HALLIBURTON | Sperry Drilling

PCDC - Pressure Case Directional
PCGK - Pressure Case Gamma

1 : 240

Company	: **Noble Energy**
Rig	: **H&P 322**
Well	: **Wells Ranch USX AE07-63-1HN**
Field	: **Wattenberg**
Country	: **USA**
API Number	: **05-123-37084**

Country	: **USA**
Field	: **Wattenberg**
Location	: **Lat: 40° 29' 48.05" North** **Long: 104° 22' 31.62" West**
Well	: **Wells Ranch USX AE07-63-1HN**
Company	: **Noble Energy**
Rig	: **H&P 322**

LOCATION

Latitude : **40° 29' 48.05" North**
Longitude : **104° 22' 31.62" West**
UTM Easting = 3312743.777 ft
UTM Northing = 1425764.297 ft

Other Services
Directional Drilling

Elev. KB **N/A**
DF **4879.00 ft**
GL **4855.00 ft**
WD **N/A**

Permanent Datum : **Ground Level** Elevation : **4855.00 ft**
Log Measured From : **Drill Floor** **24.00 ft** Above Permanent Datum
Drilling Measured From : **Drill Floor**

MD LOG

Depth Logged : **665.00 ft** To **11,122.00 ft**
Date Logged : **30-Jun-13** To **07-Jul-13**
Total Depth MD : **11,122.00 ft** TVD: **6,656.57 ft**
Spud Date : **30-Jun-13**

Unit No. : **11210425**
Plot Type : **Final**
Plot Date : **07-Jul-13**
Job No. :**CA-XX-090054019**

Borehole Record (MD)

Run No.	Size	From	To
2	8.750 in	665.00 ft	5,895.00 ft
3	8.750 in	5,895.00 ft	7,023.00 ft
4	6.125 in	7,023.00 ft	11,122.00 ft

Borehole Record (MD)

Run No.	Size	From	To

Casing Record (MD)

Size	Weight	From	To
9.625 in	36.00 lbpf	SURFACE	655.00 ft
7.000 in	26.00 lbpf	SURFACE	7,013.00 ft

WELL INFORMATION

MWD Run Number	100	200	300		
Date run completed	02-Jul-13	04-Jul-13	07-Jul-13		
Rig Bit Number	2	3	4		
Bit Size (in)	8.750	8.750	6.125		
Tool Nominal OD (in)	6.750	6.750	4.750		
Log Start Depth (MD, ft)	665.00	5,895.00	7,023.00		
Log End Depth (MD, ft)	5,895.00	7,023.00	11,122.00		
Drill or Wipe	Drill	Drill	Drill		
Drill/Wipe Start Date and Time	01-Jul-13 20:00	03-Jul-13 03:15	05-Jul-13 13:15		
Drill/Wipe End Date and Time	02-Jul-13 18:00	04-Jul-13 01:45	06-Jul-13 21:48		
Min Inc (deg) @ Depth (MD, ft)	.11 @ 1,010.00	.51 @ 5,931.00	85.50 @ 7,041.00		
Max Inc (deg) @ Depth (MD, ft)	13.06 @ 2,710.00	81.99 @ 6,968.00	91.51 @ 11,054.00		
Bit TFA(in2) / Bit Type	.78 / PDC	.90 / PDC	.46 / PDC		
Flow Rate (gpm)	581.88	550.85	270.00		
Max AV (fpm) / CV (fpm) @ MWD	462.9 / 462.9	427.3 / 427.3	529.2 / 529.2		
Fluid Type	Fresh Water Gel	Fresh Water Gel	Fresh Water Gel		
Density (ppg) / Viscosity (spqt)	8.90 / 28.00	10.75 / 37.00	10.80 / 34.00		
Filtrate CL (ppm)	2,100.00	2,500.00	2200.0		
pH / Fluid Loss (mptm)	8.70 / N/A	9.50 / N/A	10.50 / N/A		
PV (cP) / YP (lhf2)	2 / 4.00	11 / 9.50	8 / 7.00		
% Solids / % Sand	4.00 / 0.25	11.2 / .25	6.70 / 0.50		
% Oil / Oil:Water Ratio	N/A / N/A	N/A / N/A	N/A / N/A		
Rm @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmf @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Rmc @ Measured Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		

Max Tool Temp (degF) / Source	150.10 / PCM	167.97 / PCM	213.40 / PCM		
Rm @ Max Tool Temp (degF)	N/A @ N/A	N/A @ N/A	N/A @ N/A		
Lead MWD Engineer	Robert Ley	Robert Ley	Robert Ley		
Customer Representative	Charles Collver	Charles Collver	Charles Collver		

SENSOR INFORMATION

Downhole Processor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	5.84		
Sub Serial Number	11254959	11254959	11675320		
Insert Serial Number	11145581	11145581	10868872		
Date and Time Initialized	30-Jun-13 18:54	30-Jun-13 18:54	04-Jul-13 06:03		
Date and Time Read	04-Jul-13 07:59	04-Jul-13 07:53	07-Jul-13 06:35		
ECMB SW Version	N/A	N/A	N/A		

Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	58.00	55.00	68.00		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11254959	11254959	11675320		
Sonde Serial Number	11833052	11833052	11638497		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	345.33	354.50	68.82		

Gamma Ray Sensor Information

Tool Type	PCG	PCG	PCG		
Distance From Bit (ft)	50.80	48.18	61.55		
Recorded Sample Period (sec)	10	10	10		
Software Version	8.15	8.15	8.15		
Sub Serial Number	11254959	11254959	11675320		
Insert/Sonde Serial Number	11579768	11579768	11579852		

REMARKS

1. All depths are measured depths and are calibrated to the driller' pipe tally and are measured from the 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.

4. The Following smoothing parameters have been applied to the data"

PGRC (Gamma Ray Corrected):
Interval Resolution: 0.5 feet
Coercion Distance: 0.6 feet
Gap Fill: 3.0 feet

ROPA (Rate of Penetration):
Interval Resolution: 0.5 feet
Coercion Distance: 1.2 feet
Gap Fill: 3.0 feet

Insite Version 7.3.40 build 25

5. Survey at TD is projected to the bit

WARRANTY

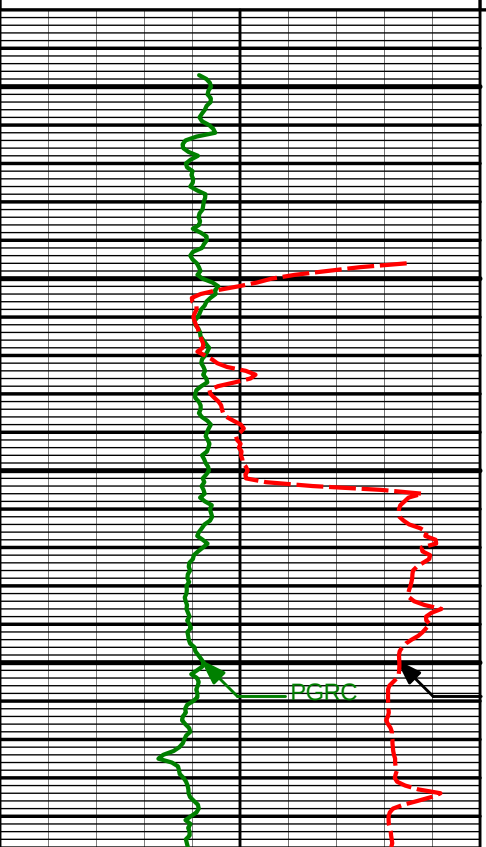
HALLIBURTON WILL USE ITS BEST EFFORTS TO FURNISH CUSTOMERS WITH ACCURATE INFORMATION AND INTERPRETATIONS THAT ARE PART OF, AND INCIDENT TO, THE SERVICES PROVIDED. HOWEVER, HALLIBURTON CANNOT AND DOES NOT WARRANT THE ACCURACY OR CORRECTNESS OF SUCH INFORMATION AND INTERPRETATIONS. UNDER NO CIRCUMSTANCES SHOULD ANY SUCH INFORMATION OR INTERPRETATION BE RELIED UPON AS THE SOLE BASIS FOR ANY DRILLING, COMPLETION, PRODUCTION, OR FINANCIAL DECISION OR ANY PROCEDURE INVOLVING ANY RISK TO THE SAFETY OF ANY DRILLING VENTURE, DRILLING RIG OR ITS CREW OR ANY OTHER THIRD PARTY. THE CUSTOMER HAS FULL RESPONSIBILITY FOR ALL DRILLING, COMPLETION AND PRODUCTION OPERATION. HALLIBURTON MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WITH RESPECT TO THE SERVICES RENDERED. IN NO EVENT WILL HALLIBURTON BE LIABLE FOR FAILURE TO OBTAIN ANY PARTICULAR RESULTS OR FOR ANY DAMAGES, INCLUDING, BUT NOT LIMITED TO, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, RESULTING FROM THE USE OF ANY INFORMATION OR INTERPRETATION PROVIDED BY HALLIBURTON.

HALLIBURTON

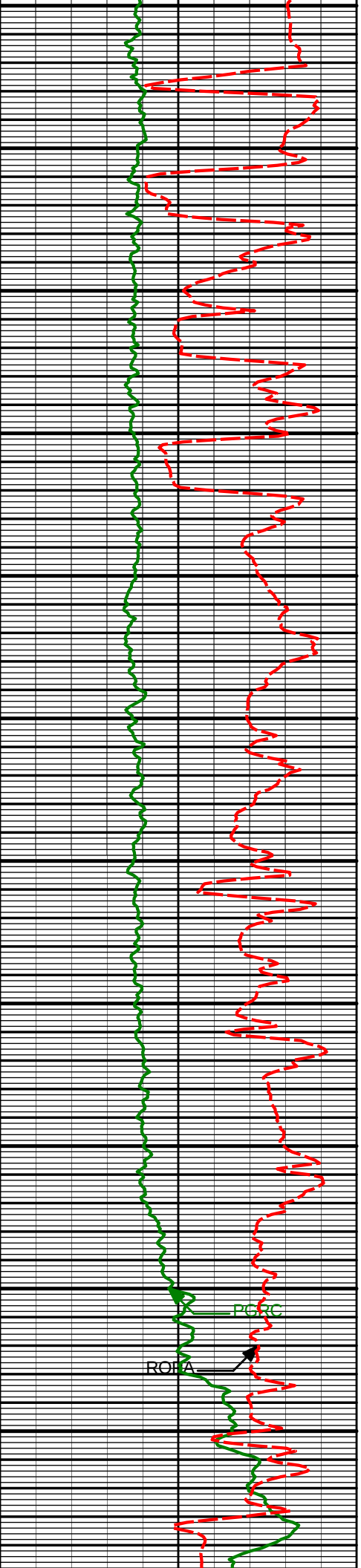
MD Detail Log 1:600

Gamma Ray
(PGRC)
(Api)
0 300

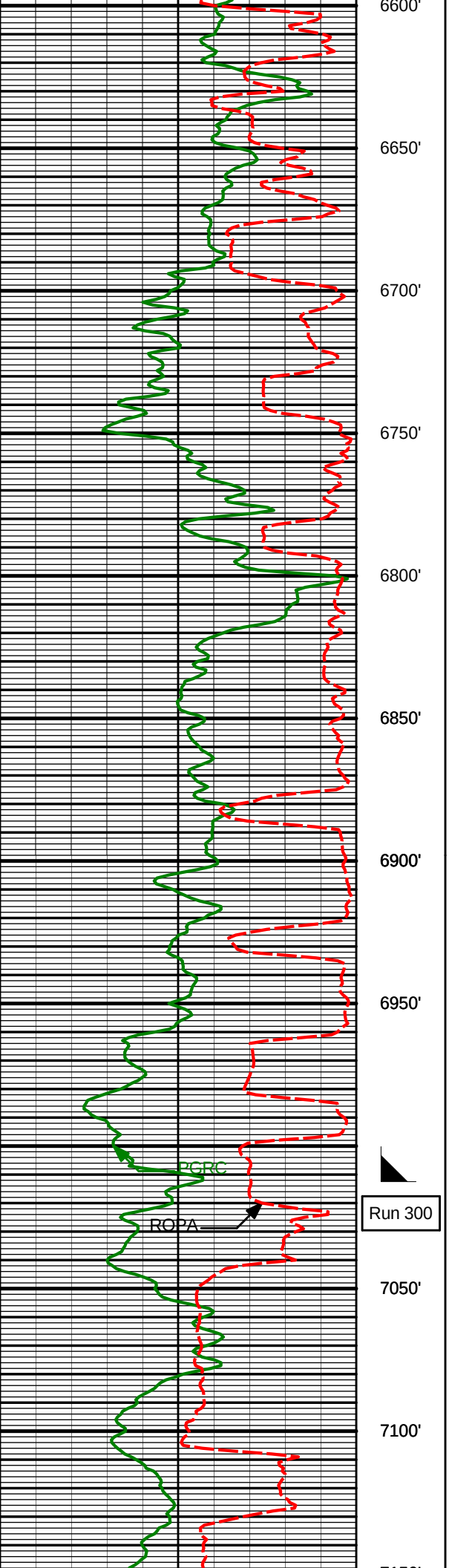
Avg Rate of Penetration
feet per hr
600 0



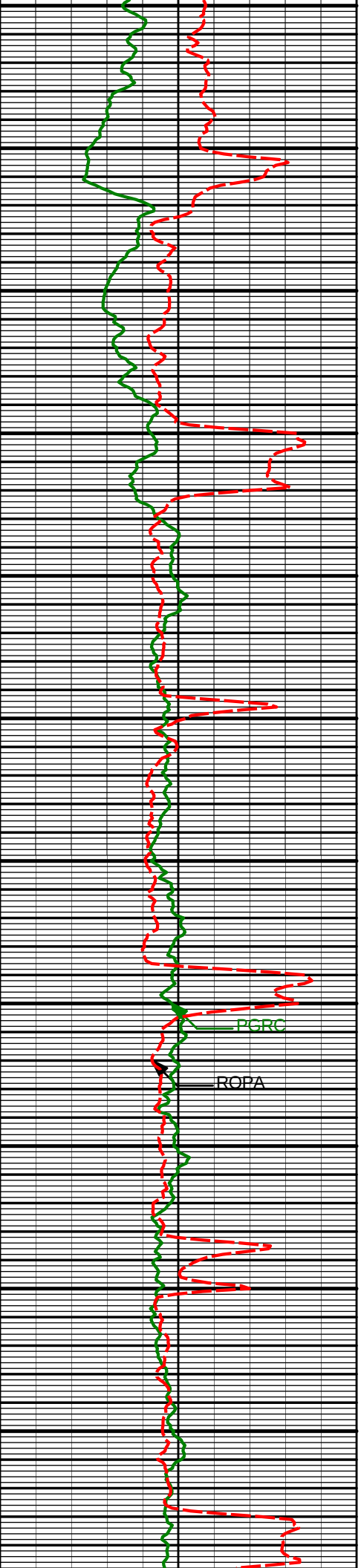
Feet	Depth	Inc	Azm	TVD	Vsec
	5837'	0.23°	282.45°	5818.73'	121.13'
	5931'	0.51°	286.51°	5912.73'	120.54'
	5978'	1.90°	59.95°	5959.72'	121.02'
	6025'	7.11°	87.45°	6006.57'	124.60'



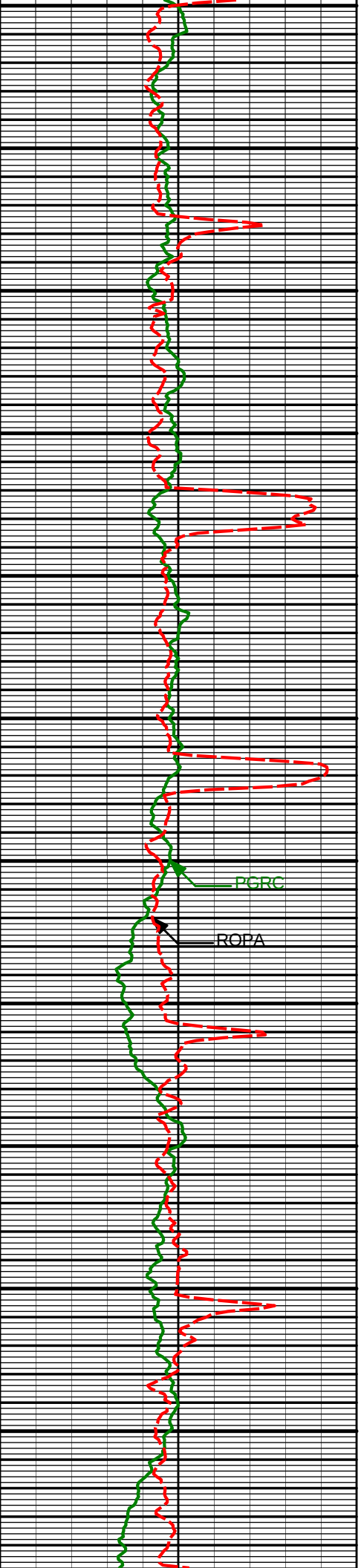
6072'	12.01°	93.07°	6052.90'	132.39'
6120'	15.16°	99.00°	6099.55'	143.59'
6167'	17.93°	102.13°	6144.60'	156.75'
6215'	19.97°	98.44°	6190.00'	172.11'
6262'	24.02°	92.30°	6233.58'	189.62'
6310'	28.21°	88.69°	6276.67'	210.74'
6357'	30.83°	91.11°	6317.56'	233.89'
6405'	34.56°	91.01°	6357.95'	259.81'
6499'	44.43°	91.91°	6430.41'	319.51'
6546'	50.64°	93.56°	6462.12'	354.13'
6594'	53.49°	92.51°	6491.63'	391.94'



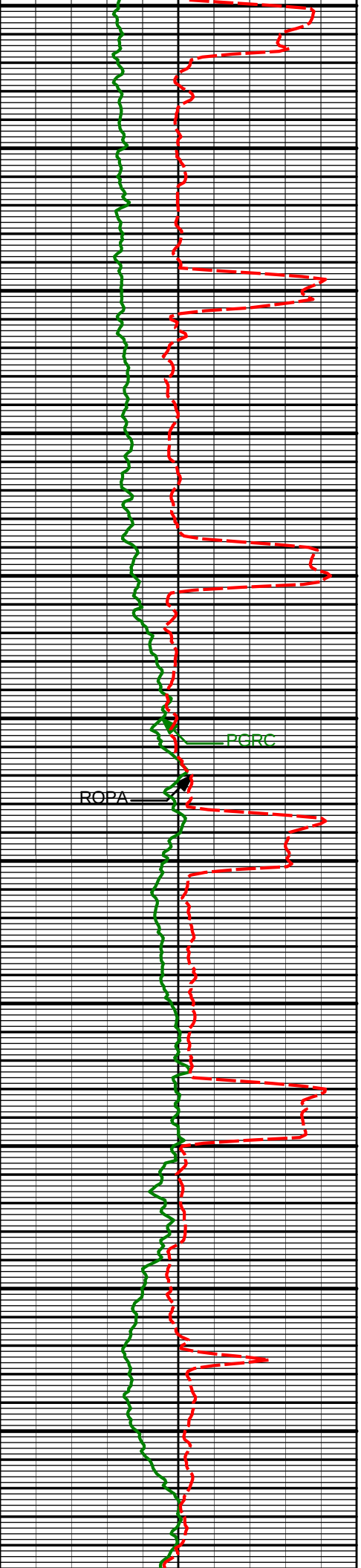
6641'	56.20°	90.97°	6518.69'	430.35'
6689'	59.13°	88.55°	6544.36'	470.90'
6736'	62.07°	87.58°	6567.43'	511.81'
6784'	64.26°	87.98°	6589.10'	554.59'
6831'	68.69°	90.36°	6607.86'	597.66'
6879'	73.67°	91.18°	6623.34'	643.08'
6926'	79.15°	90.29°	6634.38'	688.74'
6968'	81.99°	88.33°	6641.27'	730.16'
7041'	85.50°	87.24°	6649.22'	802.64'
7136'	86.64°	88.39°	6655.73'	897.32'



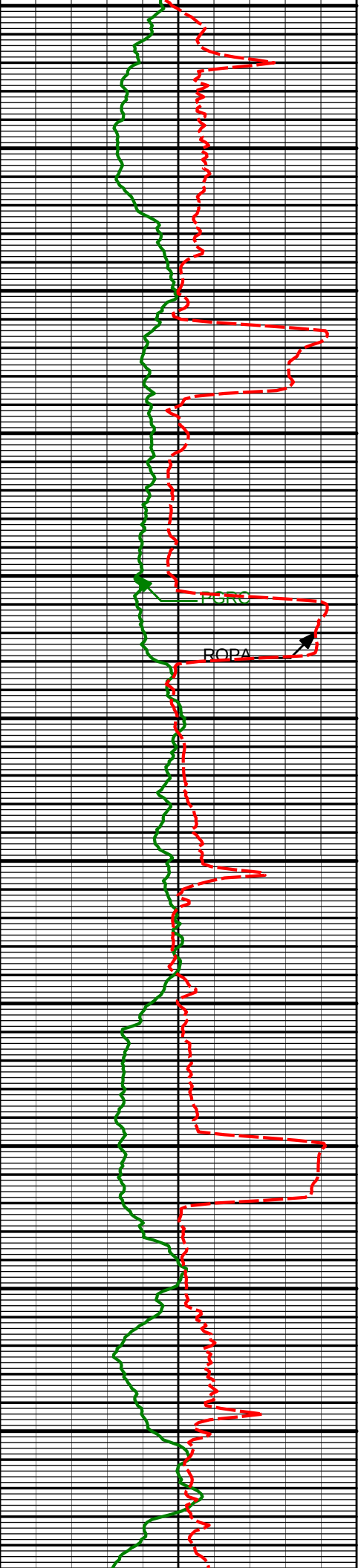
7231'	86.79°	87.77°	6661.17'	992.08'
7326'	88.86°	88.80°	6664.77'	1086.95'
7421'	90.22°	88.98°	6665.54'	1181.91'
7517'	89.69°	89.03°	6665.62'	1277.88'
7612'	90.62°	88.74°	6665.36'	1372.85'



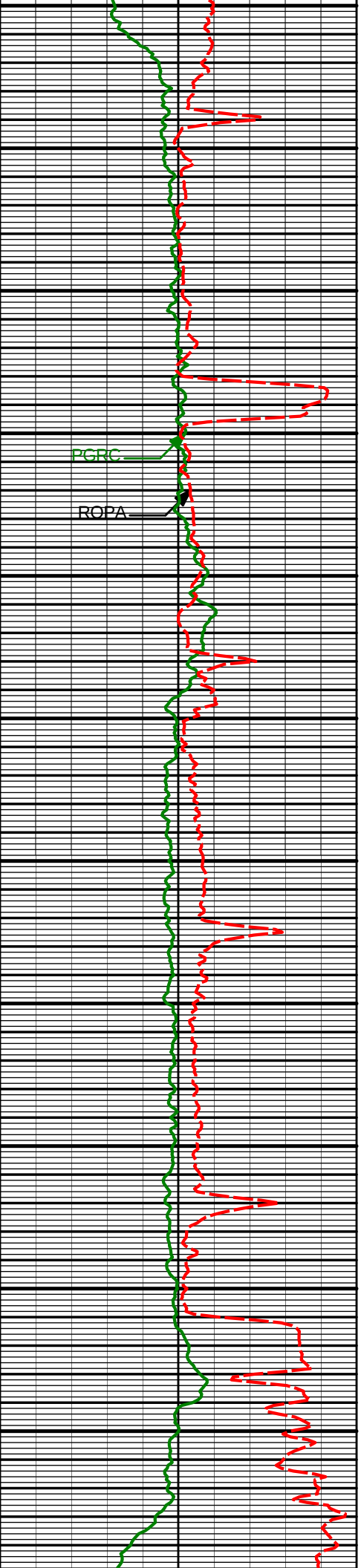
7707'	89.35°	89.20°	6665.39'	1467.82'
7801'	91.11°	89.94°	6665.01'	1561.80'
7896'	90.22°	90.02°	6663.91'	1656.79'
7992'	88.83°	88.82°	6664.71'	1752.77'
8086'	89.32°	87.91°	6666.23'	1846.70'
8181'	91.48°	89.66°	6665.56'	1941.65'



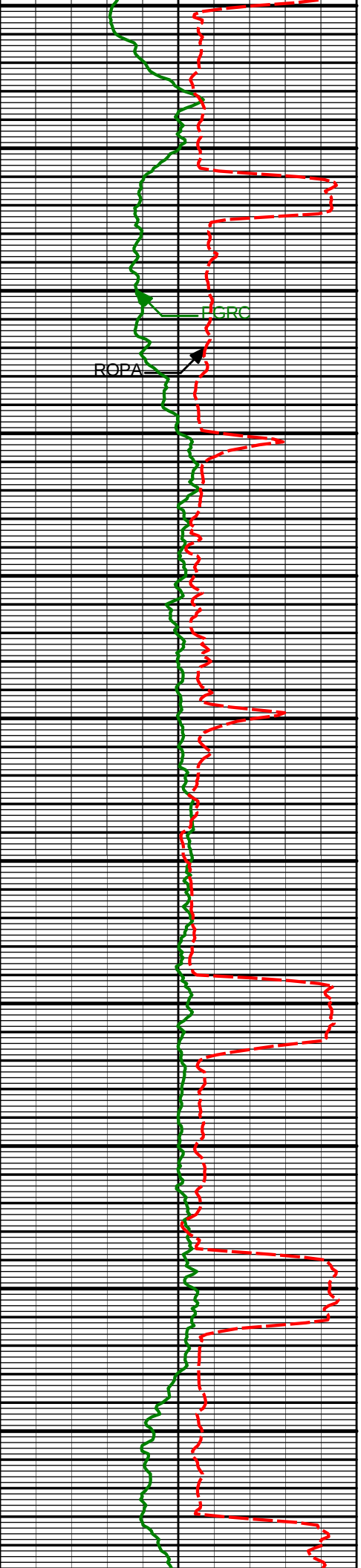
8276'	90.40°	87.19°	6664.00'	2036.57'
8371'	90.09°	87.08°	6663.60'	2131.42'
8466'	91.29°	86.99°	6662.45'	2226.25'
8561'	90.22°	87.65°	6661.19'	2321.10'
8656'	88.61°	89.13°	6662.17'	2416.04'
8750'	89.14°	88.98°	6664.01'	2509.99'



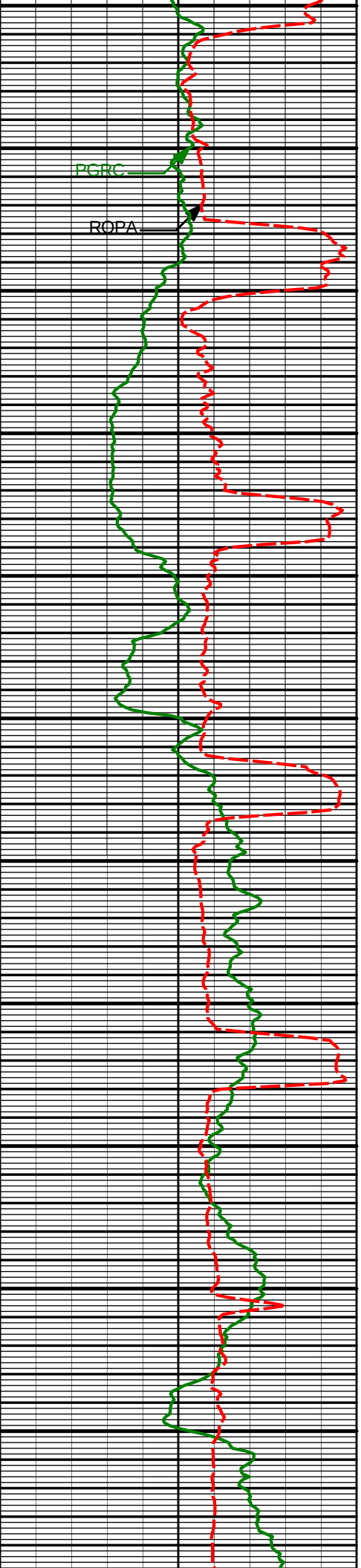
8845'	90.37°	88.45°	6664.42'	2604.95'
8940'	90.09°	88.95°	6664.03'	2699.91'
9035'	89.26°	89.96°	6664.57'	2794.89'
9130'	90.92°	91.52°	6664.42'	2889.88'
9225'	89.08°	90.21°	6664.42'	2984.87'
9320'	89.14°	89.35°	6665.90'	3079.86'



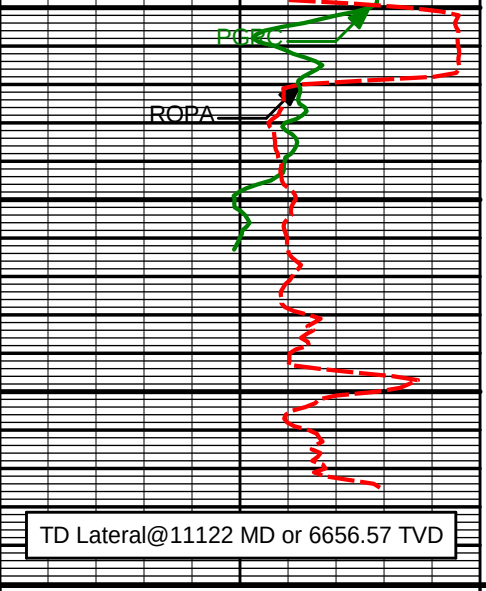
9415'	90.18°	89.53°	6666.46'	3174.84'
9510'	88.64°	87.65°	6667.43'	3269.78'
9605'	89.41°	87.64°	6669.04'	3364.66'
9699'	90.09°	87.21°	6669.44'	3458.53'
9794'	91.51°	87.70°	6668.11'	3553.40'
9889'	91.08°	88.58°	6665.97'	3648.30'



9984'	89.85°	88.82°	6665.20'	3743.25'
10079'	89.75°	88.21°	6665.53'	3838.20'
10173'	90.74°	86.61°	6665.13'	3932.07'
10268'	90.34°	85.95°	6664.23'	4026.82'
10363'	91.42°	88.34°	6662.78'	4121.65'



10458'	88.30°	87.96°	6663.01'	4216.57'
10552'	90.49°	88.86°	6664.00'	4310.50'
10647'	90.52°	89.49°	6663.15'	4405.47'
10742'	90.65°	89.78°	6662.18'	4500.46'
10837'	89.54°	88.93°	6662.03'	4595.44'
10932'	91.45°	88.09°	6661.21'	4690.38'



11000'					
	11027'	91.20°	87.86°	6659.01'	4785.27'
11050'	11054'	91.51°	87.41°	6658.37'	4812.24'
11100'					
	11122'	91.51°	87.41°	6656.57'	4880.12'
11150'					

Avg Rate of Penetration
feet per hr
600 0

Feet

Depth Inc Azm TVD Vsec

Gamma Ray
(PGRC)
(Api)
0 300

HALLIBURTON

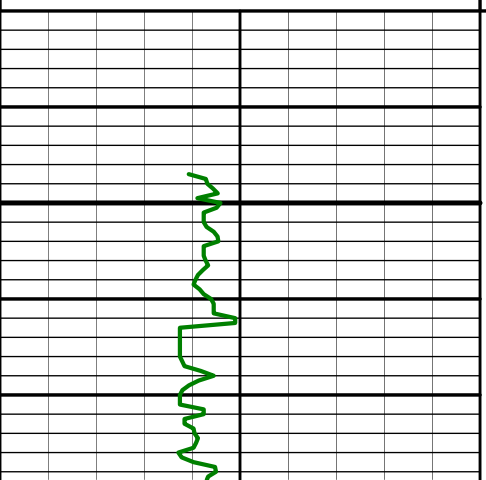
MD Detail Log 1:240

Gamma Ray
(PGRC)
(Api)
0 300

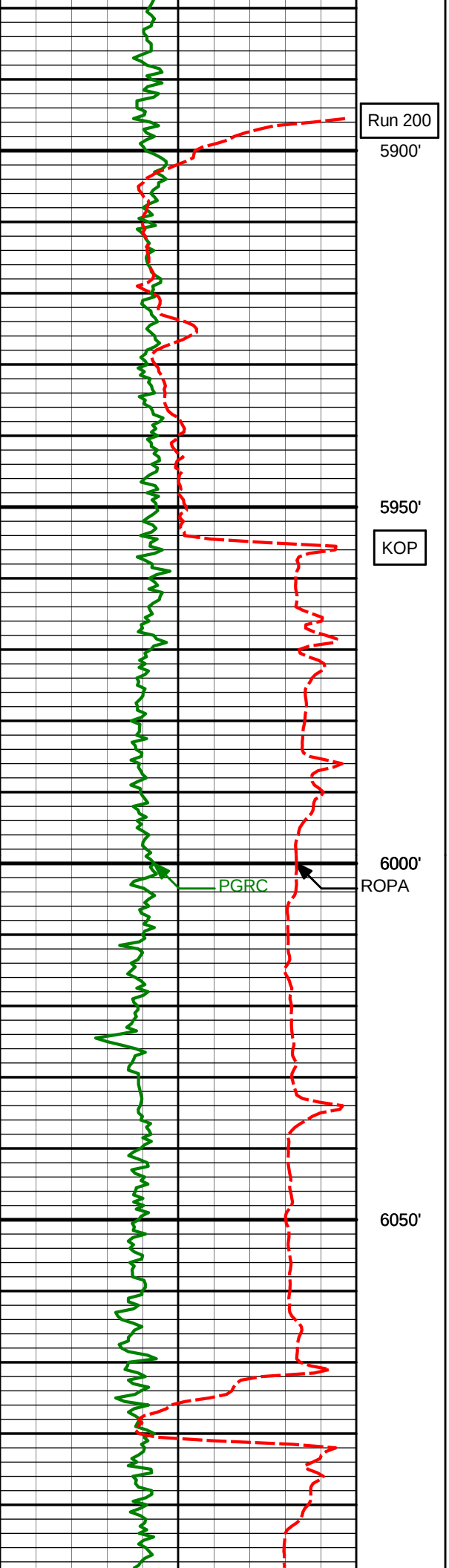
Avg Rate of Penetration
feet per hr
600 0

Feet

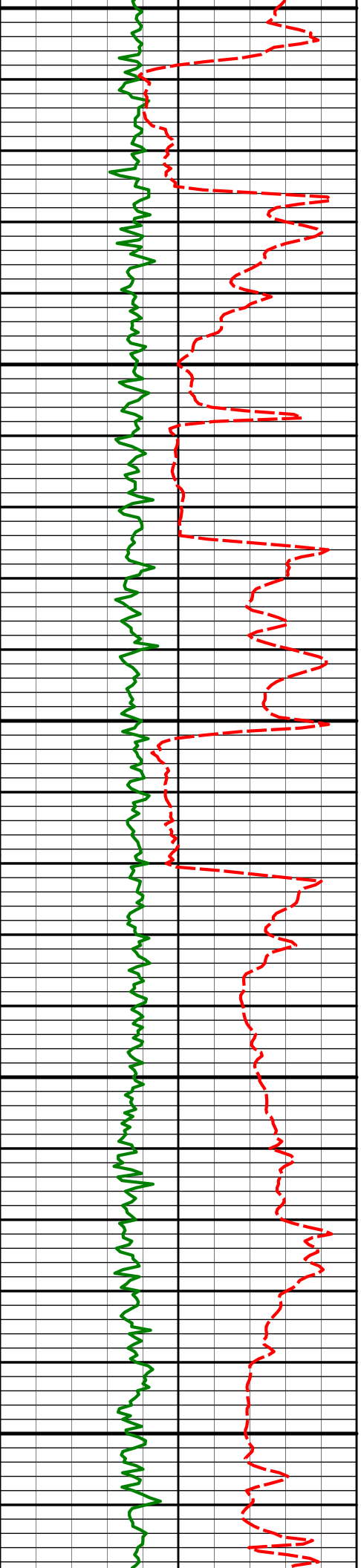
Depth Inc Azm TVD Vsec



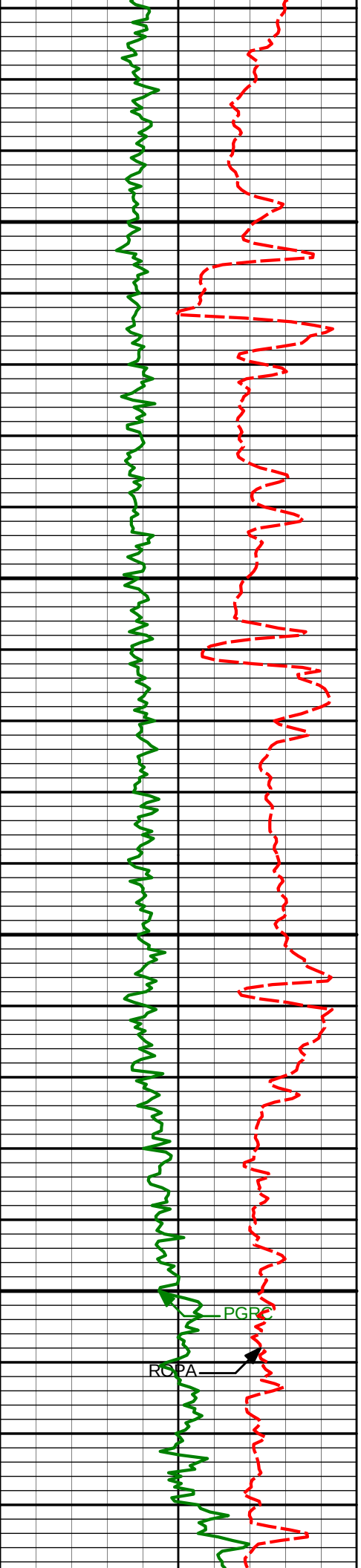
	5837'	0.23°	282.45°	5818.73'	121.13'
5850'					



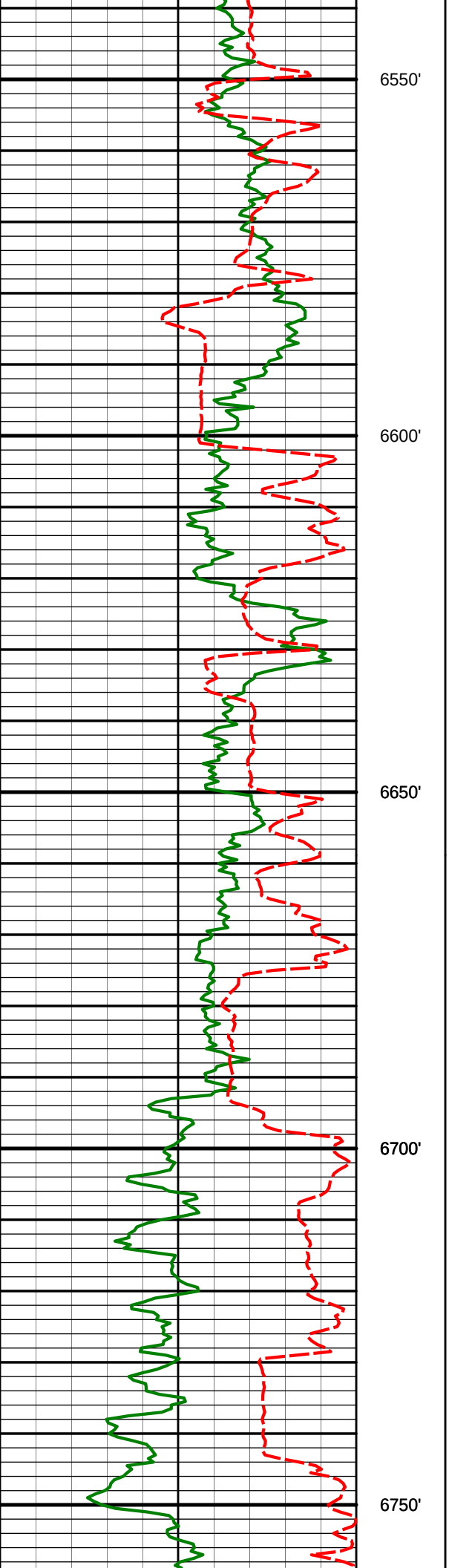
5931'	0.51°	286.51°	5912.73'	120.54'
5978'	1.90°	59.95°	5959.72'	121.02'
6025'	7.11°	87.45°	6006.57'	124.60'
6072'	12.01°	93.07°	6052.90'	132.39'



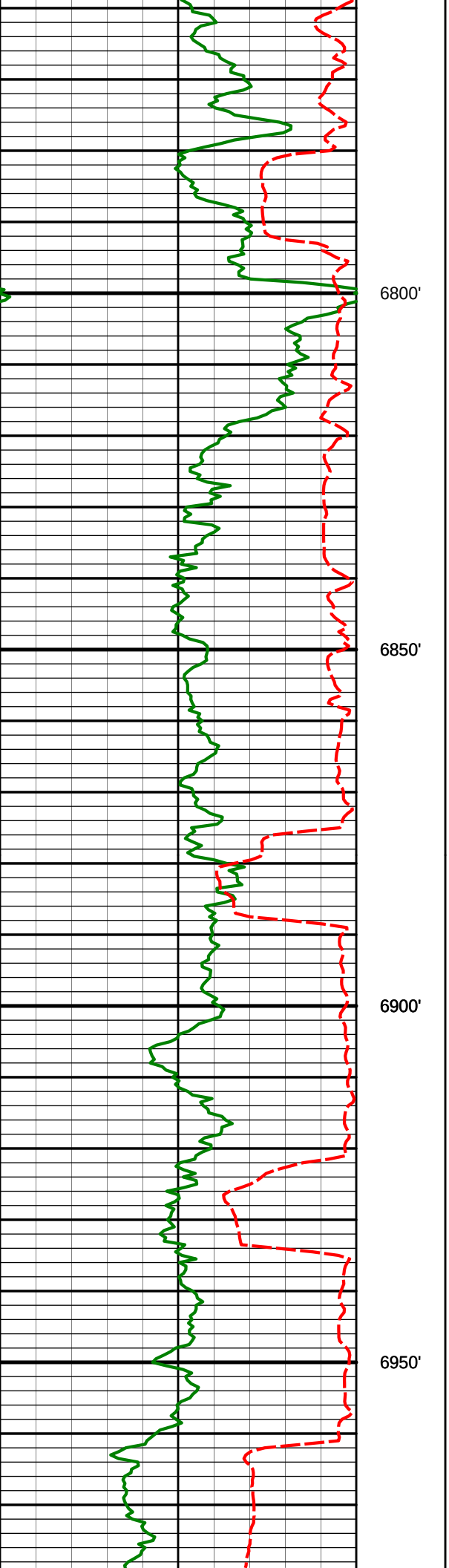
6120'	15.16°	99.00°	6099.55'	143.59'
6167'	17.93°	102.13°	6144.60'	156.75'
6215'	19.97°	98.44°	6190.00'	172.11'
6262'	24.02°	92.30°	6233.58'	189.62'
6310'	28.21°	88.69°	6276.67'	210.74'



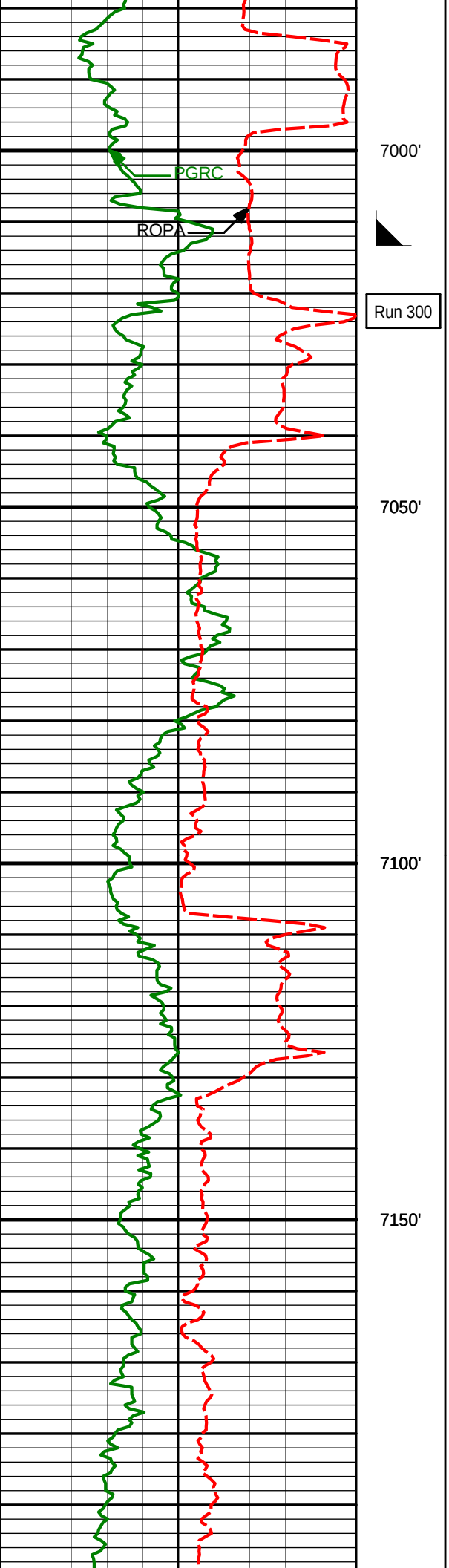
6357'	30.83°	91.11°	6317.56'	233.89'
6405'	34.56°	91.01°	6357.95'	259.81'
6499'	44.43°	91.91°	6430.41'	319.51'



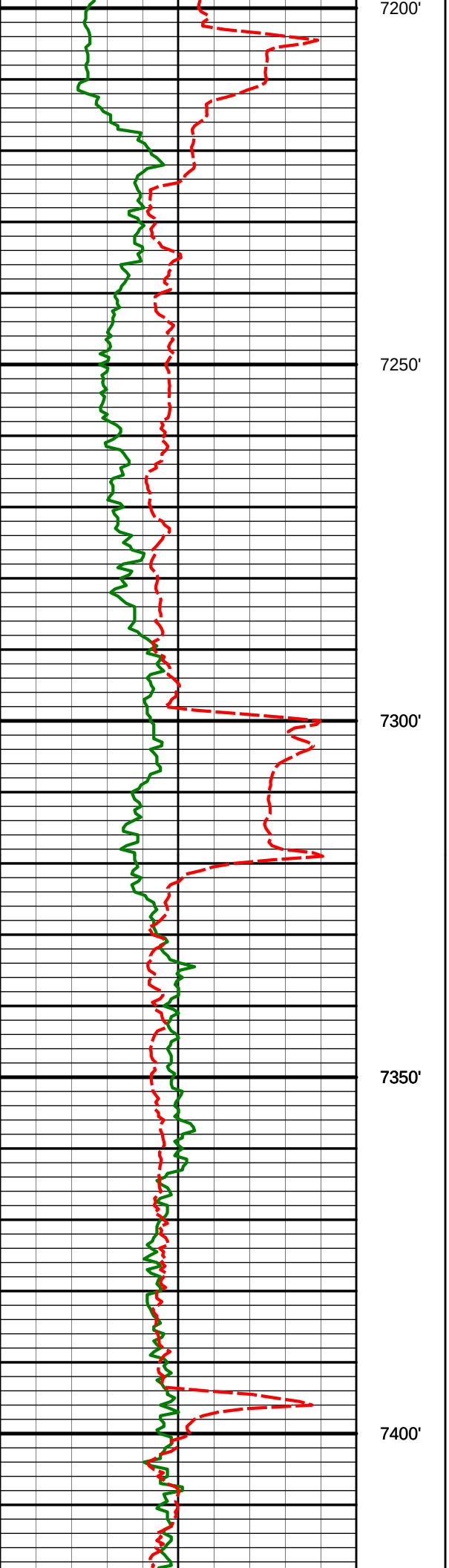
6546'	50.64°	93.56°	6462.12'	354.13'
6594'	53.49°	92.51°	6491.63'	391.94'
6641'	56.20°	90.97°	6518.69'	430.35'
6689'	59.13°	88.55°	6544.36'	470.90'
6736'	62.07°	87.58°	6567.43'	511.81'



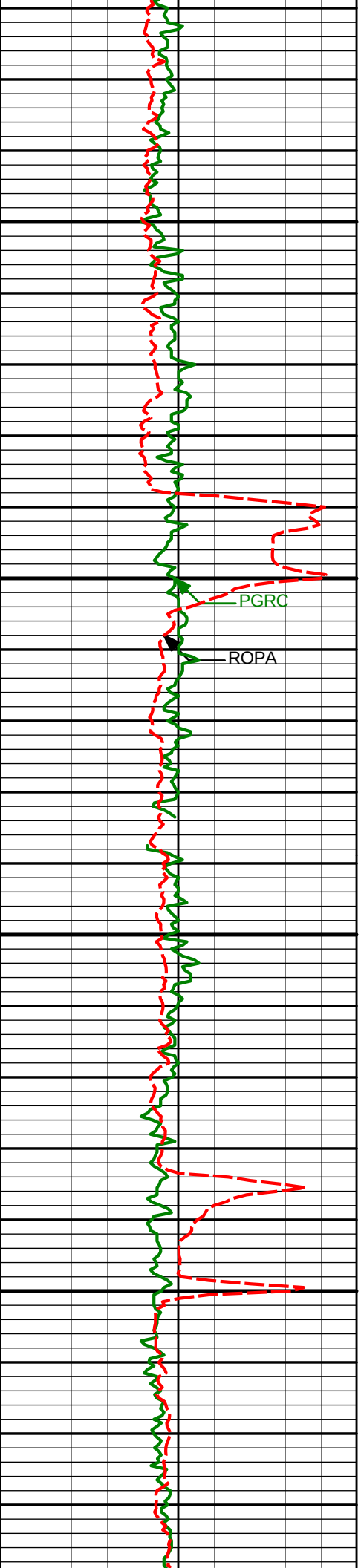
6784'	64.26°	87.98°	6589.10'	554.59'
6831'	68.69°	90.36°	6607.86'	597.66'
6879'	73.67°	91.18°	6623.34'	643.08'
6926'	79.15°	90.29°	6634.38'	688.74'
6968'	81.99°	88.33°	6641.27'	730.16'



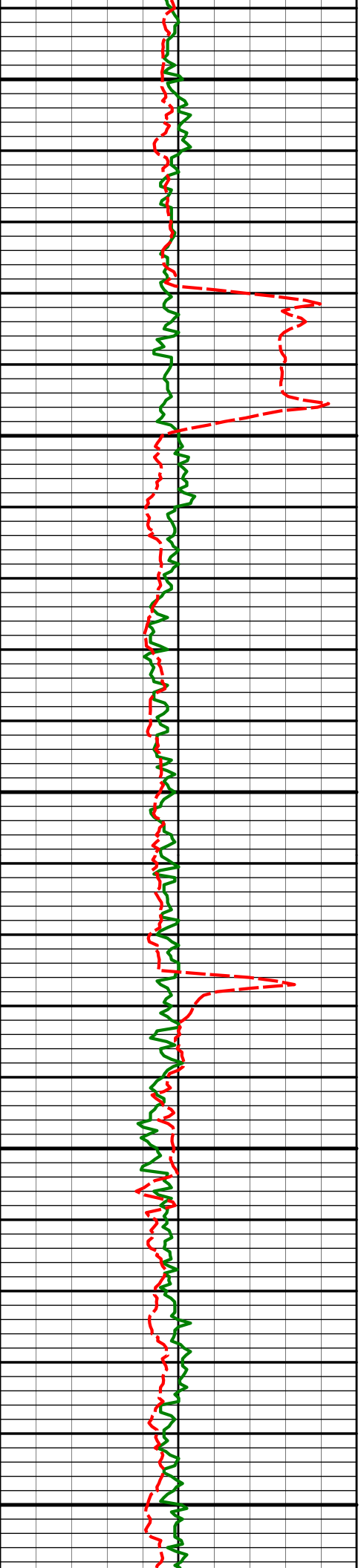
7041'	85.50°	87.24°	6649.22'	802.64'
7136'	86.64°	88.39°	6655.73'	897.32'



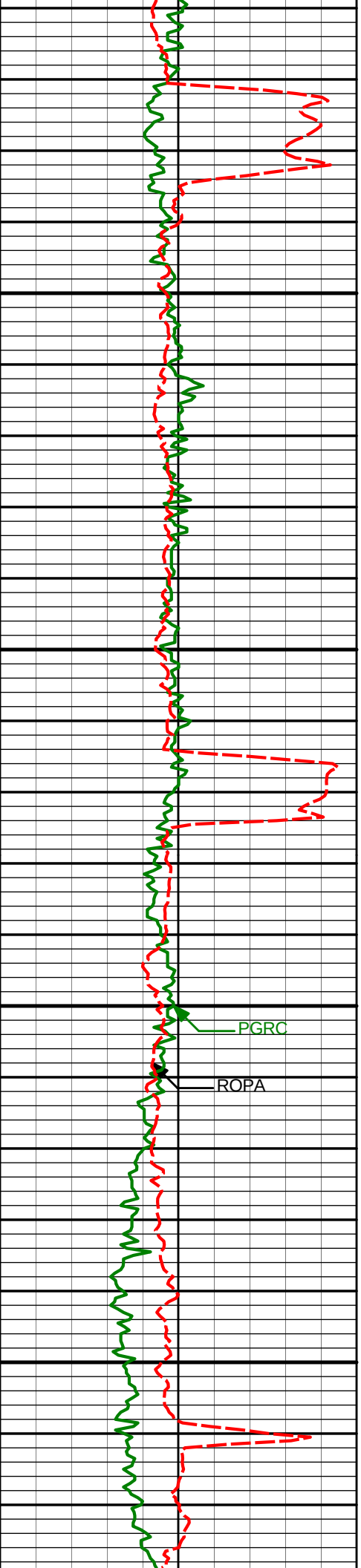
7231'	86.79°	87.77°	6661.17'	992.08'
7326'	88.86°	88.80°	6664.77'	1086.95'



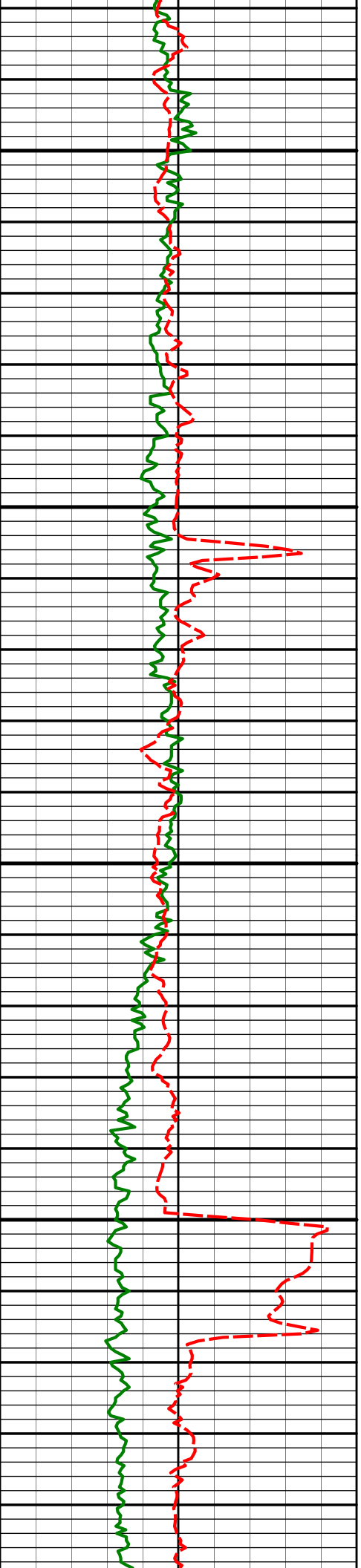
7421'	90.22°	88.98°	6665.54'	1181.91'
7517'	89.69°	89.03°	6665.62'	1277.88'
7612'	90.62°	88.74°	6665.36'	1372.85'



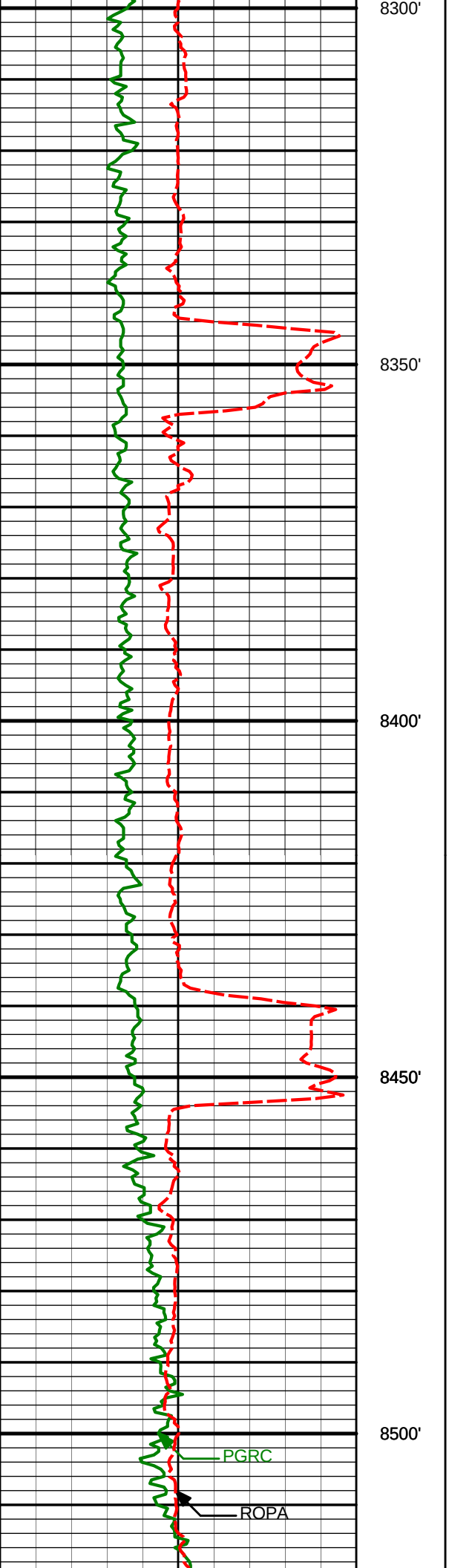
7707'	89.35°	89.20°	6665.39'	1467.82'
7801'	91.11°	89.94°	6665.01'	1561.80'



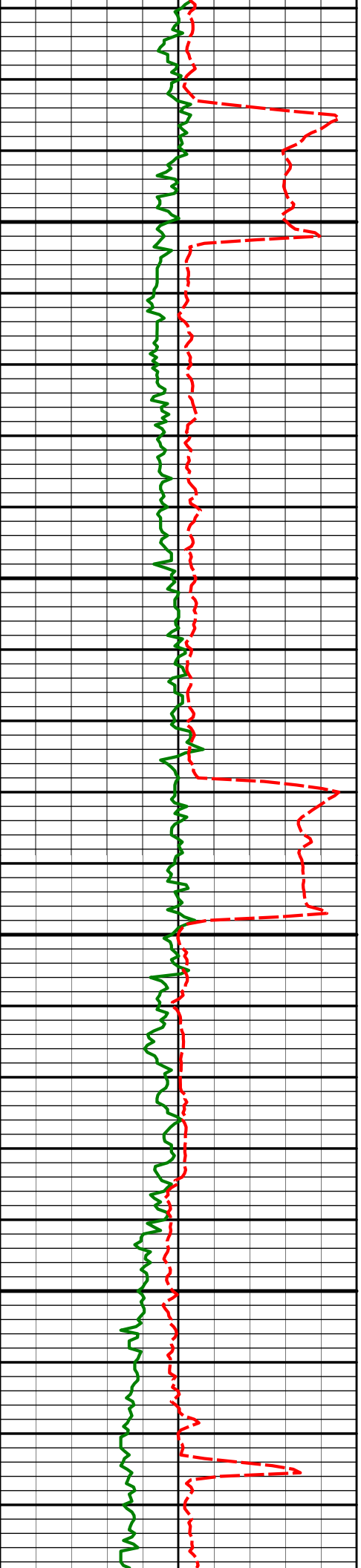
7896'	90.22°	90.02°	6663.91'	1656.79'
7992'	88.83°	88.82°	6664.71'	1752.77'



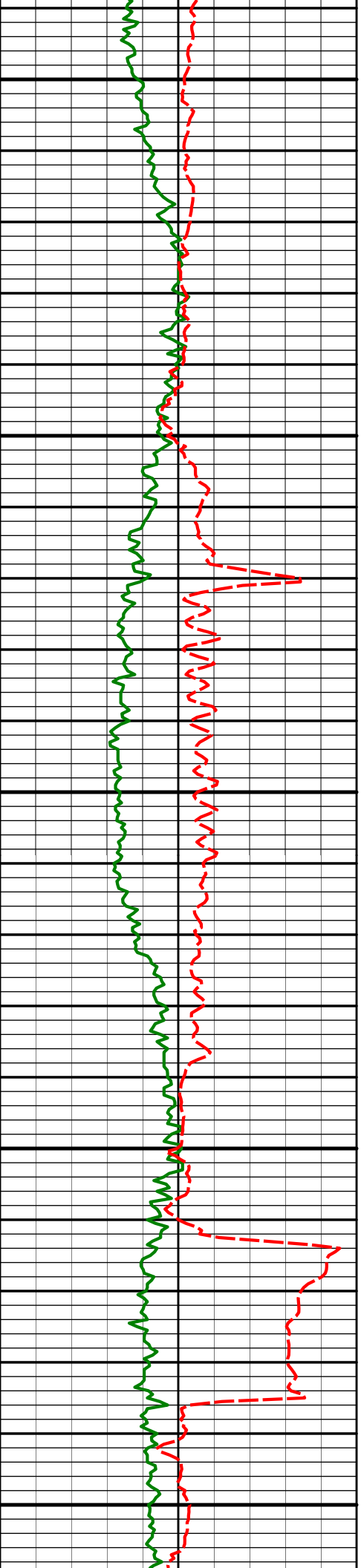
8086'	89.32°	87.91°	6666.23'	1846.70'
8181'	91.48°	89.66°	6665.56'	1941.65'
8276'	90.40°	87.19°	6664.00'	2036.57'



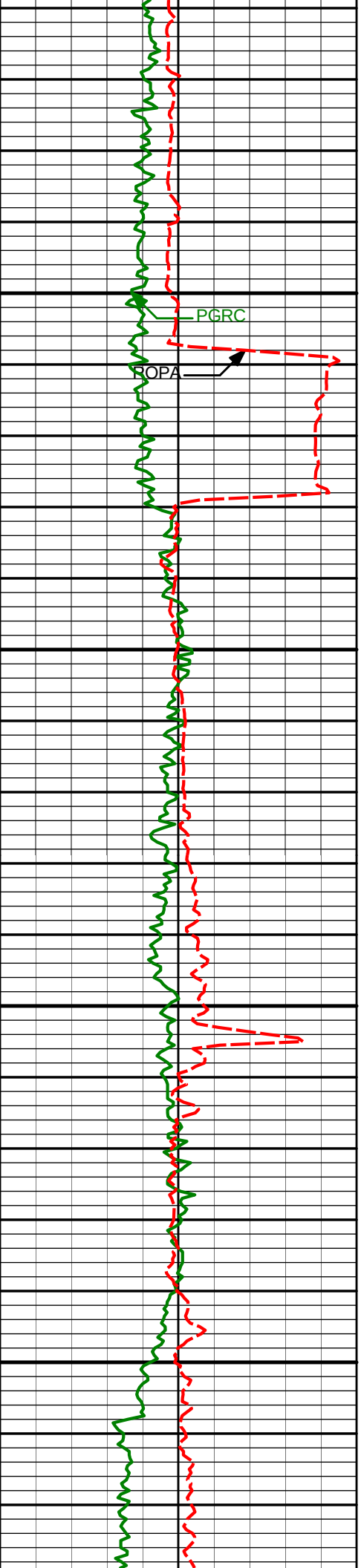
8371'	90.09°	87.08°	6663.60'	2131.42'
8466'	91.29°	86.99°	6662.45'	2226.25'



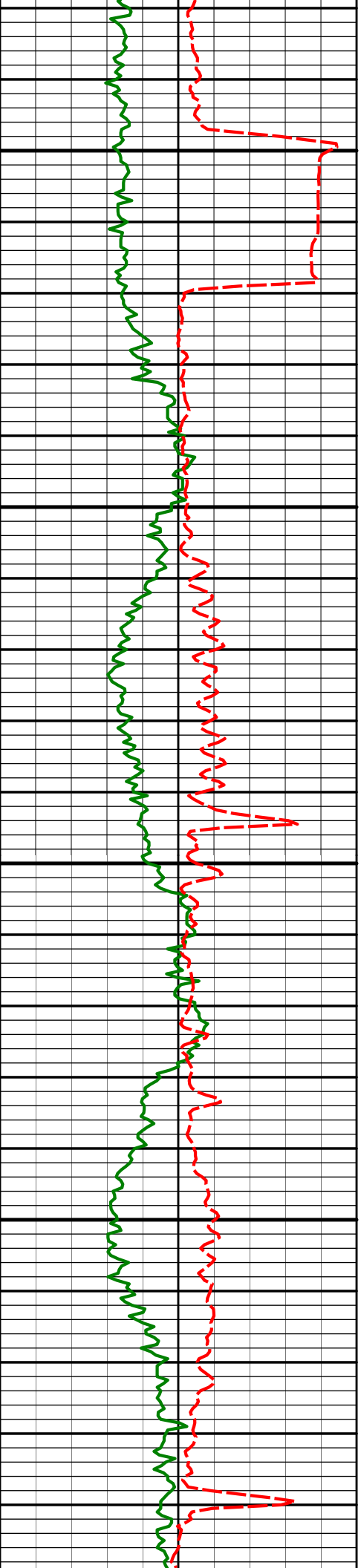
8561'	90.22°	87.65°	6661.19'	2321.10'
8656'	88.61°	89.13°	6662.17'	2416.04'



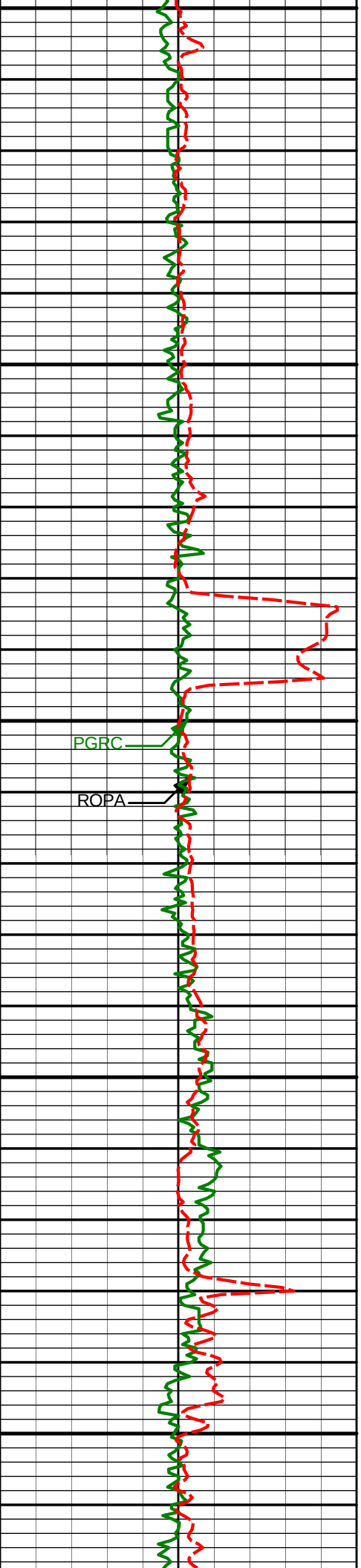
8750'	89.14°	88.98°	6664.01'	2509.99'
8845'	90.37°	88.45°	6664.42'	2604.95'
8940'	90.09°	88.95°	6664.03'	2699.91'



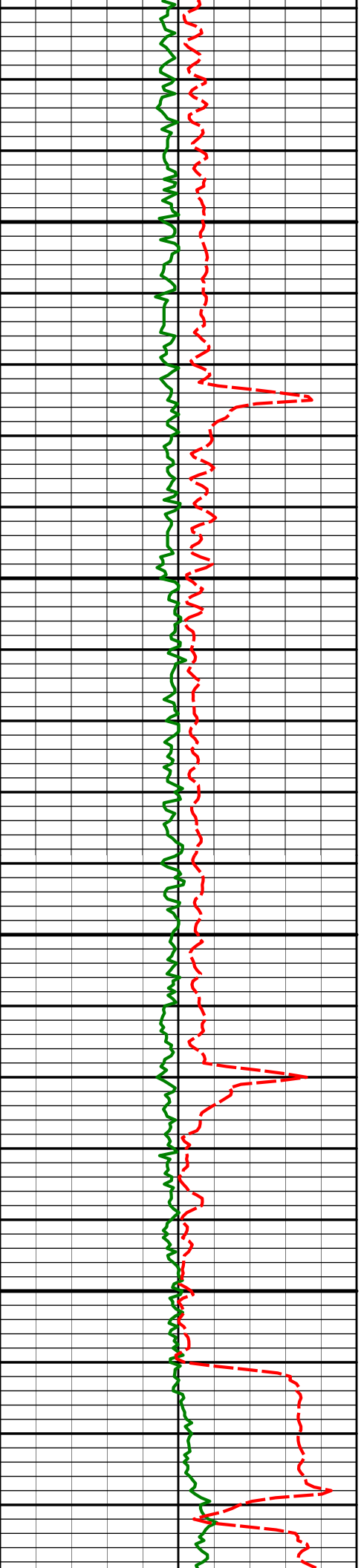
9035'	89.26°	89.96°	6664.57'	2794.89'
9130'	90.92°	91.52°	6664.42'	2889.88'



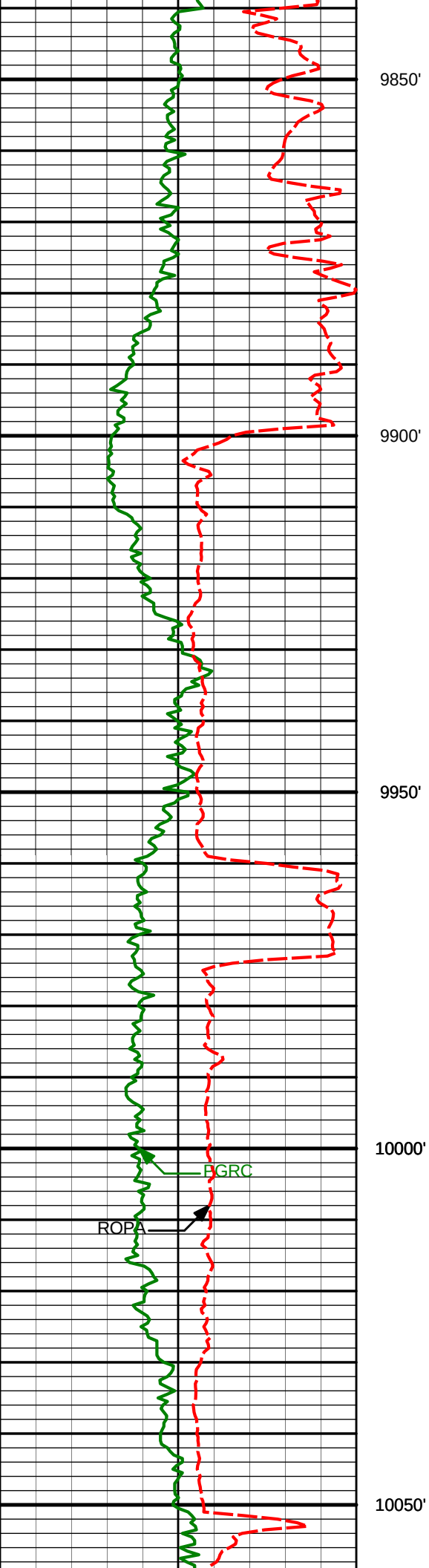
9225'	89.08°	90.21°	6664.42'	2984.87'
9320'	89.14°	89.35°	6665.90'	3079.86'



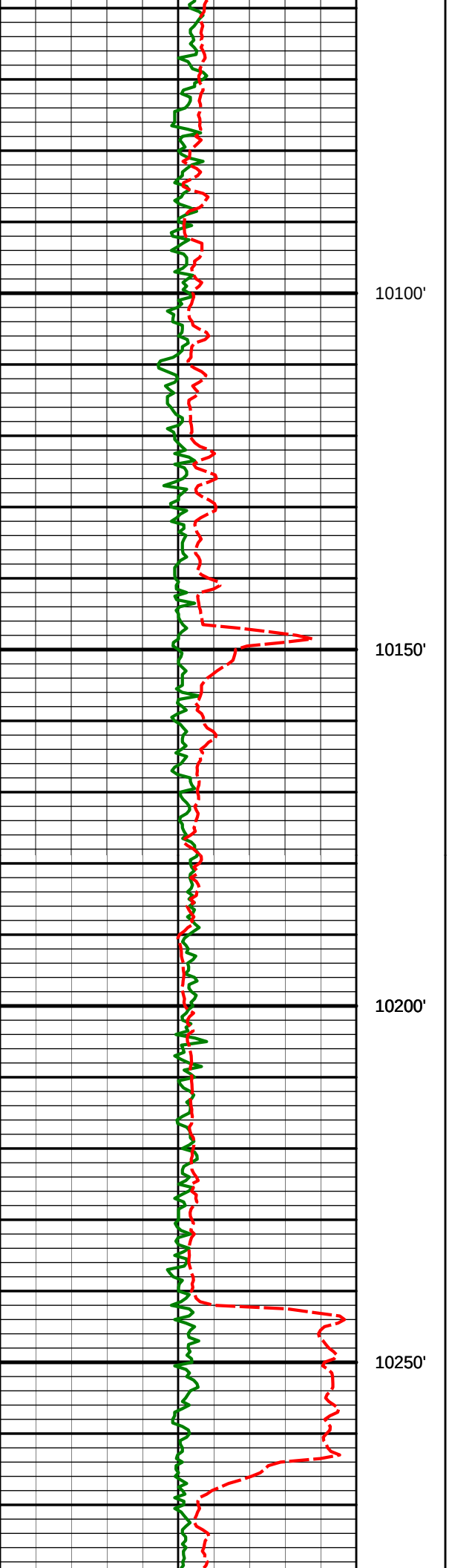
9415'	90.18°	89.53°	6666.46'	3174.84'
9510'	88.64°	87.65°	6667.43'	3269.78'
9605'	89.41°	87.64°	6669.04'	3364.66'



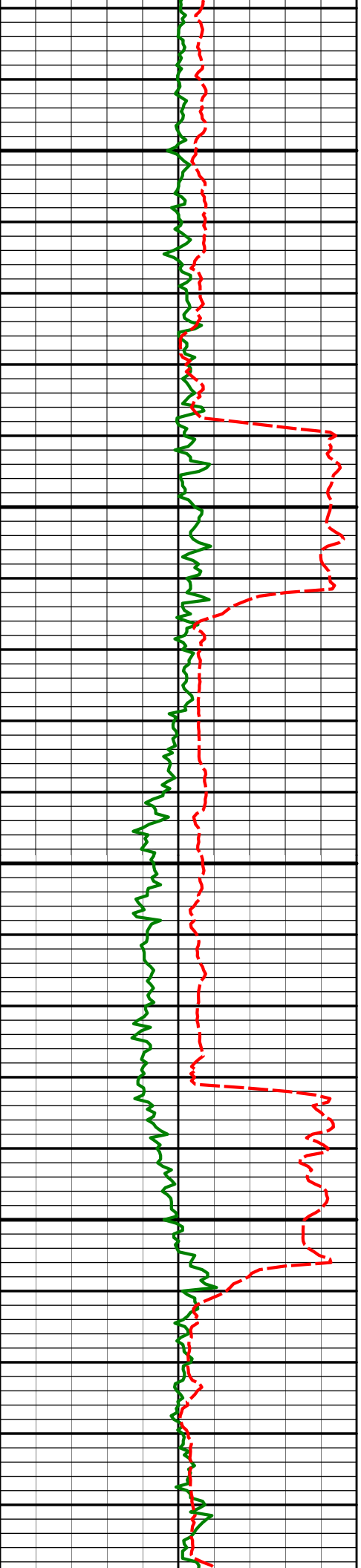
9699'	90.09°	87.21°	6669.44'	3458.53'
9794'	91.51°	87.70°	6668.11'	3553.40'



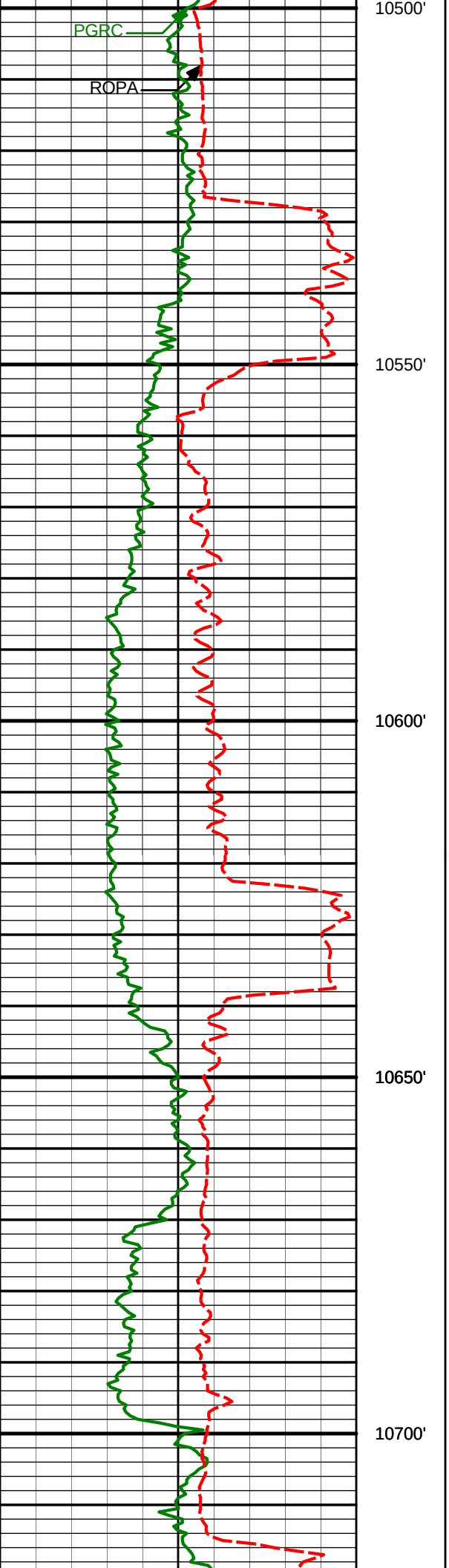
9889'	91.08°	88.58°	6665.97'	3648.30'
9984'	89.85°	88.82°	6665.20'	3743.25'



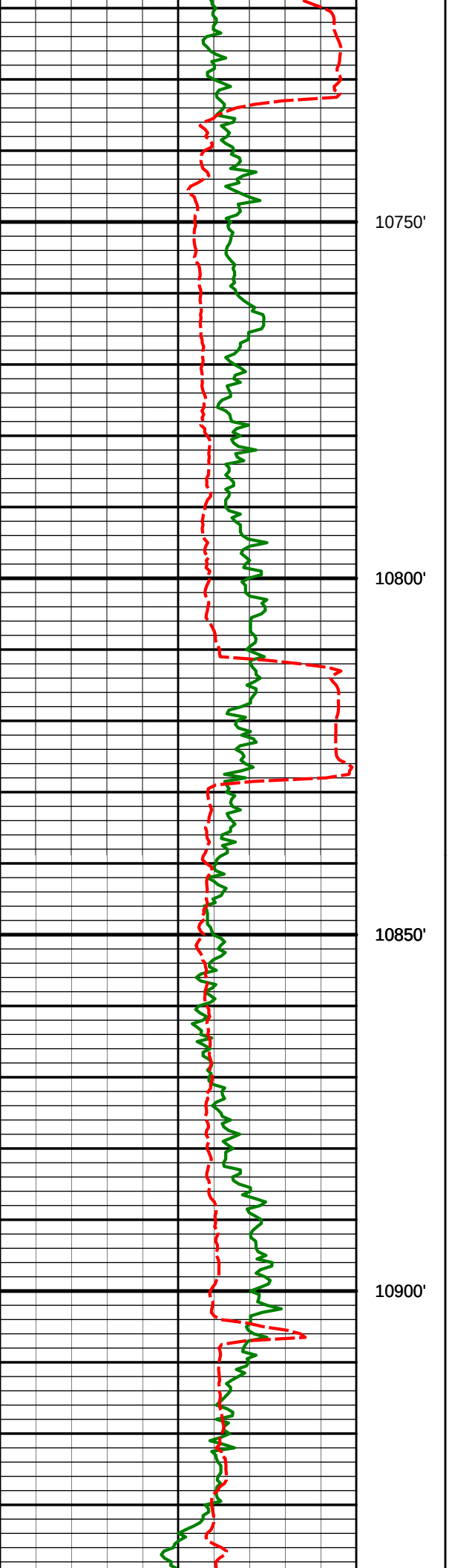
10079'	89.75°	88.21°	6665.53'	3838.20'
10173'	90.74°	86.61°	6665.13'	3932.07'
10268'	90.34°	85.95°	6664.23'	4026.82'



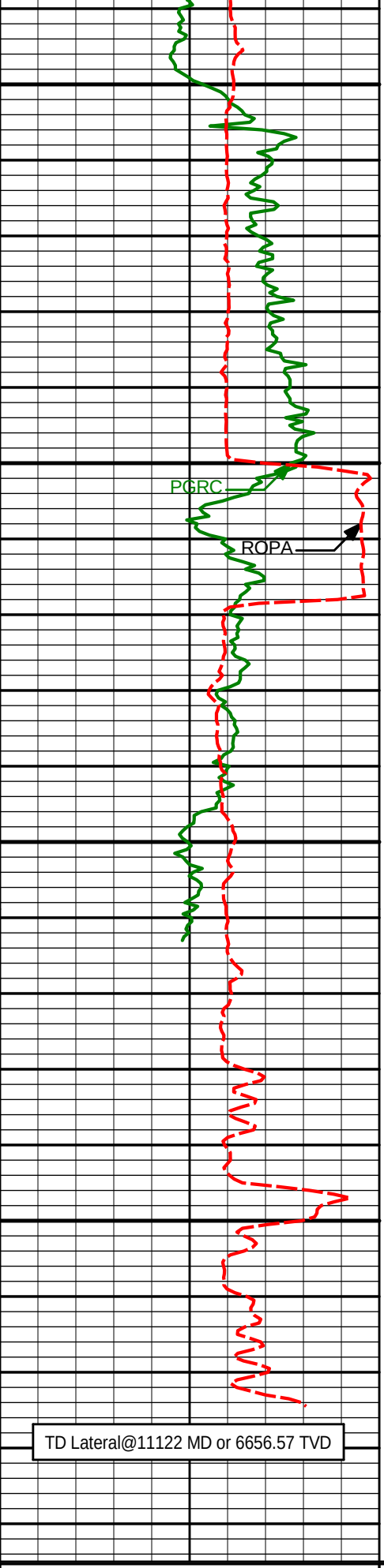
10363'	91.42°	88.34°	6662.78'	4121.65'
10458'	88.30°	87.96°	6663.01'	4216.57'



10552'	90.49°	88.86°	6664.00'	4310.50'
10647'	90.52°	89.49°	6663.15'	4405.47'



10742'	90.65°	89.78°	6662.18'	4500.46'
10837'	89.54°	88.93°	6662.03'	4595.44'
10932'	91.45°	88.09°	6661.21'	4690.38'



Depth	Inc	Azm	TVD	Vsec
11027'	91.20°	87.86°	6659.01'	4785.27'
11054'	91.51°	87.41°	6658.37'	4812.24'
11122'	91.51°	87.41°	6656.57'	4880.12'

Avg Rate of Penetration
feet per hr
600 0

Feet

Gamma Ray (PGRC) (Api) 0 300	Depth	Inc	Azm	TVD	Vsec

HALLIBURTON

DIRECTIONAL SURVEY REPORT

Noble Energy
Wells Ranch USX AE07-63-1HN
Wattenberg
Weld Colorado
USA
CA-XX-0900544019

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	0.80	326.00	249.99	1.45 N	0.98 W	-0.99	0.32
500.00	1.00	17.30	499.96	4.98 N	1.30 W	-1.34	0.32
661.00	0.30	227.90	660.96	6.04 N	1.20 W	-1.24	0.79
731.00	0.35	356.71	730.96	6.12 N	1.35 W	-1.39	0.83
824.00	0.11	235.52	823.96	6.35 N	1.44 W	-1.48	0.44
917.00	0.22	214.05	916.96	6.15 N	1.61 W	-1.65	0.14
1010.00	0.11	233.57	1009.96	5.95 N	1.79 W	-1.83	0.13
1103.00	0.37	212.21	1102.96	5.64 N	2.02 W	-2.06	0.29
1197.00	0.55	254.40	1196.95	5.26 N	2.61 W	-2.65	0.39
1290.00	0.60	227.57	1289.95	4.81 N	3.40 W	-3.43	0.29
1383.00	0.48	224.85	1382.94	4.21 N	4.03 W	-4.06	0.13
1476.00	0.56	236.60	1475.94	3.68 N	4.69 W	-4.71	0.14
1571.00	0.47	196.06	1570.94	3.05 N	5.19 W	-5.21	0.39
1666.00	0.56	204.96	1665.93	2.26 N	5.49 W	-5.50	0.12
1761.00	0.36	215.77	1760.93	1.60 N	5.86 W	-5.87	0.22
1856.00	0.58	254.26	1855.93	1.23 N	6.49 W	-6.50	0.39
1951.00	0.64	223.07	1950.92	0.71 N	7.32 W	-7.32	0.35
2045.00	2.67	147.24	2044.88	1.51 S	6.49 W	-6.48	2.76
2140.00	5.41	138.15	2139.64	6.71 S	2.30 W	-2.26	2.95
2235.00	6.57	135.06	2234.12	13.89 S	4.52 E	4.61	1.27
2330.00	8.07	134.77	2328.34	22.43 S	13.10 E	13.24	1.59
2425.00	9.32	135.21	2422.25	32.60 S	23.25 E	23.47	1.32
2520.00	11.34	128.15	2515.71	43.83 S	36.02 E	36.31	2.50
2615.00	12.75	130.03	2608.61	56.34 S	51.39 E	51.77	1.55
2710.00	13.06	133.92	2701.22	70.53 S	67.15 E	67.62	0.97
2805.00	12.49	132.12	2793.86	84.86 S	82.50 E	83.06	0.73
2900.00	11.46	138.09	2886.80	98.77 S	96.42 E	97.08	1.69
2995.00	10.33	144.21	2980.09	112.71 S	107.71 E	108.46	1.70
3090.00	8.14	142.44	3073.85	124.95 S	116.79 E	117.62	2.33
3185.00	6.45	129.52	3168.09	133.68 S	125.01 E	125.89	2.47
3280.00	5.12	154.26	3262.61	140.89 S	130.96 E	131.90	2.94
3374.00	2.25	172.59	3356.41	146.50 S	133.02 E	133.99	3.26
3470.00	0.87	74.01	3452.39	148.16 S	133.97 E	134.94	2.63
3565.00	0.94	87.90	3547.38	147.93 S	135.43 E	136.41	0.24
3660.00	1.15	3.51	3642.36	146.95 S	136.27 E	137.24	1.48
3755.00	1.43	1.75	3737.34	144.82 S	136.36 E	137.32	0.30
3850.00	1.88	10.08	3832.30	142.09 S	136.67 E	137.61	0.53
3944.00	1.75	11.58	3926.25	139.18 S	137.23 E	138.15	0.15
4039.00	2.04	329.03	4021.21	136.31 S	136.65 E	137.55	1.48
4134.00	1.67	319.92	4116.16	133.80 S	134.89 E	135.77	0.50
4229.00	1.20	257.11	4211.13	132.96 S	133.03 E	133.91	1.63
4324.00	1.76	279.54	4306.10	132.94 S	130.61 E	131.49	0.84
4419.00	2.15	276.03	4401.04	132.51 S	127.40 E	128.27	0.43
4514.00	2.63	282.89	4495.96	131.84 S	123.50 E	124.38	0.58
4609.00	2.53	290.59	4590.87	130.62 S	119.42 E	120.29	0.38
4704.00	1.24	323.28	4685.82	129.06 S	116.85 E	117.70	1.71
4799.00	0.59	311.61	4780.80	127.91 S	115.87 E	116.72	0.71
4893.00	1.06	49.42	4874.80	127.03 S	116.17 E	117.01	1.36
4988.00	1.30	81.62	4969.78	126.30 S	117.91 E	118.74	0.73

5083.00	1.18	70.25	5064.75	125.81 S	119.89 E	120.72	0.29
5177.00	0.86	164.66	5158.75	126.17 S	120.98 E	121.82	1.61
5272.00	0.43	188.73	5253.74	127.21 S	121.12 E	121.96	0.53
5367.00	0.07	322.69	5348.74	127.51 S	121.03 E	121.87	0.50
5462.00	0.19	94.14	5443.74	127.48 S	121.16 E	122.00	0.26
5557.00	0.16	349.17	5538.74	127.36 S	121.29 E	122.14	0.29
5652.00	0.25	318.99	5633.74	127.08 S	121.13 E	121.97	0.15
5746.00	0.38	301.35	5727.74	126.76 S	120.73 E	121.57	0.16
5837.00	0.23	282.45	5818.73	126.57 S	120.30 E	121.13	0.19
5931.00	0.51	286.51	5912.73	126.41 S	119.71 E	120.54	0.29
5978.00	1.90	59.95	5959.72	125.96 S	120.18 E	121.02	4.86
6025.00	7.11	87.45	6006.57	125.43 S	123.77 E	124.60	11.69
6072.00	12.01	93.07	6052.90	125.57 S	131.56 E	132.39	10.59
6120.00	15.16	99.00	6099.55	126.82 S	142.75 E	143.59	7.17
6167.00	17.93	102.13	6144.60	129.30 S	155.90 E	156.75	6.19
6215.00	19.97	98.44	6190.00	132.06 S	171.23 E	172.11	4.92
6262.00	24.02	92.30	6233.58	133.62 S	188.74 E	189.62	9.91
6310.00	28.21	88.69	6276.67	133.75 S	209.86 E	210.74	9.33
6357.00	30.83	91.11	6317.56	133.73 S	233.01 E	233.89	6.12
6405.00	34.56	91.01	6357.95	134.21 S	258.93 E	259.81	7.76
6499.00	44.43	91.91	6430.41	135.78 S	318.61 E	319.51	10.52
6546.00	50.64	93.56	6462.12	137.46 S	353.22 E	354.13	13.47
6594.00	53.49	92.51	6491.63	139.45 S	391.03 E	391.94	6.19
6641.00	56.20	90.97	6518.69	140.61 S	429.43 E	430.35	6.35
6689.00	59.13	88.55	6544.36	140.43 S	469.98 E	470.90	7.45
6736.00	62.07	87.58	6567.43	139.04 S	510.90 E	511.81	6.51
6784.00	64.26	87.98	6589.10	137.38 S	553.69 E	554.59	4.62
6831.00	68.69	90.36	6607.86	136.77 S	596.77 E	597.66	10.51
6879.00	73.67	91.18	6623.34	137.38 S	642.18 E	643.08	10.49
6926.00	79.15	90.29	6634.38	137.96 S	687.84 E	688.74	11.80
6968.00	81.99	88.33	6641.27	137.46 S	729.26 E	730.16	8.20
7041.00	85.50	87.24	6649.22	134.66 S	801.76 E	802.64	5.03
7136.00	86.64	88.39	6655.73	131.05 S	896.47 E	897.32	1.70
7231.00	86.79	87.77	6661.17	127.87 S	991.26 E	992.08	0.68
7326.00	88.86	88.80	6664.77	125.03 S	1086.14 E	1086.95	2.43
7421.00	90.22	88.98	6665.54	123.19 S	1181.12 E	1181.91	1.44
7517.00	89.69	89.03	6665.62	121.53 S	1277.10 E	1277.88	0.55
7612.00	90.62	88.74	6665.36	119.68 S	1372.08 E	1372.85	1.02
7707.00	89.35	89.20	6665.39	117.97 S	1467.07 E	1467.82	1.42
7801.00	91.11	89.94	6665.01	117.26 S	1561.06 E	1561.80	2.03
7896.00	90.22	90.02	6663.91	117.23 S	1656.05 E	1656.79	0.94
7992.00	88.83	88.82	6664.71	116.25 S	1752.04 E	1752.77	1.91
8086.00	89.32	87.91	6666.23	113.57 S	1845.99 E	1846.70	1.10
8181.00	91.48	89.66	6665.56	111.55 S	1940.95 E	1941.65	2.93
8276.00	90.40	87.19	6664.00	108.94 S	2035.90 E	2036.57	2.83
8371.00	90.09	87.08	6663.60	104.19 S	2130.78 E	2131.42	0.35
8466.00	91.29	86.99	6662.45	99.27 S	2225.64 E	2226.25	1.27
8561.00	90.22	87.65	6661.19	94.83 S	2320.53 E	2321.10	1.33
8656.00	88.61	89.13	6662.17	92.16 S	2415.48 E	2416.04	2.29
8750.00	89.14	88.98	6664.01	90.61 S	2509.45 E	2509.99	0.58
8845.00	90.37	88.45	6664.42	88.48 S	2604.42 E	2604.95	1.41
8940.00	90.09	88.95	6664.03	86.33 S	2699.39 E	2699.91	0.61
9035.00	89.26	89.96	6664.57	85.42 S	2794.39 E	2794.89	1.37
9130.00	90.92	91.52	6664.42	86.64 S	2889.37 E	2889.88	2.40
9225.00	89.08	90.21	6664.42	88.08 S	2984.36 E	2984.87	2.38
9320.00	89.14	89.35	6665.90	87.72 S	3079.34 E	3079.86	0.91
9415.00	90.18	89.53	6666.46	86.79 S	3174.33 E	3174.84	1.12
9510.00	88.64	87.65	6667.43	84.45 S	3269.29 E	3269.78	2.56
9605.00	89.41	87.64	6669.04	80.55 S	3364.20 E	3364.66	0.81
9699.00	90.09	87.21	6669.44	76.32 S	3458.10 E	3458.53	0.86
9794.00	91.51	87.70	6668.11	72.10 S	3553.00 E	3553.40	1.58
9889.00	91.08	88.58	6665.97	69.01 S	3647.92 E	3648.30	1.04
9984.00	89.85	88.82	6665.20	66.86 S	3742.89 E	3743.25	1.32
10079.00	89.75	88.21	6665.53	64.40 S	3837.86 E	3838.20	0.65
10173.00	90.74	86.61	6665.13	60.15 S	3931.76 E	3932.07	2.00
10268.00	90.34	85.95	6664.23	53.99 S	4026.55 E	4026.82	0.81
10363.00	91.42	88.34	6662.78	49.26 S	4121.41 E	4121.65	2.76
10458.00	88.30	87.96	6663.01	46.19 S	4216.35 E	4216.57	3.30
10552.00	90.49	88.86	6664.00	43.58 S	4310.30 E	4310.50	2.52
10647.00	90.52	89.49	6663.15	42.22 S	4405.29 E	4405.47	0.67
10742.00	90.65	89.78	6662.18	41.61 S	4500.28 E	4500.46	0.32
10837.00	89.54	88.93	6662.03	40.54 S	4595.28 E	4595.44	1.47
10932.00	91.45	88.09	6661.21	38.07 S	4690.23 E	4690.38	2.20
11027.00	91.20	87.86	6659.01	34.72 S	4785.15 E	4785.27	0.35
11054.00	91.51	87.41	6658.37	33.60 S	4812.12 E	4812.24	2.04

11122.00	91.51	87.41	6656.57	30.53 S	4880.03 E	4880.12	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 90.38 DEGREES (GRID)
A TOTAL CORRECTION OF 7.68 DEG FROM MAGNETIC NORTH TO GRID NORTH HAS BEEN APPLIED

HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11122.00 FEET
IS 4880.12 FEET ALONG 90.36 DEGREES (GRID)

Casing set at 7013 ft.

Surveys at 250 ft, 500 ft, and 661 ft were taken and provided by HP 322 while they were drilling the surface hole.

Date Printed:07 July 2013