Schlumberger

Company: Noble Energy Inc

Well: ANNI LD29-763

Field: Wildcat

County: Weld State: Colorado

Platform Express

Triple Combo

County: Weld
Field: Wildcat
Location: SESW: Sec20, T9N, R58W
Well: ANNI LD29-763
Company: Noble Energy Inc

| Location: | | | | |
|---|---|---|---|---|
| SESW: Sec20, T9N, R58W | | Elev.: | K.B. | 4895.00 ft |
| SHL: 380'FSL x 1365'FWL | | | G.L. | 4865.00 ft |
| Lat/Long: 40.73031/-103.89269 | | | D.F. | 4894.00 ft |
| Permanent Datum: | Ground Level | Elev.: | | 4865.00 f |
| Log Measured From: | Kelly Bushing | 30.00 ft | | above Perm.Datum |
| Drilling Measured From: | Kelly Bushing | | | |

| API Serial No. | Section: | Township: | Range: |
|---|---|---|---|
| 05-123-43288 | 20 | 9N | 58W |

| | | | |
|---|---|---|---|
| Logging Date | 05-Nov-2016 | | |
| Run Number | One | | |
| Depth Driller | 10965.00 ft | | |
| Schlumberger Depth | 10965.00 ft | | |
| Bottom Log Interval | 6000.00 ft | | |
| Top Log Interval | 60.00 ft | | |
| Casing Fluid Type | BRINE | | |
| Salinity | | | |
| Density | 9.3 lbm/gal | | |
| Fluid Level | 8.00 ft | | |
| BIT/CASING/TUBING STRING | | | |
| Bit Size | 8.50 in | | |
| From | 1928.00 ft | | |
| To | 10965.00 ft | | |
| Casing/Tubing Size | 5.5 in | | |
| Weight | 20 lbm/ft | | |
| Grade | N/A | | |
| From | 30.00 ft | | |
| To | 10965.00 ft | | |
| Max Recorded Temperatures | 210 degF | | |
| Logger on Bottom Time | 05-Nov-2016 | 17:34:00 | |
| Unit Number Location: | 9115 | Ft Morgan | |
| Recorded By | B Kesek | | |
| Witnessed By | Bill Mansfield | | |

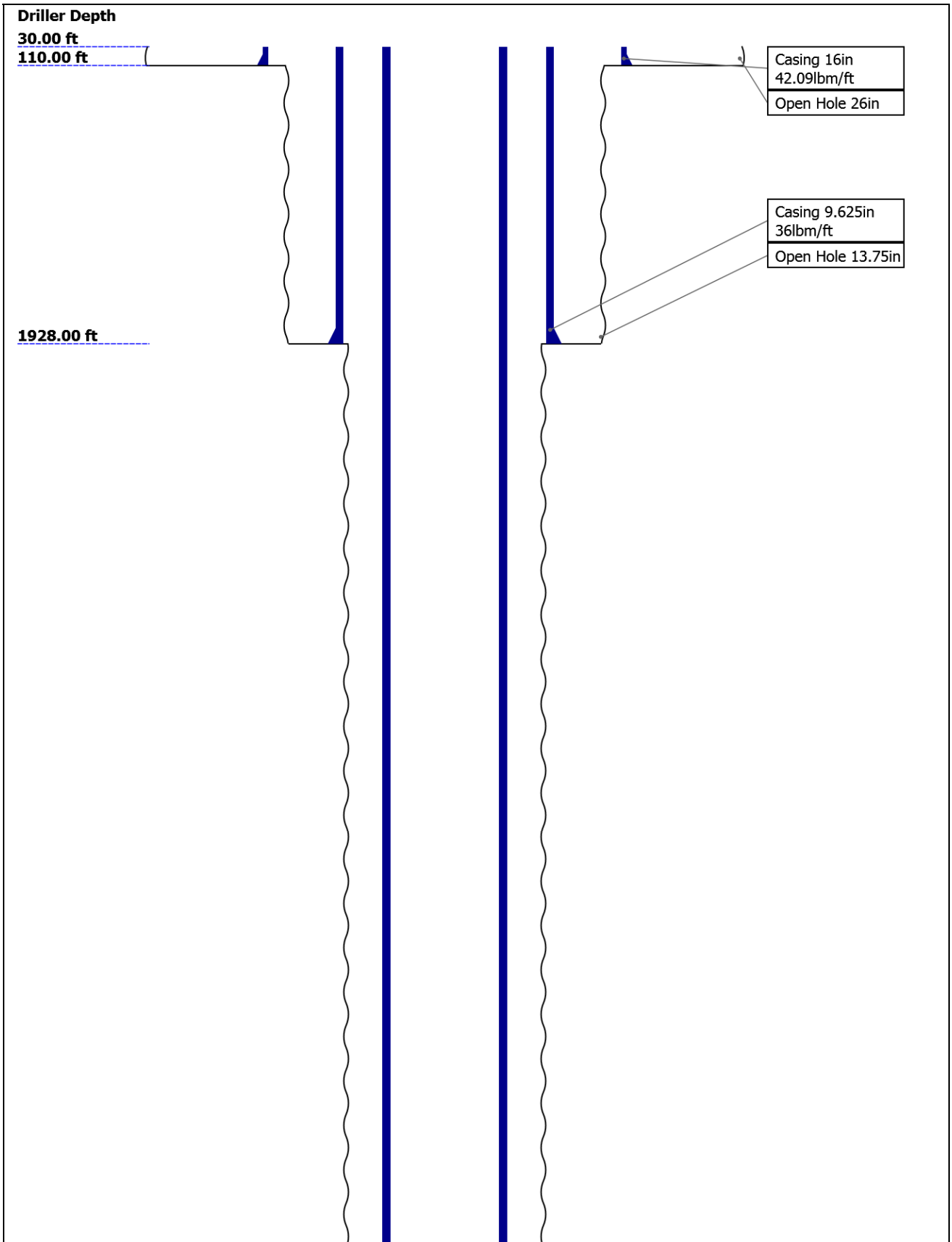
## Disclaimer

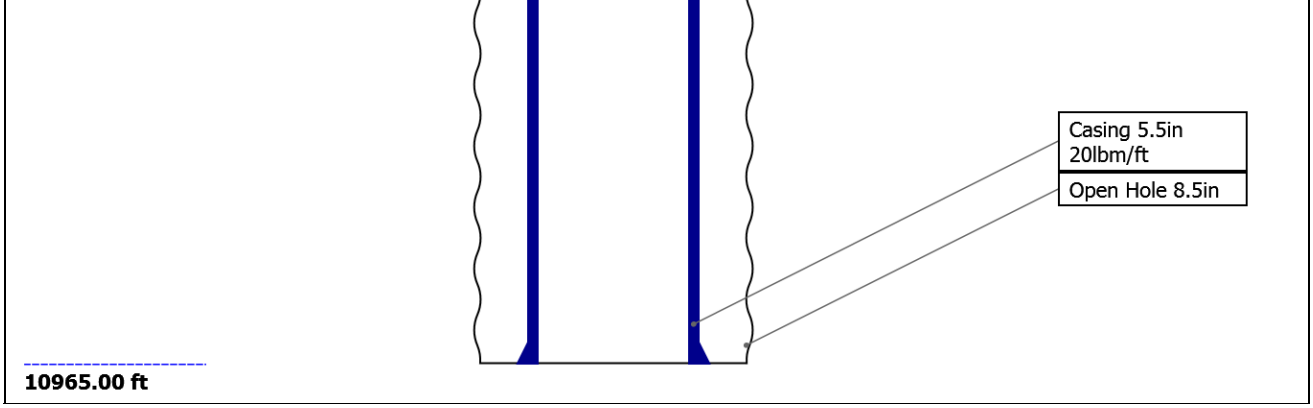


## Contents

11. Tail

## Well Sketch



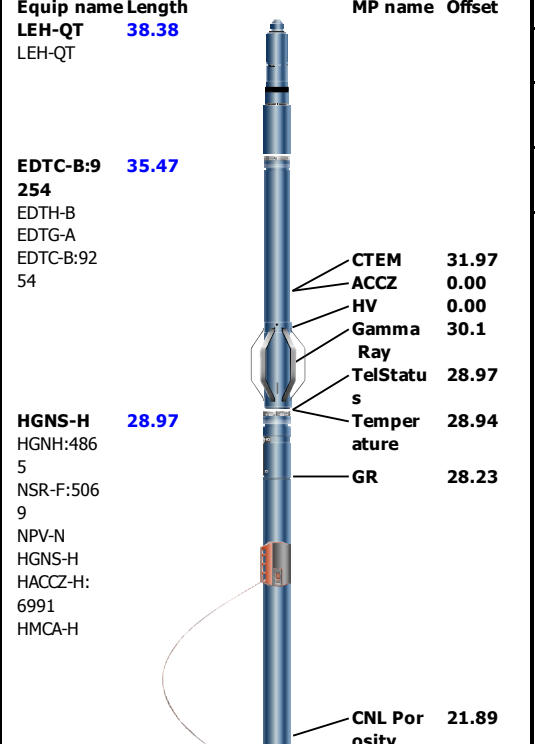



## Borehole Size/Casing/Tubing Record

| | | | | | | |
|---|---|---|---|---|---|---|
| Bit | | | | | | |
| Bit Size ( in ) | 26 | 13.75 | 8.5 | | | |
| Top Driller ( ft ) | 30 | 110 | 1928 | | | |
| Top Logger ( ft ) | 30 | 110 | 1928 | | | |
| Bottom Driller ( ft ) | 110 | 1928 | 10965 | | | |
| Bottom Logger ( ft ) | 110 | 1928 | 10965 | | | |
| Casing | | | | | | |
| Size ( in ) | 16 | 9.625 | 5.5 | | | |
| Weight ( lbm/ft ) | 42.09 | 36 | 20 | | | |
| Inner Diameter ( in ) | 15.511 | 8.921 | 4.778 | | | |
| Grade | N/A | N/A | N/A | | | |
| Top Driller ( ft ) | 30 | 30 | 30 | | | |
| Top Logger ( ft ) | 30 | 30 | 30 | | | |
| Bottom Driller ( ft ) | 110 | 1928 | 10965 | | | |
| Bottom Logger ( ft ) | 110 | 1928 | 10965 | | | |

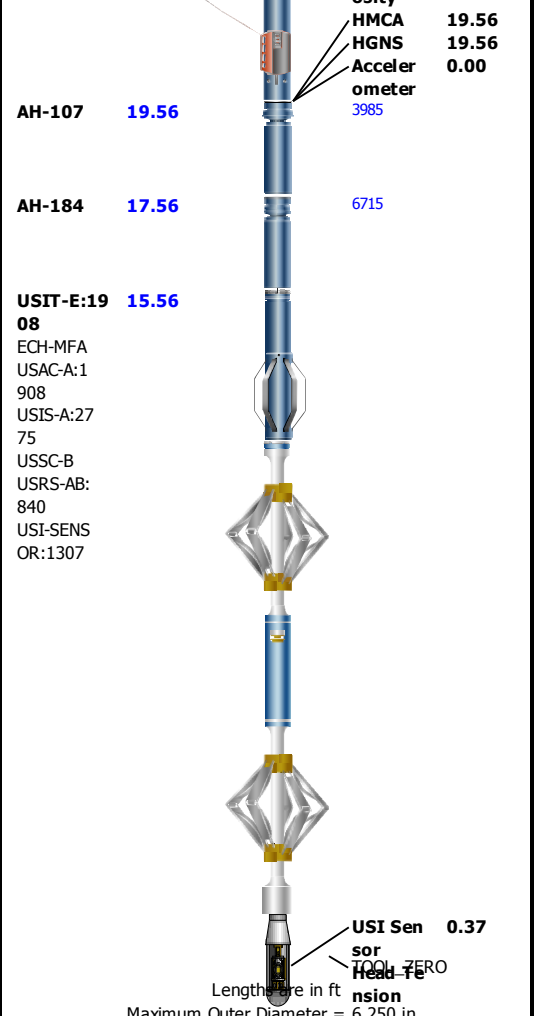
## Remarks and Equipment Summary

### One: Toolstring




### One: Remarks

| |
|---|
| This is the first run in the hole. |
| Tool ran as per toolsketch. |
| Houma kit, small hole kit and inline centralisers used for centralisation. |
| Main Pass recorded at 2500PSI, record pass at 0PSI. |




## Depth Summary

| | One | | |
|---|---|---|---|
| **Depth Measuring Device** | | | |
| Type | IDW-JA | | |
| Serial Number | 5797 | | |
| Calibration Date | | | |
| Calibrator Serial Number | | | |
| Calibration Cable Type | 7-46 AXXS | | |
| Wheel Correction 1 | -5 | | |
| Wheel Correction 2 | -3 | | |
| **Tension Device** | | | |
| Type | CMTD-B/A | | |
| Serial Number | 146 | | |
| Calibration Date | | | |
| Calibrator Serial Number | | | |
| Number of Calibration Points | 0 | | |
| **Logging Cable** | | | |
| Type | 7-46A-XS | | |
| Serial Number | | | |
| Length | 22000.00 ft | | |
| Conveyance Type | Wireline | | |

| | | | |
|---|---|---|---|
| Rig Type | | | |

| One:Depth Control Parameters | | Depth Control Remarks |
|---|---|---|
| Log Sequence | First Log In the Well | |
| Rig Up Length At Surface | | |
| Rig Up Length At Bottom | | |
| Rig Up Length Correction | | |
| Stretch Correction | | |
| Tool Zero Check At Surface | | |

# One

## Integration Summary

| Output Channel(s) | Output Description | Input Parameter | Output Value | Unit |
|---|---|---|---|---|
| ICV | Integrated Cement Volume | GCSE_UP_PASS, FCD | 0 | ft3 |
| IHV | Integrated Hole Volume | GCSE_UP_PASS | 0 | ft3 |

## Software Version

| Acquisition System | Version |
|---|---|
| Maxwell 2016 SP2 | 6.2.68624.3100 |

## Pass Summary

| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include Parallel Data |
|---|---|---|---|---|---|---|---|---|---|
| One | Main[4]:Up | Up | 56.27 ft | 6040.69 ft | 05-Nov-2016 6:01:26 PM | 05-Nov-2016 7:39:23 PM | ON | 6.35 ft | Yes |

All depths are referenced to toolstring zero

## Log

Company:Noble Energy Inc Well:ANNI LD29-763

One: Main[4]:Up:S004

Description: AIT Basic Log Two Format: Log ( Noble Nuclear ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 05-Nov-2016 20:23:32

| Channel | Source | Sampling |
|---|---|---|
| GR_CAL | EDTC-B:EDTC-B:EDTC-B | 6in |
| ICV | Borehole | 6in - RT |
| IHV | Borehole | 6in - RT |
| NPOR | HGNS-H:HGNS-H:HGNS-H | 6in |
| TENS | WLWorkflow | 6in |
| TIME_1900 | WLWorkflow | 0.1in |

IHV - Integrated Hole Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 100.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

Cable Tension (TENS)

5000 lbf 0

GR Backup

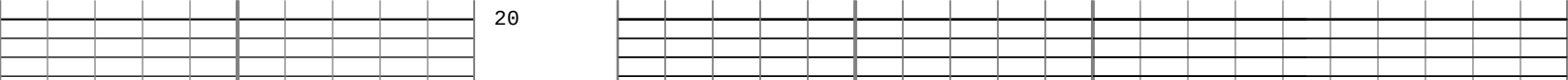
Calibrated Gamma Ray (GR_EDTC) EDTC-B

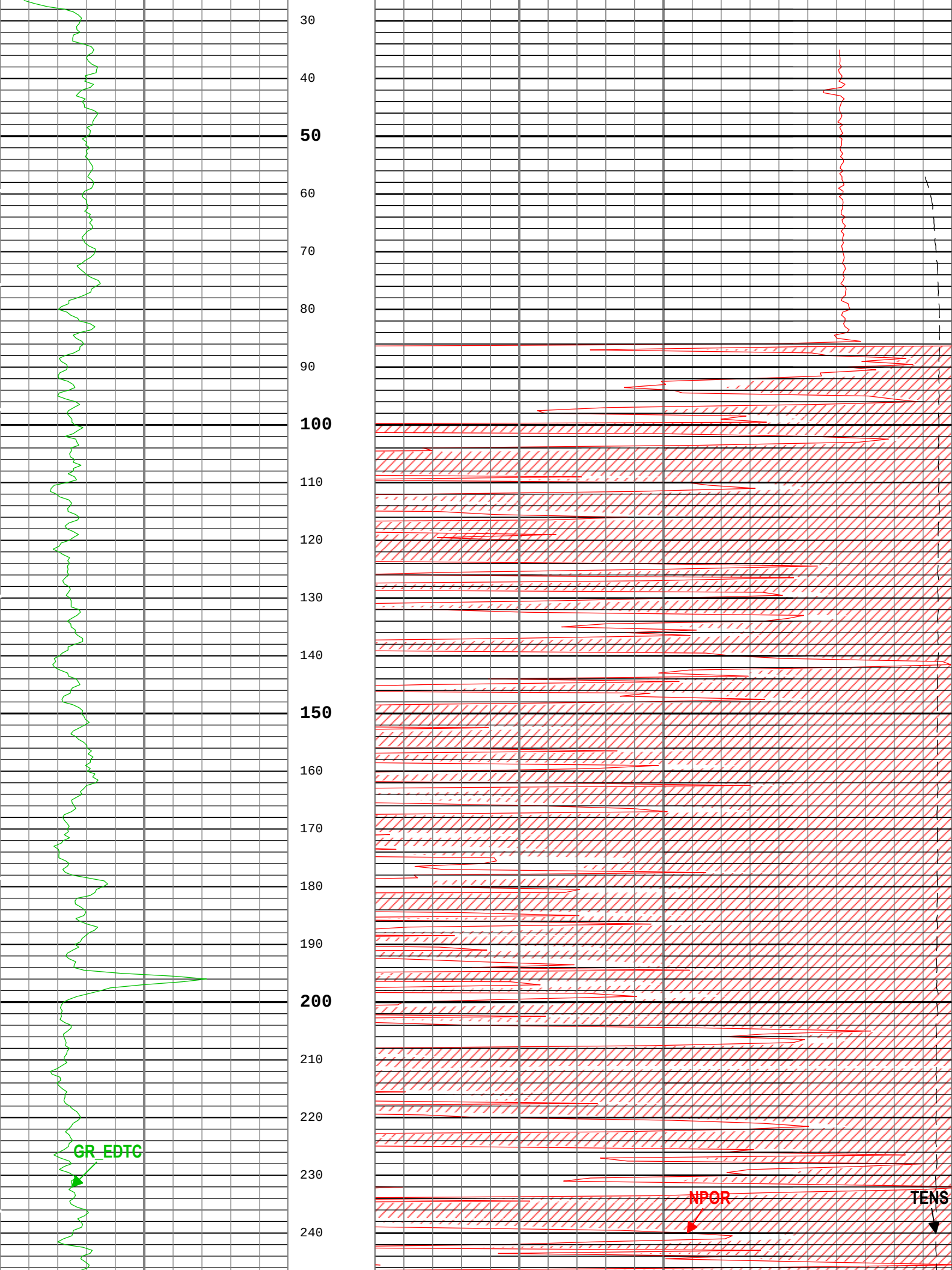
0 gAPI 150

NPOR Backup

Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H

0.45 ft3/ft3 -0.15

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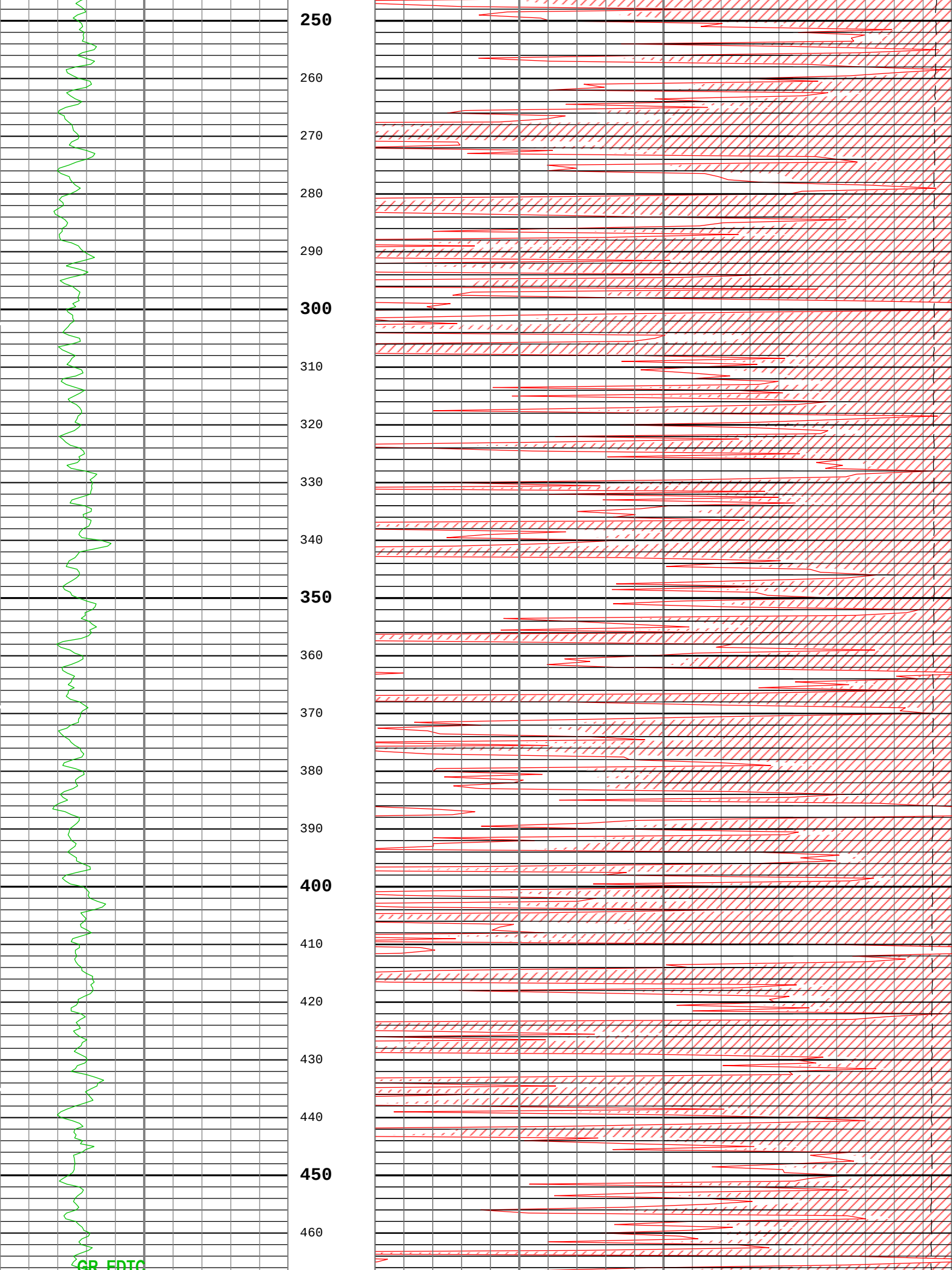
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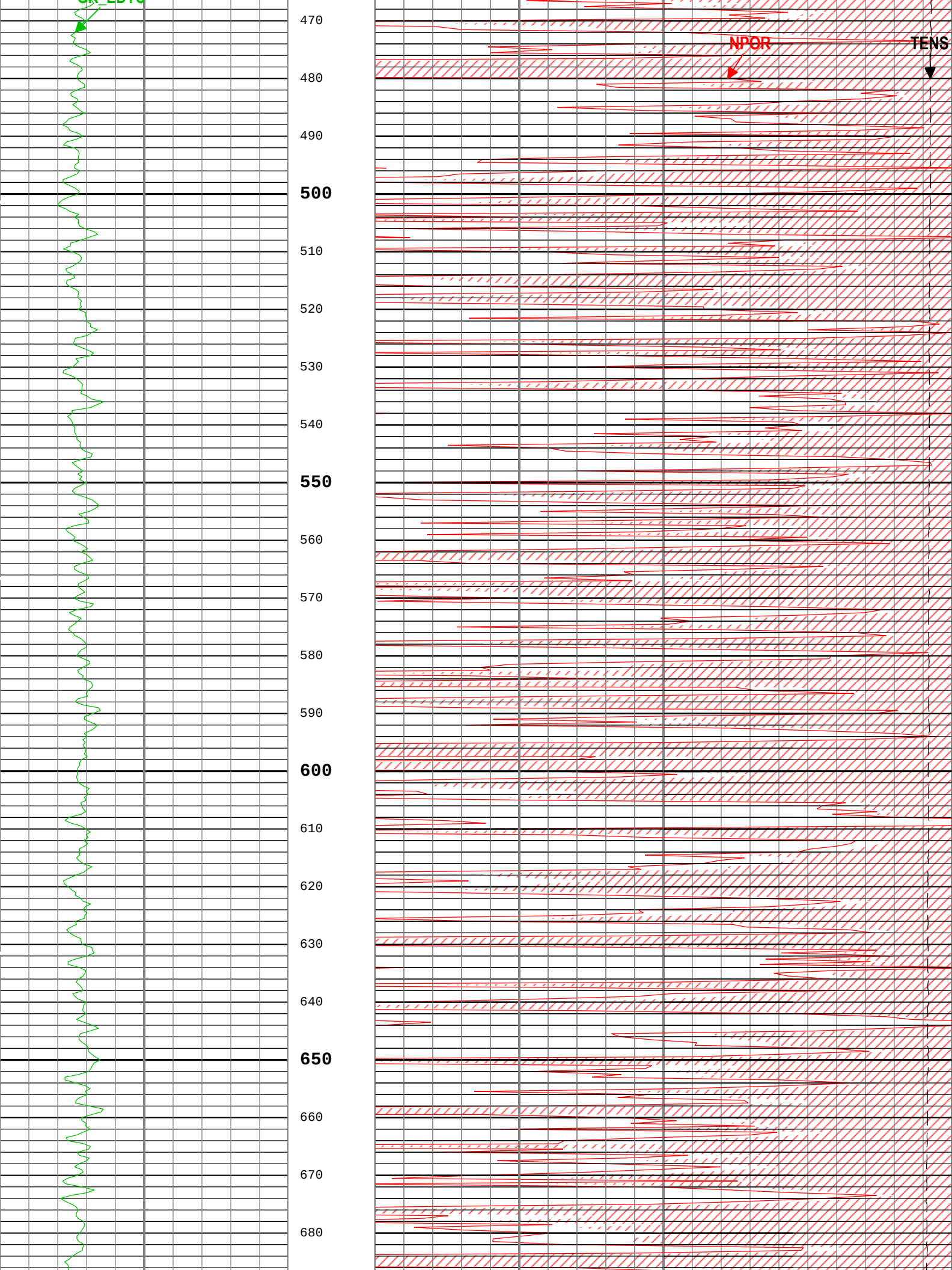
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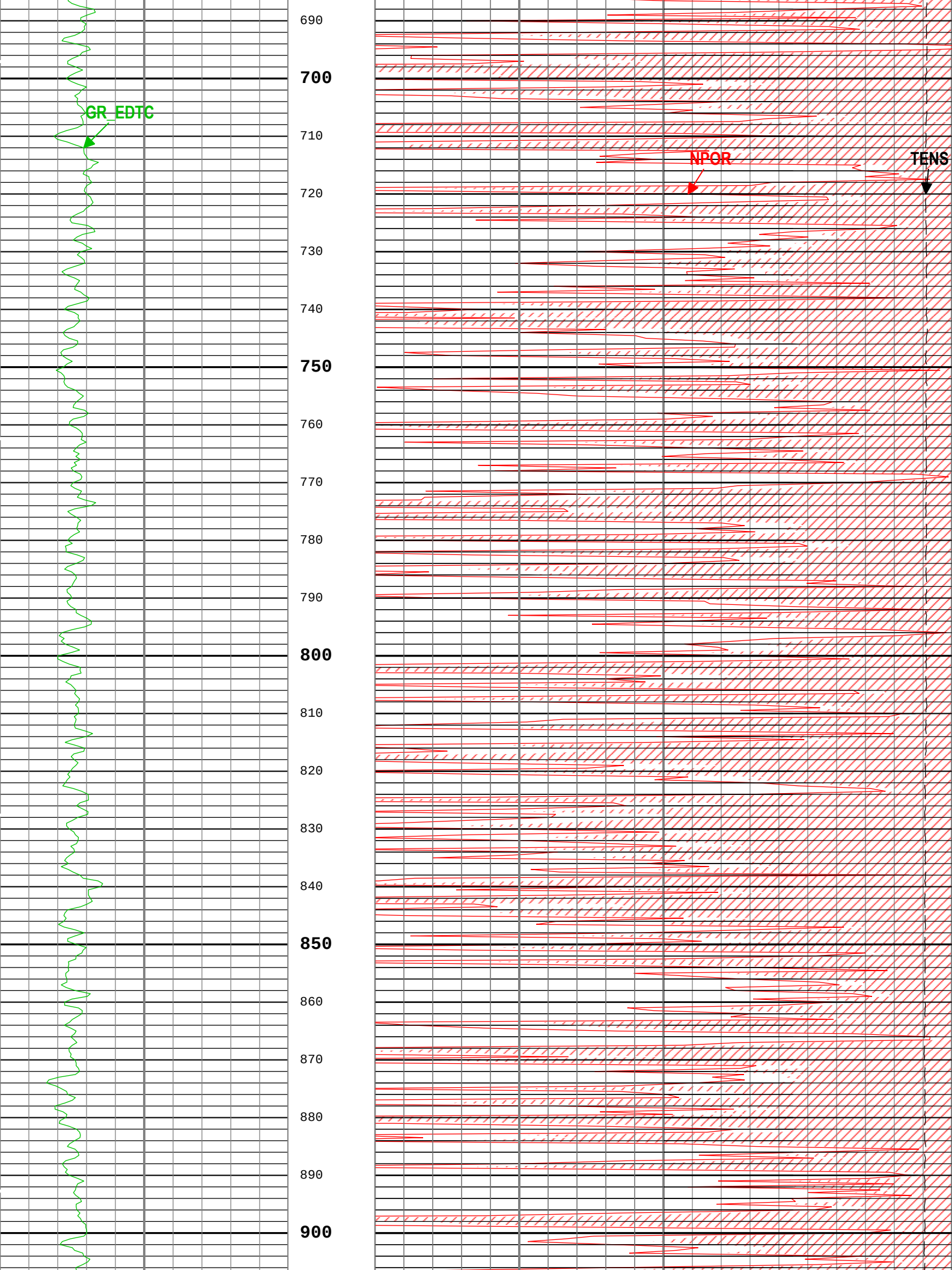
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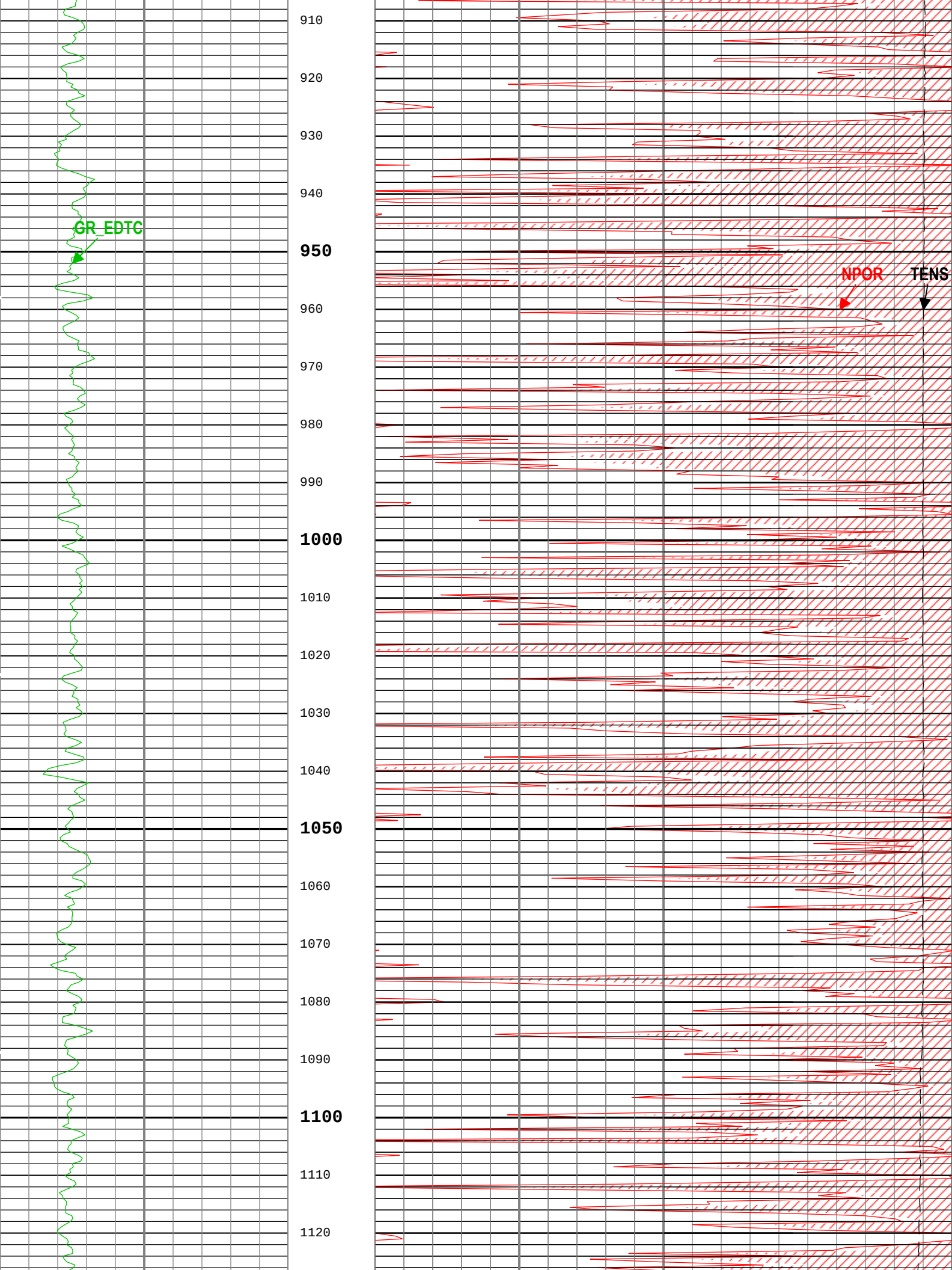
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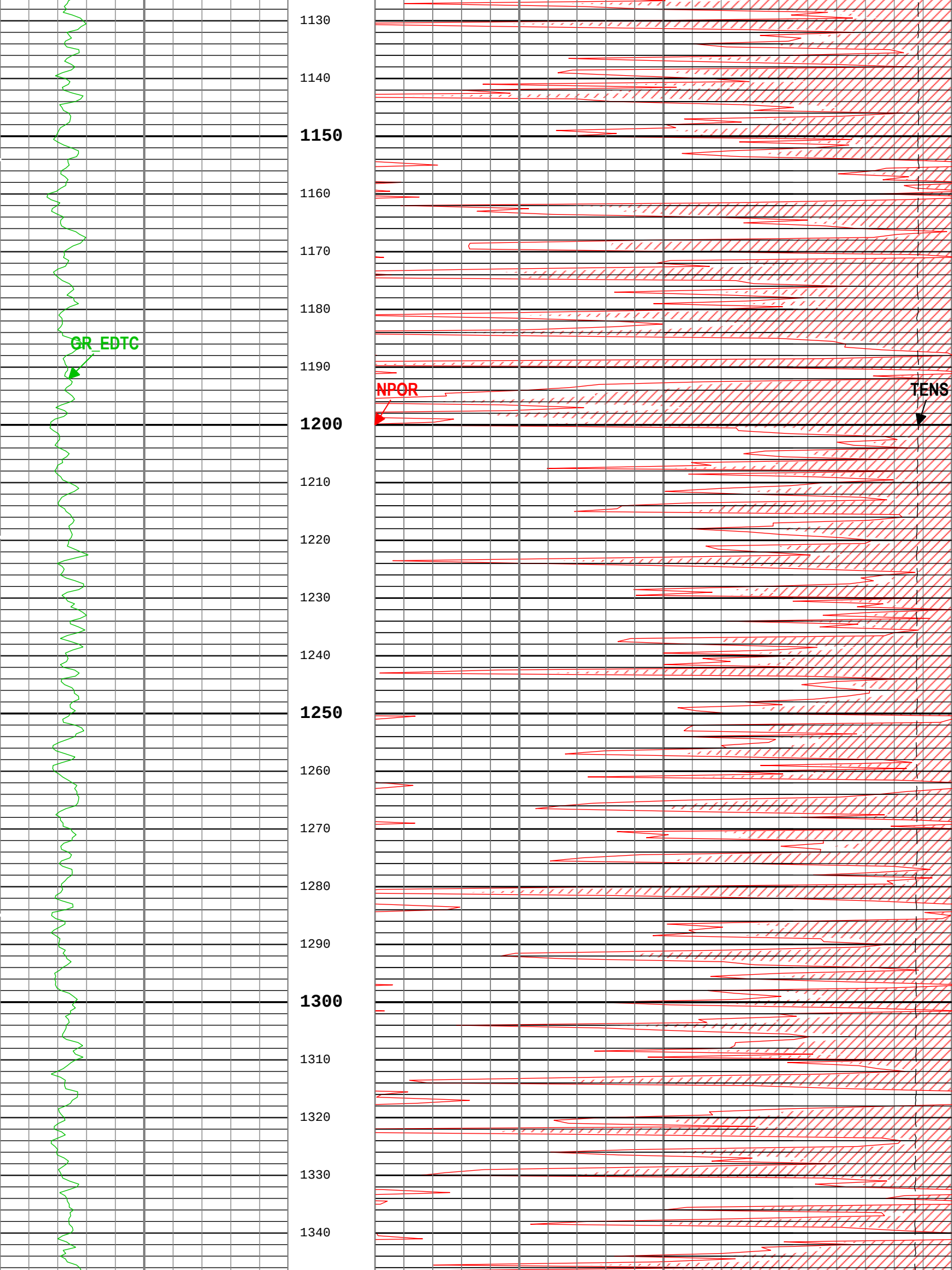
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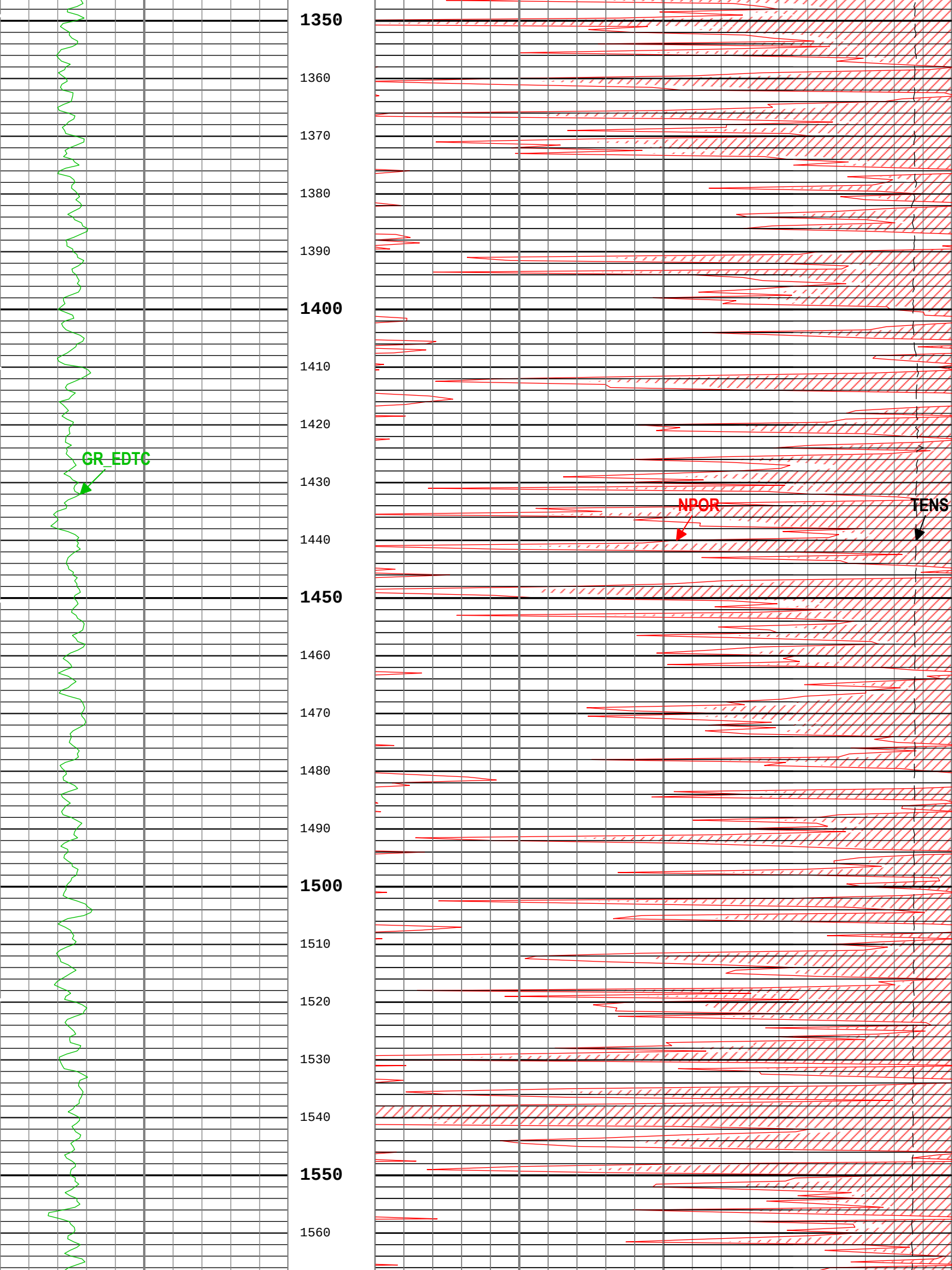
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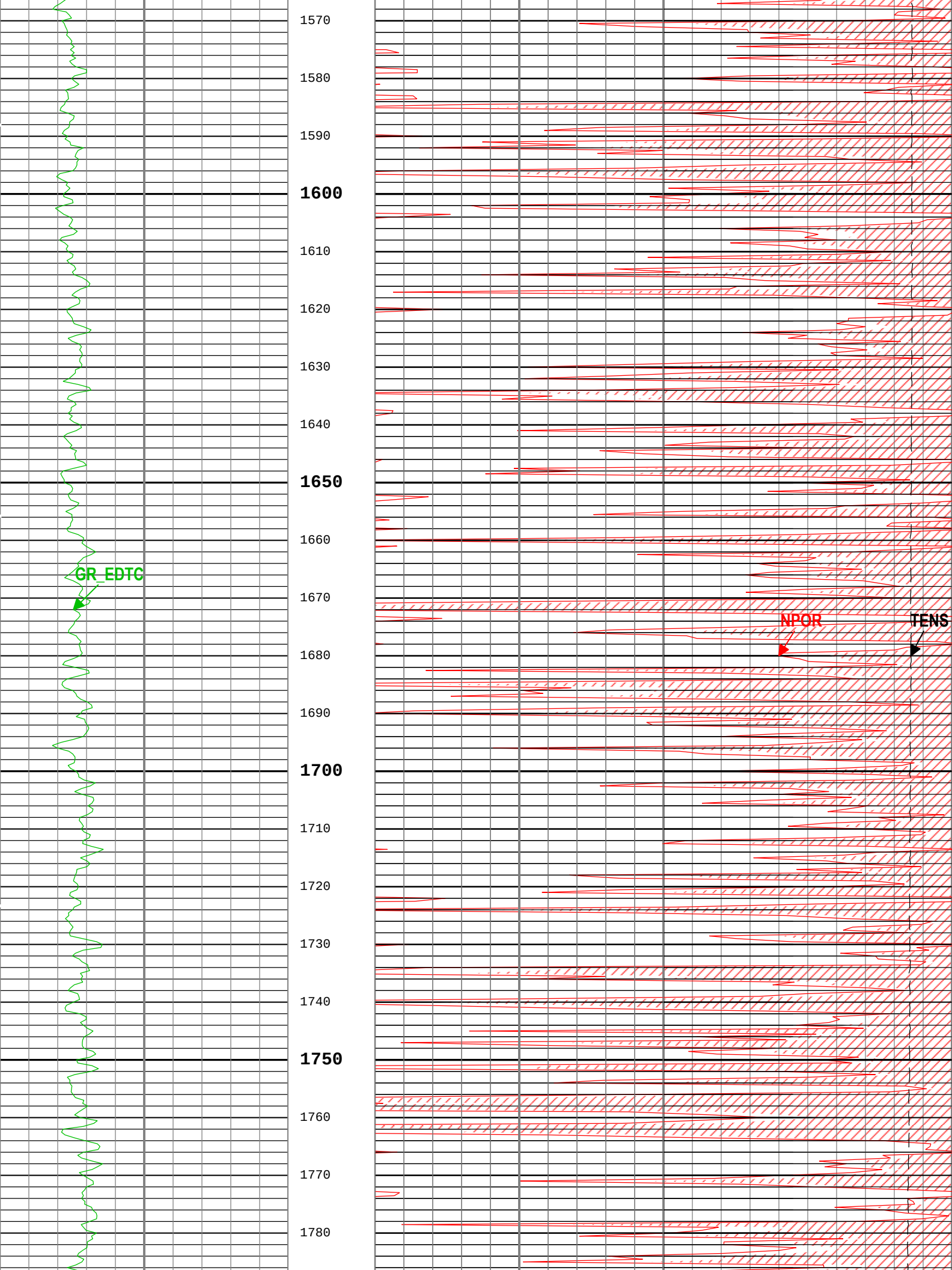
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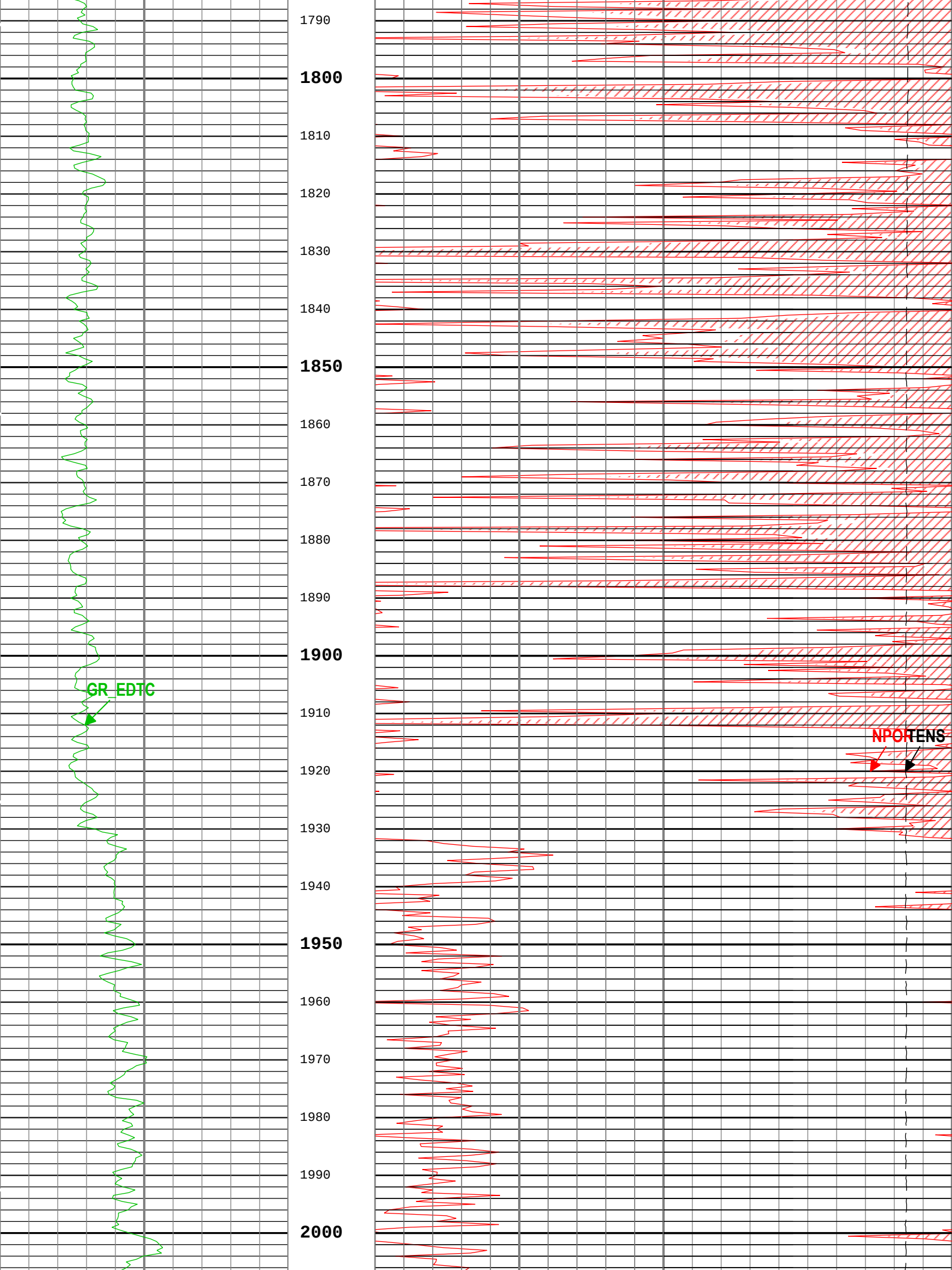
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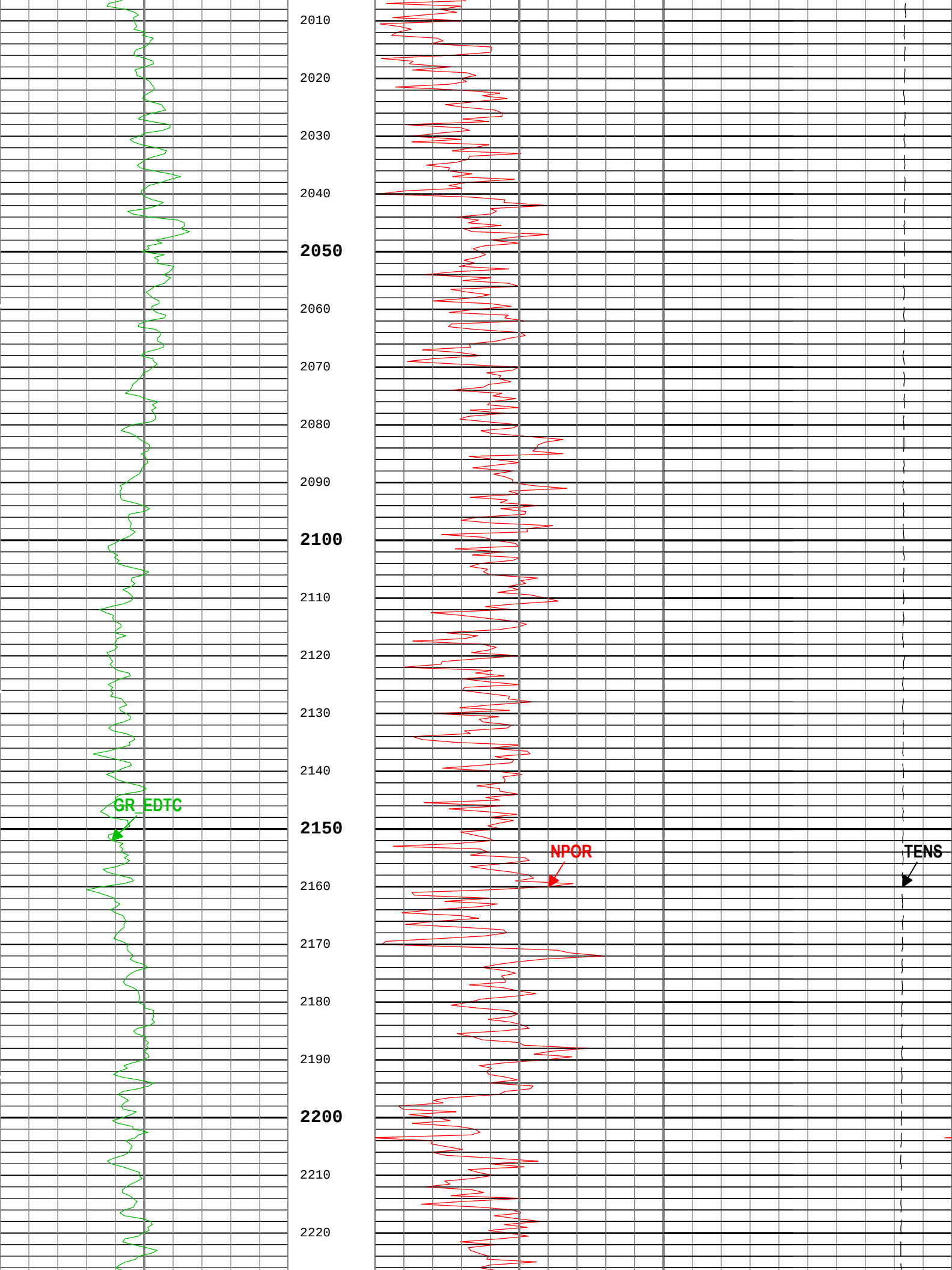
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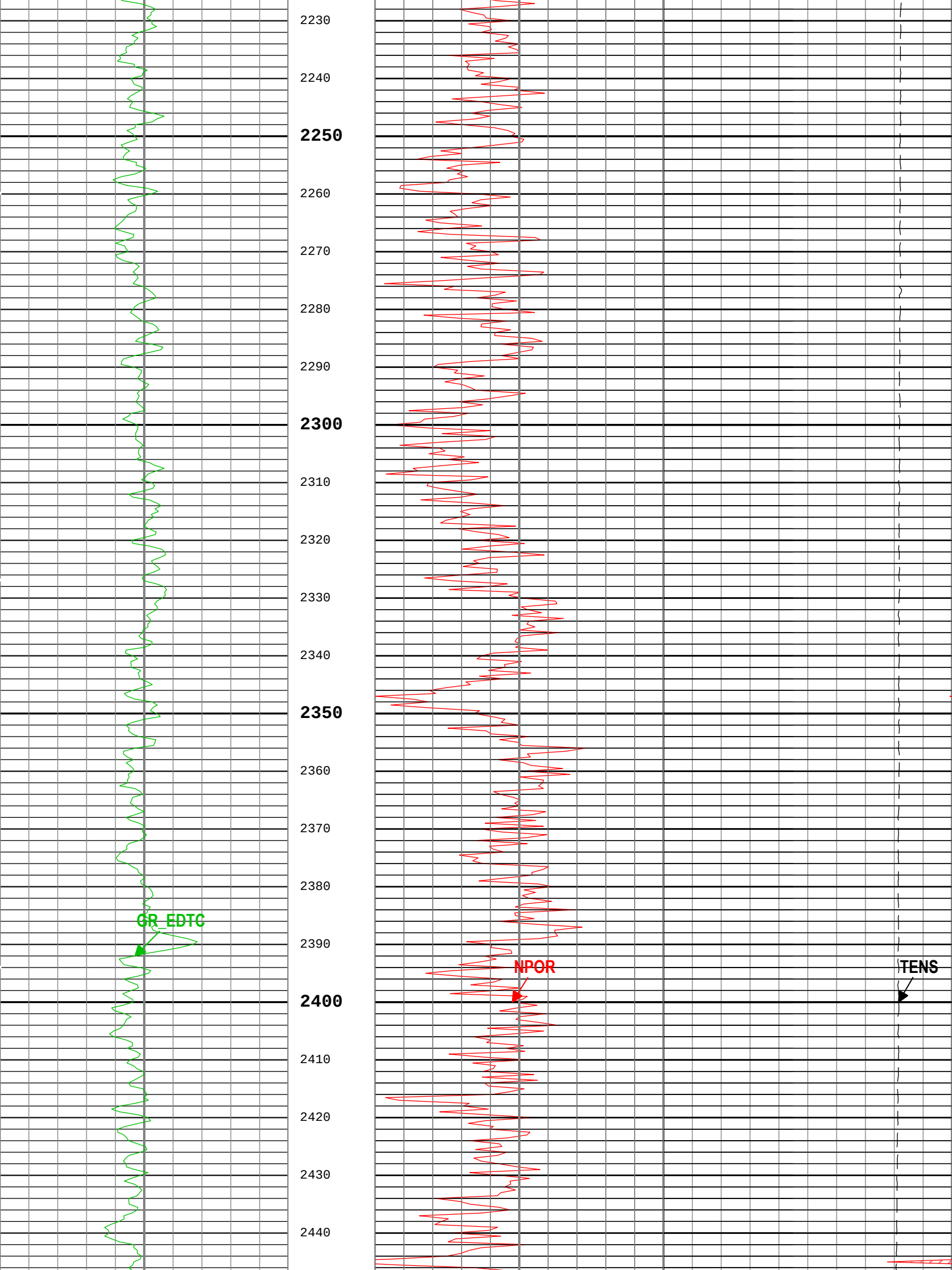
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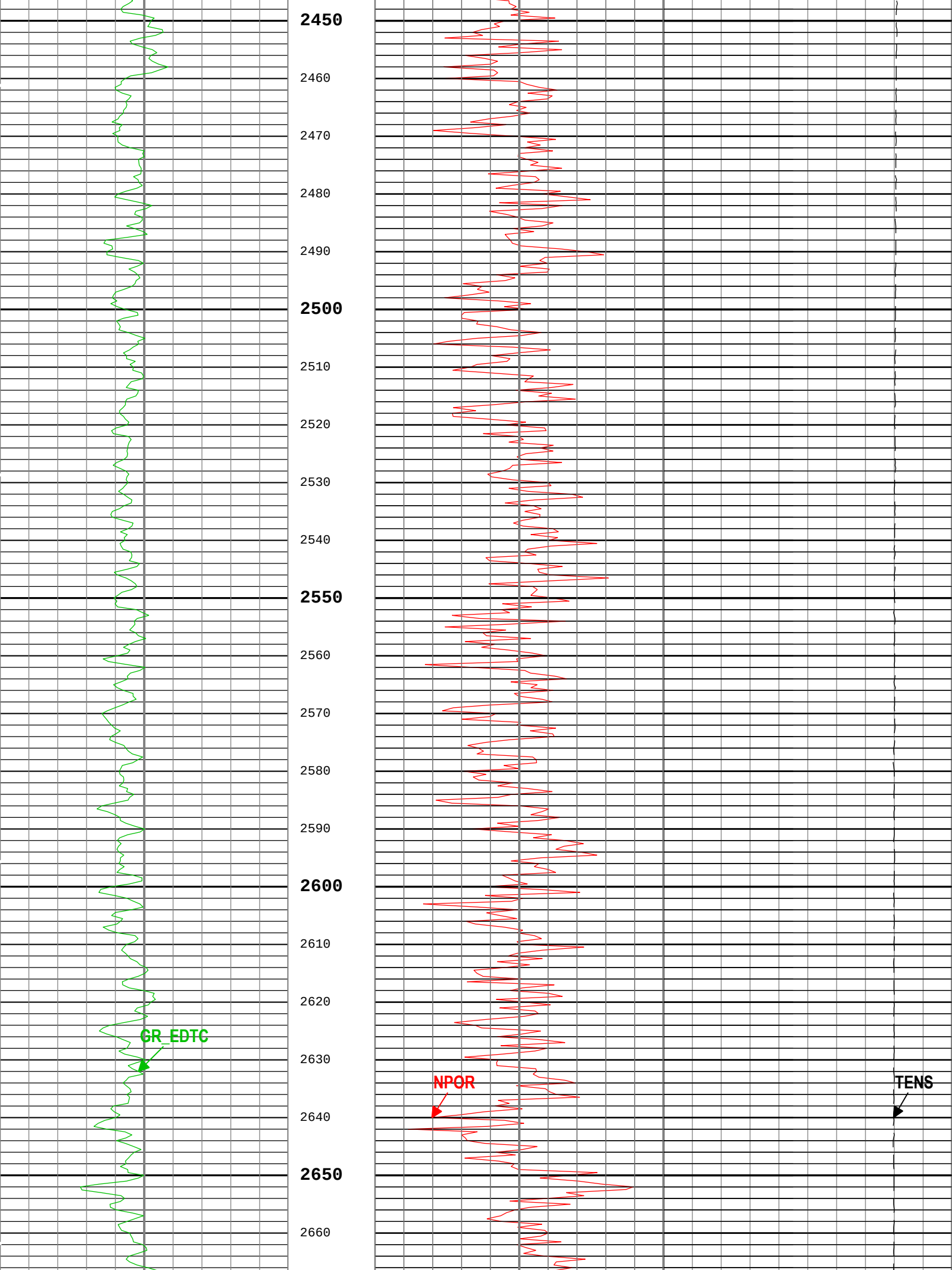
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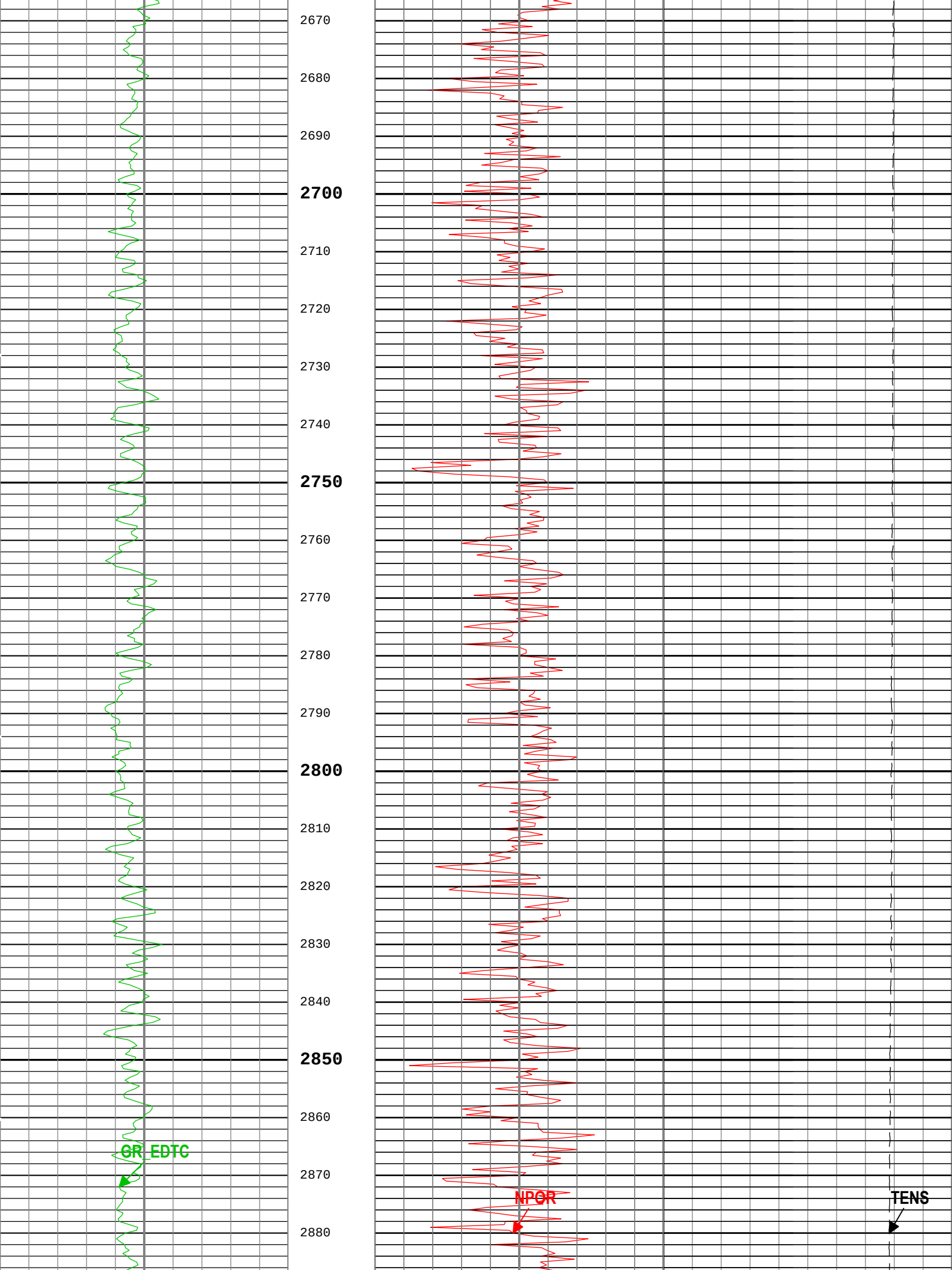
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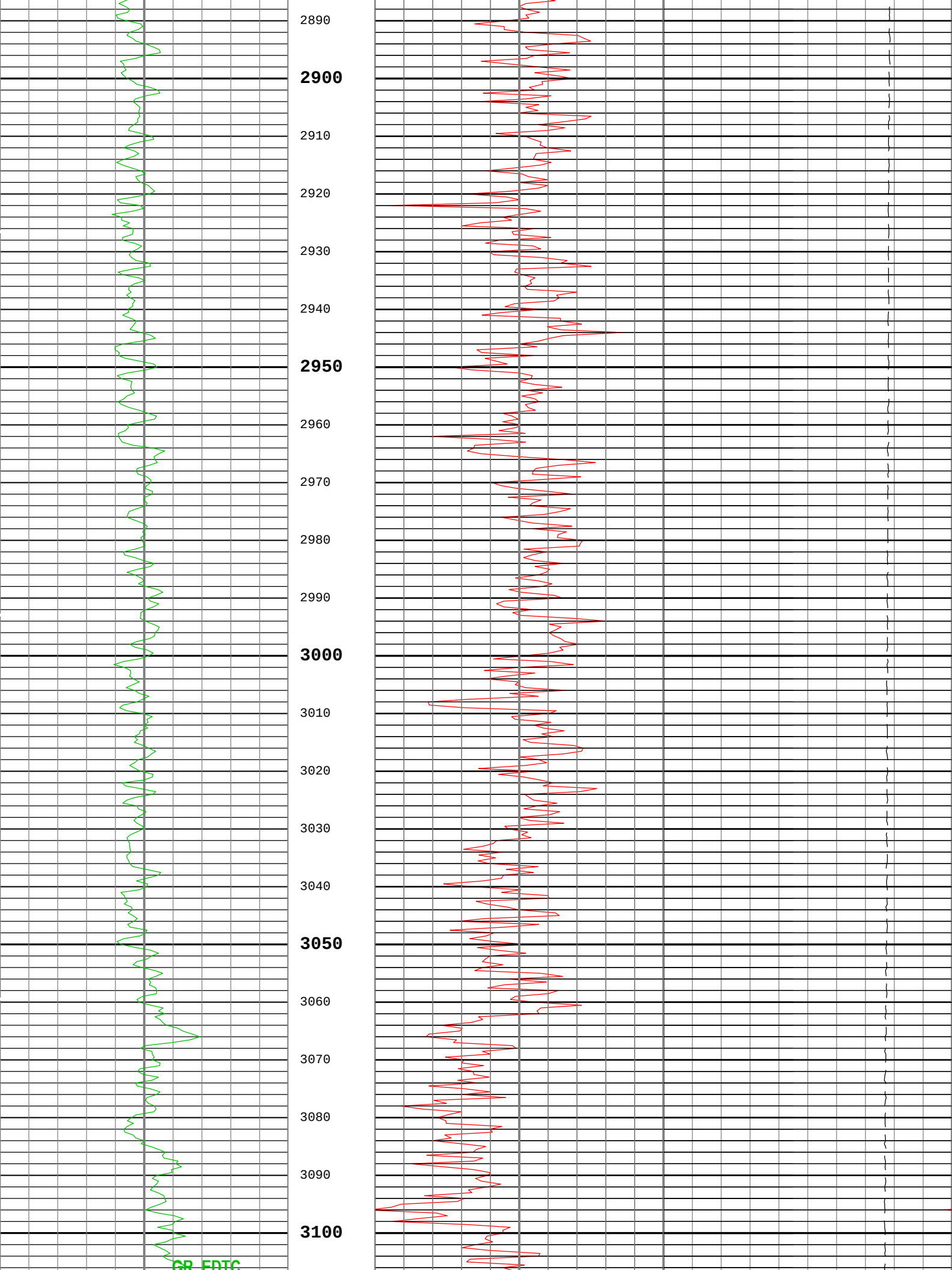
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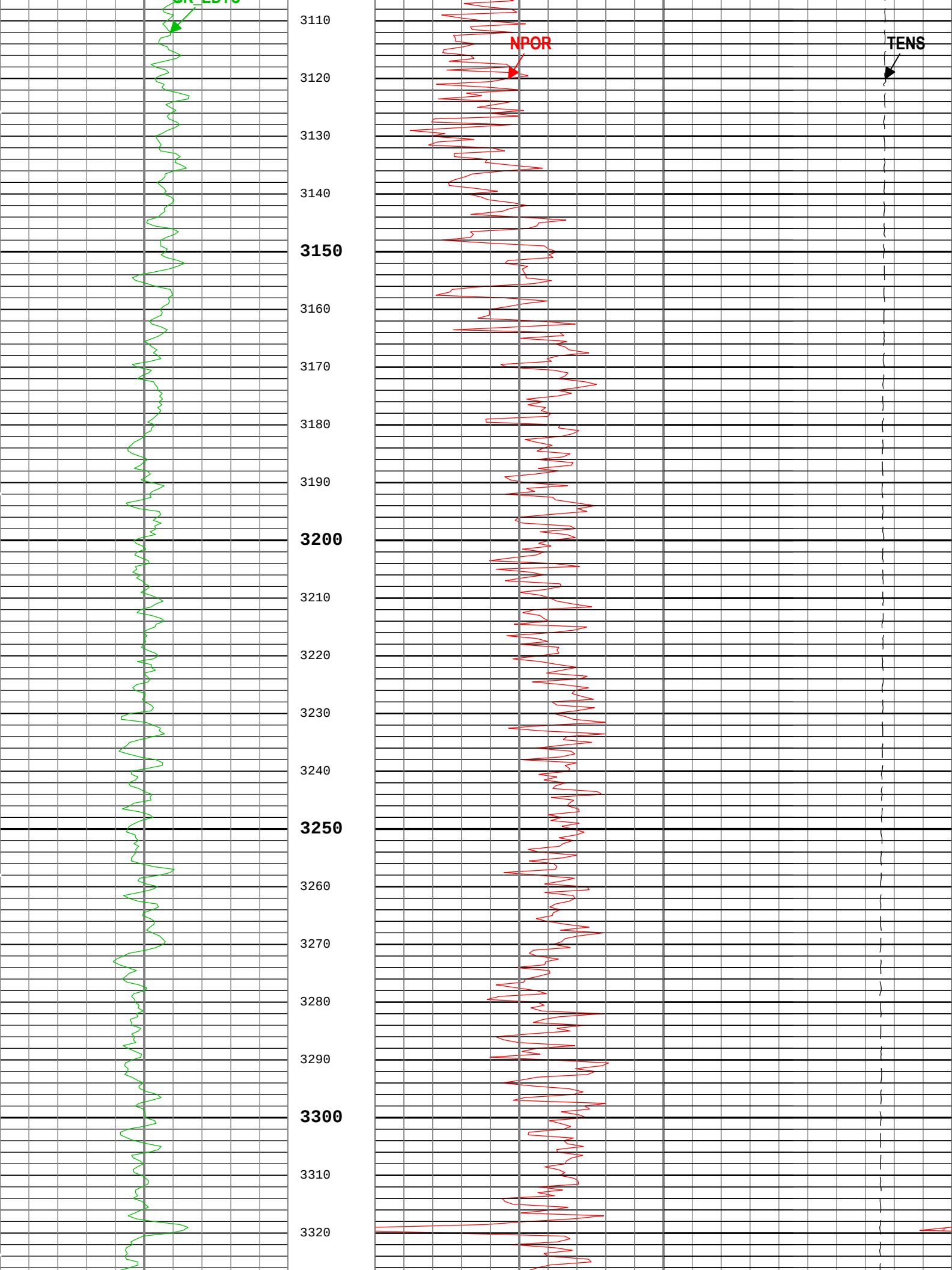
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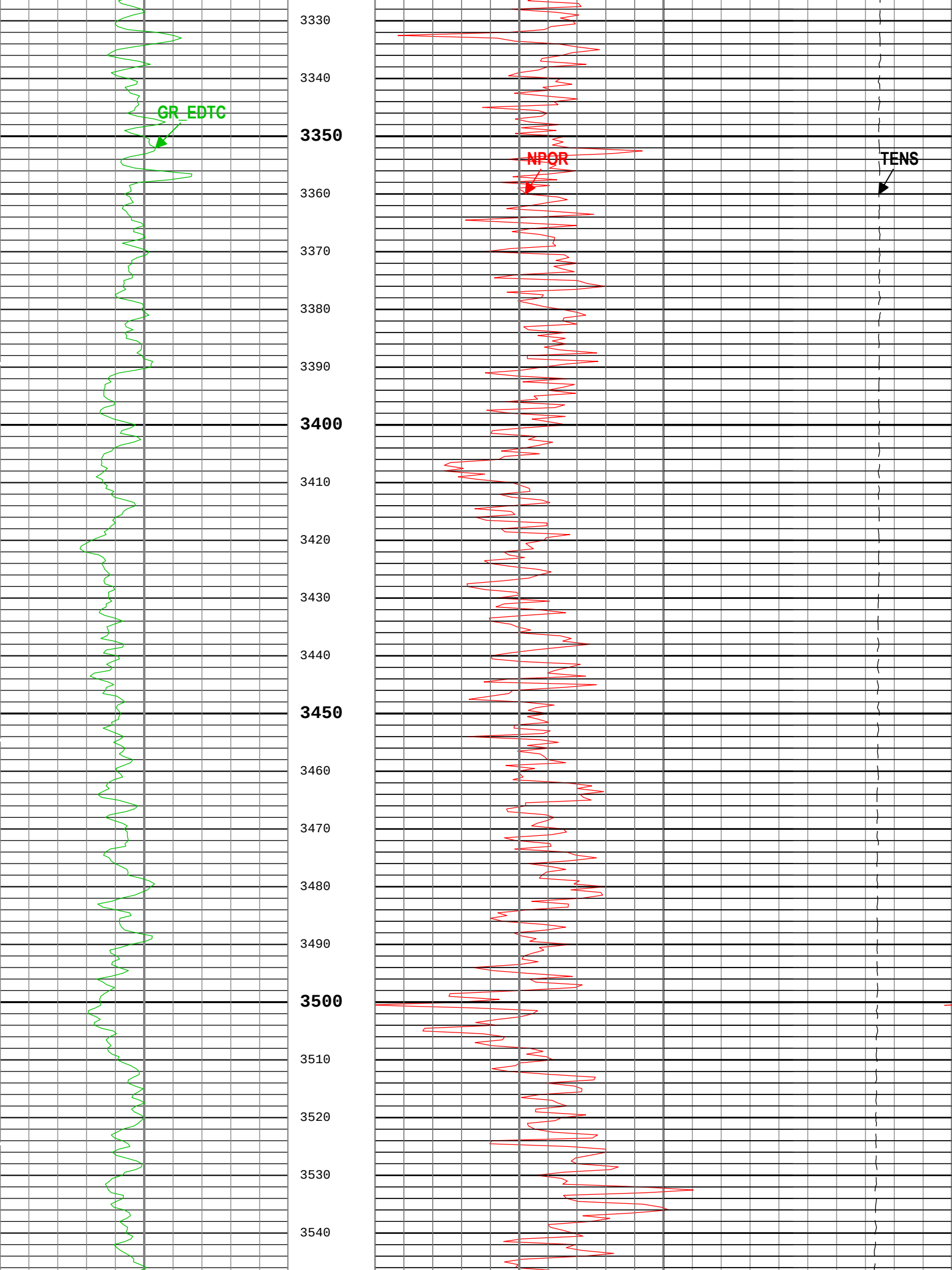
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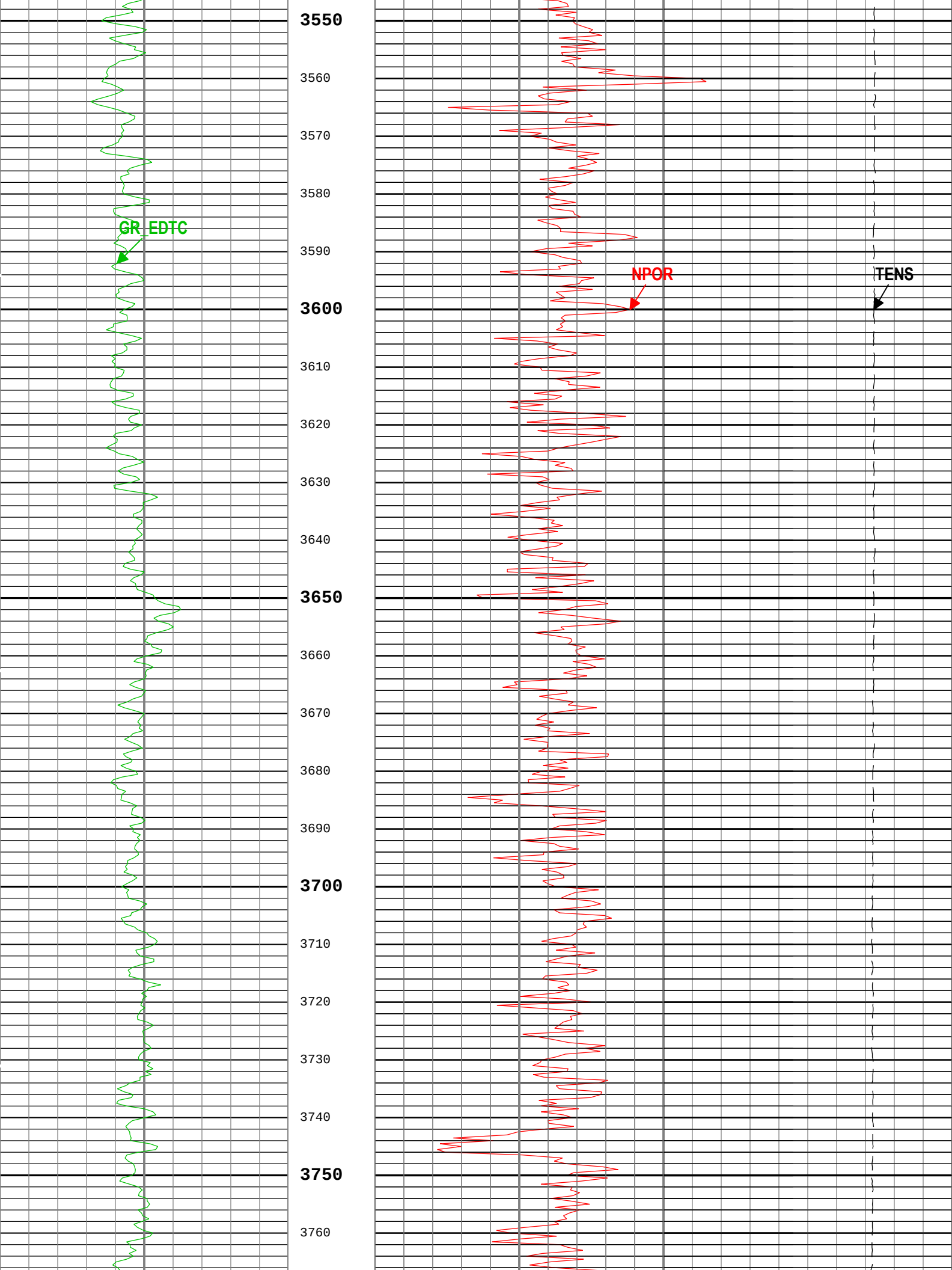
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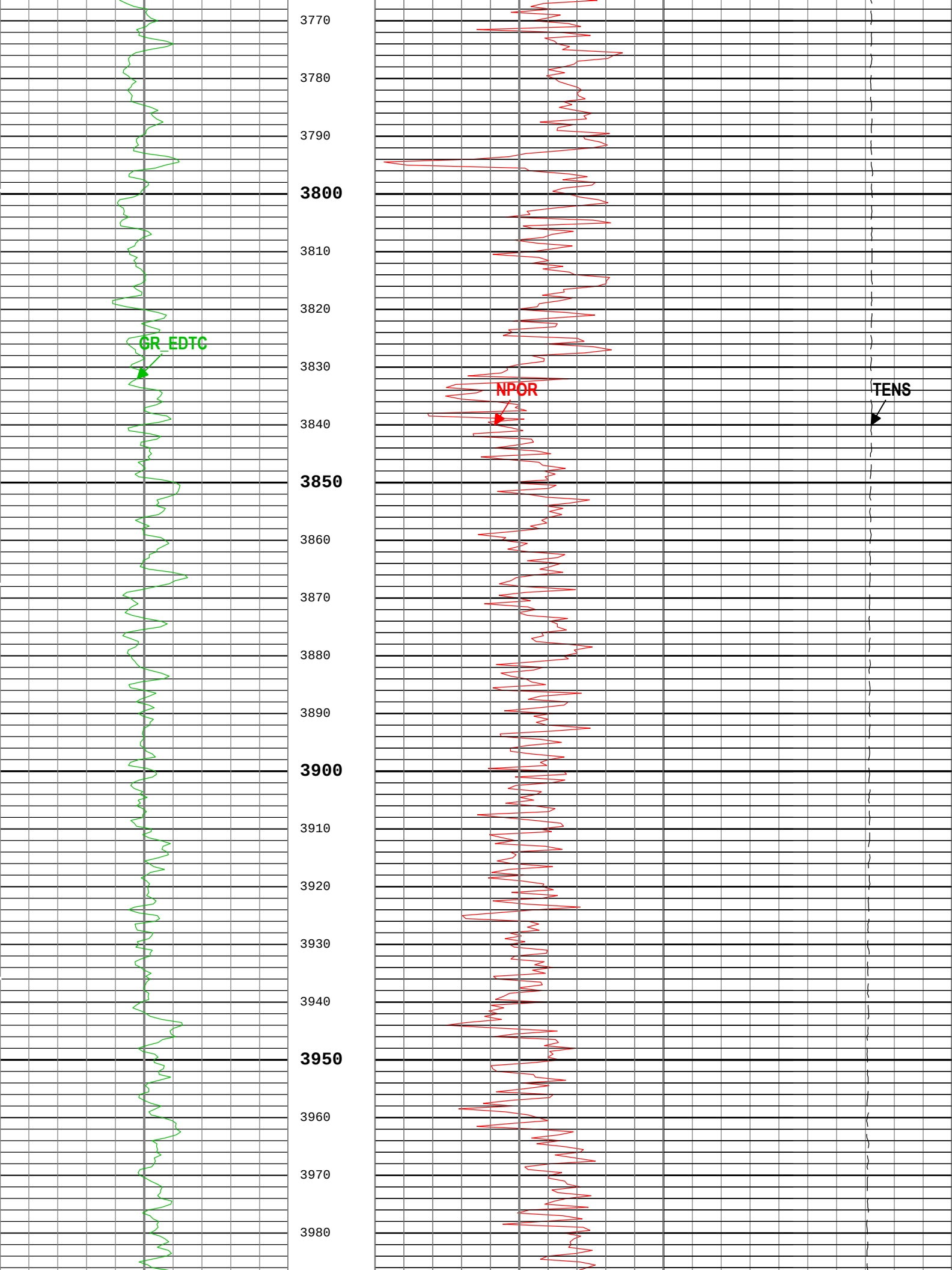
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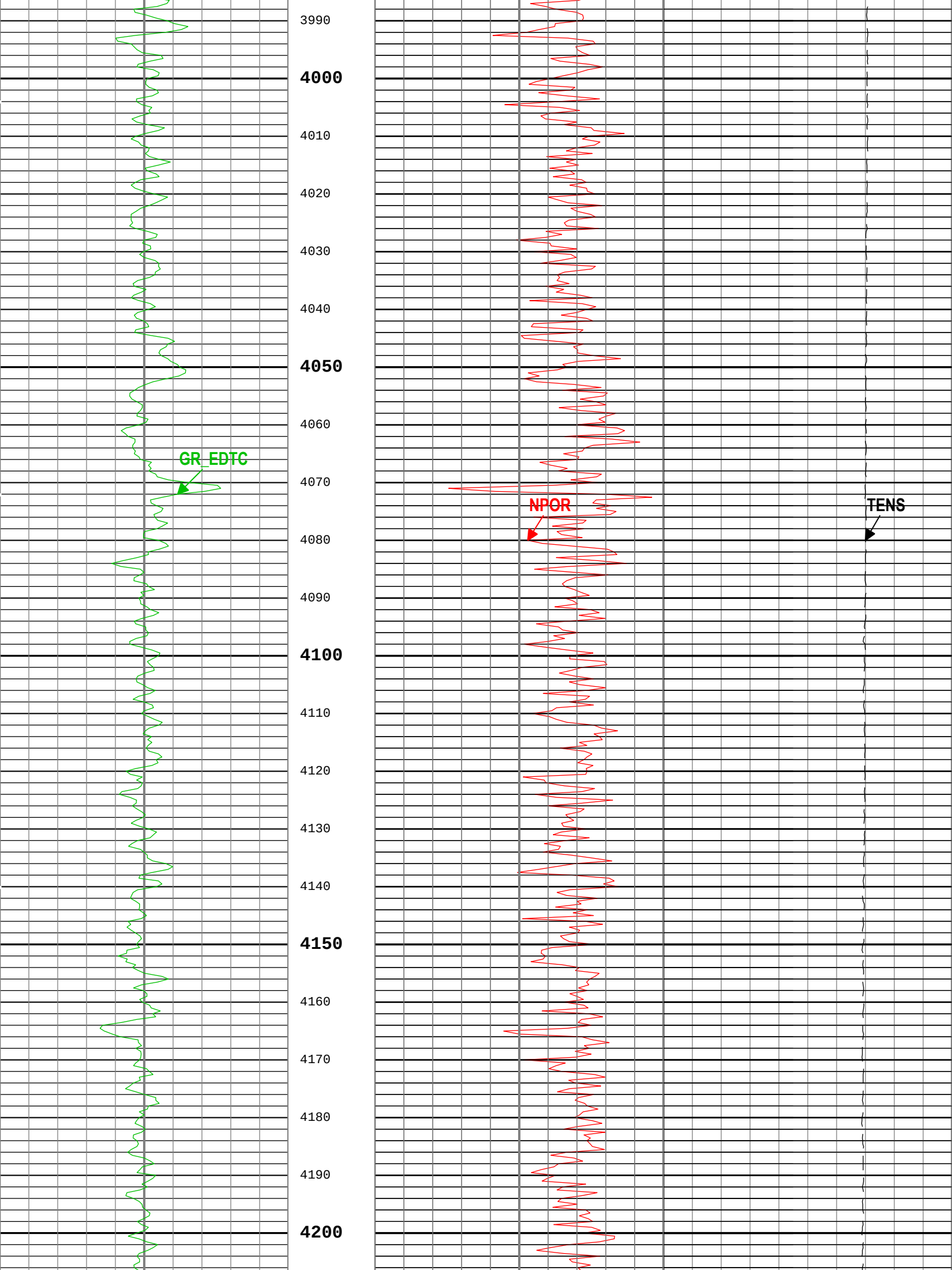
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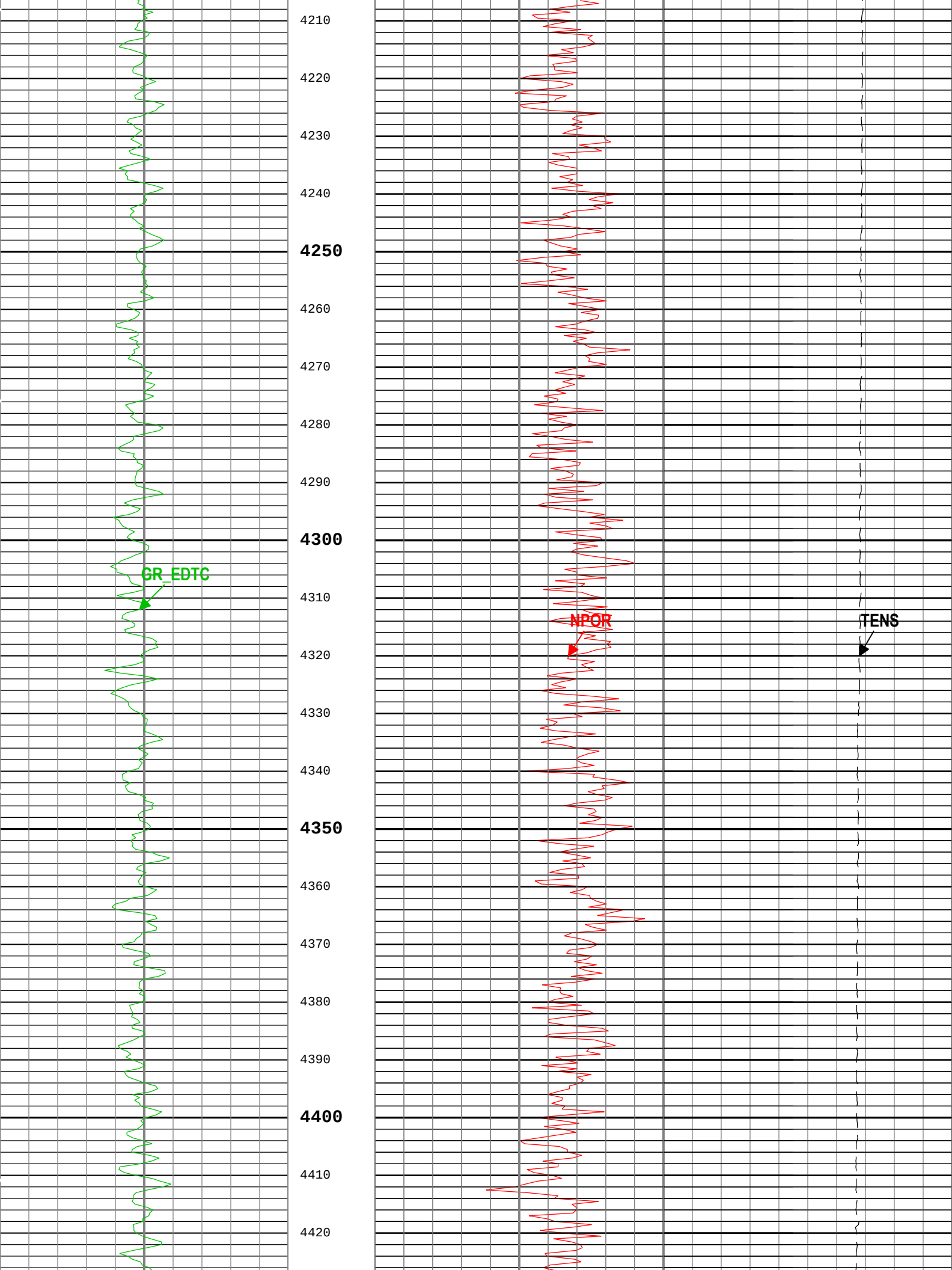
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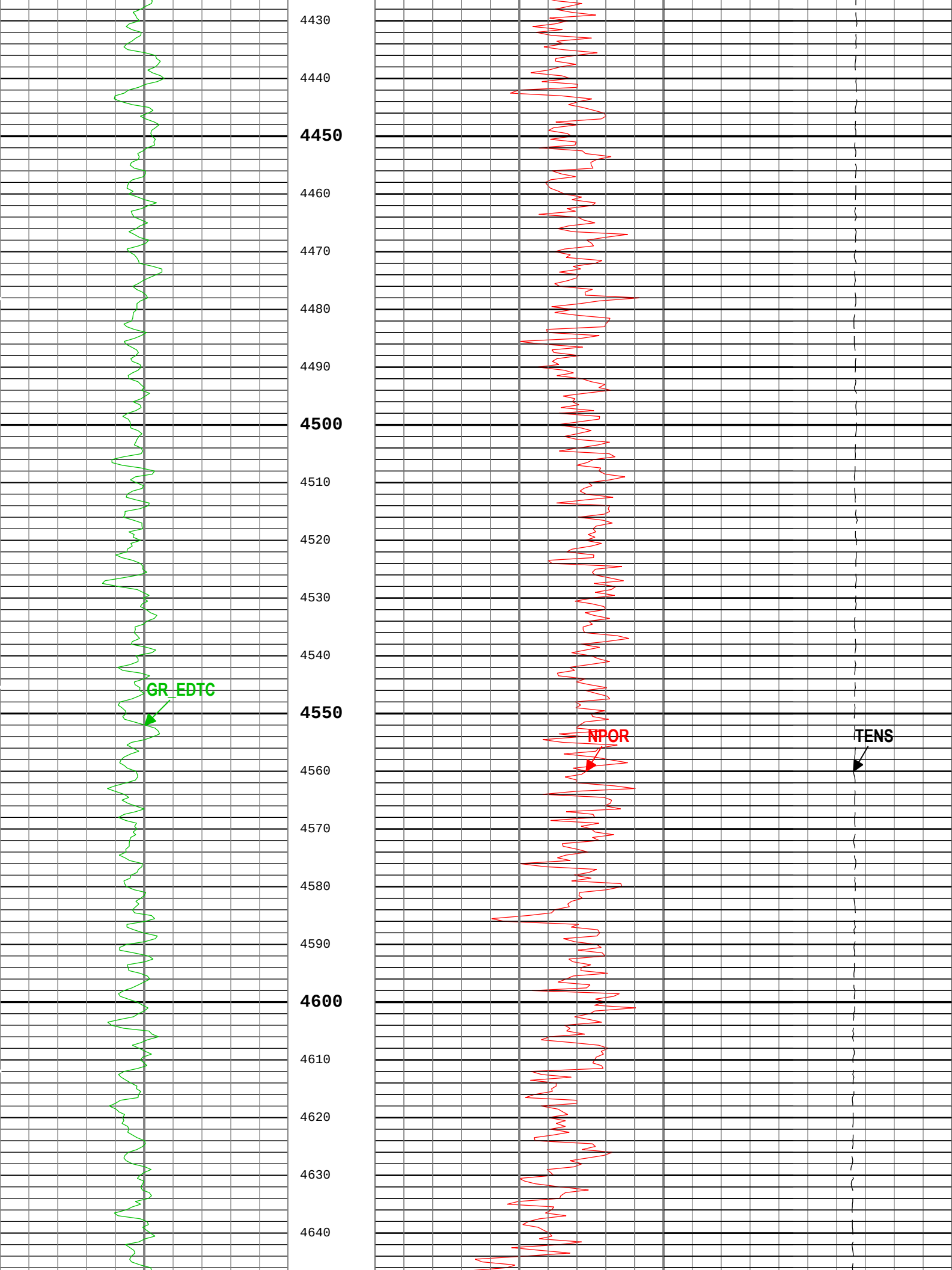
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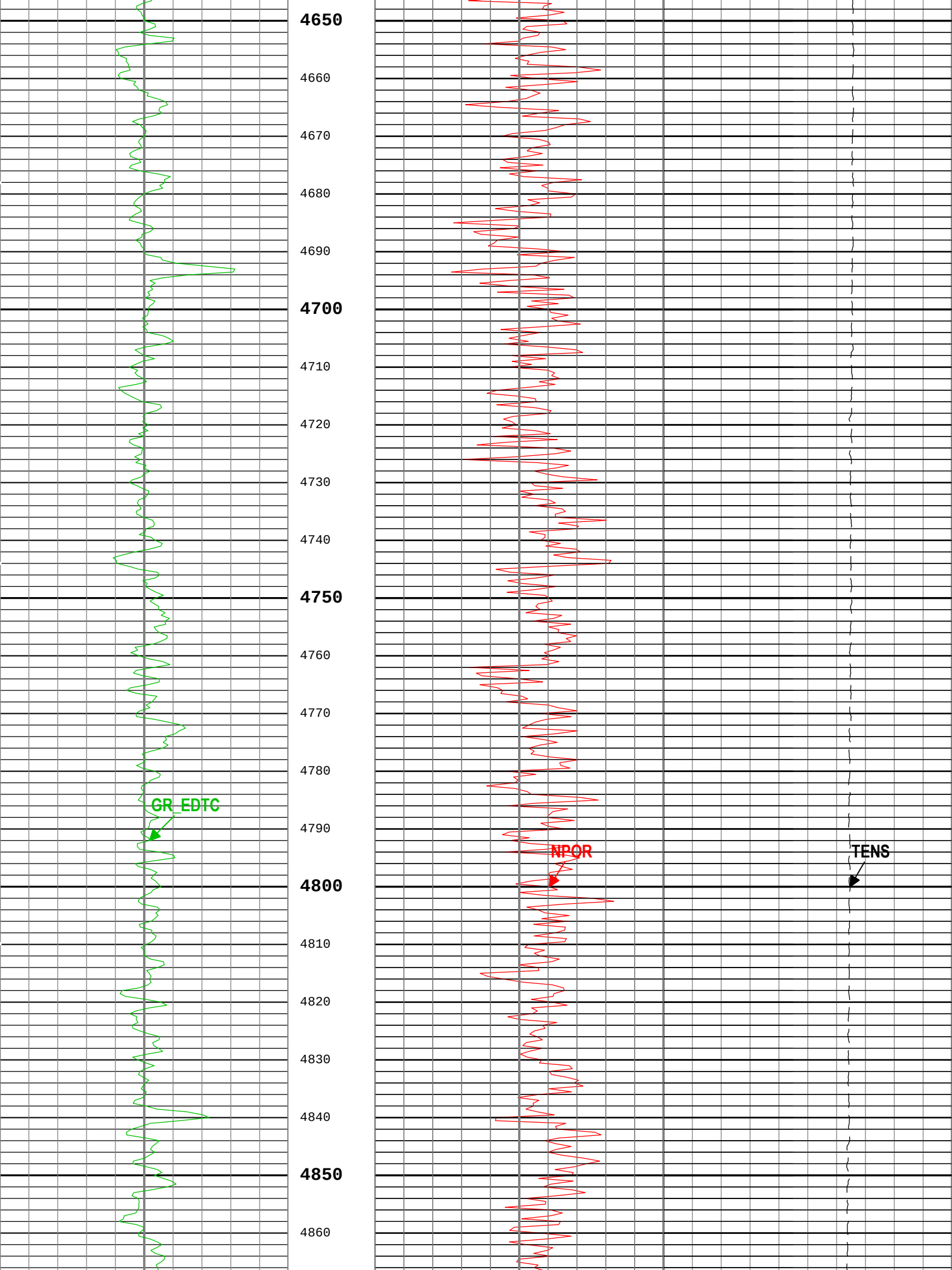
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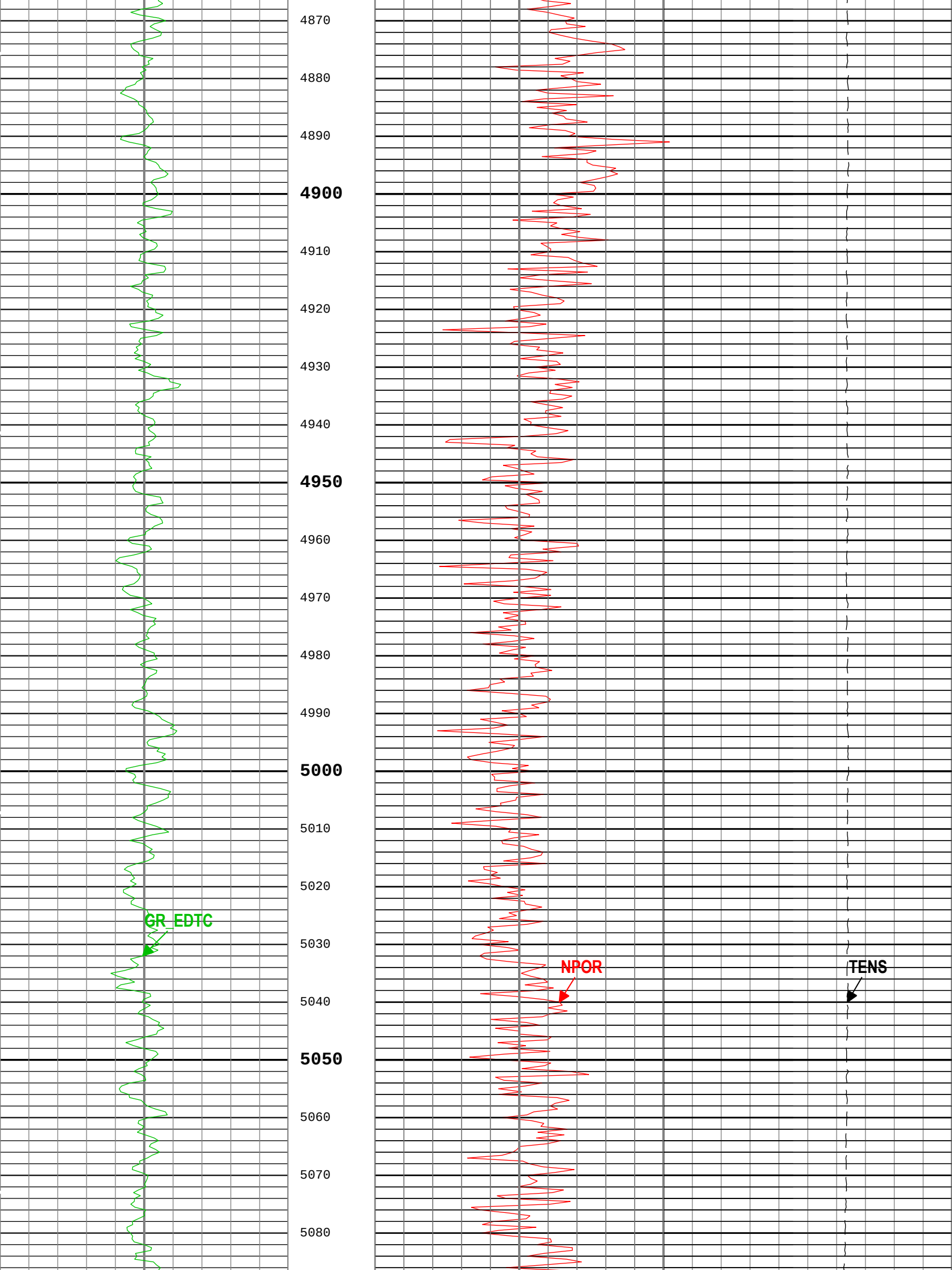
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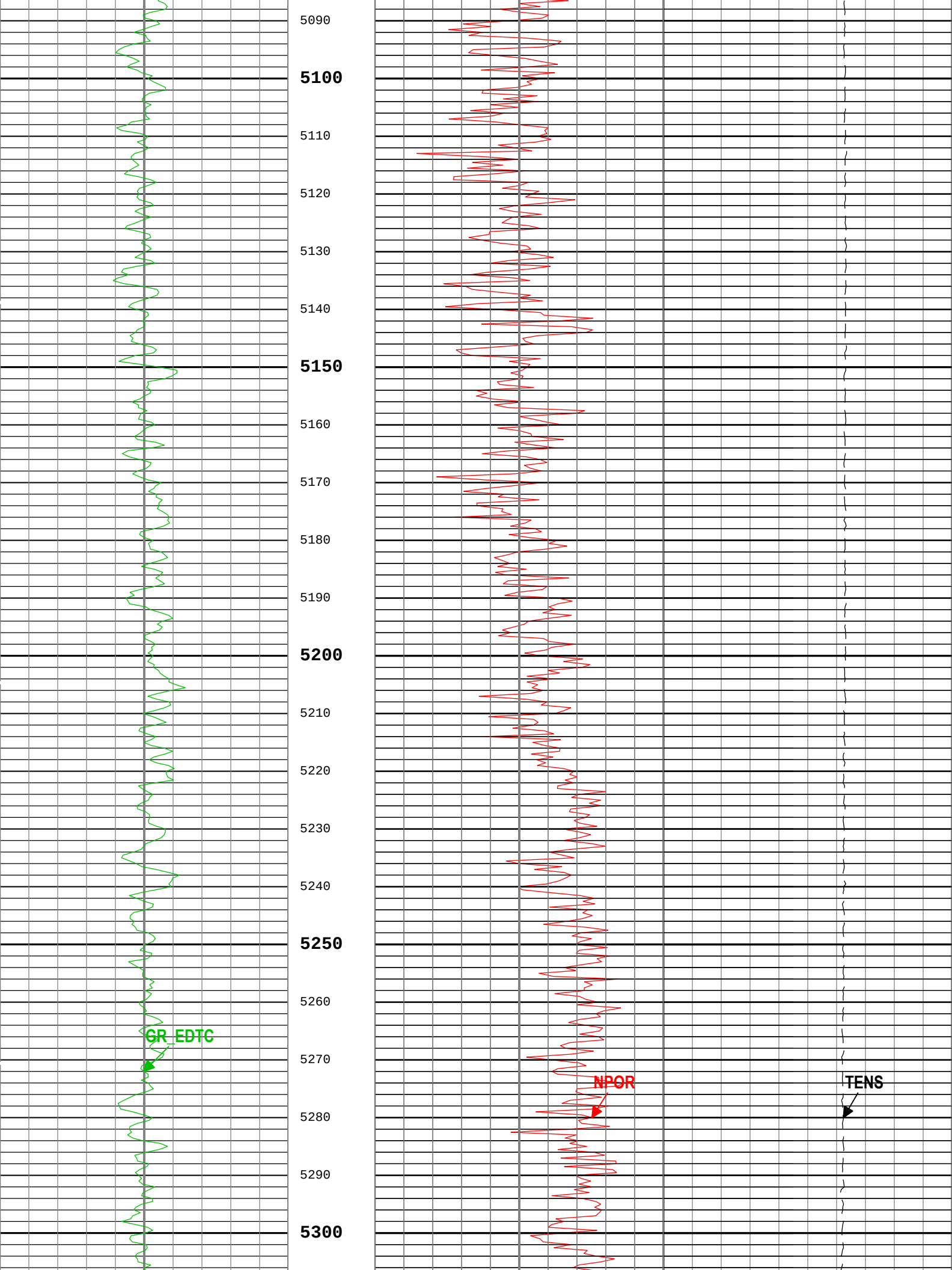
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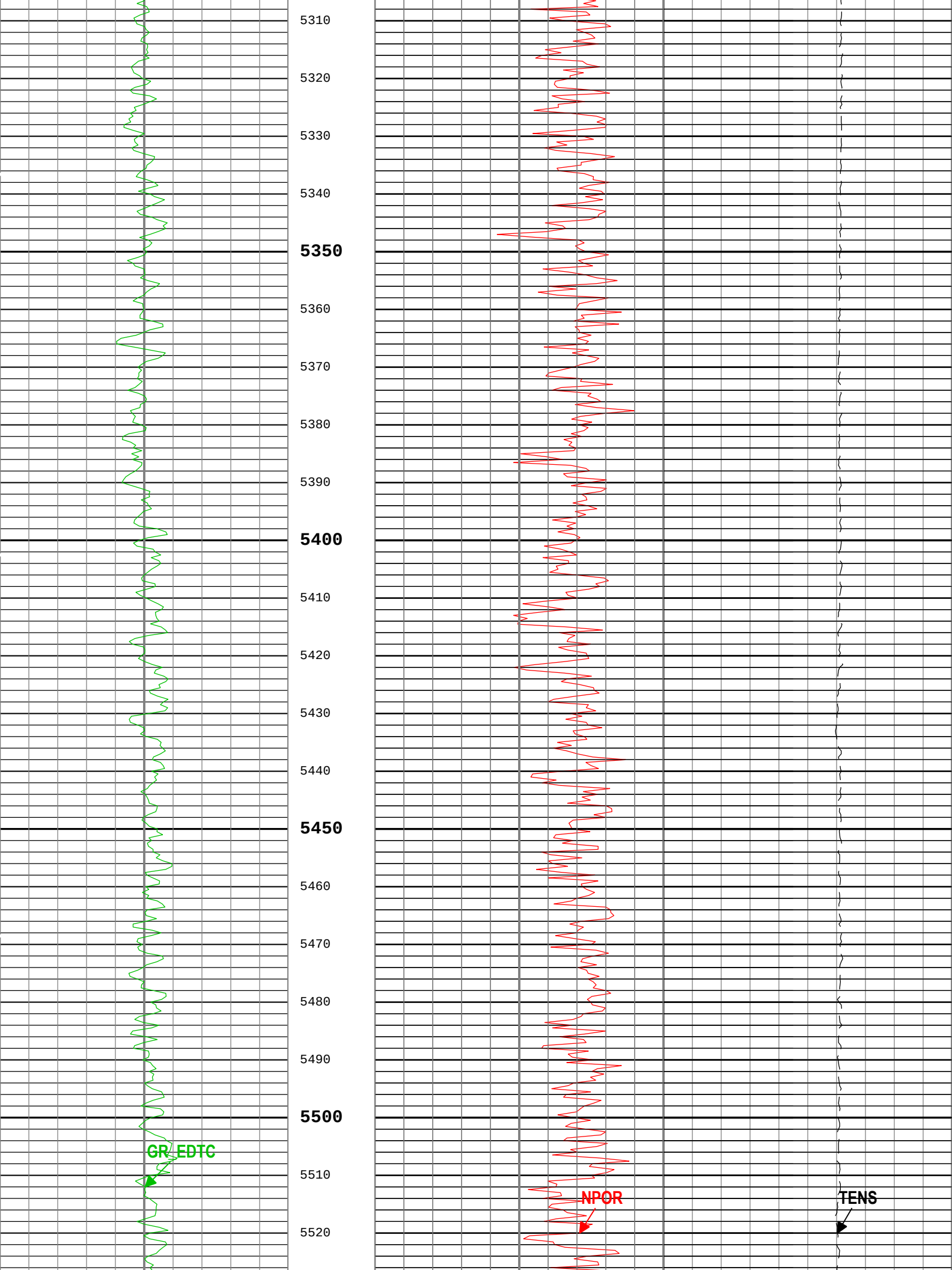
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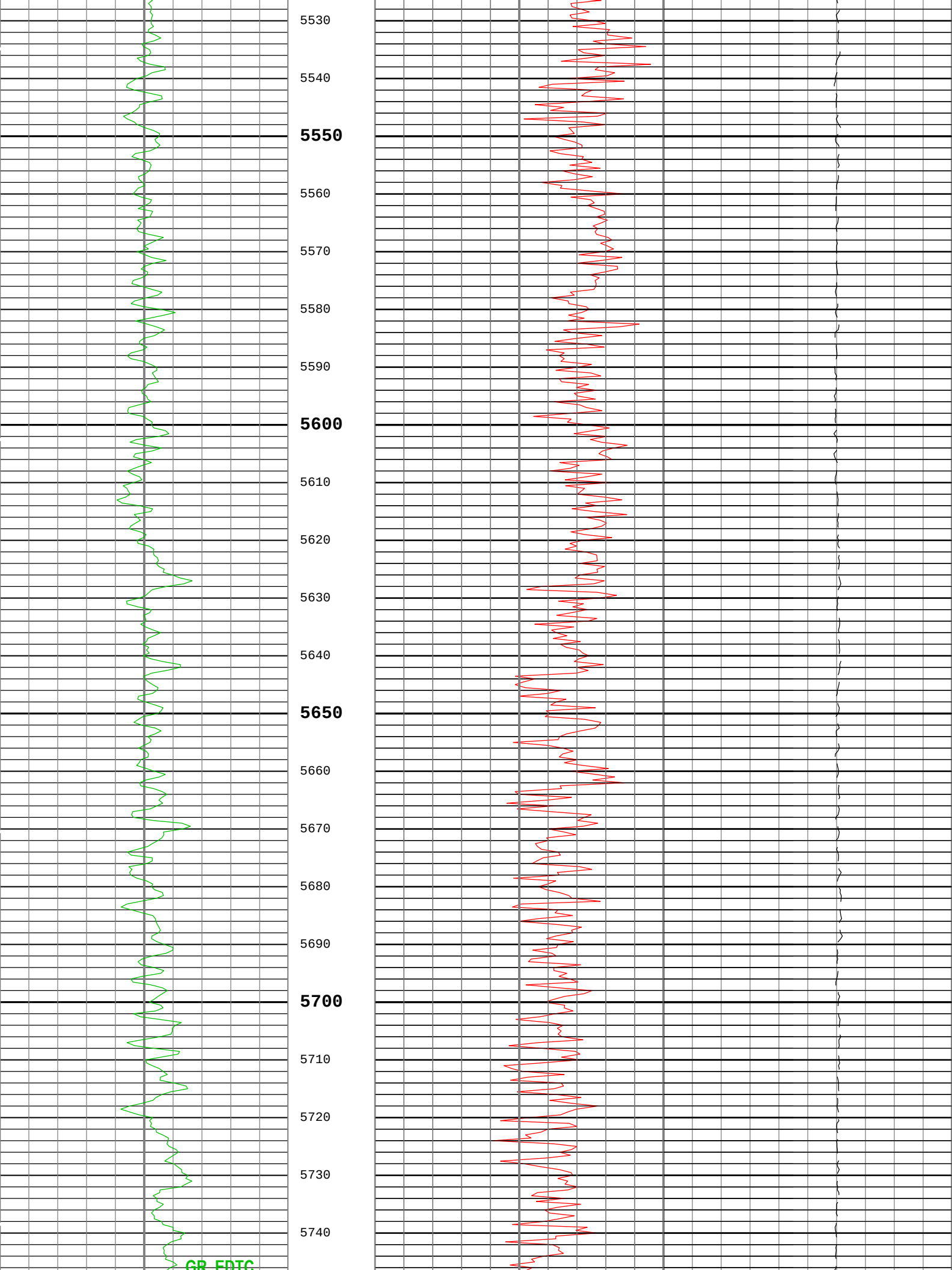
GR_EDTC
NPOR
TENS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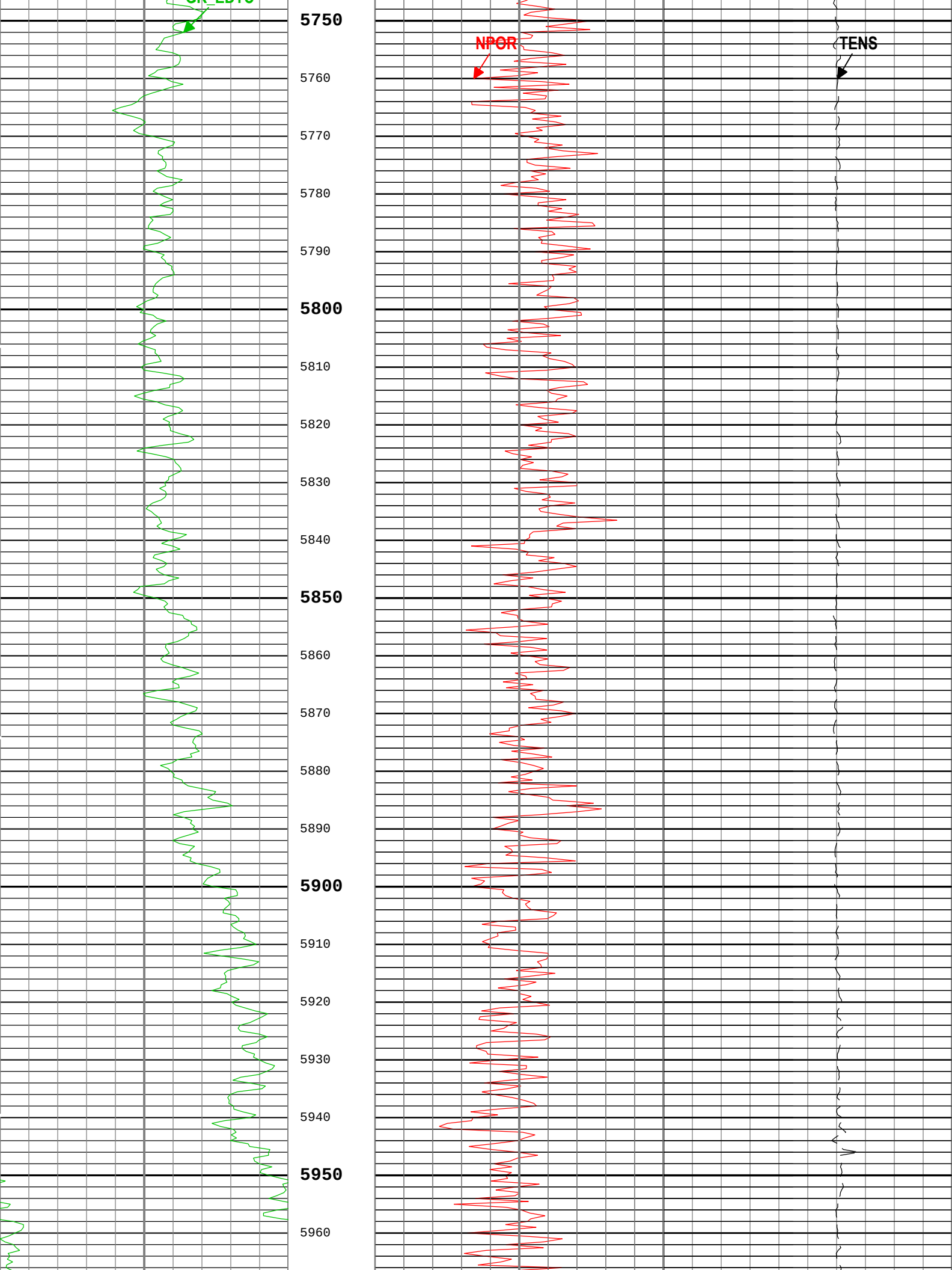
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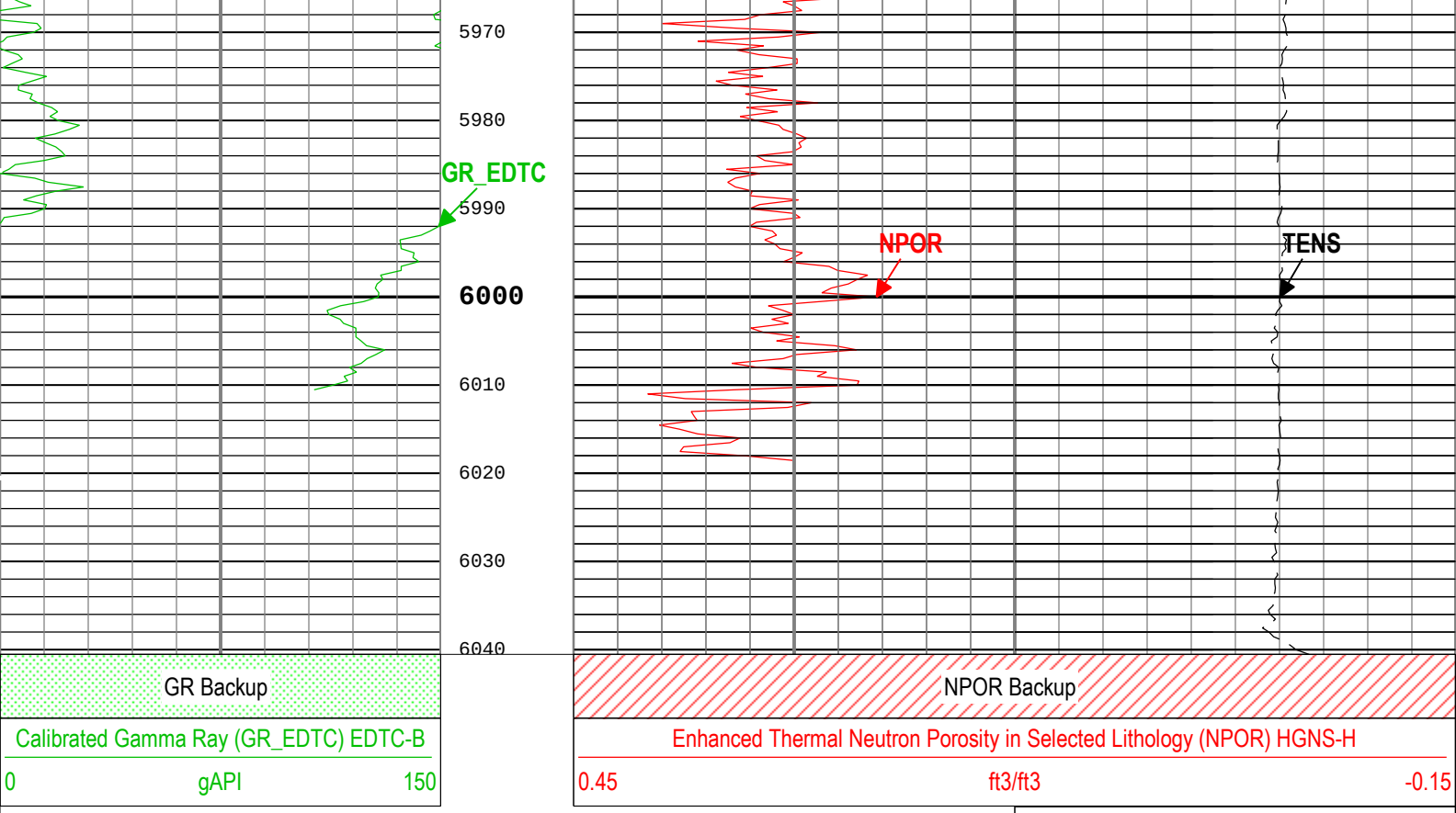



Description: AIT Basic Log Two Format: Log ( Noble Nuclear ) Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 05-Nov-2016 20:23:32

# Channel Processing Parameters

## One: Parameters

| Parameter | Description | Tool | Value | Unit |
|---|---|---|---|---|
| ISSBAR | Barite Mud Presence Flag | Borehole | No | |
| BHS | Borehole Status (Open or Cased Hole) | Borehole | Cased | |
| BHT | Bottom Hole Temperature | Borehole | 210 | degF |
| BS | Bit Size | WLSESSION | Depth Zoned | in |
| BSAL | Borehole Salinity | Borehole | 0 | ppm |
| CBLO | Casing Bottom (Logger) | WLSESSION | 10965 | ft |
| CMTY(U-USIT_CEMT) | Cement Type | USIT-E | Regular Cement | |
| CSODDRL | Casing Outer Diameter - Zoned along driller depths | WLSESSION | 5.5 | in |
| DC_MODE | Depth Correction Mode | DepthCorrection | Real-time | |
| DFD | Drilling Fluid Density | Borehole | 9.3 | lbm/gal |
| DFT | Drilling Fluid Type | Borehole | Water | |
| DFT_WATER | Drilling Fluid Water Type | Borehole | BRINE | |
| EDF | Elevation of Derrick Floor Above Permanent Datum | WLSESSION | 29 | ft |
| EPD | Elevation of Permanent Datum (PDAT) above Mean Sea Level | WLSESSION | 4865 | ft |
| FSAL | Formation Salinity | Borehole | 0 | ppm |
| GCSE_DOWN_PASS | Generalized Caliper Selection for WL Log Down Passes | Borehole | BS(RT) | |

| | | | | |
|---|---|---|---|---|
| GCSE_UP_PASS | Generalized Caliper Selection for WL Log Up Passes | Borehole | BS(RT) | |
| GGRD | Geothermal Gradient | Borehole | 1 | 0.01 degF/ft |
| GRSE | Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity | Borehole | REMS(RT) | |
| GTSE | Generalized Temperature Selection, from Measured or Computed Temperature | Borehole | GTEM_LINEST(RT) | |
| HSCO | Hole Size Correction Option | HGNS-H | Yes | |
| IMAR | Image Rotation | USIT-E | Off | |
| MATR | Rock Matrix for Neutron Porosity Corrections | Borehole | LIMESTONE | |
| MFST | Mud Filtrate Sample Temperature | Borehole | 68 | degF |
| MST | Mud Sample Temperature | Borehole | 68 | degF |
| PDAT | Permanent Datum | WLSESSION | GL | |
| RMFS | Resistivity of Mud Filtrate Sample | Borehole | 0.15 | ohm.m |
| RMS | Resistivity of Mud Sample | Borehole | 0.2 | ohm.m |
| SHT | Surface Hole Temperature | Borehole | 68 | degF |
| U-USIT_DFSZ | Drilling Fluid Specific Acoustic Impedance | USIT-E | 1.7 | Mrayl |
| UFGDE | Fiberglass Density | USIT-E | 1.95 | g/cm3 |
| UFGPS | Fiberglass Processing Selection | USIT-E | No | |
| UFGVL | Fiberglass Velocity | USIT-E | 9678.48 | ft/s |
| USI_FSOD | USIT USI Fluid Slowness Fits Casing Outer Diameter | USIT-E | 0_OFF | |
| USI_FVEL_SEL | USI Fluid Velocity Selection | USIT-E | Automatic | |
| USI_ZMUD_SEL | USI Mud Impedance Selection | USIT-E | FreePipe Norm. | |

## Depth Zone Parameters

| Parameter | Value | Start ( ft ) | Stop ( ft ) |
|---|---|---|---|
| BS | 26 | 30 | 110 |
| BS | 13.75 | 110 | 1928 |
| BS | 8.5 | 1928 | 6040.5 |

All depth are actual.

# Tool Control Parameters

## One: Parameters

| Parameter | Description | Tool | Value | Unit |
|---|---|---|---|---|
| MAX_LOG_SPEED | Toolstring Maximum Logging Speed | WLSESSION | 3600 | ft/h |
| ULOG | Logging Objective | USIT-E | MEASUREMENT | |
| UMFR | Modulation Frequency | USIT-E | 333333 | Hz |
| UPAT | USIT Emission Pattern | USIT-E | Pattern 375 KHz | |
| UWKM | USIT Working Mode | USIT-E | Uncompressed 10 deg at 6.0 in LF | |
| USIT_DEPTHLOG | Starting Depth Log for Ultrasonics | USIT-E | 6000 | ft |
| WINB | Window Begin Time | USIT-E | Time Zoned | us |
| WINE | Window End Time | USIT-E | Time Zoned | us |

# One

# Software Version

| Acquisition System | Version |
|---|---|
| Maxwell 2016 SP2 | 6.2.68624.3100 |

# Pass Summary

| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include Parallel Data |
|---|---|---|---|---|---|---|---|---|---|
| One | Log[2]:Up | Up | 2411.34 ft | 2689.09 ft | 05-Nov-2016 | 05-Nov-2016 | ON | 4.82 ft | Yes |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 5:40:25 PM | 5:44:46 PM | | | |
| One | Main[4]:Up | Up | 56.27 ft | 6040.69 ft | 05-Nov-2016 6:01:26 PM | 05-Nov-2016 7:39:23 PM | ON | 6.35 ft | Yes |

All depths are referenced to toolstring zero

# Log

Company:Noble Energy Inc Well:ANNI LD29-763

One: Main[4]:Up:S004

Description: AIT Basic Log Two Format: Noble Nuclear RA Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 05-Nov-2016 20:23:36

IHV - Integrated Hole Volume every 10.00 (ft3)

IHV - Integrated Hole Volume every 100.00 (ft3)

ICV - Integrated Cement Volume every 10.00 (ft3)

ICV - Integrated Cement Volume every 100.00 (ft3)

TIME_1900 - Time Marked every 60.00 (s)

Main To Repeat

Repeat To Main

Cable Tension (TENS)

5000 lbf 0

Main To Repeat

Repeat To Main

Gamma Ray (ECGR_EDTC) EDTC-B

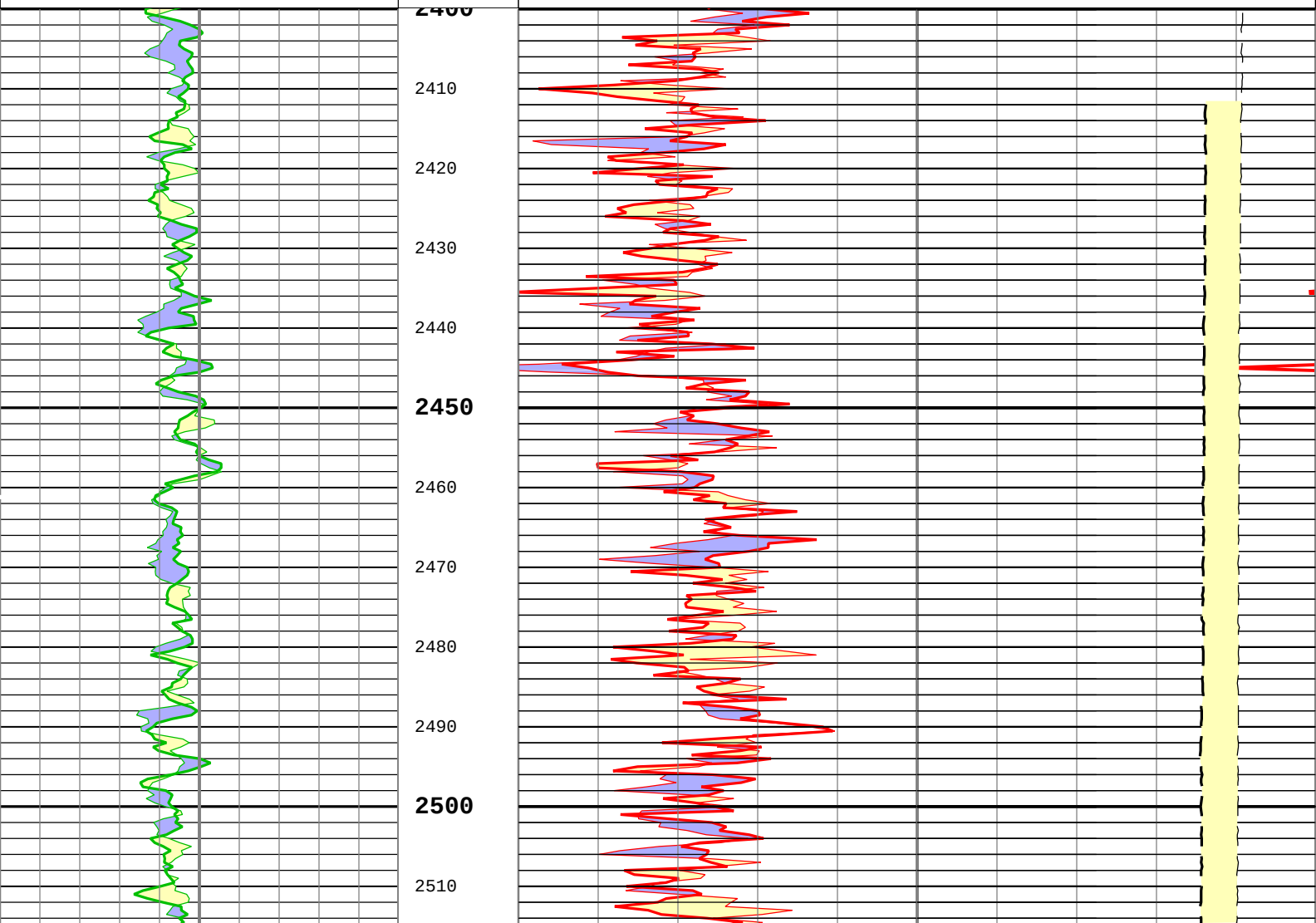
0 gAPI 150

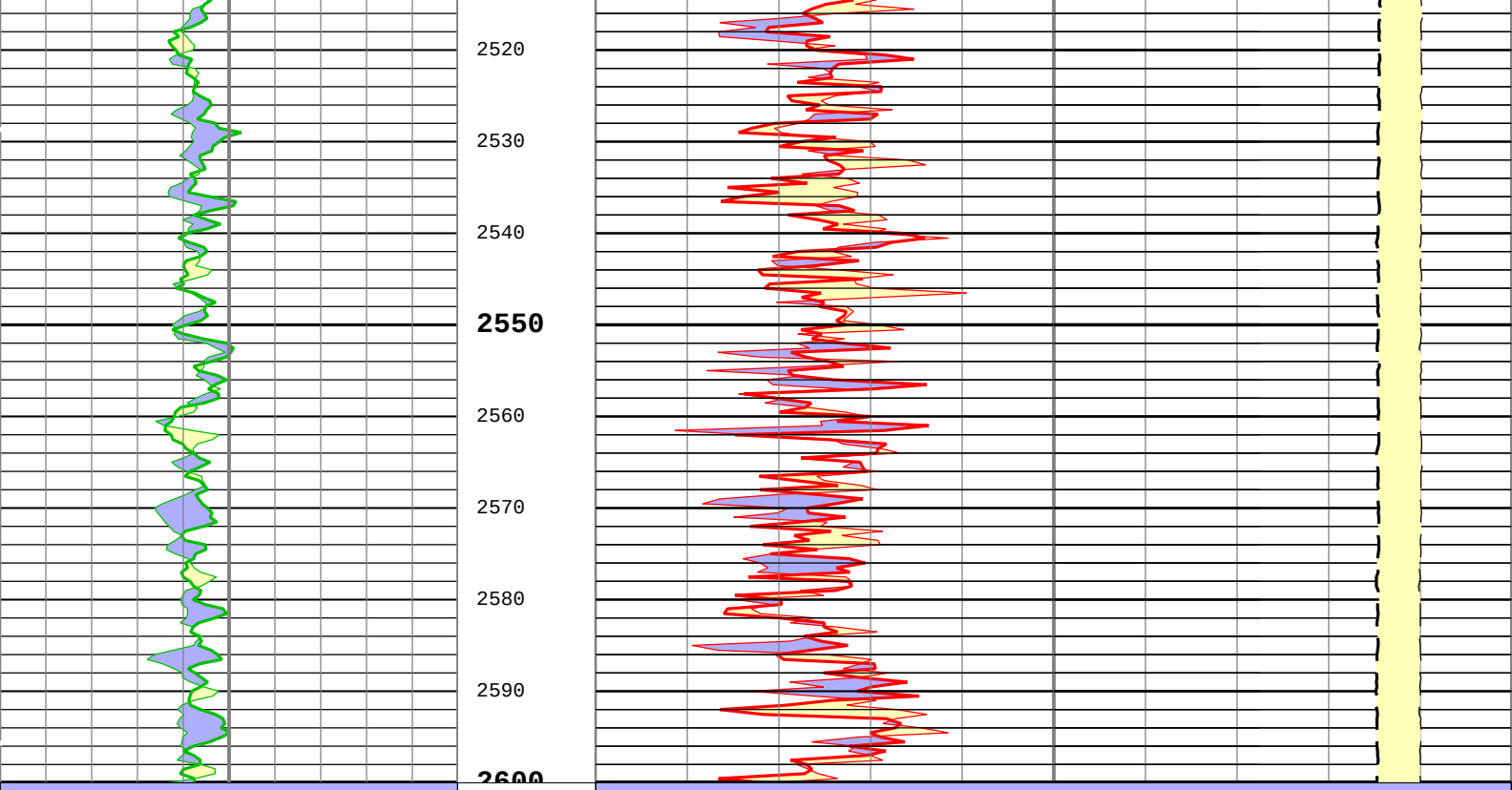
Main To Repeat

Repeat To Main

Enhanced Thermal Neutron Porosity in Selected Lithology (NPOR) HGNS-H

0.45 ft3/ft3 -0.15






Description: AIT Basic Log Two Format: Noble Nuclear RA Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 05-Nov-2016 20:23:36

## Channel Processing Parameters

### One: Parameters

| Parameter | Description | Tool | Value | Unit |
|---|---|---|---|---|
| ISSBAR | Barite Mud Presence Flag | Borehole | No | |
| BHS | Borehole Status (Open or Cased Hole) | Borehole | Cased | |
| BHT | Bottom Hole Temperature | Borehole | 210 | degF |
| BS | Bit Size | WLSESSION | 8.5 | in |
| BSAL | Borehole Salinity | Borehole | 0 | ppm |
| CBLO | Casing Bottom (Logger) | WLSESSION | 10965 | ft |
| CDEN | Cement Density | EDTC-B | 2 | g/cm3 |
| CMTY(U-USIT_CEMT) | Cement Type | USIT-E | Regular Cement | |

| | | | | |
|---|---|---|---|---|
| CSODDRL | Casing Outer Diameter - Zoned along driller depths | WLSESSION | 5.5 | in |
| DC_MODE | Depth Correction Mode | DepthCorrection | Real-time | |
| DFD | Drilling Fluid Density | Borehole | 9.3 | lbm/gal |
| DFT | Drilling Fluid Type | Borehole | Water | |
| DFT_WATER | Drilling Fluid Water Type | Borehole | BRINE | |
| EDF | Elevation of Derrick Floor Above Permanent Datum | WLSESSION | 29 | ft |
| EPD | Elevation of Permanent Datum (PDAT) above Mean Sea Level | WLSESSION | 4865 | ft |
| FSAL | Formation Salinity | Borehole | 0 | ppm |
| GCSE_DOWN_PASS | Generalized Caliper Selection for WL Log Down Passes | Borehole | BS(RT) | |
| GCSE_UP_PASS | Generalized Caliper Selection for WL Log Up Passes | Borehole | BS(RT) | |
| GGRD | Geothermal Gradient | Borehole | 1 | 0.01 degF/ft |
| GRSE | Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity | Borehole | REMS(RT) | |
| GTSE | Generalized Temperature Selection, from Measured or Computed Temperature | Borehole | GTEM_LINEST(RT) | |
| HSCO | Hole Size Correction Option | HGNS-H | Yes | |
| IMAR | Image Rotation | USIT-E | Off | |
| MATR | Rock Matrix for Neutron Porosity Corrections | Borehole | LIMESTONE | |
| MFST | Mud Filtrate Sample Temperature | Borehole | 68 | degF |
| MST | Mud Sample Temperature | Borehole | 68 | degF |
| PDAT | Permanent Datum | WLSESSION | GL | |
| RMFS | Resistivity of Mud Filtrate Sample | Borehole | 0.15 | ohm.m |
| RMS | Resistivity of Mud Sample | Borehole | 0.2 | ohm.m |
| SHT | Surface Hole Temperature | Borehole | 68 | degF |
| U-USIT_DFSZ | Drilling Fluid Specific Acoustic Impedance | USIT-E | 1.7 | Mrayl |
| UFGDE | Fiberglass Density | USIT-E | 1.95 | g/cm3 |
| UFGPS | Fiberglass Processing Selection | USIT-E | No | |
| UFGVL | Fiberglass Velocity | USIT-E | 9678.48 | ft/s |
| USI_FSOD | USIT USI Fluid Slowness Fits Casing Outer Diameter | USIT-E | 0_OFF | |
| USI_FVEL_SEL | USI Fluid Velocity Selection | USIT-E | Automatic | |
| USI_ZMUD_SEL | USI Mud Impedance Selection | USIT-E | FreePipe Norm. | |

# Tool Control Parameters

## One: Parameters

| Parameter | Description | Tool | Value | Unit |
|---|---|---|---|---|
| MAX_LOG_SPEED | Toolstring Maximum Logging Speed | WLSESSION | 3600 | ft/h |
| ULOG | Logging Objective | USIT-E | MEASUREMENT | |
| UMFR | Modulation Frequency | USIT-E | 333333 | Hz |
| UPAT | USIT Emission Pattern | USIT-E | Pattern 375 KHz | |
| UWKM | USIT Working Mode | USIT-E | Uncompressed 10 deg at 6.0 in LF | |
| USIT_DEPTHLOG | Starting Depth Log for Ultrasonics | USIT-E | 6000 | ft |
| WINB | Window Begin Time | USIT-E | Time Zoned | us |
| WINE | Window End Time | USIT-E | Time Zoned | us |

# Calibration Report

## HGNS-H (HILT Gamma-Ray and Neutron Sonde, 150 degC) Calibration - Run One

Primary Equipment :

| | | |
|---|---|---|
| HILT Gamma-Ray and Neutron Sonde, 150 degC | HGNS-H | |

Auxiliary Equipment :

| | | |
|---|---|---|
| HGNS Accelerometer, 150 degC | HACCZ-H | 6991 |
| AmBe Neutron Logging Source | NSR-F | 5069 |

Calibration Parameter :

| | |
|---|---|
| Water Temperature (Calibration Tank Water Temperature) | 57.5 |
| Housing Size (Thermal Housing Size) | 3.38 |
| JIG-BKG | |

## HGNS Accelerometer EEPROM - Accelerometer EEPROM Read

Master (EEPROM): 00:00:00 15-May-2007

| Measurement | Unit | Phase | Nominal | Low Limit | Actual | High Limit |
|---|---|---|---|---|---|---|
| Accelerometer Manufacturer | | Master | | | QAT_160 | |
| Accelerometer Reference Temperature | degF | Master | | 30.2 | 77.0 | 122.0 |
| Accelerometer Coefficients - 0 | | Master | ----- | ----- | -4298.000 | ----- |
| Accelerometer Coefficients - 1 | | Master | ----- | ----- | 50.180 | ----- |
| Accelerometer Coefficients - 2 | | Master | ----- | ----- | -0.002 | ----- |
| Accelerometer Coefficients - 3 | | Master | ----- | ----- | 0.000 | ----- |
| Accelerometer Coefficients - 4 | | Master | ----- | ----- | 2.754 | ----- |
| Accelerometer Coefficients - 5 | | Master | ----- | ----- | 0.000 | ----- |
| Accelerometer Coefficients - 6 | | Master | ----- | ----- | 0.000 | ----- |
| Accelerometer Coefficients - 7 | | Master | ----- | ----- | 0.000 | ----- |
| Accelerometer Coefficients - 8 | | Master | ----- | ----- | 300.500 | ----- |
| Accelerometer Coefficients - 9 | | Master | ----- | ----- | 0.994 | ----- |

## HGNS Neutron Calibration - HGNS Neutron Accumulations

Master (EEPROM): 11:48:48 21-Oct-2016

| Measurement | Unit | Phase | Nominal | Low Limit | Actual | High Limit |
|---|---|---|---|---|---|---|
| Near Zero Measurement | 1/s | Master | 0 | 5.0 | 28.4 | 40.0 |
| Far Zero Measurement | 1/s | Master | 0 | 5.0 | 29.6 | 40.0 |
| Near Plus Measurement | 1/s | Master | 6031.0 | 4700.0 | 5125.0 | 6900.0 |
| Far Plus Measurement | 1/s | Master | 2793.0 | 1900.0 | 2104.0 | 2900.0 |
| Near Corrected Plus Measurement | 1/s | Master | | 4700.0 | 5187.0 | 6900.0 |
| Far Corrected Plus Measurement | 1/s | Master | | 1900.0 | 2131.0 | 2900.0 |

| | |
|---|---|
| Company: | Noble Energy Inc |
| Well: | ANNI LD29-763 |
| Field: | Wildcat |
| County: | Weld |
| State: | Colorado |

Schlumberger

# Platform Express
# Triple Combo