



1 : 600 / 1 : 240

[illegible]

WELL INFORMATION

| | | | | | |
|---|------------------|------------------|--|--|--|
| MWD Run Number | 100 | 200 | | | |
| Date run completed | 20-Feb-15 | 21-Feb-15 | | | |
| Rig Bit Number | 2 | 3 | | | |
| Bit Size (in) | 8.750 | 8.750 | | | |
| Tool Nominal OD (in) | 6.750 | 6.750 | | | |
| Log Start Depth (TVD, ft) | 949.99 | 6,310.60 | | | |
| Log End Depth (TVD, ft) | 6,310.60 | 6,612.15 | | | |
| Drill or Wipe | Drill | Drill | | | |
| Drill/Wipe Start Date and Time | 19-Feb-15 17:15 | 20-Feb-15 17:00 | | | |
| Drill/Wipe End Date and Time | 20-Feb-15 08:30 | 21-Feb-15 06:00 | | | |
| Min Inc (deg) @ Depth (TVD, ft) | 0.11 @ 1,099.99 | 24.92 @ 6,348.16 | | | |
| Max Inc (deg) @ Depth (TVD, ft) | 19.08 @ 6,260.10 | 81.43 @ 6,605.18 | | | |
| Bit TFA(in2) / Bit Type | 1.21 / PDC | 1.21 / PDC | | | |
| Flow Rate (gpm) | 559.34 | 551.45 | | | |
| Max AV (fpm) / CV (fpm) @ MWD | N/A / N/A | N/A / N/A | | | |
| Fluid Type | Fresh Water Gel | Fresh Water Gel | | | |
| Density (ppg) / Viscosity (spqt) | 9.50 / 27.00 | 10.30 / 45.00 | | | |
| Filtrate CL (ppm) | 160.00 | 150.00 | | | |
| pH / Fluid Loss (mptm) | 8.90 / 0 | 9.00 / 6 | | | |
| PV (cP) / YP (lhf2) | 1 / 3.00 | 15 / 14.00 | | | |
| % Solids / % Sand | 2 / .3 | 9.50 / 0.30 | | | |
| % Oil / Oil:Water Ratio | N/A / N/A | N/A / N/A | | | |
| Rm @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | | | |
| Rmf @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | | | |
| Rmc @ Measured Temp (degF) | N/A @ N/A | N/A @ N/A | | | |

| | | | | | |
|-------------------------------|-----------------|-----------------|--|--|--|
| Max Tool Temp (degF) / Source | 145.90 / PCM | 167.00 / PCM | | | |
| Rm @ Max Tool Temp (degF) | N/A @ N/A | N/A @ N/A | | | |
| Lead MWD Engineer | Paul Kock | Paul Kock | | | |
| Customer Representative | Charles Collver | Charles Collver | | | |

SENSOR INFORMATION

Downhole Processor Information

| | | | | | |
|---------------------------|-----------------|-----------------|--|--|--|
| Tool Type | PCM | PCM | | | |
| Software Version | 5.93 | 5.93 | | | |
| Sub Serial Number | 11107081 | 11107081 | | | |
| Insert Serial Number | 11680742 | 11680742 | | | |
| Date and Time Initialized | 19-Feb-15 10:28 | 19-Feb-14 10:28 | | | |
| Date and Time Read | 21-Feb-15 10:26 | 21-Feb-15 10:39 | | | |
| ECMB SW Version | N/A | N/A | | | |

Directional Sensor Information

| | | | | | |
|------------------------|----------|----------|--|--|--|
| Tool Type | PCDC | PCDC | | | |
| Distance From Bit (ft) | 52.31 | 53.06 | | | |
| Software Version | 6.33 | 6.33 | | | |
| Sub Serial Number | 11107081 | 11107081 | | | |
| Sonde Serial Number | 11638559 | 11638559 | | | |
| Sensor ID Number | N/A | N/A | | | |
| Toolface Offset (deg) | 119.80 | 103.70 | | | |

Gamma Ray Sensor Information

| | | | | | |
|------------------------------|----------|----------|--|--|--|
| Tool Type | PCG | PCG | | | |
| Distance From Bit (ft) | 42.19 | 42.94 | | | |
| Recorded Sample Period (sec) | 10 | 10 | | | |
| Software Version | 8.15 | 8.15 | | | |
| Sub Serial Number | 11107081 | 11107081 | | | |
| Insert/Sonde Serial Number | 11293411 | 11293411 | | | |

REMARKS

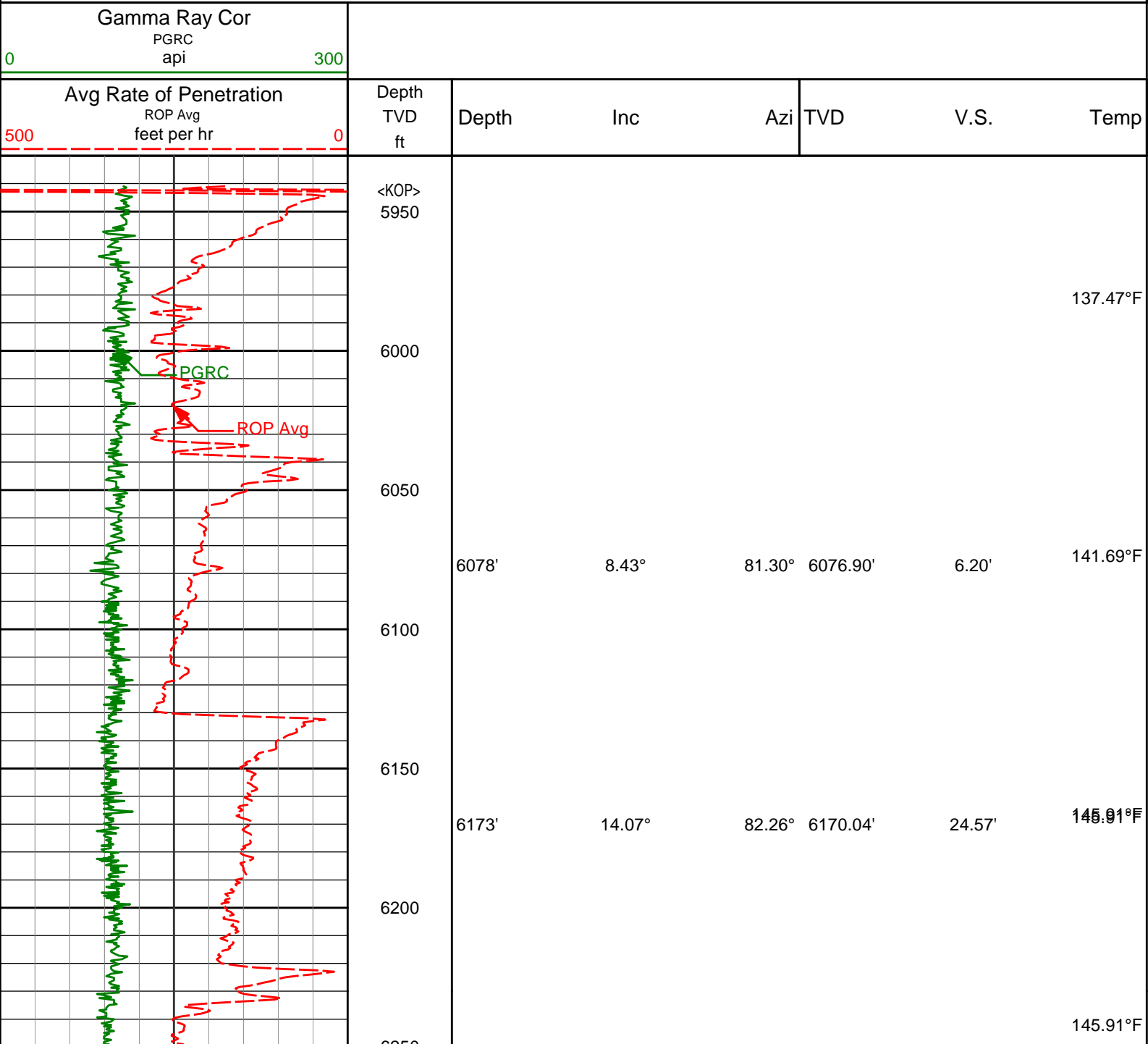
1. All depths are calibrated to the driller's pipe tally and are measured from the Rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
 - ROPA: Average Rate of Penetration is real time data.
 - PGRC: Smooth Pressure Case Gamma Ray Borehole corrected is recorded data.
4. The following smoothing parameters have been applied to the data:
 - All ROP in logs - 0.5 ft interval, 1.2 ft coercion distance.
 - Gamma in 2" (1:600) logs - 1 ft interval, 3 ft coercion distance.
 - Gamma in 5" (1:240) logs - 0.5 ft interval, 0.6 ft coercion distance.
5. INSITE version 8.1.10.

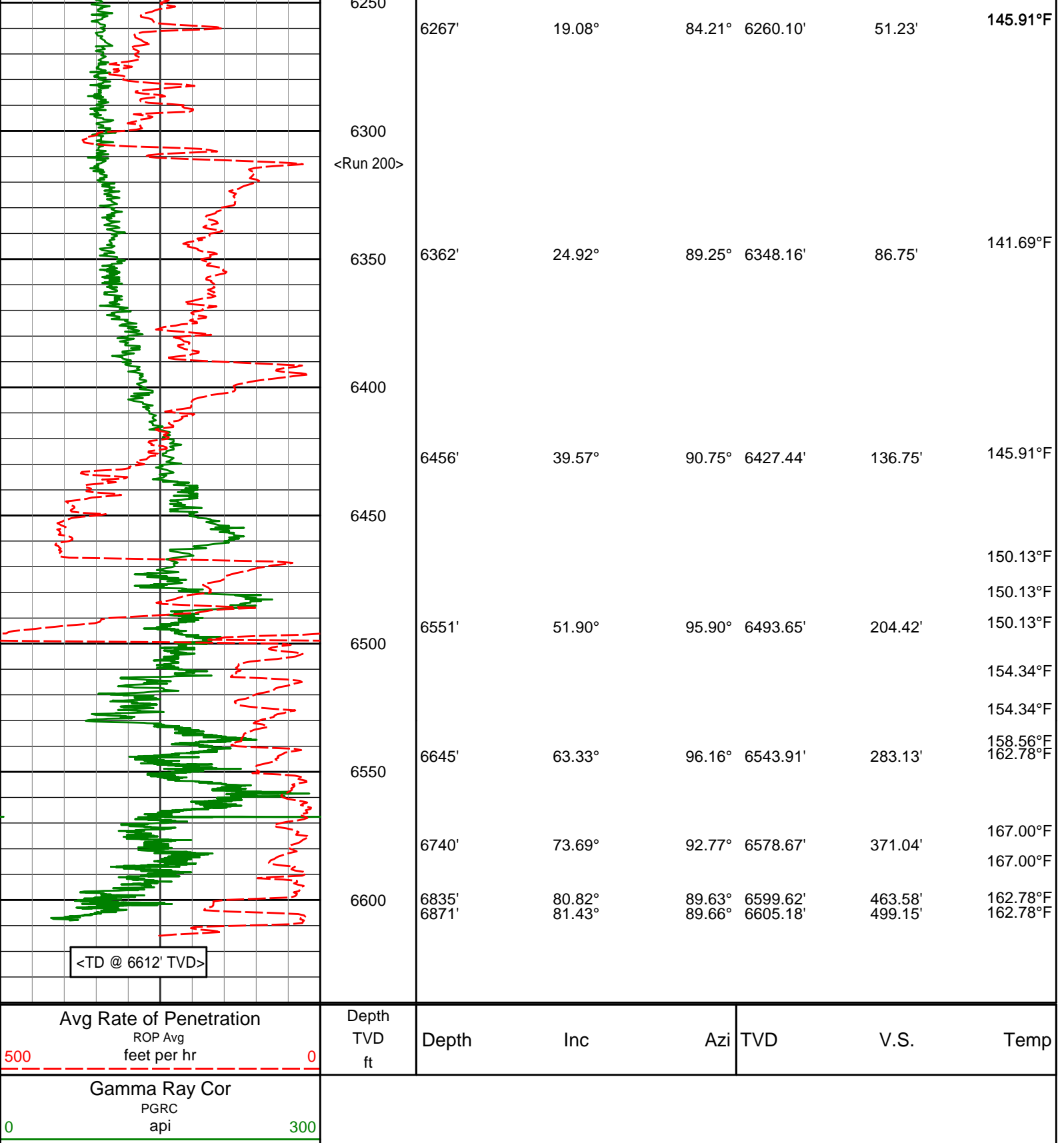
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TVD Detail 1:600 Scale



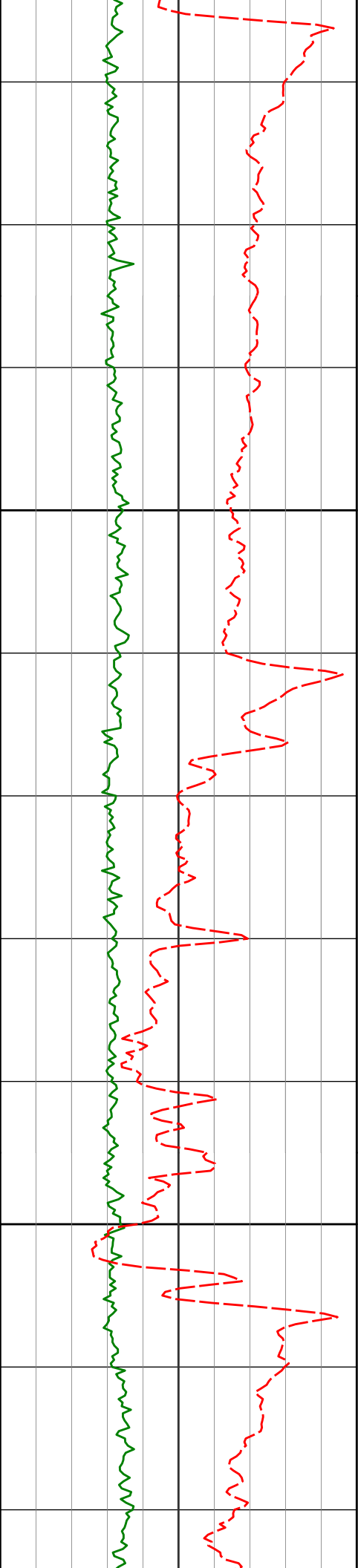


TVD Detail 1:240 Scale

300

0

141.69°F

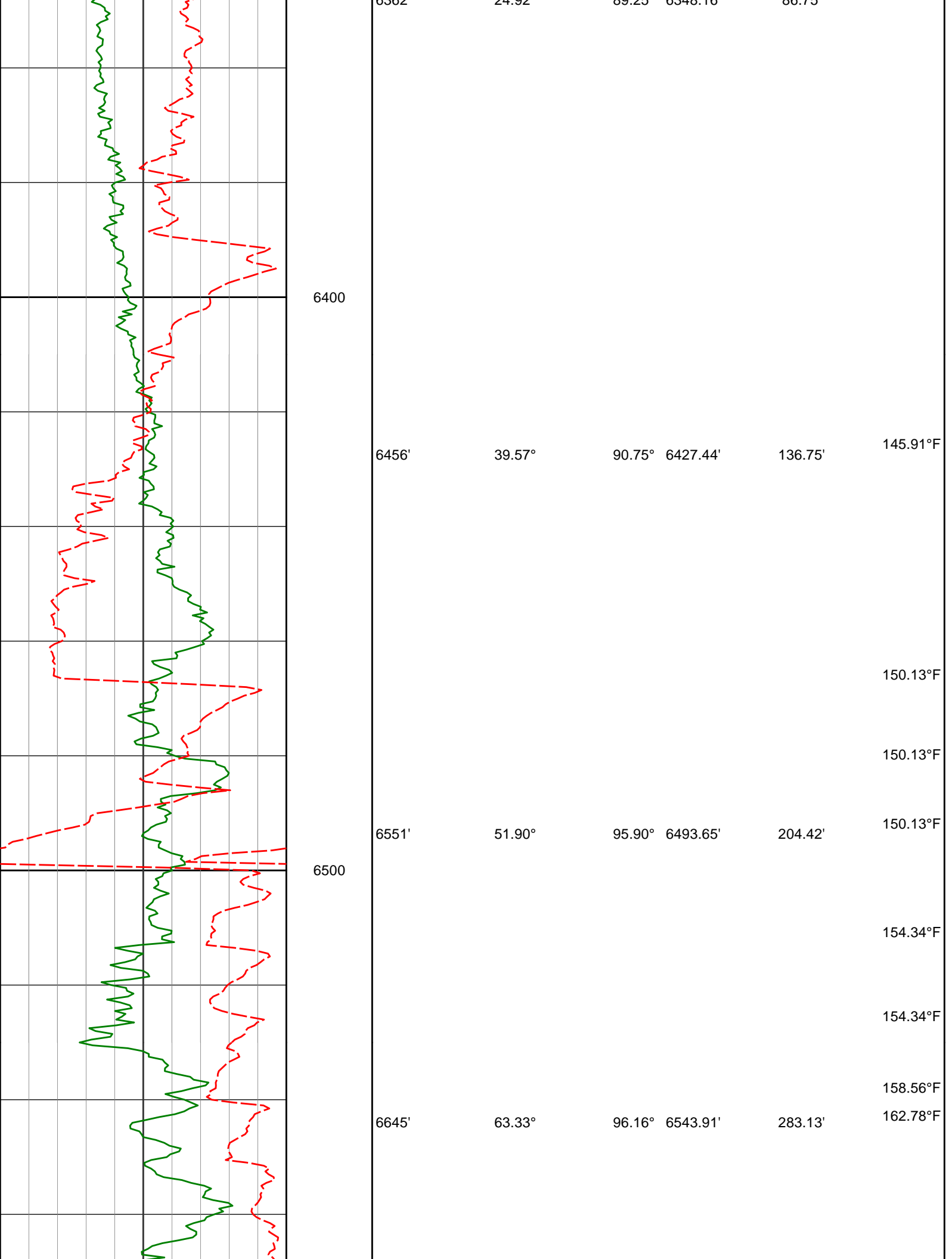


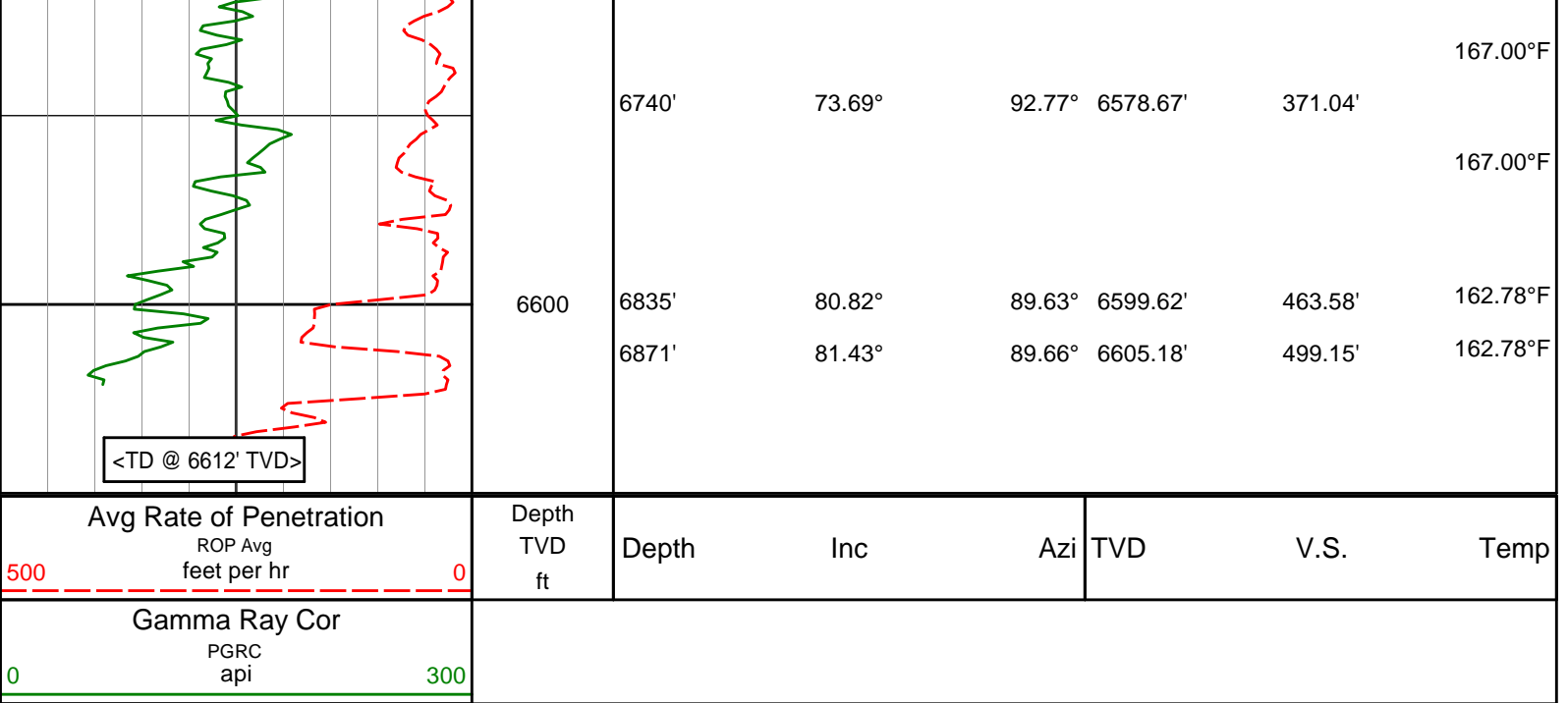
6200

<Run 200>

6300

| | | | | | |
|-------|--------|--------|----------|--------|----------|
| 0173 | 14.07 | 02.20 | 0170.04 | 24.57 | 145.91°F |
| 6267' | 19.08° | 84.21° | 6260.10' | 51.23' | 145.91°F |
| 6262' | 24.02° | 80.25° | 6248.16' | 86.75' | 141.69°F |





HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Aggie State AA17-625
Wattenberg
Weld Colorado
USA
CA-XX-0902101362

| Measured Depth (feet) | Inclination (degrees) | Direction (degrees) | Vertical Depth (feet) | Latitude (feet) | Departure (feet) | Vertical Section (feet) | Dogleg (deg/100ft) |
|-----------------------|-----------------------|---------------------|-----------------------|-----------------|------------------|-------------------------|--------------------|
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 N | 0.00 E | 0.00 | TIE-IN |
| 273.00 | 0.40 | 324.84 | 273.00 | 0.78 N | 0.55 W | -0.54 | 0.15 |
| 642.00 | 0.40 | 63.64 | 641.99 | 2.40 N | 0.14 W | -0.11 | 0.16 |
| 920.00 | 0.50 | 214.64 | 919.99 | 1.84 N | 0.04 E | 0.07 | 0.31 |
| 1100.00 | 0.11 | 285.70 | 1099.99 | 1.24 N | 0.57 W | -0.55 | 0.26 |
| 1377.00 | 0.57 | 215.18 | 1376.98 | 0.18 N | 1.62 W | -1.62 | 0.20 |
| 1653.00 | 0.47 | 213.98 | 1652.97 | 1.88 S | 3.04 W | -3.06 | 0.04 |
| 1838.00 | 0.56 | 234.09 | 1837.96 | 3.04 S | 4.20 W | -4.23 | 0.11 |
| 2114.00 | 0.32 | 235.46 | 2113.95 | 4.27 S | 5.93 W | -5.98 | 0.09 |
| 2300.00 | 0.37 | 280.58 | 2299.95 | 4.45 S | 6.94 W | -7.00 | 0.14 |
| 2392.00 | 0.39 | 316.47 | 2391.95 | 4.17 S | 7.45 W | -7.50 | 0.26 |
| 2487.00 | 0.44 | 329.14 | 2486.95 | 3.62 S | 7.86 W | -7.90 | 0.11 |
| 2581.00 | 0.25 | 330.54 | 2580.95 | 3.13 S | 8.15 W | -8.18 | 0.20 |
| 2676.00 | 0.86 | 313.82 | 2675.94 | 2.46 S | 8.76 W | -8.79 | 0.66 |
| 2866.00 | 0.94 | 334.78 | 2865.92 | 0.06 S | 10.46 W | -10.46 | 0.18 |
| 2960.00 | 1.29 | 327.99 | 2959.90 | 1.53 N | 11.35 W | -11.33 | 0.40 |
| 3054.00 | 1.31 | 326.58 | 3053.88 | 3.33 N | 12.50 W | -12.46 | 0.04 |
| 3243.00 | 0.72 | 309.67 | 3242.84 | 5.89 N | 14.60 W | -14.53 | 0.35 |
| 3338.00 | 0.72 | 275.19 | 3337.84 | 6.32 N | 15.66 W | -15.58 | 0.45 |
| 3433.00 | 1.05 | 264.27 | 3432.83 | 6.29 N | 17.12 W | -17.04 | 0.39 |
| 3621.00 | 0.98 | 246.37 | 3620.80 | 5.48 N | 20.30 W | -20.24 | 0.17 |
| 3716.00 | 1.01 | 255.56 | 3715.78 | 4.94 N | 21.86 W | -21.80 | 0.17 |
| 3811.00 | 1.05 | 264.45 | 3810.77 | 4.65 N | 23.54 W | -23.48 | 0.17 |
| 3905.00 | 0.59 | 129.71 | 3904.76 | 4.26 N | 24.02 W | -23.97 | 1.62 |
| 3999.00 | 0.65 | 100.14 | 3998.76 | 3.85 N | 23.12 W | -23.08 | 0.34 |
| 4188.00 | 0.63 | 30.52 | 4187.75 | 4.56 N | 21.54 W | -21.49 | 0.39 |
| 4282.00 | 0.91 | 14.48 | 4281.74 | 5.73 N | 21.09 W | -21.02 | 0.37 |
| 4471.00 | 1.19 | 3.81 | 4470.71 | 9.14 N | 20.59 W | -20.48 | 0.18 |
| 4659.00 | 0.88 | 33.41 | 4658.68 | 12.29 N | 19.66 W | -19.52 | 0.32 |
| 4753.00 | 0.91 | 34.52 | 4752.67 | 13.51 N | 18.84 W | -18.68 | 0.04 |

| | | | | | | | |
|---------|-------|--------|---------|---------|----------|--------|-------|
| 4943.00 | 0.78 | 38.83 | 4942.65 | 15.76 N | 17.18 W | -16.99 | 0.08 |
| 5131.00 | 1.03 | 120.67 | 5130.63 | 15.89 N | 14.92 W | -14.73 | 0.64 |
| 5320.00 | 0.85 | 90.76 | 5319.61 | 15.01 N | 12.06 W | -11.88 | 0.27 |
| 5415.00 | 0.33 | 54.54 | 5414.60 | 15.16 N | 11.13 W | -10.95 | 0.65 |
| 5510.00 | 0.70 | 112.46 | 5509.60 | 15.10 N | 10.37 W | -10.19 | 0.63 |
| 5604.00 | 0.62 | 118.67 | 5603.59 | 14.63 N | 9.39 W | -9.22 | 0.11 |
| 5699.00 | 0.63 | 78.99 | 5698.59 | 14.49 N | 8.43 W | -8.26 | 0.45 |
| 5794.00 | 0.22 | 117.97 | 5793.58 | 14.50 N | 7.76 W | -7.59 | 0.50 |
| 5888.00 | 0.16 | 331.79 | 5887.58 | 14.53 N | 7.66 W | -7.49 | 0.39 |
| 6078.00 | 8.43 | 81.30 | 6076.90 | 16.88 N | 6.01 E | 6.20 | 4.47 |
| 6173.00 | 14.07 | 82.26 | 6170.04 | 19.49 N | 24.35 E | 24.57 | 5.94 |
| 6267.00 | 19.08 | 84.21 | 6260.10 | 22.58 N | 50.97 E | 51.23 | 5.36 |
| 6362.00 | 24.92 | 89.25 | 6348.16 | 24.41 N | 86.47 E | 86.75 | 6.46 |
| 6456.00 | 39.57 | 90.75 | 6427.44 | 24.27 N | 136.48 E | 136.75 | 15.61 |
| 6551.00 | 51.90 | 95.90 | 6493.65 | 20.02 N | 204.20 E | 204.42 | 13.54 |
| 6645.00 | 63.33 | 96.16 | 6543.91 | 11.68 N | 283.01 E | 283.13 | 12.16 |
| 6740.00 | 73.69 | 92.77 | 6578.67 | 4.90 N | 371.01 E | 371.04 | 11.40 |
| 6835.00 | 80.82 | 89.63 | 6599.62 | 3.00 N | 463.58 E | 463.58 | 8.17 |
| 6871.00 | 81.43 | 89.66 | 6605.18 | 3.22 N | 499.14 E | 499.15 | 1.70 |
| 6926.00 | 84.00 | 90.00 | 6612.15 | 3.38 N | 553.70 E | 553.70 | 4.71 |

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 89.33 DEGREES (GRID)
A TOTAL CORRECTION OF 7.44 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6926.00 FEET
IS 553.71 FEET ALONG 89.65 DEGREES (GRID)**

Surface surveys at 273 ft, 642 ft and 920 ft have had azimuths corrected to grid north, but were not taken by Halliburton.

Last survey is a projection from 6871 ft MD to TD at 6926 ft MD.