

Well Name: **Centennial 12-21DU**

Surface Location: **EEE/Ryland 20SD Pad Sec.21-T4N-R67W**  
 North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

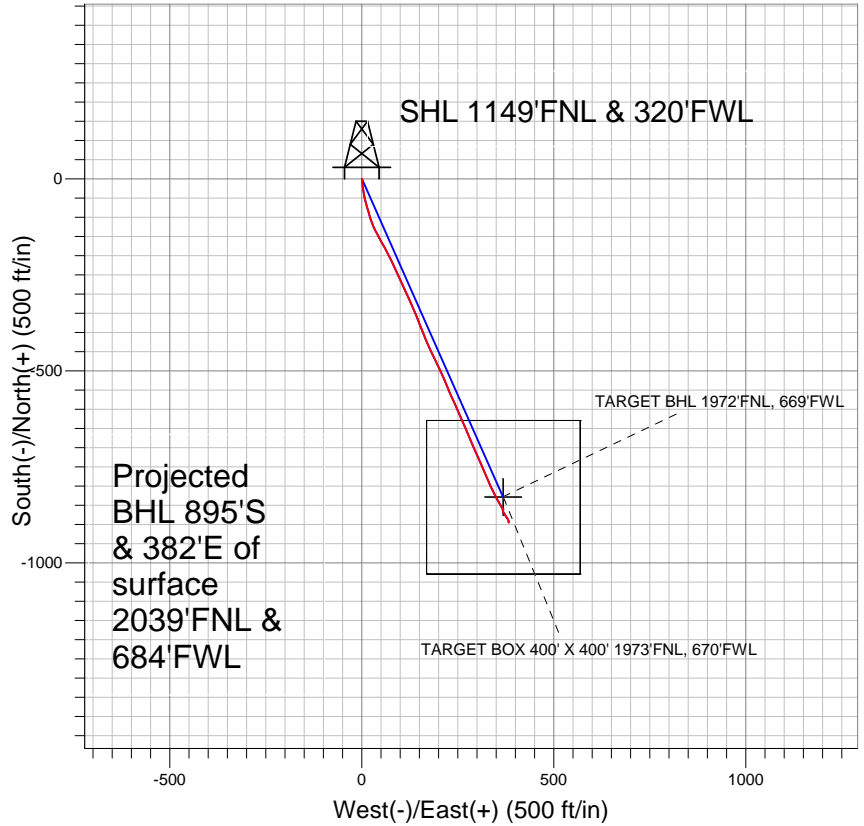
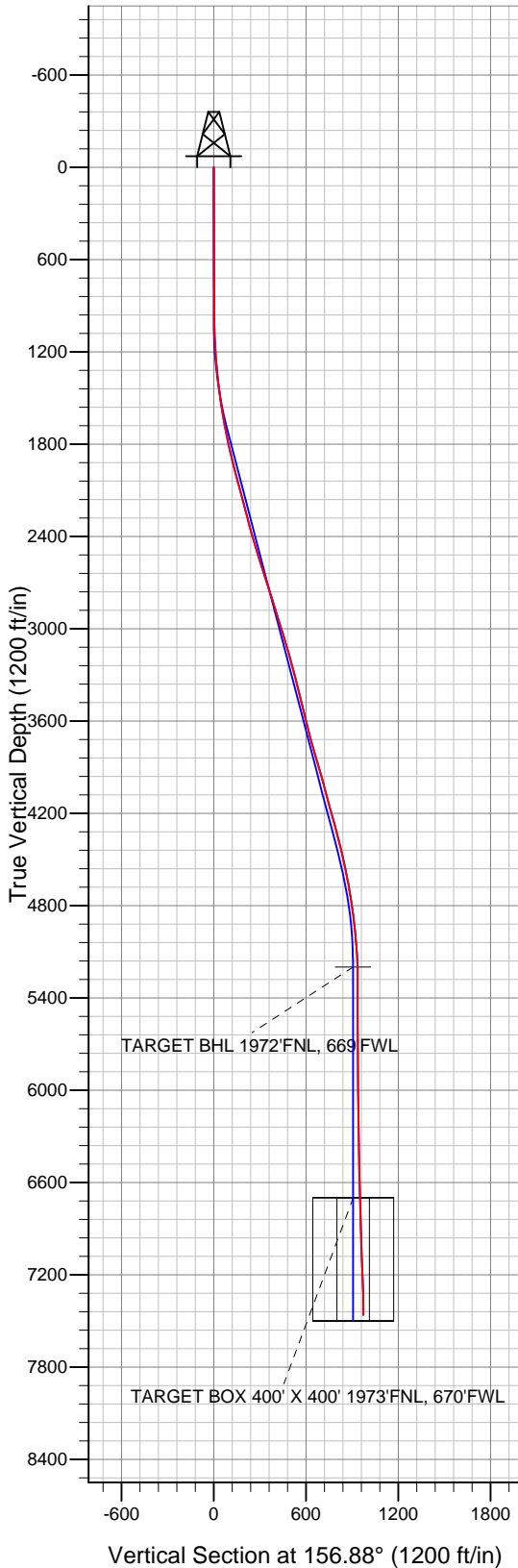
Ground Elevation: 4922.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1353592.25	3166095.82	40° 18' 8.928 N	104° 54' 16.128 W

Original Well Elev WELL @ 4935.0ft (Original Well Elev)

Slot

## PETROLEUM DEVELOPMENT CORP Weld County CO



### LEGEND

- Centennial 12-21DU, Wellbore #1, Plan #1 (3-8-10) V0
- Wellbore #1
- Survey #1

## Final Survey Plot

Projected Final Survey -  
 7579'MD & 7462'TVD @ 973' VS  
 0.7 deg Inc 199.8 deg AZ

Project: SEC.21-T4N-R67W  
 Site: EEE/Ryland 20SD Pad Sec.21-T4N-R67W  
 Well: Centennial 12-21DU  
 Plan: Wellbore #1



## **Directional**

# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.21-T4N-R67W**

**EEE/Ryland 20SD Pad Sec.21-T4N-R67W**

**Centennial 12-21DU**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**20 October, 2010**





<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Centennial 12-21DU
<b>Project:</b>	SEC.21-T4N-R67W	<b>TVD Reference:</b>	WELL @ 4935.0ft (Original Well Elev)
<b>Site:</b>	EEE/Ryland 20SD Pad Sec.21-T4N-R67W	<b>MD Reference:</b>	WELL @ 4935.0ft (Original Well Elev)
<b>Well:</b>	Centennial 12-21DU	<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.21-T4N-R67W, 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		EEE/Ryland 20SD Pad Sec.21-T4N-R67W			
Site Position:		Northing:	1,353,584.71 ft	Latitude:	40° 18' 8.856 N
From:	Lat/Long	Easting:	3,166,056.83 ft	Longitude:	104° 54' 16.632 W
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.38 °

Well	Centennial 12-21DU					
Well Position	+N-S	0.0 ft	Northing:	1,353,592.25 ft	Latitude:	40° 18' 8.928 N
	+E-W	0.0 ft	Easting:	3,166,095.82 ft	Longitude:	104° 54' 16.128 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,922.0 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	10/7/2010	9.02	66.97	53,137

<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	156.88	

<b>Survey Program</b>	<b>Date</b>	10/20/2010			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
704.0	7,579.0	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	
704.0	0.40	167.20	704.0	-2.4	0.5	2.4	0.06	0.06	0.00	
798.0	0.40	170.80	798.0	-3.0	0.7	3.1	0.03	0.00	3.83	
891.0	0.40	187.90	891.0	-3.7	0.7	3.7	0.13	0.00	18.39	
985.0	0.30	160.20	985.0	-4.2	0.7	4.2	0.21	-0.11	-29.47	
1,078.0	1.80	174.10	1,078.0	-5.9	0.9	5.8	1.62	1.61	14.95	
1,172.0	3.30	176.80	1,171.9	-10.1	1.3	9.8	1.60	1.60	2.87	
1,265.0	4.80	172.60	1,264.6	-16.6	1.9	16.0	1.64	1.61	-4.52	
1,359.0	6.00	172.70	1,358.2	-25.4	3.0	24.5	1.28	1.28	0.11	
1,452.0	7.50	171.10	1,450.6	-36.2	4.6	35.1	1.63	1.61	-1.72	
1,546.0	9.10	167.90	1,543.6	-49.5	7.1	48.4	1.77	1.70	-3.40	
1,640.0	10.10	164.70	1,636.3	-64.8	10.8	63.8	1.21	1.06	-3.40	



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Centennial 12-21DU
<b>Project:</b>	SEC.21-T4N-R67W	<b>TVD Reference:</b>	WELL @ 4935.0ft (Original Well Elev)
<b>Site:</b>	EEE/Ryland 20SD Pad Sec.21-T4N-R67W	<b>MD Reference:</b>	WELL @ 4935.0ft (Original Well Elev)
<b>Well:</b>	Centennial 12-21DU	<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)
1,733.0	11.50	163.10	1,727.6	-81.5	15.7	81.1	1.54	1.51	-1.72
1,827.0	12.90	164.30	1,819.5	-100.6	21.2	100.8	1.51	1.49	1.28
1,920.0	13.20	156.40	1,910.1	-120.3	28.3	121.7	1.94	0.32	-8.49
2,014.0	15.20	152.40	2,001.2	-141.1	38.3	144.8	2.37	2.13	-4.26
2,108.0	15.00	151.50	2,092.0	-162.7	49.8	169.2	0.33	-0.21	-0.96
2,201.0	14.90	150.70	2,181.8	-183.7	61.4	193.0	0.25	-0.11	-0.86
2,294.0	15.10	153.60	2,271.7	-204.9	72.7	217.0	0.84	0.22	3.12
2,388.0	15.60	155.60	2,362.3	-227.4	83.3	241.9	0.77	0.53	2.13
2,481.0	16.00	154.90	2,451.8	-250.4	93.9	267.2	0.48	0.43	-0.75
2,575.0	17.50	155.40	2,541.8	-275.0	105.3	294.3	1.60	1.60	0.53
2,668.0	18.20	155.40	2,630.3	-300.9	117.2	322.8	0.75	0.75	0.00
2,762.0	17.80	155.70	2,719.7	-327.4	129.2	351.8	0.44	-0.43	0.32
2,856.0	17.20	158.50	2,809.4	-353.4	140.2	380.1	1.10	-0.64	2.98
2,949.0	17.40	158.90	2,898.2	-379.2	150.2	407.7	0.25	0.22	0.43
3,043.0	17.40	157.40	2,987.9	-405.2	160.7	435.8	0.48	0.00	-1.60
3,137.0	16.40	155.70	3,077.8	-430.3	171.6	463.1	1.19	-1.06	-1.81
3,230.0	16.30	154.60	3,167.1	-454.1	182.6	489.3	0.35	-0.11	-1.18
3,323.0	15.40	155.40	3,256.5	-477.1	193.3	514.7	1.00	-0.97	0.86
3,417.0	14.60	154.20	3,347.3	-499.1	203.7	539.0	0.91	-0.85	-1.28
3,510.0	13.90	156.30	3,437.4	-519.9	213.2	561.9	0.94	-0.75	2.26
3,604.0	13.20	158.70	3,528.8	-540.2	221.7	583.9	0.96	-0.74	2.55
3,697.0	13.10	155.10	3,619.4	-559.7	230.0	605.0	0.89	-0.11	-3.87
3,791.0	15.30	156.10	3,710.5	-580.7	239.5	628.1	2.35	2.34	1.06
3,885.0	16.00	156.30	3,801.0	-603.9	249.7	653.4	0.75	0.74	0.21
3,978.0	16.90	156.40	3,890.2	-628.0	260.3	679.8	0.97	0.97	0.11
4,071.0	16.10	157.30	3,979.4	-652.3	270.7	706.2	0.90	-0.86	0.97
4,165.0	14.60	155.80	4,070.0	-675.1	280.6	731.1	1.65	-1.60	-1.60
4,258.0	14.90	156.80	4,160.0	-696.8	290.1	754.7	0.42	0.32	1.08
4,352.0	15.60	156.30	4,250.7	-719.5	299.9	779.5	0.76	0.74	-0.53
4,445.0	14.50	156.70	4,340.5	-741.6	309.6	803.6	1.19	-1.18	0.43
4,539.0	14.20	156.20	4,431.5	-763.0	318.9	826.9	0.35	-0.32	-0.53
4,633.0	12.10	156.70	4,523.1	-782.6	327.4	848.3	2.24	-2.23	0.53
4,726.0	10.90	155.50	4,614.2	-799.5	334.9	866.8	1.32	-1.29	-1.29
4,820.0	9.50	155.80	4,706.7	-814.7	341.8	883.5	1.49	-1.49	0.32
4,913.0	9.10	151.10	4,798.5	-828.1	348.5	898.5	0.92	-0.43	-5.05
5,007.0	6.50	150.80	4,891.6	-839.3	354.7	911.1	2.77	-2.77	-0.32
5,101.0	5.80	151.20	4,985.1	-848.1	359.6	921.2	0.75	-0.74	0.43
5,195.0	3.90	141.50	5,078.7	-854.8	363.8	929.0	2.19	-2.02	-10.32
5,288.0	2.80	145.10	5,171.6	-859.1	367.1	934.2	1.20	-1.18	3.87
5,382.0	0.10	312.40	5,265.5	-860.9	368.4	936.4	3.08	-2.87	177.98
5,475.0	0.30	283.90	5,358.5	-860.8	368.1	936.2	0.23	0.22	-30.65
5,569.0	0.30	304.30	5,452.5	-860.6	367.6	935.8	0.11	0.00	21.70
5,662.0	0.40	254.10	5,545.5	-860.6	367.1	935.6	0.33	0.11	-53.98
5,756.0	0.20	226.30	5,639.5	-860.8	366.7	935.6	0.26	-0.21	-29.57
5,850.0	0.50	178.10	5,733.5	-861.3	366.6	936.1	0.42	0.32	-51.28
5,943.0	0.60	170.20	5,826.5	-862.2	366.7	936.9	0.13	0.11	-8.49
6,037.0	0.70	165.50	5,920.5	-863.2	366.9	938.0	0.12	0.11	-5.00
6,130.0	0.70	163.30	6,013.5	-864.3	367.2	939.1	0.03	0.00	-2.37
6,224.0	0.80	160.60	6,107.5	-865.5	367.6	940.3	0.11	0.11	-2.87
6,317.0	0.80	157.30	6,200.5	-866.7	368.0	941.6	0.05	0.00	-3.55
6,411.0	0.90	157.00	6,294.5	-868.0	368.6	943.0	0.11	0.11	-0.32
6,504.0	0.90	151.60	6,387.5	-869.3	369.2	944.5	0.09	0.00	-5.81
6,598.0	1.00	154.00	6,481.5	-870.7	369.9	946.0	0.11	0.11	2.55



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6,691.0	1.10	149.70	6,574.4	-872.2	370.7	947.7	0.14	0.11	-4.62
6,785.0	1.30	144.30	6,668.4	-873.8	371.8	949.6	0.24	0.21	-5.74
6,878.0	1.60	146.50	6,761.4	-875.8	373.1	951.9	0.33	0.32	2.37
6,972.0	2.00	148.00	6,855.3	-878.3	374.7	954.9	0.43	0.43	1.60
7,066.0	2.50	146.70	6,949.3	-881.4	376.7	958.5	0.53	0.53	-1.38
7,159.0	2.10	143.60	7,042.2	-884.4	378.9	962.2	0.45	-0.43	-3.33
7,253.0	2.20	154.10	7,136.1	-887.4	380.7	965.6	0.43	0.11	11.17
7,346.0	2.30	162.80	7,229.1	-890.8	382.0	969.3	0.38	0.11	9.35
7,440.0	0.90	176.60	7,323.0	-893.4	382.6	971.8	1.53	-1.49	14.68
7,532.0	0.70	199.80	7,415.0	-894.6	382.4	972.9	0.41	-0.22	25.22
7,579.0	0.70	199.80	7,462.0	-895.2	382.3	973.4	0.00	0.00	0.00

Checked By: _____	Approved By: _____	Date: _____
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