

1 : 240

Country : USA								
Field : Wattenberg								
Location : Lat: 40° 7' 1.73" North Long: 104° 44' 26.37" West								
Well : Gobbler 2C-23-HZ								
Company : Anadarko Petroleum								
Rig : Ensign 132								
LOCATION		Company : Anadarko Petroleum						
		Rig : Ensign 132						
Latitude : 40° 7' 1.73" North Longitude : 104° 44' 26.37" West UTM Easting = 3,212,364.27 ft UTM Northing = 1,286,430.04 ft		Well : Gobbler 2C-23-HZ						
		Field : Wattenberg						
API Number : 05-123-36816		Country : USA						
Permanent Datum : Ground Level		Elevation : 5094.00 ft						
Log Measured From : Drill Floor		13.00 ft Above Permanent Datum						
Drilling Measured From : Drill Floor		MD LOG						
Depth Logged : 6,937.00 ft To 11,968.00 ft		Unit No. : 11210429						
Date Logged : 04-May-13 To 11-May-13		Job No. : CA-XX-0900275968						
Total Depth MD : 11,968.00 ft TVD : 7,549.87 ft		Plot Type : Final						
Spud Date : 04-May-13		Plot Date : 12-May-13						
Run No.	Borehole Record (MD)		Run No.	Borehole Record (MD)				
	Size	From		To	Size	From	To	
	2	8,750 in		1,071.00 ft	6,937.00 ft			
	3	8,750 in		6,937.00 ft	7,856.00 ft			
	4	6,125 in		7,856.00 ft	11,968.00 ft			
	Casing Record (MD)		Size	Weight		From	To	
	Size							
	9,625 in	40.60 lbpf		SURFACE	1,074.10 ft			
	7,000 in	28.00 lbpf		SURFACE	7,936.00 ft			

<b>MWD Run Number</b>	100	200	300		
<b>Date run completed</b>	05-May-13	07-May-13	12-May-13		
<b>Rig Bit Number</b>	2	3	4		
<b>Bit Size (in)</b>	8.750	8.750	6.125		
<b>Tool Nominal OD (in)</b>	6.750	6.750	4.750		
<b>Log Start Depth (MD, ft)</b>	1,081.00	6,937.00	7,856.00		
<b>Log End Depth (MD, ft)</b>	6,937.00	7,856.00	11,968.00		
<b>Drill or Wipe</b>	Drill	Drill	Drill		
<b>Drill/Wipe Start Date and Time</b>	04-May-13 05:45	06-May-13 02:00	08-May-13 08:14		
<b>Drill/Wipe End Date and Time</b>	05-May-13 12:20	07-May-13 00:45	08-May-13 08:14		
<b>Min Inc (deg) @ Depth (MD, ft)</b>	.32 @ 5,144.00	1.52 @ 6,955.00	85.42 @ 11,542.00		
<b>Max Inc (deg) @ Depth (MD, ft)</b>	6.59 @ 4,284.00	85.31 @ 7,809.00	91.85 @ 11,927.00		
<b>Bit TFA(in2) / Bit Type</b>	1.09 / PDC	.98 / PDC	.98 / PDC		
<b>Flow Rate (gpm)</b>	590.79	537.67	280.12		
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	500.5 / 76.3	466.1 / 376.3	450.0 /		
<b>Fluid Type</b>	Native/Spud Mud	Fresh Water Gel	Fresh Water Gel		
<b>Density (ppg) / Viscosity (spqt)</b>	8.40 / 30.00	9.75 / 42.00	9.80 / 43.00		
<b>Filtrate CL (ppm)</b>	1,400.00	1,200.00	1,300.00		
<b>pH / Fluid Loss (mptm)</b>	8.00 / 20	8.50 / 3	9.00 / 4		
<b>PV (cP) / YP (Ihf2)</b>	1 / 2.00	19 / 13.00	17 / 11.00		
<b>% Solids / % Sand</b>	0.40 / N/A	8.10 / N/A	10.00 / N/A		
<b>% Oil / Oil:Water Ratio</b>	N/A / N/A	4.50 / N/A	3.00 / N/A		
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A	N/A @ N/A		
<b>Max Tool Temp (deg F) / S</b>	100.00 / PGM	100.00 / PGM	200.05 / LOGM		

Max Tool Temp (degF) / Source	163.20 / PCM	180.09 / PCM	229.65 / HCM		
Rm @ Max Tool Temp (degF)	N/A @ 163.20	N/A @ 180.09	N/A @ 229.65		
Lead MWD Engineer	Evan LeBlanc	Evan LeBlanc	Evan LeBlanc		
Customer Representative	Jason Laub	Jason Laub	Jason Laub		

## SENSOR INFORMATION

### Directional Sensor Information

Tool Type	PCDC	PCDC	PCDC		
Distance From Bit (ft)	51.30	46.06	39.58		
Software Version	6.21	6.21	6.21		
Sub Serial Number	11341336	11341336	12121221		
Sonde Serial Number	10993273	10993273	10993273		
Sensor ID Number	N/A	N/A	N/A		
Toolface Offset (deg)	252.54	181.07	83.02		

### Gamma Ray Sensor Information

Tool Type	PCG	PCG	DGR		
Distance From Bit (ft)	56.25	51.01	64.56		
Recorded Sample Period (sec)	10	10	8		
Software Version	8.15	8.15	N/A		
Sub Serial Number	11341336	11341336	223559		
Insert/Sonde Serial Number	11680968	11680968	10911224		

### Resistivity Sensor Information

Tool Type	N/A	N/A	Slim P4		
Distance From Bit (ft)	N/A	N/A	54.08		
Recorded Sample Period (sec)	N/A	N/A	8		
Software Version	N/A	N/A	5.55		
Sub Serial Number	N/A	N/A	223559		
Receiver Insert Serial Number	N/A	N/A	57772		
Transmitter Insert Serial Number	N/A	N/A	163196		
Receiver Orientation	N/A	N/A	Up		

### Pulser Controller Sensor Information

Tool Type	PCM	PCM	PCM		
Software Version	5.84	5.84	8.17		
PIC Software Version	1.40	1.40	1.40		
Sub/HOC Serial Number	11341336	11341336	11633645		
Insert/Probe/Module SN	11227484	11227484	11227484		
Battery Serial Number	N/A	N/A	N/A		
Valve Insert SN	N/A	N/A	N/A		
DC Insert Serial Number	N/A	N/A	N/A		
Choke Size (32nd)	N/A	N/A	N/A		
Driver Current (amps)	N/A	N/A	N/A		
Driver SMI Current (amps)	N/A	N/A	N/A		
Boot Strap Version	4,130.00	4,130.00	N/A		

### DDSr-DGR Sensor Information

Tool Type	N/A	N/A	DDSr-DGR		
Distance From Bit (ft)	N/A	N/A	0		
Recorded Sample Period (sec)	N/A	N/A	12		
Software Version	N/A	N/A	10.88		
Sub Serial Number	N/A	N/A	223559		
Insert Serial Number	N/A	N/A	12203402		

## REMARKS

1. All depths are calibrated to the driller's pipe tally and are measured from the rotary table.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded (memory data) unless otherwise stated.
4. All main log data was logged while drilling
5. Environmental parameters used to process Gamma Ray are as follows:
  - Hole Size: 8.75" 6937-7921, 6.125" 7921-11968
  - Mud Density: 9.6 to 10.2 ppg
6. The following smoothing parameters have been applied to the data:
  - ROP: 0.5 ft interval, 1.2 ft coercion distance
  - All other curves: 0.5 ft interval, 0.6 ft coercion distance
7. Hole was logged from 6937-7921 using a PCGK and from 7921 to 11968 using a DGR tool

## WARRANTY

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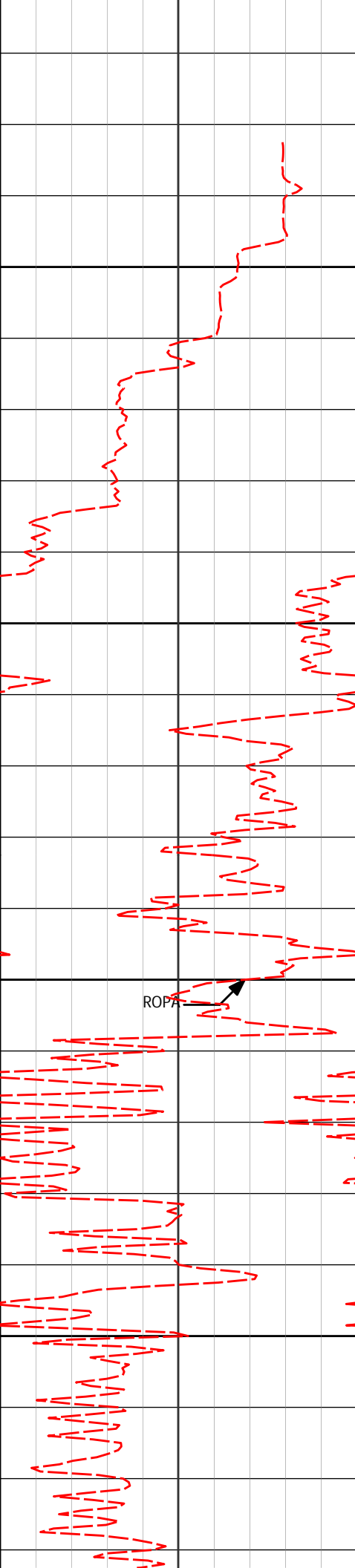
# HALLIBURTON

## Sperry Drilling Services

# MD Detail Log 1:240

Anadarko Petroleum Corp  
Gobbler 2N-23Hz  
Ensign 132  
2N 66W

<div><div><div>PCG Gamma Ray BCorr</div><div>PGRC</div><div><div></div><div>api</div><div>300</div></div></div></div>																			
<div><div><div>DGR Comb Gamma Ray BCorr</div><div>PGRC</div><div><div></div><div>api</div><div>300</div></div></div></div>																			
<div><div><div>Avg Rate of Penetration</div><div>ROPA</div><div><div></div><div>feet per hr</div><div>0</div></div></div></div>										Depth ft	Depth	Inc.	Azi.	TVD	V.S.				
										1000									



1100

1150

1200

ROPA

1250

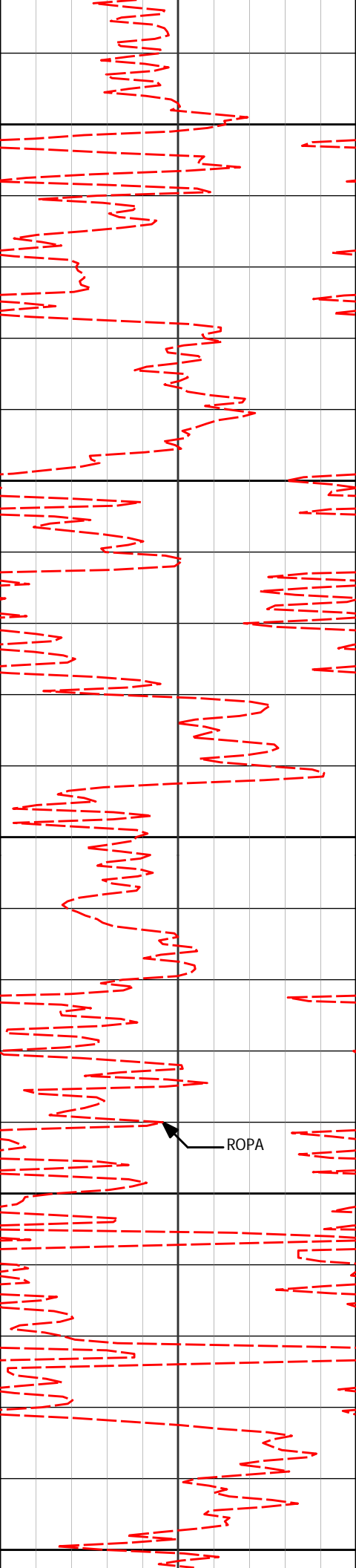
1250'

0.46°

212.75°

1249.96'

1.10'



1300

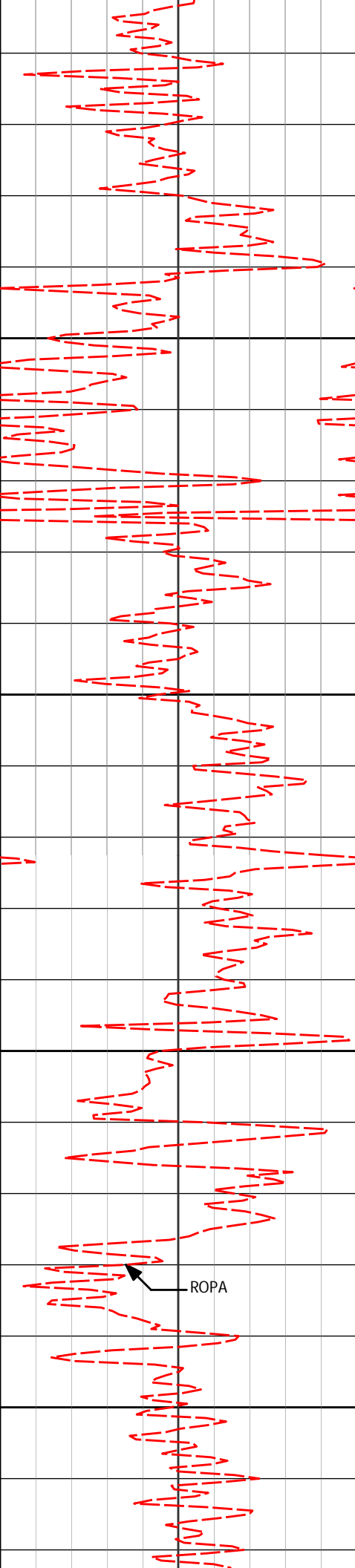
1350

1400

1450

1500

ROPA



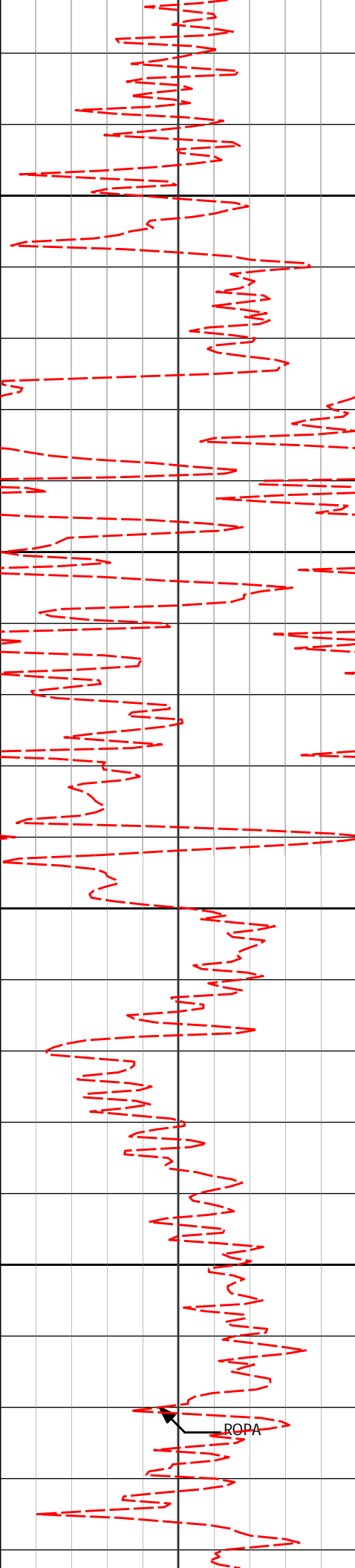
1526'

0.36°

183.19°

1525.95'

-0.70'



1750

1800

1850

1900

1802'

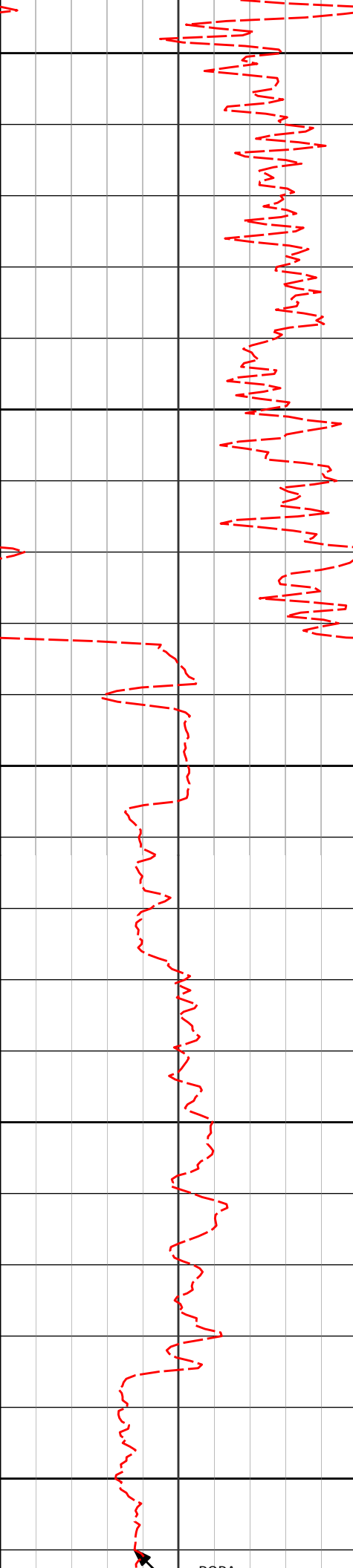
0.33°

200.38°

1801.95'

-2.32'

ROPA



1950

2000

2050

2100

2150

2086'

0.77°

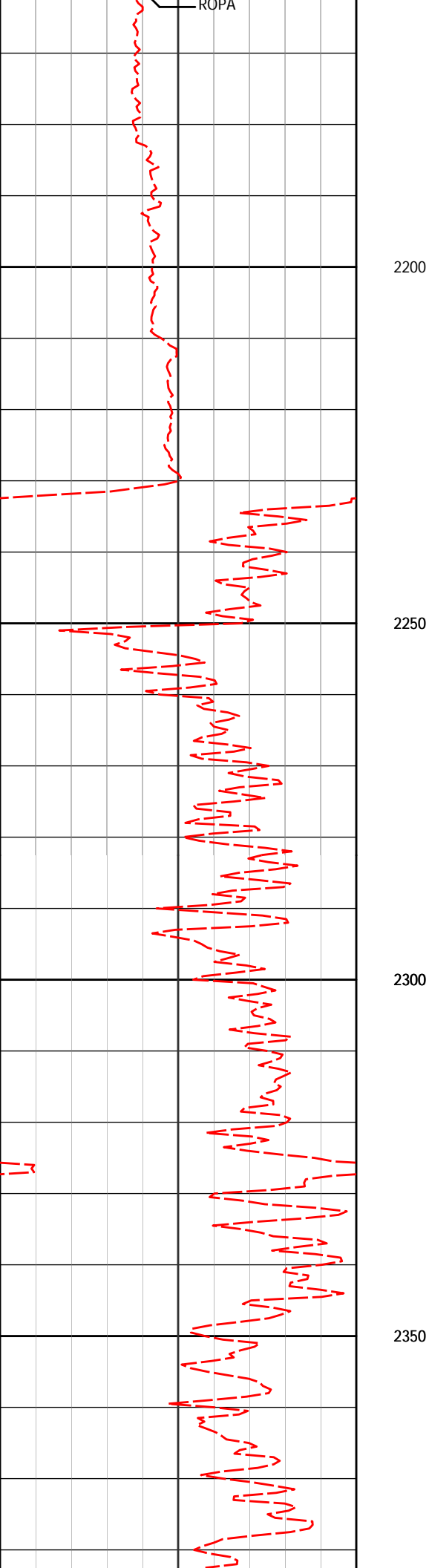
265.44°

2085.93'

-3.25'



- ROPA

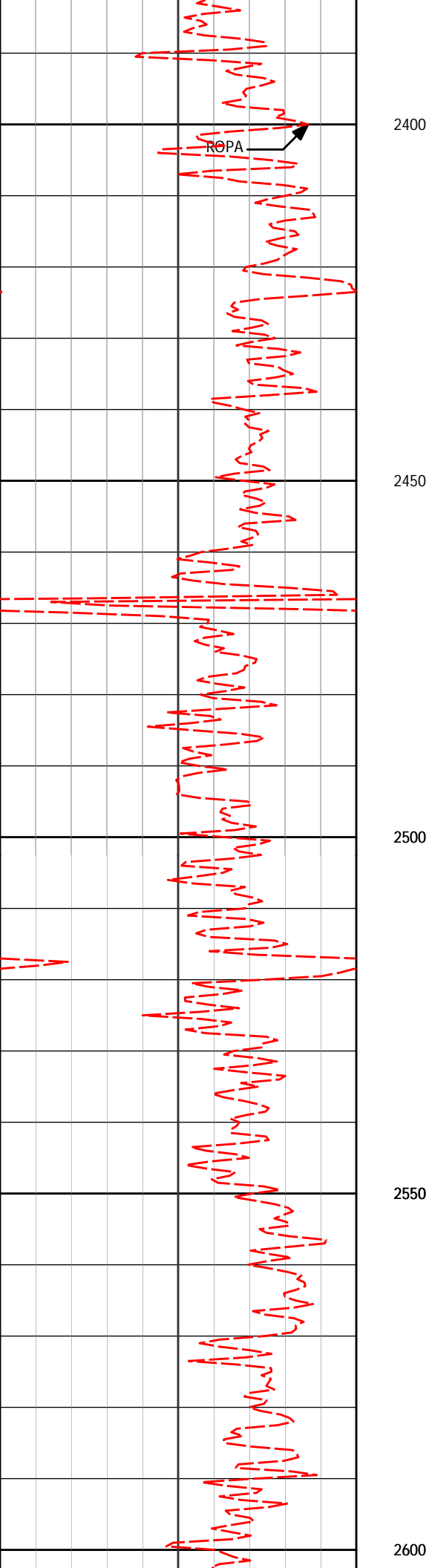


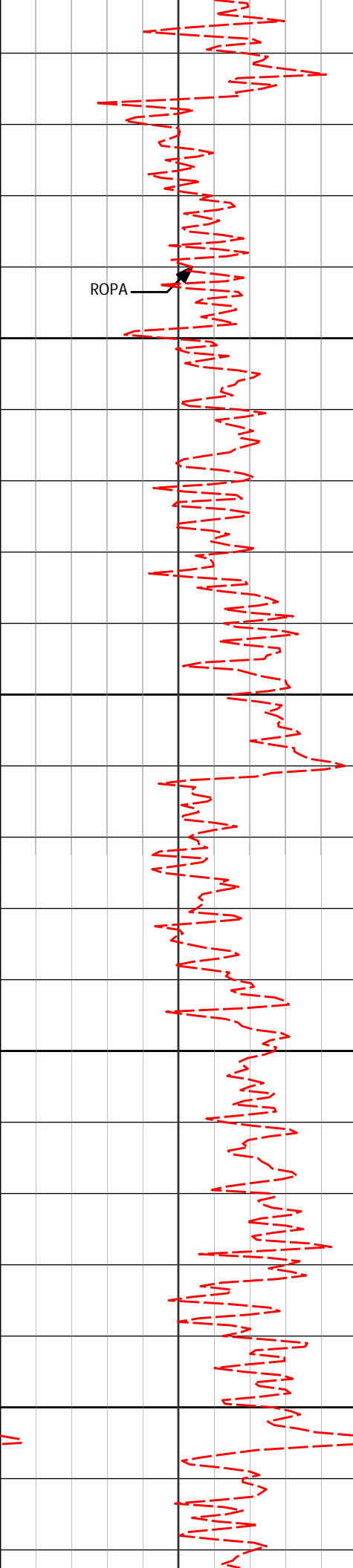
2373'

 $0.44^\circ$  $331.46^\circ$ 

2372.92'

-2.44'





2650

2660'

0.41°

352.54°

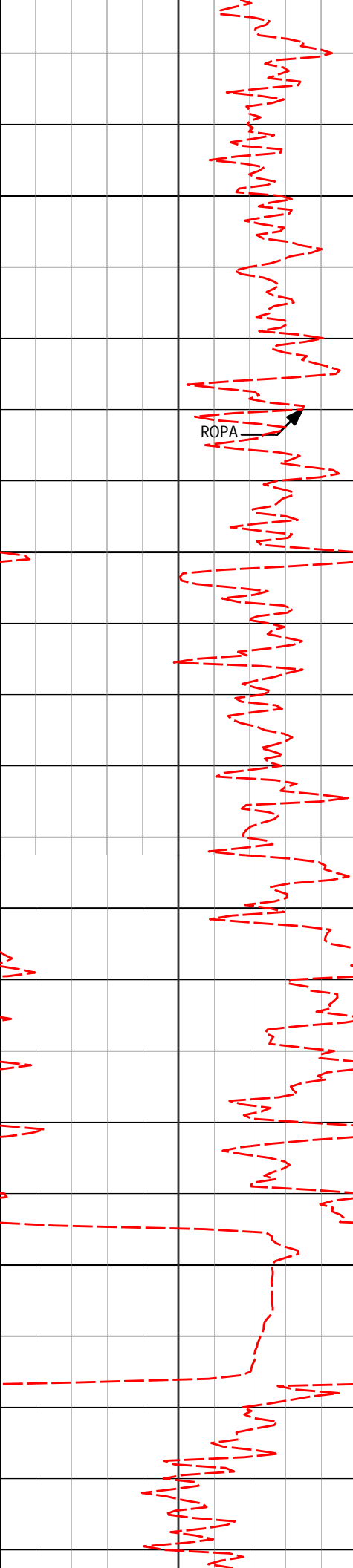
2659.91'

-0.46'

2700

2750

2800



2850

2900

2950

3000

ROPA

2946'

0.45°

196.97°

2945.91'

-0.52'

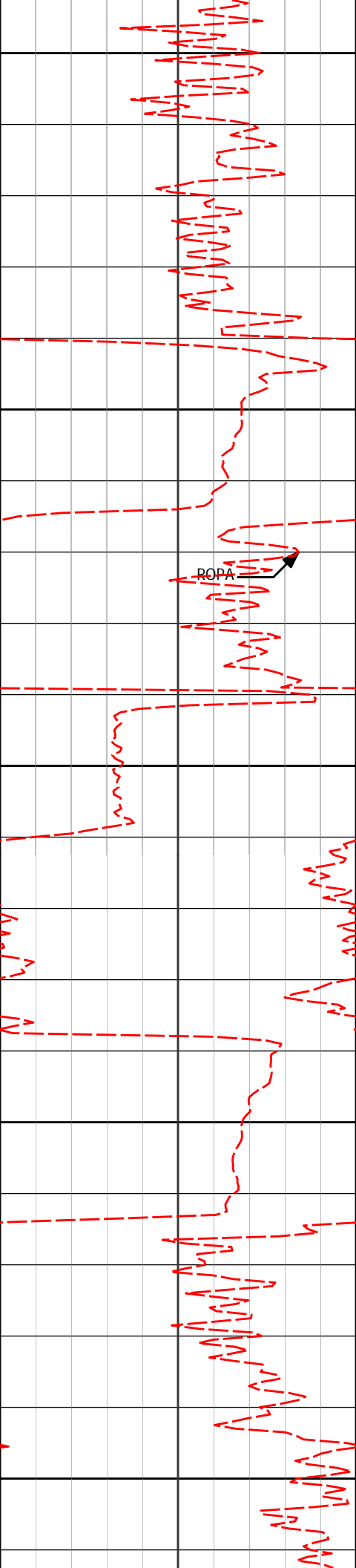
3041'

1.64°

165.58°

3040.89'

-2.20'



3050

3100

3150

3200

3250

ROPA

3137'

2.98°

173.45°

3136.81'

-6.00'

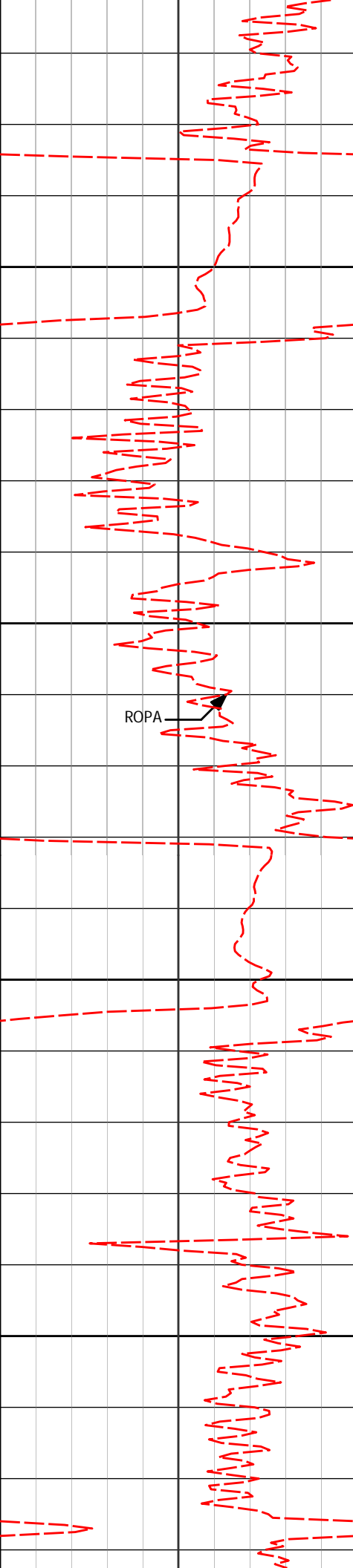
3233'

4.39°

169.26°

3232.61'

-12.09'



3300

3350

3400

3450

ROPA

3330'

5.17°

170.19°

3329.27'

-20.03'

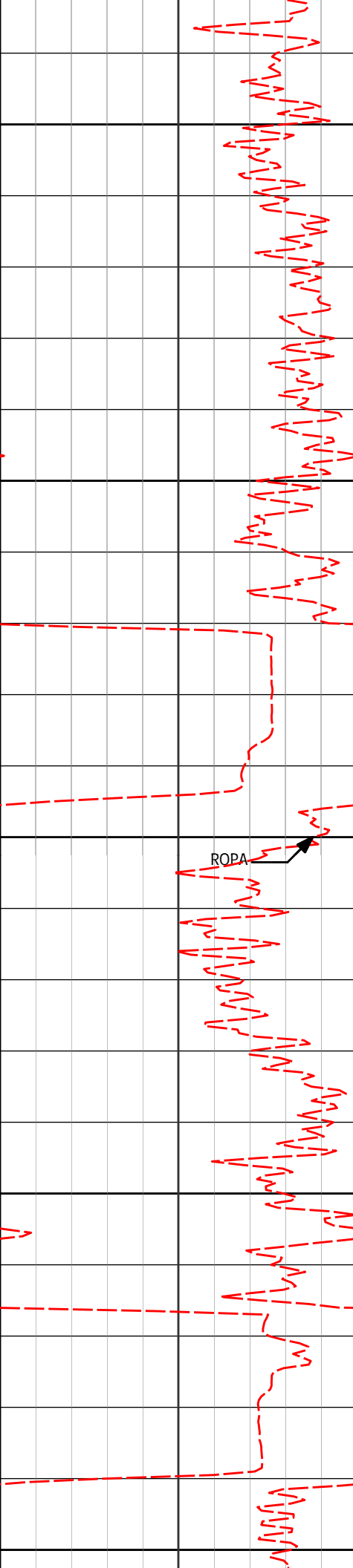
3425'

6.55°

174.44°

3423.78'

-29.64'



3500

3520'

5.35°

177.91°

3518.26'

-39.45'

3550

3600

ROPA

3615'

5.17°

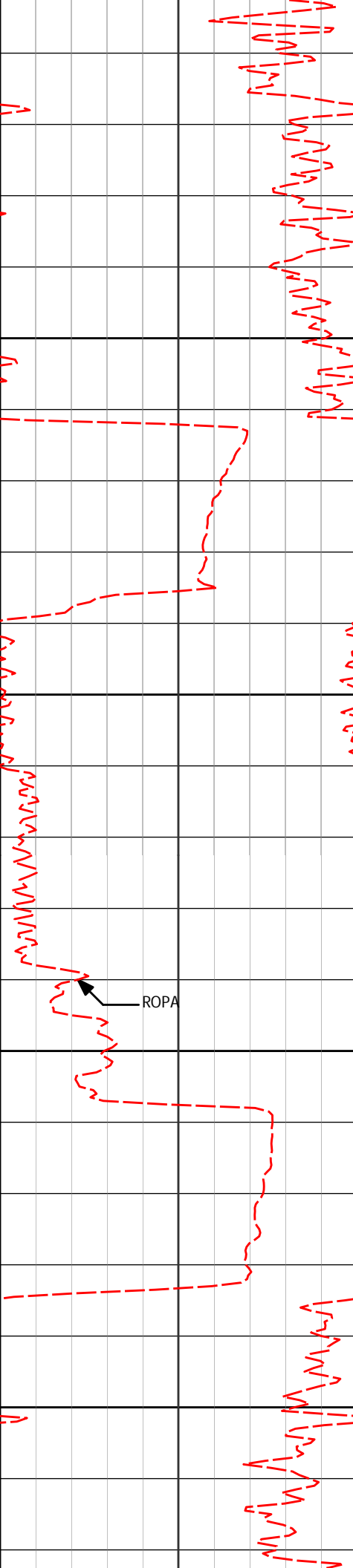
168.85°

3612.86'

-48.07'

3650

3700



3710'

5.12°

169.35°

3707.48'

-56.43'

3750

3800

3806'

5.17°

162.03°

3803.10'

-64.74'

3850

3900

3901'

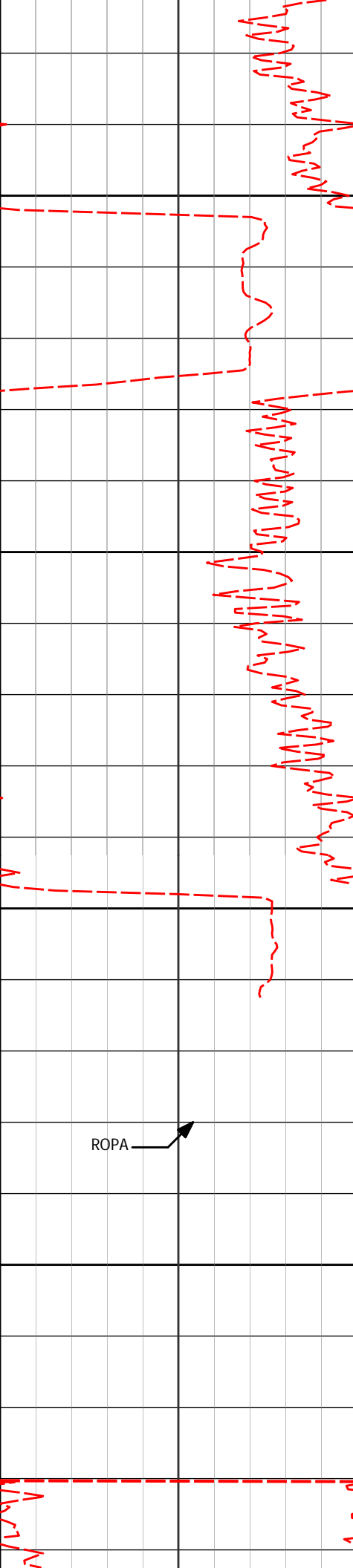
5.75°

173.20°

3897.67'

-73.53'





3950

4000

4050

4100

ROPA



3996'

5.39°

169.86°

3992.22'

-82.64'

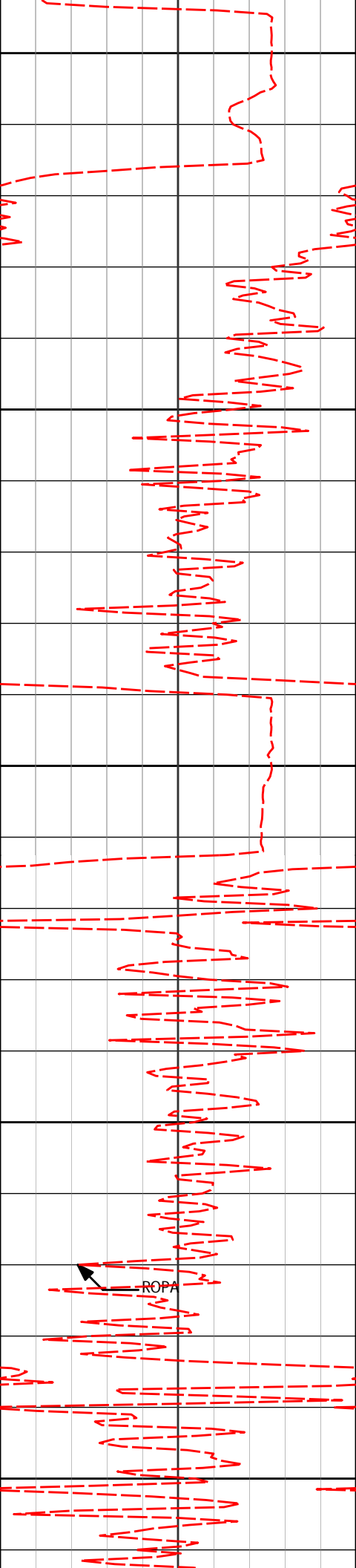
4092'

5.80°

164.32°

4087.76'

-91.74'



4150

4188'

5.53°

159.28°

4183.29'

-100.72'

4200

4250

4284'

6.59°

162.12°

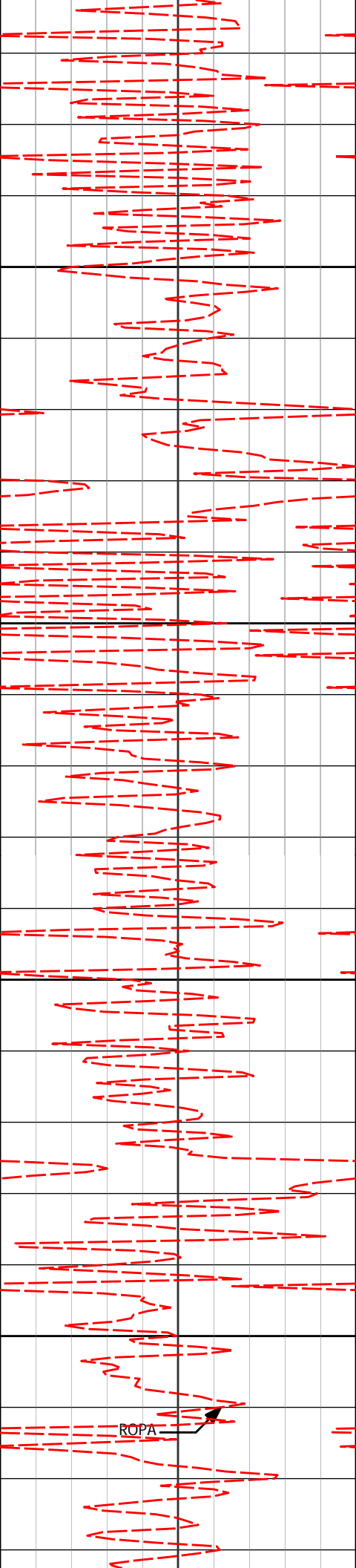
4278.76'

-110.27'

4300

ROPA

4350



4400

4450

4500

4550

4379'

6.56°

165.51°

4373.13'

-120.69'

4475'

5.65°

162.29°

4468.59'

-130.49'

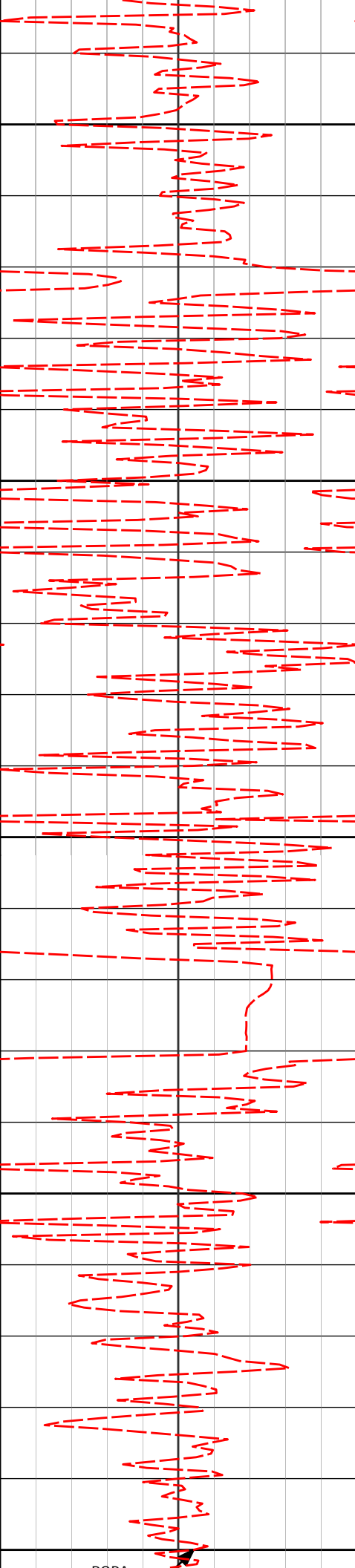
4570'

4.28°

168.10°

4563.23'

-138.40'



4600

4650

4700

4750

4800

4666'

4.01°

174.57°

4658.98'

-145.24'

4762'

2.80°

178.06°

4754.81'

-150.93'

4857'

182.35°

4849.73'

-154.59'

4953'

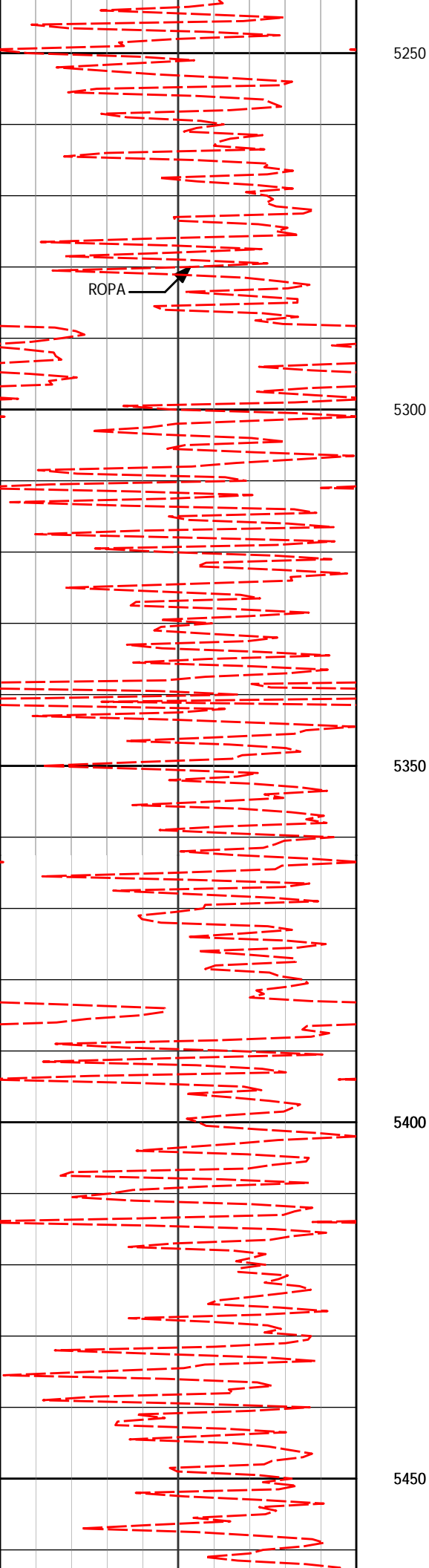
201.03°

4945.70'

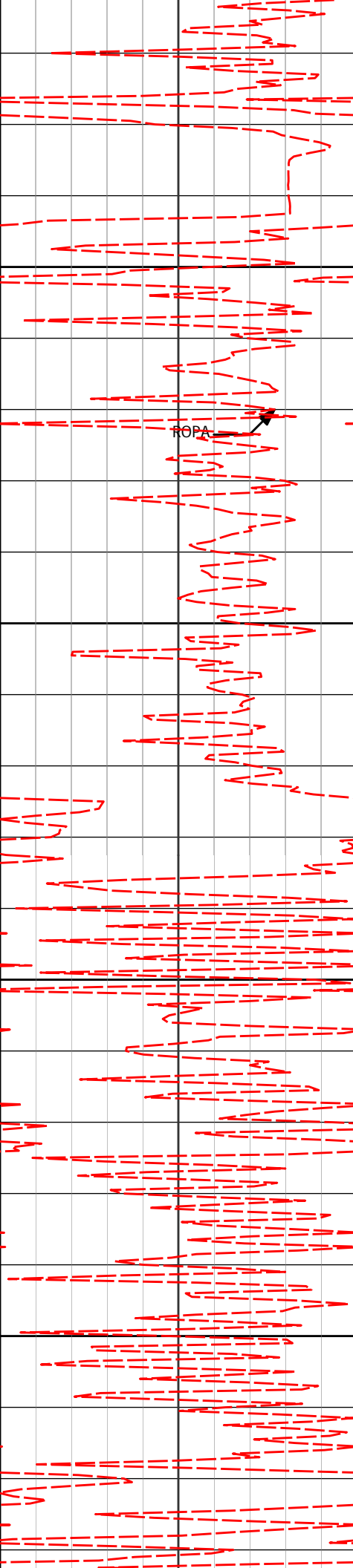
-156.98'

5000





5428' 1.14° 336.80° 5420.66' -155.59'



5500

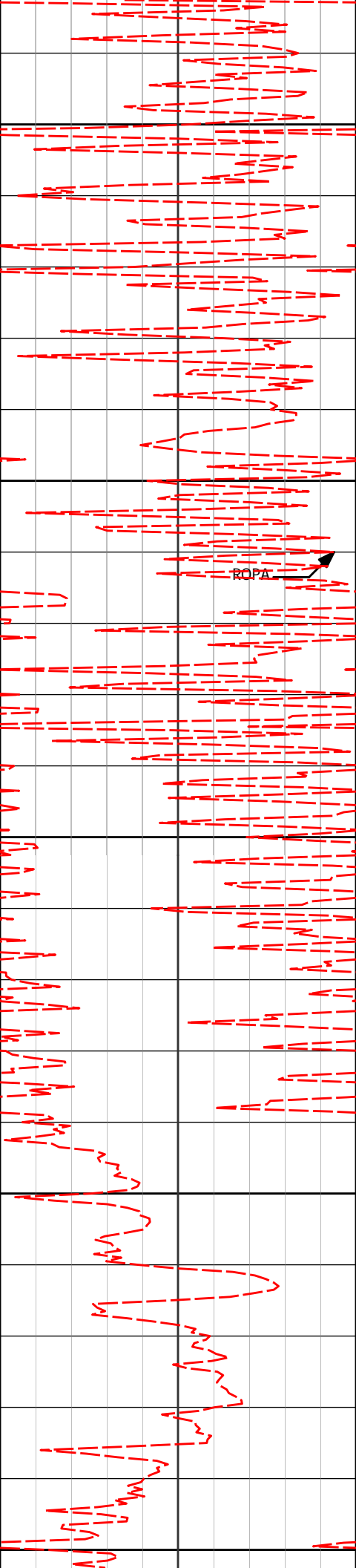
5550

5600

5650

ROPA





5700

5750

5800

5850

5900

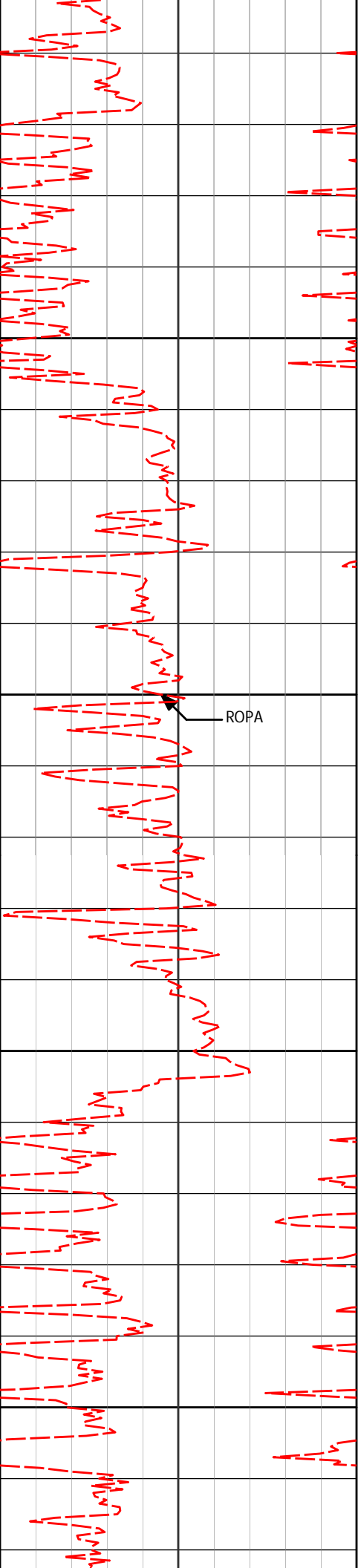
5811'

0.97°

328.02°

5803.60'

-149.36'



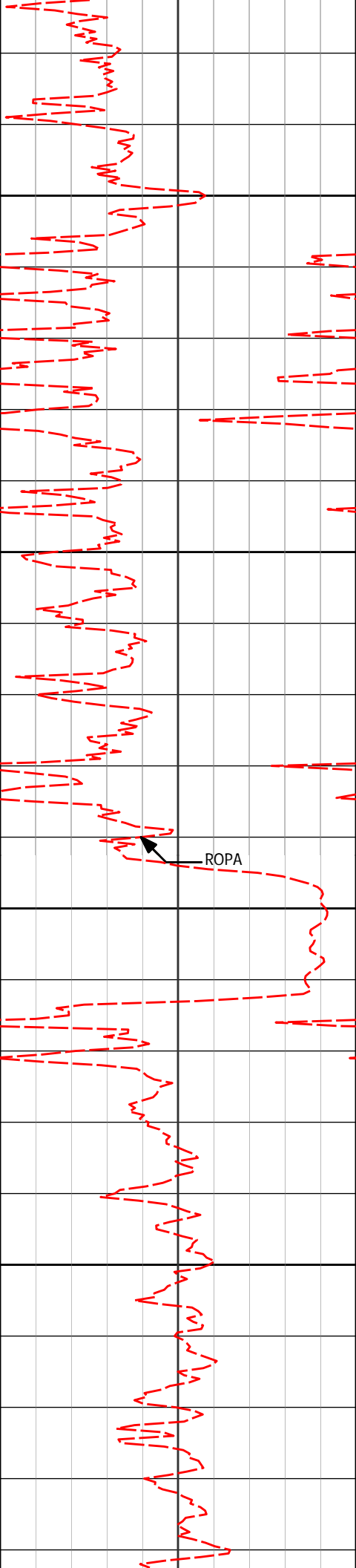
5950

6000

6050

6100

ROPA



6150

6193'

1.23°

3.71°

6185.53'

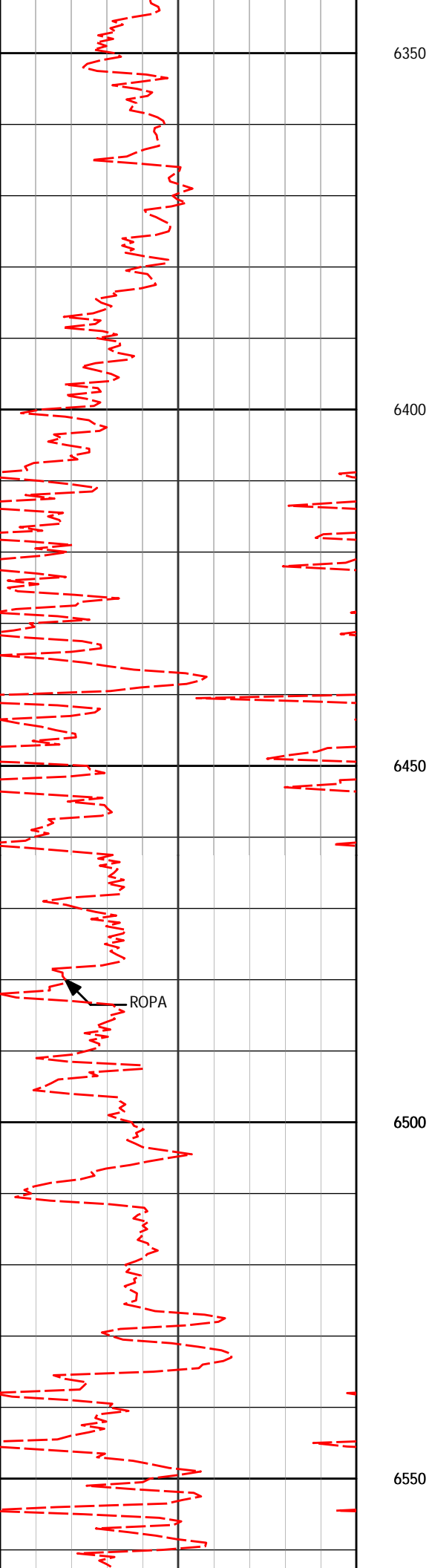
-142.53'

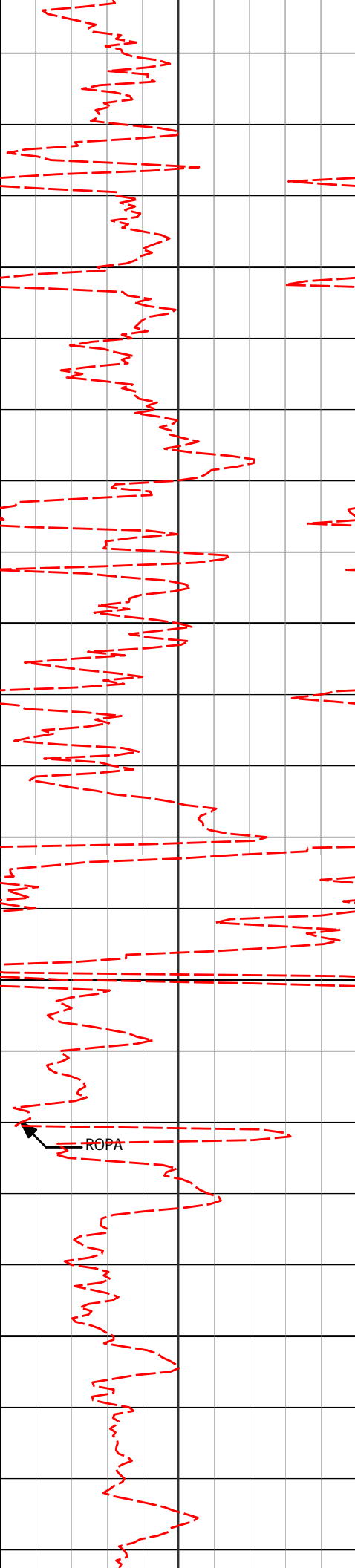
6200

6250

6300

ROPA





6573'

0.69°

31.45°

6565.48'

-136.50'

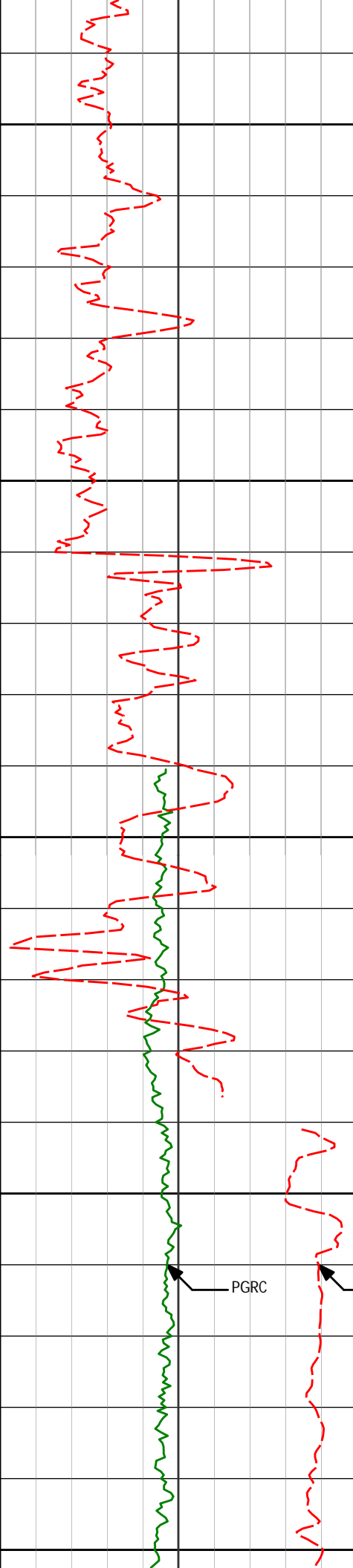
6600

6650

6700

6750

ROPA



6800

6850

6885'

Start Gamma Logging

6900

Run 200

6955'

PGRC

KOP

7000

1.26°

230.05°

6877.46'

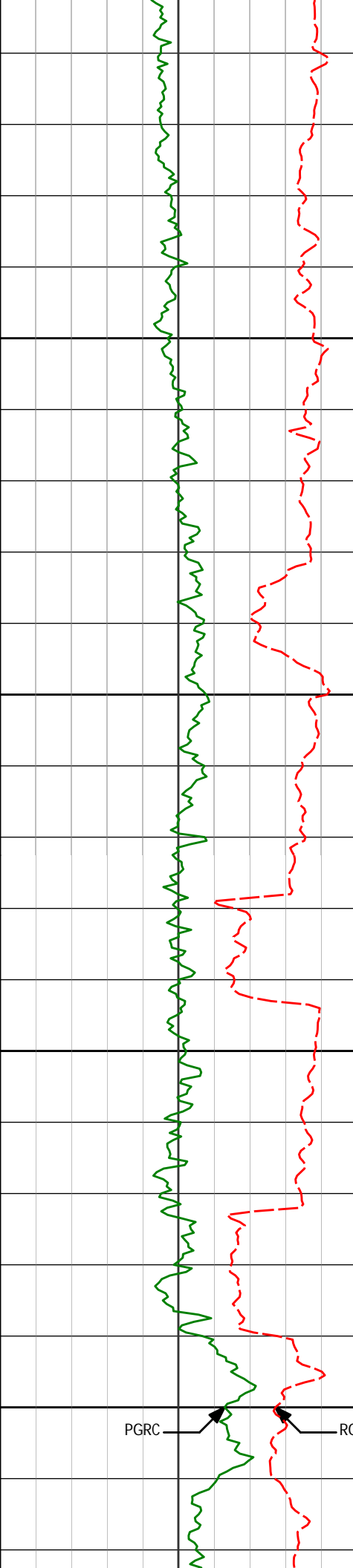
-137.11'

1.52°

310.92°

6947.44'

-137.01'



7050

7100

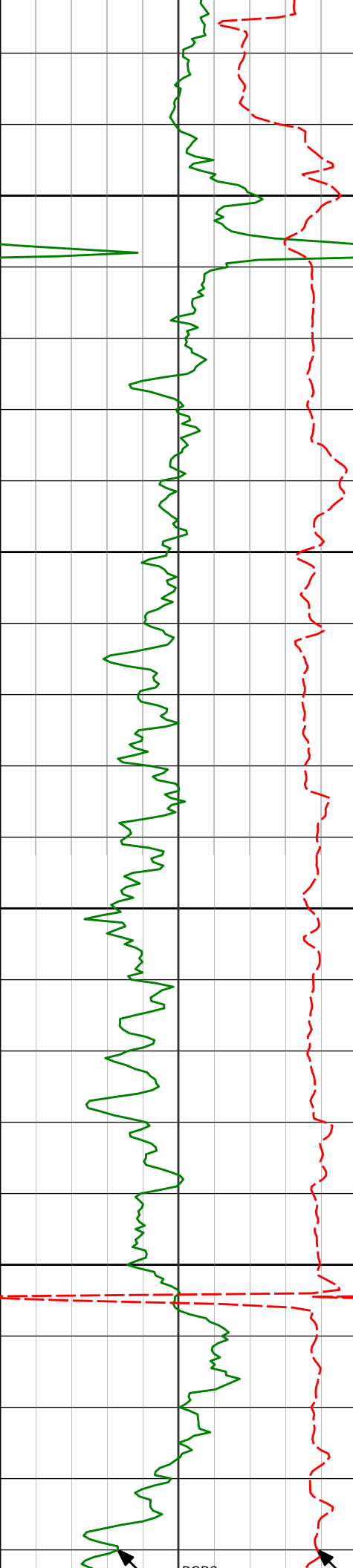
7150

7200

PGRC

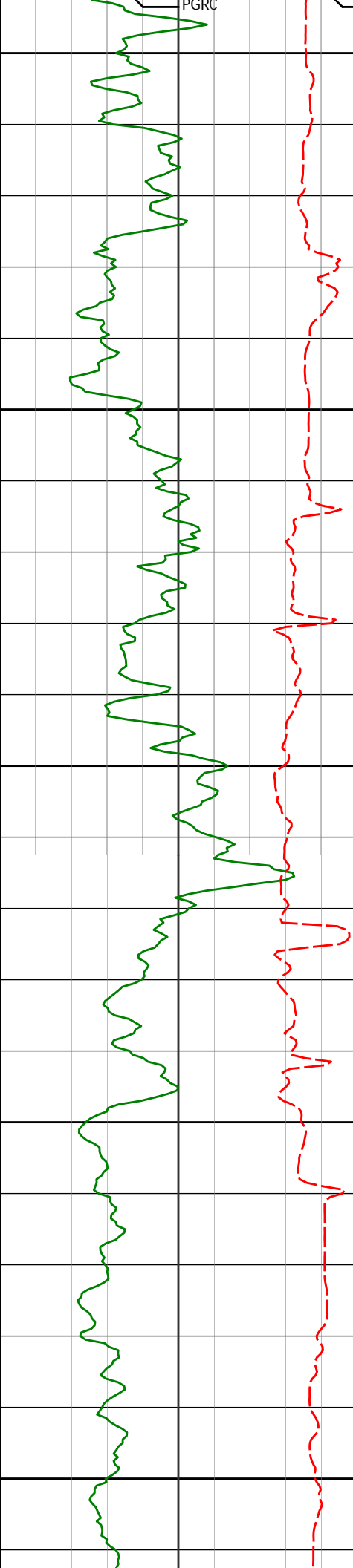
RQPA

7003	8.14°	1.23°	6995.25'	-133.19'
7051'	14.41°	2.07°	7042.31'	-123.81'
7096'	18.91°	3.78°	7085.41'	-110.93'
7146'	23.22°	0.23°	7132.06'	-92.98'
7194'	26.12°	0.94°	7175.67'	-72.94'



	7241'	28.73°	1.55°	7217.38'	-51.30'
7250					
	7289'	33.02°	1.98°	7258.57'	-26.68'
7300					
	7336'	37.95°	2.19°	7296.83'	0.58'
7350					
	7385'	43.02°	3.40°	7334.09'	32.35'
7400					
	7432'	49.27°	3.76°	7366.63'	66.17'
DOP2					
DOP1					





7450

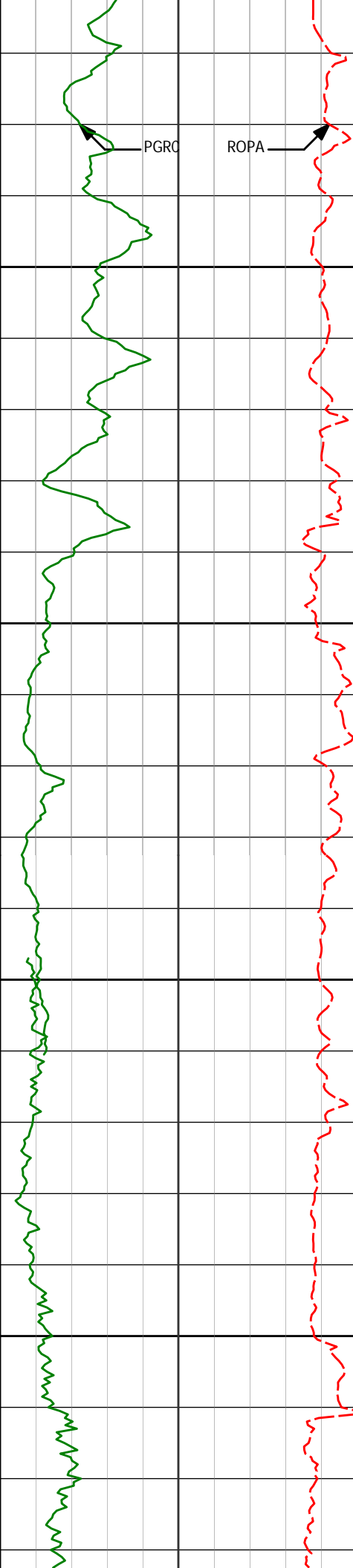
7500

7550

7600

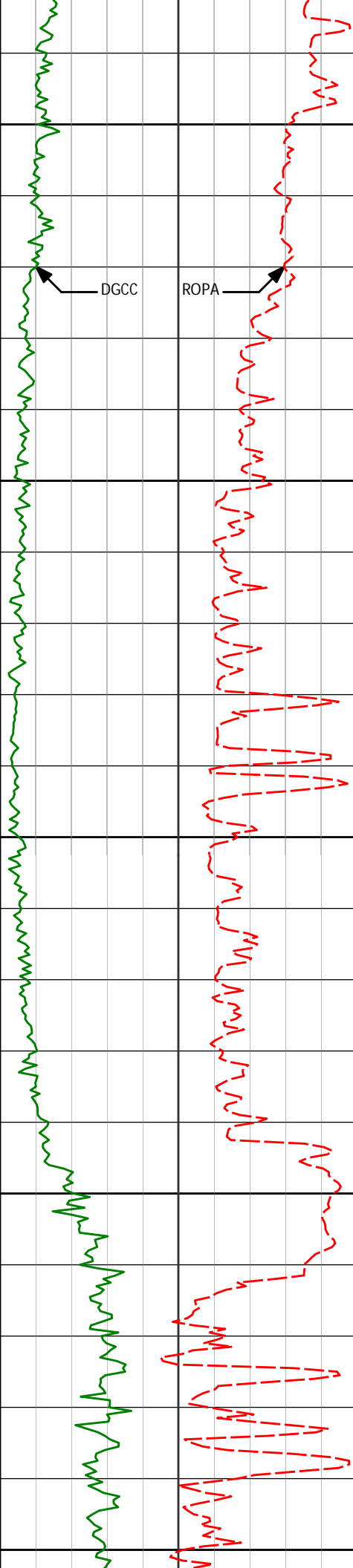
7650

7480'	55.63°	0.74°	7395.88'	104.18'
7527'	58.90°	0.04°	7421.29'	143.71'
7576'	58.75°	358.80°	7446.66'	185.62'
7623'	61.09°	358.68°	7470.21'	226.28'



Run 300

7671'	67.65°	0.91°	7490.96'	269.52'
7700				
7719'	74.27°	2.48°	7506.62'	314.86'
7750				
7767'	79.35°	2.90°	7517.56'	361.53'
7800				
7809'	85.31°	1.81°	7523.17'	403.11'
7850				



7900

7912'

87.84°

2.70°

7529.32'

505.86'

DGCC

ROPA

7" Casing set at 7936' MD

7950

8000

8007'

88.02°

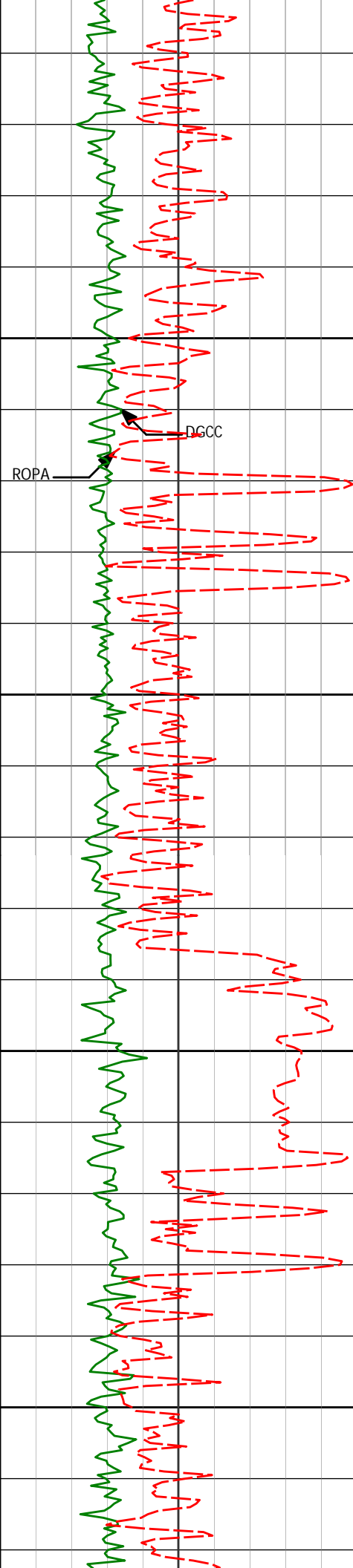
2.04°

7532.75'

600.74'

8050

8100



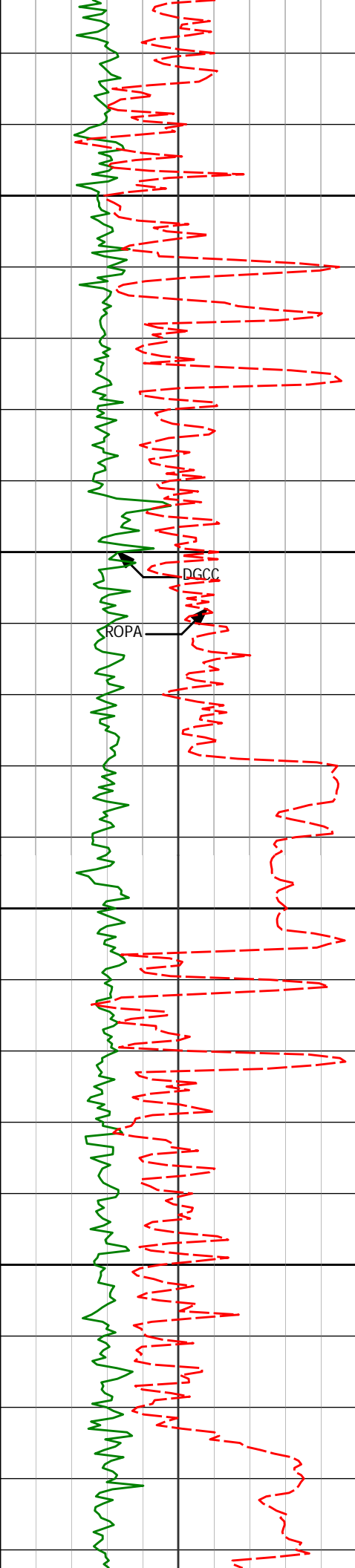
8150

8200

8250

8300

8103	88.89°	0.50°	7535.34'	696.68'
8199'	88.46°	359.75°	7537.56'	792.66'
8295'	91.05°	0.15°	7537.97'	888.65'



8350

8391'

90.56°

358.86°

7536.62'

984.62'

8400

DGCC

ROPA

8450

8487'

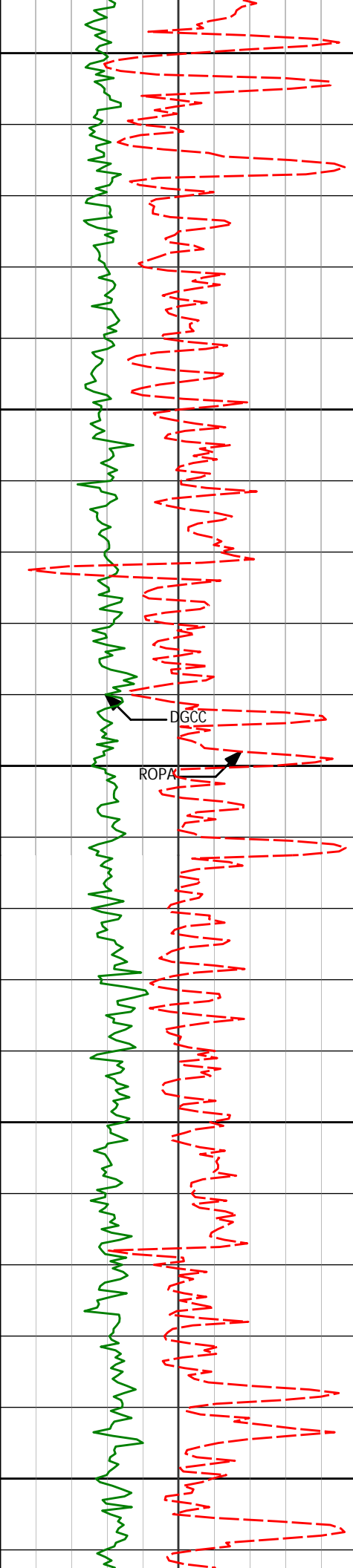
89.07°

1.49°

7536.93'

1080.61'

8500



8550

8582'

90.31°

0.84°

7537.45'

1175.60'

8600

8650

8678'

90.49°

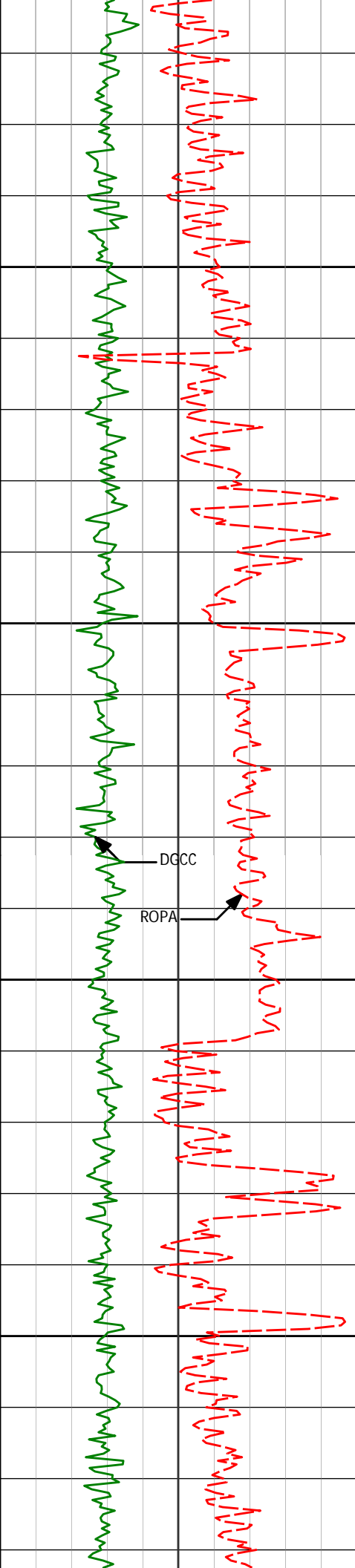
1.81°

7536.78'

1271.58'

8700

8750



8773'	90.37°	0.34°	7536.06'	1366.57'
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8800

8850

8869'	90.43°	359.95°	7535.39'	1462.56'
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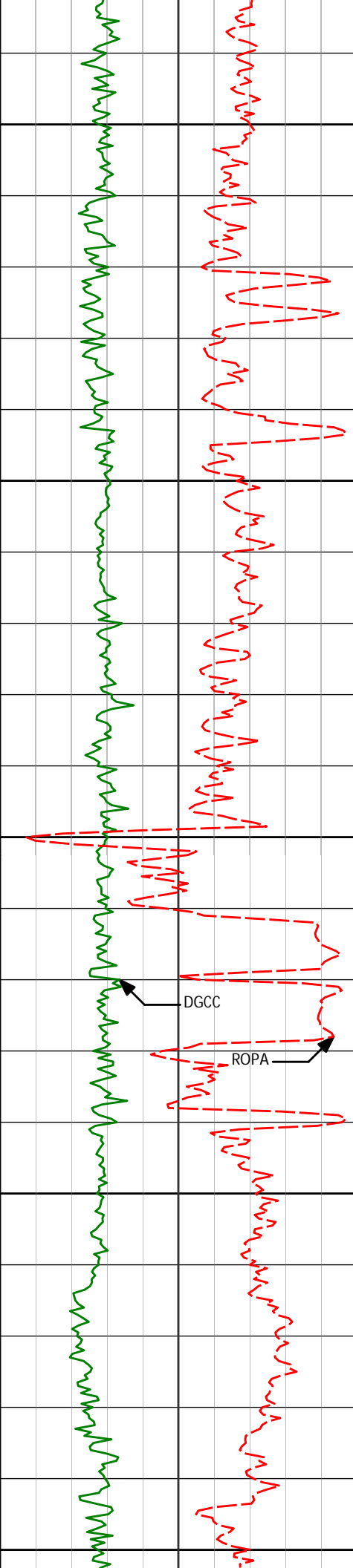
DGCC

ROPA

8900

8950

8965'	90.19°	359.45°	7534.87'	1558.56'
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9000

9050

9100

9150

9200

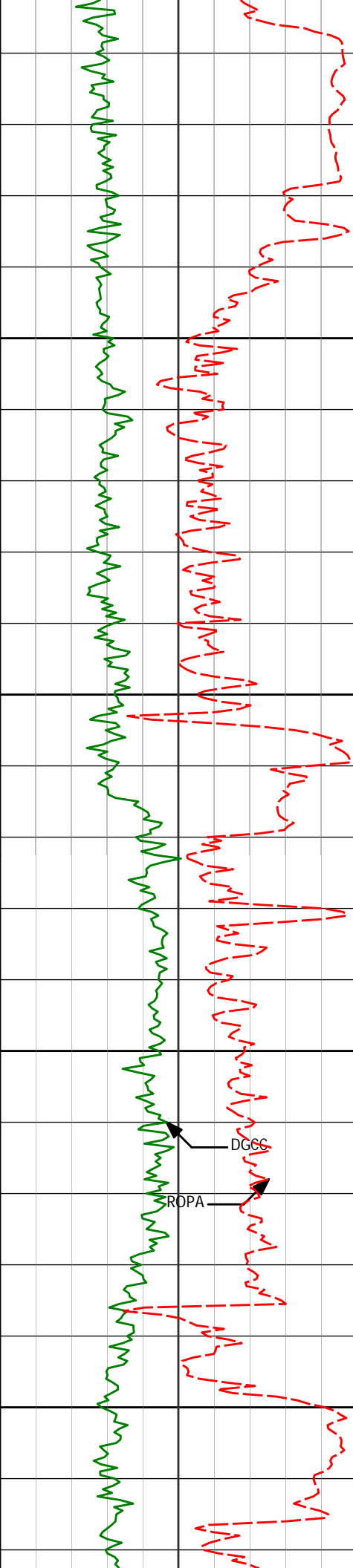
9060'	87.77°	357.86°	7536.56'	1653.49'
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DGCC

ROPA

9155'	88.08°	358.88°	7540.00'	1748.37'
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9250

9251'

87.47°

358.38°

7543.73'

1844.26'

9300

9350

9346'

89.44°

357.97°

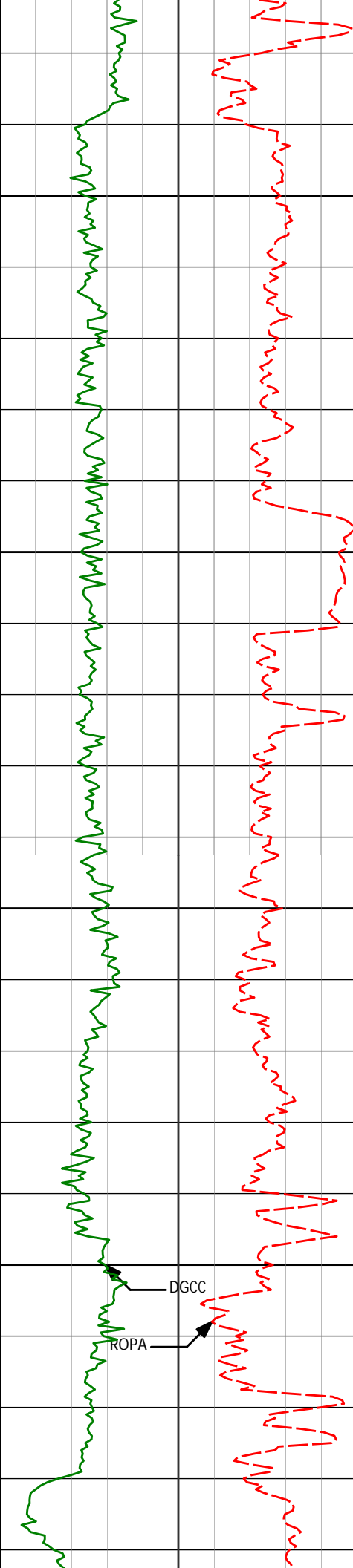
7546.29'

1939.15'

9400

DGCC

ROPA



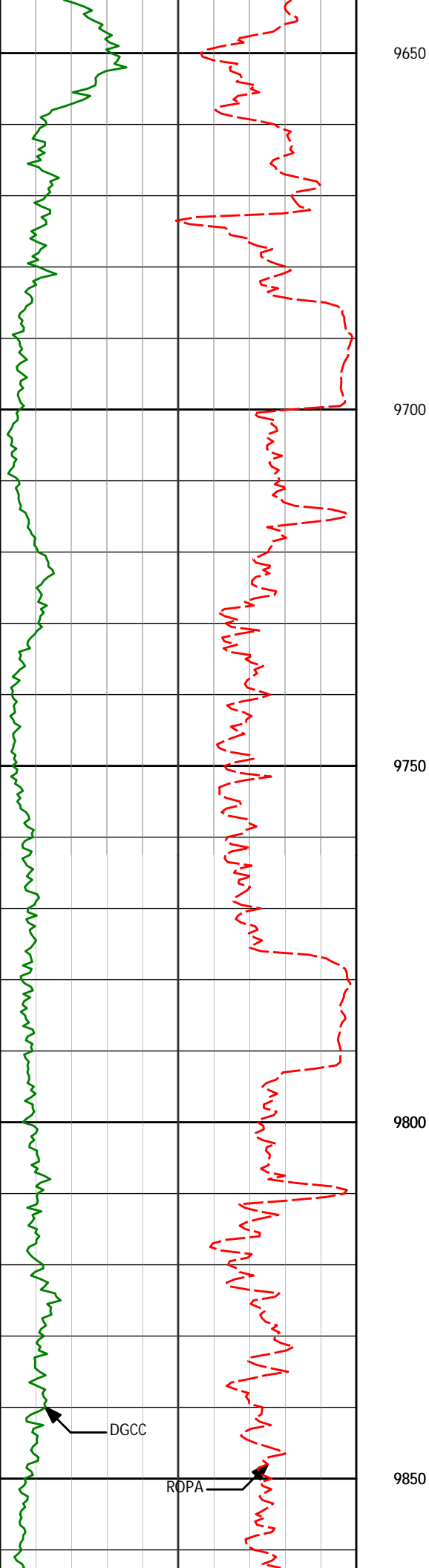
9450

9500

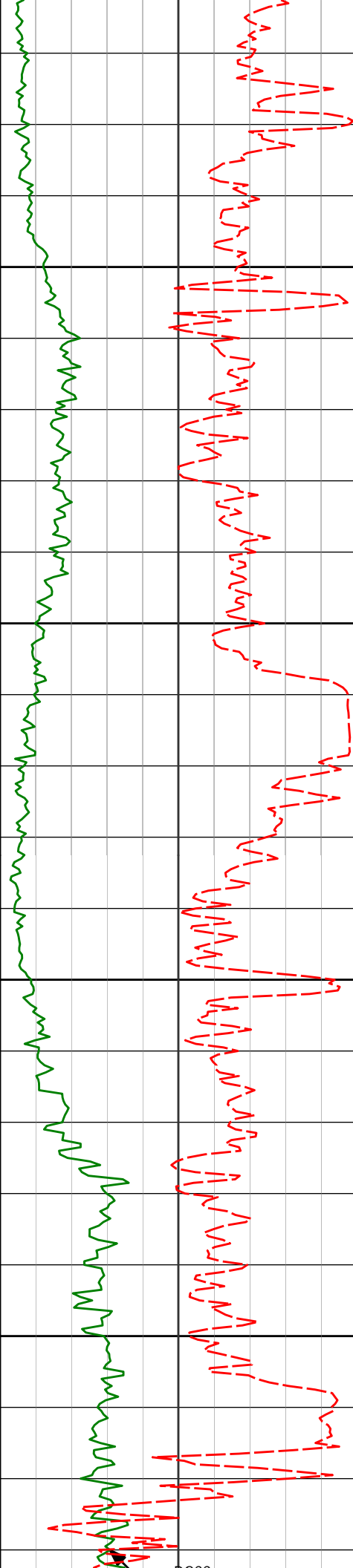
9550

9600

9442'	89.57°	359.20°	7547.12'	2035.10'
9537'	89.26°	0.21°	7548.09'	2130.09'
9633'	89.07°	359.13°	7549.49'	2226.08'



9729'	89.63°	359.89°	7550.58'	2322.06'
9824'	90.74°	1.63°	7550.27'	2417.05'



9900

9919'

91.30°

1.37°

7548.58'

2512.01'

9950

10000

10015'

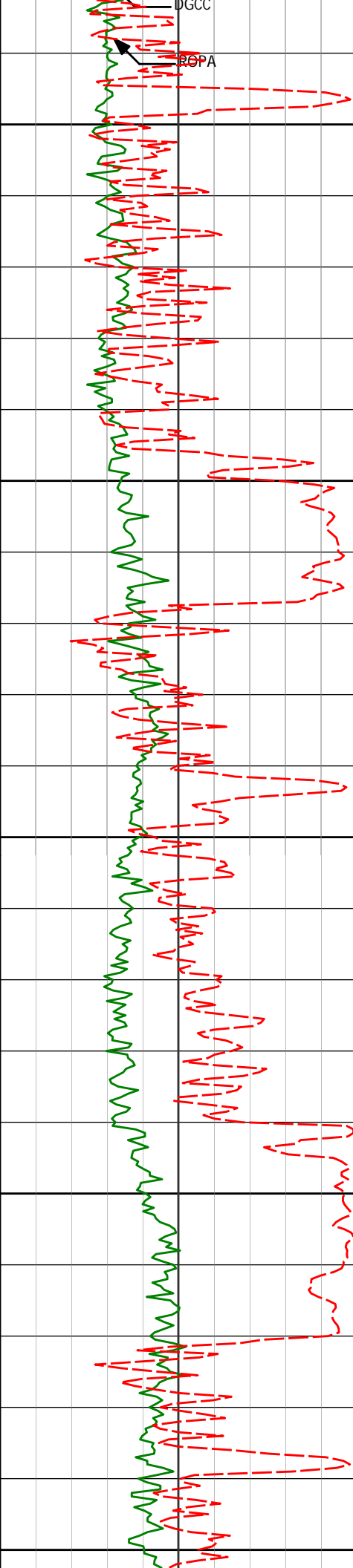
89.88°

0.96°

7547.59'

2608.00'

10050



10100

10111'

87.28°

0.28°

7549.97'

2703.96'

10150

10200

10206'

88.33°

0.86°

7553.61'

2798.88'

10250

10300

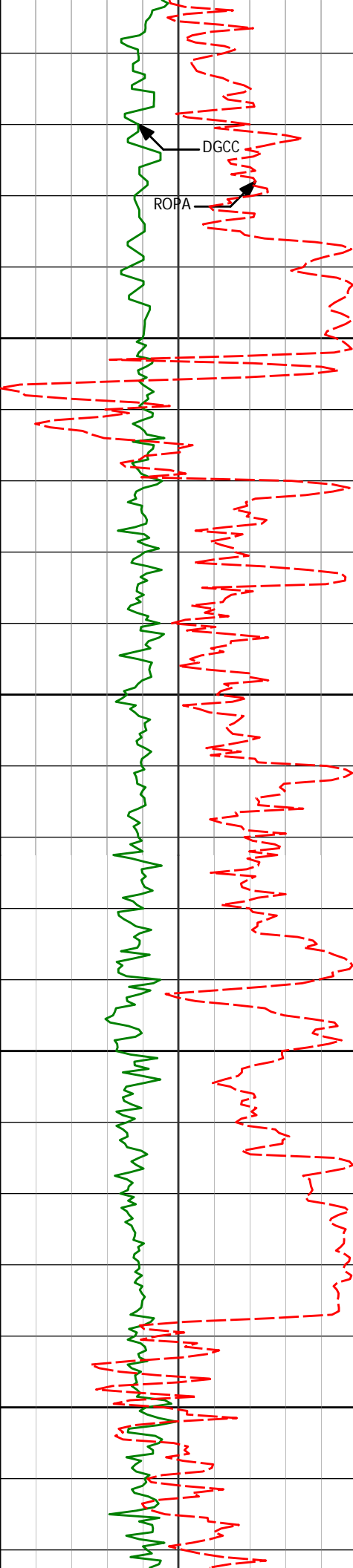
10302'

90.31°

0.19°

7554.75'

2894.87'



10350

10400

10450

10500

10397'

90.49°

0.66°

7554.09'

2989.87'

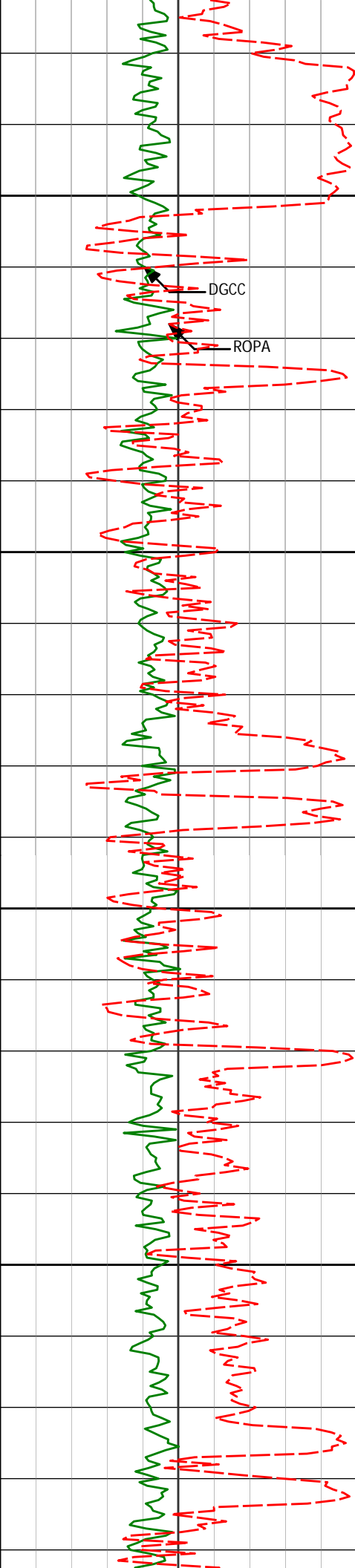
10492'

91.36°

0.08°

7552.55'

3084.85'



10550

10600

10650

10700

10588'

91.61°

0.97°

7550.07'

3180.82'

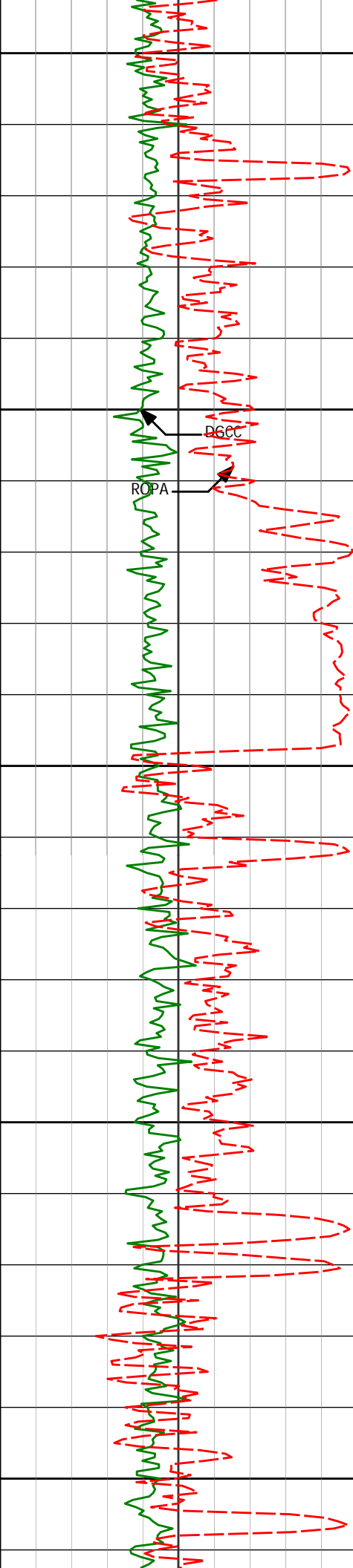
10683'

90.93°

0.49°

7547.96'

3275.79'



10750

10778'

90.87°

0.71°

7546.47'

3370.78'

10800

D6CC  
ROPA

10850

10873'

90.99°

1.99°

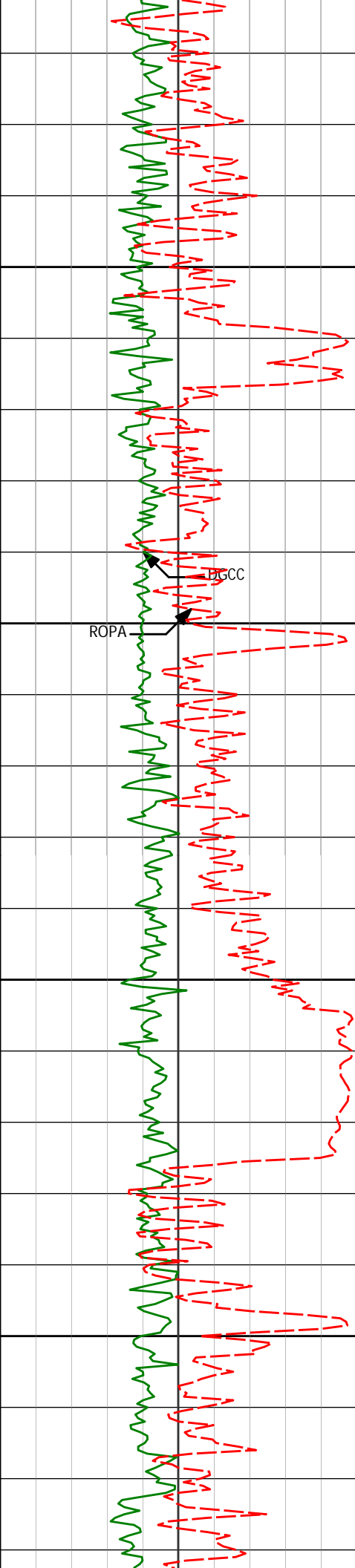
7544.93'

3465.75'

10900

10950





11000

11050

11100

11150

10969'

90.49°

2.19°

7543.69'

3561.70'

11064'

89.57°

1.65°

7543.64'

3656.66'

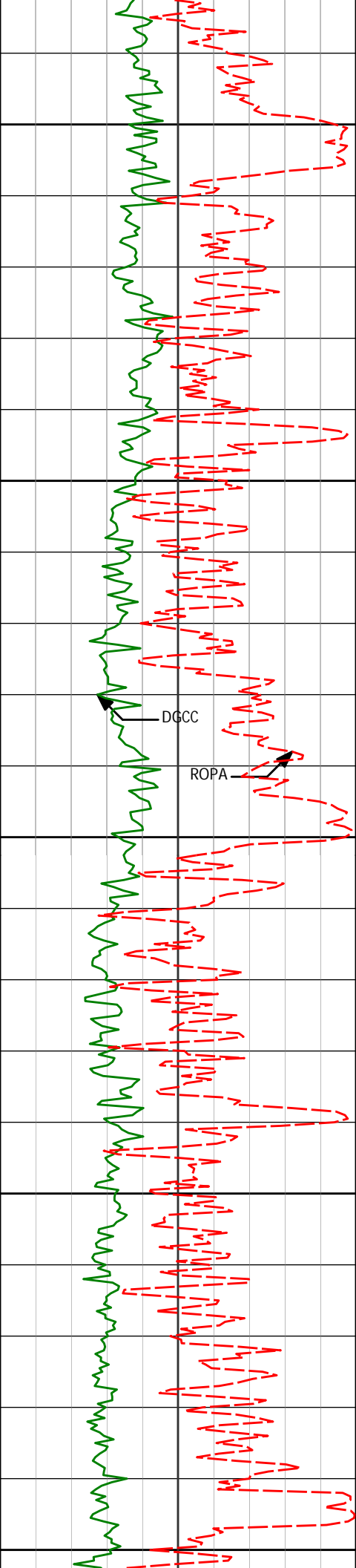
11160'

91.11°

1.88°

7543.07'

3752.62'



11200

11250

11300

11350

11400

11256'

90.99°

1.49°

7541.31'

3848.58'

DGCC

ROPA

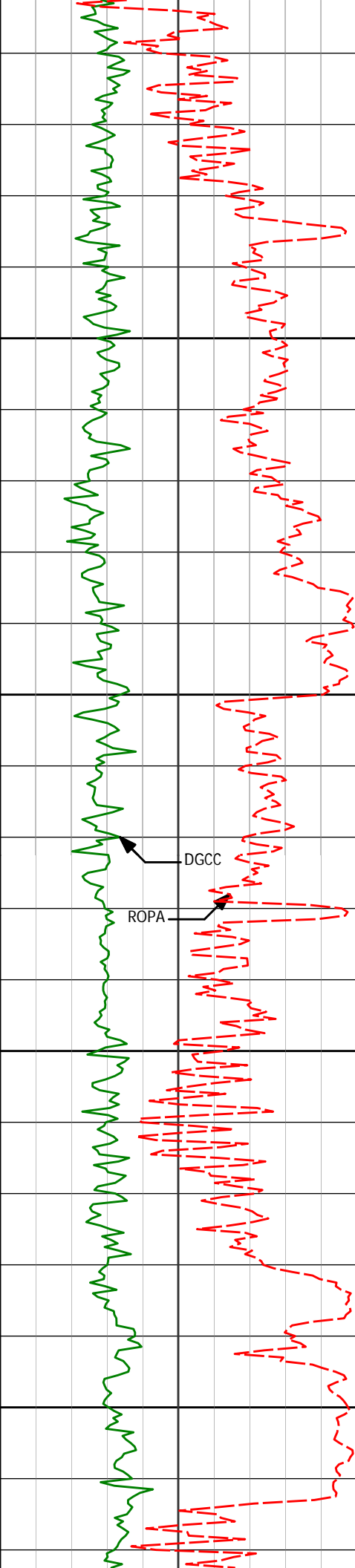
11351'

91.24°

1.08°

7539.46'

3943.55'



11450

11500

11550

11600

11446'

89.14°

359.92°

7539.15'

4038.54'

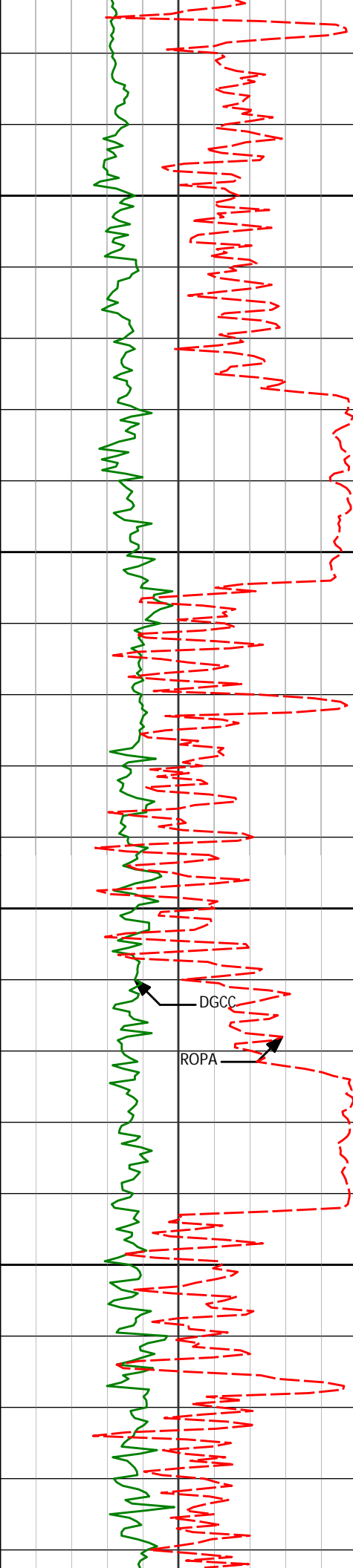
11542'

85.42°

358.21°

7543.70'

4134.39'



11637'

87.03°

357.87°

7549.95'

4229.10'

11650

11700

11733'

88.33°

358.15°

7553.84'

4324.94'

11750

DGCC

ROPA

11800

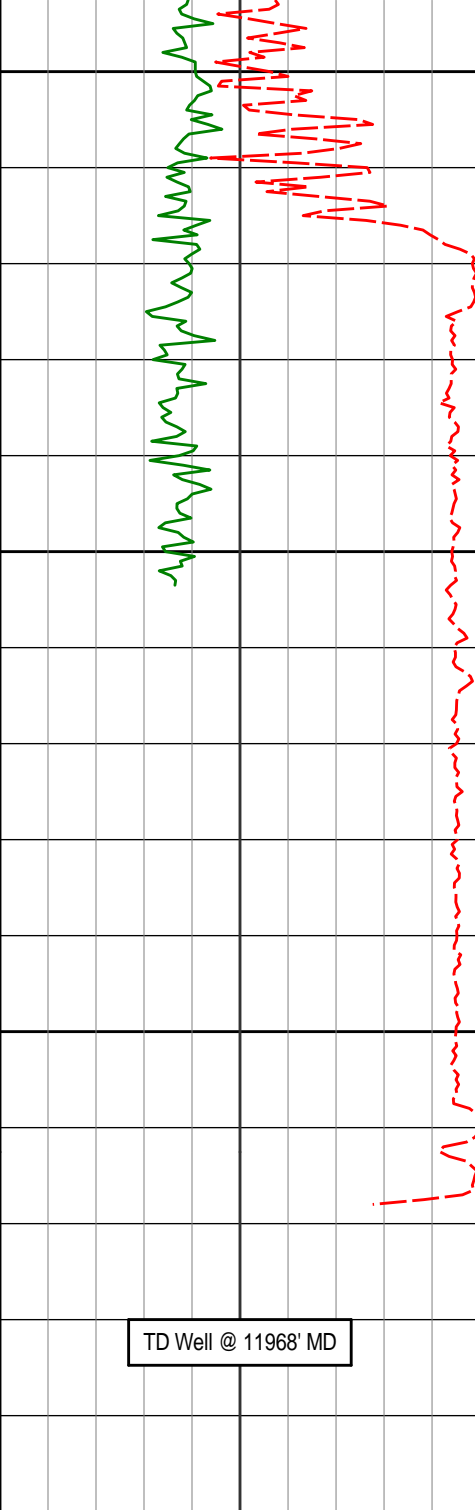
11829'

91.42°

359.54°

7554.05'

4420.90'



11850

11900

11950

12000

11927'

91.85°

358.82°

7551.25'

4518.84'

**Avg Rate of Penetration**

ROPA

feet per hr

Depth  
ft

**Depth**

**Inc.**

**Azi.**

**TVD**

**V.S.**

**DGR Comb Gamma Ray BCorr**

PGRC

api

**PCG Gamma Ray BCorr**

PGRC

api



**HALLIBURTON**

**DIRECTIONAL SURVEY REPORT**

Anadarko Petroleum

Gobbler 2C-23-HZ

991.00	0.02	278.40	990.96	1.93 N	7.20 E	1.97	TIE-IN
1250.00	0.46	212.75	1249.96	1.06 N	6.59 E	1.10	0.17
1526.00	0.36	183.19	1525.95	0.74 S	5.95 E	-0.70	0.08
1802.00	0.33	200.38	1801.95	2.35 S	5.62 E	-2.32	0.04
2086.00	0.77	265.44	2085.93	3.26 S	3.43 E	-3.25	0.25
2373.00	0.44	331.46	2372.92	2.45 S	0.98 E	-2.44	0.25
2660.00	0.41	352.54	2659.91	0.46 S	0.32 E	-0.46	0.06
2946.00	0.45	196.97	2945.91	0.52 S	0.14 W	-0.52	0.29
3041.00	1.64	165.58	3040.89	2.20 S	0.09 E	-2.20	1.34
3137.00	2.98	173.45	3136.81	6.01 S	0.72 E	-6.00	1.43
3233.00	4.39	169.26	3232.61	12.10 S	1.69 E	-12.09	1.49
3330.00	5.17	170.19	3329.27	20.05 S	3.13 E	-20.03	0.81
3425.00	6.55	174.44	3423.78	29.66 S	4.38 E	-29.64	1.52
3520.00	5.35	177.91	3518.26	39.48 S	5.07 E	-39.45	1.32
3615.00	5.17	168.85	3612.86	48.11 S	6.06 E	-48.07	0.89
3710.00	5.12	169.35	3707.48	56.47 S	7.67 E	-56.43	0.07
3806.00	5.17	162.03	3803.10	64.80 S	9.79 E	-64.74	0.69
3901.00	5.75	173.20	3897.67	73.59 S	11.68 E	-73.53	1.27
3996.00	5.39	169.86	3992.22	82.71 S	13.03 E	-82.64	0.51
4092.00	5.80	164.32	4087.76	91.82 S	15.13 E	-91.74	0.71
4188.00	5.53	159.28	4183.29	100.82 S	18.08 E	-100.72	0.59
4284.00	6.59	162.12	4278.76	110.38 S	21.41 E	-110.27	1.15
4379.00	6.56	165.51	4373.13	120.83 S	24.44 E	-120.69	0.41
4475.00	5.65	162.29	4468.59	130.64 S	27.25 E	-130.49	1.01
4570.00	4.28	168.10	4563.23	138.56 S	29.40 E	-138.40	1.53
4666.00	4.01	174.57	4658.98	145.41 S	30.46 E	-145.24	0.56
4762.00	2.80	178.06	4754.81	151.09 S	30.86 E	-150.93	1.28
4857.00	1.63	182.35	4849.73	154.76 S	30.88 E	-154.59	1.24
4953.00	1.30	201.03	4945.70	157.14 S	30.43 E	-156.98	0.60
5048.00	0.71	226.85	5040.69	158.55 S	29.62 E	-158.39	0.77
5144.00	0.32	305.72	5136.68	158.80 S	28.96 E	-158.64	0.75
5428.00	1.14	336.80	5420.66	155.74 S	27.21 E	-155.59	0.31
5811.00	0.97	328.02	5803.60	149.49 S	23.99 E	-149.36	0.06
6193.00	1.23	3.71	6185.53	142.66 S	22.54 E	-142.53	0.19
6573.00	0.69	31.45	6565.48	136.64 S	24.00 E	-136.50	0.18
6885.00	1.26	230.05	6877.46	137.24 S	22.35 E	-137.11	0.62
6955.00	1.52	310.92	6947.44	137.12 S	21.06 E	-137.01	2.59
7003.00	8.14	1.23	6995.25	133.30 S	20.65 E	-133.19	15.13
7051.00	14.41	2.07	7042.31	123.93 S	20.94 E	-123.81	13.07
7096.00	18.91	3.78	7085.41	111.05 S	21.62 E	-110.93	10.06
7146.00	23.22	0.23	7132.06	93.10 S	22.20 E	-92.98	8.99
7194.00	26.12	0.94	7175.67	73.07 S	22.41 E	-72.94	6.07
7241.00	28.73	1.55	7217.38	51.43 S	22.88 E	-51.30	5.59
7289.00	33.02	1.98	7258.57	26.81 S	23.65 E	-26.68	8.95
7336.00	37.95	2.19	7296.83	0.44 N	24.64 E	0.58	10.49
7385.00	43.02	3.40	7334.09	32.21 N	26.21 E	32.35	10.47
7432.00	49.27	3.76	7366.63	66.02 N	28.33 E	66.17	13.31
7480.00	55.63	0.74	7395.88	104.02 N	29.78 E	104.18	14.16
7527.00	58.90	0.04	7421.29	143.54 N	30.05 E	143.71	7.07
7576.00	58.75	358.80	7446.66	185.47 N	29.62 E	185.62	2.19
7623.00	61.09	358.68	7470.21	226.12 N	28.73 E	226.28	4.98
7671.00	67.65	0.91	7490.96	269.37 N	28.60 E	269.52	14.29
7719.00	74.27	2.48	7506.62	314.70 N	29.95 E	314.86	14.13
7767.00	79.35	2.90	7517.56	361.37 N	32.14 E	361.53	10.62
7809.00	85.31	1.81	7523.17	402.94 N	33.85 E	403.11	14.42
7912.00	87.84	2.70	7529.32	505.66 N	37.90 E	505.86	2.60
8007.00	88.02	2.04	7532.75	600.52 N	41.82 E	600.74	0.72
8103.00	88.89	0.50	7535.34	696.46 N	43.95 E	696.68	1.84
8199.00	88.46	359.75	7537.56	792.43 N	44.16 E	792.66	0.90
8295.00	91.05	0.15	7537.97	888.42 N	44.07 E	888.65	2.73
8391.00	90.56	358.86	7536.62	984.41 N	43.25 E	984.62	1.44
8487.00	89.07	1.49	7536.93	1080.39 N	43.54 E	1080.61	3.15
8582.00	90.31	0.84	7537.45	1175.37 N	45.47 E	1175.60	1.47
8678.00	90.49	1.81	7536.78	1271.34 N	47.69 E	1271.58	1.03
8773.00	90.37	0.34	7536.06	1366.32 N	49.47 E	1366.57	1.55

8965.00	90.19	359.45	7534.87	1558.31 N	49.21 E	1558.56	0.58
9060.00	87.77	357.86	7536.56	1653.26 N	46.98 E	1653.49	3.05
9155.00	88.08	358.88	7540.00	1748.16 N	44.28 E	1748.37	1.12
9251.00	87.47	358.38	7543.73	1844.06 N	41.99 E	1844.26	0.82
9346.00	89.44	357.97	7546.29	1938.97 N	38.96 E	1939.15	2.12
9442.00	89.57	359.20	7547.12	2034.94 N	36.59 E	2035.10	1.29
9537.00	89.26	0.21	7548.09	2129.93 N	36.10 E	2130.09	1.11
9633.00	89.07	359.13	7549.49	2225.92 N	35.55 E	2226.08	1.14
9729.00	89.63	359.89	7550.58	2321.90 N	34.73 E	2322.06	0.98
9824.00	90.74	1.63	7550.27	2416.89 N	35.99 E	2417.05	2.17
9919.00	91.30	1.37	7548.58	2511.84 N	38.48 E	2512.01	0.65
10015.00	89.88	0.96	7547.59	2607.82 N	40.43 E	2608.00	1.54
10111.00	87.28	0.28	7549.97	2703.77 N	41.47 E	2703.96	2.80
10206.00	88.33	0.86	7553.61	2798.70 N	42.41 E	2798.88	1.26
10302.00	90.31	0.19	7554.75	2894.68 N	43.29 E	2894.87	2.18
10397.00	90.49	0.66	7554.09	2989.67 N	44.00 E	2989.87	0.53
10492.00	91.36	0.08	7552.55	3084.66 N	44.61 E	3084.85	1.10
10588.00	91.61	0.97	7550.07	3180.62 N	45.49 E	3180.82	0.96
10683.00	90.93	0.49	7547.96	3275.59 N	46.70 E	3275.79	0.88
10778.00	90.87	0.71	7546.47	3370.57 N	47.69 E	3370.78	0.24
10873.00	90.99	1.99	7544.93	3465.53 N	49.93 E	3465.75	1.35
10969.00	90.49	2.19	7543.69	3561.46 N	53.43 E	3561.70	0.56
11064.00	89.57	1.65	7543.64	3656.40 N	56.62 E	3656.66	1.12
11160.00	91.11	1.88	7543.07	3752.35 N	59.57 E	3752.62	1.62
11256.00	90.99	1.49	7541.31	3848.30 N	62.39 E	3848.58	0.42
11351.00	91.24	1.08	7539.46	3943.25 N	64.52 E	3943.55	0.51
11446.00	89.14	359.92	7539.15	4038.24 N	65.35 E	4038.54	2.53
11542.00	85.42	358.21	7543.70	4134.10 N	63.79 E	4134.39	4.26
11637.00	87.03	357.87	7549.95	4228.84 N	60.55 E	4229.10	1.73
11733.00	88.33	358.15	7553.84	4324.70 N	57.22 E	4324.94	1.39
11829.00	91.42	359.54	7554.05	4420.66 N	55.28 E	4420.90	3.53
11927.00	91.85	358.82	7551.25	4518.61 N	53.88 E	4518.84	0.86

# **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 0.31 DEGREES (TRUE)  
A TOTAL CORRECTION OF 8.63 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED**

**HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  
HORIZONTAL DISPLACEMENT(CLOSURE) AT 11927.00 FEET  
IS 4518.93 FEET ALONG 0.68 DEGREES (TRUE)**

**All surveys are magnetic In-Field-Referencing (IFR) corrected.  
Final survey is a projection to TD.**