Schlumberger

Company: Kerr McGee Oil & Gas Onshore LP

Well: Butterball 38N-10HZ

Field: WATTENBERG

County: WELD State: COLORADO

County: WELD
Field: WATTENBERG
Location: 717' FNL & 1489' FEL
Well: Butterball 38N-10HZ
Company: Kerr McGee Oil & Gas Onshore LP

Ultrasonic Imager

Cement Evaluation

Gamma Ray - CCL Log

Location:				
717' 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.:	4922.00 f	
Log Measured From:	Kelly Bushing	16.00 ft	above Perm.Datum	
Drilling Measured From:	Kelly Bushing			

API Serial No.	Section:	Township:	Range:
05123409900000	10	2N	67W

Logging Date	07-May-2015		
Run Number	ONE		
Depth Driller	13115.00 ft		
Schlumberger Depth	7420.00 ft		
Bottom Log Interval	7420.00 ft		
Top Log Interval	12.00 ft		
Casing Fluid Type	Water		
Salinity			
Density	12 lbm/gal		
Fluid Level	8.00 ft		
BIT/CASING/TUBING STRING			
Bit Size	7.88 in		
From	1150.00 ft		
To	7420.00 ft		
Casing/Tubing Size	5.5 in		
Weight	17 lbm/ft		
Grade	N/A		
From	0.00 ft		
To	13113.00 ft		
Max Recorded Temperatures	218.92 degF		
Logger on Bottom Time	07-May-2015	16:15:00	
Unit Number Location:	3022	FORT MORGAN, C	
Recorded By	Peter Brookens		
Witnessed By	Van Franke		

Disclaimer

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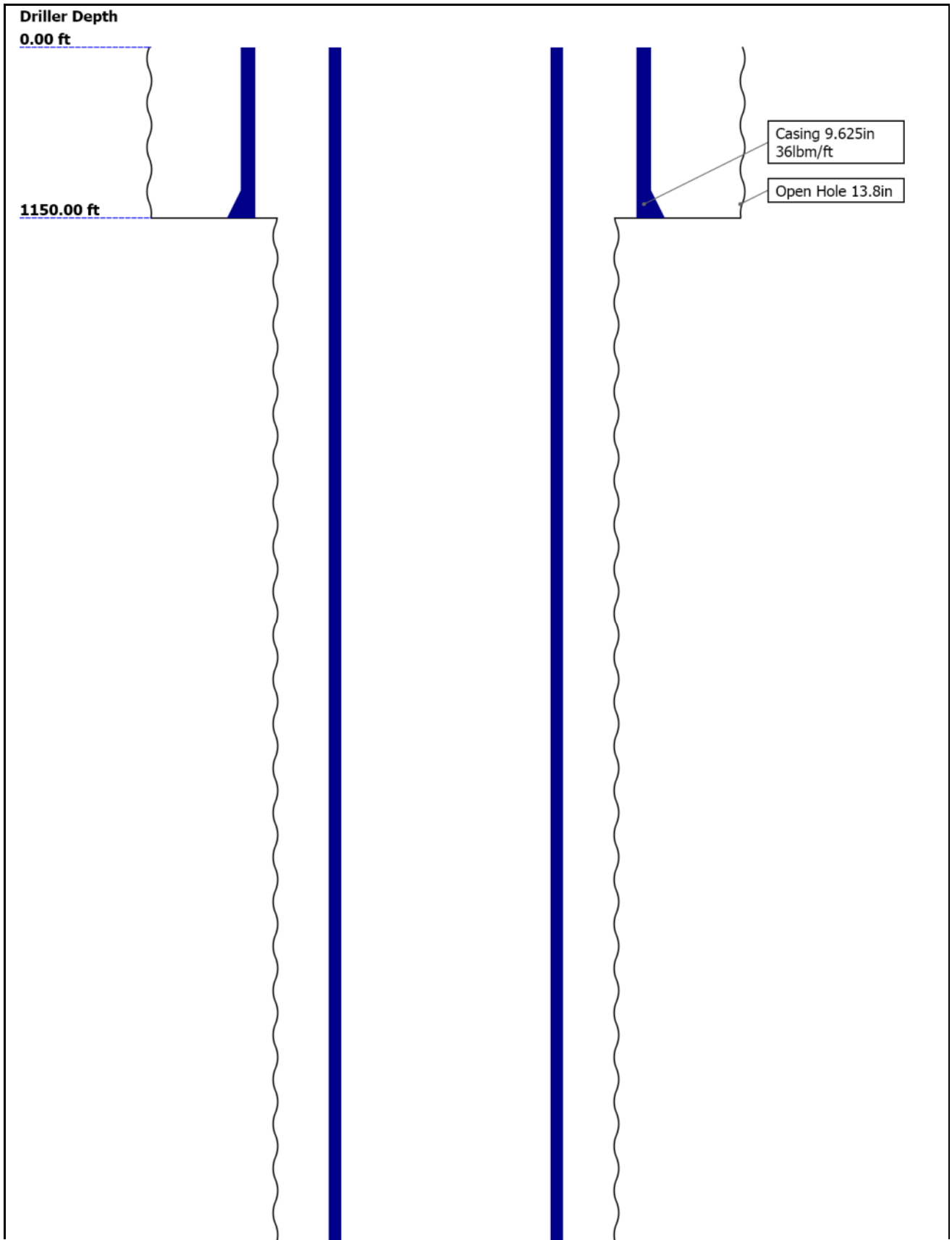
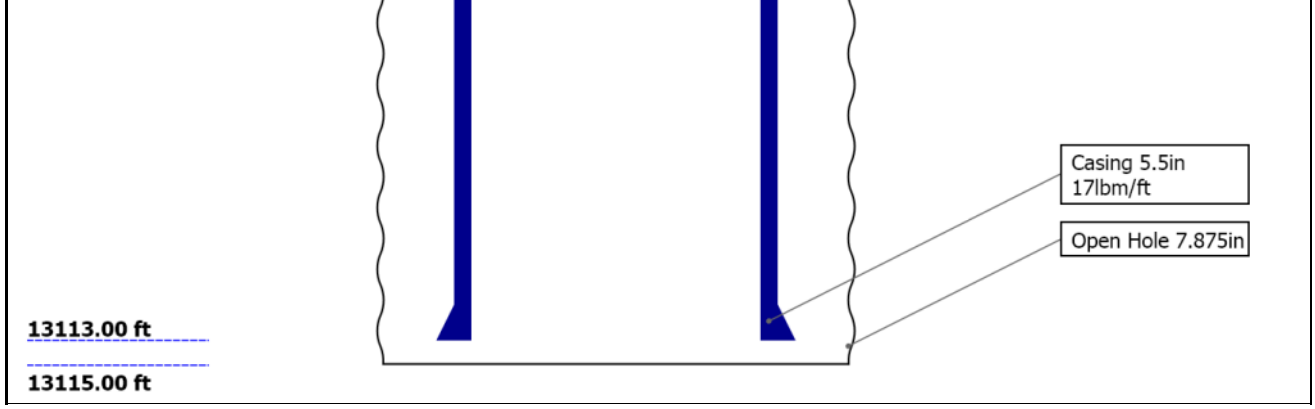
13. Xyz (Import (2) of USI Acoustic Impedance of Mud vs Depth 3.0 in)
14. Tail

Well Sketch





Borehole Size/Casing/Tubing Record

Bit						
Bit Size (in)	13.8	7.875				
Top Driller (ft)	0	1150				
Top Logger (ft)	0	1150				
Bottom Driller (ft)	1150	13115				
Bottom Logger (ft)	1150	7420				
Casing						
Size (in)	9.625	5.5				
Weight (lbm/ft)	36	17				
Inner Diameter (in)	8.921	4.892				
Grade	J55	N/A				
Top Driller (ft)	0	0				
Top Logger (ft)	0	0				
Bottom Driller (ft)	1150	13113				
Bottom Logger (ft)	1150	13113				

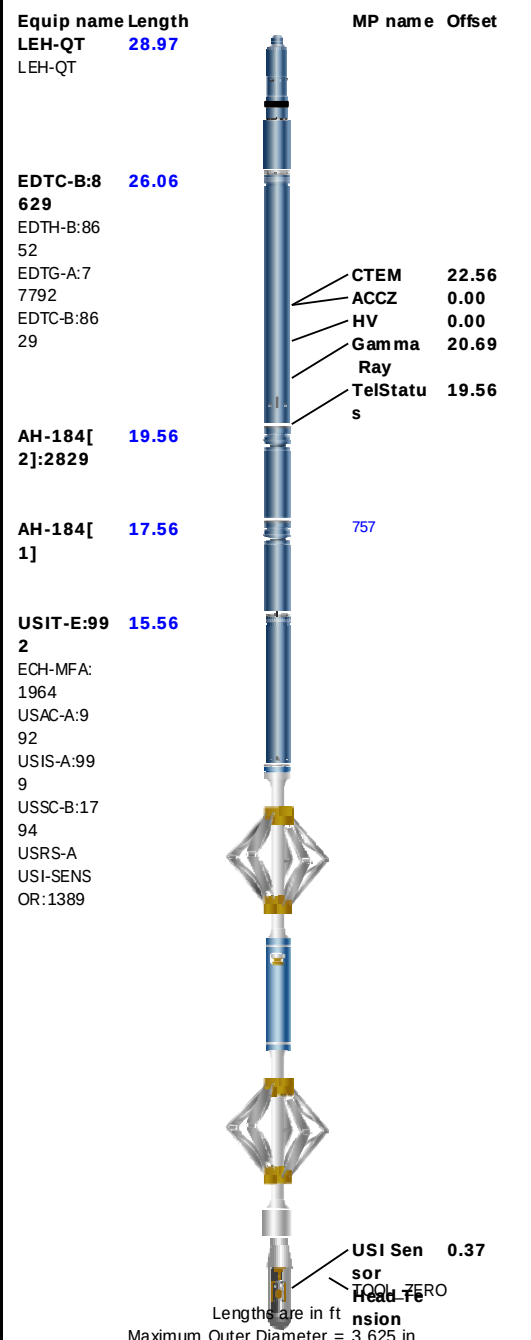
Operational Run Summary

Parameter (unit)	**ONE**					
Date Log Started	07-May-2015					
Time Log Started	14:30:09					
Date Log Finished	07-May-2015					
Time Log Finished	17:32:56					
Top Log Interval (ft)	12.00					
Bottom Log Interval (ft)	7420.00					
Total Depth (ft)	13113.00					
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-00014					

Remarks and Equipment Summary

ONE: Toolstring



Lengths are in ft
Maximum Outer Diameter = 3.625 in
Line: Sensor Location, Value: Gating Offset
All measurements are relative to TOOL_ZERO

ONE: Remarks

Log Objective: Cement Evaluation.
This is the first run in hole.
Toolstring run as per toolsketch (2 centralizers, 2 knuckles).
0 PSI main and repeat passes.
11.2 PPG OBM mud push, 12 PPG lead cement, 13.5 PPG tail cement.
DFD set to 12 PPG based on Zebra values most closely matching fluid slowness.
TD not tagged. Deviate out near ###'.
Crew: Ludgate, Strand, Brookens.

Depth Summary

	ONE		
Depth Measuring Device			
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		

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.
Rig Up Length At Surface		IDW USED AS PRIMARY DEPTH CONTROL.
Rig Up Length At Bottom		Z-CHART USED AS SECONDARY DEPTH CONTROL.
Rig Up Length Correction		
Stretch Correction		
Tool Zero Check At Surface		

Import (2) of USI Cement

USIT - Fluid Properties Measurement

Run Name	Pass Name	Start Depth(ft)	Stop Depth(ft)
Run 1	Main[7]:Up	7417.16	-0.83

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 : 43.99m(144.34ft) to 47.04m(154.35ft)
MUD_N_FRP = 1.00
DFD = 1.44g/cm3(12.00lbm/gal)
CZMD median computed in free pipe normalization interval = 2.09 MRayl

Start Depth(ft)	Stop Depth(ft)	Start Value(Mrayl)	End Value(Mrayl)

ONE

USI Cement

Log Company:Kerr McGee Oil & Gas Onshore LP Well:Butterball 38N-10HZ

ONE: Main[7]:Up:S004

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 13:53:32

TIME_1900 - Time Marked every 60.00 (s)

Casing Collar Locator Ultrasonic (CCLU) USIT-E
-20 in 20

Gamma Ray (ECGR_EDTC) EDTC-B
0 gAPI 150

Stuck Tool Indicator

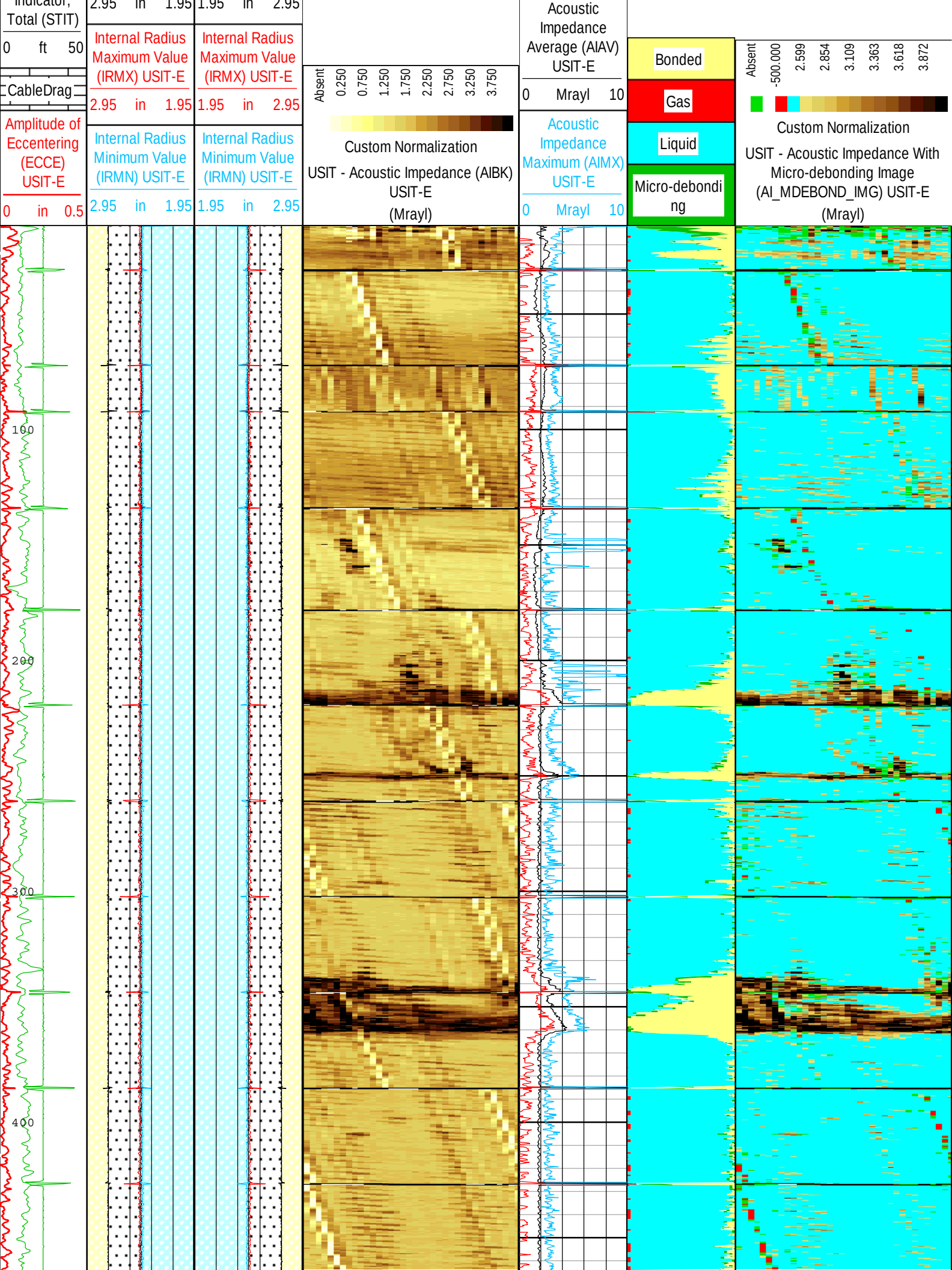
External Radii Average (ERAV) USIT-E
2.95 in 1.95

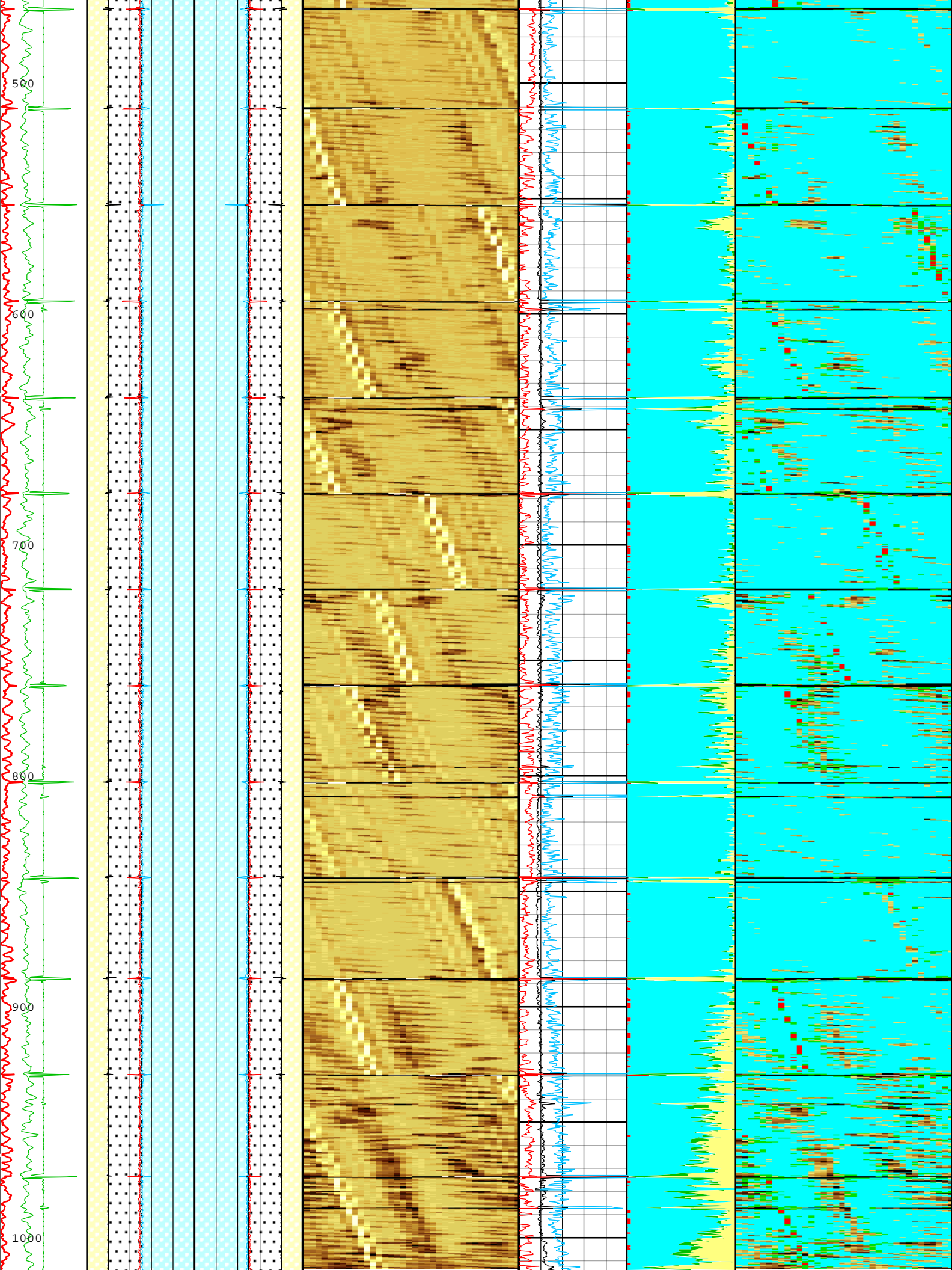
Internal Radius Averaged Value (IRAV) USIT-E

External Radii Average (ERAV) USIT-E
1.95 in 2.95

Internal Radius Averaged Value (IRAV) USIT-E

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


Indicator, Total (STIT)
0 ft 50
CableDrag
Amplitude of Eccentering (ECCE) USIT-E
0 in 0.5
2.95 in 1.95
Internal Radius Maximum Value (IRMX) USIT-E
2.95 in 1.95
Internal Radius Minimum Value (IRMN) USIT-E
2.95 in 1.95
1.95 in 2.95
Internal Radius Maximum Value (IRMX) USIT-E
1.95 in 2.95
Internal Radius Minimum Value (IRMN) USIT-E
1.95 in 2.95
Absent 0.250 0.750 1.250 1.750 2.250 2.750 3.250 3.750
Custom Normalization
USIT - Acoustic Impedance (AIBK) USIT-E (Mrayl)
Acoustic Impedance Average (AIAV) USIT-E
0 Mrayl 10
Acoustic Impedance Maximum (AIMX) USIT-E
0 Mrayl 10
Bonded
Gas
Liquid
Micro-debonding
Absent -500.000 2.599 2.854 3.109 3.363 3.618 3.872
Custom Normalization
USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)
100
200
300
400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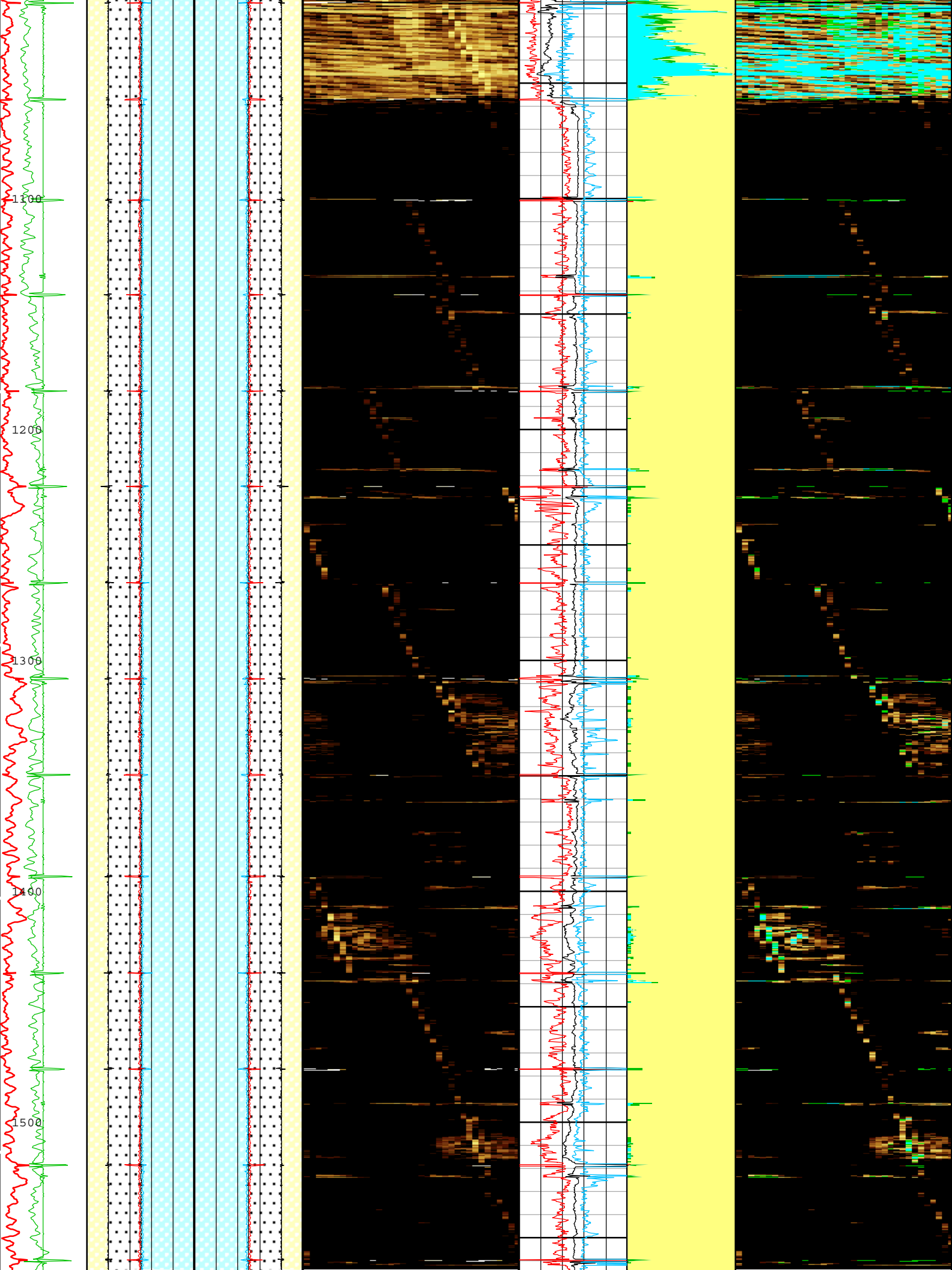
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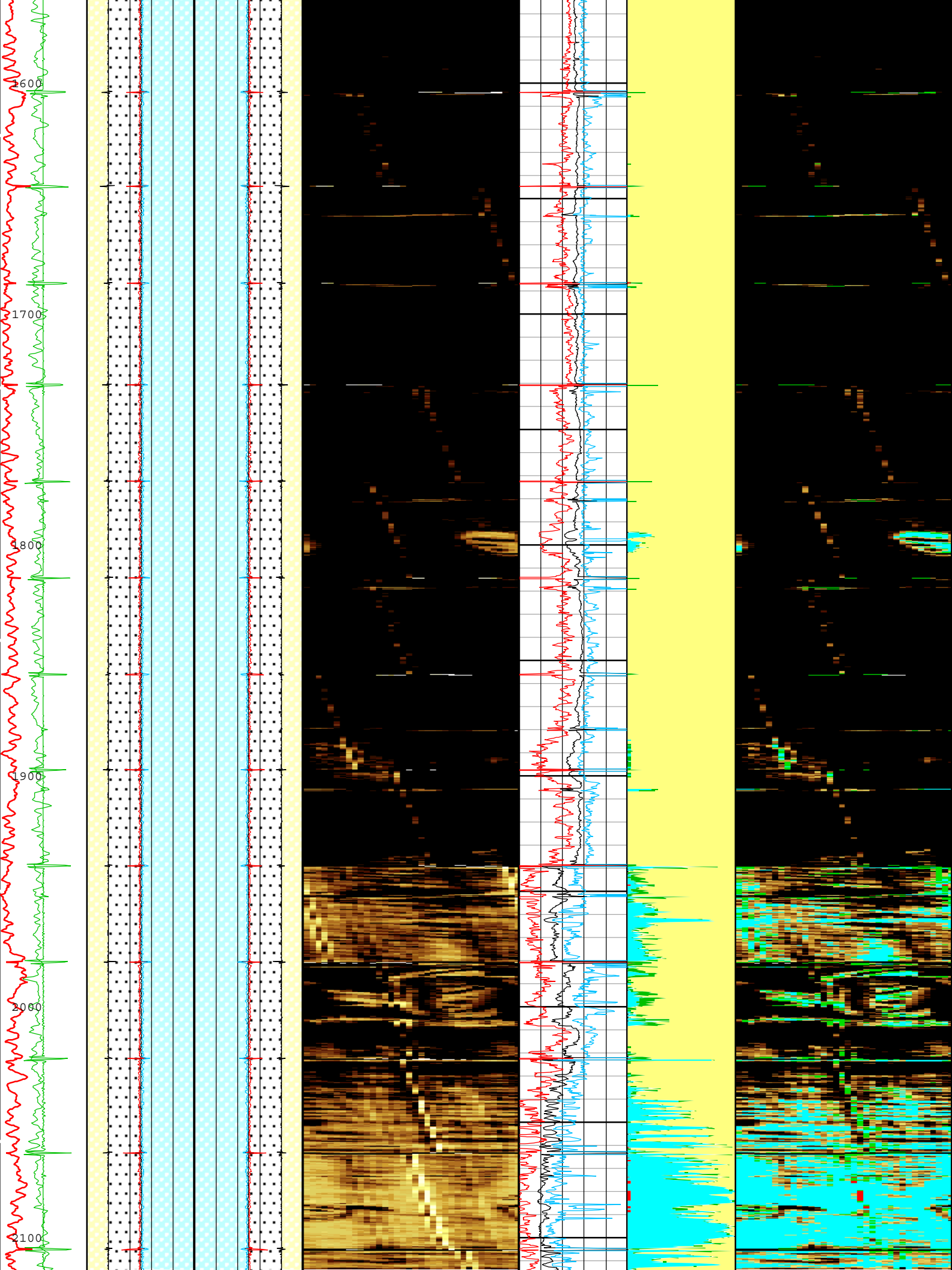
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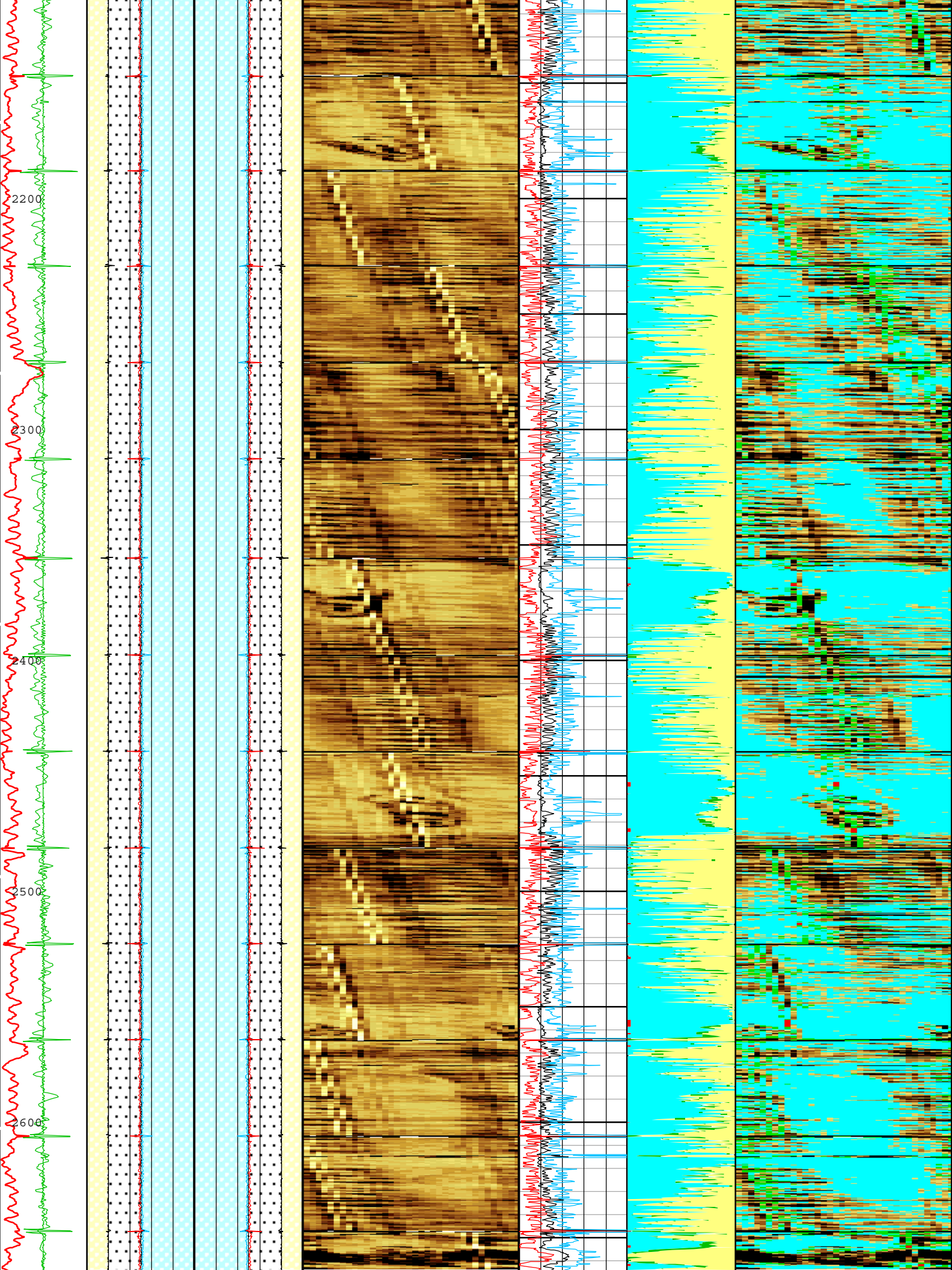
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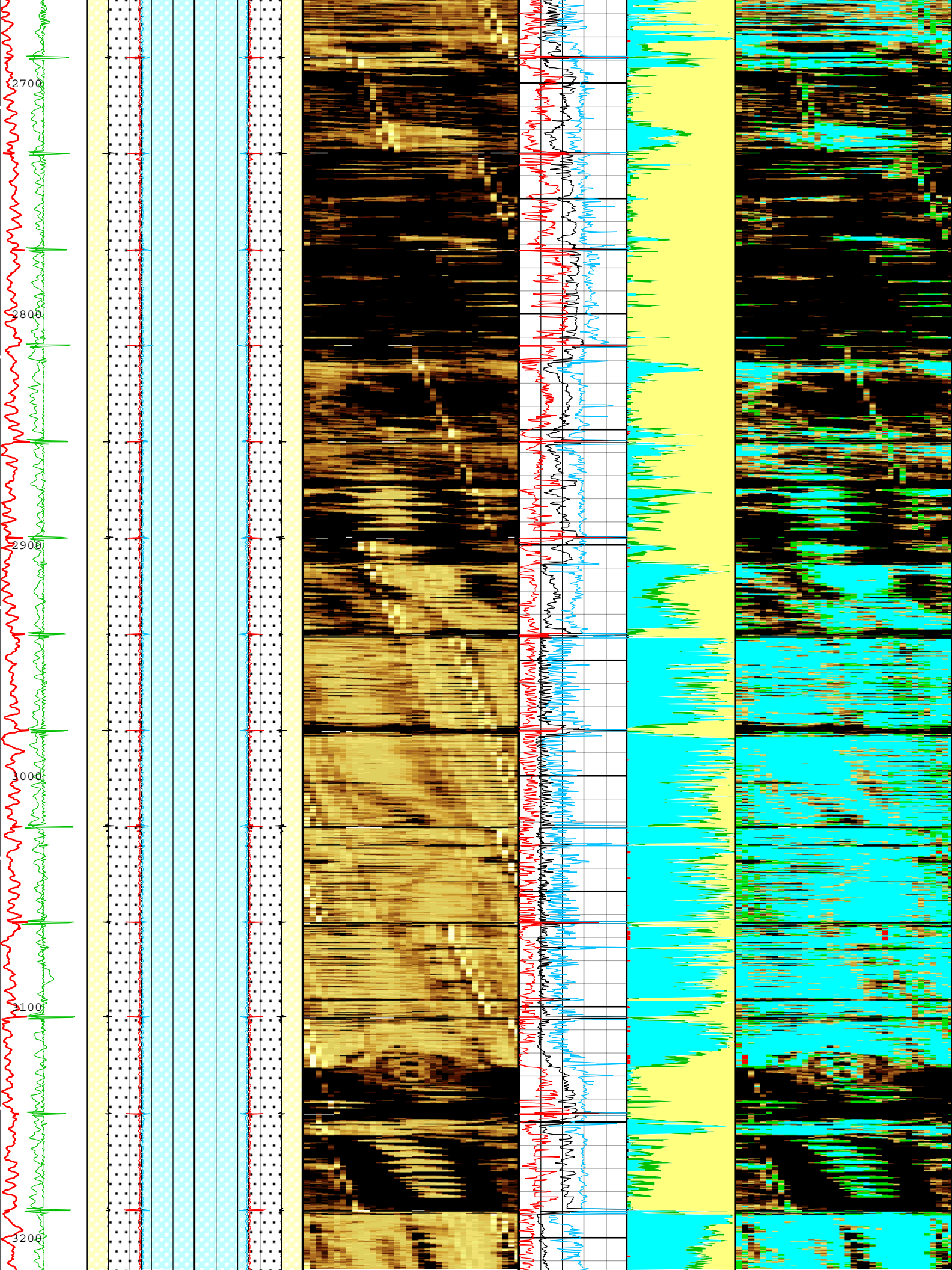
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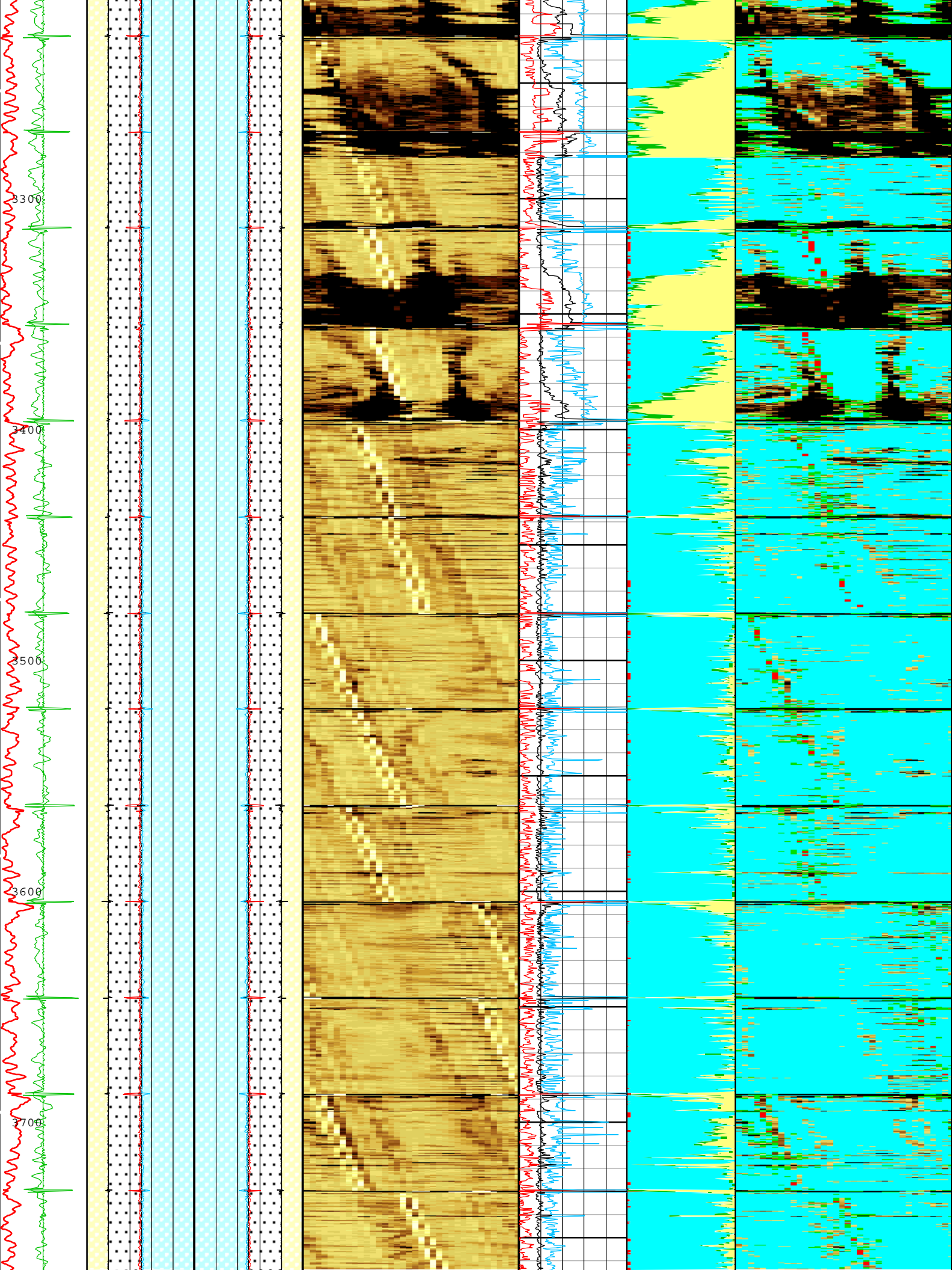
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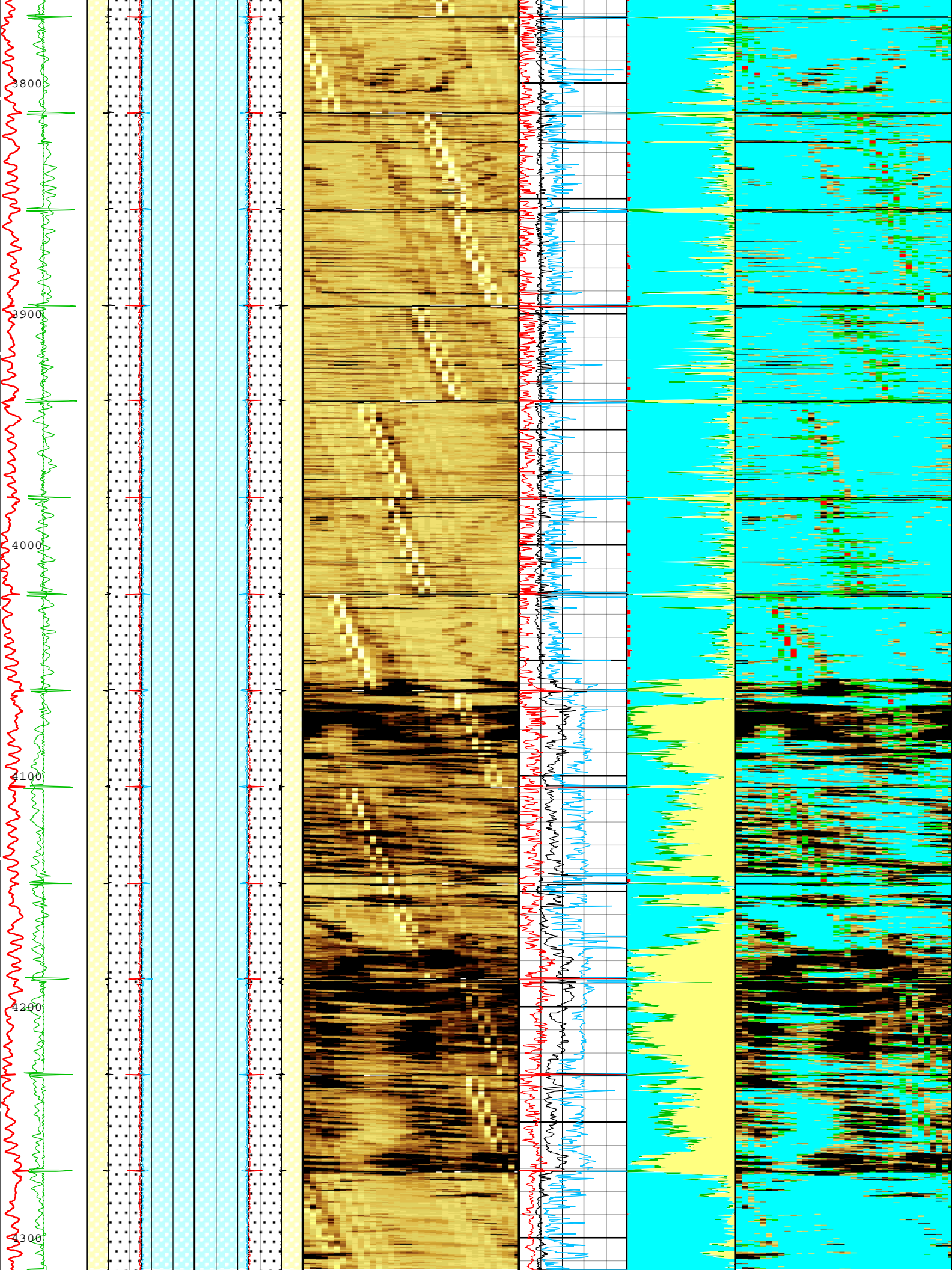
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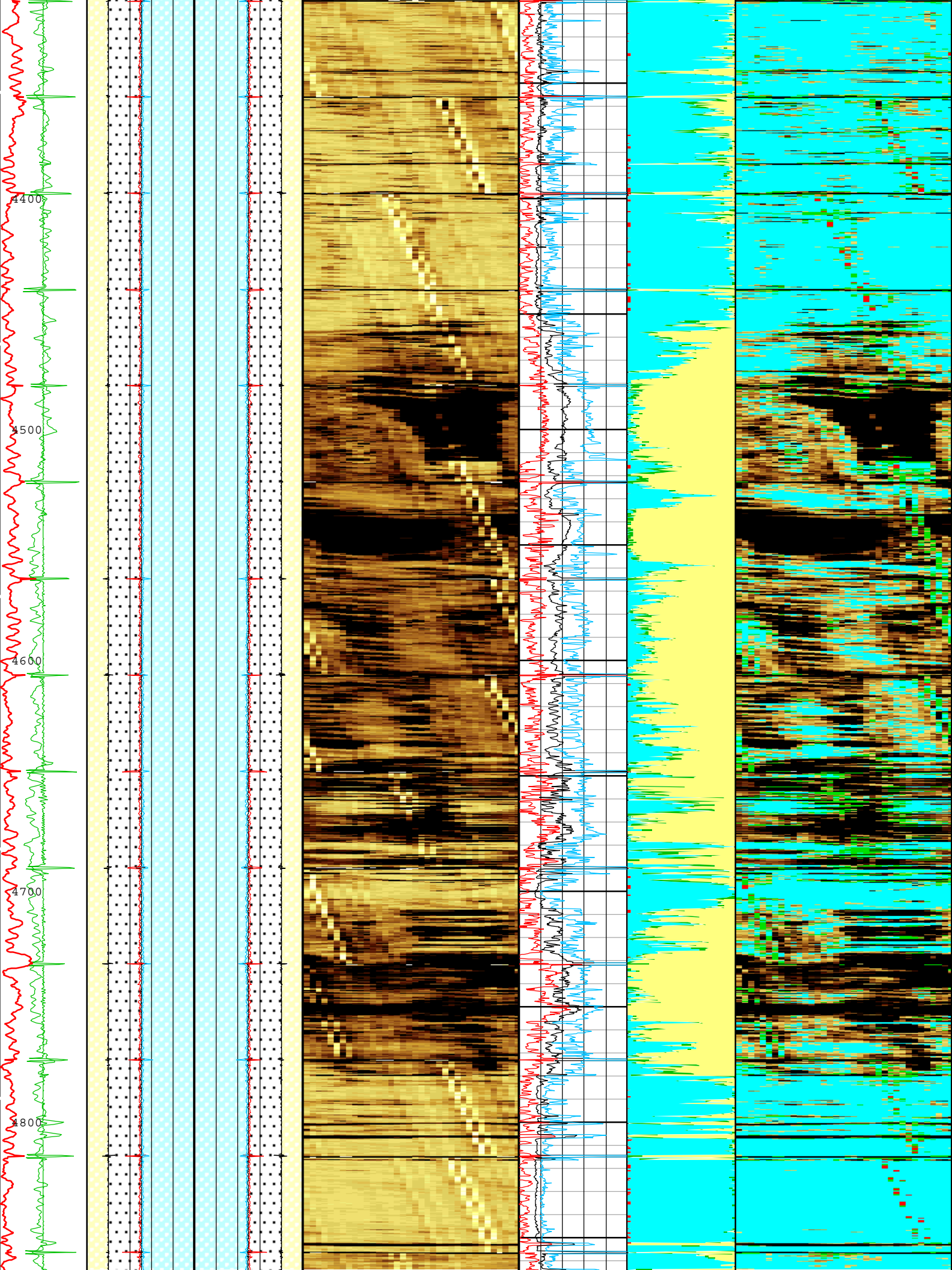
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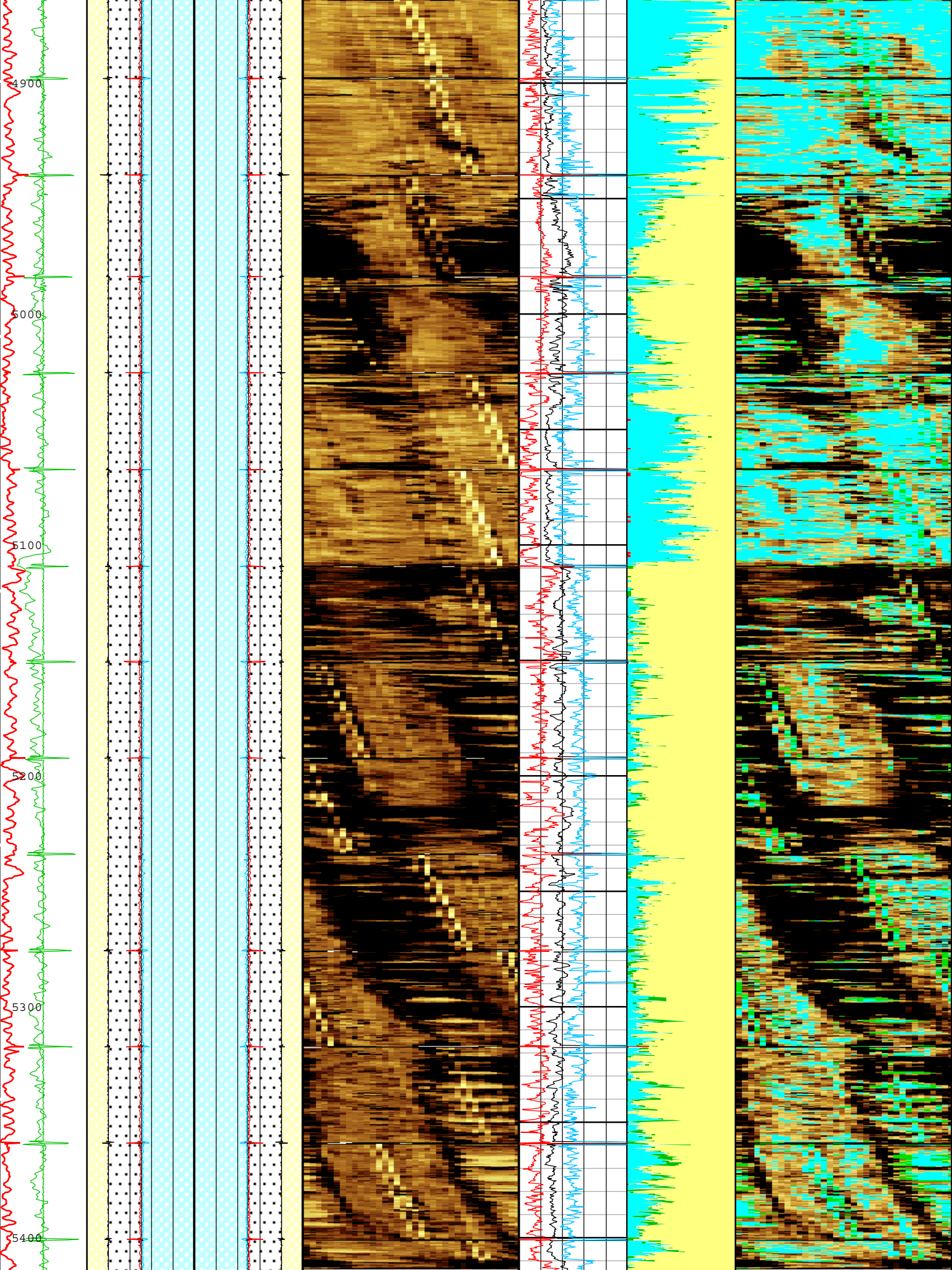
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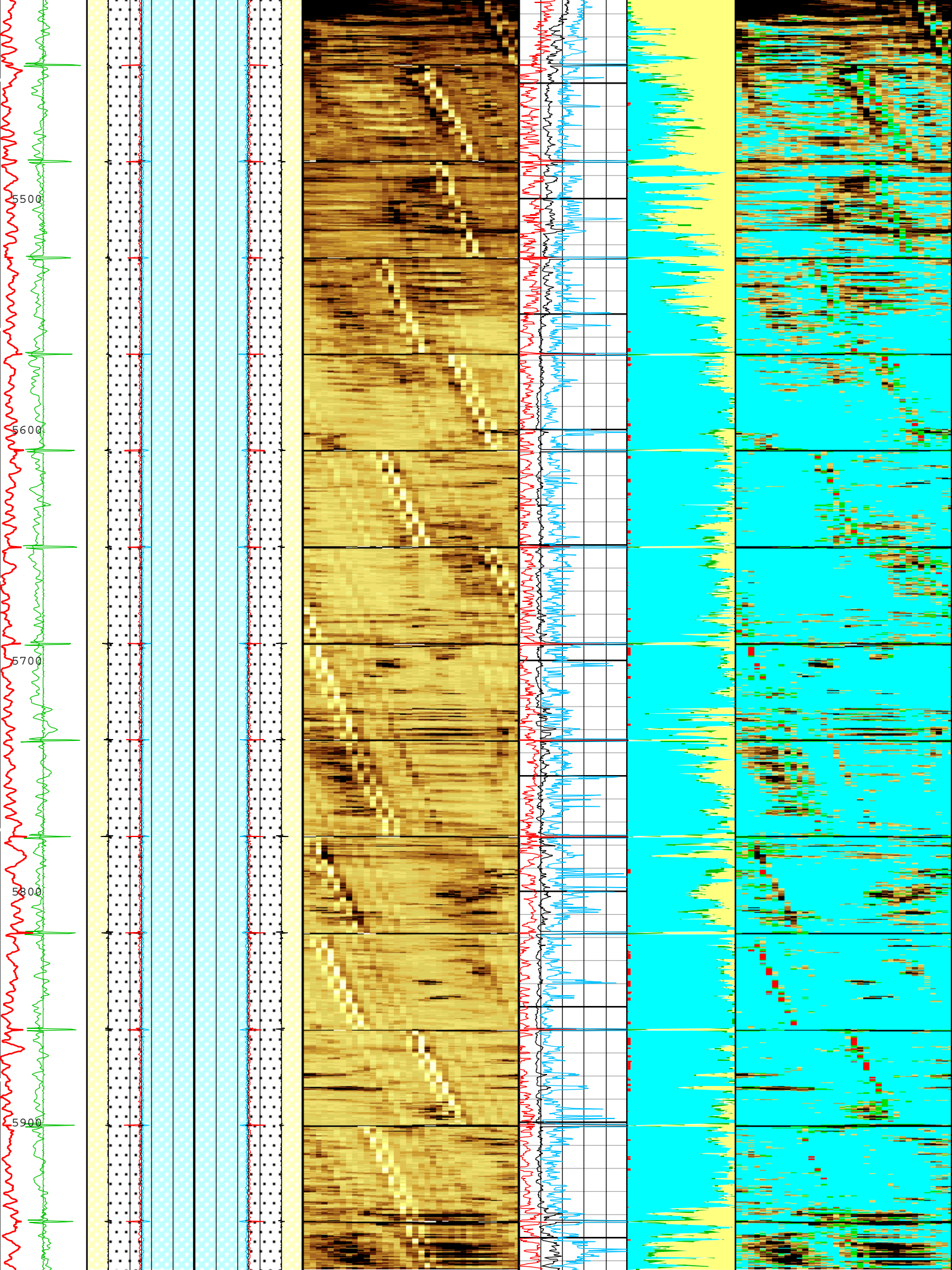
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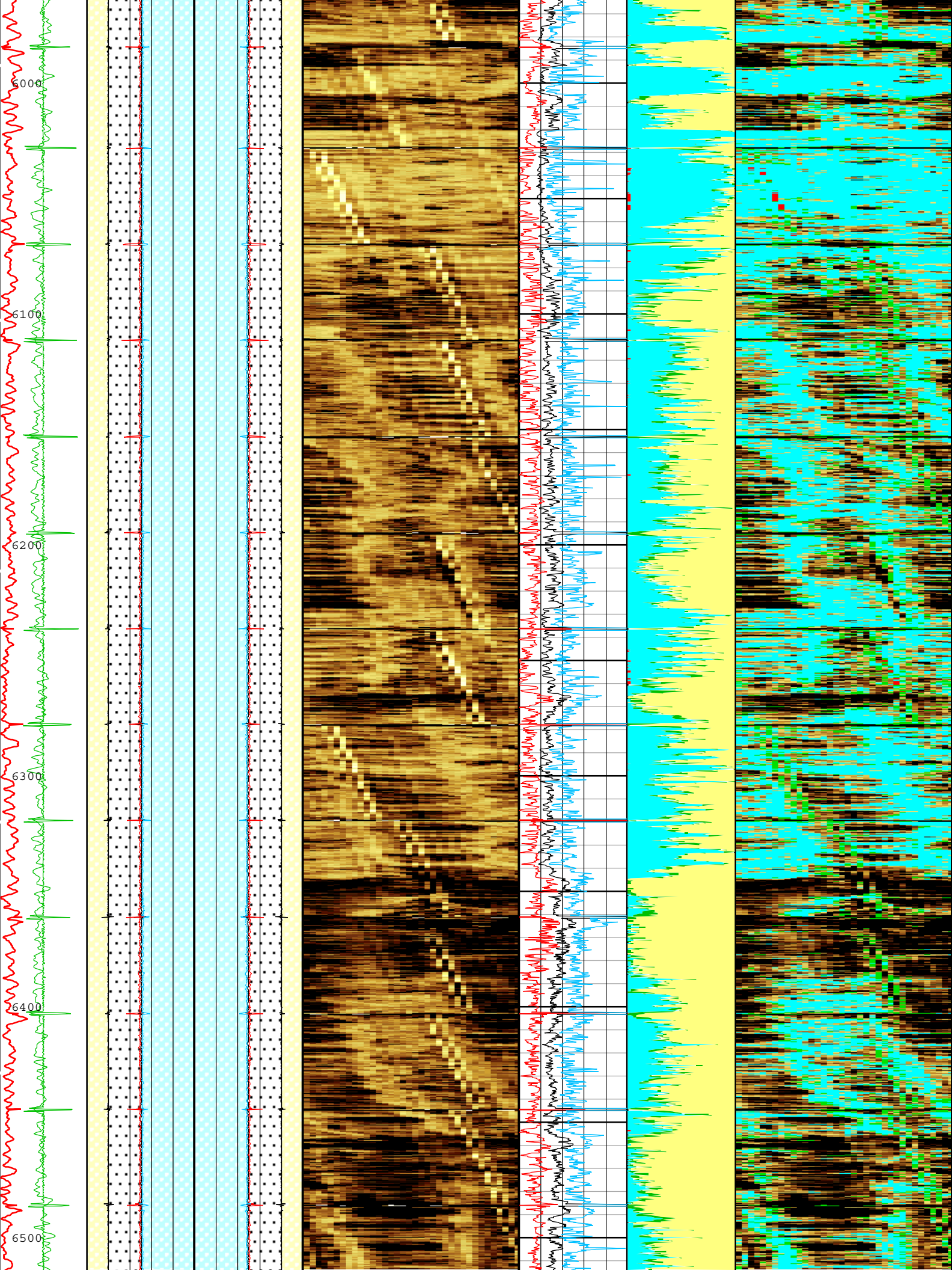
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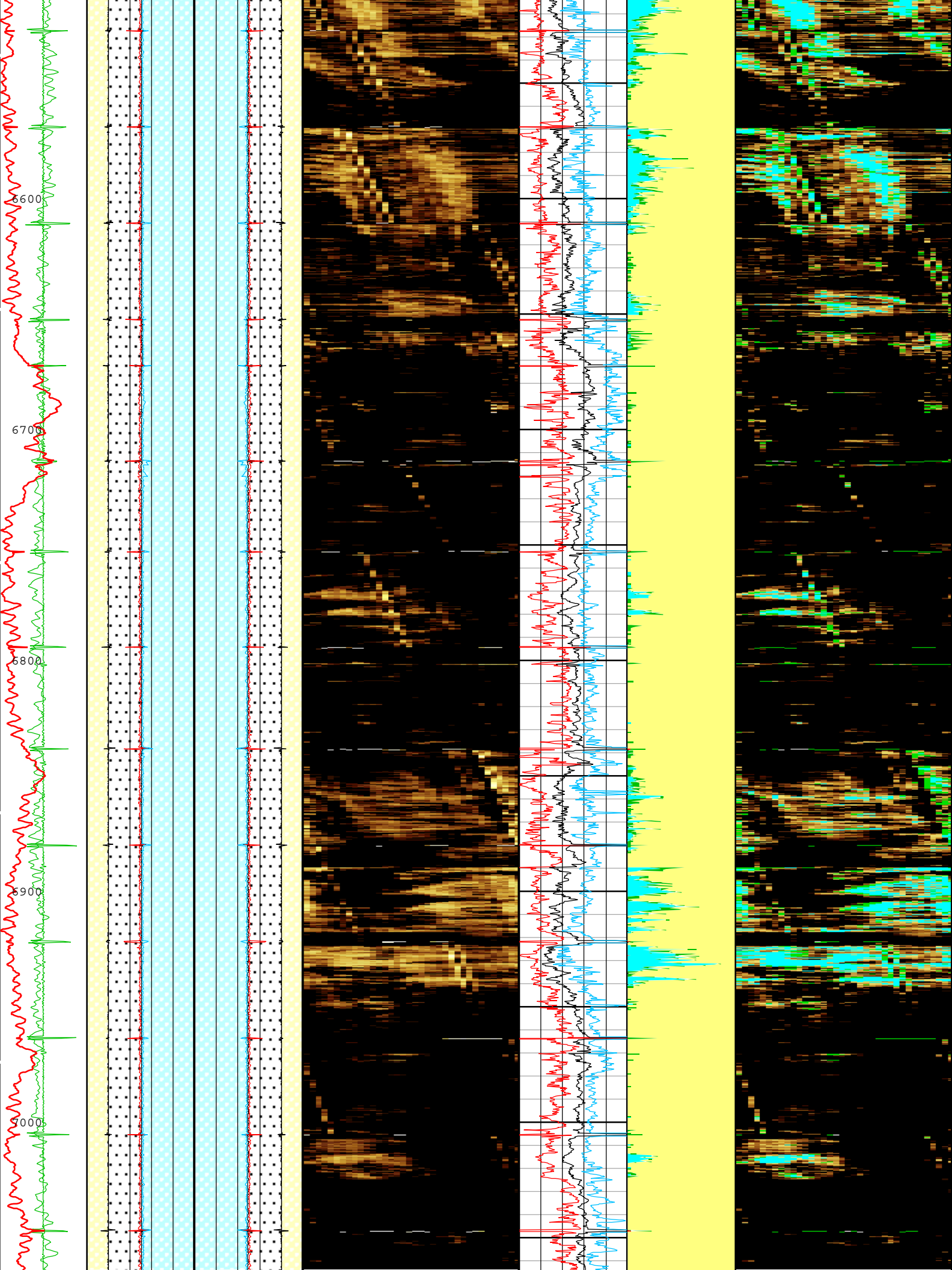
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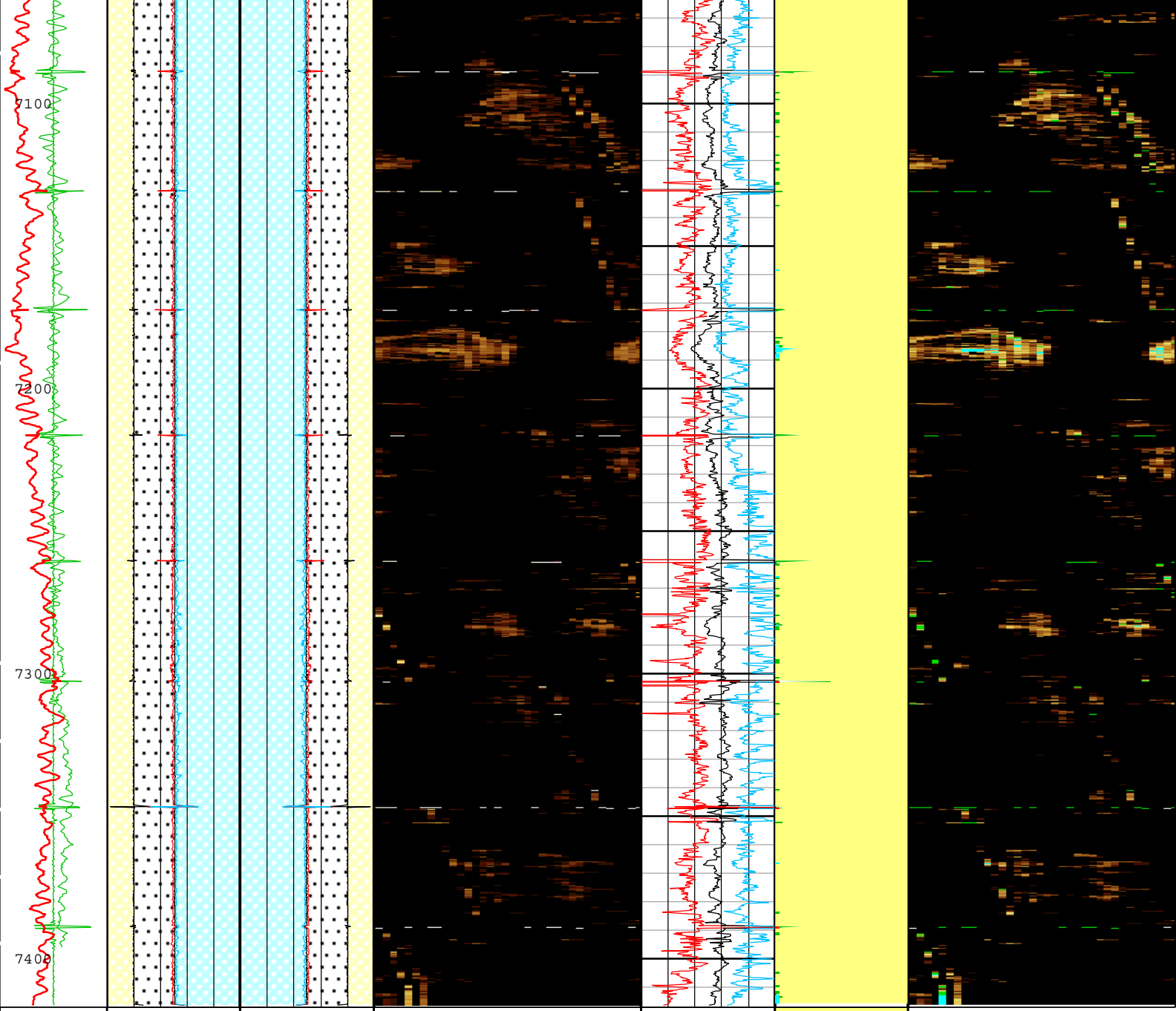


Casing Collar Locator Ultrasonic (CCLU) USIT-E	External Radii Average (ERAV) USIT-E	External Radii Average (ERAV) USIT-E	Absent 0.250 0.750 1.250 1.750 2.250 2.750 3.250 3.750	Acoustic Impedance Minimum (AIMN) USIT-E	Bonded	Absent -500.000 2.599 2.854 3.109 3.363 3.618 3.872
-20 in 20	2.95 in 1.95	1.95 in 2.95	Custom Normalization	0 Mrayl 10	Gas	Custom Normalization
Gamma Ray (ECGR_EDTC) EDTC-B	Internal Radius Averaged Value (IRAV) USIT-E	Internal Radius Averaged Value (IRAV) USIT-E	USIT - Acoustic Impedance (AIBK) USIT-E (Mrayl)	Acoustic Impedance Average (AIAV) USIT-E	Liquid	USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)
0 gAPI 150	2.95 in 1.95	1.95 in 2.95		0 Mrayl 10	Micro-debonding	
Stuck Tool Indicator, Total (STIT)	Internal Radius Maximum Value (IRMX) USIT-E	Internal Radius Maximum Value (IRMX) USIT-E		Acoustic Impedance Maximum (AIMX) USIT-E		
0 ft 50	2.95 in 1.95	1.95 in 2.95		0 Mrayl 10		
CableDrag	Internal Radius Minimum Value (IRMN) USIT-E	Internal Radius Minimum Value (IRMN) USIT-E				
	2.95 in 1.95	1.95 in 2.95				
Amplitude of Eccentering (ECCE)						

(ECCE)
USIT-E

0 in 0.5

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 13:53:32

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	13113	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	12	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	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	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
SDTVER	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	13113	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	1.48	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	13.8	12	1150
BS	7.875	1150	7417

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	7400	ft
USSP	Ultrasonic Service	USIT-E	USI	
VRES	Vertical Resolution	USIT-E	3.0 in	
WINB	Window Begin Time	USIT-E	33.83	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	60	07-May-2015 16:17:42	07-May-2015 16:20:48	7417.16	7352.37
EMXV	70	07-May-2015 16:20:48	07-May-2015 16:21:33	7352.37	7334.53
EMXV	75	07-May-2015 16:21:33	07-May-2015 16:24:59	7334.53	7083.98
EMXV	70	07-May-2015 16:24:59	07-May-2015 16:25:10	7083.98	7064.34

EMXV	65	07-May-2015 16:25:10	07-May-2015 16:26:27	7064.34	6925.19
EMXV	60	07-May-2015 16:26:27	07-May-2015 16:34:22	6925.19	6062.43
EMXV	55	07-May-2015 16:34:22	07-May-2015 17:29:30	6062.43	77.88
EMXV	60	07-May-2015 17:29:30	07-May-2015 17:29:49	77.88	59.52
EMXV	65	07-May-2015 17:29:49	07-May-2015 17:30:09	59.52	40.93
EMXV	70	07-May-2015 17:30:09	07-May-2015 17:30:17	40.93	37.3
EMXV	75	07-May-2015 17:30:17	07-May-2015 17:30:38	37.3	30.77
EMXV	80	07-May-2015 17:30:38	07-May-2015 17:30:54	30.77	25.52
EMXV	85	07-May-2015 17:30:54	07-May-2015 17:31:07	25.52	21.15
EMXV	90	07-May-2015 17:31:07	07-May-2015 17:31:42	21.15	9.96
EMXV	100	07-May-2015 17:31:42	07-May-2015 17:32:08	9.96	1.88
EMXV	110	07-May-2015 17:32:08	07-May-2015 17:32:31	1.88	-0.83

All depth are at tool zero.

Import (3) of USI Goodwin

ONE

USI Goodwin Compressed

Log

Company:Kerr McGee Oil & Gas Onshore LP Well:Butterball 38N-10HZ

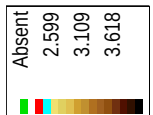
ONE: Main[7]:Up:S004

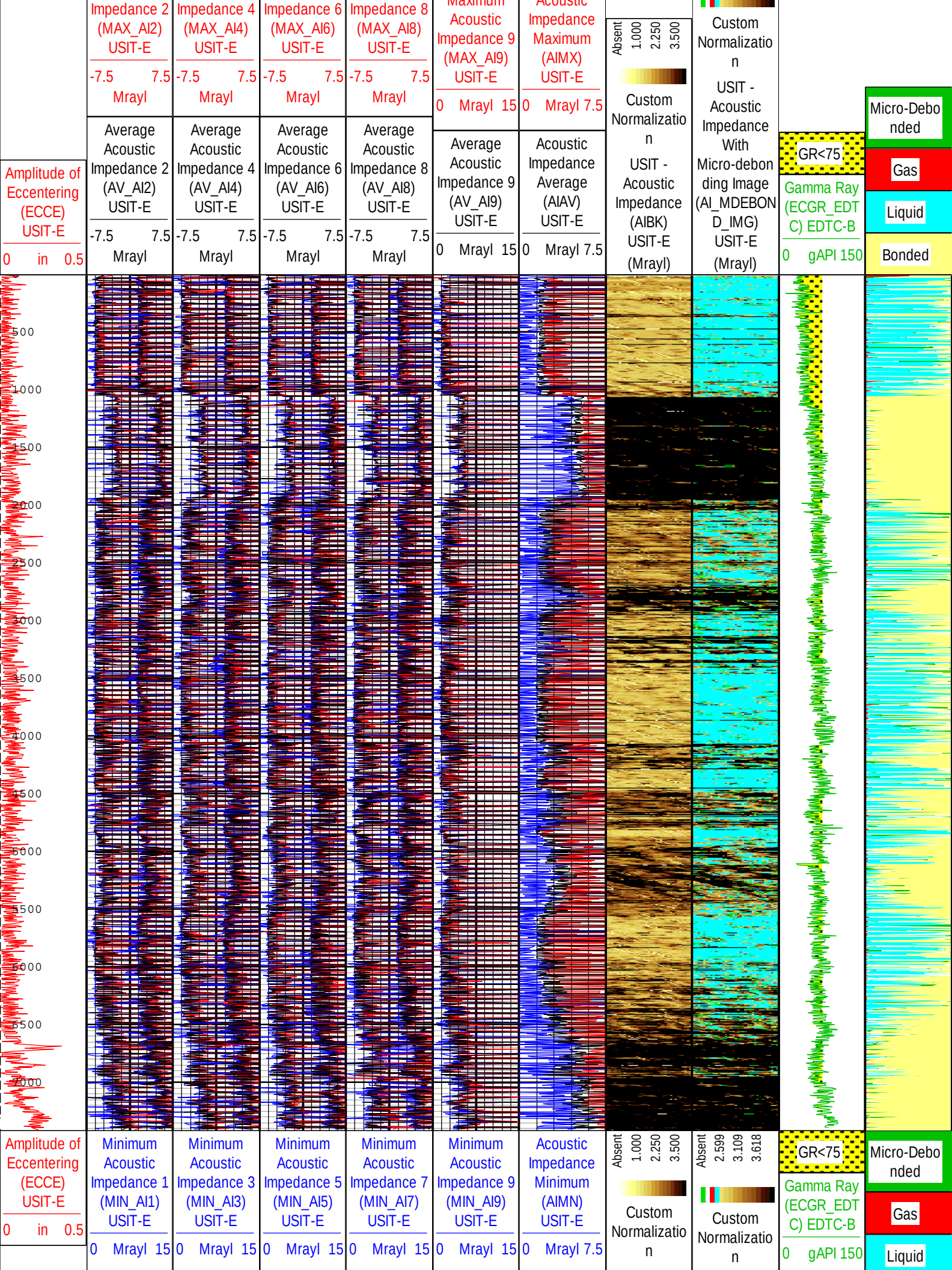
Description: USI Goodwin Format: USI Goodwin Index Scale: 0.1 in per 100 ft Index Unit: ft Index Type: Measured Depth Creation Date: 09-May-2015 13:53:53

TIME_1900 - Time Marked every 60.00 (s)

Minimum Acoustic Impedance 1 (MIN_AI1) USIT-E 0 Mrayl 15	Minimum Acoustic Impedance 3 (MIN_AI3) USIT-E 0 Mrayl 15	Minimum Acoustic Impedance 5 (MIN_AI5) USIT-E 0 Mrayl 15	Minimum Acoustic Impedance 7 (MIN_AI7) USIT-E 0 Mrayl 15
Maximum Acoustic Impedance 1 (MAX_AI1) USIT-E 0 Mrayl 15	Maximum Acoustic Impedance 3 (MAX_AI3) USIT-E 0 Mrayl 15	Maximum Acoustic Impedance 5 (MAX_AI5) USIT-E 0 Mrayl 15	Maximum Acoustic Impedance 7 (MAX_AI7) USIT-E 0 Mrayl 15
Average Acoustic Impedance 1 (AV_AI1) USIT-E 0 Mrayl 15	Average Acoustic Impedance 3 (AV_AI3) USIT-E 0 Mrayl 15	Average Acoustic Impedance 5 (AV_AI5) USIT-E 0 Mrayl 15	Average Acoustic Impedance 7 (AV_AI7) USIT-E 0 Mrayl 15
Minimum Acoustic Impedance 2 (MIN_AI2) USIT-E -7.5 7.5 Mrayl	Minimum Acoustic Impedance 4 (MIN_AI4) USIT-E -7.5 7.5 Mrayl	Minimum Acoustic Impedance 6 (MIN_AI6) USIT-E -7.5 7.5 Mrayl	Minimum Acoustic Impedance 8 (MIN_AI8) USIT-E -7.5 7.5 Mrayl
Maximum Acoustic	Maximum Acoustic	Maximum Acoustic	Maximum Acoustic

Minimum Acoustic Impedance 9 (MIN_AI9) USIT-E 0 Mrayl 15	Acoustic Impedance Minimum (AIMN) USIT-E 0 Mrayl 7.5
Maximum	Acoustic




Impedance 2 (MAX_AI2) USIT-E
-7.5 7.5 Mrayl
Impedance 4 (MAX_AI4) USIT-E
-7.5 7.5 Mrayl
Impedance 6 (MAX_AI6) USIT-E
-7.5 7.5 Mrayl
Impedance 8 (MAX_AI8) USIT-E
-7.5 7.5 Mrayl
Maximum Acoustic Impedance 9 (MAX_AI9) USIT-E
0 Mrayl 15
Acoustic Impedance Maximum (AIMX) USIT-E
0 Mrayl 7.5
Absent 1.000 2.250 3.500
Custom Normalization
Custom Normalization
USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)
GR<75
Gamma Ray (ECGR_EDTC) EDTC-B
0 gAPI 150
Micro-Debonded
Gas
Liquid
Bonded
Amplitude of Eccentering (ECCE) USIT-E
0 in 0.5
Average Acoustic Impedance 2 (AV_AI2) USIT-E
-7.5 7.5 Mrayl
Average Acoustic Impedance 4 (AV_AI4) USIT-E
-7.5 7.5 Mrayl
Average Acoustic Impedance 6 (AV_AI6) USIT-E
-7.5 7.5 Mrayl
Average Acoustic Impedance 8 (AV_AI8) USIT-E
-7.5 7.5 Mrayl
Average Acoustic Impedance 9 (AV_AI9) USIT-E
0 Mrayl 15
Acoustic Impedance Average (AIAV) USIT-E
0 Mrayl 7.5
Custom Normalization
USIT - Acoustic Impedance (AIBK) USIT-E (Mrayl)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
Amplitude of Eccentering (ECCE) USIT-E
0 in 0.5
Minimum Acoustic Impedance 1 (MIN_AI1) USIT-E
0 Mrayl 15
Minimum Acoustic Impedance 3 (MIN_AI3) USIT-E
0 Mrayl 15
Minimum Acoustic Impedance 5 (MIN_AI5) USIT-E
0 Mrayl 15
Minimum Acoustic Impedance 7 (MIN_AI7) USIT-E
0 Mrayl 15
Minimum Acoustic Impedance 9 (MIN_AI9) USIT-E
0 Mrayl 15
Acoustic Impedance Minimum (AIMN) USIT-E
0 Mrayl 7.5
Absent 1.000 2.250 3.500
Custom Normalization
Absent 2.599 3.109 3.618
Custom Normalization
GR<75
Gamma Ray (ECGR_EDTC) EDTC-B
0 gAPI 150
Micro-Debonded
Gas
Liquid

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	Maximum Acoustic Impedance 9 (MAX_AI9) USIT-E	Acoustic Impedance Maximum (AIMX) USIT-E
0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 15	0 Mrayl 7.5
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	Average Acoustic Impedance 9 (AV_AI9) USIT-E	Acoustic Impedance Average (AIAV) 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		

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

Bonded

TIME_1900 - Time Marked every 60.00 (s)

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 13:53:53

Import (2) of USI Cement

ONE

USI Cement

Log

Company:Kerr McGee Oil & Gas Onshore LP Well:Butterball 38N-10HZ

ONE: Repeat[6]:Up:S004

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 13:53:57

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		
Gamma Ray		

(ECGR_EDTC) EDTC-B
0 gAPI 150

Stuck Tool Indicator, Total (STIT)
0 ft 50

CableDrag

Amplitude of Eccentering (ECCE) USIT-E
0 in 0.5

2.95 in 1.95

Internal Radius Averaged Value (IRAV) USIT-E
2.95 in 1.95

Internal Radius Maximum Value (IRMX) USIT-E
2.95 in 1.95

Internal Radius Minimum Value (IRMN) USIT-E
2.95 in 1.95

1.95 in 2.95

Internal Radius Averaged Value (IRAV) USIT-E
1.95 in 2.95

Internal Radius Maximum Value (IRMX) USIT-E
1.95 in 2.95

Internal Radius Minimum Value (IRMN) USIT-E
1.95 in 2.95

Absent 0.250 0.750 1.250 1.750 2.250 2.750 3.250 3.750

Custom Normalization

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

Acoustic Impedance 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

Bonded

Gas

Liquid

Micro-debonding

Absent -500.000 2.599 2.854 3.109 3.363 3.618 3.872

Custom Normalization

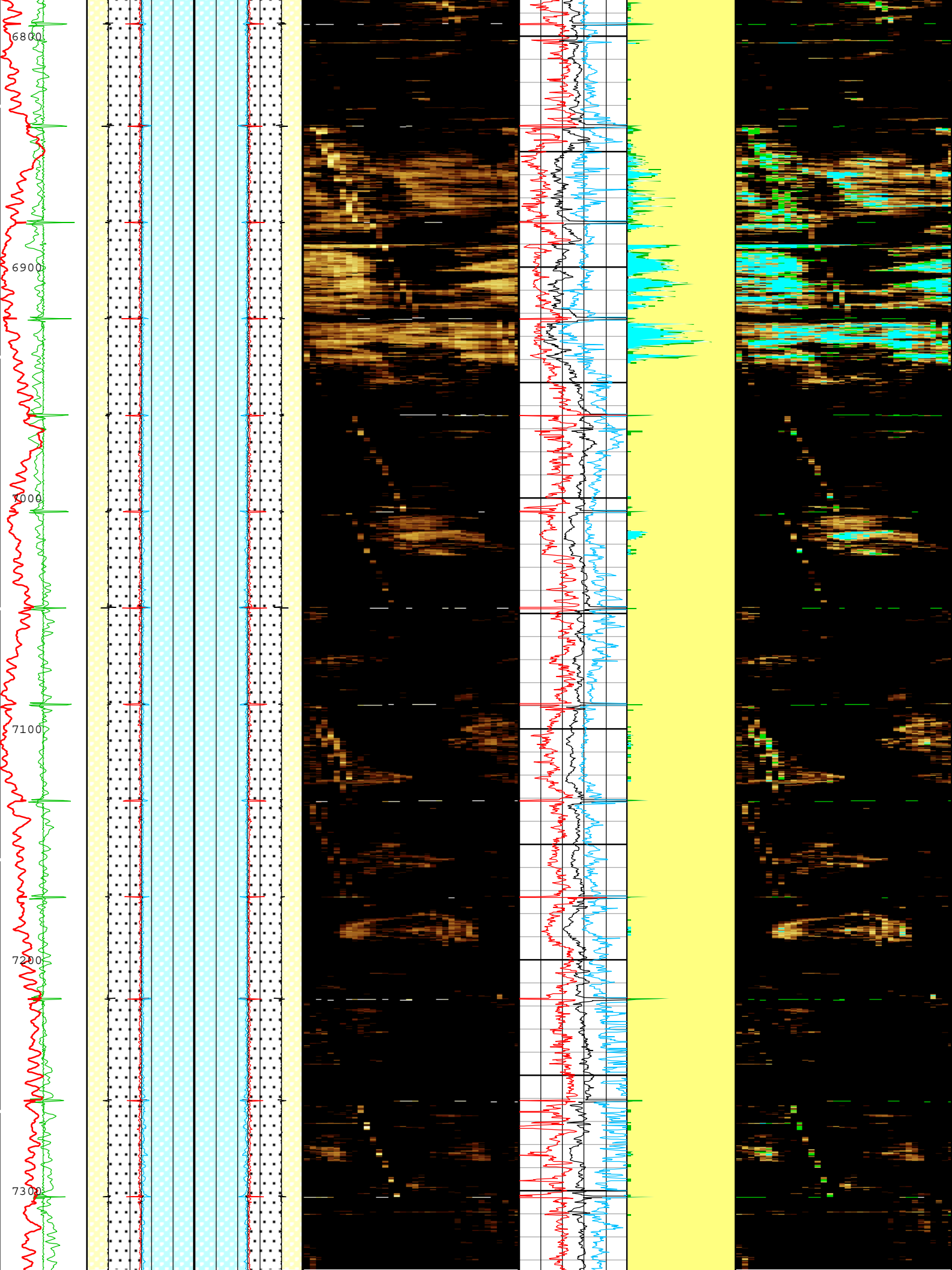
USIT - Acoustic Impedance With Micro-debonding Image (AI_MDEBOND_IMG) USIT-E (Mrayl)

6400

6500

6600

6700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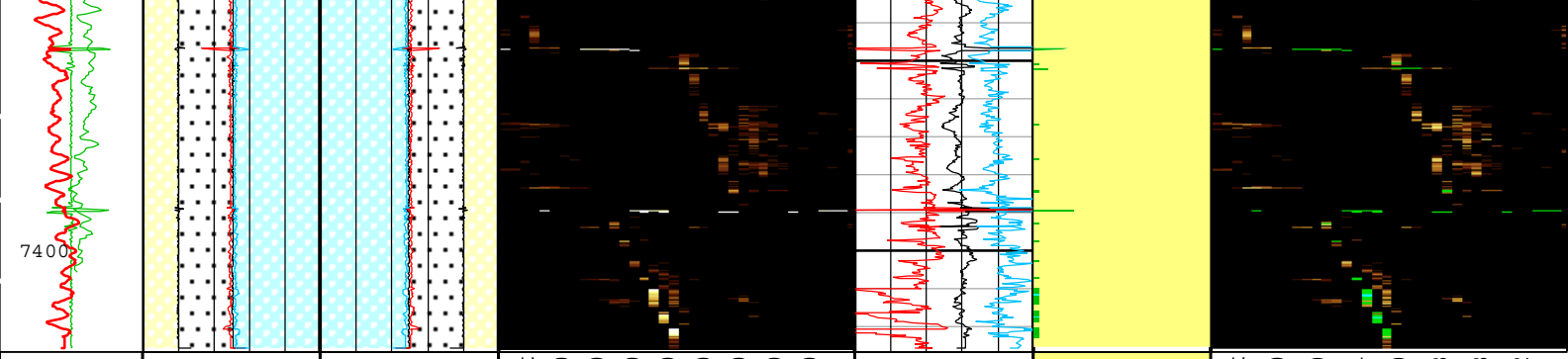
7000
7100
7200
7300



Casing Collar Locator Ultrasonic (CCLU) USIT-E
-20 in 20

Gamma Ray (ECGR_EDTC) EDTC-B
0 gAPI 150

Stuck Tool Indicator, Total (STIT)
0 ft 50

CableDrag

Amplitude of Eccentering (ECCE) USIT-E
0 in 0.5

External Radii Average (ERAV) USIT-E
2.95 in 1.95

Internal Radius Averaged Value (IRAV) USIT-E
2.95 in 1.95

Internal Radius Maximum Value (IRMX) USIT-E
2.95 in 1.95

Internal Radius Minimum Value (IRMN) USIT-E
2.95 in 1.95

External Radii Average (ERAV) USIT-E
1.95 in 2.95

Internal Radius Averaged Value (IRAV) USIT-E
1.95 in 2.95

Internal Radius Maximum Value (IRMX) USIT-E
1.95 in 2.95

Internal Radius Minimum Value (IRMN) USIT-E
1.95 in 2.95

Absent 0.250 0.750 1.250 1.750 2.250 2.750 3.250 3.750

Custom Normalization

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

Acoustic Impedance 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

Bonded

Gas

Liquid

Micro-debonding

Absent -500.000 2.599 2.854 3.109 3.363 3.618 3.872

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: 09-May-2015 13:53:57

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	13113	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	12	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	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	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
SDTVER	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	13113	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	1.48	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	7400	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

Time Zone Parameters

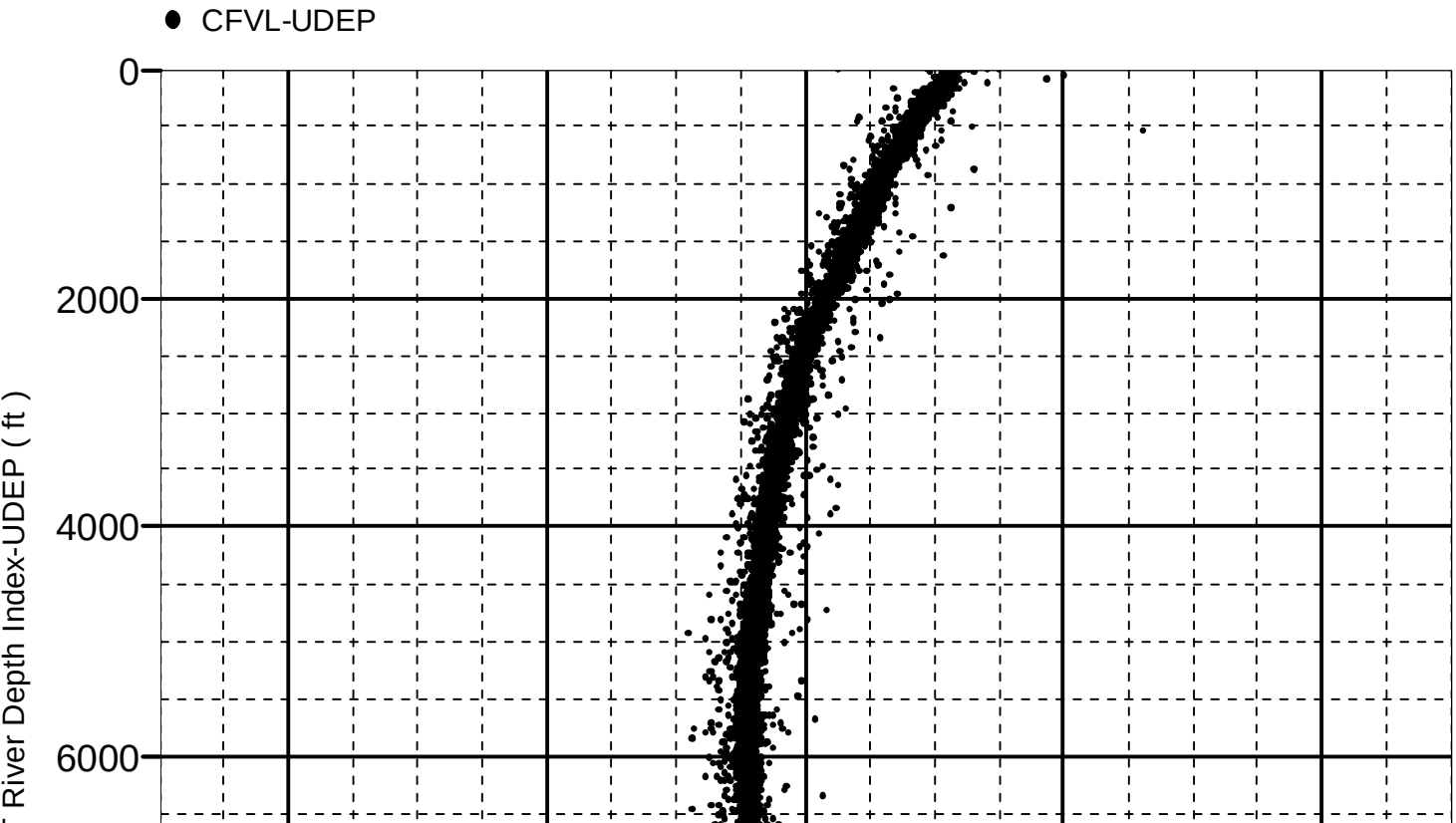
Parameter	Value	Start Time	Stop Time	Start Depth (ft)	Stop Depth (ft)
EMXV	70	07-May-2015 15:59:58	07-May-2015 16:11:39	7426.59	6432.69
EMXV	65	07-May-2015 16:11:39	07-May-2015 16:11:46	6432.69	6419.2
EMXV	60	07-May-2015 16:11:46	07-May-2015 16:11:58	6419.2	6402.32
WINB	33.83	07-May-2015 15:59:58	07-May-2015 16:02:07	7426.59	7383.98
WINB	32.39	07-May-2015 16:02:07	07-May-2015 16:11:58	7383.98	6402.32

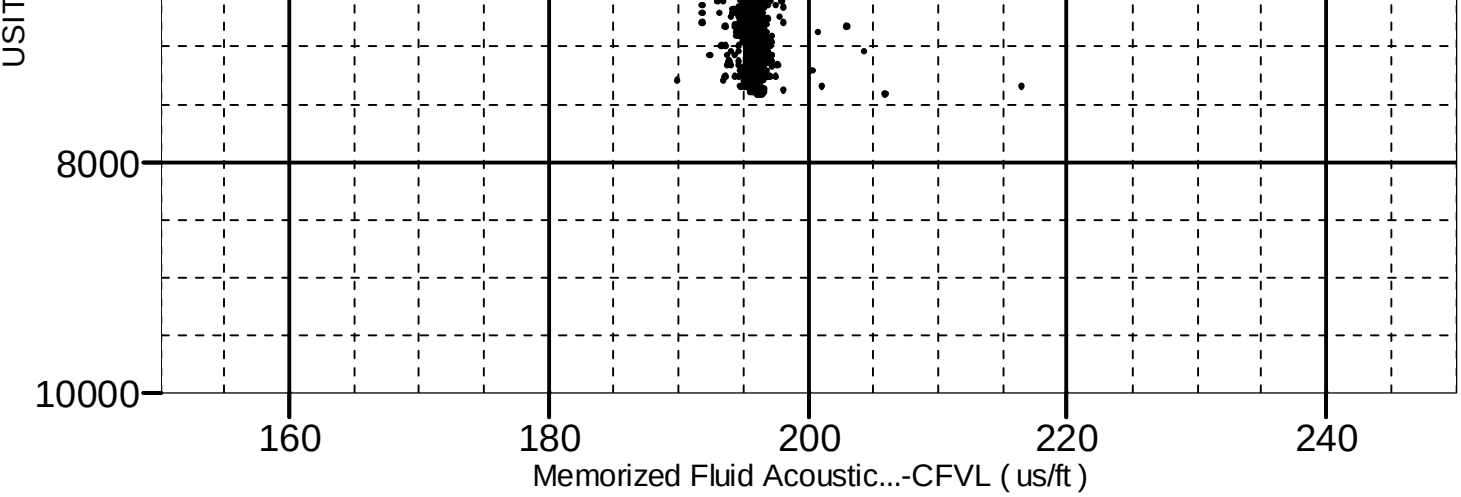
All depth are at tool zero.

Fluid Acoustic Slowness vs Depth

2D Cross Plot

Index Range: From 7416.75 to -1.00 ft





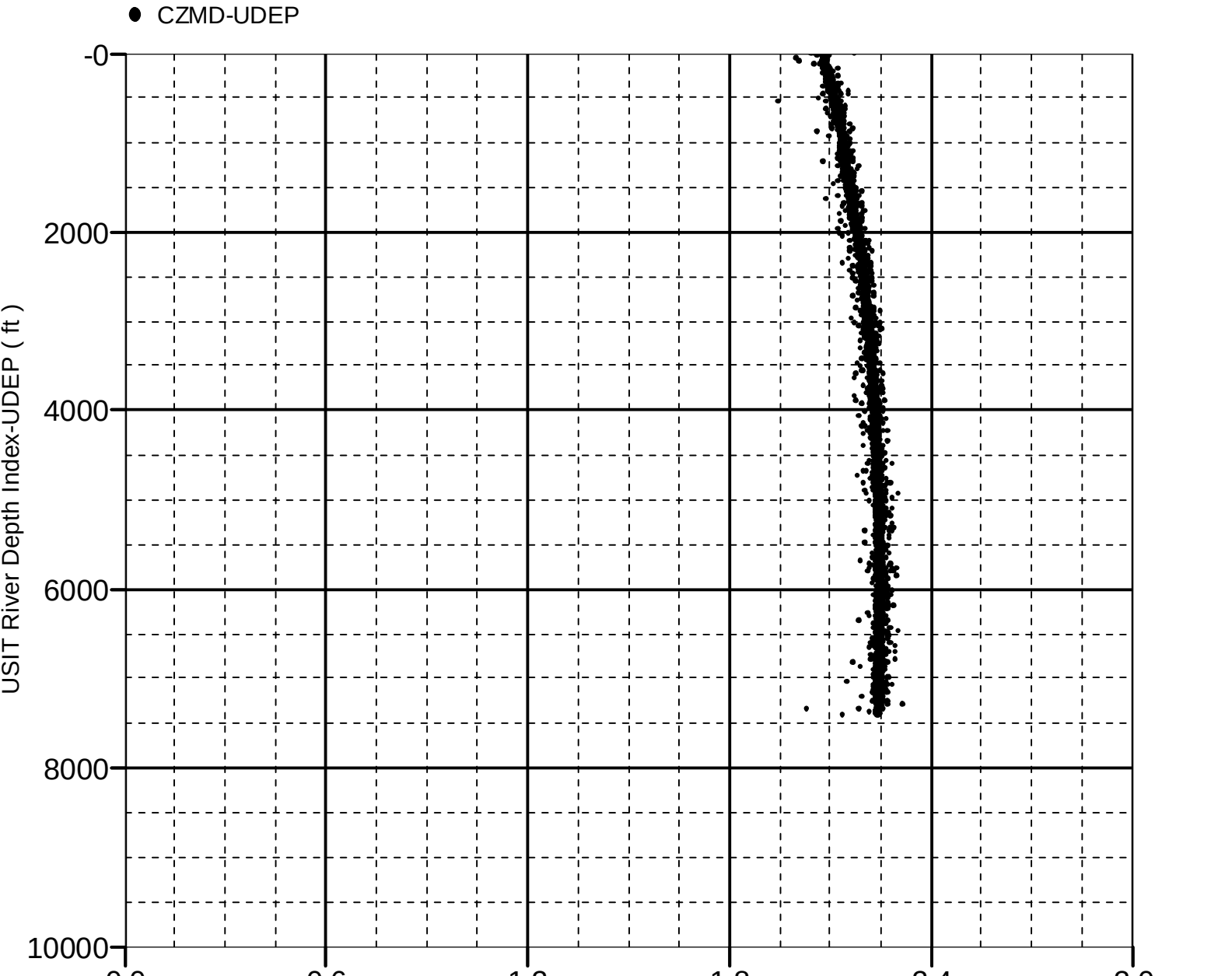
XYZ

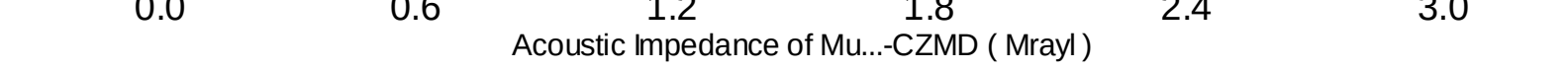
Company:Kerr McGee Oil & Gas Onshore LP Well:Butterball 38N-10HZ
ONE: Main[7]:Up:S004

Acoustic Impedance of Mud vs Depth

2D Cross Plot

Index Range: From 7416.75 to -1.00 ft





Company:	Kerr McGee Oil & Gas Onshore LP
Well:	Butterball 38N-10HZ
Field:	WATTENBERG
County:	WELD
State:	COLORADO

Schlumberger

Ultrasonic Imager
Cement Evaluation
Gamma Ray - CCL Log