

Company: ENCANA OIL & GAS (USA) INC

Well: HMU 6-15AA (J6SEB)

Field: MAMM CREEK

County: GARFIELD

State: COLORADO

SLIM CEMENT MAPPING LOG
CBL-VDL
GAMMA RAY-CCL

| | | | | |
|-----------|---|---------------|--|--------------|
| County: | GARFIELD | | | |
| Field: | MAMM CREEK | | | |
| Location: | SHL: 1910 FSL & 1885 FEL | | | |
| Well: | HMU 6-15AA (J6SEB) | | | |
| Company: | ENCANA OIL & GAS (USA) INC | | | |
| | LOCATION | | | |
| | SHL: 1910 FSL & 1885 FEL BHL: 655 FSL & 1410 FEL | | Elev.: K.B. 7166.00 ft G.L. 7144.00 ft D.F. 7165.00 ft | |
| | Permanent Datum: | GROUND LEVEL | Elev.: 7144.00 ft | |
| | Log Measured From: | KELLY BUSHING | 22.00 ft above Perm. Datum | |
| | Drilling Measured From: | KELLY BUSHING | | |
| | API Serial No. 05-045-21940-000C | Section 6 | Township 8S | Range 92W |

| | Run 1 | Run 2 | Run 3 |
|--------------------------|---------|-------|-------|
| PVT DATA | | | |
| Oil Density | | | |
| Water Salinity | | | |
| Gas Gravity | | | |
| Bo | | | |
| Bw | | | |
| 1/Bg | | | |
| Bubble Point Pressure | | | |
| Bubble Point Temperature | | | |
| Solution GOR | | | |
| Maximum Deviation | | | |
| CEMENTING DATA | | | |
| Primary/Squeeze | Primary | | |
| Casing String No | | | |
| Lead Cement Type | | | |
| Volume | | | |
| Density | | | |
| Water Loss | | | |
| Additives | | | |
| Tail Cement Type | | | |
| Volume | | | |
| Density | | | |
| Water Loss | | | |
| Additives | | | |
| Expected Cement Top | | | |

| | | | |
|-------------------------------|-----------------|----------|----------------|
| Logging Date | 26-Nov-2013 | | |
| Run Number | 1 | | |
| Depth Driller | 8760 ft | | |
| Schlumberger Depth | 8688 ft | | |
| Bottom Log Interval | 8679 ft | | |
| Top Log Interval | 70 ft | | |
| Casing Fluid Type | FRESH WATER | | |
| Salinity | | | |
| Density | 8.4 lbm/gal | | |
| Fluid Level | 70 ft | | |
| BIT/CASING/TUBING STRING | | | |
| Bit Size | 7.875 in | | |
| From | 6643 ft | | |
| To | 8760 ft | | |
| Casing/Tubing Size | 4.500 in | | |
| Weight | 11.6 lbm/ft | | |
| Grade | S-80 | | |
| From | 22 ft | | |
| To | 8740 ft | | |
| Maximum Recorded Temperatures | 246 degF | | |
| Logger On Bottom | 26-Nov-2013 | Time | 17:15 |
| Unit Number | 391 | Location | GRAND JUNCTION |
| Recorded By | KIRSTIE BUNTING | | |
| Witnessed By | JIM DYKEMAN | | |

| | | | |
|-------------------------------|--|----------|--|
| Logging Date | | | |
| Run Number | | | |
| Depth Driller | | | |
| Schlumberger Depth | | | |
| Bottom Log Interval | | | |
| Top Log Interval | | | |
| Casing Fluid Type | | | |
| Salinity | | | |
| Density | | | |
| Fluid Level | | | |
| BIT/CASING/TUBING STRING | | | |
| Bit Size | | | |
| From | | | |
| To | | | |
| Casing/Tubing Size | | | |
| Weight | | | |
| Grade | | | |
| From | | | |
| To | | | |
| Maximum Recorded Temperatures | | | |
| Logger On Bottom | | Time | |
| Unit Number | | Location | |
| Recorded By | | | |
| Witnessed By | | | |

DEPTH SUMMARY LISTING

Date Created: 14-AUG-2013 11:54:57

Depth System Equipment

| Depth Measuring Device | | Tension Device | | Logging Cable | |
|---------------------------|-----------|-------------------------------|------------|--------------------|----------|
| Type: | IDW-JB | Type: | CMTD-B/A | Type: | 1-25ZT |
| Serial Number: | 6349 | Serial Number: | 3421 | Serial Number: | 112136 |
| Calibration Date: | 7-31-2013 | Calibration Date: | 14-AUG-201 | Length: | 19000 FT |
| Calibrator Serial Number: | | Calibrator Serial Number: | 174878 | | |
| Calibration Cable Type: | 1-25ZT | Number of Calibration Points: | 10 | Conveyance Method: | Wireline |
| Wheel Correction 1: | -5 | Calibration RMS: | 3 | Rig Type: | LAND |
| Wheel Correction 2: | -4 | Calibration Peak Error: | 8 | | |

Depth Control Parameters

| | |
|-----------------------------|-----------------------|
| Log Sequence: | First Log In the Well |
| Rig Up Length At Surface: | 0.00 FT |
| Rig Up Length At Bottom: | 0.00 FT |
| Rig Up Length Correction: | 0.00 FT |
| Stretch Correction: | |
| Tool Zero Check At Surface: | |

Depth Control Remarks

1. ALL SCHLUMBERGER DEPTH CONTROL PROCEDURES USED
2. IDW USED AS PRIMARY DEPTH REFERENCE
3. SPWT DRUM COUNTER USED AS SECONDARY DEPTH REFERENCE
- 4.
- 5.
- 6.

DISCLAIMER

THE USE OF AND RELIANCE UPON THIS RECORDED-DATA BY THE HEREIN NAMED COMPANY (AND ANY OF ITS AFFILIATES, PARTNERS, REPRESENTATIVES, AGENTS, CONSULTANTS AND EMPLOYEES) IS SUBJECT TO THE TERMS AND CONDITIONS AGREED UPON BETWEEN SCHLUMBERGER AND THE COMPANY, INCLUDING: (a) RESTRICTIONS ON USE OF THE RECORDED-DATA; (b) DISCLAIMERS AND WAIVERS OF WARRANTIES AND REPRESENTATIONS REGARDING COMPANY'S USE OF AND RELIANCE UPON THE RECORDED-DATA; AND (c) CUSTOMER'S FULL AND SOLE RESPONSIBILITY FOR ANY INFERENCE DRAWN OR DECISION MADE IN CONNECTION WITH THE USE OF THIS RECORDED-DATA.

| | |
|--|-----------------------|
| OTHER SERVICES1 | OTHER SERVICES2 |
| OS1: RESERVOIR SATURATION | OS1: |
| OS2: LOG | OS2: |
| OS3: SIGMA MODE | OS3: |
| OS4: | OS4: |
| OS5: | OS5: |
| REMARKS: RUN NUMBER 1 | REMARKS: RUN NUMBER 2 |
| FIRST RUN IN HOLE CORRLEATED TO DOWN LOG | |
| TOOL RAN AS PER TOOL SKETCH | |
| | |
| ENTRANCE: 16:30 | |
| TIME ON BOTTOM: 17:15 | |
| EXIT: 20:00 | |
| | |

| |
|--|
| MAXIMUM RECORDED TEMPERATURE: 246 DEGF |
| MAXIMUM RECORDED PRESSURE: 3631 PSIA |
| SHORT JOINTS: 6582 FT & 7575 FT |
| EXPECTED CBL AMPLITUDE IN FREE PIPE IS 80MV |
| MAIN PASS LOGGED UNDER ZERO SURFACE PRESSURE |
| CREW: KBUNTING, WAZIZ, KJOHNS, KBOZARTH, KIRWIN |
| THANK YOU FOR CHOOSING F&B WIRELINE. A QUALIFIED LOGGING |

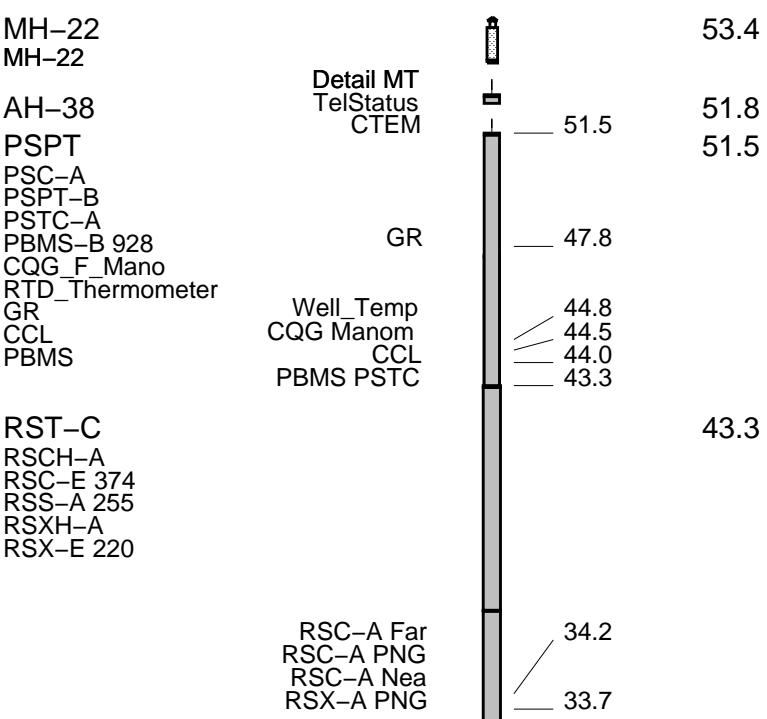
| RUN 1 | | | RUN 2 | | |
|------------------|-------|------------|------------------|-------|------|
| SERVICE ORDER #: | | CGF9-00178 | SERVICE ORDER #: | | |
| PROGRAM VERSION: | | 19C0-187 | PROGRAM VERSION: | | |
| FLUID LEVEL: | | 70 ft | FLUID LEVEL: | | |
| LOGGED INTERVAL | START | STOP | LOGGED INTERVAL | START | STOP |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

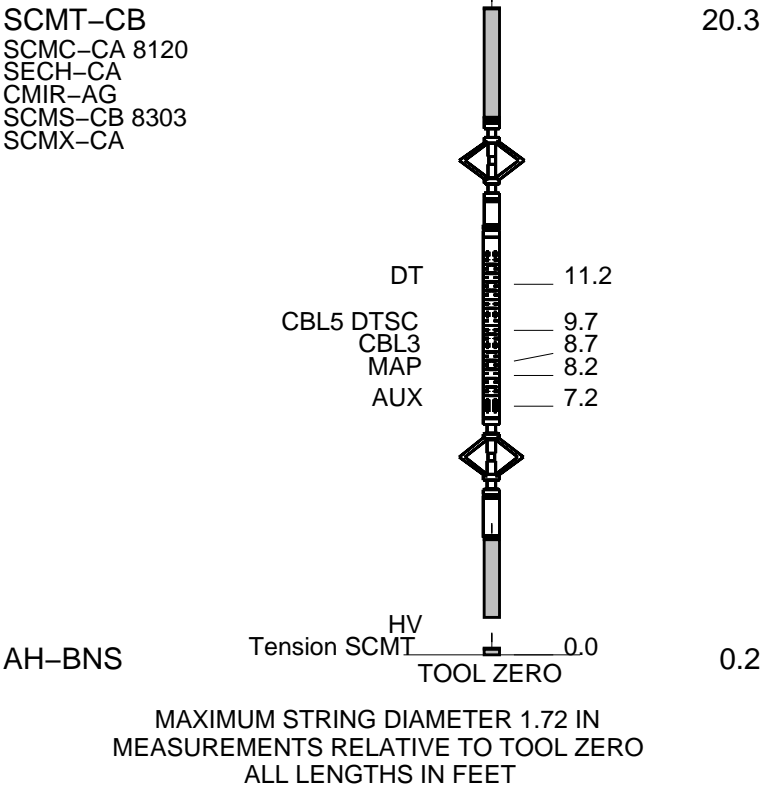
| EQUIPMENT | DESCRIPTION |
|-----------|-------------|
| | |

| | RUN 1 | RUN 2 |
|-----|-------|-------|
| 1 | 1 | 1 |
| 2 | 1 | 1 |
| 3 | 1 | 1 |
| 4 | 1 | 1 |
| 5 | 1 | 1 |
| 6 | 1 | 1 |
| 7 | 1 | 1 |
| 8 | 1 | 1 |
| 9 | 1 | 1 |
| 10 | 1 | 1 |
| 11 | 1 | 1 |
| 12 | 1 | 1 |
| 13 | 1 | 1 |
| 14 | 1 | 1 |
| 15 | 1 | 1 |
| 16 | 1 | 1 |
| 17 | 1 | 1 |
| 18 | 1 | 1 |
| 19 | 1 | 1 |
| 20 | 1 | 1 |
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| 39 | 1 | 1 |
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| 47 | 1 | 1 |
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| 79 | 1 | 1 |
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| 87 | 1 | 1 |
| 88 | 1 | 1 |
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| 91 | 1 | 1 |
| 92 | 1 | 1 |
| 93 | 1 | 1 |
| 94 | 1 | 1 |
| 95 | 1 | 1 |
| 96 | 1 | 1 |
| 97 | 1 | 1 |
| 98 | 1 | 1 |
| 99 | 1 | 1 |
| 100 | 1 | 1 |

| SURFACE EQUIPMENT | |
|-------------------|--|
| WITM-A | |
| PSC_16MHZ | |

DOWNHOLE EQUIPMENT





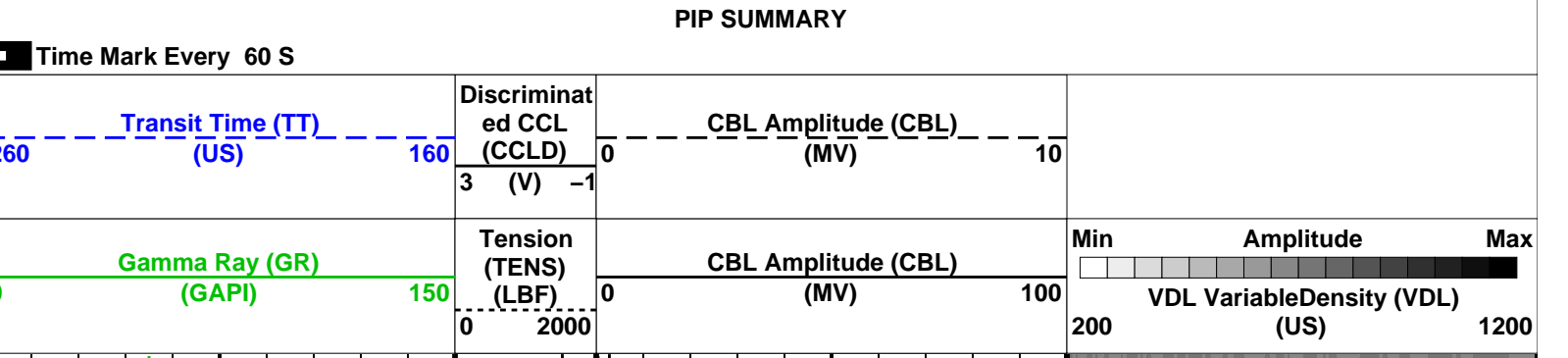
Schlumberger

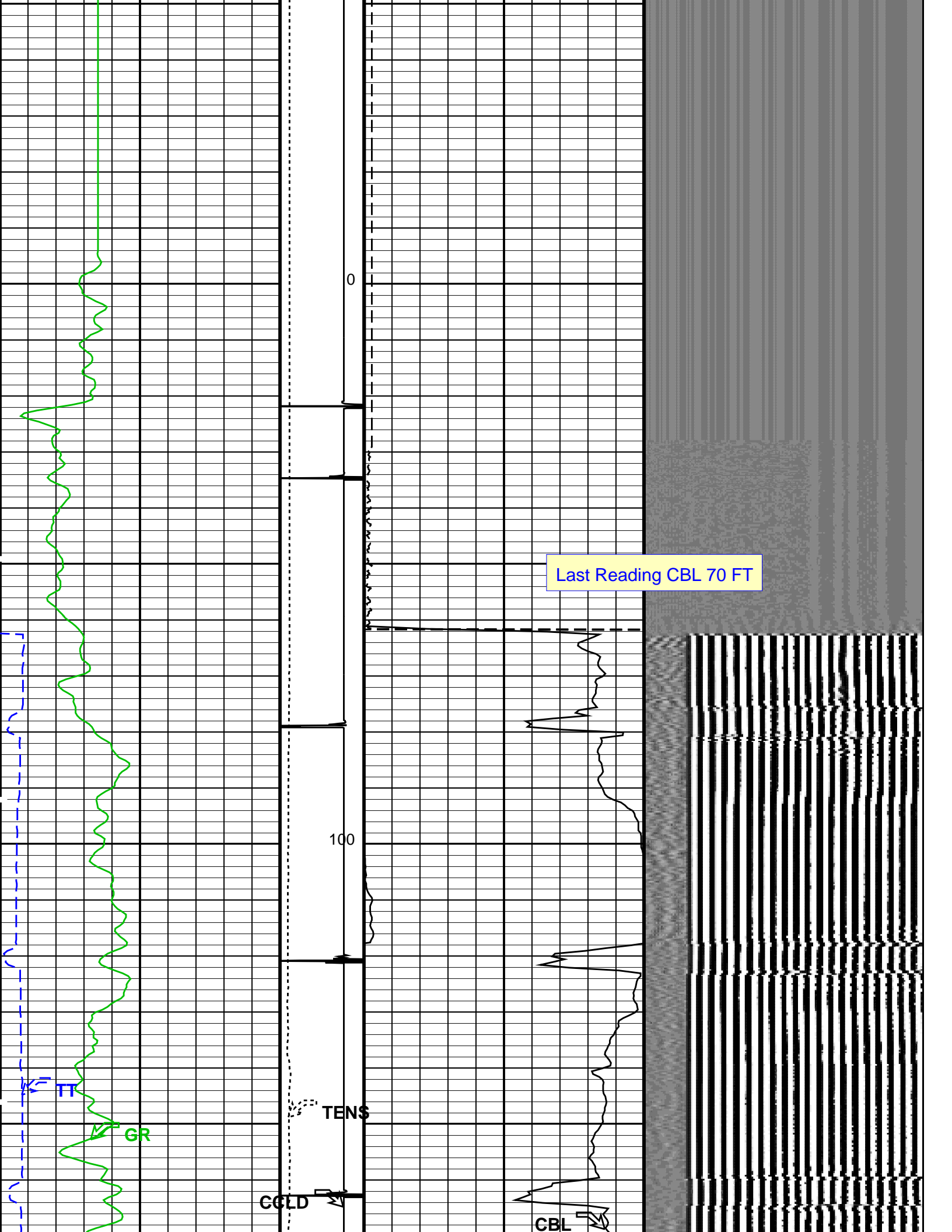
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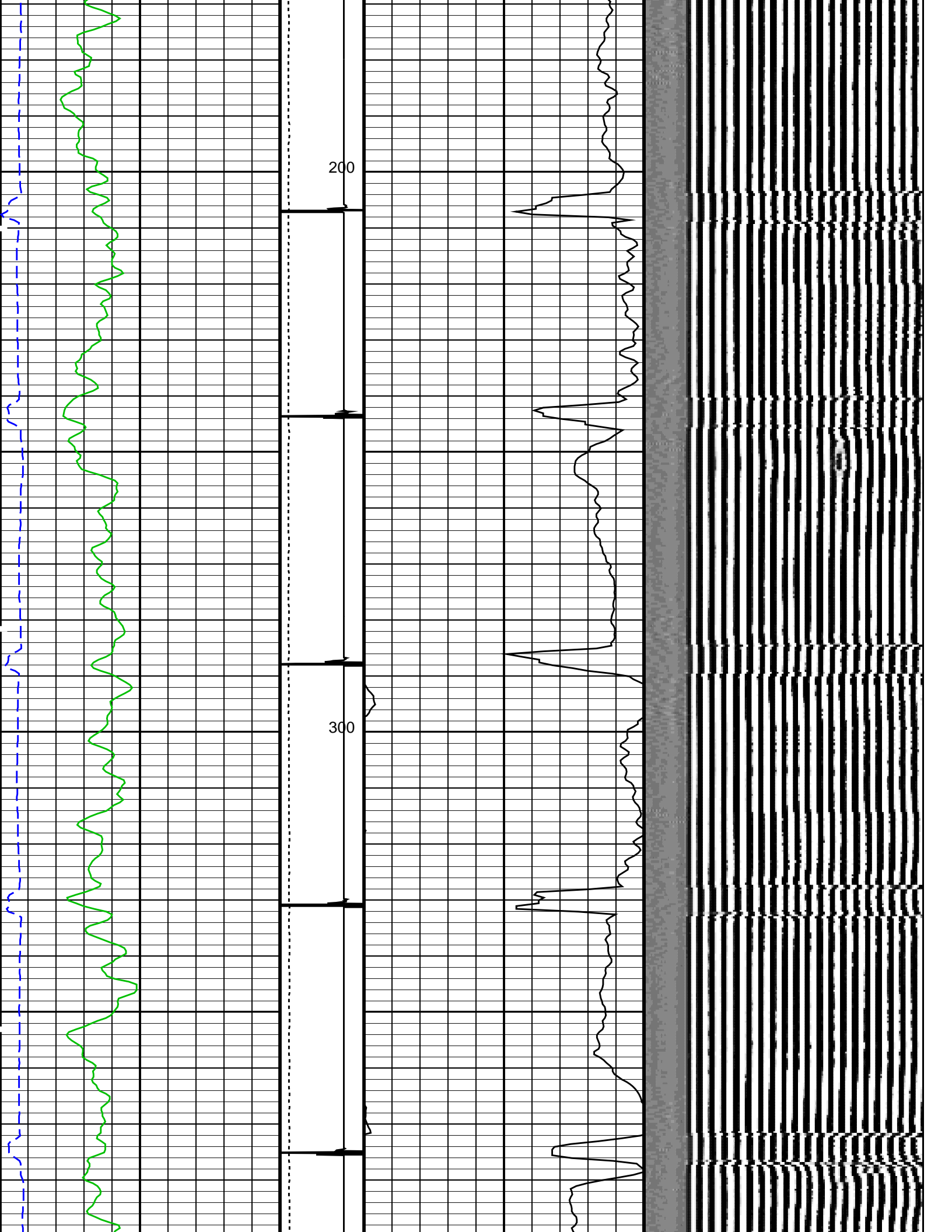
MAXIS Field Log

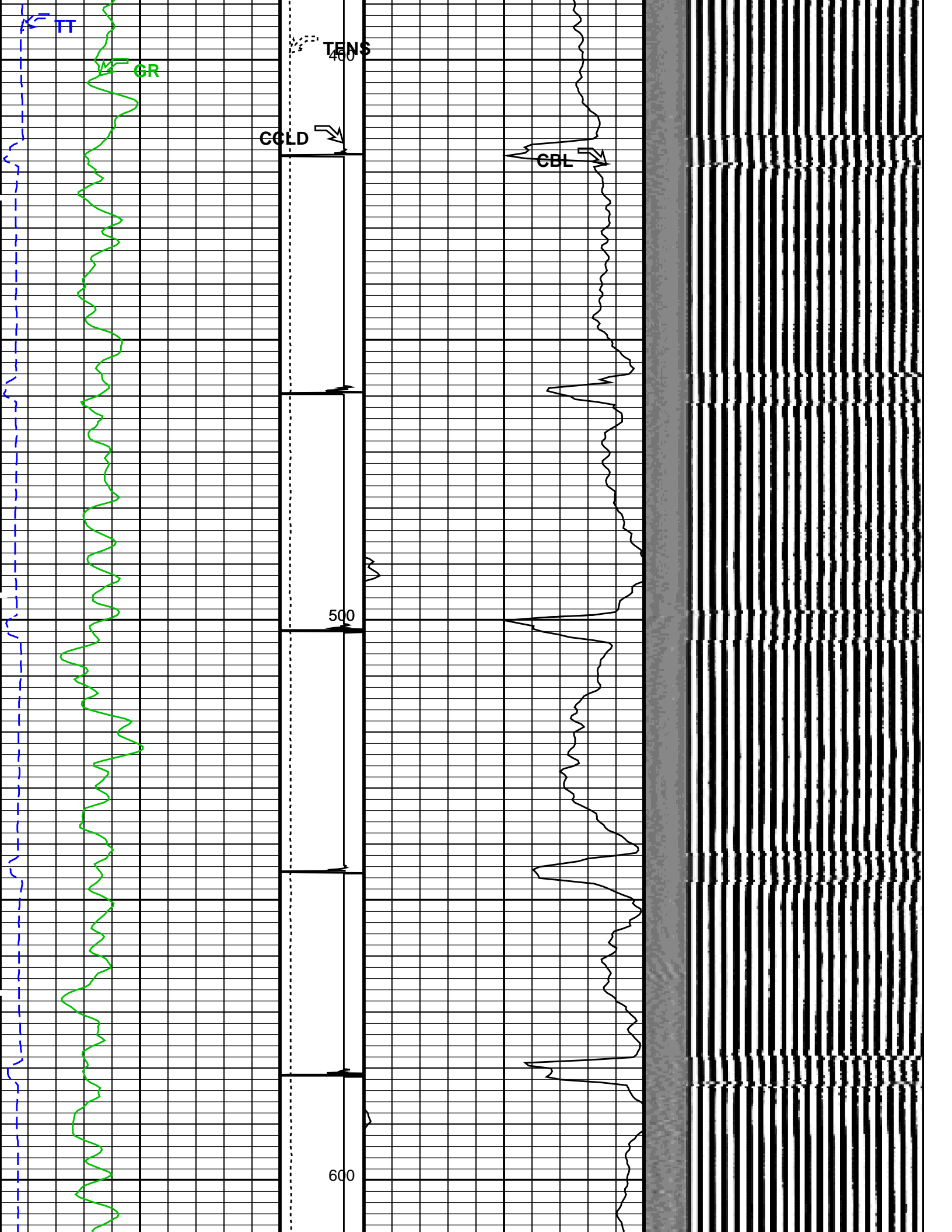
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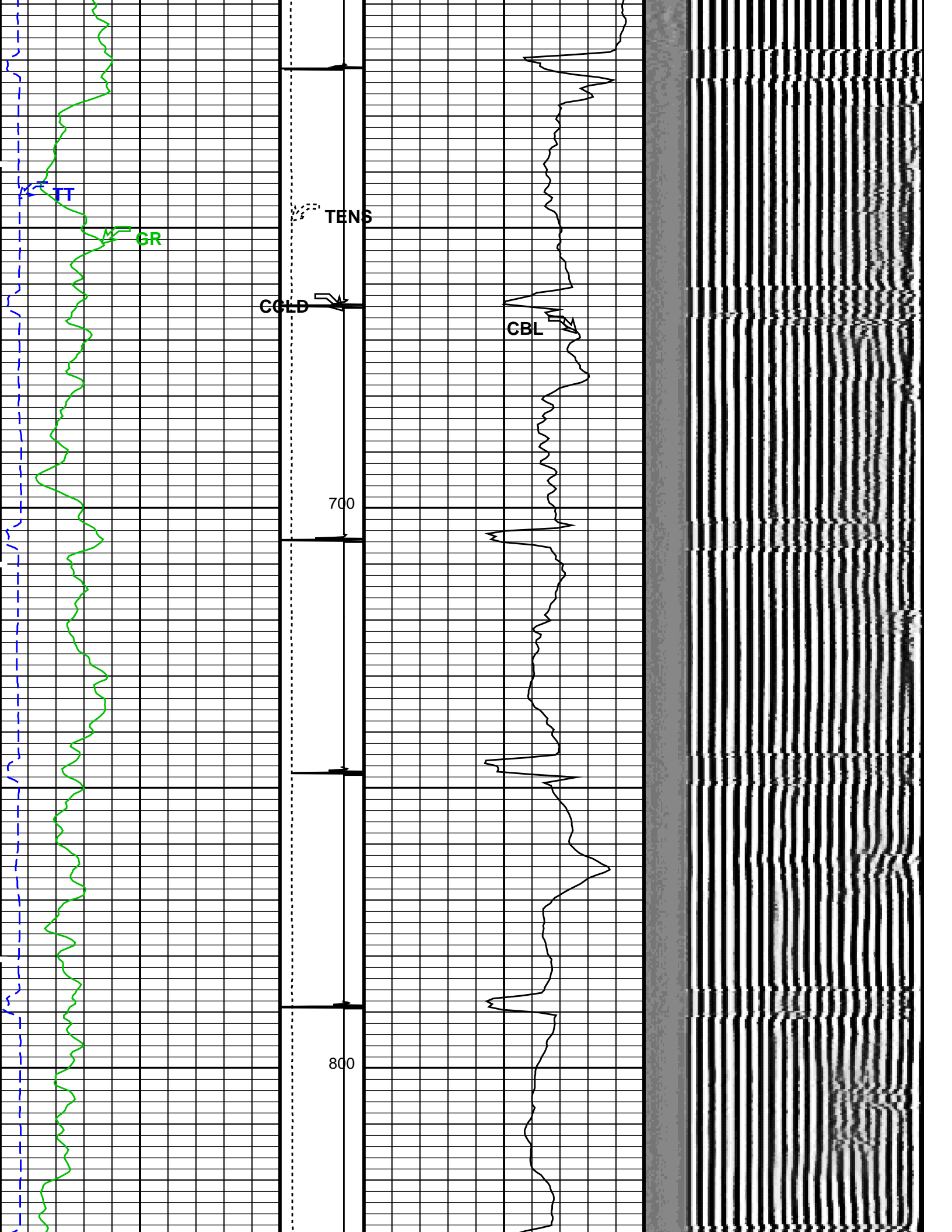
| Input DLIS Files | | | | | | |
|-----------------------------|-----------------------|--------|----------|-----------------------|-----------|----------|
| DEFAULT | SCMT_RST_PSP_102LUP | FN:99 | PRODUCER | 26-Nov-2013 17:17 | 8692.5 FT | -11.0 FT |
| Output DLIS Files | | | | | | |
| DEFAULT | SCMT_RST_PSP_106PUP | FN:103 | PRODUCER | 26-Nov-2013 19:44 | 8696.5 FT | -51.5 FT |
| OP System Version: 19C0-187 | | | | | | |
| SCMT-CB | SRPC-5214-H2-2012-OP1 | | RST-C | SRPC-5214-H2-2012-OP1 | | |
| PSPT | SRPC-5214-H2-2012-OP1 | | | | | |

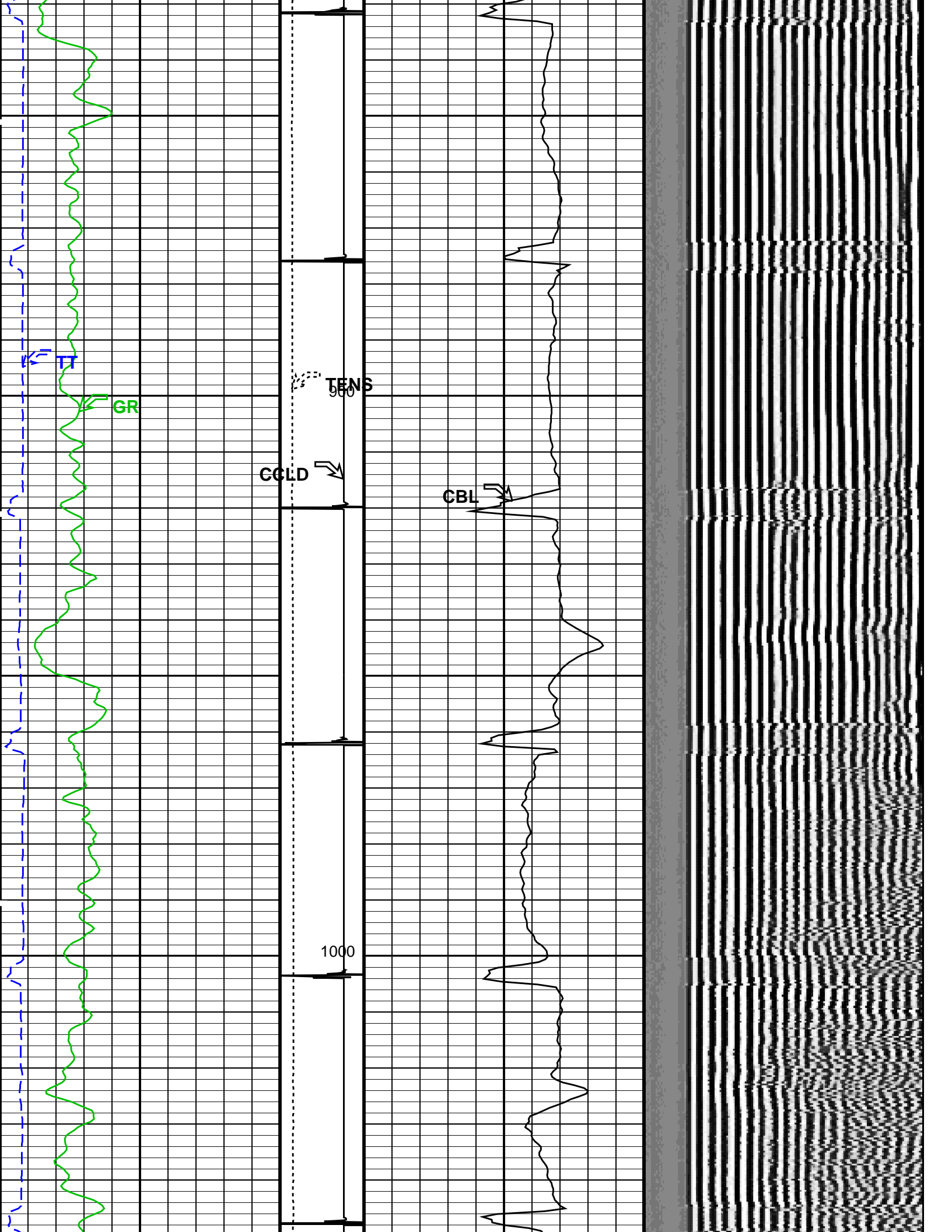


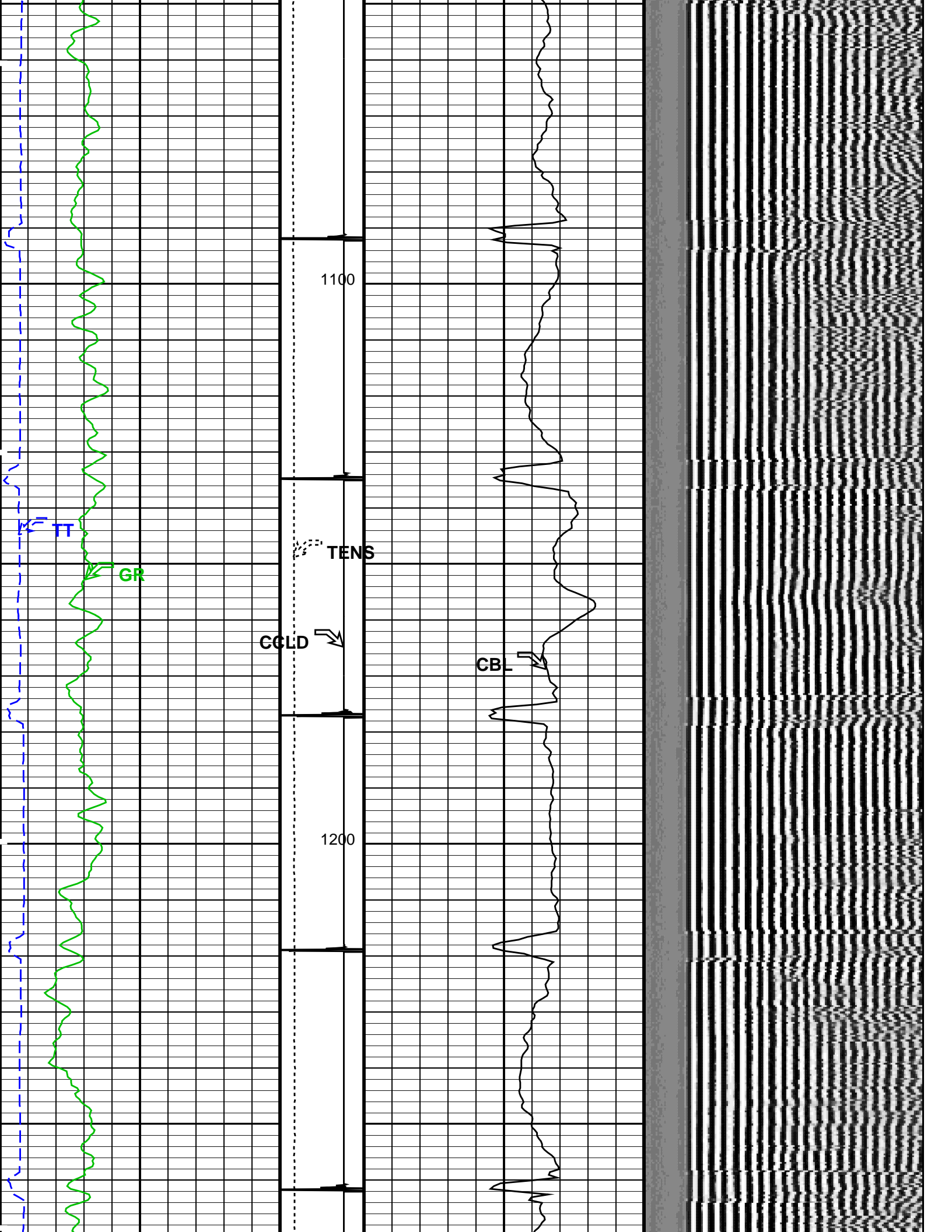


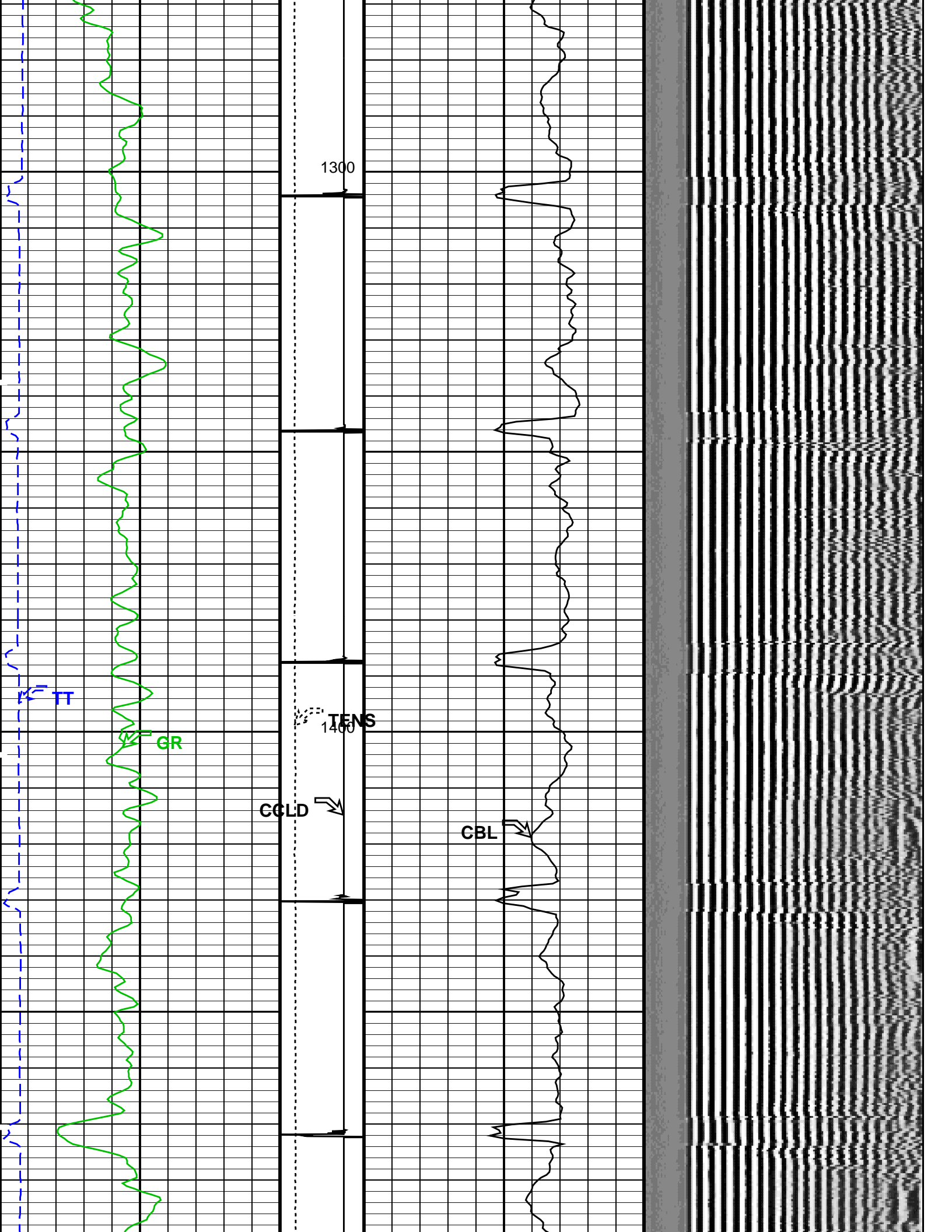


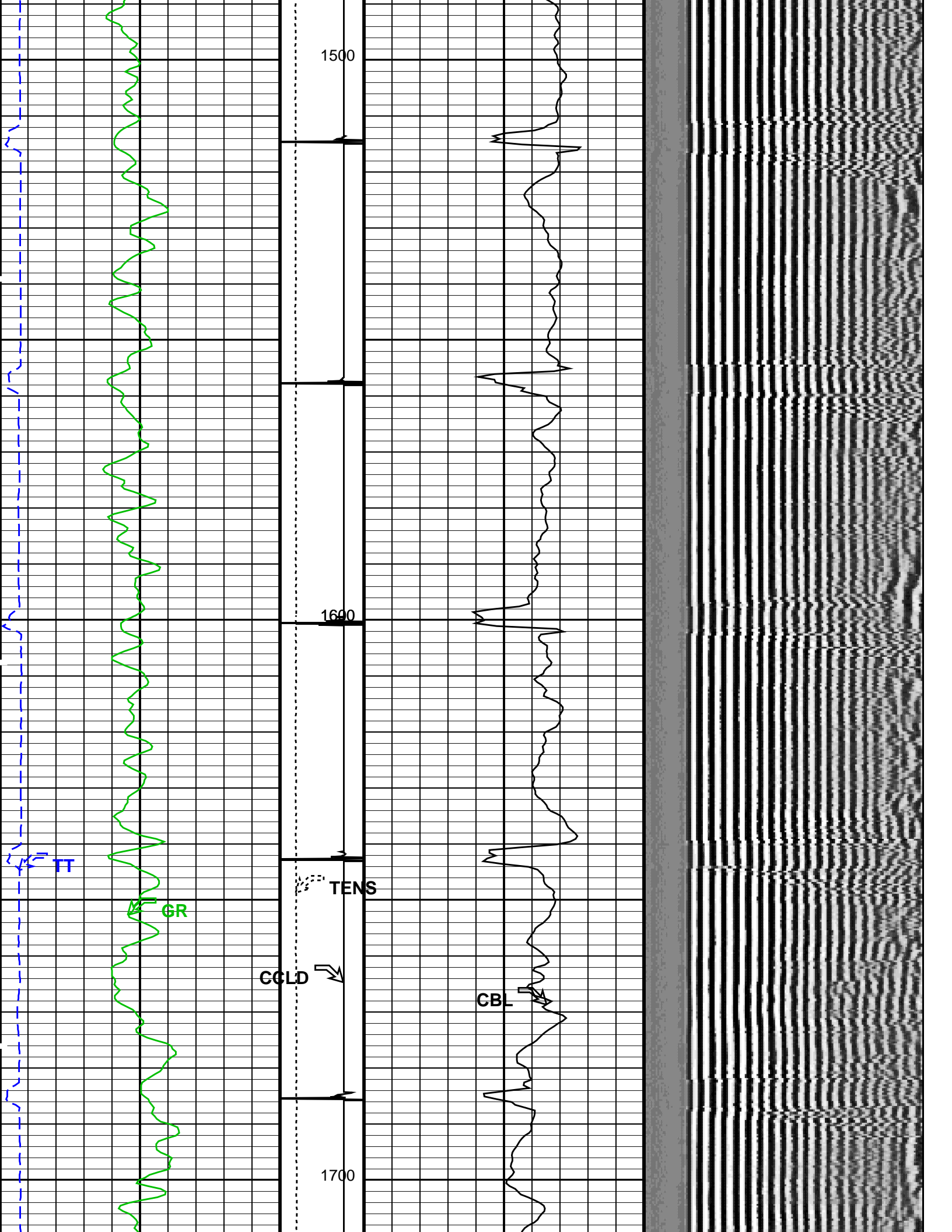


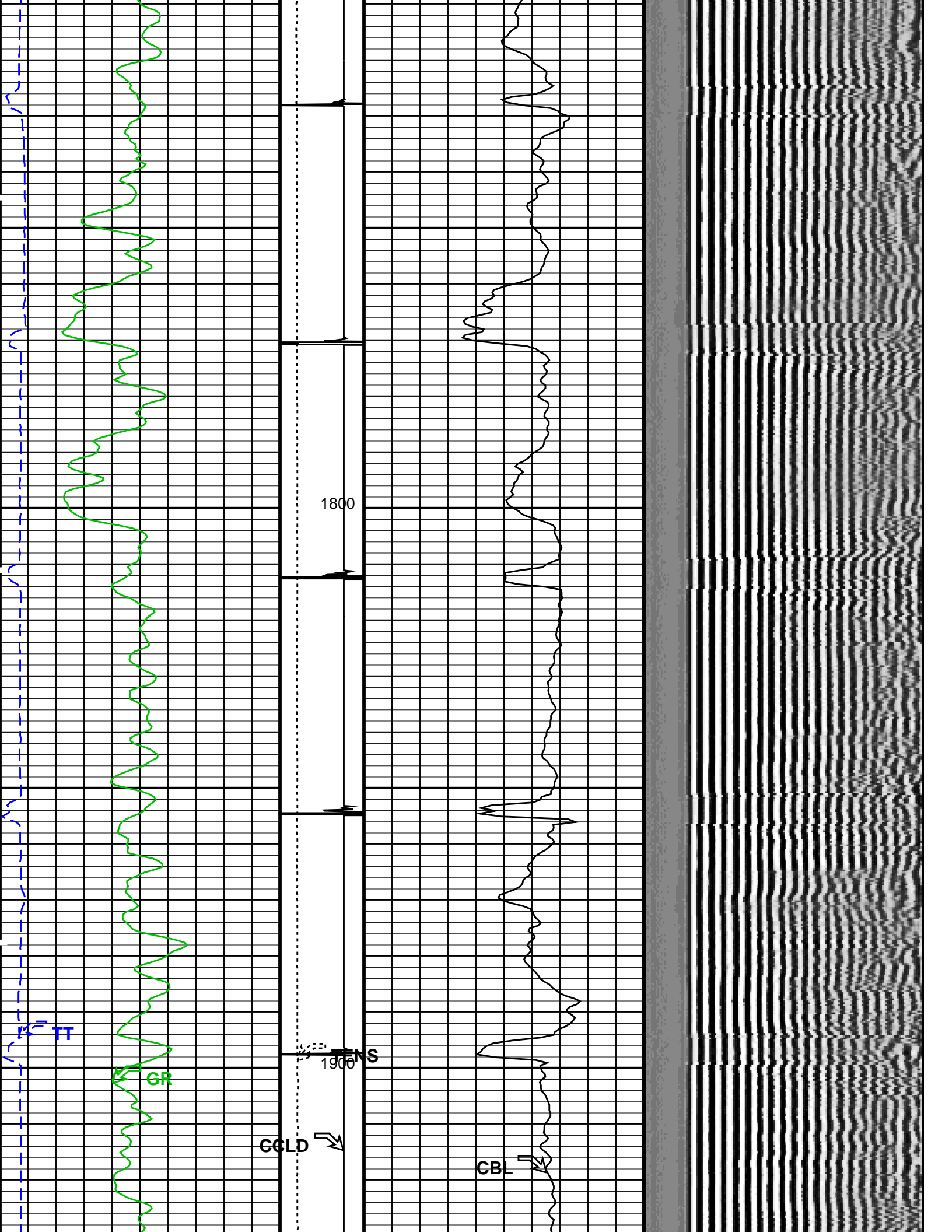


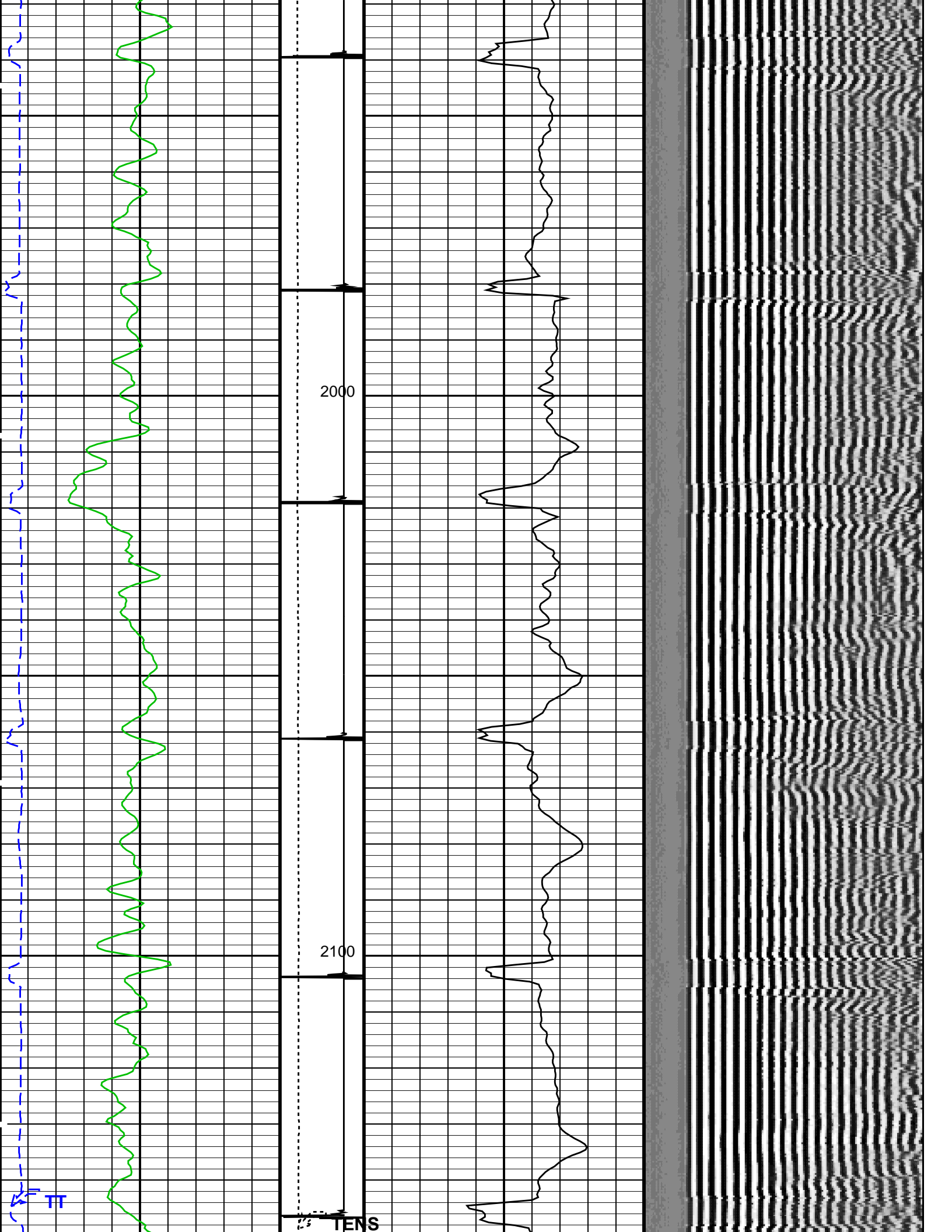


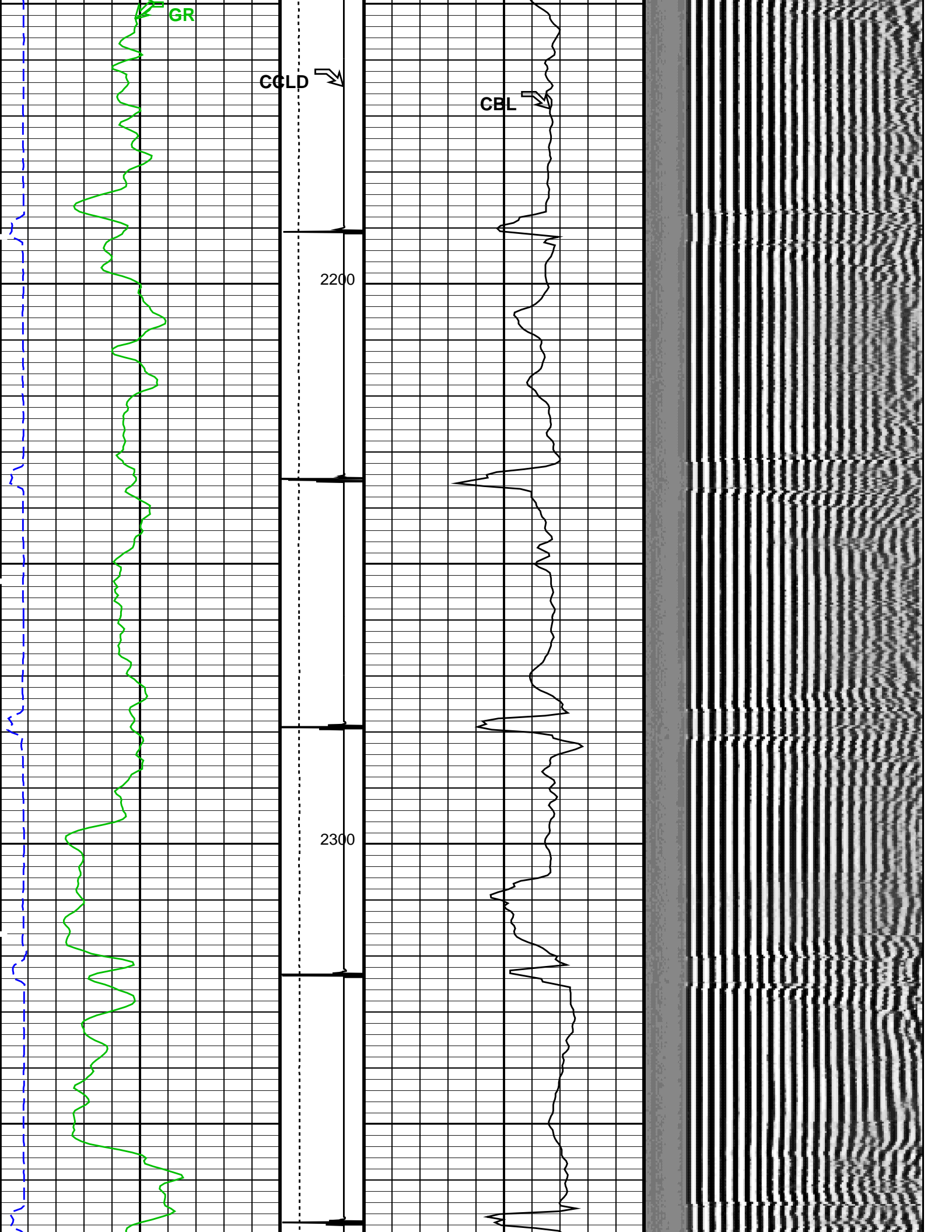


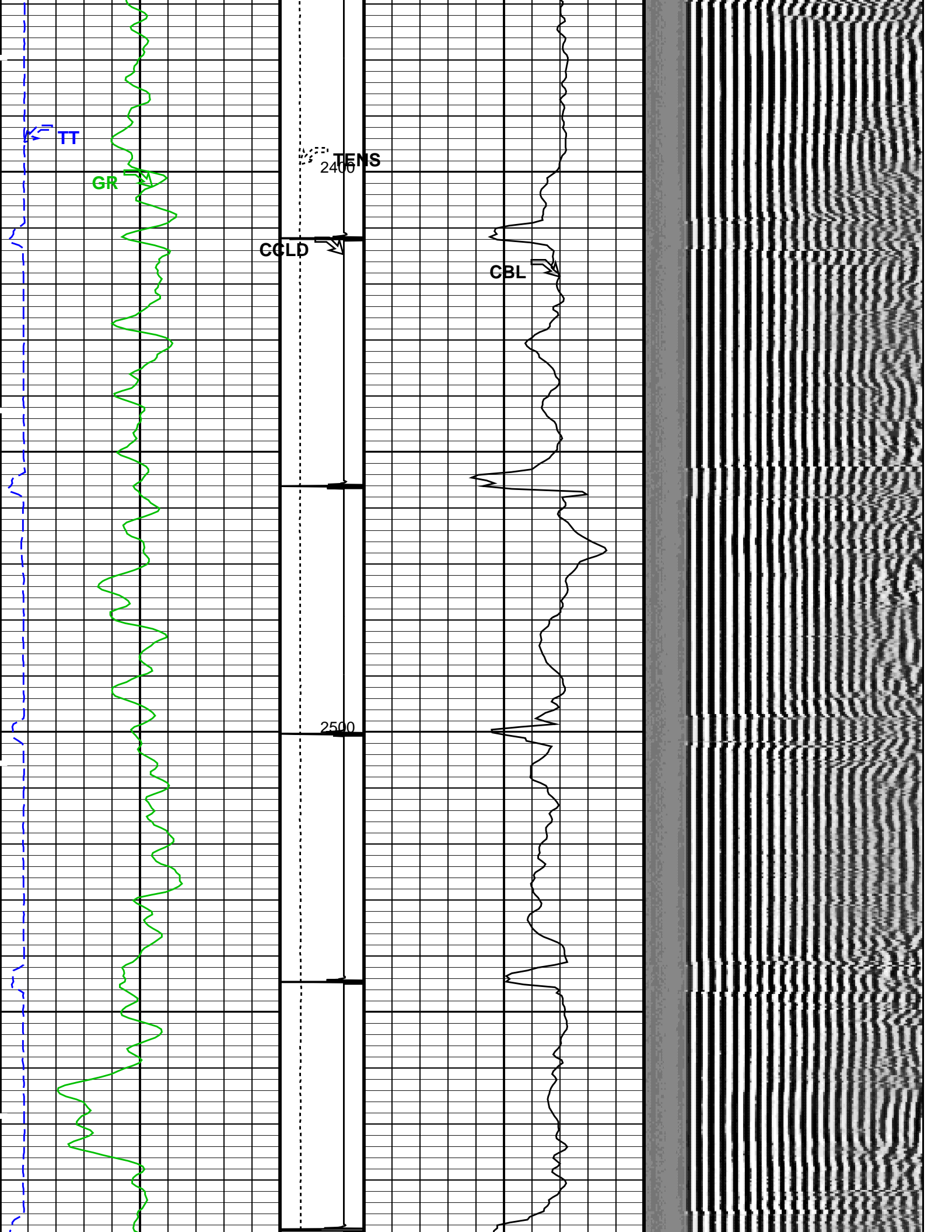


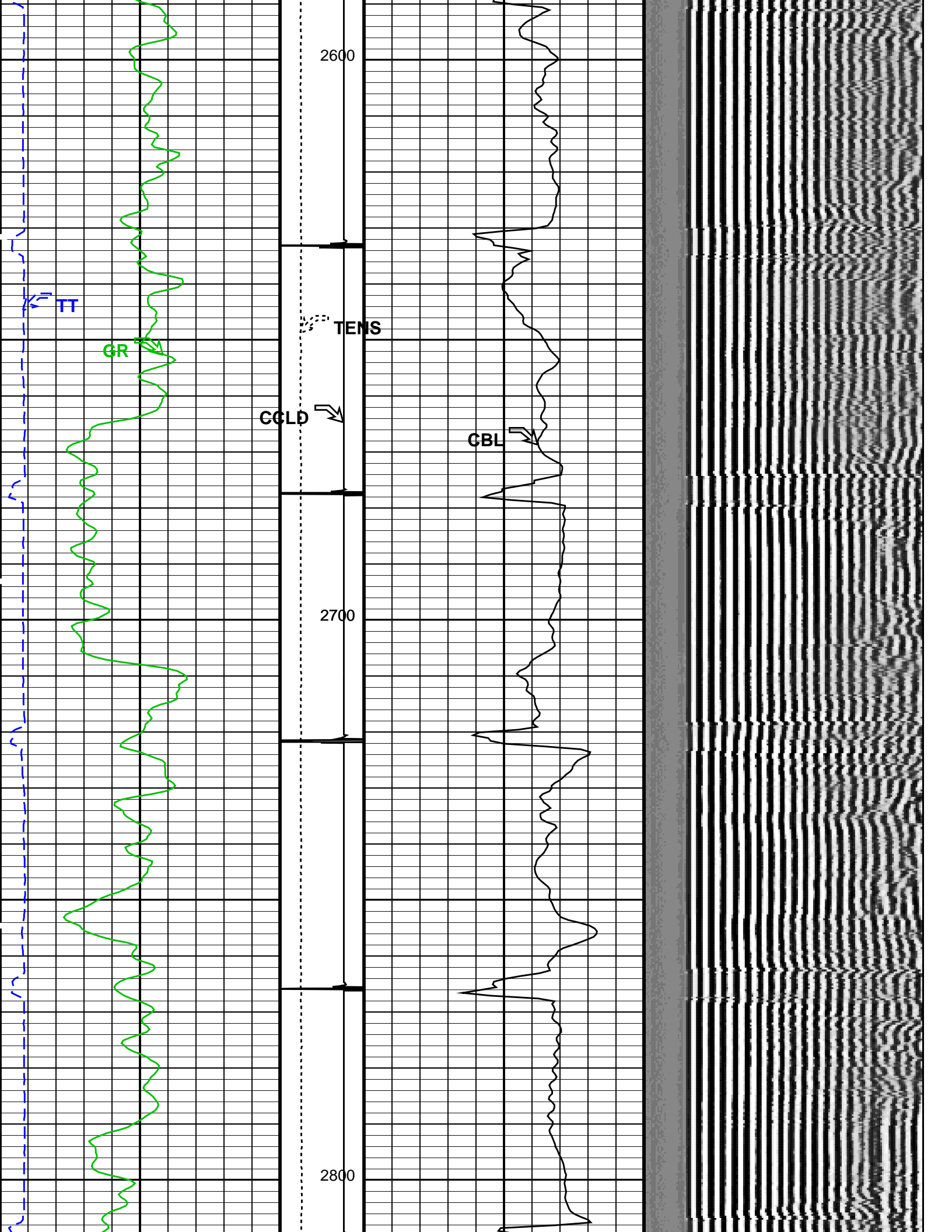


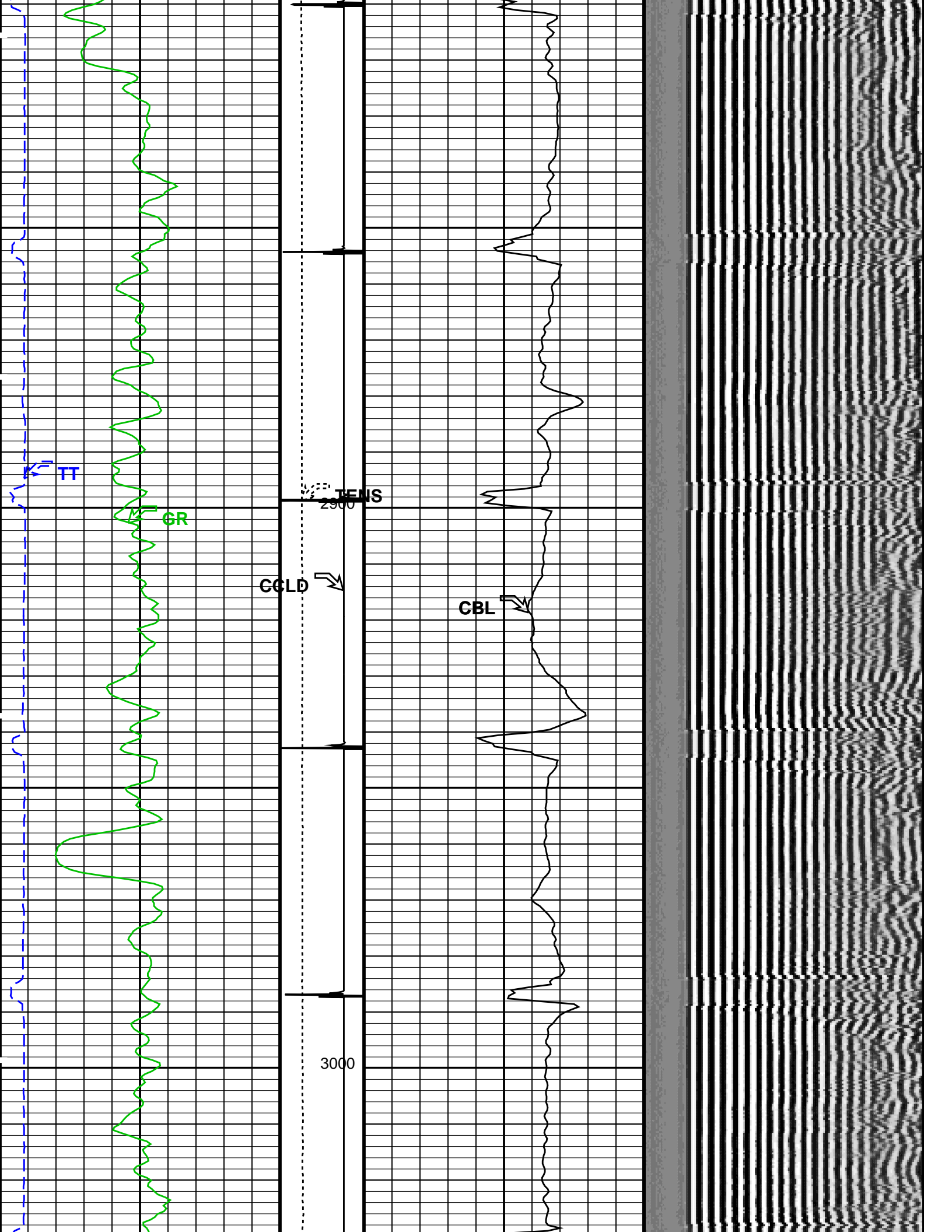


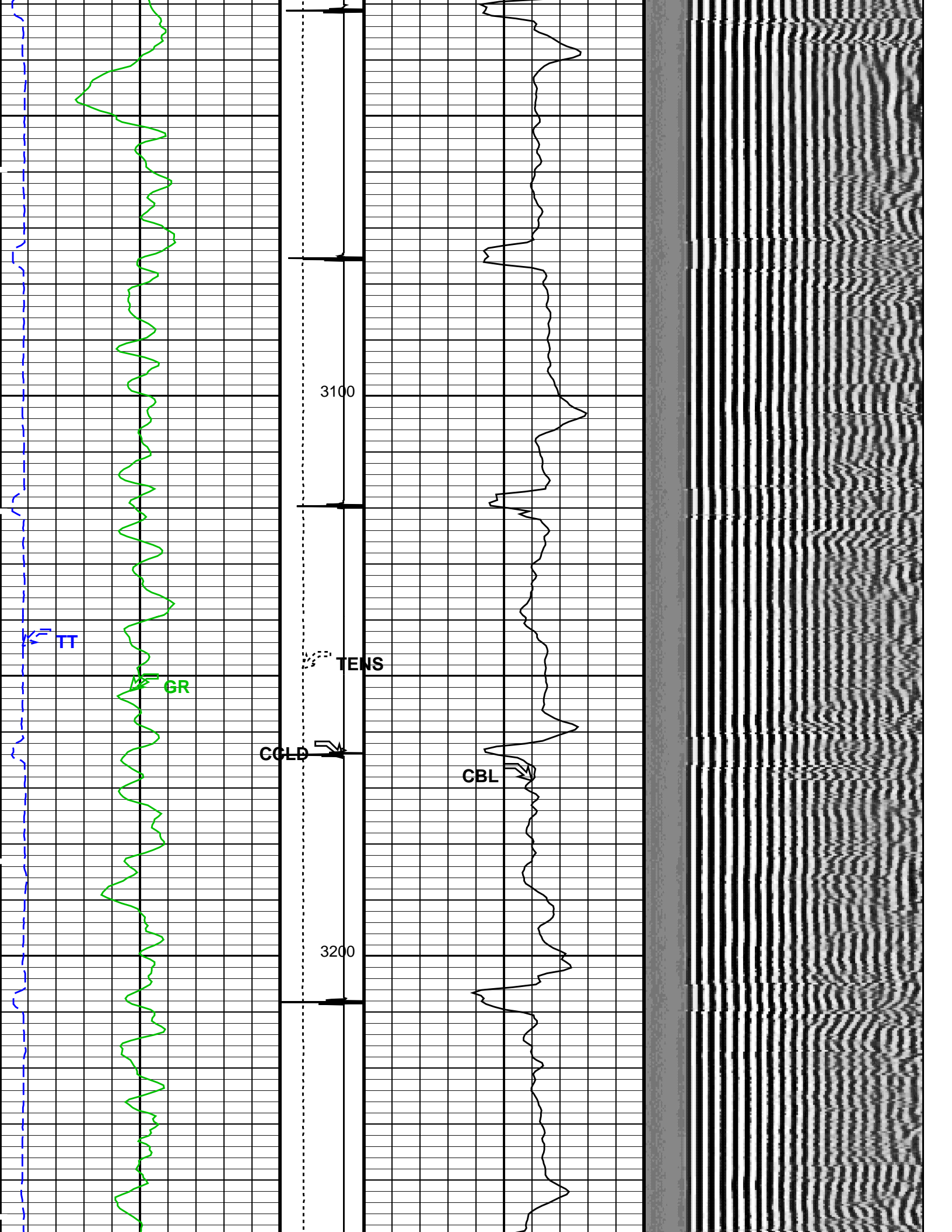


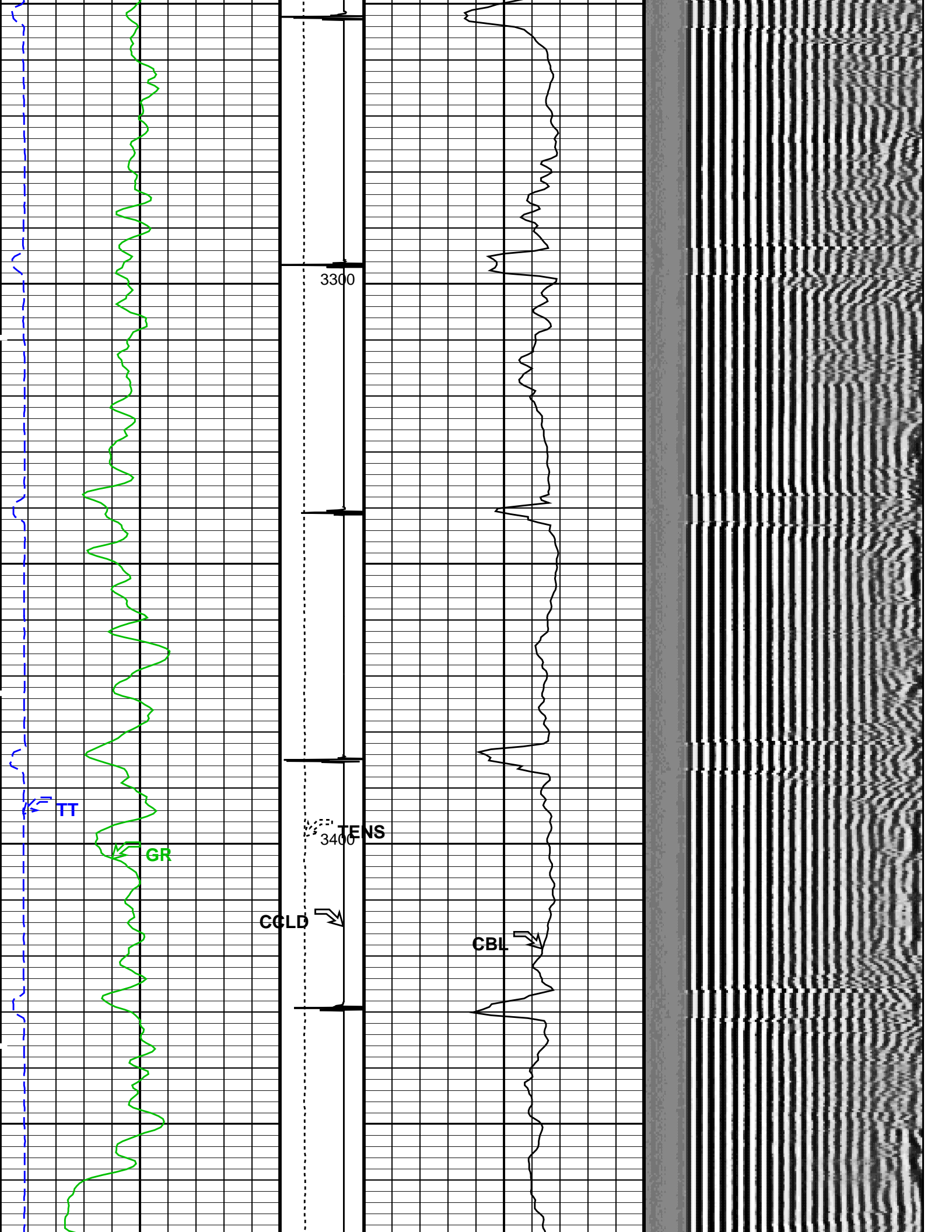


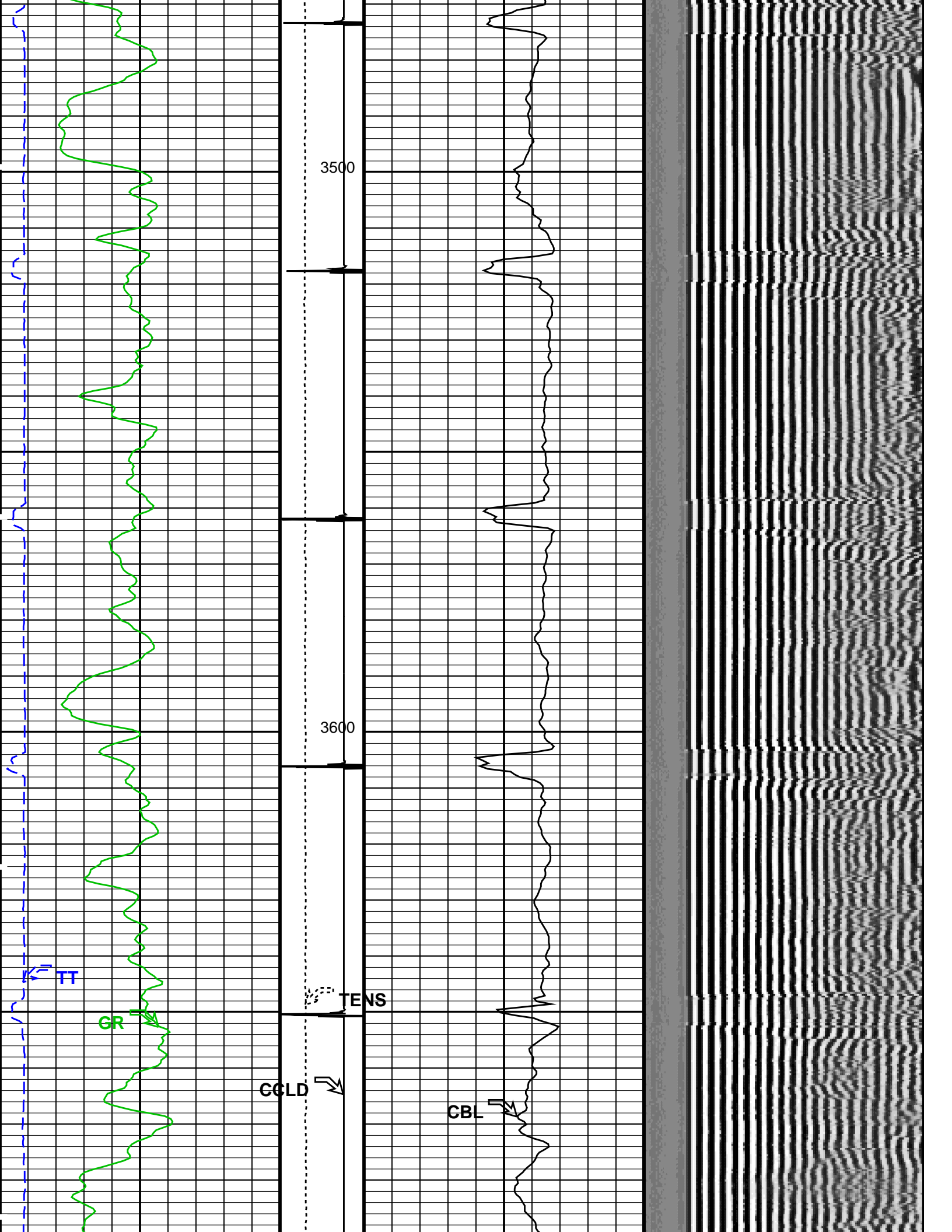


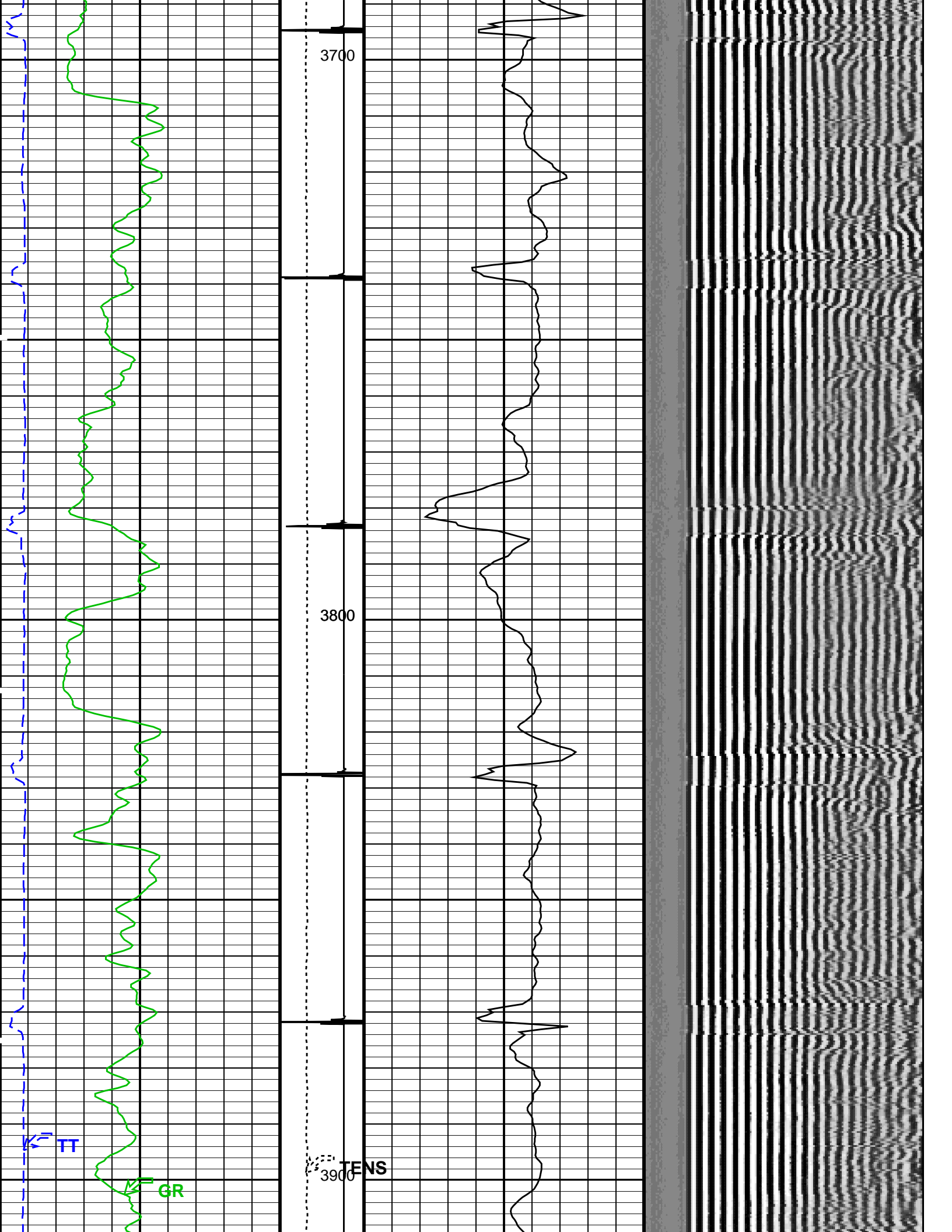


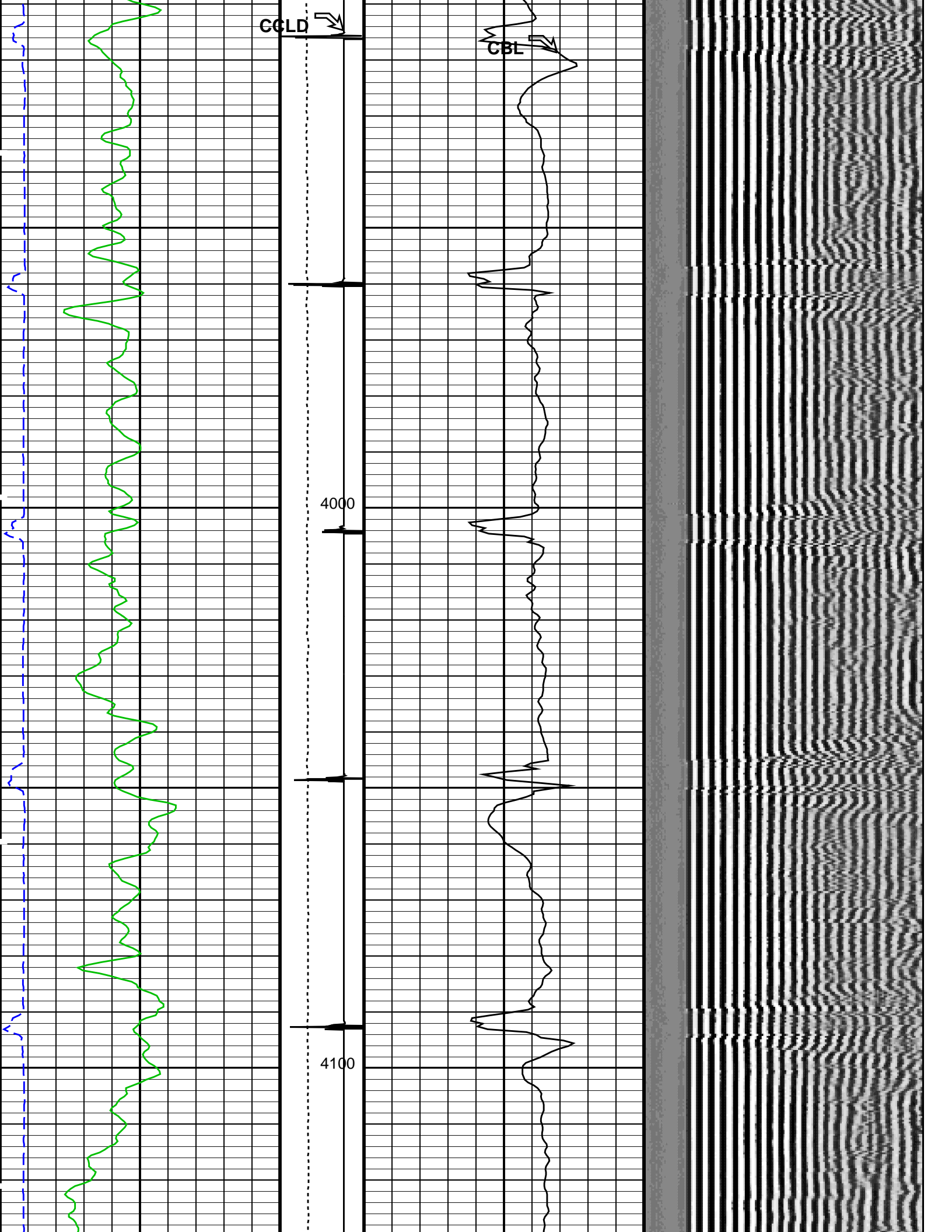


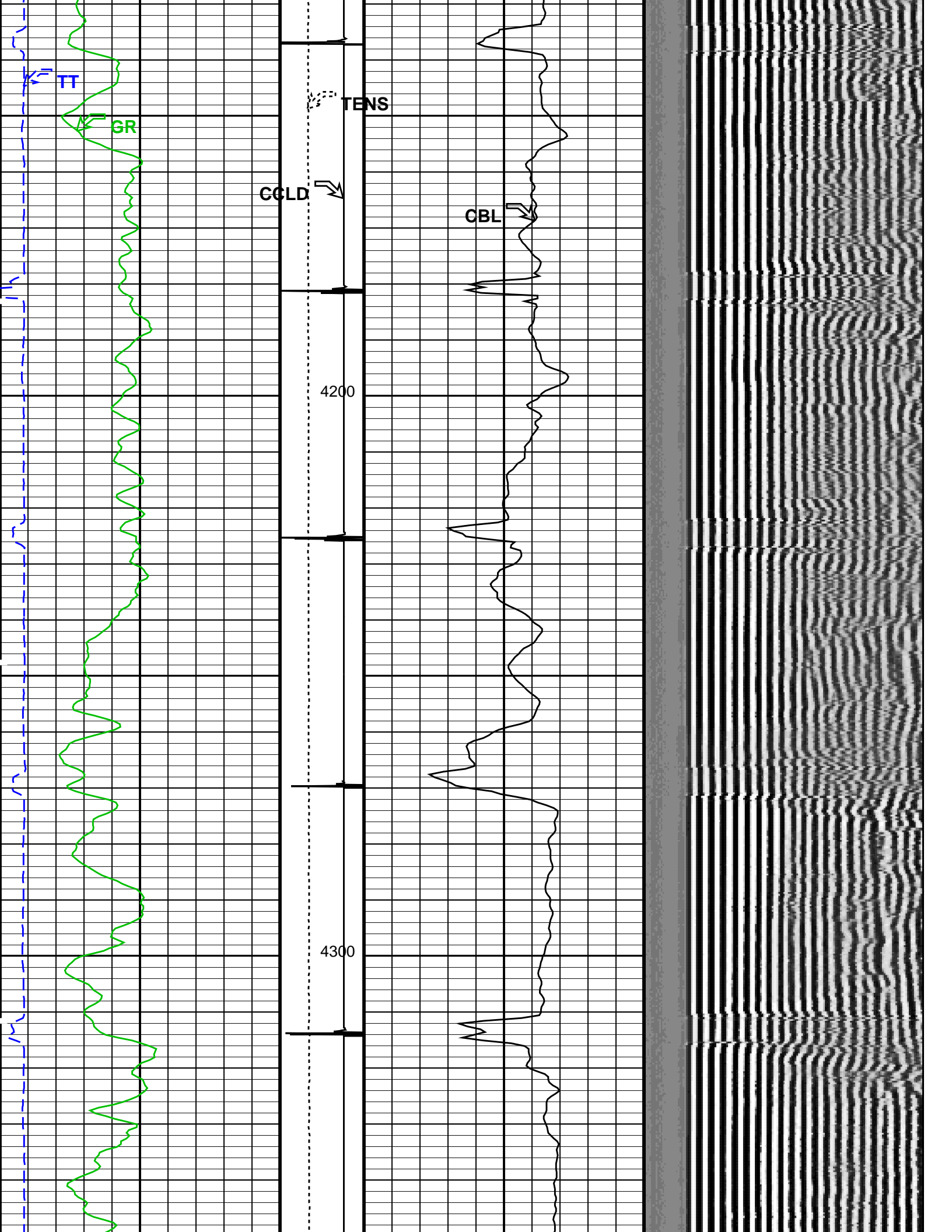


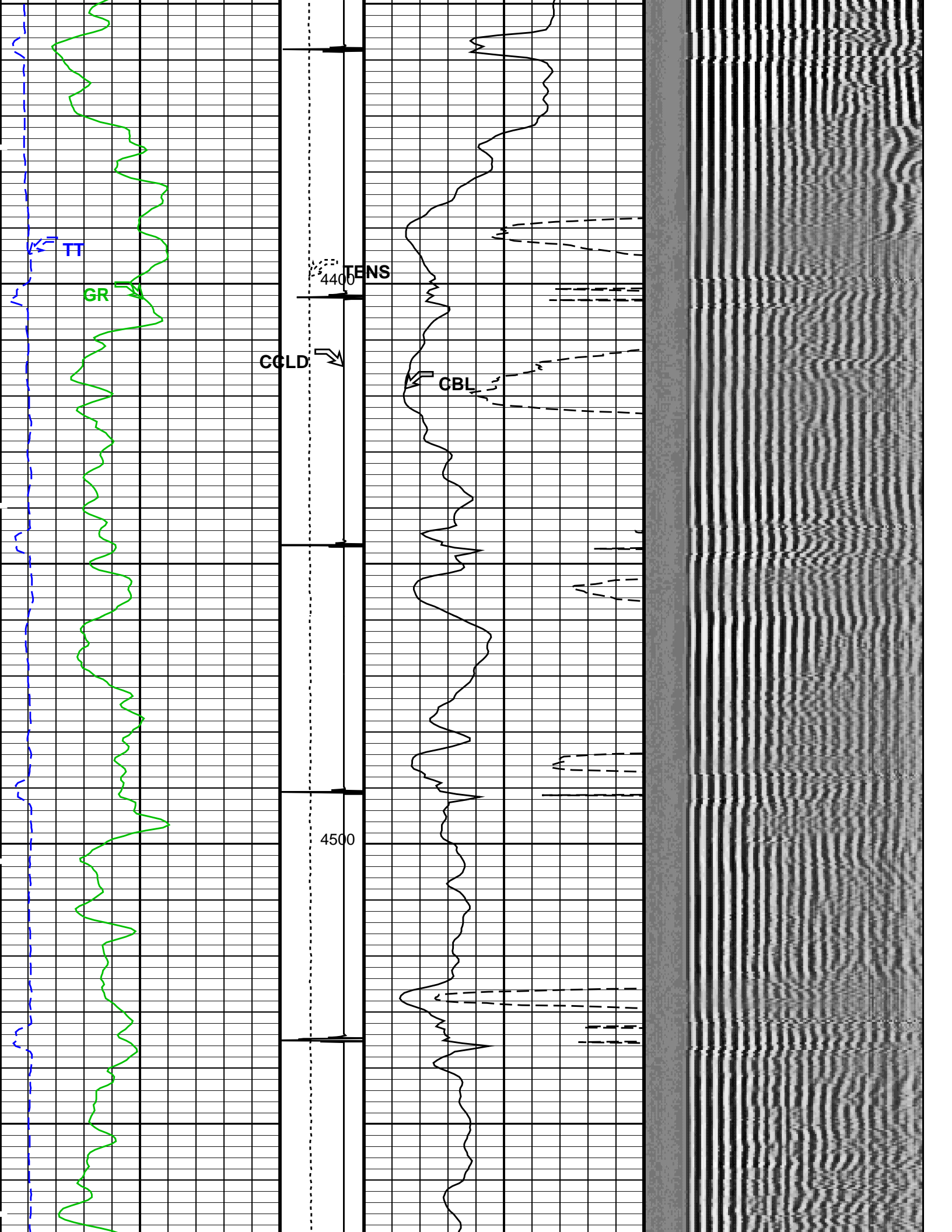


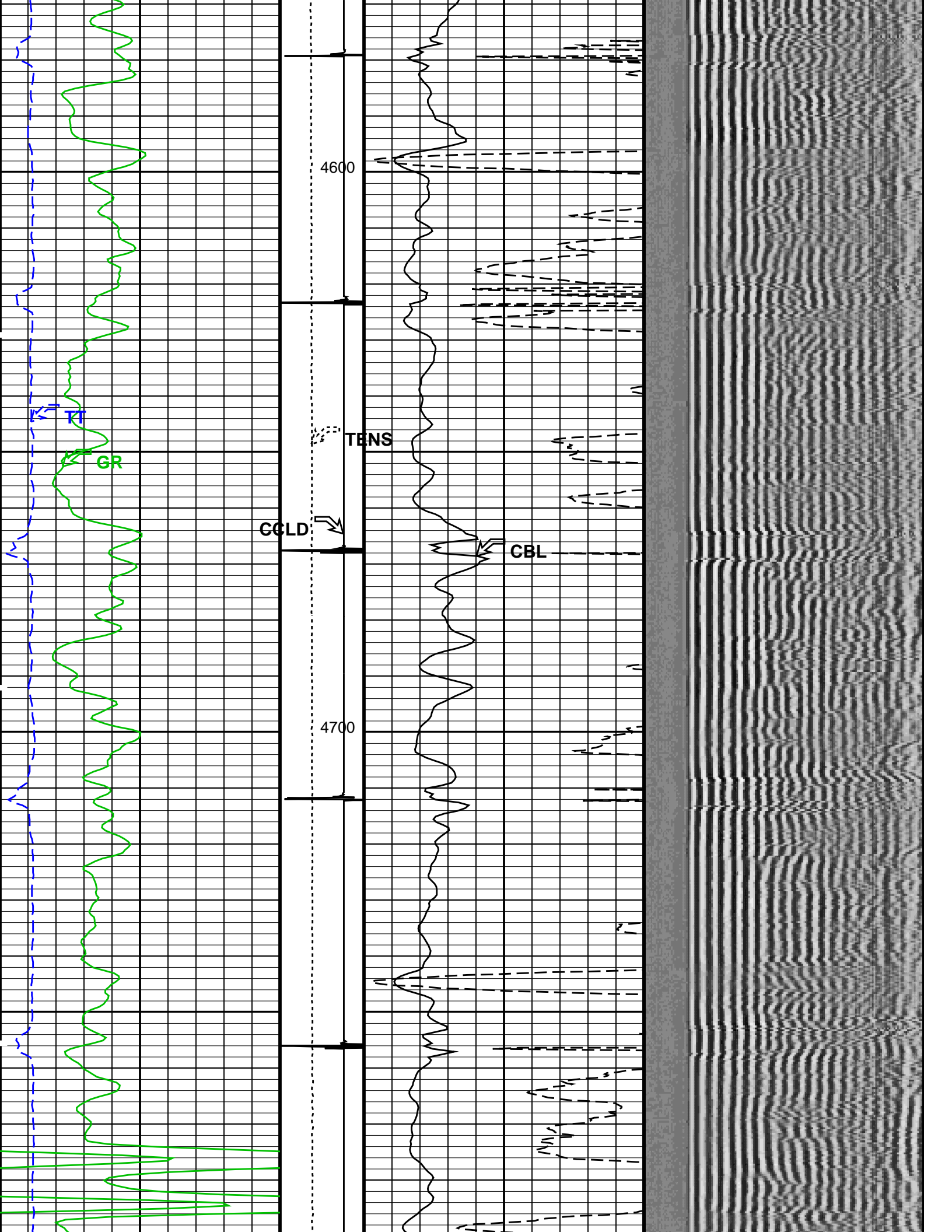


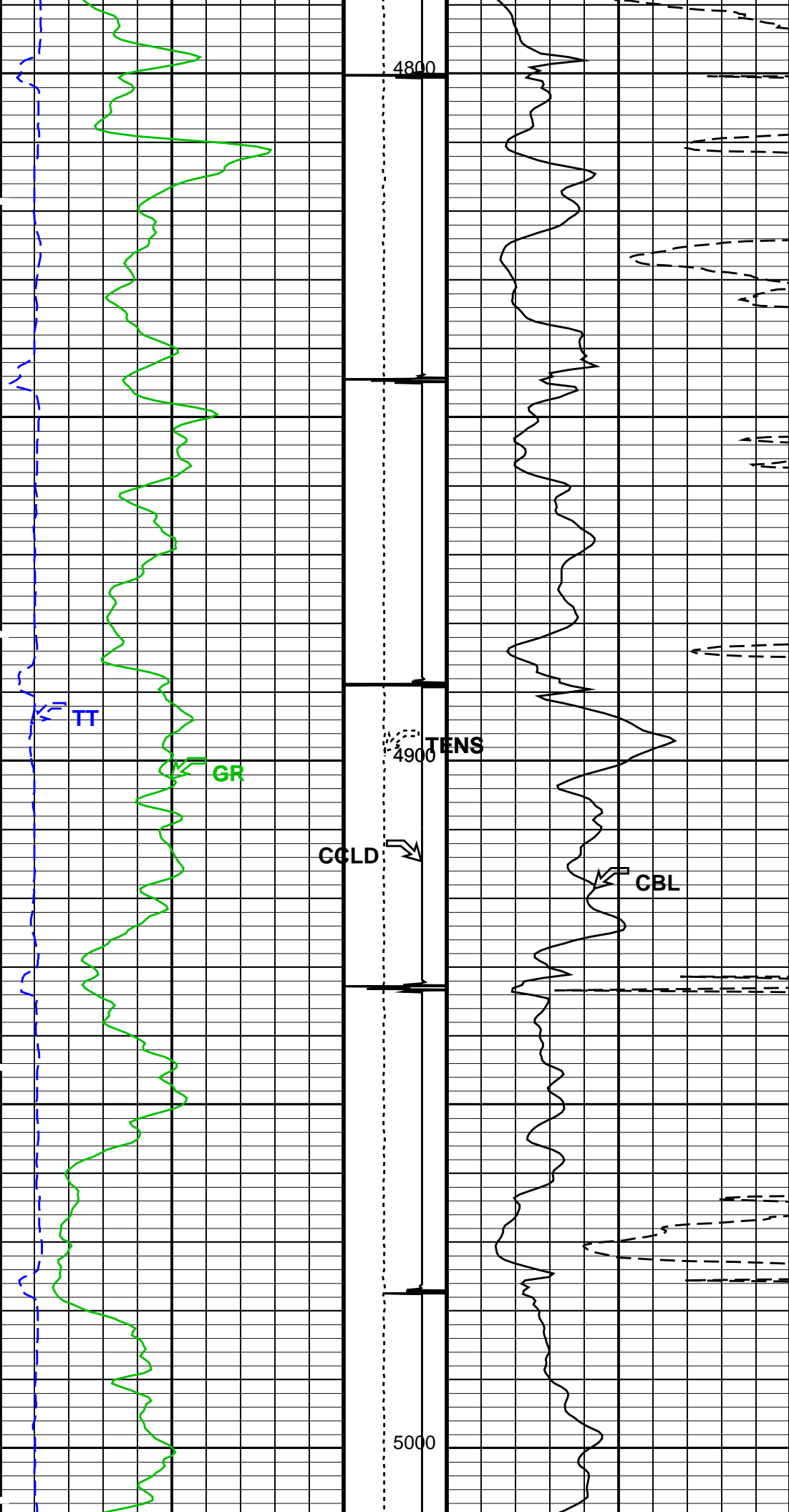


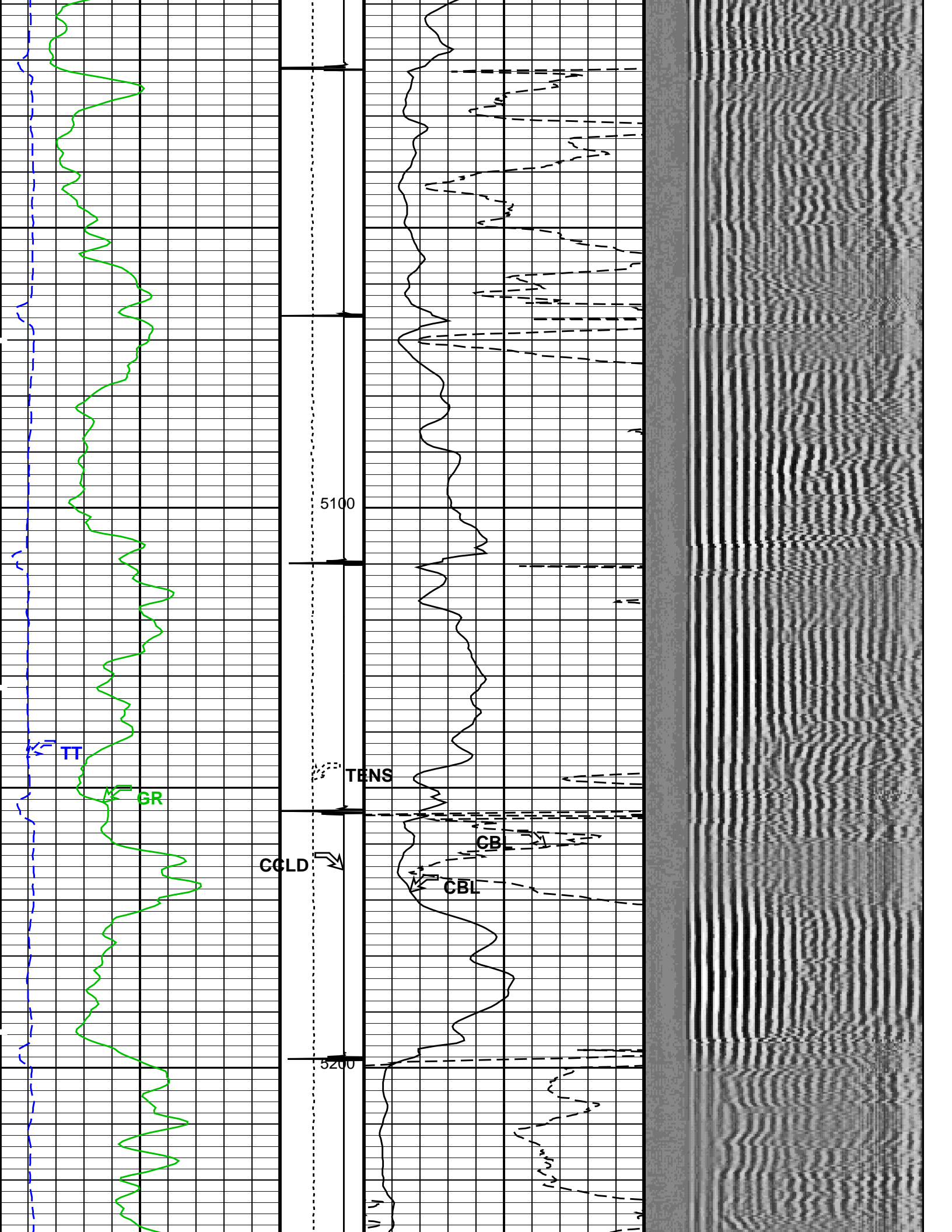


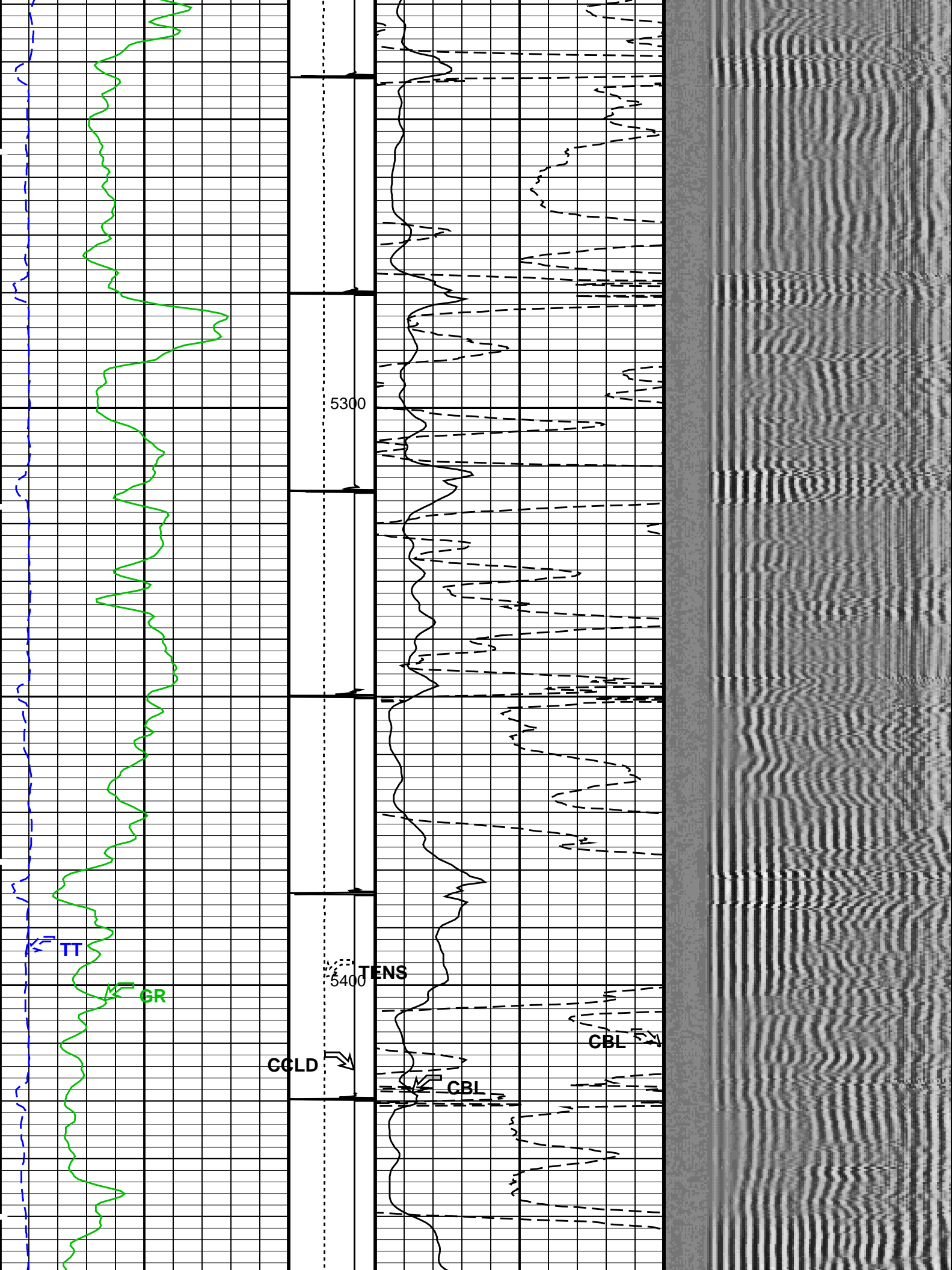


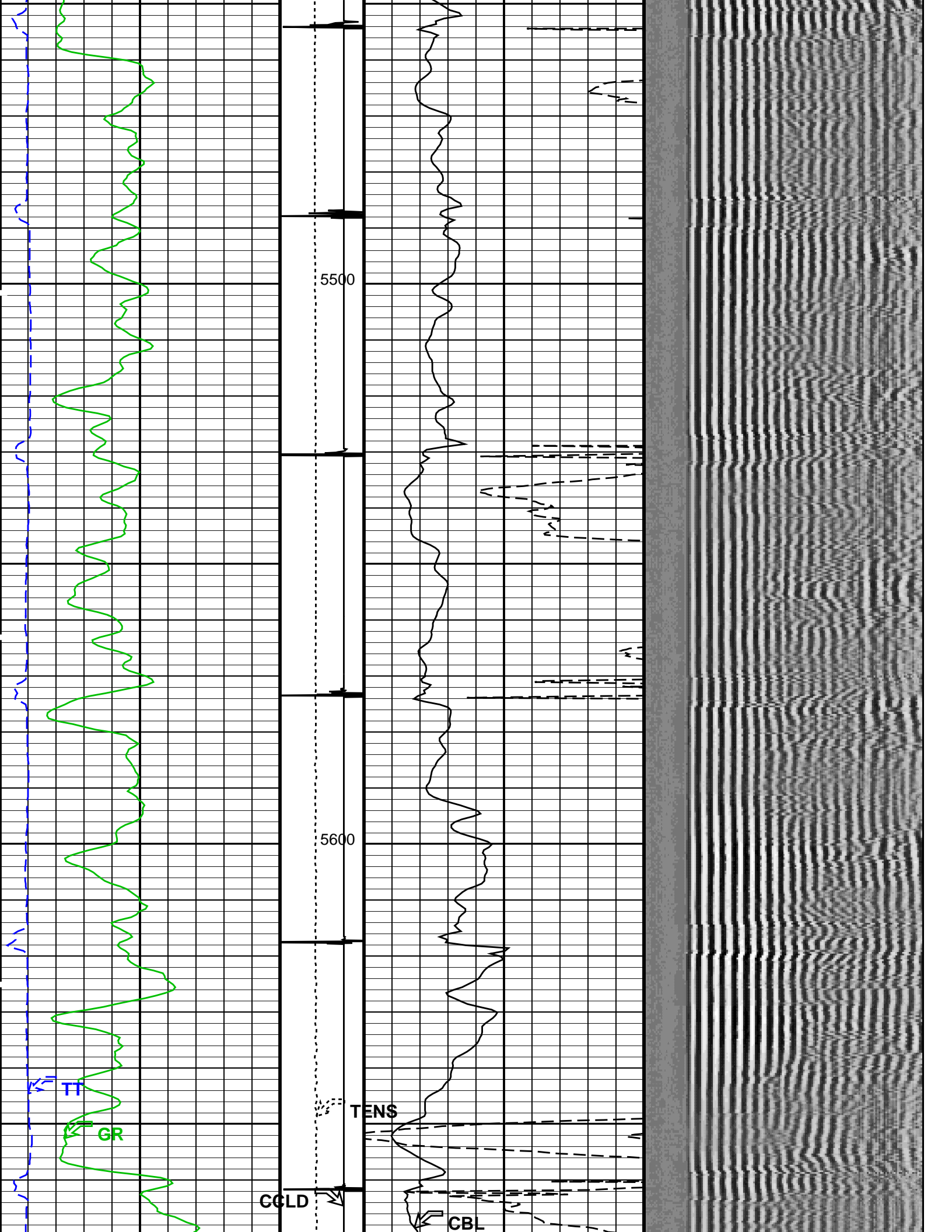


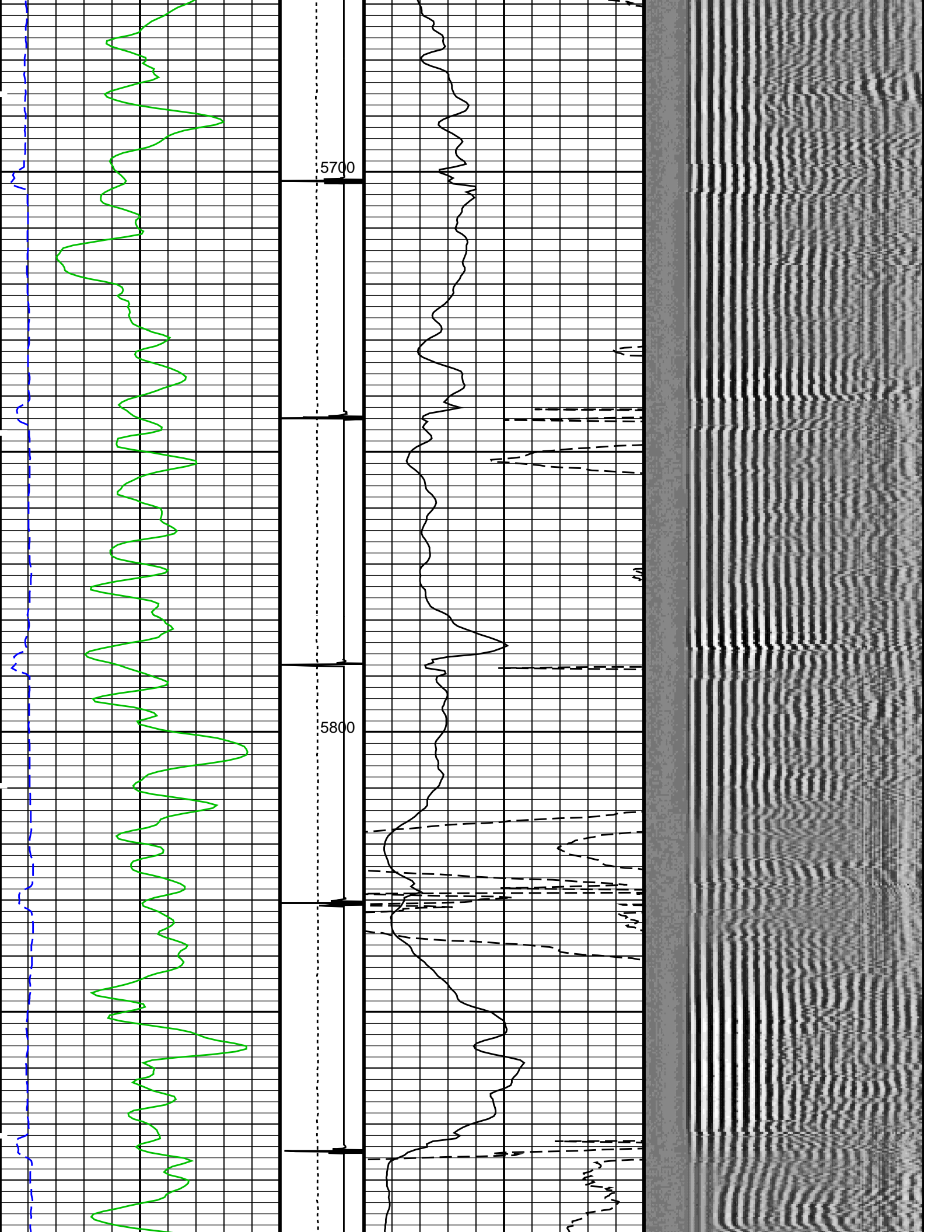


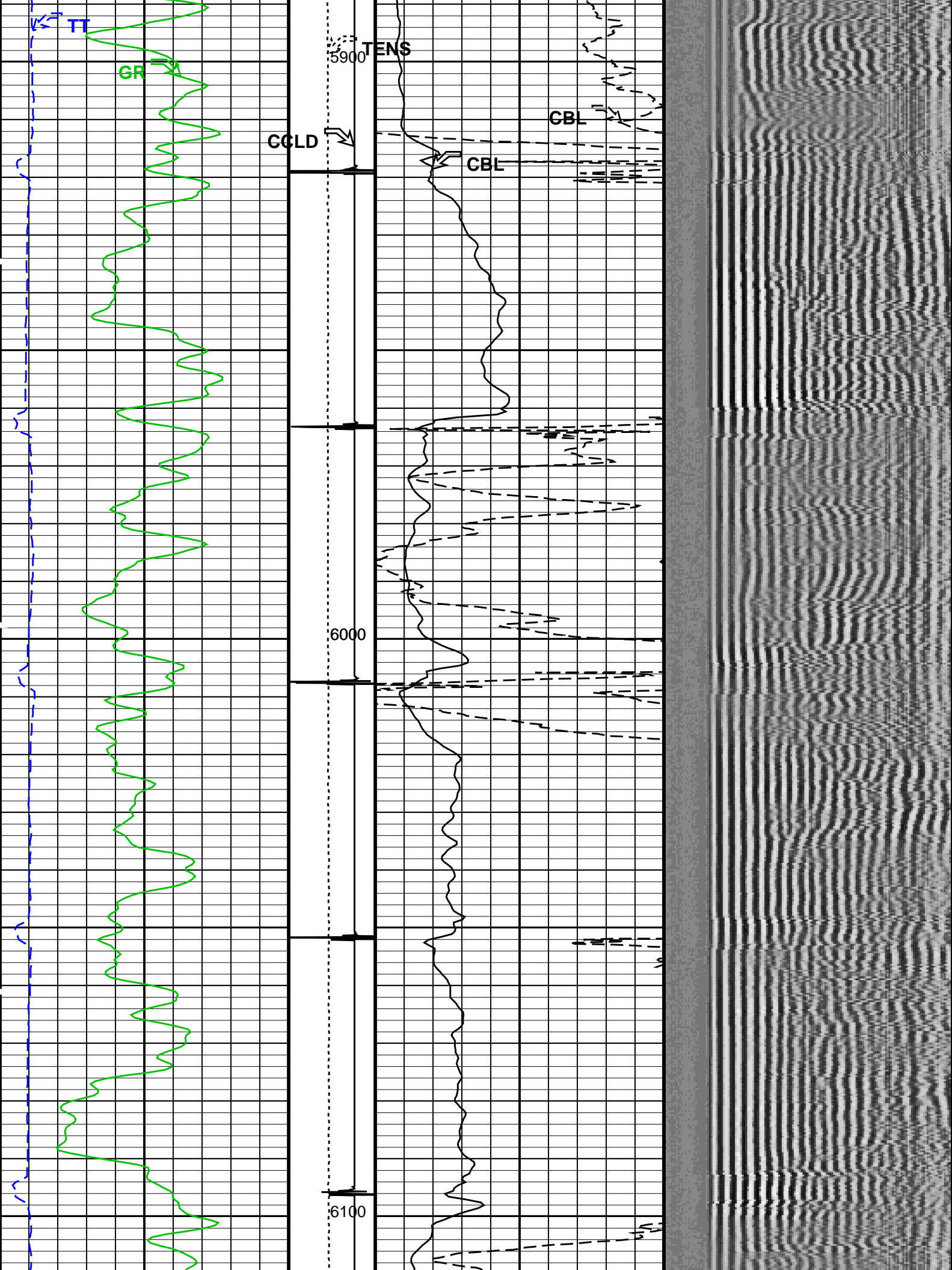


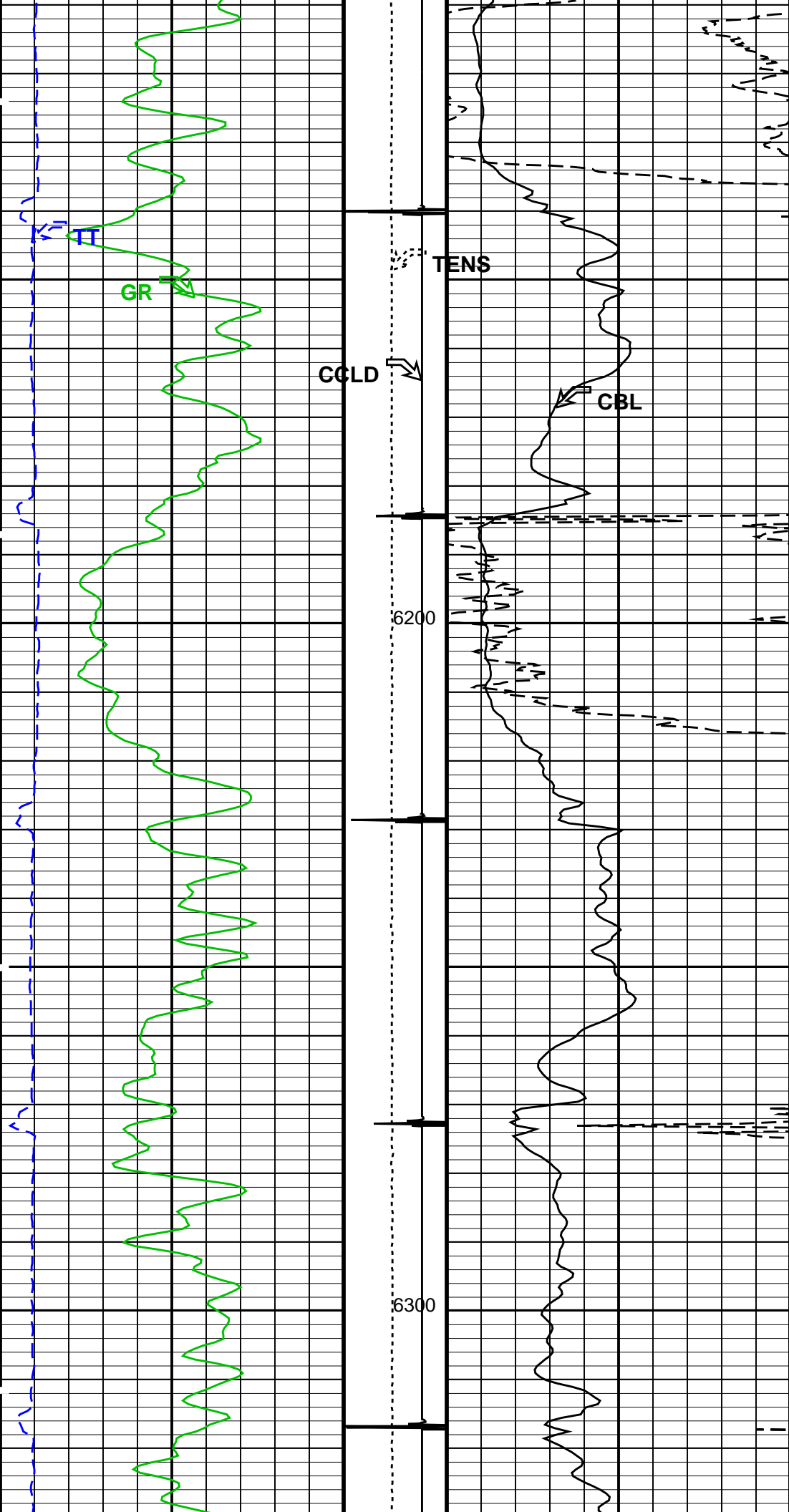


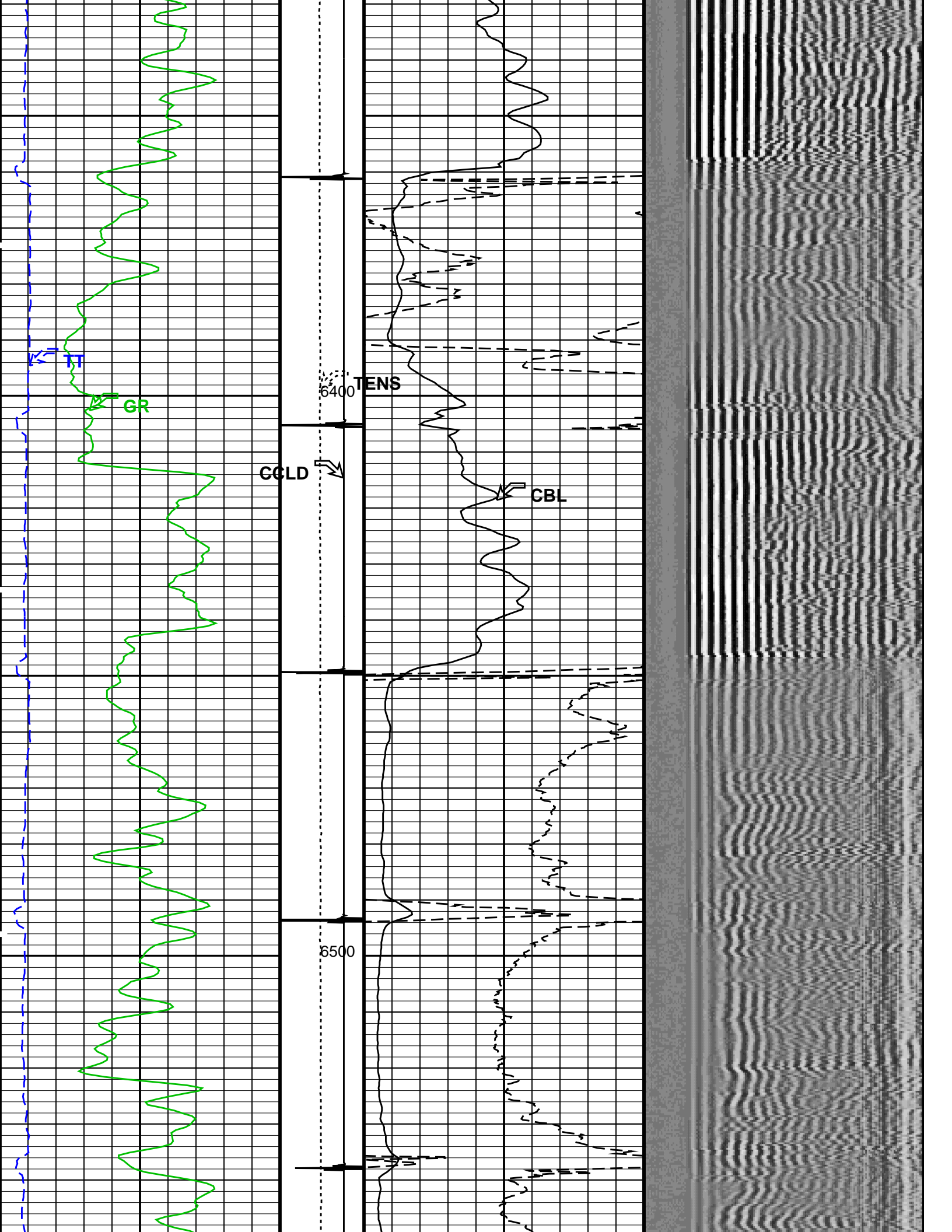


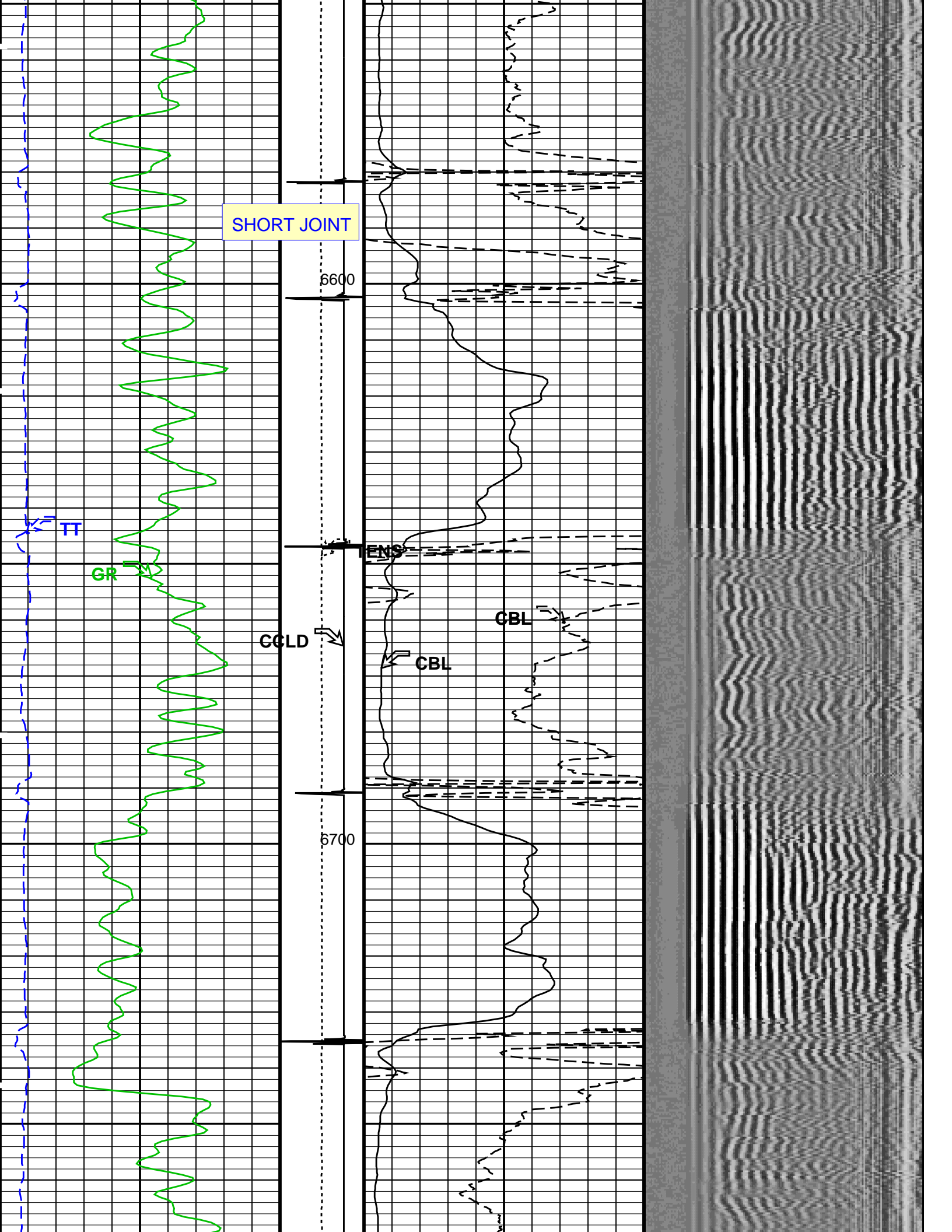


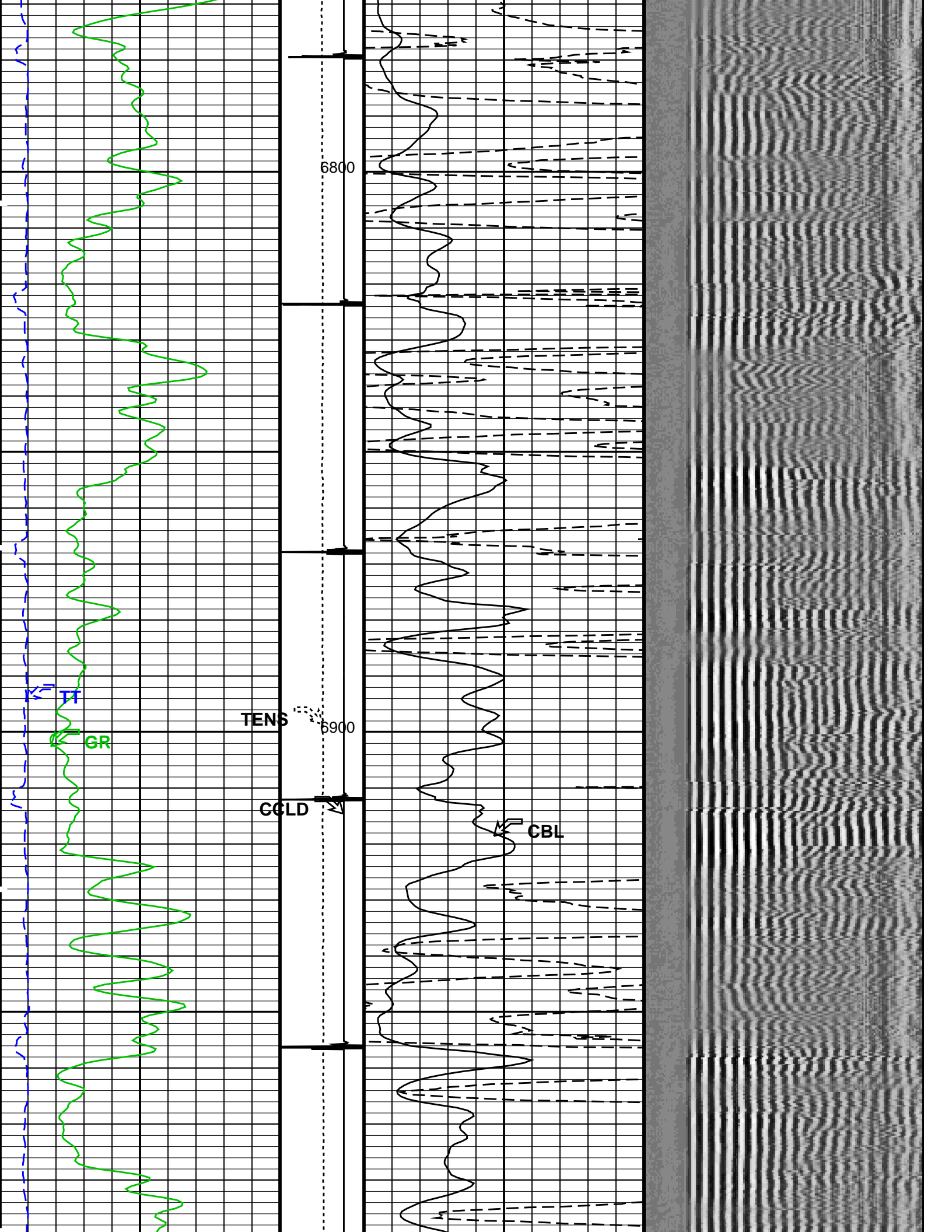


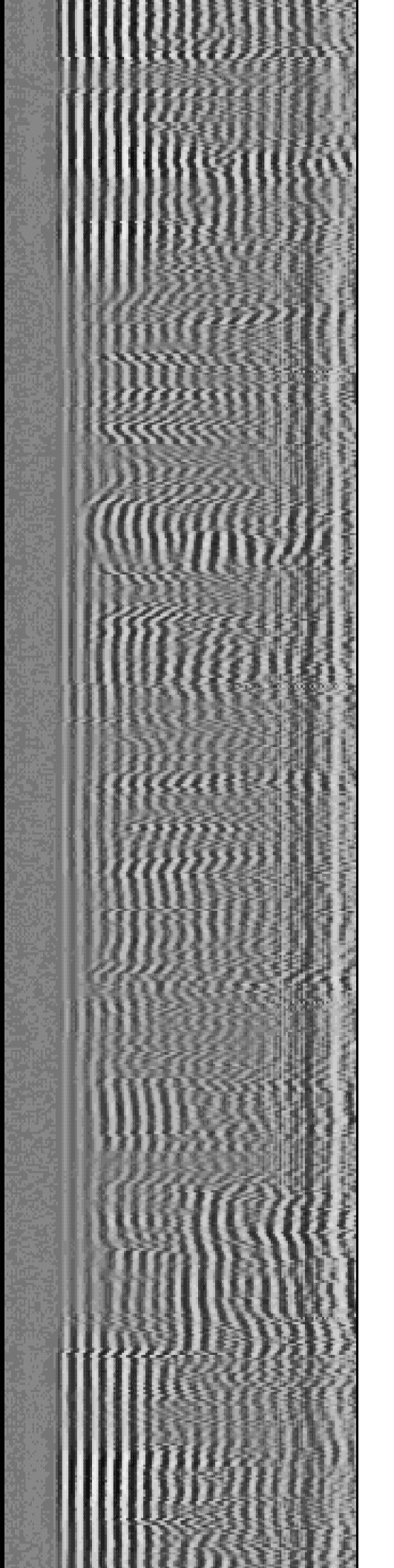
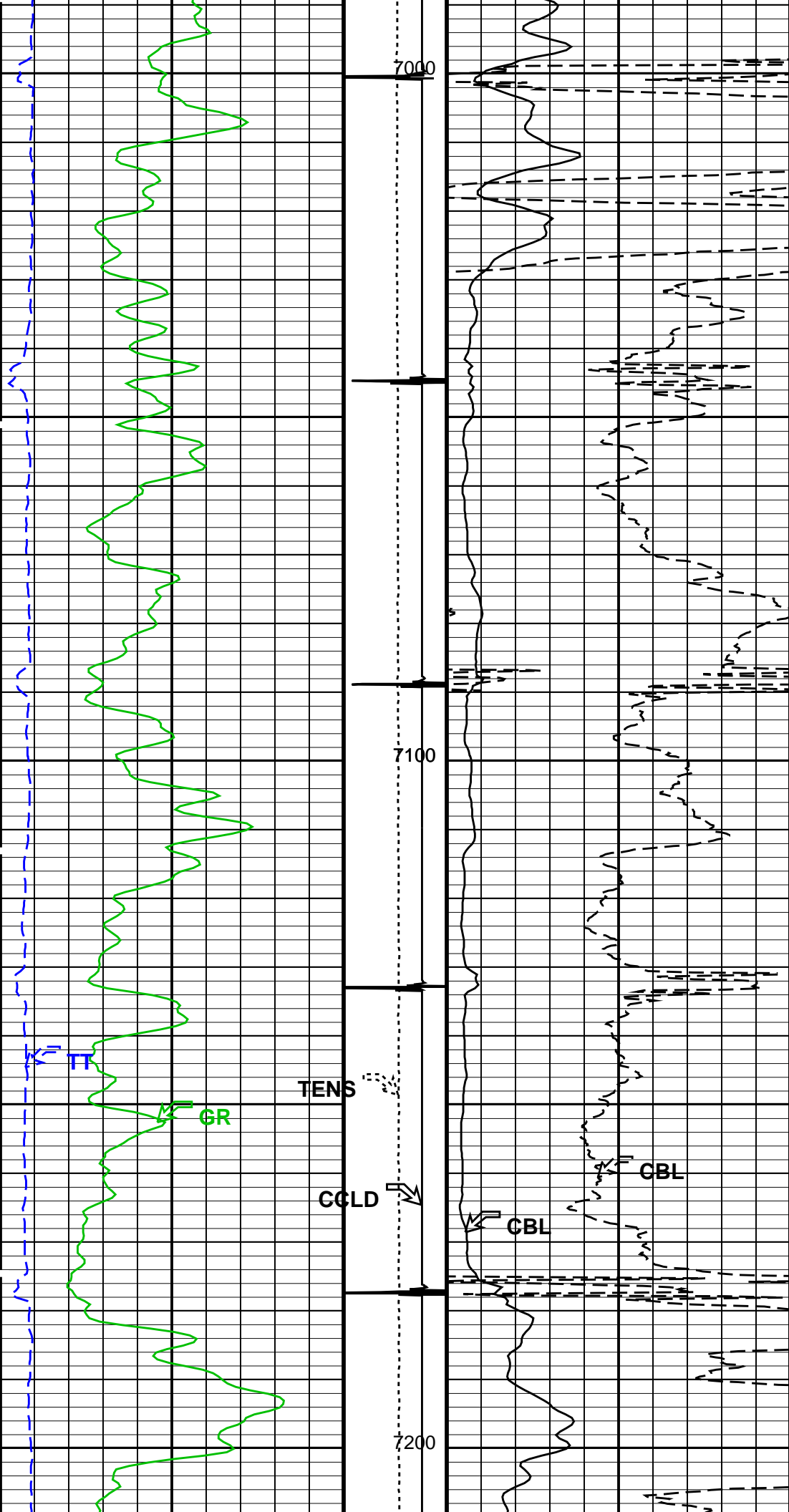


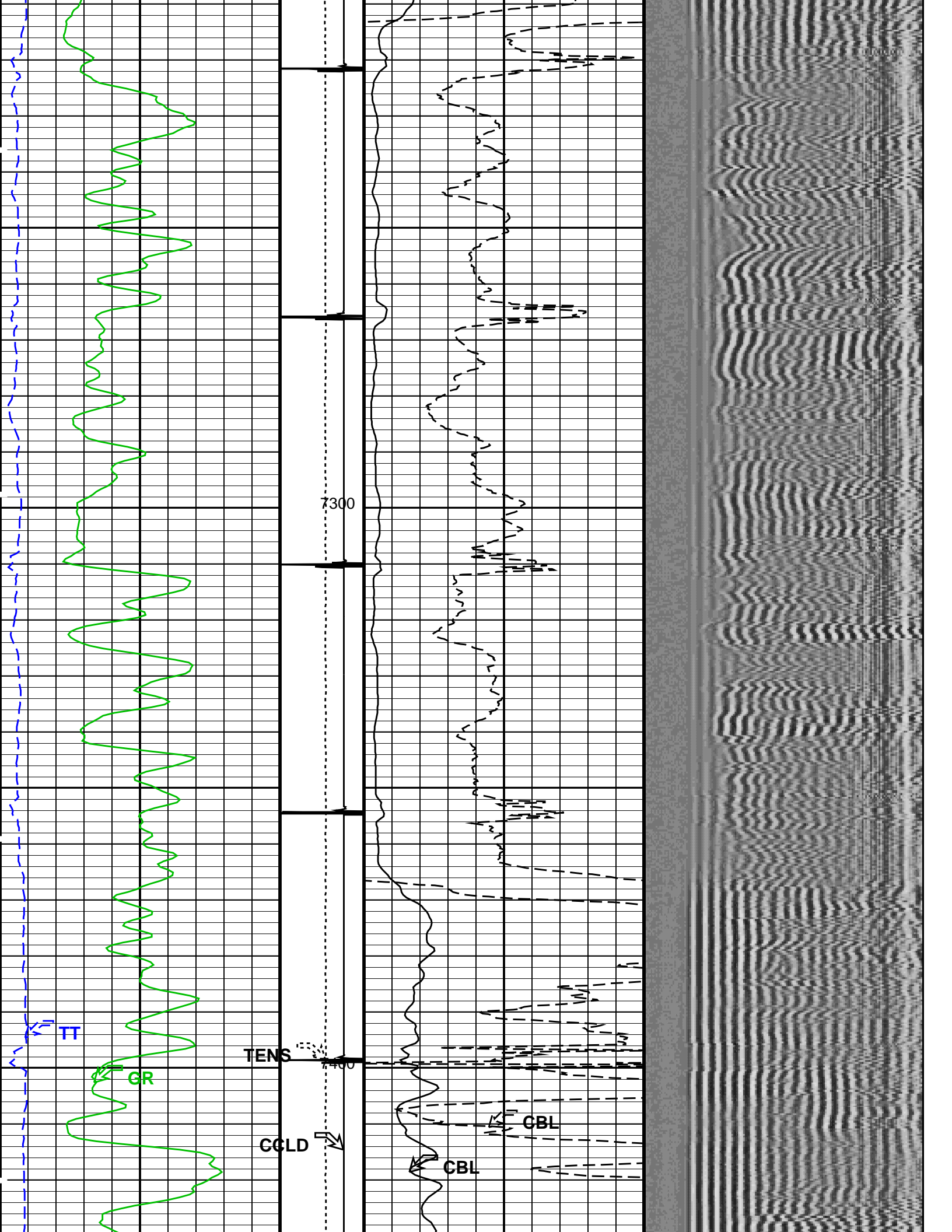


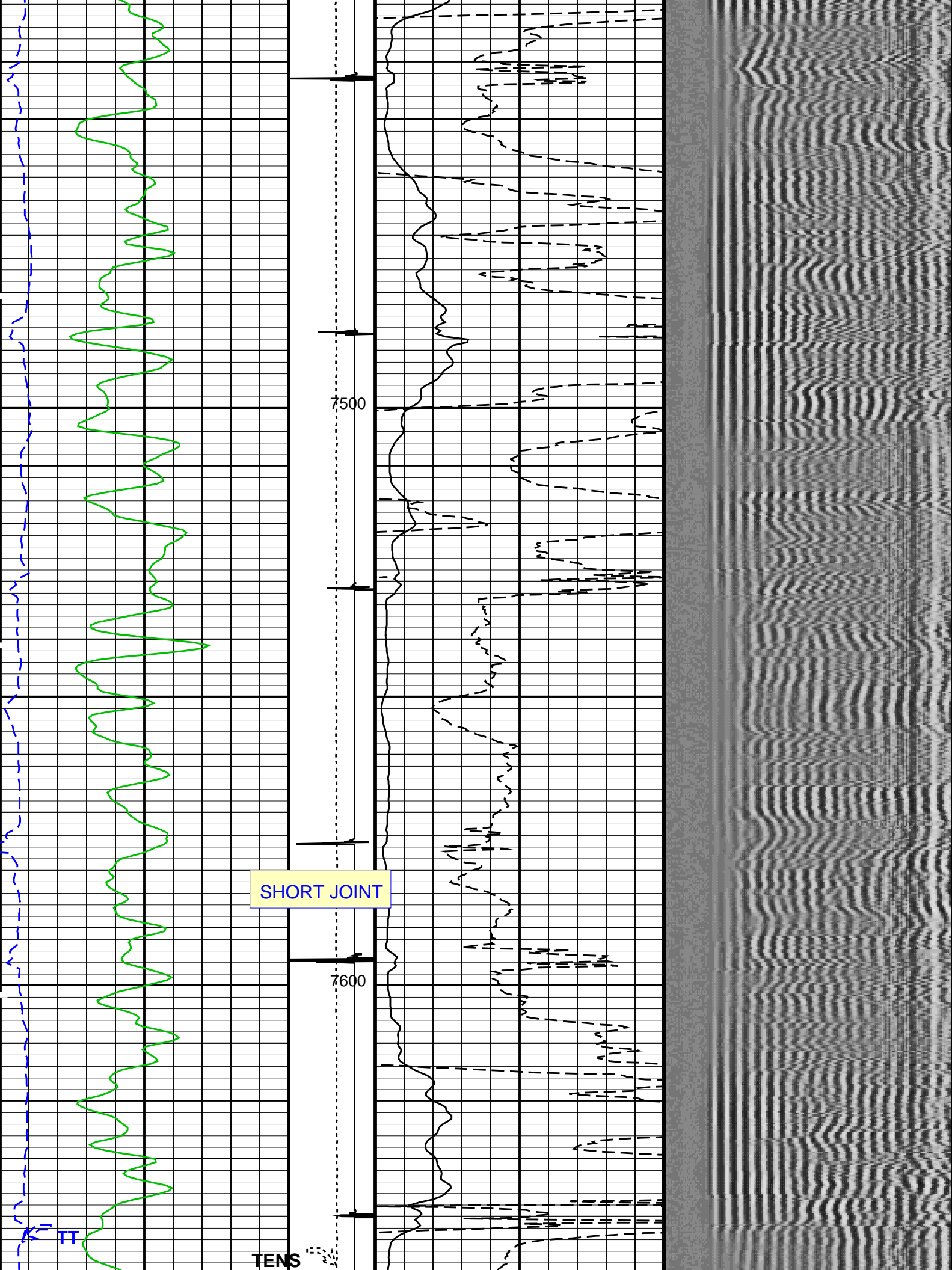


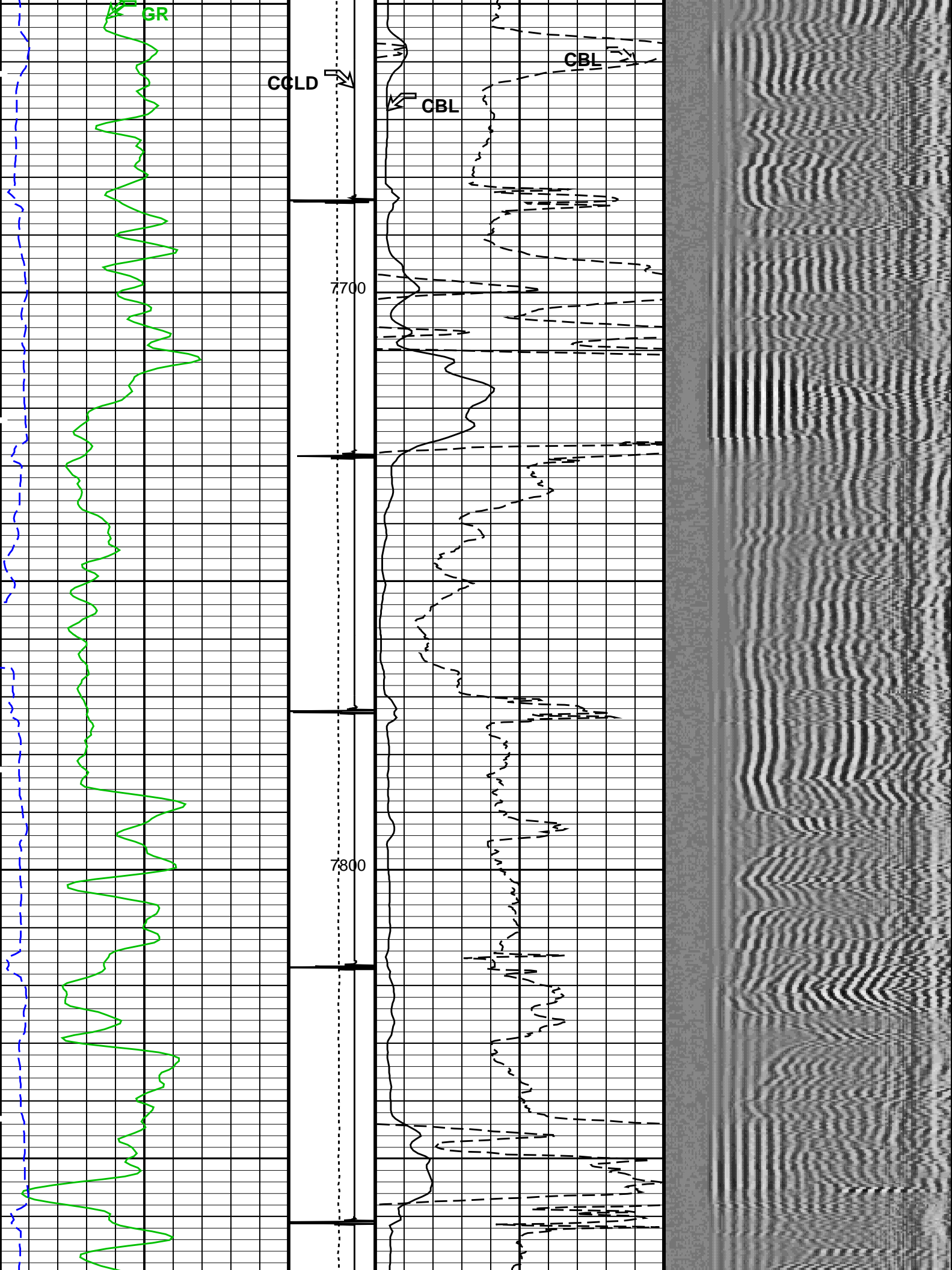


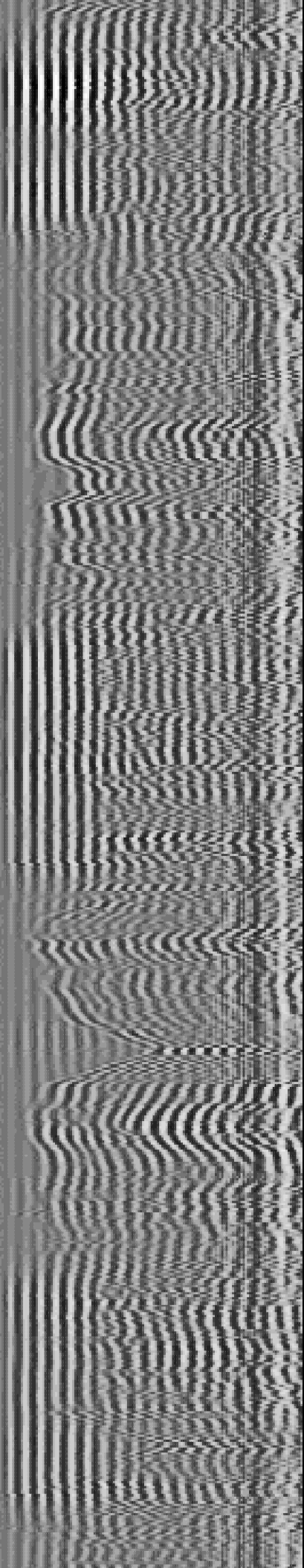
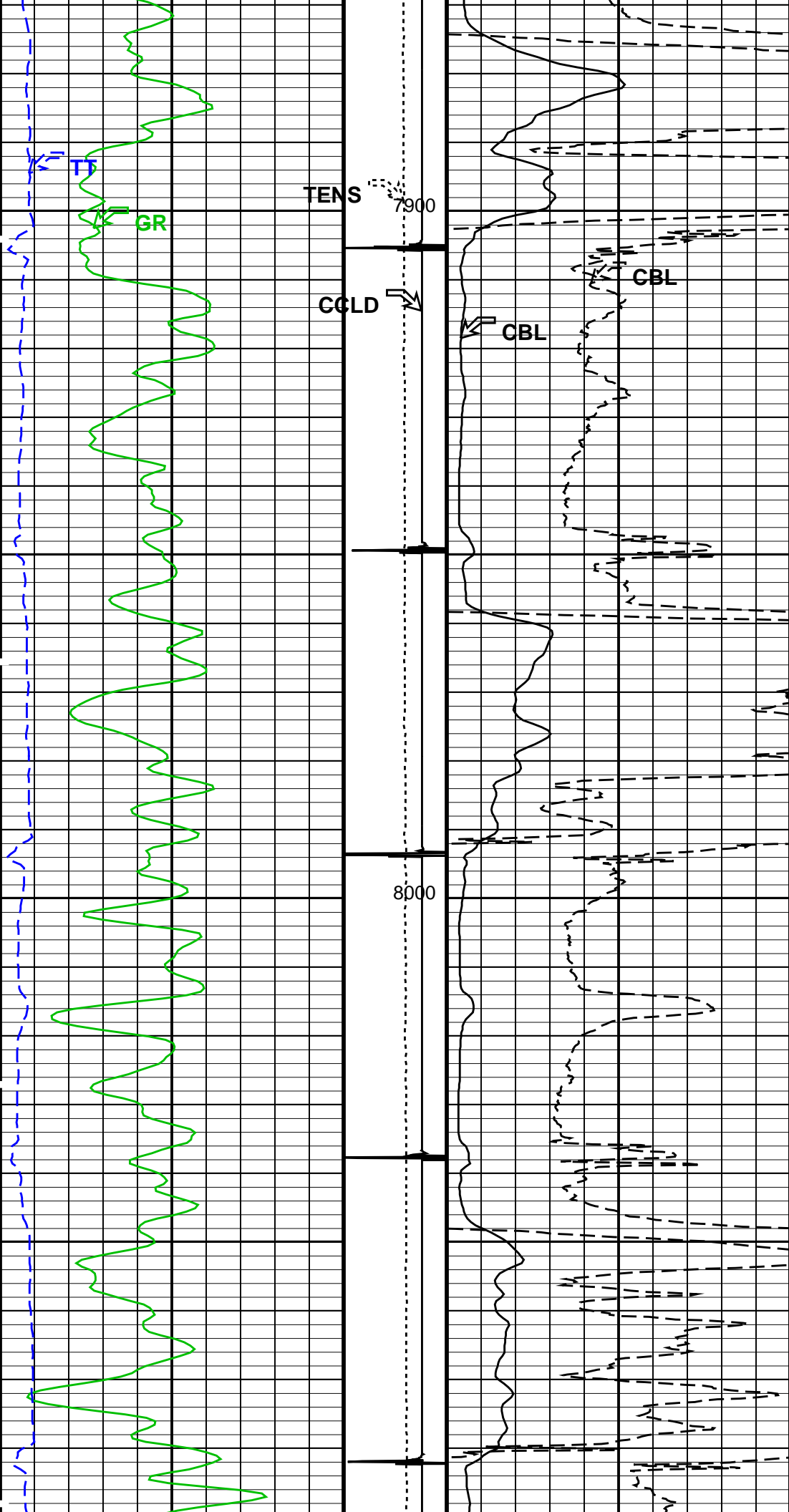


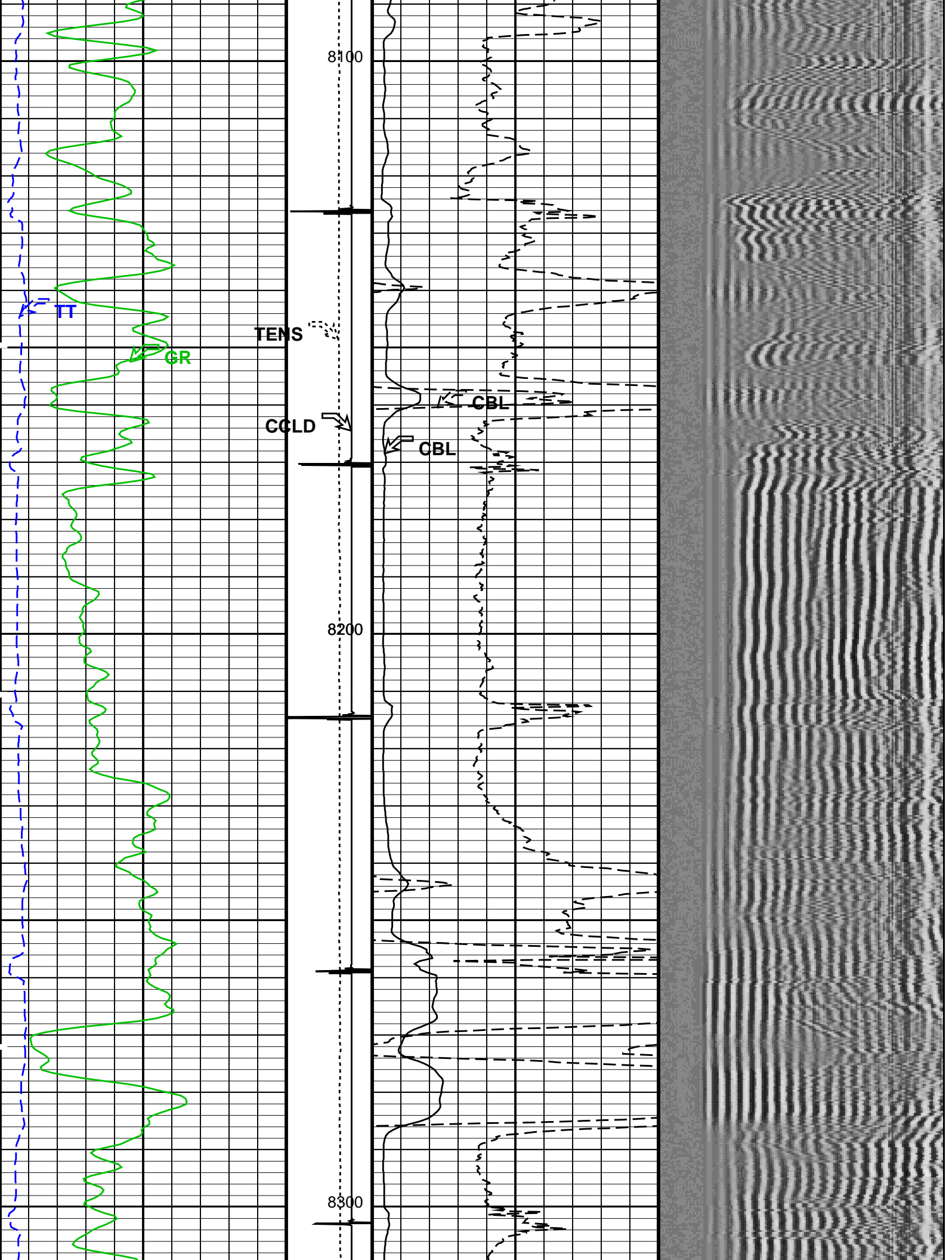


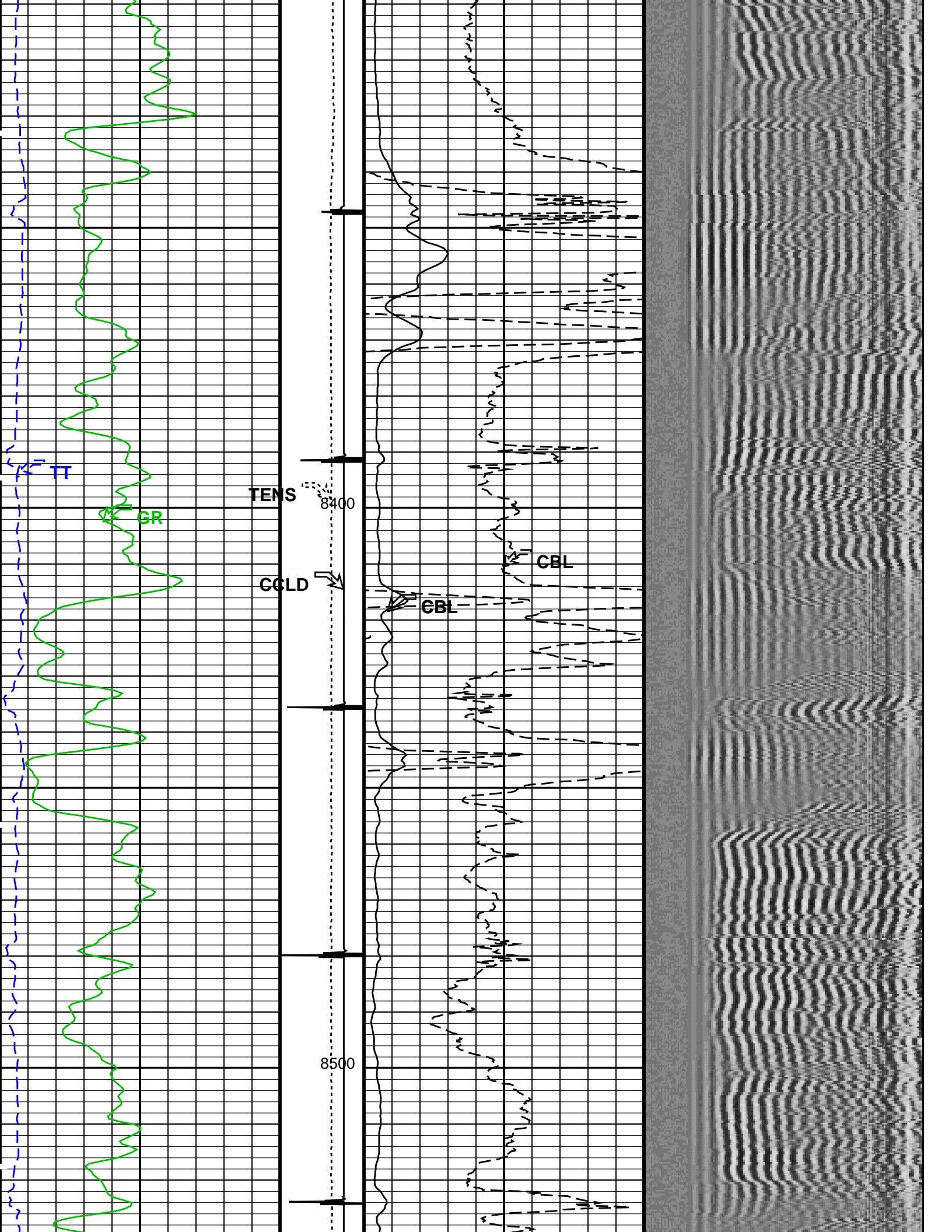


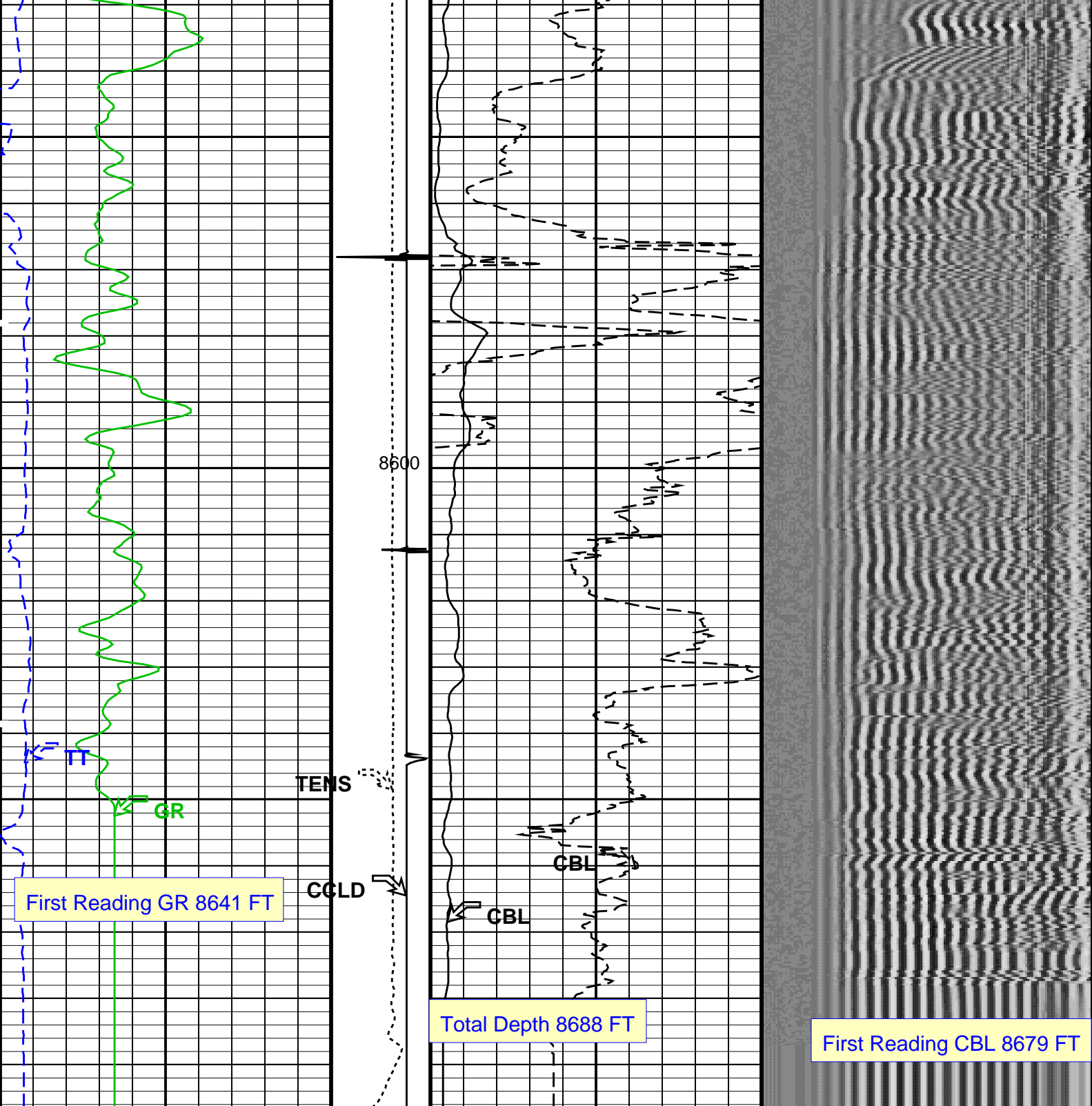












| | | | |
|--|--|--|---|
| <p>Gamma Ray (GR) (GAPI)</p> <p>0 150</p> | <p>Tension (TENS) (LBF)</p> <p>0 2000</p> | <p>CBL Amplitude (CBL) (MV)</p> <p>0 100</p> | <p>Min Amplitude Max</p> <p>200 VDL VariableDensity (VDL) (US) 1200</p> |
| <p>Transit Time (TT) (US)</p> <p>260 160</p> | <p>Discriminat ed CCL (CCLD) (V)</p> <p>3 -1</p> | <p>CBL Amplitude (CBL) (MV)</p> <p>0 10</p> | |

PIP SUMMARY

Time Mark Every 60 S

Format: CBL_VDL Vertical Scale: 5" per 100'

Graphics File Created: 26-Nov-2013 19:44

OP System Version: 19C0-187

| | | | |
|--|--------------|---------------------------------|---------------------------|
| <<<SCMT Cement Evaluation Information Summary>>> | | | |
| Sonde Serial Number | SCMS-CB 8303 | | |
| Current Casing Size | 4.50000 IN | | |
| Casing Weight | 11.6000 LB/F | | |
| Expected CBL Amplitude in Free Pipe Section | 80 MV | Minimum Sonic Amplitude | 0.579149 MV (100% Cement) |
| | | | 1.55185 MV (80% Cement) |
| | | MAP Minimum Sonic Amplitude | 4.32284 MV (100% Cement) |
| | | | 8.10244 MV (80% Cement) |
| Master Calibration (Normalization) | | Before Calibration (Adjustment) | |
| Date of Master Calibration | 19-NOV-2013 | | |
| CBL Correction Factor | 0.0743678 | CBL Adjustment Factor (CBAF) | 1.0 |
| MAP 1 Correction Factor | 0.127925 | MAP Adjustment Factor (MPAF) | 1.0 |
| MAP 2 Correction Factor | 0.120622 | | |
| MAP 3 Correction Factor | 0.153607 | | |
| MAP 4 Correction Factor | 0.159414 | | |
| MAP 5 Correction Factor | 0.164508 | | |
| MAP 6 Correction Factor | 0.182220 | | |
| MAP 7 Correction Factor | 0.190086 | | |
| MAP 8 Correction Factor | 0.182177 | | |

| Parameters | | | |
|---|--|-----------|------|
| DLIS Name | Description | Value | |
| SCMT-CB: Slim Cement Mapping Tool, 1-11/16 OD | | | |
| BILI | Bond Index Level for Zone Isolation | 0.8 | |
| CB3D | SCMT CBL 3 ft Peak Detection Mode | PEAK | |
| CB3G | SCMT CBL 3 ft Peak Detection T0_Delay and Noise Gate | 224.559 | US |
| CB3T | SCMT CBL 3 ft Fixed Threshold Level | 20 | MV |
| CB5D | SCMT CBL 5 ft Peak Detection Mode | PEAK | |
| CB5G | SCMT CBL 5 ft Peak Detection T0_Delay and Noise Gate | 338.559 | US |
| CB5T | SCMT CBL 5 ft Fixed Threshold Level | 20 | MV |
| CBLG | CBL Gate Width | 45 | US |
| CBRA | CBL LQC Reference Amplitude in Free Pipe | 80 | MV |
| CMCF | CBL Cement Type Compensation Factor | 1 | |
| CMTC | SCMT Slow Channel Multiplexer Mode | SCAN | |
| CMTM | SCMT Operating Mode | LOG | |
| CSCS | SCMT Slow Channel Index | VCC | |
| CTHI | Casing Thickness | 0.255617 | IN |
| DTF | Delta-T Fluid | 189 | US/F |
| FATT | Acoustic Attenuation due to Fluid | 0 | DB/F |
| FCF | CBL Fluid Compensation Factor | 0.924277 | |
| GOBO | Good Bond | 1.55185 | MV |
| MAPD | SCMT MAP Peak Detection Mode | PEAK | |
| MAPG | SCMT MAP Peak Detection T0_Delay and Noise Gate | 167.559 | US |
| MAPT | SCMT MAP Fixed Threshold Level | 30 | MV |
| MATT | Maximum Attenuation | 16.5449 | DB/F |
| MCCF | MAP Cement Type Compensation Factor | 1 | |
| MCI | Minimum Cemented Interval for Isolation | 1.25 | FT |
| MMSA | MAP Minimum Sonic Amplitude | 4.32284 | MV |
| MSA | Minimum Sonic Amplitude | 0.579149 | MV |
| PEDE | Peak Detection On/Off Switch in Playback | OFF | |
| VDLG | VDL Manual Gain | 5 | |
| ZCMT | Acoustic Impedance of Cement | 6.8 | MRAY |
| System and Miscellaneous | | | |
| CSIZ | Current Casing Size | 4.500 | IN |
| CWEI | Casing Weight | 11.60 | LB/F |
| DFD | Drilling Fluid Density | 8.40 | LB/G |
| DO | Depth Offset for Playback | 4.0 | FT |
| PP | Playback Processing | RECOMPUTE | |
| TD | Total Depth | 8688 | FT |

| Input DLIS Files | | | | | | |
|------------------|---------------------|-------|----------|-------------------|-----------|----------|
| DEFAULT | SCMT_RST_PSP_102LUP | FN:99 | PRODUCER | 26-Nov-2013 17:17 | 8692.5 FT | -11.0 FT |

Output DLIS Files

DEFAULT

SCMT_RST_PSP_106PUP

FN:103

PRODUCER

26-Nov-2013 19:44

Schlumberger

REPEAT ANALYSIS CBL VDL

MAXIS Field Log

Company: ENCANA OIL & GAS (USA) INC

Well: HMU 6-15AA (J6SEB)

Input DLIS Files

| | | | | | | |
|---------|---------------------|--------|----------|-------------------|-----------|-----------|
| DEFAULT | SCMT_RST_PSP_097LUP | FN:94 | PRODUCER | 26-Nov-2013 16:58 | 6753.0 FT | 6431.5 FT |
| DEFAULT | SCMT_RST_PSP_106PUP | FN:103 | PRODUCER | 26-Nov-2013 19:44 | 8696.5 FT | -51.5 FT |

Output DLIS Files

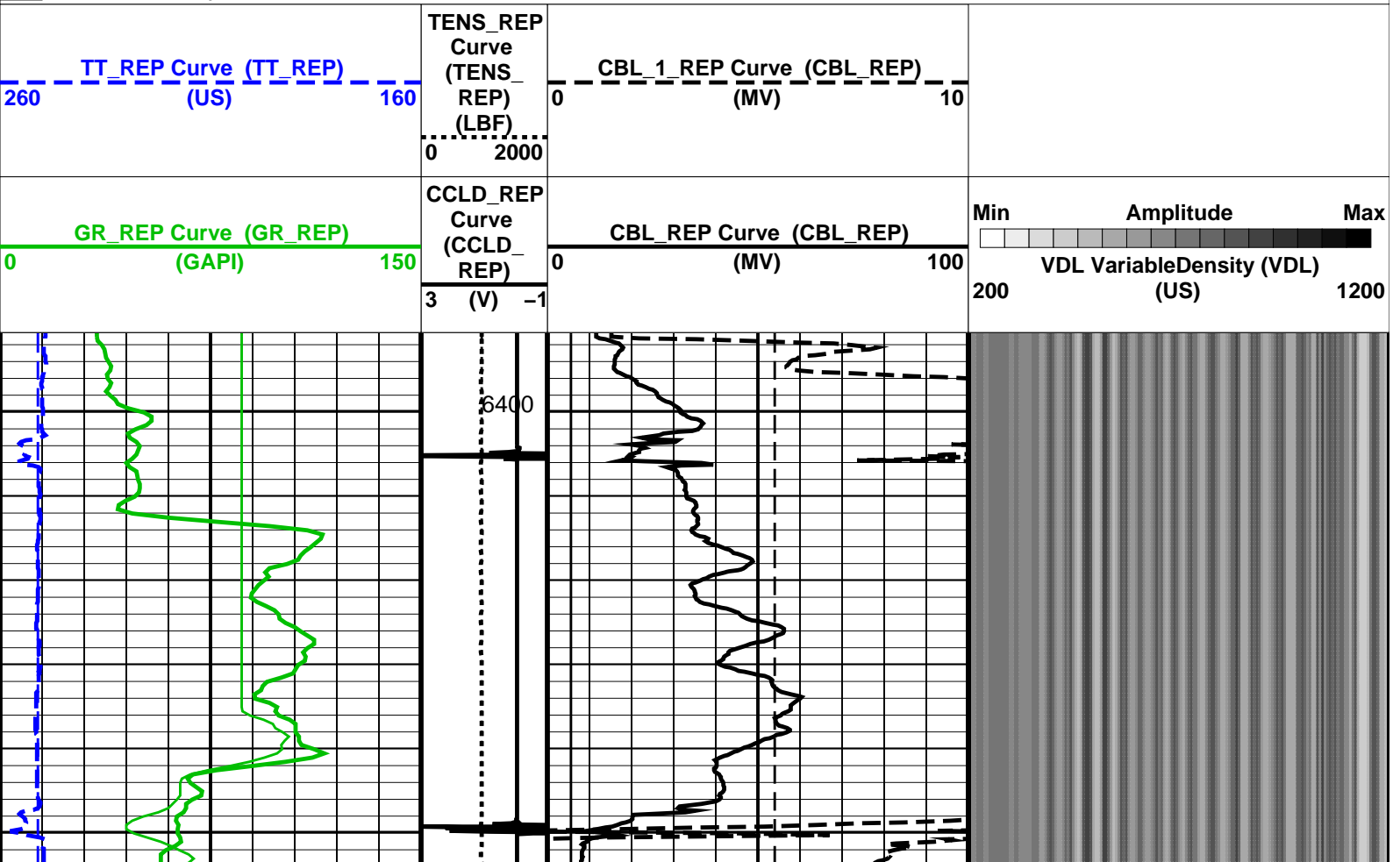
| | | | | | | |
|---------|---------------------|--------|----------|-------------------|-----------|-----------|
| DEFAULT | SCMT_RST_PSP_108PUP | FN:105 | PRODUCER | 26-Nov-2013 19:54 | 6756.0 FT | 6390.0 FT |
|---------|---------------------|--------|----------|-------------------|-----------|-----------|

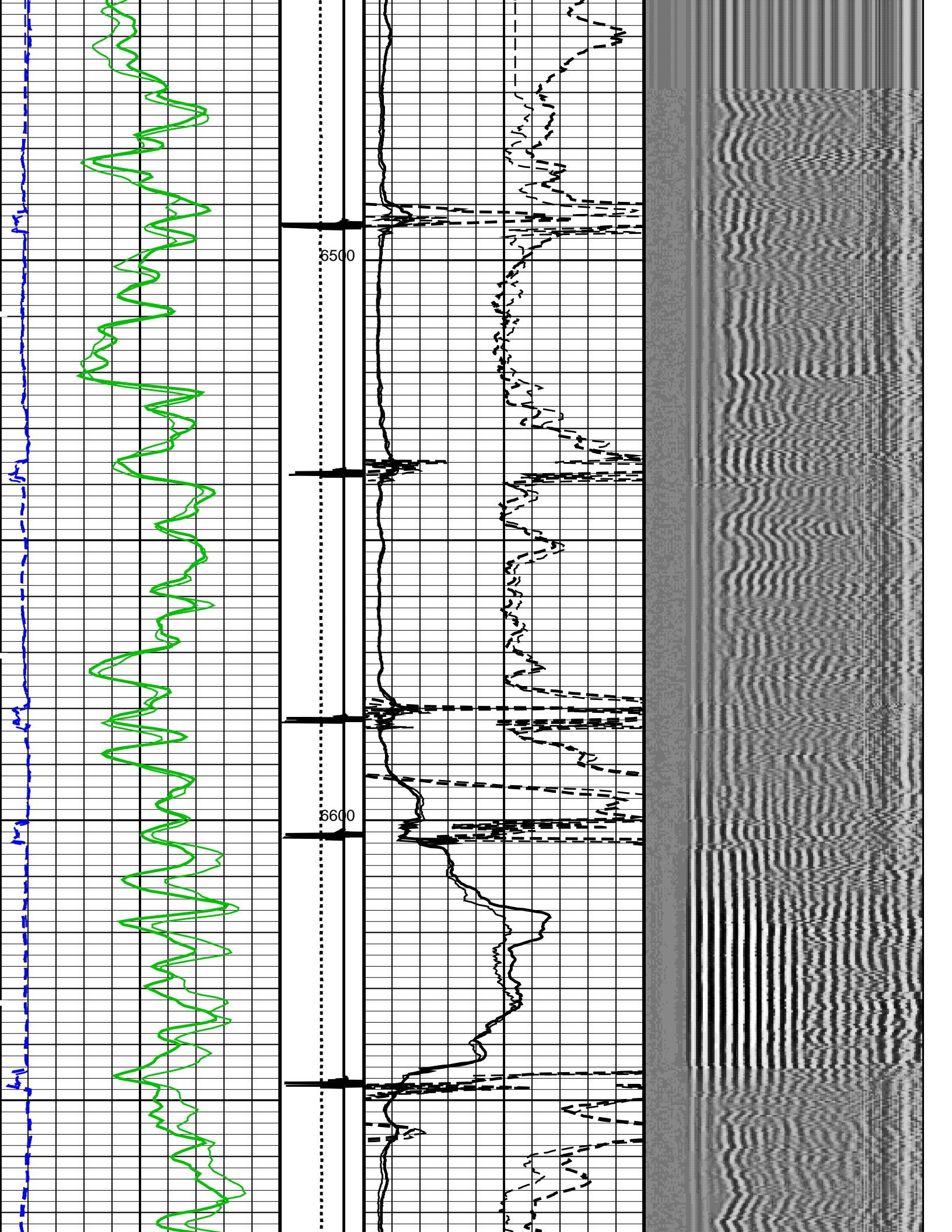
OP System Version: 19C0-187

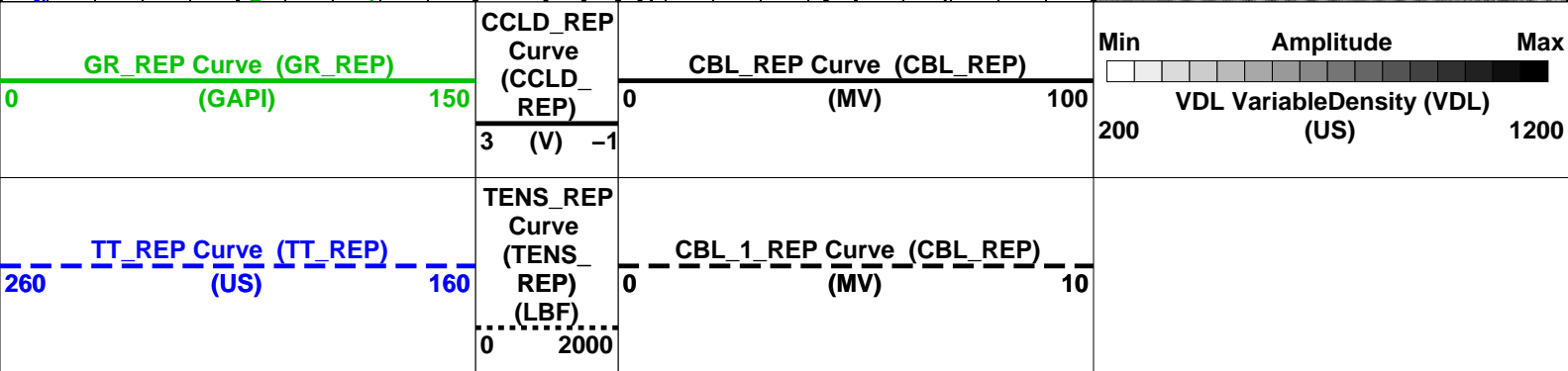
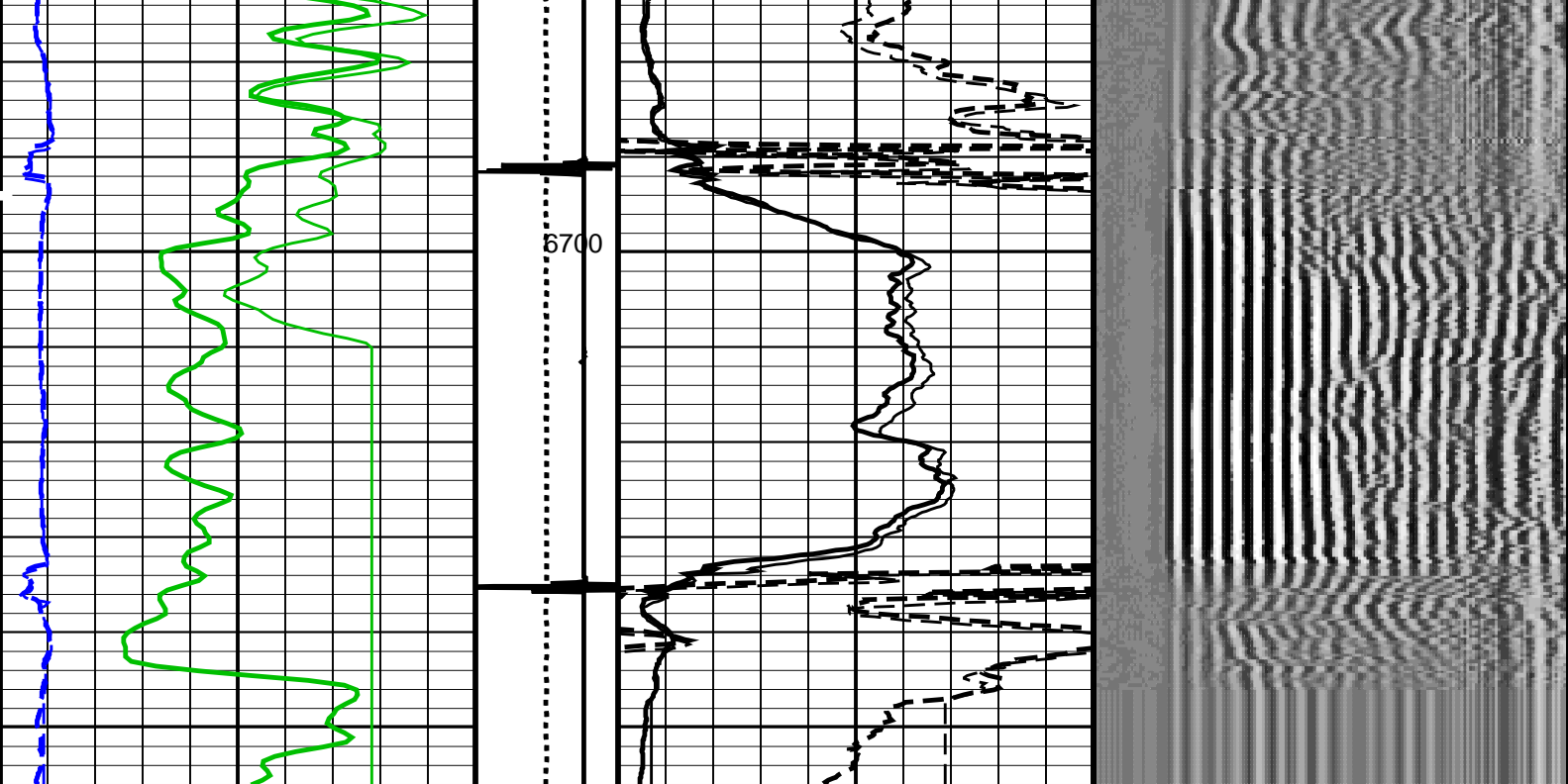
| | | | |
|---------|-----------------------|-------|-----------------------|
| SCMT-CB | SRPC-5214-H2-2012-OP1 | RST-C | SRPC-5214-H2-2012-OP1 |
| PSPT | SRPC-5214-H2-2012-OP1 | | |

PIP SUMMARY

Time Mark Every 60 S







PIP SUMMARY

☒ Time Mark Every 60 S
 Format: CBL_VDL_REP Vertical Scale: 5" per 100' Graphics File Created: 26-Nov-2013 19:54

OP System Version: 19C0-187

| | | | |
|---------|-----------------------|-------|-----------------------|
| SCMT-CB | SRPC-5214-H2-2012-OP1 | RST-C | SRPC-5214-H2-2012-OP1 |
| PSPT | SRPC-5214-H2-2012-OP1 | | |

<<<SCMT Cement Evaluation Information Summary>>>

| | | | |
|---|--------------|---------------------------------|--|
| Sonde Serial Number | SCMS-CB 8303 | | |
| Current Casing Size | 4.50000 IN | | |
| Casing Weight | 11.6000 LB/F | | |
| Expected CBL Amplitude in Free Pipe Section | 80 MV | Minimum Sonic Amplitude | 0.579149 MV (100% Cement) 1.55185 MV (80% Cement) |
| | | MAP Minimum Sonic Amplitude | 4.32284 MV (100% Cement) 8.10244 MV (80% Cement) |
| Master Calibration (Normalization) | | Before Calibration (Adjustment) | |
| Date of Master Calibration | 19-NOV-2013 | | |
| CBL Correction Factor | 0.0743678 | CBL Adjustment Factor (CBAF) | 1.0 |
| MAP 1 Correction Factor | 0.127925 | MAP Adjustment Factor (MPAF) | 1.0 |
| MAP 2 Correction Factor | 0.120622 | | |
| MAP 3 Correction Factor | 0.153607 | | |
| MAP 4 Correction Factor | 0.150414 | | |

| | |
|-------------------------|----------|
| MAP 4 Correction Factor | 0.159414 |
| MAP 5 Correction Factor | 0.164508 |
| MAP 6 Correction Factor | 0.182220 |
| MAP 7 Correction Factor | 0.190086 |
| MAP 8 Correction Factor | 0.182177 |

Parameters

| DLIS Name | Description | Value | |
|---|--|-----------|------|
| SCMT-CB: Slim Cement Mapping Tool, 1-11/16 OD | | | |
| BILI | Bond Index Level for Zone Isolation | 0.8 | |
| CB3D | SCMT CBL 3 ft Peak Detection Mode | PEAK | |
| CB3G | SCMT CBL 3 ft Peak Detection T0_Delay and Noise Gate | 224.559 | US |
| CB3T | SCMT CBL 3 ft Fixed Threshold Level | 20 | MV |
| CB5D | SCMT CBL 5 ft Peak Detection Mode | PEAK | |
| CB5G | SCMT CBL 5 ft Peak Detection T0_Delay and Noise Gate | 338.559 | US |
| CB5T | SCMT CBL 5 ft Fixed Threshold Level | 20 | MV |
| CBLG | CBL Gate Width | 45 | US |
| CBRA | CBL LQC Reference Amplitude in Free Pipe | 80 | MV |
| CMCF | CBL Cement Type Compensation Factor | 1 | |
| CMTC | SCMT Slow Channel Multiplexer Mode | SCAN | |
| CMTM | SCMT Operating Mode | LOG | |
| CSCS | SCMT Slow Channel Index | VCC | |
| CTHI | Casing Thickness | 0.255617 | IN |
| DTF | Delta-T Fluid | 189 | US/F |
| FATT | Acoustic Attenuation due to Fluid | 0 | DB/F |
| FCF | CBL Fluid Compensation Factor | 0.924277 | |
| GOBO | Good Bond | 1.55185 | MV |
| MAPD | SCMT MAP Peak Detection Mode | PEAK | |
| MAPG | SCMT MAP Peak Detection T0_Delay and Noise Gate | 167.559 | US |
| MAPT | SCMT MAP Fixed Threshold Level | 30 | MV |
| MATT | Maximum Attenuation | 16.5449 | DB/F |
| MCCF | MAP Cement Type Compensation Factor | 1 | |
| MCI | Minimum Cemented Interval for Isolation | 1.25 | FT |
| MMSA | MAP Minimum Sonic Amplitude | 4.32284 | MV |
| MSA | Minimum Sonic Amplitude | 0.579149 | MV |
| PEDE | Peak Detection On/Off Switch in Playback | OFF | |
| VDLG | VDL Manual Gain | 5 | |
| ZCMT | Acoustic Impedance of Cement | 6.8 | MRAY |
| System and Miscellaneous | | | |
| CSIZ | Current Casing Size | 4.500 | IN |
| CWEI | Casing Weight | 11.60 | LB/F |
| DFD | Drilling Fluid Density | 8.40 | LB/G |
| DO | Depth Offset for Playback | 3.0 | FT |
| DORL | Depth Offset for Repeat Analysis | 0.0 | FT |
| PP | Playback Processing | RECOMPUTE | |
| TD | Total Depth | 8688 | FT |

Input DLIS Files

| | | | | | | |
|---------|---------------------|--------|----------|-------------------|-----------|-----------|
| DEFAULT | SCMT_RST_PSP_097LUP | FN:94 | PRODUCER | 26-Nov-2013 16:58 | 6753.0 FT | 6431.5 FT |
| DEFAULT | SCMT_RST_PSP_106PUP | FN:103 | PRODUCER | 26-Nov-2013 19:44 | 8696.5 FT | -51.5 FT |

Output DLIS Files

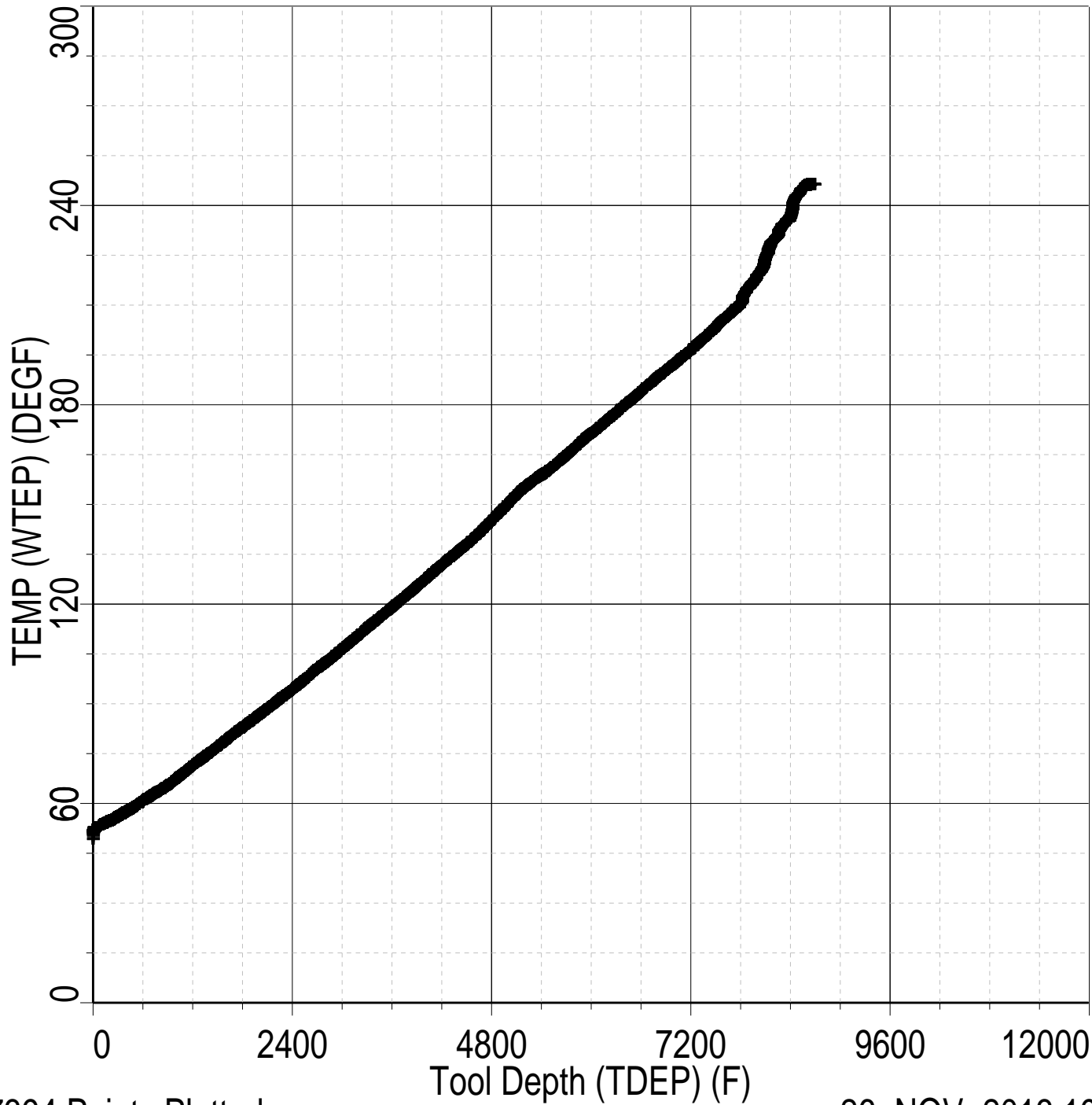
| | | | | |
|---------|---------------------|--------|----------|-------------------|
| DEFAULT | SCMT_RST_PSP_108PUP | FN:105 | PRODUCER | 26-Nov-2013 19:54 |
|---------|---------------------|--------|----------|-------------------|

Schlumberger

TEMPERATURE PLOT

MAXIS Field Log

Index: 8696.5 – -51.5 FT



17394 Points Plotted

26-NOV-2013 19:52

Schlumberger

PBMS COEFFICIENTS

MAXIS Field Log

Client: ENCANA OIL & GAS (USA) INC
Field: MAMM CREEK
Well: HMU 6-15AA (J6SEB)
Run date: 26-Nov-2013

Tool: PSP
Sub Type: PBMS
Sensor: GR

PBMS Gamma Ray

Sonde Serial NB

Sensor Serial NB

Calib Date ddmmyy

Matrix Size

Coeff CRC

RESISTORS FOR GR SENSOR N.33223,TOOL PBMS–BA0928. SENSOR S/N:
33223
090800
12
CFE2

GR HV Rt

| | Rt**0 | Rt**1 |
|-------|--------------------|--------------------|
| Rt**0 | +.182000000000e+04 | +.332000000000e+04 |

Client: ENCANA OIL & GAS (USA) INC

Field: MAMM CREEK

Well: HMU 6–15AA (J6SEB)

Run date: 26–Nov–2013

Tool: PSP

Sub Type: PBMS

Sensor: WellTemp RTD

PBMS RTD Well Thermometer

Sonde Serial NB

Sensor Serial NB

Calib Date ddmmyy

Matrix Size

Coeff CRC

COEFFICIENTS FOR RTD THERMOMETER PBMS–B.928 S/N:
928
280612
16
A24E

WTemp Coeff

| | Tt**0 | Tt**1 | Tt**2 |
|-------|--------------------|--------------------|--------------------|
| Tt**0 | –.391987973189E+03 | +.191346892512E+03 | –.440920753451E+02 |
| | Tt**3 | Tt**4 | Tt**5 |
| Tt**0 | +.957191300908E+01 | –.711421725686E+00 | 0.0 |

| | | | |
|-----------|----------------------------|-----------|------|
| Client: | ENCANA OIL & GAS (USA) INC | Tool: | PSP |
| Field: | MAMM CREEK | Sub Type: | PBMS |
| Well: | HMU 6-15AA (J6SEB) | Sensor: | CQG |
| Run date: | 26-Nov-2013 | | |

PBMS Quartz Gauge type F

| | |
|-------------------|--------------------------------------|
| Sonde Serial NB | COEFFICIENTS FOR CQG PBMS-B.928 S/N: |
| Sensor Serial NB | 928 |
| Calib Date ddmmyy | 280612 |
| Matrix Size | 66 |
| Coeff CRC | 9DC3 |

Pres Coeff

| | | | |
|-------|--------------------|--------------------|--------------------|
| | Fb**0 | Fb**1 | Fb**2 |
| Fc**0 | +714463802232E+04 | +183434658655E-01 | -.156620073569E-06 |
| Fc**1 | -.100638308957E+01 | -.119899563644E-04 | -.912155899025E-10 |
| Fc**2 | +936268101283E-06 | +423898071451E-10 | +958076371919E-15 |
| Fc**3 | +185123362373E-11 | +203107925433E-15 | 0.0 |
| Fc**4 | 0.0 | 0.0 | 0.0 |
| Fc**5 | 0.0 | 0.0 | 0.0 |

| | | | |
|-------|--------------------|--------------------|--------------------|
| | Fb**3 | Fb**4 | Fb**5 |
| Fc**0 | -.746577997611E-10 | -.588773826860E-15 | -.622250441458E-19 |
| Fc**1 | -.120636521092E-15 | +400325894750E-19 | 0.0 |
| Fc**2 | 0.0 | 0.0 | 0.0 |
| Fc**3 | 0.0 | 0.0 | 0.0 |
| Fc**4 | 0.0 | 0.0 | 0.0 |
| Fc**5 | 0.0 | 0.0 | 0.0 |

PBMS Quartz Gauge type F

| | |
|-------------------|--------|
| Sonde Serial NB | : |
| Sensor Serial NB | 928 |
| Calib Date ddmmyy | 280612 |
| Matrix Size | 66 |
| Coeff CRC | 283B |

Temp Coeff

| | | | |
|-------|-------------------|--------------------|-------------------|
| | Fc**0 | Fc**1 | Fc**2 |
| Fb**0 | +117016867873E+03 | -.284359629614E-03 | +604391180345E-08 |

| | | | |
|-------|--------------------|--------------------|--------------------|
| Fb**1 | −.598309140812E−02 | +.182731130848E−07 | +.160166486172E−12 |
| Fb**2 | −.307621454576E−07 | +.300601550309E−12 | +.311233548560E−17 |
| Fb**3 | −.419658736767E−12 | +.117473708647E−16 | 0.0 |
| Fb**4 | 0.0 | 0.0 | 0.0 |
| Fb**5 | 0.0 | 0.0 | 0.0 |

| | | | |
|-------|--------------------|--------------------|--------------------|
| | Fc**3 | Fc**4 | Fc**5 |
| Fb**0 | +.114322792679E−12 | +.153807711176E−17 | −.736714260866E−21 |
| Fb**1 | −.528037875456E−18 | −.220337637519E−21 | 0.0 |
| Fb**2 | 0.0 | 0.0 | 0.0 |
| Fb**3 | 0.0 | 0.0 | 0.0 |
| Fb**4 | 0.0 | 0.0 | 0.0 |
| Fb**5 | 0.0 | 0.0 | 0.0 |

PBMS Quartz Gauge type F

Sonde Serial NB

:

Sensor Serial NB

928

Calib Date ddmmyy

280612

Matrix Size

16

Coeff CRC

093F

Clock Freq Coeff

| | | | |
|--------------|--------------------|--------------------|--------------------|
| | (Fb'−Fc')**0 | (Fb'−Fc')**1 | (Fb'−Fc')**2 |
| (Fb'−Fc')**0 | +.310874009898E+05 | +.288920923041E−02 | +.697940727038E−06 |
| | (Fb'−Fc')**3 | (Fb'−Fc')**4 | (Fb'−Fc')**5 |
| (Fb'−Fc')**0 | −.657432344763E−10 | −.412920638782E−15 | +.213369826099E−20 |

PBMS Quartz Gauge type F

Sonde Serial NB

:

Sensor Serial NB

928

Calib Date ddmmyy

280612

Matrix Size

16

Coeff CRC

8419

Clock Temp Coeff

| | | | |
|--------------|--------------------|--------------------|--------------------|
| | (Fb'−Fc')**0 | (Fb'−Fc')**1 | (Fb'−Fc')**2 |
| (Fb'−Fc')**0 | +.115369519827E+03 | −.565338877075E−02 | −.333717531829E−07 |
| | (Fb'−Fc')**3 | (Fb'−Fc')**4 | (Fb'−Fc')**5 |
| (Fb'−Fc')**0 | −.124387135327E−12 | +.713102327208E−16 | −.316084316842E−20 |



MASTER CALIBRATION

MAXIS Field Log

Slim Cement Mapping Tool, 1-11/16 OD / Equipment Identification

Primary Equipment:

Slim Cement Mapping Xmitter Electronics
Slim Cement Mapping Sonde
Slim Cement Mapping Cartridge

SCMX – CA
SCMS – CB 8303
SCMC – CA 8120

Auxiliary Equipment:

Slim Electronics Cartridge Housing

SECH – CA

Slim Cement Mapping Tool, 1-11/16 OD Master Calibration

SCMT CBL and MAP Amplitude Normalization in SFT-155/-255

| Phase | MAP 1 Amplitude Plus MV | Value | Phase | MAP 2 Amplitude Plus MV | Value |
|--------|---|-------|--------|---|-------|
| Master | | 938.0 | Master | | 994.8 |
| | 500.0 (Minimum) 1075 (Nominal) 1650 (Maximum) | | | 500.0 (Minimum) 1075 (Nominal) 1650 (Maximum) | |
| Phase | MAP 3 Amplitude Plus MV | Value | Phase | MAP 4 Amplitude Plus MV | Value |
| Master | | 781.2 | Master | | 752.8 |
| | 500.0 (Minimum) 1075 (Nominal) 1650 (Maximum) | | | 500.0 (Minimum) 1075 (Nominal) 1650 (Maximum) | |
| Phase | MAP 5 Amplitude Plus MV | Value | Phase | MAP 6 Amplitude Plus MV | Value |
| Master | | 729.4 | Master | | 658.5 |
| | 500.0 (Minimum) 1075 (Nominal) 1650 (Maximum) | | | 500.0 (Minimum) 1075 (Nominal) 1650 (Maximum) | |
| Phase | MAP 7 Amplitude Plus MV | Value | Phase | MAP 8 Amplitude Plus MV | Value |
| Master | | 631.3 | Master | | 658.7 |
| | 500.0 (Minimum) 1075 (Nominal) 1650 (Maximum) | | | 500.0 (Minimum) 1075 (Nominal) 1650 (Maximum) | |
| Phase | CBL Amplitude Plus MV | Value | | | |
| Master | | 1291 | | | |
| | 1000 (Minimum) 1350 (Nominal) 1700 (Maximum) | | | | |

Master: 19-Nov-2013 13:46

Company: **ENCANA OIL & GAS (USA) INC**

Well: **HMU 6-15AA (J6SEB)**

Field: **MAMM CREEK**

County: **GARFIELD**



County:

GARFIELD

State:

COLORADO

SLIM CEMENT MAPPING LOG

CBL-VDL

GAMMA RAY-CCL