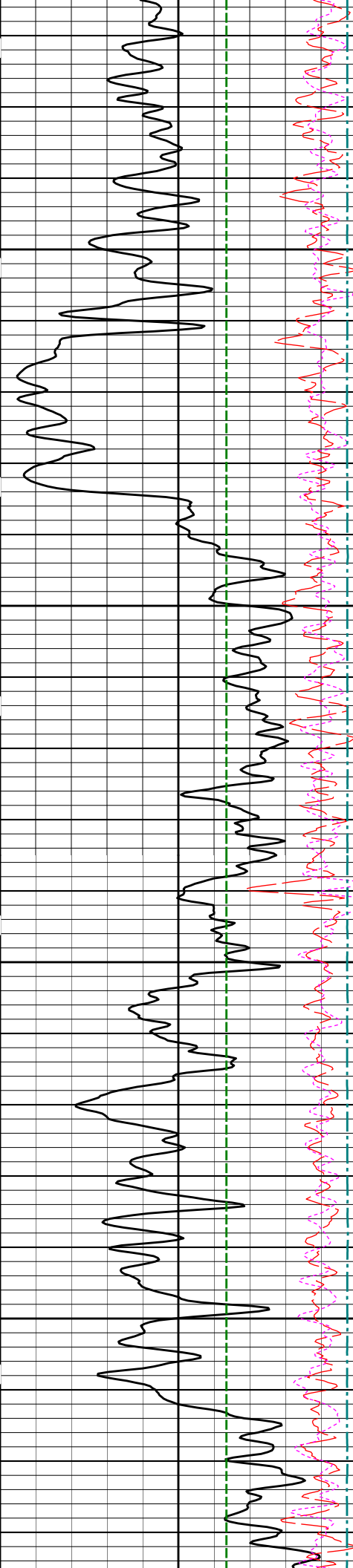
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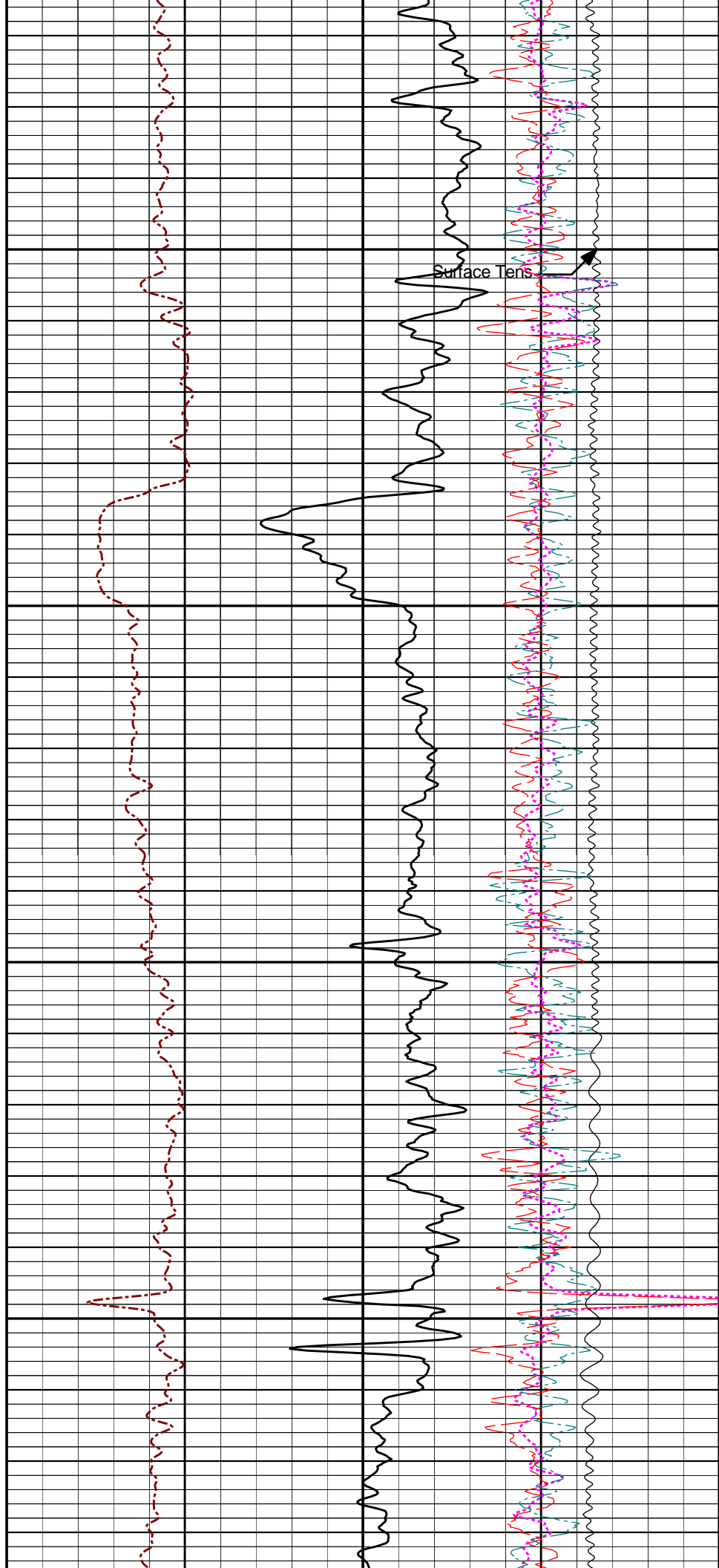
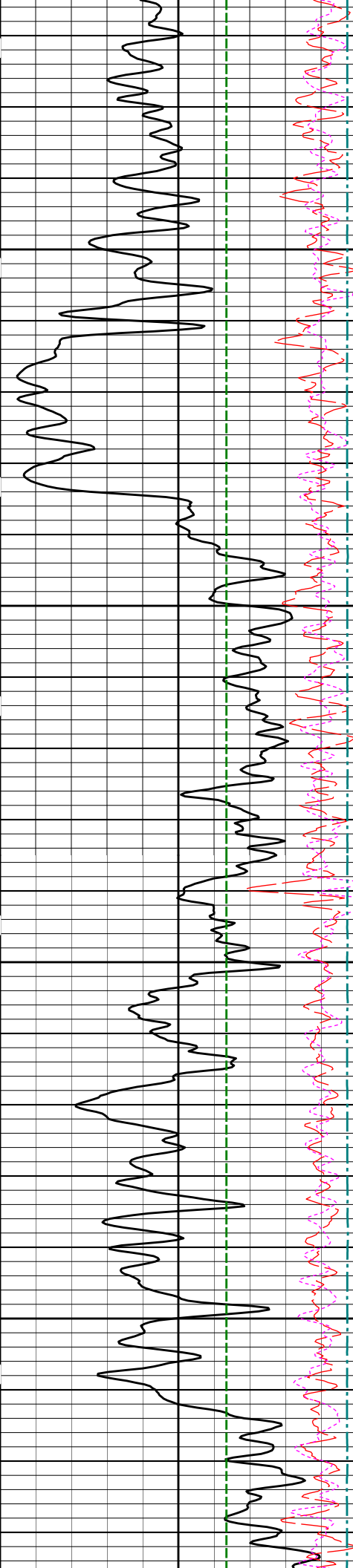
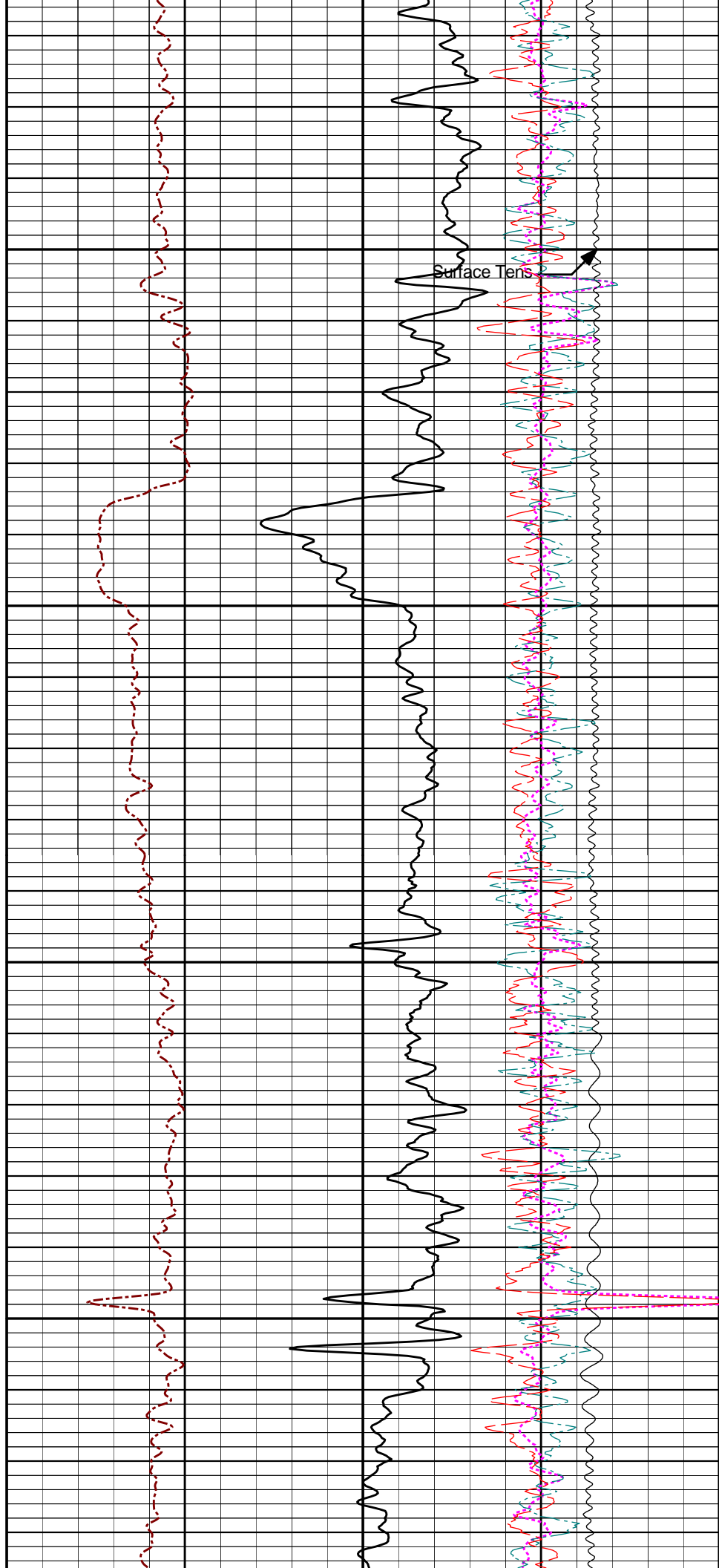


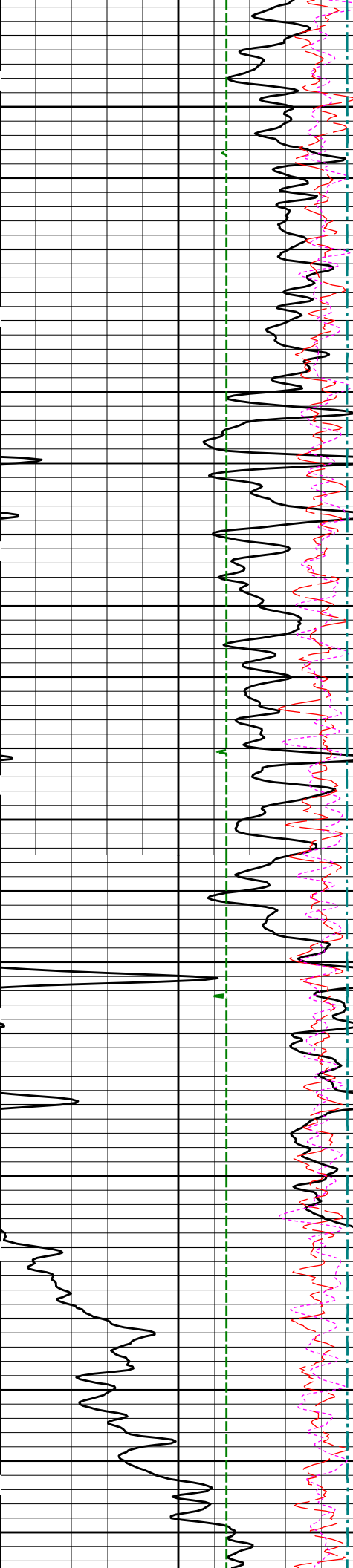
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7250

7300

7350





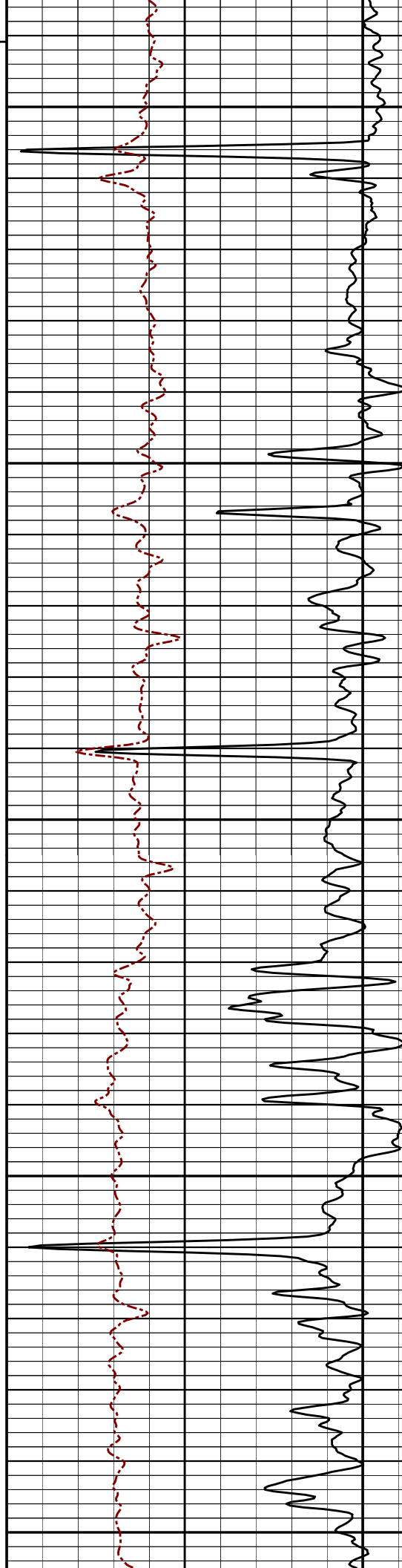
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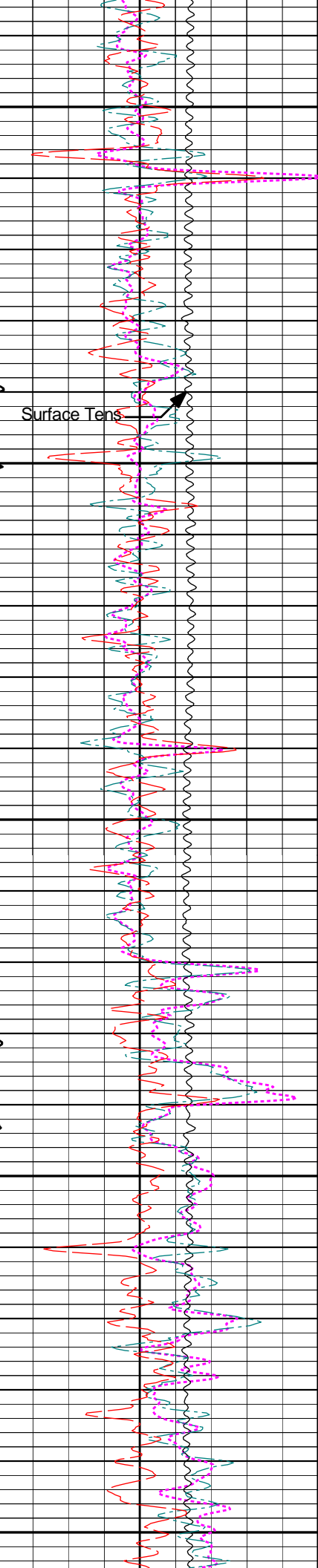
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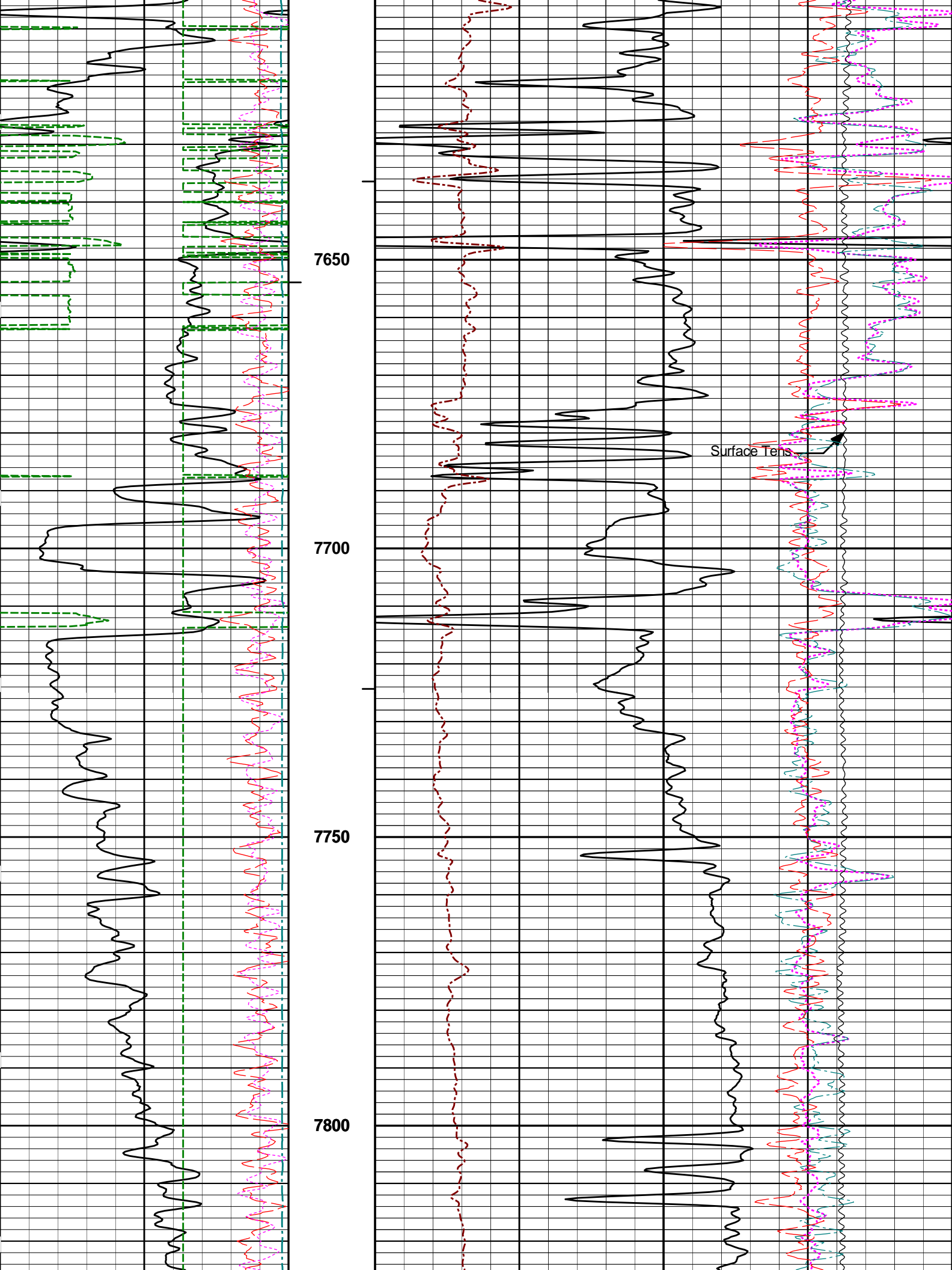
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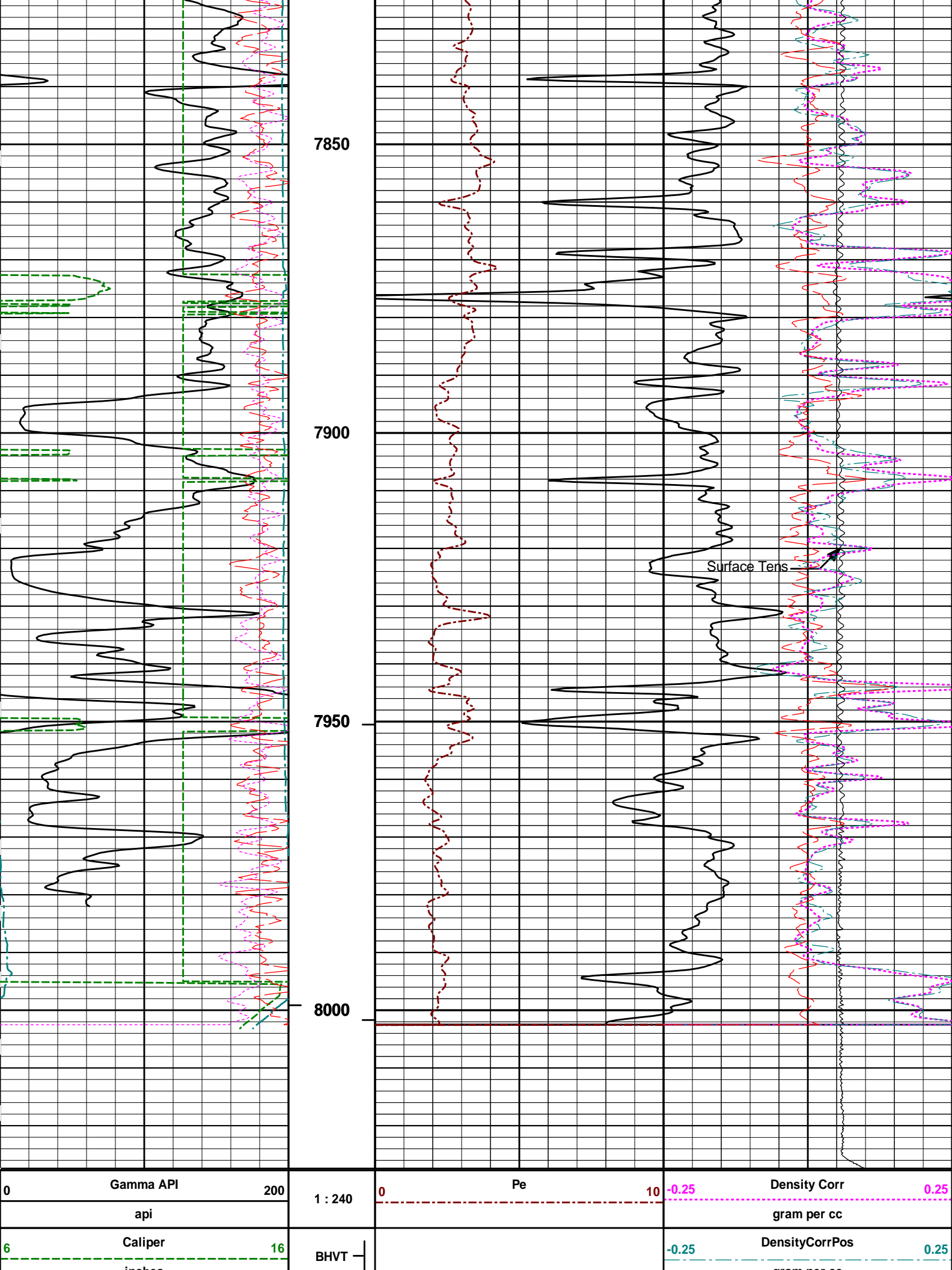
7600



Surface Tens







| | | | | | |
|--------|-------------|-------------|------------------|----------------|------|
| inches | | AHVT | gram per cc | | |
| 0 | Caliper Pad | | -0.25 | DensityCorrNeg | 0.25 |
| inches | | | gram per cc | | |
| 9 | Far Quality | | 10K | Surface Tens | 0 |
| | | | pounds | | |
| -9 | NearQuality | 1 | 2 Bulk Density 3 | | |
| | | gram per cc | | | |

HALLIBURTON

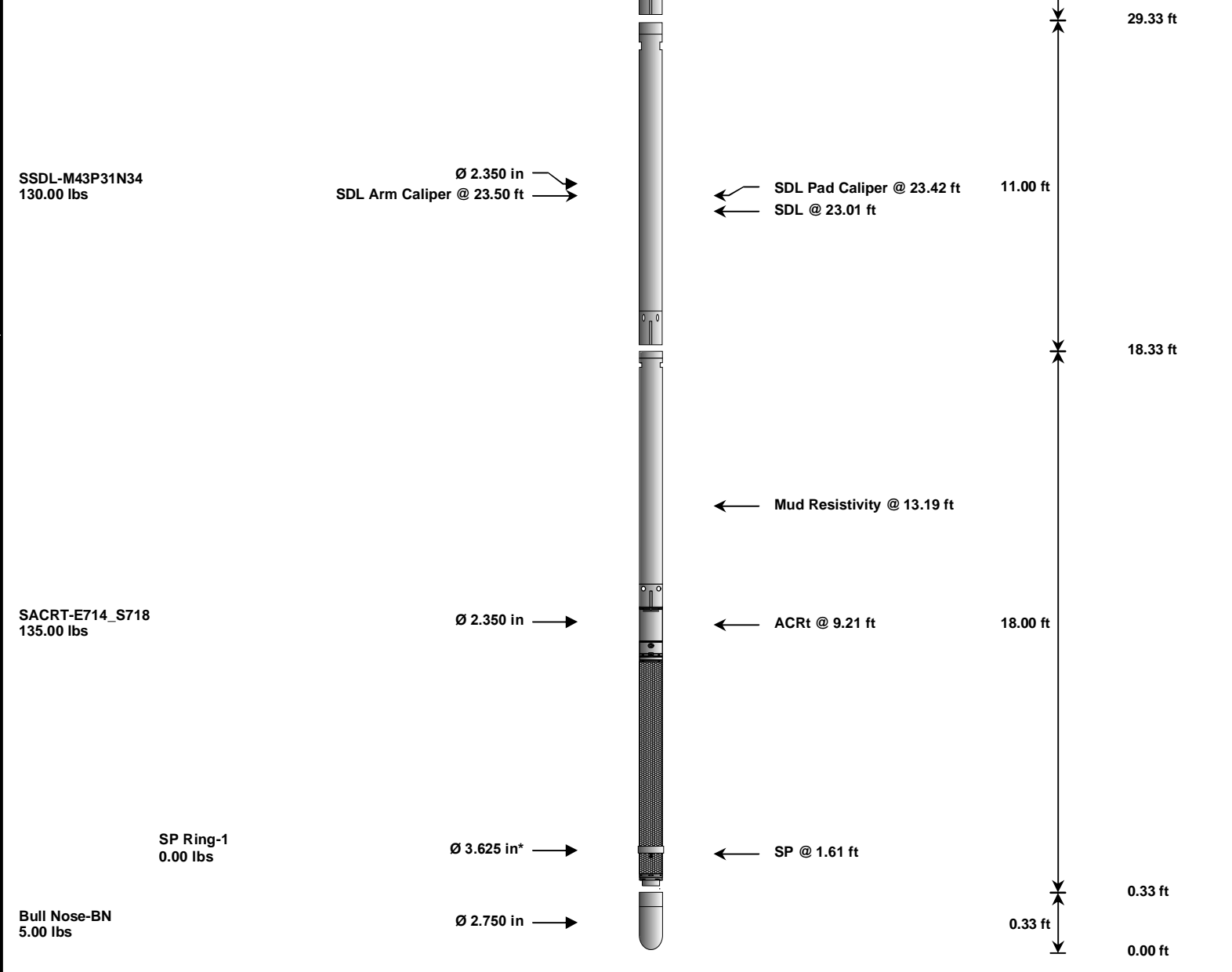
Plot Time: 12-Jul-11 16:48:44
Plot Range: 3495 ft to 8027.42 ft
Data: {ActiveWell}\Well Based\MAIN*
Plot File: \\PORO\IQ_RHOB_5IN_RM

MAIN PASS 5" = 100'

HALLIBURTON

TOOL STRING DIAGRAM REPORT

| Description | Overbody Description | O.D. | Diagram | Sensors @ Delays | Length | Accumulated Length |
|-----------------------------|----------------------|--------------|---------|---|---------|--------------------|
| SCHD-001 40.00 lbs | | Ø 2.350 in → | | ← Temperature @ 56.32 ft | 4.00 ft | 58.32 ft |
| SBIS-001 15.00 lbs | | Ø 2.350 in → | | | 1.11 ft | 54.32 ft |
| | | | | | | 53.21 ft |
| S4TG-11577722 90.00 lbs | | Ø 2.350 in → | | | 9.63 ft | |
| | | | | ← GammaRay @ 44.63 ft | | 43.58 ft |
| SCEN-001 75.00 lbs | | Ø 2.750 in → | | | 5.25 ft | |
| | | | | | | 38.33 ft |
| SDSN-11581734 100.00 lbs | | Ø 2.350 in → | | ← DSN Far @ 32.70 ft ← DSN Near @ 31.86 ft | 9.00 ft | |



| Mnemonic | Tool Name | Serial Number | Weight (lbs) | Length (ft) | Accumulated Length (ft) | Max.Log. Speed (fpm) |
|--------------|---|---------------|---------------|--------------|-------------------------|----------------------|
| SCHD | Ultra-Slim Cable Head | 001 | 40.00 | 4.00 | 54.32 | 300.00 |
| SBIS | Ultra-Slim Battery and Inverter Sub | 001 | 15.00 | 1.11 | 53.21 | 300.00 |
| S4TG | Ultra-Slim Quad Telemetry Gamma Cartridge | 11577722 | 90.00 | 9.63 | 43.58 | 60.00 |
| SCEN | SLIM DECENTRALIZER | 001 | 75.00 | 5.25 | 38.33 | 300.00 |
| SDSN | Ultra-Slim Hole Dual Spaced Neutron | 11581734 | 100.00 | 9.00 | 29.33 | 60.00 |
| SSDL | Ultra-Slim Hole Spectral Density | M43P31N34 | 130.00 | 11.00 | 18.33 | 60.00 |
| SACRT | Array Compensated True Resistivity | E714_S718 | 135.00 | 18.00 | 0.33 | 300.00 |
| SP | SP Ring | 1 | 0.00 | 0.25 * | 1.61 | 300.00 |
| BLNS | Bull Nose | BN | 5.00 | 0.33 | 0.00 | 300.00 |
| Total | | | 590.00 | 58.32 | | |

* Not included in Total Length and Length Accumulation.

Data: CANNON_22_3\0001 SLIM_TRIPLE\004 12-Jul-11 13:40 Up @8028.3f Date: 12-Jul-11 14:57:50

| | | | |
|---------|---------------------------------|-------|----|
| COMPANY | KERR-MCGEE OIL & GAS ONSHORE LP | | |
| WELL | CANNON 22-3 | | |
| FIELD | WATTENBERG | | |
| COUNTY | WELD | STATE | CO |

HALLIBURTON

DUAL SPACED NEUTRON
SPECTRAL DENSITY
LOG