



1 : 600 / 1 : 240

WELL INFORMATION					
MWD Run Number	100				
Date run completed	22-Dec-15				
Rig Bit Number	0100				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (TVD, ft)	645.00				
Log End Depth (TVD, ft)	6,046.22				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	20-Dec-15 21:00				
Drill/Wipe End Date and Time	21-Dec-15 21:00				
Min Inc (deg) @ Depth (TVD, ft)	0.17 @ 1,468.98				
Max Inc (deg) @ Depth (TVD, ft)	86.34 @ 6,046.22				
Bit TFA(in2) / Bit Type	0.98 / PDC				
Flow Rate (gpm)	584.13				
Max AV (fpm) / CV (fpm) @ MWD	400.0 / 250.0				
Fluid Type	Native/Spud Mud				
Density (ppg) / Viscosity (spqt)	10.20 / 36.00				
Filtrate CL (ppm)	1,100.00				
pH / Fluid Loss (mptm)	7.50 / 0				
PV (cP) / YP (lhf2)	20 / 9.00				
% Solids / % Sand	3 / 0.1				
% Oil / Oil:Water Ratio	1 / 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) / S	127.05 / PDC				

Max Tool Temp (degF) / Source	167.97 / PCM				
Rm @ Max Tool Temp (degF)	N/A @ N/A				
Lead MWD Engineer	adam sampson				
Customer Representative	Charles Colvile				

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM				
Software Version	5.93				
Sub Serial Number	11619287				
Insert Serial Number	11680784				
Date and Time Initialized	20-Dec-15 11:12				
Date and Time Read	22-Dec-15 02:04				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	55.00				
Software Version	6.33				
Sub Serial Number	11619287				
Sonde Serial Number	10859920				
Sensor ID Number	N/A				
Toolface Offset (deg)	46.20				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	43.13				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11619287				
Insert/Sonde Serial Number	11579789				

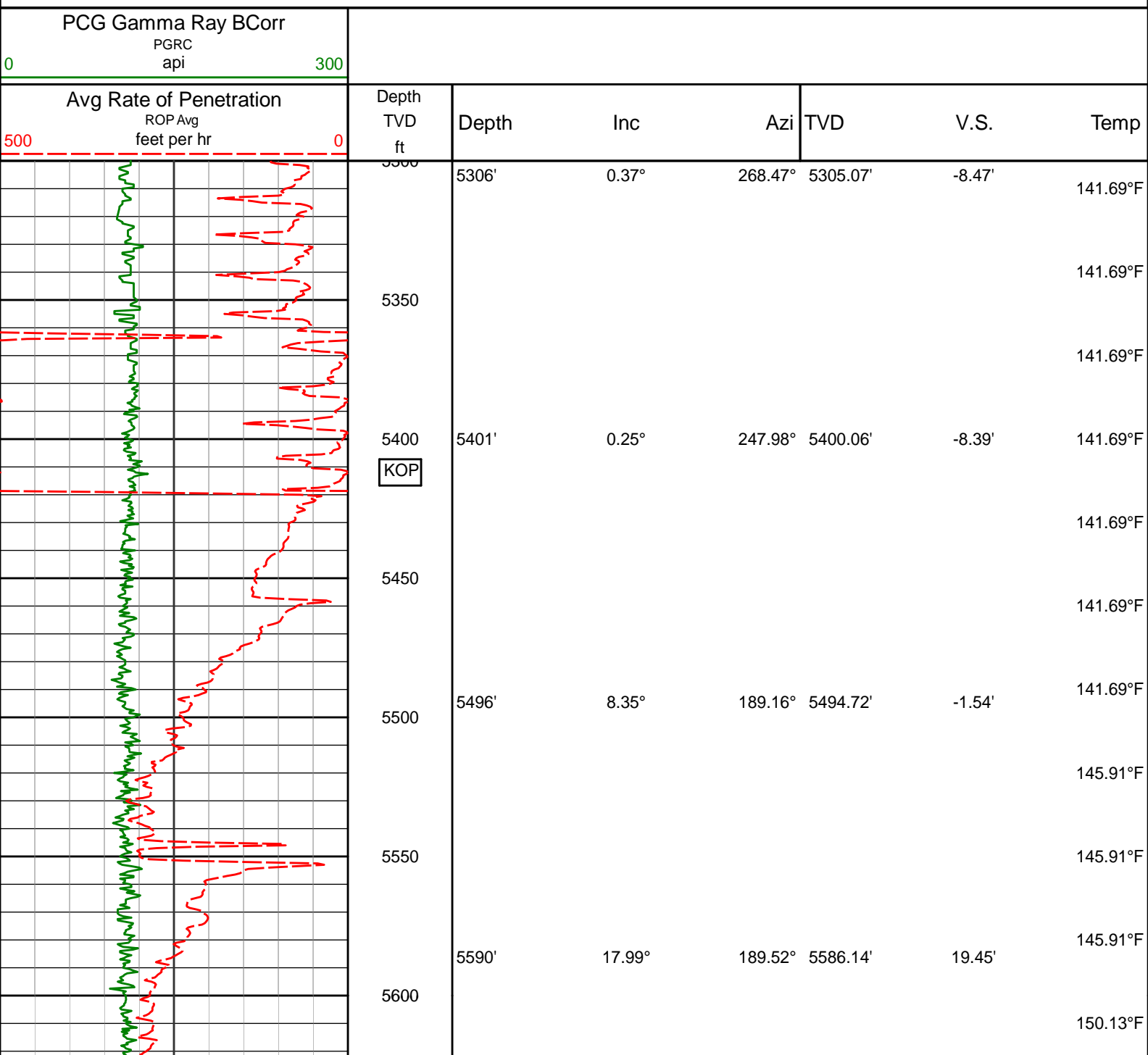
REMARKS

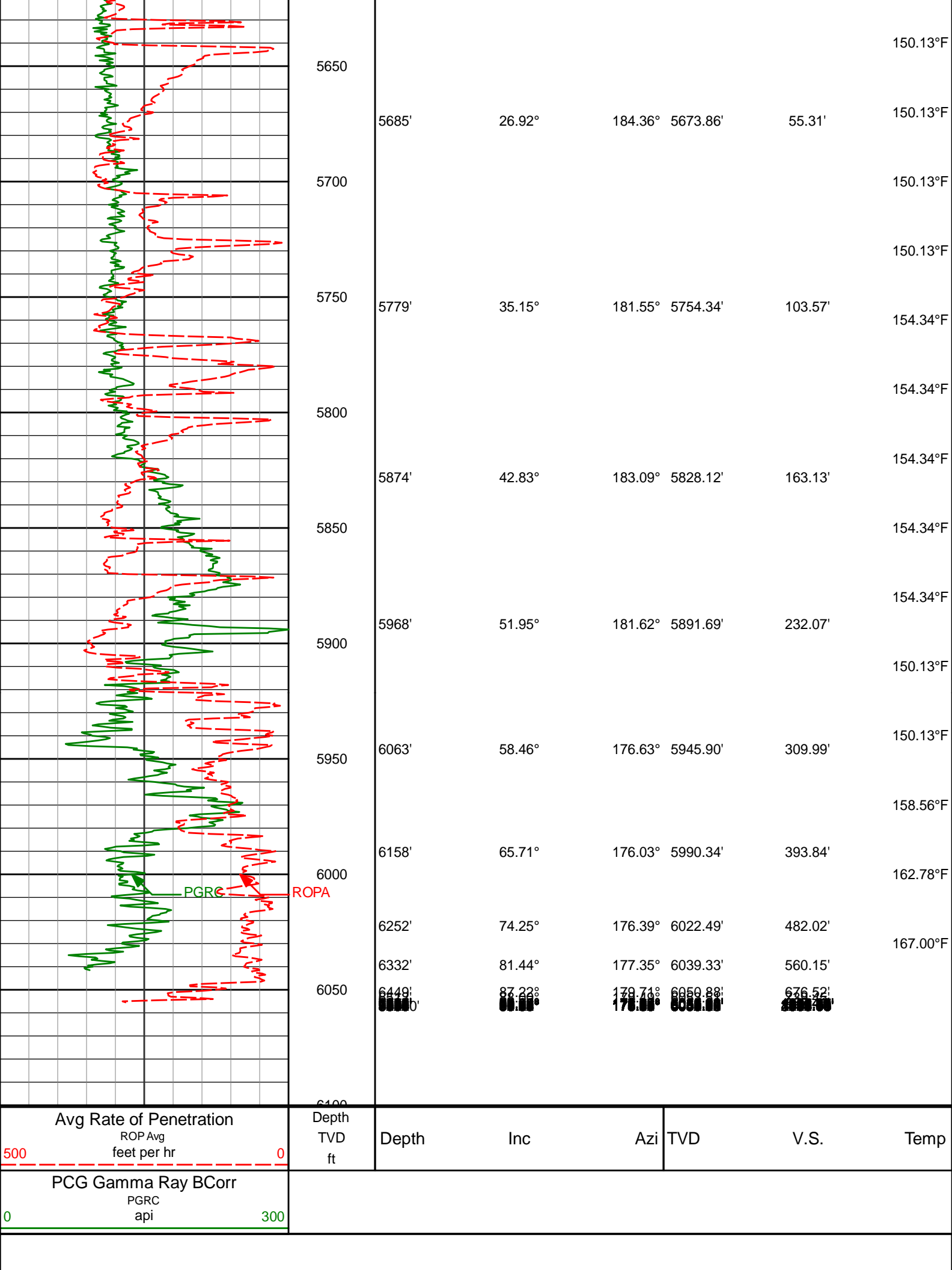
1. All depths are calibrated to the driller's pipe tally and are measured from the Rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
 - ROPA: Average Rate of Penetration is real time data.
 - 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 8.3.0.

WARRANTY

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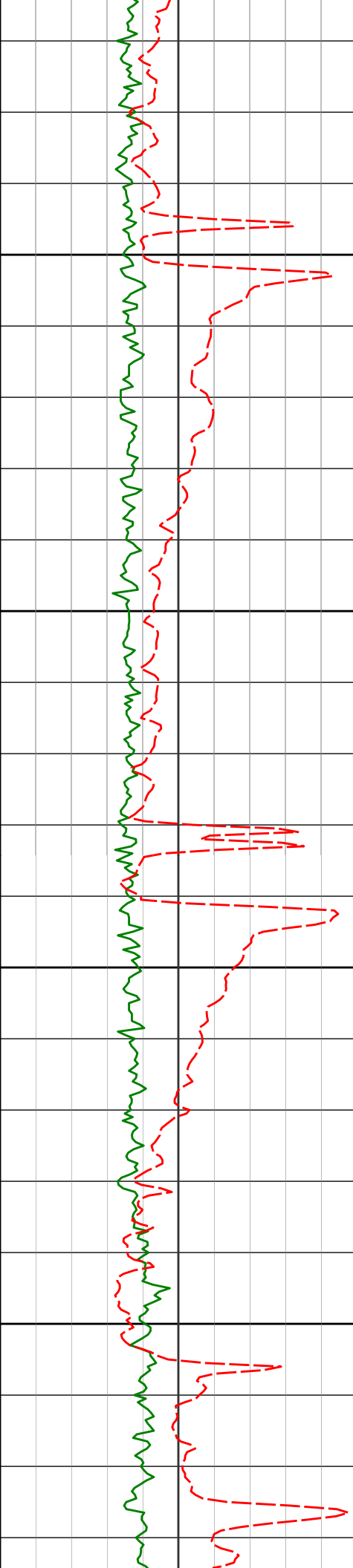
TVD Detail 1:600 Scale





TVD Detail 1:240 Scale

PCG Gamma Ray BCorr PGRC api								
0	300	Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
Avg Rate of Penetration ROP Avg feet per hr								
500	0							
		5400 KOP	5401'	0.25°	247.98°	5400.06'	-8.39'	141.69°F
								141.69°F
		5450						141.69°F
								141.69°F
			5496'	8.35°	189.16°	5494.72'	-1.54'	141.69°F
		5500						



5550

5600

5650

5700

5590'

5685'

17.99°

26.92°

189.52°

184.36°

5586.14'

5673.86'

19.45'

55.31'

145.91°F

145.91°F

145.91°F

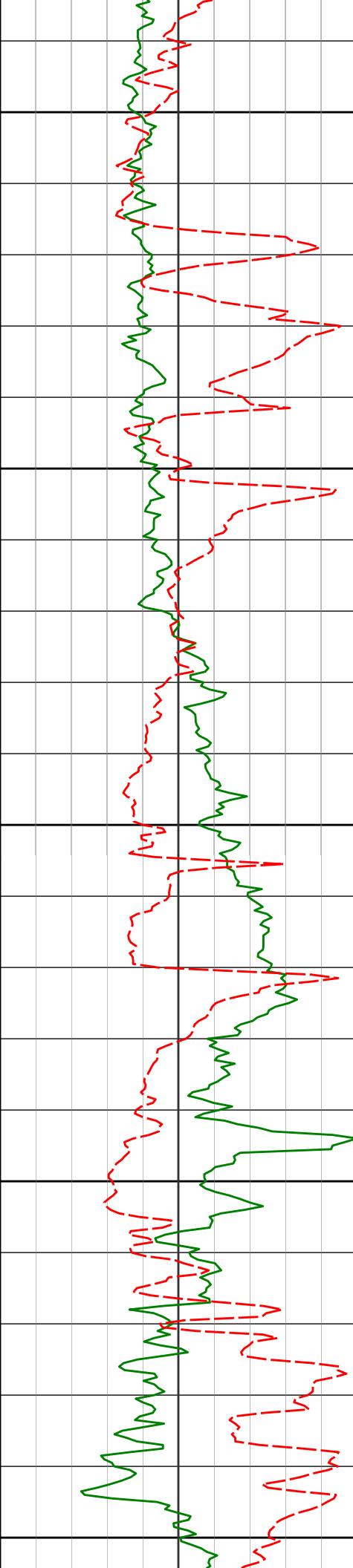
150.13°F

150.13°F

150.13°F

150.13°F

150.13°F



5750

5779'

35.15°

181.55° 5754.34'

103.57'

154.34°F

5800

5874'

42.83°

183.09° 5828.12'

163.13'

154.34°F

5850

5968'

51.95°

181.62° 5891.69'

232.07'

154.34°F

5900

6063'

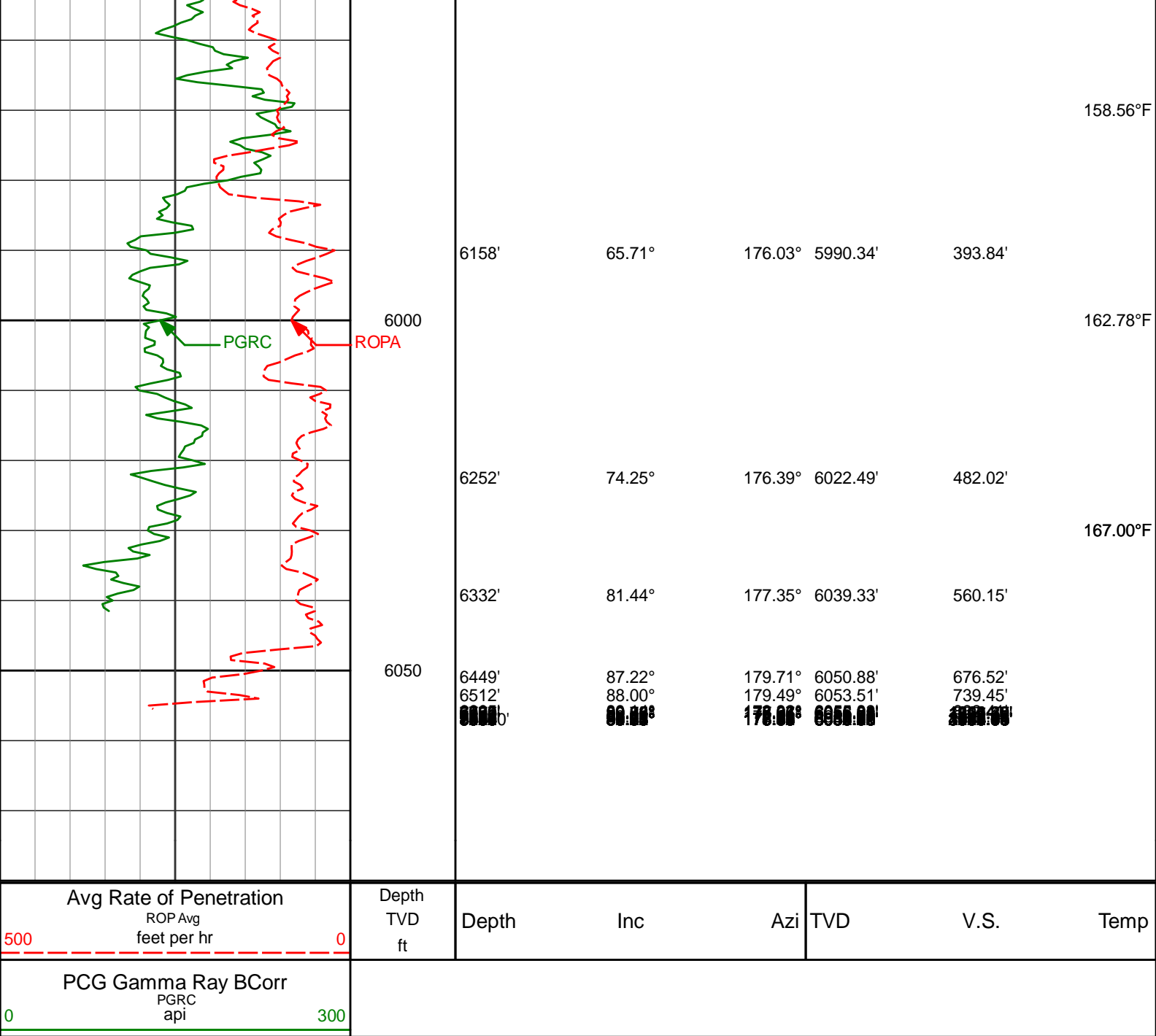
58.46°

176.63° 5945.90'

309.99'

150.13°F

5950



DIRECTIONAL SURVEY REPORT

Noble
Ann LC34-765
Wattenberg
Weld Colorado
USA
CA-XX-0902972916

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
250.00	0.09	75.23	250.00	0.05 N	0.19 E	-0.04	0.04
500.00	0.17	75.23	500.00	0.19 N	0.74 E	-0.17	0.03
645.00	0.22	75.23	645.00	0.32 N	1.22 E	-0.28	0.03
725.00	0.25	75.23	725.00	0.40 N	1.53 E	-0.36	0.04
914.00	0.43	70.01	913.99	0.75 N	2.60 E	-0.67	0.10
1009.00	0.44	69.11	1008.99	1.00 N	3.27 E	-0.90	0.01
1287.00	0.48	100.08	1286.98	1.18 N	5.43 E	-1.02	0.09
1469.00	0.17	78.29	1468.98	1.10 N	6.44 E	-0.90	0.18
1744.00	0.25	100.08	1743.99	1.00 N	5.43 E	-0.90	0.09

1744.00	0.23	129.94	1743.98	0.80 N	7.28 E	-0.58	0.07
1836.00	0.43	136.81	1835.98	0.42 N	7.67 E	-0.18	0.20
1927.00	0.44	160.45	1926.97	0.16 S	8.03 E	0.40	0.20
2019.00	0.31	141.98	2018.97	0.69 S	8.30 E	0.94	0.19
2110.00	0.43	176.24	2109.97	1.22 S	8.47 E	1.48	0.27
2201.00	0.79	165.47	2200.97	2.16 S	8.65 E	2.43	0.42
2293.00	0.79	179.31	2292.96	3.41 S	8.81 E	3.68	0.21
2384.00	0.99	182.88	2383.95	4.82 S	8.78 E	5.08	0.23
2476.00	1.10	184.24	2475.93	6.50 S	8.68 E	6.76	0.12
2568.00	1.09	175.54	2567.91	8.25 S	8.68 E	8.51	0.18
2660.00	1.03	187.02	2659.90	9.94 S	8.65 E	10.20	0.24
2846.00	1.29	180.82	2845.86	13.68 S	8.41 E	13.93	0.15
2940.00	1.41	180.10	2939.83	15.90 S	8.40 E	16.14	0.14
3035.00	1.38	177.95	3034.81	18.21 S	8.44 E	18.46	0.07
3129.00	1.35	181.95	3128.78	20.45 S	8.44 E	20.70	0.10
3224.00	1.20	170.17	3223.76	22.55 S	8.57 E	22.80	0.32
3319.00	0.97	100.39	3318.74	23.67 S	9.53 E	23.95	1.32
3508.00	0.76	108.60	3507.72	24.37 S	12.30 E	24.73	0.13
3603.00	0.86	106.67	3602.71	24.77 S	13.58 E	25.17	0.11
3698.00	0.81	106.13	3697.70	25.16 S	14.91 E	25.60	0.05
3792.00	0.82	103.28	3791.69	25.50 S	16.21 E	25.98	0.04
3887.00	1.13	355.58	3886.68	24.72 S	16.80 E	25.22	1.67
3981.00	1.15	12.54	3980.66	22.88 S	16.93 E	23.38	0.36
4076.00	1.45	17.78	4075.64	20.81 S	17.50 E	21.33	0.34
4171.00	1.43	31.76	4170.61	18.66 S	18.49 E	19.21	0.37
4265.00	1.60	30.69	4264.58	16.53 S	19.78 E	17.13	0.19
4360.00	2.21	320.89	4359.54	13.97 S	19.30 E	14.55	2.35
4455.00	2.14	327.33	4454.47	11.06 S	17.19 E	11.58	0.27
4550.00	2.20	330.06	4549.40	7.99 S	15.32 E	8.45	0.13
4644.00	2.15	332.82	4643.33	4.86 S	13.62 E	5.27	0.12
4739.00	2.05	336.97	4738.27	1.71 S	12.14 E	2.08	0.19
4833.00	1.98	332.44	4832.21	1.27 N	10.73 E	-0.94	0.18
4928.00	1.95	324.76	4927.15	4.05 N	9.04 E	-3.77	0.28
5022.00	2.01	333.49	5021.10	6.83 N	7.38 E	-6.60	0.33
5117.00	0.68	272.89	5116.07	8.35 N	6.08 E	-8.16	1.87
5211.00	0.50	286.67	5210.07	8.49 N	5.13 E	-8.33	0.24
5306.00	0.37	268.47	5305.07	8.60 N	4.43 E	-8.47	0.19
5401.00	0.25	247.98	5400.06	8.52 N	3.93 E	-8.39	0.17
5496.00	8.35	189.16	5494.72	1.62 N	2.63 E	-1.54	8.65
5590.00	17.99	189.52	5586.14	19.49 S	0.86 W	19.45	10.26
5685.00	26.92	184.36	5673.86	55.48 S	4.94 W	55.31	9.61
5779.00	35.15	181.55	5754.34	103.83 S	7.29 W	103.57	8.89
5874.00	42.83	183.09	5828.12	163.51 S	9.78 W	163.13	8.15
5968.00	51.95	181.62	5891.69	232.56 S	12.56 W	232.07	9.77
6063.00	58.46	176.63	5945.90	310.48 S	11.24 W	309.99	8.10
6158.00	65.71	176.03	5990.34	394.20 S	5.85 W	393.84	7.65
6252.00	74.25	176.39	6022.49	482.24 S	0.03 W	482.02	9.08
6332.00	81.44	177.35	6039.33	560.28 S	4.24 E	560.15	9.07

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 178.26 DEGREES (GRID)
A TOTAL CORRECTION OF 7.06 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 6332.00 FEET
IS 560.30 FEET ALONG 179.57 DEGREES (GRID)**

final survey is a projection to bit @ TD