

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Richter 34R-343**

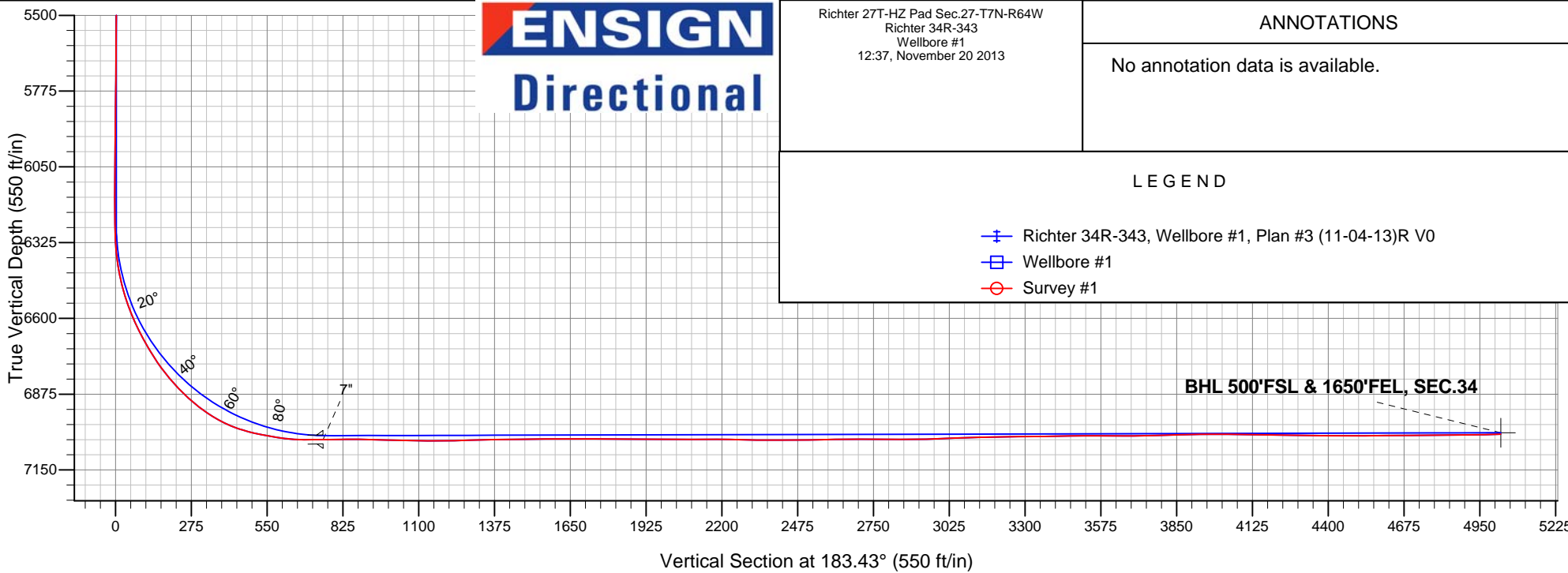
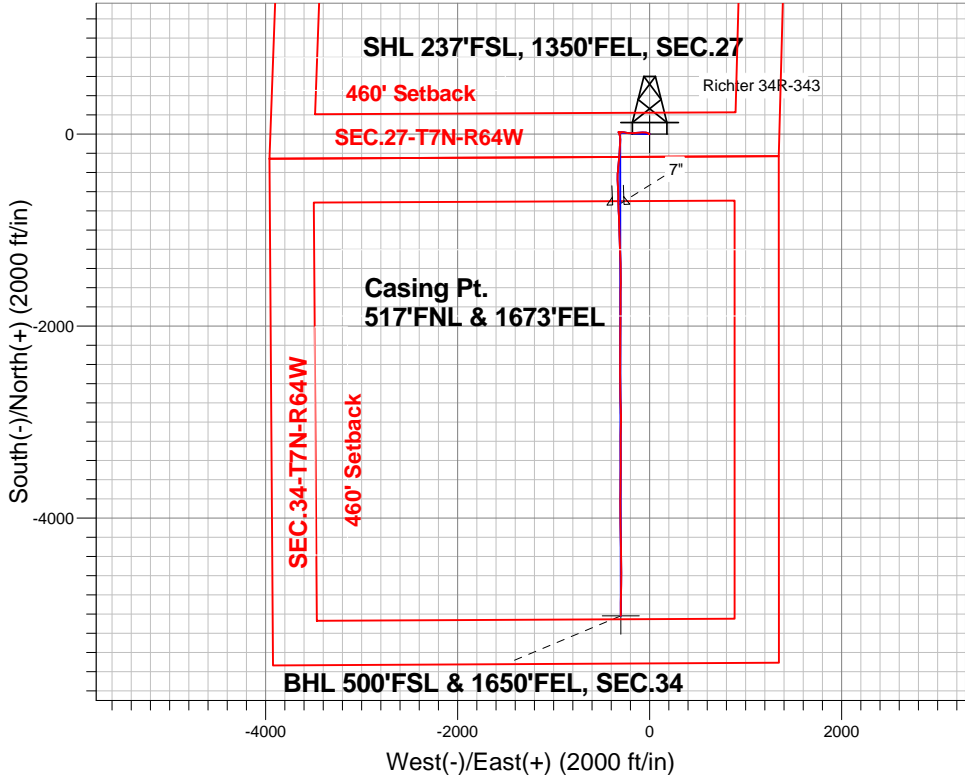
Surface Location: Richter 27T-HZ Pad Sec.27-T7N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4870.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1440176.38	3269159.22	40.537650	-104.531590	
RKB - 13.5' WELL @ 4883.5ft (RKB - 13.5')						

FINAL SURVEY

Projected Bottom Hole Location
11794'MD 7020'TVD 5016'S & 301'W of SHL
91.4 degree Incl @ 180.3 degree AZM





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.27-T7N-R64W

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

Richter 34R-343

Wellbore #1

Survey: Survey #1

Standard Survey Report

20 November, 2013

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Richter 34R-343
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 34R-343	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 34R-343					
Well Position	+N-S	0.0 ft	Northing:	1,440,176.38 ft	Latitude:	40.537650
	+E-W	0.0 ft	Easting:	3,269,159.22 ft	Longitude:	-104.531590
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	11/4/2013	8.43	67.12	52,975

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 (°)	
	0.0	0.0	0.0	183.43	

Survey Program	Date	11/20/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
163.0	11,794.0	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
1.0	0.00	319.00	1.0	0.0	0.0	0.0	0.25	0.25	0.00
SHL 237'FSL, 1350'FEL, SEC.27									
163.0	0.40	319.00	163.0	0.4	-0.4	-0.4	0.25	0.25	0.00
254.0	0.40	320.80	254.0	0.9	-0.8	-0.9	0.01	0.00	1.98
345.0	0.40	335.00	345.0	1.4	-1.1	-1.4	0.11	0.00	15.60
437.0	0.20	336.40	437.0	1.9	-1.3	-1.8	0.22	-0.22	1.52
528.0	0.20	292.80	528.0	2.1	-1.5	-2.0	0.16	0.00	-47.91
619.0	0.30	328.90	619.0	2.4	-1.8	-2.2	0.20	0.11	39.67
710.0	0.50	284.70	710.0	2.7	-2.3	-2.5	0.39	0.22	-48.57
801.0	0.40	302.50	801.0	2.9	-3.0	-2.8	0.19	-0.11	19.56
879.0	0.70	280.30	879.0	3.2	-3.7	-2.9	0.46	0.38	-28.46

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Site:	Richter 27T-HZ Pad Sec.27-T7N-R64W	MD Reference:	WELL @ 4883.5ft (RKB - 13.5')
Well:	Richter 34R-343	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)
995.0	1.10	328.20	995.0	4.2	-4.9	-3.9	0.70	0.34	41.29
1,090.0	2.10	292.10	1,089.9	5.7	-7.0	-5.2	1.45	1.05	-38.00
1,185.0	2.40	295.50	1,184.9	7.2	-10.4	-6.5	0.35	0.32	3.58
1,280.0	3.30	287.90	1,279.7	8.9	-14.8	-8.0	1.03	0.95	-8.00
1,375.0	4.50	296.90	1,374.5	11.4	-20.8	-10.1	1.41	1.26	9.47
1,471.0	6.10	295.30	1,470.1	15.3	-28.7	-13.5	1.67	1.67	-1.67
1,566.0	6.60	279.70	1,564.5	18.4	-38.7	-16.0	1.88	0.53	-16.42
1,661.0	8.30	272.10	1,658.7	19.5	-50.9	-16.5	2.06	1.79	-8.00
1,757.0	9.20	268.10	1,753.6	19.5	-65.5	-15.6	1.13	0.94	-4.17
1,852.0	9.10	266.50	1,847.4	18.8	-80.6	-14.0	0.29	-0.11	-1.68
1,947.0	8.30	267.20	1,941.3	18.0	-94.9	-12.3	0.85	-0.84	0.74
2,043.0	8.60	265.60	2,036.3	17.1	-109.0	-10.6	0.40	0.31	-1.67
2,138.0	9.30	264.40	2,130.1	15.9	-123.7	-8.4	0.76	0.74	-1.26
2,233.0	8.90	262.10	2,223.9	14.1	-138.7	-5.8	0.57	-0.42	-2.42
2,328.0	9.20	261.60	2,317.7	12.0	-153.5	-2.8	0.33	0.32	-0.53
2,424.0	9.40	268.40	2,412.5	10.6	-168.9	-0.5	1.16	0.21	7.08
2,519.0	9.10	273.50	2,506.2	10.9	-184.1	0.1	0.92	-0.32	5.37
2,614.0	8.30	269.60	2,600.1	11.3	-198.5	0.6	1.05	-0.84	-4.11
2,709.0	8.50	270.30	2,694.1	11.3	-212.4	1.4	0.24	0.21	0.74
2,805.0	9.10	279.30	2,789.0	12.5	-227.0	1.0	1.56	0.63	9.38
2,900.0	8.60	280.40	2,882.9	15.0	-241.4	-0.6	0.56	-0.53	1.16
2,995.0	8.50	282.10	2,976.8	17.8	-255.2	-2.5	0.29	-0.11	1.79
3,090.0	7.60	279.80	3,070.9	20.3	-268.3	-4.3	1.01	-0.95	-2.42
3,185.0	5.80	267.40	3,165.2	21.2	-279.3	-4.5	2.42	-1.89	-13.05
3,281.0	3.40	275.60	3,260.9	21.2	-286.9	-4.1	2.59	-2.50	8.54
3,376.0	2.00	256.80	3,355.8	21.1	-291.4	-3.7	1.72	-1.47	-19.79
3,471.0	1.40	264.20	3,450.8	20.6	-294.1	-3.0	0.67	-0.63	7.79
3,566.0	1.10	277.20	3,545.7	20.6	-296.2	-2.9	0.43	-0.32	13.68
3,662.0	0.40	170.90	3,641.7	20.4	-297.0	-2.6	1.32	-0.73	-110.73
3,757.0	0.70	138.00	3,736.7	19.7	-296.6	-1.9	0.45	0.32	-34.63
3,852.0	1.20	183.00	3,831.7	18.2	-296.3	-0.5	0.91	0.53	47.37
3,947.0	0.60	286.90	3,926.7	17.4	-296.8	0.4	1.54	-0.63	109.37
4,042.0	1.00	264.50	4,021.7	17.5	-298.1	0.4	0.53	0.42	-23.58
4,137.0	1.10	262.40	4,116.7	17.3	-299.8	0.7	0.11	0.11	-2.21
4,232.0	1.10	253.60	4,211.7	16.9	-301.6	1.2	0.18	0.00	-9.26
4,327.0	1.40	260.00	4,306.6	16.4	-303.6	1.8	0.35	0.32	6.74
4,423.0	1.40	264.70	4,402.6	16.1	-305.9	2.2	0.12	0.00	4.90
4,518.0	1.50	260.90	4,497.6	15.8	-308.3	2.6	0.15	0.11	-4.00
4,613.0	1.20	256.50	4,592.6	15.4	-310.5	3.2	0.33	-0.32	-4.63
4,708.0	0.40	245.20	4,687.6	15.0	-311.8	3.7	0.85	-0.84	-11.89
4,803.0	0.30	250.80	4,782.6	14.8	-312.3	3.9	0.11	-0.11	5.89
4,898.0	0.80	240.10	4,877.5	14.4	-313.1	4.4	0.54	0.53	-11.26
4,992.0	1.60	222.40	4,971.5	13.1	-314.6	5.7	0.93	0.85	-18.83
5,087.0	0.60	325.40	5,066.5	12.5	-315.8	6.4	1.93	-1.05	108.42
5,182.0	0.60	347.00	5,161.5	13.4	-316.2	5.5	0.24	0.00	22.74
5,277.0	0.60	325.90	5,256.5	14.3	-316.5	4.6	0.23	0.00	-22.21
5,372.0	0.60	332.40	5,351.5	15.1	-317.1	3.8	0.07	0.00	6.84
5,467.0	0.80	331.00	5,446.5	16.2	-317.6	2.8	0.21	0.21	-1.47
5,563.0	0.40	310.60	5,542.5	17.0	-318.2	2.1	0.47	-0.42	-21.25
5,658.0	0.50	325.40	5,637.5	17.5	-318.7	1.5	0.16	0.11	15.58
5,753.0	1.00	306.40	5,732.5	18.4	-319.6	0.8	0.58	0.53	-20.00
5,848.0	1.00	312.90	5,827.5	19.4	-320.9	-0.2	0.12	0.00	6.84
5,944.0	0.70	338.70	5,923.4	20.5	-321.7	-1.3	0.50	-0.31	26.88
6,039.0	0.40	6.70	6,018.4	21.4	-321.9	-2.1	0.42	-0.32	29.47

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Well:	Richter 34R-343	North Reference:	True
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Design:	Wellbore #1	Database:	Landmark

Survey									
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6,134.0	0.40	11.20	6,113.4	22.1	-321.7	-2.8	0.03	0.00	4.74
6,229.0	0.30	107.40	6,208.4	22.3	-321.4	-3.1	0.55	-0.11	101.26
6,276.0	1.30	153.10	6,255.4	21.8	-321.1	-2.6	2.36	2.13	97.23
6,324.0	2.60	153.60	6,303.4	20.3	-320.4	-1.2	2.71	2.71	1.04
6,371.0	5.50	152.90	6,350.3	17.4	-318.9	1.7	6.17	6.17	-1.49
6,420.0	9.10	159.30	6,398.9	11.7	-316.4	7.3	7.52	7.35	13.06
6,467.0	12.10	164.50	6,445.1	3.4	-313.8	15.3	6.69	6.38	11.06
6,515.0	15.50	167.50	6,491.7	-7.7	-311.1	26.3	7.24	7.08	6.25
6,562.0	18.90	171.20	6,536.6	-21.3	-308.5	39.7	7.60	7.23	7.87
6,610.0	22.20	176.10	6,581.5	-38.1	-306.7	56.3	7.75	6.88	10.21
6,706.0	28.30	182.30	6,668.3	-79.0	-306.4	97.1	6.92	6.35	6.46
6,801.0	33.00	183.70	6,750.0	-127.3	-309.0	145.5	5.00	4.95	1.47
6,896.0	41.10	183.00	6,825.8	-184.4	-312.3	202.7	8.54	8.53	-0.74
6,991.0	48.00	186.10	6,893.5	-250.8	-317.7	269.3	7.61	7.26	3.26
7,087.0	57.20	185.40	6,951.7	-326.6	-325.3	345.4	9.60	9.58	-0.73
7,124.0	61.80	184.60	6,970.5	-358.3	-328.1	377.3	12.57	12.43	-2.16
7,182.0	69.60	182.60	6,994.3	-411.0	-331.3	430.1	13.81	13.45	-3.45
7,229.0	74.20	179.80	7,008.9	-455.7	-332.3	474.7	11.31	9.79	-5.96
7,277.0	78.40	178.40	7,020.3	-502.3	-331.5	521.2	9.20	8.75	-2.92
7,324.0	81.00	178.10	7,028.7	-548.5	-330.1	567.3	5.57	5.53	-0.64
7,372.0	82.30	178.10	7,035.7	-596.0	-328.5	614.5	2.71	2.71	0.00
7,419.0	87.80	177.90	7,039.7	-642.8	-326.9	661.1	11.71	11.70	-0.43
7,470.0	90.70	178.20	7,040.4	-693.7	-325.2	711.9	5.72	5.69	0.59
7,511.0	90.70	177.86	7,039.9	-734.7	-323.8	752.7	0.83	0.00	-0.83
7"									
7,530.0	90.70	177.70	7,039.7	-753.7	-323.0	771.6	0.83	0.00	-0.83
7,575.0	91.20	177.50	7,038.9	-798.6	-321.1	816.4	1.20	1.11	-0.44
7,620.0	90.00	177.90	7,038.4	-843.6	-319.3	861.2	2.81	-2.67	0.89
7,668.0	88.70	178.10	7,039.0	-891.6	-317.7	908.9	2.74	-2.71	0.42
7,714.0	88.30	177.90	7,040.2	-937.5	-316.1	954.7	0.97	-0.87	-0.43
7,760.0	87.80	177.90	7,041.7	-983.4	-314.4	1,000.5	1.09	-1.09	0.00
7,806.0	88.60	178.20	7,043.2	-1,029.4	-312.8	1,046.2	1.86	1.74	0.65
7,851.0	89.50	179.10	7,043.9	-1,074.4	-311.7	1,091.1	2.83	2.00	2.00
7,947.0	90.70	178.90	7,043.8	-1,170.4	-310.1	1,186.8	1.27	1.25	-0.21
8,040.0	91.60	177.90	7,041.9	-1,263.3	-307.5	1,279.4	1.45	0.97	-1.08
8,135.0	90.90	177.70	7,039.8	-1,358.2	-303.8	1,373.9	0.77	-0.74	-0.21
8,230.0	90.50	178.60	7,038.7	-1,453.2	-300.8	1,468.5	1.04	-0.42	0.95
8,326.0	90.70	180.90	7,037.7	-1,549.1	-300.3	1,564.3	2.40	0.21	2.40
8,421.0	89.90	180.50	7,037.2	-1,644.1	-301.5	1,659.2	0.94	-0.84	-0.42
8,516.0	89.80	180.30	7,037.4	-1,739.1	-302.2	1,754.1	0.24	-0.11	-0.21
8,611.0	89.30	180.00	7,038.2	-1,834.1	-302.4	1,848.9	0.61	-0.53	-0.32
8,707.0	90.00	180.90	7,038.7	-1,930.1	-303.2	1,944.8	1.19	0.73	0.94
8,802.0	90.30	180.50	7,038.5	-2,025.1	-304.3	2,039.7	0.53	0.32	-0.42
8,897.0	90.10	180.50	7,038.2	-2,120.1	-305.2	2,134.6	0.21	-0.21	0.00
8,992.0	88.50	180.20	7,039.3	-2,215.1	-305.7	2,229.4	1.71	-1.68	-0.32
9,088.0	89.30	180.30	7,041.2	-2,311.1	-306.2	2,325.2	0.84	0.83	0.10
9,183.0	90.60	180.00	7,041.3	-2,406.1	-306.4	2,420.1	1.40	1.37	-0.32
9,278.0	90.20	179.80	7,040.6	-2,501.1	-306.2	2,514.9	0.47	-0.42	-0.21
9,373.0	91.60	180.20	7,039.1	-2,596.1	-306.2	2,609.7	1.53	1.47	0.42
9,468.0	89.70	178.40	7,038.0	-2,691.0	-305.1	2,704.5	2.75	-2.00	-1.89
9,564.0	89.90	178.60	7,038.4	-2,787.0	-302.6	2,800.1	0.29	0.21	0.21
9,659.0	89.90	178.20	7,038.5	-2,882.0	-299.9	2,894.7	0.42	0.00	-0.42
9,754.0	92.30	180.50	7,036.7	-2,976.9	-298.8	2,989.5	3.50	2.53	2.42

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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9,849.0	92.00	181.40	7,033.1	-3,071.8	-300.4	3,084.3	1.00	-0.32	0.95
9,945.0	91.50	180.30	7,030.2	-3,167.8	-301.8	3,180.2	1.26	-0.52	-1.15
10,040.0	89.90	178.20	7,029.0	-3,262.8	-300.6	3,274.9	2.78	-1.68	-2.21
10,135.0	90.90	180.70	7,028.4	-3,357.8	-299.7	3,369.7	2.83	1.05	2.63
10,230.0	91.20	181.40	7,026.6	-3,452.7	-301.4	3,464.6	0.80	0.32	0.74
10,326.0	89.80	180.00	7,025.8	-3,548.7	-302.6	3,560.4	2.06	-1.46	-1.46
10,421.0	89.30	179.60	7,026.5	-3,643.7	-302.3	3,655.2	0.67	-0.53	-0.42
10,516.0	92.10	180.90	7,025.4	-3,738.7	-302.7	3,750.1	3.25	2.95	1.37
10,611.0	91.00	179.60	7,022.8	-3,833.6	-303.1	3,844.9	1.79	-1.16	-1.37
10,706.0	91.30	180.30	7,020.9	-3,928.6	-303.0	3,939.7	0.80	0.32	0.74
10,802.0	89.30	179.60	7,020.4	-4,024.6	-302.9	4,035.5	2.21	-2.08	-0.73
10,897.0	89.60	179.30	7,021.3	-4,119.6	-302.0	4,130.3	0.45	0.32	-0.32
10,992.0	88.30	178.60	7,023.1	-4,214.6	-300.3	4,225.0	1.55	-1.37	-0.74
11,087.0	89.30	179.10	7,025.0	-4,309.5	-298.4	4,319.7	1.18	1.05	0.53
11,183.0	89.80	179.10	7,025.8	-4,405.5	-296.9	4,415.4	0.52	0.52	0.00
11,278.0	90.40	179.80	7,025.6	-4,500.5	-295.9	4,510.2	0.97	0.63	0.74
11,373.0	90.20	180.20	7,025.1	-4,595.5	-295.9	4,605.0	0.47	-0.21	0.42
11,468.0	90.50	180.90	7,024.6	-4,690.5	-296.9	4,699.9	0.80	0.32	0.74
11,564.0	90.40	180.90	7,023.8	-4,786.5	-298.4	4,795.8	0.10	-0.10	0.00
11,659.0	90.70	180.70	7,022.9	-4,881.5	-299.7	4,890.7	0.38	0.32	-0.21
11,737.0	91.40	180.30	7,021.5	-4,959.5	-300.4	4,968.5	1.03	0.90	-0.51
11,794.0	91.40	180.30	7,020.1	-5,016.4	-300.7	5,025.4	0.00	0.00	0.00
BHL 500'FSL & 1650'FEL, SEC.34									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,511.0	7,039.9	7"	7	7-1/2

Checked By: _____	Approved By: _____	Date: _____
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