

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Lofland 22D-232**

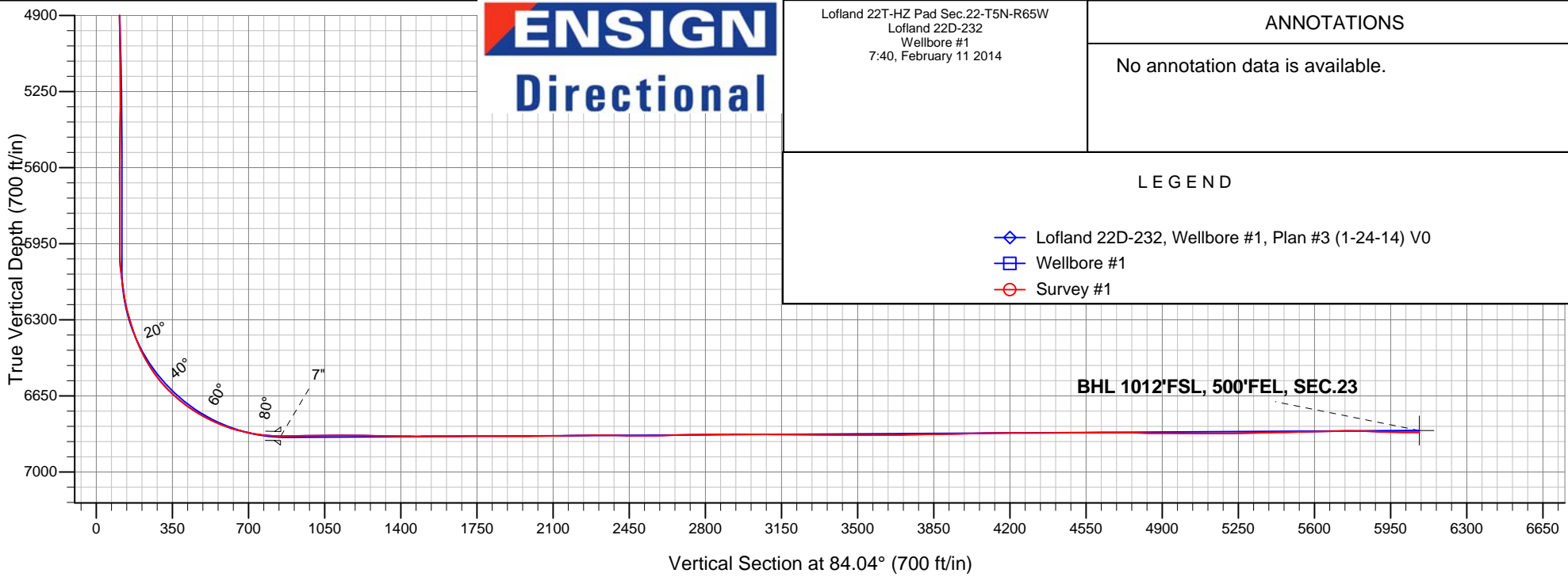
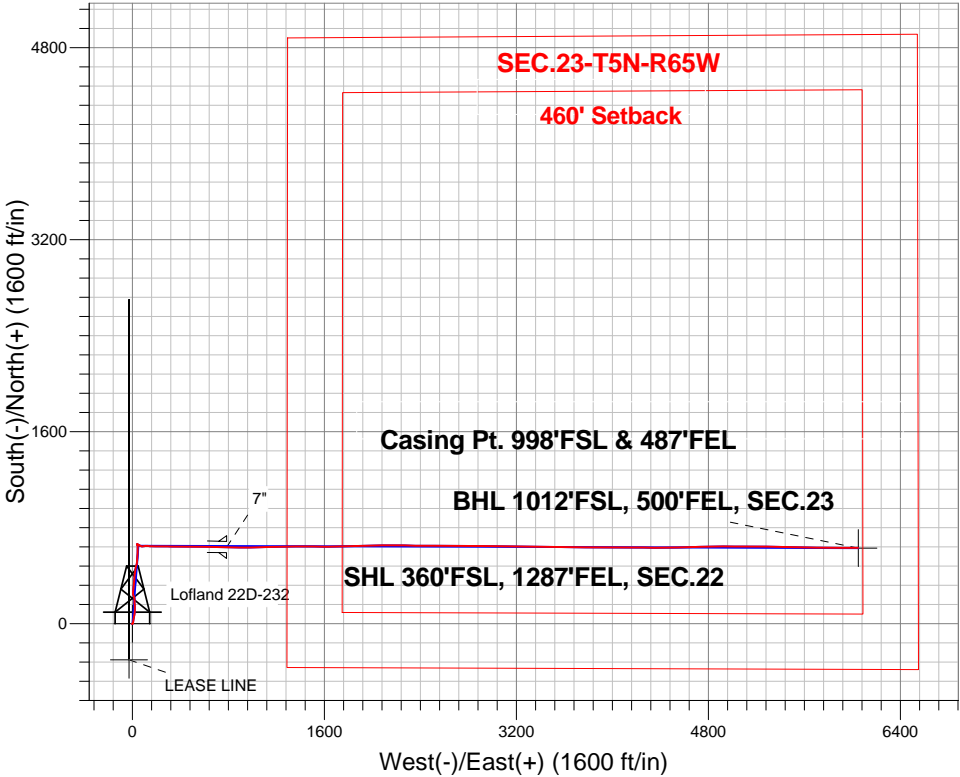
Surface Location: Lofland 22T-HZ Pad Sec.22-T5N-R65W  
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4647.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1381877.64	3238329.12	40.378500	-104.644530	
Ensign Rig #14 - RKB - 15' WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')						

FINAL SURVEY

Projected Bottom Hole Location  
12566'MD 6818'TVD 633'N & 6048'E of SHL  
89.6 degree Incl @ 89.5 degree AZM





# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.22-T5N-R65W**

**Lofland 22T-HZ Pad Sec.22-T5N-R65W**

**Lofland 22D-232**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**11 February, 2014**

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Lofland 22D-232
<b>Project:</b>	SEC.22-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')
<b>Site:</b>	Lofland 22T-HZ Pad Sec.22-T5N-R65W	<b>MD Reference:</b>	WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')
<b>Well:</b>	Lofland 22D-232	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

<b>Project</b>	SEC.22-T5N-R65W, Weld County, Colorado		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

Site	Lofland 22T-HZ Pad Sec.22-T5N-R65W				
Site Position:		Northing:	1,381,877.65 ft	Latitude:	40.378500
From:	Lat/Long	Easting:	3,238,329.12 ft	Longitude:	-104.644530
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.55 °

Well	Lofland 22D-232					
Well Position	+N-S	0.0 ft	Northing:	1,381,877.64 ft	Latitude:	40.378500
	+E-W	0.0 ft	Easting:	3,238,329.12 ft	Longitude:	-104.644530
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,647.0 ft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	1/2/2014	8.45	66.96	52,865

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	84.04	

<b>Survey Program</b>	<b>Date</b>	2/11/2014			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
122.0	12,566.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
1.0	0.00	177.40	1.0	0.0	0.0	0.0	0.16	0.16	0.00	
<b>SHL 360°FSL, 1287°FEL, SEC.22</b>										
3.5	0.01	177.40	3.5	0.0	0.0	0.0	0.16	0.16	0.00	
<b>LEASE LINE</b>										
122.0	0.20	177.40	122.0	-0.2	0.0	0.0	0.16	0.16	0.00	
186.0	0.20	264.60	186.0	-0.3	-0.1	-0.1	0.43	0.00	136.25	
249.0	0.50	195.10	249.0	-0.6	-0.3	-0.3	0.74	0.48	-110.32	
345.0	0.40	46.10	345.0	-0.8	-0.1	-0.2	0.90	-0.10	-155.21	
439.0	1.70	20.20	439.0	0.8	0.6	0.6	1.44	1.38	-27.55	
531.0	2.60	25.70	530.9	3.9	1.9	2.3	1.00	0.98	5.98	
628.0	3.50	15.30	627.8	8.8	3.7	4.6	1.09	0.93	-10.72	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Lofland 22D-232
<b>Project:</b>	SEC.22-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')
<b>Site:</b>	Lofland 22T-HZ Pad Sec.22-T5N-R65W	<b>MD Reference:</b>	WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')
<b>Well:</b>	Lofland 22D-232	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
721.0	5.00	12.30	720.5	15.5	5.3	6.9	1.63	1.61	-3.23
817.0	5.40	13.70	816.1	23.9	7.3	9.7	0.44	0.42	1.46
894.0	6.50	10.60	892.7	31.7	8.9	12.2	1.49	1.43	-4.03
972.0	6.60	3.00	970.2	40.5	10.0	14.1	1.12	0.13	-9.74
1,066.0	8.10	9.70	1,063.4	52.5	11.4	16.7	1.84	1.60	7.13
1,225.0	8.10	8.60	1,220.8	74.6	14.9	22.6	0.10	0.00	-0.69
1,351.0	8.20	11.80	1,345.6	92.2	18.1	27.6	0.37	0.08	2.54
1,502.0	6.20	351.60	1,495.4	110.8	19.1	30.5	2.12	-1.32	-13.38
1,654.0	6.20	5.50	1,646.5	127.1	18.7	31.8	0.99	0.00	9.14
1,745.0	7.30	1.20	1,736.9	137.7	19.3	33.5	1.33	1.21	-4.73
1,836.0	7.70	357.20	1,827.1	149.6	19.1	34.5	0.72	0.44	-4.40
1,927.0	7.70	354.20	1,917.3	161.8	18.2	34.9	0.44	0.00	-3.30
2,018.0	7.00	1.80	2,007.5	173.4	17.7	35.6	1.31	-0.77	8.35
2,110.0	8.70	0.50	2,098.7	185.9	18.0	37.2	1.86	1.85	-1.41
2,202.0	9.80	356.70	2,189.5	200.7	17.6	38.3	1.37	1.20	-4.13
2,354.0	7.10	335.40	2,339.8	222.2	12.9	35.9	2.69	-1.78	-14.01
2,445.0	8.10	340.10	2,430.0	233.3	8.4	32.6	1.29	1.10	5.16
2,538.0	8.00	349.60	2,522.1	245.8	5.0	30.5	1.43	-0.11	10.22
2,665.0	8.90	5.60	2,647.8	264.3	4.4	31.8	1.97	0.71	12.60
2,823.0	10.70	7.70	2,803.5	291.0	7.5	37.7	1.16	1.14	1.33
2,981.0	10.50	3.20	2,958.8	319.9	10.3	43.4	0.54	-0.13	-2.85
3,140.0	9.10	8.60	3,115.4	346.8	13.0	48.9	1.05	-0.88	3.40
3,298.0	8.20	4.20	3,271.6	370.4	15.7	54.0	0.71	-0.57	-2.78
3,457.0	7.80	2.50	3,429.1	392.5	17.0	57.6	0.29	-0.25	-1.07
3,616.0	8.00	5.50	3,586.6	414.3	18.5	61.4	0.29	0.13	1.89
3,775.0	10.00	9.70	3,743.6	438.9	21.9	67.3	1.32	1.26	2.64
3,934.0	11.20	13.50	3,899.9	467.5	27.8	76.2	0.87	0.75	2.39
4,094.0	9.10	12.10	4,057.4	495.0	34.1	85.3	1.32	-1.31	-0.88
4,252.0	9.10	6.70	4,213.4	519.7	38.2	91.9	0.54	0.00	-3.42
4,410.0	7.50	3.50	4,369.8	542.4	40.3	96.3	1.05	-1.01	-2.03
4,569.0	6.90	358.30	4,527.5	562.3	40.6	98.8	0.56	-0.38	-3.27
4,727.0	8.80	5.10	4,684.0	583.8	41.4	101.8	1.34	1.20	4.30
4,885.0	7.70	1.40	4,840.4	606.4	42.8	105.5	0.77	-0.70	-2.34
5,013.0	6.80	0.20	4,967.4	622.6	43.0	107.4	0.71	-0.70	-0.94
5,173.0	4.40	5.30	5,126.6	638.1	43.6	109.6	1.53	-1.50	3.19
5,332.0	4.20	351.80	5,285.1	650.0	43.3	110.5	0.65	-0.13	-8.49
5,460.0	2.10	324.90	5,412.9	656.5	41.3	109.2	1.96	-1.64	-21.02
5,620.0	0.60	349.10	5,572.9	659.8	39.5	107.7	0.98	-0.94	15.13
5,779.0	0.90	341.60	5,731.9	661.8	38.9	107.4	0.20	0.19	-4.72
5,938.0	0.50	152.90	5,890.9	662.3	38.8	107.4	0.88	-0.25	107.74
6,003.0	0.70	188.80	5,955.9	661.7	38.9	107.4	0.64	0.31	55.23
6,034.0	1.00	165.60	5,986.9	661.2	38.9	107.3	1.45	0.97	-74.84
6,066.0	2.30	109.70	6,018.9	660.7	39.6	108.0	6.02	4.06	-174.69
6,098.0	5.00	99.20	6,050.8	660.3	41.6	109.9	8.66	8.44	-32.81
6,130.0	8.00	95.80	6,082.6	659.9	45.2	113.4	9.45	9.38	-10.63
6,161.0	8.50	111.46	6,113.3	658.8	49.5	117.6	7.40	1.61	50.52
6,194.0	9.10	129.60	6,145.9	656.2	53.8	121.6	8.57	1.82	54.97
6,226.0	10.40	125.30	6,177.4	653.0	58.1	125.5	4.65	4.06	-13.44
6,257.0	12.60	118.80	6,207.8	649.7	63.3	130.4	8.23	7.10	-20.97
6,289.0	14.10	108.50	6,238.9	646.8	70.1	136.8	8.77	4.69	-32.19
6,321.0	15.30	94.90	6,269.9	645.2	78.0	144.5	11.39	3.75	-42.50
6,352.0	16.50	81.20	6,299.7	645.5	86.4	152.9	12.68	3.87	-44.19
6,382.0	17.90	82.60	6,328.4	646.8	95.2	161.8	4.87	4.67	4.67
6,416.0	19.30	87.60	6,360.6	647.7	106.0	172.6	6.24	4.12	14.71

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Lofland 22D-232
<b>Project:</b>	SEC.22-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')
<b>Site:</b>	Lofland 22T-HZ Pad Sec.22-T5N-R65W	<b>MD Reference:</b>	WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')
<b>Well:</b>	Lofland 22D-232	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
6,448.0	21.30	90.90	6,390.6	647.8	117.1	183.7	7.20	6.25	10.31
6,480.0	23.90	91.90	6,420.2	647.5	129.4	195.9	8.21	8.13	3.13
6,511.0	26.40	92.30	6,448.2	647.0	142.5	208.9	8.08	8.06	1.29
6,543.0	28.80	92.30	6,476.6	646.4	157.3	223.6	7.50	7.50	0.00
6,575.0	31.10	91.20	6,504.3	645.9	173.3	239.4	7.39	7.19	-3.44
6,606.0	33.50	91.20	6,530.5	645.6	189.9	255.8	7.74	7.74	0.00
6,638.0	36.60	90.00	6,556.7	645.4	208.2	274.1	9.92	9.69	-3.75
6,669.0	39.70	89.70	6,581.1	645.5	227.4	293.1	10.02	10.00	-0.97
6,701.0	43.10	90.40	6,605.1	645.4	248.5	314.2	10.72	10.63	2.19
6,733.0	45.70	91.20	6,627.9	645.1	270.9	336.4	8.31	8.13	2.50
6,765.0	47.90	92.10	6,649.8	644.5	294.2	359.5	7.17	6.88	2.81
6,796.0	50.60	91.90	6,670.1	643.6	317.7	382.8	8.72	8.71	-0.65
6,828.0	53.40	90.70	6,689.8	643.1	342.9	407.8	9.24	8.75	-3.75
6,860.0	56.10	89.70	6,708.2	643.0	369.1	433.8	8.81	8.44	-3.13
6,891.0	58.20	89.10	6,725.1	643.3	395.1	459.7	6.97	6.77	-1.94
6,923.0	60.80	89.00	6,741.3	643.7	422.7	487.2	8.13	8.13	-0.31
6,955.0	63.50	90.50	6,756.2	643.8	450.9	515.3	9.40	8.44	4.69
6,986.0	65.90	91.40	6,769.5	643.4	479.0	543.1	8.17	7.74	2.90
7,018.0	68.10	92.10	6,782.0	642.5	508.4	572.3	7.16	6.88	2.19
7,050.0	70.80	91.90	6,793.2	641.4	538.4	602.0	8.46	8.44	-0.63
7,081.0	73.70	91.20	6,802.7	640.6	567.9	631.3	9.60	9.35	-2.26
7,113.0	76.20	90.70	6,811.0	640.1	598.8	661.9	7.96	7.81	-1.56
7,145.0	77.90	90.70	6,818.2	639.7	629.9	692.9	5.31	5.31	0.00
7,177.0	80.20	90.40	6,824.2	639.4	661.4	724.1	7.25	7.19	-0.94
7,208.0	82.70	90.70	6,828.8	639.1	692.0	754.6	8.12	8.06	0.97
7,240.0	85.20	90.40	6,832.2	638.8	723.8	786.2	7.87	7.81	-0.94
7,266.0	87.40	90.70	6,833.9	638.6	749.8	812.0	8.54	8.46	1.15
7,302.0	89.42	90.70	6,834.9	638.1	785.7	847.7	5.60	5.60	0.00
7"									
7,316.0	90.20	90.70	6,834.9	638.0	799.7	861.6	5.60	5.60	0.00
7,346.0	90.60	90.90	6,834.7	637.5	829.7	891.4	1.49	1.33	0.67
7,377.0	90.90	91.60	6,834.3	636.9	860.7	922.2	2.46	0.97	2.26
7,407.0	91.40	91.80	6,833.7	636.0	890.7	951.9	1.80	1.67	0.67
7,438.0	91.60	91.10	6,832.9	635.2	921.7	982.6	2.35	0.65	-2.26
7,469.0	90.30	90.00	6,832.4	634.9	952.7	1,013.4	5.49	-4.19	-3.55
7,499.0	89.70	89.30	6,832.4	635.1	982.7	1,043.3	3.07	-2.00	-2.33
7,529.0	90.20	88.40	6,832.4	635.7	1,012.7	1,073.2	3.43	1.67	-3.00
7,560.0	91.00	87.90	6,832.1	636.7	1,043.7	1,104.1	3.04	2.58	-1.61
7,590.0	90.40	87.70	6,831.7	637.8	1,073.6	1,134.0	2.11	-2.00	-0.67
7,620.0	89.40	88.10	6,831.8	638.9	1,103.6	1,164.0	3.59	-3.33	1.33
7,651.0	89.20	88.80	6,832.2	639.8	1,134.6	1,194.9	2.35	-0.65	2.26
7,681.0	89.00	89.00	6,832.6	640.3	1,164.6	1,224.8	0.94	-0.67	0.67
7,712.0	89.10	89.10	6,833.1	640.9	1,195.6	1,255.6	0.46	0.32	0.32
7,742.0	89.10	89.00	6,833.6	641.4	1,225.6	1,285.5	0.33	0.00	-0.33
7,773.0	89.20	88.60	6,834.1	642.0	1,256.6	1,316.4	1.33	0.32	-1.29
7,803.0	89.10	88.60	6,834.5	642.7	1,286.6	1,346.3	0.33	-0.33	0.00
7,834.0	89.00	88.60	6,835.0	643.5	1,317.5	1,377.2	0.32	-0.32	0.00
7,864.0	89.10	88.60	6,835.5	644.2	1,347.5	1,407.1	0.33	0.33	0.00
7,895.0	89.20	88.80	6,836.0	644.9	1,378.5	1,438.0	0.72	0.32	0.65
7,925.0	89.70	90.40	6,836.3	645.1	1,408.5	1,467.9	5.59	1.67	5.33
7,956.0	90.70	91.90	6,836.2	644.5	1,439.5	1,498.6	5.82	3.23	4.84
7,986.0	90.70	92.10	6,835.8	643.5	1,469.5	1,528.3	0.67	0.00	0.67
8,017.0	90.40	89.50	6,835.5	643.0	1,500.5	1,559.1	8.44	-0.97	-8.39

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<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)	
8,048.0	89.80	89.70	6,835.5	643.3	1,531.5	1,590.0	2.04	-1.94	0.65	
8,078.0	90.30	91.10	6,835.4	643.1	1,561.5	1,619.8	4.96	1.67	4.67	
8,109.0	90.70	92.10	6,835.2	642.2	1,592.5	1,650.5	3.47	1.29	3.23	
8,139.0	90.50	91.80	6,834.8	641.2	1,622.4	1,680.2	1.20	-0.67	-1.00	
8,170.0	90.10	89.10	6,834.7	640.9	1,653.4	1,711.0	8.80	-1.29	-8.71	
8,200.0	89.60	88.10	6,834.8	641.7	1,683.4	1,740.9	3.73	-1.67	-3.33	
8,231.0	89.50	88.10	6,835.0	642.7	1,714.4	1,771.8	0.32	-0.32	0.00	
8,261.0	89.30	87.90	6,835.3	643.7	1,744.4	1,801.8	0.94	-0.67	-0.67	
8,291.0	89.30	87.70	6,835.7	644.9	1,774.4	1,831.7	0.67	0.00	-0.67	
8,322.0	89.80	87.90	6,835.9	646.1	1,805.3	1,862.6	1.74	1.61	0.65	
8,352.0	89.80	88.10	6,836.0	647.1	1,835.3	1,892.6	0.67	0.00	0.67	
8,382.0	90.00	88.10	6,836.1	648.1	1,865.3	1,922.5	0.67	0.67	0.00	
8,413.0	90.10	87.70	6,836.1	649.2	1,896.3	1,953.4	1.33	0.32	-1.29	
8,443.0	90.80	87.40	6,835.8	650.5	1,926.3	1,983.4	2.54	2.33	-1.00	
8,474.0	90.80	87.90	6,835.4	651.8	1,957.2	2,014.3	1.61	0.00	1.61	
8,504.0	90.50	88.80	6,835.0	652.7	1,987.2	2,044.2	3.16	-1.00	3.00	
8,534.0	90.70	89.00	6,834.7	653.2	2,017.2	2,074.1	0.94	0.67	0.67	
8,565.0	90.60	88.80	6,834.4	653.8	2,048.2	2,105.0	0.72	-0.32	-0.65	
8,595.0	90.80	89.70	6,834.0	654.2	2,078.2	2,134.9	3.07	0.67	3.00	
8,625.0	91.40	90.40	6,833.4	654.2	2,108.2	2,164.7	3.07	2.00	2.33	
8,656.0	91.50	90.90	6,832.7	653.9	2,139.2	2,195.5	1.64	0.32	1.61	
8,686.0	91.50	90.90	6,831.9	653.4	2,169.2	2,225.2	0.00	0.00	0.00	
8,717.0	91.00	91.20	6,831.2	652.8	2,200.1	2,256.0	1.88	-1.61	0.97	
8,749.0	90.00	91.10	6,830.9	652.2	2,232.1	2,287.8	3.14	-3.13	-0.31	
8,780.0	89.30	91.10	6,831.1	651.6	2,263.1	2,318.5	2.26	-2.26	0.00	
8,812.0	89.00	90.70	6,831.6	651.1	2,295.1	2,350.3	1.56	-0.94	-1.25	
8,844.0	89.50	90.50	6,832.0	650.7	2,327.1	2,382.1	1.68	1.56	-0.63	
8,875.0	89.10	90.40	6,832.4	650.5	2,358.1	2,412.9	1.33	-1.29	-0.32	
8,907.0	89.10	90.20	6,832.9	650.3	2,390.1	2,444.7	0.62	0.00	-0.63	
8,939.0	89.60	89.80	6,833.2	650.3	2,422.1	2,476.5	2.00	1.56	-1.25	
8,971.0	90.20	89.70	6,833.3	650.5	2,454.1	2,508.4	1.90	1.88	-0.31	
9,002.0	90.20	90.70	6,833.2	650.4	2,485.1	2,539.2	3.23	0.00	3.23	
9,034.0	90.60	90.50	6,833.0	650.0	2,517.1	2,571.0	1.40	1.25	-0.63	
9,065.0	91.00	90.20	6,832.5	649.8	2,548.1	2,601.8	1.61	1.29	-0.97	
9,098.0	91.30	90.20	6,831.9	649.7	2,581.1	2,634.6	0.91	0.91	0.00	
9,129.0	91.70	91.10	6,831.1	649.4	2,612.1	2,665.4	3.18	1.29	2.90	
9,161.0	92.20	91.20	6,830.0	648.7	2,644.1	2,697.1	1.59	1.56	0.31	
9,193.0	91.50	90.40	6,828.9	648.3	2,676.0	2,728.9	3.32	-2.19	-2.50	
9,224.0	91.40	89.80	6,828.2	648.2	2,707.0	2,759.7	1.96	-0.32	-1.94	
9,256.0	90.70	89.80	6,827.6	648.3	2,739.0	2,791.5	2.19	-2.19	0.00	
9,288.0	90.70	89.70	6,827.2	648.5	2,771.0	2,823.4	0.31	0.00	-0.31	
9,319.0	90.50	90.00	6,826.9	648.6	2,802.0	2,854.2	1.16	-0.65	0.97	
9,351.0	89.90	90.70	6,826.7	648.4	2,834.0	2,886.0	2.88	-1.88	2.19	
9,382.0	90.00	90.90	6,826.8	647.9	2,865.0	2,916.8	0.72	0.32	0.65	
9,414.0	89.90	90.20	6,826.8	647.6	2,897.0	2,948.6	2.21	-0.31	-2.19	
9,444.0	90.00	90.00	6,826.8	647.6	2,927.0	2,978.4	0.75	0.33	-0.67	
9,477.0	90.00	90.70	6,826.8	647.4	2,960.0	3,011.2	2.12	0.00	2.12	
9,508.0	89.80	91.80	6,826.9	646.7	2,991.0	3,042.0	3.61	-0.65	3.55	
9,540.0	89.70	91.60	6,827.0	645.7	3,023.0	3,073.7	0.70	-0.31	-0.63	
9,571.0	89.80	91.20	6,827.1	645.0	3,054.0	3,104.4	1.33	0.32	-1.29	
9,603.0	89.80	90.70	6,827.3	644.5	3,086.0	3,136.2	1.56	0.00	-1.56	
9,635.0	89.50	90.70	6,827.5	644.1	3,118.0	3,168.0	0.94	-0.94	0.00	
9,666.0	88.90	90.90	6,827.9	643.6	3,149.0	3,198.8	2.04	-1.94	0.65	
9,698.0	88.60	90.70	6,828.6	643.2	3,181.0	3,230.5	1.13	-0.94	-0.63	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Lofland 22D-232
<b>Project:</b>	SEC.22-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')
<b>Site:</b>	Lofland 22T-HZ Pad Sec.22-T5N-R65W	<b>MD Reference:</b>	WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')
<b>Well:</b>	Lofland 22D-232	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
9,729.0	89.50	91.10	6,829.1	642.7	3,211.9	3,261.3	3.18	2.90	1.29
9,761.0	90.10	91.10	6,829.2	642.1	3,243.9	3,293.1	1.88	1.88	0.00
9,793.0	90.20	90.70	6,829.1	641.6	3,275.9	3,324.8	1.29	0.31	-1.25
9,824.0	89.70	90.00	6,829.2	641.4	3,306.9	3,355.6	2.77	-1.61	-2.26
9,856.0	89.20	89.30	6,829.5	641.6	3,338.9	3,387.5	2.69	-1.56	-2.19
9,888.0	88.90	89.30	6,830.0	642.0	3,370.9	3,419.3	0.94	-0.94	0.00
9,919.0	89.80	90.50	6,830.3	642.0	3,401.9	3,450.2	4.84	2.90	3.87
9,951.0	90.60	90.90	6,830.2	641.6	3,433.9	3,482.0	2.80	2.50	1.25
9,983.0	90.50	90.40	6,829.9	641.3	3,465.9	3,513.7	1.59	-0.31	-1.56
10,014.0	90.40	90.40	6,829.7	641.1	3,496.9	3,544.6	0.32	-0.32	0.00
10,046.0	90.30	90.50	6,829.5	640.8	3,528.9	3,576.4	0.44	-0.31	0.31
10,078.0	90.00	90.20	6,829.4	640.6	3,560.9	3,608.2	1.33	-0.94	-0.94
10,110.0	89.80	90.20	6,829.5	640.5	3,592.9	3,640.0	0.63	-0.63	0.00
10,142.0	90.10	91.40	6,829.5	640.1	3,624.9	3,671.8	3.87	0.94	3.75
10,173.0	90.80	91.80	6,829.2	639.2	3,655.9	3,702.5	2.60	2.26	1.29
10,205.0	91.20	91.60	6,828.7	638.2	3,687.9	3,734.2	1.40	1.25	-0.63
10,237.0	91.10	91.40	6,828.0	637.4	3,719.9	3,765.9	0.70	-0.31	-0.63
10,268.0	91.10	91.10	6,827.4	636.7	3,750.8	3,796.7	0.97	0.00	-0.97
10,300.0	90.80	90.70	6,826.9	636.2	3,782.8	3,828.4	1.56	-0.94	-1.25
10,332.0	90.80	90.40	6,826.5	635.9	3,814.8	3,860.2	0.94	0.00	-0.94
10,363.0	90.90	90.50	6,826.0	635.7	3,845.8	3,891.0	0.46	0.32	0.32
10,395.0	91.00	90.20	6,825.5	635.5	3,877.8	3,922.8	0.99	0.31	-0.94
10,427.0	91.40	90.40	6,824.8	635.3	3,909.8	3,954.6	1.40	1.25	0.63
10,458.0	91.30	89.50	6,824.1	635.3	3,940.8	3,985.5	2.92	-0.32	-2.90
10,490.0	91.30	90.00	6,823.4	635.5	3,972.8	4,017.3	1.56	0.00	1.56
10,522.0	91.20	89.80	6,822.7	635.5	4,004.8	4,049.1	0.70	-0.31	-0.63
10,553.0	91.30	89.70	6,822.0	635.7	4,035.8	4,080.0	0.46	0.32	-0.32
10,585.0	91.10	90.20	6,821.3	635.7	4,067.8	4,111.8	1.68	-0.63	1.56
10,617.0	90.40	90.20	6,820.9	635.6	4,099.8	4,143.6	2.19	-2.19	0.00
10,648.0	90.00	90.20	6,820.8	635.5	4,130.8	4,174.4	1.29	-1.29	0.00
10,680.0	90.00	89.80	6,820.8	635.5	4,162.8	4,206.2	1.25	0.00	-1.25
10,712.0	90.00	89.70	6,820.8	635.6	4,194.8	4,238.1	0.31	0.00	-0.31
10,744.0	90.20	90.70	6,820.7	635.5	4,226.8	4,269.9	3.19	0.63	3.13
10,775.0	90.30	91.20	6,820.6	635.0	4,257.8	4,300.7	1.64	0.32	1.61
10,807.0	90.40	90.40	6,820.4	634.5	4,289.8	4,332.4	2.52	0.31	-2.50
10,839.0	90.40	90.40	6,820.2	634.3	4,321.8	4,364.3	0.00	0.00	0.00
10,870.0	90.50	90.70	6,819.9	634.0	4,352.8	4,395.1	1.02	0.32	0.97
10,902.0	90.70	90.90	6,819.6	633.6	4,384.8	4,426.8	0.88	0.63	0.63
10,932.0	90.20	90.20	6,819.4	633.3	4,414.8	4,456.6	2.87	-1.67	-2.33
10,965.0	89.70	89.00	6,819.4	633.5	4,447.7	4,489.5	3.94	-1.52	-3.64
10,997.0	89.60	88.30	6,819.6	634.3	4,479.7	4,521.4	2.21	-0.31	-2.19
11,028.0	90.00	88.60	6,819.7	635.1	4,510.7	4,552.3	1.61	1.29	0.97
11,060.0	90.60	88.80	6,819.5	635.8	4,542.7	4,584.2	1.98	1.88	0.63
11,092.0	91.20	89.00	6,819.0	636.4	4,574.7	4,616.1	1.98	1.88	0.63
11,124.0	90.60	88.60	6,818.5	637.1	4,606.7	4,647.9	2.25	-1.88	-1.25
11,155.0	89.50	88.30	6,818.5	638.0	4,637.7	4,678.8	3.68	-3.55	-0.97
11,187.0	89.10	88.40	6,818.9	638.9	4,669.7	4,710.8	1.29	-1.25	0.31
11,218.0	89.00	88.40	6,819.4	639.7	4,700.7	4,741.7	0.32	-0.32	0.00
11,250.0	88.70	87.90	6,820.0	640.8	4,732.6	4,773.6	1.82	-0.94	-1.56
11,281.0	88.50	88.10	6,820.8	641.9	4,763.6	4,804.5	0.91	-0.65	0.65
11,313.0	88.80	88.60	6,821.5	642.8	4,795.6	4,836.4	1.82	0.94	1.56
11,345.0	89.80	89.10	6,821.9	643.4	4,827.6	4,868.3	3.49	3.13	1.56
11,377.0	90.10	88.80	6,822.0	644.0	4,859.6	4,900.2	1.33	0.94	-0.94

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Lofland 22D-232
<b>Project:</b>	SEC.22-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')
<b>Site:</b>	Lofland 22T-HZ Pad Sec.22-T5N-R65W	<b>MD Reference:</b>	WELL @ 4662.0ft (Ensign Rig #14 - RKB - 15')
<b>Well:</b>	Lofland 22D-232	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
11,409.0	90.30	89.00	6,821.9	644.6	4,891.6	4,932.0	0.88	0.63	0.63
11,441.0	90.00	90.00	6,821.8	644.9	4,923.6	4,963.9	3.26	-0.94	3.13
11,472.0	89.40	90.90	6,821.9	644.7	4,954.6	4,994.7	3.49	-1.94	2.90
11,504.0	89.60	90.90	6,822.2	644.2	4,986.6	5,026.5	0.63	0.63	0.00
11,536.0	89.70	90.70	6,822.4	643.7	5,018.5	5,058.3	0.70	0.31	-0.63
11,567.0	90.00	90.40	6,822.5	643.4	5,049.5	5,089.1	1.37	0.97	-0.97
11,599.0	90.20	90.20	6,822.4	643.2	5,081.5	5,120.9	0.88	0.63	-0.63
11,631.0	90.30	89.70	6,822.3	643.3	5,113.5	5,152.7	1.59	0.31	-1.56
11,662.0	90.20	90.00	6,822.2	643.4	5,144.5	5,183.5	1.02	-0.32	0.97
11,694.0	90.40	90.40	6,822.0	643.2	5,176.5	5,215.3	1.40	0.63	1.25
11,726.0	90.20	91.10	6,821.8	642.8	5,208.5	5,247.1	2.28	-0.63	2.19
11,757.0	90.50	91.10	6,821.6	642.2	5,239.5	5,277.9	0.97	0.97	0.00
11,789.0	91.00	90.70	6,821.2	641.7	5,271.5	5,309.7	2.00	1.56	-1.25
11,821.0	91.50	90.50	6,820.5	641.4	5,303.5	5,341.4	1.68	1.56	-0.63
11,852.0	92.00	90.40	6,819.6	641.1	5,334.5	5,372.2	1.64	1.61	-0.32
11,884.0	91.60	90.50	6,818.6	640.9	5,366.5	5,404.0	1.29	-1.25	0.31
11,915.0	90.70	91.10	6,817.9	640.5	5,397.5	5,434.8	3.49	-2.90	1.94
11,947.0	90.70	91.40	6,817.6	639.8	5,429.5	5,466.5	0.94	0.00	0.94
11,979.0	91.20	91.10	6,817.0	639.1	5,461.5	5,498.3	1.82	1.56	-0.94
12,011.0	91.30	90.50	6,816.3	638.6	5,493.4	5,530.1	1.90	0.31	-1.88
12,042.0	91.50	90.20	6,815.6	638.4	5,524.4	5,560.9	1.16	0.65	-0.97
12,074.0	91.70	90.70	6,814.7	638.2	5,556.4	5,592.6	1.68	0.63	1.56
12,106.0	91.50	91.60	6,813.8	637.5	5,588.4	5,624.4	2.88	-0.63	2.81
12,137.0	91.40	91.80	6,813.0	636.6	5,619.4	5,655.1	0.72	-0.32	0.65
12,169.0	91.60	91.60	6,812.2	635.7	5,651.4	5,686.8	0.88	0.63	-0.63
12,201.0	91.30	91.40	6,811.3	634.8	5,683.3	5,718.5	1.13	-0.94	-0.63
12,233.0	89.70	91.40	6,811.1	634.1	5,715.3	5,750.3	5.00	-5.00	0.00
12,264.0	88.40	91.40	6,811.6	633.3	5,746.3	5,781.0	4.19	-4.19	0.00
12,296.0	88.10	91.10	6,812.6	632.6	5,778.3	5,812.7	1.33	-0.94	-0.94
12,328.0	88.20	90.70	6,813.6	632.1	5,810.3	5,844.5	1.29	0.31	-1.25
12,360.0	88.40	90.40	6,814.5	631.8	5,842.2	5,876.3	1.13	0.63	-0.94
12,391.0	88.60	90.20	6,815.4	631.6	5,873.2	5,907.1	0.91	0.65	-0.65
12,423.0	88.60	89.80	6,816.1	631.6	5,905.2	5,938.9	1.25	0.00	-1.25
12,455.0	88.90	89.50	6,816.8	631.8	5,937.2	5,970.7	1.33	0.94	-0.94
12,486.0	89.20	89.50	6,817.3	632.1	5,968.2	6,001.6	0.97	0.97	0.00
12,511.0	89.60	89.50	6,817.6	632.3	5,993.2	6,026.5	1.60	1.60	0.00
12,566.0	89.60	89.50	6,818.0	632.8	6,048.2	6,081.2	0.00	0.00	0.00
BHL 1010'FSL, 500'FEL, SEC.23									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,302.0	6,834.9	7"	7	7-1/2

Checked By: _____	Approved By: _____	Date: _____
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