

MONOPOLE - DIPOLE ARRAY  
SEMBLANCE

|                                |                       |                        |                 |
|--------------------------------|-----------------------|------------------------|-----------------|
| COMPANY:                       |                       | MARATHON OIL COMPANY   |                 |
| WELL:                          |                       | 596-31C-26             |                 |
| FIELD:                         |                       | GRAND VALLEY           |                 |
| COUNTY:                        | GARFIELD              | STATE:                 | COLORADO        |
| Location: 2163' FSL & 602' FWL |                       | Latitude:              | Other Services: |
| API: 05-045-16024              |                       | Longitude:             |                 |
| Licence:                       |                       |                        |                 |
| Permanent Datum: G.L.          | Elevation: 8520       | Elevations: K.B.: 8544 |                 |
| Log measured from G.L. 0       | above Permanent Datum | D.F.: 8543             |                 |
| Drilling measured from K.B.    |                       | G.L.: 8520             |                 |
| Date                           | 27-OCT-09             |                        |                 |
| Run Number                     | 1                     | 2                      |                 |
| Service Order                  | 3521277               |                        |                 |
| Depth Driller                  | 9806.000              |                        |                 |
| Depth Logger                   | 9629.000              |                        |                 |
| First Reading                  | 9600.000              |                        |                 |
| Last Reading                   | 2300.000              |                        |                 |
| Casing Driller                 | @ 2385                | @                      |                 |
| Casing Logger                  |                       |                        |                 |
| Bit Size                       | 8.750                 |                        |                 |
| Hole Fluid Type                | WATER                 |                        |                 |
| Density                        | Viscosity             | 8.34                   |                 |
| pH                             | Fluid Loss            |                        |                 |
| Sample Source                  | NONE                  |                        |                 |
| Rm @ Measured Temperature      | @                     | @                      |                 |
| Rmt @ Measured Temperature     | @                     | @                      |                 |
| Rmc @ Measured Temperature     | @                     | @                      |                 |
| Source Rmt                     | Rmc                   |                        |                 |
| Rm @ BHT                       | @                     | @                      |                 |
| Time Since Circulation         |                       |                        |                 |
| Maximum Recorded Temperature   | 260                   | @ TD                   | @               |
| Equipment No.                  | Location              | 13029                  | GDUCT           |
| Recorded By                    | D. KUNTZ              |                        |                 |
| Witnessed By                   | S. NADJ               |                        |                 |

All interpretation of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretation or recommendation and we shall not be liable or responsible for any loss, cost, damages or expenses incurred or sustained by anyone resulting from any interpretation or recommendation made by any of our employees or agents.

|   |          |                 |         |
|---|----------|-----------------|---------|
| Rig:<br>Drilling Stopped<br>Circulation Stopped | Remarks: | Service Order # | 3521277 |
|---|----------|-----------------|---------|

|                |           |       |
|----------------|-----------|-------|
| Tool on Bottom |           |       |
| BHT            |           |       |
| Equipment Data |           |       |
| Tool Type      | Tool Type | Other |
|                |           |       |

PLOT TYPE: MDA MONOPOLE-DIPOLE ARRAY SEMBLANCE

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REMARKS:

Project: 3521277  
Company: MARATHON OIL COMPANY  
Well: 596-31C-26  
Field: GRAND VALLEY  
County: GARFIELD  
State: COLORADO  
Country: U.S.A.  
Log Date: 22-NOV-09

SHA / MCG / SKJ / MDN logged in combination.  
MDA-UGR logged separately.  
Logged through Casing.  
Logging Unit 13029, Grand Junction, CO.  
Recorded by D. Kuntz.

DTQC, DTPQ and DTSQ are flags for zones where the values of DTP and/or DTS may not be accurate. Caution should be excersised if DTP and DTS are used in analysis and interpretation where these flags occur.  
Any other curves that are dependent upon DTP and DTS should also be consider with caution. These include VPVS, POIS, SPHI, ITTP and ITTS.

Another flag of potentially inaccurate responses is the borehole rugosity as indicated by the caliper(s).

Poisson's Ratio:  
$$POIS = (2 - (DTS/DTP)^2) / (2 * (1 - (DTS/DTP)^2))$$

$$VPVS = DTS/DTP$$

DIPOLE Shear:  
Receivers R2, R4, R6, R8. First receiver offset 11.7 feet.  
Frequency pre-filtered 2000 - 5000 Hz fixed butter worth filter.  
Slowness filter 60 - 200 usec/ft.  
Used guided semblance @ x32 resolution, variable wave tracking with width @ 300 usec.

MONOPOLE Compressional:

Receivers R1, R3, R5, R7. First receiver offset 9.0 feet.  
Frequency pre-filtered 5000 - 20000 Hz fixed butterworth filter.  
Slowness filter 40 - 120 usec/ft.  
Used guided semblance @ x32 resolution, variable wave tracking with  
width @ 70 usec.

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# CURVE DESCRIPTIONS:

## CURVE LEGEND:

GRGC = Gamma Ray  
VPVS = Velocity Ratio, Compressional Velocity Vp to Shear Velocity Vs  
POIS = Poisson's Ratio  
DTP = Delta T Compressional, From Monopole Semblance  
DTS = Delta Time Shear, From Monopole Semblance  
DTPQ = Delta T Compressional Quality Flag  
DTSQ = Delta T Shear Quality Flag  
ITTP = Compressional Integrated Travel Time from DTP  
ITTS = Shear Integrated Travel Time from DTS  
MWAVE = Monopole Waveform - First Receiver  
MSEM = Monopole Compressional Semblance  
DWAVE = Dipole Waveform - First Receiver  
DSEM = Dipole Semblance

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# PARAMETERS:

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## BOREHOLE ENVIRONMENT:

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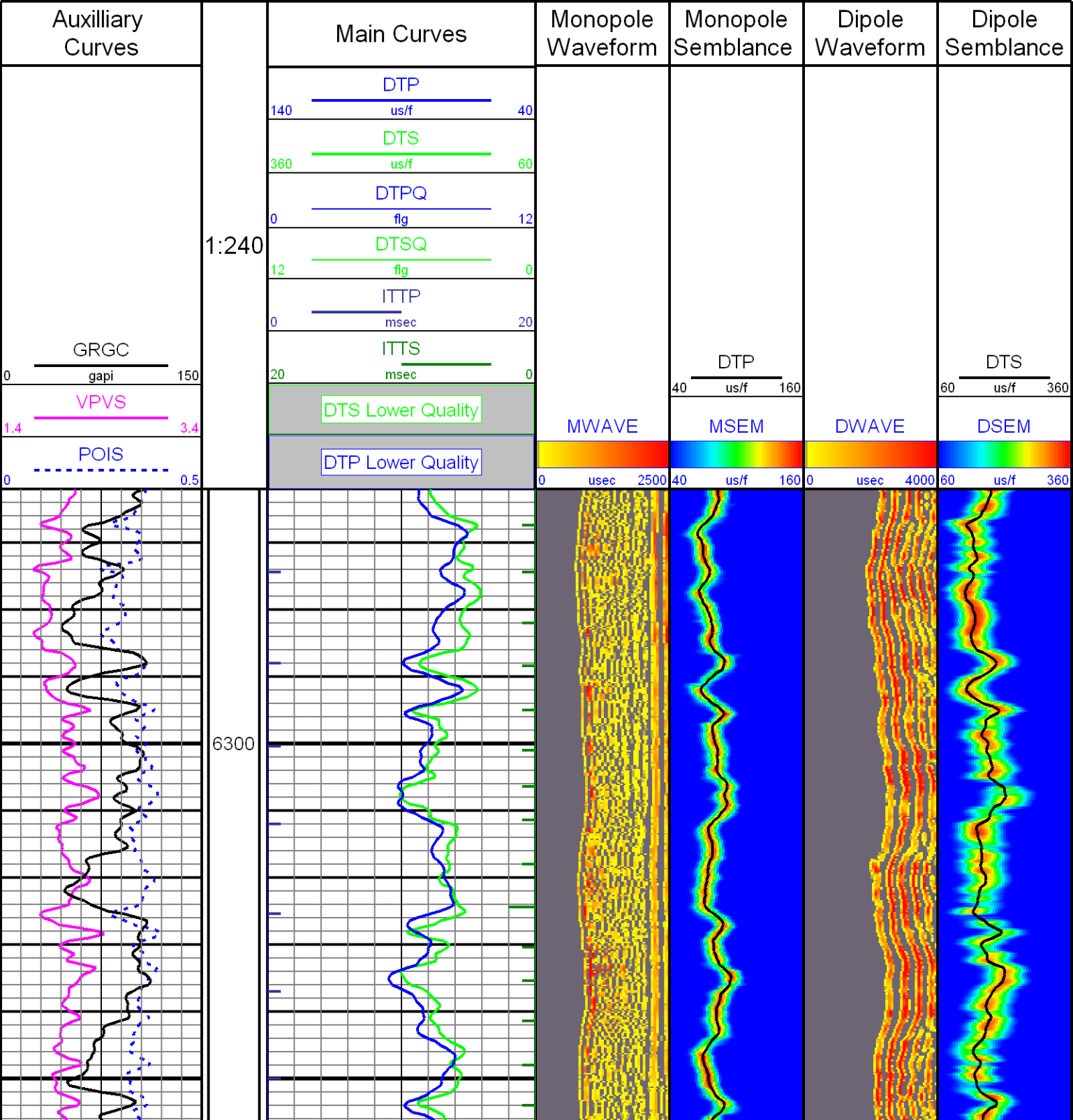
ANALYST: N. Harris  
PROGRAM: ADA v7.12

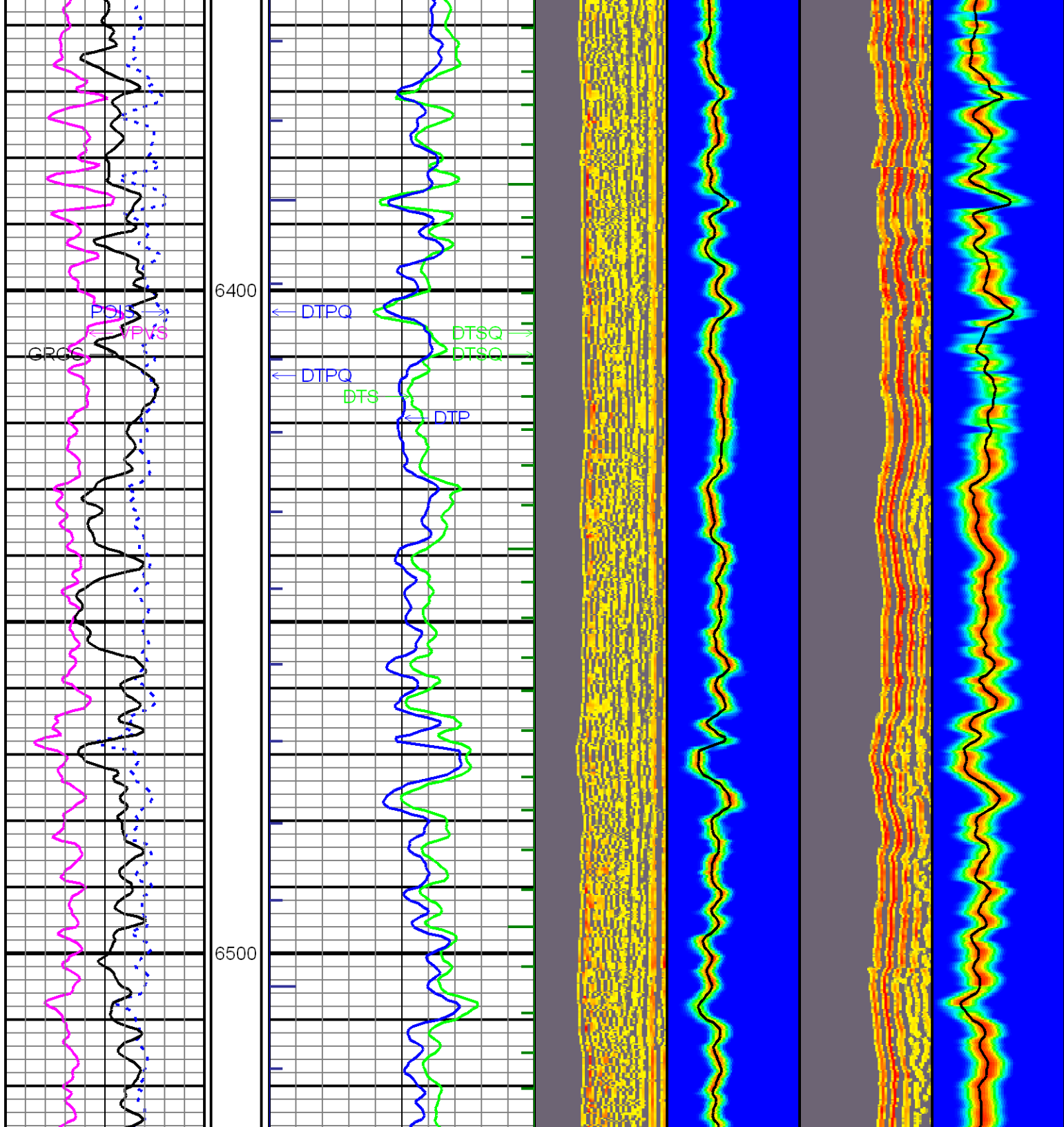
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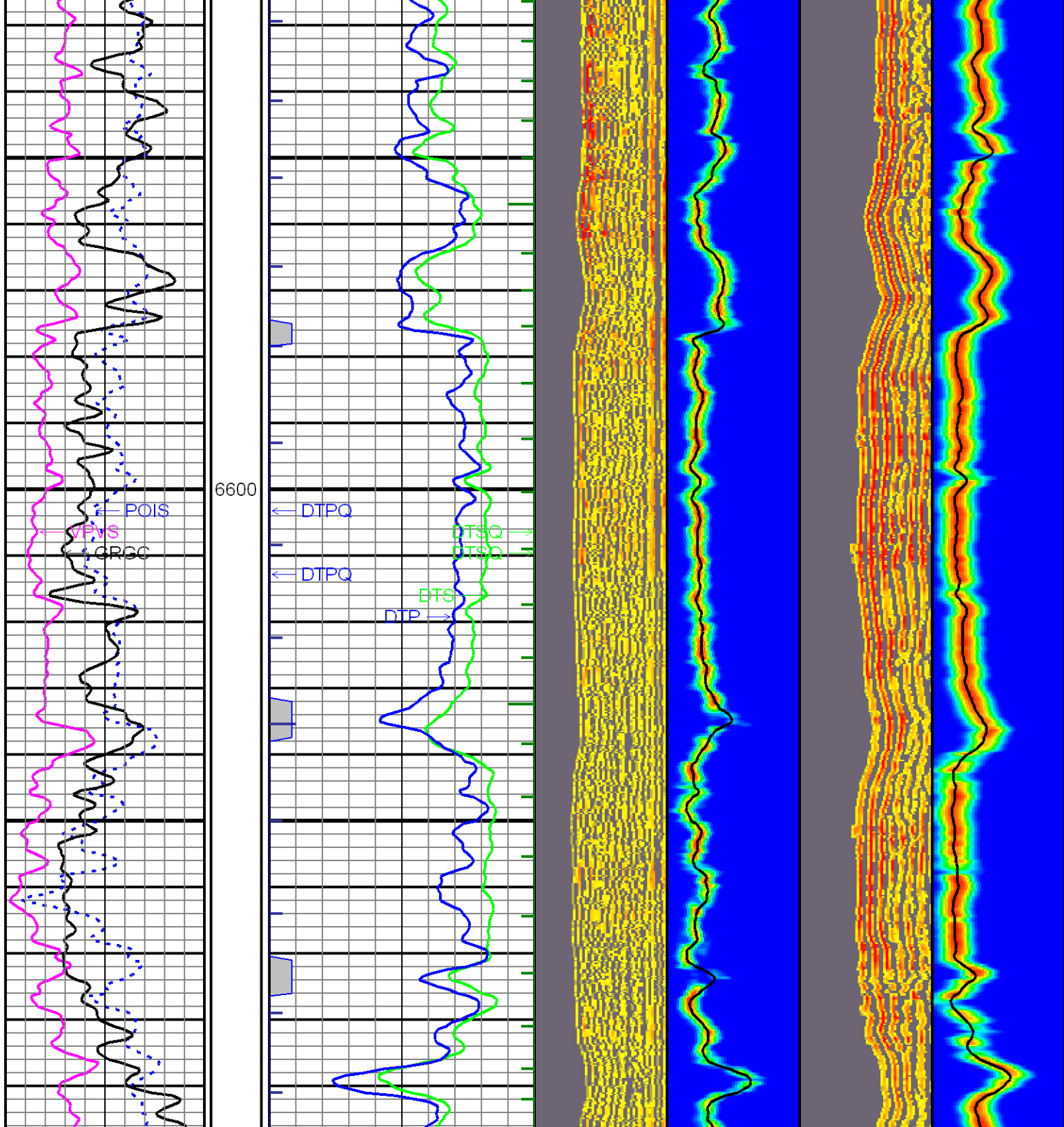
ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER  
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SCHEDULE.

WEATHERFORD INTERNATIONAL, LTD.

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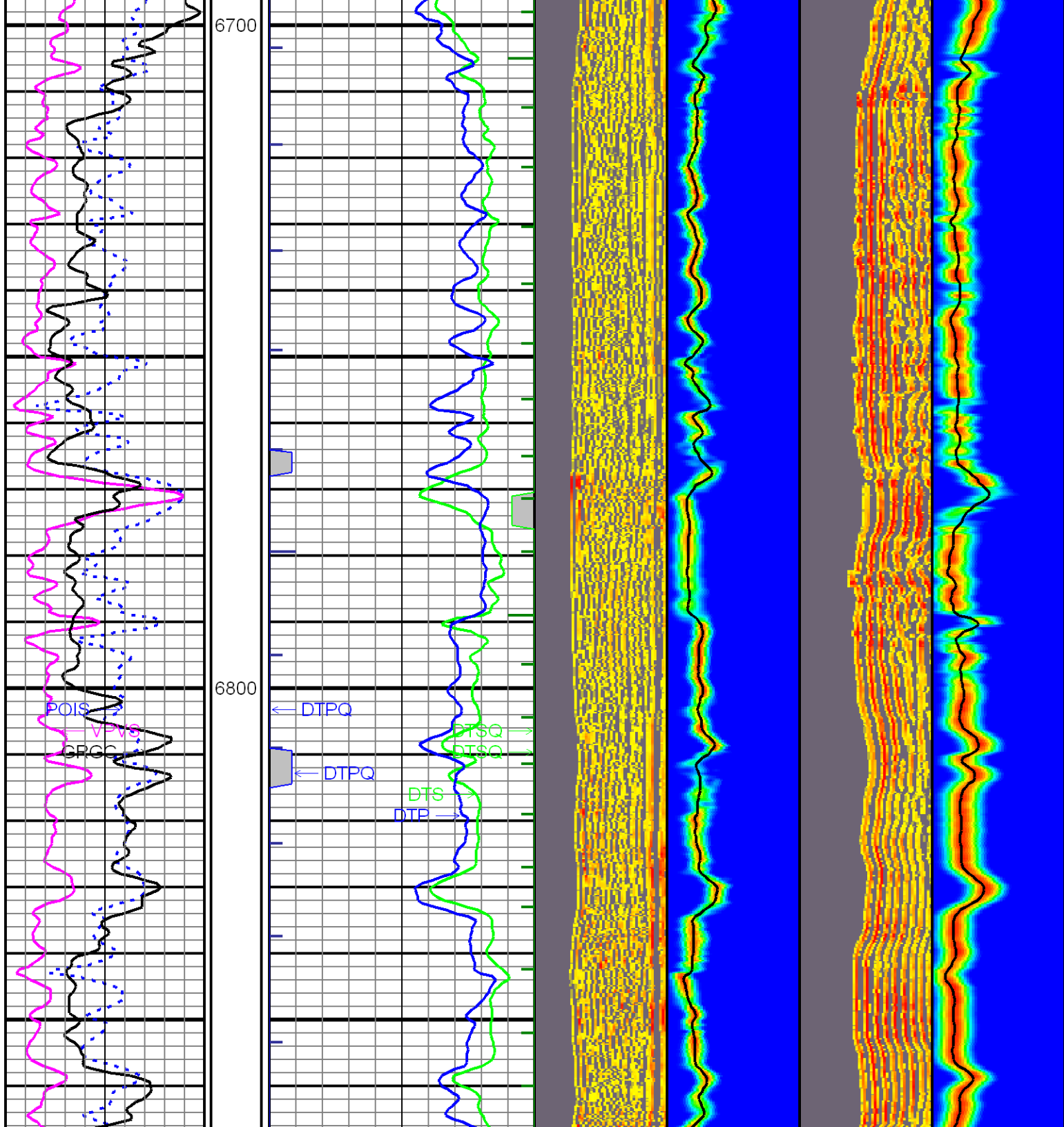
POIS  
VVS  
GRGC

← DTPQ

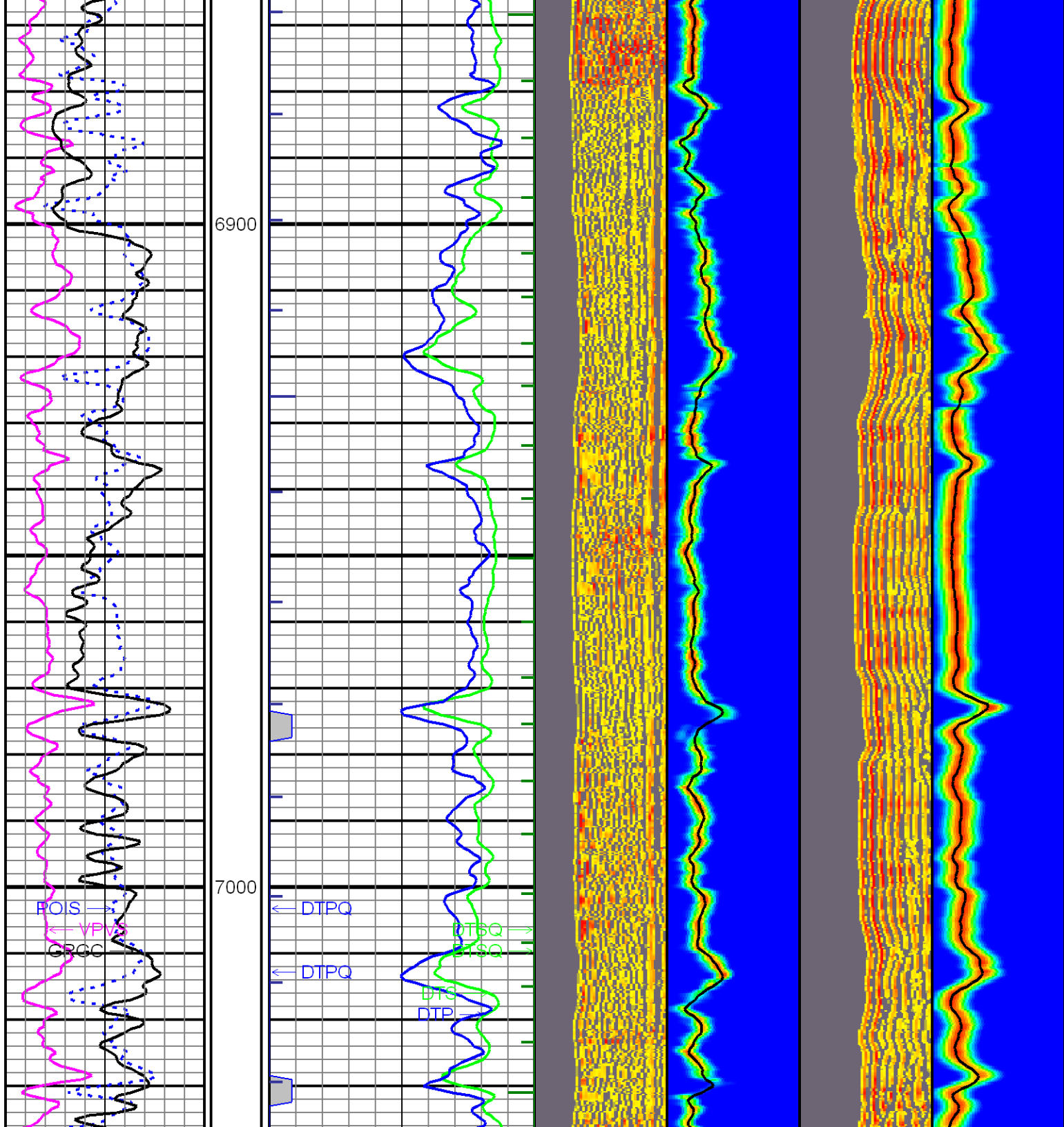
← DTPQ

DTS  
DTP →

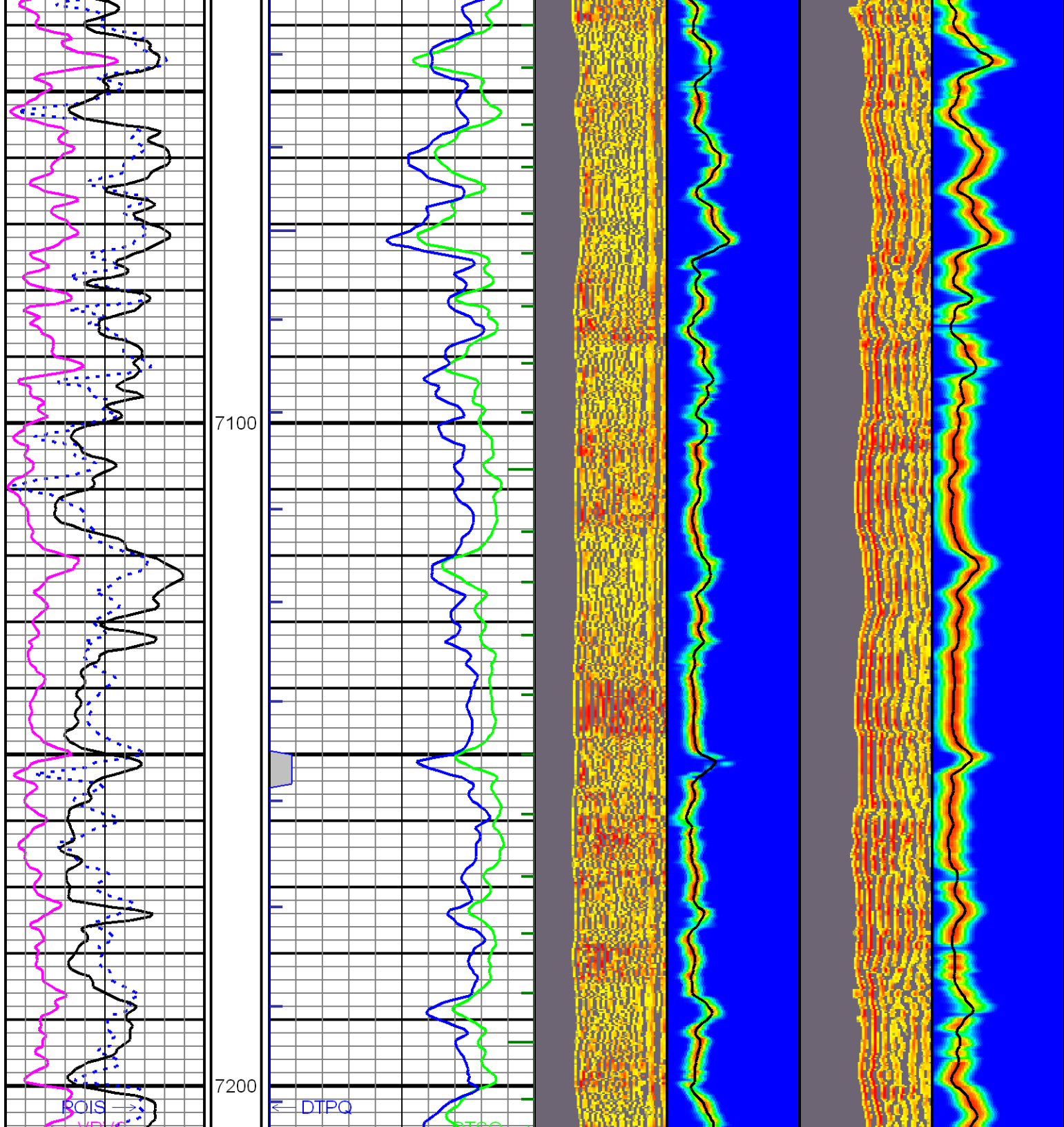
DTSQ →  
DTSQ →

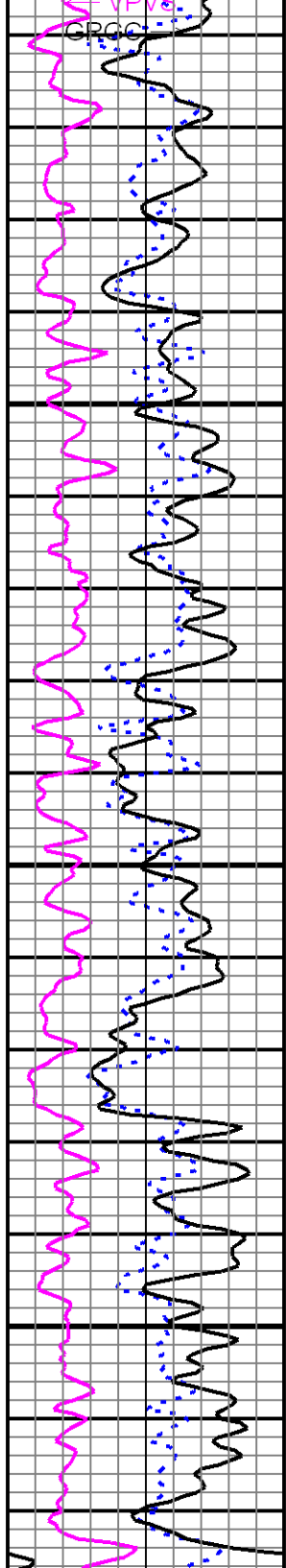




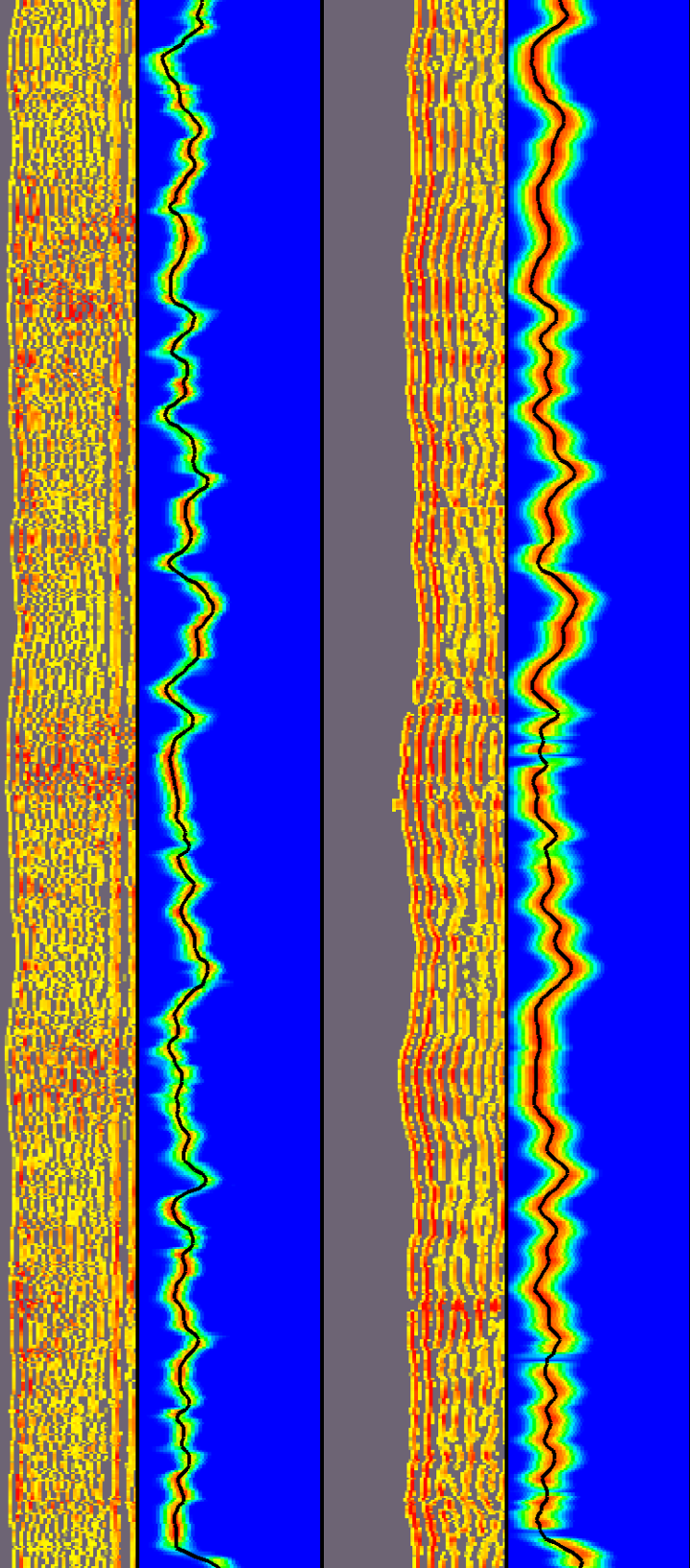
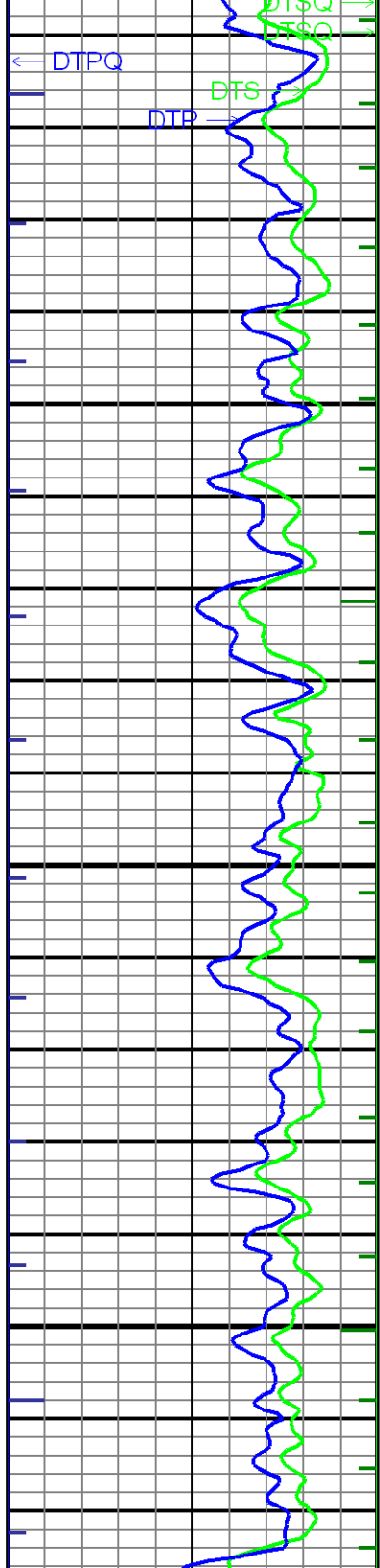


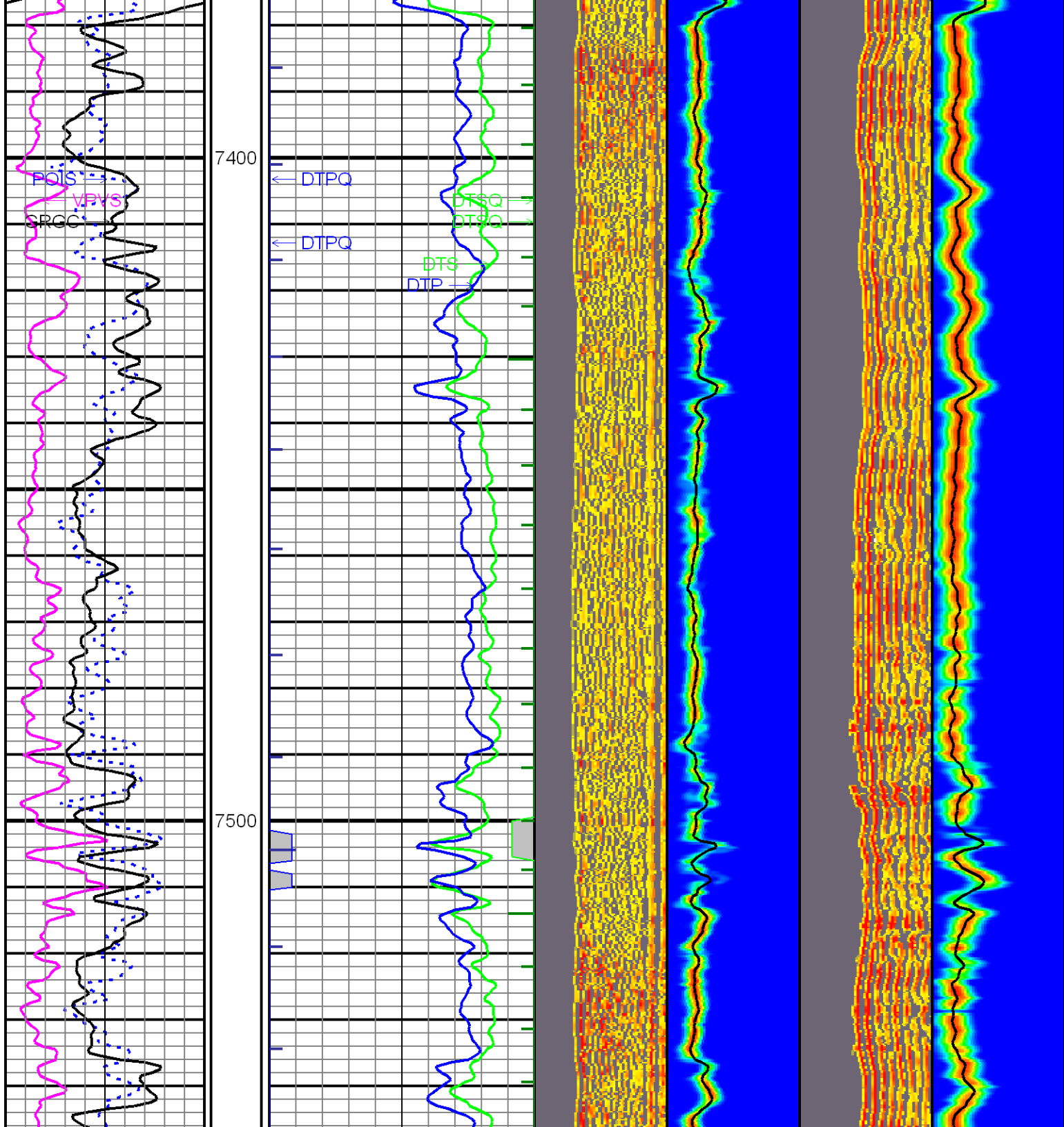


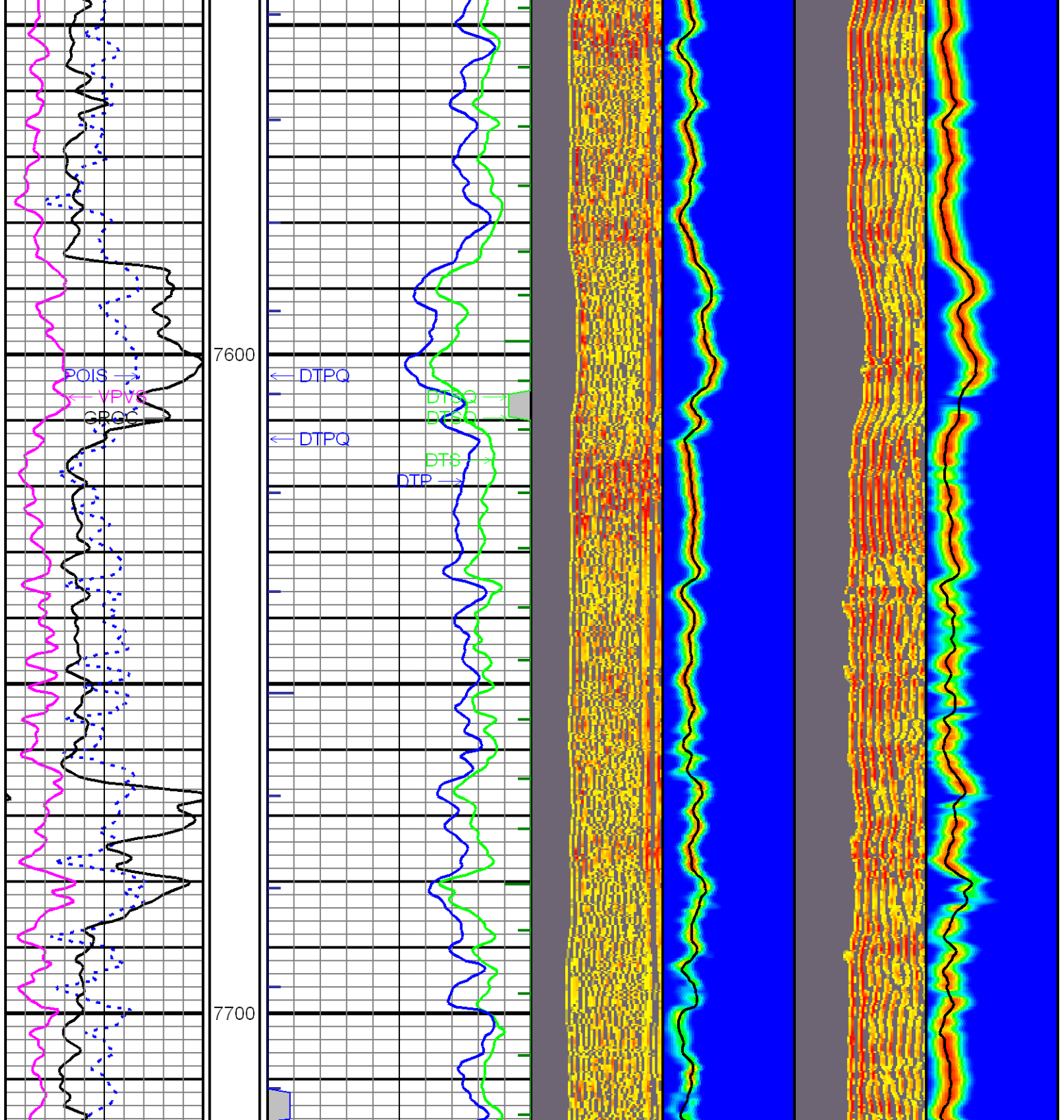


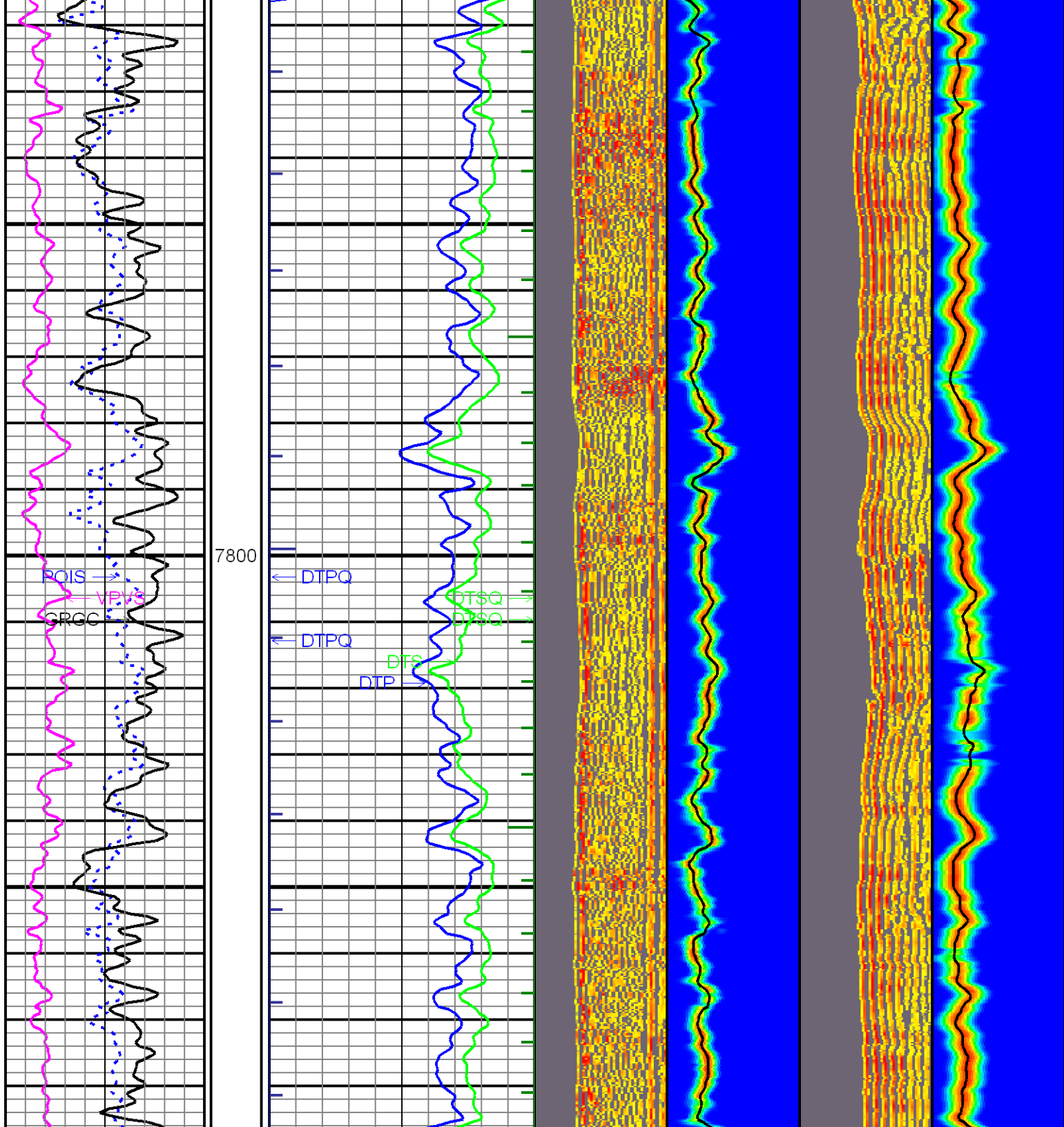


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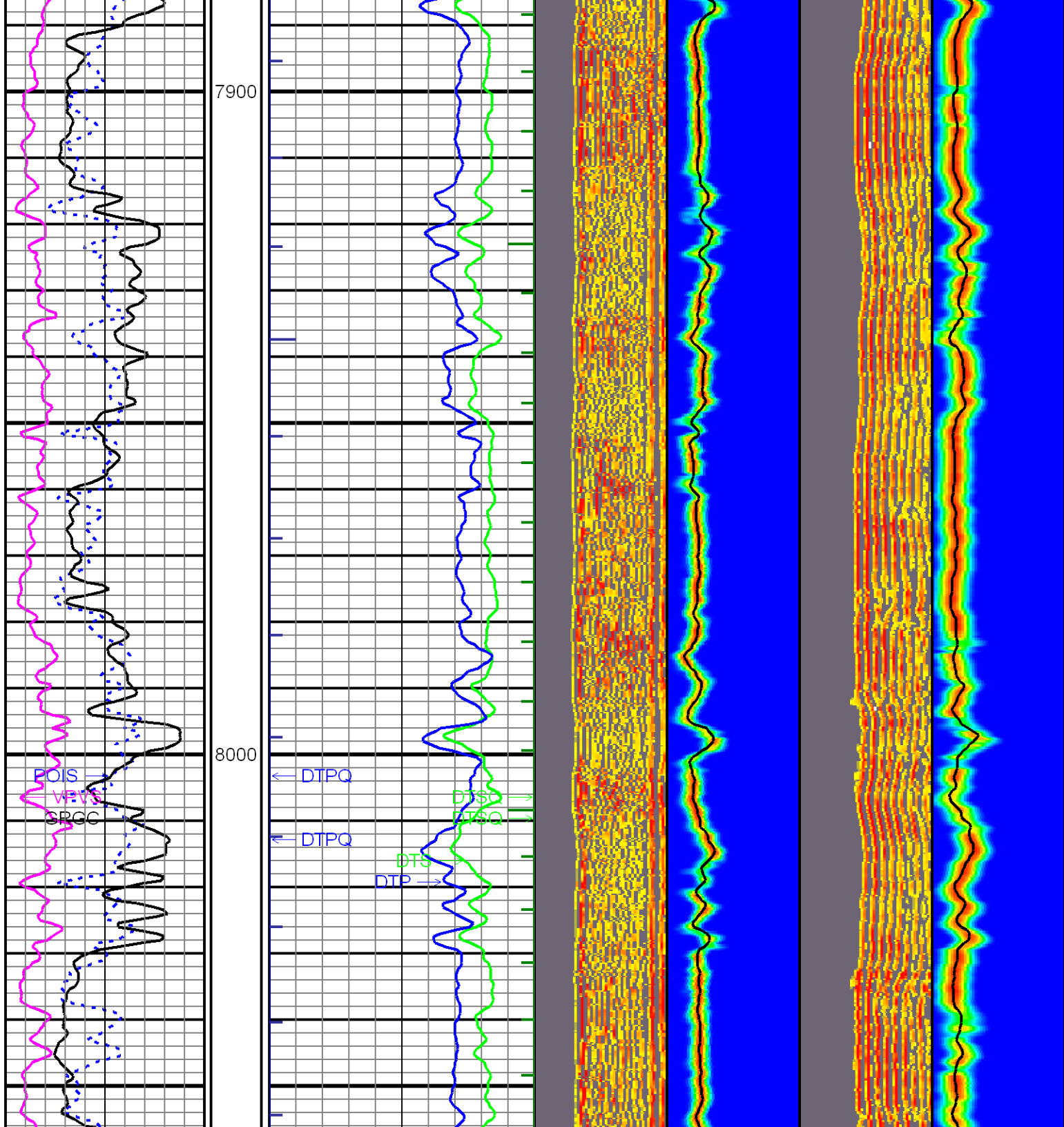


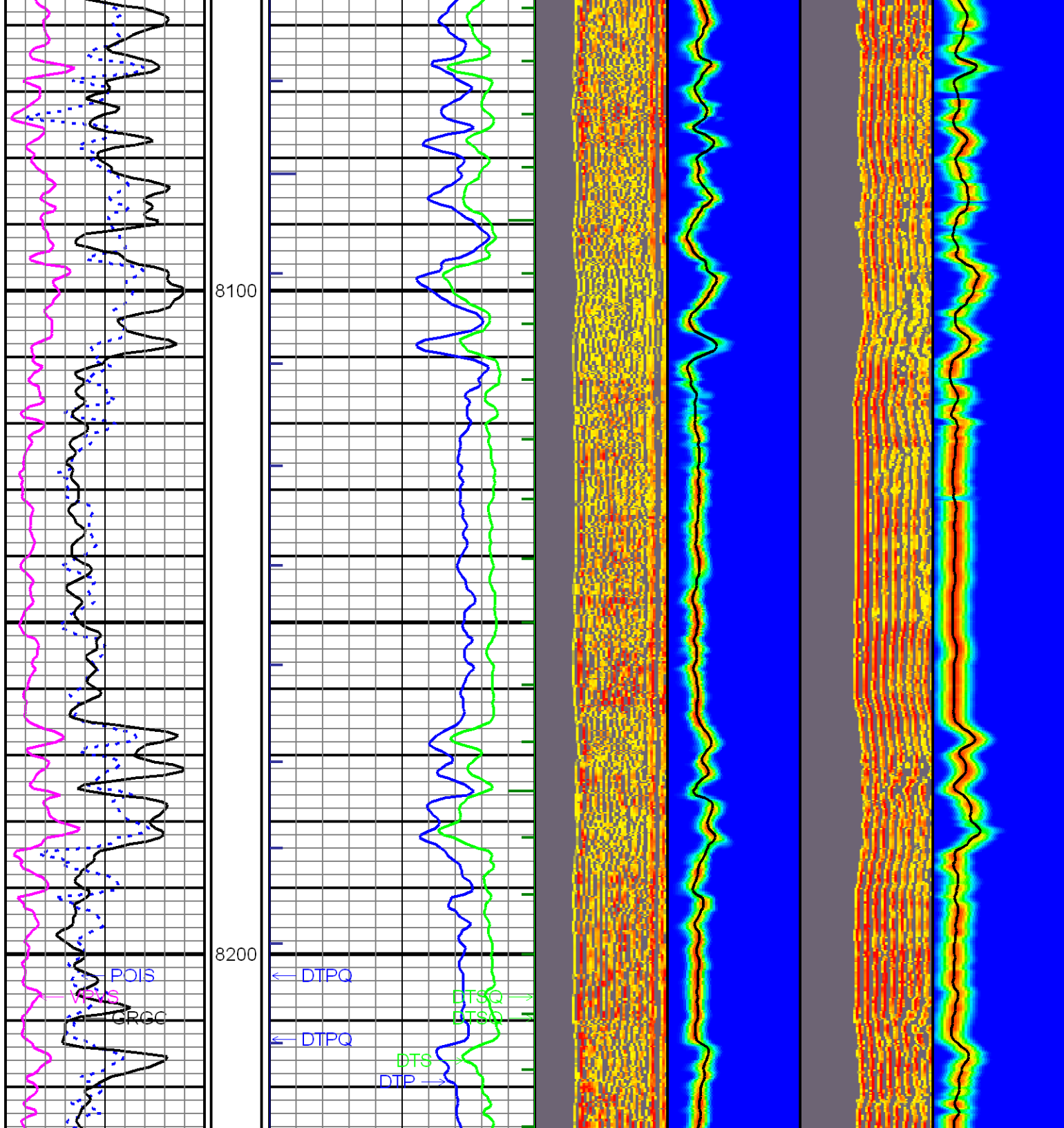




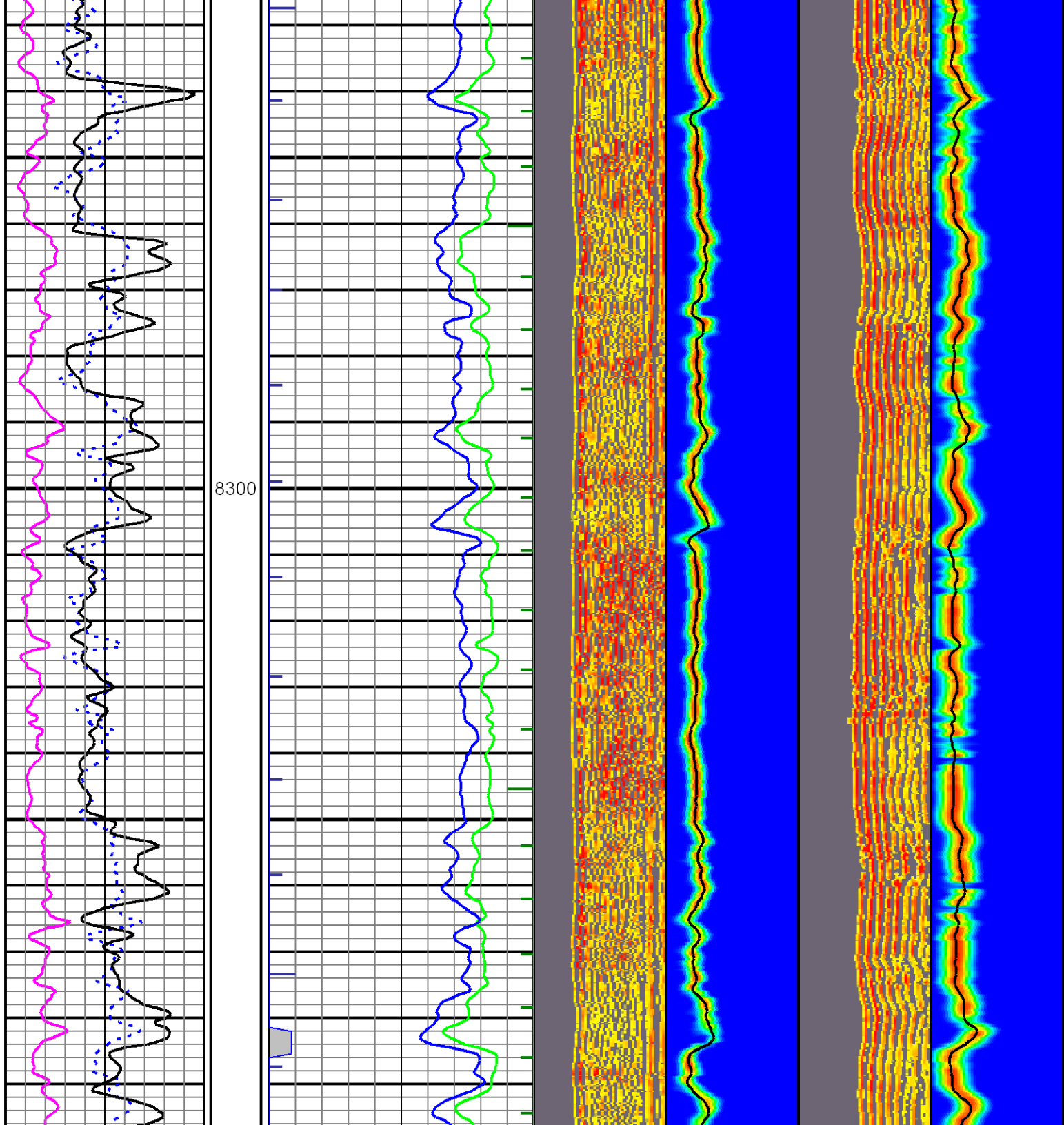


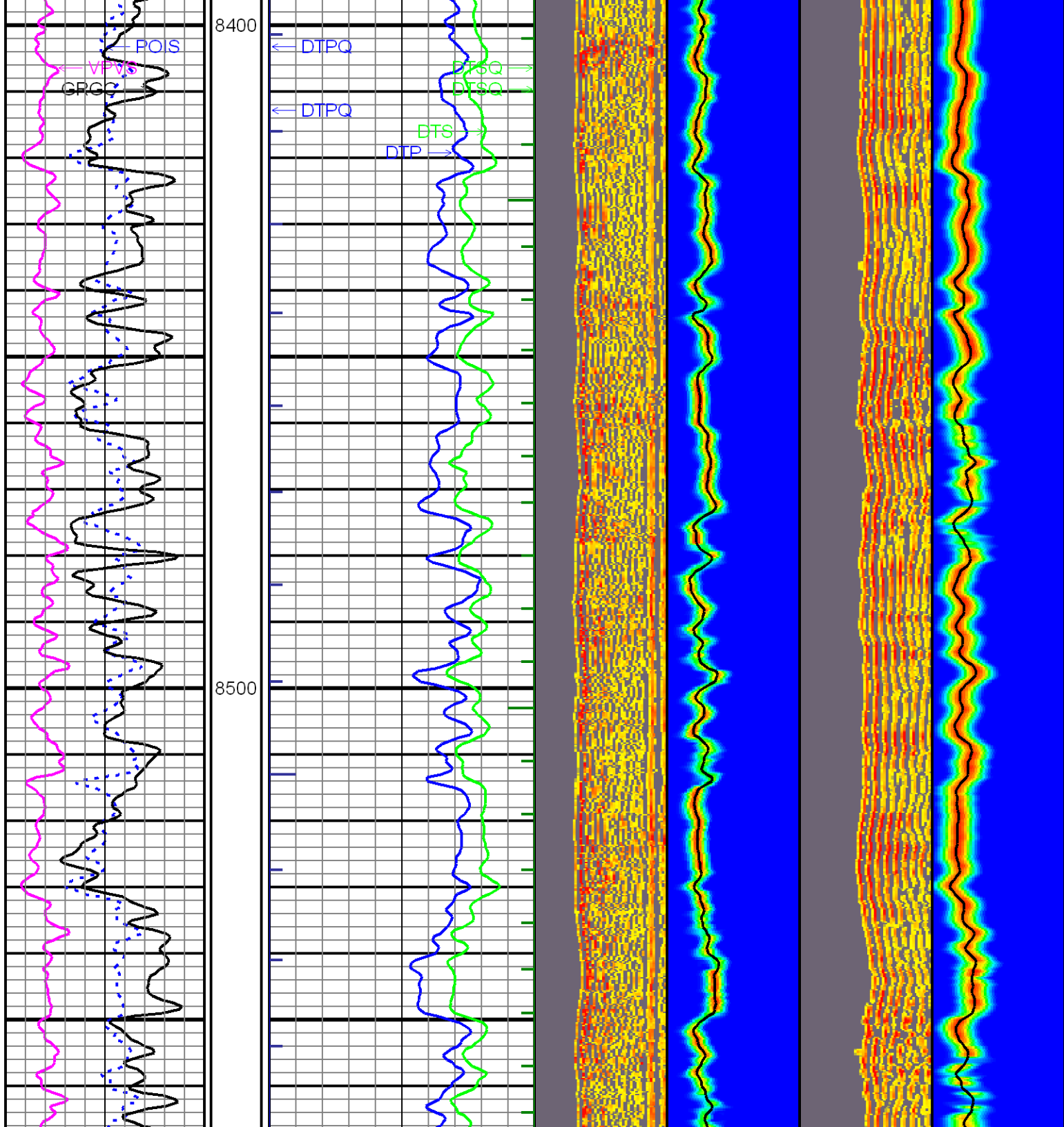


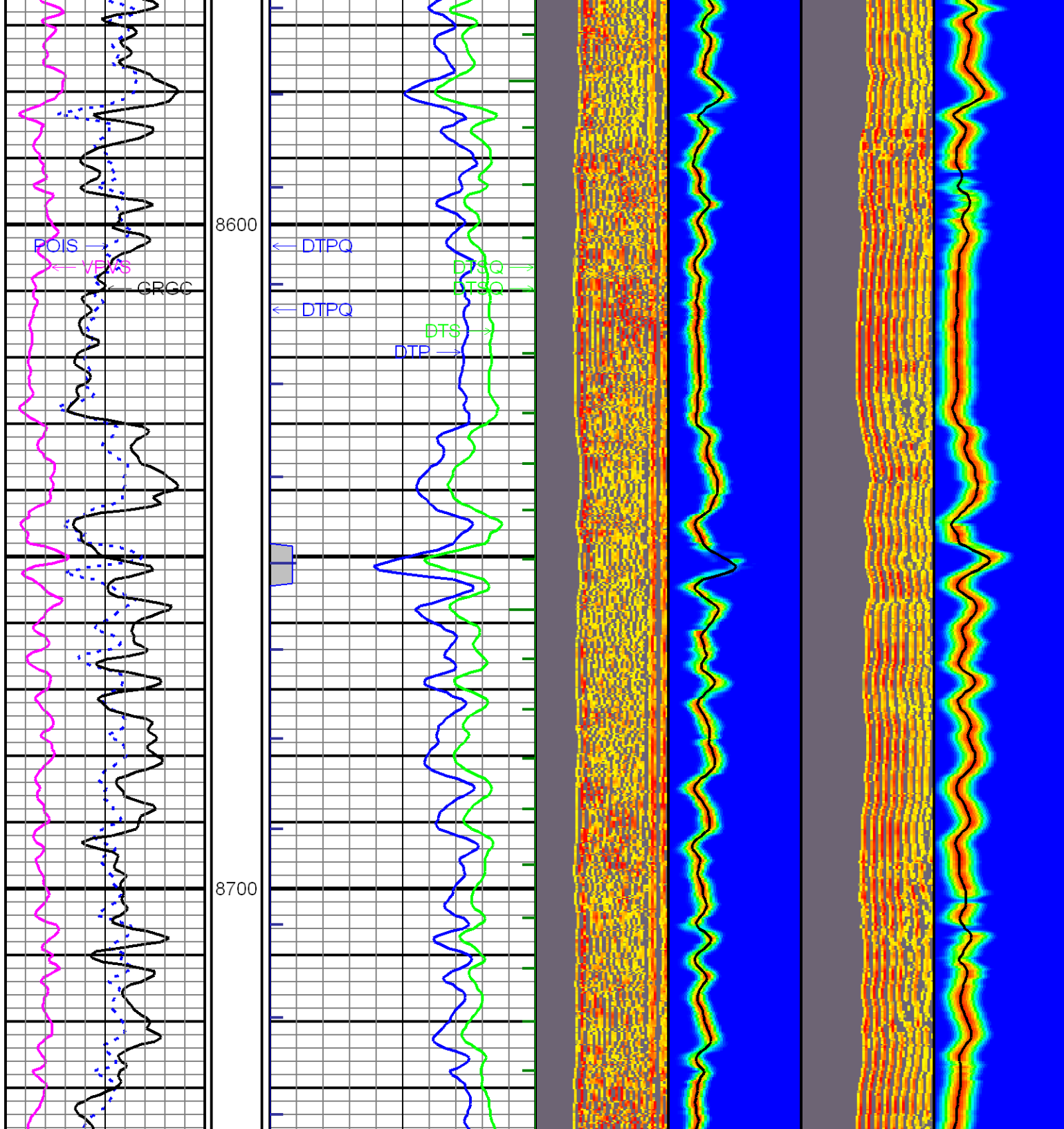


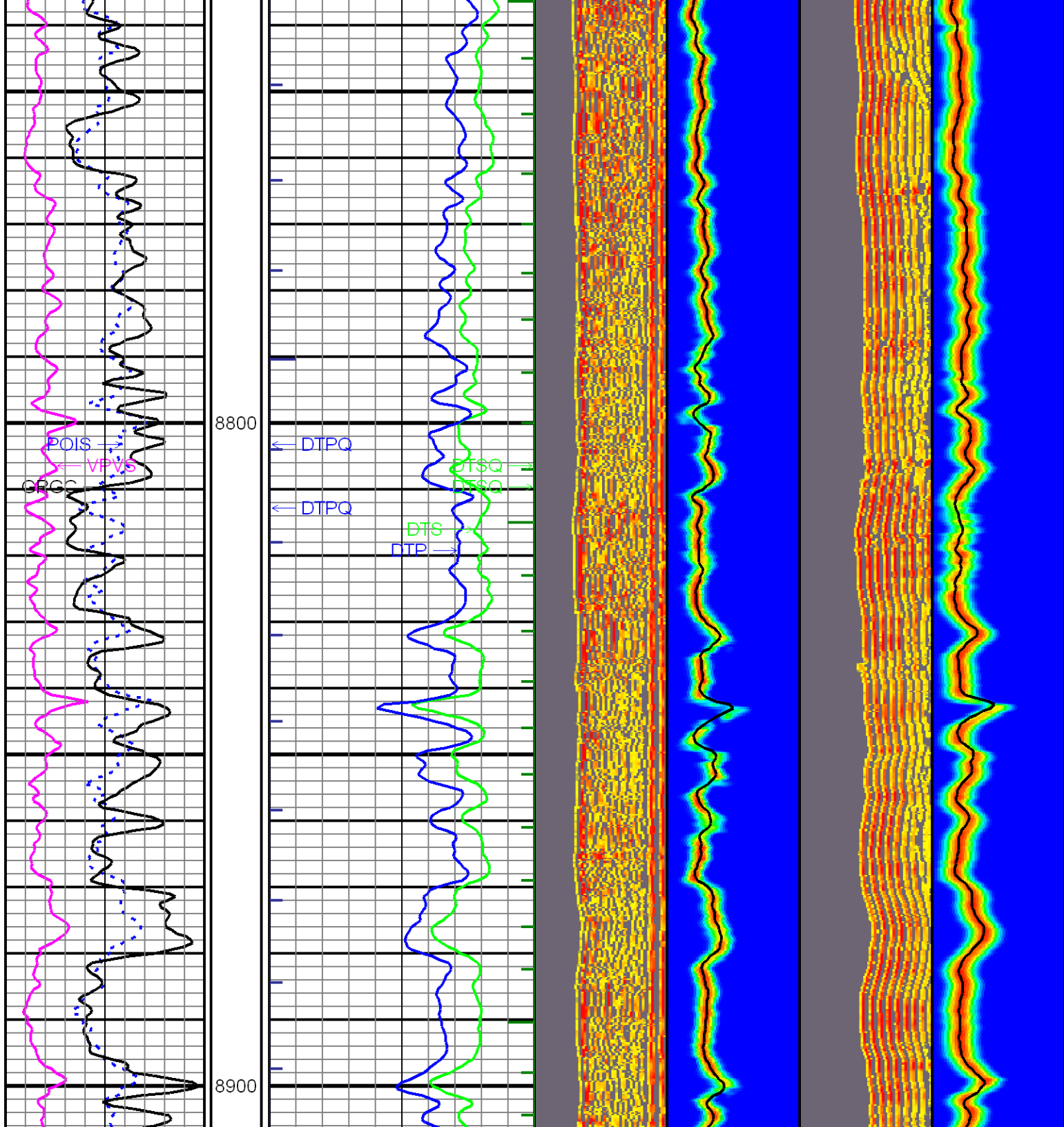


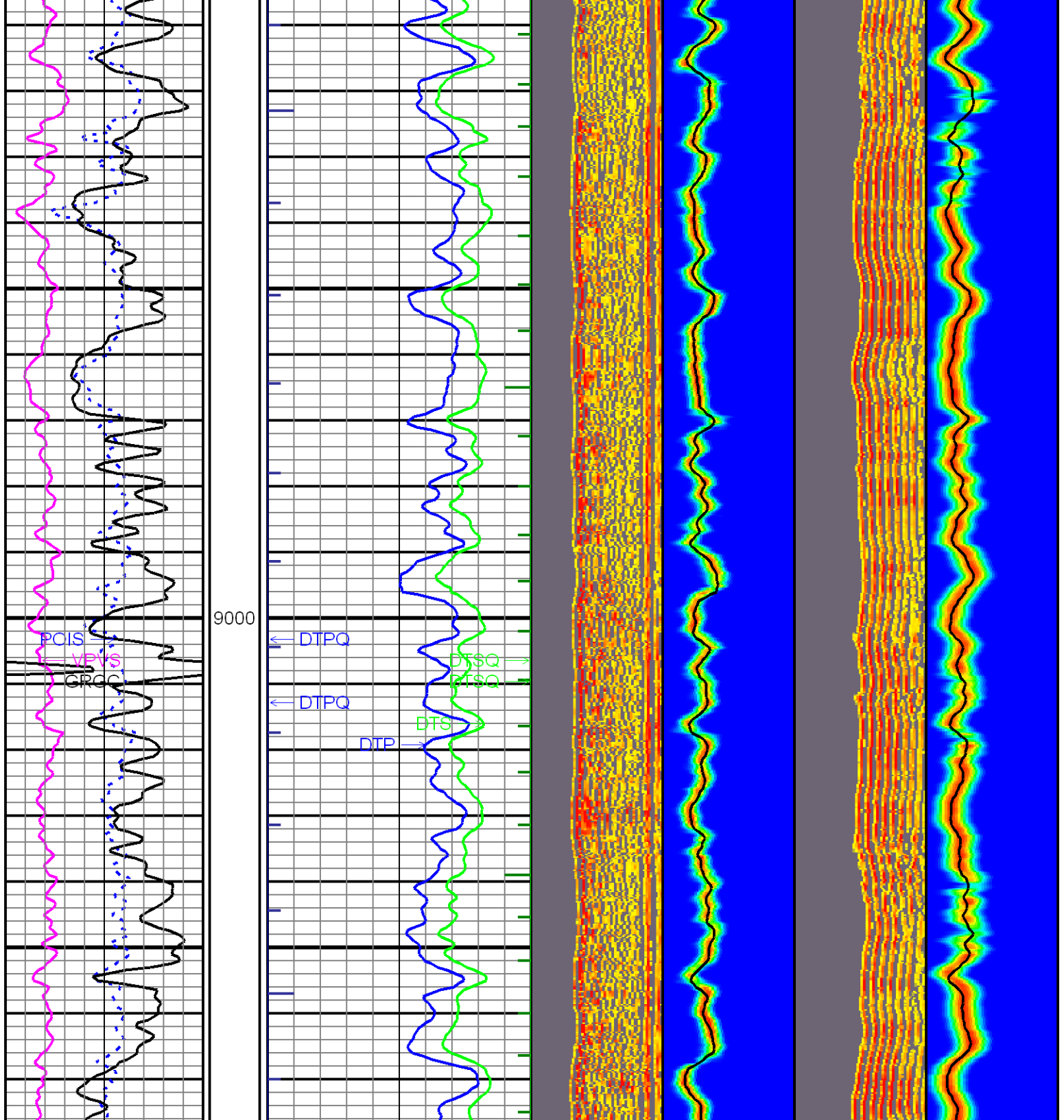




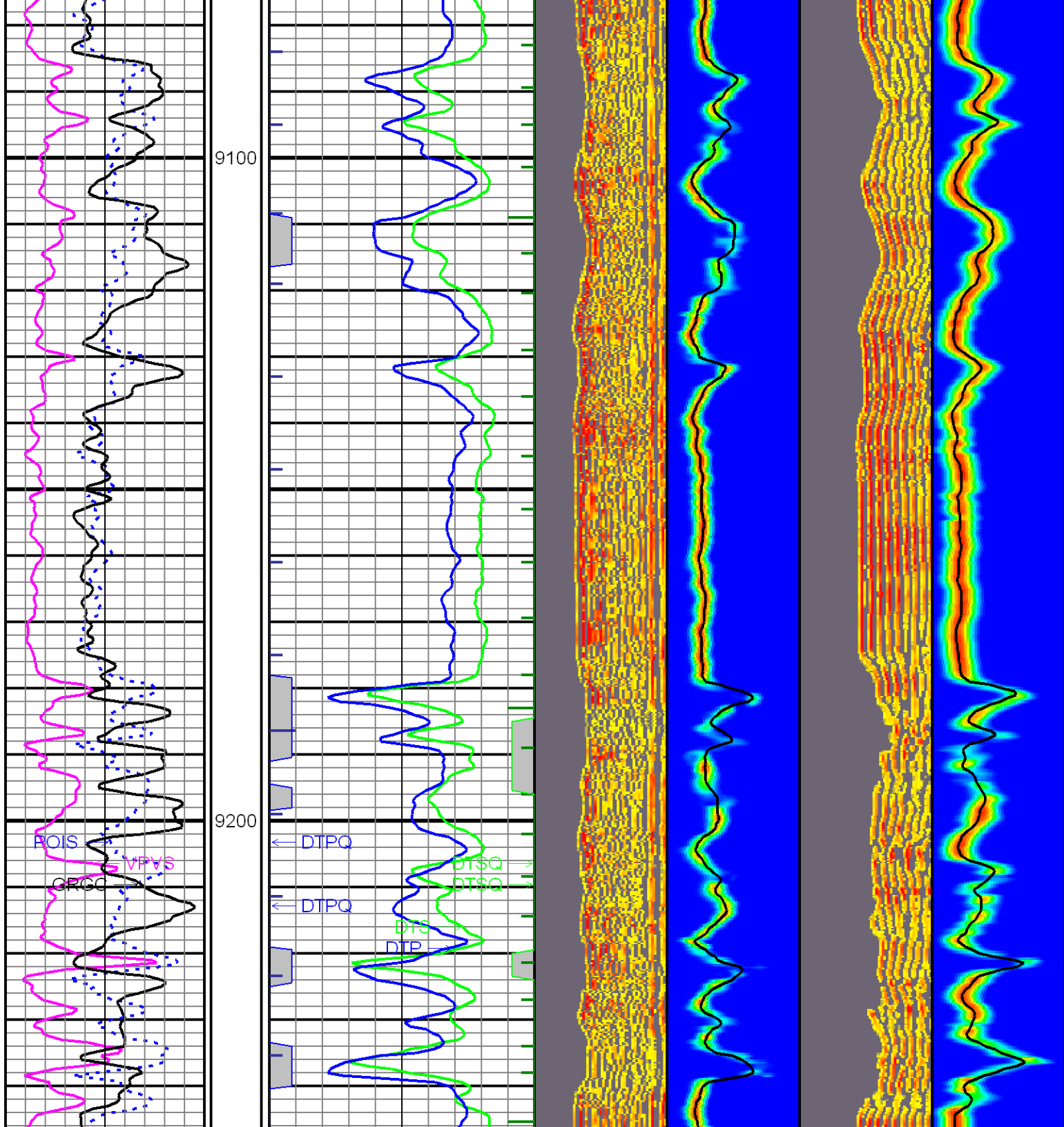


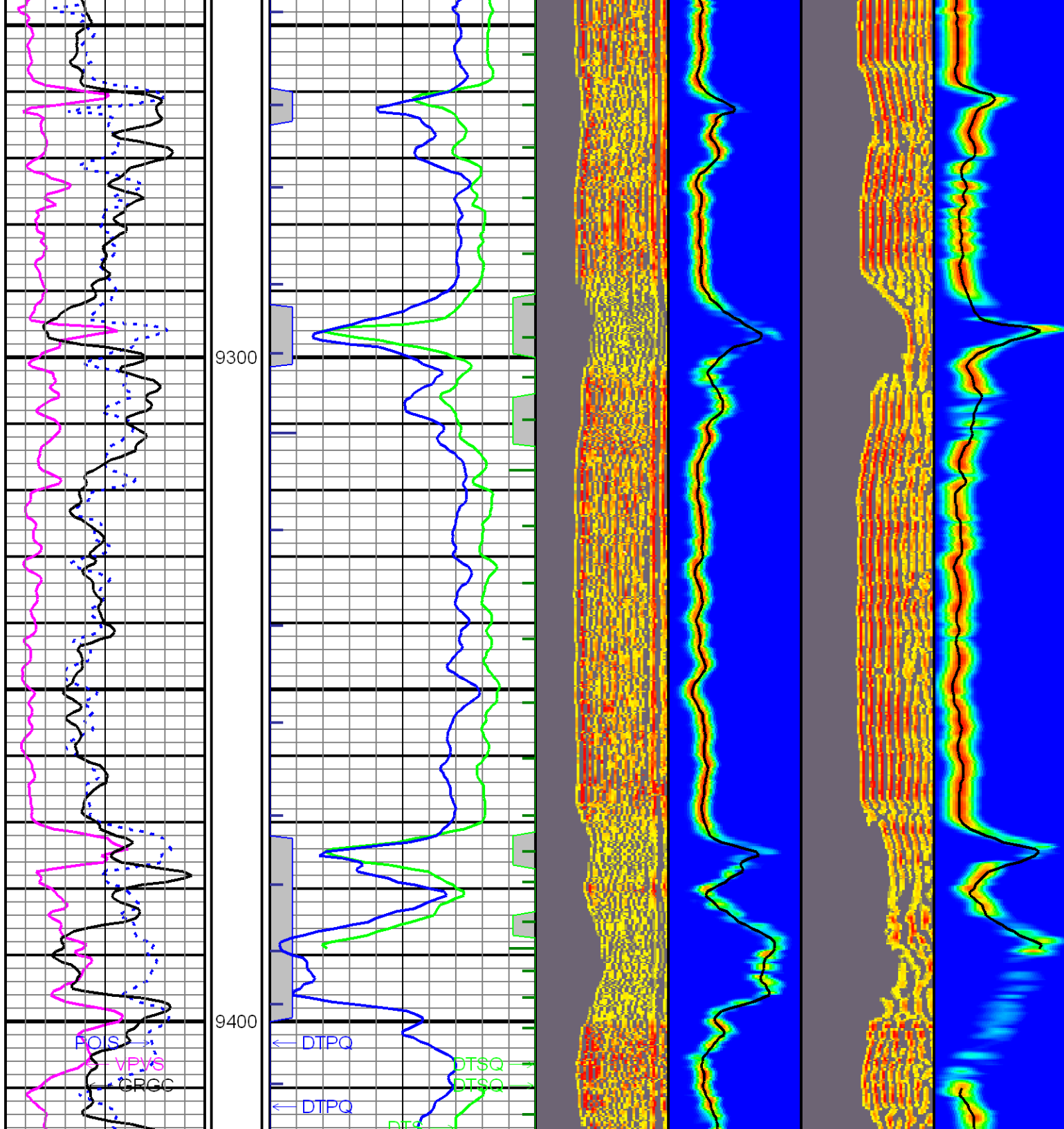




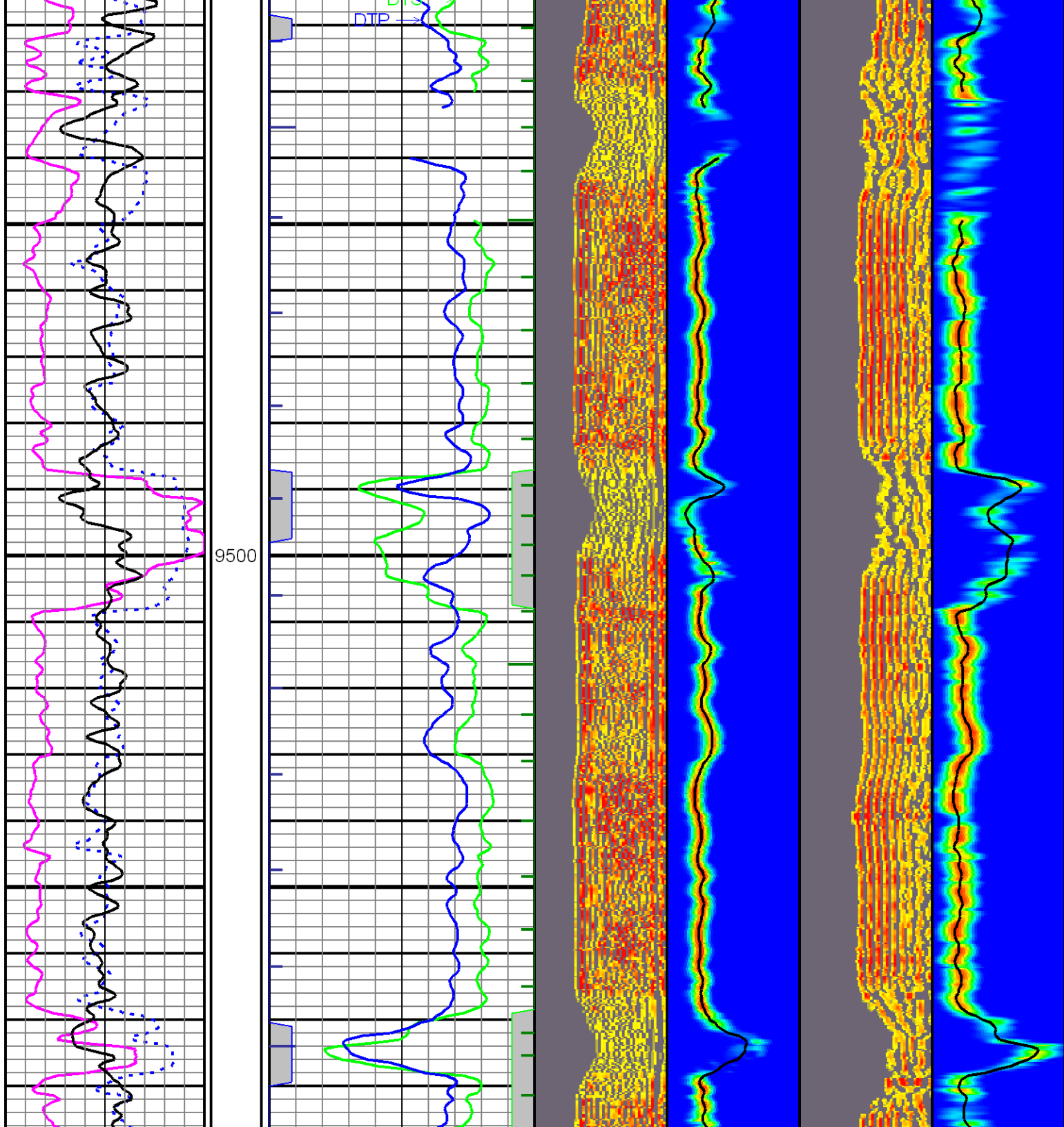


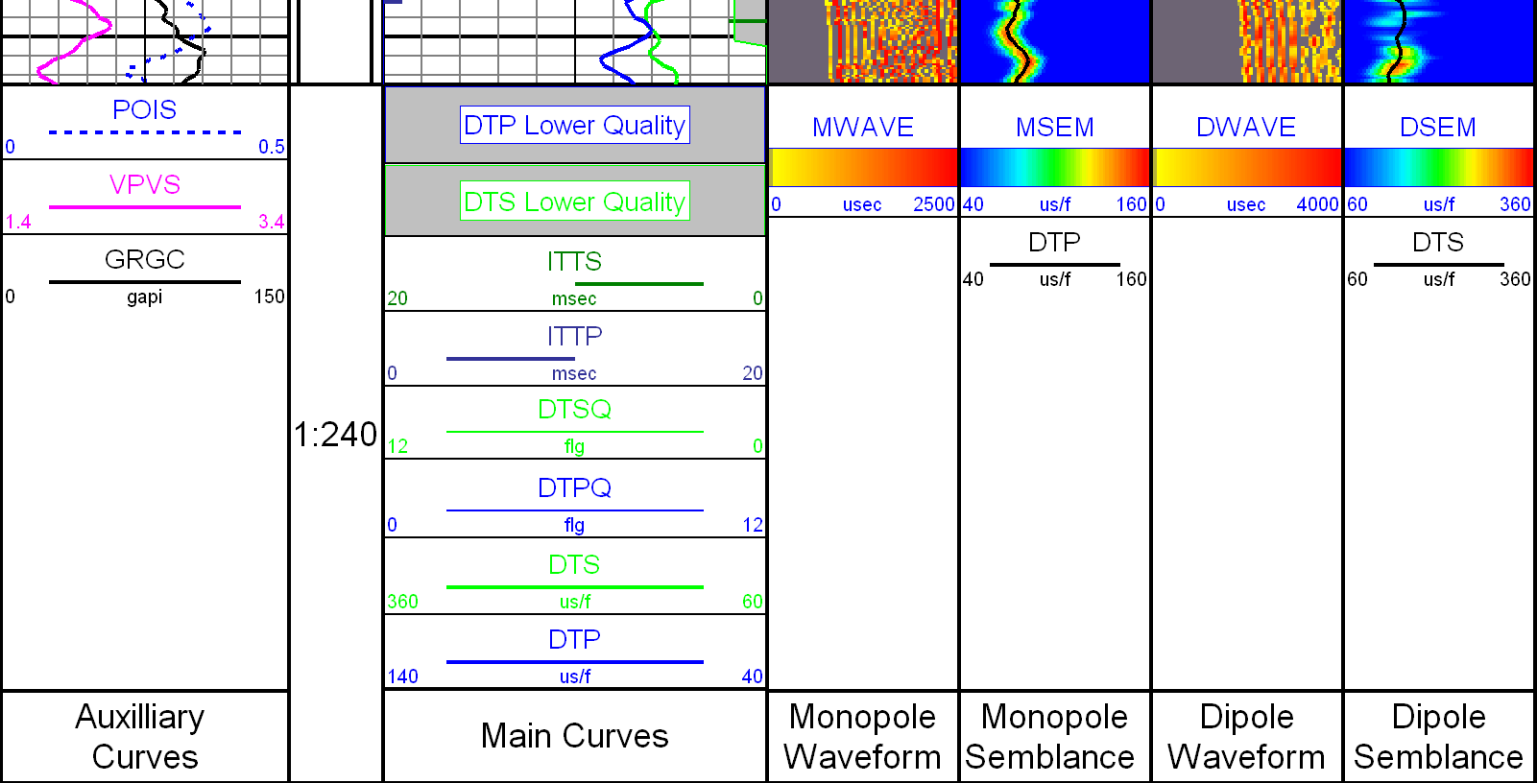












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WELL:  
FIELD:  
COUNTY:  
STATE:

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596-31C-26  
GRAND VALLEY  
GARFIELD  
COLORADO



**Weatherford®**

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