

Well Name: **Carlson 14-2D**

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

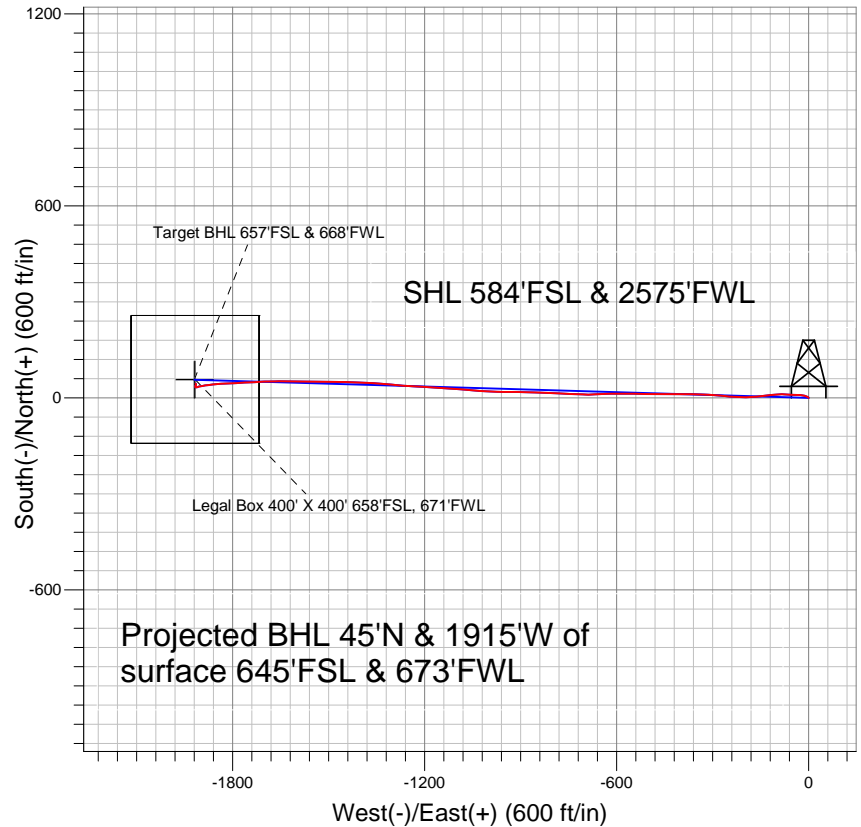
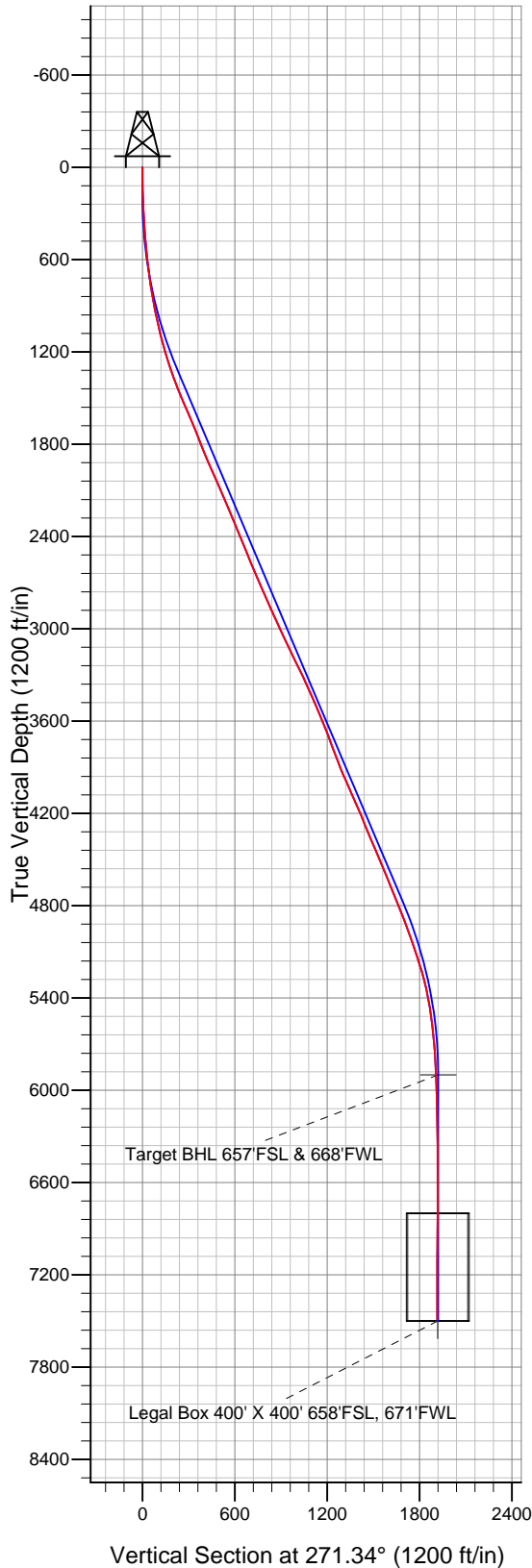
Ground Elevation: 4850.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1430164.74	3209923.38	40° 30' 42.300 N	104° 44' 42.036 W

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

Slot

PETROLEUM DEVELOPMENT CORP Weld County CO



LEGEND

- Carlson 14-2D, Wellbore #1, Plan #1 (6-24-10) V0
- Wellbore #1
- Survey #1

Final Survey Plot

Projected Final Survey -
7846'MD & 7490'TVD @ 1915' VS
0.6 deg Inc 349.9 deg AZ

Project: SEC.2-T6N-R66W
Site: Carlson 24-2D Pad Sec.2-T6N-R66W
Well: Carlson 14-2D
Plan: Wellbore #1



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.2-T6N-R66W

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

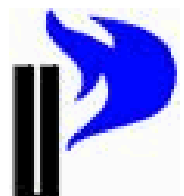
Carlson 14-2D

Wellbore #1

Survey: Survey #1

Standard Survey Report

15 November, 2010





Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Carlson 14-2D
Project:	SEC.2-T6N-R66W	TVD Reference:	WELL @ 4863.0ft (Original Well Elev)
Site:	Carlson 24-2D Pad Sec.2-T6N-R66W	MD Reference:	WELL @ 4863.0ft (Original Well Elev)
Well:	Carlson 14-2D	North Reference:	True
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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

Well	Carlson 14-2D					
Well Position	+N-S	0.0 ft	Northing:	1,430,164.74 ft	Latitude:	40° 30' 42.300 N
	+E-W	0.0 ft	Easting:	3,209,923.38 ft	Longitude:	104° 44' 42.036 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,850.0 ft

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

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	271.34	

Survey Program	Date	11/15/2010			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
151.0	7,846.0	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
151.0	1.50	315.10	151.0	1.4	-1.4	1.4	0.99	0.99	0.00
239.0	2.60	298.60	238.9	3.2	-4.0	4.0	1.41	1.25	-18.75
330.0	3.50	288.10	329.8	5.0	-8.4	8.5	1.16	0.99	-11.54
422.0	4.60	283.30	421.6	6.7	-14.7	14.8	1.25	1.20	-5.22
512.0	5.50	276.20	511.2	8.0	-22.5	22.7	1.22	1.00	-7.89
606.0	6.70	274.30	604.7	8.9	-32.4	32.6	1.29	1.28	-2.02
668.0	6.90	272.00	666.2	9.3	-39.7	40.0	0.54	0.32	-3.71
733.0	7.30	270.60	730.7	9.5	-47.8	48.0	0.67	0.62	-2.15
826.0	8.90	272.70	822.8	9.9	-60.9	61.1	1.75	1.72	2.26
920.0	11.20	273.60	915.4	10.8	-77.3	77.5	2.45	2.45	0.96
1,014.0	13.10	265.30	1,007.3	10.5	-97.0	97.2	2.74	2.02	-8.83



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Carlson 14-2D
Project:	SEC.2-T6N-R66W	TVD Reference:	WELL @ 4863.0ft (Original Well Elev)
Site:	Carlson 24-2D Pad Sec.2-T6N-R66W	MD Reference:	WELL @ 4863.0ft (Original Well Elev)
Well:	Carlson 14-2D	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)
1,107.0	14.70	264.10	1,097.5	8.5	-119.2	119.4	1.75	1.72	-1.29
1,201.0	16.70	262.40	1,188.0	5.4	-144.5	144.6	2.18	2.13	-1.81
1,294.0	17.90	266.90	1,276.8	2.9	-172.0	172.0	1.93	1.29	4.84
1,388.0	19.50	270.60	1,365.9	2.3	-202.1	202.1	2.12	1.70	3.94
1,482.0	21.90	273.20	1,453.8	3.4	-235.3	235.3	2.73	2.55	2.77
1,575.0	23.60	276.10	1,539.6	6.4	-271.1	271.2	2.19	1.83	3.12
1,669.0	22.90	274.10	1,625.9	9.7	-308.1	308.2	1.12	-0.74	-2.13
1,763.0	22.10	270.10	1,712.8	11.0	-344.0	344.2	1.84	-0.85	-4.26
1,856.0	21.50	268.90	1,799.1	10.7	-378.6	378.7	0.80	-0.65	-1.29
1,950.0	22.80	271.30	1,886.2	10.8	-414.0	414.1	1.68	1.38	2.55
2,043.0	24.00	271.10	1,971.5	11.6	-450.9	451.1	1.29	1.29	-0.22
2,137.0	23.90	271.30	2,057.4	12.4	-489.1	489.2	0.14	-0.11	0.21
2,230.0	23.40	270.70	2,142.6	13.0	-526.4	526.5	0.60	-0.54	-0.65
2,324.0	22.40	268.70	2,229.2	12.9	-562.9	563.1	1.35	-1.06	-2.13
2,418.0	22.60	271.20	2,316.1	12.8	-598.9	599.0	1.04	0.21	2.66
2,511.0	22.30	267.20	2,402.0	12.3	-634.4	634.5	1.67	-0.32	-4.30
2,605.0	22.50	267.50	2,488.9	10.7	-670.2	670.2	0.25	0.21	0.32
2,699.0	22.20	271.70	2,575.9	10.4	-705.9	705.9	1.73	-0.32	4.47
2,792.0	23.50	273.20	2,661.6	12.0	-742.0	742.1	1.53	1.40	1.61
2,886.0	22.90	272.20	2,748.0	13.7	-779.0	779.1	0.76	-0.64	-1.06
2,979.0	24.60	272.10	2,833.1	15.1	-816.4	816.5	1.83	1.83	-0.11
3,073.0	25.30	271.90	2,918.3	16.5	-856.0	856.2	0.75	0.74	-0.21
3,167.0	24.20	272.10	3,003.7	17.9	-895.3	895.5	1.17	-1.17	0.21
3,260.0	24.40	269.60	3,088.4	18.5	-933.6	933.8	1.13	0.22	-2.69
3,354.0	26.20	271.30	3,173.4	18.8	-973.8	973.9	2.06	1.91	1.81
3,447.0	27.20	274.30	3,256.5	20.8	-1,015.5	1,015.7	1.80	1.08	3.23
3,541.0	24.00	272.90	3,341.3	23.4	-1,056.0	1,056.3	3.46	-3.40	-1.49
3,635.0	23.60	274.80	3,427.3	26.0	-1,093.9	1,094.2	0.92	-0.43	2.02
3,728.0	23.40	276.70	3,512.6	29.7	-1,130.8	1,131.1	0.84	-0.22	2.04
3,821.0	22.00	273.20	3,598.4	32.8	-1,166.5	1,166.9	2.09	-1.51	-3.76
3,915.0	21.50	271.20	3,685.7	34.2	-1,201.3	1,201.8	0.95	-0.53	-2.13
4,008.0	20.50	272.80	3,772.5	35.3	-1,234.6	1,235.1	1.24	-1.08	1.72
4,102.0	21.30	275.90	3,860.3	37.9	-1,268.0	1,268.6	1.45	0.85	3.30
4,195.0	22.90	275.60	3,946.5	41.4	-1,302.8	1,303.4	1.72	1.72	-0.32
4,289.0	23.90	273.70	4,032.8	44.4	-1,340.0	1,340.7	1.33	1.06	-2.02
4,382.0	24.00	273.60	4,117.7	46.8	-1,377.7	1,378.4	0.12	0.11	-0.11
4,476.0	22.50	270.70	4,204.1	48.2	-1,414.8	1,415.5	2.01	-1.60	-3.09
4,569.0	21.80	271.10	4,290.2	48.8	-1,449.8	1,450.6	0.77	-0.75	0.43
4,663.0	23.70	271.90	4,376.9	49.7	-1,486.2	1,486.9	2.05	2.02	0.85
4,756.0	22.70	271.30	4,462.4	50.7	-1,522.8	1,523.6	1.10	-1.08	-0.65
4,850.0	22.30	269.50	4,549.3	51.0	-1,558.8	1,559.5	0.85	-0.43	-1.91
4,943.0	22.90	270.20	4,635.1	50.9	-1,594.5	1,595.3	0.71	0.65	0.75
5,037.0	23.50	271.50	4,721.5	51.5	-1,631.5	1,632.3	0.84	0.64	1.38
5,131.0	21.00	268.80	4,808.5	51.6	-1,667.1	1,667.9	2.87	-2.66	-2.87
5,224.0	20.50	267.90	4,895.5	50.7	-1,700.0	1,700.8	0.64	-0.54	-0.97
5,318.0	19.00	267.00	4,983.9	49.2	-1,731.8	1,732.5	1.63	-1.60	-0.96
5,411.0	19.00	267.10	5,071.9	47.7	-1,762.0	1,762.6	0.04	0.00	0.11
5,505.0	18.80	266.50	5,160.8	46.0	-1,792.4	1,793.0	0.30	-0.21	-0.64
5,599.0	15.30	267.80	5,250.7	44.6	-1,819.9	1,820.5	3.75	-3.72	1.38
5,692.0	12.90	265.60	5,340.9	43.3	-1,842.5	1,843.1	2.64	-2.58	-2.37
5,786.0	9.80	264.10	5,433.0	41.7	-1,861.0	1,861.4	3.31	-3.30	-1.60
5,880.0	7.50	263.40	5,525.9	40.2	-1,875.0	1,875.5	2.45	-2.45	-0.74
5,973.0	5.90	259.10	5,618.3	38.6	-1,885.7	1,886.1	1.80	-1.72	-4.62



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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)
6,067.0	5.20	264.20	5,711.9	37.2	-1,894.7	1,895.1	0.91	-0.74	5.43
6,161.0	3.60	252.50	5,805.6	35.9	-1,901.8	1,902.1	1.94	-1.70	-12.45
6,254.0	2.90	252.10	5,898.4	34.3	-1,906.8	1,907.1	0.75	-0.75	-0.43
6,255.9	2.88	252.19	5,900.3	34.3	-1,906.9	1,907.2	1.21	-1.18	4.65
Target BHL 657'FSL & 668'FWL									
6,348.0	1.80	259.10	5,992.3	33.3	-1,910.5	1,910.8	1.21	-1.17	7.50
6,441.0	1.20	259.00	6,085.3	32.8	-1,912.9	1,913.2	0.65	-0.65	-0.11
6,534.0	0.90	263.40	6,178.3	32.6	-1,914.6	1,914.8	0.33	-0.32	4.73
6,628.0	0.50	296.80	6,272.3	32.7	-1,915.7	1,915.9	0.59	-0.43	35.53
6,721.0	0.40	324.50	6,365.3	33.1	-1,916.2	1,916.5	0.25	-0.11	29.79
6,815.0	0.40	335.40	6,459.3	33.7	-1,916.6	1,916.8	0.08	0.00	11.60
6,908.0	0.60	352.00	6,552.3	34.5	-1,916.8	1,917.1	0.26	0.22	17.85
7,002.0	0.60	8.00	6,646.3	35.4	-1,916.8	1,917.1	0.18	0.00	17.02
7,095.0	0.50	0.50	6,739.3	36.3	-1,916.7	1,917.0	0.13	-0.11	-8.06
7,189.0	0.40	42.00	6,833.3	37.0	-1,916.5	1,916.8	0.35	-0.11	44.15
7,283.0	0.30	37.70	6,927.3	37.4	-1,916.1	1,916.5	0.11	-0.11	-4.57
7,376.0	0.50	47.50	7,020.3	37.9	-1,915.7	1,916.0	0.23	0.22	10.54
7,470.0	0.80	24.70	7,114.3	38.7	-1,915.1	1,915.5	0.42	0.32	-24.26
7,563.0	1.50	2.40	7,207.2	40.6	-1,914.8	1,915.2	0.88	0.75	-23.98
7,657.0	0.80	357.60	7,301.2	42.4	-1,914.7	1,915.2	0.75	-0.74	-5.11
7,800.0	0.60	349.90	7,444.2	44.2	-1,914.9	1,915.4	0.15	-0.14	-5.38
7,846.0	0.60	349.90	7,490.2	44.6	-1,915.0	1,915.5	0.00	0.00	0.00
Legal Box 400' X 400' 658'FSL, 671'FWL									

Checked By: _____	Approved By: _____	Date: _____
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