

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

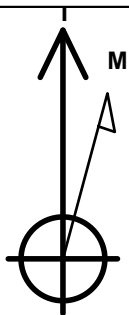
Ground Elevation: 4961.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1460085.78	3211948.74	40.593830	-104.736800	

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

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
BHL 1520'FNL, 500'FWL	7476.0	-305.6	-4379.7	Point



Azimuths to True North
Magnetic North: 8.68°

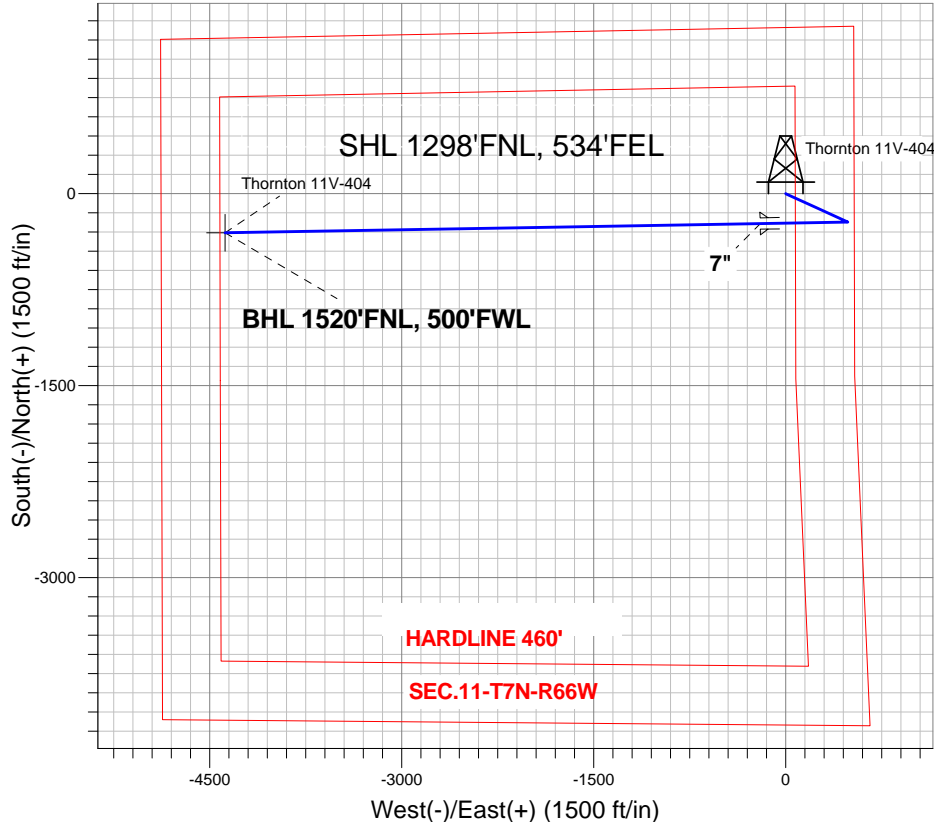
Magnetic Field
Strength: 53091.2nT
Dip Angle: 67.16°
Date: 10/24/2012
Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
2000.0	2000.0	KOP #1
6710.2	6748.1	KOP #2
7484.0	8064.4	End of Build

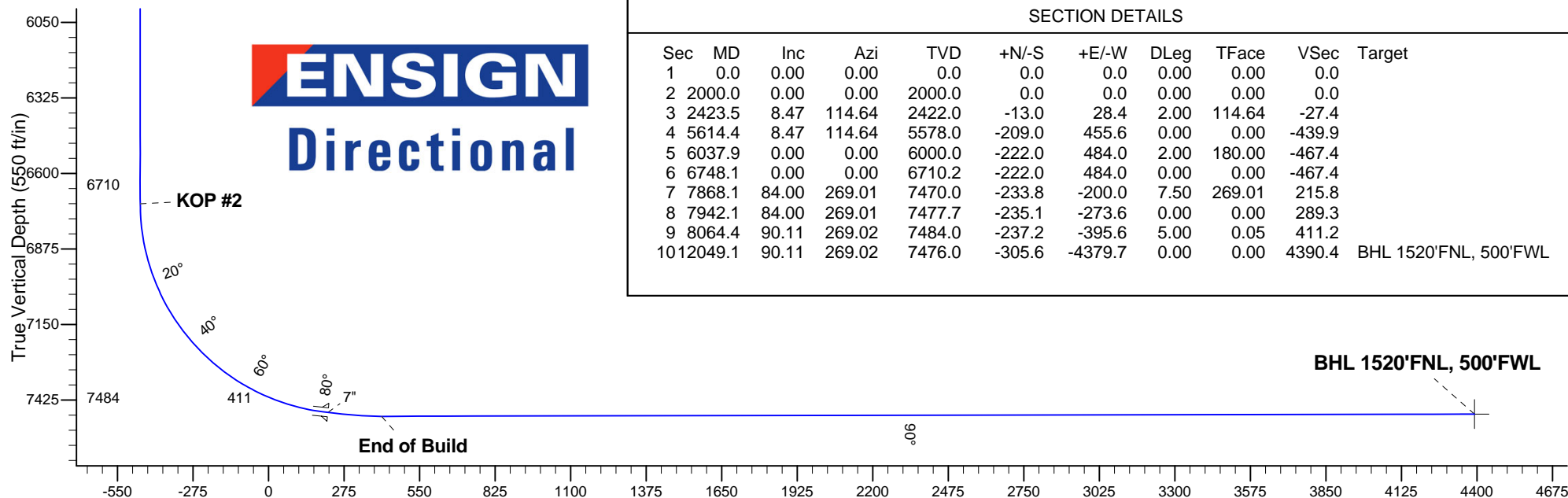
Thornton 11C-HZ Pad Sec.11-T7N-R66W
Thornton 11V-404
Plan #1 (10-15-12)

South(-)/North(+) (1500 ft/in)



West(-)/East(+) (1500 ft/in)

ENSIGN
Directional



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	2423.5	8.47	114.64	2422.0	-13.0	28.4	2.00	114.64	-27.4	
4	5614.4	8.47	114.64	5578.0	-209.0	455.6	0.00	0.00	-439.9	
5	6037.9	0.00	0.00	6000.0	-222.0	484.0	2.00	180.00	-467.4	
6	6748.1	0.00	0.00	6710.2	-222.0	484.0	0.00	0.00	-467.4	
7	7868.1	84.00	269.01	7470.0	-233.8	-200.0	7.50	269.01	215.8	
8	7942.1	84.00	269.01	7477.7	-235.1	-273.6	0.00	0.00	289.3	
9	8064.4	90.11	269.02	7484.0	-237.2	-395.6	5.00	0.05	411.2	
10	12049.1	90.11	269.02	7476.0	-305.6	-4379.7	0.00	0.00	4390.4	BHL 1520'FNL, 500'FWL

Vertical Section at 266.01° (550 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 #1 (10-15-12)

Standard Planning Report

24 October, 2012

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 11V-404
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Project:	SEC.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	North Reference:	True
Well:	Thornton 11V-404	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (10-15-12)		

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

Well	Thornton 11V-404					
Well Position	+N-S	-102.0 ft	Northing:	1,460,085.78 ft	Latitude:	40.593830
	+E-W	-22.2 ft	Easting:	3,211,948.74 ft	Longitude:	-104.736800
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,961.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	10/24/2012	8.68	67.16	53,091

Design	Plan #1 (10-15-12)			
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	266.01

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	
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,423.5	8.47	114.64	2,422.0	-13.0	28.4	2.00	2.00	0.00	114.64	
5,614.4	8.47	114.64	5,578.0	-209.0	455.6	0.00	0.00	0.00	0.00	
6,037.9	0.00	0.00	6,000.0	-222.0	484.0	2.00	-2.00	0.00	180.00	
6,748.1	0.00	0.00	6,710.2	-222.0	484.0	0.00	0.00	0.00	0.00	
7,868.1	84.00	269.01	7,470.0	-233.8	-200.0	7.50	7.50	0.00	269.01	
7,942.1	84.00	269.01	7,477.7	-235.1	-273.6	0.00	0.00	0.00	0.00	
8,064.4	90.11	269.02	7,484.0	-237.2	-395.6	5.00	5.00	0.00	0.05	
12,049.1	90.11	269.02	7,476.0	-305.6	-4,379.7	0.00	0.00	0.00	0.00	BHL 1520'FNL, 500

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Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	North Reference:	True
Well:	Thornton 11V-404	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (10-15-12)		

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
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
KOP #1									
2,040.0	0.80	114.64	2,040.0	-0.1	0.3	-0.2	2.00	2.00	0.00

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Project:	SEC.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	North Reference:	True
Well:	Thornton 11V-404	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (10-15-12)		

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)
2,080.0	1.60	114.64	2,080.0	-0.5	1.0	-1.0	2.00	2.00	0.00
2,120.0	2.40	114.64	2,120.0	-1.0	2.3	-2.2	2.00	2.00	0.00
2,160.0	3.20	114.64	2,159.9	-1.9	4.1	-3.9	2.00	2.00	0.00
2,200.0	4.00	114.64	2,199.8	-2.9	6.3	-6.1	2.00	2.00	0.00
2,240.0	4.80	114.64	2,239.7	-4.2	9.1	-8.8	2.00	2.00	0.00
2,280.0	5.60	114.64	2,279.6	-5.7	12.4	-12.0	2.00	2.00	0.00
2,320.0	6.40	114.64	2,319.3	-7.4	16.2	-15.7	2.00	2.00	0.00
2,360.0	7.20	114.64	2,359.1	-9.4	20.5	-19.8	2.00	2.00	0.00
2,400.0	8.00	114.64	2,398.7	-11.6	25.3	-24.5	2.00	2.00	0.00
2,423.5	8.47	114.64	2,422.0	-13.0	28.4	-27.4	2.00	2.00	0.00
2,440.0	8.47	114.64	2,438.3	-14.0	30.6	-29.6	0.00	0.00	0.00
2,480.0	8.47	114.64	2,477.8	-16.5	36.0	-34.7	0.00	0.00	0.00
2,520.0	8.47	114.64	2,517.4	-19.0	41.3	-39.9	0.00	0.00	0.00
2,560.0	8.47	114.64	2,557.0	-21.4	46.7	-45.1	0.00	0.00	0.00
2,600.0	8.47	114.64	2,596.5	-23.9	52.0	-50.2	0.00	0.00	0.00
2,640.0	8.47	114.64	2,636.1	-26.3	57.4	-55.4	0.00	0.00	0.00
2,680.0	8.47	114.64	2,675.7	-28.8	62.7	-60.6	0.00	0.00	0.00
2,720.0	8.47	114.64	2,715.2	-31.2	68.1	-65.8	0.00	0.00	0.00
2,760.0	8.47	114.64	2,754.8	-33.7	73.5	-70.9	0.00	0.00	0.00
2,800.0	8.47	114.64	2,794.4	-36.1	78.8	-76.1	0.00	0.00	0.00
2,840.0	8.47	114.64	2,833.9	-38.6	84.2	-81.3	0.00	0.00	0.00
2,880.0	8.47	114.64	2,873.5	-41.1	89.5	-86.4	0.00	0.00	0.00
2,920.0	8.47	114.64	2,913.0	-43.5	94.9	-91.6	0.00	0.00	0.00
2,960.0	8.47	114.64	2,952.6	-46.0	100.2	-96.8	0.00	0.00	0.00
3,000.0	8.47	114.64	2,992.2	-48.4	105.6	-102.0	0.00	0.00	0.00
3,040.0	8.47	114.64	3,031.7	-50.9	110.9	-107.1	0.00	0.00	0.00
3,080.0	8.47	114.64	3,071.3	-53.3	116.3	-112.3	0.00	0.00	0.00
3,120.0	8.47	114.64	3,110.9	-55.8	121.6	-117.5	0.00	0.00	0.00
3,160.0	8.47	114.64	3,150.4	-58.3	127.0	-122.6	0.00	0.00	0.00
3,200.0	8.47	114.64	3,190.0	-60.7	132.4	-127.8	0.00	0.00	0.00
3,240.0	8.47	114.64	3,229.6	-63.2	137.7	-133.0	0.00	0.00	0.00
3,280.0	8.47	114.64	3,269.1	-65.6	143.1	-138.2	0.00	0.00	0.00
3,320.0	8.47	114.64	3,308.7	-68.1	148.4	-143.3	0.00	0.00	0.00
3,360.0	8.47	114.64	3,348.2	-70.5	153.8	-148.5	0.00	0.00	0.00
3,400.0	8.47	114.64	3,387.8	-73.0	159.1	-153.7	0.00	0.00	0.00
3,440.0	8.47	114.64	3,427.4	-75.4	164.5	-158.8	0.00	0.00	0.00
3,480.0	8.47	114.64	3,466.9	-77.9	169.8	-164.0	0.00	0.00	0.00
3,520.0	8.47	114.64	3,506.5	-80.4	175.2	-169.2	0.00	0.00	0.00
3,560.0	8.47	114.64	3,546.1	-82.8	180.6	-174.4	0.00	0.00	0.00
3,600.0	8.47	114.64	3,585.6	-85.3	185.9	-179.5	0.00	0.00	0.00
3,640.0	8.47	114.64	3,625.2	-87.7	191.3	-184.7	0.00	0.00	0.00
3,680.0	8.47	114.64	3,664.8	-90.2	196.6	-189.9	0.00	0.00	0.00
3,720.0	8.47	114.64	3,704.3	-92.6	202.0	-195.0	0.00	0.00	0.00
3,760.0	8.47	114.64	3,743.9	-95.1	207.3	-200.2	0.00	0.00	0.00
3,800.0	8.47	114.64	3,783.4	-97.6	212.7	-205.4	0.00	0.00	0.00
3,840.0	8.47	114.64	3,823.0	-100.0	218.0	-210.6	0.00	0.00	0.00
3,880.0	8.47	114.64	3,862.6	-102.5	223.4	-215.7	0.00	0.00	0.00
3,920.0	8.47	114.64	3,902.1	-104.9	228.8	-220.9	0.00	0.00	0.00
3,960.0	8.47	114.64	3,941.7	-107.4	234.1	-226.1	0.00	0.00	0.00
4,000.0	8.47	114.64	3,981.3	-109.8	239.5	-231.2	0.00	0.00	0.00
4,040.0	8.47	114.64	4,020.8	-112.3	244.8	-236.4	0.00	0.00	0.00
4,080.0	8.47	114.64	4,060.4	-114.7	250.2	-241.6	0.00	0.00	0.00
4,120.0	8.47	114.64	4,100.0	-117.2	255.5	-246.8	0.00	0.00	0.00

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Wellbore:	Wellbore #1		
Design:	Plan #1 (10-15-12)		

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	8.47	114.64	4,139.5	-119.7	260.9	-251.9	0.00	0.00	0.00
4,200.0	8.47	114.64	4,179.1	-122.1	266.2	-257.1	0.00	0.00	0.00
4,240.0	8.47	114.64	4,218.6	-124.6	271.6	-262.3	0.00	0.00	0.00
4,280.0	8.47	114.64	4,258.2	-127.0	277.0	-267.4	0.00	0.00	0.00
4,320.0	8.47	114.64	4,297.8	-129.5	282.3	-272.6	0.00	0.00	0.00
4,360.0	8.47	114.64	4,337.3	-131.9	287.7	-277.8	0.00	0.00	0.00
4,400.0	8.47	114.64	4,376.9	-134.4	293.0	-282.9	0.00	0.00	0.00
4,440.0	8.47	114.64	4,416.5	-136.9	298.4	-288.1	0.00	0.00	0.00
4,480.0	8.47	114.64	4,456.0	-139.3	303.7	-293.3	0.00	0.00	0.00
4,520.0	8.47	114.64	4,495.6	-141.8	309.1	-298.5	0.00	0.00	0.00
4,560.0	8.47	114.64	4,535.2	-144.2	314.4	-303.6	0.00	0.00	0.00
4,600.0	8.47	114.64	4,574.7	-146.7	319.8	-308.8	0.00	0.00	0.00
4,640.0	8.47	114.64	4,614.3	-149.1	325.1	-314.0	0.00	0.00	0.00
4,680.0	8.47	114.64	4,653.8	-151.6	330.5	-319.1	0.00	0.00	0.00
4,720.0	8.47	114.64	4,693.4	-154.1	335.9	-324.3	0.00	0.00	0.00
4,760.0	8.47	114.64	4,733.0	-156.5	341.2	-329.5	0.00	0.00	0.00
4,800.0	8.47	114.64	4,772.5	-159.0	346.6	-334.7	0.00	0.00	0.00
4,840.0	8.47	114.64	4,812.1	-161.4	351.9	-339.8	0.00	0.00	0.00
4,880.0	8.47	114.64	4,851.7	-163.9	357.3	-345.0	0.00	0.00	0.00
4,920.0	8.47	114.64	4,891.2	-166.3	362.6	-350.2	0.00	0.00	0.00
4,960.0	8.47	114.64	4,930.8	-168.8	368.0	-355.3	0.00	0.00	0.00
5,000.0	8.47	114.64	4,970.4	-171.2	373.3	-360.5	0.00	0.00	0.00
5,040.0	8.47	114.64	5,009.9	-173.7	378.7	-365.7	0.00	0.00	0.00
5,080.0	8.47	114.64	5,049.5	-176.2	384.1	-370.9	0.00	0.00	0.00
5,120.0	8.47	114.64	5,089.0	-178.6	389.4	-376.0	0.00	0.00	0.00
5,160.0	8.47	114.64	5,128.6	-181.1	394.8	-381.2	0.00	0.00	0.00
5,200.0	8.47	114.64	5,168.2	-183.5	400.1	-386.4	0.00	0.00	0.00
5,240.0	8.47	114.64	5,207.7	-186.0	405.5	-391.5	0.00	0.00	0.00
5,280.0	8.47	114.64	5,247.3	-188.4	410.8	-396.7	0.00	0.00	0.00
5,320.0	8.47	114.64	5,286.9	-190.9	416.2	-401.9	0.00	0.00	0.00
5,360.0	8.47	114.64	5,326.4	-193.4	421.5	-407.1	0.00	0.00	0.00
5,400.0	8.47	114.64	5,366.0	-195.8	426.9	-412.2	0.00	0.00	0.00
5,440.0	8.47	114.64	5,405.6	-198.3	432.3	-417.4	0.00	0.00	0.00
5,480.0	8.47	114.64	5,445.1	-200.7	437.6	-422.6	0.00	0.00	0.00
5,520.0	8.47	114.64	5,484.7	-203.2	443.0	-427.7	0.00	0.00	0.00
5,560.0	8.47	114.64	5,524.2	-205.6	448.3	-432.9	0.00	0.00	0.00
5,600.0	8.47	114.64	5,563.8	-208.1	453.7	-438.1	0.00	0.00	0.00
5,614.4	8.47	114.64	5,578.0	-209.0	455.6	-439.9	0.00	0.00	0.00
5,640.0	7.96	114.64	5,603.4	-210.5	458.9	-443.2	2.00	-2.00	0.00
5,680.0	7.16	114.64	5,643.0	-212.7	463.7	-447.8	2.00	-2.00	0.00
5,720.0	6.36	114.64	5,682.8	-214.7	468.0	-451.9	2.00	-2.00	0.00
5,760.0	5.56	114.64	5,722.6	-216.4	471.8	-455.6	2.00	-2.00	0.00
5,800.0	4.76	114.64	5,762.4	-217.9	475.0	-458.7	2.00	-2.00	0.00
5,840.0	3.96	114.64	5,802.3	-219.2	477.8	-461.4	2.00	-2.00	0.00
5,880.0	3.16	114.64	5,842.2	-220.2	480.0	-463.6	2.00	-2.00	0.00
5,920.0	2.36	114.64	5,882.1	-221.0	481.8	-465.2	2.00	-2.00	0.00
5,960.0	1.56	114.64	5,922.1	-221.6	483.0	-466.4	2.00	-2.00	0.00
6,000.0	0.76	114.64	5,962.1	-221.9	483.8	-467.2	2.00	-2.00	0.00
6,037.9	0.00	0.00	6,000.0	-222.0	484.0	-467.4	2.00	-2.00	0.00
6,040.0	0.00	0.00	6,002.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,080.0	0.00	0.00	6,042.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,120.0	0.00	0.00	6,082.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,160.0	0.00	0.00	6,122.1	-222.0	484.0	-467.4	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 11V-404
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Project:	SEC.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	North Reference:	True
Well:	Thornton 11V-404	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (10-15-12)		

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	6,162.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,240.0	0.00	0.00	6,202.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,280.0	0.00	0.00	6,242.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,320.0	0.00	0.00	6,282.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,360.0	0.00	0.00	6,322.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,400.0	0.00	0.00	6,362.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,440.0	0.00	0.00	6,402.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,480.0	0.00	0.00	6,442.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,520.0	0.00	0.00	6,482.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,560.0	0.00	0.00	6,522.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,600.0	0.00	0.00	6,562.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,640.0	0.00	0.00	6,602.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,680.0	0.00	0.00	6,642.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,720.0	0.00	0.00	6,682.1	-222.0	484.0	-467.4	0.00	0.00	0.00
6,748.1	0.00	0.00	6,710.2	-222.0	484.0	-467.4	0.00	0.00	0.00
KOP #2									
6,760.0	0.89	269.01	6,722.1	-222.0	483.9	-467.3	7.50	7.50	0.00
6,800.0	3.89	269.01	6,762.1	-222.0	482.2	-465.6	7.50	7.50	0.00
6,840.0	6.89	269.01	6,801.9	-222.1	478.5	-461.9	7.50	7.50	0.00
6,880.0	9.89	269.01	6,841.5	-222.2	472.6	-456.0	7.50	7.50	0.00
6,920.0	12.89	269.01	6,880.7	-222.3	464.7	-448.1	7.50	7.50	0.00
6,960.0	15.89	269.01	6,919.4	-222.5	454.8	-438.2	7.50	7.50	0.00
7,000.0	18.89	269.01	6,957.6	-222.7	442.9	-426.3	7.50	7.50	0.00
7,040.0	21.89	269.01	6,995.1	-223.0	428.9	-412.4	7.50	7.50	0.00
7,080.0	24.89	269.01	7,031.8	-223.2	413.0	-396.5	7.50	7.50	0.00
7,120.0	27.89	269.01	7,067.6	-223.5	395.3	-378.7	7.50	7.50	0.00
7,160.0	30.89	269.01	7,102.4	-223.9	375.6	-359.1	7.50	7.50	0.00
7,200.0	33.89	269.01	7,136.2	-224.2	354.2	-337.7	7.50	7.50	0.00
7,240.0	36.89	269.01	7,168.8	-224.6	331.1	-314.6	7.50	7.50	0.00
7,280.0	39.89	269.01	7,200.2	-225.1	306.2	-289.8	7.50	7.50	0.00
7,320.0	42.89	269.01	7,230.2	-225.5	279.8	-263.4	7.50	7.50	0.00
7,360.0	45.89	269.01	7,258.8	-226.0	251.8	-235.5	7.50	7.50	0.00
7,400.0	48.89	269.01	7,285.8	-226.5	222.4	-206.1	7.50	7.50	0.00
7,440.0	51.89	269.01	7,311.3	-227.1	191.6	-175.3	7.50	7.50	0.00
7,480.0	54.89	269.01	7,335.2	-227.6	159.5	-143.2	7.50	7.50	0.00
7,520.0	57.89	269.01	7,357.3	-228.2	126.2	-110.0	7.50	7.50	0.00
7,560.0	60.89	269.01	7,377.7	-228.8	91.7	-75.6	7.50	7.50	0.00
7,600.0	63.89	269.01	7,396.2	-229.4	56.3	-40.2	7.50	7.50	0.00
7,640.0	66.89	269.01	7,412.9	-230.0	19.9	-3.9	7.50	7.50	0.00
7,680.0	69.89	269.01	7,427.6	-230.7	-17.2	33.3	7.50	7.50	0.00
7,720.0	72.89	269.01	7,440.4	-231.3	-55.1	71.1	7.50	7.50	0.00
7,760.0	75.89	269.01	7,451.1	-232.0	-93.7	109.6	7.50	7.50	0.00
7,800.0	78.89	269.01	7,459.8	-232.7	-132.7	148.6	7.50	7.50	0.00
7,840.0	81.89	269.01	7,466.5	-233.3	-172.1	187.9	7.50	7.50	0.00
7,868.1	84.00	269.01	7,470.0	-233.8	-200.0	215.8	7.50	7.50	0.00
7"									
7,880.0	84.00	269.01	7,471.2	-234.0	-211.8	227.6	0.00	0.00	0.00
7,920.0	84.00	269.01	7,475.4	-234.7	-251.6	267.3	0.00	0.00	0.00
7,942.1	84.00	269.01	7,477.7	-235.1	-273.6	289.3	0.00	0.00	0.00
7,960.0	84.89	269.01	7,479.4	-235.4	-291.4	307.1	5.00	5.00	0.00
8,000.0	86.89	269.01	7,482.3	-236.1	-331.3	346.9	5.00	5.00	0.00
8,040.0	88.89	269.01	7,483.8	-236.8	-371.2	386.8	5.00	5.00	0.00
8,064.4	90.11	269.02	7,484.0	-237.2	-395.6	411.2	5.00	5.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 11V-404
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Project:	SEC.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	North Reference:	True
Well:	Thornton 11V-404	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (10-15-12)		

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)
End of Build									
8,080.0	90.11	269.02	7,484.0	-237.5	-411.2	426.8	0.00	0.00	0.00
8,120.0	90.11	269.02	7,483.9	-238.1	-451.2	466.7	0.00	0.00	0.00
8,160.0	90.11	269.02	7,483.8	-238.8	-491.2	506.7	0.00	0.00	0.00
8,200.0	90.11	269.02	7,483.7	-239.5	-531.2	546.6	0.00	0.00	0.00
8,240.0	90.11	269.02	7,483.6	-240.2	-571.2	586.5	0.00	0.00	0.00
8,280.0	90.11	269.02	7,483.6	-240.9	-611.2	626.5	0.00	0.00	0.00
8,320.0	90.11	269.02	7,483.5	-241.6	-651.2	666.4	0.00	0.00	0.00
8,360.0	90.11	269.02	7,483.4	-242.3	-691.2	706.4	0.00	0.00	0.00
8,400.0	90.11	269.02	7,483.3	-243.0	-731.2	746.3	0.00	0.00	0.00
8,440.0	90.11	269.02	7,483.2	-243.6	-771.2	786.3	0.00	0.00	0.00
8,480.0	90.11	269.02	7,483.2	-244.3	-811.2	826.2	0.00	0.00	0.00
8,520.0	90.11	269.02	7,483.1	-245.0	-851.2	866.2	0.00	0.00	0.00
8,560.0	90.11	269.02	7,483.0	-245.7	-891.2	906.1	0.00	0.00	0.00
8,600.0	90.11	269.02	7,482.9	-246.4	-931.2	946.0	0.00	0.00	0.00
8,640.0	90.11	269.02	7,482.8	-247.1	-971.1	986.0	0.00	0.00	0.00
8,680.0	90.11	269.02	7,482.8	-247.8	-1,011.1	1,025.9	0.00	0.00	0.00
8,720.0	90.11	269.02	7,482.7	-248.5	-1,051.1	1,065.9	0.00	0.00	0.00
8,760.0	90.11	269.02	7,482.6	-249.1	-1,091.1	1,105.8	0.00	0.00	0.00
8,800.0	90.11	269.02	7,482.5	-249.8	-1,131.1	1,145.8	0.00	0.00	0.00
8,840.0	90.11	269.02	7,482.4	-250.5	-1,171.1	1,185.7	0.00	0.00	0.00
8,880.0	90.11	269.02	7,482.4	-251.2	-1,211.1	1,225.7	0.00	0.00	0.00
8,920.0	90.11	269.02	7,482.3	-251.9	-1,251.1	1,265.6	0.00	0.00	0.00
8,960.0	90.11	269.02	7,482.2	-252.6	-1,291.1	1,305.6	0.00	0.00	0.00
9,000.0	90.11	269.02	7,482.1	-253.3	-1,331.1	1,345.5	0.00	0.00	0.00
9,040.0	90.11	269.02	7,482.0	-254.0	-1,371.1	1,385.4	0.00	0.00	0.00
9,080.0	90.11	269.02	7,482.0	-254.6	-1,411.1	1,425.4	0.00	0.00	0.00
9,120.0	90.11	269.02	7,481.9	-255.3	-1,451.1	1,465.3	0.00	0.00	0.00
9,160.0	90.11	269.02	7,481.8	-256.0	-1,491.1	1,505.3	0.00	0.00	0.00
9,200.0	90.11	269.02	7,481.7	-256.7	-1,531.1	1,545.2	0.00	0.00	0.00
9,240.0	90.11	269.02	7,481.6	-257.4	-1,571.1	1,585.2	0.00	0.00	0.00
9,280.0	90.11	269.02	7,481.5	-258.1	-1,611.1	1,625.1	0.00	0.00	0.00
9,320.0	90.11	269.02	7,481.5	-258.8	-1,651.0	1,665.1	0.00	0.00	0.00
9,360.0	90.11	269.02	7,481.4	-259.4	-1,691.0	1,705.0	0.00	0.00	0.00
9,400.0	90.11	269.02	7,481.3	-260.1	-1,731.0	1,744.9	0.00	0.00	0.00
9,440.0	90.11	269.02	7,481.2	-260.8	-1,771.0	1,784.9	0.00	0.00	0.00
9,480.0	90.11	269.02	7,481.1	-261.5	-1,811.0	1,824.8	0.00	0.00	0.00
9,520.0	90.11	269.02	7,481.1	-262.2	-1,851.0	1,864.8	0.00	0.00	0.00
9,560.0	90.11	269.02	7,481.0	-262.9	-1,891.0	1,904.7	0.00	0.00	0.00
9,600.0	90.11	269.02	7,480.9	-263.6	-1,931.0	1,944.7	0.00	0.00	0.00
9,640.0	90.11	269.02	7,480.8	-264.3	-1,971.0	1,984.6	0.00	0.00	0.00
9,680.0	90.11	269.02	7,480.7	-264.9	-2,011.0	2,024.6	0.00	0.00	0.00
9,720.0	90.11	269.02	7,480.7	-265.6	-2,051.0	2,064.5	0.00	0.00	0.00
9,760.0	90.11	269.02	7,480.6	-266.3	-2,091.0	2,104.4	0.00	0.00	0.00
9,800.0	90.11	269.02	7,480.5	-267.0	-2,131.0	2,144.4	0.00	0.00	0.00
9,840.0	90.11	269.02	7,480.4	-267.7	-2,171.0	2,184.3	0.00	0.00	0.00
9,880.0	90.11	269.02	7,480.3	-268.4	-2,211.0	2,224.3	0.00	0.00	0.00
9,920.0	90.11	269.02	7,480.3	-269.1	-2,251.0	2,264.2	0.00	0.00	0.00
9,960.0	90.11	269.02	7,480.2	-269.8	-2,290.9	2,304.2	0.00	0.00	0.00
10,000.0	90.11	269.02	7,480.1	-270.4	-2,330.9	2,344.1	0.00	0.00	0.00
10,040.0	90.11	269.02	7,480.0	-271.1	-2,370.9	2,384.1	0.00	0.00	0.00
10,080.0	90.11	269.02	7,479.9	-271.8	-2,410.9	2,424.0	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 11V-404
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Project:	SEC.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	North Reference:	True
Well:	Thornton 11V-404	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (10-15-12)		

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)
10,120.0	90.11	269.02	7,479.9	-272.5	-2,450.9	2,463.9	0.00	0.00	0.00
10,160.0	90.11	269.02	7,479.8	-273.2	-2,490.9	2,503.9	0.00	0.00	0.00
10,200.0	90.11	269.02	7,479.7	-273.9	-2,530.9	2,543.8	0.00	0.00	0.00
10,240.0	90.11	269.02	7,479.6	-274.6	-2,570.9	2,583.8	0.00	0.00	0.00
10,280.0	90.11	269.02	7,479.5	-275.2	-2,610.9	2,623.7	0.00	0.00	0.00
10,320.0	90.11	269.02	7,479.5	-275.9	-2,650.9	2,663.7	0.00	0.00	0.00
10,360.0	90.11	269.02	7,479.4	-276.6	-2,690.9	2,703.6	0.00	0.00	0.00
10,400.0	90.11	269.02	7,479.3	-277.3	-2,730.9	2,743.6	0.00	0.00	0.00
10,440.0	90.11	269.02	7,479.2	-278.0	-2,770.9	2,783.5	0.00	0.00	0.00
10,480.0	90.11	269.02	7,479.1	-278.7	-2,810.9	2,823.5	0.00	0.00	0.00
10,520.0	90.11	269.02	7,479.1	-279.4	-2,850.9	2,863.4	0.00	0.00	0.00
10,560.0	90.11	269.02	7,479.0	-280.1	-2,890.9	2,903.3	0.00	0.00	0.00
10,600.0	90.11	269.02	7,478.9	-280.7	-2,930.9	2,943.3	0.00	0.00	0.00
10,640.0	90.11	269.02	7,478.8	-281.4	-2,970.8	2,983.2	0.00	0.00	0.00
10,680.0	90.11	269.02	7,478.7	-282.1	-3,010.8	3,023.2	0.00	0.00	0.00
10,720.0	90.11	269.02	7,478.7	-282.8	-3,050.8	3,063.1	0.00	0.00	0.00
10,760.0	90.11	269.02	7,478.6	-283.5	-3,090.8	3,103.1	0.00	0.00	0.00
10,800.0	90.11	269.02	7,478.5	-284.2	-3,130.8	3,143.0	0.00	0.00	0.00
10,840.0	90.11	269.02	7,478.4	-284.9	-3,170.8	3,183.0	0.00	0.00	0.00
10,880.0	90.11	269.02	7,478.3	-285.6	-3,210.8	3,222.9	0.00	0.00	0.00
10,920.0	90.11	269.02	7,478.3	-286.2	-3,250.8	3,262.8	0.00	0.00	0.00
10,960.0	90.11	269.02	7,478.2	-286.9	-3,290.8	3,302.8	0.00	0.00	0.00
11,000.0	90.11	269.02	7,478.1	-287.6	-3,330.8	3,342.7	0.00	0.00	0.00
11,040.0	90.11	269.02	7,478.0	-288.3	-3,370.8	3,382.7	0.00	0.00	0.00
11,080.0	90.11	269.02	7,477.9	-289.0	-3,410.8	3,422.6	0.00	0.00	0.00
11,120.0	90.11	269.02	7,477.9	-289.7	-3,450.8	3,462.6	0.00	0.00	0.00
11,160.0	90.11	269.02	7,477.8	-290.4	-3,490.8	3,502.5	0.00	0.00	0.00
11,200.0	90.11	269.02	7,477.7	-291.1	-3,530.8	3,542.5	0.00	0.00	0.00
11,240.0	90.11	269.02	7,477.6	-291.7	-3,570.8	3,582.4	0.00	0.00	0.00
11,280.0	90.11	269.02	7,477.5	-292.4	-3,610.8	3,622.3	0.00	0.00	0.00
11,320.0	90.11	269.02	7,477.5	-293.1	-3,650.7	3,662.3	0.00	0.00	0.00
11,360.0	90.11	269.02	7,477.4	-293.8	-3,690.7	3,702.2	0.00	0.00	0.00
11,400.0	90.11	269.02	7,477.3	-294.5	-3,730.7	3,742.2	0.00	0.00	0.00
11,440.0	90.11	269.02	7,477.2	-295.2	-3,770.7	3,782.1	0.00	0.00	0.00
11,480.0	90.11	269.02	7,477.1	-295.9	-3,810.7	3,822.1	0.00	0.00	0.00
11,520.0	90.11	269.02	7,477.1	-296.5	-3,850.7	3,862.0	0.00	0.00	0.00
11,560.0	90.11	269.02	7,477.0	-297.2	-3,890.7	3,902.0	0.00	0.00	0.00
11,600.0	90.11	269.02	7,476.9	-297.9	-3,930.7	3,941.9	0.00	0.00	0.00
11,640.0	90.11	269.02	7,476.8	-298.6	-3,970.7	3,981.9	0.00	0.00	0.00
11,680.0	90.11	269.02	7,476.7	-299.3	-4,010.7	4,021.8	0.00	0.00	0.00
11,720.0	90.11	269.02	7,476.7	-300.0	-4,050.7	4,061.7	0.00	0.00	0.00
11,760.0	90.11	269.02	7,476.6	-300.7	-4,090.7	4,101.7	0.00	0.00	0.00
11,800.0	90.11	269.02	7,476.5	-301.4	-4,130.7	4,141.6	0.00	0.00	0.00
11,840.0	90.11	269.02	7,476.4	-302.0	-4,170.7	4,181.6	0.00	0.00	0.00
11,880.0	90.11	269.02	7,476.3	-302.7	-4,210.7	4,221.5	0.00	0.00	0.00
11,920.0	90.11	269.02	7,476.3	-303.4	-4,250.7	4,261.5	0.00	0.00	0.00
11,960.0	90.11	269.02	7,476.2	-304.1	-4,290.7	4,301.4	0.00	0.00	0.00
12,000.0	90.11	269.02	7,476.1	-304.8	-4,330.6	4,341.4	0.00	0.00	0.00
12,040.0	90.11	269.02	7,476.0	-305.5	-4,370.6	4,381.3	0.00	0.00	0.00
12,049.1	90.11	269.02	7,476.0	-305.6	-4,379.7	4,390.4	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Thornton 11V-404
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Project:	SEC.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	North Reference:	True
Well:	Thornton 11V-404	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (10-15-12)		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,868.1	7,470.0	7"	7	8-3/4

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,000.0	2,000.0	0.0	0.0	KOP #1
6,748.1	6,710.2	-222.0	484.0	KOP #2
8,064.4	7,484.0	-237.2	-395.6	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 #1 (10-15-12)

Anticollision Report

24 October, 2012



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (10-15-12)
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	Stations
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 1,000.0ft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Elliptical Conic

Survey Tool Program		Date	10/24/2012		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	12,049.0	Plan #1 (10-15-12) (Wellbore #1)	MWD	MWD - Standard	

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Thornton 11C-HZ Pad Sec.11-T7N-R66W						
Thornton 11V-214 - Wellbore #1 - Plan #1 (10-15-12)	1,500.0	1,500.0	58.5	52.0	8.975	CC, ES
Thornton 11V-214 - Wellbore #1 - Plan #1 (10-15-12)	12,049.1	11,881.9	479.3	236.9	1.978	SF
Thornton 11W-214 - Wellbore #1 - Plan #1 (10-15-12)	1,000.0	1,000.0	57.4	53.2	13.447	CC, ES
Thornton 11W-214 - Wellbore #1 - Plan #1 (10-15-12)	12,049.1	11,920.1	591.6	342.3	2.373	SF
Thornton 11W-414 - Wellbore #1 - Plan #1 (10-15-12)	200.0	200.0	77.4	76.7	114.796	CC, ES
Thornton 11W-414 - Wellbore #1 - Plan #1 (10-15-12)	12,049.1	12,113.4	881.6	620.3	3.374	SF

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							
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)			
0.0	0.0	0.0	0.0	0.0	0.0	41.65	43.7	38.9	58.5					
100.0	100.0	100.0	100.0	0.1	0.1	41.65	43.7	38.9	58.5	58.3	0.22	260.289		
200.0	200.0	200.0	200.0	0.3	0.3	41.65	43.7	38.9	58.5	57.8	0.67	86.763		
300.0	300.0	300.0	300.0	0.6	0.6	41.65	43.7	38.9	58.5	57.4	1.12	52.058		
400.0	400.0	400.0	400.0	0.8	0.8	41.65	43.7	38.9	58.5	56.9	1.57	37.184		
500.0	500.0	500.0	500.0	1.0	1.0	41.65	43.7	38.9	58.5	56.5	2.02	28.921		
600.0	600.0	600.0	600.0	1.2	1.2	41.65	43.7	38.9	58.5	56.0	2.47	23.663		
700.0	700.0	700.0	700.0	1.5	1.5	41.65	43.7	38.9	58.5	55.6	2.92	20.022		
800.0	800.0	800.0	800.0	1.7	1.7	41.65	43.7	38.9	58.5	55.1	3.37	17.353		
900.0	900.0	900.0	900.0	1.9	1.9	41.65	43.7	38.9	58.5	54.7	3.82	15.311		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	41.65	43.7	38.9	58.5	54.2	4.27	13.699		
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	41.65	43.7	38.9	58.5	53.8	4.72	12.395		
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	41.65	43.7	38.9	58.5	53.3	5.17	11.317		
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	41.65	43.7	38.9	58.5	52.9	5.62	10.412		
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	41.65	43.7	38.9	58.5	52.4	6.07	9.640		
1,500.0	1,500.0	1,500.0	1,500.0	3.3	3.3	41.65	43.7	38.9	58.5	52.0	6.52	8.975 CC, ES		
1,600.0	1,600.0	1,598.2	1,598.2	3.5	3.5	42.38	44.3	40.4	60.0	53.1	6.95	8.633		
1,700.0	1,700.0	1,696.1	1,696.0	3.7	3.7	44.34	46.2	45.1	64.7	57.3	7.39	8.759		
1,800.0	1,800.0	1,793.6	1,793.1	3.9	3.9	47.05	49.2	52.9	72.6	64.7	7.82	9.280		
1,900.0	1,900.0	1,890.8	1,889.6	4.2	4.1	49.97	53.4	63.6	83.7	75.5	8.26	10.136		
2,000.0	2,000.0	1,990.0	1,987.9	4.4	4.4	52.45	58.2	75.7	96.2	87.5	8.72	11.041		

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 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	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	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
2,100.0	2,100.0	2,089.2	2,086.3	4.6	4.6	-60.89		62.9	87.8	108.0	98.9	9.13	11.838	
2,200.0	2,199.8	2,188.7	2,184.9	4.8	4.9	-61.30		67.7	99.9	118.1	108.6	9.54	12.390	
2,300.0	2,299.5	2,288.3	2,283.6	5.0	5.2	-63.05		72.5	112.0	126.7	116.7	9.96	12.719	
2,400.0	2,398.7	2,387.8	2,382.3	5.2	5.4	-65.92		77.2	124.1	133.9	123.5	10.41	12.862	
2,423.5	2,422.0	2,411.1	2,405.4	5.2	5.5	-66.74		78.4	127.0	135.4	124.9	10.52	12.874	
2,500.0	2,497.6	2,487.2	2,480.8	5.4	5.7	-69.51		82.0	136.2	140.5	129.6	10.89	12.901	
2,600.0	2,596.5	2,586.6	2,579.4	5.7	6.0	-72.83		86.8	148.3	147.7	136.3	11.40	12.952	
2,700.0	2,695.4	2,685.9	2,677.9	5.9	6.3	-75.83		91.5	160.4	155.2	143.3	11.93	13.014	
2,800.0	2,794.4	2,785.3	2,776.4	6.2	6.6	-78.55		96.3	172.5	163.2	150.7	12.47	13.084	
2,900.0	2,893.3	2,884.7	2,875.0	6.5	6.9	-81.02		101.0	184.6	171.5	158.5	13.04	13.158	
3,000.0	2,992.2	2,984.1	2,973.5	6.8	7.2	-83.25		105.8	196.7	180.1	166.5	13.61	13.234	
3,100.0	3,091.1	3,083.5	3,072.1	7.1	7.5	-85.28		110.5	208.8	188.9	174.7	14.19	13.311	
3,200.0	3,190.0	3,182.9	3,170.6	7.4	7.8	-87.12		115.3	220.9	198.0	183.2	14.79	13.388	
3,300.0	3,288.9	3,282.3	3,269.2	7.7	8.1	-88.81		120.1	233.0	207.2	191.8	15.39	13.464	
3,400.0	3,387.8	3,381.7	3,367.7	8.0	8.5	-90.34		124.8	245.1	216.6	200.6	16.00	13.539	
3,500.0	3,486.7	3,481.1	3,466.2	8.3	8.8	-91.75		129.6	257.2	226.2	209.6	16.62	13.612	
3,600.0	3,585.6	3,580.5	3,564.8	8.6	9.1	-93.05		134.3	269.3	235.9	218.6	17.24	13.683	
3,700.0	3,684.5	3,679.9	3,663.3	8.9	9.4	-94.24		139.1	281.4	245.6	227.8	17.86	13.753	
3,800.0	3,783.4	3,779.3	3,761.9	9.3	9.7	-95.35		143.9	293.5	255.5	237.0	18.49	13.820	
3,900.0	3,882.4	3,878.7	3,860.4	9.6	10.0	-96.36		148.6	305.6	265.5	246.4	19.12	13.885	
4,000.0	3,981.3	3,978.1	3,958.9	9.9	10.3	-97.31		153.4	317.7	275.5	255.8	19.75	13.949	
4,100.0	4,080.2	4,077.5	4,057.5	10.3	10.7	-98.19		158.1	329.8	285.6	265.2	20.39	14.009	
4,200.0	4,179.1	4,176.9	4,156.0	10.6	11.0	-99.01		162.9	341.9	295.8	274.8	21.03	14.068	
4,300.0	4,278.0	4,276.3	4,254.6	10.9	11.3	-99.77		167.7	354.0	306.0	284.4	21.67	14.125	
4,400.0	4,376.9	4,375.7	4,353.1	11.3	11.6	-100.49		172.4	366.1	316.3	294.0	22.31	14.180	
4,500.0	4,475.8	4,475.1	4,451.6	11.6	11.9	-101.16		177.2	378.2	326.6	303.7	22.95	14.233	
4,600.0	4,574.7	4,574.5	4,550.2	11.9	12.3	-101.79		181.9	390.4	337.0	313.4	23.59	14.284	
4,700.0	4,673.6	4,673.9	4,648.7	12.3	12.6	-102.38		186.7	402.5	347.4	323.2	24.24	14.333	
4,800.0	4,772.5	4,773.2	4,747.3	12.6	12.9	-102.93		191.5	414.6	357.8	333.0	24.88	14.380	
4,900.0	4,871.4	4,872.6	4,845.8	13.0	13.2	-103.46		196.2	426.7	368.3	342.8	25.53	14.426	
5,000.0	4,970.4	4,972.0	4,944.3	13.3	13.6	-103.96		201.0	438.8	378.8	352.6	26.18	14.470	
5,100.0	5,069.3	5,071.4	5,042.9	13.7	13.9	-104.42		205.7	450.9	389.3	362.5	26.83	14.513	
5,200.0	5,168.2	5,172.1	5,142.7	14.0	14.2	-104.88		210.5	463.1	399.9	372.4	27.47	14.555	
5,300.0	5,267.1	5,279.2	5,249.2	14.4	14.5	-105.66		214.7	473.6	409.2	381.1	28.06	14.582	
5,400.0	5,366.0	5,386.1	5,355.9	14.7	14.7	-106.87		217.4	480.5	416.8	388.2	28.62	14.565	
5,500.0	5,464.9	5,492.7	5,462.4	15.1	14.9	-108.51		218.6	483.7	422.8	393.7	29.14	14.509	
5,600.0	5,563.8	5,594.1	5,563.8	15.4	15.0	-110.39		218.7	483.9	427.9	398.2	29.64	14.437	
5,614.4	5,578.0	5,608.4	5,578.0	15.5	15.0	-110.65		218.7	483.9	428.6	398.9	29.71	14.427	
5,700.0	5,662.9	5,693.2	5,662.9	15.7	15.2	-112.12		218.7	483.9	432.8	402.7	30.11	14.372	
5,800.0	5,762.4	5,792.7	5,762.4	15.9	15.4	-113.41		218.7	483.9	436.7	406.2	30.53	14.306	
5,900.0	5,862.2	5,892.5	5,862.2	16.1	15.6	-114.24		218.7	483.9	439.3	408.4	30.91	14.214	
6,000.0	5,962.1	5,992.5	5,962.1	16.3	15.7	-114.62		218.7	483.9	440.6	409.3	31.27	14.090	
6,037.9	6,000.0	6,030.3	6,000.0	16.4	15.8	-0.02		218.7	483.9	440.7	413.2	27.51	16.022	
6,100.0	6,062.1	6,092.4	6,062.1	16.5	15.9	-0.02		218.7	483.9	440.7	413.0	27.75	15.882	
6,200.0	6,162.1	6,192.4	6,162.1	16.6	16.1	-0.02		218.7	483.9	440.7	412.6	28.15	15.658	
6,300.0	6,262.1	6,292.4	6,262.1	16.8	16.3	-0.02		218.7	483.9	440.7	412.2	28.54	15.440	
6,400.0	6,362.1	6,392.4	6,362.1	17.0	16.5	-0.02		218.7	483.9	440.7	411.8	28.94	15.227	
6,500.0	6,462.1	6,492.4	6,462.1	17.2	16.6	-0.02		218.7	483.9	440.7	411.4	29.34	15.020	
6,600.0	6,562.1	6,592.6	6,562.2	17.3	16.8	-0.03		218.7	483.8	440.7	411.0	29.74	14.817	
6,692.6	6,654.7	6,685.4	6,654.7	17.5	16.9	-0.98		218.6	476.4	440.7	410.6	30.10	14.642	
6,700.0	6,662.1	6,692.7	6,662.0	17.5	16.9	-1.12		218.6	475.4	440.7	410.5	30.12	14.628	

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 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	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 (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			
6,748.1	6,710.2	6,739.7	6,708.2		17.6	17.0	-2.21	218.4	467.0	440.8	410.4	30.31	14.541		
6,750.0	6,712.1	6,741.5	6,710.0		17.6	17.0	88.73	218.4	466.6	440.8	407.0	33.79	13.045		
6,800.0	6,762.1	6,789.5	6,756.5		17.7	17.0	87.41	218.2	455.0	441.1	407.3	33.83	13.039		
6,850.0	6,811.8	6,836.9	6,801.6		17.7	17.0	86.10	218.0	440.7	441.7	407.9	33.84	13.054		
6,900.0	6,861.1	6,883.6	6,845.3		17.7	16.9	84.83	217.7	423.8	442.5	408.7	33.81	13.088		
6,950.0	6,909.8	6,929.9	6,887.3		17.7	16.9	83.58	217.4	404.6	443.5	409.8	33.76	13.139		
7,000.0	6,957.6	6,975.7	6,927.7		17.7	16.9	82.37	217.0	383.1	444.7	411.1	33.69	13.202		
7,050.0	7,004.3	7,020.9	6,966.3		17.7	16.9	81.20	216.6	359.4	446.1	412.5	33.61	13.274		
7,100.0	7,049.8	7,065.8	7,003.1		17.7	16.9	80.07	216.1	333.8	447.6	414.1	33.53	13.351		
7,150.0	7,093.8	7,110.2	7,038.0		17.6	16.9	78.99	215.7	306.4	449.2	415.7	33.46	13.426		
7,200.0	7,136.2	7,154.3	7,071.0		17.6	16.9	77.96	215.2	277.2	450.9	417.4	33.41	13.495		
7,250.0	7,176.8	7,200.0	7,103.4		17.6	17.0	76.94	214.6	244.9	452.6	419.2	33.40	13.549		
7,300.0	7,215.3	7,241.4	7,131.0		17.6	17.0	76.06	214.1	214.1	454.3	420.9	33.45	13.581		
7,350.0	7,251.7	7,284.4	7,157.9		17.6	17.2	75.20	213.5	180.5	456.1	422.5	33.57	13.585		
7,400.0	7,285.8	7,327.2	7,182.8		17.7	17.4	74.39	212.9	145.7	457.8	424.1	33.78	13.554		
7,450.0	7,317.4	7,369.8	7,205.5		17.8	17.6	73.65	212.3	109.7	459.5	425.4	34.08	13.483		
7,500.0	7,346.5	7,412.1	7,226.0		17.9	17.9	72.97	211.7	72.7	461.1	426.6	34.49	13.369		
7,550.0	7,372.8	7,454.2	7,244.4		18.2	18.3	72.36	211.0	34.8	462.7	427.6	35.02	13.210		
7,600.0	7,396.2	7,500.0	7,262.0		18.5	18.8	71.77	210.3	-7.4	464.1	428.4	35.72	12.994		
7,650.0	7,416.7	7,537.9	7,274.7		18.9	19.2	71.33	209.7	-43.2	465.3	428.9	36.49	12.754		
7,700.0	7,434.2	7,579.6	7,286.5		19.4	19.7	70.91	209.0	-83.1	466.5	429.1	37.42	12.467		
7,750.0	7,448.6	7,621.1	7,296.1		20.0	20.3	70.56	208.3	-123.4	467.4	429.0	38.47	12.150		
7,800.0	7,459.8	7,662.5	7,303.5		20.7	20.9	70.28	207.6	-164.2	468.2	428.6	39.65	11.809		
7,850.0	7,467.9	7,700.0	7,308.3		21.4	21.5	70.07	207.0	-201.4	468.9	428.0	40.88	11.468		
7,868.1	7,470.0	7,718.8	7,310.0		21.7	21.8	70.00	206.6	-220.1	469.0	427.6	41.44	11.318		
7,900.0	7,473.3	7,745.1	7,311.6		22.3	22.3	69.87	206.2	-246.4	469.5	427.2	42.32	11.094		
7,942.1	7,477.7	7,779.7	7,312.3		23.0	22.9	69.54	205.6	-280.9	470.7	427.2	43.50	10.822		
8,000.0	7,482.3	7,836.6	7,312.0		24.0	24.0	68.91	204.6	-337.8	472.5	427.2	45.34	10.421		
8,064.4	7,484.0	7,901.0	7,311.6		25.3	25.2	68.64	203.5	-402.2	473.3	425.7	47.59	9.945		
8,100.0	7,483.9	7,936.6	7,311.4		26.0	25.9	68.63	202.9	-437.8	473.3	424.4	48.93	9.674		
8,200.0	7,483.7	8,036.6	7,310.8		28.0	28.1	68.58	201.2	-537.7	473.5	420.6	52.82	8.964		
8,300.0	7,483.5	8,136.6	7,310.2		30.2	30.3	68.54	199.5	-637.7	473.6	416.7	56.93	8.319		
8,400.0	7,483.3	8,236.6	7,309.6		32.5	32.6	68.49	197.8	-737.7	473.7	412.5	61.21	7.740		
8,500.0	7,483.1	8,336.6	7,309.0		34.9	35.0	68.45	196.0	-837.7	473.9	408.3	65.63	7.221		
8,600.0	7,482.9	8,436.6	7,308.4		37.3	37.4	68.40	194.3	-937.7	474.0	403.9	70.16	6.757		
8,700.0	7,482.7	8,536.6	7,307.9		39.8	39.9	68.36	192.6	-1,037.7	474.2	399.4	74.77	6.342		
8,800.0	7,482.5	8,636.6	7,307.3		42.3	42.5	68.32	190.9	-1,137.6	474.3	394.9	79.46	5.969		
8,900.0	7,482.3	8,736.6	7,306.7		44.9	45.0	68.27	189.2	-1,237.6	474.5	390.3	84.22	5.634		
9,000.0	7,482.1	8,836.6	7,306.1		47.5	47.6	68.23	187.5	-1,337.6	474.6	385.6	89.02	5.332		
9,100.0	7,481.9	8,936.6	7,305.5		50.1	50.2	68.18	185.7	-1,437.6	474.8	380.9	93.86	5.058		
9,200.0	7,481.7	9,036.6	7,304.9		52.7	52.9	68.14	184.0	-1,537.6	474.9	376.2	98.74	4.810		
9,300.0	7,481.5	9,136.6	7,304.3		55.3	55.5	68.10	182.3	-1,637.6	475.1	371.4	103.65	4.583		
9,400.0	7,481.3	9,236.6	7,303.7		58.0	58.2	68.05	180.6	-1,737.5	475.2	366.6	108.59	4.376		
9,500.0	7,481.1	9,336.6	7,303.1		60.7	60.9	68.01	178.9	-1,837.5	475.4	361.8	113.54	4.187		
9,600.0	7,480.9	9,436.6	7,302.5		63.3	63.6	67.96	177.2	-1,937.5	475.5	357.0	118.52	4.012		
9,700.0	7,480.7	9,536.6	7,301.9		66.0	66.3	67.92	175.4	-2,037.5	475.7	352.2	123.51	3.851		
9,800.0	7,480.5	9,636.6	7,301.3		68.7	69.0	67.88	173.7	-2,137.5	475.8	347.3	128.51	3.702		
9,900.0	7,480.3	9,736.6	7,300.7		71.4	71.7	67.83	172.0	-2,237.5	476.0	342.4	133.53	3.564		
10,000.0	7,480.1	9,836.6	7,300.1		74.2	74.4	67.79	170.3	-2,337.4	476.1	337.6	138.56	3.436		
10,100.0	7,479.9	9,936.6	7,299.5		76.9	77.1	67.75	168.6	-2,437.4	476.3	332.7	143.59	3.317		
10,200.0	7,479.7	10,036.6	7,299.0		79.6	79.9	67.70	166.9	-2,537.4	476.4	327.8	148.64	3.205		

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 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	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	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,300.0	7,479.5	10,136.5	7,298.4	82.3	82.6	67.66	165.2	-2,637.4	476.6	322.9	153.68	3.101	
10,400.0	7,479.3	10,236.5	7,297.8	85.1	85.3	67.62	163.4	-2,737.4	476.7	318.0	158.74	3.003	
10,500.0	7,479.1	10,336.5	7,297.2	87.8	88.1	67.57	161.7	-2,837.4	476.9	313.1	163.80	2.911	
10,600.0	7,478.9	10,436.5	7,296.6	90.6	90.8	67.53	160.0	-2,937.3	477.0	308.2	168.86	2.825	
10,700.0	7,478.7	10,536.5	7,296.0	93.3	93.6	67.48	158.3	-3,037.3	477.2	303.2	173.93	2.743	
10,800.0	7,478.5	10,636.5	7,295.4	96.1	96.3	67.44	156.6	-3,137.3	477.3	298.3	179.00	2.667	
10,900.0	7,478.3	10,736.5	7,294.8	98.8	99.1	67.40	154.9	-3,237.3	477.5	293.4	184.07	2.594	
11,000.0	7,478.1	10,836.5	7,294.2	101.6	101.9	67.35	153.1	-3,337.3	477.6	288.5	189.15	2.525	
11,100.0	7,477.9	10,936.5	7,293.6	104.4	104.6	67.31	151.4	-3,437.2	477.8	283.6	194.23	2.460	
11,200.0	7,477.7	11,036.5	7,293.0	107.1	107.4	67.27	149.7	-3,537.2	477.9	278.6	199.30	2.398	
11,300.0	7,477.5	11,136.5	7,292.4	109.9	110.2	67.22	148.0	-3,637.2	478.1	273.7	204.38	2.339	
11,400.0	7,477.3	11,236.5	7,291.8	112.6	112.9	67.18	146.3	-3,737.2	478.2	268.8	209.46	2.283	
11,500.0	7,477.1	11,336.5	7,291.2	115.4	115.7	67.14	144.6	-3,837.2	478.4	263.9	214.54	2.230	
11,600.0	7,476.9	11,436.5	7,290.6	118.2	118.5	67.09	142.8	-3,937.2	478.5	258.9	219.62	2.179	
11,700.0	7,476.7	11,536.5	7,290.0	121.0	121.2	67.05	141.1	-4,037.1	478.7	254.0	224.70	2.130	
11,800.0	7,476.5	11,636.5	7,289.5	123.7	124.0	67.01	139.4	-4,137.1	478.9	249.1	229.77	2.084	
11,900.0	7,476.3	11,736.5	7,288.9	126.5	126.8	66.96	137.7	-4,237.1	479.0	244.2	234.85	2.040	
12,000.0	7,476.1	11,836.5	7,288.3	129.3	129.6	66.92	136.0	-4,337.1	479.2	239.2	239.93	1.997	
12,018.7	7,476.1	11,855.2	7,288.2	129.8	130.1	66.91	135.7	-4,355.8	479.2	238.3	240.88	1.989	
12,049.1	7,476.0	11,881.9	7,288.0	130.7	130.8	66.90	135.2	-4,382.4	479.3	236.9	242.33	1.978 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	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
0.0	0.0	0.0	0.0	0.0	0.0	104.70	104.70	-14.6	55.5	57.4				
100.0	100.0	100.0	100.0	0.1	0.1	104.70	104.70	-14.6	55.5	57.4	57.2	0.22	255.489	
200.0	200.0	200.0	200.0	0.3	0.3	104.70	104.70	-14.6	55.5	57.4	56.8	0.67	85.163	
300.0	300.0	300.0	300.0	0.6	0.6	104.70	104.70	-14.6	55.5	57.4	56.3	1.12	51.098	
400.0	400.0	400.0	400.0	0.8	0.8	104.70	104.70	-14.6	55.5	57.4	55.9	1.57	36.498	
500.0	500.0	500.0	500.0	1.0	1.0	104.70	104.70	-14.6	55.5	57.4	55.4	2.02	28.388	
600.0	600.0	600.0	600.0	1.2	1.2	104.70	104.70	-14.6	55.5	57.4	55.0	2.47	23.226	
700.0	700.0	700.0	700.0	1.5	1.5	104.70	104.70	-14.6	55.5	57.4	54.5	2.92	19.653	
800.0	800.0	800.0	800.0	1.7	1.7	104.70	104.70	-14.6	55.5	57.4	54.1	3.37	17.033	
900.0	900.0	900.0	900.0	1.9	1.9	104.70	104.70	-14.6	55.5	57.4	53.6	3.82	15.029	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	104.70	104.70	-14.6	55.5	57.4	53.2	4.27	13.447 CC, ES	
1,100.0	1,100.0	1,098.6	1,098.6	2.4	2.3	105.90	105.90	-16.1	56.4	58.6	53.9	4.69	12.497	
1,200.0	1,200.0	1,196.9	1,196.8	2.6	2.5	109.20	109.20	-20.5	58.8	62.4	57.3	5.10	12.243	
1,300.0	1,300.0	1,294.8	1,294.3	2.8	2.7	113.84	113.84	-27.8	62.9	69.0	63.5	5.51	12.529	
1,400.0	1,400.0	1,392.1	1,390.8	3.0	2.9	118.96	118.96	-38.0	68.6	78.9	73.0	5.94	13.296	
1,500.0	1,500.0	1,488.4	1,486.0	3.3	3.2	123.86	123.86	-50.8	75.8	92.3	85.9	6.38	14.465	
1,600.0	1,600.0	1,584.4	1,580.4	3.5	3.4	128.16	128.16	-66.4	84.4	109.2	102.3	6.85	15.926	
1,700.0	1,700.0	1,682.5	1,676.6	3.7	3.8	131.52	131.52	-83.0	93.7	127.3	120.0	7.36	17.312	
1,800.0	1,800.0	1,780.6	1,772.9	3.9	4.1	134.04	134.04	-99.6	103.0	145.8	138.0	7.88	18.512	
1,900.0	1,900.0	1,878.7	1,869.1	4.2	4.5	135.99	135.99	-116.2	112.3	164.5	156.1	8.42	19.547	
2,000.0	2,000.0	1,976.8	1,965.3	4.4	4.8	137.55	137.55	-132.9	121.6	183.4	174.4	8.97	20.441	
2,100.0	2,100.0	2,075.2	2,061.8	4.6	5.2	24.23	24.23	-149.5	130.9	200.8	191.8	9.01	22.292	
2,200.0	2,199.8	2,173.9	2,158.7	4.8	5.6	25.75	25.75	-166.3	140.2	215.2	205.8	9.42	22.846	
2,300.0	2,299.5	2,273.0	2,255.9	5.0	6.0	27.48	27.48	-183.1	149.6	226.7	216.8	9.83	23.054	
2,400.0	2,398.7	2,372.3	2,353.3	5.2	6.4	29.46	29.46	-199.9	159.0	235.3	225.1	10.25	22.964	
2,423.5	2,422.0	2,395.6	2,376.2	5.2	6.5	29.97	29.97	-203.9	161.2	237.0	226.6	10.35	22.905	
2,500.0	2,497.6	2,471.6	2,450.7	5.4	6.8	31.67	31.67	-216.8	168.4	242.2	231.5	10.69	22.656	
2,600.0	2,596.5	2,571.0	2,548.2	5.7	7.2	33.78	33.78	-233.6	177.8	249.3	238.1	11.15	22.359	
2,700.0	2,695.4	2,670.3	2,645.6	5.9	7.6	35.77	35.77	-250.4	187.2	256.7	245.1	11.62	22.087	
2,800.0	2,794.4	2,769.6	2,743.1	6.2	8.0	37.64	37.64	-267.3	196.6	264.4	252.3	12.11	21.835	
2,900.0	2,893.3	2,869.0	2,840.5	6.5	8.5	39.41	39.41	-284.1	206.0	272.4	259.8	12.61	21.598	
3,000.0	2,992.2	2,968.3	2,937.9	6.8	8.9	41.08	41.08	-301.0	215.3	280.6	267.5	13.13	21.376	
3,100.0	3,091.1	3,067.6	3,035.4	7.1	9.3	42.65	42.65	-317.8	224.7	289.1	275.4	13.66	21.164	
3,200.0	3,190.0	3,167.0	3,132.8	7.4	9.7	44.14	44.14	-334.6	234.1	297.8	283.6	14.20	20.964	
3,300.0	3,288.9	3,266.3	3,230.3	7.7	10.1	45.53	45.53	-351.5	243.5	306.6	291.8	14.76	20.773	
3,400.0	3,387.8	3,365.6	3,327.7	8.0	10.6	46.85	46.85	-368.3	252.9	315.6	300.3	15.33	20.590	
3,500.0	3,486.7	3,465.0	3,425.2	8.3	11.0	48.10	48.10	-385.1	262.3	324.8	308.9	15.91	20.416	
3,600.0	3,585.6	3,564.3	3,522.6	8.6	11.4	49.27	49.27	-402.0	271.7	334.1	317.6	16.50	20.250	
3,700.0	3,684.5	3,663.6	3,620.1	8.9	11.9	50.39	50.39	-418.8	281.1	343.6	326.5	17.10	20.091	
3,800.0	3,783.4	3,763.0	3,717.5	9.3	12.3	51.44	51.44	-435.7	290.5	353.2	335.4	17.71	19.940	
3,900.0	3,882.4	3,862.3	3,815.0	9.6	12.7	52.44	52.44	-452.5	299.9	362.9	344.5	18.33	19.796	
4,000.0	3,981.3	3,961.7	3,912.4	9.9	13.1	53.38	53.38	-469.3	309.3	372.6	353.7	18.96	19.658	
4,100.0	4,080.2	4,061.0	4,009.9	10.3	13.6	54.28	54.28	-486.2	318.7	382.5	362.9	19.59	19.526	
4,200.0	4,179.1	4,160.3	4,107.3	10.6	14.0	55.13	55.13	-503.0	328.1	392.5	372.3	20.23	19.401	
4,300.0	4,278.0	4,259.7	4,204.7	10.9	14.4	55.94	55.94	-519.9	337.5	402.6	381.7	20.88	19.282	
4,400.0	4,376.9	4,359.0	4,302.2	11.3	14.9	56.71	56.71	-536.7	346.9	412.7	391.2	21.53	19.168	
4,500.0	4,475.8	4,458.3	4,399.6	11.6	15.3	57.44	57.44	-553.5	356.3	422.9	400.7	22.19	19.060	
4,600.0	4,574.7	4,557.7	4,497.1	11.9	15.7	58.14	58.14	-570.4	365.7	433.2	410.3	22.85	18.957	
4,700.0	4,673.6	4,657.0	4,594.5	12.3	16.2	58.81	58.81	-587.2	375.1	443.5	420.0	23.52	18.858	
4,800.0	4,772.5	4,756.3	4,692.0	12.6	16.6	59.45	59.45	-604.1	384.5	453.9	429.7	24.19	18.764	
4,900.0	4,871.4	4,855.7	4,789.4	13.0	17.0	60.05	60.05	-620.9	393.9	464.4	439.5	24.87	18.675	

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 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	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	4,970.4	4,955.0	4,886.9	13.3	17.5	60.63	60.63	-637.7	403.3	474.8	449.3	25.54	18.590	
5,100.0	5,069.3	5,054.3	4,984.3	13.7	17.9	61.19	61.19	-654.6	412.7	485.4	459.2	26.23	18.508	
5,200.0	5,168.2	5,153.7	5,081.8	14.0	18.3	61.72	61.72	-671.4	422.1	496.0	469.1	26.91	18.430	
5,300.0	5,267.1	5,253.0	5,179.2	14.4	18.8	62.23	62.23	-688.3	431.5	506.6	479.0	27.60	18.356	
5,400.0	5,366.0	5,352.3	5,276.6	14.7	19.2	62.72	62.72	-705.1	440.9	517.2	489.0	28.29	18.285	
5,500.0	5,464.9	5,451.7	5,374.1	15.1	19.7	63.19	63.19	-721.9	450.3	527.9	499.0	28.98	18.217	
5,600.0	5,563.8	5,556.6	5,477.1	15.4	20.1	63.67	63.67	-739.5	460.1	538.5	508.8	29.69	18.141	
5,614.4	5,578.0	5,573.8	5,493.9	15.5	20.1	63.76	63.76	-742.2	461.6	539.9	510.1	29.79	18.122	
5,700.0	5,662.9	5,676.1	5,595.0	15.7	20.4	64.37	64.37	-756.4	469.5	547.0	516.6	30.36	18.018	
5,800.0	5,762.4	5,796.0	5,714.0	15.9	20.7	64.90	64.90	-769.1	476.6	553.3	522.4	30.91	17.904	
5,900.0	5,862.2	5,916.3	5,833.9	16.1	21.0	65.24	65.24	-777.4	481.2	557.5	526.1	31.37	17.771	
6,000.0	5,962.1	6,036.8	5,954.3	16.3	21.1	65.39	65.39	-781.3	483.4	559.4	527.7	31.76	17.617	
6,037.9	6,000.0	6,082.5	6,000.0	16.4	21.2	-179.95	-179.95	-781.6	483.5	559.6	526.0	33.54	16.684	
6,100.0	6,062.1	6,144.6	6,062.1	16.5	21.3	-179.95	-179.95	-781.6	483.5	559.6	525.8	33.73	16.588	
6,200.0	6,162.1	6,244.6	6,162.1	16.6	21.4	-179.95	-179.95	-781.6	483.5	559.6	525.5	34.05	16.436	
6,300.0	6,262.1	6,344.6	6,262.1	16.8	21.5	-179.95	-179.95	-781.6	483.5	559.6	525.2	34.36	16.286	
6,400.0	6,362.1	6,444.6	6,362.1	17.0	21.6	-179.95	-179.95	-781.6	483.5	559.6	524.9	34.68	16.136	
6,500.0	6,462.1	6,544.6	6,462.1	17.2	21.8	-179.95	-179.95	-781.6	483.5	559.6	524.6	35.00	15.989	
6,561.4	6,523.5	6,606.0	6,523.5	17.3	21.8	-179.95	-179.95	-781.6	483.5	559.6	524.4	35.20	15.899	
6,600.0	6,562.1	6,644.4	6,561.9	17.3	21.9	-179.94	-179.94	-781.6	483.4	559.6	524.3	35.32	15.843	
6,700.0	6,662.1	6,742.3	6,659.4	17.5	22.0	-179.12	-179.12	-781.7	475.4	559.8	524.3	35.53	15.756	
6,748.1	6,710.2	6,788.3	6,704.7	17.6	22.0	-178.30	-178.30	-781.9	467.4	560.1	524.6	35.57	15.746	
6,750.0	6,712.1	6,790.1	6,706.5	17.6	22.0	-87.27	-87.27	-781.9	467.0	560.2	525.8	34.37	16.296	
6,800.0	6,762.1	6,837.1	6,752.1	17.7	22.0	-86.26	-86.26	-782.1	455.9	560.7	526.2	34.59	16.213	
6,850.0	6,811.8	6,883.5	6,796.4	17.7	22.0	-85.26	-85.26	-782.3	442.2	561.5	526.7	34.75	16.156	
6,900.0	6,861.1	6,929.4	6,839.4	17.7	21.9	-84.29	-84.29	-782.6	426.0	562.4	527.5	34.88	16.124	
6,950.0	6,909.8	6,974.8	6,880.8	17.7	21.9	-83.35	-83.35	-782.9	407.4	563.4	528.5	34.96	16.115	
7,000.0	6,957.6	7,019.8	6,920.7	17.7	21.9	-82.44	-82.44	-783.3	386.7	564.6	529.6	35.01	16.125	
7,050.0	7,004.3	7,064.4	6,959.0	17.7	21.9	-81.57	-81.57	-783.7	363.8	565.8	530.8	35.03	16.151	
7,100.0	7,049.8	7,108.6	6,995.5	17.7	21.8	-80.73	-80.73	-784.1	339.0	567.1	532.1	35.03	16.189	
7,150.0	7,093.8	7,150.0	7,028.5	17.6	21.8	-79.97	-79.97	-784.5	313.9	568.5	533.5	35.02	16.235	
7,200.0	7,136.2	7,195.8	7,063.2	17.6	21.7	-79.17	-79.17	-785.1	284.0	569.9	534.9	35.01	16.276	
7,250.0	7,176.8	7,239.0	7,094.3	17.6	21.7	-78.46	-78.46	-785.6	254.0	571.3	536.3	35.03	16.311	
7,300.0	7,215.3	7,281.9	7,123.4	17.6	21.6	-77.80	-77.80	-786.1	222.6	572.7	537.6	35.07	16.329	
7,350.0	7,251.7	7,324.5	7,150.6	17.6	21.6	-77.18	-77.18	-786.7	189.7	574.1	538.9	35.17	16.322	
7,400.0	7,285.8	7,366.9	7,175.7	17.7	21.6	-76.61	-76.61	-787.3	155.6	575.4	540.1	35.34	16.283	
7,450.0	7,317.4	7,409.1	7,198.8	17.8	21.5	-76.09	-76.09	-787.9	120.4	576.6	541.1	35.59	16.202	
7,500.0	7,346.5	7,450.0	7,219.3	17.9	21.5	-75.63	-75.63	-788.6	84.9	577.8	541.9	35.94	16.077	
7,550.0	7,372.8	7,492.9	7,238.8	18.2	21.4	-75.21	-75.21	-789.2	46.8	578.9	542.4	36.43	15.889	
7,600.0	7,396.2	7,534.5	7,255.6	18.5	21.4	-74.85	-74.85	-789.9	8.6	579.8	542.8	37.05	15.650	
7,650.0	7,416.7	7,576.1	7,270.2	18.9	21.4	-74.54	-74.54	-790.6	-30.2	580.7	542.9	37.80	15.360	
7,700.0	7,434.2	7,617.5	7,282.7	19.4	21.3	-74.29	-74.29	-791.3	-69.7	581.4	542.7	38.70	15.023	
7,750.0	7,448.6	7,658.9	7,293.0	20.0	21.3	-74.09	-74.09	-792.0	-109.8	581.9	542.2	39.73	14.645	
7,800.0	7,459.8	7,700.0	7,301.1	20.7	21.3	-73.95	-73.95	-792.7	-150.1	582.3	541.4	40.91	14.234	
7,850.0	7,467.9	7,741.5	7,307.1	21.4	21.6	-73.87	-73.87	-793.4	-191.1	582.6	540.3	42.23	13.796	
7,868.1	7,470.0	7,756.4	7,308.7	21.7	21.9	-73.85	-73.85	-793.6	-206.0	582.6	539.9	42.73	13.634	
7,900.0	7,473.3	7,782.7	7,310.8	22.3	22.3	-73.79	-73.79	-794.1	-232.2	582.8	539.2	43.65	13.353	
7,942.1	7,477.7	7,817.3	7,312.2	23.0	22.9	-73.58	-73.58	-794.7	-266.7	583.6	538.7	44.88	13.003	
8,000.0	7,482.3	7,871.1	7,312.1	24.0	24.0	-73.11	-73.11	-795.6	-320.5	585.0	538.2	46.77	12.507	
8,064.4	7,484.0	7,935.4	7,311.7	25.3	25.2	-72.89	-72.89	-796.8	-384.8	585.6	536.5	49.13	11.919	
8,100.0	7,483.9	7,971.0	7,311.5	26.0	26.0	-72.88	-72.88	-797.4	-420.4	585.6	535.2	50.49	11.600	

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 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	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			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	7,483.7	8,071.0	7,310.9	28.0	28.1	-72.84	-799.1	-520.4	585.8	531.3	54.47	10.754	
8,300.0	7,483.5	8,171.0	7,310.3	30.2	30.3	-72.81	-800.9	-620.4	585.9	527.3	58.67	9.986	
8,400.0	7,483.3	8,271.0	7,309.7	32.5	32.7	-72.77	-802.6	-720.4	586.1	523.0	63.05	9.295	
8,500.0	7,483.1	8,371.0	7,309.1	34.9	35.0	-72.74	-804.4	-820.3	586.2	518.7	67.57	8.676	
8,600.0	7,482.9	8,471.0	7,308.5	37.3	37.5	-72.70	-806.1	-920.3	586.4	514.2	72.21	8.121	
8,700.0	7,482.7	8,571.0	7,307.9	39.8	40.0	-72.66	-807.9	-1,020.3	586.5	509.6	76.93	7.624	
8,800.0	7,482.5	8,671.0	7,307.3	42.3	42.5	-72.63	-809.6	-1,120.3	586.7	504.9	81.74	7.178	
8,900.0	7,482.3	8,771.0	7,306.8	44.9	45.1	-72.59	-811.4	-1,220.3	586.8	500.2	86.61	6.776	
9,000.0	7,482.1	8,871.0	7,306.2	47.5	47.6	-72.56	-813.1	-1,320.3	587.0	495.5	91.53	6.413	
9,100.0	7,481.9	8,971.0	7,305.6	50.1	50.2	-72.52	-814.9	-1,420.2	587.1	490.6	96.49	6.085	
9,200.0	7,481.7	9,071.0	7,305.0	52.7	52.9	-72.49	-816.6	-1,520.2	587.3	485.8	101.49	5.786	
9,300.0	7,481.5	9,171.0	7,304.4	55.3	55.5	-72.45	-818.4	-1,620.2	587.4	480.9	106.53	5.514	
9,400.0	7,481.3	9,271.0	7,303.8	58.0	58.2	-72.41	-820.1	-1,720.2	587.6	476.0	111.59	5.266	
9,500.0	7,481.1	9,371.0	7,303.2	60.7	60.8	-72.38	-821.9	-1,820.2	587.7	471.0	116.67	5.037	
9,600.0	7,480.9	9,471.0	7,302.6	63.3	63.5	-72.34	-823.6	-1,920.1	587.9	466.1	121.78	4.827	
9,700.0	7,480.7	9,571.0	7,302.0	66.0	66.2	-72.31	-825.4	-2,020.1	588.0	461.1	126.90	4.634	
9,800.0	7,480.5	9,671.0	7,301.4	68.7	68.9	-72.27	-827.1	-2,120.1	588.2	456.1	132.04	4.455	
9,900.0	7,480.3	9,771.0	7,300.8	71.4	71.6	-72.24	-828.9	-2,220.1	588.3	451.1	137.19	4.288	
10,000.0	7,480.1	9,871.0	7,300.2	74.2	74.3	-72.20	-830.6	-2,320.1	588.5	446.1	142.35	4.134	
10,100.0	7,479.9	9,971.0	7,299.6	76.9	77.1	-72.17	-832.4	-2,420.1	588.6	441.1	147.53	3.990	
10,200.0	7,479.7	10,071.0	7,299.0	79.6	79.8	-72.13	-834.1	-2,520.0	588.8	436.1	152.71	3.856	
10,300.0	7,479.5	10,171.0	7,298.4	82.3	82.5	-72.09	-835.9	-2,620.0	588.9	431.0	157.90	3.730	
10,400.0	7,479.3	10,271.0	7,297.9	85.1	85.2	-72.06	-837.6	-2,720.0	589.1	426.0	163.10	3.612	
10,500.0	7,479.1	10,371.0	7,297.3	87.8	88.0	-72.02	-839.4	-2,820.0	589.2	420.9	168.30	3.501	
10,600.0	7,478.9	10,471.0	7,296.7	90.6	90.7	-71.99	-841.1	-2,920.0	589.4	415.9	173.51	3.397	
10,700.0	7,478.7	10,571.0	7,296.1	93.3	93.5	-71.95	-842.9	-3,019.9	589.5	410.8	178.72	3.299	
10,800.0	7,478.5	10,671.0	7,295.5	96.1	96.2	-71.92	-844.6	-3,119.9	589.7	405.7	183.94	3.206	
10,900.0	7,478.3	10,771.0	7,294.9	98.8	99.0	-71.88	-846.4	-3,219.9	589.8	400.7	189.16	3.118	
11,000.0	7,478.1	10,871.0	7,294.3	101.6	101.7	-71.85	-848.1	-3,319.9	590.0	395.6	194.38	3.035	
11,100.0	7,477.9	10,971.0	7,293.7	104.4	104.5	-71.81	-849.9	-3,419.9	590.1	390.5	199.61	2.956	
11,200.0	7,477.7	11,071.0	7,293.1	107.1	107.3	-71.78	-851.6	-3,519.9	590.3	385.5	204.84	2.882	
11,300.0	7,477.5	11,171.0	7,292.5	109.9	110.0	-71.74	-853.4	-3,619.8	590.4	380.4	210.07	2.811	
11,400.0	7,477.3	11,271.0	7,291.9	112.6	112.8	-71.71	-855.1	-3,719.8	590.6	375.3	215.30	2.743	
11,500.0	7,477.1	11,371.0	7,291.3	115.4	115.6	-71.67	-856.9	-3,819.8	590.8	370.2	220.54	2.679	
11,600.0	7,476.9	11,471.0	7,290.7	118.2	118.3	-71.64	-858.6	-3,919.8	590.9	365.1	225.77	2.617	
11,700.0	7,476.7	11,571.0	7,290.1	121.0	121.1	-71.60	-860.4	-4,019.8	591.1	360.1	231.01	2.559	
11,800.0	7,476.5	11,671.0	7,289.5	123.7	123.9	-71.57	-862.1	-4,119.8	591.2	355.0	236.25	2.503	
11,900.0	7,476.3	11,771.0	7,289.0	126.5	126.6	-71.53	-863.9	-4,219.7	591.4	349.9	241.49	2.449	
12,000.0	7,476.1	11,871.0	7,288.4	129.3	129.4	-71.50	-865.6	-4,319.7	591.5	344.8	246.72	2.398	
12,049.1	7,476.0	11,920.1	7,288.1	130.7	130.8	-71.48	-866.5	-4,368.8	591.6	342.3	249.30	2.373 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	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	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	124.39		-43.7	63.9	77.4				
100.0	100.0	100.0	100.0	0.1	0.1	124.39		-43.7	63.9	77.4	77.2	0.22	344.389	
200.0	200.0	200.0	200.0	0.3	0.3	124.39		-43.7	63.9	77.4	76.7	0.67	114.796 CC, ES	
300.0	300.0	297.8	297.8	0.6	0.5	125.07		-45.3	64.5	78.8	77.7	1.10	71.754	
400.0	400.0	395.3	395.2	0.8	0.7	126.96		-49.9	66.3	83.1	81.6	1.53	54.408	
500.0	500.0	492.4	491.9	1.0	1.0	129.70		-57.6	69.4	90.5	88.5	1.98	45.764	
600.0	600.0	588.8	587.6	1.2	1.2	132.84		-68.2	73.6	101.1	98.6	2.45	41.268	
700.0	700.0	684.4	682.1	1.5	1.6	135.99		-81.7	78.9	115.0	112.1	2.95	38.986	
800.0	800.0	778.8	774.9	1.7	1.9	138.93		-97.9	85.3	132.3	128.8	3.49	37.956	
900.0	900.0	874.7	868.6	1.9	2.3	141.52		-116.8	92.8	152.4	148.4	4.06	37.522	
1,000.0	1,000.0	972.4	964.0	2.1	2.8	143.58		-136.3	100.5	173.1	168.5	4.66	37.114	
1,100.0	1,100.0	1,070.1	1,059.4	2.4	3.2	145.20		-155.8	108.2	194.0	188.7	5.28	36.731	
1,200.0	1,200.0	1,167.7	1,154.8	2.6	3.7	146.51		-175.3	116.0	215.0	209.0	5.91	36.386	
1,300.0	1,300.0	1,265.4	1,250.2	2.8	4.1	147.58		-194.7	123.7	236.0	229.5	6.54	36.082	
1,400.0	1,400.0	1,363.1	1,345.6	3.0	4.6	148.48		-214.2	131.4	257.1	250.0	7.18	35.817	
1,500.0	1,500.0	1,460.7	1,441.0	3.3	5.0	149.24		-233.7	139.1	278.3	270.5	7.82	35.584	
1,600.0	1,600.0	1,558.4	1,536.4	3.5	5.5	149.89		-253.2	146.8	299.6	291.1	8.47	35.380	
1,700.0	1,700.0	1,656.1	1,631.8	3.7	5.9	150.46		-272.7	154.6	320.8	311.7	9.11	35.200	
1,800.0	1,800.0	1,753.8	1,727.2	3.9	6.4	150.95		-292.2	162.3	342.1	332.3	9.76	35.041	
1,900.0	1,900.0	1,851.4	1,822.6	4.2	6.9	151.39		-311.7	170.0	363.4	353.0	10.41	34.899	
2,000.0	2,000.0	1,949.1	1,917.9	4.4	7.3	151.78		-331.2	177.7	384.7	373.6	11.06	34.772	
2,100.0	2,100.0	2,047.0	2,013.6	4.6	7.8	37.40		-350.7	185.5	404.7	395.1	9.56	42.316	
2,200.0	2,199.8	2,145.4	2,109.6	4.8	8.2	37.93		-370.4	193.2	422.0	412.0	10.02	42.133	
2,300.0	2,299.5	2,244.0	2,206.0	5.0	8.7	38.72		-390.0	201.0	436.7	426.2	10.47	41.718	
2,400.0	2,398.7	2,342.8	2,302.5	5.2	9.2	39.77		-409.8	208.8	448.8	437.9	10.92	41.095	
2,423.5	2,422.0	2,366.1	2,325.2	5.2	9.3	40.05		-414.4	210.7	451.3	440.3	11.03	40.920	
2,500.0	2,497.6	2,441.7	2,399.1	5.4	9.6	41.07		-429.5	216.7	459.3	447.9	11.39	40.328	
2,600.0	2,596.5	2,540.6	2,495.7	5.7	10.1	42.35		-449.2	224.5	469.9	458.1	11.87	39.586	
2,700.0	2,695.4	2,639.5	2,592.2	5.9	10.6	43.57		-469.0	232.3	480.8	468.5	12.37	38.878	
2,800.0	2,794.4	2,738.4	2,688.8	6.2	11.0	44.75		-488.7	240.1	491.9	479.0	12.88	38.202	
2,900.0	2,893.3	2,837.3	2,785.4	6.5	11.5	45.87		-508.4	247.9	503.2	489.8	13.40	37.557	
3,000.0	2,992.2	2,936.1	2,882.0	6.8	12.0	46.94		-528.2	255.7	514.6	500.7	13.93	36.941	
3,100.0	3,091.1	3,035.0	2,978.6	7.1	12.5	47.96		-547.9	263.6	526.3	511.8	14.48	36.353	
3,200.0	3,190.0	3,133.9	3,075.2	7.4	12.9	48.94		-567.6	271.4	538.0	523.0	15.03	35.792	
3,300.0	3,288.9	3,232.8	3,171.7	7.7	13.4	49.88		-587.4	279.2	550.0	534.4	15.60	35.257	
3,400.0	3,387.8	3,331.7	3,268.3	8.0	13.9	50.77		-607.1	287.0	562.1	545.9	16.18	34.746	
3,500.0	3,486.7	3,430.6	3,364.9	8.3	14.3	51.63		-626.9	294.8	574.3	557.5	16.76	34.260	
3,600.0	3,585.6	3,529.5	3,461.5	8.6	14.8	52.46		-646.6	302.6	586.6	569.2	17.36	33.796	
3,700.0	3,684.5	3,628.4	3,558.1	8.9	15.3	53.25		-666.3	310.4	599.1	581.1	17.96	33.355	
3,800.0	3,783.4	3,727.2	3,654.7	9.3	15.7	54.01		-686.1	318.3	611.6	593.0	18.57	32.934	
3,900.0	3,882.4	3,826.1	3,751.2	9.6	16.2	54.74		-705.8	326.1	624.3	605.1	19.19	32.532	
4,000.0	3,981.3	3,925.0	3,847.8	9.9	16.7	55.43		-725.5	333.9	637.0	617.2	19.81	32.150	
4,100.0	4,080.2	4,023.9	3,944.4	10.3	17.1	56.11		-745.3	341.7	649.9	629.4	20.45	31.786	
4,200.0	4,179.1	4,122.8	4,041.0	10.6	17.6	56.75		-765.0	349.5	662.8	641.7	21.08	31.438	
4,300.0	4,278.0	4,221.7	4,137.6	10.9	18.1	57.37		-784.7	357.3	675.8	654.1	21.73	31.107	
4,400.0	4,376.9	4,320.6	4,234.1	11.3	18.5	57.97		-804.5	365.2	688.9	666.5	22.37	30.791	
4,500.0	4,475.8	4,419.5	4,330.7	11.6	19.0	58.55		-824.2	373.0	702.0	679.0	23.03	30.490	
4,600.0	4,574.7	4,518.3	4,427.3	11.9	19.5	59.10		-843.9	380.8	715.3	691.6	23.68	30.202	
4,700.0	4,673.6	4,617.2	4,523.9	12.3	20.0	59.64		-863.7	388.6	728.6	704.2	24.34	29.927	
4,800.0	4,772.5	4,716.1	4,620.5	12.6	20.4	60.15		-883.4	396.4	741.9	716.9	25.01	29.665	
4,900.0	4,871.4	4,815.0	4,717.1	13.0	20.9	60.65		-903.1	404.2	755.3	729.6	25.68	29.414	

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 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	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						
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
5,000.0	4,970.4	4,913.9	4,813.6	13.3	21.4	61.13	-922.9	412.0	768.8	742.4	26.35	29.174	
5,100.0	5,069.3	5,012.8	4,910.2	13.7	21.8	61.59	-942.6	419.9	782.3	755.3	27.03	28.945	
5,200.0	5,168.2	5,111.7	5,006.8	14.0	22.3	62.04	-962.3	427.7	795.8	768.1	27.71	28.725	
5,300.0	5,267.1	5,210.6	5,103.4	14.4	22.8	62.47	-982.1	435.5	809.4	781.1	28.39	28.514	
5,400.0	5,366.0	5,309.4	5,200.0	14.7	23.2	62.89	-1,001.8	443.3	823.1	794.0	29.07	28.313	
5,500.0	5,464.9	5,408.3	5,296.6	15.1	23.7	63.29	-1,021.6	451.1	836.8	807.0	29.76	28.120	
5,600.0	5,563.8	5,510.4	5,396.2	15.4	24.2	63.70	-1,041.9	459.2	850.5	820.0	30.45	27.929	
5,614.4	5,578.0	5,530.1	5,415.5	15.5	24.2	63.78	-1,045.7	460.7	852.4	821.8	30.56	27.893	
5,700.0	5,662.9	5,648.0	5,531.4	15.7	24.6	64.39	-1,065.8	468.7	862.2	831.1	31.15	27.678	
5,800.0	5,762.4	5,786.6	5,668.6	15.9	24.9	64.92	-1,083.8	475.8	871.0	839.3	31.73	27.449	
5,900.0	5,862.2	5,925.9	5,807.3	16.1	25.2	65.26	-1,095.7	480.5	876.8	844.6	32.22	27.214	
6,000.0	5,962.1	6,065.7	5,947.0	16.3	25.4	65.42	-1,101.3	482.7	879.5	846.9	32.61	26.969	
6,037.9	6,000.0	6,118.7	6,000.0	16.4	25.4	-179.93	-1,101.7	482.9	879.7	841.6	38.08	23.100	
6,100.0	6,062.1	6,180.8	6,062.1	16.5	25.5	-179.93	-1,101.7	482.9	879.7	841.5	38.27	22.989	
6,200.0	6,162.1	6,280.8	6,162.1	16.6	25.6	-179.93	-1,101.7	482.9	879.7	841.2	38.55	22.818	
6,300.0	6,262.1	6,380.8	6,262.1	16.8	25.7	-179.93	-1,101.7	482.9	879.7	840.9	38.84	22.650	
6,400.0	6,362.1	6,480.8	6,362.1	17.0	25.8	-179.93	-1,101.7	482.9	879.7	840.6	39.13	22.483	
6,500.0	6,462.1	6,580.8	6,462.1	17.2	25.9	-179.93	-1,101.7	482.9	879.7	840.3	39.42	22.316	
6,600.0	6,562.1	6,680.8	6,562.1	17.3	26.0	-179.93	-1,101.7	482.9	879.7	840.0	39.71	22.151	
6,700.0	6,662.1	6,780.8	6,662.1	17.5	26.1	-179.93	-1,101.7	482.9	879.7	839.7	40.01	21.987	
6,748.1	6,710.2	6,828.9	6,710.2	17.6	26.1	-179.93	-1,101.7	482.9	879.7	839.6	40.15	21.908	
6,750.0	6,712.1	6,830.8	6,712.1	17.6	26.1	-88.94	-1,101.7	482.9	879.7	844.7	35.02	25.118	
6,800.0	6,762.1	6,879.7	6,761.0	17.7	26.2	-88.94	-1,101.8	481.2	879.7	844.6	35.15	25.026	
6,850.0	6,811.8	6,928.7	6,809.7	17.7	26.2	-88.95	-1,101.8	476.4	879.7	844.5	35.24	24.965	
6,900.0	6,861.1	6,977.6	6,858.0	17.7	26.2	-88.96	-1,102.0	468.5	879.7	844.4	35.28	24.934	
6,950.0	6,909.8	7,026.6	6,905.7	17.7	26.2	-88.97	-1,102.2	457.5	879.7	844.4	35.29	24.929	
7,000.0	6,957.6	7,075.6	6,952.6	17.7	26.2	-88.99	-1,102.4	443.4	879.7	844.5	35.26	24.946	
7,050.0	7,004.3	7,124.6	6,998.5	17.7	26.2	-89.02	-1,102.7	426.4	879.7	844.5	35.22	24.979	
7,100.0	7,049.8	7,173.6	7,043.3	17.7	26.2	-89.05	-1,103.1	406.5	879.7	844.6	35.16	25.021	
7,150.0	7,093.8	7,222.6	7,086.7	17.6	26.2	-89.08	-1,103.5	383.7	879.7	844.6	35.10	25.063	
7,161.4	7,103.6	7,233.8	7,096.4	17.6	26.2	-89.09	-1,103.6	378.1	879.7	844.6	35.09	25.071	
7,200.0	7,136.2	7,271.7	7,128.6	17.6	26.1	-89.12	-1,103.9	358.2	879.7	844.7	35.06	25.095	
7,250.0	7,176.8	7,320.9	7,168.9	17.6	26.1	-89.16	-1,104.4	330.0	879.7	844.7	35.04	25.105	
7,300.0	7,215.3	7,370.0	7,207.2	17.6	26.1	-89.20	-1,105.0	299.2	879.7	844.6	35.08	25.080	
7,350.0	7,251.7	7,419.2	7,243.5	17.6	26.0	-89.25	-1,105.5	266.0	879.7	844.5	35.18	25.007	
7,400.0	7,285.8	7,468.5	7,277.7	17.7	26.0	-89.30	-1,106.2	230.5	879.7	844.4	35.37	24.871	
7,450.0	7,317.4	7,517.8	7,309.5	17.8	25.9	-89.35	-1,106.8	192.9	879.7	844.1	35.67	24.663	
7,500.0	7,346.5	7,567.2	7,338.8	17.9	25.9	-89.41	-1,107.5	153.2	879.7	843.6	36.09	24.373	
7,550.0	7,372.8	7,616.6	7,365.6	18.2	25.8	-89.47	-1,108.3	111.7	879.7	843.1	36.66	23.997	
7,600.0	7,396.2	7,666.1	7,389.6	18.5	25.8	-89.53	-1,109.0	68.4	879.7	842.4	37.38	23.537	
7,650.0	7,416.7	7,715.6	7,410.9	18.9	25.8	-89.59	-1,109.8	23.7	879.8	841.5	38.25	22.999	
7,700.0	7,434.2	7,765.2	7,429.1	19.4	25.8	-89.65	-1,110.6	-22.4	879.8	840.5	39.29	22.394	
7,750.0	7,448.6	7,814.9	7,444.4	20.0	25.8	-89.72	-1,111.5	-69.7	879.8	839.3	40.48	21.736	
7,800.0	7,459.8	7,864.6	7,456.6	20.7	25.8	-89.79	-1,112.3	-117.9	879.8	838.0	41.81	21.044	
7,850.0	7,467.9	7,914.4	7,465.7	21.4	25.8	-89.86	-1,113.2	-166.8	879.8	836.5	43.28	20.329	
7,868.1	7,470.0	7,932.5	7,468.1	21.7	25.9	-89.88	-1,113.5	-184.7	879.8	836.0	43.84	20.068	
7,900.0	7,473.3	7,964.4	7,471.7	22.3	25.9	-89.89	-1,114.1	-216.4	879.8	834.9	44.87	19.608	
7,942.1	7,477.7	8,006.5	7,476.1	23.0	26.1	-89.89	-1,114.8	-258.2	879.8	833.5	46.30	19.004	
8,000.0	7,482.3	8,064.3	7,481.3	24.0	26.5	-89.94	-1,115.8	-315.8	879.9	831.5	48.38	18.185	
8,064.4	7,484.0	8,128.7	7,483.9	25.3	27.2	-89.99	-1,116.9	-380.1	879.9	829.1	50.81	17.316	
8,100.0	7,483.9	8,164.3	7,483.9	26.0	27.7	-90.00	-1,117.6	-415.7	879.9	827.7	52.21	16.852	

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 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	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	7,483.7	8,264.3	7,483.7	28.0	29.5	-90.00	-1,119.3	-515.7	879.9	823.6	56.35	15.616		
8,300.0	7,483.5	8,364.3	7,483.5	30.2	31.5	-90.00	-1,121.1	-615.7	880.0	819.3	60.71	14.494		
8,400.0	7,483.3	8,464.3	7,483.3	32.5	33.7	-90.00	-1,122.8	-715.7	880.0	814.8	65.27	13.484		
8,500.0	7,483.1	8,564.3	7,483.1	34.9	36.0	-90.00	-1,124.6	-815.7	880.1	810.1	69.97	12.577		
8,600.0	7,482.9	8,664.3	7,482.9	37.3	38.4	-90.00	-1,126.4	-915.7	880.1	805.3	74.80	11.765		
8,700.0	7,482.7	8,764.3	7,482.7	39.8	40.8	-90.00	-1,128.1	-1,015.6	880.1	800.4	79.74	11.038		
8,800.0	7,482.5	8,864.3	7,482.5	42.3	43.3	-90.00	-1,129.9	-1,115.6	880.2	795.4	84.76	10.385		
8,900.0	7,482.3	8,964.3	7,482.3	44.9	45.8	-90.00	-1,131.6	-1,215.6	880.2	790.4	89.85	9.797		
9,000.0	7,482.1	9,064.3	7,482.1	47.5	48.3	-90.00	-1,133.4	-1,315.6	880.3	785.3	94.99	9.267		
9,100.0	7,481.9	9,164.3	7,481.9	50.1	50.9	-90.00	-1,135.2	-1,415.6	880.3	780.1	100.19	8.786		
9,200.0	7,481.7	9,264.3	7,481.7	52.7	53.5	-90.00	-1,136.9	-1,515.6	880.4	774.9	105.43	8.350		
9,300.0	7,481.5	9,364.3	7,481.5	55.3	56.1	-90.00	-1,138.7	-1,615.6	880.4	769.7	110.71	7.952		
9,400.0	7,481.3	9,464.3	7,481.3	58.0	58.7	-90.00	-1,140.4	-1,715.5	880.4	764.4	116.02	7.589		
9,500.0	7,481.1	9,564.3	7,481.1	60.7	61.3	-90.00	-1,142.2	-1,815.5	880.5	759.1	121.35	7.256		
9,600.0	7,480.9	9,664.3	7,480.9	63.3	64.0	-90.00	-1,144.0	-1,915.5	880.5	753.8	126.71	6.949		
9,700.0	7,480.7	9,764.3	7,480.7	66.0	66.7	-90.00	-1,145.7	-2,015.5	880.6	748.5	132.09	6.667		
9,800.0	7,480.5	9,864.3	7,480.5	68.7	69.3	-90.00	-1,147.5	-2,115.5	880.6	743.1	137.49	6.405		
9,900.0	7,480.3	9,964.3	7,480.3	71.4	72.0	-90.00	-1,149.2	-2,215.5	880.7	737.8	142.90	6.163		
10,000.0	7,480.1	10,064.3	7,480.1	74.2	74.7	-90.00	-1,151.0	-2,315.4	880.7	732.4	148.33	5.937		
10,100.0	7,479.9	10,164.3	7,479.9	76.9	77.4	-90.00	-1,152.8	-2,415.4	880.7	727.0	153.77	5.728		
10,200.0	7,479.7	10,264.3	7,479.7	79.6	80.1	-90.00	-1,154.5	-2,515.4	880.8	721.6	159.23	5.532		
10,300.0	7,479.5	10,364.3	7,479.5	82.3	82.9	-90.00	-1,156.3	-2,615.4	880.8	716.1	164.69	5.348		
10,400.0	7,479.3	10,464.3	7,479.3	85.1	85.6	-90.00	-1,158.0	-2,715.4	880.9	710.7	170.16	5.177		
10,500.0	7,479.1	10,564.3	7,479.1	87.8	88.3	-90.00	-1,159.8	-2,815.4	880.9	705.3	175.65	5.015		
10,600.0	7,478.9	10,664.3	7,478.9	90.6	91.0	-90.00	-1,161.6	-2,915.4	881.0	699.8	181.14	4.863		
10,700.0	7,478.7	10,764.3	7,478.7	93.3	93.8	-90.00	-1,163.3	-3,015.3	881.0	694.4	186.63	4.720		
10,800.0	7,478.5	10,864.3	7,478.5	96.1	96.5	-90.00	-1,165.1	-3,115.3	881.0	688.9	192.14	4.585		
10,900.0	7,478.3	10,964.3	7,478.3	98.8	99.3	-90.00	-1,166.8	-3,215.3	881.1	683.4	197.65	4.458		
11,000.0	7,478.1	11,064.3	7,478.1	101.6	102.0	-90.00	-1,168.6	-3,315.3	881.1	678.0	203.16	4.337		
11,100.0	7,477.9	11,164.3	7,477.9	104.4	104.8	-90.00	-1,170.4	-3,415.3	881.2	672.5	208.68	4.222		
11,200.0	7,477.7	11,264.3	7,477.7	107.1	107.5	-90.00	-1,172.1	-3,515.3	881.2	667.0	214.21	4.114		
11,300.0	7,477.5	11,364.3	7,477.5	109.9	110.3	-90.00	-1,173.9	-3,615.2	881.2	661.5	219.74	4.010		
11,400.0	7,477.3	11,464.3	7,477.3	112.6	113.0	-90.00	-1,175.6	-3,715.2	881.3	656.0	225.27	3.912		
11,500.0	7,477.1	11,564.3	7,477.1	115.4	115.8	-90.00	-1,177.4	-3,815.2	881.3	650.5	230.81	3.818		
11,600.0	7,476.9	11,664.3	7,476.9	118.2	118.5	-90.00	-1,179.2	-3,915.2	881.4	645.0	236.35	3.729		
11,700.0	7,476.7	11,764.3	7,476.7	121.0	121.3	-90.00	-1,180.9	-4,015.2	881.4	639.5	241.89	3.644		
11,800.0	7,476.5	11,864.3	7,476.5	123.7	124.1	-90.00	-1,182.7	-4,115.2	881.5	634.0	247.44	3.562		
11,900.0	7,476.3	11,964.3	7,476.3	126.5	126.8	-90.00	-1,184.4	-4,215.1	881.5	628.5	252.99	3.484		
12,000.0	7,476.1	12,064.3	7,476.1	129.3	129.6	-90.00	-1,186.2	-4,315.1	881.5	623.0	258.54	3.410		
12,049.1	7,476.0	12,113.4	7,476.0	130.7	131.0	-90.00	-1,187.1	-4,364.2	881.6	620.3	261.27	3.374 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
Reference Site:	Thornton 11C-HZ Pad Sec.11-T7N-R66W	MD Reference:	WELL @ 4976.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thornton 11V-404	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 (10-15-12)	Offset TVD Reference:	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

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.49°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Thornton 11V-404
Project:	SEC.11-T7N-R66W	TVD Reference:	WELL @ 4976.0ft (RKB - 15')
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