

# PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Thornton 11V-404**

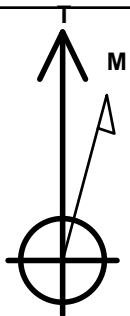
Surface Location: Thornton 11C-HZ Pad Sec.11-T7N-R66W  
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone  
Ground Elevation: 4961.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1460154.54	3211895.38	40.594020	-104.736990	

RKB - 15' WELL @ 4976.0ft (RKB - 15')

## WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape Point
BHL 1520'FNL, 500'FWL	7476.0	-374.9	-4327.0	



Azimuths to True North  
Magnetic North: 8.60°

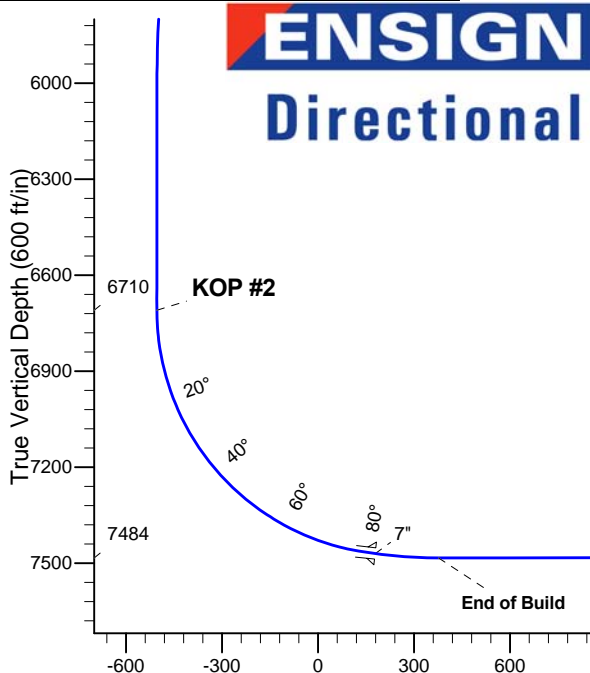
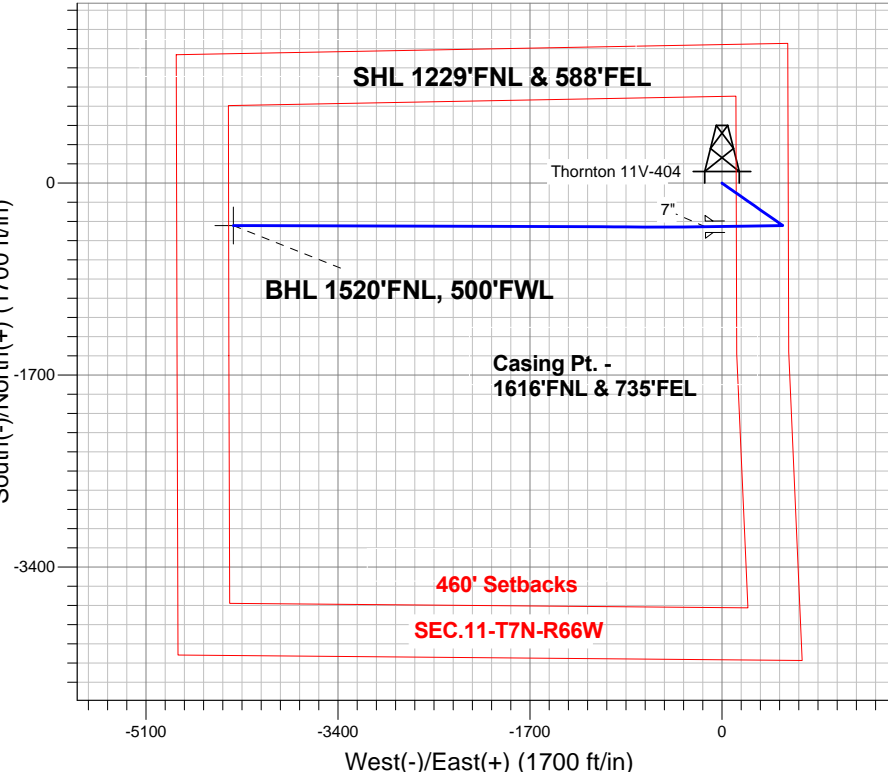
Magnetic Field  
Strength: 53027.1srT  
Dip Angle: 67.14°  
Date: 6/3/2013  
Model: IGRF2010

## ANNOTATIONS

TVD	MD	Annotation
2000.0	2000.0	KOP #1
6709.7	6768.1	KOP #2
7484.1	8087.2	End of Build

Thornton 11C-HZ Pad Sec.11-T7N-R66W  
Thornton 11V-404  
Plan #2 (6-03-13)  
8:04, June 03 2013

South(-)/North(+) (1700 ft/in)



## 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	2000.0	0.00	0.00	2000.0	0.0	0.0	0.00	0.00	0.0	
3	2536.2	10.72	124.87	2533.1	-28.6	41.1	2.00	124.87	-38.4	
4	5522.2	10.72	124.87	5466.9	-346.3	496.9	0.00	0.00	-465.2	
5	6058.4	0.00	0.00	6000.0	-374.9	538.0	2.00	180.00	-503.6	
6	6768.6	0.00	0.00	6710.2	-374.9	538.0	0.00	0.00	-503.6	
7	7888.6	84.00	269.01	7470.0	-386.7	-146.0	7.50	269.01	178.8	
8	7962.6	84.00	269.01	7477.7	-388.0	-219.6	0.00	0.00	252.2	
9	8087.2	90.12	270.20	7484.1	-388.8	-344.0	5.00	11.04	376.2	
10	12070.3	90.12	270.20	7476.0	-374.9	-4327.0	0.00	0.00	4343.2	BHL 1520'FNL, 500'FWL

BHL 1520'FNL, 500'FWL

Vertical Section at 265.05° (600 ft/in)



## **Directional**

# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.11-T7N-R66W**

**Thornton 11C-HZ Pad Sec.11-T7N-R66W**

**Thornton 11V-404**

**Wellbore #1**

**Plan: Plan #2 (6-03-13)**

## **Standard Planning Report**

**03 June, 2013**

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Project:</b>	SEC.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 11V-404	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (6-03-13)		

<b>Project</b>	SEC.11-T7N-R66W, Weld County, Colorado		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

<b>Site</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W		
<b>Site Position:</b>		<b>Northing:</b>	1,460,187.98 ft
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,211,970.08 ft
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	"
		<b>Latitude:</b>	40.594110
		<b>Longitude:</b>	-104.736720
		<b>Grid Convergence:</b>	0.49 °

<b>Well</b>	Thornton 11V-404		
<b>Well Position</b>	<b>+N/-S</b>	-32.8 ft	<b>Northing:</b>
	<b>+E/-W</b>	-75.0 ft	<b>Easting:</b>
<b>Position Uncertainty</b>		0.0 ft	<b>Wellhead Elevation:</b>
			ft
			<b>Latitude:</b>
			40.594020
			<b>Longitude:</b>
			-104.736990
			<b>Ground Level:</b>
			4,961.0 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	6/3/2013	8.60	67.14	53,027

<b>Design</b>	Plan #2 (6-03-13)			
<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	265.05

<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	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,536.2	10.72	124.87	2,533.1	-28.6	41.1	2.00	2.00	0.00	124.87	
5,522.2	10.72	124.87	5,466.9	-346.3	496.9	0.00	0.00	0.00	0.00	
6,058.4	0.00	0.00	6,000.0	-374.9	538.0	2.00	-2.00	0.00	180.00	
6,768.6	0.00	0.00	6,710.2	-374.9	538.0	0.00	0.00	0.00	0.00	
7,888.6	84.00	269.01	7,470.0	-386.7	-146.0	7.50	7.50	0.00	269.01	
7,962.6	84.00	269.01	7,477.7	-388.0	-219.6	0.00	0.00	0.00	0.00	
8,087.2	90.12	270.20	7,484.1	-388.8	-344.0	5.00	4.91	0.96	11.04	
12,070.3	90.12	270.20	7,476.0	-374.9	-4,327.0	0.00	0.00	0.00	0.00	BHL 1520'FNL, 500

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Project:</b>	SEC.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 11V-404	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (6-03-13)		

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
40.0	0.00	0.00	40.0	0.0	0.0	0.0	0.00	0.00	0.00
80.0	0.00	0.00	80.0	0.0	0.0	0.0	0.00	0.00	0.00
120.0	0.00	0.00	120.0	0.0	0.0	0.0	0.00	0.00	0.00
160.0	0.00	0.00	160.0	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
240.0	0.00	0.00	240.0	0.0	0.0	0.0	0.00	0.00	0.00
280.0	0.00	0.00	280.0	0.0	0.0	0.0	0.00	0.00	0.00
320.0	0.00	0.00	320.0	0.0	0.0	0.0	0.00	0.00	0.00
360.0	0.00	0.00	360.0	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
440.0	0.00	0.00	440.0	0.0	0.0	0.0	0.00	0.00	0.00
480.0	0.00	0.00	480.0	0.0	0.0	0.0	0.00	0.00	0.00
520.0	0.00	0.00	520.0	0.0	0.0	0.0	0.00	0.00	0.00
560.0	0.00	0.00	560.0	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
640.0	0.00	0.00	640.0	0.0	0.0	0.0	0.00	0.00	0.00
680.0	0.00	0.00	680.0	0.0	0.0	0.0	0.00	0.00	0.00
720.0	0.00	0.00	720.0	0.0	0.0	0.0	0.00	0.00	0.00
760.0	0.00	0.00	760.0	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
840.0	0.00	0.00	840.0	0.0	0.0	0.0	0.00	0.00	0.00
880.0	0.00	0.00	880.0	0.0	0.0	0.0	0.00	0.00	0.00
920.0	0.00	0.00	920.0	0.0	0.0	0.0	0.00	0.00	0.00
960.0	0.00	0.00	960.0	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
1,040.0	0.00	0.00	1,040.0	0.0	0.0	0.0	0.00	0.00	0.00
1,080.0	0.00	0.00	1,080.0	0.0	0.0	0.0	0.00	0.00	0.00
1,120.0	0.00	0.00	1,120.0	0.0	0.0	0.0	0.00	0.00	0.00
1,160.0	0.00	0.00	1,160.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,240.0	0.00	0.00	1,240.0	0.0	0.0	0.0	0.00	0.00	0.00
1,280.0	0.00	0.00	1,280.0	0.0	0.0	0.0	0.00	0.00	0.00
1,320.0	0.00	0.00	1,320.0	0.0	0.0	0.0	0.00	0.00	0.00
1,360.0	0.00	0.00	1,360.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,440.0	0.00	0.00	1,440.0	0.0	0.0	0.0	0.00	0.00	0.00
1,480.0	0.00	0.00	1,480.0	0.0	0.0	0.0	0.00	0.00	0.00
1,520.0	0.00	0.00	1,520.0	0.0	0.0	0.0	0.00	0.00	0.00
1,560.0	0.00	0.00	1,560.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,640.0	0.00	0.00	1,640.0	0.0	0.0	0.0	0.00	0.00	0.00
1,680.0	0.00	0.00	1,680.0	0.0	0.0	0.0	0.00	0.00	0.00
1,720.0	0.00	0.00	1,720.0	0.0	0.0	0.0	0.00	0.00	0.00
1,760.0	0.00	0.00	1,760.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,840.0	0.00	0.00	1,840.0	0.0	0.0	0.0	0.00	0.00	0.00
1,880.0	0.00	0.00	1,880.0	0.0	0.0	0.0	0.00	0.00	0.00
1,920.0	0.00	0.00	1,920.0	0.0	0.0	0.0	0.00	0.00	0.00
1,960.0	0.00	0.00	1,960.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>KOP #1</b>									
2,040.0	0.80	124.87	2,040.0	-0.2	0.2	-0.2	2.00	2.00	0.00

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
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<b>Project:</b>	SEC.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 11V-404	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (6-03-13)		

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)
2,080.0	1.60	124.87	2,080.0	-0.6	0.9	-0.9	2.00	2.00	0.00
2,120.0	2.40	124.87	2,120.0	-1.4	2.1	-1.9	2.00	2.00	0.00
2,160.0	3.20	124.87	2,159.9	-2.6	3.7	-3.4	2.00	2.00	0.00
2,200.0	4.00	124.87	2,199.8	-4.0	5.7	-5.4	2.00	2.00	0.00
2,240.0	4.80	124.87	2,239.7	-5.7	8.2	-7.7	2.00	2.00	0.00
2,280.0	5.60	124.87	2,279.6	-7.8	11.2	-10.5	2.00	2.00	0.00
2,320.0	6.40	124.87	2,319.3	-10.2	14.6	-13.7	2.00	2.00	0.00
2,360.0	7.20	124.87	2,359.1	-12.9	18.5	-17.3	2.00	2.00	0.00
2,400.0	8.00	124.87	2,398.7	-15.9	22.9	-21.4	2.00	2.00	0.00
2,440.0	8.80	124.87	2,438.3	-19.3	27.7	-25.9	2.00	2.00	0.00
2,480.0	9.60	124.87	2,477.8	-22.9	32.9	-30.8	2.00	2.00	0.00
2,520.0	10.40	124.87	2,517.1	-26.9	38.6	-36.1	2.00	2.00	0.00
2,536.2	10.72	124.87	2,533.1	-28.6	41.1	-38.4	2.00	2.00	0.00
2,560.0	10.72	124.87	2,556.5	-31.1	44.7	-41.8	0.00	0.00	0.00
2,600.0	10.72	124.87	2,595.8	-35.4	50.8	-47.5	0.00	0.00	0.00
2,640.0	10.72	124.87	2,635.1	-39.6	56.9	-53.3	0.00	0.00	0.00
2,680.0	10.72	124.87	2,674.4	-43.9	63.0	-59.0	0.00	0.00	0.00
2,720.0	10.72	124.87	2,713.7	-48.2	69.1	-64.7	0.00	0.00	0.00
2,760.0	10.72	124.87	2,753.0	-52.4	75.2	-70.4	0.00	0.00	0.00
2,800.0	10.72	124.87	2,792.3	-56.7	81.3	-76.1	0.00	0.00	0.00
2,840.0	10.72	124.87	2,831.6	-60.9	87.4	-81.8	0.00	0.00	0.00
2,880.0	10.72	124.87	2,870.9	-65.2	93.5	-87.6	0.00	0.00	0.00
2,920.0	10.72	124.87	2,910.2	-69.4	99.6	-93.3	0.00	0.00	0.00
2,960.0	10.72	124.87	2,949.5	-73.7	105.8	-99.0	0.00	0.00	0.00
3,000.0	10.72	124.87	2,988.8	-78.0	111.9	-104.7	0.00	0.00	0.00
3,040.0	10.72	124.87	3,028.1	-82.2	118.0	-110.4	0.00	0.00	0.00
3,080.0	10.72	124.87	3,067.4	-86.5	124.1	-116.2	0.00	0.00	0.00
3,120.0	10.72	124.87	3,106.7	-90.7	130.2	-121.9	0.00	0.00	0.00
3,160.0	10.72	124.87	3,146.0	-95.0	136.3	-127.6	0.00	0.00	0.00
3,200.0	10.72	124.87	3,185.3	-99.2	142.4	-133.3	0.00	0.00	0.00
3,240.0	10.72	124.87	3,224.6	-103.5	148.5	-139.0	0.00	0.00	0.00
3,280.0	10.72	124.87	3,263.9	-107.7	154.6	-144.7	0.00	0.00	0.00
3,320.0	10.72	124.87	3,303.2	-112.0	160.7	-150.5	0.00	0.00	0.00
3,360.0	10.72	124.87	3,342.5	-116.3	166.8	-156.2	0.00	0.00	0.00
3,400.0	10.72	124.87	3,381.8	-120.5	172.9	-161.9	0.00	0.00	0.00
3,440.0	10.72	124.87	3,421.1	-124.8	179.0	-167.6	0.00	0.00	0.00
3,480.0	10.72	124.87	3,460.4	-129.0	185.1	-173.3	0.00	0.00	0.00
3,520.0	10.72	124.87	3,499.7	-133.3	191.3	-179.0	0.00	0.00	0.00
3,560.0	10.72	124.87	3,539.0	-137.5	197.4	-184.8	0.00	0.00	0.00
3,600.0	10.72	124.87	3,578.3	-141.8	203.5	-190.5	0.00	0.00	0.00
3,640.0	10.72	124.87	3,617.6	-146.0	209.6	-196.2	0.00	0.00	0.00
3,680.0	10.72	124.87	3,656.9	-150.3	215.7	-201.9	0.00	0.00	0.00
3,720.0	10.72	124.87	3,696.2	-154.6	221.8	-207.6	0.00	0.00	0.00
3,760.0	10.72	124.87	3,735.5	-158.8	227.9	-213.3	0.00	0.00	0.00
3,800.0	10.72	124.87	3,774.8	-163.1	234.0	-219.1	0.00	0.00	0.00
3,840.0	10.72	124.87	3,814.1	-167.3	240.1	-224.8	0.00	0.00	0.00
3,880.0	10.72	124.87	3,853.4	-171.6	246.2	-230.5	0.00	0.00	0.00
3,920.0	10.72	124.87	3,892.7	-175.8	252.3	-236.2	0.00	0.00	0.00
3,960.0	10.72	124.87	3,932.0	-180.1	258.4	-241.9	0.00	0.00	0.00
4,000.0	10.72	124.87	3,971.3	-184.3	264.5	-247.6	0.00	0.00	0.00
4,040.0	10.72	124.87	4,010.6	-188.6	270.6	-253.4	0.00	0.00	0.00
4,080.0	10.72	124.87	4,049.9	-192.9	276.8	-259.1	0.00	0.00	0.00
4,120.0	10.72	124.87	4,089.2	-197.1	282.9	-264.8	0.00	0.00	0.00

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Project:</b>	SEC.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 11V-404	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (6-03-13)		

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)
4,160.0	10.72	124.87	4,128.5	-201.4	289.0	-270.5	0.00	0.00	0.00
4,200.0	10.72	124.87	4,167.8	-205.6	295.1	-276.2	0.00	0.00	0.00
4,240.0	10.72	124.87	4,207.1	-209.9	301.2	-281.9	0.00	0.00	0.00
4,280.0	10.72	124.87	4,246.4	-214.1	307.3	-287.7	0.00	0.00	0.00
4,320.0	10.72	124.87	4,285.7	-218.4	313.4	-293.4	0.00	0.00	0.00
4,360.0	10.72	124.87	4,325.0	-222.6	319.5	-299.1	0.00	0.00	0.00
4,400.0	10.72	124.87	4,364.3	-226.9	325.6	-304.8	0.00	0.00	0.00
4,440.0	10.72	124.87	4,403.6	-231.2	331.7	-310.5	0.00	0.00	0.00
4,480.0	10.72	124.87	4,442.9	-235.4	337.8	-316.2	0.00	0.00	0.00
4,520.0	10.72	124.87	4,482.2	-239.7	343.9	-322.0	0.00	0.00	0.00
4,560.0	10.72	124.87	4,521.5	-243.9	350.0	-327.7	0.00	0.00	0.00
4,600.0	10.72	124.87	4,560.8	-248.2	356.1	-333.4	0.00	0.00	0.00
4,640.0	10.72	124.87	4,600.1	-252.4	362.3	-339.1	0.00	0.00	0.00
4,680.0	10.72	124.87	4,639.4	-256.7	368.4	-344.8	0.00	0.00	0.00
4,720.0	10.72	124.87	4,678.7	-260.9	374.5	-350.5	0.00	0.00	0.00
4,760.0	10.72	124.87	4,718.0	-265.2	380.6	-356.3	0.00	0.00	0.00
4,800.0	10.72	124.87	4,757.3	-269.5	386.7	-362.0	0.00	0.00	0.00
4,840.0	10.72	124.87	4,796.6	-273.7	392.8	-367.7	0.00	0.00	0.00
4,880.0	10.72	124.87	4,835.9	-278.0	398.9	-373.4	0.00	0.00	0.00
4,920.0	10.72	124.87	4,875.2	-282.2	405.0	-379.1	0.00	0.00	0.00
4,960.0	10.72	124.87	4,914.5	-286.5	411.1	-384.9	0.00	0.00	0.00
5,000.0	10.72	124.87	4,953.8	-290.7	417.2	-390.6	0.00	0.00	0.00
5,040.0	10.72	124.87	4,993.1	-295.0	423.3	-396.3	0.00	0.00	0.00
5,080.0	10.72	124.87	5,032.4	-299.2	429.4	-402.0	0.00	0.00	0.00
5,120.0	10.72	124.87	5,071.7	-303.5	435.5	-407.7	0.00	0.00	0.00
5,160.0	10.72	124.87	5,111.0	-307.8	441.6	-413.4	0.00	0.00	0.00
5,200.0	10.72	124.87	5,150.3	-312.0	447.8	-419.2	0.00	0.00	0.00
5,240.0	10.72	124.87	5,189.6	-316.3	453.9	-424.9	0.00	0.00	0.00
5,280.0	10.72	124.87	5,228.9	-320.5	460.0	-430.6	0.00	0.00	0.00
5,320.0	10.72	124.87	5,268.2	-324.8	466.1	-436.3	0.00	0.00	0.00
5,360.0	10.72	124.87	5,307.5	-329.0	472.2	-442.0	0.00	0.00	0.00
5,400.0	10.72	124.87	5,346.9	-333.3	478.3	-447.7	0.00	0.00	0.00
5,440.0	10.72	124.87	5,386.2	-337.5	484.4	-453.5	0.00	0.00	0.00
5,480.0	10.72	124.87	5,425.5	-341.8	490.5	-459.2	0.00	0.00	0.00
5,520.0	10.72	124.87	5,464.8	-346.1	496.6	-464.9	0.00	0.00	0.00
5,522.2	10.72	124.87	5,466.9	-346.3	496.9	-465.2	0.00	0.00	0.00
5,560.0	9.97	124.87	5,504.1	-350.2	502.5	-470.4	2.00	-2.00	0.00
5,600.0	9.17	124.87	5,543.5	-354.0	508.0	-475.5	2.00	-2.00	0.00
5,640.0	8.37	124.87	5,583.1	-357.5	513.0	-480.2	2.00	-2.00	0.00
5,680.0	7.57	124.87	5,622.7	-360.6	517.5	-484.5	2.00	-2.00	0.00
5,720.0	6.77	124.87	5,662.4	-363.5	521.6	-488.3	2.00	-2.00	0.00
5,760.0	5.97	124.87	5,702.1	-366.0	525.3	-491.7	2.00	-2.00	0.00
5,800.0	5.17	124.87	5,741.9	-368.2	528.4	-494.7	2.00	-2.00	0.00
5,840.0	4.37	124.87	5,781.8	-370.1	531.2	-497.2	2.00	-2.00	0.00
5,880.0	3.57	124.87	5,821.7	-371.7	533.4	-499.4	2.00	-2.00	0.00
5,920.0	2.77	124.87	5,861.6	-373.0	535.3	-501.1	2.00	-2.00	0.00
5,960.0	1.97	124.87	5,901.6	-373.9	536.6	-502.3	2.00	-2.00	0.00
6,000.0	1.17	124.87	5,941.6	-374.6	537.5	-503.2	2.00	-2.00	0.00
6,040.0	0.37	124.87	5,981.6	-374.9	538.0	-503.6	2.00	-2.00	0.00
6,058.4	0.00	0.00	6,000.0	-374.9	538.0	-503.6	2.00	-2.00	0.00
6,080.0	0.00	0.00	6,021.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,120.0	0.00	0.00	6,061.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,160.0	0.00	0.00	6,101.6	-374.9	538.0	-503.6	0.00	0.00	0.00

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Project:</b>	SEC.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 11V-404	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (6-03-13)		

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)
6,200.0	0.00	0.00	6,141.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,240.0	0.00	0.00	6,181.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,280.0	0.00	0.00	6,221.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,320.0	0.00	0.00	6,261.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,360.0	0.00	0.00	6,301.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,400.0	0.00	0.00	6,341.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,440.0	0.00	0.00	6,381.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,480.0	0.00	0.00	6,421.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,520.0	0.00	0.00	6,461.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,560.0	0.00	0.00	6,501.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,600.0	0.00	0.00	6,541.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,640.0	0.00	0.00	6,581.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,680.0	0.00	0.00	6,621.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,720.0	0.00	0.00	6,661.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,760.0	0.00	0.00	6,701.6	-374.9	538.0	-503.6	0.00	0.00	0.00
6,768.1	0.00	0.00	6,709.7	-374.9	538.0	-503.6	0.00	0.00	0.00
<b>KOP #2</b>									
6,768.6	0.00	0.00	6,710.2	-374.9	538.0	-503.6	0.00	0.00	0.00
6,800.0	2.35	269.01	6,741.6	-374.9	537.4	-503.0	7.50	7.50	0.00
6,840.0	5.35	269.01	6,781.5	-375.0	534.7	-500.3	7.50	7.50	0.00
6,880.0	8.35	269.01	6,821.2	-375.0	529.9	-495.5	7.50	7.50	0.00
6,920.0	11.35	269.01	6,860.6	-375.2	523.1	-488.7	7.50	7.50	0.00
6,960.0	14.35	269.01	6,899.6	-375.3	514.2	-479.8	7.50	7.50	0.00
7,000.0	17.35	269.01	6,938.1	-375.5	503.2	-468.9	7.50	7.50	0.00
7,040.0	20.35	269.01	6,975.9	-375.7	490.3	-456.1	7.50	7.50	0.00
7,080.0	23.35	269.01	7,013.0	-376.0	475.4	-441.2	7.50	7.50	0.00
7,120.0	26.35	269.01	7,049.3	-376.3	458.6	-424.4	7.50	7.50	0.00
7,160.0	29.35	269.01	7,084.7	-376.6	439.9	-405.8	7.50	7.50	0.00
7,200.0	32.35	269.01	7,119.0	-376.9	419.4	-385.3	7.50	7.50	0.00
7,240.0	35.35	269.01	7,152.2	-377.3	397.2	-363.1	7.50	7.50	0.00
7,280.0	38.35	269.01	7,184.2	-377.7	373.2	-339.2	7.50	7.50	0.00
7,320.0	41.35	269.01	7,215.0	-378.2	347.5	-313.6	7.50	7.50	0.00
7,360.0	44.35	269.01	7,244.3	-378.7	320.3	-286.5	7.50	7.50	0.00
7,400.0	47.35	269.01	7,272.1	-379.2	291.6	-257.8	7.50	7.50	0.00
7,440.0	50.35	269.01	7,298.4	-379.7	261.5	-227.8	7.50	7.50	0.00
7,480.0	53.35	269.01	7,323.2	-380.2	230.1	-196.4	7.50	7.50	0.00
7,520.0	56.35	269.01	7,346.2	-380.8	197.4	-163.8	7.50	7.50	0.00
7,560.0	59.35	269.01	7,367.5	-381.4	163.5	-130.0	7.50	7.50	0.00
7,600.0	62.35	269.01	7,386.9	-382.0	128.6	-95.2	7.50	7.50	0.00
7,640.0	65.35	269.01	7,404.6	-382.6	92.7	-59.3	7.50	7.50	0.00
7,680.0	68.35	269.01	7,420.3	-383.2	55.9	-22.6	7.50	7.50	0.00
7,720.0	71.35	269.01	7,434.1	-383.9	18.4	14.8	7.50	7.50	0.00
7,760.0	74.35	269.01	7,445.9	-384.5	-19.8	52.9	7.50	7.50	0.00
7,800.0	77.35	269.01	7,455.6	-385.2	-58.6	91.6	7.50	7.50	0.00
7,840.0	80.35	269.01	7,463.4	-385.9	-97.8	130.8	7.50	7.50	0.00
7,880.0	83.35	269.01	7,469.0	-386.6	-137.4	170.3	7.50	7.50	0.00
7,888.6	84.00	269.01	7,470.0	-386.7	-146.0	178.8	7.50	7.50	0.00
<b>7"</b>									
7,920.0	84.00	269.01	7,473.3	-387.3	-177.2	209.9	0.01	0.01	0.00
7,960.0	84.00	269.01	7,477.4	-387.9	-217.0	249.6	0.00	0.00	0.00
7,962.6	84.00	269.01	7,477.7	-388.0	-219.6	252.2	0.00	0.00	0.00
8,000.0	85.83	269.37	7,481.0	-388.5	-256.8	289.4	5.00	4.91	0.96
8,040.0	87.80	269.75	7,483.2	-388.8	-296.7	329.2	5.00	4.91	0.96



<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Project:</b>	SEC.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 11V-404	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (6-03-13)		

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)
8,080.0	89.76	270.13	7,484.1	-388.9	-336.7	369.0	5.00	4.91	0.95
8,087.2	90.11	270.20	7,484.1	-388.8	-343.9	376.2	5.00	4.91	0.95
<b>End of Build</b>									
8,120.0	90.12	270.20	7,484.0	-388.7	-376.7	408.9	0.01	0.01	0.00
8,160.0	90.12	270.20	7,484.0	-388.6	-416.7	448.7	0.00	0.00	0.00
8,200.0	90.12	270.20	7,483.9	-388.4	-456.7	488.5	0.00	0.00	0.00
8,240.0	90.12	270.20	7,483.8	-388.3	-496.7	528.4	0.00	0.00	0.00
8,280.0	90.12	270.20	7,483.7	-388.2	-536.7	568.2	0.00	0.00	0.00
8,320.0	90.12	270.20	7,483.6	-388.0	-576.7	608.1	0.00	0.00	0.00
8,360.0	90.12	270.20	7,483.5	-387.9	-616.7	647.9	0.00	0.00	0.00
8,400.0	90.12	270.20	7,483.5	-387.7	-656.7	687.7	0.00	0.00	0.00
8,440.0	90.12	270.20	7,483.4	-387.6	-696.7	727.6	0.00	0.00	0.00
8,480.0	90.12	270.20	7,483.3	-387.5	-736.7	767.4	0.00	0.00	0.00
8,520.0	90.12	270.20	7,483.2	-387.3	-776.7	807.2	0.00	0.00	0.00
8,560.0	90.12	270.20	7,483.1	-387.2	-816.7	847.1	0.00	0.00	0.00
8,600.0	90.12	270.20	7,483.1	-387.0	-856.7	886.9	0.00	0.00	0.00
8,640.0	90.12	270.20	7,483.0	-386.9	-896.7	926.8	0.00	0.00	0.00
8,680.0	90.12	270.20	7,482.9	-386.8	-936.7	966.6	0.00	0.00	0.00
8,720.0	90.12	270.20	7,482.8	-386.6	-976.7	1,006.4	0.00	0.00	0.00
8,760.0	90.12	270.20	7,482.7	-386.5	-1,016.7	1,046.3	0.00	0.00	0.00
8,800.0	90.12	270.20	7,482.7	-386.3	-1,056.7	1,086.1	0.00	0.00	0.00
8,840.0	90.12	270.20	7,482.6	-386.2	-1,096.7	1,126.0	0.00	0.00	0.00
8,880.0	90.12	270.20	7,482.5	-386.1	-1,136.7	1,165.8	0.00	0.00	0.00
8,920.0	90.12	270.20	7,482.4	-385.9	-1,176.7	1,205.6	0.00	0.00	0.00
8,960.0	90.12	270.20	7,482.3	-385.8	-1,216.7	1,245.5	0.00	0.00	0.00
9,000.0	90.12	270.20	7,482.2	-385.6	-1,256.7	1,285.3	0.00	0.00	0.00
9,040.0	90.12	270.20	7,482.2	-385.5	-1,296.7	1,325.1	0.00	0.00	0.00
9,080.0	90.12	270.20	7,482.1	-385.4	-1,336.7	1,365.0	0.00	0.00	0.00
9,120.0	90.12	270.20	7,482.0	-385.2	-1,376.7	1,404.8	0.00	0.00	0.00
9,160.0	90.12	270.20	7,481.9	-385.1	-1,416.7	1,444.7	0.00	0.00	0.00
9,200.0	90.12	270.20	7,481.8	-384.9	-1,456.7	1,484.5	0.00	0.00	0.00
9,240.0	90.12	270.20	7,481.8	-384.8	-1,496.7	1,524.3	0.00	0.00	0.00
9,280.0	90.12	270.20	7,481.7	-384.7	-1,536.7	1,564.2	0.00	0.00	0.00
9,320.0	90.12	270.20	7,481.6	-384.5	-1,576.7	1,604.0	0.00	0.00	0.00
9,360.0	90.12	270.20	7,481.5	-384.4	-1,616.7	1,643.9	0.00	0.00	0.00
9,400.0	90.12	270.20	7,481.4	-384.2	-1,656.7	1,683.7	0.00	0.00	0.00
9,440.0	90.12	270.20	7,481.4	-384.1	-1,696.7	1,723.5	0.00	0.00	0.00
9,480.0	90.12	270.20	7,481.3	-384.0	-1,736.7	1,763.4	0.00	0.00	0.00
9,520.0	90.12	270.20	7,481.2	-383.8	-1,776.7	1,803.2	0.00	0.00	0.00
9,560.0	90.12	270.20	7,481.1	-383.7	-1,816.7	1,843.0	0.00	0.00	0.00
9,600.0	90.12	270.20	7,481.0	-383.5	-1,856.7	1,882.9	0.00	0.00	0.00
9,640.0	90.12	270.20	7,480.9	-383.4	-1,896.7	1,922.7	0.00	0.00	0.00
9,680.0	90.12	270.20	7,480.9	-383.3	-1,936.7	1,962.6	0.00	0.00	0.00
9,720.0	90.12	270.20	7,480.8	-383.1	-1,976.7	2,002.4	0.00	0.00	0.00
9,760.0	90.12	270.20	7,480.7	-383.0	-2,016.7	2,042.2	0.00	0.00	0.00
9,800.0	90.12	270.20	7,480.6	-382.8	-2,056.7	2,082.1	0.00	0.00	0.00
9,840.0	90.12	270.20	7,480.5	-382.7	-2,096.7	2,121.9	0.00	0.00	0.00
9,880.0	90.12	270.20	7,480.5	-382.6	-2,136.7	2,161.7	0.00	0.00	0.00
9,920.0	90.12	270.20	7,480.4	-382.4	-2,176.7	2,201.6	0.00	0.00	0.00
9,960.0	90.12	270.20	7,480.3	-382.3	-2,216.7	2,241.4	0.00	0.00	0.00
10,000.0	90.12	270.20	7,480.2	-382.1	-2,256.7	2,281.3	0.00	0.00	0.00
10,040.0	90.12	270.20	7,480.1	-382.0	-2,296.7	2,321.1	0.00	0.00	0.00



<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Project:</b>	SEC.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 11V-404	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (6-03-13)		

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)
10,080.0	90.12	270.20	7,480.0	-381.9	-2,336.7	2,360.9	0.00	0.00	0.00
10,120.0	90.12	270.20	7,480.0	-381.7	-2,376.7	2,400.8	0.00	0.00	0.00
10,160.0	90.12	270.20	7,479.9	-381.6	-2,416.7	2,440.6	0.00	0.00	0.00
10,200.0	90.12	270.20	7,479.8	-381.4	-2,456.7	2,480.5	0.00	0.00	0.00
10,240.0	90.12	270.20	7,479.7	-381.3	-2,496.7	2,520.3	0.00	0.00	0.00
10,280.0	90.12	270.20	7,479.6	-381.1	-2,536.7	2,560.1	0.00	0.00	0.00
10,320.0	90.12	270.20	7,479.6	-381.0	-2,576.7	2,600.0	0.00	0.00	0.00
10,360.0	90.12	270.20	7,479.5	-380.9	-2,616.7	2,639.8	0.00	0.00	0.00
10,400.0	90.12	270.20	7,479.4	-380.7	-2,656.7	2,679.6	0.00	0.00	0.00
10,440.0	90.12	270.20	7,479.3	-380.6	-2,696.7	2,719.5	0.00	0.00	0.00
10,480.0	90.12	270.20	7,479.2	-380.4	-2,736.7	2,759.3	0.00	0.00	0.00
10,520.0	90.12	270.20	7,479.2	-380.3	-2,776.7	2,799.2	0.00	0.00	0.00
10,560.0	90.12	270.20	7,479.1	-380.2	-2,816.7	2,839.0	0.00	0.00	0.00
10,600.0	90.12	270.20	7,479.0	-380.0	-2,856.7	2,878.8	0.00	0.00	0.00
10,640.0	90.12	270.20	7,478.9	-379.9	-2,896.7	2,918.7	0.00	0.00	0.00
10,680.0	90.12	270.20	7,478.8	-379.7	-2,936.7	2,958.5	0.00	0.00	0.00
10,720.0	90.12	270.20	7,478.7	-379.6	-2,976.7	2,998.4	0.00	0.00	0.00
10,760.0	90.12	270.20	7,478.7	-379.5	-3,016.7	3,038.2	0.00	0.00	0.00
10,800.0	90.12	270.20	7,478.6	-379.3	-3,056.7	3,078.0	0.00	0.00	0.00
10,840.0	90.12	270.20	7,478.5	-379.2	-3,096.7	3,117.9	0.00	0.00	0.00
10,880.0	90.12	270.20	7,478.4	-379.0	-3,136.7	3,157.7	0.00	0.00	0.00
10,920.0	90.12	270.20	7,478.3	-378.9	-3,176.7	3,197.5	0.00	0.00	0.00
10,960.0	90.12	270.20	7,478.3	-378.8	-3,216.7	3,237.4	0.00	0.00	0.00
11,000.0	90.12	270.20	7,478.2	-378.6	-3,256.7	3,277.2	0.00	0.00	0.00
11,040.0	90.12	270.20	7,478.1	-378.5	-3,296.7	3,317.1	0.00	0.00	0.00
11,080.0	90.12	270.20	7,478.0	-378.3	-3,336.7	3,356.9	0.00	0.00	0.00
11,120.0	90.12	270.20	7,477.9	-378.2	-3,376.7	3,396.7	0.00	0.00	0.00
11,160.0	90.12	270.20	7,477.9	-378.1	-3,416.7	3,436.6	0.00	0.00	0.00
11,200.0	90.12	270.20	7,477.8	-377.9	-3,456.7	3,476.4	0.00	0.00	0.00
11,240.0	90.12	270.20	7,477.7	-377.8	-3,496.7	3,516.2	0.00	0.00	0.00
11,280.0	90.12	270.20	7,477.6	-377.6	-3,536.7	3,556.1	0.00	0.00	0.00
11,320.0	90.12	270.20	7,477.5	-377.5	-3,576.7	3,595.9	0.00	0.00	0.00
11,360.0	90.12	270.20	7,477.4	-377.4	-3,616.7	3,635.8	0.00	0.00	0.00
11,400.0	90.12	270.20	7,477.4	-377.2	-3,656.7	3,675.6	0.00	0.00	0.00
11,440.0	90.12	270.20	7,477.3	-377.1	-3,696.7	3,715.4	0.00	0.00	0.00
11,480.0	90.12	270.20	7,477.2	-376.9	-3,736.7	3,755.3	0.00	0.00	0.00
11,520.0	90.12	270.20	7,477.1	-376.8	-3,776.7	3,795.1	0.00	0.00	0.00
11,560.0	90.12	270.20	7,477.0	-376.7	-3,816.7	3,835.0	0.00	0.00	0.00
11,600.0	90.12	270.20	7,477.0	-376.5	-3,856.7	3,874.8	0.00	0.00	0.00
11,640.0	90.12	270.20	7,476.9	-376.4	-3,896.7	3,914.6	0.00	0.00	0.00
11,680.0	90.12	270.20	7,476.8	-376.2	-3,936.7	3,954.5	0.00	0.00	0.00
11,720.0	90.12	270.20	7,476.7	-376.1	-3,976.7	3,994.3	0.00	0.00	0.00
11,760.0	90.12	270.20	7,476.6	-376.0	-4,016.7	4,034.1	0.00	0.00	0.00
11,800.0	90.12	270.20	7,476.5	-375.8	-4,056.7	4,074.0	0.00	0.00	0.00
11,840.0	90.12	270.20	7,476.5	-375.7	-4,096.7	4,113.8	0.00	0.00	0.00
11,880.0	90.12	270.20	7,476.4	-375.5	-4,136.7	4,153.7	0.00	0.00	0.00
11,920.0	90.12	270.20	7,476.3	-375.4	-4,176.7	4,193.5	0.00	0.00	0.00
11,960.0	90.12	270.20	7,476.2	-375.3	-4,216.7	4,233.3	0.00	0.00	0.00
12,000.0	90.12	270.20	7,476.1	-375.1	-4,256.7	4,273.2	0.00	0.00	0.00
12,040.0	90.12	270.20	7,476.1	-375.0	-4,296.7	4,313.0	0.00	0.00	0.00
12,070.3	90.12	270.20	7,476.0	-374.9	-4,327.0	4,343.2	0.00	0.00	0.00
BHL 1520°FNL, 500°FWL									

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Project:</b>	SEC.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Thornton 11V-404	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (6-03-13)		

#### Targets

##### Target Name

- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
BHL 1520'FNL, 500'F <sup>1</sup>	0.00	0.00	7,476.0	-374.9	-4,327.0	1,459,742.47	3,207,571.93	40.592990	-104.752570
- plan hits target center									
- Point									

#### Casing Points

Measured Depth	Vertical Depth	Name	Casing Diameter	Hole Diameter
(ft)	(ft)		(")	(")
7,888.6	7,470.0	7"	7	8-3/4

#### Plan Annotations

Measured Depth	Vertical Depth	Local Coordinates		Comment
(ft)	(ft)	+N/-S	+E/-W	
(ft)	(ft)	(ft)	(ft)	
2,000.0	2,000.0	0.0	0.0	KOP #1
6,768.1	6,709.7	-374.9	538.0	KOP #2
8,087.2	7,484.1	-388.8	-343.9	End of Build



## **Directional**

# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.11-T7N-R66W**

**Thornton 11C-HZ Pad Sec.11-T7N-R66W**

**Thornton 11V-404**

**Wellbore #1**

**Plan #2 (6-03-13)**

## **Anticollision Report**

**03 June, 2013**



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #2 (6-03-13)		
<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> 6/3/2013			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	12,070.3	Plan #2 (6-03-13) (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
Thornton 11C-HZ Pad Sec.11-T7N-R66W						
Thornton 11U-204 - Wellbore #1 - Plan #1 (10-15-12)	200.0	200.0	81.8	81.2	121.373	CC, ES
Thornton 11U-204 - Wellbore #1 - Plan #1 (10-15-12)	2,000.0	1,952.7	374.3	363.3	34.119	SF
Thornton 11U-434 - Wellbore #1 - Plan #1 (10-15-12)	1,000.0	1,000.0	83.4	79.1	19.528	CC, ES
Thornton 11U-434 - Wellbore #1 - Plan #1 (10-15-12)	12,070.3	12,071.8	881.7	620.4	3.374	SF
Thornton 11V-214 - Wellbore #1 - Plan #1 (10-15-12)	1,500.0	1,500.0	95.1	88.6	14.595	CC, ES
Thornton 11V-214 - Wellbore #1 - Plan #1 (10-15-12)	12,070.3	11,881.9	479.3	237.1	1.979	SF
Thornton 11W-214 - Wellbore #1 - Plan #1 (10-15-12)	1,000.0	1,000.0	136.9	132.7	32.067	CC, ES
Thornton 11W-214 - Wellbore #1 - Plan #1 (10-15-12)	12,070.3	11,920.1	591.6	342.4	2.374	SF
Thornton 11W-414 - Wellbore #1 - Plan #1 (10-15-12)	200.0	200.0	162.4	161.7	240.790	CC, ES
Thornton 11W-414 - Wellbore #1 - Plan #1 (10-15-12)	12,070.3	12,113.4	881.6	620.5	3.377	SF

Offset Design		Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11U-204 - Wellbore #1 - Plan #1 (10-15-12)										Offset Site Error:		0.0 ft
Survey Program: 0-MWD												Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							
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)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	66.38	32.8	75.0	81.8					
100.0	100.0	100.0	100.0	0.1	0.1	66.38	32.8	75.0	81.8	81.6	0.22	364.120	121.373 CC, ES	
200.0	200.0	200.0	200.0	0.3	0.3	66.38	32.8	75.0	81.8	81.2	0.67	121.373		
300.0	300.0	297.9	297.8	0.6	0.6	65.61	34.3	75.7	83.1	82.0	1.12	74.353		
400.0	400.0	395.5	395.4	0.8	0.8	63.46	38.8	77.8	87.1	85.5	1.57	55.547		
500.0	500.0	492.7	492.2	1.0	1.0	60.30	46.4	81.3	93.9	91.8	2.03	46.150		
600.0	600.0	589.2	588.0	1.2	1.3	56.60	56.7	86.1	103.8	101.3	2.53	41.057		
700.0	700.0	684.8	682.5	1.5	1.6	52.81	69.9	92.2	117.0	114.0	3.06	38.295		
800.0	800.0	779.4	775.5	1.7	1.9	49.24	85.8	99.5	133.7	130.0	3.62	36.932		
900.0	900.0	876.5	870.5	1.9	2.3	46.07	104.0	107.9	152.7	148.5	4.22	36.201		
1,000.0	1,000.0	974.3	966.2	2.1	2.7	43.59	122.3	116.4	172.2	167.4	4.83	35.655		
1,100.0	1,100.0	1,072.2	1,061.9	2.4	3.2	41.60	140.7	124.9	192.0	186.5	5.44	35.261		
1,200.0	1,200.0	1,170.0	1,157.6	2.6	3.6	39.99	159.1	133.4	211.9	205.8	6.06	34.972		
1,300.0	1,300.0	1,267.8	1,253.3	2.8	4.0	38.66	177.4	141.9	232.0	225.3	6.67	34.755		
1,400.0	1,400.0	1,365.7	1,349.1	3.0	4.4	37.54	195.8	150.4	252.1	244.8	7.29	34.589		
1,500.0	1,500.0	1,463.5	1,444.8	3.3	4.8	36.58	214.2	158.9	272.4	264.5	7.90	34.461		

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 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11U-204 - Wellbore #1 - Plan #1 (10-15-12)													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
1,600.0	1,600.0	1,561.4	1,540.5	3.5	5.3	35.76		232.5	167.5	292.7	284.1	8.52	34.360	
1,700.0	1,700.0	1,659.2	1,636.2	3.7	5.7	35.04		250.9	176.0	313.0	303.9	9.13	34.280	
1,800.0	1,800.0	1,757.0	1,731.9	3.9	6.1	34.41		269.3	184.5	333.4	323.7	9.74	34.215	
1,900.0	1,900.0	1,854.9	1,827.7	4.2	6.6	33.86		287.6	193.0	353.8	343.5	10.36	34.162	
2,000.0	2,000.0	1,952.7	1,923.4	4.4	7.0	33.36		306.0	201.5	374.3	363.3	10.97	34.119 SF	
2,100.0	2,100.0	2,050.5	2,019.0	4.6	7.4	-91.79		324.4	210.0	394.8	385.2	9.61	41.072	
2,200.0	2,199.8	2,148.0	2,114.4	4.8	7.9	-92.49		342.7	218.4	415.6	405.5	10.05	41.370	
2,300.0	2,299.5	2,245.1	2,209.5	5.0	8.3	-93.53		360.9	226.9	436.7	426.2	10.48	41.665	
2,400.0	2,398.7	2,341.8	2,304.0	5.2	8.7	-94.86		379.1	235.3	458.4	447.4	10.93	41.952	
2,500.0	2,497.5	2,437.8	2,398.0	5.4	9.1	-96.42		397.1	243.6	480.8	469.4	11.39	42.220	
2,536.2	2,533.1	2,472.5	2,431.9	5.5	9.3	-97.03		403.6	246.6	489.2	477.6	11.56	42.310	
2,600.0	2,595.8	2,533.3	2,491.5	5.7	9.6	-98.39		415.0	251.9	504.2	492.3	11.88	42.451	
2,700.0	2,694.0	2,628.8	2,584.9	5.9	10.0	-100.37		432.9	260.2	528.2	515.8	12.39	42.624	
2,800.0	2,792.3	2,724.3	2,678.2	6.2	10.4	-102.18		450.9	268.5	552.8	539.9	12.93	42.748	
2,900.0	2,890.5	2,819.7	2,771.6	6.6	10.8	-103.84		468.8	276.8	577.9	564.4	13.49	42.836	
3,000.0	2,988.8	2,915.2	2,865.0	6.9	11.2	-105.36		486.7	285.1	603.5	589.4	14.07	42.896	
3,100.0	3,087.0	3,010.6	2,958.4	7.2	11.7	-106.77		504.6	293.4	629.4	614.7	14.66	42.936	
3,200.0	3,185.3	3,106.1	3,051.8	7.6	12.1	-108.06		522.5	301.7	655.6	640.3	15.26	42.962	
3,300.0	3,283.5	3,201.5	3,145.2	7.9	12.5	-109.25		540.5	310.0	682.1	666.2	15.87	42.978	
3,400.0	3,381.8	3,297.0	3,238.6	8.3	12.9	-110.36		558.4	318.3	708.9	692.4	16.49	42.988	
3,500.0	3,480.0	3,392.5	3,332.0	8.6	13.4	-111.39		576.3	326.6	735.9	718.8	17.12	42.993	
3,600.0	3,578.3	3,487.9	3,425.4	9.0	13.8	-112.34		594.2	334.9	763.1	745.4	17.75	42.995	
3,700.0	3,676.5	3,583.4	3,518.8	9.4	14.2	-113.23		612.2	343.2	790.5	772.2	18.39	42.996	
3,800.0	3,774.8	3,678.8	3,612.2	9.8	14.6	-114.06		630.1	351.5	818.1	799.1	19.03	42.997	
3,900.0	3,873.1	3,774.3	3,705.6	10.1	15.1	-114.84		648.0	359.8	845.8	826.2	19.67	42.997	
4,000.0	3,971.3	3,869.7	3,799.0	10.5	15.5	-115.57		665.9	368.1	873.7	853.4	20.32	42.998	
4,100.0	4,069.6	3,965.2	3,892.3	10.9	15.9	-116.25		683.8	376.4	901.7	880.7	20.97	43.000	
4,200.0	4,167.8	4,060.7	3,985.7	11.3	16.3	-116.90		701.8	384.7	929.8	908.2	21.62	43.002	
4,300.0	4,266.1	4,156.1	4,079.1	11.7	16.7	-117.50		719.7	393.0	958.0	935.7	22.28	43.005	
4,400.0	4,364.3	4,251.6	4,172.5	12.1	17.2	-118.07		737.6	401.3	986.3	963.4	22.93	43.010	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11U-434 - Wellbore #1 - Plan #1 (10-15-12)													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
0.0	0.0	0.0	0.0	0.0	0.0	87.50		3.6	83.3	83.4				
100.0	100.0	100.0	100.0	0.1	0.1	87.50		3.6	83.3	83.4	83.2	0.22	371.033	
200.0	200.0	200.0	200.0	0.3	0.3	87.50		3.6	83.3	83.4	82.7	0.67	123.678	
300.0	300.0	300.0	300.0	0.6	0.6	87.50		3.6	83.3	83.4	82.3	1.12	74.207	
400.0	400.0	400.0	400.0	0.8	0.8	87.50		3.6	83.3	83.4	81.8	1.57	53.005	
500.0	500.0	500.0	500.0	1.0	1.0	87.50		3.6	83.3	83.4	81.4	2.02	41.226	
600.0	600.0	600.0	600.0	1.2	1.2	87.50		3.6	83.3	83.4	80.9	2.47	33.730	
700.0	700.0	700.0	700.0	1.5	1.5	87.50		3.6	83.3	83.4	80.5	2.92	28.541	
800.0	800.0	800.0	800.0	1.7	1.7	87.50		3.6	83.3	83.4	80.0	3.37	24.736	
900.0	900.0	900.0	900.0	1.9	1.9	87.50		3.6	83.3	83.4	79.6	3.82	21.825	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	87.50		3.6	83.3	83.4	79.1	4.27	19.528 CC, ES	
1,100.0	1,100.0	1,098.1	1,098.1	2.4	2.4	86.63		5.0	84.3	84.5	79.8	4.71	17.932	
1,200.0	1,200.0	1,196.0	1,195.9	2.6	2.6	84.16		8.9	87.4	88.0	82.8	5.15	17.067	
1,300.0	1,300.0	1,293.4	1,292.9	2.8	2.8	80.48		15.5	92.5	94.1	88.5	5.60	16.790	
1,400.0	1,400.0	1,390.2	1,389.0	3.0	3.0	76.10		24.6	99.5	103.1	97.1	6.06	17.012	
1,500.0	1,500.0	1,486.8	1,484.5	3.3	3.3	71.54		36.2	108.5	115.4	108.9	6.54	17.639	
1,600.0	1,600.0	1,585.5	1,581.9	3.5	3.6	67.57		48.8	118.2	129.2	122.1	7.05	18.322	
1,700.0	1,700.0	1,684.2	1,679.3	3.7	3.9	64.37		61.4	128.0	143.4	135.9	7.57	18.950	
1,800.0	1,800.0	1,782.9	1,776.7	3.9	4.2	61.75		74.0	137.7	158.0	149.9	8.09	19.522	
1,900.0	1,900.0	1,881.6	1,874.1	4.2	4.5	59.58		86.6	147.4	172.9	164.3	8.63	20.040	
2,000.0	2,000.0	1,980.3	1,971.5	4.4	4.8	57.75		99.1	157.1	188.0	178.8	9.16	20.511	
2,100.0	2,100.0	2,079.0	2,068.9	4.6	5.2	-68.86		111.7	166.9	202.6	193.4	9.24	21.932	
2,200.0	2,199.8	2,177.6	2,166.2	4.8	5.5	-71.22		124.3	176.6	216.3	206.6	9.65	22.408	
2,300.0	2,299.5	2,275.9	2,263.3	5.0	5.8	-74.09		136.8	186.3	229.4	219.4	10.07	22.776	
2,400.0	2,398.7	2,374.0	2,360.1	5.2	6.2	-77.40		149.3	196.0	242.4	231.9	10.51	23.071	
2,500.0	2,497.5	2,471.6	2,456.4	5.4	6.5	-81.08		161.8	205.6	255.7	244.7	10.97	23.319	
2,536.2	2,533.1	2,506.8	2,491.2	5.5	6.6	-82.49		166.3	209.0	260.7	249.6	11.14	23.402	
2,600.0	2,595.8	2,568.7	2,552.3	5.7	6.9	-85.09		174.2	215.2	269.9	258.4	11.46	23.554	
2,700.0	2,694.0	2,665.9	2,648.1	5.9	7.2	-88.82		186.6	224.7	285.3	273.3	11.98	23.818	
2,800.0	2,792.3	2,763.0	2,744.0	6.2	7.6	-92.18		199.0	234.3	301.8	289.3	12.52	24.101	
2,900.0	2,890.5	2,860.1	2,839.8	6.6	7.9	-95.18		211.3	243.9	319.2	306.1	13.09	24.392	
3,000.0	2,988.8	2,957.2	2,935.7	6.9	8.2	-97.88		223.7	253.4	337.4	323.8	13.67	24.687	
3,100.0	3,087.0	3,054.3	3,031.5	7.2	8.6	-100.30		236.1	263.0	356.3	342.1	14.26	24.981	
3,200.0	3,185.3	3,151.4	3,127.3	7.6	9.0	-102.48		248.5	272.6	375.8	360.9	14.87	25.270	
3,300.0	3,283.5	3,248.6	3,223.2	7.9	9.3	-104.44		260.9	282.2	395.7	380.2	15.49	25.553	
3,400.0	3,381.8	3,345.7	3,319.0	8.3	9.7	-106.22		273.3	291.7	416.1	399.9	16.11	25.829	
3,500.0	3,480.0	3,442.8	3,414.9	8.6	10.0	-107.83		285.6	301.3	436.8	420.0	16.74	26.096	
3,600.0	3,578.3	3,539.9	3,510.7	9.0	10.4	-109.30		298.0	310.9	457.8	440.4	17.37	26.355	
3,700.0	3,676.5	3,637.0	3,606.6	9.4	10.7	-110.64		310.4	320.5	479.0	461.0	18.01	26.605	
3,800.0	3,774.8	3,734.1	3,702.4	9.8	11.1	-111.87		322.8	330.0	500.5	481.9	18.64	26.845	
3,900.0	3,873.1	3,831.3	3,798.3	10.1	11.4	-113.00		335.2	339.6	522.2	502.9	19.29	27.077	
4,000.0	3,971.3	3,928.4	3,894.1	10.5	11.8	-114.03		347.6	349.2	544.1	524.2	19.93	27.300	
4,100.0	4,069.6	4,025.5	3,990.0	10.9	12.1	-114.99		359.9	358.8	566.1	545.6	20.58	27.514	
4,200.0	4,167.8	4,122.6	4,085.8	11.3	12.5	-115.88		372.3	368.3	588.3	567.1	21.22	27.720	
4,300.0	4,266.1	4,219.7	4,181.7	11.7	12.9	-116.70		384.7	377.9	610.6	588.8	21.87	27.918	
4,400.0	4,364.3	4,316.8	4,277.5	12.1	13.2	-117.47		397.1	387.5	633.0	610.5	22.52	28.108	
4,500.0	4,462.6	4,414.0	4,373.4	12.5	13.6	-118.18		409.5	397.1	655.6	632.4	23.17	28.291	
4,600.0	4,560.8	4,511.1	4,469.2	12.9	13.9	-118.84		421.9	406.6	678.2	654.3	23.82	28.466	
4,700.0	4,659.1	4,608.2	4,565.1	13.3	14.3	-119.47		434.3	416.2	700.9	676.4	24.48	28.635	
4,800.0	4,757.3	4,705.3	4,660.9	13.7	14.7	-120.05		446.6	425.8	723.6	698.5	25.13	28.797	
4,900.0	4,855.6	4,802.4	4,756.7	14.1	15.0	-120.60		459.0	435.3	746.4	720.7	25.78	28.953	

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 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11U-434 - Wellbore #1 - Plan #1 (10-15-12)													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
5,000.0	4,953.8	4,899.5	4,852.6	14.5	15.4	-121.11		471.4	444.9	769.3	742.9	26.43	29.103	
5,100.0	5,052.1	4,996.7	4,948.4	14.9	15.7	-121.60		483.8	454.5	792.3	765.2	27.09	29.248	
5,200.0	5,150.3	5,093.8	5,044.3	15.4	16.1	-122.06		496.2	464.1	815.3	787.5	27.74	29.387	
5,300.0	5,248.6	5,190.9	5,140.1	15.8	16.5	-122.49		508.6	473.6	838.3	809.9	28.40	29.521	
5,400.0	5,346.9	5,288.0	5,236.0	16.2	16.8	-122.90		520.9	483.2	861.4	832.4	29.05	29.650	
5,500.0	5,445.1	5,385.1	5,331.8	16.6	17.2	-123.29		533.3	492.8	884.5	854.8	29.71	29.774	
5,522.2	5,466.9	5,406.7	5,353.1	16.7	17.3	-123.37		536.1	494.9	889.7	859.8	29.85	29.801	
5,600.0	5,543.5	5,482.4	5,427.9	17.0	17.5	-123.90		545.7	502.4	907.1	876.8	30.38	29.861	
5,700.0	5,642.5	5,580.2	5,524.4	17.2	17.9	-124.37		558.2	512.0	927.9	896.9	30.99	29.944	
5,800.0	5,741.9	5,708.1	5,650.9	17.5	18.3	-124.66		572.8	523.3	945.4	913.8	31.56	29.954	
5,900.0	5,841.7	5,842.7	5,784.9	17.7	18.6	-124.86		583.2	531.4	957.3	925.3	32.07	29.855	
6,000.0	5,941.6	5,978.5	5,920.5	17.8	18.8	-124.95		588.8	535.6	963.6	931.1	32.50	29.647	
6,058.4	6,000.0	6,058.1	6,000.0	17.9	18.9	-0.10		589.6	536.3	964.5	932.3	32.26	29.895	
6,100.0	6,041.6	6,099.6	6,041.6	18.0	19.0	-0.10		589.6	536.3	964.5	932.1	32.40	29.771	
6,200.0	6,141.6	6,199.6	6,141.6	18.1	19.1	-0.10		589.6	536.3	964.5	931.8	32.74	29.464	
6,300.0	6,241.6	6,299.6	6,241.6	18.3	19.3	-0.10		589.6	536.3	964.5	931.5	33.08	29.162	
6,400.0	6,341.6	6,399.6	6,341.6	18.5	19.4	-0.10		589.6	536.3	964.5	931.1	33.42	28.863	
6,500.0	6,441.6	6,499.6	6,441.6	18.6	19.6	-0.10		589.6	536.3	964.5	930.8	33.76	28.568	
6,600.0	6,541.6	6,599.6	6,541.6	18.8	19.8	-0.10		589.6	536.3	964.5	930.4	34.11	28.277	
6,700.0	6,641.6	6,699.6	6,641.6	18.9	19.9	-0.10		589.6	536.3	964.5	930.1	34.46	27.990	
6,768.6	6,710.2	6,768.3	6,710.2	19.0	20.0	-0.10		589.6	536.3	964.5	929.8	34.70	27.795	
6,800.0	6,741.6	6,800.3	6,742.2	19.1	20.1	90.89		589.6	535.6	964.5	929.2	35.29	27.328	
6,850.0	6,791.4	6,851.3	6,793.0	19.1	20.1	90.89		589.6	531.8	964.5	929.1	35.40	27.249	
6,900.0	6,840.9	6,902.2	6,843.5	19.1	20.1	90.88		589.4	524.6	964.5	929.1	35.45	27.205	
6,950.0	6,889.9	6,953.2	6,893.3	19.1	20.1	90.86		589.3	514.1	964.5	929.1	35.47	27.192	
7,000.0	6,938.1	7,004.1	6,942.4	19.1	20.1	90.85		589.0	500.2	964.5	929.1	35.45	27.205	
7,050.0	6,985.3	7,055.1	6,990.3	19.1	20.1	90.83		588.7	483.1	964.5	929.1	35.41	27.240	
7,100.0	7,031.3	7,106.0	7,037.0	19.1	20.1	90.81		588.4	462.9	964.5	929.2	35.35	27.287	
7,150.0	7,075.9	7,156.9	7,082.3	19.0	20.0	90.78		588.0	439.6	964.5	929.3	35.28	27.339	
7,200.0	7,119.0	7,207.7	7,125.8	19.0	20.0	90.75		587.5	413.4	964.5	929.3	35.22	27.384	
7,250.0	7,160.4	7,258.5	7,167.5	18.9	19.9	90.72		587.0	384.4	964.5	929.3	35.19	27.409	
7,300.0	7,199.8	7,309.3	7,207.1	18.9	19.8	90.68		586.5	352.7	964.5	929.3	35.20	27.401	
7,350.0	7,237.1	7,360.0	7,244.5	18.9	19.7	90.64		585.9	318.4	964.5	929.2	35.27	27.344	
7,400.0	7,272.1	7,410.7	7,279.6	18.8	19.7	90.60		585.3	281.8	964.5	929.1	35.43	27.222	
7,450.0	7,304.8	7,461.3	7,312.1	18.9	19.6	90.55		584.6	243.0	964.5	928.8	35.69	27.023	
7,491.2	7,329.8	7,503.0	7,336.8	18.9	19.6	90.52		584.0	209.5	964.5	928.5	36.00	26.793	
7,500.0	7,334.9	7,511.9	7,341.9	18.9	19.6	90.51		583.9	202.1	964.5	928.4	36.08	26.736	
7,550.0	7,362.3	7,562.4	7,368.9	19.0	19.5	90.46		583.2	159.5	964.5	927.9	36.60	26.356	
7,600.0	7,386.9	7,612.9	7,393.0	19.2	19.5	90.41		582.4	115.2	964.5	927.3	37.27	25.882	
7,650.0	7,408.7	7,663.3	7,414.1	19.4	19.5	90.35		581.7	69.4	964.5	926.4	38.09	25.319	
7,700.0	7,427.4	7,713.7	7,432.1	19.8	19.7	90.30		580.8	22.4	964.5	925.4	39.08	24.680	
7,750.0	7,443.1	7,764.0	7,447.0	20.2	20.2	90.25		580.0	-25.6	964.5	924.3	40.22	23.980	
7,800.0	7,455.6	7,814.2	7,458.7	20.8	20.8	90.19		579.2	-74.5	964.5	923.0	41.51	23.234	
7,850.0	7,465.0	7,864.3	7,467.1	21.4	21.6	90.13		578.3	-123.9	964.5	921.6	42.94	22.464	
7,888.6	7,470.0	7,903.0	7,471.5	22.0	22.2	90.09		577.7	-162.3	964.5	920.4	44.12	21.862	
7,900.0	7,471.2	7,914.4	7,472.7	22.2	22.4	90.09		577.5	-173.6	964.5	920.1	44.49	21.682	
7,962.6	7,477.7	7,977.0	7,479.2	23.2	23.5	90.09		576.4	-235.9	964.6	918.0	46.58	20.709	
8,000.0	7,481.0	8,014.4	7,482.0	23.8	24.2	90.03		575.8	-273.2	964.5	916.5	47.92	20.127	
8,087.2	7,484.1	8,101.6	7,484.0	25.5	25.9	90.00		574.3	-360.3	963.3	912.1	51.21	18.810	
8,100.0	7,484.1	8,114.4	7,484.0	25.7	26.1	90.00		574.1	-373.1	963.0	911.3	51.72	18.621	
8,200.0	7,483.9	8,214.4	7,483.8	27.7	28.2	90.00		572.4	-473.1	961.0	905.2	55.78	17.228	

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 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11U-434 - Wellbore #1 - Plan #1 (10-15-12)												Offset Site Error: 0.0 ft	
Survey Program: 0-MWD												Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance						
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)		
8,300.0	7,483.7	8,314.3	7,483.6	29.9	30.4	90.00	570.7	-573.0	958.9	898.8	60.09	15.958	
8,400.0	7,483.5	8,414.3	7,483.4	32.1	32.7	90.00	569.0	-673.0	956.9	892.3	64.60	14.812	
8,500.0	7,483.3	8,514.3	7,483.2	34.5	35.0	90.00	567.3	-772.9	954.8	885.5	69.28	13.783	
8,600.0	7,483.1	8,614.3	7,483.0	36.9	37.4	90.00	565.6	-872.9	952.8	878.7	74.08	12.861	
8,700.0	7,482.9	8,714.2	7,482.8	39.3	39.9	90.00	563.9	-972.9	950.7	871.7	78.99	12.035	
8,800.0	7,482.7	8,814.2	7,482.5	41.8	42.4	90.00	562.2	-1,072.8	948.7	864.7	83.99	11.295	
8,900.0	7,482.4	8,914.2	7,482.3	44.3	44.9	90.00	560.5	-1,172.8	946.6	857.6	89.07	10.628	
9,000.0	7,482.2	9,014.2	7,482.1	46.9	47.5	90.00	558.8	-1,272.8	944.6	850.4	94.20	10.027	
9,100.0	7,482.0	9,114.2	7,481.9	49.5	50.1	90.00	557.1	-1,372.7	942.5	843.1	99.39	9.483	
9,200.0	7,481.8	9,214.1	7,481.7	52.1	52.7	90.00	555.4	-1,472.7	940.5	835.8	104.62	8.989	
9,300.0	7,481.6	9,314.1	7,481.5	54.8	55.3	90.00	553.7	-1,572.7	938.4	828.5	109.89	8.540	
9,400.0	7,481.4	9,414.1	7,481.3	57.4	57.9	90.00	552.0	-1,672.6	936.4	821.2	115.19	8.129	
9,500.0	7,481.2	9,514.1	7,481.1	60.1	60.6	90.00	550.3	-1,772.6	934.3	813.8	120.52	7.752	
9,600.0	7,481.0	9,614.1	7,480.9	62.7	63.3	90.00	548.6	-1,872.6	932.3	806.4	125.87	7.406	
9,700.0	7,480.8	9,714.0	7,480.7	65.4	66.0	90.00	546.9	-1,972.5	930.2	799.0	131.25	7.087	
9,800.0	7,480.6	9,814.0	7,480.5	68.1	68.7	90.00	545.2	-2,072.5	928.2	791.5	136.64	6.793	
9,900.0	7,480.4	9,914.0	7,480.3	70.8	71.4	90.00	543.5	-2,172.4	926.1	784.1	142.06	6.519	
10,000.0	7,480.2	10,014.0	7,480.1	73.5	74.1	90.00	541.8	-2,272.4	924.1	776.6	147.48	6.265	
10,100.0	7,480.0	10,114.0	7,479.9	76.3	76.8	90.00	540.1	-2,372.4	922.0	769.1	152.93	6.029	
10,200.0	7,479.8	10,213.9	7,479.7	79.0	79.5	90.00	538.4	-2,472.3	920.0	761.6	158.38	5.809	
10,300.0	7,479.6	10,313.9	7,479.5	81.7	82.2	90.00	536.7	-2,572.3	917.9	754.1	163.84	5.602	
10,400.0	7,479.4	10,413.9	7,479.3	84.5	85.0	90.00	535.0	-2,672.3	915.9	746.5	169.32	5.409	
10,500.0	7,479.2	10,513.9	7,479.1	87.2	87.7	90.00	533.3	-2,772.2	913.8	739.0	174.80	5.228	
10,600.0	7,479.0	10,613.8	7,478.9	90.0	90.4	90.00	531.6	-2,872.2	911.8	731.5	180.29	5.057	
10,700.0	7,478.8	10,713.8	7,478.7	92.7	93.2	90.00	529.9	-2,972.2	909.7	723.9	185.79	4.896	
10,800.0	7,478.6	10,813.8	7,478.5	95.5	95.9	90.00	528.2	-3,072.1	907.7	716.4	191.29	4.745	
10,900.0	7,478.4	10,913.8	7,478.3	98.2	98.7	90.00	526.5	-3,172.1	905.6	708.8	196.80	4.602	
11,000.0	7,478.2	11,013.8	7,478.1	101.0	101.4	90.00	524.8	-3,272.1	903.5	701.2	202.32	4.466	
11,100.0	7,478.0	11,113.7	7,477.9	103.7	104.2	90.00	523.1	-3,372.0	901.5	693.7	207.84	4.337	
11,200.0	7,477.8	11,213.7	7,477.7	106.5	106.9	90.00	521.4	-3,472.0	899.4	686.1	213.37	4.215	
11,300.0	7,477.6	11,313.7	7,477.5	109.3	109.7	90.00	519.7	-3,571.9	897.4	678.5	218.90	4.100	
11,400.0	7,477.4	11,413.7	7,477.3	112.0	112.5	90.00	518.0	-3,671.9	895.3	670.9	224.44	3.989	
11,500.0	7,477.2	11,513.7	7,477.1	114.8	115.2	90.00	516.3	-3,771.9	893.3	663.3	229.98	3.884	
11,600.0	7,477.0	11,613.6	7,476.9	117.6	118.0	90.00	514.6	-3,871.8	891.2	655.7	235.52	3.784	
11,700.0	7,476.8	11,713.6	7,476.7	120.4	120.8	90.00	512.9	-3,971.8	889.2	648.1	241.06	3.689	
11,800.0	7,476.5	11,813.6	7,476.5	123.1	123.5	90.00	511.2	-4,071.8	887.1	640.5	246.61	3.597	
11,900.0	7,476.3	11,913.6	7,476.3	125.9	126.3	90.00	509.5	-4,171.7	885.1	632.9	252.17	3.510	
12,000.0	7,476.1	12,013.6	7,476.1	128.7	129.1	90.00	507.8	-4,271.7	883.0	625.3	257.72	3.426	
12,070.3	7,476.0	12,071.8	7,476.0	130.6	130.7	90.00	506.8	-4,329.9	881.7	620.4	261.29	3.374 SF	

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11V-214 - Wellbore #1 - Plan #1 (10-15-12)													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	105.55	-25.5	91.6	95.1					
100.0	100.0	100.0	100.0	0.1	0.1	105.55	-25.5	91.6	95.1	94.9	0.22	423.245		
200.0	200.0	200.0	200.0	0.3	0.3	105.55	-25.5	91.6	95.1	94.5	0.67	141.082		
300.0	300.0	300.0	300.0	0.6	0.6	105.55	-25.5	91.6	95.1	94.0	1.12	84.649		
400.0	400.0	400.0	400.0	0.8	0.8	105.55	-25.5	91.6	95.1	93.6	1.57	60.464		
500.0	500.0	500.0	500.0	1.0	1.0	105.55	-25.5	91.6	95.1	93.1	2.02	47.027		
600.0	600.0	600.0	600.0	1.2	1.2	105.55	-25.5	91.6	95.1	92.7	2.47	38.477		
700.0	700.0	700.0	700.0	1.5	1.5	105.55	-25.5	91.6	95.1	92.2	2.92	32.557		
800.0	800.0	800.0	800.0	1.7	1.7	105.55	-25.5	91.6	95.1	91.8	3.37	28.216		
900.0	900.0	900.0	900.0	1.9	1.9	105.55	-25.5	91.6	95.1	91.3	3.82	24.897		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	105.55	-25.5	91.6	95.1	90.9	4.27	22.276		
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	105.55	-25.5	91.6	95.1	90.4	4.72	20.155		
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	105.55	-25.5	91.6	95.1	90.0	5.17	18.402		
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	105.55	-25.5	91.6	95.1	89.5	5.62	16.930		
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	105.55	-25.5	91.6	95.1	89.1	6.07	15.676		
1,500.0	1,500.0	1,500.0	1,500.0	3.3	3.3	105.55	-25.5	91.6	95.1	88.6	6.52	14.595 CC, ES		
1,600.0	1,600.0	1,597.4	1,597.4	3.5	3.5	104.96	-24.9	93.2	96.5	89.5	6.95	13.876		
1,700.0	1,700.0	1,694.5	1,694.4	3.7	3.7	103.29	-23.1	97.8	100.6	93.3	7.38	13.628		
1,800.0	1,800.0	1,791.2	1,790.7	3.9	3.9	100.79	-20.1	105.4	107.7	99.9	7.82	13.770		
1,900.0	1,900.0	1,887.7	1,886.5	4.2	4.1	97.82	-15.9	116.0	117.9	109.6	8.27	14.251		
2,000.0	2,000.0	1,986.8	1,984.8	4.4	4.4	94.99	-11.2	128.1	129.5	120.7	8.74	14.813		
2,100.0	2,100.0	2,086.1	2,083.2	4.6	4.6	-32.51	-6.4	140.2	139.8	130.7	9.10	15.360		
2,200.0	2,199.8	2,185.5	2,181.7	4.8	4.9	-35.56	-1.7	152.3	147.7	138.2	9.50	15.549		
2,300.0	2,299.5	2,284.9	2,280.3	5.0	5.2	-39.10	3.1	164.4	153.2	143.3	9.89	15.485		
2,400.0	2,398.7	2,384.1	2,378.7	5.2	5.4	-43.25	7.8	176.4	156.7	146.4	10.30	15.218		
2,500.0	2,497.5	2,483.2	2,476.9	5.4	5.7	-48.11	12.6	188.5	158.7	147.9	10.72	14.800		
2,536.2	2,533.1	2,519.0	2,512.4	5.5	5.8	-50.07	14.3	192.9	159.1	148.2	10.88	14.620		
2,600.0	2,595.8	2,582.0	2,574.8	5.7	6.0	-53.60	17.3	200.5	160.1	148.9	11.19	14.303		
2,700.0	2,694.0	2,680.7	2,672.7	5.9	6.3	-59.02	22.0	212.6	162.9	151.2	11.71	13.913		
2,800.0	2,792.3	2,779.5	2,770.6	6.2	6.6	-64.22	26.8	224.6	167.2	154.9	12.26	13.635		
2,900.0	2,890.5	2,878.2	2,868.6	6.6	6.9	-69.12	31.5	236.6	172.8	159.9	12.84	13.452		
3,000.0	2,988.8	2,977.0	2,966.5	6.9	7.2	-73.70	36.2	248.6	179.6	166.1	13.45	13.348		
3,100.0	3,087.0	3,075.8	3,064.4	7.2	7.5	-77.92	41.0	260.7	187.4	173.3	14.08	13.308		
3,200.0	3,185.3	3,174.5	3,162.3	7.6	7.8	-81.79	45.7	272.7	196.2	181.5	14.73	13.321		
3,300.0	3,283.5	3,273.3	3,260.2	7.9	8.1	-85.32	50.4	284.7	205.8	190.5	15.39	13.376		
3,400.0	3,381.8	3,372.0	3,358.1	8.3	8.4	-88.53	55.1	296.7	216.2	200.1	16.06	13.463		
3,500.0	3,480.0	3,470.8	3,456.0	8.6	8.7	-91.44	59.9	308.7	227.1	210.4	16.73	13.577		
3,600.0	3,578.3	3,569.6	3,553.9	9.0	9.0	-94.07	64.6	320.8	238.6	221.2	17.41	13.709		
3,700.0	3,676.5	3,668.3	3,651.8	9.4	9.4	-96.47	69.3	332.8	250.6	232.5	18.09	13.855		
3,800.0	3,774.8	3,767.1	3,749.7	9.8	9.7	-98.64	74.1	344.8	262.9	244.2	18.77	14.011		
3,900.0	3,873.1	3,865.8	3,847.6	10.1	10.0	-100.62	78.8	356.8	275.6	256.2	19.45	14.174		
4,000.0	3,971.3	3,964.6	3,945.6	10.5	10.3	-102.43	83.5	368.9	288.6	268.5	20.13	14.340		
4,100.0	4,069.6	4,063.3	4,043.5	10.9	10.6	-104.08	88.2	380.9	301.8	281.0	20.80	14.509		
4,200.0	4,167.8	4,162.1	4,141.4	11.3	10.9	-105.59	93.0	392.9	315.3	293.8	21.48	14.678		
4,300.0	4,266.1	4,260.9	4,239.3	11.7	11.3	-106.97	97.7	404.9	329.0	306.8	22.16	14.846		
4,400.0	4,364.3	4,359.6	4,337.2	12.1	11.6	-108.25	102.4	417.0	342.8	320.0	22.84	15.012		
4,500.0	4,462.6	4,458.4	4,435.1	12.5	11.9	-109.42	107.2	429.0	356.8	333.3	23.51	15.176		
4,600.0	4,560.8	4,557.1	4,533.0	12.9	12.2	-110.51	111.9	441.0	371.0	346.8	24.19	15.336		
4,700.0	4,659.1	4,655.9	4,630.9	13.3	12.5	-111.52	116.6	453.0	385.2	360.4	24.86	15.493		
4,800.0	4,757.3	4,754.7	4,728.8	13.7	12.9	-112.46	121.3	465.1	399.6	374.1	25.54	15.647		
4,900.0	4,855.6	4,853.4	4,826.7	14.1	13.2	-113.33	126.1	477.1	414.1	387.8	26.21	15.797		

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 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11V-214 - Wellbore #1 - Plan #1 (10-15-12)													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	
5,000.0	4,953.8	4,952.2	4,924.7	14.5	13.5	-114.14	130.8	489.1	428.6	401.7	26.89	15.942		
5,100.0	5,052.1	5,050.9	5,022.6	14.9	13.8	-114.90	135.5	501.1	443.2	415.7	27.56	16.084		
5,200.0	5,150.3	5,149.7	5,120.5	15.4	14.1	-115.61	140.3	513.2	457.9	429.7	28.23	16.222		
5,300.0	5,248.6	5,256.6	5,226.7	15.8	14.4	-116.52	144.7	524.5	471.9	443.0	28.85	16.358		
5,400.0	5,346.9	5,363.9	5,333.7	16.2	14.6	-117.80	147.7	532.2	484.2	454.8	29.41	16.463		
5,500.0	5,445.1	5,470.9	5,440.5	16.6	14.8	-119.42	149.3	536.1	495.0	465.1	29.93	16.541		
5,522.2	5,466.9	5,494.5	5,464.2	16.7	14.9	-119.83	149.4	536.4	497.3	467.2	30.04	16.555		
5,600.0	5,543.5	5,573.9	5,543.5	17.0	15.0	-121.28	149.5	536.6	504.3	473.9	30.40	16.591		
5,700.0	5,642.5	5,672.9	5,642.5	17.2	15.2	-122.76	149.5	536.6	511.9	481.1	30.81	16.616		
5,800.0	5,741.9	5,772.3	5,741.9	17.5	15.3	-123.85	149.5	536.6	517.8	486.6	31.20	16.597		
5,900.0	5,841.7	5,872.0	5,841.7	17.7	15.5	-124.58	149.5	536.6	521.9	490.3	31.57	16.532		
6,000.0	5,941.6	5,971.9	5,941.6	17.8	15.7	-124.96	149.5	536.6	524.1	492.1	31.92	16.418		
6,058.4	6,000.0	6,030.3	6,000.0	17.9	15.8	-0.15	149.5	536.6	524.4	495.7	28.69	18.278		
6,100.0	6,041.6	6,071.9	6,041.6	18.0	15.9	-0.15	149.5	536.6	524.4	495.5	28.85	18.178		
6,200.0	6,141.6	6,171.9	6,141.6	18.1	16.1	-0.15	149.5	536.6	524.4	495.2	29.23	17.943		
6,300.0	6,241.6	6,271.9	6,241.6	18.3	16.2	-0.15	149.5	536.6	524.4	494.8	29.61	17.713		
6,400.0	6,341.6	6,371.9	6,341.6	18.5	16.4	-0.15	149.5	536.6	524.4	494.4	29.99	17.487		
6,500.0	6,441.6	6,471.9	6,441.6	18.6	16.6	-0.15	149.5	536.6	524.4	494.0	30.37	17.266		
6,600.0	6,541.6	6,571.9	6,541.6	18.8	16.8	-0.15	149.5	536.6	524.4	493.6	30.76	17.050		
6,700.0	6,641.6	6,672.4	6,641.8	18.9	16.9	-0.77	149.4	530.9	524.3	493.2	31.14	16.837		
6,714.6	6,656.2	6,686.8	6,656.2	18.9	16.9	-0.98	149.4	529.0	524.3	493.1	31.20	16.805		
6,768.6	6,710.2	6,739.8	6,708.2	19.0	17.0	-2.00	149.2	519.7	524.4	493.0	31.43	16.686		
6,800.0	6,741.6	6,769.9	6,737.6	19.1	17.0	88.30	149.1	512.8	524.6	490.2	34.41	15.245		
6,850.0	6,791.4	6,817.5	6,783.3	19.1	17.0	87.19	148.9	499.6	525.0	490.6	34.40	15.260		
6,900.0	6,840.9	6,864.6	6,827.6	19.1	16.9	86.11	148.6	483.8	525.6	491.2	34.36	15.297		
6,950.0	6,889.9	6,911.1	6,870.3	19.1	16.9	85.05	148.3	465.5	526.4	492.1	34.29	15.352		
7,000.0	6,938.1	6,957.0	6,911.4	19.1	16.9	84.01	147.9	444.9	527.3	493.1	34.20	15.420		
7,050.0	6,985.3	7,002.5	6,950.8	19.1	16.9	83.01	147.5	422.1	528.4	494.3	34.10	15.497		
7,100.0	7,031.3	7,047.5	6,988.3	19.1	16.9	82.04	147.1	397.3	529.6	495.6	34.00	15.578		
7,150.0	7,075.9	7,092.2	7,024.0	19.0	16.9	81.10	146.6	370.5	530.9	497.0	33.91	15.657		
7,200.0	7,119.0	7,136.4	7,057.8	19.0	16.9	80.21	146.2	342.0	532.3	498.5	33.85	15.727		
7,250.0	7,160.4	7,180.2	7,089.6	18.9	16.9	79.36	145.6	311.9	533.8	500.0	33.82	15.781		
7,300.0	7,199.8	7,223.7	7,119.4	18.9	17.0	78.55	145.1	280.2	535.3	501.4	33.85	15.812		
7,350.0	7,237.1	7,266.9	7,147.2	18.9	17.1	77.79	144.5	247.1	536.8	502.8	33.95	15.811		
7,400.0	7,272.1	7,309.8	7,172.9	18.8	17.3	77.08	143.9	212.7	538.2	504.1	34.13	15.772		
7,450.0	7,304.8	7,350.0	7,195.2	18.9	17.5	76.45	143.4	179.3	539.7	505.3	34.39	15.694		
7,500.0	7,334.9	7,394.9	7,217.9	18.9	17.8	75.81	142.7	140.6	541.1	506.3	34.79	15.553		
7,550.0	7,362.3	7,437.1	7,237.2	19.0	18.1	75.26	142.1	103.1	542.4	507.1	35.30	15.365		
7,600.0	7,386.9	7,479.1	7,254.3	19.2	18.5	74.76	141.4	64.8	543.7	507.7	35.94	15.126		
7,650.0	7,408.7	7,521.0	7,269.3	19.4	19.0	74.32	140.7	25.7	544.8	508.1	36.71	14.840		
7,700.0	7,427.4	7,562.6	7,282.0	19.8	19.5	73.93	140.0	-14.0	545.8	508.2	37.61	14.512		
7,750.0	7,443.1	7,604.2	7,292.5	20.2	20.1	73.60	139.4	-54.2	546.7	508.1	38.64	14.149		
7,800.0	7,455.6	7,645.7	7,300.8	20.8	20.7	73.33	138.7	-94.8	547.5	507.7	39.80	13.757		
7,850.0	7,465.0	7,687.1	7,306.8	21.4	21.3	73.12	138.0	-135.8	548.1	507.0	41.07	13.345		
7,888.6	7,470.0	7,719.0	7,310.0	22.0	21.8	72.99	137.4	-167.5	548.4	506.3	42.12	13.019		
7,900.0	7,471.2	7,728.4	7,310.7	22.2	22.0	72.96	137.2	-176.9	548.5	506.1	42.44	12.925		
7,962.6	7,477.7	7,779.9	7,312.3	23.2	22.9	72.59	136.4	-228.3	549.9	505.7	44.21	12.438		
8,000.0	7,481.0	7,816.3	7,312.1	23.8	23.6	72.17	135.7	-264.8	550.9	505.4	45.41	12.129		
8,087.2	7,484.1	7,903.5	7,311.6	25.5	25.3	71.75	134.2	-351.9	550.9	502.4	48.49	11.361		
8,100.0	7,484.1	7,916.2	7,311.5	25.7	25.5	71.74	134.0	-364.7	550.6	501.7	48.97	11.244		
8,200.0	7,483.9	8,016.2	7,310.9	27.7	27.6	71.63	132.3	-464.6	548.8	495.9	52.84	10.386		

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 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11V-214 - Wellbore #1 - Plan #1 (10-15-12)											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	7,483.7	8,116.2	7,310.3	29.9	29.8	71.52	130.6	-564.6	546.9	490.0	56.94	9.606		
8,400.0	7,483.5	8,216.2	7,309.8	32.1	32.1	71.42	128.9	-664.5	545.1	483.9	61.22	8.903		
8,500.0	7,483.3	8,316.1	7,309.2	34.5	34.5	71.31	127.2	-764.5	543.3	477.6	65.66	8.275		
8,600.0	7,483.1	8,416.1	7,308.6	36.9	36.9	71.20	125.4	-864.5	541.4	471.2	70.20	7.712		
8,700.0	7,482.9	8,516.1	7,308.0	39.3	39.4	71.09	123.7	-964.4	539.6	464.8	74.85	7.210		
8,800.0	7,482.7	8,616.1	7,307.4	41.8	41.9	70.98	122.0	-1,064.4	537.8	458.2	79.56	6.759		
8,900.0	7,482.4	8,716.1	7,306.8	44.3	44.5	70.87	120.3	-1,164.4	536.0	451.6	84.34	6.355		
9,000.0	7,482.2	8,816.0	7,306.2	46.9	47.1	70.75	118.6	-1,264.3	534.1	445.0	89.17	5.990		
9,100.0	7,482.0	8,916.0	7,305.6	49.5	49.7	70.64	116.9	-1,364.3	532.3	438.3	94.04	5.660		
9,200.0	7,481.8	9,016.0	7,305.0	52.1	52.3	70.53	115.2	-1,464.2	530.5	431.5	98.95	5.361		
9,300.0	7,481.6	9,116.0	7,304.4	54.8	55.0	70.41	113.4	-1,564.2	528.7	424.8	103.88	5.089		
9,400.0	7,481.4	9,215.9	7,303.8	57.4	57.6	70.30	111.7	-1,664.2	526.9	418.0	108.84	4.841		
9,500.0	7,481.2	9,315.9	7,303.2	60.1	60.3	70.18	110.0	-1,764.1	525.0	411.2	113.81	4.613		
9,600.0	7,481.0	9,415.9	7,302.6	62.7	63.0	70.06	108.3	-1,864.1	523.2	404.4	118.80	4.404		
9,700.0	7,480.8	9,515.9	7,302.0	65.4	65.7	69.95	106.6	-1,964.0	521.4	397.6	123.80	4.212		
9,800.0	7,480.6	9,615.9	7,301.4	68.1	68.4	69.83	104.9	-2,064.0	519.6	390.8	128.81	4.034		
9,900.0	7,480.4	9,715.8	7,300.9	70.8	71.1	69.71	103.1	-2,164.0	517.8	384.0	133.83	3.869		
10,000.0	7,480.2	9,815.8	7,300.3	73.5	73.8	69.59	101.4	-2,263.9	516.0	377.2	138.86	3.716		
10,100.0	7,480.0	9,915.8	7,299.7	76.3	76.6	69.47	99.7	-2,363.9	514.2	370.3	143.88	3.574		
10,200.0	7,479.8	10,015.8	7,299.1	79.0	79.3	69.35	98.0	-2,463.9	512.4	363.5	148.91	3.441		
10,300.0	7,479.6	10,115.7	7,298.5	81.7	82.0	69.22	96.3	-2,563.8	510.6	356.7	153.95	3.317		
10,400.0	7,479.4	10,215.7	7,297.9	84.5	84.8	69.10	94.6	-2,663.8	508.8	349.9	158.98	3.201		
10,500.0	7,479.2	10,315.7	7,297.3	87.2	87.5	68.98	92.9	-2,763.7	507.0	343.0	164.01	3.092		
10,600.0	7,479.0	10,415.7	7,296.7	90.0	90.3	68.85	91.1	-2,863.7	505.2	336.2	169.03	2.989		
10,700.0	7,478.8	10,515.7	7,296.1	92.7	93.0	68.72	89.4	-2,963.7	503.5	329.4	174.06	2.892		
10,800.0	7,478.6	10,615.6	7,295.5	95.5	95.8	68.60	87.7	-3,063.6	501.7	322.6	179.08	2.801		
10,900.0	7,478.4	10,715.6	7,294.9	98.2	98.5	68.47	86.0	-3,163.6	499.9	315.8	184.10	2.715		
11,000.0	7,478.2	10,815.6	7,294.3	101.0	101.3	68.34	84.3	-3,263.5	498.1	309.0	189.11	2.634		
11,100.0	7,478.0	10,915.6	7,293.7	103.7	104.0	68.21	82.6	-3,363.5	496.3	302.2	194.11	2.557		
11,200.0	7,477.8	11,015.5	7,293.1	106.5	106.8	68.08	80.8	-3,463.5	494.6	295.5	199.11	2.484		
11,300.0	7,477.6	11,115.5	7,292.5	109.3	109.6	67.95	79.1	-3,563.4	492.8	288.7	204.11	2.414		
11,400.0	7,477.4	11,215.5	7,292.0	112.0	112.3	67.81	77.4	-3,663.4	491.0	281.9	209.09	2.348		
11,500.0	7,477.2	11,315.5	7,291.4	114.8	115.1	67.68	75.7	-3,763.4	489.3	275.2	214.07	2.286		
11,600.0	7,477.0	11,415.5	7,290.8	117.6	117.9	67.55	74.0	-3,863.3	487.5	268.5	219.04	2.226		
11,700.0	7,476.8	11,515.4	7,290.2	120.4	120.7	67.41	72.3	-3,963.3	485.7	261.7	224.00	2.169		
11,800.0	7,476.5	11,615.4	7,289.6	123.1	123.4	67.27	70.6	-4,063.2	484.0	255.0	228.95	2.114		
11,900.0	7,476.3	11,715.4	7,289.0	125.9	126.2	67.14	68.8	-4,163.2	482.2	248.3	233.89	2.062		
12,000.0	7,476.1	11,815.4	7,288.4	128.7	129.0	67.00	67.1	-4,263.2	480.5	241.7	238.82	2.012		
12,070.3	7,476.0	11,881.9	7,288.0	130.6	130.8	66.90	66.0	-4,329.7	479.3	237.1	242.20	1.979 SF		

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11W-214 - Wellbore #1 - Plan #1 (10-15-12)													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	127.73	-83.8	108.3	136.9					
100.0	100.0	100.0	100.0	0.1	0.1	127.73	-83.8	108.3	136.9	136.7	0.22	609.272		
200.0	200.0	200.0	200.0	0.3	0.3	127.73	-83.8	108.3	136.9	136.3	0.67	203.091		
300.0	300.0	300.0	300.0	0.6	0.6	127.73	-83.8	108.3	136.9	135.8	1.12	121.854		
400.0	400.0	400.0	400.0	0.8	0.8	127.73	-83.8	108.3	136.9	135.4	1.57	87.039		
500.0	500.0	500.0	500.0	1.0	1.0	127.73	-83.8	108.3	136.9	134.9	2.02	67.697		
600.0	600.0	600.0	600.0	1.2	1.2	127.73	-83.8	108.3	136.9	134.5	2.47	55.388		
700.0	700.0	700.0	700.0	1.5	1.5	127.73	-83.8	108.3	136.9	134.0	2.92	46.867		
800.0	800.0	800.0	800.0	1.7	1.7	127.73	-83.8	108.3	136.9	133.6	3.37	40.618		
900.0	900.0	900.0	900.0	1.9	1.9	127.73	-83.8	108.3	136.9	133.1	3.82	35.840		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	127.73	-83.8	108.3	136.9	132.7	4.27	32.067 CC, ES		
1,100.0	1,100.0	1,095.8	1,095.7	2.4	2.3	127.99	-85.2	109.1	138.5	133.8	4.69	29.553		
1,200.0	1,200.0	1,191.3	1,191.2	2.6	2.5	128.73	-89.4	111.4	143.1	138.0	5.09	28.140		
1,300.0	1,300.0	1,286.4	1,285.9	2.8	2.7	129.87	-96.3	115.3	150.9	145.4	5.49	27.458		
1,400.0	1,400.0	1,380.9	1,379.8	3.0	2.9	131.27	-105.9	120.6	161.8	155.9	5.91	27.353		
1,500.0	1,500.0	1,474.6	1,472.4	3.3	3.1	132.81	-118.0	127.4	175.9	169.5	6.35	27.701		
1,600.0	1,600.0	1,567.7	1,564.0	3.5	3.4	134.39	-132.7	135.6	193.2	186.4	6.80	28.397		
1,700.0	1,700.0	1,665.8	1,660.2	3.7	3.7	135.87	-149.4	144.9	211.9	204.6	7.29	29.080		
1,800.0	1,800.0	1,763.9	1,756.4	3.9	4.0	137.11	-166.0	154.2	230.7	222.9	7.78	29.637		
1,900.0	1,900.0	1,862.0	1,852.7	4.2	4.4	138.17	-182.6	163.5	249.6	241.3	8.30	30.084		
2,000.0	2,000.0	1,960.1	1,948.9	4.4	4.8	139.08	-199.3	172.7	268.6	259.8	8.82	30.444		
2,100.0	2,100.0	2,058.5	2,045.4	4.6	5.1	15.00	-215.9	182.0	286.0	277.0	8.96	31.923		
2,200.0	2,199.8	2,157.3	2,142.4	4.8	5.5	15.88	-232.7	191.4	300.1	290.8	9.37	32.038		
2,300.0	2,299.5	2,256.6	2,239.8	5.0	5.9	16.88	-249.5	200.8	311.0	301.3	9.78	31.810		
2,400.0	2,398.7	2,356.1	2,337.4	5.2	6.3	18.01	-266.4	210.2	318.7	308.5	10.19	31.286		
2,500.0	2,497.5	2,455.7	2,435.1	5.4	6.7	19.31	-283.3	219.6	323.2	312.6	10.60	30.502		
2,536.2	2,533.1	2,491.8	2,470.5	5.5	6.9	19.83	-289.4	223.0	324.1	313.4	10.75	30.161		
2,600.0	2,595.8	2,555.3	2,532.8	5.7	7.1	20.76	-300.2	229.0	325.3	314.3	11.04	29.479		
2,700.0	2,694.0	2,654.9	2,630.6	5.9	7.6	22.22	-317.1	238.5	327.4	315.9	11.50	28.473		
2,800.0	2,792.3	2,754.6	2,728.3	6.2	8.0	23.65	-333.9	247.9	329.7	317.8	11.97	27.536		
2,900.0	2,890.5	2,854.2	2,826.0	6.6	8.4	25.07	-350.8	257.3	332.2	319.8	12.46	26.661		
3,000.0	2,988.8	2,953.8	2,923.8	6.9	8.8	26.46	-367.7	266.7	334.9	322.0	12.96	25.841		
3,100.0	3,087.0	3,053.5	3,021.5	7.2	9.2	27.83	-384.6	276.2	337.8	324.4	13.47	25.073		
3,200.0	3,185.3	3,153.1	3,119.2	7.6	9.7	29.18	-401.5	285.6	340.9	326.9	14.00	24.350		
3,300.0	3,283.5	3,252.7	3,217.0	7.9	10.1	30.50	-418.4	295.0	344.2	329.7	14.54	23.670		
3,400.0	3,381.8	3,352.4	3,314.7	8.3	10.5	31.80	-435.3	304.4	347.7	332.6	15.10	23.029		
3,500.0	3,480.0	3,452.0	3,412.4	8.6	10.9	33.06	-452.2	313.9	351.3	335.6	15.67	22.424		
3,600.0	3,578.3	3,551.6	3,510.2	9.0	11.4	34.31	-469.1	323.3	355.1	338.9	16.25	21.852		
3,700.0	3,676.5	3,651.3	3,607.9	9.4	11.8	35.52	-485.9	332.7	359.1	342.2	16.85	21.312		
3,800.0	3,774.8	3,750.9	3,705.7	9.8	12.2	36.71	-502.8	342.1	363.2	345.7	17.46	20.800		
3,900.0	3,873.1	3,850.5	3,803.4	10.1	12.7	37.88	-519.7	351.6	367.5	349.4	18.09	20.317		
4,000.0	3,971.3	3,950.2	3,901.1	10.5	13.1	39.01	-536.6	361.0	371.9	353.2	18.73	19.859		
4,100.0	4,069.6	4,049.8	3,998.9	10.9	13.5	40.12	-553.5	370.4	376.5	357.1	19.38	19.425		
4,200.0	4,167.8	4,149.4	4,096.6	11.3	14.0	41.20	-570.4	379.8	381.2	361.2	20.05	19.014		
4,300.0	4,266.1	4,249.1	4,194.3	11.7	14.4	42.26	-587.3	389.3	386.0	365.3	20.73	18.625		
4,400.0	4,364.3	4,348.7	4,292.1	12.1	14.8	43.29	-604.2	398.7	391.0	369.6	21.42	18.257		
4,500.0	4,462.6	4,448.3	4,389.8	12.5	15.3	44.29	-621.1	408.1	396.1	374.0	22.12	17.907		
4,600.0	4,560.8	4,547.9	4,487.6	12.9	15.7	45.26	-638.0	417.5	401.3	378.5	22.83	17.576		
4,700.0	4,659.1	4,647.6	4,585.3	13.3	16.1	46.22	-654.8	427.0	406.7	383.1	23.56	17.262		
4,800.0	4,757.3	4,747.2	4,683.0	13.7	16.6	47.14	-671.7	436.4	412.1	387.8	24.29	16.965		
4,900.0	4,855.6	4,846.8	4,780.8	14.1	17.0	48.05	-688.6	445.8	417.6	392.6	25.03	16.683		

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 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11W-214 - Wellbore #1 - Plan #1 (10-15-12)													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
5,000.0	4,953.8	4,946.5	4,878.5	14.5	17.4	48.92	48.92	-705.5	455.2	423.3	397.5	25.78	16.415	
5,100.0	5,052.1	5,046.1	4,976.2	14.9	17.9	49.78	49.78	-722.4	464.7	429.0	402.5	26.54	16.162	
5,200.0	5,150.3	5,145.7	5,074.0	15.4	18.3	50.61	50.61	-739.3	474.1	434.8	407.5	27.31	15.921	
5,300.0	5,248.6	5,245.4	5,171.7	15.8	18.7	51.42	51.42	-756.2	483.5	440.8	412.7	28.09	15.692	
5,400.0	5,346.9	5,345.0	5,269.4	16.2	19.2	52.21	52.21	-773.1	492.9	446.8	417.9	28.87	15.475	
5,500.0	5,445.1	5,444.6	5,367.2	16.6	19.6	52.98	52.98	-790.0	502.4	452.9	423.2	29.66	15.269	
5,522.2	5,466.9	5,466.7	5,388.8	16.7	19.7	53.15	53.15	-793.7	504.4	454.2	424.4	29.83	15.225	
5,600.0	5,543.5	5,547.8	5,468.4	17.0	20.1	53.73	53.73	-807.4	512.1	459.6	429.2	30.41	15.112	
5,700.0	5,642.5	5,664.0	5,583.0	17.2	20.4	54.37	54.37	-824.2	521.4	465.9	434.8	31.06	15.001	
5,800.0	5,741.9	5,780.6	5,698.6	17.5	20.7	54.83	54.83	-836.9	528.6	470.7	439.1	31.60	14.892	
5,900.0	5,841.7	5,897.3	5,815.0	17.7	20.9	55.15	55.15	-845.6	533.4	473.9	441.9	32.07	14.778	
6,000.0	5,941.6	6,014.2	5,931.7	17.8	21.1	55.31	55.31	-850.1	535.9	475.6	443.2	32.45	14.658	
6,058.4	6,000.0	6,082.5	6,000.0	17.9	21.2	-179.80	-179.80	-850.8	536.3	475.9	441.2	34.69	13.719	
6,100.0	6,041.6	6,124.1	6,041.6	18.0	21.3	-179.80	-179.80	-850.8	536.3	475.9	441.1	34.81	13.670	
6,200.0	6,141.6	6,224.1	6,141.6	18.1	21.4	-179.80	-179.80	-850.8	536.3	475.9	440.8	35.11	13.556	
6,300.0	6,241.6	6,324.1	6,241.6	18.3	21.5	-179.80	-179.80	-850.8	536.3	475.9	440.5	35.41	13.442	
6,400.0	6,341.6	6,424.1	6,341.6	18.5	21.6	-179.80	-179.80	-850.8	536.3	475.9	440.2	35.71	13.328	
6,500.0	6,441.6	6,524.1	6,441.6	18.6	21.7	-179.80	-179.80	-850.8	536.3	475.9	439.9	36.01	13.216	
6,600.0	6,541.6	6,624.1	6,541.6	18.8	21.9	-179.80	-179.80	-850.8	536.3	475.9	439.6	36.32	13.105	
6,700.0	6,641.6	6,722.4	6,639.7	18.9	21.9	-179.14	-179.14	-850.9	530.8	476.1	439.5	36.51	13.038	
6,768.6	6,710.2	6,788.3	6,704.7	19.0	22.0	-177.85	-177.85	-851.1	520.1	476.5	440.0	36.51	13.053	
6,800.0	6,741.6	6,817.9	6,733.5	19.1	22.0	-86.11	-86.11	-851.2	513.5	476.9	441.6	35.33	13.500	
6,850.0	6,791.4	6,864.6	6,778.4	19.1	22.0	-84.93	-84.93	-851.4	500.9	477.8	442.2	35.57	13.432	
6,900.0	6,840.9	6,910.7	6,822.0	19.1	22.0	-83.78	-83.78	-851.7	485.6	478.7	443.0	35.76	13.388	
6,950.0	6,889.9	6,956.3	6,864.1	19.1	21.9	-82.67	-82.67	-852.0	468.0	479.9	444.0	35.90	13.369	
7,000.0	6,938.1	7,000.0	6,903.3	19.1	21.9	-81.62	-81.62	-852.3	448.9	481.2	445.2	35.98	13.372	
7,050.0	6,985.3	7,046.3	6,943.6	19.1	21.9	-80.55	-80.55	-852.7	426.2	482.6	446.5	36.04	13.392	
7,100.0	7,031.3	7,090.6	6,980.8	19.1	21.8	-79.55	-79.55	-853.1	402.1	484.1	448.0	36.05	13.428	
7,150.0	7,075.9	7,134.6	7,016.3	19.0	21.8	-78.60	-78.60	-853.6	376.2	485.7	449.6	36.04	13.476	
7,200.0	7,119.0	7,178.2	7,050.0	19.0	21.8	-77.70	-77.70	-854.1	348.5	487.3	451.3	36.01	13.531	
7,250.0	7,160.4	7,221.5	7,081.9	18.9	21.7	-76.85	-76.85	-854.6	319.2	488.9	452.9	35.98	13.588	
7,300.0	7,199.8	7,264.5	7,111.8	18.9	21.7	-76.06	-76.06	-855.1	288.3	490.6	454.6	35.97	13.638	
7,350.0	7,237.1	7,307.2	7,139.7	18.9	21.6	-75.32	-75.32	-855.7	256.0	492.2	456.2	35.99	13.677	
7,400.0	7,272.1	7,350.0	7,165.9	18.8	21.6	-74.63	-74.63	-856.3	222.2	493.7	457.7	36.06	13.694	
7,450.0	7,304.8	7,391.9	7,189.7	18.9	21.5	-74.01	-74.01	-856.9	187.6	495.2	459.0	36.20	13.680	
7,500.0	7,334.9	7,434.0	7,211.5	18.9	21.5	-73.45	-73.45	-857.5	151.7	496.6	460.2	36.44	13.630	
7,550.0	7,362.3	7,475.9	7,231.3	19.0	21.4	-72.95	-72.95	-858.2	114.8	497.9	461.1	36.78	13.538	
7,600.0	7,386.9	7,517.6	7,249.0	19.2	21.4	-72.51	-72.51	-858.8	77.0	499.1	461.8	37.24	13.401	
7,650.0	7,408.7	7,559.2	7,264.5	19.4	21.4	-72.13	-72.13	-859.5	38.4	500.1	462.3	37.84	13.215	
7,700.0	7,427.4	7,600.0	7,277.7	19.8	21.3	-71.82	-71.82	-860.2	-0.2	501.0	462.4	38.58	12.986	
7,750.0	7,443.1	7,642.1	7,289.1	20.2	21.3	-71.56	-71.56	-860.9	-40.7	501.7	462.2	39.49	12.706	
7,800.0	7,455.6	7,683.5	7,298.1	20.8	21.3	-71.38	-71.38	-861.6	-81.0	502.3	461.7	40.53	12.391	
7,850.0	7,465.0	7,724.7	7,305.0	21.4	21.4	-71.25	-71.25	-862.3	-121.7	502.6	460.9	41.72	12.047	
7,888.6	7,470.0	7,756.6	7,308.7	22.0	21.9	-71.20	-71.20	-862.9	-153.4	502.8	460.0	42.73	11.767	
7,900.0	7,471.2	7,766.0	7,309.6	22.2	22.0	-71.19	-71.19	-863.0	-162.7	502.8	459.8	43.04	11.682	
7,962.6	7,477.7	7,817.5	7,312.2	23.2	22.9	-70.89	-70.89	-863.9	-214.1	503.9	459.1	44.80	11.250	
8,000.0	7,481.0	7,850.8	7,312.2	23.8	23.6	-70.56	-70.56	-864.5	-247.5	505.1	459.2	45.92	11.001	
8,087.2	7,484.1	7,938.0	7,311.7	25.5	25.3	-70.13	-70.13	-866.0	-334.6	507.5	458.5	48.95	10.368	
8,100.0	7,484.1	7,950.7	7,311.6	25.7	25.6	-70.14	-70.14	-866.3	-347.3	507.7	458.3	49.42	10.275	
8,200.0	7,483.9	8,050.7	7,311.0	27.7	27.7	-70.18	-70.18	-868.0	-447.3	509.8	456.6	53.25	9.574	
8,300.0	7,483.7	8,150.7	7,310.4	29.9	29.9	-70.21	-70.21	-869.8	-547.3	512.0	454.6	57.33	8.930	

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 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11W-214 - Wellbore #1 - Plan #1 (10-15-12)											Offset Site Error:		0.0 ft
Survey Program:		0-MWD											Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	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)					
8,400.0	7,483.5	8,250.6	7,309.8	32.1	32.2	-70.25	-871.5	-647.2	514.1	452.5	61.59	8.346			
8,500.0	7,483.3	8,350.6	7,309.2	34.5	34.6	-70.29	-873.3	-747.2	516.2	450.2	66.01	7.819			
8,600.0	7,483.1	8,450.6	7,308.7	36.9	37.0	-70.33	-875.0	-847.1	518.3	447.7	70.56	7.346			
8,700.0	7,482.9	8,550.6	7,308.1	39.3	39.5	-70.37	-876.8	-947.1	520.4	445.2	75.20	6.920			
8,800.0	7,482.7	8,650.6	7,307.5	41.8	42.0	-70.40	-878.5	-1,047.1	522.5	442.6	79.94	6.536			
8,900.0	7,482.4	8,750.5	7,306.9	44.3	44.5	-70.44	-880.3	-1,147.0	524.6	439.9	84.74	6.191			
9,000.0	7,482.2	8,850.5	7,306.3	46.9	47.1	-70.48	-882.0	-1,247.0	526.7	437.1	89.61	5.878			
9,100.0	7,482.0	8,950.5	7,305.7	49.5	49.7	-70.51	-883.8	-1,346.9	528.8	434.3	94.53	5.595			
9,200.0	7,481.8	9,050.5	7,305.1	52.1	52.3	-70.55	-885.5	-1,446.9	530.9	431.5	99.49	5.337			
9,300.0	7,481.6	9,150.4	7,304.5	54.8	55.0	-70.58	-887.3	-1,546.9	533.1	428.6	104.49	5.102			
9,400.0	7,481.4	9,250.4	7,303.9	57.4	57.6	-70.62	-889.0	-1,646.8	535.2	425.6	109.52	4.886			
9,500.0	7,481.2	9,350.4	7,303.3	60.1	60.3	-70.65	-890.8	-1,746.8	537.3	422.7	114.58	4.689			
9,600.0	7,481.0	9,450.4	7,302.7	62.7	63.0	-70.69	-892.5	-1,846.7	539.4	419.7	119.67	4.507			
9,700.0	7,480.8	9,550.3	7,302.1	65.4	65.7	-70.72	-894.3	-1,946.7	541.5	416.7	124.78	4.340			
9,800.0	7,480.6	9,650.3	7,301.5	68.1	68.3	-70.76	-896.0	-2,046.7	543.6	413.7	129.91	4.185			
9,900.0	7,480.4	9,750.3	7,300.9	70.8	71.1	-70.79	-897.7	-2,146.6	545.7	410.7	135.06	4.041			
10,000.0	7,480.2	9,850.3	7,300.3	73.5	73.8	-70.83	-899.5	-2,246.6	547.8	407.6	140.22	3.907			
10,100.0	7,480.0	9,950.3	7,299.8	76.3	76.5	-70.86	-901.2	-2,346.5	549.9	404.5	145.40	3.782			
10,200.0	7,479.8	10,050.2	7,299.2	79.0	79.2	-70.89	-903.0	-2,446.5	552.1	401.5	150.59	3.666			
10,300.0	7,479.6	10,150.2	7,298.6	81.7	81.9	-70.93	-904.7	-2,546.5	554.2	398.4	155.80	3.557			
10,400.0	7,479.4	10,250.2	7,298.0	84.5	84.7	-70.96	-906.5	-2,646.4	556.3	395.3	161.01	3.455			
10,500.0	7,479.2	10,350.2	7,297.4	87.2	87.4	-70.99	-908.2	-2,746.4	558.4	392.2	166.24	3.359			
10,600.0	7,479.0	10,450.1	7,296.8	90.0	90.2	-71.02	-910.0	-2,846.3	560.5	389.0	171.47	3.269			
10,700.0	7,478.8	10,550.1	7,296.2	92.7	92.9	-71.06	-911.7	-2,946.3	562.6	385.9	176.72	3.184			
10,800.0	7,478.6	10,650.1	7,295.6	95.5	95.7	-71.09	-913.5	-3,046.3	564.7	382.8	181.97	3.103			
10,900.0	7,478.4	10,750.1	7,295.0	98.2	98.4	-71.12	-915.2	-3,146.2	566.9	379.6	187.23	3.028			
11,000.0	7,478.2	10,850.1	7,294.4	101.0	101.2	-71.15	-917.0	-3,246.2	569.0	376.5	192.50	2.956			
11,100.0	7,478.0	10,950.0	7,293.8	103.7	103.9	-71.18	-918.7	-3,346.1	571.1	373.3	197.77	2.888			
11,200.0	7,477.8	11,050.0	7,293.2	106.5	106.7	-71.21	-920.5	-3,446.1	573.2	370.1	203.05	2.823			
11,300.0	7,477.6	11,150.0	7,292.6	109.3	109.4	-71.24	-922.2	-3,546.1	575.3	367.0	208.34	2.761			
11,400.0	7,477.4	11,250.0	7,292.0	112.0	112.2	-71.27	-924.0	-3,646.0	577.4	363.8	213.63	2.703			
11,500.0	7,477.2	11,349.9	7,291.4	114.8	115.0	-71.30	-925.7	-3,746.0	579.5	360.6	218.92	2.647			
11,600.0	7,477.0	11,449.9	7,290.9	117.6	117.7	-71.33	-927.5	-3,845.9	581.7	357.4	224.22	2.594			
11,700.0	7,476.8	11,549.9	7,290.3	120.4	120.5	-71.36	-929.2	-3,945.9	583.8	354.2	229.53	2.543			
11,800.0	7,476.5	11,649.9	7,289.7	123.1	123.3	-71.39	-931.0	-4,045.9	585.9	351.0	234.84	2.495			
11,900.0	7,476.3	11,749.8	7,289.1	125.9	126.1	-71.42	-932.7	-4,145.8	588.0	347.8	240.15	2.448			
12,000.0	7,476.1	11,849.8	7,288.5	128.7	128.8	-71.45	-934.5	-4,245.8	590.1	344.6	245.47	2.404			
12,070.3	7,476.0	11,920.1	7,288.1	130.6	130.8	-71.47	-935.7	-4,316.0	591.6	342.4	249.21	2.374 SF			



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11W-414 - Wellbore #1 - Plan #1 (10-15-12)													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)	+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	134.08	-112.9	116.6	162.4					
100.0	100.0	100.0	100.0	0.1	0.1	134.08	-112.9	116.6	162.4	162.1	0.22	722.369		
200.0	200.0	200.0	200.0	0.3	0.3	134.08	-112.9	116.6	162.4	161.7	0.67	240.790 CC, ES		
300.0	300.0	295.1	295.0	0.6	0.5	134.30	-114.4	117.2	163.9	162.8	1.09	149.924		
400.0	400.0	389.9	389.8	0.8	0.7	134.96	-118.8	119.0	168.4	166.9	1.52	111.028		
500.0	500.0	484.3	483.9	1.0	1.0	135.97	-126.1	121.8	176.0	174.1	1.96	89.903		
600.0	600.0	578.1	577.0	1.2	1.2	137.25	-136.1	125.8	186.8	184.4	2.42	77.280		
700.0	700.0	671.2	669.0	1.5	1.5	138.68	-148.9	130.9	200.6	197.7	2.89	69.312		
800.0	800.0	763.2	759.5	1.7	1.9	140.18	-164.2	137.0	217.6	214.3	3.40	64.096		
900.0	900.0	856.7	851.1	1.9	2.3	141.68	-182.4	144.2	237.6	233.7	3.93	60.464		
1,000.0	1,000.0	954.4	946.5	2.1	2.7	143.05	-201.9	151.9	258.3	253.8	4.49	57.545		
1,100.0	1,100.0	1,052.1	1,041.8	2.4	3.1	144.21	-221.4	159.6	279.0	274.0	5.06	55.145		
1,200.0	1,200.0	1,149.8	1,137.2	2.6	3.6	145.22	-240.9	167.3	299.9	294.3	5.64	53.148		
1,300.0	1,300.0	1,247.4	1,232.6	2.8	4.0	146.09	-260.4	175.0	320.9	314.7	6.23	51.469		
1,400.0	1,400.0	1,345.1	1,328.0	3.0	4.5	146.86	-279.9	182.8	341.9	335.1	6.83	50.044		
1,500.0	1,500.0	1,442.8	1,423.4	3.3	4.9	147.53	-299.4	190.5	363.0	355.6	7.43	48.823		
1,600.0	1,600.0	1,540.4	1,518.8	3.5	5.4	148.14	-318.9	198.2	384.1	376.1	8.04	47.767		
1,700.0	1,700.0	1,638.1	1,614.2	3.7	5.9	148.68	-338.3	205.9	405.3	396.6	8.65	46.847		
1,800.0	1,800.0	1,735.8	1,709.6	3.9	6.3	149.16	-357.8	213.6	426.4	417.2	9.26	46.038		
1,900.0	1,900.0	1,833.4	1,805.0	4.2	6.8	149.60	-377.3	221.3	447.7	437.8	9.88	45.321		
2,000.0	2,000.0	1,931.1	1,900.4	4.4	7.2	150.00	-396.8	229.1	468.9	458.4	10.49	44.684		
2,100.0	2,100.0	2,029.1	1,996.1	4.6	7.7	25.42	-416.4	236.8	488.6	479.1	9.54	51.194		
2,200.0	2,199.8	2,127.5	2,092.2	4.8	8.2	25.87	-436.0	244.6	505.3	495.3	9.99	50.559		
2,300.0	2,299.5	2,226.4	2,188.8	5.0	8.6	26.47	-455.8	252.4	518.9	508.4	10.44	49.701		
2,400.0	2,398.7	2,325.5	2,285.6	5.2	9.1	27.24	-475.5	260.2	529.5	518.6	10.88	48.647		
2,500.0	2,497.5	2,424.8	2,382.5	5.4	9.6	28.17	-495.3	268.1	537.2	525.8	11.33	47.413		
2,536.2	2,533.1	2,460.8	2,417.7	5.5	9.7	28.55	-502.5	270.9	539.2	527.7	11.49	46.923		
2,600.0	2,595.8	2,524.1	2,479.5	5.7	10.0	29.27	-515.2	275.9	542.6	530.8	11.79	46.002		
2,700.0	2,694.0	2,623.4	2,576.5	5.9	10.5	30.38	-535.0	283.8	548.0	535.7	12.28	44.624		
2,800.0	2,792.3	2,722.6	2,673.5	6.2	11.0	31.46	-554.8	291.6	553.6	540.8	12.78	43.324		
2,900.0	2,890.5	2,821.9	2,770.4	6.6	11.4	32.52	-574.6	299.5	559.4	546.1	13.29	42.094		
3,000.0	2,988.8	2,921.2	2,867.4	6.9	11.9	33.56	-594.4	307.3	565.4	551.6	13.81	40.931		
3,100.0	3,087.0	3,020.5	2,964.4	7.2	12.4	34.58	-614.2	315.2	571.6	557.2	14.35	39.829		
3,200.0	3,185.3	3,119.8	3,061.4	7.6	12.9	35.58	-634.1	323.0	577.9	563.0	14.90	38.786		
3,300.0	3,283.5	3,219.1	3,158.4	7.9	13.3	36.55	-653.9	330.9	584.5	569.0	15.46	37.796		
3,400.0	3,381.8	3,318.4	3,255.3	8.3	13.8	37.50	-673.7	338.7	591.2	575.1	16.04	36.857		
3,500.0	3,480.0	3,417.7	3,352.3	8.6	14.3	38.43	-693.5	346.6	598.0	581.4	16.63	35.965		
3,600.0	3,578.3	3,517.0	3,449.3	9.0	14.7	39.34	-713.3	354.4	605.0	587.8	17.23	35.119		
3,700.0	3,676.5	3,616.3	3,546.3	9.4	15.2	40.23	-733.1	362.3	612.2	594.4	17.84	34.315		
3,800.0	3,774.8	3,715.6	3,643.3	9.8	15.7	41.10	-752.9	370.1	619.5	601.0	18.46	33.552		
3,900.0	3,873.1	3,814.9	3,740.2	10.1	16.2	41.95	-772.8	378.0	627.0	607.9	19.10	32.826		
4,000.0	3,971.3	3,914.2	3,837.2	10.5	16.6	42.78	-792.6	385.8	634.5	614.8	19.75	32.136		
4,100.0	4,069.6	4,013.5	3,934.2	10.9	17.1	43.59	-812.4	393.6	642.3	621.8	20.40	31.480		
4,200.0	4,167.8	4,112.7	4,031.2	11.3	17.6	44.38	-832.2	401.5	650.1	629.0	21.07	30.857		
4,300.0	4,266.1	4,212.0	4,128.1	11.7	18.0	45.15	-852.0	409.3	658.0	636.3	21.74	30.263		
4,400.0	4,364.3	4,311.3	4,225.1	12.1	18.5	45.90	-871.8	417.2	666.1	643.7	22.43	29.698		
4,500.0	4,462.6	4,410.6	4,322.1	12.5	19.0	46.64	-891.7	425.0	674.3	651.2	23.12	29.160		
4,600.0	4,560.8	4,509.9	4,419.1	12.9	19.4	47.35	-911.5	432.9	682.6	658.8	23.83	28.648		
4,700.0	4,659.1	4,609.2	4,516.1	13.3	19.9	48.05	-931.3	440.7	691.0	666.5	24.54	28.160		
4,800.0	4,757.3	4,708.5	4,613.0	13.7	20.4	48.74	-951.1	448.6	699.5	674.2	25.26	27.694		
4,900.0	4,855.6	4,807.8	4,710.0	14.1	20.9	49.40	-970.9	456.4	708.1	682.1	25.98	27.251		

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 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11W-414 - Wellbore #1 - Plan #1 (10-15-12)											Offset Site Error:		0.0 ft
Survey Program: 0-MWD													Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)					
5,000.0	4,953.8	4,907.1	4,807.0	14.5	21.3	50.05	-990.7	464.3	716.8	690.1	26.72	26.828			
5,100.0	5,052.1	5,006.4	4,904.0	14.9	21.8	50.69	-1,010.6	472.1	725.6	698.1	27.46	26.424			
5,200.0	5,150.3	5,105.7	5,001.0	15.4	22.3	51.31	-1,030.4	480.0	734.4	706.2	28.21	26.039			
5,300.0	5,248.6	5,205.0	5,097.9	15.8	22.7	51.91	-1,050.2	487.8	743.4	714.4	28.96	25.671			
5,400.0	5,346.9	5,304.3	5,194.9	16.2	23.2	52.50	-1,070.0	495.7	752.4	722.7	29.72	25.319			
5,500.0	5,445.1	5,403.6	5,291.9	16.6	23.7	53.08	-1,089.8	503.5	761.5	731.0	30.48	24.983			
5,522.2	5,466.9	5,425.6	5,313.4	16.7	23.8	53.21	-1,094.2	505.3	763.6	732.9	30.65	24.911			
5,600.0	5,543.5	5,504.2	5,390.1	17.0	24.2	53.71	-1,109.9	511.5	771.3	740.1	31.21	24.716			
5,700.0	5,642.5	5,637.2	5,520.8	17.2	24.6	54.34	-1,133.4	520.8	780.9	749.0	31.87	24.503			
5,800.0	5,741.9	5,771.0	5,653.2	17.5	24.9	54.80	-1,151.4	527.9	788.1	755.7	32.44	24.295			
5,900.0	5,841.7	5,905.3	5,786.8	17.7	25.2	55.11	-1,163.6	532.7	793.1	760.1	32.92	24.091			
6,000.0	5,941.6	6,040.0	5,921.3	17.8	25.4	55.27	-1,169.9	535.2	795.6	762.3	33.30	23.892			
6,058.4	6,000.0	6,118.7	6,000.0	17.9	25.4	-179.83	-1,170.9	535.6	796.0	756.8	39.24	20.286			
6,100.0	6,041.6	6,160.3	6,041.6	18.0	25.5	-179.83	-1,170.9	535.6	796.0	756.7	39.36	20.226			
6,200.0	6,141.6	6,260.3	6,141.6	18.1	25.6	-179.83	-1,170.9	535.6	796.0	756.4	39.63	20.087			
6,300.0	6,241.6	6,360.3	6,241.6	18.3	25.7	-179.83	-1,170.9	535.6	796.0	756.1	39.90	19.952			
6,400.0	6,341.6	6,460.3	6,341.6	18.5	25.8	-179.83	-1,170.9	535.6	796.0	755.9	40.17	19.817			
6,500.0	6,441.6	6,560.3	6,441.6	18.6	25.9	-179.83	-1,170.9	535.6	796.0	755.6	40.45	19.682			
6,600.0	6,541.6	6,660.3	6,541.6	18.8	26.0	-179.83	-1,170.9	535.6	796.0	755.3	40.72	19.548			
6,700.0	6,641.6	6,760.3	6,641.6	18.9	26.1	-179.83	-1,170.9	535.6	796.0	755.0	41.00	19.414			
6,768.6	6,710.2	6,828.9	6,710.2	19.0	26.1	-179.83	-1,170.9	535.6	796.0	754.9	41.20	19.323			
6,800.0	6,741.6	6,859.6	6,740.9	19.1	26.1	-88.84	-1,171.0	535.0	796.0	760.3	35.79	22.242			
6,850.0	6,791.4	6,908.6	6,789.7	19.1	26.2	-88.85	-1,171.0	531.5	796.0	760.2	35.89	22.181			
6,900.0	6,840.9	6,957.6	6,838.2	19.1	26.2	-88.86	-1,171.1	524.9	796.0	760.1	35.94	22.149			
6,950.0	6,889.9	7,006.5	6,886.2	19.1	26.2	-88.87	-1,171.3	515.1	796.0	760.1	35.95	22.141			
7,000.0	6,938.1	7,055.5	6,933.5	19.1	26.2	-88.89	-1,171.5	502.3	796.0	760.1	35.93	22.156			
7,050.0	6,985.3	7,104.5	6,979.9	19.1	26.2	-88.92	-1,171.8	486.5	796.0	760.2	35.88	22.188			
7,100.0	7,031.3	7,153.6	7,025.2	19.1	26.2	-88.95	-1,172.1	467.7	796.0	760.2	35.81	22.232			
7,150.0	7,075.9	7,202.6	7,069.2	19.0	26.2	-88.98	-1,172.5	446.1	796.0	760.3	35.73	22.280			
7,200.0	7,119.0	7,251.7	7,111.7	19.0	26.1	-89.02	-1,173.0	421.7	796.0	760.4	35.66	22.324			
7,250.0	7,160.4	7,300.8	7,152.7	18.9	26.1	-89.06	-1,173.4	394.5	796.0	760.4	35.61	22.355			
7,259.2	7,167.7	7,309.8	7,160.0	18.9	26.1	-89.07	-1,173.5	389.3	796.0	760.4	35.61	22.356			
7,300.0	7,199.8	7,350.0	7,191.8	18.9	26.1	-89.11	-1,174.0	364.8	796.0	760.4	35.60	22.361			
7,300.0	7,199.8	7,350.0	7,191.8	18.9	26.1	-89.11	-1,174.0	364.8	796.0	760.4	35.60	22.361			
7,350.0	7,237.1	7,399.2	7,229.0	18.9	26.0	-89.16	-1,174.5	332.6	796.0	760.4	35.65	22.330			
7,400.0	7,272.1	7,448.4	7,264.1	18.8	26.0	-89.21	-1,175.1	298.0	796.0	760.3	35.78	22.250			
7,450.0	7,304.8	7,497.7	7,296.8	18.9	25.9	-89.27	-1,175.8	261.2	796.0	760.0	36.01	22.109			
7,500.0	7,334.9	7,547.1	7,327.2	18.9	25.9	-89.33	-1,176.5	222.3	796.0	759.7	36.35	21.899			
7,550.0	7,362.3	7,596.5	7,355.0	19.0	25.9	-89.39	-1,177.2	181.5	796.1	759.2	36.83	21.614			
7,600.0	7,386.9	7,646.0	7,380.2	19.2	25.8	-89.46	-1,177.9	138.9	796.1	758.6	37.46	21.253			
7,650.0	7,408.7	7,695.5	7,402.6	19.4	25.8	-89.52	-1,178.7	94.8	796.1	757.8	38.24	20.819			
7,700.0	7,427.4	7,745.1	7,422.1	19.8	25.8	-89.59	-1,179.5	49.2	796.1	756.9	39.18	20.319			
7,750.0	7,443.1	7,794.7	7,438.6	20.2	25.8	-89.67	-1,180.3	2.4	796.1	755.8	40.28	19.765			
7,800.0	7,455.6	7,844.4	7,452.0	20.8	25.8	-89.74	-1,181.2	-45.4	796.1	754.6	41.53	19.170			
7,850.0	7,465.0	7,894.2	7,462.4	21.4	25.8	-89.81	-1,182.0	-94.1	796.1	753.2	42.92	18.550			
7,888.6	7,470.0	7,932.7	7,468.2	22.0	25.9	-89.87	-1,182.7	-132.2	796.1	752.0	44.08	18.061			
7,900.0	7,471.2	7,944.1	7,469.5	22.2	25.9	-89.88	-1,182.9	-143.4	796.1	751.7	44.43	17.918			
7,962.6	7,477.7	8,006.7	7,476.1	23.2	26.1	-89.88	-1,184.0	-205.7	796.1	749.6	46.50	17.121			
8,000.0	7,481.0	8,044.0	7,479.8	23.8	26.3	-89.94	-1,184.7	-242.9	796.3	748.5	47.81	16.656			
8,087.2	7,484.1	8,131.2	7,483.9	25.5	27.2	-89.98	-1,186.2	-329.9	797.5	746.5	51.00	15.638			
8,100.0	7,484.1	8,144.0	7,484.0	25.7	27.4	-89.99	-1,186.4	-342.7	797.8	746.3	51.48	15.495			

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 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Thornton 11C-HZ Pad Sec.11-T7N-R66W - Thornton 11W-414 - Wellbore #1 - Plan #1 (10-15-12)												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)			
8,200.0	7,483.9	8,244.0	7,483.8	27.7	29.1	-89.99	-1,188.2	-442.6	799.9	744.3	55.51	14.409		
8,300.0	7,483.7	8,343.9	7,483.6	29.9	31.1	-89.99	-1,189.9	-542.6	802.0	742.2	59.78	13.415		
8,400.0	7,483.5	8,443.9	7,483.4	32.1	33.3	-89.99	-1,191.7	-642.6	804.1	739.8	64.26	12.513		
8,500.0	7,483.3	8,543.9	7,483.2	34.5	35.5	-89.99	-1,193.5	-742.5	806.2	737.3	68.90	11.701		
8,600.0	7,483.1	8,643.9	7,483.0	36.9	37.9	-89.99	-1,195.2	-842.5	808.3	734.6	73.68	10.970		
8,700.0	7,482.9	8,743.9	7,482.8	39.3	40.3	-89.99	-1,197.0	-942.5	810.4	731.8	78.57	10.314		
8,800.0	7,482.7	8,843.8	7,482.6	41.8	42.8	-89.99	-1,198.7	-1,042.4	812.5	729.0	83.55	9.725		
8,900.0	7,482.4	8,943.8	7,482.4	44.3	45.3	-89.99	-1,200.5	-1,142.4	814.6	726.0	88.61	9.194		
9,000.0	7,482.2	9,043.8	7,482.2	46.9	47.8	-89.99	-1,202.3	-1,242.3	816.7	723.0	93.73	8.714		
9,100.0	7,482.0	9,143.8	7,482.0	49.5	50.3	-89.99	-1,204.0	-1,342.3	818.9	720.0	98.90	8.279		
9,200.0	7,481.8	9,243.7	7,481.8	52.1	52.9	-89.99	-1,205.8	-1,442.3	821.0	716.8	104.12	7.885		
9,300.0	7,481.6	9,343.7	7,481.6	54.8	55.5	-89.99	-1,207.5	-1,542.2	823.1	713.7	109.38	7.525		
9,400.0	7,481.4	9,443.7	7,481.4	57.4	58.2	-89.99	-1,209.3	-1,642.2	825.2	710.5	114.67	7.196		
9,500.0	7,481.2	9,543.7	7,481.2	60.1	60.8	-89.99	-1,211.1	-1,742.1	827.3	707.3	120.00	6.894		
9,600.0	7,481.0	9,643.7	7,481.0	62.7	63.5	-89.99	-1,212.8	-1,842.1	829.4	704.1	125.34	6.617		
9,700.0	7,480.8	9,743.6	7,480.8	65.4	66.1	-89.99	-1,214.6	-1,942.1	831.5	700.8	130.71	6.361		
9,800.0	7,480.6	9,843.6	7,480.6	68.1	68.8	-89.99	-1,216.3	-2,042.0	833.6	697.5	136.10	6.125		
9,900.0	7,480.4	9,943.6	7,480.4	70.8	71.5	-89.99	-1,218.1	-2,142.0	835.7	694.2	141.51	5.906		
10,000.0	7,480.2	10,043.6	7,480.2	73.5	74.2	-89.99	-1,219.9	-2,242.0	837.9	690.9	146.93	5.702		
10,100.0	7,480.0	10,143.5	7,480.0	76.3	76.9	-89.99	-1,221.6	-2,341.9	840.0	687.6	152.37	5.513		
10,200.0	7,479.8	10,243.5	7,479.8	79.0	79.6	-89.99	-1,223.4	-2,441.9	842.1	684.3	157.82	5.336		
10,300.0	7,479.6	10,343.5	7,479.6	81.7	82.3	-89.99	-1,225.1	-2,541.8	844.2	680.9	163.28	5.170		
10,400.0	7,479.4	10,443.5	7,479.4	84.5	85.0	-89.99	-1,226.9	-2,641.8	846.3	677.6	168.75	5.015		
10,500.0	7,479.2	10,543.5	7,479.2	87.2	87.7	-90.00	-1,228.7	-2,741.8	848.4	674.2	174.23	4.870		
10,600.0	7,479.0	10,643.4	7,479.0	90.0	90.5	-90.00	-1,230.4	-2,841.7	850.5	670.8	179.71	4.733		
10,700.0	7,478.8	10,743.4	7,478.8	92.7	93.2	-90.00	-1,232.2	-2,941.7	852.6	667.4	185.21	4.604		
10,800.0	7,478.6	10,843.4	7,478.6	95.5	95.9	-90.00	-1,233.9	-3,041.7	854.7	664.0	190.71	4.482		
10,900.0	7,478.4	10,943.4	7,478.4	98.2	98.7	-90.00	-1,235.7	-3,141.6	856.9	660.6	196.22	4.367		
11,000.0	7,478.2	11,043.3	7,478.2	101.0	101.4	-90.00	-1,237.5	-3,241.6	859.0	657.2	201.73	4.258		
11,100.0	7,478.0	11,143.3	7,478.0	103.7	104.2	-90.00	-1,239.2	-3,341.5	861.1	653.8	207.25	4.155		
11,200.0	7,477.8	11,243.3	7,477.8	106.5	106.9	-90.00	-1,241.0	-3,441.5	863.2	650.4	212.78	4.057		
11,300.0	7,477.6	11,343.3	7,477.6	109.3	109.7	-90.00	-1,242.7	-3,541.5	865.3	647.0	218.31	3.964		
11,400.0	7,477.4	11,443.3	7,477.4	112.0	112.4	-90.00	-1,244.5	-3,641.4	867.4	643.6	223.84	3.875		
11,500.0	7,477.2	11,543.2	7,477.2	114.8	115.2	-90.00	-1,246.2	-3,741.4	869.5	640.1	229.38	3.791		
11,600.0	7,477.0	11,643.2	7,477.0	117.6	118.0	-90.00	-1,248.0	-3,841.3	871.6	636.7	234.92	3.710		
11,700.0	7,476.8	11,743.2	7,476.8	120.4	120.7	-90.00	-1,249.8	-3,941.3	873.7	633.3	240.46	3.634		
11,800.0	7,476.5	11,843.2	7,476.6	123.1	123.5	-90.00	-1,251.5	-4,041.3	875.8	629.8	246.01	3.560		
11,900.0	7,476.3	11,943.1	7,476.4	125.9	126.3	-90.00	-1,253.3	-4,141.2	878.0	626.4	251.56	3.490		
12,000.0	7,476.1	12,043.1	7,476.2	128.7	129.0	-90.00	-1,255.0	-4,241.2	880.1	623.0	257.11	3.423		
12,070.3	7,476.0	12,113.4	7,476.0	130.6	131.0	-90.00	-1,256.3	-4,311.4	881.6	620.5	261.02	3.377 SF		

Reference Depths are relative to WELL @ 4976.0ft (RKB - 15')	Coordinates are relative to: Thornton 11V-404
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.500000 °	Grid Convergence at Surface is: 0.49°



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Thornton 11V-404
<b>Project:</b>	SEC.11-T7N-R66W	<b>TVD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Reference Site:</b>	Thornton 11C-HZ Pad Sec.11-T7N-R66W	<b>MD Reference:</b>	WELL @ 4976.0ft (RKB - 15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton 11V-404	<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 #2 (6-03-13)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to WELL @ 4976.0ft (RKB - 15')  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000 °

Coordinates are relative to: Thornton 11V-404  
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