

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Collins 18T-321**

Surface Location: Collins 4N64W18T Pad Sec.18-T4N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

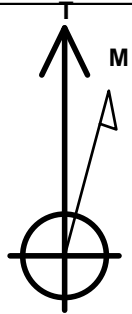
Ground Elevation: 4782.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1355535.93	3254564.82	40.305750	-104.587230	

Original Well Elev WELL @ 4797.0ft (Original Well Elev)

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 234'FSL & 880'FEL	1.0	0.0	0.0	Point
BHL 500'FNL & 1054'FEL	6895.0	4539.3	-145.0	Point



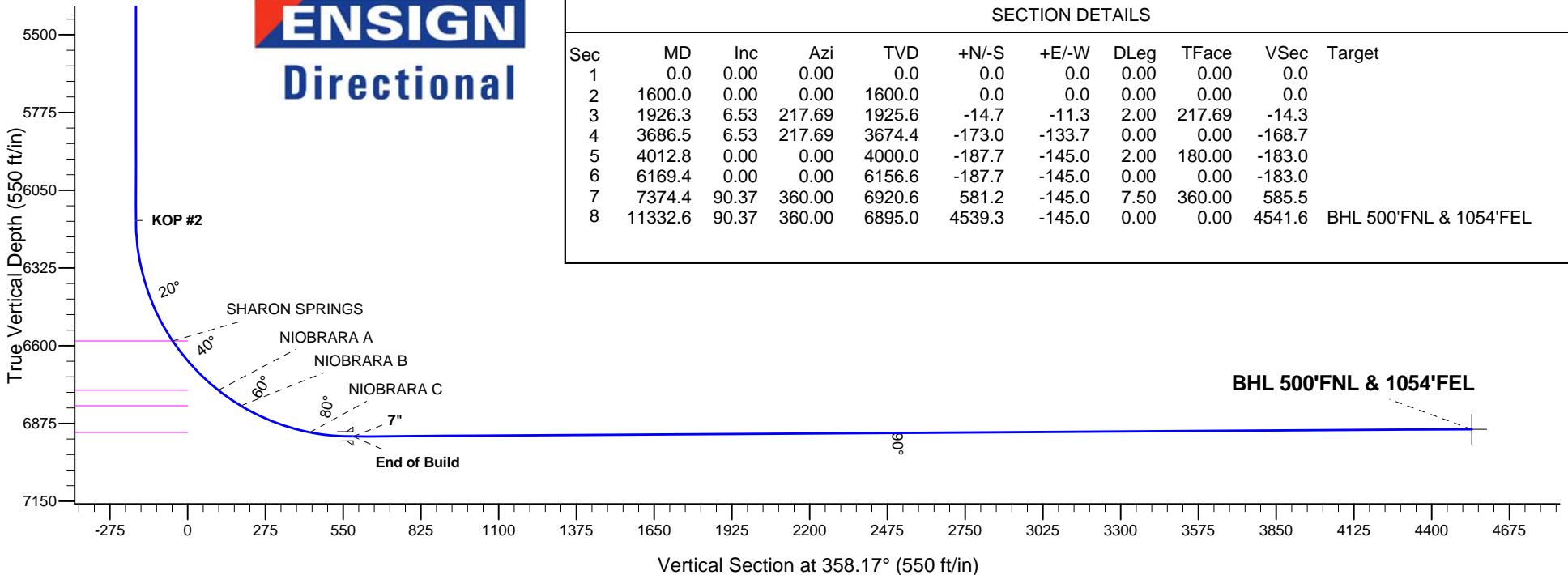
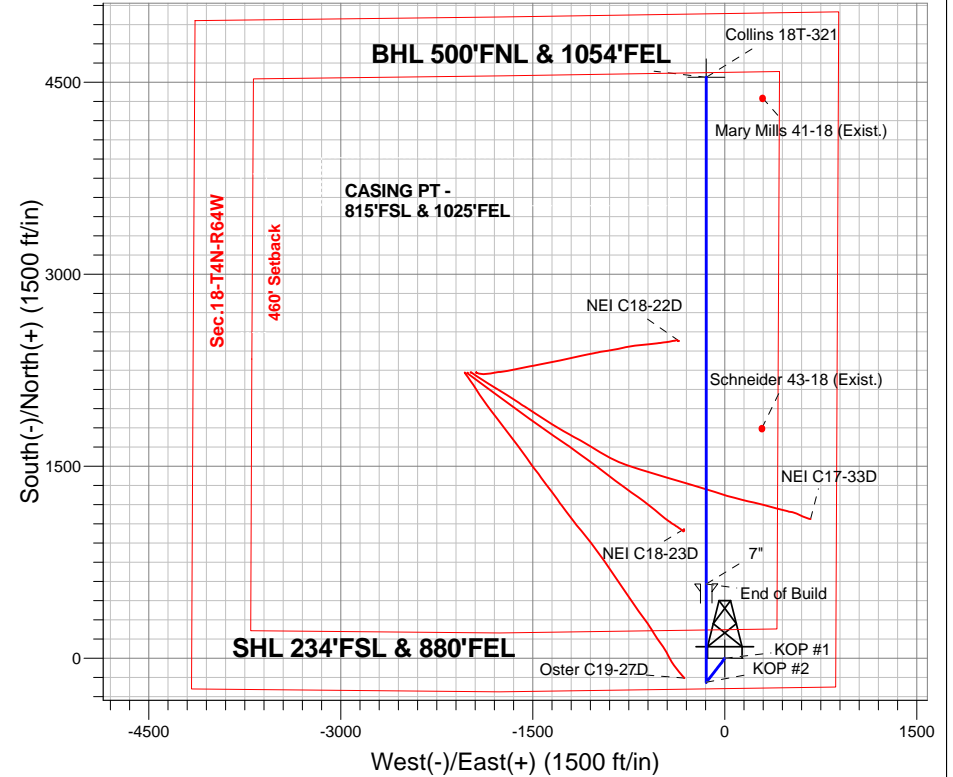
Azimuths to True North
Magnetic North: 8.30°

Magnetic Field
Strength: 52744.0nT
Dip Angle: 66.89°
Date: 11/3/2014
Model: IGRF2010

Collins 4N64W18T Pad Sec.18-T4N-R64W
Collins 18T-321
Plan #1 (11-3-14)

ANNOTATIONS

TVD	MD	Annotation
1600.0	1600.0	KOP #1
6156.6	6169.4	KOP #2
6920.6	7374.4	End of Build



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1600.0	0.00	0.00	1600.0	0.0	0.0	0.00	0.00	0.0	
3	1926.3	6.53	217.69	1925.6	-14.7	-11.3	2.00	217.69	-14.3	
4	3686.5	6.53	217.69	3674.4	-173.0	-133.7	0.00	0.00	-168.7	
5	4012.8	0.00	0.00	4000.0	-187.7	-145.0	2.00	180.00	-183.0	
6	6169.4	0.00	0.00	6156.6	-187.7	-145.0	0.00	0.00	-183.0	
7	7374.4	90.37	360.00	6920.6	581.2	-145.0	7.50	360.00	585.5	
8	11332.6	90.37	360.00	6895.0	4539.3	-145.0	0.00	0.00	4541.6	BHL 500'FNL & 1054'FEL



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.18-T4N-R64W

Collins 4N64W18T Pad Sec.18-T4N-R64W

Collins 18T-321

Wellbore #1

Plan: Plan #1 (11-3-14)

Standard Planning Report

05 November, 2014

Database:	landmark	Local Co-ordinate Reference:	Well Collins 18T-321
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Project:	SEC.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	North Reference:	True
Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-3-14)		

Project	SEC.18-T4N-R64W		
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

Collins 4N64W18T Pad Sec.18-T4N-R64W					
Site Position:		Northing:	1,355,535.33ft	Latitude:	40.305750
From:	Lat/Long	Easting:	3,254,506.26ft	Longitude:	-104.587440
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.59 °

Well	Collins 18T-321					
Well Position	+N-S	0.0 ft	Northing:	1,355,535.93 ft	Latitude:	40.305750
	+E-W	58.6 ft	Easting:	3,254,564.82 ft	Longitude:	-104.587230
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,782.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/3/2014	8.30	66.89	52,744

Design	Plan #1 (11-3-14)			
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	358.17

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	
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,926.3	6.53	217.69	1,925.6	-14.7	-11.3	2.00	2.00	0.00	217.69	
3,686.5	6.53	217.69	3,674.4	-173.0	-133.7	0.00	0.00	0.00	0.00	
4,012.8	0.00	0.00	4,000.0	-187.7	-145.0	2.00	-2.00	0.00	180.00	
6,169.4	0.00	0.00	6,156.6	-187.7	-145.0	0.00	0.00	0.00	0.00	
7,374.4	90.37	360.00	6,920.6	581.2	-145.0	7.50	7.50	0.00	360.00	
11,332.6	90.37	360.00	6,895.0	4,539.3	-145.0	0.00	0.00	0.00	0.00	BHL 500'FNL & 105°

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Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Project:	SEC.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	North Reference:	True
Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-3-14)		

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
1,300.0	0.00	0.00	1,300.0	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
1,500.0	0.00	0.00	1,500.0	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
KOP #1									
1,700.0	2.00	217.69	1,700.0	-1.4	-1.1	-1.3	2.00	2.00	0.00
1,800.0	4.00	217.69	1,799.8	-5.5	-4.3	-5.4	2.00	2.00	0.00
1,900.0	6.00	217.69	1,899.5	-12.4	-9.6	-12.1	2.00	2.00	0.00
1,926.3	6.53	217.69	1,925.6	-14.7	-11.3	-14.3	2.00	2.00	0.00
2,000.0	6.53	217.69	1,998.8	-21.3	-16.5	-20.8	0.00	0.00	0.00
2,100.0	6.53	217.69	2,098.2	-30.3	-23.4	-29.5	0.00	0.00	0.00
2,200.0	6.53	217.69	2,197.5	-39.3	-30.4	-38.3	0.00	0.00	0.00
2,300.0	6.53	217.69	2,296.9	-48.3	-37.3	-47.1	0.00	0.00	0.00
2,400.0	6.53	217.69	2,396.2	-57.3	-44.3	-55.9	0.00	0.00	0.00
2,500.0	6.53	217.69	2,495.6	-66.3	-51.2	-64.6	0.00	0.00	0.00
2,600.0	6.53	217.69	2,594.9	-75.3	-58.2	-73.4	0.00	0.00	0.00
2,700.0	6.53	217.69	2,694.3	-84.3	-65.1	-82.2	0.00	0.00	0.00
2,800.0	6.53	217.69	2,793.6	-93.3	-72.1	-90.9	0.00	0.00	0.00
2,900.0	6.53	217.69	2,893.0	-102.3	-79.0	-99.7	0.00	0.00	0.00
3,000.0	6.53	217.69	2,992.3	-111.3	-86.0	-108.5	0.00	0.00	0.00
3,100.0	6.53	217.69	3,091.7	-120.3	-92.9	-117.2	0.00	0.00	0.00
3,200.0	6.53	217.69	3,191.0	-129.3	-99.9	-126.0	0.00	0.00	0.00
3,300.0	6.53	217.69	3,290.4	-138.2	-106.8	-134.8	0.00	0.00	0.00
3,400.0	6.53	217.69	3,389.7	-147.2	-113.7	-143.5	0.00	0.00	0.00
3,500.0	6.53	217.69	3,489.1	-156.2	-120.7	-152.3	0.00	0.00	0.00
3,600.0	6.53	217.69	3,588.4	-165.2	-127.6	-161.1	0.00	0.00	0.00
3,686.5	6.53	217.69	3,674.4	-173.0	-133.7	-168.7	0.00	0.00	0.00
3,700.0	6.26	217.69	3,687.8	-174.2	-134.6	-169.8	2.00	-2.00	0.00
3,800.0	4.26	217.69	3,787.4	-181.4	-140.2	-176.9	2.00	-2.00	0.00
3,838.7	3.48	217.69	3,826.0	-183.5	-141.8	-178.9	2.00	-2.00	0.00
PARKMAN									
3,900.0	2.26	217.69	3,887.2	-185.9	-143.6	-181.3	2.00	-2.00	0.00
4,000.0	0.26	217.69	3,987.2	-187.7	-145.0	-183.0	2.00	-2.00	0.00
4,012.8	0.00	0.00	4,000.0	-187.7	-145.0	-183.0	2.00	-2.00	0.00
4,100.0	0.00	0.00	4,087.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,187.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,287.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
4,312.8	0.00	0.00	4,300.0	-187.7	-145.0	-183.0	0.00	0.00	0.00
SUSSEX									
4,400.0	0.00	0.00	4,387.2	-187.7	-145.0	-183.0	0.00	0.00	0.00

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Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	North Reference:	True
Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-3-14)		

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)
4,500.0	0.00	0.00	4,487.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,587.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,687.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,787.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,887.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
4,912.8	0.00	0.00	4,900.0	-187.7	-145.0	-183.0	0.00	0.00	0.00
SHANNON									
5,000.0	0.00	0.00	4,987.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,087.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,187.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,287.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,387.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,487.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,587.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,687.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
5,800.0	0.00	0.00	5,787.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
5,900.0	0.00	0.00	5,887.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
6,000.0	0.00	0.00	5,987.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
6,100.0	0.00	0.00	6,087.2	-187.7	-145.0	-183.0	0.00	0.00	0.00
6,169.4	0.00	0.00	6,156.6	-187.7	-145.0	-183.0	0.00	0.00	0.00
KOP #2									
6,200.0	2.29	360.00	6,187.2	-187.1	-145.0	-182.4	7.49	7.49	0.00
6,300.0	9.79	360.00	6,286.5	-176.6	-145.0	-171.9	7.50	7.50	0.00
6,400.0	17.29	360.00	6,383.7	-153.2	-145.0	-148.5	7.50	7.50	0.00
6,500.0	24.79	360.00	6,477.0	-117.3	-145.0	-112.6	7.50	7.50	0.00
6,600.0	32.29	360.00	6,564.7	-69.6	-145.0	-64.9	7.50	7.50	0.00
6,621.8	33.93	360.00	6,583.0	-57.6	-145.0	-53.0	7.50	7.50	0.00
SHARON SPRINGS									
6,700.0	39.79	360.00	6,645.6	-10.8	-145.0	-6.1	7.50	7.50	0.00
6,800.0	47.29	360.00	6,718.0	58.1	-145.0	62.7	7.50	7.50	0.00
6,860.1	51.80	360.00	6,757.0	103.8	-145.0	108.4	7.50	7.50	0.00
NIORARA A									
6,900.0	54.79	360.00	6,780.8	135.8	-145.0	140.3	7.50	7.50	0.00
6,957.2	59.08	360.00	6,812.0	183.7	-145.0	188.2	7.50	7.50	0.00
NIORARA B									
7,000.0	62.29	360.00	6,833.0	221.0	-145.0	225.5	7.50	7.50	0.00
7,100.0	69.79	360.00	6,873.5	312.3	-145.0	316.8	7.50	7.50	0.00
7,200.0	77.29	360.00	6,901.9	408.2	-145.0	412.6	7.50	7.50	0.00
7,220.0	78.79	360.00	6,906.0	427.7	-145.0	432.1	7.50	7.50	0.00
NIORARA C									
7,300.0	84.79	360.00	6,917.4	506.9	-145.0	511.3	7.50	7.50	0.00
7,374.4	90.37	360.00	6,920.6	581.2	-145.0	585.5	7.50	7.50	0.00
End of Build - 7"									
7,400.0	90.37	360.00	6,920.4	606.8	-145.0	611.1	0.00	0.00	0.00
7,500.0	90.37	360.00	6,919.7	706.8	-145.0	711.1	0.00	0.00	0.00
7,600.0	90.37	360.00	6,919.1	806.8	-145.0	811.0	0.00	0.00	0.00
7,700.0	90.37	360.00	6,918.5	906.8	-145.0	911.0	0.00	0.00	0.00
7,800.0	90.37	360.00	6,917.8	1,006.8	-145.0	1,010.9	0.00	0.00	0.00
7,900.0	90.37	360.00	6,917.2	1,106.8	-145.0	1,110.8	0.00	0.00	0.00
8,000.0	90.37	360.00	6,916.5	1,206.8	-145.0	1,210.8	0.00	0.00	0.00
8,100.0	90.37	360.00	6,915.9	1,306.8	-145.0	1,310.7	0.00	0.00	0.00
8,200.0	90.37	360.00	6,915.2	1,406.8	-145.0	1,410.7	0.00	0.00	0.00

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Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	North Reference:	True
Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-3-14)		

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)
8,300.0	90.37	360.00	6,914.6	1,506.8	-145.0	1,510.6	0.00	0.00	0.00
8,400.0	90.37	360.00	6,913.9	1,606.8	-145.0	1,610.6	0.00	0.00	0.00
8,500.0	90.37	360.00	6,913.3	1,706.8	-145.0	1,710.5	0.00	0.00	0.00
8,600.0	90.37	360.00	6,912.6	1,806.8	-145.0	1,810.5	0.00	0.00	0.00
8,700.0	90.37	360.00	6,912.0	1,906.8	-145.0	1,910.4	0.00	0.00	0.00
8,800.0	90.37	360.00	6,911.4	2,006.8	-145.0	2,010.4	0.00	0.00	0.00
8,900.0	90.37	360.00	6,910.7	2,106.8	-145.0	2,110.3	0.00	0.00	0.00
9,000.0	90.37	360.00	6,910.1	2,206.8	-145.0	2,210.3	0.00	0.00	0.00
9,100.0	90.37	360.00	6,909.4	2,306.8	-145.0	2,310.2	0.00	0.00	0.00
9,200.0	90.37	360.00	6,908.8	2,406.8	-145.0	2,410.2	0.00	0.00	0.00
9,300.0	90.37	360.00	6,908.1	2,506.8	-145.0	2,510.1	0.00	0.00	0.00
9,400.0	90.37	360.00	6,907.5	2,606.8	-145.0	2,610.1	0.00	0.00	0.00
9,500.0	90.37	360.00	6,906.8	2,706.8	-145.0	2,710.0	0.00	0.00	0.00
9,600.0	90.37	360.00	6,906.2	2,806.7	-145.0	2,809.9	0.00	0.00	0.00
9,700.0	90.37	360.00	6,905.5	2,906.7	-145.0	2,909.9	0.00	0.00	0.00
9,800.0	90.37	360.00	6,904.9	3,006.7	-145.0	3,009.8	0.00	0.00	0.00
9,900.0	90.37	360.00	6,904.3	3,106.7	-145.0	3,109.8	0.00	0.00	0.00
10,000.0	90.37	360.00	6,903.6	3,206.7	-145.0	3,209.7	0.00	0.00	0.00
10,100.0	90.37	360.00	6,903.0	3,306.7	-145.0	3,309.7	0.00	0.00	0.00
10,200.0	90.37	360.00	6,902.3	3,406.7	-145.0	3,409.6	0.00	0.00	0.00
10,300.0	90.37	360.00	6,901.7	3,506.7	-145.0	3,509.6	0.00	0.00	0.00
10,400.0	90.37	360.00	6,901.0	3,606.7	-145.0	3,609.5	0.00	0.00	0.00
10,500.0	90.37	360.00	6,900.4	3,706.7	-145.0	3,709.5	0.00	0.00	0.00
10,600.0	90.37	360.00	6,899.7	3,806.7	-145.0	3,809.4	0.00	0.00	0.00
10,700.0	90.37	360.00	6,899.1	3,906.7	-145.0	3,909.4	0.00	0.00	0.00
10,800.0	90.37	360.00	6,898.4	4,006.7	-145.0	4,009.3	0.00	0.00	0.00
10,900.0	90.37	360.00	6,897.8	4,106.7	-145.0	4,109.3	0.00	0.00	0.00
11,000.0	90.37	360.00	6,897.1	4,206.7	-145.0	4,209.2	0.00	0.00	0.00
11,100.0	90.37	360.00	6,896.5	4,306.7	-145.0	4,309.2	0.00	0.00	0.00
11,200.0	90.37	360.00	6,895.9	4,406.7	-145.0	4,409.1	0.00	0.00	0.00
11,300.0	90.37	360.00	6,895.2	4,506.7	-145.0	4,509.0	0.00	0.00	0.00
11,332.6	90.37	360.00	6,895.0	4,539.3	-145.0	4,541.6	0.00	0.00	0.00

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
SHL 234'FSL & 880'F	0.00	0.00	1.0	0.0	0.0	1,355,535.93	3,254,564.82	40.305750	-104.587230
- plan hits target									
- Point									
BHL 500'FNL & 1054'	0.00	0.00	6,895.0	4,539.3	-145.0	1,360,073.26	3,254,373.11	40.318210	-104.587750
- plan hits target									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
7,374.4	6,920.6	7"	7	7-1/2	

Database:	landmark	Local Co-ordinate Reference:	Well Collins 18T-321
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Project:	SEC.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	North Reference:	True
Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-3-14)		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,838.7	3,826.0	PARKMAN		0.00	
4,312.8	4,300.0	SUSSEX		0.00	
4,912.8	4,900.0	SHANNON		0.00	
6,621.8	6,583.0	SHARON SPRINGS		0.00	
6,860.1	6,757.0	NIOBRARA A		0.00	
6,957.2	6,812.0	NIOBRARA B		0.00	
7,220.0	6,906.0	NIOBRARA C		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,600.0	1,600.0	0.0	0.0	KOP #1
6,169.4	6,156.6	-187.7	-145.0	KOP #2
7,374.4	6,920.6	581.2	-145.0	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.18-T4N-R64W

Collins 4N64W18T Pad Sec.18-T4N-R64W

Collins 18T-321

Wellbore #1

Plan #1 (11-3-14)

Anticollision Report

05 November, 2014



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (11-3-14)		
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	11/5/2014		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,332.6	Plan #1 (11-3-14) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Separation Factor	Warning
Collins 4N64W18T Pad Sec.18-T4N-R64W						
Collins 18Q-221 - Wellbore #1 - Plan #1 (11-3-14)	366.3	367.3	89.3	87.9	62.717	CC
Collins 18Q-221 - Wellbore #1 - Plan #1 (11-3-14)	400.0	400.0	89.3	87.8	56.777	ES
Collins 18Q-221 - Wellbore #1 - Plan #1 (11-3-14)	900.0	881.4	131.3	127.5	34.607	SF
Collins 18Q-301 - Wellbore #1 - Plan #1 (11-3-14)	166.0	168.0	120.0	119.5	228.159	CC
Collins 18Q-301 - Wellbore #1 - Plan #1 (11-3-14)	200.0	200.0	120.0	119.3	177.968	ES
Collins 18Q-301 - Wellbore #1 - Plan #1 (11-3-14)	3,800.0	3,663.6	882.1	862.9	45.912	SF
Collins 18T-201 - Wellbore #1 - Plan #1 (11-3-14)	1,000.0	1,000.0	30.7	26.4	7.184	CC, ES
Collins 18T-201 - Wellbore #1 - Plan #1 (11-3-14)	11,332.6	11,280.3	341.6	165.5	1.939	SF
Collins 18T-221 - Wellbore #1 - Plan #1 (11-3-14)	1,600.0	1,599.0	30.7	23.7	4.405	CC, ES
Collins 18T-221 - Wellbore #1 - Plan #1 (11-3-14)	11,332.6	11,260.7	253.6	79.0	1.452	Level 3, SF
Collins 18T-341 - Wellbore #1 - Plan #1 (10-27-14)	766.3	767.3	58.6	55.3	18.176	CC
Collins 18T-341 - Wellbore #1 - Plan #1 (10-27-14)	800.0	801.0	58.6	55.2	17.362	ES
Collins 18T-341 - Wellbore #1 - Plan #1 (10-27-14)	11,332.6	11,386.1	580.1	402.4	3.264	SF
MARY MILLS 41-18						
MARY MILLS 41-18 - Wellbore #1 - Design #1	11,172.3	6,895.0	440.6	339.3	4.350	CC, ES
MARY MILLS 41-18 - Wellbore #1 - Design #1	11,200.0	6,894.9	441.5	339.7	4.336	SF
NEI C18-32D Pad Sec.18-T4N-R64W						
NEI C17-33D - Wellbore #1 - Wellbore #1	7,913.5	7,525.1	740.9	682.6	12.709	CC, ES
NEI C17-33D - Wellbore #1 - Wellbore #1	8,100.0	7,508.0	763.8	702.6	12.482	SF
NEI C18-22D - Wellbore #1 - Wellbore #1	9,273.1	7,237.0	216.1	147.3	3.140	CC, ES, SF
NEI C18-23D - Wellbore #1 - Wellbore #1	7,791.9	7,433.4	171.8	117.1	3.139	CC, ES
NEI C18-23D - Wellbore #1 - Wellbore #1	7,800.0	7,433.6	172.0	117.2	3.135	SF
Oster C19-27D - Wellbore #1 - Wellbore #1	6,631.9	7,341.7	229.9	164.7	3.526	CC, ES, SF
Schneider 43-18 (Exist.) - Wellbore #1 - Design #1	8,592.9	6,901.7	435.1	381.6	8.135	CC
Schneider 43-18 (Exist.) - Wellbore #1 - Design #1	8,600.0	6,901.6	435.1	381.5	8.117	ES
Schneider 43-18 (Exist.) - Wellbore #1 - Design #1	8,700.0	6,901.0	448.0	392.7	8.090	SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18Q-221 - Wellbore #1 - Plan #1 (11-3-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWDD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	1.0	1.0	0.0	0.0	-92.34	-3.6	-89.3	89.3	89.3	0.00	N/A		
100.0	100.0	101.0	101.0	0.1	0.1	-92.34	-3.6	-89.3	89.3	89.1	0.23	393.481		
200.0	200.0	201.0	201.0	0.3	0.3	-92.34	-3.6	-89.3	89.3	88.6	0.68	132.032		
300.0	300.0	301.0	301.0	0.6	0.6	-92.34	-3.6	-89.3	89.3	88.2	1.13	79.324		
366.3	366.3	367.3	367.3	0.7	0.7	-92.34	-3.6	-89.3	89.3	87.9	1.42	62.717 CC		
400.0	400.0	400.0	400.0	0.8	0.8	-92.34	-3.6	-89.3	89.3	87.8	1.57	56.777 ES		
500.0	500.0	497.9	497.9	1.0	1.0	-92.46	-3.9	-90.9	91.0	89.0	2.00	45.410		
600.0	600.0	594.7	594.5	1.2	1.2	-92.81	-4.7	-95.8	96.1	93.7	2.43	39.499		
700.0	700.0	691.0	690.5	1.5	1.4	-93.31	-6.0	-103.8	104.5	101.7	2.87	36.374		
800.0	800.0	786.6	785.4	1.7	1.7	-93.89	-7.8	-115.0	116.3	112.9	3.33	34.953		
900.0	900.0	881.4	879.1	1.9	2.0	-94.48	-10.1	-129.1	131.3	127.5	3.79	34.607 SF		
1,000.0	1,000.0	975.1	971.2	2.1	2.3	-95.04	-12.9	-146.0	149.6	145.3	4.28	34.955		
1,100.0	1,100.0	1,067.6	1,061.6	2.4	2.7	-95.54	-16.1	-165.7	171.1	166.3	4.78	35.752		
1,200.0	1,200.0	1,162.0	1,153.1	2.6	3.1	-95.99	-19.7	-188.2	195.2	189.9	5.32	36.715		
1,300.0	1,300.0	1,258.9	1,247.1	2.8	3.6	-96.35	-23.6	-211.7	219.8	213.9	5.87	37.468		
1,400.0	1,400.0	1,355.9	1,341.1	3.0	4.1	-96.64	-27.4	-235.2	244.3	237.9	6.42	38.032		
1,500.0	1,500.0	1,452.8	1,435.1	3.3	4.6	-96.88	-31.2	-258.7	268.8	261.8	6.99	38.462		
1,600.0	1,600.0	1,549.7	1,529.0	3.5	5.1	-97.07	-35.0	-282.2	293.3	285.8	7.56	38.797		
1,700.0	1,700.0	1,647.0	1,623.3	3.7	5.6	44.96	-38.9	-305.8	316.7	309.2	7.48	42.336		
1,800.0	1,799.8	1,744.7	1,718.0	3.9	6.1	45.14	-42.7	-329.5	337.6	329.7	7.92	42.632		
1,900.0	1,899.5	1,842.8	1,813.2	4.1	6.6	45.71	-46.6	-353.2	356.2	347.8	8.37	42.547		
2,000.0	1,998.8	1,941.2	1,908.5	4.3	7.1	46.68	-50.4	-377.1	373.1	364.3	8.84	42.195		
2,100.0	2,098.2	2,039.5	2,003.8	4.5	7.6	47.64	-54.3	-400.9	390.1	380.8	9.33	41.812		
2,200.0	2,197.5	2,137.9	2,099.2	4.7	8.1	48.52	-58.2	-424.7	407.1	397.3	9.83	41.423		
2,300.0	2,296.9	2,236.2	2,194.5	4.9	8.6	49.33	-62.1	-448.6	424.3	413.9	10.34	41.031		
2,400.0	2,396.2	2,334.6	2,289.8	5.2	9.2	50.08	-65.9	-472.4	441.5	430.6	10.86	40.644		
2,500.0	2,495.6	2,432.9	2,385.2	5.4	9.7	50.77	-69.8	-496.2	458.8	447.4	11.39	40.263		
2,600.0	2,594.9	2,531.3	2,480.5	5.7	10.2	51.41	-73.7	-520.1	476.1	464.2	11.94	39.892		
2,700.0	2,694.3	2,629.6	2,575.9	6.0	10.7	52.01	-77.6	-543.9	493.5	481.0	12.48	39.532		
2,800.0	2,793.6	2,728.0	2,671.2	6.2	11.2	52.57	-81.4	-567.8	511.0	497.9	13.04	39.184		
2,900.0	2,893.0	2,826.3	2,766.5	6.5	11.8	53.09	-85.3	-591.6	528.5	514.9	13.60	38.849		
3,000.0	2,992.3	2,924.7	2,861.9	6.8	12.3	53.57	-89.2	-615.4	546.0	531.8	14.17	38.528		
3,100.0	3,091.7	3,023.0	2,957.2	7.1	12.8	54.03	-93.1	-639.3	563.6	548.8	14.75	38.220		
3,200.0	3,191.0	3,121.4	3,052.5	7.4	13.3	54.46	-96.9	-663.1	581.2	565.8	15.32	37.925		
3,300.0	3,290.4	3,219.7	3,147.9	7.6	13.9	54.86	-100.8	-686.9	598.8	582.9	15.91	37.643		
3,400.0	3,389.7	3,318.1	3,243.2	7.9	14.4	55.24	-104.7	-710.8	616.4	599.9	16.49	37.374		
3,500.0	3,489.1	3,416.4	3,338.6	8.2	14.9	55.60	-108.6	-734.6	634.1	617.0	17.08	37.116		
3,600.0	3,588.4	3,514.8	3,433.9	8.5	15.4	55.94	-112.5	-758.4	651.8	634.1	17.68	36.870		
3,700.0	3,687.8	3,613.1	3,529.2	8.8	16.0	56.30	-116.3	-782.3	669.6	651.3	18.27	36.642		
3,800.0	3,787.4	3,711.3	3,624.4	9.0	16.5	56.77	-120.2	-806.1	688.5	669.7	18.81	36.604		
3,900.0	3,887.2	3,809.1	3,719.2	9.2	17.0	57.02	-124.0	-829.8	709.3	690.0	19.31	36.739		
4,000.0	3,987.2	3,906.4	3,813.5	9.4	17.5	57.08	-127.9	-853.3	732.0	712.2	19.76	37.038		
4,100.0	4,087.2	4,003.3	3,907.5	9.6	18.0	-85.62	-131.7	-876.8	755.9	735.7	20.20	37.425		
4,200.0	4,187.2	4,100.3	4,001.5	9.8	18.6	-86.05	-135.5	-900.3	779.8	759.2	20.63	37.796		
4,300.0	4,287.2	4,197.2	4,095.5	10.0	19.1	-86.45	-139.3	-923.8	803.8	782.7	21.07	38.149		
4,400.0	4,387.2	4,294.1	4,189.4	10.2	19.6	-86.82	-143.2	-947.3	827.8	806.2	21.51	38.483		
4,500.0	4,487.2	4,391.1	4,283.4	10.4	20.1	-87.18	-147.0	-970.8	851.8	829.8	21.95	38.801		
4,600.0	4,587.2	4,488.0	4,377.4	10.6	20.6	-87.51	-150.8	-994.3	875.8	853.4	22.40	39.104		
4,700.0	4,687.2	4,585.0	4,471.3	10.8	21.2	-87.83	-154.6	-1,017.8	899.9	877.1	22.85	39.392		
4,800.0	4,787.2	4,681.9	4,565.3	11.0	21.7	-88.13	-158.4	-1,041.3	924.0	900.7	23.30	39.666		
4,900.0	4,887.2	4,778.8	4,659.3	11.1	22.2	-88.42	-162.3	-1,064.8	948.2	924.4	23.75	39.928		

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 Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18Q-221 - Wellbore #1 - Plan #1 (11-3-14)												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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
5,000.0	4,987.2	4,875.8	4,753.3	11.3	22.7	-88.69	-166.1	-1,088.3	972.3	948.1	24.20	40.177	
5,100.0	5,087.2	4,972.7	4,847.2	11.5	23.2	-88.95	-169.9	-1,111.8	996.5	971.8	24.66	40.415	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18Q-301 - Wellbore #1 - Plan #1 (11-3-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	2.0	2.0	0.0	0.0	-91.74	-3.6	-119.9	120.0	120.0	0.00	N/A		
100.0	100.0	102.0	102.0	0.1	0.1	-91.74	-3.6	-119.9	120.0	119.8	0.23	523.362		
166.0	166.0	168.0	168.0	0.3	0.3	-91.74	-3.6	-119.9	120.0	119.5	0.53	228.159 CC		
200.0	200.0	200.0	200.0	0.3	0.3	-91.74	-3.6	-119.9	120.0	119.3	0.67	177.968 ES		
300.0	300.0	297.9	297.9	0.6	0.5	-91.83	-3.9	-121.6	121.7	120.6	1.11	109.816		
400.0	400.0	393.6	393.5	0.8	0.8	-92.06	-4.6	-126.4	126.8	125.2	1.54	82.069		
500.0	500.0	488.9	488.5	1.0	1.0	-92.42	-5.7	-134.3	135.1	133.2	1.99	67.775		
600.0	600.0	583.6	582.5	1.2	1.3	-92.84	-7.2	-145.3	146.8	144.4	2.46	59.772		
700.0	700.0	677.5	675.3	1.5	1.6	-93.29	-9.2	-159.2	161.7	158.8	2.93	55.136		
800.0	800.0	770.3	766.5	1.7	1.9	-93.74	-11.5	-176.0	179.9	176.4	3.43	52.469		
900.0	900.0	861.9	856.0	1.9	2.3	-94.17	-14.2	-195.3	201.2	197.2	3.94	51.023		
1,000.0	1,000.0	952.2	943.6	2.1	2.8	-94.56	-17.3	-217.2	225.5	221.1	4.48	50.364		
1,100.0	1,100.0	1,041.7	1,029.7	2.4	3.2	-94.91	-20.7	-241.5	252.9	247.9	5.04	50.200		
1,200.0	1,200.0	1,137.5	1,121.5	2.6	3.8	-95.22	-24.5	-268.7	281.5	275.9	5.63	49.982		
1,300.0	1,300.0	1,233.4	1,213.3	2.8	4.4	-95.48	-28.4	-295.8	310.1	303.9	6.24	49.741		
1,400.0	1,400.0	1,329.2	1,305.1	3.0	4.9	-95.69	-32.2	-323.0	338.8	331.9	6.85	49.485		
1,500.0	1,500.0	1,425.0	1,396.9	3.3	5.5	-95.87	-36.0	-350.2	367.4	359.9	7.46	49.232		
1,600.0	1,600.0	1,520.8	1,488.7	3.5	6.1	-96.02	-39.8	-377.3	396.0	387.9	8.08	48.991		
1,700.0	1,700.0	1,616.9	1,580.8	3.7	6.7	45.92	-43.6	-404.6	423.4	415.8	7.66	55.265		
1,800.0	1,799.8	1,713.7	1,673.5	3.9	7.3	45.92	-47.5	-432.0	448.6	440.4	8.12	55.243		
1,900.0	1,899.5	1,810.9	1,766.7	4.1	7.8	46.23	-51.4	-459.6	471.4	462.8	8.59	54.867		
2,000.0	1,998.8	1,908.4	1,860.1	4.3	8.4	46.95	-55.3	-487.2	492.5	483.5	9.08	54.257		
2,100.0	2,098.2	2,005.9	1,953.5	4.5	9.0	47.70	-59.1	-514.9	513.7	504.1	9.58	53.633		
2,200.0	2,197.5	2,103.5	2,047.0	4.7	9.6	48.39	-63.0	-542.5	534.9	524.9	10.09	53.014		
2,300.0	2,296.9	2,201.0	2,140.4	4.9	10.2	49.03	-66.9	-570.2	556.3	545.6	10.61	52.406		
2,400.0	2,396.2	2,298.5	2,233.8	5.2	10.8	49.62	-70.8	-597.9	577.6	566.5	11.15	51.814		
2,500.0	2,495.6	2,396.0	2,327.3	5.4	11.4	50.17	-74.7	-625.5	599.1	587.4	11.69	51.240		
2,600.0	2,594.9	2,493.6	2,420.7	5.7	12.0	50.68	-78.6	-653.2	620.6	608.3	12.24	50.688		
2,700.0	2,694.3	2,591.1	2,514.1	6.0	12.6	51.16	-82.5	-680.8	642.1	629.3	12.80	50.157		
2,800.0	2,793.6	2,688.6	2,607.6	6.2	13.2	51.60	-86.3	-708.5	663.6	650.3	13.37	49.649		
2,900.0	2,893.0	2,786.1	2,701.0	6.5	13.8	52.02	-90.2	-736.1	685.2	671.3	13.94	49.163		
3,000.0	2,992.3	2,883.6	2,794.5	6.8	14.4	52.41	-94.1	-763.8	706.9	692.4	14.51	48.700		
3,100.0	3,091.7	2,981.2	2,887.9	7.1	15.0	52.78	-98.0	-791.4	728.5	713.4	15.10	48.258		
3,200.0	3,191.0	3,078.7	2,981.3	7.4	15.6	53.13	-101.9	-819.1	750.2	734.5	15.68	47.836		
3,300.0	3,290.4	3,176.2	3,074.8	7.6	16.2	53.46	-105.8	-846.7	771.9	755.7	16.27	47.435		
3,400.0	3,389.7	3,273.7	3,168.2	7.9	16.8	53.77	-109.7	-874.4	793.7	776.8	16.87	47.052		
3,500.0	3,489.1	3,371.2	3,261.6	8.2	17.4	54.06	-113.5	-902.0	815.4	798.0	17.47	46.688		
3,600.0	3,588.4	3,468.8	3,355.1	8.5	18.0	54.34	-117.4	-929.7	837.2	819.1	18.07	46.340		
3,700.0	3,687.8	3,566.3	3,448.5	8.8	18.6	54.65	-121.3	-957.3	859.0	840.4	18.67	46.017		
3,800.0	3,787.4	3,663.6	3,541.7	9.0	19.2	55.17	-125.2	-984.9	882.1	862.9	19.21	45.912 SF		
3,900.0	3,887.2	3,760.4	3,634.5	9.2	19.8	55.54	-129.0	-1,012.4	907.1	887.4	19.72	45.992		
4,000.0	3,987.2	3,856.6	3,726.7	9.4	20.4	55.76	-132.9	-1,039.6	934.0	913.8	20.20	46.246		
4,100.0	4,087.2	3,952.4	3,818.5	9.6	21.0	-86.83	-136.7	-1,066.8	962.1	941.4	20.64	46.602		
4,200.0	4,187.2	4,048.2	3,910.3	9.8	21.6	-87.15	-140.5	-1,094.0	990.2	969.1	21.09	46.942		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18T-201 - Wellbore #1 - Plan #1 (11-3-14)													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	-90.00	0.0	-30.7	30.7					
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-30.7	30.7	30.5	0.22	136.498		
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-30.7	30.7	30.0	0.67	45.499		
300.0	300.0	300.0	300.0	0.6	0.6	-90.00	0.0	-30.7	30.7	29.6	1.12	27.300		
400.0	400.0	400.0	400.0	0.8	0.8	-90.00	0.0	-30.7	30.7	29.1	1.57	19.500		
500.0	500.0	500.0	500.0	1.0	1.0	-90.00	0.0	-30.7	30.7	28.7	2.02	15.166		
600.0	600.0	600.0	600.0	1.2	1.2	-90.00	0.0	-30.7	30.7	28.2	2.47	12.409		
700.0	700.0	700.0	700.0	1.5	1.5	-90.00	0.0	-30.7	30.7	27.8	2.92	10.500		
800.0	800.0	800.0	800.0	1.7	1.7	-90.00	0.0	-30.7	30.7	27.3	3.37	9.100		
900.0	900.0	900.0	900.0	1.9	1.9	-90.00	0.0	-30.7	30.7	26.9	3.82	8.029		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-90.00	0.0	-30.7	30.7	26.4	4.27	7.184 CC, ES		
1,100.0	1,100.0	1,099.0	1,099.0	2.4	2.3	-91.18	-0.7	-32.3	32.3	27.6	4.70	6.869		
1,200.0	1,200.0	1,197.7	1,197.6	2.6	2.5	-94.12	-2.7	-37.0	37.1	32.0	5.12	7.258		
1,300.0	1,300.0	1,296.0	1,295.5	2.8	2.7	-97.58	-6.0	-44.8	45.4	39.8	5.54	8.187		
1,400.0	1,400.0	1,394.0	1,392.7	3.0	3.0	-100.73	-10.5	-55.5	57.0	51.0	5.98	9.533		
1,500.0	1,500.0	1,493.1	1,491.0	3.3	3.2	-103.00	-15.6	-67.5	69.8	63.4	6.42	10.875		
1,600.0	1,600.0	1,592.2	1,589.3	3.5	3.5	-104.56	-20.6	-79.4	82.7	75.8	6.87	12.042		
1,700.0	1,700.0	1,691.6	1,687.8	3.7	3.8	37.10	-25.7	-91.3	94.3	87.0	7.24	13.018		
1,800.0	1,799.8	1,791.2	1,786.5	3.9	4.1	37.77	-30.8	-103.3	103.1	95.4	7.63	13.506		
1,900.0	1,899.5	1,890.9	1,885.4	4.1	4.3	39.48	-35.8	-115.3	109.2	101.1	8.03	13.593		
2,000.0	1,998.8	1,990.7	1,984.4	4.3	4.6	41.91	-40.9	-127.3	113.5	105.0	8.46	13.417		
2,100.0	2,098.2	2,090.5	2,083.3	4.5	5.0	44.21	-46.0	-139.3	117.9	109.0	8.90	13.239		
2,200.0	2,197.5	2,190.3	2,182.2	4.7	5.3	46.35	-51.1	-151.3	122.5	113.1	9.37	13.074		
2,300.0	2,296.9	2,290.1	2,281.2	4.9	5.6	48.32	-56.2	-163.3	127.2	117.4	9.84	12.921		
2,400.0	2,396.2	2,389.9	2,380.1	5.2	5.9	50.15	-61.2	-175.3	132.1	121.7	10.34	12.778		
2,500.0	2,495.6	2,489.7	2,479.1	5.4	6.2	51.86	-66.3	-187.3	137.1	126.2	10.84	12.644		
2,600.0	2,594.9	2,589.5	2,578.0	5.7	6.5	53.44	-71.4	-199.3	142.2	130.8	11.36	12.518		
2,700.0	2,694.3	2,689.3	2,676.9	6.0	6.9	54.90	-76.5	-211.3	147.4	135.5	11.89	12.400		
2,800.0	2,793.6	2,789.1	2,775.9	6.2	7.2	56.27	-81.6	-223.3	152.7	140.3	12.43	12.290		
2,900.0	2,893.0	2,888.9	2,874.8	6.5	7.5	57.55	-86.7	-235.3	158.1	145.1	12.98	12.187		
3,000.0	2,992.3	2,988.7	2,973.8	6.8	7.8	58.74	-91.7	-247.3	163.6	150.1	13.53	12.090		
3,100.0	3,091.7	3,088.5	3,072.7	7.1	8.2	59.85	-96.8	-259.3	169.1	155.0	14.09	11.999		
3,200.0	3,191.0	3,188.2	3,171.6	7.4	8.5	60.90	-101.9	-271.3	174.7	160.0	14.66	11.914		
3,300.0	3,290.4	3,288.0	3,270.6	7.6	8.8	61.87	-107.0	-283.3	180.4	165.1	15.24	11.835		
3,400.0	3,389.7	3,387.8	3,369.5	7.9	9.1	62.79	-112.1	-295.3	186.0	170.2	15.82	11.760		
3,500.0	3,489.1	3,487.6	3,468.5	8.2	9.5	63.66	-117.1	-307.3	191.8	175.4	16.40	11.691		
3,600.0	3,588.4	3,587.4	3,567.4	8.5	9.8	64.47	-122.2	-319.3	197.6	180.6	16.99	11.625		
3,700.0	3,687.8	3,687.2	3,666.3	8.8	10.1	65.24	-127.3	-331.3	203.4	185.8	17.58	11.567		
3,800.0	3,787.4	3,787.0	3,765.3	9.0	10.5	65.54	-132.4	-343.3	210.1	192.0	18.10	11.611		
3,900.0	3,887.2	3,886.6	3,864.0	9.2	10.8	65.01	-137.5	-355.3	218.4	199.8	18.55	11.770		
4,000.0	3,987.2	3,986.0	3,962.5	9.4	11.1	63.77	-142.5	-367.2	228.1	209.2	18.95	12.041		
4,100.0	4,087.2	4,085.1	4,060.8	9.6	11.5	-80.28	-147.6	-379.2	239.0	219.7	19.31	12.378		
4,200.0	4,187.2	4,184.3	4,159.1	9.8	11.8	-81.89	-152.6	-391.1	250.2	230.5	19.68	12.711		
4,300.0	4,287.2	4,283.4	4,257.4	10.0	12.1	-83.36	-157.7	-403.0	261.5	241.4	20.06	13.036		
4,400.0	4,387.2	4,382.6	4,355.7	10.2	12.5	-84.71	-162.7	-414.9	272.9	252.5	20.44	13.354		
4,500.0	4,487.2	4,481.7	4,454.0	10.4	12.8	-85.96	-167.8	-426.9	284.5	263.7	20.82	13.663		
4,600.0	4,587.2	4,580.8	4,552.3	10.6	13.1	-87.10	-172.8	-438.8	296.2	275.0	21.21	13.964		
4,700.0	4,687.2	4,680.0	4,650.6	10.8	13.5	-88.16	-177.9	-450.7	308.0	286.4	21.61	14.256		
4,800.0	4,787.2	4,781.8	4,751.5	11.0	13.8	-89.15	-183.0	-462.8	319.9	297.9	22.00	14.536		
4,900.0	4,887.2	4,892.8	4,862.0	11.1	14.0	-89.95	-187.4	-473.3	329.3	306.9	22.38	14.713		
5,000.0	4,987.2	5,004.6	4,973.5	11.3	14.3	-90.43	-190.2	-479.9	335.1	312.4	22.76	14.726		

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 Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18T-201 - Wellbore #1 - Plan #1 (11-3-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,087.2	5,116.7	5,085.6	11.5	14.4	-90.61	-191.3	-482.4	-482.4	337.4	314.3	23.14	14.578	
5,200.0	5,187.2	5,218.3	5,187.2	11.7	14.6	-90.61	-191.3	-482.4	-482.4	337.4	313.9	23.53	14.339	
5,300.0	5,287.2	5,318.3	5,287.2	11.9	14.7	-90.61	-191.3	-482.4	-482.4	337.4	313.5	23.92	14.107	
5,400.0	5,387.2	5,418.3	5,387.2	12.1	14.9	-90.61	-191.3	-482.4	-482.4	337.4	313.1	24.31	13.882	
5,500.0	5,487.2	5,518.3	5,487.2	12.3	15.1	-90.61	-191.3	-482.4	-482.4	337.4	312.7	24.70	13.662	
5,600.0	5,587.2	5,618.3	5,587.2	12.5	15.2	-90.61	-191.3	-482.4	-482.4	337.4	312.4	25.09	13.449	
5,700.0	5,687.2	5,718.3	5,687.2	12.7	15.4	-90.61	-191.3	-482.4	-482.4	337.4	312.0	25.49	13.241	
5,800.0	5,787.2	5,818.3	5,787.2	12.9	15.6	-90.61	-191.3	-482.4	-482.4	337.4	311.6	25.88	13.038	
5,900.0	5,887.2	5,918.3	5,887.2	13.1	15.7	-90.61	-191.3	-482.4	-482.4	337.4	311.2	26.28	12.841	
6,000.0	5,987.2	6,018.3	5,987.2	13.4	15.9	-90.61	-191.3	-482.4	-482.4	337.4	310.8	26.68	12.648	
6,100.0	6,087.2	6,118.3	6,087.2	13.6	16.1	-90.61	-191.3	-482.4	-482.4	337.4	310.4	27.08	12.461	
6,182.9	6,170.1	6,201.4	6,170.2	13.7	16.2	-90.13	-187.1	-482.4	-482.4	337.4	310.0	27.42	12.307	
6,200.0	6,187.2	6,218.3	6,186.9	13.8	16.2	-89.66	-185.1	-482.4	-482.4	337.4	309.9	27.50	12.271	
6,300.0	6,286.5	6,317.1	6,283.8	13.9	16.3	-88.19	-166.2	-482.4	-482.4	337.6	309.7	27.85	12.121	
6,400.0	6,383.7	6,414.8	6,376.5	14.1	16.4	-86.77	-135.5	-482.4	-482.4	338.0	309.8	28.12	12.019	
6,500.0	6,477.0	6,511.6	6,463.7	14.2	16.5	-85.41	-93.6	-482.4	-482.4	338.5	310.2	28.33	11.949	
6,600.0	6,564.7	6,607.4	6,544.1	14.3	16.5	-84.13	-41.6	-482.4	-482.4	339.2	310.7	28.54	11.884	
6,700.0	6,645.6	6,702.4	6,616.7	14.4	16.6	-82.95	19.5	-482.4	-482.4	340.0	311.2	28.83	11.793	
6,800.0	6,718.0	6,796.6	6,680.8	14.5	16.6	-81.90	88.6	-482.4	-482.4	340.8	311.6	29.27	11.643	
6,900.0	6,780.8	6,890.2	6,735.5	14.8	16.8	-80.99	164.4	-482.4	-482.4	341.7	311.7	29.95	11.406	
7,000.0	6,833.0	6,983.3	6,780.4	15.4	17.1	-80.22	245.9	-482.4	-482.4	342.4	311.5	30.94	11.067	
7,100.0	6,873.5	7,075.9	6,814.8	16.1	17.5	-79.61	331.9	-482.4	-482.4	343.1	310.8	32.27	10.632	
7,200.0	6,901.9	7,168.2	6,838.5	17.0	18.2	-79.16	421.0	-482.4	-482.4	343.6	309.6	33.95	10.120	
7,300.0	6,917.4	7,260.3	6,851.3	18.0	19.1	-78.89	512.1	-482.4	-482.4	343.9	307.9	35.96	9.564	
7,400.0	6,920.4	7,354.9	6,853.6	19.2	20.2	-78.81	606.6	-482.4	-482.4	344.0	305.7	38.25	8.991	
7,500.0	6,919.7	7,454.9	6,853.4	20.5	21.4	-78.87	706.6	-482.4	-482.4	343.9	303.1	40.77	8.435	
7,600.0	6,919.1	7,554.8	6,853.1	21.9	22.7	-78.92	806.6	-482.4	-482.4	343.8	300.4	43.47	7.910	
7,700.0	6,918.5	7,654.8	6,852.8	23.3	24.1	-78.98	906.6	-482.4	-482.4	343.8	297.4	46.32	7.422	
7,800.0	6,917.8	7,754.8	6,852.5	24.8	25.6	-79.04	1,006.6	-482.4	-482.4	343.7	294.4	49.29	6.973	
7,900.0	6,917.2	7,854.8	6,852.2	26.4	27.1	-79.10	1,106.6	-482.4	-482.4	343.6	291.3	52.37	6.561	
8,000.0	6,916.5	7,954.8	6,851.9	28.0	28.7	-79.15	1,206.6	-482.4	-482.4	343.6	288.0	55.54	6.186	
8,100.0	6,915.9	8,054.8	6,851.6	29.6	30.3	-79.21	1,306.6	-482.4	-482.4	343.5	284.7	58.78	5.843	
8,200.0	6,915.2	8,154.8	6,851.3	31.3	32.0	-79.27	1,406.6	-482.4	-482.4	343.4	281.3	62.09	5.531	
8,300.0	6,914.6	8,254.8	6,851.0	33.0	33.6	-79.32	1,506.6	-482.4	-482.4	343.4	277.9	65.45	5.246	
8,400.0	6,913.9	8,354.8	6,850.7	34.7	35.3	-79.38	1,606.6	-482.4	-482.4	343.3	274.5	68.85	4.986	
8,500.0	6,913.3	8,454.8	6,850.4	36.5	37.0	-79.44	1,706.6	-482.4	-482.4	343.2	270.9	72.30	4.748	
8,600.0	6,912.6	8,554.8	6,850.1	38.2	38.8	-79.50	1,806.6	-482.4	-482.4	343.2	267.4	75.77	4.529	
8,700.0	6,912.0	8,654.8	6,849.8	40.0	40.5	-79.55	1,906.6	-482.4	-482.4	343.1	263.8	79.28	4.328	
8,800.0	6,911.4	8,754.8	6,849.5	41.8	42.3	-79.61	2,006.6	-482.4	-482.4	343.0	260.2	82.82	4.142	
8,900.0	6,910.7	8,854.8	6,849.2	43.6	44.1	-79.67	2,106.6	-482.4	-482.4	343.0	256.6	86.38	3.971	
9,000.0	6,910.1	8,954.8	6,848.9	45.4	45.9	-79.73	2,206.6	-482.4	-482.4	342.9	253.0	89.95	3.812	
9,100.0	6,909.4	9,054.8	6,848.6	47.2	47.7	-79.78	2,306.6	-482.4	-482.4	342.9	249.3	93.55	3.665	
9,200.0	6,908.8	9,154.8	6,848.3	49.1	49.5	-79.84	2,406.6	-482.4	-482.4	342.8	245.6	97.16	3.528	
9,300.0	6,908.1	9,254.8	6,848.0	50.9	51.3	-79.90	2,506.6	-482.4	-482.4	342.7	241.9	100.79	3.401	
9,400.0	6,907.5	9,354.8	6,847.7	52.7	53.1	-79.96	2,606.6	-482.4	-482.4	342.7	238.2	104.43	3.281	
9,500.0	6,906.8	9,454.8	6,847.4	54.6	55.0	-80.01	2,706.6	-482.4	-482.4	342.6	234.5	108.08	3.170	
9,600.0	6,906.2	9,554.8	6,847.1	56.4	56.8	-80.07	2,806.6	-482.4	-482.4	342.6	230.8	111.75	3.065	
9,700.0	6,905.5	9,654.8	6,846.8	58.3	58.6	-80.13	2,906.6	-482.4	-482.4	342.5	227.1	115.42	2.967	
9,800.0	6,904.9	9,754.8	6,846.5	60.1	60.5	-80.19	3,006.6	-482.4	-482.4	342.4	223.3	119.10	2.875	
9,900.0	6,904.3	9,854.8	6,846.2	62.0	62.3	-80.24	3,106.6	-482.4	-482.4	342.4	219.6	122.80	2.788	
10,000.0	6,903.6	9,954.8	6,845.9	63.9	64.2	-80.30	3,206.6	-482.4	-482.4	342.3	215.8	126.50	2.706	

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 Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18T-201 - Wellbore #1 - Plan #1 (11-3-14)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	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
10,100.0	6,903.0	10,054.8	6,845.6	65.7	66.1	-80.36	3,306.6	-482.4	342.3	212.1	130.20	2.629	
10,200.0	6,902.3	10,154.8	6,845.3	67.6	67.9	-80.42	3,406.6	-482.4	342.2	208.3	133.92	2.555	
10,300.0	6,901.7	10,254.8	6,845.0	69.5	69.8	-80.47	3,506.6	-482.4	342.1	204.5	137.64	2.486	
10,400.0	6,901.0	10,354.8	6,844.7	71.4	71.7	-80.53	3,606.6	-482.4	342.1	200.7	141.36	2.420	
10,500.0	6,900.4	10,454.8	6,844.4	73.2	73.5	-80.59	3,706.6	-482.4	342.0	196.9	145.09	2.357	
10,600.0	6,899.7	10,554.8	6,844.2	75.1	75.4	-80.65	3,806.6	-482.4	342.0	193.1	148.83	2.298	
10,700.0	6,899.1	10,654.8	6,843.9	77.0	77.3	-80.70	3,906.6	-482.4	341.9	189.3	152.57	2.241	
10,800.0	6,898.4	10,754.8	6,843.6	78.9	79.2	-80.76	4,006.6	-482.4	341.9	185.5	156.31	2.187	
10,900.0	6,897.8	10,854.8	6,843.3	80.8	81.0	-80.82	4,106.6	-482.4	341.8	181.7	160.06	2.135	
11,000.0	6,897.1	10,954.8	6,843.0	82.7	82.9	-80.88	4,206.6	-482.4	341.7	177.9	163.82	2.086	
11,100.0	6,896.5	11,054.8	6,842.7	84.6	84.8	-80.94	4,306.6	-482.4	341.7	174.1	167.57	2.039	
11,200.0	6,895.9	11,154.8	6,842.4	86.4	86.7	-80.99	4,406.6	-482.4	341.6	170.3	171.33	1.994	
11,300.0	6,895.2	11,254.8	6,842.1	88.3	88.6	-81.05	4,506.6	-482.4	341.6	166.5	175.10	1.951	
11,324.3	6,895.1	11,279.1	6,842.0	88.8	89.0	-81.07	4,530.8	-482.4	341.6	165.6	176.01	1.941	
11,332.6	6,895.0	11,280.3	6,842.0	89.0	89.0	-81.07	4,532.0	-482.4	341.6	165.5	176.19	1.939 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18T-221 - Wellbore #1 - Plan #1 (11-3-14)													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	90.00	0.0	30.7	30.7					
100.0	100.0	99.0	99.0	0.1	0.1	90.00	0.0	30.7	30.7	30.5	0.22	137.183		
200.0	200.0	199.0	199.0	0.3	0.3	90.00	0.0	30.7	30.7	30.0	0.67	45.651		
300.0	300.0	299.0	299.0	0.6	0.6	90.00	0.0	30.7	30.7	29.6	1.12	27.354		
400.0	400.0	399.0	399.0	0.8	0.8	90.00	0.0	30.7	30.7	29.1	1.57	19.528		
500.0	500.0	499.0	499.0	1.0	1.0	90.00	0.0	30.7	30.7	28.7	2.02	15.183		
600.0	600.0	599.0	599.0	1.2	1.2	90.00	0.0	30.7	30.7	28.2	2.47	12.420		
700.0	700.0	699.0	699.0	1.5	1.5	90.00	0.0	30.7	30.7	27.8	2.92	10.508		
800.0	800.0	799.0	799.0	1.7	1.7	90.00	0.0	30.7	30.7	27.3	3.37	9.106		
900.0	900.0	899.0	899.0	1.9	1.9	90.00	0.0	30.7	30.7	26.9	3.82	8.034		
1,000.0	1,000.0	999.0	999.0	2.1	2.1	90.00	0.0	30.7	30.7	26.4	4.27	7.188		
1,100.0	1,100.0	1,099.0	1,099.0	2.4	2.4	90.00	0.0	30.7	30.7	26.0	4.72	6.503		
1,200.0	1,200.0	1,199.0	1,199.0	2.6	2.6	90.00	0.0	30.7	30.7	25.5	5.17	5.937		
1,300.0	1,300.0	1,299.0	1,299.0	2.8	2.8	90.00	0.0	30.7	30.7	25.1	5.62	5.462		
1,400.0	1,400.0	1,399.0	1,399.0	3.0	3.0	90.00	0.0	30.7	30.7	24.6	6.07	5.057		
1,500.0	1,500.0	1,499.0	1,499.0	3.3	3.3	90.00	0.0	30.7	30.7	24.2	6.52	4.708		
1,600.0	1,600.0	1,599.0	1,599.0	3.5	3.5	90.00	0.0	30.7	30.7	23.7	6.97	4.405 CC, ES		
1,700.0	1,700.0	1,699.0	1,699.0	3.7	3.7	-130.16	0.0	30.7	31.8	24.4	7.39	4.302		
1,800.0	1,799.8	1,798.8	1,798.8	3.9	3.9	-136.60	0.0	30.7	35.4	27.6	7.78	4.546		
1,900.0	1,899.5	1,898.5	1,898.5	4.1	4.2	-144.68	0.0	30.7	42.1	34.0	8.17	5.156		
2,000.0	1,998.8	1,997.8	1,997.8	4.3	4.4	-151.86	0.0	30.7	51.7	43.2	8.58	6.032		
2,100.0	2,098.2	2,097.2	2,097.2	4.5	4.6	-156.82	0.0	30.7	62.0	53.0	8.99	6.897		
2,200.0	2,197.5	2,196.5	2,196.5	4.7	4.8	-160.35	0.0	30.7	72.6	63.2	9.41	7.716		
2,300.0	2,296.9	2,295.9	2,295.9	4.9	5.0	-162.97	0.0	30.7	83.4	73.6	9.83	8.482		
2,400.0	2,396.2	2,395.2	2,395.2	5.2	5.3	-164.99	0.0	30.7	94.3	84.1	10.26	9.196		
2,500.0	2,495.6	2,494.6	2,494.6	5.4	5.5	-166.59	0.0	30.7	105.4	94.7	10.69	9.858		
2,600.0	2,594.9	2,595.1	2,595.1	5.7	5.7	-167.16	-1.5	31.3	116.0	104.9	11.10	10.450		
2,700.0	2,694.3	2,695.9	2,695.8	6.0	5.9	-166.10	-6.2	33.1	125.5	114.0	11.49	10.926		
2,800.0	2,793.6	2,796.7	2,796.1	6.2	6.1	-163.73	-14.3	36.3	134.1	122.3	11.89	11.283		
2,900.0	2,893.0	2,896.8	2,895.6	6.5	6.2	-160.34	-25.4	40.7	142.3	130.0	12.31	11.556		
3,000.0	2,992.3	2,996.1	2,994.0	6.8	6.4	-157.02	-37.2	45.3	150.8	138.0	12.76	11.818		
3,100.0	3,091.7	3,095.4	3,092.5	7.1	6.6	-154.06	-49.0	50.0	159.7	146.5	13.22	12.080		
3,200.0	3,191.0	3,194.6	3,190.9	7.4	6.9	-151.42	-60.9	54.7	169.0	155.3	13.70	12.338		
3,300.0	3,290.4	3,293.9	3,289.4	7.6	7.1	-149.05	-72.7	59.3	178.6	164.4	14.19	12.589		
3,400.0	3,389.7	3,393.2	3,387.9	7.9	7.3	-146.93	-84.5	64.0	188.5	173.8	14.69	12.831		
3,500.0	3,489.1	3,492.5	3,486.3	8.2	7.6	-145.03	-96.4	68.7	198.6	183.4	15.20	13.063		
3,600.0	3,588.4	3,591.8	3,584.8	8.5	7.8	-143.30	-108.2	73.3	208.9	193.2	15.73	13.285		
3,700.0	3,687.8	3,691.0	3,683.3	8.8	8.1	-141.76	-120.0	78.0	219.4	203.1	16.26	13.494		
3,800.0	3,787.4	3,790.4	3,781.8	9.0	8.3	-140.10	-131.9	82.6	228.3	211.5	16.78	13.607		
3,900.0	3,887.2	3,889.8	3,880.4	9.2	8.6	-137.99	-143.7	87.3	234.9	217.6	17.29	13.583		
4,000.0	3,987.2	3,989.1	3,978.8	9.4	8.9	-135.41	-155.5	92.0	239.2	221.4	17.79	13.449		
4,100.0	4,087.2	4,089.4	4,078.3	9.6	9.2	85.14	-167.1	96.5	242.5	224.3	18.28	13.267		
4,200.0	4,187.2	4,191.6	4,180.1	9.8	9.4	87.30	-176.1	100.1	245.4	226.7	18.75	13.092		
4,300.0	4,287.2	4,294.4	4,282.7	10.0	9.6	88.63	-181.8	102.3	247.4	228.2	19.19	12.894		
4,400.0	4,387.2	4,397.5	4,385.7	10.2	9.9	89.14	-184.0	103.2	248.2	228.6	19.60	12.661		
4,500.0	4,487.2	4,497.9	4,486.2	10.4	10.1	89.15	-184.0	103.2	248.2	228.2	20.00	12.414		
4,600.0	4,587.2	4,597.9	4,586.2	10.6	10.3	89.15	-184.0	103.2	248.2	227.8	20.40	12.171		
4,700.0	4,687.2	4,697.9	4,686.2	10.8	10.5	89.15	-184.0	103.2	248.2	227.4	20.80	11.936		
4,800.0	4,787.2	4,797.9	4,786.2	11.0	10.7	89.15	-184.0	103.2	248.2	227.0	21.20	11.708		
4,900.0	4,887.2	4,897.9	4,886.2	11.1	10.9	89.15	-184.0	103.2	248.2	226.6	21.61	11.489		
5,000.0	4,987.2	4,997.9	4,986.2	11.3	11.1	89.15	-184.0	103.2	248.2	226.2	22.01	11.276		

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 Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18T-221 - Wellbore #1 - Plan #1 (11-3-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
5,100.0	5,087.2	5,097.9	5,086.2	11.5	11.3	89.15	-184.0	103.2	248.2	225.8	22.42	11.071		
5,200.0	5,187.2	5,197.9	5,186.2	11.7	11.5	89.15	-184.0	103.2	248.2	225.4	22.83	10.872		
5,300.0	5,287.2	5,297.9	5,286.2	11.9	11.7	89.15	-184.0	103.2	248.2	225.0	23.24	10.679		
5,400.0	5,387.2	5,397.9	5,386.2	12.1	11.9	89.15	-184.0	103.2	248.2	224.6	23.66	10.493		
5,500.0	5,487.2	5,497.9	5,486.2	12.3	12.1	89.15	-184.0	103.2	248.2	224.1	24.07	10.312		
5,600.0	5,587.2	5,597.9	5,586.2	12.5	12.3	89.15	-184.0	103.2	248.2	223.7	24.49	10.137		
5,700.0	5,687.2	5,697.9	5,686.2	12.7	12.5	89.15	-184.0	103.2	248.2	223.3	24.90	9.968		
5,800.0	5,787.2	5,797.9	5,786.2	12.9	12.7	89.15	-184.0	103.2	248.2	222.9	25.32	9.803		
5,900.0	5,887.2	5,897.9	5,886.2	13.1	12.9	89.15	-184.0	103.2	248.2	222.5	25.74	9.644		
6,000.0	5,987.2	5,997.9	5,986.2	13.4	13.2	89.15	-184.0	103.2	248.2	222.1	26.16	9.489		
6,100.0	6,087.2	6,097.9	6,086.2	13.6	13.4	89.15	-184.0	103.2	248.2	221.6	26.58	9.339		
6,200.0	6,187.2	6,197.0	6,185.0	13.8	13.6	87.90	-178.0	103.2	248.4	221.4	26.96	9.211		
6,300.0	6,286.5	6,294.9	6,281.2	13.9	13.7	85.98	-159.6	103.2	248.8	221.5	27.26	9.129		
6,400.0	6,383.7	6,391.9	6,373.2	14.1	13.8	84.15	-129.5	103.2	249.5	222.0	27.47	9.083		
6,500.0	6,477.0	6,487.9	6,459.9	14.2	13.9	82.43	-88.4	103.2	250.4	222.7	27.65	9.057		
6,600.0	6,564.7	6,583.1	6,540.1	14.3	14.0	80.85	-37.2	103.2	251.4	223.6	27.85	9.029		
6,700.0	6,645.6	6,677.5	6,612.8	14.4	14.2	79.43	23.1	103.2	252.5	224.4	28.13	8.975		
6,800.0	6,718.0	6,771.3	6,677.1	14.5	14.5	78.19	91.3	103.2	253.6	225.0	28.57	8.874		
6,900.0	6,780.8	6,864.6	6,732.2	14.8	14.9	77.15	166.5	103.2	254.6	225.3	29.24	8.705		
7,000.0	6,833.0	6,957.4	6,777.6	15.4	15.4	76.32	247.3	103.2	255.4	225.3	30.19	8.460		
7,100.0	6,873.5	7,050.0	6,812.7	16.1	16.1	75.70	332.9	103.2	256.1	224.7	31.46	8.142		
7,200.0	6,901.9	7,142.1	6,837.2	17.0	17.0	75.30	421.7	103.2	256.6	223.5	33.05	7.764		
7,300.0	6,917.4	7,234.2	6,850.8	18.0	18.0	75.13	512.7	103.2	256.8	221.8	34.94	7.349		
7,400.0	6,920.4	7,328.2	6,853.7	19.2	19.1	75.17	606.6	103.2	256.7	219.6	37.13	6.914		
7,500.0	6,919.7	7,428.2	6,853.4	20.5	20.4	75.24	706.6	103.2	256.7	217.0	39.63	6.477		
7,600.0	6,919.1	7,528.2	6,853.1	21.9	21.7	75.32	806.6	103.2	256.6	214.3	42.31	6.065		
7,700.0	6,918.5	7,628.2	6,852.8	23.3	23.2	75.40	906.6	103.2	256.5	211.3	45.14	5.682		
7,800.0	6,917.8	7,728.2	6,852.5	24.8	24.7	75.47	1,006.6	103.2	256.4	208.3	48.09	5.331		
7,900.0	6,917.2	7,828.2	6,852.2	26.4	26.3	75.55	1,106.6	103.2	256.3	205.1	51.16	5.010		
8,000.0	6,916.5	7,928.2	6,851.9	28.0	27.9	75.62	1,206.6	103.2	256.2	201.9	54.31	4.718		
8,100.0	6,915.9	8,028.2	6,851.6	29.6	29.5	75.70	1,306.6	103.2	256.1	198.6	57.53	4.452		
8,200.0	6,915.2	8,128.2	6,851.3	31.3	31.2	75.77	1,406.6	103.2	256.0	195.2	60.82	4.210		
8,300.0	6,914.6	8,228.2	6,851.0	33.0	32.9	75.85	1,506.6	103.2	256.0	191.8	64.16	3.990		
8,400.0	6,913.9	8,328.2	6,850.7	34.7	34.6	75.93	1,606.6	103.2	255.9	188.3	67.54	3.788		
8,500.0	6,913.3	8,428.2	6,850.4	36.5	36.4	76.00	1,706.6	103.2	255.8	184.8	70.97	3.604		
8,600.0	6,912.6	8,528.2	6,850.1	38.2	38.2	76.08	1,806.6	103.2	255.7	181.3	74.43	3.436		
8,700.0	6,912.0	8,628.2	6,849.8	40.0	39.9	76.15	1,906.6	103.2	255.6	177.7	77.91	3.281		
8,800.0	6,911.4	8,728.2	6,849.5	41.8	41.7	76.23	2,006.6	103.2	255.5	174.1	81.43	3.138		
8,900.0	6,910.7	8,828.2	6,849.2	43.6	43.5	76.30	2,106.6	103.2	255.5	170.5	84.97	3.006		
9,000.0	6,910.1	8,928.2	6,848.9	45.4	45.3	76.38	2,206.6	103.2	255.4	166.8	88.53	2.885		
9,100.0	6,909.4	9,028.2	6,848.6	47.2	47.2	76.46	2,306.6	103.2	255.3	163.2	92.10	2.772		
9,200.0	6,908.8	9,128.2	6,848.3	49.1	49.0	76.53	2,406.6	103.2	255.2	159.5	95.70	2.667		
9,300.0	6,908.1	9,228.2	6,848.0	50.9	50.8	76.61	2,506.6	103.2	255.1	155.8	99.31	2.569		
9,400.0	6,907.5	9,328.2	6,847.7	52.7	52.7	76.69	2,606.6	103.2	255.0	152.1	102.93	2.478		
9,500.0	6,906.8	9,428.2	6,847.4	54.6	54.5	76.76	2,706.6	103.2	255.0	148.4	106.57	2.393		
9,600.0	6,906.2	9,528.2	6,847.2	56.4	56.4	76.84	2,806.6	103.2	254.9	144.7	110.21	2.313		
9,700.0	6,905.5	9,628.2	6,846.9	58.3	58.2	76.91	2,906.6	103.2	254.8	140.9	113.87	2.238		
9,800.0	6,904.9	9,728.2	6,846.6	60.1	60.1	76.99	3,006.6	103.2	254.7	137.2	117.54	2.167		
9,900.0	6,904.3	9,828.2	6,846.3	62.0	61.9	77.07	3,106.6	103.2	254.6	133.4	121.22	2.101		
10,000.0	6,903.6	9,928.2	6,846.0	63.9	63.8	77.14	3,206.6	103.2	254.6	129.7	124.90	2.038		
10,100.0	6,903.0	10,028.2	6,845.7	65.7	65.7	77.22	3,306.6	103.2	254.5	125.9	128.59	1.979		

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 Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18T-221 - Wellbore #1 - Plan #1 (11-3-14)												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)		
10,200.0	6,902.3	10,128.2	6,845.4	67.6	67.5	77.30	3,406.6	103.2	254.4	122.1	132.29	1.923	
10,300.0	6,901.7	10,228.2	6,845.1	69.5	69.4	77.37	3,506.6	103.2	254.3	118.3	136.00	1.870	
10,400.0	6,901.0	10,328.2	6,844.8	71.4	71.3	77.45	3,606.6	103.2	254.3	114.6	139.71	1.820	
10,500.0	6,900.4	10,428.2	6,844.5	73.2	73.2	77.53	3,706.6	103.2	254.2	110.8	143.43	1.772	
10,600.0	6,899.7	10,528.2	6,844.2	75.1	75.1	77.60	3,806.6	103.2	254.1	107.0	147.15	1.727	
10,700.0	6,899.1	10,628.1	6,843.9	77.0	76.9	77.68	3,906.6	103.2	254.0	103.2	150.88	1.684	
10,800.0	6,898.4	10,728.1	6,843.6	78.9	78.8	77.76	4,006.6	103.2	254.0	99.3	154.62	1.643	
10,900.0	6,897.8	10,828.1	6,843.3	80.8	80.7	77.84	4,106.6	103.2	253.9	95.5	158.36	1.603	
11,000.0	6,897.1	10,928.1	6,843.0	82.7	82.6	77.91	4,206.6	103.2	253.8	91.7	162.10	1.566	
11,100.0	6,896.5	11,028.1	6,842.7	84.6	84.5	77.99	4,306.6	103.2	253.7	87.9	165.85	1.530	
11,200.0	6,895.9	11,128.1	6,842.4	86.4	86.4	78.07	4,406.6	103.2	253.7	84.1	169.60	1.496	Level 3
11,300.0	6,895.2	11,228.1	6,842.1	88.3	88.3	78.14	4,506.6	103.2	253.6	80.2	173.36	1.463	Level 3
11,332.6	6,895.0	11,260.7	6,842.0	89.0	88.9	78.17	4,539.1	103.2	253.6	79.0	174.58	1.452	Level 3, SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18T-341 - Wellbore #1 - Plan #1 (10-27-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWDD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	1.0	1.0	0.0	0.0	-90.00	0.0	-58.6	58.6	58.6	0.00	N/A		
100.0	100.0	101.0	101.0	0.1	0.1	-90.00	0.0	-58.6	58.6	58.3	0.23	258.007		
200.0	200.0	201.0	201.0	0.3	0.3	-90.00	0.0	-58.6	58.6	57.9	0.68	86.574		
300.0	300.0	301.0	301.0	0.6	0.6	-90.00	0.0	-58.6	58.6	57.4	1.13	52.013		
400.0	400.0	401.0	401.0	0.8	0.8	-90.00	0.0	-58.6	58.6	57.0	1.58	37.174		
500.0	500.0	501.0	501.0	1.0	1.0	-90.00	0.0	-58.6	58.6	56.5	2.03	28.922		
600.0	600.0	601.0	601.0	1.2	1.2	-90.00	0.0	-58.6	58.6	56.1	2.47	23.668		
700.0	700.0	701.0	701.0	1.5	1.5	-90.00	0.0	-58.6	58.6	55.6	2.92	20.030		
766.3	766.3	767.3	767.3	1.6	1.6	-90.00	0.0	-58.6	58.6	55.3	3.22	18.176 CC		
800.0	800.0	801.0	801.0	1.7	1.7	-90.00	0.0	-58.6	58.6	55.2	3.37	17.362 ES		
900.0	900.0	900.0	900.0	1.9	1.9	-90.47	-0.5	-60.2	60.3	56.5	3.80	15.840		
1,000.0	1,000.0	996.8	996.7	2.1	2.1	-91.67	-1.9	-65.1	65.2	61.0	4.22	15.449		
1,100.0	1,100.0	1,094.2	1,093.7	2.4	2.3	-93.32	-4.2	-73.1	73.5	68.9	4.65	15.813		
1,200.0	1,200.0	1,190.8	1,189.6	2.6	2.5	-95.08	-7.5	-84.1	85.2	80.1	5.09	16.746		
1,300.0	1,300.0	1,287.3	1,285.0	2.8	2.8	-96.73	-11.6	-98.2	100.1	94.6	5.54	18.077		
1,400.0	1,400.0	1,386.0	1,382.4	3.0	3.1	-98.06	-16.1	-113.5	116.1	110.1	6.00	19.351		
1,500.0	1,500.0	1,484.7	1,479.8	3.3	3.4	-99.07	-20.6	-128.8	132.2	125.7	6.47	20.425		
1,600.0	1,600.0	1,583.4	1,577.1	3.5	3.7	-99.86	-25.1	-144.2	148.3	141.3	6.95	21.333		
1,700.0	1,700.0	1,682.3	1,674.7	3.7	4.1	-42.03	-29.5	-159.5	163.1	155.8	7.28	22.416		
1,800.0	1,799.8	1,781.5	1,772.6	3.9	4.4	42.45	-34.1	-175.0	175.3	167.7	7.68	22.829		
1,900.0	1,899.5	1,880.9	1,870.8	4.1	4.8	43.57	-38.6	-190.4	185.1	177.0	8.10	22.856		
2,000.0	1,998.8	1,980.5	1,969.0	4.3	5.1	45.19	-43.1	-205.9	193.1	184.6	8.54	22.616		
2,100.0	2,098.2	2,080.0	2,067.2	4.5	5.5	46.73	-47.6	-221.3	201.2	192.2	9.00	22.362		
2,200.0	2,197.5	2,179.5	2,165.4	4.7	5.9	48.16	-52.2	-236.8	209.5	200.0	9.47	22.113		
2,300.0	2,296.9	2,279.1	2,263.6	4.9	6.2	49.48	-56.7	-252.3	217.8	207.9	9.96	21.870		
2,400.0	2,396.2	2,378.6	2,361.9	5.2	6.6	50.69	-61.2	-267.7	226.3	215.8	10.46	21.634		
2,500.0	2,495.6	2,478.1	2,460.1	5.4	7.0	51.82	-65.7	-283.2	234.8	223.9	10.97	21.405		
2,600.0	2,594.9	2,577.7	2,558.3	5.7	7.3	52.88	-70.2	-298.6	243.5	232.0	11.49	21.186		
2,700.0	2,694.3	2,677.2	2,656.5	6.0	7.7	53.85	-74.8	-314.1	252.2	240.2	12.02	20.975		
2,800.0	2,793.6	2,776.7	2,754.7	6.2	8.1	54.77	-79.3	-329.6	261.0	248.4	12.56	20.774		
2,900.0	2,893.0	2,876.2	2,853.0	6.5	8.5	55.62	-83.8	-345.0	269.8	256.7	13.11	20.582		
3,000.0	2,992.3	2,975.8	2,951.2	6.8	8.8	56.42	-88.3	-360.5	278.7	265.0	13.66	20.398		
3,100.0	3,091.7	3,075.3	3,049.4	7.1	9.2	57.17	-92.9	-376.0	287.7	273.4	14.22	20.224		
3,200.0	3,191.0	3,174.8	3,147.6	7.4	9.6	57.88	-97.4	-391.4	296.7	281.9	14.79	20.058		
3,300.0	3,290.4	3,274.4	3,245.8	7.6	10.0	58.54	-101.9	-406.9	305.7	290.3	15.36	19.900		
3,400.0	3,389.7	3,373.9	3,344.0	7.9	10.4	59.16	-106.4	-422.4	314.8	298.8	15.94	19.750		
3,500.0	3,489.1	3,473.4	3,442.3	8.2	10.7	59.75	-111.0	-437.8	323.9	307.4	16.52	19.608		
3,600.0	3,588.4	3,573.0	3,540.5	8.5	11.1	60.31	-115.5	-453.3	333.0	315.9	17.10	19.473		
3,700.0	3,687.8	3,672.5	3,638.7	8.8	11.5	60.86	-120.0	-468.7	342.2	324.5	17.69	19.348		
3,800.0	3,787.4	3,771.9	3,736.8	9.0	11.9	61.22	-124.5	-484.2	352.5	334.3	18.21	19.361		
3,900.0	3,887.2	3,871.2	3,834.8	9.2	12.3	61.12	-129.0	-499.6	364.4	345.8	18.68	19.514		
4,000.0	3,987.2	3,970.1	3,932.4	9.4	12.6	60.60	-133.5	-515.0	378.1	359.0	19.09	19.801		
4,100.0	4,087.2	4,068.8	4,029.8	9.6	13.0	-82.66	-138.0	-530.3	392.9	373.4	19.49	20.159		
4,200.0	4,187.2	4,167.5	4,127.2	9.8	13.4	-83.57	-142.5	-545.7	407.8	387.9	19.89	20.505		
4,300.0	4,287.2	4,266.2	4,224.6	10.0	13.8	-84.41	-147.0	-561.0	422.8	402.5	20.29	20.839		
4,400.0	4,387.2	4,364.9	4,321.9	10.2	14.2	-85.20	-151.5	-576.3	437.9	417.2	20.69	21.159		
4,500.0	4,487.2	4,463.6	4,419.3	10.4	14.5	-85.94	-156.0	-591.7	453.0	431.9	21.10	21.467		
4,600.0	4,587.2	4,562.2	4,516.7	10.6	14.9	-86.63	-160.5	-607.0	468.3	446.7	21.52	21.764		
4,700.0	4,687.2	4,660.9	4,614.1	10.8	15.3	-87.27	-164.9	-622.3	483.6	461.6	21.93	22.049		
4,800.0	4,787.2	4,759.6	4,711.5	11.0	15.7	-87.88	-169.4	-637.6	498.9	476.6	22.35	22.323		
4,900.0	4,887.2	4,858.3	4,808.8	11.1	16.0	-88.45	-173.9	-653.0	514.3	491.5	22.77	22.586		

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 Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18T-341 - Wellbore #1 - Plan #1 (10-27-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWDD													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	4,987.2	4,957.0	4,906.2	11.3	16.4	-88.98		-178.4	-668.3	529.8	506.6	23.19	22.840	
5,100.0	5,087.2	5,055.6	5,003.6	11.5	16.8	-89.49		-182.9	-683.6	545.3	521.6	23.62	23.084	
5,200.0	5,187.2	5,169.5	5,116.1	11.7	17.2	-90.01		-187.7	-700.2	559.9	535.9	24.04	23.291	
5,300.0	5,287.2	5,292.1	5,238.0	11.9	17.4	-90.40		-191.6	-713.5	570.7	546.3	24.45	23.342	
5,400.0	5,387.2	5,415.7	5,361.3	12.1	17.7	-90.63		-194.1	-721.8	577.5	552.6	24.86	23.229	
5,500.0	5,487.2	5,539.8	5,485.3	12.3	17.9	-90.72		-195.0	-725.0	580.1	554.8	25.27	22.953	
5,600.0	5,587.2	5,642.7	5,588.2	12.5	18.0	-90.72		-195.0	-725.0	580.1	554.4	25.66	22.607	
5,700.0	5,687.2	5,742.7	5,688.2	12.7	18.1	-90.72		-195.0	-725.0	580.1	554.0	26.04	22.273	
5,800.0	5,787.2	5,842.7	5,788.2	12.9	18.3	-90.72		-195.0	-725.0	580.1	553.7	26.43	21.948	
5,900.0	5,887.2	5,942.7	5,888.2	13.1	18.4	-90.72		-195.0	-725.0	580.1	553.3	26.82	21.630	
6,000.0	5,987.2	6,042.7	5,988.2	13.4	18.6	-90.72		-195.0	-725.0	580.1	552.9	27.21	21.320	
6,100.0	6,087.2	6,142.7	6,088.2	13.6	18.7	-90.72		-195.0	-725.0	580.1	552.5	27.60	21.017	
6,133.0	6,120.2	6,175.7	6,121.2	13.6	18.8	-90.74		-195.0	-725.0	580.1	552.4	27.73	20.921	
6,200.0	6,187.2	6,242.9	6,188.3	13.8	18.9	-90.76		-194.8	-725.0	580.1	552.1	27.99	20.727	
6,300.0	6,286.5	6,344.0	6,289.0	13.9	19.0	-90.94		-186.0	-725.0	580.1	551.8	28.29	20.504	
6,400.0	6,383.7	6,445.4	6,387.9	14.1	19.1	-91.10		-163.9	-725.0	580.1	551.6	28.52	20.344	
6,500.0	6,477.0	6,546.9	6,483.1	14.2	19.1	-91.24		-128.8	-725.0	580.2	551.5	28.69	20.219	
6,600.0	6,564.7	6,648.7	6,573.0	14.3	19.2	-91.36		-81.3	-725.0	580.2	551.3	28.89	20.083	
6,700.0	6,645.6	6,750.6	6,655.9	14.4	19.2	-91.46		-22.2	-725.0	580.2	551.0	29.18	19.885	
6,800.0	6,718.0	6,852.6	6,730.3	14.5	19.3	-91.53		47.5	-725.0	580.2	550.6	29.64	19.574	
6,900.0	6,780.8	6,954.7	6,794.8	14.8	19.4	-91.58		126.5	-725.0	580.3	549.9	30.36	19.111	
7,000.0	6,833.0	7,056.9	6,848.3	15.4	19.6	-91.59		213.5	-725.0	580.3	548.9	31.39	18.483	
7,100.0	6,873.5	7,159.0	6,889.6	16.1	19.9	-91.58		306.8	-725.0	580.3	547.5	32.77	17.705	
7,200.0	6,901.9	7,261.1	6,918.1	17.0	20.4	-91.54		404.8	-725.0	580.2	545.7	34.50	16.820	
7,300.0	6,917.4	7,363.2	6,933.3	18.0	21.1	-91.48		505.6	-725.0	580.2	543.7	36.54	15.881	
7,400.0	6,920.4	7,464.5	6,935.6	19.2	22.0	-91.41		606.9	-725.0	580.2	541.4	38.83	14.942	
7,500.0	6,919.7	7,564.5	6,934.7	20.5	23.1	-91.38		706.9	-725.0	580.2	538.9	41.35	14.031	
7,600.0	6,919.1	7,664.5	6,933.7	21.9	24.3	-91.35		806.9	-725.0	580.2	536.1	44.06	13.169	
7,700.0	6,918.5	7,764.5	6,932.8	23.3	25.6	-91.31		906.9	-725.0	580.2	533.3	46.92	12.366	
7,800.0	6,917.8	7,864.5	6,931.8	24.8	27.0	-91.28		1,006.9	-725.0	580.2	530.3	49.91	11.624	
7,900.0	6,917.2	7,964.5	6,930.8	26.4	28.4	-91.25		1,106.9	-725.0	580.2	527.2	53.02	10.943	
8,000.0	6,916.5	8,064.5	6,929.9	28.0	29.9	-91.22		1,206.9	-725.0	580.2	524.0	56.21	10.321	
8,100.0	6,915.9	8,164.5	6,928.9	29.6	31.5	-91.19		1,306.9	-725.0	580.2	520.7	59.48	9.753	
8,200.0	6,915.2	8,264.5	6,928.0	31.3	33.0	-91.16		1,406.9	-725.0	580.2	517.3	62.82	9.235	
8,300.0	6,914.6	8,364.5	6,927.0	33.0	34.7	-91.13		1,506.9	-725.0	580.1	513.9	66.21	8.762	
8,400.0	6,913.9	8,464.5	6,926.0	34.7	36.3	-91.10		1,606.9	-725.0	580.1	510.5	69.65	8.330	
8,500.0	6,913.3	8,564.5	6,925.1	36.5	38.0	-91.07		1,706.9	-725.0	580.1	507.0	73.13	7.933	
8,600.0	6,912.6	8,664.5	6,924.1	38.2	39.7	-91.04		1,806.9	-725.0	580.1	503.5	76.64	7.570	
8,700.0	6,912.0	8,764.5	6,923.2	40.0	41.4	-91.00		1,906.9	-725.0	580.1	499.9	80.18	7.235	
8,800.0	6,911.4	8,864.5	6,922.2	41.8	43.1	-90.97		2,006.9	-725.0	580.1	496.4	83.75	6.927	
8,900.0	6,910.7	8,964.5	6,921.2	43.6	44.9	-90.94		2,106.9	-725.0	580.1	492.8	87.34	6.642	
9,000.0	6,910.1	9,064.5	6,920.3	45.4	46.6	-90.91		2,206.8	-725.0	580.1	489.2	90.95	6.378	
9,100.0	6,909.4	9,164.5	6,919.3	47.2	48.4	-90.88		2,306.8	-725.0	580.1	485.5	94.58	6.133	
9,200.0	6,908.8	9,264.5	6,918.4	49.1	50.2	-90.85		2,406.8	-725.0	580.1	481.9	98.23	5.906	
9,300.0	6,908.1	9,364.5	6,917.4	50.9	52.0	-90.82		2,506.8	-725.0	580.1	478.2	101.89	5.693	
9,400.0	6,907.5	9,464.5	6,916.4	52.7	53.8	-90.79		2,606.8	-725.0	580.1	474.5	105.56	5.495	
9,500.0	6,906.8	9,564.5	6,915.5	54.6	55.6	-90.76		2,706.8	-725.0	580.1	470.8	109.25	5.310	
9,600.0	6,906.2	9,664.5	6,914.5	56.4	57.4	-90.72		2,806.8	-725.0	580.1	467.1	112.94	5.136	
9,700.0	6,905.5	9,764.5	6,913.6	58.3	59.2	-90.69		2,906.8	-725.0	580.1	463.4	116.65	4.973	
9,800.0	6,904.9	9,864.5	6,912.6	60.1	61.1	-90.66		3,006.8	-725.0	580.1	459.7	120.36	4.819	
9,900.0	6,904.3	9,964.5	6,911.6	62.0	62.9	-90.63		3,106.8	-725.0	580.1	456.0	124.08	4.675	

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 Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design Collins 4N64W18T Pad Sec.18-T4N-R64W - Collins 18T-341 - Wellbore #1 - Plan #1 (10-27-14)													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	
10,000.0	6,903.6	10,064.5	6,910.7	63.9	64.7	-90.60	3,206.8	-725.0	580.1	452.3	127.81	4.539		
10,100.0	6,903.0	10,164.5	6,909.7	65.7	66.6	-90.57	3,306.8	-725.0	580.1	448.5	131.54	4.410		
10,200.0	6,902.3	10,264.5	6,908.8	67.6	68.4	-90.54	3,406.8	-725.0	580.1	444.8	135.29	4.288		
10,300.0	6,901.7	10,364.5	6,907.8	69.5	70.3	-90.51	3,506.8	-725.0	580.1	441.0	139.03	4.172		
10,400.0	6,901.0	10,464.5	6,906.8	71.4	72.1	-90.48	3,606.8	-725.0	580.1	437.3	142.78	4.063		
10,500.0	6,900.4	10,564.5	6,905.9	73.2	74.0	-90.45	3,706.8	-725.0	580.1	433.5	146.54	3.958		
10,600.0	6,899.7	10,664.5	6,904.9	75.1	75.9	-90.41	3,806.8	-725.0	580.1	429.8	150.30	3.859		
10,700.0	6,899.1	10,764.5	6,904.0	77.0	77.7	-90.38	3,906.8	-725.0	580.1	426.0	154.06	3.765		
10,800.0	6,898.4	10,864.5	6,903.0	78.9	79.6	-90.35	4,006.8	-725.0	580.0	422.2	157.83	3.675		
10,900.0	6,897.8	10,964.5	6,902.0	80.8	81.5	-90.32	4,106.8	-725.0	580.0	418.4	161.60	3.589		
11,000.0	6,897.1	11,064.5	6,901.1	82.7	83.3	-90.29	4,206.7	-725.0	580.0	414.7	165.37	3.507		
11,100.0	6,896.5	11,164.5	6,900.1	84.6	85.2	-90.26	4,306.7	-725.0	580.0	410.9	169.15	3.429		
11,200.0	6,895.9	11,264.5	6,899.2	86.4	87.1	-90.23	4,406.7	-725.0	580.0	407.1	172.93	3.354		
11,300.0	6,895.2	11,364.5	6,898.2	88.3	89.0	-90.20	4,506.7	-725.0	580.0	403.3	176.71	3.282		
11,321.2	6,895.1	11,385.8	6,898.0	88.7	89.4	-90.19	4,528.0	-725.0	580.0	402.5	177.52	3.268		
11,332.6	6,895.0	11,386.1	6,898.0	89.0	89.4	-90.19	4,528.3	-725.0	580.1	402.4	177.74	3.264 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design MARY MILLS 41-18 - MARY MILLS 41-18 - Wellbore #1 - Design #1												Offset Site Error:	0.0 ft
Survey Program: 0-Reference												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,300.0	6,901.7	6,900.7	6,900.7	69.5	15.4	90.73	4,379.0	295.6	977.2	892.3	84.86	11.516	
10,400.0	6,901.0	6,900.0	6,900.0	71.4	15.4	90.65	4,379.0	295.6	889.1	802.4	86.74	10.251	
10,500.0	6,900.4	6,899.4	6,899.4	73.2	15.4	90.56	4,379.0	295.6	803.8	715.2	88.61	9.070	
10,600.0	6,899.7	6,898.7	6,898.7	75.1	15.4	90.48	4,379.0	295.6	722.2	631.7	90.49	7.981	
10,700.0	6,899.1	6,898.1	6,898.1	77.0	15.4	90.40	4,379.0	295.6	645.9	553.5	92.38	6.992	
10,800.0	6,898.4	6,897.4	6,897.4	78.9	15.4	90.31	4,379.0	295.6	576.8	482.5	94.26	6.119	
10,900.0	6,897.8	6,896.8	6,896.8	80.8	15.4	90.23	4,379.0	295.6	517.9	421.8	96.14	5.387	
11,000.0	6,897.1	6,896.1	6,896.1	82.7	15.4	90.14	4,379.0	295.6	473.1	375.0	98.03	4.826	
11,100.0	6,896.5	6,895.5	6,895.5	84.6	15.4	90.06	4,379.0	295.6	446.5	346.6	99.92	4.468	
11,172.3	6,896.0	6,895.0	6,895.0	85.9	15.4	90.00	4,379.0	295.6	440.6	339.3	101.28	4.350 CC, ES	
11,200.0	6,895.9	6,894.9	6,894.9	86.4	15.4	89.98	4,379.0	295.6	441.5	339.7	101.81	4.336 SF	
11,300.0	6,895.2	6,894.2	6,894.2	88.3	15.4	89.89	4,379.0	295.6	458.7	355.0	103.70	4.424	
11,332.6	6,895.0	6,894.0	6,894.0	89.0	15.4	89.87	4,379.0	295.6	468.9	364.5	104.31	4.495	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design NEI C18-32D Pad Sec.18-T4N-R64W - NEI C17-33D - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 106-Reference												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,300.0	6,917.4	7,567.4	6,894.4	18.0	58.8	80.09	1,116.1	593.6	960.3	909.8	50.47	19.026	
7,400.0	6,920.4	7,563.2	6,890.2	19.2	58.8	83.97	1,116.5	592.9	900.5	849.4	51.07	17.633	
7,500.0	6,919.7	7,556.0	6,883.1	20.5	58.8	83.42	1,117.0	591.7	847.8	795.4	52.33	16.201	
7,600.0	6,919.1	7,548.8	6,876.1	21.9	58.7	82.87	1,117.6	590.6	804.1	750.4	53.68	14.980	
7,700.0	6,918.5	7,532.0	6,859.5	23.3	58.7	81.57	1,118.9	587.9	770.9	715.8	55.06	14.001	
7,800.0	6,917.8	7,532.0	6,859.5	24.8	58.7	81.57	1,118.9	587.9	749.5	692.9	56.56	13.251	
7,900.0	6,917.2	7,526.3	6,853.9	26.4	58.6	81.13	1,119.4	587.0	741.0	682.9	58.09	12.757	
7,913.5	6,917.1	7,525.1	6,852.7	26.6	58.6	81.04	1,119.5	586.8	740.9	682.6	58.29	12.709 CC, ES	
8,000.0	6,916.5	7,517.1	6,844.8	28.0	58.6	80.42	1,120.1	585.6	745.9	686.3	59.63	12.509	
8,100.0	6,915.9	7,508.0	6,835.9	29.6	58.6	79.73	1,120.8	584.2	763.8	702.6	61.20	12.482 SF	
8,200.0	6,915.2	7,499.1	6,827.1	31.3	58.6	79.04	1,121.5	582.8	794.0	731.2	62.78	12.647	
8,300.0	6,914.6	7,490.3	6,818.5	33.0	58.5	78.37	1,122.2	581.4	835.0	770.6	64.38	12.970	
8,400.0	6,913.9	7,481.7	6,810.0	34.7	58.5	77.70	1,122.8	580.0	885.3	819.4	65.98	13.418	
8,500.0	6,913.3	7,473.2	6,801.7	36.5	58.5	77.05	1,123.5	578.6	943.6	876.0	67.60	13.959	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 134-Reference													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
8,300.0	6,914.6	7,241.5	6,965.0	33.0	33.9	-91.77	2,479.9	-361.1	996.8	945.3	51.49	19.360		
8,400.0	6,913.9	7,241.0	6,964.5	34.7	33.9	-91.65	2,479.9	-361.1	899.4	846.2	53.21	16.904		
8,500.0	6,913.3	7,240.6	6,964.0	36.5	33.9	-91.52	2,479.9	-361.1	802.7	747.8	54.95	14.609		
8,600.0	6,912.6	7,240.1	6,963.6	38.2	33.9	-91.40	2,479.9	-361.1	706.9	650.2	56.70	12.467		
8,700.0	6,912.0	7,239.6	6,963.1	40.0	33.9	-91.28	2,479.9	-361.1	612.5	554.0	58.48	10.474		
8,800.0	6,911.4	7,239.2	6,962.6	41.8	33.9	-91.15	2,479.9	-361.1	520.1	459.8	60.26	8.631		
8,900.0	6,910.7	7,238.7	6,962.2	43.6	33.9	-91.03	2,479.8	-361.1	431.2	369.1	62.05	6.948		
9,000.0	6,910.1	7,238.3	6,961.7	45.4	33.9	-90.91	2,479.8	-361.1	348.3	284.4	63.86	5.454		
9,100.0	6,909.4	7,237.8	6,961.3	47.2	33.9	-90.79	2,479.8	-361.1	276.9	211.2	65.67	4.216		
9,200.0	6,908.8	7,237.3	6,960.8	49.1	33.9	-90.67	2,479.8	-361.1	228.2	160.7	67.49	3.381		
9,273.1	6,908.3	7,237.0	6,960.5	50.4	33.9	-90.58	2,479.8	-361.1	216.1	147.3	68.83	3.140 CC, ES, SF		
9,300.0	6,908.1	7,236.9	6,960.4	50.9	33.9	-90.54	2,479.8	-361.1	217.8	148.5	69.32	3.142		
9,400.0	6,907.5	7,236.4	6,959.9	52.7	33.9	-90.42	2,479.8	-361.1	250.6	179.5	71.15	3.523		
9,500.0	6,906.8	7,236.0	6,959.4	54.6	33.9	-90.30	2,479.8	-361.1	313.4	240.4	72.99	4.294		
9,600.0	6,906.2	7,235.5	6,959.0	56.4	33.9	-90.18	2,479.8	-361.1	391.9	317.1	74.83	5.237		
9,700.0	6,905.5	7,235.1	6,958.5	58.3	33.9	-90.06	2,479.8	-361.2	478.5	401.8	76.68	6.241		
9,800.0	6,904.9	7,234.6	6,958.1	60.1	33.9	-89.94	2,479.8	-361.2	569.5	491.0	78.53	7.252		
9,900.0	6,904.3	7,234.2	6,957.6	62.0	33.9	-89.82	2,479.8	-361.2	663.1	582.7	80.38	8.250		
10,000.0	6,903.6	7,233.7	6,957.2	63.9	33.9	-89.70	2,479.8	-361.2	758.4	676.1	82.24	9.221		
10,100.0	6,903.0	7,233.3	6,956.7	65.7	33.9	-89.58	2,479.8	-361.2	854.7	770.6	84.10	10.163		
10,200.0	6,902.3	7,232.8	6,956.3	67.6	33.9	-89.46	2,479.8	-361.2	951.8	865.8	85.96	11.072		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 726-Reference													Offset Well Error:	0.0 ft
NEI C18-32D Pad Sec.18-T4N-R64W - NEI C18-23D - Wellbore #1 - Wellbore #1														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
6,800.0	6,718.0	7,220.8	6,756.6	14.5	43.4	-15.07	993.9	-318.4	951.8	922.0	29.78	31.957		
6,900.0	6,780.8	7,283.0	6,818.7	14.8	43.5	-18.84	994.8	-317.7	876.3	851.6	24.79	35.356		
7,000.0	6,833.0	7,331.7	6,867.4	15.4	43.5	-24.68	995.8	-317.3	793.9	773.2	20.67	38.409		
7,100.0	6,873.5	7,370.8	6,906.6	16.1	43.5	-34.18	996.8	-317.0	706.0	683.8	22.19	31.820		
7,200.0	6,901.9	7,403.0	6,938.7	17.0	43.5	-50.15	997.8	-316.9	614.3	581.7	32.56	18.865		
7,300.0	6,917.4	7,417.6	6,953.3	18.0	43.5	-70.85	998.2	-316.9	520.7	476.7	44.06	11.819		
7,400.0	6,920.4	7,423.6	6,959.3	19.2	43.5	-86.81	998.4	-316.9	427.8	378.8	49.01	8.729		
7,500.0	6,919.7	7,426.1	6,961.8	20.5	43.5	-87.64	998.5	-316.8	338.7	288.3	50.36	6.725		
7,600.0	6,919.1	7,428.6	6,964.3	21.9	43.5	-88.47	998.6	-316.8	257.6	205.8	51.80	4.972		
7,700.0	6,918.5	7,431.1	6,966.8	23.3	43.5	-89.31	998.6	-316.8	194.9	141.6	53.30	3.656		
7,791.9	6,917.9	7,433.4	6,969.1	24.7	43.5	-90.08	998.7	-316.8	171.8	117.1	54.74	3.139 CC, ES		
7,800.0	6,917.8	7,433.6	6,969.3	24.8	43.5	-90.15	998.7	-316.8	172.0	117.2	54.86	3.135 SF		
7,900.0	6,917.2	7,436.2	6,971.9	26.4	43.5	-91.00	998.8	-316.8	203.0	146.5	56.47	3.594		
8,000.0	6,916.5	7,438.7	6,974.4	28.0	43.5	-91.85	998.9	-316.8	269.8	211.7	58.10	4.643		
8,100.0	6,915.9	7,441.3	6,977.0	29.6	43.5	-92.71	999.0	-316.8	352.7	292.9	59.77	5.901		
8,200.0	6,915.2	7,443.9	6,979.6	31.3	43.5	-93.56	999.1	-316.8	442.7	381.2	61.44	7.204		
8,300.0	6,914.6	7,446.5	6,982.2	33.0	43.5	-94.43	999.1	-316.8	536.2	473.1	63.13	8.493		
8,400.0	6,913.9	7,449.1	6,984.8	34.7	43.5	-95.29	999.2	-316.8	631.7	566.9	64.83	9.744		
8,500.0	6,913.3	7,451.7	6,987.4	36.5	43.5	-96.16	999.3	-316.8	728.4	661.9	66.53	10.949		
8,600.0	6,912.6	7,454.3	6,990.0	38.2	43.5	-97.02	999.4	-316.8	825.9	757.7	68.23	12.105		
8,700.0	6,912.0	7,457.0	6,992.7	40.0	43.5	-97.89	999.5	-316.8	923.9	854.0	69.92	13.214		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

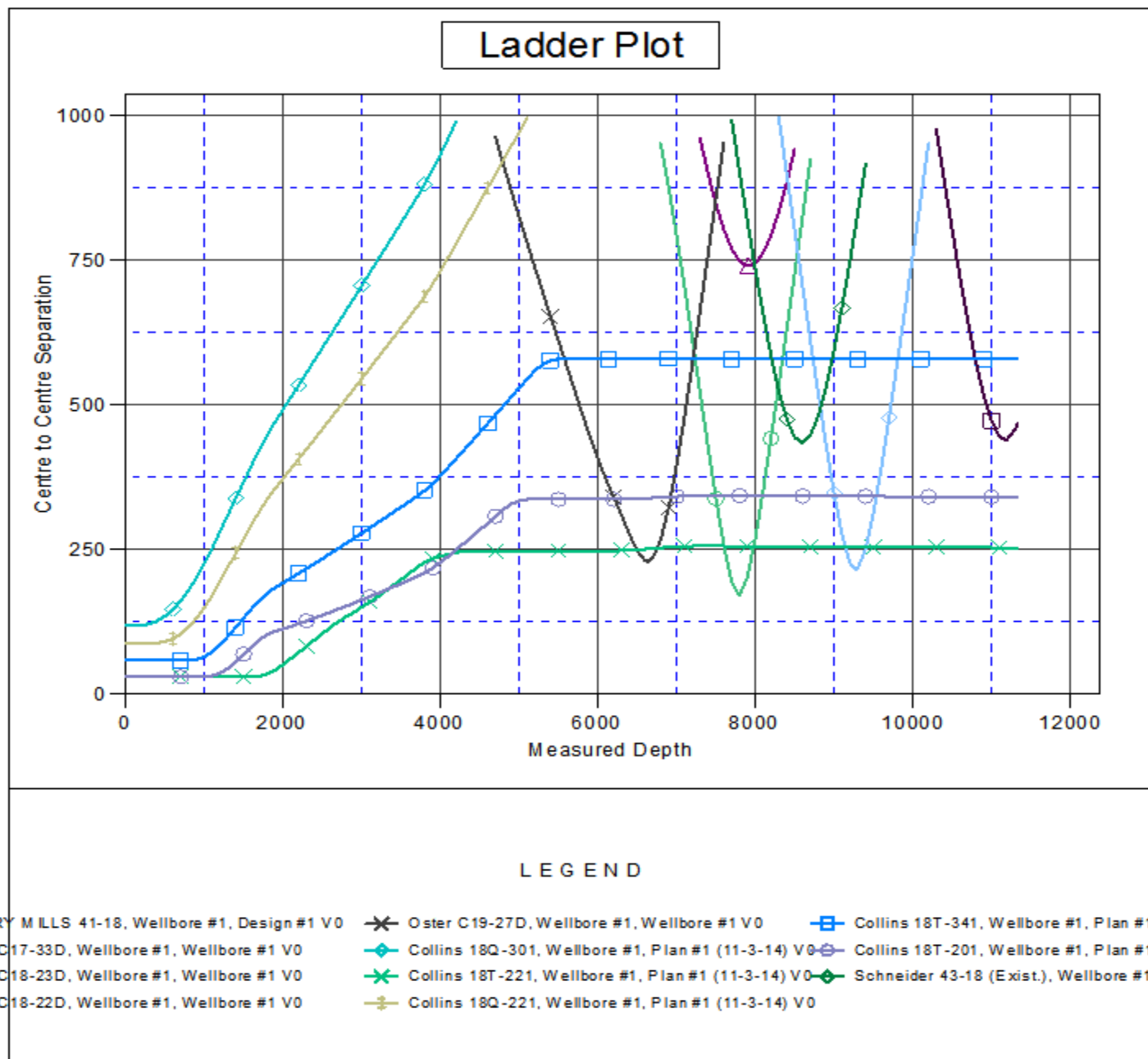
Offset Design													Offset Site Error:	0.0 ft
Survey Program: 260-Reference													Offset Well Error:	0.0 ft
NEI C18-32D Pad Sec.18-T4N-R64W - Oster C19-27D - Wellbore #1 - Wellbore #1														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,700.0	4,687.2	5,734.0	5,193.9	10.8	44.0	-42.68		436.5	-720.6	964.2	935.1	29.05	33.187	
4,800.0	4,787.2	5,815.6	5,265.6	11.0	44.8	-43.05		404.7	-698.4	916.9	887.3	29.62	30.958	
4,900.0	4,887.2	5,892.4	5,333.7	11.1	45.5	-43.42		375.4	-677.8	870.7	840.5	30.17	28.863	
5,000.0	4,987.2	5,968.5	5,401.5	11.3	46.1	-43.77		347.5	-657.7	825.9	795.2	30.71	26.891	
5,100.0	5,087.2	6,053.1	5,477.5	11.5	46.8	-44.15		317.6	-635.6	782.2	750.9	31.30	24.991	
5,200.0	5,187.2	6,141.2	5,556.7	11.7	47.6	-44.62		286.5	-612.9	738.8	706.9	31.92	23.143	
5,300.0	5,287.2	6,229.8	5,636.4	11.9	48.3	-45.21		254.8	-590.7	695.7	663.1	32.60	21.338	
5,400.0	5,387.2	6,315.6	5,713.7	12.1	49.1	-45.96		223.5	-570.2	653.0	619.6	33.34	19.586	
5,500.0	5,487.2	6,401.7	5,791.3	12.3	49.8	-46.91		191.9	-550.8	611.0	576.9	34.16	17.888	
5,600.0	5,587.2	6,489.6	5,870.9	12.5	50.5	-47.95		160.3	-530.8	569.7	534.7	35.04	16.257	
5,700.0	5,687.2	6,588.0	5,960.0	12.7	51.3	-49.13		125.7	-507.2	528.3	492.2	36.05	14.655	
5,800.0	5,787.2	6,675.6	6,038.9	12.9	52.0	-50.23		95.1	-484.8	485.9	448.9	37.02	13.127	
5,900.0	5,887.2	6,761.0	6,116.4	13.1	52.7	-51.79		64.7	-465.7	445.7	407.5	38.22	11.662	
6,000.0	5,987.2	6,837.8	6,186.6	13.4	53.3	-53.59		37.6	-450.5	407.9	368.3	39.56	10.311	
6,100.0	6,087.2	6,918.4	6,260.9	13.6	53.8	-55.75		10.1	-435.6	372.7	331.5	41.15	9.057	
6,200.0	6,187.2	6,995.2	6,333.0	13.8	54.3	-58.57		-13.2	-423.1	341.7	298.7	42.98	7.951	
6,300.0	6,286.5	7,080.7	6,414.6	13.9	54.8	-64.63		-35.4	-410.4	310.6	264.0	46.59	6.667	
6,400.0	6,383.7	7,166.6	6,497.1	14.1	55.3	-73.36		-54.6	-396.8	277.7	225.6	52.13	5.327	
6,500.0	6,477.0	7,245.9	6,573.8	14.2	55.7	-84.62		-70.8	-384.4	248.3	189.6	58.69	4.231	
6,600.0	6,564.7	7,319.5	6,645.2	14.3	56.0	-97.29		-84.9	-373.6	231.2	167.1	64.09	3.606	
6,631.9	6,591.4	7,341.7	6,666.9	14.3	56.1	-101.26		-88.9	-370.5	229.9	164.7	65.20	3.526 CC, ES, SF	
6,700.0	6,645.6	7,387.1	6,711.2	14.4	56.3	-109.09		-96.5	-364.3	236.0	169.6	66.36	3.556	
6,800.0	6,718.0	7,446.9	6,769.8	14.5	56.5	-118.02		-106.0	-356.5	267.7	202.0	65.66	4.077	
6,900.0	6,780.8	7,497.2	6,819.0	14.8	56.7	-123.16		-113.5	-350.3	323.1	259.5	63.69	5.074	
7,000.0	6,833.0	7,537.1	6,858.2	15.4	56.9	-124.21		-119.3	-345.5	395.7	333.6	62.14	6.368	
7,100.0	6,873.5	7,566.9	6,887.6	16.1	57.0	-120.65		-123.3	-342.1	479.5	417.3	62.22	7.707	
7,200.0	6,901.9	7,584.5	6,904.9	17.0	57.0	-110.15		-125.6	-340.2	570.3	505.7	64.57	8.832	
7,300.0	6,917.4	7,588.0	6,908.3	18.0	57.1	-89.59		-126.0	-339.8	664.8	598.5	66.35	10.021	
7,400.0	6,920.4	7,576.2	6,896.7	19.2	57.0	-68.20		-124.5	-341.1	760.7	698.3	62.43	12.186	
7,500.0	6,919.7	7,558.9	6,879.6	20.5	57.0	-64.26		-122.3	-343.0	857.1	795.3	61.77	13.877	
7,600.0	6,919.1	7,540.1	6,861.2	21.9	56.9	-60.35		-119.7	-345.1	954.0	893.1	60.90	15.666	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-Reference													Offset Well Error:	0.0 ft
NEI C18-32D Pad Sec.18-T4N-R64W - Schneider 43-18 (Exist.) - Wellbore #1 - Design #1														
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		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
							+N/-S (ft)	+E/-W (ft)						
7,700.0	6,918.5	6,907.5	6,907.5	23.3	15.4	90.76	1,799.7	290.0	993.2	954.6	38.65	25.696		
7,800.0	6,917.8	6,906.8	6,906.8	24.8	15.4	90.67	1,799.7	290.0	904.4	864.2	40.17	22.516		
7,900.0	6,917.2	6,906.2	6,906.2	26.4	15.4	90.59	1,799.7	290.0	818.1	776.4	41.73	19.604		
8,000.0	6,916.5	6,905.5	6,905.5	28.0	15.4	90.50	1,799.7	290.0	735.4	692.0	43.34	16.967		
8,100.0	6,915.9	6,904.9	6,904.9	29.6	15.4	90.42	1,799.7	290.0	657.4	612.4	44.99	14.613		
8,200.0	6,915.2	6,904.2	6,904.2	31.3	15.4	90.33	1,799.7	290.0	586.2	539.5	46.67	12.561		
8,300.0	6,914.6	6,903.6	6,903.6	33.0	15.4	90.25	1,799.7	290.0	524.5	476.1	48.37	10.843		
8,400.0	6,913.9	6,902.9	6,902.9	34.7	15.4	90.16	1,799.7	290.0	475.9	425.8	50.10	9.500		
8,500.0	6,913.3	6,902.3	6,902.3	36.5	15.4	90.08	1,799.7	290.0	444.9	393.0	51.84	8.581		
8,592.9	6,912.7	6,901.7	6,901.7	38.1	15.4	90.00	1,799.7	290.0	435.1	381.6	53.48	8.135 CC		
8,600.0	6,912.6	6,901.6	6,901.6	38.2	15.4	89.99	1,799.7	290.0	435.1	381.5	53.60	8.117 ES		
8,700.0	6,912.0	6,901.0	6,901.0	40.0	15.4	89.91	1,799.7	290.0	448.0	392.7	55.38	8.090 SF		
8,800.0	6,911.4	6,900.4	6,900.4	41.8	15.4	89.82	1,799.7	290.0	481.8	424.7	57.17	8.428		
8,900.0	6,910.7	6,899.7	6,899.7	43.6	15.4	89.74	1,799.7	290.0	532.5	473.5	58.97	9.031		
9,000.0	6,910.1	6,899.1	6,899.1	45.4	15.4	89.65	1,799.7	290.0	595.8	535.0	60.78	9.803		
9,100.0	6,909.4	6,898.4	6,898.4	47.2	15.4	89.57	1,799.7	290.0	668.1	605.5	62.59	10.674		
9,200.0	6,908.8	6,897.8	6,897.8	49.1	15.4	89.48	1,799.7	290.0	746.9	682.5	64.42	11.594		
9,300.0	6,908.1	6,897.1	6,897.1	50.9	15.4	89.40	1,799.7	290.0	830.2	764.0	66.25	12.532		
9,400.0	6,907.5	6,896.5	6,896.5	52.7	15.4	89.31	1,799.7	290.0	916.9	848.8	68.09	13.466		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4797.0ft (Original Well Elev) Coordinates are relative to: Collins 18T-321
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000 °
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.59°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Collins 18T-321
Project:	SEC.18-T4N-R64W	TVD Reference:	WELL @ 4797.0ft (Original Well Elev)
Reference Site:	Collins 4N64W18T Pad Sec.18-T4N-R64W	MD Reference:	WELL @ 4797.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Collins 18T-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (11-3-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4797.0ft (Original Well Elev) Coordinates are relative to: Collins 18T-321
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000 °
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