

Company: ENCANA OIL & GAS (USA) INC.

Well: TWIN CREEK 12-5A2 (F12E)

Field: MAMM CREEK

County: GARFIELD State: COLORADO

CEMENT BOND LOG  
CBL- VDL  
GAMMA RAY - CCL

County: GARFIELD

Field: MAMM CREEK

Location: SHL: 2549' FNL & 1578' FWL

Well: TWIN CREEK 12-5A2

Company: ENCANA OIL & GAS (USA) INC.

LOCATION			
SHL: 2549' FNL & 1578' FWL	Elev.: K.B.	6166.80 ft	
BHL: 1560' FNL & 660' FWL	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.	Section 12	Township 7S	Range 92W
05-045-20385-0000			

	Run 1	Run 2	Run
Oil Density			
Water Salinity			
Gas Gravity			
Bo			
Bw			
1/Bq			
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	13-May-2012		
Run Number	TWO		
Depth Driller	5701 ft		
Schlumberger Depth	5650 ft		
Bottom Log Interval	5642 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	5701 ft		
Casing/Tubing Size	4.500 in		
Weight	11.6 lbm/ft		
Grade	S80		
From	22 ft		
To	5748 ft		
Maximum Recorded Temperatures	157 degF		
Logger On Bottom	13-May-2012	Time	5:59
Unit Number	391	Location	GRAND JUNCTION
Recorded By	DAVID PATE		
Witnessed By	UNATTENDED		

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: 13-MAY-2012 12:59:01

## 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	
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Log Sequence:	Subsequent Log In the Well
Reference Log Name:	CEMENT BOND LOG
Reference Log Run Number:	TWO
Reference Log Date:	15-FEB-2012

Depth Control Remarks	
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- |   |
|---|
| <ol style="list-style-type: none"><li>1. ALL SCHLUMBERGER DEPTH CONTROL POLICIES APPLIED</li><li>2. IDW USED AS PRIMARY DEPTH REFERENCE, Z-CHART USED AS SECONDARY.</li><li>3.</li><li>4.</li><li>5.</li><li>6.</li></ol> |
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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 21-FEB-2012 BY E&P WIRELINE.	
TOOL RAN AS PER TOOL SKETCH.	
TD TAGGED AT: 5650 FT	
MAXIMUM RECORDED PRESSURE: 2309 PSIA	
MAXIMUM RECORDED TEMPERATURE: 157 DEGF	
SHORT JOINTS: 3680 FT & 4670 FT	

CLIENT: SCHLUMBERGER	
=	
CYCLESKIPPING DUE TO GOOD BOND CAUSING TT TO READ HIGH.	
EXPECTED FREE PIPE AMPLITUDE: 80mA	
AFE: 09133378	
THANK YOU FOR CHOOSING SCHLUMBERGER.	
CREW: 391- WALEED A. & CHRIS A.	

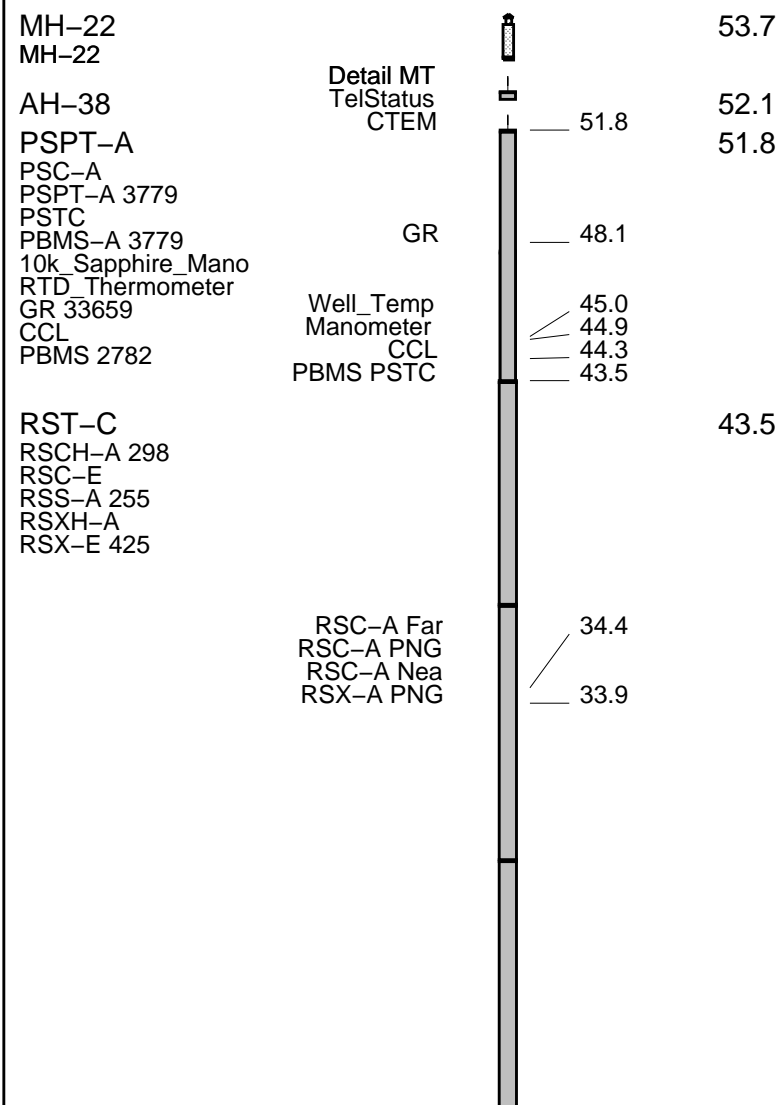
RUN 1 SERVICE ORDER #: BIHS-00256 PROGRAM VERSION: 18C0-147 FLUID LEVEL: 22 ft			RUN 2 SERVICE ORDER #: PROGRAM VERSION: FLUID LEVEL:		
LOGGED INTERVAL	START	STOP	LOGGED INTERVAL	START	STOP

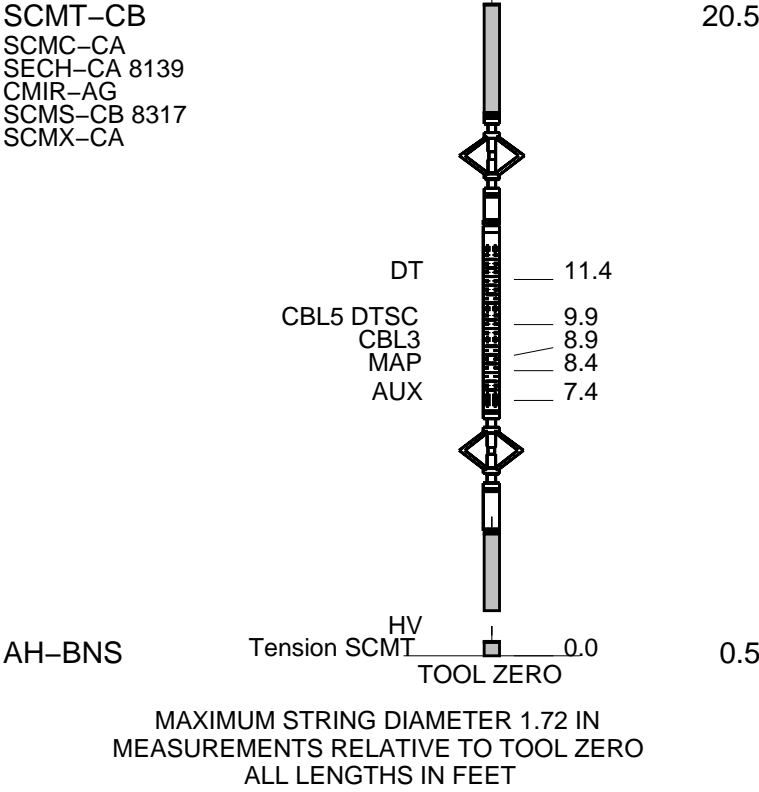
EQUIPMENT	DESCRIPTION

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100	1	1

WITM-A 4101 PSC_16MHZ	SURFACE EQUIPMENT	
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## DOWNHOLE EQUIPMENT





Schlumberger

MAIN PASS 0 PSI

MAXIS Field Log

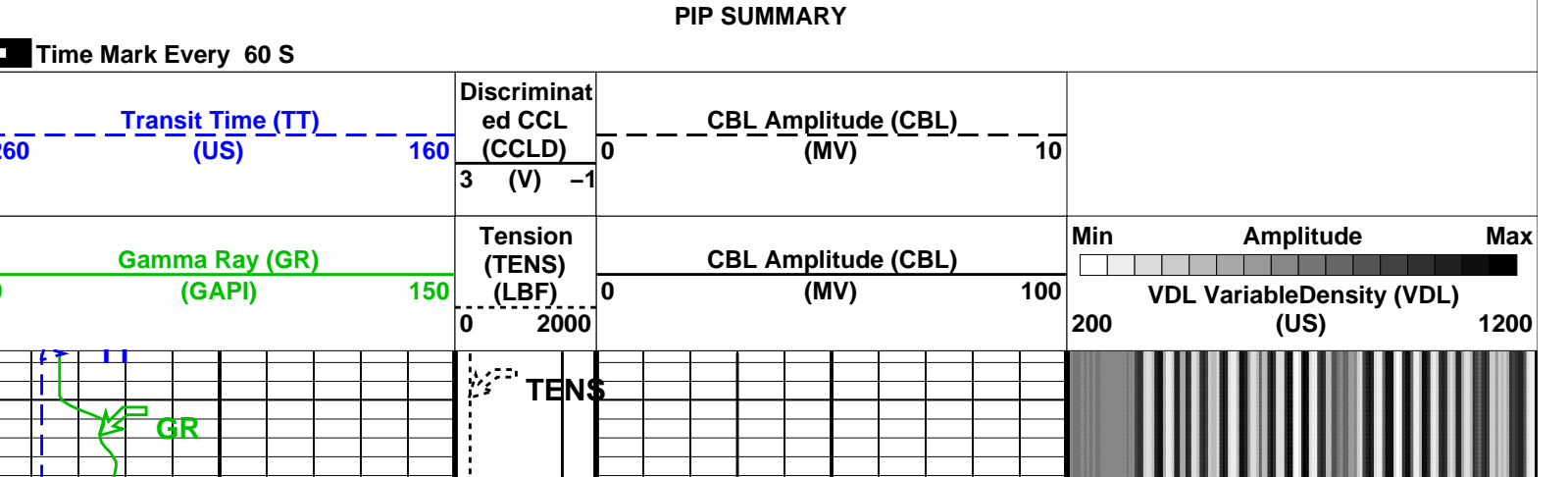
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Output DLIS Files

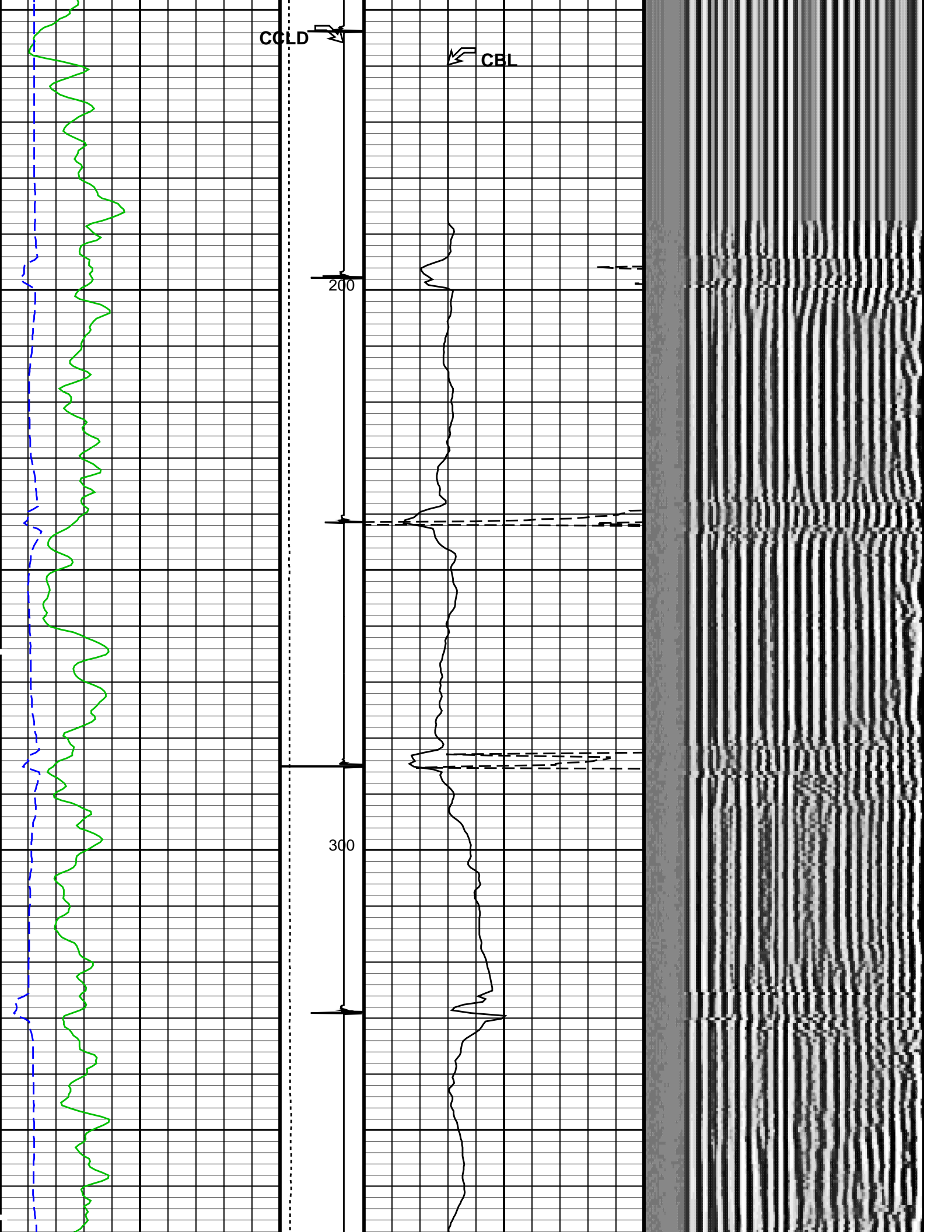
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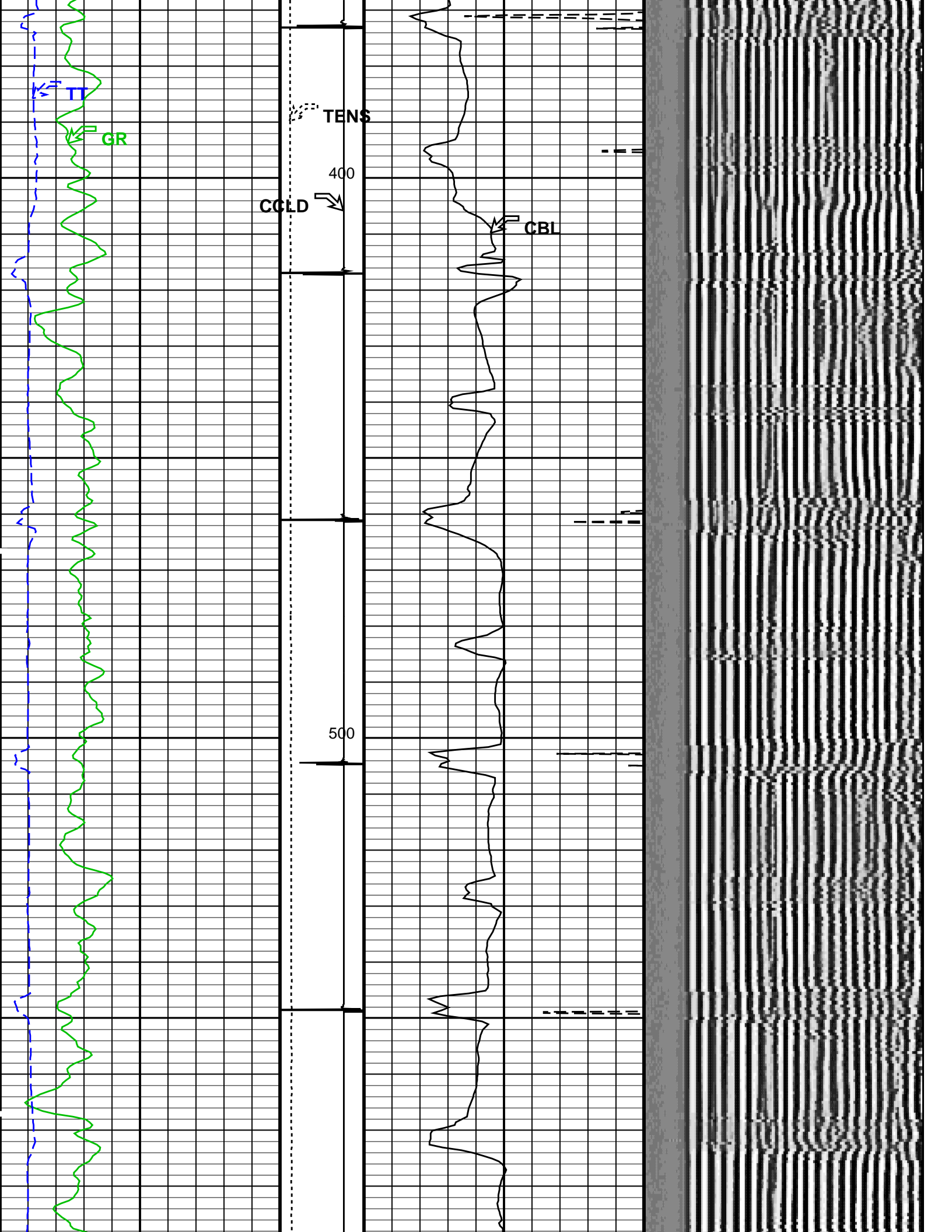
OP System Version: 18C0-147

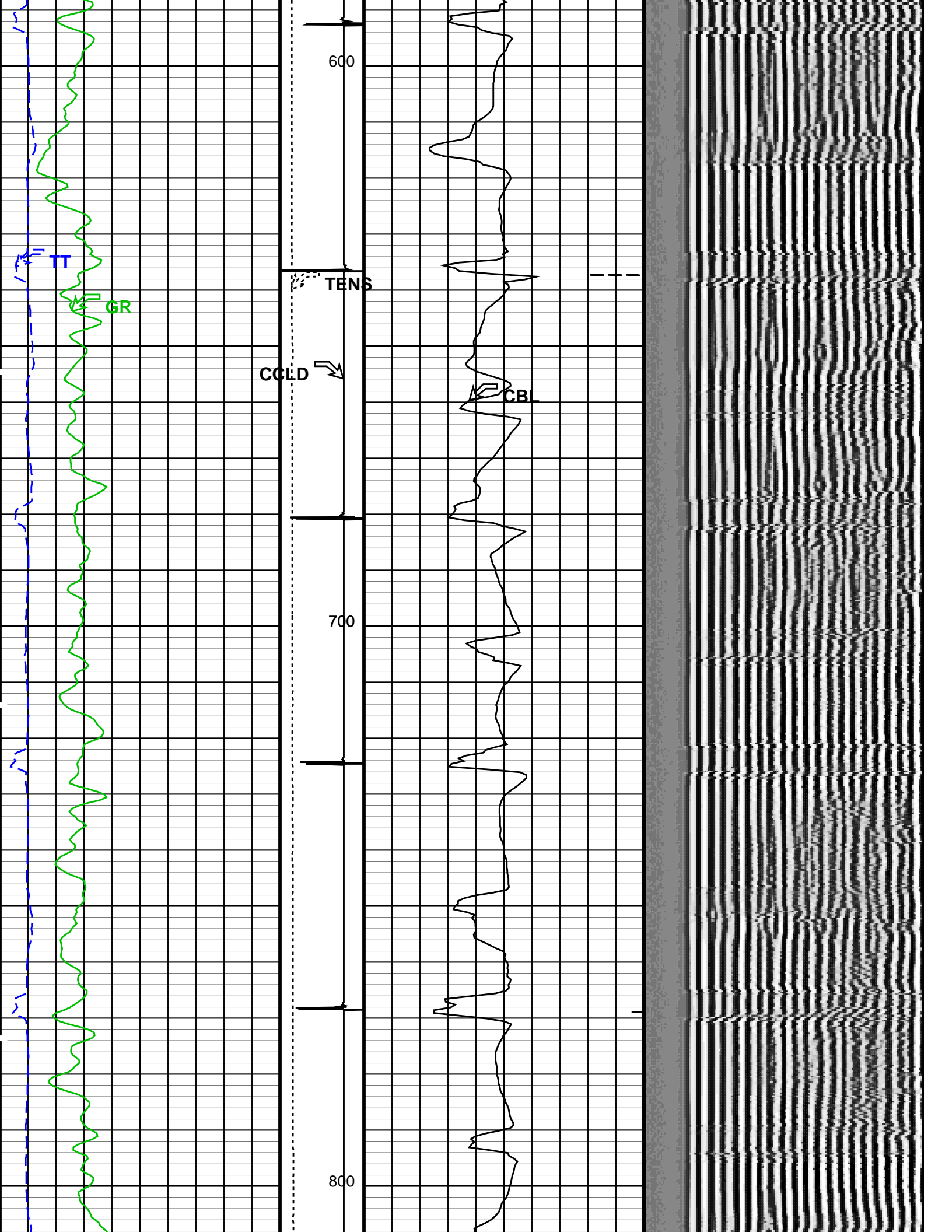
SCMT-CB HFE-4028-IFLEX RST-C 18C0-147  
PSPT-A HFE-4028-IFLEX

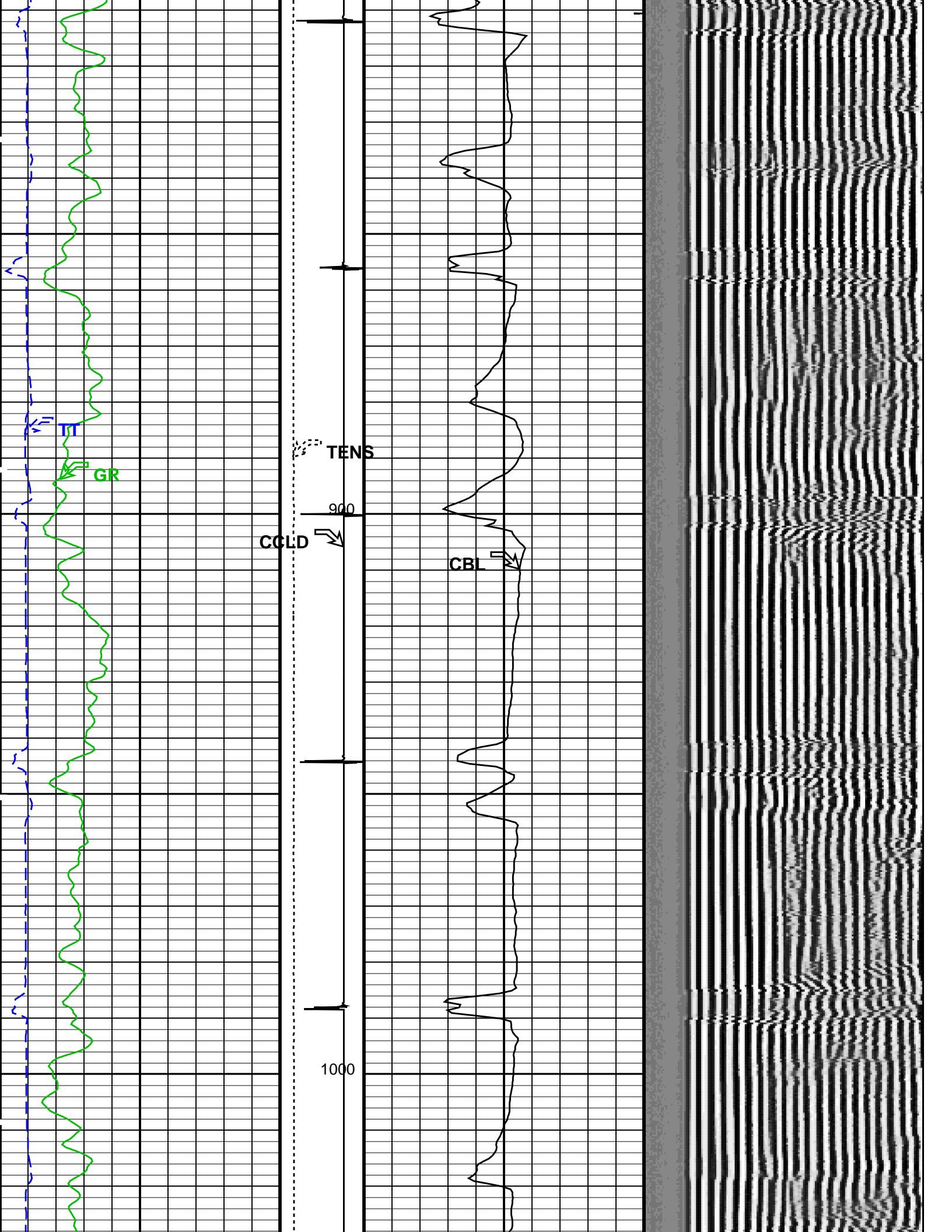




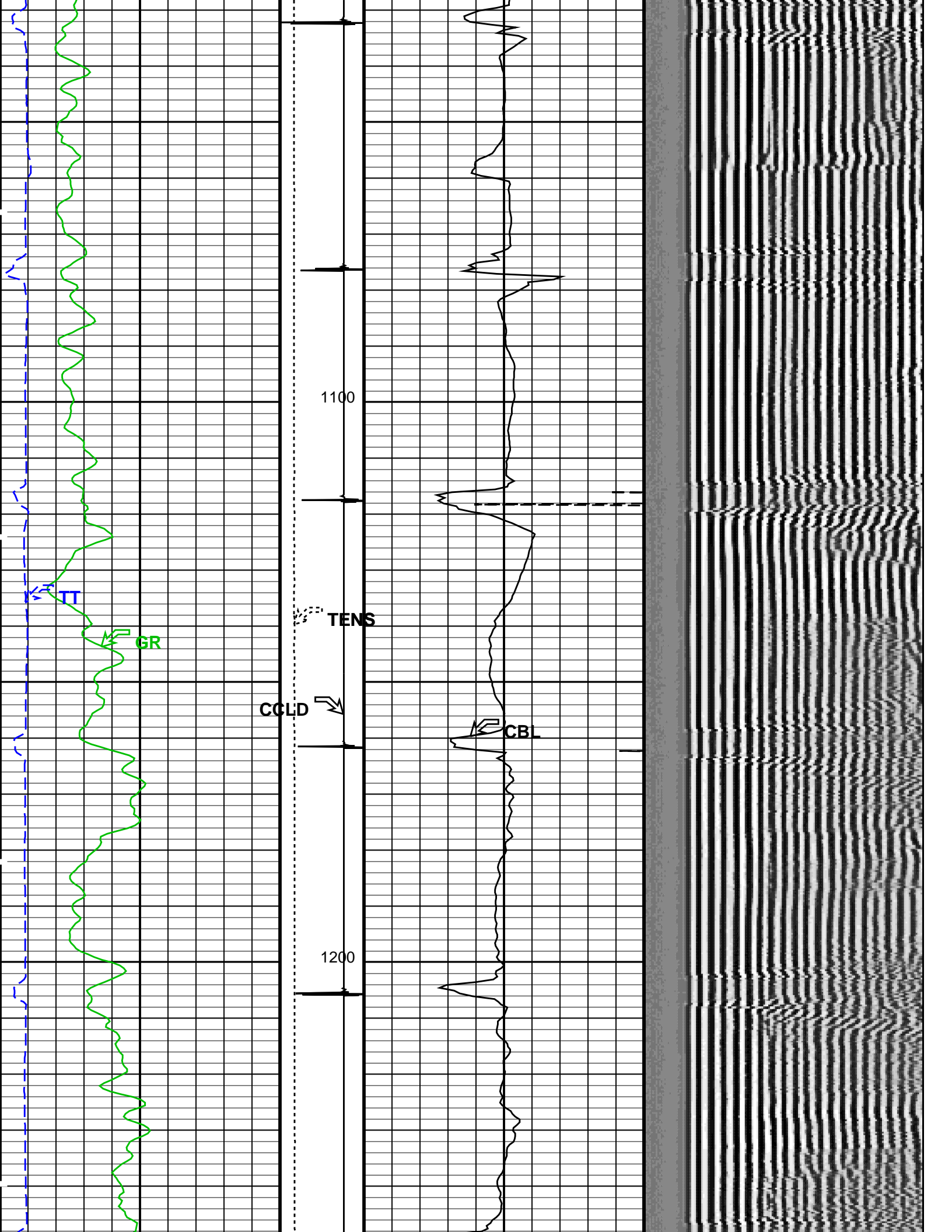


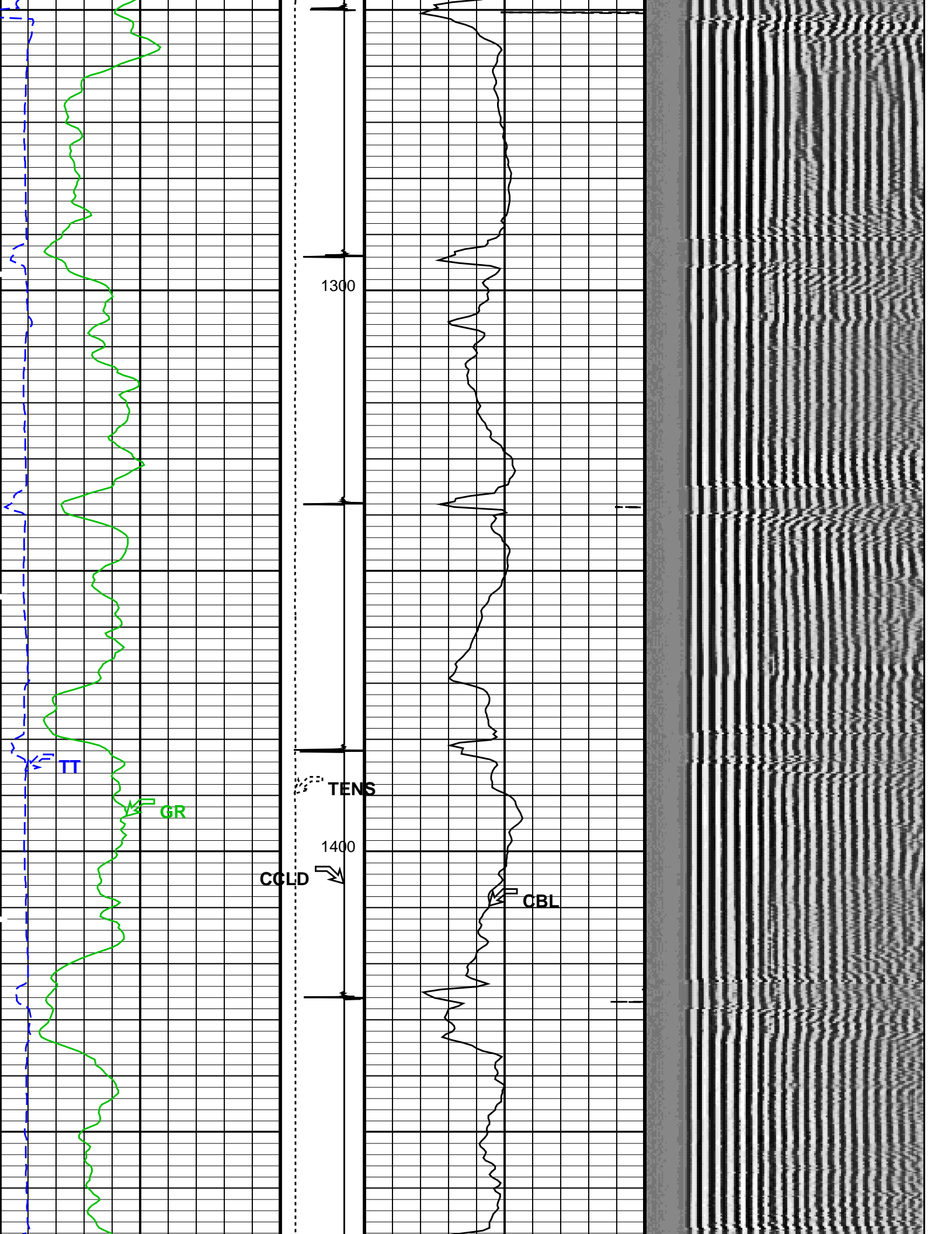


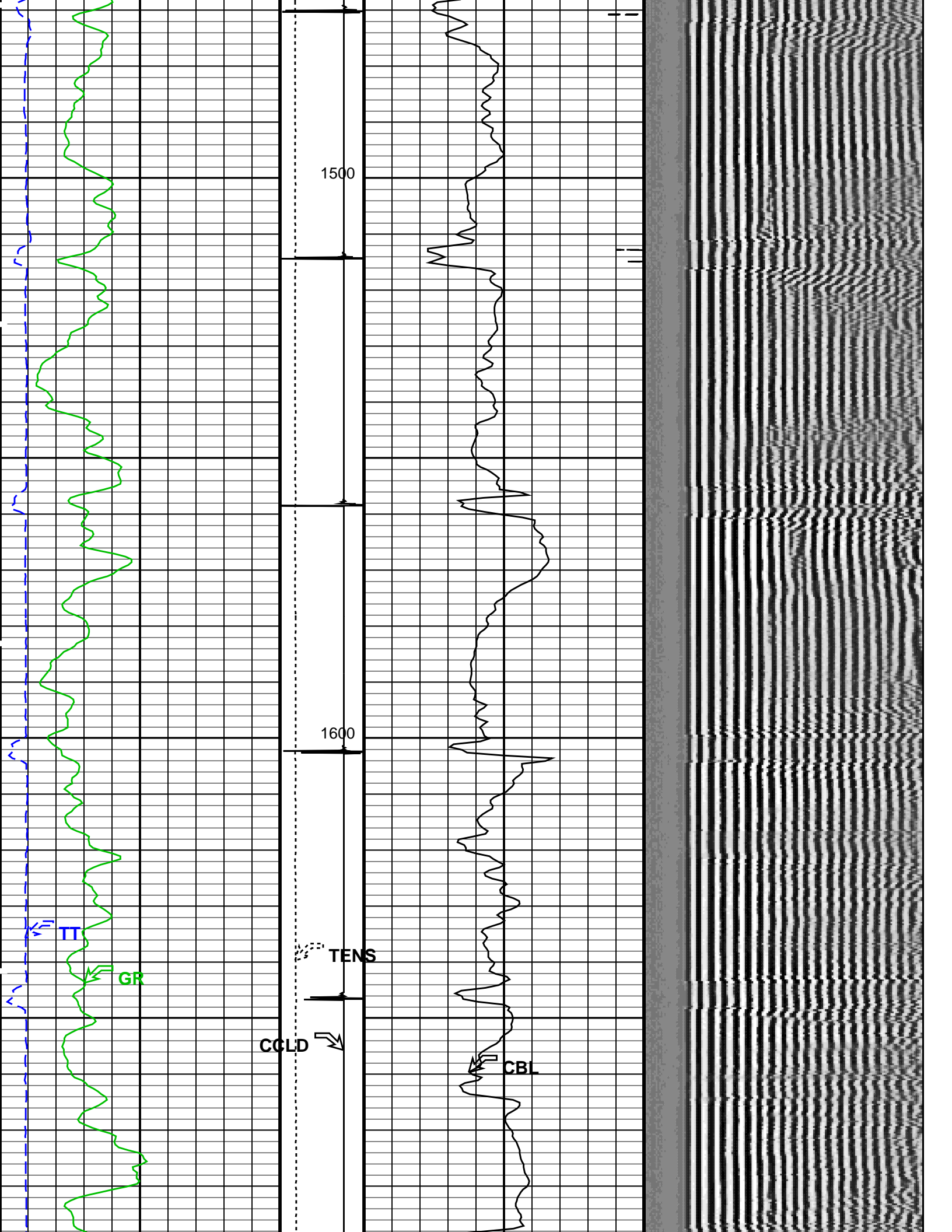


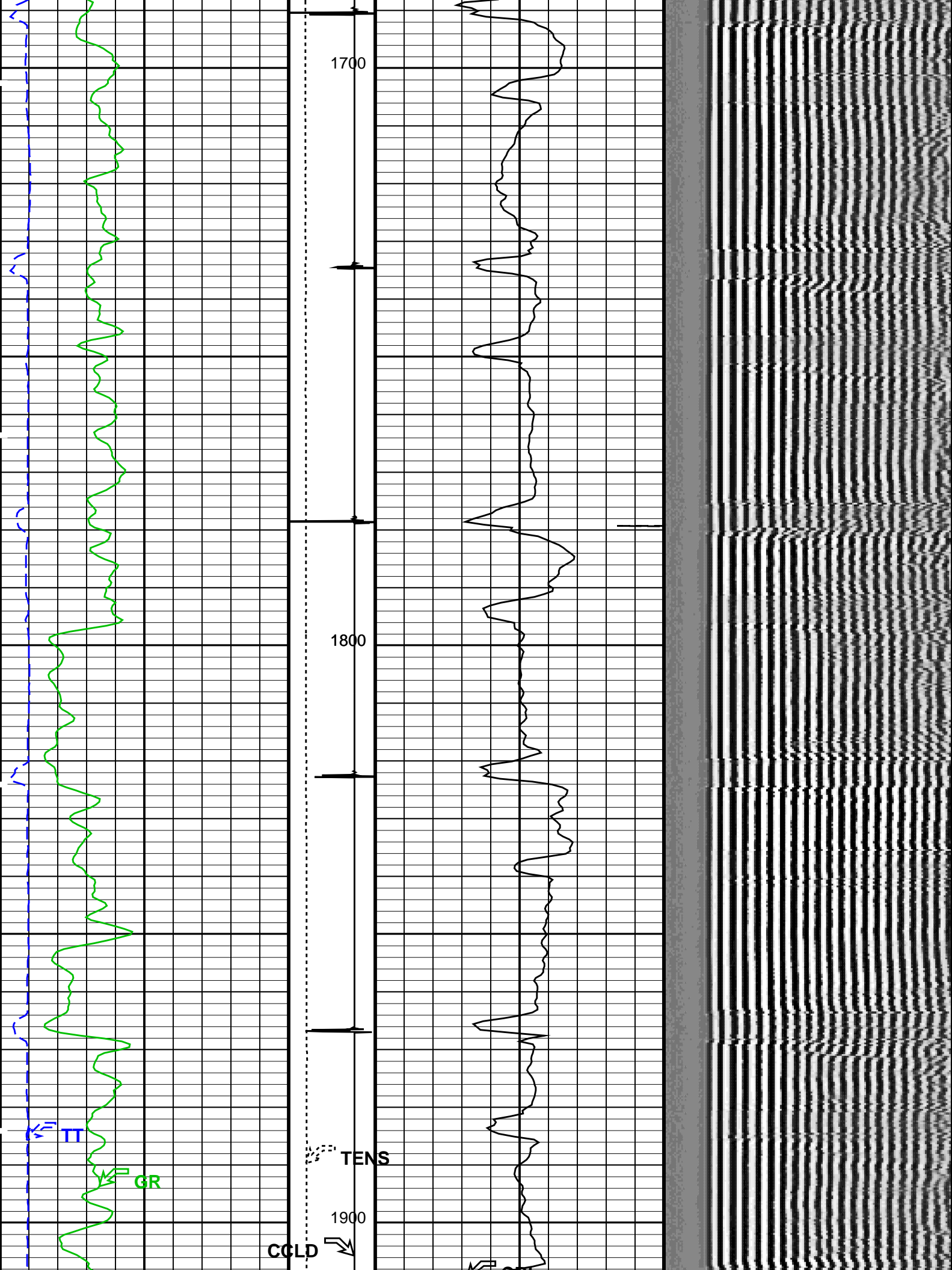




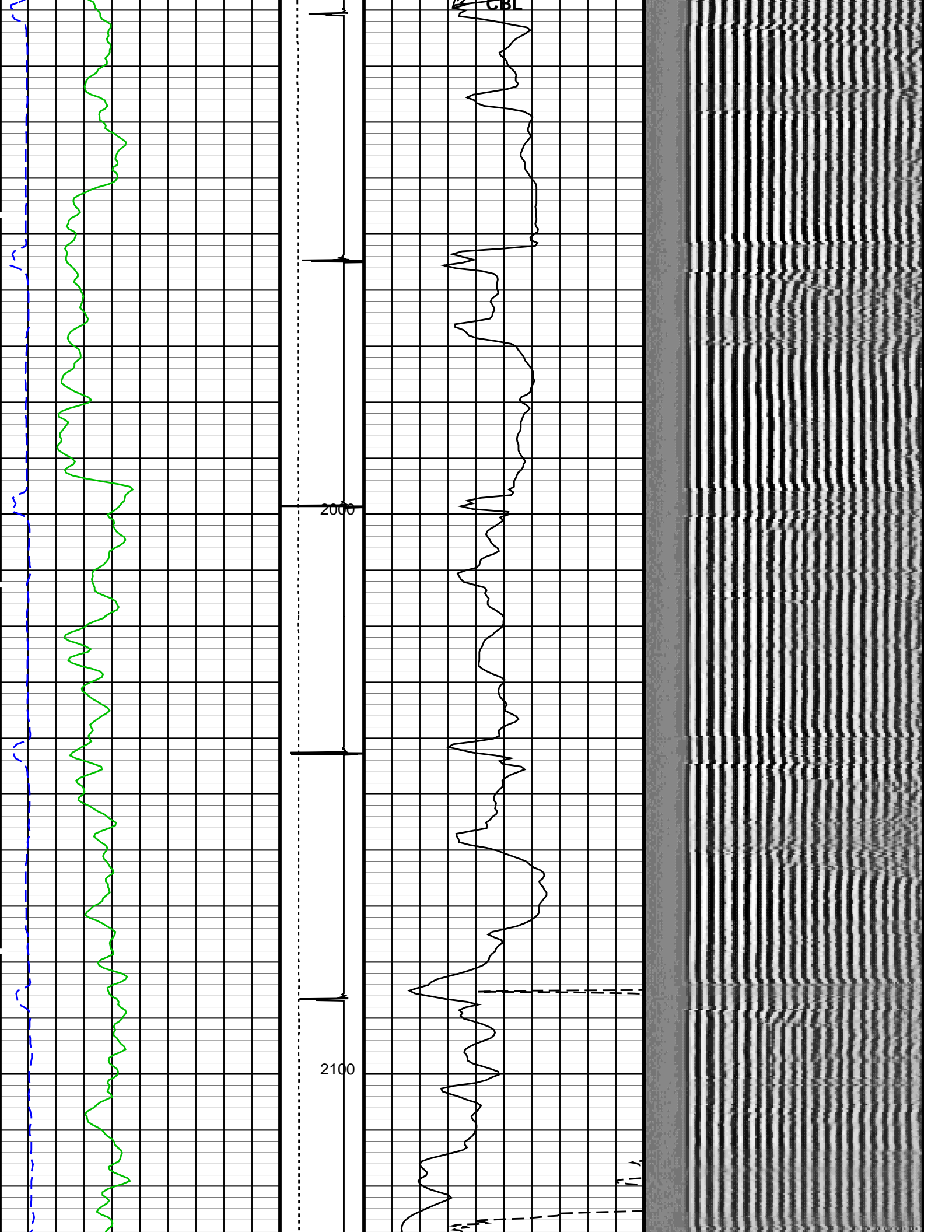


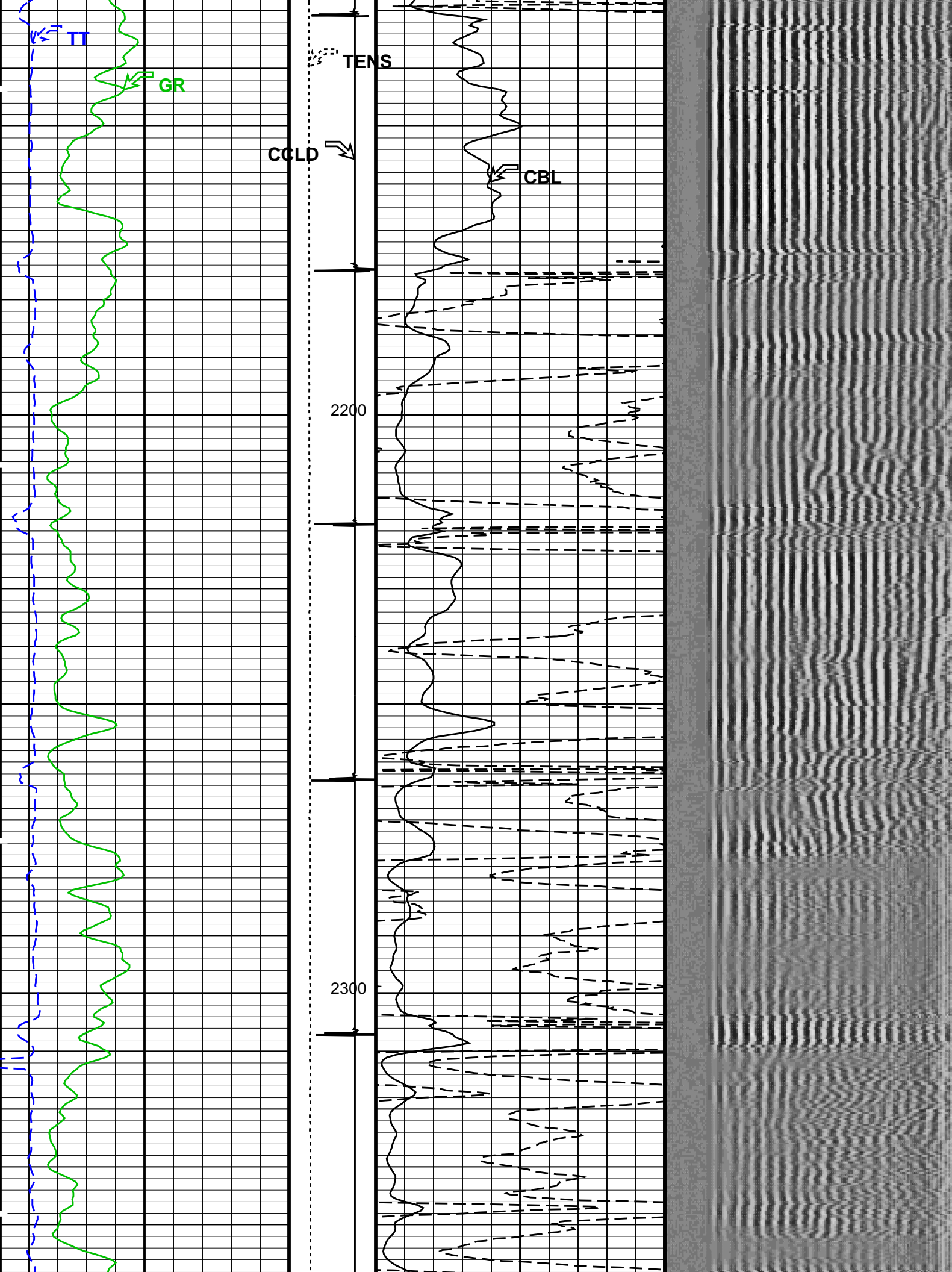


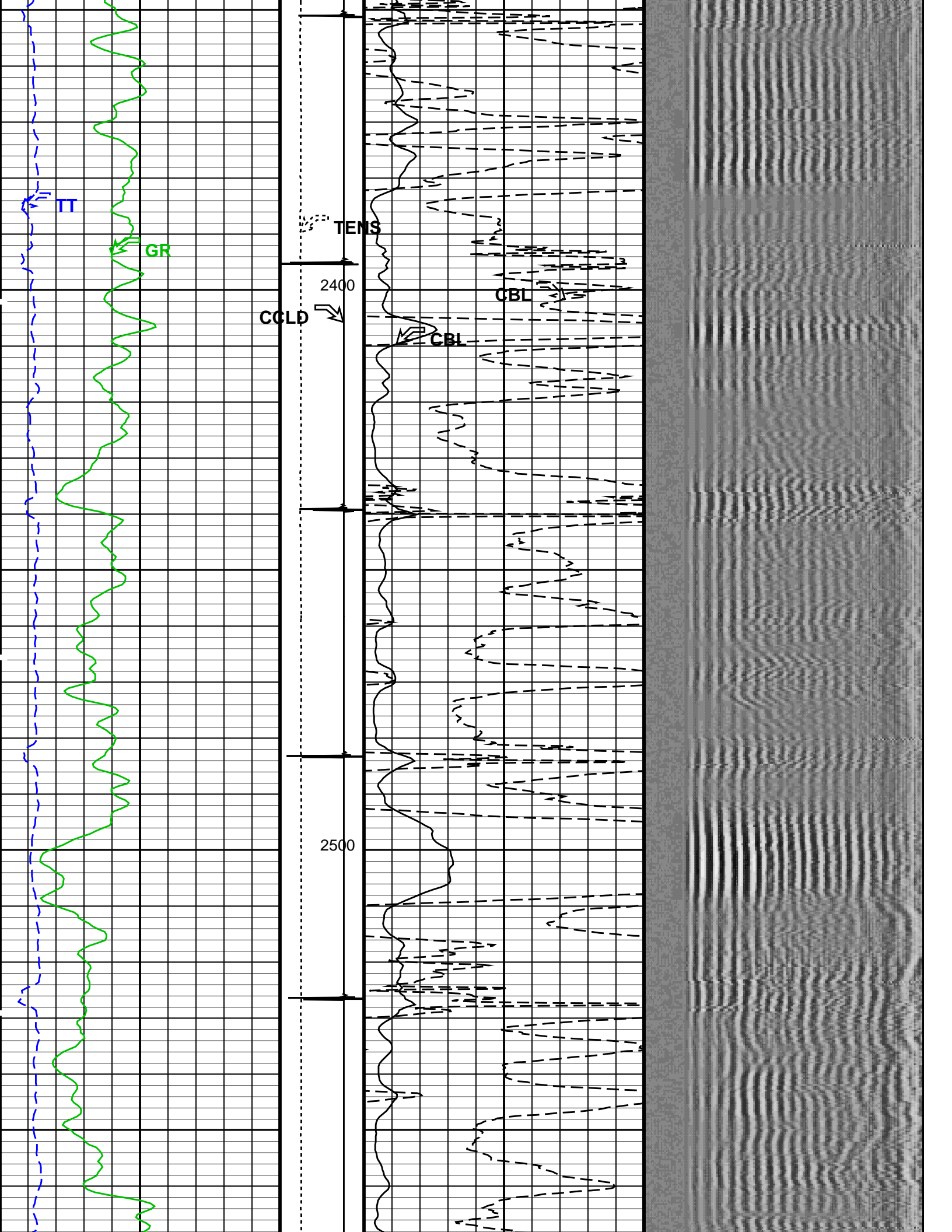


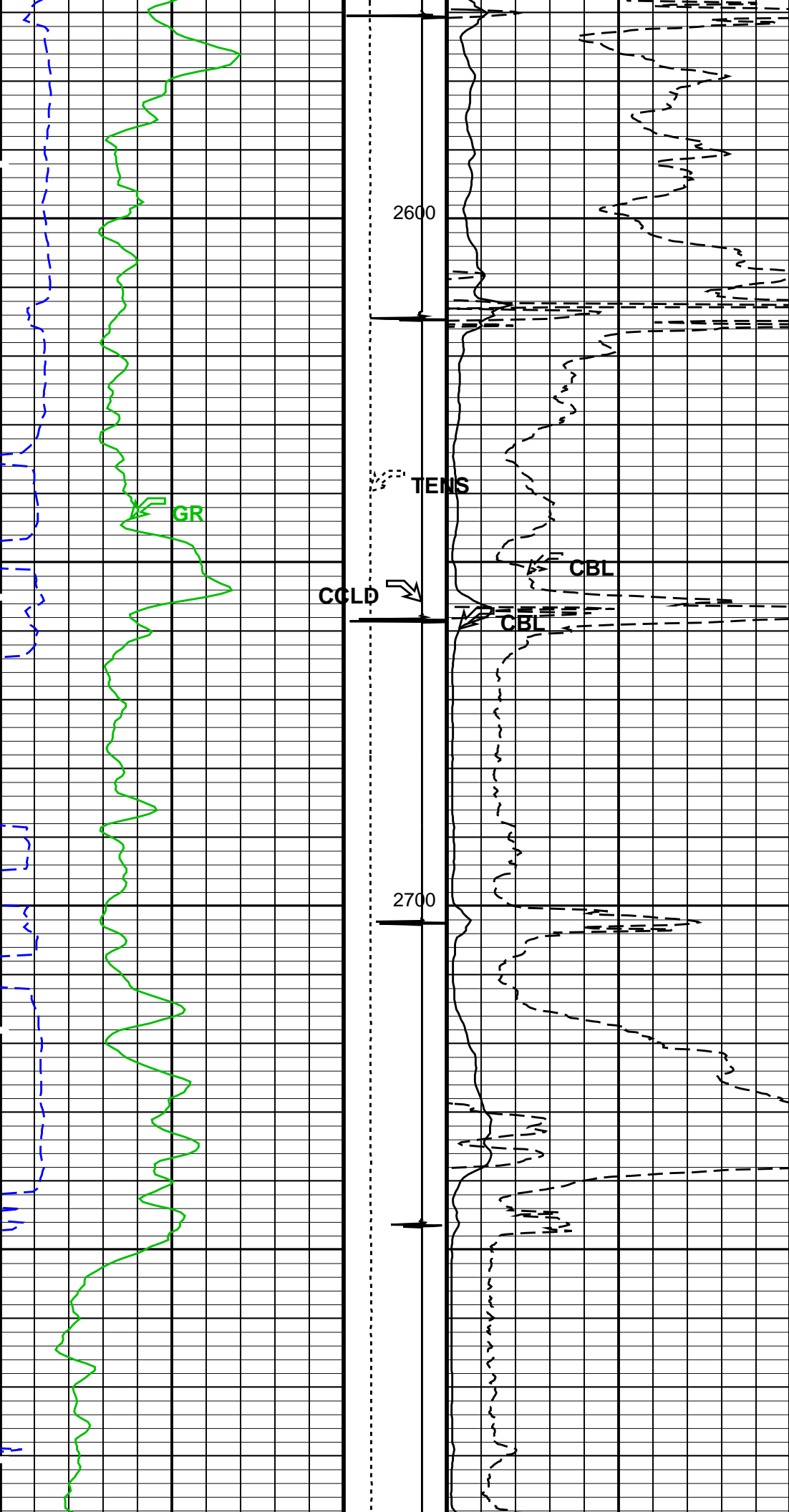




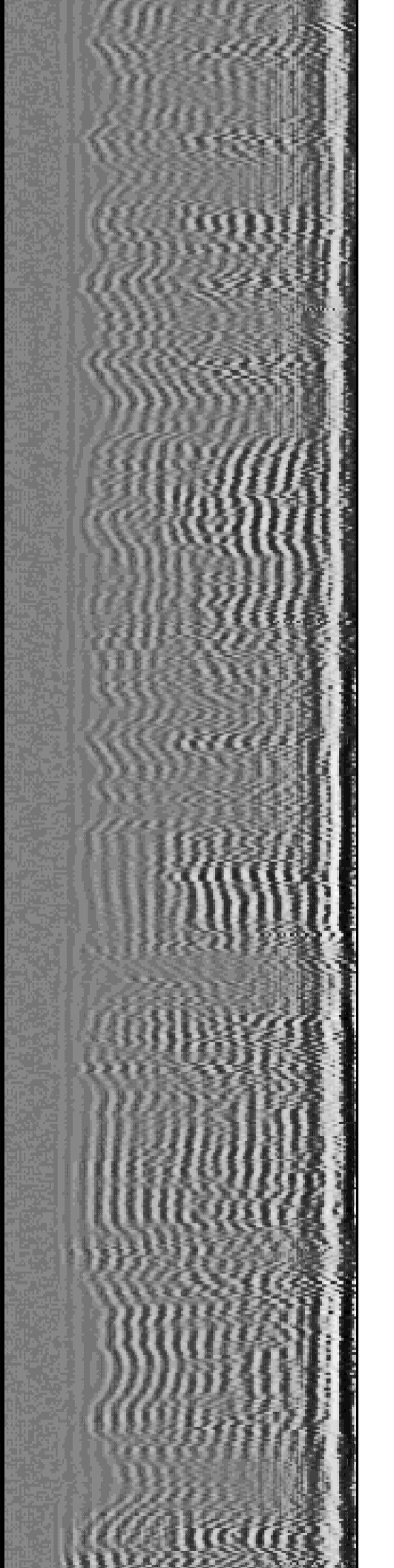
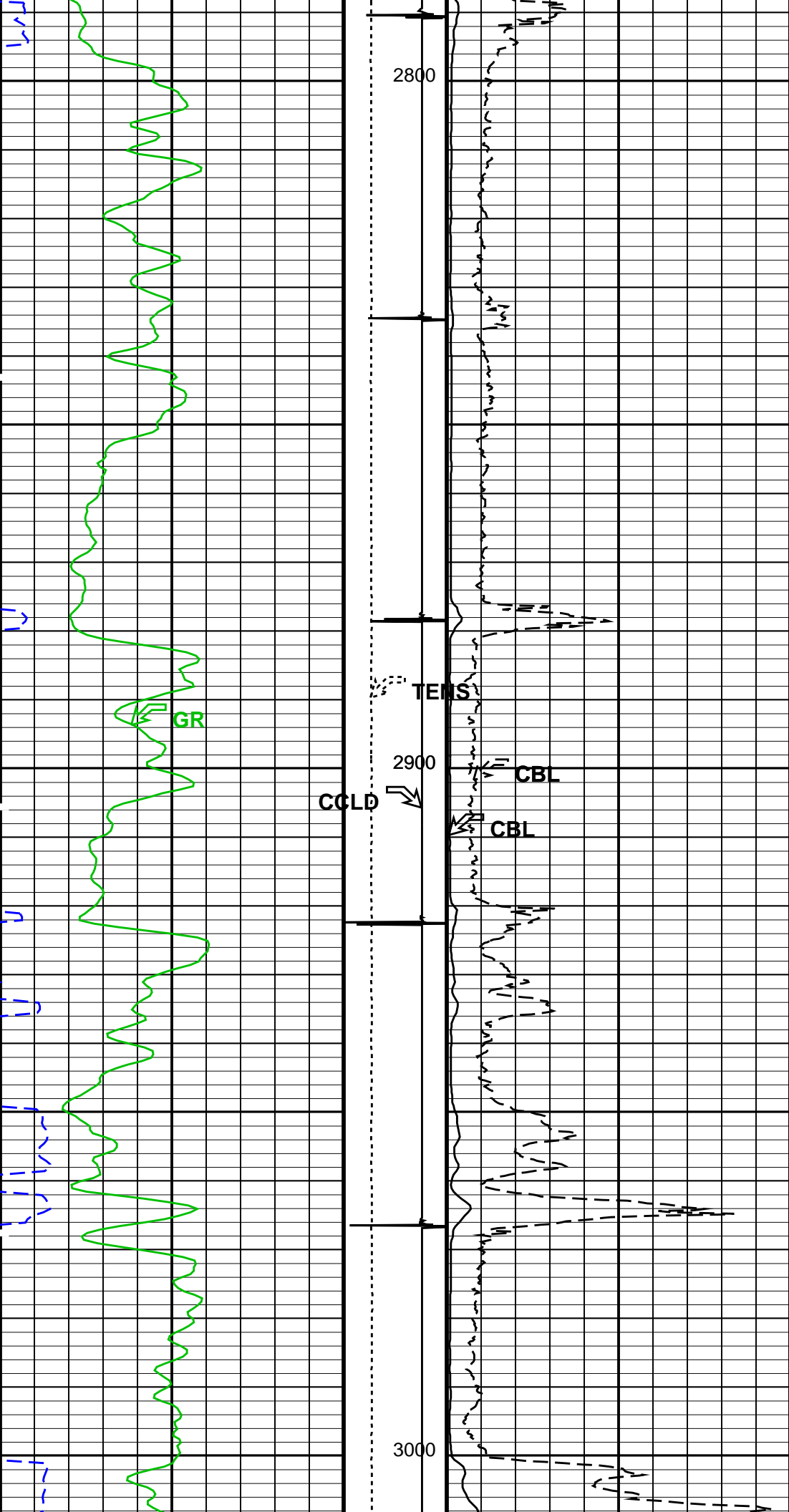


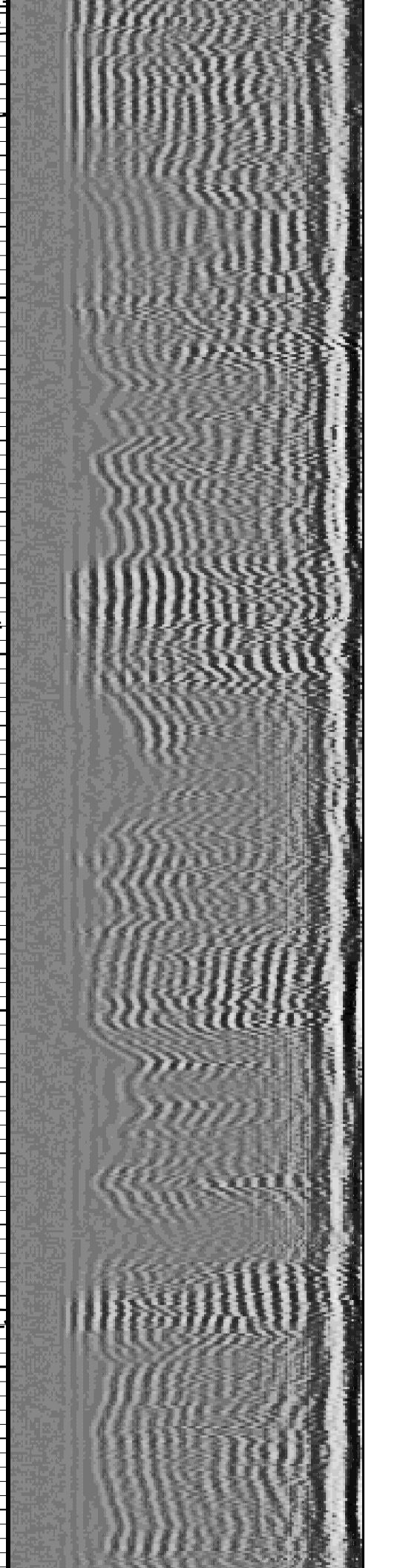
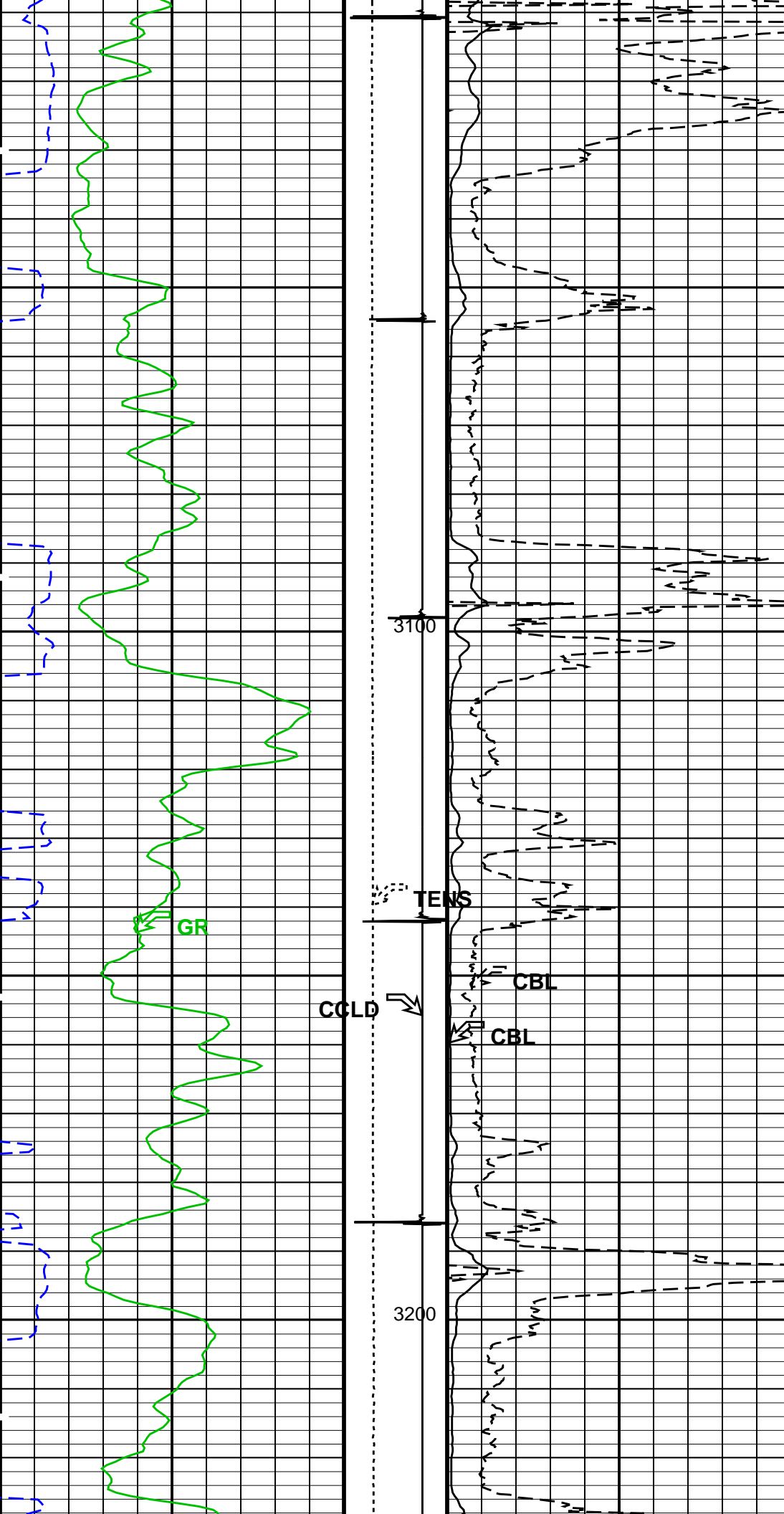


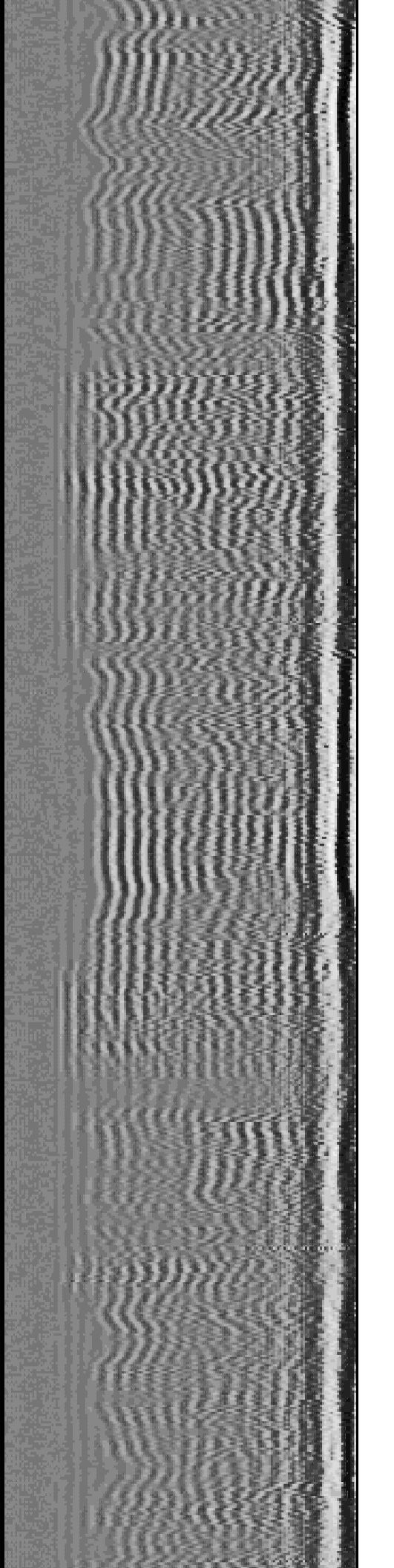
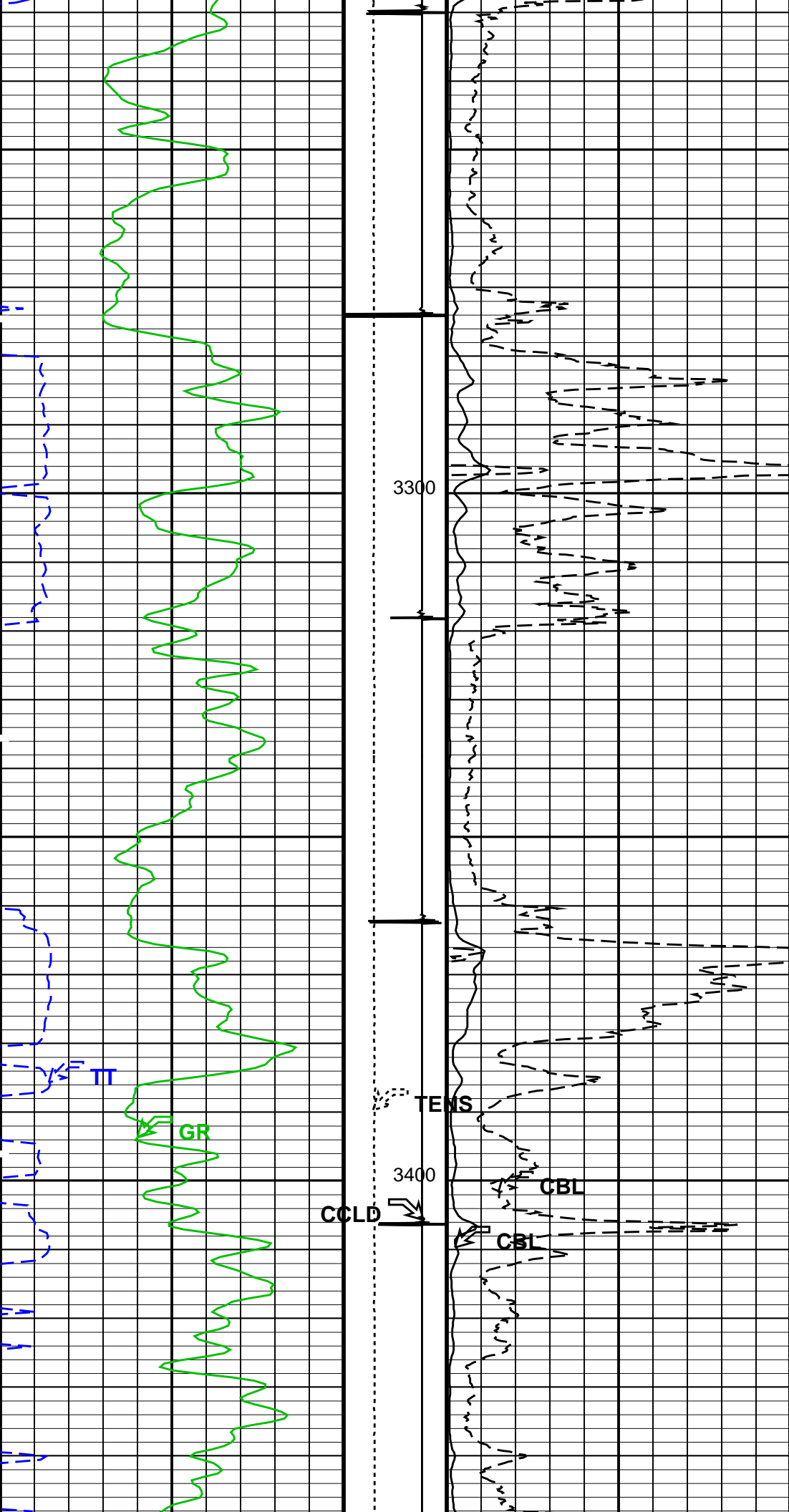


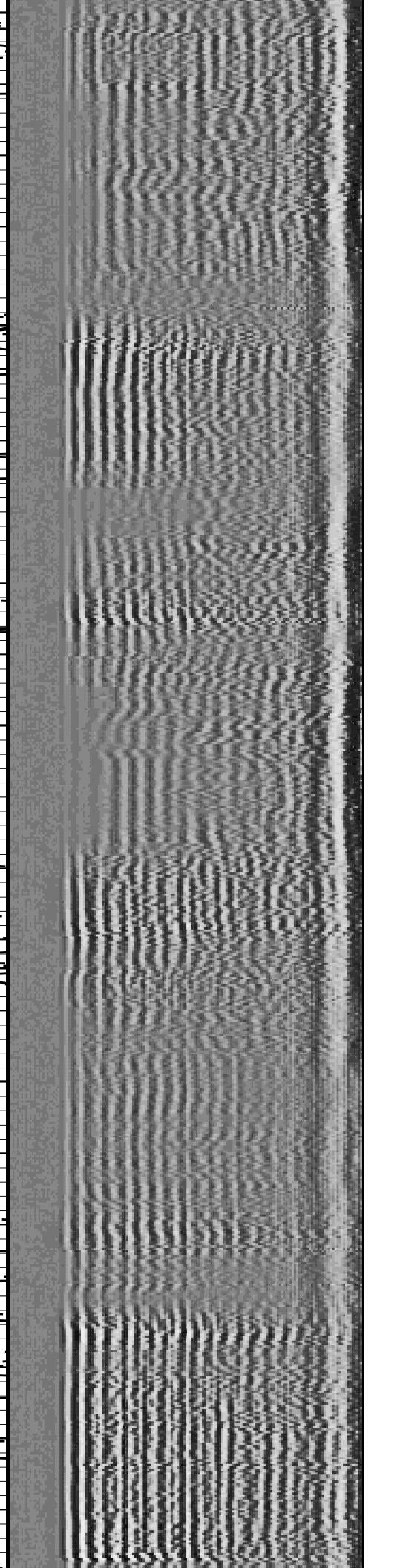
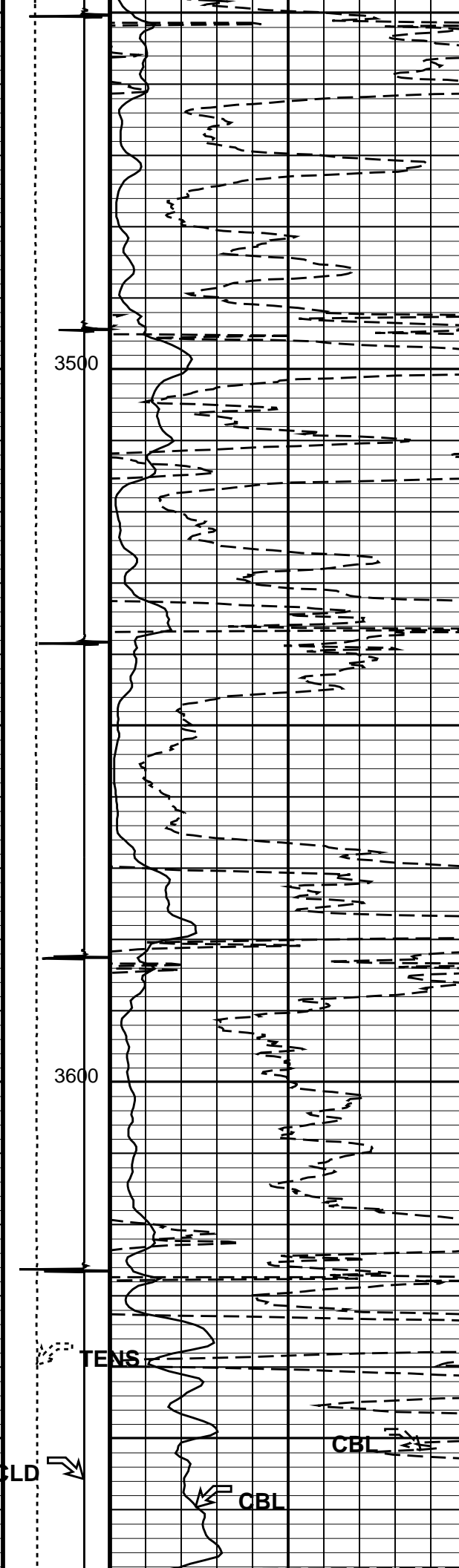
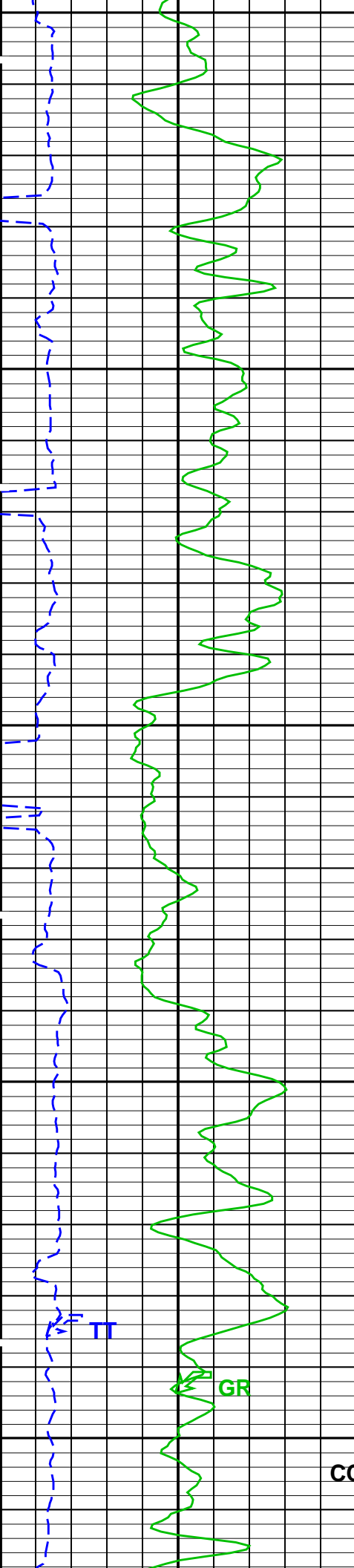




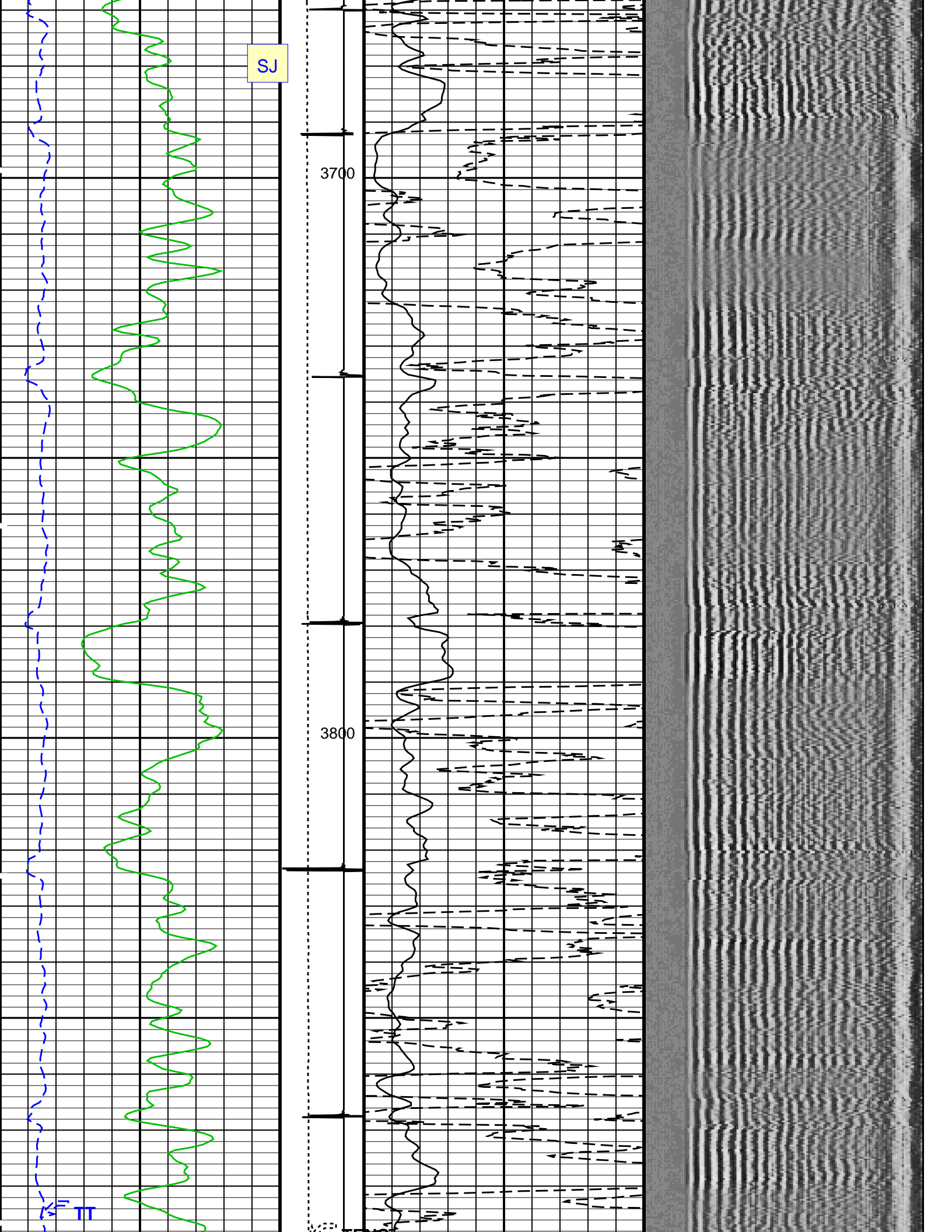


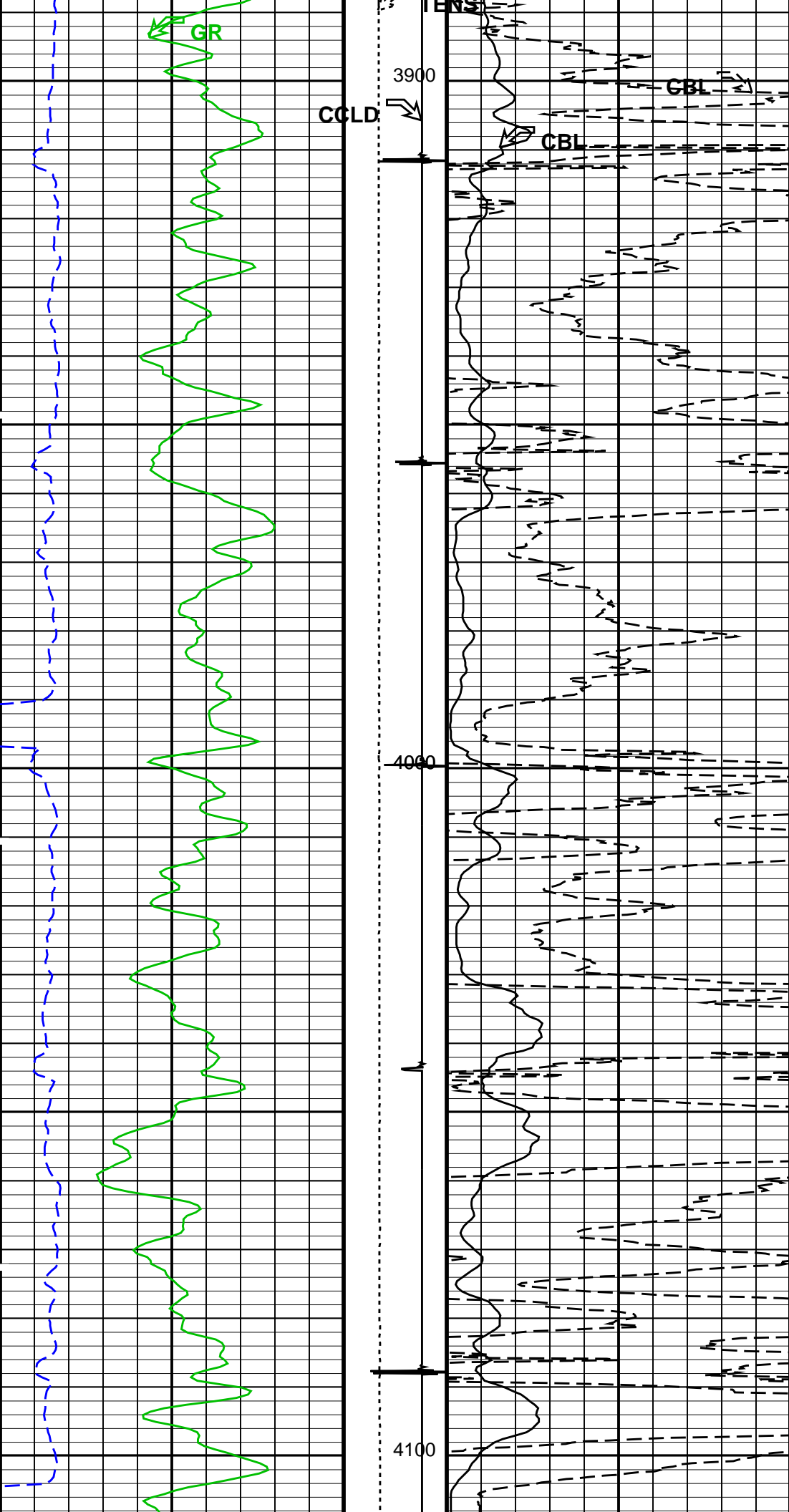


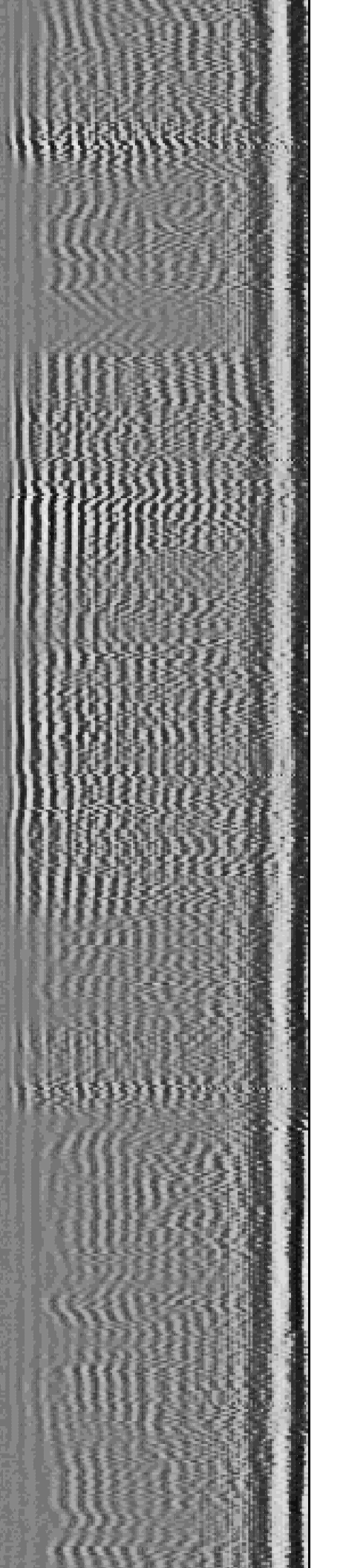
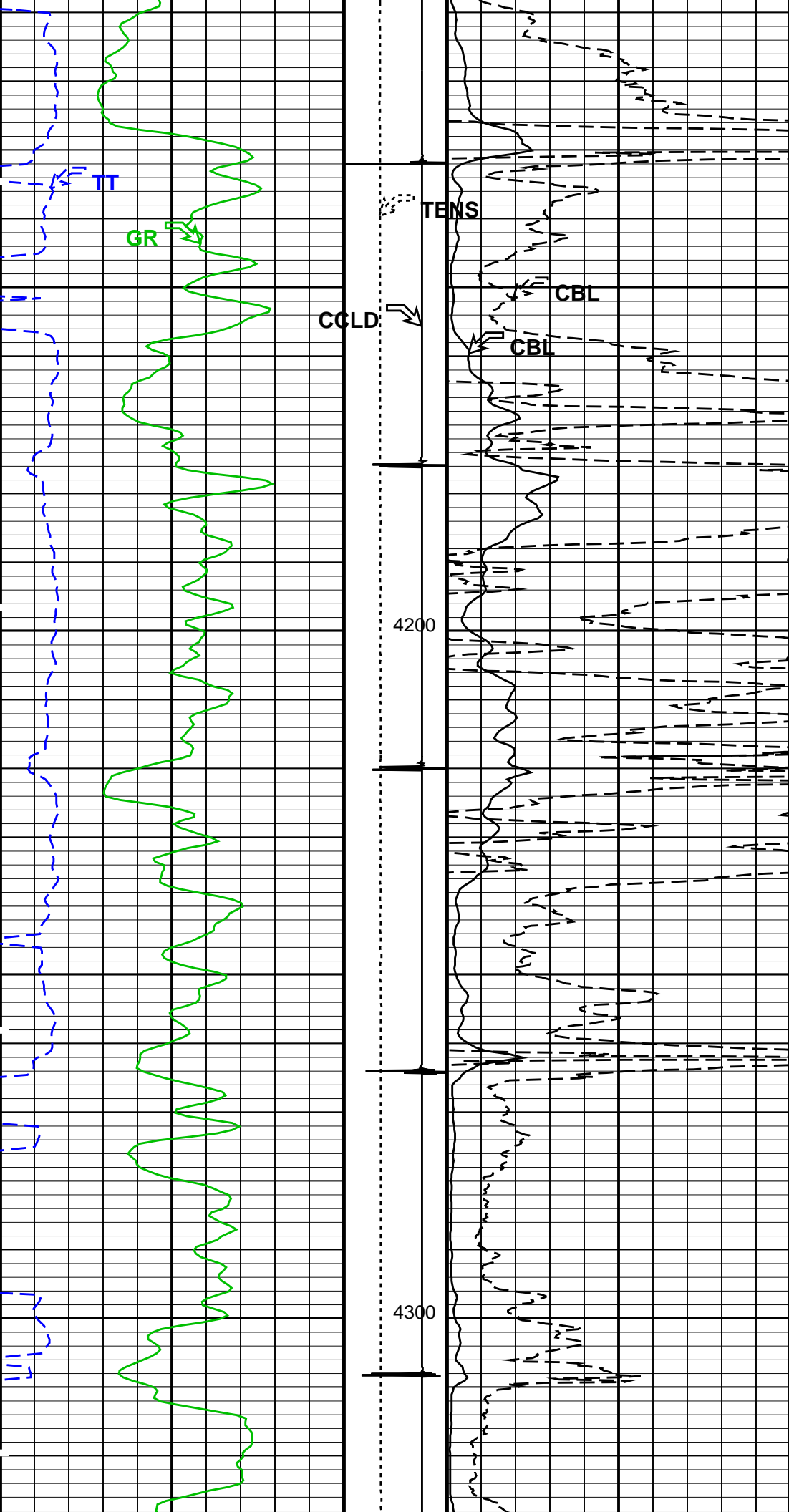




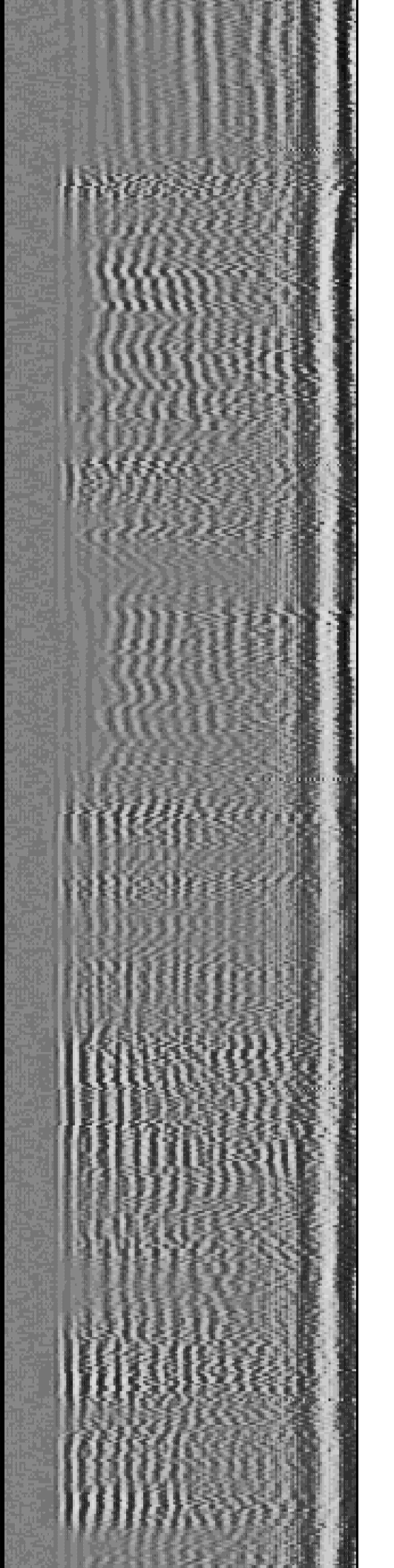
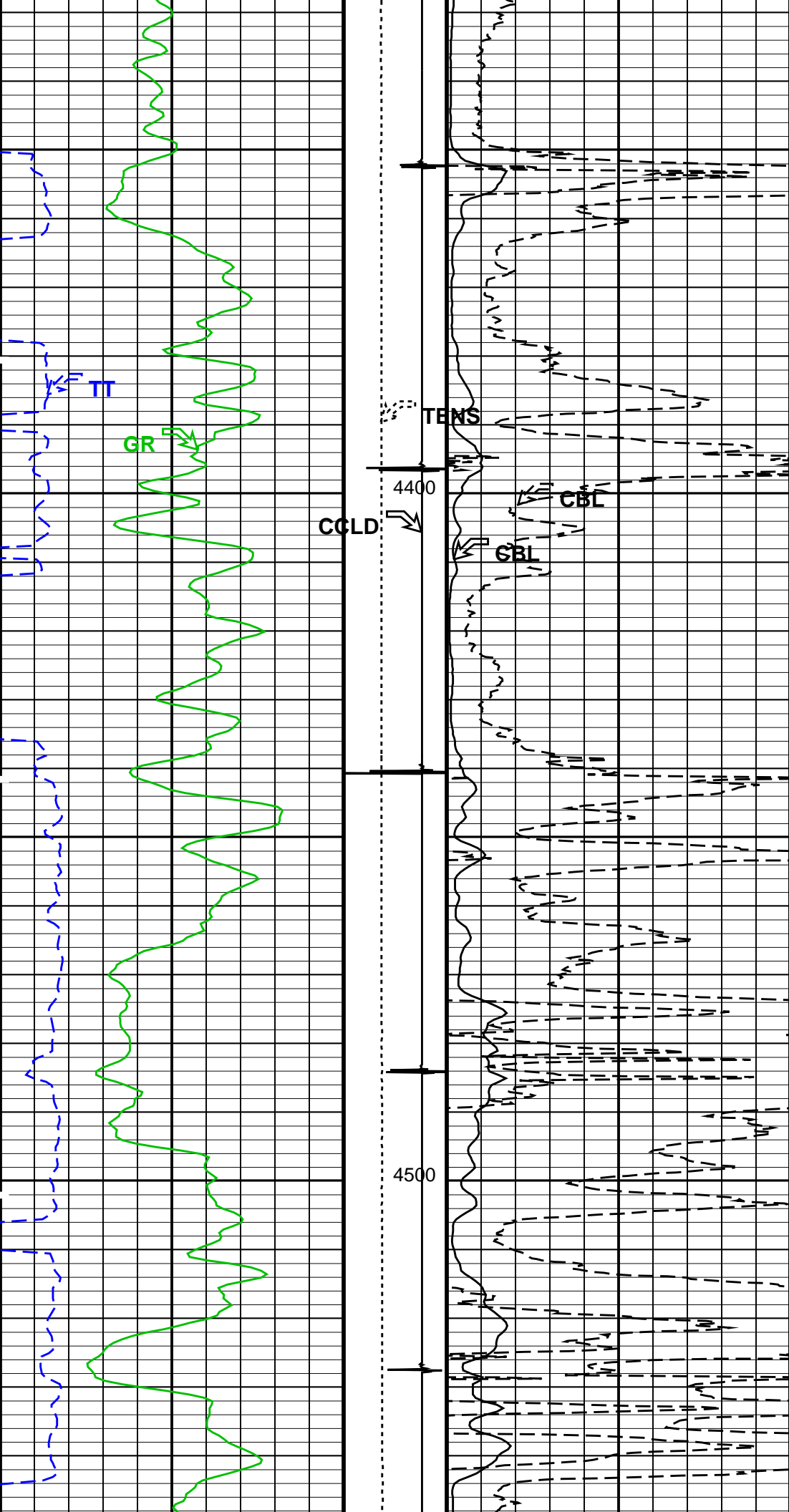


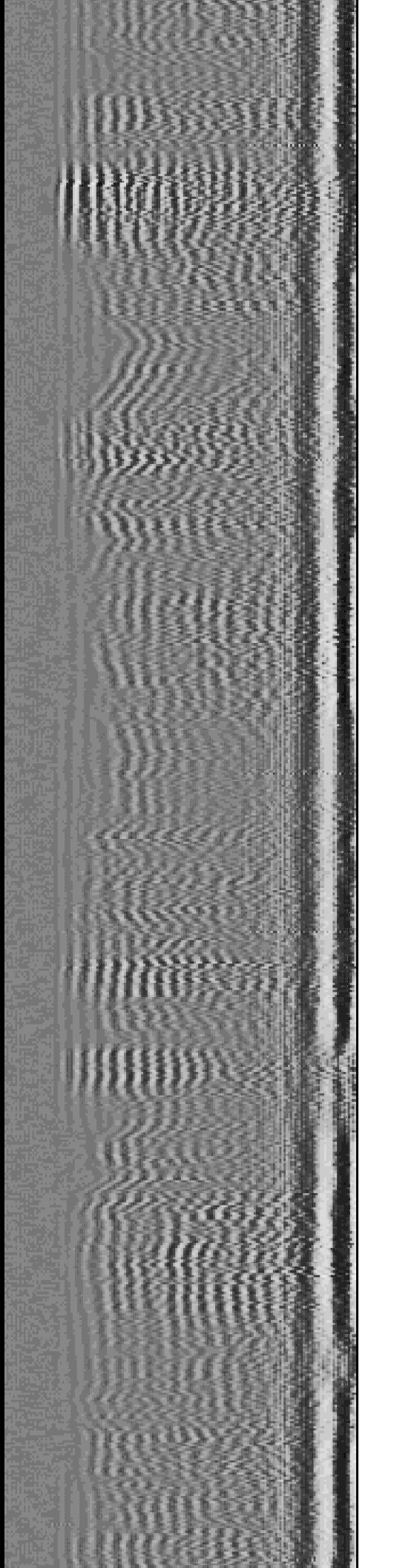
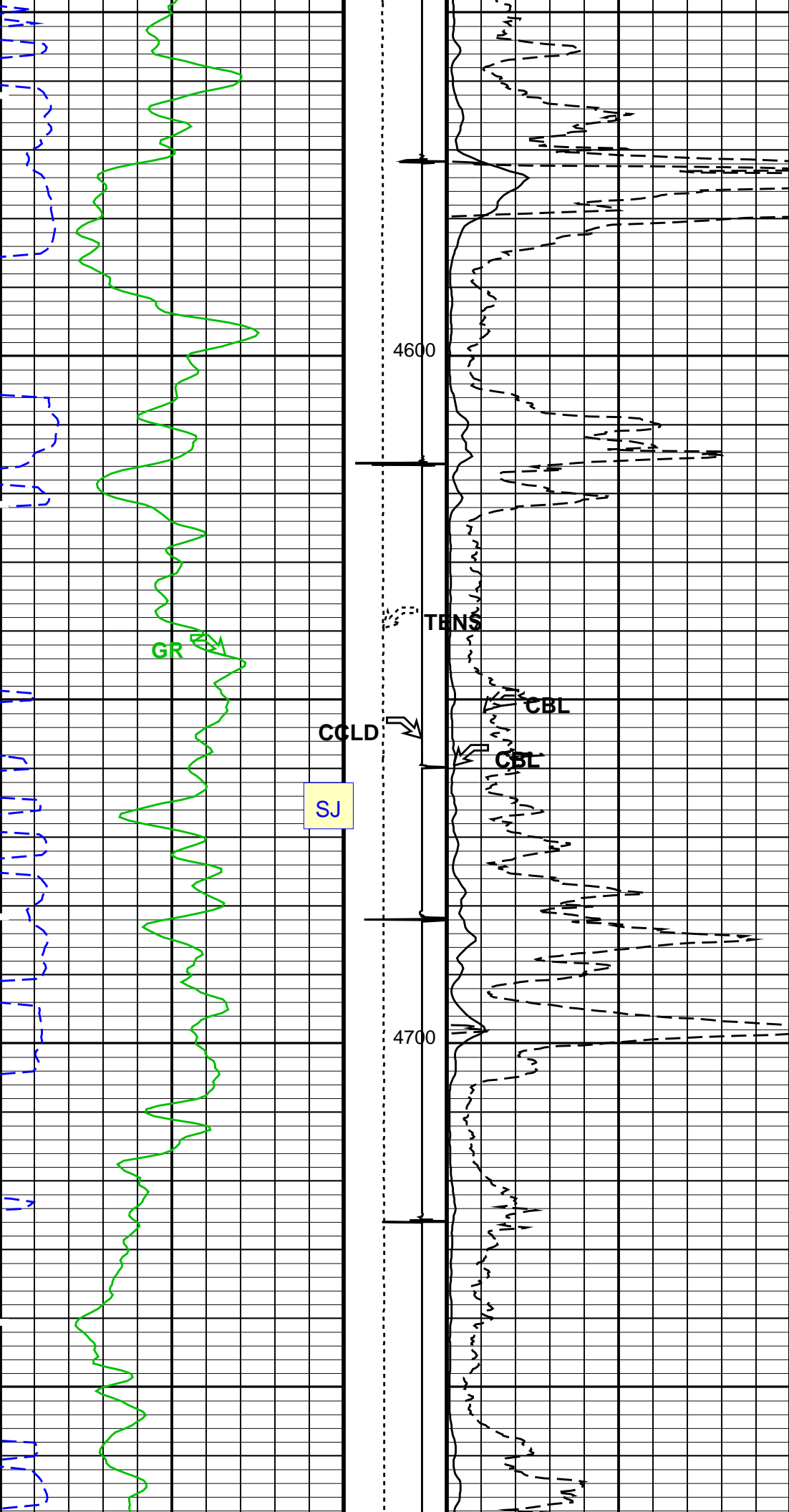


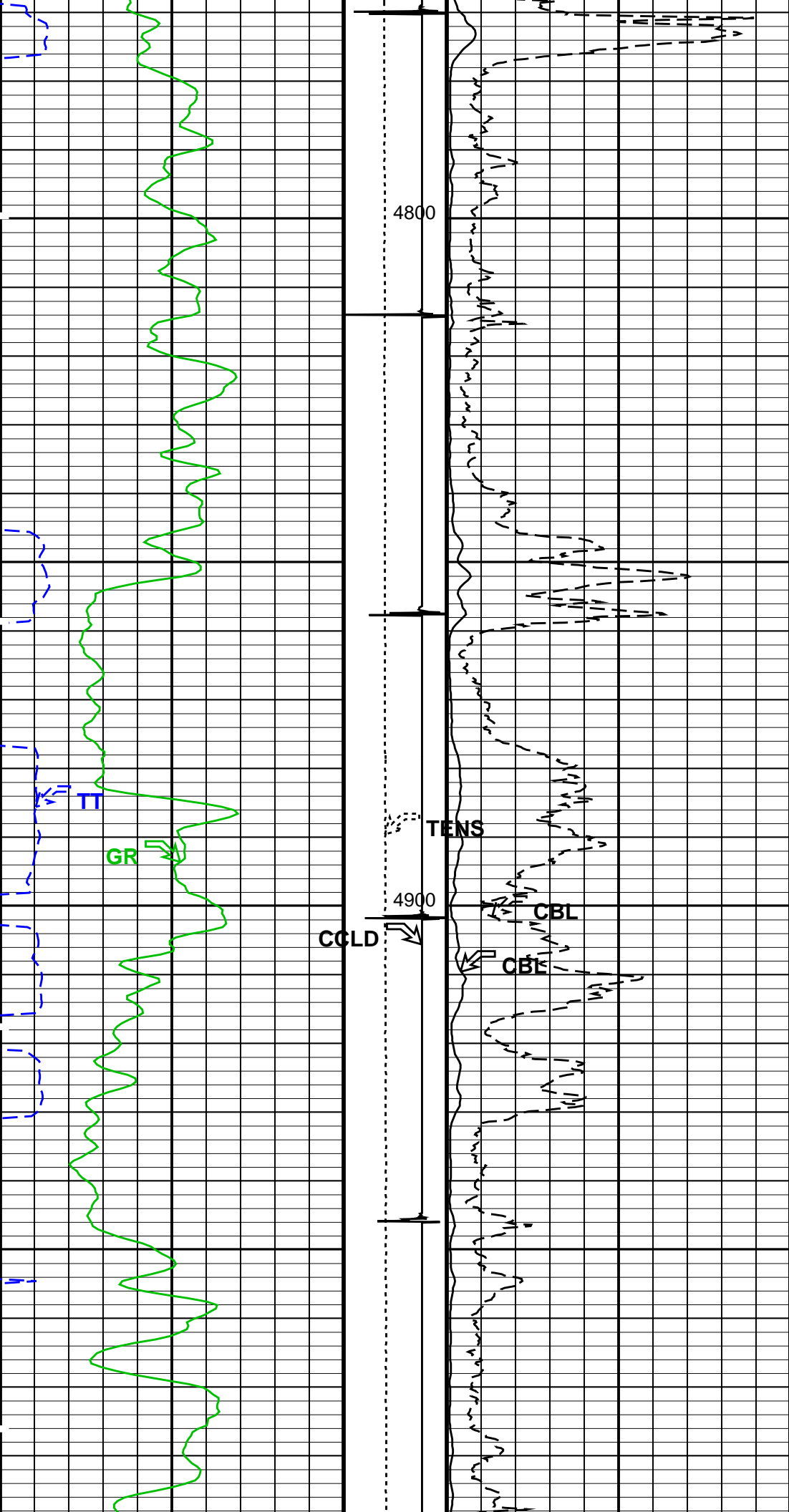


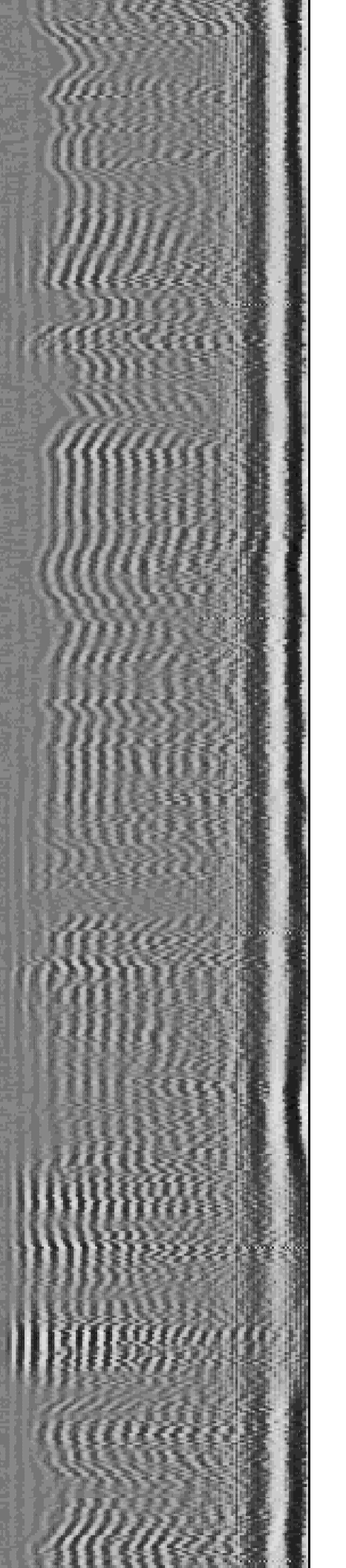
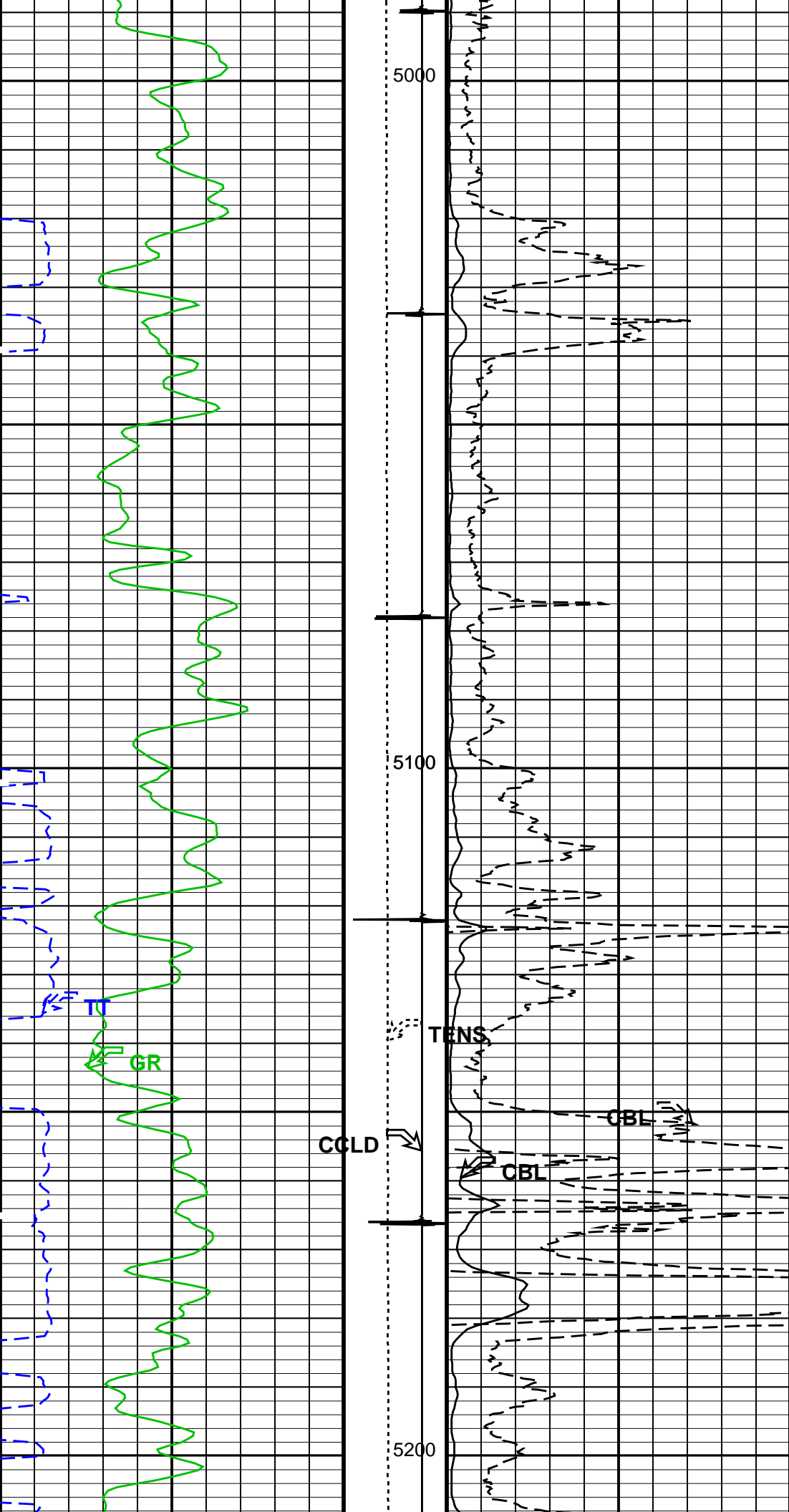




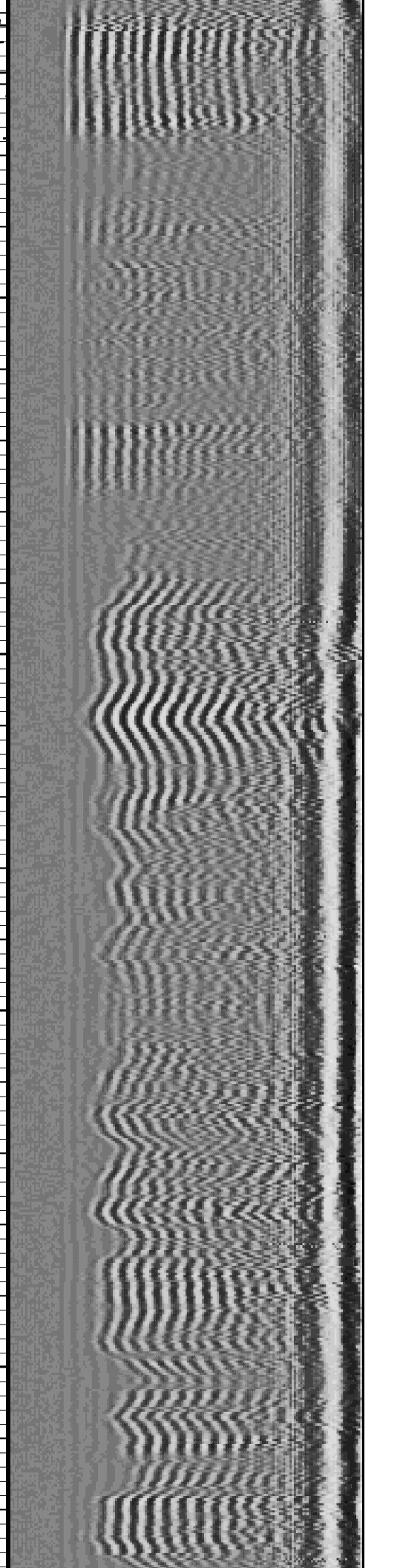
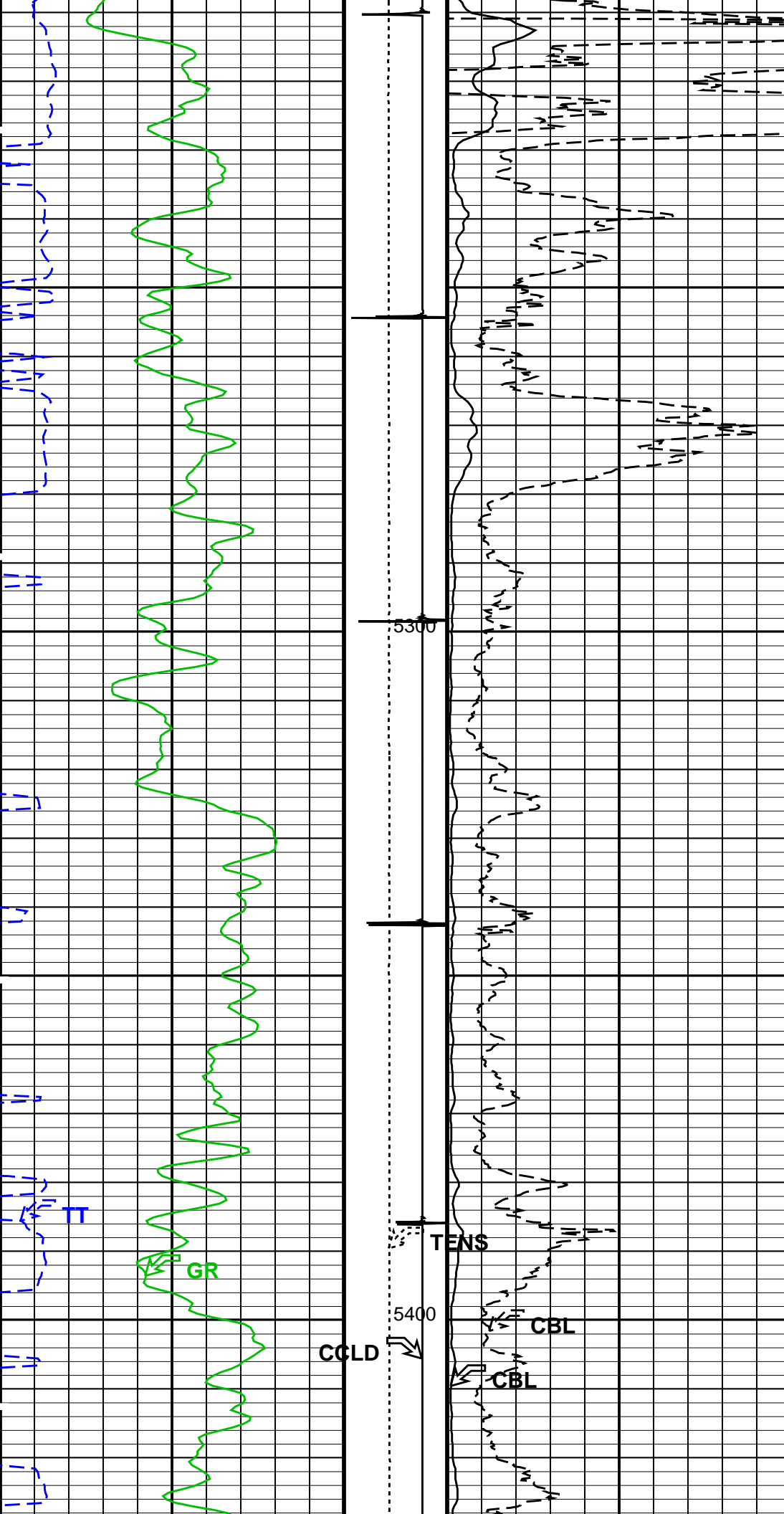




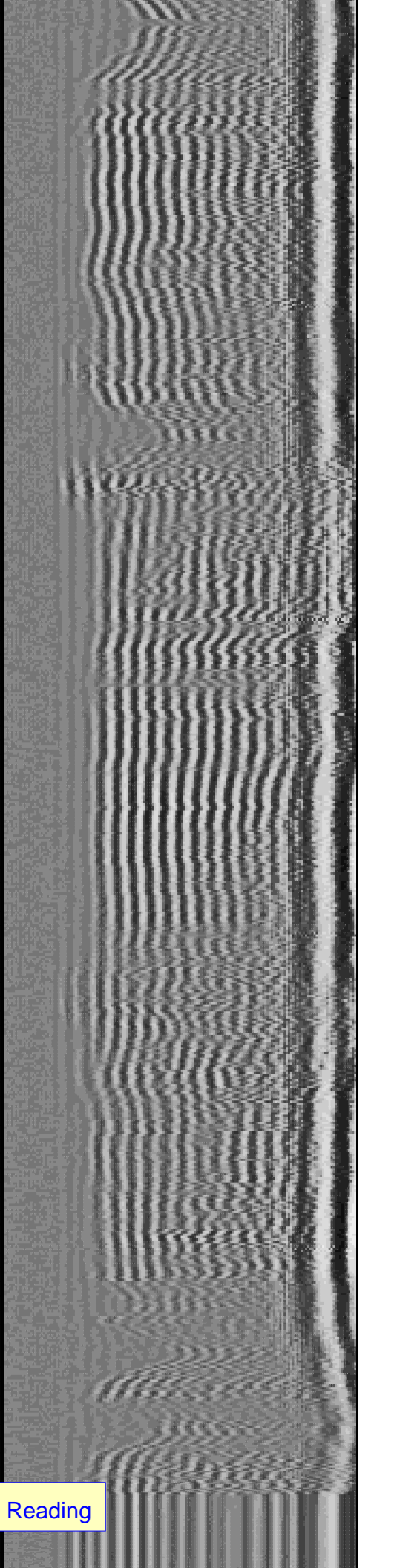
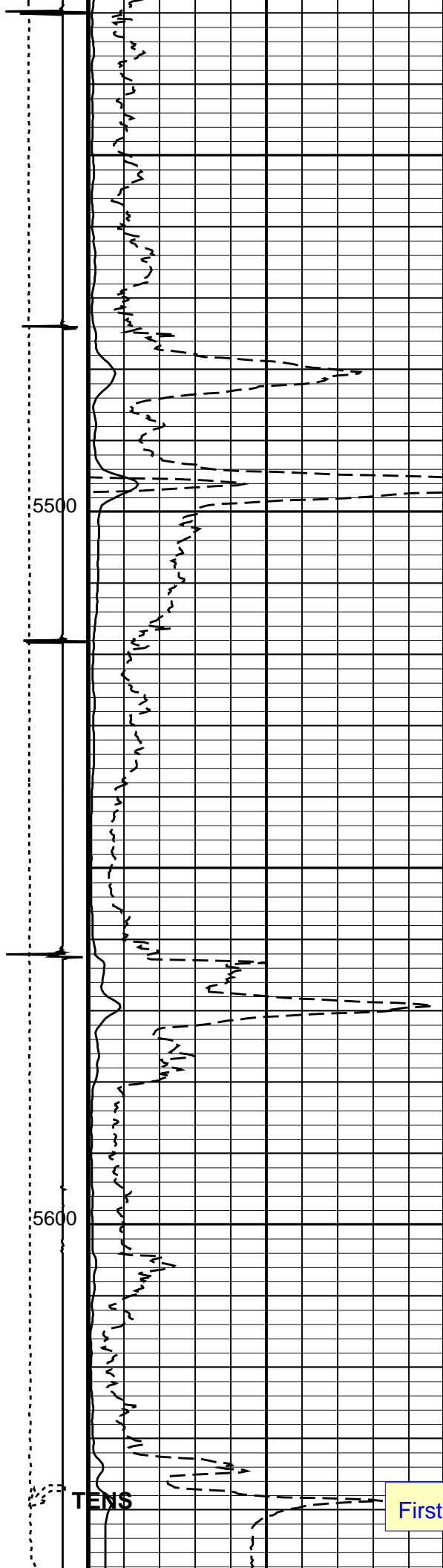
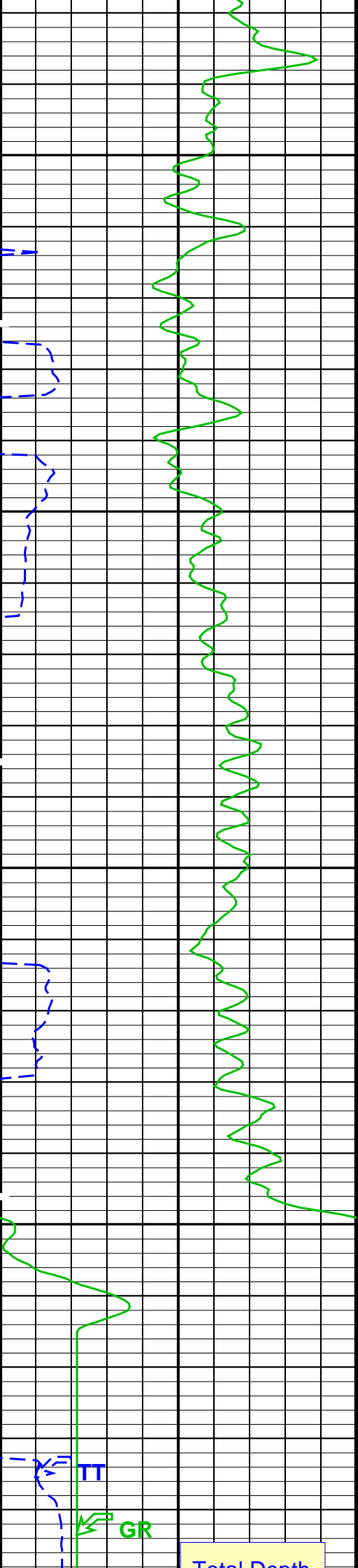


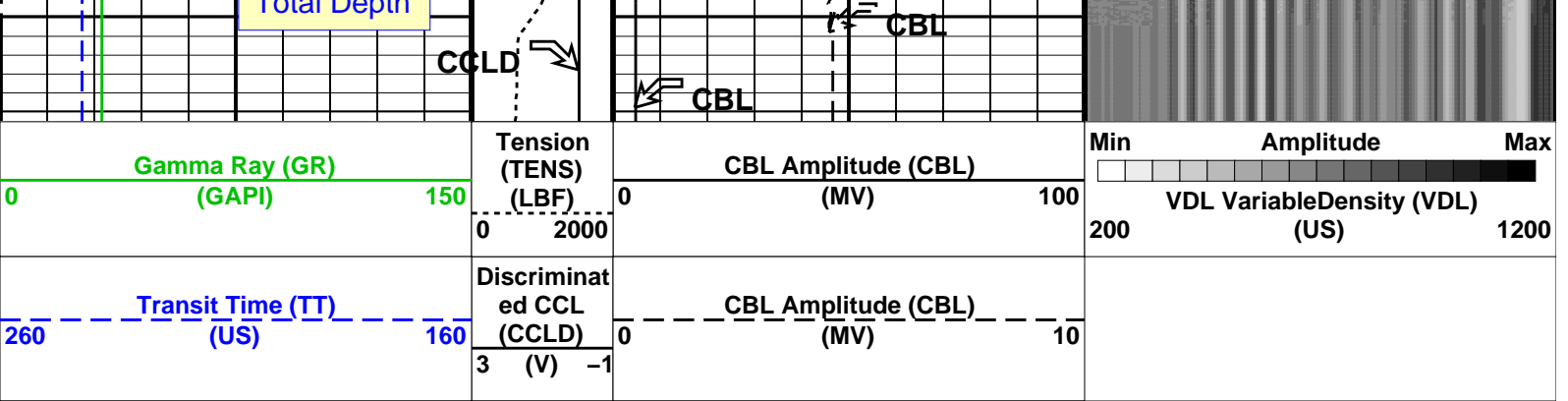












Time Mark Every 60 S

Format: CBL\_VDL Vertical Scale: 5" per 100' Graphics File Created: 13-May-2012 06:08

## 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

## Output DLIS Files

DEFAULT      SCMT\_RST\_PSP\_015LUP      FN:14      PRODUCER      13-May-2012 06:08

Schlumberger

REPEAT PASS 0 PSI

MAXIS Field Log

Company: ENCANA OIL & GAS (USA) INC.

Well: TWIN CREEK 12-5A2 (F12E)

## Input DLIS Files

DEFAULT      SCMT\_RST\_PSP\_014PUP      FN:13      PRODUCER      13-May-2012 06:06      5647.5 FT      5256.0 FT

## Output DLIS Files

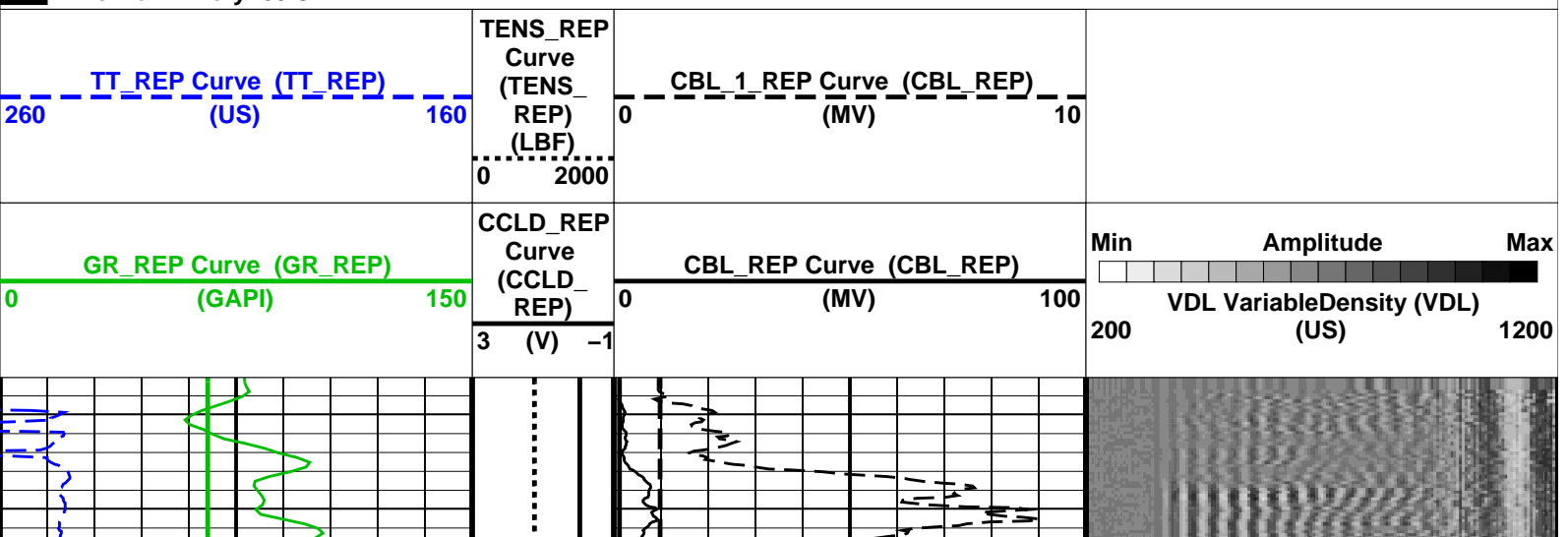
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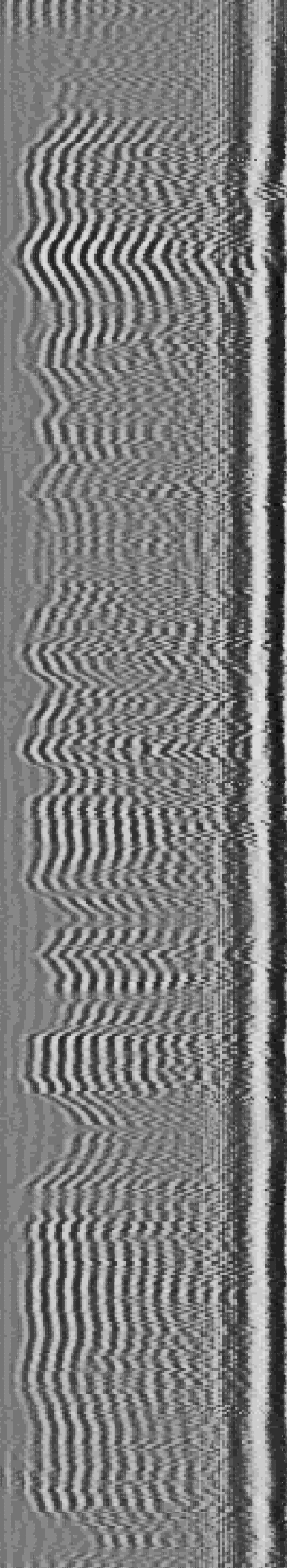
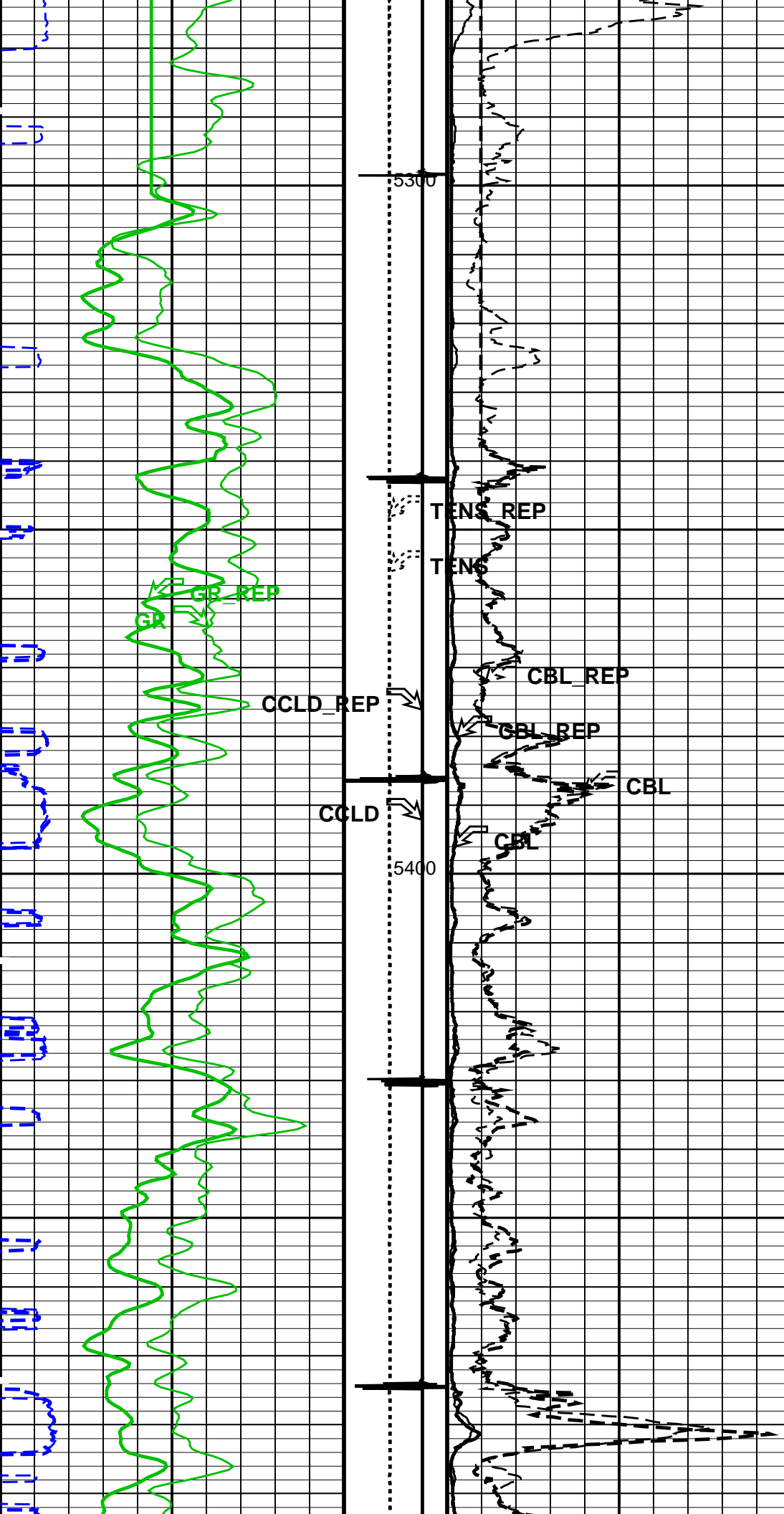
## OP System Version: 18C0-147

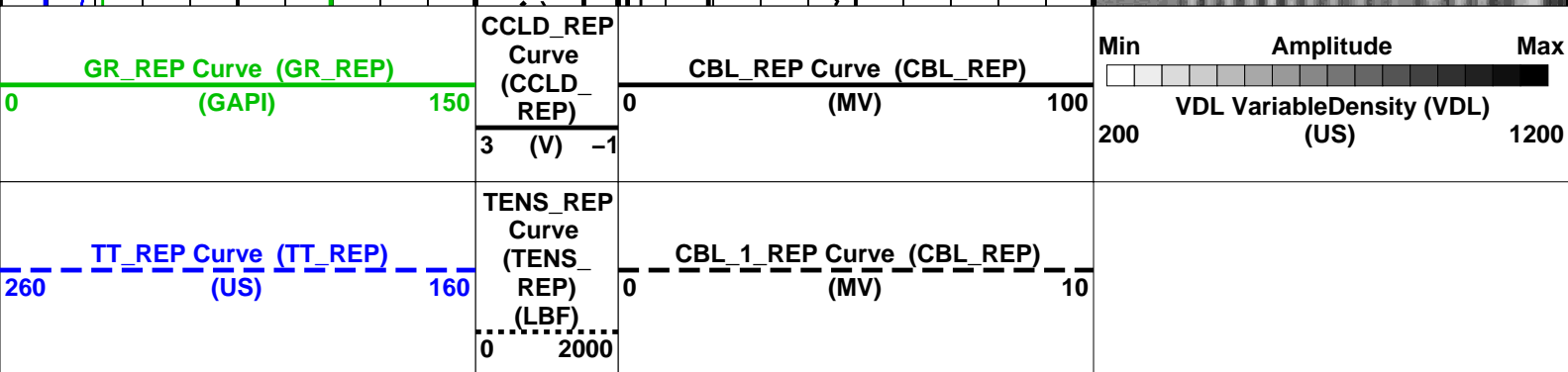
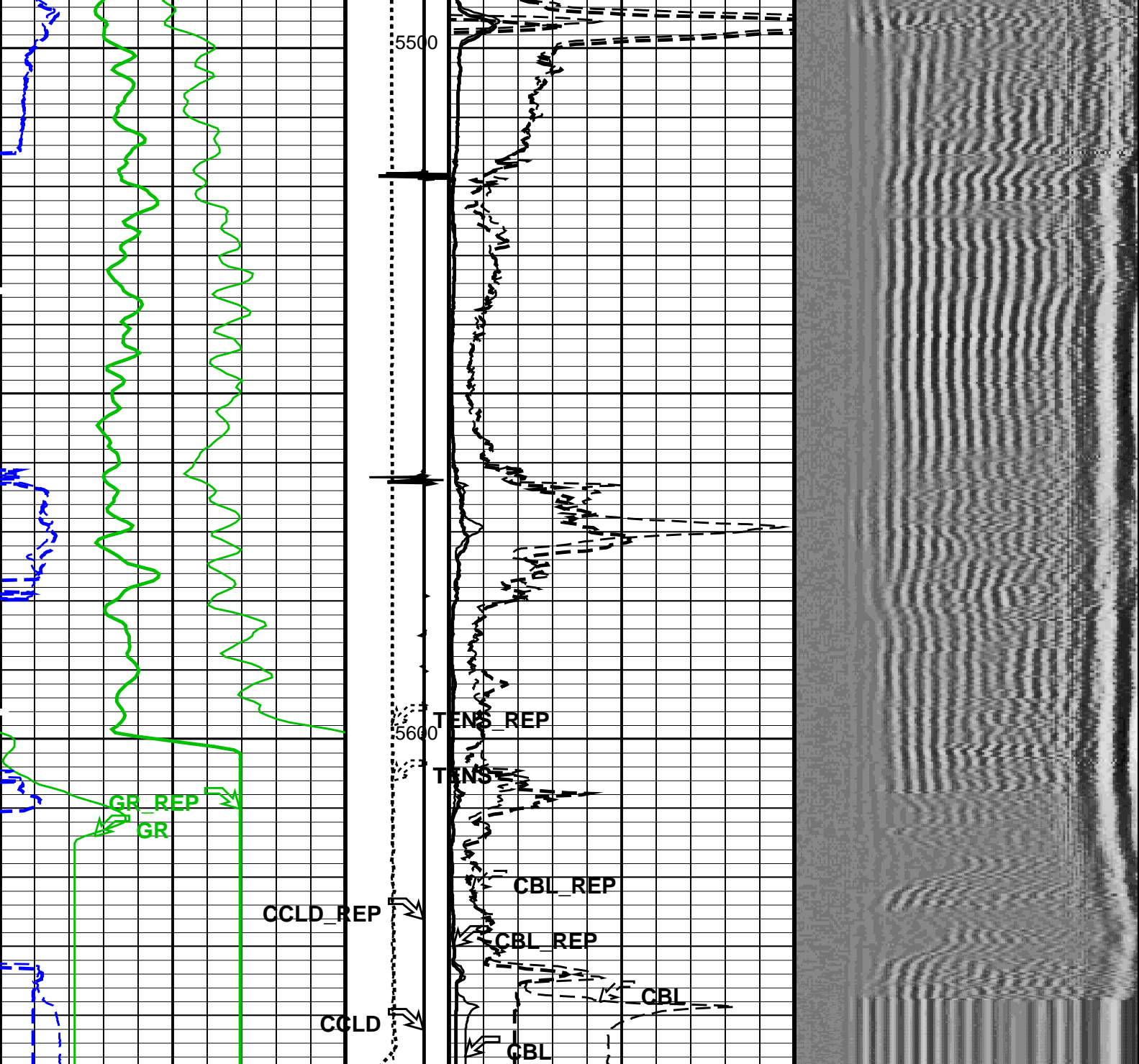
SCMT-CB      HFE-4028-IFLEX      RST-C      18C0-147  
 PSPT-A      HFE-4028-IFLEX

## PIP SUMMARY

 Time Mark Every 60 S







PIP SUMMARY

Time Mark Every 60 S

Format: CBL\_VDL\_REP Vertical Scale: 5" per 100'

Graphics File Created: 13-May-2012 06:08

OP System Version: 18C0-147



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		

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

DEFAULT	SCMT RST PSP 014PUP	FN:13	PRODUCER	13-May-2012 06:06	5647.5 FT	5256.0 FT
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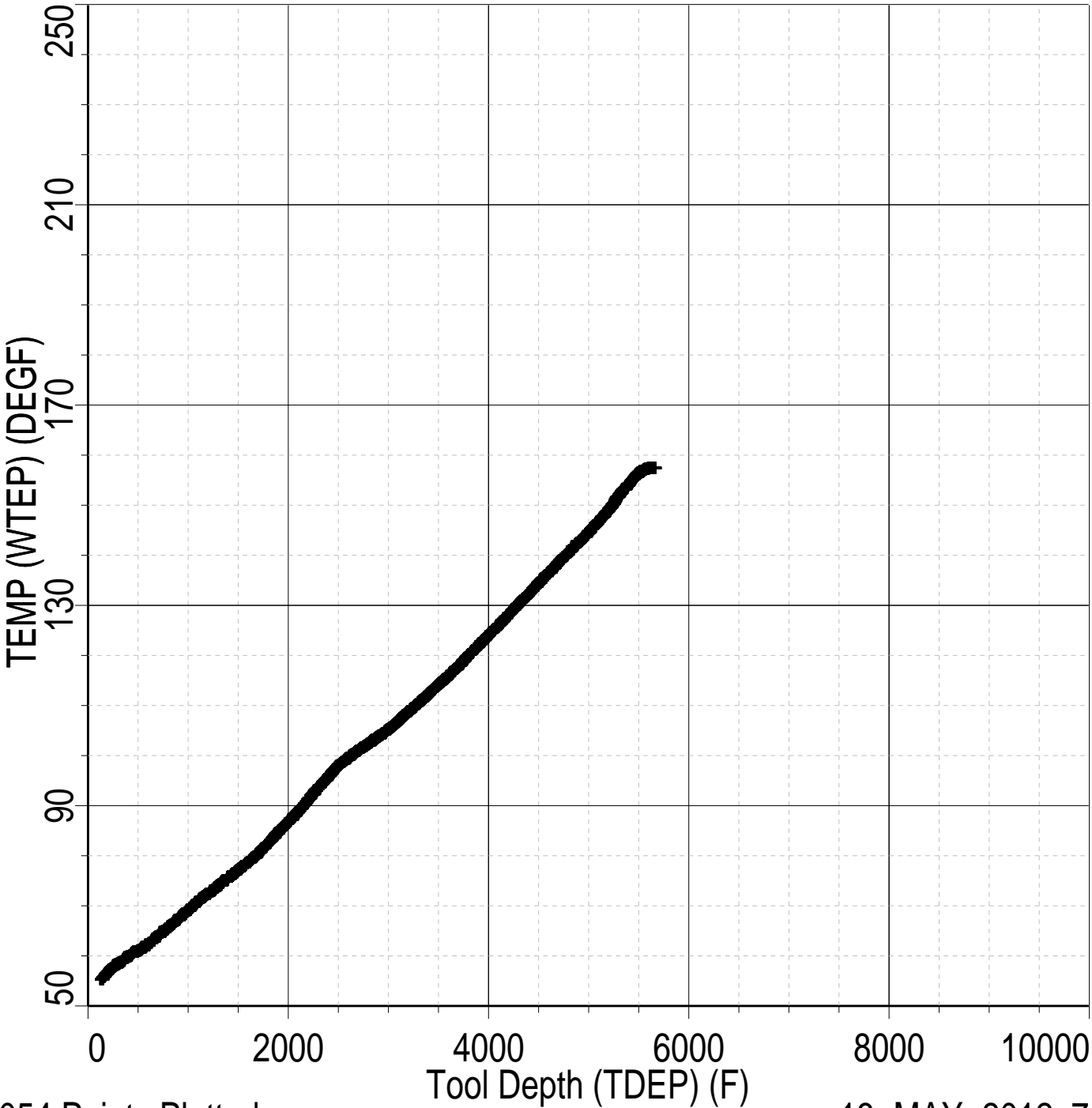
## Output DLIS Files

Schlumberger

TEMPERATURE PLOT

MAXIS Field Log

Index: 5661.0 – 134.5 FT



## 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 NB 3779

Calib Date ddmmyy 090107

Matrix Size 16

Coeff CRC D285

## 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

## PBMS Sapphire 10kPsi Gauge

Sonde Serial NB

Sensor Serial NB 3779

Calib Date ddmmyy 090107

Matrix Size 66

## COEFFICIENTS FOR SAPPHIRE PBMS-A.3779 S/N:



Matrix Size  
Coeff CRC

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 3779  
Calib Date ddmmyy 090107  
Matrix Size 66  
Coeff CRC 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

Tt**5	0.0	0.0	0.0
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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: GR

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.  
Field: MAMM CREEK  
Well: TWIN CREEK F12E PAD  
Run date: 13-May-2012

Tool: PSP  
Sub Type: PBMS  
Sensor: WellTemp RTD

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 16  
Coeff CRC 3846

WTemp Coeff

Tt**0	Tt**1	Tt**2
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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 12-5A2 (F12E)  
Field: MAMM CREEK  
County: GARFIELD  
State: COLORADO

CEMENT BOND LOG  
CBL- VDL  
GAMMA RAY - CCL