

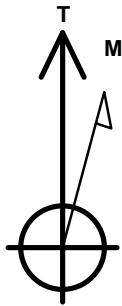
PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Niles Miller 20Y-401**

Surface Location: Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W
 North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
 Ground Elevation: 4956.0
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.0 0.0 1317970.63 3197035.88 40.204075 -104.794568
 Original Well Elev WELL @ 4969.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 349°FSL, 829°FEL	1.0	0.0	0.0	Point
BHL 500°FNL, 98°FEL	7427.0	4424.5	689.2	Point



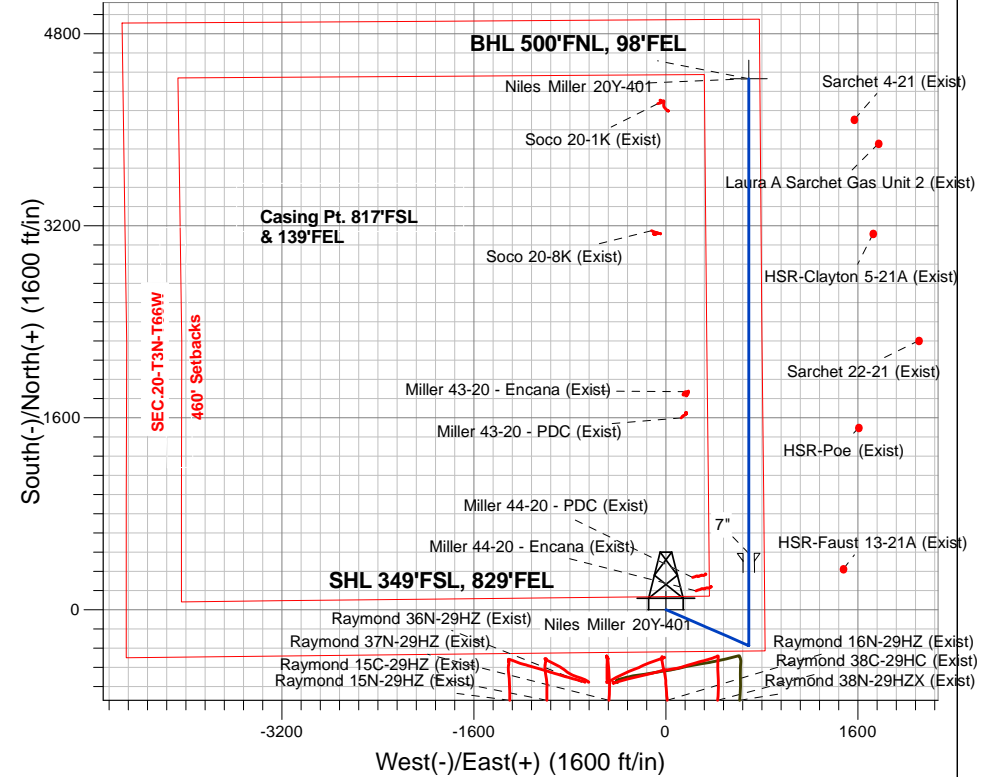
Azimuths to True North
 Magnetic North: 8.26°

Magnetic Field
 Strength: 52552.5snT
 Dip Angle: 66.73°
 Date: 12/8/2015
 Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
1200.0	1200.0	KOP - Start Build 1.50
5267.3	5331.1	Start Drop -2.00
5800.0	5866.9	Start 877.6 hold at 5866.9 MD
6677.6	6744.4	Start Build 7.50
7441.5	7947.2	Start 3956.7 hold at 7947.2 MD
7427.0	11904.0	TD at 11904.0

Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W
 Niles Miller 20Y-401
 Plan #1 (12-01-15)
 10:19, December 08 2015



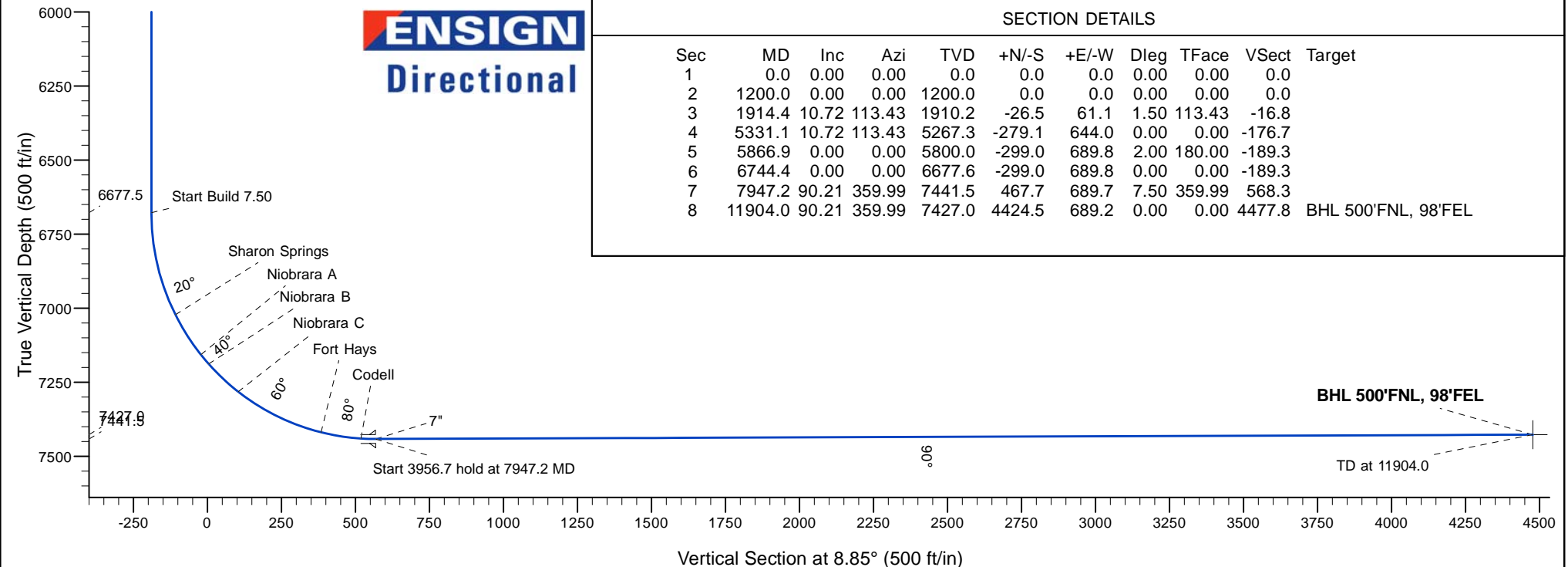
SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	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	1914.4	10.72	113.43	1910.2	-26.5	61.1	1.50	113.43	-16.8	
4	5331.1	10.72	113.43	5267.3	-279.1	644.0	0.00	0.00	-176.7	
5	5866.9	0.00	0.00	5800.0	-299.0	689.8	2.00	180.00	-189.3	
6	6744.4	0.00	0.00	6677.6	-299.0	689.8	0.00	0.00	-189.3	
7	7947.2	90.21	359.99	7441.5	467.7	689.7	7.50	359.99	568.3	
8	11904.0	90.21	359.99	7427.0	4424.5	689.2	0.00	0.00	4477.8	BHL 500°FNL, 98°FEL

BHL 500°FNL, 98°FEL

TD at 11904.0

Vertical Section at 8.85° (500 ft/in)



ENSIGN
 Directional



PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.20-T3N-R66W

Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W

Niles Miller 20Y-401

Wellbore #1

Plan: Plan #1 (12-01-15)

Standard Planning Report

08 December, 2015

Database:	US_EDM	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Project:	SEC.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	North Reference:	True
Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (12-01-15)		

Project	SEC.20-T3N-R66W, Weld County, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site		Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W			
Site Position:		Northing:	1,317,895.72 usft	Latitude:	40.203869
From:	Lat/Long	Easting:	3,197,037.36 usft	Longitude:	-104.794565
Position Uncertainty:	0.0 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.46 °

Well	Niles Miller 20Y-401					
Well Position	+N/-S	74.9 ft	Northing:	1,317,970.63 usft	Latitude:	40.204075
	+E/-W	-0.9 ft	Easting:	3,197,035.88 usft	Longitude:	-104.794568
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	4,956.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/8/2015	8.26	66.73	52,552

Design	Plan #1 (12-01-15)			
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	8.85

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	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	
1,914.4	10.72	113.43	1,910.2	-26.5	61.1	1.50	1.50	0.00	113.43	
5,331.1	10.72	113.43	5,267.3	-279.1	644.0	0.00	0.00	0.00	0.00	
5,866.9	0.00	0.00	5,800.0	-299.0	689.8	2.00	-2.00	0.00	180.00	
6,744.4	0.00	0.00	6,677.6	-299.0	689.8	0.00	0.00	0.00	0.00	
7,947.2	90.21	359.99	7,441.5	467.7	689.7	7.50	7.50	0.00	359.99	
11,904.0	90.21	359.99	7,427.0	4,424.5	689.2	0.00	0.00	0.00	0.00	BHL 500'FNL, 98'FEL

Database:	US_EDM	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Project:	SEC.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	North Reference:	True
Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (12-01-15)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
SHL 349°FSL, 829°FEL									
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 - Start Build 1.50									
1,300.0	1.50	113.43	1,300.0	-0.5	1.2	-0.3	1.50	1.50	0.00
1,400.0	3.00	113.43	1,399.9	-2.1	4.8	-1.3	1.50	1.50	0.00
1,500.0	4.50	113.43	1,499.7	-4.7	10.8	-3.0	1.50	1.50	0.00
1,600.0	6.00	113.43	1,599.3	-8.3	19.2	-5.3	1.50	1.50	0.00
1,700.0	7.50	113.43	1,698.6	-13.0	30.0	-8.2	1.50	1.50	0.00
1,800.0	9.00	113.43	1,797.5	-18.7	43.1	-11.8	1.50	1.50	0.00
1,900.0	10.50	113.43	1,896.1	-25.4	58.7	-16.1	1.50	1.50	0.00
1,914.4	10.72	113.43	1,910.2	-26.5	61.1	-16.8	1.50	1.50	0.00
2,000.0	10.72	113.43	1,994.3	-32.8	75.7	-20.8	0.00	0.00	0.00
2,100.0	10.72	113.43	2,092.6	-40.2	92.8	-25.5	0.00	0.00	0.00
2,200.0	10.72	113.43	2,190.9	-47.6	109.8	-30.1	0.00	0.00	0.00
2,300.0	10.72	113.43	2,289.1	-55.0	126.9	-34.8	0.00	0.00	0.00
2,400.0	10.72	113.43	2,387.4	-62.4	144.0	-39.5	0.00	0.00	0.00
2,500.0	10.72	113.43	2,485.6	-69.8	161.0	-44.2	0.00	0.00	0.00
2,600.0	10.72	113.43	2,583.9	-77.2	178.1	-48.9	0.00	0.00	0.00
2,700.0	10.72	113.43	2,682.1	-84.6	195.1	-53.5	0.00	0.00	0.00
2,800.0	10.72	113.43	2,780.4	-92.0	212.2	-58.2	0.00	0.00	0.00
2,900.0	10.72	113.43	2,878.7	-99.4	229.3	-62.9	0.00	0.00	0.00
3,000.0	10.72	113.43	2,976.9	-106.8	246.3	-67.6	0.00	0.00	0.00
3,100.0	10.72	113.43	3,075.2	-114.2	263.4	-72.3	0.00	0.00	0.00
3,200.0	10.72	113.43	3,173.4	-121.6	280.4	-76.9	0.00	0.00	0.00
3,300.0	10.72	113.43	3,271.7	-128.9	297.5	-81.6	0.00	0.00	0.00
3,400.0	10.72	113.43	3,369.9	-136.3	314.6	-86.3	0.00	0.00	0.00
3,500.0	10.72	113.43	3,468.2	-143.7	331.6	-91.0	0.00	0.00	0.00
3,600.0	10.72	113.43	3,566.5	-151.1	348.7	-95.7	0.00	0.00	0.00
3,700.0	10.72	113.43	3,664.7	-158.5	365.7	-100.3	0.00	0.00	0.00
3,800.0	10.72	113.43	3,763.0	-165.9	382.8	-105.0	0.00	0.00	0.00
3,900.0	10.72	113.43	3,861.2	-173.3	399.8	-109.7	0.00	0.00	0.00
3,971.0	10.72	113.43	3,931.0	-178.6	412.0	-113.0	0.00	0.00	0.00
Parkman									
4,000.0	10.72	113.43	3,959.5	-180.7	416.9	-114.4	0.00	0.00	0.00
4,100.0	10.72	113.43	4,057.7	-188.1	434.0	-119.1	0.00	0.00	0.00
4,200.0	10.72	113.43	4,156.0	-195.5	451.0	-123.7	0.00	0.00	0.00
4,300.0	10.72	113.43	4,254.2	-202.9	468.1	-128.4	0.00	0.00	0.00
4,400.0	10.72	113.43	4,352.5	-210.3	485.1	-133.1	0.00	0.00	0.00
4,434.1	10.72	113.43	4,386.0	-212.8	491.0	-134.7	0.00	0.00	0.00

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Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Project:	SEC.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	North Reference:	True
Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (12-01-15)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Sussex									
4,500.0	10.72	113.43	4,450.8	-217.7	502.2	-137.8	0.00	0.00	0.00
4,600.0	10.72	113.43	4,549.0	-225.1	519.3	-142.5	0.00	0.00	0.00
4,700.0	10.72	113.43	4,647.3	-232.5	536.3	-147.1	0.00	0.00	0.00
4,800.0	10.72	113.43	4,745.5	-239.9	553.4	-151.8	0.00	0.00	0.00
4,900.0	10.72	113.43	4,843.8	-247.3	570.4	-156.5	0.00	0.00	0.00
5,000.0	10.72	113.43	4,942.0	-254.7	587.5	-161.2	0.00	0.00	0.00
5,019.3	10.72	113.43	4,961.0	-256.1	590.8	-162.1	0.00	0.00	0.00
Shannon									
5,100.0	10.72	113.43	5,040.3	-262.0	604.6	-165.9	0.00	0.00	0.00
5,200.0	10.72	113.43	5,138.6	-269.4	621.6	-170.6	0.00	0.00	0.00
5,300.0	10.72	113.43	5,236.8	-276.8	638.7	-175.2	0.00	0.00	0.00
5,331.1	10.72	113.43	5,267.4	-279.1	644.0	-176.7	0.00	0.00	0.00
Start Drop -2.00									
5,400.0	9.34	113.43	5,335.2	-283.9	655.0	-179.7	2.00	-2.00	0.00
5,500.0	7.34	113.43	5,434.1	-289.7	668.3	-183.4	2.00	-2.00	0.00
5,600.0	5.34	113.43	5,533.5	-294.1	678.4	-186.1	2.00	-2.00	0.00
5,700.0	3.34	113.43	5,633.2	-297.1	685.4	-188.0	2.00	-2.00	0.00
5,800.0	1.34	113.43	5,733.2	-298.7	689.1	-189.1	2.00	-2.00	0.00
5,866.9	0.00	0.00	5,800.0	-299.0	689.8	-189.3	2.00	-2.00	0.00
Start 877.6 hold at 5866.9 MD									
5,900.0	0.00	0.00	5,833.1	-299.0	689.8	-189.3	0.00	0.00	0.00
6,000.0	0.00	0.00	5,933.1	-299.0	689.8	-189.3	0.00	0.00	0.00
6,100.0	0.00	0.00	6,033.1	-299.0	689.8	-189.3	0.00	0.00	0.00
6,200.0	0.00	0.00	6,133.1	-299.0	689.8	-189.3	0.00	0.00	0.00
6,300.0	0.00	0.00	6,233.1	-299.0	689.8	-189.3	0.00	0.00	0.00
6,400.0	0.00	0.00	6,333.1	-299.0	689.8	-189.3	0.00	0.00	0.00
6,500.0	0.00	0.00	6,433.1	-299.0	689.8	-189.3	0.00	0.00	0.00
6,600.0	0.00	0.00	6,533.1	-299.0	689.8	-189.3	0.00	0.00	0.00
6,700.0	0.00	0.00	6,633.1	-299.0	689.8	-189.3	0.00	0.00	0.00
6,744.4	0.00	0.00	6,677.5	-299.0	689.8	-189.3	0.00	0.00	0.00
Start Build 7.50									
6,800.0	4.17	359.99	6,733.1	-297.0	689.8	-187.3	7.50	7.50	0.00
6,900.0	11.67	359.99	6,832.1	-283.2	689.8	-173.7	7.50	7.50	0.00
7,000.0	19.17	359.99	6,928.4	-256.6	689.8	-147.4	7.50	7.50	0.00
7,100.0	26.67	359.99	7,020.4	-217.7	689.8	-109.0	7.50	7.50	0.00
7,101.7	26.80	359.99	7,022.0	-216.9	689.8	-108.2	7.50	7.50	0.00
Sharon Springs									
7,200.0	34.17	359.99	7,106.6	-167.1	689.8	-59.0	7.50	7.50	0.00
7,262.7	38.87	359.99	7,157.0	-129.8	689.8	-22.1	7.50	7.50	0.00
Niobrara A									
7,300.0	41.67	359.99	7,185.5	-105.7	689.8	1.7	7.50	7.50	0.00
7,303.4	41.93	359.99	7,188.0	-103.4	689.8	4.0	7.50	7.50	0.00
Niobrara B									
7,400.0	49.17	359.99	7,255.6	-34.5	689.8	72.0	7.50	7.50	0.00
7,441.7	52.30	359.99	7,282.0	-2.2	689.8	103.9	7.50	7.50	0.00
Niobrara C									
7,500.0	56.67	359.99	7,315.8	45.2	689.8	150.8	7.50	7.50	0.00
7,600.0	64.17	359.99	7,365.2	132.1	689.8	236.7	7.50	7.50	0.00
7,700.0	71.67	359.99	7,402.7	224.7	689.7	328.2	7.50	7.50	0.00
7,758.5	76.06	359.99	7,419.0	280.9	689.7	383.7	7.50	7.50	0.00

Database:	US_EDM	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Project:	SEC.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	North Reference:	True
Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (12-01-15)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
Fort Hays									
7,800.0	79.17	359.99	7,427.9	321.4	689.7	423.7	7.50	7.50	0.00
7,896.4	86.40	359.99	7,440.0	417.0	689.7	518.2	7.50	7.50	0.00
Codell									
7,900.0	86.67	359.99	7,440.2	420.6	689.7	521.7	7.50	7.50	0.00
7,947.2	90.21	359.99	7,441.5	467.7	689.7	568.3	7.50	7.50	0.00
Start 3956.7 hold at 7947.2 MD - 7"									
8,000.0	90.21	359.99	7,441.3	520.5	689.7	620.5	0.00	0.00	0.00
8,100.0	90.21	359.99	7,440.9	620.5	689.7	719.3	0.00	0.00	0.00
8,200.0	90.21	359.99	7,440.6	720.5	689.7	818.1	0.00	0.00	0.00
8,300.0	90.21	359.99	7,440.2	820.5	689.7	916.9	0.00	0.00	0.00
8,400.0	90.21	359.99	7,439.8	920.5	689.7	1,015.7	0.00	0.00	0.00
8,500.0	90.21	359.99	7,439.5	1,020.5	689.6	1,114.5	0.00	0.00	0.00
8,600.0	90.21	359.99	7,439.1	1,120.5	689.6	1,213.3	0.00	0.00	0.00
8,700.0	90.21	359.99	7,438.7	1,220.5	689.6	1,312.1	0.00	0.00	0.00
8,800.0	90.21	359.99	7,438.4	1,320.5	689.6	1,410.9	0.00	0.00	0.00
8,900.0	90.21	359.99	7,438.0	1,420.5	689.6	1,509.7	0.00	0.00	0.00
9,000.0	90.21	359.99	7,437.6	1,520.5	689.6	1,608.5	0.00	0.00	0.00
9,100.0	90.21	359.99	7,437.3	1,620.5	689.6	1,707.3	0.00	0.00	0.00
9,200.0	90.21	359.99	7,436.9	1,720.5	689.6	1,806.2	0.00	0.00	0.00
9,300.0	90.21	359.99	7,436.5	1,820.5	689.5	1,905.0	0.00	0.00	0.00
9,400.0	90.21	359.99	7,436.2	1,920.5	689.5	2,003.8	0.00	0.00	0.00
9,500.0	90.21	359.99	7,435.8	2,020.5	689.5	2,102.6	0.00	0.00	0.00
9,600.0	90.21	359.99	7,435.4	2,120.5	689.5	2,201.4	0.00	0.00	0.00
9,700.0	90.21	359.99	7,435.1	2,220.5	689.5	2,300.2	0.00	0.00	0.00
9,800.0	90.21	359.99	7,434.7	2,320.5	689.5	2,399.0	0.00	0.00	0.00
9,900.0	90.21	359.99	7,434.3	2,420.5	689.5	2,497.8	0.00	0.00	0.00
10,000.0	90.21	359.99	7,434.0	2,520.5	689.5	2,596.6	0.00	0.00	0.00
10,100.0	90.21	359.99	7,433.6	2,620.5	689.4	2,695.4	0.00	0.00	0.00
10,200.0	90.21	359.99	7,433.2	2,720.5	689.4	2,794.2	0.00	0.00	0.00
10,300.0	90.21	359.99	7,432.9	2,820.5	689.4	2,893.0	0.00	0.00	0.00
10,400.0	90.21	359.99	7,432.5	2,920.5	689.4	2,991.8	0.00	0.00	0.00
10,500.0	90.21	359.99	7,432.1	3,020.5	689.4	3,090.6	0.00	0.00	0.00
10,600.0	90.21	359.99	7,431.8	3,120.5	689.4	3,189.4	0.00	0.00	0.00
10,700.0	90.21	359.99	7,431.4	3,220.5	689.4	3,288.2	0.00	0.00	0.00
10,800.0	90.21	359.99	7,431.0	3,320.5	689.4	3,387.0	0.00	0.00	0.00
10,900.0	90.21	359.99	7,430.7	3,420.5	689.3	3,485.9	0.00	0.00	0.00
11,000.0	90.21	359.99	7,430.3	3,520.5	689.3	3,584.7	0.00	0.00	0.00
11,100.0	90.21	359.99	7,429.9	3,620.5	689.3	3,683.5	0.00	0.00	0.00
11,200.0	90.21	359.99	7,429.6	3,720.5	689.3	3,782.3	0.00	0.00	0.00
11,300.0	90.21	359.99	7,429.2	3,820.5	689.3	3,881.1	0.00	0.00	0.00
11,400.0	90.21	359.99	7,428.8	3,920.5	689.3	3,979.9	0.00	0.00	0.00
11,500.0	90.21	359.99	7,428.5	4,020.5	689.3	4,078.7	0.00	0.00	0.00
11,600.0	90.21	359.99	7,428.1	4,120.5	689.3	4,177.5	0.00	0.00	0.00
11,700.0	90.21	359.99	7,427.7	4,220.5	689.2	4,276.3	0.00	0.00	0.00
11,800.0	90.21	359.99	7,427.4	4,320.5	689.2	4,375.1	0.00	0.00	0.00
11,900.0	90.21	359.99	7,427.0	4,420.5	689.2	4,473.9	0.00	0.00	0.00
11,904.0	90.21	359.99	7,427.0	4,424.5	689.2	4,477.8	0.00	0.00	0.00
TD at 11904.0 - BHL 500'FNL, 98'FEL									

Database:	US_EDM	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Project:	SEC.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	North Reference:	True
Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (12-01-15)		

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL 349°FSL, 829°FEL - plan hits target center - Point	0.00	0.00	1.0	0.0	0.0	1,317,970.64	3,197,035.88	40.204075	-104.794568
BHL 500°FNL, 98°FEL - plan hits target center - Point	0.00	0.00	7,427.0	4,424.5	689.2	1,322,400.23	3,197,689.85	40.216220	-104.792100

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,947.2	7,441.5	7"	7	8-3/4

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,971.0	3,931.0	Parkman		0.00	
4,434.1	4,386.0	Sussex		0.00	
5,019.3	4,961.0	Shannon		0.00	
7,101.7	7,022.0	Sharon Springs		0.00	
7,262.7	7,157.0	Niobrara A		0.00	
7,303.4	7,188.0	Niobrara B		0.00	
7,441.7	7,282.0	Niobrara C		0.00	
7,758.5	7,419.0	Fort Hays		0.00	
7,896.4	7,440.0	Codell		0.00	

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,200.0	1,200.0	0.0	0.0	KOP - Start Build 1.50
5,331.1	5,267.3	-26.5	61.1	Start Drop -2.00
5,866.9	5,800.0	-279.1	644.0	Start 877.6 hold at 5866.9 MD
6,744.4	6,677.6	-299.0	689.8	Start Build 7.50
7,947.2	7,441.5	-299.0	689.8	Start 3956.7 hold at 7947.2 MD
11,904.0	7,427.0	467.7	689.7	TD at 11904.0



PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.20-T3N-R66W

Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W

Niles Miller 20Y-401

Wellbore #1

Plan #1 (12-01-15)

Anticollision Report

08 December, 2015



Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (12-01-15)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 800.0 ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	12/8/2015		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,904.0	Plan #1 (12-01-15) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Existing Wells Sec.20-T3N-R66W						
HSR-Clayton 5-21A (Exist) - Wellbore #1 - Wellbore #1						Out of range
HSR-Faust 13-21A (Exist) - Wellbore #1 - Wellbore #1	7,819.5	7,454.3	790.1	622.5	4.714	CC, ES
HSR-Faust 13-21A (Exist) - Wellbore #1 - Wellbore #1	7,850.0	7,458.7	790.7	622.7	4.708	SF
HSR-Poe (Exist) - Wellbore #1 - Wellbore #1						Out of range
Laura A Sarchet Gas Unit 2 (Exist) - Wellbore #1 - Wellbo						Out of range
Miller 43-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	9,288.8	7,461.8	539.4	486.2	10.136	CC
Miller 43-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	9,300.0	7,462.2	539.5	486.1	10.101	ES
Miller 43-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	9,400.0	7,465.2	550.8	495.6	9.985	SF
Miller 43-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	9,079.9	7,424.4	561.2	511.0	11.169	CC, ES
Miller 43-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	9,200.0	7,421.5	573.9	521.6	10.980	SF
Miller 44-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	3,106.3	3,092.5	311.7	297.1	21.323	CC, ES
Miller 44-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	7,700.0	7,394.8	421.1	387.0	12.360	SF
Miller 44-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	2,696.7	2,692.7	397.3	385.3	32.940	CC
Miller 44-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	2,800.0	2,795.5	397.7	385.0	31.356	ES
Miller 44-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	7,800.0	7,420.5	465.2	430.5	13.373	SF
Raymond 15C-29HZ (Exist) - Wellbore #1 - Wellbore #1						Out of range
Raymond 15N-29HZ (Exist) - Wellbore #1 - Wellbore #1						Out of range
Raymond 16N-29HZ (Exist) - Wellbore #1 - Wellbore #1	4,278.9	4,302.0	547.9	526.5	25.593	CC, ES
Raymond 16N-29HZ (Exist) - Wellbore #1 - Wellbore #1	6,950.0	6,859.9	741.5	709.5	23.213	SF
Raymond 37N-29HZ (Exist) - Wellbore #1 - Wellbore #1	2,026.8	2,059.4	701.7	692.3	74.343	CC, ES
Raymond 37N-29HZ (Exist) - Wellbore #1 - Wellbore #1	3,000.0	2,946.0	792.3	777.7	54.474	SF
Raymond 38C-29HC (Exist) - Wellbore #1 - Wellbore #1	6,754.5	6,728.5	270.5	237.5	8.194	CC, ES
Raymond 38C-29HC (Exist) - Wellbore #1 - Wellbore #1	6,850.0	6,821.3	272.9	239.4	8.133	SF
Raymond 38N-29HZX (Exist) - Wellbore #1 - Wellbore #1	6,645.9	6,648.0	117.0	78.8	3.064	CC, ES
Raymond 38N-29HZX (Exist) - Wellbore #1 - Wellbore #1	6,700.0	6,698.9	117.6	79.1	3.052	SF
Sarchet 22-21 (Exist) - Wellbore #1 - Wellbore #1						Out of range
Sarchet 4-21 (Exist) - Wellbore #1 - Wellbore #1						Out of range
Soco 20-1K (Exist) - Wellbore #1 - Wellbore #1	11,698.1	7,383.0	754.7	656.3	7.670	CC
Soco 20-1K (Exist) - Wellbore #1 - Wellbore #1	11,700.0	7,383.0	754.7	656.2	7.668	ES
Soco 20-1K (Exist) - Wellbore #1 - Wellbore #1	11,800.0	7,381.6	761.5	661.2	7.593	SF
Soco 20-8K (Exist) - Wellbore #1 - Wellbore #1	10,629.2	7,371.1	787.6	708.7	9.971	CC, ES
Soco 20-8K (Exist) - Wellbore #1 - Wellbore #1	10,700.0	7,371.9	790.8	710.5	9.847	SF

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W						
Niles Miller 20Q-221 - Wellbore #1 - Plan #1 (12-01-15)	200.0	198.0	74.9	74.3	111.870	CC
Niles Miller 20Q-221 - Wellbore #1 - Plan #1 (12-01-15)	300.0	297.7	75.1	74.0	67.845	ES
Niles Miller 20Q-221 - Wellbore #1 - Plan #1 (12-01-15)	900.0	888.7	104.0	100.1	26.855	SF
Niles Miller 20Q-321 - Wellbore #1 - Plan #1 (12-01-15)	400.0	398.0	60.0	58.4	38.220	CC
Niles Miller 20Q-321 - Wellbore #1 - Plan #1 (12-01-15)	500.0	497.7	60.2	58.2	30.053	ES
Niles Miller 20Q-321 - Wellbore #1 - Plan #1 (12-01-15)	900.0	893.8	73.1	69.3	19.386	SF
Niles Miller 20T-221 - Wellbore #1 - Plan #1 (12-01-15)	1,000.0	999.0	14.9	10.6	3.487	CC, ES
Niles Miller 20T-221 - Wellbore #1 - Plan #1 (12-01-15)	1,100.0	1,098.7	15.9	11.2	3.391	SF
Niles Miller 20T-241 - Wellbore #1 - Plan #1 (12-01-15)	600.0	599.0	45.0	42.5	18.206	CC
Niles Miller 20T-241 - Wellbore #1 - Plan #1 (12-01-15)	700.0	698.7	45.3	42.4	15.617	ES
Niles Miller 20T-241 - Wellbore #1 - Plan #1 (12-01-15)	1,000.0	996.3	54.3	50.1	12.934	SF
Niles Miller 20T-301 - Wellbore #1 - Plan #1 (12-01-15)	800.0	799.0	30.0	26.6	8.895	CC, ES
Niles Miller 20T-301 - Wellbore #1 - Plan #1 (12-01-15)	1,000.0	998.2	32.5	28.3	7.717	SF
Niles Miller 20T-321 - Wellbore #1 - Plan #1 (12-01-15)	1,200.0	1,201.0	30.1	24.9	5.817	CC, ES
Niles Miller 20T-321 - Wellbore #1 - Plan #1 (12-01-15)	11,904.0	11,737.7	600.9	432.6	3.569	SF
Niles Miller 20Y-241 - Wellbore #1 - Plan #1 (12-01-15)	1,200.0	1,200.0	15.0	9.8	2.902	CC, ES
Niles Miller 20Y-241 - Wellbore #1 - Plan #1 (12-01-15)	11,904.0	11,654.7	376.2	240.9	2.780	SF

Offset Design Existing Wells Sec.20-T3N-R66W - HSR-Faust 13-21A (Exist) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 8060-UNKNOWN												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,700.0	7,402.7	7,425.7	7,425.7	20.6	148.5	87.36	340.7	1,479.8	798.5	632.4	166.12	4.807	
7,750.0	7,416.9	7,439.9	7,439.9	20.7	148.8	88.76	340.7	1,479.8	793.0	626.2	166.80	4.754	
7,800.0	7,427.9	7,450.9	7,450.9	20.8	149.0	89.74	340.7	1,479.8	790.3	622.9	167.39	4.721	
7,819.5	7,431.3	7,454.3	7,454.3	20.9	149.1	90.00	340.7	1,479.8	790.1	622.5	167.61	4.714	CC, ES
7,850.0	7,435.7	7,458.7	7,458.7	21.0	149.2	90.27	340.7	1,479.8	790.7	622.7	167.94	4.708	SF
7,900.0	7,440.2	7,463.2	7,463.2	21.3	149.3	90.34	340.7	1,479.8	794.1	625.6	168.47	4.714	

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 43-20 - Encana (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
8,700.0	7,438.7	7,441.8	7,440.0	31.1	13.6	-90.36	1,808.6	149.8	798.3	755.0	43.33	18.421		
8,800.0	7,438.4	7,445.5	7,443.7	32.6	13.6	-90.76	1,808.7	149.9	727.8	682.8	44.95	16.190		
8,900.0	7,438.0	7,449.1	7,447.3	34.2	13.6	-91.14	1,808.9	150.1	664.8	618.2	46.60	14.267		
9,000.0	7,437.6	7,452.5	7,450.7	35.8	13.6	-91.50	1,809.0	150.2	611.8	563.5	48.27	12.674		
9,100.0	7,437.3	7,455.9	7,454.1	37.5	13.6	-91.86	1,809.1	150.4	571.5	521.5	49.97	11.437		
9,200.0	7,436.9	7,459.1	7,457.3	39.1	13.6	-92.20	1,809.2	150.5	546.7	495.0	51.68	10.577		
9,288.8	7,436.6	7,461.8	7,460.1	40.6	13.6	-92.49	1,809.3	150.6	539.4	486.2	53.22	10.136 CC		
9,300.0	7,436.5	7,462.2	7,460.4	40.8	13.6	-92.53	1,809.3	150.6	539.5	486.1	53.42	10.101 ES		
9,400.0	7,436.2	7,465.2	7,463.4	42.5	13.6	-92.85	1,809.4	150.8	550.8	495.6	55.16	9.985 SF		
9,500.0	7,435.8	7,468.1	7,466.3	44.2	13.6	-93.16	1,809.5	150.9	579.3	522.4	56.92	10.177		
9,600.0	7,435.4	7,470.9	7,469.1	46.0	13.6	-93.46	1,809.6	151.0	622.7	564.0	58.69	10.610		
9,700.0	7,435.1	7,473.7	7,471.9	47.7	13.6	-93.75	1,809.7	151.1	678.2	617.7	60.47	11.216		
9,800.0	7,434.7	7,476.3	7,474.5	49.5	13.6	-94.03	1,809.8	151.3	743.0	680.8	62.25	11.936		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 43-20 - PDC (Exist) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)		
8,600.0	7,439.1	7,435.9	7,435.0	29.6	14.3	-89.97	1,600.1	128.3	738.3	695.8	42.54	17.356	
8,700.0	7,438.7	7,433.5	7,432.6	31.1	14.3	-89.72	1,600.2	128.3	677.7	633.6	44.08	15.373	
8,800.0	7,438.4	7,431.1	7,430.2	32.6	14.3	-89.48	1,600.2	128.4	627.1	581.4	45.66	13.734	
8,900.0	7,438.0	7,428.7	7,427.9	34.2	14.3	-89.23	1,600.2	128.4	589.3	542.1	47.27	12.466	
9,000.0	7,437.6	7,426.3	7,425.5	35.8	14.3	-88.99	1,600.3	128.5	566.9	517.9	48.92	11.589	
9,079.9	7,437.4	7,424.4	7,423.6	37.1	14.3	-88.80	1,600.3	128.5	561.2	511.0	50.25	11.169	CC, ES
9,100.0	7,437.3	7,423.9	7,423.1	37.5	14.3	-88.75	1,600.3	128.5	561.6	511.0	50.58	11.102	
9,200.0	7,436.9	7,421.5	7,420.7	39.1	14.3	-88.50	1,600.4	128.6	573.9	521.6	52.27	10.980	SF
9,300.0	7,436.5	7,419.2	7,418.3	40.8	14.3	-88.26	1,600.4	128.6	602.8	548.8	53.97	11.168	
9,400.0	7,436.2	7,416.8	7,415.9	42.5	14.3	-88.02	1,600.5	128.7	646.0	590.3	55.69	11.599	
9,500.0	7,435.8	7,414.4	7,413.5	44.2	14.3	-87.77	1,600.5	128.7	700.9	643.5	57.43	12.205	
9,600.0	7,435.4	7,412.0	7,411.2	46.0	14.3	-87.53	1,600.6	128.8	765.0	705.9	59.17	12.928	

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 44-20 - Encana (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error: 0.0 ft	
Survey Program: 100-NS-GYRO-MS													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	6.0	6.0	0.0	0.0	63.07	191.3	376.5	422.3	422.3	0.01	N/A		
100.0	100.0	106.5	106.5	0.1	0.1	63.04	191.4	376.3	422.2	421.9	0.26	1,647.375		
118.3	118.3	124.3	124.3	0.2	0.2	63.04	191.4	376.3	422.2	421.9	0.33	1,286.538		
200.0	200.0	204.0	204.0	0.3	0.3	63.03	191.6	376.5	422.4	421.7	0.65	649.200		
300.0	300.0	304.9	304.9	0.6	0.5	63.02	191.8	376.7	422.8	421.7	1.08	390.351		
400.0	400.0	407.2	407.2	0.8	0.7	63.07	191.5	376.9	422.7	421.2	1.47	287.595		
443.1	443.1	449.1	449.1	0.9	0.7	63.11	191.2	376.9	422.6	421.0	1.63	259.034		
500.0	500.0	504.8	504.8	1.0	0.8	63.14	191.0	377.1	422.8	420.9	1.85	229.024		
600.0	600.0	608.7	608.7	1.2	1.0	63.14	190.9	376.9	422.5	420.3	2.24	188.786		
700.0	700.0	706.7	706.7	1.5	1.1	63.13	190.8	376.6	422.1	419.5	2.61	161.773		
798.3	798.3	804.3	804.3	1.7	1.3	63.12	190.8	376.5	422.1	419.0	3.01	140.143		
800.0	800.0	806.0	806.0	1.7	1.3	63.12	190.8	376.5	422.1	419.0	3.02	139.800		
900.0	900.0	905.1	905.1	1.9	1.5	63.09	191.1	376.5	422.2	418.8	3.44	122.621		
1,000.0	1,000.0	1,007.5	1,007.5	2.1	1.7	63.02	191.5	376.2	422.1	418.2	3.88	108.675		
1,100.0	1,100.0	1,108.2	1,108.2	2.4	1.9	62.98	191.5	375.6	421.6	417.3	4.31	97.861		
1,200.0	1,200.0	1,206.8	1,206.8	2.6	2.1	63.02	191.1	375.4	421.3	416.6	4.69	89.841		
1,300.0	1,300.0	1,305.4	1,305.4	2.8	2.3	-50.53	190.9	375.5	420.5	415.4	5.04	83.405		
1,400.0	1,399.9	1,407.8	1,407.8	3.0	2.4	-50.96	190.7	375.5	417.8	412.4	5.40	77.375		
1,500.0	1,499.7	1,506.0	1,506.0	3.2	2.6	-51.70	190.6	375.2	413.4	407.7	5.78	71.520		
1,600.0	1,599.3	1,608.0	1,608.0	3.4	2.8	-52.84	190.6	374.8	407.4	401.2	6.20	65.725		
1,700.0	1,698.6	1,707.1	1,707.1	3.6	3.0	-54.32	190.6	374.0	399.7	393.1	6.63	60.256		
1,800.0	1,797.5	1,803.5	1,803.5	3.9	3.2	-56.17	191.0	373.4	391.2	384.1	7.09	55.205		
1,900.0	1,896.1	1,904.3	1,904.3	4.2	3.5	-58.48	191.1	373.0	381.7	374.1	7.57	50.402		
1,914.4	1,910.2	1,918.3	1,918.3	4.2	3.5	-58.84	191.1	372.9	380.2	372.6	7.65	49.729		
2,000.0	1,994.3	2,001.5	2,001.5	4.5	3.7	-60.94	191.1	372.4	371.7	363.6	8.10	45.917		
2,100.0	2,092.6	2,099.2	2,099.2	4.8	3.9	-63.45	191.0	372.3	362.7	354.1	8.59	42.209		
2,200.0	2,190.9	2,200.0	2,200.0	5.2	4.0	-66.09	190.2	372.2	354.1	345.0	9.09	38.963		
2,300.0	2,289.1	2,297.5	2,297.4	5.5	4.2	-68.80	189.5	371.8	346.0	336.4	9.64	35.886		
2,400.0	2,387.4	2,395.5	2,395.4	5.9	4.4	-71.68	189.1	371.3	339.0	328.8	10.23	33.128		
2,500.0	2,485.6	2,495.3	2,495.2	6.3	4.6	-74.68	188.3	370.9	332.7	321.9	10.83	30.727		
2,600.0	2,583.9	2,596.8	2,596.7	6.7	4.8	-77.84	186.9	370.1	326.6	315.2	11.44	28.556		
2,700.0	2,682.1	2,693.6	2,693.5	7.0	5.0	-81.06	185.6	368.7	321.2	309.1	12.06	26.625		
2,800.0	2,780.4	2,792.2	2,792.1	7.4	5.3	-84.40	184.4	367.5	317.1	304.4	12.69	24.977		
2,900.0	2,878.7	2,890.9	2,890.8	7.8	5.5	-87.80	182.9	366.3	313.8	300.5	13.32	23.556		
3,000.0	2,976.9	2,986.8	2,986.7	8.2	5.7	-91.24	181.9	364.7	312.0	298.1	13.95	22.367		
3,100.0	3,075.2	3,086.3	3,086.1	8.6	6.0	-94.80	181.0	363.4	311.7	297.1	14.58	21.381		
3,106.3	3,081.3	3,092.5	3,092.4	8.7	6.0	-95.03	180.9	363.3	311.7	297.1	14.62	21.323	CC, ES	
3,200.0	3,173.4	3,182.6	3,182.4	9.0	6.2	-98.31	180.1	361.7	312.5	297.3	15.18	20.577		
3,300.0	3,271.7	3,279.9	3,279.7	9.4	6.4	-101.85	179.8	360.0	315.0	299.2	15.78	19.965		
3,400.0	3,369.9	3,378.2	3,378.0	9.8	6.7	-105.31	179.4	358.5	318.8	302.4	16.36	19.488		
3,500.0	3,468.2	3,474.5	3,474.3	10.2	6.9	-108.70	179.2	356.6	323.9	307.0	16.91	19.154		
3,600.0	3,566.5	3,572.7	3,572.5	10.7	7.2	-112.00	179.4	354.9	330.6	313.1	17.45	18.948		
3,700.0	3,664.7	3,670.6	3,670.4	11.1	7.4	-115.13	179.4	353.4	338.1	320.1	17.97	18.818		
3,800.0	3,763.0	3,765.9	3,765.7	11.5	7.6	-118.12	179.6	351.3	347.0	328.5	18.46	18.800		
3,900.0	3,861.2	3,862.4	3,862.1	11.9	7.9	-120.99	180.7	349.3	357.6	338.7	18.92	18.900		
4,000.0	3,959.5	3,961.7	3,961.4	12.3	8.1	-123.70	181.7	347.6	369.0	349.7	19.38	19.045		
4,100.0	4,057.7	4,059.6	4,059.3	12.7	8.3	-126.25	182.4	345.7	380.9	361.0	19.83	19.208		
4,200.0	4,156.0	4,158.5	4,158.1	13.1	8.5	-128.68	183.1	343.8	393.5	373.2	20.28	19.405		
4,300.0	4,254.2	4,260.4	4,260.1	13.6	8.8	-131.13	182.9	341.2	406.1	385.4	20.73	19.595		
4,400.0	4,352.5	4,359.2	4,358.8	14.0	9.0	-133.50	181.6	338.1	418.6	397.4	21.16	19.780		
4,500.0	4,450.8	4,457.4	4,456.9	14.4	9.3	-135.74	180.4	334.9	431.8	410.2	21.59	20.000		

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

Company:	PETROLEUM DEVELOPMENT CORP DJ	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.20-T3N-R66W - Miller 44-20 - Encana (Exist) - Wellbore #1 - Wellbore #1											Offset Site Error:		0.0 ft
Survey Program:		100-NS-GYRO-MS											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)				
4,600.0	4,549.0	4,556.3	4,555.8	14.8	9.6	-137.84	178.9	331.8	445.3	423.3	22.02	20.227			
4,700.0	4,647.3	4,654.8	4,654.1	15.2	9.8	-139.81	177.3	328.9	459.2	436.8	22.44	20.466			
4,800.0	4,745.5	4,752.5	4,751.9	15.6	10.0	-141.65	175.5	326.0	473.6	450.7	22.86	20.715			
4,900.0	4,843.8	4,852.1	4,851.4	16.1	10.3	-143.44	173.7	322.8	488.4	465.1	23.28	20.979			
5,000.0	4,942.0	4,950.3	4,949.5	16.5	10.5	-145.01	171.8	320.7	503.0	479.3	23.70	21.224			
5,100.0	5,040.3	5,045.5	5,044.7	16.9	10.8	-146.39	170.6	318.8	518.5	494.4	24.13	21.489			
5,200.0	5,138.6	5,141.3	5,140.5	17.3	11.0	-147.62	170.3	317.3	534.7	510.2	24.57	21.761			
5,300.0	5,236.8	5,238.6	5,237.7	17.7	11.3	-148.77	170.3	315.8	551.6	526.6	25.00	22.064			
5,331.1	5,267.3	5,269.9	5,269.1	17.9	11.3	-149.11	170.4	315.5	556.8	531.7	25.12	22.162			
5,400.0	5,335.2	5,337.1	5,336.3	18.1	11.4	-149.83	170.8	315.2	567.7	542.3	25.41	22.341			
5,500.0	5,434.1	5,434.6	5,433.8	18.4	11.6	-150.67	171.7	314.6	581.4	555.6	25.78	22.556			
5,600.0	5,533.5	5,534.4	5,533.5	18.6	11.8	-151.27	172.6	314.3	591.9	565.8	26.13	22.656			
5,700.0	5,633.2	5,631.6	5,630.7	18.8	11.9	-151.67	173.7	313.5	600.0	573.5	26.47	22.669			
5,800.0	5,733.2	5,733.3	5,732.4	19.0	12.2	-151.92	174.5	312.7	604.7	577.9	26.83	22.541			
5,866.9	5,800.0	5,797.7	5,796.9	19.1	12.3	-38.58	174.9	311.8	606.3	579.2	27.06	22.404			
5,900.0	5,833.1	5,832.3	5,831.5	19.1	12.4	-38.61	175.1	311.2	606.7	579.5	27.20	22.305			
6,000.0	5,933.1	5,934.1	5,933.2	19.2	12.7	-38.72	175.1	309.7	607.7	580.0	27.62	22.000			
6,100.0	6,033.1	6,031.1	6,030.2	19.4	12.9	-38.80	175.5	308.3	608.9	580.9	28.03	21.725			
6,200.0	6,133.1	6,132.3	6,131.4	19.5	13.2	-38.91	175.9	306.4	610.4	582.0	28.45	21.456			
6,300.0	6,233.1	6,235.6	6,234.7	19.7	13.4	-39.05	175.7	304.7	611.3	582.4	28.88	21.166			
6,400.0	6,333.1	6,334.1	6,333.2	19.8	13.7	-39.15	175.7	303.4	612.1	582.8	29.31	20.888			
6,500.0	6,433.1	6,432.3	6,431.3	20.0	13.9	-39.27	175.7	301.6	613.3	583.6	29.73	20.630			
6,600.0	6,533.1	6,533.5	6,532.5	20.1	14.2	-39.45	175.5	299.4	614.6	584.4	30.16	20.379			
6,700.0	6,633.1	6,636.3	6,635.3	20.2	14.5	-39.67	174.6	297.0	615.3	584.8	30.58	20.119			
6,744.4	6,677.6	6,680.7	6,679.6	20.3	14.6	-39.77	174.2	296.0	615.6	584.8	30.77	20.007			
6,750.0	6,683.1	6,686.2	6,685.2	20.3	14.6	-39.77	174.1	295.9	615.6	584.9	30.79	19.998			
6,800.0	6,733.1	6,736.4	6,735.3	20.4	14.7	-40.06	173.6	294.8	614.4	583.6	30.87	19.906			
6,850.0	6,782.8	6,786.2	6,785.2	20.4	14.8	-40.70	172.9	293.5	610.7	579.9	30.84	19.800			
6,900.0	6,832.1	6,835.0	6,833.9	20.5	15.0	-41.67	172.1	292.1	604.6	573.8	30.73	19.675			
6,950.0	6,880.7	6,882.9	6,881.8	20.5	15.1	-42.98	171.4	290.7	596.2	565.6	30.54	19.523			
7,000.0	6,928.4	6,929.3	6,928.2	20.5	15.2	-44.62	170.7	289.4	585.7	555.4	30.30	19.331			
7,050.0	6,975.1	6,974.3	6,973.1	20.5	15.3	-46.62	170.1	287.9	573.3	543.3	30.04	19.085			
7,100.0	7,020.4	7,018.5	7,017.4	20.5	15.4	-49.04	169.5	286.4	559.2	529.4	29.80	18.764			
7,150.0	7,064.4	7,062.1	7,060.9	20.5	15.5	-51.88	168.9	284.9	543.7	514.1	29.64	18.342			
7,200.0	7,106.6	7,104.0	7,102.8	20.5	15.7	-55.13	168.4	283.4	527.1	497.5	29.60	17.806			
7,250.0	7,147.0	7,144.0	7,142.7	20.5	15.8	-58.75	167.9	282.0	509.7	480.0	29.71	17.153			
7,300.0	7,185.5	7,182.0	7,180.7	20.5	15.9	-62.69	167.4	280.7	492.0	462.0	30.00	16.401			
7,350.0	7,221.7	7,217.7	7,216.4	20.5	15.9	-66.87	166.9	279.4	474.6	444.2	30.44	15.590			
7,400.0	7,255.6	7,251.1	7,249.8	20.4	16.0	-71.16	166.5	278.3	458.1	427.1	31.00	14.778			
7,450.0	7,287.0	7,282.1	7,280.7	20.4	16.1	-75.41	166.1	277.2	443.3	411.7	31.62	14.023			
7,500.0	7,315.8	7,310.3	7,308.9	20.4	16.2	-79.45	165.7	276.2	431.0	398.8	32.22	13.376			
7,550.0	7,341.9	7,335.8	7,334.4	20.4	16.3	-83.11	165.4	275.3	421.9	389.1	32.77	12.873			
7,600.0	7,365.2	7,358.5	7,357.1	20.4	16.3	-86.26	165.1	274.5	416.8	383.5	33.26	12.533			
7,629.3	7,377.4	7,370.4	7,368.9	20.5	16.3	-87.82	164.9	274.1	416.0	382.4	33.51	12.412			
7,650.0	7,385.5	7,378.2	7,376.7	20.5	16.4	-88.79	164.8	273.8	416.4	382.7	33.68	12.363			
7,700.0	7,402.7	7,394.8	7,393.4	20.6	16.4	-90.59	164.6	273.2	421.1	387.0	34.07	12.360 SF			
7,750.0	7,416.9	7,408.4	7,406.9	20.7	16.4	-91.61	164.4	272.8	431.1	396.6	34.45	12.511			
7,800.0	7,427.9	7,418.7	7,417.2	20.8	16.5	-91.80	164.3	272.4	446.2	411.4	34.86	12.802			
7,850.0	7,435.7	7,425.8	7,424.4	21.0	16.5	-91.14	164.2	272.2	466.2	430.9	35.27	13.216			
7,900.0	7,440.2	7,429.7	7,428.2	21.3	16.5	-89.58	164.2	272.0	490.4	454.8	35.68	13.745			

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

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 44-20 - Encana (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													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	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor		
Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
7,947.2	7,441.5	7,430.4	7,428.9	21.7	16.5	-87.30	164.2	272.0	516.7	480.7	36.00	14.353		
8,000.0	7,441.3	7,429.5	7,428.0	22.1	16.5	-87.18	164.2	272.0	549.4	512.9	36.52	15.041		
8,100.0	7,440.9	7,427.9	7,426.4	23.1	16.5	-86.95	164.2	272.1	618.9	581.3	37.61	16.455		
8,200.0	7,440.6	7,426.2	7,424.7	24.2	16.5	-86.72	164.2	272.1	695.9	657.1	38.81	17.932		
8,300.0	7,440.2	7,424.5	7,423.0	25.4	16.5	-86.50	164.2	272.2	778.2	738.1	40.10	19.408		

Company:	PETROLEUM DEVELOPMENT CORP DJ	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 44-20 - PDC (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													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)			
0.0	0.0	8.0	8.0	0.0	0.0	48.17	296.9	331.8	445.2	445.2	0.01	N/A		
100.0	100.0	108.1	108.1	0.1	0.1	48.15	297.1	331.6	445.2	445.0	0.26	1,718.383		
104.5	104.5	112.5	112.5	0.1	0.2	48.15	297.1	331.6	445.2	444.9	0.28	1,607.453		
200.0	200.0	206.1	206.1	0.3	0.3	48.15	297.2	331.8	445.4	444.8	0.66	680.037		
300.0	300.0	306.7	306.7	0.6	0.5	48.14	297.5	332.1	445.8	444.7	1.09	410.564		
400.0	400.0	410.1	410.1	0.8	0.7	48.19	297.1	332.2	445.6	444.2	1.47	302.279		
460.0	460.0	468.1	468.0	0.9	0.8	48.24	296.7	332.3	445.5	443.8	1.70	262.229		
500.0	500.0	507.1	507.1	1.0	0.8	48.26	296.6	332.5	445.6	443.7	1.85	240.884		
600.0	600.0	610.5	610.5	1.2	1.0	48.25	296.5	332.2	445.3	443.1	2.24	198.738		
700.0	700.0	708.6	708.6	1.5	1.2	48.23	296.5	331.9	445.0	442.4	2.61	170.293		
792.8	792.8	800.8	800.8	1.7	1.3	48.22	296.4	331.8	444.9	441.9	2.99	148.679		
800.0	800.0	807.9	807.9	1.7	1.3	48.22	296.5	331.8	444.9	441.9	3.02	147.186		
900.0	900.0	906.7	906.6	1.9	1.5	48.20	296.7	331.8	445.1	441.7	3.45	129.151		
1,000.0	1,000.0	1,008.9	1,008.9	2.1	1.8	48.13	297.1	331.5	445.2	441.3	3.89	114.530		
1,100.0	1,100.0	1,110.3	1,110.3	2.4	2.0	48.08	297.2	330.9	444.8	440.5	4.31	103.151		
1,200.0	1,200.0	1,209.3	1,209.3	2.6	2.1	48.10	296.7	330.8	444.4	439.7	4.69	94.686		
1,300.0	1,300.0	1,307.4	1,307.4	2.8	2.3	-65.47	296.6	330.8	443.8	438.7	5.04	87.967		
1,400.0	1,399.9	1,410.2	1,410.2	3.0	2.4	-65.95	296.3	330.8	441.9	436.5	5.41	81.747		
1,500.0	1,499.7	1,507.7	1,507.7	3.2	2.6	-66.76	296.2	330.5	439.1	433.3	5.79	75.837		
1,600.0	1,599.3	1,609.9	1,609.9	3.4	2.8	-67.99	296.2	330.1	435.2	429.0	6.21	70.026		
1,700.0	1,698.6	1,708.4	1,708.4	3.6	3.0	-69.56	296.2	329.3	430.4	423.7	6.66	64.636		
1,800.0	1,797.5	1,804.8	1,804.8	3.9	3.2	-71.47	296.6	328.7	425.4	418.3	7.12	59.716		
1,900.0	1,896.1	1,906.3	1,906.2	4.2	3.5	-73.82	296.7	328.3	420.1	412.5	7.63	55.071		
1,914.4	1,910.2	1,920.2	1,920.1	4.2	3.5	-74.18	296.7	328.2	419.3	411.6	7.70	54.427		
2,000.0	1,994.3	2,003.1	2,003.0	4.5	3.7	-76.28	296.8	327.7	414.9	406.7	8.16	50.824		
2,100.0	2,092.6	2,101.9	2,101.8	4.8	3.9	-78.78	296.6	327.6	410.6	401.9	8.67	47.345		
2,200.0	2,190.9	2,203.2	2,203.2	5.2	4.0	-81.33	295.8	327.5	406.6	397.4	9.17	44.319		
2,300.0	2,289.1	2,300.0	2,300.0	5.5	4.2	-83.86	295.1	327.1	403.3	393.6	9.73	41.459		
2,400.0	2,387.4	2,397.7	2,397.7	5.9	4.4	-86.47	294.7	326.6	401.1	390.8	10.31	38.898		
2,500.0	2,485.6	2,498.5	2,498.4	6.3	4.6	-89.15	293.9	326.2	399.5	388.6	10.89	36.670		
2,600.0	2,583.9	2,599.9	2,599.8	6.7	4.8	-91.89	292.5	325.4	398.0	386.5	11.48	34.662		
2,696.7	2,678.9	2,692.7	2,692.7	7.0	5.0	-94.50	291.3	324.0	397.3	385.3	12.06	32.940 CC		
2,700.0	2,682.1	2,695.9	2,695.9	7.0	5.0	-94.59	291.3	324.0	397.3	385.3	12.08	32.886		
2,800.0	2,780.4	2,795.5	2,795.5	7.4	5.3	-97.35	290.0	322.8	397.7	385.0	12.68	31.356 ES		
2,900.0	2,878.7	2,893.5	2,893.4	7.8	5.5	-100.06	288.5	321.5	398.8	385.5	13.28	30.035		
3,000.0	2,976.9	2,988.9	2,988.8	8.2	5.7	-102.73	287.5	320.0	401.1	387.3	13.87	28.925		
3,100.0	3,075.2	3,088.9	3,088.8	8.6	6.0	-105.47	286.6	318.7	404.6	390.2	14.46	27.977		
3,200.0	3,173.4	3,184.1	3,184.0	9.0	6.2	-108.07	285.8	317.0	409.0	393.9	15.04	27.199		
3,300.0	3,271.7	3,281.7	3,281.5	9.4	6.4	-110.69	285.4	315.3	414.8	399.2	15.61	26.579		
3,400.0	3,369.9	3,379.8	3,379.6	9.8	6.7	-113.21	285.0	313.8	421.4	405.2	16.17	26.066		
3,500.0	3,468.2	3,475.5	3,475.3	10.2	6.9	-115.65	284.9	311.9	429.1	412.3	16.71	25.681		
3,600.0	3,566.5	3,574.0	3,573.8	10.7	7.2	-118.04	285.0	310.2	437.9	420.6	17.24	25.397		
3,700.0	3,664.7	3,671.7	3,671.5	11.1	7.4	-120.30	285.0	308.7	447.2	429.4	17.76	25.172		
3,800.0	3,763.0	3,766.1	3,765.9	11.5	7.6	-122.46	285.3	306.6	457.6	439.4	18.27	25.054		
3,900.0	3,861.2	3,862.3	3,862.0	11.9	7.9	-124.54	286.3	304.6	469.4	450.7	18.75	25.042		
4,000.0	3,959.5	3,962.0	3,961.7	12.3	8.1	-126.54	287.4	302.9	481.8	462.6	19.23	25.062		
4,100.0	4,057.7	4,059.9	4,059.6	12.7	8.3	-128.44	288.0	301.0	494.4	474.7	19.70	25.093		
4,200.0	4,156.0	4,159.1	4,158.8	13.1	8.5	-130.28	288.7	299.0	507.6	487.4	20.18	25.151		
4,300.0	4,254.2	4,262.2	4,261.8	13.6	8.8	-132.17	288.6	296.5	520.5	499.9	20.66	25.193		
4,400.0	4,352.5	4,361.1	4,360.7	14.0	9.1	-134.01	287.2	293.4	533.2	512.1	21.13	25.234		
4,500.0	4,450.8	4,459.5	4,459.0	14.4	9.3	-135.77	286.0	290.1	546.5	524.9	21.59	25.310		

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

Company:	PETROLEUM DEVELOPMENT CORP DJ	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.20-T3N-R66W - Miller 44-20 - PDC (Exist) - Wellbore #1 - Wellbore #1											Offset Site Error:		0.0 ft
Survey Program:		100-NS-GYRO-MS											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)				
4,600.0	4,549.0	4,558.7	4,558.1	14.8	9.6	-137.45	284.5	287.0	560.0	537.9	22.05	25.393			
4,700.0	4,647.3	4,657.3	4,656.7	15.2	9.8	-139.03	282.9	284.1	573.7	551.2	22.51	25.491			
4,800.0	4,745.5	4,755.0	4,754.3	15.6	10.1	-140.53	281.1	281.2	587.8	564.9	22.96	25.603			
4,900.0	4,843.8	4,855.1	4,854.4	16.1	10.3	-142.02	279.3	278.1	602.3	578.9	23.41	25.730			
5,000.0	4,942.0	4,952.9	4,952.2	16.5	10.5	-143.32	277.4	276.0	616.6	592.7	23.85	25.847			
5,100.0	5,040.3	5,047.5	5,046.7	16.9	10.8	-144.49	276.3	274.1	631.7	607.4	24.31	25.990			
5,200.0	5,138.6	5,142.7	5,141.9	17.3	11.0	-145.54	275.9	272.6	647.5	622.7	24.77	26.144			
5,300.0	5,236.8	5,239.8	5,239.0	17.7	11.3	-146.55	275.9	271.1	663.9	638.7	25.21	26.337			
5,331.1	5,267.3	5,271.1	5,270.3	17.9	11.3	-146.84	276.1	270.8	669.0	643.7	25.34	26.403			
5,400.0	5,335.2	5,338.0	5,337.2	18.1	11.4	-147.50	276.5	270.5	679.6	654.0	25.63	26.519			
5,500.0	5,434.1	5,435.5	5,434.6	18.4	11.6	-148.27	277.4	269.9	693.1	667.1	26.00	26.659			
5,600.0	5,533.5	5,535.1	5,534.3	18.6	11.8	-148.84	278.2	269.6	703.4	677.0	26.35	26.692			
5,700.0	5,633.2	5,632.0	5,631.2	18.8	11.9	-149.22	279.4	268.9	711.3	684.6	26.69	26.648			
5,800.0	5,733.2	5,734.1	5,733.3	19.0	12.2	-149.46	280.2	268.0	715.9	688.8	27.05	26.463			
5,866.9	5,800.0	5,800.0	5,799.1	19.1	12.3	-36.11	280.5	267.1	717.4	690.1	27.29	26.289			
5,900.0	5,833.1	5,833.3	5,832.4	19.1	12.4	-36.14	280.7	266.5	717.8	690.4	27.43	26.174			
6,000.0	5,933.1	5,935.3	5,934.4	19.2	12.7	-36.23	280.7	265.0	718.7	690.9	27.84	25.812			
6,100.0	6,033.1	6,031.8	6,030.9	19.4	12.9	-36.30	281.2	263.6	720.0	691.7	28.25	25.485			
6,200.0	6,133.1	6,133.4	6,132.5	19.5	13.2	-36.41	281.6	261.7	721.4	692.7	28.67	25.162			
6,300.0	6,233.1	6,237.2	6,236.2	19.7	13.4	-36.52	281.4	260.0	722.2	693.1	29.10	24.817			
6,400.0	6,333.1	6,335.3	6,334.4	19.8	13.7	-36.61	281.3	258.7	723.0	693.5	29.52	24.488			
6,500.0	6,433.1	6,433.4	6,432.4	20.0	13.9	-36.72	281.4	256.9	724.1	694.2	29.95	24.180			
6,600.0	6,533.1	6,535.1	6,534.1	20.1	14.2	-36.87	281.2	254.6	725.3	694.9	30.37	23.878			
6,700.0	6,633.1	6,638.4	6,637.3	20.2	14.5	-37.07	280.2	252.3	725.9	695.1	30.80	23.568			
6,744.4	6,677.6	6,682.7	6,681.7	20.3	14.6	-37.15	279.8	251.3	726.2	695.2	30.99	23.434			
6,750.0	6,683.1	6,688.3	6,687.3	20.3	14.6	-37.15	279.7	251.2	726.2	695.2	31.00	23.423			
6,800.0	6,733.1	6,738.6	6,737.6	20.4	14.7	-37.41	279.2	250.0	724.9	693.8	31.08	23.322			
6,850.0	6,782.8	6,788.7	6,787.6	20.4	14.8	-37.96	278.5	248.7	720.9	689.9	31.05	23.218			
6,900.0	6,832.1	6,837.4	6,836.3	20.5	15.0	-38.81	277.7	247.3	714.4	683.5	30.92	23.107			
6,950.0	6,880.7	6,885.2	6,884.1	20.5	15.1	-39.94	277.0	246.0	705.6	674.9	30.70	22.982			
7,000.0	6,928.4	6,931.4	6,930.2	20.5	15.2	-41.37	276.3	244.6	694.5	664.0	30.42	22.828			
7,050.0	6,975.1	6,976.1	6,975.0	20.5	15.3	-43.11	275.7	243.2	681.3	651.2	30.10	22.631			
7,100.0	7,020.4	7,020.4	7,019.2	20.5	15.4	-45.22	275.1	241.7	666.2	636.4	29.79	22.364			
7,150.0	7,064.4	7,063.9	7,062.7	20.5	15.5	-47.72	274.6	240.1	649.4	619.9	29.52	21.997			
7,200.0	7,106.6	7,105.8	7,104.6	20.5	15.7	-50.59	274.0	238.7	631.1	601.7	29.35	21.503			
7,250.0	7,147.0	7,145.8	7,144.5	20.5	15.8	-53.82	273.5	237.3	611.5	582.2	29.31	20.863			
7,300.0	7,185.5	7,183.8	7,182.5	20.5	15.9	-57.40	273.0	235.9	591.2	561.8	29.45	20.073			
7,350.0	7,221.7	7,219.6	7,218.2	20.5	16.0	-61.26	272.5	234.7	570.5	540.7	29.78	19.158			
7,400.0	7,255.6	7,253.0	7,251.6	20.4	16.0	-65.32	272.1	233.5	549.9	519.6	30.27	18.165			
7,450.0	7,287.0	7,283.9	7,282.5	20.4	16.1	-69.47	271.7	232.4	529.9	499.0	30.88	17.158			
7,500.0	7,315.8	7,312.1	7,310.7	20.4	16.2	-73.56	271.3	231.4	511.3	479.7	31.56	16.202			
7,550.0	7,341.9	7,337.6	7,336.2	20.4	16.3	-77.43	271.0	230.6	494.6	462.4	32.22	15.349			
7,600.0	7,365.2	7,360.3	7,358.9	20.4	16.3	-80.94	270.7	229.8	480.7	447.8	32.84	14.635			
7,650.0	7,385.5	7,380.0	7,378.5	20.5	16.4	-83.97	270.5	229.1	470.2	436.8	33.40	14.077			
7,700.0	7,402.7	7,396.6	7,395.2	20.6	16.4	-86.39	270.2	228.5	463.8	429.9	33.89	13.683			
7,742.9	7,415.1	7,408.4	7,407.0	20.6	16.4	-87.93	270.1	228.1	462.0	427.7	34.29	13.473			
7,750.0	7,416.9	7,410.2	7,408.7	20.7	16.4	-88.13	270.1	228.0	462.0	427.7	34.35	13.450			
7,800.0	7,427.9	7,420.5	7,419.0	20.8	16.5	-89.15	269.9	227.6	465.2	430.5	34.79	13.373 SF			
7,850.0	7,435.7	7,427.6	7,426.2	21.0	16.5	-89.39	269.8	227.4	473.5	438.3	35.22	13.443			
7,900.0	7,440.2	7,431.5	7,430.1	21.3	16.5	-88.84	269.8	227.3	486.8	451.1	35.65	13.653			

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

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design													Existing Wells Sec.20-T3N-R66W - Miller 44-20 - PDC (Exist) - Wellbore #1 - Wellbore #1		Offset Site Error:		0.0 ft	
Survey Program: 100-NS-GYRO-MS															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)							
7,947.2	7,441.5	7,432.2	7,430.7	21.7	16.5	-87.59	269.8	227.2	503.4	467.4	36.02	13.974						
8,000.0	7,441.3	7,431.3	7,429.8	22.1	16.5	-87.48	269.8	227.3	526.4	489.9	36.55	14.402						
8,100.0	7,440.9	7,429.7	7,428.2	23.1	16.5	-87.27	269.8	227.3	580.7	543.1	37.64	15.428						
8,200.0	7,440.6	7,428.0	7,426.5	24.2	16.5	-87.06	269.8	227.4	646.0	607.2	38.84	16.633						
8,300.0	7,440.2	7,426.3	7,424.9	25.4	16.5	-86.86	269.8	227.4	719.3	679.2	40.13	17.926						
8,400.0	7,439.8	7,424.7	7,423.2	26.7	16.5	-86.65	269.9	227.5	798.5	757.0	41.50	19.242						

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.20-T3N-R66W - Raymond 16N-29HZ (Exist) - Wellbore #1 - Wellbore #1											Offset Site Error:		0.0 ft
Survey Program:		17-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)				
0.0	0.0	0.0	0.0	0.0	0.0	-142.40	-606.5	-467.1	766.8						
100.0	100.0	56.0	56.0	0.1	0.1	-142.40	-606.5	-467.1	765.5	765.3	0.22	3,511.688			
152.7	152.7	108.7	108.7	0.2	0.2	-142.39	-606.5	-467.2	765.5	765.1	0.45	1,688.254			
200.0	200.0	154.9	154.9	0.3	0.3	-142.39	-606.5	-467.2	765.6	764.9	0.66	1,161.888			
300.0	300.0	253.2	253.2	0.6	0.5	-142.37	-606.5	-467.7	765.9	764.8	1.09	703.349			
400.0	400.0	353.1	353.1	0.8	0.7	-142.35	-606.7	-468.0	766.2	764.7	1.52	505.223			
500.0	500.0	451.8	451.8	1.0	0.9	-142.32	-606.8	-468.7	766.7	764.7	1.95	393.878			
600.0	600.0	552.9	552.9	1.2	1.1	-142.26	-606.7	-469.6	767.3	764.9	2.38	321.925			
700.0	700.0	655.3	655.3	1.5	1.4	-142.18	-606.2	-470.5	767.4	764.6	2.83	271.498			
800.0	800.0	753.2	753.2	1.7	1.6	-142.09	-605.6	-471.7	767.6	764.4	3.26	235.647			
900.0	900.0	854.0	853.9	1.9	1.8	-142.01	-605.3	-472.7	768.0	764.3	3.69	208.080			
1,000.0	1,000.0	956.0	956.0	2.1	2.0	-141.91	-604.6	-473.8	768.1	764.0	4.13	186.097			
1,100.0	1,100.0	1,055.2	1,055.1	2.4	2.2	-141.86	-604.1	-474.4	768.2	763.6	4.55	168.642			
1,200.0	1,200.0	1,153.9	1,153.8	2.6	2.4	-141.81	-603.9	-475.0	768.4	763.4	4.99	154.086			
1,300.0	1,300.0	1,263.8	1,263.8	2.8	2.6	104.90	-603.6	-475.6	768.9	763.4	5.43	141.677			
1,400.0	1,399.9	1,409.1	1,409.0	3.0	2.9	105.34	-599.3	-471.8	766.0	760.1	5.92	129.340			
1,500.0	1,499.7	1,542.8	1,542.0	3.2	3.2	105.89	-591.1	-461.8	758.1	751.7	6.41	118.285			
1,600.0	1,599.3	1,657.1	1,655.3	3.4	3.5	106.46	-582.9	-449.4	748.2	741.3	6.87	108.954			
1,700.0	1,698.6	1,766.7	1,763.6	3.6	3.8	107.08	-575.2	-434.8	737.5	730.2	7.34	100.491			
1,800.0	1,797.5	1,882.1	1,877.2	3.9	4.1	107.86	-566.2	-416.4	725.4	717.5	7.85	92.354			
1,900.0	1,896.1	1,980.2	1,973.6	4.2	4.4	108.76	-557.9	-400.2	713.3	705.0	8.35	85.384			
1,914.4	1,910.2	1,993.9	1,987.1	4.2	4.4	108.90	-556.8	-397.9	711.7	703.3	8.43	84.452			
2,000.0	1,994.3	2,085.6	2,077.2	4.5	4.7	109.70	-549.1	-382.5	701.8	692.9	8.90	78.849			
2,100.0	2,092.6	2,169.3	2,159.4	4.8	5.0	110.47	-542.2	-368.7	690.8	681.4	9.41	73.396			
2,200.0	2,190.9	2,265.0	2,253.7	5.2	5.3	111.37	-535.3	-353.8	681.3	671.4	9.96	68.406			
2,300.0	2,289.1	2,358.8	2,346.2	5.5	5.6	112.31	-528.6	-339.8	672.6	662.0	10.51	63.975			
2,400.0	2,387.4	2,451.9	2,438.1	5.9	5.9	113.29	-522.4	-326.9	665.1	654.0	11.07	60.098			
2,500.0	2,485.6	2,546.6	2,531.8	6.3	6.2	114.31	-516.4	-313.9	658.1	646.5	11.63	56.606			
2,600.0	2,583.9	2,637.0	2,621.3	6.7	6.5	115.23	-512.4	-302.3	653.3	641.1	12.18	53.620			
2,700.0	2,682.1	2,752.7	2,735.8	7.0	6.9	116.37	-506.7	-286.0	647.5	634.7	12.80	50.586			
2,800.0	2,780.4	2,867.8	2,849.1	7.4	7.2	117.52	-499.4	-267.5	639.3	625.9	13.41	47.671			
2,900.0	2,878.7	2,971.6	2,951.0	7.8	7.6	118.59	-491.4	-249.3	629.5	615.5	14.01	44.935			
3,000.0	2,976.9	3,059.8	3,037.7	8.2	7.9	119.54	-485.1	-234.4	620.6	606.1	14.56	42.622			
3,100.0	3,075.2	3,152.3	3,128.9	8.6	8.3	120.55	-479.3	-220.0	613.6	598.5	15.12	40.590			
3,200.0	3,173.4	3,247.7	3,223.1	9.0	8.6	121.76	-472.4	-206.3	607.2	591.6	15.67	38.763			
3,300.0	3,271.7	3,342.9	3,317.1	9.4	8.9	122.91	-466.7	-192.9	602.1	585.9	16.21	37.139			
3,400.0	3,369.9	3,441.1	3,414.2	9.8	9.2	124.20	-460.2	-179.7	597.4	580.7	16.75	35.659			
3,500.0	3,468.2	3,541.3	3,513.3	10.2	9.5	125.57	-453.2	-166.5	593.1	575.8	17.29	34.295			
3,600.0	3,566.5	3,660.6	3,630.8	10.7	10.0	127.02	-445.6	-147.8	587.3	569.5	17.88	32.844			
3,700.0	3,664.7	3,765.7	3,733.8	11.1	10.4	128.14	-439.2	-127.8	578.9	560.5	18.45	31.382			
3,800.0	3,763.0	3,860.0	3,826.4	11.5	10.7	129.21	-433.3	-110.5	571.3	552.3	18.98	30.095			
3,900.0	3,861.2	3,952.4	3,917.1	11.9	11.1	130.30	-427.7	-94.3	564.7	545.2	19.50	28.954			
4,000.0	3,959.5	4,056.6	4,019.7	12.3	11.4	131.61	-421.2	-76.6	558.8	538.8	20.04	27.888			
4,100.0	4,057.7	4,148.6	4,110.1	12.7	11.8	132.82	-415.2	-61.1	553.2	532.6	20.55	26.923			
4,200.0	4,156.0	4,238.7	4,198.9	13.1	12.1	134.05	-409.6	-47.1	549.1	528.1	21.04	26.101			
4,278.9	4,233.5	4,302.0	4,261.6	13.5	12.3	134.90	-406.3	-38.5	547.9	526.5	21.41	25.593 CC, ES			
4,300.0	4,254.2	4,313.0	4,272.5	13.6	12.3	135.05	-405.8	-37.2	548.0	526.5	21.50	25.491			
4,400.0	4,352.5	4,398.0	4,356.9	14.0	12.6	136.16	-402.8	-28.0	550.2	528.3	21.97	25.046			
4,500.0	4,450.8	4,483.0	4,441.6	14.4	12.8	137.25	-400.7	-21.3	555.7	533.3	22.43	24.775			
4,600.0	4,549.0	4,569.0	4,527.5	14.8	13.0	138.35	-399.3	-17.0	564.3	541.4	22.88	24.663			
4,700.0	4,647.3	4,654.0	4,612.5	15.2	13.1	139.42	-398.5	-14.8	575.7	552.4	23.32	24.681			

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

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Raymond 16N-29HZ (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 17-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
4,800.0	4,745.5	4,747.1	4,705.6	15.6	13.3	140.55	-397.9	-14.0	589.0	565.2	23.77	24.776		
4,900.0	4,843.8	4,843.6	4,802.1	16.1	13.5	141.69	-397.4	-13.6	603.0	578.8	24.22	24.897		
5,000.0	4,942.0	4,939.7	4,898.2	16.5	13.6	142.75	-397.1	-13.5	617.6	592.9	24.67	25.037		
5,100.0	5,040.3	5,036.0	4,994.5	16.9	13.8	143.72	-397.4	-13.6	632.8	607.7	25.12	25.194		
5,200.0	5,138.6	5,132.6	5,091.0	17.3	13.9	144.66	-397.6	-13.9	648.3	622.8	25.56	25.362		
5,300.0	5,236.8	5,229.2	5,187.6	17.7	14.1	145.55	-397.9	-14.5	664.3	638.3	26.01	25.544		
5,331.1	5,267.3	5,259.1	5,217.5	17.9	14.1	145.82	-398.0	-14.7	669.4	643.2	26.15	25.602		
5,400.0	5,335.2	5,323.4	5,281.9	18.1	14.2	146.45	-398.4	-15.4	680.2	653.7	26.43	25.733		
5,500.0	5,434.1	5,421.7	5,380.2	18.4	14.4	147.22	-399.1	-16.7	693.8	667.0	26.80	25.889		
5,600.0	5,533.5	5,521.1	5,479.6	18.6	14.5	147.80	-399.6	-18.1	704.5	677.4	27.14	25.955		
5,700.0	5,633.2	5,621.7	5,580.2	18.8	14.7	148.20	-399.9	-19.5	712.3	684.9	27.47	25.935		
5,800.0	5,733.2	5,722.9	5,681.3	19.0	14.8	148.42	-400.0	-20.6	716.9	689.2	27.76	25.822		
5,866.9	5,800.0	5,789.3	5,747.7	19.1	14.9	-98.09	-400.1	-21.3	718.3	690.4	27.95	25.699		
5,900.0	5,833.1	5,822.2	5,780.6	19.1	15.0	-98.09	-400.1	-21.7	718.7	690.7	28.07	25.604		
6,000.0	5,933.1	5,920.1	5,878.5	19.2	15.1	-98.07	-400.1	-23.0	720.0	691.6	28.43	25.330		
6,100.0	6,033.1	6,022.0	5,980.3	19.4	15.3	-98.03	-399.8	-24.5	721.4	692.6	28.79	25.058		
6,200.0	6,133.1	6,122.0	6,080.4	19.5	15.4	-97.97	-399.2	-25.8	722.7	693.5	29.15	24.792		
6,300.0	6,233.1	6,223.8	6,182.2	19.7	15.6	-97.87	-398.0	-27.0	723.7	694.1	29.52	24.517		
6,400.0	6,333.1	6,322.0	6,280.3	19.8	15.8	-97.72	-396.4	-28.3	724.8	694.9	29.88	24.259		
6,500.0	6,433.1	6,421.2	6,379.5	20.0	16.0	-97.55	-394.4	-29.9	726.1	695.8	30.24	24.008		
6,600.0	6,533.1	6,523.0	6,481.3	20.1	16.1	-97.36	-392.2	-31.4	727.3	696.7	30.61	23.758		
6,700.0	6,633.1	6,619.1	6,577.3	20.2	16.3	-97.18	-390.1	-33.1	728.7	697.8	30.97	23.529		
6,744.4	6,677.6	6,661.5	6,619.7	20.3	16.4	-97.20	-390.4	-33.8	729.5	698.3	31.13	23.432		
6,750.0	6,683.1	6,666.3	6,624.5	20.3	16.4	-97.20	-390.6	-33.8	729.6	698.4	31.15	23.420		
6,800.0	6,733.1	6,707.7	6,665.8	20.4	16.4	-97.48	-394.1	-34.4	731.1	699.8	31.33	23.333		
6,850.0	6,782.8	6,743.0	6,700.6	20.4	16.5	-97.97	-399.6	-35.1	733.9	702.4	31.49	23.309		
6,900.0	6,832.1	6,803.8	6,759.9	20.5	16.5	-99.52	-413.4	-35.6	737.5	705.8	31.71	23.255		
6,950.0	6,880.7	6,859.9	6,813.5	20.5	16.6	-101.41	-429.5	-34.3	741.5	709.5	31.94	23.213 SF		
7,000.0	6,928.4	6,909.4	6,859.9	20.5	16.6	-103.35	-446.5	-31.7	746.4	714.3	32.14	23.227		
7,050.0	6,975.1	6,952.1	6,899.1	20.5	16.7	-105.13	-463.1	-28.4	753.1	720.9	32.27	23.337		
7,100.0	7,020.4	6,999.0	6,940.8	20.5	16.7	-107.28	-484.0	-23.1	761.9	729.4	32.41	23.510		
7,150.0	7,064.4	7,022.9	6,961.2	20.5	16.8	-107.99	-495.8	-19.7	773.3	741.0	32.38	23.885		
7,200.0	7,106.6	7,042.0	6,977.1	20.5	16.8	-108.20	-506.0	-16.7	788.2	756.0	32.29	24.408		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.20-T3N-R66W - Raymond 37N-29HZ (Exist) - Wellbore #1 - Wellbore #1											Offset Site Error:		0.0 ft
Survey Program:		17-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)				
0.0	0.0	0.0	0.0	0.0	0.0	-140.80	-606.9	-495.0	784.5						
100.0	100.0	57.2	57.2	0.1	0.1	-140.80	-606.8	-495.0	783.1	782.9	0.22	3,539.328			
200.0	200.0	159.2	159.2	0.3	0.3	-140.79	-606.4	-494.7	782.6	781.9	0.67	1,175.891			
300.0	300.0	258.0	258.0	0.6	0.5	-140.78	-606.0	-494.5	782.2	781.1	1.09	716.935			
400.0	400.0	358.1	358.1	0.8	0.7	-140.79	-605.8	-494.2	781.8	780.2	1.52	513.852			
500.0	500.0	458.0	458.0	1.0	0.9	-140.79	-605.4	-494.0	781.4	779.5	1.96	399.688			
600.0	600.0	558.3	558.3	1.2	1.2	-140.79	-605.1	-493.7	781.0	778.6	2.39	326.762			
700.0	700.0	657.2	657.2	1.5	1.4	-140.79	-604.8	-493.5	780.6	777.8	2.82	276.691			
800.0	800.0	757.4	757.4	1.7	1.6	-140.82	-604.9	-493.0	780.4	777.1	3.26	239.716			
900.0	900.0	856.5	856.5	1.9	1.8	-140.81	-604.5	-492.9	780.0	776.3	3.69	211.496			
935.8	935.8	890.8	890.8	2.0	1.8	-140.80	-604.4	-493.0	780.0	776.1	3.84	203.085			
1,000.0	1,000.0	952.3	952.3	2.1	2.0	-140.77	-604.3	-493.3	780.1	776.0	4.11	189.601			
1,100.0	1,100.0	1,096.0	1,096.0	2.4	2.3	-140.69	-601.7	-492.6	778.7	774.1	4.64	167.729			
1,200.0	1,200.0	1,228.0	1,227.5	2.6	2.6	-140.32	-591.3	-490.5	771.6	766.5	5.16	149.465			
1,300.0	1,300.0	1,345.1	1,343.4	2.8	2.9	107.35	-574.9	-491.5	761.9	756.2	5.64	135.081			
1,400.0	1,399.9	1,466.3	1,462.7	3.0	3.2	109.00	-553.3	-492.3	750.1	743.9	6.15	121.953			
1,500.0	1,499.7	1,585.0	1,578.8	3.2	3.6	111.02	-528.8	-491.7	736.6	729.9	6.67	110.426			
1,600.0	1,599.3	1,670.0	1,661.9	3.4	3.9	112.75	-510.8	-491.4	724.4	717.3	7.13	101.566			
1,700.0	1,698.6	1,761.7	1,751.6	3.6	4.2	114.76	-492.2	-491.8	715.2	707.5	7.63	93.718			
1,800.0	1,797.5	1,858.8	1,846.8	3.9	4.5	117.00	-472.8	-491.2	707.6	699.4	8.18	86.514			
1,900.0	1,896.1	1,942.6	1,929.2	4.2	4.8	119.02	-457.4	-491.0	703.4	694.7	8.71	80.790			
1,914.4	1,910.2	1,956.7	1,943.0	4.2	4.9	119.37	-454.9	-491.0	703.1	694.3	8.79	79.986			
2,000.0	1,994.3	2,036.8	2,022.1	4.5	5.1	121.24	-441.5	-490.1	701.8	692.5	9.29	75.558			
2,026.8	2,020.7	2,059.4	2,044.4	4.6	5.2	121.75	-438.0	-489.9	701.7	692.3	9.44	74.343	CC, ES		
2,100.0	2,092.6	2,122.4	2,106.6	4.8	5.4	123.17	-428.5	-489.6	702.4	692.6	9.85	71.296			
2,200.0	2,190.9	2,209.8	2,193.0	5.2	5.7	125.14	-415.7	-489.9	705.3	694.9	10.43	67.636			
2,300.0	2,289.1	2,295.0	2,277.6	5.5	5.9	126.94	-405.1	-490.6	710.6	699.6	10.99	64.676			
2,400.0	2,387.4	2,380.3	2,362.5	5.9	6.1	128.53	-397.1	-491.3	718.4	706.8	11.53	62.324			
2,500.0	2,485.6	2,466.3	2,448.4	6.3	6.4	129.90	-392.0	-492.1	728.3	716.2	12.06	60.414			
2,600.0	2,583.9	2,555.1	2,537.2	6.7	6.5	131.09	-389.5	-493.0	740.2	727.7	12.56	58.941			
2,700.0	2,682.1	2,654.1	2,636.1	7.0	6.7	132.21	-389.0	-493.6	753.0	740.0	13.06	57.653			
2,800.0	2,780.4	2,753.8	2,735.8	7.4	6.9	133.34	-387.8	-494.1	765.7	752.1	13.56	56.452			
2,900.0	2,878.7	2,850.8	2,832.8	7.8	7.1	134.39	-386.8	-494.5	778.8	764.7	14.06	55.391			
3,000.0	2,976.9	2,946.0	2,928.0	8.2	7.2	135.32	-386.8	-494.8	792.3	777.7	14.54	54.474	SF		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Raymond 38C-29HC (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error: 0.0 ft	
Survey Program: 17-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	-144.23	-605.8	-436.4	747.8					
100.0	100.0	56.3	56.3	0.1	0.1	-144.24	-605.8	-436.3	746.6	746.4	0.22	3,393.480		
200.0	200.0	154.5	154.5	0.3	0.3	-144.26	-606.2	-436.2	746.8	746.2	0.66	1,133.647		
300.0	300.0	252.7	252.7	0.6	0.5	-144.27	-606.6	-436.4	747.3	746.2	1.09	686.794		
400.0	400.0	352.0	352.0	0.8	0.7	-144.28	-607.2	-436.6	747.9	746.4	1.52	491.494		
500.0	500.0	451.9	451.9	1.0	0.9	-144.29	-607.8	-436.9	748.6	746.6	1.96	382.778		
600.0	600.0	551.0	551.0	1.2	1.2	-144.29	-608.4	-437.3	749.3	746.9	2.39	313.670		
700.0	700.0	649.9	649.9	1.5	1.4	-144.31	-609.3	-437.7	750.2	747.4	2.82	265.859		
800.0	800.0	749.8	749.7	1.7	1.6	-144.30	-610.0	-438.3	751.1	747.9	3.26	230.684		
900.0	900.0	849.0	849.0	1.9	1.8	-144.29	-610.7	-439.1	752.2	748.5	3.69	203.878		
1,000.0	1,000.0	951.6	951.6	2.1	2.0	-144.29	-611.5	-439.6	753.1	749.0	4.13	182.530		
1,100.0	1,100.0	1,053.8	1,053.8	2.4	2.2	-144.29	-612.0	-439.9	753.7	749.1	4.56	165.314		
1,200.0	1,200.0	1,181.8	1,181.8	2.6	2.5	-144.42	-611.4	-437.4	752.2	747.1	5.05	148.980		
1,300.0	1,300.0	1,303.0	1,302.7	2.8	2.7	101.94	-609.7	-429.9	747.7	742.2	5.51	135.658		
1,400.0	1,399.9	1,421.1	1,420.3	3.0	3.0	101.82	-606.8	-419.0	741.1	735.2	5.97	124.182		
1,500.0	1,499.7	1,539.4	1,537.6	3.2	3.3	101.80	-602.8	-404.6	732.7	726.3	6.44	113.708		
1,600.0	1,599.3	1,645.8	1,642.8	3.4	3.6	101.98	-597.7	-389.9	722.7	715.8	6.91	104.544		
1,700.0	1,698.6	1,751.1	1,746.9	3.6	3.8	102.34	-592.6	-374.7	712.8	705.4	7.40	96.304		
1,800.0	1,797.5	1,856.4	1,850.6	3.9	4.2	102.78	-587.7	-357.4	702.5	694.6	7.93	88.570		
1,900.0	1,896.1	1,957.9	1,950.5	4.2	4.5	103.34	-583.3	-339.7	692.4	683.9	8.48	81.689		
1,914.4	1,910.2	1,973.4	1,965.8	4.2	4.5	103.44	-582.6	-336.9	691.0	682.4	8.56	80.719		
2,000.0	1,994.3	2,067.4	2,058.0	4.5	4.9	103.91	-578.2	-319.3	681.8	672.7	9.09	75.024		
2,100.0	2,092.6	2,166.6	2,155.1	4.8	5.2	104.37	-573.1	-299.7	670.2	660.5	9.70	69.110		
2,200.0	2,190.9	2,265.9	2,252.3	5.2	5.6	104.78	-568.7	-279.7	658.9	648.6	10.33	63.803		
2,300.0	2,289.1	2,368.5	2,352.5	5.5	6.0	105.19	-564.0	-258.6	647.3	636.3	10.98	58.937		
2,400.0	2,387.4	2,468.7	2,450.5	5.9	6.4	105.64	-558.9	-238.0	635.3	623.7	11.63	54.618		
2,500.0	2,485.6	2,562.0	2,541.8	6.3	6.7	106.16	-553.9	-219.7	623.8	611.5	12.25	50.922		
2,600.0	2,583.9	2,657.8	2,635.7	6.7	7.1	106.67	-549.7	-201.3	613.4	600.5	12.88	47.605		
2,700.0	2,682.1	2,757.2	2,733.2	7.0	7.5	107.23	-545.4	-182.3	603.0	589.5	13.53	44.551		
2,800.0	2,780.4	2,857.8	2,831.8	7.4	7.8	107.85	-540.7	-163.2	592.7	578.5	14.19	41.780		
2,900.0	2,878.7	2,959.0	2,931.0	7.8	8.2	108.45	-536.1	-143.5	582.0	567.2	14.85	39.188		
3,000.0	2,976.9	3,053.6	3,023.7	8.2	8.6	109.01	-532.0	-125.0	571.6	556.2	15.49	36.902		
3,100.0	3,075.2	3,144.9	3,113.5	8.6	8.9	109.67	-528.3	-108.8	562.7	546.6	16.10	34.949		
3,200.0	3,173.4	3,246.1	3,213.0	9.0	9.3	110.45	-524.4	-91.1	554.2	537.5	16.74	33.115		
3,300.0	3,271.7	3,346.1	3,311.5	9.4	9.7	111.33	-519.8	-74.2	545.6	528.3	17.36	31.437		
3,400.0	3,369.9	3,442.3	3,406.3	9.8	10.0	112.31	-514.7	-58.6	537.3	519.4	17.94	29.945		
3,500.0	3,468.2	3,542.4	3,505.0	10.2	10.4	113.38	-509.5	-42.9	529.6	511.0	18.53	28.583		
3,600.0	3,566.5	3,634.0	3,595.4	10.7	10.7	114.33	-505.4	-28.3	522.3	503.2	19.10	27.351		
3,700.0	3,664.7	3,729.9	3,690.0	11.1	11.0	115.23	-502.7	-13.1	516.3	496.7	19.68	26.237		
3,800.0	3,763.0	3,823.7	3,782.7	11.5	11.4	116.03	-501.4	1.4	511.8	491.5	20.26	25.257		
3,900.0	3,861.2	3,938.5	3,895.9	11.9	11.8	116.92	-499.9	20.5	506.5	485.6	20.91	24.225		
4,000.0	3,959.5	4,049.8	4,004.9	12.3	12.2	117.68	-497.0	42.5	498.0	476.4	21.57	23.091		
4,100.0	4,057.7	4,155.4	4,108.1	12.7	12.7	118.45	-493.1	64.6	488.0	465.8	22.20	21.979		
4,200.0	4,156.0	4,256.8	4,207.1	13.1	13.1	119.22	-488.8	86.4	477.3	454.5	22.82	20.914		
4,300.0	4,254.2	4,357.5	4,305.3	13.6	13.6	120.04	-484.1	108.2	466.3	442.9	23.43	19.905		
4,400.0	4,352.5	4,456.0	4,401.3	14.0	14.0	121.03	-478.6	129.0	455.3	431.3	23.98	18.985		
4,500.0	4,450.8	4,553.8	4,496.9	14.4	14.4	122.13	-472.8	149.1	444.7	420.1	24.51	18.143		
4,600.0	4,549.0	4,652.5	4,593.4	14.8	14.8	123.33	-466.9	169.1	434.4	409.4	25.02	17.365		
4,700.0	4,647.3	4,750.4	4,689.0	15.2	15.2	124.54	-461.2	188.9	424.5	399.0	25.51	16.638		
4,800.0	4,745.5	4,848.9	4,785.4	15.6	15.6	125.81	-455.7	208.7	415.1	389.1	26.00	15.966		
4,900.0	4,843.8	4,947.3	4,881.6	16.1	16.1	127.18	-450.0	228.2	406.0	379.5	26.46	15.345		

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

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Raymond 38C-29HC (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 17-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)			
5,000.0	4,942.0	5,045.5	4,977.8	16.5	16.5	128.65	-444.2	247.3	397.3	370.4	26.89	14.775		
5,100.0	5,040.3	5,140.2	5,070.6	16.9	16.8	130.18	-438.4	265.2	389.5	362.2	27.30	14.265		
5,200.0	5,138.6	5,234.4	5,163.3	17.3	17.2	131.75	-433.4	281.8	383.3	355.6	27.70	13.841		
5,300.0	5,236.8	5,333.2	5,260.4	17.7	17.6	133.25	-429.5	299.1	378.2	350.1	28.11	13.456		
5,331.1	5,267.3	5,364.9	5,291.6	17.9	17.7	133.73	-428.4	304.7	376.7	348.4	28.24	13.339		
5,400.0	5,335.2	5,435.2	5,360.7	18.1	18.0	134.68	-425.4	317.3	372.5	344.0	28.49	13.071		
5,500.0	5,434.1	5,532.6	5,456.4	18.4	18.3	135.83	-420.6	334.8	364.2	335.4	28.81	12.642		
5,600.0	5,533.5	5,625.4	5,547.9	18.6	18.7	136.70	-416.0	349.6	355.4	326.3	29.10	12.212		
5,700.0	5,633.2	5,726.2	5,647.3	18.8	19.0	137.29	-411.0	365.4	344.4	315.0	29.41	11.712		
5,800.0	5,733.2	5,821.0	5,740.9	19.0	19.4	137.46	-406.5	380.1	331.2	301.4	29.71	11.146		
5,866.9	5,800.0	5,881.8	5,801.0	19.1	19.6	-109.15	-403.6	388.5	322.0	292.1	29.91	10.767		
5,900.0	5,833.1	5,911.7	5,830.7	19.1	19.7	-109.15	-402.3	392.2	317.6	287.6	30.02	10.579		
6,000.0	5,933.1	6,003.5	5,921.8	19.2	19.9	-109.10	-398.6	402.1	306.1	275.7	30.37	10.080		
6,100.0	6,033.1	6,097.0	6,015.0	19.4	20.2	-108.99	-395.3	410.2	296.8	266.1	30.71	9.664		
6,200.0	6,133.1	6,192.3	6,109.9	19.5	20.4	-108.89	-392.4	416.8	289.2	258.2	31.05	9.314		
6,300.0	6,233.1	6,288.0	6,205.5	19.7	20.6	-108.75	-389.9	422.1	283.1	251.7	31.39	9.019		
6,400.0	6,333.1	6,384.8	6,302.1	19.8	20.8	-108.61	-387.7	426.4	278.2	246.5	31.73	8.768		
6,500.0	6,433.1	6,481.1	6,398.4	20.0	21.0	-108.52	-386.2	429.5	274.6	242.6	32.07	8.564		
6,600.0	6,533.1	6,578.0	6,495.3	20.1	21.1	-108.49	-385.3	431.8	272.1	239.7	32.42	8.393		
6,700.0	6,633.1	6,675.1	6,592.3	20.2	21.3	-108.68	-385.7	433.3	270.8	238.0	32.79	8.259		
6,744.4	6,677.6	6,718.7	6,635.9	20.3	21.3	-108.79	-386.2	433.7	270.5	237.6	32.96	8.208		
6,750.0	6,683.1	6,724.1	6,641.4	20.3	21.3	-108.81	-386.2	433.7	270.5	237.5	32.99	8.200		
6,754.5	6,687.6	6,728.5	6,645.8	20.3	21.3	-108.83	-386.3	433.8	270.5	237.5	33.02	8.194 CC, ES		
6,800.0	6,733.1	6,773.1	6,690.4	20.4	21.4	-109.28	-386.7	434.1	271.0	237.8	33.27	8.148		
6,850.0	6,782.8	6,821.3	6,738.6	20.4	21.5	-110.30	-387.4	434.2	272.9	239.4	33.56	8.133 SF		
6,900.0	6,832.1	6,867.4	6,784.6	20.5	21.5	-111.87	-388.9	434.4	276.4	242.6	33.86	8.164		
6,950.0	6,880.7	6,905.9	6,823.0	20.5	21.6	-113.80	-392.4	434.6	282.8	248.7	34.14	8.284		
7,000.0	6,928.4	6,939.9	6,856.4	20.5	21.6	-115.90	-398.0	434.7	293.1	258.7	34.36	8.531		
7,050.0	6,975.1	6,969.6	6,885.4	20.5	21.6	-117.82	-404.8	434.5	308.1	273.6	34.47	8.939		
7,100.0	7,020.4	6,996.1	6,910.8	20.5	21.6	-119.32	-412.0	434.0	328.0	293.6	34.44	9.524		
7,150.0	7,064.4	7,021.4	6,934.9	20.5	21.7	-120.51	-419.9	433.3	352.7	318.4	34.30	10.281		
7,200.0	7,106.6	7,046.0	6,957.9	20.5	21.7	-121.39	-428.5	432.7	381.6	347.5	34.07	11.200		
7,250.0	7,147.0	7,062.0	6,972.7	20.5	21.7	-120.80	-434.6	432.4	414.3	380.6	33.70	12.292		
7,300.0	7,185.5	7,076.9	6,986.4	20.5	21.7	-119.59	-440.6	432.1	450.4	417.1	33.34	13.508		
7,350.0	7,221.7	7,088.0	6,996.5	20.5	21.7	-117.21	-445.2	431.9	489.4	456.4	33.05	14.809		
7,400.0	7,255.6	7,100.5	7,007.7	20.4	21.7	-114.37	-450.6	431.7	530.7	497.8	32.89	16.138		
7,450.0	7,287.0	7,109.0	7,015.4	20.4	21.7	-110.02	-454.3	431.6	573.8	540.9	32.90	17.444		
7,500.0	7,315.8	7,114.7	7,020.4	20.4	21.7	-104.11	-456.8	431.6	618.4	585.3	33.06	18.703		
7,550.0	7,341.9	7,117.7	7,023.2	20.4	21.7	-96.56	-458.2	431.5	664.0	630.7	33.23	19.978		
7,600.0	7,365.2	7,118.3	7,023.7	20.4	21.7	-87.49	-458.5	431.5	710.3	677.2	33.09	21.463		
7,650.0	7,385.5	7,116.8	7,022.3	20.5	21.7	-77.39	-457.8	431.5	757.0	724.7	32.25	23.475		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Raymond 38N-29HZX (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 17-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	-146.23	-606.5	-405.6	730.8					
100.0	100.0	60.6	60.6	0.1	0.1	-146.22	-606.4	-405.7	729.6	729.4	0.23	3,184.849		
200.0	200.0	161.3	161.3	0.3	0.3	-146.14	-605.6	-406.3	729.2	728.6	0.68	1,079.212		
300.0	300.0	261.2	261.2	0.6	0.6	-146.02	-604.6	-407.4	729.1	728.0	1.11	655.011		
400.0	400.0	363.6	363.5	0.8	0.8	-145.90	-603.3	-408.4	728.5	727.0	1.55	468.662		
500.0	500.0	463.4	463.3	1.0	1.0	-145.75	-601.7	-409.7	727.9	725.9	2.00	364.596		
600.0	600.0	564.0	563.9	1.2	1.2	-145.58	-600.0	-411.1	727.3	724.9	2.44	298.583		
700.0	700.0	666.3	666.2	1.5	1.4	-145.44	-598.2	-412.1	726.5	723.6	2.87	252.972		
800.0	800.0	767.6	767.5	1.7	1.6	-145.30	-596.3	-413.0	725.4	722.1	3.31	219.175		
900.0	900.0	867.3	867.1	1.9	1.8	-145.16	-594.4	-413.7	724.2	720.5	3.74	193.388		
1,000.0	1,000.0	966.4	966.3	2.1	2.0	-145.02	-592.5	-414.6	723.2	719.0	4.18	173.149		
1,100.0	1,100.0	1,080.4	1,080.2	2.4	2.3	-144.91	-590.3	-414.7	721.7	717.1	4.64	155.578		
1,200.0	1,200.0	1,202.1	1,201.7	2.6	2.5	-145.16	-587.5	-409.0	717.1	712.0	5.13	139.822		
1,300.0	1,300.0	1,320.7	1,319.8	2.8	2.8	101.13	-584.0	-398.9	710.1	704.5	5.58	127.279		
1,400.0	1,399.9	1,437.2	1,435.5	3.0	3.1	100.89	-579.8	-385.1	701.2	695.1	6.03	116.355		
1,500.0	1,499.7	1,559.1	1,555.7	3.2	3.4	100.64	-574.1	-365.8	689.6	683.1	6.52	105.774		
1,600.0	1,599.3	1,667.3	1,661.8	3.4	3.8	100.53	-568.3	-345.9	676.4	669.4	7.01	96.441		
1,700.0	1,698.6	1,763.5	1,756.0	3.6	4.1	100.55	-563.5	-326.9	663.4	655.9	7.50	88.402		
1,800.0	1,797.5	1,870.8	1,860.8	3.9	4.5	100.62	-558.8	-304.0	650.5	642.4	8.07	80.603		
1,900.0	1,896.1	1,969.8	1,957.3	4.2	4.8	100.96	-553.5	-282.7	637.0	628.4	8.64	73.739		
1,914.4	1,910.2	1,982.5	1,969.7	4.2	4.9	101.02	-552.8	-280.0	635.2	626.5	8.72	72.862		
2,000.0	1,994.3	2,060.6	2,045.9	4.5	5.2	101.23	-549.7	-263.3	625.0	615.8	9.21	67.848		
2,100.0	2,092.6	2,152.9	2,136.0	4.8	5.5	101.38	-547.3	-243.3	614.2	604.3	9.82	62.548		
2,200.0	2,190.9	2,258.4	2,239.1	5.2	5.9	101.58	-544.8	-220.8	603.7	593.2	10.49	57.576		
2,300.0	2,289.1	2,358.7	2,336.9	5.5	6.3	101.80	-541.5	-199.1	592.3	581.1	11.17	53.046		
2,400.0	2,387.4	2,455.7	2,431.6	5.9	6.7	102.03	-538.4	-178.4	581.2	569.3	11.84	49.095		
2,500.0	2,485.6	2,568.6	2,541.6	6.3	7.2	102.25	-534.8	-153.4	569.6	557.0	12.59	45.236		
2,600.0	2,583.9	2,681.7	2,650.9	6.7	7.8	102.26	-529.1	-124.5	554.5	541.1	13.39	41.407		
2,700.0	2,682.1	2,779.0	2,744.6	7.0	8.2	102.25	-523.7	-99.1	538.6	524.5	14.14	38.089		
2,800.0	2,780.4	2,871.9	2,834.0	7.4	8.7	102.13	-519.7	-74.4	523.5	508.6	14.89	35.145		
2,900.0	2,878.7	2,964.6	2,923.6	7.8	9.1	101.99	-516.7	-50.3	509.6	494.0	15.64	32.584		
3,000.0	2,976.9	3,056.7	3,012.9	8.2	9.6	102.01	-513.9	-28.2	497.0	480.7	16.35	30.391		
3,100.0	3,075.2	3,151.3	3,105.2	8.6	10.0	102.24	-511.1	-7.6	485.8	468.7	17.06	28.472		
3,200.0	3,173.4	3,250.9	3,202.5	9.0	10.4	102.62	-507.7	13.1	474.9	457.1	17.77	26.732		
3,300.0	3,271.7	3,350.3	3,299.9	9.4	10.8	103.12	-503.9	33.1	464.0	445.5	18.46	25.135		
3,400.0	3,369.9	3,443.1	3,390.9	9.8	11.1	103.69	-500.4	51.0	453.6	434.5	19.12	23.726		
3,500.0	3,468.2	3,541.3	3,487.4	10.2	11.5	104.36	-497.3	68.9	444.5	424.8	19.78	22.473		
3,600.0	3,566.5	3,649.7	3,593.7	10.7	11.9	105.16	-493.0	89.3	434.5	414.1	20.47	21.229		
3,700.0	3,664.7	3,753.5	3,695.1	11.1	12.4	105.84	-487.7	110.8	422.5	401.3	21.16	19.965		
3,800.0	3,763.0	3,850.2	3,789.6	11.5	12.8	106.47	-483.3	130.7	410.9	389.1	21.82	18.829		
3,900.0	3,861.2	3,957.6	3,894.5	11.9	13.3	107.21	-478.0	153.4	398.8	376.3	22.52	17.712		
4,000.0	3,959.5	4,053.9	3,988.2	12.3	13.7	107.82	-472.6	174.9	385.5	362.3	23.19	16.628		
4,100.0	4,057.7	4,154.1	4,085.8	12.7	14.2	108.46	-467.7	197.2	372.9	349.0	23.86	15.627		
4,200.0	4,156.0	4,257.7	4,186.1	13.1	14.7	108.85	-463.0	222.3	359.0	334.4	24.60	14.598		
4,300.0	4,254.2	4,354.5	4,280.0	13.6	15.2	109.20	-458.8	246.1	345.3	320.0	25.31	13.644		
4,400.0	4,352.5	4,453.0	4,375.4	14.0	15.6	109.57	-454.9	270.1	331.9	305.9	26.02	12.755		
4,500.0	4,450.8	4,543.8	4,463.5	14.4	16.1	110.01	-451.6	291.3	319.5	292.8	26.68	11.974		
4,600.0	4,549.0	4,640.3	4,558.1	14.8	16.5	110.94	-448.4	310.6	309.7	282.5	27.27	11.356		
4,700.0	4,647.3	4,743.3	4,658.8	15.2	16.9	112.04	-444.4	331.4	299.5	271.7	27.85	10.753		
4,800.0	4,745.5	4,840.6	4,754.0	15.6	17.3	113.08	-440.7	351.4	289.1	260.7	28.41	10.174		
4,900.0	4,843.8	4,937.3	4,848.7	16.1	17.7	114.21	-437.4	370.8	279.5	250.5	28.95	9.656		

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

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.20-T3N-R66W - Raymond 38N-29HZX (Exist) - Wellbore #1 - Wellbore #1											Offset Site Error:		0.0 ft
Survey Program:		17-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			
Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)				
5,000.0	4,942.0	5,034.5	4,944.2	16.5	18.1	115.72	-433.9	388.5	271.3	241.9	29.40	9.228			
5,100.0	5,040.3	5,136.3	5,044.2	16.9	18.5	117.38	-430.1	407.3	263.0	233.1	29.83	8.817			
5,200.0	5,138.6	5,238.7	5,144.5	17.3	18.9	119.01	-426.1	427.5	253.8	223.5	30.25	8.388			
5,300.0	5,236.8	5,335.6	5,239.3	17.7	19.4	120.61	-422.3	447.0	244.5	213.9	30.66	7.976			
5,331.1	5,267.3	5,367.2	5,270.3	17.9	19.5	121.18	-421.1	453.1	241.9	211.1	30.77	7.861			
5,400.0	5,335.2	5,436.9	5,338.6	18.1	19.8	122.30	-417.9	466.8	235.2	204.2	30.98	7.593			
5,500.0	5,434.1	5,534.5	5,434.2	18.4	20.2	123.49	-413.0	485.5	224.3	193.1	31.26	7.177			
5,600.0	5,533.5	5,632.0	5,530.0	18.6	20.6	124.03	-408.6	503.5	212.4	180.8	31.60	6.720			
5,700.0	5,633.2	5,730.8	5,627.1	18.8	20.9	123.77	-404.5	521.4	199.1	167.0	32.06	6.210			
5,800.0	5,733.2	5,827.2	5,721.8	19.0	21.3	122.58	-400.8	538.7	184.2	151.5	32.65	5.642			
5,866.9	5,800.0	5,890.6	5,784.3	19.1	21.5	-125.18	-398.4	548.8	174.3	141.2	33.10	5.268			
5,900.0	5,833.1	5,922.1	5,815.5	19.1	21.7	-125.78	-397.2	553.5	169.7	136.3	33.34	5.089			
6,000.0	5,933.1	6,020.0	5,912.3	19.2	22.0	-127.67	-393.6	567.2	156.2	122.1	34.09	4.582			
6,100.0	6,033.1	6,117.7	6,009.1	19.4	22.3	-129.66	-389.9	580.1	143.5	108.6	34.85	4.117			
6,200.0	6,133.1	6,213.8	6,104.6	19.5	22.6	-131.57	-386.7	591.0	132.7	97.1	35.59	3.728			
6,300.0	6,233.1	6,309.4	6,199.7	19.7	22.8	-133.59	-385.2	599.3	125.3	88.9	36.34	3.447			
6,400.0	6,333.1	6,406.5	6,296.7	19.8	23.0	-135.34	-384.4	605.4	120.2	83.2	37.02	3.246			
6,500.0	6,433.1	6,503.6	6,393.7	20.0	23.2	-136.38	-384.2	608.6	117.8	80.2	37.54	3.137			
6,600.0	6,533.1	6,602.5	6,492.6	20.1	23.3	-137.05	-384.7	610.0	117.1	79.1	37.99	3.083			
6,645.9	6,579.1	6,648.0	6,538.1	20.2	23.4	-137.33	-385.0	610.5	117.0	78.8	38.18	3.064 CC, ES			
6,700.0	6,633.1	6,698.9	6,589.0	20.2	23.4	-138.28	-386.8	611.6	117.6	79.1	38.55	3.052 SF			
6,744.4	6,677.6	6,740.2	6,630.1	20.3	23.5	-139.91	-390.2	613.0	119.4	80.4	39.00	3.062			
6,750.0	6,683.1	6,746.0	6,635.8	20.3	23.5	-140.17	-390.8	613.3	119.7	80.7	39.08	3.064			
6,800.0	6,733.1	6,790.0	6,679.3	20.4	23.6	-143.28	-397.4	615.8	125.4	85.6	39.84	3.148			
6,850.0	6,782.8	6,829.5	6,717.7	20.4	23.6	-147.06	-406.0	618.7	136.8	96.3	40.51	3.377			
6,900.0	6,832.1	6,866.6	6,753.2	20.5	23.7	-150.83	-416.3	621.4	154.4	113.5	40.90	3.775			
6,950.0	6,880.7	6,898.6	6,783.3	20.5	23.7	-153.71	-426.9	623.2	178.2	137.3	40.92	4.356			
7,000.0	6,928.4	6,926.9	6,809.6	20.5	23.7	-155.46	-437.5	623.5	207.7	167.1	40.57	5.120			
7,050.0	6,975.1	6,951.5	6,832.0	20.5	23.7	-156.40	-447.6	623.1	241.9	202.0	39.94	6.057			
7,100.0	7,020.4	6,973.8	6,851.9	20.5	23.7	-156.77	-457.6	622.4	279.9	240.8	39.10	7.159			
7,150.0	7,064.4	6,993.3	6,869.1	20.5	23.7	-156.61	-466.9	621.8	320.9	282.8	38.08	8.425			
7,200.0	7,106.6	7,003.0	6,877.5	20.5	23.7	-154.96	-471.6	621.5	364.4	327.5	36.90	9.874			
7,250.0	7,147.0	7,021.6	6,893.5	20.5	23.7	-153.84	-481.1	620.9	409.7	374.0	35.70	11.476			
7,300.0	7,185.5	7,031.2	6,901.6	20.5	23.7	-150.58	-486.1	620.6	456.6	422.1	34.47	13.246			
7,350.0	7,221.7	7,045.0	6,913.3	20.5	23.7	-146.68	-493.6	620.2	504.7	471.4	33.37	15.124			
7,400.0	7,255.6	7,045.0	6,913.3	20.4	23.7	-136.01	-493.6	620.2	553.6	520.7	32.84	16.856			
7,450.0	7,287.0	7,045.0	6,913.3	20.4	23.7	-116.53	-493.6	620.2	603.0	569.7	33.21	18.154			
7,500.0	7,315.8	7,045.0	6,913.3	20.4	23.7	-85.04	-493.6	620.2	652.6	620.0	32.66	19.982			
7,550.0	7,341.9	7,045.0	6,913.3	20.4	23.7	-54.28	-493.6	620.2	702.3	674.0	28.30	24.815			
7,600.0	7,365.2	7,045.0	6,913.3	20.4	23.7	-35.62	-493.6	620.2	751.8	728.2	23.62	31.835			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Soco 20-1K (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
11,500.0	7,428.5	7,385.8	7,382.9	80.6	14.8	-88.80	4,218.4	-65.3	780.2	685.5	94.69	8.240		
11,600.0	7,428.1	7,384.4	7,381.5	82.4	14.8	-88.69	4,218.4	-65.2	761.0	664.5	96.55	7.882		
11,698.1	7,427.8	7,383.0	7,380.1	84.3	14.8	-88.59	4,218.4	-65.2	754.7	656.3	98.39	7.670 CC		
11,700.0	7,427.7	7,383.0	7,380.1	84.3	14.8	-88.59	4,218.4	-65.2	754.7	656.2	98.42	7.668 ES		
11,800.0	7,427.4	7,381.6	7,378.7	86.2	14.8	-88.48	4,218.4	-65.2	761.5	661.2	100.29	7.593 SF		
11,904.0	7,427.0	7,380.2	7,377.3	88.1	14.8	-88.37	4,218.4	-65.1	782.2	680.0	102.23	7.652		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Soco 20-8K (Exist) - Wellbore #1 - Wellbore #1													
Survey Program: 100-MWD												Offset Site Error:	0.0 ft
												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,500.0	7,432.1	7,369.7	7,368.5	62.1	15.4	-87.87	3,149.5	-97.7	798.2	721.6	76.60	10.421	
10,600.0	7,431.8	7,370.8	7,369.5	63.9	15.4	-87.95	3,149.5	-97.8	788.2	709.7	78.45	10.047	
10,629.2	7,431.7	7,371.1	7,369.9	64.5	15.4	-87.98	3,149.6	-97.8	787.6	708.7	78.99	9.971 CC, ES	
10,700.0	7,431.4	7,371.9	7,370.6	65.8	15.4	-88.03	3,149.6	-97.8	790.8	710.5	80.31	9.847 SF	

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 ft
Survey Program: 0-MWD														Offset Well Error:	0.0 ft
Reference															
Offset															
Semi Major Axis															
Distance															
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning		
0.0	0.0	0.0	0.0	0.0	0.0	179.32	-74.9	0.9	75.0						
100.0	100.0	98.0	98.0	0.1	0.1	179.32	-74.9	0.9	74.9	74.7	0.22	336.735			
200.0	200.0	198.0	198.0	0.3	0.3	179.32	-74.9	0.9	74.9	74.3	0.67	111.870 CC			
300.0	300.0	297.7	297.7	0.6	0.5	-179.73	-75.1	-0.4	75.1	74.0	1.11	67.845 ES			
400.0	400.0	397.3	397.2	0.8	0.8	-176.85	-75.6	-4.2	75.8	74.2	1.55	48.981			
500.0	500.0	496.6	496.3	1.0	1.0	-172.18	-76.6	-10.5	77.3	75.3	2.00	38.740			
600.0	600.0	595.6	594.9	1.2	1.3	-166.02	-77.8	-19.4	80.3	77.8	2.45	32.780			
700.0	700.0	694.0	692.6	1.5	1.5	-158.87	-79.4	-30.7	85.3	82.4	2.91	29.348			
800.0	800.0	791.7	789.3	1.7	1.8	-151.39	-81.4	-44.4	93.1	89.7	3.38	27.557			
900.0	900.0	888.7	884.9	1.9	2.2	-144.17	-83.7	-60.4	104.0	100.1	3.87	26.855 SF			
1,000.0	1,000.0	984.7	979.2	2.1	2.6	-137.65	-86.3	-78.6	118.2	113.8	4.40	26.859			
1,100.0	1,100.0	1,079.8	1,072.1	2.4	3.0	-132.02	-89.2	-99.0	135.7	130.8	4.97	27.303			
1,200.0	1,200.0	1,173.8	1,163.3	2.6	3.5	-127.28	-92.4	-121.3	156.4	150.8	5.58	28.011			
1,300.0	1,300.0	1,266.3	1,252.5	2.8	3.9	123.22	-95.8	-145.5	180.8	174.9	5.88	30.733			
1,400.0	1,399.9	1,356.8	1,339.2	3.0	4.5	126.87	-99.5	-171.2	209.6	203.2	6.31	33.198			
1,500.0	1,499.7	1,450.4	1,428.6	3.2	5.0	130.23	-103.4	-198.8	241.8	235.1	6.74	35.860			
1,600.0	1,599.3	1,543.2	1,517.1	3.4	5.6	133.11	-107.3	-226.2	276.5	269.3	7.17	38.576			
1,700.0	1,698.6	1,635.0	1,604.8	3.6	6.2	135.59	-111.2	-253.2	313.5	305.9	7.59	41.301			
1,800.0	1,797.5	1,725.8	1,691.5	3.9	6.7	137.75	-115.0	-280.0	352.9	344.9	8.02	44.013			
1,900.0	1,896.1	1,815.6	1,777.2	4.2	7.3	139.64	-118.8	-306.5	394.6	386.2	8.45	46.700			
1,914.4	1,910.2	1,828.4	1,789.4	4.2	7.4	139.89	-119.3	-310.3	400.8	392.3	8.51	47.082			
2,000.0	1,994.3	1,904.7	1,862.2	4.5	7.8	141.62	-122.5	-332.8	438.0	429.1	8.90	49.201			
2,100.0	2,092.6	1,993.8	1,947.3	4.8	8.4	143.30	-126.3	-359.0	481.8	472.4	9.37	51.414			
2,200.0	2,190.9	2,082.8	2,032.3	5.2	9.0	144.71	-130.0	-385.3	525.8	515.9	9.85	53.380			
2,300.0	2,289.1	2,171.9	2,117.3	5.5	9.5	145.90	-133.8	-411.6	570.1	559.7	10.34	55.135			
2,400.0	2,387.4	2,261.0	2,202.4	5.9	10.1	146.92	-137.5	-437.8	614.5	603.7	10.84	56.707			
2,500.0	2,485.6	2,350.1	2,287.4	6.3	10.6	147.81	-141.3	-464.1	659.1	647.7	11.34	58.120			
2,600.0	2,583.9	2,439.2	2,372.4	6.7	11.2	148.58	-145.0	-490.4	703.8	691.9	11.85	59.395			
2,700.0	2,682.1	2,528.2	2,457.5	7.0	11.8	149.27	-148.8	-516.6	748.5	736.2	12.36	60.549			
2,800.0	2,780.4	2,617.3	2,542.5	7.4	12.3	149.87	-152.5	-542.9	793.4	780.5	12.88	61.599			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 ft
Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20Q-321 - Wellbore #1 - Plan #1 (12-01-15)														Offset Well Error:	0.0 ft
Survey Program: 0-MWD															
Reference		Offset		Semi Major Axis			Distance								Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
0.0	0.0	0.0	0.0	0.0	0.0	179.37	-60.0	0.7	60.0						
100.0	100.0	98.0	98.0	0.1	0.1	179.37	-60.0	0.7	60.0	59.7	0.22	269.464			
200.0	200.0	198.0	198.0	0.3	0.3	179.37	-60.0	0.7	60.0	59.3	0.67	89.522			
300.0	300.0	298.0	298.0	0.6	0.6	179.37	-60.0	0.7	60.0	58.8	1.12	53.569			
400.0	400.0	398.0	398.0	0.8	0.8	179.37	-60.0	0.7	60.0	58.4	1.57	38.220 CC			
500.0	500.0	497.7	497.7	1.0	1.0	-179.46	-60.2	-0.6	60.2	58.2	2.00	30.053 ES			
600.0	600.0	597.3	597.2	1.2	1.2	-175.93	-60.9	-4.3	61.1	58.7	2.43	25.112			
700.0	700.0	696.6	696.3	1.5	1.4	-170.30	-62.2	-10.6	63.1	60.2	2.87	21.977			
800.0	800.0	795.4	794.7	1.7	1.7	-163.10	-63.9	-19.4	66.9	63.6	3.32	20.166			
900.0	900.0	893.8	892.4	1.9	1.9	-155.15	-66.1	-30.6	73.1	69.3	3.77	19.386 SF			
1,000.0	1,000.0	991.5	989.2	2.1	2.2	-147.28	-68.8	-44.2	82.2	78.0	4.24	19.401			
1,100.0	1,100.0	1,088.5	1,084.7	2.4	2.6	-140.13	-71.9	-60.1	94.6	89.9	4.73	19.987			
1,200.0	1,200.0	1,184.5	1,179.0	2.6	2.9	-134.01	-75.5	-78.1	110.3	105.0	5.26	20.947			
1,300.0	1,300.0	1,279.3	1,271.6	2.8	3.3	117.85	-79.4	-98.2	129.6	123.9	5.69	22.795			
1,400.0	1,399.9	1,372.4	1,361.9	3.0	3.8	122.76	-83.7	-120.1	153.5	147.4	6.11	25.121			
1,500.0	1,499.7	1,467.4	1,453.9	3.2	4.2	127.15	-88.4	-143.7	181.1	174.5	6.54	27.701			
1,600.0	1,599.3	1,561.9	1,545.3	3.4	4.7	130.82	-93.0	-167.1	211.1	204.2	6.96	30.345			
1,700.0	1,698.6	1,655.5	1,635.9	3.6	5.2	133.94	-97.5	-190.3	243.6	236.3	7.38	33.008			
1,800.0	1,797.5	1,748.3	1,725.6	3.9	5.7	136.60	-102.1	-213.3	278.6	270.8	7.81	35.668			
1,900.0	1,896.1	1,840.1	1,814.5	4.2	6.2	138.90	-106.5	-236.1	315.9	307.7	8.25	38.309			
1,914.4	1,910.2	1,853.2	1,827.2	4.2	6.2	139.21	-107.2	-239.3	321.5	313.2	8.31	38.686			
2,000.0	1,994.3	1,931.3	1,902.7	4.5	6.6	141.16	-111.0	-258.7	354.9	346.2	8.70	40.777			
2,100.0	2,092.6	2,022.5	1,991.0	4.8	7.1	143.03	-115.4	-281.3	394.4	385.2	9.18	42.972			
2,200.0	2,190.9	2,113.7	2,079.2	5.2	7.6	144.56	-119.9	-303.9	434.1	424.4	9.66	44.933			
2,300.0	2,289.1	2,204.9	2,167.5	5.5	8.1	145.84	-124.3	-326.5	474.0	463.9	10.15	46.689			
2,400.0	2,387.4	2,296.1	2,255.7	5.9	8.6	146.92	-128.8	-349.1	514.2	503.5	10.65	48.266			
2,500.0	2,485.6	2,387.3	2,343.9	6.3	9.1	147.84	-133.2	-371.7	554.4	543.2	11.16	49.688			
2,600.0	2,583.9	2,478.5	2,432.2	6.7	9.6	148.64	-137.7	-394.3	594.8	583.1	11.67	50.974			
2,700.0	2,682.1	2,569.7	2,520.4	7.0	10.1	149.34	-142.1	-417.0	635.2	623.0	12.18	52.142			
2,800.0	2,780.4	2,660.9	2,608.7	7.4	10.6	149.95	-146.6	-439.6	675.7	663.0	12.70	53.206			
2,900.0	2,878.7	2,752.1	2,696.9	7.8	11.1	150.50	-151.0	-462.2	716.3	703.0	13.22	54.178			
3,000.0	2,976.9	2,843.3	2,785.1	8.2	11.5	150.99	-155.5	-484.8	756.9	743.1	13.74	55.069			
3,100.0	3,075.2	2,934.5	2,873.4	8.6	12.0	151.42	-159.9	-507.4	797.5	783.3	14.27	55.889			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design													Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20T-221 - Wellbore #1 - Plan #1 (12-01-15)		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					
Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)						
0.0	0.0	0.0	0.0	0.0	0.0	179.46	-14.9	0.1	14.9	14.9	0.00	N/A					
100.0	100.0	99.0	99.0	0.1	0.1	179.46	-14.9	0.1	14.9	14.7	0.22	66.545					
200.0	200.0	199.0	199.0	0.3	0.3	179.46	-14.9	0.1	14.9	14.2	0.67	22.145					
300.0	300.0	299.0	299.0	0.6	0.6	179.46	-14.9	0.1	14.9	13.8	1.12	13.269					
400.0	400.0	399.0	399.0	0.8	0.8	179.46	-14.9	0.1	14.9	13.3	1.57	9.472					
500.0	500.0	499.0	499.0	1.0	1.0	179.46	-14.9	0.1	14.9	12.9	2.02	7.365					
600.0	600.0	599.0	599.0	1.2	1.2	179.46	-14.9	0.1	14.9	12.4	2.47	6.025					
700.0	700.0	699.0	699.0	1.5	1.5	179.46	-14.9	0.1	14.9	12.0	2.92	5.097					
800.0	800.0	799.0	799.0	1.7	1.7	179.46	-14.9	0.1	14.9	11.5	3.37	4.417					
900.0	900.0	899.0	899.0	1.9	1.9	179.46	-14.9	0.1	14.9	11.1	3.82	3.897					
1,000.0	1,000.0	999.0	999.0	2.1	2.1	179.46	-14.9	0.1	14.9	10.6	4.27	3.487 CC, ES					
1,100.0	1,100.0	1,098.7	1,098.7	2.4	2.3	-177.71	-15.9	-0.6	15.9	11.2	4.69	3.391 SF					
1,200.0	1,200.0	1,198.2	1,198.1	2.6	2.5	-171.04	-19.0	-3.0	19.2	14.1	5.10	3.770					
1,300.0	1,300.0	1,297.4	1,297.1	2.8	2.7	85.45	-24.1	-6.9	25.0	19.5	5.49	4.545					
1,400.0	1,399.9	1,396.1	1,395.4	3.0	2.9	96.78	-31.2	-12.4	33.9	28.1	5.88	5.772					
1,500.0	1,499.7	1,494.1	1,492.7	3.2	3.1	106.23	-40.2	-19.3	46.9	40.6	6.28	7.470					
1,600.0	1,599.3	1,592.5	1,590.3	3.4	3.4	113.52	-50.2	-27.0	62.8	56.1	6.70	9.383					
1,700.0	1,698.6	1,690.7	1,687.7	3.6	3.6	119.39	-60.2	-34.6	80.6	73.5	7.13	11.311					
1,800.0	1,797.5	1,788.4	1,784.5	3.9	3.9	124.28	-70.1	-42.2	100.4	92.8	7.58	13.252					
1,900.0	1,896.1	1,885.6	1,881.0	4.2	4.2	128.43	-80.0	-49.8	122.3	114.2	8.04	15.201					
1,914.4	1,910.2	1,899.5	1,894.8	4.2	4.2	128.98	-81.4	-50.9	125.6	117.5	8.11	15.484					
2,000.0	1,994.3	1,982.4	1,977.0	4.5	4.5	131.96	-89.9	-57.4	145.7	137.2	8.53	17.074					
2,100.0	2,092.6	2,079.3	2,073.1	4.8	4.8	134.55	-99.7	-64.9	169.6	160.5	9.04	18.757					
2,200.0	2,190.9	2,176.2	2,169.2	5.2	5.0	136.50	-109.6	-72.5	193.7	184.1	9.56	20.266					
2,300.0	2,289.1	2,273.0	2,265.2	5.5	5.3	138.02	-119.4	-80.0	217.9	207.8	10.08	21.617					
2,400.0	2,387.4	2,369.9	2,361.3	5.9	5.6	139.23	-129.3	-87.6	242.3	231.7	10.61	22.829					
2,500.0	2,485.6	2,466.8	2,457.4	6.3	5.9	140.22	-139.1	-95.1	266.8	255.6	11.15	23.919					
2,600.0	2,583.9	2,563.6	2,553.4	6.7	6.2	141.05	-149.0	-102.7	291.3	279.6	11.70	24.902					
2,700.0	2,682.1	2,660.5	2,649.5	7.0	6.5	141.75	-158.8	-110.3	315.9	303.6	12.25	25.793					
2,800.0	2,780.4	2,757.4	2,745.6	7.4	6.9	142.34	-168.7	-117.8	340.5	327.7	12.80	26.601					
2,900.0	2,878.7	2,854.2	2,841.7	7.8	7.2	142.86	-178.5	-125.4	365.1	351.8	13.36	27.337					
3,000.0	2,976.9	2,951.1	2,937.7	8.2	7.5	143.31	-188.4	-132.9	389.8	375.9	13.92	28.010					
3,100.0	3,075.2	3,048.0	3,033.8	8.6	7.8	143.71	-198.2	-140.5	414.5	400.0	14.48	28.627					
3,200.0	3,173.4	3,144.8	3,129.9	9.0	8.1	144.06	-208.1	-148.0	439.2	424.1	15.04	29.194					
3,300.0	3,271.7	3,241.7	3,225.9	9.4	8.4	144.38	-217.9	-155.6	463.9	448.3	15.61	29.717					
3,400.0	3,369.9	3,338.6	3,322.0	9.8	8.7	144.66	-227.8	-163.1	488.6	472.4	16.18	30.200					
3,500.0	3,468.2	3,435.4	3,418.1	10.2	9.0	144.92	-237.6	-170.7	513.4	496.6	16.75	30.648					
3,600.0	3,566.5	3,532.3	3,514.1	10.7	9.4	145.15	-247.5	-178.3	538.1	520.8	17.32	31.064					
3,700.0	3,664.7	3,629.2	3,610.2	11.1	9.7	145.36	-257.3	-185.8	562.9	545.0	17.90	31.451					
3,800.0	3,763.0	3,726.1	3,706.3	11.5	10.0	145.55	-267.2	-193.4	587.6	569.2	18.47	31.812					
3,900.0	3,861.2	3,822.9	3,802.3	11.9	10.3	145.73	-277.0	-200.9	612.4	593.3	19.05	32.150					
4,000.0	3,959.5	3,932.7	3,911.3	12.3	10.6	145.99	-287.3	-208.8	636.5	616.9	19.62	32.443					
4,100.0	4,057.7	4,049.6	4,027.9	12.7	10.9	146.50	-294.8	-214.5	657.9	637.7	20.15	32.649					
4,200.0	4,156.0	4,167.6	4,145.7	13.1	11.1	147.27	-298.5	-217.4	676.4	655.7	20.65	32.749					
4,300.0	4,254.2	4,275.1	4,253.2	13.6	11.3	148.15	-298.9	-217.7	692.5	671.3	21.13	32.778					
4,400.0	4,352.5	4,373.3	4,351.5	14.0	11.4	148.94	-298.9	-217.7	708.4	686.8	21.58	32.830					
4,500.0	4,450.8	4,471.6	4,449.8	14.4	11.6	149.69	-298.9	-217.7	724.5	702.4	22.03	32.891					
4,600.0	4,549.0	4,569.9	4,548.0	14.8	11.7	150.42	-298.9	-217.7	740.6	718.2	22.47	32.956					
4,700.0	4,647.3	4,668.1	4,646.3	15.2	11.9	151.11	-298.9	-217.7	756.9	734.0	22.92	33.025					
4,800.0	4,745.5	4,766.4	4,744.5	15.6	12.1	151.77	-298.9	-217.7	773.3	750.0	23.37	33.096					
4,900.0	4,843.8	4,864.6	4,842.8	16.1	12.2	152.41	-298.9	-217.7	789.8	766.0	23.81	33.170					

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

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 ft
Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20T-221 - Wellbore #1 - Plan #1 (12-01-15)														Offset Well Error:	0.0 ft
Survey Program: 0-MWD															
Reference		Offset		Semi Major Axis		Distance									
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre +N/-S	+E/-W	Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)				

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 ft
Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20T-241 - Wellbore #1 - Plan #1 (12-01-15)														Offset Well Error:	0.0 ft
Survey Program: 0-MWD															
Reference		Offset		Semi Major Axis			Distance								Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
0.0	0.0	0.0	0.0	0.0	0.0	179.27	-45.0	0.6	45.0						
100.0	100.0	99.0	99.0	0.1	0.1	179.27	-45.0	0.6	45.0	44.7	0.22	201.086			
200.0	200.0	199.0	199.0	0.3	0.3	179.27	-45.0	0.6	45.0	44.3	0.67	66.917			
300.0	300.0	299.0	299.0	0.6	0.6	179.27	-45.0	0.6	45.0	43.9	1.12	40.097			
400.0	400.0	399.0	399.0	0.8	0.8	179.27	-45.0	0.6	45.0	43.4	1.57	28.624			
500.0	500.0	499.0	499.0	1.0	1.0	179.27	-45.0	0.6	45.0	43.0	2.02	22.256			
600.0	600.0	599.0	599.0	1.2	1.2	179.27	-45.0	0.6	45.0	42.5	2.47	18.206	CC		
700.0	700.0	698.7	698.7	1.5	1.4	-179.18	-45.3	-0.7	45.3	42.4	2.90	15.617	ES		
800.0	800.0	798.2	798.1	1.7	1.6	-174.62	-46.4	-4.4	46.6	43.3	3.33	14.012			
900.0	900.0	897.5	897.2	1.9	1.9	-167.64	-48.2	-10.6	49.3	45.6	3.76	13.135			
1,000.0	1,000.0	996.3	995.6	2.1	2.1	-159.27	-50.7	-19.2	54.3	50.1	4.20	12.934	SF		
1,100.0	1,100.0	1,094.7	1,093.3	2.4	2.3	-150.73	-53.8	-30.2	62.0	57.3	4.64	13.339			
1,200.0	1,200.0	1,192.3	1,190.0	2.6	2.6	-142.98	-57.6	-43.5	72.8	67.7	5.11	14.228			
1,300.0	1,300.0	1,289.1	1,285.3	2.8	2.9	110.68	-62.1	-59.0	87.2	81.6	5.56	15.670			
1,400.0	1,399.9	1,384.4	1,378.9	3.0	3.3	117.36	-67.2	-76.5	106.1	100.1	5.98	17.736			
1,500.0	1,499.7	1,480.4	1,472.8	3.2	3.7	123.17	-72.7	-95.8	129.1	122.7	6.40	20.169			
1,600.0	1,599.3	1,576.3	1,566.5	3.4	4.1	127.91	-78.3	-115.1	154.7	147.9	6.82	22.685			
1,700.0	1,698.6	1,671.5	1,659.6	3.6	4.5	131.82	-83.8	-134.2	182.8	175.5	7.24	25.234			
1,800.0	1,797.5	1,765.9	1,752.0	3.9	4.9	135.09	-89.2	-153.2	213.3	205.7	7.68	27.795			
1,900.0	1,896.1	1,859.6	1,843.6	4.2	5.3	137.88	-94.6	-172.0	246.3	238.2	8.12	30.350			
1,914.4	1,910.2	1,872.9	1,856.6	4.2	5.3	138.24	-95.4	-174.7	251.2	243.1	8.18	30.717			
2,000.0	1,994.3	1,952.7	1,934.6	4.5	5.7	140.45	-100.0	-190.7	281.0	272.4	8.58	32.757			
2,100.0	2,092.6	2,045.7	2,025.6	4.8	6.1	142.51	-105.4	-209.4	316.1	307.1	9.06	34.910			
2,200.0	2,190.9	2,138.8	2,116.6	5.2	6.5	144.16	-110.8	-228.2	351.6	342.0	9.54	36.841			
2,300.0	2,289.1	2,231.9	2,207.7	5.5	6.9	145.51	-116.2	-246.9	387.2	377.2	10.04	38.574			
2,400.0	2,387.4	2,325.0	2,298.7	5.9	7.3	146.63	-121.6	-265.6	423.0	412.4	10.54	40.135			
2,500.0	2,485.6	2,418.1	2,389.7	6.3	7.8	147.58	-127.0	-284.3	458.9	447.8	11.05	41.546			
2,600.0	2,583.9	2,511.1	2,480.7	6.7	8.2	148.39	-132.3	-303.0	494.9	483.3	11.56	42.823			
2,700.0	2,682.1	2,604.2	2,571.8	7.0	8.6	149.10	-137.7	-321.7	531.0	518.9	12.07	43.985			
2,800.0	2,780.4	2,697.3	2,662.8	7.4	9.0	149.71	-143.1	-340.4	567.1	554.5	12.59	45.044			
2,900.0	2,878.7	2,790.4	2,753.8	7.8	9.5	150.25	-148.5	-359.1	603.3	590.2	13.11	46.013			
3,000.0	2,976.9	2,883.5	2,844.8	8.2	9.9	150.73	-153.9	-377.8	639.5	625.9	13.64	46.902			
3,100.0	3,075.2	2,976.6	2,935.8	8.6	10.3	151.15	-159.3	-396.6	675.8	661.6	14.16	47.720			
3,200.0	3,173.4	3,069.6	3,026.9	9.0	10.8	151.54	-164.7	-415.3	712.1	697.4	14.69	48.475			
3,300.0	3,271.7	3,162.7	3,117.9	9.4	11.2	151.88	-170.0	-434.0	748.4	733.2	15.22	49.174			
3,400.0	3,369.9	3,255.8	3,208.9	9.8	11.6	152.20	-175.4	-452.7	784.7	769.0	15.75	49.822			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design		Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20T-301 - Wellbore #1 - Plan #1 (12-01-15)											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)				
0.0	0.0	0.0	0.0	0.0	0.0	179.48	-30.0	0.3	30.0						
100.0	100.0	99.0	99.0	0.1	0.1	179.48	-30.0	0.3	30.0	29.7	0.22	134.004			
200.0	200.0	199.0	199.0	0.3	0.3	179.48	-30.0	0.3	30.0	29.3	0.67	44.594			
300.0	300.0	299.0	299.0	0.6	0.6	179.48	-30.0	0.3	30.0	28.8	1.12	26.721			
400.0	400.0	399.0	399.0	0.8	0.8	179.48	-30.0	0.3	30.0	28.4	1.57	19.075			
500.0	500.0	499.0	499.0	1.0	1.0	179.48	-30.0	0.3	30.0	27.9	2.02	14.832			
600.0	600.0	599.0	599.0	1.2	1.2	179.48	-30.0	0.3	30.0	27.5	2.47	12.132			
700.0	700.0	699.0	699.0	1.5	1.5	179.48	-30.0	0.3	30.0	27.0	2.92	10.264			
800.0	800.0	799.0	799.0	1.7	1.7	179.48	-30.0	0.3	30.0	26.6	3.37	8.895 CC, ES			
900.0	900.0	898.6	898.6	1.9	1.9	-178.36	-30.5	-0.9	30.5	26.7	3.80	8.041			
1,000.0	1,000.0	998.2	998.1	2.1	2.1	-172.32	-32.2	-4.3	32.5	28.3	4.22	7.717 SF			
1,100.0	1,100.0	1,097.4	1,097.1	2.4	2.3	-163.89	-35.1	-10.1	36.5	31.9	4.64	7.875			
1,200.0	1,200.0	1,196.2	1,195.5	2.6	2.5	-155.01	-39.0	-18.2	43.2	38.1	5.07	8.508			
1,300.0	1,300.0	1,294.4	1,293.0	2.8	2.8	100.67	-44.0	-28.4	53.0	47.5	5.50	9.626			
1,400.0	1,399.9	1,391.6	1,389.2	3.0	3.0	109.68	-50.1	-40.8	66.9	61.0	5.91	11.324			
1,500.0	1,499.7	1,488.5	1,484.9	3.2	3.3	117.36	-57.0	-55.0	85.2	78.9	6.32	13.482			
1,600.0	1,599.3	1,585.8	1,580.8	3.4	3.6	123.43	-64.1	-69.5	106.2	99.5	6.74	15.770			
1,700.0	1,698.6	1,682.4	1,676.1	3.6	4.0	128.29	-71.1	-83.9	129.7	122.5	7.16	18.107			
1,800.0	1,797.5	1,778.5	1,770.8	3.9	4.3	132.29	-78.1	-98.2	155.5	147.9	7.60	20.464			
1,900.0	1,896.1	1,873.8	1,864.8	4.2	4.6	135.64	-85.1	-112.4	183.7	175.7	8.05	22.833			
1,914.4	1,910.2	1,887.5	1,878.3	4.2	4.7	136.08	-86.1	-114.4	187.9	179.8	8.11	23.173			
2,000.0	1,994.3	1,968.7	1,958.4	4.5	5.0	138.59	-92.0	-126.6	213.6	205.1	8.52	25.085			
2,100.0	2,092.6	2,063.6	2,052.0	4.8	5.3	140.85	-98.9	-140.7	244.0	235.0	9.00	27.107			
2,200.0	2,190.9	2,158.5	2,145.6	5.2	5.7	142.62	-105.8	-154.8	274.6	265.1	9.49	28.924			
2,300.0	2,289.1	2,253.4	2,239.2	5.5	6.0	144.03	-112.7	-169.0	305.4	295.4	9.99	30.557			
2,400.0	2,387.4	2,348.3	2,332.7	5.9	6.4	145.18	-119.6	-183.1	336.3	325.8	10.50	32.028			
2,500.0	2,485.6	2,443.2	2,426.3	6.3	6.7	146.14	-126.5	-197.2	367.4	356.4	11.01	33.356			
2,600.0	2,583.9	2,538.1	2,519.9	6.7	7.1	146.95	-133.4	-211.4	398.5	387.0	11.53	34.560			
2,700.0	2,682.1	2,633.0	2,613.5	7.0	7.4	147.64	-140.4	-225.5	429.7	417.6	12.05	35.654			
2,800.0	2,780.4	2,727.9	2,707.1	7.4	7.8	148.24	-147.3	-239.6	460.9	448.4	12.58	36.651			
2,900.0	2,878.7	2,822.8	2,800.6	7.8	8.2	148.77	-154.2	-253.8	492.2	479.1	13.10	37.563			
3,000.0	2,976.9	2,917.7	2,894.2	8.2	8.5	149.23	-161.1	-267.9	523.5	509.9	13.63	38.399			
3,100.0	3,075.2	3,012.6	2,987.8	8.6	8.9	149.64	-168.0	-282.1	554.8	540.7	14.17	39.169			
3,200.0	3,173.4	3,107.4	3,081.4	9.0	9.2	150.00	-174.9	-296.2	586.2	571.5	14.70	39.878			
3,300.0	3,271.7	3,202.3	3,175.0	9.4	9.6	150.33	-181.8	-310.3	617.6	602.3	15.24	40.534			
3,400.0	3,369.9	3,297.2	3,268.5	9.8	10.0	150.63	-188.7	-324.5	649.0	633.2	15.77	41.143			
3,500.0	3,468.2	3,392.1	3,362.1	10.2	10.3	150.90	-195.7	-338.6	680.4	664.1	16.31	41.708			
3,600.0	3,566.5	3,487.0	3,455.7	10.7	10.7	151.14	-202.6	-352.7	711.8	695.0	16.85	42.235			
3,700.0	3,664.7	3,581.9	3,549.3	11.1	11.1	151.37	-209.5	-366.9	743.2	725.8	17.40	42.726			
3,800.0	3,763.0	3,676.8	3,642.8	11.5	11.4	151.57	-216.4	-381.0	774.7	756.7	17.94	43.186			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design													Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20T-321 - Wellbore #1 - Plan #1 (12-01-15)		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)						
0.0	0.0	1.0	1.0	0.0	0.0	-0.69	30.1	-0.4	30.1	30.1	0.00	N/A					
100.0	100.0	101.0	101.0	0.1	0.1	-0.69	30.1	-0.4	30.1	29.9	0.23	132.516					
200.0	200.0	201.0	201.0	0.3	0.3	-0.69	30.1	-0.4	30.1	29.4	0.68	44.465					
300.0	300.0	301.0	301.0	0.6	0.6	-0.69	30.1	-0.4	30.1	29.0	1.13	26.715					
400.0	400.0	401.0	401.0	0.8	0.8	-0.69	30.1	-0.4	30.1	28.5	1.58	19.093					
500.0	500.0	501.0	501.0	1.0	1.0	-0.69	30.1	-0.4	30.1	28.1	2.03	14.855					
600.0	600.0	601.0	601.0	1.2	1.2	-0.69	30.1	-0.4	30.1	27.6	2.47	12.156					
700.0	700.0	701.0	701.0	1.5	1.5	-0.69	30.1	-0.4	30.1	27.2	2.92	10.288					
800.0	800.0	801.0	801.0	1.7	1.7	-0.69	30.1	-0.4	30.1	26.7	3.37	8.917					
900.0	900.0	901.0	901.0	1.9	1.9	-0.69	30.1	-0.4	30.1	26.3	3.82	7.868					
1,000.0	1,000.0	1,001.0	1,001.0	2.1	2.1	-0.69	30.1	-0.4	30.1	25.8	4.27	7.041					
1,100.0	1,100.0	1,101.0	1,101.0	2.4	2.4	-0.69	30.1	-0.4	30.1	25.4	4.72	6.370					
1,200.0	1,200.0	1,201.0	1,201.0	2.6	2.6	-0.69	30.1	-0.4	30.1	24.9	5.17	5.817 CC, ES					
1,300.0	1,300.0	1,301.0	1,301.0	2.8	2.8	-116.35	30.1	-0.4	30.6	25.0	5.60	5.469					
1,400.0	1,399.9	1,400.9	1,400.9	3.0	3.0	-122.52	30.1	-0.4	32.6	26.6	6.02	5.413					
1,500.0	1,499.7	1,500.7	1,500.7	3.2	3.3	-131.15	30.1	-0.4	36.5	30.1	6.44	5.670					
1,600.0	1,599.3	1,600.3	1,600.3	3.4	3.5	-140.27	30.1	-0.4	43.1	36.2	6.86	6.280					
1,700.0	1,698.6	1,700.9	1,700.9	3.6	3.7	-148.89	28.8	0.1	51.4	44.2	7.25	7.089					
1,800.0	1,797.5	1,801.5	1,801.4	3.9	3.9	-157.04	25.0	1.3	60.6	53.0	7.62	7.954					
1,900.0	1,896.1	1,902.1	1,901.8	4.2	4.0	-164.69	18.8	3.5	70.9	62.9	7.98	8.885					
1,914.4	1,910.2	1,916.6	1,916.2	4.2	4.1	-165.74	17.7	3.9	72.5	64.4	8.03	9.025					
2,000.0	1,994.3	2,002.7	2,002.0	4.5	4.2	-171.69	10.0	6.5	81.7	73.3	8.37	9.766					
2,100.0	2,092.6	2,101.9	2,100.5	4.8	4.4	-177.55	0.0	9.9	92.4	83.6	8.78	10.532					
2,200.0	2,190.9	2,200.9	2,199.0	5.2	4.7	177.84	-10.0	13.2	103.9	94.7	9.21	11.284					
2,300.0	2,289.1	2,299.9	2,297.5	5.5	4.9	174.16	-20.0	16.6	115.9	106.3	9.66	11.997					
2,400.0	2,387.4	2,398.9	2,395.9	5.9	5.1	171.18	-30.0	20.0	128.3	118.2	10.14	12.661					
2,500.0	2,485.6	2,498.0	2,494.4	6.3	5.3	168.72	-40.0	23.4	141.0	130.4	10.63	13.271					
2,600.0	2,583.9	2,597.0	2,592.9	6.7	5.6	166.68	-49.9	26.8	153.9	142.8	11.13	13.828					
2,700.0	2,682.1	2,696.0	2,691.3	7.0	5.8	164.95	-59.9	30.2	167.0	155.3	11.65	14.336					
2,800.0	2,780.4	2,795.0	2,789.8	7.4	6.1	163.47	-69.9	33.6	180.2	168.0	12.17	14.797					
2,900.0	2,878.7	2,894.1	2,888.3	7.8	6.4	162.20	-79.9	37.0	193.4	180.7	12.71	15.217					
3,000.0	2,976.9	2,993.1	2,986.7	8.2	6.6	161.09	-89.9	40.4	206.8	193.6	13.26	15.599					
3,100.0	3,075.2	3,092.1	3,085.2	8.6	6.9	160.11	-99.9	43.8	220.2	206.4	13.81	15.948					
3,200.0	3,173.4	3,191.2	3,183.6	9.0	7.2	159.25	-109.9	47.2	233.7	219.4	14.37	16.266					
3,300.0	3,271.7	3,290.2	3,282.1	9.4	7.4	158.48	-119.9	50.6	247.3	232.3	14.94	16.557					
3,400.0	3,369.9	3,389.2	3,380.6	9.8	7.7	157.79	-129.9	53.9	260.9	245.4	15.51	16.824					
3,500.0	3,468.2	3,488.2	3,479.0	10.2	8.0	157.17	-139.9	57.3	274.5	258.4	16.08	17.070					
3,600.0	3,566.5	3,587.3	3,577.5	10.7	8.3	156.61	-149.8	60.7	288.1	271.5	16.66	17.296					
3,700.0	3,664.7	3,686.3	3,676.0	11.1	8.5	156.09	-159.8	64.1	301.8	284.5	17.24	17.505					
3,800.0	3,763.0	3,785.3	3,774.4	11.5	8.8	155.63	-169.8	67.5	315.5	297.6	17.83	17.698					
3,900.0	3,861.2	3,884.3	3,872.9	11.9	9.1	155.20	-179.8	70.9	329.2	310.8	18.41	17.877					
4,000.0	3,959.5	3,983.4	3,971.4	12.3	9.4	154.80	-189.8	74.3	342.9	323.9	19.00	18.043					
4,100.0	4,057.7	4,082.4	4,069.8	12.7	9.7	154.44	-199.8	77.7	356.6	337.0	19.60	18.198					
4,200.0	4,156.0	4,181.4	4,168.3	13.1	10.0	154.10	-209.8	81.1	370.4	350.2	20.19	18.343					
4,300.0	4,254.2	4,280.5	4,266.7	13.6	10.3	153.79	-219.8	84.5	384.2	363.4	20.79	18.478					
4,400.0	4,352.5	4,379.5	4,365.2	14.0	10.6	153.50	-229.8	87.9	397.9	376.5	21.39	18.605					
4,500.0	4,450.8	4,478.5	4,463.7	14.4	10.8	153.23	-239.7	91.3	411.7	389.7	21.99	18.723					
4,600.0	4,549.0	4,577.5	4,562.1	14.8	11.1	152.97	-249.7	94.6	425.5	402.9	22.59	18.835					
4,700.0	4,647.3	4,676.6	4,660.6	15.2	11.4	152.74	-259.7	98.0	439.3	416.1	23.20	18.939					
4,800.0	4,745.5	4,775.6	4,759.1	15.6	11.7	152.51	-269.7	101.4	453.1	429.3	23.80	19.038					
4,900.0	4,843.8	4,874.6	4,857.5	16.1	12.0	152.30	-279.7	104.8	466.9	442.5	24.41	19.131					

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

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design		Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20T-321 - Wellbore #1 - Plan #1 (12-01-15)											Offset Site Error:		0.0 ft		
Survey Program: 0-MWD															Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor					
5,000.0	4,942.0	4,971.1	4,953.6	16.5	12.3	152.18	-288.9	107.9	480.9	455.9	24.98	19.255					
5,100.0	5,040.3	5,065.9	5,048.1	16.9	12.5	152.40	-295.1	110.1	495.7	470.2	25.46	19.466					
5,200.0	5,138.6	5,160.2	5,142.3	17.3	12.7	152.94	-298.4	111.2	511.3	485.4	25.89	19.749					
5,300.0	5,236.8	5,255.7	5,237.8	17.7	12.8	153.77	-298.9	111.4	527.8	501.5	26.28	20.084					
5,331.1	5,267.3	5,286.2	5,268.3	17.9	12.9	154.04	-298.9	111.4	533.0	506.6	26.40	20.190					
5,400.0	5,335.2	5,354.1	5,336.2	18.1	13.0	154.69	-298.9	111.4	543.8	517.2	26.67	20.390					
5,500.0	5,434.1	5,453.0	5,435.1	18.4	13.2	155.44	-298.9	111.4	557.0	530.0	27.02	20.612					
5,600.0	5,533.5	5,552.4	5,534.5	18.6	13.3	155.98	-298.9	111.4	567.1	539.7	27.36	20.725					
5,700.0	5,633.2	5,652.1	5,634.2	18.8	13.5	156.35	-298.9	111.4	574.0	546.3	27.68	20.735					
5,800.0	5,733.2	5,752.0	5,734.2	19.0	13.7	156.54	-298.9	111.4	577.7	549.8	27.98	20.647					
5,866.9	5,800.0	5,818.9	5,801.0	19.1	13.8	-89.99	-298.9	111.4	578.5	550.3	28.18	20.530					
5,900.0	5,833.1	5,852.0	5,834.1	19.1	13.9	-89.99	-298.9	111.4	578.5	550.2	28.29	20.446					
6,000.0	5,933.1	5,952.0	5,934.1	19.2	14.0	-89.99	-298.9	111.4	578.5	549.8	28.64	20.196					
6,100.0	6,033.1	6,052.0	6,034.1	19.4	14.2	-89.99	-298.9	111.4	578.5	549.5	29.00	19.950					
6,200.0	6,133.1	6,152.0	6,134.1	19.5	14.4	-89.99	-298.9	111.4	578.5	549.1	29.35	19.709					
6,300.0	6,233.1	6,252.0	6,234.1	19.7	14.6	-89.99	-298.9	111.4	578.5	548.8	29.71	19.471					
6,400.0	6,333.1	6,352.0	6,334.1	19.8	14.8	-89.99	-298.9	111.4	578.5	548.4	30.07	19.238					
6,500.0	6,433.1	6,452.0	6,434.1	20.0	14.9	-89.99	-298.9	111.4	578.5	548.0	30.43	19.008					
6,600.0	6,533.1	6,552.0	6,534.1	20.1	15.1	-89.99	-298.9	111.4	578.5	547.7	30.80	18.783					
6,641.9	6,575.0	6,593.9	6,576.0	20.2	15.2	-89.98	-298.8	111.4	578.5	547.5	30.95	18.691					
6,700.0	6,633.1	6,651.8	6,633.8	20.2	15.3	-89.67	-295.7	111.4	578.5	547.4	31.12	18.591					
6,744.4	6,677.6	6,695.6	6,677.3	20.3	15.3	-89.15	-290.4	111.4	578.5	547.3	31.20	18.541					
6,750.0	6,683.1	6,701.0	6,682.7	20.3	15.4	-89.06	-289.6	111.4	578.5	547.3	31.21	18.536					
6,800.0	6,733.1	6,750.0	6,730.8	20.4	15.4	-88.33	-280.4	111.3	578.7	547.4	31.27	18.508					
6,850.0	6,782.8	6,797.8	6,777.0	20.4	15.4	-87.62	-268.5	111.3	579.0	547.7	31.29	18.501					
6,900.0	6,832.1	6,845.5	6,822.4	20.5	15.4	-86.92	-253.7	111.3	579.3	548.0	31.30	18.510					
6,950.0	6,880.7	6,892.9	6,866.4	20.5	15.4	-86.23	-236.3	111.3	579.7	548.5	31.28	18.532					
7,000.0	6,928.4	6,939.9	6,909.0	20.5	15.4	-85.57	-216.3	111.3	580.2	549.0	31.26	18.564					
7,050.0	6,975.1	6,986.5	6,949.9	20.5	15.4	-84.92	-194.0	111.3	580.8	549.6	31.23	18.599					
7,100.0	7,020.4	7,032.7	6,989.0	20.5	15.4	-84.30	-169.4	111.3	581.4	550.2	31.20	18.635					
7,150.0	7,064.4	7,078.6	7,026.4	20.5	15.5	-83.70	-142.7	111.3	582.0	550.8	31.18	18.666					
7,200.0	7,106.6	7,124.3	7,061.8	20.5	15.5	-83.12	-114.0	111.3	582.7	551.5	31.18	18.688					
7,250.0	7,147.0	7,169.6	7,095.3	20.5	15.5	-82.58	-83.4	111.3	583.4	552.2	31.20	18.696					
7,300.0	7,185.5	7,214.7	7,126.8	20.5	15.5	-82.07	-51.1	111.3	584.1	552.8	31.26	18.685					
7,350.0	7,221.7	7,259.6	7,156.1	20.5	15.6	-81.59	-17.1	111.3	584.8	553.4	31.35	18.651					
7,400.0	7,255.6	7,304.2	7,183.2	20.4	15.7	-81.14	18.3	111.3	585.5	554.0	31.50	18.589					
7,450.0	7,287.0	7,350.0	7,208.8	20.4	15.8	-80.72	56.2	111.3	586.1	554.5	31.69	18.496					
7,500.0	7,315.8	7,392.9	7,230.8	20.4	15.9	-80.36	93.1	111.3	586.8	554.8	31.94	18.371					
7,550.0	7,341.9	7,437.0	7,251.1	20.4	16.1	-80.02	132.2	111.3	587.4	555.1	32.26	18.209					
7,600.0	7,365.2	7,481.0	7,269.1	20.4	16.3	-79.72	172.3	111.3	587.9	555.3	32.64	18.014					
7,650.0	7,385.5	7,524.8	7,284.7	20.5	16.6	-79.46	213.2	111.3	588.4	555.3	33.08	17.785					
7,700.0	7,402.7	7,568.5	7,298.0	20.6	16.9	-79.24	254.9	111.3	588.8	555.2	33.60	17.523					
7,750.0	7,416.9	7,612.1	7,308.8	20.7	17.2	-79.06	297.2	111.3	589.1	555.0	34.19	17.233					
7,800.0	7,427.9	7,655.7	7,317.1	20.8	17.5	-78.92	339.9	111.3	589.4	554.6	34.84	16.918					
7,850.0	7,435.7	7,700.0	7,323.1	21.0	17.9	-78.82	383.8	111.3	589.6	554.0	35.57	16.577					
7,900.0	7,440.2	7,742.7	7,326.4	21.3	18.3	-78.76	426.3	111.3	589.7	553.4	36.35	16.225					
7,947.2	7,441.5	7,783.7	7,327.4	21.7	18.8	-78.75	467.4	111.3	589.7	552.6	37.14	15.878					
7,948.1	7,441.5	7,784.5	7,327.4	21.7	18.8	-78.75	468.1	111.3	589.7	552.6	37.16	15.871					
8,000.0	7,441.3	7,835.0	7,326.7	22.1	19.3	-78.69	518.6	111.3	589.9	551.7	38.20	15.440					
8,100.0	7,440.9	7,935.0	7,325.1	23.1	20.5	-78.57	618.6	111.3	590.1	549.7	40.40	14.605					

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

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design		Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20T-321 - Wellbore #1 - Plan #1 (12-01-15)											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			
Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)				
8,200.0	7,440.6	8,035.0	7,323.5	24.2	21.7	-78.46	718.6	111.3	590.3	547.5	42.82	13.786			
8,300.0	7,440.2	8,135.0	7,321.8	25.4	23.1	-78.34	818.6	111.3	590.6	545.2	45.42	13.004			
8,400.0	7,439.8	8,235.0	7,320.2	26.7	24.5	-78.22	918.6	111.3	590.8	542.7	48.16	12.267			
8,500.0	7,439.5	8,334.9	7,318.6	28.1	26.0	-78.10	1,018.5	111.3	591.1	540.0	51.04	11.581			
8,600.0	7,439.1	8,434.9	7,317.0	29.6	27.5	-77.99	1,118.5	111.3	591.3	537.3	54.01	10.948			
8,700.0	7,438.7	8,534.9	7,315.4	31.1	29.1	-77.87	1,218.5	111.3	591.6	534.5	57.08	10.364			
8,800.0	7,438.4	8,634.9	7,313.8	32.6	30.8	-77.75	1,318.5	111.3	591.8	531.6	60.22	9.828			
8,900.0	7,438.0	8,734.9	7,312.2	34.2	32.4	-77.63	1,418.5	111.3	592.1	528.7	63.42	9.336			
9,000.0	7,437.6	8,834.9	7,310.6	35.8	34.1	-77.52	1,518.4	111.3	592.3	525.7	66.67	8.884			
9,100.0	7,437.3	8,934.9	7,309.0	37.5	35.8	-77.40	1,618.4	111.3	592.6	522.6	69.97	8.469			
9,200.0	7,436.9	9,034.9	7,307.4	39.1	37.5	-77.28	1,718.4	111.2	592.9	519.5	73.31	8.087			
9,300.0	7,436.5	9,134.9	7,305.8	40.8	39.3	-77.16	1,818.4	111.2	593.1	516.4	76.68	7.735			
9,400.0	7,436.2	9,234.9	7,304.2	42.5	41.0	-77.05	1,918.4	111.2	593.4	513.3	80.08	7.410			
9,500.0	7,435.8	9,334.9	7,302.6	44.2	42.8	-76.93	2,018.3	111.2	593.7	510.2	83.50	7.110			
9,600.0	7,435.4	9,434.9	7,301.0	46.0	44.6	-76.81	2,118.3	111.2	593.9	507.0	86.95	6.831			
9,700.0	7,435.1	9,534.9	7,299.4	47.7	46.4	-76.70	2,218.3	111.2	594.2	503.8	90.41	6.573			
9,800.0	7,434.7	9,634.8	7,297.8	49.5	48.2	-76.58	2,318.3	111.2	594.5	500.6	93.89	6.332			
9,900.0	7,434.3	9,734.8	7,296.2	51.3	50.0	-76.47	2,418.3	111.2	594.8	497.4	97.38	6.108			
10,000.0	7,434.0	9,834.8	7,294.6	53.1	51.8	-76.35	2,518.2	111.2	595.1	494.2	100.88	5.899			
10,100.0	7,433.6	9,934.8	7,292.9	54.9	53.7	-76.23	2,618.2	111.2	595.3	491.0	104.40	5.703			
10,200.0	7,433.2	10,034.8	7,291.3	56.7	55.5	-76.12	2,718.2	111.2	595.6	487.7	107.92	5.519			
10,300.0	7,432.9	10,134.8	7,289.7	58.5	57.3	-76.00	2,818.2	111.2	595.9	484.5	111.45	5.347			
10,400.0	7,432.5	10,234.8	7,288.1	60.3	59.2	-75.89	2,918.1	111.2	596.2	481.2	114.99	5.185			
10,500.0	7,432.1	10,334.8	7,286.5	62.1	61.0	-75.77	3,018.1	111.2	596.5	478.0	118.53	5.033			
10,600.0	7,431.8	10,434.8	7,284.9	63.9	62.9	-75.65	3,118.1	111.2	596.8	474.7	122.08	4.889			
10,700.0	7,431.4	10,534.8	7,283.3	65.8	64.7	-75.54	3,218.1	111.2	597.1	471.5	125.63	4.753			
10,800.0	7,431.0	10,634.8	7,281.7	67.6	66.6	-75.42	3,318.1	111.2	597.4	468.2	129.18	4.625			
10,900.0	7,430.7	10,734.8	7,280.1	69.4	68.5	-75.31	3,418.0	111.2	597.7	465.0	132.74	4.503			
11,000.0	7,430.3	10,834.8	7,278.5	71.3	70.3	-75.19	3,518.0	111.2	598.0	461.7	136.30	4.388			
11,100.0	7,429.9	10,934.7	7,276.9	73.1	72.2	-75.08	3,618.0	111.1	598.3	458.5	139.86	4.278			
11,200.0	7,429.6	11,034.7	7,275.3	75.0	74.1	-74.96	3,718.0	111.1	598.7	455.2	143.43	4.174			
11,300.0	7,429.2	11,134.7	7,273.7	76.8	75.9	-74.85	3,818.0	111.1	599.0	452.0	146.99	4.075			
11,400.0	7,428.8	11,234.7	7,272.1	78.7	77.8	-74.74	3,917.9	111.1	599.3	448.7	150.56	3.981			
11,500.0	7,428.5	11,334.7	7,270.5	80.6	79.7	-74.62	4,017.9	111.1	599.6	445.5	154.12	3.891			
11,600.0	7,428.1	11,434.7	7,268.9	82.4	81.6	-74.51	4,117.9	111.1	599.9	442.2	157.68	3.805			
11,700.0	7,427.7	11,534.7	7,267.3	84.3	83.5	-74.39	4,217.9	111.1	600.3	439.0	161.25	3.723			
11,800.0	7,427.4	11,634.7	7,265.7	86.2	85.3	-74.28	4,317.9	111.1	600.6	435.8	164.81	3.644			
11,904.0	7,427.0	11,737.7	7,264.0	88.1	87.1	-74.16	4,420.8	111.1	600.9	432.6	168.36	3.569 SF			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 ft
Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20Y-241 - Wellbore #1 - Plan #1 (12-01-15)														Offset Well Error:	0.0 ft
Survey Program: 0-MWD															
Reference		Offset		Semi Major Axis			Distance								
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning		
0.0	0.0	0.0	0.0	0.0	0.0	-0.37	15.0	-0.1	15.0	15.0	0.00	N/A			
100.0	100.0	100.0	100.0	0.1	0.1	-0.37	15.0	-0.1	15.0	14.8	0.22	66.738			
200.0	200.0	200.0	200.0	0.3	0.3	-0.37	15.0	-0.1	15.0	14.3	0.67	22.246			
300.0	300.0	300.0	300.0	0.6	0.6	-0.37	15.0	-0.1	15.0	13.9	1.12	13.348			
400.0	400.0	400.0	400.0	0.8	0.8	-0.37	15.0	-0.1	15.0	13.4	1.57	9.534			
500.0	500.0	500.0	500.0	1.0	1.0	-0.37	15.0	-0.1	15.0	13.0	2.02	7.415			
600.0	600.0	600.0	600.0	1.2	1.2	-0.37	15.0	-0.1	15.0	12.5	2.47	6.067			
700.0	700.0	700.0	700.0	1.5	1.5	-0.37	15.0	-0.1	15.0	12.1	2.92	5.134			
800.0	800.0	800.0	800.0	1.7	1.7	-0.37	15.0	-0.1	15.0	11.6	3.37	4.449			
900.0	900.0	900.0	900.0	1.9	1.9	-0.37	15.0	-0.1	15.0	11.2	3.82	3.926			
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-0.37	15.0	-0.1	15.0	10.7	4.27	3.513			
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	-0.37	15.0	-0.1	15.0	10.3	4.72	3.178			
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	-0.37	15.0	-0.1	15.0	9.8	5.17	2.902 CC, ES			
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	-118.21	15.0	-0.1	15.6	10.0	5.60	2.781			
1,400.0	1,399.9	1,399.9	1,399.9	3.0	3.0	-129.40	15.0	-0.1	17.8	11.8	6.02	2.954			
1,500.0	1,499.7	1,500.2	1,500.2	3.2	3.2	-140.98	14.2	0.9	21.3	14.9	6.41	3.323			
1,600.0	1,599.3	1,600.6	1,600.5	3.4	3.4	-150.36	11.8	4.1	25.2	18.4	6.79	3.712			
1,700.0	1,698.6	1,701.2	1,700.9	3.6	3.6	-158.30	7.8	9.3	29.4	22.2	7.17	4.100			
1,800.0	1,797.5	1,801.8	1,801.1	3.9	3.8	-165.25	2.2	16.7	33.9	26.4	7.55	4.490			
1,900.0	1,896.1	1,902.6	1,901.1	4.2	4.1	-171.45	-5.1	26.1	38.7	30.8	7.93	4.883			
1,914.4	1,910.2	1,917.1	1,915.5	4.2	4.1	-172.30	-6.2	27.7	39.5	31.5	7.99	4.940			
2,000.0	1,994.3	2,002.8	2,000.4	4.5	4.3	-176.86	-13.5	37.2	43.5	35.1	8.35	5.210			
2,100.0	2,092.6	2,102.6	2,099.2	4.8	4.6	178.79	-22.1	48.4	48.4	39.6	8.78	5.509			
2,200.0	2,190.9	2,202.4	2,198.0	5.2	4.8	175.25	-30.6	59.6	53.5	44.3	9.24	5.793			
2,300.0	2,289.1	2,302.3	2,296.8	5.5	5.1	172.34	-39.2	70.8	58.8	49.1	9.71	6.057			
2,400.0	2,387.4	2,402.1	2,395.7	5.9	5.4	169.92	-47.8	82.0	64.2	54.0	10.20	6.299			
2,500.0	2,485.6	2,501.9	2,494.5	6.3	5.7	167.87	-56.3	93.2	69.8	59.1	10.70	6.518			
2,600.0	2,583.9	2,601.7	2,593.3	6.7	6.0	166.13	-64.9	104.3	75.3	64.1	11.22	6.717			
2,700.0	2,682.1	2,701.5	2,692.1	7.0	6.3	164.63	-73.4	115.5	81.0	69.3	11.75	6.896			
2,800.0	2,780.4	2,801.4	2,790.9	7.4	6.6	163.33	-82.0	126.7	86.7	74.4	12.29	7.057			
2,900.0	2,878.7	2,901.2	2,889.8	7.8	7.0	162.18	-90.6	137.9	92.4	79.6	12.83	7.203			
3,000.0	2,976.9	3,001.0	2,988.6	8.2	7.3	161.17	-99.1	149.1	98.2	84.8	13.39	7.335			
3,100.0	3,075.2	3,100.8	3,087.4	8.6	7.6	160.28	-107.7	160.3	104.0	90.1	13.95	7.454			
3,200.0	3,173.4	3,200.6	3,186.2	9.0	7.9	159.48	-116.2	171.5	109.8	95.3	14.52	7.562			
3,300.0	3,271.7	3,300.5	3,285.0	9.4	8.3	158.75	-124.8	182.7	115.7	100.6	15.10	7.661			
3,400.0	3,369.9	3,400.3	3,383.9	9.8	8.6	158.10	-133.3	193.8	121.5	105.9	15.68	7.750			
3,500.0	3,468.2	3,500.1	3,482.7	10.2	8.9	157.51	-141.9	205.0	127.4	111.1	16.27	7.832			
3,600.0	3,566.5	3,599.9	3,581.5	10.7	9.2	156.97	-150.5	216.2	133.3	116.4	16.86	7.908			
3,700.0	3,664.7	3,699.7	3,680.3	11.1	9.6	156.48	-159.0	227.4	139.2	121.7	17.45	7.977			
3,800.0	3,763.0	3,799.6	3,779.1	11.5	9.9	156.02	-167.6	238.6	145.1	127.1	18.05	8.040			
3,900.0	3,861.2	3,899.4	3,878.0	11.9	10.3	155.61	-176.1	249.8	151.0	132.4	18.65	8.099			
4,000.0	3,959.5	3,999.2	3,976.8	12.3	10.6	155.22	-184.7	261.0	156.9	137.7	19.25	8.153			
4,100.0	4,057.7	4,099.0	4,075.6	12.7	10.9	154.86	-193.2	272.2	162.9	143.0	19.85	8.203			
4,200.0	4,156.0	4,198.8	4,174.4	13.1	11.3	154.53	-201.8	283.4	168.8	148.3	20.46	8.250			
4,300.0	4,254.2	4,298.6	4,273.2	13.6	11.6	154.22	-210.4	294.5	174.7	153.7	21.07	8.293			
4,400.0	4,352.5	4,398.5	4,372.1	14.0	12.0	153.93	-218.9	305.7	180.7	159.0	21.68	8.334			
4,500.0	4,450.8	4,498.3	4,470.9	14.4	12.3	153.66	-227.5	316.9	186.6	164.3	22.29	8.371			
4,600.0	4,549.0	4,598.1	4,569.7	14.8	12.7	153.40	-236.0	328.1	192.6	169.7	22.91	8.407			
4,700.0	4,647.3	4,697.9	4,668.5	15.2	13.0	153.16	-244.6	339.3	198.5	175.0	23.52	8.440			
4,800.0	4,745.5	4,797.7	4,767.3	15.6	13.3	152.94	-253.1	350.5	204.5	180.4	24.14	8.471			
4,900.0	4,843.8	4,897.6	4,866.2	16.1	13.7	152.72	-261.7	361.7	210.5	185.7	24.76	8.500			

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

Company:	PETROLEUM DEVELOPMENT CORP DJ	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
	Sec.20-T3N-R66W		
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 ft
Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20Y-241 - Wellbore #1 - Plan #1 (12-01-15)														Offset Well Error:	0.0 ft
Survey Program: 0-MWD															
Reference		Offset		Semi Major Axis			Distance								Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
5,000.0	4,942.0	4,997.4	4,965.0	16.5	14.0	152.52	-270.3	372.9	216.4	191.0	25.38	8.528			
5,100.0	5,040.3	5,097.2	5,063.8	16.9	14.4	152.33	-278.8	384.1	222.4	196.4	26.00	8.554			
5,200.0	5,138.6	5,193.2	5,159.0	17.3	14.7	152.28	-286.6	394.3	228.9	202.4	26.57	8.617			
5,300.0	5,236.8	5,287.1	5,252.3	17.7	14.9	152.70	-292.5	401.9	237.8	210.8	27.01	8.804			
5,331.1	5,267.3	5,316.1	5,281.3	17.9	15.0	152.92	-293.9	403.8	241.0	213.9	27.13	8.885			
5,400.0	5,335.2	5,380.4	5,345.4	18.1	15.1	153.53	-296.5	407.1	248.4	221.0	27.37	9.075			
5,500.0	5,434.1	5,473.5	5,438.4	18.4	15.2	154.46	-298.6	409.9	258.6	230.9	27.64	9.354			
5,600.0	5,533.5	5,568.6	5,533.5	18.6	15.4	155.42	-299.0	410.4	268.0	240.2	27.87	9.616			
5,700.0	5,633.2	5,668.3	5,633.2	18.8	15.6	156.13	-299.0	410.4	274.9	246.8	28.11	9.781			
5,800.0	5,733.2	5,768.2	5,733.2	19.0	15.7	156.50	-299.0	410.4	278.7	250.3	28.35	9.828			
5,866.9	5,800.0	5,835.1	5,800.0	19.1	15.8	-90.00	-299.0	410.4	279.4	250.9	28.52	9.794			
5,900.0	5,833.1	5,868.2	5,833.1	19.1	15.9	-90.00	-299.0	410.4	279.4	250.7	28.64	9.755			
6,000.0	5,933.1	5,968.2	5,933.1	19.2	16.0	-90.00	-299.0	410.4	279.4	250.4	28.99	9.638			
6,100.0	6,033.1	6,068.2	6,033.1	19.4	16.2	-90.00	-299.0	410.4	279.4	250.0	29.34	9.522			
6,200.0	6,133.1	6,168.2	6,133.1	19.5	16.4	-90.00	-299.0	410.4	279.4	249.7	29.69	9.409			
6,300.0	6,233.1	6,268.2	6,233.1	19.7	16.5	-90.00	-299.0	410.4	279.4	249.3	30.05	9.297			
6,400.0	6,333.1	6,368.2	6,333.1	19.8	16.7	-90.00	-299.0	410.4	279.4	249.0	30.41	9.188			
6,500.0	6,433.1	6,468.2	6,433.1	20.0	16.9	-90.00	-299.0	410.4	279.4	248.6	30.77	9.080			
6,543.0	6,476.1	6,511.2	6,476.1	20.0	16.9	-89.98	-298.9	410.4	279.4	248.5	30.92	9.035			
6,600.0	6,533.1	6,568.0	6,532.9	20.1	17.0	-89.35	-295.8	410.4	279.4	248.4	31.03	9.004			
6,700.0	6,633.1	6,665.5	6,629.1	20.2	17.1	-86.28	-280.8	410.4	280.0	249.0	30.95	9.047			
6,744.4	6,677.6	6,707.3	6,669.6	20.3	17.1	-84.21	-270.7	410.4	280.9	250.1	30.84	9.110			
6,750.0	6,683.1	6,712.4	6,674.6	20.3	17.1	-83.91	-269.2	410.4	281.1	250.3	30.82	9.121			
6,800.0	6,733.1	6,758.4	6,718.3	20.4	17.1	-81.30	-255.2	410.4	282.9	252.2	30.65	9.230			
6,850.0	6,782.8	6,803.6	6,760.5	20.4	17.1	-78.78	-238.9	410.4	285.2	254.7	30.49	9.355			
6,900.0	6,832.1	6,850.0	6,802.7	20.5	17.1	-76.26	-219.6	410.4	288.0	257.7	30.33	9.497			
6,950.0	6,880.7	6,892.3	6,840.0	20.5	17.1	-74.02	-199.8	410.4	291.3	261.1	30.20	9.647			
7,000.0	6,928.4	6,935.8	6,877.2	20.5	17.1	-71.80	-177.2	410.4	294.9	264.9	30.06	9.811			
7,050.0	6,975.1	6,978.8	6,912.7	20.5	17.1	-69.71	-153.0	410.4	298.8	268.9	29.93	9.985			
7,100.0	7,020.4	7,021.3	6,946.4	20.5	17.1	-67.74	-127.0	410.4	302.9	273.2	29.79	10.171			
7,150.0	7,064.4	7,063.4	6,978.3	20.5	17.1	-65.90	-99.5	410.4	307.2	277.6	29.63	10.368			
7,200.0	7,106.6	7,105.1	7,008.3	20.5	17.0	-64.18	-70.5	410.4	311.5	282.1	29.45	10.577			
7,250.0	7,147.0	7,150.0	7,038.8	20.5	17.0	-62.49	-37.7	410.4	315.9	286.6	29.26	10.796			
7,300.0	7,185.5	7,187.5	7,062.8	20.5	17.0	-61.14	-8.8	410.4	320.2	291.1	29.05	11.021			
7,350.0	7,221.7	7,228.3	7,087.2	20.5	17.0	-59.80	23.8	410.4	324.3	295.5	28.82	11.253			
7,400.0	7,255.6	7,268.7	7,109.7	20.4	17.0	-58.59	57.5	410.4	328.4	299.8	28.58	11.487			
7,450.0	7,287.0	7,308.9	7,130.2	20.4	16.9	-57.50	92.0	410.4	332.2	303.8	28.34	11.719			
7,500.0	7,315.8	7,350.0	7,149.3	20.4	16.9	-56.50	128.4	410.4	335.7	307.6	28.11	11.943			
7,550.0	7,341.9	7,388.7	7,165.4	20.4	17.0	-55.66	163.6	410.4	339.0	311.1	27.91	12.149			
7,600.0	7,365.2	7,428.4	7,180.1	20.4	17.0	-54.90	200.4	410.4	342.0	314.2	27.75	12.325			
7,650.0	7,385.5	7,467.8	7,192.8	20.5	17.2	-54.26	237.7	410.4	344.6	317.0	27.64	12.468			
7,700.0	7,402.7	7,507.2	7,203.6	20.6	17.4	-53.72	275.6	410.4	346.9	319.3	27.60	12.567			
7,750.0	7,416.9	7,550.0	7,213.0	20.7	17.8	-53.25	317.3	410.4	348.7	321.1	27.66	12.607			
7,800.0	7,427.9	7,585.6	7,219.1	20.8	18.1	-52.94	352.4	410.4	350.2	322.4	27.79	12.600			
7,850.0	7,435.7	7,624.7	7,223.8	21.0	18.4	-52.71	391.3	410.4	351.2	323.2	28.04	12.526			
7,900.0	7,440.2	7,663.8	7,226.6	21.3	18.8	-52.57	430.2	410.4	351.8	323.4	28.39	12.390			
7,947.2	7,441.5	7,700.0	7,227.4	21.7	19.2	-52.53	466.4	410.4	352.0	323.1	28.83	12.210			
8,000.0	7,441.3	7,751.2	7,226.8	22.1	19.8	-52.48	517.7	410.4	352.2	322.5	29.72	11.854			
8,100.0	7,440.9	7,851.2	7,225.5	23.1	20.9	-52.35	617.6	410.3	352.8	321.3	31.56	11.178			
8,200.0	7,440.6	7,951.2	7,224.1	24.2	22.2	-52.23	717.6	410.3	353.4	319.8	33.60	10.519			

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

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
8,300.0	7,440.2	8,051.2	7,222.8	25.4	23.5	-52.11	817.6	410.3	354.0	318.2	35.78	9.893		
8,400.0	7,439.8	8,151.2	7,221.5	26.7	25.0	-51.98	917.6	410.3	354.6	316.5	38.09	9.309		
8,500.0	7,439.5	8,251.2	7,220.1	28.1	26.4	-51.86	1,017.6	410.3	355.2	314.7	40.50	8.769		
8,600.0	7,439.1	8,351.2	7,218.8	29.6	28.0	-51.74	1,117.6	410.3	355.8	312.8	43.00	8.274		
8,700.0	7,438.7	8,451.2	7,217.5	31.1	29.5	-51.62	1,217.6	410.3	356.4	310.8	45.56	7.822		
8,800.0	7,438.4	8,551.2	7,216.2	32.6	31.1	-51.50	1,317.5	410.3	357.0	308.8	48.18	7.409		
8,900.0	7,438.0	8,651.2	7,214.8	34.2	32.8	-51.38	1,417.5	410.3	357.6	306.7	50.84	7.033		
9,000.0	7,437.6	8,751.2	7,213.5	35.8	34.5	-51.26	1,517.5	410.2	358.2	304.6	53.54	6.690		
9,100.0	7,437.3	8,851.2	7,212.2	37.5	36.2	-51.14	1,617.5	410.2	358.8	302.5	56.27	6.376		
9,200.0	7,436.9	8,951.2	7,210.9	39.1	37.9	-51.02	1,717.5	410.2	359.4	300.3	59.02	6.088		
9,300.0	7,436.5	9,051.2	7,209.5	40.8	39.6	-50.90	1,817.5	410.2	360.0	298.2	61.80	5.825		
9,400.0	7,436.2	9,151.2	7,208.2	42.5	41.3	-50.78	1,917.5	410.2	360.6	296.0	64.59	5.582		
9,500.0	7,435.8	9,251.2	7,206.9	44.2	43.1	-50.66	2,017.5	410.2	361.2	293.8	67.39	5.359		
9,600.0	7,435.4	9,351.2	7,205.6	46.0	44.9	-50.54	2,117.4	410.2	361.8	291.6	70.21	5.153		
9,700.0	7,435.1	9,451.2	7,204.2	47.7	46.7	-50.43	2,217.4	410.2	362.4	289.4	73.03	4.962		
9,800.0	7,434.7	9,551.2	7,202.9	49.5	48.5	-50.31	2,317.4	410.2	363.0	287.1	75.86	4.785		
9,900.0	7,434.3	9,651.2	7,201.6	51.3	50.3	-50.19	2,417.4	410.1	363.6	284.9	78.70	4.620		
10,000.0	7,434.0	9,751.2	7,200.2	53.1	52.1	-50.08	2,517.4	410.1	364.2	282.7	81.54	4.467		
10,100.0	7,433.6	9,851.1	7,198.9	54.9	53.9	-49.96	2,617.4	410.1	364.8	280.5	84.38	4.324		
10,200.0	7,433.2	9,951.1	7,197.6	56.7	55.7	-49.85	2,717.4	410.1	365.5	278.2	87.23	4.190		
10,300.0	7,432.9	10,051.1	7,196.3	58.5	57.6	-49.73	2,817.3	410.1	366.1	276.0	90.07	4.064		
10,400.0	7,432.5	10,151.1	7,194.9	60.3	59.4	-49.62	2,917.3	410.1	366.7	273.8	92.91	3.947		
10,500.0	7,432.1	10,251.1	7,193.6	62.1	61.2	-49.50	3,017.3	410.1	367.3	271.6	95.76	3.836		
10,600.0	7,431.8	10,351.1	7,192.3	63.9	63.1	-49.39	3,117.3	410.1	367.9	269.3	98.60	3.732		
10,700.0	7,431.4	10,451.1	7,191.0	65.8	64.9	-49.27	3,217.3	410.1	368.6	267.1	101.44	3.633		
10,800.0	7,431.0	10,551.1	7,189.6	67.6	66.8	-49.16	3,317.3	410.1	369.2	264.9	104.27	3.541		
10,900.0	7,430.7	10,651.1	7,188.3	69.4	68.6	-49.05	3,417.3	410.0	369.8	262.7	107.11	3.453		
11,000.0	7,430.3	10,751.1	7,187.0	71.3	70.5	-48.94	3,517.3	410.0	370.4	260.5	109.94	3.370		
11,100.0	7,429.9	10,851.1	7,185.7	73.1	72.4	-48.82	3,617.2	410.0	371.1	258.3	112.77	3.291		
11,200.0	7,429.6	10,951.1	7,184.3	75.0	74.2	-48.71	3,717.2	410.0	371.7	256.1	115.59	3.216		
11,300.0	7,429.2	11,051.1	7,183.0	76.8	76.1	-48.60	3,817.2	410.0	372.3	253.9	118.41	3.145		
11,400.0	7,428.8	11,151.1	7,181.7	78.7	78.0	-48.49	3,917.2	410.0	373.0	251.7	121.22	3.077		
11,500.0	7,428.5	11,251.1	7,180.4	80.6	79.9	-48.38	4,017.2	410.0	373.6	249.6	124.03	3.012		
11,600.0	7,428.1	11,351.1	7,179.0	82.4	81.7	-48.27	4,117.2	410.0	374.2	247.4	126.84	2.951		
11,700.0	7,427.7	11,451.1	7,177.7	84.3	83.6	-48.16	4,217.2	410.0	374.9	245.2	129.64	2.892		
11,800.0	7,427.4	11,551.1	7,176.4	86.2	85.5	-48.05	4,317.1	409.9	375.5	243.1	132.43	2.836		
11,904.0	7,427.0	11,654.7	7,175.0	88.1	87.4	-47.94	4,420.8	409.9	376.2	240.9	135.33	2.780 SF		

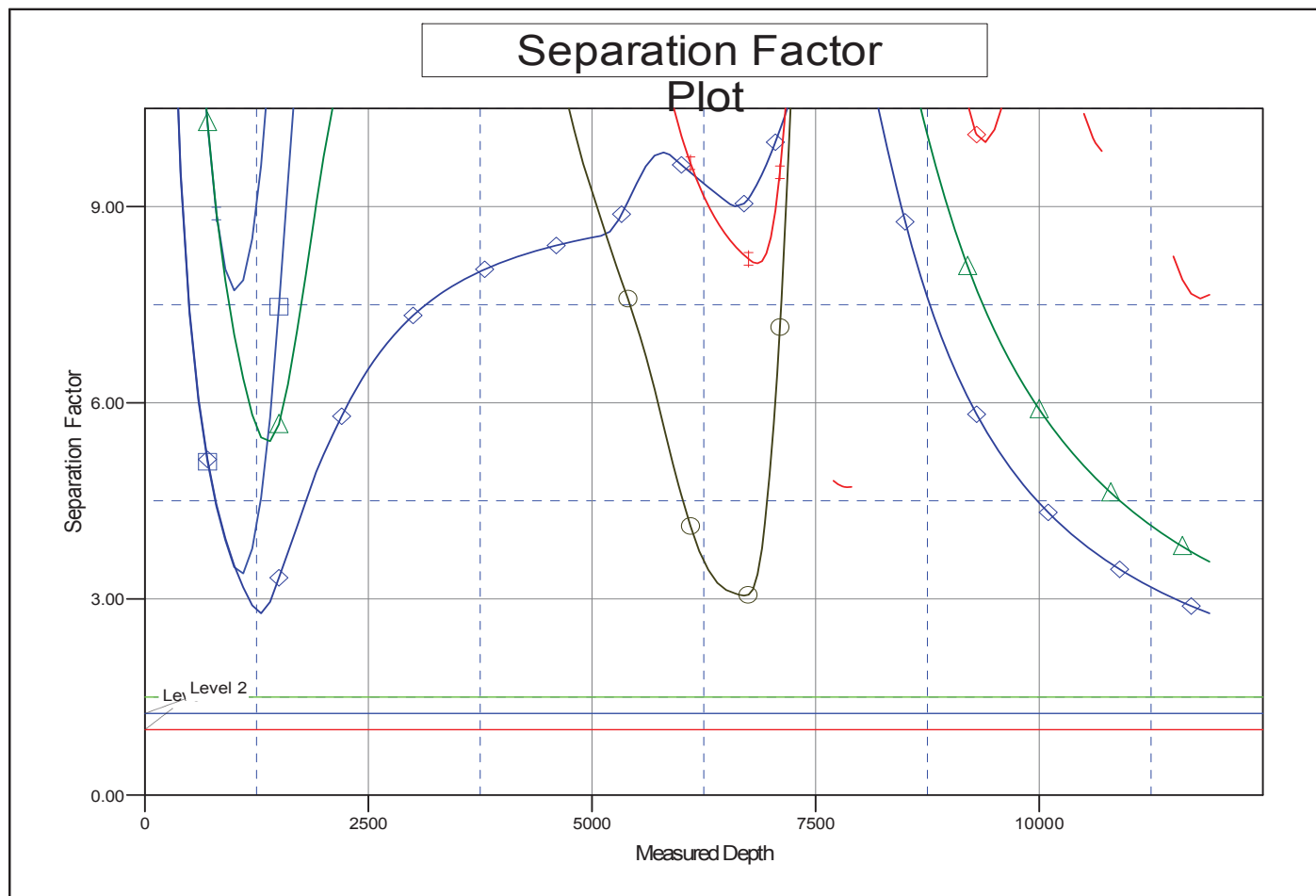
Reference Depths are relative to WELL @ 4969.0ft (Original Well Elev)	Coordinates are relative to: Niles Miller 20Y-401
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.500000	Grid Convergence at Surface is: 0.46°



Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Y-401
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4969.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4969.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Y-401	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #1 (12-01-15)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4969.0ft (Original Well Elev)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: Niles Miller 20Y-401
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.46°



LEGEND

-20- Encana (Exist), Wellbore #1, Wellbore #1 V0	—●— Soco 20-1K (Exist), Wellbore #1, Wellbore #1 V0	—▲— NilesMiller 20T-321, Wellbore #1, Plan #1 (12-01-15) V0
ust 13-21A (Exist), Wellbore #1, Wellbore #1 V0	—■— NilesMiller 20T-221, Wellbore #1, Plan #1 (12-01-15) V0	—■— NilesMiller 20T-241, Wellbore #1, Plan #1 (12-01-15) V0
-8K (Exist), Wellbore #1, Wellbore #1 V0	—◆— NilesMiller 20T-301, Wellbore #1, Plan #1 (12-01-15) V0	—●— Raymond 38N-29HZX (Exist), Wellbore #1, V0
-20- PDC (Exist), Wellbore #1, Wellbore #1 V0	—■— NilesMiller 20Q-221, Wellbore #1, Plan #1 (12-01-15) V0	—◆— Raymond 16N-29HZ (Exist), Wellbore #1, V0
-20- PDC (Exist), Wellbore #1, Wellbore #1 V0	—◆— NilesMiller 20Y-241, Wellbore #1, Plan #1 (12-01-15) V0	—◆— Raymond 37N-29HZ (Exist), Wellbore #1, V0
-20- Encana (Exist), Wellbore #1, Wellbore #1 V0	—■— NilesMiller 20Q-321, Wellbore #1, Plan #1 (12-01-15) V0	—◆— Raymond 38C-29HC (Exist), Wellbore #1, V0