



1 : 600 / 1 : 240

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WELL INFORMATION

MWD Run Number	100				
Date run completed	15-Dec-15				
Rig Bit Number	2				
Bit Size (in)	8.750				
Tool Nominal OD (in)	6.750				
Log Start Depth (TVD, ft)	643.00				
Log End Depth (TVD, ft)	5,939.18				
Drill or Wipe	Drill				
Drill/Wipe Start Date and Time	14-Dec-15 08:00				
Drill/Wipe End Date and Time	15-Dec-15 13:00				
Min Inc (deg) @ Depth (TVD, ft)	0.38 @ 643.00				
Max Inc (deg) @ Depth (TVD, ft)	85.30 @ 5,939.18				
Bit TFA(in2) / Bit Type	0.98 / PDC				
Flow Rate (gpm)	576.25				
Max AV (fpm) / CV (fpm) @ MWD	450.0 / 550.0				
Fluid Type	Native/Spud Mud				
Density (ppg) / Viscosity (spqt)	9.65 / 39.00				
Filtrate CL (ppm)	1,400.00				
pH / Fluid Loss (mptm)	8.60 / 5				
PV (cP) / YP (lbf2)	12 / 11.00				
% Solids / % Sand	10.20 / 0.15				
% Oil / Oil:Water Ratio	1 / N/A				
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	100.00 / PDC				

Max Tool Temp (degF) / Source	163.20 / 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	12230081				
Date and Time Initialized	13-Dec-15 18:52				
Date and Time Read	15-Dec-15 21:19				
ECMB SW Version	N/A				

Directional Sensor Information

Tool Type	PCDC				
Distance From Bit (ft)	55.00				
Software Version	6.21				
Sub Serial Number	11619287				
Sonde Serial Number	11062116				
Sensor ID Number	N/A				
Toolface Offset (deg)	110.30				

Gamma Ray Sensor Information

Tool Type	PCG				
Distance From Bit (ft)	43.12				
Recorded Sample Period (sec)	10				
Software Version	8.15				
Sub Serial Number	11619287				
Insert/Sonde Serial Number	12037419				

REMARKS

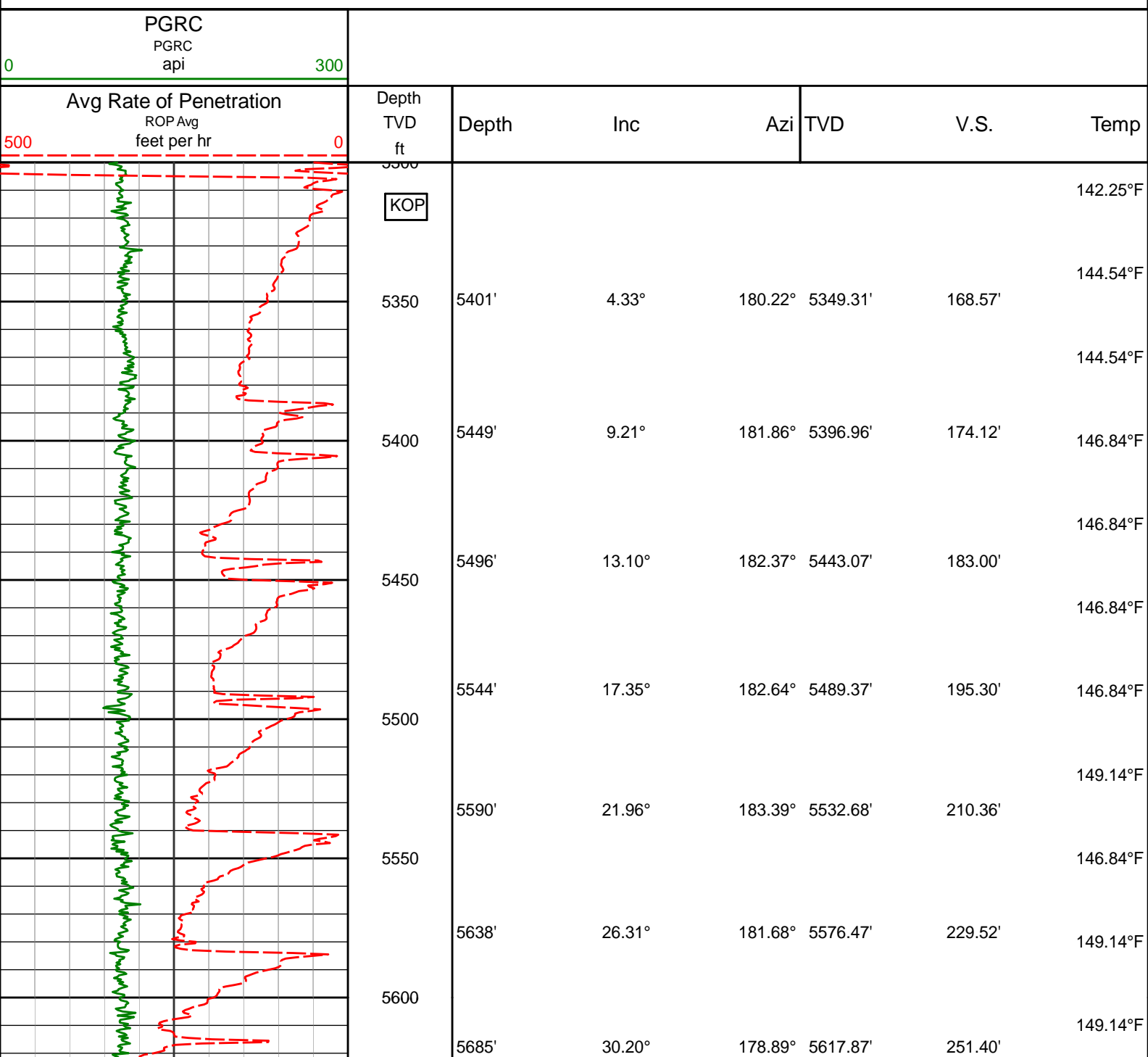
1. All depths are calibrated to the driller's pipe tally and are measured from the Rig drill floor.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
 - ROPA: Average Rate of Penetration is real time data.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

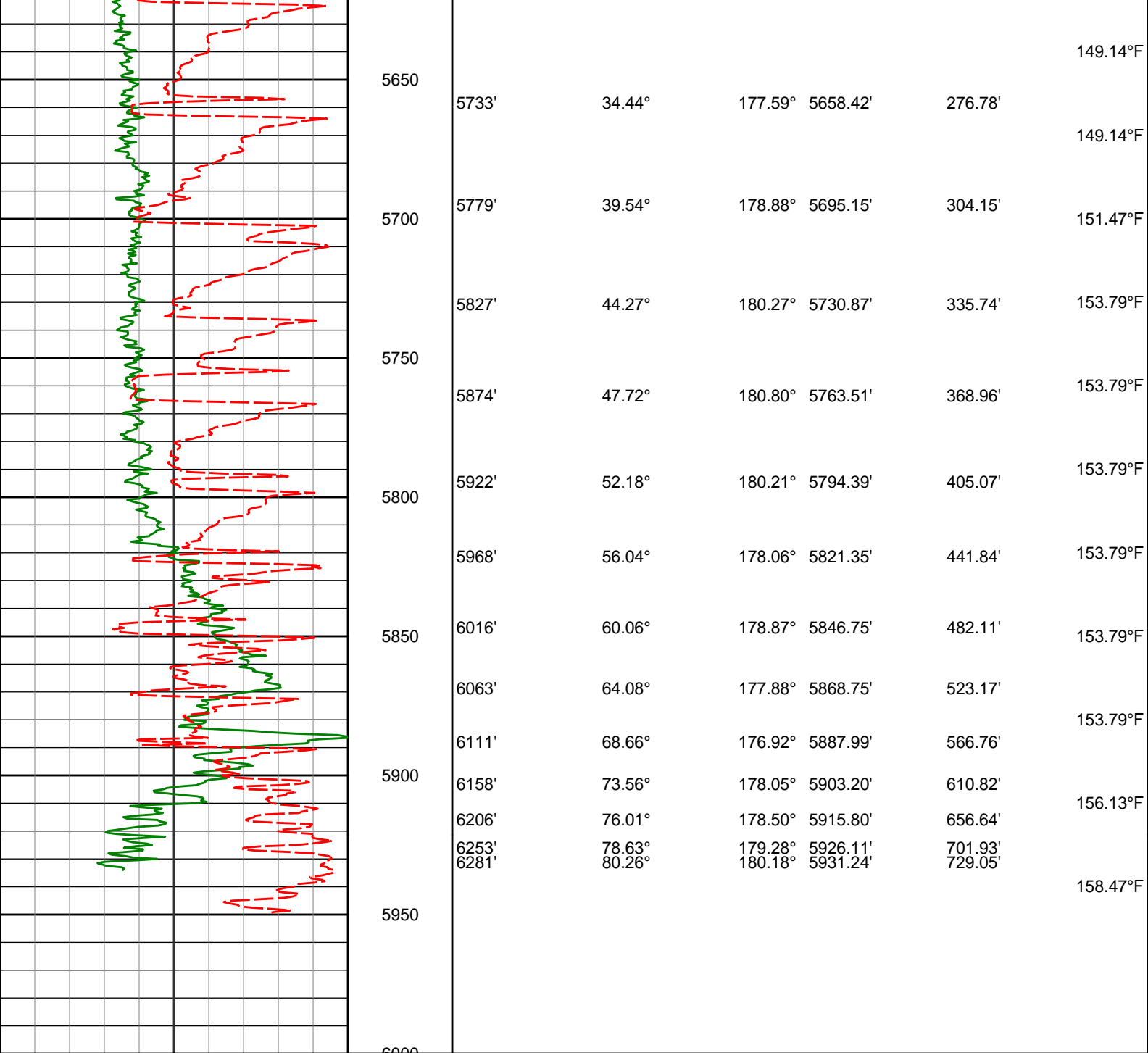
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TVD Detail 1:600 Scale

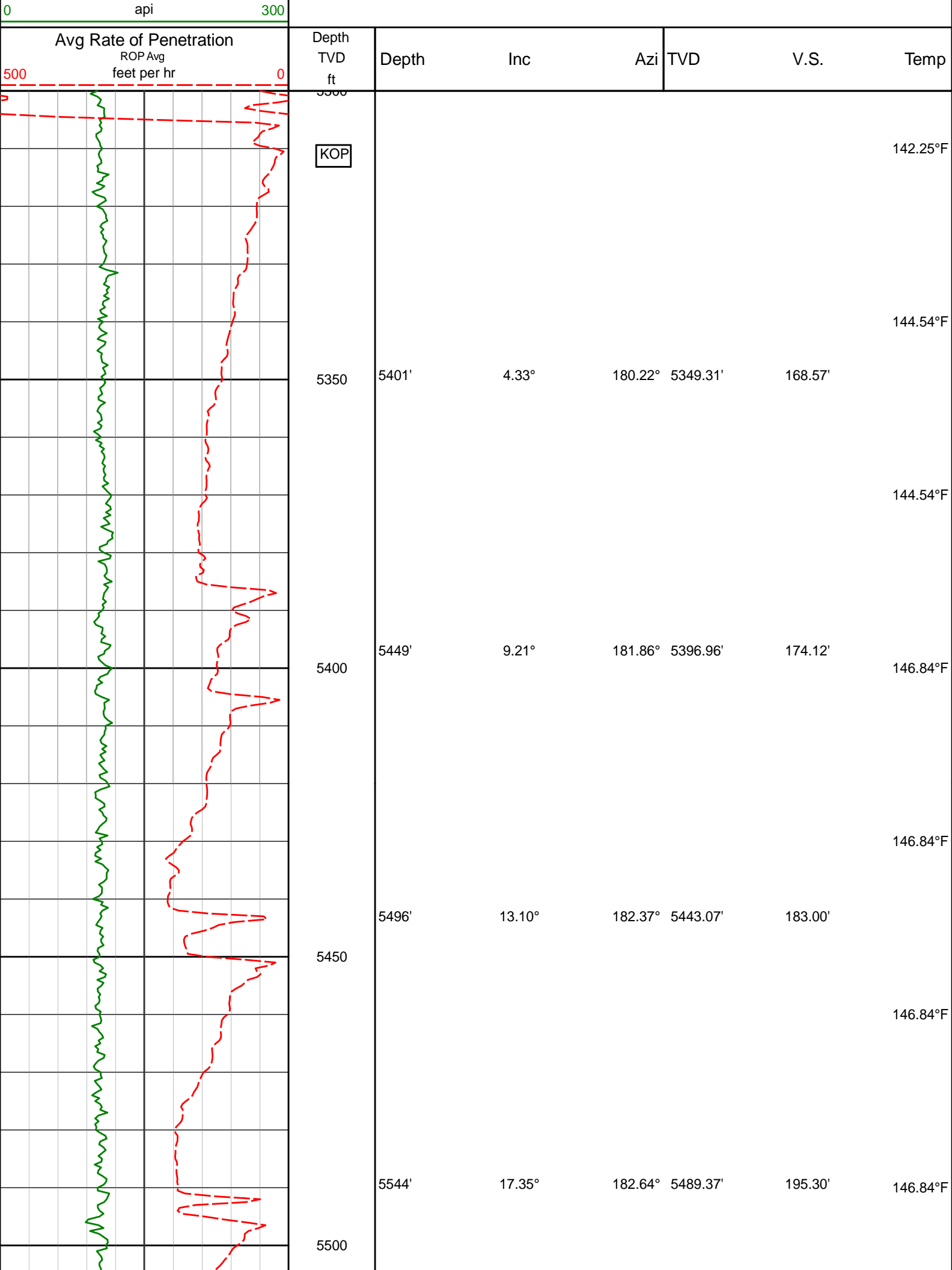


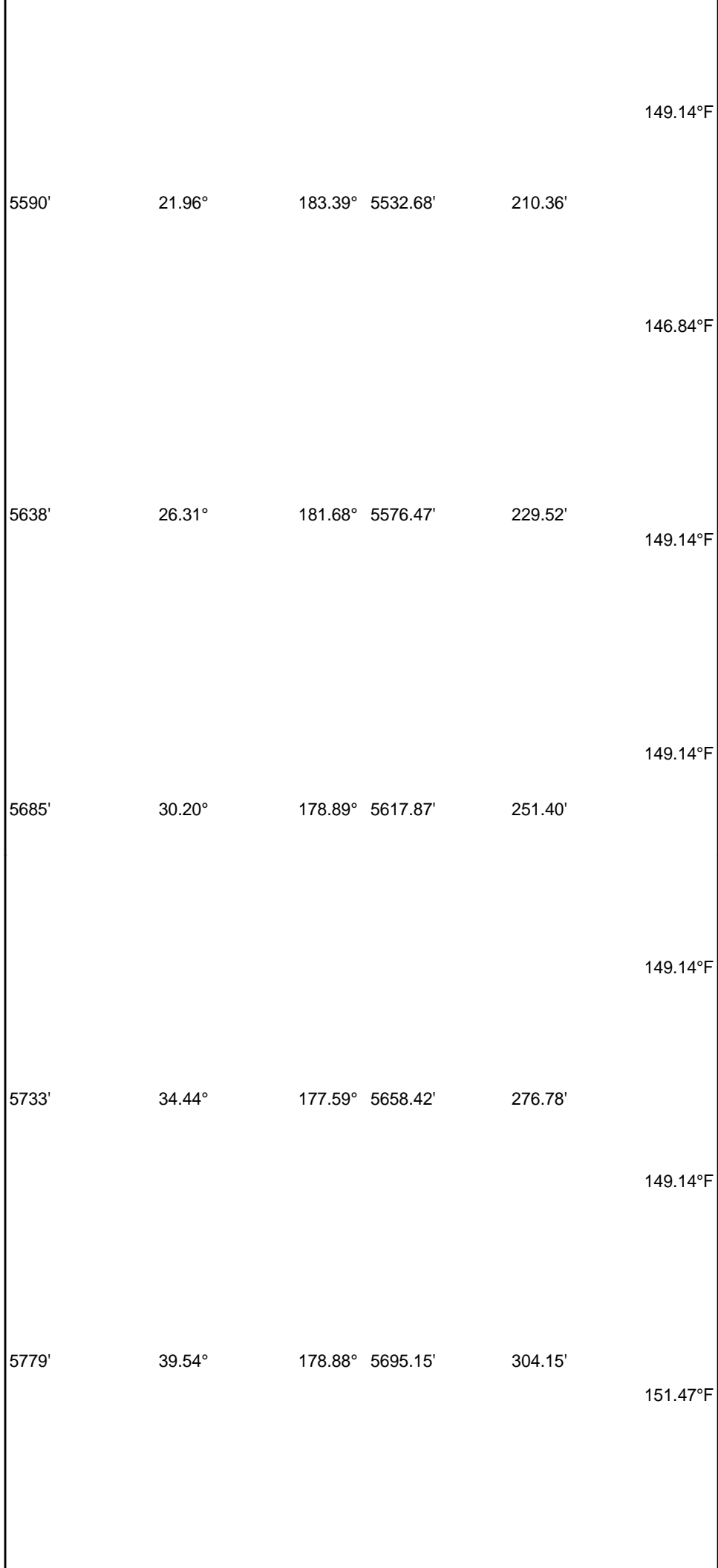
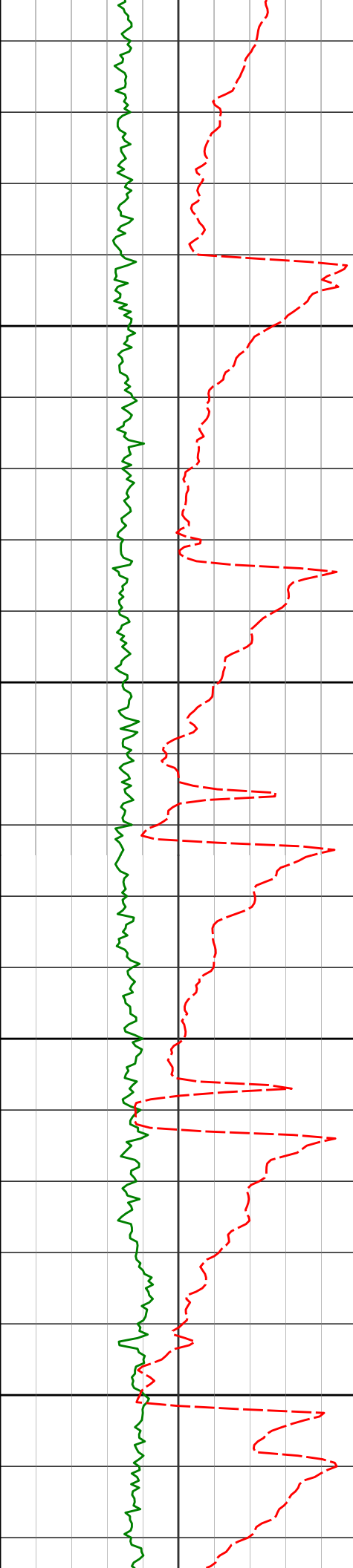


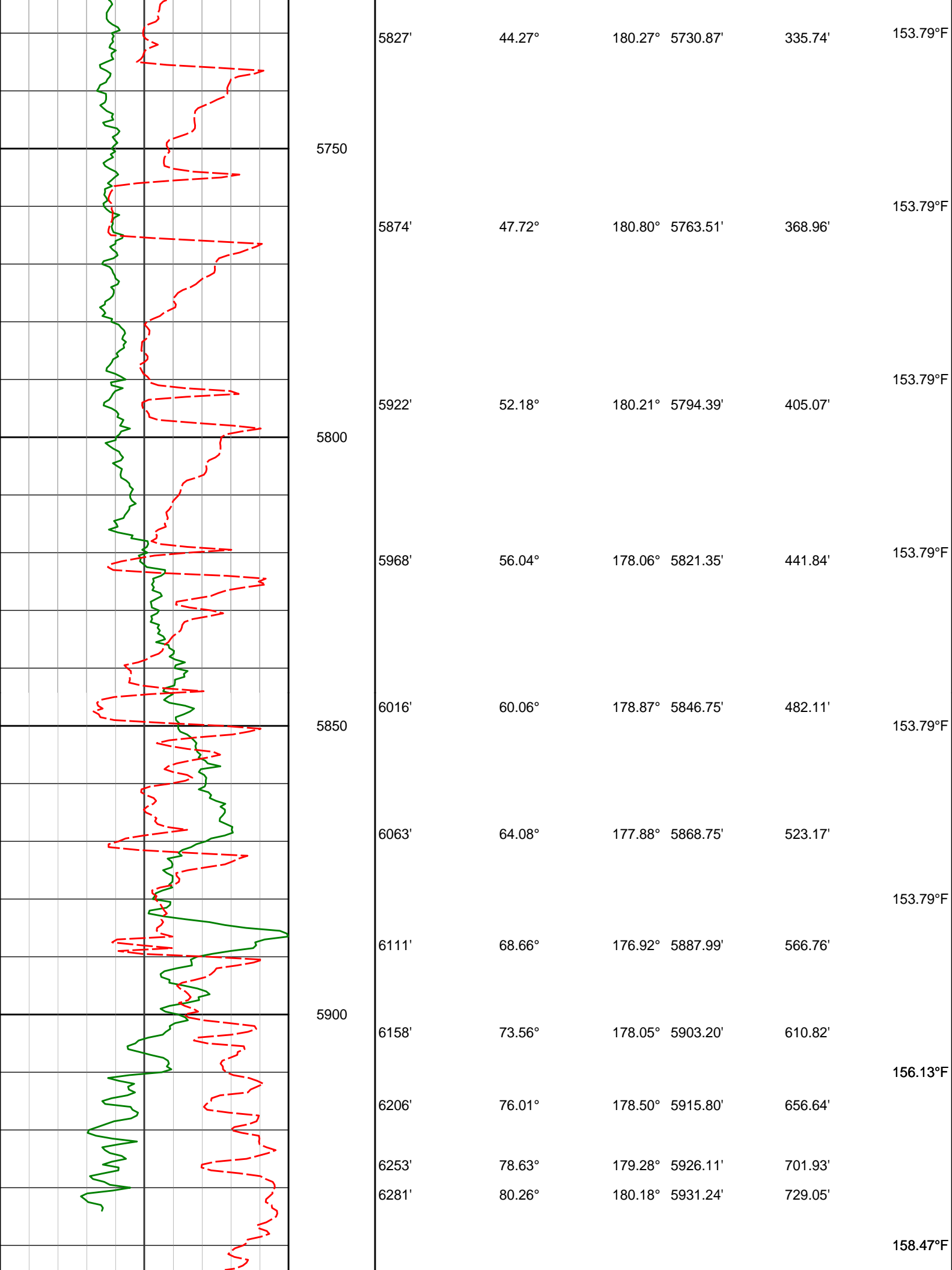
Avg Rate of Penetration ROP Avg feet per hr		Depth TVD ft	Depth	Inc	Azi	TVD	V.S.	Temp
PGRC PGRC api								

TVD Detail 1:240 Scale

PGRC PGRC	
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DIRECTIONAL SURVEY REPORT

**Noble Energy
Ann LC34-755
Wattenberg
Weld Colorado
USA
CA-XX-0902972914**

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	0.15	147.32	250.00	0.28 S	0.18 E	0.30	0.06
500.00	0.30	147.32	500.00	1.10 S	0.71 E	1.21	0.06
643.00	0.38	147.32	643.00	1.82 S	1.16 E	1.99	0.06
725.00	0.43	147.32	724.99	2.30 S	1.48 E	2.53	0.06
914.00	0.68	140.23	913.98	3.76 S	2.57 E	4.15	0.14
1009.00	2.39	117.39	1008.95	5.10 S	4.69 E	5.85	1.88
1103.00	2.08	112.05	1102.88	6.64 S	8.02 E	7.95	0.40
1195.00	4.29	98.12	1194.73	7.76 S	12.97 E	9.91	2.53
1287.00	6.29	101.52	1286.33	9.25 S	21.31 E	12.84	2.19
1378.00	7.86	98.07	1376.64	11.12 S	32.35 E	16.62	1.79
1469.00	8.75	94.83	1466.68	12.57 S	45.41 E	20.35	1.11
1561.00	8.40	90.86	1557.66	13.26 S	59.10 E	23.43	0.75
1652.00	9.57	94.45	1647.54	13.95 S	73.29 E	26.60	1.42
1744.00	8.94	87.66	1738.34	14.25 S	88.06 E	29.49	1.36
1836.00	8.50	85.68	1829.28	13.45 S	101.99 E	31.14	0.58
1927.00	8.64	95.15	1919.27	13.55 S	115.50 E	33.62	1.56
2019.00	9.78	94.80	2010.08	14.83 S	130.17 E	37.45	1.24
2110.00	9.49	90.78	2099.80	15.57 S	145.38 E	40.85	0.80
2201.00	9.54	88.44	2189.55	15.47 S	160.41 E	43.39	0.43
2293.00	9.41	95.64	2280.29	16.00 S	175.52 E	46.57	1.30
2384.00	9.30	92.48	2370.08	17.05 S	190.27 E	50.19	0.58
2476.00	8.91	92.08	2460.92	17.63 S	204.82 E	53.31	0.43
2568.00	9.55	101.49	2551.74	19.41 S	219.41 E	57.63	1.78
2660.00	9.49	100.24	2642.47	22.28 S	234.35 E	63.07	0.23
2845.00	10.27	100.58	2824.73	28.02 S	265.58 E	74.20	0.43
2940.00	9.95	99.06	2918.25	30.87 S	282.01 E	79.89	0.44
3035.00	9.02	96.03	3011.95	32.94 S	297.52 E	84.65	1.11
3224.00	9.14	87.05	3198.59	33.72 S	327.24 E	90.64	0.75
3319.00	10.37	91.62	3292.22	33.58 S	343.32 E	93.32	1.53
3414.00	10.56	91.38	3385.64	34.03 S	360.57 E	96.79	0.21
3508.00	11.11	95.11	3477.96	35.04 S	378.20 E	100.89	0.95
3603.00	11.54	94.54	3571.11	36.61 S	396.79 E	105.69	0.47

3698.00	10.92	94.72	3664.30	38.10 S	415.23 E	110.40	0.66
3792.00	10.76	92.74	3756.62	39.26 S	432.87 E	114.63	0.43
3887.00	10.48	91.44	3849.99	39.90 S	450.36 E	118.34	0.39
3981.00	9.89	87.14	3942.51	39.71 S	466.98 E	121.07	1.02
4076.00	9.20	81.14	4036.20	38.13 S	482.63 E	122.26	1.27
4171.00	9.38	89.63	4129.95	36.91 S	497.89 E	123.74	1.45
4265.00	8.39	98.44	4222.83	37.87 S	512.34 E	127.22	1.79
4360.00	10.07	108.20	4316.60	41.48 S	527.09 E	133.36	2.41
4455.00	9.55	107.99	4410.21	46.51 S	542.48 E	141.02	0.55
4550.00	10.06	105.93	4503.82	51.22 S	557.95 E	148.37	0.65
4644.00	10.63	97.52	4596.30	54.61 S	574.43 E	154.60	1.71
4739.00	8.93	88.48	4689.92	55.56 S	590.49 E	158.35	2.40
4833.00	6.95	83.51	4783.02	54.73 S	603.44 E	159.80	2.23
4928.00	5.78	94.80	4877.43	54.48 S	613.93 E	161.40	1.80
5022.00	5.34	92.78	4970.99	55.08 S	623.02 E	163.59	0.52
5117.00	4.33	87.70	5065.65	55.15 S	631.02 E	165.07	1.15
5211.00	3.02	78.50	5159.46	54.52 S	636.99 E	165.49	1.52
5306.00	0.78	62.47	5254.40	53.72 S	640.02 E	165.23	2.40
5401.00	4.33	180.22	5349.31	57.01 S	640.59 E	168.57	5.00
5449.00	9.21	181.86	5396.96	62.66 S	640.45 E	174.12	10.17
5496.00	13.10	182.37	5443.07	71.75 S	640.11 E	183.00	8.28
5544.00	17.35	182.64	5489.37	84.34 S	639.56 E	195.30	8.85
5590.00	21.96	183.39	5532.68	99.79 S	638.73 E	210.36	10.04
5638.00	26.31	181.68	5576.47	119.40 S	637.89 E	229.52	9.17
5685.00	30.20	178.89	5617.87	141.63 S	637.81 E	251.40	8.73
5733.00	34.44	177.59	5658.42	167.28 S	638.62 E	276.78	8.97
5779.00	39.54	178.88	5695.15	194.93 S	639.45 E	304.15	11.20
5827.00	44.27	180.27	5730.87	226.98 S	639.68 E	335.74	10.05
5874.00	47.72	180.80	5763.51	260.78 S	639.36 E	368.96	7.38
5922.00	52.18	180.21	5794.39	297.51 S	639.04 E	405.07	9.35
5968.00	56.04	178.06	5821.35	334.76 S	639.62 E	441.84	9.20
6016.00	60.06	178.87	5846.75	375.47 S	640.70 E	482.11	8.50
6063.00	64.08	177.88	5868.75	416.97 S	641.89 E	523.17	8.76
6111.00	68.66	176.92	5887.99	460.89 S	643.89 E	566.76	9.70
6158.00	73.56	178.05	5903.20	505.30 S	645.84 E	610.82	10.69
6206.00	76.01	178.50	5915.80	551.59 S	647.23 E	656.64	5.17
6253.00	78.63	179.28	5926.11	597.43 S	648.12 E	701.93	5.81
6281.00	80.26	180.18	5931.24	624.96 S	648.25 E	729.05	6.62

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 169.89 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 6281.00 FEET
IS 900.44 FEET ALONG 133.95 DEGREES (GRID)**