

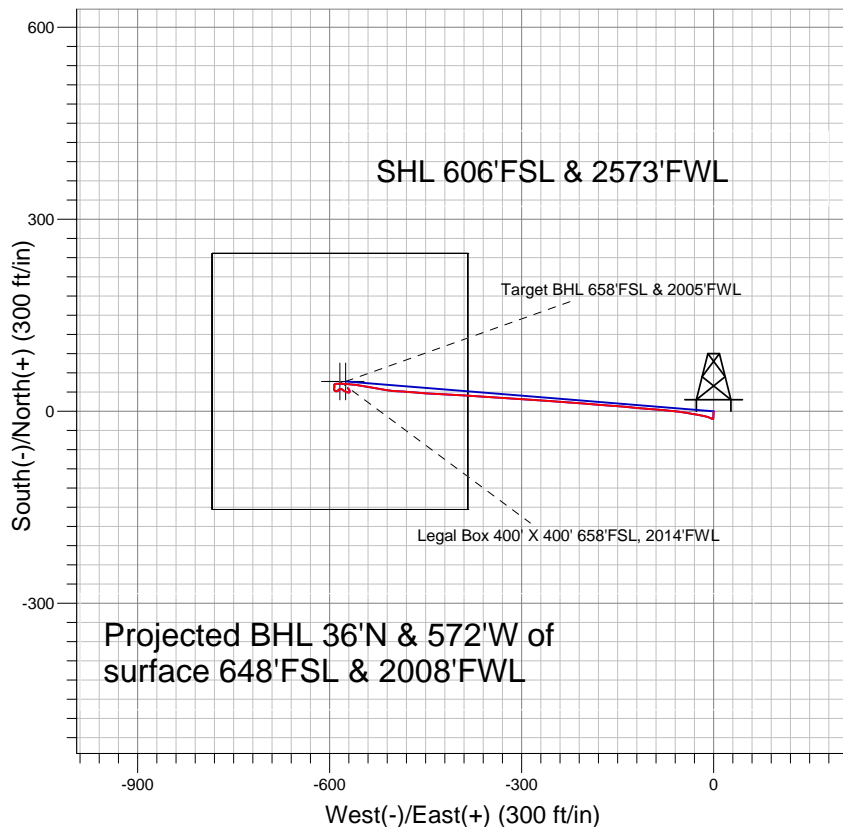
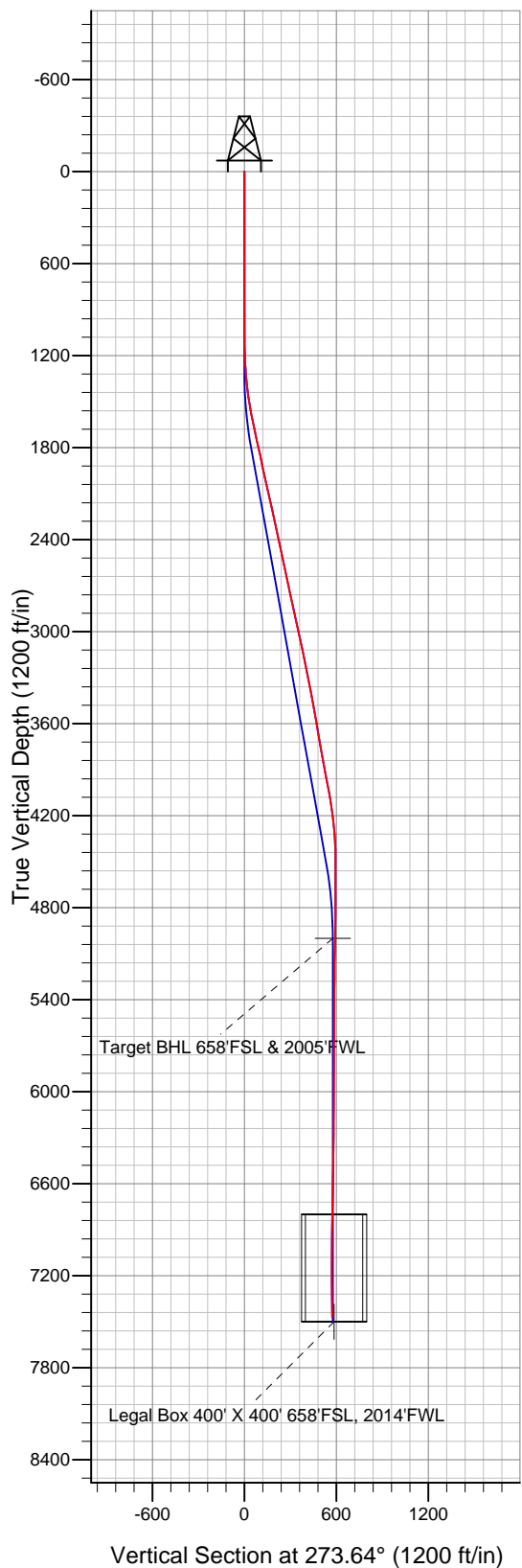
Well Name: **Carlson 24-2D**  
 Surface Location: Carlson 24-2D Pad Sec.2-T6N-R66W  
 North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone  
 Ground Elevation: 4850.0  

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1430186.58	3209920.41	40° 30' 42.516 N	104° 44' 42.072 W

 Original Well Elev WELL @ 4863.0ft (Original Well Elev)

Slot

## PETROLEUM DEVELOPMENT CORP Weld County CO



### LEGEND

- + Carlson 24-2D, Wellbore #1, Plan #1 (6-24-10) V0
- + Wellbore #1
- Survey #1

## Final Survey Plot

Projected Final Survey -  
 7530'MD & 7472'TVD @ 573' VS  
 1.1 deg Inc 314.8 deg AZ

Project: SEC.2-T6N-R66W  
 Site: Carlson 24-2D Pad Sec.2-T6N-R66W  
 Well: Carlson 24-2D  
 Plan: Wellbore #1



## **Directional**

# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.2-T6N-R66W**

**Carlson 24-2D Pad Sec.2-T6N-R66W**

**Carlson 24-2D**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**02 December, 2010**

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Carlson 24-2D
<b>Project:</b>	SEC.2-T6N-R66W	<b>TVD Reference:</b>	WELL @ 4863.0ft (Original Well Elev)
<b>Site:</b>	Carlson 24-2D Pad Sec.2-T6N-R66W	<b>MD Reference:</b>	WELL @ 4863.0ft (Original Well Elev)
<b>Well:</b>	Carlson 24-2D	<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.2-T6N-R66W, 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

<b>Site</b>	Carlson 24-2D Pad Sec.2-T6N-R66W		
<b>Site Position:</b>		<b>Northing:</b>	1,430,186.59 ft
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,209,920.41 ft
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	"
		<b>Latitude:</b>	40° 30' 42.516 N
		<b>Longitude:</b>	104° 44' 42.072 W
		<b>Grid Convergence:</b>	0.49 °

<b>Well</b>	Carlson 24-2D		
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b> 1,430,186.58 ft
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b> 3,209,920.41 ft
<b>Position Uncertainty</b>	0.0 ft	<b>Wellhead Elevation:</b>	ft
		<b>Latitude:</b>	40° 30' 42.516 N
		<b>Longitude:</b>	104° 44' 42.072 W
		<b>Ground Level:</b>	4,850.0 ft

<b>Wellbore</b>	Wellbore #1		
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>
	IGRF2010	10/28/2010	8.95
			<b>Dip Angle (°)</b>
			67.17
			<b>Field Strength (nT)</b>
			53,258

<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>
	0.0	0.0	0.0
			<b>Direction (°)</b>
			273.64

<b>Survey Program</b>	<b>Date</b> 12/2/2010		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>
733.0	7,530.0	Survey #1 (Wellbore #1)	MWD
			<b>Description</b>
			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
733.0	1.30	184.00	732.9	-8.3	-0.6	0.1	0.18	0.18	0.00
827.0	1.50	185.70	826.9	-10.6	-0.8	0.1	0.22	0.21	1.81
920.0	0.20	250.30	919.9	-11.8	-1.1	0.3	1.53	-1.40	69.46
1,014.0	0.30	277.50	1,013.9	-11.9	-1.4	0.7	0.16	0.11	28.94
1,107.0	0.30	213.70	1,106.9	-12.0	-1.8	1.1	0.34	0.00	-68.60
1,201.0	2.40	298.90	1,200.9	-11.3	-3.7	3.0	2.55	2.23	90.64
1,294.0	4.10	289.50	1,293.7	-9.2	-8.5	7.9	1.91	1.83	-10.11
1,388.0	6.00	281.10	1,387.3	-7.2	-16.5	16.0	2.16	2.02	-8.94
1,482.0	8.80	280.70	1,480.6	-4.9	-28.4	28.0	2.98	2.98	-0.43
1,575.0	10.80	277.60	1,572.2	-2.4	-44.0	43.8	2.22	2.15	-3.33
1,668.0	12.00	278.20	1,663.4	0.1	-62.2	62.1	1.30	1.29	0.65

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Carlson 24-2D
<b>Project:</b>	SEC.2-T6N-R66W	<b>TVD Reference:</b>	WELL @ 4863.0ft (Original Well Elev)
<b>Site:</b>	Carlson 24-2D Pad Sec.2-T6N-R66W	<b>MD Reference:</b>	WELL @ 4863.0ft (Original Well Elev)
<b>Well:</b>	Carlson 24-2D	<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)
1,762.0	12.20	273.40	1,755.3	2.1	-81.8	81.8	1.09	0.21	-5.11
1,855.0	12.30	274.70	1,846.2	3.5	-101.5	101.5	0.32	0.11	1.40
1,949.0	12.40	276.20	1,938.0	5.4	-121.5	121.6	0.36	0.11	1.60
2,042.0	12.70	275.00	2,028.8	7.4	-141.6	141.8	0.43	0.32	-1.29
2,136.0	12.40	273.70	2,120.5	8.9	-162.0	162.2	0.44	-0.32	-1.38
2,229.0	12.60	273.60	2,211.3	10.2	-182.1	182.4	0.22	0.22	-0.11
2,323.0	12.90	276.30	2,303.0	12.0	-202.7	203.1	0.71	0.32	2.87
2,417.0	12.20	274.10	2,394.7	13.9	-223.1	223.5	0.90	-0.74	-2.34
2,510.0	11.80	273.10	2,485.7	15.1	-242.4	242.8	0.48	-0.43	-1.08
2,604.0	11.80	272.10	2,577.7	15.9	-261.6	262.1	0.22	0.00	-1.06
2,697.0	11.80	277.20	2,668.8	17.5	-280.5	281.1	1.12	0.00	5.48
2,791.0	11.90	273.40	2,760.8	19.3	-299.7	300.3	0.84	0.11	-4.04
2,884.0	12.70	273.80	2,851.6	20.5	-319.5	320.2	0.87	0.86	0.43
2,978.0	12.50	273.00	2,943.4	21.7	-340.0	340.7	0.28	-0.21	-0.85
3,072.0	12.10	271.40	3,035.2	22.5	-360.0	360.7	0.56	-0.43	-1.70
3,165.0	11.90	275.70	3,126.2	23.7	-379.3	380.0	0.98	-0.22	4.62
3,259.0	12.30	274.00	3,218.1	25.4	-398.9	399.7	0.57	0.43	-1.81
3,352.0	10.70	272.00	3,309.2	26.3	-417.4	418.2	1.77	-1.72	-2.15
3,446.0	10.40	272.10	3,401.6	27.0	-434.6	435.4	0.32	-0.32	0.11
3,539.0	10.30	274.60	3,493.1	27.9	-451.3	452.1	0.49	-0.11	2.69
3,633.0	10.40	275.90	3,585.6	29.5	-468.1	469.0	0.27	0.11	1.38
3,727.0	9.50	272.50	3,678.2	30.7	-484.3	485.3	1.14	-0.96	-3.62
3,821.0	9.80	273.70	3,770.8	31.5	-500.0	501.0	0.38	0.32	1.28
3,914.0	10.50	281.90	3,862.4	33.8	-516.2	517.3	1.72	0.75	8.82
4,008.0	10.70	280.10	3,954.8	37.1	-533.2	534.5	0.41	0.21	-1.91
4,101.0	10.60	277.70	4,046.2	39.8	-550.2	551.6	0.49	-0.11	-2.58
4,195.0	9.10	276.50	4,138.8	41.8	-566.1	567.6	1.61	-1.60	-1.28
4,288.0	6.40	273.90	4,230.9	42.9	-578.6	580.2	2.93	-2.90	-2.80
4,382.0	4.40	268.30	4,324.5	43.2	-587.4	589.0	2.20	-2.13	-5.96
4,475.0	1.80	234.70	4,417.4	42.2	-592.2	593.7	3.30	-2.80	-36.13
4,569.0	0.70	152.30	4,511.4	40.9	-593.1	594.5	1.96	-1.17	-87.66
4,662.0	0.50	170.40	4,604.4	40.0	-592.8	594.1	0.29	-0.22	19.46
4,756.0	0.30	163.80	4,698.4	39.3	-592.7	594.0	0.22	-0.21	-7.02
4,850.0	1.30	187.90	4,792.3	38.0	-592.7	594.0	1.10	1.06	25.64
4,943.0	1.60	196.80	4,885.3	35.8	-593.3	594.3	0.40	0.32	9.57
5,037.0	2.40	147.20	4,979.3	32.8	-592.6	593.5	1.94	0.85	-52.77
5,058.0	2.18	136.33	5,000.3	32.2	-592.1	592.9	2.32	-1.06	-51.75
Target BHL 658'FSL & 2005'FWL									
5,130.0	2.20	91.50	5,072.2	31.2	-589.7	590.5	2.32	0.03	-62.27
5,224.0	0.80	42.80	5,166.2	31.6	-587.5	588.3	1.89	-1.49	-51.81
5,317.0	0.60	32.50	5,259.2	32.5	-586.8	587.7	0.25	-0.22	-11.08
5,410.0	0.60	36.20	5,352.2	33.3	-586.2	587.2	0.04	0.00	3.98
5,504.0	0.50	65.00	5,446.1	33.9	-585.6	586.5	0.31	-0.11	30.64
5,598.0	0.30	98.00	5,540.1	34.0	-584.9	585.9	0.32	-0.21	35.11
5,691.0	0.30	89.30	5,633.1	34.0	-584.5	585.4	0.05	0.00	-9.35
5,785.0	0.30	56.80	5,727.1	34.1	-584.0	585.0	0.18	0.00	-34.57
5,878.0	0.50	44.00	5,820.1	34.5	-583.5	584.5	0.23	0.22	-13.76
5,972.0	0.30	66.40	5,914.1	34.9	-583.0	584.1	0.27	-0.21	23.83
6,065.0	0.20	100.60	6,007.1	35.0	-582.6	583.7	0.19	-0.11	36.77
6,159.0	0.40	109.40	6,101.1	34.9	-582.2	583.2	0.22	0.21	9.36
6,253.0	0.50	115.50	6,195.1	34.6	-581.5	582.5	0.12	0.11	6.49
6,346.0	0.60	122.20	6,288.1	34.1	-580.7	581.7	0.13	0.11	7.20
6,440.0	0.80	132.40	6,382.1	33.4	-579.8	580.8	0.25	0.21	10.85

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Carlson 24-2D
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<b>Well:</b>	Carlson 24-2D	<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)
6,533.0	0.80	124.40	6,475.1	32.6	-578.8	579.7	0.12	0.00	-8.60
6,627.0	1.00	116.60	6,569.1	31.9	-577.5	578.4	0.25	0.21	-8.30
6,721.0	0.90	116.30	6,663.1	31.2	-576.1	576.9	0.11	-0.11	-0.32
6,814.0	1.20	117.20	6,756.1	30.4	-574.6	575.4	0.32	0.32	0.97
6,908.0	1.20	106.20	6,850.1	29.7	-572.8	573.5	0.24	0.00	-11.70
7,001.0	1.10	95.30	6,943.0	29.3	-571.0	571.7	0.26	-0.11	-11.72
7,095.0	0.80	70.70	7,037.0	29.5	-569.4	570.2	0.53	-0.32	-26.17
7,189.0	1.10	356.60	7,131.0	30.6	-568.9	569.7	1.24	0.32	-78.83
7,282.0	1.20	344.00	7,224.0	32.4	-569.2	570.1	0.29	0.11	-13.55
7,376.0	1.20	325.10	7,318.0	34.2	-570.0	571.0	0.42	0.00	-20.11
7,469.0	1.10	314.80	7,411.0	35.6	-571.2	572.3	0.25	-0.11	-11.08
7,530.0	1.10	314.80	7,471.9	36.4	-572.0	573.2	0.00	0.00	0.00
Legal Box 400' X 400' 658'FSL, 2014'FWL									

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