

# Ultrasonic Imaging Tool-Cement Bond Log

USIT-CBL-GR-CCL

05-June-2013 Scale: 1/200

Schlumberger

Company: Statoil

Well: 15/9-F-11 B

Field: Volve

Rig Name: Maersk Inspire

State: Norway

Country: Norway

Latitude: 58° 26' 29.96"N  
Longitude: 1° 53' 14.87"E  
Block: 15/9

UWID: 15/9-F-11 B  
Rig Name: Maersk Inspire  
Rig Type: Jack Up rig

FL:  
FL1: North Sea  
FL2: Norwegian Sector

Log Measured From: - Drill Floor: 54.90 m

Permanent Datum: - Mean Sea Level

Ground Level: 91.00 m

Acquisition Dates:

05-Jun-2013

Other Services:

Log Interval:

2492.79(m) ... 3184.93(m)

OS1

Index Types:

Measured Depth

Index Scales:

1:200

Depth Source:

Wireline Depth

Depth Sensor:

IDW

Print Type:

Field

Company: Statoil

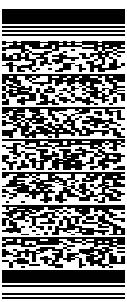
Well: 15/9-F-11 B

Field: Volve

Rig Name: Maersk Inspire

State:

Country: Norway



## Disclaimer

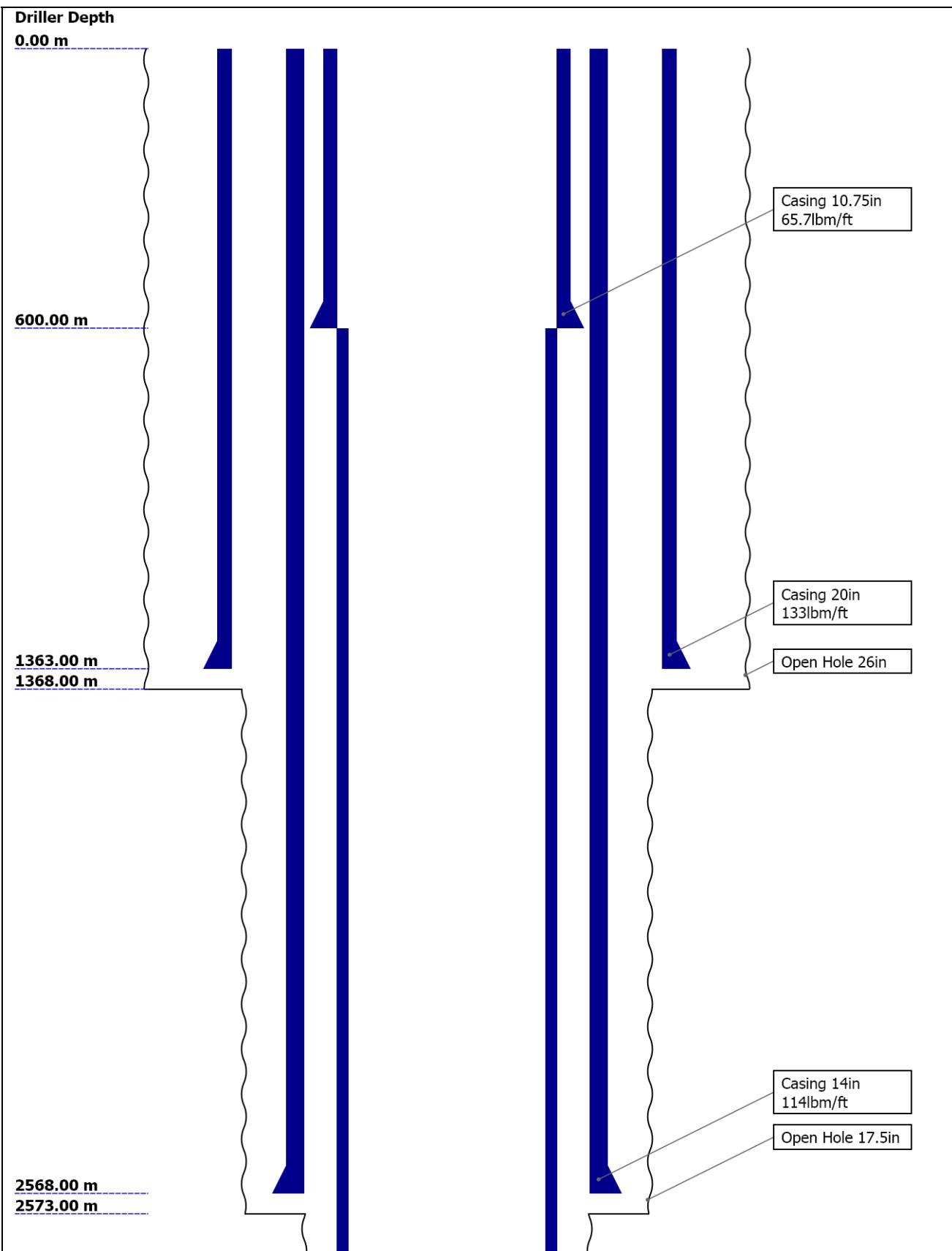
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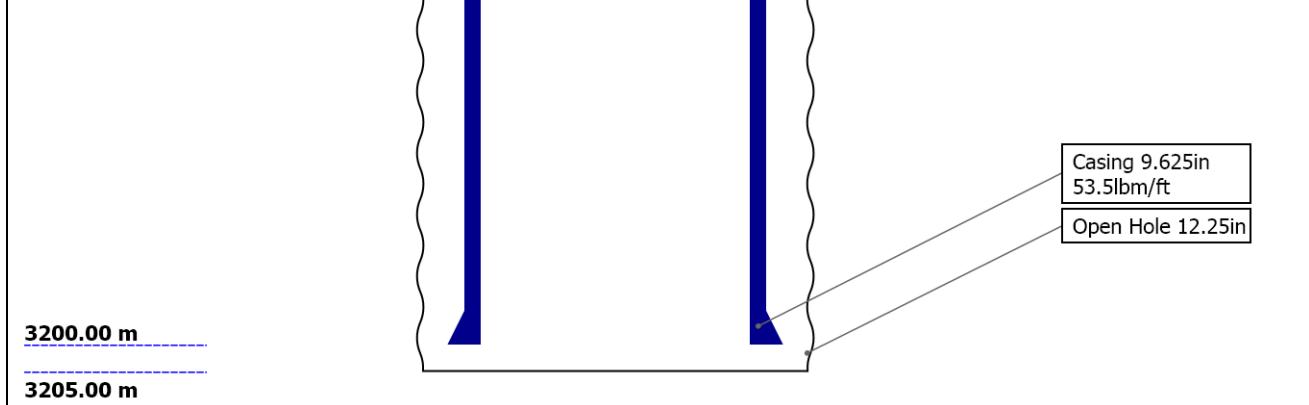
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## Well Sketch





## Borehole Size/Casing/Tubing Record

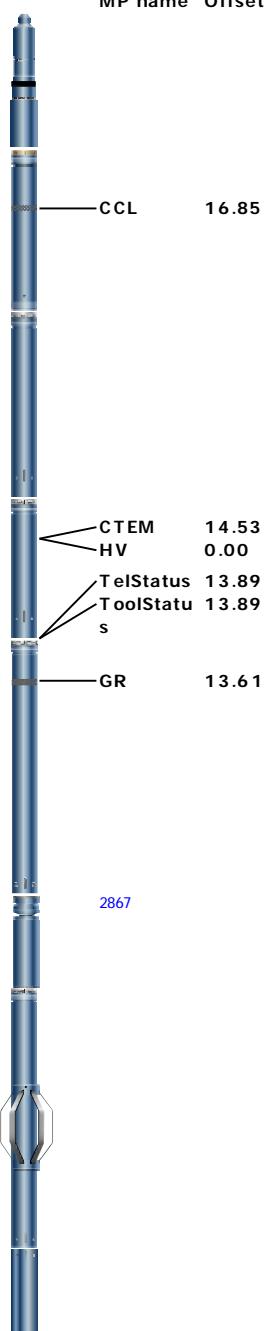
Bit					
Bit Size ( in )	26	17.5	12.25		
Top Driller ( m )	0	1368	2573		
Top Logger ( m )	0	1368	2573		
Bottom Driller ( m )	1368	2573	3205		
Bottom Logger ( m )	1368	2573	3205		
Casing					
Size ( in )	20	14	10.75	9.625	
Weight ( lbm/ft )	133	114	65.7	53.5	
Inner Diameter ( in )	18.743	12.42	9.566	8.547	
Grade	N80	N/A	P110	P110	
Top Driller ( m )	0	0	0	600	
Top Logger ( m )	0	0	0	600	
Bottom Driller ( m )	1363	2568	600	3200	
Bottom Logger ( m )	1363	2568	600	3200	

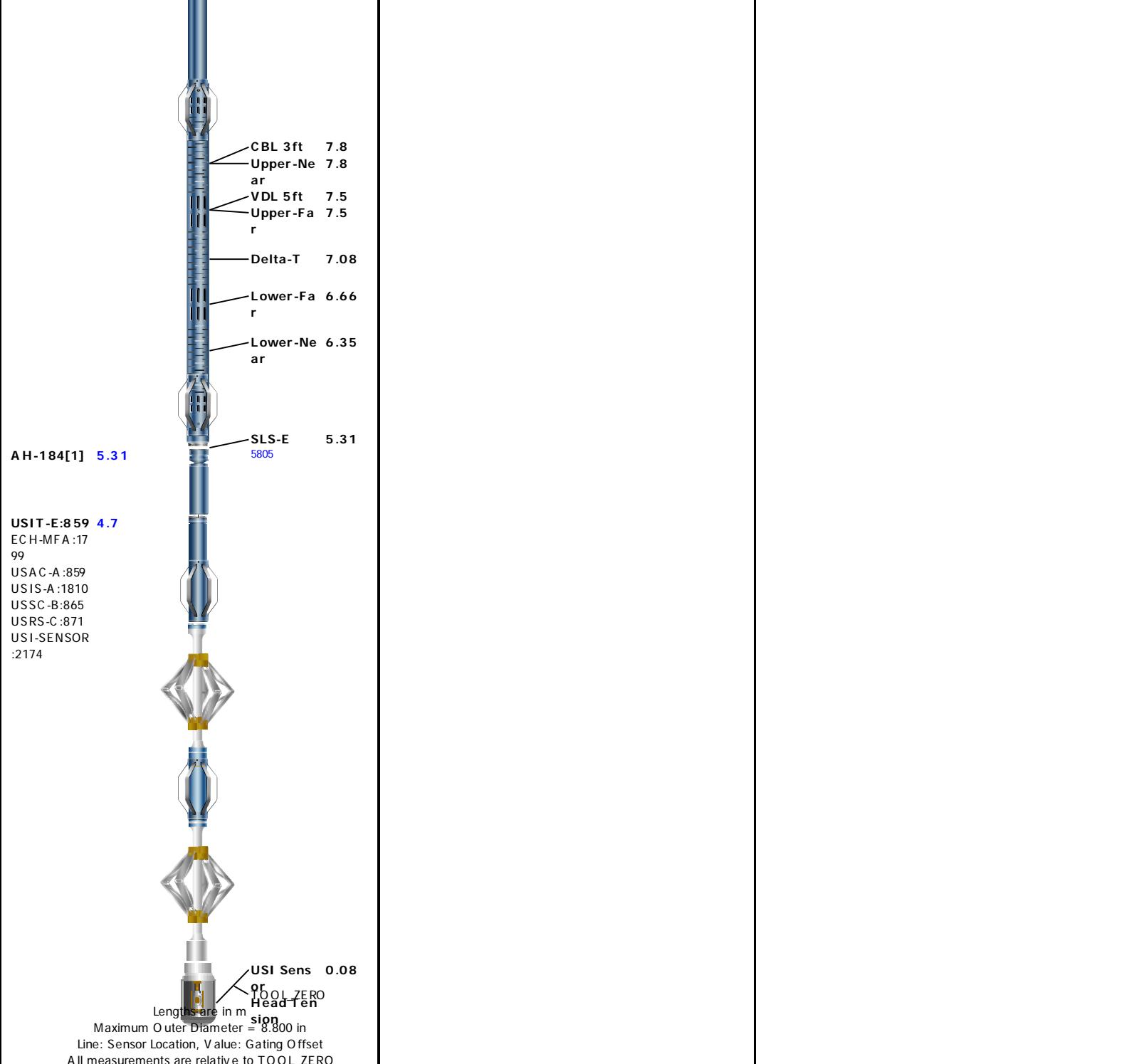
## Operational Run Summary

Parameter ( unit )	1				
Date Log Started	05-Jun-2013				
Time Log Started	11:32:15				
Date Log Finished	05-Jun-2013				
Time Log Finished	18:36:46				
Top Log Interval ( m )	2500.00				
Bottom Log Interval ( m )	3185.00				
Total Depth ( m )	3185.00				
Max Hole Deviation ( deg )	64.40				
Azimuth of Max Deviation ( deg )	110.30				
Bit Size ( in )	12.250				
Logging Unit Number	ONCC A 3815				
Logging Unit Location	NOBO				
Recorded By	Y.Chshelokova/ G. Fardanea/ C.Da Tian				
Witnessed By	Morton Rillo				

Witnessed By	Morten Billie				
Service Order Number					
<b>Borehole Fluids</b>					
Parameter( unit )	1				
Fluid Type	Oil				
Max Recorded Temperatures ( degC )	NaN				
Salinity ( ppm )	0				
Density ( g/cm3 )	1.28				
Date Logger on Bottom	NaN				
Time Logger on Bottom	NaN				
Electricity Stability ( V )					
Oil/Water					
Total Solid ( % )					
High Gravity Solids ( % )					

## Remarks and Equipment Summary

1: Toolstring	1: Remarks
<p>Equip name Length LEH-QT:30 17.98 05 LEH-QT:3005</p> <p>CAL-YA:87 17.09 8 CAL-YA:878</p> <p>ACTS-B:99 16.02 0 ACTS-B:990</p> <p>DTC-H:817 14.8 9 ECH-KC:910 1 DTC-H:8179</p> <p>SGT-N:104 13.89 79 SGH-K:3279 SGC-TB:104 79 SGD-TAA</p> <p>AH-184[2] 12.21</p> <p>DSLT-H:81 11.6 42 ECH-KH:819 2 DSLC-H:814 2 SLS-E:2131</p>  <p>The diagram illustrates the toolstring configuration. It shows a vertical sequence of tools, each with its name and length. Labels indicate specific components: CCL (Centralizer) at 16.85 mMD, CTEM/HV (CTEM/HV) at 14.53 mMD, TelStatus/ToolStatus (TelStatus/ToolStatus) at 13.89 mMD, and GR (Gamma Ray) at 13.61 mMD. The total length of the string is 2867 mMD.</p>	<p>9 5/8 in casing tally dated 25.05.13 prepared by Anders Langva is used as correlation refere</p> <p>Correlated main pass at pup joint at 3154.53 mMD</p> <p>Log objectives: To verify good cement behind 9 5/8 in casing 53.5 ppf P110. (Nominal ID: 8.547 in)</p> <p>USIT Resolution for both main and repeat pass is 5 deg 6 in with Speed 2000 fph.</p> <p>Tool ran as per toolsketch centralized with 5 GEMCOS (OD: 8.8 in) and 2 built in USIS Centralizers</p> <p>CBL firing was 15 Hz. Free pipe normalization is adjusted at 2453.7 mMD with CBAF value 1.03. Top of cement observed at 2680 mMD</p> <p>Theoretical Z mud was used with K factor: 0.95; FVEL: 233 us/ft and Z mud: 1.59 Mrayl</p> <p>Well is filled with OBM Environmul 1.28 SG. Well is cemented with standard Class G Cement with ZCMT 5.6 MRayl</p> <p>The images have been rotated such that the centre of each image track represents the low side of tubular</p>



## Depth Summary

Depth Control Parameters	1		
Conveyance Type	Wireline		
Log Sequence	Subsequent trip		
Rig Type	Jack Up rig		
Depth Remark Parameters	1		
Depth Remark 1	Schlumberger depth control procedure is followed		
Depth Remark 2	IDW is used as primary depth control device and Z chart as secondary		
Depth Measuring Device	1		
Type	IDW-JA		
Serial Number	7057		
Calibration Date	28-May-2013		
Quality Control Status	Good		

Calibrator Serial Number	32		
Calibration Cable Type	7-46 PXS		
Wheel Correction 1	-2		
Wheel Correction 2	-4		
Tension Device	1		
Type	CMTD-B/A		
Serial Number	1412		
Calibration Date	04-Jun-2013		
Calibrator Serial Number	1115		
Calibration Points	10		
Calibration RMS	32		
Calibration Peak Error	72		
Logging Cable	1		
Type	7-46P-XS		
Serial Number	F711165		
Logging Cable Length ( m )	7315.20		

## Sequence of Events

soe run 1.txt

Client: Statoil  
 Field: Volve  
 Rig: Maersk Inspirer  
 Well: 15/9-F-11 B

Engineers:

Yekaterina Chshelokova	(03/06)	(D)
Gilang Fardanea	(03/06)	(N)

Operators:

Cheng Da Tian	(03/06)	(D)
Lars Even Hovland	(03/06)	(D)
Emily Carr	(03/06)	(N)
Jan Oivind Lea	(03/06)	(N)

05-Jun-2013

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10:30 Toolbox Meeting  
 11:00 Rig up  
 11:45 Run in the Hole  
 12:15 Pickup Tension at 500m  
 12:40 Pickup Tension at 1000m  
 12:55 Pickup Tension at 1500m  
 13:05 Pass over the first high devi depth 1683 m  
 13:15 Pickup Tension at 2000m  
 13:40 Pickup Tension at 2500m  
 14:15 Pickup Tension at 3000m  
 14:30 Arrived at bottom interval 3185m  
 Adjust parameters  
 14:50 Repeat pass with K=1, Zmud=167, slowness= 233  
 15:30 Repeat pass stop at 2950m  
 15:40 Go down from main pass  
 16:25 Arrived at bottom interval  
 16:30 Start main pass  
 17:30 Finish main pass  
 Top interval at 100m above TOC.  
 18:15 Start POOH  
 19:30 C-Plate the tool at Head.  
 Toolbox meeting  
 19:50 Start rig down  
 20:30 Finished Rig down

USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(m)	Stop Depth(m)
Run 1	Log[13]:Up	3184.93	2492.79

Fluid Velocity : DTMD parameter used

Start Depth(m)	Stop Depth(m)	Start Value(us/ft)	End Value(us/ft)
0		233.00	233.00

### **Mud Impedance : ZMUD parameter used**

Start Depth(m)	Stop Depth(m)	Start Value(Mrayl)	End Value(Mrayl)
0		1.50	1.50

1

Main Pass

## Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
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## Software Version

Acquisition System	Version
MaxWell	3.1.9755.0
Application Patch	SP-20121221-3.1.9755.1574

Computation	Description	Version
CEVAL	Sonic Cement Evaluation Computation Ensemble provides common Parameters and Channels	3.1.9755.1574
Cementation	Cementation Computation Application	3.1.9755.0
CORROSION Ensemble	CORROSION Ensemble	3.1.9755.0

## Tool Elements

CAL-YA	Casing Anomaly Locator 3-3/8 in 31 Pin Heads	3.1.9755.0	
USI-SENSOR	USIT Transducer Element	3.1.9755.1574	DSP: v01.82
SGC-TB	Scintillation Gamma Cartridge	3.1.9755.0	
SLS-E	Sonic Logging Sonde E supports 3'-5'BHC DT and CBL/ADL	3.1.9755.1574	4.0

Pass Summary

Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data	

1	Log[13]:Up	Up	2492.79 m	3184.93 m	05-Jun-2013 4:40:16 PM	05-Jun-2013 5:24:48 PM	-0.37 m	true
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All depths are referenced to toolstring zero

**Log**

1: Log[13]:Up

Description: USI Composite Format: Log ( USI\_E\_CBL\_Composite\_60DEG ) Index Scale: 1:200 Index Unit: m Index Type: Measured Depth Creation Date: 06-Jun-2013 23:20:20

Channel	Source	Sampling
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AIAV	USIT-E:USR:USI-SENSOR	6in
AIMN	USIT-E:USR:USI-SENSOR	6in
AWAV	USIT-E:USR:USI-SENSOR	6in
AWMN	USIT-E:USR:USI-SENSOR	6in
AWMX	USIT-E:USR:USI-SENSOR	6in
AZEC	USIT-E:USR:USI-SENSOR	6in
CCL	CAL-YA:CAL-YA:CAL-YA	1in
CCLU	USIT-E:USR:USI-SENSOR	6in
CEMR	USIT-E:USR:USI-SENSOR	6in
CS	WLWorkflow	6in
AIMX	USIT-E:USR:USI-SENSOR	6in
CBL	DSLT-H:SLS-E:SLS-E	6in
ECCE	USIT-E:USR:USI-SENSOR	6in
ERAV	USIT-E:USR:USI-SENSOR	6in
GASR	USIT-E:USR:USI-SENSOR	6in
GR_CAL	SGT-N:SGT-N:SGC-TB	6in
IRAV	USIT-E:USR:USI-SENSOR	6in
IRMN	USIT-E:USR:USI-SENSOR	6in
IRMX	USIT-E:USR:USI-SENSOR	6in
MDR	USIT-E:USR:USI-SENSOR	6in
RB	USIT-E:USR:USI-SENSOR	6in
RSAV	USIT-E:USR:USI-SENSOR	6in
TENS.1	WLWorkflow	1in
TENS.2	WLWorkflow	6in
THAV	USIT-E:USR:USI-SENSOR	6in
THMN	USIT-E:USR:USI-SENSOR	6in
THMX	USIT-E:USR:USI-SENSOR	6in
THNO	USIT-E:USR:USI-SENSOR	6in
TIME_1900	WLWorkflow	0.1in
TT	DSLT-H:SLS-E:SLS-E	6in
TTSL	DSLT-H:SLS-E:SLS-E	6in
UFLG	USIT-E:USR:USI-SENSOR	6in

USIT Processing Flags (UFLG[0]) USIT-E

1 - UFLG 1 Value within [0.0 - 1.5] - :	<span style="color: black;">■</span> UTIM Error
2 - UFLG 2 Value within [1.5 - 2.5] - :	<span style="color: darkred;">■</span> Pulse Origin Not Detected
3 - UFLG 3 Value within [2.5 - 3.5] - :	<span style="color: red;">■</span> WINLEN Error
4 - UFLG 4 UFLG 5 UFLG 6 Value within [3.5 - 6.5] - :	<span style="color: blue;">■</span> Casing Thickness Error
5 - UFLG 7 UFLG 8 UFLG 9 Value within [6.5 - 10 ] - :	<span style="color: cyan;">■</span> Loop Processing Error

TIME\_1900 - Time Marked every 60.00 (s)

Relative Bearing (RB) USIT-E _____ - 0 deg 360
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Casing Collar

**Locator**

**Amplitude (CCL)**

**CAL-YA**

-5	5
Cable Tension (TENS).1	5000 lbf 0
Motor Revolution Speed (RSAV) USIT-E	6 c/s 8
Cable Speed (CS)	0 1000 m/h
Cable Tension (TENS).2	1000 lbf 0
Azimuth of Eccentering (AZEC) USIT-E	0 deg 360
Casing Collar Locator Ultrasonic (CCLU) USIT-E	-30 in 10
Amplitude of Eccentering (ECCE) USIT-E	0 in 0.5

**Orientation:** Top of Hole

**Thickness Minimum Value (THMN) USIT-E**

**Thickness Maximum Value (THMX) USIT-E**

**Acoustic Impedance Maximum (AIMX) USIT-E**

**Acoustic Impedance Minimum (AIMN) USIT-E**

**Micro-debonding**

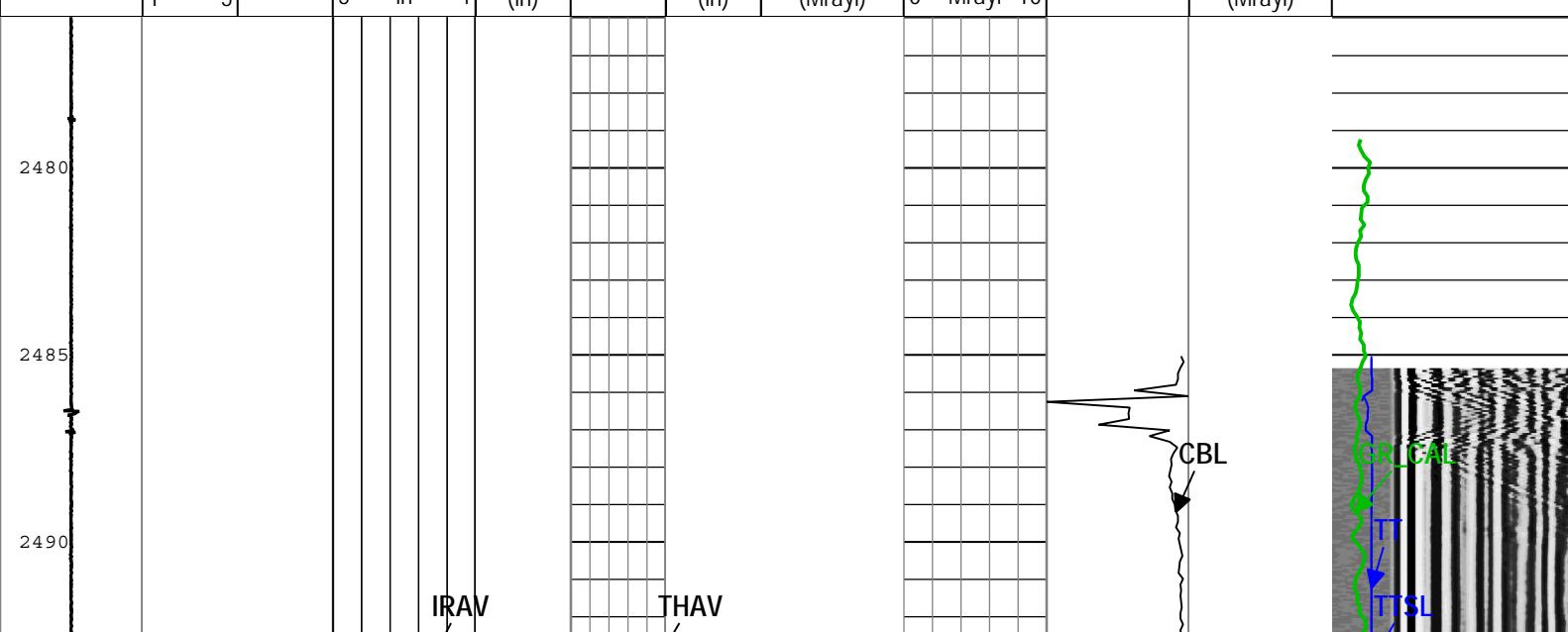
**Custom Normalization**

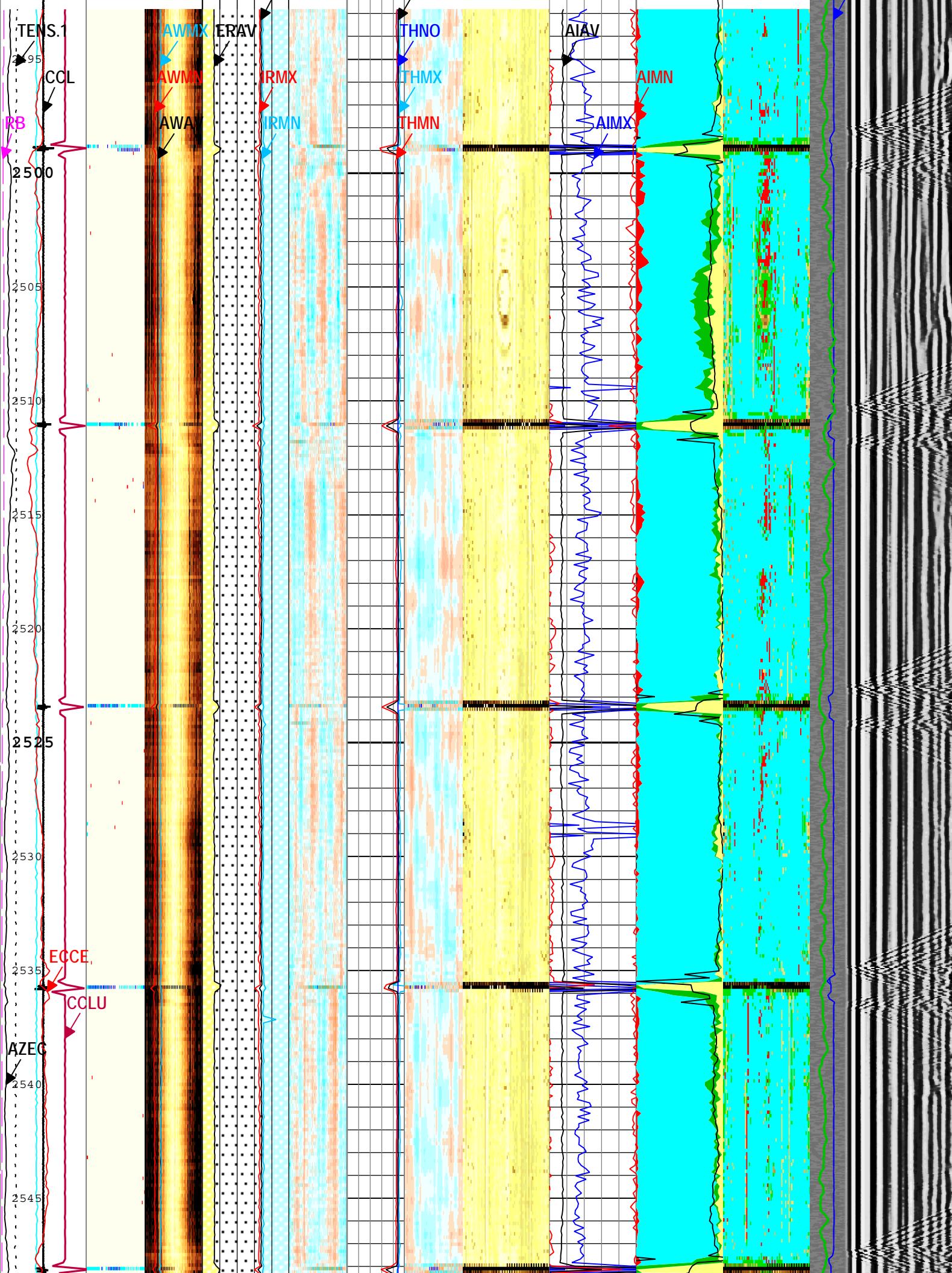
**Variable Density Log (VDL) DSLT-H**

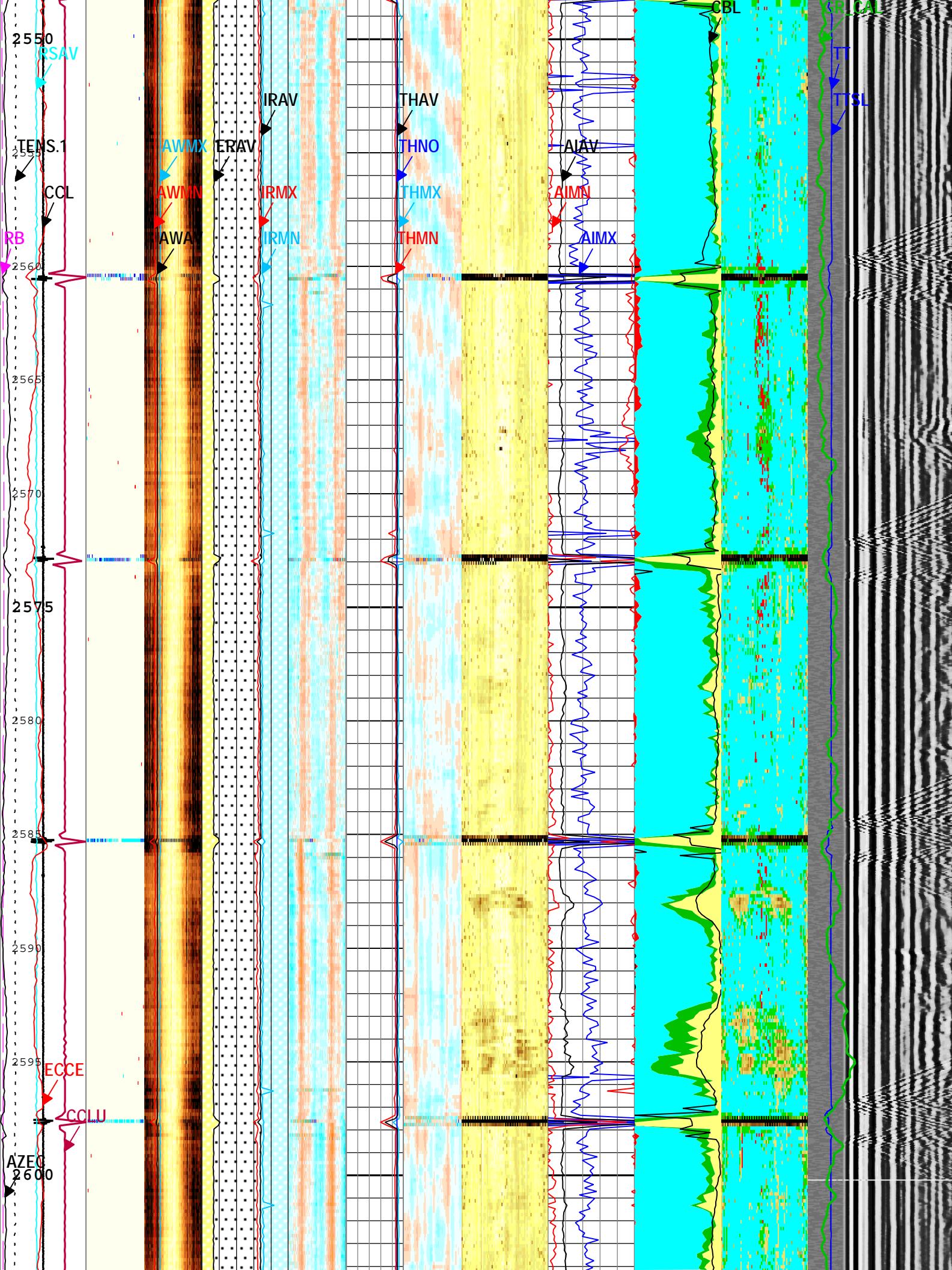
**Transit Time (Sliding Gate) (TTSL) DSLT-H**

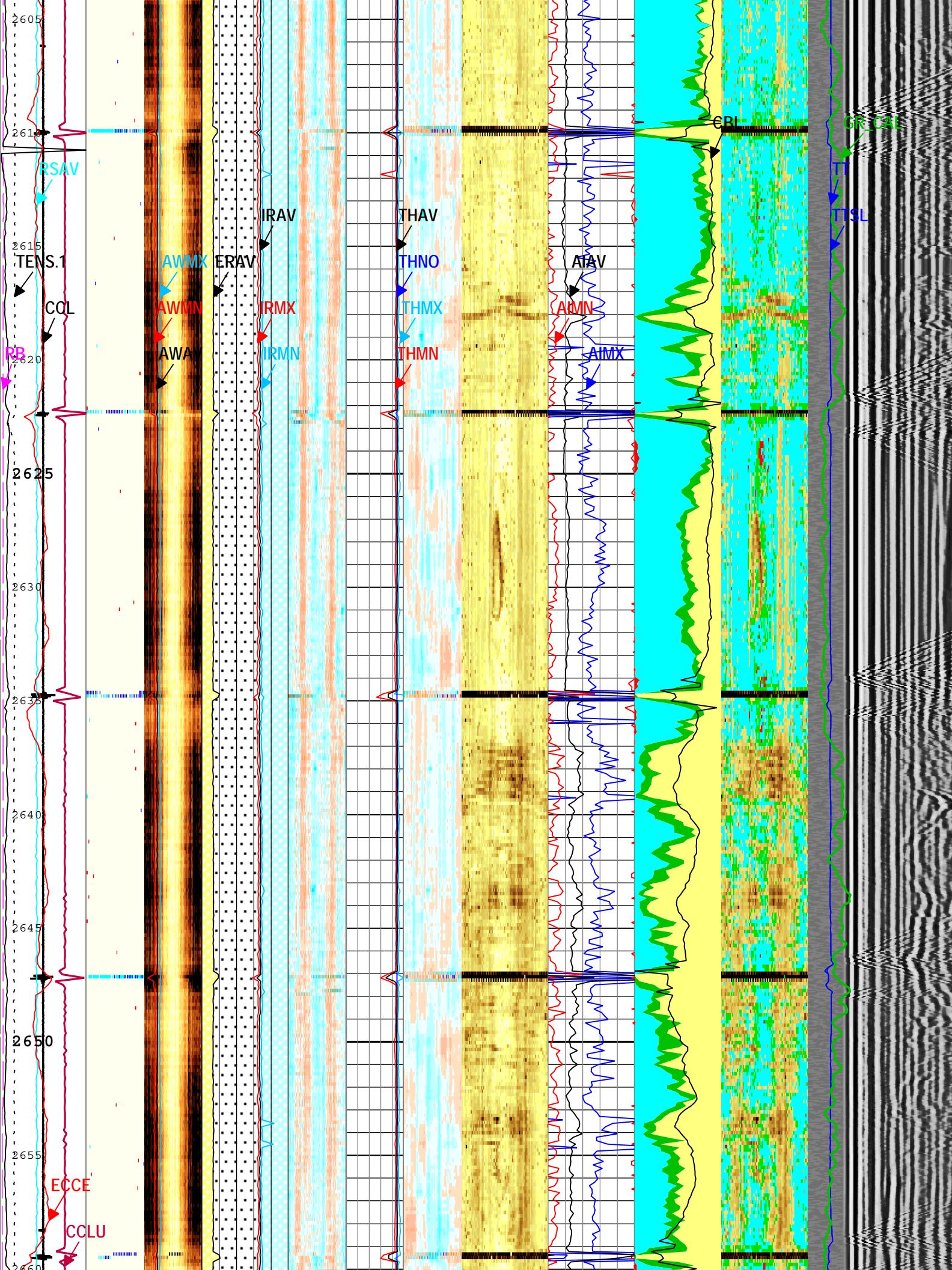
**Transit Time for CBL (TT) DSLT-H**

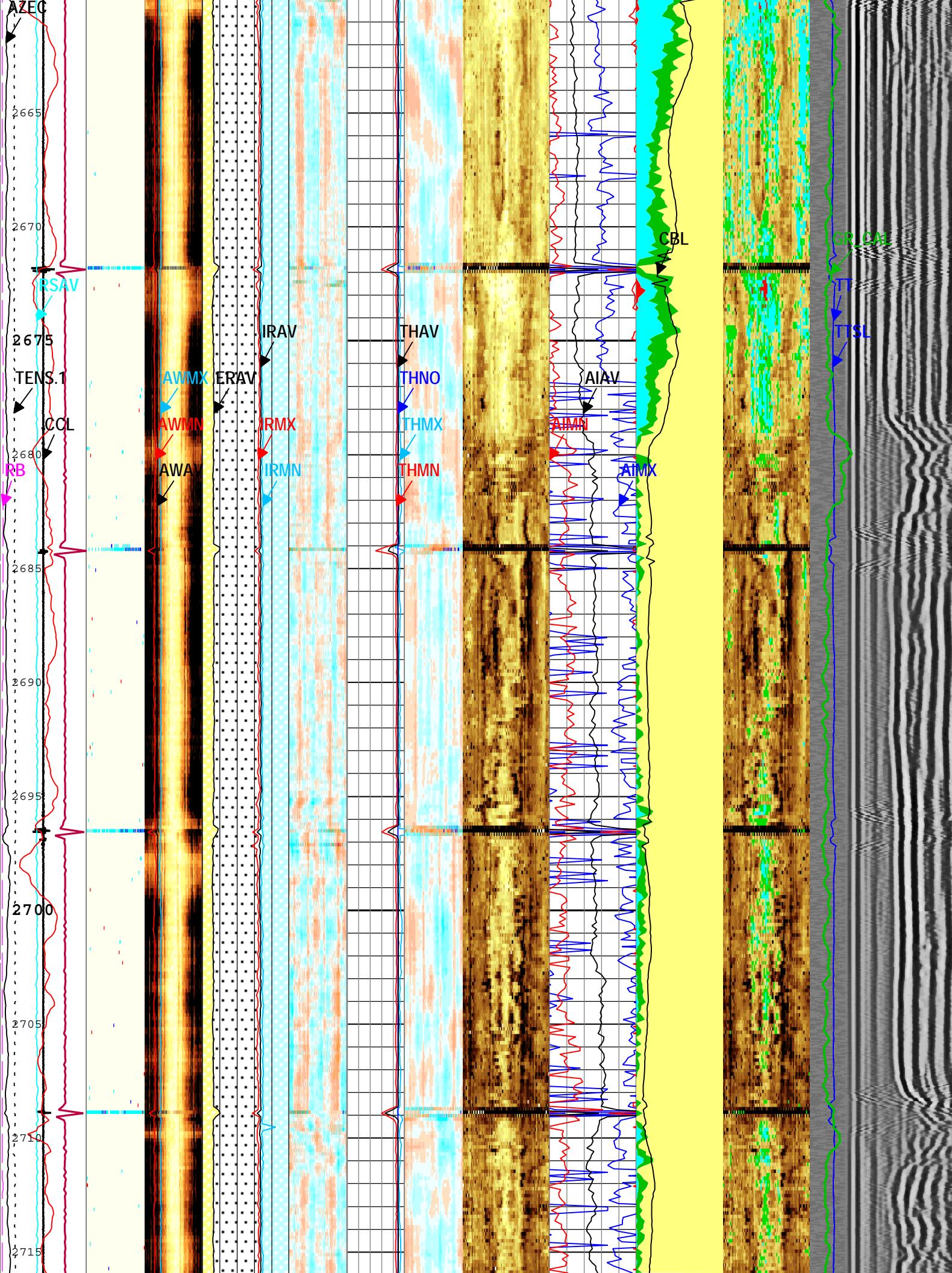
**Calibrated Gamma Ray (GR\_CAL) SGT-N**

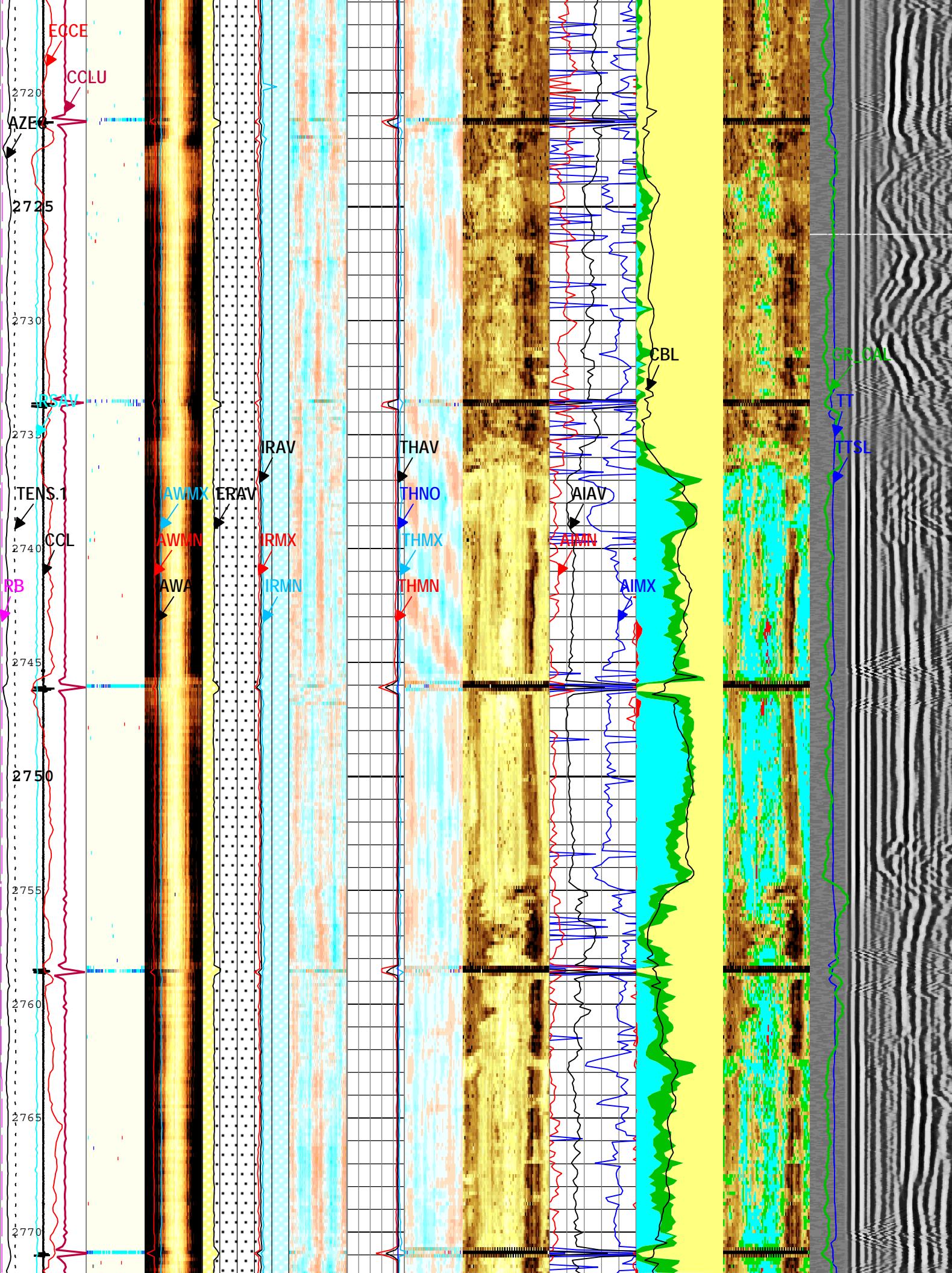


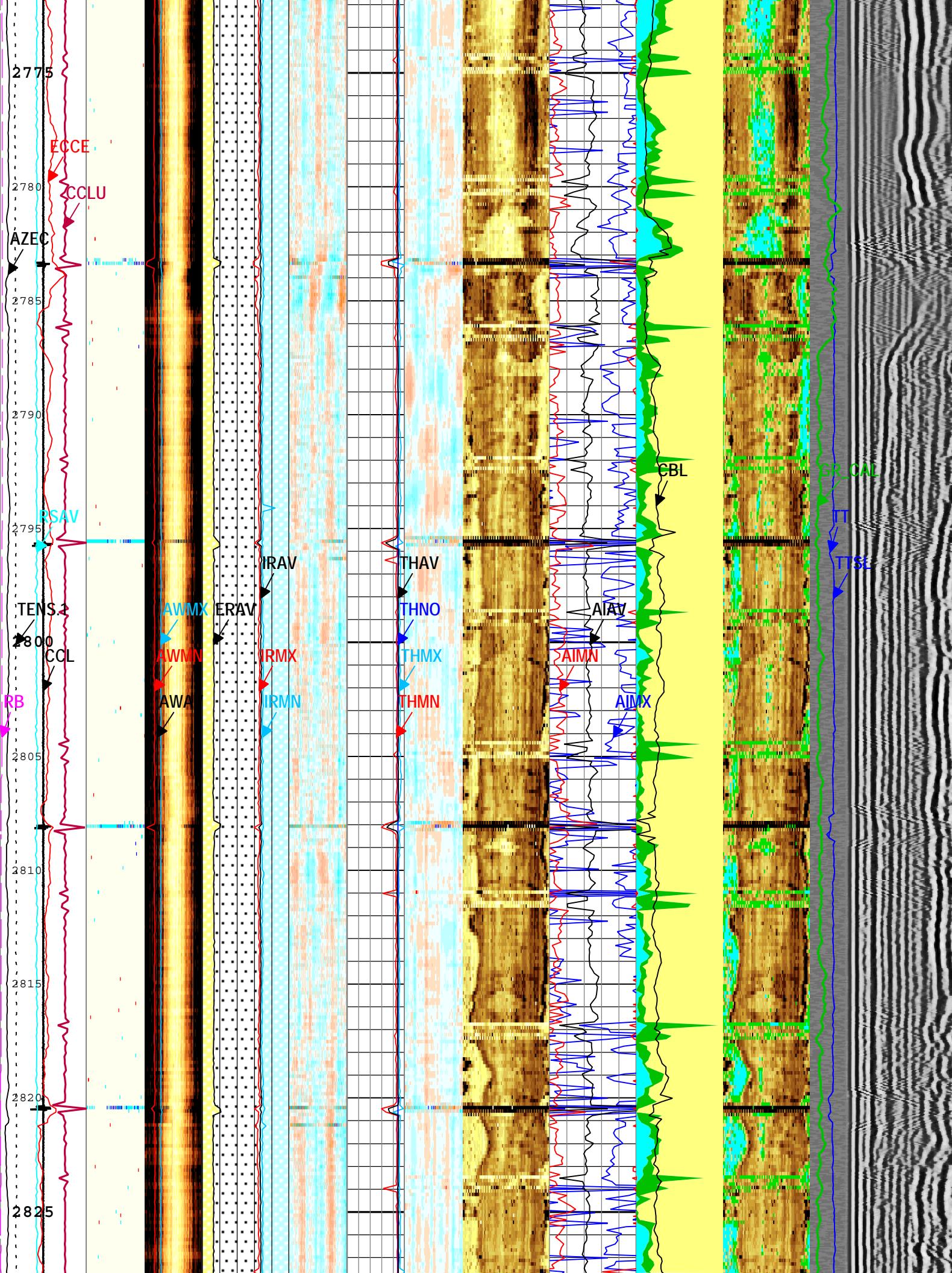


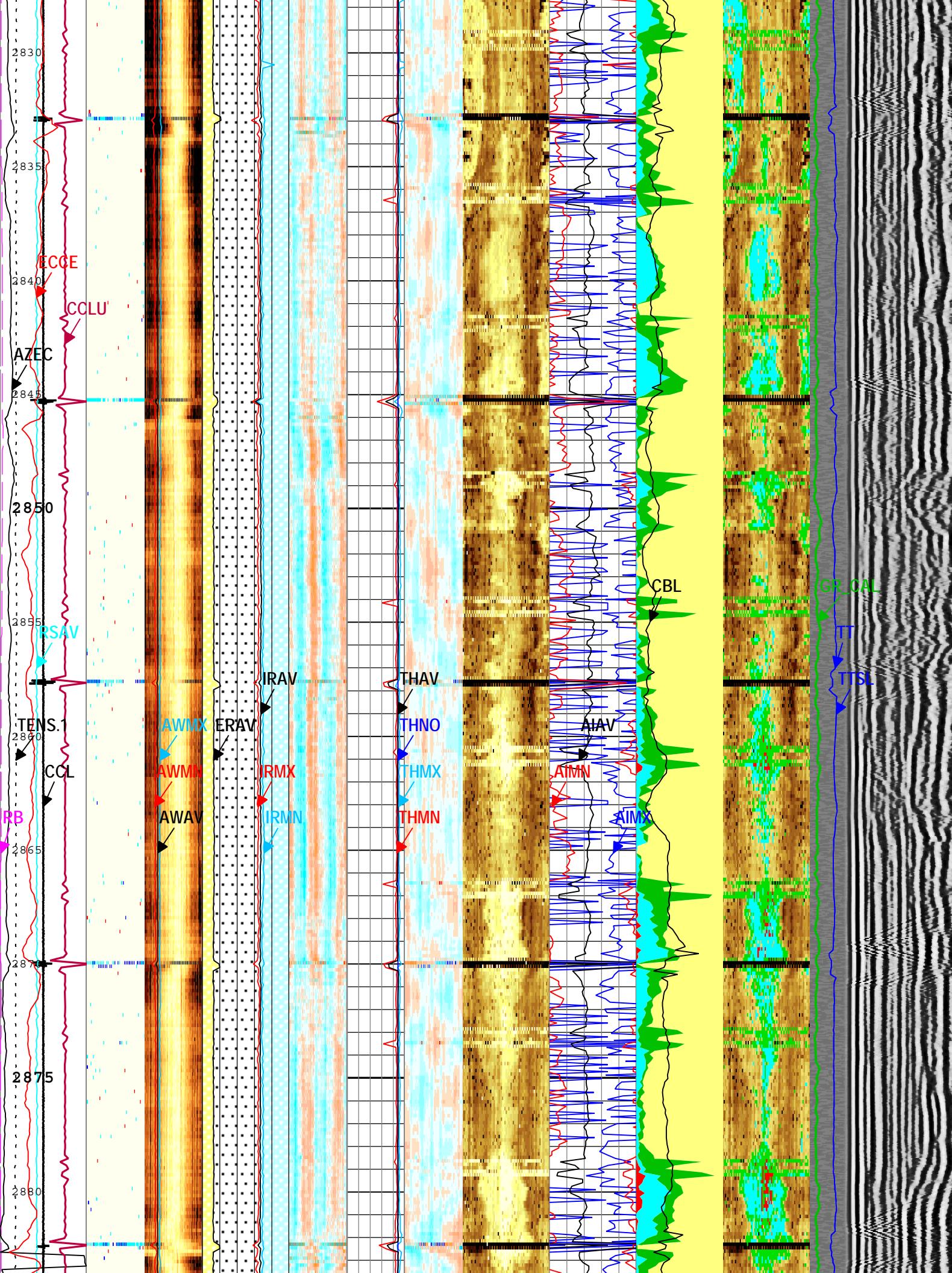


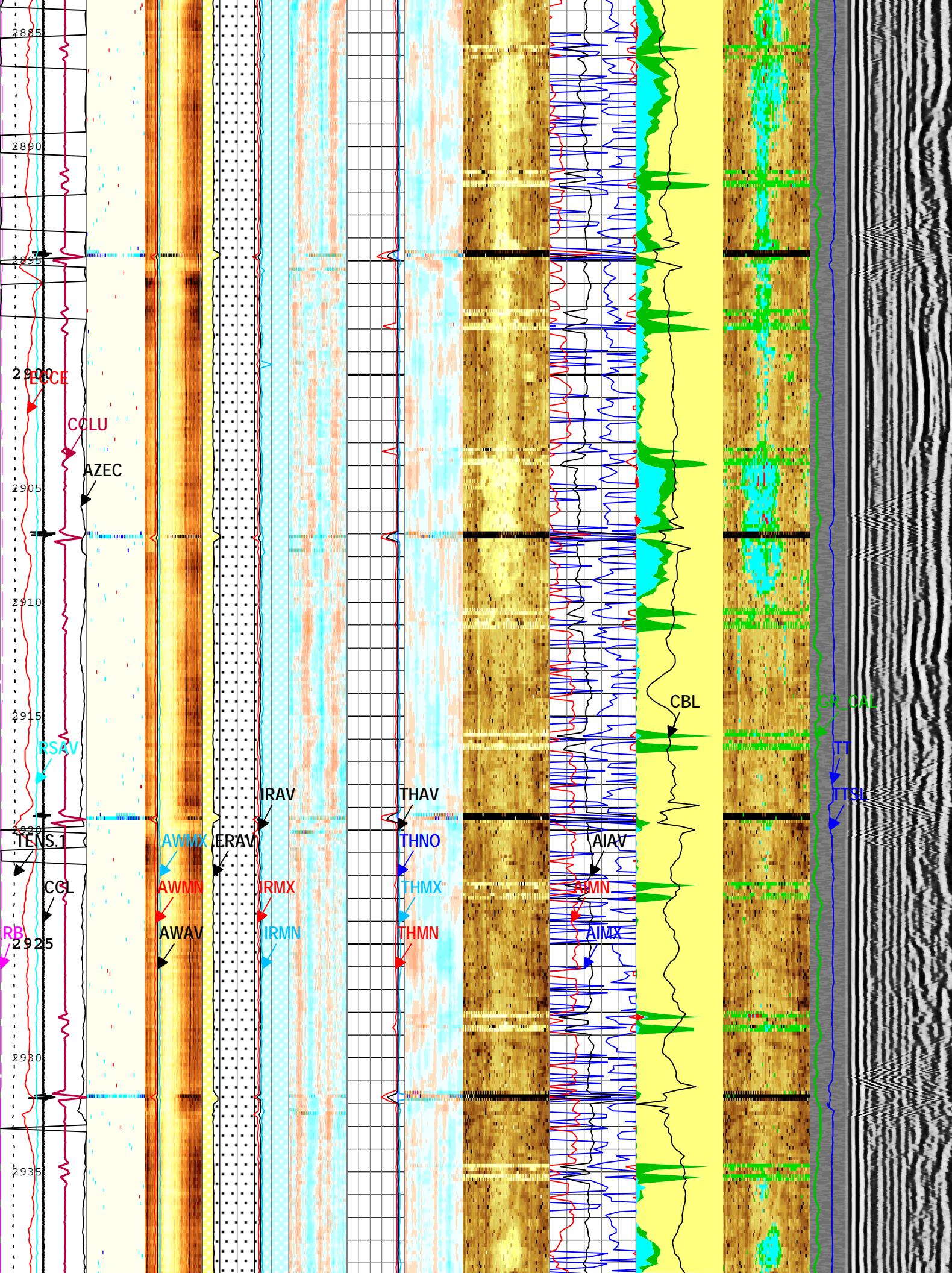


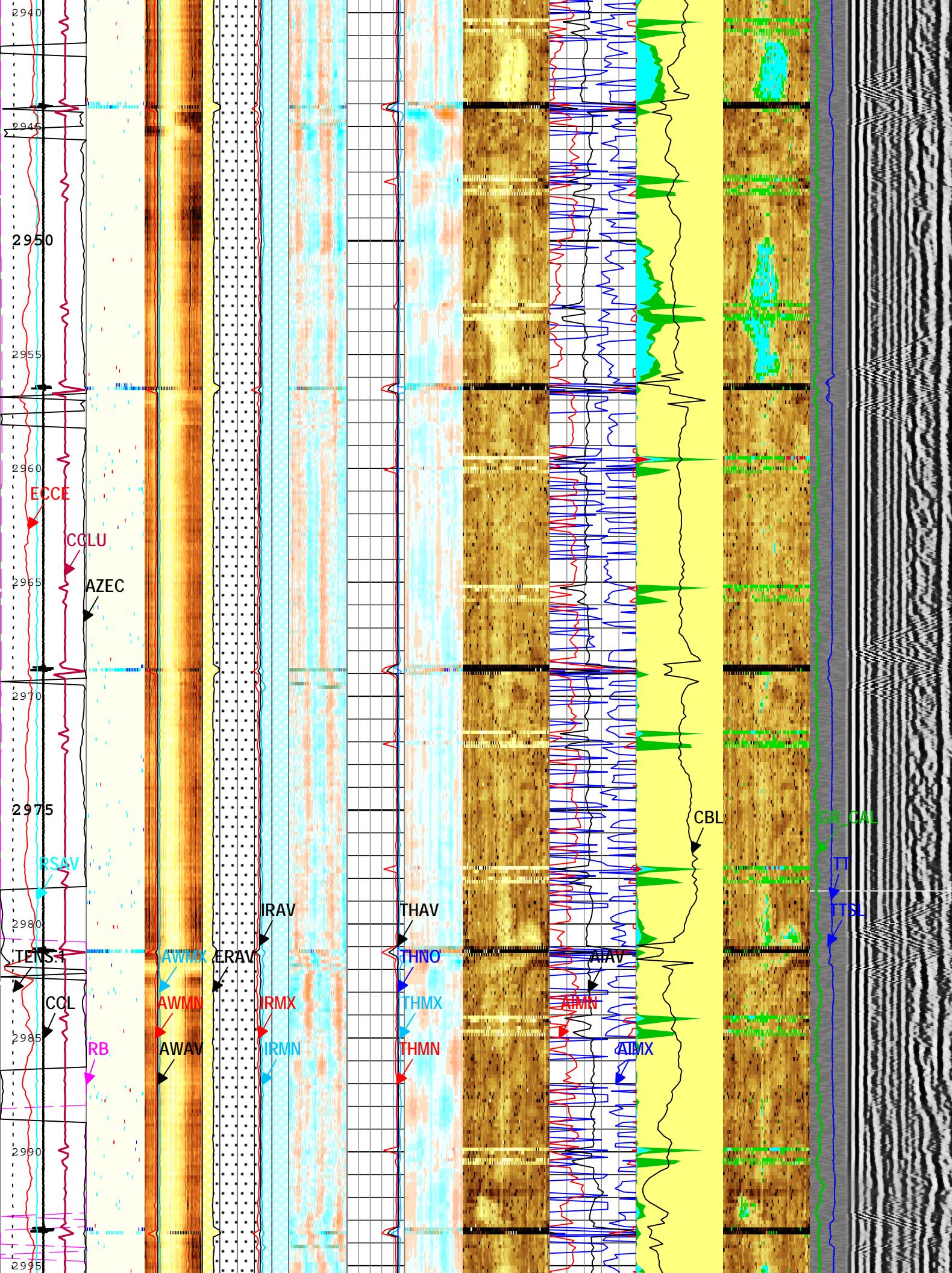


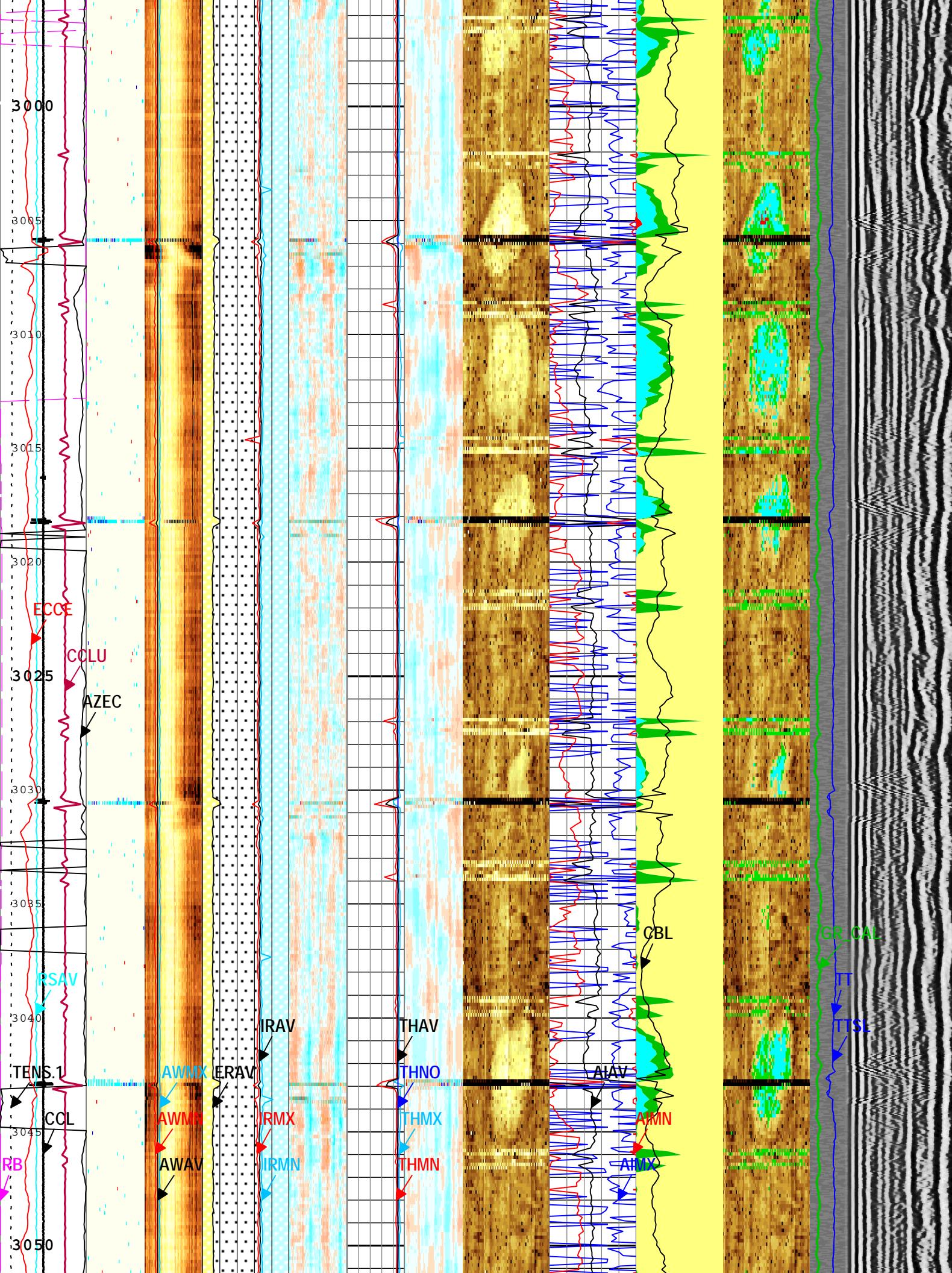


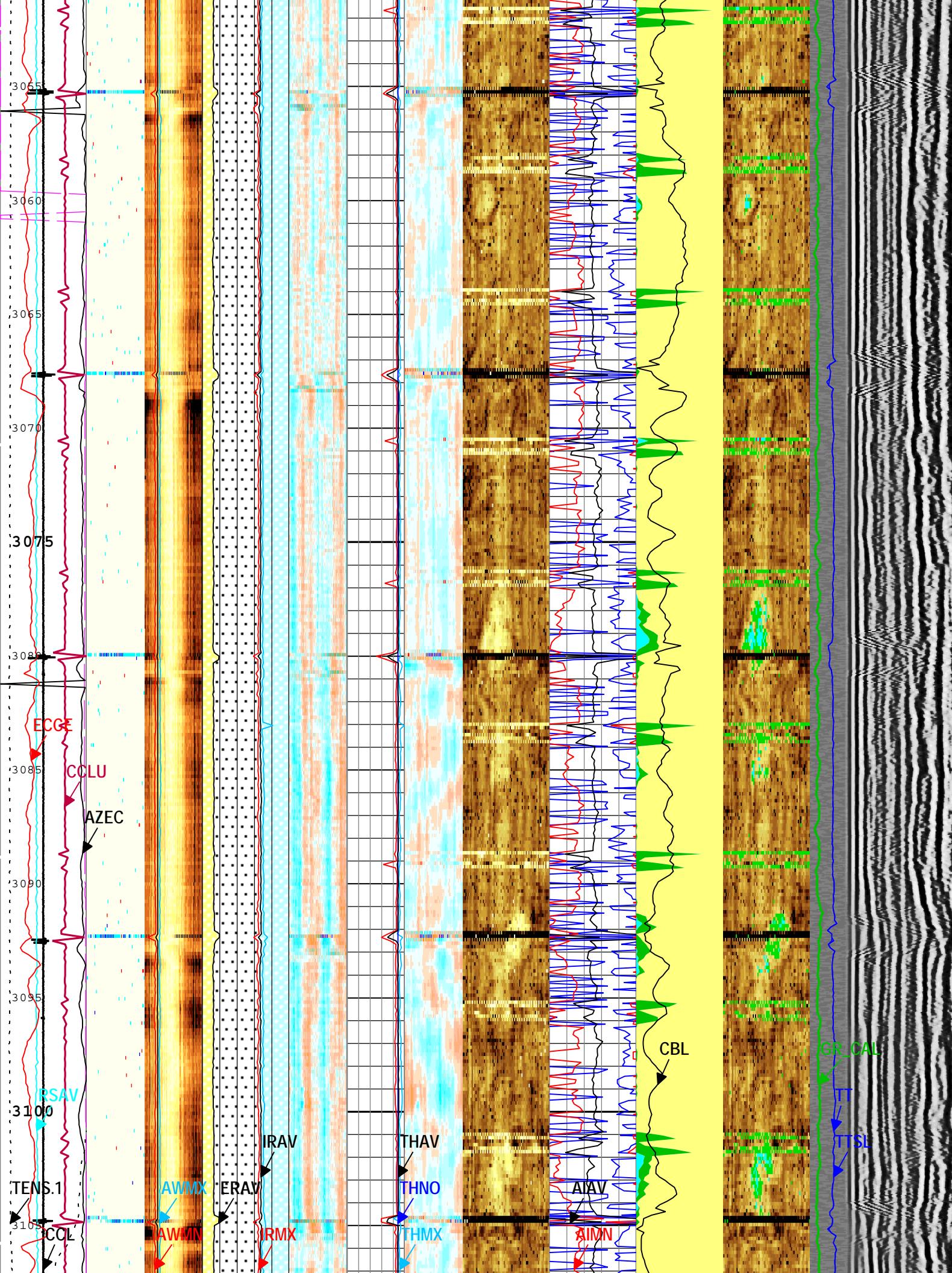


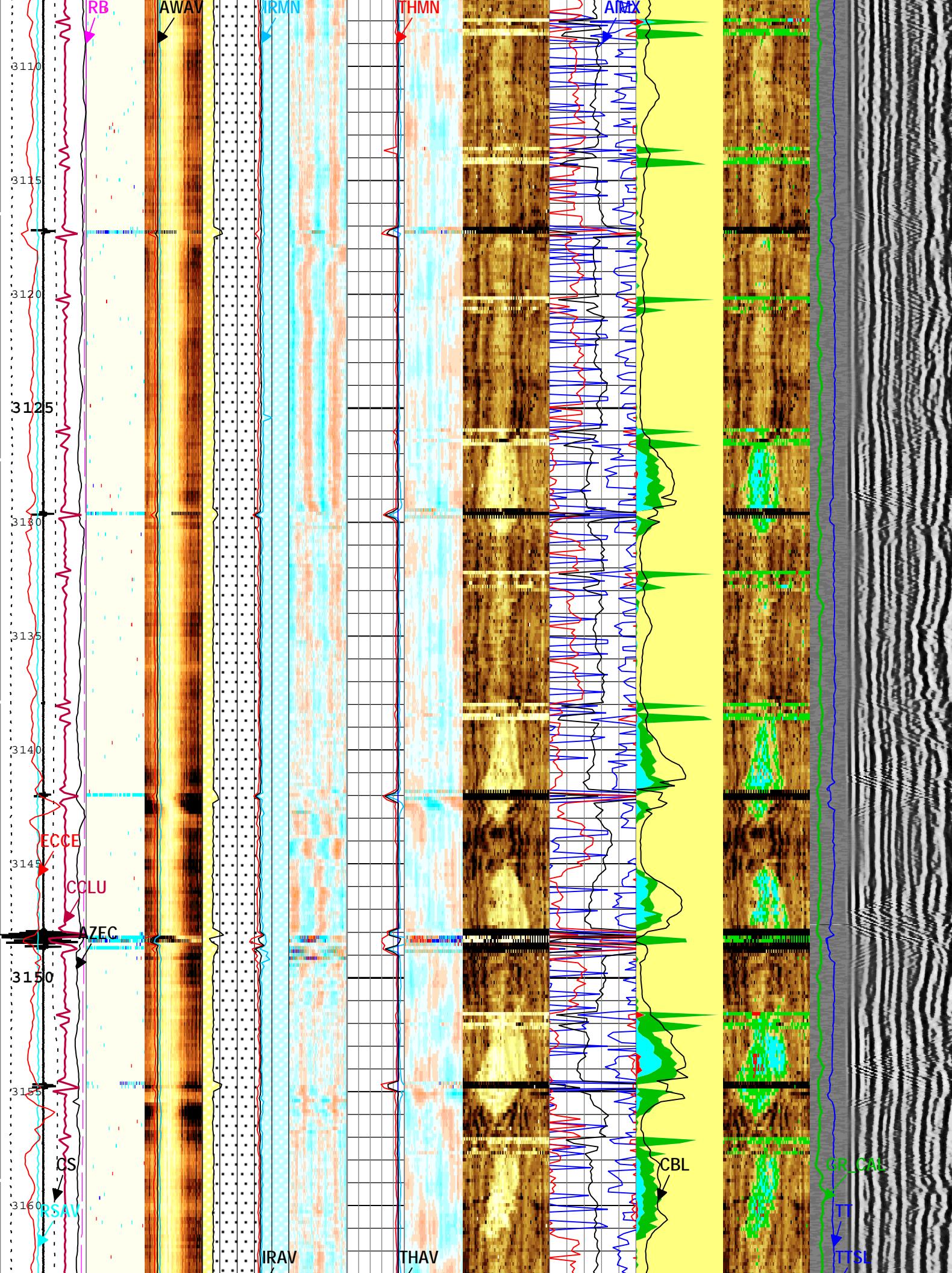


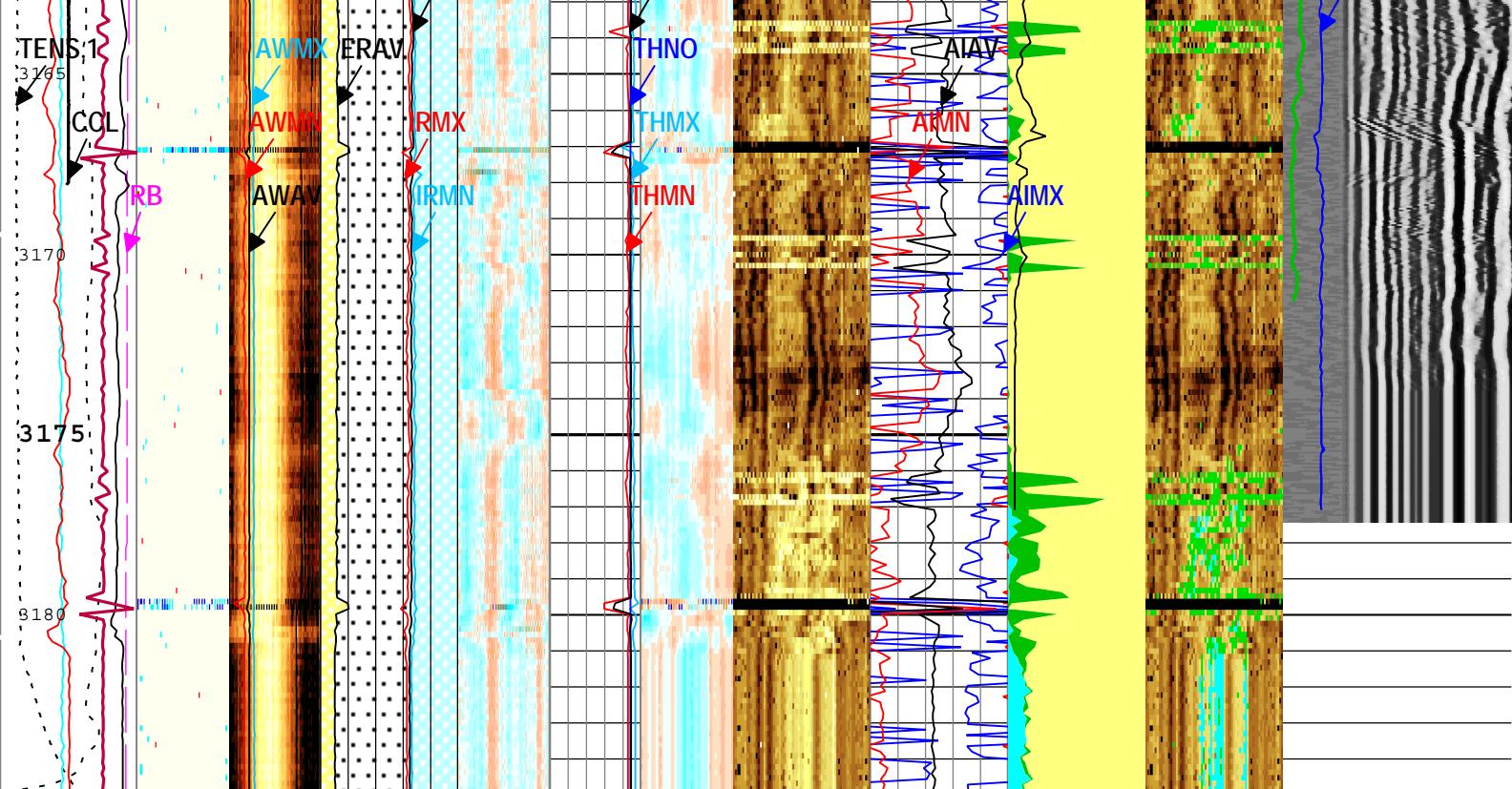












0 dB /5

Casing Collar  
Locator  
Ultrasonic  
(CCLU)  
USIT-E

-30 in 10

Amplitude of  
Eccentering  
(ECCE)  
USIT-E

0 in 0.5

TIME\_1900 - Time Marked every 60.00 (s)

USIT Processing Flags (UFLG[0]) USIT-E

- 1 - UFLG 1 Value within [0.0 - 1.5] - : █ UTIM Error
- 2 - UFLG 2 Value within [1.5 - 2.5] - : █ Pulse Origin Not Detected
- 3 - UFLG 3 Value within [2.5 - 3.5] - : █ WINLEN Error
- 4 - UFLG 4 UFLG 5 UFLG 6 Value within [3.5 - 6.5] - : █ Casing Thickness Error
- 5 - UFLG 7 UFLG 8 UFLG 9 Value within [6.5 - 10] - : █ Loop Processing Error

Description: USI Composite Format: Log (USI\_E\_CBL\_Composite\_60DEG) Index Scale: 1:200 Index Unit: m Index Type: Measured Depth Creation Date: 06-Jun-2013 23:20:20

## Channel Processing Parameters

Parameter	Description	Tool	Value	Unit
AFVU	Automatic Fluid Velocity Update	USIT-E	Off	
AMSG	Auxiliary Minimum Sliding Gate	DSLT-H	180	us
CBRA	CBL LQC Reference Amplitude in Free Pipe	DSLT-H	Depth Zoned	mV
CCL_MULTIPLIER	Casing Collar Locator Multiplier	CAL-YA	3	
CMCF	CBL Cement Type Compensation Factor	DSLT-H	Depth Zoned	
CMTY	Cement Type	USIT-E	Regular Cement	
CTHILGR	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	Depth Zoned	in
CYSTLGR	Casing Yield Strength - Zoned along logger depths	WLSESSION	Depth Zoned	psi
DETE	Delta-T Detection	DSLT-H	E1	
DTMD	Borehole Fluid Slowness	Borehole	233	us/ft
FCF	CBL Fluid Compensation Factor	DSLT-H	1	
IMAR	Image Rotation	USIT-E	RB	
MAHTR	Manual High Threshold Reference for first arrival detection	DSLT-H	120	
MCI	Minimum Cemented Interval for Isolation	DSLT-H	Depth Zoned	m
MNHTR	Minimum High Threshold Reference for first arrival detection	DSLT-H	100	
MSA	Minimum Sonic Amplitude	DSLT-H	Depth Zoned	mV
NMSG	Near Minimum Sliding Gate	DSLT-H	344	us
NMXG	Near Maximum Sliding Gate	DSLT-H	1026	us
RCTH	Reference Calibrator Thickness	USIT-E	0.295	in
SGAD	Sliding Gate Status	DSLT-H	Off	
TCUB	T^3 Processing Level	USIT-E	Loop	
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
UFGDE	Fiberglass Density	USIT-E	1.95	g/cm3
UFGPS	Fiberglass Processing Selection	USIT-E	No	
UFGVL	Fiberglass Velocity	USIT-E	2950	m/s
UTHDP	Thickness Detection Policy	USIT-E	Fundamental	
VCAS	Ultrasonic Transversal Velocity in Casing	USIT-E	51.4	us/ft
WLLEN	T^3 Processing Length	USIT-E	32.33	us

WLEN	1.51 Processing Length	USIT-E	52.00	us
ZCAS	Acoustic Impedance of Casing	USIT-E	46.25	Mrayl
ZCMT	Acoustic Impedance of Cement	DSLT-H	5.6	Mrayl
ZMUD	Acoustic Impedance of Mud	Borehole	1.59	Mrayl

## Depth Zone Parameters

Parameter	Value	Start ( m )	Stop ( m )
CBRA	53	2475.97	3185.01
CBRA	0	3185.01	3185.01
CMCF	0.68	2475.97	3185.01
CMCF	0	3185.01	3185.01
CTHILGR	0.79	2475.97	2568
CTHILGR	0.539	2475.97	3185.01
CYSTLGR	0	2475.97	2568
CYSTLGR	110000	2475.97	3185.01
MCI	6.96	2475.97	2568
MCI	4.52	2568	3185.01
MCI	0	3185.01	3185.01
MSA	3.67	2475.97	3185.01
MSA	0	3185.01	3185.01

All depth are actual.

## Tool Control Parameters

Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	40	dB
DDT5	USIC Downhole Decimation for T5 only (SPOOF)	USIT-E	0_NONE	
DSLT_MODE	DSLT Acquisition Mode	DSLT-H	CBL	
DSLT_RATE	DSLT Firing Rate	DSLT-H	15 Hz	
DTFS	DSLT Telemetry Frame Size	DSLT-H	536	
EMXV	EMEX Voltage	USIT-E	90	V
HRES	Horizontal Resolution	USIT-E	5 deg	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	1097.28	m/h
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
USI_UPAT	USIT Emission Pattern	USIT-E	Pattern 300 KHz	
USI_UWKM	USIT Working Mode	USIT-E	Uncompressed 5 deg at 6.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	3186	m
VRES	Vertical Resolution	USIT-E	6.0 in	
WINB	Window Begin Time	USIT-E	53.8	us
WINE	Window End Time	USIT-E	Time Zoned	us

## Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth ( m )	Stop Depth ( m )
WINE	128.79	05-Jun-2013 16:40:16	05-Jun-2013 16:41:17	3184.93	3177.06
WINE	120.39	05-Jun-2013 16:41:17	05-Jun-2013 17:24:48	3177.06	2492.79

All depth are at tool zero.

## USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(m)	Stop Depth(m)
Run 1	Log[6]:Up	3183.77	2722.51

Fluid Velocity : DTMD parameter used

Start Depth(m)	Stop Depth(m)	Start Value(us/ft)	End Value(us/ft)
0		233.00	233.00

#### **Mud Impedance : ZMUD parameter used**

Start Depth(m)	Stop Depth(m)	Start Value(Mrayl)	End Value(Mrayl)
0		1.59	1.59

1

## Repeat Pass

## Integration Summary

Output Channel(s)	Output Description	Input Parameter	Output Value	Unit
-------------------	--------------------	-----------------	--------------	------

## Software Version

Acquisition System	Version
MaxWell	3.1.9755.0
Application Patch	SP-20121221-3.1.9755.1574

Computation	Description	Version	
CEVAL	Sonic Cement Evaluation Computation Ensemble provides common Parameters and Channels	3.1.9755.1574	
Cementation	Cementation Computation Application	3.1.9755.0	
CORROSION Ensemble	CORROSION Ensemble	3.1.9755.0	
Tool Elements	Description	Software Version	Firmware Version
CAL-YA	Casing Anomaly Locator 3-3/8 in 31 Pin Heads	3.1.9755.0	
USI-SENSOR	USIT Transducer Element	3.1.9755.1574	DSP: v01.82
SGC-TB	Scintillation Gamma Cartridge	3.1.9755.0	
SLS-E	Sonic Logging Sonde E supports 3'-5'BHC DT and	3.1.9755.1574	4.0

Pass Summary

Pass Summary									
Run Name	Pass Objective	Direction	Top	Bottom	Start	Stop	Depth Shift	Include Parallel Data	
1	Log[6]:Up	Up	2722.51 m	3183.77 m	05-Jun-2013 2:57:31 PM	05-Jun-2013 3:33:49 PM	-1.40 m	true	

All depths are referenced to toolstring zero.

Log

1: Log[6]:Up

Description: USI Composite Format: Log ( USI\_E\_CBL\_Composite\_60DEG ) Index Scale: 1:200 Index Unit: m Index Type: Measured Depth Creation Date: 06-Jun-2013 22:20:27

Channel	Source	Sampling
AIAV	USIT-E:USR5:USI-SENSOR	6in
AIMN	USIT-E:USR5:USI-SENSOR	6in
AWAV	USIT-E:USR5:USI-SENSOR	6in
AWMN	USIT-E:USR5:USI-SENSOR	6in
AWMX	USIT-E:USR5:USI-SENSOR	6in
AZEC	USIT-E:USR5:USI-SENSOR	6in
CCL	CAL-YA:CAL-YA:CAL-YA	1in
CCLU	USIT-E:USR5:USI-SENSOR	6in
CEMR	USIT-E:USR5:USI-SENSOR	6in
CS	WLWorkflow	6in
AIMX	USIT-E:USR5:USI-SENSOR	6in
CBL	DSLT-H:SLS-E:SLS-E	6in
ECCE	USIT-E:USR5:USI-SENSOR	6in
ERAV	USIT-E:USR5:USI-SENSOR	6in
GASR	USIT-E:USR5:USI-SENSOR	6in

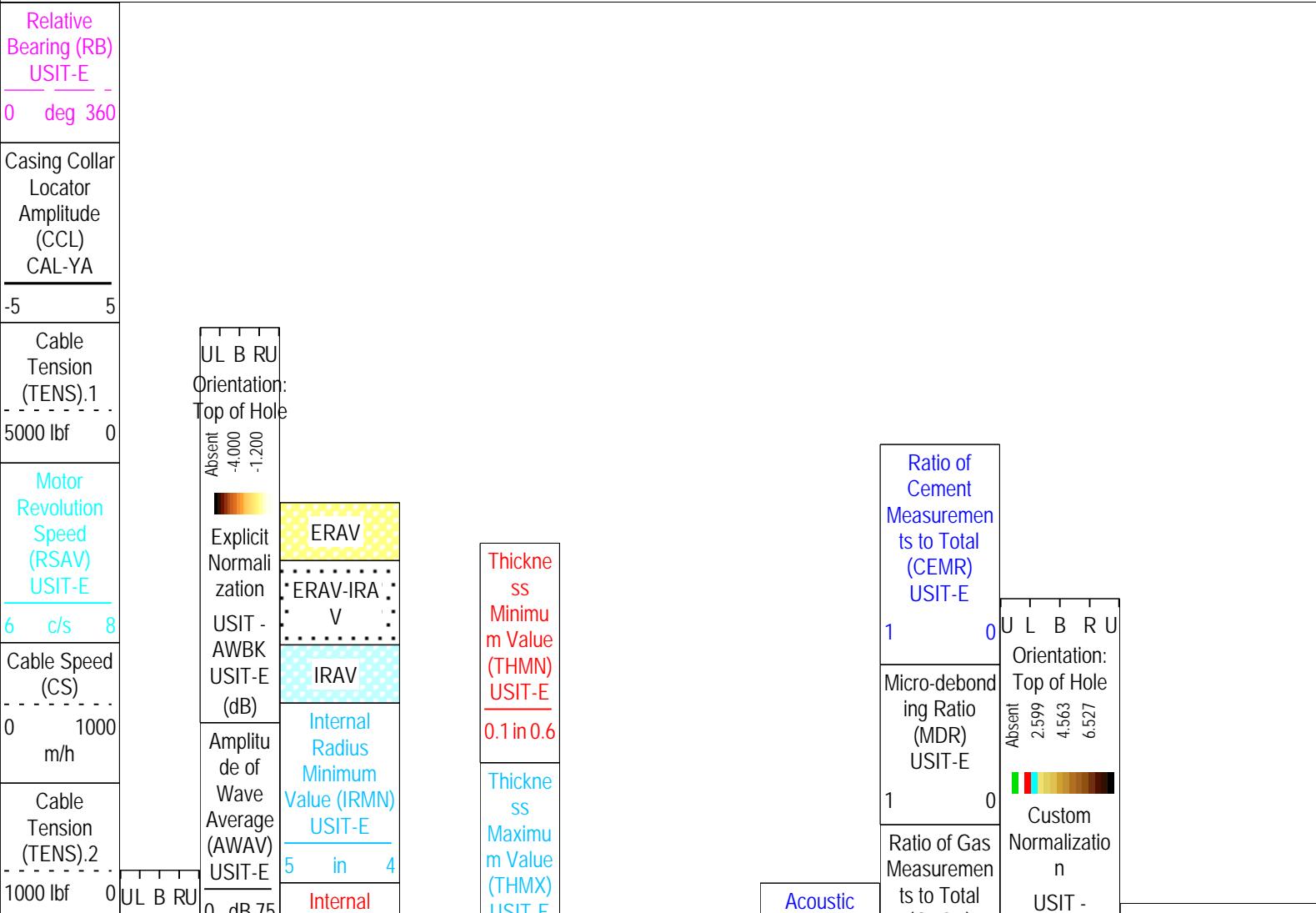
GR_CAL	SGT-N:SGT-N:SGC-TB	6in
IRAV	USIT-E:USR:USI-SENSOR	6in
IRMN	USIT-E:USR:USI-SENSOR	6in
IRMX	USIT-E:USR:USI-SENSOR	6in
MDR	USIT-E:USR:USI-SENSOR	6in
RB	USIT-E:USR:USI-SENSOR	6in
RSAV	USIT-E:USR:USI-SENSOR	6in
TENS.1	WLWorkflow	1in
TENS.2	WLWorkflow	6in
THAV	USIT-E:USR:USI-SENSOR	6in
THMN	USIT-E:USR:USI-SENSOR	6in
THMX	USIT-E:USR:USI-SENSOR	6in
THNO	USIT-E:USR:USI-SENSOR	6in
TIME_1900	WLWorkflow	0.1in
TT	DSLT-H:SLS-E:SLS-E	6in
TTSL	DSLT-H:SLS-E:SLS-E	6in
UFLG	USIT-E:USR:USI-SENSOR	6in

TIME\_1900 - Time Marked every 60.00 (s)

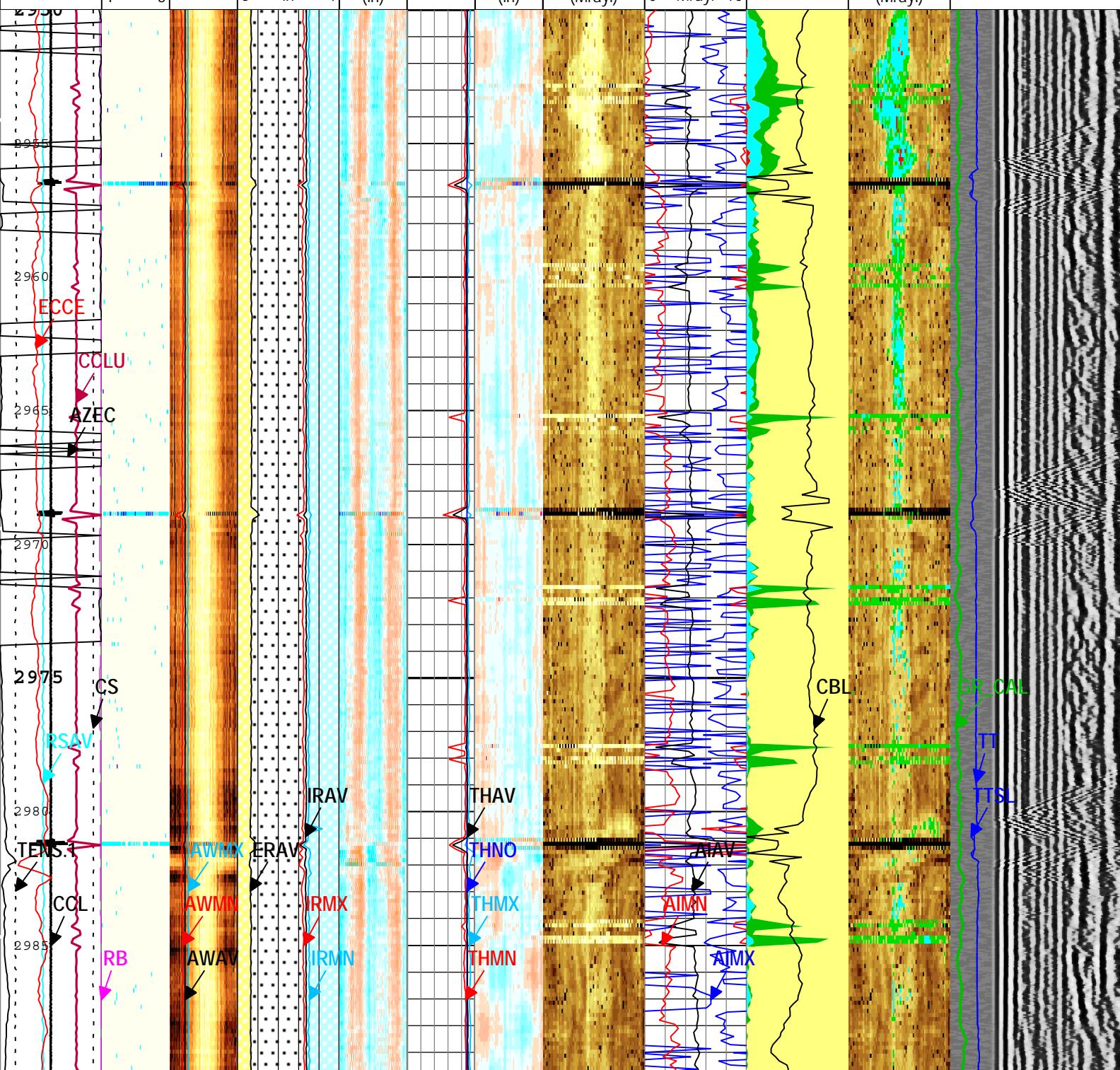
#### USIT Processing Flags (UFLG[0]) USIT-E

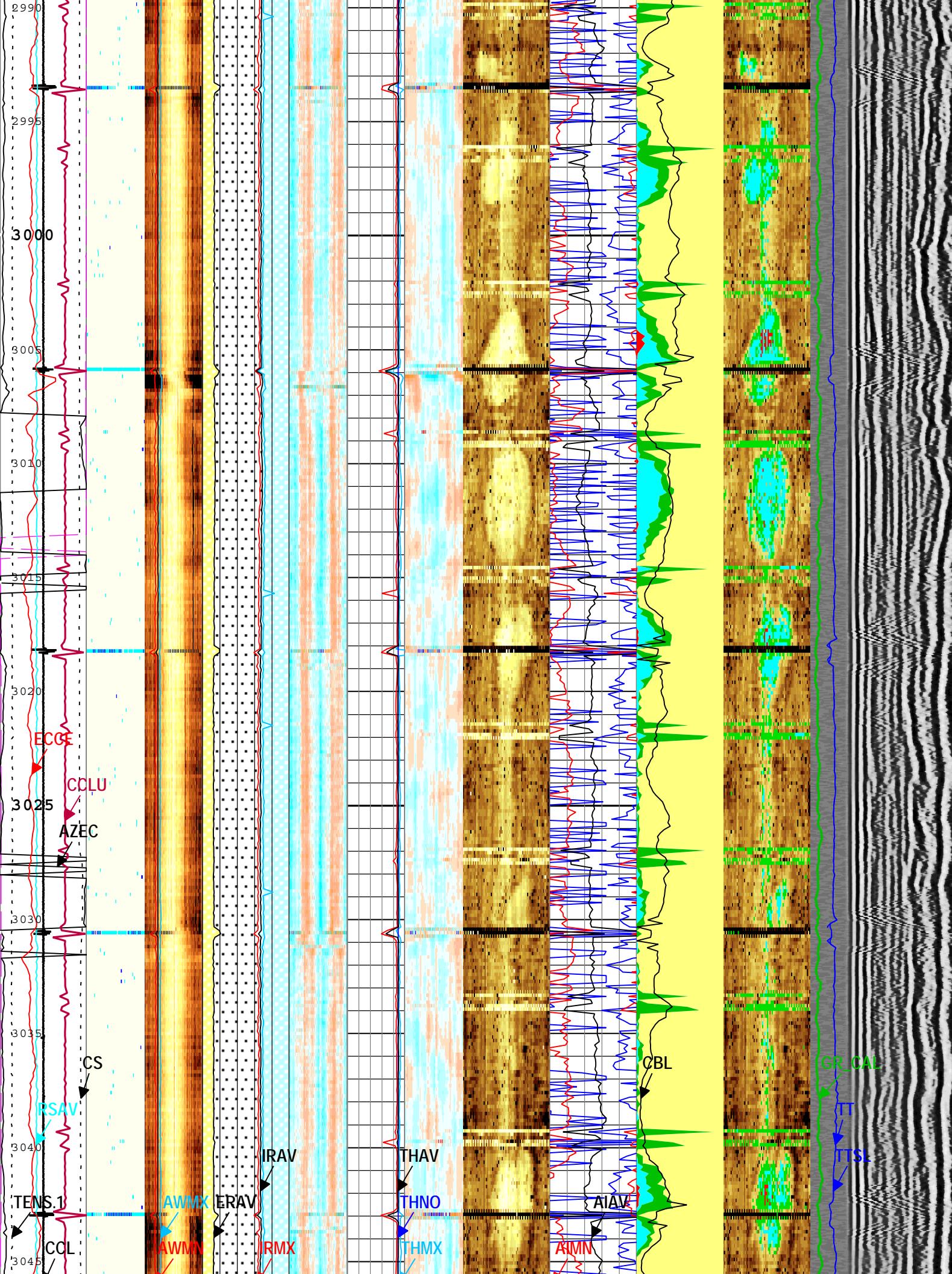
- 1 - UFLG 1 Value within [0.0 - 1.5] - :
- 2 - UFLG 2 Value within [1.5 - 2.5] - :
- 3 - UFLG 3 Value within [2.5 - 3.5] - :
- 4 - UFLG 4 UFLG 5 UFLG 6 Value within [3.5 - 6.5] - :
- 5 - UFLG 7 UFLG 8 UFLG 9 Value within [6.5 - 10] - :

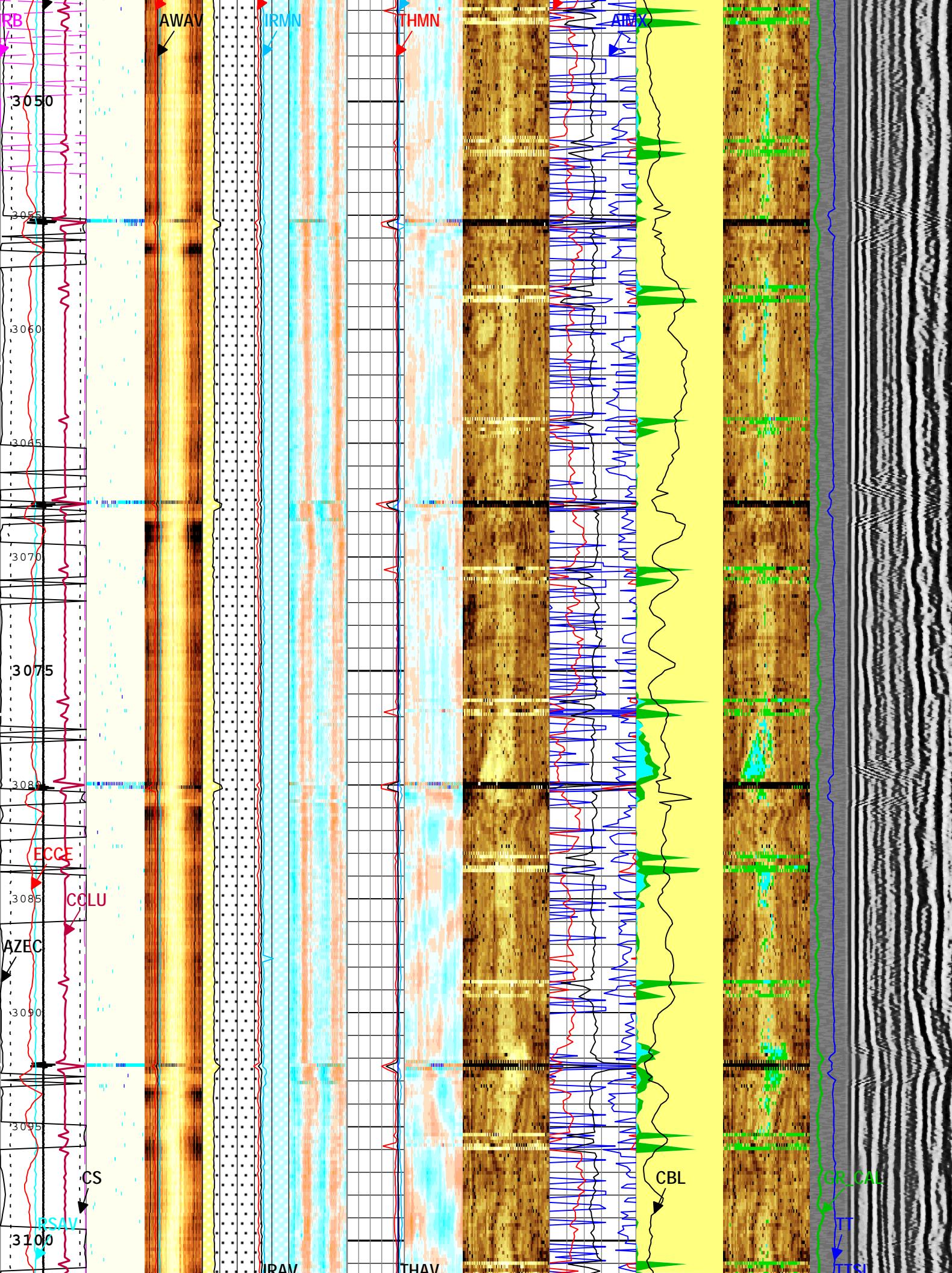
- UTIM Error
- Pulse Origin Not Detected
- WINLEN Error
- Casing Thickness Error
- Loop Processing Error

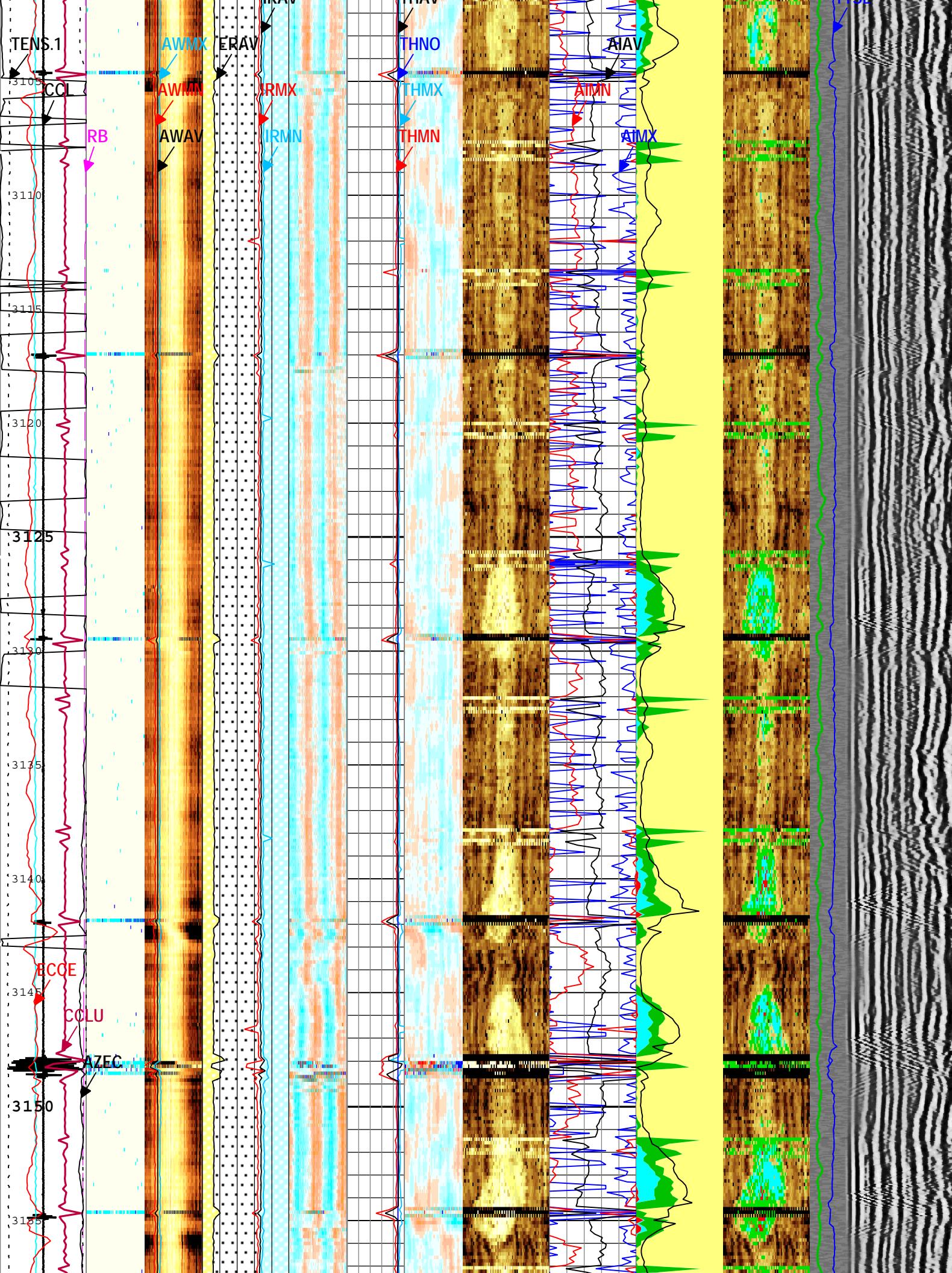


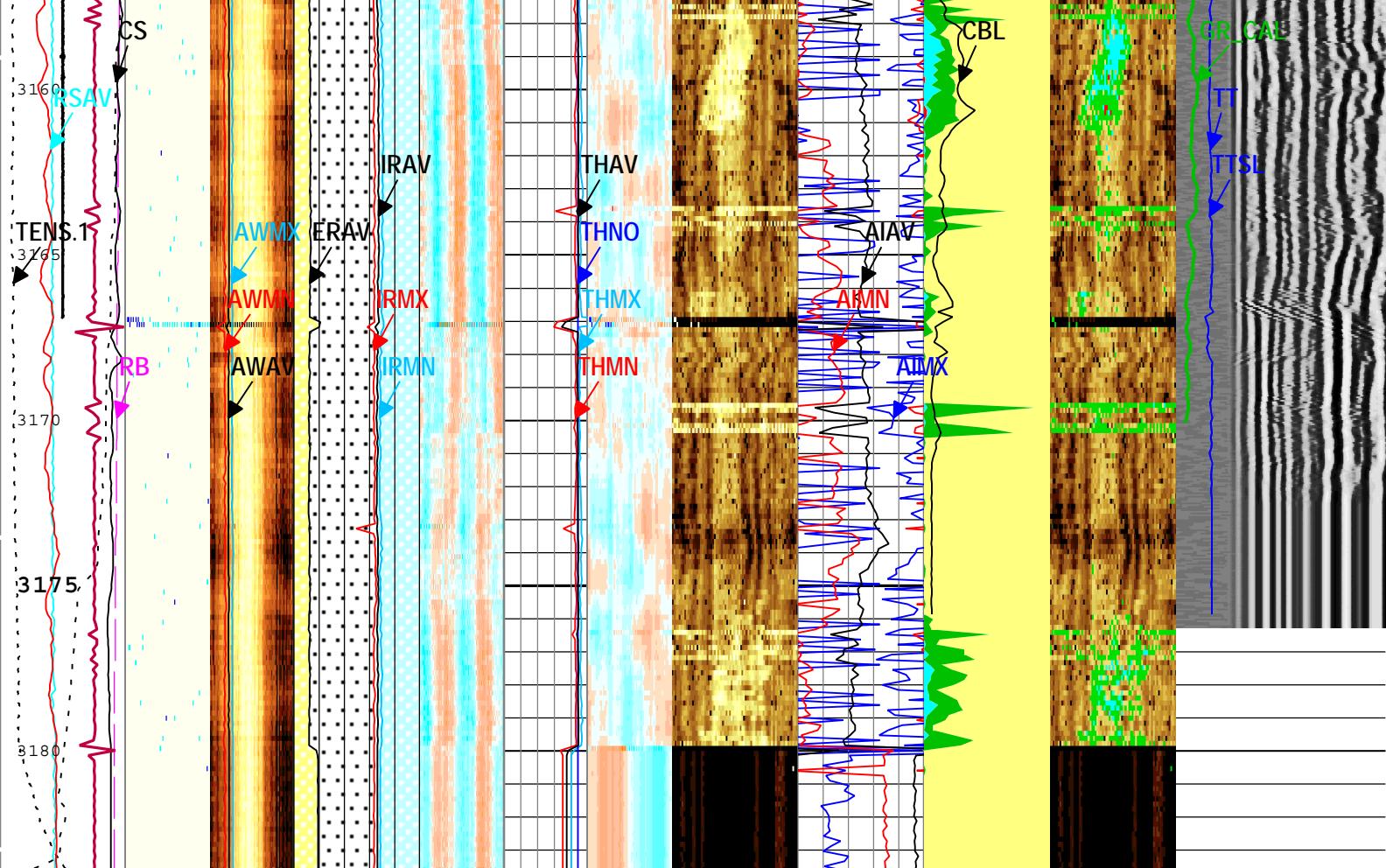
Azimuth of Eccentring (AZEC) USIT-E		Orientation Top of Hole	0 dB 75	Radius Maximum Value (IRMX) USIT-E	0.1 in 0.6	USIT-E	Impedance Maximum (AIMX) USIT-E	(GASR) USIT-E	AI_MDEBON D_IMG USIT-E (Mrayl)	Min Amplitude Max
Absent 2.500		Amplitude of Wave Minimum	5 in 4	Radius Maximum Value (IRMX) USIT-E	0.1 in 0.6	USIT-E	Impedance Maximum (AIMX) USIT-E	(GASR) USIT-E	AI_MDEBON D_IMG USIT-E (Mrayl)	Variable Density Log (VDL) DSLT-H
0 deg 360		Explicit Normalization (AWMN) USIT-E	UL B RU	Orientation Top of Hole	UL B RU	Orientation Top of Hole	Orientation Top of Hole	1 0	Bonded	200 us 1200
Casing Collar Locator Ultrasonic (CCLU) USIT-E	-30 in 10	Average (ERAV) USIT-E	External Radii Average (ERAV) USIT-E	Absent -0.028 0.035	Orientation Top of Hole	Orientation Top of Hole	Orientation Top of Hole	0 Mrayl 10	Gas	Transit Time (Sliding Gate) (TTSL) DSLT-H
Amplitude of Eccentring (ECCE) USIT-E	0 in 0.5	Amplitude of Wave Maximum (AWMX) USIT-E	5 in 4	Thickness Average Value (IRAV) USIT-E	0.1 in 0.6	Thickness Average Value (THAV) USIT-IRBK USIT-E	Explicit Normalization	0 Mrayl 10	Liquid	400 us 200
USIT Processing Flags (UFLG[0]) USIT-E		Internal Radius Averaged Value (IRAV) USIT-E	USIT - IRBK USIT-E	Custom Normalization	Custom Normalization	Custom Normalization	Acoustic Impedance Average (AIAV) USIT-E	Micro-debonding	Transit Time for CBL (TT) DSLT-H	400 us 200
0		0.5	0 dB 75	0.1 in 0.6 (in)	0.1 in 0.6 (in)	0.1 in 0.6 (in)	0 Mrayl 10 (Mrayl)	CBL Amplitude (CBL) DSLT-H	Calibrated Gamma Ray (GR_CAL) SGT-N	0 gAPI 150













### USIT Processing Flags (UFLG[0]) USIT-E

- 1 - UFLG 1 Value within [0.0 - 1.5] - : █ UTIM Error
- 2 - UFLG 2 Value within [1.5 - 2.5] - : █ Pulse Origin Not Detected
- 3 - UFLG 3 Value within [2.5 - 3.5] - : █ WINLEN Error
- 4 - UFLG 4 UFLG 5 UFLG 6 Value within [3.5 - 6.5] - : █ Casing Thickness Error
- 5 - UFLG 7 UFLG 8 UFLG 9 Value within [6.5 - 10 ] - : █ Loop Processing Error

TIME\_1900 - Time Marked every 60.00 (s)

Description: USI Composite Format: Log ( USI\_E\_CBL\_Composite\_60DEG ) Index Scale: 1:200 Index Unit: m Index Type: Measured Depth Creation Date: 06-Jun-2013 23:20:37

## Channel Processing Parameters

Parameter	Description	Tool	Value	Unit
AFVU	Automatic Fluid Velocity Update	USIT-E	Off	
AMSG	Auxiliary Minimum Sliding Gate	DSLT-H	180	us
CBRA	CBL LQC Reference Amplitude in Free Pipe	DSLT-H	Depth Zoned	mV
CCL_MULTIPLIER	Casing Collar Locator Multiplier	CAL-YA	3	
CMCF	CBL Cement Type Compensation Factor	DSLT-H	Depth Zoned	
CMTY	Cement Type	USIT-E	Regular Cement	
CTHILGR	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.539	in
CYSTLGR	Casing Yield Strength - Zoned along logger depths	WLSESSION	110000	psi
DETE	Delta-T Detection	DSLT-H	E1	
DTMD	Borehole Fluid Slowness	Borehole	233	us/ft
FCF	CBL Fluid Compensation Factor	DSLT-H	1	
IMAR	Image Rotation	USIT-E	RB	
MAHTR	Manual High Threshold Reference for first arrival detection	DSLT-H	120	
MCI	Minimum Cemented Interval for Isolation	DSLT-H	Depth Zoned	m
MNHTR	Minimum High Threshold Reference for first arrival detection	DSLT-H	100	
MSA	Minimum Sonic Amplitude	DSLT-H	Depth Zoned	mV
NMSG	Near Minimum Sliding Gate	DSLT-H	344	us
NMXG	Near Maximum Sliding Gate	DSLT-H	1026	us
RCTH	Reference Calibrator Thickness	USIT-E	0.295	in
SGAD	Sliding Gate Status	DSLT-H	Off	
TCUB	T^3 Processing Level	USIT-E	Loop	
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
UFGDE	Fiberglass Density	USIT-E	1.95	g/cm3
UFGPS	Fiberglass Processing Selection	USIT-E	No	

UFGVL	Fiberglass Velocity	USIT-E	2950	m/s
UTHDP	Thickness Detection Policy	USIT-E	Fundamental	
VCAS	Ultrasonic Transversal Velocity in Casing	USIT-E	51.4	us/ft
WLEN	T^3 Processing Length	USIT-E	30	us
ZCAS	Acoustic Impedance of Casing	USIT-E	46.25	Mrayl
ZCMT	Acoustic Impedance of Cement	DSLT-H	5.6	Mrayl
ZMUD	Acoustic Impedance of Mud	Borehole	1.59	Mrayl

## Depth Zone Parameters

Parameter	Value	Start ( m )	Stop ( m )
CBRA	53	2950	3183.79
CBRA	0	3183.79	3183.79
CMCF	0.68	2950	3183.79
CMCF	0	3183.79	3183.79
MCI	4.52	2950	3183.79
MCI	0	3183.79	3183.79
MSA	3.67	2950	3183.79
MSA	0	3183.79	3183.79

All depth are actual.

## Tool Control Parameters

Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	40	dB
DDT5	USIC Downhole Decimation for T5 only (SPOOF)	USIT-E	0_NONE	
DSLTD_MODE	DSLT Acquisition Mode	DSLT-H	CBL	
DSLTD_RATE	DSLT Firing Rate	DSLT-H	15 Hz	
DTFS	DSLT Telemetry Frame Size	DSLT-H	536	
EMXV	EMEX Voltage	USIT-E	90	V
HRES	Horizontal Resolution	USIT-E	5 deg	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	1097.28	m/h
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
USI_UPAT	USIT Emission Pattern	USIT-E	Pattern 300 KHz	
USI_UWKM	USIT Working Mode	USIT-E	Uncompressed 5 deg at 6.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	3185	m
VRES	Vertical Resolution	USIT-E	6.0 in	
WINB	Window Begin Time	USIT-E	51.86	us
WINE	Window End Time	USIT-E	117.39	us

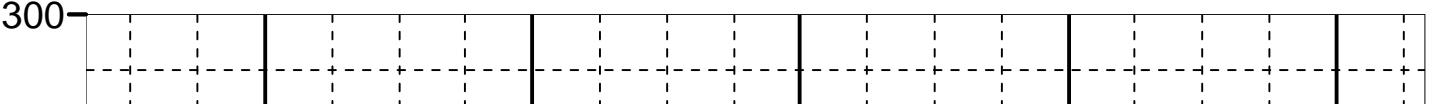
XYZ

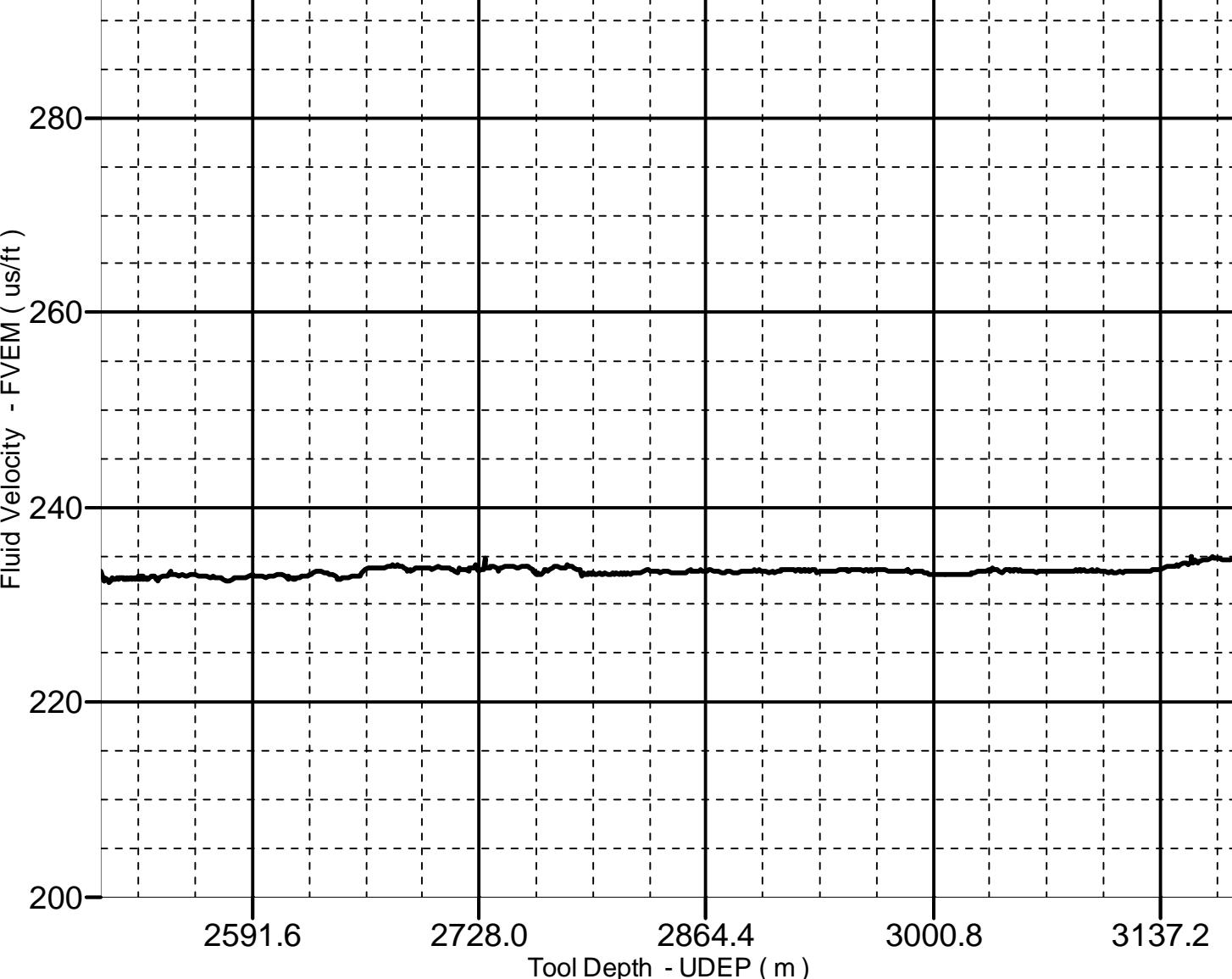
1: Log[3]:Down

## Fluid Acoustic Slowness vs Depth 2D Cross Plot

Index Range: From 2500.00 to 3200.00 m

— UDEP-FVEM

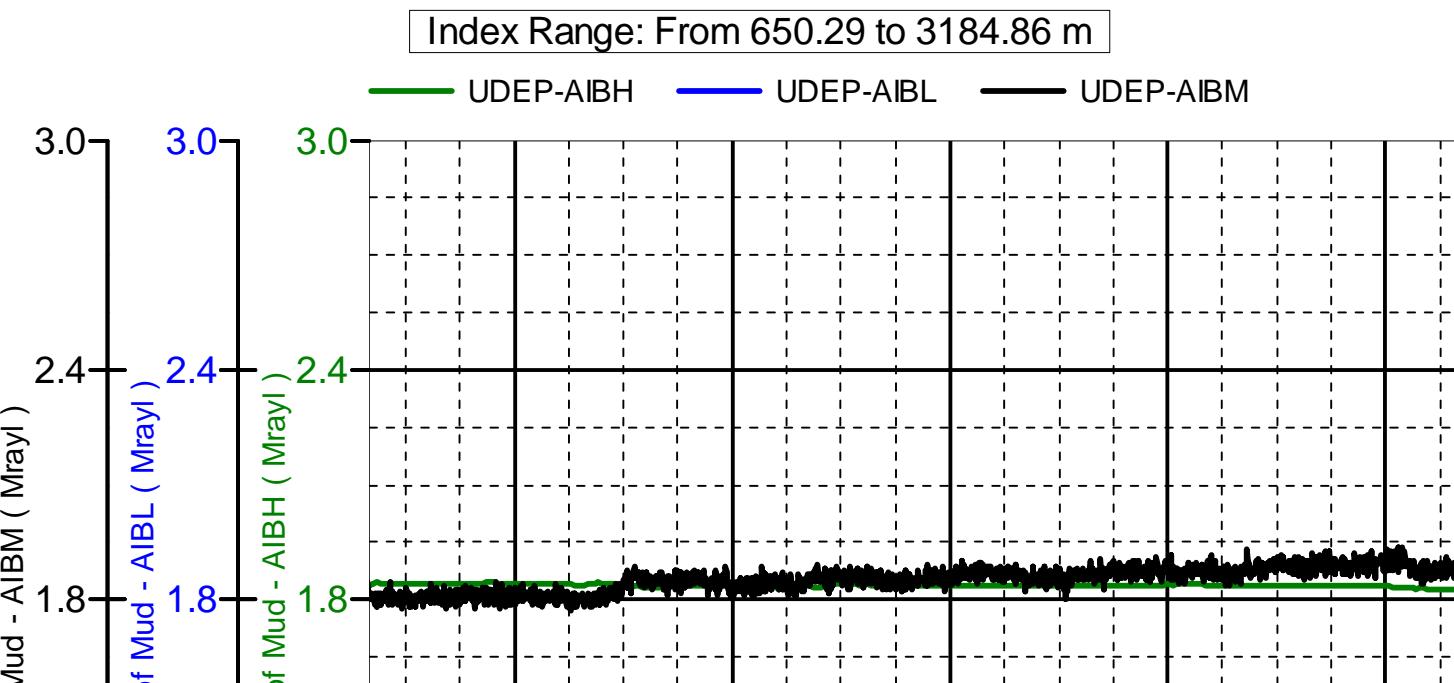


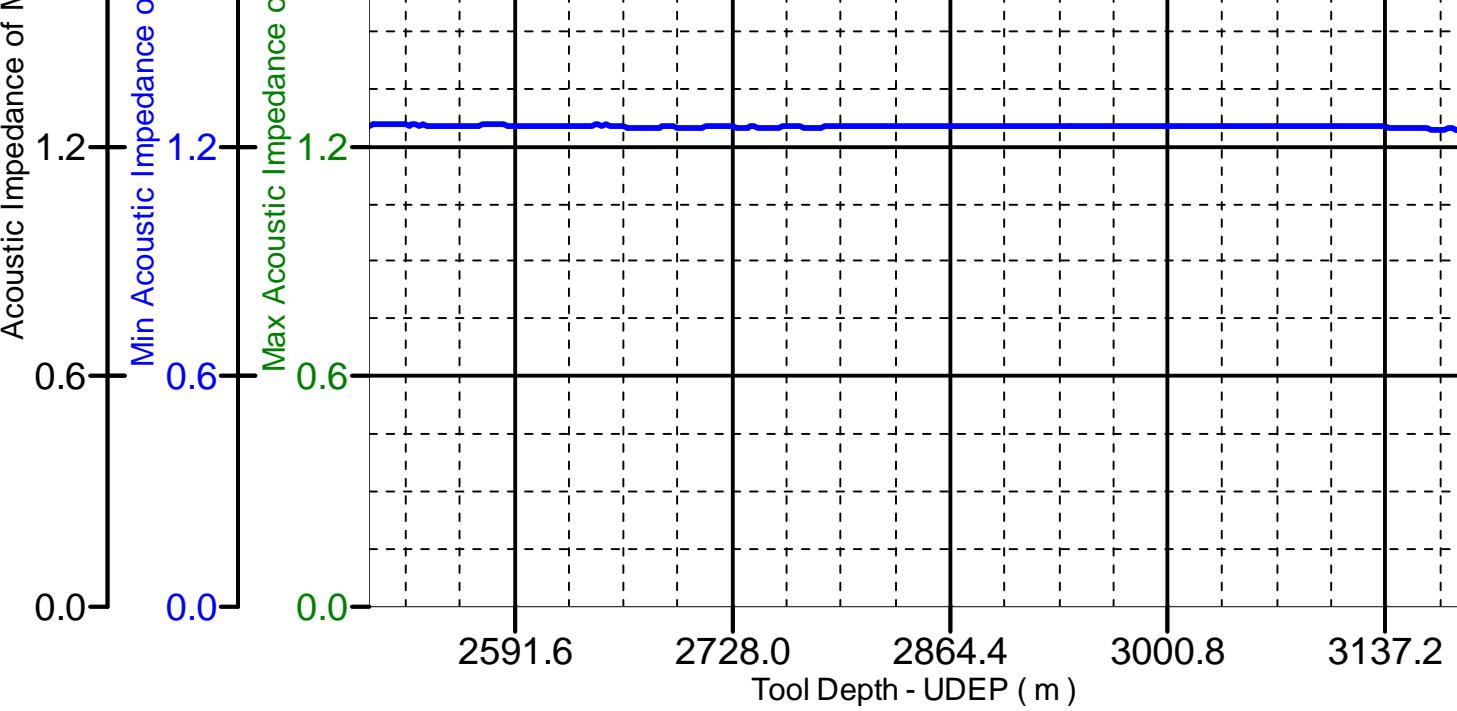


XYZ 1: Log[3]:Down

## Theoretical Acoustic Impedance of Mud vs Depth

### 2D Cross Plot





## Calibration Report

### DSLT-H (Digitizing Sonic Logging Tool - H) Calibration - Run 1

Primary Equipment :

Sonic Logging Sonde E supports 3'-5'BHC DT and CBL/VDL SLS-E 2131

### CBL Normalization - CBL Accumulations

Master (Measured): 14:18:15 25-Jan-2013

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Upper Far Amplitude		Master	4200.0	3200.0	3835.7		
Upper Near Raw Amplitude	mV	Master	33.000	27.000	40.980	43.000	
Lower Far Amplitude		Master	4200.0	3200.0	3442.4		
Lower Near Raw Amplitude	mV	Master	46.000	27.000	35.319	68.000	

### CBL Normalization - CBL/VDL Coefficients

Master (Measured): 14:18:15 25-Jan-2013

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
CBL Correction Factor for UT		Master	3.500	2.700	2.831	4.300	
CBL Correction Factor for LT		Master	2.500	1.700	3.284	4.300	
VDL Ratio between UT and LT for CBLB Mode		Master			0.897		

### CBL Free Pipe Adjustment - Free Pipe Measurement

Before (Manual Entry): 17:44:39 05-Jun-2013

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
CBL Amplitude - 0	mV	Before	----	----	----	----	
CBL Reference Amplitude (CBRA) - 0	mV	Before	----	----	----	----	
Measurement Depth - 0	m	Before	----	----	----	----	

### CBL Free Pipe Adjustment - CBL Amplitude Coefficient

Before (Manual Entry): 17:44:39 05-Jun-2013

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
CBL Adjustment Factor		Before	1.000	0.200	1.030	5.000	
Depth of Before Calibration	m	Before			2493.198		

### SGT-N (Scintillation Gamma-Ray Tool) Calibration - Run 1

Primary Equipment :

Scintillation Gamma Cartridge SGC-TB 10479

Calibration Parameter :

Plus Reference

### SGT-N Gamma-Ray Calibration - Gamma Ray Coefficients

Before:				After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Gain		Before After After-Before	---	---	---	---	NOT DONE
			---	---	---	---	

### SGT-N Gamma-Ray Calibration - Gamma Ray Accumulations

Before:				After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Zero Measurement - 0	gAPI	Before After After-Before	---	---	---	---	NOT DONE
			---	---	---	---	
RGR Plus Measurement	gAPI	Before After After-Before	---	---	---	---	NOT DONE NOT DONE
			---	---	---	---	

### SGT-N Gamma-Ray Plateau Check - Gamma Ray Plateau Check

Before:				After:			
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Plus Plateau Measurement - 0	gAPI	Before After After-Before	---	---	---	---	NOT DONE
			---	---	---	---	
RGR Minus Plateau Measurement - 0	gAPI	Before After After-Before	---	---	---	---	NOT DONE
			---	---	---	---	

### ACTS-B (Auxiliary Compression Tension Sub - B (Only external acquisition supported)) Calibration - Run 1

Primary Equipment :	Auxiliary Compression Tension Sub - B (Only external acquisition supported)	ACTS-B	990
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### HTEN Master Calibration - HTEN Master Calibration

Master:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
HTEN Shop Gain		Master	1.000	0.800	NOT DONE	4.500	

### HTEN Before Calibration - HTEN Before Calibration

Before (Measured):	11:41:50 05-Jun-2013						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RHTE Zero Measurement	lbf	Before	0	-300.000	-83.815	300.000	
RHTE Plus Measurement	lbf	Before	1014.040	861.934	796.474	1166.146	
HTEN Gain		Before	2.650	0.800	1.152	4.500	
HTEN Offset	lbf	Before	0	-1000.000	96.550	1000.000	

### CAL-YA (Casing Anomaly Locator 3-3/8 in 31 Pin Heads) Calibration - Run 1

Primary Equipment :	Casing Anomaly Locator 3-3/8 in 31 Pin Heads	CAL-YA	878
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### CCL Amplitude Normalization - CCL Normalization Gain and Offset

Before (Measured):	12:06:24 05-Jun-2013						
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Normalization Gain		Before			0.430		
Normalization Offset	V	Before			-0.005		

### LEH-QT (Logging Equipment Head - QT, 3-3/8 inch 31 pin HPHT with Tension Sensor) Calibration - Run 1

Primary Equipment :	Logging Equipment Head - QT, 3-3/8 inch 31 pin HPHT with Tension Sensor	LEH-QT	3005
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### HTEN Master Calibration - HTEN Master Calibration

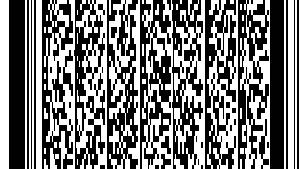
Master:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
HTEN Shop Gain		Master	1.000	0.800	NOT DONE	4.500	
HTEN Shop Offset	lbf	Master	0	-1000.000	NOT DONE	1000.000	

HTEN Before Calibration - HTEN Before Calibration							
Before:							
Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RHTE Zero Measurement - 0	lbf	Before	----	----	----	----	
RHTE Plus Measurement - 0	lbf	Before	----	----	----	----	
HTEN Gain - 0		Before	----	----	----	----	
HTEN Offset - 0	lbf	Before	----	----	----	----	

<b>Company:</b>	Statoil
<b>Well:</b>	15/9-F-11 B
<b>Field:</b>	Volve
<b>Rig Name:</b>	Maersk Inspirer
<b>State:</b>	
<b>Country:</b>	Norway



Ultrasonic Imaging Tool-Cement Bond Log

**Schlumberger**    USIT-CBL-GR-CCL

05-June-2013 Scale: 1/200