

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Rieder 18T-241**

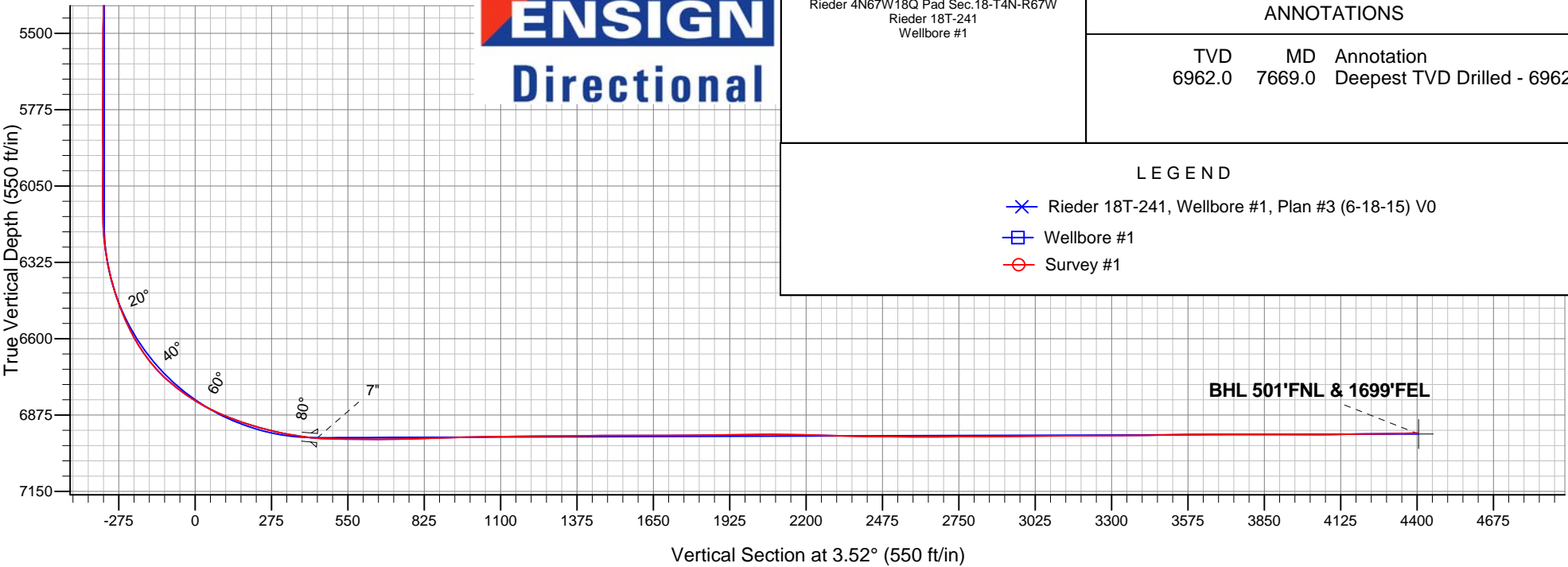
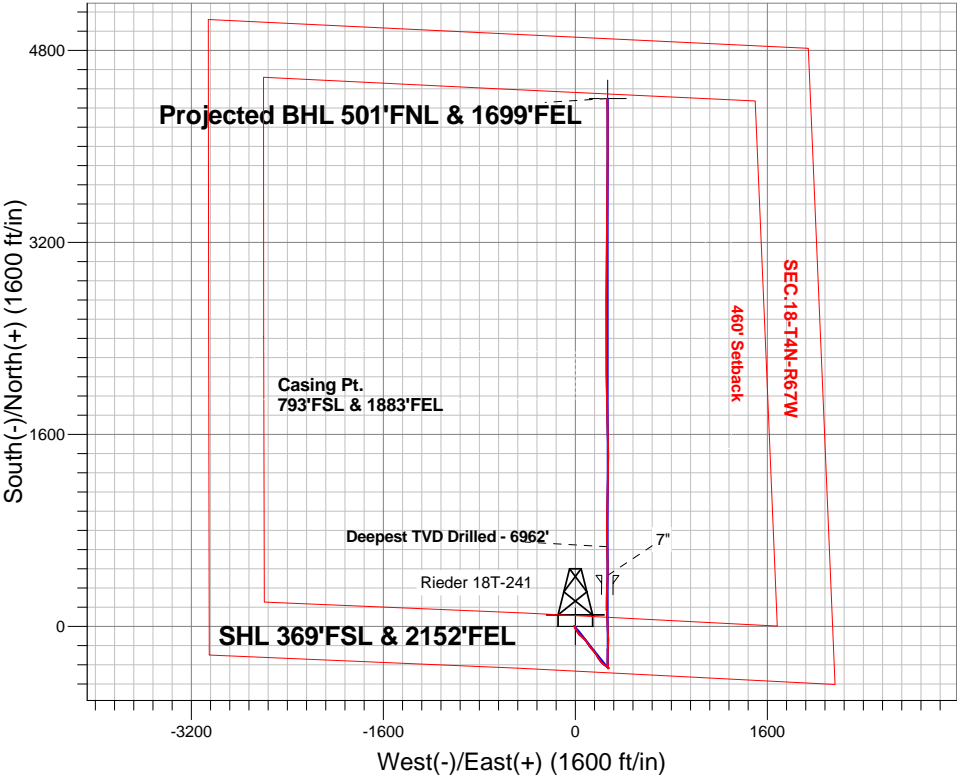
Surface Location: Rieder 4N67W18Q Pad Sec.18-T4N-R67W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4812.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1355267.04	3158741.20	40.307210	-104.930810	
Ensign Rig #134 RKB - 13' WELL @ 4825.0ft (Ensign Rig #134 RKB - 13')						

FINAL SURVEY

Projected Bottom Hole Location
11402'MD 6940'TVD 4396'N & 266'E of SHL
91.1 degree Incl @ 358.6 degree AZM





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.18-T4N-R67W

Rieder 4N67W18Q Pad Sec.18-T4N-R67W

Rieder 18T-241

Wellbore #1

Survey: Survey #1

Standard Survey Report

30 June, 2015

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18T-241
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4825.0ft (Ensign Rig #134 RKB - 13')
Site:	Rieder 4N67W18Q Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4825.0ft (Ensign Rig #134 RKB - 13')
Well:	Rieder 18T-241	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

Project	SEC.18-T4N-R67W, 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		Rieder 4N67W18Q Pad Sec.18-T4N-R67W			
Site Position:		Northing:	1,355,266.69ft	Latitude:	40.307210
From:	Lat/Long	Easting:	3,158,679.84ft	Longitude:	-104.931030
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.37 °

Well	Rieder 18T-241					
Well Position	+N-S	0.0 ft	Northing:	1,355,267.04 ft	Latitude:	40.307210
	+E-W	0.0 ft	Easting:	3,158,741.20 ft	Longitude:	-104.930810
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,812.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/18/2015	8.41	66.81	52,643

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	3.52	

Survey Program	Date 6/30/2015				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
137.0	11,402.0	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	258.70	1.0	0.0	0.0	0.0	0.00	0.00	0.00	
SHL 369'FSL & 2152'FEL										
137.0	0.20	258.70	137.0	0.0	-0.2	-0.1	0.15	0.15	0.00	
229.0	0.70	282.30	229.0	0.0	-0.9	0.0	0.57	0.54	25.65	
321.0	0.60	290.70	321.0	0.3	-1.9	0.2	0.15	-0.11	9.13	
413.0	1.20	276.70	413.0	0.6	-3.3	0.4	0.69	0.65	-15.22	
506.0	0.80	224.40	506.0	0.3	-4.8	0.0	1.02	-0.43	-56.24	
598.0	0.90	218.30	598.0	-0.8	-5.7	-1.1	0.15	0.11	-6.63	
691.0	0.70	1.00	691.0	-0.8	-6.1	-1.1	1.63	-0.22	153.44	
783.0	0.90	10.70	782.9	0.5	-6.0	0.1	0.26	0.22	10.54	
882.0	1.00	4.40	881.9	2.1	-5.8	1.8	0.15	0.10	-6.36	

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Site:	Rieder 4N67W18Q Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4825.0ft (Ensign Rig #134 RKB - 13')
Well:	Rieder 18T-241	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

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)
985.0	0.40	332.20	984.9	3.3	-5.9	3.0	0.67	-0.58	-31.26
1,077.0	0.50	309.20	1,076.9	3.9	-6.3	3.5	0.22	0.11	-25.00
1,170.0	0.70	316.60	1,169.9	4.6	-7.0	4.1	0.23	0.22	7.96
1,262.0	2.60	165.60	1,261.9	2.9	-6.9	2.5	3.51	2.07	-164.13
1,355.0	4.80	156.90	1,354.7	-2.7	-4.8	-3.0	2.43	2.37	-9.35
1,447.0	4.70	162.70	1,446.4	-9.8	-2.2	-9.9	0.53	-0.11	6.30
1,539.0	5.50	152.40	1,538.0	-17.3	1.0	-17.2	1.32	0.87	-11.20
1,632.0	4.70	152.70	1,630.6	-24.7	4.8	-24.3	0.86	-0.86	0.32
1,724.0	6.20	147.10	1,722.2	-32.2	9.2	-31.6	1.73	1.63	-6.09
1,817.0	5.70	145.90	1,814.7	-40.2	14.5	-39.3	0.55	-0.54	-1.29
1,909.0	5.00	143.60	1,906.3	-47.2	19.5	-46.0	0.80	-0.76	-2.50
2,001.0	6.40	149.60	1,997.9	-54.9	24.4	-53.3	1.65	1.52	6.52
2,094.0	7.80	146.90	2,090.1	-64.6	30.5	-62.7	1.55	1.51	-2.90
2,187.0	8.40	132.00	2,182.2	-74.5	39.0	-71.9	2.34	0.65	-16.02
2,279.0	8.00	128.10	2,273.3	-82.9	49.0	-79.8	0.74	-0.43	-4.24
2,372.0	8.00	125.70	2,365.4	-90.7	59.4	-86.9	0.36	0.00	-2.58
2,465.0	8.80	133.60	2,457.4	-99.4	69.8	-94.9	1.51	0.86	8.49
2,560.0	8.50	140.10	2,551.3	-109.8	79.6	-104.7	1.08	-0.32	6.84
2,655.0	7.60	138.70	2,645.4	-119.9	88.2	-114.2	0.97	-0.95	-1.47
2,750.0	8.40	146.70	2,739.5	-130.4	96.2	-124.3	1.44	0.84	8.42
2,846.0	7.40	143.80	2,834.5	-141.3	103.7	-134.6	1.12	-1.04	-3.02
2,941.0	7.70	149.40	2,928.7	-151.7	110.5	-144.6	0.84	0.32	5.89
3,036.0	8.50	143.20	3,022.8	-162.8	118.0	-155.2	1.25	0.84	-6.53
3,132.0	8.40	141.10	3,117.7	-173.9	126.6	-165.8	0.34	-0.10	-2.19
3,227.0	5.90	133.60	3,212.0	-182.7	134.5	-174.1	2.80	-2.63	-7.89
3,322.0	6.30	141.30	3,306.5	-190.1	141.3	-181.1	0.96	0.42	8.11
3,417.0	7.10	140.40	3,400.8	-198.7	148.3	-189.2	0.85	0.84	-0.95
3,513.0	7.50	142.20	3,496.0	-208.2	155.9	-198.3	0.48	0.42	1.88
3,671.0	10.40	146.20	3,652.1	-228.2	170.2	-217.3	1.88	1.84	2.53
3,767.0	10.50	145.90	3,746.5	-242.7	179.9	-231.2	0.12	0.10	-0.31
3,893.0	9.20	147.60	3,870.6	-260.7	191.7	-248.4	1.06	-1.03	1.35
3,989.0	7.50	147.80	3,965.6	-272.5	199.2	-259.7	1.77	-1.77	0.21
4,084.0	7.90	144.50	4,059.8	-283.0	206.3	-269.8	0.63	0.42	-3.47
4,179.0	7.00	139.20	4,154.0	-292.7	213.9	-279.0	1.19	-0.95	-5.58
4,275.0	6.20	134.80	4,249.3	-300.8	221.4	-286.6	0.99	-0.83	-4.58
4,370.0	7.90	135.50	4,343.6	-309.1	229.6	-294.4	1.79	1.79	0.74
4,465.0	7.50	130.10	4,437.7	-317.7	238.9	-302.5	0.87	-0.42	-5.68
4,560.0	6.50	126.20	4,532.0	-324.9	248.0	-309.1	1.16	-1.05	-4.11
4,655.0	6.20	121.40	4,626.4	-330.7	256.7	-314.4	0.64	-0.32	-5.05
4,750.0	5.20	117.70	4,721.0	-335.4	264.9	-318.5	1.12	-1.05	-3.89
4,846.0	3.60	139.90	4,816.7	-339.7	270.7	-322.5	2.40	-1.67	23.13
4,941.0	2.60	137.80	4,911.6	-343.6	274.0	-326.2	1.06	-1.05	-2.21
5,036.0	0.70	83.80	5,006.5	-345.2	276.1	-327.6	2.38	-2.00	-56.84
5,131.0	0.40	103.90	5,101.5	-345.2	277.0	-327.5	0.37	-0.32	21.16
5,226.0	0.40	133.20	5,196.5	-345.5	277.5	-327.8	0.21	0.00	30.84
5,322.0	0.80	142.20	5,292.5	-346.2	278.2	-328.5	0.43	0.42	9.38
5,417.0	0.70	161.50	5,387.5	-347.3	278.8	-329.5	0.28	-0.11	20.32
5,512.0	1.10	161.20	5,482.5	-348.7	279.3	-330.9	0.42	0.42	-0.32
5,608.0	1.20	281.70	5,578.5	-349.4	278.6	-331.6	2.08	0.10	125.52
5,703.0	0.70	257.80	5,673.5	-349.3	277.0	-331.7	0.66	-0.53	-25.16
5,798.0	1.10	270.10	5,768.5	-349.4	275.6	-331.9	0.47	0.42	12.95
5,893.0	0.50	297.00	5,863.4	-349.2	274.3	-331.8	0.73	-0.63	28.32
5,988.0	0.40	247.10	5,958.4	-349.2	273.6	-331.7	0.41	-0.11	-52.53
6,084.0	0.40	274.50	6,054.4	-349.3	273.0	-331.9	0.20	0.00	28.54

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Site:	Rieder 4N67W18Q Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4825.0ft (Ensign Rig #134 RKB - 13')
Well:	Rieder 18T-241	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 2003.21 Single User Db

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)
6,179.0	0.20	341.90	6,149.4	-349.1	272.6	-331.7	0.39	-0.21	70.95
6,274.0	5.70	3.10	6,244.3	-344.2	272.8	-326.8	5.80	5.79	22.32
6,370.0	11.60	357.70	6,339.1	-329.8	272.6	-312.5	6.20	6.15	-5.63
6,465.0	17.60	354.90	6,431.0	-305.9	271.0	-288.7	6.36	6.32	-2.95
6,560.0	22.90	1.60	6,520.1	-273.1	270.2	-256.0	6.08	5.58	7.05
6,656.0	29.80	0.10	6,606.1	-230.6	270.8	-213.5	7.22	7.19	-1.56
6,751.0	38.60	3.30	6,684.6	-177.3	272.5	-160.2	9.45	9.26	3.37
6,846.0	49.20	359.40	6,753.0	-111.5	273.9	-94.5	11.51	11.16	-4.11
6,942.0	56.50	357.90	6,810.9	-35.1	272.0	-18.3	7.71	7.60	-1.56
7,037.0	64.30	356.50	6,857.8	47.4	267.9	63.7	8.31	8.21	-1.47
7,132.0	70.60	357.70	6,894.2	134.9	263.5	150.9	6.73	6.63	1.26
7,227.0	74.70	1.70	6,922.6	225.6	263.1	241.3	5.90	4.32	4.21
7,323.0	79.60	1.90	6,943.9	319.1	266.0	334.8	5.11	5.10	0.21
7,388.0	82.70	1.70	6,953.9	383.3	268.1	399.0	4.78	4.77	-0.31
7,429.0	85.45	0.66	6,958.1	424.0	268.9	439.8	7.16	6.70	-2.54
7"									
7,479.0	88.80	359.40	6,960.6	474.0	268.9	489.6	7.16	6.71	-2.52
7,574.0	89.70	359.10	6,961.9	569.0	267.7	584.3	1.00	0.95	-0.32
7,669.0	90.20	358.60	6,962.0	663.9	265.8	679.0	0.74	0.53	-0.53
Deepest TVD Drilled - 6962'									
7,764.0	91.50	359.80	6,960.6	758.9	264.4	773.7	1.86	1.37	1.26
7,859.0	91.50	359.80	6,958.1	853.9	264.1	868.5	0.00	0.00	0.00
7,954.0	91.80	1.60	6,955.3	948.8	265.3	963.3	1.92	0.32	1.89
8,050.0	91.00	1.00	6,953.0	1,044.8	267.4	1,059.2	1.04	-0.83	-0.63
8,145.0	90.50	2.60	6,951.8	1,139.7	270.4	1,154.2	1.76	-0.53	1.68
8,239.0	90.60	0.00	6,950.8	1,233.7	272.6	1,248.1	2.77	0.11	-2.77
8,335.0	90.40	0.30	6,950.0	1,329.7	272.8	1,343.9	0.38	-0.21	0.31
8,430.0	90.60	0.10	6,949.2	1,424.7	273.1	1,438.8	0.30	0.21	-0.21
8,525.0	90.00	359.10	6,948.7	1,519.7	272.5	1,533.5	1.23	-0.63	-1.05
8,620.0	90.10	358.70	6,948.6	1,614.6	270.7	1,628.2	0.43	0.11	-0.42
8,715.0	90.60	358.70	6,948.0	1,709.6	268.5	1,722.9	0.53	0.53	0.00
8,810.0	90.30	358.60	6,947.3	1,804.6	266.3	1,817.5	0.33	-0.32	-0.11
8,906.0	90.80	358.90	6,946.4	1,900.6	264.2	1,913.2	0.61	0.52	0.31
9,001.0	90.80	0.00	6,945.0	1,995.5	263.3	2,007.9	1.16	0.00	1.16
9,096.0	89.50	359.30	6,944.8	2,090.5	262.7	2,102.7	1.55	-1.37	-0.74
9,191.0	88.90	359.80	6,946.1	2,185.5	261.9	2,197.5	0.82	-0.63	0.53
9,286.0	88.00	359.10	6,948.7	2,280.5	261.0	2,292.2	1.20	-0.95	-0.74
9,381.0	88.80	359.30	6,951.3	2,375.4	259.7	2,386.9	0.87	0.84	0.21
9,477.0	89.80	359.80	6,952.5	2,471.4	258.9	2,482.7	1.16	1.04	0.52
9,572.0	89.90	0.70	6,952.7	2,566.4	259.4	2,577.5	0.95	0.11	0.95
9,667.0	90.20	0.30	6,952.7	2,661.4	260.2	2,672.4	0.53	0.32	-0.42
9,762.0	89.90	359.80	6,952.6	2,756.4	260.3	2,767.2	0.61	-0.32	-0.53
9,857.0	90.90	1.00	6,951.9	2,851.4	260.9	2,862.1	1.64	1.05	1.26
9,952.0	90.50	0.30	6,950.8	2,946.4	262.0	2,956.9	0.85	-0.42	-0.74
10,048.0	90.30	0.10	6,950.1	3,042.4	262.3	3,052.8	0.29	-0.21	-0.21
10,143.0	90.50	1.20	6,949.4	3,137.4	263.4	3,147.6	1.18	0.21	1.16
10,238.0	90.10	1.20	6,948.9	3,232.4	265.4	3,242.6	0.42	-0.42	0.00
10,333.0	90.30	0.00	6,948.6	3,327.4	266.4	3,337.4	1.28	0.21	-1.26
10,428.0	91.20	0.70	6,947.4	3,422.3	267.0	3,432.3	1.20	0.95	0.74
10,523.0	90.60	0.00	6,945.9	3,517.3	267.6	3,527.1	0.97	-0.63	-0.74
10,618.0	90.70	0.00	6,944.8	3,612.3	267.6	3,621.9	0.11	0.11	0.00
10,714.0	90.20	0.70	6,944.0	3,708.3	268.1	3,717.8	0.90	-0.52	0.73
10,809.0	89.80	0.00	6,944.0	3,803.3	268.7	3,812.6	0.85	-0.42	-0.74

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
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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)	
10,904.0	89.60	359.30	6,944.5	3,898.3	268.1	3,907.4	0.77	-0.21	-0.74	
10,999.0	89.80	0.30	6,945.0	3,993.3	267.8	4,002.2	1.07	0.21	1.05	
11,094.0	90.90	0.70	6,944.4	4,088.3	268.6	4,097.1	1.23	1.16	0.42	
11,189.0	90.60	0.30	6,943.2	4,183.3	269.5	4,191.9	0.53	-0.32	-0.42	
11,284.0	90.80	359.30	6,942.0	4,278.3	269.1	4,286.7	1.07	0.21	-1.05	
11,351.0	91.10	358.40	6,940.9	4,345.3	267.8	4,353.5	1.42	0.45	-1.34	
11,402.0	91.10	358.40	6,939.9	4,396.2	266.4	4,404.3	0.00	0.00	0.00	
BHL 500'FNL & 1695'FEL										

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name		Casing Diameter (")	Hole Diameter (")
7,429.0	6,958.1	7"		7	7-1/2

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment	
		+N/-S (ft)	+E/-W (ft)		
7,669.0	6,962.0	663.9	265.8	Deepest TVD Drilled - 6962'	

Checked By: _____ Approved By: _____ Date: _____