

# PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Thornton 28S-403**

Surface Location: Thornton 28SW-HZ Pad Sec.28-T7N-R66W  
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

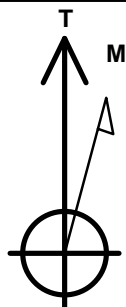
Ground Elevation: 4935.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1442374.53	3200912.00	40.545470	-104.777060	

RKB-15' WELL @ 4950.0ft (RKB-15')

## WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
BHL 2140'FNL & 1131'FEL, SEC.33	7396.0	-4641.4	-408.6	Point



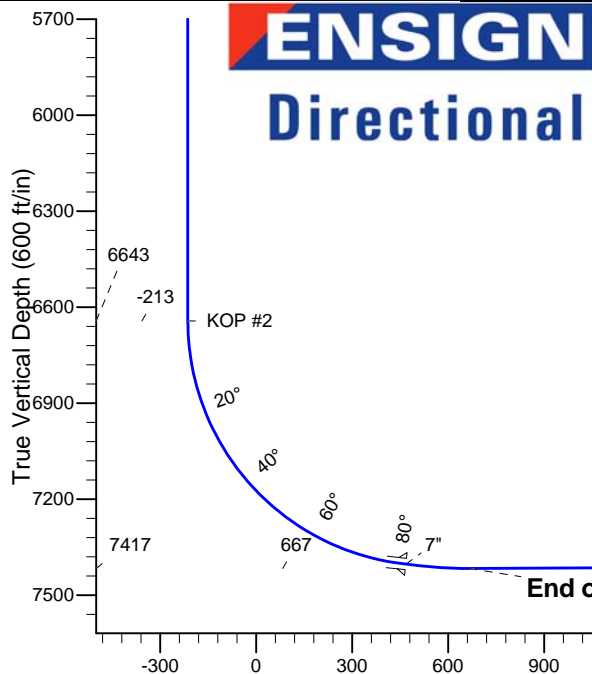
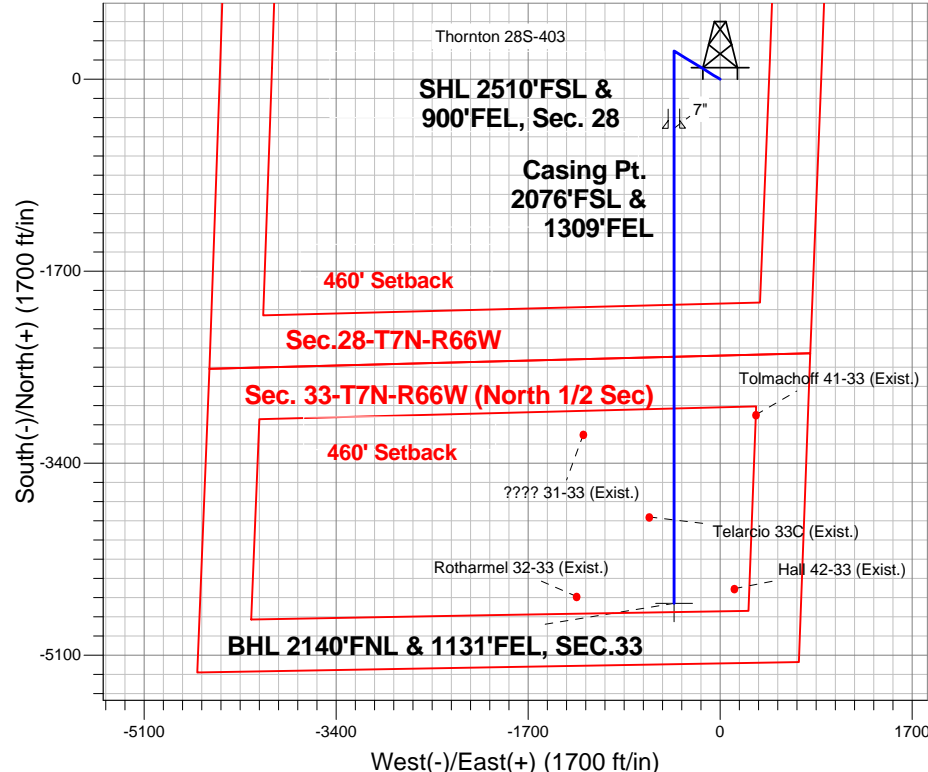
Azimuths to True North  
Magnetic North: 8.62°

Magnetic Field  
Strength: 52997.5snT  
Dip Angle: 67.10°  
Date: 6/4/2013  
Model: IGRF2010

Thornton 28SW-HZ Pad Sec.28-T7N-R66W  
Thornton 28S-403  
Plan #1 (06-04-13)  
11:12, June 11 2013

## ANNOTATIONS

TVD	MD	Annotation
1000.0	1000.0	KOP #1
6643.3	6673.7	KOP #2
7417.0	7993.7	End of Build



## SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1000.0	0.00	0.00	1000.0	0.0	0.0	0.00	0.00	0.0	
3	1376.6	7.53	301.46	1375.5	12.9	-21.1	2.00	301.46	-11.0	
4	4653.8	7.53	301.46	4624.5	237.1	-387.5	0.00	0.00	-202.2	
5	5030.4	0.00	0.00	5000.0	250.0	-408.6	2.00	180.00	-213.2	
6	6673.7	0.00	0.00	6643.2	250.0	-408.6	0.00	0.00	-213.2	
7	7793.7	84.00	180.00	7403.0	-434.1	-408.6	7.50	180.00	468.3	
8	7867.7	84.00	180.00	7410.7	-507.7	-408.6	0.00	0.00	541.6	
9	7993.7	90.30	180.00	7417.0	-633.5	-408.6	5.00	0.00	666.9	
10	12001.7	90.30	180.00	7396.0	-4641.4	-408.6	0.00	0.00	4659.4	BHL 2140'FNL & 1131'FEL, SEC.33

BHL 2140'FNL & 1131'FEL, SEC.33

Vertical Section at 185.03° (600 ft/in)



# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.28-T7N-R66W**

**Thornton 28SW-HZ Pad Sec.28-T7N-R66W**

**Thornton 28S-403**

**Wellbore #1**

**Plan: Plan #1 (06-04-13)**

## **Standard Planning Report**

**11 June, 2013**

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Project:</b>	SEC.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1 (06-04-13)		

<b>Project</b>	SEC.28-T7N-R66W, Weld Country		
<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		Thornton 28SW-HZ Pad Sec.28-T7N-R66W			
Site Position:		Northing:	1,442,374.80 ft	Latitude:	40.545470
From:	Lat/Long	Easting:	3,200,942.57 ft	Longitude:	-104.776950
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.47 °

Well	Thornton 28S-403					
Well Position	+N/-S	0.0 ft	Northing:	1,442,374.53 ft	Latitude:	40.545470
	+E/-W	-30.6 ft	Easting:	3,200,912.00 ft	Longitude:	-104.777060
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,935.0 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	6/4/2013	8.62	67.10	52,998

<b>Design</b>	Plan #1 (06-04-13)			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<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	185.03

<b>Plan Sections</b>										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,376.6	7.53	301.46	1,375.5	12.9	-21.1	2.00	2.00	0.00	301.46	
4,653.8	7.53	301.46	4,624.5	237.1	-387.5	0.00	0.00	0.00	0.00	
5,030.4	0.00	0.00	5,000.0	250.0	-408.6	2.00	-2.00	0.00	180.00	
6,673.7	0.00	0.00	6,643.2	250.0	-408.6	0.00	0.00	0.00	0.00	
7,793.7	84.00	180.00	7,403.0	-434.1	-408.6	7.50	7.50	0.00	180.00	
7,867.7	84.00	180.00	7,410.7	-507.7	-408.6	0.00	0.00	0.00	0.00	
7,993.7	90.30	180.00	7,417.0	-633.5	-408.6	5.00	5.00	0.00	0.00	
12,001.7	90.30	180.00	7,396.0	-4,641.4	-408.6	0.00	0.00	0.00	0.00	BHL 2140'FNL & 11

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Project:</b>	SEC.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1 (06-04-13)		

Planned 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
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
1,100.0	2.00	301.46	1,100.0	0.9	-1.5	-0.8	2.00	2.00	0.00
1,200.0	4.00	301.46	1,199.8	3.6	-6.0	-3.1	2.00	2.00	0.00
1,300.0	6.00	301.46	1,299.5	8.2	-13.4	-7.0	2.00	2.00	0.00
1,376.6	7.53	301.46	1,375.5	12.9	-21.1	-11.0	2.00	2.00	0.00
1,400.0	7.53	301.46	1,398.7	14.5	-23.7	-12.4	0.00	0.00	0.00
1,500.0	7.53	301.46	1,497.9	21.3	-34.9	-18.2	0.00	0.00	0.00
1,600.0	7.53	301.46	1,597.0	28.2	-46.1	-24.0	0.00	0.00	0.00
1,700.0	7.53	301.46	1,696.1	35.0	-57.2	-29.9	0.00	0.00	0.00
1,800.0	7.53	301.46	1,795.3	41.9	-68.4	-35.7	0.00	0.00	0.00
1,900.0	7.53	301.46	1,894.4	48.7	-79.6	-41.5	0.00	0.00	0.00
2,000.0	7.53	301.46	1,993.5	55.5	-90.8	-47.4	0.00	0.00	0.00
2,100.0	7.53	301.46	2,092.7	62.4	-102.0	-53.2	0.00	0.00	0.00
2,200.0	7.53	301.46	2,191.8	69.2	-113.2	-59.0	0.00	0.00	0.00
2,300.0	7.53	301.46	2,290.9	76.1	-124.3	-64.9	0.00	0.00	0.00
2,400.0	7.53	301.46	2,390.1	82.9	-135.5	-70.7	0.00	0.00	0.00
2,500.0	7.53	301.46	2,489.2	89.8	-146.7	-76.5	0.00	0.00	0.00
2,600.0	7.53	301.46	2,588.4	96.6	-157.9	-82.4	0.00	0.00	0.00
2,700.0	7.53	301.46	2,687.5	103.4	-169.1	-88.2	0.00	0.00	0.00
2,800.0	7.53	301.46	2,786.6	110.3	-180.2	-94.0	0.00	0.00	0.00
2,900.0	7.53	301.46	2,885.8	117.1	-191.4	-99.9	0.00	0.00	0.00
3,000.0	7.53	301.46	2,984.9	124.0	-202.6	-105.7	0.00	0.00	0.00
3,100.0	7.53	301.46	3,084.0	130.8	-213.8	-111.5	0.00	0.00	0.00
3,200.0	7.53	301.46	3,183.2	137.6	-225.0	-117.4	0.00	0.00	0.00
3,300.0	7.53	301.46	3,282.3	144.5	-236.2	-123.2	0.00	0.00	0.00
3,400.0	7.53	301.46	3,381.5	151.3	-247.3	-129.0	0.00	0.00	0.00
3,500.0	7.53	301.46	3,480.6	158.2	-258.5	-134.9	0.00	0.00	0.00
3,600.0	7.53	301.46	3,579.7	165.0	-269.7	-140.7	0.00	0.00	0.00
3,700.0	7.53	301.46	3,678.9	171.8	-280.9	-146.6	0.00	0.00	0.00
3,800.0	7.53	301.46	3,778.0	178.7	-292.1	-152.4	0.00	0.00	0.00
3,900.0	7.53	301.46	3,877.1	185.5	-303.2	-158.2	0.00	0.00	0.00
4,000.0	7.53	301.46	3,976.3	192.4	-314.4	-164.1	0.00	0.00	0.00
4,100.0	7.53	301.46	4,075.4	199.2	-325.6	-169.9	0.00	0.00	0.00
4,200.0	7.53	301.46	4,174.6	206.1	-336.8	-175.7	0.00	0.00	0.00
4,300.0	7.53	301.46	4,273.7	212.9	-348.0	-181.6	0.00	0.00	0.00
4,400.0	7.53	301.46	4,372.8	219.7	-359.2	-187.4	0.00	0.00	0.00
4,500.0	7.53	301.46	4,472.0	226.6	-370.3	-193.2	0.00	0.00	0.00
4,600.0	7.53	301.46	4,571.1	233.4	-381.5	-199.1	0.00	0.00	0.00
4,653.8	7.53	301.46	4,624.5	237.1	-387.5	-202.2	0.00	0.00	0.00
4,700.0	6.61	301.46	4,670.3	240.1	-392.4	-204.7	2.00	-2.00	0.00
4,800.0	4.61	301.46	4,769.8	245.2	-400.7	-209.1	2.00	-2.00	0.00
4,900.0	2.61	301.46	4,869.6	248.5	-406.1	-211.9	2.00	-2.00	0.00

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<b>Project:</b>	SEC.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1 (06-04-13)		

Planned 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)
5,000.0	0.61	301.46	4,969.6	249.9	-408.5	-213.1	2.00	-2.00	0.00
5,030.4	0.00	0.00	5,000.0	250.0	-408.6	-213.2	2.00	-2.00	0.00
5,100.0	0.00	0.00	5,069.6	250.0	-408.6	-213.2	0.00	0.00	0.00
5,200.0	0.00	0.00	5,169.6	250.0	-408.6	-213.2	0.00	0.00	0.00
5,300.0	0.00	0.00	5,269.6	250.0	-408.6	-213.2	0.00	0.00	0.00
5,400.0	0.00	0.00	5,369.6	250.0	-408.6	-213.2	0.00	0.00	0.00
5,500.0	0.00	0.00	5,469.6	250.0	-408.6	-213.2	0.00	0.00	0.00
5,600.0	0.00	0.00	5,569.6	250.0	-408.6	-213.2	0.00	0.00	0.00
5,700.0	0.00	0.00	5,669.6	250.0	-408.6	-213.2	0.00	0.00	0.00
5,800.0	0.00	0.00	5,769.6	250.0	-408.6	-213.2	0.00	0.00	0.00
5,900.0	0.00	0.00	5,869.6	250.0	-408.6	-213.2	0.00	0.00	0.00
6,000.0	0.00	0.00	5,969.6	250.0	-408.6	-213.2	0.00	0.00	0.00
6,100.0	0.00	0.00	6,069.6	250.0	-408.6	-213.2	0.00	0.00	0.00
6,200.0	0.00	0.00	6,169.6	250.0	-408.6	-213.2	0.00	0.00	0.00
6,300.0	0.00	0.00	6,269.6	250.0	-408.6	-213.2	0.00	0.00	0.00
6,400.0	0.00	0.00	6,369.6	250.0	-408.6	-213.2	0.00	0.00	0.00
6,500.0	0.00	0.00	6,469.6	250.0	-408.6	-213.2	0.00	0.00	0.00
6,600.0	0.00	0.00	6,569.6	250.0	-408.6	-213.2	0.00	0.00	0.00
6,673.7	0.00	0.00	6,643.3	250.0	-408.6	-213.2	0.00	0.00	0.00
<b>KOP #2</b>									
6,700.0	1.97	180.00	6,669.5	249.5	-408.6	-212.7	7.51	7.51	0.00
6,800.0	9.47	180.00	6,769.0	239.6	-408.6	-202.8	7.50	7.50	0.00
6,900.0	16.97	180.00	6,866.3	216.7	-408.6	-180.0	7.50	7.50	0.00
7,000.0	24.47	180.00	6,959.7	181.4	-408.6	-144.8	7.50	7.50	0.00
7,100.0	31.97	180.00	7,047.8	134.1	-408.6	-97.7	7.50	7.50	0.00
7,200.0	39.47	180.00	7,128.9	75.8	-408.6	-39.6	7.50	7.50	0.00
7,300.0	46.97	180.00	7,201.7	7.3	-408.6	28.5	7.50	7.50	0.00
7,400.0	54.47	180.00	7,265.0	-70.0	-408.6	105.6	7.50	7.50	0.00
7,500.0	61.97	180.00	7,317.6	-155.0	-408.6	190.2	7.50	7.50	0.00
7,600.0	69.47	180.00	7,358.7	-246.1	-408.6	281.0	7.50	7.50	0.00
7,700.0	76.97	180.00	7,387.5	-341.8	-408.6	376.3	7.50	7.50	0.00
7,793.7	84.00	180.00	7,403.0	-434.1	-408.6	468.3	7.50	7.50	0.00
<b>7"</b>									
7,800.0	84.00	180.00	7,403.6	-440.4	-408.6	474.5	0.00	0.00	0.00
7,867.7	84.00	180.00	7,410.7	-507.7	-408.6	541.6	0.00	0.00	0.00
7,900.0	85.62	180.00	7,413.6	-539.9	-408.6	573.6	5.00	5.00	0.00
7,993.7	90.30	180.00	7,417.0	-633.5	-408.6	666.9	5.00	5.00	0.00
<b>End of Build</b>									
8,000.0	90.30	180.00	7,417.0	-639.8	-408.6	673.2	0.00	0.00	0.00
8,100.0	90.30	180.00	7,416.4	-739.8	-408.6	772.8	0.00	0.00	0.00
8,200.0	90.30	180.00	7,415.9	-839.8	-408.6	872.4	0.00	0.00	0.00
8,300.0	90.30	180.00	7,415.4	-939.8	-408.6	972.0	0.00	0.00	0.00
8,400.0	90.30	180.00	7,414.9	-1,039.8	-408.6	1,071.6	0.00	0.00	0.00
8,500.0	90.30	180.00	7,414.3	-1,139.8	-408.6	1,171.2	0.00	0.00	0.00
8,600.0	90.30	180.00	7,413.8	-1,239.8	-408.6	1,270.8	0.00	0.00	0.00
8,700.0	90.30	180.00	7,413.3	-1,339.8	-408.6	1,370.5	0.00	0.00	0.00
8,800.0	90.30	180.00	7,412.8	-1,439.8	-408.6	1,470.1	0.00	0.00	0.00
8,900.0	90.30	180.00	7,412.2	-1,539.8	-408.6	1,569.7	0.00	0.00	0.00
9,000.0	90.30	180.00	7,411.7	-1,639.8	-408.6	1,669.3	0.00	0.00	0.00
9,100.0	90.30	180.00	7,411.2	-1,739.8	-408.6	1,768.9	0.00	0.00	0.00
9,200.0	90.30	180.00	7,410.7	-1,839.8	-408.6	1,868.5	0.00	0.00	0.00
9,300.0	90.30	180.00	7,410.1	-1,939.8	-408.6	1,968.1	0.00	0.00	0.00
9,400.0	90.30	180.00	7,409.6	-2,039.8	-408.6	2,067.7	0.00	0.00	0.00

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Project:</b>	SEC.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #1 (06-04-13)		

## Planned 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)
9,500.0	90.30	180.00	7,409.1	-2,139.8	-408.6	2,167.4	0.00	0.00	0.00
9,600.0	90.30	180.00	7,408.6	-2,239.8	-408.6	2,267.0	0.00	0.00	0.00
9,700.0	90.30	180.00	7,408.1	-2,339.8	-408.6	2,366.6	0.00	0.00	0.00
9,800.0	90.30	180.00	7,407.5	-2,439.8	-408.6	2,466.2	0.00	0.00	0.00
9,900.0	90.30	180.00	7,407.0	-2,539.8	-408.6	2,565.8	0.00	0.00	0.00
10,000.0	90.30	180.00	7,406.5	-2,639.8	-408.6	2,665.4	0.00	0.00	0.00
10,100.0	90.30	180.00	7,406.0	-2,739.8	-408.6	2,765.0	0.00	0.00	0.00
10,200.0	90.30	180.00	7,405.4	-2,839.8	-408.6	2,864.7	0.00	0.00	0.00
10,300.0	90.30	180.00	7,404.9	-2,939.8	-408.6	2,964.3	0.00	0.00	0.00
10,400.0	90.30	180.00	7,404.4	-3,039.8	-408.6	3,063.9	0.00	0.00	0.00
10,500.0	90.30	180.00	7,403.9	-3,139.8	-408.6	3,163.5	0.00	0.00	0.00
10,600.0	90.30	180.00	7,403.3	-3,239.8	-408.6	3,263.1	0.00	0.00	0.00
10,700.0	90.30	180.00	7,402.8	-3,339.8	-408.6	3,362.7	0.00	0.00	0.00
10,800.0	90.30	180.00	7,402.3	-3,439.8	-408.6	3,462.3	0.00	0.00	0.00
10,900.0	90.30	180.00	7,401.8	-3,539.7	-408.6	3,561.9	0.00	0.00	0.00
11,000.0	90.30	180.00	7,401.2	-3,639.7	-408.6	3,661.6	0.00	0.00	0.00
11,100.0	90.30	180.00	7,400.7	-3,739.7	-408.6	3,761.2	0.00	0.00	0.00
11,200.0	90.30	180.00	7,400.2	-3,839.7	-408.6	3,860.8	0.00	0.00	0.00
11,300.0	90.30	180.00	7,399.7	-3,939.7	-408.6	3,960.4	0.00	0.00	0.00
11,400.0	90.30	180.00	7,399.2	-4,039.7	-408.6	4,060.0	0.00	0.00	0.00
11,500.0	90.30	180.00	7,398.6	-4,139.7	-408.6	4,159.6	0.00	0.00	0.00
11,600.0	90.30	180.00	7,398.1	-4,239.7	-408.6	4,259.2	0.00	0.00	0.00
11,700.0	90.30	180.00	7,397.6	-4,339.7	-408.6	4,358.9	0.00	0.00	0.00
11,800.0	90.30	180.00	7,397.1	-4,439.7	-408.6	4,458.5	0.00	0.00	0.00
11,900.0	90.30	180.00	7,396.5	-4,539.7	-408.6	4,558.1	0.00	0.00	0.00
12,000.0	90.30	180.00	7,396.0	-4,639.7	-408.6	4,657.7	0.00	0.00	0.00
12,001.7	90.30	180.00	7,396.0	-4,641.4	-408.6	4,659.4	0.00	0.00	0.00
BHL 2140'FNL & 1131'FEL, SEC.33									

## Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,793.7	7,403.0	7"	7	7-1/2

## Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	+E/-W (ft)	Comment
1,000.0	1,000.0	0.0	0.0	KOP #1
6,673.7	6,643.3	250.0	-408.6	KOP #2
7,993.7	7,417.0	-633.5	-408.6	End of Build



# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.28-T7N-R66W**

**Thornton 28SW-HZ Pad Sec.28-T7N-R66W**

**Thornton 28S-403**

**Wellbore #1**

**Plan #1 (06-04-13)**

## **Anticollision Report**

**11 June, 2013**



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #1 (06-04-13)		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	Stations	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 1,000.0ft	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.00 Sigma		

<b>Survey Tool Program</b>	<b>Date</b>	6/5/2013		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	12,001.7	Plan #1 (06-04-13) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Existing Wells						
???? 31-33 (Exist.) - Wellbore #1 - Wellbore #1	10,504.3	7,373.8	803.3	592.5	3.811	CC, ES
???? 31-33 (Exist.) - Wellbore #1 - Wellbore #1	10,600.0	7,373.3	808.9	596.4	3.806	SF
Hall 42-33 (Exist.) - Wellbore #1 - Wellbore #1	11,870.5	7,352.7	533.7	297.7	2.261	CC, ES
Hall 42-33 (Exist.) - Wellbore #1 - Wellbore #1	11,900.0	7,352.5	534.5	297.9	2.259	SF
Rotharmel 32-33 (Exist.) - Wellbore #1 - Wellbore #1	11,939.7	7,304.3	861.7	625.3	3.646	CC, ES
Rotharmel 32-33 (Exist.) - Wellbore #1 - Wellbore #1	12,001.7	7,304.0	863.9	626.4	3.637	SF
Telarcio 33C (Exist.) - Wellbore #1 - Wellbore #1	11,236.6	7,353.0	219.6	-4.5	0.980	Level 1, CC, ES, SF
Tolmachoff 41-33 (Exist.) - Wellbore #1 - Wellbore #1	10,329.4	7,374.8	725.5	517.9	3.495	CC, ES
Tolmachoff 41-33 (Exist.) - Wellbore #1 - Wellbore #1	10,400.0	7,374.4	728.9	520.1	3.490	SF
Thornton 28SW-HZ Pad Sec.28-T7N-R66W						
Thornton 28S-223 - Wellbore #1 - Plan #1 (06-04-13)	1,000.0	1,000.0	30.6	26.3	7.159	CC, ES
Thornton 28S-223 - Wellbore #1 - Plan #1 (06-04-13)	12,001.7	11,887.1	366.5	205.1	2.271	SF
Thornton 28W-103 - Wellbore #1 - Plan #1 (06-04-13)	1,000.0	1,000.0	89.0	84.7	20.843	CC, ES
Thornton 28W-103 - Wellbore #1 - Plan #1 (06-04-13)	12,001.7	11,764.3	981.5	806.7	5.613	SF
Thornton 28W-443 - Wellbore #1 - Plan #1 (06-04-13)	1,000.0	1,000.0	58.5	54.2	13.693	CC, ES
Thornton 28W-443 - Wellbore #1 - Plan #1 (06-04-13)	12,001.7	11,976.9	589.4	406.5	3.223	SF

<b>Offset Design</b>											
Existing Wells - ???? 31-33 (Exist.) - Wellbore #1 - Wellbore #1											
Survey Program: 0-UNKNOWN											
Reference											
Offset											
Semi Major Axis											
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)
10,000.0	7,406.5	7,376.5	7,376.5	54.3	147.5	90.19	-3,144.1	-1,211.9	948.4	746.9	201.52
10,100.0	7,406.0	7,376.0	7,376.0	56.2	147.5	90.15	-3,144.1	-1,211.9	899.3	695.9	203.35
10,200.0	7,405.4	7,375.4	7,375.4	58.0	147.5	90.11	-3,144.1	-1,211.9	859.0	653.8	205.18
10,300.0	7,404.9	7,374.9	7,374.9	59.8	147.5	90.08	-3,144.1	-1,211.9	828.8	621.8	207.02
10,400.0	7,404.4	7,374.4	7,374.4	61.7	147.5	90.04	-3,144.1	-1,211.9	810.0	601.1	208.86
10,500.0	7,403.9	7,373.9	7,373.9	63.5	147.5	90.00	-3,144.1	-1,211.9	803.3	592.6	210.71
10,504.3	7,403.8	7,373.8	7,373.8	63.6	147.5	90.00	-3,144.1	-1,211.9	803.3	592.5	210.79
10,600.0	7,403.3	7,373.3	7,373.3	65.4	147.5	89.96	-3,144.1	-1,211.9	808.9	596.4	212.56
10,700.0	7,402.8	7,372.8	7,372.8	67.2	147.5	89.93	-3,144.1	-1,211.9	826.8	612.3	214.42
10,800.0	7,402.3	7,372.3	7,372.3	69.1	147.4	89.89	-3,144.1	-1,211.9	856.0	639.7	216.28
											4.707
											4.422
											4.186
											4.004
											3.878
											3.812
											3.811
											3.806
											3.856
											3.958

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> Existing Wells - ??? 31-33 (Exist.) - Wellbore #1 - Wellbore #1													<b>Offset Site Error:</b>	0.0 ft
Survey Program: 0-UNKNOWN													<b>Offset Well Error:</b>	0.0 ft
Reference	Offset	Semi Major Axis		Distance										Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
10,900.0	7,401.8	7,371.8	7,371.8	71.0	147.4	89.85	-3,144.1	-1,211.9	895.4	677.3	218.14	4.105		
11,000.0	7,401.2	7,371.2	7,371.2	72.8	147.4	89.81	-3,144.1	-1,211.9	943.9	723.9	220.00	4.290		

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Existing Wells - Hall 42-33 (Exist.) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7500-UNKNOWN												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)		
11,100.0	7,400.7	7,356.7	7,356.7	74.7	147.1	-90.43	-4,510.3	125.1	937.3	715.7	221.59	4.230	
11,200.0	7,400.2	7,356.2	7,356.2	76.6	147.1	-90.38	-4,510.3	125.1	857.0	633.5	223.46	3.835	
11,300.0	7,399.7	7,355.7	7,355.7	78.4	147.1	-90.32	-4,510.3	125.1	781.3	555.9	225.33	3.467	
11,400.0	7,399.2	7,355.2	7,355.2	80.3	147.1	-90.26	-4,510.3	125.1	711.5	484.3	227.20	3.132	
11,500.0	7,398.6	7,354.6	7,354.6	82.2	147.1	-90.21	-4,510.3	125.1	649.7	420.6	229.08	2.836	
11,600.0	7,398.1	7,354.1	7,354.1	84.1	147.1	-90.15	-4,510.3	125.1	598.4	367.4	230.95	2.591	
11,700.0	7,397.6	7,353.6	7,353.6	86.0	147.1	-90.10	-4,510.3	125.1	560.3	327.5	232.83	2.406	
11,800.0	7,397.1	7,353.1	7,353.1	87.9	147.1	-90.04	-4,510.3	125.1	538.4	303.6	234.71	2.294	
11,870.5	7,396.7	7,352.7	7,352.7	89.2	147.1	-90.00	-4,510.3	125.1	533.7	297.7	236.03	2.261 CC, ES	
11,900.0	7,396.5	7,352.5	7,352.5	89.7	147.1	-89.98	-4,510.3	125.1	534.5	297.9	236.59	2.259 SF	
12,001.7	7,396.0	7,352.0	7,352.0	91.7	147.0	-89.93	-4,510.3	125.1	549.6	311.1	238.50	2.304	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> Existing Wells - Rotharmel 32-33 (Exist.) - Wellbore #1 - Wellbore #1													<b>Offset Site Error:</b>	0.0 ft
Survey Program: 7500-UNKNOWN													<b>Offset Well Error:</b>	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance				Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
11,500.0	7,398.6	7,306.6	7,306.6	82.2	146.1	90.15	-4,579.5	-1,270.3	967.4	739.3	228.11	4.241		
11,600.0	7,398.1	7,306.1	7,306.1	84.1	146.1	90.12	-4,579.5	-1,270.3	926.3	696.3	229.99	4.027		
11,700.0	7,397.6	7,305.6	7,305.6	86.0	146.1	90.08	-4,579.5	-1,270.3	894.4	662.6	231.87	3.858		
11,800.0	7,397.1	7,305.1	7,305.1	87.9	146.1	90.05	-4,579.5	-1,270.3	873.0	639.2	233.75	3.735		
11,900.0	7,396.5	7,304.5	7,304.5	89.7	146.1	90.01	-4,579.5	-1,270.3	862.6	627.0	235.63	3.661		
11,939.7	7,396.3	7,304.3	7,304.3	90.5	146.1	90.00	-4,579.5	-1,270.3	861.7	625.3	236.38	3.646 CC, ES		
12,001.7	7,396.0	7,304.0	7,304.0	91.7	146.1	89.98	-4,579.5	-1,270.3	863.9	626.4	237.54	3.637 SF		

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> Existing Wells - Telarcio 33C (Exist.) - Wellbore #1 - Wellbore #1													<b>Offset Site Error:</b>	0.0 ft
Survey Program: 7500-UNKNOWN													<b>Offset Well Error:</b>	0.0 ft
Reference	Offset	Semi Major Axis		Distance										Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
10,300.0	7,404.9	7,357.9	7,357.9	59.8	147.2	91.28	-3,876.3	-628.2	962.0	755.4	206.60	4.656		
10,400.0	7,404.4	7,357.4	7,357.4	61.7	147.1	91.14	-3,876.3	-628.2	864.9	656.5	208.46	4.149		
10,500.0	7,403.9	7,356.9	7,356.9	63.5	147.1	91.01	-3,876.3	-628.2	768.6	558.3	210.32	3.655		
10,600.0	7,403.3	7,356.3	7,356.3	65.4	147.1	90.87	-3,876.3	-628.2	673.4	461.2	212.18	3.174		
10,700.0	7,402.8	7,355.8	7,355.8	67.2	147.1	90.73	-3,876.3	-628.2	579.8	365.7	214.05	2.709		
10,800.0	7,402.3	7,355.3	7,355.3	69.1	147.1	90.60	-3,876.3	-628.2	488.7	272.8	215.91	2.263		
10,900.0	7,401.8	7,354.8	7,354.8	71.0	147.1	90.46	-3,876.3	-628.2	401.9	184.1	217.78	1.845		
11,000.0	7,401.2	7,354.2	7,354.2	72.8	147.1	90.32	-3,876.3	-628.2	322.8	103.1	219.65	1.470 Level 3		
11,100.0	7,400.7	7,353.7	7,353.7	74.7	147.1	90.19	-3,876.3	-628.2	258.6	37.1	221.52	1.167 Level 2		
11,200.0	7,400.2	7,353.2	7,353.2	76.6	147.1	90.05	-3,876.3	-628.2	222.6	-0.8	223.39	0.996 Level 1		
11,236.6	7,400.0	7,353.0	7,353.0	77.3	147.1	90.00	-3,876.3	-628.2	219.6	-4.5	224.08	0.980 Level 1, CC, ES, SF		
11,300.0	7,399.7	7,352.7	7,352.7	78.4	147.1	89.91	-3,876.3	-628.2	228.5	3.3	225.27	1.015 Level 2		
11,400.0	7,399.2	7,352.2	7,352.2	80.3	147.0	89.78	-3,876.3	-628.2	273.7	46.6	227.14	1.205 Level 2		
11,500.0	7,398.6	7,351.6	7,351.6	82.2	147.0	89.64	-3,876.3	-628.2	342.9	113.9	229.02	1.497 Level 3		
11,600.0	7,398.1	7,351.1	7,351.1	84.1	147.0	89.50	-3,876.3	-628.2	424.6	193.7	230.89	1.839		
11,700.0	7,397.6	7,350.6	7,350.6	86.0	147.0	89.37	-3,876.3	-628.2	512.8	280.0	232.77	2.203		
11,800.0	7,397.1	7,350.1	7,350.1	87.9	147.0	89.23	-3,876.3	-628.2	604.7	370.0	234.64	2.577		
11,900.0	7,396.5	7,349.5	7,349.5	89.7	147.0	89.09	-3,876.3	-628.2	698.8	462.3	236.52	2.954		
12,001.7	7,396.0	7,349.0	7,349.0	91.7	147.0	88.95	-3,876.3	-628.2	796.0	557.5	238.43	3.338		

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Offset Design</b> Existing Wells - Tolmachoff 41-33 (Exist.) - Wellbore #1 - Wellbore #1													<b>Offset Site Error:</b>	0.0 ft
Survey Program: 7500-UNKNOWN													<b>Offset Well Error:</b>	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
9,700.0	7,408.1	7,378.1	7,378.1	48.9	147.6	-90.26	-2,969.2	316.9	960.5	764.4	196.08	4.898		
9,800.0	7,407.5	7,377.5	7,377.5	50.7	147.6	-90.22	-2,969.2	316.9	898.1	700.2	197.89	4.539		
9,900.0	7,407.0	7,377.0	7,377.0	52.5	147.5	-90.18	-2,969.2	316.9	843.1	643.4	199.70	4.222		
10,000.0	7,406.5	7,376.5	7,376.5	54.3	147.5	-90.14	-2,969.2	316.9	796.8	595.3	201.53	3.954		
10,100.0	7,406.0	7,376.0	7,376.0	56.2	147.5	-90.09	-2,969.2	316.9	760.9	557.6	203.35	3.742		
10,200.0	7,405.4	7,375.4	7,375.4	58.0	147.5	-90.05	-2,969.2	316.9	736.9	531.8	205.19	3.592		
10,300.0	7,404.9	7,374.9	7,374.9	59.8	147.5	-90.01	-2,969.2	316.9	726.1	519.1	207.02	3.507		
10,329.4	7,404.8	7,374.8	7,374.8	60.4	147.5	-90.00	-2,969.2	316.9	725.5	517.9	207.57	3.495 CC, ES		
10,400.0	7,404.4	7,374.4	7,374.4	61.7	147.5	-89.97	-2,969.2	316.9	728.9	520.1	208.86	3.490 SF		
10,500.0	7,403.9	7,373.9	7,373.9	63.5	147.5	-89.93	-2,969.2	316.9	745.3	534.6	210.71	3.537		
10,600.0	7,403.3	7,373.3	7,373.3	65.4	147.5	-89.89	-2,969.2	316.9	774.3	561.7	212.56	3.643		
10,700.0	7,402.8	7,372.8	7,372.8	67.2	147.5	-89.85	-2,969.2	316.9	814.6	600.2	214.41	3.799		
10,800.0	7,402.3	7,372.3	7,372.3	69.1	147.4	-89.81	-2,969.2	316.9	864.7	648.5	216.27	3.998		
10,900.0	7,401.8	7,371.8	7,371.8	71.0	147.4	-89.76	-2,969.2	316.9	923.0	704.8	218.13	4.231		
11,000.0	7,401.2	7,371.2	7,371.2	72.8	147.4	-89.72	-2,969.2	316.9	987.9	767.9	219.99	4.491		

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 28SW-HZ Pad Sec.28-T7N-R66W - Thornton 28S-223 - Wellbore #1 - Plan #1 (06-04-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	89.97	0.0	30.6	30.6					
100.0	100.0	100.0	100.0	0.1	0.1	89.97	0.0	30.6	30.6	30.3	0.22	136.014		
200.0	200.0	200.0	200.0	0.3	0.3	89.97	0.0	30.6	30.6	29.9	0.67	45.338		
300.0	300.0	300.0	300.0	0.6	0.6	89.97	0.0	30.6	30.6	29.4	1.12	27.203		
400.0	400.0	400.0	400.0	0.8	0.8	89.97	0.0	30.6	30.6	29.0	1.57	19.431		
500.0	500.0	500.0	500.0	1.0	1.0	89.97	0.0	30.6	30.6	28.5	2.02	15.113		
600.0	600.0	600.0	600.0	1.2	1.2	89.97	0.0	30.6	30.6	28.1	2.47	12.365		
700.0	700.0	700.0	700.0	1.5	1.5	89.97	0.0	30.6	30.6	27.6	2.92	10.463		
800.0	800.0	800.0	800.0	1.7	1.7	89.97	0.0	30.6	30.6	27.2	3.37	9.068		
900.0	900.0	900.0	900.0	1.9	1.9	89.97	0.0	30.6	30.6	26.8	3.82	8.001		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	89.97	0.0	30.6	30.6	26.3	4.27	7.159 CC, ES		
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	150.12	0.0	30.6	32.1	27.4	4.71	6.806		
1,200.0	1,199.8	1,199.8	1,199.8	2.6	2.6	154.16	0.0	30.6	36.7	31.6	5.15	7.132		
1,300.0	1,299.5	1,299.5	1,299.5	2.8	2.8	158.97	0.0	30.6	44.7	39.1	5.58	8.016		
1,376.6	1,375.5	1,375.5	1,375.5	3.0	3.0	162.40	0.0	30.6	53.2	47.3	5.91	9.015		
1,400.0	1,398.7	1,398.7	1,398.7	3.0	3.0	163.35	0.0	30.6	56.2	50.2	6.01	9.349		
1,500.0	1,497.9	1,497.9	1,497.9	3.3	3.3	166.48	0.0	30.6	68.8	62.4	6.45	10.672		
1,600.0	1,597.0	1,597.0	1,597.0	3.6	3.5	168.63	0.0	30.6	81.6	74.8	6.90	11.841		
1,700.0	1,696.1	1,696.1	1,696.1	3.9	3.7	170.19	0.0	30.6	94.5	87.2	7.34	12.874		
1,800.0	1,795.3	1,795.3	1,795.3	4.2	3.9	171.38	0.0	30.6	107.5	99.7	7.79	13.792		
1,900.0	1,894.4	1,894.4	1,894.4	4.5	4.1	172.32	0.0	30.6	120.5	112.2	8.24	14.612		
2,000.0	1,993.5	1,993.5	1,993.5	4.8	4.4	173.07	0.0	30.6	133.5	124.8	8.70	15.346		
2,100.0	2,092.7	2,096.5	2,096.5	5.1	4.6	173.31	1.5	29.9	145.3	136.1	9.16	15.867		
2,200.0	2,191.8	2,200.3	2,200.1	5.4	4.8	172.63	6.3	27.5	154.3	144.7	9.62	16.048		
2,300.0	2,290.9	2,304.3	2,303.8	5.7	5.1	171.16	14.5	23.5	160.6	150.6	10.08	15.932		
2,400.0	2,390.1	2,407.0	2,405.7	6.0	5.3	169.00	25.8	18.0	164.5	154.0	10.56	15.587		
2,500.0	2,489.2	2,506.7	2,504.5	6.3	5.6	166.80	37.4	12.3	168.1	157.1	11.04	15.232		
2,600.0	2,588.4	2,606.5	2,603.4	6.6	5.8	164.69	49.1	6.6	171.9	160.4	11.53	14.911		
2,700.0	2,687.5	2,706.2	2,702.3	7.0	6.1	162.68	60.8	0.9	175.9	163.9	12.03	14.621		
2,800.0	2,786.6	2,805.9	2,801.2	7.3	6.3	160.76	72.4	-4.8	180.1	167.6	12.55	14.357		
2,900.0	2,885.8	2,905.7	2,900.1	7.6	6.6	158.93	84.1	-10.4	184.5	171.5	13.07	14.117		
3,000.0	2,984.9	3,005.4	2,999.0	7.9	6.9	157.18	95.8	-16.1	189.1	175.5	13.61	13.898		
3,100.0	3,084.0	3,105.1	3,097.8	8.3	7.2	155.52	107.4	-21.8	193.9	179.7	14.16	13.697		
3,200.0	3,183.2	3,204.9	3,196.7	8.6	7.4	153.94	119.1	-27.5	198.8	184.1	14.71	13.512		
3,300.0	3,282.3	3,304.6	3,295.6	8.9	7.7	152.44	130.7	-33.2	203.9	188.6	15.28	13.343		
3,400.0	3,381.5	3,404.3	3,394.5	9.2	8.0	151.01	142.4	-38.9	209.0	193.2	15.85	13.187		
3,500.0	3,480.6	3,504.1	3,493.4	9.6	8.3	149.65	154.1	-44.6	214.4	197.9	16.43	13.044		
3,600.0	3,579.7	3,603.8	3,592.3	9.9	8.6	148.36	165.7	-50.3	219.8	202.8	17.02	12.912		
3,700.0	3,678.9	3,703.5	3,691.2	10.2	8.9	147.13	177.4	-56.0	225.3	207.7	17.62	12.790		
3,800.0	3,778.0	3,803.2	3,790.0	10.5	9.2	145.96	189.0	-61.6	231.0	212.7	18.22	12.678		
3,900.0	3,877.1	3,903.0	3,888.9	10.9	9.5	144.84	200.7	-67.3	236.7	217.9	18.82	12.574		
4,000.0	3,976.3	4,002.7	3,987.8	11.2	9.8	143.78	212.4	-73.0	242.5	223.1	19.43	12.478		
4,100.0	4,075.4	4,102.4	4,086.7	11.5	10.1	142.77	224.0	-78.7	248.4	228.3	20.05	12.390		
4,200.0	4,174.6	4,200.0	4,183.5	11.9	10.4	141.95	234.9	-84.0	254.6	233.9	20.63	12.337		
4,300.0	4,273.7	4,297.3	4,280.4	12.2	10.6	141.79	243.1	-88.0	261.8	240.7	21.13	12.390		
4,400.0	4,372.8	4,393.9	4,376.8	12.5	10.8	142.30	248.3	-90.6	270.1	248.6	21.57	12.526		
4,500.0	4,472.0	4,490.1	4,472.9	12.9	11.0	143.40	250.6	-91.7	279.7	257.8	21.95	12.743		
4,600.0	4,571.1	4,588.3	4,571.1	13.2	11.1	144.90	250.7	-91.7	290.3	268.0	22.31	13.012		
4,653.8	4,624.5	4,641.6	4,624.5	13.4	11.2	145.68	250.7	-91.7	296.1	273.6	22.52	13.152		
4,700.0	4,670.3	4,687.4	4,670.3	13.5	11.3	146.34	250.7	-91.7	300.8	278.2	22.69	13.258		
4,800.0	4,769.8	4,787.0	4,769.8	13.7	11.5	147.43	250.7	-91.7	309.0	286.0	23.05	13.408		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 28SW-HZ Pad Sec.28-T7N-R66W - Thornton 28S-223 - Wellbore #1 - Plan #1 (06-04-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,900.0	4,869.6	4,886.8	4,869.6	13.9	11.7	148.11		250.7	-91.7	314.4	291.0	23.40	13.434	
5,000.0	4,969.6	4,986.7	4,969.6	14.1	11.9	148.40		250.7	-91.7	316.8	293.0	23.75	13.339	
5,030.4	5,000.0	5,017.2	5,000.0	14.1	12.0	89.87		250.7	-91.7	316.9	293.1	23.85	13.287	
5,100.0	5,069.6	5,086.7	5,069.6	14.2	12.1	89.87		250.7	-91.7	316.9	292.8	24.12	13.140	
5,200.0	5,169.6	5,186.7	5,169.6	14.4	12.3	89.87		250.7	-91.7	316.9	292.4	24.52	12.926	
5,300.0	5,269.6	5,286.7	5,269.6	14.6	12.5	89.87		250.7	-91.7	316.9	292.0	24.92	12.718	
5,400.0	5,369.6	5,386.7	5,369.6	14.7	12.7	89.87		250.7	-91.7	316.9	291.6	25.32	12.516	
5,500.0	5,469.6	5,486.7	5,469.6	14.9	13.0	89.87		250.7	-91.7	316.9	291.2	25.72	12.319	
5,600.0	5,569.6	5,586.7	5,569.6	15.1	13.2	89.87		250.7	-91.7	316.9	290.8	26.13	12.128	
5,700.0	5,669.6	5,686.7	5,669.6	15.3	13.4	89.87		250.7	-91.7	316.9	290.4	26.54	11.942	
5,800.0	5,769.6	5,786.7	5,769.6	15.4	13.6	89.87		250.7	-91.7	316.9	290.0	26.94	11.761	
5,900.0	5,869.6	5,886.7	5,869.6	15.6	13.8	89.87		250.7	-91.7	316.9	289.5	27.35	11.585	
6,000.0	5,969.6	5,986.7	5,969.6	15.8	14.0	89.87		250.7	-91.7	316.9	289.1	27.76	11.414	
6,100.0	6,069.6	6,086.7	6,069.6	16.0	14.2	89.87		250.7	-91.7	316.9	288.7	28.18	11.247	
6,200.0	6,169.6	6,186.7	6,169.6	16.2	14.4	89.87		250.7	-91.7	316.9	288.3	28.59	11.084	
6,300.0	6,269.6	6,286.7	6,269.6	16.4	14.6	89.87		250.7	-91.7	316.9	287.9	29.00	10.926	
6,400.0	6,369.6	6,386.7	6,369.6	16.5	14.8	89.87		250.7	-91.7	316.9	287.5	29.42	10.772	
6,500.0	6,469.6	6,486.7	6,469.6	16.7	15.0	89.87		250.7	-91.7	316.9	287.1	29.84	10.622	
6,600.0	6,569.6	6,586.7	6,569.6	16.9	15.2	89.93		250.4	-91.7	316.9	286.7	30.24	10.479	
6,611.9	6,581.4	6,598.6	6,581.4	16.9	15.3	90.01		250.0	-91.7	316.9	286.6	30.28	10.464	
6,673.7	6,643.2	6,660.0	6,642.6	17.1	15.3	90.94		244.8	-91.7	316.9	286.5	30.45	10.410	
6,700.0	6,669.5	6,685.9	6,668.2	17.1	15.4	-88.48		241.2	-91.7	317.0	286.5	30.49	10.397	
6,750.0	6,719.4	6,734.8	6,716.2	17.2	15.4	-87.37		231.9	-91.7	317.2	286.7	30.55	10.385	
6,800.0	6,769.0	6,783.3	6,763.1	17.2	15.4	-86.29		219.7	-91.7	317.6	287.0	30.58	10.385	
6,850.0	6,818.0	6,831.4	6,808.9	17.3	15.5	-85.23		204.7	-91.7	318.0	287.4	30.59	10.395	
6,900.0	6,866.3	6,879.2	6,853.3	17.3	15.5	-84.19		187.0	-91.7	318.6	288.0	30.59	10.413	
6,950.0	6,913.6	6,926.7	6,896.2	17.3	15.5	-83.18		166.6	-91.7	319.2	288.6	30.58	10.436	
7,000.0	6,959.7	6,973.9	6,937.5	17.3	15.5	-82.21		143.9	-91.7	319.9	289.3	30.57	10.463	
7,050.0	7,004.5	7,020.8	6,977.0	17.3	15.5	-81.27		118.7	-91.7	320.7	290.1	30.57	10.489	
7,100.0	7,047.8	7,067.4	7,014.8	17.3	15.5	-80.38		91.4	-91.7	321.5	290.9	30.58	10.513	
7,150.0	7,089.3	7,113.7	7,050.6	17.3	15.5	-79.53		62.0	-91.7	322.3	291.7	30.60	10.532	
7,200.0	7,128.9	7,159.8	7,084.3	17.3	15.6	-78.72		30.6	-91.7	323.2	292.5	30.66	10.542	
7,250.0	7,166.4	7,205.7	7,116.0	17.4	15.6	-77.97		-2.6	-91.7	324.1	293.3	30.75	10.540	
7,300.0	7,201.7	7,250.0	7,144.7	17.4	15.6	-77.28		-36.4	-91.7	324.9	294.1	30.87	10.527	
7,350.0	7,234.6	7,296.8	7,172.7	17.4	15.8	-76.61		-73.8	-91.7	325.8	294.8	31.05	10.493	
7,400.0	7,265.0	7,342.1	7,197.7	17.4	15.9	-76.01		-111.6	-91.7	326.6	295.3	31.28	10.443	
7,450.0	7,292.7	7,387.2	7,220.3	17.5	16.1	-75.47		-150.7	-91.7	327.4	295.8	31.57	10.372	
7,500.0	7,317.6	7,432.2	7,240.4	17.6	16.4	-74.99		-190.9	-91.7	328.1	296.2	31.92	10.280	
7,550.0	7,339.6	7,477.1	7,258.2	17.7	16.6	-74.56		-232.1	-91.7	328.8	296.4	32.34	10.167	
7,600.0	7,358.7	7,521.8	7,273.4	17.9	16.9	-74.19		-274.2	-91.7	329.4	296.5	32.83	10.033	
7,650.0	7,374.7	7,566.5	7,286.1	18.2	17.3	-73.88		-317.0	-91.7	329.9	296.5	33.39	9.880	
7,700.0	7,387.5	7,611.1	7,296.3	18.5	17.6	-73.64		-360.4	-91.7	330.3	296.3	34.02	9.709	
7,750.0	7,397.2	7,655.6	7,304.0	18.9	18.0	-73.45		-404.2	-91.7	330.6	295.9	34.72	9.522	
7,793.7	7,403.0	7,694.5	7,308.5	19.3	18.4	-73.33		-442.8	-91.7	330.8	295.4	35.39	9.348	
7,800.0	7,403.6	7,700.0	7,309.0	19.4	18.5	-73.32		-448.3	-91.7	330.8	295.3	35.49	9.320	
7,867.7	7,410.7	7,760.1	7,311.8	20.0	19.1	-72.73		-508.3	-91.7	332.0	295.3	36.65	9.058	
7,900.0	7,413.6	7,789.1	7,311.4	20.4	19.4	-72.20		-537.4	-91.7	333.0	295.8	37.16	8.961	
7,993.7	7,417.0	7,882.6	7,309.1	21.4	20.5	-71.20		-630.9	-91.7	334.8	295.8	38.93	8.598	
8,000.0	7,417.0	7,888.9	7,309.0	21.5	20.6	-71.18		-637.2	-91.7	334.8	295.7	39.07	8.569	
8,100.0	7,416.4	7,988.9	7,306.6	22.7	21.9	-70.88		-737.1	-91.7	335.4	294.0	41.40	8.101	
8,200.0	7,415.9	8,088.9	7,304.1	24.1	23.2	-70.57		-837.1	-91.7	336.0	292.1	43.90	7.654	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 28SW-HZ Pad Sec.28-T7N-R66W - Thornton 28S-223 - Wellbore #1 - Plan #1 (06-04-13)											Offset Site Error: 0.0 ft		
Survey Program: 0-MWD											Offset Well Error: 0.0 ft		
Reference		Offset		Semi Major Axis			Distance				Warning		
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses		Minimum Separation	Separation Factor
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)		(ft)	
8,300.0	7,415.4	8,188.9	7,301.7	25.5	24.7	-70.26	-937.0	-91.7	336.7	290.1	46.54	7.234	
8,400.0	7,414.9	8,288.9	7,299.3	26.9	26.2	-69.96	-1,037.0	-91.7	337.3	288.0	49.29	6.844	
8,500.0	7,414.3	8,388.8	7,296.9	28.4	27.7	-69.66	-1,136.9	-91.7	338.0	285.9	52.13	6.483	
8,600.0	7,413.8	8,488.8	7,294.4	30.0	29.3	-69.36	-1,236.9	-91.7	338.6	283.6	55.05	6.152	
8,700.0	7,413.3	8,588.8	7,292.0	31.6	31.0	-69.06	-1,336.8	-91.7	339.3	281.3	58.02	5.848	
8,800.0	7,412.8	8,688.8	7,289.6	33.2	32.6	-68.76	-1,436.8	-91.7	340.0	279.0	61.05	5.569	
8,900.0	7,412.2	8,788.8	7,287.2	34.9	34.3	-68.46	-1,536.7	-91.7	340.7	276.6	64.12	5.314	
9,000.0	7,411.7	8,888.8	7,284.7	36.6	36.0	-68.16	-1,636.7	-91.7	341.4	274.2	67.22	5.079	
9,100.0	7,411.2	8,988.7	7,282.3	38.3	37.8	-67.87	-1,736.6	-91.7	342.1	271.8	70.34	4.864	
9,200.0	7,410.7	9,088.7	7,279.9	40.0	39.5	-67.57	-1,836.6	-91.7	342.8	269.3	73.49	4.665	
9,300.0	7,410.1	9,188.7	7,277.5	41.8	41.3	-67.28	-1,936.6	-91.7	343.6	266.9	76.65	4.482	
9,400.0	7,409.6	9,288.7	7,275.0	43.5	43.1	-66.99	-2,036.5	-91.7	344.3	264.5	79.83	4.313	
9,500.0	7,409.1	9,388.7	7,272.6	45.3	44.9	-66.69	-2,136.5	-91.7	345.1	262.0	83.02	4.156	
9,600.0	7,408.6	9,488.6	7,270.2	47.1	46.7	-66.41	-2,236.4	-91.7	345.8	259.6	86.21	4.011	
9,700.0	7,408.1	9,588.6	7,267.8	48.9	48.5	-66.12	-2,336.4	-91.7	346.6	257.2	89.41	3.876	
9,800.0	7,407.5	9,688.6	7,265.3	50.7	50.3	-65.83	-2,436.3	-91.7	347.4	254.7	92.60	3.751	
9,900.0	7,407.0	9,788.6	7,262.9	52.5	52.1	-65.54	-2,536.3	-91.7	348.1	252.3	95.80	3.634	
10,000.0	7,406.5	9,888.6	7,260.5	54.3	53.9	-65.26	-2,636.2	-91.7	348.9	249.9	99.00	3.524	
10,100.0	7,406.0	9,988.6	7,258.1	56.2	55.8	-64.98	-2,736.2	-91.7	349.7	247.5	102.20	3.422	
10,200.0	7,405.4	10,088.5	7,255.6	58.0	57.6	-64.70	-2,836.1	-91.7	350.5	245.1	105.39	3.326	
10,300.0	7,404.9	10,188.5	7,253.2	59.8	59.5	-64.42	-2,936.1	-91.7	351.4	242.8	108.58	3.236	
10,400.0	7,404.4	10,288.5	7,250.8	61.7	61.3	-64.14	-3,036.0	-91.7	352.2	240.4	111.76	3.151	
10,500.0	7,403.9	10,388.5	7,248.4	63.5	63.2	-63.86	-3,136.0	-91.7	353.0	238.1	114.93	3.072	
10,600.0	7,403.3	10,488.5	7,245.9	65.4	65.1	-63.58	-3,235.9	-91.7	353.9	235.8	118.10	2.996	
10,700.0	7,402.8	10,588.4	7,243.5	67.2	66.9	-63.31	-3,335.9	-91.7	354.7	233.4	121.26	2.925	
10,800.0	7,402.3	10,688.4	7,241.1	69.1	68.8	-63.03	-3,435.8	-91.7	355.6	231.2	124.41	2.858	
10,900.0	7,401.8	10,788.4	7,238.7	71.0	70.7	-62.76	-3,535.8	-91.7	356.4	228.9	127.55	2.795	
11,000.0	7,401.2	10,888.4	7,236.2	72.8	72.5	-62.49	-3,635.7	-91.7	357.3	226.6	130.68	2.734	
11,100.0	7,400.7	10,988.4	7,233.8	74.7	74.4	-62.22	-3,735.7	-91.7	358.2	224.4	133.80	2.677	
11,200.0	7,400.2	11,088.4	7,231.4	76.6	76.3	-61.95	-3,835.6	-91.7	359.1	222.2	136.91	2.623	
11,300.0	7,399.7	11,188.3	7,228.9	78.4	78.2	-61.68	-3,935.6	-91.7	360.0	220.0	140.01	2.571	
11,400.0	7,399.2	11,288.3	7,226.5	80.3	80.1	-61.42	-4,035.6	-91.7	360.9	217.8	143.10	2.522	
11,500.0	7,398.6	11,388.3	7,224.1	82.2	82.0	-61.15	-4,135.5	-91.7	361.8	215.6	146.17	2.475	
11,600.0	7,398.1	11,488.3	7,221.7	84.1	83.8	-60.89	-4,235.5	-91.7	362.7	213.5	149.24	2.430	
11,700.0	7,397.6	11,588.3	7,219.2	86.0	85.7	-60.63	-4,335.4	-91.7	363.6	211.4	152.29	2.388	
11,800.0	7,397.1	11,688.3	7,216.8	87.9	87.6	-60.37	-4,435.4	-91.7	364.6	209.2	155.33	2.347	
11,900.0	7,396.5	11,788.2	7,214.4	89.7	89.5	-60.11	-4,535.3	-91.7	365.5	207.2	158.36	2.308	
12,001.7	7,396.0	11,887.1	7,212.0	91.7	91.4	-59.85	-4,634.1	-91.7	366.5	205.1	161.39	2.271 SF	



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 28SW-HZ Pad Sec.28-T7N-R66W - Thornton 28W-103 - Wellbore #1 - Plan #1 (06-04-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	87.65	3.7	88.9	89.0					
100.0	100.0	100.0	100.0	0.1	0.1	87.65	3.7	88.9	89.0	88.8	0.22	396.012		
200.0	200.0	200.0	200.0	0.3	0.3	87.65	3.7	88.9	89.0	88.3	0.67	132.004		
300.0	300.0	300.0	300.0	0.6	0.6	87.65	3.7	88.9	89.0	87.9	1.12	79.202		
400.0	400.0	400.0	400.0	0.8	0.8	87.65	3.7	88.9	89.0	87.4	1.57	56.573		
500.0	500.0	500.0	500.0	1.0	1.0	87.65	3.7	88.9	89.0	87.0	2.02	44.001		
600.0	600.0	600.0	600.0	1.2	1.2	87.65	3.7	88.9	89.0	86.5	2.47	36.001		
700.0	700.0	700.0	700.0	1.5	1.5	87.65	3.7	88.9	89.0	86.1	2.92	30.462		
800.0	800.0	800.0	800.0	1.7	1.7	87.65	3.7	88.9	89.0	85.6	3.37	26.401		
900.0	900.0	900.0	900.0	1.9	1.9	87.65	3.7	88.9	89.0	85.2	3.82	23.295		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	87.65	3.7	88.9	89.0	84.7	4.27	20.843 CC, ES		
1,100.0	1,100.0	1,097.2	1,097.2	2.4	2.3	146.27	4.5	90.4	92.0	87.3	4.70	19.564		
1,200.0	1,199.8	1,194.0	1,193.8	2.6	2.6	146.47	6.9	94.6	100.8	95.7	5.12	19.679		
1,300.0	1,299.5	1,289.7	1,289.2	2.8	2.8	146.72	11.0	101.6	115.5	109.9	5.55	20.815		
1,376.6	1,375.5	1,362.8	1,361.9	3.0	3.0	146.92	15.1	108.8	130.6	124.7	5.88	22.201		
1,400.0	1,398.7	1,385.7	1,384.5	3.0	3.0	147.06	16.4	111.1	135.6	129.6	5.98	22.654		
1,500.0	1,497.9	1,483.3	1,481.5	3.3	3.3	147.55	22.3	121.2	157.0	150.5	6.43	24.414		
1,600.0	1,597.0	1,581.0	1,578.5	3.6	3.5	147.92	28.1	131.4	178.4	171.5	6.88	25.914		
1,700.0	1,696.1	1,678.7	1,675.5	3.9	3.8	148.22	33.9	141.5	199.8	192.4	7.35	27.198		
1,800.0	1,795.3	1,776.4	1,772.4	4.2	4.1	148.46	39.8	151.6	221.2	213.4	7.81	28.308		
1,900.0	1,894.4	1,874.0	1,869.4	4.5	4.3	148.65	45.6	161.7	242.6	234.3	8.29	29.269		
2,000.0	1,993.5	1,971.7	1,966.4	4.8	4.6	148.81	51.4	171.8	264.0	255.3	8.77	30.115		
2,100.0	2,092.7	2,069.4	2,063.4	5.1	4.9	148.95	57.3	181.9	285.5	276.2	9.25	30.860		
2,200.0	2,191.8	2,167.1	2,160.3	5.4	5.2	149.07	63.1	192.1	306.9	297.2	9.74	31.520		
2,300.0	2,290.9	2,264.7	2,257.3	5.7	5.5	149.18	68.9	202.2	328.3	318.1	10.23	32.108		
2,400.0	2,390.1	2,362.4	2,354.3	6.0	5.8	149.27	74.8	212.3	349.7	339.0	10.72	32.635		
2,500.0	2,489.2	2,460.1	2,451.3	6.3	6.1	149.35	80.6	222.4	371.2	360.0	11.21	33.110		
2,600.0	2,588.4	2,557.8	2,548.2	6.6	6.4	149.42	86.4	232.5	392.6	380.9	11.71	33.539		
2,700.0	2,687.5	2,655.4	2,645.2	7.0	6.6	149.48	92.3	242.6	414.0	401.8	12.20	33.929		
2,800.0	2,786.6	2,753.1	2,742.2	7.3	6.9	149.54	98.1	252.8	435.5	422.7	12.70	34.285		
2,900.0	2,885.8	2,850.8	2,839.2	7.6	7.2	149.60	103.9	262.9	456.9	443.7	13.20	34.610		
3,000.0	2,984.9	2,948.5	2,936.1	7.9	7.5	149.64	109.8	273.0	478.3	464.6	13.70	34.909		
3,100.0	3,084.0	3,046.2	3,033.1	8.3	7.8	149.69	115.6	283.1	499.7	485.5	14.20	35.184		
3,200.0	3,183.2	3,143.8	3,130.1	8.6	8.1	149.73	121.4	293.2	521.2	506.5	14.71	35.438		
3,300.0	3,282.3	3,241.5	3,227.1	8.9	8.4	149.76	127.3	303.3	542.6	527.4	15.21	35.673		
3,400.0	3,381.5	3,339.2	3,324.0	9.2	8.7	149.80	133.1	313.5	564.0	548.3	15.71	35.891		
3,500.0	3,480.6	3,436.9	3,421.0	9.6	9.0	149.83	138.9	323.6	585.5	569.2	16.22	36.095		
3,600.0	3,579.7	3,534.5	3,518.0	9.9	9.4	149.86	144.8	333.7	606.9	590.2	16.73	36.284		
3,700.0	3,678.9	3,632.2	3,615.0	10.2	9.7	149.89	150.6	343.8	628.3	611.1	17.23	36.461		
3,800.0	3,778.0	3,729.9	3,711.9	10.5	10.0	149.91	156.4	353.9	649.7	632.0	17.74	36.627		
3,900.0	3,877.1	3,827.6	3,808.9	10.9	10.3	149.94	162.3	364.0	671.2	652.9	18.25	36.783		
4,000.0	3,976.3	3,925.2	3,905.9	11.2	10.6	149.96	168.1	374.2	692.6	673.9	18.75	36.930		
4,100.0	4,075.4	4,022.9	4,002.9	11.5	10.9	149.98	173.9	384.3	714.0	694.8	19.26	37.067		
4,200.0	4,174.6	4,120.6	4,099.9	11.9	11.2	150.00	179.8	394.4	735.5	715.7	19.77	37.197		
4,300.0	4,273.7	4,218.3	4,196.8	12.2	11.5	150.02	185.6	404.5	756.9	736.6	20.28	37.320		
4,400.0	4,372.8	4,315.9	4,293.8	12.5	11.8	150.04	191.4	414.6	778.3	757.5	20.79	37.436		
4,500.0	4,472.0	4,413.6	4,390.8	12.9	12.1	150.05	197.3	424.7	799.8	778.5	21.30	37.546		
4,600.0	4,571.1	4,511.3	4,487.8	13.2	12.4	150.07	203.1	434.9	821.2	799.4	21.81	37.651		
4,653.8	4,624.5	4,563.9	4,540.0	13.4	12.6	150.08	206.2	440.3	832.7	810.6	22.09	37.705		
4,700.0	4,670.3	4,609.0	4,584.8	13.5	12.7	150.17	208.9	445.0	842.3	820.0	22.33	37.712		
4,800.0	4,769.8	4,707.3	4,682.3	13.7	13.0	150.26	214.8	455.2	860.9	838.0	22.83	37.704		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 28SW-HZ Pad Sec.28-T7N-R66W - Thornton 28W-103 - Wellbore #1 - Plan #1 (06-04-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,900.0	4,869.6	4,806.0	4,780.3	13.9	13.3	150.21	150.21	220.7	465.4	876.5	853.2	23.30	37.613	
5,000.0	4,969.6	4,905.1	4,878.7	14.1	13.6	150.02	150.02	226.6	475.7	889.1	865.4	23.74	37.446	
5,030.4	5,000.0	4,935.3	4,908.7	14.1	13.7	91.39	91.39	228.4	478.8	892.4	868.5	23.87	37.380	
5,100.0	5,069.6	5,004.4	4,977.3	14.2	13.9	91.12	91.12	232.6	485.9	899.5	875.3	24.18	37.205	
5,200.0	5,169.6	5,103.6	5,075.8	14.4	14.3	90.73	90.73	238.5	496.2	909.8	885.1	24.63	36.941	
5,300.0	5,269.6	5,209.5	5,180.9	14.6	14.6	90.33	90.33	244.8	507.1	920.0	894.9	25.09	36.675	
5,400.0	5,369.6	5,347.7	5,318.6	14.7	14.9	89.95	89.95	250.8	517.6	927.6	902.0	25.55	36.301	
5,500.0	5,469.6	5,486.8	5,457.6	14.9	15.1	89.78	89.78	253.5	522.3	931.0	905.0	26.00	35.810	
5,600.0	5,569.6	5,598.8	5,569.6	15.1	15.3	89.78	89.78	253.7	522.5	931.2	904.8	26.39	35.280	
5,700.0	5,669.6	5,698.8	5,669.6	15.3	15.5	89.78	89.78	253.7	522.5	931.2	904.4	26.79	34.761	
5,800.0	5,769.6	5,798.8	5,769.6	15.4	15.6	89.78	89.78	253.7	522.5	931.2	904.0	27.18	34.255	
5,900.0	5,869.6	5,898.8	5,869.6	15.6	15.8	89.78	89.78	253.7	522.5	931.2	903.6	27.58	33.761	
6,000.0	5,969.6	5,998.8	5,969.6	15.8	16.0	89.78	89.78	253.7	522.5	931.2	903.2	27.98	33.280	
6,100.0	6,069.6	6,098.8	6,069.6	16.0	16.2	89.78	89.78	253.7	522.5	931.2	902.8	28.38	32.810	
6,200.0	6,169.6	6,198.8	6,169.6	16.2	16.3	89.78	89.78	253.7	522.5	931.2	902.4	28.78	32.352	
6,300.0	6,269.6	6,298.8	6,269.6	16.4	16.5	89.78	89.78	253.7	522.5	931.2	902.0	29.19	31.904	
6,400.0	6,369.6	6,398.8	6,369.6	16.5	16.7	89.78	89.78	253.7	522.5	931.2	901.6	29.59	31.468	
6,500.0	6,469.6	6,498.9	6,469.7	16.7	16.9	89.89	89.89	251.9	522.5	931.2	901.2	29.97	31.067	
6,522.4	6,492.0	6,521.3	6,492.0	16.8	16.9	90.00	90.00	250.0	522.5	931.2	901.1	30.05	30.991	
6,600.0	6,569.6	6,597.5	6,567.3	16.9	17.0	90.69	90.69	238.8	522.5	931.2	901.0	30.28	30.751	
6,673.7	6,643.2	6,667.2	6,634.9	17.1	17.0	91.72	91.72	222.0	522.5	931.6	901.1	30.47	30.571	
6,700.0	6,669.5	6,691.4	6,658.0	17.1	17.0	-87.84	-87.84	214.8	522.5	931.9	901.4	30.53	30.523	
6,750.0	6,719.4	6,736.8	6,700.7	17.2	17.0	-87.01	-87.01	199.2	522.5	932.5	901.9	30.61	30.465	
6,800.0	6,769.0	6,781.5	6,741.7	17.2	17.0	-86.20	-86.20	181.4	522.5	933.4	902.7	30.67	30.435	
6,850.0	6,818.0	6,825.6	6,781.1	17.3	17.0	-85.41	-85.41	161.5	522.5	934.4	903.7	30.71	30.426	
6,900.0	6,866.3	6,869.2	6,818.7	17.3	17.1	-84.63	-84.63	139.8	522.5	935.5	904.8	30.74	30.435	
6,950.0	6,913.6	6,912.1	6,854.7	17.3	17.1	-83.88	-83.88	116.2	522.5	936.8	906.1	30.76	30.454	
7,000.0	6,959.7	6,954.6	6,888.8	17.3	17.1	-83.16	-83.16	90.9	522.5	938.2	907.4	30.78	30.478	
7,050.0	7,004.5	7,000.0	6,923.7	17.3	17.1	-82.42	-82.42	61.8	522.5	939.7	908.9	30.81	30.498	
7,100.0	7,047.8	7,038.2	6,951.6	17.3	17.1	-81.79	-81.79	35.8	522.5	941.3	910.4	30.85	30.507	
7,150.0	7,089.3	7,079.4	6,980.3	17.3	17.1	-81.16	-81.16	6.2	522.5	942.8	911.9	30.91	30.499	
7,200.0	7,128.9	7,120.2	7,007.1	17.3	17.1	-80.56	-80.56	-24.6	522.5	944.4	913.4	31.00	30.462	
7,250.0	7,166.4	7,160.8	7,032.0	17.4	17.2	-79.99	-79.99	-56.5	522.5	946.0	914.9	31.13	30.394	
7,300.0	7,201.7	7,200.0	7,054.5	17.4	17.2	-79.47	-79.47	-88.7	522.5	947.6	916.3	31.28	30.292	
7,350.0	7,234.6	7,240.9	7,076.1	17.4	17.3	-78.97	-78.97	-123.4	522.5	949.1	917.6	31.50	30.130	
7,400.0	7,265.0	7,280.6	7,095.4	17.4	17.4	-78.51	-78.51	-158.1	522.5	950.6	918.8	31.77	29.921	
7,450.0	7,292.7	7,320.1	7,112.7	17.5	17.5	-78.10	-78.10	-193.6	522.5	951.9	919.8	32.10	29.659	
7,500.0	7,317.6	7,359.4	7,128.0	17.6	17.7	-77.73	-77.73	-229.8	522.5	953.2	920.7	32.49	29.341	
7,550.0	7,339.6	7,400.0	7,141.9	17.7	17.9	-77.40	-77.40	-267.9	522.5	954.4	921.4	32.95	28.962	
7,600.0	7,358.7	7,437.6	7,152.9	17.9	18.1	-77.12	-77.12	-303.8	522.5	955.4	921.9	33.48	28.536	
7,650.0	7,374.7	7,476.4	7,162.5	18.2	18.4	-76.88	-76.88	-341.5	522.5	956.2	922.2	34.08	28.057	
7,700.0	7,387.5	7,515.2	7,170.1	18.5	18.7	-76.69	-76.69	-379.5	522.5	957.0	922.2	34.75	27.535	
7,750.0	7,397.2	7,550.0	7,175.3	18.9	19.0	-76.55	-76.55	-413.9	522.5	957.5	922.1	35.46	27.006	
7,793.7	7,403.0	7,587.7	7,179.1	19.3	19.4	-76.45	-76.45	-451.4	522.5	957.9	921.7	36.20	26.463	
7,800.0	7,403.6	7,592.6	7,179.5	19.4	19.4	-76.44	-76.44	-456.3	522.5	957.9	921.6	36.30	26.388	
7,867.7	7,410.7	7,650.0	7,181.4	20.0	20.0	-76.20	-76.20	-513.7	522.5	959.0	921.5	37.52	25.558	
7,900.0	7,413.6	7,670.8	7,181.0	20.4	20.2	-76.04	-76.04	-534.5	522.5	959.8	921.7	38.06	25.215	
7,993.7	7,417.0	7,764.3	7,178.8	21.4	21.3	-75.65	-75.65	-627.9	522.5	961.2	921.0	40.14	23.947	
8,000.0	7,417.0	7,770.6	7,178.7	21.5	21.3	-75.65	-75.65	-634.2	522.5	961.2	920.9	40.28	23.860	
8,100.0	7,416.4	7,870.6	7,176.4	22.7	22.6	-75.54	-75.54	-734.2	522.5	961.6	918.9	42.73	22.504	
8,200.0	7,415.9	7,970.6	7,174.1	24.1	23.9	-75.44	-75.44	-834.2	522.5	962.1	916.7	45.35	21.214	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 28SW-HZ Pad Sec.28-T7N-R66W - Thornton 28W-103 - Wellbore #1 - Plan #1 (06-04-13)												Offset Site Error: 0.0 ft	
Survey Program: 0-MWD												Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance					Warning	
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation		Separation Factor
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)		
8,300.0	7,415.4	8,070.6	7,171.7	25.5	25.3	-75.34	-934.1	522.5	962.5	914.4	48.12	20.004	
8,400.0	7,414.9	8,170.6	7,169.4	26.9	26.8	-75.23	-1,034.1	522.5	963.0	912.0	51.00	18.881	
8,500.0	7,414.3	8,270.5	7,167.1	28.4	28.3	-75.13	-1,134.0	522.5	963.5	909.5	53.99	17.846	
8,600.0	7,413.8	8,370.5	7,164.8	30.0	29.9	-75.03	-1,234.0	522.5	963.9	906.9	57.06	16.894	
8,700.0	7,413.3	8,470.5	7,162.5	31.6	31.5	-74.92	-1,333.9	522.5	964.4	904.2	60.20	16.020	
8,800.0	7,412.8	8,570.5	7,160.1	33.2	33.1	-74.82	-1,433.9	522.5	964.9	901.5	63.40	15.219	
8,900.0	7,412.2	8,670.5	7,157.8	34.9	34.8	-74.72	-1,533.9	522.5	965.3	898.7	66.65	14.484	
9,000.0	7,411.7	8,770.5	7,155.5	36.6	36.5	-74.61	-1,633.8	522.6	965.8	895.9	69.94	13.808	
9,100.0	7,411.2	8,870.4	7,153.2	38.3	38.2	-74.51	-1,733.8	522.6	966.3	893.0	73.27	13.187	
9,200.0	7,410.7	8,970.4	7,150.8	40.0	39.9	-74.41	-1,833.7	522.6	966.8	890.1	76.63	12.615	
9,300.0	7,410.1	9,070.4	7,148.5	41.8	41.7	-74.31	-1,933.7	522.6	967.3	887.2	80.02	12.087	
9,400.0	7,409.6	9,170.4	7,146.2	43.5	43.4	-74.20	-2,033.6	522.6	967.7	884.3	83.43	11.599	
9,500.0	7,409.1	9,270.4	7,143.9	45.3	45.2	-74.10	-2,133.6	522.6	968.2	881.4	86.86	11.146	
9,600.0	7,408.6	9,370.4	7,141.6	47.1	47.0	-74.00	-2,233.6	522.6	968.7	878.4	90.31	10.726	
9,700.0	7,408.1	9,470.3	7,139.2	48.9	48.8	-73.90	-2,333.5	522.6	969.2	875.4	93.78	10.335	
9,800.0	7,407.5	9,570.3	7,136.9	50.7	50.6	-73.79	-2,433.5	522.6	969.7	872.5	97.25	9.971	
9,900.0	7,407.0	9,670.3	7,134.6	52.5	52.4	-73.69	-2,533.4	522.6	970.2	869.5	100.74	9.631	
10,000.0	7,406.5	9,770.3	7,132.3	54.3	54.3	-73.59	-2,633.4	522.6	970.7	866.5	104.24	9.313	
10,100.0	7,406.0	9,870.3	7,130.0	56.2	56.1	-73.49	-2,733.3	522.6	971.2	863.5	107.74	9.015	
10,200.0	7,405.4	9,970.3	7,127.6	58.0	57.9	-73.39	-2,833.3	522.6	971.8	860.5	111.25	8.735	
10,300.0	7,404.9	10,070.2	7,125.3	59.8	59.8	-73.29	-2,933.3	522.6	972.3	857.5	114.77	8.471	
10,400.0	7,404.4	10,170.2	7,123.0	61.7	61.6	-73.18	-3,033.2	522.6	972.8	854.5	118.30	8.223	
10,500.0	7,403.9	10,270.2	7,120.7	63.5	63.5	-73.08	-3,133.2	522.6	973.3	851.5	121.83	7.989	
10,600.0	7,403.3	10,370.2	7,118.4	65.4	65.3	-72.98	-3,233.1	522.6	973.8	848.5	125.36	7.768	
10,700.0	7,402.8	10,470.2	7,116.0	67.2	67.2	-72.88	-3,333.1	522.6	974.4	845.5	128.89	7.559	
10,800.0	7,402.3	10,570.2	7,113.7	69.1	69.0	-72.78	-3,433.0	522.6	974.9	842.5	132.43	7.362	
10,900.0	7,401.8	10,670.2	7,111.4	71.0	70.9	-72.68	-3,533.0	522.6	975.4	839.5	135.97	7.174	
11,000.0	7,401.2	10,770.1	7,109.1	72.8	72.8	-72.58	-3,633.0	522.6	976.0	836.5	139.51	6.996	
11,100.0	7,400.7	10,870.1	7,106.8	74.7	74.6	-72.48	-3,732.9	522.6	976.5	833.5	143.06	6.826	
11,200.0	7,400.2	10,970.1	7,104.4	76.6	76.5	-72.38	-3,832.9	522.6	977.1	830.5	146.60	6.665	
11,300.0	7,399.7	11,070.1	7,102.1	78.4	78.4	-72.28	-3,932.8	522.6	977.6	827.5	150.14	6.511	
11,400.0	7,399.2	11,170.1	7,099.8	80.3	80.3	-72.18	-4,032.8	522.6	978.2	824.5	153.69	6.365	
11,500.0	7,398.6	11,270.1	7,097.5	82.2	82.1	-72.08	-4,132.7	522.6	978.7	821.5	157.23	6.225	
11,600.0	7,398.1	11,370.0	7,095.2	84.1	84.0	-71.98	-4,232.7	522.6	979.3	818.5	160.78	6.091	
11,700.0	7,397.6	11,470.0	7,092.8	86.0	85.9	-71.88	-4,332.7	522.6	979.8	815.5	164.32	5.963	
11,800.0	7,397.1	11,570.0	7,090.5	87.9	87.8	-71.78	-4,432.6	522.6	980.4	812.5	167.86	5.840	
11,900.0	7,396.5	11,670.0	7,088.2	89.7	89.7	-71.68	-4,532.6	522.6	980.9	809.5	171.40	5.723	
12,001.7	7,396.0	11,764.3	7,086.0	91.7	91.5	-71.58	-4,626.8	522.6	981.5	806.7	174.87	5.613 SF	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 28SW-HZ Pad Sec.28-T7N-R66W - Thornton 28W-443 - Wellbore #1 - Plan #1 (06-04-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	86.42	3.7	58.4	58.5					
100.0	100.0	100.0	100.0	0.1	0.1	86.42	3.7	58.4	58.5	58.3	0.22	260.172		
200.0	200.0	200.0	200.0	0.3	0.3	86.42	3.7	58.4	58.5	57.8	0.67	86.724		
300.0	300.0	300.0	300.0	0.6	0.6	86.42	3.7	58.4	58.5	57.4	1.12	52.034		
400.0	400.0	400.0	400.0	0.8	0.8	86.42	3.7	58.4	58.5	56.9	1.57	37.167		
500.0	500.0	500.0	500.0	1.0	1.0	86.42	3.7	58.4	58.5	56.5	2.02	28.908		
600.0	600.0	600.0	600.0	1.2	1.2	86.42	3.7	58.4	58.5	56.0	2.47	23.652		
700.0	700.0	700.0	700.0	1.5	1.5	86.42	3.7	58.4	58.5	55.6	2.92	20.013		
800.0	800.0	800.0	800.0	1.7	1.7	86.42	3.7	58.4	58.5	55.1	3.37	17.345		
900.0	900.0	900.0	900.0	1.9	1.9	86.42	3.7	58.4	58.5	54.7	3.82	15.304		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	86.42	3.7	58.4	58.5	54.2	4.27	13.693 CC, ES		
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	145.90	3.7	58.4	59.9	55.2	4.71	12.714		
1,200.0	1,199.8	1,199.8	1,199.8	2.6	2.6	148.47	3.7	58.4	64.3	59.2	5.15	12.495		
1,300.0	1,299.5	1,299.5	1,299.5	2.8	2.8	152.03	3.7	58.4	71.9	66.3	5.58	12.884		
1,376.6	1,375.5	1,375.5	1,375.5	3.0	3.0	154.99	3.7	58.4	80.0	74.1	5.91	13.535		
1,400.0	1,398.7	1,398.7	1,398.7	3.0	3.0	155.89	3.7	58.4	82.8	76.8	6.01	13.767		
1,500.0	1,497.9	1,497.9	1,497.9	3.3	3.3	159.12	3.7	58.4	94.9	88.5	6.46	14.700		
1,600.0	1,597.0	1,596.1	1,596.1	3.6	3.5	160.75	5.1	59.1	107.6	100.7	6.90	15.600		
1,700.0	1,696.1	1,694.3	1,694.1	3.9	3.7	160.47	9.6	61.3	121.2	113.9	7.35	16.499		
1,800.0	1,795.3	1,792.2	1,791.7	4.2	3.9	158.86	17.0	64.9	135.7	127.9	7.81	17.385		
1,900.0	1,894.4	1,890.8	1,889.8	4.5	4.1	156.93	26.0	69.4	150.8	142.5	8.28	18.216		
2,000.0	1,993.5	1,989.5	1,988.0	4.8	4.4	155.35	35.0	73.8	166.0	157.2	8.76	18.953		
2,100.0	2,092.7	2,088.3	2,086.2	5.1	4.6	154.03	44.1	78.2	181.3	172.0	9.24	19.608		
2,200.0	2,191.8	2,187.0	2,184.4	5.4	4.9	152.92	53.1	82.7	196.6	186.9	9.74	20.191		
2,300.0	2,290.9	2,285.7	2,282.7	5.7	5.1	151.97	62.1	87.1	212.1	201.8	10.24	20.712		
2,400.0	2,390.1	2,384.5	2,380.9	6.0	5.4	151.15	71.1	91.6	227.6	216.8	10.74	21.181		
2,500.0	2,489.2	2,483.2	2,479.1	6.3	5.6	150.44	80.2	96.0	243.1	231.8	11.25	21.602		
2,600.0	2,588.4	2,582.0	2,577.4	6.6	5.9	149.81	89.2	100.4	258.7	246.9	11.77	21.983		
2,700.0	2,687.5	2,680.7	2,675.6	7.0	6.2	149.25	98.2	104.9	274.2	262.0	12.28	22.329		
2,800.0	2,786.6	2,779.5	2,773.8	7.3	6.4	148.75	107.2	109.3	289.8	277.0	12.80	22.643		
2,900.0	2,885.8	2,878.2	2,872.1	7.6	6.7	148.31	116.2	113.7	305.5	292.2	13.32	22.931		
3,000.0	2,984.9	2,977.0	2,970.3	7.9	7.0	147.90	125.3	118.2	321.1	307.3	13.85	23.194		
3,100.0	3,084.0	3,075.7	3,068.5	8.3	7.2	147.54	134.3	122.6	336.8	322.4	14.37	23.436		
3,200.0	3,183.2	3,174.4	3,166.8	8.6	7.5	147.20	143.3	127.1	352.5	337.6	14.90	23.659		
3,300.0	3,282.3	3,273.2	3,265.0	8.9	7.8	146.90	152.3	131.5	368.1	352.7	15.43	23.865		
3,400.0	3,381.5	3,371.9	3,363.2	9.2	8.0	146.62	161.4	135.9	383.8	367.9	15.96	24.057		
3,500.0	3,480.6	3,470.7	3,461.5	9.6	8.3	146.36	170.4	140.4	399.5	383.0	16.49	24.234		
3,600.0	3,579.7	3,569.4	3,559.7	9.9	8.6	146.12	179.4	144.8	415.2	398.2	17.02	24.399		
3,700.0	3,678.9	3,668.2	3,657.9	10.2	8.9	145.90	188.4	149.2	431.0	413.4	17.55	24.554		
3,800.0	3,778.0	3,766.9	3,756.1	10.5	9.1	145.69	197.5	153.7	446.7	428.6	18.09	24.698		
3,900.0	3,877.1	3,865.7	3,854.4	10.9	9.4	145.50	206.5	158.1	462.4	443.8	18.62	24.833		
4,000.0	3,976.3	3,964.4	3,952.6	11.2	9.7	145.32	215.5	162.5	478.1	459.0	19.16	24.959		
4,100.0	4,075.4	4,063.1	4,050.8	11.5	10.0	145.15	224.5	167.0	493.9	474.2	19.69	25.079		
4,200.0	4,174.6	4,161.9	4,149.1	11.9	10.3	145.00	233.5	171.4	509.6	489.4	20.23	25.191		
4,300.0	4,273.7	4,264.5	4,251.2	12.2	10.5	144.87	242.6	175.9	525.2	504.4	20.76	25.296		
4,400.0	4,372.8	4,373.5	4,359.9	12.5	10.8	145.07	249.3	179.2	539.3	518.0	21.25	25.379		
4,500.0	4,472.0	4,482.7	4,469.1	12.9	11.0	145.63	252.2	180.6	551.5	529.8	21.70	25.421		
4,600.0	4,571.1	4,584.7	4,571.1	13.2	11.1	146.39	252.3	180.7	562.5	540.4	22.12	25.426		
4,653.8	4,624.5	4,638.1	4,624.5	13.4	11.2	146.78	252.3	180.7	568.4	546.1	22.36	25.420		
4,700.0	4,670.3	4,683.9	4,670.3	13.5	11.3	147.14	252.3	180.7	573.2	550.6	22.57	25.394		
4,800.0	4,769.8	4,783.4	4,769.8	13.7	11.5	147.75	252.3	180.7	581.4	558.5	22.99	25.292		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 28SW-HZ Pad Sec.28-T7N-R66W - Thornton 28W-443 - Wellbore #1 - Plan #1 (06-04-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
4,900.0	4,869.6	4,883.2	4,869.6	13.9	11.7	148.14	252.3	180.7	586.8	563.4	23.38	25.095		
5,000.0	4,969.6	4,983.2	4,969.6	14.1	11.9	148.30	252.3	180.7	589.2	565.4	23.75	24.805		
5,030.4	5,000.0	5,013.6	5,000.0	14.1	12.0	89.77	252.3	180.7	589.3	565.4	23.86	24.698		
5,100.0	5,069.6	5,083.2	5,069.6	14.2	12.1	89.77	252.3	180.7	589.3	565.2	24.13	24.425		
5,200.0	5,169.6	5,183.2	5,169.6	14.4	12.3	89.77	252.3	180.7	589.3	564.8	24.53	24.027		
5,300.0	5,269.6	5,283.2	5,269.6	14.6	12.5	89.77	252.3	180.7	589.3	564.4	24.93	23.641		
5,400.0	5,369.6	5,383.2	5,369.6	14.7	12.7	89.77	252.3	180.7	589.3	564.0	25.33	23.266		
5,500.0	5,469.6	5,483.2	5,469.6	14.9	12.9	89.77	252.3	180.7	589.3	563.6	25.73	22.900		
5,600.0	5,569.6	5,583.2	5,569.6	15.1	13.1	89.77	252.3	180.7	589.3	563.2	26.14	22.545		
5,700.0	5,669.6	5,683.2	5,669.6	15.3	13.4	89.77	252.3	180.7	589.3	562.8	26.55	22.200		
5,800.0	5,769.6	5,783.2	5,769.6	15.4	13.6	89.77	252.3	180.7	589.3	562.4	26.95	21.864		
5,900.0	5,869.6	5,883.2	5,869.6	15.6	13.8	89.77	252.3	180.7	589.3	561.9	27.36	21.536		
6,000.0	5,969.6	5,983.2	5,969.6	15.8	14.0	89.77	252.3	180.7	589.3	561.5	27.77	21.218		
6,100.0	6,069.6	6,083.2	6,069.6	16.0	14.2	89.77	252.3	180.7	589.3	561.1	28.19	20.908		
6,200.0	6,169.6	6,183.2	6,169.6	16.2	14.4	89.77	252.3	180.7	589.3	560.7	28.60	20.606		
6,300.0	6,269.6	6,283.2	6,269.6	16.4	14.6	89.77	252.3	180.7	589.3	560.3	29.01	20.312		
6,400.0	6,369.6	6,383.2	6,369.6	16.5	14.8	89.77	252.3	180.7	589.3	559.9	29.43	20.025		
6,500.0	6,469.6	6,483.2	6,469.6	16.7	15.0	89.77	252.3	180.7	589.3	559.5	29.84	19.746		
6,600.0	6,569.6	6,583.2	6,569.6	16.9	15.2	89.77	252.3	180.7	589.3	559.0	30.26	19.474		
6,673.7	6,643.2	6,656.9	6,643.2	17.1	15.4	89.77	252.3	180.7	589.3	558.7	30.57	19.278		
6,700.0	6,669.5	6,683.3	6,669.6	17.1	15.4	-90.23	251.9	180.7	589.3	558.6	30.66	19.219		
6,750.0	6,719.4	6,733.4	6,719.7	17.2	15.5	-90.23	248.6	180.7	589.3	558.5	30.80	19.132		
6,800.0	6,769.0	6,783.6	6,769.4	17.2	15.6	-90.23	242.0	180.7	589.3	558.4	30.91	19.067		
6,850.0	6,818.0	6,833.7	6,818.5	17.3	15.6	-90.24	232.1	180.7	589.3	558.3	30.99	19.019		
6,900.0	6,866.3	6,883.9	6,867.0	17.3	15.6	-90.24	219.0	180.7	589.3	558.3	31.04	18.985		
6,950.0	6,913.6	6,934.1	6,914.4	17.3	15.7	-90.24	202.8	180.7	589.3	558.2	31.08	18.963		
7,000.0	6,959.7	6,984.2	6,960.7	17.3	15.7	-90.23	183.5	180.7	589.3	558.2	31.10	18.947		
7,050.0	7,004.5	7,034.4	7,005.6	17.3	15.7	-90.23	161.3	180.7	589.3	558.2	31.13	18.933		
7,100.0	7,047.8	7,084.5	7,049.0	17.3	15.7	-90.23	136.1	180.7	589.3	558.1	31.16	18.915		
7,150.0	7,089.3	7,134.7	7,090.6	17.3	15.7	-90.22	108.1	180.7	589.3	558.1	31.20	18.887		
7,200.0	7,128.9	7,184.8	7,130.3	17.3	15.7	-90.22	77.5	180.7	589.3	558.0	31.27	18.843		
7,250.0	7,166.4	7,235.0	7,167.9	17.4	15.8	-90.21	44.3	180.7	589.3	557.9	31.38	18.777		
7,300.0	7,201.7	7,285.1	7,203.2	17.4	15.8	-90.20	8.7	180.7	589.3	557.8	31.54	18.684		
7,350.0	7,234.6	7,335.2	7,236.1	17.4	15.8	-90.19	-29.1	180.7	589.3	557.5	31.76	18.558		
7,400.0	7,265.0	7,385.4	7,266.5	17.4	16.0	-90.18	-68.9	180.7	589.3	557.3	32.04	18.395		
7,450.0	7,292.7	7,435.5	7,294.2	17.5	16.2	-90.17	-110.7	180.7	589.3	556.9	32.39	18.193		
7,500.0	7,317.6	7,485.6	7,319.1	17.6	16.4	-90.16	-154.2	180.7	589.3	556.5	32.83	17.952		
7,550.0	7,339.6	7,535.7	7,341.0	17.7	16.7	-90.15	-199.2	180.7	589.3	556.0	33.35	17.672		
7,600.0	7,358.7	7,585.8	7,360.0	17.9	17.0	-90.14	-245.6	180.7	589.3	555.3	33.95	17.357		
7,650.0	7,374.7	7,635.9	7,375.9	18.2	17.4	-90.13	-293.1	180.7	589.3	554.7	34.65	17.009		
7,700.0	7,387.5	7,686.0	7,388.6	18.5	17.7	-90.11	-341.5	180.7	589.3	553.9	35.42	16.636		
7,750.0	7,397.2	7,736.1	7,398.2	18.9	18.2	-90.10	-390.6	180.7	589.3	553.0	36.28	16.242		
7,793.7	7,403.0	7,779.8	7,403.9	19.3	18.6	-90.09	-434.0	180.7	589.3	552.2	37.09	15.888		
7,800.0	7,403.6	7,786.1	7,404.5	19.4	18.7	-90.09	-440.3	180.7	589.3	552.1	37.21	15.835		
7,867.7	7,410.7	7,853.8	7,411.6	20.0	19.4	-90.09	-507.6	180.7	589.3	550.7	38.59	15.270		
7,900.0	7,413.6	7,886.1	7,414.5	20.4	19.7	-90.08	-539.8	180.7	589.3	550.0	39.29	14.997		
7,993.7	7,417.0	7,979.9	7,417.6	21.4	20.8	-90.06	-633.5	180.7	589.3	547.8	41.46	14.214		
8,000.0	7,417.0	7,986.2	7,417.6	21.5	20.9	-90.06	-639.8	180.7	589.3	547.7	41.61	14.162		
8,100.0	7,416.4	8,086.2	7,417.1	22.7	22.1	-90.06	-739.8	180.7	589.3	545.2	44.14	13.350		
8,200.0	7,415.9	8,186.2	7,416.5	24.1	23.5	-90.06	-839.8	180.7	589.3	542.5	46.85	12.579		
8,300.0	7,415.4	8,286.2	7,416.0	25.5	24.9	-90.06	-939.8	180.7	589.3	539.6	49.70	11.856		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

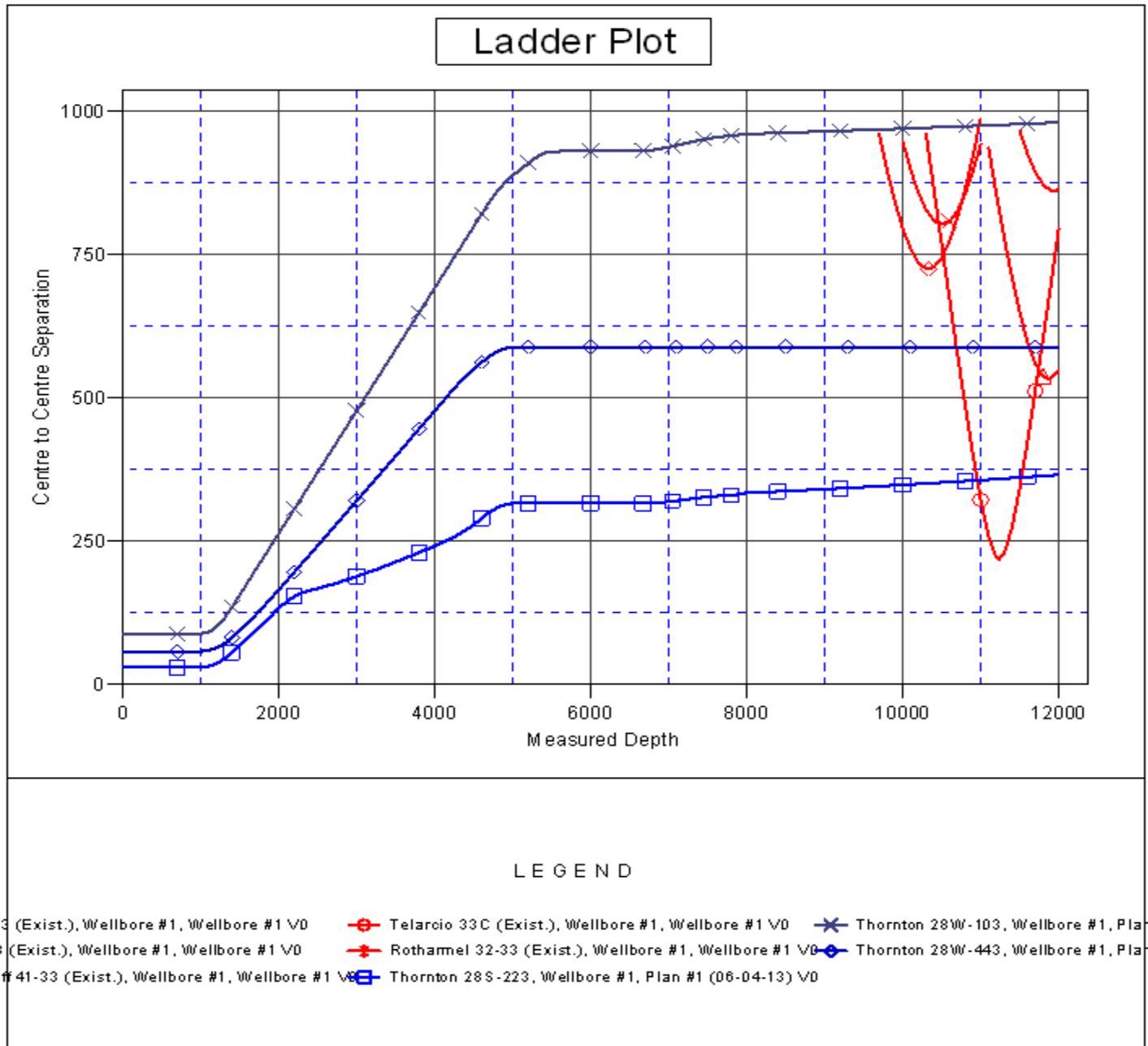
Offset Design Thornton 28SW-HZ Pad Sec.28-T7N-R66W - Thornton 28W-443 - Wellbore #1 - Plan #1 (06-04-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
8,400.0	7,414.9	8,386.2	7,415.4	26.9	26.4	-90.06	-1,039.8	180.7	589.3	536.6	52.68	11.185		
8,500.0	7,414.3	8,486.2	7,414.9	28.4	28.0	-90.05	-1,139.8	180.7	589.3	533.5	55.77	10.566		
8,600.0	7,413.8	8,586.2	7,414.3	30.0	29.6	-90.05	-1,239.8	180.7	589.3	530.3	58.95	9.996		
8,700.0	7,413.3	8,686.2	7,413.8	31.6	31.2	-90.05	-1,339.8	180.7	589.3	527.1	62.20	9.474		
8,800.0	7,412.8	8,786.2	7,413.3	33.2	32.9	-90.05	-1,439.8	180.7	589.3	523.8	65.52	8.994		
8,900.0	7,412.2	8,886.2	7,412.7	34.9	34.5	-90.05	-1,539.8	180.7	589.3	520.4	68.90	8.553		
9,000.0	7,411.7	8,986.2	7,412.2	36.6	36.2	-90.05	-1,639.8	180.7	589.3	517.0	72.32	8.149		
9,100.0	7,411.2	9,086.2	7,411.6	38.3	38.0	-90.04	-1,739.8	180.7	589.3	513.5	75.78	7.777		
9,200.0	7,410.7	9,186.2	7,411.1	40.0	39.7	-90.04	-1,839.8	180.7	589.3	510.0	79.28	7.434		
9,300.0	7,410.1	9,286.2	7,410.6	41.8	41.5	-90.04	-1,939.8	180.7	589.3	506.5	82.80	7.117		
9,400.0	7,409.6	9,386.2	7,410.0	43.5	43.3	-90.04	-2,039.8	180.7	589.3	502.9	86.36	6.824		
9,500.0	7,409.1	9,486.2	7,409.5	45.3	45.1	-90.04	-2,139.8	180.7	589.3	499.4	89.94	6.552		
9,600.0	7,408.6	9,586.2	7,408.9	47.1	46.9	-90.04	-2,239.8	180.7	589.3	495.8	93.54	6.300		
9,700.0	7,408.1	9,686.2	7,408.4	48.9	48.7	-90.03	-2,339.8	180.7	589.3	492.1	97.16	6.065		
9,800.0	7,407.5	9,786.2	7,407.9	50.7	50.5	-90.03	-2,439.8	180.7	589.3	488.5	100.80	5.846		
9,900.0	7,407.0	9,886.2	7,407.3	52.5	52.3	-90.03	-2,539.8	180.7	589.3	484.8	104.45	5.642		
10,000.0	7,406.5	9,986.2	7,406.8	54.3	54.1	-90.03	-2,639.8	180.7	589.3	481.2	108.12	5.451		
10,100.0	7,406.0	10,086.2	7,406.2	56.2	56.0	-90.03	-2,739.8	180.7	589.3	477.5	111.79	5.271		
10,200.0	7,405.4	10,186.2	7,405.7	58.0	57.8	-90.02	-2,839.8	180.7	589.3	473.8	115.48	5.103		
10,300.0	7,404.9	10,286.2	7,405.1	59.8	59.7	-90.02	-2,939.8	180.7	589.3	470.1	119.18	4.945		
10,400.0	7,404.4	10,386.2	7,404.6	61.7	61.5	-90.02	-3,039.8	180.7	589.3	466.4	122.89	4.795		
10,500.0	7,403.9	10,486.2	7,404.1	63.5	63.4	-90.02	-3,139.8	180.7	589.3	462.7	126.61	4.655		
10,600.0	7,403.3	10,586.2	7,403.5	65.4	65.3	-90.02	-3,239.8	180.7	589.3	459.0	130.33	4.522		
10,700.0	7,402.8	10,686.2	7,403.0	67.2	67.1	-90.02	-3,339.8	180.7	589.3	455.2	134.06	4.396		
10,800.0	7,402.3	10,786.2	7,402.4	69.1	69.0	-90.01	-3,439.8	180.7	589.3	451.5	137.80	4.277		
10,900.0	7,401.8	10,886.2	7,401.9	71.0	70.9	-90.01	-3,539.7	180.7	589.3	447.8	141.54	4.163		
11,000.0	7,401.2	10,986.2	7,401.4	72.8	72.7	-90.01	-3,639.7	180.7	589.3	444.0	145.29	4.056		
11,100.0	7,400.7	11,086.2	7,400.8	74.7	74.6	-90.01	-3,739.7	180.7	589.3	440.3	149.04	3.954		
11,200.0	7,400.2	11,186.2	7,400.3	76.6	76.5	-90.01	-3,839.7	180.7	589.3	436.5	152.80	3.857		
11,300.0	7,399.7	11,286.2	7,399.7	78.4	78.4	-90.01	-3,939.7	180.7	589.3	432.7	156.57	3.764		
11,400.0	7,399.2	11,386.2	7,399.2	80.3	80.3	-90.00	-4,039.7	180.7	589.3	429.0	160.33	3.675		
11,500.0	7,398.6	11,486.2	7,398.7	82.2	82.1	-90.00	-4,139.7	180.7	589.3	425.2	164.10	3.591		
11,600.0	7,398.1	11,586.2	7,398.1	84.1	84.0	-90.00	-4,239.7	180.7	589.3	421.4	167.88	3.510		
11,700.0	7,397.6	11,686.2	7,397.6	86.0	85.9	-90.00	-4,339.7	180.7	589.3	417.6	171.66	3.433		
11,800.0	7,397.1	11,786.2	7,397.0	87.9	87.8	-90.00	-4,439.7	180.7	589.3	413.9	175.44	3.359		
11,900.0	7,396.5	11,886.2	7,396.5	89.7	89.7	-90.00	-4,539.7	180.7	589.3	410.1	179.22	3.288		
11,968.7	7,396.2	11,954.9	7,396.1	91.0	91.0	-89.99	-4,608.4	180.7	589.3	407.5	181.82	3.241		
12,001.7	7,396.0	11,976.9	7,396.0	91.7	91.4	-89.99	-4,630.5	180.7	589.4	406.5	182.86	3.223 SF		



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to WELL @ 4950.0ft (RKB-15')  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000 °

Coordinates are relative to: Thornton 28S-403  
Coordinate System is US State Plane 1983, Colorado Northern Zone  
Grid Convergence at Surface is: 0.47°



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 28S-403
<b>Project:</b>	SEC.28-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Reference Site:</b>	Thornton 28SW-HZ Pad Sec.28-T7N-R66W	<b>MD Reference:</b>	WELL @ 4950.0ft (RKB-15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 28S-403	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #1 (06-04-13)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to WELL @ 4950.0ft (RKB-15')

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Thornton 28S-403

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