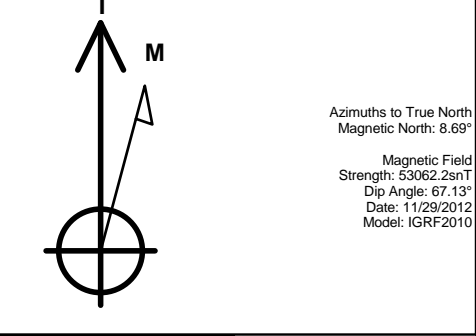


PETROLEUM DEVELOPMENT CORP Weld County CO

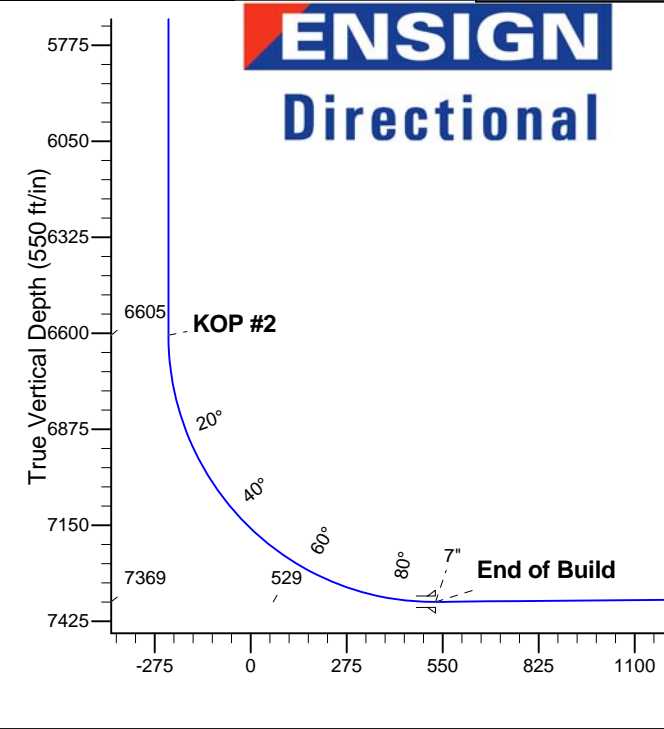
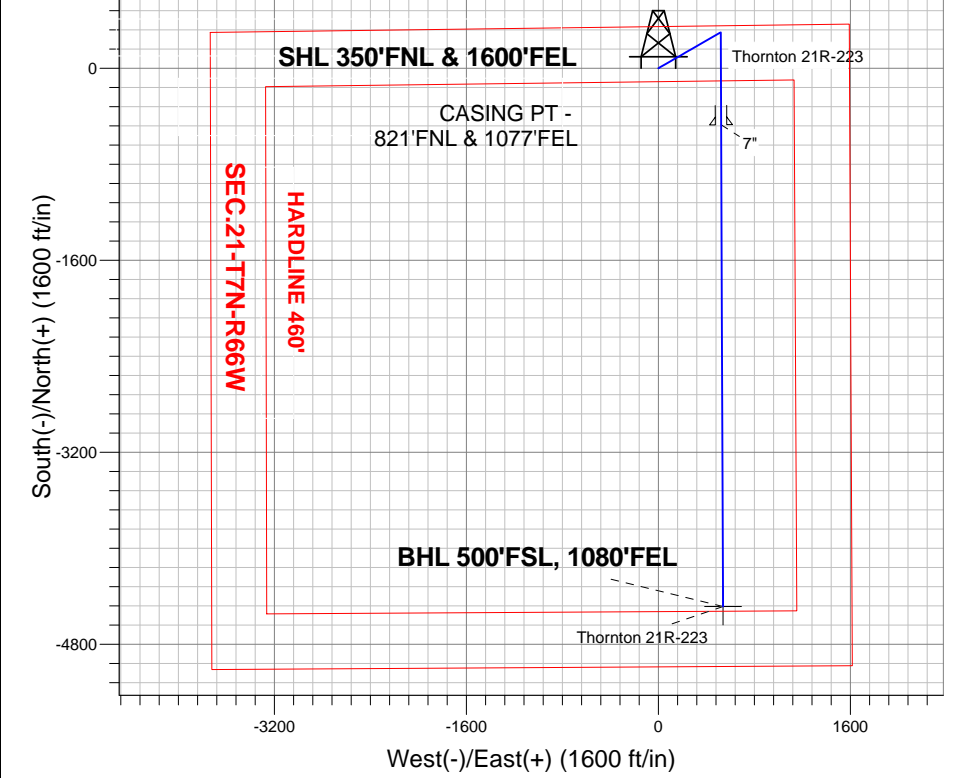
Well Name: **Thornton 21R-223**
Surface Location: Thornton 21R-HZ Pad Sec.21-T7N-R66W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4970.0
+N/-S +E/-W Northing Easting Latitude Longitude Slot
0.0 0.0 1450161.89 3200234.49 40.566860 -104.779270
Original Well Elev WELL @ 4985.0ft (Original Well Elev)

WELLBORE TARGET DETAILS				
Name	TVD	+N/-S	+E/-W	Shape
BHL 500'FSL, 1080'FEL	7335.0	-4484.8	539.1	Point

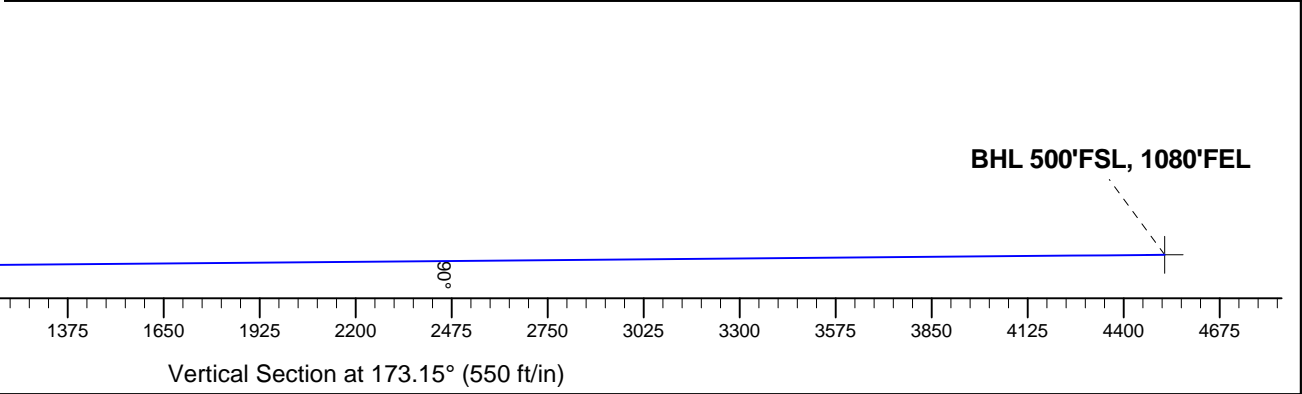


Thornton 21R-HZ Pad Sec.21-T7N-R66W
Thornton 21R-223
Plan #1 (11-29-12)
14:58, November 30 2012

ANNOTATIONS		
TVD	MD	Annotation
1000.0	1000.0	KOP #1
6605.4	6646.8	KOP #2
7369.3	7853.3	End of Build



SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1000.0	0.00	0.00	1000.0	0.0	0.0	0.00	0.00	0.0	
3	1407.5	8.15	60.02	1406.1	14.5	25.1	2.00	60.02	-11.4	
4	5233.9	8.15	60.02	5193.9	285.5	494.9	0.00	0.00	-224.4	
5	5641.4	0.00	0.00	5600.0	300.0	520.0	2.00	180.00	-235.8	
6	6646.8	0.00	0.00	6605.4	300.0	520.0	0.00	0.00	-235.8	
7	7853.3	90.49	179.77	7369.3	-470.5	523.1	7.50	179.77	529.5	
8	11867.8	90.49	179.77	7335.0	-4484.8	539.1	0.00	0.00	4517.1	BHL 500'FSL, 1080'FEL





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.21-T7N-R66W

Thornton 21R-HZ Pad Sec.21-T7N-R66W

Thornton 21R-223

Wellbore #1

Plan: Plan #1 (11-29-12)

Standard Planning Report

30 November, 2012

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 21R-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Project:	SEC.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	North Reference:	True
Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-29-12)		

Project	SEC.21-T7N-R66W, Weld County, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site		Thornton 21R-HZ Pad Sec.21-T7N-R66W			
Site Position: From:		Northing:	1,450,103.21 ft	Latitude:	40.566700
	Lat/Long	Easting:	3,200,184.96 ft	Longitude:	-104.779450
	Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:

Well	Thornton 21R-223					
Well Position	+N-S	58.3 ft	Northing:	1,450,161.89 ft	Latitude:	40.566860
	+E-W	50.0 ft	Easting:	3,200,234.49 ft	Longitude:	-104.779270
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,970.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/29/2012	8.69	67.13	53,062

Design	Plan #1 (11-29-12)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	173.15

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,407.5	8.15	60.02	1,406.1	14.5	25.1	2.00	2.00	0.00	60.02	
5,233.9	8.15	60.02	5,193.9	285.5	494.9	0.00	0.00	0.00	0.00	
5,641.4	0.00	0.00	5,600.0	300.0	520.0	2.00	-2.00	0.00	180.00	
6,646.8	0.00	0.00	6,605.4	300.0	520.0	0.00	0.00	0.00	0.00	
7,853.3	90.49	179.77	7,369.3	-470.5	523.1	7.50	7.50	0.00	179.77	
11,867.8	90.49	179.77	7,335.0	-4,484.8	539.1	0.00	0.00	0.00	0.00	BHL 500'FSL, 1080

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 21R-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Project:	SEC.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	North Reference:	True
Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-29-12)		

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
KOP #1									
1,040.0	0.80	60.02	1,040.0	0.1	0.2	-0.1	2.00	2.00	0.00
1,080.0	1.60	60.02	1,080.0	0.6	1.0	-0.4	2.00	2.00	0.00
1,120.0	2.40	60.02	1,120.0	1.3	2.2	-1.0	2.00	2.00	0.00
1,160.0	3.20	60.02	1,159.9	2.2	3.9	-1.8	2.00	2.00	0.00
1,200.0	4.00	60.02	1,199.8	3.5	6.0	-2.7	2.00	2.00	0.00
1,240.0	4.80	60.02	1,239.7	5.0	8.7	-3.9	2.00	2.00	0.00
1,280.0	5.60	60.02	1,279.6	6.8	11.8	-5.4	2.00	2.00	0.00
1,320.0	6.40	60.02	1,319.3	8.9	15.5	-7.0	2.00	2.00	0.00
1,360.0	7.20	60.02	1,359.1	11.3	19.6	-8.9	2.00	2.00	0.00
1,400.0	8.00	60.02	1,398.7	13.9	24.1	-11.0	2.00	2.00	0.00
1,407.5	8.15	60.02	1,406.1	14.5	25.1	-11.4	2.00	2.00	0.00
1,440.0	8.15	60.02	1,438.3	16.8	29.1	-13.2	0.00	0.00	0.00
1,480.0	8.15	60.02	1,477.9	19.6	34.0	-15.4	0.00	0.00	0.00
1,520.0	8.15	60.02	1,517.5	22.4	38.9	-17.6	0.00	0.00	0.00
1,560.0	8.15	60.02	1,557.1	25.3	43.8	-19.9	0.00	0.00	0.00
1,600.0	8.15	60.02	1,596.7	28.1	48.7	-22.1	0.00	0.00	0.00
1,640.0	8.15	60.02	1,636.3	30.9	53.6	-24.3	0.00	0.00	0.00
1,680.0	8.15	60.02	1,675.9	33.8	58.5	-26.5	0.00	0.00	0.00
1,720.0	8.15	60.02	1,715.5	36.6	63.4	-28.8	0.00	0.00	0.00
1,760.0	8.15	60.02	1,755.1	39.4	68.3	-31.0	0.00	0.00	0.00
1,800.0	8.15	60.02	1,794.7	42.3	73.3	-33.2	0.00	0.00	0.00
1,840.0	8.15	60.02	1,834.3	45.1	78.2	-35.4	0.00	0.00	0.00
1,880.0	8.15	60.02	1,873.9	47.9	83.1	-37.7	0.00	0.00	0.00
1,920.0	8.15	60.02	1,913.5	50.8	88.0	-39.9	0.00	0.00	0.00
1,960.0	8.15	60.02	1,953.0	53.6	92.9	-42.1	0.00	0.00	0.00
2,000.0	8.15	60.02	1,992.6	56.4	97.8	-44.4	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 21R-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Project:	SEC.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	North Reference:	True
Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-29-12)		

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)
2,040.0	8.15	60.02	2,032.2	59.3	102.7	-46.6	0.00	0.00	0.00
2,080.0	8.15	60.02	2,071.8	62.1	107.6	-48.8	0.00	0.00	0.00
2,120.0	8.15	60.02	2,111.4	64.9	112.6	-51.0	0.00	0.00	0.00
2,160.0	8.15	60.02	2,151.0	67.8	117.5	-53.3	0.00	0.00	0.00
2,200.0	8.15	60.02	2,190.6	70.6	122.4	-55.5	0.00	0.00	0.00
2,240.0	8.15	60.02	2,230.2	73.4	127.3	-57.7	0.00	0.00	0.00
2,280.0	8.15	60.02	2,269.8	76.3	132.2	-59.9	0.00	0.00	0.00
2,320.0	8.15	60.02	2,309.4	79.1	137.1	-62.2	0.00	0.00	0.00
2,360.0	8.15	60.02	2,349.0	81.9	142.0	-64.4	0.00	0.00	0.00
2,400.0	8.15	60.02	2,388.6	84.8	146.9	-66.6	0.00	0.00	0.00
2,440.0	8.15	60.02	2,428.2	87.6	151.9	-68.9	0.00	0.00	0.00
2,480.0	8.15	60.02	2,467.8	90.4	156.8	-71.1	0.00	0.00	0.00
2,520.0	8.15	60.02	2,507.4	93.3	161.7	-73.3	0.00	0.00	0.00
2,560.0	8.15	60.02	2,547.0	96.1	166.6	-75.5	0.00	0.00	0.00
2,600.0	8.15	60.02	2,586.6	98.9	171.5	-77.8	0.00	0.00	0.00
2,640.0	8.15	60.02	2,626.2	101.8	176.4	-80.0	0.00	0.00	0.00
2,680.0	8.15	60.02	2,665.8	104.6	181.3	-82.2	0.00	0.00	0.00
2,720.0	8.15	60.02	2,705.4	107.4	186.2	-84.4	0.00	0.00	0.00
2,760.0	8.15	60.02	2,745.0	110.3	191.1	-86.7	0.00	0.00	0.00
2,800.0	8.15	60.02	2,784.6	113.1	196.1	-88.9	0.00	0.00	0.00
2,840.0	8.15	60.02	2,824.2	115.9	201.0	-91.1	0.00	0.00	0.00
2,880.0	8.15	60.02	2,863.8	118.8	205.9	-93.4	0.00	0.00	0.00
2,920.0	8.15	60.02	2,903.4	121.6	210.8	-95.6	0.00	0.00	0.00
2,960.0	8.15	60.02	2,942.9	124.4	215.7	-97.8	0.00	0.00	0.00
3,000.0	8.15	60.02	2,982.5	127.3	220.6	-100.0	0.00	0.00	0.00
3,040.0	8.15	60.02	3,022.1	130.1	225.5	-102.3	0.00	0.00	0.00
3,080.0	8.15	60.02	3,061.7	132.9	230.4	-104.5	0.00	0.00	0.00
3,120.0	8.15	60.02	3,101.3	135.8	235.4	-106.7	0.00	0.00	0.00
3,160.0	8.15	60.02	3,140.9	138.6	240.3	-108.9	0.00	0.00	0.00
3,200.0	8.15	60.02	3,180.5	141.4	245.2	-111.2	0.00	0.00	0.00
3,240.0	8.15	60.02	3,220.1	144.3	250.1	-113.4	0.00	0.00	0.00
3,280.0	8.15	60.02	3,259.7	147.1	255.0	-115.6	0.00	0.00	0.00
3,320.0	8.15	60.02	3,299.3	150.0	259.9	-117.9	0.00	0.00	0.00
3,360.0	8.15	60.02	3,338.9	152.8	264.8	-120.1	0.00	0.00	0.00
3,400.0	8.15	60.02	3,378.5	155.6	269.7	-122.3	0.00	0.00	0.00
3,440.0	8.15	60.02	3,418.1	158.5	274.7	-124.5	0.00	0.00	0.00
3,480.0	8.15	60.02	3,457.7	161.3	279.6	-126.8	0.00	0.00	0.00
3,520.0	8.15	60.02	3,497.3	164.1	284.5	-129.0	0.00	0.00	0.00
3,560.0	8.15	60.02	3,536.9	167.0	289.4	-131.2	0.00	0.00	0.00
3,600.0	8.15	60.02	3,576.5	169.8	294.3	-133.5	0.00	0.00	0.00
3,640.0	8.15	60.02	3,616.1	172.6	299.2	-135.7	0.00	0.00	0.00
3,680.0	8.15	60.02	3,655.7	175.5	304.1	-137.9	0.00	0.00	0.00
3,720.0	8.15	60.02	3,695.3	178.3	309.0	-140.1	0.00	0.00	0.00
3,760.0	8.15	60.02	3,734.9	181.1	313.9	-142.4	0.00	0.00	0.00
3,800.0	8.15	60.02	3,774.5	184.0	318.9	-144.6	0.00	0.00	0.00
3,840.0	8.15	60.02	3,814.1	186.8	323.8	-146.8	0.00	0.00	0.00
3,880.0	8.15	60.02	3,853.7	189.6	328.7	-149.0	0.00	0.00	0.00
3,920.0	8.15	60.02	3,893.3	192.5	333.6	-151.3	0.00	0.00	0.00
3,960.0	8.15	60.02	3,932.8	195.3	338.5	-153.5	0.00	0.00	0.00
4,000.0	8.15	60.02	3,972.4	198.1	343.4	-155.7	0.00	0.00	0.00
4,040.0	8.15	60.02	4,012.0	201.0	348.3	-158.0	0.00	0.00	0.00
4,080.0	8.15	60.02	4,051.6	203.8	353.2	-160.2	0.00	0.00	0.00
4,120.0	8.15	60.02	4,091.2	206.6	358.2	-162.4	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 21R-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Project:	SEC.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	North Reference:	True
Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-29-12)		

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	8.15	60.02	4,130.8	209.5	363.1	-164.6	0.00	0.00	0.00
4,200.0	8.15	60.02	4,170.4	212.3	368.0	-166.9	0.00	0.00	0.00
4,240.0	8.15	60.02	4,210.0	215.1	372.9	-169.1	0.00	0.00	0.00
4,280.0	8.15	60.02	4,249.6	218.0	377.8	-171.3	0.00	0.00	0.00
4,320.0	8.15	60.02	4,289.2	220.8	382.7	-173.5	0.00	0.00	0.00
4,360.0	8.15	60.02	4,328.8	223.6	387.6	-175.8	0.00	0.00	0.00
4,400.0	8.15	60.02	4,368.4	226.5	392.5	-178.0	0.00	0.00	0.00
4,440.0	8.15	60.02	4,408.0	229.3	397.4	-180.2	0.00	0.00	0.00
4,480.0	8.15	60.02	4,447.6	232.1	402.4	-182.5	0.00	0.00	0.00
4,520.0	8.15	60.02	4,487.2	235.0	407.3	-184.7	0.00	0.00	0.00
4,560.0	8.15	60.02	4,526.8	237.8	412.2	-186.9	0.00	0.00	0.00
4,600.0	8.15	60.02	4,566.4	240.6	417.1	-189.1	0.00	0.00	0.00
4,640.0	8.15	60.02	4,606.0	243.5	422.0	-191.4	0.00	0.00	0.00
4,680.0	8.15	60.02	4,645.6	246.3	426.9	-193.6	0.00	0.00	0.00
4,720.0	8.15	60.02	4,685.2	249.1	431.8	-195.8	0.00	0.00	0.00
4,760.0	8.15	60.02	4,724.8	252.0	436.7	-198.0	0.00	0.00	0.00
4,800.0	8.15	60.02	4,764.4	254.8	441.7	-200.3	0.00	0.00	0.00
4,840.0	8.15	60.02	4,804.0	257.6	446.6	-202.5	0.00	0.00	0.00
4,880.0	8.15	60.02	4,843.6	260.5	451.5	-204.7	0.00	0.00	0.00
4,920.0	8.15	60.02	4,883.1	263.3	456.4	-207.0	0.00	0.00	0.00
4,960.0	8.15	60.02	4,922.7	266.1	461.3	-209.2	0.00	0.00	0.00
5,000.0	8.15	60.02	4,962.3	269.0	466.2	-211.4	0.00	0.00	0.00
5,040.0	8.15	60.02	5,001.9	271.8	471.1	-213.6	0.00	0.00	0.00
5,080.0	8.15	60.02	5,041.5	274.6	476.0	-215.9	0.00	0.00	0.00
5,120.0	8.15	60.02	5,081.1	277.5	481.0	-218.1	0.00	0.00	0.00
5,160.0	8.15	60.02	5,120.7	280.3	485.9	-220.3	0.00	0.00	0.00
5,200.0	8.15	60.02	5,160.3	283.1	490.8	-222.5	0.00	0.00	0.00
5,233.9	8.15	60.02	5,193.9	285.5	494.9	-224.4	0.00	0.00	0.00
5,240.0	8.03	60.02	5,199.9	286.0	495.7	-224.8	2.00	-2.00	0.00
5,280.0	7.23	60.02	5,239.6	288.6	500.3	-226.9	2.00	-2.00	0.00
5,320.0	6.43	60.02	5,279.3	291.0	504.4	-228.7	2.00	-2.00	0.00
5,360.0	5.63	60.02	5,319.1	293.1	508.0	-230.4	2.00	-2.00	0.00
5,400.0	4.83	60.02	5,358.9	294.9	511.2	-231.8	2.00	-2.00	0.00
5,440.0	4.03	60.02	5,398.8	296.5	513.9	-233.0	2.00	-2.00	0.00
5,480.0	3.23	60.02	5,438.7	297.7	516.1	-234.0	2.00	-2.00	0.00
5,520.0	2.43	60.02	5,478.6	298.7	517.8	-234.8	2.00	-2.00	0.00
5,560.0	1.63	60.02	5,518.6	299.4	519.0	-235.3	2.00	-2.00	0.00
5,600.0	0.83	60.02	5,558.6	299.9	519.7	-235.7	2.00	-2.00	0.00
5,640.0	0.03	60.02	5,598.6	300.0	520.0	-235.8	2.00	-2.00	0.00
5,641.4	0.00	0.00	5,600.0	300.0	520.0	-235.8	2.00	-2.00	0.00
5,680.0	0.00	0.00	5,638.6	300.0	520.0	-235.8	0.00	0.00	0.00
5,720.0	0.00	0.00	5,678.6	300.0	520.0	-235.8	0.00	0.00	0.00
5,760.0	0.00	0.00	5,718.6	300.0	520.0	-235.8	0.00	0.00	0.00
5,800.0	0.00	0.00	5,758.6	300.0	520.0	-235.8	0.00	0.00	0.00
5,840.0	0.00	0.00	5,798.6	300.0	520.0	-235.8	0.00	0.00	0.00
5,880.0	0.00	0.00	5,838.6	300.0	520.0	-235.8	0.00	0.00	0.00
5,920.0	0.00	0.00	5,878.6	300.0	520.0	-235.8	0.00	0.00	0.00
5,960.0	0.00	0.00	5,918.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,000.0	0.00	0.00	5,958.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,040.0	0.00	0.00	5,998.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,080.0	0.00	0.00	6,038.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,120.0	0.00	0.00	6,078.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,160.0	0.00	0.00	6,118.6	300.0	520.0	-235.8	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 21R-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Project:	SEC.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	North Reference:	True
Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-29-12)		

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	6,158.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,240.0	0.00	0.00	6,198.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,280.0	0.00	0.00	6,238.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,320.0	0.00	0.00	6,278.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,360.0	0.00	0.00	6,318.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,400.0	0.00	0.00	6,358.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,440.0	0.00	0.00	6,398.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,480.0	0.00	0.00	6,438.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,520.0	0.00	0.00	6,478.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,560.0	0.00	0.00	6,518.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,600.0	0.00	0.00	6,558.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,640.0	0.00	0.00	6,598.6	300.0	520.0	-235.8	0.00	0.00	0.00
6,646.8	0.00	0.00	6,605.4	300.0	520.0	-235.8	0.00	0.00	0.00
KOP #2									
6,680.0	2.49	179.77	6,638.6	299.3	520.0	-235.1	7.50	7.50	0.00
6,720.0	5.49	179.77	6,678.5	296.5	520.0	-232.3	7.50	7.50	0.00
6,760.0	8.49	179.77	6,718.2	291.6	520.0	-227.5	7.50	7.50	0.00
6,800.0	11.49	179.77	6,757.6	284.7	520.1	-220.6	7.50	7.50	0.00
6,840.0	14.49	179.77	6,796.6	275.7	520.1	-211.7	7.50	7.50	0.00
6,880.0	17.49	179.77	6,835.0	264.7	520.1	-200.7	7.50	7.50	0.00
6,920.0	20.49	179.77	6,872.8	251.7	520.2	-187.8	7.50	7.50	0.00
6,960.0	23.49	179.77	6,909.9	236.7	520.3	-172.9	7.50	7.50	0.00
7,000.0	26.49	179.77	6,946.2	219.8	520.3	-156.1	7.50	7.50	0.00
7,040.0	29.49	179.77	6,981.5	201.0	520.4	-137.5	7.50	7.50	0.00
7,080.0	32.49	179.77	7,015.8	180.4	520.5	-117.0	7.50	7.50	0.00
7,120.0	35.49	179.77	7,048.9	158.1	520.6	-94.8	7.50	7.50	0.00
7,160.0	38.49	179.77	7,080.9	134.0	520.7	-70.9	7.50	7.50	0.00
7,200.0	41.49	179.77	7,111.5	108.3	520.8	-45.4	7.50	7.50	0.00
7,240.0	44.49	179.77	7,140.8	81.0	520.9	-18.3	7.50	7.50	0.00
7,280.0	47.49	179.77	7,168.6	52.3	521.0	10.3	7.50	7.50	0.00
7,320.0	50.49	179.77	7,194.8	22.1	521.1	40.3	7.50	7.50	0.00
7,360.0	53.49	179.77	7,219.4	-9.4	521.2	71.6	7.50	7.50	0.00
7,400.0	56.49	179.77	7,242.4	-42.2	521.4	104.1	7.50	7.50	0.00
7,440.0	59.49	179.77	7,263.6	-76.1	521.5	137.8	7.50	7.50	0.00
7,480.0	62.49	179.77	7,283.0	-111.1	521.6	172.5	7.50	7.50	0.00
7,520.0	65.49	179.77	7,300.5	-147.0	521.8	208.2	7.50	7.50	0.00
7,560.0	68.49	179.77	7,316.2	-183.8	521.9	244.8	7.50	7.50	0.00
7,600.0	71.49	179.77	7,329.8	-221.4	522.1	282.1	7.50	7.50	0.00
7,640.0	74.49	179.77	7,341.5	-259.6	522.2	320.1	7.50	7.50	0.00
7,680.0	77.49	179.77	7,351.2	-298.5	522.4	358.7	7.50	7.50	0.00
7,720.0	80.49	179.77	7,358.9	-337.7	522.5	397.7	7.50	7.50	0.00
7,760.0	83.49	179.77	7,364.4	-377.3	522.7	437.0	7.50	7.50	0.00
7,800.0	86.49	179.77	7,367.9	-417.2	522.9	476.6	7.50	7.50	0.00
7,840.0	89.49	179.77	7,369.3	-457.1	523.0	516.3	7.50	7.50	0.00
7,853.3	90.49	179.77	7,369.3	-470.4	523.1	529.5	7.50	7.50	0.00
End of Build - 7"									
7,880.0	90.49	179.77	7,369.1	-497.1	523.2	556.0	0.01	0.01	0.00
7,920.0	90.49	179.77	7,368.8	-537.1	523.3	595.7	0.00	0.00	0.00
7,960.0	90.49	179.77	7,368.4	-577.1	523.5	635.5	0.00	0.00	0.00
8,000.0	90.49	179.77	7,368.1	-617.1	523.7	675.2	0.00	0.00	0.00
8,040.0	90.49	179.77	7,367.7	-657.1	523.8	714.9	0.00	0.00	0.00
8,080.0	90.49	179.77	7,367.4	-697.1	524.0	754.7	0.00	0.00	0.00
8,120.0	90.49	179.77	7,367.1	-737.1	524.1	794.4	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 21R-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Project:	SEC.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	North Reference:	True
Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-29-12)		

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)
8,160.0	90.49	179.77	7,366.7	-777.1	524.3	834.1	0.00	0.00	0.00
8,200.0	90.49	179.77	7,366.4	-817.1	524.5	873.9	0.00	0.00	0.00
8,240.0	90.49	179.77	7,366.0	-857.1	524.6	913.6	0.00	0.00	0.00
8,280.0	90.49	179.77	7,365.7	-897.1	524.8	953.3	0.00	0.00	0.00
8,320.0	90.49	179.77	7,365.3	-937.1	524.9	993.1	0.00	0.00	0.00
8,360.0	90.49	179.77	7,365.0	-977.1	525.1	1,032.8	0.00	0.00	0.00
8,400.0	90.49	179.77	7,364.7	-1,017.1	525.3	1,072.5	0.00	0.00	0.00
8,440.0	90.49	179.77	7,364.3	-1,057.1	525.4	1,112.3	0.00	0.00	0.00
8,480.0	90.49	179.77	7,364.0	-1,097.1	525.6	1,152.0	0.00	0.00	0.00
8,520.0	90.49	179.77	7,363.6	-1,137.1	525.7	1,191.7	0.00	0.00	0.00
8,560.0	90.49	179.77	7,363.3	-1,177.1	525.9	1,231.4	0.00	0.00	0.00
8,600.0	90.49	179.77	7,362.9	-1,217.1	526.1	1,271.2	0.00	0.00	0.00
8,640.0	90.49	179.77	7,362.6	-1,257.1	526.2	1,310.9	0.00	0.00	0.00
8,680.0	90.49	179.77	7,362.3	-1,297.1	526.4	1,350.6	0.00	0.00	0.00
8,720.0	90.49	179.77	7,361.9	-1,337.1	526.5	1,390.4	0.00	0.00	0.00
8,760.0	90.49	179.77	7,361.6	-1,377.1	526.7	1,430.1	0.00	0.00	0.00
8,800.0	90.49	179.77	7,361.2	-1,417.1	526.9	1,469.8	0.00	0.00	0.00
8,840.0	90.49	179.77	7,360.9	-1,457.1	527.0	1,509.6	0.00	0.00	0.00
8,880.0	90.49	179.77	7,360.6	-1,497.1	527.2	1,549.3	0.00	0.00	0.00
8,920.0	90.49	179.77	7,360.2	-1,537.1	527.3	1,589.0	0.00	0.00	0.00
8,960.0	90.49	179.77	7,359.9	-1,577.1	527.5	1,628.8	0.00	0.00	0.00
9,000.0	90.49	179.77	7,359.5	-1,617.1	527.7	1,668.5	0.00	0.00	0.00
9,040.0	90.49	179.77	7,359.2	-1,657.1	527.8	1,708.2	0.00	0.00	0.00
9,080.0	90.49	179.77	7,358.8	-1,697.1	528.0	1,748.0	0.00	0.00	0.00
9,120.0	90.49	179.77	7,358.5	-1,737.1	528.1	1,787.7	0.00	0.00	0.00
9,160.0	90.49	179.77	7,358.2	-1,777.1	528.3	1,827.4	0.00	0.00	0.00
9,200.0	90.49	179.77	7,357.8	-1,817.1	528.4	1,867.1	0.00	0.00	0.00
9,240.0	90.49	179.77	7,357.5	-1,857.1	528.6	1,906.9	0.00	0.00	0.00
9,280.0	90.49	179.77	7,357.1	-1,897.1	528.8	1,946.6	0.00	0.00	0.00
9,320.0	90.49	179.77	7,356.8	-1,937.1	528.9	1,986.3	0.00	0.00	0.00
9,360.0	90.49	179.77	7,356.4	-1,977.1	529.1	2,026.1	0.00	0.00	0.00
9,400.0	90.49	179.77	7,356.1	-2,017.1	529.2	2,065.8	0.00	0.00	0.00
9,440.0	90.49	179.77	7,355.8	-2,057.1	529.4	2,105.5	0.00	0.00	0.00
9,480.0	90.49	179.77	7,355.4	-2,097.1	529.6	2,145.3	0.00	0.00	0.00
9,520.0	90.49	179.77	7,355.1	-2,137.1	529.7	2,185.0	0.00	0.00	0.00
9,560.0	90.49	179.77	7,354.7	-2,177.1	529.9	2,224.7	0.00	0.00	0.00
9,600.0	90.49	179.77	7,354.4	-2,217.1	530.0	2,264.5	0.00	0.00	0.00
9,640.0	90.49	179.77	7,354.1	-2,257.0	530.2	2,304.2	0.00	0.00	0.00
9,680.0	90.49	179.77	7,353.7	-2,297.0	530.4	2,343.9	0.00	0.00	0.00
9,720.0	90.49	179.77	7,353.4	-2,337.0	530.5	2,383.7	0.00	0.00	0.00
9,760.0	90.49	179.77	7,353.0	-2,377.0	530.7	2,423.4	0.00	0.00	0.00
9,800.0	90.49	179.77	7,352.7	-2,417.0	530.8	2,463.1	0.00	0.00	0.00
9,840.0	90.49	179.77	7,352.3	-2,457.0	531.0	2,502.9	0.00	0.00	0.00
9,880.0	90.49	179.77	7,352.0	-2,497.0	531.2	2,542.6	0.00	0.00	0.00
9,920.0	90.49	179.77	7,351.7	-2,537.0	531.3	2,582.3	0.00	0.00	0.00
9,960.0	90.49	179.77	7,351.3	-2,577.0	531.5	2,622.0	0.00	0.00	0.00
10,000.0	90.49	179.77	7,351.0	-2,617.0	531.6	2,661.8	0.00	0.00	0.00
10,040.0	90.49	179.77	7,350.6	-2,657.0	531.8	2,701.5	0.00	0.00	0.00
10,080.0	90.49	179.77	7,350.3	-2,697.0	532.0	2,741.2	0.00	0.00	0.00
10,120.0	90.49	179.77	7,349.9	-2,737.0	532.1	2,781.0	0.00	0.00	0.00
10,160.0	90.49	179.77	7,349.6	-2,777.0	532.3	2,820.7	0.00	0.00	0.00
10,200.0	90.49	179.77	7,349.3	-2,817.0	532.4	2,860.4	0.00	0.00	0.00
10,240.0	90.49	179.77	7,348.9	-2,857.0	532.6	2,900.2	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 21R-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Project:	SEC.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	North Reference:	True
Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-29-12)		

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)
10,280.0	90.49	179.77	7,348.6	-2,897.0	532.8	2,939.9	0.00	0.00	0.00
10,320.0	90.49	179.77	7,348.2	-2,937.0	532.9	2,979.6	0.00	0.00	0.00
10,360.0	90.49	179.77	7,347.9	-2,977.0	533.1	3,019.4	0.00	0.00	0.00
10,400.0	90.49	179.77	7,347.6	-3,017.0	533.2	3,059.1	0.00	0.00	0.00
10,440.0	90.49	179.77	7,347.2	-3,057.0	533.4	3,098.8	0.00	0.00	0.00
10,480.0	90.49	179.77	7,346.9	-3,097.0	533.6	3,138.6	0.00	0.00	0.00
10,520.0	90.49	179.77	7,346.5	-3,137.0	533.7	3,178.3	0.00	0.00	0.00
10,560.0	90.49	179.77	7,346.2	-3,177.0	533.9	3,218.0	0.00	0.00	0.00
10,600.0	90.49	179.77	7,345.8	-3,217.0	534.0	3,257.7	0.00	0.00	0.00
10,640.0	90.49	179.77	7,345.5	-3,257.0	534.2	3,297.5	0.00	0.00	0.00
10,680.0	90.49	179.77	7,345.2	-3,297.0	534.4	3,337.2	0.00	0.00	0.00
10,720.0	90.49	179.77	7,344.8	-3,337.0	534.5	3,376.9	0.00	0.00	0.00
10,760.0	90.49	179.77	7,344.5	-3,377.0	534.7	3,416.7	0.00	0.00	0.00
10,800.0	90.49	179.77	7,344.1	-3,417.0	534.8	3,456.4	0.00	0.00	0.00
10,840.0	90.49	179.77	7,343.8	-3,457.0	535.0	3,496.1	0.00	0.00	0.00
10,880.0	90.49	179.77	7,343.4	-3,497.0	535.2	3,535.9	0.00	0.00	0.00
10,920.0	90.49	179.77	7,343.1	-3,537.0	535.3	3,575.6	0.00	0.00	0.00
10,960.0	90.49	179.77	7,342.8	-3,577.0	535.5	3,615.3	0.00	0.00	0.00
11,000.0	90.49	179.77	7,342.4	-3,617.0	535.6	3,655.1	0.00	0.00	0.00
11,040.0	90.49	179.77	7,342.1	-3,657.0	535.8	3,694.8	0.00	0.00	0.00
11,080.0	90.49	179.77	7,341.7	-3,697.0	536.0	3,734.5	0.00	0.00	0.00
11,120.0	90.49	179.77	7,341.4	-3,737.0	536.1	3,774.3	0.00	0.00	0.00
11,160.0	90.49	179.77	7,341.1	-3,777.0	536.3	3,814.0	0.00	0.00	0.00
11,200.0	90.49	179.77	7,340.7	-3,817.0	536.4	3,853.7	0.00	0.00	0.00
11,240.0	90.49	179.77	7,340.4	-3,857.0	536.6	3,893.5	0.00	0.00	0.00
11,280.0	90.49	179.77	7,340.0	-3,897.0	536.7	3,933.2	0.00	0.00	0.00
11,320.0	90.49	179.77	7,339.7	-3,937.0	536.9	3,972.9	0.00	0.00	0.00
11,360.0	90.49	179.77	7,339.3	-3,977.0	537.1	4,012.6	0.00	0.00	0.00
11,400.0	90.49	179.77	7,339.0	-4,017.0	537.2	4,052.4	0.00	0.00	0.00
11,440.0	90.49	179.77	7,338.7	-4,057.0	537.4	4,092.1	0.00	0.00	0.00
11,480.0	90.49	179.77	7,338.3	-4,097.0	537.5	4,131.8	0.00	0.00	0.00
11,520.0	90.49	179.77	7,338.0	-4,137.0	537.7	4,171.6	0.00	0.00	0.00
11,560.0	90.49	179.77	7,337.6	-4,177.0	537.9	4,211.3	0.00	0.00	0.00
11,600.0	90.49	179.77	7,337.3	-4,217.0	538.0	4,251.0	0.00	0.00	0.00
11,640.0	90.49	179.77	7,336.9	-4,257.0	538.2	4,290.8	0.00	0.00	0.00
11,680.0	90.49	179.77	7,336.6	-4,297.0	538.3	4,330.5	0.00	0.00	0.00
11,720.0	90.49	179.77	7,336.3	-4,337.0	538.5	4,370.2	0.00	0.00	0.00
11,760.0	90.49	179.77	7,335.9	-4,377.0	538.7	4,410.0	0.00	0.00	0.00
11,800.0	90.49	179.77	7,335.6	-4,417.0	538.8	4,449.7	0.00	0.00	0.00
11,840.0	90.49	179.77	7,335.2	-4,457.0	539.0	4,489.4	0.00	0.00	0.00
11,867.8	90.49	179.77	7,335.0	-4,484.8	539.1	4,517.1	0.00	0.00	0.00
BHL 500'FSL, 1080'FEL									

Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
BHL 500'FSL, 1080'FI - plan hits target center - Point	0.00	0.00	7,335.0	-4,484.8	539.1	1,445,681.77	3,200,810.01	40.554550	-104.777330

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 21R-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Project:	SEC.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	North Reference:	True
Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-29-12)		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,853.3	7,369.3	7"	7	7-1/2

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,000.0	1,000.0	0.0	0.0	KOP #1
6,646.8	6,605.4	300.0	520.0	KOP #2
7,853.3	7,369.3	-470.4	523.1	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.21-T7N-R66W

Thornton 21R-HZ Pad Sec.21-T7N-R66W

Thornton 21R-223

Wellbore #1

Plan #1 (11-29-12)

Anticollision Report

30 November, 2012



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (11-29-12)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program		Date	11/30/2012		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	11,867.1	Plan #1 (11-29-12) (Wellbore #1)	MWD	MWD - Standard	

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Thornton 21R-HZ Pad Sec.21-T7N-R66W						
Thornton 21R-403 - Wellbore #1 - Plan #1 (11-29-12)	1,000.0	1,000.0	76.8	72.5	17.982	CC, ES
Thornton 21R-403 - Wellbore #1 - Plan #1 (11-29-12)	11,867.8	12,009.2	470.8	303.1	2.807	SF
Thornton 21U-203 - Wellbore #1 - Plan #1 (11-29-12)	200.0	200.0	58.3	57.7	86.527	CC, ES
Thornton 21U-203 - Wellbore #1 - Plan #1 (11-29-12)	11,867.8	11,993.9	880.9	703.3	4.959	SF
Thornton 21U-443 - Wellbore #1 - Plan #1 (11-29-12)	800.0	800.0	30.6	27.2	9.065	CC, ES
Thornton 21U-443 - Wellbore #1 - Plan #1 (11-29-12)	11,867.8	12,074.3	473.4	307.5	2.853	SF

Offset Design		Thornton 21R-HZ Pad Sec.21-T7N-R66W - Thornton 21R-403 - Wellbore #1 - Plan #1 (11-29-12)											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 (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		
0.0	0.0	0.0	0.0	0.0	0.0	-139.37	-58.3	-50.0	76.8					
100.0	100.0	100.0	100.0	0.1	0.1	-139.37	-58.3	-50.0	76.8	76.6	0.22	341.667		
200.0	200.0	200.0	200.0	0.3	0.3	-139.37	-58.3	-50.0	76.8	76.1	0.67	113.889		
300.0	300.0	300.0	300.0	0.6	0.6	-139.37	-58.3	-50.0	76.8	75.7	1.12	68.333		
400.0	400.0	400.0	400.0	0.8	0.8	-139.37	-58.3	-50.0	76.8	75.2	1.57	48.810		
500.0	500.0	500.0	500.0	1.0	1.0	-139.37	-58.3	-50.0	76.8	74.8	2.02	37.963		
600.0	600.0	600.0	600.0	1.2	1.2	-139.37	-58.3	-50.0	76.8	74.3	2.47	31.061		
700.0	700.0	700.0	700.0	1.5	1.5	-139.37	-58.3	-50.0	76.8	73.9	2.92	26.282		
800.0	800.0	800.0	800.0	1.7	1.7	-139.37	-58.3	-50.0	76.8	73.4	3.37	22.778		
900.0	900.0	900.0	900.0	1.9	1.9	-139.37	-58.3	-50.0	76.8	73.0	3.82	20.098		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-139.37	-58.3	-50.0	76.8	72.5	4.27	17.982	CC, ES	
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	161.03	-58.3	-50.0	78.4	73.7	4.71	16.645		
1,200.0	1,199.8	1,199.8	1,199.8	2.6	2.6	162.17	-58.3	-50.0	83.4	78.3	5.15	16.203		
1,300.0	1,299.5	1,299.5	1,299.5	2.8	2.8	163.79	-58.3	-50.0	91.7	86.2	5.58	16.440		
1,407.5	1,406.1	1,406.1	1,406.1	3.1	3.0	165.75	-58.3	-50.0	104.5	98.5	6.04	17.298		
1,500.0	1,497.7	1,497.7	1,497.7	3.3	3.3	167.32	-58.3	-50.0	117.3	110.8	6.45	18.172		
1,600.0	1,596.7	1,596.7	1,596.7	3.6	3.5	168.68	-58.3	-50.0	131.2	124.3	6.90	19.004		
1,700.0	1,695.7	1,695.7	1,695.7	3.9	3.7	169.78	-58.3	-50.0	145.1	137.7	7.35	19.736		
1,800.0	1,794.7	1,794.7	1,794.7	4.2	3.9	170.69	-58.3	-50.0	159.1	151.3	7.80	20.385		
1,900.0	1,893.7	1,893.7	1,893.7	4.5	4.1	171.45	-58.3	-50.0	173.1	164.8	8.26	20.962		
2,000.0	1,992.6	1,992.6	1,992.6	4.8	4.4	172.09	-58.3	-50.0	187.1	178.4	8.71	21.479		

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton 21R-HZ Pad Sec.21-T7N-R66W - Thornton 21R-403 - Wellbore #1 - Plan #1 (11-29-12)													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)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
2,100.0	2,091.6	2,097.3	2,097.3	5.1	4.6	172.94		-56.7	-49.4	199.9	190.7	9.18	21.781	
2,200.0	2,190.6	2,203.0	2,202.9	5.4	4.8	174.27		-51.5	-47.6	209.6	200.0	9.64	21.748	
2,300.0	2,289.6	2,309.1	2,308.5	5.8	5.1	176.09		-42.6	-44.4	216.5	206.4	10.10	21.427	
2,400.0	2,388.6	2,413.4	2,412.0	6.1	5.3	178.35		-30.4	-39.9	220.7	210.2	10.57	20.884	
2,500.0	2,487.6	2,512.9	2,510.6	6.4	5.6	-179.41		-17.8	-35.4	224.5	213.5	11.03	20.347	
2,600.0	2,586.6	2,612.5	2,609.3	6.8	5.8	-177.25		-5.1	-30.8	228.6	217.1	11.51	19.866	
2,700.0	2,685.6	2,712.0	2,707.9	7.1	6.1	-175.17		7.5	-26.3	233.1	221.1	11.99	19.434	
2,800.0	2,784.6	2,811.6	2,806.5	7.4	6.3	-173.16		20.1	-21.7	237.8	225.3	12.49	19.043	
2,900.0	2,883.6	2,911.1	2,905.2	7.8	6.6	-171.24		32.8	-17.1	242.8	229.8	12.99	18.687	
3,000.0	2,982.5	3,010.7	3,003.8	8.1	6.9	-169.39		45.4	-12.6	248.1	234.6	13.51	18.363	
3,100.0	3,081.5	3,110.2	3,102.4	8.4	7.2	-167.62		58.0	-8.0	253.6	239.5	14.04	18.067	
3,200.0	3,180.5	3,209.8	3,201.1	8.8	7.5	-165.93		70.6	-3.5	259.3	244.8	14.57	17.795	
3,300.0	3,279.5	3,309.3	3,299.7	9.1	7.7	-164.32		83.3	1.1	265.3	250.2	15.12	17.546	
3,400.0	3,378.5	3,408.9	3,398.4	9.4	8.0	-162.77		95.9	5.7	271.5	255.8	15.68	17.317	
3,500.0	3,477.5	3,508.4	3,497.0	9.8	8.3	-161.30		108.5	10.2	277.8	261.6	16.24	17.105	
3,600.0	3,576.5	3,608.0	3,595.6	10.1	8.6	-159.89		121.2	14.8	284.4	267.5	16.82	16.910	
3,700.0	3,675.5	3,707.5	3,694.3	10.5	8.9	-158.54		133.8	19.3	291.1	273.7	17.40	16.730	
3,800.0	3,774.5	3,807.1	3,792.9	10.8	9.2	-157.26		146.4	23.9	297.9	279.9	17.99	16.564	
3,900.0	3,873.5	3,906.6	3,891.5	11.1	9.5	-156.03		159.0	28.5	304.9	286.3	18.58	16.410	
4,000.0	3,972.4	4,006.2	3,990.2	11.5	9.8	-154.86		171.7	33.0	312.0	292.8	19.18	16.267	
4,100.0	4,071.4	4,105.7	4,088.8	11.8	10.2	-153.74		184.3	37.6	319.3	299.5	19.79	16.135	
4,200.0	4,170.4	4,205.2	4,187.5	12.2	10.5	-152.68		196.9	42.1	326.6	306.2	20.40	16.012	
4,300.0	4,269.4	4,304.8	4,286.1	12.5	10.8	-151.66		209.6	46.7	334.1	313.1	21.02	15.898	
4,400.0	4,368.4	4,404.3	4,384.7	12.9	11.1	-150.68		222.2	51.3	341.7	320.0	21.64	15.792	
4,500.0	4,467.4	4,503.9	4,483.4	13.2	11.4	-149.75		234.8	55.8	349.4	327.1	22.26	15.694	
4,600.0	4,566.4	4,603.4	4,582.0	13.5	11.7	-148.85		247.4	60.4	357.1	334.2	22.89	15.602	
4,700.0	4,665.4	4,703.0	4,680.6	13.9	12.0	-148.00		260.1	65.0	365.0	341.4	23.52	15.517	
4,800.0	4,764.4	4,802.5	4,779.3	14.2	12.3	-147.18		272.7	69.5	372.9	348.7	24.15	15.438	
4,900.0	4,863.4	4,900.0	4,875.9	14.6	12.6	-146.51		284.4	73.7	381.1	356.3	24.75	15.396	
5,000.0	4,962.3	4,995.6	4,971.1	14.9	12.8	-146.30		293.1	76.9	390.2	364.9	25.25	15.451	
5,100.0	5,061.3	5,091.4	5,066.7	15.3	13.0	-146.55		298.8	78.9	400.2	374.5	25.70	15.572	
5,200.0	5,160.3	5,186.7	5,161.9	15.6	13.2	-147.22		301.5	79.9	411.3	385.2	26.10	15.760	
5,233.9	5,193.9	5,218.9	5,194.1	15.7	13.3	-147.53		301.7	80.0	415.3	389.0	26.22	15.838	
5,300.0	5,259.4	5,284.2	5,259.4	15.9	13.4	-148.23		301.7	80.0	422.6	396.1	26.46	15.968	
5,400.0	5,358.9	5,383.6	5,358.9	16.2	13.6	-149.03		301.7	80.0	431.3	404.4	26.82	16.082	
5,500.0	5,458.7	5,483.4	5,458.7	16.4	13.7	-149.53		301.7	80.0	437.0	409.8	27.16	16.089	
5,600.0	5,558.6	5,583.4	5,558.6	16.5	13.9	-149.77		301.7	80.0	439.8	412.3	27.49	15.996	
5,641.4	5,600.0	5,624.7	5,600.0	16.6	14.0	-89.78		301.7	80.0	440.0	412.4	27.64	15.918	
5,700.0	5,658.6	5,683.4	5,658.6	16.7	14.1	-89.78		301.7	80.0	440.0	412.2	27.86	15.794	
5,800.0	5,758.6	5,783.4	5,758.6	16.8	14.3	-89.78		301.7	80.0	440.0	411.8	28.24	15.579	
5,900.0	5,858.6	5,883.4	5,858.6	17.0	14.5	-89.78		301.7	80.0	440.0	411.4	28.63	15.369	
6,000.0	5,958.6	5,983.4	5,958.6	17.1	14.7	-89.78		301.7	80.0	440.0	411.0	29.02	15.164	
6,100.0	6,058.6	6,083.4	6,058.6	17.3	14.9	-89.78		301.7	80.0	440.0	410.6	29.41	14.963	
6,200.0	6,158.6	6,183.4	6,158.6	17.5	15.1	-89.78		301.7	80.0	440.0	410.2	29.80	14.767	
6,300.0	6,258.6	6,283.4	6,258.6	17.7	15.3	-89.78		301.7	80.0	440.0	409.8	30.19	14.575	
6,400.0	6,358.6	6,383.4	6,358.6	17.8	15.5	-89.78		301.7	80.0	440.0	409.4	30.58	14.387	
6,500.0	6,458.6	6,483.4	6,458.6	18.0	15.7	-89.78		301.7	80.0	440.0	409.0	30.98	14.203	
6,600.0	6,558.6	6,583.4	6,558.6	18.2	15.9	-89.78		301.7	80.0	440.0	408.6	31.38	14.023	
6,646.8	6,605.4	6,630.2	6,605.4	18.2	16.0	-89.78		301.7	80.0	440.0	408.4	31.56	13.941	
6,650.0	6,608.6	6,633.4	6,608.6	18.3	16.0	90.45		301.7	80.0	440.0	408.5	31.56	13.942	
6,700.0	6,658.6	6,683.3	6,658.6	18.3	16.1	90.69		301.7	80.0	440.0	408.3	31.75	13.859	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton 21R-HZ Pad Sec.21-T7N-R66W - Thornton 21R-403 - Wellbore #1 - Plan #1 (11-29-12)													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
6,750.0	6,708.3	6,733.0	6,708.3	18.4	16.2	91.35	91.35	301.7	80.0	440.1	408.2	31.95	13.775	
6,800.0	6,757.6	6,782.3	6,757.6	18.4	16.3	92.40	92.40	301.7	80.0	440.4	408.2	32.16	13.696	
6,850.0	6,806.2	6,832.9	6,808.1	18.4	16.4	93.67	93.67	300.1	80.0	440.9	408.6	32.33	13.640	
6,900.0	6,854.0	6,884.2	6,859.1	18.4	16.4	94.93	94.93	295.0	80.0	441.7	409.2	32.45	13.610	
6,950.0	6,900.7	6,936.2	6,910.4	18.4	16.5	96.17	96.17	286.4	80.1	442.7	410.1	32.53	13.606	
7,000.0	6,946.2	6,988.9	6,961.7	18.4	16.5	97.40	97.40	274.1	80.1	443.8	411.3	32.57	13.626	
7,050.0	6,990.1	7,042.4	7,012.7	18.4	16.5	98.59	98.59	258.1	80.2	445.2	412.6	32.57	13.669	
7,100.0	7,032.5	7,096.7	7,063.2	18.4	16.4	99.75	99.75	238.2	80.3	446.7	414.1	32.53	13.731	
7,150.0	7,073.0	7,151.8	7,112.9	18.4	16.4	100.87	100.87	214.4	80.4	448.3	415.8	32.46	13.808	
7,200.0	7,111.5	7,207.6	7,161.4	18.4	16.4	101.94	101.94	186.7	80.5	450.0	417.6	32.38	13.896	
7,250.0	7,147.9	7,264.3	7,208.3	18.4	16.3	102.96	102.96	155.1	80.6	451.8	419.5	32.30	13.988	
7,300.0	7,181.9	7,321.7	7,253.4	18.4	16.3	103.92	103.92	119.5	80.8	453.6	421.3	32.23	14.074	
7,350.0	7,213.4	7,379.8	7,296.2	18.4	16.3	104.81	104.81	80.2	80.9	455.4	423.2	32.19	14.147	
7,400.0	7,242.4	7,438.7	7,336.4	18.4	16.3	105.64	105.64	37.2	81.1	457.1	424.9	32.20	14.196	
7,450.0	7,268.6	7,498.3	7,373.5	18.4	16.3	106.38	106.38	-9.4	81.3	458.8	426.5	32.29	14.211	
7,500.0	7,292.0	7,558.5	7,407.2	18.5	16.4	107.05	107.05	-59.2	81.5	460.4	427.9	32.46	14.181	
7,550.0	7,312.4	7,619.2	7,437.2	18.6	16.6	107.63	107.63	-112.0	81.7	461.8	429.0	32.75	14.098	
7,600.0	7,329.8	7,680.5	7,463.1	18.8	16.8	108.13	108.13	-167.5	82.0	463.0	429.8	33.17	13.960	
7,650.0	7,344.1	7,742.2	7,484.6	19.0	17.1	108.53	108.53	-225.4	82.2	464.0	430.3	33.71	13.765	
7,700.0	7,355.3	7,804.2	7,501.4	19.3	17.5	108.83	108.83	-285.0	82.4	464.8	430.4	34.40	13.513	
7,750.0	7,363.2	7,866.5	7,513.3	19.7	18.0	109.04	109.04	-346.2	82.7	465.3	430.1	35.23	13.209	
7,800.0	7,367.9	7,923.7	7,520.2	20.0	18.4	109.17	109.17	-403.0	82.9	465.7	429.6	36.15	12.883	
7,853.3	7,369.3	7,976.9	7,525.7	20.5	18.9	109.56	109.56	-455.9	83.2	467.1	430.0	37.13	12.579	
7,900.0	7,368.9	8,030.9	7,530.1	21.0	19.4	110.12	110.12	-509.7	83.4	468.5	430.5	38.04	12.316	
8,000.0	7,368.1	8,141.4	7,531.7	22.0	20.6	110.41	110.41	-620.1	83.9	469.3	429.1	40.22	11.669	
8,100.0	7,367.2	8,241.4	7,531.1	23.2	21.8	110.43	110.43	-720.1	84.3	469.3	426.8	42.54	11.034	
8,200.0	7,366.4	8,341.4	7,530.4	24.5	23.1	110.45	110.45	-820.1	84.7	469.4	424.3	45.03	10.424	
8,300.0	7,365.5	8,441.4	7,529.7	25.9	24.5	110.47	110.47	-920.1	85.1	469.4	421.7	47.67	9.847	
8,400.0	7,364.7	8,541.4	7,529.0	27.3	26.0	110.49	110.49	-1,020.1	85.5	469.4	419.0	50.43	9.308	
8,500.0	7,363.8	8,641.4	7,528.3	28.8	27.5	110.51	110.51	-1,120.1	85.9	469.5	416.2	53.31	8.807	
8,600.0	7,362.9	8,741.4	7,527.6	30.3	29.0	110.53	110.53	-1,220.1	86.4	469.5	413.3	56.26	8.345	
8,700.0	7,362.1	8,841.4	7,526.9	31.9	30.6	110.55	110.55	-1,320.1	86.8	469.6	410.3	59.30	7.918	
8,800.0	7,361.2	8,941.4	7,526.2	33.5	32.3	110.57	110.57	-1,420.1	87.2	469.6	407.2	62.40	7.526	
8,900.0	7,360.4	9,041.4	7,525.5	35.2	33.9	110.59	110.59	-1,520.1	87.6	469.6	404.1	65.55	7.164	
9,000.0	7,359.5	9,141.4	7,524.8	36.8	35.6	110.61	110.61	-1,620.1	88.0	469.7	400.9	68.75	6.831	
9,100.0	7,358.7	9,241.4	7,524.1	38.5	37.3	110.63	110.63	-1,720.1	88.5	469.7	397.7	71.99	6.524	
9,200.0	7,357.8	9,341.4	7,523.5	40.2	39.1	110.65	110.65	-1,820.1	88.9	469.8	394.5	75.27	6.241	
9,300.0	7,357.0	9,441.4	7,522.8	42.0	40.8	110.67	110.67	-1,920.1	89.3	469.8	391.2	78.58	5.978	
9,400.0	7,356.1	9,541.4	7,522.1	43.7	42.6	110.69	110.69	-2,020.0	89.7	469.8	387.9	81.92	5.736	
9,500.0	7,355.2	9,641.4	7,521.4	45.5	44.4	110.71	110.71	-2,120.0	90.1	469.9	384.6	85.28	5.510	
9,600.0	7,354.4	9,741.4	7,520.7	47.3	46.2	110.73	110.73	-2,220.0	90.5	469.9	381.3	88.66	5.300	
9,700.0	7,353.5	9,841.4	7,520.0	49.1	48.0	110.74	110.74	-2,320.0	91.0	470.0	377.9	92.05	5.105	
9,800.0	7,352.7	9,941.4	7,519.3	50.8	49.8	110.76	110.76	-2,420.0	91.4	470.0	374.5	95.47	4.923	
9,900.0	7,351.8	10,041.4	7,518.6	52.7	51.6	110.78	110.78	-2,520.0	91.8	470.0	371.1	98.90	4.753	
10,000.0	7,351.0	10,141.4	7,517.9	54.5	53.4	110.80	110.80	-2,620.0	92.2	470.1	367.7	102.34	4.593	
10,100.0	7,350.1	10,241.4	7,517.2	56.3	55.2	110.82	110.82	-2,720.0	92.6	470.1	364.3	105.80	4.444	
10,200.0	7,349.3	10,341.4	7,516.5	58.1	57.1	110.84	110.84	-2,820.0	93.1	470.2	360.9	109.26	4.303	
10,300.0	7,348.4	10,441.4	7,515.8	60.0	58.9	110.86	110.86	-2,920.0	93.5	470.2	357.5	112.74	4.171	
10,400.0	7,347.6	10,541.4	7,515.2	61.8	60.8	110.88	110.88	-3,020.0	93.9	470.2	354.0	116.22	4.046	
10,500.0	7,346.7	10,641.4	7,514.5	63.6	62.6	110.90	110.90	-3,120.0	94.3	470.3	350.6	119.71	3.928	
10,600.0	7,345.8	10,741.4	7,513.8	65.5	64.5	110.92	110.92	-3,220.0	94.7	470.3	347.1	123.21	3.817	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton 21R-HZ Pad Sec.21-T7N-R66W - Thornton 21R-403 - Wellbore #1 - Plan #1 (11-29-12)												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)	Semi Major Axis 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
10,700.0	7,345.0	10,841.4	7,513.1	67.3	66.4	110.94	-3,320.0	95.2	470.4	343.6	126.71	3.712	
10,800.0	7,344.1	10,941.4	7,512.4	69.2	68.2	110.96	-3,420.0	95.6	470.4	340.2	130.22	3.612	
10,900.0	7,343.3	11,041.4	7,511.7	71.1	70.1	110.98	-3,520.0	96.0	470.4	336.7	133.74	3.518	
11,000.0	7,342.4	11,141.4	7,511.0	72.9	72.0	111.00	-3,620.0	96.4	470.5	333.2	137.26	3.428	
11,100.0	7,341.6	11,241.4	7,510.3	74.8	73.8	111.02	-3,720.0	96.8	470.5	329.7	140.78	3.342	
11,200.0	7,340.7	11,341.4	7,509.6	76.7	75.7	111.04	-3,820.0	97.2	470.6	326.2	144.31	3.261	
11,300.0	7,339.9	11,441.4	7,508.9	78.5	77.6	111.06	-3,920.0	97.7	470.6	322.7	147.85	3.183	
11,400.0	7,339.0	11,541.4	7,508.2	80.4	79.5	111.08	-4,020.0	98.1	470.6	319.3	151.38	3.109	
11,500.0	7,338.1	11,641.4	7,507.5	82.3	81.4	111.10	-4,120.0	98.5	470.7	315.8	154.92	3.038	
11,600.0	7,337.3	11,741.4	7,506.9	84.2	83.2	111.11	-4,220.0	98.9	470.7	312.3	158.46	2.971	
11,700.0	7,336.4	11,841.4	7,506.2	86.1	85.1	111.13	-4,320.0	99.3	470.8	308.8	162.01	2.906	
11,800.0	7,335.6	11,941.4	7,505.5	87.9	87.0	111.15	-4,420.0	99.8	470.8	305.2	165.55	2.844	
11,867.8	7,335.0	12,009.2	7,505.0	89.0	88.3	111.17	-4,487.8	100.0	470.8	303.1	167.72	2.807 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton 21R-HZ Pad Sec.21-T7N-R66W - Thornton 21U-203 - Wellbore #1 - Plan #1 (11-29-12)													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	90.02	90.02	0.0	58.3	58.3				
100.0	100.0	100.0	100.0	0.1	0.1	90.02	90.02	0.0	58.3	58.3	58.1	0.22	259.581	
200.0	200.0	200.0	200.0	0.3	0.3	90.02	90.02	0.0	58.3	58.3	57.7	0.67	86.527 CC, ES	
300.0	300.0	298.0	298.0	0.6	0.6	89.67	89.67	0.4	60.0	60.0	58.9	1.11	53.933	
400.0	400.0	395.8	395.6	0.8	0.8	88.72	88.72	1.4	64.9	65.0	63.5	1.56	41.706	
500.0	500.0	493.1	492.6	1.0	1.0	87.44	87.44	3.3	73.0	73.4	71.4	2.02	36.281	
600.0	600.0	589.8	588.6	1.2	1.3	86.08	86.08	5.8	84.2	85.1	82.6	2.51	33.913	
700.0	700.0	685.6	683.2	1.5	1.6	84.80	84.80	9.0	98.4	100.2	97.2	3.03	33.119	
800.0	800.0	780.2	776.3	1.7	2.0	83.69	83.69	12.8	115.5	118.6	115.0	3.58	33.167	
900.0	900.0	873.7	867.5	1.9	2.4	82.75	82.75	17.2	135.3	140.2	136.0	4.16	33.682	
1,000.0	1,000.0	965.8	956.7	2.1	2.8	81.98	81.98	22.2	157.6	165.0	160.2	4.78	34.485	
1,100.0	1,100.0	1,062.7	1,050.2	2.4	3.3	21.34	21.34	27.8	182.5	189.7	184.9	4.80	39.485	
1,200.0	1,199.8	1,160.3	1,144.4	2.6	3.8	21.19	21.19	33.4	207.6	211.2	205.9	5.27	40.107	
1,300.0	1,299.5	1,258.6	1,239.2	2.8	4.4	21.39	21.39	39.1	232.9	229.5	223.8	5.74	39.991	
1,407.5	1,406.1	1,364.9	1,341.7	3.1	4.9	21.92	21.92	45.2	260.1	245.7	239.4	6.26	39.249	
1,500.0	1,497.7	1,456.5	1,430.1	3.3	5.4	22.55	22.55	50.4	283.7	258.0	251.3	6.73	38.335	
1,600.0	1,596.7	1,555.6	1,525.7	3.6	6.0	23.18	23.18	56.1	309.1	271.4	264.1	7.25	37.444	
1,700.0	1,695.7	1,654.6	1,621.2	3.9	6.5	23.75	23.75	61.8	334.6	284.8	277.0	7.77	36.641	
1,800.0	1,794.7	1,753.7	1,716.8	4.2	7.1	24.26	24.26	67.5	360.0	298.2	289.9	8.30	35.915	
1,900.0	1,893.7	1,852.7	1,812.4	4.5	7.6	24.73	24.73	73.2	385.5	311.7	302.8	8.84	35.256	
2,000.0	1,992.6	1,951.8	1,907.9	4.8	8.2	25.16	25.16	78.9	410.9	325.1	315.8	9.38	34.655	
2,100.0	2,091.6	2,050.9	2,003.5	5.1	8.7	25.56	25.56	84.6	436.4	338.6	328.7	9.93	34.106	
2,200.0	2,190.6	2,149.9	2,099.1	5.4	9.3	25.93	25.93	90.3	461.8	352.1	341.6	10.48	33.604	
2,300.0	2,289.6	2,249.0	2,194.6	5.8	9.8	26.27	26.27	96.0	487.3	365.6	354.6	11.03	33.141	
2,400.0	2,388.6	2,348.0	2,290.2	6.1	10.4	26.58	26.58	101.7	512.7	379.2	367.6	11.59	32.716	
2,500.0	2,487.6	2,447.1	2,385.8	6.4	11.0	26.88	26.88	107.4	538.2	392.7	380.5	12.15	32.322	
2,600.0	2,586.6	2,546.2	2,481.3	6.8	11.5	27.15	27.15	113.1	563.6	406.2	393.5	12.71	31.957	
2,700.0	2,685.6	2,645.2	2,576.9	7.1	12.1	27.41	27.41	118.8	589.1	419.8	406.5	13.28	31.618	
2,800.0	2,784.6	2,744.3	2,672.5	7.4	12.6	27.65	27.65	124.5	614.5	433.3	419.5	13.84	31.303	
2,900.0	2,883.6	2,843.3	2,768.0	7.8	13.2	27.88	27.88	130.2	639.9	446.9	432.5	14.41	31.009	
3,000.0	2,982.5	2,942.4	2,863.6	8.1	13.7	28.09	28.09	135.9	665.4	460.5	445.5	14.98	30.734	
3,100.0	3,081.5	3,041.5	2,959.2	8.4	14.3	28.29	28.29	141.6	690.8	474.1	458.5	15.56	30.476	
3,200.0	3,180.5	3,140.5	3,054.7	8.8	14.8	28.48	28.48	147.3	716.3	487.7	471.5	16.13	30.234	
3,300.0	3,279.5	3,239.6	3,150.3	9.1	15.4	28.66	28.66	153.0	741.7	501.2	484.5	16.70	30.007	
3,400.0	3,378.5	3,338.6	3,245.9	9.4	15.9	28.83	28.83	158.7	767.2	514.8	497.6	17.28	29.792	
3,500.0	3,477.5	3,437.7	3,341.4	9.8	16.5	28.99	28.99	164.4	792.6	528.4	510.6	17.86	29.590	
3,600.0	3,576.5	3,536.8	3,437.0	10.1	17.1	29.14	29.14	170.1	818.1	542.0	523.6	18.44	29.399	
3,700.0	3,675.5	3,635.8	3,532.6	10.5	17.6	29.29	29.29	175.8	843.5	555.6	536.6	19.02	29.219	
3,800.0	3,774.5	3,734.9	3,628.1	10.8	18.2	29.42	29.42	181.5	869.0	569.3	549.7	19.60	29.047	
3,900.0	3,873.5	3,833.9	3,723.7	11.1	18.7	29.56	29.56	187.2	894.4	582.9	562.7	20.18	28.885	
4,000.0	3,972.4	3,933.0	3,819.3	11.5	19.3	29.68	29.68	192.9	919.9	596.5	575.7	20.76	28.731	
4,100.0	4,071.4	4,032.1	3,914.8	11.8	19.8	29.80	29.80	198.6	945.3	610.1	588.8	21.34	28.584	
4,200.0	4,170.4	4,131.1	4,010.4	12.2	20.4	29.92	29.92	204.3	970.8	623.7	601.8	21.93	28.444	
4,300.0	4,269.4	4,230.2	4,106.0	12.5	21.0	30.03	30.03	210.0	996.2	637.3	614.8	22.51	28.311	
4,400.0	4,368.4	4,329.2	4,201.5	12.9	21.5	30.13	30.13	215.7	1,021.7	651.0	627.9	23.10	28.184	
4,500.0	4,467.4	4,428.3	4,297.1	13.2	22.1	30.24	30.24	221.3	1,047.1	664.6	640.9	23.68	28.062	
4,600.0	4,566.4	4,527.4	4,392.7	13.5	22.6	30.33	30.33	227.0	1,072.6	678.2	654.0	24.27	27.946	
4,700.0	4,665.4	4,626.4	4,488.2	13.9	23.2	30.43	30.43	232.7	1,098.0	691.9	667.0	24.86	27.835	
4,800.0	4,764.4	4,725.5	4,583.8	14.2	23.7	30.52	30.52	238.4	1,123.4	705.5	680.0	25.44	27.728	
4,900.0	4,863.4	4,824.5	4,679.4	14.6	24.3	30.60	30.60	244.1	1,148.9	719.1	693.1	26.03	27.626	
5,000.0	4,962.3	4,923.6	4,774.9	14.9	24.8	30.68	30.68	249.8	1,174.3	732.8	706.1	26.62	27.528	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton 21R-HZ Pad Sec.21-T7N-R66W - Thornton 21U-203 - Wellbore #1 - Plan #1 (11-29-12)													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
5,100.0	5,061.3	5,022.7	4,870.5	15.3	25.4	30.76		255.5	1,199.8	746.4	719.2	27.21	27.433	
5,200.0	5,160.3	5,121.7	4,966.1	15.6	26.0	30.84		261.2	1,225.2	760.0	732.2	27.80	27.343	
5,233.9	5,193.9	5,155.3	4,998.4	15.7	26.1	30.87		263.2	1,233.9	764.7	736.7	28.00	27.313	
5,300.0	5,259.4	5,220.7	5,061.5	15.9	26.5	30.99		266.9	1,250.7	774.3	746.0	28.35	27.316	
5,400.0	5,358.9	5,319.2	5,156.6	16.2	27.1	31.09		272.6	1,276.0	791.4	762.6	28.81	27.471	
5,500.0	5,458.7	5,419.2	5,253.0	16.4	27.6	31.08		278.3	1,301.6	811.4	782.2	29.22	27.770	
5,600.0	5,558.6	5,554.8	5,384.8	16.5	28.2	30.91		285.4	1,333.1	831.9	802.3	29.61	28.092	
5,641.4	5,600.0	5,611.5	5,440.2	16.6	28.4	90.84		287.9	1,344.5	839.9	810.1	29.79	28.190	
5,700.0	5,658.6	5,692.4	5,519.8	16.7	28.7	90.61		291.1	1,358.8	850.2	820.2	30.03	28.311	
5,800.0	5,758.6	5,832.1	5,658.0	16.8	29.0	90.30		295.5	1,378.4	864.2	833.8	30.45	28.385	
5,900.0	5,858.6	5,973.5	5,798.7	17.0	29.3	90.10		298.4	1,391.4	873.5	842.6	30.86	28.308	
6,000.0	5,958.6	6,115.8	5,940.9	17.1	29.5	90.01		299.9	1,397.8	877.9	846.7	31.26	28.087	
6,100.0	6,058.6	6,233.5	6,058.6	17.3	29.6	90.00		300.0	1,398.3	878.3	846.7	31.62	27.775	
6,200.0	6,158.6	6,333.5	6,158.6	17.5	29.7	90.00		300.0	1,398.3	878.3	846.4	31.97	27.472	
6,300.0	6,258.6	6,433.5	6,258.6	17.7	29.8	90.00		300.0	1,398.3	878.3	846.0	32.32	27.174	
6,400.0	6,358.6	6,533.5	6,358.6	17.8	29.9	90.00		300.0	1,398.3	878.3	845.7	32.68	26.881	
6,500.0	6,458.6	6,633.5	6,458.6	18.0	30.0	90.00		300.0	1,398.3	878.3	845.3	33.03	26.592	
6,600.0	6,558.6	6,733.5	6,558.6	18.2	30.1	90.00		300.0	1,398.3	878.3	845.0	33.39	26.308	
6,631.2	6,589.8	6,764.7	6,589.8	18.2	30.2	90.00		300.0	1,398.3	878.3	844.8	33.50	26.220	
6,646.8	6,605.4	6,780.3	6,605.4	18.2	30.2	90.00		300.0	1,398.3	878.3	844.8	33.56	26.176	
6,650.0	6,608.6	6,783.5	6,608.6	18.3	30.2	-89.77		300.0	1,398.3	878.3	844.8	33.53	26.198	
6,700.0	6,658.6	6,833.2	6,658.6	18.3	30.2	-89.77		298.1	1,398.4	878.3	844.7	33.67	26.089	
6,750.0	6,708.3	6,883.0	6,707.8	18.4	30.3	-89.77		293.1	1,398.4	878.3	844.6	33.77	26.007	
6,800.0	6,757.6	6,932.7	6,756.8	18.4	30.3	-89.77		284.8	1,398.4	878.4	844.5	33.85	25.951	
6,850.0	6,806.2	6,982.5	6,805.2	18.4	30.3	-89.78		273.4	1,398.5	878.4	844.5	33.89	25.917	
6,900.0	6,854.0	7,032.2	6,852.8	18.4	30.3	-89.78		258.8	1,398.5	878.4	844.5	33.91	25.903	
6,950.0	6,900.7	7,082.0	6,899.3	18.4	30.3	-89.79		241.2	1,398.6	878.4	844.5	33.91	25.902	
7,000.0	6,946.2	7,131.7	6,944.6	18.4	30.3	-89.79		220.5	1,398.7	878.4	844.5	33.90	25.911	
7,050.0	6,990.1	7,181.5	6,988.4	18.4	30.3	-89.80		197.0	1,398.8	878.4	844.5	33.88	25.924	
7,100.0	7,032.5	7,231.3	7,030.6	18.4	30.3	-89.81		170.7	1,398.9	878.4	844.5	33.87	25.933	
7,150.0	7,073.0	7,281.1	7,071.1	18.4	30.3	-89.82		141.6	1,399.1	878.4	844.6	33.88	25.931	
7,200.0	7,111.5	7,330.9	7,109.5	18.4	30.2	-89.82		110.0	1,399.2	878.4	844.5	33.90	25.910	
7,250.0	7,147.9	7,380.7	7,145.8	18.4	30.2	-89.84		75.9	1,399.4	878.5	844.5	33.96	25.864	
7,300.0	7,181.9	7,430.5	7,179.9	18.4	30.2	-89.85		39.6	1,399.5	878.5	844.4	34.07	25.784	
7,350.0	7,213.4	7,480.3	7,211.5	18.4	30.2	-89.86		1.1	1,399.7	878.5	844.3	34.23	25.664	
7,400.0	7,242.4	7,530.2	7,240.5	18.4	30.3	-89.87		-39.5	1,399.9	878.5	844.1	34.45	25.499	
7,450.0	7,268.6	7,580.0	7,266.8	18.4	30.3	-89.88		-81.8	1,400.1	878.5	843.8	34.75	25.285	
7,500.0	7,292.0	7,629.9	7,290.4	18.5	30.3	-89.90		-125.7	1,400.3	878.6	843.5	35.12	25.019	
7,550.0	7,312.4	7,679.8	7,311.0	18.6	30.4	-89.91		-171.2	1,400.5	878.6	843.0	35.57	24.703	
7,600.0	7,329.8	7,729.7	7,328.6	18.8	30.5	-89.92		-217.9	1,400.7	878.6	842.5	36.10	24.339	
7,650.0	7,344.1	7,779.6	7,343.1	19.0	30.6	-89.94		-265.6	1,400.9	878.6	841.9	36.72	23.930	
7,700.0	7,355.3	7,829.5	7,354.5	19.3	30.7	-89.95		-314.2	1,401.1	878.7	841.3	37.42	23.484	
7,750.0	7,363.2	7,879.5	7,362.7	19.7	30.9	-89.97		-363.5	1,401.3	878.7	840.5	38.19	23.006	
7,800.0	7,367.9	7,929.5	7,367.6	20.0	31.1	-89.98		-413.2	1,401.6	878.7	839.7	39.05	22.504	
7,853.3	7,369.3	7,982.8	7,369.3	20.5	31.3	-90.00		-466.5	1,401.8	878.7	838.7	40.03	21.954	
7,900.0	7,368.9	8,029.4	7,368.9	21.0	31.5	-90.00		-513.1	1,402.0	878.8	837.8	40.96	21.452	
8,000.0	7,368.1	8,129.4	7,368.0	22.0	32.1	-90.00		-613.1	1,402.5	878.8	835.7	43.13	20.377	
8,100.0	7,367.2	8,229.4	7,367.2	23.2	32.8	-90.00		-713.1	1,402.9	878.9	833.4	45.52	19.309	
8,200.0	7,366.4	8,329.4	7,366.3	24.5	33.5	-90.00		-813.1	1,403.4	878.9	830.8	48.09	18.275	
8,300.0	7,365.5	8,429.4	7,365.5	25.9	34.4	-90.00		-913.1	1,403.8	879.0	828.2	50.83	17.291	
8,400.0	7,364.7	8,529.4	7,364.6	27.3	35.4	-90.00		-1,013.1	1,404.3	879.0	825.3	53.71	16.366	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton 21R-HZ Pad Sec.21-T7N-R66W - Thornton 21U-203 - Wellbore #1 - Plan #1 (11-29-12)													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
8,500.0	7,363.8	8,629.4	7,363.8	28.8	36.5	-90.00	-90.00	-1,113.1	1,404.7	879.1	822.4	56.70	15.504	
8,600.0	7,362.9	8,729.4	7,362.9	30.3	37.6	-90.00	-90.00	-1,213.1	1,405.2	879.2	819.4	59.79	14.704	
8,700.0	7,362.1	8,829.4	7,362.1	31.9	38.9	-90.00	-90.00	-1,313.1	1,405.6	879.2	816.2	62.97	13.963	
8,800.0	7,361.2	8,929.4	7,361.2	33.5	40.1	-90.00	-90.00	-1,413.1	1,406.1	879.3	813.0	66.21	13.280	
8,900.0	7,360.4	9,029.4	7,360.4	35.2	41.5	-90.00	-90.00	-1,513.1	1,406.6	879.3	809.8	69.52	12.648	
9,000.0	7,359.5	9,129.4	7,359.5	36.8	42.9	-90.00	-90.00	-1,613.1	1,407.0	879.4	806.5	72.88	12.066	
9,100.0	7,358.7	9,229.4	7,358.6	38.5	44.3	-90.00	-90.00	-1,713.1	1,407.5	879.4	803.1	76.29	11.528	
9,200.0	7,357.8	9,329.4	7,357.8	40.2	45.8	-90.00	-90.00	-1,813.1	1,407.9	879.5	799.7	79.74	11.030	
9,300.0	7,357.0	9,429.4	7,356.9	42.0	47.3	-90.00	-90.00	-1,913.1	1,408.4	879.5	796.3	83.22	10.569	
9,400.0	7,356.1	9,529.4	7,356.1	43.7	48.8	-90.00	-90.00	-2,013.1	1,408.8	879.6	792.8	86.73	10.141	
9,500.0	7,355.2	9,629.4	7,355.2	45.5	50.4	-90.00	-90.00	-2,113.1	1,409.3	879.6	789.4	90.28	9.744	
9,600.0	7,354.4	9,729.4	7,354.4	47.3	52.0	-90.00	-90.00	-2,213.1	1,409.7	879.7	785.8	93.84	9.374	
9,700.0	7,353.5	9,829.4	7,353.5	49.1	53.6	-90.00	-90.00	-2,313.1	1,410.2	879.7	782.3	97.43	9.029	
9,800.0	7,352.7	9,929.4	7,352.7	50.8	55.2	-90.00	-90.00	-2,413.1	1,410.6	879.8	778.8	101.04	8.707	
9,900.0	7,351.8	10,029.4	7,351.8	52.7	56.9	-90.00	-90.00	-2,513.1	1,411.1	879.8	775.2	104.66	8.406	
10,000.0	7,351.0	10,129.4	7,350.9	54.5	58.6	-90.00	-90.00	-2,613.0	1,411.5	879.9	771.6	108.30	8.124	
10,100.0	7,350.1	10,229.4	7,350.1	56.3	60.3	-90.00	-90.00	-2,713.0	1,412.0	880.0	768.0	111.96	7.860	
10,200.0	7,349.3	10,329.4	7,349.2	58.1	62.0	-90.00	-90.00	-2,813.0	1,412.4	880.0	764.4	115.63	7.611	
10,300.0	7,348.4	10,429.4	7,348.4	60.0	63.7	-90.00	-90.00	-2,913.0	1,412.9	880.1	760.8	119.31	7.376	
10,400.0	7,347.6	10,529.4	7,347.5	61.8	65.4	-90.00	-90.00	-3,013.0	1,413.3	880.1	757.1	123.00	7.156	
10,500.0	7,346.7	10,629.4	7,346.7	63.6	67.1	-90.00	-90.00	-3,113.0	1,413.8	880.2	753.5	126.70	6.947	
10,600.0	7,345.8	10,729.4	7,345.8	65.5	68.9	-90.00	-90.00	-3,213.0	1,414.3	880.2	749.8	130.40	6.750	
10,700.0	7,345.0	10,829.4	7,345.0	67.3	70.7	-90.00	-90.00	-3,313.0	1,414.7	880.3	746.2	134.12	6.563	
10,800.0	7,344.1	10,929.4	7,344.1	69.2	72.4	-90.00	-90.00	-3,413.0	1,415.2	880.3	742.5	137.84	6.386	
10,900.0	7,343.3	11,029.4	7,343.2	71.1	74.2	-90.00	-90.00	-3,513.0	1,415.6	880.4	738.8	141.58	6.218	
11,000.0	7,342.4	11,129.4	7,342.4	72.9	76.0	-90.00	-90.00	-3,613.0	1,416.1	880.4	735.1	145.31	6.059	
11,100.0	7,341.6	11,229.4	7,341.5	74.8	77.8	-90.00	-90.00	-3,713.0	1,416.5	880.5	731.4	149.06	5.907	
11,200.0	7,340.7	11,329.4	7,340.7	76.7	79.6	-90.00	-90.00	-3,813.0	1,417.0	880.5	727.7	152.80	5.763	
11,300.0	7,339.9	11,429.4	7,339.8	78.5	81.4	-90.00	-90.00	-3,913.0	1,417.4	880.6	724.0	156.56	5.625	
11,400.0	7,339.0	11,529.4	7,339.0	80.4	83.2	-90.00	-90.00	-4,013.0	1,417.9	880.7	720.3	160.32	5.493	
11,500.0	7,338.1	11,629.4	7,338.1	82.3	85.0	-90.00	-90.00	-4,113.0	1,418.3	880.7	716.6	164.08	5.368	
11,600.0	7,337.3	11,729.4	7,337.3	84.2	86.8	-90.00	-90.00	-4,213.0	1,418.8	880.8	712.9	167.84	5.247	
11,700.0	7,336.4	11,829.4	7,336.4	86.1	88.6	-90.00	-90.00	-4,313.0	1,419.2	880.8	709.2	171.61	5.133	
11,800.0	7,335.6	11,929.4	7,335.6	87.9	90.5	-90.00	-90.00	-4,413.0	1,419.7	880.9	705.5	175.39	5.022	
11,832.5	7,335.3	11,961.9	7,335.3	88.4	91.1	-90.00	-90.00	-4,445.4	1,419.8	880.9	704.4	176.50	4.991	
11,867.8	7,335.0	11,993.9	7,335.0	89.0	91.6	-90.00	-90.00	-4,477.5	1,420.0	880.9	703.3	177.64	4.959 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton 21R-HZ Pad Sec.21-T7N-R66W - Thornton 21U-443 - Wellbore #1 - Plan #1 (11-29-12)													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	90.00	90.00	0.0	30.6	30.6				
100.0	100.0	100.0	100.0	0.1	0.1	90.00	90.00	0.0	30.6	30.6	30.3	0.22	135.971	
200.0	200.0	200.0	200.0	0.3	0.3	90.00	90.00	0.0	30.6	30.6	29.9	0.67	45.324	
300.0	300.0	300.0	300.0	0.6	0.6	90.00	90.00	0.0	30.6	30.6	29.4	1.12	27.194	
400.0	400.0	400.0	400.0	0.8	0.8	90.00	90.00	0.0	30.6	30.6	29.0	1.57	19.424	
500.0	500.0	500.0	500.0	1.0	1.0	90.00	90.00	0.0	30.6	30.6	28.5	2.02	15.108	
600.0	600.0	600.0	600.0	1.2	1.2	90.00	90.00	0.0	30.6	30.6	28.1	2.47	12.361	
700.0	700.0	700.0	700.0	1.5	1.5	90.00	90.00	0.0	30.6	30.6	27.6	2.92	10.459	
800.0	800.0	800.0	800.0	1.7	1.7	90.00	90.00	0.0	30.6	30.6	27.2	3.37	9.065 CC, ES	
900.0	900.0	899.0	898.9	1.9	1.9	89.07	89.07	0.5	32.2	32.2	28.4	3.81	8.453	
1,000.0	1,000.0	997.7	997.5	2.1	2.1	86.77	86.77	2.1	37.0	37.2	32.9	4.25	8.757	
1,100.0	1,100.0	1,096.1	1,095.6	2.4	2.3	24.90	24.90	4.7	45.1	44.0	39.3	4.67	9.419	
1,200.0	1,199.8	1,194.2	1,193.0	2.6	2.6	24.33	24.33	8.3	56.3	51.0	45.9	5.09	10.014	
1,300.0	1,299.5	1,292.2	1,289.8	2.8	2.9	24.57	24.57	12.9	70.7	58.1	52.6	5.52	10.539	
1,407.5	1,406.1	1,397.2	1,392.9	3.1	3.2	25.43	25.43	19.0	89.6	66.0	60.0	5.99	11.033	
1,500.0	1,497.7	1,489.3	1,483.0	3.3	3.5	26.34	26.34	24.9	107.8	73.0	66.6	6.42	11.366	
1,600.0	1,596.7	1,589.0	1,580.5	3.6	3.9	27.14	27.14	31.3	127.5	80.5	73.6	6.91	11.663	
1,700.0	1,695.7	1,688.7	1,678.1	3.9	4.3	27.81	27.81	37.6	147.3	88.1	80.7	7.40	11.903	
1,800.0	1,794.7	1,788.5	1,775.6	4.2	4.7	28.37	28.37	44.0	167.0	95.7	87.8	7.91	12.102	
1,900.0	1,893.7	1,888.2	1,873.1	4.5	5.1	28.85	28.85	50.4	186.7	103.3	94.8	8.42	12.262	
2,000.0	1,992.6	1,987.9	1,970.7	4.8	5.5	29.26	29.26	56.7	206.5	110.8	101.9	8.94	12.395	
2,100.0	2,091.6	2,087.6	2,068.2	5.1	6.0	29.62	29.62	63.1	226.2	118.4	109.0	9.47	12.506	
2,200.0	2,190.6	2,187.3	2,165.7	5.4	6.4	29.94	29.94	69.5	245.9	126.0	116.0	10.00	12.599	
2,300.0	2,289.6	2,287.0	2,263.2	5.8	6.8	30.22	30.22	75.8	265.6	133.6	123.1	10.54	12.677	
2,400.0	2,388.6	2,386.7	2,360.8	6.1	7.3	30.47	30.47	82.2	285.4	141.2	130.1	11.08	12.743	
2,500.0	2,487.6	2,486.4	2,458.3	6.4	7.7	30.70	30.70	88.6	305.1	148.8	137.2	11.63	12.800	
2,600.0	2,586.6	2,586.1	2,555.8	6.8	8.1	30.90	30.90	94.9	324.8	156.4	144.2	12.17	12.848	
2,700.0	2,685.6	2,685.8	2,653.4	7.1	8.6	31.09	31.09	101.3	344.5	164.0	151.3	12.73	12.890	
2,800.0	2,784.6	2,785.5	2,750.9	7.4	9.0	31.25	31.25	107.6	364.3	171.6	158.4	13.28	12.926	
2,900.0	2,883.6	2,885.3	2,848.4	7.8	9.5	31.41	31.41	114.0	384.0	179.2	165.4	13.83	12.957	
3,000.0	2,982.5	2,985.0	2,946.0	8.1	9.9	31.55	31.55	120.4	403.7	186.9	172.5	14.39	12.984	
3,100.0	3,081.5	3,084.7	3,043.5	8.4	10.4	31.68	31.68	126.7	423.5	194.5	179.5	14.95	13.008	
3,200.0	3,180.5	3,184.4	3,141.0	8.8	10.8	31.80	31.80	133.1	443.2	202.1	186.6	15.51	13.029	
3,300.0	3,279.5	3,284.1	3,238.5	9.1	11.3	31.91	31.91	139.5	462.9	209.7	193.6	16.07	13.047	
3,400.0	3,378.5	3,383.8	3,336.1	9.4	11.7	32.02	32.02	145.8	482.6	217.3	200.7	16.63	13.064	
3,500.0	3,477.5	3,483.5	3,433.6	9.8	12.2	32.11	32.11	152.2	502.4	224.9	207.7	17.20	13.078	
3,600.0	3,576.5	3,583.2	3,531.1	10.1	12.6	32.20	32.20	158.6	522.1	232.5	214.8	17.76	13.091	
3,700.0	3,675.5	3,682.9	3,628.7	10.5	13.1	32.29	32.29	164.9	541.8	240.1	221.8	18.33	13.102	
3,800.0	3,774.5	3,782.6	3,726.2	10.8	13.5	32.37	32.37	171.3	561.5	247.8	228.9	18.90	13.112	
3,900.0	3,873.5	3,882.3	3,823.7	11.1	14.0	32.44	32.44	177.6	581.3	255.4	235.9	19.46	13.121	
4,000.0	3,972.4	3,982.1	3,921.3	11.5	14.4	32.51	32.51	184.0	601.0	263.0	243.0	20.03	13.129	
4,100.0	4,071.4	4,081.8	4,018.8	11.8	14.9	32.58	32.58	190.4	620.7	270.6	250.0	20.60	13.136	
4,200.0	4,170.4	4,181.5	4,116.3	12.2	15.3	32.64	32.64	196.7	640.5	278.2	257.1	21.17	13.143	
4,300.0	4,269.4	4,281.2	4,213.9	12.5	15.8	32.70	32.70	203.1	660.2	285.8	264.1	21.74	13.149	
4,400.0	4,368.4	4,380.9	4,311.4	12.9	16.2	32.76	32.76	209.5	679.9	293.5	271.2	22.31	13.154	
4,500.0	4,467.4	4,480.6	4,408.9	13.2	16.7	32.81	32.81	215.8	699.6	301.1	278.2	22.88	13.159	
4,600.0	4,566.4	4,580.3	4,506.4	13.5	17.1	32.86	32.86	222.2	719.4	308.7	285.2	23.45	13.163	
4,700.0	4,665.4	4,680.0	4,604.0	13.9	17.6	32.91	32.91	228.6	739.1	316.3	292.3	24.02	13.167	
4,800.0	4,764.4	4,779.7	4,701.5	14.2	18.0	32.96	32.96	234.9	758.8	323.9	299.3	24.60	13.170	
4,900.0	4,863.4	4,879.4	4,799.0	14.6	18.5	33.00	33.00	241.3	778.5	331.6	306.4	25.17	13.173	
5,000.0	4,962.3	4,979.1	4,896.6	14.9	18.9	33.04	33.04	247.6	798.3	339.2	313.4	25.74	13.176	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Offset Design Thornton 21R-HZ Pad Sec.21-T7N-R66W - Thornton 21U-443 - Wellbore #1 - Plan #1 (11-29-12)													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	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	
5,100.0	5,061.3	5,078.9	4,994.1	15.3	19.4	33.08	254.0	818.0	346.8	320.5	26.32	13.178		
5,200.0	5,160.3	5,178.6	5,091.6	15.6	19.8	33.12	260.4	837.7	354.4	327.5	26.89	13.181		
5,233.9	5,193.9	5,212.3	5,124.7	15.7	20.0	33.13	262.5	844.4	357.0	329.9	27.08	13.181		
5,300.0	5,259.4	5,278.2	5,189.1	15.9	20.3	33.15	266.7	857.4	362.7	335.2	27.43	13.221		
5,400.0	5,358.9	5,377.6	5,286.3	16.2	20.8	32.97	273.1	877.1	373.7	345.8	27.87	13.407		
5,500.0	5,458.7	5,476.5	5,383.1	16.4	21.2	32.56	279.4	896.7	387.6	359.4	28.24	13.726		
5,600.0	5,558.6	5,586.7	5,491.1	16.5	21.6	31.90	286.0	917.2	403.4	374.9	28.52	14.145		
5,641.4	5,600.0	5,633.8	5,537.6	16.6	21.7	91.63	288.5	924.8	409.8	381.1	28.65	14.302		
5,700.0	5,658.6	5,700.9	5,603.9	16.7	21.9	91.17	291.6	934.4	418.1	389.2	28.83	14.502		
5,800.0	5,758.6	5,816.4	5,718.6	16.8	22.2	90.57	295.7	947.4	429.3	400.1	29.16	14.723		
5,900.0	5,858.6	5,932.8	5,834.6	17.0	22.4	90.19	298.5	956.0	436.7	407.2	29.50	14.801		
6,000.0	5,958.6	6,049.8	5,951.5	17.1	22.6	90.02	299.9	960.2	440.2	410.4	29.86	14.741		
6,100.0	6,058.6	6,156.9	6,058.6	17.3	22.7	90.00	300.0	960.6	440.6	410.3	30.23	14.572		
6,200.0	6,158.6	6,256.9	6,158.6	17.5	22.9	90.00	300.0	960.6	440.6	410.0	30.60	14.397		
6,300.0	6,258.6	6,356.9	6,258.6	17.7	23.0	90.00	300.0	960.6	440.6	409.6	30.97	14.225		
6,400.0	6,358.6	6,456.9	6,358.6	17.8	23.1	90.00	300.0	960.6	440.6	409.2	31.34	14.056		
6,500.0	6,458.6	6,556.9	6,458.6	18.0	23.3	90.00	300.0	960.6	440.6	408.8	31.72	13.891		
6,600.0	6,558.6	6,656.9	6,558.6	18.2	23.4	90.00	300.0	960.6	440.6	408.5	32.09	13.728		
6,646.8	6,605.4	6,703.7	6,605.4	18.2	23.5	90.00	300.0	960.6	440.6	408.3	32.27	13.653		
6,650.0	6,608.6	6,706.9	6,608.6	18.3	23.5	-89.77	300.0	960.6	440.6	408.3	32.25	13.662		
6,698.7	6,657.3	6,755.5	6,657.3	18.3	23.5	-90.00	300.0	960.6	440.6	408.2	32.38	13.607		
6,700.0	6,658.6	6,756.9	6,658.6	18.3	23.5	-90.01	300.0	960.6	440.6	408.2	32.38	13.606		
6,750.0	6,708.3	6,806.6	6,708.3	18.4	23.6	-90.67	300.0	960.6	440.6	408.2	32.43	13.584		
6,800.0	6,757.6	6,855.9	6,757.6	18.4	23.7	-91.73	300.0	960.6	440.8	408.3	32.42	13.595		
6,850.0	6,806.2	6,906.1	6,807.7	18.4	23.7	-93.00	298.4	960.6	441.2	408.8	32.36	13.634		
6,900.0	6,854.0	6,957.0	6,858.4	18.4	23.8	-94.26	293.4	960.6	441.8	409.6	32.28	13.688		
6,950.0	6,900.7	7,008.6	6,909.3	18.4	23.8	-95.52	284.9	960.6	442.7	410.5	32.19	13.753		
7,000.0	6,946.2	7,060.9	6,960.2	18.4	23.8	-96.75	272.8	960.7	443.8	411.7	32.10	13.826		
7,050.0	6,990.1	7,114.0	7,010.9	18.4	23.8	-97.96	257.0	960.7	445.0	413.0	32.01	13.904		
7,100.0	7,032.5	7,167.9	7,061.0	18.4	23.8	-99.13	237.4	960.8	446.4	414.5	31.92	13.984		
7,150.0	7,073.0	7,222.5	7,110.4	18.4	23.8	-100.27	214.0	960.9	448.0	416.1	31.86	14.063		
7,200.0	7,111.5	7,277.9	7,158.6	18.4	23.8	-101.37	186.7	961.0	449.7	417.9	31.81	14.136		
7,250.0	7,147.9	7,334.2	7,205.4	18.4	23.8	-102.41	155.5	961.2	451.4	419.6	31.79	14.201		
7,300.0	7,181.9	7,391.2	7,250.3	18.4	23.8	-103.40	120.4	961.3	453.2	421.4	31.80	14.254		
7,350.0	7,213.4	7,448.9	7,293.0	18.4	23.8	-104.33	81.6	961.5	455.0	423.2	31.85	14.289		
7,400.0	7,242.4	7,507.4	7,333.2	18.4	23.8	-105.19	39.1	961.7	456.8	424.9	31.94	14.301		
7,450.0	7,268.6	7,566.6	7,370.4	18.4	23.8	-105.97	-6.9	961.8	458.6	426.5	32.12	14.278		
7,500.0	7,292.0	7,626.4	7,404.3	18.5	23.8	-106.68	-56.2	962.1	460.2	427.9	32.29	14.253		
7,550.0	7,312.4	7,686.9	7,434.5	18.6	23.9	-107.30	-108.6	962.3	461.7	429.1	32.58	14.173		
7,600.0	7,329.8	7,747.9	7,460.7	18.8	23.9	-107.84	-163.6	962.5	463.1	430.1	32.93	14.063		
7,650.0	7,344.1	7,809.3	7,482.5	19.0	24.1	-108.29	-221.1	962.7	464.2	430.9	33.36	13.916		
7,700.0	7,355.3	7,871.2	7,499.8	19.3	24.3	-108.64	-280.4	963.0	465.1	431.3	33.87	13.733		
7,750.0	7,363.2	7,933.3	7,512.3	19.7	24.5	-108.90	-341.3	963.2	465.8	431.4	34.47	13.516		
7,800.0	7,367.9	7,991.9	7,519.6	20.0	24.8	-109.07	-399.4	963.5	466.3	431.2	35.11	13.282		
7,853.3	7,369.3	8,045.1	7,525.1	20.5	25.1	-109.45	-452.3	963.7	467.7	432.0	35.74	13.088		
7,900.0	7,368.9	8,098.1	7,529.7	21.0	25.4	-110.03	-505.1	963.9	469.2	432.7	36.51	12.851		
8,000.0	7,368.1	8,209.4	7,531.7	22.0	26.3	-110.37	-616.4	964.4	470.2	431.6	38.59	12.184		
8,100.0	7,367.2	8,309.4	7,531.1	23.2	27.2	-110.39	-716.4	964.8	470.2	429.4	40.85	11.510		
8,200.0	7,366.4	8,409.4	7,530.4	24.5	28.2	-110.41	-816.4	965.3	470.3	427.0	43.31	10.860		
8,300.0	7,365.5	8,509.4	7,529.7	25.9	29.4	-110.42	-916.4	965.7	470.4	424.5	45.92	10.244		
8,400.0	7,364.7	8,609.4	7,529.0	27.3	30.6	-110.44	-1,016.4	966.1	470.5	421.8	48.67	9.668		

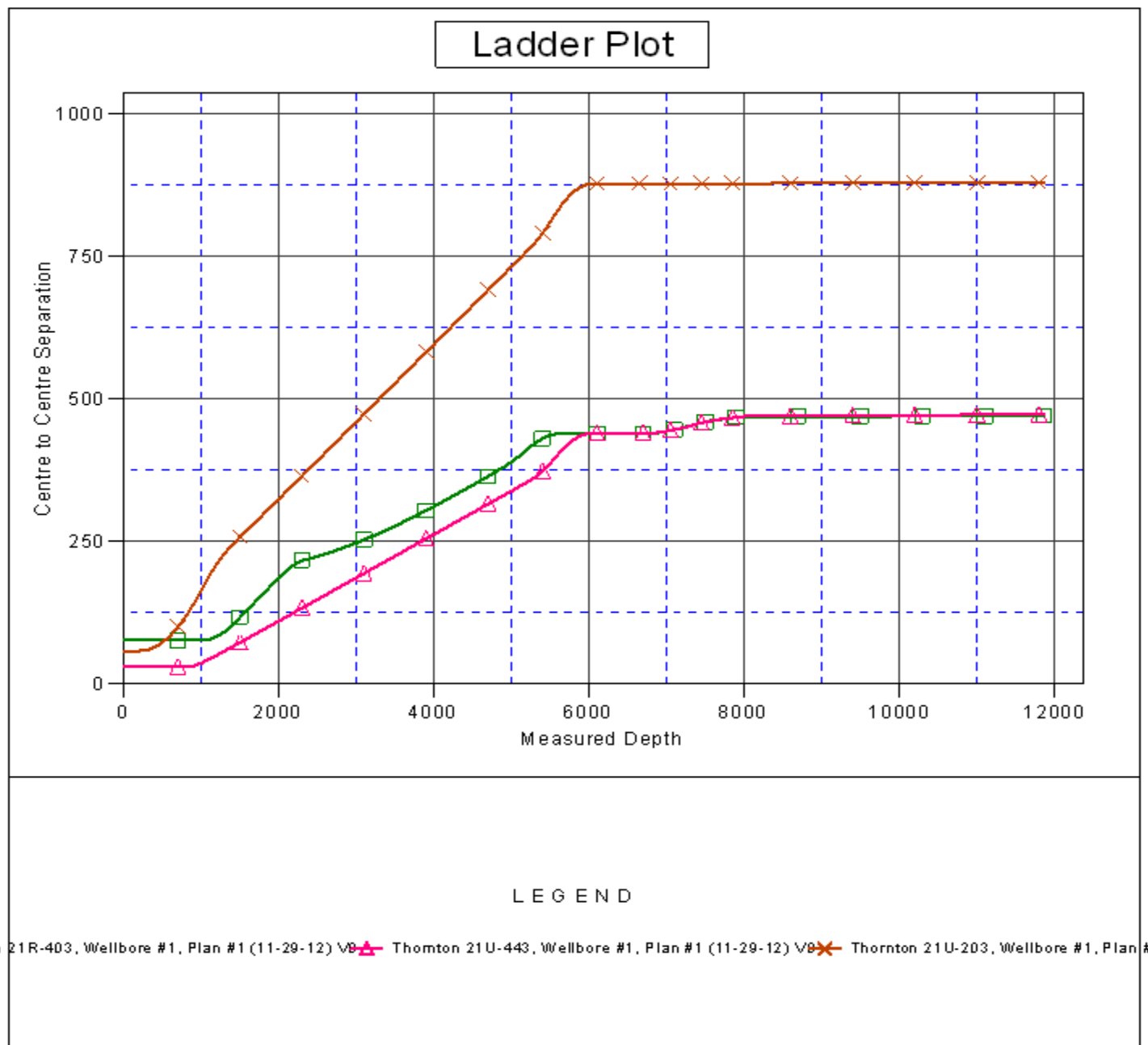
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Offset Design		Thornton 21R-HZ Pad Sec.21-T7N-R66W - Thornton 21U-443 - Wellbore #1 - Plan #1 (11-29-12)										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)			
8,500.0	7,363.8	8,709.4	7,528.3	28.8	31.9	-110.46	-1,116.4	966.5	470.6	419.1	51.52	9.134		
8,600.0	7,362.9	8,809.4	7,527.6	30.3	33.3	-110.48	-1,216.4	967.0	470.7	416.2	54.47	8.641		
8,700.0	7,362.1	8,909.4	7,526.9	31.9	34.7	-110.49	-1,316.3	967.4	470.7	413.2	57.50	8.187		
8,800.0	7,361.2	9,009.4	7,526.2	33.5	36.2	-110.51	-1,416.3	967.8	470.8	410.2	60.59	7.771		
8,900.0	7,360.4	9,109.4	7,525.5	35.2	37.7	-110.53	-1,516.3	968.3	470.9	407.2	63.74	7.388		
9,000.0	7,359.5	9,209.4	7,524.8	36.8	39.2	-110.55	-1,616.3	968.7	471.0	404.1	66.94	7.036		
9,100.0	7,358.7	9,309.4	7,524.1	38.5	40.8	-110.56	-1,716.3	969.1	471.1	400.9	70.18	6.712		
9,200.0	7,357.8	9,409.4	7,523.4	40.2	42.4	-110.58	-1,816.3	969.5	471.2	397.7	73.46	6.414		
9,300.0	7,357.0	9,509.4	7,522.8	42.0	44.1	-110.60	-1,916.3	970.0	471.2	394.5	76.77	6.139		
9,400.0	7,356.1	9,609.4	7,522.1	43.7	45.7	-110.62	-2,016.3	970.4	471.3	391.2	80.10	5.884		
9,500.0	7,355.2	9,709.4	7,521.4	45.5	47.4	-110.63	-2,116.3	970.8	471.4	387.9	83.46	5.648		
9,600.0	7,354.4	9,809.4	7,520.7	47.3	49.1	-110.65	-2,216.3	971.2	471.5	384.7	86.84	5.429		
9,700.0	7,353.5	9,909.4	7,520.0	49.1	50.8	-110.67	-2,316.3	971.7	471.6	381.3	90.25	5.226		
9,800.0	7,352.7	10,009.4	7,519.3	50.8	52.6	-110.69	-2,416.3	972.1	471.7	378.0	93.66	5.036		
9,900.0	7,351.8	10,109.4	7,518.6	52.7	54.3	-110.70	-2,516.3	972.5	471.7	374.7	97.09	4.859		
10,000.0	7,351.0	10,209.4	7,517.9	54.5	56.1	-110.72	-2,616.3	973.0	471.8	371.3	100.54	4.693		
10,100.0	7,350.1	10,309.4	7,517.2	56.3	57.8	-110.74	-2,716.3	973.4	471.9	367.9	104.00	4.538		
10,200.0	7,349.3	10,409.4	7,516.5	58.1	59.6	-110.75	-2,816.3	973.8	472.0	364.5	107.47	4.392		
10,300.0	7,348.4	10,509.4	7,515.8	60.0	61.4	-110.77	-2,916.3	974.2	472.1	361.1	110.94	4.255		
10,400.0	7,347.6	10,609.4	7,515.1	61.8	63.2	-110.79	-3,016.3	974.7	472.2	357.7	114.43	4.126		
10,500.0	7,346.7	10,709.4	7,514.4	63.6	65.0	-110.81	-3,116.3	975.1	472.3	354.3	117.92	4.005		
10,600.0	7,345.8	10,809.4	7,513.8	65.5	66.8	-110.82	-3,216.3	975.5	472.3	350.9	121.42	3.890		
10,700.0	7,345.0	10,909.4	7,513.1	67.3	68.6	-110.84	-3,316.3	975.9	472.4	347.5	124.93	3.781		
10,800.0	7,344.1	11,009.4	7,512.4	69.2	70.4	-110.86	-3,416.3	976.4	472.5	344.1	128.44	3.679		
10,900.0	7,343.3	11,109.4	7,511.7	71.1	72.3	-110.88	-3,516.3	976.8	472.6	340.6	131.96	3.581		
11,000.0	7,342.4	11,209.4	7,511.0	72.9	74.1	-110.89	-3,616.3	977.2	472.7	337.2	135.49	3.489		
11,100.0	7,341.6	11,309.4	7,510.3	74.8	75.9	-110.91	-3,716.3	977.7	472.8	333.7	139.01	3.401		
11,200.0	7,340.7	11,409.4	7,509.6	76.7	77.8	-110.93	-3,816.3	978.1	472.8	330.3	142.55	3.317		
11,300.0	7,339.9	11,509.4	7,508.9	78.5	79.6	-110.94	-3,916.3	978.5	472.9	326.8	146.08	3.237		
11,400.0	7,339.0	11,609.4	7,508.2	80.4	81.5	-110.96	-4,016.3	978.9	473.0	323.4	149.62	3.161		
11,500.0	7,338.1	11,709.4	7,507.5	82.3	83.3	-110.98	-4,116.3	979.4	473.1	319.9	153.16	3.089		
11,600.0	7,337.3	11,809.4	7,506.8	84.2	85.2	-111.00	-4,216.2	979.8	473.2	316.5	156.71	3.020		
11,700.0	7,336.4	11,909.4	7,506.1	86.1	87.0	-111.01	-4,316.2	980.2	473.3	313.0	160.25	2.953		
11,800.0	7,335.6	12,009.4	7,505.4	87.9	88.9	-111.03	-4,416.2	980.6	473.4	309.6	163.80	2.890		
11,833.0	7,335.3	12,042.4	7,505.2	88.4	89.5	-111.04	-4,449.2	980.8	473.4	308.5	164.86	2.871		
11,867.8	7,335.0	12,074.3	7,505.0	89.0	90.1	-111.04	-4,481.1	980.9	473.4	307.5	165.92	2.853 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4985.0ft (Original Well Elev) Coordinates are relative to: Thornton 21R-223
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000 °
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.47°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 21R-223
Project:	SEC.21-T7N-R66W	TVD Reference:	WELL @ 4985.0ft (Original Well Elev)
Reference Site:	Thornton 21R-HZ Pad Sec.21-T7N-R66W	MD Reference:	WELL @ 4985.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 21R-223	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-29-12)	Offset TVD Reference:	Offset Datum

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