**HALLIBURTON** | Sperry Drilling

# AGR Azimuthal Gamma Ray
# XBAT Bi-Modal Acoustic
# EWR-M5

Powered by INSITE™

**1 : 500**

| | |
|---|---|
| Country | : Japan |
| Field | : Nankai Trough |
| Location | : Lat: 33° 18' 3.04" North<br>Long: 136° 38' 12.17" East |
| Well | : C0002P |
| Company | : JAMSTEC |
| Rig | : CHIKYU |

Company : **JAMSTEC**
Rig : **CHIKYU**
Well : **C0002P**
Field : **Nankai Trough**
Country : **Japan**
DOE Number :

LOCATION

Latitude : **33° 18' 3.04" North**
Longitude : **136° 38' 12.17" East**

UTM Easting = 652382.4 m
UTM Northing = 3685834.6 m

Other Services
**Directional Drilling**
**DDSr Drillstring Dynamics**

Permanent Datum : **Mean Sea Level** Elevation : **0.00 m**
Log Measured From : **Drill Floor** **28.50 m** Above Permanent Datum
Drilling Measured From : **Drill Floor**

TVDss LOG

Elev. KB **0.00 m**
DF **28.50 m**
GL **0.00 m**
WD **1939.00 m**

Depth Logged : **4,156.11 m** To **4,995.59 m**
Date Logged : **26-Dec-13** To **02-Jan-14**
Total Depth MD : **5,026.00 m** TVD : **5,024.09 m**
Spud Date : **11-Oct-13**

Unit No. : **0003501** Job No. : **JP-XX-0900526576**
Plot Type : **Final**
Plot Date : **11-Jan-14**

| Run No. | Borehole Record (TVDss) Size | From | To |
|---|---|---|---|
| 4 | 12.250 in | 4,156.11 m | 4,995.59 m |

| Run No. | Borehole Record (TVDss) Size | From | To |
|---|---|---|---|
| | | | |

| Casing Record (TVDss) Size | Weight | From | To |
|---|---|---|---|
| 36.000 in | 822.35 kgpm | 1,934.32 m | 1,992.50 m |
| 20.000 in | 192.39 kgpm | 1,934.32 m | 2,799.30 m |
| 13.375 in | 101.19 kgpm | 2,799.30 m | 3,874.39 m |

## WELL INFORMATION

| | |
|---|---|
| MWD Run Number | 400 |
| Date run completed | 02-Jan-14 |
| Rig Bit Number | 4 |
| Bit Size (in) | 12.250 |
| Tool Nominal OD (in) | 8.000 |
| Log Start Depth (TVD, m) | 4,184.611 |
| Log End Depth (TVD, m) | 5,024.093 |
| Drill or Wipe | Drill |
| Drill/Wipe Start Date and Time | 26-Dec-13 10:00 |
| Drill/Wipe End Date and Time | 31-Dec-13 00:15 |
| Min Inc (deg) @ Depth (TVD, m) | 1.40 @ 4,947.854 |
| Max Inc (deg) @ Depth (TVD, m) | 2.93 @ 4,152.405 |
| Bit TFA(cm2) / Bit Type | 6.8 / PDC |
| Flow Rate (m3pm) | 3.03 |
| Max AV (mps) / CV (mps) @ MWD | 1.3 / 3.1 |
| Fluid Type | Polymer |
| Density (ppg) / Viscosity (spl) | 10.68 / 107.81 |
| Filtrate CL (ppm) | 120,700.00 |
| pH / Fluid Loss (m3pm) | 11.10 / 0 |
| PV (mPsec) / YP (pa) | 44 / 27.29 |
| % Solids / % Sand | 14 / 0.2 |
| % Oil / Oil:Water Ratio | N/A / N/A |
| Rm @ Measured Temp (degC) | .110 @ 24.00 |
| Rmf @ Measured Temp (degC) | .080 @ 24.00 |
| Rmc @ Measured Temp (degC) | .140 @ 24.00 |
| Max Tool Temp (degC) / Source | 43.14 / HCIM |
| Rm @ Max Tool Temp (degC) | .0774 @ 43.14 |
| Lead MWD Engineer | Alex Munro |
| Customer Representative | Dr Moe |

# SENSOR INFORMATION

## Downhole Processor Information

| | | | | | |
|---|---|---|---|---|---|
| **Tool Type** | HCIM | | | | |
| **Software Version** | 88.56 | | | | |
| **Sub Serial Number** | 11952679 | | | | |
| **Insert Serial Number** | 11790865 | | | | |
| **Date and Time Initialized** | 26-Dec-13 16:50 | | | | |
| **Date and Time Read** | 02-Jan-14 05:24 | | | | |
| **ECMB SW Version** | N/A | | | | |

## Directional Sensor Information

| | | | | | |
|---|---|---|---|---|---|
| **Tool Type** | PCDC | | | | |
| **Distance From Bit (m)** | 31.450 | | | | |
| **Software Version** | 6.21 | | | | |
| **Sub Serial Number** | 11025002 | | | | |
| **Sonde Serial Number** | 11902126 | | | | |
| **Sensor ID Number** | N/A | | | | |
| **Toolface Offset (deg)** | 0 | | | | |

## Gamma Ray Sensor Information

| | | | | | |
|---|---|---|---|---|---|
| **Tool Type** | AGR | | | | |
| **Distance From Bit (m)** | 16.230 | | | | |
| **Recorded Sample Period (sec)** | 10 | | | | |
| **Software Version** | 9.23 | | | | |
| **Sub Serial Number** | 11952679 | | | | |
| **Insert/Sonde Serial Number** | 239879 | | | | |

## Resistivity Sensor Information

| | | | | | |
|---|---|---|---|---|---|
| **Tool Type** | EWR-M5 | | | | |
| **Distance From Bit (m)** | 19.030 | | | | |
| **Recorded Sample Period (sec)** | 12 | | | | |
| **Software Version** | 1.56 | | | | |
| **Sub Serial Number** | 11952679 | | | | |
| **Receiver Insert Serial Number** | 208050 | | | | |
| **Transmitter Insert Serial Number** | 239879 | | | | |
| **Receiver Orientation** | Down | | | | |

## Sonic Sensor Information

| | | | | | |
|---|---|---|---|---|---|
| **Tool Type** | XBAT | | | | |
| **Distance From Bit (m)** | 26.84 | | | | |
| **Recorded Sample Period (sec)** | 20 | | | | |
| **Sub Serial Number** | N/A | | | | |
| **Receiver Insert Serial Number** | 12108405 | | | | |
| **Transmitter Insert Serial Number** | 11215811 | | | | |
| **MIT File** | 4:M11_D5 | | | | |
| **Config File** | N/A | | | | |
| **Real-Time Window (us/m)** | N/A - N/A | | | | |
| **Battery Insert Serial Number** | 11816955 | | | | |
| **MCM Software Version** | N/A | | | | |
| **DAQ1/DAQ2 Software Version** | N/A / N/A | | | | |
| **DSM Software Version** | N/A | | | | |

## REMARKS

1. All depths are referenced to driller's pipe tally. No correction has been made for pipe stretch or squat.

2. Curve Mnemonice used are:

   ROPA : Smoothed Avg Rate of Penetration, m/h
   AGRCC : Smoothed AGR Comb Gamma Ray BCorr ( K+ and Borehole corrected), api
   MAGNQC : Smoothed AGR North Quad GR BCorr ( K+ and Borehole Corrected), api
   MAGEQC : Smoothed AGR East Quad GR BCorr ( K+ and Borehole Corrected), api
   MAGSQC : Smoothed AGR South Quad GR BCorr ( K+ and Borehole Corrected), api
   MAGWQC : Smoothed AGR West Quad GR BCorr ( K+ and Borehole Corrected), api
   RH16PC : Smoothed 16in 2 MHz Phase Resistivity BC, ohmm
   RH24PC : Smoothed 24in 2 MHz Phase Resistivity BC, ohmm
   RH32PC : Smoothed 32in 2 MHz Phase Resistivity BC, ohmm
   RH40PC : Smoothed 40in 2 MHz Phase Resistivity BC, ohmm
   RH48PC : Smoothed 48in 2 MHz Phase Resistivity BC, ohmm
   AGRCCM : Smoothed AGR GR Azi Mag BCorr
   AGXT : Smoothed AGR Formation Exposure Time, hr

3. The following smoothing parameters have been applied to the data:
   Gamma Ray / Resistivity curves 0.1524m interval, 0.60960 coercion distance
   ROP 0.1524m interval, 0.60960 coercion distance

## WARRANTY

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## MWD RUN 400 - BHA

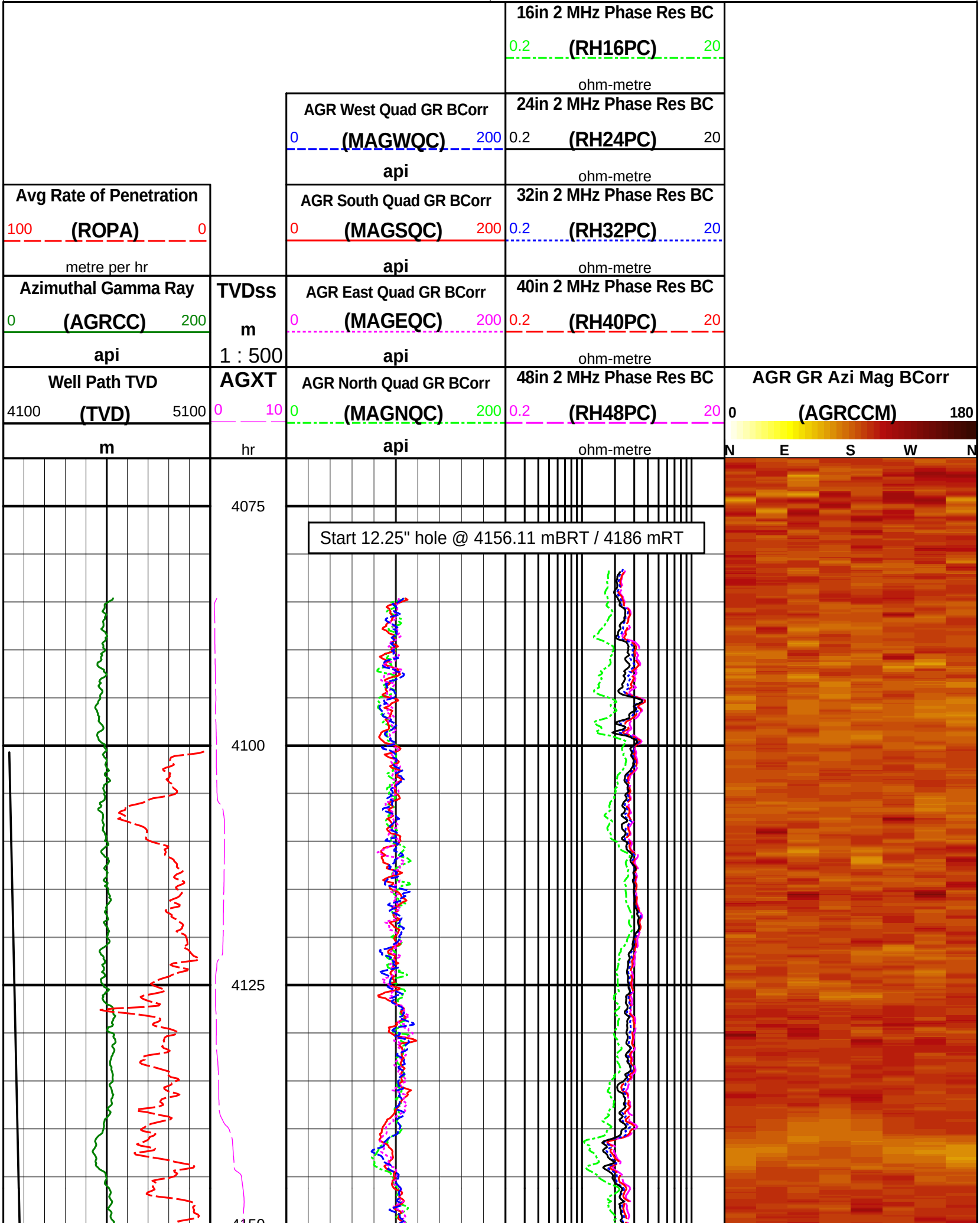
| | Component Length (m) | Cumulative Length (m) |
|---|---|---|
| | | 5251.15 |
| Drill Pipe 6.6250 in OD | 940.000 | |
| | | 4311.15 |
| Sub 8.5000 in OD | .800 | |

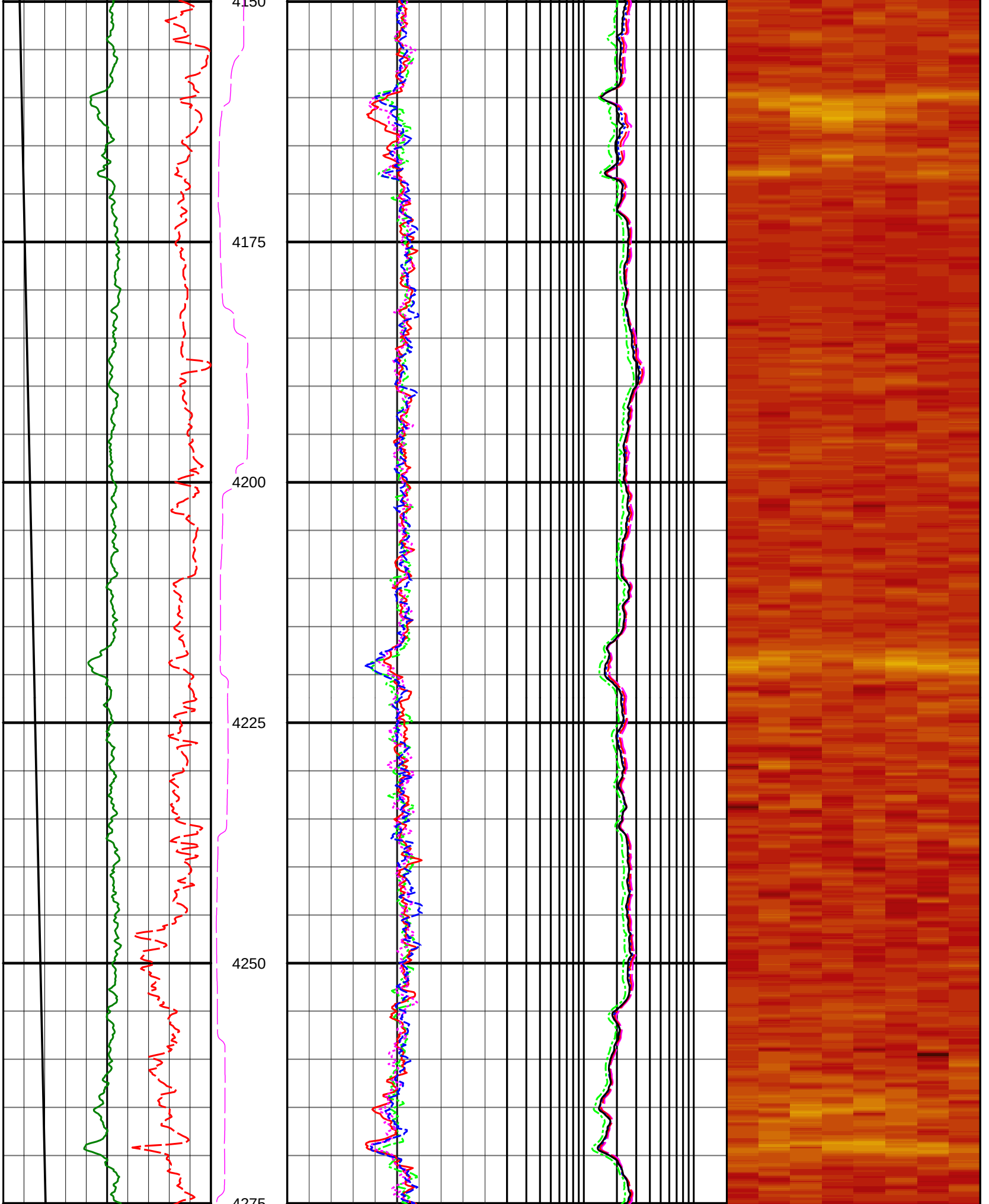
## MWD RUN 400 - MWD

| | Sensor Measure Point Distance To Bit (m) |
|---|---|
| MWD - Directional SN# 11902126 | 31.450 |

| | | |
|---|---|---|
| | | 4310.35 |
| Drill Pipe<br>5.5000 in OD | 902.400 | |
| | | 3407.95 |
| Sub<br>7.5000 in OD | .800 | |
| | | 3407.15 |
| Drill Pipe<br>5.5000 in OD | 789.600 | |
| | | 2617.55 |
| Drill Pipe<br>5.0000 in OD | 2,331.200 | |
| | | 286.35 |
| Sub<br>8.5000 in OD | .910 | |
| | | 285.44 |
| Drill Pipe<br>5.6800 in OD | 108.390 | |
| | | 177.05 |
| Sub<br>8.5000 in OD | .610 | |
| | | 176.44 |
| Collar<br>8.5000 in OD | 18.540 | |
| | | 157.90 |
| Jar<br>8.0000 in OD | 9.370 | |
| | | 148.53 |
| Collar<br>8.5000 in OD | 111.050 | |
| | | 37.48 |
| Collar<br>8.0000 in OD | 2.360 | |
| | | 35.12 |
| MWD<br>8.0000 in OD | 23.23 | |
| | | 11.89 |
| Stabilizer<br>8.5000 in OD | 1.680 | |
| | | 10.21 |
| Sub<br>8.0000 in OD | .680 | |
| | | 9.53 |
| Motor<br>9.6250 in OD | 9.190 | |
| | | 0.34 |
| Bit<br>7.7500 in OD | .340 | |

| | |
|---|---|
| MWD - Processor<br>SN# 10996871 | |
| MWD - Telemetry<br>SN# 10450009 | |
| MWD - Sonic<br>SN# 11816955 | |
| MWD - Processor | |
| MWD - Gamma Ray<br>SN# 239879 | 16.230 |
| MWD - Drilling<br>SN# 239879 | 16.020 |
| MWD - Drilling<br>SN# 239879 | 16.790 |
| MWD - Resistivity<br>SN# 208050 | 19.030 |
| MWD - Resistivity<br>SN# 11576832 | 13.790 |


16in 2 MHz Phase Res BC
0.2 (RH16PC) 20
ohm-metre
AGR West Quad GR BCorr
0 (MAGWQC) 200
api
24in 2 MHz Phase Res BC
0.2 (RH24PC) 20
ohm-metre
Avg Rate of Penetration
100 (ROPA) 0
metre per hr
AGR South Quad GR BCorr
0 (MAGSQC) 200
api
32in 2 MHz Phase Res BC
0.2 (RH32PC) 20
ohm-metre
Azimuthal Gamma Ray
0 (AGRCC) 200
api
TVDss
m
1 : 500
AGR East Quad GR BCorr
0 (MAGEQC) 200
api
40in 2 MHz Phase Res BC
0.2 (RH40PC) 20
ohm-metre
Well Path TVD
4100 (TVD) 5100
m
AGXT
0 10
hr
AGR North Quad GR BCorr
0 (MAGNQC) 200
api
48in 2 MHz Phase Res BC
0.2 (RH48PC) 20
ohm-metre
AGR GR Azi Mag BCorr
0 (AGRCCM) 180
N E S W N
4075
4100
4125
Start 12.25" hole @ 4156.11 mBRT / 4186 mRT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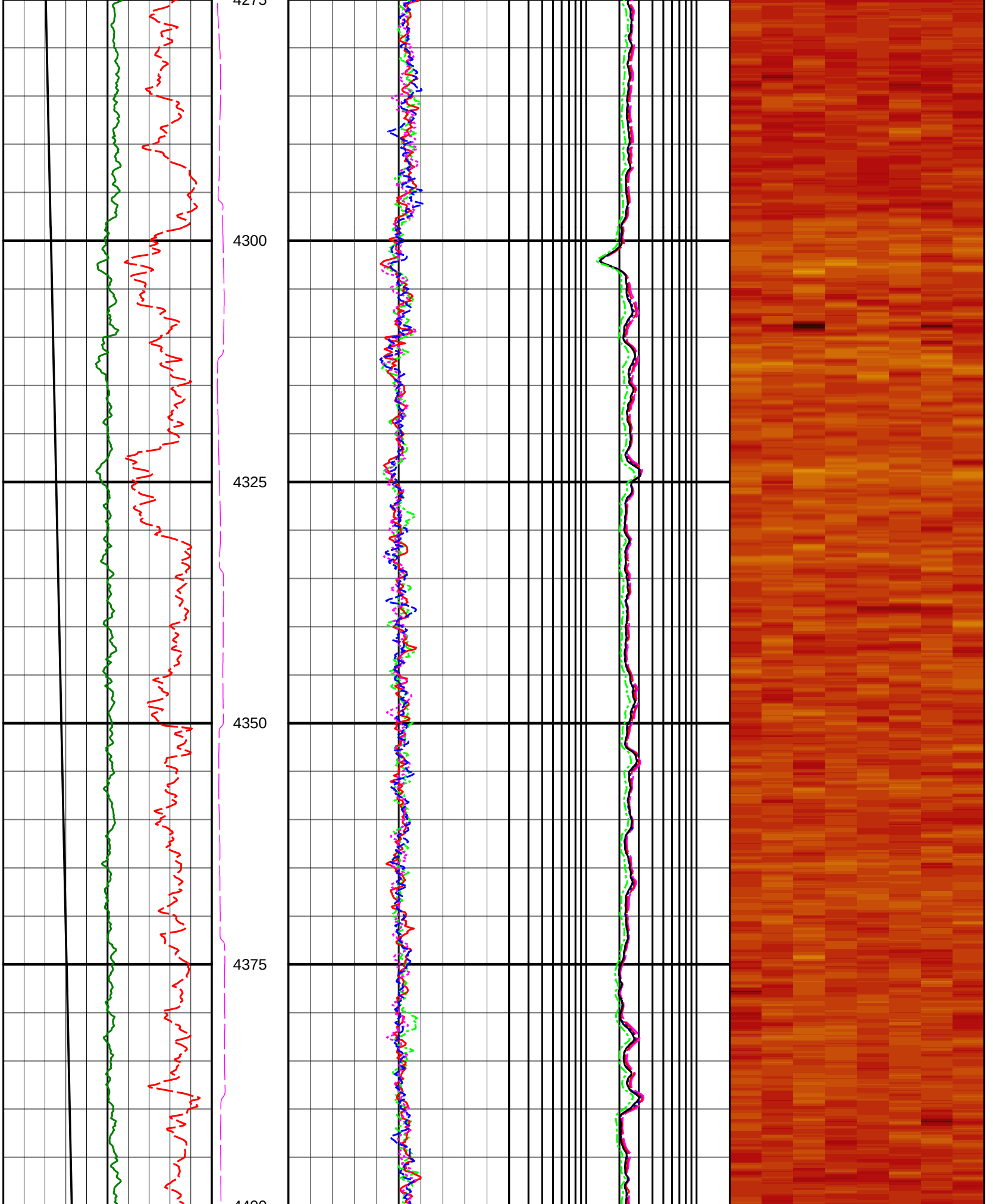
4200
4225
4250
4275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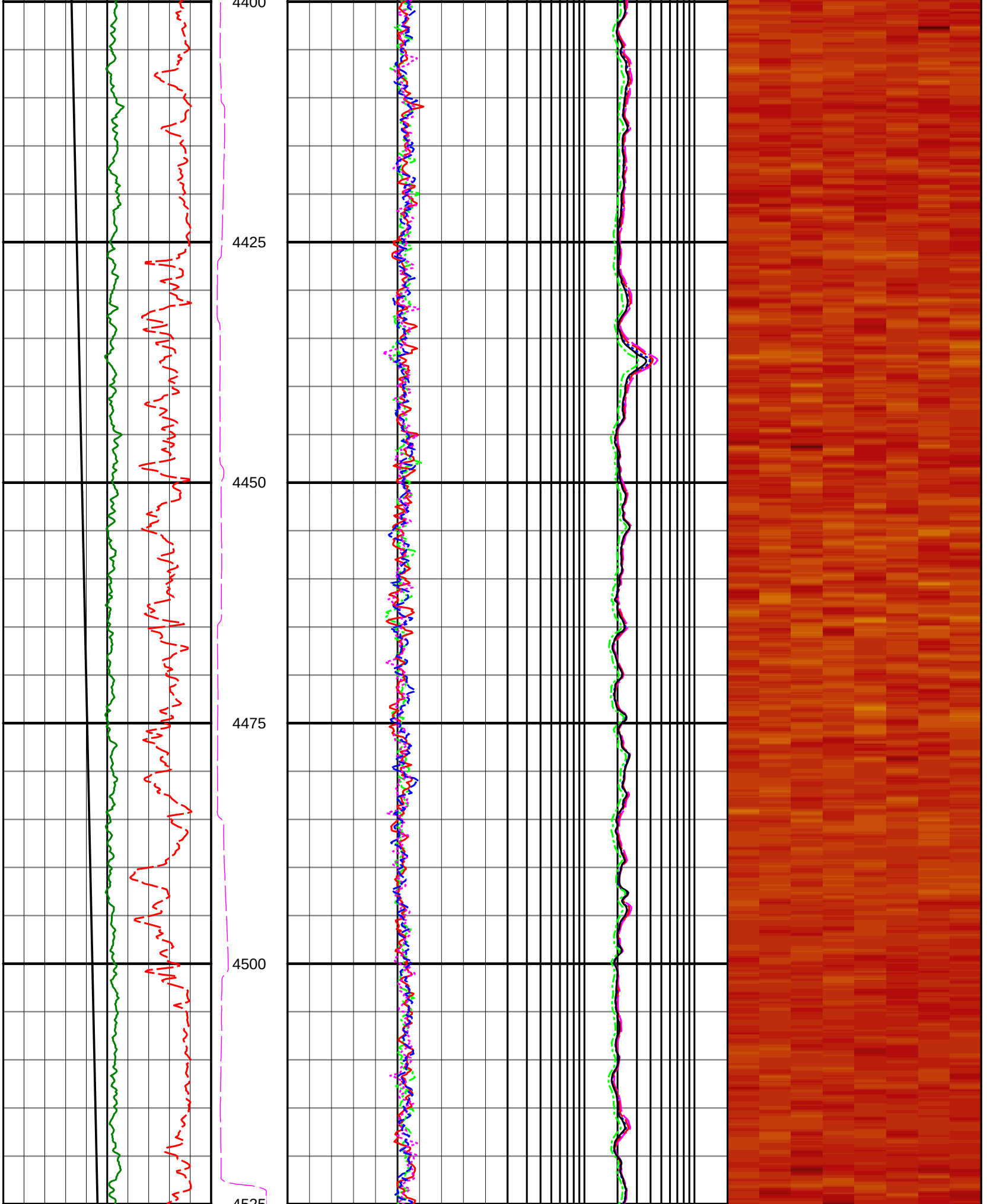
4350
4375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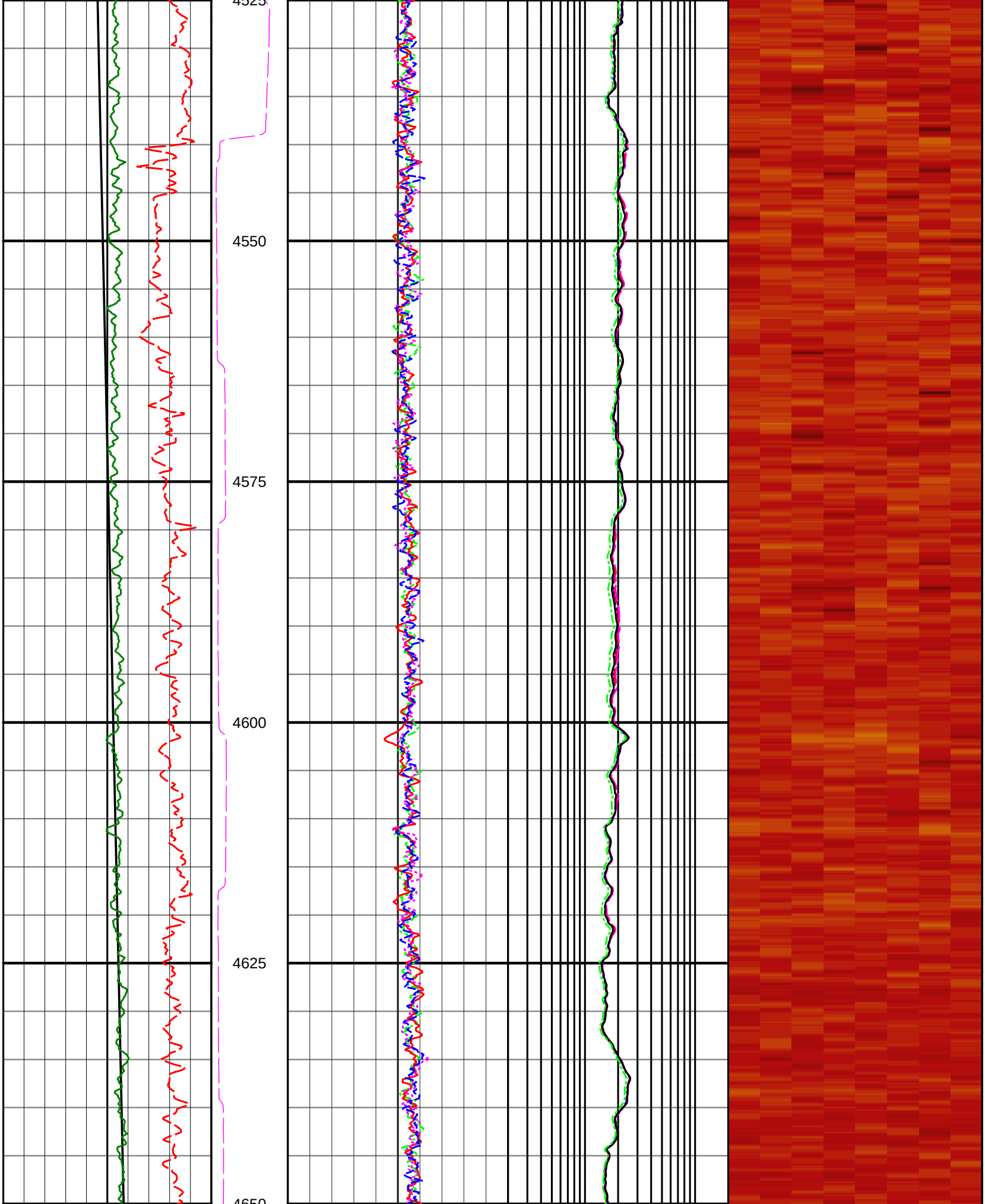
4475
4500
4525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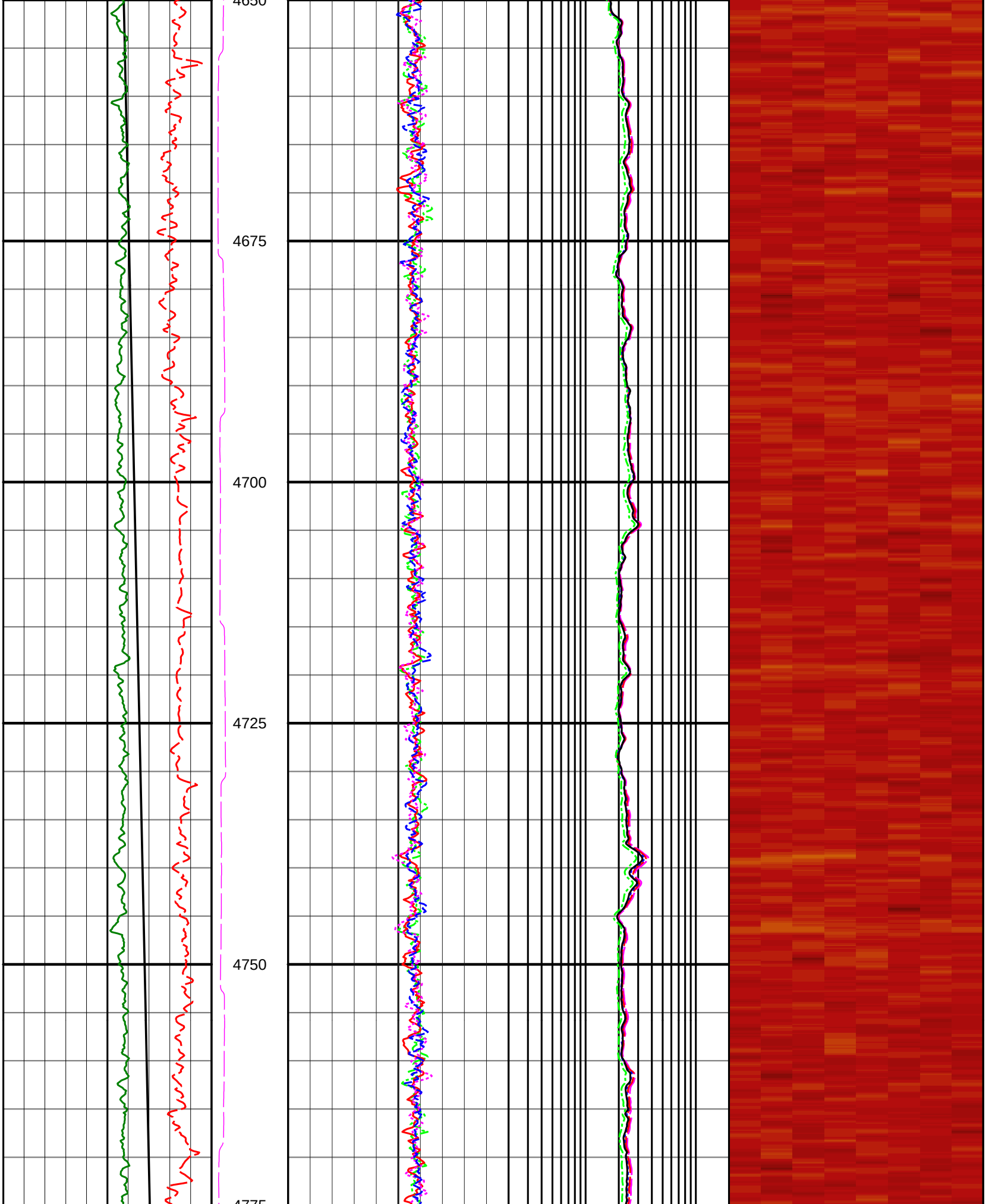
4650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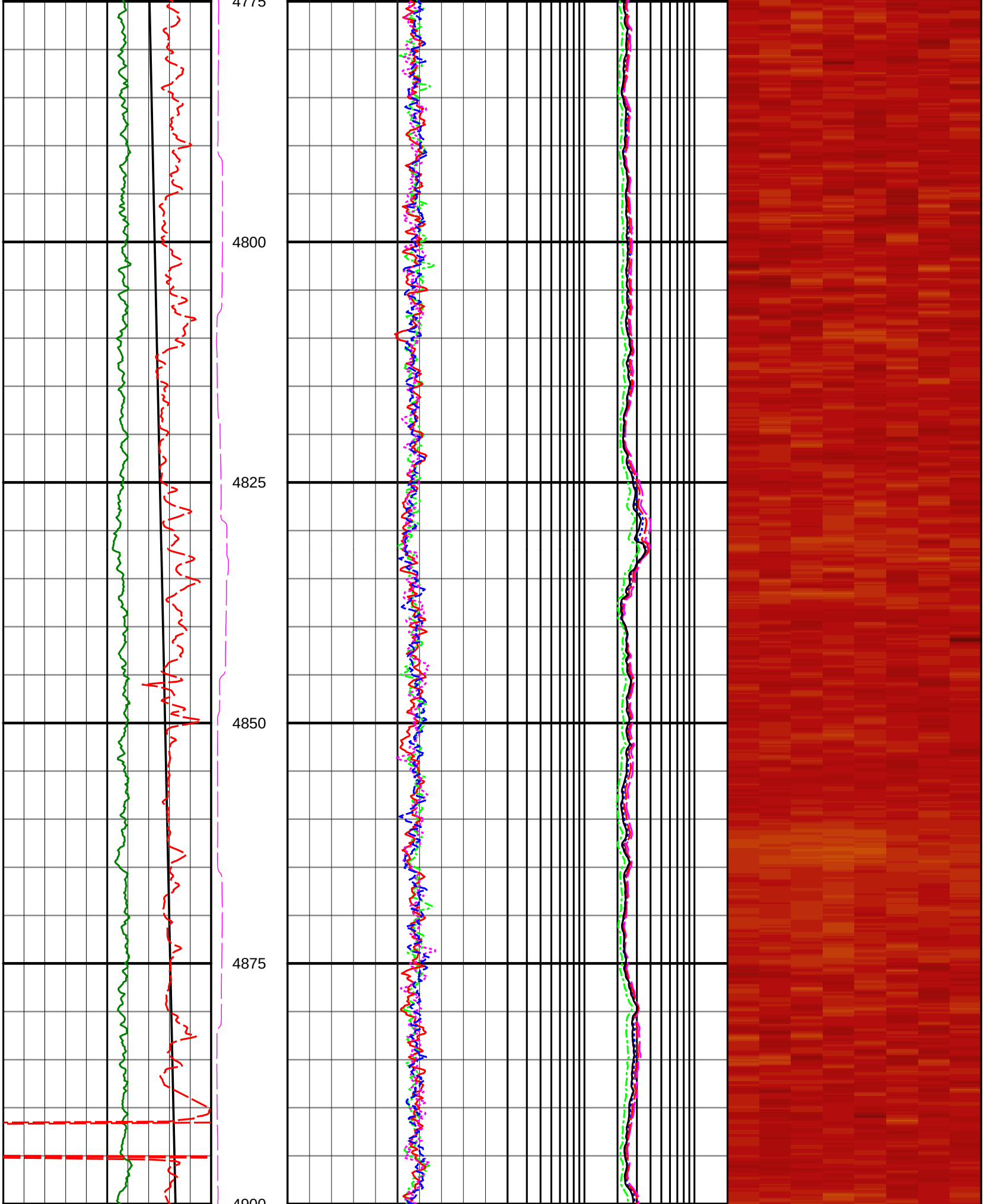
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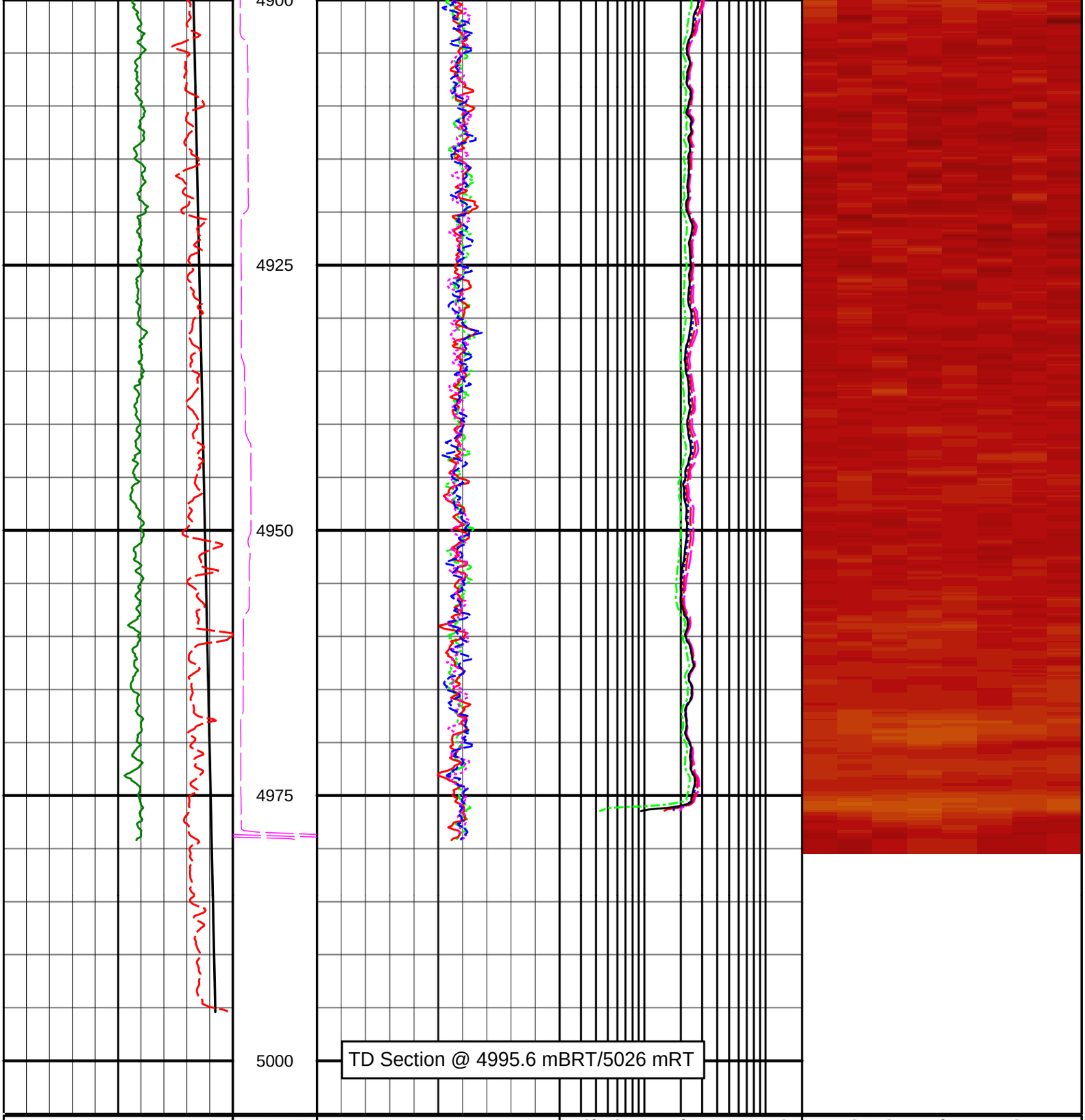
4850
4875
4900




| | | | | |
|---|---|---|---|---|
| Well Path TVD<br>4100 (TVD) 5100<br>m | AGXT<br>0 10<br>hr | AGR North Quad GR BCorr<br>0 (MAGNQC) 200<br>api | 48in 2 MHz Phase Res BC<br>0.2 (RH48PC) 20<br>ohm-metre | AGR GR Azi Mag BCorr<br>0 (AGRCCM) 180<br>N E S W N |
| Azimuthal Gamma Ray<br>0 (AGRCC) 200<br>api | TVDss<br>m<br>1 : 500 | AGR East Quad GR BCorr<br>0 (MAGEQC) 200<br>api | 40in 2 MHz Phase Res BC<br>0.2 (RH40PC) 20<br>ohm-metre | |
| Avg Rate of Penetration<br>100 (ROPA) 0<br>metre per hr | | AGR South Quad GR BCorr<br>0 (MAGSQC) 200<br>api | 32in 2 MHz Phase Res BC<br>0.2 (RH32PC) 20<br>ohm-metre | |
| | | AGR West Quad GR BCorr<br>0 (MAGWQC) 200<br>api | 24in 2 MHz Phase Res BC<br>0.2 (RH24PC) 20<br>ohm-metre | |
| | | | 16in 2 MHz Phase Res BC | |

HALLIBURTON

# DIRECTIONAL SURVEY REPORT

Mantle Quest Japan Co.,Ltd.
C0002P
Nankai Trough
Japan
JP-XX-0900526576

| Measured Depth (metres) | Inclination (degrees) | Direction (degrees) | Vertical Depth (metres) | Latitude (metres) | Departure (metres) | Vertical Section (metres) | Dogleg (deg/30m) |
|---|---|---|---|---|---|---|---|
| 2827.800 | 0.00 | 0.00 | 2827.800 | 0.000 N | 0.000 E | 0.000 | TIE-IN |
| 2890.590 | 3.40 | 159.39 | 2890.553 | 1.743 S | 0.656 E | -1.743 | 1.62 |
| 2928.740 | 5.12 | 140.76 | 2928.598 | 4.121 S | 2.131 E | -4.121 | 1.72 |
| 2966.900 | 5.18 | 106.59 | 2966.613 | 5.932 S | 4.859 E | -5.932 | 2.38 |
| 3010.810 | 5.07 | 76.58 | 3010.355 | 6.048 S | 8.647 E | -6.048 | 1.81 |
| 3043.630 | 5.11 | 51.56 | 3043.050 | 4.802 S | 11.203 E | -4.802 | 2.01 |
| 3084.170 | 5.36 | 38.78 | 3083.422 | 2.204 S | 13.803 E | -2.204 | 0.88 |
| 3123.580 | 4.98 | 25.39 | 3122.673 | 0.777 N | 15.689 E | 0.777 | 0.96 |
| 3162.080 | 4.18 | 4.38 | 3161.052 | 3.686 N | 16.513 E | 3.686 | 1.44 |
| 3199.710 | 2.00 | 1.06 | 3198.625 | 5.710 N | 16.630 E | 5.710 | 1.74 |
| 3238.190 | 0.31 | 209.19 | 3237.098 | 6.290 N | 16.592 E | 6.290 | 1.78 |
| 3276.890 | 0.44 | 239.16 | 3275.798 | 6.123 N | 16.413 E | 6.123 | 0.18 |
| 3314.850 | 0.41 | 269.76 | 3313.757 | 6.048 N | 16.152 E | 6.048 | 0.18 |
| 3353.040 | 0.12 | 310.15 | 3351.946 | 6.073 N | 15.985 E | 6.073 | 0.26 |
| 3391.260 | 0.56 | 336.21 | 3390.165 | 6.270 N | 15.879 E | 6.270 | 0.36 |
| 3429.140 | 0.50 | 334.26 | 3428.044 | 6.588 N | 15.732 E | 6.588 | 0.05 |
| 3468.360 | 0.62 | 352.84 | 3467.262 | 6.952 N | 15.632 E | 6.952 | 0.17 |
| 3505.570 | 0.31 | 333.27 | 3504.471 | 7.242 N | 15.561 E | 7.242 | 0.28 |
| 3544.480 | 0.19 | 98.24 | 3543.381 | 7.327 N | 15.578 E | 7.327 | 0.34 |
| 3581.980 | 0.25 | 209.19 | 3580.880 | 7.247 N | 15.599 E | 7.247 | 0.29 |
| 3620.060 | 0.31 | 210.19 | 3618.960 | 7.085 N | 15.507 E | 7.085 | 0.05 |
| 3657.980 | 0.84 | 245.28 | 3656.878 | 6.880 N | 15.203 E | 6.880 | 0.48 |
| 3691.660 | 0.36 | 224.61 | 3690.556 | 6.702 N | 14.905 E | 6.702 | 0.46 |
| 3729.630 | 0.25 | 132.00 | 3728.526 | 6.561 N | 14.882 E | 6.561 | 0.35 |
| 3767.900 | 0.44 | 166.60 | 3766.795 | 6.362 N | 14.978 E | 6.362 | 0.21 |
| 3887.570 | 0.31 | 300.87 | 3886.464 | 6.081 N | 14.807 E | 6.081 | 0.17 |
| 3904.000 | 0.22 | 301.45 | 3902.894 | 6.121 N | 14.742 E | 6.121 | 0.16 |
| 3996.760 | 2.38 | 94.61 | 3995.629 | 6.059 N | 16.513 E | 6.059 | 0.83 |
| 4010.460 | 1.46 | 75.41 | 4009.321 | 6.080 N | 16.966 E | 6.080 | 2.44 |
| 4039.630 | 3.59 | 105.91 | 4038.462 | 5.923 N | 18.204 E | 5.923 | 2.52 |
| 4074.320 | 3.88 | 104.24 | 4073.078 | 5.336 N | 20.386 E | 5.336 | 0.27 |
| 4114.770 | 2.47 | 97.13 | 4113.466 | 4.891 N | 22.578 E | 4.891 | 1.08 |
| 4153.753 | 2.93 | 97.28 | 4152.405 | 4.661 N | 24.399 E | 4.661 | 0.35 |
| 4190.770 | 2.85 | 92.40 | 4189.375 | 4.503 N | 26.256 E | 4.503 | 0.21 |
| 4228.710 | 2.82 | 92.05 | 4227.269 | 4.430 N | 28.132 E | 4.430 | 0.03 |
| 4267.620 | 2.72 | 91.98 | 4266.133 | 4.364 N | 30.013 E | 4.364 | 0.08 |
| 4305.530 | 2.53 | 93.65 | 4304.003 | 4.279 N | 31.748 E | 4.279 | 0.16 |
| 4343.840 | 2.36 | 93.75 | 4342.278 | 4.174 N | 33.379 E | 4.174 | 0.13 |
| 4382.200 | 2.25 | 92.32 | 4380.607 | 4.091 N | 34.920 E | 4.091 | 0.10 |
| 4416.740 | 1.97 | 92.61 | 4415.124 | 4.037 N | 36.192 E | 4.037 | 0.24 |
| 4458.160 | 2.10 | 92.74 | 4456.517 | 3.968 N | 37.663 E | 3.968 | 0.09 |
| 4494.780 | 2.10 | 91.96 | 4493.113 | 3.913 N | 39.004 E | 3.913 | 0.02 |
| 4535.180 | 1.97 | 89.62 | 4533.488 | 3.892 N | 40.437 E | 3.892 | 0.11 |
| 4572.710 | 1.83 | 90.94 | 4570.997 | 3.887 N | 41.679 E | 3.887 | 0.12 |
| 4610.770 | 1.73 | 90.61 | 4609.039 | 3.871 N | 42.861 E | 3.871 | 0.07 |
| 4649.220 | 1.82 | 89.80 | 4647.470 | 3.867 N | 44.054 E | 3.867 | 0.07 |
| 4686.700 | 1.70 | 90.44 | 4684.933 | 3.865 N | 45.206 E | 3.865 | 0.10 |
| 4724.760 | 1.62 | 93.01 | 4722.976 | 3.832 N | 46.310 E | 3.832 | 0.09 |
| 4762.960 | 1.77 | 95.87 | 4761.160 | 3.743 N | 47.436 E | 3.743 | 0.13 |
| 4801.260 | 1.71 | 92.70 | 4799.442 | 3.656 N | 48.596 E | 3.656 | 0.09 |
| 4838.540 | 1.67 | 90.73 | 4836.706 | 3.623 N | 49.696 E | 3.623 | 0.06 |
| 4913.640 | 1.53 | 90.52 | 4911.776 | 3.600 N | 51.795 E | 3.600 | 0.06 |
| 4949.730 | 1.40 | 87.84 | 4947.855 | 3.612 N | 52.720 E | 3.612 | 0.12 |
| 4990.290 | 1.74 | 80.10 | 4988.400 | 3.736 N | 53.822 E | 3.736 | 0.29 |
| 5026.000 | 1.74 | 80.10 | 5024.093 | 3.923 N | 54.889 E | 3.923 | 0.00 |

**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 0.00 DEGREES (GRID)**
**A TOTAL CORRECTION OF -7.66 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.**
**HORIZONTAL DISPLACEMENT(CLOSURE) AT 5026.000 METRES**
**IS 55.029 METRES ALONG 85.91 DEGREES (GRID)**

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