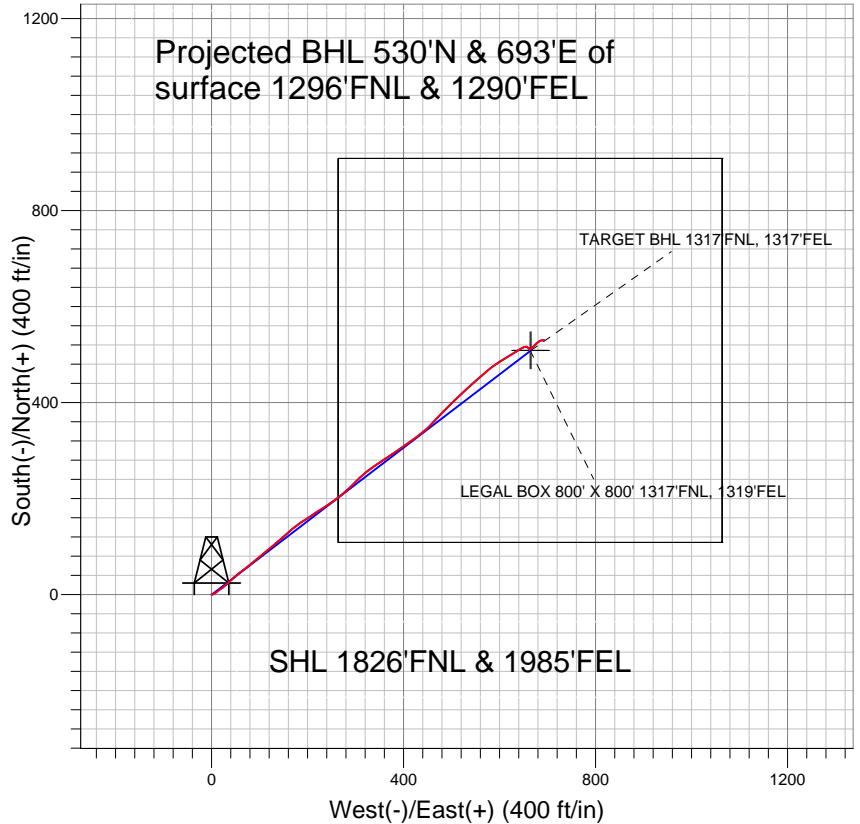
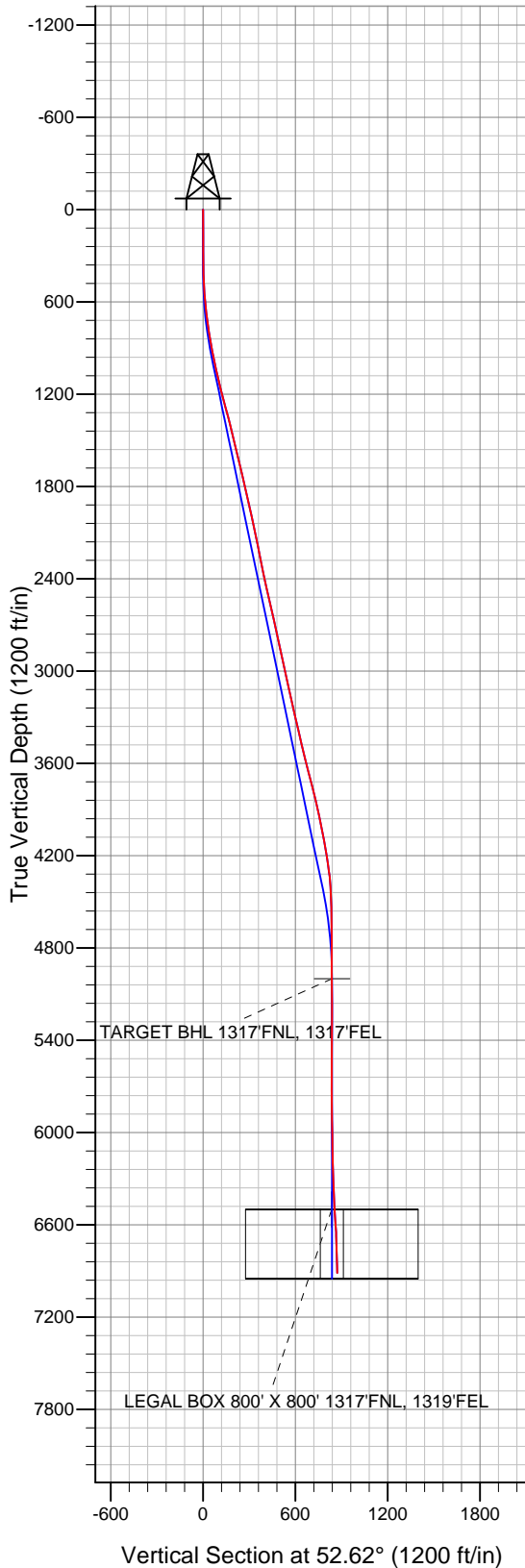


## PETROLEUM DEVELOPMENT CORP Weld County CO



### LEGEND

- ✕ P&H 22CD, Wellbore #1, Plan #2 (11-12-10) V0
- Wellbore #1
- Survey #1

## Final Survey Plot

Projected Final Survey -  
 7004'MD & 6913'TVD @ 872' VS  
 1.8 deg Inc 94.0 deg AZ

Project: SEC.22-T5N-R64W  
 Site: P&H 22CD Pad Sec.22-T5N-R64W  
 Well: P&H 22CD  
 Plan: Wellbore #1



## **Directional**

# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.22-T5N-R64W**

**P&H 22CD Pad Sec.22-T5N-R64W**

**P&H 22CD**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**07 December, 2010**

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well P&H 22CD
<b>Project:</b>	SEC.22-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4613.0ft (Original Well Elev)
<b>Site:</b>	P&H 22CD Pad Sec.22-T5N-R64W	<b>MD Reference:</b>	WELL @ 4613.0ft (Original Well Elev)
<b>Well:</b>	P&H 22CD	<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-R64W, 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	P&H 22CD Pad Sec.22-T5N-R64W				
Site Position:		Northing:	1,385,324.42 ft	Latitude:	40° 23' 13.524 N
From:	Lat/Long	Easting:	3,269,215.05 ft	Longitude:	104° 32' 0.744 W
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.62 °

Well	P&H 22CD					
Well Position	+N-S	0.0 ft	Northing:	1,385,324.41 ft	Latitude:	40° 23' 13.524 N
	+E-W	0.0 ft	Easting:	3,269,215.05 ft	Longitude:	104° 32' 0.744 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,600.0 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	11/12/2010	8.82	67.10	53,214

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	52.62	

<b>Survey Program</b>	<b>Date</b>	12/7/2010			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
175.0	7,004.0	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
175.0	0.40	75.70	175.0	0.2	0.6	0.6	0.23	0.23	0.00
266.0	0.60	100.40	266.0	0.1	1.4	1.2	0.32	0.22	27.14
357.0	1.00	71.40	357.0	0.3	2.6	2.2	0.61	0.44	-31.87
447.0	2.20	59.00	446.9	1.5	4.8	4.7	1.38	1.33	-13.78
540.0	3.60	53.20	539.8	4.1	8.7	9.4	1.54	1.51	-6.24
633.0	5.80	53.70	632.5	8.7	14.8	17.0	2.37	2.37	0.54
701.0	6.30	55.00	700.1	12.8	20.6	24.2	0.76	0.74	1.91
796.0	8.70	49.20	794.3	20.5	30.3	36.6	2.65	2.53	-6.11
891.0	11.10	45.90	887.9	31.6	42.4	52.8	2.59	2.53	-3.47
986.0	12.40	52.80	980.9	44.1	57.0	72.1	2.01	1.37	7.26
1,080.0	13.40	51.00	1,072.5	57.1	73.5	93.1	1.15	1.06	-1.91

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well P&H 22CD
<b>Project:</b>	SEC.22-T5N-R64W	<b>TVD Reference:</b>	WELL @ 4613.0ft (Original Well Elev)
<b>Site:</b>	P&H 22CD Pad Sec.22-T5N-R64W	<b>MD Reference:</b>	WELL @ 4613.0ft (Original Well Elev)
<b>Well:</b>	P&H 22CD	<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)
1,175.0	14.00	51.70	1,164.8	71.1	91.1	115.6	0.66	0.63	0.74
1,270.0	14.30	49.20	1,256.9	85.9	109.0	138.8	0.72	0.32	-2.63
1,365.0	15.00	51.30	1,348.9	101.3	127.5	162.8	0.92	0.74	2.21
1,460.0	13.50	46.60	1,440.9	116.6	145.2	186.1	1.99	-1.58	-4.95
1,555.0	13.50	49.10	1,533.3	131.4	161.6	208.2	0.61	0.00	2.63
1,650.0	13.50	56.50	1,625.7	144.8	179.2	230.3	1.82	0.00	7.79
1,745.0	13.50	54.70	1,718.1	157.3	197.5	252.5	0.44	0.00	-1.89
1,838.0	13.00	57.40	1,808.6	169.3	215.2	273.7	0.86	-0.54	2.90
1,933.0	12.40	56.90	1,901.3	180.6	232.7	294.6	0.64	-0.63	-0.53
2,026.0	12.80	56.00	1,992.0	191.8	249.6	314.8	0.48	0.43	-0.97
2,122.0	11.80	51.80	2,085.8	203.8	266.2	335.2	1.40	-1.04	-4.38
2,217.0	11.10	47.50	2,178.9	216.0	280.5	354.1	1.16	-0.74	-4.53
2,312.0	11.60	44.30	2,272.1	229.0	294.0	372.6	0.85	0.53	-3.37
2,408.0	12.40	47.00	2,366.0	243.0	308.2	392.4	1.02	0.83	2.81
2,503.0	12.60	51.70	2,458.7	256.3	323.8	412.9	1.09	0.21	4.95
2,597.0	12.60	54.80	2,550.5	268.6	340.3	433.4	0.72	0.00	3.30
2,692.0	12.70	56.80	2,643.2	280.3	357.5	454.2	0.47	0.11	2.11
2,787.0	12.40	57.40	2,735.9	291.5	374.8	474.8	0.34	-0.32	0.63
2,882.0	12.30	53.80	2,828.7	303.0	391.6	495.1	0.82	-0.11	-3.79
2,976.0	12.50	54.30	2,920.5	314.8	407.9	515.2	0.24	0.21	0.53
3,070.0	12.50	56.80	3,012.3	326.3	424.7	535.6	0.58	0.00	2.66
3,165.0	12.00	47.80	3,105.1	338.6	440.6	555.7	2.08	-0.53	-9.47
3,260.0	12.80	46.10	3,197.9	352.5	455.5	576.0	0.93	0.84	-1.79
3,355.0	13.00	41.60	3,290.5	367.8	470.2	596.9	1.08	0.21	-4.74
3,449.0	13.50	44.90	3,382.0	383.5	484.9	618.2	0.96	0.53	3.51
3,544.0	13.40	45.90	3,474.4	399.0	500.7	640.1	0.27	-0.11	1.05
3,639.0	14.00	46.70	3,566.7	414.5	516.9	662.4	0.66	0.63	0.84
3,733.0	14.30	46.80	3,657.8	430.3	533.7	685.3	0.32	0.32	0.11
3,827.0	14.20	48.80	3,749.0	445.8	550.8	708.3	0.53	-0.11	2.13
3,922.0	14.00	49.20	3,841.1	461.0	568.3	731.4	0.23	-0.21	0.42
4,018.0	11.50	53.20	3,934.7	474.3	584.7	752.6	2.76	-2.60	4.17
4,110.0	11.30	56.80	4,024.9	484.8	599.6	770.8	0.80	-0.22	3.91
4,205.0	10.80	59.60	4,118.1	494.4	615.1	788.9	0.77	-0.53	2.95
4,299.0	9.10	57.90	4,210.7	502.8	629.0	805.0	1.84	-1.81	-1.81
4,394.0	7.30	58.80	4,304.8	509.9	640.5	818.5	1.90	-1.89	0.95
4,487.0	4.50	66.00	4,397.3	514.4	648.9	827.9	3.11	-3.01	7.74
4,581.0	1.80	78.00	4,491.1	516.2	653.7	832.9	2.94	-2.87	12.77
4,676.0	1.50	97.20	4,586.1	516.4	656.4	835.1	0.66	-0.32	20.21
4,771.0	0.90	175.40	4,681.0	515.5	657.7	835.6	1.67	-0.63	82.32
4,866.0	0.30	86.70	4,776.0	514.8	658.0	835.4	0.99	-0.63	-93.37
4,962.0	0.70	109.40	4,872.0	514.6	658.8	835.9	0.46	0.42	23.65
5,058.0	0.70	114.80	4,968.0	514.2	659.9	836.5	0.07	0.00	5.63
5,090.1	0.77	115.39	5,000.1	514.0	660.3	836.7	0.21	0.21	1.85
TARGET BHL 1317'FNL, 1317'FEL									
5,153.0	0.90	116.30	5,063.0	513.6	661.1	837.1	0.21	0.21	1.44
5,246.0	0.70	107.70	5,156.0	513.1	662.3	837.8	0.25	-0.22	-9.25
5,342.0	0.30	228.90	5,252.0	512.7	662.6	837.8	0.93	-0.42	126.25
5,437.0	0.50	270.10	5,347.0	512.6	662.0	837.3	0.36	0.21	43.37
5,532.0	0.30	236.60	5,442.0	512.4	661.4	836.7	0.32	-0.21	-35.26
5,627.0	0.50	164.40	5,537.0	511.9	661.3	836.3	0.52	0.21	-76.00
5,722.0	0.30	149.70	5,632.0	511.3	661.6	836.1	0.23	-0.21	-15.47
5,816.0	0.40	125.70	5,726.0	510.9	662.0	836.2	0.19	0.11	-25.53
5,911.0	0.60	60.00	5,821.0	510.9	662.7	836.8	0.60	0.21	-69.16

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well P&H 22CD
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<b>Site:</b>	P&H 22CD Pad Sec.22-T5N-R64W	<b>MD Reference:</b>	WELL @ 4613.0ft (Original Well Elev)
<b>Well:</b>	P&H 22CD	<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)
6,005.0	0.70	82.20	5,915.0	511.3	663.6	837.7	0.29	0.11	23.62
6,100.0	1.00	51.70	6,010.0	511.9	664.9	839.1	0.56	0.32	-32.11
6,195.0	1.40	53.40	6,105.0	513.1	666.5	841.1	0.42	0.42	1.79
6,290.0	1.50	44.10	6,199.9	514.6	668.3	843.5	0.27	0.11	-9.79
6,385.0	1.90	50.00	6,294.9	516.6	670.3	846.3	0.46	0.42	6.21
6,480.0	2.20	46.30	6,389.8	518.8	672.8	849.6	0.34	0.32	-3.89
6,574.0	2.50	40.40	6,483.8	521.6	675.5	853.4	0.41	0.32	-6.28
6,589.1	2.89	43.00	6,498.8	522.2	676.0	854.1	2.70	2.58	17.22
<b>LEGAL BOX 800' X 800' 1317'FNL, 1319'FEL</b>									
6,669.0	5.00	49.90	6,578.5	525.9	680.0	859.6	2.70	2.64	8.64
6,762.0	2.20	76.00	6,671.4	528.9	684.8	865.3	3.41	-3.01	28.06
6,858.0	2.00	82.70	6,767.3	529.6	688.3	868.4	0.33	-0.21	6.98
6,954.0	1.90	94.00	6,863.2	529.7	691.5	871.1	0.41	-0.10	11.77
7,004.0	1.80	94.00	6,913.2	529.6	693.1	872.3	0.20	-0.20	0.00

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_