

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Ram Land 300-443**

Surface Location: Ram Land 30KO-HZ Pad Sec.30-T4N-R66W
 North American Datum 1983, US State Plane 1983, Colorado Northern Zone

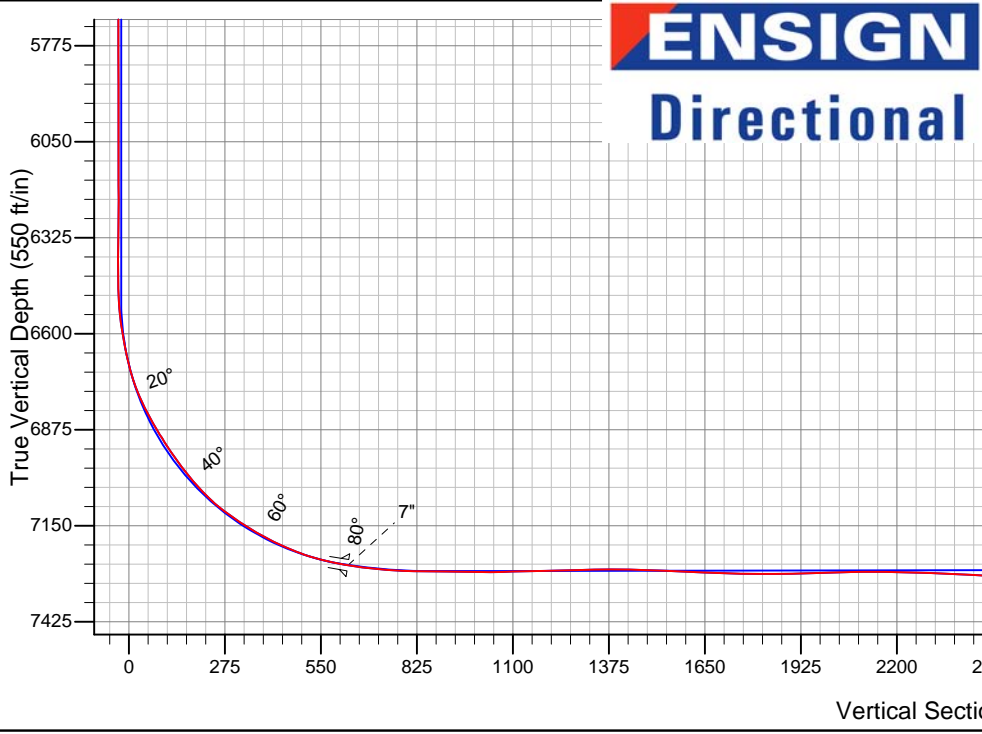
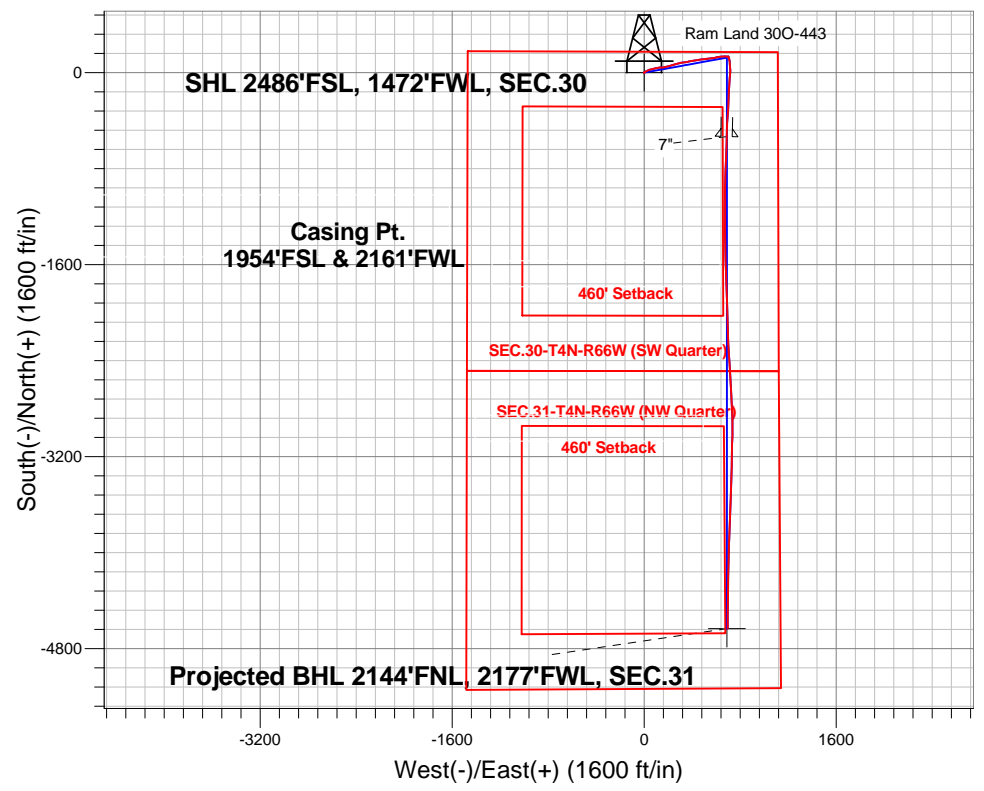
Ground Elevation: 4758.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1346353.61	3188458.91	40.282170	-104.824500	

Ensign Rig #121 - RKB -13.5' WELL @ 4771.5ft (Ensign Rig #121 - RKB -13.5')

FINAL SURVEY

Projected Bottom Hole Location
 11759'MD 7260'TVD 4634'S & 696'E of SHL
 90.4 degree Incl @ 180.2 degree AZM

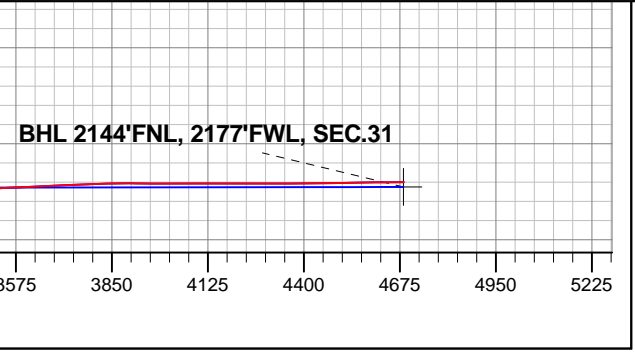


Ram Land 30KO-HZ Pad Sec.30-T4N-R66W
 Ram Land 300-443
 Wellbore #1
 7:42, July 08 2014

ANNOTATIONS
 No annotation data is available.

LEGEND

- △ Ram Land 300-443, Wellbore #1, Plan #2 (6-23-14)R V0
- Wellbore #1
- Survey #1





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.30-T4N-R66W

Ram Land 30KO-HZ Pad Sec.30-T4N-R66W

Ram Land 30O-443

Wellbore #1

Survey: Survey #1

Standard Survey Report

08 July, 2014



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 300-443
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4771.5ft (Ensign Rig #121 - RKB -13.5')
Site:	Ram Land 30KO-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4771.5ft (Ensign Rig #121 - RKB -13.5')
Well:	Ram Land 300-443	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.30-T4N-R66W, 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	Ram Land 30KO-HZ Pad Sec.30-T4N-R66W				
Site Position:		Northing:	1,346,353.40ft	Latitude:	40.282170
From:	Lat/Long	Easting:	3,188,428.22ft	Longitude:	-104.824610
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.44 °

Well	Ram Land 300-443					
Well Position	+N-S	0.0 ft	Northing:	1,346,353.61 ft	Latitude:	40.282170
	+E-W	0.0 ft	Easting:	3,188,458.91 ft	Longitude:	-104.824500
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,758.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/23/2014	8.48	66.84	52,745

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	171.54	

Survey Program	Date	7/8/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
157.0	11,759.0	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	270.40	1.0	0.0	0.0	0.0	0.25	0.25	0.00	
SHL 2486'FSL, 1472'FWL, SEC.30										
157.0	0.40	270.40	157.0	0.0	-0.5	-0.1	0.25	0.25	0.00	
248.0	0.30	234.70	248.0	-0.1	-1.1	0.0	0.26	-0.11	-39.23	
339.0	0.30	321.90	339.0	-0.1	-1.4	-0.1	0.45	0.00	95.82	
431.0	1.50	67.50	431.0	0.6	-0.4	-0.6	1.75	1.30	114.78	
521.0	3.30	58.40	520.9	2.4	2.9	-1.9	2.04	2.00	-10.11	
613.0	4.90	58.80	612.7	5.8	8.5	-4.5	1.74	1.74	0.43	
704.0	6.20	59.80	703.2	10.3	16.0	-7.8	1.43	1.43	1.10	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 300-443
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4771.5ft (Ensign Rig #121 - RKB -13.5')
Site:	Ram Land 30KO-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4771.5ft (Ensign Rig #121 - RKB -13.5')
Well:	Ram Land 300-443	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)	
795.0	7.70	64.70	793.6	15.4	25.8	-11.4	1.77	1.65	5.38	
887.0	9.20	67.70	884.6	20.8	38.2	-14.9	1.70	1.63	3.26	
976.0	9.30	74.40	972.4	25.4	51.7	-17.5	1.21	0.11	7.53	
1,082.0	9.60	78.10	1,077.0	29.5	68.6	-19.1	0.64	0.28	3.49	
1,177.0	8.70	75.10	1,170.8	33.0	83.3	-20.4	1.07	-0.95	-3.16	
1,273.0	9.60	81.60	1,265.5	36.1	98.2	-21.2	1.43	0.94	6.77	
1,367.0	7.80	73.70	1,358.5	39.0	112.1	-22.1	2.29	-1.91	-8.40	
1,463.0	6.20	73.30	1,453.7	42.3	123.3	-23.7	1.67	-1.67	-0.42	
1,558.0	6.00	92.00	1,548.2	43.6	133.2	-23.5	2.09	-0.21	19.68	
1,653.0	7.70	96.40	1,642.5	42.7	144.5	-21.0	1.87	1.79	4.63	
1,748.0	9.00	84.20	1,736.5	42.8	158.2	-19.0	2.31	1.37	-12.84	
1,844.0	10.00	76.90	1,831.2	45.4	173.8	-19.4	1.63	1.04	-7.60	
1,939.0	9.30	73.70	1,924.9	49.5	189.2	-21.1	0.93	-0.74	-3.37	
2,035.0	10.40	73.50	2,019.5	54.1	204.9	-23.3	1.15	1.15	-0.21	
2,130.0	10.70	71.80	2,112.9	59.3	221.5	-26.0	0.46	0.32	-1.79	
2,226.0	10.00	74.00	2,207.3	64.4	238.0	-28.6	0.84	-0.73	2.29	
2,321.0	9.10	76.20	2,301.0	68.4	253.2	-30.4	1.02	-0.95	2.32	
2,416.0	9.10	76.00	2,394.8	72.0	267.8	-31.8	0.03	0.00	-0.21	
2,512.0	10.10	78.60	2,489.4	75.5	283.5	-33.0	1.14	1.04	2.71	
2,607.0	10.00	77.70	2,583.0	78.9	299.7	-34.0	0.20	-0.11	-0.95	
2,703.0	9.60	74.60	2,677.6	82.8	315.5	-35.5	0.69	-0.42	-3.23	
2,798.0	9.60	87.10	2,771.3	85.3	331.1	-35.7	2.19	0.00	13.16	
2,894.0	9.20	81.10	2,866.0	86.9	346.7	-35.0	1.10	-0.42	-6.25	
2,989.0	8.90	78.40	2,959.8	89.6	361.4	-35.4	0.55	-0.32	-2.84	
3,084.0	7.80	78.30	3,053.8	92.4	374.9	-36.2	1.16	-1.16	-0.11	
3,179.0	7.70	80.90	3,147.9	94.7	387.5	-36.7	0.38	-0.11	2.74	
3,274.0	7.60	81.80	3,242.1	96.6	400.0	-36.7	0.16	-0.11	0.95	
3,370.0	7.80	81.30	3,337.2	98.5	412.7	-36.7	0.22	0.21	-0.52	
3,465.0	8.00	75.50	3,431.3	101.1	425.5	-37.4	0.86	0.21	-6.11	
3,560.0	8.10	77.60	3,525.4	104.2	438.4	-38.6	0.33	0.11	2.21	
3,655.0	8.80	83.90	3,619.3	106.4	452.2	-38.7	1.22	0.74	6.63	
3,750.0	8.00	78.60	3,713.3	108.5	465.9	-38.8	1.17	-0.84	-5.58	
3,846.0	8.40	85.10	3,808.3	110.4	479.4	-38.7	1.05	0.42	6.77	
3,941.0	8.00	83.20	3,902.4	111.8	492.9	-38.1	0.51	-0.42	-2.00	
4,036.0	8.00	89.00	3,996.4	112.7	506.1	-37.0	0.85	0.00	6.11	
4,131.0	8.20	86.50	4,090.5	113.2	519.4	-35.6	0.43	0.21	-2.63	
4,227.0	7.40	78.30	4,185.6	114.9	532.3	-35.3	1.43	-0.83	-8.54	
4,322.0	8.30	78.10	4,279.7	117.5	545.0	-36.1	0.95	0.95	-0.21	
4,417.0	8.10	84.10	4,373.7	119.6	558.4	-36.2	0.92	-0.21	6.32	
4,513.0	9.10	79.70	4,468.7	121.7	572.6	-36.1	1.25	1.04	-4.58	
4,608.0	8.20	82.50	4,562.6	123.9	586.7	-36.3	1.05	-0.95	2.95	
4,703.0	8.90	78.80	4,656.5	126.2	600.6	-36.5	0.94	0.74	-3.89	
4,798.0	7.70	75.10	4,750.5	129.3	614.0	-37.6	1.38	-1.26	-3.89	
4,893.0	9.10	82.10	4,844.5	132.0	627.6	-38.2	1.82	1.47	7.37	
4,988.0	9.30	86.40	4,938.3	133.5	642.7	-37.5	0.75	0.21	4.53	
5,084.0	7.30	85.50	5,033.3	134.4	656.5	-36.4	2.09	-2.08	-0.94	
5,179.0	4.70	86.90	5,127.8	135.1	666.4	-35.6	2.74	-2.74	1.47	
5,274.0	3.90	92.20	5,222.5	135.2	673.5	-34.7	0.94	-0.84	5.58	
5,369.0	2.70	103.10	5,317.3	134.6	678.9	-33.2	1.42	-1.26	11.47	
5,464.0	1.80	99.90	5,412.3	133.8	682.6	-31.9	0.96	-0.95	-3.37	
5,559.0	1.40	103.20	5,507.2	133.3	685.2	-31.0	0.43	-0.42	3.47	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 300-443
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4771.5ft (Ensign Rig #121 - RKB -13.5')
Site:	Ram Land 30KO-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4771.5ft (Ensign Rig #121 - RKB -13.5')
Well:	Ram Land 300-443	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)	
5,655.0	0.90	102.70	5,603.2	132.9	687.1	-30.3	0.52	-0.52	-0.52	
5,750.0	0.30	31.50	5,698.2	132.9	687.9	-30.3	0.90	-0.63	-74.95	
5,845.0	0.30	111.70	5,793.2	133.0	688.3	-30.3	0.41	0.00	84.42	
5,940.0	0.70	103.60	5,888.2	132.8	689.1	-30.0	0.43	0.42	-8.53	
6,036.0	0.70	71.80	5,984.2	132.9	690.2	-29.9	0.40	0.00	-33.13	
6,131.0	1.10	99.50	6,079.2	132.9	691.6	-29.7	0.61	0.42	29.16	
6,226.0	1.10	67.50	6,174.2	133.1	693.4	-29.6	0.64	0.00	-33.68	
6,321.0	1.40	66.30	6,269.1	133.9	695.3	-30.1	0.32	0.32	-1.26	
6,417.0	1.80	71.80	6,365.1	134.8	697.8	-30.7	0.45	0.42	5.73	
6,512.0	1.40	93.90	6,460.1	135.2	700.4	-30.7	0.77	-0.42	23.26	
6,607.0	6.90	155.40	6,554.8	130.0	703.9	-25.0	6.69	5.79	64.74	
6,654.0	10.00	161.80	6,601.3	123.5	706.4	-18.2	6.88	6.60	13.62	
6,702.0	11.10	167.40	6,648.5	115.0	708.7	-9.5	3.13	2.29	11.67	
6,749.0	14.20	171.60	6,694.3	104.9	710.5	0.8	6.88	6.60	8.94	
6,797.0	19.40	175.80	6,740.3	91.1	711.9	14.6	11.12	10.83	8.75	
6,844.0	23.80	175.80	6,783.9	73.9	713.2	31.9	9.36	9.36	0.00	
6,892.0	28.00	173.50	6,827.1	53.0	715.2	52.8	9.00	8.75	-4.79	
6,939.0	30.40	175.30	6,868.1	30.2	717.4	75.7	5.44	5.11	3.83	
6,987.0	32.80	180.70	6,909.0	5.1	718.3	100.6	7.73	5.00	11.25	
7,034.0	35.50	186.00	6,947.9	-21.2	716.7	126.4	8.54	5.74	11.28	
7,082.0	38.50	185.80	6,986.3	-50.0	713.7	154.4	6.26	6.25	-0.42	
7,129.0	41.20	185.00	7,022.3	-79.9	710.9	183.7	5.85	5.74	-1.70	
7,178.0	44.60	183.60	7,058.2	-113.2	708.4	216.2	7.21	6.94	-2.86	
7,225.0	50.00	181.80	7,090.1	-147.7	706.8	250.1	11.83	11.49	-3.83	
7,273.0	54.90	181.60	7,119.3	-185.7	705.7	287.5	10.21	10.21	-0.42	
7,320.0	58.00	182.50	7,145.3	-224.8	704.3	326.0	6.79	6.60	1.91	
7,367.0	59.70	184.10	7,169.6	-265.0	701.9	365.4	4.64	3.62	3.40	
7,414.0	63.90	184.10	7,191.8	-306.3	699.0	405.8	8.94	8.94	0.00	
7,463.0	67.00	183.60	7,212.2	-350.8	696.0	449.3	6.39	6.33	-1.02	
7,510.0	70.40	183.70	7,229.3	-394.5	693.2	492.2	7.24	7.23	0.21	
7,558.0	74.30	182.20	7,243.8	-440.1	690.9	537.0	8.65	8.13	-3.13	
7,620.0	79.50	180.90	7,257.9	-500.5	689.2	596.4	8.63	8.39	-2.10	
7,652.0	81.05	181.09	7,263.3	-532.0	688.7	627.5	4.89	4.85	0.61	
7"										
7,686.0	82.70	181.30	7,268.1	-565.7	688.0	660.7	4.89	4.85	0.60	
7,750.0	84.30	182.00	7,275.3	-629.2	686.1	723.3	2.73	2.50	1.09	
7,845.0	89.80	182.70	7,280.2	-724.0	682.3	816.5	5.84	5.79	0.74	
7,940.0	88.90	182.30	7,281.3	-818.9	678.1	909.7	1.04	-0.95	-0.42	
8,036.0	89.30	180.20	7,282.8	-914.8	676.0	1,004.3	2.23	0.42	-2.19	
8,131.0	92.10	180.70	7,281.6	-1,009.8	675.3	1,098.2	2.99	2.95	0.53	
8,226.0	90.80	179.70	7,279.2	-1,104.8	674.9	1,192.1	1.73	-1.37	-1.05	
8,321.0	91.70	180.20	7,277.1	-1,199.8	675.0	1,286.0	1.08	0.95	0.53	
8,417.0	90.00	179.70	7,275.7	-1,295.7	675.1	1,381.0	1.85	-1.77	-0.52	
8,512.0	88.40	179.70	7,277.0	-1,390.7	675.6	1,475.0	1.68	-1.68	0.00	
8,606.0	87.40	179.00	7,280.5	-1,484.7	676.7	1,568.1	1.30	-1.06	-0.74	
8,702.0	87.70	178.30	7,284.6	-1,580.5	678.9	1,663.2	0.79	0.31	-0.73	
8,797.0	88.90	177.20	7,287.4	-1,675.4	682.7	1,757.6	1.71	1.26	-1.16	
8,892.0	90.30	177.90	7,288.1	-1,770.3	686.7	1,852.1	1.65	1.47	0.74	
8,987.0	91.40	179.30	7,286.7	-1,865.3	689.0	1,946.4	1.87	1.16	1.47	
9,082.0	92.20	178.50	7,283.7	-1,960.2	690.9	2,040.5	1.19	0.84	-0.84	
9,177.0	89.80	178.10	7,282.0	-2,055.2	693.7	2,134.9	2.56	-2.53	-0.42	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ram Land 300-443
Project:	SEC.30-T4N-R66W	TVD Reference:	WELL @ 4771.5ft (Ensign Rig #121 - RKB -13.5')
Site:	Ram Land 30KO-HZ Pad Sec.30-T4N-R66W	MD Reference:	WELL @ 4771.5ft (Ensign Rig #121 - RKB -13.5')
Well:	Ram Land 300-443	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)	
9,272.0	88.20	177.60	7,283.7	-2,150.1	697.2	2,229.3	1.76	-1.68	-0.53	
9,368.0	87.80	177.40	7,287.0	-2,245.9	701.4	2,324.7	0.47	-0.42	-0.21	
9,463.0	87.10	176.90	7,291.3	-2,340.7	706.1	2,419.1	0.91	-0.74	-0.53	
9,558.0	86.40	176.20	7,296.6	-2,435.4	711.9	2,513.6	1.04	-0.74	-0.74	
9,653.0	86.50	176.50	7,302.5	-2,530.0	717.9	2,608.1	0.33	0.11	0.32	
9,748.0	87.60	177.10	7,307.4	-2,624.7	723.2	2,702.6	1.32	1.16	0.63	
9,843.0	88.90	176.70	7,310.3	-2,719.6	728.3	2,797.1	1.43	1.37	-0.42	
9,937.0	91.90	177.80	7,309.7	-2,813.4	732.8	2,890.6	3.40	3.19	1.17	
10,033.0	92.70	178.50	7,305.8	-2,909.3	735.9	2,985.9	1.11	0.83	0.73	
10,127.0	93.50	181.60	7,300.7	-3,003.2	735.8	3,078.7	3.40	0.85	3.30	
10,222.0	93.50	181.40	7,294.9	-3,097.9	733.4	3,172.1	0.21	0.00	-0.21	
10,317.0	93.40	180.70	7,289.2	-3,192.8	731.6	3,265.7	0.74	-0.11	-0.74	
10,413.0	93.10	181.30	7,283.8	-3,288.6	730.0	3,360.2	0.70	-0.31	0.63	
10,508.0	91.80	181.30	7,279.7	-3,383.5	727.8	3,453.7	1.37	-1.37	0.00	
10,603.0	91.90	183.00	7,276.6	-3,478.3	724.2	3,547.1	1.79	0.11	1.79	
10,700.0	92.80	182.30	7,272.7	-3,575.2	719.8	3,642.2	1.18	0.93	-0.72	
10,793.0	92.50	182.00	7,268.4	-3,668.0	716.3	3,733.5	0.46	-0.32	-0.32	
10,889.0	92.10	182.20	7,264.5	-3,763.9	712.8	3,827.8	0.47	-0.42	0.21	
10,984.0	88.70	181.80	7,263.8	-3,858.8	709.4	3,921.2	3.60	-3.58	-0.42	
11,079.0	90.40	181.40	7,264.6	-3,953.7	706.8	4,014.7	1.84	1.79	-0.42	
11,174.0	89.90	181.60	7,264.3	-4,048.7	704.3	4,108.3	0.57	-0.53	0.21	
11,270.0	90.40	180.60	7,264.1	-4,144.7	702.5	4,202.9	1.16	0.52	-1.04	
11,365.0	89.30	181.10	7,264.3	-4,239.7	701.1	4,296.7	1.27	-1.16	0.53	
11,460.0	91.10	181.30	7,264.0	-4,334.6	699.1	4,390.3	1.91	1.89	0.21	
11,555.0	90.20	180.70	7,262.9	-4,429.6	697.4	4,484.0	1.14	-0.95	-0.63	
11,650.0	91.60	180.40	7,261.4	-4,524.6	696.5	4,577.8	1.51	1.47	-0.32	
11,707.0	90.40	180.20	7,260.4	-4,581.6	696.2	4,634.2	2.13	-2.11	-0.35	
11,759.0	90.40	180.20	7,260.1	-4,633.6	696.0	4,685.6	0.00	0.00	0.00	
BHL 2144'FNL, 2170'FWL, SEC.31										

Casing Points						
Measured Depth (ft)	Vertical Depth (ft)		Name	Casing Diameter (")	Hole Diameter (")	
7,652.0	7,263.3	7"		7	7-1/2	

Checked By: _____ Approved By: _____ Date: _____