

Company: ENCANA OIL & GAS (USA) INC.

Well: TWIN CREEK 12-5D1 (F12E)

Field: MAMM CREEK

County: GARFIELD State: COLORADO

CEMENT BOND LOG
CBL- VDL
GAMMA RAY - CCL

County: GARFIELD

Field: MAMM CREEK

Location: SHL: 2560' FNL & 1566' FWL

Well: TWIN CREEK 12-5D1

Company: ENCANA OIL & GAS (USA) INC.

LOCATION	
SHL: 2560' FNL & 1566' FWL BHL: 2420' FNL & 660' FWL	Elev.: K.B. 6166.80 ft G.L. 6144.80 ft D.F. 6165.80 ft
Permanent Datum: _____	GROUND LEVEL _____ Elev.: 6144.80 ft
Log Measured From: _____	KELLY BUSHING _____ 22.00 ft above Perm. Datum
Drilling Measured From: _____	KELLY BUSHING _____
API Serial No. 05-045-20388-0000	Section 12 Township 7S Range 92W

Logging Date	13-May-2012		
Run Number	THREE		
Depth Driller	5532 ft		
Schlumberger Depth	5452 ft		
Bottom Log Interval	5446 ft		
Top Log Interval	200 ft		
Casing Fluid Type	FRESH WATER		
Salinity			
Density	8.4 lbm/gal		
Fluid Level	22 ft		
BIT/CASING/TUBING STRING			
Bit Size	8.750 in		
From	22 ft		
To	5532 ft		
Casing/Tubing Size	4.500 in		
Weight	11.6 lbm/ft		
Grade	S80		
From	22 ft		
To	5505 ft		
Maximum Recorded Temperatures	157 degF		
Logger On Bottom	13-May-2012	Time	1:50
Unit Number	391	Location	GRAND JUNCTION
Recorded By	DAVID PATE		
Witnessed By	UNATTENDED		

PVT DATA				Run 1	Run 2	Run 3
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						
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						
Unit Number						
Recorded By						
Witnessed By						

DEPTH SUMMARY LISTING	
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Date Created: 13-MAY-2012 12:07:04

Depth System Equipment

Depth Measuring Device		Tension Device		Logging Cable	
Type:	IDW-B	Type:	CMTD-C	Type:	1-25ZT
Serial Number:	5913	Serial Number:	5032	Serial Number:	391
Calibration Date:	30-SEP-2011	Calibration Date:	2-MAY-2012	Length:	18400 FT
Calibrator Serial Number:	33	Calibrator Serial Number:	1159		
Calibration Cable Type:	1-25ZT	Number of Calibration Points:	10	Conveyance Method:	Wireline
Wheel Correction 1:	-5	Calibration RMS:	8	Rig Type:	Rigless
Wheel Correction 2:	-5	Calibration Peak Error:	4		

Depth Control Parameters	
Depth (m)	0.0
Depth (m)	0.5
Depth (m)	1.0
Depth (m)	1.5
Depth (m)	2.0
Depth (m)	2.5
Depth (m)	3.0
Depth (m)	3.5
Depth (m)	4.0
Depth (m)	4.5
Depth (m)	5.0
Depth (m)	5.5
Depth (m)	6.0
Depth (m)	6.5
Depth (m)	7.0
Depth (m)	7.5
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Depth (m)	8.5
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Depth (m)	9.5
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Depth (m)	10.5
Depth (m)	11.0
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Depth (m)	12.5
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Depth (m)	14.5
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Depth (m)	17.5
Depth (m)	18.0
Depth (m)	18.5
Depth (m)	19.0
Depth (m)	19.5
Depth (m)	20.0
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Depth (m)	21.5
Depth (m)	22.0
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Depth (m)	23.5
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Depth (m)	24.5
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Depth (m)	26.5
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Depth (m)	30.5
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Depth (m)	31.5
Depth (m)	32.0
Depth (m)	32.5
Depth (m)	33.0
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Depth (m)	34.0
Depth (m)	34.5
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Depth (m)	73.5
Depth (m)	74.0
Depth (m)	74.5
Depth (m)	75.0
Depth (m)	75.5
Depth (m)	76.0
Depth (m)	76.5
Depth (m)	77.0
Depth (m)	77.5
Depth (m)	78.0

Log Sequence:	Subsequent Log In the Well
Reference Log Name:	CEMENT BOND LOG
Reference Log Run Number:	TWO
Reference Log Date:	8-FEB-2012

Depth Control Remarks	
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| 1. ALL SCHLUMBERGER DEPTH CONTROL POLICIES APPLIED
2. IDW USED AS PRIMARY DEPTH REFERENCE, Z-CHART USED AS SECONDARY.
3.
4.
5.
6. |
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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: RST	OS1:
OS2:	OS2:
OS3:	OS3:
OS4:	OS4:
OS5:	OS5:
REMARKS: RUN NUMBER 1	REMARKS: RUN NUMBER 2
THIS LOG CORRELATED TO CEMENT BOND LOG RAN ON 8-FEB-2012	BY E&P WIRELINE.
TOOL RAN AS PER TOOL SKETCH.	
TD TAGGED AT: 5452FT	
MAXIMUM RECORDED PRESSURE: 2271 PSIA	
MAXIMUM RECORDED TEMPERATURE: 157 DEGF	
SHORT JOINTS: 3450 FT & 4490 FT	

CLIENT COMMENTS: 01/10/17 & 1/10/17	
=	
CYCLESKIPPING DUE TO GOOD BOND CAUSING TT TO READ HIGH.	
EXPECTED FREE PIPE AMPLITUDE: 80mA	
AFE: 09133381	
THANK YOU FOR CHOOSING SCHLUMBERGER.	
CREW: 391- WALEED A. & CHRIS A.	

RUN 1 SERVICE ORDER #: BIHS-00254 PROGRAM VERSION: 18C0-147 FLUID LEVEL: 22 ft			RUN 2 SERVICE ORDER #: PROGRAM VERSION: FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

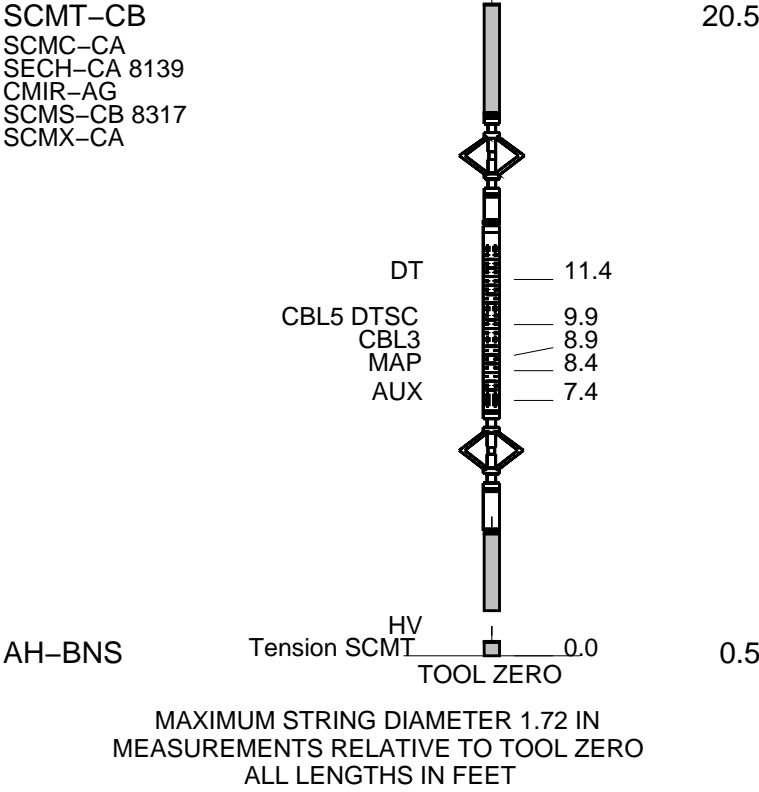
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3	1	1
4	1	1
5	1	1
6	1	1
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8	1	1
9	1	1
10	1	1
11	1	1
12	1	1
13	1	1
14	1	1
15	1	1
16	1	1
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97	1	1
98	1	1
99	1	1
100	1	1

WITM-A 4101 PSC_16MHZ	SURFACE EQUIPMENT	
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DOWNHOLE EQUIPMENT

Device	Temperature (°C)
MH-22	53.7
MH-22	
Detail MT	
TelStatus	
CTEM	
AH-38	52.1
PSPT-A	51.8
PSC-A	
PSPT-A 3779	
PSTC	
PBMS-A 3779	48.1
10k_Sapphire_Mano	
RTD_Thermometer	
GR 33659	45.0
CCL	44.9
PBMS 2782	44.3
	43.5
Well_Temp	
Manometer	
CCL	
PBMS PSTC	
RST-C	43.5
RSCH-A 298	
RSC-E	
RSS-A 255	
RSXH-A	
RSX-E 425	
RSC-A Far	34.4
RSC-A PNG	
RSC-A Nea	
RSX-A PNG	33.9



Schlumberger

MAIN PASS 0 PSI

MAXIS Field Log

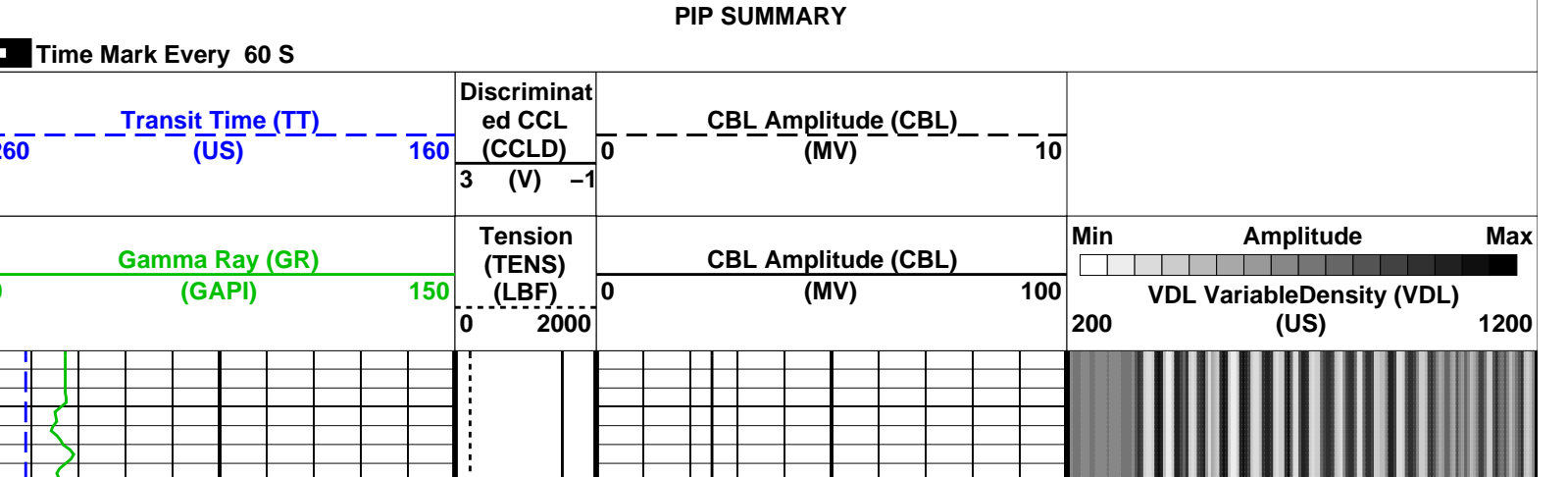
Company: ENCANA OIL & GAS (USA) INC. Well: TWIN CREEK F12E PAD

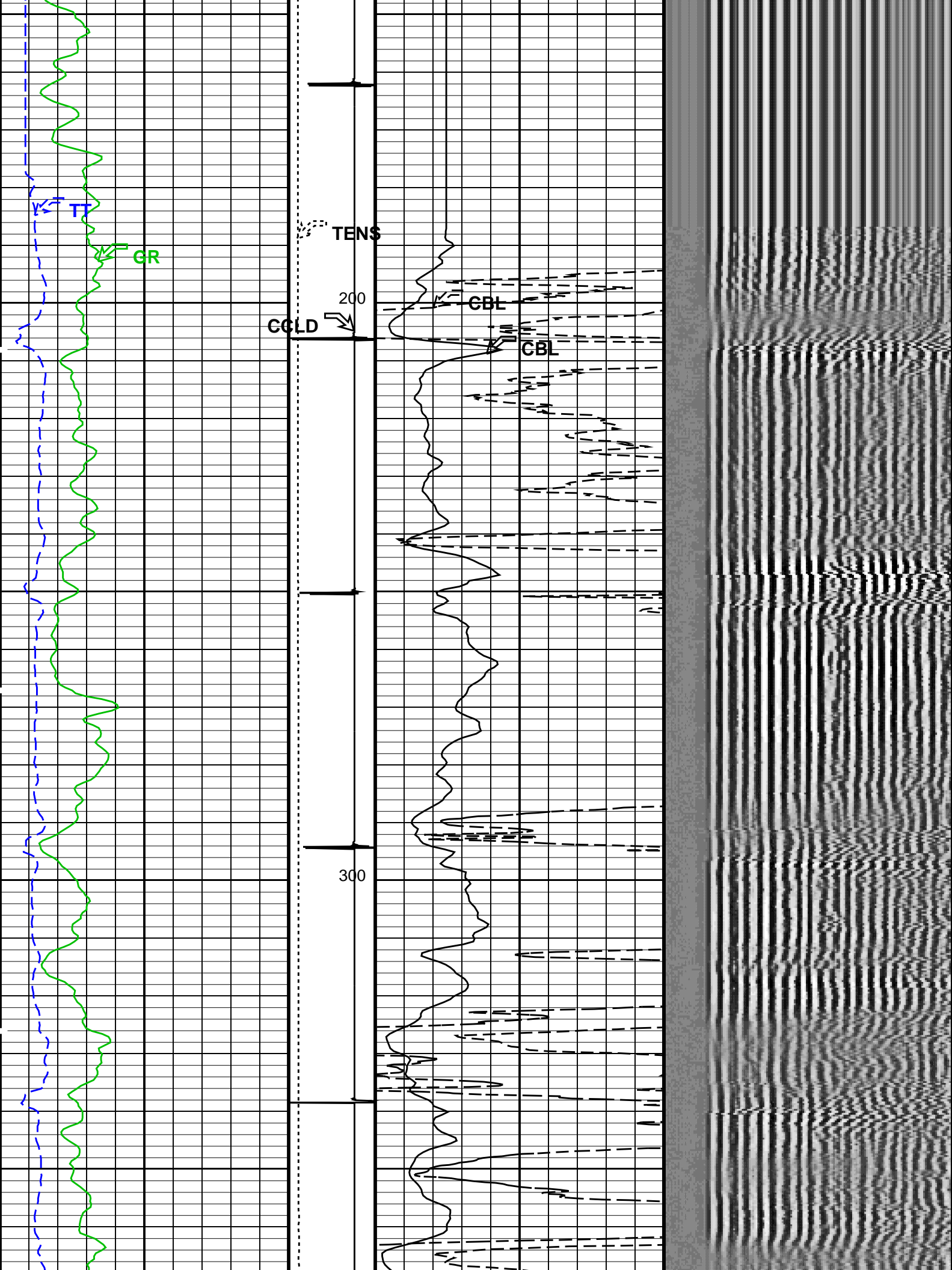
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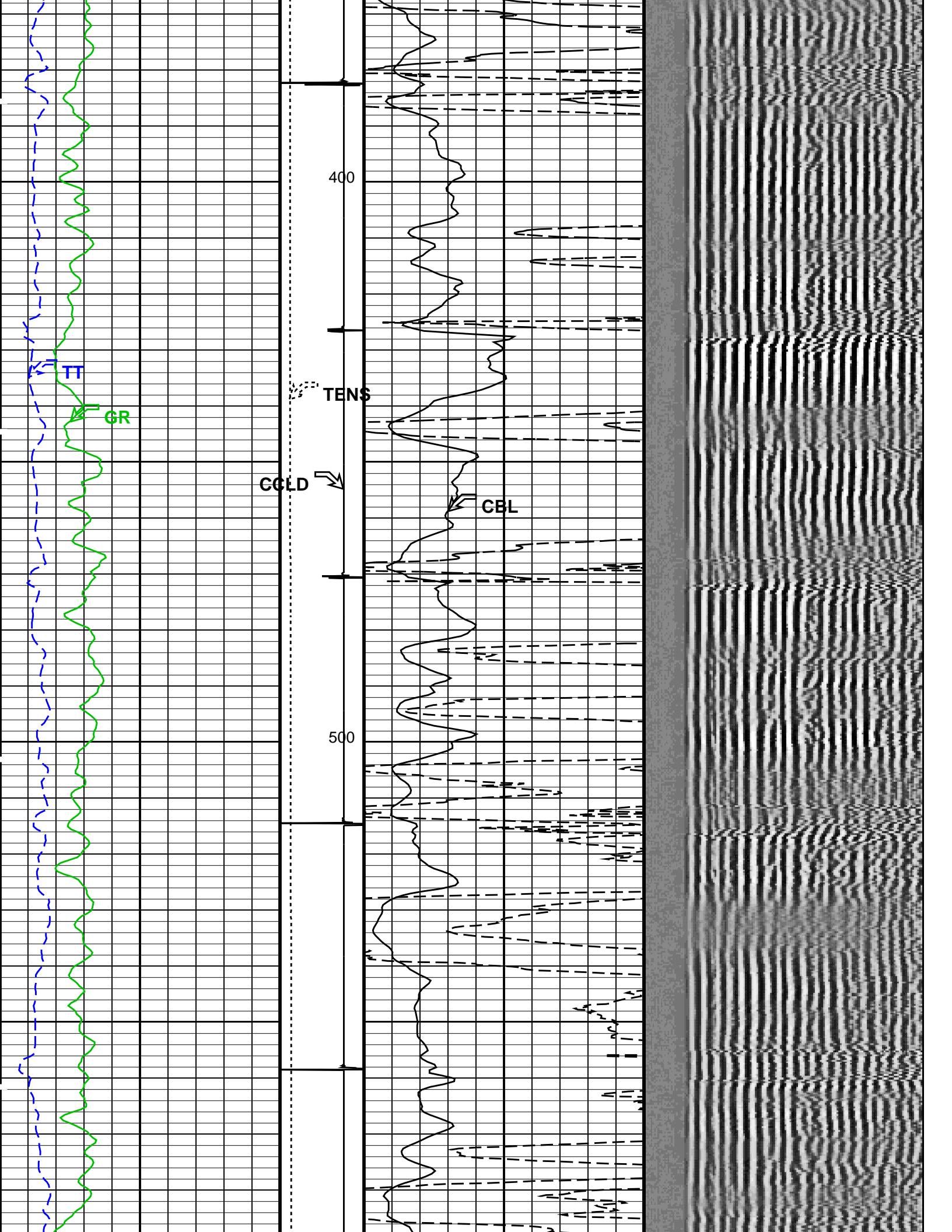
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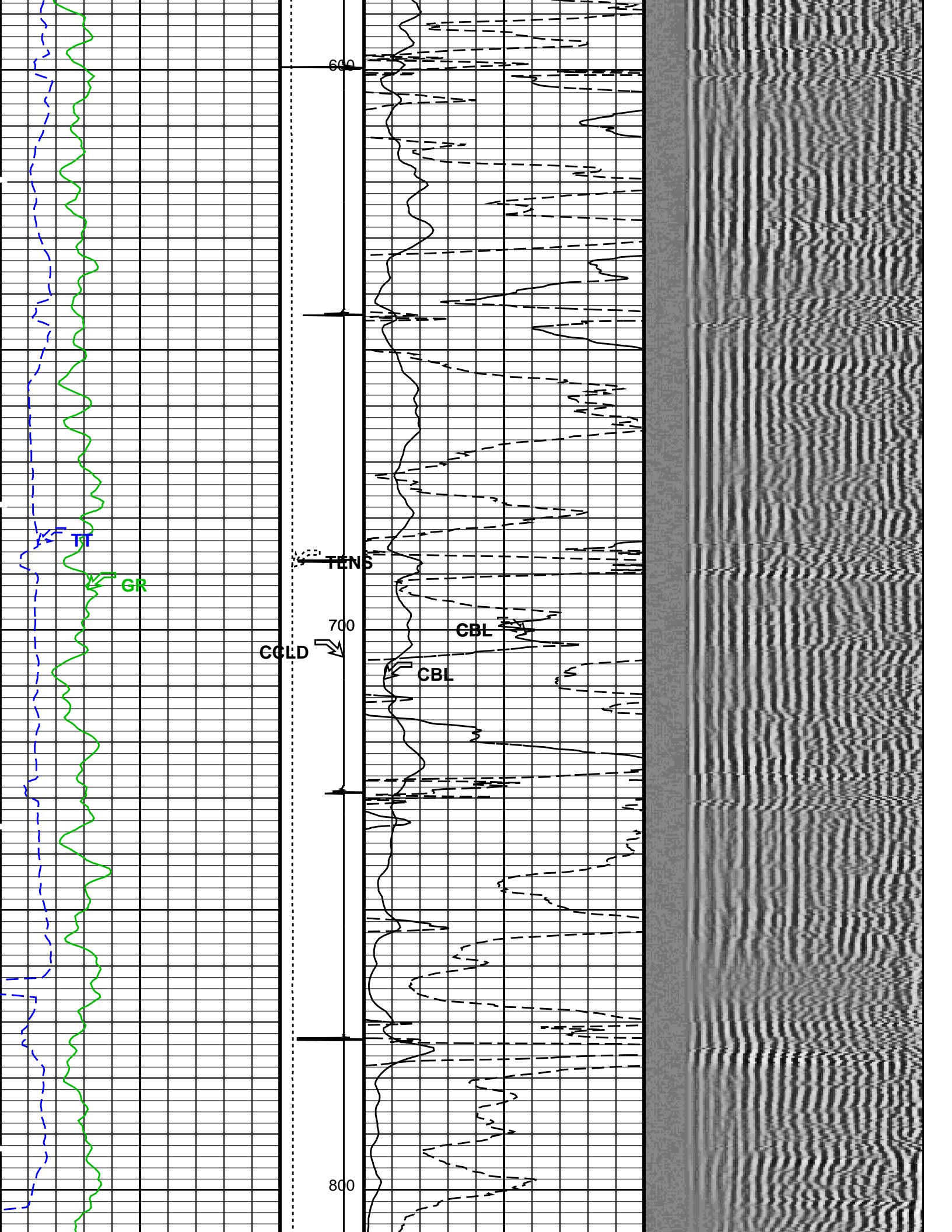
OP System Version: 18C0-147

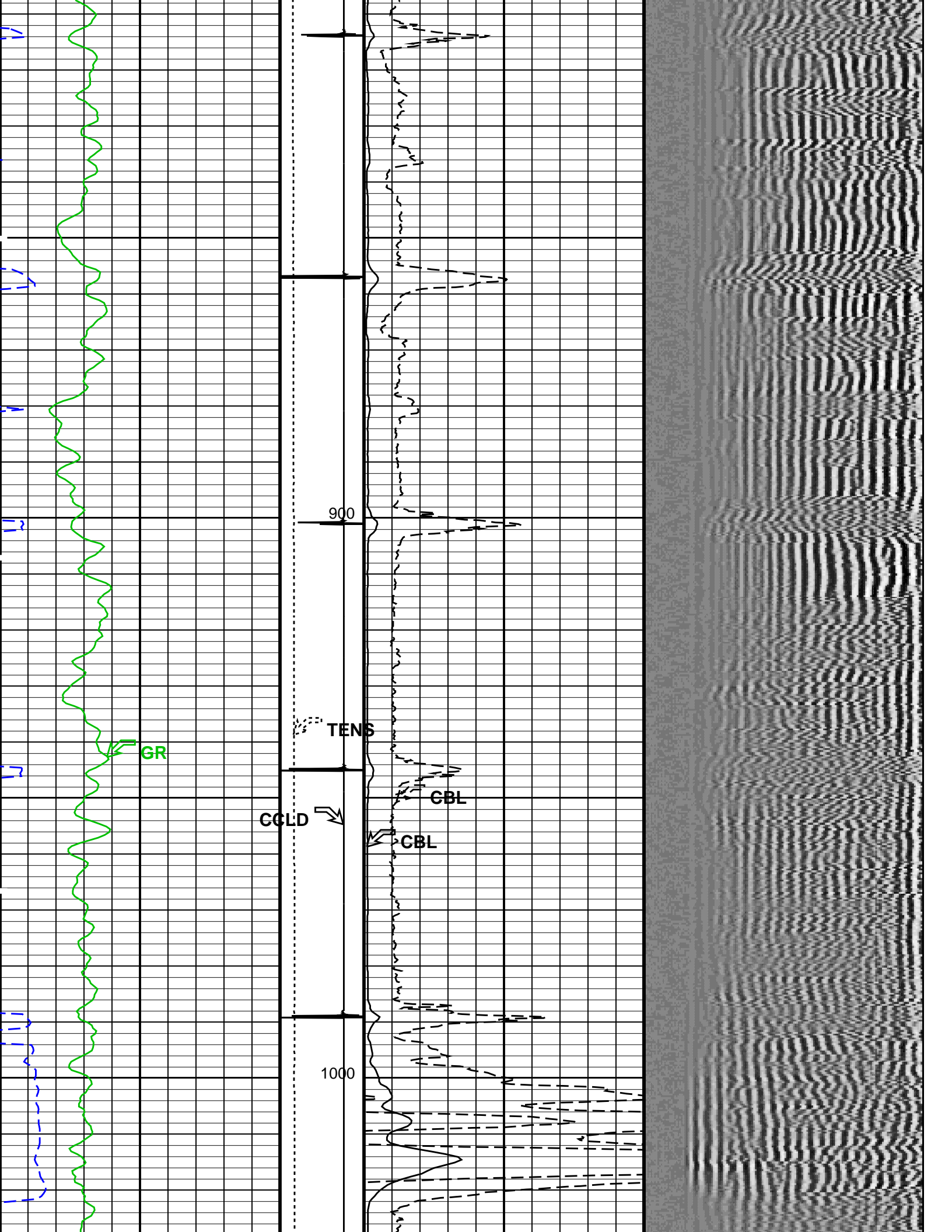
SCMT-CB HFE-4028-IFLEX RST-C 18C0-147
PSPT-A HFE-4028-IFLEX

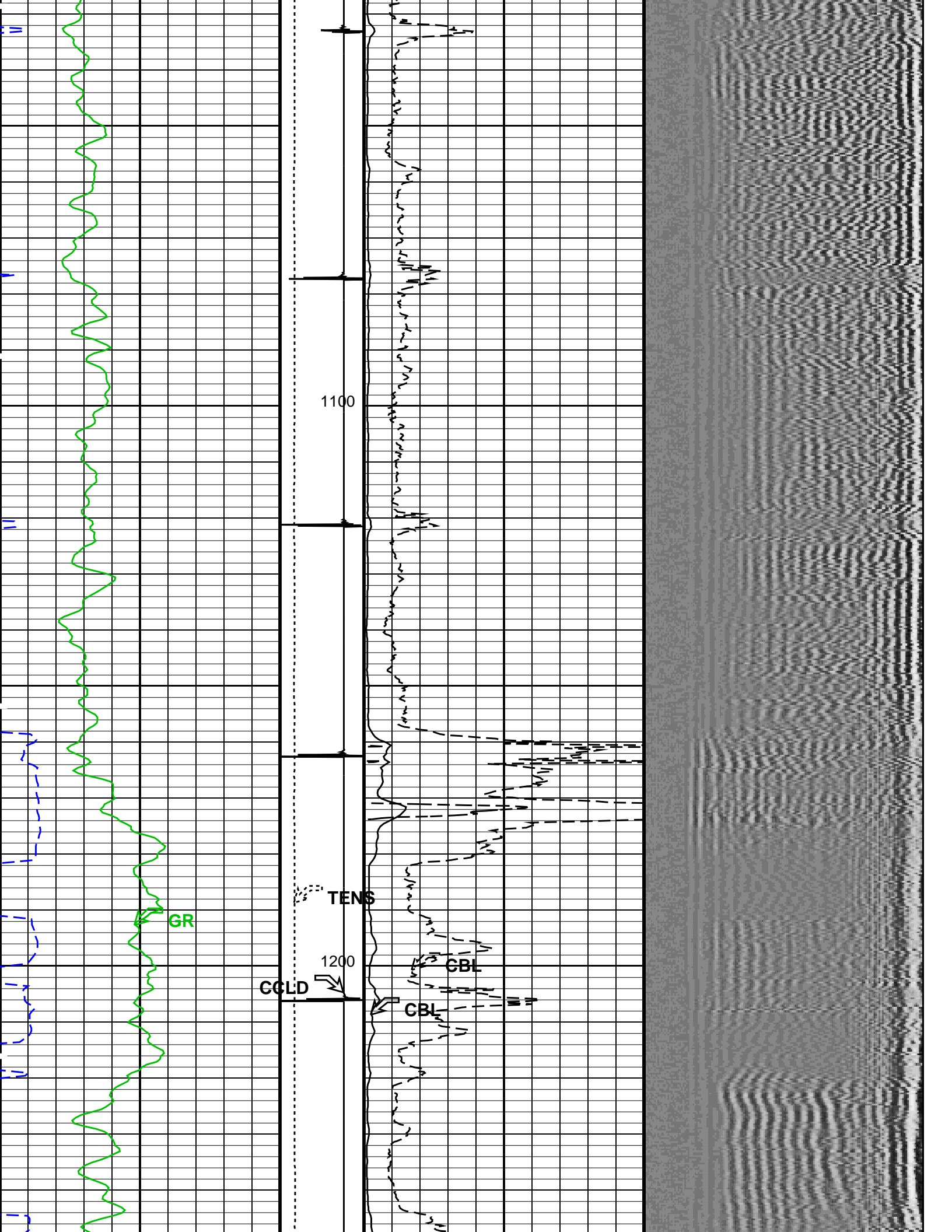


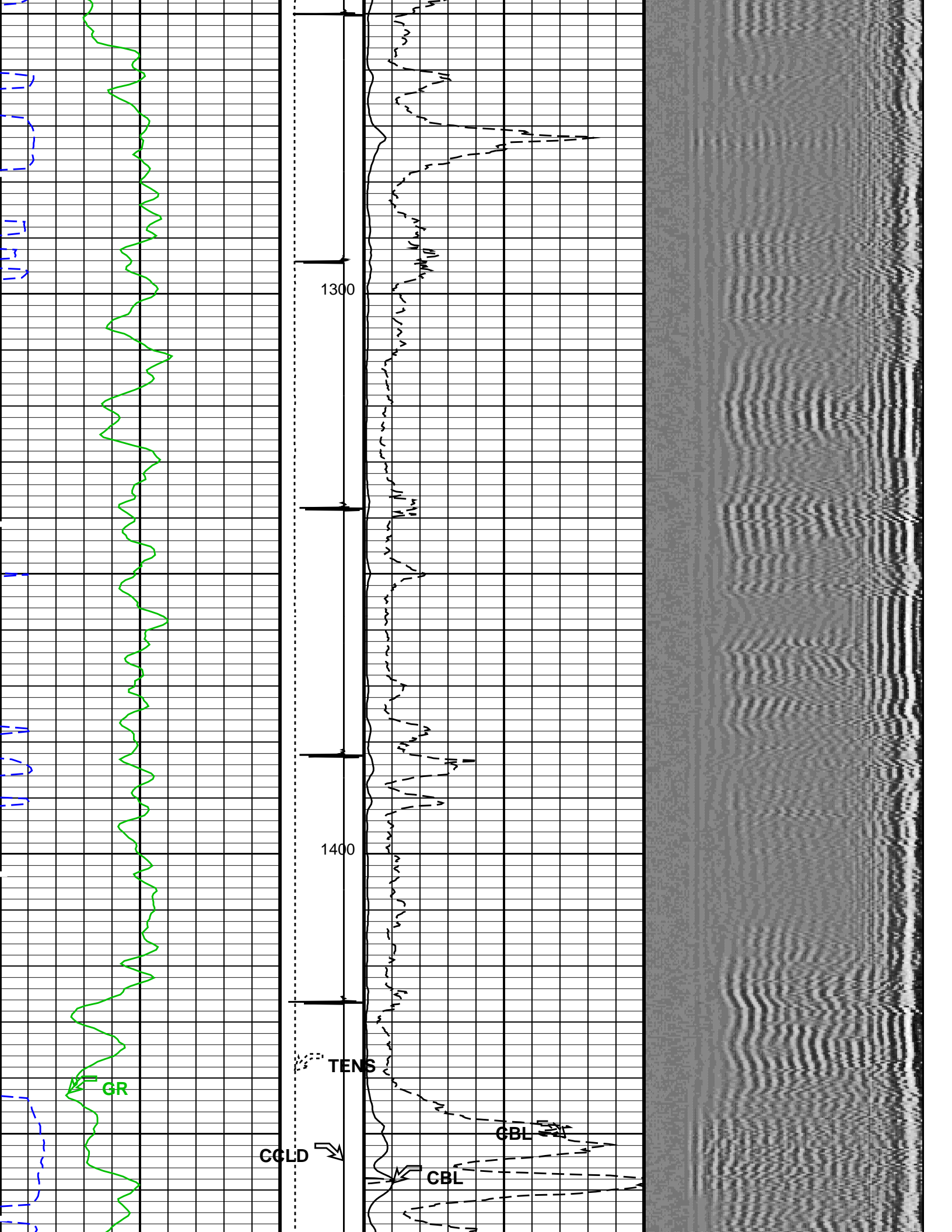


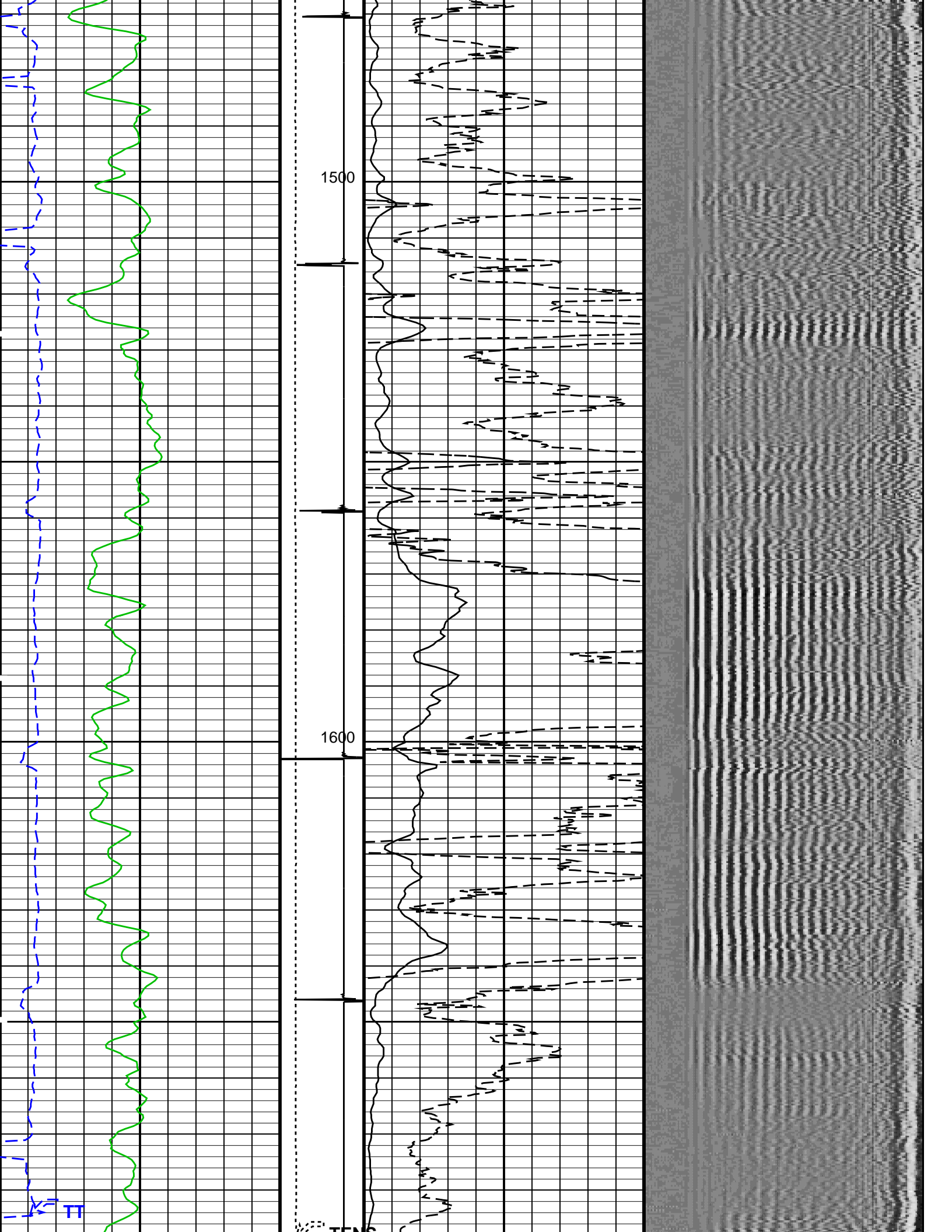


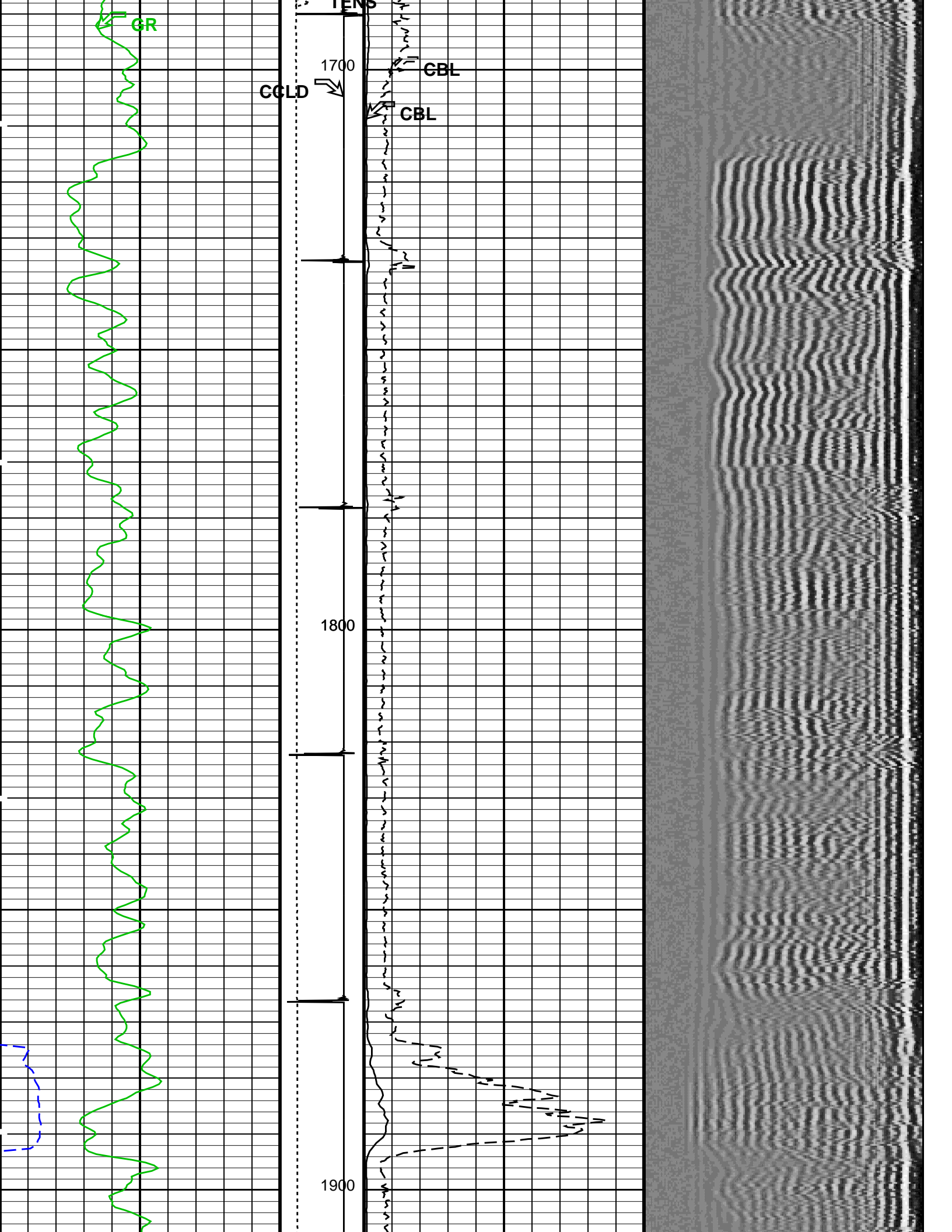


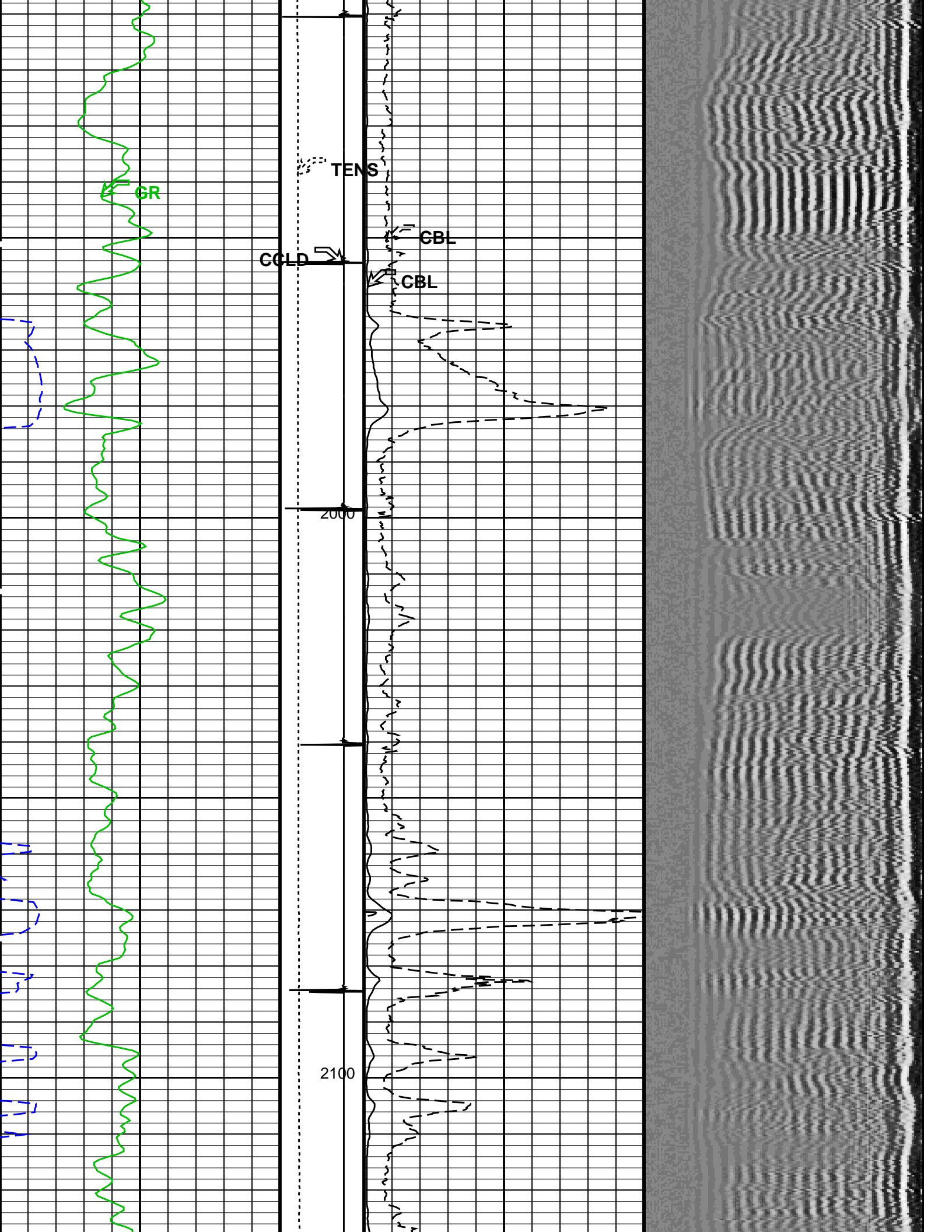


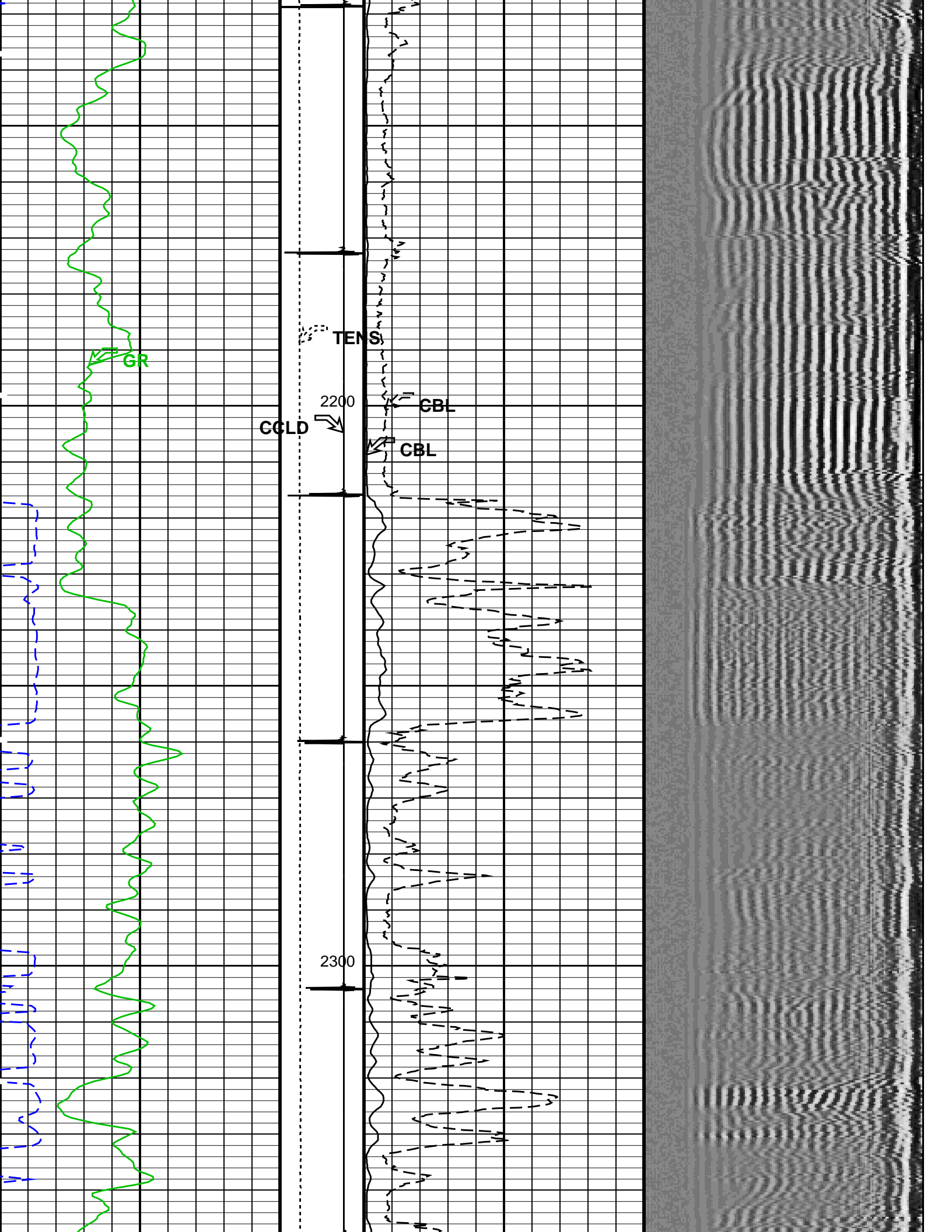


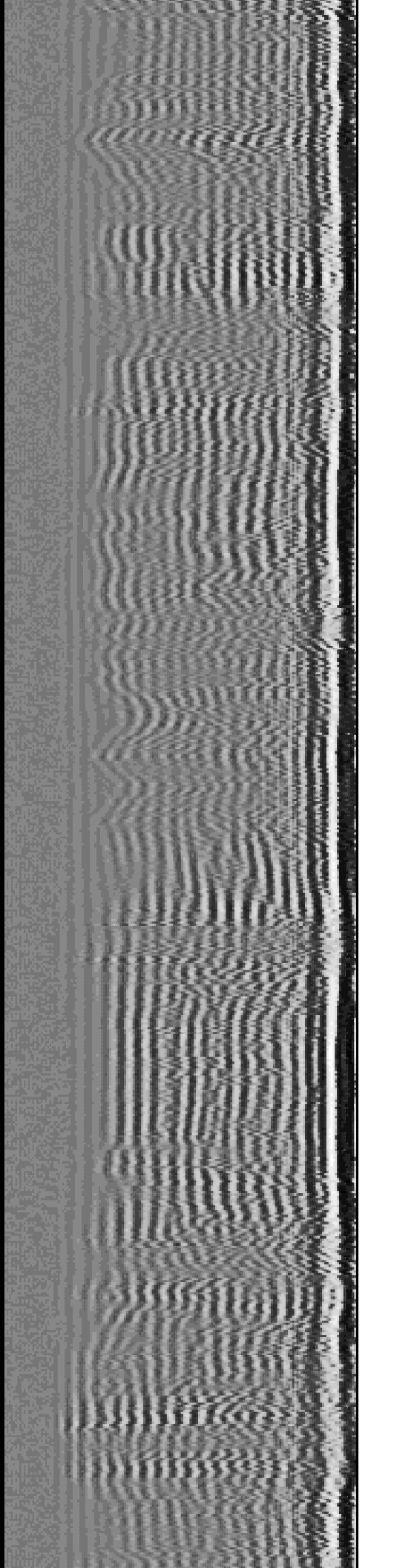
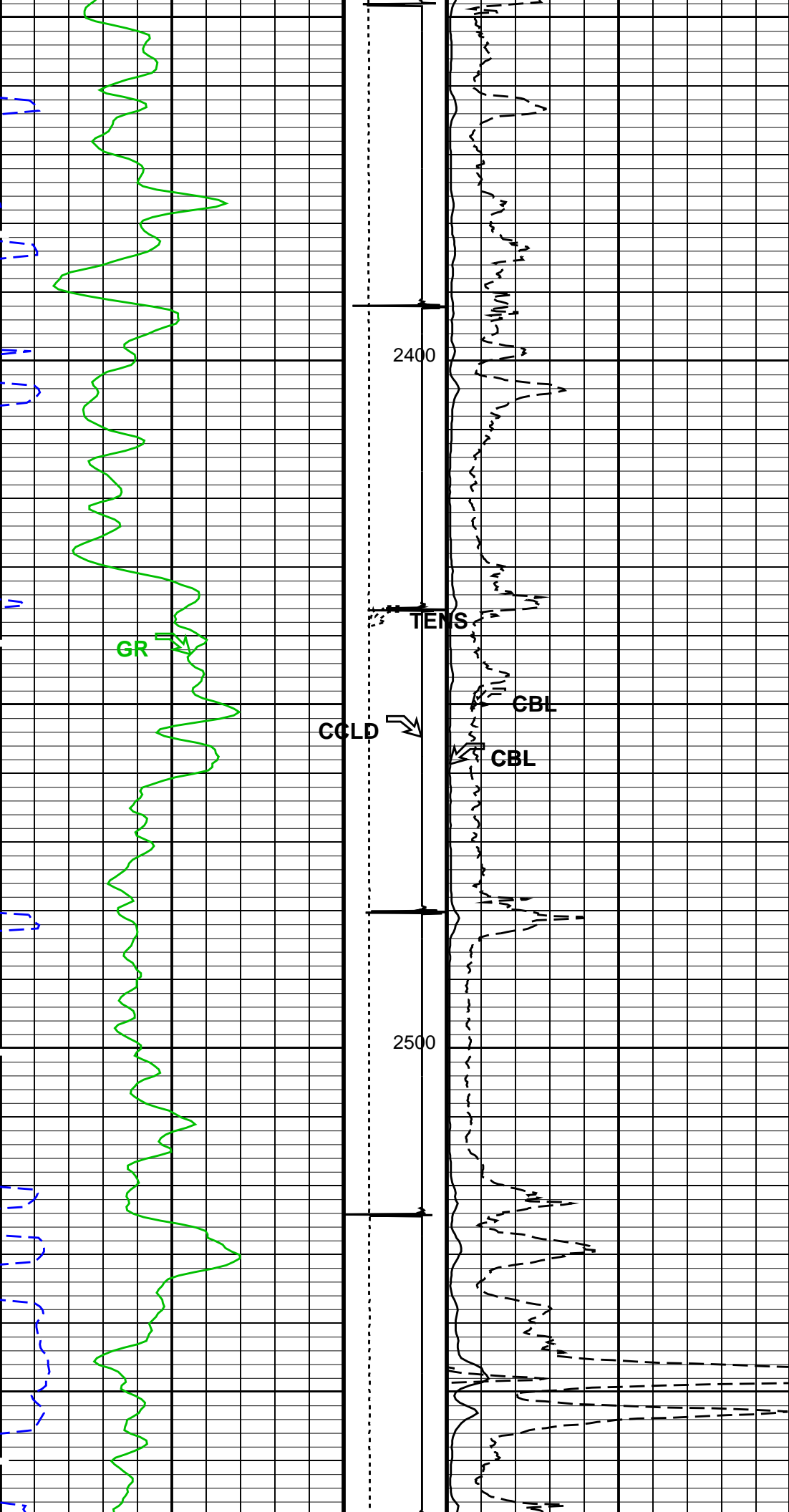


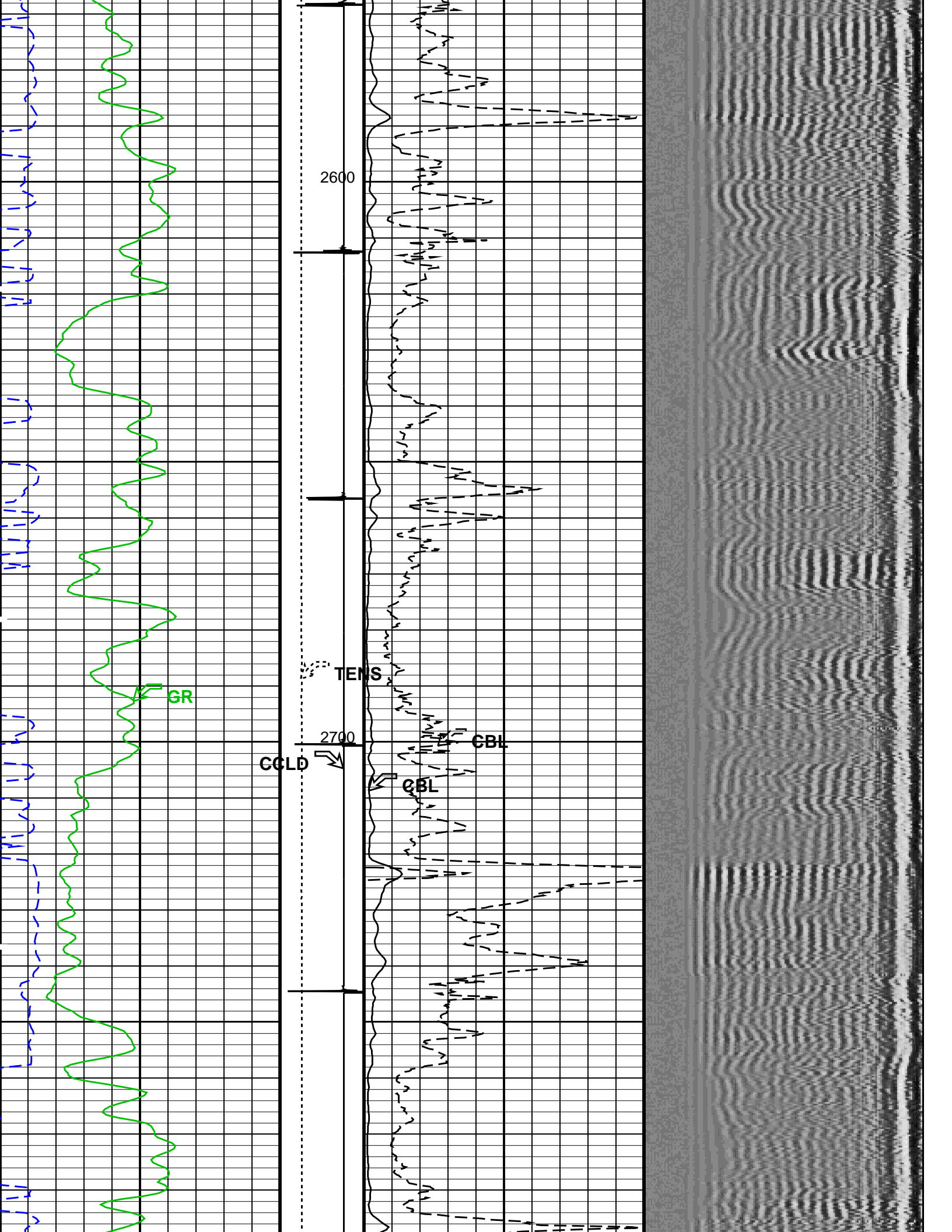


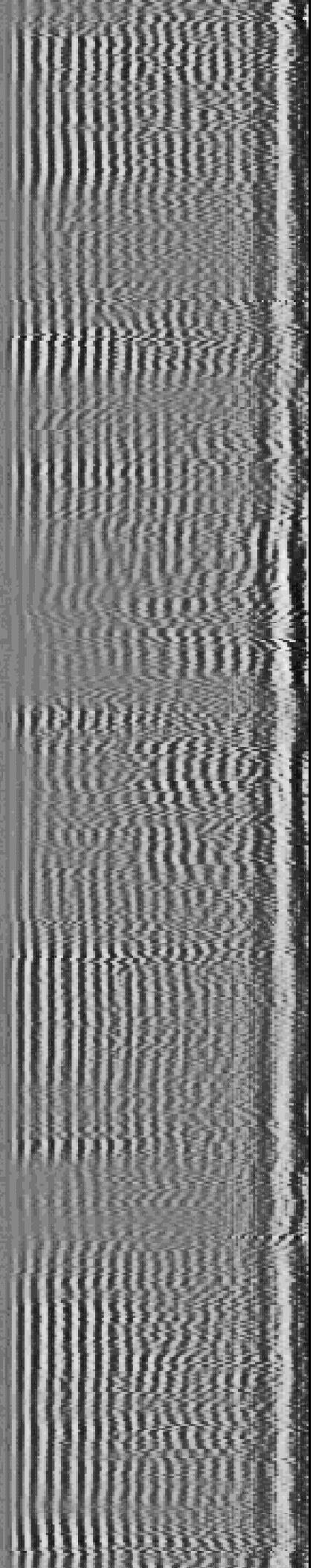
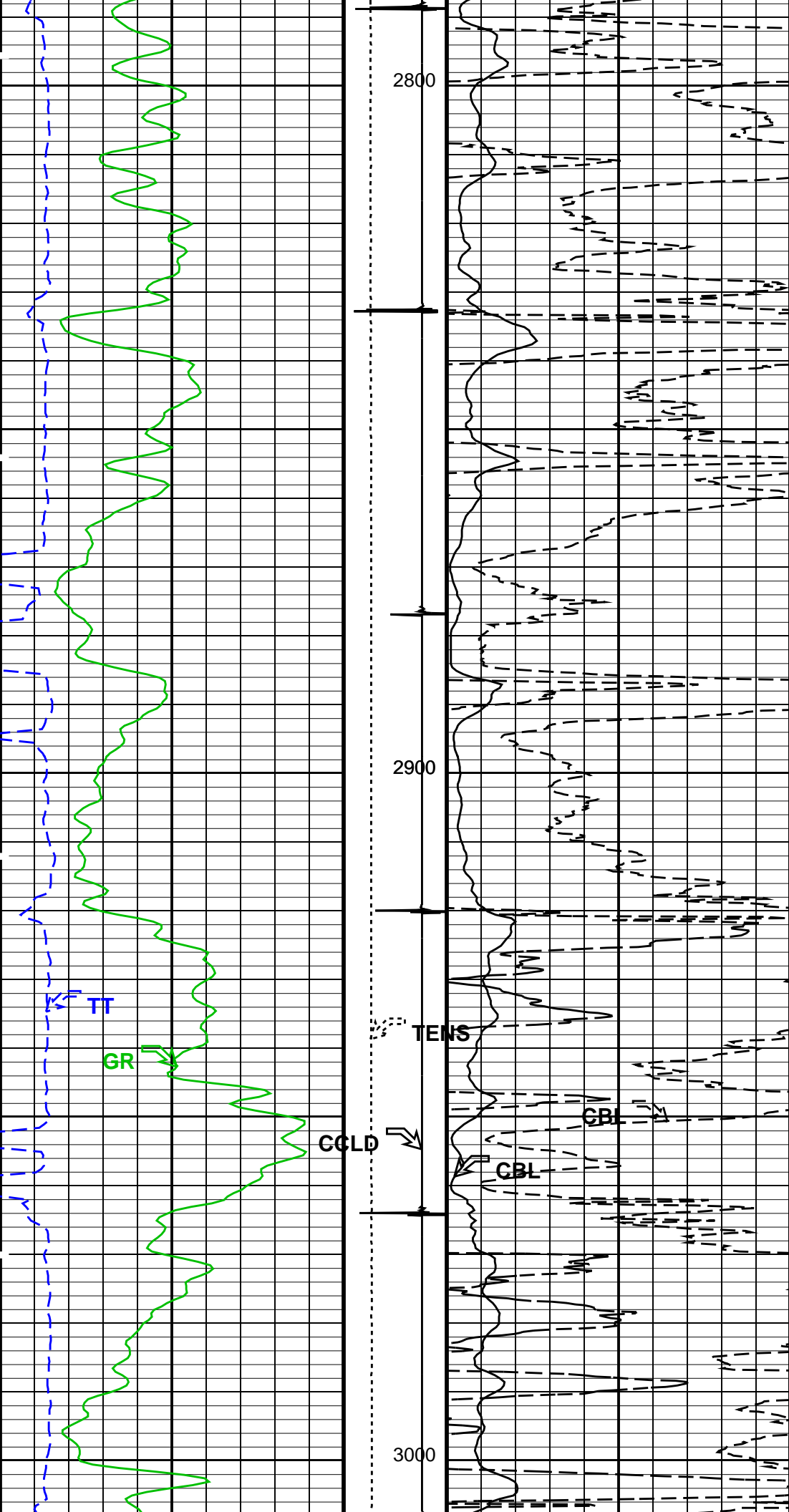


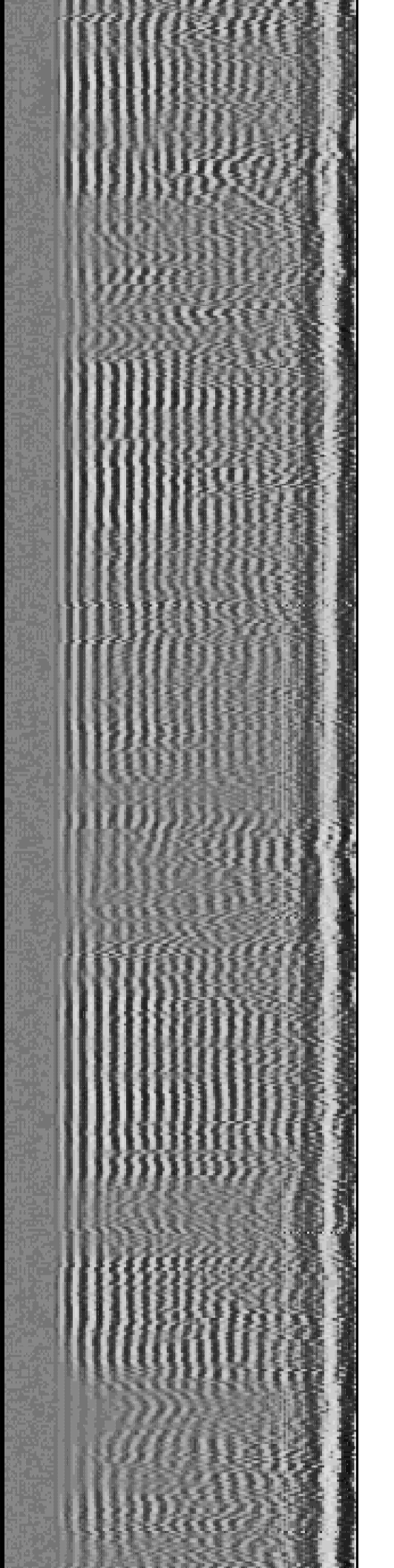
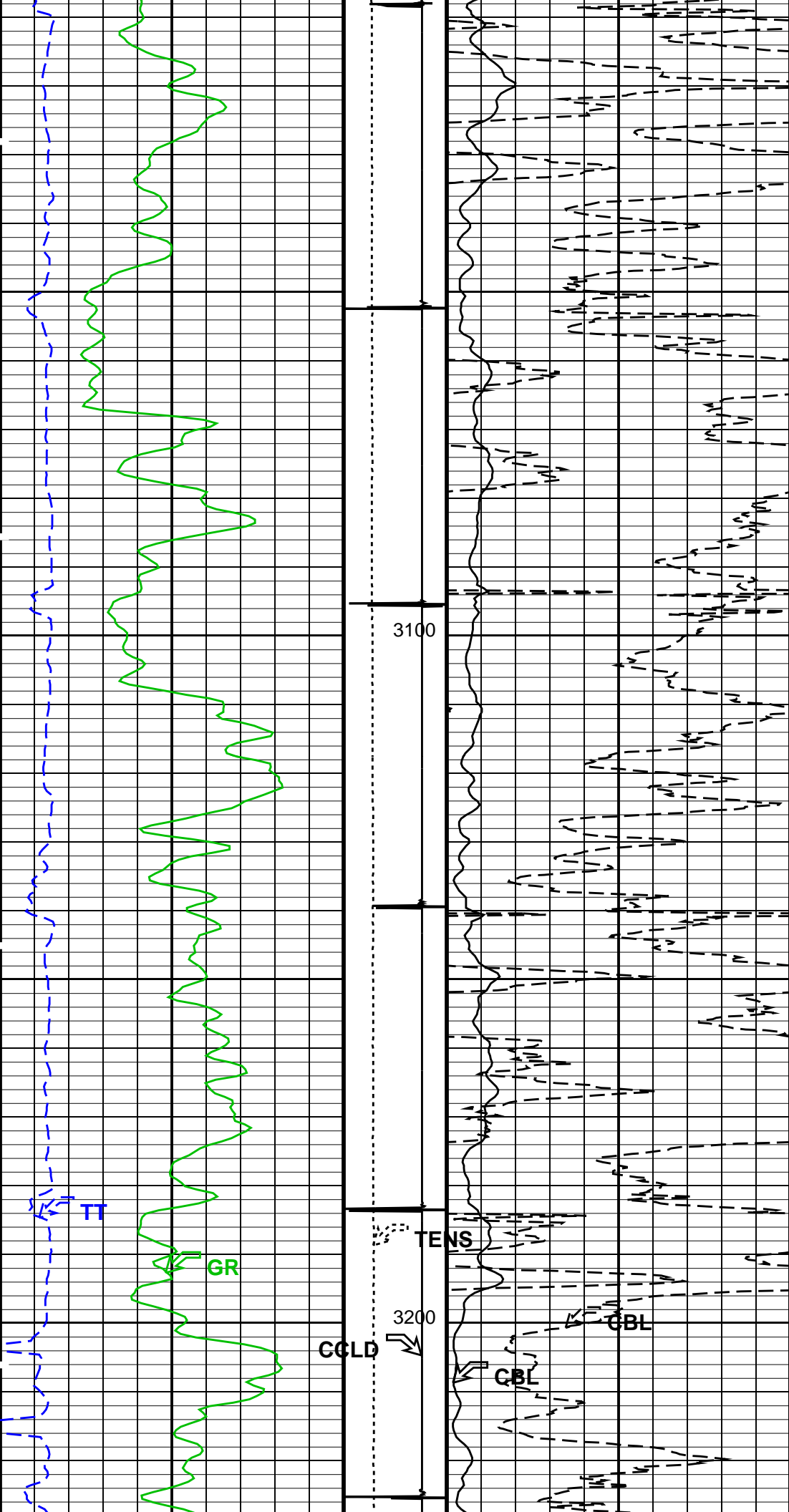


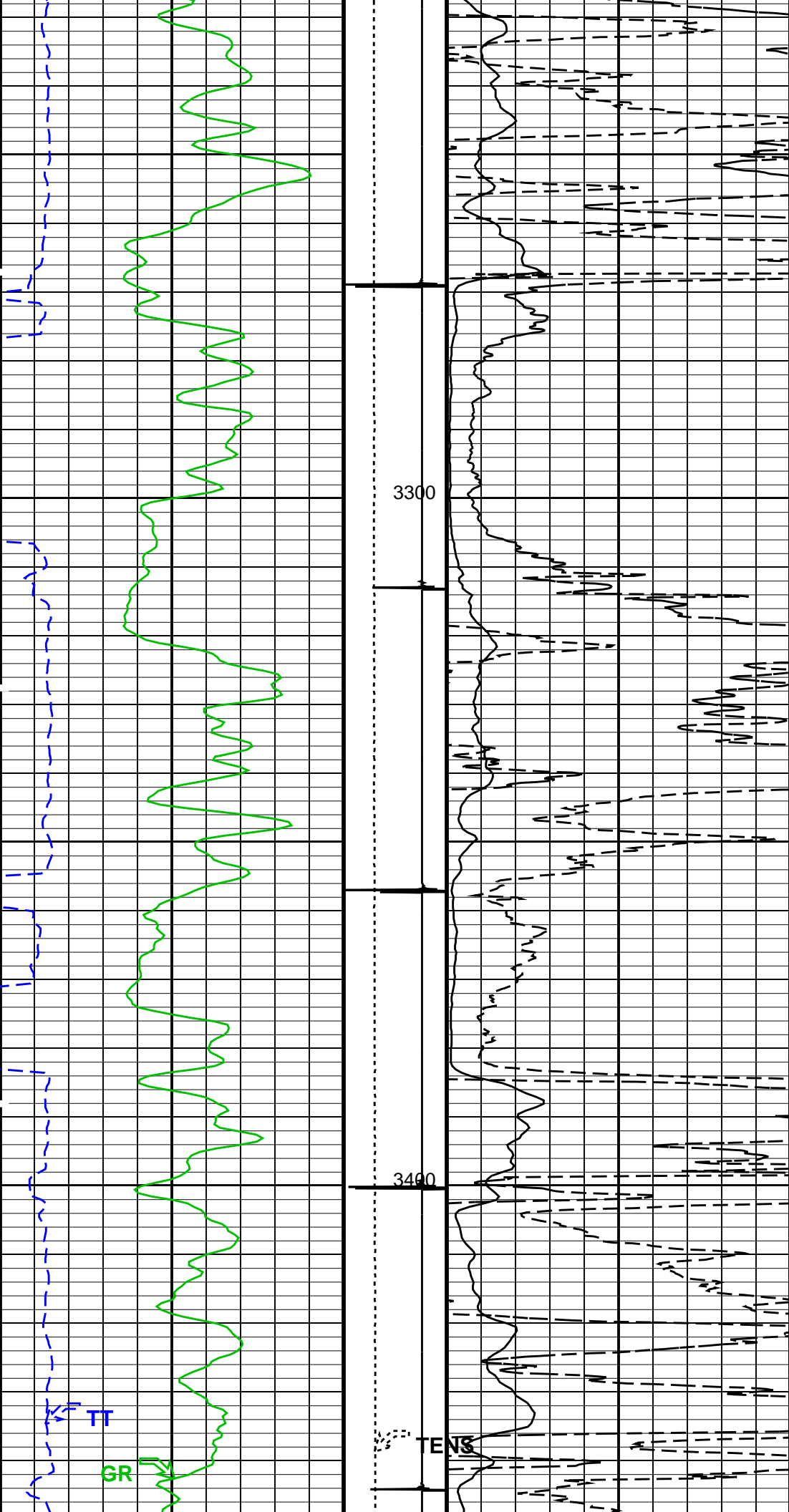


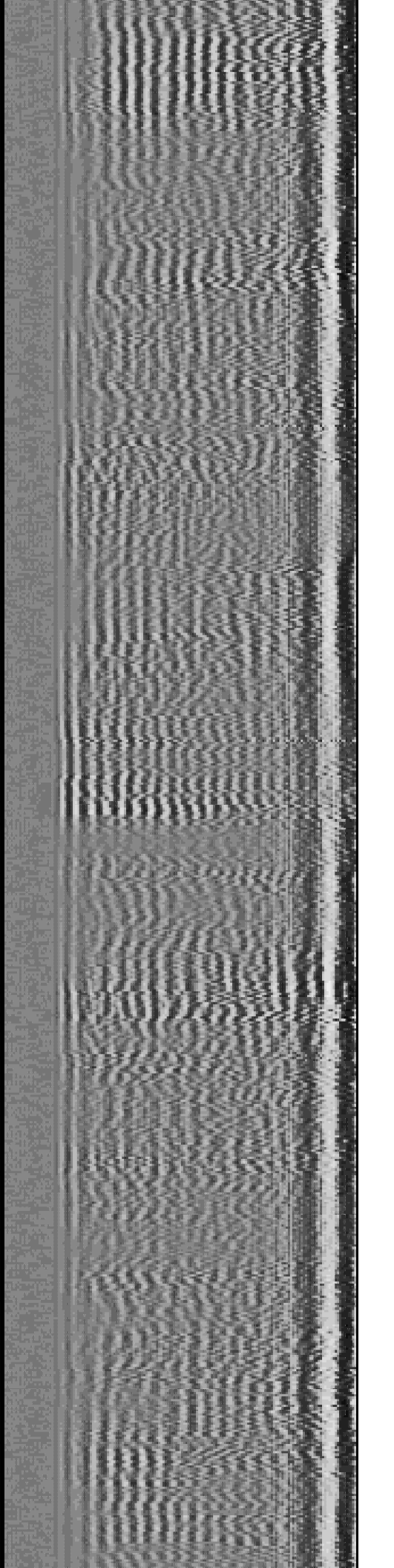
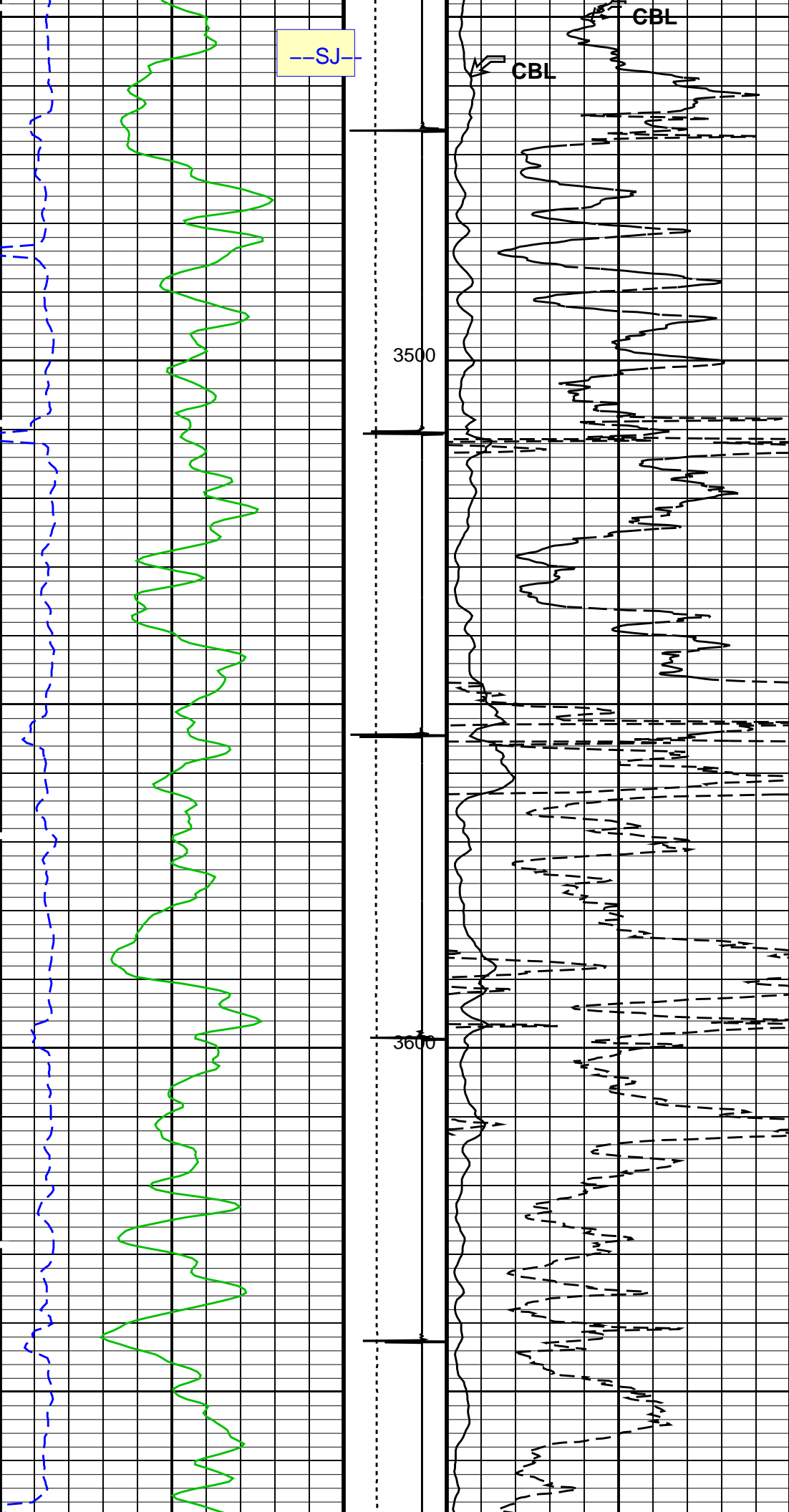


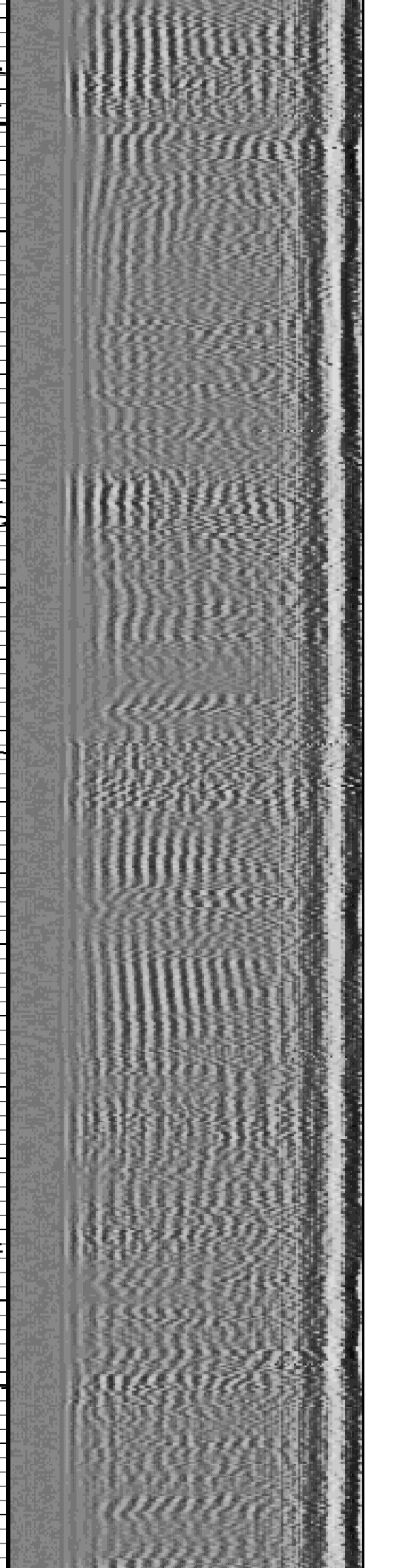
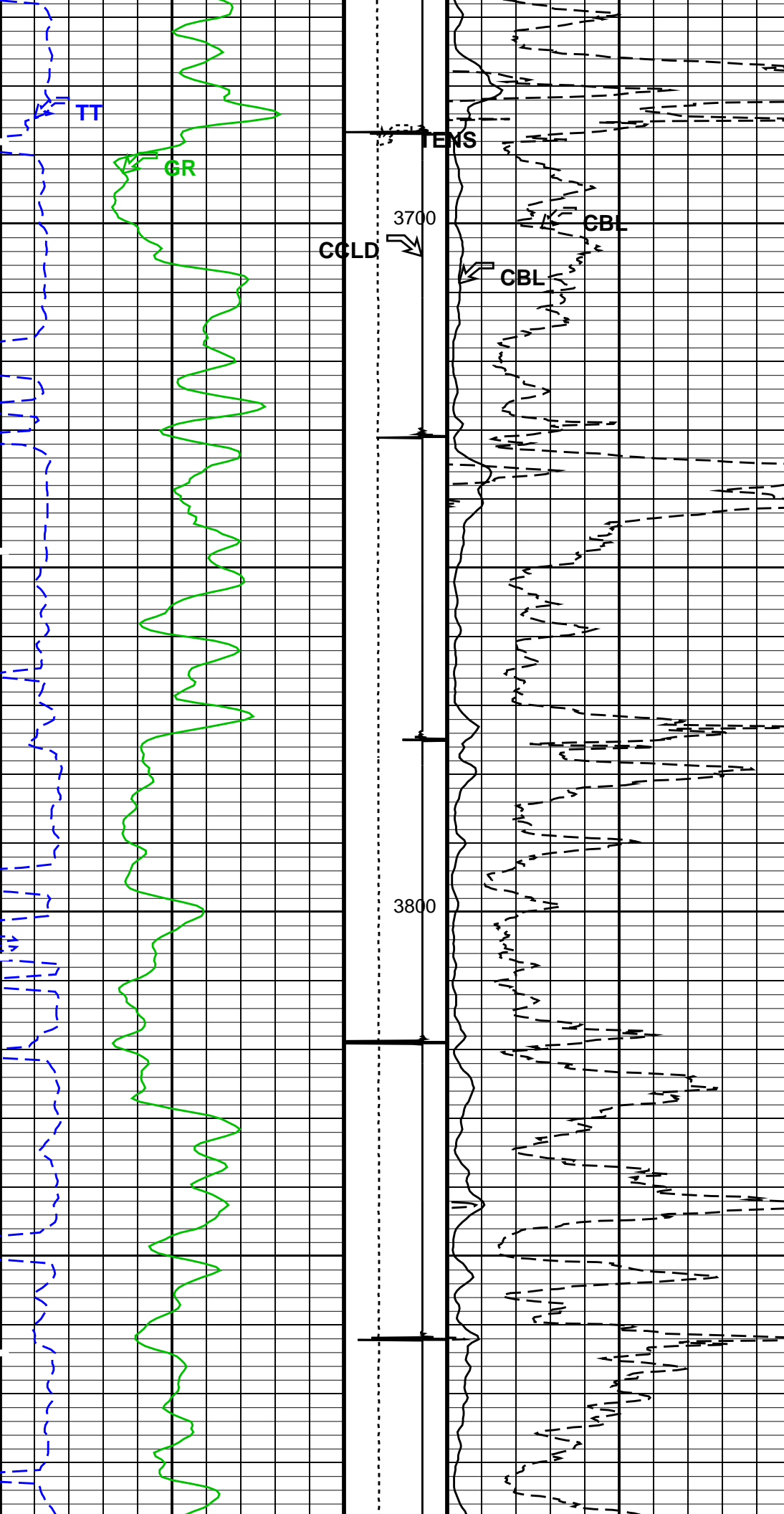


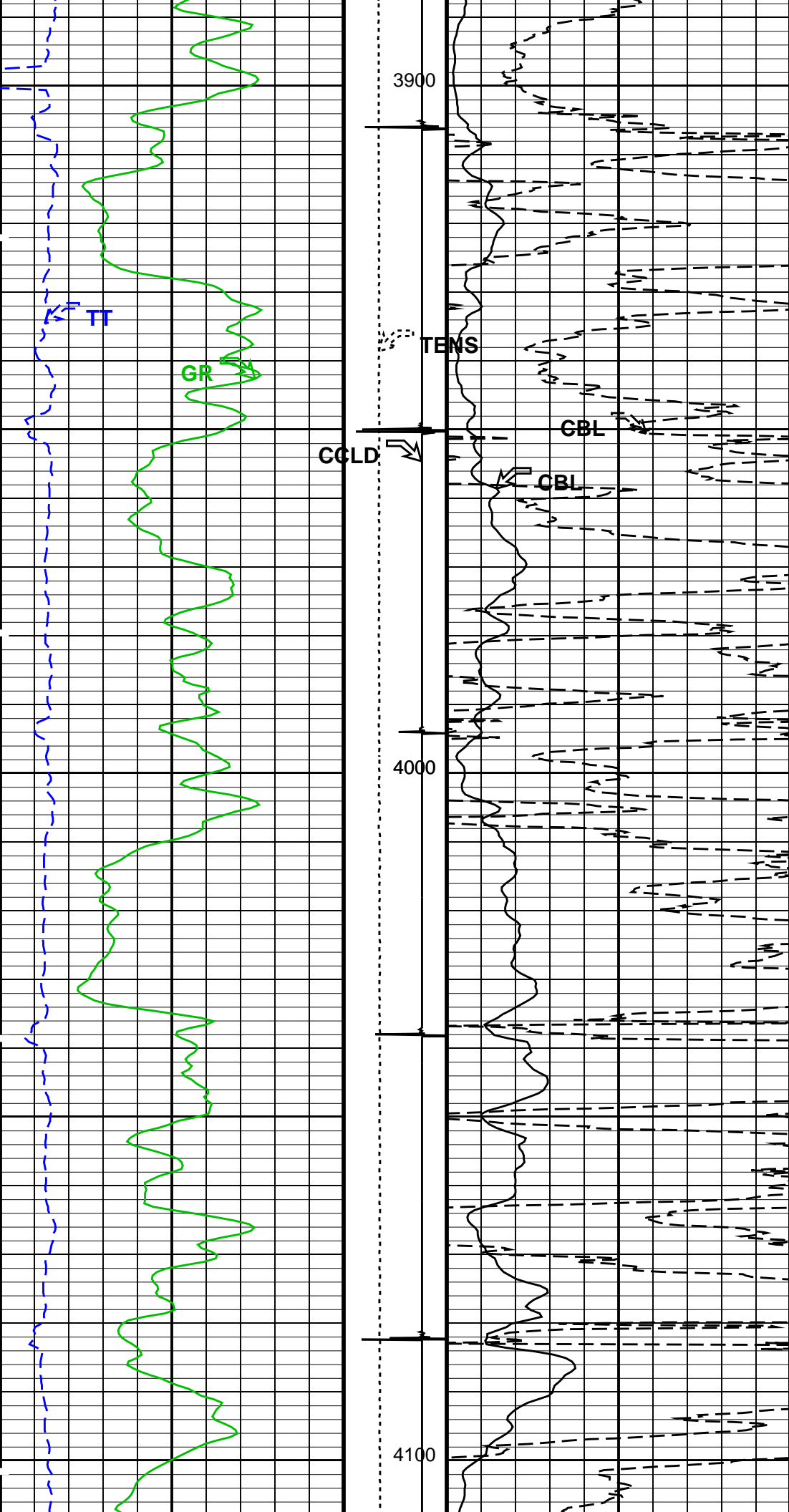


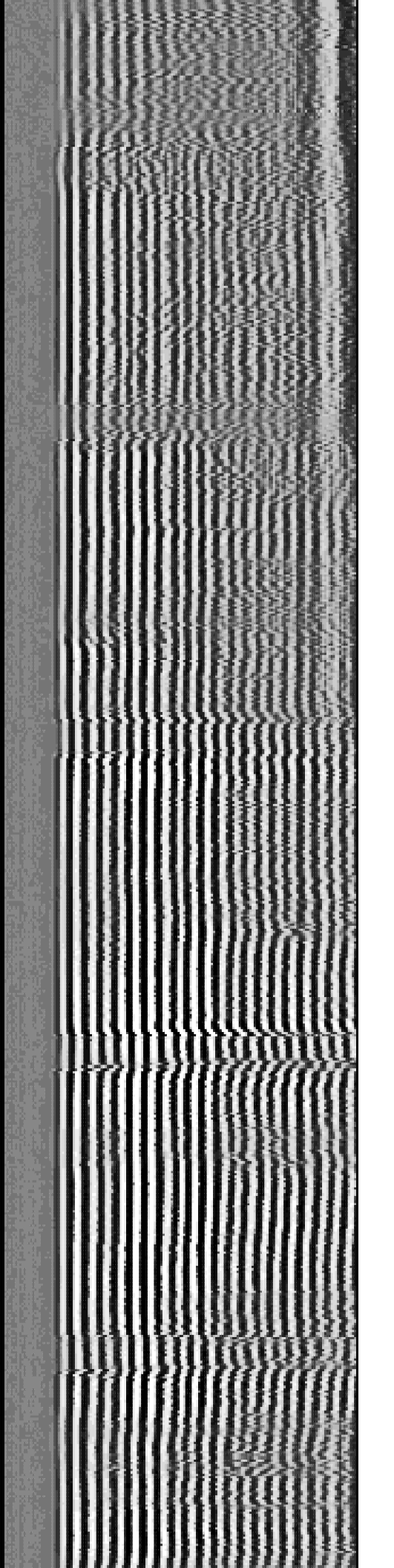
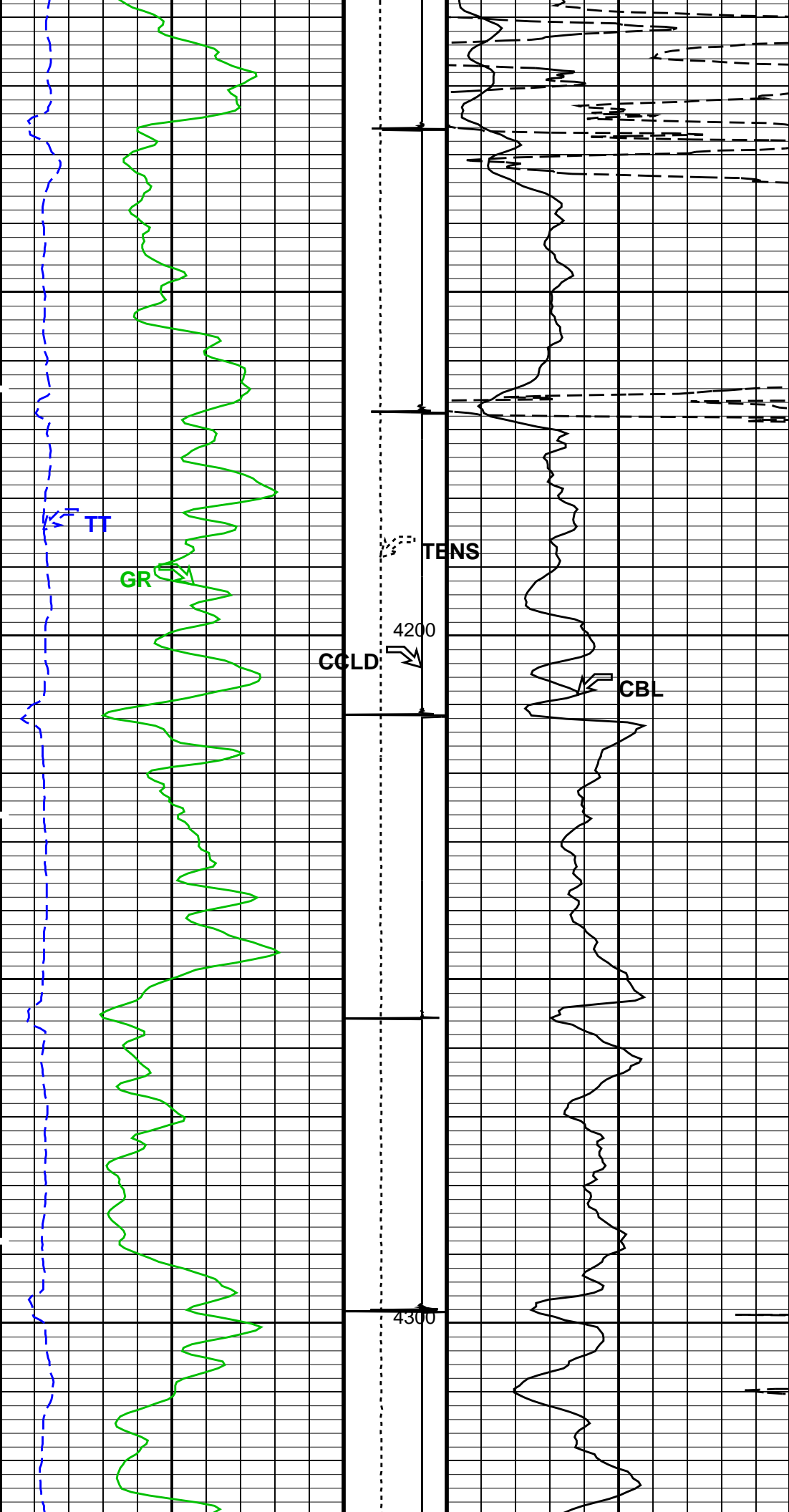


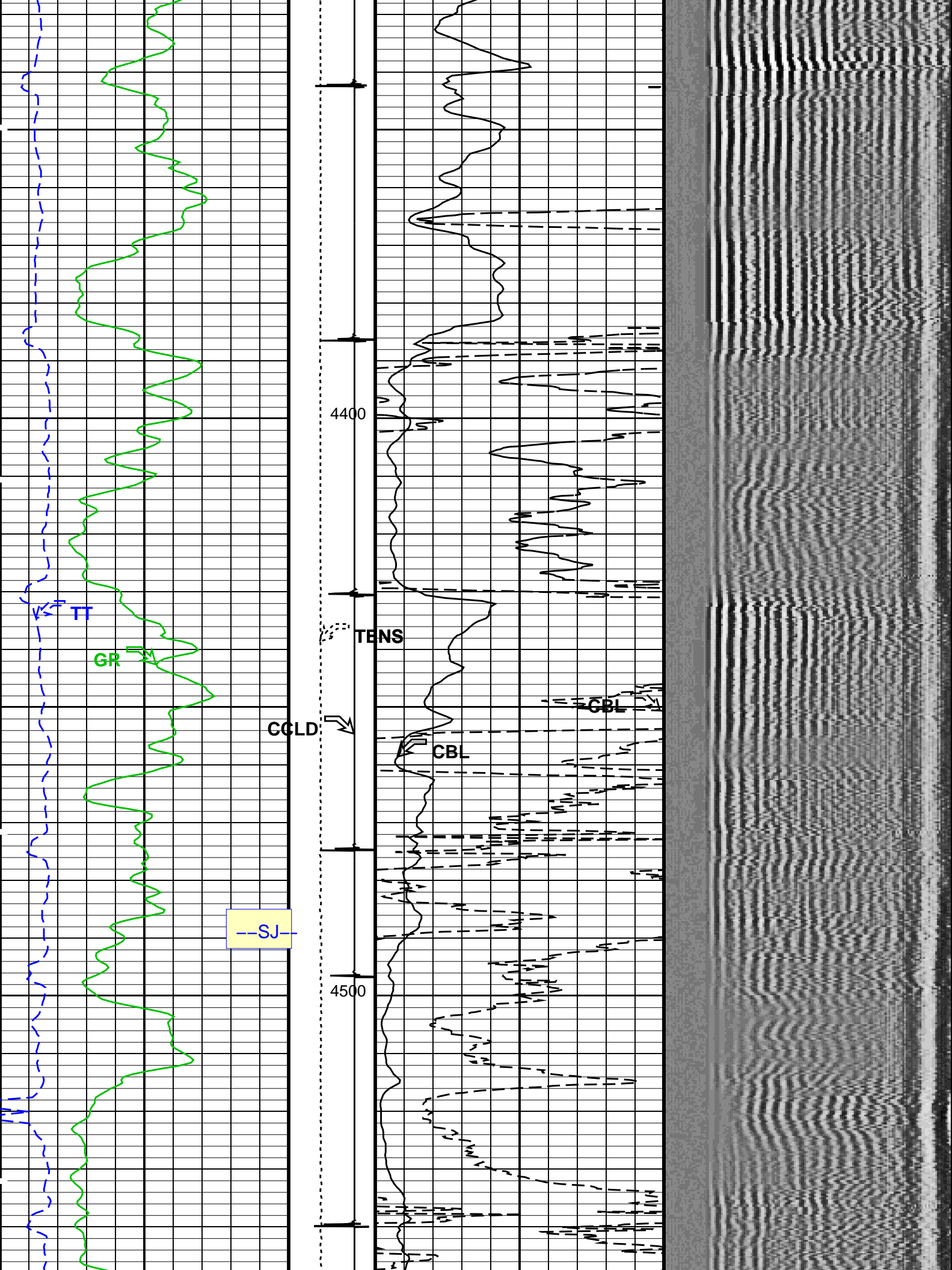


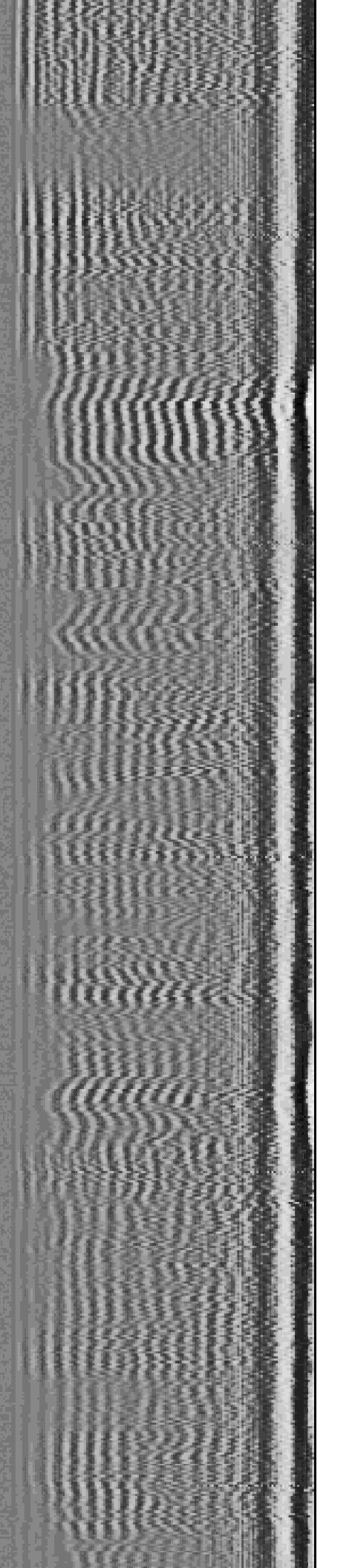
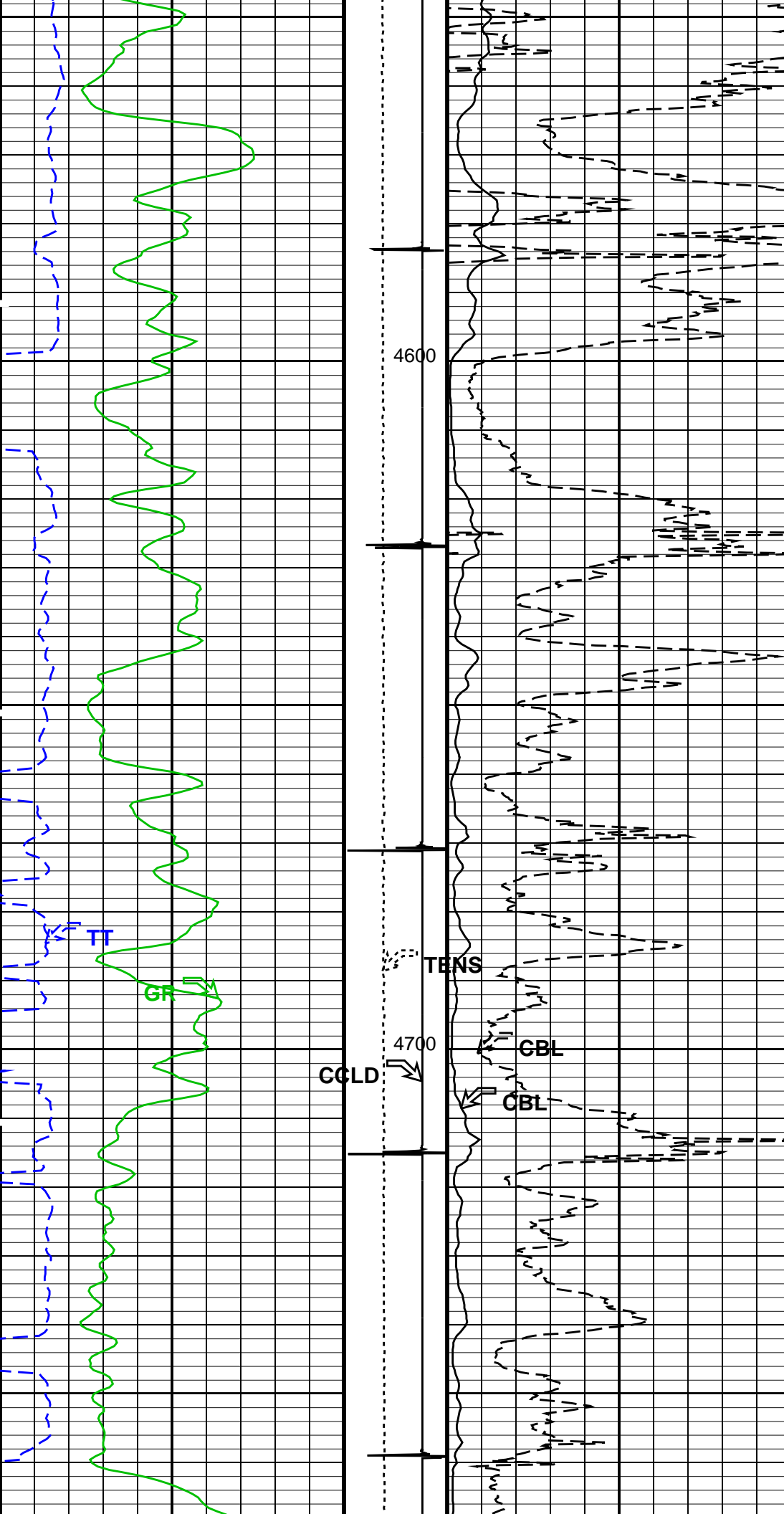


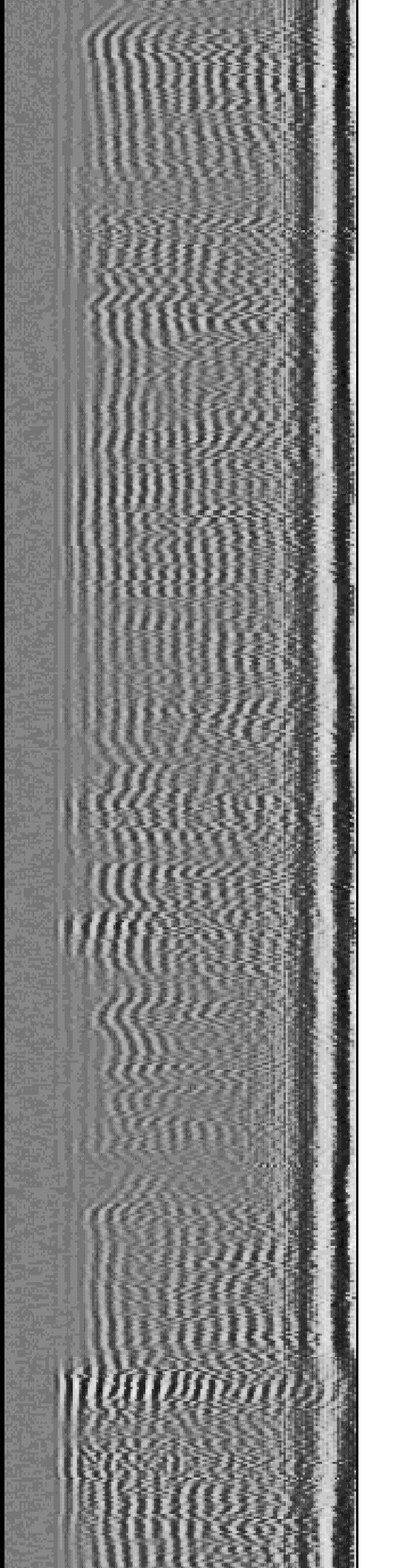
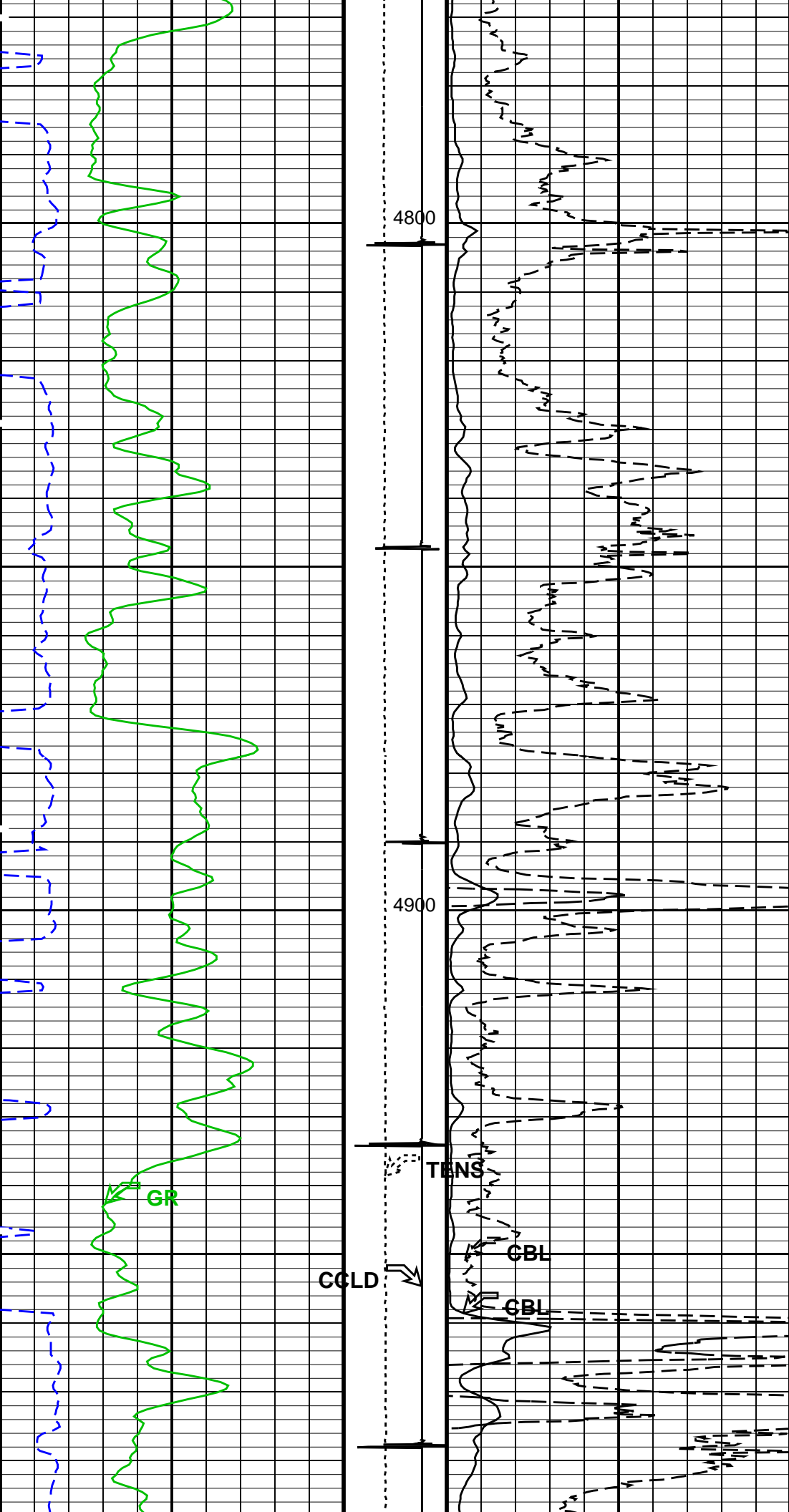


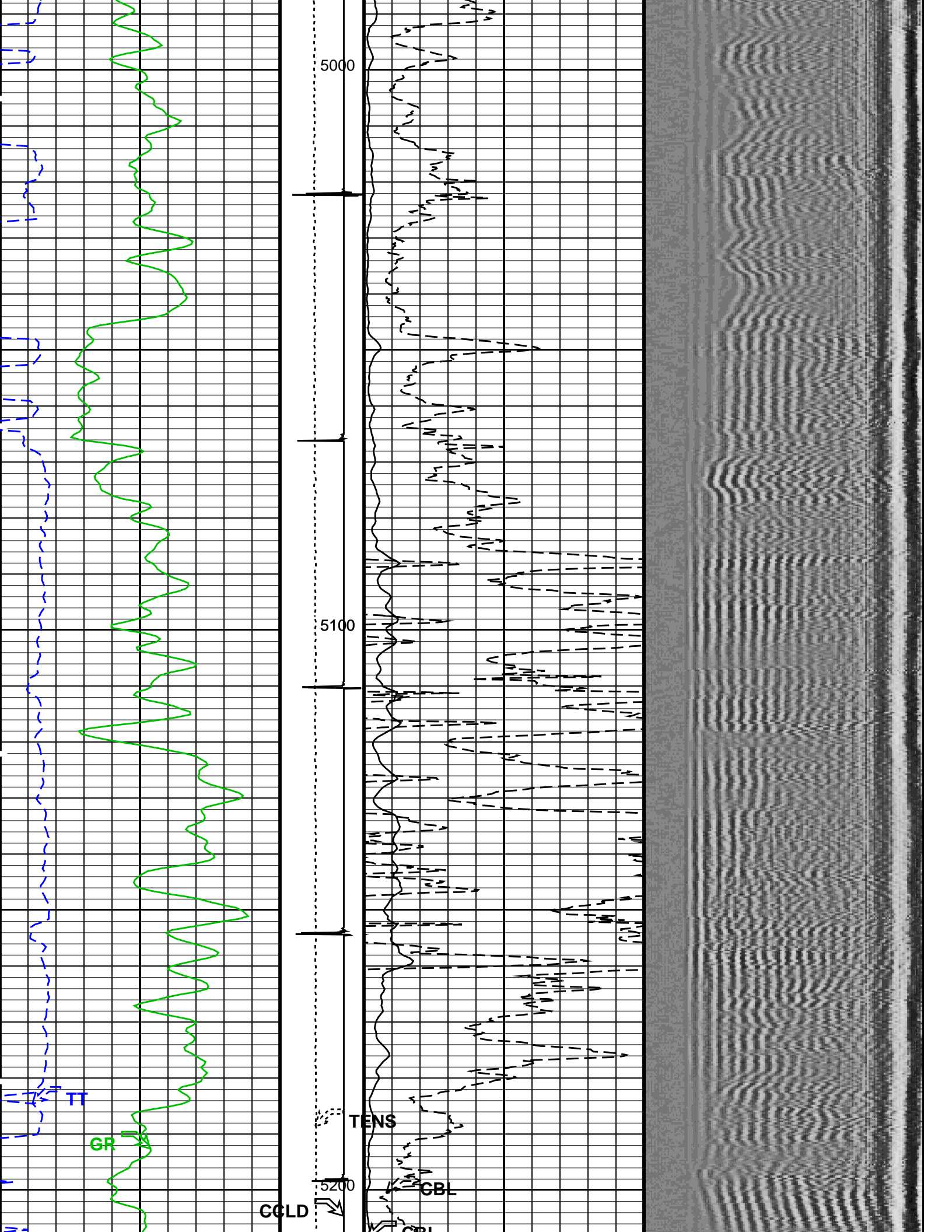


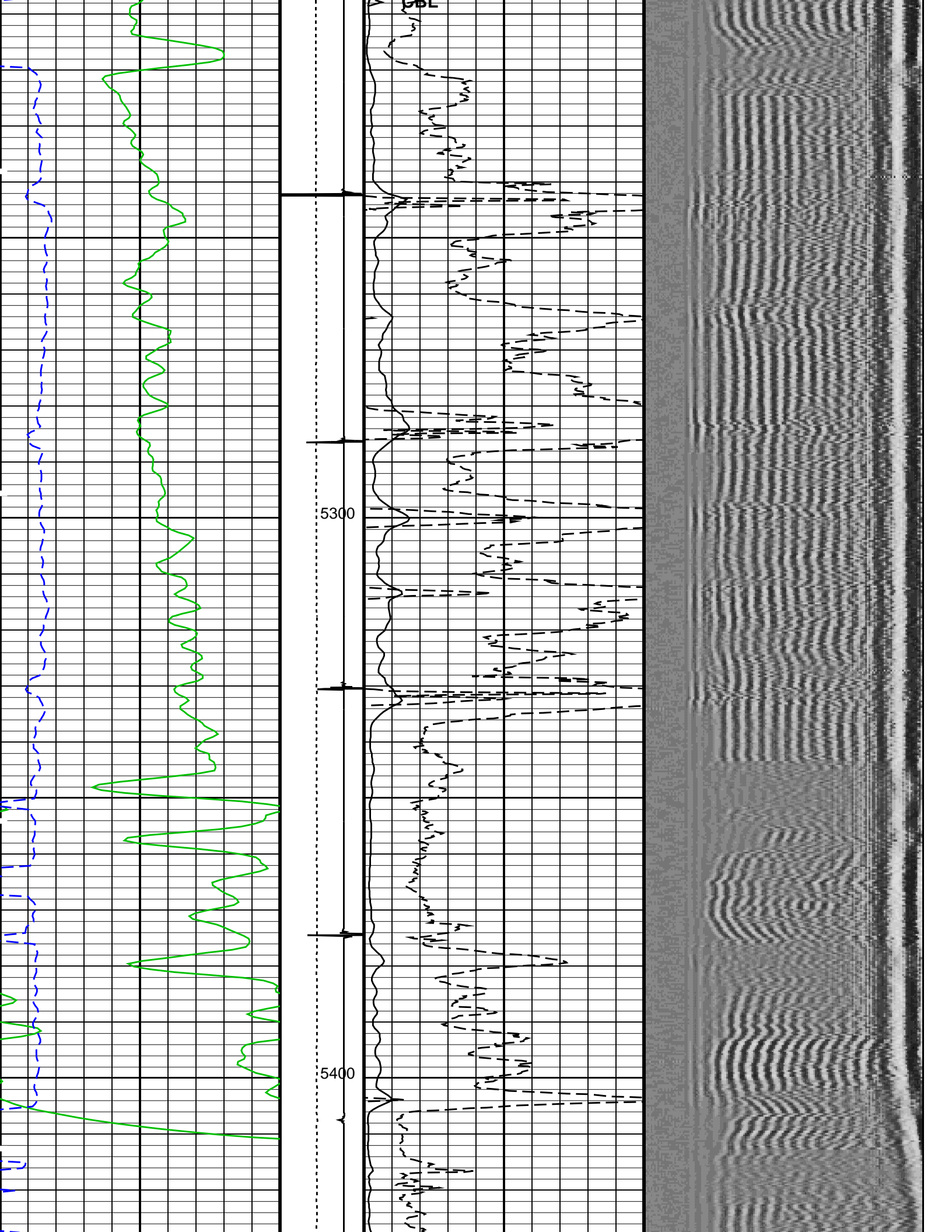


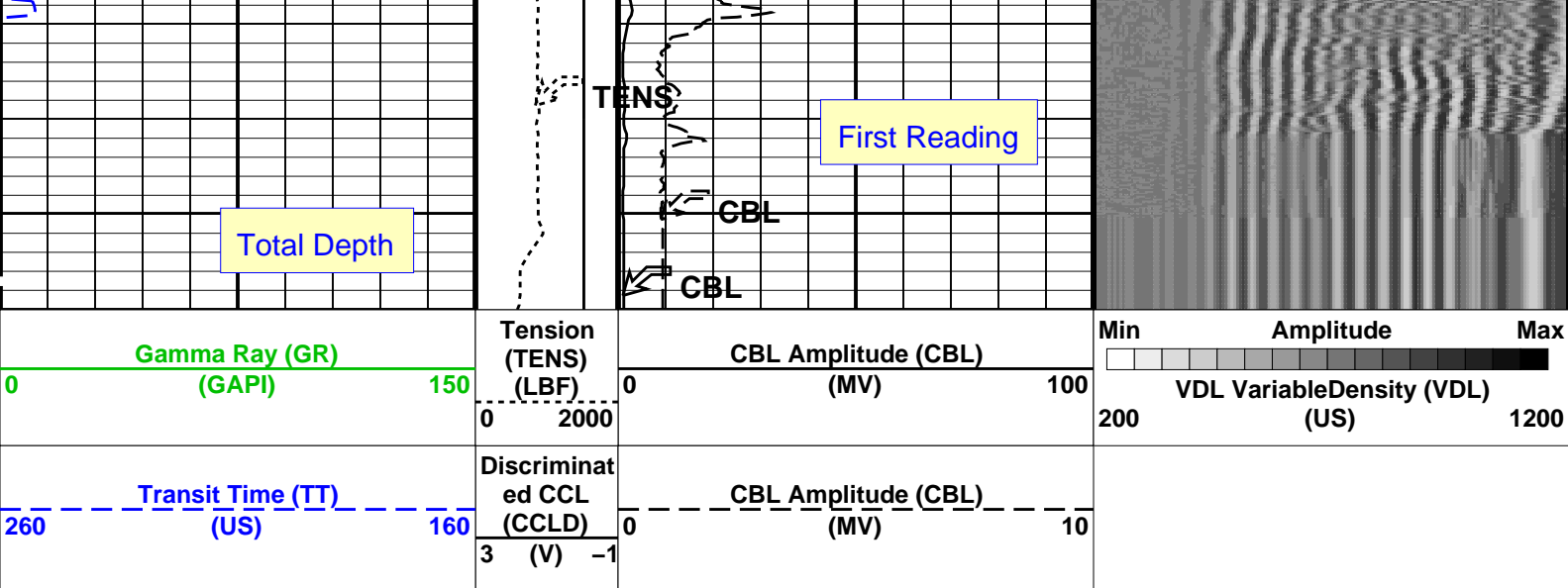












Time Mark Every 60 S

Format: CBL_VDL Vertical Scale: 5" per 100' Graphics File Created: 13-May-2012 01:59

OP System Version: 18C0-147

SCMT-CB HFE-4028-IFLEX RST-C 18C0-147
PSPT-A HFE-4028-IFLEX

<<<SCMT Cement Evaluation Information Summary>>>

Sonde Serial Number	SCMS-CB 8317		
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	6-MAR-2012		
CBL Correction Factor	0.0689824	CBL Adjustment Factor (CBAF)	1.0
MAP 1 Correction Factor	0.107072	MAP Adjustment Factor (MPAF)	1.0
MAP 2 Correction Factor	0.128400		
MAP 3 Correction Factor	0.135634		
MAP 4 Correction Factor	0.115019		
MAP 5 Correction Factor	0.108562		
MAP 6 Correction Factor	0.113017		
MAP 7 Correction Factor	0.117769		
MAP 8 Correction Factor	0.123422		

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	40 US
CBPA	CBL LSC Reference Amplitude in Free Pipe	20 MV

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
DORL	Depth Offset for Repeat Analysis	0.0	FT
TD	Total Depth	9216	FT

Output DLIS Files

DEFAULT SCMT_RST_PSP_005LUP FN:4 PRODUCER 13-May-2012 01:59

Schlumberger

REPEAT PASS 0 PSI

MAXIS Field Log

Company: ENCANA OIL & GAS (USA) INC.

Well: TWIN CREEK F12E PAD

Input DLIS Files

DEFAULT SCMT_RST_PSP_004PUP FN:3 PRODUCER 13-May-2012 01:58 5460.0 FT 5073.0 FT

Output DLIS Files

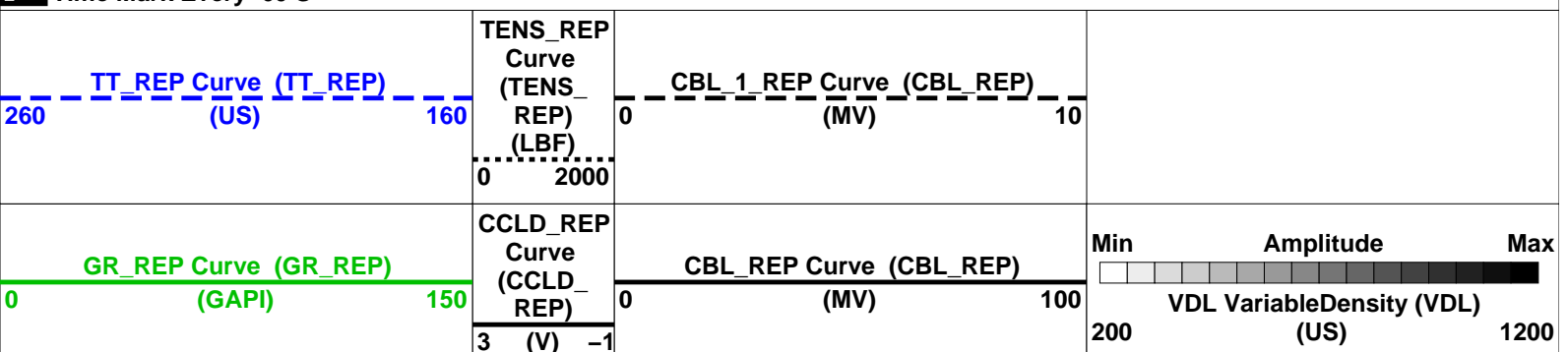
DEFAULT SCMT_RST_PSP_005LUP FN:4 PRODUCER 13-May-2012 01:59

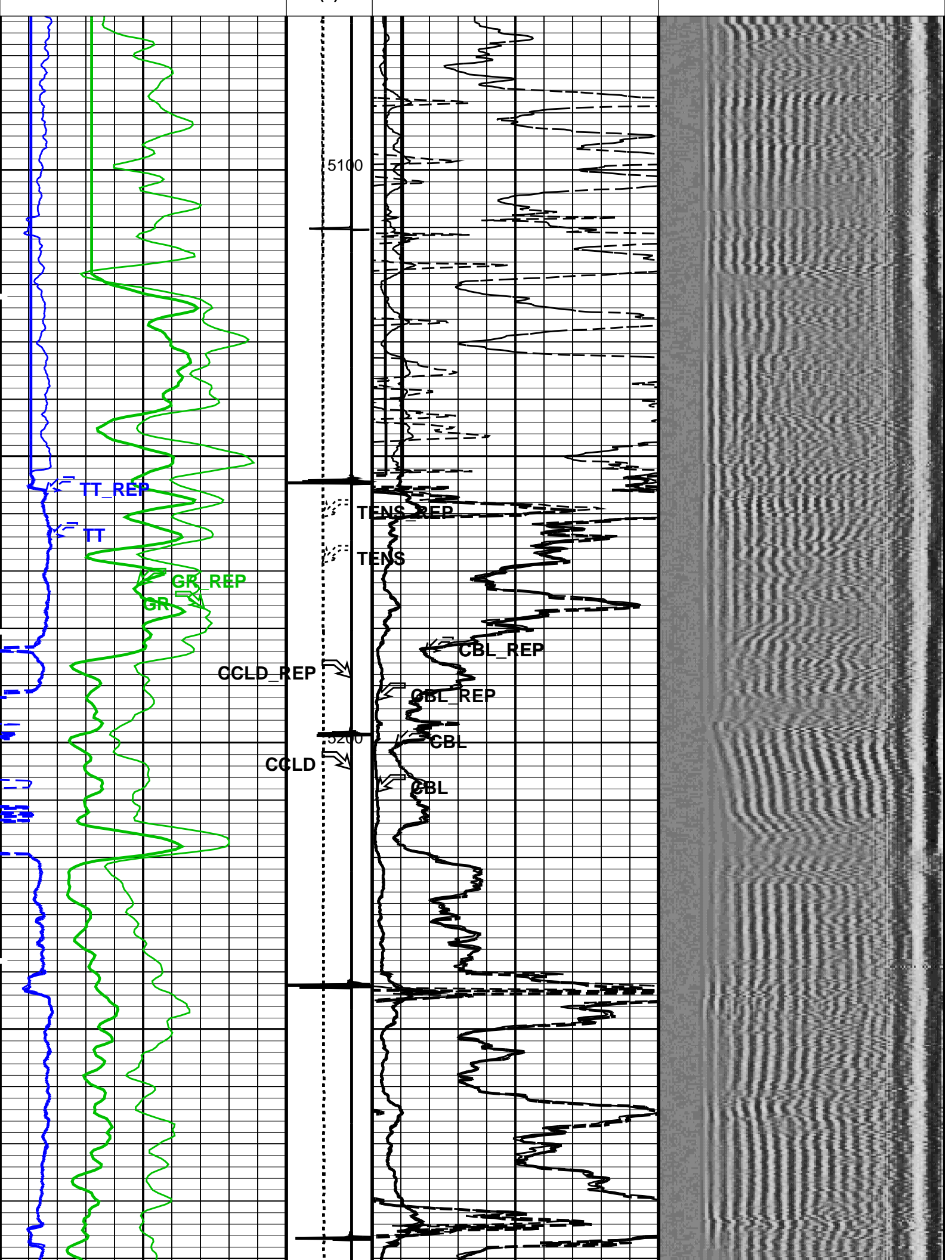
OP System Version: 18C0-147

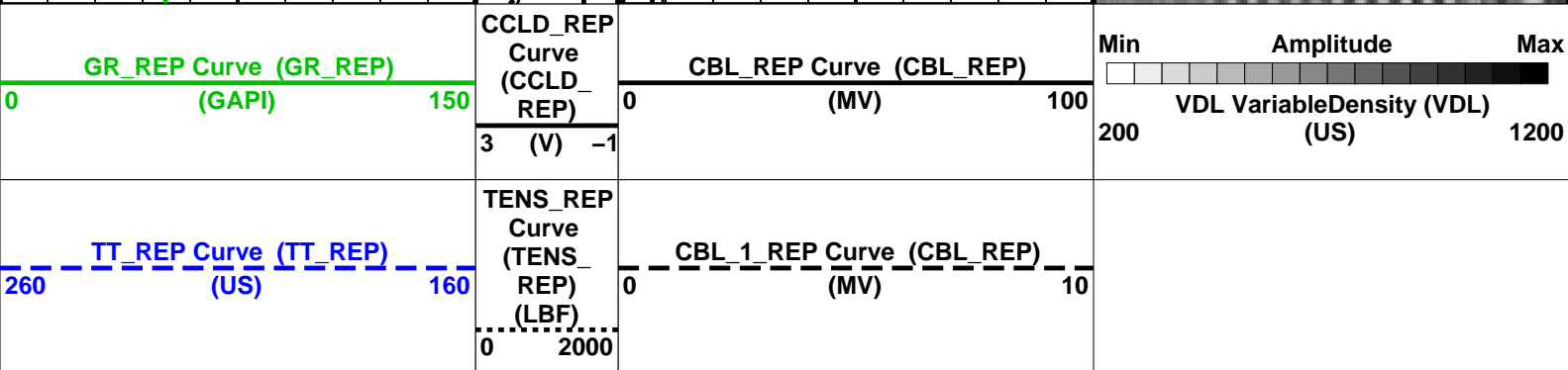
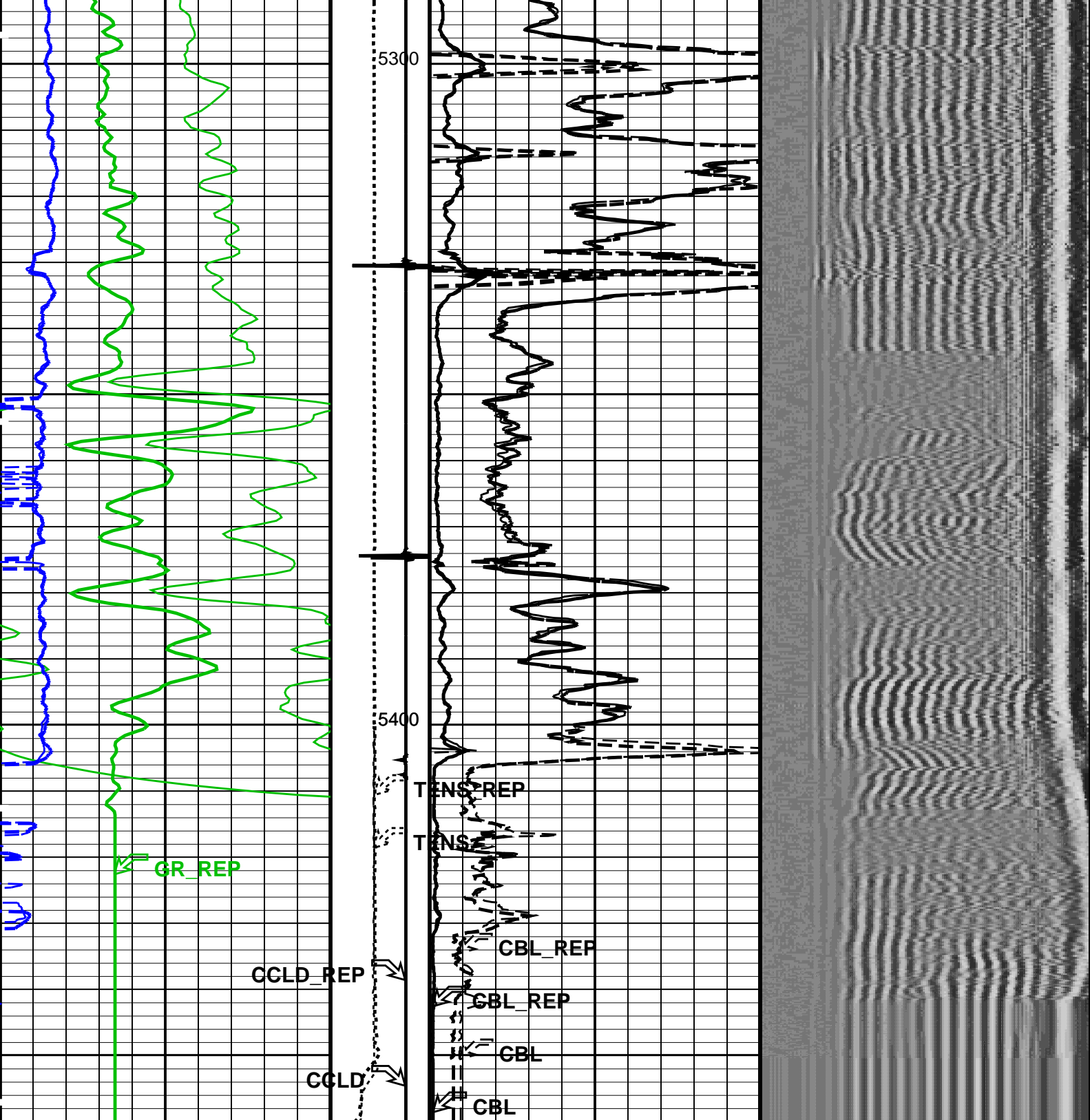
SCMT-CB HFE-4028-IFLEX RST-C 18C0-147
PSPT-A HFE-4028-IFLEX

PIP SUMMARY

Time Mark Every 60 S







PIP SUMMARY

OP System Version: 18C0-147

SCMT-CB HFE-4028-IFLEX RST-C 18C0-147
 PSPT-A HFE-4028-IFLEX

<<<SCMT Cement Evaluation Information Summary>>>

Sonde Serial Number	SCMS-CB 8317		
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	6-MAR-2012		
CBL Correction Factor	0.0689824	CBL Adjustment Factor (CBAF)	1.0
MAP 1 Correction Factor	0.107072	MAP Adjustment Factor (MPAF)	1.0
MAP 2 Correction Factor	0.128400		
MAP 3 Correction Factor	0.135634		
MAP 4 Correction Factor	0.115019		
MAP 5 Correction Factor	0.108562		
MAP 6 Correction Factor	0.113017		
MAP 7 Correction Factor	0.117769		
MAP 8 Correction Factor	0.123422		

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	40	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
DORL	Depth Offset for Repeat Analysis	0.0	FT
TD	Total Depth	9216	FT

Input DLIS Files

Input DLIS Files

DEFAULT SCMT_RST_PSP_004PUP FN:3 PRODUCER 13-May-2012 01:58 5460.0 FT 5073.0 FT

Output DLIS Files

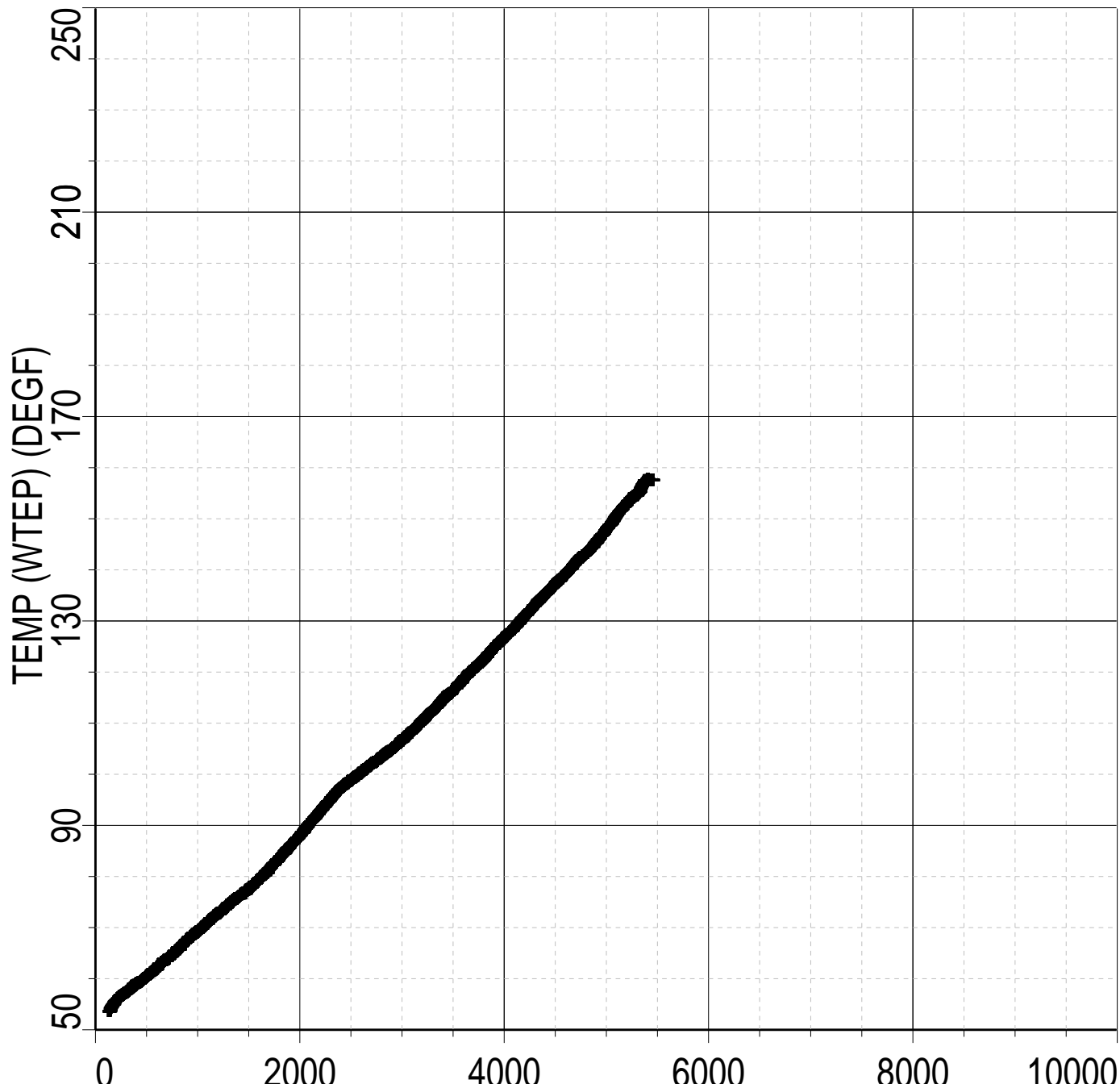
DEFAULT SCMT_RST_PSP_005LUP FN:4 PRODUCER 13-May-2012 01:59



TEMPERATURE PLOT

MAXIS Field Log

Index: 5460.0 – 134.0 FT





COEFFICIENTS

MAXIS Field Log

Client: ENCANA OIL & GAS (USA) INC.

Field: MAMM CREEK

Well: TWIN CREEK F12E PAD

Run date: 13-May-2012

Tool: PSP

Sub Type: PBMS

Sensor: Clock Model

PBMS Digitalization Clock

Sonde Serial NB

Sensor Serial NB3779

Calib Date ddmmyy090107

Matrix Size16

Coeff CRCD285

Clock Coeff

	Temp**0	Temp**1	Temp**2
Temp**0	-.210501098404E+03	-.537713340627E+01	-.752421519422E-01
	Temp**3	Temp**4	Temp**5
Temp**0	+.630273975887E-03	+.266728381738E-05	0.0

Client: ENCANA OIL & GAS (USA) INC.

Field: MAMM CREEK

Well: TWIN CREEK F12E PAD

Run date: 13-May-2012

Tool: PSP

Sub Type: PBMS

Sensor: Sapphire

Sonde Serial NB

Sensor Serial NB

Calib Date ddmmyy

Matrix Size

Coeff CRC

COEFFICIENTS FOR SAPPHIRE PBMS–A.3779 S/N:

3779

090107

66

4C82

Pres Coeff

	Tt**0	Tt**1	Tt**2
Tp**0	–.611876617639E+04	+.471061007964E+04	–.216447354932E+04
Tp**1	+.371836126905E+04	–.234756196935E+04	+.129149325686E+04
Tp**2	+.193143980957E+02	–.189348218853E+01	–.341812471126E+01
Tp**3	–.568815065386E+01	+.200079683569E+01	0.0
Tp**4	0.0	0.0	0.0
Tp**5	0.0	0.0	0.0

	Tt**3	Tt**4	Tt**5
Tp**0	+.380249508124E+03	–.247683004908E+02	0.0
Tp**1	–.227135245080E+03	+.146352372057E+02	0.0
Tp**2	0.0	0.0	0.0
Tp**3	0.0	0.0	0.0
Tp**4	0.0	0.0	0.0
Tp**5	0.0	0.0	0.0

PBMS Sapphire 10kPsi Gauge

Sonde Serial NB

Sensor Serial NB

Calib Date ddmmyy

Matrix Size

Coeff CRC

:

3779

090107

66

C39E

Temp Coeff

	Tp**0	Tp**1	Tp**2
Tt**0	–.278275571347E+03	+.251216271916E+01	–.820715649824E+00
Tt**1	+.598349067015E+02	–.107326373545E+01	+.652890183203E–01
Tt**2	+.109160002120E+02	+.262812193556E+00	–.450134240377E–02
Tt**3	–.673302171285E+00	–.213772918779E–01	0.0
Tt**4	0.0	0.0	0.0
Tt**5	0.0	0.0	0.0

	Tp**3	Tp**4	Tp**5
Tt**0	+.151507143209E+00	–.592670012996E–02	0.0
Tt**1	+.127486538512E–01	–.437897076104E–02	0.0
Tt**2	0.0	0.0	0.0

Tt**3	0.0	0.0	0.0
Tt**4	0.0	0.0	0.0
Tt**5	0.0	0.0	0.0

Client:	ENCANA OIL & GAS (USA) INC.	Tool:	PSP
Field:	MAMM CREEK	Sub Type:	PBMS
Well:	TWIN CREEK F12E PAD	Sensor:	GR
Run date:	13-May-2012		

PBMS Gamma Ray
Sonde Serial NB RESISTORS FOR GR SENSOR N.34552,TOOL PBMS-AA3779. SENSOR S/N:
Sensor Serial NB 34552
Calib Date ddmmyy 030606
Matrix Size 12
Coeff CRC 3AE5

GR HV Rt		
	Rt**0	Rt**1
Rt**0	+.200000000000e+04	+.214000000000e+04

Client:	ENCANA OIL & GAS (USA) INC.	Tool:	PSP
Field:	MAMM CREEK	Sub Type:	PBMS
Well:	TWIN CREEK F12E PAD	Sensor:	WellTemp RTD
Run date:	13-May-2012		

PBMS RTD Well Thermometer
Sonde Serial NB COEFFICIENTS FOR RTD THERMOMETER PBMS-A.3779 S/N:
Sensor Serial NB 3779
Calib Date ddmmyy 090107
Matrix Size 12

Matrix Size 16
Coeff CRC 3846

WTemp Coeff

	Tt**0	Tt**1	Tt**2
Tt**0	+.492135102627E+02	-.278827553804E+03	+.142867554561E+03
	Tt**3	Tt**4	Tt**5
Tt**0	-.233378392336E+02	+.145553494493E+01	0.0

Company: ENCANA OIL & GAS (USA) INC.

Schlumberger

Well: TWIN CREEK 12-5D1 (F12E)
Field: MAMM CREEK
County: GARFIELD
State: COLORADO

CEMENT BOND LOG
CBL- VDL
GAMMA RAY - CCL