

Company: Noble Energy Inc

Well: Burton K25-67-1HN

Field: Wattenberg

County: Weld State: Colorado

Ultrasonic Imager (2500 psi)

Cement Evaluation

Gamma Ray - CCL Log

County: Weld

Field: Wattenberg

Location: SWNW Sec.25, T4N, R66W

Well: Burton K25-67-1HN

Company: Noble Energy Inc

Location:

SWNW Sec.25, T4N, R66W

SHL: 2305' FNL x 265' FWL

Lat: 40.283890/ Long: -104.733940

Elev.: K.B. 4791.00 ft

G.L. 4775.00 ft

D.F. 4790.00 ft

Permanent Datum:

Ground Level

Elev.: 4775.00 f

Log Measured From:

Kelly Bushing

16.00 ft

above Perm.Datum

Drilling Measured From:

Kelly Bushing

API Serial No.

05-123-38366

Section: 25

Township: 4N

Range: 66W

Logging Date

06-Dec-2014

Run Number	Run 2	
Depth Driller	7482.00 ft	
Schlumberger Depth	6400.00 ft	
Bottom Log Interval	6400.00 ft	
Top Log Interval	15.00 ft	
Casing Fluid Type	Brine	
Salinity		
Density	8.4 lbm/gal	
Fluid Level	0.00 ft	
BIT/CASING/TUBING STRING		
Bit Size	8.75 in	
From	674.00 ft	
To	7482.00 ft	
Casing/Tubing Size	7 in	
Weight	26 lbm/ft	
Grade	P110	
From	0.00 ft	
To	7472.70 ft	
Max Recorded Temperatures	224 degF	
Logger on Bottom	06-Dec-2014	11:40:00
Unit Number	3022	Ft. Morgan, CO
Recorded By	Aleksei Bekhterev	
Witnessed By	Jon Lefor	

Disclaimer

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13.1 USI Composite

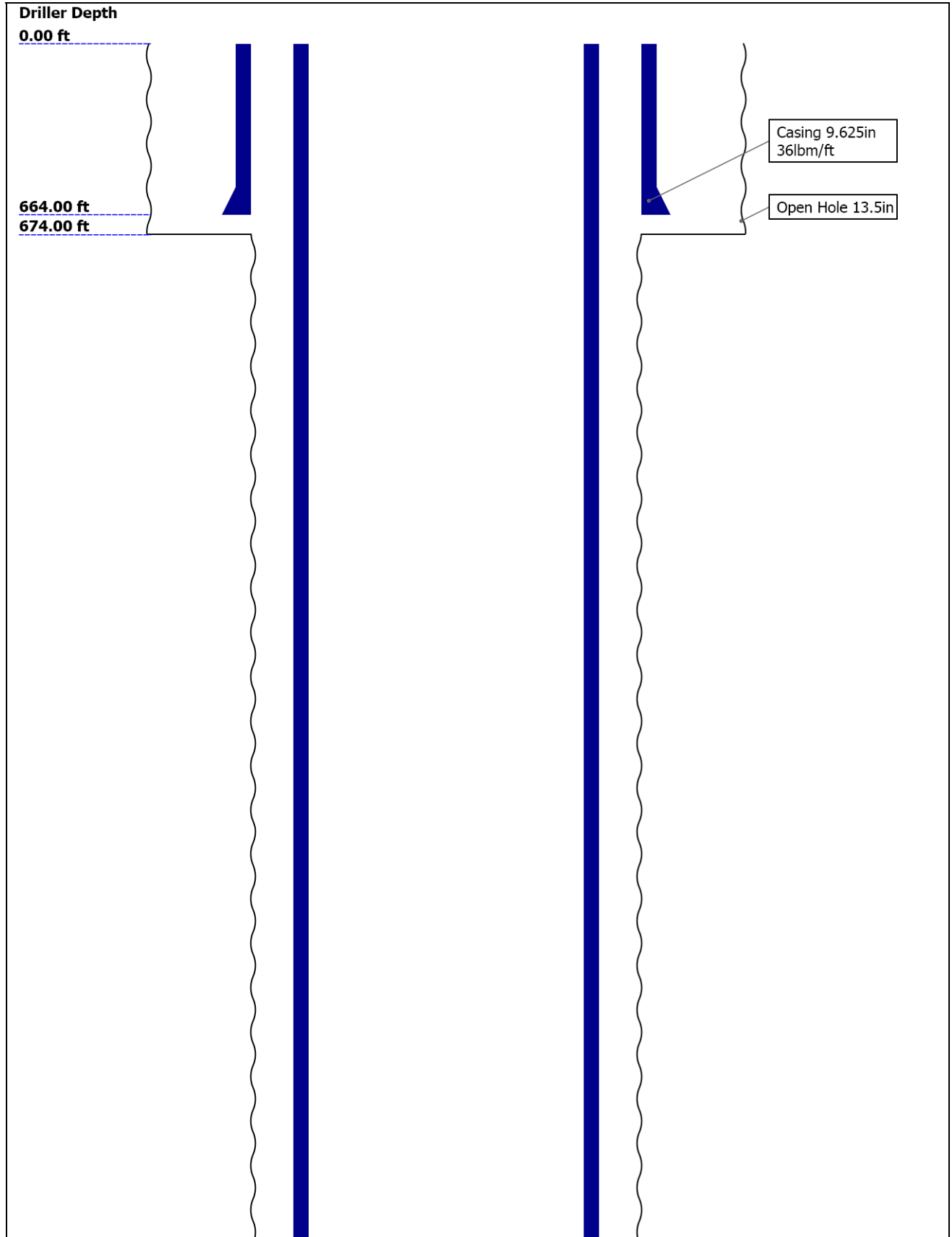
13.2 Parameter Listing

14. USI Cement

14.1 USI Cement

14.2 Parameter Listing

Well Sketch



7472.70 ft

7482.00 ft

Casing 7in
26lbm/ft

Open Hole 8.75in

Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	13.5	8.75				
Top Driller (ft)	0	674				
Top Logger (ft)	0	674				
Bottom Driller (ft)	674	7482				
Bottom Logger (ft)	674	7482				
Casing						
Size (in)	9.625	7				
Weight (lbm/ft)	36	26				
Inner Diameter (in)	8.921	6.276				
Grade	J55	P110				
Top Driller (ft)	0	0				
Top Logger (ft)	0	0				
Bottom Driller (ft)	664	7472.7				
Bottom Logger (ft)	664	7472.7				

Operational Run Summary

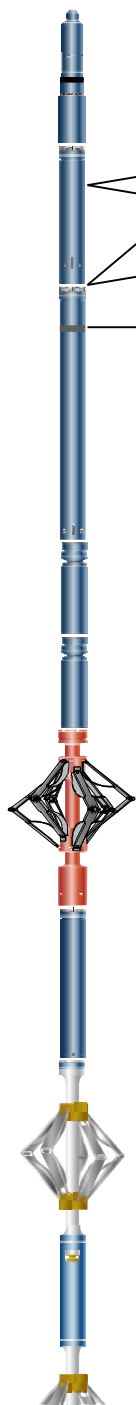
Parameter (unit)	Run 2					
Date Log Started	06-Dec-2014					
Time Log Started	10:13:52					
Date Log Finished	06-Dec-2014					
Time Log Finished	13:02:33					
Top Log Interval (ft)	15.00					
Bottom Log Interval (ft)	6400.00					
Total Depth (ft)	6404.10					
Max Hole Deviation (deg)	0.00					
Azimuth of Max Deviation (deg)	0.00					
Bit Size (in)	8.750					
Logging Unit Number	3022					
Logging Unit Location	Ft. Morgan, CO					
Recorded By	Aleksei Bekhterev					
Witnessed By	Jon Lefor					

Service Order Number	CY37-00067					
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Borehole Fluids						
Parameter(unit)	Run 2					
Fluid Type	Water					
Fluid Name	Brine					
Max Recorded Temperatures (degF)	224					
Salinity (ppm)	0					
Density (lbm/gal)	8.4					
Date Logger on Bottom	06-Dec-2014					
Time Logger on Bottom	11:40:00					
Total Solid (%)						
High Gravity Solids (%)						

Remarks and Equipment Summary

Run 2: Toolstring				Run 2: Remarks	
Equip name	Length	MP name	Offset	Toolstring ran as per toolsketch	
LEH-QT	34.75			13.6 single slurry cement	
LEH-QT				Retriveable plug is set at 6404 ft (30ft above top of the liner) as per client request	
DTC-H:880	31.84			Repeat pass is done with 0 psi	
3		CTEM	30.94	Station log performed at 5200.1 ft to monitor microannulus closing	
ECH-KC:1035		HV	0.00	Microannulus closed at 2500 psi, main pass is done with 2500 psi	
4		ToolStat	28.84	Log started 5 ft above retrieveable plug	
DTC-H:8803		us		Temperature at the bottom: 224 degF	
		TelStatus	28.84	Top of the cement 870 ft	
SGT-N:984	28.84			Crew: Jacob Jump, Ian Derry, Aleksei Bekhterev	
1		GR	27.92	Thank you for choosing Schlumberger Wireline!	
SGH-K:2693					
SGC-TB:9841					
SGD-TAA:213					
65					
AH-184[2]	23.34				
AH-184[1]	21.34		3906		
CME-AF	19.34		8212		
USIT-E:172	15.54				
2					
ECH-MFA:19					
92					
USAC-A:1722					
USIS-A:999					
USSC-B:1794					
USRS-B:875					
USI-SENSOR					



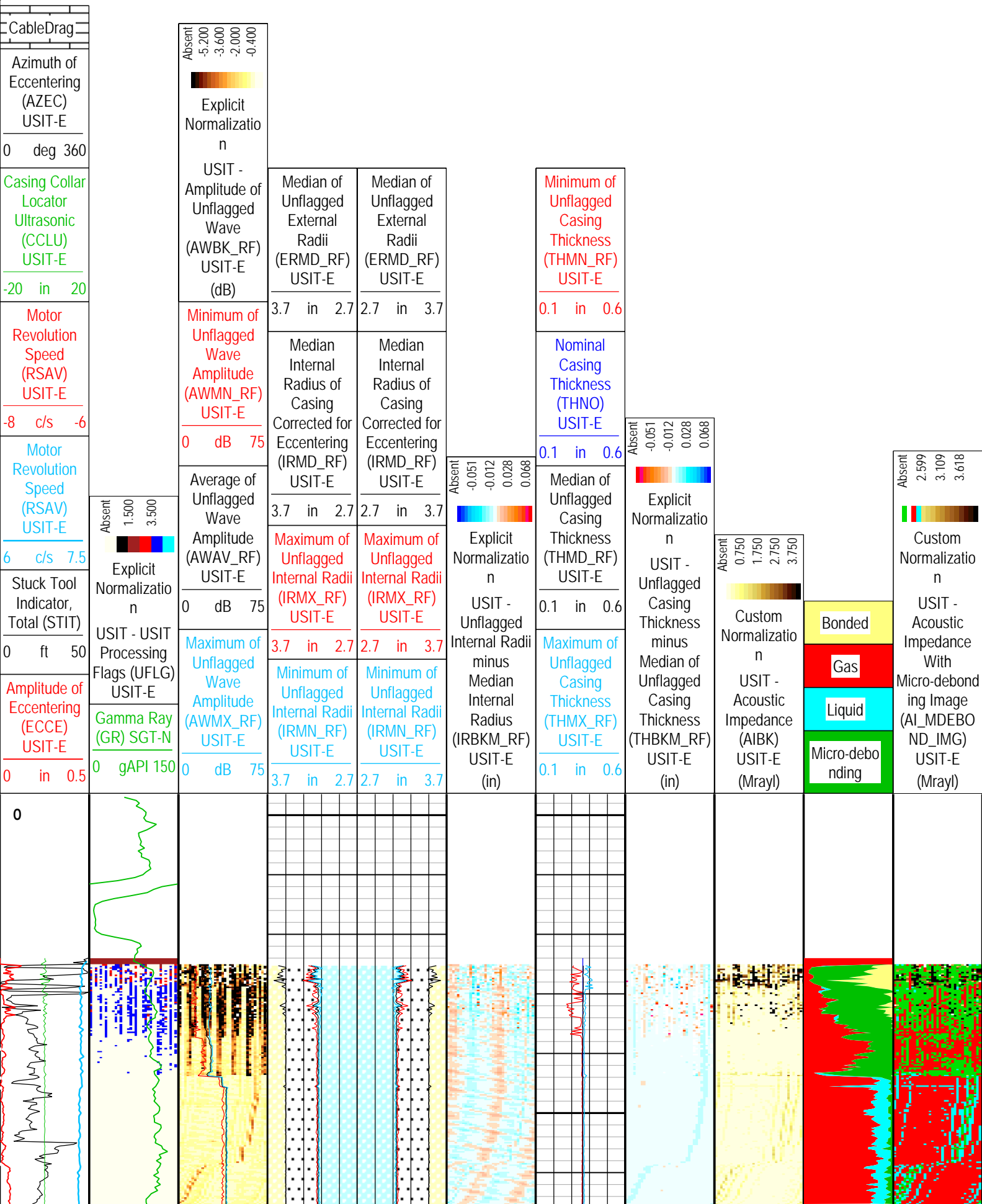
 <p>USI Sens 0.38 or TOOL_ZERO Head Tension</p> <p>Lengths are in ft Maximum Outer Diameter = 4.645 in Line: Sensor Location, Value: Gating Offset All measurements are relative to TOOL_ZERO</p>		
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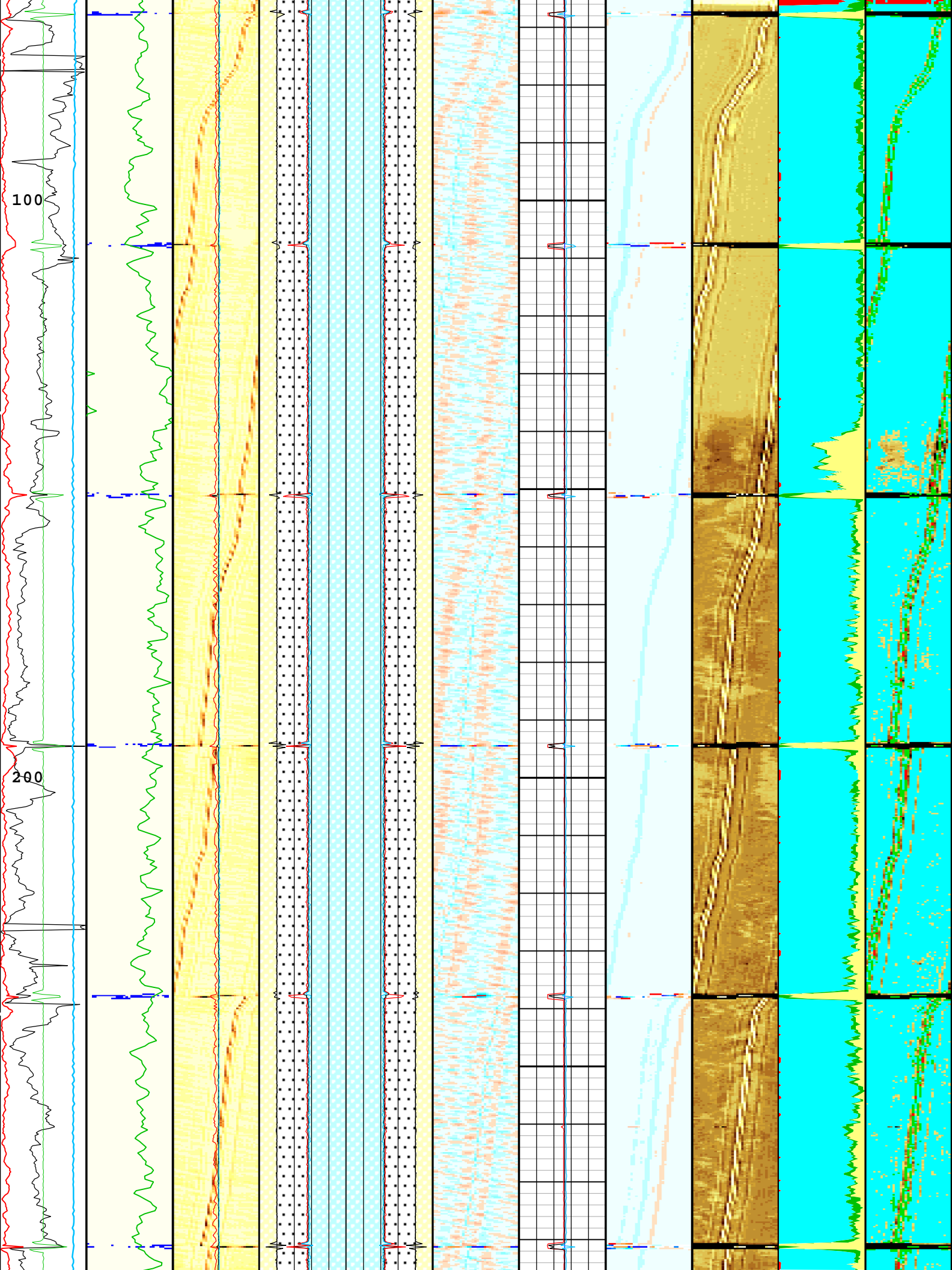
Depth Summary			
		Run 2	
Depth Measuring Device			
Type	IDW-B		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Calibration Cable Type			
Wheel Correction 1	0		
Wheel Correction 2	0		
Tension Device			
Type	CMTD-B/A		
Serial Number			
Calibration Date			
Calibrator Serial Number			
Number of Calibration Points	0		
Logging Cable			
Type	7-39P-LXS		
Serial Number			
Length	17000.00 ft		
Conveyance Type	Wireline		
Rig Type	Rigless		
Run 2:Depth Control Parameters		Depth Control Remarks	
Log Sequence	First Log In the Well	All Schlumberger depth procedures followed	
Rig Up Length At Surface		IDW used as primary depth device	
Rig Up Length At Bottom		Z-chart used as secondary depth reference	
Rig Up Length Correction			
Stretch Correction			
Tool Zero Check At Surface			

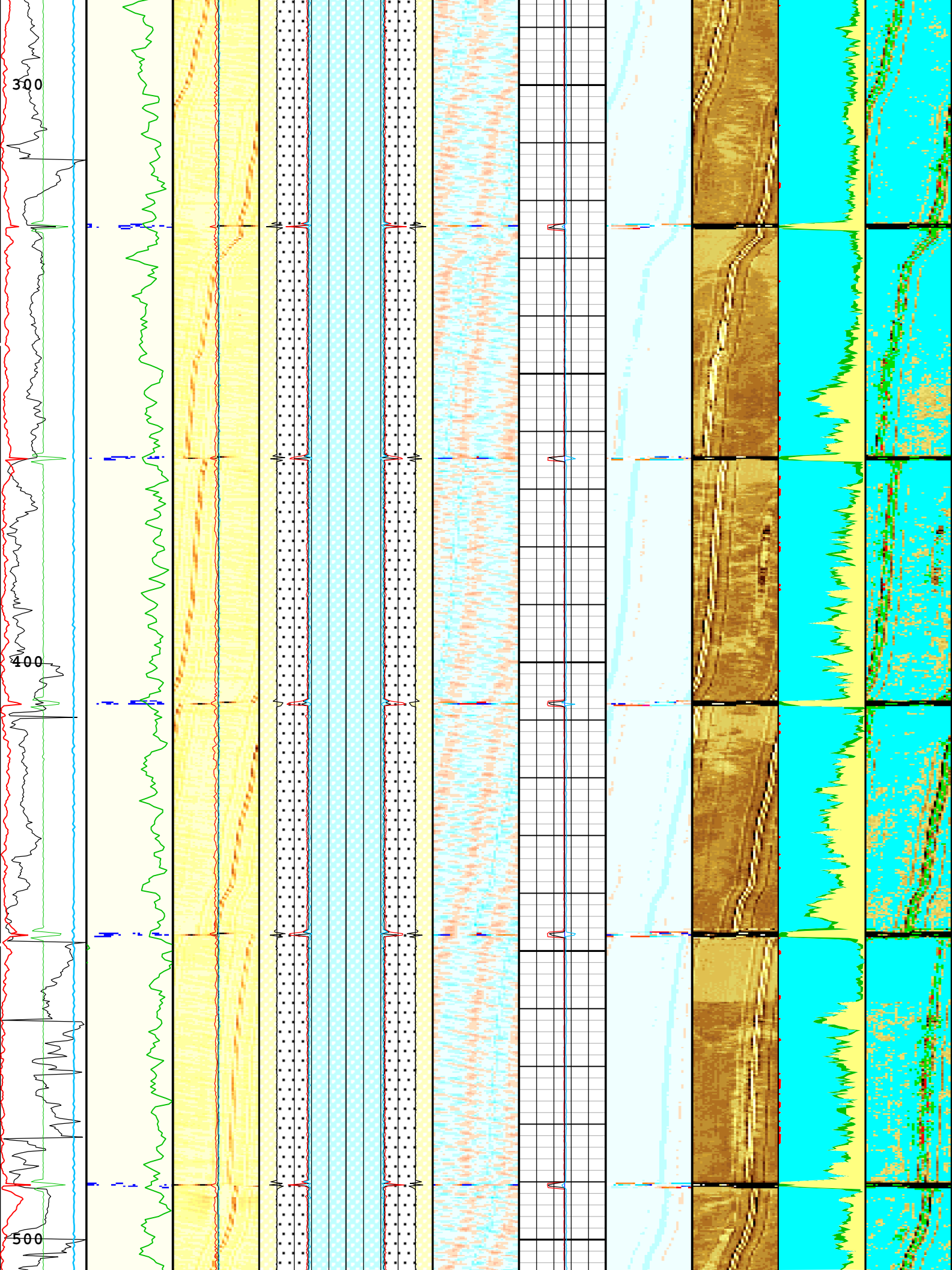
USI Composite			
USIT - Fluid Properties Measurement			
Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 4	Main[8]:Up	6398.98	24.23
Fluid Velocity = "Automatic". CFVL equals DFSL channel			
Start Depth(ft)	Stop Depth(ft)	Start Value(us/ft)	End Value(us/ft)
Mud Impedance = "FreePipe Norm.". Free Pipe normalization zone is : 14.44m(47.37ft) to 19.28m(63.24ft) MUD_N_FRP = 1.10 DFD = 1.01g/cm3(8.40lbm/gal) CZMD median computed in free pipe normalization interval = 1.65 MRayl			
Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)
Run 2			
USI Composite			

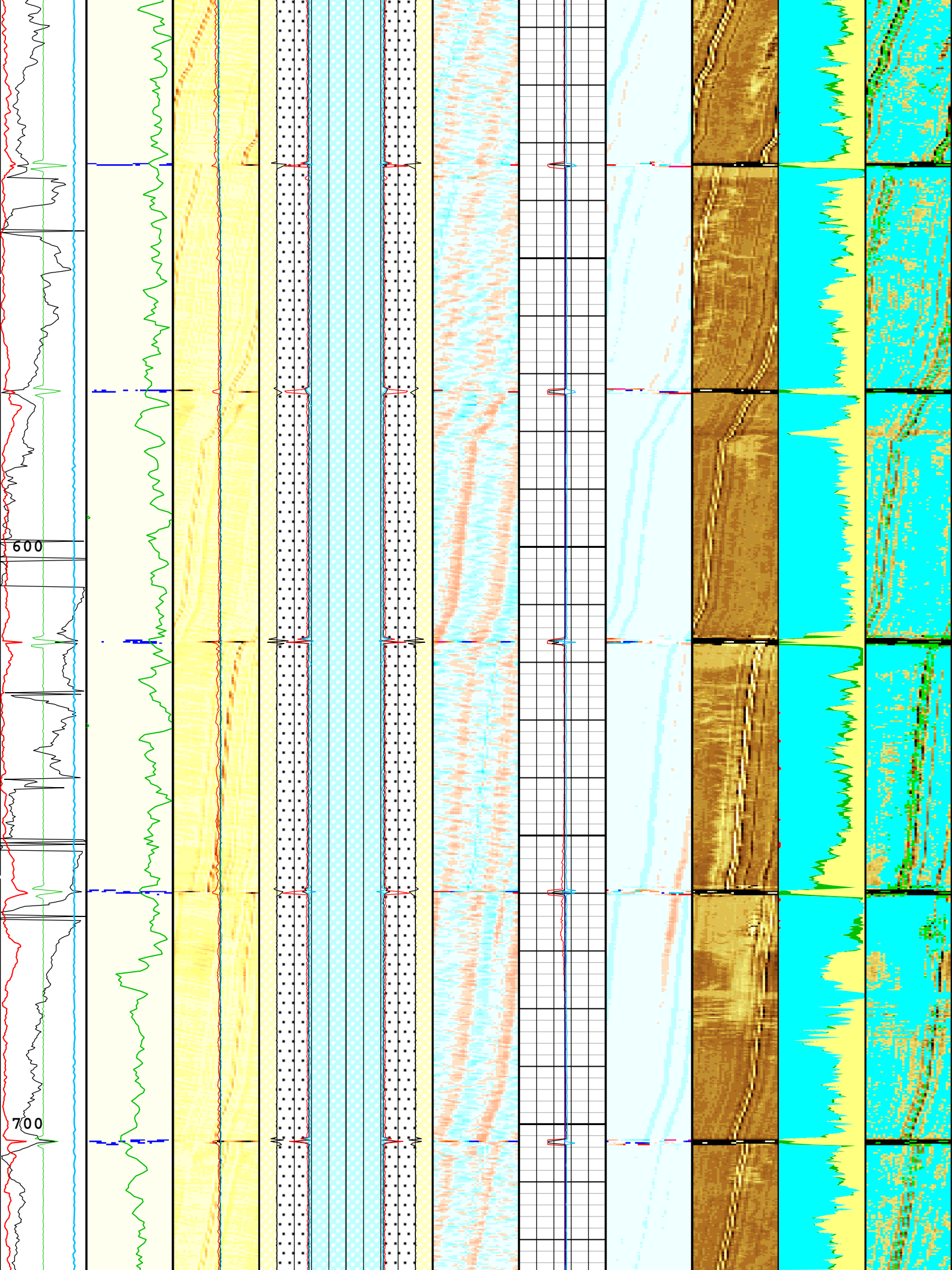
		Current Depth(ft)	Well Depth (ft)	1625.27 ft
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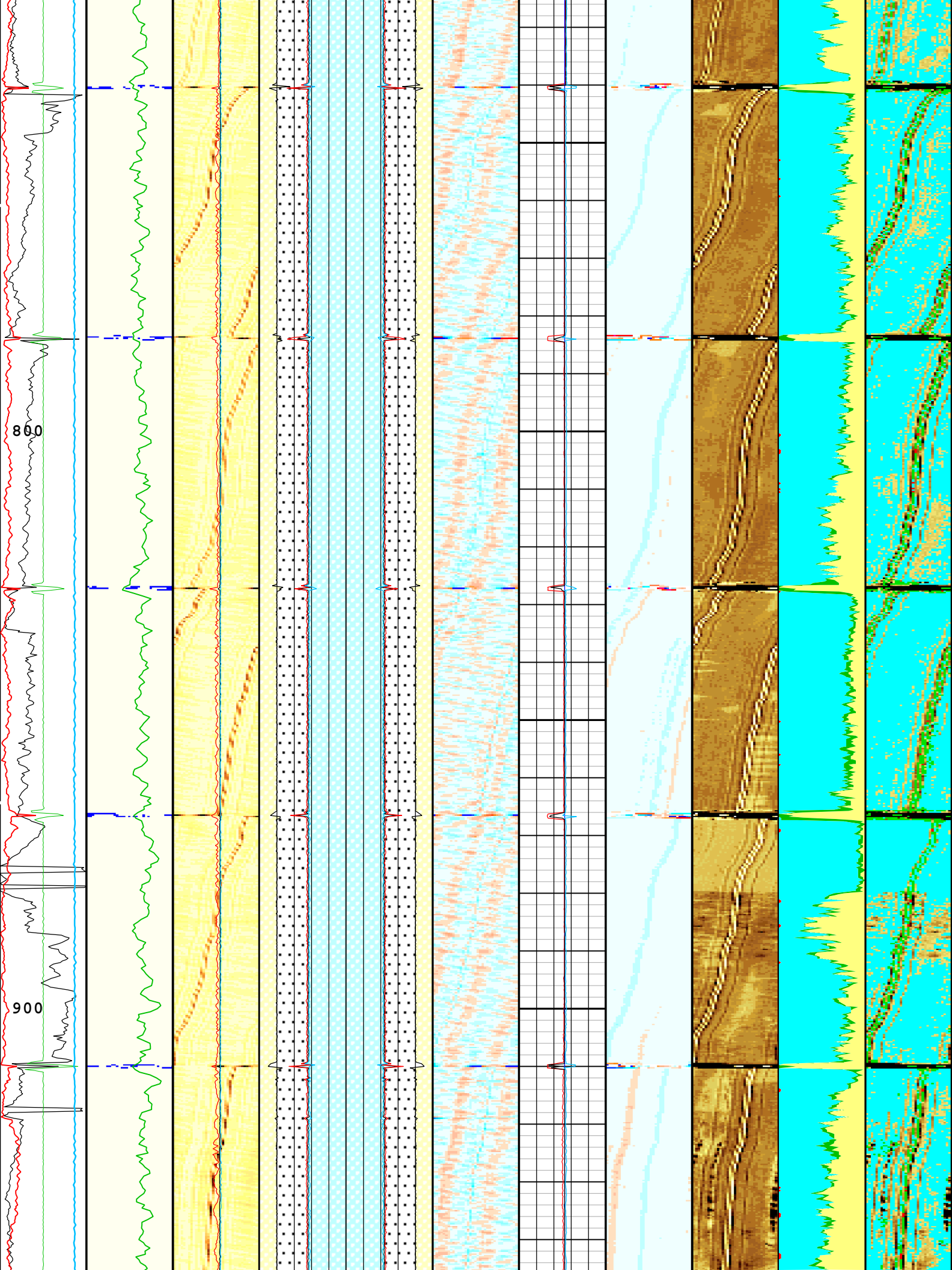
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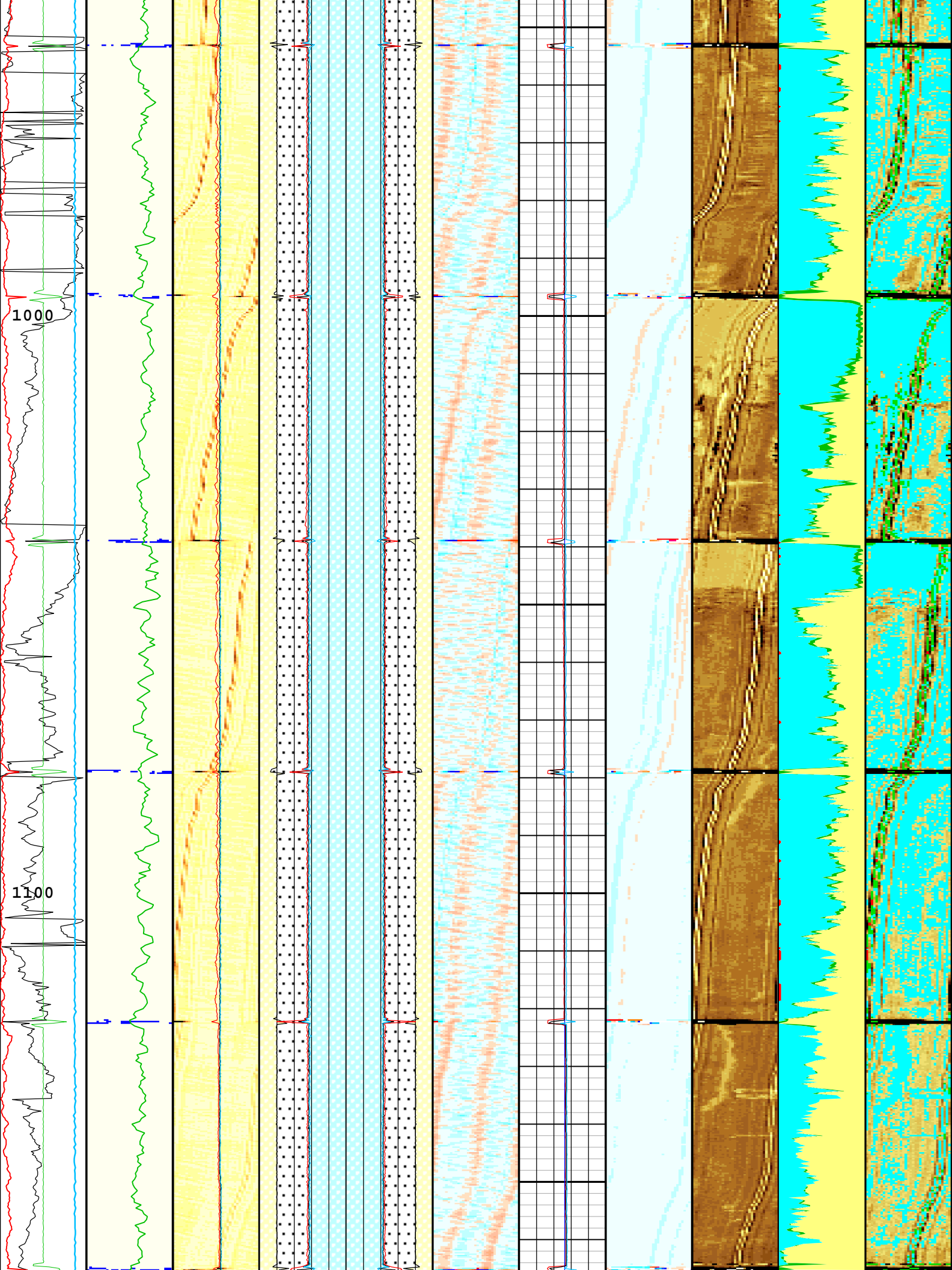


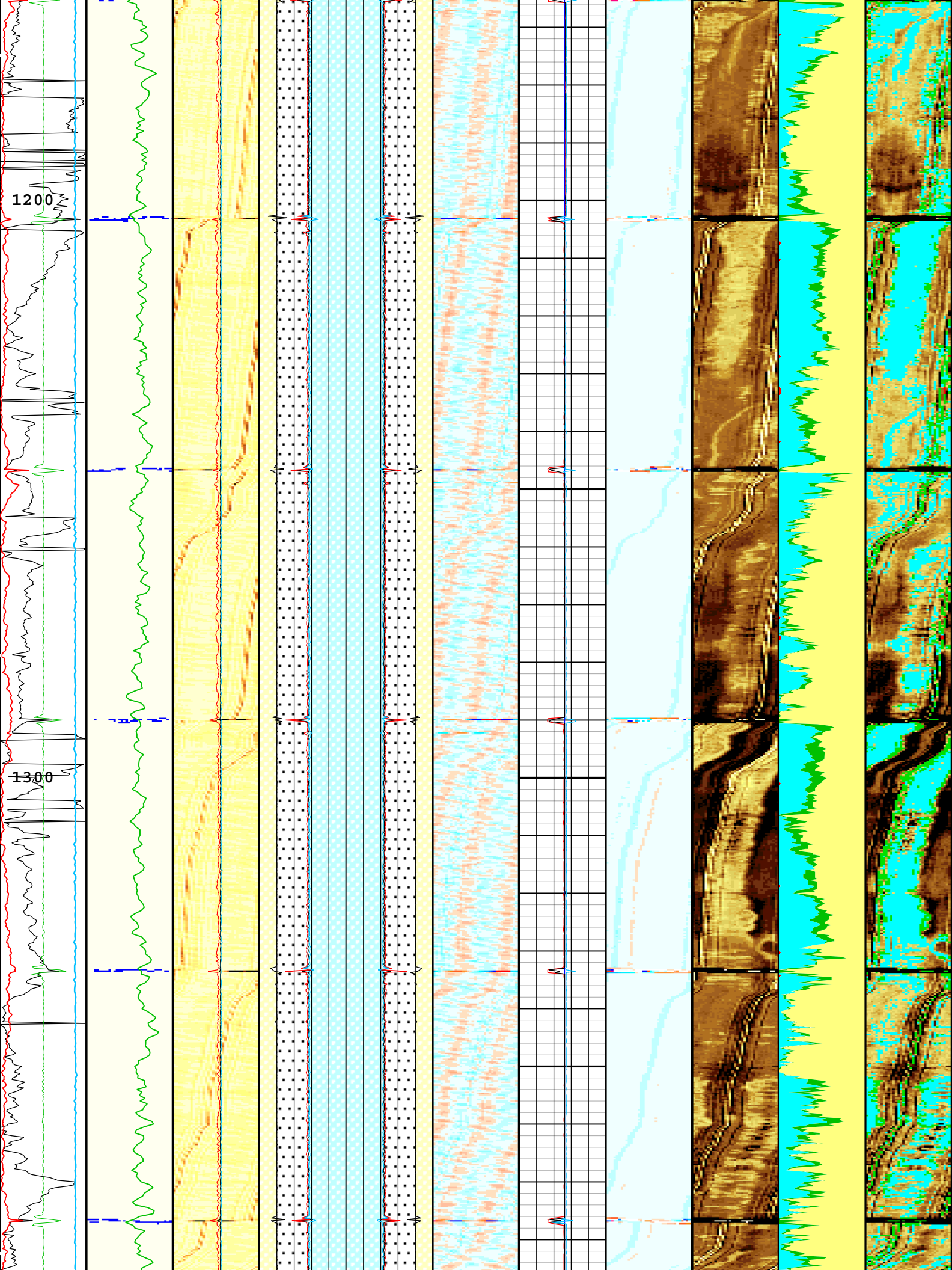


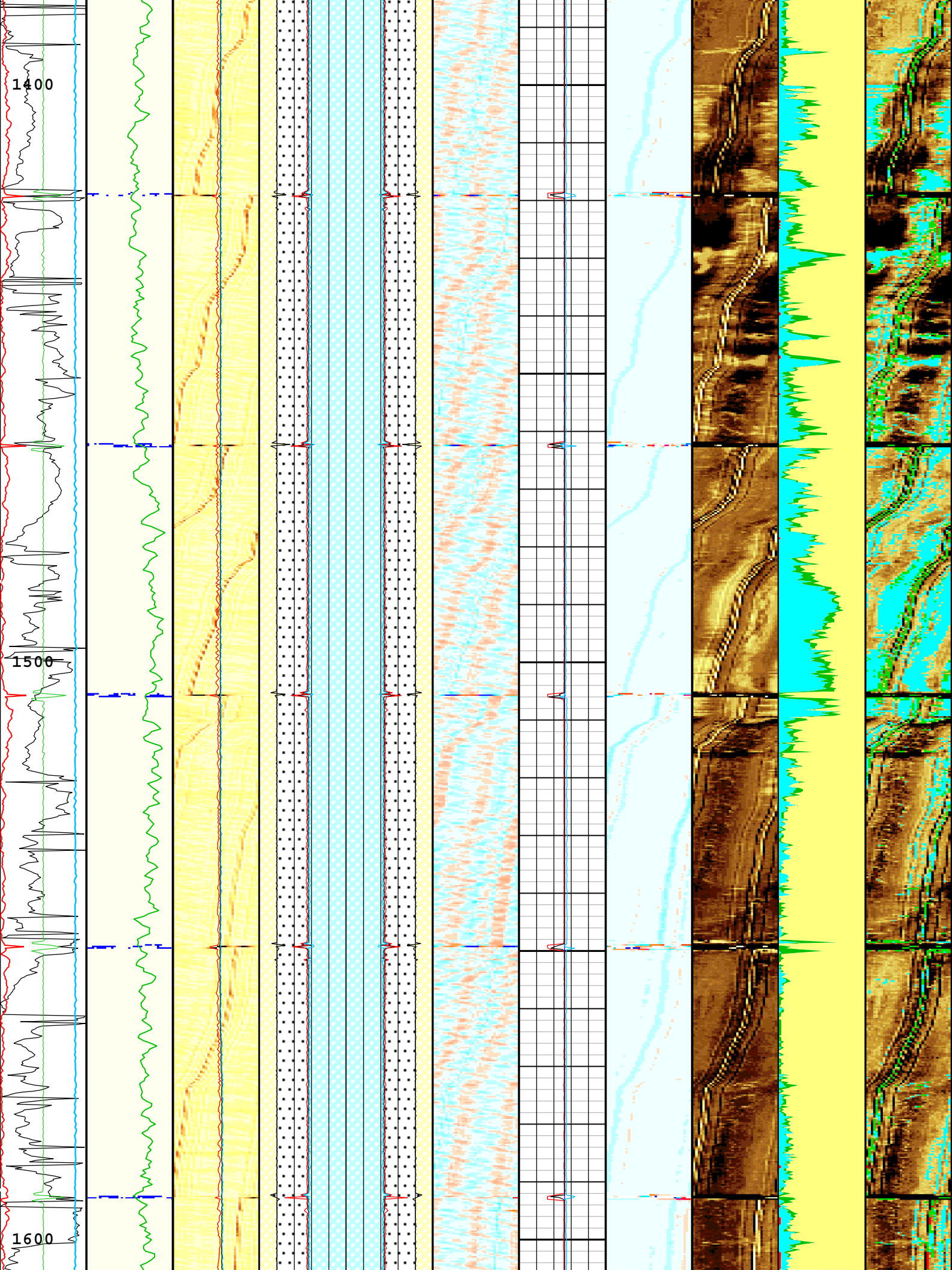


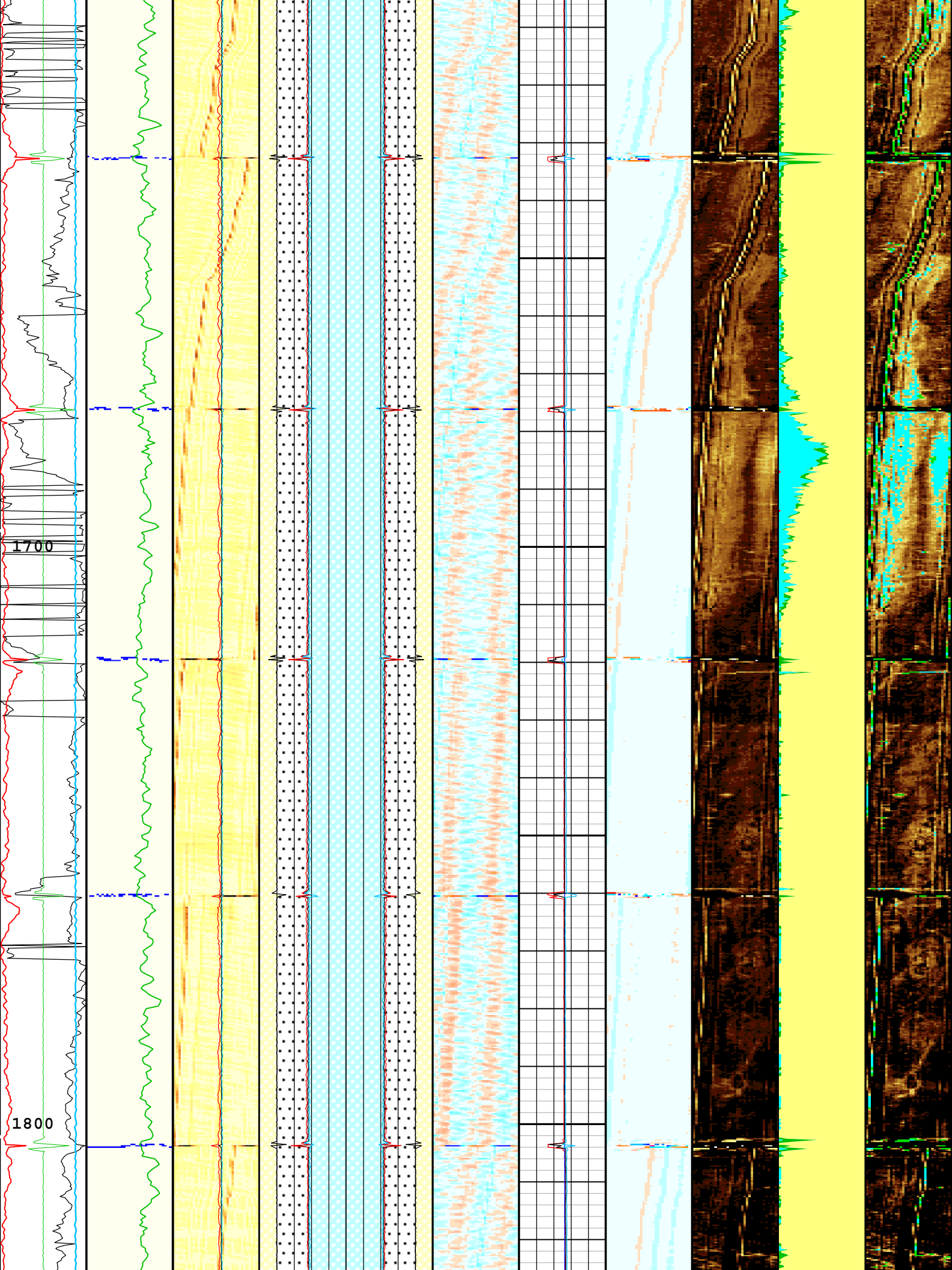


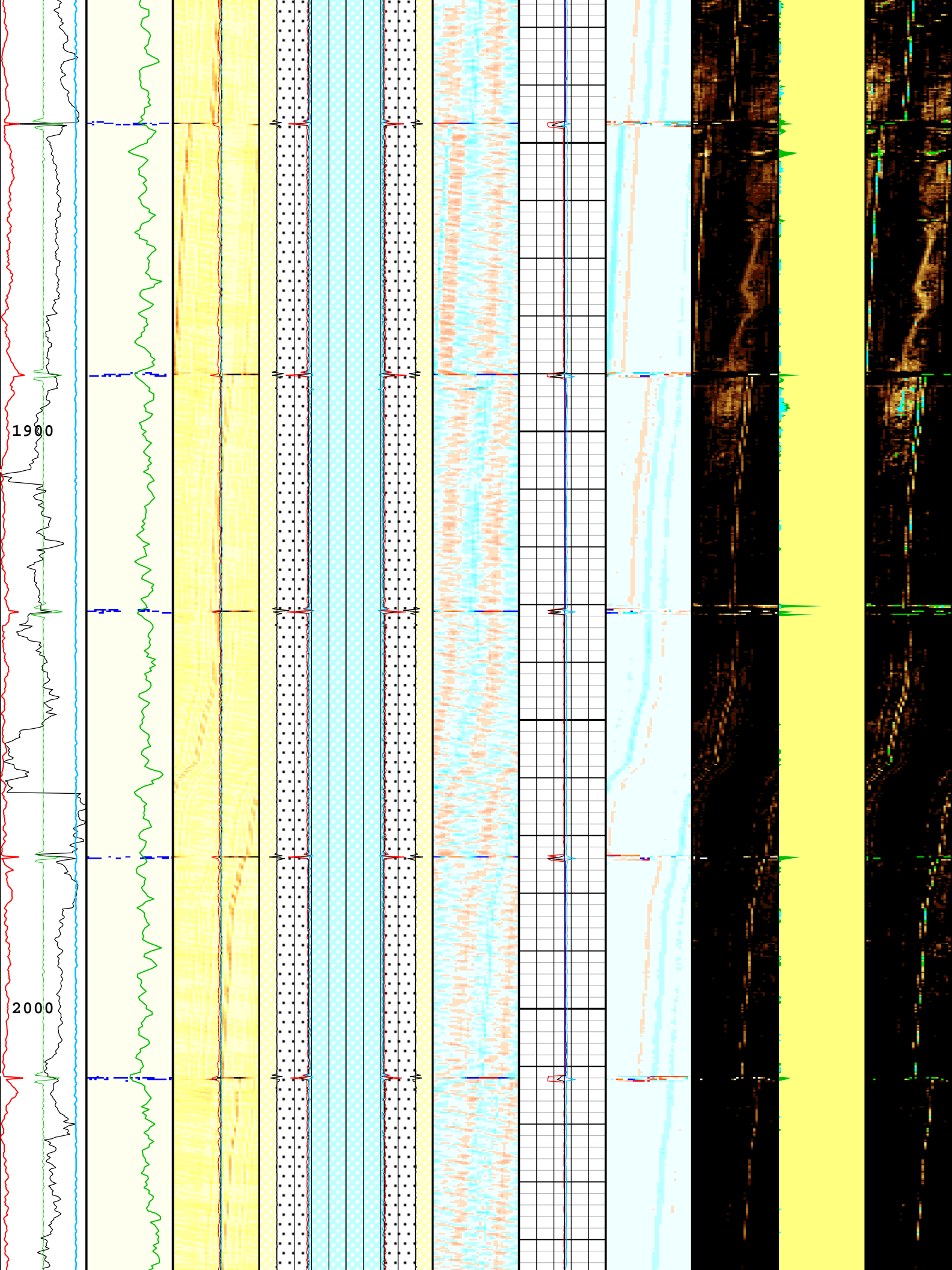


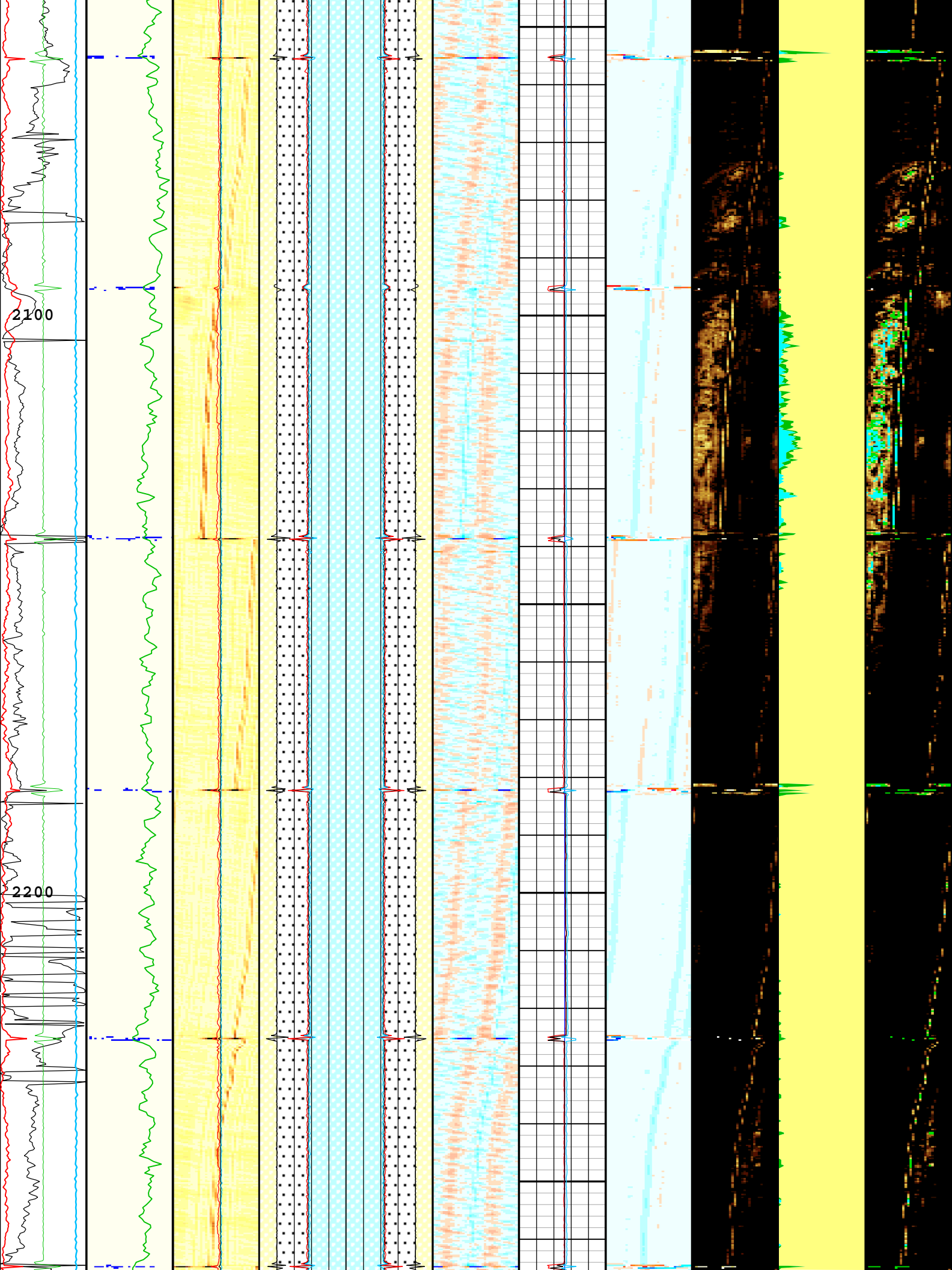


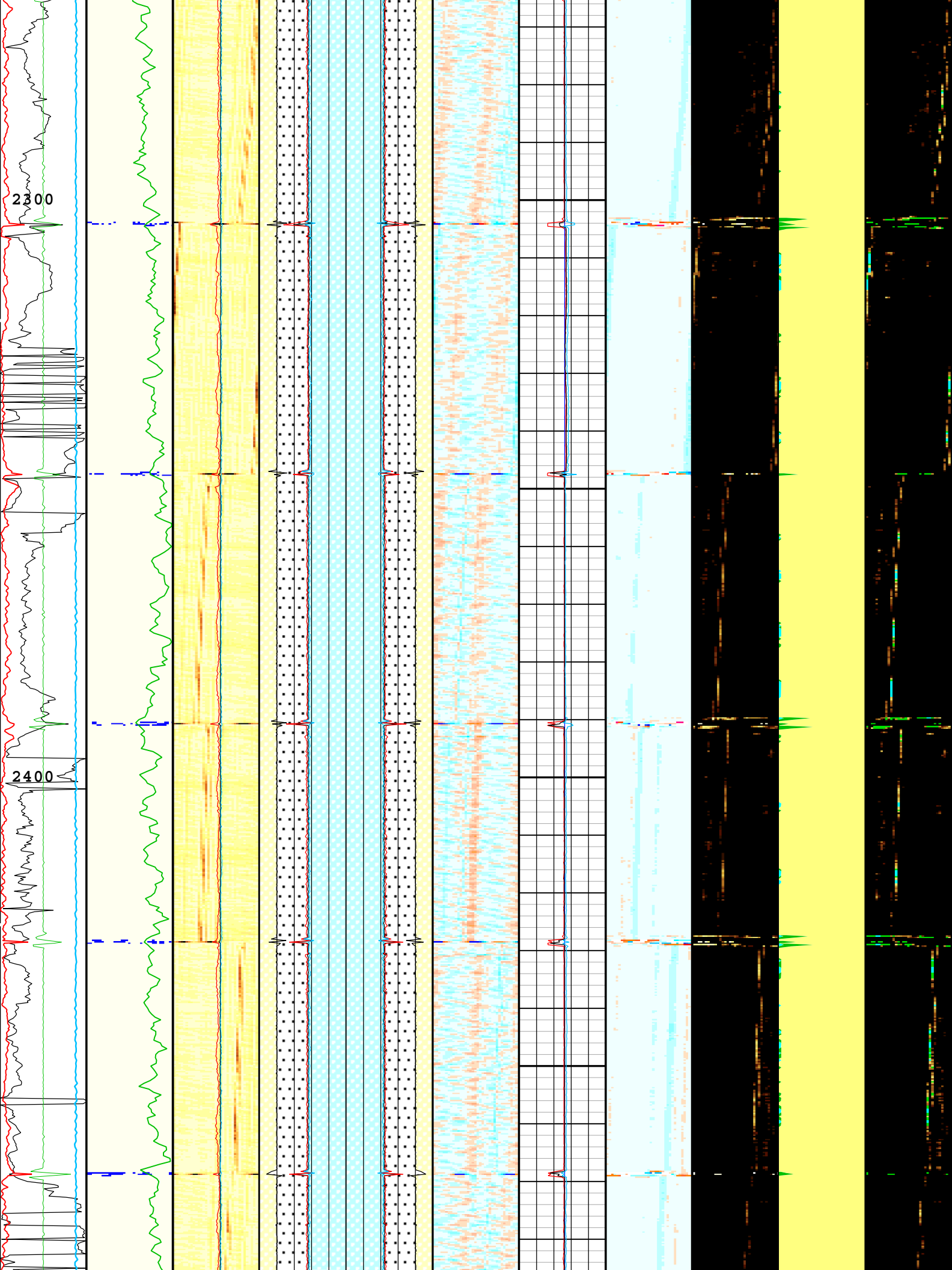


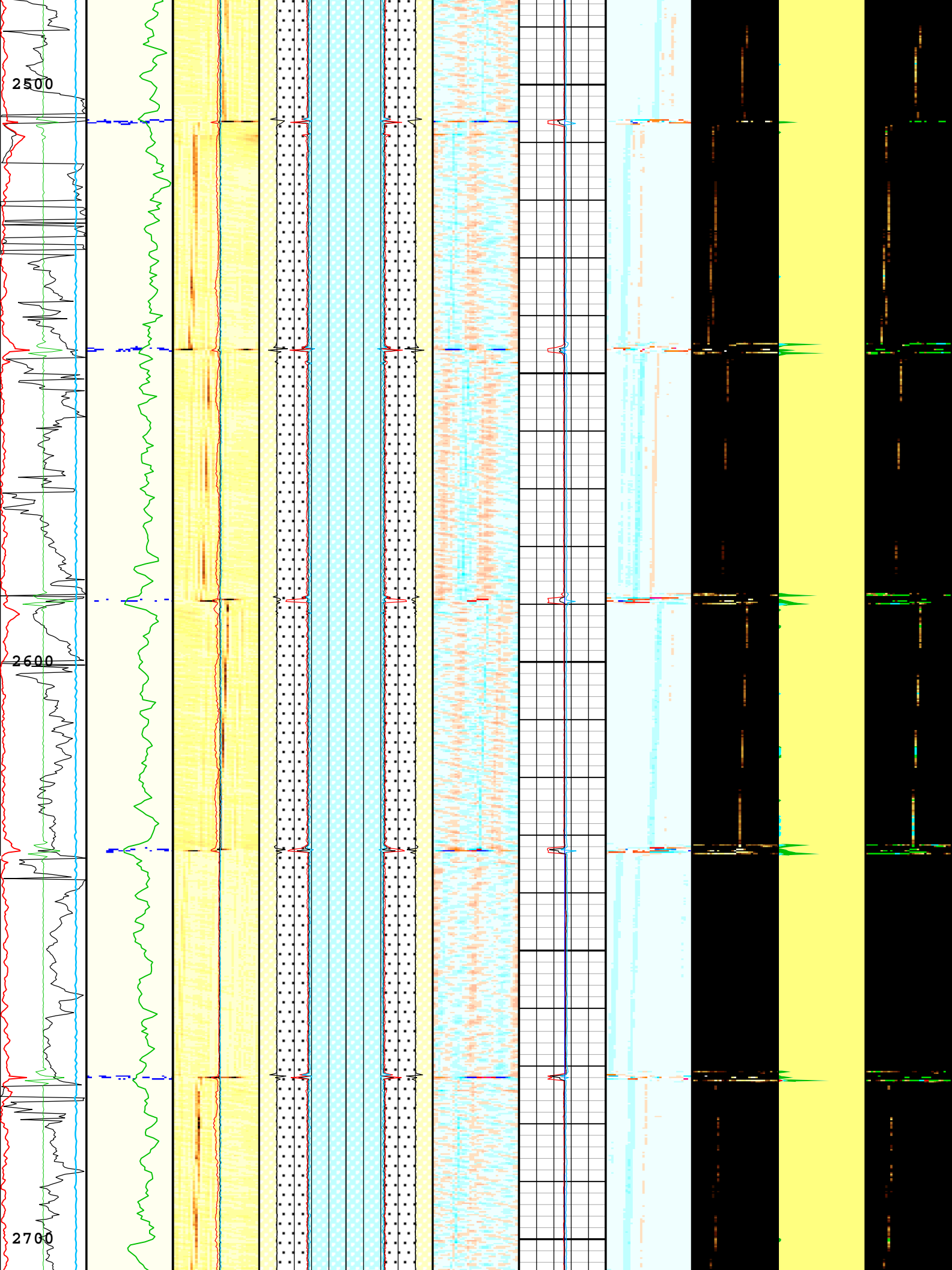


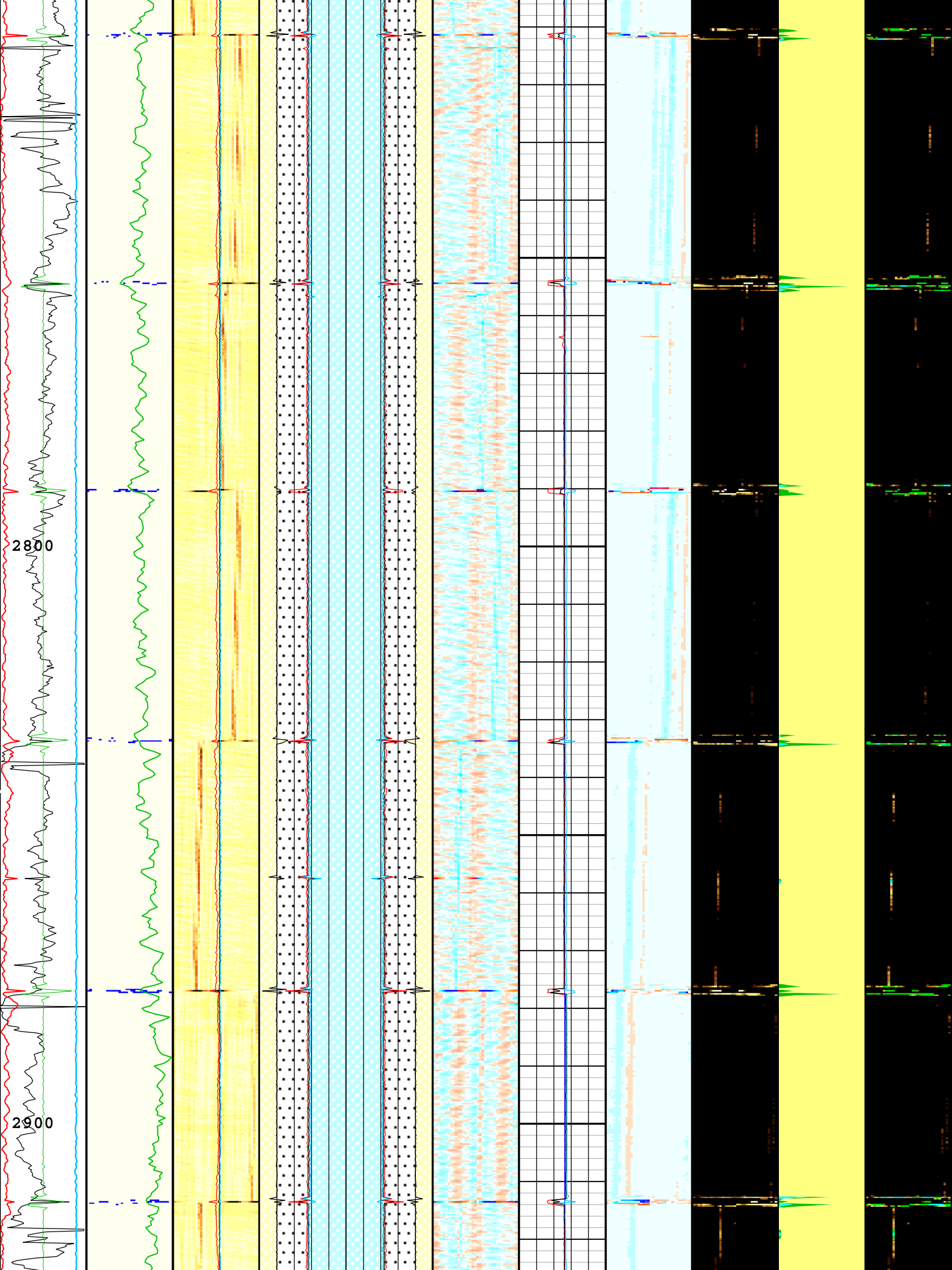


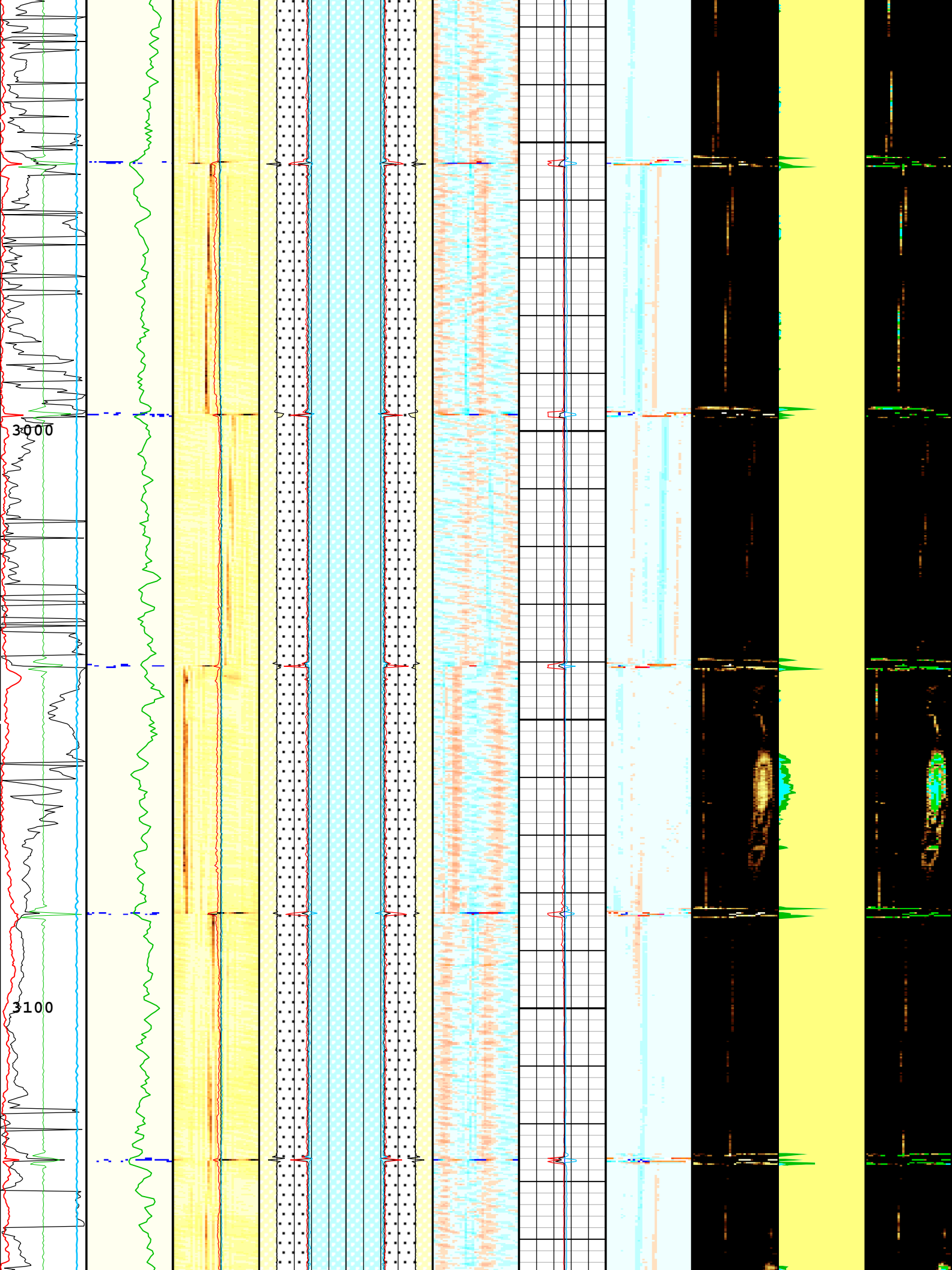


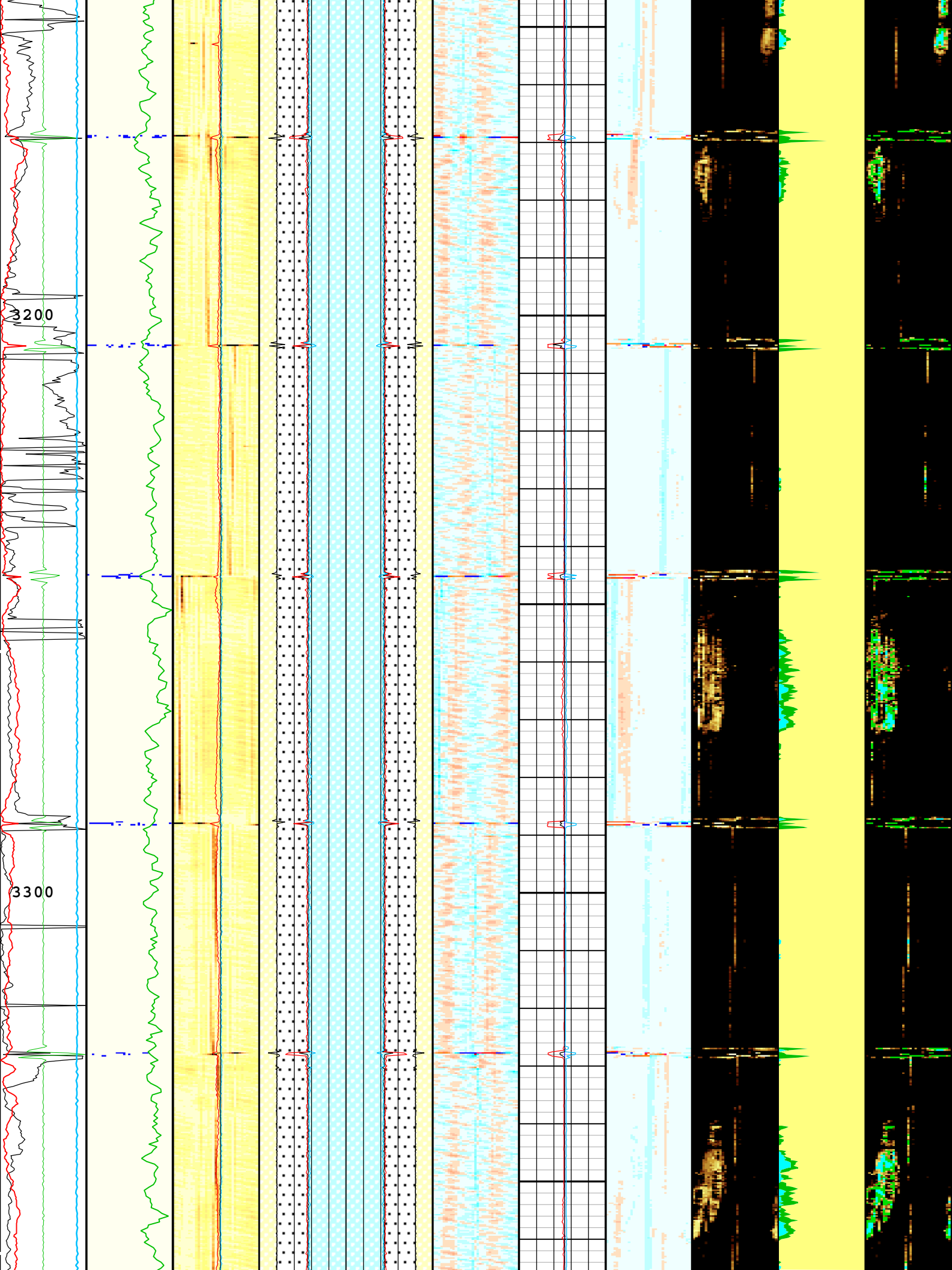


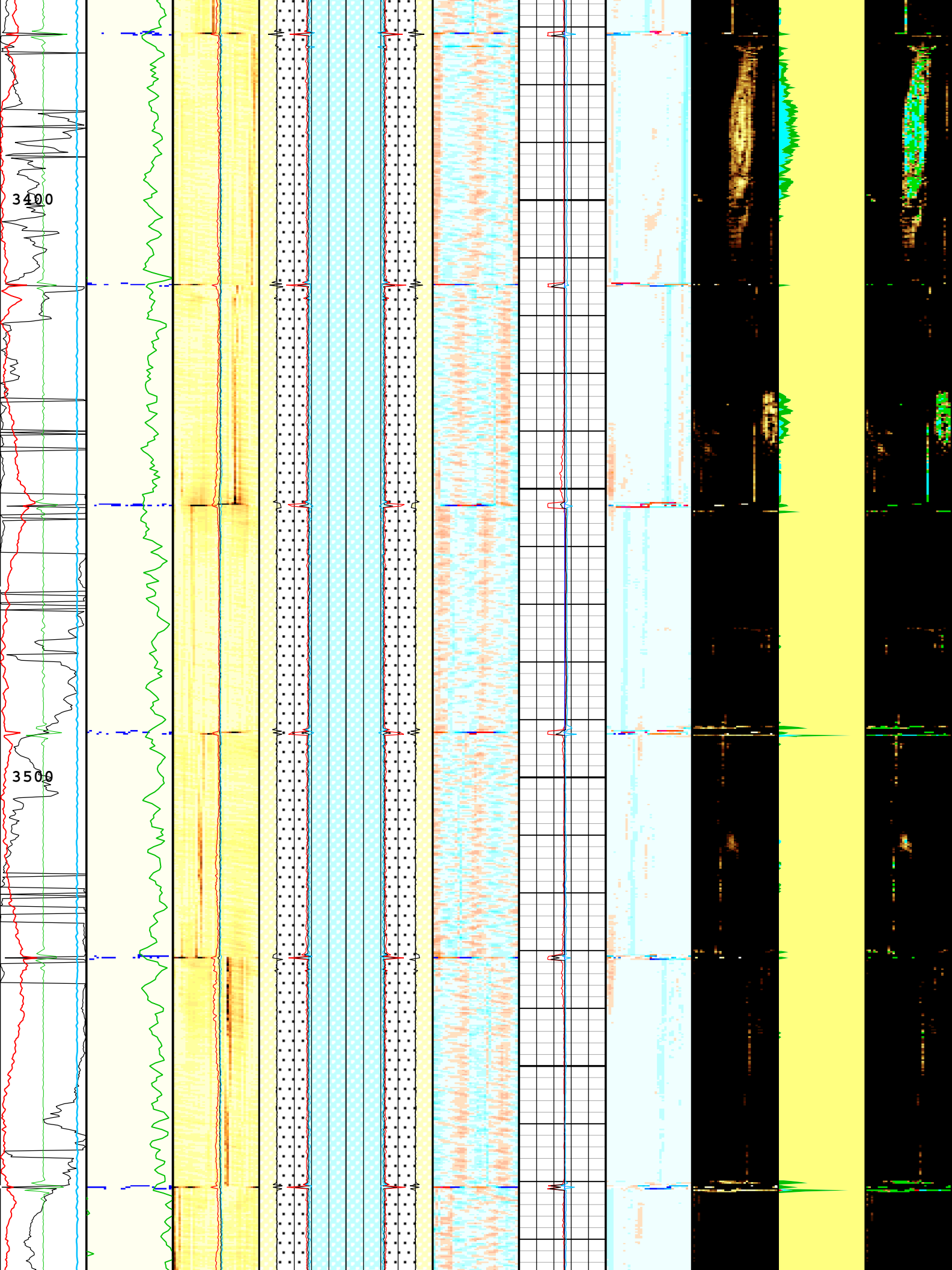


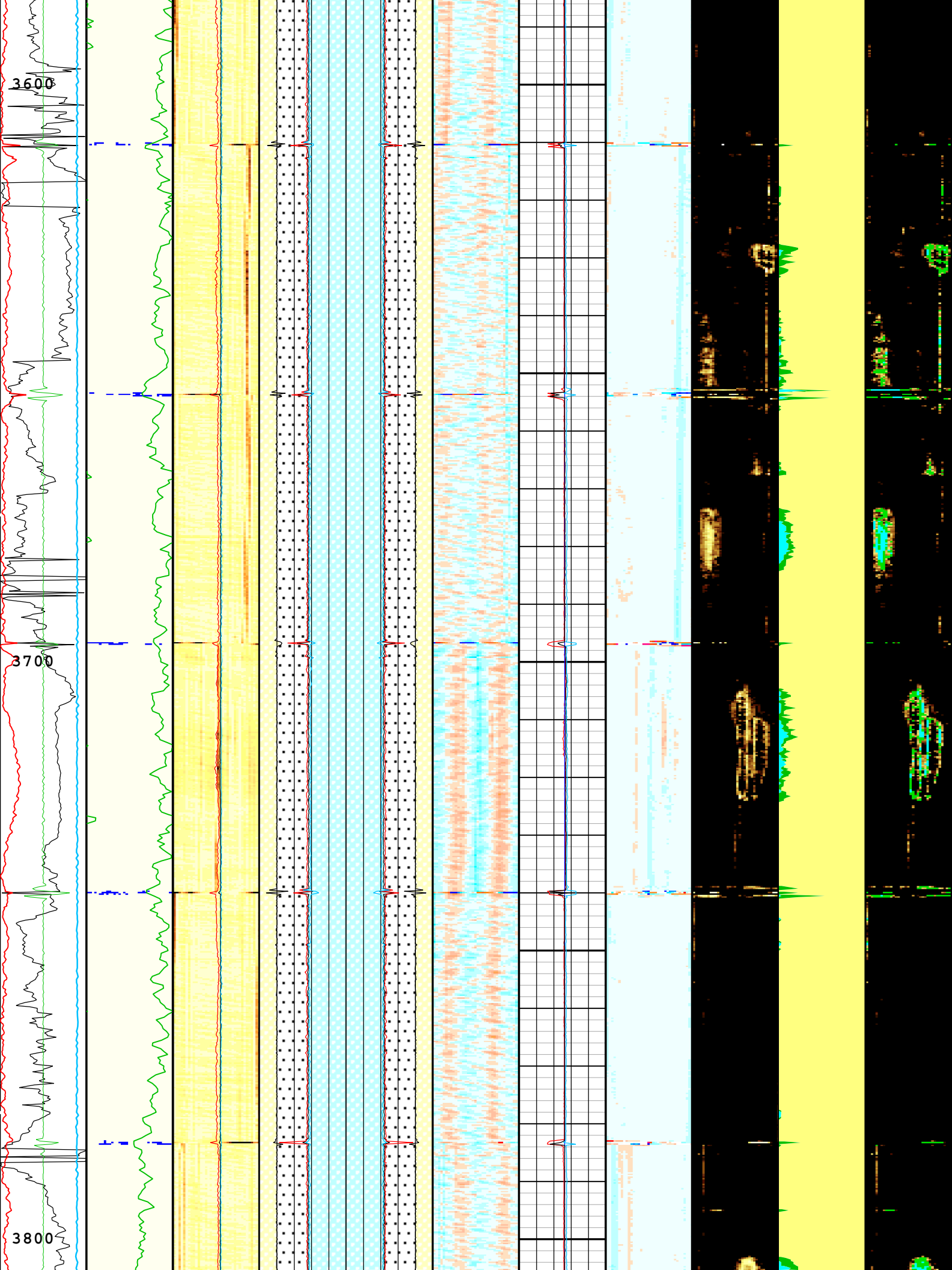


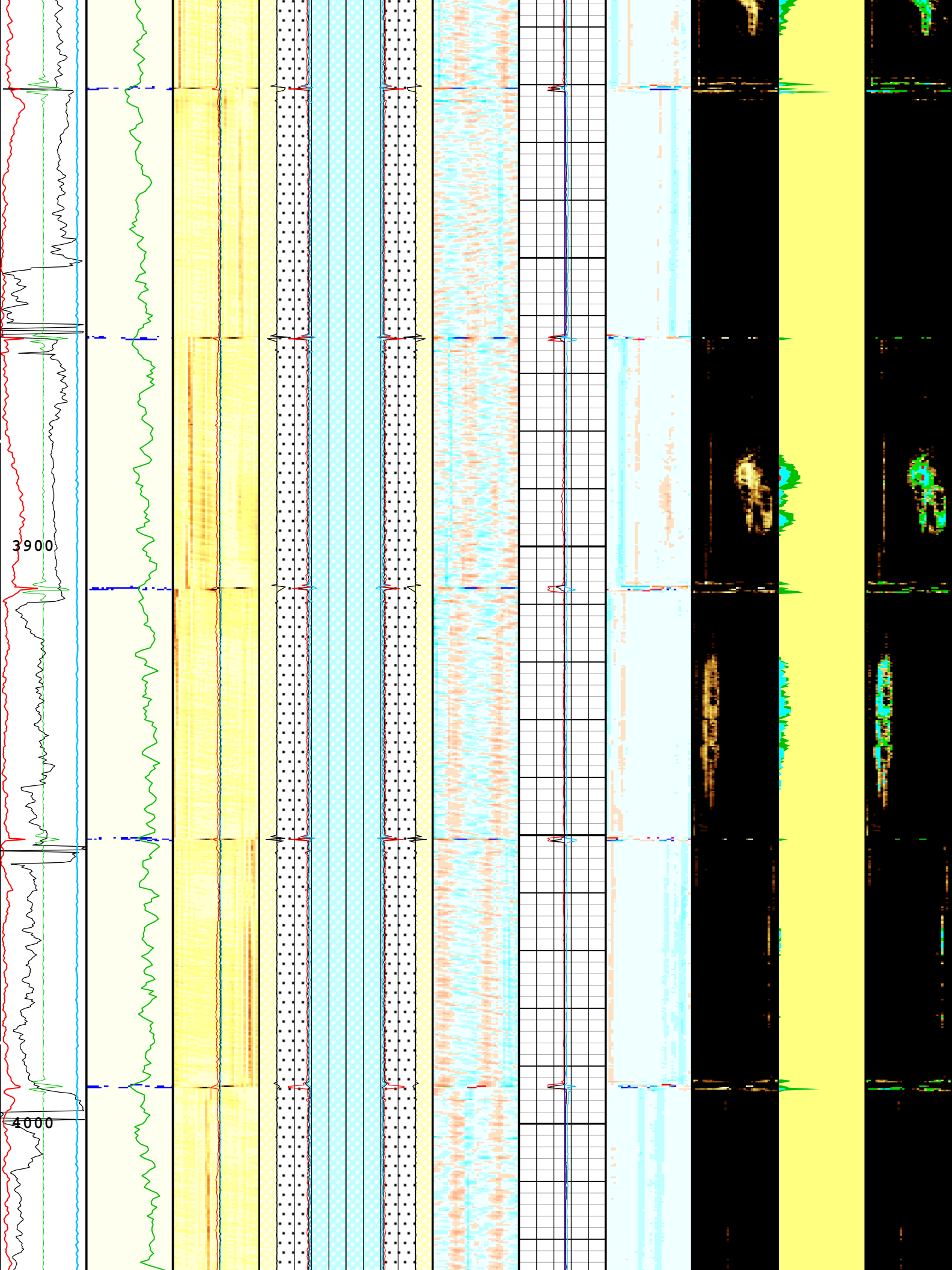


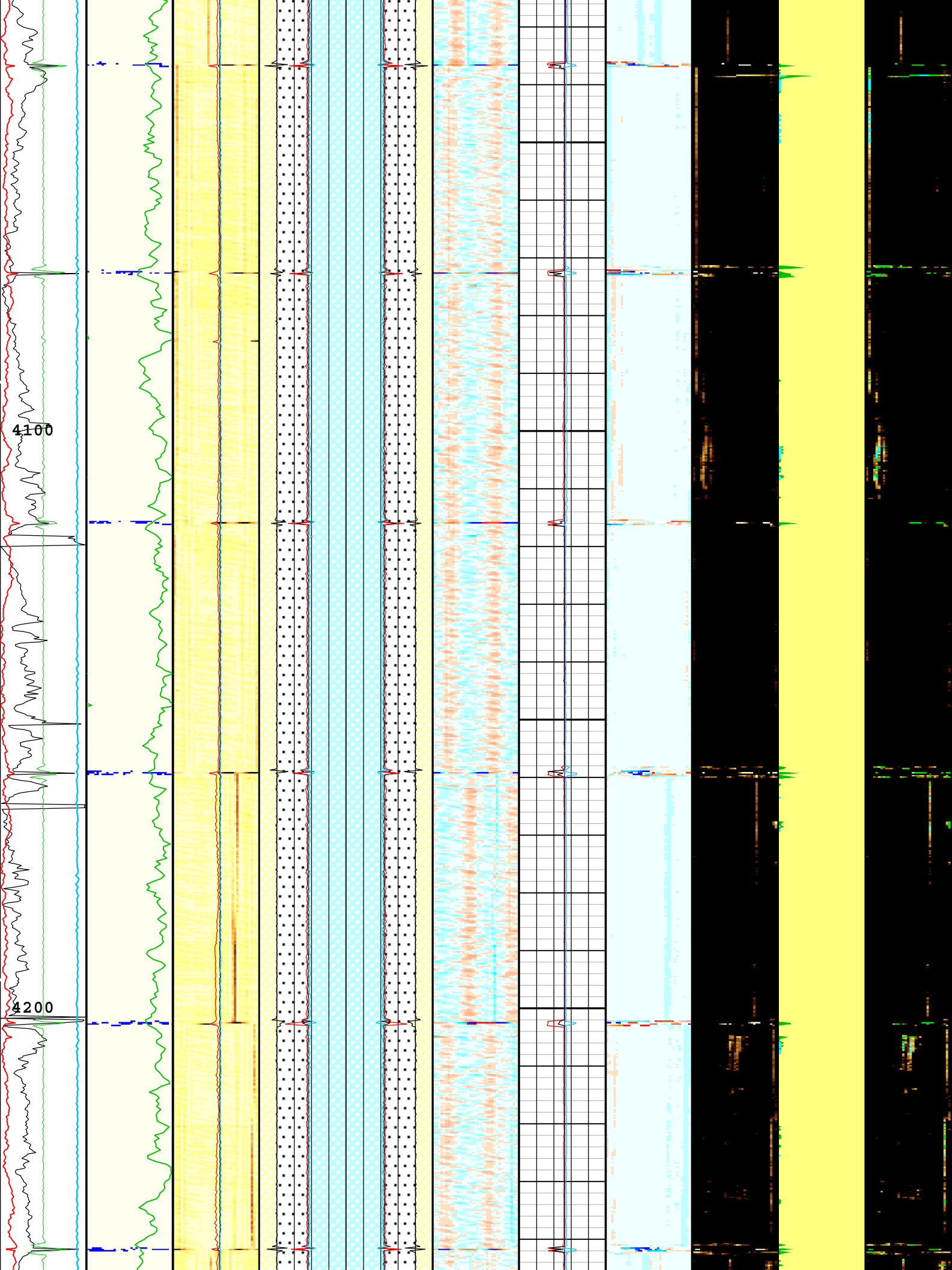


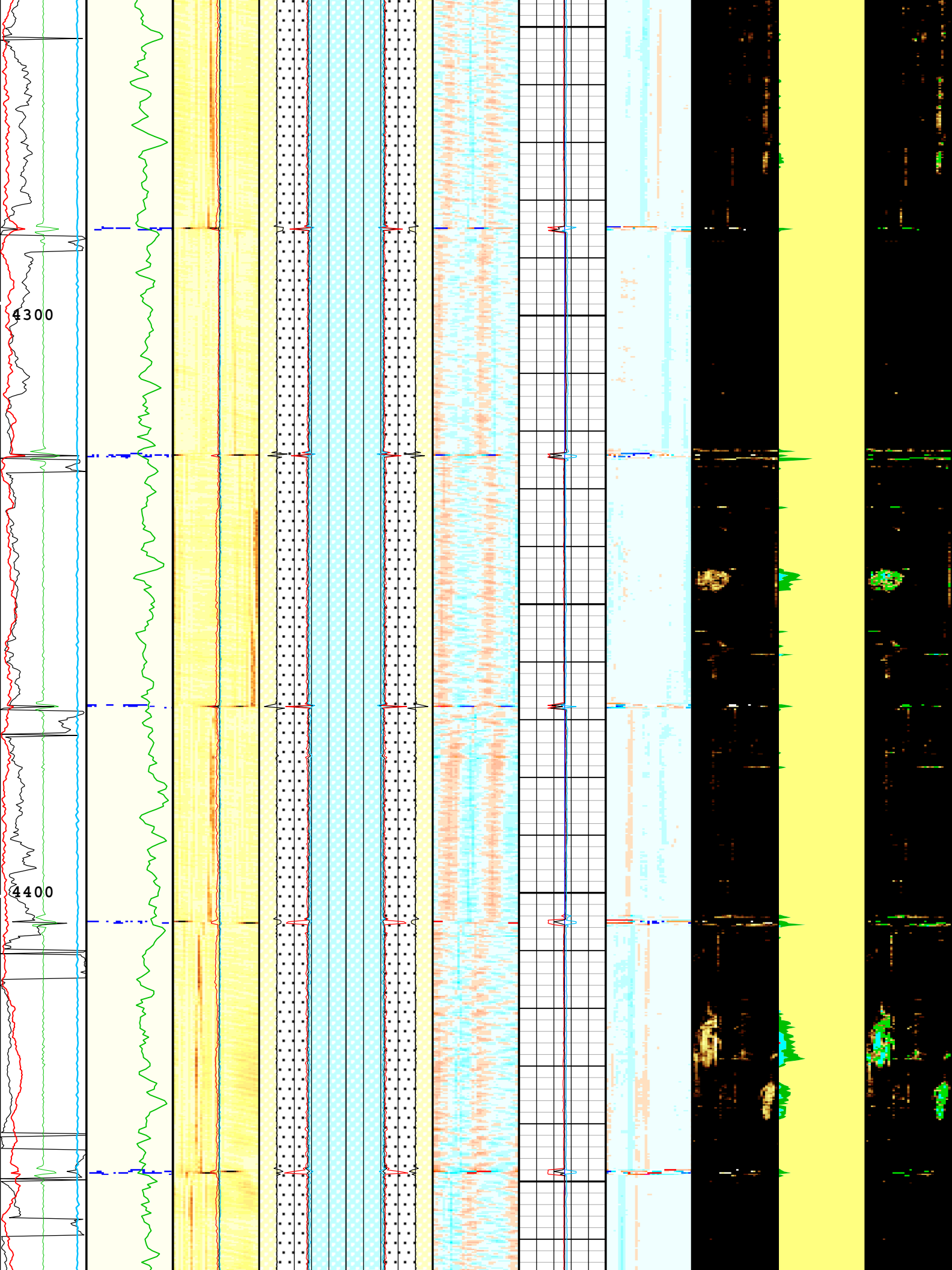


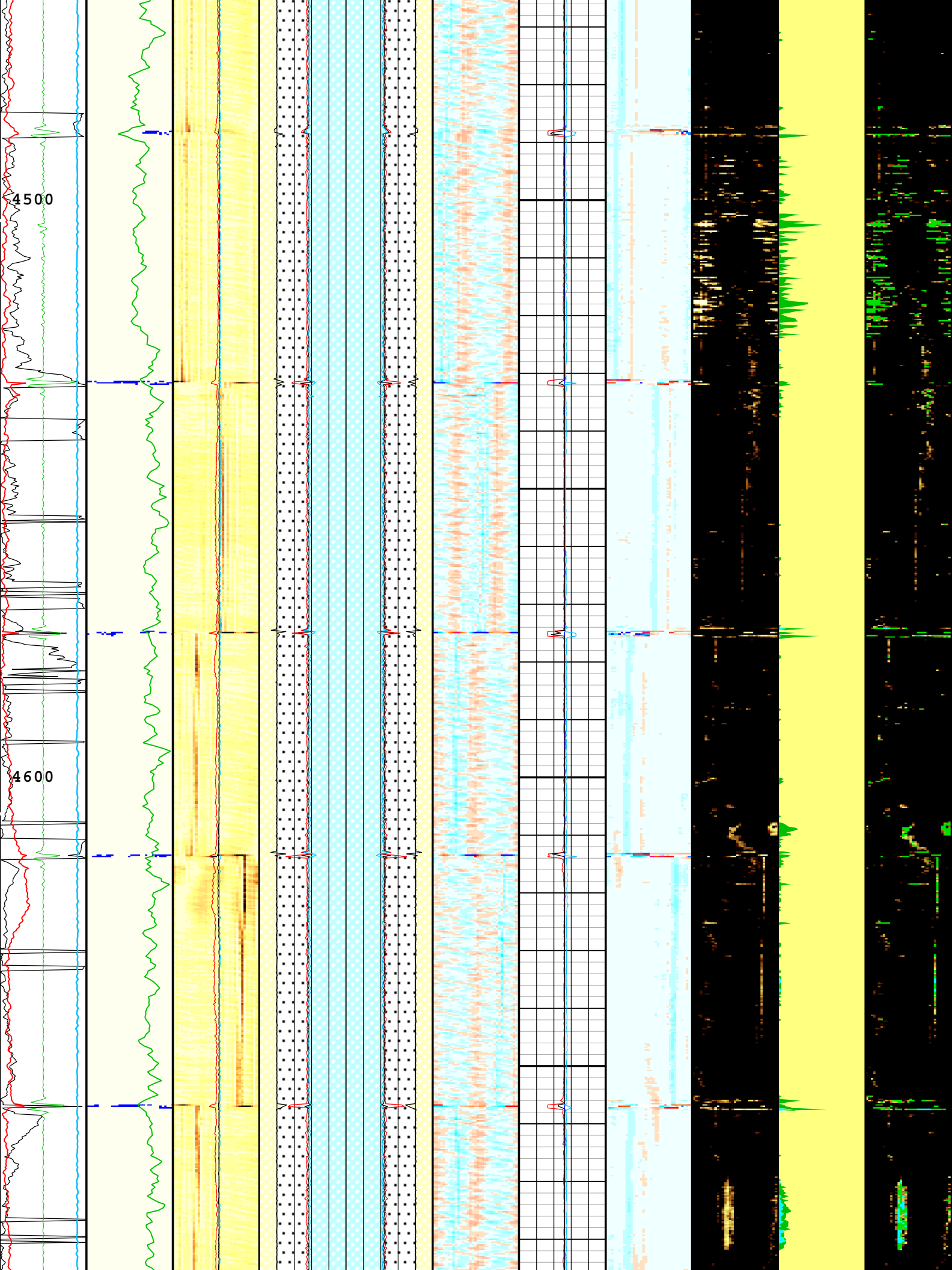


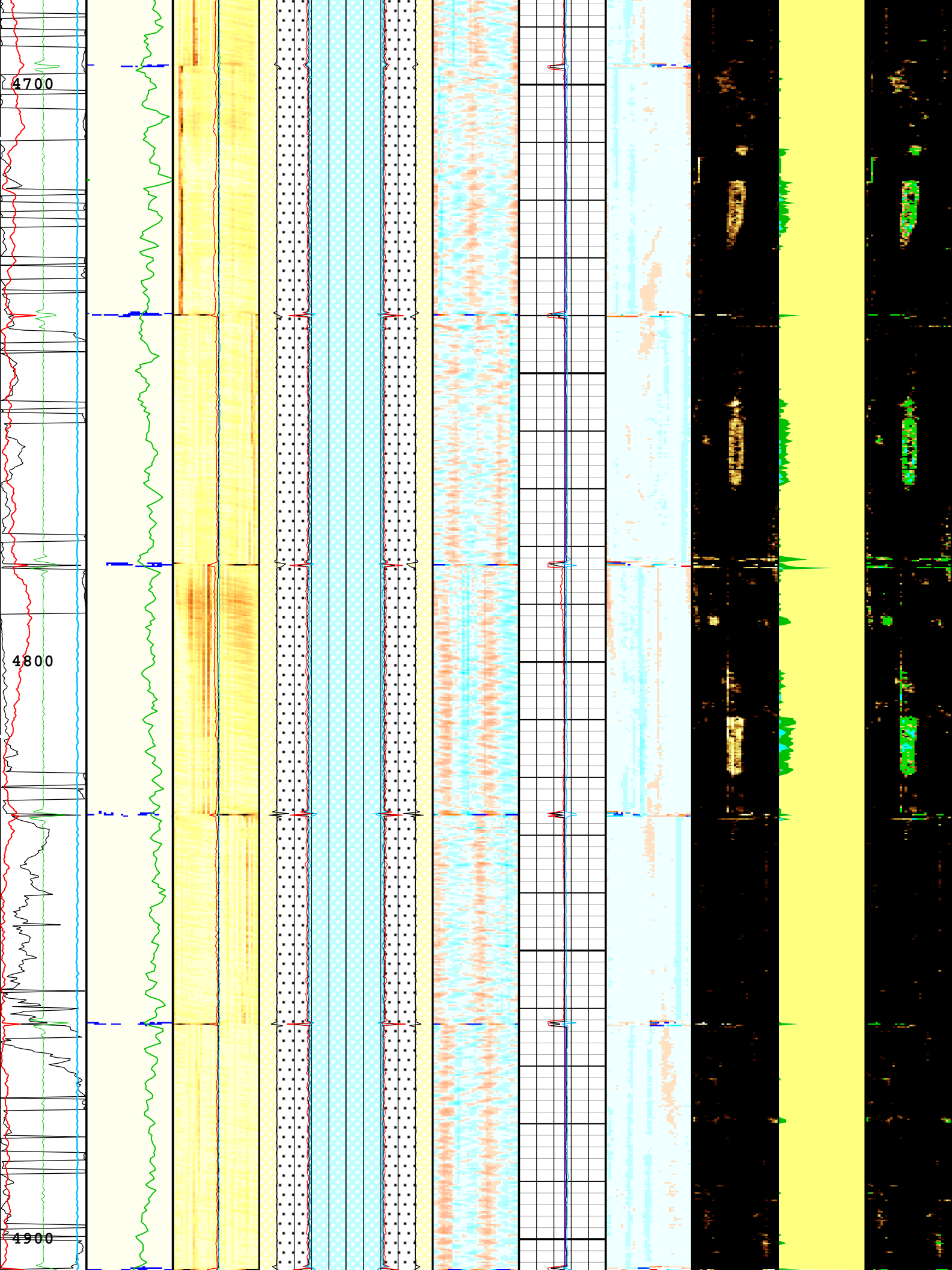


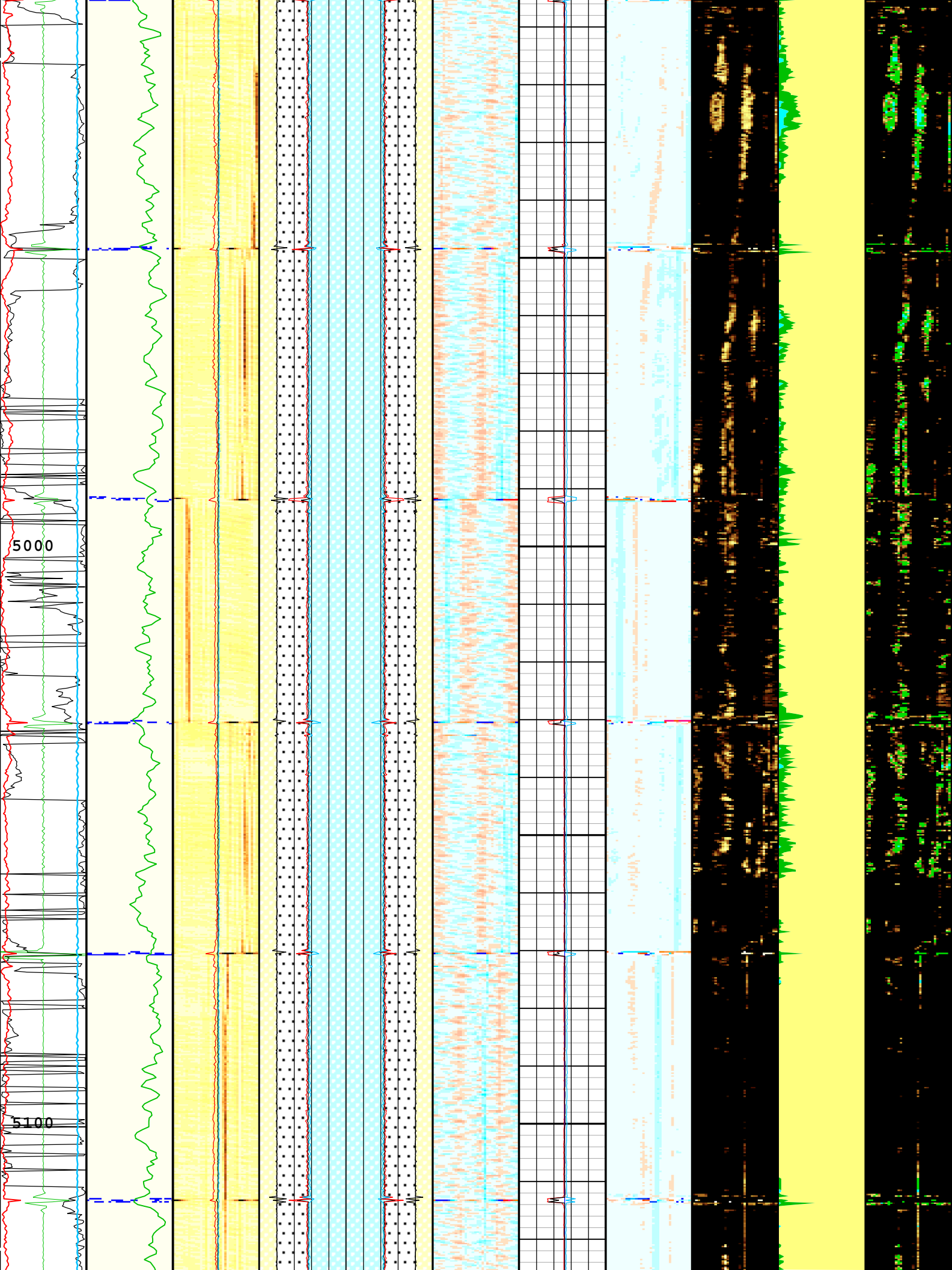


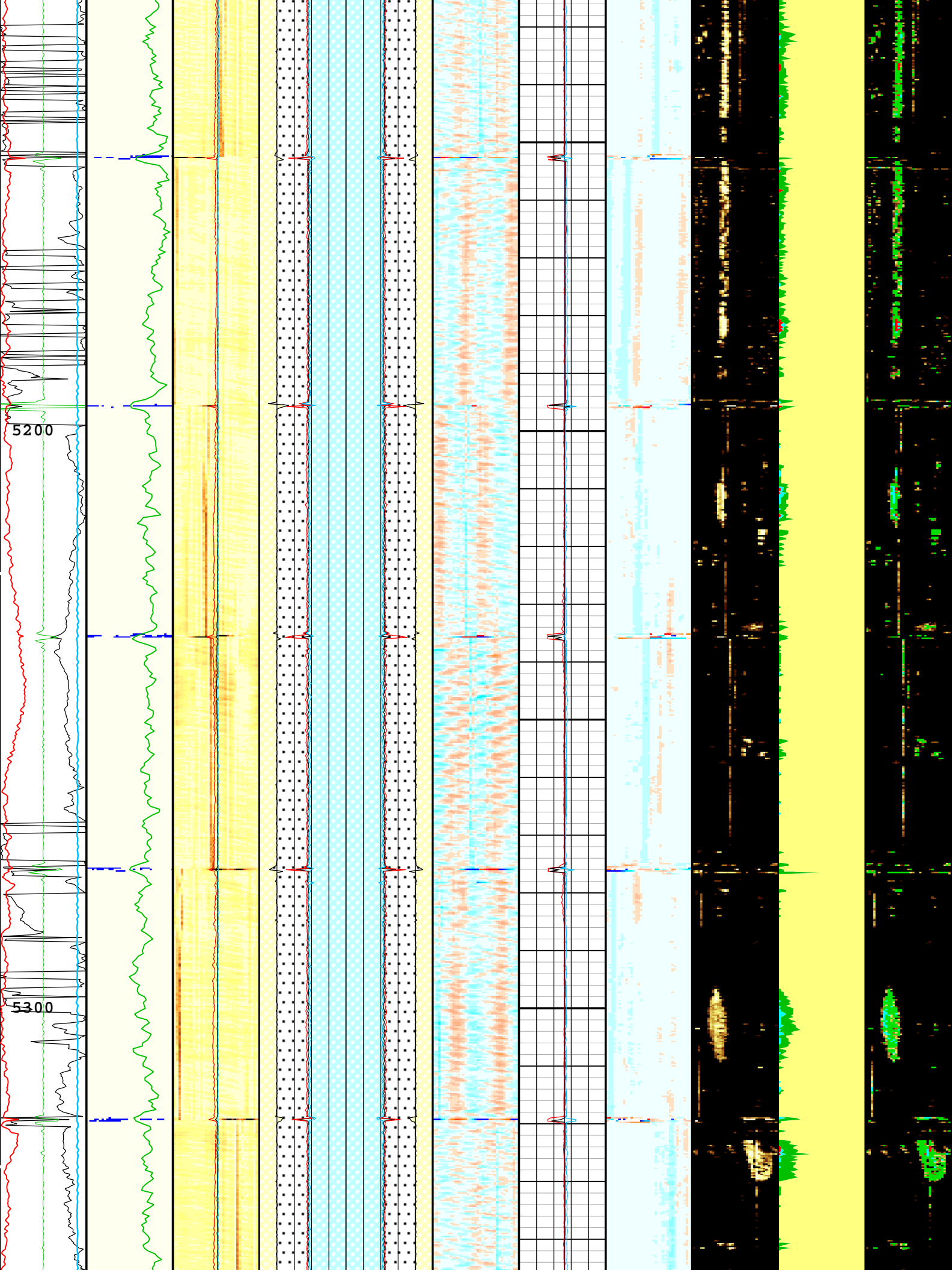


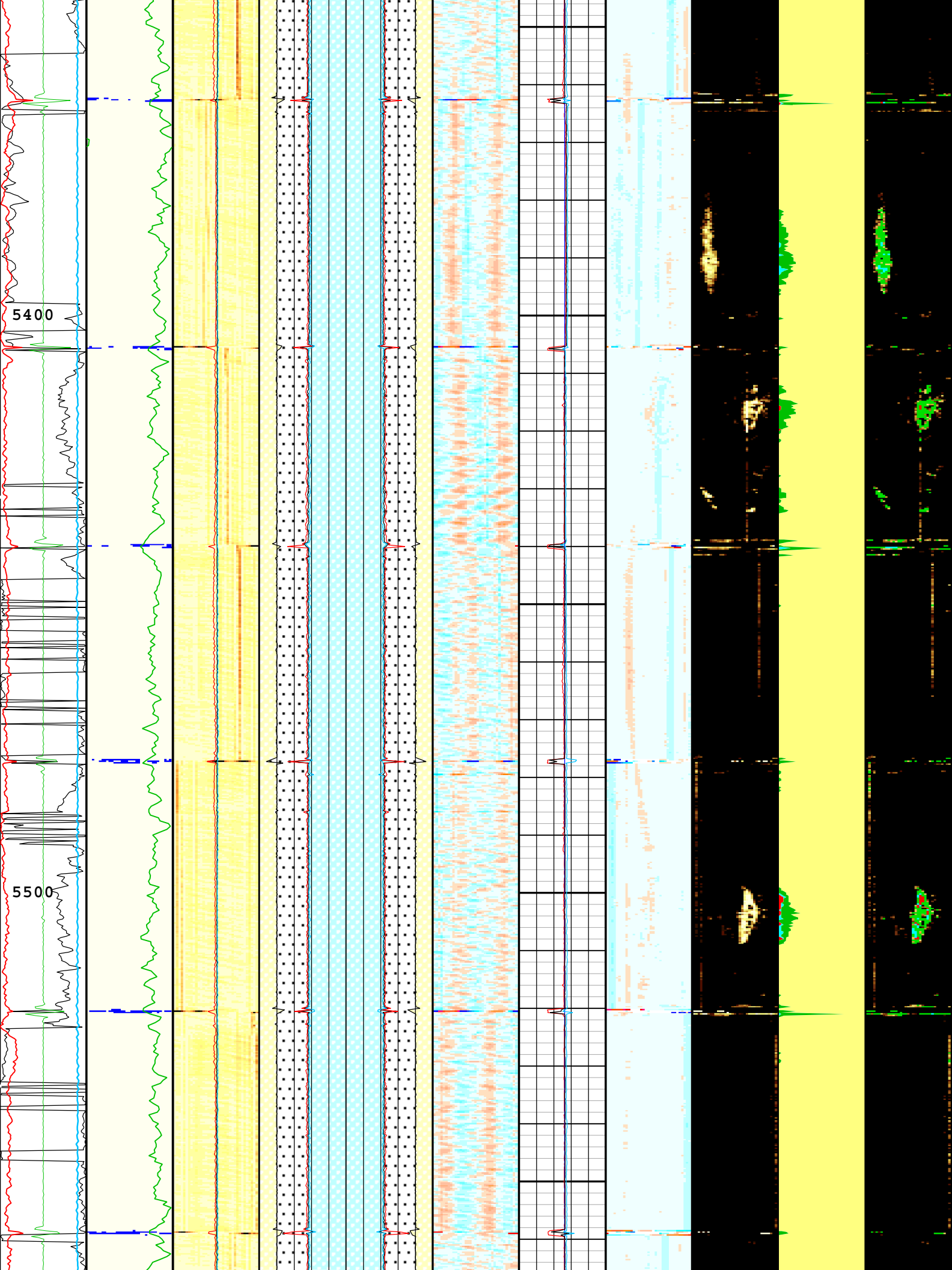


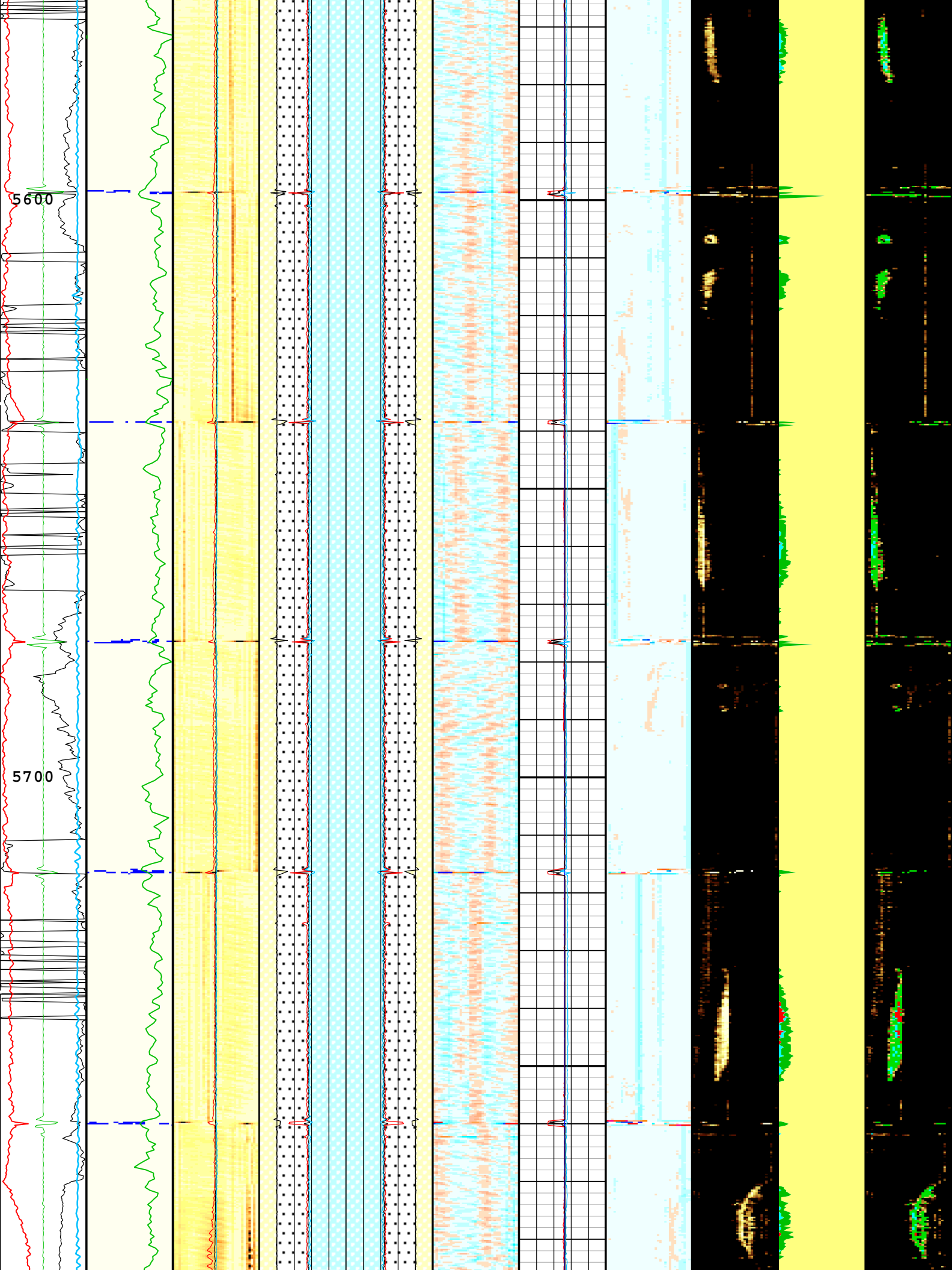


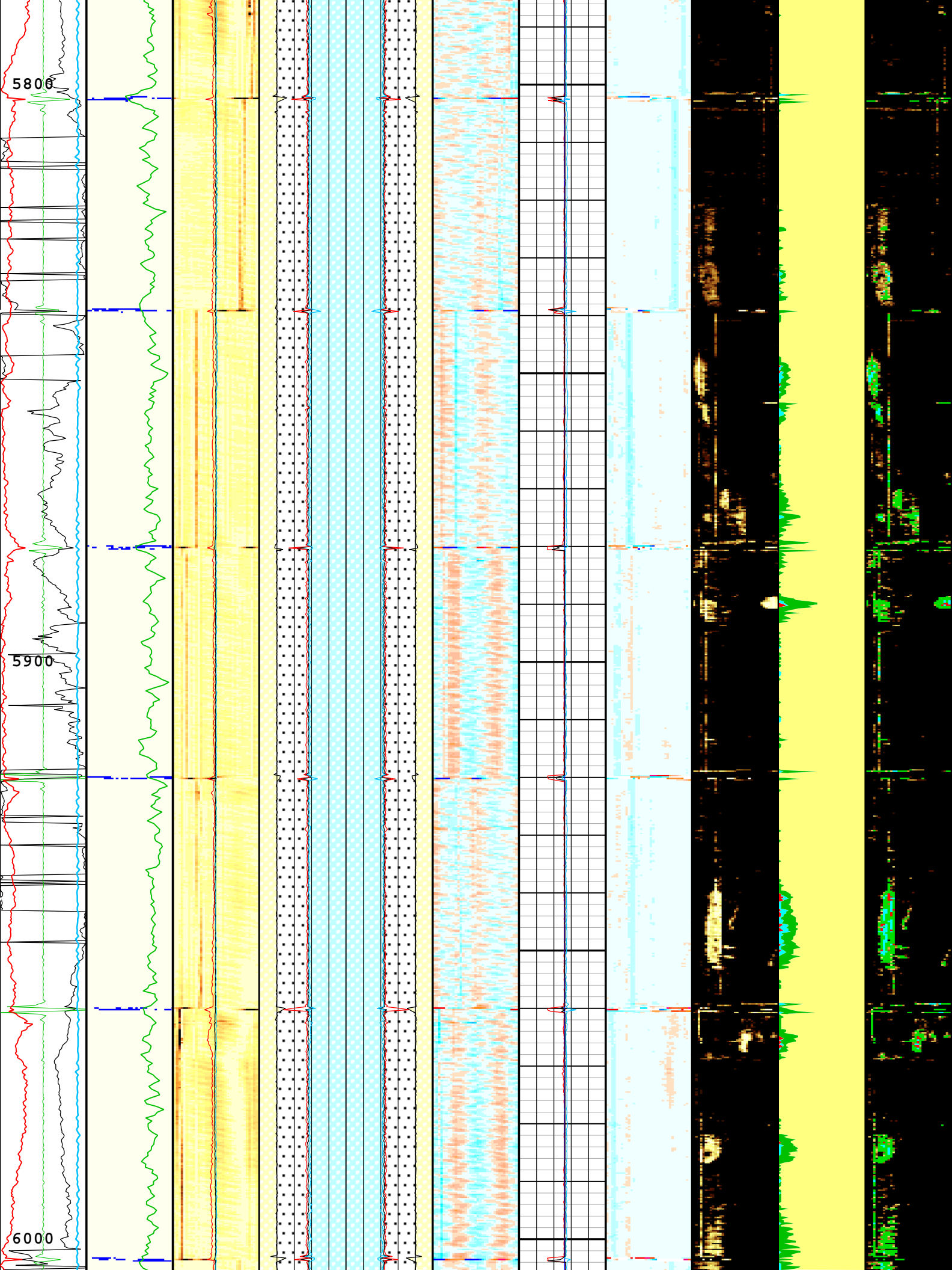


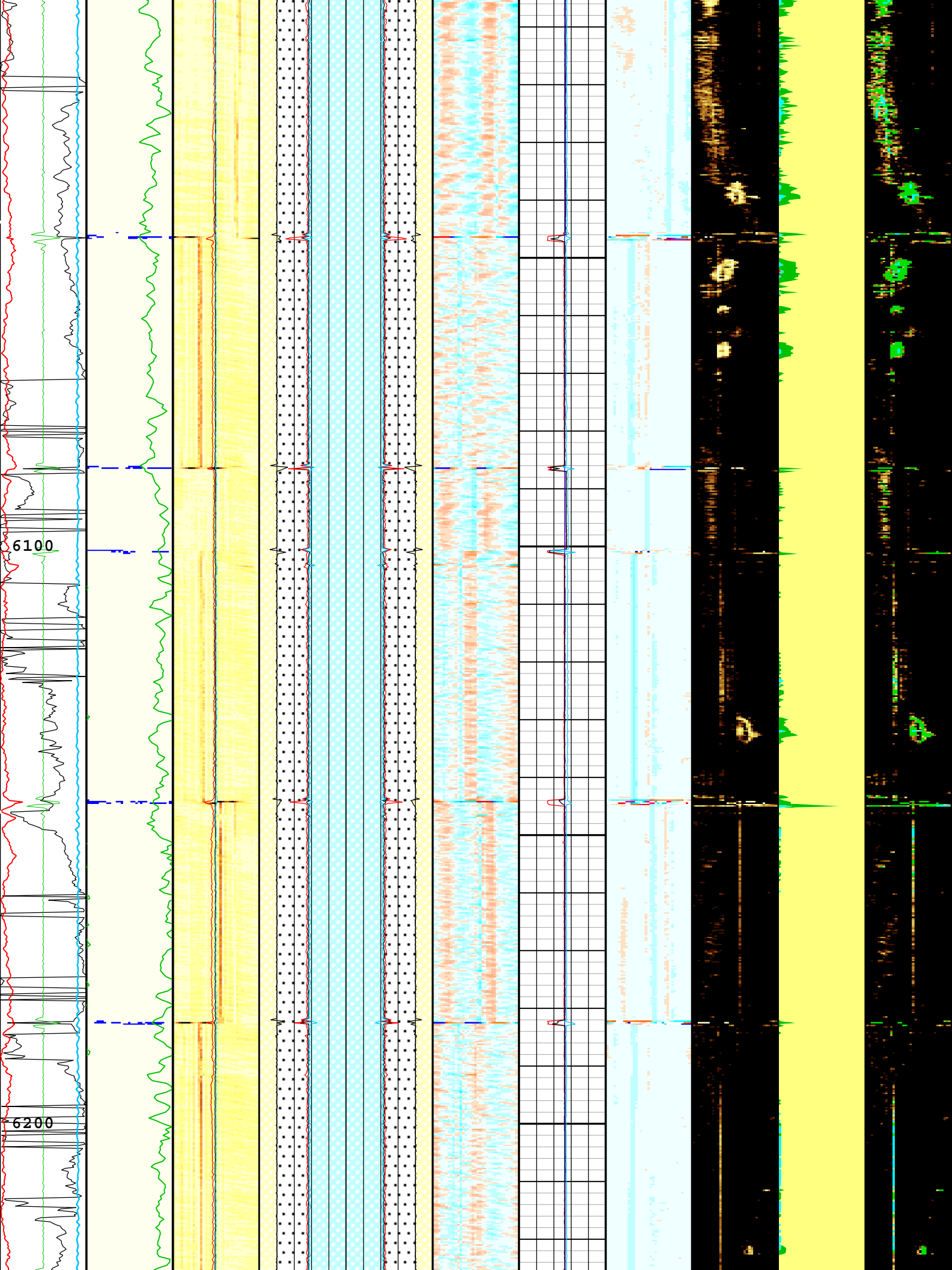


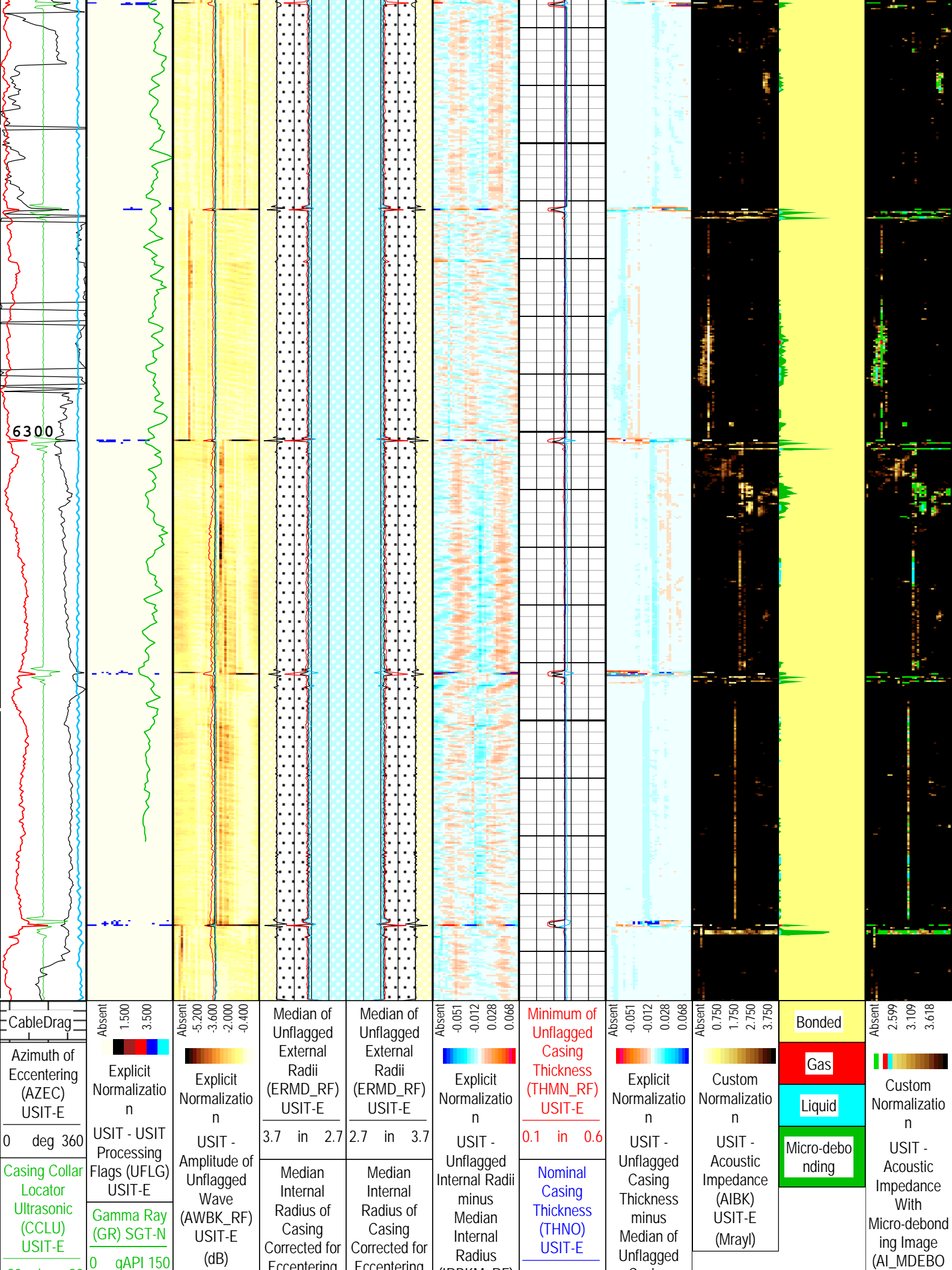












TIME_1900 - Time Marked every 60.00 (s)					
Description: USI Composite	Format: USI Composite	Index Scale: 5 in per 100 ft	Index Unit: ft	Index Type: Measured Depth	Creation Date: 06-Dec-2014 17:40:09

OPLEV	USIT Remove Flagged Data Level	USIT-E	OPT2	
RAPID_OPTION	Rapid Access Computation Option	USIT-E	Off	
RCOD	Reference Calibrator Outer Diameter	USIT-E	7	in
RCSO	Reference Calibrator Standoff	USIT-E	1.181	in
RCTH	Reference Calibrator Thickness	USIT-E	0.295	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
SDTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	USIT-E	0.3	Mrayl
SOGR	Standoff Distance of the Gamma Ray Tool	SGT-N	0	in
TCUB	T^3 Processing Level	USIT-E	Loop	
TD	Total Measured Depth	Borehole	6404.1	ft
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
TPOS	Tool Position: Centered or Eccentered	SGT-N	Centered	
UDFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0	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.	
UTHDP	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	674	
BS	8.75	674	6398.5	
ZMUD	1.62	0	100	
ZMUD	1.63	100	300	
ZMUD	1.64	300	600	
ZMUD	1.65	600	1000	
ZMUD	1.66	1000	1500	
ZMUD	1.67	1500	2000	
ZMUD	1.68	2000	2500	
ZMUD	1.69	2500	3500	
ZMUD	1.7	3500	4500	
ZMUD	1.71	4500	5800	
ZMUD	1.72	5800	6398.5	

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	18	dB
DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	

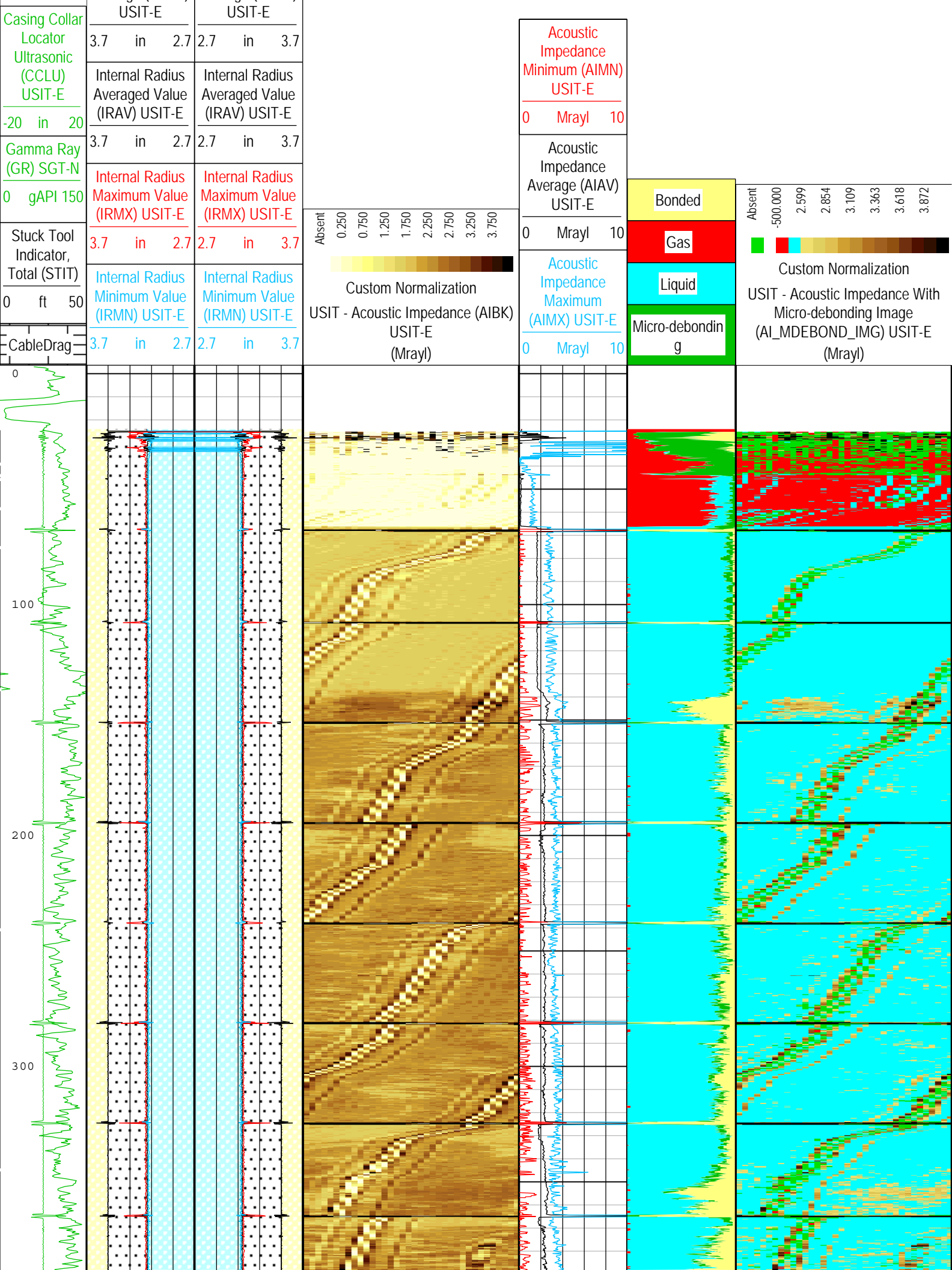
DOTF	Distance between Opposite Transducer Faces	USIT-E	2.874	in
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMFR	Modulation Frequency	USIT-E	333333	Hz
USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
USI_UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
USI_UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 3.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	6393.4	ft
VRES	Vertical Resolution	USIT-E	3.0 in	
WINB	Window Begin Time	USIT-E	Time Zoned	us
WINE	Window End Time	USIT-E	Time Zoned	us

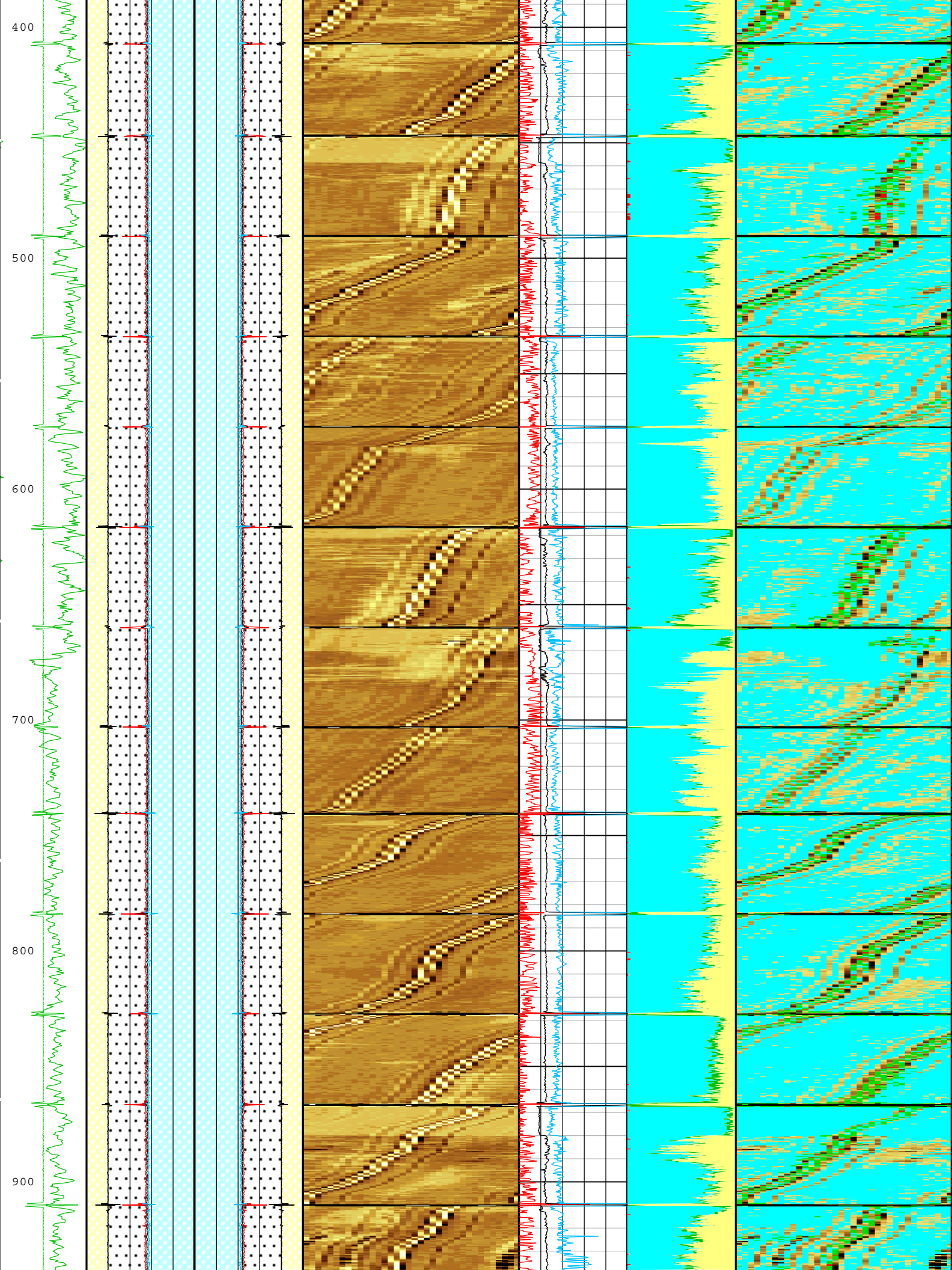
Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	95	06-Dec-2014 11:51:52	06-Dec-2014 11:59:34	6398.98	5678.1
EMXV	90	06-Dec-2014 11:59:34	06-Dec-2014 11:59:42	5678.1	5665.65
EMXV	95	06-Dec-2014 11:59:42	06-Dec-2014 11:59:46	5665.65	5658.74
EMXV	100	06-Dec-2014 11:59:46	06-Dec-2014 12:15:13	5658.74	4067.38
EMXV	95	06-Dec-2014 12:15:13	06-Dec-2014 12:19:57	4067.38	3575.37
EMXV	90	06-Dec-2014 12:19:57	06-Dec-2014 12:20:01	3575.37	3568.77
EMXV	85	06-Dec-2014 12:20:01	06-Dec-2014 12:25:26	3568.77	3003.83
EMXV	80	06-Dec-2014 12:25:26	06-Dec-2014 12:25:31	3003.83	2996.78
EMXV	75	06-Dec-2014 12:25:31	06-Dec-2014 12:25:33	2996.78	2992.83
EMXV	70	06-Dec-2014 12:25:33	06-Dec-2014 12:39:10	2992.83	1573.01
EMXV	65	06-Dec-2014 12:39:10	06-Dec-2014 12:39:14	1573.01	1566.23
EMXV	60	06-Dec-2014 12:39:14	06-Dec-2014 12:43:13	1566.23	1151.56
EMXV	55	06-Dec-2014 12:43:13	06-Dec-2014 12:49:05	1151.56	542.99
EMXV	50	06-Dec-2014 12:49:05	06-Dec-2014 12:49:09	542.99	536.52
EMXV	45	06-Dec-2014 12:49:09	06-Dec-2014 13:02:25	536.52	24.23
WINB	38.4	06-Dec-2014 11:51:52	06-Dec-2014 12:26:50	6398.98	2858.54
WINB	32.08	06-Dec-2014 12:26:50	06-Dec-2014 13:02:25	2858.54	24.23
WINE	78.4	06-Dec-2014 11:51:52	06-Dec-2014 12:26:48	6398.98	2861.77
WINE	80.6	06-Dec-2014 12:26:48	06-Dec-2014 13:02:25	2861.77	24.23

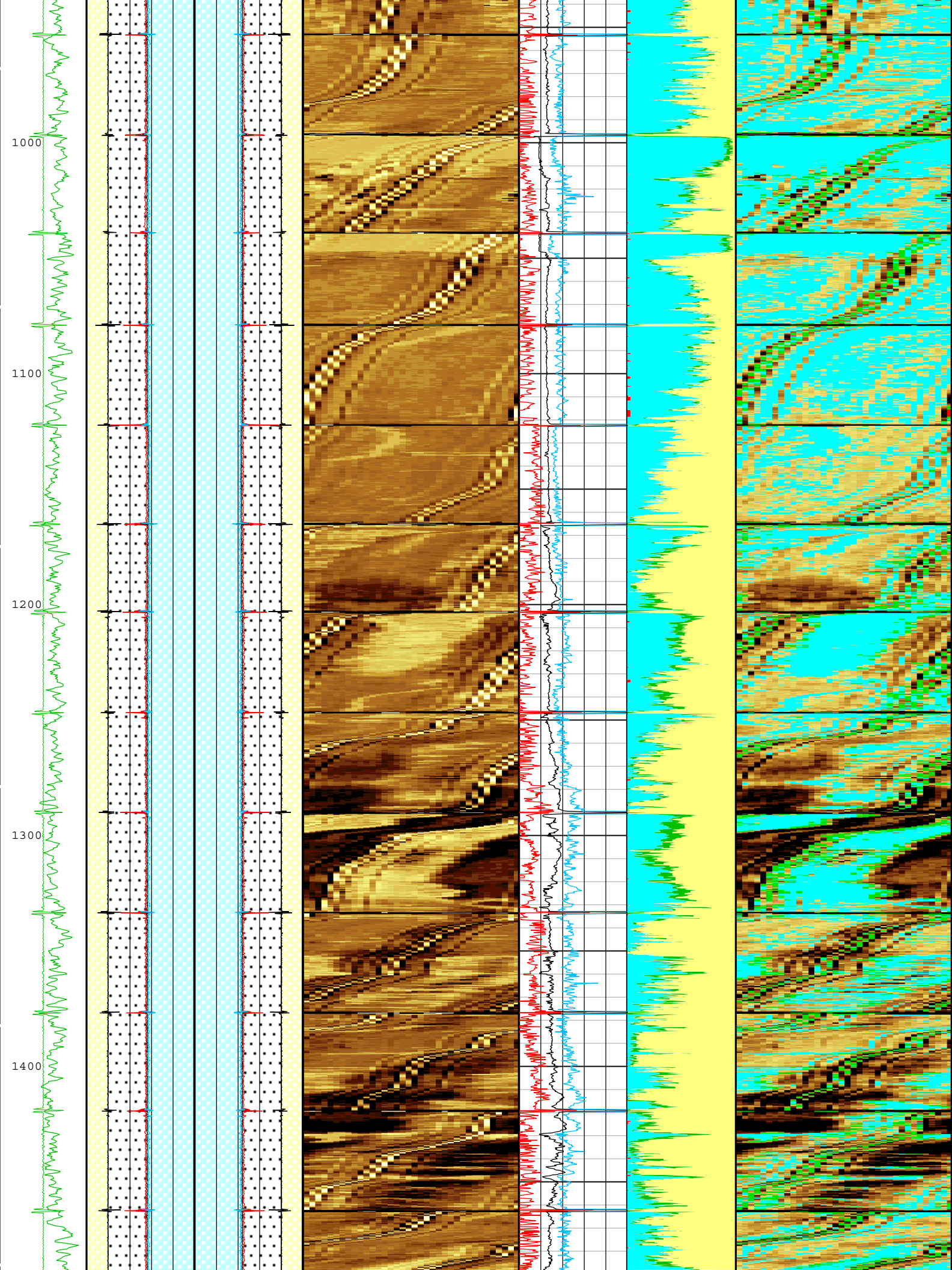
All depth are at tool zero.					
USI Cement					
Run 2					
USI Cement					
Log	Company:Noble Energy Inc		Well:Burton K25-67-1HN		
			Run 2: Main[8]:Up:S012		

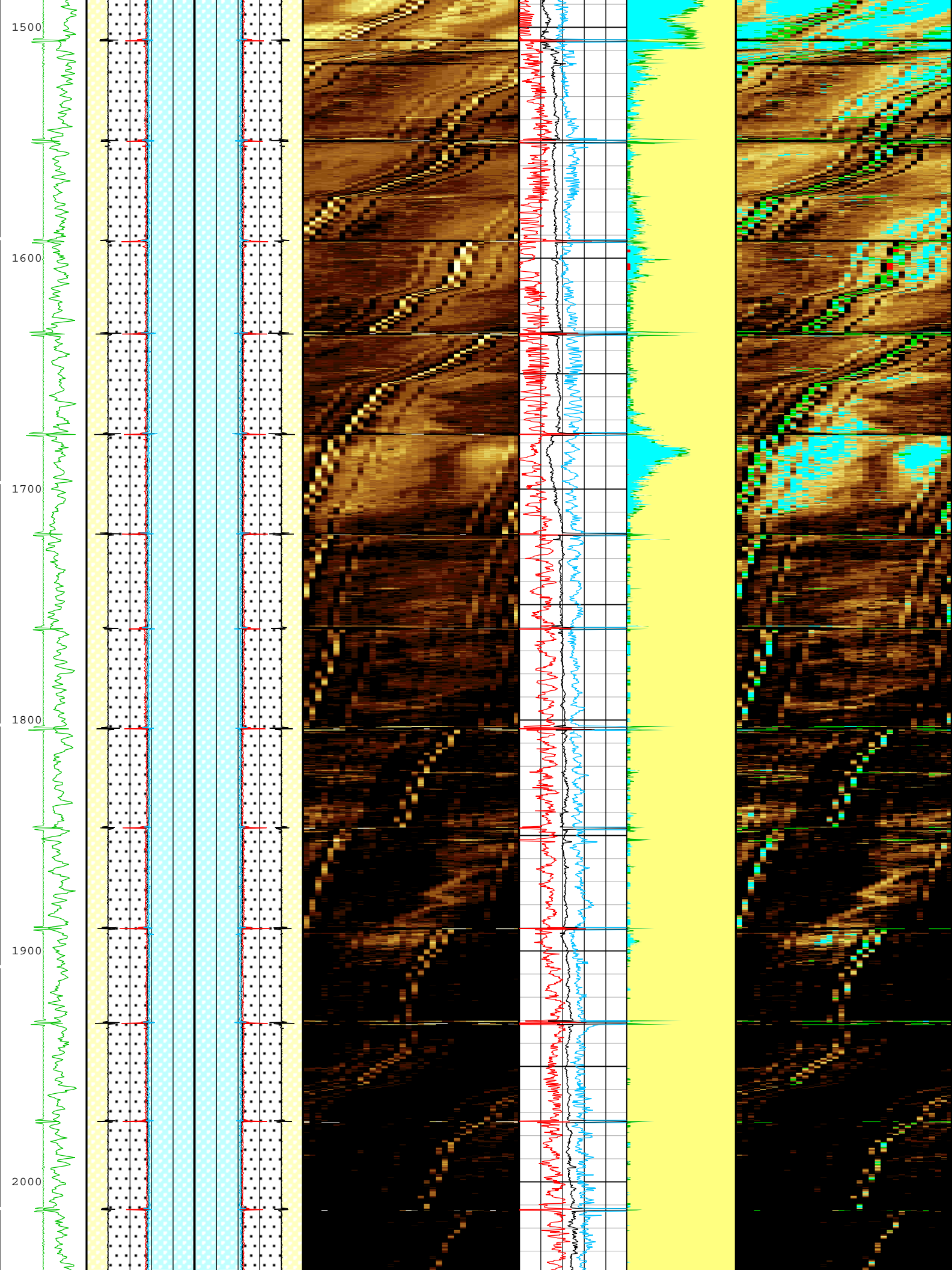
Description: USI Cement
Format: USI Cement
Index Scale: 2 in per 100 ft
Index Unit: ft
Index Type: Measured Depth
Creation Date: 06-Dec-2014 17:40:19

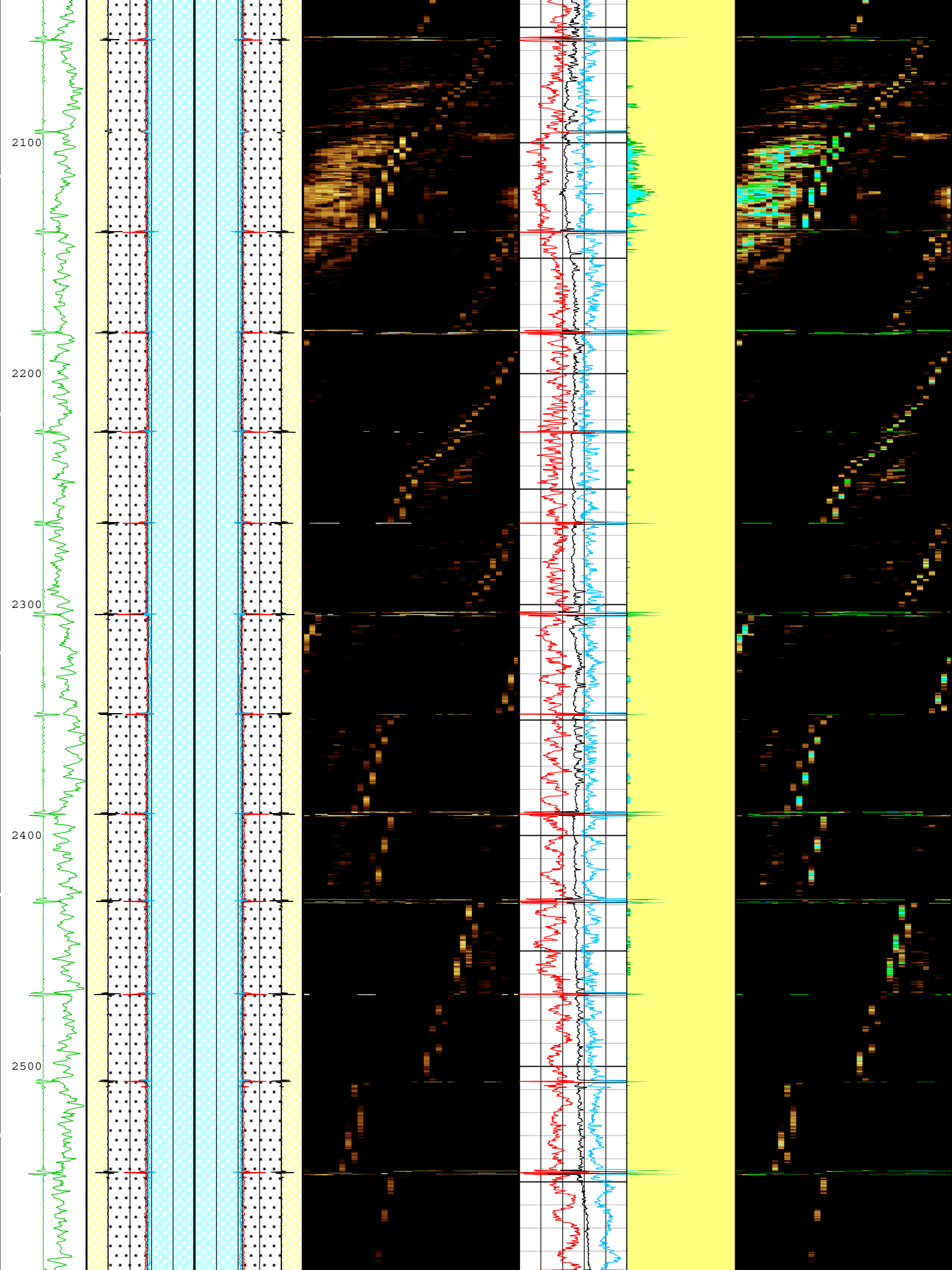
TIME_1900 - Time Marked every 60.00 (s)		
External Radii Average (ERAV)	External Radii Average (ERAV)	

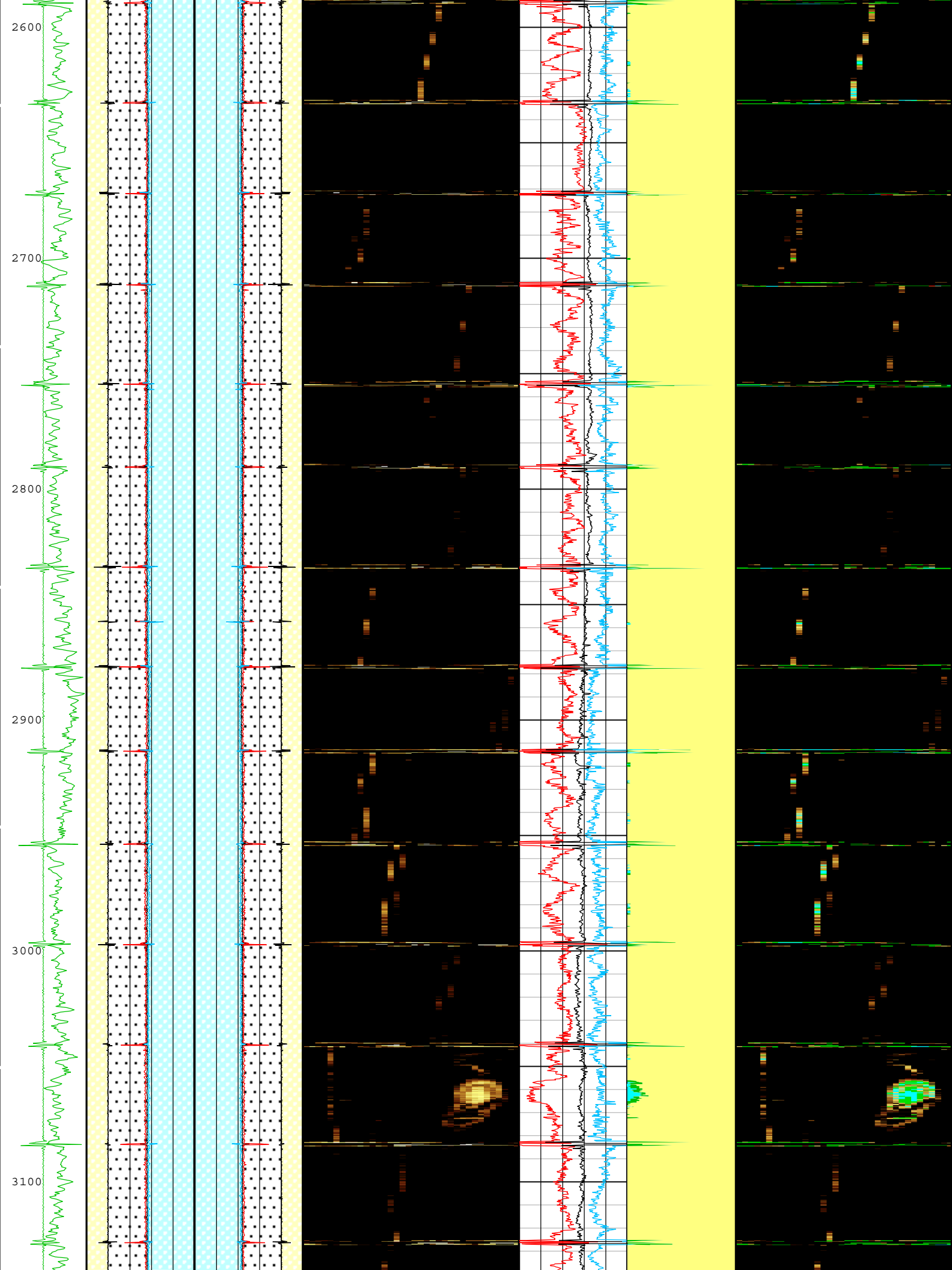


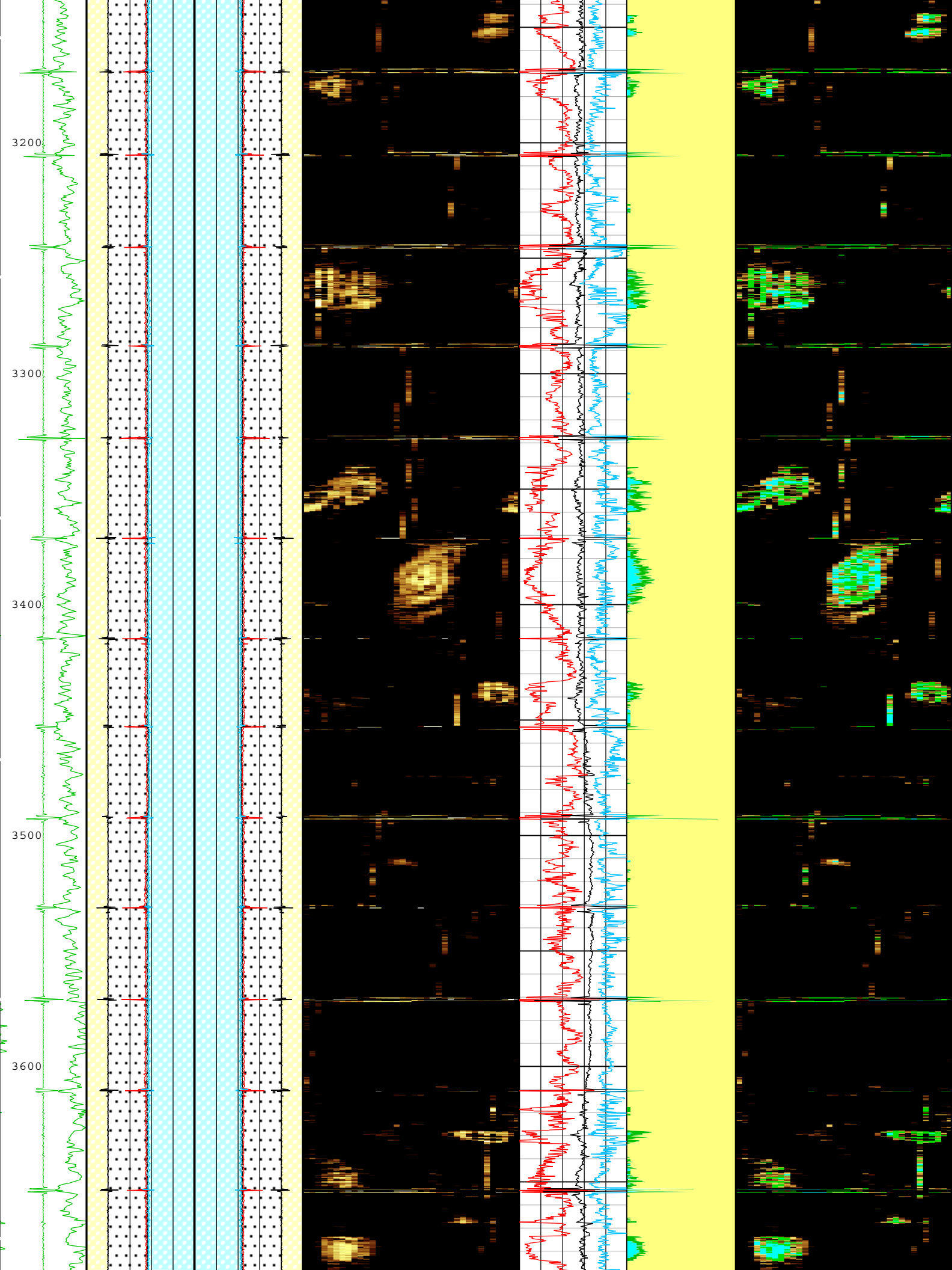


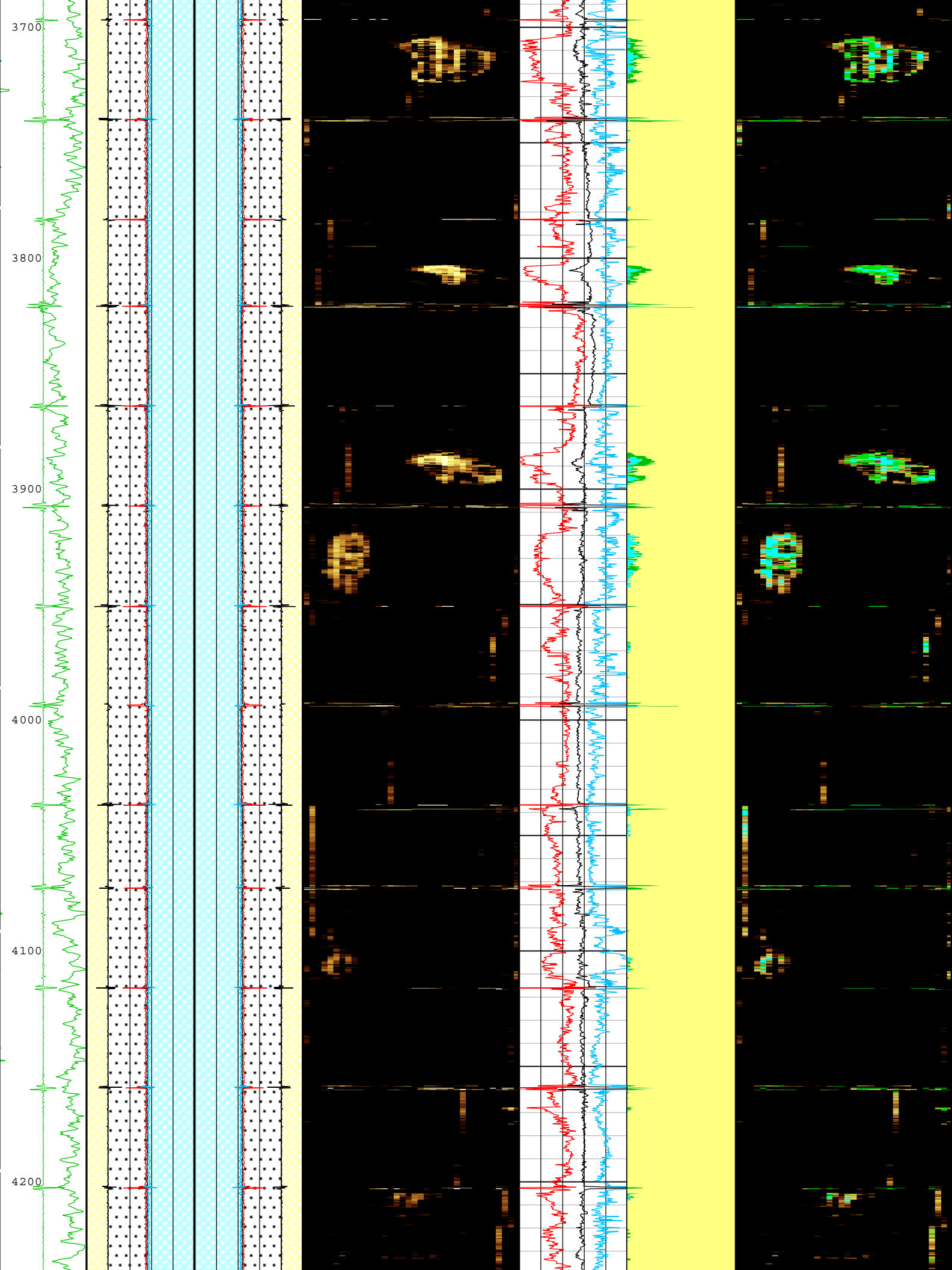


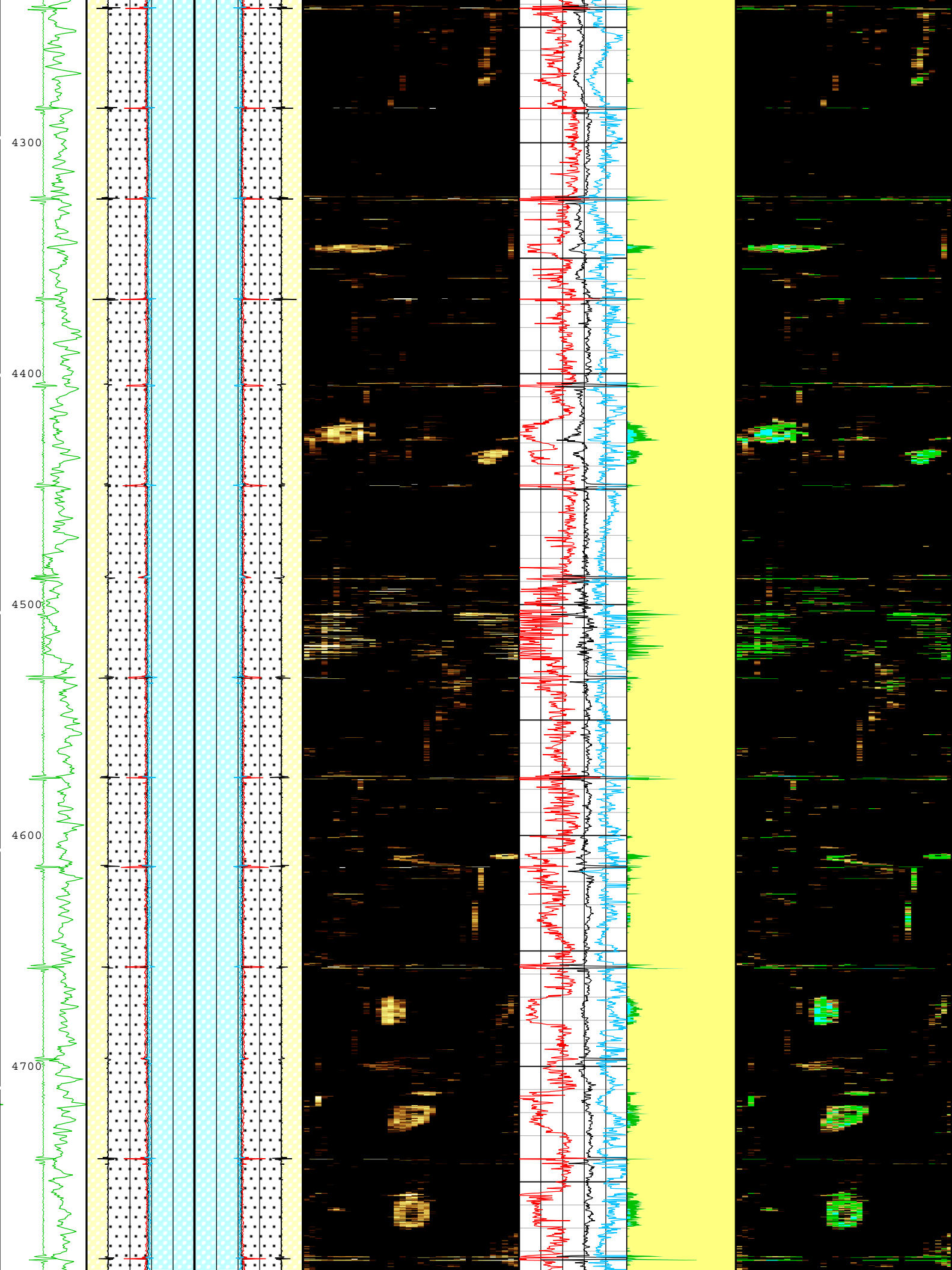


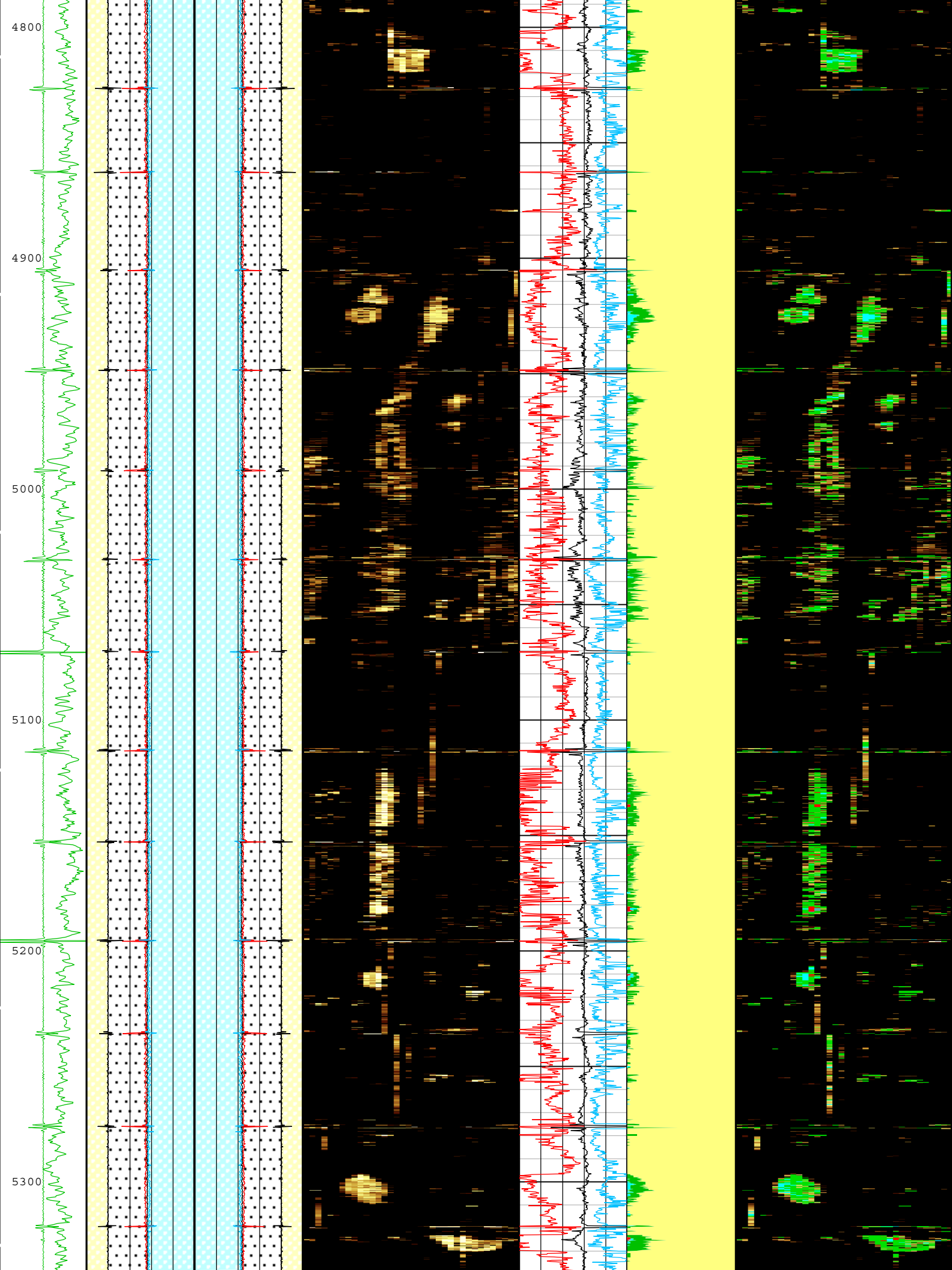


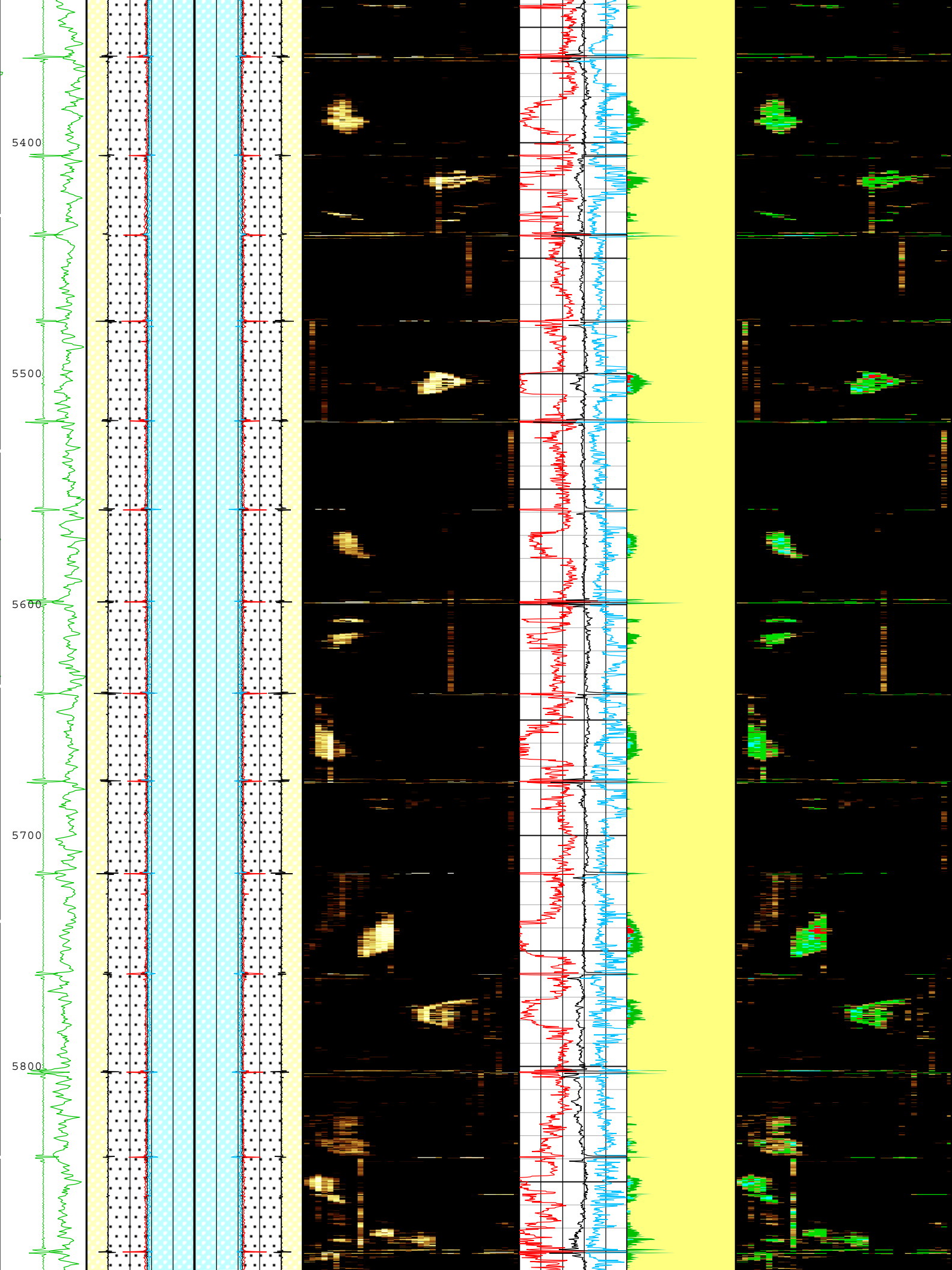


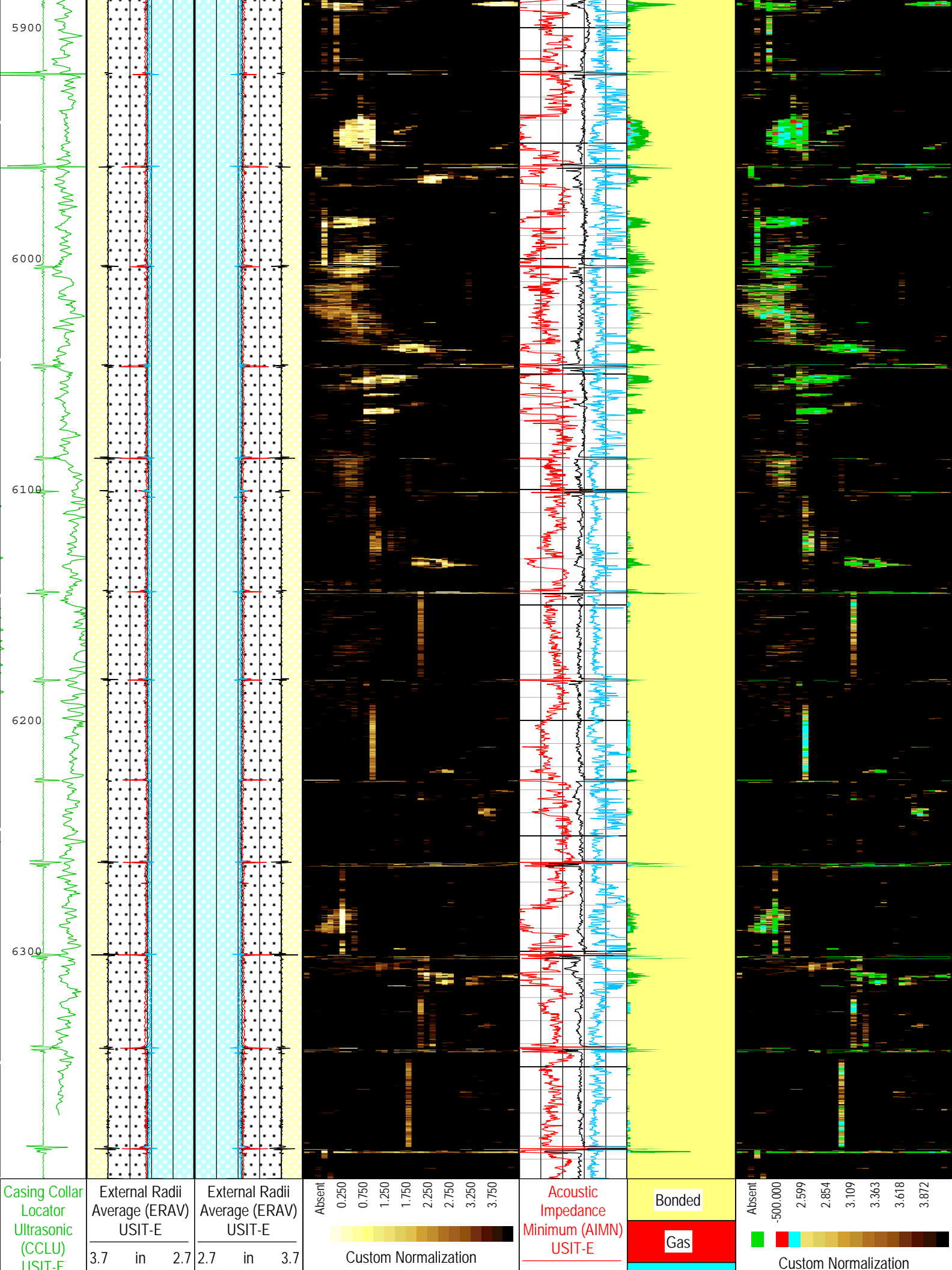












USIT-E	Internal Radius Averaged Value (IRAV) USIT-E	Internal Radius Averaged Value (IRAV) USIT-E	USIT - Acoustic Impedance (AIBK) USIT-E (Mrayl)	0 Mrayl 10	Liquid	USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)
-20 in 20				Acoustic Impedance Average (AIAV) USIT-E	Micro-debonding	
Gamma Ray (GR) SGT-N	3.7 in 2.7	2.7 in 3.7		0 Mrayl 10		
0 gAPI 150				Acoustic Impedance Maximum (AIMX) USIT-E		
Stuck Tool Indicator, Total (STIT)	Internal Radius Maximum Value (IRMX) USIT-E	Internal Radius Maximum Value (IRMX) USIT-E				
0 ft 50	3.7 in 2.7	2.7 in 3.7				
	Internal Radius Minimum Value (IRMN) USIT-E	Internal Radius Minimum Value (IRMN) USIT-E				
CableDrag	3.7 in 2.7	2.7 in 3.7				

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: 06-Dec-2014 17:40:19

Channel Processing Parameters				
Parameter	Description	Tool	Value	Unit
AFVU	Automatic Fluid Velocity Update	USIT-E	On	
BARI	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	7472.7	ft
CDEN	Cement Density	SGT-N	16.69	lbm/gal
CMTY	Cement Type	USIT-E	Light Cement	
CTHILGR	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.362	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
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	SGT-N	1	
HEMA	Hematite Presence Flag	Borehole	No	
ICE_PROCESS	ICE Processing	USIT-E	Yes	
IMAR	Image Rotation	USIT-E	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	22.5	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.1	
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	7	in
RCSO	Reference Calibrator Standoff	USIT-E	1.181	in
RCTH	Reference Calibrator Thickness	USIT-E	0.295	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
SdTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	USIT-E	0.3	Mrayl
SOGR	Standoff Distance of the Gamma Ray Tool	SGT-N	0	in

TCUB	T^3 Processing Level	USIT-E	Loop	
TD	Total Measured Depth	Borehole	6404.1	ft
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
TPOS	Tool Position: Centered or Eccentered	SGT-N	Centered	
UDFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0	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.	
UTHDP	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	674	
BS	8.75	674	6398.5	
ZMUD	1.62	0	100	
ZMUD	1.63	100	300	
ZMUD	1.64	300	600	
ZMUD	1.65	600	1000	
ZMUD	1.66	1000	1500	
ZMUD	1.67	1500	2000	
ZMUD	1.68	2000	2500	
ZMUD	1.69	2500	3500	
ZMUD	1.7	3500	4500	
ZMUD	1.71	4500	5800	
ZMUD	1.72	5800	6398.5	
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	18	dB
DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
DOTF	Distance between Opposite Transducer Faces	USIT-E	2.874	in
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/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 375 KHz	
USI_UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 3.0 in I.F	

USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	6393.4	ft
VRES	Vertical Resolution	USIT-E	3.0 in	
WINB	Window Begin Time	USIT-E	Time Zoned	us
WINE	Window End Time	USIT-E	Time Zoned	us

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	95	06-Dec-2014 11:51:52	06-Dec-2014 11:59:34	6398.98	5678.1
EMXV	90	06-Dec-2014 11:59:34	06-Dec-2014 11:59:42	5678.1	5665.65
EMXV	95	06-Dec-2014 11:59:42	06-Dec-2014 11:59:46	5665.65	5658.74
EMXV	100	06-Dec-2014 11:59:46	06-Dec-2014 12:15:13	5658.74	4067.38
EMXV	95	06-Dec-2014 12:15:13	06-Dec-2014 12:19:57	4067.38	3575.37
EMXV	90	06-Dec-2014 12:19:57	06-Dec-2014 12:20:01	3575.37	3568.77
EMXV	85	06-Dec-2014 12:20:01	06-Dec-2014 12:25:26	3568.77	3003.83
EMXV	80	06-Dec-2014 12:25:26	06-Dec-2014 12:25:31	3003.83	2996.78
EMXV	75	06-Dec-2014 12:25:31	06-Dec-2014 12:25:33	2996.78	2992.83
EMXV	70	06-Dec-2014 12:25:33	06-Dec-2014 12:39:10	2992.83	1573.01
EMXV	65	06-Dec-2014 12:39:10	06-Dec-2014 12:39:14	1573.01	1566.23
EMXV	60	06-Dec-2014 12:39:14	06-Dec-2014 12:43:13	1566.23	1151.56
EMXV	55	06-Dec-2014 12:43:13	06-Dec-2014 12:49:05	1151.56	542.99
EMXV	50	06-Dec-2014 12:49:05	06-Dec-2014 12:49:09	542.99	536.52
EMXV	45	06-Dec-2014 12:49:09	06-Dec-2014 13:02:25	536.52	24.23
WINB	38.4	06-Dec-2014 11:51:52	06-Dec-2014 12:26:50	6398.98	2858.54
WINB	32.08	06-Dec-2014 12:26:50	06-Dec-2014 13:02:25	2858.54	24.23
WINE	78.4	06-Dec-2014 11:51:52	06-Dec-2014 12:26:48	6398.98	2861.77
WINE	80.6	06-Dec-2014 12:26:48	06-Dec-2014 13:02:25	2861.77	24.23

All depth are at tool zero.

USI Goodwin	
Run 2	
USI Goodwin Compressed	

Log	Company:Noble Energy Inc Well:Burton K25-67-1HN Run 2: Main[8]:Up:S012
-----	--

Description: USI Goodwin Format: USI Goodwin Index Scale: 0.1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 06-Dec-2014 17:40:25

TIME_1900 - Time Marked every 60.00 (s)

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
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	Average	Average	Average

[illegible]

CableDrag				
Azimuth of Eccentering (AZEC) USIT-E				
0 deg 360				
Casing Collar				

Absent

-5.200

-3.600

-2.000

-0.400

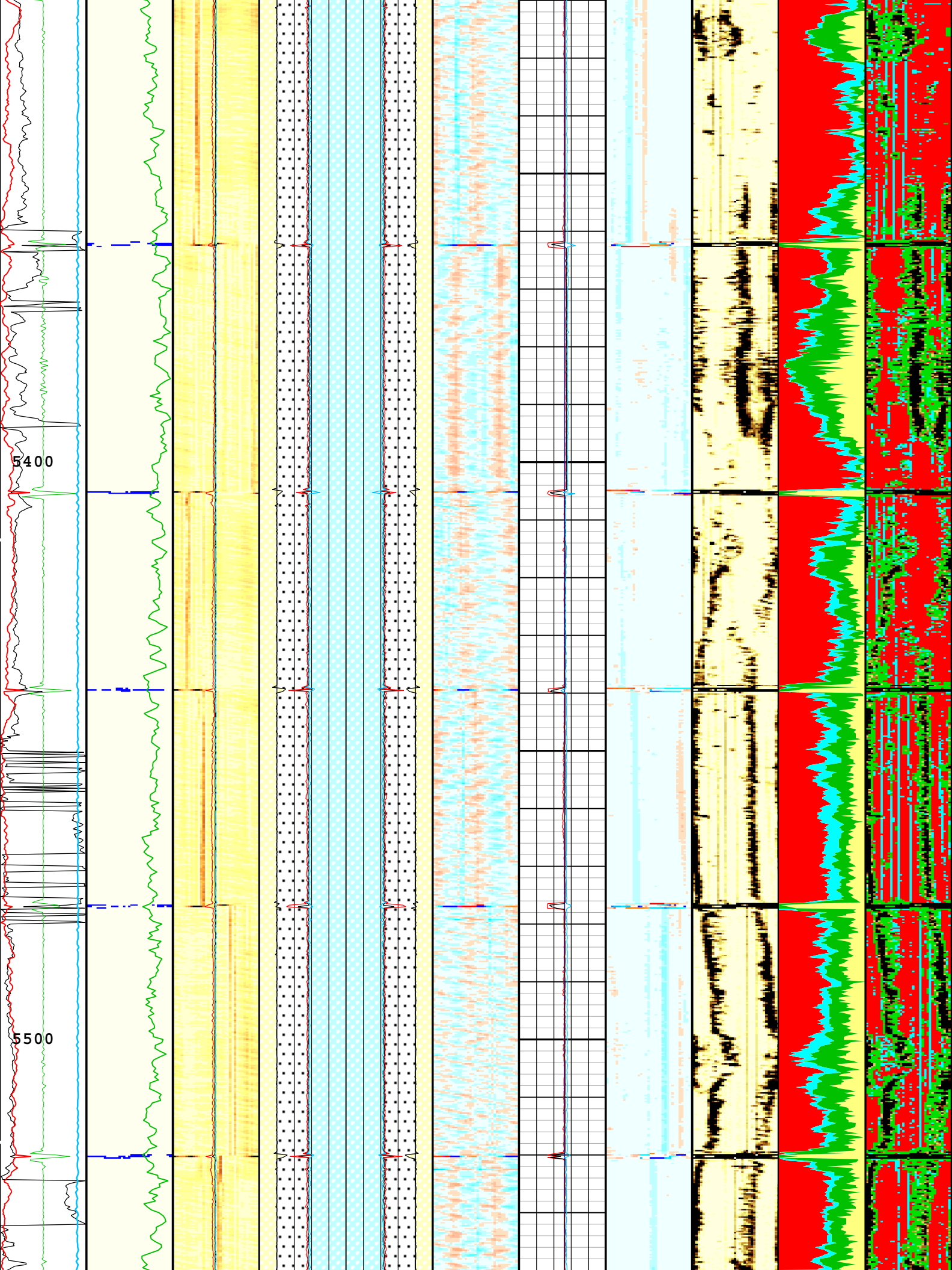
Explicit Normalization

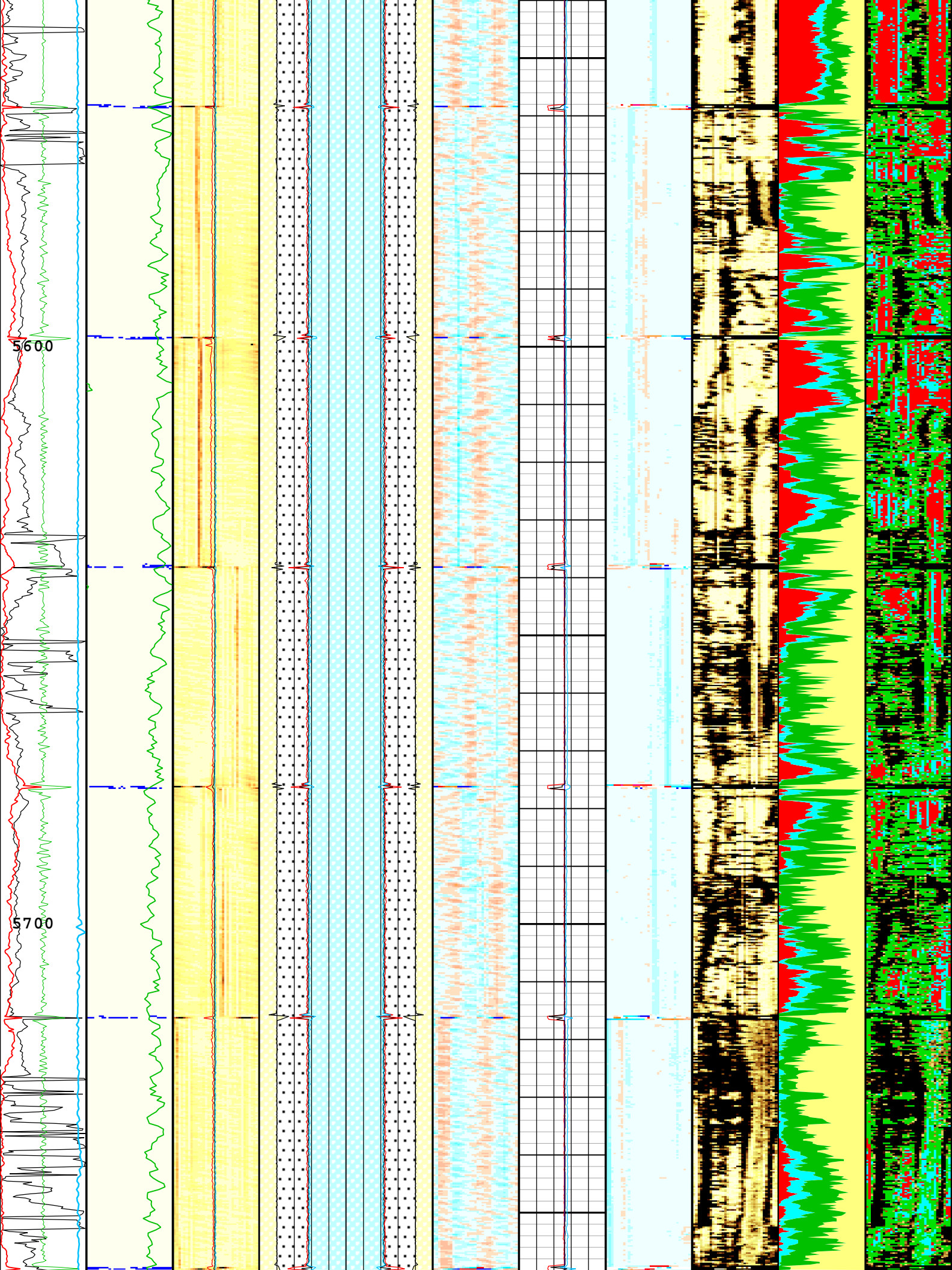
USIT - Amplitude of

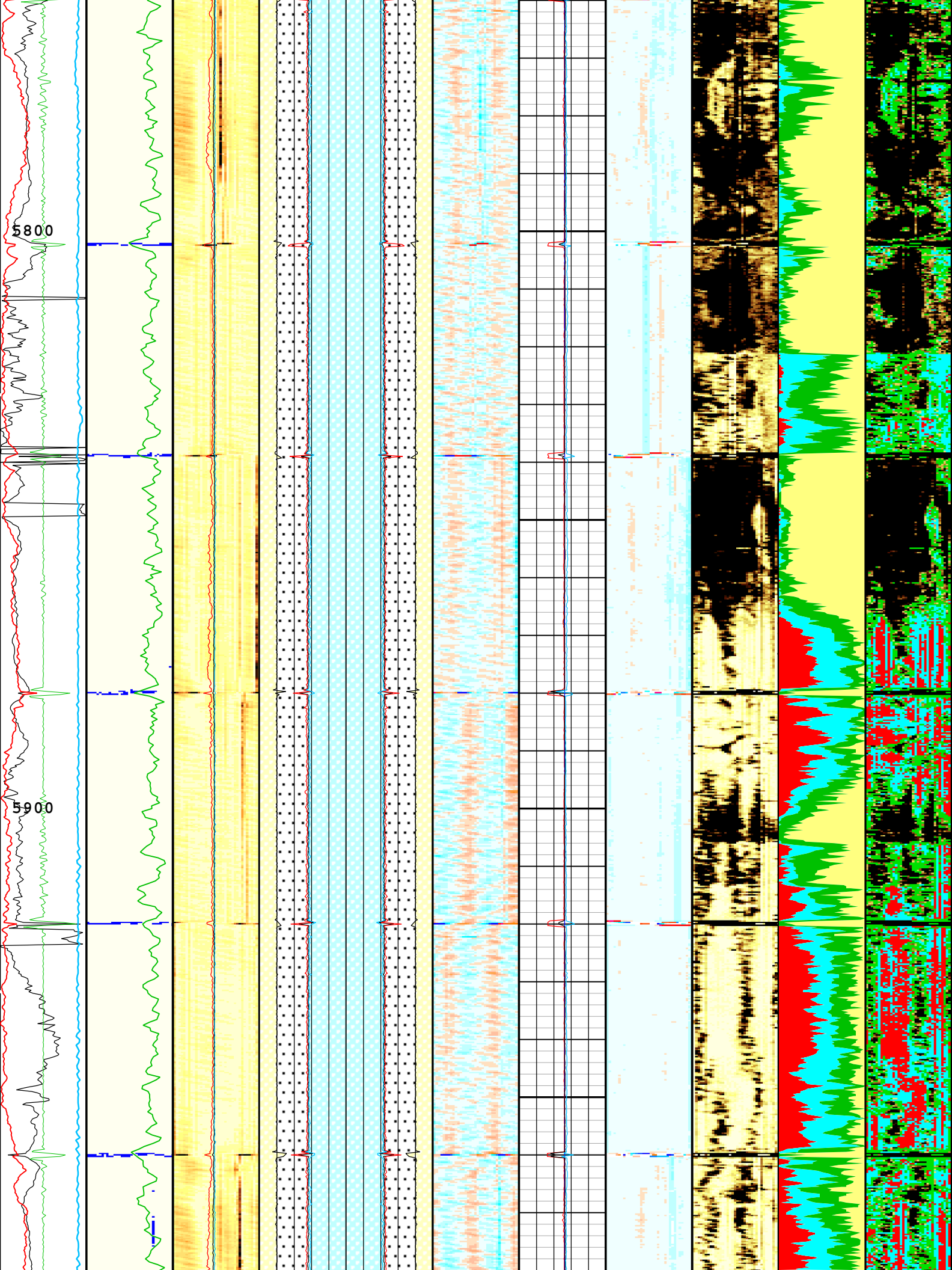
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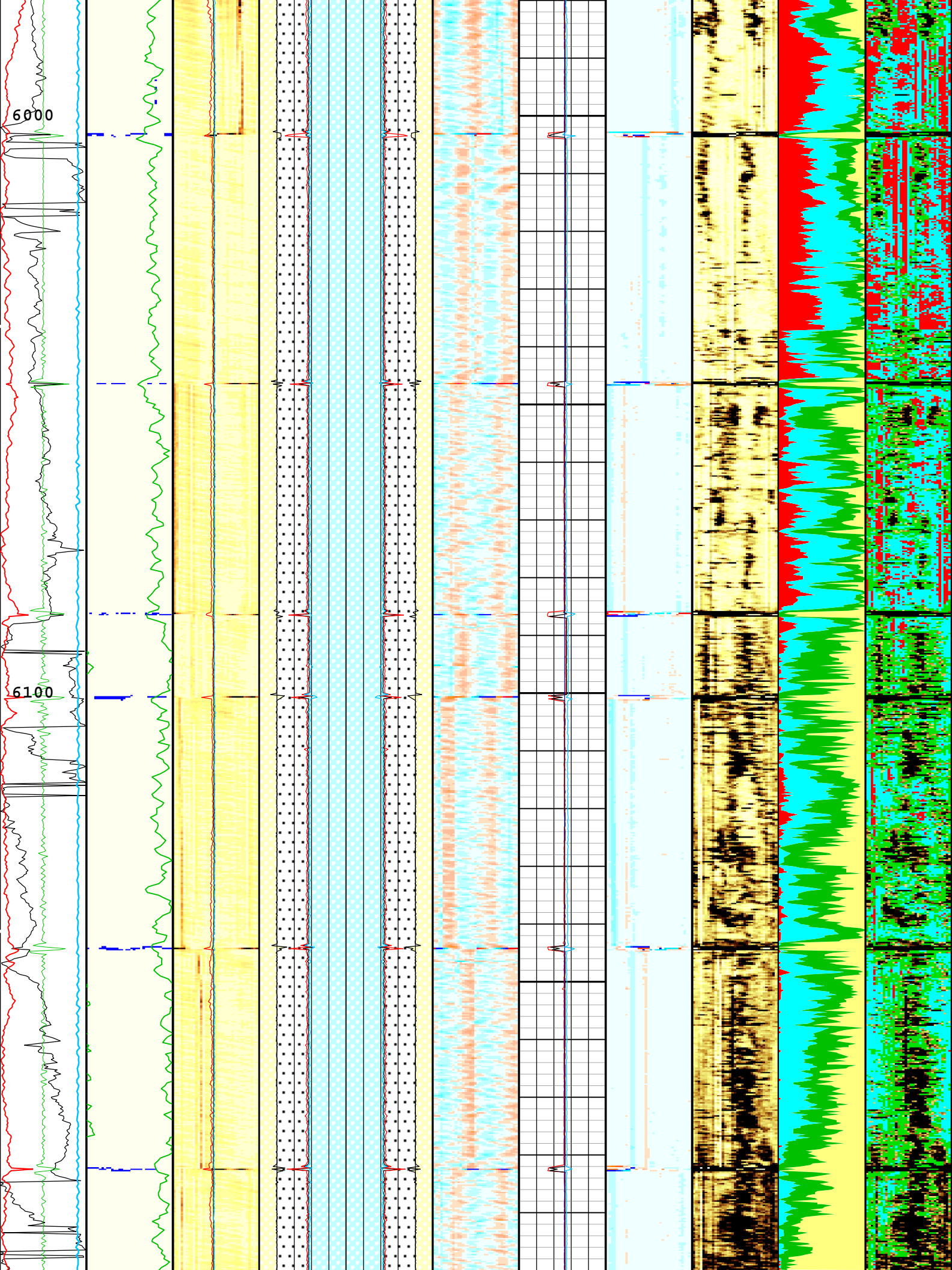
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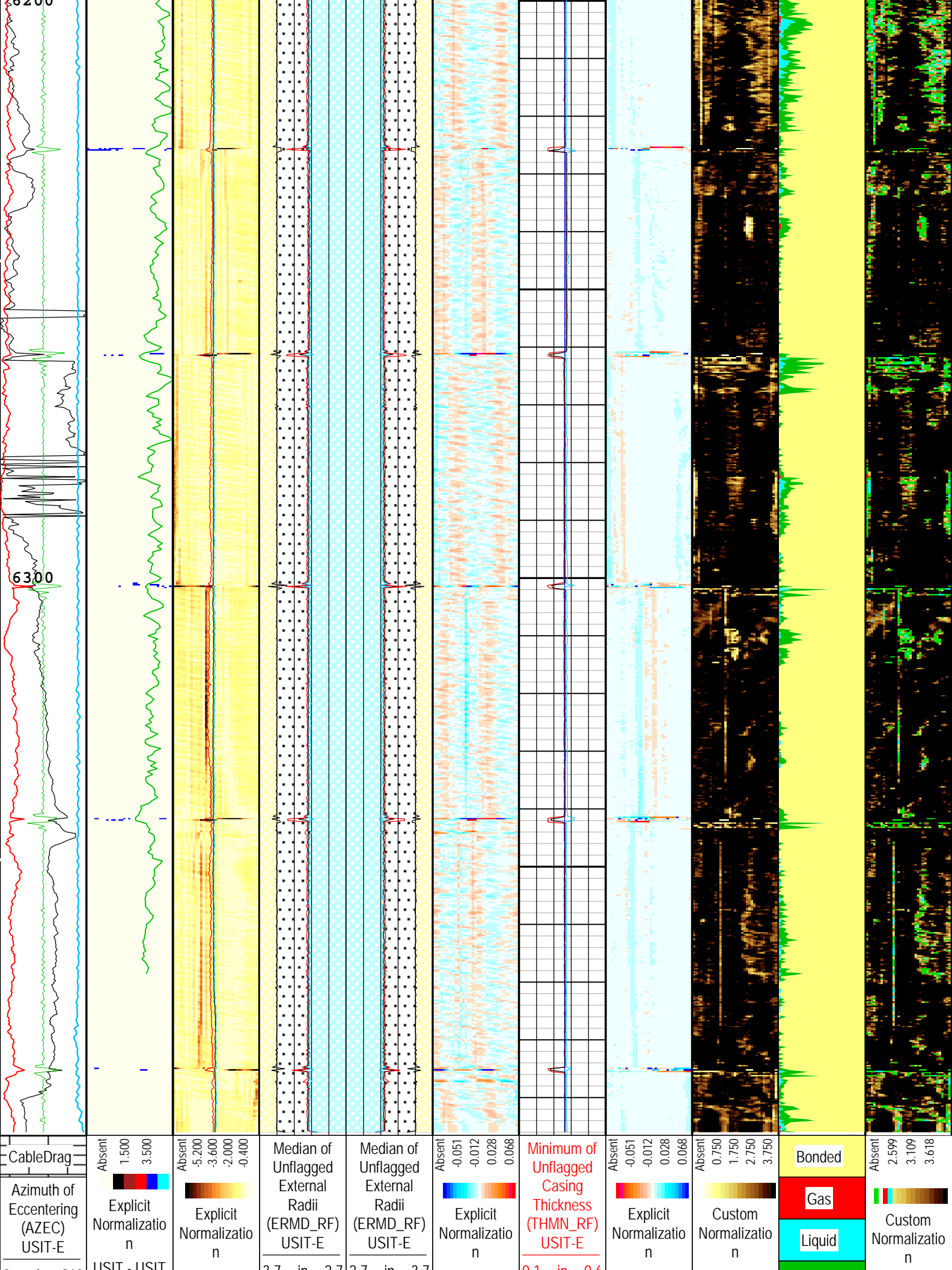
Minimum of











deg 360	USIT - USIT Processing Flags (UFLG) USIT-E	Amplitude of Unflagged Wave (AWBK_RF) USIT-E (dB)	Median Internal Radius of Casing Corrected for Eccentering (IRMD_RF) USIT-E	Median Internal Radius of Casing Corrected for Eccentering (IRMD_RF) USIT-E	USIT - Unflagged Internal Radii minus Median Internal Radius (IRBKM_RF) USIT-E (in)	Nominal Casing Thickness (THNO) USIT-E	USIT - Unflagged Casing Thickness minus Median of Unflagged Casing Thickness (THBKM_RF) USIT-E (in)	USIT - Acoustic Impedance (AIBK) USIT-E (Mrayl)	Micro-debonding	USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)
Casing Collar Locator Ultrasonic (CCLU) USIT-E	Gamma Ray (GR) SGT-N	Minimum of Unflagged Wave Amplitude (AWMN_RF) USIT-E	Maximum of Unflagged Internal Radii (IRMX_RF) USIT-E	Maximum of Unflagged Internal Radii (IRMX_RF) USIT-E	Median of Unflagged Casing Thickness (THMD_RF) USIT-E	Median of Unflagged Casing Thickness (THMD_RF) USIT-E				
-20 in 20	0 gAPI 150	Average of Unflagged Wave Amplitude (AWAV_RF) USIT-E	Minimum of Unflagged Internal Radii (IRMN_RF) USIT-E	Minimum of Unflagged Internal Radii (IRMN_RF) USIT-E	Maximum of Unflagged Casing Thickness (THMX_RF) USIT-E	Maximum of Unflagged Casing Thickness (THMX_RF) USIT-E				
Motor Revolution Speed (RSAV) USIT-E		Maximum of Unflagged Wave Amplitude (AWMX_RF) USIT-E								
-8 c/s -6										
Motor Revolution Speed (RSAV) USIT-E										
6 c/s 7.5										
Stuck Tool Indicator, Total (STIT)										
0 ft 50										
Amplitude of Eccentering (ECCE) USIT-E										
0 in 0.5										

TIME_1900 - Time Marked every 60.00 (s)

Description: USI Composite Format: USI Composite Index Scale: 5 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 06-Dec-2014 17:40:29

Channel Processing Parameters				
Parameter	Description	Tool	Value	Unit
AFVU	Automatic Fluid Velocity Update	USIT-E	On	
BARI	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	8.75	in
CASING_PRATIO	Casing Poisson Ratio	USIT-E	Standard Poisson ratio	
CBLO	Casing Bottom (Logger)	WLSESSION	7472.7	ft
CDEN	Cement Density	SGT-N	16.69	lbm/gal
CMTY	Cement Type	USIT-E	Light Cement	
CTHILGR	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.362	in
CYSTLGR	Casing Yield Strength - Zoned along logger depths	WLSESSION	110000	psi
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
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	SGT-N	1	
HEMA	Hematite Presence Flag	Borehole	No	

ICE_PROCESS	ICE Processing	USIT-E	Yes	
IMAR	Image Rotation	USIT-E	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	22.5	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.1	
MUD_N_THE	Theoretical Mud Normalization Factor	USIT-E	1	
OPLEV	USIT Remove Flagged Data Level	USIT-E	OPT2	
RAPID_OPTION	Rapid Access Computation Option	USIT-E	Off	
RCOD	Reference Calibrator Outer Diameter	USIT-E	7	in
RCSO	Reference Calibrator Standoff	USIT-E	1.181	in
RCTH	Reference Calibrator Thickness	USIT-E	0.295	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
SDTVER	Acoustic Impedance STD Vertical Threshold for Micro-debonding	USIT-E	0.3	Mrayl
SOGR	Standoff Distance of the Gamma Ray Tool	SGT-N	0	in
TCUB	T^3 Processing Level	USIT-E	Loop	
TD	Total Measured Depth	Borehole	6404.1	ft
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
TPOS	Tool Position: Centered or Eccentered	SGT-N	Centered	
UDFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0	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.	
UTHDP	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)	
ZMUD	1.71	5200	5800	
ZMUD	1.72	5800	6396.5	
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	18	dB
DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
DOTF	Distance between Opposite Transducer Faces	USIT-E	2.874	in
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/h
ULOG	Logging Objective	USIT-E	MEASUREMENT	
UMER	Modulation Frequency	USIT-E	333333	Hz

USFR	Ultrasonic Sampling Frequency	USIT-E	500000	Hz
USI_UPAT	USIT Emission Pattern	USIT-E	Pattern 375 KHz	
USI_UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 3.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	6394	ft
VRES	Vertical Resolution	USIT-E	3.0 in	
WINB	Window Begin Time	USIT-E	38.4	us
WINE	Window End Time	USIT-E	78.4	us

Time Zone Parameters

Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	90	06-Dec-2014 11:05:21	06-Dec-2014 11:07:59	6396.56	6142.3
EMXV	95	06-Dec-2014 11:07:59	06-Dec-2014 11:17:44	6142.3	5127.56

All depth are at tool zero.

USI Cement

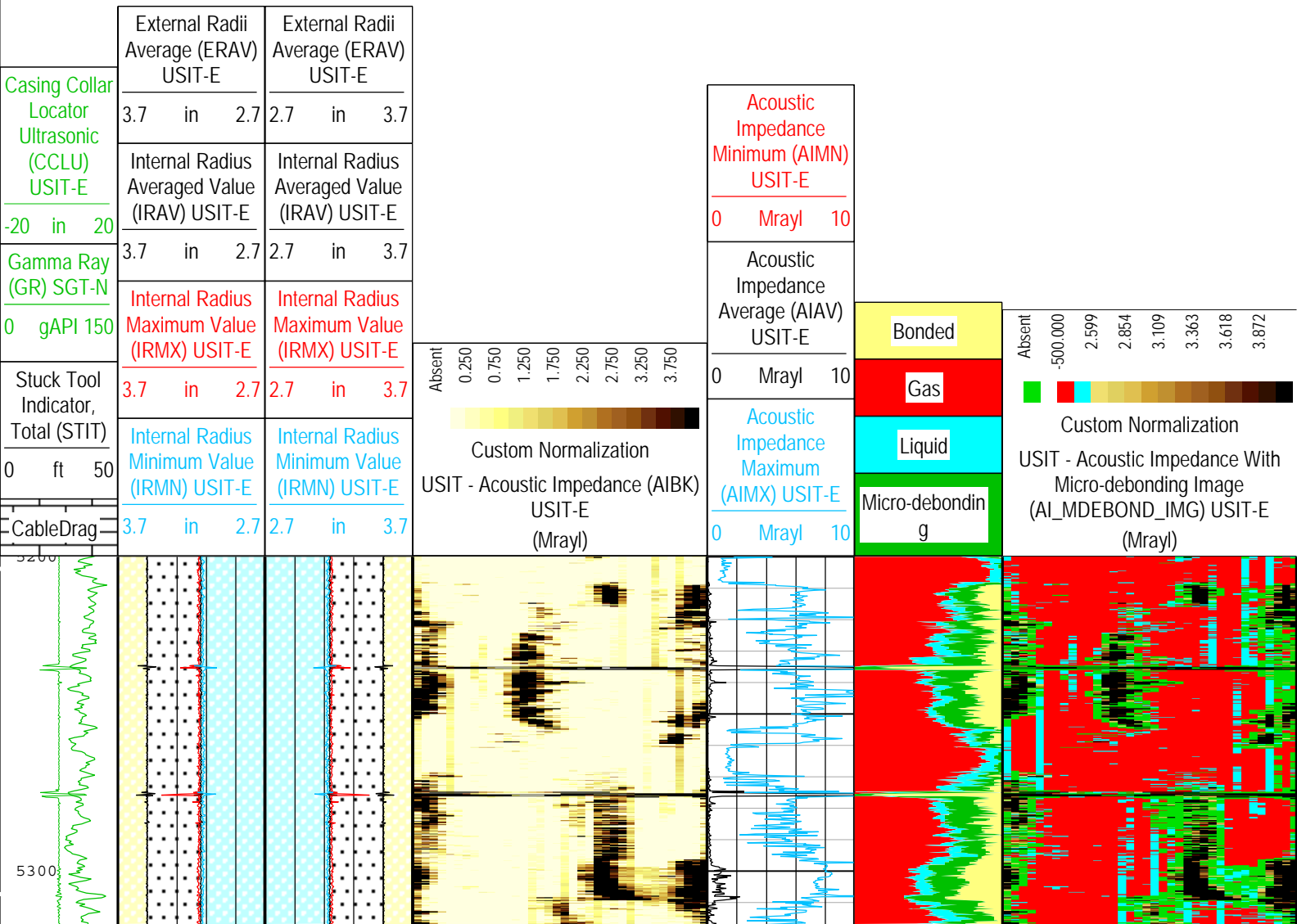
Run 2

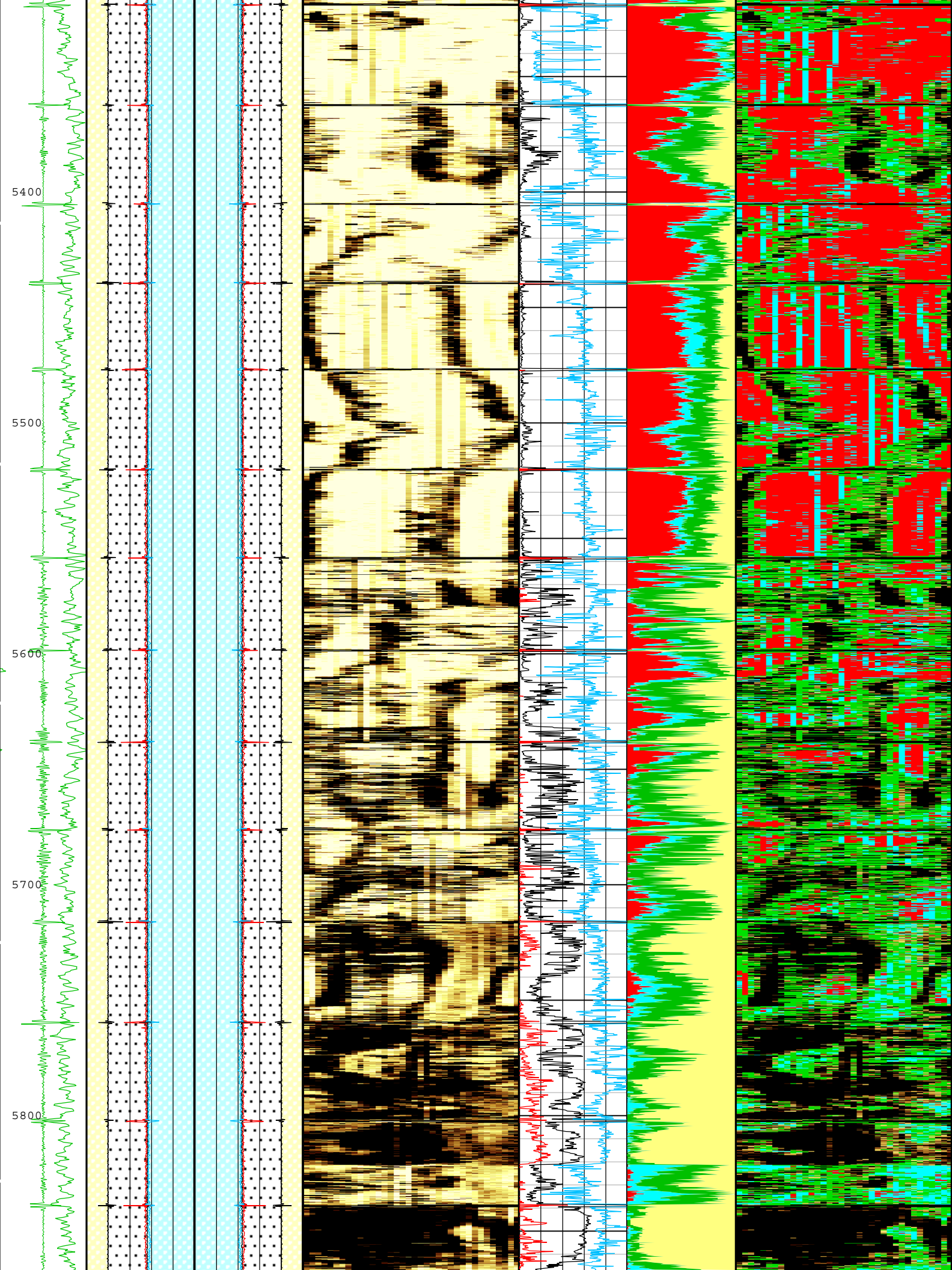
USI Cement

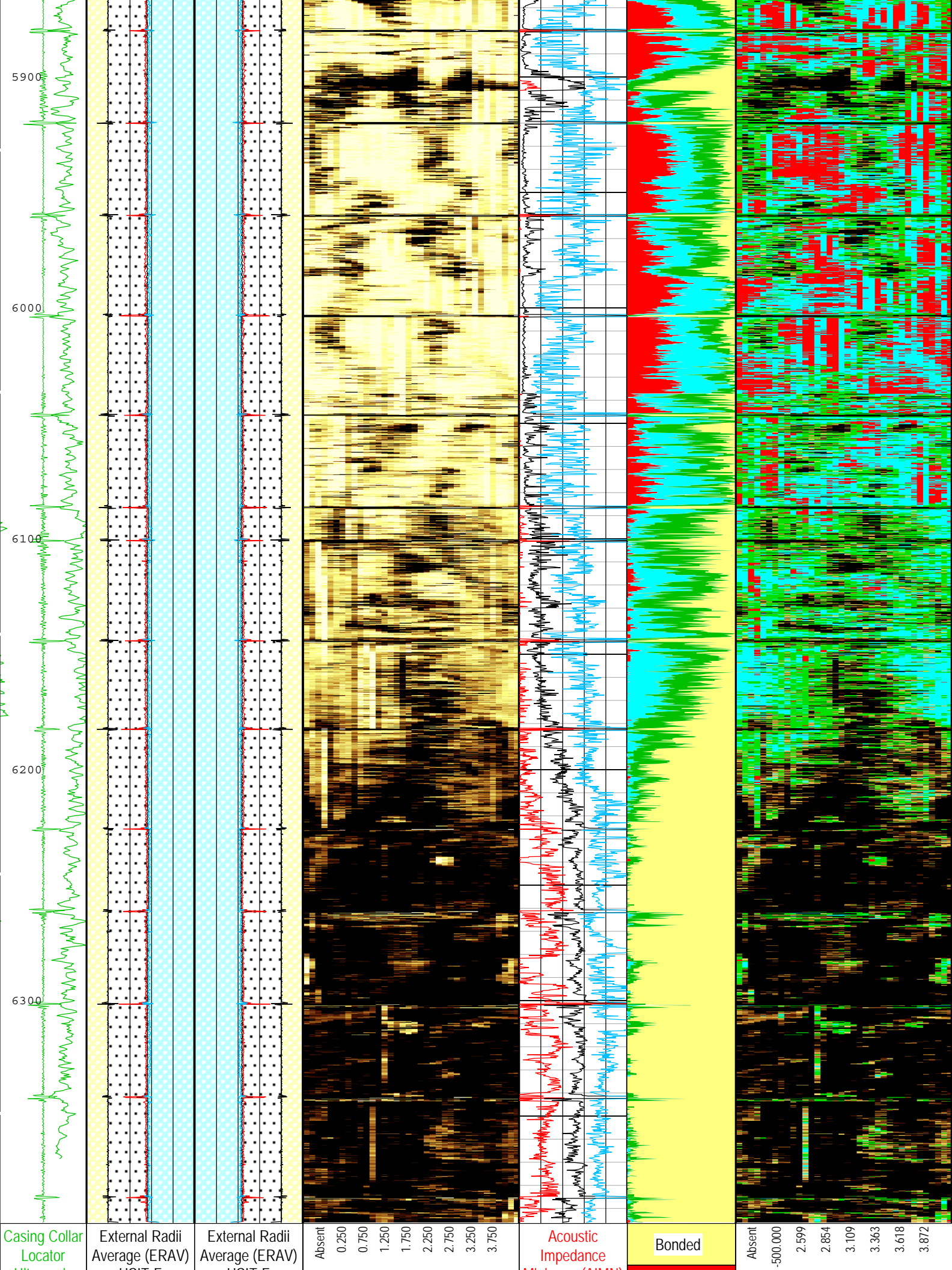
Log	Company:Noble Energy Inc	Well:Burton K25-67-1HN
		Run 2: Repeat[6]:Up:S012

Description: USI Cement Format: USI Cement Index Scale: 2 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 06-Dec-2014 17:40:34

TIME_1900 - Time Marked every 60.00 (s)







Ultrasonic
(CCLU)
USIT-E

-20 in 20

Gamma Ray
(GR) SGT-N

0 gAPI 150

Stuck Tool
Indicator,
Total (STIT)

0 ft 50

CableDrag

USIT-E

3.7 in 2.7

Internal Radius
Averaged Value
(IRAV) USIT-E

3.7 in 2.7

Internal Radius
Maximum Value
(IRMX) USIT-E

3.7 in 2.7

Internal Radius
Minimum Value
(IRMN) USIT-E

3.7 in 2.7

USIT-E

2.7 in 3.7

Internal Radius
Averaged Value
(IRAV) USIT-E

2.7 in 3.7

Internal Radius
Maximum Value
(IRMX) USIT-E

2.7 in 3.7

Internal Radius
Minimum Value
(IRMN) USIT-E

2.7 in 3.7

Custom Normalization

USIT - Acoustic Impedance (AIBK)
USIT-E
(Mrayl)

Minimum (AIMN)
USIT-E

0 Mrayl 10

Acoustic
Impedance
Average (AIAV)
USIT-E

0 Mrayl 10

Acoustic
Impedance
Maximum
(AIMX) USIT-E

0 Mrayl 10

Gas

Liquid

Micro-debondin
g

Custom Normalization

USIT - Acoustic Impedance With
Micro-debonding Image
(AI_MDEBOND_IMG) USIT-E
(Mrayl)

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: 06-Dec-2014 17:40:34

Channel Processing Parameters				
Parameter	Description	Tool	Value	Unit
AFVU	Automatic Fluid Velocity Update	USIT-E	On	
BARI	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	8.75	in
CASING_PRATIO	Casing Poisson Ratio	USIT-E	Standard Poisson ratio	
CBLO	Casing Bottom (Logger)	WLSESSION	7472.7	ft
CDEN	Cement Density	SGT-N	16.69	lbm/gal
CMTY	Cement Type	USIT-E	Light Cement	
CTHILGR	Nominal Casing Thickness - Zoned along logger depths	WLSESSION	0.362	in
DC_MODE	Depth Correction Mode	DepthCorrection	Real-time	
DFD	Drilling Fluid Density	Borehole	8.4	lbm/gal
DFT	Drilling Fluid Type	Borehole	Water	
DTMD	Borehole Fluid Slowness	Borehole	206	us/ft
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	SGT-N	1	
HEMA	Hematite Presence Flag	Borehole	No	
ICE_PROCESS	ICE Processing	USIT-E	Yes	
IMAR	Image Rotation	USIT-E	Off	
MEAS_WLEN	Tcube Processing Window Length in Measurement Mode	USIT-E	22.5	us
MUD_N_FRP	Free Pipe Mud Normalization Factor	USIT-E	1.1	
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	7	in
RCSO	Reference Calibrator Standoff	USIT-E	1.181	in
RCTH	Reference Calibrator Thickness	USIT-E	0.295	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	0.2	Mrayl

SDTVER	Acoustic Impedance STD Vertical Threshold for micro-debonding	USIT-E	0.3	Mrayl
SOGR	Standoff Distance of the Gamma Ray Tool	SGT-N	0	in
TCUB	T^3 Processing Level	USIT-E	Loop	
TD	Total Measured Depth	Borehole	6404.1	ft
THDH	Maximum Search Thickness (percentage of nominal)	USIT-E	130	%
THDL	Minimum Search Thickness (percentage of nominal)	USIT-E	70	%
TPOS	Tool Position: Centered or Eccentered	SGT-N	Centered	
UDFSZ	Drilling Fluid Specific Acoustic Impedance	USIT-E	0	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.	
UTHDP	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)
ZMUD	1.71	5200	5800
ZMUD	1.72	5800	6396.5
All depth are actual.			

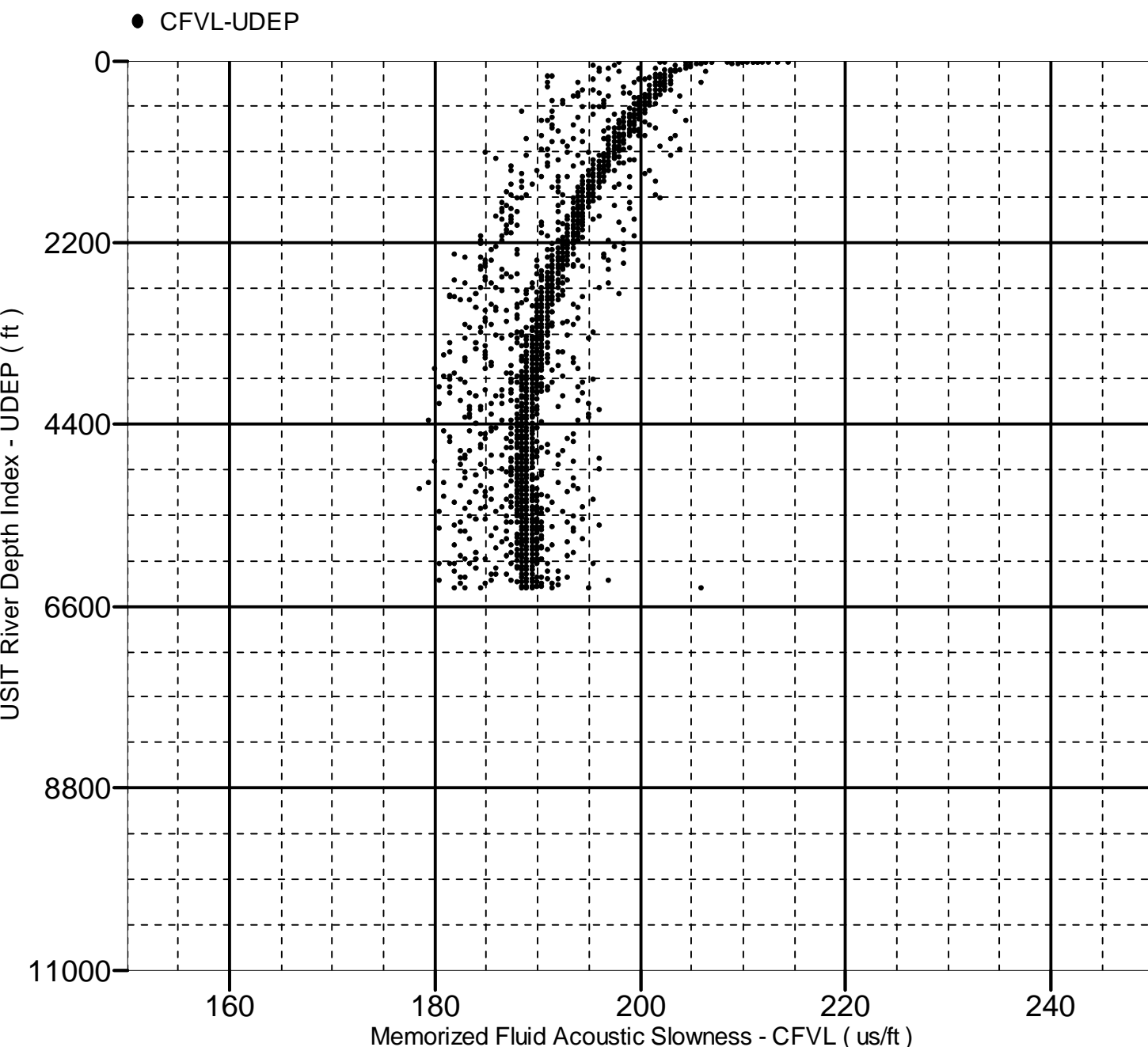
Tool Control Parameters				
Parameter	Description	Tool	Value	Unit
AGMN	Minimum Gain of Cartridge	USIT-E	-12	dB
AGMX	Maximum Gain of Cartridge	USIT-E	18	dB
DDT5	USIC Downhole Decimation for T5 only	USIT-E	0_NONE	
DOTF	Distance between Opposite Transducer Faces	USIT-E	2.874	in
EMXV	EMEX Voltage	USIT-E	Time Zoned	V
HRES	Horizontal Resolution	USIT-E	10 deg	
MAX_LOG_SPEED	Toolstring Maximum Logging Speed	WLSESSION	3600	ft/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 375 KHz	
USI_UWKM	USIT Working Mode	USIT-E	Uncompressed 10 deg at 3.0 in LF	
USIT_DEPTHLOG	Starting Depth Log for Ultrasonics	USIT-E	6394	ft
VRES	Vertical Resolution	USIT-E	3.0 in	
WINB	Window Begin Time	USIT-E	38.4	us
WINE	Window End Time	USIT-E	78.4	us

Time Zone Parameters					
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	90	06-Dec-2014 11:05:21	06-Dec-2014 11:07:59	6396.56	6142.3
EMXV	95	06-Dec-2014 11:07:59	06-Dec-2014 11:17:44	6142.3	5127.56

Fluid Acoustic Slowness vs Depth

2D Cross Plot

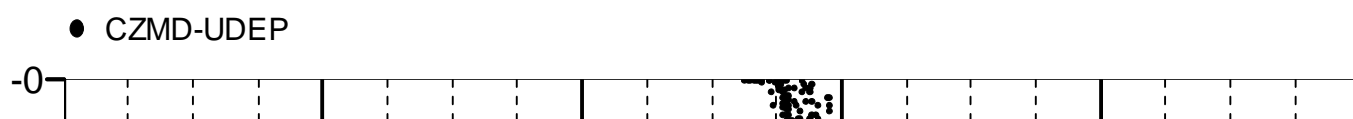
Index Range: From 6398.50 to 24.00 ft

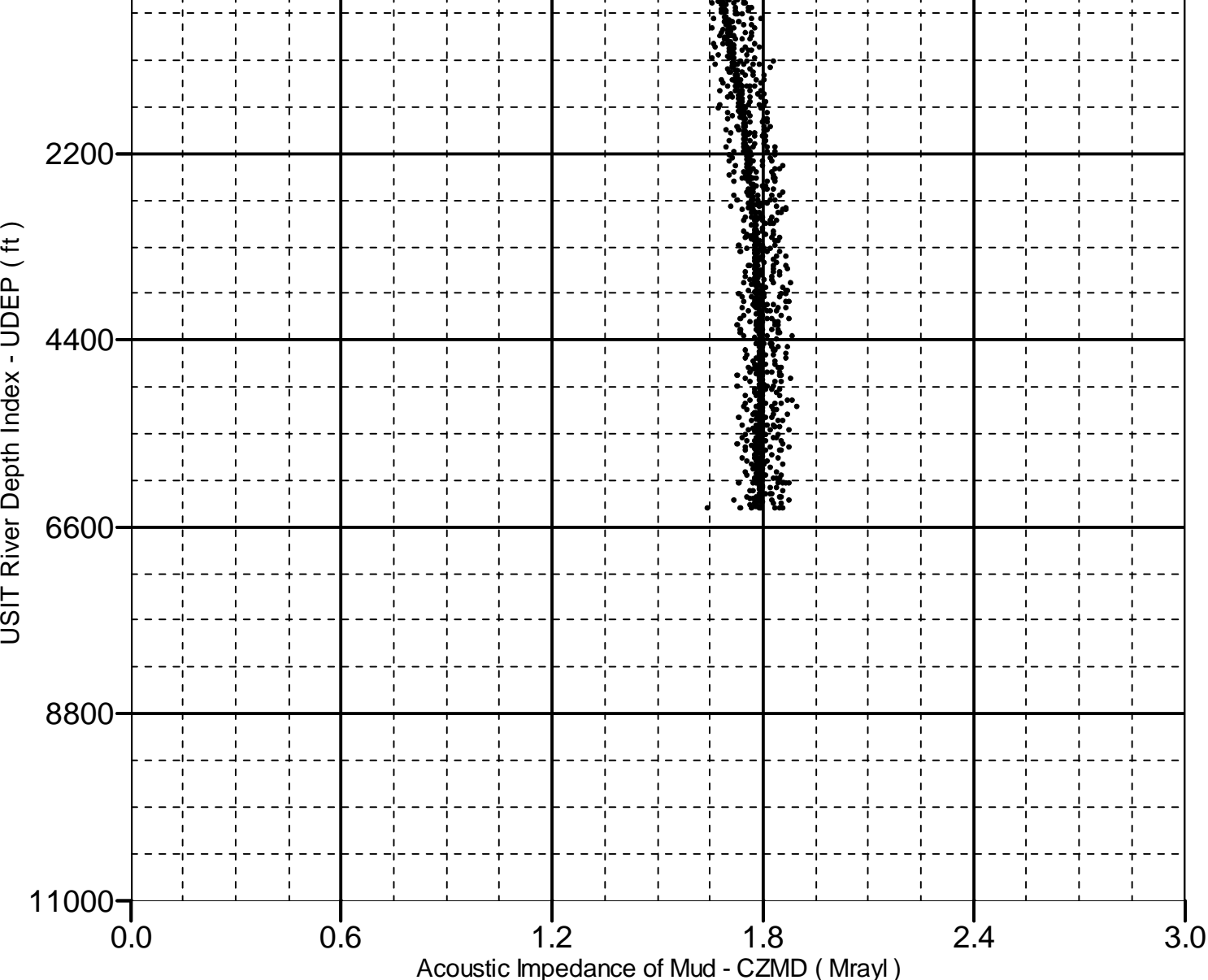


Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 6398.50 to 24.00 ft





Calibration Report

SGT-N (Scintillation Gamma-Ray Tool) Calibration - Run 2

Primary Equipment :

Scintillation Gamma Cartridge

SGC-TB

9841

Calibration Parameter :

Plus Reference (Jig minus background reference)

165

SGT-N Gamma-Ray Calibration - Gamma Ray Coefficients

Before (Measured): 17:08:48 01-Dec-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
Gamma Ray Gain		Before			1.098		

SGT-N Gamma-Ray Calibration - Gamma Ray Accumulations

Before (Measured): 17:08:48 01-Dec-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Zero Measurement	gAPI	Before		0	65.744	120.000	
RGR Plus Measurement	gAPI	Before	150.250	136.591	150.250	163.909	

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

Before (Measured): 17:11:23 01-Dec-2014

Measurement	Unit	Phase	Nominal	Low Limit	Actual	High Limit	
RGR Plus Plateau Measurement	gAPI	Before			217.105		
RGR Minus Plateau Measurement	gAPI	Before			215.625		

Company:	Noble Energy Inc	Schlumberger
Well:	Burton K25-67-1HN	
Field:	Wattenberg	
County:	Weld	
State:	Colorado	
Ultrasonic Imager		
Cement Evaluation		
Gamma Ray - CCL Log		