

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Guttersen 31T-401**

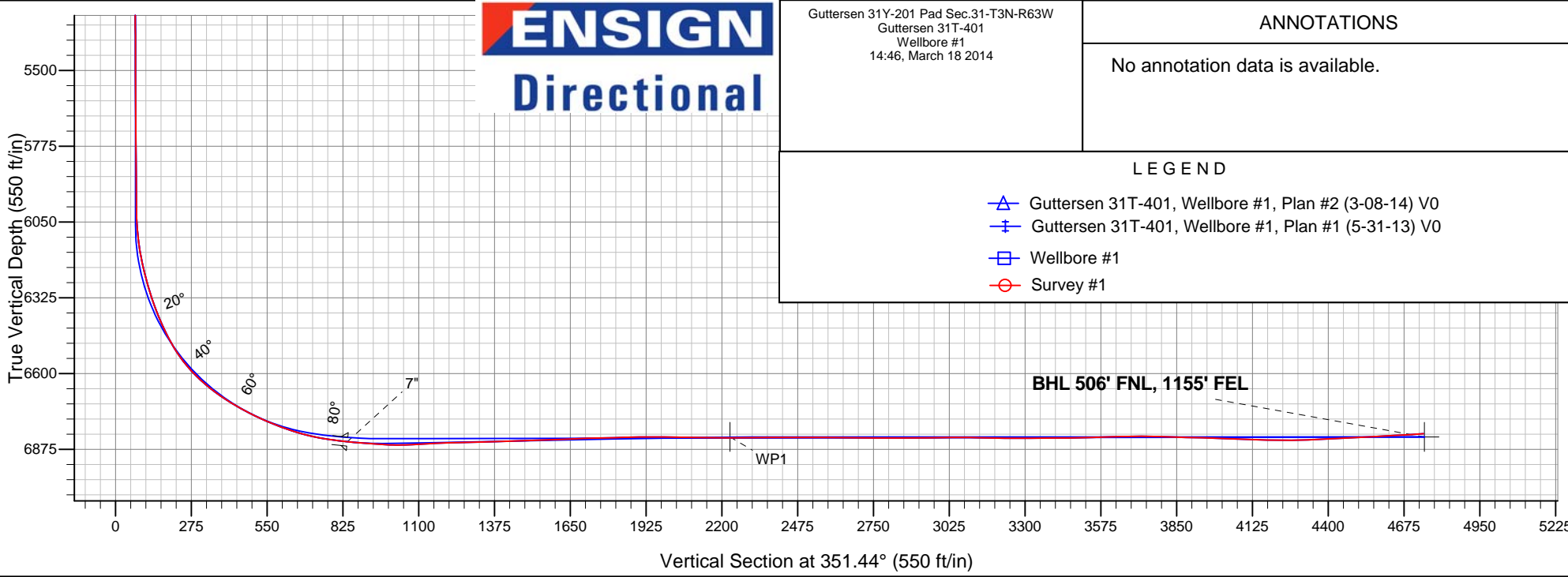
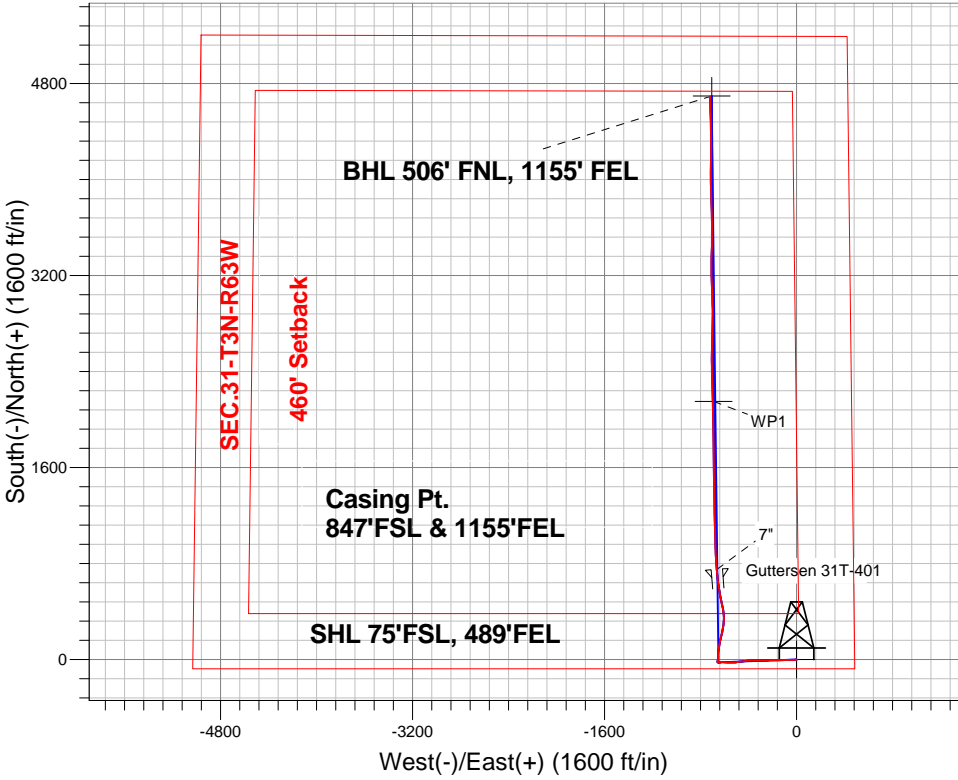
Surface Location: Guttersen 31Y-201 Pad Sec.31-T3N-R63W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4836.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1308210.92	3287065.77	40.174870	-104.472670	
Ensign 136 RKB - 12.5' WELL @ 4848.5ft (Ensign 136 RKB - 12.5')						

FINAL SURVEY

Projected Bottom Hole Location
11265'MD 6818'TVD 4690'N & 722'W of SHL
93.6 degree Incl @ 357.6 degree AZM



ENSIGN
Directional

Guttersen 31Y-201 Pad Sec.31-T3N-R63W
Guttersen 31T-401
Wellbore #1
14:46, March 18 2014

ANNOTATIONS

No annotation data is available.

LEGEND

- Guttersen 31T-401, Wellbore #1, Plan #2 (3-08-14) V0
- Guttersen 31T-401, Wellbore #1, Plan #1 (5-31-13) 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-401

Wellbore #1

Survey: Survey #1

Standard Survey Report

18 March, 2014

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Gutteresen 31T-401
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-401	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	Gutteresen 31T-401					
Well Position	+N-S	0.0 ft	Northing:	1,308,210.92 ft	Latitude:	40.174870
	+E-W	0.0 ft	Easting:	3,287,065.77 ft	Longitude:	-104.472670
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	3/8/2014	8.32	66.82	52,756

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	351.44	

Survey Program	Date	3/18/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
133.0	11,265.0	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	208.20	1.0	0.0	0.0	0.0	0.53	0.53	0.00	
SHL 75°FSL, 489°FEL										
133.0	0.70	208.20	133.0	-0.7	-0.4	-0.7	0.53	0.53	0.00	
223.0	1.20	236.00	223.0	-1.7	-1.4	-1.5	0.74	0.56	30.89	
318.0	2.40	256.20	317.9	-2.8	-4.2	-2.1	1.41	1.26	21.26	
408.0	4.40	266.50	407.8	-3.4	-9.5	-2.0	2.31	2.22	11.44	
499.0	6.10	266.20	498.4	-4.0	-17.8	-1.3	1.87	1.87	-0.33	
590.0	7.70	269.90	588.7	-4.3	-28.7	0.0	1.82	1.76	4.07	
681.0	8.70	270.40	678.8	-4.2	-41.7	2.0	1.10	1.10	0.55	
772.0	7.90	272.70	768.8	-3.9	-54.8	4.3	0.95	-0.88	2.53	
863.0	7.90	266.20	859.0	-4.0	-67.3	6.0	0.98	0.00	-7.14	

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Site:	Guttersen 31Y-201 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4848.5ft (Ensign 136 RKB - 12.5')
Well:	Guttersen 31T-401	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)
880.0	8.20	266.40	875.8	-4.2	-69.7	6.2	1.77	1.76	1.18
931.0	8.40	268.50	926.3	-4.5	-77.0	7.0	0.71	0.39	4.12
1,027.0	7.60	266.00	1,021.3	-5.1	-90.4	8.4	0.91	-0.83	-2.60
1,118.0	7.90	265.80	1,111.5	-6.0	-102.6	9.3	0.33	0.33	-0.22
1,209.0	6.40	267.80	1,201.8	-6.7	-113.9	10.4	1.67	-1.65	2.20
1,300.0	6.60	270.60	1,292.2	-6.8	-124.2	11.8	0.41	0.22	3.08
1,391.0	6.50	268.70	1,382.6	-6.9	-134.6	13.2	0.26	-0.11	-2.09
1,481.0	6.60	271.60	1,472.0	-6.8	-144.8	14.8	0.38	0.11	3.22
1,573.0	6.50	269.50	1,563.4	-6.7	-155.3	16.5	0.28	-0.11	-2.28
1,663.0	7.70	272.70	1,652.7	-6.5	-166.5	18.4	1.40	1.33	3.56
1,754.0	7.40	270.40	1,743.0	-6.2	-178.4	20.5	0.47	-0.33	-2.53
1,845.0	6.80	269.40	1,833.3	-6.2	-189.6	22.1	0.67	-0.66	-1.10
1,936.0	7.50	273.90	1,923.6	-5.8	-201.0	24.1	0.98	0.77	4.95
2,026.0	7.80	265.10	2,012.8	-6.0	-212.9	25.8	1.34	0.33	-9.78
2,117.0	7.20	265.30	2,103.0	-6.9	-224.7	26.6	0.66	-0.66	0.22
2,210.0	6.20	266.40	2,195.3	-7.7	-235.6	27.4	1.08	-1.08	1.18
2,305.0	7.10	270.40	2,289.7	-8.0	-246.6	28.8	1.06	0.95	4.21
2,400.0	8.00	268.30	2,383.9	-8.2	-259.0	30.5	0.99	0.95	-2.21
2,495.0	7.60	270.20	2,478.0	-8.4	-271.9	32.2	0.50	-0.42	2.00
2,591.0	7.10	270.10	2,573.2	-8.3	-284.2	34.1	0.52	-0.52	-0.10
2,686.0	7.80	270.10	2,667.4	-8.3	-296.5	35.9	0.74	0.74	0.00
2,781.0	7.70	269.40	2,761.5	-8.4	-309.3	37.8	0.14	-0.11	-0.74
2,876.0	7.60	272.50	2,855.7	-8.1	-322.0	39.9	0.45	-0.11	3.26
2,972.0	7.40	272.70	2,950.9	-7.6	-334.5	42.3	0.21	-0.21	0.21
3,067.0	8.30	267.40	3,045.0	-7.6	-347.5	44.2	1.21	0.95	-5.58
3,162.0	7.70	269.90	3,139.1	-7.9	-360.7	45.9	0.73	-0.63	2.63
3,257.0	7.30	270.20	3,233.2	-7.9	-373.1	47.7	0.42	-0.42	0.32
3,353.0	7.30	266.40	3,328.5	-8.3	-385.3	49.2	0.50	0.00	-3.96
3,448.0	6.60	265.80	3,422.8	-9.1	-396.7	50.1	0.74	-0.74	-0.63
3,543.0	7.70	264.30	3,517.0	-10.1	-408.5	50.8	1.17	1.16	-1.58
3,638.0	6.70	266.00	3,611.3	-11.1	-420.4	51.6	1.08	-1.05	1.79
3,733.0	6.90	255.60	3,705.6	-12.9	-431.4	51.5	1.31	0.21	-10.95
3,829.0	8.10	260.90	3,800.8	-15.4	-443.7	50.8	1.44	1.25	5.52
3,924.0	8.20	261.10	3,894.8	-17.5	-457.0	50.7	0.11	0.11	0.21
4,019.0	8.00	258.80	3,988.9	-19.9	-470.2	50.4	0.40	-0.21	-2.42
4,114.0	8.00	265.30	4,083.0	-21.7	-483.2	50.5	0.95	0.00	6.84
4,209.0	7.70	264.40	4,177.1	-22.8	-496.2	51.3	0.34	-0.32	-0.95
4,305.0	8.50	268.50	4,272.1	-23.7	-509.6	52.5	1.03	0.83	4.27
4,400.0	8.40	270.90	4,366.1	-23.7	-523.6	54.5	0.39	-0.11	2.53
4,495.0	8.10	270.80	4,460.1	-23.5	-537.2	56.7	0.32	-0.32	-0.11
4,590.0	7.80	268.70	4,554.2	-23.6	-550.4	58.6	0.44	-0.32	-2.21
4,685.0	7.70	267.60	4,648.3	-24.0	-563.2	60.1	0.19	-0.11	-1.16
4,781.0	7.40	271.50	4,743.5	-24.1	-575.8	61.9	0.62	-0.31	4.06
4,876.0	6.80	273.70	4,837.8	-23.6	-587.5	64.1	0.69	-0.63	2.32
4,971.0	7.30	270.40	4,932.0	-23.2	-599.2	66.3	0.68	0.53	-3.47
5,066.0	7.70	272.50	5,026.2	-22.9	-611.6	68.4	0.51	0.42	2.21
5,162.0	7.10	268.80	5,121.4	-22.7	-623.9	70.4	0.80	-0.63	-3.85
5,257.0	5.40	260.90	5,215.9	-23.5	-634.2	71.1	2.00	-1.79	-8.32
5,352.0	4.00	267.20	5,310.5	-24.4	-641.9	71.4	1.57	-1.47	6.63
5,447.0	1.90	265.70	5,405.4	-24.7	-646.8	71.9	2.21	-2.21	-1.58
5,543.0	1.70	267.60	5,501.4	-24.9	-649.8	72.2	0.22	-0.21	1.98
5,638.0	1.20	268.70	5,596.3	-24.9	-652.2	72.4	0.53	-0.53	1.16
5,733.0	1.10	274.50	5,691.3	-24.9	-654.1	72.8	0.16	-0.11	6.11
5,828.0	0.80	298.20	5,786.3	-24.5	-655.6	73.4	0.51	-0.32	24.95

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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)
5,924.0	1.10	309.80	5,882.3	-23.6	-656.9	74.5	0.37	0.31	12.08
5,987.0	0.90	283.80	5,945.3	-23.1	-657.9	75.1	0.78	-0.32	-41.27
6,018.0	0.80	294.10	5,976.3	-22.9	-658.3	75.3	0.59	-0.32	33.23
6,050.0	1.10	315.40	6,008.3	-22.6	-658.7	75.7	1.43	0.94	66.56
6,081.0	2.20	6.00	6,039.3	-21.8	-658.9	76.5	5.57	3.55	163.23
6,113.0	4.80	15.70	6,071.2	-19.9	-658.4	78.3	8.30	8.13	30.31
6,145.0	6.60	13.90	6,103.0	-16.9	-657.6	81.2	5.65	5.63	-5.63
6,176.0	8.60	7.60	6,133.8	-12.8	-656.9	85.1	6.98	6.45	-20.32
6,208.0	10.50	9.90	6,165.3	-7.6	-656.1	90.2	6.05	5.94	7.19
6,240.0	12.50	10.80	6,196.7	-1.3	-654.9	96.2	6.27	6.25	2.81
6,272.0	14.40	6.40	6,227.8	6.0	-653.8	103.3	6.74	5.94	-13.75
6,303.0	15.80	2.90	6,257.7	14.1	-653.2	111.2	5.39	4.52	-11.29
6,335.0	16.40	359.70	6,288.5	23.0	-653.0	119.9	3.35	1.88	-10.00
6,367.0	17.30	359.50	6,319.1	32.2	-653.1	129.1	2.82	2.81	-0.63
6,399.0	19.50	0.60	6,349.5	42.3	-653.0	139.1	6.96	6.88	3.44
6,430.0	22.20	3.70	6,378.4	53.4	-652.6	149.9	9.41	8.71	10.00
6,462.0	24.50	6.60	6,407.8	66.0	-651.5	162.2	8.03	7.19	9.06
6,494.0	26.40	9.00	6,436.7	79.6	-649.6	175.4	6.75	5.94	7.50
6,525.0	27.90	9.00	6,464.3	93.6	-647.4	188.9	4.84	4.84	0.00
6,557.0	30.60	9.60	6,492.2	109.0	-644.8	203.8	8.49	8.44	1.88
6,589.0	34.10	9.70	6,519.2	125.9	-642.0	220.0	10.94	10.94	0.31
6,621.0	37.80	11.10	6,545.1	144.4	-638.6	237.8	11.84	11.56	4.38
6,652.0	41.40	12.70	6,569.0	163.7	-634.5	256.3	12.07	11.61	5.16
6,684.0	45.10	13.80	6,592.3	185.0	-629.4	276.7	11.80	11.56	3.44
6,716.0	48.20	12.20	6,614.3	207.7	-624.2	298.3	10.35	9.69	-5.00
6,748.0	50.90	11.70	6,635.0	231.5	-619.2	321.1	8.52	8.44	-1.56
6,779.0	53.20	11.00	6,654.1	255.5	-614.4	344.1	7.63	7.42	-2.26
6,811.0	54.90	9.20	6,672.9	281.0	-609.8	368.6	7.00	5.31	-5.63
6,843.0	57.70	5.50	6,690.6	307.4	-606.4	394.2	13.00	8.75	-11.56
6,875.0	59.70	1.10	6,707.3	334.7	-604.9	421.0	13.31	6.25	-13.75
6,906.0	60.80	356.50	6,722.7	361.6	-605.5	447.7	13.36	3.55	-14.84
6,938.0	61.90	352.90	6,738.0	389.5	-608.0	475.7	10.45	3.44	-11.25
6,970.0	63.80	349.50	6,752.6	417.6	-612.4	504.1	11.16	5.94	-10.63
7,002.0	65.60	347.90	6,766.3	446.0	-618.1	533.0	7.22	5.63	-5.00
7,033.0	67.40	347.60	6,778.7	473.8	-624.1	561.4	5.87	5.81	-0.97
7,065.0	69.30	348.50	6,790.5	502.9	-630.3	591.1	6.49	5.94	2.81
7,097.0	70.90	349.50	6,801.3	532.4	-636.0	621.2	5.80	5.00	3.13
7,129.0	72.50	350.60	6,811.4	562.3	-641.3	651.5	5.97	5.00	3.44
7,160.0	75.00	350.70	6,820.1	591.7	-646.1	681.3	8.07	8.06	0.32
7,192.0	77.40	351.80	6,827.7	622.4	-650.8	712.4	8.21	7.50	3.44
7,224.0	79.70	353.40	6,834.1	653.5	-654.9	743.7	8.70	7.19	5.00
7,256.0	81.80	354.10	6,839.2	684.9	-658.3	775.3	6.91	6.56	2.19
7,275.0	82.90	354.80	6,841.7	703.7	-660.1	794.1	6.84	5.79	3.68
7,322.0	84.19	355.41	6,847.0	750.2	-664.1	840.7	3.04	2.75	1.31
7"									
7,344.0	84.80	355.70	6,849.1	772.0	-665.8	862.5	3.04	2.75	1.30
7,374.0	85.20	355.50	6,851.7	801.8	-668.1	892.3	1.49	1.33	-0.67
7,405.0	85.60	356.20	6,854.2	832.6	-670.3	923.1	2.59	1.29	2.26
7,435.0	86.20	356.40	6,856.4	862.5	-672.3	953.0	2.11	2.00	0.67
7,465.0	86.90	357.20	6,858.2	892.4	-673.9	982.8	3.54	2.33	2.67
7,557.0	93.50	0.20	6,857.8	984.3	-676.0	1,074.0	7.88	7.17	3.26
7,647.0	92.60	357.20	6,853.1	1,074.1	-678.1	1,163.1	3.48	-1.00	-3.33
7,738.0	91.30	357.40	6,850.0	1,165.0	-682.3	1,253.6	1.45	-1.43	0.22

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

Survey									
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7,829.0	91.50	359.20	6,847.7	1,255.9	-685.0	1,343.9	1.99	0.22	1.98
7,920.0	91.60	359.70	6,845.3	1,346.9	-685.9	1,434.0	0.56	0.11	0.55
8,015.0	92.40	359.50	6,842.0	1,441.8	-686.6	1,528.0	0.87	0.84	-0.21
8,110.0	91.90	359.90	6,838.4	1,536.8	-687.1	1,621.9	0.67	-0.53	0.42
8,205.0	92.20	359.00	6,835.0	1,631.7	-688.0	1,715.9	1.00	0.32	-0.95
8,301.0	90.90	359.20	6,832.4	1,727.6	-689.5	1,811.0	1.37	-1.35	0.21
8,396.0	91.40	358.10	6,830.5	1,822.6	-691.7	1,905.3	1.27	0.53	-1.16
8,491.0	89.30	358.70	6,829.9	1,917.5	-694.4	1,999.5	2.30	-2.21	0.63
8,586.0	88.50	359.20	6,831.7	2,012.5	-696.1	2,093.7	0.99	-0.84	0.53
8,682.0	90.10	359.40	6,832.9	2,108.5	-697.3	2,188.8	1.68	1.67	0.21
8,723.3	90.27	358.75	6,832.8	2,149.8	-698.0	2,229.8	1.63	0.42	-1.58
WP1									
8,777.0	90.50	357.90	6,832.4	2,203.5	-699.5	2,283.0	1.63	0.42	-1.58
8,872.0	89.80	359.20	6,832.2	2,298.4	-701.9	2,377.3	1.55	-0.74	1.37
8,967.0	90.10	357.90	6,832.3	2,393.4	-704.3	2,471.6	1.40	0.32	-1.37
9,063.0	90.20	359.40	6,832.0	2,489.4	-706.6	2,566.8	1.57	0.10	1.56
9,158.0	89.30	2.50	6,832.4	2,584.3	-705.0	2,660.5	3.40	-0.95	3.26
9,253.0	89.50	1.60	6,833.4	2,679.3	-701.6	2,753.9	0.97	0.21	-0.95
9,348.0	90.00	0.60	6,833.8	2,774.3	-699.8	2,847.5	1.18	0.53	-1.05
9,444.0	90.60	0.20	6,833.3	2,870.3	-699.1	2,942.3	0.75	0.63	-0.42
9,539.0	90.70	359.00	6,832.2	2,965.2	-699.8	3,036.4	1.27	0.11	-1.26
9,634.0	88.60	357.20	6,832.8	3,060.2	-702.9	3,130.7	2.91	-2.21	-1.89
9,729.0	89.30	358.10	6,834.6	3,155.1	-706.8	3,225.1	1.20	0.74	0.95
9,824.0	90.50	359.40	6,834.7	3,250.1	-708.9	3,319.4	1.86	1.26	1.37
9,919.0	90.60	1.80	6,833.8	3,345.0	-707.9	3,413.1	2.53	0.11	2.53
10,015.0	90.80	0.90	6,832.6	3,441.0	-705.7	3,507.7	0.96	0.21	-0.94
10,110.0	92.50	0.40	6,829.9	3,536.0	-704.6	3,601.4	1.87	1.79	-0.53
10,205.0	90.40	359.70	6,827.5	3,630.9	-704.5	3,695.3	2.33	-2.21	-0.74
10,300.0	87.90	357.80	6,828.9	3,725.9	-706.6	3,789.5	3.31	-2.63	-2.00
10,395.0	88.50	358.50	6,831.9	3,820.8	-709.6	3,883.8	0.97	0.63	0.74
10,491.0	88.50	358.50	6,834.4	3,916.7	-712.1	3,979.1	0.00	0.00	0.00
10,586.0	87.80	359.00	6,837.5	4,011.6	-714.2	4,073.3	0.91	-0.74	0.53
10,681.0	88.10	1.30	6,840.9	4,106.6	-714.0	4,167.1	2.44	0.32	2.42
10,776.0	90.60	1.10	6,842.0	4,201.5	-712.0	4,260.7	2.64	2.63	-0.21
10,872.0	92.70	359.70	6,839.2	4,297.5	-711.3	4,355.5	2.63	2.19	-1.46
10,967.0	92.60	358.80	6,834.8	4,392.4	-712.5	4,449.5	0.95	-0.11	-0.95
11,062.0	93.50	358.30	6,829.7	4,487.2	-714.9	4,543.6	1.08	0.95	-0.53
11,158.0	92.70	358.10	6,824.6	4,583.0	-718.0	4,638.8	0.86	-0.83	-0.21
11,213.0	93.60	357.60	6,821.5	4,637.9	-720.0	4,693.4	1.87	1.64	-0.91
11,265.0	93.60	357.60	6,818.3	4,689.7	-722.2	4,745.0	0.00	0.00	0.00
BHL 500' FNL, 1140' FEL									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,322.0	6,847.0	7"	7	7-1/2

Checked By: _____ Approved By: _____ Date: _____