

Company: Noble Energy, Inc

Well: Wells Ranch AA22-617

Field: Wattenberg

County: Weld State: Colorado

Cased Hole Neutron Porosity

Gamma Ray

| | | | | |
|----------------|----------------------|----------------------------------|----------------|-----------------------------|
| County: | Weld | | | |
| Field: | Wattenberg | | | |
| Location: | SWSW S22 T6N R63W | | | |
| Well: | Wells Ranch AA22-617 | | | |
| Company: | Noble Energy, Inc | | | |
| Location: | | SWSW S22 T6N R63W | Elev.: | K.B. 4775.00 ft |
| | | 447 FSL & 907 FEL | | G.L. 4745.00 ft |
| | | Lat: 40.46753 / Long: -104.43196 | | D.F. |
| | | Permanent Datum: | Mean Sea Level | Elev.: 0.00 ft |
| | | Log Measured From: | Kelly Bushing | 4775.00 ft above Perm.Datum |
| | | Drilling Measured From: | Kelly Bushing | |
| API Serial No. | | Section: | Township: | Range: |
| 05-123-42266 | | 22 | 6N | 63 |
| Logging Date | 04-May-2016 | | | |

| | | | | |
|---------------------------|-------------------------------|----------|--|--|
| Run Number | One | | | |
| Depth Driller | 15931.00 ft | | | |
| Schlumberger Depth | 6900.00 ft | | | |
| Bottom Log Interval | 6900.00 ft | | | |
| Top Log Interval | 100.00 ft | | | |
| Casing Fluid Type | BRINE | | | |
| Salinity | | | | |
| Density | 8.5 lbm/gal | | | |
| Fluid Level | 0.00 ft | | | |
| BIT/CASING/TUBING STRING | | | | |
| Bit Size | 8.75 in | | | |
| From | 1921.00 ft | | | |
| To | 6900.00 ft | | | |
| Casing/Tubing Size | 5.5 in | | | |
| Weight | 20 lbm/ft | | | |
| Grade | N/A | | | |
| From | 30.00 ft | | | |
| To | 15915.10 ft | | | |
| Max Recorded Temperatures | 214 degF | | | |
| Logger on Bottom | Time | 08:47:00 | | |
| Unit Number | Location: | FtMorgan | | |
| Recorded By | Benjamin Mammon/ Blanka Kesek | | | |
| Witnessed By | Bill Mansfield | | | |

Disclaimer

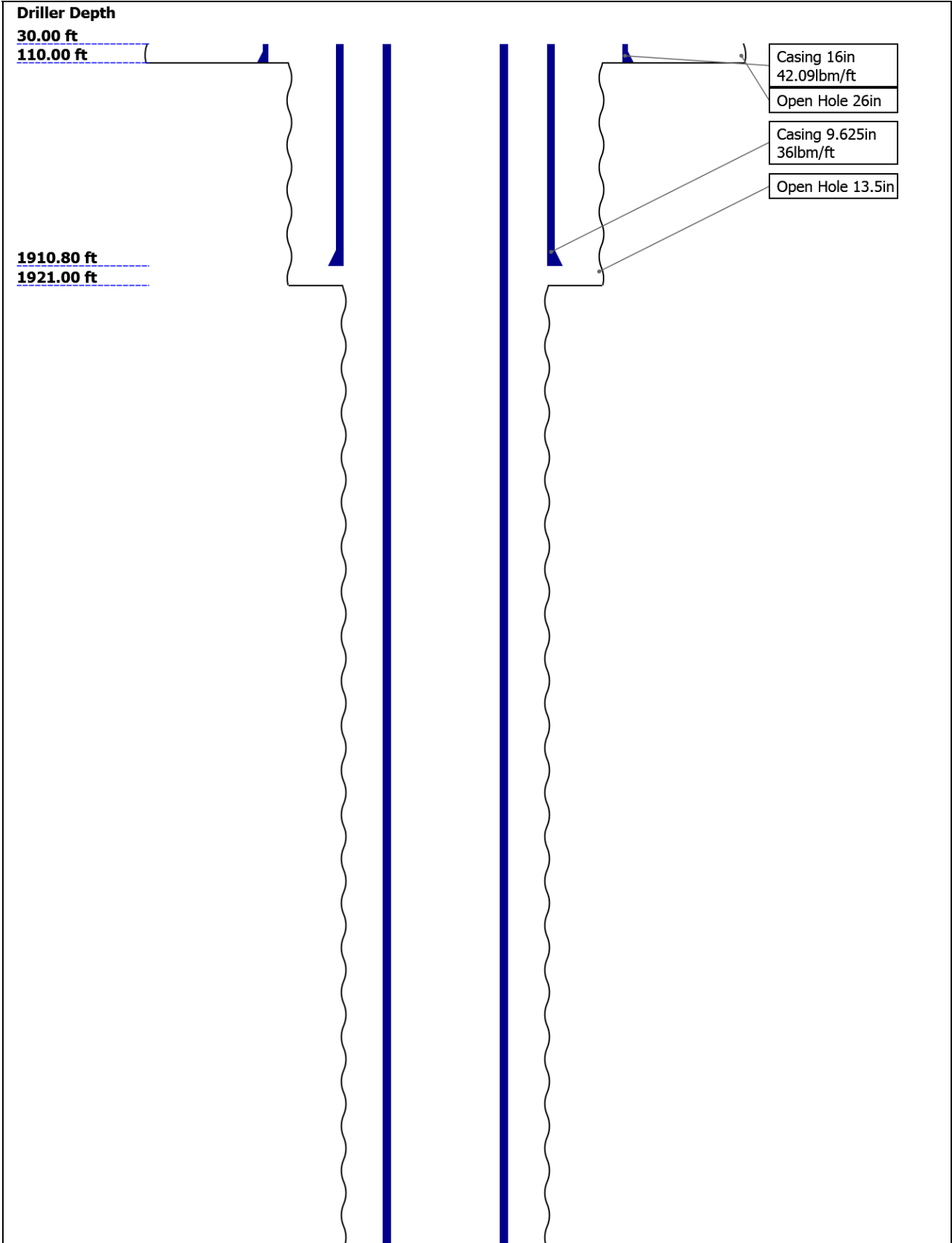
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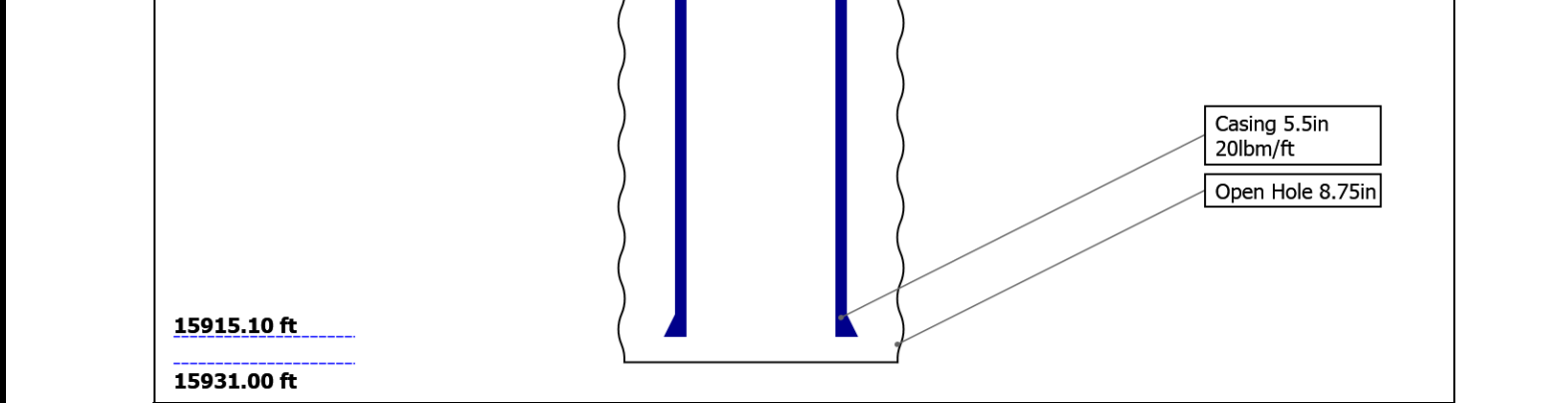
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Well Sketch





Borehole Size/Casing/Tubing Record

| | | | | | | |
|-----------------------|--------|--------|---------|--|--|--|
| Bit | | | | | | |
| Bit Size (in) | 26 | 13.5 | 8.75 | | | |
| Top Driller (ft) | 30 | 110 | 1921 | | | |
| Top Logger (ft) | 30 | 110 | 1921 | | | |
| Bottom Driller (ft) | 110 | 1921 | 15931 | | | |
| Bottom Logger (ft) | 110 | 1921 | 6900 | | | |
| 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 | 1910.8 | 15915.1 | | | |
| Bottom Logger (ft) | 110 | 1910.8 | 15915.1 | | | |

Operational Run Summary

| | | | | | | |
|----------------------------------|-------------------------|--|--|--|--|--|
| Parameter (unit) | One | | | | | |
| Date Log Started | 04-May-2016 | | | | | |
| Time Log Started | 08:12:57 | | | | | |
| Date Log Finished | 04-May-2016 | | | | | |
| Time Log Finished | 11:19:13 | | | | | |
| | | | | | | |
| Top Log Interval (ft) | 100.00 | | | | | |
| Bottom Log Interval (ft) | 6900.00 | | | | | |
| | | | | | | |
| Total Depth (ft) | | | | | | |
| Max Hole Deviation (deg) | 0.00 | | | | | |
| Azimuth of Max Deviation (deg) | 0.00 | | | | | |
| Bit Size (in) | 8.750 | | | | | |
| | | | | | | |
| Logging Unit Number | 2161 | | | | | |
| Logging Unit Location | Ft Morgan | | | | | |
| Recorded By | Benjamin Marmon/ Blanka | | | | | |

| Remarks and Equipment Summary | | | | | |
|--|--|--|--|--|--|
| One: Toolstring | | | One: Remarks | | |
| Equip nameLength LEH-QT: 44.17 2493 LEH-QT: 2493 | | MP nameOffset | This is the first run in the well. | | |
| DTC-H:9 41.26 170 ECH-KC: 9579 DTC-H:9 170 | | CTEM HV TelStat ToolStatus | Toolstring run as per toolsketch. | | |
| SGT-N:1 38.26 0249 SGH-K:30 39 SGC-TB: 10249 SGD-TAA :21700 | | GR 37.34 | Log Objective: Cement Evaluation. | | |
| HGNS-H 32.76 :4779 HGNH:38 26 NPV-N NSR-F:50 69 HACCZ-H :5736 HMCA-H HGNS-H: 4779 | | Temperature 32.73 GR 32.02 | 0 PSI Repeat Pass and 2500 PSI Main Pass. | | |
| AH-184 [2]:2829 | | CNL Porosity 25.68 HMCA 23.35 HGNS 23.35 Accelerometer 0.00 | Estimated TOC @2044 '. | | |
| AH-184 [1]:2829 | | | Bottom Log Interval at 6751'. Sub would not spin below this depth. | | |
| CME-AF :5898 | | | Bottom hole temperature was 214 degF. | | |
| USIT-E:9 15.56 81 ECH-MFA :1923 USAC-A: 981 USIS-A:1 739 USSC-B: 938 USRS-A: 865 USI-SEN SOR:3248 | | | | | |

| | | |
|---|--|--|
|  <p>USI Se 0.37 nsor TOOL_ZERO Head Sensor dimension</p> <p>Lengths are in ft Maximum Outer Diameter = 4.700 in Line: Sensor Location, Value: Gating Offset All measurements are relative to TOOL_ZERO</p> | | |
|---|--|--|

| Depth Summary | | | | |
|------------------------------|-----------------------|-----|---|--|
| | | One | | |
| Depth Measuring Device | | | | |
| Type | IDW-B | | | |
| Serial Number | | | | |
| Calibration Date | | | | |
| Calibrator Serial Number | | | | |
| Calibration Cable Type | | | | |
| Wheel Correction 1 | 0 | | | |
| Wheel Correction 2 | 0 | | | |
| Tension Device | | | | |
| Type | CMTD-B/A | | | |
| Serial Number | | | | |
| Calibration Date | | | | |
| Calibrator Serial Number | | | | |
| Number of Calibration Points | 0 | | | |
| Logging Cable | | | | |
| Type | 7-46NT-XS | | | |
| Serial Number | | | | |
| Length | 24000.00 ft | | | |
| Conveyance Type | Wireline | | | |
| Rig Type | Crane | | | |
| One:Depth Control Parameters | | | Depth Control Remarks | |
| Log Sequence | First Log In the Well | | All Schlumberger depth control procedures followed during logging operations. | |
| Rig Up Length At Surface | | | IDW used as primary depth control device. | |
| Rig Up Length At Bottom | | | Z-Chart used as secondary depth control device. | |
| 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 | 6.0.53731.3100 |

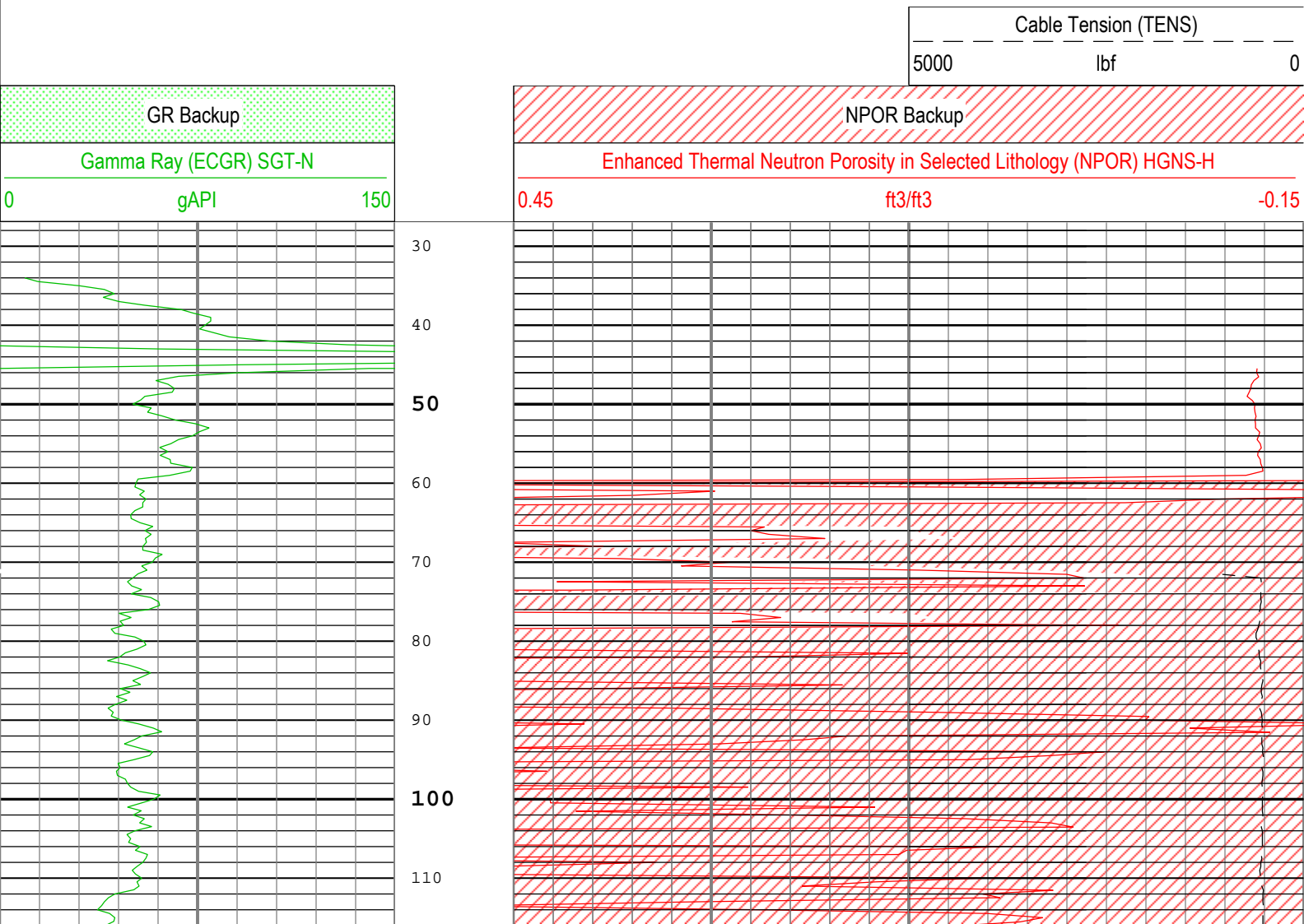
| Pass Summary | | | | | | | | | |
|--|----------------|-----------|----------|------------|------------------------|-------------------------|----------|-------------|-----------------------|
| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include Parallel Data |
| One | Log[2]:Up | Up | 71.14 ft | 6791.99 ft | 04-May-2016 8:55:37 AM | 04-May-2016 10:48:13 AM | ON | 6.23 ft | Yes |
| All depths are referenced to toolstring zero | | | | | | | | | |

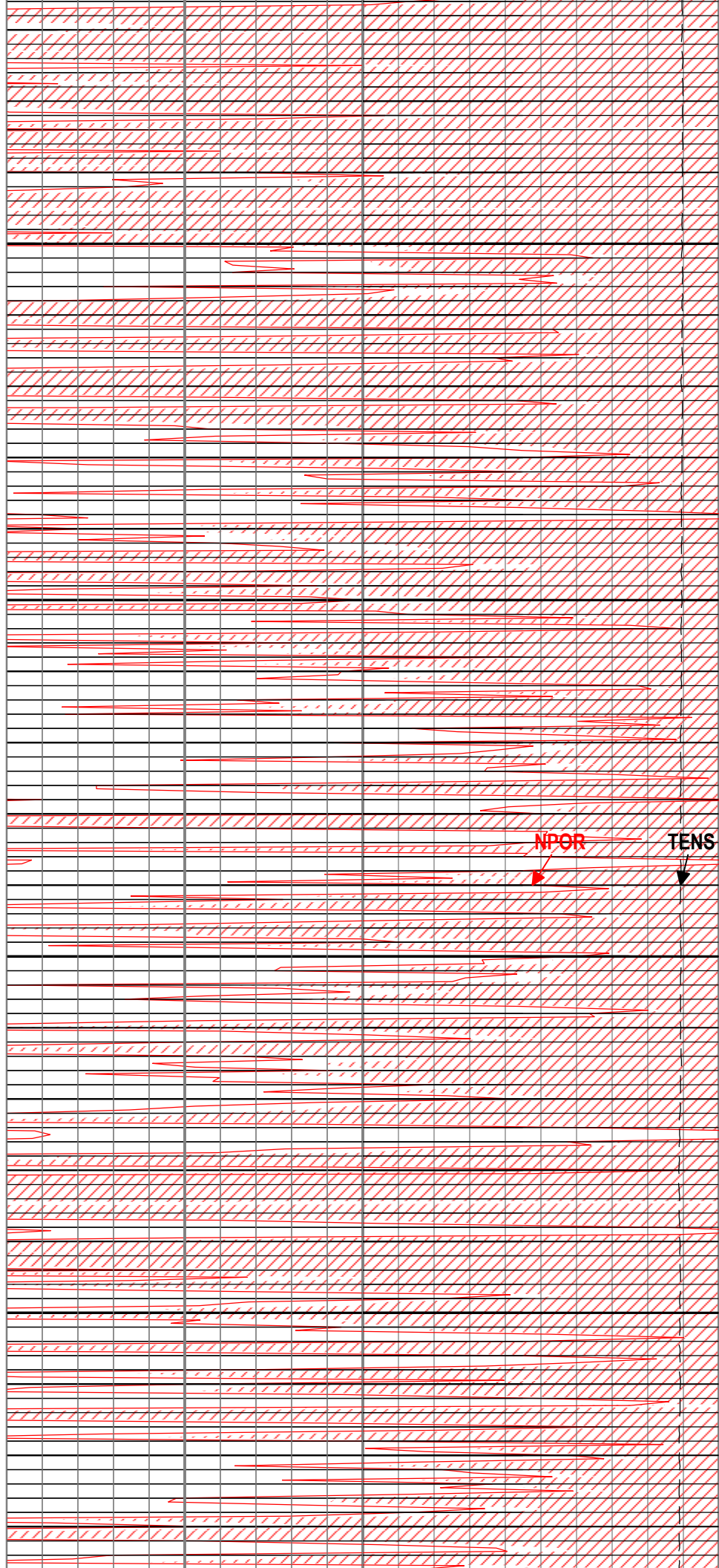
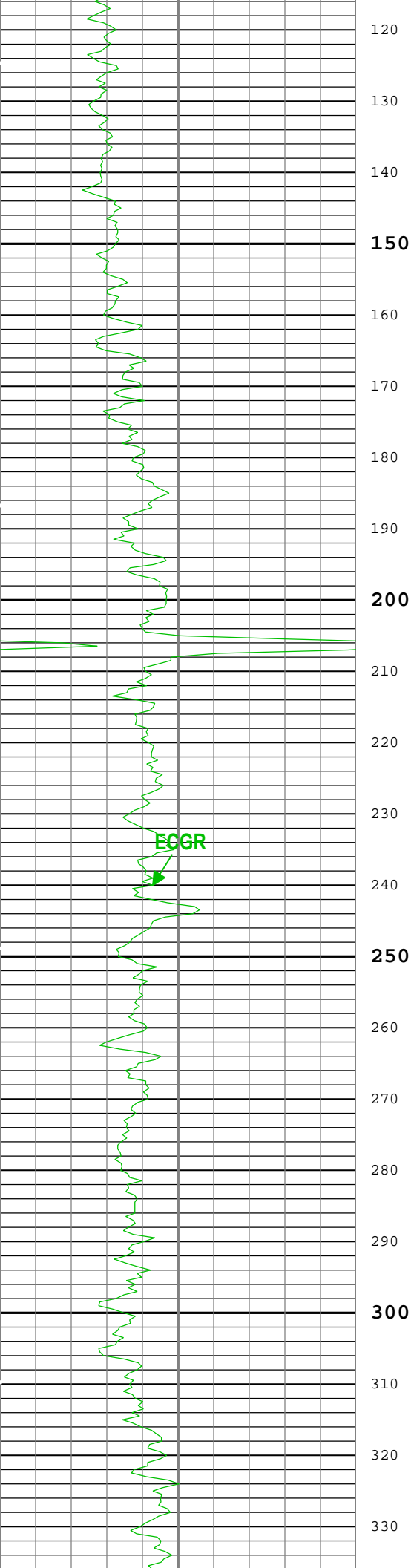
| Log | Company:Noble Energy, Inc | Well:Wells Ranch AA22-617 |
|---------------------|---------------------------|---------------------------|
| One: Log[2]:Up:S008 | | |

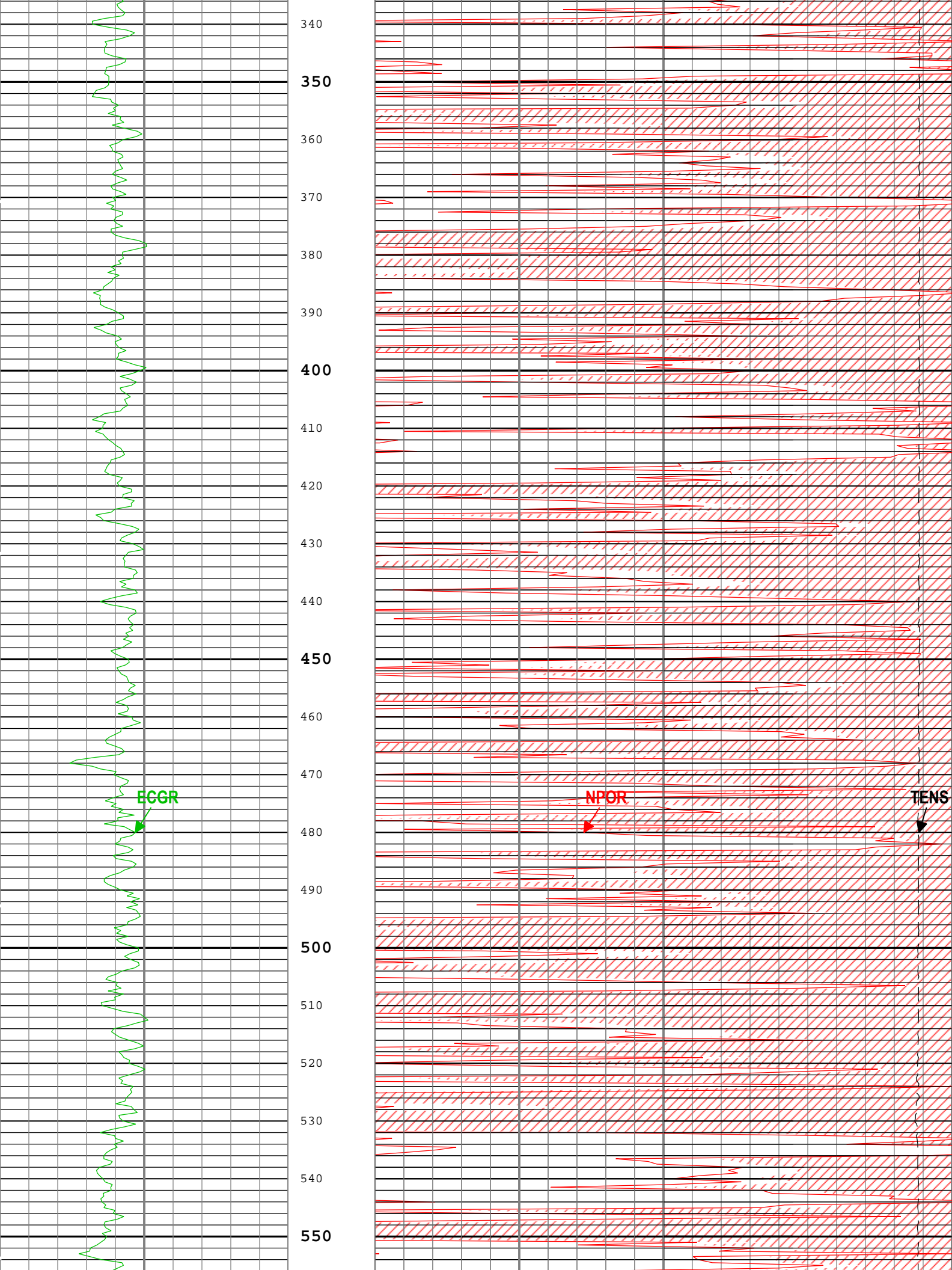
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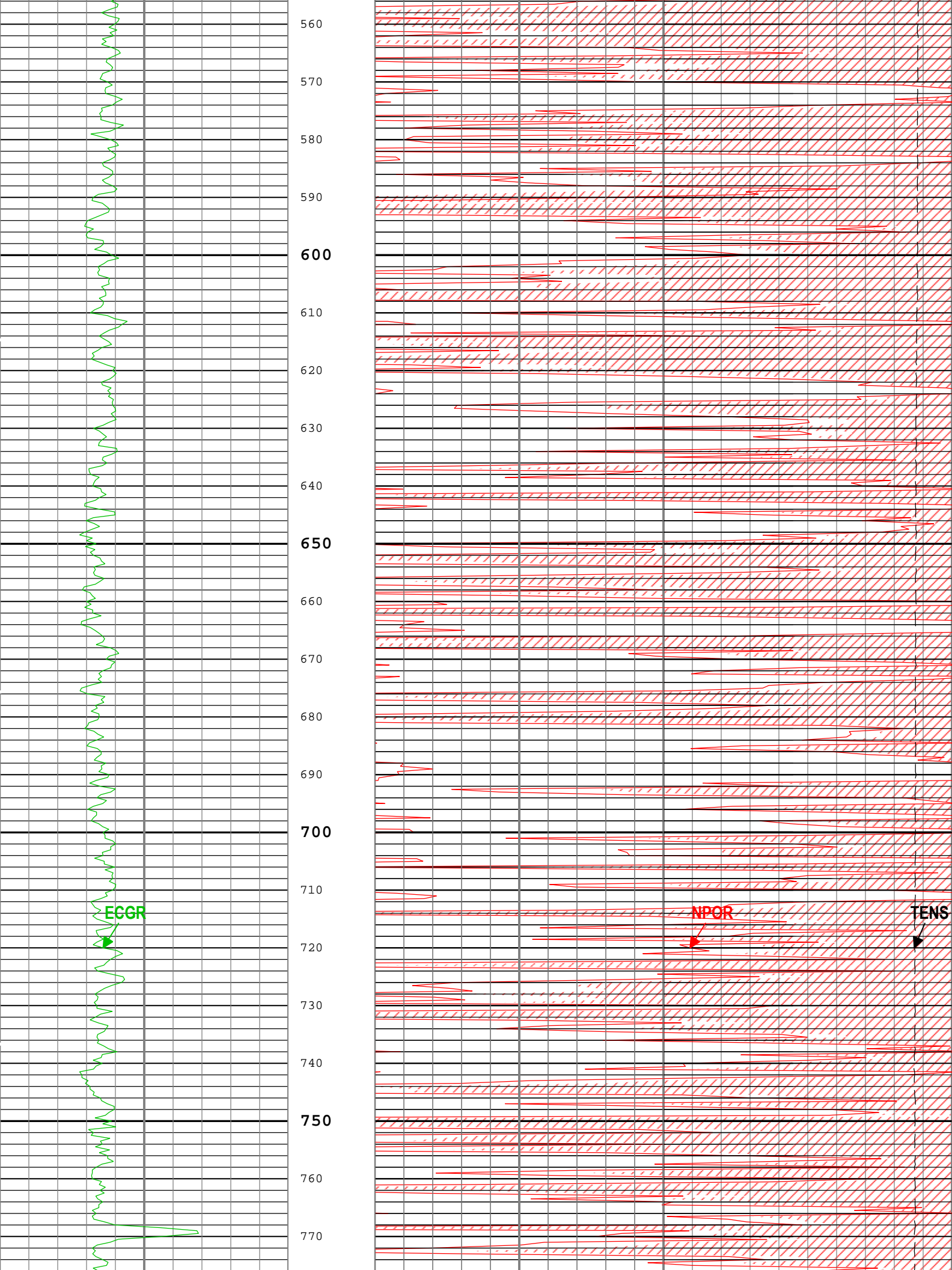
| Channel | Source | Sampling |
|-----------|----------------------|----------|
| GR | SGT-N:SGT-N:SGC-TB | 6in |
| ICV | Borehole | 6in |
| IHV | Borehole | 6in |
| NPOR | HGNS-H:HGNS-H:HGNS-H | 6in |
| TENS | WLWorkflow | 6in |
| TIME_1900 | WLWorkflow | 0.1in |

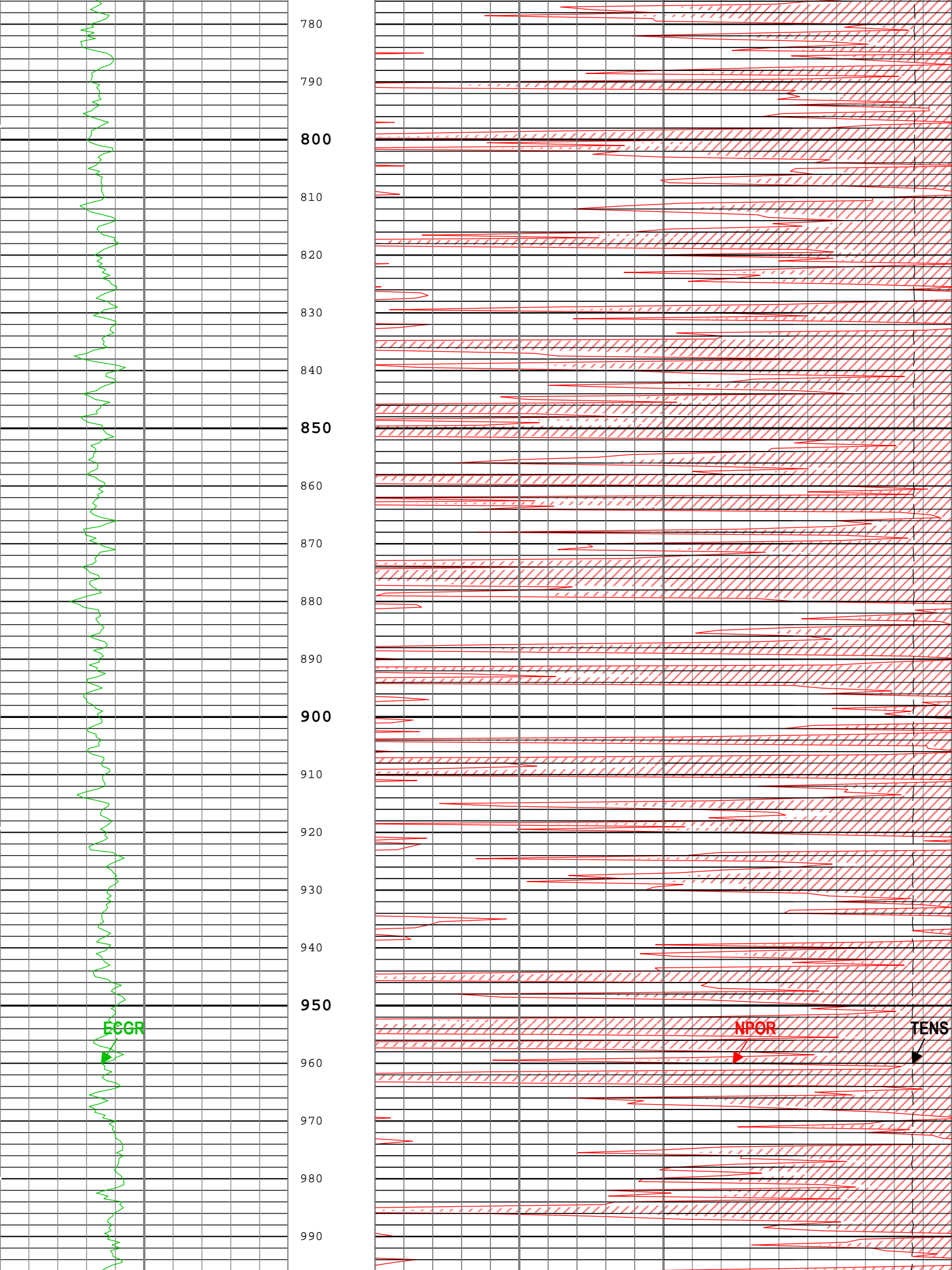
— IHV - Integrated Hole Volume every 10.00 (ft3)
— IHV - Integrated Hole Volume every 100.00 (ft3)
— ICV - Integrated Cement Volume every 10.00 (ft3)
— ICV - Integrated Cement Volume every 100.00 (ft3)
TIME_1900 - Time Marked every 60.00 (s)

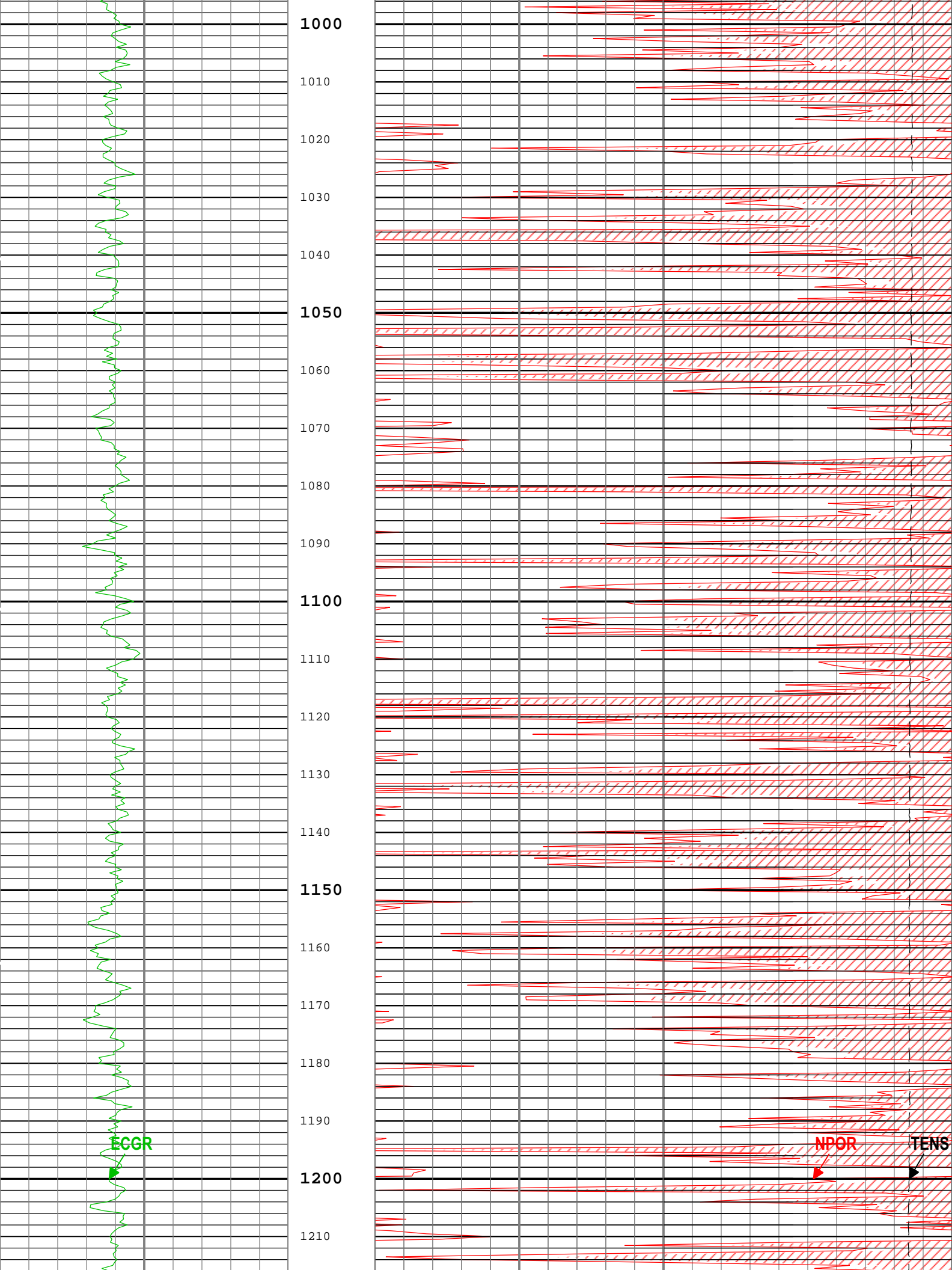


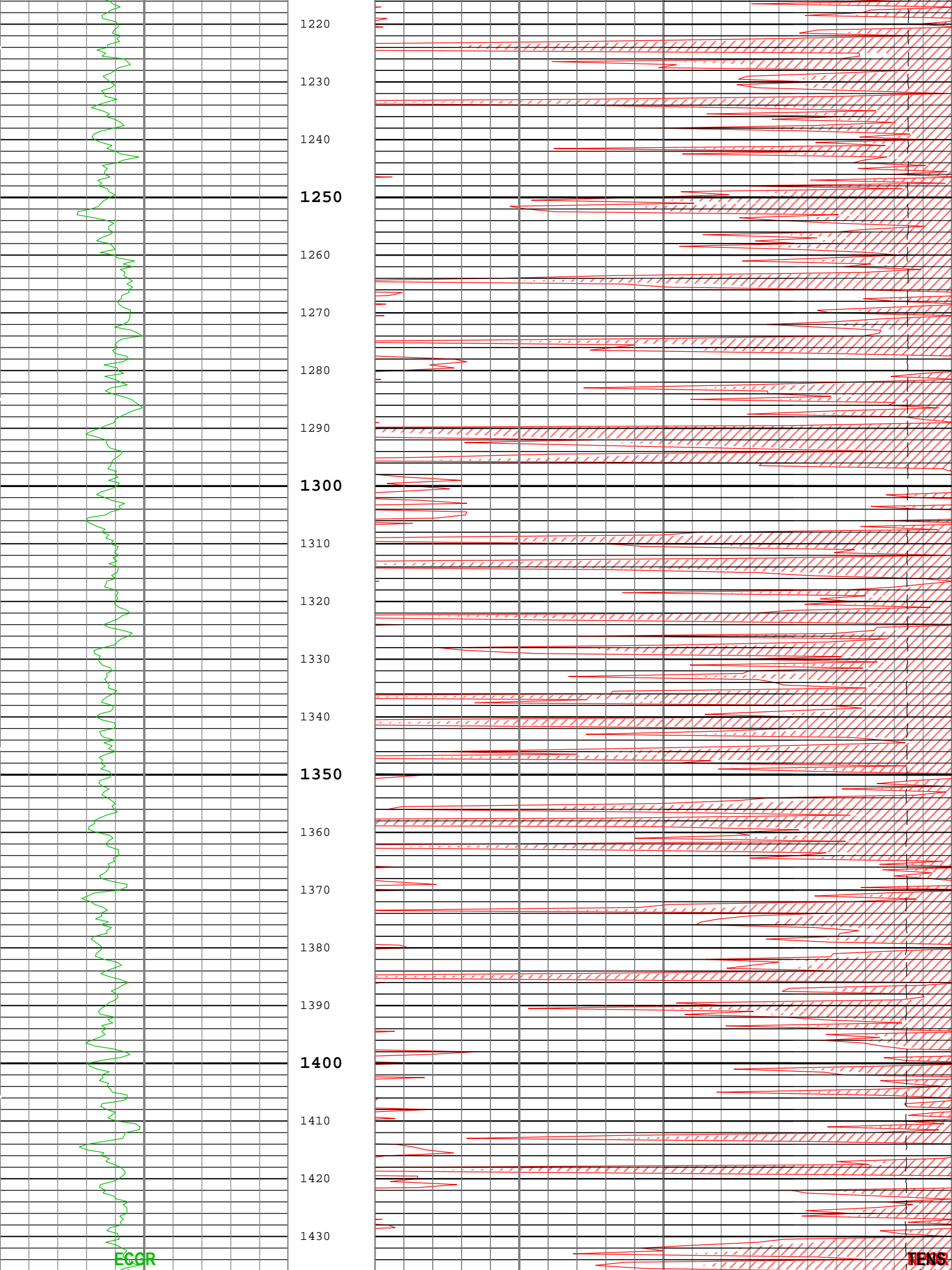


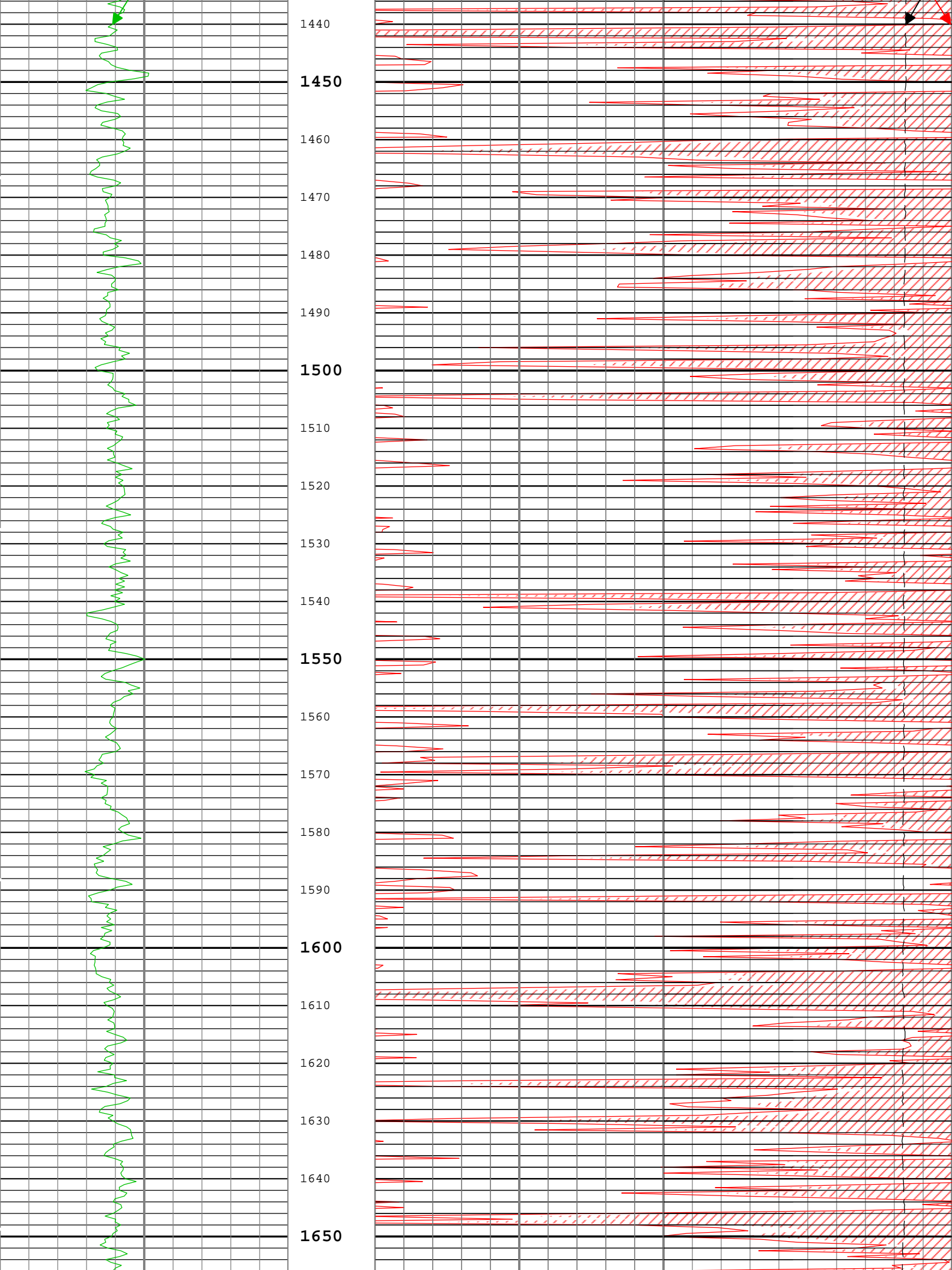


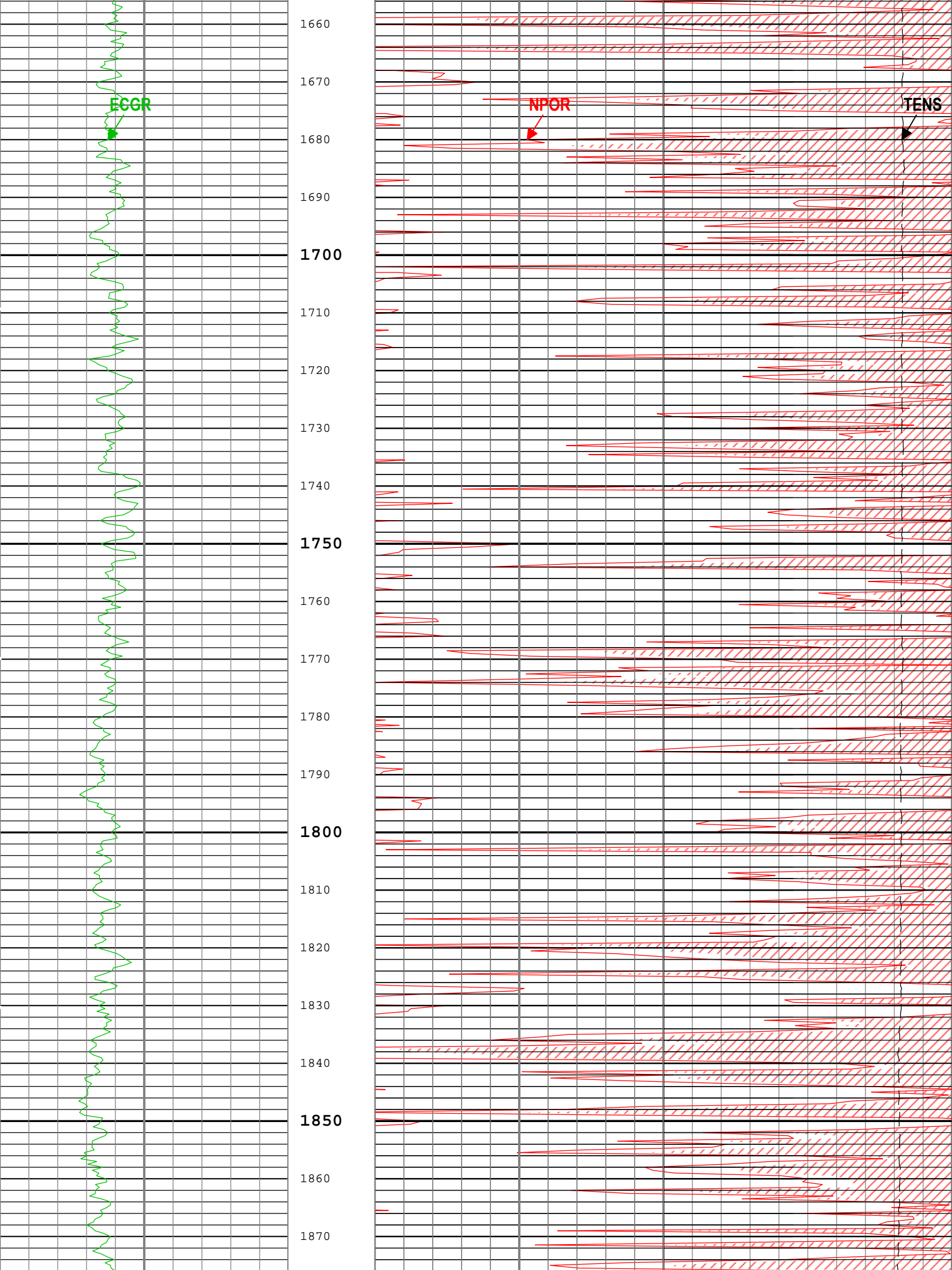


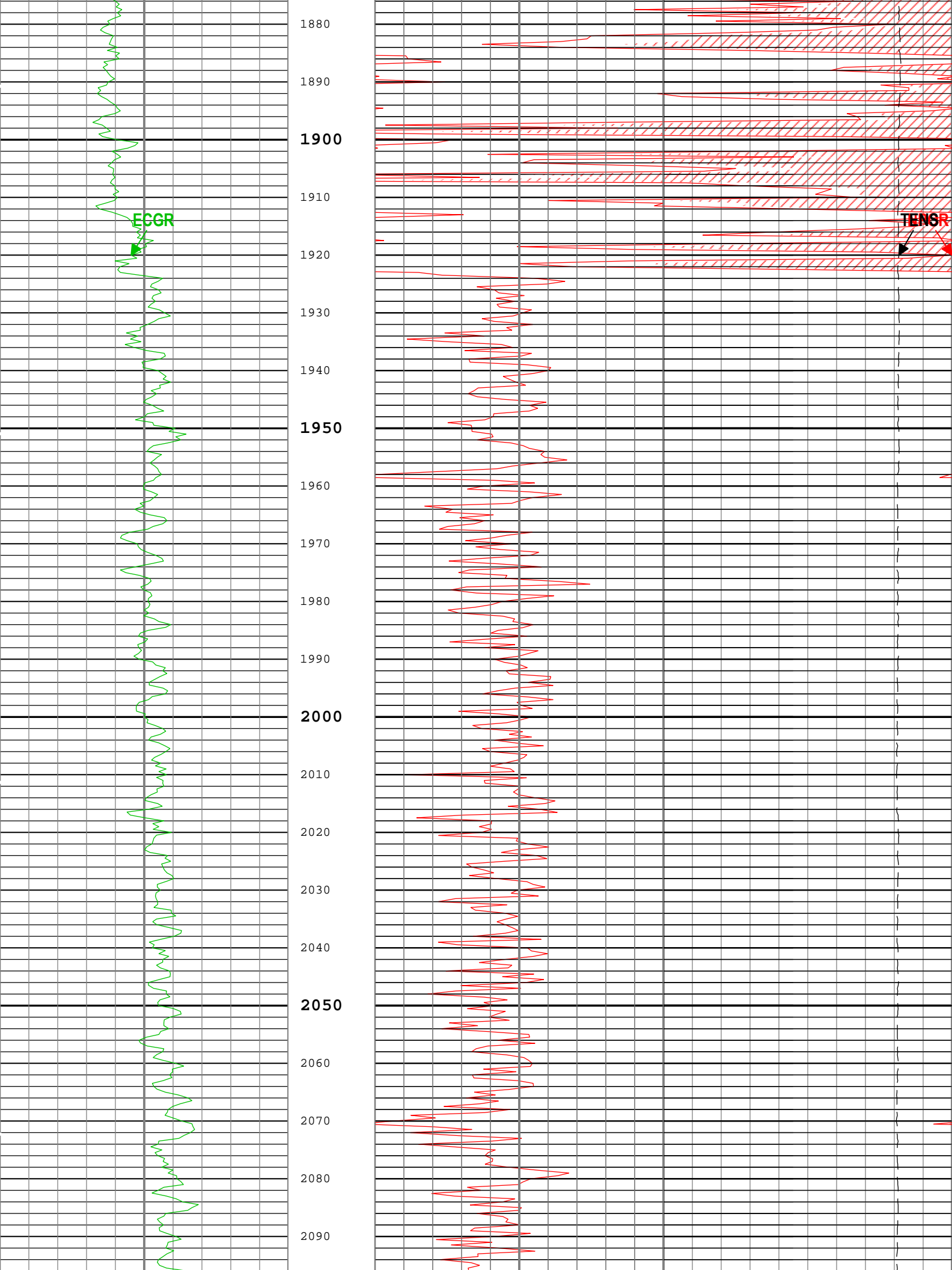


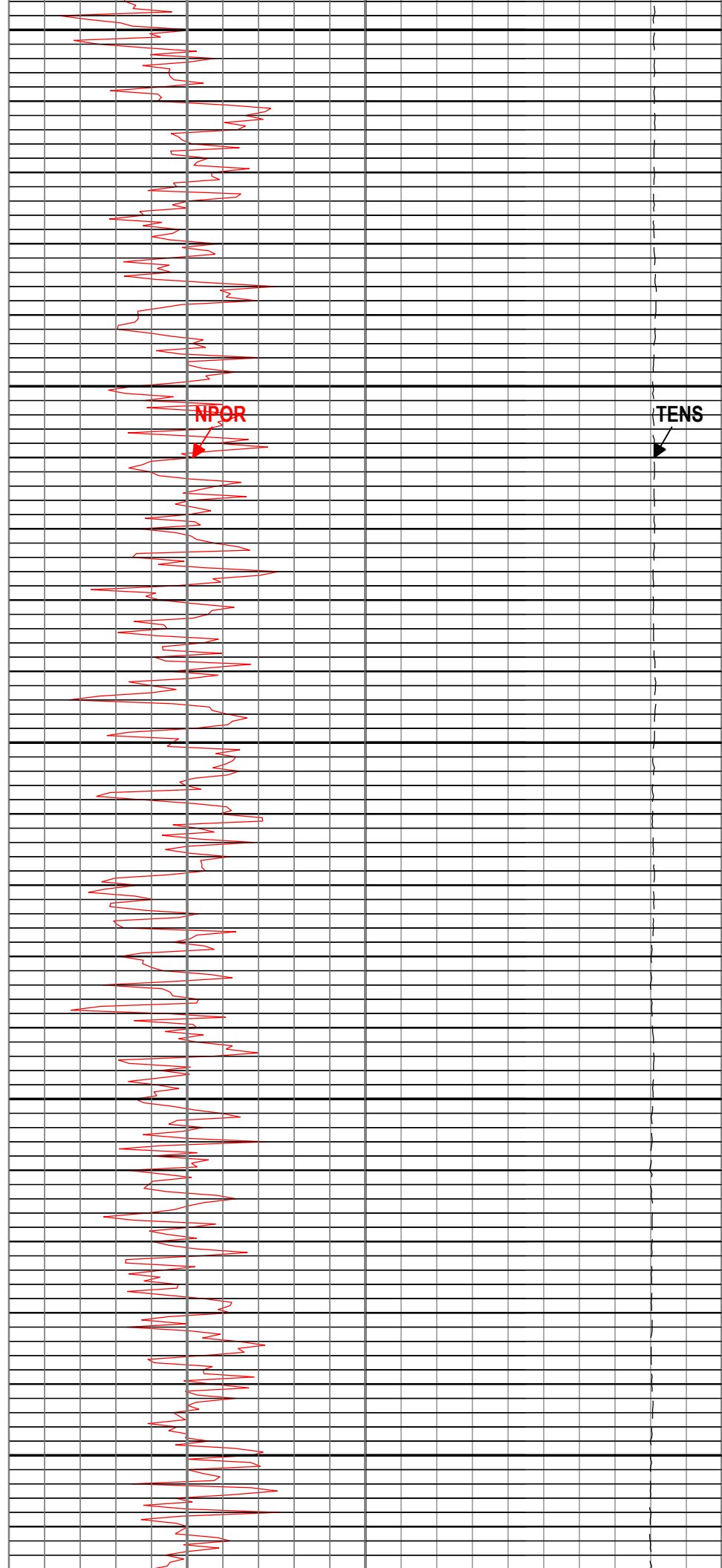
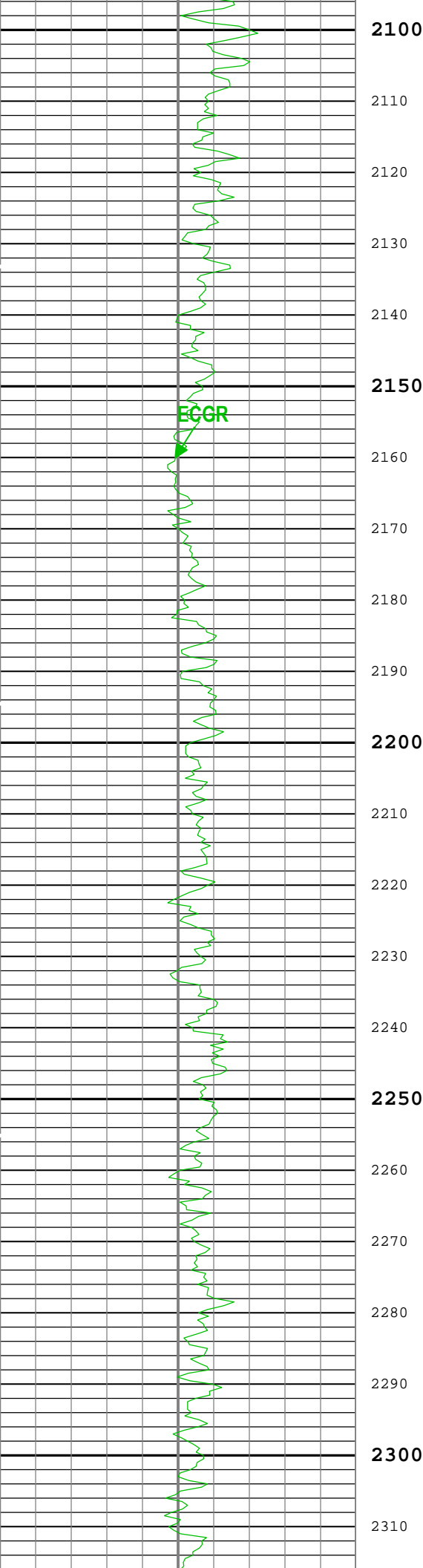


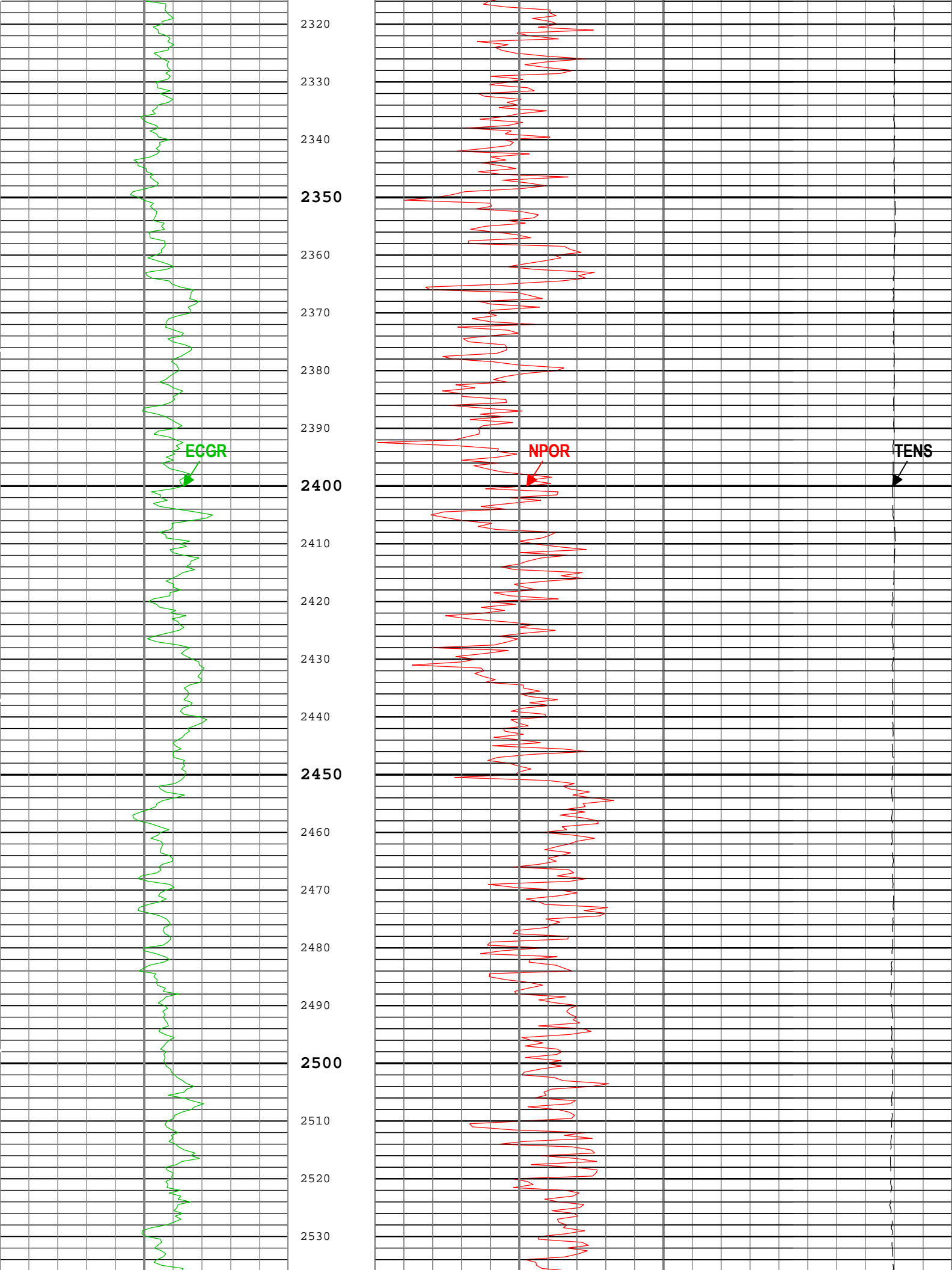


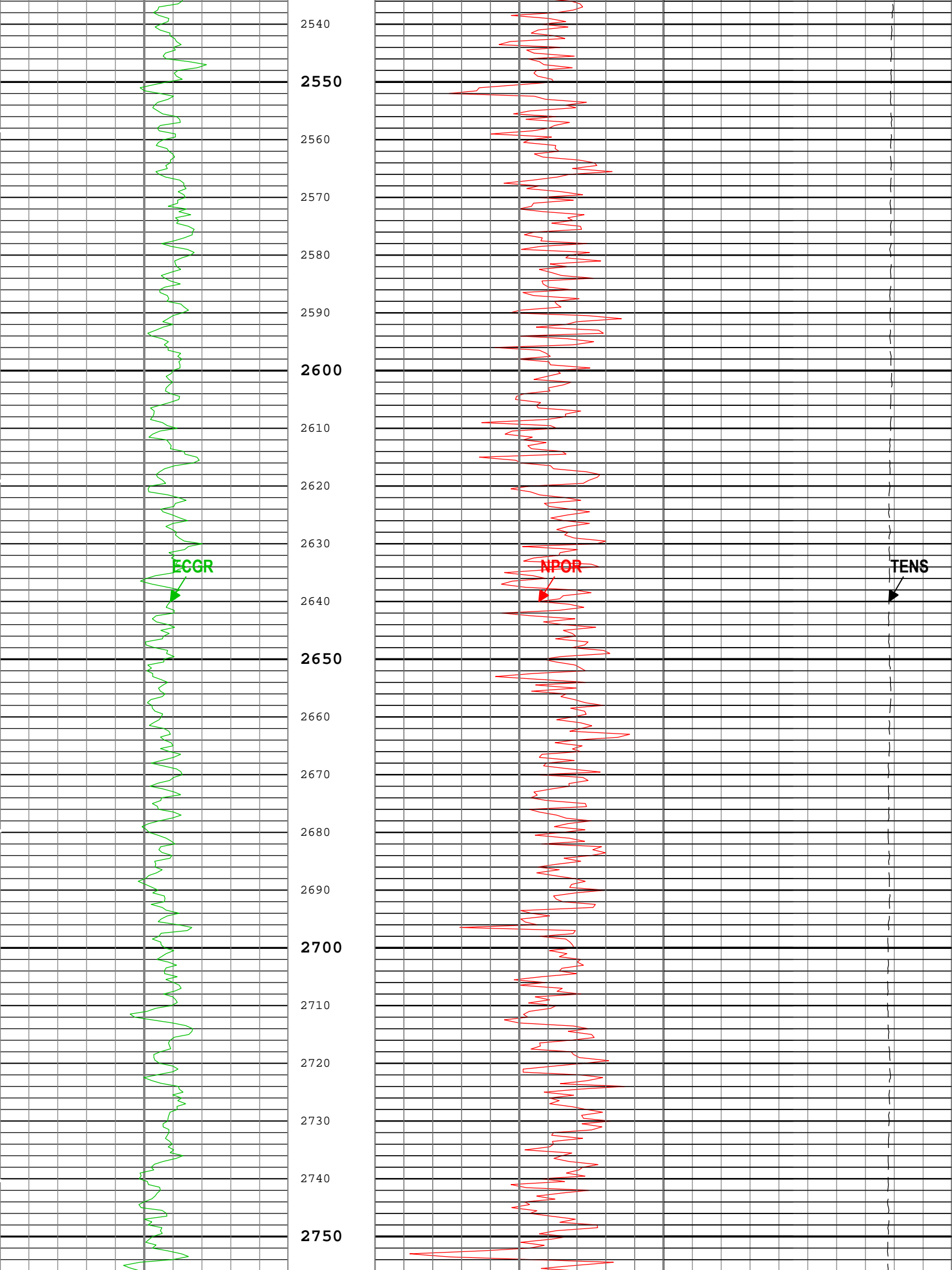


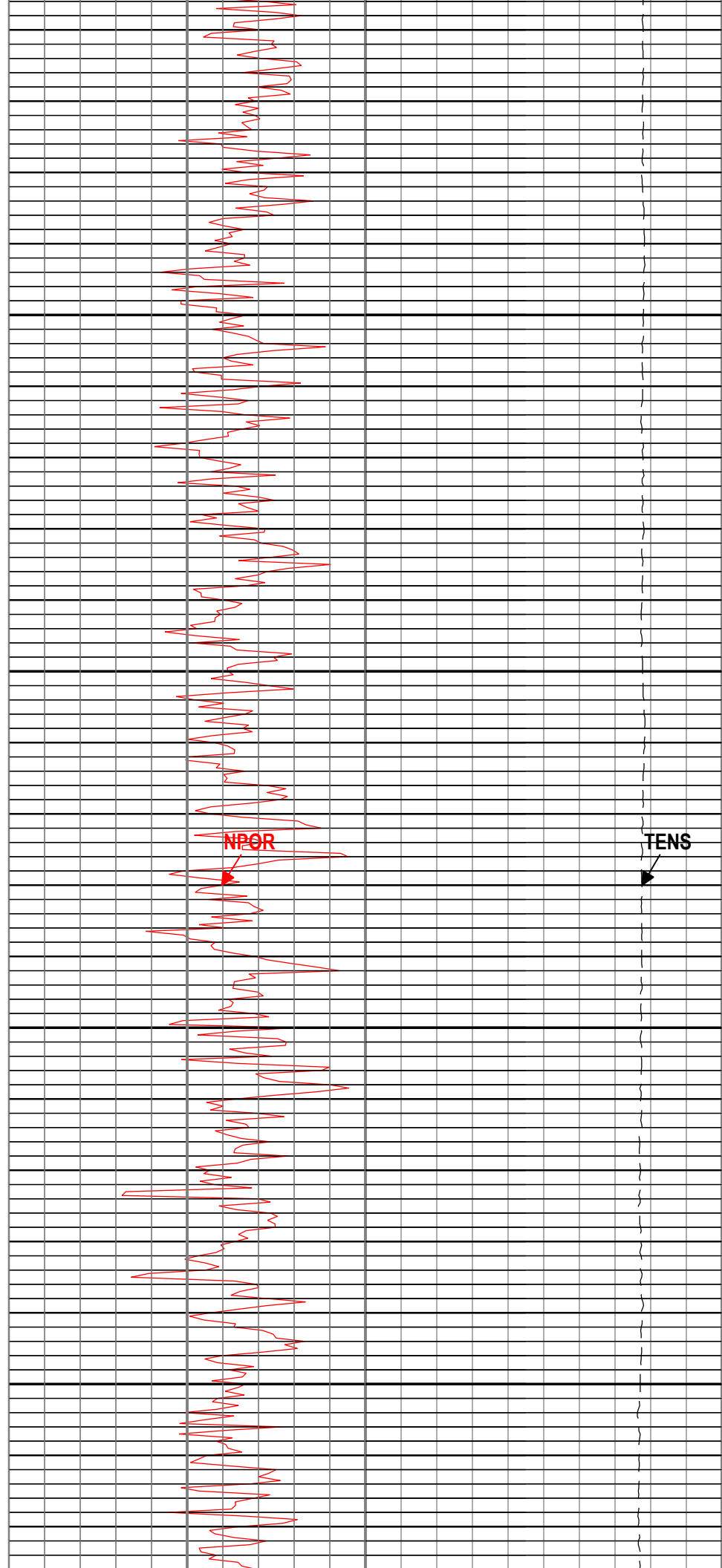
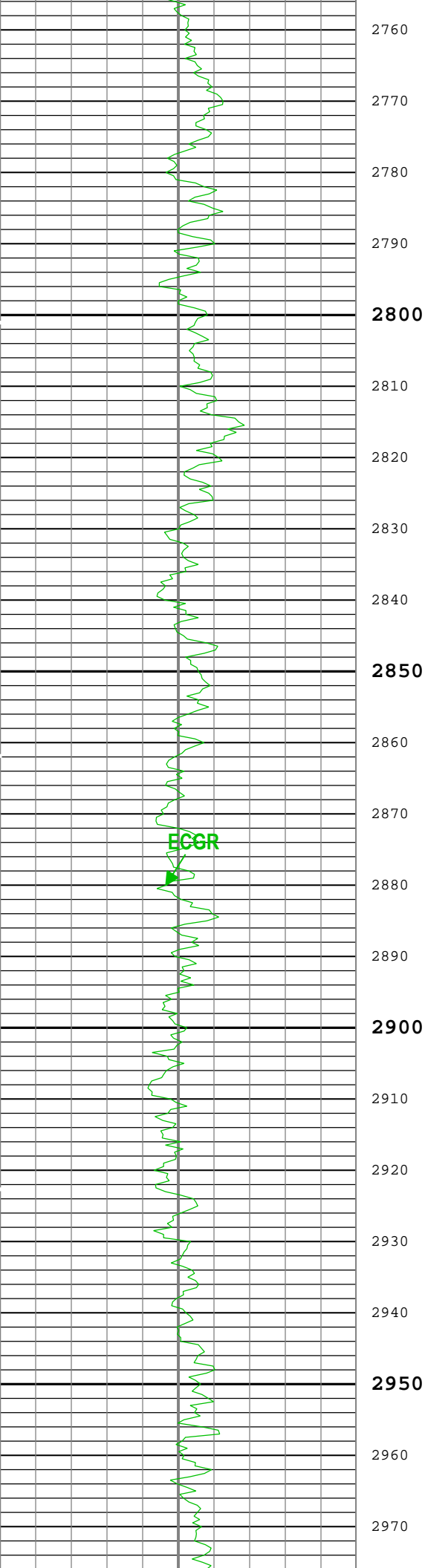


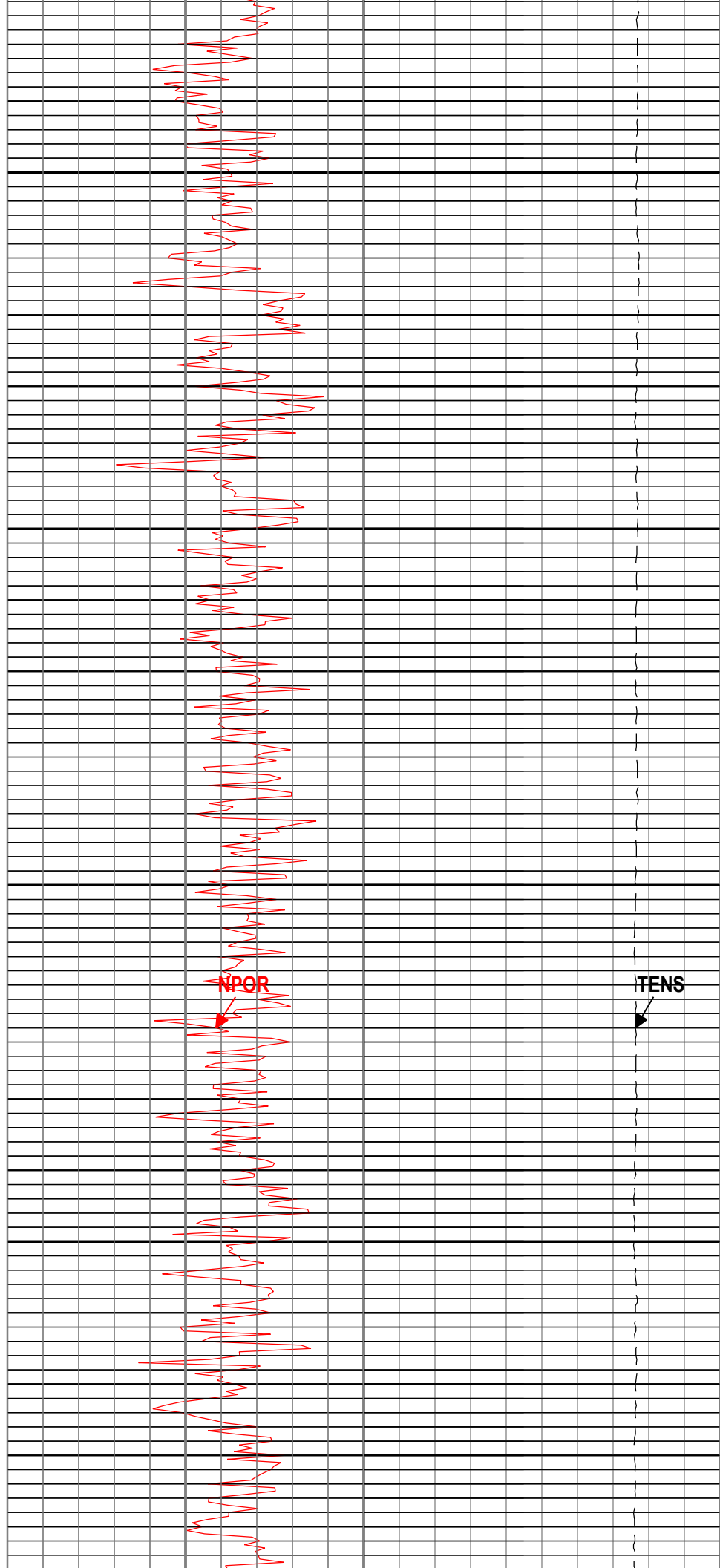
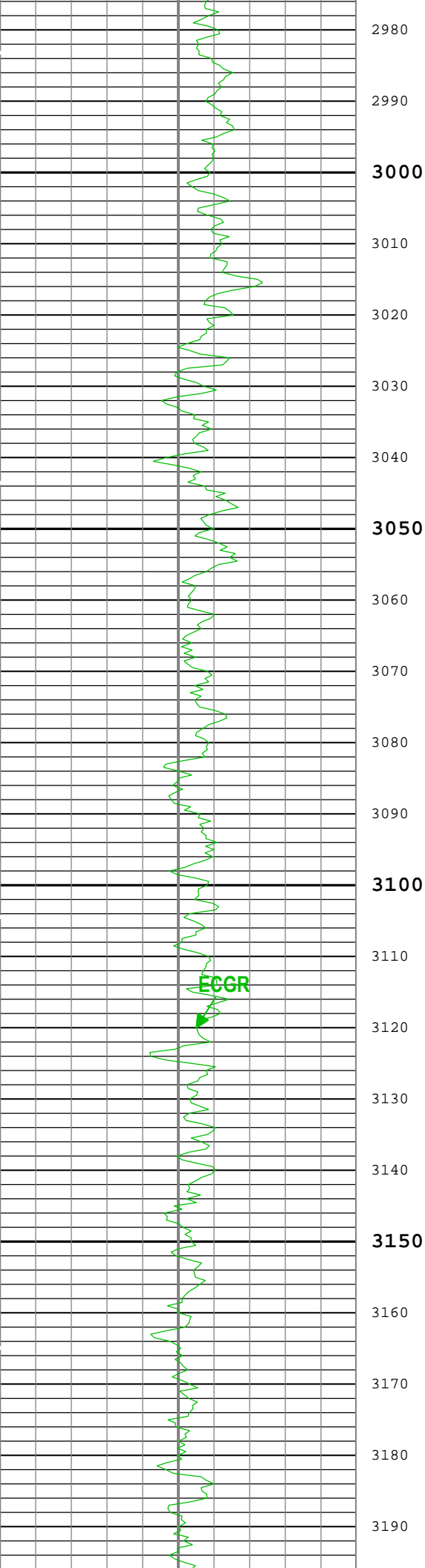


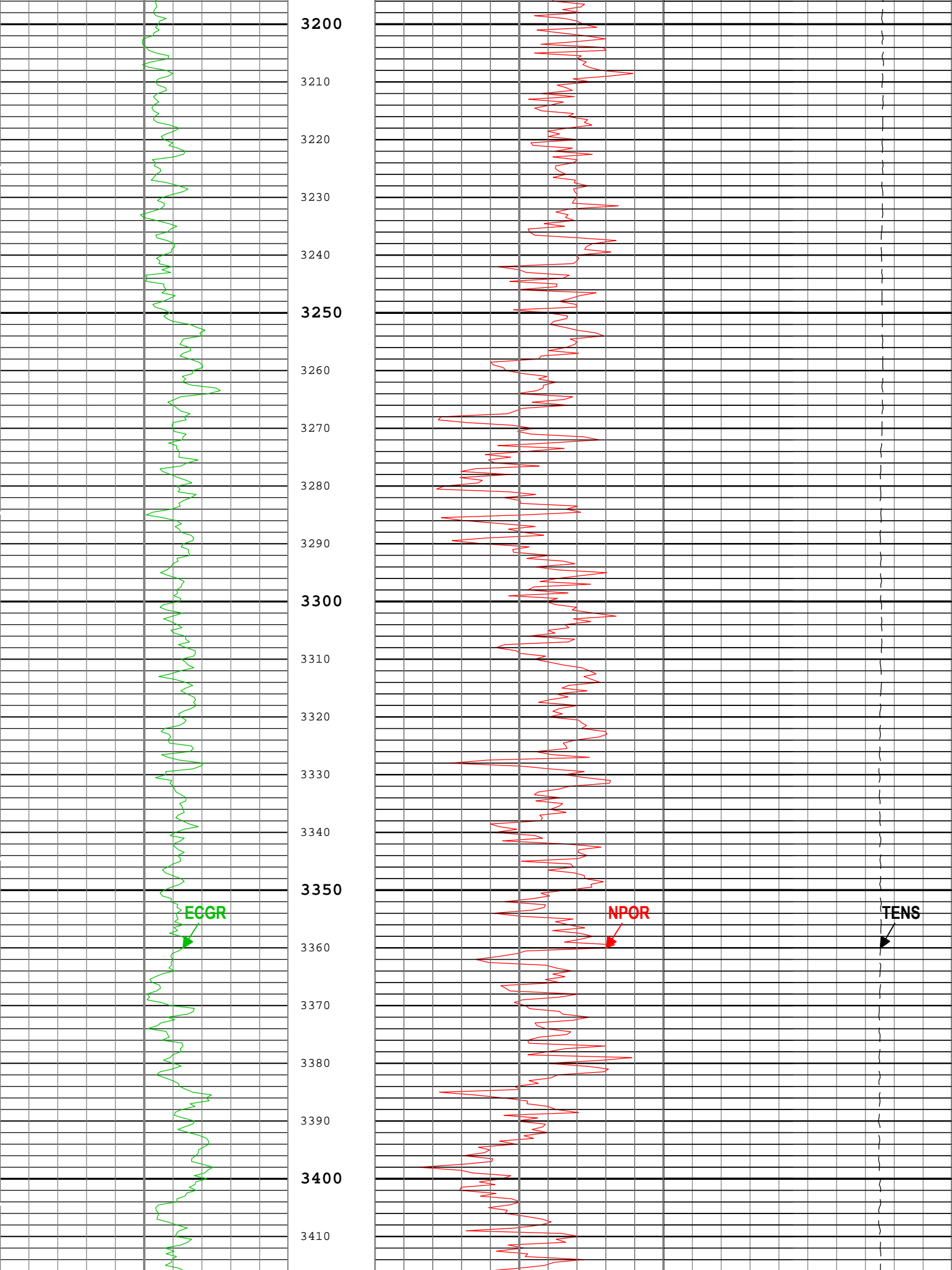


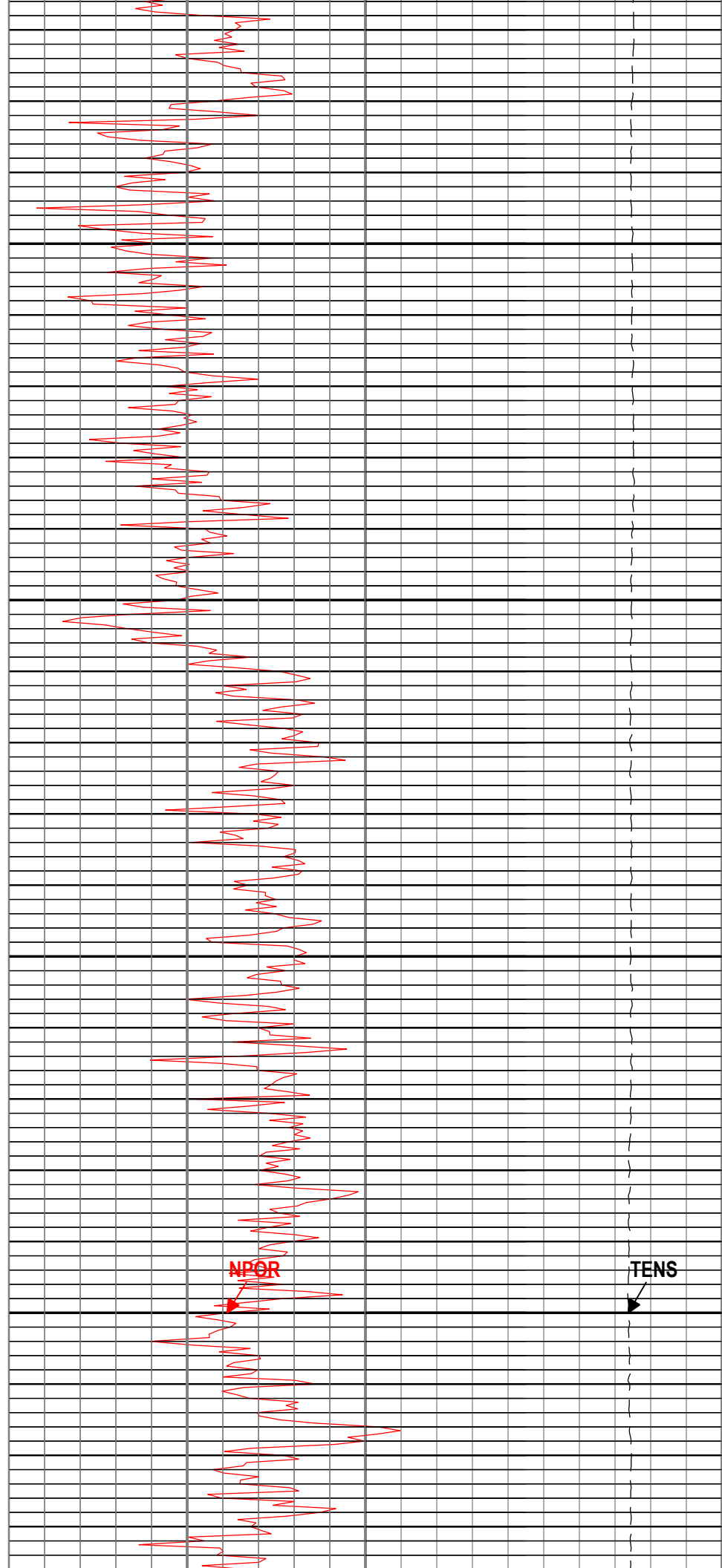
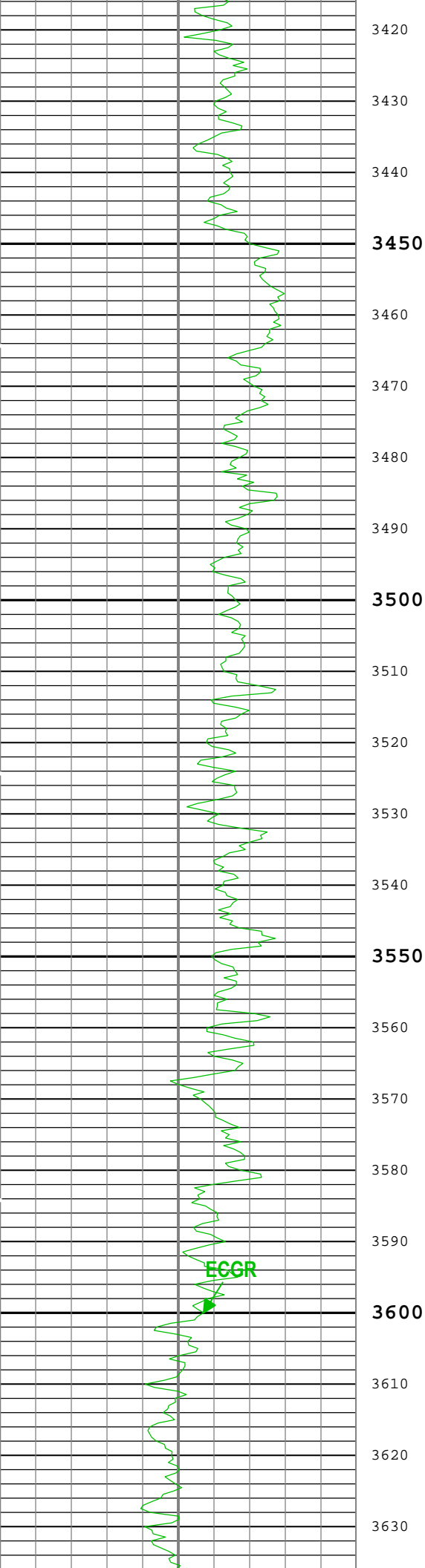


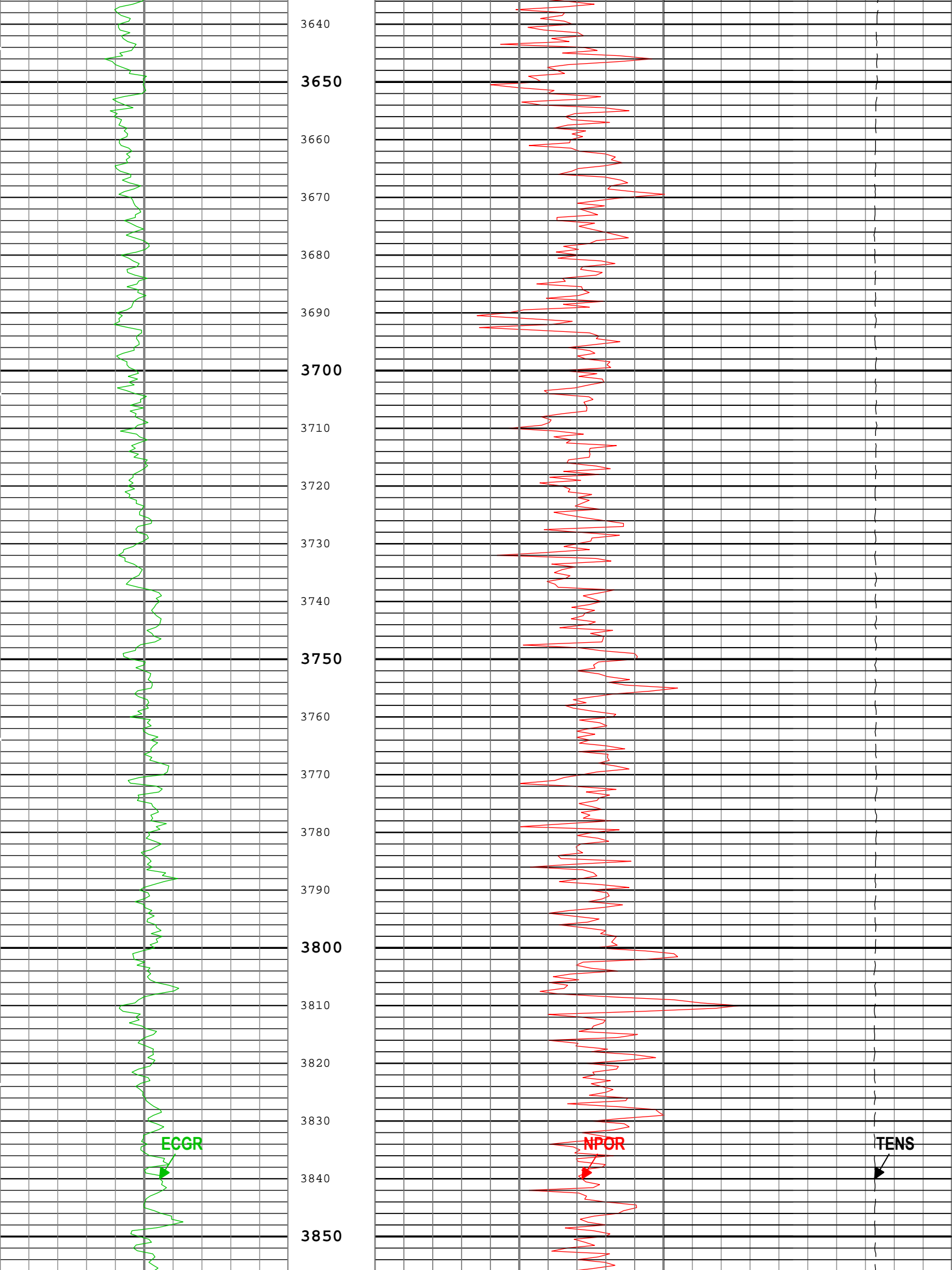


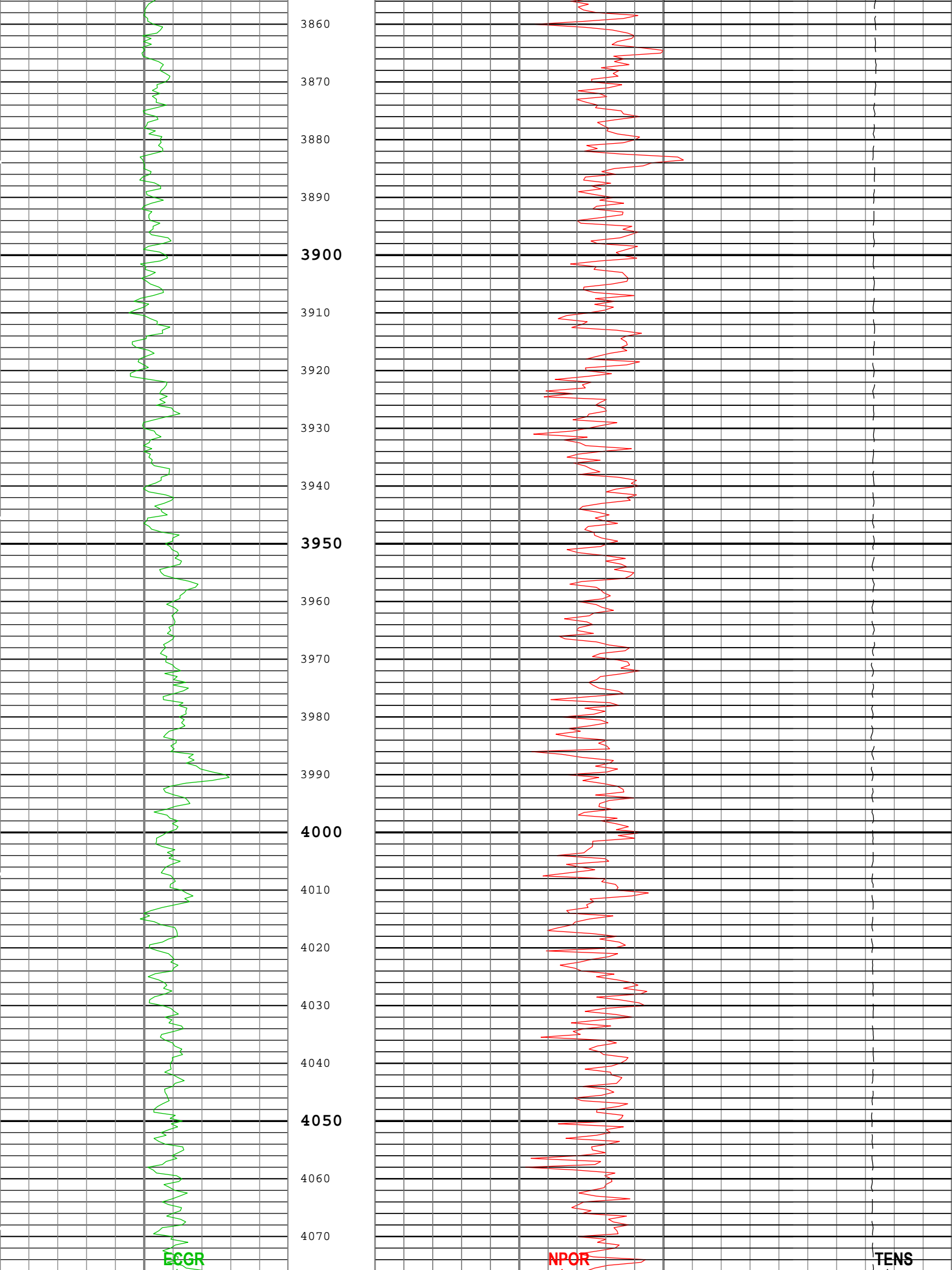


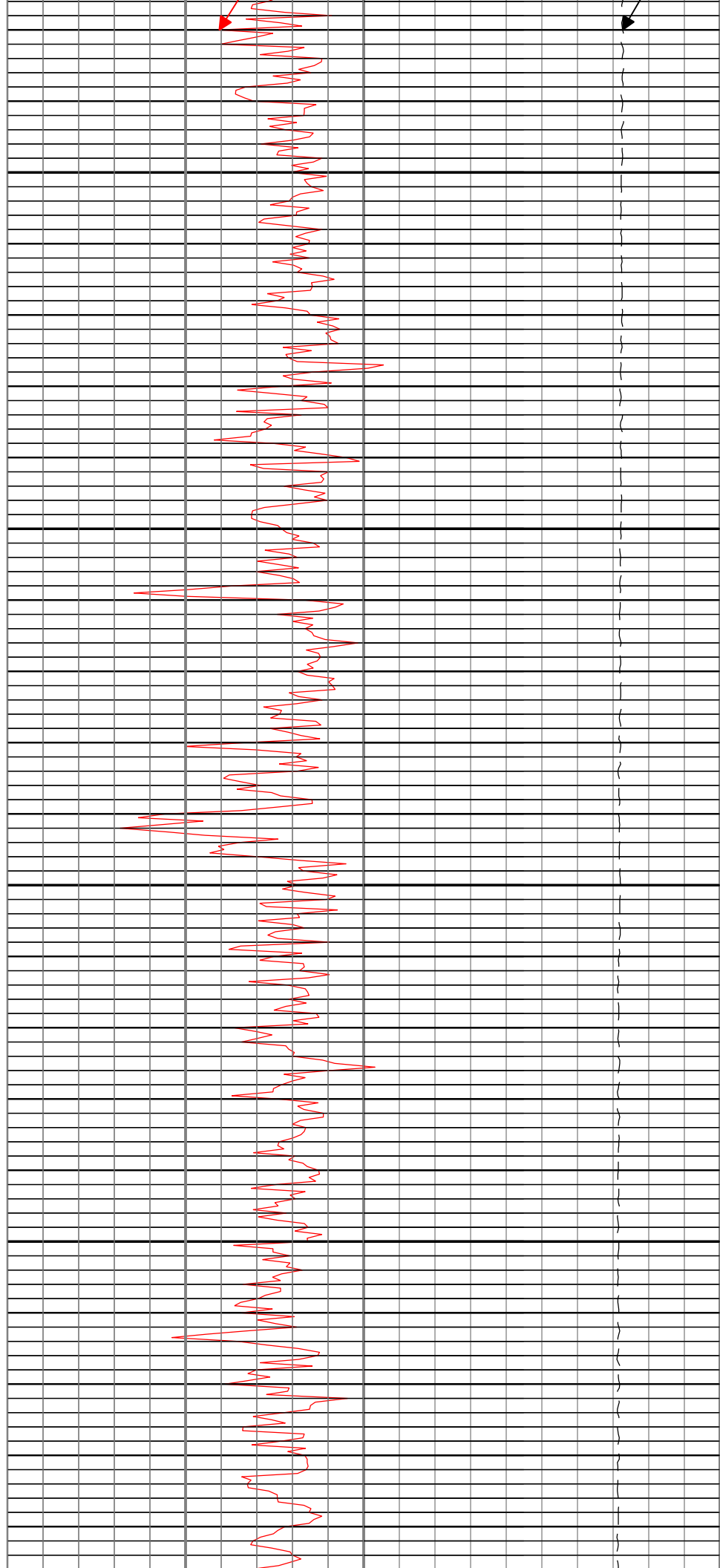
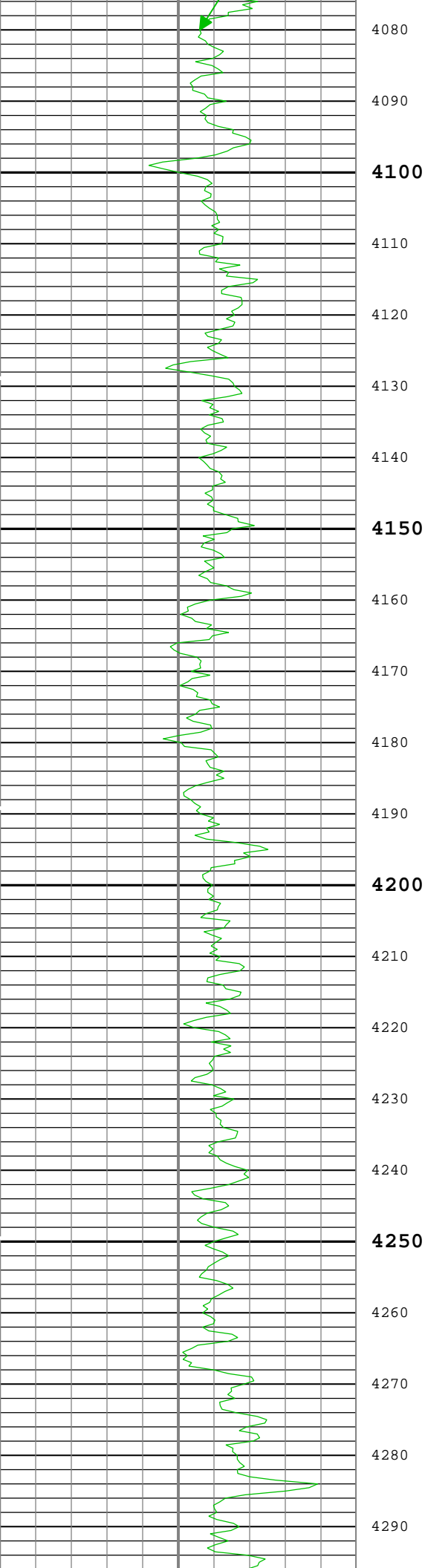


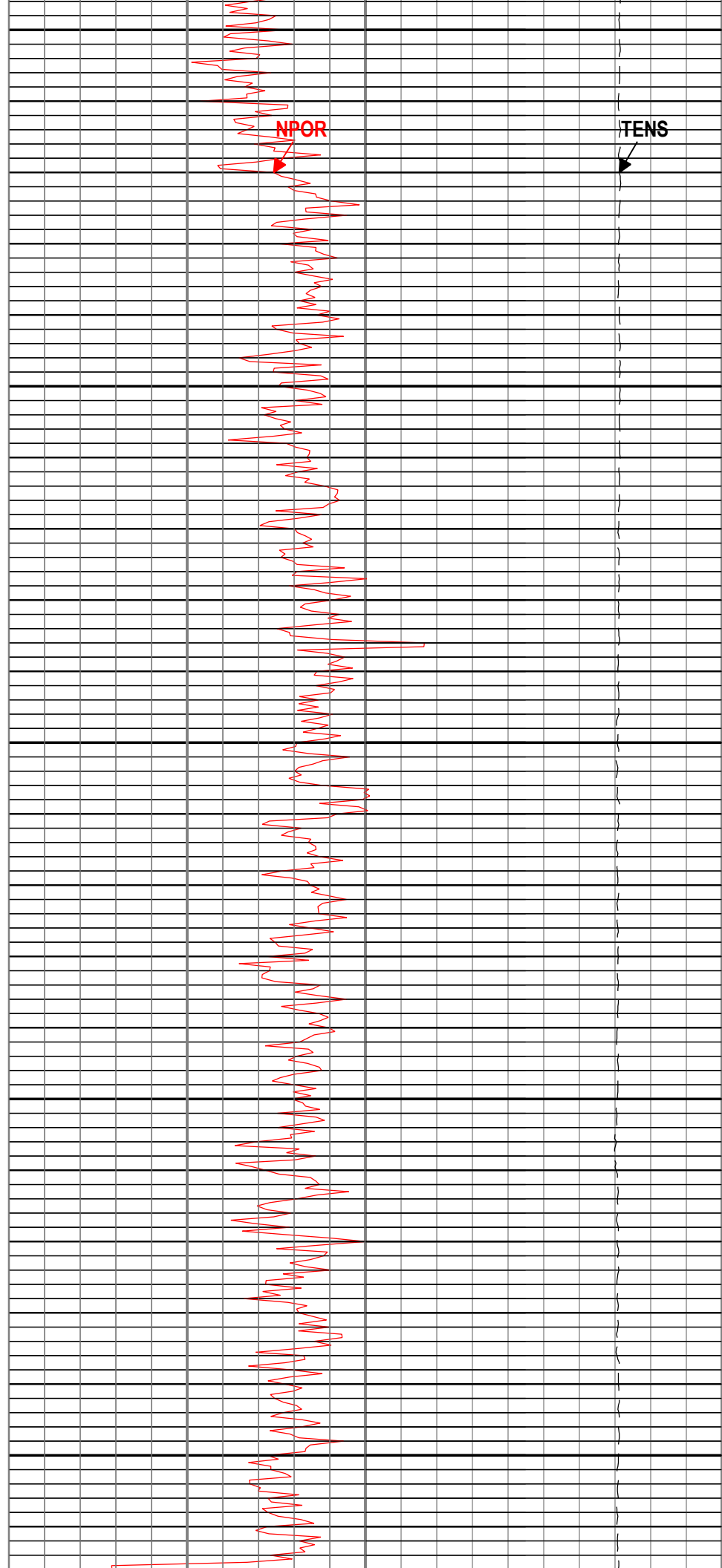
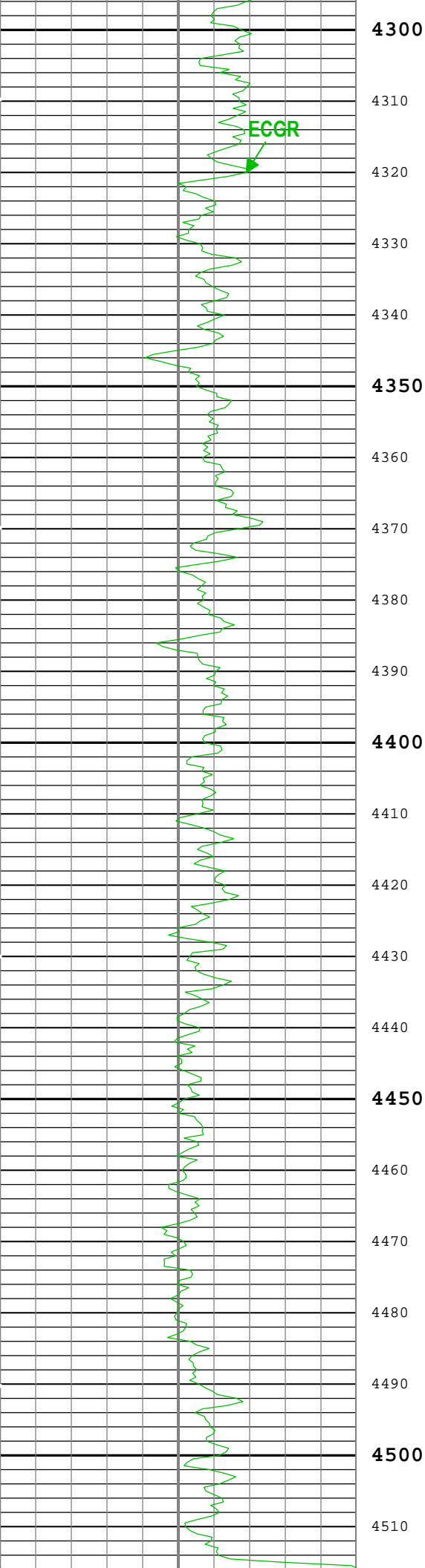


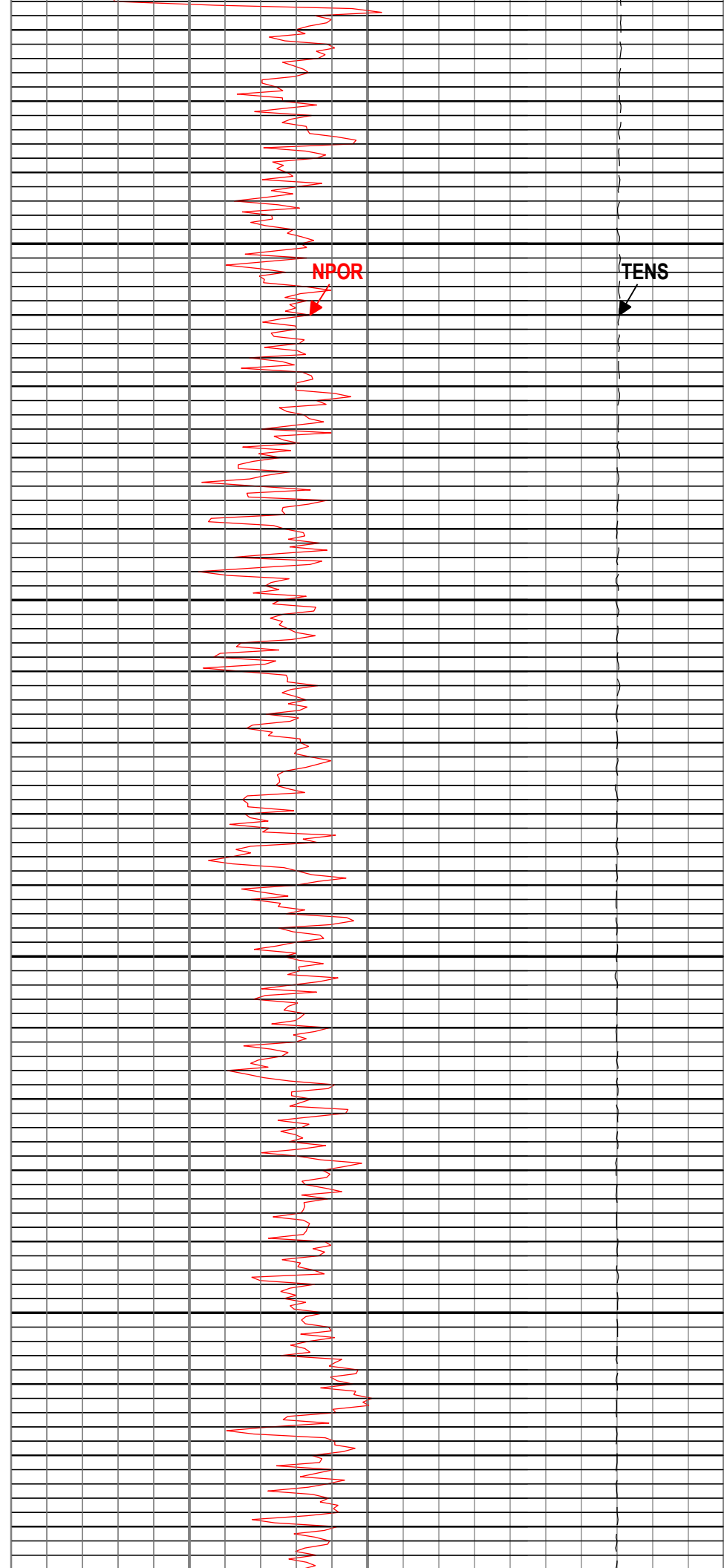
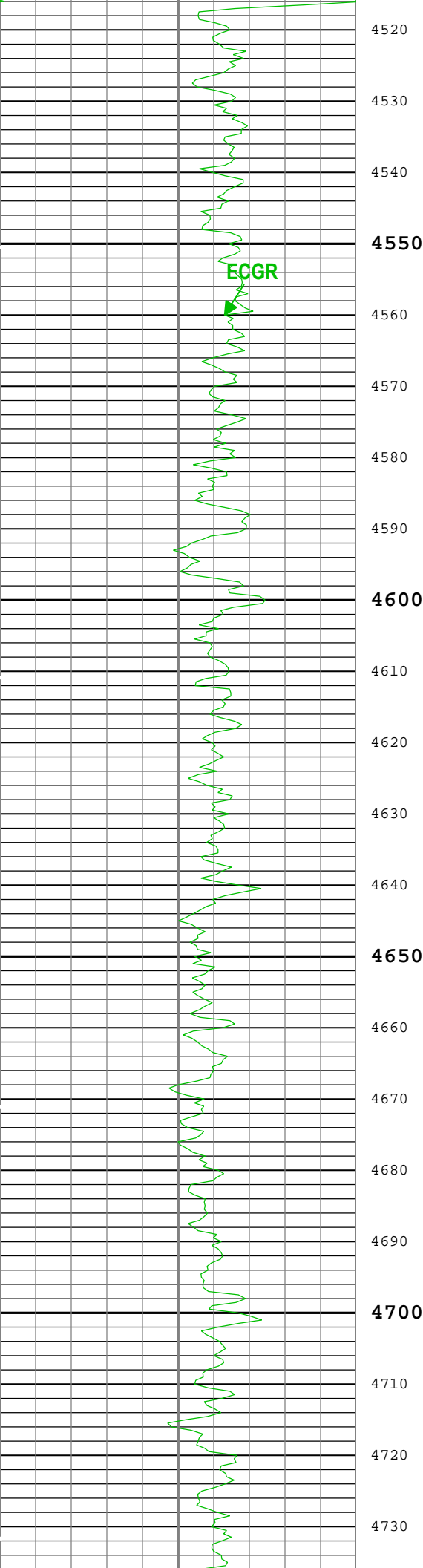


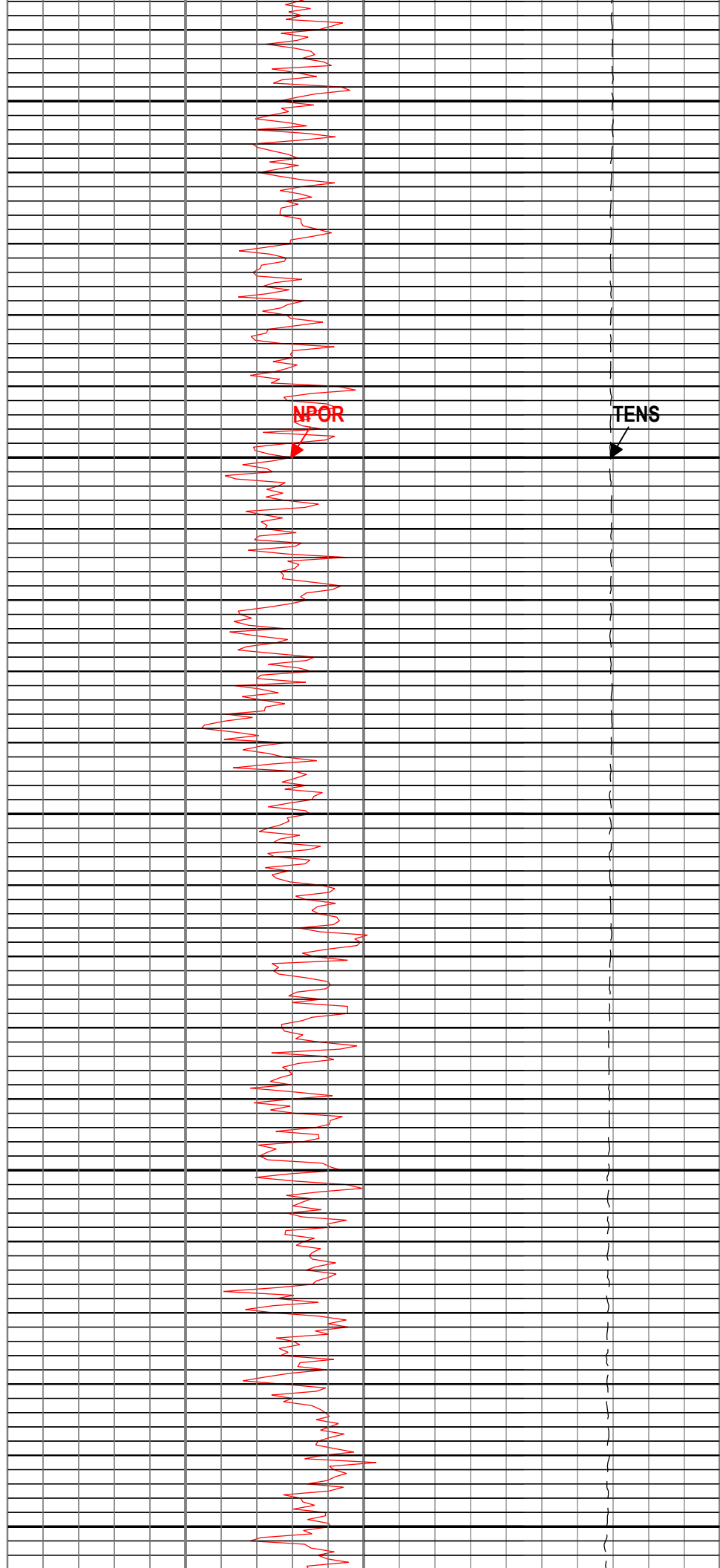
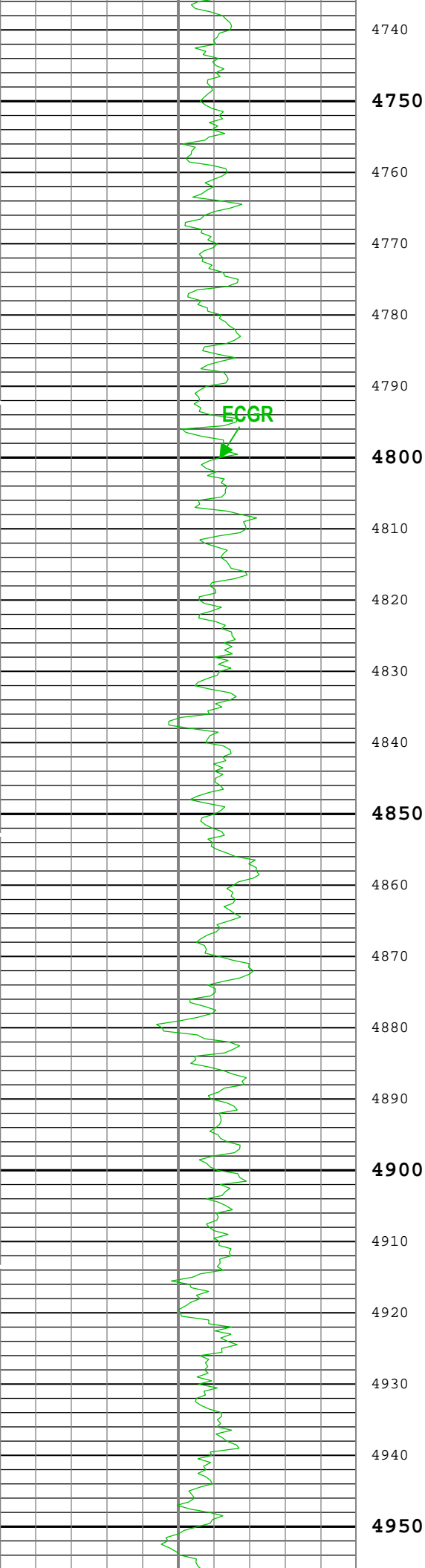


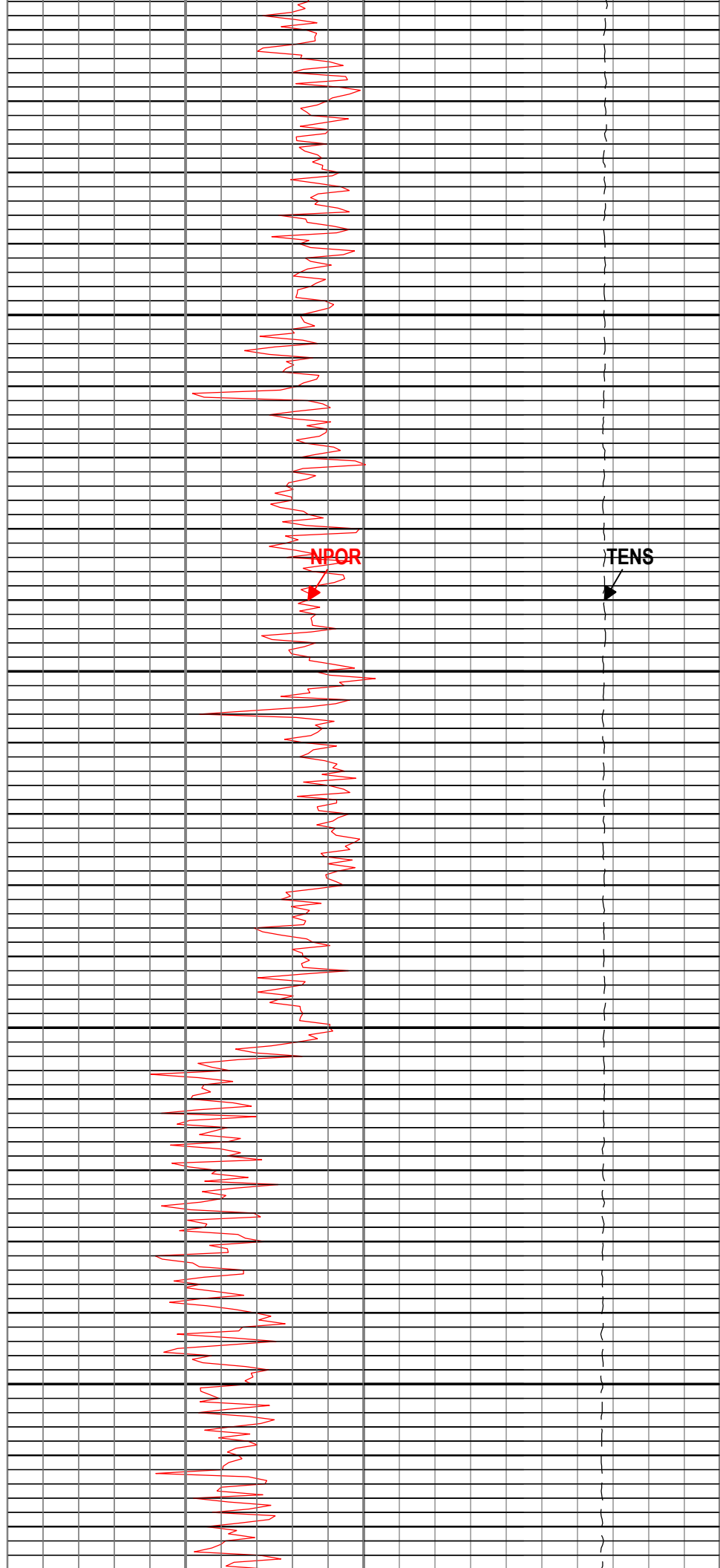
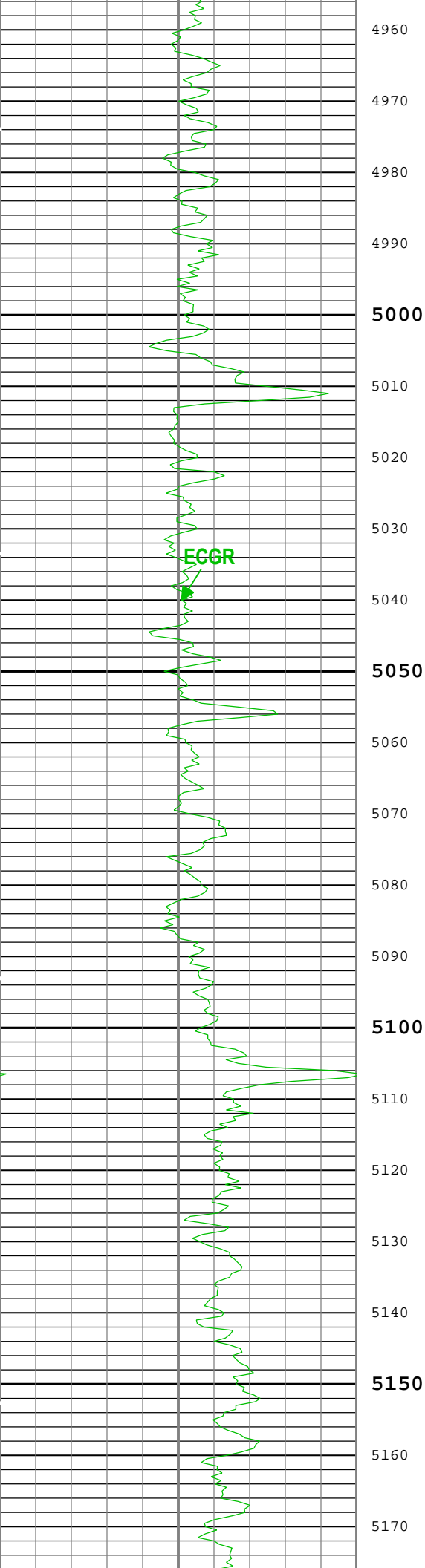


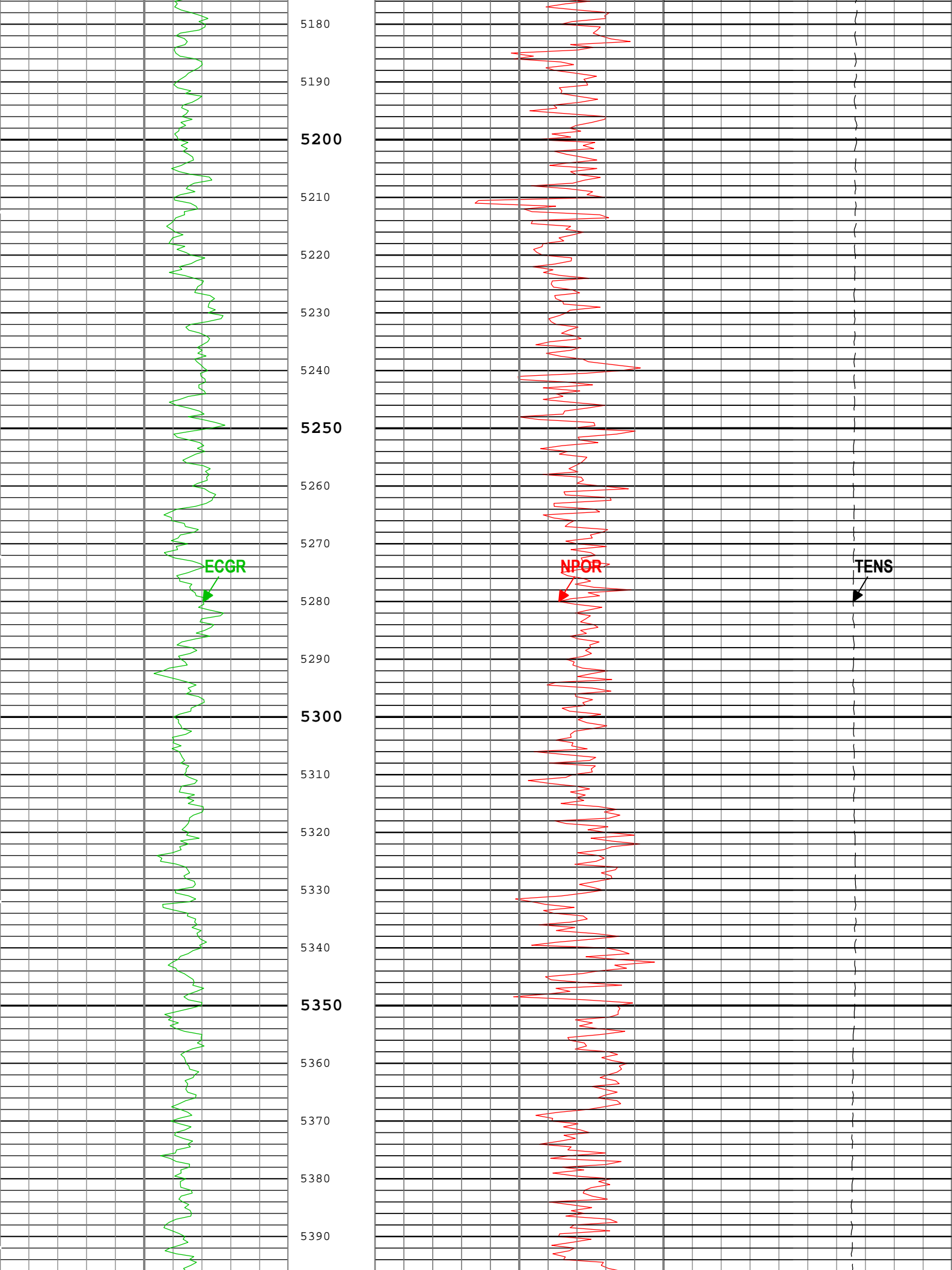


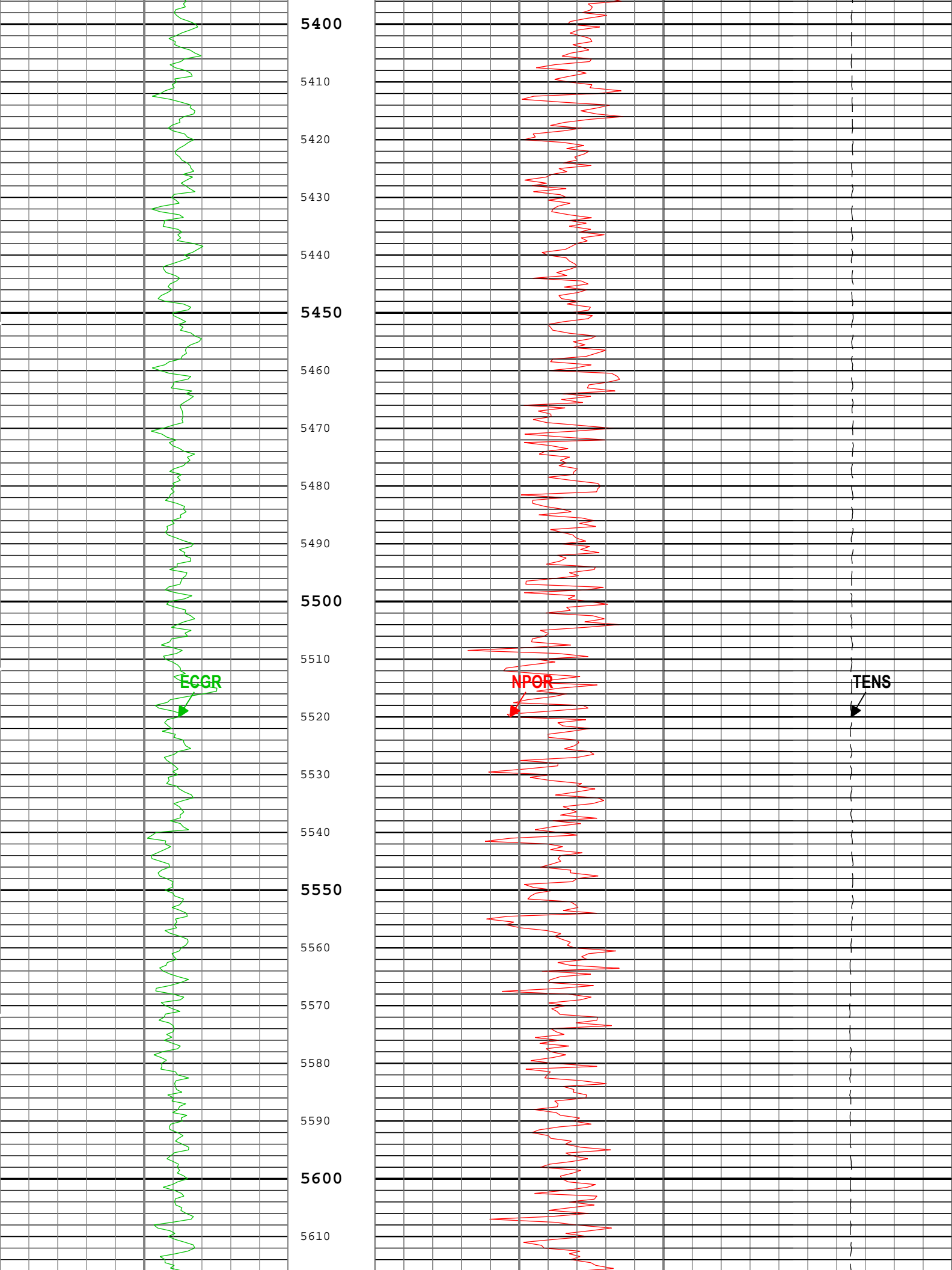


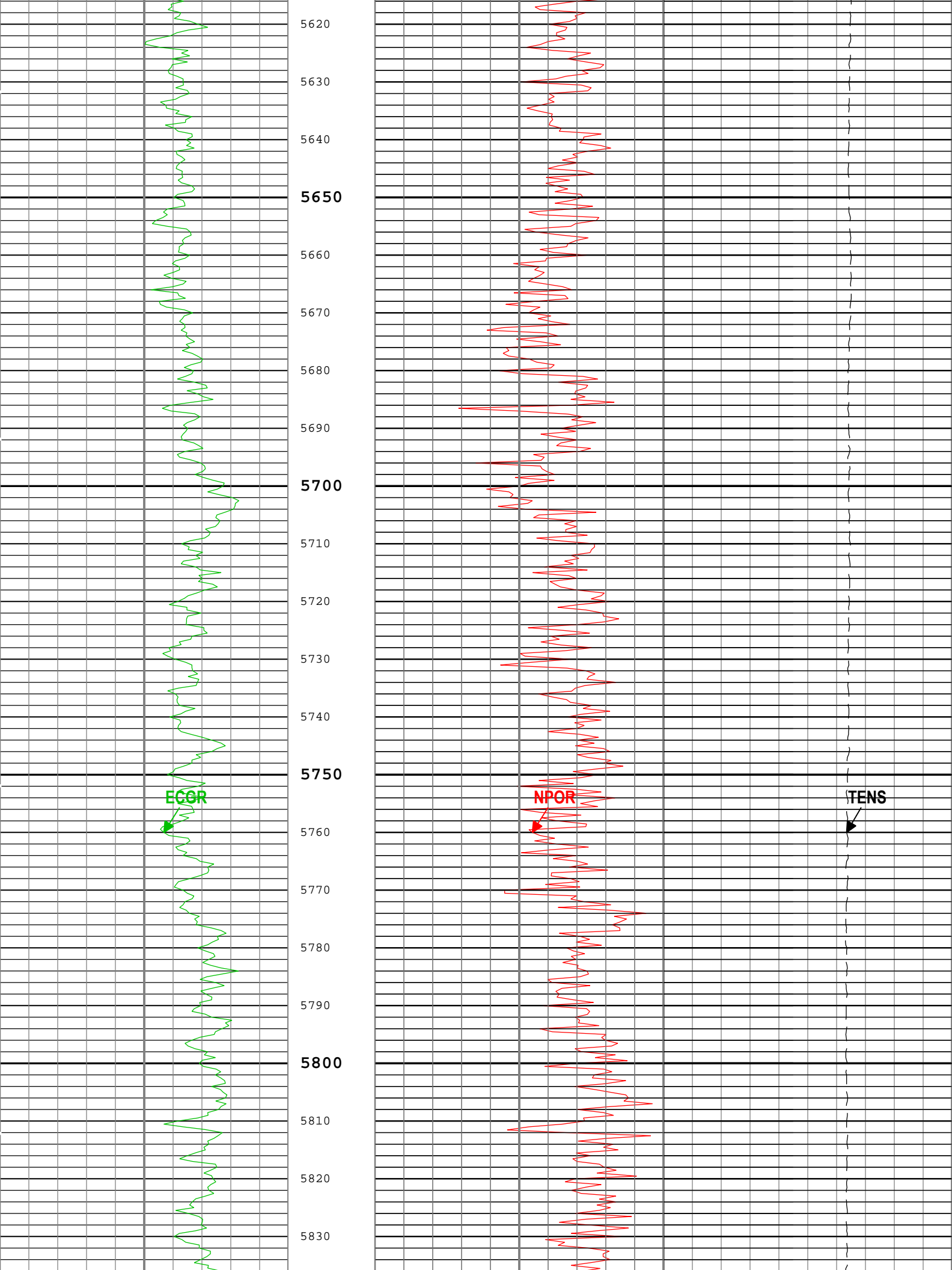


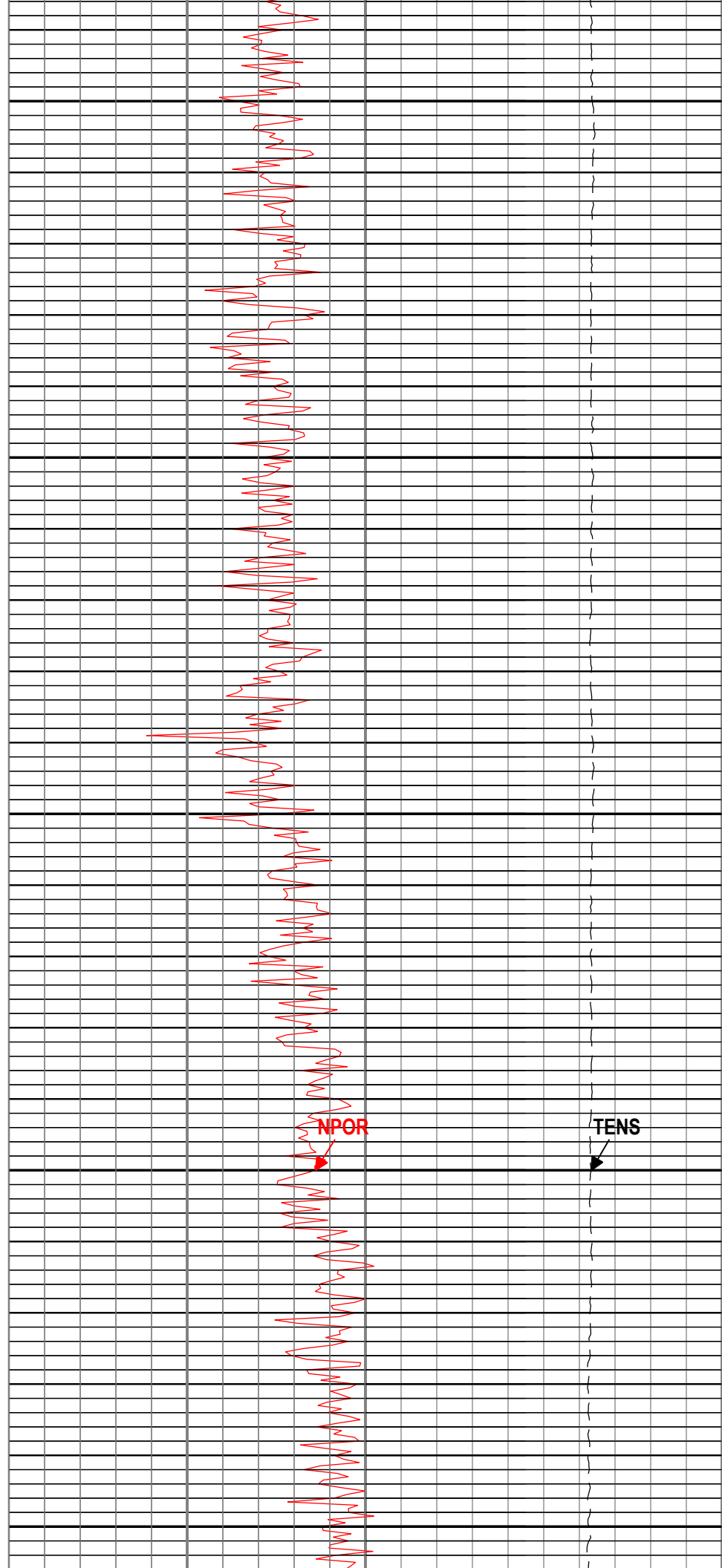
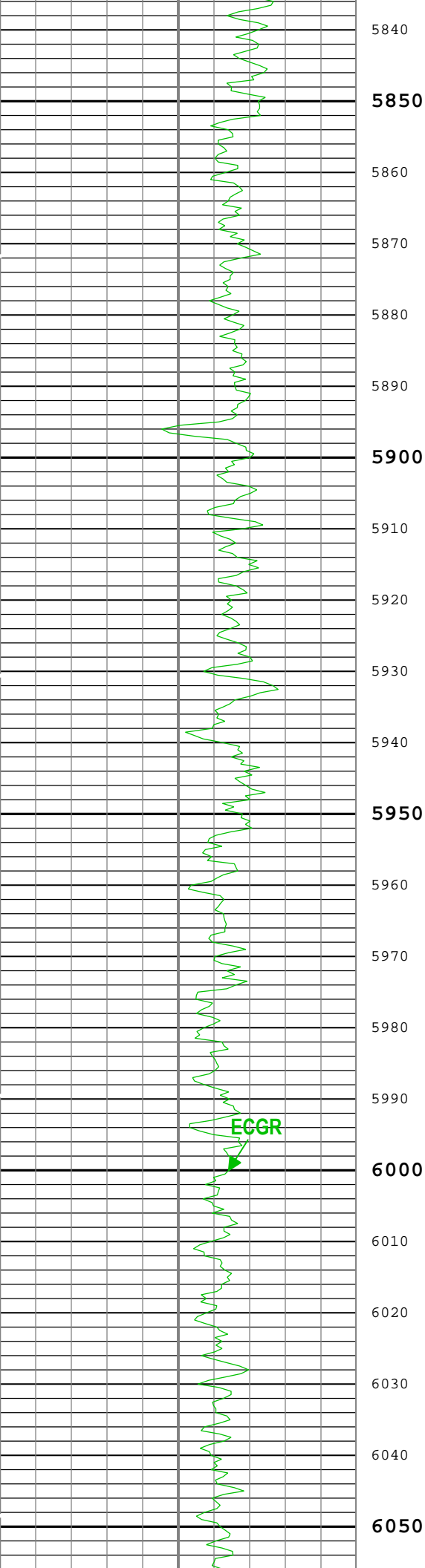


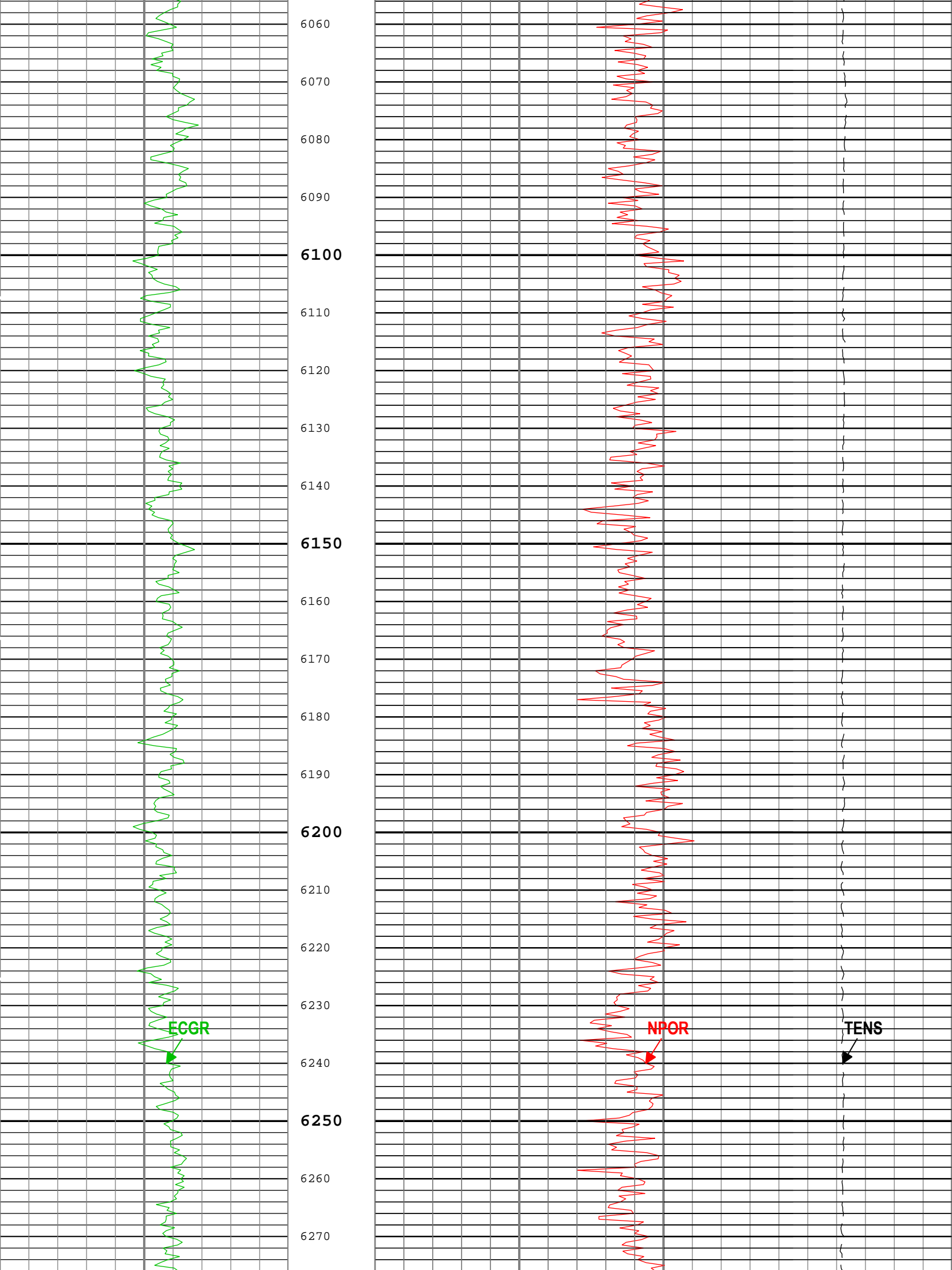


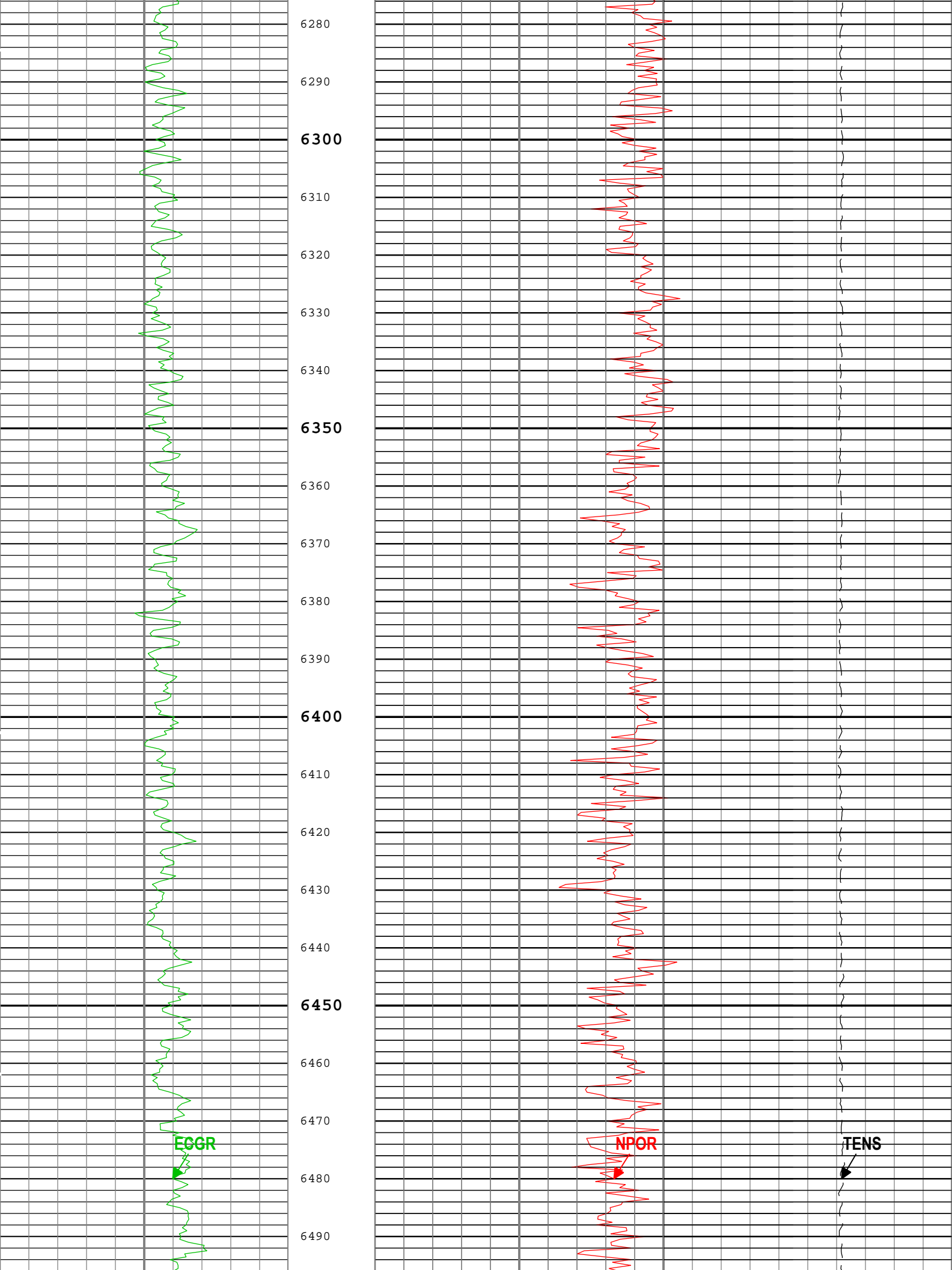


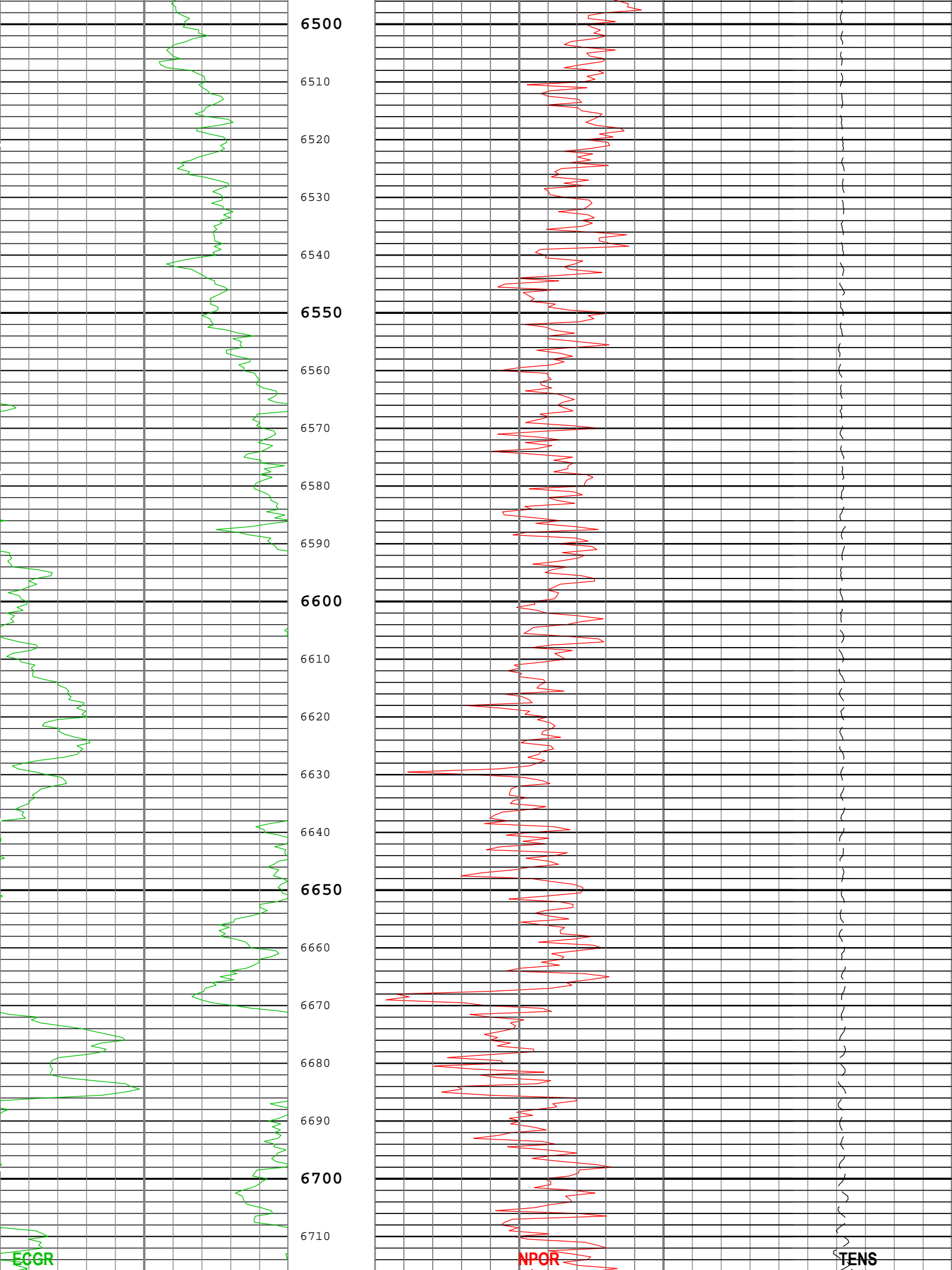


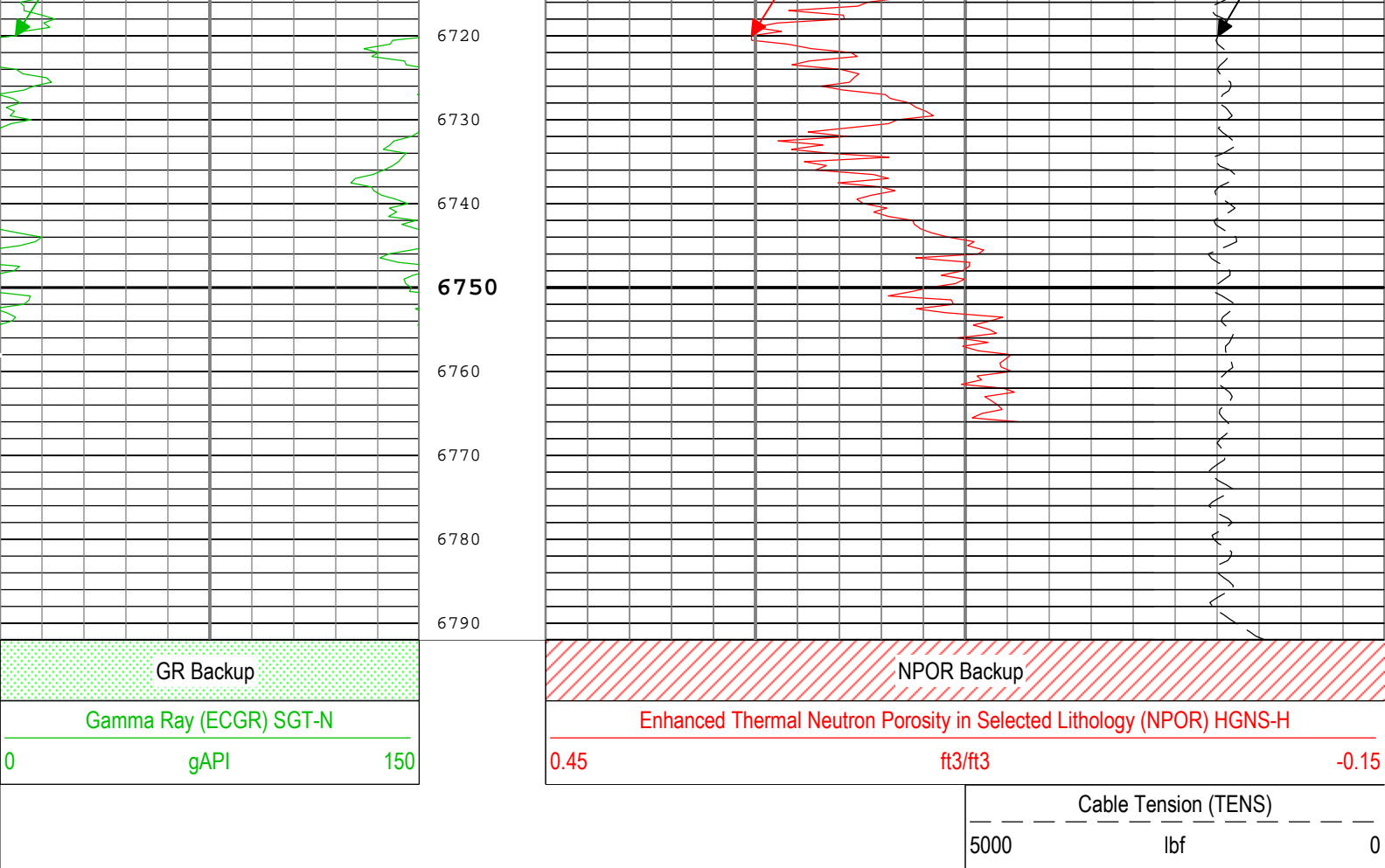












TIME_1900 - Time Marked every 60.00 (s)

- ICV - Integrated Cement Volume every 100.00 (ft3)
- ICV - Integrated Cement Volume every 10.00 (ft3)
- IHV - Integrated Hole Volume every 100.00 (ft3)
- IHV - Integrated Hole Volume every 10.00 (ft3)

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: 04-May-2016 14:39:09

| 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 | 214 | degF |
| BS | Bit Size | WLSESSION | Depth Zoned | in |
| BSAL | Borehole Salinity | Borehole | 0 | ppm |
| CBLO | Casing Bottom (Logger) | WLSESSION | 15915.1 | ft |
| CCCO | Casing & Cement Thickness Correction Option | HGNS-H | Yes | |
| CDEN | Cement Density | SGT-N | 2 | g/cm3 |
| CMTY(U-USIT_CEMT) | Cement Type | USIT-E | Light 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 | 8.5 | lbm/gal |
| DFT | Drilling Fluid Type | Borehole | Water | |
| DFT_WATER | Drilling Fluid Water Type | Borehole | BRINE | |
| EPD | Elevation of Permanent Datum (PDAT) above Mean Sea Level | WLSESSION | 0 | ft |

| | | | | |
|----------------|--|-----------|----------------|--------------|
| FSAL | Formation Salinity | Borehole | 0 | ppm |
| GCSE_DOWN_PASS | Generalized Caliper Selection for WL Log Down Passes | Borehole | BS | |
| GCSE_UP_PASS | Generalized Caliper Selection for WL Log Up Passes | Borehole | BS | |
| GGRD | Geothermal Gradient | Borehole | 1 | 0.01 degF/ft |
| GRSE | Generalized Mud Resistivity Selection, from Measured or Computed Mud Resistivity | Borehole | REMS | |
| GTSE | Generalized Temperature Selection, from Measured or Computed Temperature | Borehole | GTEM_LINEST | |
| 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 | MSL | |
| 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 | 1.8 | 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 | 13.5 | 110 | 1921 |
| BS | 8.75 | 1921 | 6792 |
| 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 | 6785 | 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 | 6.0.53731.3100 |

| Pass Summary | | | | | | | | | |
|--------------|----------------|-----------|-----|--------|-------|------|----------|-------------|---------|
| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include |

| | | | | | | | | | |
|-----|-----------|----|------------|------------|-------------------------|-------------------------|----|----------|---------------|
| | | | | | | | | | Parallel Data |
| One | Log[2]:Up | Up | 71.14 ft | 6791.99 ft | 04-May-2016 8:55:37 AM | 04-May-2016 10:48:13 AM | ON | 6.23 ft | Yes |
| One | Log[3]:Up | Up | 2181.89 ft | 2664.58 ft | 04-May-2016 11:00:20 AM | 04-May-2016 11:09:20 AM | ON | -0.85 ft | Yes |

All depths are referenced to toolstring zero

| | | |
|-----|---------------------------|---------------------------|
| Log | Company:Noble Energy, Inc | Well:Wells Ranch AA22-617 |
| | One: Log[2]:Up:S008 | |

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: 04-May-2016 14:39:13

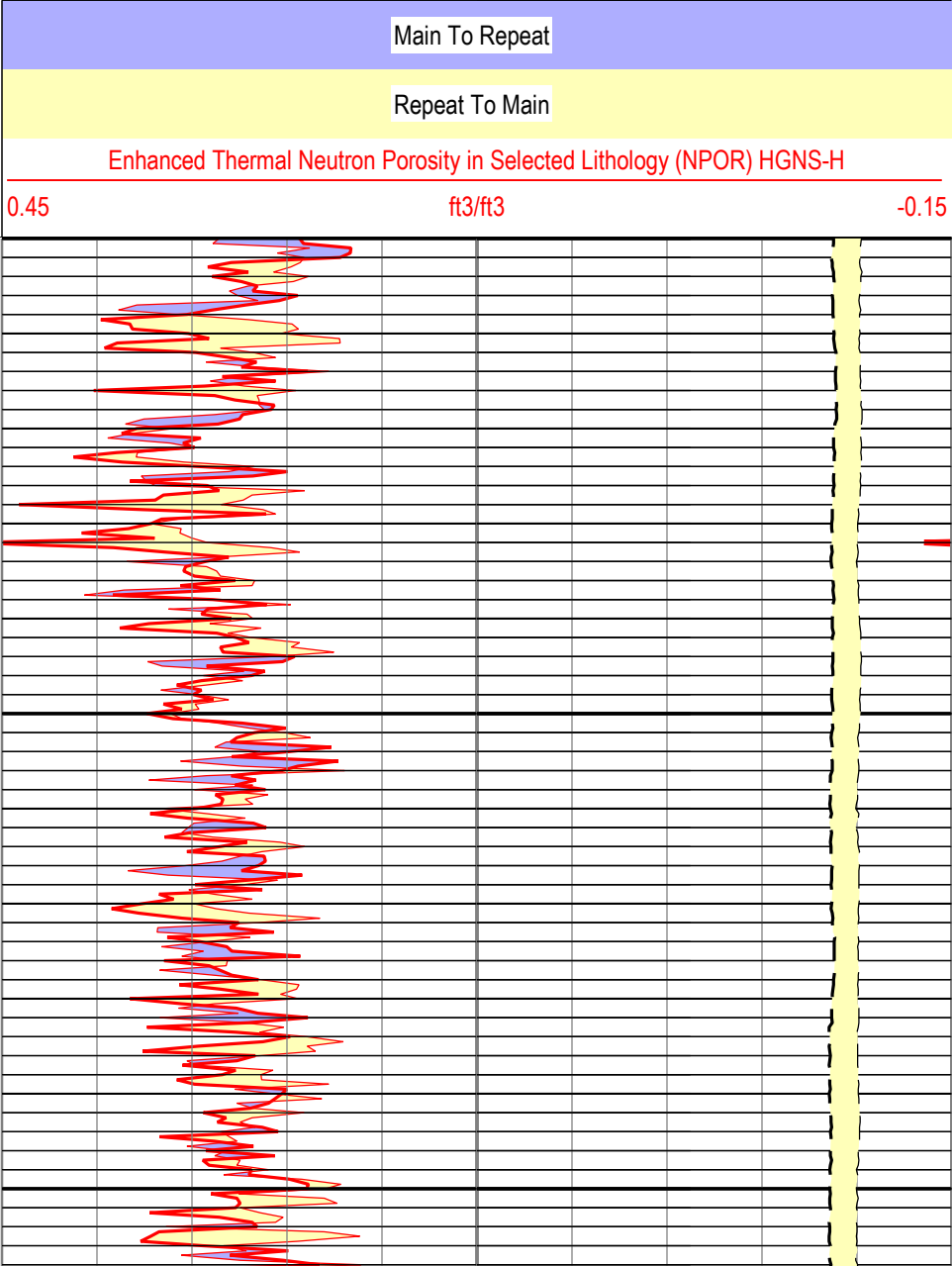
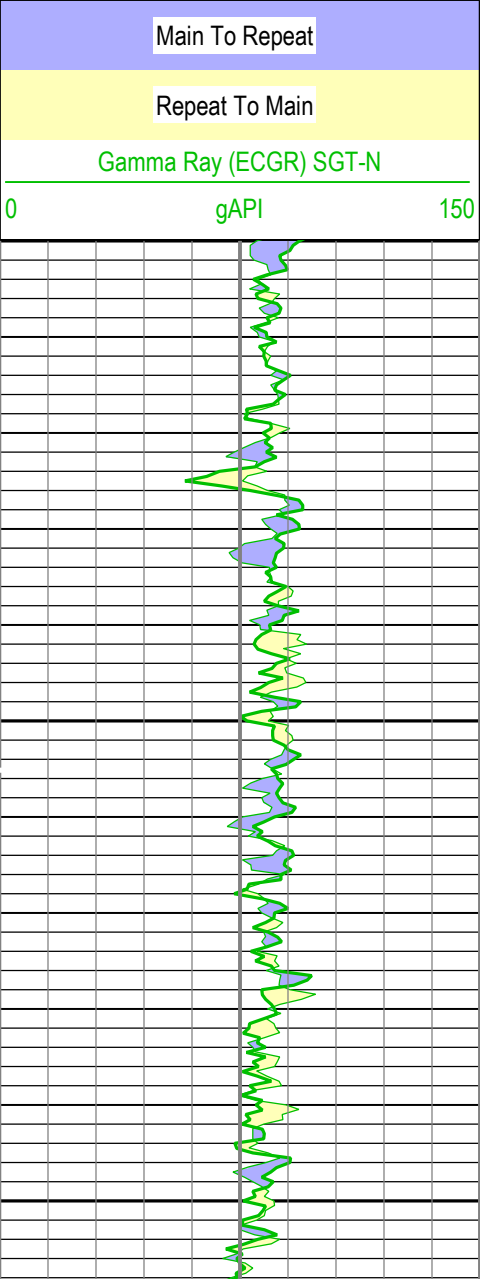
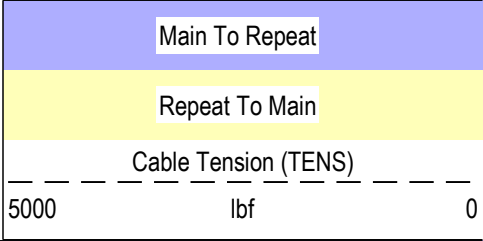
TIME_1900 - Time Marked every 60.00 (s)

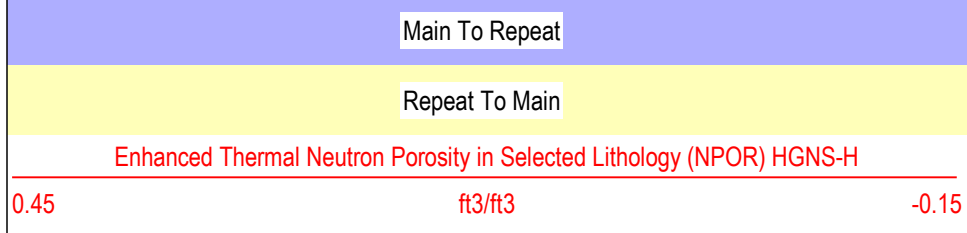
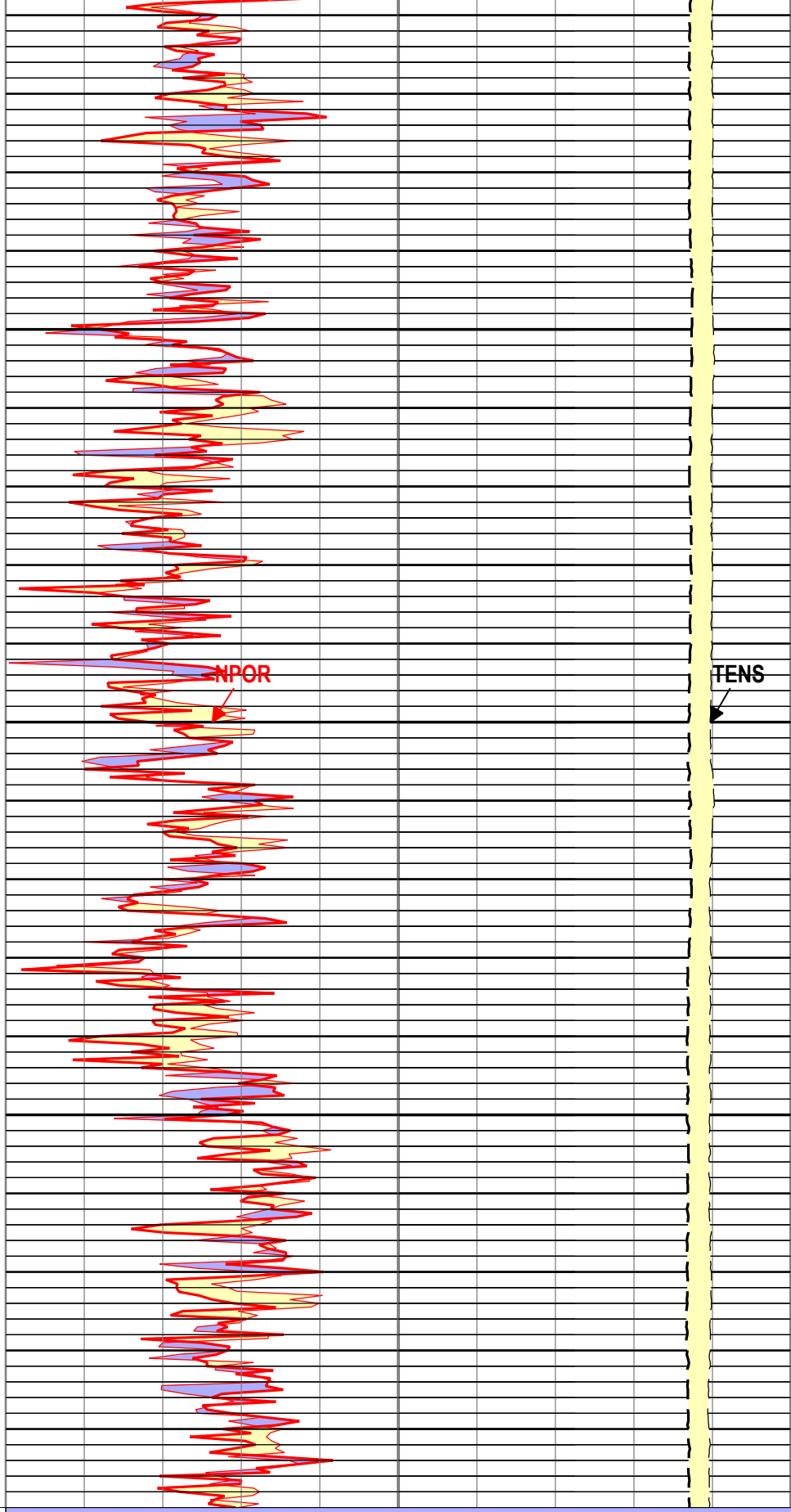
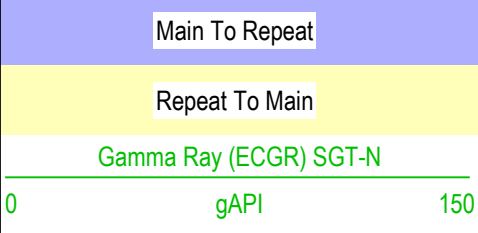
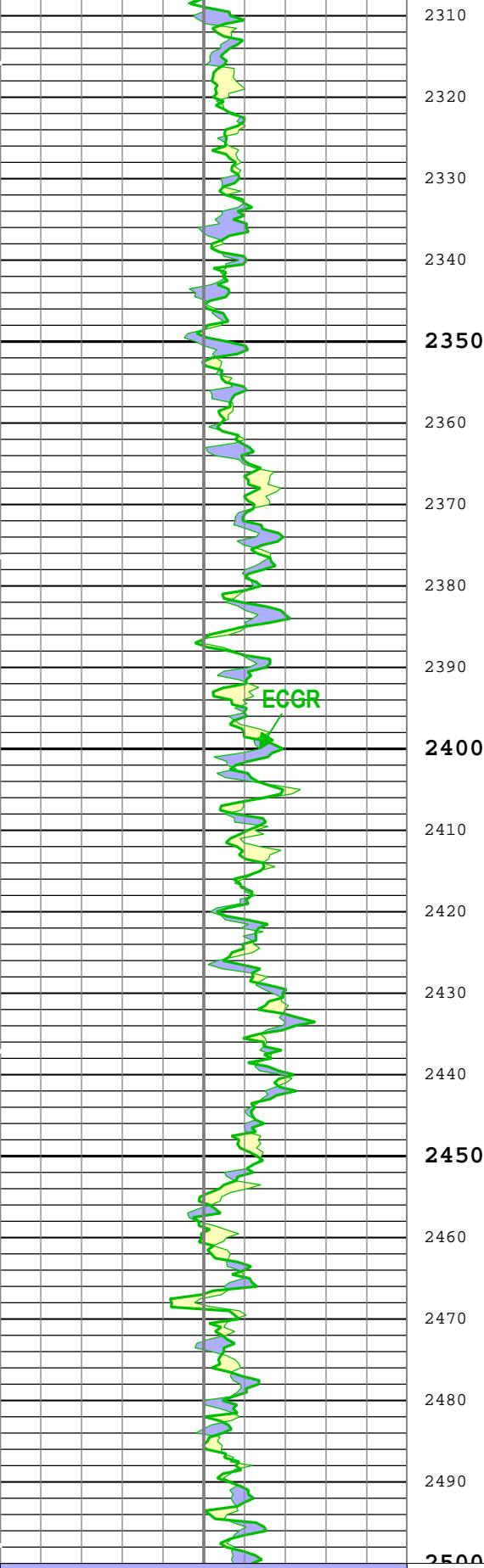
—IHV - Integrated Hole Volume every 10.00 (ft3)

—IHV - Integrated Hole Volume every 100.00 (ft3)

—ICV - Integrated Cement Volume every 10.00 (ft3)

—ICV - Integrated Cement Volume every 100.00 (ft3)





| Master (EEPROM): | | 15:14:00 19-Apr-2016 | | | | | |
|---------------------------------|------|----------------------|---------|-----------|--------|------------|------------------------|
| Measurement | Unit | Phase | Nominal | Low Limit | Actual | High Limit | <div><div></div></div> |
| Near Zero Measurement | 1/s | Master | 0 | 5.0 | 25.7 | 40.0 | <div><div></div></div> |
| Far Zero Measurement | 1/s | Master | 0 | 5.0 | 34.4 | 40.0 | <div><div></div></div> |
| Near Plus Measurement | 1/s | Master | 6031.0 | 4700.0 | 4848.0 | 6900.0 | <div><div></div></div> |
| Far Plus Measurement | 1/s | Master | 2793.0 | 1900.0 | 2049.0 | 2900.0 | <div><div></div></div> |
| Near Corrected Plus Measurement | 1/s | Master | | 4700.0 | 4934.0 | 6900.0 | <div><div></div></div> |
| Far Corrected Plus Measurement | 1/s | Master | | 1900.0 | 2087.0 | 2900.0 | <div><div></div></div> |

Company: Noble Energy, Inc

Schlumberger

Well: Wells Ranch AA22-617

Field: Wattenberg

| | |
|--|----------|
| County: | Weld |
| State: | Colorado |
| Cased Hole Neutron Porosity Gamma Ray | |