

Company: IMPERIAL OIL RESOURCES LIMITED

Well: IMP 09 H69-14 COLD LK 4-33-66-4

Field: LEMING

Province: ALBERTA Status: **MD**

TEMPERATURE LOG

| | |
|-------------------------|---------------------------------|
| Province: | ALBERTA |
| Field: | LEMING |
| Location: | 3-33-66-4W4 |
| Well: | IMP 09 H69-14 COLD LK 4-33-66-4 |
| Company: | IMPERIAL OIL RESOURCES LIMITED |
| Location: | |
| Permanent Datum: | 3-33-66-4W4 |
| Log Measured From: | 102043306604W400 |
| Drilling Measured From: | |
| API Serial No. | 0413046 |
| Section: | 03-33 |
| Township: | 066 |
| Range: | 04W4 |

Logging Date 12-Jun-2018

Run Number ONE

Depth Driller 601.00 m

Schlumberger Depth 547.00 m

Bottom Log Interval 547.00 m

Top Log Interval 5.00 m

Casing Fluid Type Water

Salinity

Density 1198.26 kg/m3

Fluid Level 227.00 m

BIT/CASING/TUBING STRING

Bit Size 215.90 mm

From 204.00 m

To 547.00 m

Casing/Tubing Size 73.025 mm

Weight 9.67 kg/m

Grade J55

From 4.37 m

To 582.00 m

Max Recorded Temperatures 146 degC

Logger on Bottom 12-Jun-2018 12:00:00

Unit Number 218 Location: NISKU PS

Recorded By J.ATTIG

Witnessed By CHRIS SAUNDERS

Disclaimer

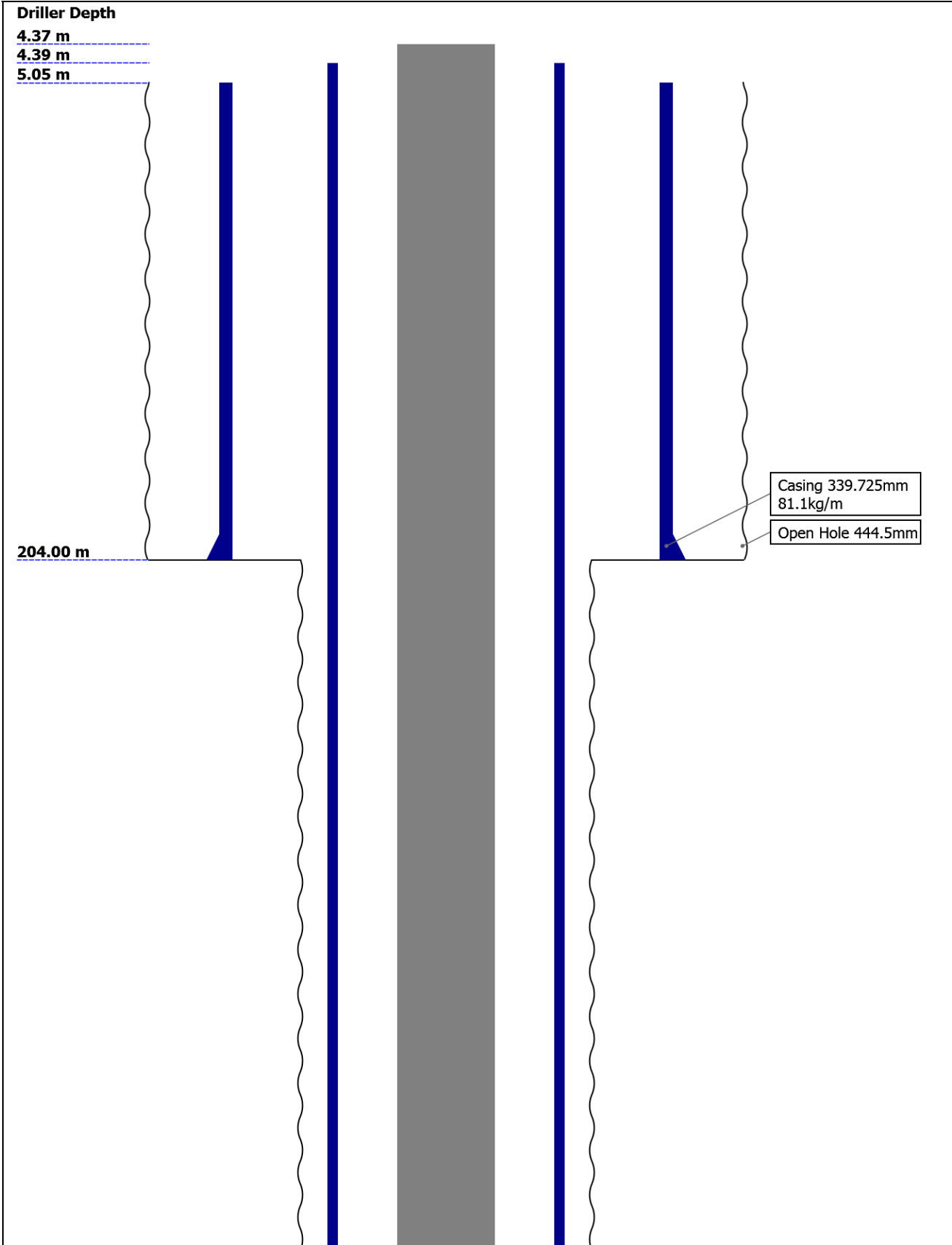
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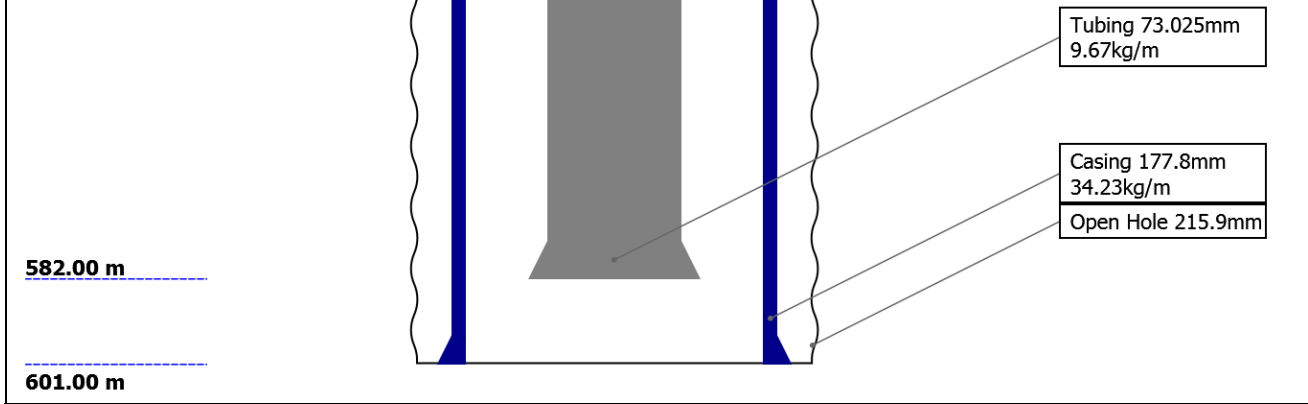
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Well Sketch





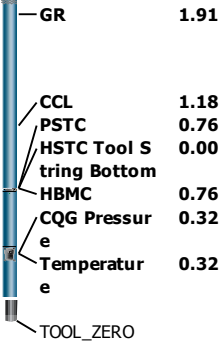
Borehole Size/Casing/Tubing Record

| | | | | | | |
|-----------------------|---------|---------|--|--|--|--|
| Bit | | | | | | |
| Bit Size (mm) | 444.5 | 215.9 | | | | |
| Top Driller (m) | 5.05 | 204 | | | | |
| Top Logger (m) | 5.05 | 204 | | | | |
| Bottom Driller (m) | 204 | 601 | | | | |
| Bottom Logger (m) | 204 | 547 | | | | |
| Casing | | | | | | |
| Size (mm) | 339.725 | 177.8 | | | | |
| Weight (kg/m) | 81.1 | 34.23 | | | | |
| Inner Diameter (mm) | 320.215 | 161.797 | | | | |
| Grade | K55 | L80 | | | | |
| Top Driller (m) | 5.05 | 4.39 | | | | |
| Top Logger (m) | 5.05 | 4.39 | | | | |
| Bottom Driller (m) | 204 | 601 | | | | |
| Bottom Logger (m) | 204 | 547 | | | | |
| Tubing | | | | | | |
| Size (mm) | 73.025 | | | | | |
| Weight (kg/m) | 9.67 | | | | | |
| Inner Diameter (mm) | 61.623 | | | | | |
| Grade | J55 | | | | | |
| Top Driller (m) | 4.37 | | | | | |
| Top Logger (m) | 4.37 | | | | | |
| Bottom Driller (m) | 582 | | | | | |
| Bottom Logger (m) | 582 | | | | | |

Remarks and Equipment Summary

| ONE: Toolstring | | | | ONE: Remarks | |
|-----------------|--------|---------|--------|-------------------------------------------------------------------------------------|--|
| Equip name | Length | MP name | Offset | THIS LOG NOT TO BE CORRELATED TO AS PRODUCTION STRING HAS MOVED DUE TO WORKOVER RIG | |
| PEH-E | 5.86 | | | | |
| AH-38 | 5.35 | | | | |
| EQF-43 | 5.26 | | | | |

HBMS-B:2803 3.43
 HUDH-A:2803
 PSC-A:2803
 HSTC-A:2803
 HBMC-A:2803
 HTPS-A:2803



Lengths are in m
 Maximum Outer Diameter = 52.451 mm
 Line: Sensor Location, Value: Gating Offset
 All measurements are relative to TOOL_ZERO

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 | 1-33A-SLC | | |
| Serial Number | | | |
| Length | 0.01 m | | |
| Conveyance Type | Wireline | | |
| Rig Type | | | |

ONE:Depth Control Parameters

Depth Control Remarks

| | | |
|--------------------------|-----------------------|--|
| Log Sequence | First Log In the Well | |
| Rig Up Length At Surface | | |
| Rig Up Length At Bottom | | |
| Rig Up Length Correction | | |
| Stretch Correction | | |

Stretch Correction

Tool Zero Check At Surface

Survey Record

Survey Calculation

Method :

Minimum Radius of Curvature

DLS Method :

Lubinski

North Reference :

True North

Total Correction Formula :

Magnetic Dec

Rig Location

Latitude :

0° 0' 0" N

Longitude :

0° 0' 0" E

Tie In Point

Measured Depth:

0.00 m

Inclination:

0.00 deg

Azimuth:

0.00 deg

True Vertical Depth:

0.00 m

North Displacement:

0.00 m

East Displacement:

0.00 m

Survey Quality Index

28 : Tie-In Point

Survey Correction Index

0 : No correction

Survey Description Index

0 : Not Flagged Survey

| Seq | MD (m) | Incl (deg) | Azim (deg) | Course (m) | TVD (m) | V Sec (m) | N/ -S (m) | E/ -W (m) | Closure (m) | at Azim (deg) | DLS deg/30m | Tool Type | QI | CI | DI |
|-----|-----------|---------------|---------------|---------------|------------|--------------|--------------|--------------|----------------|------------------|----------------|-----------|----|----|----|
| 1 | 0.00 | 0.00 | 0.00 | ---- | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 90.00 | 0.00 | TIP | 28 | 0 | 0 |

ONE

DOWN PASS 9 M/MIN

Software Version

Acquisition System

Version

Maxwell 2018

8.0.95333.3100

Application Patch

Wireline_NPD-PNX-2018CMZ_8.0.97346

Pass Summary

| Run Name | Pass Objective | Direction | Top | Bottom | Start | Stop | DSC Mode | Depth Shift | Include Parallel Data |
|----------|----------------|-----------|--------|----------|-------------------------|-------------------------|----------|-------------|-----------------------|
| ONE | Log[1]:Down | Down | 1.21 m | 548.68 m | 12-Jun-2018 10:44:13 AM | 12-Jun-2018 11:48:53 AM | ON | 0.60 m | No |

All depths are referenced to toolstring zero

Log

Company:IMPERIAL OIL RESOURCES LIMITED

Well:IMP 09 H69-14 COLD LK 4-33-66-4

ONE: Log[1]:Down:S004

Description: PSP Depth

Format: Log (PSP Imperial Temp)

Index Scale: 1:240

Index Unit: m

Index Type: Measured Depth

Creation Date: 12-Jun-2018 12:31:06

TIME_1900 - Time Marked every 60.00 (s)

Well Temperature (WTEP) HBMS-B

0degC200

Gamma Ray (GR) HBMS-B

0gAPI125

Cable Speed (CS)

0m/h150000

CCL Discriminated Amplitude (CCLD) HBMS-B

-19V1

Cable Tension (TENS)

0N 2000

0

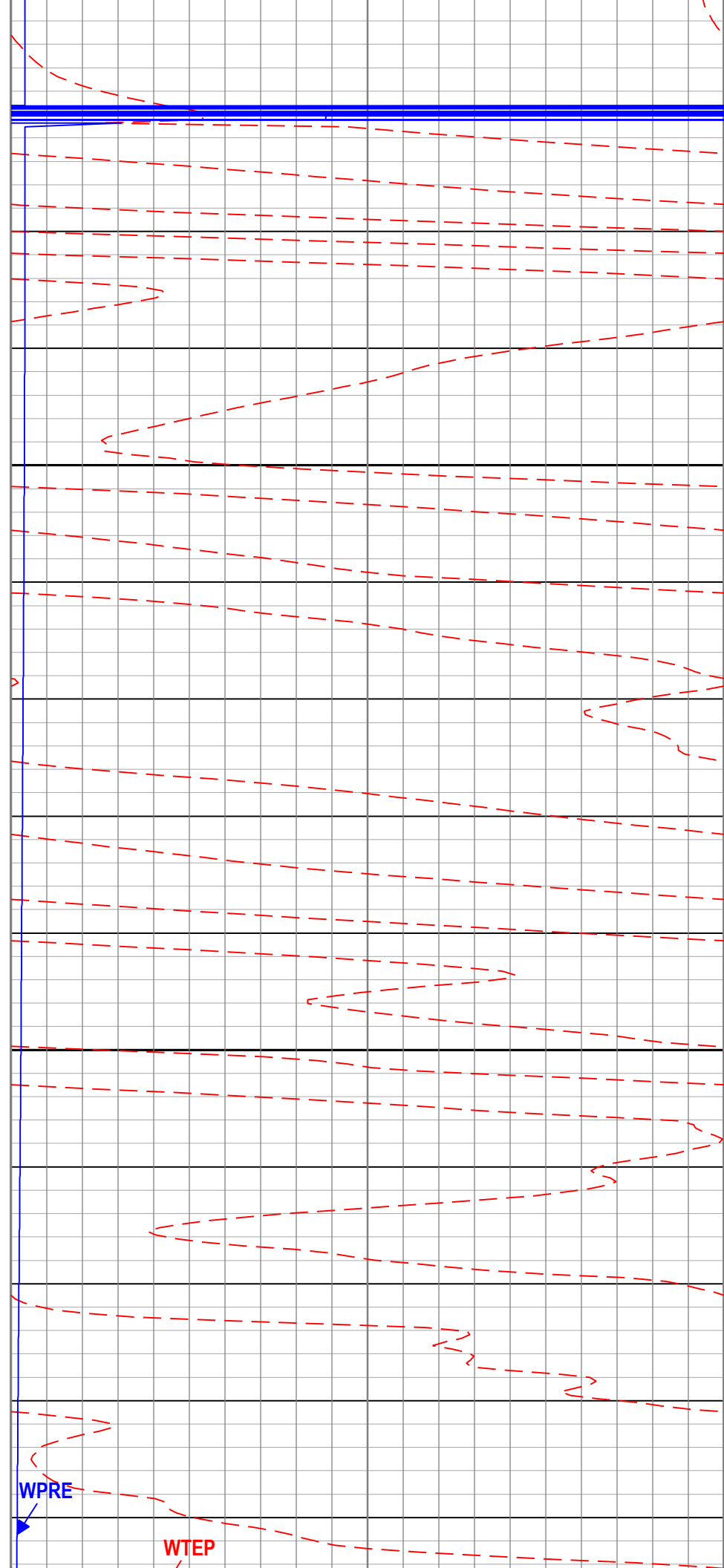
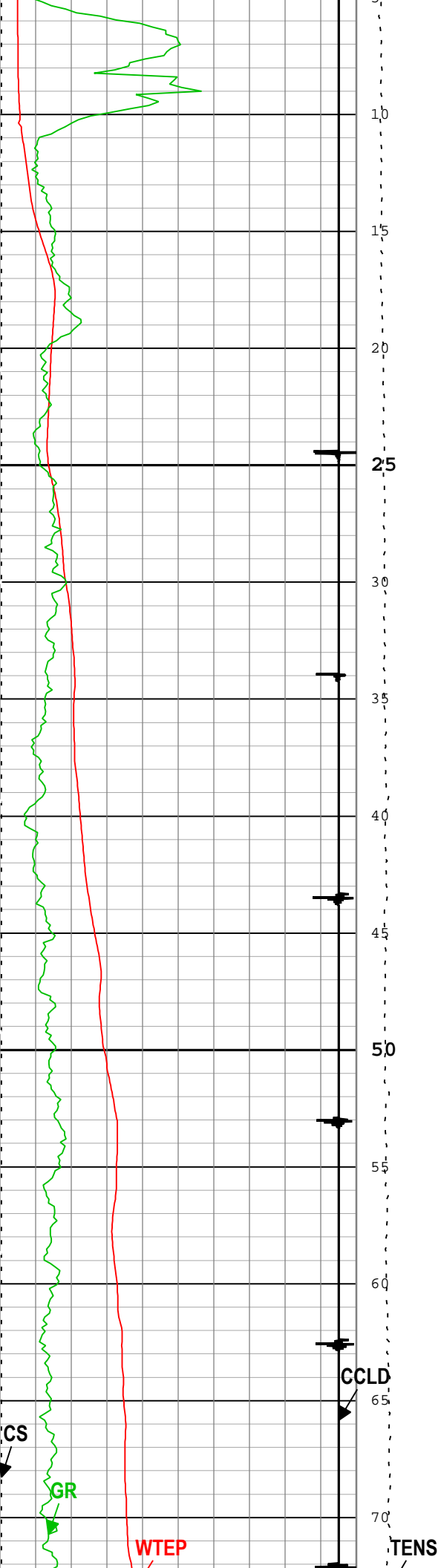
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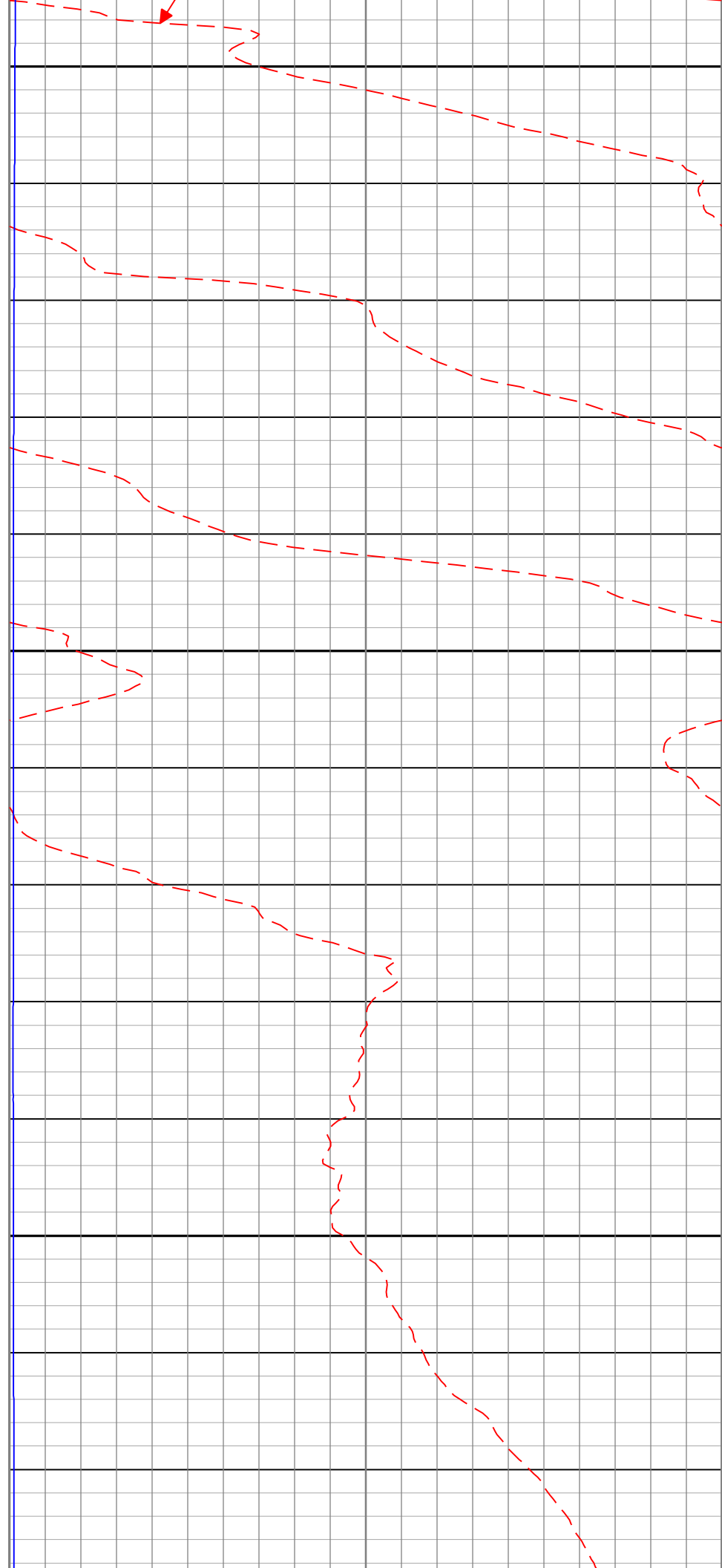
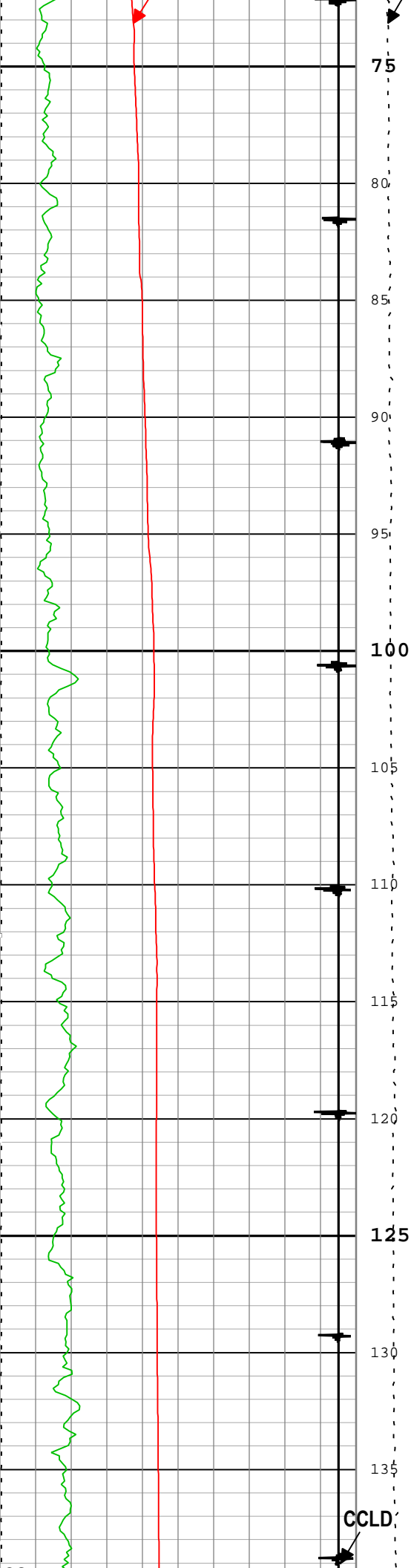
Well Temperature (WTEP) HBMS-B

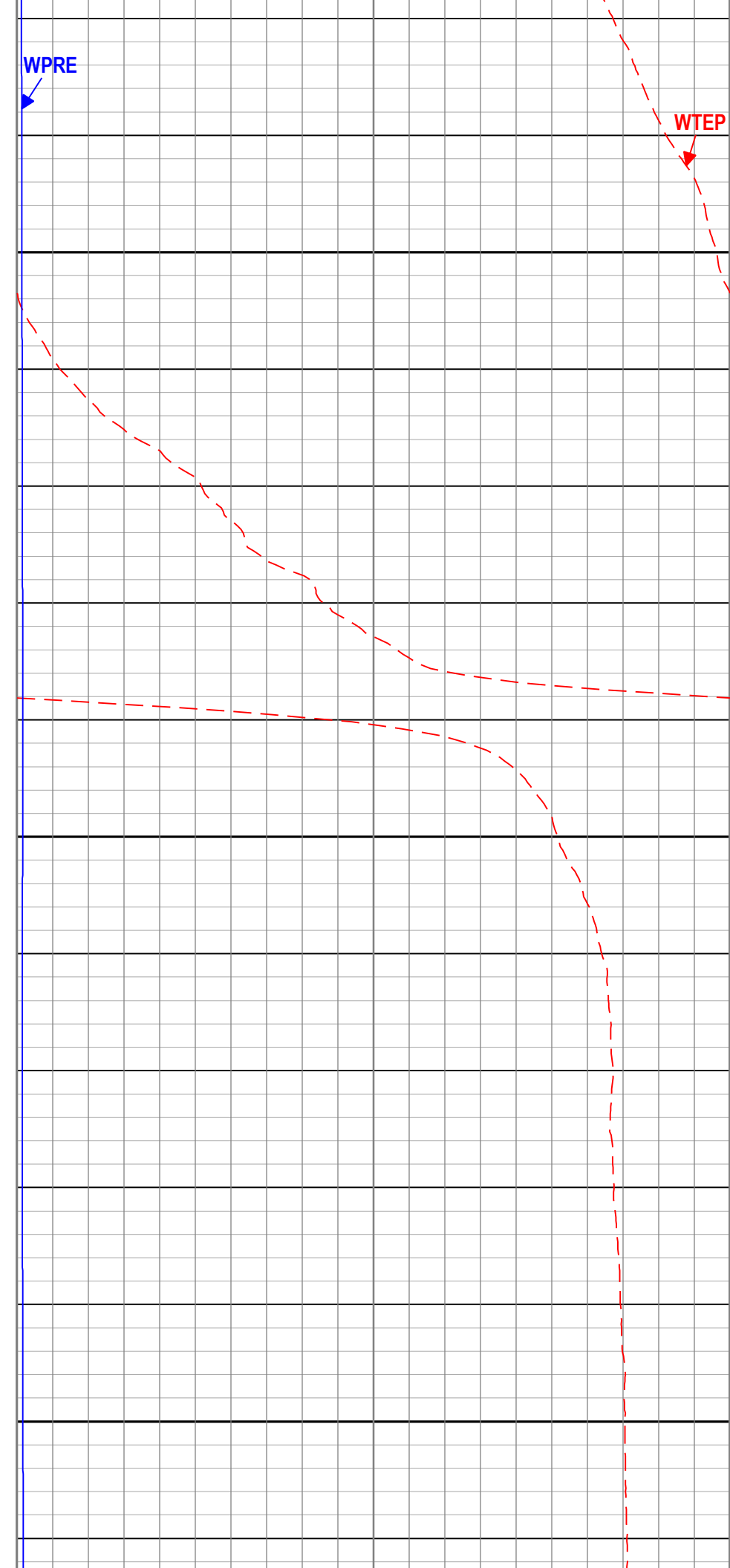
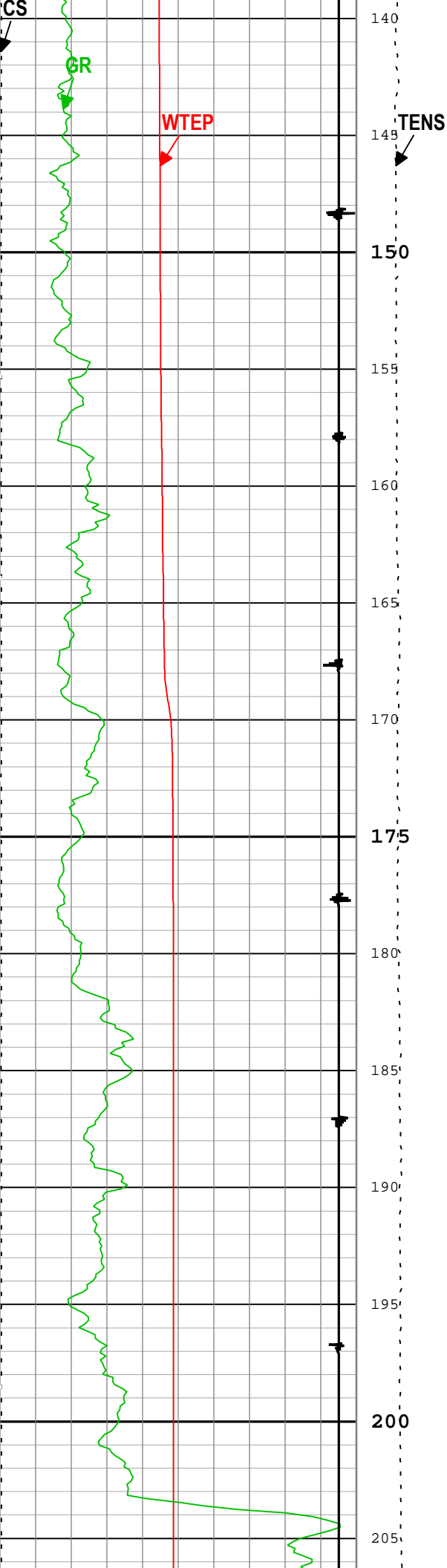
-2degC2

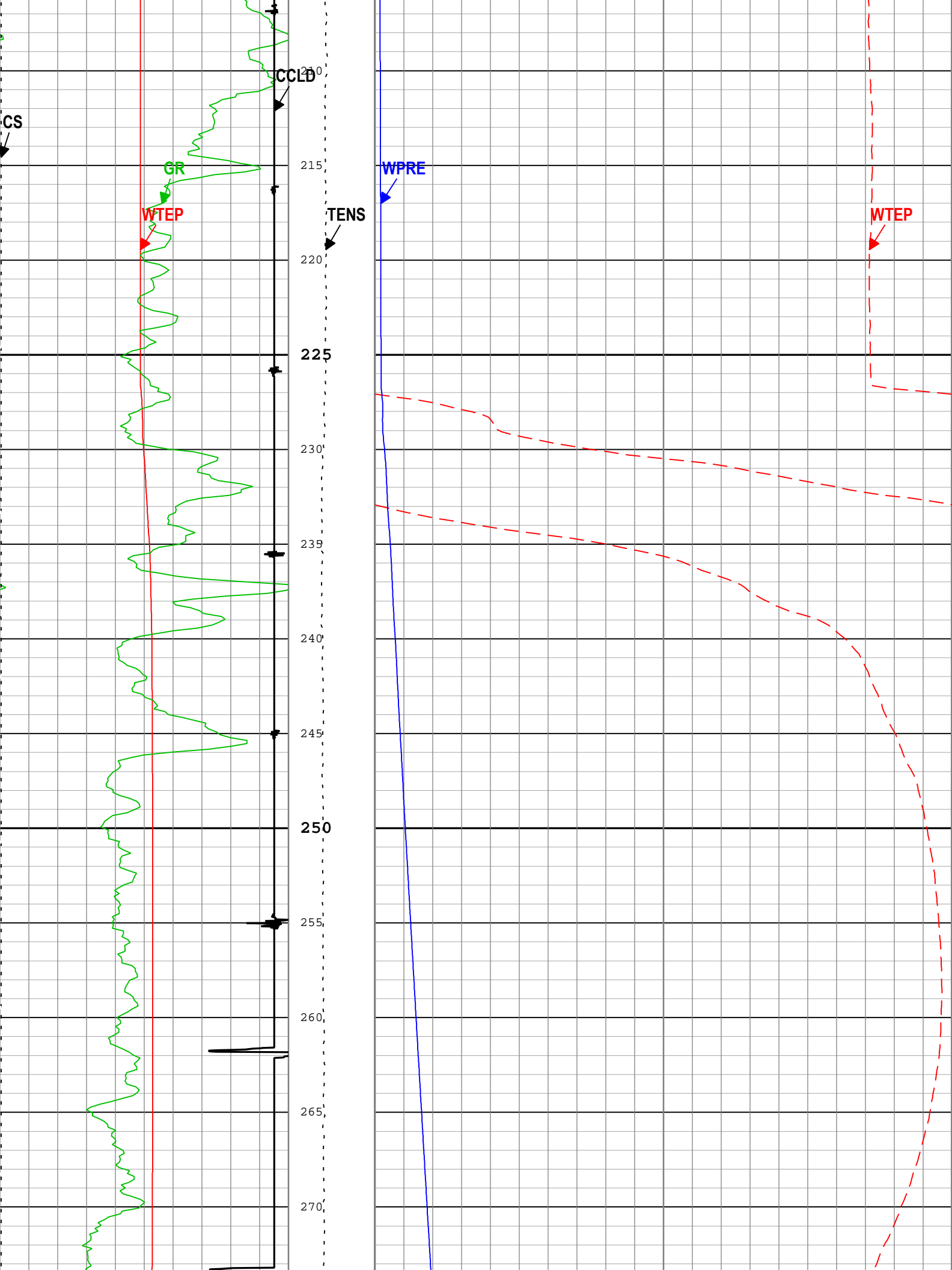
Well Pressure (WPRE) HBMS-B

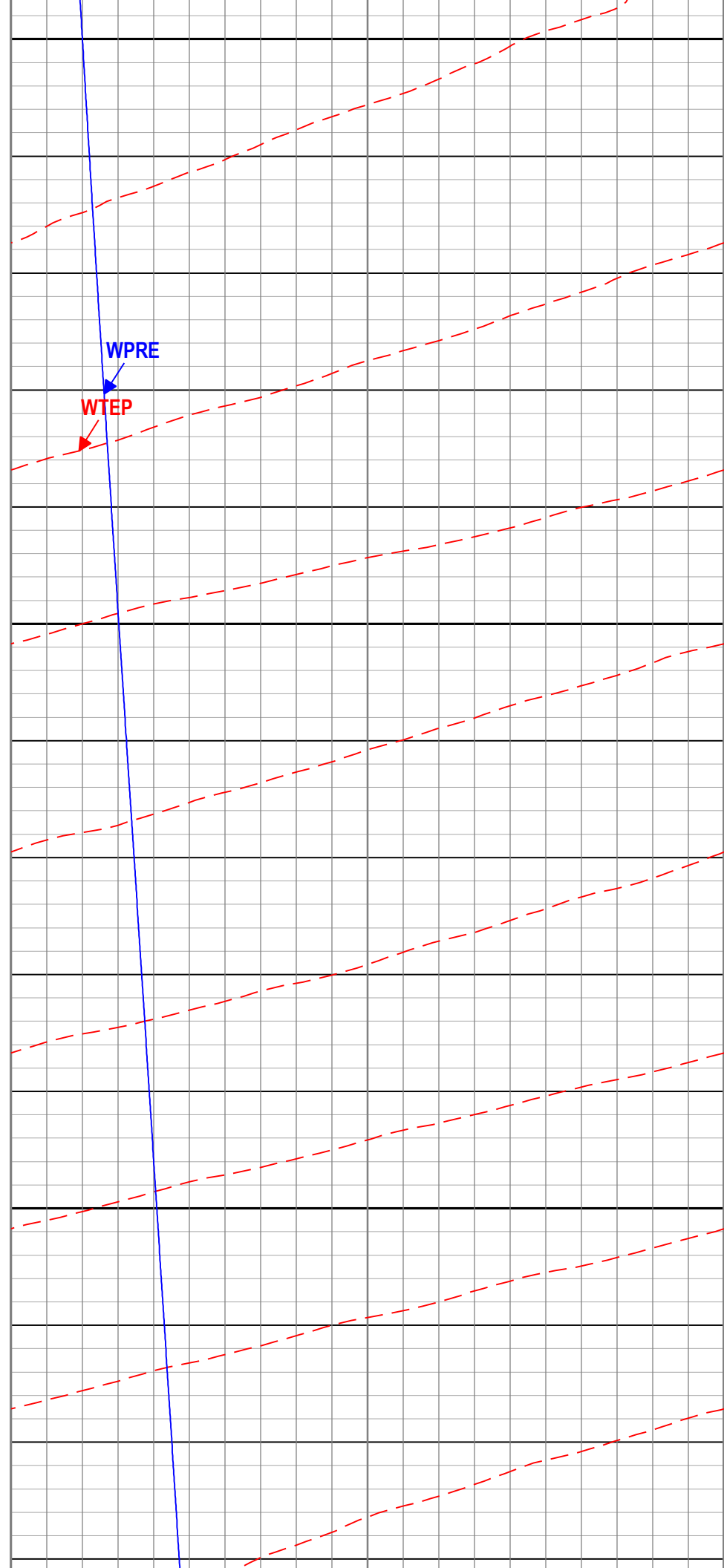
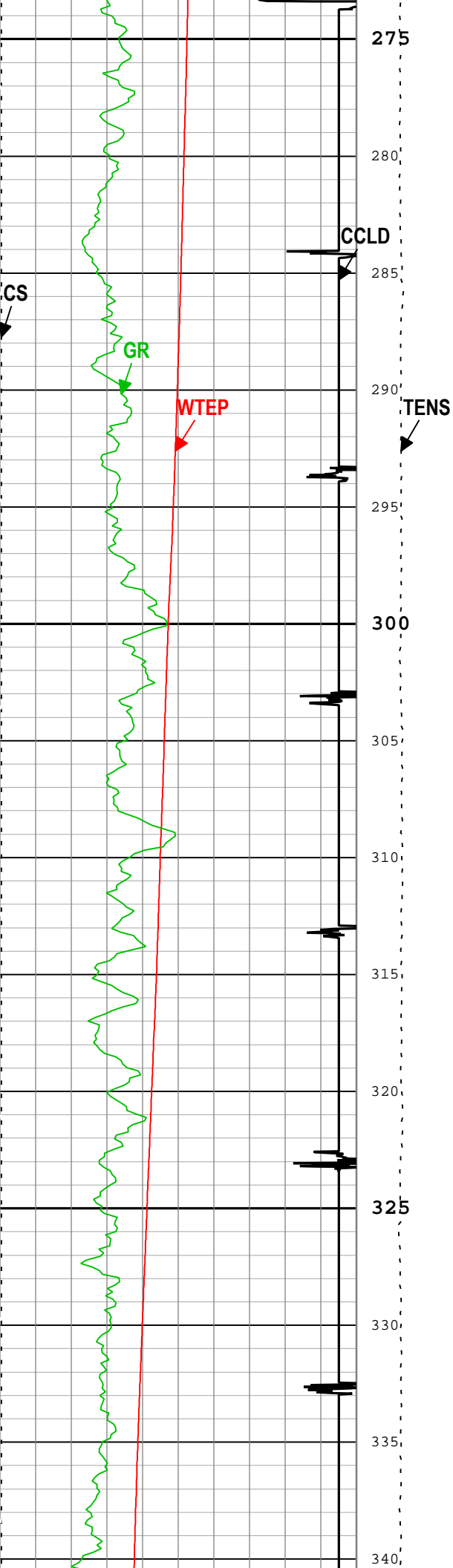
0kPa5000

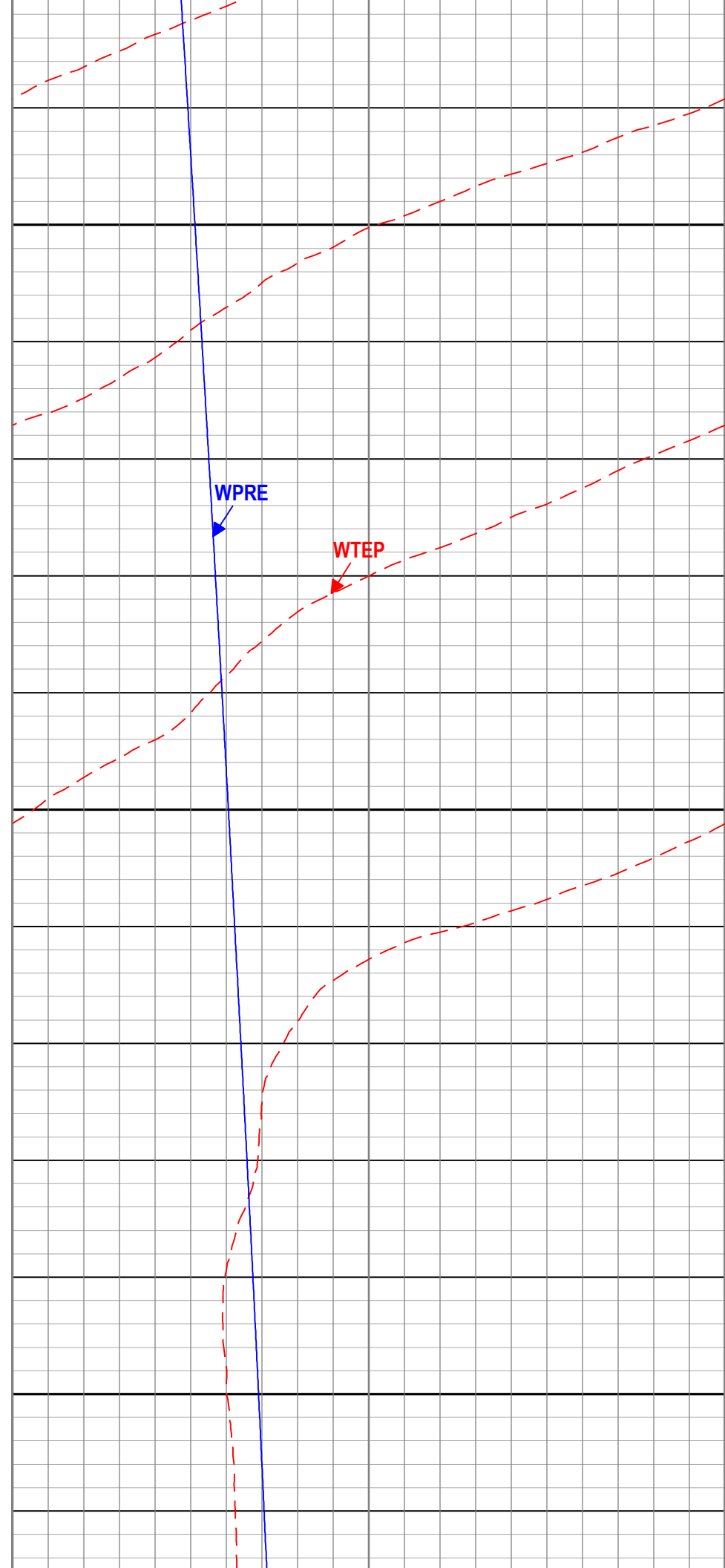
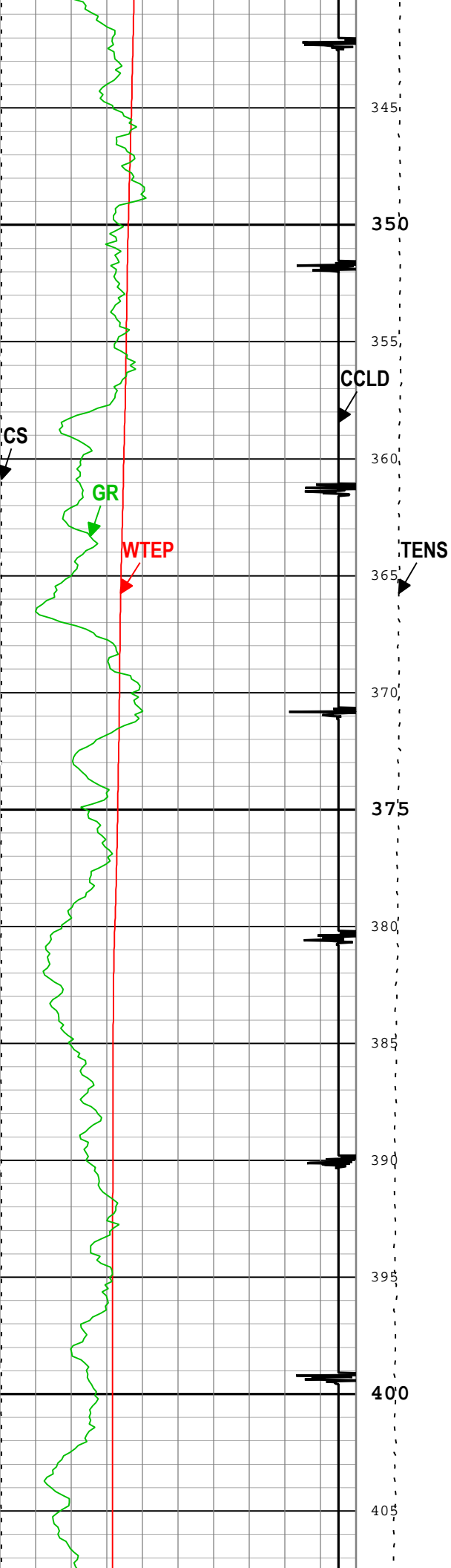


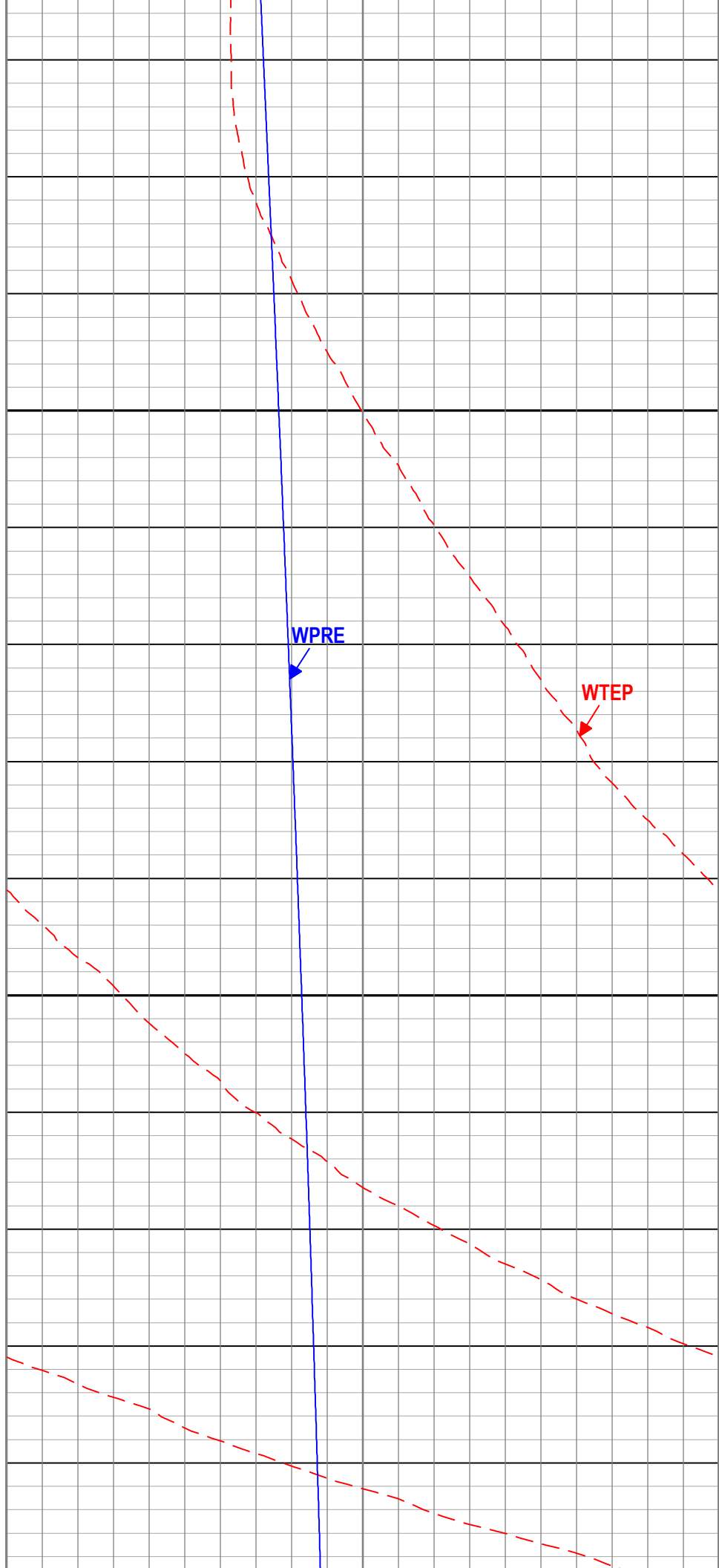
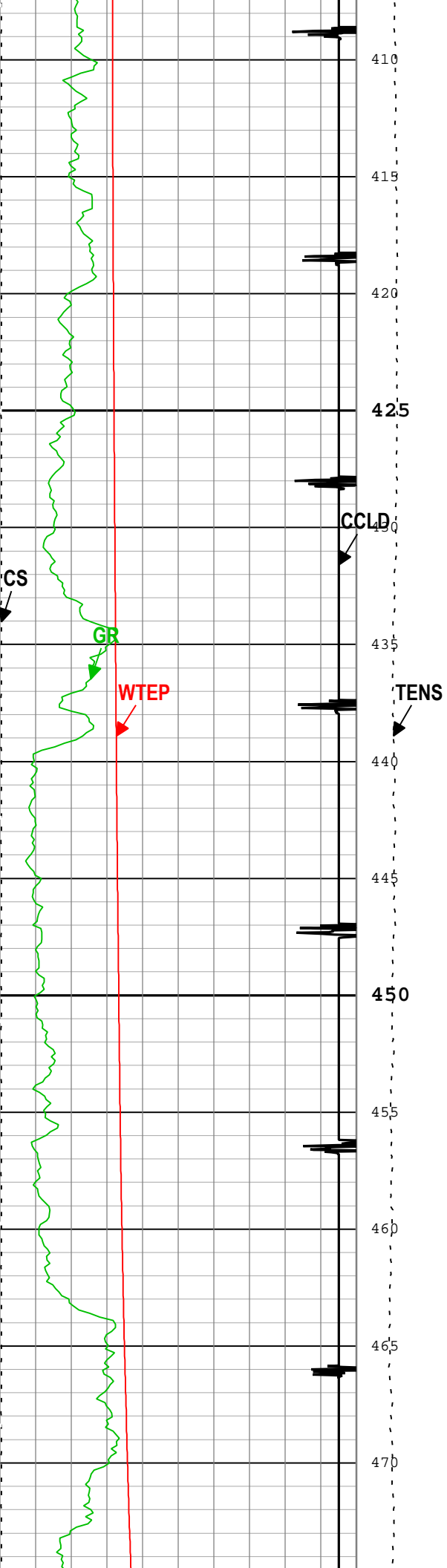


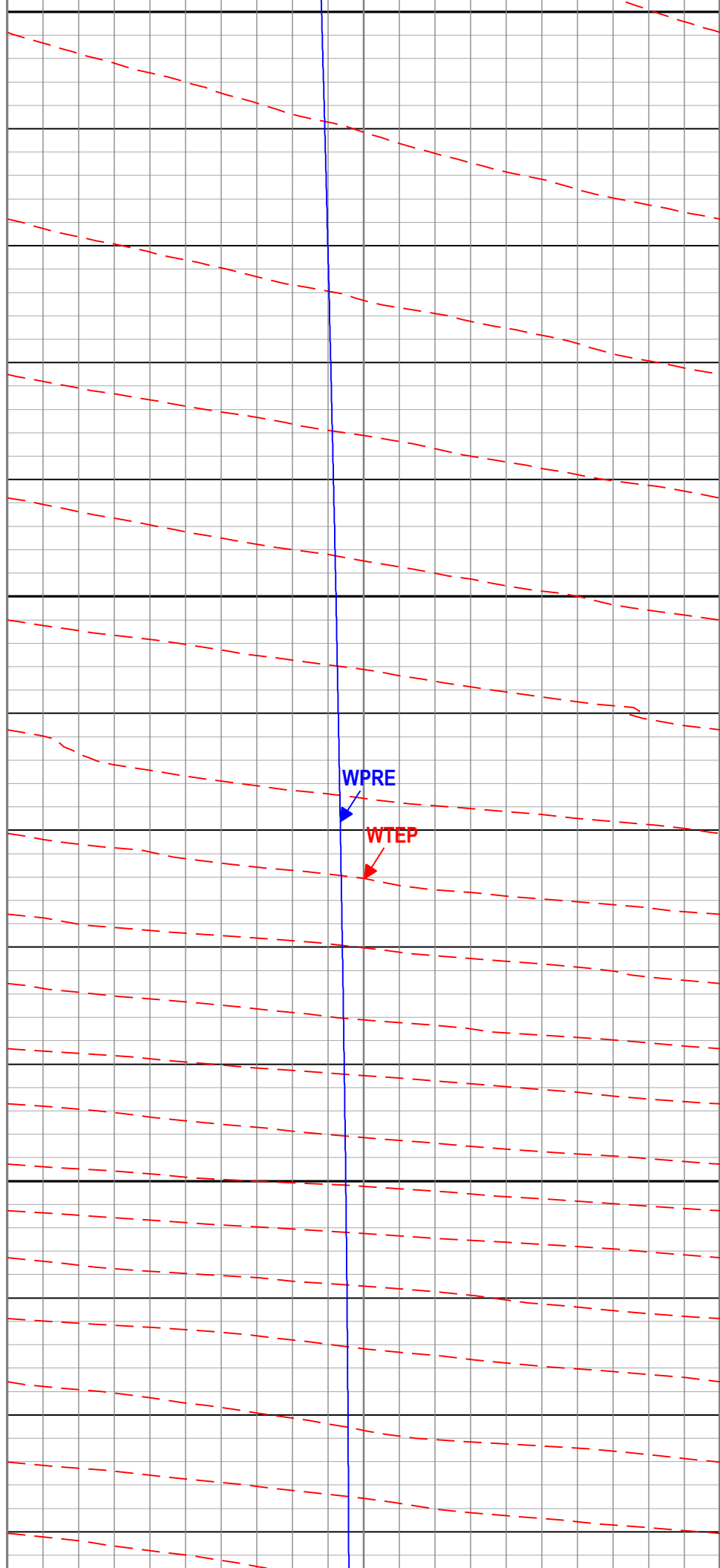
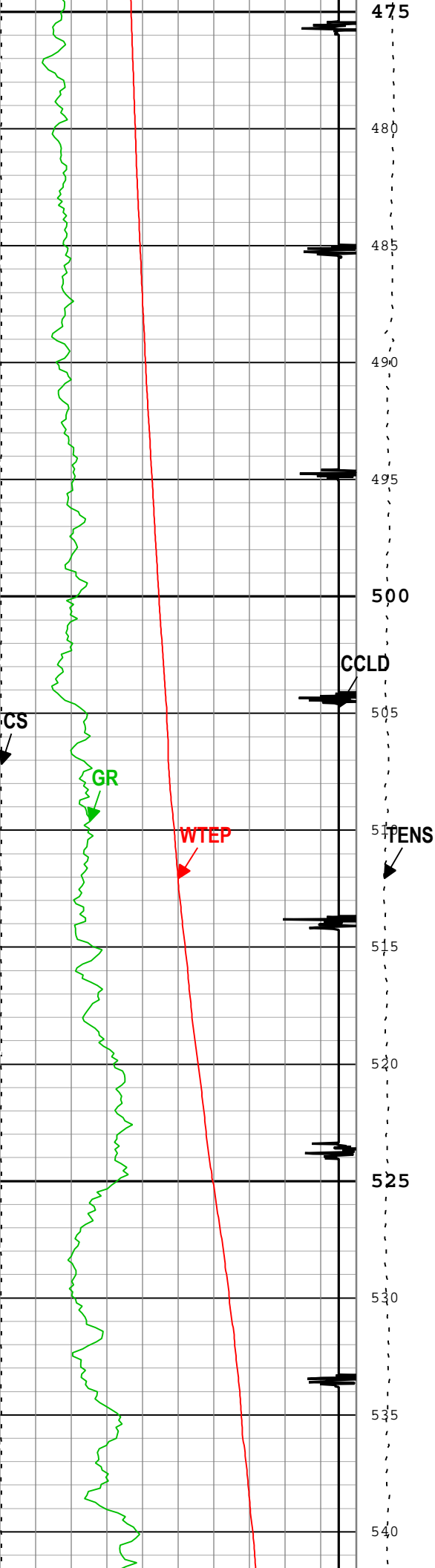


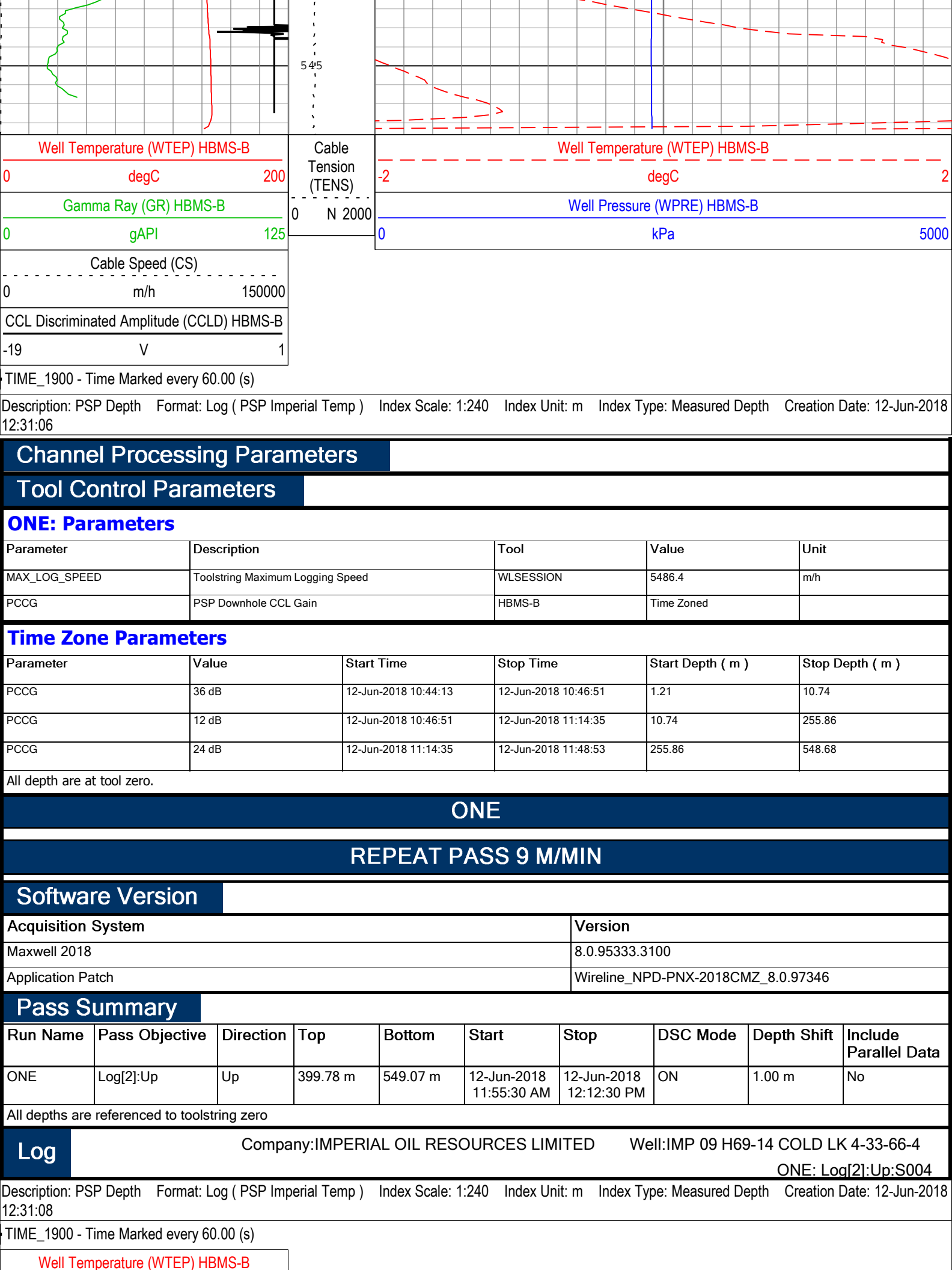


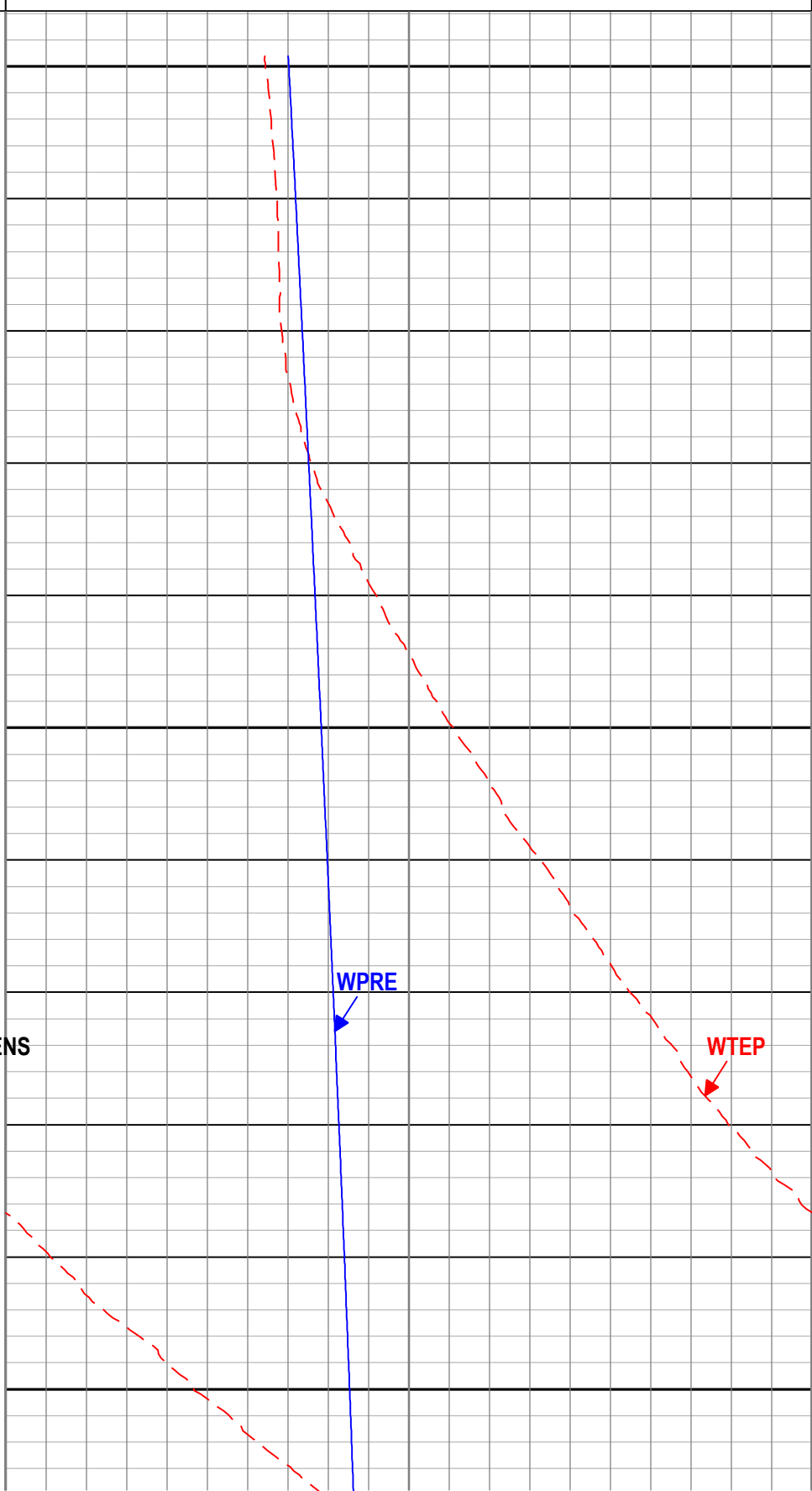
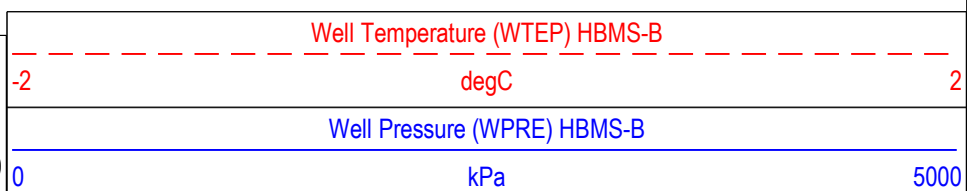
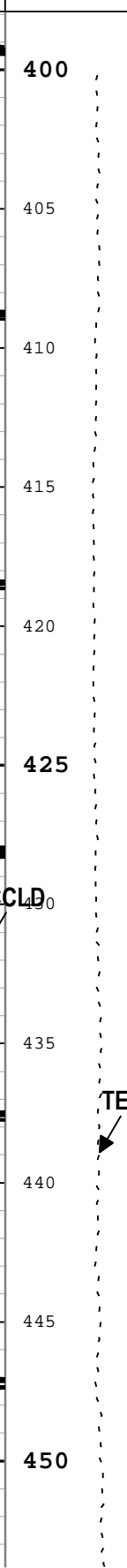
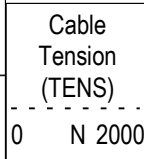
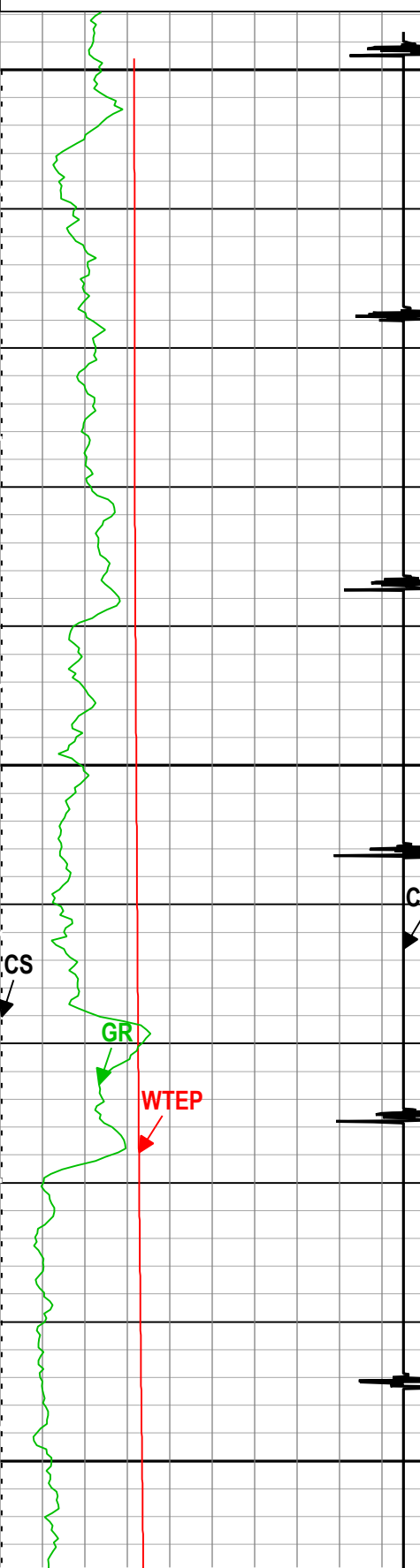
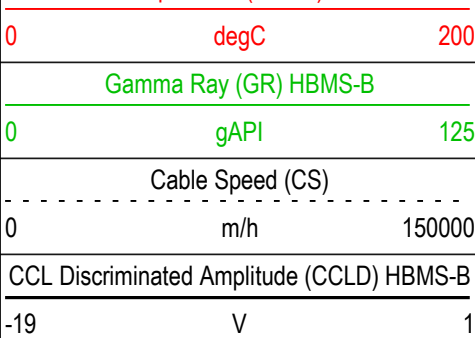


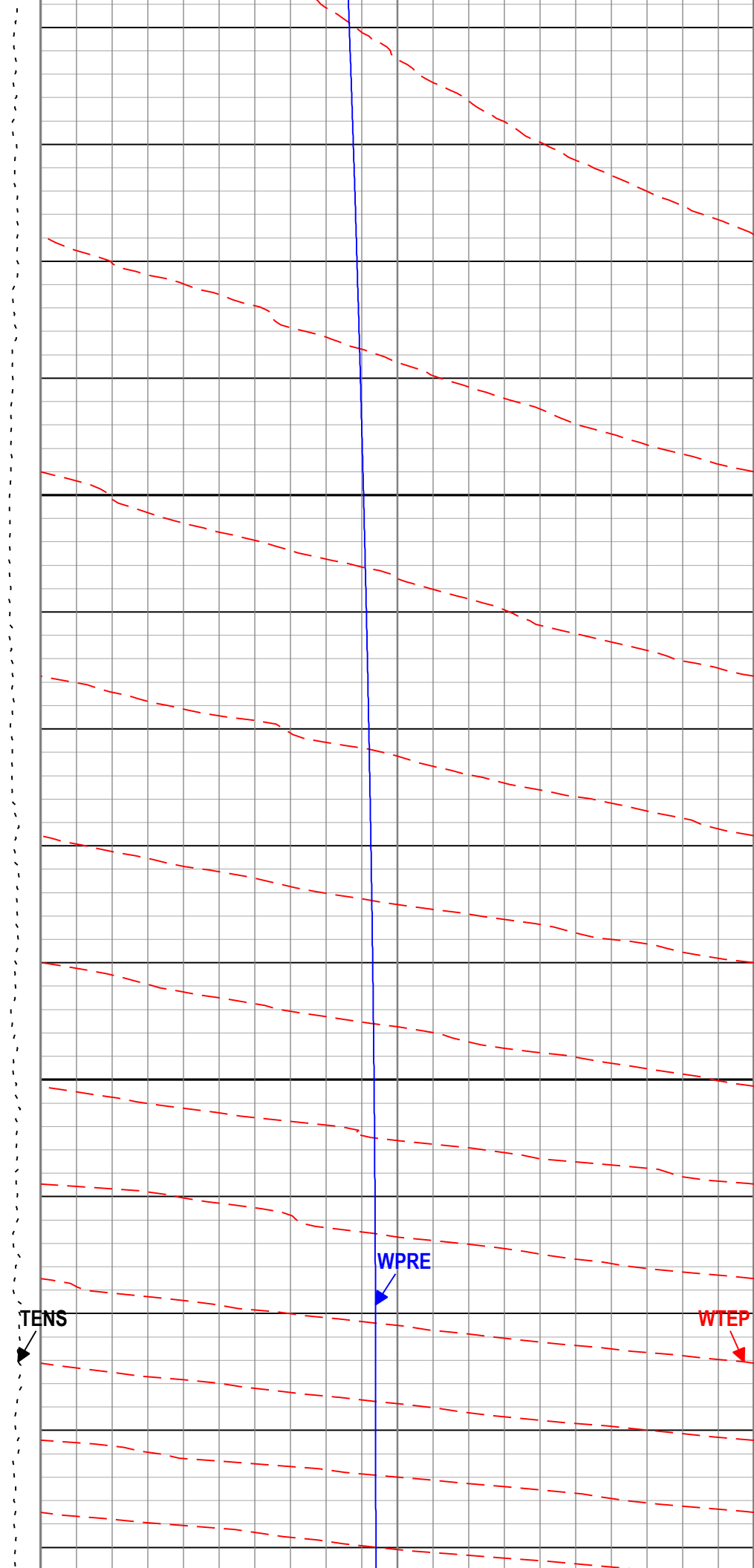
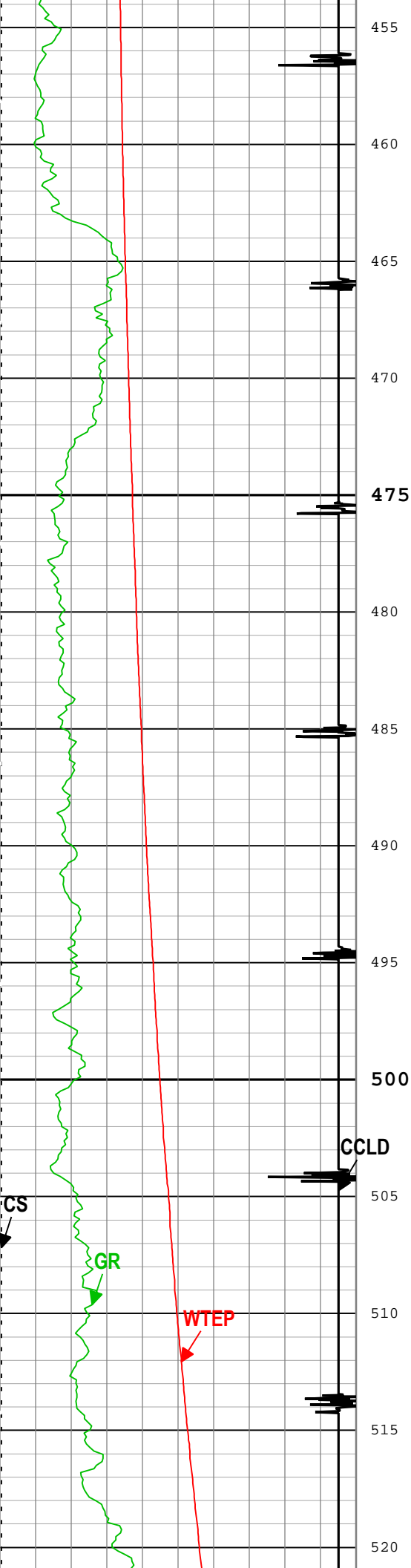


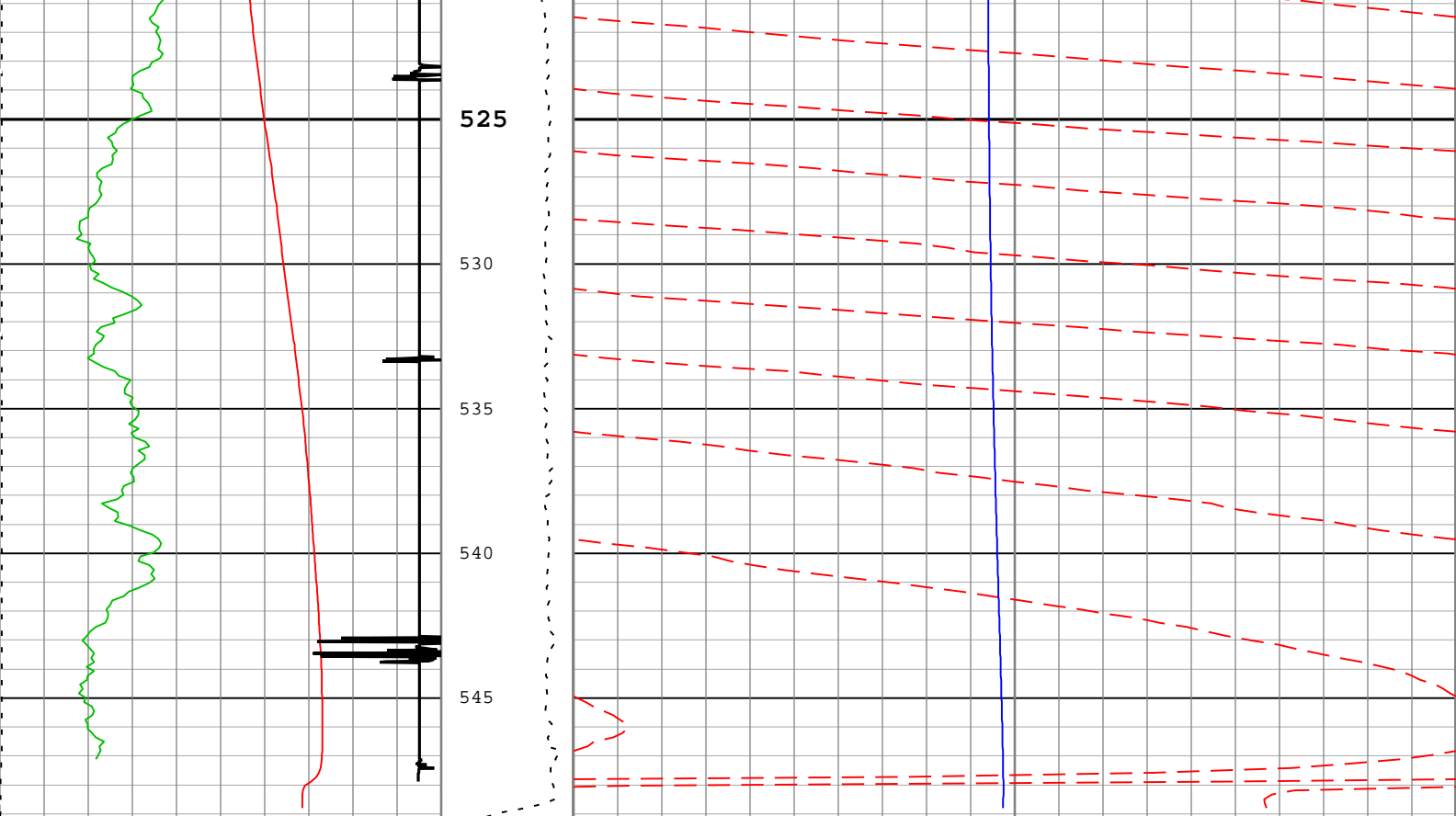












| | | |
|-------------------------------------------|----------------------|--------------------------------|
| Well Temperature (WTEP) HBMS-B | Cable Tension (TENS) | Well Temperature (WTEP) HBMS-B |
| 0 degC 200 | 0 N 2000 | -2 degC 2 |
| Gamma Ray (GR) HBMS-B | | Well Pressure (WPRE) HBMS-B |
| 0 gAPI 125 | | 0 kPa 5000 |
| Cable Speed (CS) | | |
| 0 m/h 150000 | | |
| CCL Discriminated Amplitude (CCLD) HBMS-B | | |
| -19 V 1 | | |

TIME_1900 - Time Marked every 60.00 (s)

Description: PSP Depth Format: Log (PSP Imperial Temp) Index Scale: 1:240 Index Unit: m Index Type: Measured Depth Creation Date: 12-Jun-2018 12:31:08

Channel Processing Parameters

Tool Control Parameters

ONE: Parameters

| Parameter | Description | Tool | Value | Unit |
|---------------|----------------------------------|-----------|--------|------|
| MAX_LOG_SPEED | Toolstring Maximum Logging Speed | WLSESSION | 5486.4 | m/h |
| PCCG | PSP Downhole CCL Gain | HBMS-B | 24 dB | |

Calibration Report

HBMS-B (PSP HBMS-B Tool) Calibration - Run ONE

Primary Equipment :

| | | |
|------|--------|------|
| HBMC | HBMC-A | 2803 |
| HTPS | HTPS-A | 2803 |

Calibration Parameter :

JIG-BKGD

PBMS Gamma Ray Check - HBMS Gamma Ray Accumulations

| | |
|---------|--------|
| Before: | After: |
| | |

| Measurement | Unit | Phase | Nominal | Low Limit | Actual | High Limit | | |
|--------------------------------|------|--------------|---------|-----------|----------|------------|--|--|
| GR Zero Average - 0 | gAPI | Before | ---- | ---- | ---- | ---- | | |
| | | After | ---- | ---- | ---- | ---- | | |
| | | After-Before | ---- | ---- | ---- | ---- | | |
| GR Zero Standard Deviation - 0 | gAPI | Before | ---- | ---- | ---- | ---- | | |
| | | After | ---- | ---- | ---- | ---- | | |
| | | After-Before | ---- | ---- | ---- | ---- | | |
| GR Zero Accumulation - 0 | gAPI | Before | ---- | ---- | ---- | ---- | | |
| | | After | ---- | ---- | ---- | ---- | | |
| | | After-Before | ---- | ---- | ---- | ---- | | |
| GR Plus Average - 0 | gAPI | Before | ---- | ---- | ---- | ---- | | |
| | | After | ---- | ---- | ---- | ---- | | |
| | | After-Before | ---- | ---- | ---- | ---- | | |
| GR Plus Standard Deviation - 0 | gAPI | Before | ---- | ---- | ---- | ---- | | |
| | | After | ---- | ---- | ---- | ---- | | |
| | | After-Before | ---- | ---- | ---- | ---- | | |
| GR Plus Max Deviation - 0 | gAPI | Before | ---- | ---- | ---- | ---- | | |
| | | After | ---- | ---- | ---- | ---- | | |
| | | After-Before | ---- | ---- | ---- | ---- | | |
| Jig-Background | gAPI | Before | | | NOT DONE | | | |
| | | After | | | NOT DONE | | | |
| | | After-Before | ---- | ---- | ---- | ---- | | |

| HBMS Gamma Ray Master Calibration | | |
|---------------------------------------|-----------------|-------|
| Master (EEPROM): 00:00:00 01-May-2001 | | |
| PBMS_GR_MODEL (Master) | GR Coefficients | |
| | Rt**0 | Rt**1 |
| Rt**0 | 1620 | 3320 |

| HBMS Well Temp Master Calibration | | | | | | |
|---------------------------------------|------------------|----------|-----------|--------|----------|-------|
| Master (EEPROM): 00:00:00 17-Nov-2017 | | | | | | |
| PBMS_RTD_THERM (Master) | RTD Coefficients | | | | | |
| | Tt**0 | Tt**1 | Tt**2 | Tt**3 | Tt**4 | Tt**5 |
| Tt**0 | -676.9177 | 452.4547 | -131.3021 | 22.095 | -1.34507 | 0 |

| HBMS CQG Master Calibration | | | | | | |
|---------------------------------------|------------------------------------|---------------|---------------|---------------|---------------|---------------|
| Master (EEPROM): 00:00:00 17-Nov-2017 | | | | | | |
| PBMS_P_GAUGE_PRES (Master) | CQG Pressure Model Coefficients | | | | | |
| | Fb**0 | Fb**1 | Fb**2 | Fb**3 | Fb**4 | Fb**5 |
| Fc**0 | 7269.865 | 0.01419238 | -4.214317E-07 | -8.598992E-11 | -1.62262E-15 | -2.515921E-20 |
| Fc**1 | -1.099019 | -1.325608E-05 | -9.940362E-11 | 2.552209E-16 | 1.908283E-20 | 0 |
| Fc**2 | 1.2106E-06 | 5.408029E-11 | 9.457539E-16 | 0 | 0 | 0 |
| Fc**3 | 1.264557E-12 | 2.065319E-16 | 0 | 0 | 0 | 0 |
| Fc**4 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fc**5 | 0 | 0 | 0 | 0 | 0 | 0 |
| PBMS_P_GAUGE_TEMP (Master) | CQG Temperature Model Coefficients | | | | | |
| | Fc**0 | Fc**1 | Fc**2 | Fc**3 | Fc**4 | Fc**5 |
| Fb**0 | 111.0257 | -0.0002968466 | 8.39641E-09 | 3.618141E-13 | -2.978047E-17 | -4.386101E-21 |
| Fb**1 | -0.006043007 | 1.920186E-08 | 1.981872E-13 | -6.200232E-18 | -1.244684E-21 | 0 |
| Fb**2 | -3.201434E-08 | 3.765718E-13 | 1.611457E-18 | 0 | 0 | 0 |

| | | | | | | |
|-------------------------------------------------------------------------|---------------|--------------|---------------|--------------|---------------|---------------|
| Fb**3 | -3.183355E-13 | 8.269331E-18 | 0 | 0 | 0 | 0 |
| Fb**4 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fb**5 | 0 | 0 | 0 | 0 | 0 | 0 |
| PBMS_CQG_FCLK_FREQ CQG Clock Frequency Model Coefficients (Master) | | | | | | |
| | (Fb'-Fc')**0 | (Fb'-Fc')**1 | (Fb'-Fc')**2 | (Fb'-Fc')**3 | (Fb'-Fc')**4 | (Fb'-Fc')**5 |
| (Fb'-Fc')**0 | 31104.02 | 0.002804921 | 6.407652E-07 | -6.71484E-11 | -2.876998E-16 | -2.282775E-21 |
| PBMS_CQG_FCLK_TEMP CQG Clock Temperature Model Coefficients (Master) | | | | | | |
| | (Fb'-Fc')**0 | (Fb'-Fc')**1 | (Fb'-Fc')**2 | (Fb'-Fc')**3 | (Fb'-Fc')**4 | (Fb'-Fc')**5 |
| (Fb'-Fc')**0 | 121.486 | -0.00664138 | -5.621554E-08 | 1.332489E-11 | -1.023798E-15 | 2.668665E-20 |

| | | |
|-----------|---------------------------------|--------------|
| Company: | IMPERIAL OIL RESOURCES LIMITED | Schlumberger |
| Well: | IMP 09 H69-14 COLD LK 4-33-66-4 | |
| Field: | LEMING | |
| Province: | ALBERTA | |
| Status: | **MD** | |

TEMPERATURE LOG