



**SENSOR INFORMATION**

Downhole Processor Information					
Tool Type	HCIM				
Software Version	88.47				
Sub Serial Number	11913959				
Insert Serial Number	11911117				
Date and Time Initialized	29-Nov-12 13:00				
Date and Time Read	01-Jan-70 00:00				
ECMB SW Version	N/A				

Directional Sensor Information					
Tool Type	PCDC				
Distance From Bit (ft)	62.00				
Software Version	6.21				
Sub Serial Number	11991622				
Sonde Serial Number	11297620				
Sensor ID Number	N/A				
Toolface Offset (deg)	41.12				

Gamma Ray Sensor Information					
Tool Type	PCG				
Distance From Bit (ft)	50.25				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11626952				
Insert/Sonde Serial Number	11293287				

Density Sensor Information					
Tool Type	ALD				
Distance From Bit (ft)	112.90				
Recorded Sample Period (sec)	8				
Software Version	3.04				
Sub Serial Number	10859714				
Insert Serial Number	194205				
Sensor ID Number	32767				
Source Serial Number	54926B				
Pin Orientation	Down				
Stabilizer Blade O.D. (in)	5.75				
DPA Offset	331.20				

Pressure Sensor Information					
Tool Type					
Distance From Bit (ft)					
Recorded Sample Period (sec)					
Software Version					
Collar Serial Number					
Insert Serial Number					

Sonic Sensor Information					
Tool Type	QBAT				
Distance From Bit (ft)	134.41				
Recorded Sample Period (sec)	10				
Sub Serial Number	11702005				
Receiver Insert Serial Number	11745228				
Transmitter Insert Serial Number	10435963				
MIT File	QBAT_ggss_m12_d				
Config File					
Real-Time Window (uspf)	40 - 199				
Battery Insert Serial Number	11672244				
MCM Software Version	20.08				

DAQ1/DAQ2 Software Version	20.01 / 20.01				
DSM Software Version	36.65				

### Pulsar Controller Sensor Information

Tool Type	PCM				
Software Version	8.04				
PIC Software Version					
Sub/HOC Serial Number	11633655				
Insert/Probe/Module SN	11620312				
Battery Serial Number	N/A				
Valve Insert SN	N/A				
DC Insert Serial Number	N/A				
Choke Size (32nd)	N/A				
Driver Current (amps)	N/A				
Driver SMI Current (amps)	N/A				
Boot Strap Version					

### AFR Sensor Information

Tool ID	4029				
Distance From Bit (ft)	103.20				
Software Version	40.35				
Standard-Res Sample Period (sec)	0				
High-Res Sample Period (sec)	0				
Tool Size	4.75"				
Stabilizer Size (in)	5.78				
Button Blade Size (in)	5.67				
Collar Tech ID	11660611				
Insert Tech ID	11539599				

### DDSr-HCIM Sensor Information

Tool Type	DDSr-HCIM				
Distance From Bit (ft)	0				
Recorded Sample Period (sec)	12				
Software Version	20.71				
Sub Serial Number	11913959				
Insert Serial Number	11827872				
Sensor ID Number	9534				

### ADR SENSOR INFORMATION

Tool Type	ADR				
Tool Orientation	Deep Receiver Down				
Distance From SWRO to Bit (ft)	84.80				
Recorded Sample Period (sec)	10				
Tool SAP	11913959				
Receiver Insert SAP	11911117				
Transmitter Insert SAP	11911881				
Antenna Collar SAP	11913959				
App Firmware Version	415				
Processor Board FirmWare Version	306				
Processor FPGA FirmWare Version	4				
Transmitter PIC SW Version	1,025				
Tool Size	4.75"				
Processor SIDS No.	281475250997464				
Processor PCB Rev.	0				
Receiver Board Upper SIDS No.	16607023626540416				
Receiver Board Upper PCB Rev.	0				
Receiver Board Lower SIDS No.	16607023626729977				
Receiver Board Lower PCB Rev.	0				
Receiver Board Deep SIDS No.	16607023626744758				
Receiver Board Deep PCB Rev.	0				
Receiver Insert SIDS No.	11258999116242239				
Transmitter Insert SIDS No.	15226212211612211				

Transmitter Insert SIDS No.	4503634024461884			
Antenna Collar SIDS No.	12666373998151675			

## REMARKS

1. ALL DEPTHS ARE MEASURED DEPTHS (MD), UNLESS OTHERWISE NOTED. THESE DEPTHS ARE BIT DEPTHS AND ARE CALLIBRATED TO THE DRILLERS PIPE TALLY. NO DEPTH CORRECTIONS HAVE BEEN MADE FOR PIPE STRETCH OR COMPRESSION.
2. ALL VERTICAL DEPTHS ARE TRUE VERTICAL DEPTHS (TVD), UNLESS OTHERWISE NOTED. ONLY INVERTED / REVERTED SECTIONS GREATER THAN 30' TVD ARE PRESENTED
3. ALL DATA PRESENTED IS RECORDED DATA UNLESS OTHERWISE STATED.
4. RUN 5 WAS AN MWD RUN COMPRISED OF DIRECTIONAL, PRESSURE CASE GAMMA RAY (PCG) UTILIZING SCINTILATION TYPE DETECTORS, AZIMUTHAL DEEP RESISTIVITY (ADR), DRILLSTRING DYNAMICS SENSOR (DSSr), AZIMUTHAL LITHODENSITY (ALD), AZIMUTHAL FOCUSED RESISTIVITY (AFR), AND BIMODAL ACOUSTIC TOOL (BAT). THIS RUN WAS DRILLED USING MUD MOTOR ASSEMBLY.
5. DURING RUN 500 THE ALD'S NEAR DETECTOR FAILED. THIS RESULTED IN A VERY LARGE STANDOFF CORRECTION BEING APPLIED THE DESNSITY DATA. THEREFORE ANY DENSITY DATA THAT HAS BEEN CORRECTED FOR STANDOFF BELOW 9,405' MD SHOULD BE CONSIDERED UNUSABLE AND IS NOT PRESENTED.
6. BAT HIGH FREQUENCY MEASUREMENTS WERE FIRED AT 12kHz MONOPOLE, LOW FREQUENCY MEASUREMENTS WERE FIRED AT 5kHz DIPOLE.
7. BAT HIGH FREQUENCY DATA WAS PROCESSED USING THE hp11 FILTER, LOW FREQUENCY WAS PROCESSED USING THE bp4\_12 FILTER.
8. ALL SEMBLANCE PLOTS PRESENTED ARE FROM THE BACK ARRAY, PICKS WERE ALL MADE FROM BOTH THE FRONT AND BACK ARRAYS AS WELL AS THE HF+HB AND LF-LB ARRAYS.
9. REFRACTED SHEAR WAS PRESENT THROUGHOUT THE ENTIRE LOGGED INTERVAL.

### LOG MNEUMONICS:

ROPA = AVG RATE OF PENETRATION  
 PGRC = PCG GAMMA RAY CORRECTED  
 ARH16P = 16in AVERAGE 2MHZ PHASE RESISTIVITY  
 ARH32P = 32in AVERAGE 2MHZ PHASE RESISTIVITY  
 ARM48P = 48in AVERAGE 500KHZ PHASE RESISTIVITY  
 ADXT = ADR FORMATION EXP TIME  
 ALFDBQ = ALD FAR DETECTOR BOTTOM QUADRANT DENSITY  
 BTCS = SONIC COMPRESSIONAL SLOWNESS  
 BTCSS = SONIC SHEAR SLOWNESS  
 BTVPVS = SONIC RATIO OF COMPRESSIONAL TO SLOWNESS

ALL DATA CURVES ARE SMOOTHED TO A STEP OF 1.0 FT, WITH A WINDOW OF 3.0 FT ON THE 2 INCH LOGS. ALL DATA CURVES ARE SMOOTHED TO A STEP OF 0.5 FT, WITH A WINDOW OF 0.6 FT ON THE 5 INCH LOGS, EXCEPT FOR ALL SONIC AND GAMMA RAY CURVES. GAMMA RAY CURVE IS SMOOTHED WITH A 1.1 FT WINDOW; SONIC CURVES ARE SMOOTHED WITH A 1.5 FT WINDOW. GAP FILL IS SET TO 5 FT FOR ALL CURVES.

## WARRANTY

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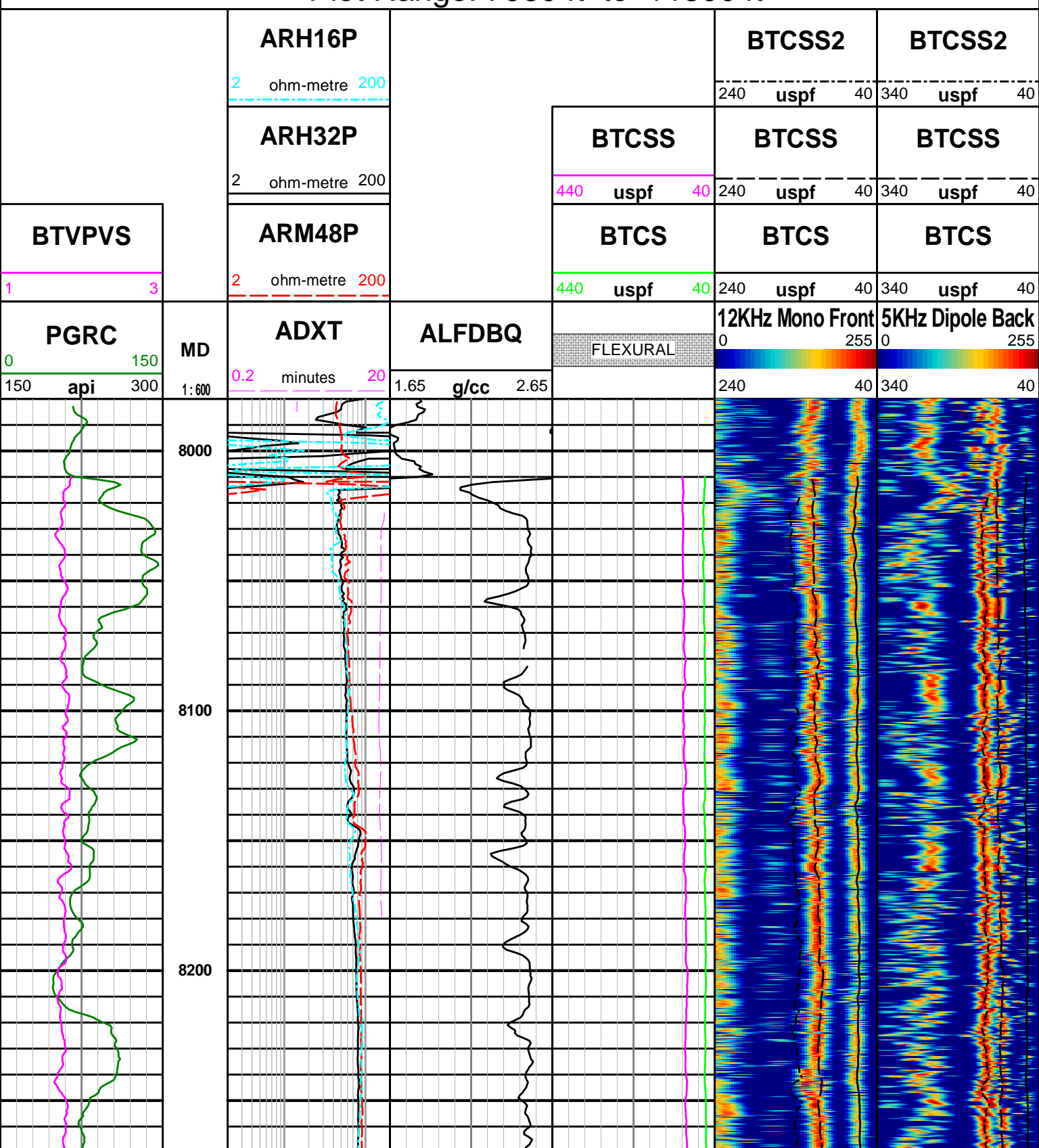
ConocoPhillips Inc.

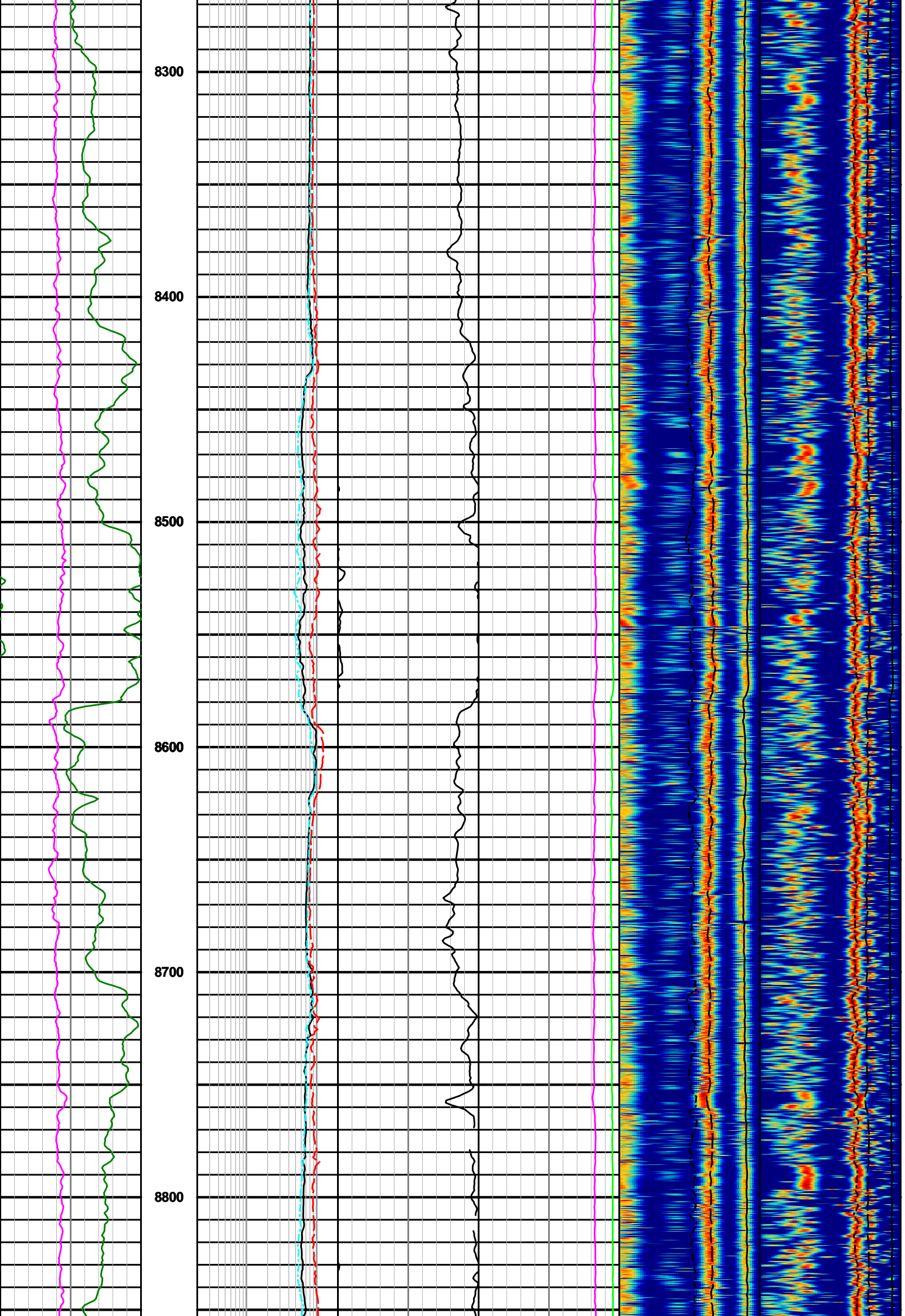


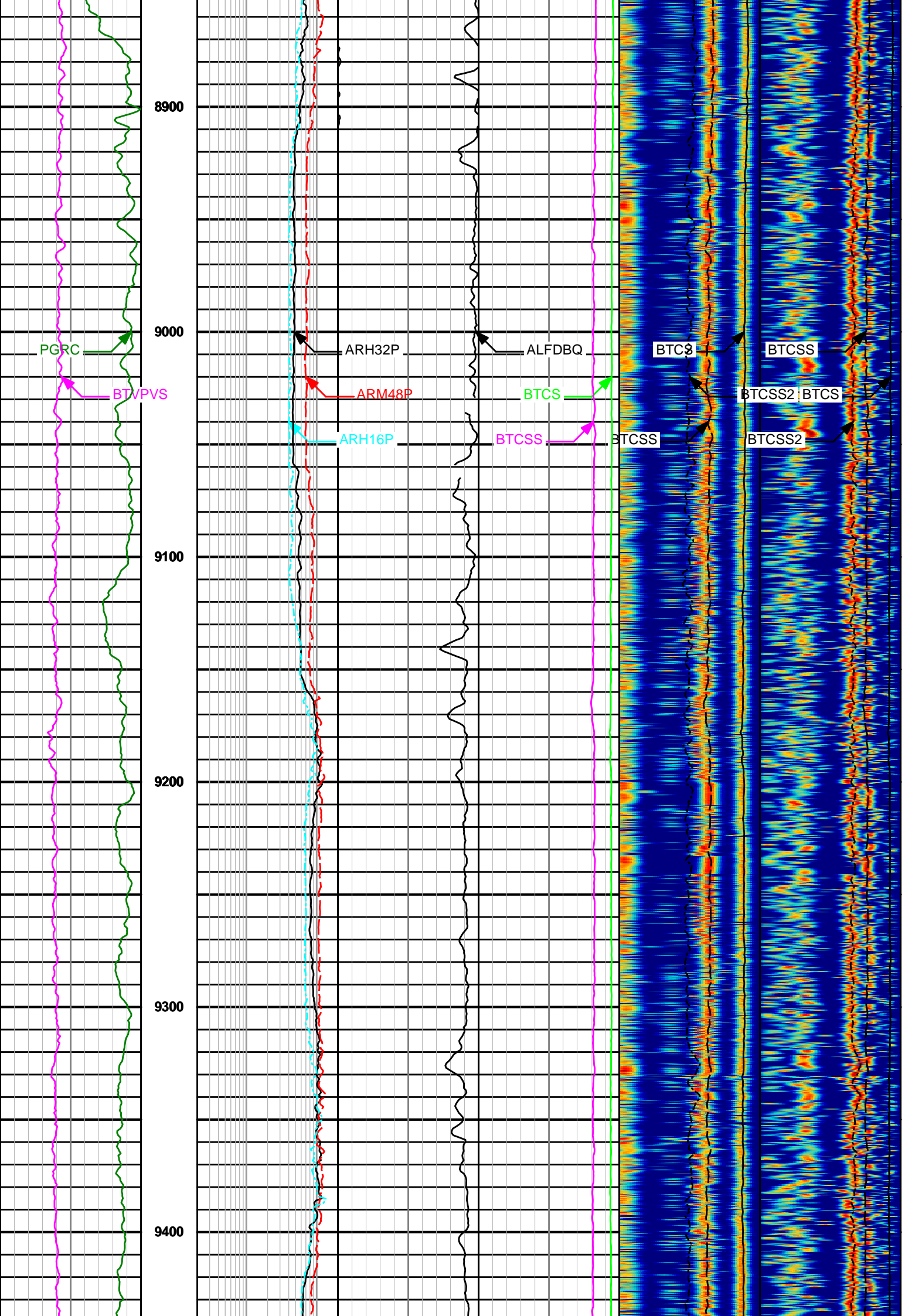
Well: Tebo 3-1H

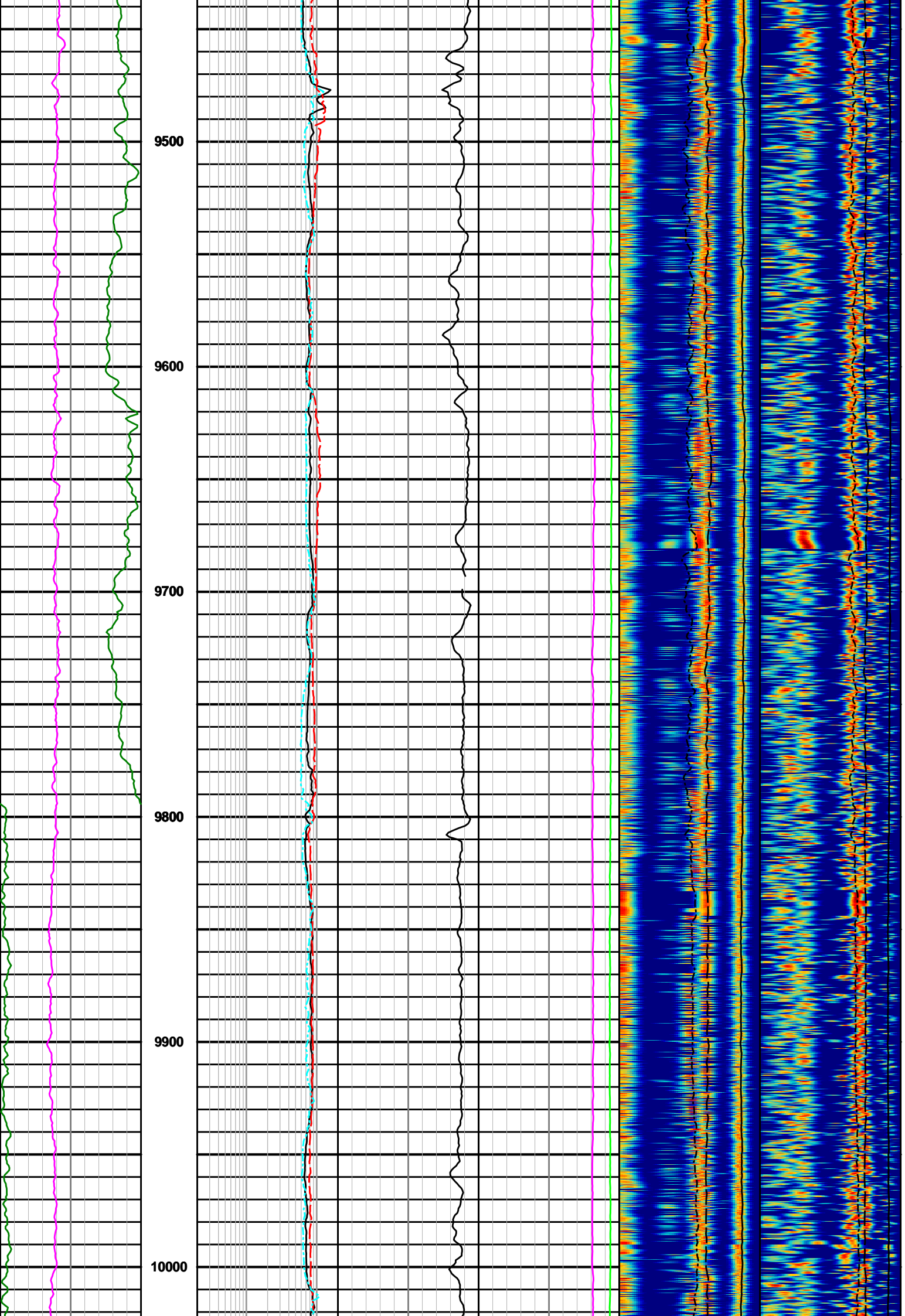
Memory QBAT Processed Data (Run500)

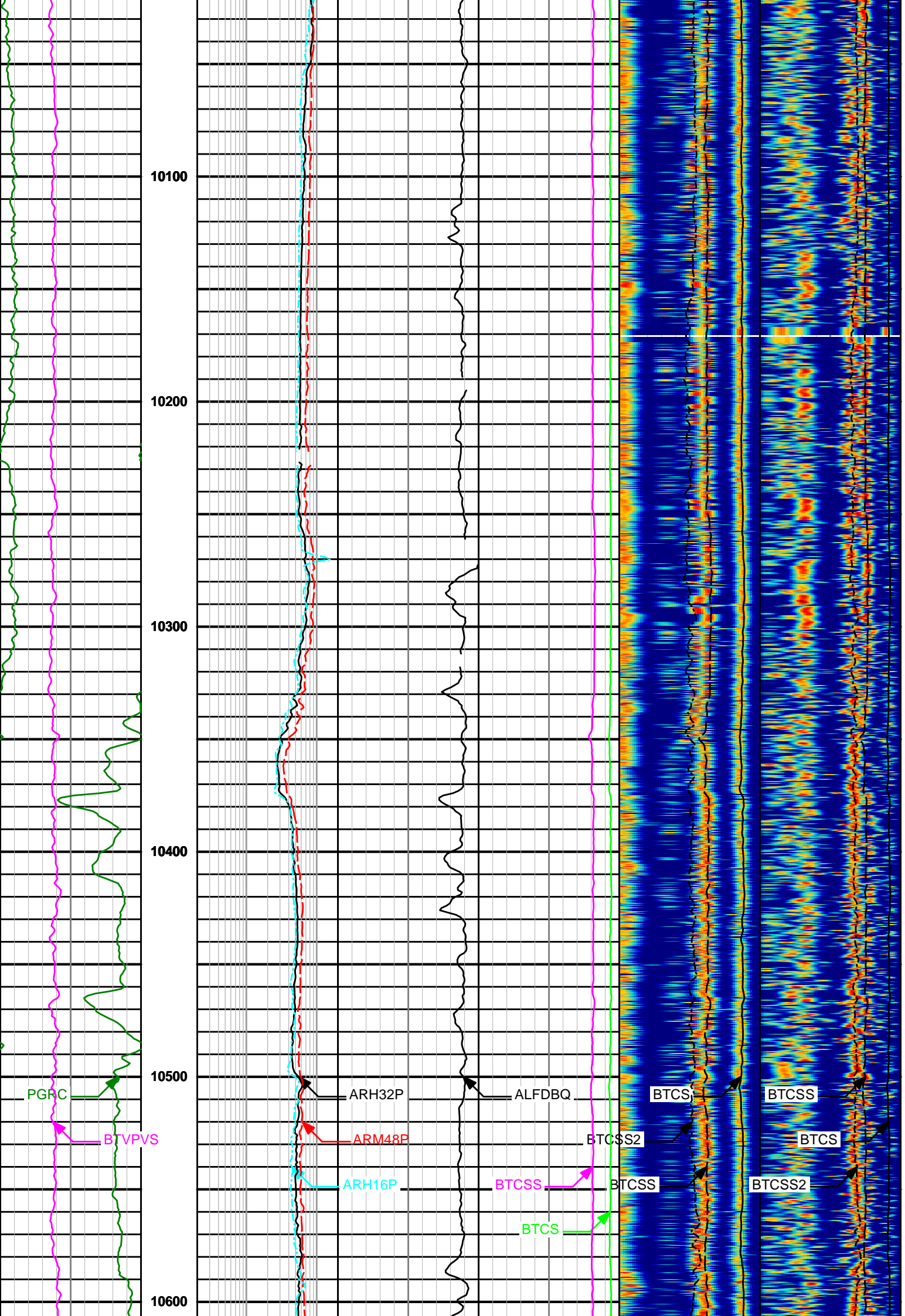
Plot Range: 7980 ft to 11800 ft

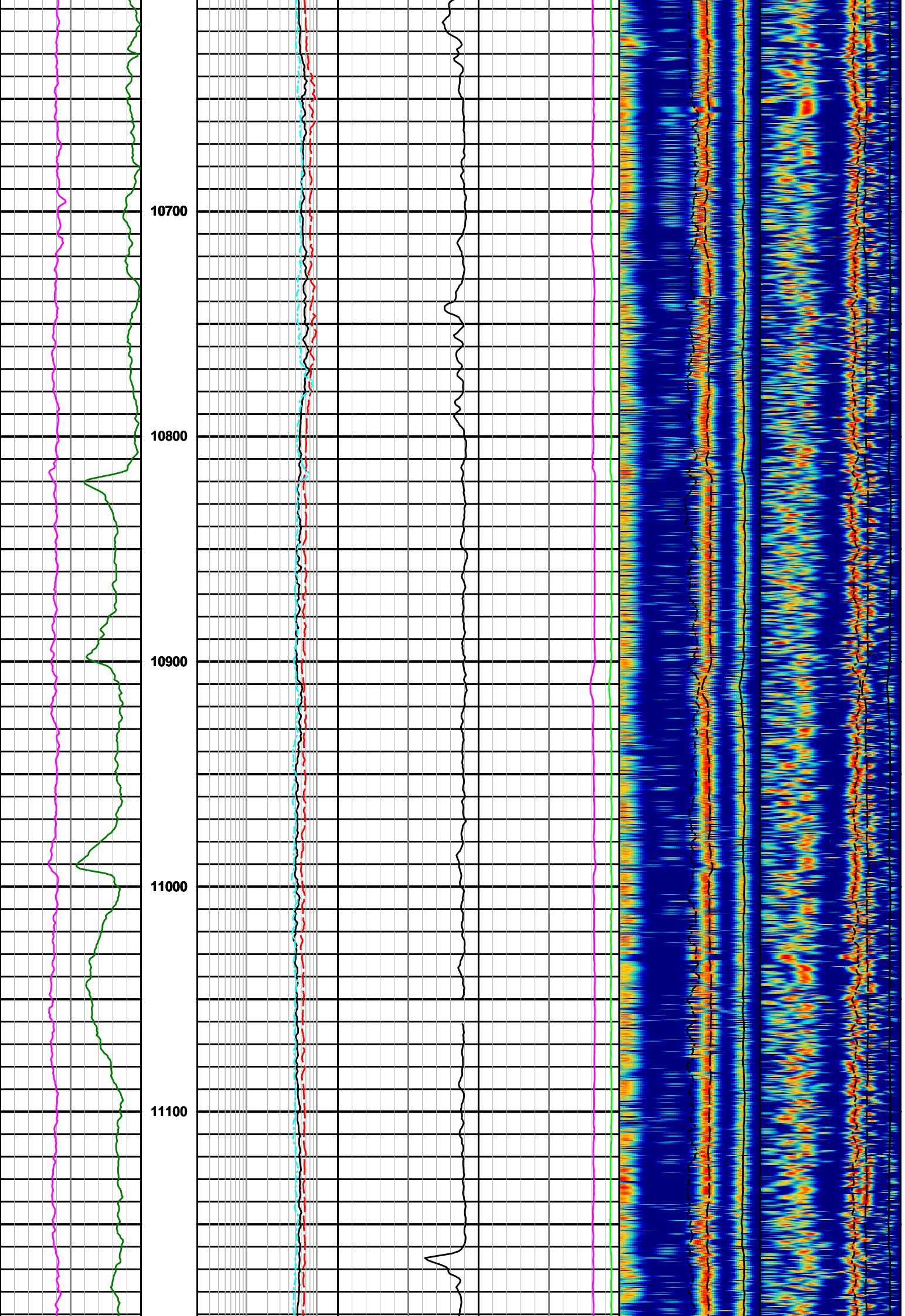


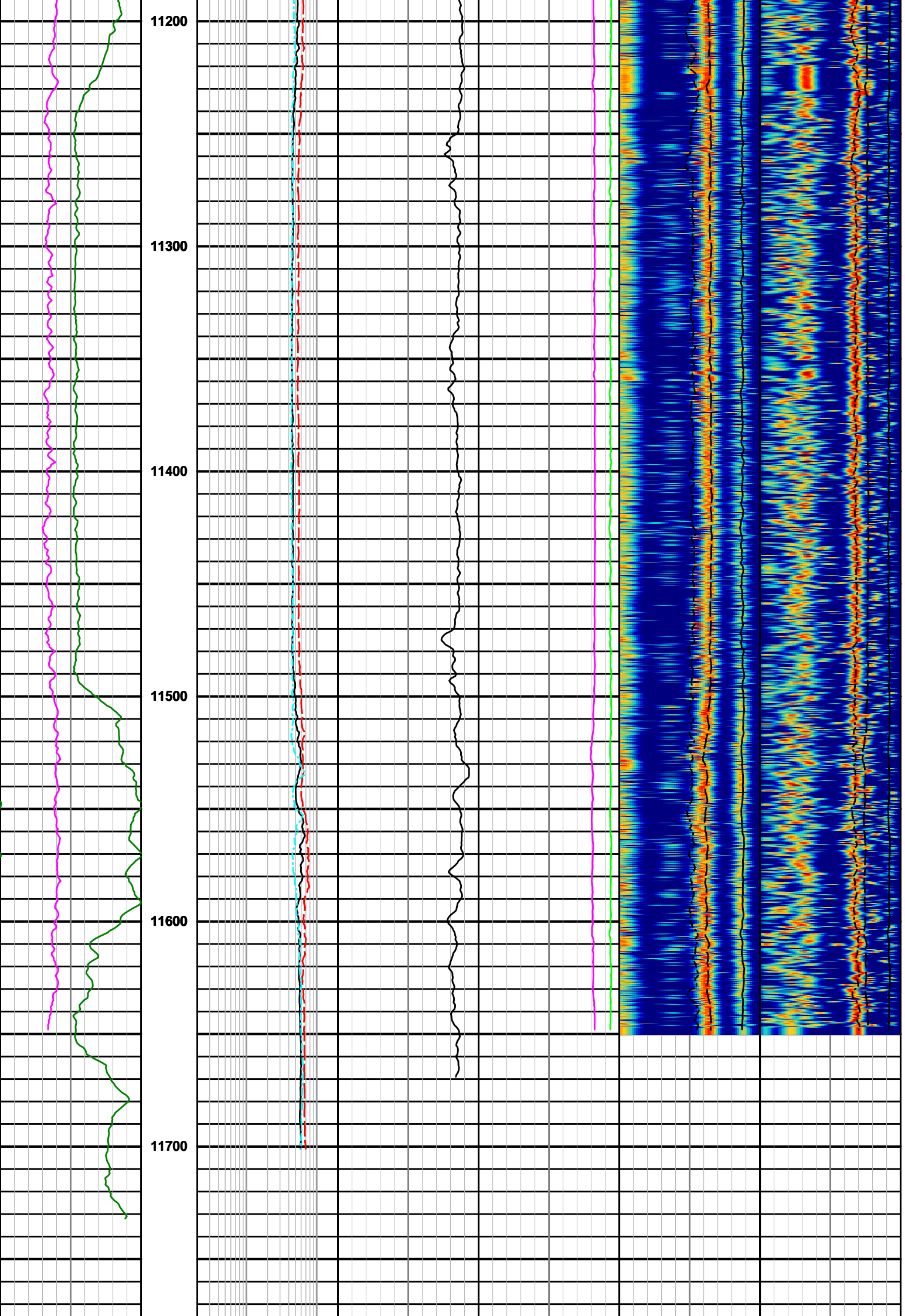


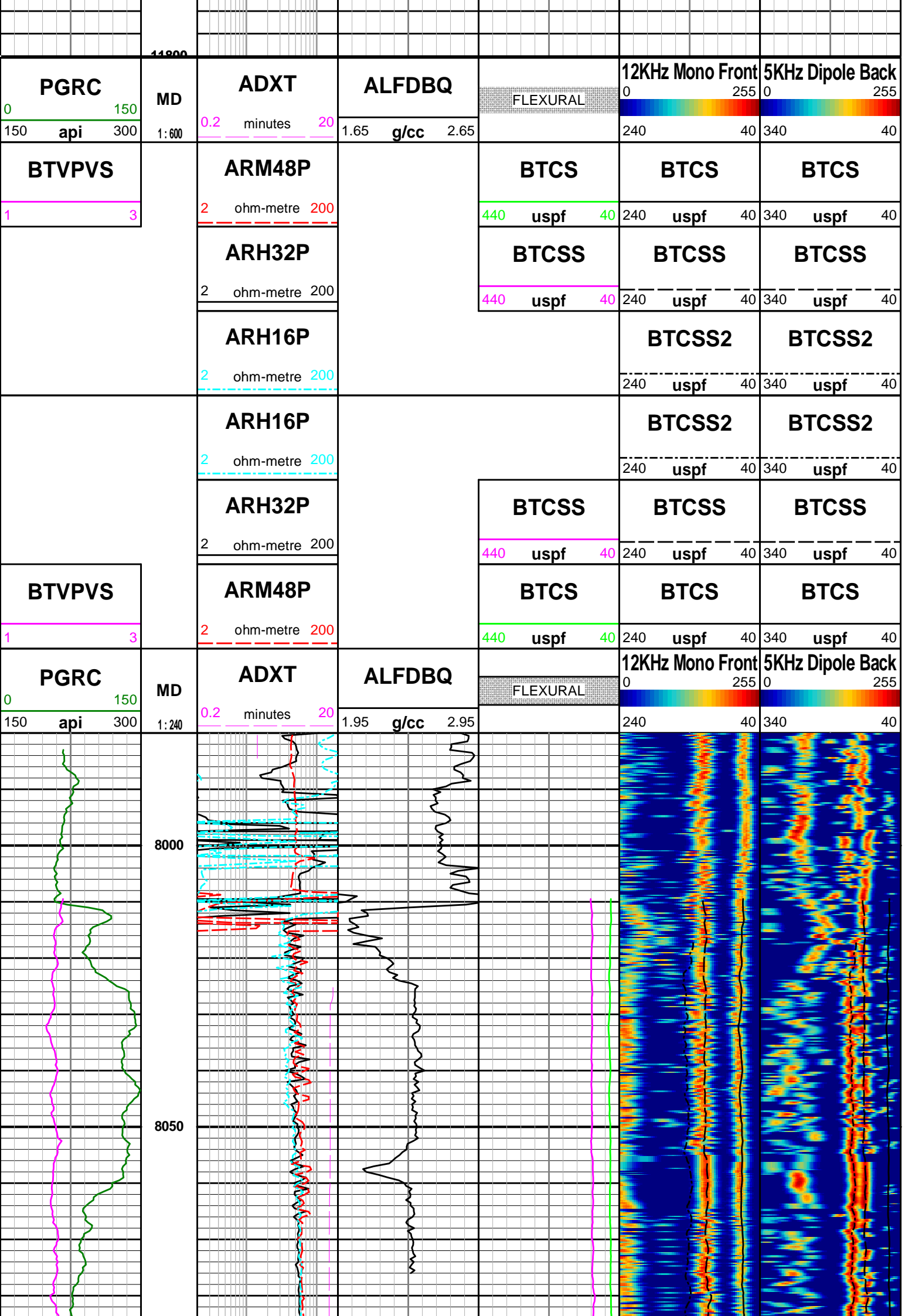


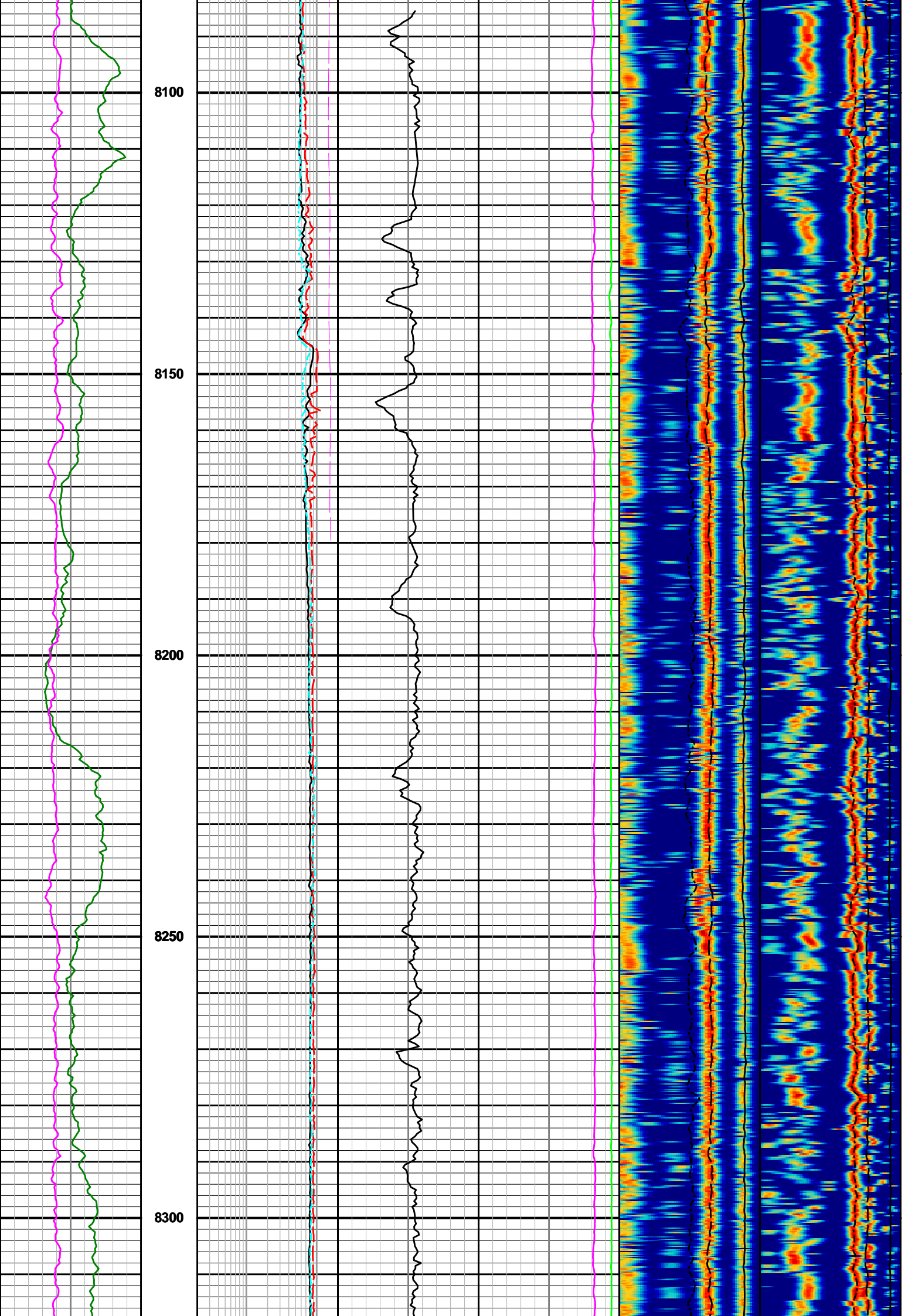


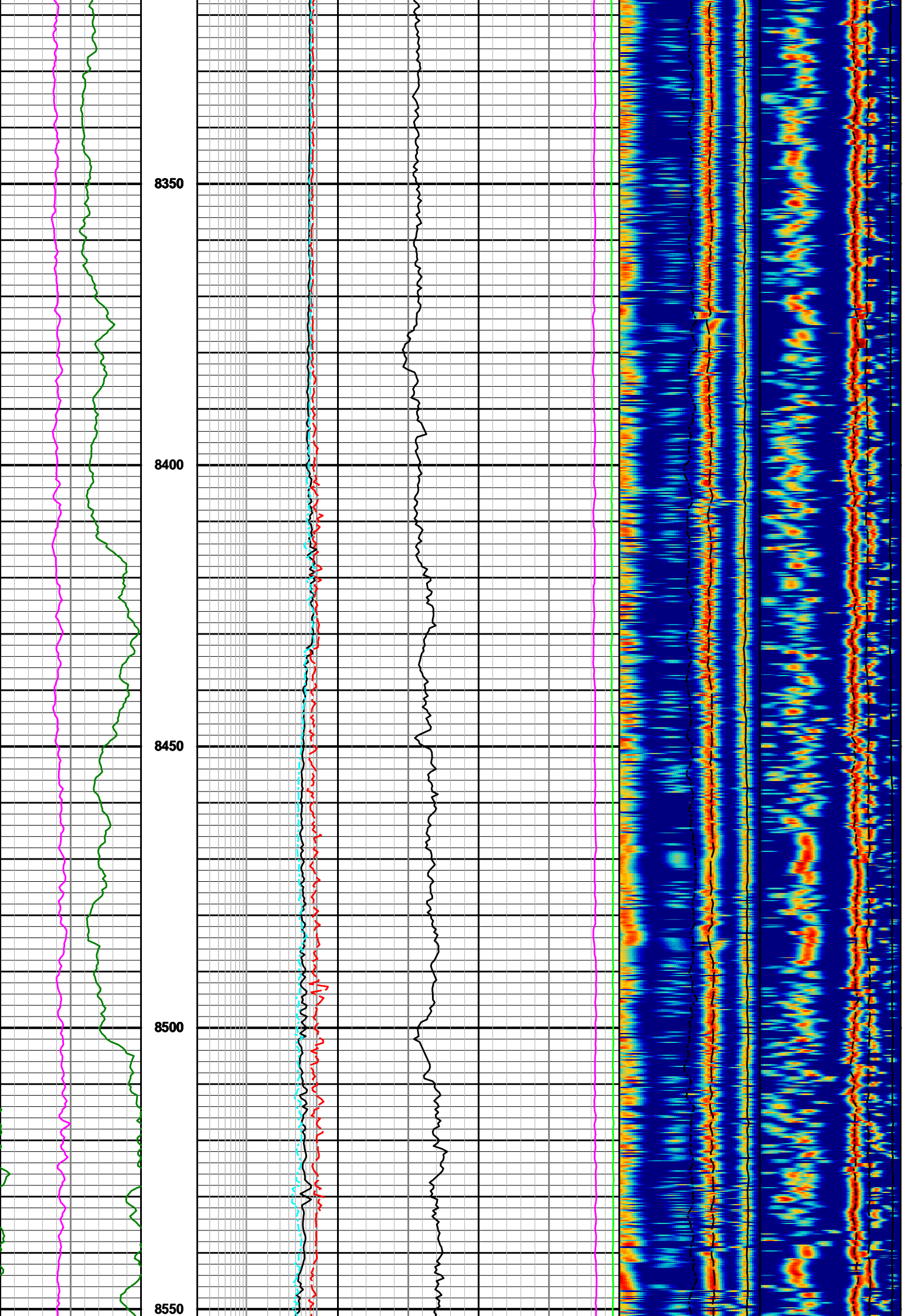


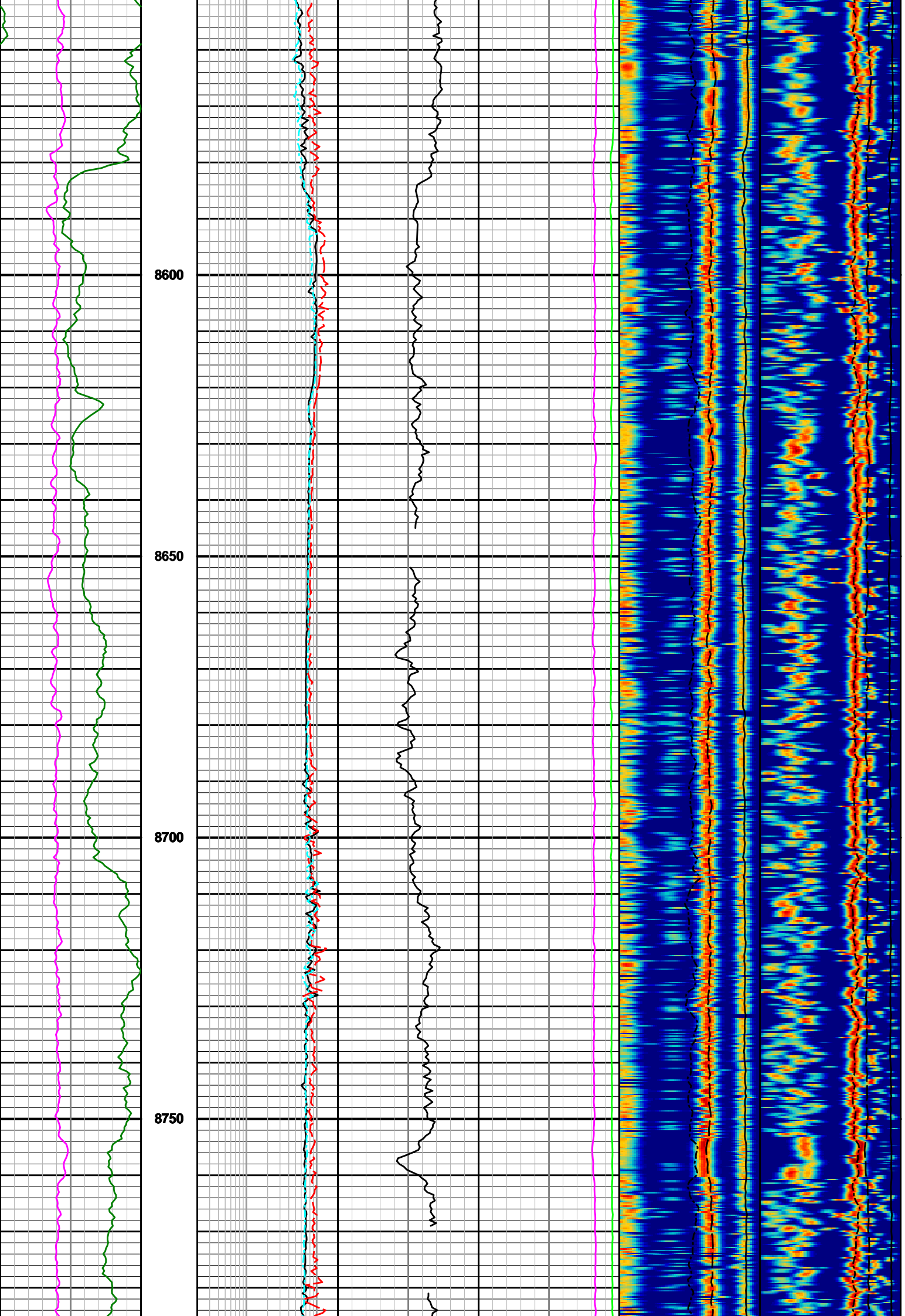


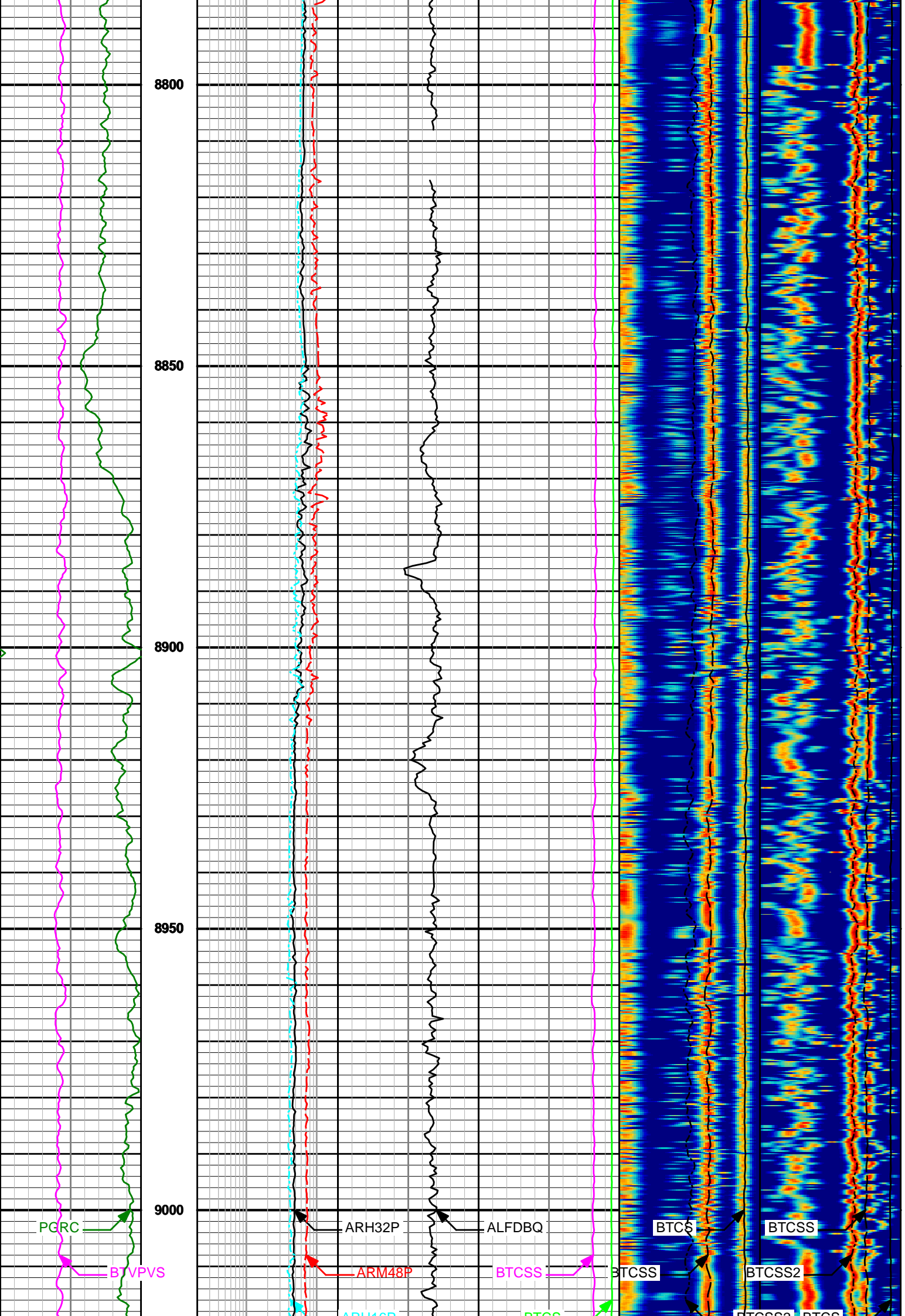


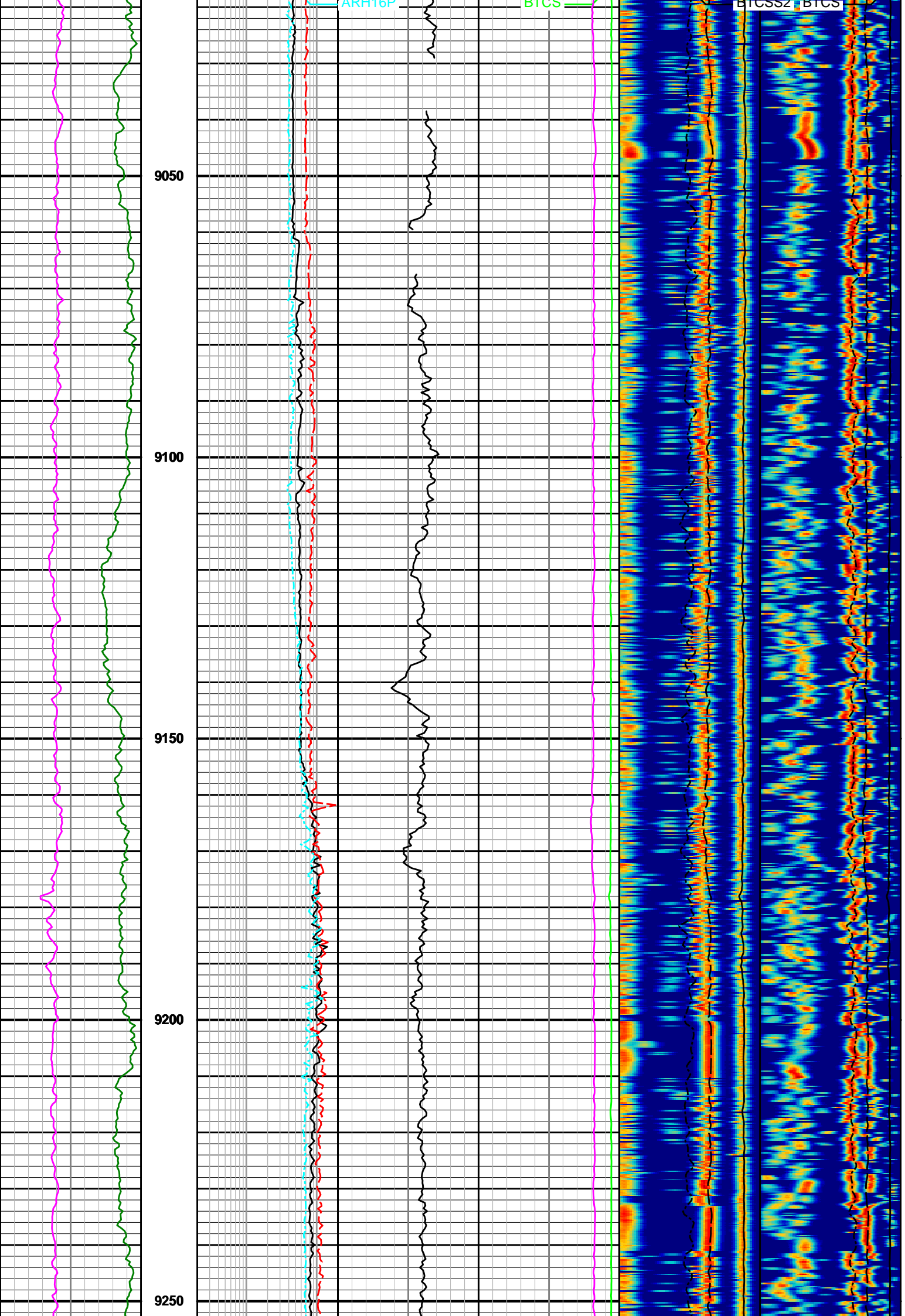


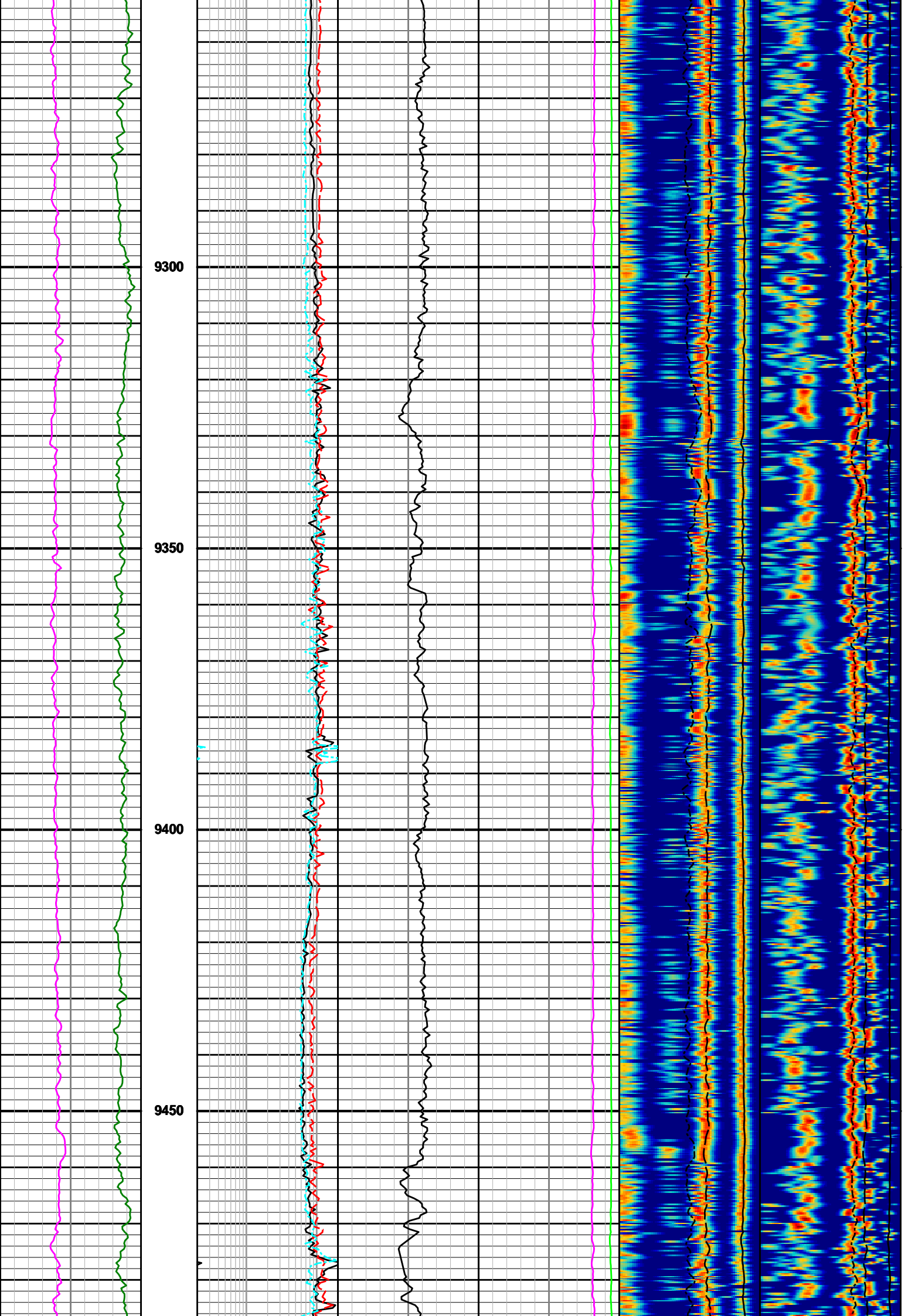


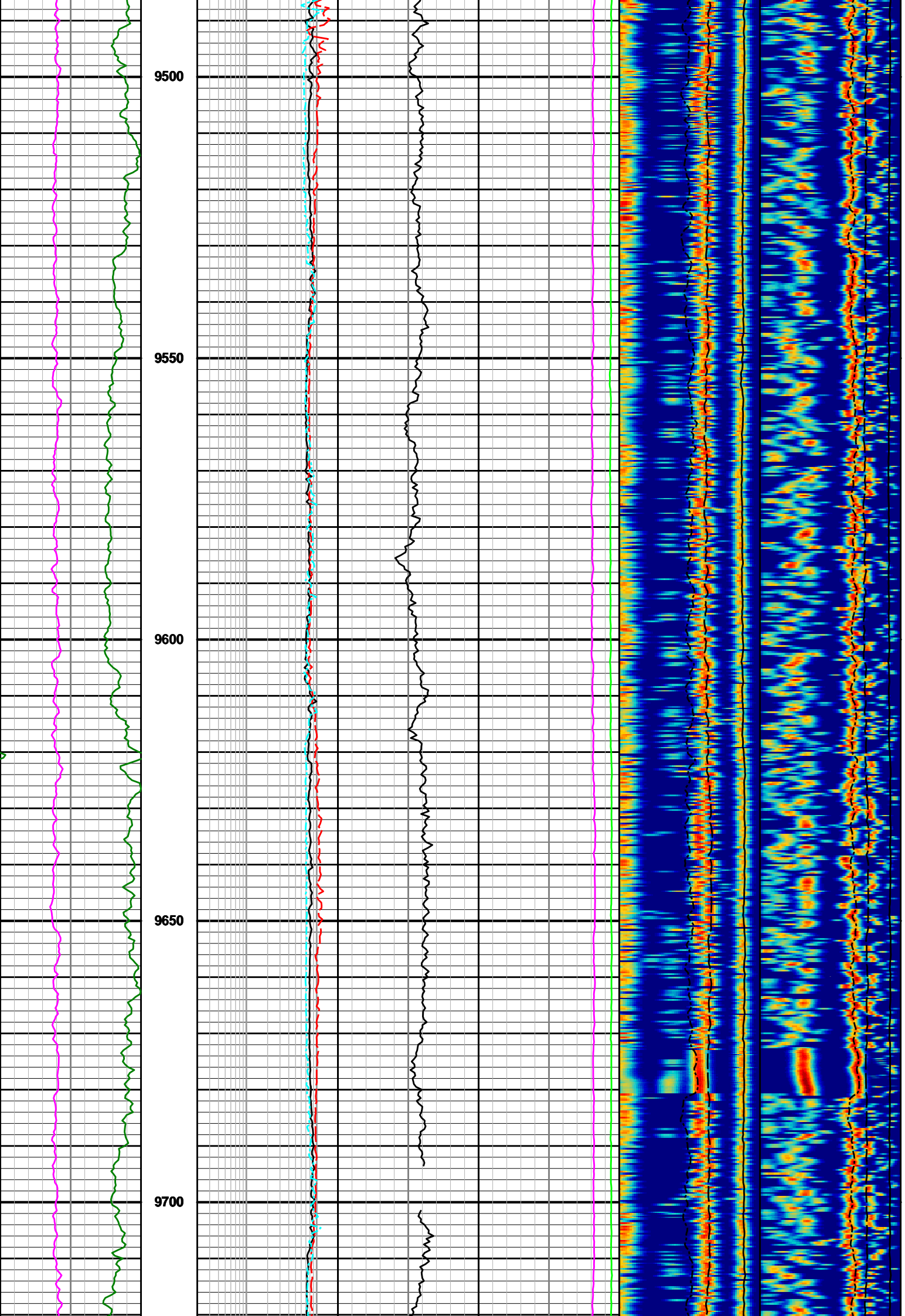


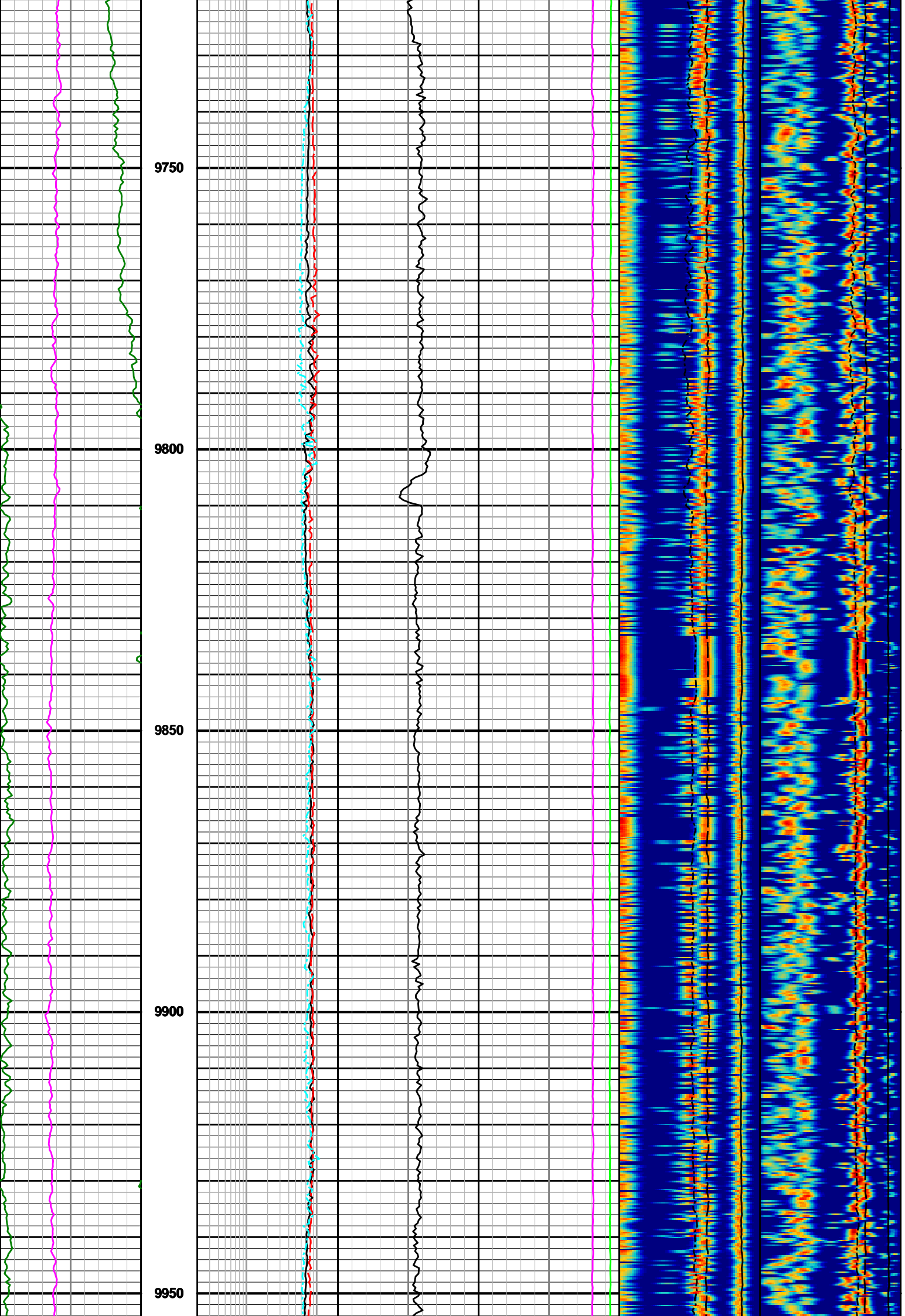


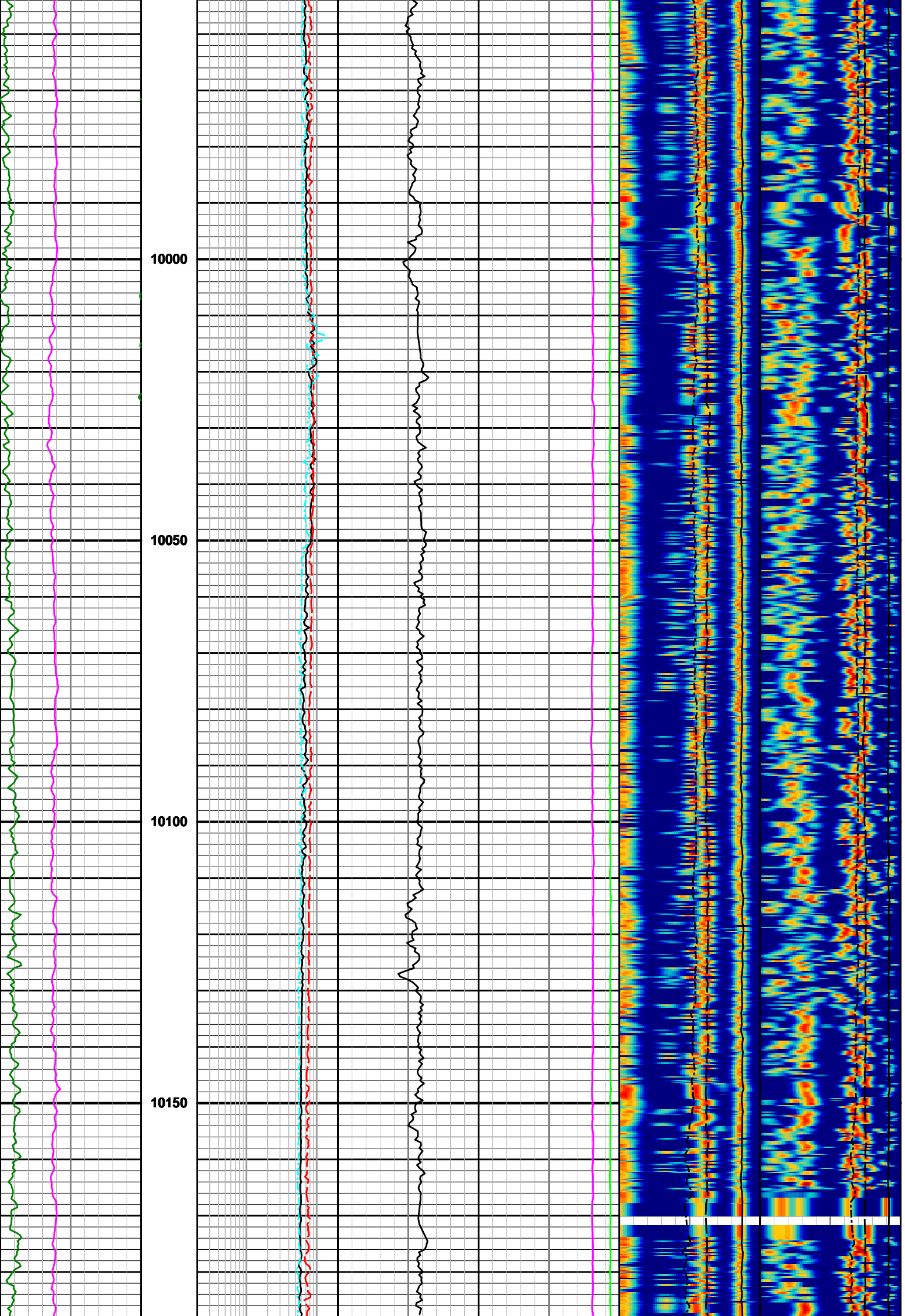


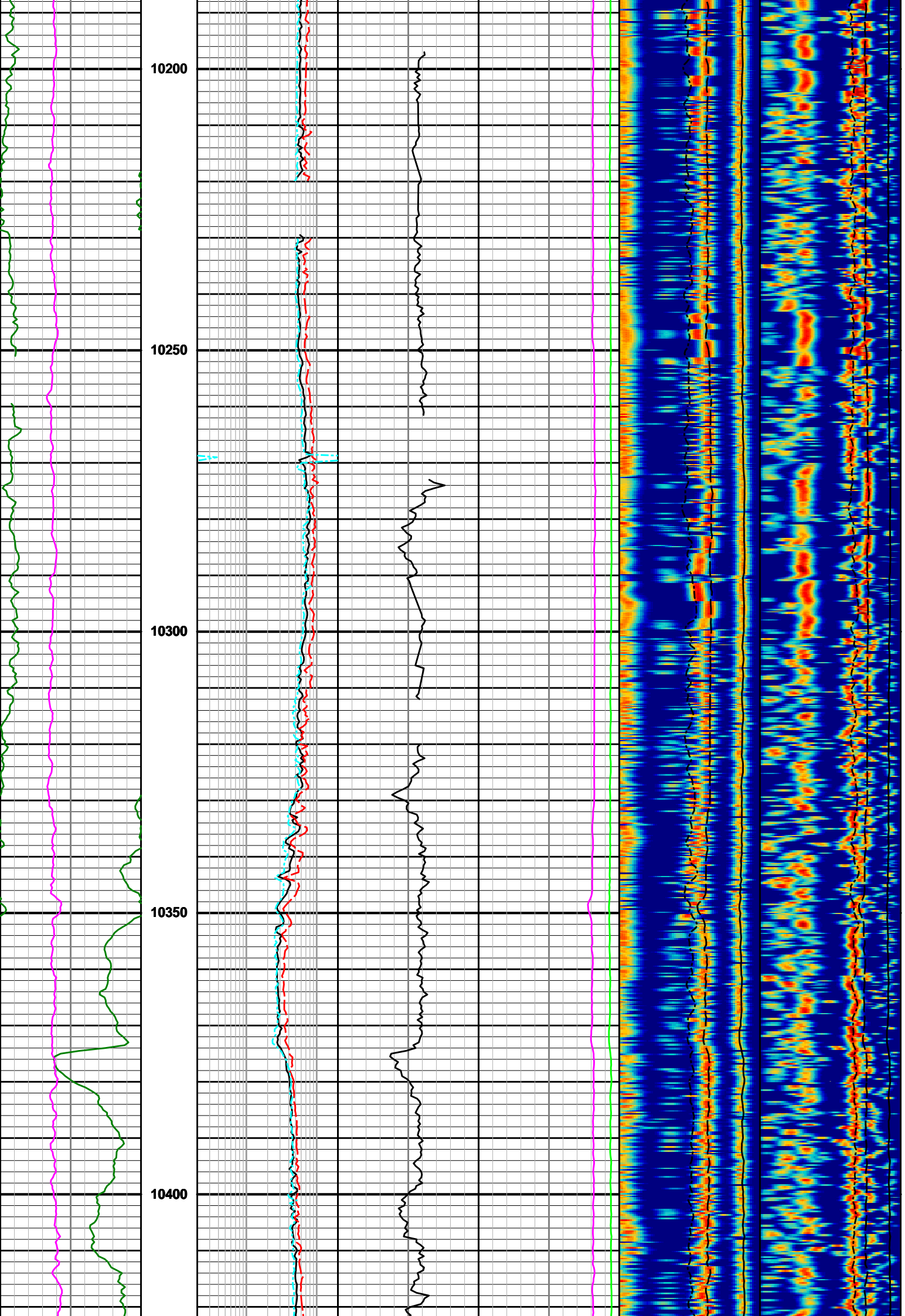


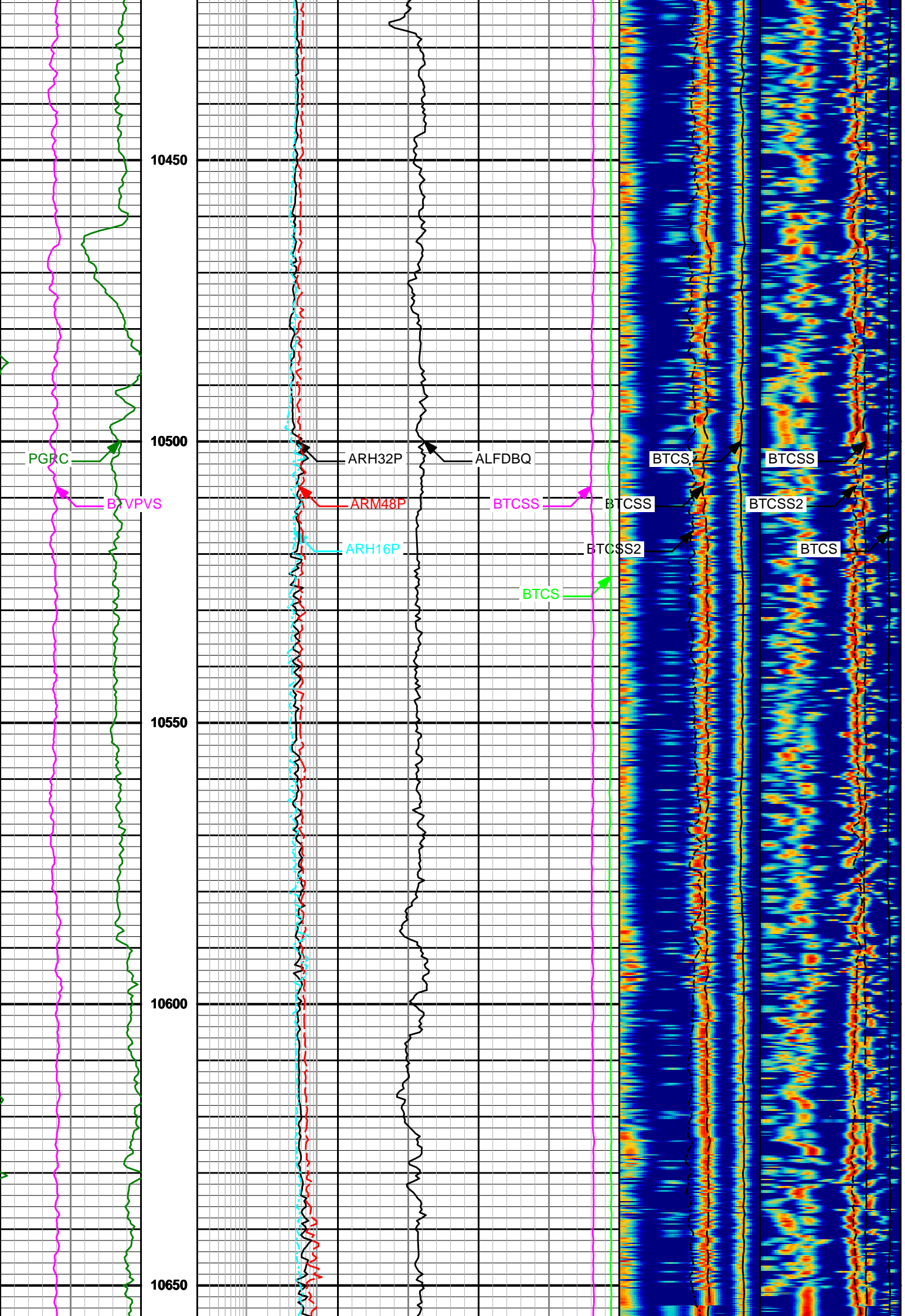


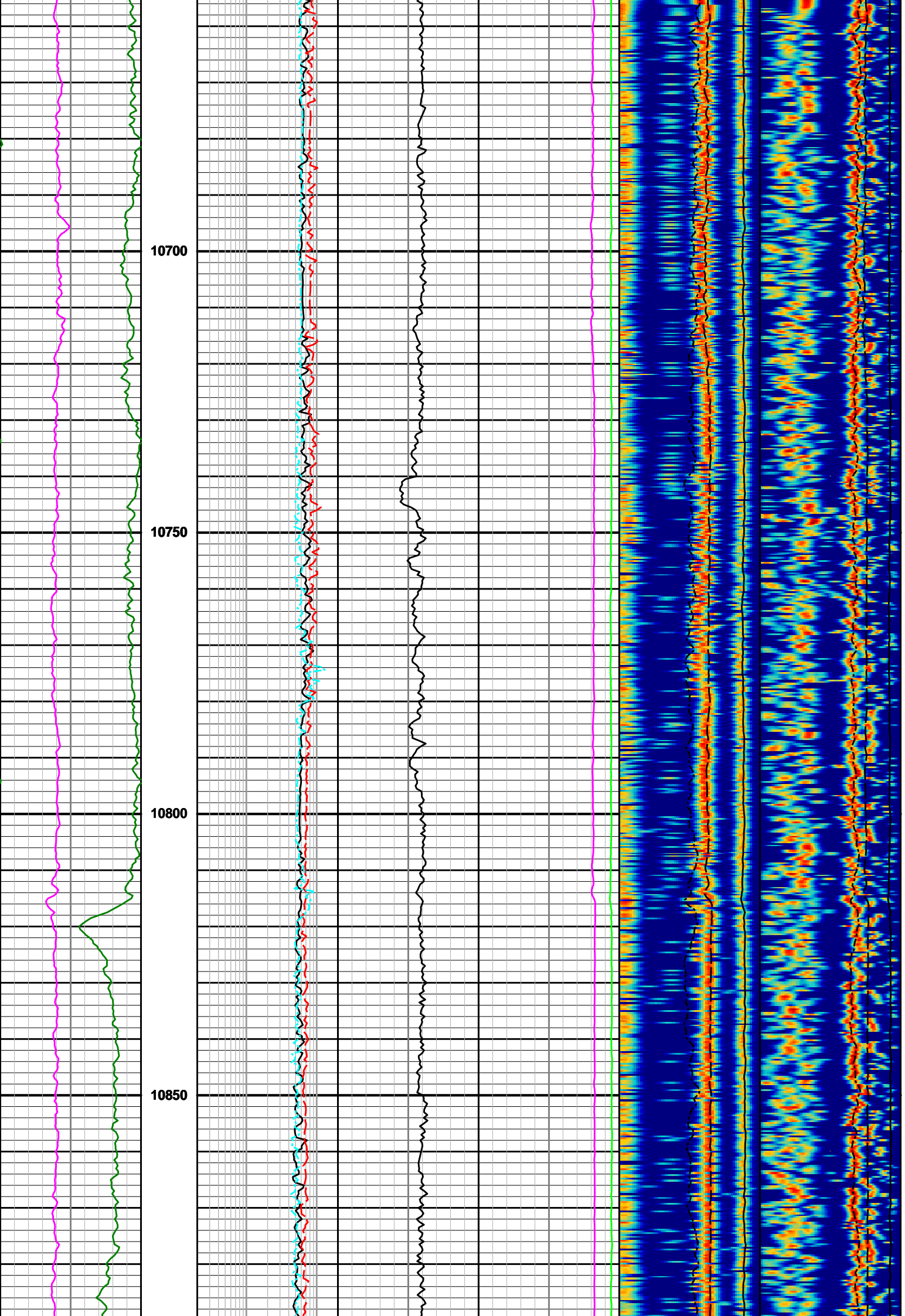


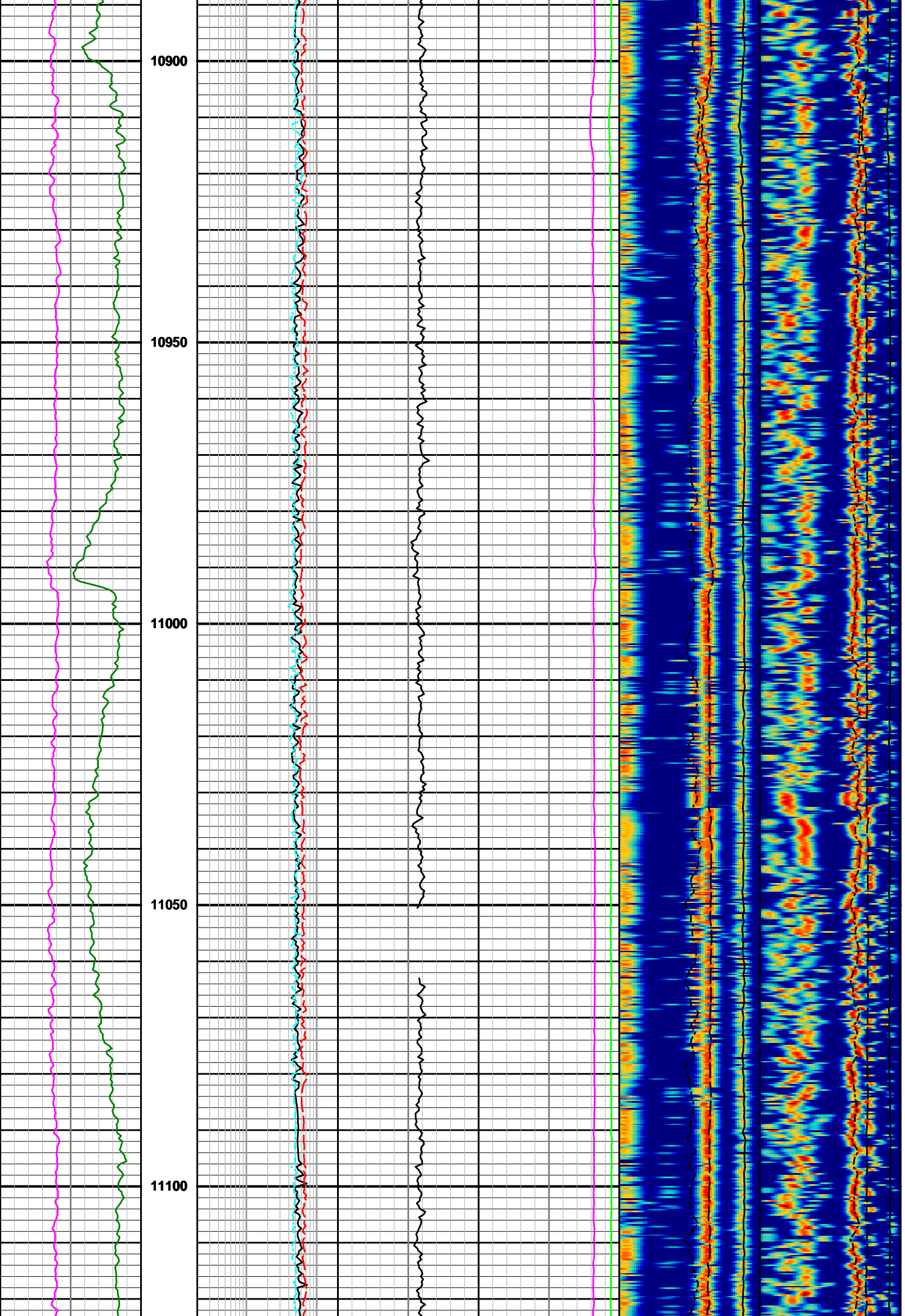


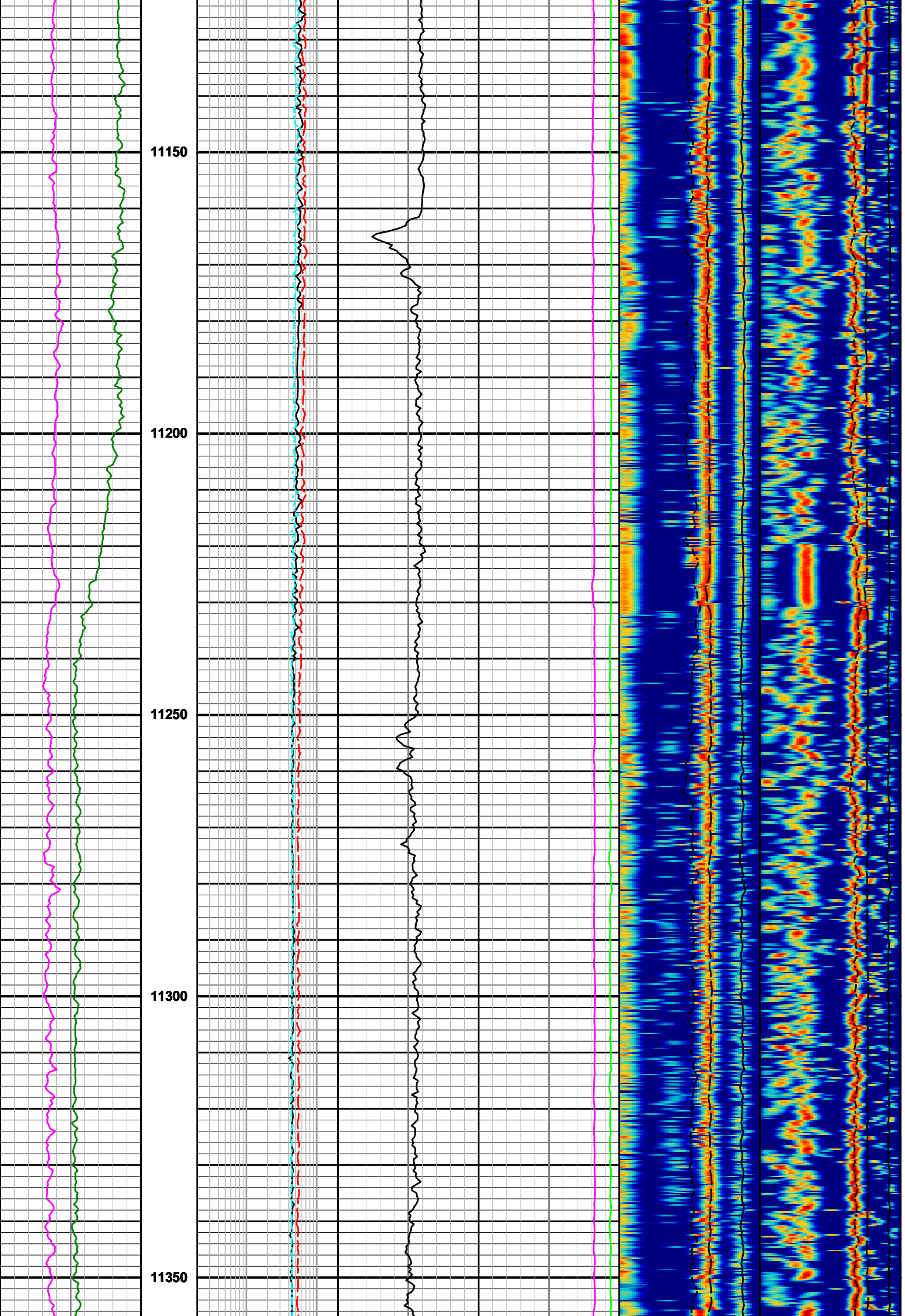


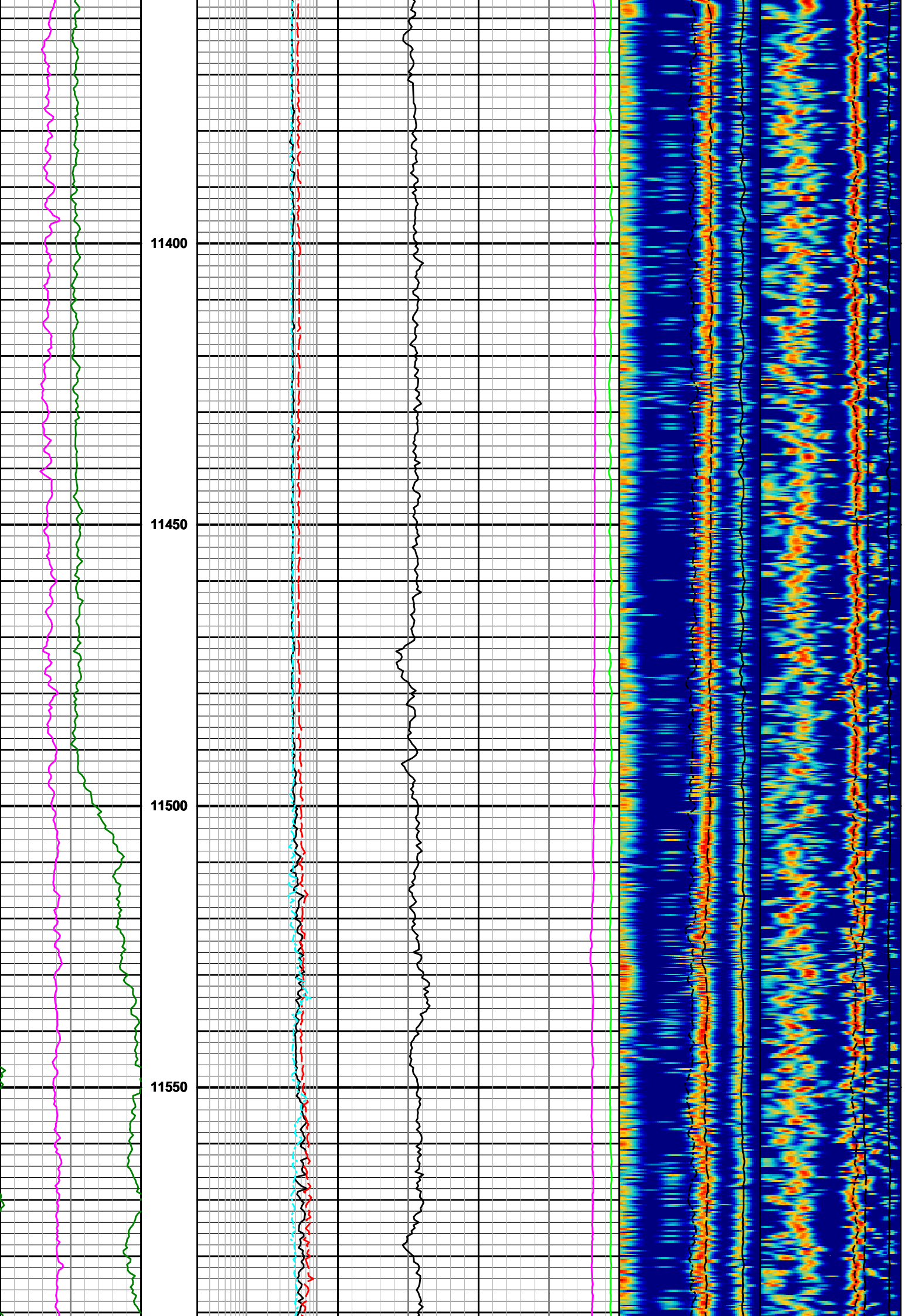


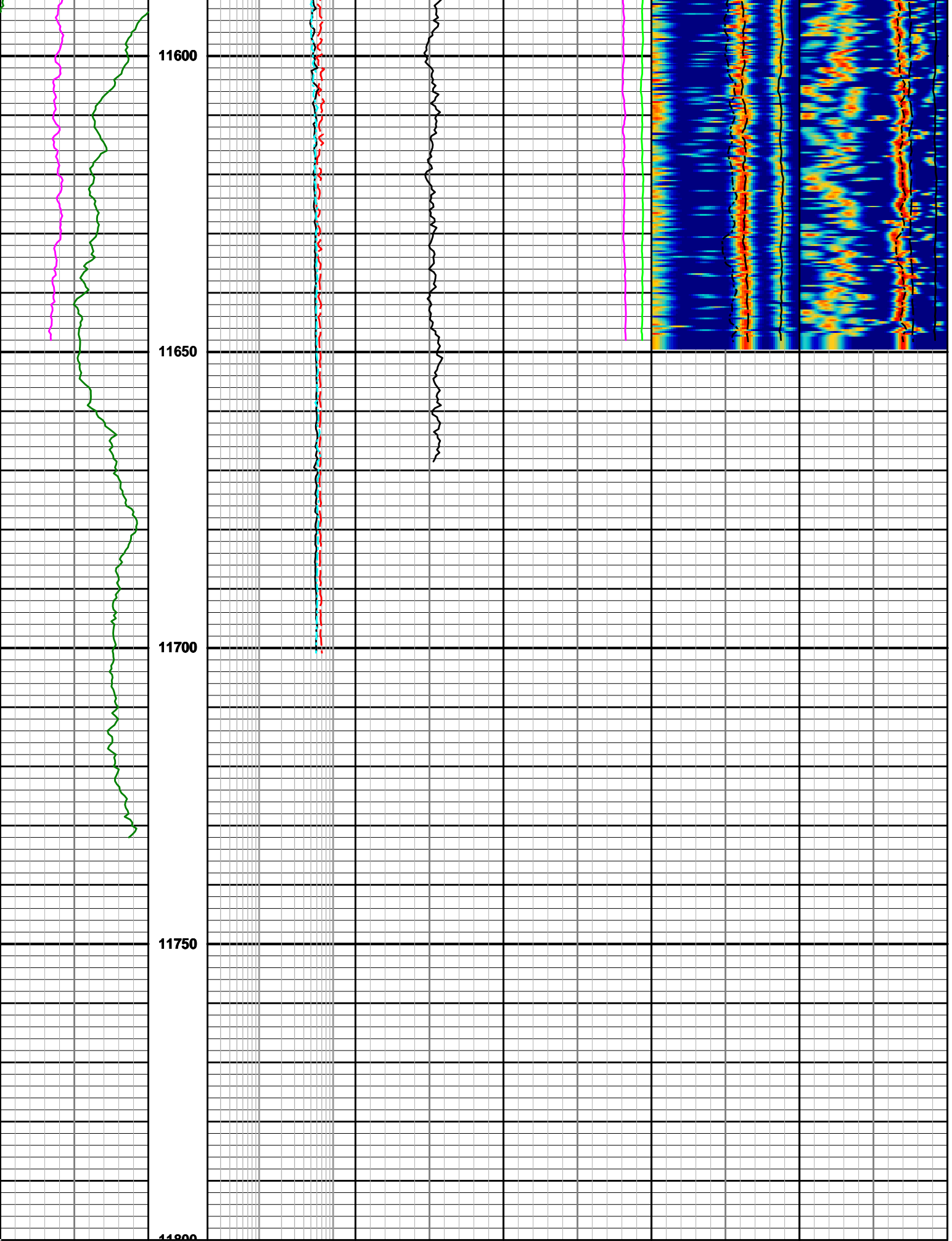












<p><b>PGRC</b></p> <p>0 150</p> <p>150 300</p> <p>api</p>	<p><b>MD</b></p> <p>1:240</p>	<p><b>ADXT</b></p> <p>0.2 minutes 20</p>	<p><b>ALFDBQ</b></p> <p>1.95 g/cc 2.95</p>	<p><b>FLEXURAL</b></p>	<p><b>12KHz Mono Front</b></p> <p>0 255 0 255</p> <p>240 40 340 40</p>	<p><b>5KHz Dipole Back</b></p> <p>0 255 0 255</p> <p>240 40 340 40</p>
<p><b>BTPVVS</b></p>		<p><b>ARM48P</b></p>		<p><b>BTCS</b></p>	<p><b>BTCS</b></p>	<p><b>BTCS</b></p>

1	3	2 ohm-metre 200	440 uspf 40	240 uspf 40	340 uspf 40
		<b>ARH32P</b>	<b>BTCSS</b>	<b>BTCSS</b>	<b>BTCSS</b>
		2 ohm-metre 200	440 uspf 40	240 uspf 40	340 uspf 40
		<b>ARH16P</b>	<b>BTCSS2</b>		<b>BTCSS2</b>
		2 ohm-metre 200	240 uspf 40	340 uspf 40	40



## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

Conoco Phillips  
 Tebo 3-1H  
 Niobrara  
 Arapahoe Colorado  
 USA  
 CA-XX-0009357158

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
7029.00	0.39	340.28	7027.80	12.37 N	20.78 E	-20.72	TIE-IN
7123.00	12.55	270.73	7121.04	12.80 N	10.42 E	-10.36	13.22
7153.00	17.72	271.82	7149.99	12.99 N	2.59 E	-2.53	17.24
7185.00	20.30	272.77	7180.24	13.41 N	7.83 W	7.89	8.13
7216.00	20.48	273.81	7209.30	14.03 N	18.61 W	18.67	1.30
7248.00	20.59	273.22	7239.27	14.72 N	29.82 W	29.88	0.72
7280.00	22.31	270.55	7269.05	15.10 N	41.51 W	41.58	6.19
7311.00	24.85	266.73	7297.46	14.78 N	53.90 W	53.97	9.53
7343.00	27.03	265.40	7326.23	13.81 N	67.86 W	67.92	7.06
7374.00	29.69	264.63	7353.51	12.53 N	82.53 W	82.59	8.66
7406.00	32.28	265.85	7380.94	11.17 N	98.94 W	98.99	8.31
7438.00	34.91	267.49	7407.60	10.15 N	116.62 W	116.66	8.71
7469.00	37.85	269.26	7432.55	9.64 N	134.99 W	135.04	10.05
7501.00	40.75	269.70	7457.31	9.46 N	155.26 W	155.30	9.11
7533.00	43.51	270.00	7481.05	9.40 N	176.72 W	176.76	8.64
7564.00	46.56	269.93	7502.95	9.39 N	198.65 W	198.69	9.87
7596.00	50.06	269.96	7524.23	9.36 N	222.54 W	222.58	10.93
7628.00	53.31	270.29	7544.07	9.42 N	247.65 W	247.69	10.19
7659.00	56.03	270.05	7561.99	9.49 N	272.94 W	272.98	8.80
7691.00	59.19	269.64	7579.13	9.42 N	299.95 W	299.99	9.92
7723.00	62.65	269.29	7594.68	9.16 N	327.91 W	327.95	10.87
7754.00	65.90	268.98	7608.14	8.73 N	355.83 W	355.87	10.52
7786.00	69.29	268.24	7620.33	8.02 N	385.41 W	385.44	10.82
7817.00	72.91	269.20	7630.37	7.36 N	414.72 W	414.75	12.01
7849.00	76.14	270.97	7638.91	7.41 N	445.56 W	445.58	11.42
7881.00	78.64	269.59	7645.90	7.57 N	476.78 W	476.81	8.90
7912.00	82.13	267.71	7651.07	6.84 N	507.33 W	507.36	12.74
7973.00	83.92	265.57	7658.48	3.29 N	567.77 W	567.78	4.55
8017.00	84.00	268.00	7663.11	0.83 N	611.45 W	611.45	5.50
8049.00	84.48	269.77	7666.33	0.21 N	643.28 W	643.28	5.70
8080.00	85.56	271.47	7669.02	0.55 N	674.16 W	674.16	6.48
8112.00	86.42	273.23	7671.26	1.86 N	706.05 W	706.06	6.11
8129.00	87.16	274.16	7672.21	2.95 N	722.99 W	723.00	6.98
8160.00	88.46	275.86	7673.39	5.66 N	753.85 W	753.87	6.88
8192.00	89.20	276.09	7674.05	8.98 N	785.67 W	785.70	2.43
8224.00	89.51	275.76	7674.41	12.29 N	817.50 W	817.54	1.41
8255.00	89.44	274.64	7674.70	15.10 N	848.37 W	848.43	3.62
8287.00	89.51	273.45	7674.99	17.35 N	880.29 W	880.35	3.72
8319.00	89.51	273.45	7675.26	19.28 N	912.23 W	912.30	0.01
8350.00	89.63	273.19	7675.50	21.07 N	943.17 W	943.26	0.92
8382.00	89.88	272.46	7675.63	22.65 N	975.13 W	975.23	2.42
8414.00	89.81	272.31	7675.72	23.98 N	1007.11 W	1007.20	0.50
8445.00	89.63	271.88	7675.87	25.12 N	1038.08 W	1038.19	1.50
8508.00	89.81	271.56	7676.18	27.01 N	1101.06 W	1101.17	0.59
8540.00	89.69	271.56	7676.31	27.88 N	1133.04 W	1133.16	0.39
8613.00	90.49	270.97	7676.20	29.49 N	1206.02 W	1206.15	1.37
8625.00	90.24	270.52	7676.04	29.78 N	1228.89 W	1228.14	2.15

8635.00	90.31	270.53	7676.04	29.78 N	1228.02 W	1228.14	2.15
8698.00	89.01	269.72	7676.42	29.92 N	1291.02 W	1291.14	2.43
8730.00	88.33	269.84	7677.16	29.80 N	1323.01 W	1323.13	2.16
8761.00	88.76	269.91	7677.94	29.73 N	1354.00 W	1354.12	1.41
8793.00	89.07	270.38	7678.55	29.81 N	1385.99 W	1386.11	1.76
8825.00	88.89	270.47	7679.12	30.05 N	1417.99 W	1418.11	0.65
8856.00	89.01	270.49	7679.68	30.31 N	1448.98 W	1449.10	0.40
8888.00	89.44	270.18	7680.11	30.49 N	1480.98 W	1481.10	1.65
8920.00	89.57	269.25	7680.39	30.33 N	1512.98 W	1513.10	2.95
8951.00	89.57	269.50	7680.62	29.99 N	1543.97 W	1544.09	0.81
8983.00	89.75	270.21	7680.82	29.91 N	1575.97 W	1576.09	2.30
9015.00	89.51	271.33	7681.02	30.34 N	1607.97 W	1608.09	3.57
9078.00	87.28	270.95	7682.79	31.59 N	1670.93 W	1671.05	3.58
9110.00	87.10	270.70	7684.36	32.05 N	1702.89 W	1703.01	0.97
9173.00	88.70	270.10	7686.67	32.49 N	1765.84 W	1765.97	2.72
9204.00	88.76	270.01	7687.35	32.52 N	1796.83 W	1796.96	0.35
9236.00	89.32	270.33	7687.89	32.61 N	1828.83 W	1828.96	2.01
9268.00	90.19	270.95	7688.03	32.97 N	1860.82 W	1860.95	3.31
9299.00	90.12	270.73	7687.94	33.43 N	1891.82 W	1891.95	0.73
9394.00	89.81	269.51	7687.99	33.63 N	1986.82 W	1986.95	1.32
9426.00	89.94	269.63	7688.06	33.39 N	2018.82 W	2018.95	0.53
9458.00	89.13	269.34	7688.32	33.10 N	2050.81 W	2050.94	2.67
9489.00	87.96	269.17	7689.11	32.70 N	2081.80 W	2081.93	3.82
9521.00	87.47	269.16	7690.38	32.24 N	2113.77 W	2113.90	1.55
9584.00	88.21	269.11	7692.76	31.29 N	2176.72 W	2176.84	1.18
9616.00	88.76	268.90	7693.61	30.73 N	2208.70 W	2208.82	1.85
9679.00	88.64	268.79	7695.03	29.46 N	2271.67 W	2271.79	0.27
9742.00	88.52	269.08	7696.60	28.29 N	2334.64 W	2334.75	0.49
9774.00	88.58	269.28	7697.41	27.83 N	2366.63 W	2366.73	0.66
9837.00	89.57	268.67	7698.43	26.70 N	2429.61 W	2429.71	1.85
9869.00	89.88	268.93	7698.58	26.03 N	2461.60 W	2461.70	1.27
9900.00	90.06	269.12	7698.60	25.50 N	2492.60 W	2492.69	0.85
9932.00	90.49	269.41	7698.44	25.09 N	2524.60 W	2524.68	1.64
9964.00	89.63	268.86	7698.41	24.60 N	2556.59 W	2556.68	3.21
9995.00	88.95	267.99	7698.79	23.75 N	2587.58 W	2587.66	3.55
10059.00	88.89	267.94	7700.00	21.48 N	2651.53 W	2651.60	0.12
10090.00	89.26	268.10	7700.50	20.41 N	2682.50 W	2682.57	1.31
10153.00	88.89	269.57	7701.52	19.13 N	2745.48 W	2745.54	2.40
10185.00	88.89	269.79	7702.14	18.95 N	2777.47 W	2777.53	0.68
10217.00	88.83	269.88	7702.78	18.86 N	2809.47 W	2809.52	0.34
10248.00	88.95	270.15	7703.38	18.86 N	2840.46 W	2840.52	0.96
10312.00	89.44	270.35	7704.28	19.14 N	2904.45 W	2904.51	0.83
10343.00	89.94	270.61	7704.45	19.41 N	2935.45 W	2935.51	1.81
10406.00	90.87	270.05	7704.00	19.77 N	2998.45 W	2998.51	1.72
10438.00	91.67	269.80	7703.30	19.73 N	3030.44 W	3030.50	2.62
10470.00	91.98	270.00	7702.28	19.67 N	3062.42 W	3062.48	1.17
10501.00	92.10	269.95	7701.18	19.66 N	3093.40 W	3093.46	0.43
10533.00	92.60	270.47	7699.87	19.77 N	3125.38 W	3125.44	2.25
10565.00	93.40	271.03	7698.19	20.19 N	3157.33 W	3157.39	3.08
10596.00	92.60	270.68	7696.57	20.65 N	3188.28 W	3188.35	2.83
10628.00	91.85	271.12	7695.33	21.15 N	3220.26 W	3220.32	2.71
10660.00	91.85	271.22	7694.29	21.81 N	3252.23 W	3252.30	0.30
10691.00	91.98	271.27	7693.26	22.48 N	3283.21 W	3283.28	0.44
10723.00	92.35	271.41	7692.05	23.23 N	3315.18 W	3315.25	1.23
10754.00	91.54	270.95	7691.00	23.87 N	3346.15 W	3346.23	2.99
10818.00	91.18	270.28	7689.48	24.55 N	3410.13 W	3410.21	1.20
10881.00	90.43	270.09	7688.59	24.76 N	3473.12 W	3473.20	1.22
10913.00	90.56	270.12	7688.32	24.81 N	3505.12 W	3505.20	0.40
10976.00	90.62	270.00	7687.67	24.88 N	3568.12 W	3568.19	0.21
11007.00	90.43	269.92	7687.39	24.86 N	3599.12 W	3599.19	0.65
11071.00	90.25	269.93	7687.01	24.77 N	3663.12 W	3663.19	0.29
11102.00	89.88	269.76	7686.98	24.69 N	3694.12 W	3694.19	1.31
11197.00	91.73	270.12	7685.64	24.60 N	3789.10 W	3789.17	1.99
11292.00	90.43	270.21	7683.85	24.87 N	3884.08 W	3884.15	1.37
11324.00	90.74	270.23	7683.52	25.00 N	3916.08 W	3916.15	0.97
11387.00	89.75	269.48	7683.25	24.83 N	3979.08 W	3979.15	1.97
11419.00	90.12	269.81	7683.28	24.63 N	4011.08 W	4011.15	1.57
11482.00	89.69	270.04	7683.39	24.55 N	4074.08 W	4074.15	0.77
11514.00	89.32	269.97	7683.66	24.56 N	4106.08 W	4106.15	1.18
11577.00	89.26	270.01	7684.44	24.55 N	4169.07 W	4169.14	0.12
11609.00	88.95	269.81	7684.94	24.50 N	4201.07 W	4201.13	1.15
11672.00	89.14	270.15	7686.00	24.47 N	4264.06 W	4264.13	0.61
11718.00	89.20	270.22	7686.67	24.62 N	4310.05 W	4310.12	0.20
11780.00	89.20	270.22	7687.53	24.86 N	4372.05 W	4372.11	0.01

CALCULATION BASED ON MINIMUM CURVATURE METHOD

**SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT  
TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT**

**VERTICAL SECTION RELATIVE TO WELL HEAD  
VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 270.26 DEGREES (TRUE)  
A TOTAL CORRECTION OF 8.49 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11780.00 FEET  
IS 4372.12 FEET ALONG 270.33 DEGREES (TRUE)**

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