PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Bolton 7X-434**

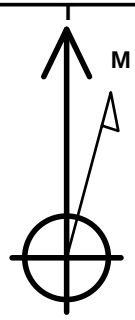
Surface Location: PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 5151.0

+N/-S	+E/-W	Northing	Easting	Latittude	Longitude	Slot
0.0	0.0	1328418.01	3129212.45	40.233980	-105.037190	

Original Well Elev WELL @ 5166.0ft (Original Well Elev)

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 370'FSL & 211'FEL	1.0	0.0	0.0	Point
BHL 876'FSL & 500'FWL	7139.0	444.9	-4481.2	Point



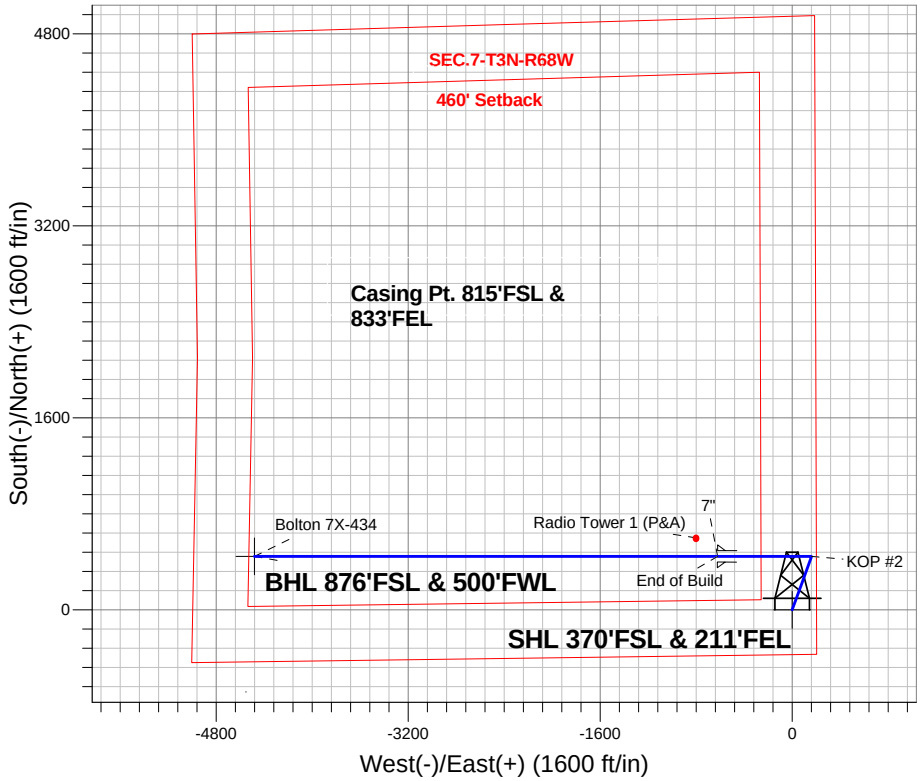
Azimuths to True North
Magnetic North: 8.58°

Magnetic Field
Strength: 52688.0snT
Dip Angle: 66.77°
Date: 7/15/2014
Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
1200.0	1200.0	KOP #1
6470.2	6501.7	KOP #2
7234.0	7720.5	End of Build

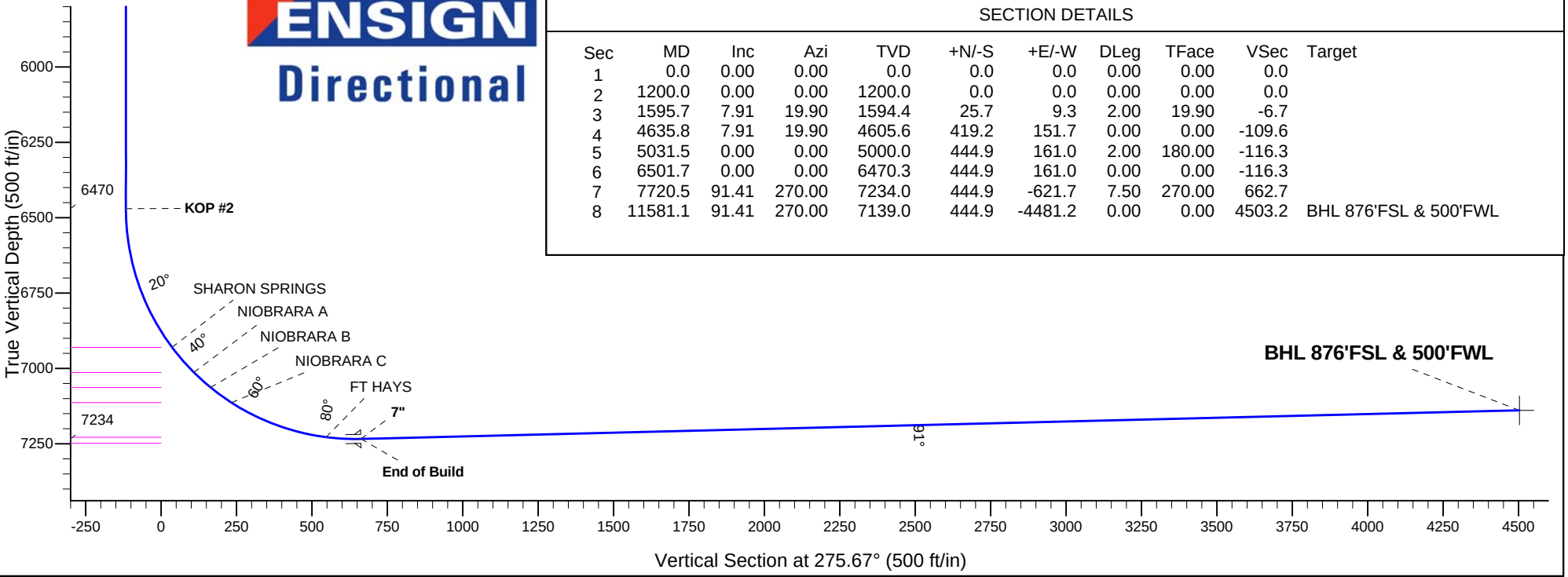
PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W
Bolton 7X-434
Plan #1 (7-15-14)



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	1200.0	0.00	0.00	1200.0	0.0	0.0	0.00	0.00	0.0	
3	1595.7	7.91	19.90	1594.4	25.7	9.3	2.00	19.90	-6.7	
4	4635.8	7.91	19.90	4605.6	419.2	151.7	0.00	0.00	-109.6	
5	5031.5	0.00	0.00	5000.0	444.9	161.0	2.00	180.00	-116.3	
6	6501.7	0.00	0.00	6470.3	444.9	161.0	0.00	0.00	-116.3	
7	7720.5	91.41	270.00	7234.0	444.9	-621.7	7.50	270.00	662.7	
8	11581.1	91.41	270.00	7139.0	444.9	-4481.2	0.00	0.00	4503.2	BHL 876'FSL & 500'FWL



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.7-T3N-68W
PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W
Bolton 7X-434

Wellbore #1

Plan: Plan #1 (7-15-14)

Standard Planning Report

18 July, 2014

Database:	landmark	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Project:	SEC.7-T3N-68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**North Reference:**	True
Well:	Bolton 7X-434	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-15-14)		

Project SEC.7-T3N-68W, Weld County, CO

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 PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W

Site Position:		**Northing:**	1,328,450.81 ft	**Latitude:**	40.234070
From:	Lat/Long	**Easting:**	3,129,212.27 ft	**Longitude:**	-105.037190
Position Uncertainty:	0.0 ft	**Slot Radius:**	"	**Grid Convergence:**	0.30 °

Well Bolton 7X-434

Well Position	**+N/-S**	-32.8 ft	**Northing:**	1,328,418.01 ft	**Latitude:**	40.233980
	+E/-W	0.0 ft	**Easting:**	3,129,212.45 ft	**Longitude:**	-105.037190
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	5,151.0 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/15/2014	8.58	66.77	52,688

Design Plan #1 (7-15-14)

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	275.67

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	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,595.7	7.91	19.90	1,594.4	25.7	9.3	2.00	2.00	0.00	19.90	
4,635.8	7.91	19.90	4,605.6	419.2	151.7	0.00	0.00	0.00	0.00	
5,031.5	0.00	0.00	5,000.0	444.9	161.0	2.00	-2.00	0.00	180.00	
6,501.7	0.00	0.00	6,470.3	444.9	161.0	0.00	0.00	0.00	0.00	
7,720.5	91.41	270.00	7,234.0	444.9	-621.7	7.50	7.50	0.00	270.00	
11,581.1	91.41	270.00	7,139.0	444.9	-4,481.2	0.00	0.00	0.00	0.00	BHL 876'FSL & 50(

Database:	landmark	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Project:	SEC.7-T3N-68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**North Reference:**	True
Well:	Bolton 7X-434	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-15-14)		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	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
KOP #1									
1,300.0	2.00	19.90	1,300.0	1.6	0.6	-0.4	2.00	2.00	0.00
1,400.0	4.00	19.90	1,399.8	6.6	2.4	-1.7	2.00	2.00	0.00
1,500.0	6.00	19.90	1,499.5	14.8	5.3	-3.9	2.00	2.00	0.00
1,595.7	7.91	19.90	1,594.4	25.7	9.3	-6.7	2.00	2.00	0.00
1,600.0	7.91	19.90	1,598.7	26.2	9.5	-6.9	0.00	0.00	0.00
1,700.0	7.91	19.90	1,697.7	39.2	14.2	-10.2	0.00	0.00	0.00
1,800.0	7.91	19.90	1,796.8	52.1	18.9	-13.6	0.00	0.00	0.00
1,900.0	7.91	19.90	1,895.8	65.0	23.5	-17.0	0.00	0.00	0.00
2,000.0	7.91	19.90	1,994.9	78.0	28.2	-20.4	0.00	0.00	0.00
2,100.0	7.91	19.90	2,093.9	90.9	32.9	-23.8	0.00	0.00	0.00
2,200.0	7.91	19.90	2,193.0	103.9	37.6	-27.2	0.00	0.00	0.00
2,300.0	7.91	19.90	2,292.0	116.8	42.3	-30.5	0.00	0.00	0.00
2,400.0	7.91	19.90	2,391.1	129.8	47.0	-33.9	0.00	0.00	0.00
2,500.0	7.91	19.90	2,490.1	142.7	51.7	-37.3	0.00	0.00	0.00
2,600.0	7.91	19.90	2,589.2	155.7	56.3	-40.7	0.00	0.00	0.00
2,700.0	7.91	19.90	2,688.2	168.6	61.0	-44.1	0.00	0.00	0.00
2,800.0	7.91	19.90	2,787.3	181.6	65.7	-47.4	0.00	0.00	0.00
2,900.0	7.91	19.90	2,886.3	194.5	70.4	-50.8	0.00	0.00	0.00
3,000.0	7.91	19.90	2,985.4	207.4	75.1	-54.2	0.00	0.00	0.00
3,100.0	7.91	19.90	3,084.4	220.4	79.8	-57.6	0.00	0.00	0.00
3,200.0	7.91	19.90	3,183.5	233.3	84.4	-61.0	0.00	0.00	0.00
3,300.0	7.91	19.90	3,282.5	246.3	89.1	-64.4	0.00	0.00	0.00
3,400.0	7.91	19.90	3,381.6	259.2	93.8	-67.7	0.00	0.00	0.00
3,449.9	7.91	19.90	3,431.0	265.7	96.2	-69.4	0.00	0.00	0.00
PARKMAN									
3,500.0	7.91	19.90	3,480.6	272.2	98.5	-71.1	0.00	0.00	0.00
3,600.0	7.91	19.90	3,579.7	285.1	103.2	-74.5	0.00	0.00	0.00
3,700.0	7.91	19.90	3,678.7	298.1	107.9	-77.9	0.00	0.00	0.00
3,800.0	7.91	19.90	3,777.8	311.0	112.6	-81.3	0.00	0.00	0.00
3,872.9	7.91	19.90	3,850.0	320.5	116.0	-83.8	0.00	0.00	0.00
SUSSEX									
3,900.0	7.91	19.90	3,876.8	324.0	117.2	-84.7	0.00	0.00	0.00
4,000.0	7.91	19.90	3,975.8	336.9	121.9	-88.0	0.00	0.00	0.00
4,100.0	7.91	19.90	4,074.9	349.8	126.6	-91.4	0.00	0.00	0.00
4,200.0	7.91	19.90	4,173.9	362.8	131.3	-94.8	0.00	0.00	0.00
4,300.0	7.91	19.90	4,273.0	375.7	136.0	-98.2	0.00	0.00	0.00
4,400.0	7.91	19.90	4,372.0	388.7	140.7	-101.6	0.00	0.00	0.00
4,453.5	7.91	19.90	4,425.0	395.6	143.2	-103.4	0.00	0.00	0.00

Database:	landmark	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Project:	SEC.7-T3N-68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**North Reference:**	True
Well:	Bolton 7X-434	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-15-14)		

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)
SHANNON									
4,500.0	7.91	19.90	4,471.1	401.6	145.4	-105.0	0.00	0.00	0.00
4,600.0	7.91	19.90	4,570.1	414.6	150.0	-108.3	0.00	0.00	0.00
4,635.8	7.91	19.90	4,605.6	419.2	151.7	-109.6	0.00	0.00	0.00
4,700.0	6.63	19.90	4,669.3	426.9	154.5	-111.6	2.00	-2.00	0.00
4,800.0	4.63	19.90	4,768.8	436.1	157.8	-114.0	2.00	-2.00	0.00
4,900.0	2.63	19.90	4,868.6	442.0	160.0	-115.5	2.00	-2.00	0.00
5,000.0	0.63	19.90	4,968.5	444.7	160.9	-116.2	2.00	-2.00	0.00
5,031.5	0.00	0.00	5,000.0	444.9	161.0	-116.3	2.00	-2.00	0.00
5,100.0	0.00	0.00	5,068.5	444.9	161.0	-116.3	0.00	0.00	0.00
5,200.0	0.00	0.00	5,168.5	444.9	161.0	-116.3	0.00	0.00	0.00
5,300.0	0.00	0.00	5,268.5	444.9	161.0	-116.3	0.00	0.00	0.00
5,400.0	0.00	0.00	5,368.5	444.9	161.0	-116.3	0.00	0.00	0.00
5,500.0	0.00	0.00	5,468.5	444.9	161.0	-116.3	0.00	0.00	0.00
5,600.0	0.00	0.00	5,568.5	444.9	161.0	-116.3	0.00	0.00	0.00
5,700.0	0.00	0.00	5,668.5	444.9	161.0	-116.3	0.00	0.00	0.00
5,800.0	0.00	0.00	5,768.5	444.9	161.0	-116.3	0.00	0.00	0.00
5,900.0	0.00	0.00	5,868.5	444.9	161.0	-116.3	0.00	0.00	0.00
6,000.0	0.00	0.00	5,968.5	444.9	161.0	-116.3	0.00	0.00	0.00
6,100.0	0.00	0.00	6,068.5	444.9	161.0	-116.3	0.00	0.00	0.00
6,200.0	0.00	0.00	6,168.5	444.9	161.0	-116.3	0.00	0.00	0.00
6,300.0	0.00	0.00	6,268.5	444.9	161.0	-116.3	0.00	0.00	0.00
6,400.0	0.00	0.00	6,368.5	444.9	161.0	-116.3	0.00	0.00	0.00
6,500.0	0.00	0.00	6,468.5	444.9	161.0	-116.3	0.00	0.00	0.00
6,501.7	0.00	0.00	6,470.2	444.9	161.0	-116.3	0.00	0.00	0.00
KOP #2									
6,600.0	7.37	270.00	6,568.3	444.9	154.7	-110.0	7.50	7.50	0.00
6,700.0	14.87	270.00	6,666.3	444.9	135.4	-90.8	7.50	7.50	0.00
6,800.0	22.37	270.00	6,761.0	444.9	103.5	-59.1	7.50	7.50	0.00
6,900.0	29.87	270.00	6,850.7	444.9	59.5	-15.3	7.50	7.50	0.00
6,995.0	37.00	270.00	6,930.0	444.9	7.2	36.8	7.50	7.50	0.00
SHARON SPRINGS									
7,000.0	37.37	270.00	6,934.0	444.9	4.2	39.8	7.50	7.50	0.00
7,100.0	44.87	270.00	7,009.2	444.9	-61.5	105.2	7.50	7.50	0.00
7,105.3	45.27	270.00	7,013.0	444.9	-65.3	108.9	7.50	7.50	0.00
NIOBRARA A									
7,180.2	50.88	270.00	7,063.0	444.9	-121.0	164.3	7.50	7.50	0.00
NIOBRARA B									
7,200.0	52.37	270.00	7,075.3	444.9	-136.5	179.8	7.50	7.50	0.00
7,265.5	57.28	270.00	7,113.0	444.9	-190.0	233.0	7.50	7.50	0.00
NIOBRARA C									
7,300.0	59.87	270.00	7,131.0	444.9	-219.5	262.3	7.50	7.50	0.00
7,400.0	67.37	270.00	7,175.4	444.9	-309.0	351.4	7.50	7.50	0.00
7,500.0	74.87	270.00	7,207.7	444.9	-403.5	445.5	7.50	7.50	0.00
7,600.0	82.37	270.00	7,227.5	444.9	-501.5	543.0	7.50	7.50	0.00
7,604.1	82.68	270.00	7,228.0	444.9	-505.6	547.1	7.50	7.50	0.00
FT HAYS									
7,700.0	89.87	270.00	7,234.2	444.9	-601.2	642.2	7.50	7.50	0.00
7,720.5	91.41	270.00	7,234.0	444.9	-621.7	662.6	7.50	7.50	0.00
End of Build - 7"									
7,800.0	91.41	270.00	7,232.0	444.9	-701.2	741.7	0.00	0.00	0.00

Database:	landmark	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Project:	SEC.7-T3N-68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**North Reference:**	True
Well:	Bolton 7X-434	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-15-14)		

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)
7,900.0	91.41	270.00	7,229.6	444.9	-801.1	841.2	0.00	0.00	0.00
8,000.0	91.41	270.00	7,227.1	444.9	-901.1	940.7	0.00	0.00	0.00
8,100.0	91.41	270.00	7,224.7	444.9	-1,001.1	1,040.1	0.00	0.00	0.00
8,200.0	91.41	270.00	7,222.2	444.9	-1,101.1	1,139.6	0.00	0.00	0.00
8,300.0	91.41	270.00	7,219.7	444.9	-1,201.0	1,239.1	0.00	0.00	0.00
8,400.0	91.41	270.00	7,217.3	444.9	-1,301.0	1,338.6	0.00	0.00	0.00
8,500.0	91.41	270.00	7,214.8	444.9	-1,401.0	1,438.1	0.00	0.00	0.00
8,600.0	91.41	270.00	7,212.4	444.9	-1,500.9	1,537.5	0.00	0.00	0.00
8,700.0	91.41	270.00	7,209.9	444.9	-1,600.9	1,637.0	0.00	0.00	0.00
8,800.0	91.41	270.00	7,207.4	444.9	-1,700.9	1,736.5	0.00	0.00	0.00
8,900.0	91.41	270.00	7,205.0	444.9	-1,800.8	1,836.0	0.00	0.00	0.00
9,000.0	91.41	270.00	7,202.5	444.9	-1,900.8	1,935.5	0.00	0.00	0.00
9,100.0	91.41	270.00	7,200.1	444.9	-2,000.8	2,034.9	0.00	0.00	0.00
9,200.0	91.41	270.00	7,197.6	444.9	-2,100.7	2,134.4	0.00	0.00	0.00
9,300.0	91.41	270.00	7,195.1	444.9	-2,200.7	2,233.9	0.00	0.00	0.00
9,400.0	91.41	270.00	7,192.7	444.9	-2,300.7	2,333.4	0.00	0.00	0.00
9,500.0	91.41	270.00	7,190.2	444.9	-2,400.7	2,432.9	0.00	0.00	0.00
9,600.0	91.41	270.00	7,187.7	444.9	-2,500.6	2,532.3	0.00	0.00	0.00
9,700.0	91.41	270.00	7,185.3	444.9	-2,600.6	2,631.8	0.00	0.00	0.00
9,800.0	91.41	270.00	7,182.8	444.9	-2,700.6	2,731.3	0.00	0.00	0.00
9,900.0	91.41	270.00	7,180.4	444.9	-2,800.5	2,830.8	0.00	0.00	0.00
10,000.0	91.41	270.00	7,177.9	444.9	-2,900.5	2,930.3	0.00	0.00	0.00
10,100.0	91.41	270.00	7,175.4	444.9	-3,000.5	3,029.7	0.00	0.00	0.00
10,200.0	91.41	270.00	7,173.0	444.9	-3,100.4	3,129.2	0.00	0.00	0.00
10,300.0	91.41	270.00	7,170.5	444.9	-3,200.4	3,228.7	0.00	0.00	0.00
10,400.0	91.41	270.00	7,168.1	444.9	-3,300.4	3,328.2	0.00	0.00	0.00
10,500.0	91.41	270.00	7,165.6	444.9	-3,400.4	3,427.7	0.00	0.00	0.00
10,600.0	91.41	270.00	7,163.1	444.9	-3,500.3	3,527.2	0.00	0.00	0.00
10,700.0	91.41	270.00	7,160.7	444.9	-3,600.3	3,626.6	0.00	0.00	0.00
10,800.0	91.41	270.00	7,158.2	444.9	-3,700.3	3,726.1	0.00	0.00	0.00
10,900.0	91.41	270.00	7,155.8	444.9	-3,800.2	3,825.6	0.00	0.00	0.00
11,000.0	91.41	270.00	7,153.3	444.9	-3,900.2	3,925.1	0.00	0.00	0.00
11,100.0	91.41	270.00	7,150.8	444.9	-4,000.2	4,024.6	0.00	0.00	0.00
11,200.0	91.41	270.00	7,148.4	444.9	-4,100.1	4,124.0	0.00	0.00	0.00
11,300.0	91.41	270.00	7,145.9	444.9	-4,200.1	4,223.5	0.00	0.00	0.00
11,400.0	91.41	270.00	7,143.5	444.9	-4,300.1	4,323.0	0.00	0.00	0.00
11,500.0	91.41	270.00	7,141.0	444.9	-4,400.1	4,422.5	0.00	0.00	0.00
11,581.1	91.41	270.00	7,139.0	444.9	-4,481.2	4,503.2	0.00	0.00	0.00

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,720.5	7,234.0	7"	7	7-1/2

Database:	landmark	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Project:	SEC.7-T3N-68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**North Reference:**	True
Well:	Bolton 7X-434	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-15-14)		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,449.9	3,431.0	PARKMAN		0.00	
3,872.9	3,850.0	SUSSEX		0.00	
4,453.5	4,425.0	SHANNON		0.00	
6,995.0	6,930.0	SHARON SPRINGS		0.00	
7,105.3	7,013.0	NIOBRARA A		0.00	
7,180.2	7,063.0	NIOBRARA B		0.00	
7,265.5	7,113.0	NIOBRARA C		0.00	
7,604.1	7,228.0	FT HAYS		0.00	
	7,248.0	CODELL		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
1,200.0	1,200.0	0.0	0.0	KOP #1
6,501.7	6,470.2	444.9	161.0	KOP #2
7,720.5	7,234.0	444.9	-621.7	End of Build

ENSIGN Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.7-T3N-68W
PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W
Bolton 7X-434

Wellbore #1
Plan #1 (7-15-14)

Anticollision Report

18 July, 2014

PDC ENERGY
Growing E&P Value

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Reference Plan #1 (7-15-14)

Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	**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** 7/17/2014

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,580.4	Plan #1 (7-15-14) (Wellbore #1)	MWD	MWD - Standard

Summary

Site Name / Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Existings Sec.7-T3N-R68W						
Billings 22-18 (Exist.) - Wellbore #1 - Wellbore #1						Out of range
Radio Tower 1 (P&A) - Wellbore #1 - Wellbore #1	7,900.2	7,217.6	156.3	-16.2	0.906	Level 1, CC, ES, SF
PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W						
Bolton 7X-304 - Wellbore #1 - Plan #1 (7-15-14)	166.3	167.3	32.8	32.3	62.453	CC
Bolton 7X-304 - Wellbore #1 - Plan #1 (7-15-14)	200.0	201.0	32.8	32.1	48.481	ES
Bolton 7X-304 - Wellbore #1 - Plan #1 (7-15-14)	11,581.1	11,509.0	363.9	130.6	1.559	SF
Bolton 7Y-214 - Wellbore #1 - Plan #1 (7-16-14)	1,200.0	1,200.0	29.1	24.0	5.635	CC, ES
Bolton 7Y-214 - Wellbore #1 - Plan #1 (7-16-14)	11,581.1	11,422.0	399.6	189.8	1.905	SF
Bolton 7Y-404 - Wellbore #1 - Plan #1 (7-16-14)	1,200.0	1,200.0	58.3	53.1	11.273	CC, ES
Bolton 7Y-404 - Wellbore #1 - Plan #1 (7-16-14)	11,581.1	11,560.7	659.4	406.5	2.607	SF

Offset Design Existings Sec.7-T3N-R68W - Radio Tower 1 (P&A) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 7850-UNKNOWN

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
1,400.0	1,399.8	1,387.8	1,387.8	3.0	27.8	-73.44	601.1	-801.3	999.7	968.9	30.78	32.477	
1,500.0	1,499.5	1,487.5	1,487.5	3.3	29.7	-73.97	601.1	-801.3	997.2	964.2	33.00	30.224	
1,600.0	1,598.7	1,586.7	1,586.7	3.5	31.7	-74.70	601.1	-801.3	993.9	958.7	35.21	28.227	
1,700.0	1,697.7	1,685.7	1,685.7	3.8	33.7	-75.46	601.1	-801.3	990.4	952.9	37.45	26.445	
1,800.0	1,796.8	1,784.8	1,784.8	4.0	35.7	-76.22	601.1	-801.3	987.0	947.3	39.70	24.861	
1,900.0	1,895.8	1,883.8	1,883.8	4.3	37.7	-77.00	601.1	-801.3	983.7	941.8	41.96	23.446	
2,000.0	1,994.9	1,982.9	1,982.9	4.6	39.7	-77.77	601.1	-801.3	980.7	936.5	44.23	22.175	
2,100.0	2,093.9	2,081.9	2,081.9	4.9	41.6	-78.55	601.1	-801.3	977.9	931.4	46.50	21.029	
2,200.0	2,193.0	2,181.0	2,181.0	5.2	43.6	-79.34	601.1	-801.3	975.2	926.4	48.78	19.992	
2,300.0	2,292.0	2,280.0	2,280.0	5.5	45.6	-80.13	601.1	-801.3	972.7	921.6	51.06	19.049	
2,400.0	2,391.1	2,379.1	2,379.1	5.8	47.6	-80.92	601.1	-801.3	970.4	917.1	53.35	18.189	
2,500.0	2,490.1	2,478.1	2,478.1	6.1	49.6	-81.72	601.1	-801.3	968.3	912.7	55.64	17.402	
2,600.0	2,589.2	2,577.2	2,577.2	6.4	51.5	-82.52	601.1	-801.3	966.4	908.5	57.94	16.680	
2,700.0	2,688.2	2,676.2	2,676.2	6.7	53.5	-83.32	601.1	-801.3	964.7	904.5	60.24	16.015	
2,800.0	2,787.3	2,775.3	2,775.3	7.0	55.5	-84.13	601.1	-801.3	963.2	900.7	62.54	15.402	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Existings Sec.7-T3N-R68W - Radio Tower 1 (P&A) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 7850-UNKNOWN

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
2,900.0	2,886.3	2,874.3	2,874.3	7.4	57.5	-84.94	601.1	-801.3	961.9	897.0	64.84	14.835	
3,000.0	2,985.4	2,973.4	2,973.4	7.7	59.5	-85.75	601.1	-801.3	960.7	893.6	67.14	14.309	
3,100.0	3,084.4	3,072.4	3,072.4	8.0	61.4	-86.56	601.1	-801.3	959.8	890.4	69.45	13.821	
3,200.0	3,183.5	3,171.5	3,171.5	8.3	63.4	-87.37	601.1	-801.3	959.1	887.3	71.75	13.367	
3,300.0	3,282.5	3,270.5	3,270.5	8.6	65.4	-88.19	601.1	-801.3	958.5	884.5	74.06	12.943	
3,400.0	3,381.6	3,369.6	3,369.6	9.0	67.4	-89.00	601.1	-801.3	958.2	881.8	76.36	12.548	
3,500.0	3,480.6	3,468.6	3,468.6	9.3	69.4	-89.82	601.1	-801.3	958.0	879.4	78.67	12.178	
3,522.5	3,502.9	3,490.9	3,490.9	9.4	69.8	-90.00	601.1	-801.3	958.0	878.9	79.19	12.098	
3,600.0	3,579.7	3,567.7	3,567.7	9.6	71.4	-90.63	601.1	-801.3	958.1	877.1	80.98	11.832	
3,700.0	3,678.7	3,666.7	3,666.7	10.0	73.3	-91.45	601.1	-801.3	958.4	875.1	83.28	11.507	
3,800.0	3,777.8	3,765.8	3,765.8	10.3	75.3	-92.26	601.1	-801.3	958.8	873.2	85.59	11.203	
3,900.0	3,876.8	3,864.8	3,864.8	10.6	77.3	-93.08	601.1	-801.3	959.4	871.6	87.89	10.916	
4,000.0	3,975.8	3,963.8	3,963.8	10.9	79.3	-93.89	601.1	-801.3	960.3	870.1	90.20	10.647	
4,100.0	4,074.9	4,062.9	4,062.9	11.3	81.3	-94.70	601.1	-801.3	961.3	868.8	92.50	10.393	
4,200.0	4,173.9	4,161.9	4,161.9	11.6	83.2	-95.51	601.1	-801.3	962.6	867.8	94.80	10.153	
4,300.0	4,273.0	4,261.0	4,261.0	11.9	85.2	-96.31	601.1	-801.3	964.0	866.9	97.10	9.928	
4,400.0	4,372.0	4,360.0	4,360.0	12.3	87.2	-97.12	601.1	-801.3	965.6	866.2	99.40	9.714	
4,500.0	4,471.1	4,459.1	4,459.1	12.6	89.2	-97.92	601.1	-801.3	967.4	865.7	101.70	9.512	
4,600.0	4,570.1	4,558.1	4,558.1	12.9	91.2	-98.72	601.1	-801.3	969.5	865.5	104.00	9.322	
4,700.0	4,669.3	4,657.3	4,657.3	13.2	93.1	-99.50	601.1	-801.3	971.5	865.3	106.28	9.142	
4,800.0	4,768.8	4,756.8	4,756.8	13.4	95.1	-100.10	601.1	-801.3	973.2	864.7	108.50	8.970	
4,900.0	4,868.6	4,856.6	4,856.6	13.6	97.1	-100.49	601.1	-801.3	974.3	863.7	110.69	8.803	
5,000.0	4,968.5	4,956.5	4,956.5	13.8	99.1	-100.66	601.1	-801.3	974.9	862.0	112.86	8.638	
5,100.0	5,068.5	5,056.5	5,056.5	14.0	101.1	-80.78	601.1	-801.3	974.9	862.1	112.77	8.645	
5,200.0	5,168.5	5,156.5	5,156.5	14.1	103.1	-80.78	601.1	-801.3	974.9	859.9	114.98	8.479	
5,300.0	5,268.5	5,256.5	5,256.5	14.3	105.1	-80.78	601.1	-801.3	974.9	857.7	117.19	8.319	
5,400.0	5,368.5	5,356.5	5,356.5	14.5	107.1	-80.78	601.1	-801.3	974.9	855.5	119.41	8.165	
5,500.0	5,468.5	5,456.5	5,456.5	14.7	109.1	-80.78	601.1	-801.3	974.9	853.3	121.62	8.016	
5,600.0	5,568.5	5,556.5	5,556.5	14.8	111.1	-80.78	601.1	-801.3	974.9	851.1	123.83	7.873	
5,700.0	5,668.5	5,656.5	5,656.5	15.0	113.1	-80.78	601.1	-801.3	974.9	848.9	126.05	7.735	
5,800.0	5,768.5	5,756.5	5,756.5	15.2	115.1	-80.78	601.1	-801.3	974.9	846.6	128.26	7.601	
5,900.0	5,868.5	5,856.5	5,856.5	15.4	117.1	-80.78	601.1	-801.3	974.9	844.4	130.47	7.472	
6,000.0	5,968.5	5,956.5	5,956.5	15.6	119.1	-80.78	601.1	-801.3	974.9	842.2	132.69	7.347	
6,100.0	6,068.5	6,056.5	6,056.5	15.8	121.1	-80.78	601.1	-801.3	974.9	840.0	134.90	7.227	
6,200.0	6,168.5	6,156.5	6,156.5	15.9	123.1	-80.78	601.1	-801.3	974.9	837.8	137.12	7.110	
6,300.0	6,268.5	6,256.5	6,256.5	16.1	125.1	-80.78	601.1	-801.3	974.9	835.6	139.34	6.997	
6,400.0	6,368.5	6,356.5	6,356.5	16.3	127.1	-80.78	601.1	-801.3	974.9	833.4	141.55	6.887	
6,500.0	6,468.5	6,456.5	6,456.5	16.5	129.1	-80.78	601.1	-801.3	974.9	831.1	143.77	6.781	
6,600.0	6,568.3	6,556.3	6,556.3	16.7	131.1	9.36	601.1	-801.3	968.7	822.1	146.54	6.610	
6,700.0	6,666.3	6,654.3	6,654.3	16.8	133.1	9.79	601.1	-801.3	949.7	804.6	145.03	6.548	
6,800.0	6,761.0	6,749.0	6,749.0	16.9	135.0	10.58	601.1	-801.3	918.2	777.2	141.02	6.511	
6,900.0	6,850.7	6,838.7	6,838.7	17.0	136.8	11.82	601.1	-801.3	874.9	740.2	134.64	6.498	
7,000.0	6,934.0	6,922.0	6,922.0	17.0	138.4	13.72	601.1	-801.3	820.5	694.2	126.27	6.498	
7,100.0	7,009.2	6,997.2	6,997.2	17.2	139.9	16.60	601.1	-801.3	756.1	639.3	116.77	6.475	
7,200.0	7,075.3	7,063.3	7,063.3	17.4	141.3	21.05	601.1	-801.3	682.9	574.7	108.19	6.312	
7,300.0	7,131.0	7,119.0	7,119.0	18.1	142.4	28.15	601.1	-801.3	602.5	497.3	105.17	5.728	
7,400.0	7,175.4	7,163.4	7,163.4	19.1	143.3	39.52	601.1	-801.3	516.5	401.4	115.17	4.485	
7,500.0	7,207.7	7,195.7	7,195.7	20.6	143.9	56.40	601.1	-801.3	427.4	287.8	139.60	3.061	
7,600.0	7,227.5	7,215.5	7,215.5	22.3	144.3	75.71	601.1	-801.3	338.1	176.6	161.49	2.094	
7,700.0	7,234.2	7,222.2	7,222.2	24.2	144.4	89.83	601.1	-801.3	253.9	85.6	168.26	1.509	
7,800.0	7,232.0	7,220.0	7,220.0	26.2	144.4	90.90	601.1	-801.3	185.6	15.3	170.24	1.090	Level 2

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design Existings Sec.7-T3N-R68W - Radio Tower 1 (P&A) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 7850-UNKNOWN

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,900.0	7,229.6	7,217.6	7,217.6	28.4	144.4	90.00	601.1	-801.3	156.3	-16.2	172.43	0.906	Level 1
7,900.2	7,229.6	7,217.6	7,217.6	28.4	144.4	90.00	601.1	-801.3	156.3	-16.2	172.43	0.906	Level 1, CC, ES, SF
8,000.0	7,227.1	7,215.1	7,215.1	30.7	144.3	89.10	601.1	-801.3	185.4	10.7	174.67	1.062	Level 2
8,100.0	7,224.7	7,212.7	7,212.7	33.0	144.3	88.20	601.1	-801.3	253.6	76.7	176.95	1.433	Level 3
8,200.0	7,222.2	7,210.2	7,210.2	35.4	144.2	87.30	601.1	-801.3	338.0	158.8	179.25	1.886	
8,300.0	7,219.7	7,207.7	7,207.7	37.9	144.2	86.40	601.1	-801.3	429.2	247.6	181.56	2.364	
8,400.0	7,217.3	7,205.3	7,205.3	40.4	144.1	85.50	601.1	-801.3	523.6	339.7	183.85	2.848	
8,500.0	7,214.8	7,202.8	7,202.8	43.0	144.1	84.61	601.1	-801.3	619.7	433.6	186.14	3.329	
8,600.0	7,212.4	7,200.4	7,200.4	45.6	144.0	83.71	601.1	-801.3	716.9	528.5	188.40	3.805	
8,700.0	7,209.9	7,197.9	7,197.9	48.2	144.0	82.82	601.1	-801.3	814.7	624.1	190.63	4.274	
8,800.0	7,207.4	7,195.4	7,195.4	50.8	143.9	81.94	601.1	-801.3	913.0	720.2	192.83	4.735	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W - Bolton 7X-304 - Wellbore #1 - Plan #1 (7-15-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	1.0	1.0	0.0	0.0	0.00	32.8	0.0	32.8	32.8	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	0.00	32.8	0.0	32.8	32.6	0.23	144.483	
166.3	166.3	167.3	167.3	0.3	0.3	0.00	32.8	0.0	32.8	32.3	0.53	62.453	CC
200.0	200.0	201.0	201.0	0.3	0.3	0.00	32.8	0.0	32.8	32.1	0.68	48.481	ES
300.0	300.0	300.0	300.0	0.6	0.6	0.61	34.5	0.4	34.5	33.4	1.13	30.667	
400.0	400.0	398.5	398.3	0.8	0.8	2.11	39.5	1.5	39.6	38.1	1.58	25.048	
500.0	500.0	496.6	496.1	1.0	1.0	3.89	47.8	3.2	48.2	46.1	2.05	23.544	
600.0	600.0	594.1	592.8	1.2	1.3	5.52	59.2	5.7	60.1	57.6	2.52	23.884	
700.0	700.0	692.5	690.2	1.5	1.6	6.81	73.1	8.7	74.4	71.4	2.99	24.880	
800.0	800.0	791.4	788.1	1.7	1.9	7.69	87.2	11.8	88.9	85.4	3.46	25.680	
900.0	900.0	890.4	886.0	1.9	2.3	8.33	101.2	14.8	103.4	99.5	3.94	26.276	
1,000.0	1,000.0	989.3	983.9	2.1	2.6	8.81	115.3	17.9	117.9	113.5	4.41	26.734	
1,100.0	1,100.0	1,088.3	1,081.8	2.4	2.9	9.18	129.3	20.9	132.4	127.5	4.89	27.098	
1,200.0	1,200.0	1,187.2	1,179.7	2.6	3.3	9.48	143.4	23.9	146.9	141.5	5.36	27.393	
1,300.0	1,300.0	1,286.4	1,277.8	2.8	3.6	-10.23	157.4	27.0	159.7	154.0	5.73	27.869	
1,400.0	1,399.8	1,385.9	1,376.3	3.0	3.9	-10.30	171.6	30.0	169.1	162.9	6.19	27.302	
1,500.0	1,499.5	1,485.7	1,475.1	3.3	4.3	-10.56	185.8	33.1	175.1	168.4	6.66	26.303	
1,600.0	1,598.7	1,585.7	1,573.9	3.5	4.6	-11.04	199.9	36.2	177.7	170.5	7.12	24.954	
1,700.0	1,697.7	1,685.7	1,672.9	3.8	5.0	-11.61	214.1	39.3	178.7	171.1	7.60	23.515	
1,800.0	1,796.8	1,785.6	1,771.8	4.0	5.3	-12.18	228.3	42.3	179.7	171.6	8.08	22.239	
1,900.0	1,895.8	1,885.6	1,870.7	4.3	5.7	-12.73	242.5	45.4	180.7	172.2	8.56	21.101	
2,000.0	1,994.9	1,985.6	1,969.6	4.6	6.0	-13.29	256.7	48.5	181.8	172.7	9.05	20.080	
2,100.0	2,093.9	2,085.6	2,068.5	4.9	6.3	-13.83	270.9	51.6	182.9	173.3	9.54	19.159	
2,200.0	2,193.0	2,185.6	2,167.5	5.2	6.7	-14.37	285.1	54.6	184.0	173.9	10.04	18.325	
2,300.0	2,292.0	2,285.5	2,266.4	5.5	7.0	-14.90	299.3	57.7	185.1	174.5	10.53	17.567	
2,400.0	2,391.1	2,385.5	2,365.3	5.8	7.4	-15.43	313.5	60.8	186.2	175.2	11.03	16.874	
2,500.0	2,490.1	2,485.5	2,464.2	6.1	7.7	-15.95	327.7	63.9	187.3	175.8	11.54	16.239	
2,600.0	2,589.2	2,585.5	2,563.1	6.4	8.1	-16.47	341.9	66.9	188.5	176.4	12.04	15.655	
2,700.0	2,688.2	2,685.5	2,662.0	6.7	8.4	-16.97	356.1	70.0	189.7	177.1	12.55	15.116	
2,800.0	2,787.3	2,785.4	2,761.0	7.0	8.8	-17.47	370.3	73.1	190.8	177.8	13.06	14.618	
2,900.0	2,886.3	2,885.4	2,859.9	7.4	9.1	-17.97	384.5	76.1	192.0	178.5	13.57	14.155	
3,000.0	2,985.4	2,985.4	2,958.8	7.7	9.5	-18.46	398.7	79.2	193.3	179.2	14.08	13.724	
3,100.0	3,084.4	3,085.4	3,057.7	8.0	9.8	-18.94	412.9	82.3	194.5	179.9	14.60	13.323	
3,200.0	3,183.5	3,185.4	3,156.6	8.3	10.2	-19.42	427.1	85.4	195.7	180.6	15.12	12.948	
3,300.0	3,282.5	3,285.3	3,255.6	8.6	10.5	-19.89	441.3	88.4	197.0	181.3	15.64	12.596	
3,400.0	3,381.6	3,385.3	3,354.5	9.0	10.8	-20.35	455.5	91.5	198.2	182.1	16.16	12.266	
3,500.0	3,480.6	3,485.3	3,453.4	9.3	11.2	-20.81	469.7	94.6	199.5	182.8	16.69	11.957	
3,600.0	3,579.7	3,585.3	3,552.3	9.6	11.5	-21.27	483.9	97.7	200.8	183.6	17.22	11.665	
3,700.0	3,678.7	3,685.2	3,651.2	10.0	11.9	-21.71	498.0	100.7	202.1	184.4	17.75	11.389	
3,800.0	3,777.8	3,785.2	3,750.1	10.3	12.2	-22.15	512.2	103.8	203.4	185.2	18.28	11.129	
3,900.0	3,876.8	3,885.2	3,849.1	10.6	12.6	-22.59	526.4	106.9	204.8	186.0	18.81	10.883	
4,000.0	3,975.8	3,985.2	3,948.0	10.9	12.9	-23.02	540.6	110.0	206.1	186.8	19.35	10.650	
4,100.0	4,074.9	4,085.2	4,046.9	11.3	13.3	-23.44	554.8	113.0	207.5	187.6	19.89	10.429	
4,200.0	4,173.9	4,185.1	4,145.8	11.6	13.6	-23.86	569.0	116.1	208.8	188.4	20.43	10.219	
4,300.0	4,273.0	4,285.1	4,244.7	11.9	14.0	-24.28	583.2	119.2	210.2	189.2	20.98	10.020	
4,400.0	4,372.0	4,385.1	4,343.7	12.3	14.3	-24.68	597.4	122.2	211.6	190.1	21.53	9.830	
4,500.0	4,471.1	4,485.1	4,442.6	12.6	14.7	-25.09	611.6	125.3	213.0	190.9	22.07	9.648	
4,600.0	4,570.1	4,585.1	4,541.5	12.9	15.0	-25.48	625.8	128.4	214.4	191.8	22.63	9.476	
4,700.0	4,669.3	4,685.0	4,640.4	13.2	15.4	-25.81	640.0	131.5	216.5	193.3	23.15	9.349	
4,800.0	4,768.8	4,784.9	4,739.2	13.4	15.7	-25.78	654.2	134.5	221.5	197.9	23.58	9.390	
4,900.0	4,868.6	4,884.5	4,837.8	13.6	16.0	-25.41	668.3	137.6	229.6	205.7	23.96	9.584	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W - Bolton 7X-304 - Wellbore #1 - Plan #1 (7-15-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,000.0	4,968.5	4,983.9	4,936.1	13.8	16.4	-24.74	682.4	140.7	240.9	216.7	24.27	9.926	
5,100.0	5,068.5	5,082.8	5,034.0	14.0	16.7	-3.93	696.5	143.7	254.7	224.7	30.00	8.490	
5,200.0	5,168.5	5,181.8	5,131.9	14.1	17.1	-3.07	710.5	146.7	268.7	238.1	30.57	8.789	
5,300.0	5,268.5	5,280.7	5,229.7	14.3	17.4	-2.30	724.6	149.8	282.7	251.6	31.14	9.080	
5,400.0	5,368.5	5,379.6	5,327.6	14.5	17.8	-1.59	738.6	152.8	296.8	265.1	31.70	9.364	
5,500.0	5,468.5	5,483.6	5,430.5	14.7	18.1	-0.94	753.0	155.9	310.6	278.4	32.26	9.631	
5,600.0	5,568.5	5,594.9	5,541.2	14.8	18.4	-0.44	764.9	158.5	321.3	288.6	32.74	9.816	
5,700.0	5,668.5	5,707.1	5,653.1	15.0	18.6	-0.14	772.7	160.2	328.3	295.1	33.16	9.900	
5,800.0	5,768.5	5,819.7	5,765.7	15.2	18.8	-0.01	776.2	161.0	331.3	297.8	33.52	9.884	
5,900.0	5,868.5	5,923.6	5,869.5	15.4	18.9	0.00	776.4	161.0	331.5	297.7	33.85	9.793	
6,000.0	5,968.5	6,023.6	5,969.5	15.6	19.1	0.00	776.4	161.0	331.5	297.3	34.19	9.697	
6,100.0	6,068.5	6,123.6	6,069.5	15.8	19.2	0.00	776.4	161.0	331.5	297.0	34.52	9.602	
6,200.0	6,168.5	6,223.6	6,169.5	15.9	19.4	0.00	776.4	161.0	331.5	296.7	34.86	9.509	
6,300.0	6,268.5	6,323.6	6,269.5	16.1	19.5	0.00	776.4	161.0	331.5	296.3	35.21	9.416	
6,400.0	6,368.5	6,423.6	6,369.5	16.3	19.7	0.00	776.4	161.0	331.5	296.0	35.55	9.325	
6,433.7	6,402.3	6,457.3	6,403.2	16.4	19.7	-0.06	776.4	160.6	331.5	295.9	35.66	9.296	
6,500.0	6,468.5	6,523.2	6,468.9	16.5	19.8	-0.90	776.4	155.8	331.6	295.7	35.84	9.252	
6,600.0	6,568.3	6,621.1	6,565.1	16.7	19.9	87.07	776.4	138.1	332.0	301.3	30.71	10.809	
6,700.0	6,666.3	6,717.5	6,657.0	16.8	20.0	85.12	776.4	108.9	332.7	301.7	31.09	10.702	
6,800.0	6,761.0	6,812.7	6,743.3	16.9	20.0	83.27	776.4	68.9	333.9	302.4	31.43	10.623	
6,900.0	6,850.7	6,906.7	6,823.0	17.0	20.1	81.54	776.4	19.2	335.2	303.4	31.76	10.553	
7,000.0	6,934.0	7,000.0	6,895.5	17.0	20.2	79.97	776.4	-39.5	336.7	304.5	32.20	10.457	
7,100.0	7,009.2	7,091.7	6,959.3	17.2	20.3	78.58	776.4	-105.3	338.3	305.4	32.86	10.293	
7,200.0	7,075.3	7,183.0	7,014.4	17.4	20.5	77.37	776.4	-177.9	339.8	305.9	33.91	10.021	
7,300.0	7,131.0	7,273.6	7,060.3	18.1	20.9	76.37	776.4	-256.0	341.2	305.7	35.45	9.624	
7,400.0	7,175.4	7,363.7	7,096.4	19.1	21.5	75.58	776.4	-338.5	342.3	304.7	37.58	9.109	
7,500.0	7,207.7	7,453.4	7,122.4	20.6	22.5	75.01	776.4	-424.3	343.2	302.9	40.31	8.515	
7,600.0	7,227.5	7,542.8	7,138.2	22.3	23.8	74.66	776.4	-512.3	343.8	300.2	43.59	7.887	
7,700.0	7,234.2	7,632.2	7,143.6	24.2	25.3	74.55	776.4	-601.4	344.0	296.7	47.29	7.273	
7,800.0	7,232.0	7,728.3	7,140.4	26.2	27.2	74.38	776.4	-697.5	344.2	293.0	51.22	6.721	
7,900.0	7,229.6	7,828.3	7,136.4	28.4	29.2	74.14	776.4	-797.4	344.6	289.3	55.37	6.224	
8,000.0	7,227.1	7,928.3	7,132.5	30.7	31.4	73.90	776.4	-897.3	345.1	285.3	59.72	5.778	
8,100.0	7,224.7	8,028.3	7,128.5	33.0	33.7	73.65	776.4	-997.2	345.5	281.3	64.20	5.381	
8,200.0	7,222.2	8,128.3	7,124.5	35.4	36.1	73.41	776.4	-1,097.1	345.9	277.1	68.80	5.028	
8,300.0	7,219.7	8,228.3	7,120.5	37.9	38.5	73.17	776.4	-1,197.0	346.4	272.9	73.49	4.713	
8,400.0	7,217.3	8,328.2	7,116.6	40.4	40.9	72.93	776.4	-1,296.9	346.8	268.5	78.25	4.432	
8,500.0	7,214.8	8,428.2	7,112.6	43.0	43.5	72.69	776.4	-1,396.9	347.2	264.2	83.06	4.180	
8,600.0	7,212.4	8,528.2	7,108.6	45.6	46.0	72.45	776.4	-1,496.8	347.7	259.8	87.92	3.955	
8,700.0	7,209.9	8,628.2	7,104.6	48.2	48.6	72.21	776.4	-1,596.7	348.2	255.3	92.81	3.751	
8,800.0	7,207.4	8,728.2	7,100.6	50.8	51.2	71.98	776.4	-1,696.6	348.6	250.9	97.73	3.567	
8,900.0	7,205.0	8,828.2	7,096.7	53.5	53.8	71.74	776.4	-1,796.5	349.1	246.4	102.67	3.400	
9,000.0	7,202.5	8,928.2	7,092.7	56.1	56.4	71.50	776.4	-1,896.4	349.6	242.0	107.62	3.248	
9,100.0	7,200.1	9,028.2	7,088.7	58.8	59.1	71.27	776.4	-1,996.3	350.1	237.5	112.58	3.109	
9,200.0	7,197.6	9,128.1	7,084.7	61.5	61.7	71.03	776.4	-2,096.2	350.6	233.0	117.56	2.982	
9,300.0	7,195.1	9,228.1	7,080.8	64.2	64.4	70.80	776.4	-2,196.1	351.1	228.5	122.53	2.865	
9,400.0	7,192.7	9,328.1	7,076.8	66.9	67.1	70.56	776.4	-2,296.0	351.6	224.0	127.51	2.757	
9,500.0	7,190.2	9,428.1	7,072.8	69.6	69.8	70.33	776.4	-2,395.9	352.1	219.6	132.49	2.657	
9,600.0	7,187.7	9,528.1	7,068.8	72.3	72.5	70.10	776.4	-2,495.9	352.6	215.1	137.46	2.565	
9,700.0	7,185.3	9,628.1	7,064.8	75.0	75.2	69.87	776.4	-2,595.8	353.1	210.7	142.43	2.479	
9,800.0	7,182.8	9,728.1	7,060.9	77.8	77.9	69.64	776.4	-2,695.7	353.6	206.2	147.40	2.399	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W - Bolton 7X-304 - Wellbore #1 - Plan #1 (7-15-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
9,900.0	7,180.4	9,828.1	7,056.9	80.5	80.6	69.41	776.4	-2,795.6	354.2	201.8	152.36	2.324	
10,000.0	7,177.9	9,928.1	7,052.9	83.2	83.4	69.18	776.4	-2,895.5	354.7	197.4	157.31	2.255	
10,100.0	7,175.4	10,028.0	7,048.9	86.0	86.1	68.95	776.4	-2,995.4	355.2	193.0	162.26	2.189	
10,200.0	7,173.0	10,128.0	7,045.0	88.7	88.8	68.72	776.4	-3,095.3	355.8	188.6	167.19	2.128	
10,300.0	7,170.5	10,228.0	7,041.0	91.5	91.6	68.49	776.4	-3,195.2	356.3	184.2	172.12	2.070	
10,400.0	7,168.1	10,328.0	7,037.0	94.2	94.3	68.27	776.4	-3,295.1	356.9	179.9	177.03	2.016	
10,500.0	7,165.6	10,428.0	7,033.0	97.0	97.1	68.04	776.4	-3,395.0	357.5	175.5	181.94	1.965	
10,600.0	7,163.1	10,528.0	7,029.0	99.8	99.8	67.81	776.4	-3,494.9	358.0	171.2	186.83	1.916	
10,700.0	7,160.7	10,628.0	7,025.1	102.5	102.6	67.59	776.4	-3,594.9	358.6	166.9	191.71	1.871	
10,800.0	7,158.2	10,728.0	7,021.1	105.3	105.3	67.37	776.4	-3,694.8	359.2	162.6	196.57	1.827	
10,900.0	7,155.8	10,828.0	7,017.1	108.1	108.1	67.14	776.4	-3,794.7	359.8	158.3	201.43	1.786	
11,000.0	7,153.3	10,927.9	7,013.1	110.8	110.9	66.92	776.4	-3,894.6	360.4	154.1	206.26	1.747	
11,100.0	7,150.8	11,027.9	7,009.2	113.6	113.6	66.70	776.4	-3,994.5	361.0	149.9	211.09	1.710	
11,200.0	7,148.4	11,127.9	7,005.2	116.4	116.4	66.48	776.4	-4,094.4	361.6	145.7	215.90	1.675	
11,300.0	7,145.9	11,227.9	7,001.2	119.1	119.2	66.26	776.4	-4,194.3	362.2	141.5	220.69	1.641	
11,400.0	7,143.5	11,327.9	6,997.2	121.9	121.9	66.04	776.4	-4,294.2	362.8	137.3	225.47	1.609	
11,500.0	7,141.0	11,427.9	6,993.2	124.7	124.7	65.82	776.4	-4,394.1	363.4	133.2	230.24	1.578	
11,581.1	7,139.0	11,509.0	6,990.0	126.2	126.9	65.64	776.4	-4,475.2	363.9	130.6	233.36	1.559	SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W - Bolton 7Y-214 - Wellbore #1 - Plan #1 (7-16-14) — **Offset Site Error:** 0.0 ft

Survey Program: 0-MWD — **Offset Well Error:** 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	180.00	-29.1	0.0	29.1				
100.0	100.0	100.0	100.0	0.1	0.1	180.00	-29.1	0.0	29.1	28.9	0.22	129.609	
200.0	200.0	200.0	200.0	0.3	0.3	180.00	-29.1	0.0	29.1	28.5	0.67	43.203	
300.0	300.0	300.0	300.0	0.6	0.6	180.00	-29.1	0.0	29.1	28.0	1.12	25.922	
400.0	400.0	400.0	400.0	0.8	0.8	180.00	-29.1	0.0	29.1	27.6	1.57	18.516	
500.0	500.0	500.0	500.0	1.0	1.0	180.00	-29.1	0.0	29.1	27.1	2.02	14.401	
600.0	600.0	600.0	600.0	1.2	1.2	180.00	-29.1	0.0	29.1	26.7	2.47	11.783	
700.0	700.0	700.0	700.0	1.5	1.5	180.00	-29.1	0.0	29.1	26.2	2.92	9.970	
800.0	800.0	800.0	800.0	1.7	1.7	180.00	-29.1	0.0	29.1	25.8	3.37	8.641	
900.0	900.0	900.0	900.0	1.9	1.9	180.00	-29.1	0.0	29.1	25.3	3.82	7.624	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	180.00	-29.1	0.0	29.1	24.9	4.27	6.822	
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	180.00	-29.1	0.0	29.1	24.4	4.72	6.172	
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	180.00	-29.1	0.0	29.1	24.0	5.17	5.635	CC, ES
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	161.20	-29.1	0.0	30.8	25.2	5.62	5.480	
1,400.0	1,399.8	1,399.8	1,399.8	3.0	3.0	163.87	-29.1	0.0	35.8	29.7	6.06	5.903	
1,500.0	1,499.5	1,499.5	1,499.5	3.3	3.3	166.97	-29.1	0.0	44.2	37.7	6.50	6.806	
1,600.0	1,598.7	1,598.7	1,598.7	3.5	3.5	169.74	-29.1	0.0	56.2	49.2	6.93	8.106	
1,700.0	1,697.7	1,697.7	1,697.7	3.8	3.7	171.75	-29.1	0.0	69.7	62.4	7.38	9.457	
1,800.0	1,796.8	1,796.8	1,796.8	4.0	3.9	173.11	-29.1	0.0	83.4	75.6	7.83	10.657	
1,900.0	1,895.8	1,895.8	1,895.8	4.3	4.1	174.08	-29.1	0.0	97.1	88.8	8.28	11.728	
2,000.0	1,994.9	1,994.9	1,994.9	4.6	4.4	174.82	-29.1	0.0	110.8	102.1	8.73	12.688	
2,100.0	2,093.9	2,093.9	2,093.9	4.9	4.6	175.39	-29.1	0.0	124.5	115.3	9.19	13.553	
2,200.0	2,193.0	2,193.0	2,193.0	5.2	4.8	175.85	-29.1	0.0	138.2	128.6	9.64	14.336	
2,300.0	2,292.0	2,292.0	2,292.0	5.5	5.0	176.22	-29.1	0.0	152.0	141.9	10.10	15.048	
2,400.0	2,391.1	2,391.1	2,391.1	5.8	5.3	176.54	-29.1	0.0	165.7	155.1	10.56	15.697	
2,500.0	2,490.1	2,490.1	2,490.1	6.1	5.5	176.80	-29.1	0.0	179.4	168.4	11.01	16.291	
2,600.0	2,589.2	2,594.6	2,594.6	6.4	5.7	176.80	-28.1	1.2	191.9	180.5	11.48	16.717	
2,700.0	2,688.2	2,700.4	2,700.2	6.7	5.9	176.23	-24.4	5.2	201.3	189.4	11.95	16.848	
2,800.0	2,787.3	2,806.5	2,806.0	7.0	6.2	175.14	-18.1	12.1	207.6	195.2	12.42	16.708	
2,900.0	2,886.3	2,909.3	2,908.0	7.4	6.4	173.66	-9.9	21.2	211.3	198.4	12.90	16.378	
3,000.0	2,985.4	3,009.1	3,007.0	7.7	6.7	172.21	-1.6	30.4	214.8	201.4	13.38	16.056	
3,100.0	3,084.4	3,108.9	3,106.0	8.0	6.9	170.81	6.7	39.5	218.5	204.6	13.86	15.759	
3,200.0	3,183.5	3,208.7	3,205.1	8.3	7.1	169.46	15.0	48.7	222.3	207.9	14.36	15.482	
3,300.0	3,282.5	3,308.5	3,304.1	8.6	7.4	168.15	23.3	57.8	226.2	211.3	14.85	15.226	
3,400.0	3,381.6	3,408.3	3,403.1	9.0	7.7	166.89	31.6	66.9	230.2	214.8	15.36	14.986	
3,500.0	3,480.6	3,508.1	3,502.1	9.3	7.9	165.67	39.9	76.1	234.3	218.4	15.87	14.763	
3,600.0	3,579.7	3,607.9	3,601.2	9.6	8.2	164.49	48.2	85.2	238.6	222.2	16.39	14.554	
3,700.0	3,678.7	3,707.6	3,700.2	10.0	8.5	163.36	56.5	94.4	242.9	226.0	16.92	14.358	
3,800.0	3,777.8	3,807.4	3,799.2	10.3	8.7	162.26	64.8	103.5	247.3	229.9	17.45	14.175	
3,900.0	3,876.8	3,907.2	3,898.2	10.6	9.0	161.21	73.1	112.6	251.8	233.8	17.98	14.002	
4,000.0	3,975.8	4,007.0	3,997.3	10.9	9.3	160.19	81.4	121.8	256.4	237.9	18.53	13.840	
4,100.0	4,074.9	4,106.8	4,096.3	11.3	9.6	159.20	89.7	130.9	261.1	242.0	19.07	13.687	
4,200.0	4,173.9	4,206.6	4,195.3	11.6	9.9	158.26	98.0	140.1	265.8	246.2	19.63	13.543	
4,300.0	4,273.0	4,303.6	4,291.6	11.9	10.1	157.43	105.8	148.7	270.9	250.7	20.16	13.438	
4,400.0	4,372.0	4,400.0	4,387.6	12.3	10.3	157.09	111.7	155.2	277.8	257.2	20.62	13.473	
4,500.0	4,471.1	4,491.4	4,478.8	12.6	10.5	157.24	115.3	159.1	286.8	265.7	21.04	13.628	
4,600.0	4,570.1	4,584.6	4,572.0	12.9	10.7	157.84	116.9	160.9	297.9	276.4	21.44	13.890	
4,700.0	4,669.3	4,681.9	4,669.3	13.2	10.9	158.77	117.0	161.0	309.9	288.1	21.84	14.188	
4,800.0	4,768.8	4,781.4	4,768.8	13.4	11.1	159.47	117.0	161.0	319.1	296.9	22.23	14.357	
4,900.0	4,868.6	4,881.2	4,868.6	13.6	11.3	159.90	117.0	161.0	325.0	302.4	22.60	14.384	
5,000.0	4,968.5	4,981.1	4,968.5	13.8	11.5	160.09	117.0	161.0	327.7	304.7	22.95	14.279	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W - Bolton 7Y-214 - Wellbore #1 - Plan #1 (7-16-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,068.5	5,081.1	5,068.5	14.0	11.7	-180.00	117.0	161.0	327.9	302.9	25.01	13.112	
5,200.0	5,168.5	5,181.1	5,168.5	14.1	11.9	-180.00	117.0	161.0	327.9	302.5	25.40	12.909	
5,300.0	5,268.5	5,281.1	5,268.5	14.3	12.1	-180.00	117.0	161.0	327.9	302.1	25.79	12.712	
5,400.0	5,368.5	5,381.1	5,368.5	14.5	12.3	-180.00	117.0	161.0	327.9	301.7	26.19	12.520	
5,500.0	5,468.5	5,481.1	5,468.5	14.7	12.5	-180.00	117.0	161.0	327.9	301.3	26.58	12.333	
5,600.0	5,568.5	5,581.1	5,568.5	14.8	12.7	-180.00	117.0	161.0	327.9	300.9	26.98	12.151	
5,700.0	5,668.5	5,681.1	5,668.5	15.0	13.0	-180.00	117.0	161.0	327.9	300.5	27.38	11.973	
5,800.0	5,768.5	5,781.1	5,768.5	15.2	13.2	-180.00	117.0	161.0	327.9	300.1	27.78	11.800	
5,900.0	5,868.5	5,881.1	5,868.5	15.4	13.4	-180.00	117.0	161.0	327.9	299.7	28.19	11.632	
6,000.0	5,968.5	5,981.1	5,968.5	15.6	13.6	-180.00	117.0	161.0	327.9	299.3	28.59	11.467	
6,100.0	6,068.5	6,081.1	6,068.5	15.8	13.8	-180.00	117.0	161.0	327.9	298.9	29.00	11.307	
6,200.0	6,168.5	6,181.1	6,168.5	15.9	14.0	-180.00	117.0	161.0	327.9	298.5	29.40	11.150	
6,300.0	6,268.5	6,281.1	6,268.5	16.1	14.2	-180.00	117.0	161.0	327.9	298.0	29.81	10.998	
6,360.6	6,329.1	6,341.7	6,329.1	16.2	14.4	-180.00	117.0	161.0	327.9	297.8	30.06	10.907	
6,400.0	6,368.5	6,381.1	6,368.5	16.3	14.5	-179.89	117.0	160.4	327.9	297.6	30.22	10.850	
6,500.0	6,468.5	6,479.9	6,466.7	16.5	14.6	-178.09	117.0	150.1	328.0	297.4	30.65	10.703	
6,600.0	6,568.3	6,576.0	6,560.1	16.7	14.7	-85.19	117.0	127.9	329.0	299.6	29.43	11.181	
6,700.0	6,666.3	6,670.2	6,648.3	16.8	14.8	-82.42	117.0	95.0	330.8	301.2	29.63	11.163	
6,800.0	6,761.0	6,762.7	6,730.4	16.9	15.0	-79.81	117.0	52.4	333.2	303.4	29.87	11.157	
6,900.0	6,850.7	6,853.7	6,805.5	17.0	15.1	-77.41	117.0	1.1	336.1	305.9	30.18	11.135	
7,000.0	6,934.0	6,943.4	6,873.0	17.0	15.5	-75.25	117.0	-57.9	339.2	308.5	30.65	11.067	
7,100.0	7,009.2	7,032.0	6,932.5	17.2	16.0	-73.36	117.0	-123.4	342.4	311.0	31.35	10.920	
7,200.0	7,075.3	7,119.6	6,983.4	17.4	16.8	-71.73	117.0	-194.6	345.4	313.0	32.37	10.671	
7,300.0	7,131.0	7,206.4	7,025.6	18.1	17.7	-70.40	117.0	-270.4	348.1	314.4	33.77	10.309	
7,400.0	7,175.4	7,292.5	7,058.6	19.1	18.9	-69.35	117.0	-350.0	350.4	314.8	35.62	9.839	
7,500.0	7,207.7	7,378.2	7,082.4	20.6	20.3	-68.60	117.0	-432.3	352.2	314.2	37.92	9.287	
7,600.0	7,227.5	7,463.6	7,096.8	22.3	21.9	-68.15	117.0	-516.4	353.2	312.6	40.64	8.691	
7,700.0	7,234.2	7,550.0	7,101.7	24.2	23.6	-67.99	117.0	-602.6	353.6	309.9	43.76	8.082	
7,705.6	7,234.2	7,553.7	7,101.7	24.3	23.6	-67.99	117.0	-606.3	353.6	309.7	43.93	8.050	
7,800.0	7,232.0	7,642.0	7,098.1	26.2	25.5	-67.76	117.0	-694.5	354.2	306.9	47.36	7.479	
7,900.0	7,229.6	7,742.0	7,093.2	28.4	27.7	-67.39	117.0	-794.4	355.2	303.9	51.31	6.922	
8,000.0	7,227.1	7,842.0	7,088.2	30.7	30.0	-67.02	117.0	-894.2	356.1	300.7	55.43	6.426	
8,100.0	7,224.7	7,941.9	7,083.3	33.0	32.4	-66.65	117.0	-994.1	357.1	297.5	59.67	5.985	
8,200.0	7,222.2	8,041.9	7,078.3	35.4	34.9	-66.29	117.0	-1,093.9	358.1	294.1	64.00	5.595	
8,300.0	7,219.7	8,141.9	7,073.4	37.9	37.4	-65.92	117.0	-1,193.8	359.1	290.7	68.40	5.250	
8,400.0	7,217.3	8,241.9	7,068.4	40.4	39.9	-65.56	117.0	-1,293.6	360.2	287.3	72.86	4.943	
8,500.0	7,214.8	8,341.8	7,063.5	43.0	42.5	-65.20	117.0	-1,393.5	361.2	283.8	77.35	4.670	
8,600.0	7,212.4	8,441.8	7,058.5	45.6	45.1	-64.84	117.0	-1,493.3	362.2	280.4	81.86	4.425	
8,700.0	7,209.9	8,541.8	7,053.5	48.2	47.7	-64.48	117.0	-1,593.1	363.3	276.9	86.39	4.205	
8,800.0	7,207.4	8,641.7	7,048.6	50.8	50.3	-64.13	117.0	-1,693.0	364.4	273.5	90.93	4.007	
8,900.0	7,205.0	8,741.7	7,043.6	53.5	53.0	-63.78	117.0	-1,792.8	365.5	270.0	95.47	3.828	
9,000.0	7,202.5	8,841.7	7,038.7	56.1	55.6	-63.43	117.0	-1,892.7	366.6	266.6	100.01	3.666	
9,100.0	7,200.1	8,941.6	7,033.7	58.8	58.3	-63.08	117.0	-1,992.5	367.7	263.2	104.55	3.517	
9,200.0	7,197.6	9,041.6	7,028.8	61.5	61.0	-62.74	117.0	-2,092.4	368.9	259.8	109.07	3.382	
9,300.0	7,195.1	9,141.6	7,023.8	64.2	63.7	-62.39	117.0	-2,192.2	370.0	256.4	113.58	3.258	
9,400.0	7,192.7	9,241.5	7,018.9	66.9	66.4	-62.05	117.0	-2,292.1	371.2	253.1	118.08	3.143	
9,500.0	7,190.2	9,341.5	7,013.9	69.6	69.2	-61.71	117.0	-2,391.9	372.4	249.8	122.56	3.038	
9,600.0	7,187.7	9,441.5	7,009.0	72.3	71.9	-61.38	117.0	-2,491.8	373.5	246.5	127.02	2.941	
9,700.0	7,185.3	9,541.5	7,004.0	75.0	74.6	-61.04	117.0	-2,591.6	374.7	243.3	131.47	2.850	
9,800.0	7,182.8	9,641.4	6,999.1	77.8	77.3	-60.71	117.0	-2,691.5	376.0	240.1	135.89	2.767	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W - Bolton 7Y-214 - Wellbore #1 - Plan #1 (7-16-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
9,900.0	7,180.4	9,741.4	6,994.1	80.5	80.1	-60.38	117.0	-2,791.3	377.2	236.9	140.29	2.689	
10,000.0	7,177.9	9,841.4	6,989.2	83.2	82.8	-60.05	117.0	-2,891.1	378.4	233.8	144.67	2.616	
10,100.0	7,175.4	9,941.3	6,984.2	86.0	85.6	-59.72	117.0	-2,991.0	379.7	230.7	149.02	2.548	
10,200.0	7,173.0	10,041.3	6,979.3	88.7	88.3	-59.40	117.0	-3,090.8	380.9	227.6	153.35	2.484	
10,300.0	7,170.5	10,141.3	6,974.3	91.5	91.1	-59.08	117.0	-3,190.7	382.2	224.6	157.66	2.424	
10,400.0	7,168.1	10,241.2	6,969.3	94.2	93.8	-58.76	117.0	-3,290.5	383.5	221.6	161.94	2.368	
10,500.0	7,165.6	10,341.2	6,964.4	97.0	96.6	-58.44	117.0	-3,390.4	384.8	218.6	166.19	2.315	
10,600.0	7,163.1	10,441.2	6,959.4	99.8	99.4	-58.12	117.0	-3,490.2	386.1	215.7	170.42	2.266	
10,700.0	7,160.7	10,541.1	6,954.5	102.5	102.1	-57.81	117.0	-3,590.1	387.5	212.8	174.62	2.219	
10,800.0	7,158.2	10,641.1	6,949.5	105.3	104.9	-57.50	117.0	-3,689.9	388.8	210.0	178.79	2.175	
10,900.0	7,155.8	10,741.1	6,944.6	108.1	107.7	-57.19	117.0	-3,789.8	390.1	207.2	182.94	2.133	
11,000.0	7,153.3	10,841.0	6,939.6	110.8	110.4	-56.88	117.0	-3,889.6	391.5	204.4	187.06	2.093	
11,100.0	7,150.8	10,941.0	6,934.7	113.6	113.2	-56.58	117.0	-3,989.5	392.9	201.7	191.15	2.055	
11,200.0	7,148.4	11,041.0	6,929.7	116.4	116.0	-56.28	117.0	-4,089.3	394.2	199.0	195.22	2.020	
11,300.0	7,145.9	11,141.0	6,924.8	119.1	118.7	-55.98	117.0	-4,189.1	395.6	196.4	199.25	1.986	
11,400.0	7,143.5	11,240.9	6,919.8	121.9	121.5	-55.68	117.0	-4,289.0	397.0	193.8	203.26	1.953	
11,500.0	7,141.0	11,340.9	6,914.9	124.7	124.3	-55.38	117.0	-4,388.8	398.5	191.2	207.24	1.923	
11,581.1	7,139.0	11,422.0	6,910.8	126.2	126.5	-55.14	117.0	-4,469.8	399.6	189.8	209.78	1.905 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W - Bolton 7Y-404 - Wellbore #1 - Plan #1 (7-16-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	180.00	-58.3	0.0	58.3				
100.0	100.0	100.0	100.0	0.1	0.1	180.00	-58.3	0.0	58.3	58.1	0.22	259.273	
200.0	200.0	200.0	200.0	0.3	0.3	180.00	-58.3	0.0	58.3	57.6	0.67	86.424	
300.0	300.0	300.0	300.0	0.6	0.6	180.00	-58.3	0.0	58.3	57.2	1.12	51.855	
400.0	400.0	400.0	400.0	0.8	0.8	180.00	-58.3	0.0	58.3	56.7	1.57	37.039	
500.0	500.0	500.0	500.0	1.0	1.0	180.00	-58.3	0.0	58.3	56.3	2.02	28.808	
600.0	600.0	600.0	600.0	1.2	1.2	180.00	-58.3	0.0	58.3	55.8	2.47	23.570	
700.0	700.0	700.0	700.0	1.5	1.5	180.00	-58.3	0.0	58.3	55.4	2.92	19.944	
800.0	800.0	800.0	800.0	1.7	1.7	180.00	-58.3	0.0	58.3	54.9	3.37	17.285	
900.0	900.0	900.0	900.0	1.9	1.9	180.00	-58.3	0.0	58.3	54.5	3.82	15.251	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	180.00	-58.3	0.0	58.3	54.0	4.27	13.646	
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	180.00	-58.3	0.0	58.3	53.6	4.72	12.346	
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	180.00	-58.3	0.0	58.3	53.1	5.17	11.273	CC, ES
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	160.66	-58.3	0.0	59.9	54.3	5.62	10.668	
1,400.0	1,399.8	1,399.8	1,399.8	3.0	3.0	162.16	-58.3	0.0	64.9	58.8	6.06	10.707	
1,500.0	1,499.5	1,499.5	1,499.5	3.3	3.3	164.20	-58.3	0.0	73.2	66.7	6.50	11.271	
1,600.0	1,598.7	1,598.7	1,598.7	3.5	3.5	166.39	-58.3	0.0	85.0	78.1	6.93	12.270	
1,700.0	1,697.7	1,695.8	1,695.8	3.8	3.7	167.48	-59.4	1.1	99.4	92.1	7.35	13.521	
1,800.0	1,796.8	1,792.3	1,792.1	4.0	3.9	166.97	-62.8	4.6	115.8	108.1	7.77	14.917	
1,900.0	1,895.8	1,887.9	1,887.4	4.3	4.0	165.49	-68.3	10.4	134.3	126.1	8.19	16.402	
2,000.0	1,994.9	1,985.3	1,984.2	4.6	4.2	163.70	-75.5	17.8	154.2	145.6	8.62	17.884	
2,100.0	2,093.9	2,083.2	2,081.6	4.9	4.5	162.30	-82.8	25.3	174.3	165.3	9.07	19.223	
2,200.0	2,193.0	2,181.0	2,178.9	5.2	4.7	161.19	-90.1	32.7	194.5	185.0	9.52	20.429	
2,300.0	2,292.0	2,278.9	2,276.2	5.5	4.9	160.28	-97.3	40.2	214.7	204.8	9.98	21.517	
2,400.0	2,391.1	2,376.8	2,373.5	5.8	5.1	159.54	-104.6	47.7	235.0	224.6	10.44	22.501	
2,500.0	2,490.1	2,474.7	2,470.9	6.1	5.4	158.91	-111.8	55.2	255.3	244.4	10.91	23.393	
2,600.0	2,589.2	2,572.6	2,568.2	6.4	5.6	158.37	-119.1	62.7	275.6	264.2	11.39	24.204	
2,700.0	2,688.2	2,670.4	2,665.5	6.7	5.9	157.91	-126.4	70.2	296.0	284.1	11.87	24.943	
2,800.0	2,787.3	2,768.3	2,762.8	7.0	6.1	157.51	-133.6	77.6	316.3	304.0	12.35	25.620	
2,900.0	2,886.3	2,866.2	2,860.2	7.4	6.4	157.15	-140.9	85.1	336.7	323.9	12.83	26.240	
3,000.0	2,985.4	2,964.1	2,957.5	7.7	6.7	156.84	-148.1	92.6	357.1	343.8	13.32	26.810	
3,100.0	3,084.4	3,062.0	3,054.8	8.0	6.9	156.56	-155.4	100.1	377.5	363.7	13.81	27.335	
3,200.0	3,183.5	3,159.9	3,152.1	8.3	7.2	156.31	-162.7	107.6	397.9	383.6	14.30	27.821	
3,300.0	3,282.5	3,257.7	3,249.5	8.6	7.5	156.08	-169.9	115.1	418.3	403.5	14.80	28.271	
3,400.0	3,381.6	3,355.6	3,346.8	9.0	7.8	155.88	-177.2	122.5	438.7	423.5	15.29	28.689	
3,500.0	3,480.6	3,453.5	3,444.1	9.3	8.0	155.69	-184.5	130.0	459.2	443.4	15.79	29.077	
3,600.0	3,579.7	3,551.4	3,541.4	9.6	8.3	155.52	-191.7	137.5	479.6	463.3	16.29	29.440	
3,700.0	3,678.7	3,649.3	3,638.8	10.0	8.6	155.36	-199.0	145.0	500.0	483.2	16.79	29.778	
3,800.0	3,777.8	3,753.7	3,742.7	10.3	8.9	155.24	-206.4	152.7	520.2	502.9	17.30	30.069	
3,900.0	3,876.8	3,868.0	3,856.6	10.6	9.1	155.38	-212.0	158.4	537.9	520.1	17.80	30.219	
4,000.0	3,975.8	3,983.2	3,971.8	10.9	9.4	155.83	-214.4	160.9	552.7	534.4	18.28	30.232	
4,100.0	4,074.9	4,086.3	4,074.9	11.3	9.5	156.42	-214.5	161.0	565.4	546.7	18.73	30.183	
4,200.0	4,173.9	4,185.3	4,173.9	11.6	9.7	156.96	-214.5	161.0	578.1	558.9	19.18	30.137	
4,300.0	4,273.0	4,284.4	4,273.0	11.9	9.9	157.48	-214.5	161.0	590.8	571.1	19.63	30.095	
4,400.0	4,372.0	4,383.4	4,372.0	12.3	10.1	157.98	-214.5	161.0	603.5	583.5	20.08	30.057	
4,500.0	4,471.1	4,482.5	4,471.1	12.6	10.3	158.46	-214.5	161.0	616.3	595.8	20.53	30.022	
4,600.0	4,570.1	4,581.5	4,570.1	12.9	10.5	158.92	-214.5	161.0	629.2	608.2	20.98	29.990	
4,700.0	4,669.3	4,680.7	4,669.3	13.2	10.7	159.40	-214.5	161.0	641.4	620.0	21.44	29.915	
4,800.0	4,768.8	4,780.2	4,768.8	13.4	10.9	159.76	-214.5	161.0	650.6	628.7	21.86	29.763	
4,900.0	4,868.6	4,880.0	4,868.6	13.6	11.1	160.00	-214.5	161.0	656.5	634.3	22.25	29.504	
5,000.0	4,968.5	4,979.9	4,968.5	13.8	11.3	160.10	-214.5	161.0	659.2	636.6	22.62	29.142	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W - Bolton 7Y-404 - Wellbore #1 - Plan #1 (7-16-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,068.5	5,079.9	5,068.5	14.0	11.5	-180.00	-214.5	161.0	659.4	634.6	24.77	26.617	
5,200.0	5,168.5	5,179.9	5,168.5	14.1	11.7	-180.00	-214.5	161.0	659.4	634.2	25.15	26.213	
5,300.0	5,268.5	5,279.9	5,268.5	14.3	11.9	-180.00	-214.5	161.0	659.4	633.8	25.54	25.819	
5,400.0	5,368.5	5,379.9	5,368.5	14.5	12.1	-180.00	-214.5	161.0	659.4	633.4	25.92	25.434	
5,500.0	5,468.5	5,479.9	5,468.5	14.7	12.3	-180.00	-214.5	161.0	659.4	633.1	26.31	25.059	
5,600.0	5,568.5	5,579.9	5,568.5	14.8	12.5	-180.00	-214.5	161.0	659.4	632.7	26.70	24.693	
5,700.0	5,668.5	5,679.9	5,668.5	15.0	12.7	-180.00	-214.5	161.0	659.4	632.3	27.09	24.336	
5,800.0	5,768.5	5,779.9	5,768.5	15.2	12.9	-180.00	-214.5	161.0	659.4	631.9	27.49	23.988	
5,900.0	5,868.5	5,879.9	5,868.5	15.4	13.1	-180.00	-214.5	161.0	659.4	631.5	27.88	23.648	
6,000.0	5,968.5	5,979.9	5,968.5	15.6	13.3	-180.00	-214.5	161.0	659.4	631.1	28.28	23.317	
6,100.0	6,068.5	6,079.9	6,068.5	15.8	13.5	-180.00	-214.5	161.0	659.4	630.7	28.68	22.993	
6,200.0	6,168.5	6,179.9	6,168.5	15.9	13.7	-180.00	-214.5	161.0	659.4	630.3	29.08	22.677	
6,300.0	6,268.5	6,279.9	6,268.5	16.1	13.9	-180.00	-214.5	161.0	659.4	629.9	29.48	22.369	
6,400.0	6,368.5	6,379.9	6,368.5	16.3	14.1	-180.00	-214.5	161.0	659.4	629.5	29.88	22.068	
6,500.0	6,468.5	6,479.9	6,468.5	16.5	14.3	-180.00	-214.5	161.0	659.4	629.1	30.28	21.774	
6,600.0	6,568.3	6,579.9	6,568.3	16.7	14.5	-90.00	-214.5	154.6	659.4	630.1	29.26	22.538	
6,700.0	6,666.3	6,679.9	6,666.3	16.8	14.7	-89.99	-214.5	135.3	659.4	629.8	29.55	22.317	
6,800.0	6,761.0	6,779.9	6,761.0	16.9	14.8	-89.99	-214.5	103.4	659.4	629.6	29.82	22.113	
6,900.0	6,850.7	6,879.9	6,850.7	17.0	14.9	-89.99	-214.5	59.4	659.4	629.2	30.15	21.873	
7,000.0	6,934.0	6,979.9	6,933.8	17.0	15.1	-89.98	-214.5	4.0	659.4	628.7	30.64	21.523	
7,100.0	7,009.2	7,079.8	7,009.1	17.2	15.4	-89.98	-214.5	-61.7	659.4	627.9	31.42	20.984	
7,200.0	7,075.3	7,179.8	7,075.1	17.4	16.0	-89.98	-214.5	-136.7	659.4	626.7	32.65	20.196	
7,300.0	7,131.0	7,279.8	7,130.8	18.1	16.9	-89.98	-214.5	-219.6	659.4	624.9	34.43	19.150	
7,400.0	7,175.4	7,379.7	7,175.1	19.1	18.2	-89.97	-214.5	-309.1	659.4	622.5	36.83	17.904	
7,500.0	7,207.7	7,479.7	7,207.4	20.6	19.7	-89.97	-214.5	-403.6	659.4	619.6	39.82	16.558	
7,600.0	7,227.5	7,579.7	7,227.1	22.3	21.5	-89.97	-214.5	-501.5	659.4	616.0	43.33	15.218	
7,700.0	7,234.2	7,679.6	7,233.9	24.2	23.4	-89.97	-214.5	-601.2	659.4	612.2	47.22	13.965	
7,800.0	7,232.0	7,779.6	7,231.7	26.2	25.5	-89.97	-214.5	-701.2	659.4	608.0	51.40	12.829	
7,900.0	7,229.6	7,879.6	7,229.3	28.4	27.8	-89.97	-214.5	-801.1	659.4	603.6	55.82	11.813	
8,000.0	7,227.1	7,979.6	7,226.8	30.7	30.1	-89.98	-214.5	-901.1	659.4	598.9	60.44	10.910	
8,100.0	7,224.7	8,079.6	7,224.4	33.0	32.5	-89.98	-214.5	-1,001.1	659.4	594.2	65.21	10.111	
8,200.0	7,222.2	8,179.6	7,222.0	35.4	35.0	-89.98	-214.5	-1,101.0	659.4	589.3	70.11	9.405	
8,300.0	7,219.7	8,279.6	7,219.5	37.9	37.5	-89.98	-214.5	-1,201.0	659.4	584.3	75.11	8.779	
8,400.0	7,217.3	8,379.6	7,217.1	40.4	40.0	-89.98	-214.5	-1,301.0	659.4	579.2	80.19	8.223	
8,500.0	7,214.8	8,479.6	7,214.6	43.0	42.6	-89.98	-214.5	-1,401.0	659.4	574.0	85.34	7.727	
8,600.0	7,212.4	8,579.6	7,212.2	45.6	45.2	-89.98	-214.5	-1,500.9	659.4	568.8	90.54	7.283	
8,700.0	7,209.9	8,679.6	7,209.7	48.2	47.8	-89.99	-214.5	-1,600.9	659.4	563.6	95.79	6.884	
8,800.0	7,207.4	8,779.6	7,207.3	50.8	50.5	-89.99	-214.5	-1,700.9	659.4	558.3	101.07	6.524	
8,900.0	7,205.0	8,879.6	7,204.8	53.5	53.1	-89.99	-214.5	-1,800.8	659.4	553.0	106.39	6.198	
9,000.0	7,202.5	8,979.6	7,202.4	56.1	55.8	-89.99	-214.5	-1,900.8	659.4	547.6	111.74	5.901	
9,100.0	7,200.1	9,079.6	7,200.0	58.8	58.5	-89.99	-214.5	-2,000.8	659.4	542.3	117.11	5.630	
9,200.0	7,197.6	9,179.6	7,197.5	61.5	61.2	-89.99	-214.5	-2,100.7	659.4	536.9	122.51	5.382	
9,300.0	7,195.1	9,279.6	7,195.1	64.2	63.9	-90.00	-214.5	-2,200.7	659.4	531.5	127.92	5.155	
9,400.0	7,192.7	9,379.6	7,192.6	66.9	66.6	-90.00	-214.5	-2,300.7	659.4	526.0	133.35	4.945	
9,500.0	7,190.2	9,479.6	7,190.2	69.6	69.4	-90.00	-214.5	-2,400.7	659.4	520.6	138.79	4.751	
9,600.0	7,187.7	9,579.6	7,187.7	72.3	72.1	-90.00	-214.5	-2,500.6	659.4	515.1	144.25	4.571	
9,700.0	7,185.3	9,679.6	7,185.3	75.0	74.8	-90.00	-214.5	-2,600.6	659.4	509.7	149.71	4.404	
9,800.0	7,182.8	9,779.6	7,182.9	77.8	77.6	-90.00	-214.5	-2,700.6	659.4	504.2	155.19	4.249	
9,900.0	7,180.4	9,879.6	7,180.4	80.5	80.3	-90.00	-214.5	-2,800.5	659.4	498.7	160.68	4.104	
10,000.0	7,177.9	9,979.6	7,178.0	83.2	83.1	-90.01	-214.5	-2,900.5	659.4	493.2	166.17	3.968	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Offset Design PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W - Bolton 7Y-404 - Wellbore #1 - Plan #1 (7-16-14)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	7,175.4	10,079.6	7,175.5	86.0	85.8	-90.01	-214.5	-3,000.5	659.4	487.7	171.68	3.841	
10,200.0	7,173.0	10,179.6	7,173.1	88.7	88.6	-90.01	-214.5	-3,100.4	659.4	482.2	177.18	3.721	
10,300.0	7,170.5	10,279.6	7,170.6	91.5	91.3	-90.01	-214.5	-3,200.4	659.4	476.7	182.70	3.609	
10,400.0	7,168.1	10,379.6	7,168.2	94.2	94.1	-90.01	-214.5	-3,300.4	659.4	471.2	188.22	3.503	
10,500.0	7,165.6	10,479.6	7,165.8	97.0	96.9	-90.01	-214.5	-3,400.4	659.4	465.6	193.75	3.403	
10,600.0	7,163.1	10,579.6	7,163.3	99.8	99.6	-90.02	-214.5	-3,500.3	659.4	460.1	199.28	3.309	
10,700.0	7,160.7	10,679.6	7,160.9	102.5	102.4	-90.02	-214.5	-3,600.3	659.4	454.6	204.81	3.219	
10,800.0	7,158.2	10,779.6	7,158.4	105.3	105.2	-90.02	-214.5	-3,700.3	659.4	449.0	210.35	3.135	
10,900.0	7,155.8	10,879.6	7,156.0	108.1	107.9	-90.02	-214.5	-3,800.2	659.4	443.5	215.89	3.054	
11,000.0	7,153.3	10,979.6	7,153.5	110.8	110.7	-90.02	-214.5	-3,900.2	659.4	437.9	221.44	2.978	
11,100.0	7,150.8	11,079.6	7,151.1	113.6	113.5	-90.02	-214.5	-4,000.2	659.4	432.4	226.99	2.905	
11,200.0	7,148.4	11,179.6	7,148.7	116.4	116.3	-90.02	-214.5	-4,100.2	659.4	426.8	232.54	2.836	
11,300.0	7,145.9	11,279.6	7,146.2	119.1	119.0	-90.03	-214.5	-4,200.1	659.4	421.3	238.10	2.769	
11,400.0	7,143.5	11,379.6	7,143.8	121.9	121.8	-90.03	-214.5	-4,300.1	659.4	415.7	243.65	2.706	
11,500.0	7,141.0	11,479.6	7,141.3	124.7	124.6	-90.03	-214.5	-4,400.1	659.4	410.2	249.21	2.646	
11,581.1	7,139.0	11,560.7	7,139.3	126.2	126.9	-90.03	-214.5	-4,481.2	659.4	406.5	252.93	2.607	SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 5166.0ft (Original Well Elev)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °
Coordinates are relative to: Bolton 7X-434
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.30°

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Bolton 7X-434
Project:	SEC.7-T3N-68W	**TVD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Reference Site:	PDC Bolton 3N68W7Y-MLVT Pad Sec.7-T3N-R68W	**MD Reference:**	WELL @ 5166.0ft (Original Well Elev)
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Bolton 7X-434	**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 (7-15-14)	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 5166.0ft (Original Well Elev) Coordinates are relative to: Bolton 7X-434

Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1983, Colorado Northern Zone

Central Meridian is -105.500000 ° Grid Convergence at Surface is: 0.30°