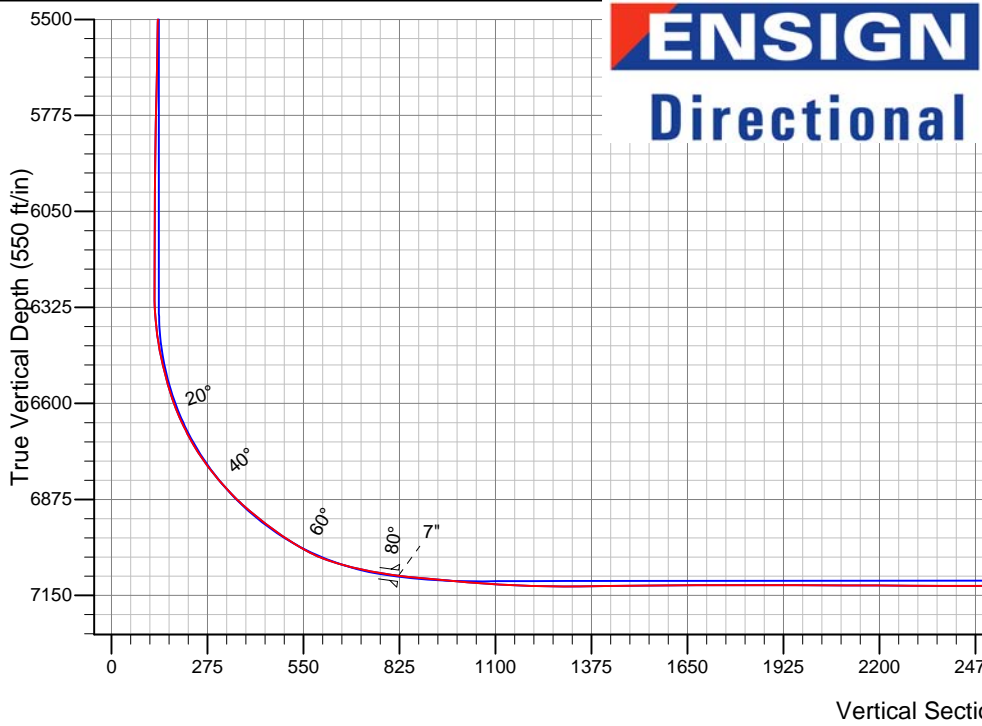
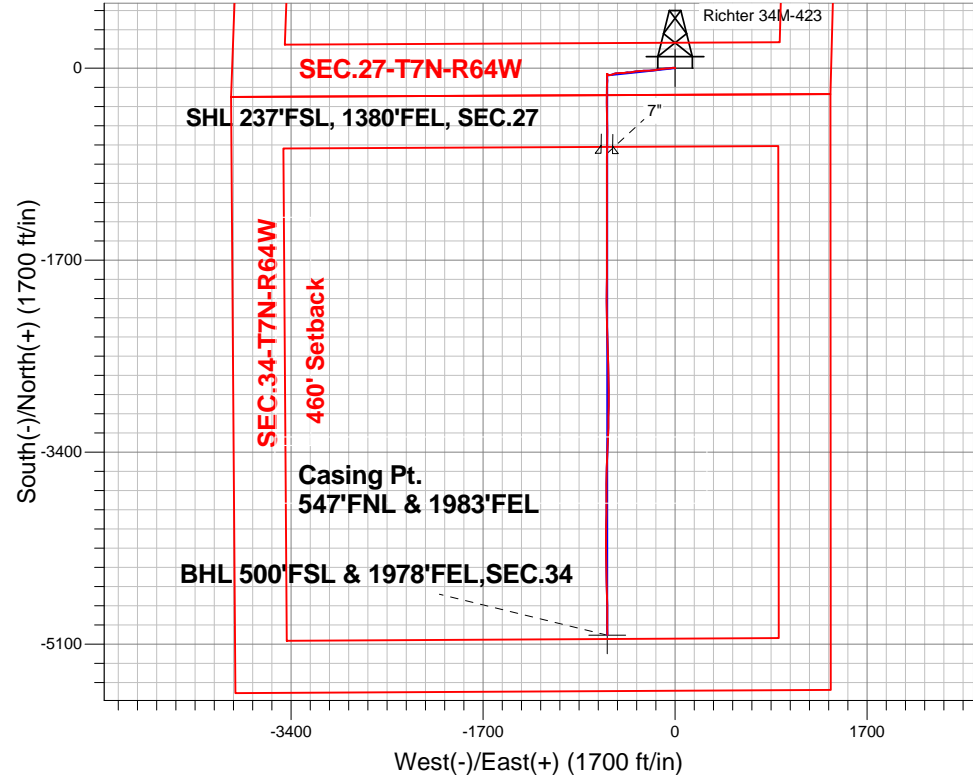


PETROLEUM DEVELOPMENT CORP Weld County CO

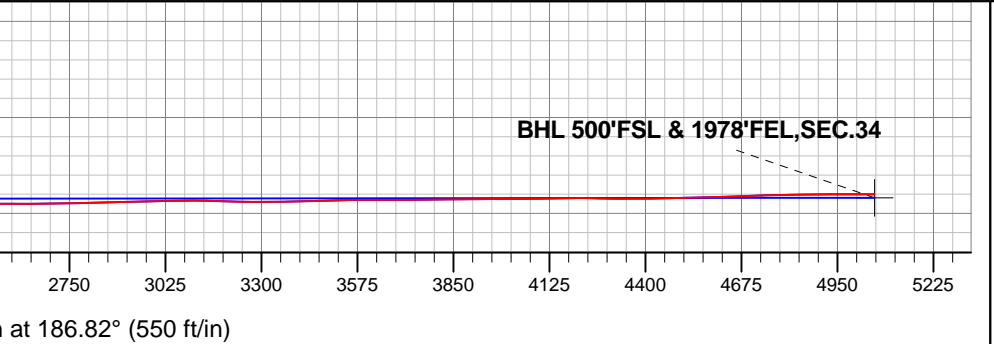
Well Name: **Richter 34M-423**
Surface Location: Richter 27T-HZ Pad Sec.27-T7N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4870.0
+N/-S +E/-W Northing Easting Latitude Longitude Slot
0.0 0.0 1440176.05 3269128.65 40.537650 -104.531700
RKB - 13.5' WELL @ 4883.5ft (RKB - 13.5')

FINAL SURVEY

Projected Bottom Hole Location
11779'MD 7095'TVD 5020'S & 599'W of SHL
89.8 degree Incl @ 179.4 degree AZM



Richter 27T-HZ Pad Sec.27-T7N-R64W Richter 34M-423 Wellbore #1 9:28, November 11 2013	ANNOTATIONS
	No annotation data is available.
LEGEND	
Richter 34M-423, Wellbore #1, Plan #3 (10-21-13)R V0	
Wellbore #1	
Survey #1	





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.27-T7N-R64W

Richter 27T-HZ Pad Sec.27-T7N-R64W

Richter 34M-423

Wellbore #1

Survey: Survey #1

Standard Survey Report

11 November, 2013

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Richter 34M-423
Project:	SEC.27-T7N-R64W	TVD Reference:	WELL @ 4883.5ft (RKB - 13.5')
Site:	Richter 27T-HZ Pad Sec.27-T7N-R64W	MD Reference:	WELL @ 4883.5ft (RKB - 13.5')
Well:	Richter 34M-423	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.27-T7N-R64W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	Richter 27T-HZ Pad Sec.27-T7N-R64W				
Site Position:		Northing:	1,440,175.74 ft	Latitude:	40.537650
From:	Lat/Long	Easting:	3,269,098.08 ft	Longitude:	-104.531810
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.63 °

Well	Richter 34M-423					
Well Position	+N-S	0.0 ft	Northing:	1,440,176.05 ft	Latitude:	40.537650
	+E-W	0.0 ft	Easting:	3,269,128.65 ft	Longitude:	-104.531700
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,870.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/30/2013	8.44	67.12	52,986

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	7,105.0	0.0	0.0	186.82	

Survey Program	Date	11/11/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
162.0	11,779.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
SHL 237'FSL, 1380'FEL, SEC.27									
162.0	0.30	102.10	162.0	-0.1	0.4	0.0	0.19	0.19	0.00
252.0	0.10	144.80	252.0	-0.2	0.7	0.1	0.26	-0.22	47.44
344.0	0.50	296.90	344.0	-0.1	0.4	0.0	0.64	0.43	165.33
434.0	0.70	310.00	434.0	0.4	-0.4	-0.4	0.27	0.22	14.56
525.0	0.90	301.40	525.0	1.2	-1.4	-1.0	0.26	0.22	-9.45
617.0	1.10	284.70	617.0	1.8	-2.9	-1.4	0.38	0.22	-18.15
708.0	1.50	277.20	707.9	2.1	-4.9	-1.5	0.48	0.44	-8.24
800.0	1.70	279.80	799.9	2.5	-7.5	-1.6	0.23	0.22	2.83
883.0	1.50	274.00	882.9	2.8	-9.8	-1.6	0.31	-0.24	-6.99
988.0	1.70	265.70	987.8	2.8	-12.7	-1.3	0.29	0.19	-7.90

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Richter 34M-423
Project:	SEC.27-T7N-R64W	TVD Reference:	WELL @ 4883.5ft (RKB - 13.5')
Site:	Richter 27T-HZ Pad Sec.27-T7N-R64W	MD Reference:	WELL @ 4883.5ft (RKB - 13.5')
Well:	Richter 34M-423	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
1,083.0	2.80	264.50	1,082.8	2.5	-16.4	-0.5	1.16	1.16	-1.26
1,178.0	4.30	266.60	1,177.6	2.0	-22.3	0.6	1.58	1.58	2.21
1,273.0	6.10	262.10	1,272.2	1.1	-30.8	2.5	1.94	1.89	-4.74
1,368.0	7.40	259.80	1,366.5	-0.7	-41.8	5.6	1.40	1.37	-2.42
1,464.0	10.10	268.60	1,461.4	-2.0	-56.3	8.6	3.13	2.81	9.17
1,559.0	10.10	267.00	1,554.9	-2.6	-73.0	11.2	0.30	0.00	-1.68
1,654.0	10.20	264.70	1,648.4	-3.8	-89.7	14.4	0.44	0.11	-2.42
1,750.0	9.90	261.40	1,743.0	-5.8	-106.3	18.4	0.68	-0.31	-3.44
1,845.0	10.20	259.90	1,836.5	-8.5	-122.7	23.0	0.42	0.32	-1.58
1,940.0	10.10	258.70	1,930.0	-11.6	-139.1	28.1	0.25	-0.11	-1.26
2,036.0	9.80	259.90	2,024.6	-14.7	-155.4	33.1	0.38	-0.31	1.25
2,131.0	9.70	267.00	2,118.2	-16.5	-171.4	36.8	1.27	-0.11	7.47
2,226.0	9.60	264.30	2,211.9	-17.8	-187.2	39.9	0.49	-0.11	-2.84
2,321.0	9.30	262.80	2,305.6	-19.5	-202.7	43.4	0.41	-0.32	-1.58
2,417.0	9.30	266.60	2,400.3	-20.9	-218.2	46.7	0.64	0.00	3.96
2,512.0	9.40	267.70	2,494.1	-21.7	-233.6	49.3	0.22	0.11	1.16
2,607.0	8.40	266.60	2,587.9	-22.4	-248.3	51.7	1.07	-1.05	-1.16
2,703.0	9.60	267.90	2,682.7	-23.1	-263.3	54.2	1.27	1.25	1.35
2,798.0	9.40	267.90	2,776.4	-23.7	-278.9	56.7	0.21	-0.21	0.00
2,893.0	9.70	267.50	2,870.1	-24.3	-294.7	59.2	0.32	0.32	-0.42
2,988.0	9.50	266.10	2,963.8	-25.2	-310.5	61.9	0.32	-0.21	-1.47
3,083.0	10.80	264.50	3,057.3	-26.6	-327.2	65.3	1.40	1.37	-1.68
3,178.0	9.80	259.10	3,150.8	-29.0	-344.0	69.6	1.46	-1.05	-5.68
3,274.0	9.90	261.90	3,245.3	-31.7	-360.2	74.3	0.51	0.10	2.92
3,369.0	9.80	261.90	3,338.9	-34.0	-376.3	78.4	0.11	-0.11	0.00
3,464.0	9.80	263.80	3,432.6	-36.0	-392.3	82.3	0.34	0.00	2.00
3,559.0	9.80	264.30	3,526.2	-37.7	-408.4	85.9	0.09	0.00	0.53
3,655.0	9.70	265.20	3,620.8	-39.2	-424.6	89.3	0.19	-0.10	0.94
3,750.0	9.20	264.20	3,714.5	-40.6	-440.1	92.6	0.55	-0.53	-1.05
3,845.0	10.90	270.50	3,808.0	-41.3	-456.7	95.2	2.13	1.79	6.63
3,940.0	10.80	266.10	3,901.3	-41.8	-474.5	97.9	0.88	-0.11	-4.63
4,035.0	11.30	264.30	3,994.6	-43.3	-492.7	101.6	0.64	0.53	-1.89
4,130.0	11.00	266.60	4,087.8	-44.8	-511.0	105.2	0.56	-0.32	2.42
4,225.0	9.10	258.00	4,181.3	-46.9	-527.4	109.2	2.54	-2.00	-9.05
4,321.0	8.20	249.90	4,276.2	-50.8	-541.2	114.8	1.58	-0.94	-8.44
4,416.0	7.70	249.40	4,370.3	-55.4	-553.5	120.8	0.53	-0.53	-0.53
4,511.0	7.00	252.60	4,464.5	-59.4	-565.0	126.1	0.85	-0.74	3.37
4,606.0	5.30	267.50	4,559.0	-61.3	-574.9	129.2	2.44	-1.79	15.68
4,702.0	3.40	278.40	4,654.7	-61.1	-582.2	129.8	2.15	-1.98	11.35
4,796.0	2.10	278.20	4,748.6	-60.4	-586.6	129.7	1.38	-1.38	-0.21
4,891.0	2.00	280.50	4,843.6	-59.9	-590.0	129.5	0.14	-0.11	2.42
4,986.0	2.50	279.30	4,938.5	-59.2	-593.7	129.3	0.53	0.53	-1.26
5,081.0	1.80	217.40	5,033.4	-60.1	-596.6	130.5	2.41	-0.74	-65.16
5,176.0	1.90	226.50	5,128.4	-62.4	-598.7	133.0	0.33	0.11	9.58
5,270.0	0.10	197.40	5,222.4	-63.5	-599.8	134.3	1.93	-1.91	-30.96
5,365.0	0.30	31.40	5,317.4	-63.4	-599.7	134.2	0.42	0.21	-174.74
5,460.0	0.40	28.80	5,412.4	-62.9	-599.4	133.6	0.11	0.11	-2.74
5,556.0	1.10	13.50	5,508.3	-61.7	-599.1	132.4	0.75	0.73	-15.94
5,651.0	0.90	357.90	5,603.3	-60.1	-598.9	130.8	0.35	-0.21	-16.42
5,746.0	1.10	8.80	5,698.3	-58.4	-598.8	129.1	0.29	0.21	11.47
5,841.0	1.40	359.60	5,793.3	-56.3	-598.6	127.0	0.38	0.32	-9.68
5,937.0	1.20	338.20	5,889.3	-54.2	-599.0	125.0	0.54	-0.21	-22.29
6,035.0	0.40	113.50	5,987.3	-53.4	-599.1	124.2	1.54	-0.82	138.06
6,131.0	0.40	27.20	6,083.3	-53.3	-598.6	124.0	0.57	0.00	-89.90

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Richter 34M-423
Project:	SEC.27-T7N-R64W	TVD Reference:	WELL @ 4883.5ft (RKB - 13.5')
Site:	Richter 27T-HZ Pad Sec.27-T7N-R64W	MD Reference:	WELL @ 4883.5ft (RKB - 13.5')
Well:	Richter 34M-423	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,226.0	0.40	17.20	6,178.3	-52.6	-598.4	123.3	0.07	0.00	-10.53
6,321.0	0.40	0.50	6,273.3	-52.0	-598.3	122.7	0.12	0.00	-17.58
6,416.0	5.40	191.40	6,368.1	-56.0	-599.1	126.8	6.10	5.26	-178.00
6,463.0	8.60	189.50	6,414.8	-61.7	-600.2	132.5	6.83	6.81	-4.04
6,511.0	11.60	182.60	6,462.0	-70.0	-601.0	140.9	6.73	6.25	-14.38
6,558.0	13.90	180.10	6,507.9	-80.4	-601.2	151.2	5.03	4.89	-5.32
6,607.0	16.60	178.60	6,555.1	-93.3	-601.0	164.0	5.57	5.51	-3.06
6,654.0	20.30	179.10	6,599.7	-108.2	-600.7	178.8	7.88	7.87	1.06
6,702.0	24.00	182.40	6,644.2	-126.3	-601.0	196.7	8.13	7.71	6.88
6,749.0	27.90	184.50	6,686.4	-146.8	-602.3	217.3	8.52	8.30	4.47
6,797.0	31.30	182.60	6,728.1	-170.4	-603.7	240.9	7.35	7.08	-3.96
6,844.0	35.50	180.80	6,767.4	-196.3	-604.5	266.7	9.18	8.94	-3.83
6,893.0	39.70	180.10	6,806.2	-226.2	-604.7	296.4	8.62	8.57	-1.43
6,940.0	42.60	180.10	6,841.6	-257.1	-604.8	327.1	6.17	6.17	0.00
6,988.0	45.70	178.60	6,876.0	-290.5	-604.4	360.2	6.81	6.46	-3.13
7,035.0	50.50	178.40	6,907.4	-325.5	-603.4	394.9	10.22	10.21	-0.43
7,083.0	52.90	179.10	6,937.1	-363.1	-602.6	432.1	5.13	5.00	1.46
7,130.0	53.60	179.40	6,965.3	-400.8	-602.1	469.5	1.57	1.49	0.64
7,178.0	57.00	180.50	6,992.6	-440.3	-602.1	508.7	7.33	7.08	2.29
7,225.0	61.00	180.30	7,016.8	-480.5	-602.4	548.7	8.52	8.51	-0.43
7,274.0	66.70	179.40	7,038.4	-524.5	-602.3	592.3	11.75	11.63	-1.84
7,321.0	72.70	179.60	7,054.7	-568.6	-601.9	636.0	12.77	12.77	0.43
7,369.0	76.20	179.60	7,067.5	-614.8	-601.6	681.9	7.29	7.29	0.00
7,416.0	78.10	180.00	7,078.0	-660.6	-601.4	727.4	4.13	4.04	0.85
7,481.0	81.60	181.20	7,089.4	-724.6	-602.1	791.0	5.68	5.38	1.85
7,512.0	83.05	180.84	7,093.6	-755.3	-602.6	821.5	4.81	4.67	-1.17
7"									
7,541.0	84.40	180.50	7,096.8	-784.1	-603.0	850.2	4.81	4.67	-1.16
7,603.0	84.90	180.00	7,102.5	-845.8	-603.2	911.5	1.14	0.81	-0.81
7,665.0	85.20	179.80	7,107.9	-907.6	-603.1	972.8	0.58	0.48	-0.32
7,756.0	85.50	179.80	7,115.3	-998.3	-602.8	1,062.8	0.33	0.33	0.00
7,848.0	87.50	179.80	7,120.9	-1,090.1	-602.5	1,154.0	2.17	2.17	0.00
7,943.0	89.30	180.30	7,123.5	-1,185.1	-602.6	1,248.3	1.97	1.89	0.53
8,037.0	90.40	180.50	7,123.8	-1,279.1	-603.2	1,341.7	1.19	1.17	0.21
8,134.0	90.70	180.10	7,122.8	-1,376.1	-603.7	1,438.1	0.52	0.31	-0.41
8,229.0	90.50	179.40	7,121.8	-1,471.1	-603.3	1,532.3	0.77	-0.21	-0.74
8,324.0	90.20	180.00	7,121.3	-1,566.1	-602.8	1,626.6	0.71	-0.32	0.63
8,419.0	90.80	179.60	7,120.4	-1,661.1	-602.5	1,720.9	0.76	0.63	-0.42
8,515.0	90.00	180.70	7,119.8	-1,757.1	-602.7	1,816.2	1.42	-0.83	1.15
8,610.0	89.80	180.80	7,119.9	-1,852.1	-604.0	1,910.7	0.24	-0.21	0.11
8,705.0	88.90	180.30	7,121.0	-1,947.0	-604.9	2,005.1	1.08	-0.95	-0.53
8,801.0	90.80	180.00	7,121.3	-2,043.0	-605.1	2,100.5	2.00	1.98	-0.31
8,896.0	89.50	179.60	7,121.0	-2,138.0	-604.8	2,194.7	1.43	-1.37	-0.42
8,991.0	89.30	178.60	7,122.0	-2,233.0	-603.3	2,288.9	1.07	-0.21	-1.05
9,086.0	89.90	178.40	7,122.7	-2,328.0	-600.8	2,382.9	0.67	0.63	-0.21
9,181.0	90.10	177.70	7,122.7	-2,422.9	-597.6	2,476.8	0.77	0.21	-0.74
9,277.0	90.50	178.40	7,122.2	-2,518.9	-594.3	2,571.6	0.84	0.42	0.73
9,372.0	90.20	178.70	7,121.6	-2,613.8	-591.9	2,665.6	0.45	-0.32	0.32
9,467.0	91.10	178.70	7,120.5	-2,708.8	-589.8	2,759.7	0.95	0.95	0.00
9,562.0	91.40	179.10	7,118.4	-2,803.8	-587.9	2,853.8	0.53	0.32	0.42
9,657.0	91.60	180.30	7,116.0	-2,898.7	-587.5	2,948.0	1.28	0.21	1.26
9,753.0	91.40	180.70	7,113.4	-2,994.7	-588.3	3,043.4	0.47	-0.21	0.42
9,848.0	88.50	180.30	7,113.5	-3,089.7	-589.1	3,137.8	3.08	-3.05	-0.42

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Richter 34M-423
Project:	SEC.27-T7N-R64W	TVD Reference:	WELL @ 4883.5ft (RKB - 13.5')
Site:	Richter 27T-HZ Pad Sec.27-T7N-R64W	MD Reference:	WELL @ 4883.5ft (RKB - 13.5')
Well:	Richter 34M-423	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,943.0	88.60	181.20	7,115.9	-3,184.6	-590.4	3,232.2	0.95	0.11	0.95
10,038.0	90.20	182.30	7,116.9	-3,279.6	-593.3	3,326.8	2.04	1.68	1.16
10,134.0	91.90	183.10	7,115.2	-3,375.5	-597.8	3,422.6	1.96	1.77	0.83
10,229.0	91.80	182.80	7,112.1	-3,470.3	-602.7	3,517.3	0.33	-0.11	-0.32
10,324.0	89.30	180.80	7,111.2	-3,565.2	-605.7	3,611.9	3.37	-2.63	-2.11
10,419.0	90.80	180.50	7,111.1	-3,660.2	-606.7	3,706.4	1.61	1.58	-0.32
10,514.0	90.70	180.10	7,109.9	-3,755.2	-607.2	3,800.7	0.43	-0.11	-0.42
10,610.0	90.40	179.80	7,108.9	-3,851.2	-607.1	3,896.1	0.44	-0.31	-0.31
10,705.0	90.00	180.00	7,108.6	-3,946.2	-607.0	3,990.4	0.47	-0.42	0.21
10,800.0	91.20	180.80	7,107.6	-4,041.2	-607.6	4,084.8	1.52	1.26	0.84
10,895.0	90.70	181.40	7,106.0	-4,136.2	-609.5	4,179.3	0.82	-0.53	0.63
10,990.0	88.60	180.50	7,106.6	-4,231.1	-611.0	4,273.8	2.40	-2.21	-0.95
11,086.0	90.10	178.70	7,107.7	-4,327.1	-610.4	4,369.0	2.44	1.56	-1.88
11,181.0	91.30	178.70	7,106.5	-4,422.1	-608.2	4,463.0	1.26	1.26	0.00
11,276.0	91.50	178.60	7,104.2	-4,517.0	-606.0	4,557.0	0.24	0.21	-0.11
11,371.0	92.20	178.40	7,101.2	-4,612.0	-603.5	4,651.0	0.77	0.74	-0.21
11,467.0	91.60	178.90	7,098.0	-4,707.9	-601.2	4,746.0	0.81	-0.63	0.52
11,562.0	90.80	180.00	7,096.0	-4,802.8	-600.3	4,840.1	1.43	-0.84	1.16
11,657.0	90.10	179.60	7,095.2	-4,897.8	-600.0	4,934.4	0.85	-0.74	-0.42
11,722.0	89.80	179.40	7,095.3	-4,962.8	-599.4	4,998.9	0.55	-0.46	-0.31
11,779.0	89.80	179.40	7,095.5	-5,019.8	-598.8	5,055.4	0.00	0.00	0.00
BHL 500'FSL & 1980'FEL,SEC.34									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,512.0	7,093.6	7"	7	7-1/2

Checked By: _____	Approved By: _____	Date: _____
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