



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100				
Date run completed	16-Jul-15				
Rig Bit Number	2				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (TVD, ft)	755.99				
Log End Depth (TVD, ft)	6,586.35				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	14-Jul-15 22:22				
Drill/Wipe End Date and Time	16-Jul-15 05:30				
Min Inc (deg) @ Depth (TVD, ft)	0.07 @ 4,724.88				
Max Inc (deg) @ Depth (TVD, ft)	76.97 @ 6,575.41				
Bit TFA(in2) / Bit Type	0.91 / PDC				
Flow Rate (gpm)	586.41				
Max AV (fpm) / CV (fpm) @ MWD	350.0 / 400.0				
Fluid Type	Fresh Water Gel				
Density (ppg) / Viscosity (spqt)	9.60 / 37.00				
Filtrate CL (ppm)	1,000.00				
pH / Fluid Loss (mptm)	8.60 / 7				
PV (cP) / YP (lhf2)	13 / 7.00				
% Solids / % Sand	10.40 / 0.00				
% Oil / Oil:Water Ratio	N/A / 0:99				
Rm @ Measured Temp (degF)	N/A @ N/A				
Rmf @ Measured Temp (degF)	N/A @ N/A				
Rmc @ Measured Temp (degF)	N/A @ N/A				
Max Tool Temp (degF) @ Depth	128.55 / PDCM				

Max Tool Temp (degF) / Source	182.55 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ N/A				
Lead MWD Engineer	Adam Sampson				
Customer Representative	Dave Neilsen				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11404289				
Insert Serial Number	11400868				
Date and Time Initialized	14-Jul-15 13:26				
Date and Time Read	16-Jul-15 10:16				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	54.00				
Software Version	6.21				
Sub Serial Number	11404289				
Sonde Serial Number	11833222				
Sensor ID Number	N/A				
Toolface Offset (deg)	319.53				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	42.33				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11404289				
Insert/Sonde Serial Number	11681007				

REMARKS

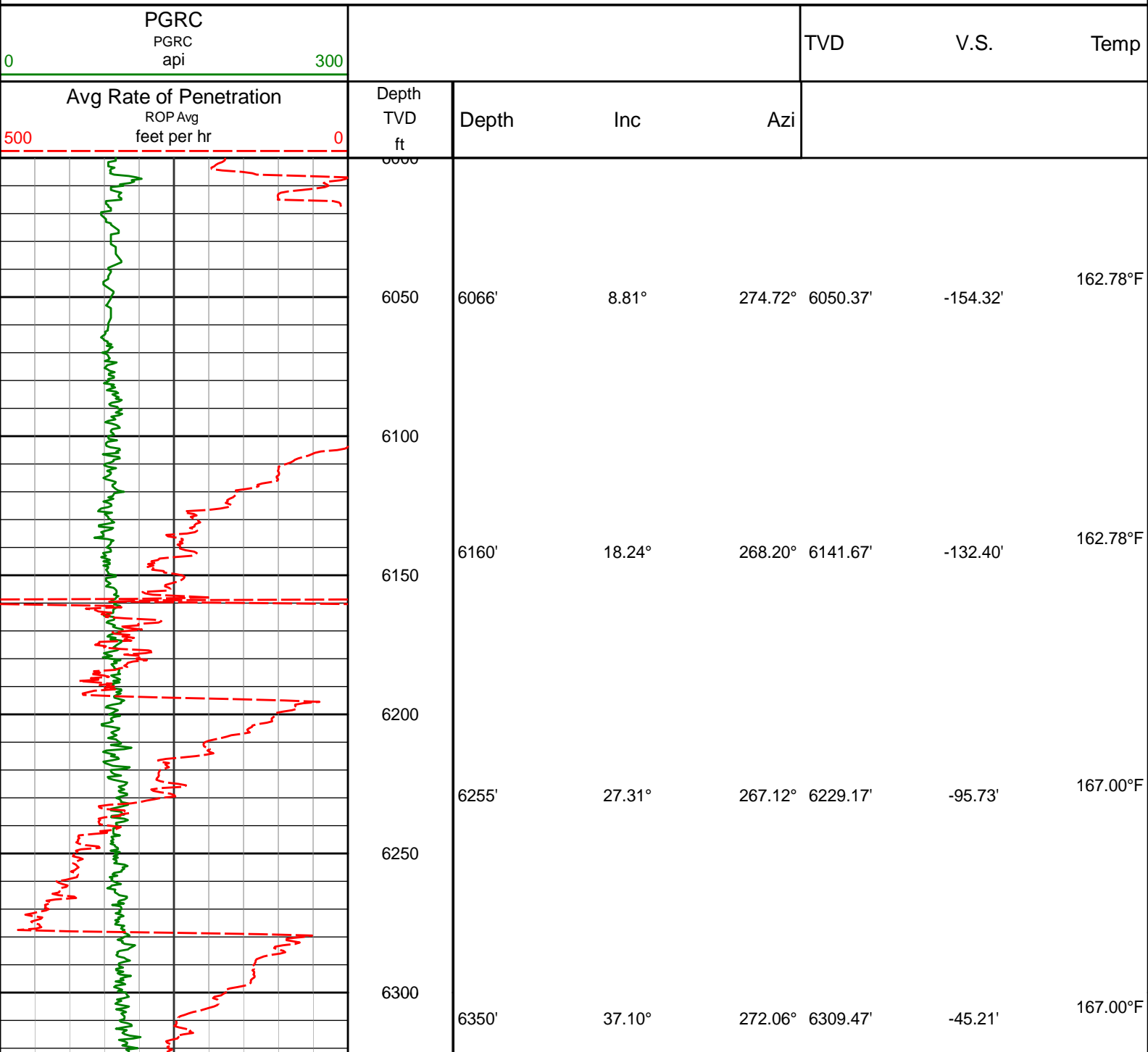
1. All depths are calibrated to the driller's pipe tally and are measured from the Rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
 - ROPA: Average Rate of Penetration is real time data.
 - 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.

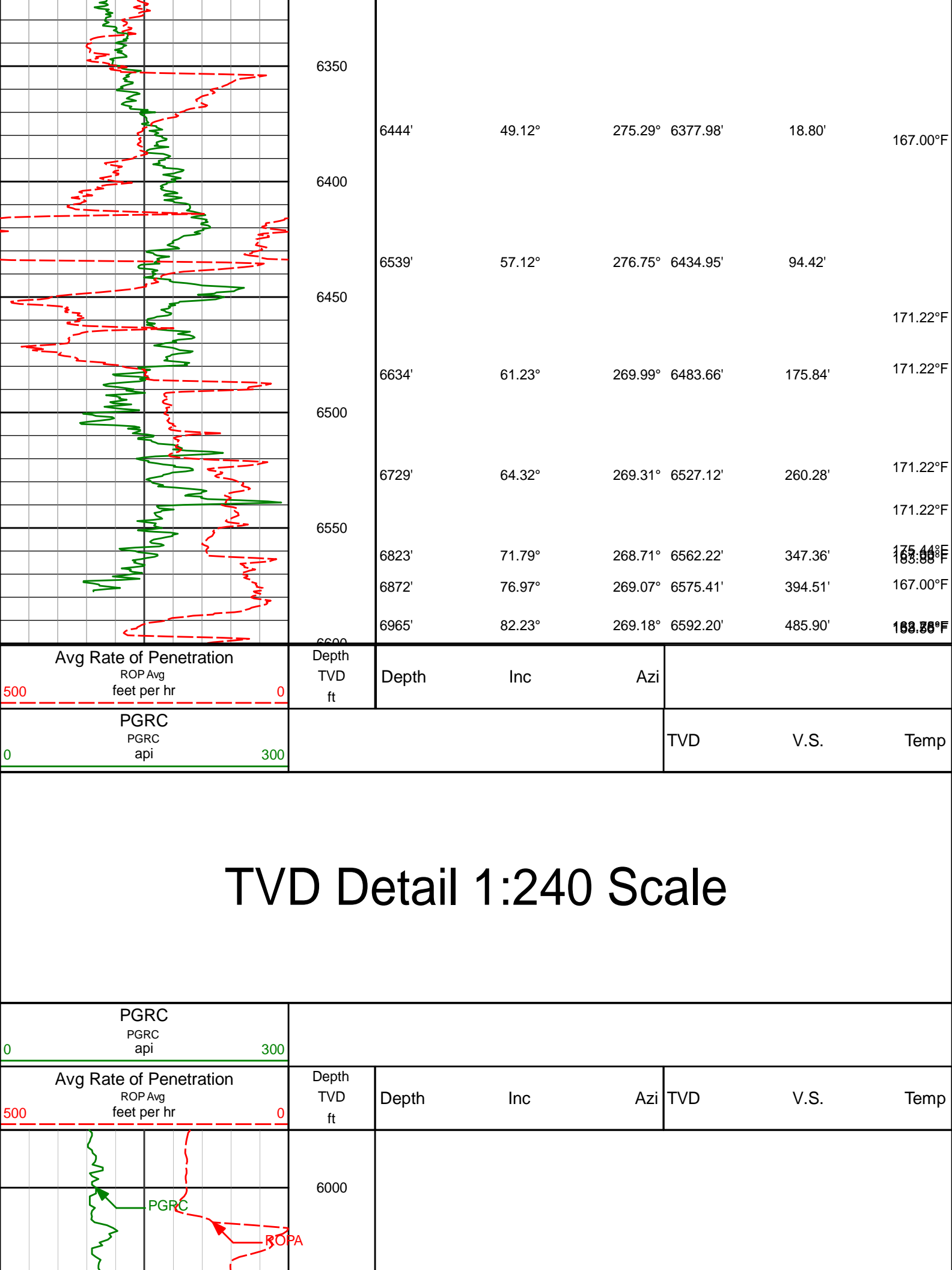
WARRANTY

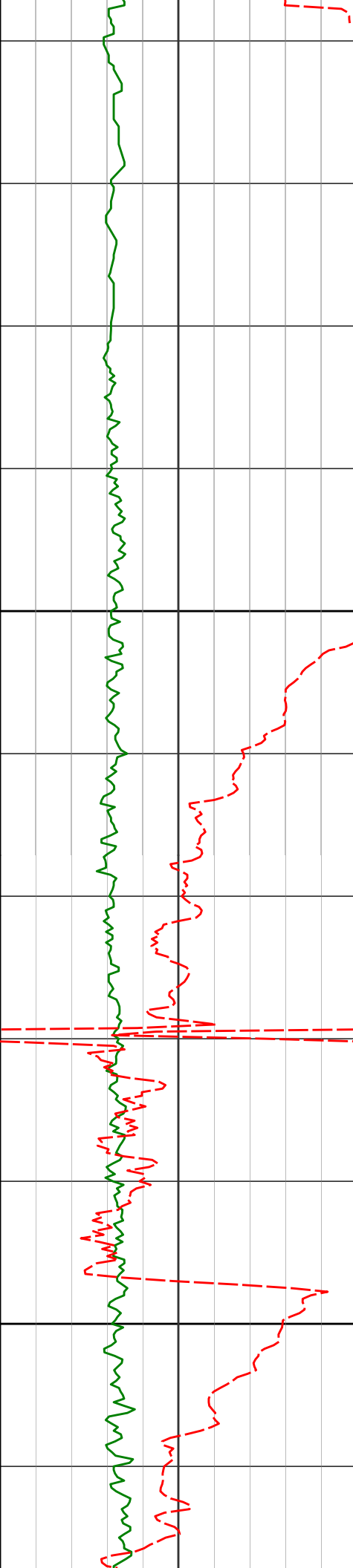
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TVD Detail 1:600 Scale







6100

6200

6066'

8.81°

274.72° 6050.37'

-154.32'

162.78°F

6160'

18.24°

268.20° 6141.67'

-132.40'

162.78°F

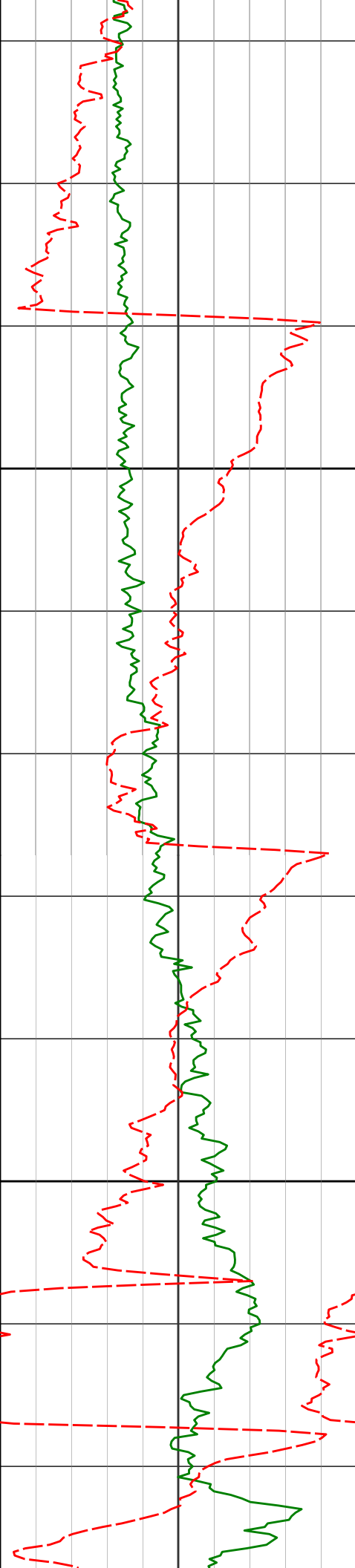
6255'

27.31°

267.12° 6229.17'

-95.73'

167.00°F



6300

6350'

37.10°

272.06°

6309.47'

-45.21'

167.00°F

6444'

49.12°

275.29°

6377.98'

18.80'

167.00°F

6400

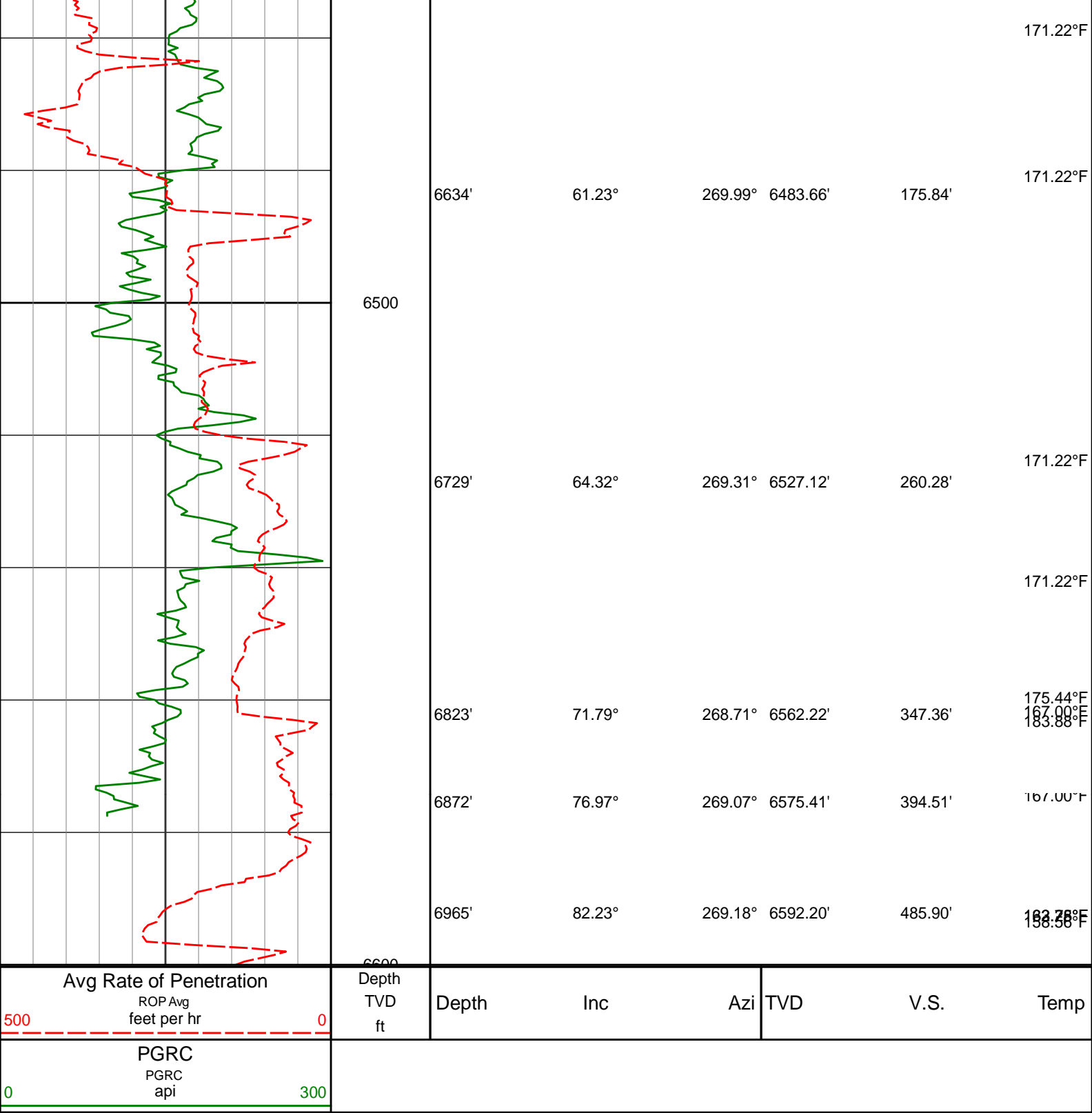
6539'

57.12°

276.75°

6434.95'

94.42'



HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
70 Ranch State BB18-689
Wattenberg
Weld Colorado
USA
CA-XX-0902563263

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
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0.00	0.00	0.00	0.00	0.00 N	0.00 E	0.00	TIE-IN
300.00	0.21	111.77	300.00	0.20 S	0.51 E	-0.51	0.07
600.00	0.43	111.77	599.99	0.83 S	2.07 E	-2.08	0.07
766.00	0.55	111.77	765.99	1.35 S	3.38 E	-3.41	0.07
826.00	0.59	111.77	825.99	1.57 S	3.94 E	-3.96	0.07
921.00	0.83	119.24	920.98	2.09 S	4.99 E	-5.03	0.26
1015.00	0.75	114.89	1014.97	2.68 S	6.14 E	-6.19	0.10
1201.00	0.60	109.72	1200.96	3.52 S	8.17 E	-8.22	0.08
1293.00	1.21	328.32	1292.95	2.86 S	8.12 E	-8.16	1.87
1384.00	1.09	336.30	1383.93	1.25 S	7.26 E	-7.28	0.22
1475.00	0.92	330.60	1474.92	0.19 N	6.55 E	-6.55	0.22
1567.00	0.99	324.14	1566.90	1.48 N	5.72 E	-5.70	0.14
1658.00	1.01	323.47	1657.89	2.76 N	4.78 E	-4.74	0.02
1750.00	1.02	338.96	1749.88	4.17 N	4.01 E	-3.94	0.30
1841.00	2.01	11.89	1840.85	6.49 N	4.05 E	-3.95	1.41
1933.00	2.46	12.69	1932.78	10.00 N	4.81 E	-4.66	0.48
2025.00	3.90	37.04	2024.64	14.42 N	7.13 E	-6.91	2.12
2116.00	5.89	42.77	2115.30	20.32 N	12.17 E	-11.85	2.25
2208.00	7.55	46.25	2206.66	27.97 N	19.74 E	-19.30	1.85
2301.00	8.76	44.16	2298.72	37.27 N	29.09 E	-28.50	1.34
2392.00	7.93	36.67	2388.76	47.28 N	37.66 E	-36.92	1.50
2484.00	8.28	40.32	2479.84	57.42 N	45.74 E	-44.83	0.67
2576.00	7.70	36.53	2570.95	67.42 N	53.69 E	-52.63	0.85
2668.00	7.76	46.00	2662.12	76.68 N	61.83 E	-60.62	1.38
2759.00	7.15	45.14	2752.35	84.94 N	70.26 E	-68.92	0.68
2851.00	8.29	52.28	2843.52	93.04 N	79.57 E	-78.10	1.61
2942.00	7.92	50.00	2933.61	101.09 N	89.56 E	-87.96	0.53
3036.00	7.49	49.01	3026.76	109.27 N	99.15 E	-97.42	0.49
3131.00	8.58	49.79	3120.82	117.91 N	109.23 E	-107.37	1.16
3226.00	7.55	45.78	3214.88	126.84 N	119.12 E	-117.12	1.23
3320.00	6.65	46.96	3308.16	134.86 N	127.53 E	-125.39	0.98
3415.00	7.66	42.83	3402.42	143.26 N	135.85 E	-133.58	1.20
3510.00	6.86	41.36	3496.66	152.16 N	143.91 E	-141.50	0.86
3604.00	7.06	39.38	3589.97	160.84 N	151.28 E	-148.74	0.33
3699.00	5.69	42.51	3684.38	168.83 N	158.17 E	-155.50	1.49
3794.00	3.68	41.57	3779.05	174.58 N	163.37 E	-160.61	2.11
3888.00	0.77	37.30	3872.97	177.34 N	165.76 E	-162.96	3.10
3983.00	0.22	24.22	3967.97	178.01 N	166.22 E	-163.41	0.59
4078.00	0.52	242.40	4062.97	177.98 N	165.91 E	-163.10	0.74
4172.00	1.29	229.51	4156.96	177.09 N	164.73 E	-161.92	0.84
4267.00	1.74	226.82	4251.92	175.40 N	162.86 E	-160.08	0.48
4362.00	0.46	146.13	4346.90	174.10 N	162.02 E	-159.26	1.82
4457.00	0.81	111.35	4441.90	173.54 N	162.85 E	-160.11	0.53
4551.00	0.93	134.29	4535.89	172.76 N	164.02 E	-161.28	0.39
4646.00	0.65	137.89	4630.88	171.82 N	164.93 E	-162.21	0.30
4740.00	0.07	99.37	4724.88	171.42 N	165.34 E	-162.63	0.64
4835.00	0.07	230.57	4819.88	171.37 N	165.36 E	-162.64	0.13
4929.00	0.19	254.53	4913.88	171.30 N	165.16 E	-162.45	0.14
5024.00	0.44	274.51	5008.88	171.28 N	164.65 E	-161.94	0.28
5119.00	0.43	263.39	5103.87	171.27 N	163.93 E	-161.22	0.09
5213.00	0.26	221.30	5197.87	171.07 N	163.43 E	-160.73	0.31
5308.00	0.79	245.21	5292.87	170.63 N	162.69 E	-159.99	0.59
5403.00	0.73	254.27	5387.86	170.19 N	161.51 E	-158.82	0.14
5497.00	0.76	179.08	5481.85	169.40 N	160.94 E	-158.26	0.97
5592.00	1.23	140.30	5576.84	167.98 N	161.60 E	-158.94	0.83
5687.00	0.98	119.65	5671.82	166.80 N	162.96 E	-160.32	0.49
5781.00	1.49	138.44	5765.80	165.49 N	164.47 E	-161.85	0.69
5876.00	0.58	16.10	5860.79	165.02 N	165.42 E	-162.80	1.96
5971.00	0.98	305.61	5955.78	165.95 N	164.89 E	-162.26	1.01
6066.00	8.81	274.72	6050.37	167.02 N	156.97 E	-154.32	8.40
6160.00	18.24	268.20	6141.67	167.15 N	135.04 E	-132.40	10.14
6255.00	27.31	267.12	6229.17	165.59 N	98.35 E	-95.73	9.56
6350.00	37.10	272.06	6309.47	165.52 N	47.82 E	-45.21	10.66
6444.00	49.12	275.29	6377.98	169.83 N	16.14 W	18.80	13.00
6539.00	57.12	276.75	6434.95	177.84 N	91.64 W	94.42	8.51
6634.00	61.23	269.99	6483.66	182.52 N	172.99 W	175.84	7.49
6729.00	64.32	269.31	6527.12	182.00 N	257.46 W	260.28	3.31
6823.00	71.79	268.71	6562.22	180.47 N	344.57 W	347.36	7.96
6872.00	76.97	269.07	6575.41	179.56 N	391.74 W	394.51	10.60

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 270.90 DEGREES (GRID)
A TOTAL CORRECTION OF 7.54 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6872.00 FEET
IS 430.93 FEET ALONG 294.63 DEGREES (GRID)

Surveys at 300' and 600' are extrapolation surveys

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