

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Guttersen 31T-221**

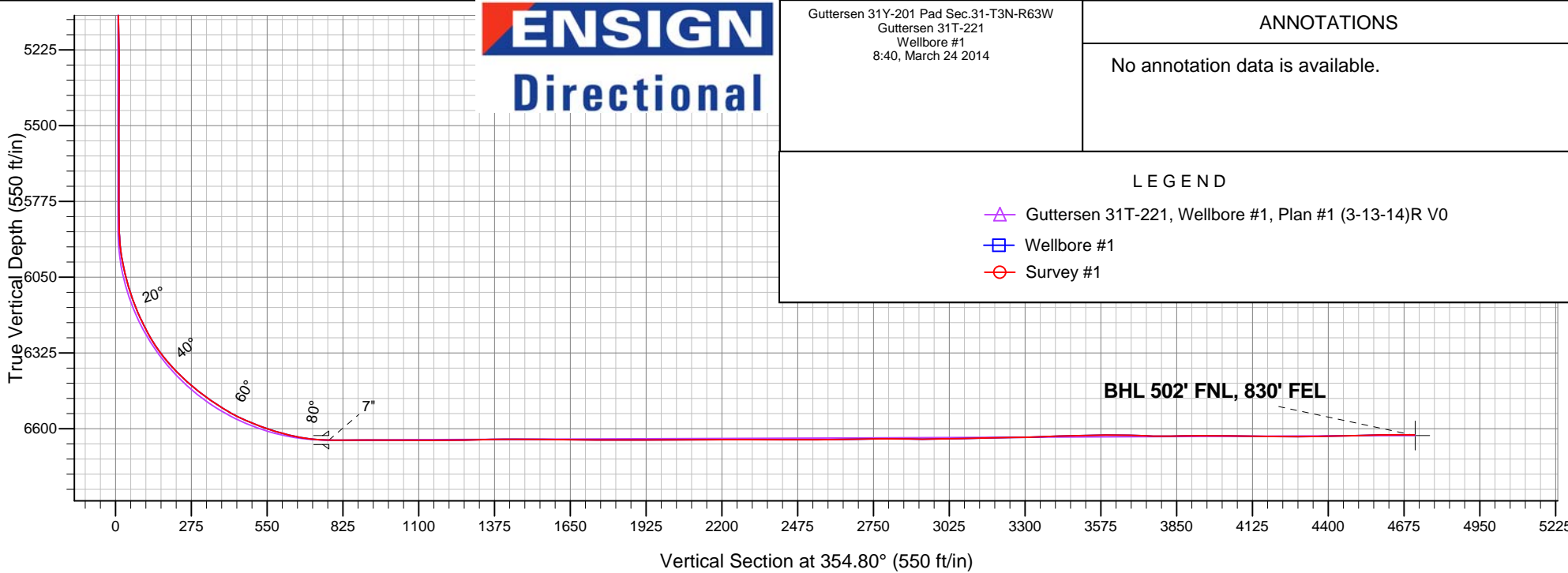
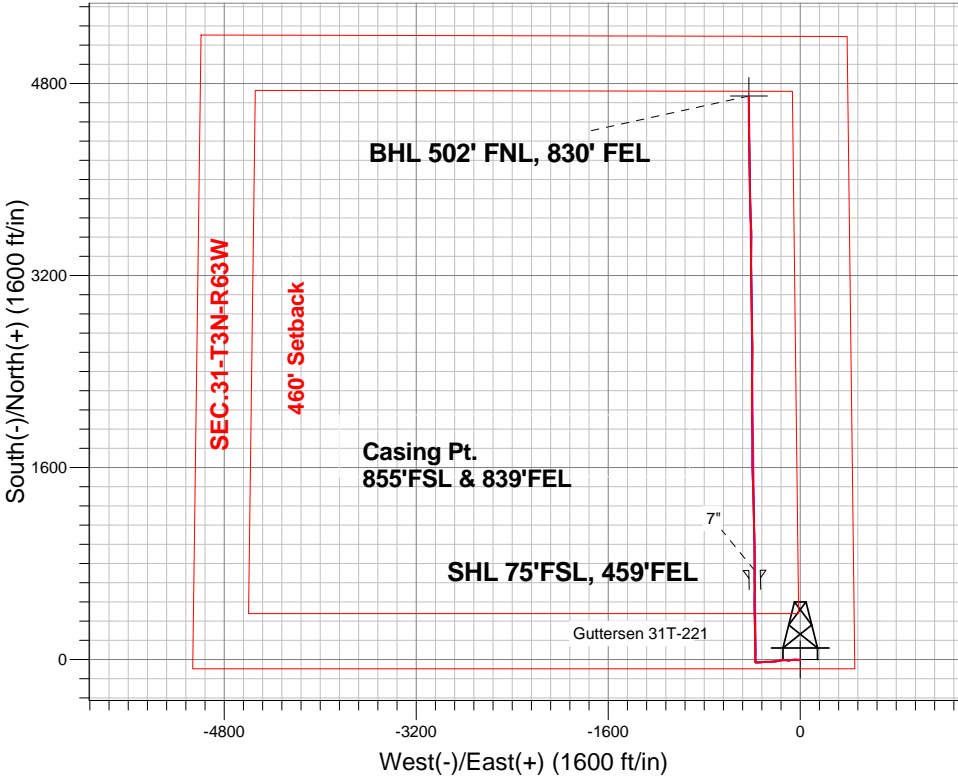
Surface Location: Guttersen 31Y-201 Pad Sec.31-T3N-R63W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4836.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1308211.28	3287096.50	40.174870	-104.472560	
Ensign 136 RKB - 12.5' WELL @ 4848.5ft (Ensign 136 RKB - 12.5')						

FINAL SURVEY

Projected Bottom Hole Location
11040'MD 6623'TVD 4694'N & 429'W of SHL
89.0 degree Incl @ 359.3 degree AZM



Guttersen 31Y-201 Pad Sec.31-T3N-R63W Guttersen 31T-221 Wellbore #1 8:40, March 24 2014	ANNOTATIONS
	No annotation data is available.
LEGEND	
Guttersen 31T-221, Wellbore #1, Plan #1 (3-13-14)R V0	
Wellbore #1	
Survey #1	



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.31-T3N-R63W

Guttersen 31Y-201 Pad Sec.31-T3N-R63W

Guttersen 31T-221

Wellbore #1

Survey: Survey #1

Standard Survey Report

24 March, 2014

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Gutteresen 31T-221
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4848.5ft (Ensign 136 RKB - 12.5')
Site:	Gutteresen 31Y-201 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4848.5ft (Ensign 136 RKB - 12.5')
Well:	Gutteresen 31T-221	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.31-T3N-R63W, Weld County, Colorado		
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		Guttersen 31Y-201 Pad Sec.31-T3N-R63W			
Site Position:		Northing:	1,308,211.98ft	Latitude:	40.174870
From:	Lat/Long	Easting:	3,287,155.18ft	Longitude:	-104.472350
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.66 °

Well	Guttersen 31T-221					
Well Position	+N-S	0.0 ft	Northing:	1,308,211.28 ft	Latitude:	40.174870
	+E-W	0.0 ft	Easting:	3,287,096.50 ft	Longitude:	-104.472560
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,836.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/25/2014	8.32	66.82	52,759

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	354.80	

Survey Program	Date	3/24/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
75.0	11,040.0	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	0.01	195.40	1.0	0.0	0.0	0.0	1.07	1.07	0.00	
SHL 75'FSL, 459'FEL										
75.0	0.80	195.40	75.0	-0.5	-0.1	-0.5	1.07	1.07	0.00	
105.0	0.90	214.50	105.0	-0.9	-0.3	-0.9	1.00	0.33	63.67	
260.0	0.80	228.60	260.0	-2.6	-1.8	-2.4	0.15	-0.06	9.10	
350.0	0.90	224.70	350.0	-3.5	-2.8	-3.3	0.13	0.11	-4.33	
441.0	1.00	235.80	441.0	-4.5	-4.0	-4.1	0.23	0.11	12.20	
532.0	1.10	250.40	531.9	-5.2	-5.4	-4.7	0.31	0.11	16.04	
622.0	1.30	260.40	621.9	-5.7	-7.3	-5.0	0.32	0.22	11.11	
713.0	1.50	259.00	712.9	-6.1	-9.4	-5.2	0.22	0.22	-1.54	
804.0	1.40	272.70	803.9	-6.3	-11.7	-5.2	0.40	-0.11	15.05	

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Site:	Gutteresen 31Y-201 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4848.5ft (Ensign 136 RKB - 12.5')
Well:	Gutteresen 31T-221	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)
855.0	1.60	278.10	854.8	-6.1	-13.1	-4.9	0.48	0.39	10.59
929.0	1.60	268.30	928.8	-6.0	-15.1	-4.6	0.37	0.00	-13.24
1,025.0	1.80	272.20	1,024.8	-6.0	-18.0	-4.4	0.24	0.21	4.06
1,117.0	1.80	272.50	1,116.7	-5.9	-20.8	-4.0	0.01	0.00	0.33
1,208.0	1.70	287.80	1,207.7	-5.4	-23.6	-3.3	0.52	-0.11	16.81
1,298.0	4.70	290.30	1,297.5	-3.7	-28.3	-1.1	3.34	3.33	2.78
1,390.0	6.30	273.20	1,389.1	-2.1	-36.9	1.2	2.47	1.74	-18.59
1,480.0	7.80	263.20	1,478.4	-2.6	-47.9	1.8	2.15	1.67	-11.11
1,571.0	7.70	262.00	1,568.6	-4.2	-60.0	1.3	0.21	-0.11	-1.32
1,662.0	7.40	262.30	1,658.8	-5.8	-71.9	0.7	0.33	-0.33	0.33
1,753.0	6.90	262.00	1,749.1	-7.3	-83.1	0.2	0.55	-0.55	-0.33
1,843.0	6.00	258.80	1,838.5	-9.0	-93.1	-0.5	1.08	-1.00	-3.56
1,934.0	5.40	278.80	1,929.1	-9.3	-102.0	0.0	2.27	-0.66	21.98
2,025.0	6.40	286.40	2,019.6	-7.2	-111.1	2.9	1.39	1.10	8.35
2,116.0	6.50	277.80	2,110.0	-5.1	-121.0	5.9	1.07	0.11	-9.45
2,208.0	5.70	271.10	2,201.5	-4.3	-130.7	7.6	1.16	-0.87	-7.28
2,303.0	4.90	263.60	2,296.1	-4.6	-139.5	8.0	1.11	-0.84	-7.89
2,399.0	5.10	261.60	2,391.8	-5.7	-147.8	7.7	0.28	0.21	-2.08
2,494.0	5.90	265.50	2,486.3	-6.7	-156.8	7.5	0.93	0.84	4.11
2,589.0	5.70	262.50	2,580.8	-7.7	-166.4	7.4	0.38	-0.21	-3.16
2,684.0	5.50	255.50	2,675.4	-9.5	-175.5	6.5	0.75	-0.21	-7.37
2,779.0	5.50	254.90	2,769.9	-11.8	-184.3	5.0	0.06	0.00	-0.63
2,875.0	5.30	250.50	2,865.5	-14.5	-192.9	3.1	0.48	-0.21	-4.58
2,970.0	5.50	256.20	2,960.1	-17.0	-201.4	1.3	0.60	0.21	6.00
3,065.0	5.60	269.90	3,054.6	-18.1	-210.5	1.1	1.40	0.11	14.42
3,161.0	5.50	266.50	3,150.2	-18.4	-219.8	1.6	0.36	-0.10	-3.54
3,256.0	4.80	261.60	3,244.8	-19.3	-228.3	1.5	0.87	-0.74	-5.16
3,351.0	5.60	270.10	3,339.4	-19.8	-236.8	1.7	1.17	0.84	8.95
3,446.0	5.70	261.60	3,434.0	-20.5	-246.1	1.9	0.89	0.11	-8.95
3,541.0	5.80	261.60	3,528.5	-21.9	-255.5	1.4	0.11	0.11	0.00
3,637.0	5.20	276.90	3,624.1	-22.1	-264.7	2.0	1.64	-0.63	15.94
3,732.0	6.40	272.00	3,718.6	-21.4	-274.2	3.6	1.37	1.26	-5.16
3,827.0	6.60	270.10	3,813.0	-21.2	-285.0	4.7	0.31	0.21	-2.00
3,973.0	6.70	270.20	3,958.0	-21.1	-301.9	6.3	0.07	0.07	0.07
4,017.0	6.40	262.70	4,001.7	-21.4	-306.9	6.5	2.06	-0.68	-17.05
4,113.0	6.00	264.30	4,097.1	-22.6	-317.2	6.2	0.45	-0.42	1.67
4,208.0	6.00	262.90	4,191.6	-23.7	-327.1	6.0	0.15	0.00	-1.47
4,303.0	4.70	273.00	4,286.2	-24.1	-335.9	6.4	1.68	-1.37	10.63
4,398.0	5.60	269.70	4,380.8	-24.0	-344.4	7.4	1.00	0.95	-3.47
4,493.0	5.40	269.50	4,475.4	-24.0	-353.5	8.1	0.21	-0.21	-0.21
4,588.0	3.70	266.50	4,570.1	-24.3	-361.0	8.6	1.81	-1.79	-3.16
4,684.0	2.60	267.80	4,665.9	-24.5	-366.3	8.8	1.15	-1.15	1.35
4,779.0	1.00	232.80	4,760.9	-25.1	-369.1	8.5	1.97	-1.68	-36.84
4,874.0	1.00	231.20	4,855.9	-26.1	-370.4	7.6	0.03	0.00	-1.68
4,969.0	0.90	353.60	4,950.8	-25.9	-371.1	7.8	1.75	-0.11	128.84
5,065.0	0.90	1.50	5,046.8	-24.4	-371.2	9.3	0.13	0.00	8.23
5,160.0	0.90	353.20	5,141.8	-22.9	-371.3	10.8	0.14	0.00	-8.74
5,255.0	1.00	5.00	5,236.8	-21.4	-371.3	12.4	0.23	0.11	12.42
5,351.0	0.60	150.70	5,332.8	-21.0	-371.0	12.8	1.60	-0.42	151.77
5,446.0	0.40	217.70	5,427.8	-21.7	-370.9	12.1	0.61	-0.21	70.53
5,541.0	0.40	197.60	5,522.8	-22.2	-371.2	11.5	0.15	0.00	-21.16
5,636.0	0.20	344.20	5,617.8	-22.4	-371.4	11.4	0.61	-0.21	154.32
5,731.0	0.40	296.10	5,712.8	-22.1	-371.7	11.7	0.32	0.21	-50.63
5,827.0	0.40	294.00	5,808.8	-21.8	-372.3	12.0	0.02	0.00	-2.19

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Well:	Gutteresen 31T-221	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)
5,858.0	0.40	343.20	5,839.8	-21.6	-372.5	12.2	1.07	0.00	158.71
5,890.0	1.40	6.00	5,871.8	-21.2	-372.5	12.7	3.26	3.13	71.25
5,922.0	3.30	357.10	5,903.8	-19.8	-372.5	14.0	6.03	5.94	-27.81
5,954.0	5.70	352.00	5,935.7	-17.4	-372.7	16.5	7.60	7.50	-15.94
5,985.0	8.70	353.00	5,966.4	-13.5	-373.2	20.4	9.69	9.68	3.23
6,017.0	10.80	354.40	5,998.0	-8.1	-373.8	25.8	6.60	6.56	4.38
6,049.0	12.70	353.40	6,029.3	-1.6	-374.5	32.3	5.97	5.94	-3.13
6,080.0	14.80	355.00	6,059.4	5.7	-375.2	39.7	6.88	6.77	5.16
6,112.0	16.90	358.70	6,090.2	14.4	-375.7	48.4	7.28	6.56	11.56
6,144.0	19.10	2.00	6,120.6	24.3	-375.6	58.3	7.58	6.88	10.31
6,176.0	21.40	2.90	6,150.6	35.4	-375.2	69.2	7.25	7.19	2.81
6,207.0	23.70	3.60	6,179.3	47.2	-374.5	81.0	7.47	7.42	2.26
6,239.0	26.00	2.00	6,208.3	60.7	-373.8	94.3	7.49	7.19	-5.00
6,271.0	27.50	359.40	6,236.9	75.1	-373.7	108.6	5.94	4.69	-8.13
6,303.0	30.00	357.60	6,264.9	90.4	-374.1	124.0	8.27	7.81	-5.63
6,334.0	32.10	357.80	6,291.5	106.4	-374.7	140.0	6.78	6.77	0.65
6,366.0	35.30	359.00	6,318.1	124.2	-375.2	157.7	10.21	10.00	3.75
6,398.0	38.60	0.10	6,343.7	143.4	-375.3	176.8	10.52	10.31	3.44
6,430.0	41.90	359.70	6,368.1	164.1	-375.4	197.4	10.34	10.31	-1.25
6,461.0	44.80	359.40	6,390.6	185.4	-375.6	218.6	9.38	9.35	-0.97
6,493.0	47.00	359.00	6,412.9	208.3	-375.9	241.5	6.93	6.88	-1.25
6,525.0	48.80	358.30	6,434.3	232.1	-376.4	265.2	5.85	5.63	-2.19
6,557.0	50.60	358.30	6,455.0	256.5	-377.2	289.6	5.63	5.63	0.00
6,588.0	52.60	358.50	6,474.3	280.7	-377.8	313.8	6.47	6.45	0.65
6,620.0	54.40	358.50	6,493.3	306.5	-378.5	339.5	5.63	5.63	0.00
6,652.0	56.30	358.30	6,511.5	332.8	-379.2	365.8	5.96	5.94	-0.63
6,684.0	58.50	358.70	6,528.8	359.7	-380.0	392.7	6.96	6.88	1.25
6,716.0	61.60	358.80	6,544.7	387.4	-380.6	420.3	9.69	9.69	0.31
6,747.0	64.70	359.90	6,558.7	415.1	-380.9	447.9	10.49	10.00	3.55
6,779.0	66.70	0.80	6,571.9	444.2	-380.7	476.9	6.76	6.25	2.81
6,811.0	68.30	0.80	6,584.1	473.8	-380.3	506.3	5.00	5.00	0.00
6,842.0	70.20	0.60	6,595.1	502.8	-379.9	535.2	6.16	6.13	-0.65
6,874.0	72.30	0.20	6,605.4	533.1	-379.7	565.3	6.67	6.56	-1.25
6,906.0	74.20	0.10	6,614.6	563.7	-379.6	595.8	5.95	5.94	-0.31
6,938.0	76.40	359.50	6,622.8	594.7	-379.7	626.7	7.11	6.88	-1.88
6,969.0	78.80	359.00	6,629.4	625.0	-380.1	656.8	7.90	7.74	-1.61
7,001.0	81.40	359.40	6,634.9	656.5	-380.6	688.3	8.22	8.13	1.25
7,033.0	84.80	0.20	6,638.8	688.2	-380.7	719.9	10.91	10.63	2.50
7,051.0	86.70	0.80	6,640.1	706.2	-380.5	737.8	11.07	10.56	3.33
7,125.0	90.60	0.40	6,641.8	780.1	-379.8	811.4	5.30	5.27	-0.54
7,216.0	89.90	359.50	6,641.4	871.1	-379.8	902.0	1.25	-0.77	-0.99
7,307.0	89.80	359.00	6,641.7	962.1	-381.0	992.7	0.56	-0.11	-0.55
7,398.0	90.00	358.80	6,641.8	1,053.1	-382.8	1,083.5	0.31	0.22	-0.22
7,488.0	89.70	358.10	6,642.1	1,143.1	-385.2	1,173.3	0.85	-0.33	-0.78
7,581.0	91.40	358.30	6,641.2	1,236.0	-388.1	1,266.1	1.84	1.83	0.22
7,676.0	91.00	359.00	6,639.2	1,331.0	-390.4	1,360.9	0.85	-0.42	0.74
7,771.0	90.00	358.10	6,638.4	1,425.9	-392.8	1,455.7	1.42	-1.05	-0.95
7,867.0	89.10	358.10	6,639.1	1,521.9	-395.9	1,551.5	0.94	-0.94	0.00
7,962.0	89.50	358.30	6,640.3	1,616.8	-398.9	1,646.3	0.47	0.42	0.21
8,057.0	89.80	0.40	6,640.9	1,711.8	-400.0	1,741.0	2.23	0.32	2.21
8,152.0	89.90	0.10	6,641.1	1,806.8	-399.6	1,835.6	0.33	0.11	-0.32
8,248.0	90.40	0.20	6,640.9	1,902.8	-399.3	1,931.2	0.53	0.52	0.10
8,343.0	90.20	359.70	6,640.4	1,997.8	-399.4	2,025.8	0.57	-0.21	-0.53

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
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Survey									
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8,438.0	90.00	359.40	6,640.2	2,092.8	-400.2	2,120.5	0.38	-0.21	-0.32
8,533.0	90.10	358.80	6,640.1	2,187.8	-401.7	2,215.2	0.64	0.11	-0.63
8,629.0	89.90	359.50	6,640.1	2,283.8	-403.1	2,310.9	0.76	-0.21	0.73
8,724.0	90.00	2.20	6,640.2	2,378.8	-401.7	2,405.4	2.84	0.11	2.84
8,819.0	89.70	0.40	6,640.4	2,473.7	-399.5	2,499.8	1.92	-0.32	-1.89
8,914.0	91.00	0.10	6,639.9	2,568.7	-399.1	2,594.3	1.40	1.37	-0.32
9,009.0	91.20	359.00	6,638.0	2,663.7	-399.9	2,689.0	1.18	0.21	-1.16
9,105.0	90.10	359.50	6,636.9	2,759.7	-401.1	2,784.7	1.26	-1.15	0.52
9,200.0	89.20	358.30	6,637.5	2,854.7	-402.9	2,879.5	1.58	-0.95	-1.26
9,295.0	90.70	359.00	6,637.6	2,949.6	-405.2	2,974.2	1.74	1.58	0.74
9,390.0	91.30	359.70	6,636.0	3,044.6	-406.3	3,068.9	0.97	0.63	0.74
9,485.0	91.20	359.00	6,633.9	3,139.6	-407.3	3,163.6	0.74	-0.11	-0.74
9,581.0	90.80	359.40	6,632.2	3,235.6	-408.7	3,259.3	0.59	-0.42	0.42
9,676.0	91.90	0.20	6,630.0	3,330.5	-409.0	3,353.9	1.43	1.16	0.84
9,771.0	92.50	359.70	6,626.3	3,425.5	-409.1	3,448.5	0.82	0.63	-0.53
9,856.0	91.30	0.80	6,623.5	3,510.4	-408.7	3,533.0	1.91	-1.41	1.29
9,961.0	88.70	358.10	6,623.5	3,615.4	-409.7	3,637.7	3.57	-2.48	-2.57
10,056.0	88.20	357.10	6,626.1	3,710.3	-413.7	3,732.5	1.18	-0.53	-1.05
10,152.0	90.70	358.50	6,627.0	3,806.2	-417.4	3,828.4	2.98	2.60	1.46
10,247.0	90.70	359.20	6,625.8	3,901.2	-419.3	3,923.1	0.74	0.00	0.74
10,342.0	89.20	358.70	6,625.9	3,996.1	-421.0	4,017.9	1.66	-1.58	-0.53
10,438.0	88.90	359.40	6,627.5	4,092.1	-422.6	4,113.6	0.79	-0.31	0.73
10,533.0	89.50	359.40	6,628.8	4,187.1	-423.6	4,208.3	0.63	0.63	0.00
10,628.0	90.70	359.00	6,628.7	4,282.1	-424.9	4,303.0	1.33	1.26	-0.42
10,723.0	91.00	359.20	6,627.3	4,377.1	-426.4	4,397.7	0.38	0.32	0.21
10,819.0	91.50	359.50	6,625.2	4,473.0	-427.5	4,493.4	0.61	0.52	0.31
10,914.0	91.20	0.10	6,622.9	4,568.0	-427.9	4,588.0	0.71	-0.32	0.63
10,984.0	89.80	359.50	6,622.3	4,638.0	-428.1	4,657.7	2.18	-2.00	-0.86
11,040.0	89.00	359.30	6,622.9	4,694.0	-428.7	4,713.5	1.47	-1.43	-0.36
BHL 500' FNL, 829' FEL									

Checked By: _____	Approved By: _____	Date: _____
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