

## PCDC - Pressure Case Directional

1 : 240

Country	: USA
Field	: Wattenburg
Location	: Lat: 40° 6' 57.17" North Long: 104° 38' 20.10" West
Well	: Hudson 13C-35HZ
Company	: Anadarko
Rig	: Xtreme 22
LOCATION	
Latitude : 40° 6' 57.17" North Longitude : 104° 38' 20.10" West UTM Easting = 3,240,821.89 ft UTM Northing = 1,286,228.62 ft	Company : Anadarko Rig : Xtreme 22 Well : Hudson 13C-35HZ Field : Wattenburg Country : USA API Number : 05-123-35946
Other Services Directional Drilling	

[illegible]

## WELL INFORMATION

<b>MWD Run Number</b>	100	200			
<b>Date run completed</b>	02-Feb-13	03-Feb-13			
<b>Rig Bit Number</b>	0100	0200			
<b>Bit Size (in)</b>	8.750	8.750			
<b>Tool Nominal OD (in)</b>	6.750	6.750			
<b>Log Start Depth (TVD, ft)</b>	1,320.95	6,600.22			
<b>Log End Depth (TVD, ft)</b>	6,600.22	7,209.71			
<b>Drill or Wipe</b>	Drill	Drill			
<b>Drill/Wipe Start Date and Time</b>	31-Jan-13 15:20	02-Feb-13 13:35			
<b>Drill/Wipe End Date and Time</b>	02-Feb-13 02:50	03-Feb-13 12:15			
<b>Min Inc (deg) @ Depth (TVD, ft)</b>	.18 @ 1,716.94	2.36 @ 6,631.20			
<b>Max Inc (deg) @ Depth (TVD, ft)</b>	9.56 @ 3,464.93	84.47 @ 7,206.65			
<b>Bit TFA(in2) / Bit Type</b>	1.54 / PDC	1.53 / PDC			
<b>Flow Rate (gpm)</b>	587.79	500.00			
<b>Max AV (fpm) / CV (fpm) @ MWD</b>	N/A / N/A	N/A / N/A			
<b>Fluid Type</b>	Fresh Water Gel	Fresh Water Gel			
<b>Density (ppg) / Viscosity (spqt)</b>	8.40 / 28.00	9.80 / 37.00			
<b>Filtrate CL (ppm)</b>	350.00	450.00			
<b>pH / Fluid Loss (mptm)</b>	8.00 / 0	8.80 / 1			
<b>PV (cP) / YP (lbf2)</b>	1 / 2.00	10 / 10.00			
<b>% Solids / % Sand</b>	0.8 / 0.5	10 / 0.25			
<b>% Oil / Oil:Water Ratio</b>	N/A / N/A	N/A / N/A			
<b>Rm @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Rmf @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Rmc @ Measured Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Max Tool Temp (degF) / Source</b>	160.83 / PCM	171.2 / PCM			
<b>Rm @ Max Tool Temp (degF)</b>	N/A @ N/A	N/A @ N/A			
<b>Lead MWD Engineer</b>	Clay Wass	Matt Busche			
<b>Customer Representative</b>	Randy Anderson	Randy Anderson			

## SENSOR INFORMATION

### Downhole Processor Information

Tool Type	PCM	PCM			
Software Version	5.76	5.76			
Sub Serial Number	11342294	11342294			
Insert Serial Number	11680788	11619996			
Date and Time Initialized	29-Jan-13 04:50	02-Feb-13 00:23			
Date and Time Read	02-Feb-13 09:00	04-Feb-13 03:01			
ECMB SW Version	N/A	N/A			

### Directional Sensor Information

Tool Type	PCDC	PCDC			
Distance From Bit (ft)	60.00	49.00			
Software Version	6.21	6.21			
Sub Serial Number	11342294	11342294			
Sonde Serial Number	11478013	11297590			
Sensor ID Number	N/A	N/A			
Toolface Offset (deg)	282.26	289.81			

### Gamma Ray Sensor Information

Tool Type		PCG			
Distance From Bit (ft)		52.30			
Recorded Sample Period (sec)		10			
Software Version		8.15			
Sub Serial Number		11342294			
Insert/Sonde Serial Number		11681025			

## REMARKS

1. All depths are true vertical depths, referenced to the Driller's pipe tally and are measured from the Kelly Bushing, unless otherwise specified.
2. No depth corrections have been made for pipe stretch or compression.
3. All data presented is recorded data unless otherwise specified.
4. The following smoothing parameters have been applied to the data:

PGRC (Corrected Gamma Ray):

Interval Resolution: 0.5 ft

Interval Distance: 0.6 ft

Gap Fill: 3.0 ft

ROPA (Average Rate Of Penetration):

Interval Resolution: 0.5 ft

Interval Distance: 1.2 ft

Gap Fill: 3.0 ft

Insite version: 7.4.10

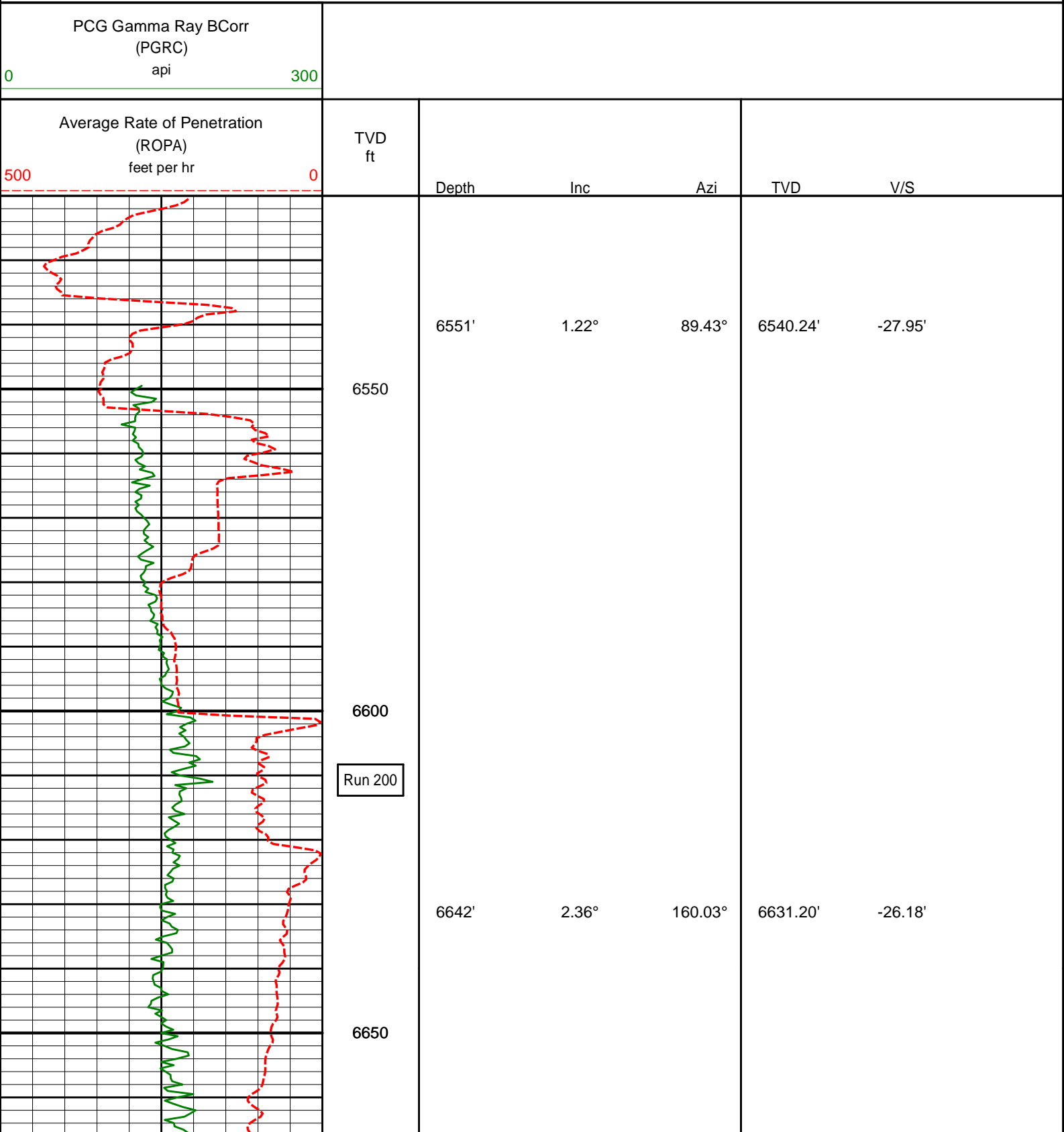
## WARRANTY

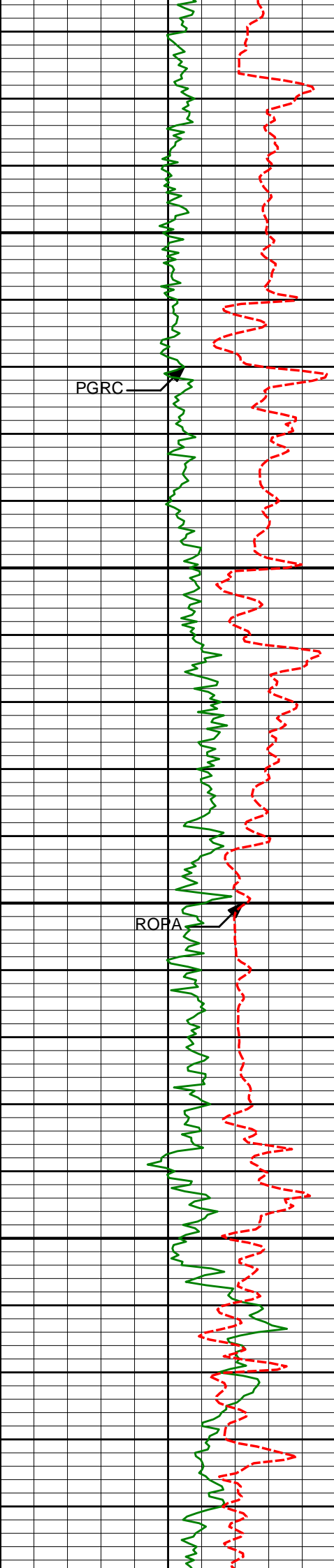
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# HALLIBURTON

## TVD Main Log 1:240





6700

6750

6800

6850

6685'

8.44°

173.29°

6673.99'

-22.21'

6728'

12.24°

177.84°

6716.29'

-14.51'

6777'

14.59°

174.37°

6763.95'

-3.17'

6813'

19.19°

172.29°

6798.39'

7.22'

6856'

25.29°

178.51°

6838.17'

23.44'

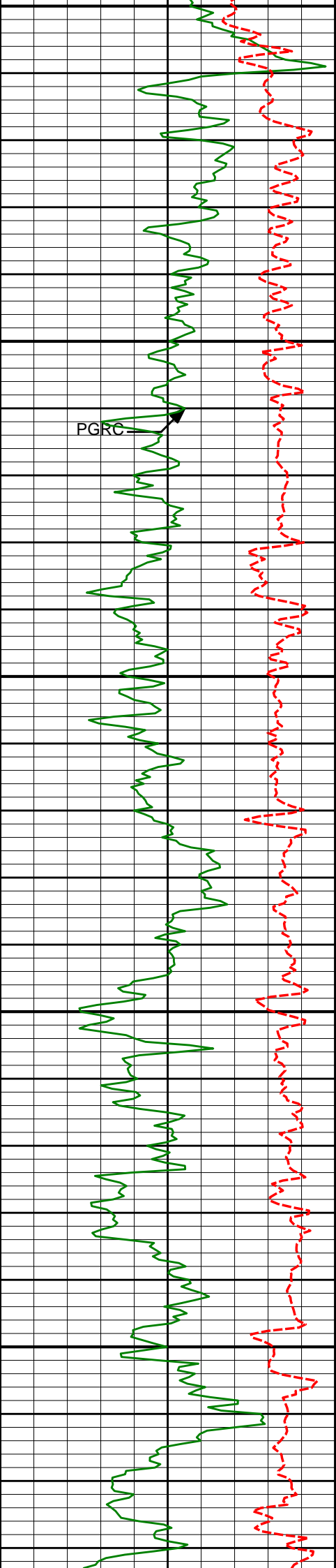
6899'

28.52°

181.36°

6876.52'

42.89'



6900

6942'

31.96°

184.51°

6913.66'

64.49'

6950

6985'

35.36°

184.66°

6949.45'

88.23'

7000

7028'

38.71°

183.75°

6983.77'

114.03'

7050

7114'

47.61°

179.19°

7046.64'

172.53'

7100

7156'

50.73°

178.98°

7074.10'

204.31'

7199'

53.92°

179.87°

7100.38'

238.34'

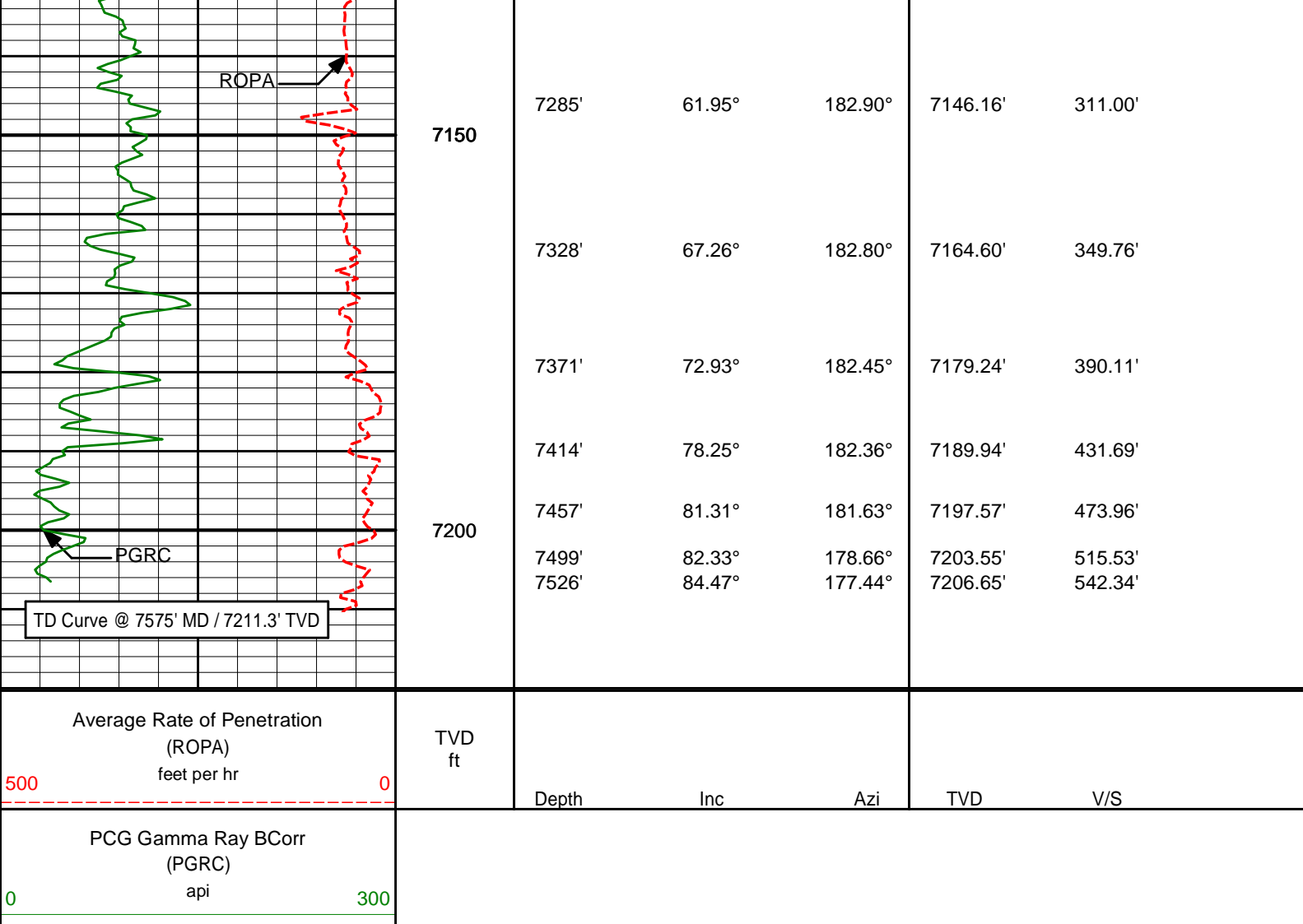
7242'

57.67°

181.38°

7124.54'

273.88'



## HALLIBURTON

### DIRECTIONAL SURVEY REPORT

Anadarko  
Hudson 13C-35HZ  
Wattenburg  
Weld Colorado  
USA  
CA-XX-0009939822

Measured Depth (feet)	Inclination (degrees)	Direction (degrees)	Vertical Depth (feet)	Latitude (feet)	Departure (feet)	Vertical Section (feet)	Dogleg (deg/100ft)
1276.00	0.26	268.18	1275.95	1.29 N	8.72 W	-1.37	TIE-IN
1350.00	0.37	232.28	1349.95	1.14 N	9.08 W	-1.22	0.30
1442.00	0.33	252.58	1441.95	0.88 N	9.57 W	-0.97	0.14
1717.00	0.18	220.40	1716.94	0.31 N	10.61 W	-0.41	0.07
1989.00	0.18	265.36	1988.94	0.05 S	11.31 W	-0.05	0.05
2263.00	0.77	197.82	2262.93	1.84 S	12.31 W	1.73	0.26
2526.00	0.74	205.26	2525.91	5.07 S	13.58 W	4.95	0.04
2783.00	0.66	187.93	2782.89	8.04 S	14.49 W	7.91	0.09
2954.00	1.14	258.96	2953.87	9.34 S	16.29 W	9.19	0.65
3040.00	3.12	265.93	3039.81	9.67 S	19.46 W	9.49	2.32
3297.00	6.80	270.91	3295.81	9.92 S	41.64 W	9.54	1.44
3382.00	8.73	272.32	3380.02	9.58 S	53.12 W	9.09	2.28
3468.00	9.56	272.72	3464.93	8.98 S	66.77 W	8.36	0.97
3554.00	8.83	271.68	3549.82	8.45 S	80.51 W	7.70	0.88
3640.00	9.18	274.32	3634.76	7.74 S	93.94 W	6.87	0.63
3726.00	7.80	275.05	3719.82	6.71 S	106.60 W	5.72	1.61
3811.00	7.57	273.03	3804.06	5.90 S	117.94 W	4.81	0.42
3897.00	6.75	274.52	3889.39	5.20 S	128.63 W	4.01	0.98
3982.00	6.84	275.94	3973.79	4.29 S	138.64 W	3.00	0.22
4068.00	6.68	277.24	4059.19	3.13 S	148.69 W	1.75	0.25

4153.00	6.47	274.99	4143.63	2.09 S	158.37 W	0.62	0.39
4239.00	5.65	282.64	4229.15	0.74 S	167.32 W	-0.81	1.34
4324.00	3.38	291.87	4313.89	1.11 N	173.73 W	-2.72	2.80
4410.00	1.96	320.40	4399.79	3.19 N	177.02 W	-4.82	2.21
4495.00	1.29	339.73	4484.76	5.21 N	178.28 W	-6.86	1.01
4753.00	0.41	41.32	4742.73	8.64 N	178.67 W	-10.30	0.45
5009.00	2.52	346.15	4998.64	14.79 N	179.41 W	-16.45	0.90
5094.00	1.79	348.52	5083.58	17.91 N	180.12 W	-19.57	0.86
5351.00	1.05	27.78	5340.50	23.93 N	179.82 W	-25.60	0.46
5608.00	1.28	34.09	5597.45	28.41 N	177.10 W	-30.05	0.10
5865.00	1.68	109.80	5854.38	29.52 N	171.95 W	-31.11	0.72
6122.00	0.83	95.00	6111.32	28.08 N	166.55 W	-29.62	0.35
6294.00	0.95	103.04	6283.30	27.65 N	163.93 W	-29.17	0.10
6380.00	1.24	107.11	6369.29	27.22 N	162.35 W	-28.72	0.35
6465.00	1.40	103.10	6454.26	26.71 N	160.45 W	-28.20	0.22
6551.00	1.22	89.43	6540.24	26.48 N	158.51 W	-27.95	0.42
6642.00	2.36	160.03	6631.20	24.73 N	156.90 W	-26.18	2.49
6685.00	8.44	173.29	6673.99	20.76 N	156.23 W	-22.21	14.35
6728.00	12.24	177.84	6716.29	13.07 N	155.68 W	-14.51	9.03
6777.00	14.59	174.37	6763.95	1.74 N	154.88 W	-3.17	5.07
6813.00	19.19	172.29	6798.39	8.65 S	153.64 W	7.22	12.90
6856.00	25.29	178.51	6838.17	24.85 S	152.46 W	23.44	15.18
6899.00	28.52	181.36	6876.52	44.30 S	152.46 W	42.89	8.09
6942.00	31.96	184.51	6913.66	65.92 S	153.60 W	64.49	8.81
6985.00	35.36	184.66	6949.45	89.67 S	155.50 W	88.23	7.90
7028.00	38.71	183.75	6983.77	115.49 S	157.39 W	114.03	7.90
7071.00	42.77	181.69	7016.34	143.52 S	158.70 W	142.04	9.95
7114.00	47.61	179.19	7046.64	174.01 S	158.91 W	172.53	11.97
7156.00	50.73	178.98	7074.10	205.78 S	158.40 W	204.31	7.46
7199.00	53.92	179.87	7100.38	239.81 S	158.06 W	238.34	7.58
7242.00	57.67	181.38	7124.54	275.36 S	158.46 W	273.88	9.21
7285.00	61.95	182.90	7146.16	312.49 S	159.86 W	311.00	10.40
7328.00	67.26	182.80	7164.60	351.27 S	161.79 W	349.76	12.34
7371.00	72.93	182.45	7179.24	391.64 S	163.64 W	390.11	13.21
7414.00	78.25	182.36	7189.94	433.24 S	165.39 W	431.69	12.38
7457.00	81.31	181.63	7197.57	475.53 S	166.86 W	473.96	7.31
7499.00	82.33	178.66	7203.55	517.09 S	166.96 W	515.53	7.40
7526.00	84.47	177.44	7206.65	543.90 S	166.05 W	542.34	9.12

<div> CALCULATION BASED ON MINIMUM CURVATURE METHOD </div> <div> SURVEY COORDINATES RELATIVE TO WELL SYSTEM REFERENCE POINT  TVD VALUES GIVEN RELATIVE TO DRILLING MEASUREMENT POINT </div> <div> VERTICAL SECTION RELATIVE TO WELL HEAD  VERTICAL SECTION IS COMPUTED ALONG A DIRECTION OF 179.47 DEGREES (TRUE)  A TOTAL CORRECTION OF 8.61 DEG FROM MAGNETIC NORTH TO TRUE NORTH HAS BEEN APPLIED </div> <div> HORIZONTAL DISPLACEMENT IS RELATIVE TO THE WELL HEAD.  HORIZONTAL DISPLACEMENT(CLOSURE) AT 7526.00 FEET  IS 568.68 FEET ALONG 196.98 DEGREES (TRUE) </div>
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