

Company: Kerr McGee Oil &amp; Gas Onshore LP

Well: Butterball 36N-10HZ

Field: WATTENBERG

County: WELD State: COLORADO

## Ultrasonic Imager

## Cement Evaluation

## Gamma Ray - CCL Log

County:	WELD			
Field:	WATTENBERG			
Location:	687' FNL & 1489' FEL			
Well:	Butterball 36N-10HZ			
Company:	Kerr McGee Oil & Gas Onshore LP			
Location:		687' FNL & 1489' FEL AT SURFACE.	Elev.:	K.B. 4938.00 ft G.L. 4922.00 ft D.F. 4937.00 ft
		Permanent Datum:	Ground Level	Elev.:
		Log Measured From:	Kelly Bushing	16.00 ft
		Drilling Measured From:	Kelly Bushing	above Perm.Datum
API Serial No.		Section:	Township:	Range:
05-123-40987-0000		10	2N	67W

Logging Date 07-May-2015

Run Number ONE

Depth Driller 12894.00 ft

Schlumberger Depth 7604.00 ft

Bottom Log Interval 7604.00 ft

Top Log Interval 19.00 ft

Casing Fluid Type Water

Salinity

Density 11 lbm/gal

Fluid Level 0.00 ft

BIT/CASING/TUBING STRING

Bit Size 7.88 in

From 1155.00 ft

To 7604.00 ft

Casing/Tubing Size 5.5 in

Weight 17 lbm/ft

Grade J55

From 0.00 ft

To 12882.00 ft

Max Recorded Temperatures 224.85 degF

Logger on Bottom 07-May-2015 12:25:00

Unit Number 3022 Location: FORT MORGAN, C

Recorded By Peter Brookens

Witnessed By Van Franke

## Disclaimer

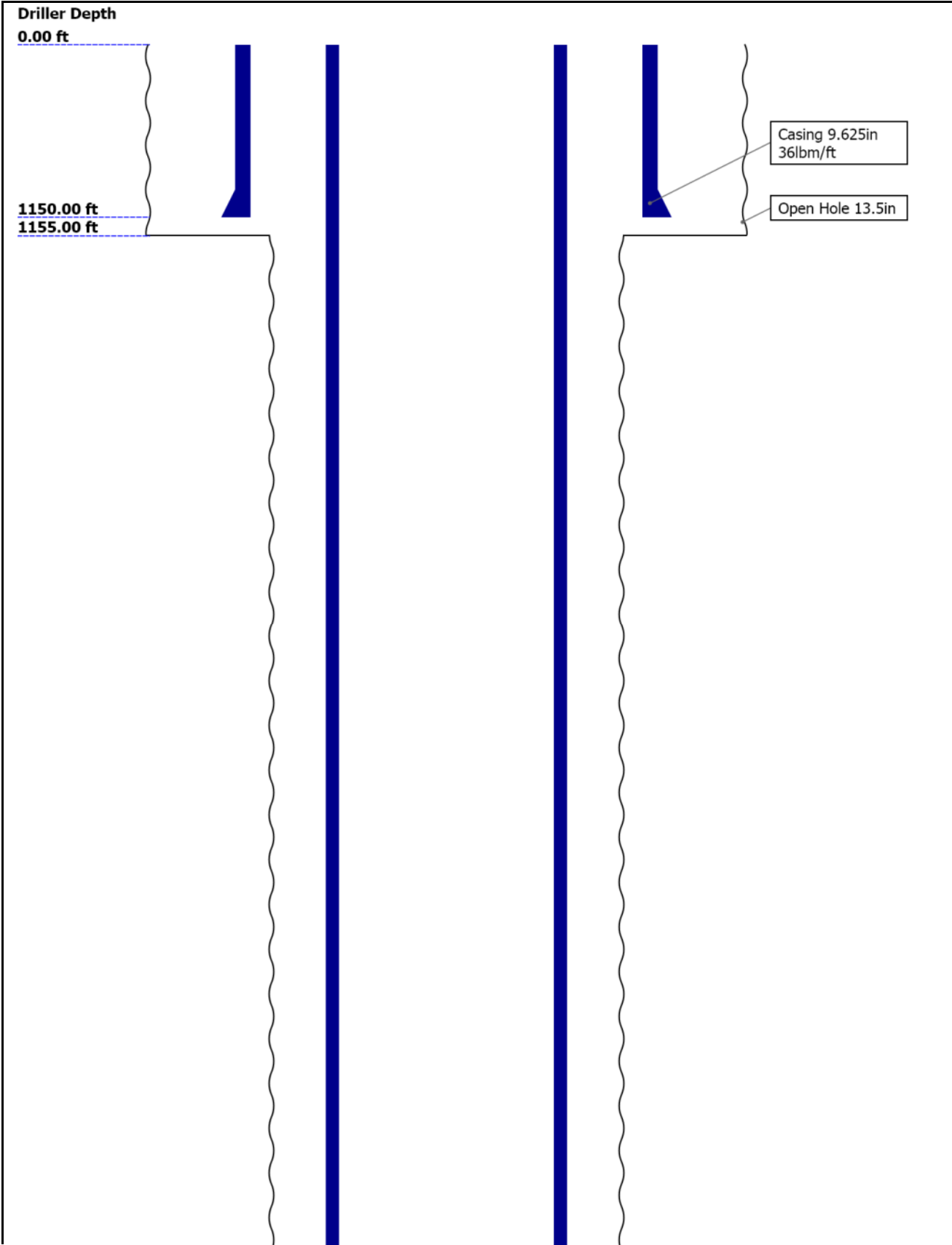
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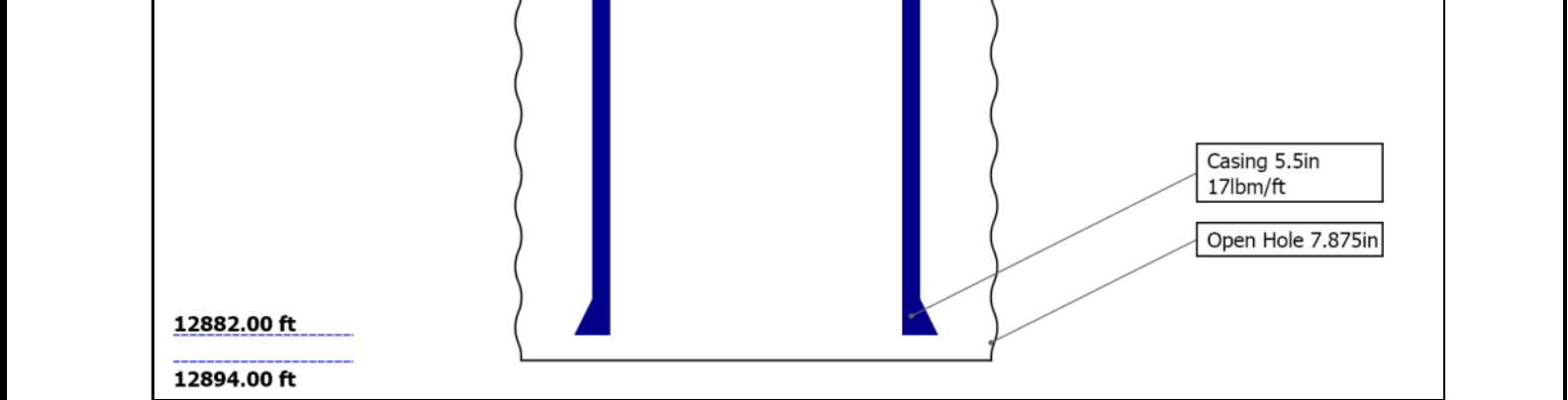
## Contents

- Header
- Disclaimer
- Contents
- Well Sketch
- Borehole Size/Casing/Tubing Record
- Operational Run Summary
- Remarks and Equipment Summary
- Depth Summary
- Import (2) of USI Cement
  - USI Fluid Properties Measurement
  - USI Cement
  - Parameter Listing
- Import (3) of USI Goodwin
  - USI Goodwin
- Import (2) of USI Cement
  - USI Cement
  - Parameter Listing

- 12. Xyz ( Import (2) of USI Fluid Acoustic Slowness vs Depth 3.0 in )
- 13. Xyz ( Import (2) of USI Acoustic Impedance of Mud vs Depth 3.0 in )
- 14. Tail

Well Sketch





## Borehole Size/Casing/Tubing Record

Bit						
Bit Size ( in )	13.5	7.875				
Top Driller ( ft )	0	1155				
Top Logger ( ft )	0	1155				
Bottom Driller ( ft )	1155	12894				
Bottom Logger ( ft )	1155	7604				
Casing						
Size ( in )	9.625	5.5				
Weight ( lbm/ft )	36	17				
Inner Diameter ( in )	8.921	4.892				
Grade	J55	J55				
Top Driller ( ft )	0	0				
Top Logger ( ft )	0	0				
Bottom Driller ( ft )	1150	12882				
Bottom Logger ( ft )	1150	12882				

## Operational Run Summary

Parameter ( unit )	ONE					
Date Log Started	07-May-2015					
Time Log Started	11:12:40					
Date Log Finished	07-May-2015					
Time Log Finished	13:42:18					
Top Log Interval ( ft )	19.00					
Bottom Log Interval ( ft )	7604.00					
Total Depth ( ft )	12889.00					
Max Hole Deviation ( deg )	0.00					
Azimuth of Max Deviation ( deg )	0.00					
Bit Size ( in )	7.875					
Logging Unit Number	3022					
Logging Unit Location	FORT MORGAN, COLORADO					
Recorded By	Peter Brookens					

Witnessed By	Van Franke					
Service Order Number	D7FE-00013					

## Remarks and Equipment Summary

[illegible]

## Depth Summary

		ONE		
<b>Depth Measuring Device</b>				
Type	IDW-JA			
Serial Number	7234			
Calibration Date	13-Feb-2015			
Calibrator Serial Number	16			
Calibration Cable Type	7-39 PLXS			
Wheel Correction 1	-4			
Wheel Correction 2	-2			

## Tension Device

Type	CMTD-B/A		
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Serial Number	1109		
Calibration Date	23-Apr-2015		
Calibrator Serial Number	78135A		
Number of Calibration Points	10		
Calibration Root Mean Square Error	6		
Calibration Peak Error	11		

Logging Cable			
Type	7-39P-LXS		
Serial Number	U711136		
Length	17200.00 ft		
Conveyance Type	Wireline		
Rig Type	RIGLESS		

ONE:Depth Control Parameters		Depth Control Remarks	
Log Sequence	First Log In the Well	ALL SCHLUMBERGER DEPTH CONTROL PROCEDURES WERE FOLLOWED DURING LOGGING.  IDW USED AS PRIMARY DEPTH CONTROL MEASURE.  Z-CHART USED AS SECONDARY DEPTH CONTROL.	
Rig Up Length At Surface			
Rig Up Length At Bottom			
Rig Up Length Correction			
Stretch Correction			
Tool Zero Check At Surface			

Import (2) of USI Cement	
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USIT - Fluid Properties Measurement	
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Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Main[3]:Up	7613.29	5.78

Fluid Velocity = "Automatic". CFVL equals DFSL channel			
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Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
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Mud Impedance = "FreePipe Norm." Free Pipe normalization zone is : 60.75m(199.31ft) to 62.65m(205.54ft) MUD_N_FRP = 0.94 DFD = 1.32g/cm3(11.00lbm/gal) CZMD median computed in free pipe normalization interval = 1.79 MRayl			
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Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
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ONE			
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USI Cement - Main Pass - 0 PSI			
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Log	Company:Kerr McGee Oil & Gas Onshore LP	Well:Butterball 36N-10HZ	
		ONE: Main[3]:Up:S005	

Description: USI Cement    Format: USI Cement    Index Scale: 2 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 09-May-2015 13:45:45

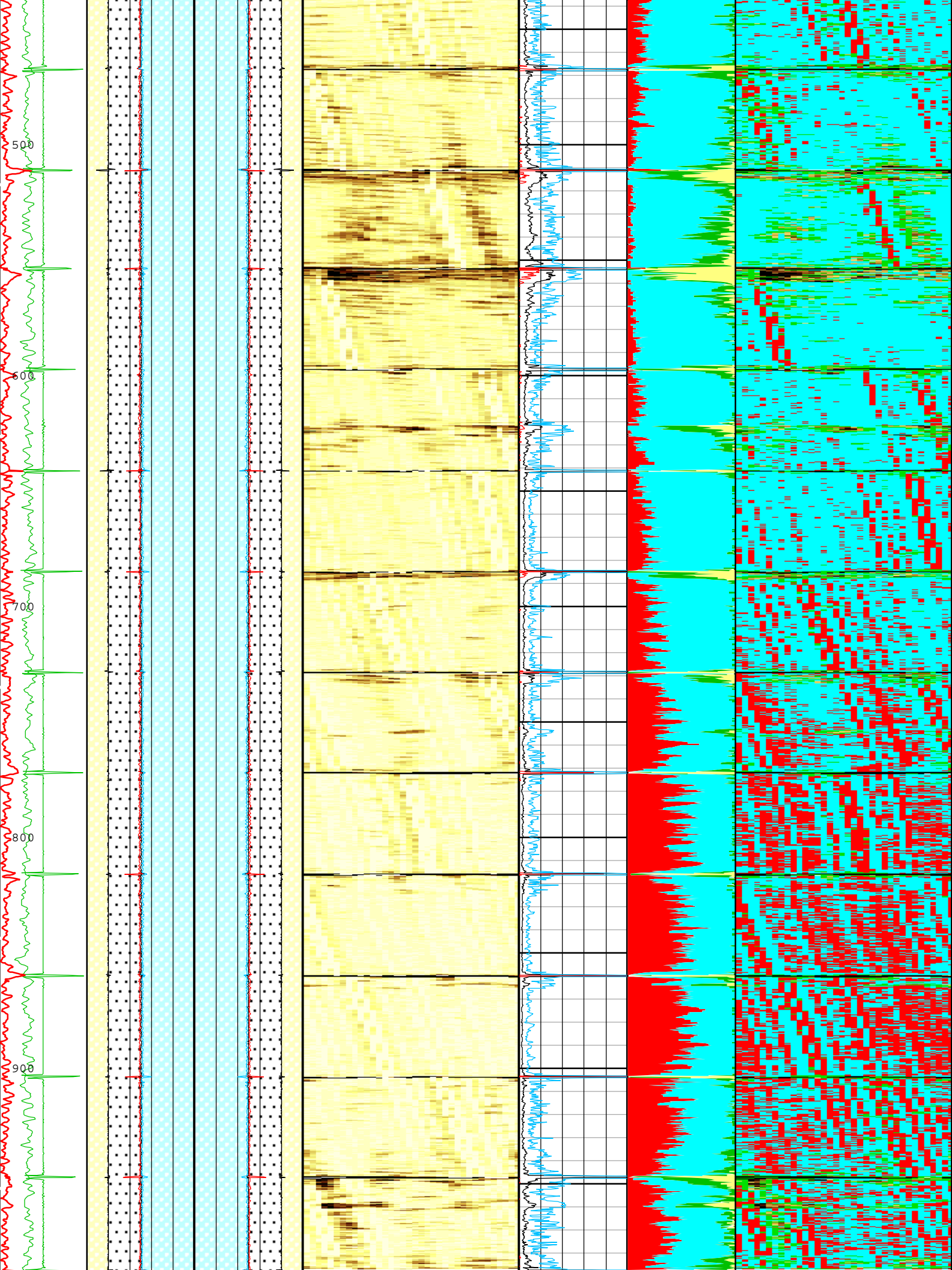
TIME\_1900 - Time Marked every 60.00 (s)

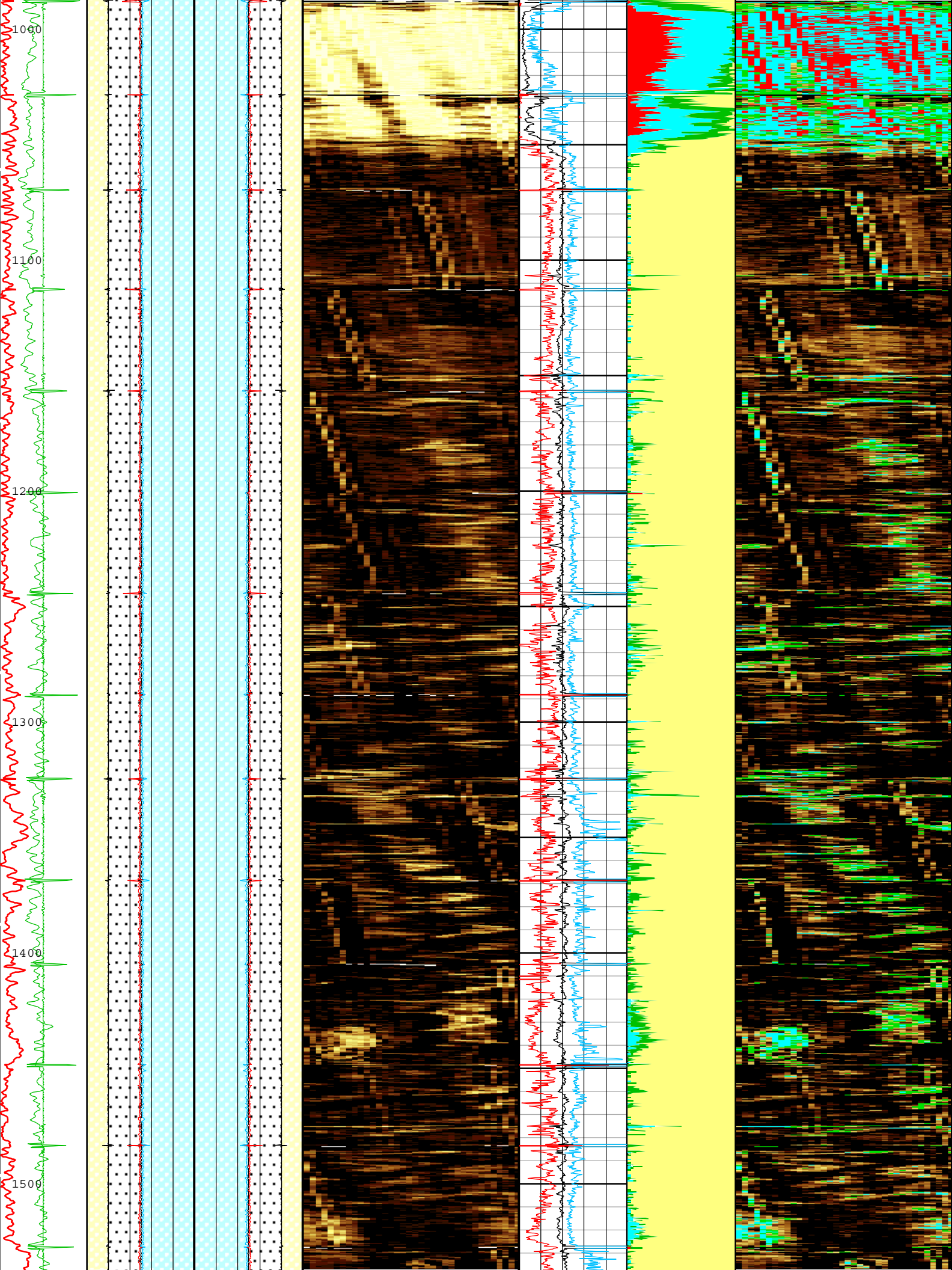
Casing Collar Locator Ultrasonic (CCLU) USIT-E	-20 in 20		External Radii Average (ERAV) USIT-E	External Radii Average (ERAV) USIT-E
	Gamma Ray (ECGR_EDT C) EDTC-B		2.95 in 1.95	1.95 in 2.95
	0 gAPI 150		Internal Radius Averaged Value (IRAV) USIT-E	Internal Radius Averaged Value (IRAV) USIT-E
	Stuck Tool Indicator		2.95 in 1.95	1.95 in 2.95

Acoustic Impedance Minimum (AIMN) USIT-E
0 MRayl 10

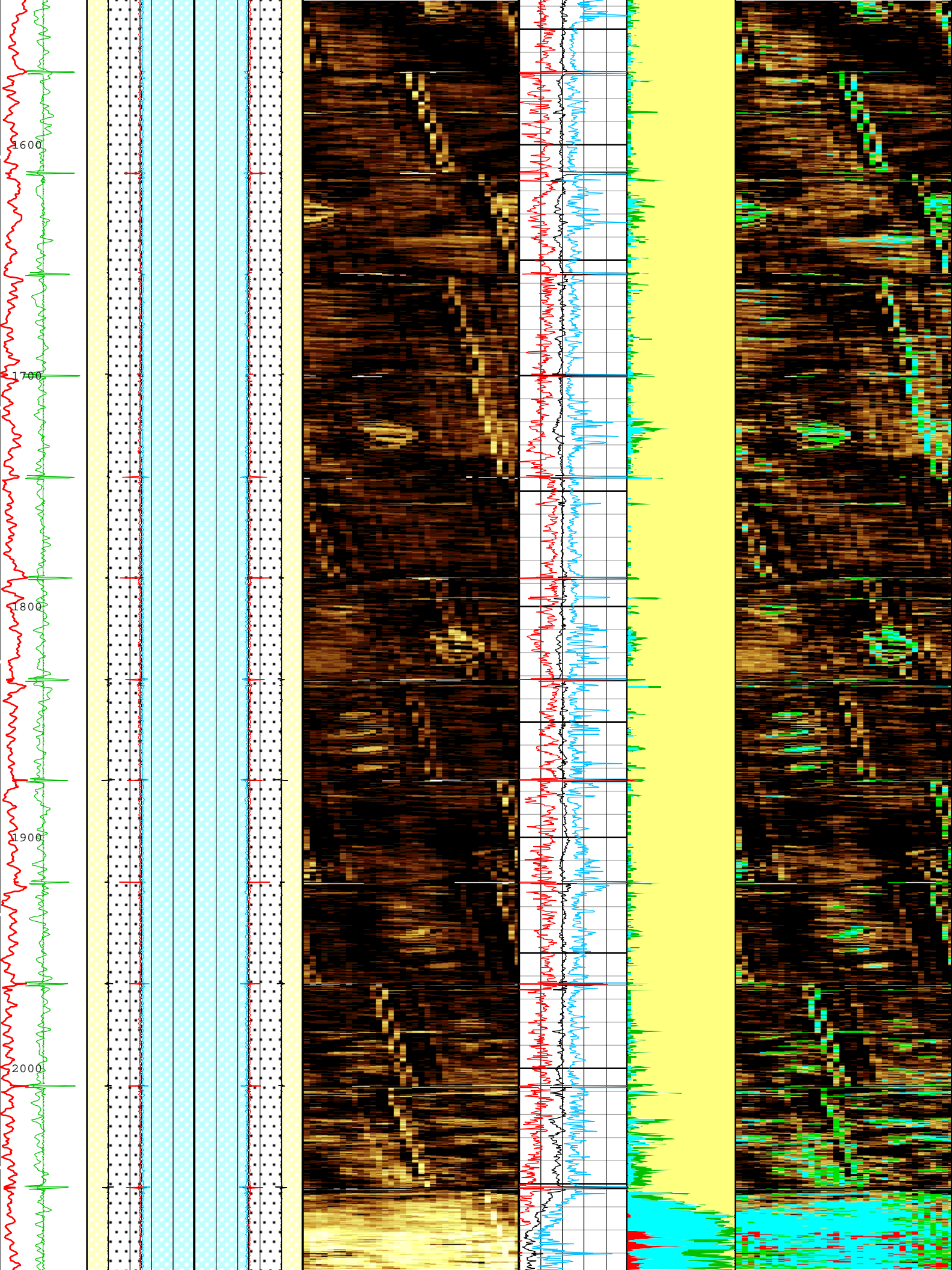
Indicator, Total (STIT)		2.95 in 1.95		1.95 in 2.95		Acoustic Impedance Average (AIAV) USIT-E		Bonded		Absent	
0 ft 50		Internal Radius Maximum Value (IRMX) USIT-E		Internal Radius Maximum Value (IRMX) USIT-E		0 Mrayl 10		Gas		-500,000	
CableDrag		2.95 in 1.95		1.95 in 2.95		Custom Normalization USIT - Acoustic Impedance (AIBK) USIT-E (Mrayl)		Liquid		2,599	
Amplitude of Eccentering (ECCE) USIT-E		Internal Radius Minimum Value (IRMN) USIT-E		Internal Radius Minimum Value (IRMN) USIT-E		0 Mrayl 10		Micro-debonding		2,854	
0 in 0.5		2.95 in 1.95		1.95 in 2.95						3,109	
										3,363	
										3,618	
										3,872	
0											
100											
200											
300											
400											

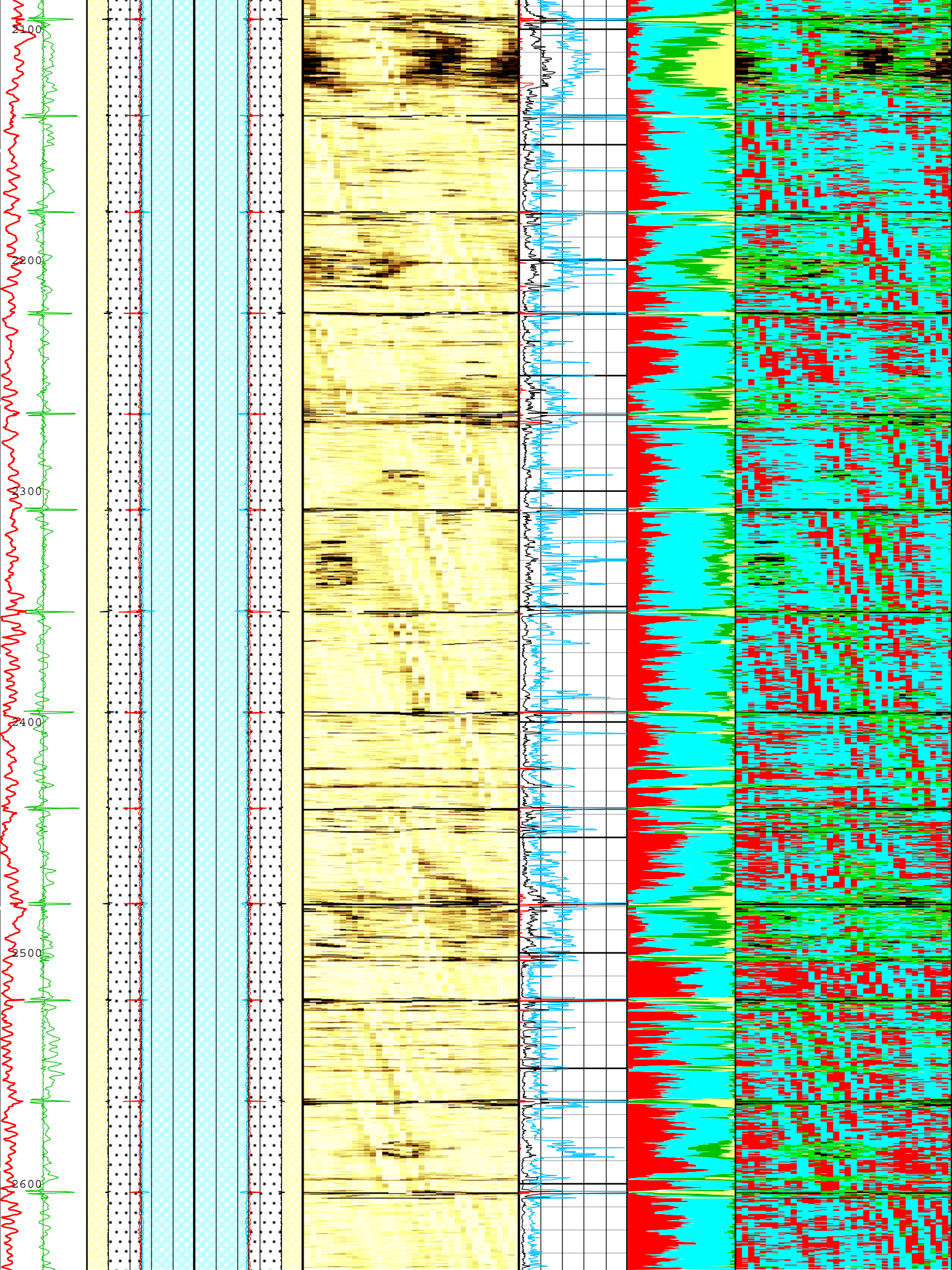




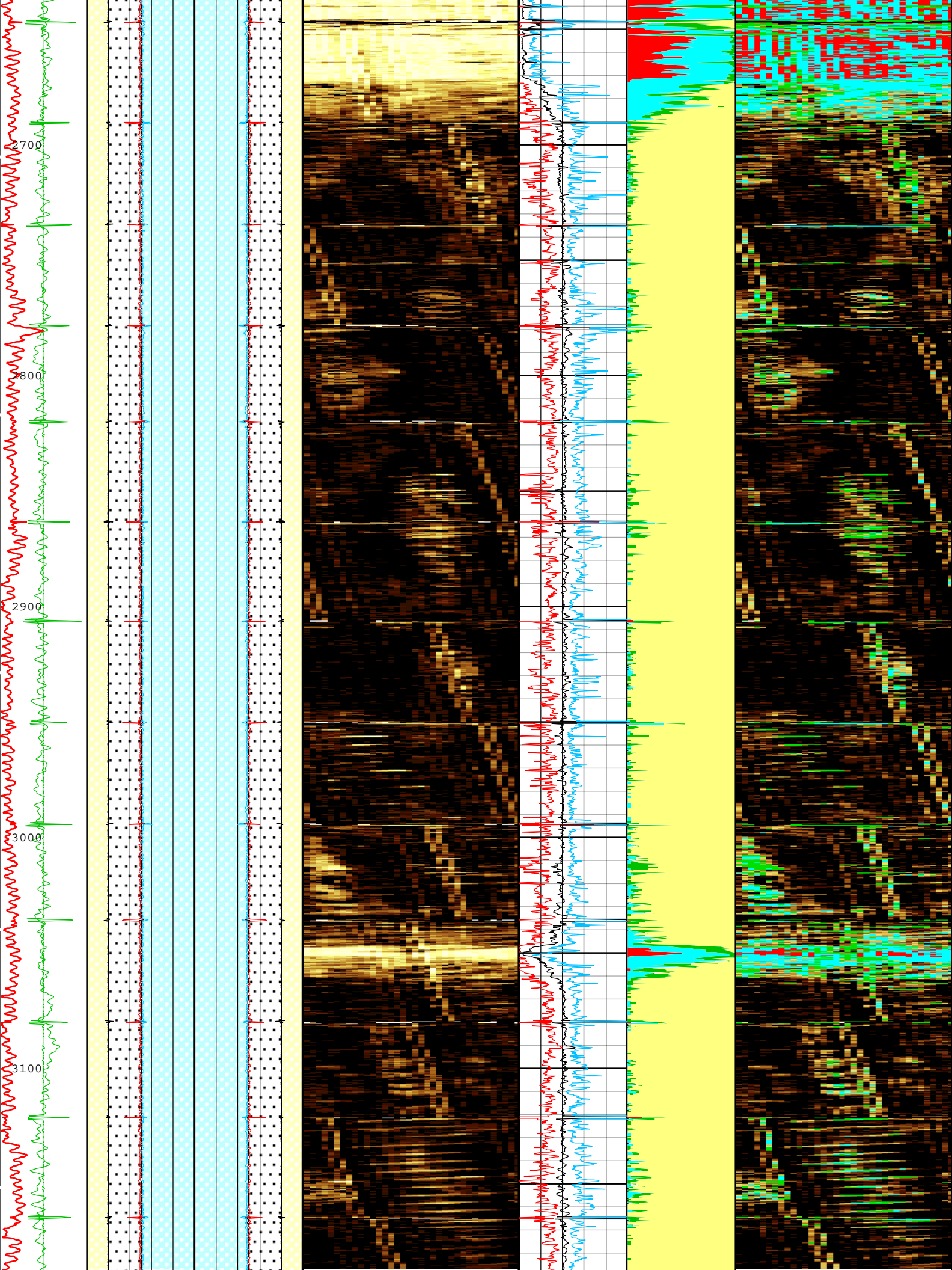


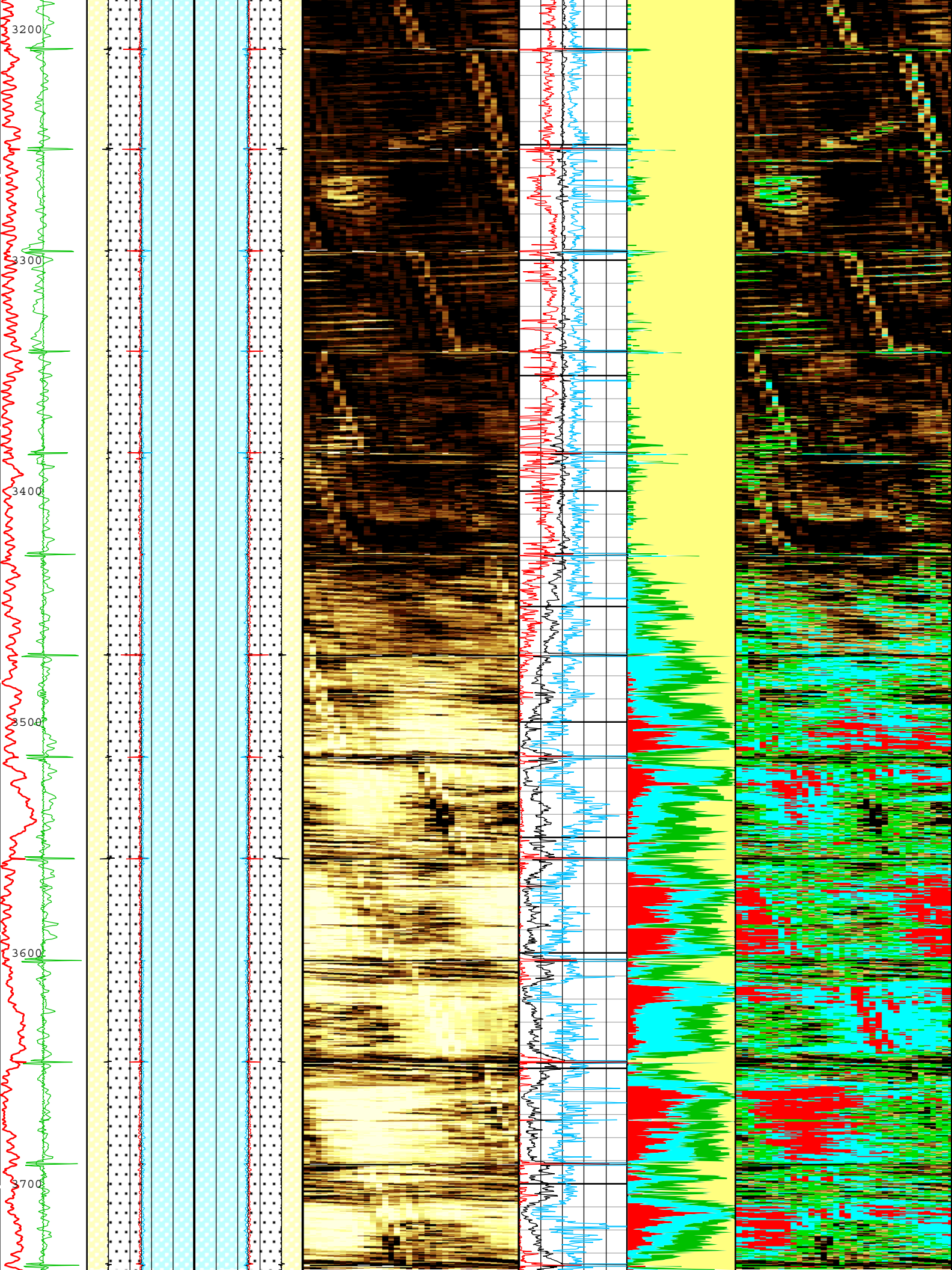




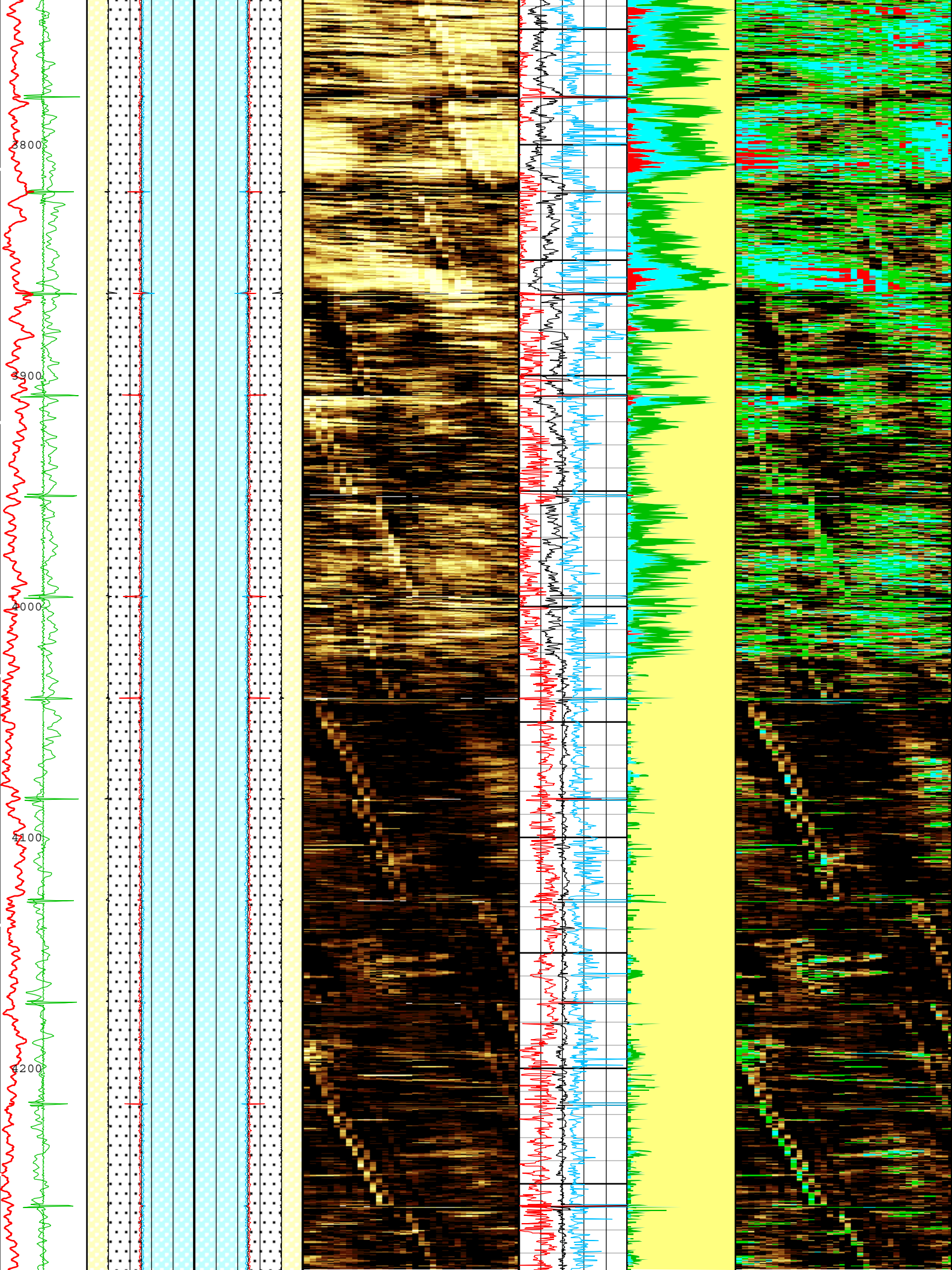




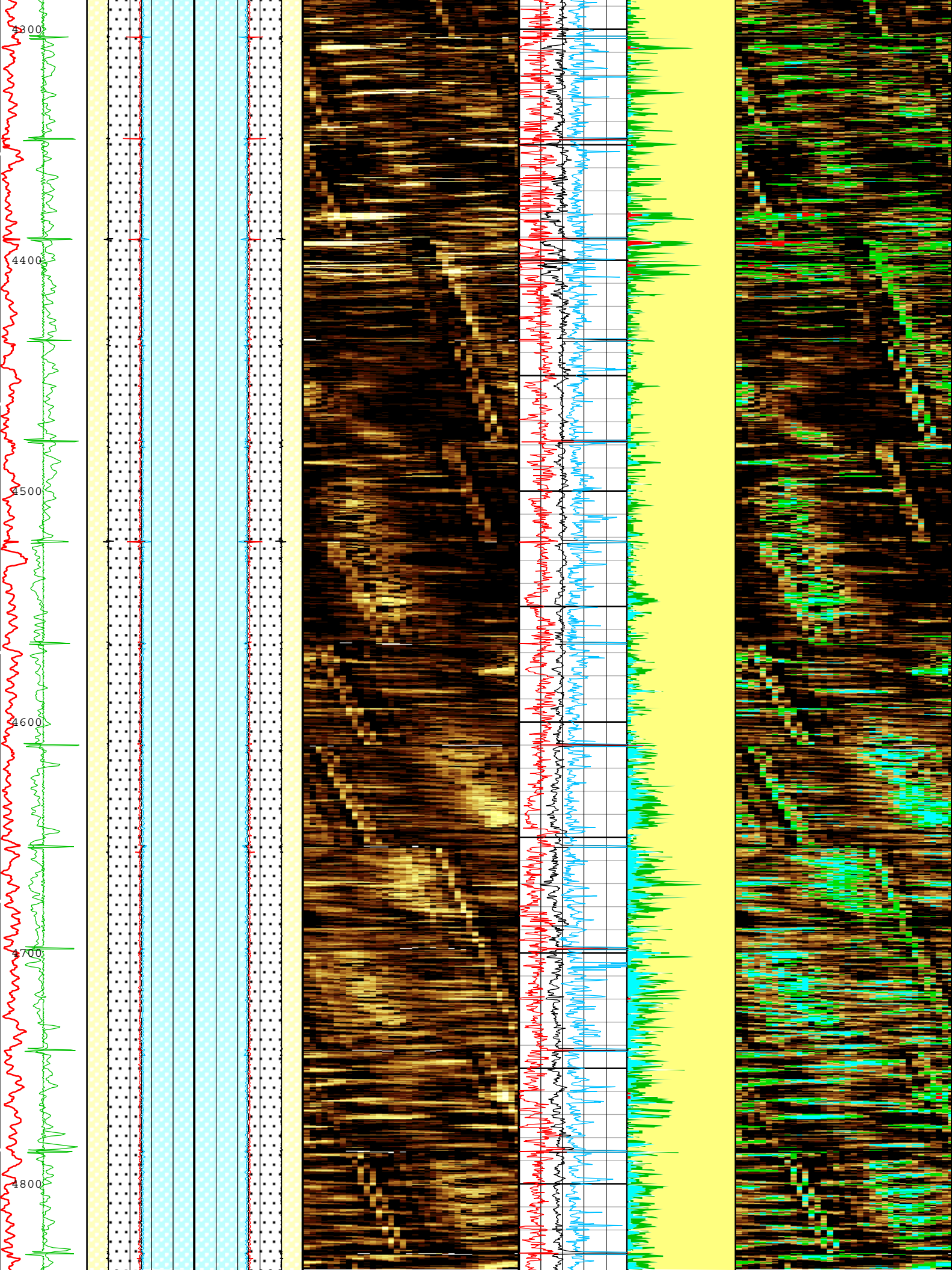


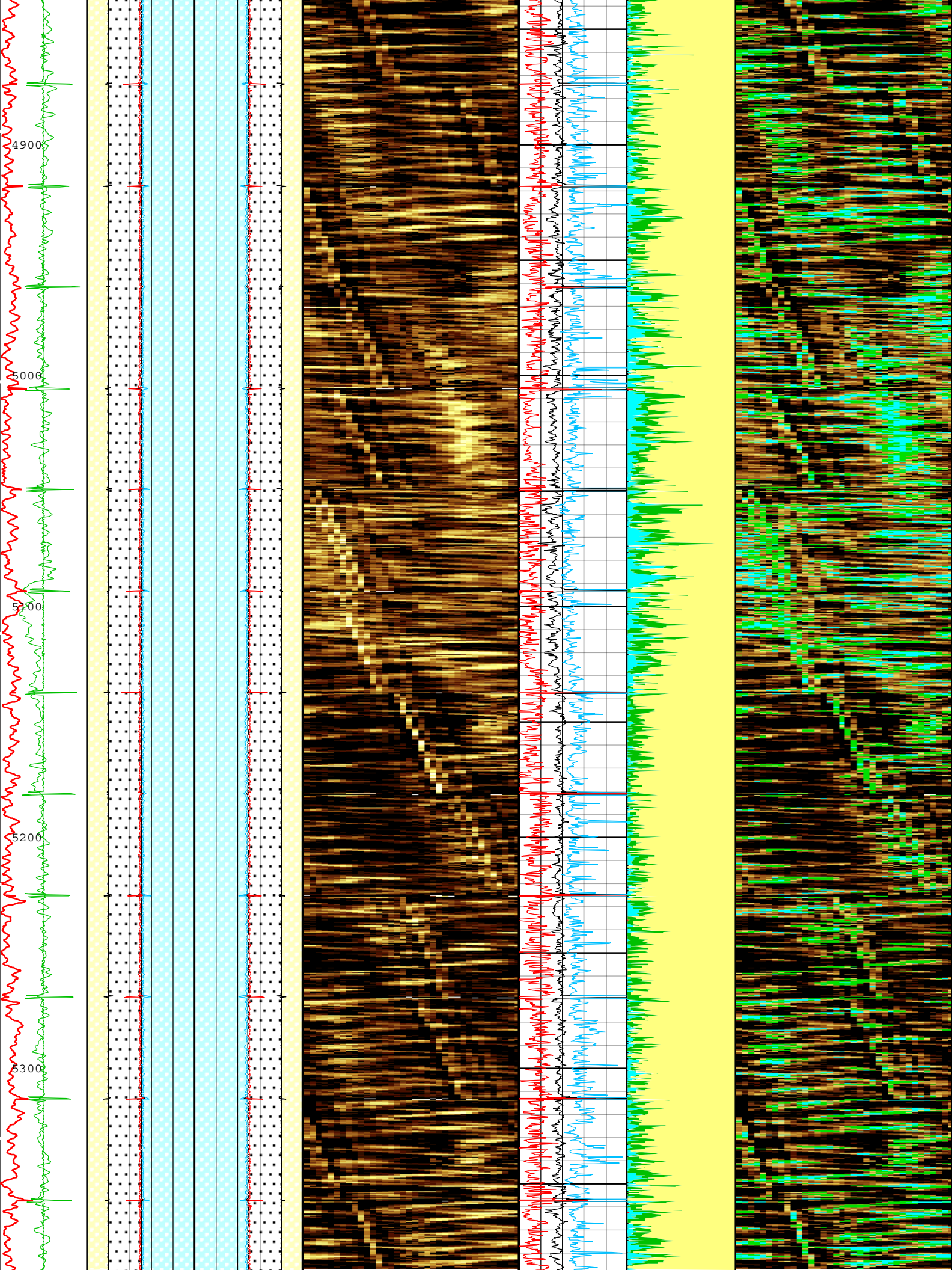




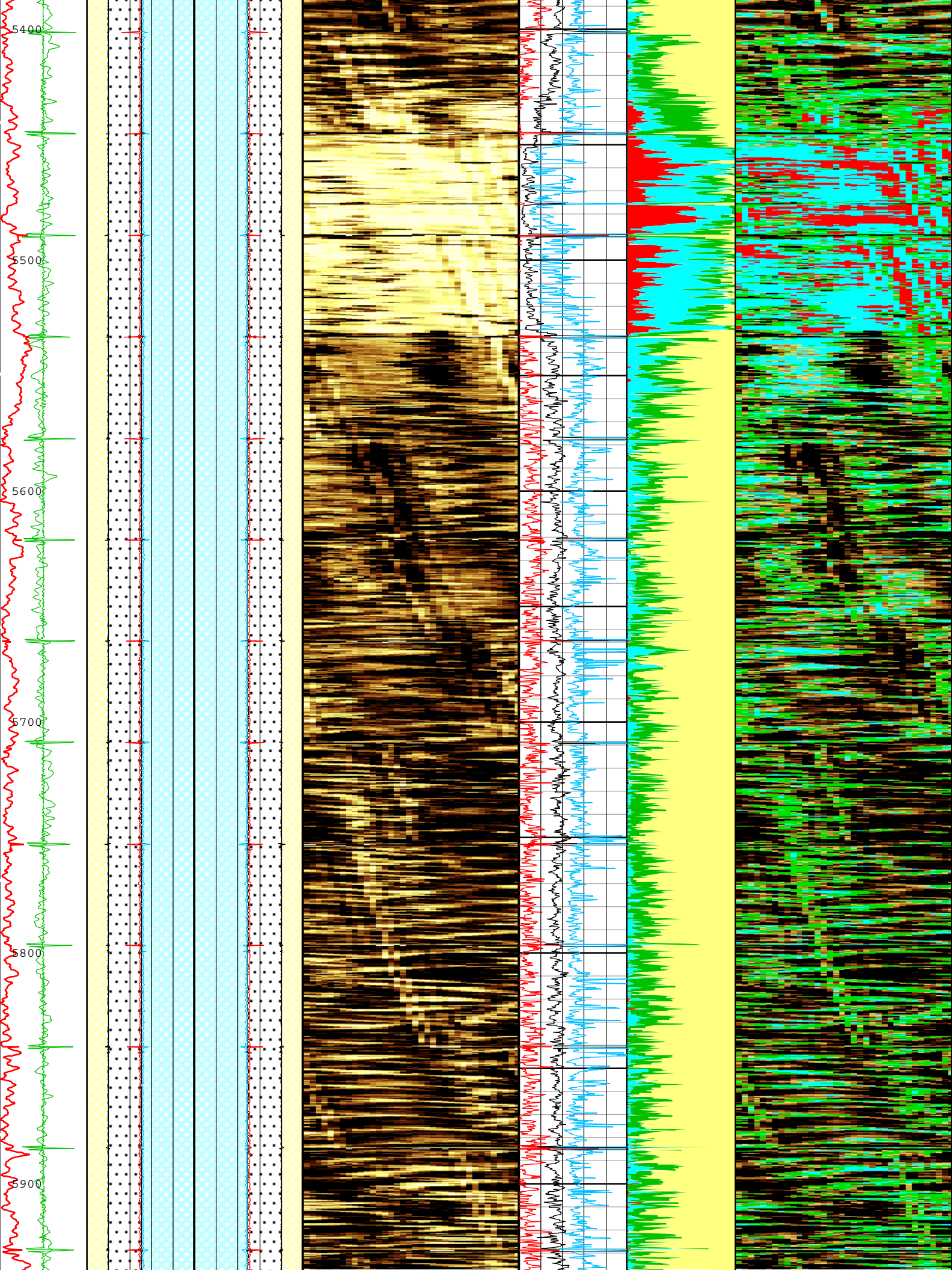


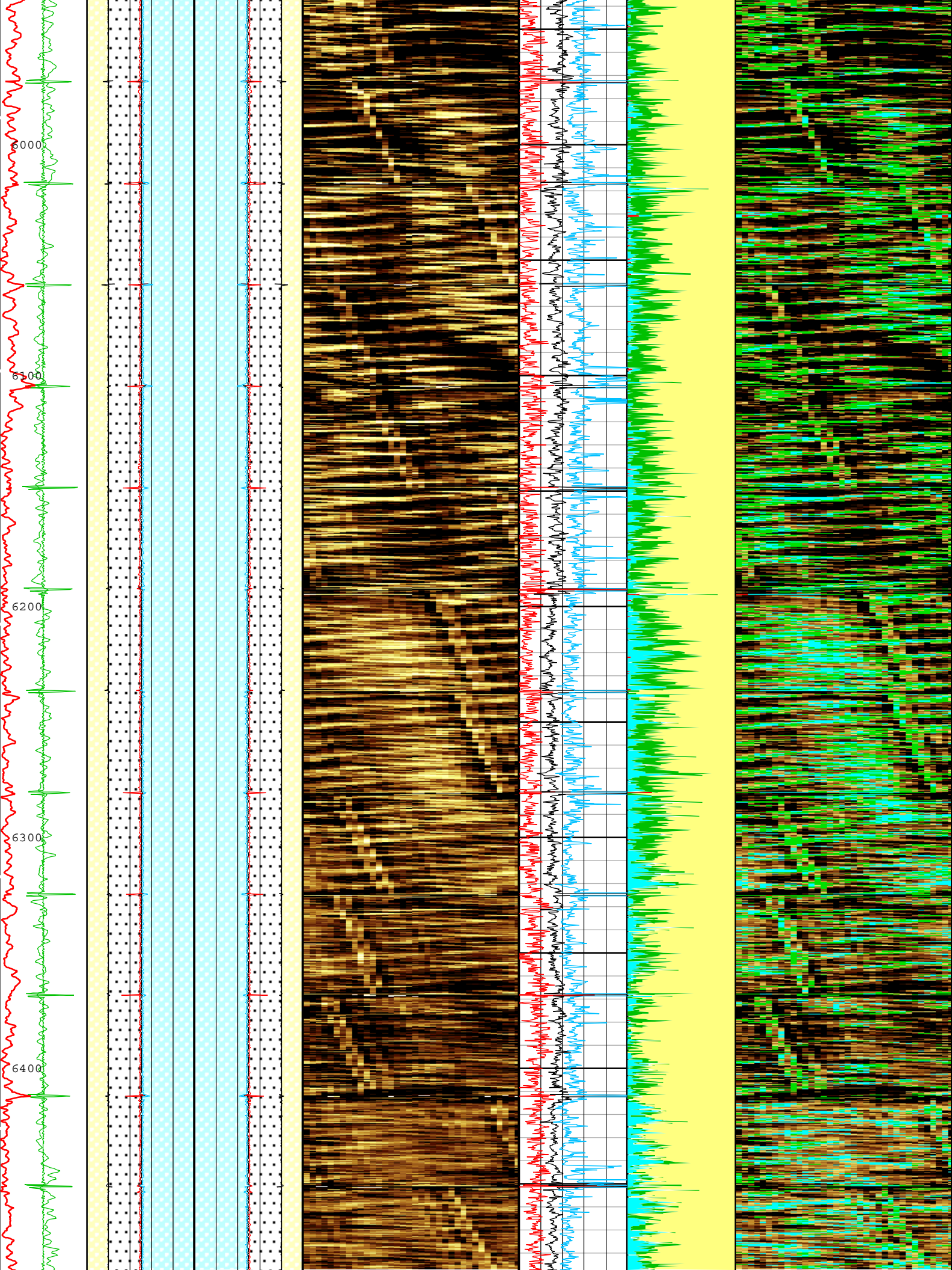




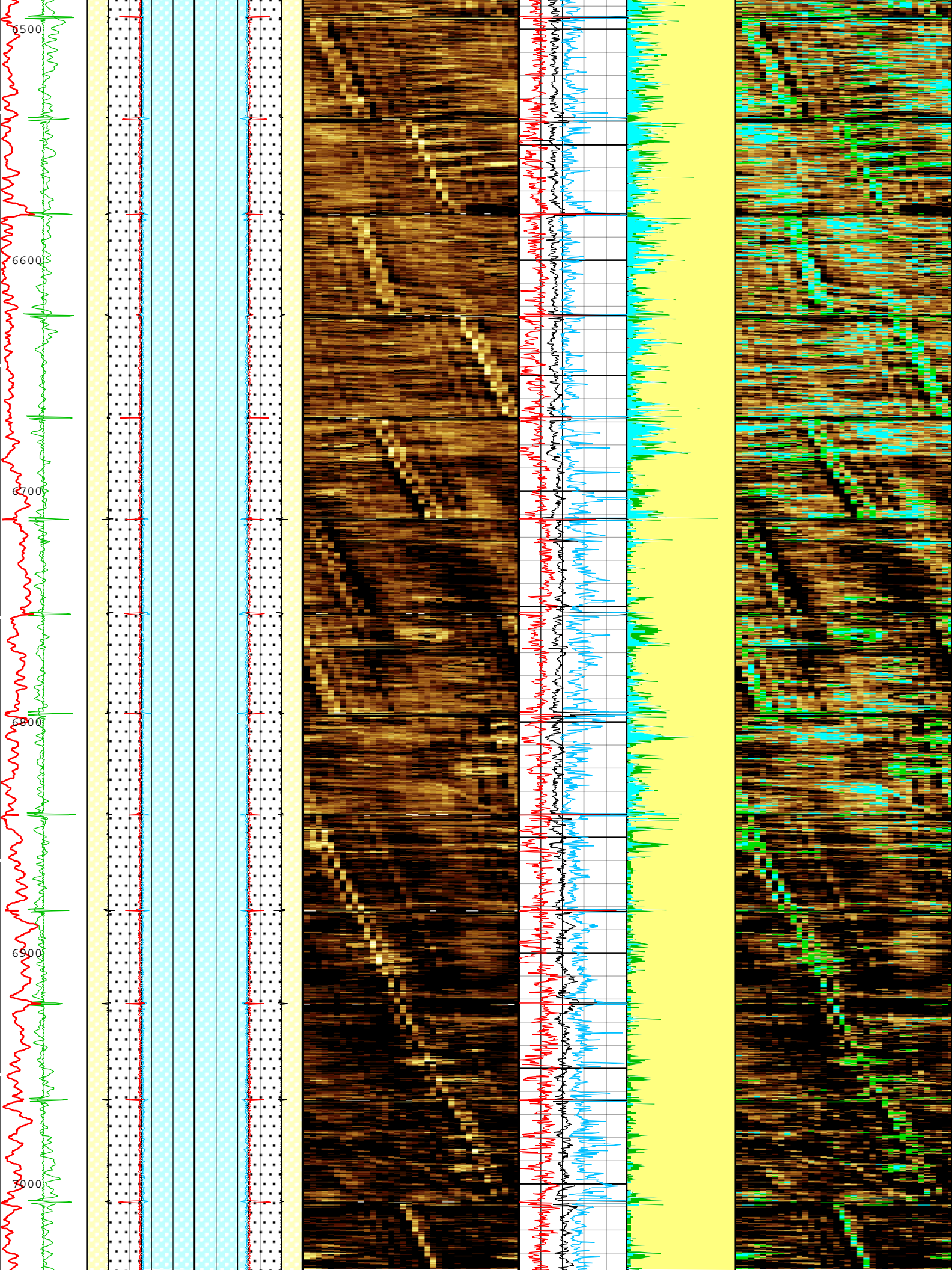




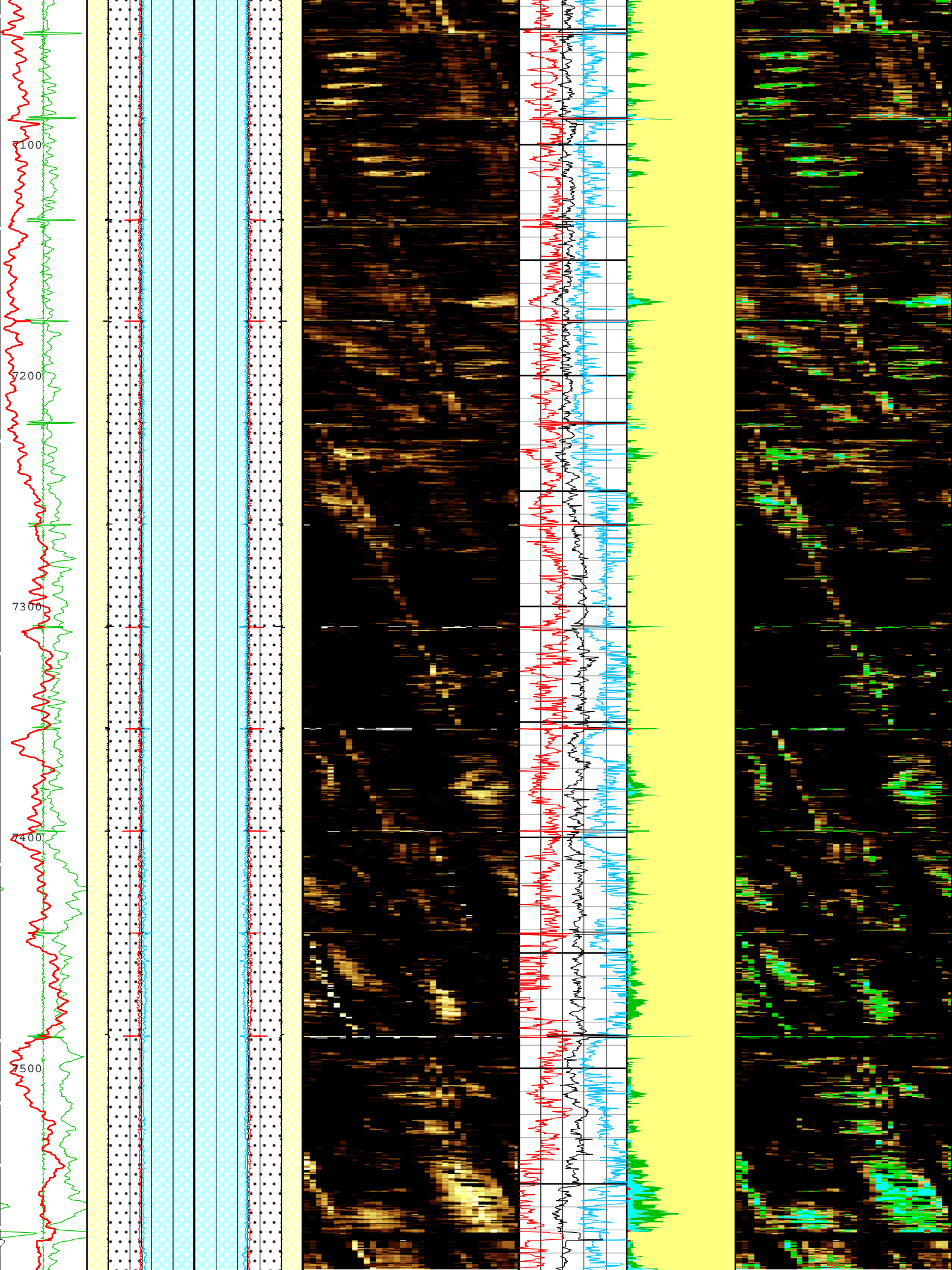


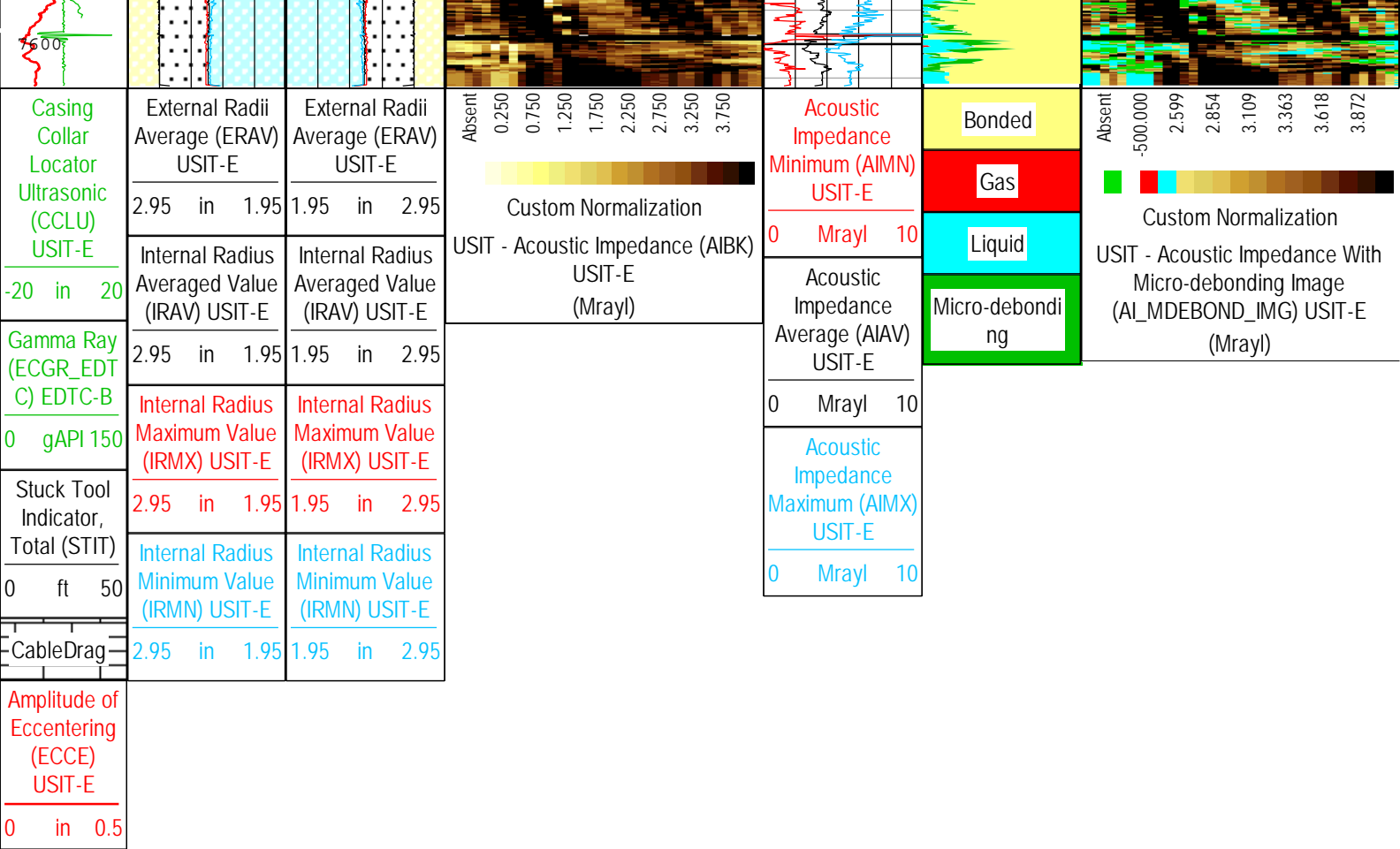












TIME\_1900 - Time Marked every 60.00 (s)

Description: USI Cement    Format: USI Cement    Index Scale: 2 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 09-May-2015 13:45:45

Channel Processing Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
AFVU	Automatic Fluid Velocity Update	USIT-E	On	
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BERJ	Bad Echo Rejection	USIT-E	On	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	Depth Zoned	in
CASING_PRATIO	Casing Poisson Ratio	USIT-E	Standard Poisson Ratio	
CBLO	Casing Bottom (Logger)	WLSESSION	12882	ft
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Light Cement	
THNO	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.304	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	11	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
FD	Fluid Density	USIT-E	10	lbm/gal
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS	
GR_MULTIPLIER	Gamma Ray Multiplier	EDTC-B	1	
HEMA	Hematite Presence Flag	Borehole	No	
ICE_BINPROC	ICE Bin Processing Depth Interval	USIT-E	0	ft

ICE_PROCESS	ICE Processing	USIT-E	Yes	
IMAR	Image Rotation	USIT-E	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	18.79	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	0.94	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1	
RAPID_OPTION	Rapid Access Computation Option	USIT-E	Off	
RCOD	Reference Calibrator Outer Diameter	USIT-E	4.5	in
RCSO	Reference Calibrator Standoff	USIT-E	0.842	in
RCTH	Reference Calibrator Thickness	USIT-E	0.216	in
SDNV	Number of Vertical Samples used for Micro-debonding Computation	USIT-E	5	
SDTHOR	Acoustic Impedance STD Horizontal Threshold for Micro-debonding	USIT-E	0.5	Mrayl
SDTVR	Acoustic Impedance STD Vertical Threshold for Micro-debonding	USIT-E	0.3	Mrayl
SOCN	Standoff Distance	EDTC-B	0.125	in
SOCO	Standoff Correction Option	EDTC-B	No	
TCUB	T^3 Processing Level	USIT-E	Loop	
TD	Total Measured Depth	Borehole	12889	ft
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
TPOS_EDTC	Tool Position: Centered or Eccentered	EDTC-B	Eccentered	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	Mrayl
UFGDE	Fiberglass Density	USIT-E	16.27	lbm/gal
UFGPS	Fiberglass Processing Selection	USIT-E	No	
UFGVL	Fiberglass Velocity	USIT-E	9678.48	ft/s
USI_FSOD	USIT USI Fluid Slowness Fits Casing Outer Diameter	USIT-E	0_OFF	
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	FreePipe Norm.	
THDP	Thickness Detection Policy	USIT-E	Fundamental	
VCAS	Ultrasonic Transversal Velocity in Casing	USIT-E	51.4	us/ft
ZCAS	Acoustic Impedance of Casing	USIT-E	46.25	Mrayl
ZINI	Initial Estimate of Cement Impedance	USIT-E	-1	Mrayl
ZMUD	Acoustic Impedance of Mud	Borehole	Depth Zoned	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.6	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Depth Zone Parameters			
Parameter	Value	Start ( ft )	Stop ( ft )
BS	13.5	0	1155
BS	7.875	1155	7604
ZMUD	1.79	0	250
ZMUD	1.8	250	590
ZMUD	1.81	590	845
ZMUD	1.82	845	935
ZMUD	1.83	935	1285
ZMUD	1.84	1285	1440
ZMUD	1.85	1440	1605
ZMUD	1.86	1605	1950
ZMUD	1.87	1950	2460
ZMUD	1.88	2460	2560
ZMUD	1.89	2560	3375
ZMUD	1.9	3375	7612

EMOD	1.9	3373	7613
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All depth are actual.

Tool Control Parameters

ONE: Parameters

Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	18	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
DOT(DOS)	Distance between Opposite Transducer Faces	USIT-E	1.756	in
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	6750	ft/h
MOTOR_PROTECT	Motor Protection	USIT-E	On	
TMUC	Type of Mud	USIT-E	BRI	
UACLV_PERM	Ultrasonic ACLV Permanent	USIT-E	No	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 500 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 3.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	7600	ft
USSP	Ultrasonic Service	USIT-E	USI	
VRES	Vertical Resolution	USIT-E	3.0 in	
WINB	Window Begin Time	USIT-E	29.18	us
WINE	Window End Time	USIT-E	73.83	us

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
EMXV	70	07-May-2015 12:19:16	07-May-2015 12:24:00	7613.29	7595.96
EMXV	65	07-May-2015 12:24:00	07-May-2015 12:25:05	7595.96	7566.79
EMXV	70	07-May-2015 12:25:05	07-May-2015 12:28:28	7566.79	7459.61
EMXV	75	07-May-2015 12:28:28	07-May-2015 12:28:34	7459.61	7451.03
EMXV	80	07-May-2015 12:28:34	07-May-2015 12:28:47	7451.03	7430.05
EMXV	75	07-May-2015 12:28:47	07-May-2015 12:29:02	7430.05	7407.9
EMXV	70	07-May-2015 12:29:02	07-May-2015 12:29:13	7407.9	7391.42
EMXV	67	07-May-2015 12:29:13	07-May-2015 12:29:29	7391.42	7367.38
EMXV	70	07-May-2015 12:29:29	07-May-2015 12:37:33	7367.38	6584.15
EMXV	65	07-May-2015 12:37:33	07-May-2015 12:38:29	6584.15	6481.61
EMXV	63	07-May-2015 12:38:29	07-May-2015 12:46:29	6481.61	5605.68
EMXV	60	07-May-2015 12:46:29	07-May-2015 12:55:30	5605.68	4622.87
EMXV	55	07-May-2015 12:55:30	07-May-2015 13:09:22	4622.87	3109.68
EMXV	50	07-May-2015 13:09:22	07-May-2015 13:17:34	3109.68	2199.62
EMXV	47	07-May-2015 13:17:34	07-May-2015 13:17:43	2199.62	2183.24
EMXV	45	07-May-2015 13:17:43	07-May-2015 13:38:28	2183.24	127.78
EMXV	50	07-May-2015 13:38:28	07-May-2015 13:38:37	127.78	121.61
EMXV	55	07-May-2015 13:38:37	07-May-2015 13:39:43	121.61	67.3
EMXV	60	07-May-2015 13:39:43	07-May-2015 13:39:54	67.3	56.4

EMXV	65	07-May-2015 13:39:54	07-May-2015 13:40:03	56.4	48.9
EMXV	70	07-May-2015 13:40:03	07-May-2015 13:40:39	48.9	18.68
EMXV	80	07-May-2015 13:40:39	07-May-2015 13:41:10	18.68	7.18
EMXV	95	07-May-2015 13:41:10	07-May-2015 13:41:24	7.18	5.78

All depth are at tool zero.

Import (3) of USI Goodwin	
ONE	
USI Goodwin Compressed - Main Pass - 0 PSI	

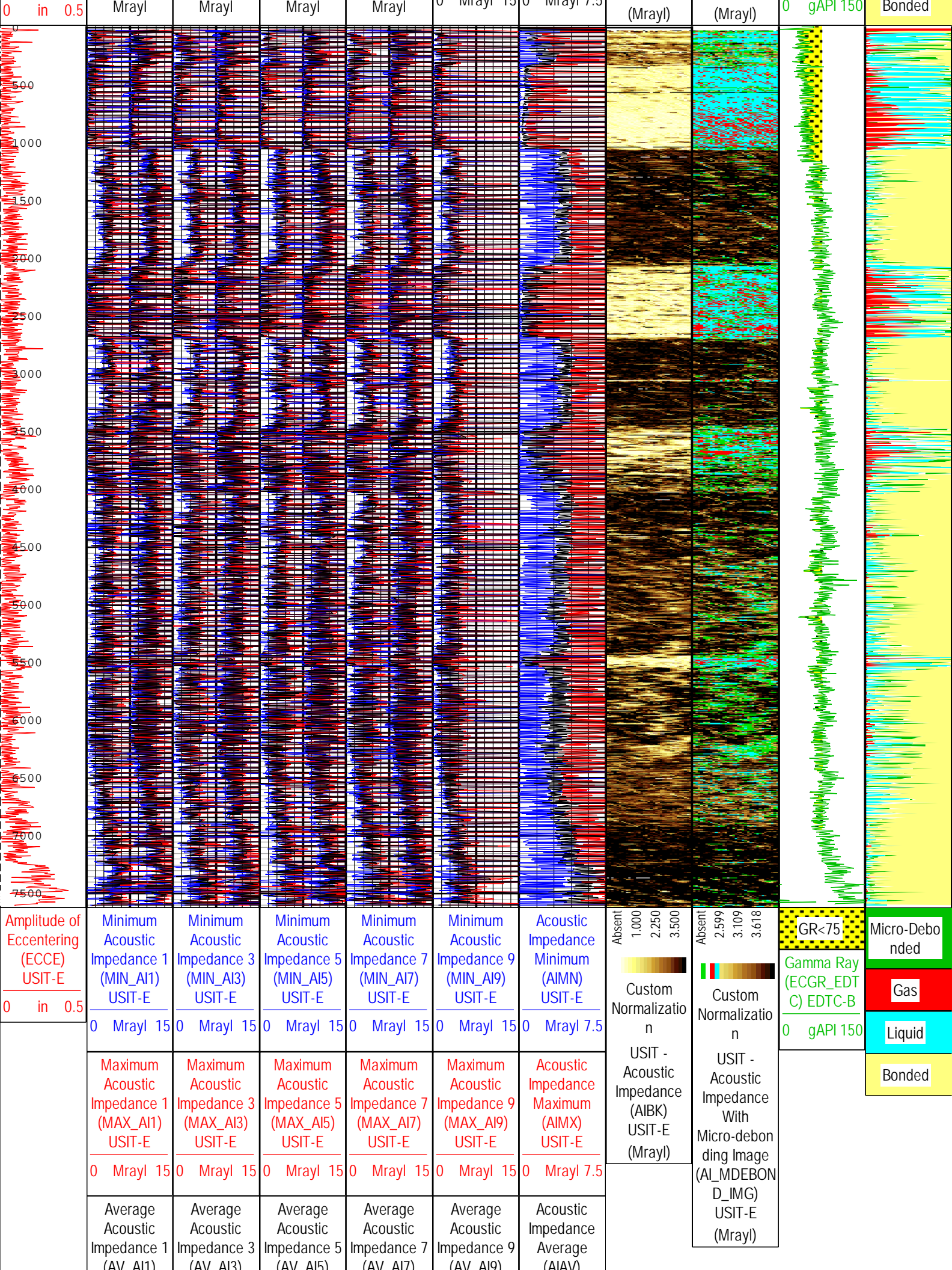
Log	Company:Kerr McGee Oil & Gas Onshore LP	Well:Butterball 36N-10HZ
		ONE: Mainf31:Up:S005

Description: USI Goodwin    Format: USI Goodwin    Index Scale: 0.1 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 09-May-2015 13:46:06

TIME\_1900 - Time Marked every 60.00 (s)

Amplitude of Eccentering (ECCE) USIT-E	Minimum Acoustic Impedance 1 (MIN_AI1) USIT-E	Minimum Acoustic Impedance 3 (MIN_AI3) USIT-E	Minimum Acoustic Impedance 5 (MIN_AI5) USIT-E	Minimum Acoustic Impedance 7 (MIN_AI7) USIT-E			<div><div><div>Absent</div><div>1,000</div><div>2,250</div><div>3,500</div></div><div>Custom Normalization</div><div>USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E</div></div> <div><div><div>Absent</div><div>2,599</div><div>3,109</div><div>3,618</div></div><div>Custom Normalization</div><div>USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E</div></div> <div><div>GR&lt;75</div><div>Gamma Ray (ECGR_EDTC) EDTC-B</div></div> <div><div>Micro-Debonded</div><div>Gas</div><div>Liquid</div></div>
	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15			
	Maximum Acoustic Impedance 1 (MAX_AI1) USIT-E	Maximum Acoustic Impedance 3 (MAX_AI3) USIT-E	Maximum Acoustic Impedance 5 (MAX_AI5) USIT-E	Maximum Acoustic Impedance 7 (MAX_AI7) USIT-E			
	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15			
	Average Acoustic Impedance 1 (AV_AI1) USIT-E	Average Acoustic Impedance 3 (AV_AI3) USIT-E	Average Acoustic Impedance 5 (AV_AI5) USIT-E	Average Acoustic Impedance 7 (AV_AI7) USIT-E			
	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15			
	Minimum Acoustic Impedance 2 (MIN_AI2) USIT-E	Minimum Acoustic Impedance 4 (MIN_AI4) USIT-E	Minimum Acoustic Impedance 6 (MIN_AI6) USIT-E	Minimum Acoustic Impedance 8 (MIN_AI8) USIT-E	Minimum Acoustic Impedance 9 (MIN_AI9) USIT-E	Acoustic Impedance Minimum (AIMN) USIT-E	
	-7.5 Mrayl 7.5	-7.5 Mrayl 7.5	-7.5 Mrayl 7.5	-7.5 Mrayl 7.5	0 Mrayl 15	0 Mrayl 7.5	
	Maximum Acoustic Impedance 2 (MAX_AI2) USIT-E	Maximum Acoustic Impedance 4 (MAX_AI4) USIT-E	Maximum Acoustic Impedance 6 (MAX_AI6) USIT-E	Maximum Acoustic Impedance 8 (MAX_AI8) USIT-E	Maximum Acoustic Impedance 9 (MAX_AI9) USIT-E	Acoustic Impedance Maximum (AIMX) USIT-E	
	-7.5 Mrayl 7.5	-7.5 Mrayl 7.5	-7.5 Mrayl 7.5	-7.5 Mrayl 7.5	0 Mrayl 15	0 Mrayl 7.5	
	Average Acoustic Impedance 2 (AV_AI2) USIT-E	Average Acoustic Impedance 4 (AV_AI4) USIT-E	Average Acoustic Impedance 6 (AV_AI6) USIT-E	Average Acoustic Impedance 8 (AV_AI8) USIT-E	Average Acoustic Impedance 9 (AV_AI9) USIT-E	Acoustic Impedance Average (AIAV) USIT-E	
	-7.5 Mrayl 7.5	-7.5 Mrayl 7.5	-7.5 Mrayl 7.5	-7.5 Mrayl 7.5	0 Mrayl 15	0 Mrayl 7.5	





(AV_AI2) USIT-E	(AV_AI4) USIT-E	(AV_AI6) USIT-E	(AV_AI8) USIT-E	(AV_AI2) USIT-E	(AV_AI4) USIT-E
0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 7.5
Minimum Acoustic Impedance 2 (MIN_AI2) USIT-E	Minimum Acoustic Impedance 4 (MIN_AI4) USIT-E	Minimum Acoustic Impedance 6 (MIN_AI6) USIT-E	Minimum Acoustic Impedance 8 (MIN_AI8) USIT-E		
-7.5 7.5 Mrayl	-7.5 7.5 Mrayl	-7.5 7.5 Mrayl	-7.5 7.5 Mrayl		
Maximum Acoustic Impedance 2 (MAX_AI2) USIT-E	Maximum Acoustic Impedance 4 (MAX_AI4) USIT-E	Maximum Acoustic Impedance 6 (MAX_AI6) USIT-E	Maximum Acoustic Impedance 8 (MAX_AI8) USIT-E		
-7.5 7.5 Mrayl	-7.5 7.5 Mrayl	-7.5 7.5 Mrayl	-7.5 7.5 Mrayl		
Average Acoustic Impedance 2 (AV_AI2) USIT-E	Average Acoustic Impedance 4 (AV_AI4) USIT-E	Average Acoustic Impedance 6 (AV_AI6) USIT-E	Average Acoustic Impedance 8 (AV_AI8) USIT-E		
-7.5 7.5 Mrayl	-7.5 7.5 Mrayl	-7.5 7.5 Mrayl	-7.5 7.5 Mrayl		

TIME\_1900 - Time Marked every 60.00 (s)

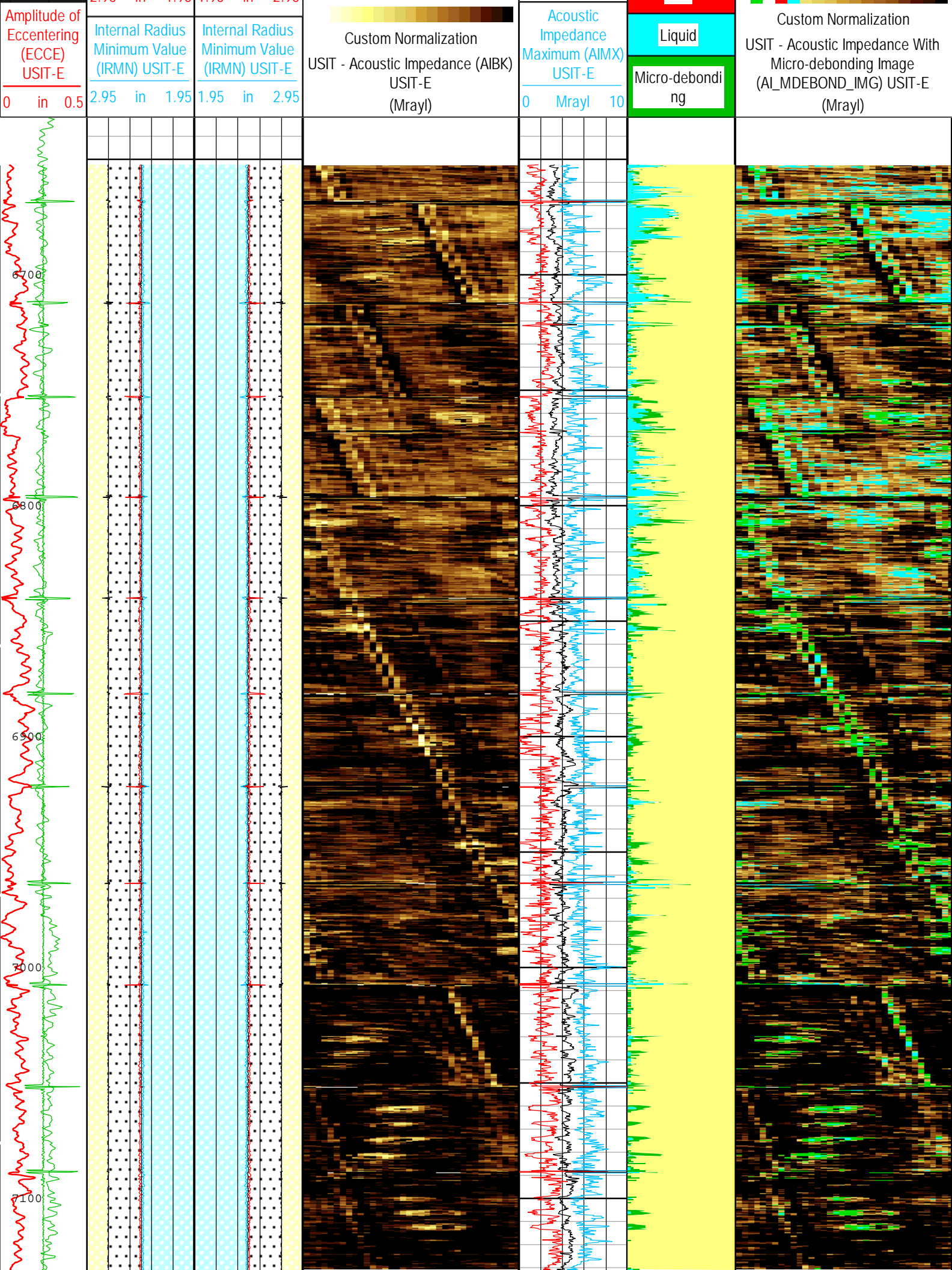
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Import (2) of USI Cement	
ONE	
USI Cement - Repeat Pass - 0 PSI	
Log	Company:Kerr McGee Oil & Gas Onshore LP    Well:Butterball 36N-10HZ ONE: Repeat[2]:Up:S005

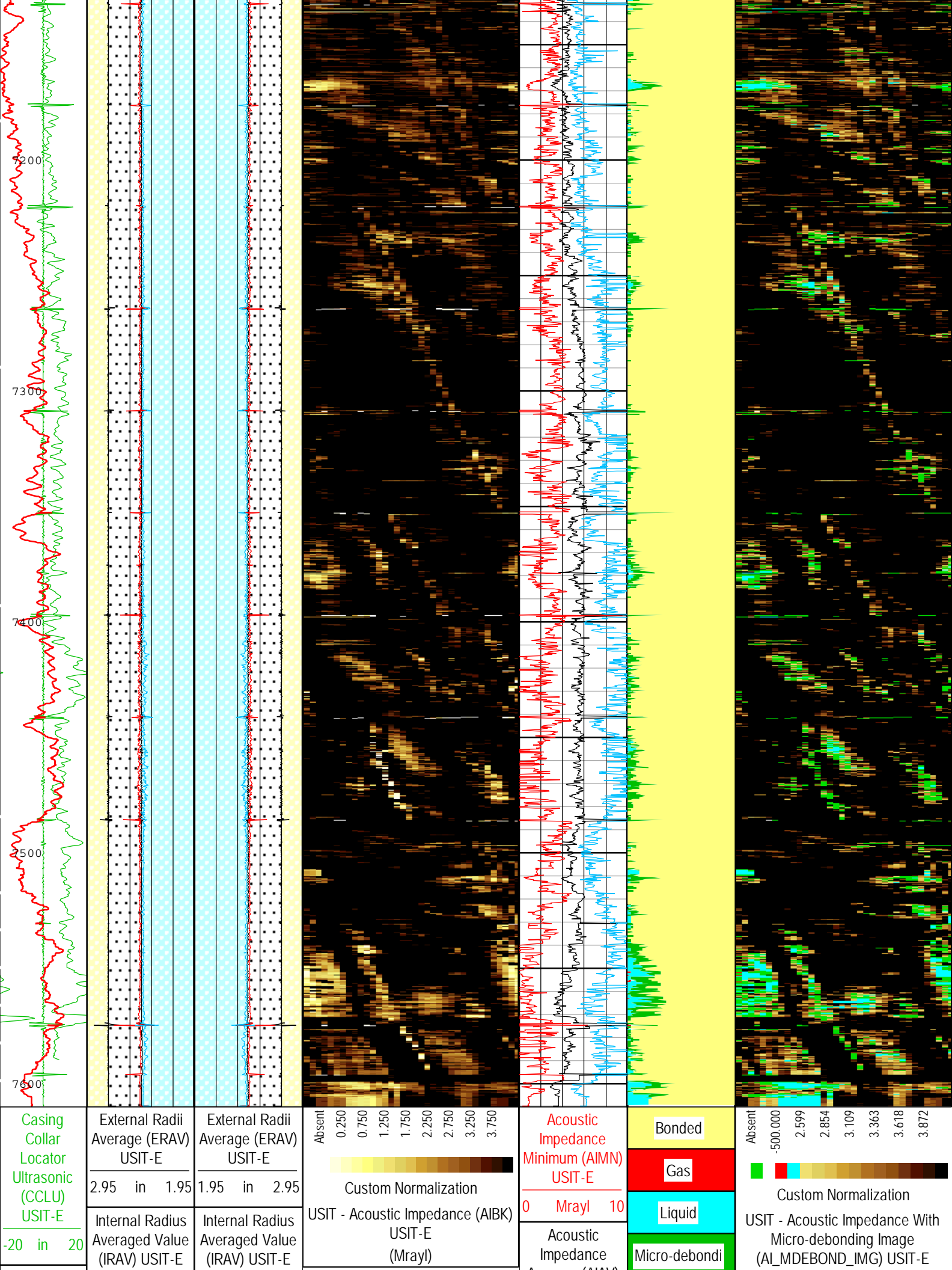
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TIME\_1900 - Time Marked every 60.00 (s)

Casing Collar Locator Ultrasonic (CCLU) USIT-E	External Radii Average (ERAV) USIT-E		External Radii Average (ERAV) USIT-E			
-20 in 20	2.95 in 1.95		1.95 in 2.95			
Gamma Ray (ECGR_EDT C) EDTC-B	Internal Radius Averaged Value (IRAV) USIT-E		Internal Radius Averaged Value (IRAV) USIT-E			
0 gAPI 150	2.95 in 1.95		1.95 in 2.95			
Stuck Tool Indicator, Total (STIT)	Internal Radius Maximum Value (IRMX) USIT-E		Internal Radius Maximum Value (IRMX) USIT-E			
0 ft 50	2.95 in 1.95		1.95 in 2.95			
CableDrag						
						Acoustic Impedance Minimum (AIMN) USIT-E  0 Mrayl 10
						Acoustic Impedance Average (AIAV) USIT-E  0 Mrayl 10
						Bonded  Gas
						Absent -500.000 2.599 2.854 3.109 3.363 3.618 3.872
						Absent 0.250 0.750 1.250 1.750 2.250 2.750 3.250 3.750







Gamma Ray (ECGR_EDT C) EDTC-B	2.95	in	1.95	1.95	in	2.95
0 gAPI 150	Internal Radius Maximum Value (IRMX) USIT-E			Internal Radius Maximum Value (IRMX) USIT-E		
Stuck Tool Indicator, Total (STIT)	2.95	in	1.95	1.95	in	2.95
0 ft 50	Internal Radius Minimum Value (IRMN) USIT-E			Internal Radius Minimum Value (IRMN) USIT-E		
CableDrag	2.95	in	1.95	1.95	in	2.95
Amplitude of Eccentering (ECCE) USIT-E						
0 in 0.5						

Average (AIAV) USIT-E	ng		(Mrayl)
0 Mrayl 10			
Acoustic Impedance Maximum (AIMX) USIT-E			
0 Mrayl 10			

TIME\_1900 - Time Marked every 60.00 (s)

Description: USI Cement    Format: USI Cement    Index Scale: 2 in per 100 ft    Index Unit: ft    Index Type: Measured Depth    Creation Date: 09-May-2015 13:46:10

Channel Processing Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
AFVU	Automatic Fluid Velocity Update	USIT-E	On	
ISSBAR	Barite Mud Presence Flag	Borehole	No	
BERJ	Bad Echo Rejection	USIT-E	On	
BHS	Borehole Status (Open or Cased Hole)	Borehole	Cased	
BS	Bit Size	WLSESSION	7.875	in
CASING_PRATIO	Casing Poisson Ratio	USIT-E	Standard Poisson Ratio	
CBLO	Casing Bottom (Logger)	WLSESSION	12882	ft
CDEN	Cement Density	EDTC-B	16.69	lbm/gal
CMTY(U-USIT_CEMT)	Cement Type	USIT-E	Light Cement	
THNO	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.304	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	11	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
FD	Fluid Density	USIT-E	10	lbm/gal
FDII	FPM Data Interpolation Interval	USIT-E	0	ft
GCSE_DOWN_PASS	Generalized Caliper Selection for WL Log Down Passes	Borehole	BS	
GCSE_UP_PASS	Generalized Caliper Selection for WL Log Up Passes	Borehole	BS	
GR_MULTIPLIER	Gamma Ray Multiplier	EDTC-B	1	
HEMA	Hematite Presence Flag	Borehole	No	
ICE_BINPROC	ICE Bin Processing Depth Interval	USIT-E	0	ft
ICE_PROCESS	ICE Processing	USIT-E	Yes	
IMAR	Image Rotation	USIT-E	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	18.79	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	0.94	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1	
RAPID_OPTION	Rapid Access Computation Option	USIT-E	Off	
RCOD	Reference Calibrator Outer Diameter	USIT-E	4.5	in
RCSO	Reference Calibrator Standoff	USIT-E	0.842	in
RCTH	Reference Calibrator Thickness	USIT-E	0.216	in



RCTH	Reference Calibrator Thickness	USIT-E	0.216	in
SDNV	Number of Vertical Samples used for Micro-debonding Computation	USIT-E	5	
SDTHOR	Acoustic Impedance STD Horizontal Threshold for Micro-debonding	USIT-E	0.5	Mrayl
SDTVR	Acoustic Impedance STD Vertical Threshold for Micro-debonding	USIT-E	0.3	Mrayl
SOCN	Standoff Distance	EDTC-B	0.125	in
SOCO	Standoff Correction Option	EDTC-B	No	
TCUB	T^3 Processing Level	USIT-E	Loop	
TD	Total Measured Depth	Borehole	12889	ft
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
TPOS_EDTC	Tool Position: Centered or Eccentered	EDTC-B	Eccentered	
U-USIT_DFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	1.8	Mrayl
UFGDE	Fiberglass Density	USIT-E	16.27	lbm/gal
UFGPS	Fiberglass Processing Selection	USIT-E	No	
UFGVL	Fiberglass Velocity	USIT-E	9678.48	ft/s
USI_FSOD	USIT USI Fluid Slowness Fits Casing Outer Diameter	USIT-E	0_OFF	
USI_FVEL_SEL	USI Fluid Velocity Selection	USIT-E	Automatic	
USI_ZMUD_SEL	USI Mud Impedance Selection	USIT-E	FreePipe Norm.	
THDP	Thickness Detection Policy	USIT-E	Fundamental	
VCAS	Ultrasonic Transversal Velocity in Casing	USIT-E	51.4	us/ft
ZCAS	Acoustic Impedance of Casing	USIT-E	46.25	Mrayl
ZINI	Initial Estimate of Cement Impedance	USIT-E	-1	Mrayl
ZMUD	Acoustic Impedance of Mud	Borehole	1.9	Mrayl
ZTCM	Acoustic Impedance Threshold for Cement	USIT-E	2.6	Mrayl
ZTGS	Acoustic Impedance Threshold for Gas	USIT-E	0.3	Mrayl

Tool Control Parameters				
ONE: Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	18	dB
U-USIT_DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
DOT(DOS)	Distance between Opposite Transducer Faces	USIT-E	1.756	in
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	6750	ft/h
MOTOR_PROTECT	Motor Protection	USIT-E	On	
TMUC	Type of Mud	USIT-E	BRI	
UACLV_PERM	Ultrasonic ACLV Permanent	USIT-E	No	
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
UPAT	USIT Emission Pattern	USIT-E	Pattern 500 KHz	
UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 3.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	7600	ft
USSP	Ultrasonic Service	USIT-E	USI	
VRES	Vertical Resolution	USIT-E	3.0 in	
WINB	Window Begin Time	USIT-E	Time Zoned	us
WINE	Window End Time	USIT-E	73.83	us

TITLE	Tool Control Parameters
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# Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth ( ft )	Stop Depth ( ft )
EMXV	65	07-May-2015 11:58:03	07-May-2015 11:59:35	7610.43	7588.98
EMXV	70	07-May-2015 11:59:35	07-May-2015 11:59:41	7588.98	7587.36
EMXV	75	07-May-2015 11:59:41	07-May-2015 11:59:51	7587.36	7584.73
EMXV	80	07-May-2015 11:59:51	07-May-2015 11:59:59	7584.73	7582.58
EMXV	85	07-May-2015 11:59:59	07-May-2015 12:00:07	7582.58	7580.32
EMXV	90	07-May-2015 12:00:07	07-May-2015 12:02:04	7580.32	7548.42
EMXV	85	07-May-2015 12:02:04	07-May-2015 12:02:30	7548.42	7541.49
EMXV	80	07-May-2015 12:02:30	07-May-2015 12:02:52	7541.49	7535.53
EMXV	75	07-May-2015 12:02:52	07-May-2015 12:03:11	7535.53	7530.41
EMXV	70	07-May-2015 12:03:11	07-May-2015 12:03:26	7530.41	7526.32
EMXV	73	07-May-2015 12:03:26	07-May-2015 12:06:40	7526.32	7324.73
EMXV	75	07-May-2015 12:06:40	07-May-2015 12:08:07	7324.73	7170.19
EMXV	70	07-May-2015 12:08:07	07-May-2015 12:11:28	7170.19	6809.11
EMXV	66	07-May-2015 12:11:28	07-May-2015 12:12:54	6809.11	6652.38
WINB	33.83	07-May-2015 11:58:03	07-May-2015 12:00:36	7610.43	7572.44
WINB	29.18	07-May-2015 12:00:36	07-May-2015 12:12:54	7572.44	6652.38

All depth are at tool zero.

XYZ

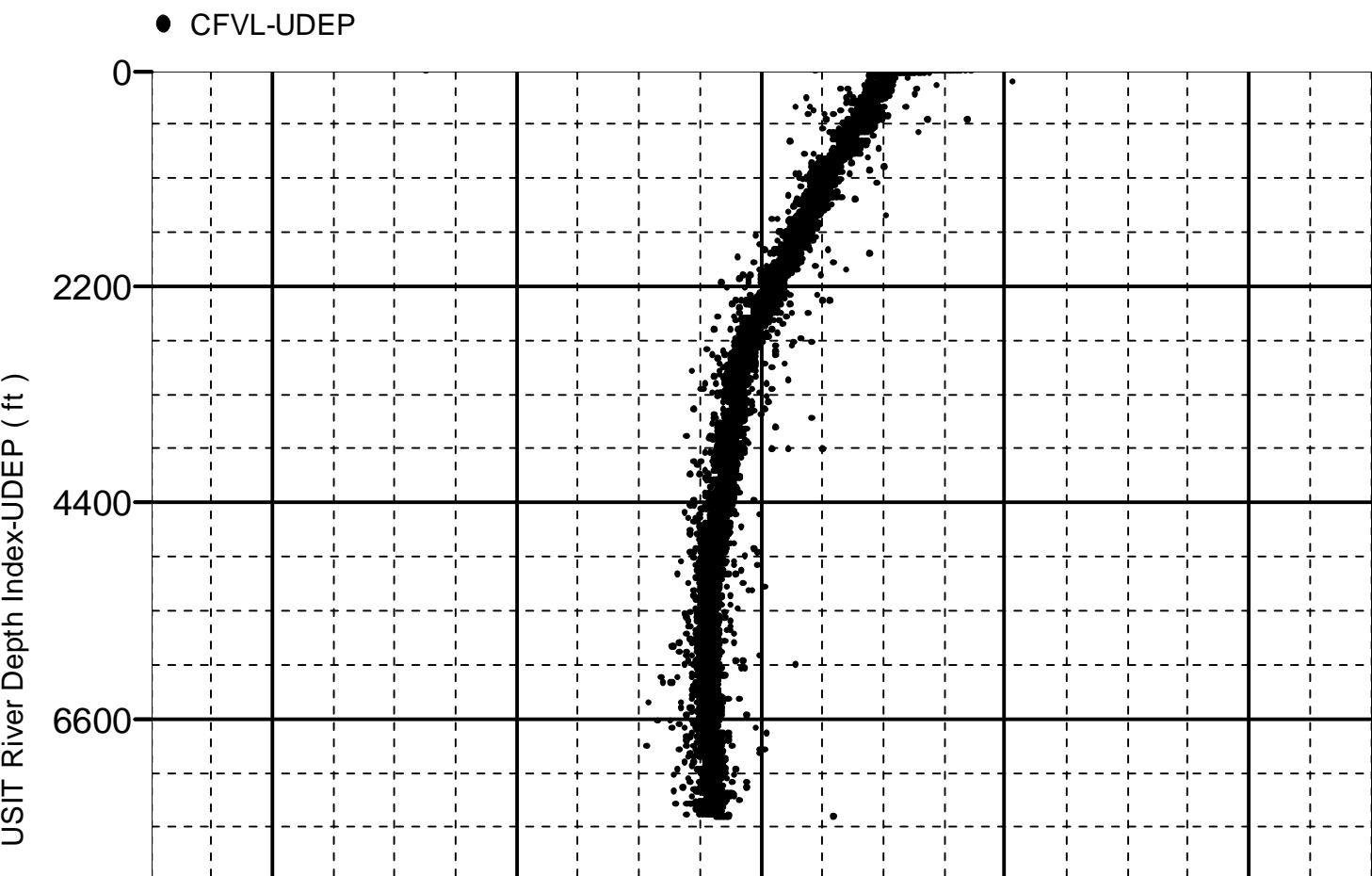
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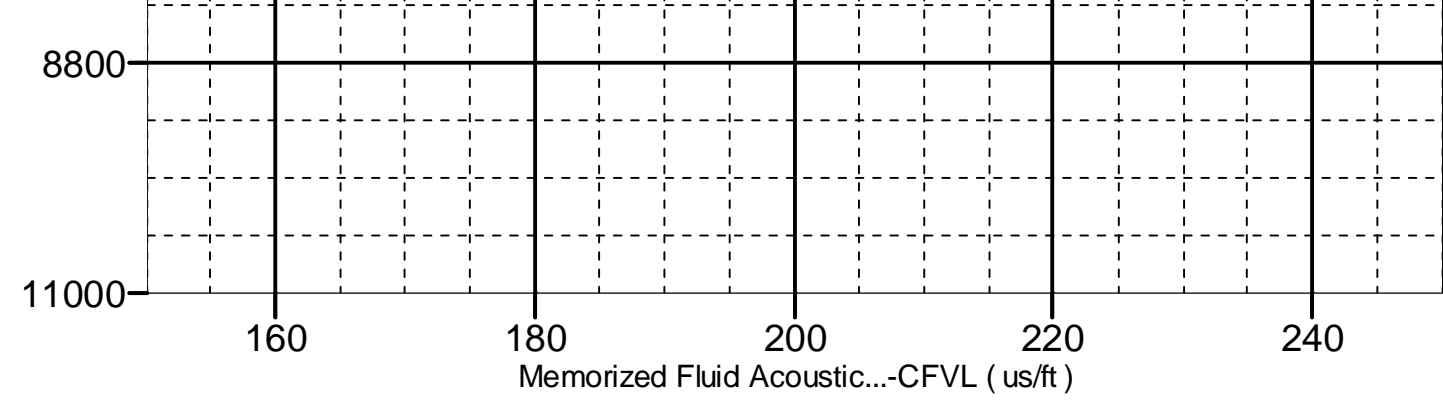
ONE: Main[3]:Up:S005

## Fluid Acoustic Slowness vs Depth

### 2D Cross Plot

Index Range: From 7613.00 to 5.50 ft

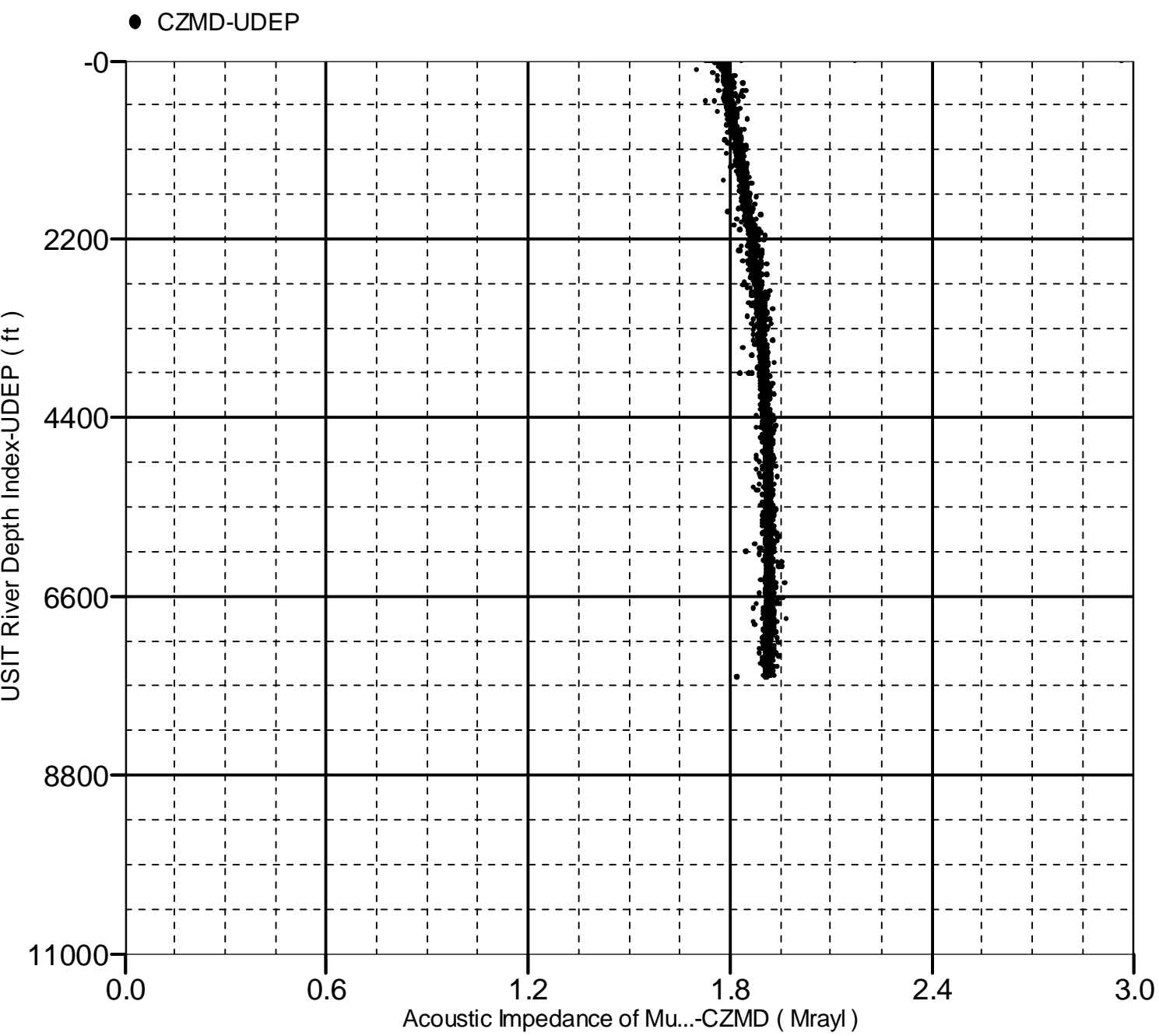




# Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 7613.00 to 5.50 ft



Company:	Kerr McGee Oil & Gas Onshore LP	Schlumberger
Well:	Butterball 36N-10HZ	
Field:	WATTENBERG	
County:	WELD	
State:	COLORADO	
Ultrasonic Imager		
Cement Evaluation		
Gamma Ray - CCL Log		