

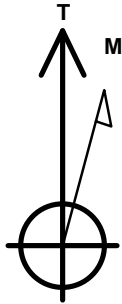
PETROLEUM DEVELOPMENT CORP DJ Basin

Well Name: **Niles Miller 20Q-321**

Surface Location: Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W
 North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
 Ground Elevation: 4954.0
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.0 0.0 1317910.68 3197037.01 40.203910 -104.794565
 Original Well Elev WELL @ 4967.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 289'FSL, 828'FEL	1.0	0.0	0.0	Point
BHL 500'FNL & 1904'FEL	7270.0	4469.9	-1116.1	Point
WP (20Q-321)	7295.5	2711.9	-1215.6	Point



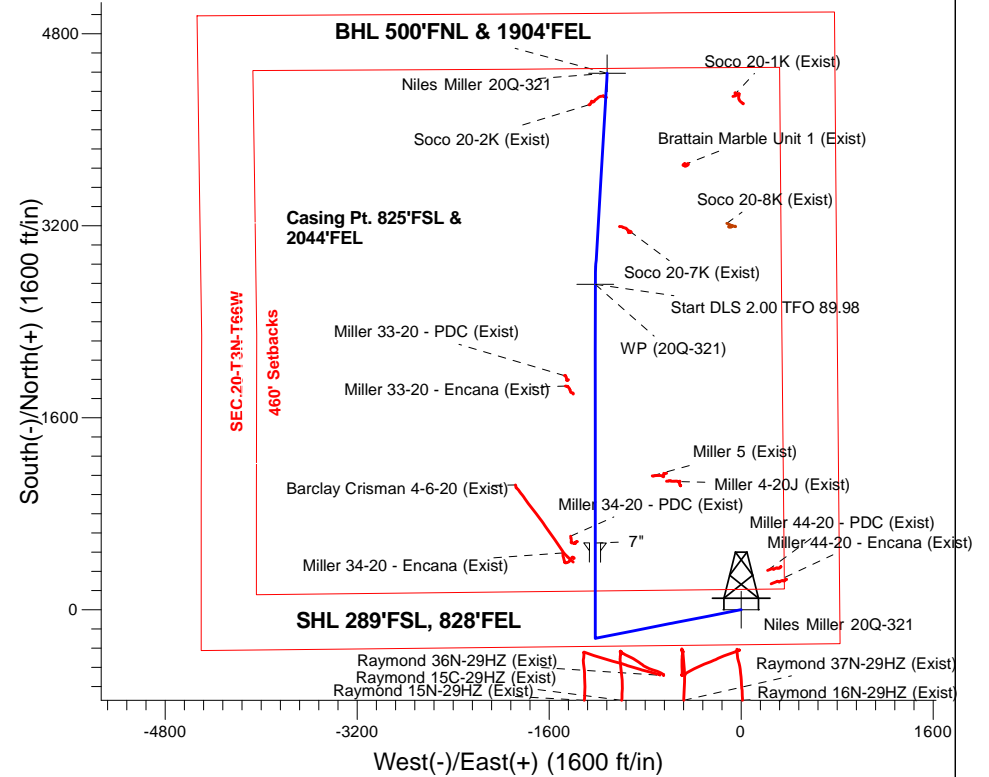
Azimuths to True North
 Magnetic North: 8.24°

Magnetic Field
 Strength: 52535.5snT
 Dip Angle: 66.73°
 Date: 2/5/2016
 Model: IGRF2010

ANNOTATIONS

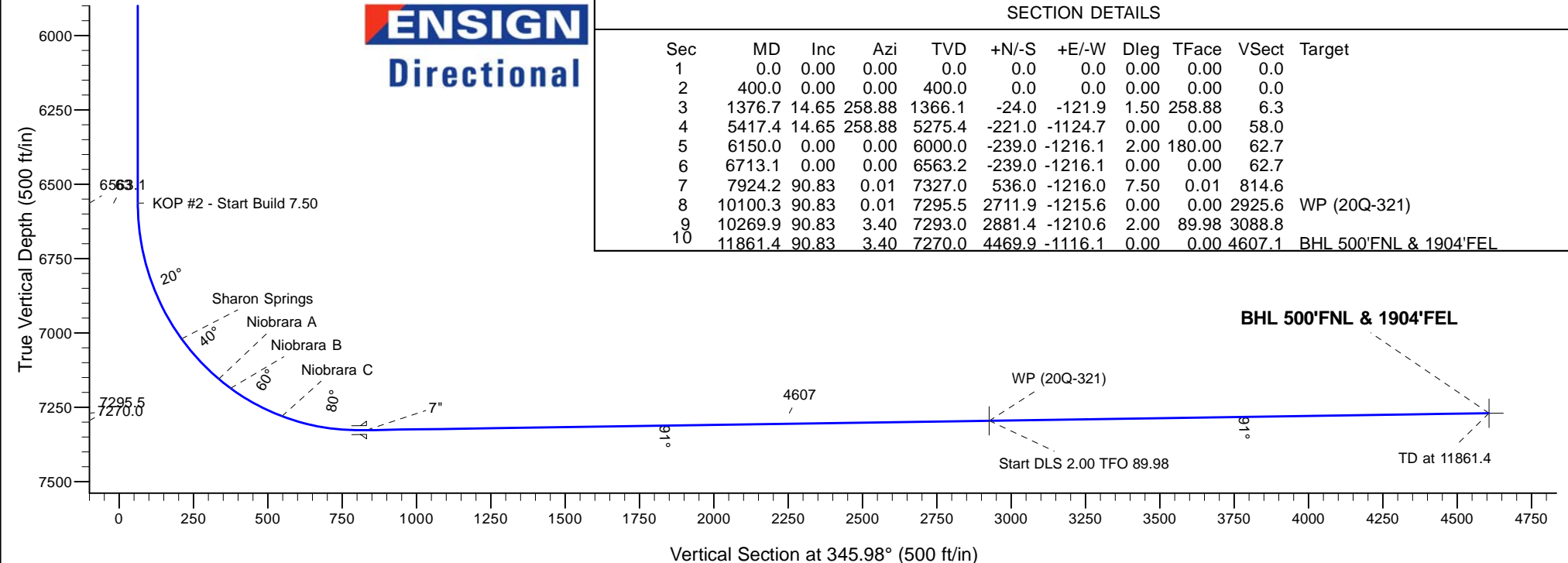
TVD	MD	Annotation
400.0	400.0	KOP - Start Build 1.50
5275.4	5417.4	Start Drop -2.00
6563.1	6713.1	KOP #2 - Start Build 7.50
7295.5	10100.3	Start DLS 2.00 TFO 89.98
7270.0	11861.4	TD at 11861.4

Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W
 Niles Miller 20Q-321
 Plan #2 (2-5-16)
 12:57, February 08 2016



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	400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	
3	1376.7	14.65	258.88	1366.1	-24.0	-121.9	1.50	258.88	6.3	
4	5417.4	14.65	258.88	5275.4	-221.0	-1124.7	0.00	0.00	58.0	
5	6150.0	0.00	0.00	6000.0	-239.0	-1216.1	2.00	180.00	62.7	
6	6713.1	0.00	0.00	6563.2	-239.0	-1216.1	0.00	0.00	62.7	
7	7924.2	90.83	0.01	7327.0	536.0	-1216.0	7.50	0.01	814.6	
8	10100.3	90.83	0.01	7295.5	2711.9	-1215.6	0.00	0.00	2925.6	WP (20Q-321)
9	10269.9	90.83	3.40	7293.0	2881.4	-1210.6	2.00	89.98	3088.8	
10	11861.4	90.83	3.40	7270.0	4469.9	-1116.1	0.00	0.00	4607.1	BHL 500'FNL & 1904'FEL





Directional

PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.20-T3N-R66W

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

Niles Miller 20Q-321

Wellbore #1

Plan: Plan #2 (2-5-16)

Standard Planning Report

08 February, 2016

Database:	US_EDM	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Project:	SEC.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	North Reference:	True
Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (2-5-16)		

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 20Q-321					
Well Position	+N/-S	15.0 ft	Northing:	1,317,910.68 usft	Latitude:	40.203910
	+E/-W	-0.2 ft	Easting:	3,197,037.02 usft	Longitude:	-104.794566
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	4,954.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/5/2016	8.24	66.73	52,535

Design	Plan #2 (2-5-16)			
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	345.98

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	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,376.7	14.65	258.88	1,366.1	-24.0	-121.9	1.50	1.50	0.00	258.88	
5,417.4	14.65	258.88	5,275.4	-221.0	-1,124.7	0.00	0.00	0.00	0.00	
6,150.0	0.00	0.00	6,000.0	-239.0	-1,216.1	2.00	-2.00	0.00	180.00	
6,713.1	0.00	0.00	6,563.2	-239.0	-1,216.1	0.00	0.00	0.00	0.00	
7,924.2	90.83	0.01	7,327.0	536.0	-1,216.0	7.50	7.50	0.00	0.01	
10,100.3	90.83	0.01	7,295.5	2,711.9	-1,215.6	0.00	0.00	0.00	0.00	WP (20Q-321)
10,269.9	90.83	3.40	7,293.0	2,881.4	-1,210.6	2.00	0.00	2.00	89.98	
11,861.4	90.83	3.40	7,270.0	4,469.9	-1,116.1	0.00	0.00	0.00	0.00	BHL 500'FNL & 1904'

Database:	US_EDM	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Project:	SEC.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	North Reference:	True
Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (2-5-16)		

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 289°FSL, 828°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
KOP - Start Build 1.50									
500.0	1.50	258.88	500.0	-0.3	-1.3	0.1	1.50	1.50	0.00
600.0	3.00	258.88	599.9	-1.0	-5.1	0.3	1.50	1.50	0.00
700.0	4.50	258.88	699.7	-2.3	-11.6	0.6	1.50	1.50	0.00
800.0	6.00	258.88	799.3	-4.0	-20.5	1.1	1.50	1.50	0.00
900.0	7.50	258.88	898.6	-6.3	-32.1	1.7	1.50	1.50	0.00
1,000.0	9.00	258.88	997.5	-9.1	-46.1	2.4	1.50	1.50	0.00
1,100.0	10.50	258.88	1,096.1	-12.3	-62.8	3.2	1.50	1.50	0.00
1,200.0	12.00	258.88	1,194.2	-16.1	-81.9	4.2	1.50	1.50	0.00
1,300.0	13.50	258.88	1,291.7	-20.4	-103.6	5.3	1.50	1.50	0.00
1,376.7	14.65	258.88	1,366.1	-24.0	-121.9	6.3	1.50	1.50	0.00
1,400.0	14.65	258.88	1,388.6	-25.1	-127.6	6.6	0.00	0.00	0.00
1,500.0	14.65	258.88	1,485.4	-30.0	-152.5	7.9	0.00	0.00	0.00
1,600.0	14.65	258.88	1,582.1	-34.8	-177.3	9.1	0.00	0.00	0.00
1,700.0	14.65	258.88	1,678.9	-39.7	-202.1	10.4	0.00	0.00	0.00
1,800.0	14.65	258.88	1,775.6	-44.6	-226.9	11.7	0.00	0.00	0.00
1,900.0	14.65	258.88	1,872.4	-49.5	-251.7	13.0	0.00	0.00	0.00
2,000.0	14.65	258.88	1,969.1	-54.4	-276.6	14.3	0.00	0.00	0.00
2,100.0	14.65	258.88	2,065.9	-59.2	-301.4	15.5	0.00	0.00	0.00
2,200.0	14.65	258.88	2,162.6	-64.1	-326.2	16.8	0.00	0.00	0.00
2,300.0	14.65	258.88	2,259.4	-69.0	-351.0	18.1	0.00	0.00	0.00
2,400.0	14.65	258.88	2,356.1	-73.9	-375.8	19.4	0.00	0.00	0.00
2,500.0	14.65	258.88	2,452.9	-78.7	-400.6	20.7	0.00	0.00	0.00
2,600.0	14.65	258.88	2,549.6	-83.6	-425.5	21.9	0.00	0.00	0.00
2,700.0	14.65	258.88	2,646.4	-88.5	-450.3	23.2	0.00	0.00	0.00
2,800.0	14.65	258.88	2,743.1	-93.4	-475.1	24.5	0.00	0.00	0.00
2,900.0	14.65	258.88	2,839.9	-98.2	-499.9	25.8	0.00	0.00	0.00
3,000.0	14.65	258.88	2,936.6	-103.1	-524.7	27.1	0.00	0.00	0.00
3,100.0	14.65	258.88	3,033.4	-108.0	-549.6	28.3	0.00	0.00	0.00
3,200.0	14.65	258.88	3,130.1	-112.9	-574.4	29.6	0.00	0.00	0.00
3,300.0	14.65	258.88	3,226.9	-117.8	-599.2	30.9	0.00	0.00	0.00
3,400.0	14.65	258.88	3,323.6	-122.6	-624.0	32.2	0.00	0.00	0.00
3,500.0	14.65	258.88	3,420.4	-127.5	-648.8	33.5	0.00	0.00	0.00
3,600.0	14.65	258.88	3,517.1	-132.4	-673.6	34.7	0.00	0.00	0.00
3,700.0	14.65	258.88	3,613.8	-137.3	-698.5	36.0	0.00	0.00	0.00
3,800.0	14.65	258.88	3,710.6	-142.1	-723.3	37.3	0.00	0.00	0.00
3,900.0	14.65	258.88	3,807.3	-147.0	-748.1	38.6	0.00	0.00	0.00
4,000.0	14.65	258.88	3,904.1	-151.9	-772.9	39.9	0.00	0.00	0.00
4,025.7	14.65	258.88	3,929.0	-153.2	-779.3	40.2	0.00	0.00	0.00
Parkman									
4,100.0	14.65	258.88	4,000.8	-156.8	-797.7	41.1	0.00	0.00	0.00
4,200.0	14.65	258.88	4,097.6	-161.7	-822.6	42.4	0.00	0.00	0.00
4,300.0	14.65	258.88	4,194.3	-166.5	-847.4	43.7	0.00	0.00	0.00
4,400.0	14.65	258.88	4,291.1	-171.4	-872.2	45.0	0.00	0.00	0.00
4,496.0	14.65	258.88	4,384.0	-176.1	-896.0	46.2	0.00	0.00	0.00

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Project:	SEC.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	North Reference:	True
Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (2-5-16)		

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	14.65	258.88	4,387.8	-176.3	-897.0	46.3	0.00	0.00	0.00
4,600.0	14.65	258.88	4,484.6	-181.2	-921.8	47.5	0.00	0.00	0.00
4,700.0	14.65	258.88	4,581.3	-186.0	-946.7	48.8	0.00	0.00	0.00
4,800.0	14.65	258.88	4,678.1	-190.9	-971.5	50.1	0.00	0.00	0.00
4,900.0	14.65	258.88	4,774.8	-195.8	-996.3	51.4	0.00	0.00	0.00
5,000.0	14.65	258.88	4,871.6	-200.7	-1,021.1	52.7	0.00	0.00	0.00
5,090.4	14.65	258.88	4,959.0	-205.1	-1,043.5	53.8	0.00	0.00	0.00
Shannon									
5,100.0	14.65	258.88	4,968.3	-205.6	-1,045.9	53.9	0.00	0.00	0.00
5,200.0	14.65	258.88	5,065.1	-210.4	-1,070.7	55.2	0.00	0.00	0.00
5,300.0	14.65	258.88	5,161.8	-215.3	-1,095.6	56.5	0.00	0.00	0.00
5,400.0	14.65	258.88	5,258.6	-220.2	-1,120.4	57.8	0.00	0.00	0.00
5,417.4	14.65	258.88	5,275.4	-221.0	-1,124.7	58.0	0.00	0.00	0.00
Start Drop -2.00									
5,500.0	13.00	258.88	5,355.6	-224.8	-1,144.1	59.0	2.00	-2.00	0.00
5,600.0	11.00	258.88	5,453.4	-228.9	-1,164.5	60.1	2.00	-2.00	0.00
5,700.0	9.00	258.88	5,551.9	-232.2	-1,181.5	60.9	2.00	-2.00	0.00
5,800.0	7.00	258.88	5,650.9	-234.9	-1,195.2	61.6	2.00	-2.00	0.00
5,900.0	5.00	258.88	5,750.4	-236.9	-1,205.4	62.2	2.00	-2.00	0.00
6,000.0	3.00	258.88	5,850.1	-238.2	-1,212.3	62.5	2.00	-2.00	0.00
6,100.0	1.00	258.88	5,950.1	-238.9	-1,215.7	62.7	2.00	-2.00	0.00
6,150.0	0.00	0.00	6,000.0	-239.0	-1,216.1	62.7	2.00	-2.00	0.00
6,200.0	0.00	0.00	6,050.0	-239.0	-1,216.1	62.7	0.00	0.00	0.00
6,300.0	0.00	0.00	6,150.0	-239.0	-1,216.1	62.7	0.00	0.00	0.00
6,400.0	0.00	0.00	6,250.0	-239.0	-1,216.1	62.7	0.00	0.00	0.00
6,500.0	0.00	0.00	6,350.0	-239.0	-1,216.1	62.7	0.00	0.00	0.00
6,600.0	0.00	0.00	6,450.0	-239.0	-1,216.1	62.7	0.00	0.00	0.00
6,700.0	0.00	0.00	6,550.0	-239.0	-1,216.1	62.7	0.00	0.00	0.00
6,713.1	0.00	0.00	6,563.1	-239.0	-1,216.1	62.7	0.00	0.00	0.00
KOP #2 - Start Build 7.50									
6,800.0	6.52	0.01	6,649.9	-234.1	-1,216.1	67.5	7.50	7.50	0.00
6,900.0	14.02	0.01	6,748.2	-216.3	-1,216.1	84.8	7.50	7.50	0.00
7,000.0	21.52	0.01	6,843.4	-185.8	-1,216.1	114.4	7.50	7.50	0.00
7,100.0	29.02	0.01	6,933.7	-143.1	-1,216.1	155.8	7.50	7.50	0.00
7,200.0	36.52	0.01	7,017.7	-89.0	-1,216.1	208.2	7.50	7.50	0.00
7,202.8	36.73	0.01	7,020.0	-87.4	-1,216.1	209.9	7.50	7.50	0.00
Sharon Springs									
7,300.0	44.02	0.01	7,094.0	-24.4	-1,216.1	270.9	7.50	7.50	0.00
7,390.2	50.78	0.01	7,155.0	41.9	-1,216.1	335.2	7.50	7.50	0.00
Niobrara A									
7,400.0	51.52	0.01	7,161.2	49.6	-1,216.1	342.7	7.50	7.50	0.00
7,441.3	54.62	0.01	7,186.0	82.6	-1,216.0	374.7	7.50	7.50	0.00
Niobrara B									
7,500.0	59.02	0.01	7,218.1	131.7	-1,216.0	422.3	7.50	7.50	0.00
7,600.0	66.52	0.01	7,263.8	220.5	-1,216.0	508.5	7.50	7.50	0.00
7,643.4	69.78	0.01	7,280.0	260.8	-1,216.0	547.7	7.50	7.50	0.00
Niobrara C									
7,700.0	74.02	0.01	7,297.6	314.6	-1,216.0	599.8	7.50	7.50	0.00
7,800.0	81.52	0.01	7,318.7	412.2	-1,216.0	694.5	7.50	7.50	0.00
7,900.0	89.02	0.01	7,327.0	511.8	-1,216.0	791.2	7.50	7.50	0.00

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Project:	SEC.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	North Reference:	True
Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (2-5-16)		

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)	
7,924.2	90.83	0.01	7,327.0	536.0	-1,216.0	814.6	7.50	7.50	0.00	
7,942.4	90.83	0.01	7,326.8	554.2	-1,216.0	832.3	0.00	0.00	0.00	
7"										
8,000.0	90.83	0.01	7,325.9	611.8	-1,216.0	888.2	0.00	0.00	0.00	
8,100.0	90.83	0.01	7,324.5	711.8	-1,215.9	985.2	0.00	0.00	0.00	
8,200.0	90.83	0.01	7,323.0	811.8	-1,215.9	1,082.2	0.00	0.00	0.00	
8,300.0	90.83	0.01	7,321.6	911.8	-1,215.9	1,179.2	0.00	0.00	0.00	
8,400.0	90.83	0.01	7,320.1	1,011.8	-1,215.9	1,276.2	0.00	0.00	0.00	
8,500.0	90.83	0.01	7,318.7	1,111.8	-1,215.9	1,373.2	0.00	0.00	0.00	
8,600.0	90.83	0.01	7,317.2	1,211.8	-1,215.9	1,470.2	0.00	0.00	0.00	
8,700.0	90.83	0.01	7,315.8	1,311.8	-1,215.8	1,567.2	0.00	0.00	0.00	
8,800.0	90.83	0.01	7,314.3	1,411.7	-1,215.8	1,664.2	0.00	0.00	0.00	
8,900.0	90.83	0.01	7,312.9	1,511.7	-1,215.8	1,761.2	0.00	0.00	0.00	
9,000.0	90.83	0.01	7,311.4	1,611.7	-1,215.8	1,858.2	0.00	0.00	0.00	
9,100.0	90.83	0.01	7,310.0	1,711.7	-1,215.8	1,955.2	0.00	0.00	0.00	
9,200.0	90.83	0.01	7,308.5	1,811.7	-1,215.8	2,052.3	0.00	0.00	0.00	
9,300.0	90.83	0.01	7,307.1	1,911.7	-1,215.7	2,149.3	0.00	0.00	0.00	
9,400.0	90.83	0.01	7,305.6	2,011.7	-1,215.7	2,246.3	0.00	0.00	0.00	
9,500.0	90.83	0.01	7,304.2	2,111.7	-1,215.7	2,343.3	0.00	0.00	0.00	
9,600.0	90.83	0.01	7,302.7	2,211.7	-1,215.7	2,440.3	0.00	0.00	0.00	
9,700.0	90.83	0.01	7,301.3	2,311.6	-1,215.7	2,537.3	0.00	0.00	0.00	
9,800.0	90.83	0.01	7,299.8	2,411.6	-1,215.7	2,634.3	0.00	0.00	0.00	
9,900.0	90.83	0.01	7,298.4	2,511.6	-1,215.6	2,731.3	0.00	0.00	0.00	
10,000.0	90.83	0.01	7,297.0	2,611.6	-1,215.6	2,828.3	0.00	0.00	0.00	
10,100.0	90.83	0.01	7,295.5	2,711.6	-1,215.6	2,925.3	0.00	0.00	0.00	
10,100.3	90.83	0.01	7,295.5	2,711.9	-1,215.6	2,925.6	0.00	0.00	0.00	
Start DLS 2.00 TFO 89.98 - WP (20Q-321)										
10,200.0	90.83	2.00	7,294.1	2,811.6	-1,213.8	3,021.9	2.00	0.00	2.00	
10,269.9	90.83	3.40	7,293.0	2,881.4	-1,210.6	3,088.8	2.00	0.00	2.00	
10,300.0	90.83	3.40	7,292.6	2,911.4	-1,208.8	3,117.5	0.00	0.00	0.00	
10,400.0	90.83	3.40	7,291.2	3,011.2	-1,202.8	3,212.9	0.00	0.00	0.00	
10,500.0	90.83	3.40	7,289.7	3,111.1	-1,196.9	3,308.3	0.00	0.00	0.00	
10,600.0	90.83	3.40	7,288.3	3,210.9	-1,191.0	3,403.7	0.00	0.00	0.00	
10,700.0	90.83	3.40	7,286.8	3,310.7	-1,185.0	3,499.1	0.00	0.00	0.00	
10,800.0	90.83	3.40	7,285.4	3,410.5	-1,179.1	3,594.5	0.00	0.00	0.00	
10,900.0	90.83	3.40	7,283.9	3,510.3	-1,173.2	3,689.9	0.00	0.00	0.00	
11,000.0	90.83	3.40	7,282.5	3,610.1	-1,167.2	3,785.4	0.00	0.00	0.00	
11,100.0	90.83	3.40	7,281.0	3,709.9	-1,161.3	3,880.8	0.00	0.00	0.00	
11,200.0	90.83	3.40	7,279.6	3,809.7	-1,155.4	3,976.2	0.00	0.00	0.00	
11,300.0	90.83	3.40	7,278.1	3,909.6	-1,149.4	4,071.6	0.00	0.00	0.00	
11,400.0	90.83	3.40	7,276.7	4,009.4	-1,143.5	4,167.0	0.00	0.00	0.00	
11,500.0	90.83	3.40	7,275.2	4,109.2	-1,137.5	4,262.4	0.00	0.00	0.00	
11,600.0	90.83	3.40	7,273.8	4,209.0	-1,131.6	4,357.8	0.00	0.00	0.00	
11,700.0	90.83	3.40	7,272.3	4,308.8	-1,125.7	4,453.2	0.00	0.00	0.00	
11,800.0	90.83	3.40	7,270.9	4,408.6	-1,119.7	4,548.6	0.00	0.00	0.00	
11,861.4	90.83	3.40	7,270.0	4,469.9	-1,116.1	4,607.1	0.00	0.00	0.00	
TD at 11861.4 - BHL 500'FNL & 1904'FEL										

Database:	US_EDM	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Project:	SEC.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	North Reference:	True
Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (2-5-16)		

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 289°FSL, 828°FEL - plan hits target center - Point	0.00	0.00	1.0	0.0	0.0	1,317,910.69	3,197,037.02	40.203910	-104.794566
BHL 500°FNL & 1904°FEL - plan hits target center - Point	0.00	0.00	7,270.0	4,469.9	-1,116.1	1,322,371.36	3,195,885.44	40.216180	-104.798562
WP (20Q-321) - plan hits target center - Point	0.00	0.00	7,295.5	2,711.9	-1,215.6	1,320,612.70	3,195,799.94	40.211354	-104.798918

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,942.4	7,326.8	7"	7	8-3/4

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,025.7	3,929.0	Parkman		0.00	
4,496.0	4,384.0	Sussex		0.00	
5,090.4	4,959.0	Shannon		0.00	
7,202.8	7,020.0	Sharon Springs		0.00	
7,390.2	7,155.0	Niobrara A		0.00	
7,441.3	7,186.0	Niobrara B		0.00	
7,643.4	7,280.0	Niobrara C		0.00	

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
400.0	400.0	0.0	0.0	KOP - Start Build 1.50
5,417.4	5,275.4	-221.0	-1,124.7	Start Drop -2.00
6,713.1	6,563.1	-239.0	-1,216.1	KOP #2 - Start Build 7.50
10,100.3	7,295.5	2,711.9	-1,215.6	Start DLS 2.00 TFO 89.98
11,861.4	7,270.0	4,469.9	-1,116.1	TD at 11861.4



Directional

PETROLEUM DEVELOPMENT CORP DJ Basin

SEC.20-T3N-R66W

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

Niles Miller 20Q-321

Wellbore #1

Plan #2 (2-5-16)

Anticollision Report

08 February, 2016



Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Reference	Plan #2 (2-5-16)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0 ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.45 Sigma	Casing Method:	Not applied

Survey Tool Program	Date 2/5/2016			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,861.4	Plan #2 (2-5-16) (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						
Barclay Crisman 4-6-20 (Exist) - Wellbore #1 - Wellbore	8,421.9	7,357.9	663.0	606.6	11.768	CC, ES
Barclay Crisman 4-6-20 (Exist) - Wellbore #1 - Wellbore	8,600.0	7,357.4	686.5	626.9	11.522	SF
Brattain Marble Unit 1 (Exist) - Wellbore #1 - Wellbore #1	11,142.2	7,253.1	682.2	576.8	6.472	CC, ES
Brattain Marble Unit 1 (Exist) - Wellbore #1 - Wellbore #1	11,200.0	7,251.6	684.7	578.0	6.417	SF
Miller 33-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	9,249.9	7,286.2	242.3	172.1	3.452	CC, ES, SF
Miller 33-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	9,339.8	7,287.9	255.8	185.0	3.614	CC, ES, SF
Miller 34-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	7,829.0	7,283.3	267.3	224.1	6.181	CC, ES
Miller 34-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	7,850.0	7,287.0	268.1	224.7	6.175	SF
Miller 34-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	7,984.4	7,287.9	202.4	158.8	4.643	CC, ES
Miller 34-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	8,000.0	7,288.8	203.0	159.2	4.638	SF
Miller 4-20J (Exist) - Wellbore #1 - Wellbore #1	8,460.3	7,331.6	604.1	551.2	11.417	CC, ES
Miller 4-20J (Exist) - Wellbore #1 - Wellbore #1	8,600.0	7,329.0	620.0	564.6	11.185	SF
Miller 44-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	111.6	119.6	452.0	451.6	1,211.824	CC
Miller 44-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	411.6	420.8	452.5	450.6	244.249	ES
Miller 44-20 - Encana (Exist) - Wellbore #1 - Wellbore #1	3,100.0	3,057.9	977.4	960.7	58.497	SF
Miller 44-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	100.0	109.9	486.8	486.5	1,518.534	CC
Miller 44-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	417.6	429.4	487.2	485.3	258.584	ES
Miller 44-20 - PDC (Exist) - Wellbore #1 - Wellbore #1	3,100.0	3,060.5	980.1	963.0	57.206	SF
Miller 5 (Exist) - Wellbore #1 - Wellbore #1	8,503.9	7,300.0	475.5	421.1	8.747	CC, ES
Miller 5 (Exist) - Wellbore #1 - Wellbore #1	8,600.0	7,300.0	485.1	429.0	8.642	SF
Raymond 15C-29HZ (Exist) - Wellbore #1 - Wellbore #1	5,074.8	4,934.7	147.9	104.5	3.403	CC, ES
Raymond 15C-29HZ (Exist) - Wellbore #1 - Wellbore #1	5,100.0	4,959.1	148.1	104.5	3.399	SF
Raymond 15N-29HZ (Exist) - Wellbore #1 - Wellbore #1	6,103.8	5,963.1	152.7	106.7	3.321	CC, ES
Raymond 15N-29HZ (Exist) - Wellbore #1 - Wellbore #1	6,713.1	6,572.7	159.5	110.8	3.273	SF
Raymond 16N-29HZ (Exist) - Wellbore #1 - Wellbore #1	2,597.3	2,528.3	389.3	369.4	19.538	CC
Raymond 16N-29HZ (Exist) - Wellbore #1 - Wellbore #1	2,600.0	2,530.6	389.3	369.4	19.513	ES
Raymond 16N-29HZ (Exist) - Wellbore #1 - Wellbore #1	2,900.0	2,801.7	410.4	387.9	18.204	SF
Raymond 37N-29HZ (Exist) - Wellbore #1 - Wellbore #1	3,050.3	2,959.8	225.2	202.0	9.680	CC
Raymond 37N-29HZ (Exist) - Wellbore #1 - Wellbore #1	3,100.0	3,007.8	225.6	201.8	9.498	ES
Raymond 37N-29HZ (Exist) - Wellbore #1 - Wellbore #1	3,300.0	3,196.9	235.6	210.2	9.270	SF
Soco 20-1K (Exist) - Wellbore #1 - Wellbore #1						Out of range
Soco 20-2K (Exist) - Wellbore #1 - Wellbore #1	11,591.6	7,226.1	128.5	8.4	1.070	Level 2, CC, ES, SF
Soco 20-7K (Exist) - Wellbore #1 - Wellbore #1	10,558.9	7,254.9	267.1	173.6	2.857	CC, ES, SF
Soco 20-8K (Exist) - Wellbore #1 - Wellbore #1						Out of range

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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	200.0	15.0	14.1	18.159	CC
Niles Miller 20Q-221 - Wellbore #1 - Plan #1 (12-01-15)	300.0	299.9	15.2	13.8	11.178	ES
Niles Miller 20Q-221 - Wellbore #1 - Plan #1 (12-01-15)	11,861.4	11,832.9	459.7	248.6	2.178	SF
Niles Miller 20T-221 - Wellbore #1 - Plan #1 (12-01-15)	400.0	401.0	45.1	43.2	23.404	CC
Niles Miller 20T-221 - Wellbore #1 - Plan #1 (12-01-15)	500.0	501.0	45.3	42.9	18.445	ES
Niles Miller 20T-221 - Wellbore #1 - Plan #1 (12-01-15)	11,861.4	11,629.4	902.1	691.8	4.289	SF
Niles Miller 20T-241 - Wellbore #1 - Plan #2 (2-5-16)	400.0	401.0	15.0	13.1	7.782	CC
Niles Miller 20T-241 - Wellbore #1 - Plan #2 (2-5-16)	500.0	501.0	15.3	12.8	6.220	ES
Niles Miller 20T-241 - Wellbore #1 - Plan #2 (2-5-16)	11,861.4	11,708.1	247.4	50.0	1.254	Level 3, SF
Niles Miller 20T-301 - Wellbore #1 - Plan #2 (2-5-16)	400.0	401.0	30.0	28.1	15.571	CC
Niles Miller 20T-301 - Wellbore #1 - Plan #2 (2-5-16)	500.0	501.0	30.3	27.8	12.310	ES
Niles Miller 20T-301 - Wellbore #1 - Plan #2 (2-5-16)	11,861.4	11,724.7	563.6	353.2	2.679	SF
Niles Miller 20T-321 - Wellbore #1 - Plan #1 (12-01-15)	400.0	403.0	90.0	88.1	46.615	CC
Niles Miller 20T-321 - Wellbore #1 - Plan #1 (12-01-15)	500.0	503.0	90.3	87.8	36.654	ES
Niles Miller 20T-321 - Wellbore #1 - Plan #1 (12-01-15)	1,100.0	1,099.1	119.6	113.6	20.204	SF
Niles Miller 20Y-241 - Wellbore #1 - Plan #1 (12-01-15)	400.0	402.0	75.0	73.0	38.862	CC
Niles Miller 20Y-241 - Wellbore #1 - Plan #1 (12-01-15)	500.0	502.0	75.2	72.8	30.566	ES
Niles Miller 20Y-241 - Wellbore #1 - Plan #1 (12-01-15)	1,000.0	999.5	95.5	90.2	18.044	SF
Niles Miller 20Y-401 - Wellbore #1 - Plan #1 (12-01-15)	400.0	402.0	60.0	58.0	31.086	CC
Niles Miller 20Y-401 - Wellbore #1 - Plan #1 (12-01-15)	500.0	502.0	60.2	57.8	24.471	ES
Niles Miller 20Y-401 - Wellbore #1 - Plan #1 (12-01-15)	900.0	900.6	73.3	68.6	15.638	SF

Offset Design		Existing Wells Sec.20-T3N-R66W - Barclay Crisman 4-6-20 (Exist) - Wellbore #1 - Wellbore #1										Offset Site Error:		0.0 ft	
Survey Program:		730-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)				
7,700.0	7,297.6	7,327.5	7,248.6	35.0	23.6	-72.55	1,033.4	-1,878.7	977.8	931.7	46.06	21.228			
7,750.0	7,309.8	7,340.2	7,261.4	35.2	23.6	-77.07	1,033.6	-1,878.8	942.8	895.9	46.95	20.081			
7,800.0	7,318.7	7,349.7	7,270.9	35.4	23.6	-81.30	1,033.7	-1,878.8	908.6	860.9	47.69	19.054			
7,850.0	7,324.5	7,356.0	7,277.2	35.6	23.7	-85.14	1,033.7	-1,878.8	875.5	827.2	48.23	18.151			
7,900.0	7,327.0	7,359.1	7,280.3	35.9	23.7	-88.47	1,033.8	-1,878.9	843.7	795.1	48.60	17.360			
7,924.2	7,327.0	7,359.4	7,280.6	36.0	23.7	-89.89	1,033.8	-1,878.9	829.0	780.3	48.74	17.010			
8,000.0	7,325.9	7,359.2	7,280.4	36.5	23.7	-89.88	1,033.8	-1,878.9	785.8	736.1	49.70	15.811			
8,100.0	7,324.5	7,358.9	7,280.1	37.3	23.7	-89.85	1,033.8	-1,878.9	737.0	685.9	51.10	14.423			
8,200.0	7,323.0	7,358.6	7,279.8	38.3	23.7	-89.82	1,033.8	-1,878.9	699.1	646.5	52.62	13.287			
8,300.0	7,321.6	7,358.3	7,279.5	39.4	23.7	-89.80	1,033.8	-1,878.9	674.1	619.9	54.24	12.428			
8,400.0	7,320.1	7,358.0	7,279.2	40.6	23.7	-89.77	1,033.8	-1,878.9	663.3	607.4	55.95	11.856			
8,421.9	7,319.8	7,357.9	7,279.1	40.9	23.7	-89.77	1,033.8	-1,878.9	663.0	606.6	56.34	11.768	CC, ES		
8,500.0	7,318.7	7,357.7	7,278.9	41.9	23.7	-89.75	1,033.8	-1,878.9	667.6	609.8	57.73	11.563			
8,600.0	7,317.2	7,357.4	7,278.6	43.4	23.7	-89.72	1,033.7	-1,878.9	686.5	626.9	59.58	11.522	SF		
8,700.0	7,315.8	7,357.1	7,278.3	44.9	23.7	-89.70	1,033.7	-1,878.9	718.9	657.5	61.48	11.694			
8,800.0	7,314.3	7,356.8	7,278.0	46.6	23.7	-89.67	1,033.7	-1,878.9	763.2	699.8	63.43	12.032			
8,900.0	7,312.9	7,356.5	7,277.7	48.3	23.7	-89.65	1,033.7	-1,878.8	817.4	752.0	65.42	12.495			
9,000.0	7,311.4	7,356.2	7,277.4	50.0	23.7	-89.62	1,033.7	-1,878.8	879.6	812.2	67.44	13.043			
9,100.0	7,310.0	7,355.9	7,277.1	51.8	23.7	-89.59	1,033.7	-1,878.8	948.3	878.8	69.50	13.646			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Brattain Marble Unit 1 (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)			
10,500.0	7,289.7	7,270.3	7,269.5	79.7	16.0	92.69	3,711.6	-478.3	936.7	845.6	91.18	10.274		
10,600.0	7,288.3	7,267.6	7,266.8	81.8	16.0	92.47	3,711.6	-478.2	871.3	777.9	93.38	9.331		
10,700.0	7,286.8	7,264.9	7,264.1	83.9	16.0	92.24	3,711.6	-478.2	812.9	717.3	95.59	8.504		
10,800.0	7,285.4	7,262.2	7,261.4	86.0	16.0	92.02	3,711.7	-478.1	763.2	665.4	97.80	7.803		
10,900.0	7,283.9	7,259.6	7,258.8	88.1	16.0	91.79	3,711.7	-478.1	723.9	623.9	100.02	7.237		
11,000.0	7,282.5	7,256.9	7,256.1	90.2	16.0	91.57	3,711.7	-478.0	696.9	594.6	102.24	6.816		
11,100.0	7,281.0	7,254.2	7,253.5	92.4	16.0	91.35	3,711.7	-477.9	683.5	579.0	104.47	6.543		
11,142.2	7,280.4	7,253.1	7,252.3	93.3	16.0	91.25	3,711.8	-477.9	682.2	576.8	105.41	6.472 CC, ES		
11,200.0	7,279.6	7,251.6	7,250.8	94.5	16.0	91.12	3,711.8	-477.9	684.7	578.0	106.70	6.417 SF		
11,300.0	7,278.1	7,249.0	7,248.2	96.7	16.0	90.90	3,711.8	-477.8	700.2	591.3	108.93	6.428		
11,400.0	7,276.7	7,246.3	7,245.5	98.9	16.0	90.68	3,711.8	-477.8	729.3	618.1	111.17	6.560		
11,500.0	7,275.2	7,243.7	7,242.9	101.1	16.0	90.46	3,711.9	-477.7	770.3	656.9	113.40	6.793		
11,600.0	7,273.8	7,241.1	7,240.3	103.2	16.0	90.24	3,711.9	-477.6	821.5	705.9	115.64	7.104		
11,700.0	7,272.3	7,238.4	7,237.6	105.4	16.0	90.02	3,711.9	-477.6	881.1	763.2	117.88	7.475		
11,800.0	7,270.9	7,235.8	7,235.0	107.6	15.9	89.80	3,711.9	-477.5	947.6	827.4	120.12	7.888		
11,861.4	7,270.0	7,234.2	7,233.4	109.0	15.9	89.67	3,712.0	-477.5	991.1	869.6	121.50	8.158		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.20-T3N-R66W - Miller 33-20 - 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)				
8,300.0	7,321.6	7,293.9	7,293.0	39.4	20.7	-90.98	1,861.7	-1,458.1	980.3	928.7	51.64	18.985	3.452 CC, ES, SF		
8,400.0	7,320.1	7,293.1	7,292.2	40.6	20.7	-90.80	1,861.7	-1,458.1	883.8	830.4	53.36	16.562			
8,500.0	7,318.7	7,292.4	7,291.4	41.9	20.7	-90.62	1,861.7	-1,458.1	788.1	732.9	55.16	14.286			
8,600.0	7,317.2	7,291.6	7,290.7	43.4	20.7	-90.43	1,861.7	-1,458.1	693.6	636.6	57.03	12.162			
8,700.0	7,315.8	7,290.8	7,289.9	44.9	20.7	-90.24	1,861.7	-1,458.0	600.9	542.0	58.95	10.194			
8,800.0	7,314.3	7,290.0	7,289.0	46.6	20.7	-90.05	1,861.6	-1,458.0	511.0	450.1	60.91	8.389			
8,900.0	7,312.9	7,289.1	7,288.2	48.3	20.7	-89.86	1,861.6	-1,458.0	425.6	362.7	62.92	6.764			
9,000.0	7,311.4	7,288.3	7,287.4	50.0	20.7	-89.66	1,861.6	-1,458.0	348.1	283.1	64.96	5.358			
9,100.0	7,310.0	7,287.5	7,286.5	51.8	20.7	-89.46	1,861.6	-1,458.0	284.9	217.9	67.03	4.251			
9,200.0	7,308.5	7,286.6	7,285.7	53.7	20.7	-89.26	1,861.6	-1,458.0	247.4	178.2	69.12	3.579			
9,249.9	7,307.8	7,286.2	7,285.2	54.6	20.7	-89.15	1,861.6	-1,458.0	242.3	172.1	70.18				
9,300.0	7,307.1	7,285.7	7,284.8	55.5	20.7	-89.05	1,861.6	-1,458.0	247.4	176.1	71.24	3.473			
9,400.0	7,305.6	7,284.8	7,283.9	57.5	20.7	-88.84	1,861.6	-1,458.0	285.0	211.6	73.38	3.884			
9,500.0	7,304.2	7,283.9	7,283.0	59.4	20.7	-88.63	1,861.6	-1,457.9	348.2	272.6	75.53	4.610			
9,600.0	7,302.7	7,283.0	7,282.1	61.4	20.7	-88.41	1,861.6	-1,457.9	425.7	348.0	77.70	5.479			
9,700.0	7,301.3	7,282.1	7,281.2	63.4	20.7	-88.19	1,861.6	-1,457.9	511.1	431.2	79.88	6.399			
9,800.0	7,299.8	7,281.1	7,280.2	65.5	20.7	-87.97	1,861.6	-1,457.9	601.0	519.0	82.07	7.323			
9,900.0	7,298.4	7,280.2	7,279.3	67.5	20.7	-87.74	1,861.6	-1,457.9	693.7	609.4	84.27	8.232			
10,000.0	7,297.0	7,279.2	7,278.3	69.6	20.7	-87.51	1,861.6	-1,457.9	788.2	701.7	86.48	9.114			
10,100.3	7,295.5	7,278.2	7,277.3	71.7	20.7	-87.27	1,861.6	-1,457.9	884.2	795.5	88.71	9.967			
10,200.0	7,294.1	7,277.2	7,276.3	73.7	20.7	-86.55	1,861.6	-1,457.9	980.8	890.8	90.01	10.897			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 33-20 - 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 (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		
8,400.0	7,320.1	7,307.5	7,307.1	40.6	19.5	-94.15	1,951.4	-1,471.6	973.8	922.1	51.65	18.853		
8,500.0	7,318.7	7,305.4	7,305.0	41.9	19.5	-93.68	1,951.4	-1,471.6	877.7	824.2	53.50	16.404		
8,600.0	7,317.2	7,303.3	7,302.9	43.4	19.5	-93.22	1,951.4	-1,471.6	782.6	727.2	55.42	14.122		
8,700.0	7,315.8	7,301.2	7,300.8	44.9	19.5	-92.75	1,951.4	-1,471.6	688.9	631.5	57.39	12.005		
8,800.0	7,314.3	7,299.1	7,298.7	46.6	19.5	-92.28	1,951.4	-1,471.5	597.2	537.8	59.40	10.055		
8,900.0	7,312.9	7,297.1	7,296.6	48.3	19.5	-91.81	1,951.5	-1,471.5	508.7	447.2	61.45	8.279		
9,000.0	7,311.4	7,295.0	7,294.5	50.0	19.4	-91.35	1,951.5	-1,471.5	425.2	361.7	63.53	6.694		
9,100.0	7,310.0	7,292.9	7,292.4	51.8	19.4	-90.88	1,951.5	-1,471.5	350.6	284.9	65.63	5.341		
9,200.0	7,308.5	7,290.8	7,290.4	53.7	19.4	-90.41	1,951.5	-1,471.5	291.5	223.7	67.76	4.301		
9,300.0	7,307.1	7,288.7	7,288.3	55.5	19.4	-89.94	1,951.5	-1,471.5	258.9	188.9	69.91	3.703		
9,339.8	7,306.5	7,287.9	7,287.4	56.3	19.4	-89.76	1,951.5	-1,471.5	255.8	185.0	70.77	3.614	CC, ES, SF	
9,400.0	7,305.6	7,286.6	7,286.2	57.5	19.4	-89.48	1,951.5	-1,471.5	262.8	190.7	72.07	3.646		
9,500.0	7,304.2	7,284.5	7,284.1	59.4	19.4	-89.01	1,951.5	-1,471.5	301.8	227.5	74.25	4.064		
9,600.0	7,302.7	7,282.4	7,282.0	61.4	19.4	-88.54	1,951.5	-1,471.5	364.8	288.4	76.44	4.773		
9,700.0	7,301.3	7,280.3	7,279.9	63.4	19.4	-88.07	1,951.6	-1,471.5	441.7	363.1	78.63	5.617		
9,800.0	7,299.8	7,278.2	7,277.8	65.5	19.4	-87.61	1,951.6	-1,471.5	526.4	445.6	80.84	6.512		
9,900.0	7,298.4	7,276.2	7,275.7	67.5	19.4	-87.14	1,951.6	-1,471.5	615.7	532.7	83.04	7.414		
10,000.0	7,297.0	7,274.1	7,273.6	69.6	19.4	-86.67	1,951.6	-1,471.4	707.9	622.6	85.25	8.303		
10,100.3	7,295.5	7,272.0	7,271.5	71.7	19.4	-86.20	1,951.6	-1,471.4	802.2	714.7	87.47	9.171		
10,200.0	7,294.1	7,269.9	7,269.5	73.7	19.4	-85.18	1,951.6	-1,471.4	897.7	809.0	88.76	10.114		
10,269.9	7,293.0	7,268.4	7,268.0	74.9	19.4	-84.23	1,951.6	-1,471.4	965.7	876.2	89.49	10.791		
10,300.0	7,292.6	7,267.8	7,267.3	75.5	19.4	-84.06	1,951.6	-1,471.4	995.1	905.0	90.10	11.044		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 34-20 - 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)			
3,200.0	3,130.1	3,088.5	3,088.0	16.5	8.0	43.72	412.3	-1,424.9	999.6	978.1	21.45	46.611		
3,300.0	3,226.9	3,188.7	3,188.1	17.2	8.2	44.64	410.8	-1,426.2	981.4	959.1	22.33	43.949		
3,400.0	3,323.6	3,285.3	3,284.7	17.8	8.5	45.58	409.3	-1,427.2	963.4	940.1	23.22	41.490		
3,500.0	3,420.4	3,380.7	3,380.1	18.5	8.7	46.56	408.3	-1,428.0	945.7	921.5	24.13	39.185		
3,600.0	3,517.1	3,477.0	3,476.4	19.2	9.0	47.60	407.7	-1,428.8	928.4	903.3	25.09	37.010		
3,700.0	3,613.8	3,576.1	3,575.5	19.8	9.3	48.74	407.2	-1,429.4	911.4	885.4	26.06	34.974		
3,800.0	3,710.6	3,673.6	3,672.9	20.5	9.5	49.92	406.9	-1,429.6	894.6	867.6	27.00	33.133		
3,900.0	3,807.3	3,771.8	3,771.2	21.2	9.6	51.17	406.8	-1,429.6	878.1	850.2	27.89	31.482		
4,000.0	3,904.1	3,870.5	3,869.8	21.8	9.8	52.46	406.3	-1,429.5	861.8	833.0	28.80	29.921		
4,100.0	4,000.8	3,966.9	3,966.3	22.5	10.0	53.70	405.1	-1,430.0	845.9	816.1	29.78	28.405		
4,200.0	4,097.6	4,061.3	4,060.6	23.2	10.3	54.93	403.6	-1,431.0	830.5	799.7	30.79	26.969		
4,300.0	4,194.3	4,155.9	4,155.2	23.9	10.5	56.17	402.1	-1,432.5	815.9	784.0	31.84	25.627		
4,400.0	4,291.1	4,249.7	4,249.0	24.5	10.8	57.40	400.4	-1,434.5	802.0	769.1	32.89	24.381		
4,500.0	4,387.8	4,343.7	4,343.0	25.2	11.1	58.66	398.9	-1,437.0	789.0	755.1	33.97	23.228		
4,600.0	4,484.6	4,440.4	4,439.5	25.9	11.4	60.00	397.6	-1,439.9	776.7	741.7	35.07	22.149		
4,700.0	4,581.3	4,537.0	4,536.2	26.5	11.7	61.36	396.1	-1,442.8	764.9	728.7	36.18	21.142		
4,800.0	4,678.1	4,632.9	4,632.0	27.2	12.0	62.73	394.7	-1,446.1	753.9	716.6	37.29	20.214		
4,900.0	4,774.8	4,731.1	4,730.1	27.9	12.3	64.19	393.3	-1,449.3	743.2	704.8	38.43	19.339		
5,000.0	4,871.6	4,826.2	4,825.2	28.5	12.6	65.68	392.5	-1,452.1	733.2	693.7	39.56	18.534		
5,100.0	4,968.3	4,923.0	4,922.0	29.2	12.9	67.26	392.0	-1,454.8	724.1	683.4	40.71	17.787		
5,200.0	5,065.1	5,023.6	5,022.5	29.9	13.2	68.98	391.5	-1,457.0	715.3	673.4	41.88	17.078		
5,300.0	5,161.8	5,120.3	5,119.2	30.6	13.6	70.71	391.2	-1,458.7	707.0	663.9	43.04	16.426		
5,400.0	5,258.6	5,218.4	5,217.2	31.2	13.9	72.52	391.0	-1,460.2	699.3	655.1	44.20	15.822		
5,417.4	5,275.4	5,235.1	5,234.0	31.3	13.9	72.83	390.9	-1,460.5	698.1	653.7	44.40	15.722		
5,500.0	5,355.6	5,314.3	5,313.2	31.8	14.2	74.13	390.7	-1,461.8	692.7	647.5	45.24	15.313		
5,600.0	5,453.4	5,409.0	5,407.9	32.2	14.5	75.49	390.7	-1,463.6	688.1	642.0	46.08	14.932		
5,700.0	5,551.9	5,504.5	5,503.4	32.6	14.7	76.66	391.3	-1,465.5	685.2	638.4	46.83	14.631		
5,800.0	5,650.9	5,605.8	5,604.6	32.9	15.0	77.66	392.0	-1,467.2	683.4	635.9	47.51	14.384		
5,900.0	5,750.4	5,704.8	5,703.6	33.2	15.3	78.42	392.8	-1,468.6	682.5	634.4	48.10	14.190		
5,974.9	5,825.0	5,780.2	5,779.0	33.3	15.5	78.84	393.5	-1,469.3	682.3	633.9	48.47	14.077		
6,000.0	5,850.1	5,805.4	5,804.1	33.4	15.6	78.95	393.7	-1,469.6	682.4	633.8	48.59	14.042		
6,100.0	5,950.1	5,904.0	5,902.8	33.5	15.8	79.20	394.7	-1,470.5	683.0	634.0	49.00	13.937		
6,150.0	6,000.0	5,954.6	5,953.4	33.6	15.9	-21.89	395.2	-1,470.9	683.6	634.4	49.18	13.899		
6,200.0	6,050.0	6,005.3	6,004.0	33.6	16.1	-21.89	395.8	-1,471.2	684.2	634.8	49.36	13.861		
6,300.0	6,150.0	6,103.9	6,102.6	33.8	16.3	-21.90	396.9	-1,471.8	685.4	635.7	49.69	13.793		
6,400.0	6,250.0	6,200.0	6,198.7	33.9	16.5	-21.90	398.4	-1,472.3	687.0	637.0	50.01	13.737		
6,500.0	6,350.0	6,298.3	6,297.1	34.0	16.6	-21.86	400.3	-1,472.6	689.0	638.7	50.32	13.693		
6,600.0	6,450.0	6,398.7	6,397.4	34.1	16.8	-21.82	402.5	-1,472.9	691.2	640.6	50.64	13.650		
6,700.0	6,550.0	6,493.2	6,491.9	34.3	17.0	-21.78	404.9	-1,473.4	693.7	642.8	50.95	13.615		
6,713.1	6,563.2	6,505.7	6,504.3	34.3	17.0	-21.77	405.3	-1,473.4	694.1	643.1	50.99	13.612		
6,750.0	6,600.0	6,541.1	6,539.7	34.3	17.1	-21.78	406.4	-1,473.7	694.4	643.3	51.08	13.594		
6,800.0	6,649.9	6,589.0	6,587.6	34.4	17.2	-21.93	408.0	-1,474.0	692.3	641.3	51.02	13.571		
6,850.0	6,699.3	6,638.3	6,636.9	34.4	17.3	-22.28	409.7	-1,474.3	687.3	636.6	50.74	13.545		
6,900.0	6,748.2	6,687.7	6,686.2	34.5	17.4	-22.83	411.5	-1,474.8	679.3	629.1	50.26	13.517		
6,950.0	6,796.3	6,734.8	6,733.3	34.5	17.5	-23.58	413.1	-1,475.2	668.4	618.9	49.58	13.483		
7,000.0	6,843.4	6,780.6	6,779.1	34.5	17.6	-24.56	414.8	-1,475.7	654.8	606.1	48.70	13.445		
7,050.0	6,889.2	6,826.3	6,824.8	34.5	17.7	-25.81	416.7	-1,476.2	638.6	590.9	47.66	13.398		
7,100.0	6,933.7	6,871.5	6,869.9	34.5	17.8	-27.37	418.5	-1,476.7	619.7	573.2	46.47	13.335		
7,150.0	6,976.6	6,914.6	6,913.0	34.5	17.9	-29.26	420.3	-1,477.1	598.3	553.1	45.17	13.246		
7,200.0	7,017.7	6,955.1	6,953.4	34.5	18.0	-31.52	422.1	-1,477.5	574.7	530.9	43.80	13.120		
7,250.0	7,056.9	6,993.9	6,992.2	34.5	18.1	-34.24	423.9	-1,478.0	549.1	506.7	42.45	12.937		

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 34-20 - 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 (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		
7,300.0	7,094.0	7,030.7	7,028.9	34.5	18.1	-37.47	425.8	-1,478.5	521.8	480.6	41.18	12.670		
7,350.0	7,128.8	7,065.6	7,063.7	34.5	18.2	-41.28	427.6	-1,479.1	493.0	452.9	40.13	12.287		
7,400.0	7,161.2	7,100.0	7,098.1	34.6	18.3	-45.85	429.5	-1,479.7	463.1	423.7	39.40	11.754		
7,450.0	7,191.0	7,129.2	7,127.3	34.6	18.4	-50.78	431.2	-1,480.3	432.6	393.5	39.07	11.071		
7,500.0	7,218.1	7,157.7	7,155.7	34.6	18.4	-56.41	432.9	-1,480.9	401.9	362.6	39.22	10.247		
7,550.0	7,242.4	7,183.9	7,181.8	34.7	18.5	-62.41	434.6	-1,481.4	371.7	331.9	39.76	9.349		
7,600.0	7,263.8	7,207.8	7,205.7	34.8	18.6	-68.57	436.1	-1,482.0	343.0	302.4	40.55	8.459		
7,650.0	7,282.2	7,229.6	7,227.5	34.9	18.6	-74.60	437.6	-1,482.4	316.8	275.4	41.38	7.656		
7,700.0	7,297.6	7,248.6	7,246.4	35.0	18.6	-80.02	438.9	-1,482.8	294.6	252.5	42.08	7.001		
7,750.0	7,309.8	7,264.5	7,262.2	35.2	18.7	-84.52	440.0	-1,483.0	278.1	235.4	42.61	6.526		
7,800.0	7,318.7	7,277.3	7,275.0	35.4	18.7	-87.88	441.0	-1,483.2	268.8	225.8	43.02	6.249		
7,829.0	7,322.5	7,283.3	7,281.0	35.5	18.7	-89.25	441.4	-1,483.3	267.3	224.1	43.25	6.181 CC, ES		
7,850.0	7,324.5	7,287.0	7,284.6	35.6	18.7	-89.96	441.7	-1,483.3	268.1	224.7	43.42	6.175 SF		
7,900.0	7,327.0	7,293.3	7,291.0	35.9	18.8	-90.68	442.1	-1,483.4	276.4	232.4	43.92	6.292		
7,924.2	7,327.0	7,295.2	7,292.8	36.0	18.8	-90.53	442.3	-1,483.4	283.4	239.2	44.23	6.408		
8,000.0	7,325.9	7,299.9	7,297.5	36.5	18.8	-91.53	442.6	-1,483.5	316.7	271.6	45.08	7.025		
8,100.0	7,324.5	7,305.6	7,303.2	37.3	18.8	-92.75	443.0	-1,483.5	379.7	333.3	46.32	8.197		
8,200.0	7,323.0	7,311.2	7,308.8	38.3	18.8	-93.94	443.4	-1,483.6	456.0	408.3	47.65	9.569		
8,300.0	7,321.6	7,316.6	7,314.2	39.4	18.8	-95.09	443.8	-1,483.7	540.0	490.9	49.08	11.003		
8,400.0	7,320.1	7,321.8	7,319.4	40.6	18.8	-96.20	444.2	-1,483.7	628.7	578.1	50.58	12.430		
8,500.0	7,318.7	7,326.9	7,324.5	41.9	18.8	-97.27	444.6	-1,483.8	720.3	668.2	52.14	13.815		
8,600.0	7,317.2	7,331.9	7,329.5	43.4	18.8	-98.31	444.9	-1,483.8	813.9	760.1	53.75	15.142		
8,700.0	7,315.8	7,336.7	7,334.3	44.9	18.8	-99.31	445.2	-1,483.9	908.8	853.4	55.40	16.403		

Company:	PETROLEUM DEVELOPMENT CORP DJ	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 34-20 - 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)			
3,600.0	3,517.1	3,472.8	3,472.5	19.2	9.1	55.66	551.2	-1,387.2	988.2	962.0	26.21	37.708		
3,700.0	3,613.8	3,567.2	3,567.0	19.8	9.3	56.83	552.0	-1,387.9	974.9	947.8	27.11	35.958		
3,800.0	3,710.6	3,667.7	3,667.5	20.5	9.4	58.14	553.1	-1,388.4	962.2	934.2	28.00	34.361		
3,900.0	3,807.3	3,774.9	3,774.7	21.2	9.5	59.62	554.3	-1,387.6	949.1	920.3	28.86	32.886		
4,000.0	3,904.1	3,879.0	3,878.8	21.8	9.6	61.13	554.9	-1,385.9	935.6	905.9	29.71	31.489		
4,100.0	4,000.8	3,976.1	3,975.8	22.5	9.6	62.55	554.9	-1,384.2	922.2	891.7	30.57	30.163		
4,200.0	4,097.6	4,070.1	4,069.8	23.2	9.8	63.93	554.6	-1,383.1	909.6	878.1	31.47	28.906		
4,300.0	4,194.3	4,163.8	4,163.6	23.9	9.9	65.31	554.2	-1,382.6	897.8	865.4	32.40	27.708		
4,400.0	4,291.1	4,253.4	4,253.1	24.5	10.1	66.64	554.0	-1,382.6	887.0	853.7	33.36	26.587		
4,500.0	4,387.8	4,344.8	4,344.5	25.2	10.3	67.99	554.3	-1,383.6	877.8	843.4	34.37	25.541		
4,600.0	4,484.6	4,442.4	4,442.1	25.9	10.6	69.39	554.0	-1,385.6	869.3	833.9	35.42	24.540		
4,700.0	4,581.3	4,538.2	4,537.9	26.5	10.9	70.76	553.6	-1,387.8	861.3	824.8	36.48	23.607		
4,800.0	4,678.1	4,630.1	4,629.7	27.2	11.1	72.10	553.5	-1,390.3	854.3	816.8	37.52	22.768		
4,900.0	4,774.8	4,724.4	4,724.0	27.9	11.4	73.47	553.9	-1,393.2	848.4	809.8	38.56	22.001		
5,000.0	4,871.6	4,823.0	4,822.5	28.5	11.7	74.91	554.1	-1,396.6	843.1	803.5	39.62	21.282		
5,100.0	4,968.3	4,921.6	4,921.1	29.2	11.9	76.37	554.3	-1,399.8	838.3	797.6	40.67	20.610		
5,200.0	5,065.1	5,020.8	5,020.3	29.9	12.2	77.89	554.5	-1,402.5	833.8	792.1	41.73	19.982		
5,300.0	5,161.8	5,119.0	5,118.5	30.6	12.5	79.42	554.6	-1,405.0	829.8	787.0	42.77	19.399		
5,400.0	5,258.6	5,214.3	5,213.7	31.2	12.8	80.95	554.9	-1,407.0	826.4	782.7	43.79	18.871		
5,417.4	5,275.4	5,231.0	5,230.4	31.3	12.8	81.22	555.0	-1,407.3	826.0	782.0	43.97	18.785		
5,500.0	5,355.6	5,310.6	5,310.0	31.8	13.0	82.42	555.6	-1,408.7	824.1	779.4	44.70	18.436		
5,600.0	5,453.4	5,409.6	5,408.9	32.2	13.3	83.71	556.3	-1,410.4	822.8	777.4	45.44	18.108		
5,700.0	5,551.9	5,512.1	5,511.5	32.6	13.6	84.83	556.8	-1,412.1	822.0	775.9	46.13	17.819		
5,800.0	5,650.9	5,617.1	5,616.4	32.9	13.9	85.73	556.6	-1,413.5	821.1	774.3	46.78	17.552		
5,900.0	5,750.4	5,715.0	5,714.3	33.2	14.2	86.37	556.4	-1,414.4	820.4	773.0	47.35	17.327		
5,954.2	5,804.4	5,766.8	5,766.1	33.3	14.3	86.63	556.5	-1,414.6	820.3	772.7	47.59	17.235		
6,000.0	5,850.1	5,810.2	5,809.6	33.4	14.4	86.81	556.7	-1,414.8	820.3	772.6	47.79	17.164		
6,100.0	5,950.1	5,903.1	5,902.4	33.5	14.6	87.02	557.6	-1,415.5	821.3	773.1	48.15	17.057		
6,150.0	6,000.0	5,953.7	5,953.1	33.6	14.8	-14.09	558.2	-1,416.2	822.0	773.7	48.33	17.007		
6,200.0	6,050.0	6,004.5	6,003.8	33.6	14.9	-14.13	558.8	-1,416.9	822.7	774.2	48.51	16.958		
6,300.0	6,150.0	6,106.6	6,105.9	33.8	15.1	-14.16	559.9	-1,417.6	823.9	775.1	48.84	16.869		
6,400.0	6,250.0	6,203.3	6,202.6	33.9	15.2	-14.12	561.2	-1,417.3	825.2	776.1	49.10	16.807		
6,500.0	6,350.0	6,300.0	6,299.3	34.0	15.3	-14.06	563.0	-1,416.9	827.0	777.6	49.35	16.756		
6,600.0	6,450.0	6,404.5	6,403.8	34.1	15.5	-14.01	564.9	-1,416.7	828.6	779.0	49.63	16.695		
6,700.0	6,550.0	6,500.0	6,499.2	34.3	15.7	-13.98	566.5	-1,416.6	830.2	780.3	49.91	16.632		
6,713.1	6,563.2	6,513.7	6,512.9	34.3	15.7	-13.97	566.7	-1,416.6	830.4	780.5	49.95	16.624		
6,750.0	6,600.0	6,549.7	6,548.9	34.3	15.7	-13.98	567.4	-1,416.5	830.3	780.2	50.01	16.602		
6,800.0	6,649.9	6,598.3	6,597.5	34.4	15.8	-14.06	568.5	-1,416.2	827.3	777.4	49.91	16.578		
6,850.0	6,699.3	6,643.5	6,642.7	34.4	15.9	-14.24	569.7	-1,415.9	821.4	771.8	49.59	16.563		
6,900.0	6,748.2	6,688.2	6,687.4	34.5	15.9	-14.56	571.0	-1,415.9	812.7	763.6	49.08	16.559		
6,950.0	6,796.3	6,736.8	6,735.9	34.5	16.0	-15.02	572.6	-1,416.1	801.0	752.6	48.37	16.558		
7,000.0	6,843.4	6,786.0	6,785.2	34.5	16.1	-15.64	574.1	-1,416.2	786.1	738.7	47.48	16.556		
7,050.0	6,889.2	6,831.8	6,830.9	34.5	16.2	-16.40	575.5	-1,416.2	768.3	721.9	46.40	16.558		
7,100.0	6,933.7	6,875.5	6,874.6	34.5	16.3	-17.33	577.0	-1,416.1	747.7	702.6	45.15	16.561		
7,150.0	6,976.6	6,917.2	6,916.3	34.5	16.4	-18.48	578.4	-1,416.1	724.5	680.7	43.75	16.559		
7,200.0	7,017.7	6,956.7	6,955.7	34.5	16.4	-19.87	580.0	-1,416.0	698.7	656.5	42.23	16.545		
7,250.0	7,056.9	6,994.6	6,993.6	34.5	16.5	-21.56	581.6	-1,416.0	670.7	630.0	40.63	16.505		
7,300.0	7,094.0	7,031.7	7,030.6	34.5	16.6	-23.66	583.3	-1,416.0	640.4	601.4	39.02	16.411		
7,350.0	7,128.8	7,066.9	7,065.9	34.5	16.7	-26.23	584.9	-1,416.1	608.0	570.5	37.48	16.223		
7,400.0	7,161.2	7,100.1	7,099.0	34.6	16.7	-29.39	586.5	-1,416.2	573.7	537.6	36.12	15.884		
7,450.0	7,191.0	7,132.5	7,131.4	34.6	16.8	-33.38	588.1	-1,416.3	537.7	502.6	35.13	15.307		

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 34-20 - 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)			
7,500.0	7,218.1	7,162.2	7,161.0	34.6	16.9	-38.23	589.5	-1,416.5	500.2	465.6	34.68	14.425		
7,550.0	7,242.4	7,188.9	7,187.6	34.7	16.9	-44.04	590.6	-1,416.7	461.7	426.7	34.93	13.217		
7,600.0	7,263.8	7,210.7	7,209.4	34.8	17.0	-50.51	591.6	-1,417.0	422.4	386.6	35.84	11.787		
7,650.0	7,282.2	7,228.6	7,227.4	34.9	17.0	-57.42	592.5	-1,417.2	383.1	345.9	37.23	10.290		
7,700.0	7,297.6	7,244.4	7,243.2	35.0	17.0	-64.66	593.3	-1,417.4	344.5	305.6	38.85	8.867		
7,750.0	7,309.8	7,257.9	7,256.6	35.2	17.1	-71.70	594.1	-1,417.7	307.2	266.9	40.32	7.620		
7,800.0	7,318.7	7,268.9	7,267.6	35.4	17.1	-78.00	594.9	-1,417.9	272.7	231.3	41.42	6.583		
7,850.0	7,324.5	7,277.3	7,275.9	35.6	17.1	-83.08	595.4	-1,418.0	242.6	200.4	42.15	5.755		
7,900.0	7,327.0	7,282.9	7,281.5	35.9	17.1	-86.63	595.8	-1,418.2	219.2	176.5	42.66	5.138		
7,924.2	7,327.0	7,284.5	7,283.2	36.0	17.1	-87.74	595.9	-1,418.2	211.1	168.2	42.89	4.922		
7,984.4	7,326.2	7,287.9	7,286.5	36.4	17.1	-88.67	596.2	-1,418.3	202.4	158.8	43.58	4.643 CC, ES		
8,000.0	7,325.9	7,288.8	7,287.4	36.5	17.1	-88.92	596.2	-1,418.3	203.0	159.2	43.76	4.638 SF		
8,100.0	7,324.5	7,294.6	7,293.2	37.3	17.2	-90.58	596.7	-1,418.4	233.0	188.0	45.00	5.178		
8,200.0	7,323.0	7,300.9	7,299.5	38.3	17.2	-92.35	597.1	-1,418.6	295.4	249.1	46.30	6.382		
8,300.0	7,321.6	7,307.2	7,305.7	39.4	17.2	-94.11	597.6	-1,418.7	374.5	326.8	47.66	7.857		
8,400.0	7,320.1	7,313.2	7,311.8	40.6	17.2	-95.81	598.1	-1,418.9	461.6	412.5	49.07	9.406		
8,500.0	7,318.7	7,319.2	7,317.7	41.9	17.2	-97.45	598.5	-1,419.0	553.0	502.5	50.53	10.945		
8,600.0	7,317.2	7,325.0	7,323.5	43.4	17.2	-99.05	598.9	-1,419.1	647.0	595.0	52.02	12.438		
8,700.0	7,315.8	7,330.6	7,329.1	44.9	17.2	-100.59	599.4	-1,419.2	742.4	688.9	53.52	13.871		
8,800.0	7,314.3	7,336.1	7,334.6	46.6	17.2	-102.07	599.8	-1,419.3	838.9	783.9	55.05	15.240		
8,900.0	7,312.9	7,341.5	7,340.0	48.3	17.3	-103.51	600.1	-1,419.4	936.1	879.5	56.58	16.545		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.20-T3N-R66W - Miller 4-20J (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)				
7,700.0	7,297.6	7,313.8	7,311.6	35.0	18.9	72.18	1,072.2	-611.5	969.3	930.1	39.26	24.692			
7,750.0	7,309.8	7,325.4	7,323.1	35.2	19.0	77.29	1,072.2	-611.8	931.7	891.0	40.75	22.864			
7,800.0	7,318.7	7,333.9	7,331.6	35.4	19.0	82.12	1,072.1	-611.9	894.7	852.6	42.11	21.248			
7,850.0	7,324.5	7,339.2	7,337.0	35.6	19.0	86.50	1,072.1	-612.0	858.7	815.4	43.29	19.836			
7,900.0	7,327.0	7,341.4	7,339.2	35.9	19.0	90.34	1,072.1	-612.1	823.9	779.6	44.30	18.597			
7,924.2	7,327.0	7,341.4	7,339.1	36.0	19.0	91.98	1,072.1	-612.1	807.6	762.9	44.75	18.048			
8,000.0	7,325.9	7,340.0	7,337.8	36.5	19.0	91.85	1,072.1	-612.0	759.4	713.7	45.70	16.618			
8,100.0	7,324.5	7,338.2	7,335.9	37.3	19.0	91.68	1,072.1	-612.0	703.4	656.3	47.08	14.941			
8,200.0	7,323.0	7,336.4	7,334.1	38.3	19.0	91.51	1,072.1	-612.0	657.8	609.2	48.57	13.542			
8,300.0	7,321.6	7,334.5	7,332.3	39.4	19.0	91.33	1,072.1	-611.9	625.0	574.8	50.17	12.458			
8,400.0	7,320.1	7,332.7	7,330.5	40.6	19.0	91.16	1,072.2	-611.9	607.1	555.3	51.85	11.708			
8,460.3	7,319.3	7,331.6	7,329.3	41.4	19.0	91.05	1,072.2	-611.9	604.1	551.2	52.91	11.417 CC, ES			
8,500.0	7,318.7	7,330.9	7,328.6	41.9	19.0	90.98	1,072.2	-611.9	605.4	551.8	53.61	11.292			
8,600.0	7,317.2	7,329.0	7,326.7	43.4	19.0	90.80	1,072.2	-611.8	620.0	564.6	55.43	11.185 SF			
8,700.0	7,315.8	7,327.1	7,324.9	44.9	19.0	90.63	1,072.2	-611.8	649.9	592.6	57.31	11.340			
8,800.0	7,314.3	7,325.2	7,323.0	46.6	19.0	90.45	1,072.2	-611.8	693.0	633.8	59.23	11.700			
8,900.0	7,312.9	7,323.4	7,321.1	48.3	19.0	90.27	1,072.2	-611.7	747.1	685.9	61.19	12.209			
9,000.0	7,311.4	7,321.5	7,319.2	50.0	19.0	90.09	1,072.2	-611.7	810.0	746.8	63.19	12.818			
9,100.0	7,310.0	7,319.5	7,317.3	51.8	19.0	89.91	1,072.2	-611.7	879.8	814.5	65.22	13.490			
9,200.0	7,308.5	7,317.6	7,315.4	53.7	19.0	89.73	1,072.2	-611.6	954.9	887.6	67.27	14.195			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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 (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	8.0	8.0	0.0	0.0	56.24	251.2	375.8	452.1	452.1	0.01	N/A		
100.0	100.0	108.3	108.3	0.1	0.2	56.21	251.4	375.7	452.0	451.7	0.32	1,425.258		
111.6	111.6	119.6	119.6	0.2	0.2	56.21	251.4	375.6	452.0	451.6	0.37	1,211.824 CC		
200.0	200.0	206.0	206.0	0.4	0.4	56.21	251.5	375.8	452.2	451.4	0.80	565.017		
300.0	300.0	306.8	306.8	0.7	0.6	56.20	251.8	376.1	452.6	451.3	1.33	340.905		
400.0	400.0	409.6	409.6	1.0	0.8	56.25	251.4	376.2	452.5	450.7	1.80	251.167		
411.6	411.6	420.8	420.8	1.0	0.9	157.38	251.3	376.2	452.5	450.6	1.85	244.249 ES		
500.0	500.0	506.9	506.9	1.2	1.0	157.49	251.0	376.5	453.7	451.4	2.24	202.094		
600.0	599.9	610.6	610.6	1.5	1.2	157.66	250.8	376.3	457.1	454.4	2.70	169.145		
700.0	699.7	708.4	708.4	1.7	1.4	157.91	250.8	375.9	462.8	459.6	3.15	147.098		
800.0	799.3	807.2	807.2	2.0	1.6	158.27	250.8	375.8	471.2	467.5	3.64	129.321		
900.0	898.6	905.3	905.3	2.4	1.9	158.70	251.0	375.8	482.3	478.1	4.16	115.820		
1,000.0	997.5	1,007.1	1,007.0	2.8	2.1	159.18	251.5	375.5	495.7	490.9	4.71	105.200		
1,100.0	1,096.1	1,106.8	1,106.8	3.2	2.4	159.75	251.5	375.0	511.1	505.9	5.25	97.426		
1,200.0	1,194.2	1,203.4	1,203.4	3.6	2.6	160.40	251.1	374.8	529.1	523.4	5.73	92.278		
1,300.0	1,291.7	1,298.7	1,298.7	4.2	2.7	161.07	250.9	374.9	550.0	543.8	6.22	88.481		
1,376.7	1,366.1	1,376.1	1,376.1	4.6	2.9	161.63	250.8	374.9	567.6	561.0	6.61	85.887		
1,400.0	1,388.6	1,399.5	1,399.5	4.8	2.9	161.83	250.7	374.8	573.2	566.4	6.73	85.139		
1,500.0	1,485.4	1,493.8	1,493.8	5.4	3.2	162.57	250.5	374.6	597.0	589.8	7.28	82.034		
1,600.0	1,582.1	1,594.1	1,594.1	6.0	3.4	163.27	250.6	374.2	621.0	613.1	7.86	78.985		
1,700.0	1,678.9	1,691.5	1,691.5	6.6	3.7	163.89	250.5	373.5	644.6	636.2	8.45	76.263		
1,800.0	1,775.6	1,784.5	1,784.5	7.3	3.9	164.42	250.8	372.8	668.6	659.5	9.04	73.957		
1,900.0	1,872.4	1,884.0	1,884.0	7.9	4.2	164.96	251.1	372.4	692.8	683.2	9.64	71.872		
2,000.0	1,969.1	1,980.4	1,980.4	8.6	4.4	165.46	251.0	371.9	716.8	706.5	10.24	69.992		
2,100.0	2,065.9	2,074.8	2,074.7	9.2	4.7	165.93	251.0	371.6	741.0	730.2	10.79	68.652		
2,200.0	2,162.6	2,175.0	2,175.0	9.9	4.8	166.45	250.4	371.6	765.4	754.1	11.32	67.615		
2,300.0	2,259.4	2,272.6	2,272.6	10.5	5.1	166.93	249.6	371.2	789.4	777.5	11.88	66.469		
2,400.0	2,356.1	2,369.0	2,368.9	11.2	5.3	167.34	249.1	370.8	813.5	801.0	12.46	65.279		
2,500.0	2,452.9	2,466.5	2,466.5	11.8	5.6	167.75	248.6	370.4	837.6	824.6	13.05	64.202		
2,600.0	2,549.6	2,571.4	2,571.4	12.5	5.8	168.20	247.2	369.8	861.4	847.8	13.64	63.133		
2,700.0	2,646.4	2,670.4	2,670.3	13.2	6.1	168.59	245.8	368.4	884.4	870.2	14.25	62.062		
2,800.0	2,743.1	2,765.0	2,764.9	13.8	6.4	168.94	244.7	367.1	907.6	892.8	14.85	61.112		
2,900.0	2,839.9	2,865.5	2,865.4	14.5	6.6	169.31	243.2	366.0	931.0	915.5	15.47	60.186		
3,000.0	2,936.6	2,961.0	2,960.8	15.2	6.9	169.61	242.1	364.4	954.0	937.9	16.08	59.316		
3,100.0	3,033.4	3,057.9	3,057.8	15.8	7.2	169.90	241.3	363.1	977.4	960.7	16.71	58.497 SF		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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	10.0	10.0	0.0	0.0	42.86	356.9	331.1	486.8	486.8	0.02	N/A	1,518.534 CC	
100.0	100.0	109.9	109.9	0.1	0.2	42.83	357.0	331.0	486.8	486.5	0.32			
200.0	200.0	208.1	208.1	0.4	0.4	42.83	357.2	331.1	487.0	486.2	0.81	604.534		
300.0	300.0	308.6	308.6	0.7	0.6	42.84	357.4	331.4	487.4	486.1	1.33	366.174		
400.0	400.0	412.5	412.5	1.0	0.8	42.88	357.0	331.5	487.2	485.4	1.81	269.637		
417.6	417.6	429.4	429.4	1.0	0.9	144.01	356.9	331.6	487.2	485.3	1.88	258.584 ES		
500.0	500.0	509.3	509.2	1.2	1.0	144.14	356.6	331.8	488.2	485.9	2.25	217.046		
600.0	599.9	612.4	612.4	1.5	1.2	144.37	356.5	331.6	491.1	488.4	2.70	181.552		
700.0	699.7	710.4	710.3	1.7	1.4	144.74	356.4	331.2	496.1	493.0	3.15	157.399		
800.0	799.3	809.1	809.1	2.0	1.6	145.26	356.4	331.1	503.6	499.9	3.66	137.758		
900.0	898.6	906.9	906.9	2.4	1.9	145.90	356.7	331.1	513.5	509.3	4.19	122.666		
1,000.0	997.5	1,008.4	1,008.4	2.8	2.1	146.63	357.1	330.8	525.5	520.8	4.75	110.656		
1,100.0	1,096.1	1,108.9	1,108.9	3.2	2.4	147.48	357.1	330.3	539.4	534.1	5.31	101.649		
1,200.0	1,194.2	1,205.9	1,205.9	3.6	2.6	148.44	356.7	330.1	555.6	549.8	5.82	95.417		
1,300.0	1,291.7	1,300.6	1,300.6	4.2	2.7	149.42	356.5	330.2	574.6	568.3	6.34	90.660		
1,376.7	1,366.1	1,378.6	1,378.5	4.6	2.9	150.26	356.4	330.2	590.8	584.0	6.76	87.365		
1,400.0	1,388.6	1,402.0	1,402.0	4.8	2.9	150.56	356.3	330.1	595.8	588.9	6.89	86.427		
1,500.0	1,485.4	1,495.4	1,495.4	5.4	3.2	151.66	356.1	329.9	617.9	610.4	7.47	82.672		
1,600.0	1,582.1	1,596.1	1,596.1	6.0	3.4	152.74	356.2	329.5	640.1	632.0	8.09	79.115		
1,700.0	1,678.9	1,692.9	1,692.9	6.6	3.7	153.70	356.2	328.8	662.2	653.5	8.71	76.030		
1,800.0	1,775.6	1,785.8	1,785.8	7.3	3.9	154.54	356.5	328.2	684.8	675.5	9.32	73.442		
1,900.0	1,872.4	1,885.9	1,885.9	7.9	4.2	155.41	356.7	327.7	707.7	697.7	9.95	71.137		
2,000.0	1,969.1	1,982.0	1,981.9	8.6	4.4	156.20	356.7	327.2	730.4	719.8	10.57	69.102		
2,100.0	2,065.9	2,077.1	2,077.0	9.2	4.7	156.95	356.7	326.9	753.5	742.3	11.14	67.624		
2,200.0	2,162.6	2,178.1	2,178.0	9.9	4.9	157.75	356.0	326.9	776.6	764.9	11.68	66.476		
2,300.0	2,259.4	2,275.0	2,275.0	10.5	5.1	158.47	355.2	326.5	799.4	787.1	12.25	65.250		
2,400.0	2,356.1	2,371.2	2,371.2	11.2	5.3	159.12	354.8	326.1	822.4	809.6	12.85	64.010		
2,500.0	2,452.9	2,469.4	2,469.4	11.8	5.6	159.75	354.2	325.7	845.6	832.1	13.44	62.897		
2,600.0	2,549.6	2,574.9	2,574.8	12.5	5.8	160.43	352.8	325.0	868.3	854.3	14.05	61.809		
2,700.0	2,646.4	2,672.9	2,672.8	13.2	6.1	161.01	351.5	323.6	890.4	875.7	14.66	60.738		
2,800.0	2,743.1	2,767.9	2,767.8	13.8	6.4	161.54	350.4	322.4	912.7	897.5	15.27	59.782		
2,900.0	2,839.9	2,868.5	2,868.4	14.5	6.7	162.10	348.8	321.3	935.2	919.3	15.89	58.865		
3,000.0	2,936.6	2,963.1	2,963.0	15.2	6.9	162.56	347.7	319.7	957.4	940.9	16.50	58.012		
3,100.0	3,033.4	3,060.5	3,060.3	15.8	7.2	163.01	346.9	318.4	980.1	963.0	17.13	57.206 SF		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Miller 5 (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 (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		
7,650.0	7,282.2	7,275.4	7,272.7	34.9	20.0	58.47	1,115.1	-740.6	972.3	936.2	36.13	26.914		
7,700.0	7,297.6	7,290.3	7,287.6	35.0	20.0	64.54	1,115.3	-740.7	931.2	893.1	38.06	24.468		
7,750.0	7,309.8	7,300.0	7,297.3	35.2	20.1	70.56	1,115.4	-740.7	889.9	849.9	40.05	22.220		
7,800.0	7,318.7	7,300.0	7,297.3	35.4	20.1	75.71	1,115.4	-740.7	848.9	807.1	41.74	20.338		
7,850.0	7,324.5	7,300.0	7,297.3	35.6	20.1	80.79	1,115.4	-740.7	808.4	765.0	43.31	18.663		
7,900.0	7,327.0	7,300.0	7,297.3	35.9	20.1	85.66	1,115.4	-740.7	768.6	723.9	44.71	17.191		
7,924.2	7,327.0	7,300.0	7,297.3	36.0	20.1	87.91	1,115.4	-740.7	749.8	704.5	45.32	16.545		
8,000.0	7,325.9	7,300.0	7,297.3	36.5	20.1	87.91	1,115.4	-740.7	692.8	646.6	46.28	14.971		
8,100.0	7,324.5	7,300.0	7,297.3	37.3	20.1	87.91	1,115.4	-740.7	623.9	576.2	47.67	13.088		
8,200.0	7,323.0	7,300.0	7,297.3	38.3	20.1	87.91	1,115.4	-740.7	564.3	515.1	49.18	11.474		
8,300.0	7,321.6	7,300.0	7,297.3	39.4	20.1	87.91	1,115.4	-740.7	517.4	466.6	50.80	10.184		
8,400.0	7,320.1	7,300.0	7,297.3	40.6	20.1	87.91	1,115.4	-740.7	486.7	434.2	52.51	9.270		
8,500.0	7,318.7	7,300.0	7,297.3	41.9	20.1	87.91	1,115.4	-740.7	475.5	421.2	54.29	8.759		
8,503.9	7,318.6	7,300.0	7,297.3	42.0	20.1	87.91	1,115.4	-740.7	475.5	421.1	54.36	8.747 CC, ES		
8,600.0	7,317.2	7,300.0	7,297.3	43.4	20.1	87.91	1,115.4	-740.7	485.1	429.0	56.13	8.642 SF		
8,700.0	7,315.8	7,300.0	7,297.3	44.9	20.1	87.91	1,115.4	-740.7	514.3	456.3	58.03	8.863		
8,800.0	7,314.3	7,300.0	7,297.3	46.6	20.1	87.91	1,115.4	-740.7	560.1	500.2	59.98	9.339		
8,900.0	7,312.9	7,300.0	7,297.3	48.3	20.1	87.91	1,115.4	-740.7	618.9	556.9	61.97	9.987		
9,000.0	7,311.4	7,300.0	7,297.3	50.0	20.1	87.91	1,115.4	-740.7	687.2	623.2	63.99	10.739		
9,100.0	7,310.0	7,300.0	7,297.3	51.8	20.1	87.91	1,115.4	-740.7	762.5	696.5	66.04	11.546		
9,200.0	7,308.5	7,300.0	7,297.3	53.7	20.1	87.91	1,115.4	-740.7	843.0	774.9	68.12	12.375		
9,300.0	7,307.1	7,300.0	7,297.3	55.5	20.1	87.91	1,115.4	-740.7	927.3	857.1	70.22	13.204		

Company:	PETROLEUM DEVELOPMENT CORP DJ	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Raymond 15C-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	-130.22	-545.5	-645.1	846.0					
100.0	100.0	55.1	55.1	0.1	0.1	-130.22	-545.5	-645.1	844.8	844.6	0.27	3,183.597		
200.0	200.0	154.3	154.3	0.4	0.4	-130.23	-545.7	-645.2	845.1	844.3	0.80	1,052.673		
300.0	300.0	255.5	255.5	0.7	0.6	-130.22	-545.7	-645.4	845.2	843.8	1.33	635.996		
400.0	400.0	354.8	354.8	1.0	0.9	-130.18	-545.3	-645.8	845.3	843.4	1.86	455.508		
500.0	500.0	453.3	453.3	1.2	1.2	-29.07	-545.0	-646.4	844.3	842.0	2.37	355.862		
600.0	599.9	551.8	551.8	1.5	1.4	-29.19	-544.9	-647.0	841.3	838.4	2.89	291.397		
700.0	699.7	651.2	651.2	1.7	1.7	-29.42	-545.0	-647.6	836.2	832.7	3.41	244.885		
800.0	799.3	752.8	752.8	2.0	1.9	-29.80	-545.4	-647.9	828.6	824.7	3.95	209.625		
900.0	898.6	855.0	855.0	2.4	2.2	-30.29	-545.4	-648.1	818.6	814.1	4.50	181.802		
1,000.0	997.5	955.7	955.7	2.8	2.4	-30.87	-544.9	-648.3	806.0	801.0	5.07	159.106		
1,100.0	1,096.1	1,055.8	1,055.7	3.2	2.7	-31.58	-544.2	-648.4	791.1	785.5	5.65	140.136		
1,200.0	1,194.2	1,154.8	1,154.8	3.6	2.9	-32.44	-543.4	-648.4	773.9	767.7	6.24	123.930		
1,300.0	1,291.7	1,251.2	1,251.2	4.2	3.2	-33.43	-542.6	-648.5	754.8	747.9	6.87	109.912		
1,376.7	1,366.1	1,325.7	1,325.7	4.6	3.4	-34.31	-541.9	-648.7	738.8	731.4	7.37	100.245		
1,400.0	1,388.6	1,348.1	1,348.0	4.8	3.4	-34.55	-541.6	-648.8	733.8	726.2	7.53	97.501		
1,500.0	1,485.4	1,444.2	1,444.1	5.4	3.7	-35.58	-540.5	-649.3	712.4	704.2	8.21	86.756		
1,600.0	1,582.1	1,540.3	1,540.2	6.0	4.0	-36.63	-539.1	-650.4	691.4	682.5	8.92	77.502		
1,700.0	1,678.9	1,628.3	1,628.2	6.6	4.2	-37.47	-536.6	-653.2	671.1	661.5	9.62	69.728		
1,800.0	1,775.6	1,722.9	1,722.6	7.3	4.5	-38.21	-533.5	-658.9	652.5	642.1	10.36	63.000		
1,900.0	1,872.4	1,818.2	1,817.5	7.9	4.7	-38.91	-529.6	-665.2	633.8	622.7	11.11	57.042		
2,000.0	1,969.1	1,913.7	1,912.6	8.6	5.0	-39.46	-524.9	-673.6	615.8	604.0	11.88	51.823		
2,100.0	2,065.9	2,003.0	2,001.2	9.2	5.3	-39.88	-520.3	-682.9	598.8	586.1	12.65	47.331		
2,200.0	2,162.6	2,094.0	2,091.4	9.9	5.6	-40.18	-515.4	-694.1	582.9	569.5	13.44	43.378		
2,300.0	2,259.4	2,185.4	2,181.8	10.5	5.9	-40.36	-510.6	-707.2	568.3	554.1	14.24	39.906		
2,400.0	2,356.1	2,273.9	2,268.8	11.2	6.2	-40.35	-506.2	-722.4	555.8	540.8	15.04	36.949		
2,500.0	2,452.9	2,380.8	2,373.9	11.8	6.6	-40.25	-500.2	-741.3	543.0	527.1	15.91	34.130		
2,600.0	2,549.6	2,481.6	2,472.9	12.5	7.0	-40.14	-494.2	-759.1	530.1	513.3	16.77	31.610		
2,700.0	2,646.4	2,587.6	2,577.0	13.2	7.4	-39.87	-486.2	-777.8	515.9	498.2	17.66	29.214		
2,800.0	2,743.1	2,691.8	2,679.1	13.8	7.9	-39.52	-477.0	-796.1	500.6	482.1	18.54	27.003		
2,900.0	2,839.9	2,798.8	2,784.0	14.5	8.3	-39.05	-466.0	-814.4	484.0	464.6	19.44	24.902		
3,000.0	2,936.6	2,901.3	2,884.3	15.2	8.8	-38.45	-453.6	-831.5	465.8	445.5	20.32	22.929		
3,100.0	3,033.4	2,999.3	2,980.0	15.8	9.2	-37.71	-441.2	-848.5	447.7	426.6	21.16	21.164		
3,200.0	3,130.1	3,094.7	3,073.3	16.5	9.7	-37.04	-429.7	-864.5	429.7	407.8	21.97	19.559		
3,300.0	3,226.9	3,191.3	3,167.9	17.2	10.1	-36.40	-419.0	-880.8	412.6	389.8	22.78	18.112		
3,400.0	3,323.6	3,287.0	3,261.9	17.8	10.5	-35.90	-409.7	-896.3	396.1	372.5	23.59	16.793		
3,500.0	3,420.4	3,383.4	3,356.7	18.5	10.9	-35.48	-401.4	-912.0	380.4	356.0	24.40	15.591		
3,600.0	3,517.1	3,483.5	3,455.2	19.2	11.3	-35.19	-393.5	-927.3	364.5	339.3	25.20	14.465		
3,700.0	3,613.8	3,583.4	3,553.9	19.8	11.7	-35.13	-386.5	-941.3	348.3	322.3	26.04	13.377		
3,800.0	3,710.6	3,683.2	3,652.7	20.5	12.1	-35.36	-380.4	-953.8	331.8	304.9	26.92	12.324		
3,900.0	3,807.3	3,782.8	3,751.6	21.2	12.5	-35.90	-375.1	-965.0	314.9	287.1	27.87	11.301		
4,000.0	3,904.1	3,883.5	3,851.6	21.8	12.8	-36.76	-370.3	-975.0	297.6	268.8	28.84	10.319		
4,100.0	4,000.8	3,982.7	3,950.3	22.5	13.2	-37.90	-365.7	-983.8	279.8	250.0	29.85	9.375		
4,200.0	4,097.6	4,081.3	4,048.6	23.2	13.5	-39.47	-361.8	-991.4	261.9	230.9	30.94	8.464		
4,300.0	4,194.3	4,180.1	4,147.0	23.9	13.8	-41.44	-358.2	-998.5	244.1	212.0	32.11	7.602		
4,400.0	4,291.1	4,279.2	4,245.9	24.5	14.0	-44.19	-355.3	-1,003.8	226.1	192.7	33.42	6.767		
4,500.0	4,387.8	4,377.2	4,343.9	25.2	14.3	-47.83	-353.1	-1,007.5	208.5	173.6	34.88	5.977		
4,600.0	4,484.6	4,474.6	4,441.3	25.9	14.5	-52.58	-351.6	-1,009.7	191.7	155.2	36.52	5.249		
4,700.0	4,581.3	4,571.5	4,538.1	26.5	14.7	-58.63	-350.8	-1,010.4	176.7	138.3	38.33	4.609		
4,800.0	4,678.1	4,668.6	4,635.3	27.2	14.9	-66.08	-350.3	-1,010.0	164.0	123.8	40.13	4.086		
4,900.0	4,774.8	4,765.3	4,731.9	27.9	15.1	-74.81	-349.7	-1,008.8	154.5	112.7	41.76	3.699		

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Raymond 15C-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	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)			
5,000.0	4,871.6	4,862.0	4,828.6	28.5	15.3	-84.59	-349.1	-1,007.0	149.1	106.2	42.96	3.472		
5,074.8	4,944.0	4,934.7	4,901.3	29.0	15.4	-92.01	-348.4	-1,006.2	147.9	104.5	43.47	3.403 CC, ES		
5,100.0	4,968.3	4,959.1	4,925.7	29.2	15.5	-94.43	-348.2	-1,006.2	148.1	104.5	43.57	3.399 SF		
5,200.0	5,065.1	5,056.0	5,022.6	29.9	15.7	-103.65	-347.4	-1,006.7	151.2	107.5	43.65	3.463		
5,300.0	5,161.8	5,151.4	5,117.9	30.6	15.9	-112.18	-346.8	-1,007.0	158.5	115.2	43.33	3.659		
5,400.0	5,258.6	5,246.6	5,213.2	31.2	16.1	-119.92	-346.9	-1,006.5	170.4	127.6	42.76	3.985		
5,417.4	5,275.4	5,263.4	5,229.9	31.3	16.1	-121.16	-346.9	-1,006.3	172.8	130.2	42.65	4.052		
5,500.0	5,355.6	5,343.3	5,309.8	31.8	16.3	-126.56	-347.3	-1,005.7	184.8	142.7	42.09	4.391		
5,600.0	5,453.4	5,440.7	5,407.3	32.2	16.5	-131.57	-347.8	-1,004.8	199.1	157.6	41.52	4.795		
5,700.0	5,551.9	5,538.9	5,505.5	32.6	16.7	-135.35	-348.1	-1,003.7	212.2	171.1	41.15	5.157		
5,800.0	5,650.9	5,637.6	5,604.1	32.9	16.9	-138.18	-348.1	-1,002.4	223.6	182.7	40.95	5.461		
5,900.0	5,750.4	5,736.4	5,702.9	33.2	17.1	-140.12	-348.4	-1,001.0	232.9	192.0	40.90	5.694		
6,000.0	5,850.1	5,835.8	5,802.3	33.4	17.3	-141.30	-349.0	-999.6	239.8	198.8	40.99	5.851		
6,100.0	5,950.1	5,935.6	5,902.2	33.5	17.5	-141.76	-350.1	-998.4	244.2	203.0	41.20	5.926		
6,150.0	6,000.0	5,985.6	5,952.1	33.6	17.6	117.13	-350.8	-997.8	245.3	203.9	41.35	5.932		
6,200.0	6,050.0	6,035.7	6,002.2	33.6	17.7	117.25	-351.7	-997.3	246.1	204.5	41.58	5.919		
6,300.0	6,150.0	6,135.8	6,102.3	33.8	17.9	117.59	-353.6	-996.7	247.6	205.5	42.06	5.886		
6,400.0	6,250.0	6,236.9	6,203.4	33.9	18.1	118.02	-356.0	-996.2	249.1	206.5	42.57	5.850		
6,500.0	6,350.0	6,336.6	6,303.1	34.0	18.4	118.39	-357.8	-996.2	250.0	206.9	43.06	5.804		
6,600.0	6,450.0	6,439.5	6,405.9	34.1	18.6	118.82	-359.9	-996.4	250.8	207.2	43.58	5.754		
6,700.0	6,550.0	6,539.9	6,506.3	34.3	18.8	119.23	-361.4	-997.3	250.7	206.6	44.09	5.687		
6,713.1	6,563.2	6,553.1	6,519.5	34.3	18.8	119.29	-361.6	-997.4	250.7	206.6	44.16	5.678		
6,715.1	6,565.1	6,555.0	6,521.4	34.3	18.8	119.29	-361.7	-997.5	250.7	206.5	44.17	5.676		
6,750.0	6,600.0	6,590.0	6,556.4	34.3	18.9	119.60	-362.3	-997.8	251.1	206.7	44.45	5.650		
6,800.0	6,649.9	6,640.6	6,607.0	34.4	19.0	120.52	-363.1	-998.5	253.0	208.2	44.86	5.640		
6,850.0	6,699.3	6,691.5	6,657.9	34.4	19.2	121.99	-363.9	-999.4	256.5	211.2	45.30	5.662		
6,900.0	6,748.2	6,740.2	6,706.6	34.5	19.3	123.82	-364.6	-1,000.4	261.8	216.1	45.67	5.732		
6,950.0	6,796.3	6,785.9	6,752.2	34.5	19.4	125.89	-365.7	-1,001.5	269.6	223.7	45.93	5.869		
7,000.0	6,843.4	6,823.2	6,789.4	34.5	19.5	127.82	-368.0	-1,002.5	280.9	234.9	45.97	6.110		
7,050.0	6,889.2	6,856.5	6,822.4	34.5	19.5	129.75	-372.0	-1,003.8	296.8	251.0	45.81	6.479		
7,100.0	6,933.7	6,887.4	6,852.9	34.5	19.6	131.56	-377.5	-1,005.1	317.5	272.0	45.43	6.987		
7,150.0	6,976.6	6,911.0	6,875.9	34.5	19.7	132.49	-382.5	-1,006.4	342.7	298.0	44.76	7.657		
7,200.0	7,017.7	6,938.0	6,902.1	34.5	19.7	133.56	-389.0	-1,007.5	372.3	328.4	43.97	8.468		
7,250.0	7,056.9	6,954.0	6,917.5	34.5	19.7	132.97	-393.1	-1,007.8	405.9	363.0	42.96	9.450		
7,300.0	7,094.0	6,974.9	6,937.5	34.5	19.8	132.61	-399.0	-1,008.3	442.9	400.9	41.96	10.554		
7,350.0	7,128.8	6,988.4	6,950.4	34.5	19.8	130.81	-403.2	-1,008.6	482.8	441.8	41.01	11.771		
7,400.0	7,161.2	6,997.0	6,958.5	34.6	19.8	127.54	-406.1	-1,008.9	525.0	484.8	40.29	13.030		
7,450.0	7,191.0	6,997.0	6,958.5	34.6	19.8	121.60	-406.1	-1,008.9	569.4	529.3	40.05	14.216		
7,500.0	7,218.1	7,010.5	6,971.1	34.6	19.8	116.95	-410.7	-1,009.3	614.9	574.9	40.09	15.339		
7,550.0	7,242.4	7,013.5	6,974.0	34.7	19.8	108.48	-411.8	-1,009.4	661.7	621.1	40.66	16.276		
7,600.0	7,263.8	7,015.0	6,975.3	34.8	19.8	97.69	-412.4	-1,009.4	709.3	668.1	41.17	17.228		
7,650.0	7,282.2	7,015.0	6,975.3	34.9	19.8	85.00	-412.4	-1,009.4	757.2	716.5	40.73	18.592		
7,700.0	7,297.6	7,013.7	6,974.1	35.0	19.8	71.65	-411.9	-1,009.4	805.3	766.8	38.54	20.895		
7,750.0	7,309.8	7,011.3	6,971.9	35.2	19.8	59.23	-411.0	-1,009.3	853.4	818.7	34.69	24.602		
7,800.0	7,318.7	6,997.0	6,958.5	35.4	19.8	47.17	-406.1	-1,008.9	901.4	872.2	29.25	30.816		
7,850.0	7,324.5	6,997.0	6,958.5	35.6	19.8	39.74	-406.1	-1,008.9	948.6	923.7	24.98	37.976		
7,900.0	7,327.0	6,997.0	6,958.5	35.9	19.8	33.87	-406.1	-1,008.9	995.3	974.1	21.24	46.851		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Raymond 15N-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	-128.89	-544.7	-675.3	868.7					
100.0	100.0	59.4	59.4	0.1	0.1	-128.89	-544.7	-675.3	867.6	867.3	0.28	3,135.342		
200.0	200.0	160.8	160.8	0.4	0.4	-128.87	-544.2	-675.0	867.1	866.3	0.82	1,056.775		
300.0	300.0	257.2	257.2	0.7	0.7	-128.84	-543.7	-675.2	866.9	865.5	1.34	646.636		
305.1	305.1	262.1	262.1	0.7	0.7	-128.84	-543.7	-675.2	866.8	865.5	1.37	634.129		
400.0	400.0	355.7	355.7	1.0	0.9	-128.79	-543.2	-675.7	867.0	865.1	1.87	464.622		
500.0	500.0	457.2	457.2	1.2	1.2	-27.68	-542.7	-676.2	865.9	863.5	2.38	363.205		
600.0	599.9	557.0	557.0	1.5	1.4	-27.78	-542.2	-676.5	862.3	859.4	2.90	297.780		
700.0	699.7	653.7	653.7	1.7	1.7	-27.97	-541.7	-677.1	856.7	853.3	3.42	250.860		
800.0	799.3	752.3	752.3	2.0	1.9	-28.26	-541.4	-678.0	849.2	845.2	3.95	215.028		
900.0	898.6	853.7	853.7	2.4	2.2	-28.72	-541.5	-678.2	839.0	834.5	4.50	186.549		
1,000.0	997.5	951.8	951.8	2.8	2.4	-29.27	-541.6	-678.6	826.8	821.7	5.06	163.480		
1,100.0	1,096.1	1,049.5	1,049.5	3.2	2.7	-29.93	-541.6	-679.1	812.4	806.8	5.63	144.322		
1,200.0	1,194.2	1,148.1	1,148.1	3.6	2.9	-30.73	-541.6	-679.6	795.9	789.6	6.22	127.935		
1,300.0	1,291.7	1,242.1	1,242.1	4.2	3.2	-31.64	-541.6	-680.2	777.3	770.5	6.83	113.770		
1,376.7	1,366.1	1,302.5	1,302.5	4.6	3.3	-32.24	-541.2	-682.0	762.7	755.4	7.29	104.629		
1,400.0	1,388.6	1,321.0	1,320.9	4.8	3.4	-32.37	-541.0	-683.0	758.4	750.9	7.43	102.062		
1,500.0	1,485.4	1,400.9	1,400.5	5.4	3.6	-32.80	-539.5	-689.3	741.3	733.2	8.06	91.935		
1,600.0	1,582.1	1,497.0	1,495.8	6.0	3.9	-32.99	-536.4	-701.6	726.8	718.1	8.75	83.086		
1,700.0	1,678.9	1,575.5	1,573.2	6.6	4.2	-32.94	-532.7	-714.4	713.8	704.3	9.41	75.817		
1,800.0	1,775.6	1,670.4	1,666.5	7.3	4.5	-32.77	-527.7	-731.0	701.4	691.2	10.15	69.078		
1,900.0	1,872.4	1,769.9	1,764.2	7.9	4.9	-32.59	-522.7	-748.6	689.3	678.4	10.93	63.077		
2,000.0	1,969.1	1,872.7	1,865.4	8.6	5.3	-32.45	-517.9	-766.3	677.1	665.4	11.71	57.823		
2,100.0	2,065.9	1,977.2	1,968.6	9.2	5.6	-32.48	-513.8	-782.3	663.9	651.5	12.49	53.144		
2,200.0	2,162.6	2,076.5	2,066.8	9.9	6.0	-32.55	-510.0	-796.8	650.5	637.2	13.28	48.980		
2,300.0	2,259.4	2,174.8	2,163.9	10.5	6.4	-32.59	-506.1	-811.5	637.1	623.0	14.07	45.274		
2,400.0	2,356.1	2,268.8	2,256.5	11.2	6.8	-32.55	-502.0	-826.5	624.2	609.4	14.87	41.985		
2,500.0	2,452.9	2,379.0	2,365.3	11.8	7.2	-32.49	-496.8	-843.7	610.8	595.0	15.72	38.864		
2,600.0	2,549.6	2,478.1	2,463.4	12.5	7.6	-32.57	-492.2	-857.4	596.2	579.6	16.52	36.078		
2,700.0	2,646.4	2,572.3	2,556.5	13.2	8.0	-32.61	-488.2	-871.3	582.4	565.0	17.33	33.608		
2,800.0	2,743.1	2,669.3	2,652.2	13.8	8.4	-32.59	-483.8	-886.3	569.1	550.9	18.15	31.354		
2,900.0	2,839.9	2,763.9	2,745.4	14.5	8.8	-32.49	-479.4	-901.8	556.3	537.3	18.97	29.328		
3,000.0	2,936.6	2,861.0	2,840.8	15.2	9.2	-32.27	-474.6	-919.0	544.2	524.4	19.79	27.500		
3,100.0	3,033.4	2,964.0	2,942.1	15.8	9.7	-32.02	-469.3	-937.0	531.9	511.3	20.62	25.795		
3,200.0	3,130.1	3,066.5	3,042.9	16.5	10.1	-31.81	-463.9	-954.2	519.1	497.7	21.44	24.209		
3,300.0	3,226.9	3,170.5	3,145.6	17.2	10.5	-31.71	-458.7	-970.3	505.4	483.1	22.28	22.686		
3,400.0	3,323.6	3,268.7	3,242.5	17.8	10.9	-31.59	-453.2	-985.2	491.1	468.0	23.09	21.267		
3,500.0	3,420.4	3,365.6	3,338.0	18.5	11.4	-31.45	-448.1	-1,000.3	477.3	453.4	23.90	19.973		
3,600.0	3,517.1	3,462.7	3,433.9	19.2	11.8	-31.40	-443.7	-1,015.3	463.9	439.2	24.71	18.772		
3,700.0	3,613.8	3,560.6	3,530.6	19.8	12.2	-31.44	-440.2	-1,030.1	451.0	425.4	25.55	17.651		
3,800.0	3,710.6	3,661.3	3,630.1	20.5	12.6	-31.50	-436.5	-1,045.3	437.9	411.5	26.39	16.596		
3,900.0	3,807.3	3,762.2	3,729.8	21.2	13.0	-31.51	-432.3	-1,060.5	424.5	397.2	27.22	15.592		
4,000.0	3,904.1	3,865.8	3,832.0	21.8	13.5	-31.39	-426.9	-1,076.1	410.3	382.3	28.05	14.628		
4,100.0	4,000.8	3,954.2	3,919.3	22.5	13.8	-31.34	-422.8	-1,089.3	396.6	367.7	28.83	13.753		
4,200.0	4,097.6	4,046.4	4,010.1	23.2	14.3	-31.18	-419.6	-1,105.5	385.5	355.9	29.63	13.012		
4,300.0	4,194.3	4,150.5	4,112.0	23.9	14.8	-30.58	-414.2	-1,125.7	374.7	344.3	30.40	12.325		
4,400.0	4,291.1	4,252.5	4,212.1	24.5	15.3	-29.94	-408.2	-1,144.8	362.9	331.7	31.14	11.654		
4,500.0	4,387.8	4,355.9	4,313.7	25.2	15.7	-29.40	-402.0	-1,162.7	350.0	318.1	31.88	10.978		
4,600.0	4,484.6	4,452.1	4,408.5	25.9	16.1	-29.12	-397.2	-1,178.0	336.7	304.1	32.64	10.318		
4,700.0	4,581.3	4,548.1	4,503.0	26.5	16.6	-28.80	-393.1	-1,194.4	324.9	291.5	33.38	9.731		
4,800.0	4,678.1	4,652.4	4,605.7	27.2	17.1	-28.33	-388.2	-1,212.3	312.7	278.6	34.13	9.164		

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
	Sec.20-T3N-R66W		
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Raymond 15N-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	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)			
4,900.0	4,774.8	4,752.1	4,703.8	27.9	17.5	-27.74	-382.4	-1,229.0	299.6	264.8	34.82	8.605		
5,000.0	4,871.6	4,853.2	4,803.4	28.5	18.0	-27.10	-376.2	-1,245.4	285.9	250.5	35.49	8.058		
5,100.0	4,968.3	4,953.8	4,902.7	29.2	18.4	-26.59	-370.5	-1,260.8	271.8	235.7	36.16	7.516		
5,200.0	5,065.1	5,055.5	5,003.2	29.9	18.8	-26.34	-365.2	-1,274.8	256.8	219.9	36.90	6.960		
5,300.0	5,161.8	5,159.1	5,106.0	30.6	19.2	-26.48	-360.4	-1,286.7	240.4	202.7	37.72	6.372		
5,400.0	5,258.6	5,257.9	5,204.4	31.2	19.5	-27.24	-357.0	-1,295.9	222.8	184.1	38.68	5.760		
5,417.4	5,275.4	5,275.3	5,221.7	31.3	19.6	-27.46	-356.5	-1,297.3	219.7	180.8	38.86	5.652		
5,500.0	5,355.6	5,357.9	5,304.0	31.8	19.8	-28.64	-355.4	-1,303.0	205.8	166.0	39.83	5.167		
5,600.0	5,453.4	5,459.2	5,405.1	32.2	20.1	-30.20	-354.3	-1,308.7	191.2	150.3	40.95	4.670		
5,700.0	5,551.9	5,560.9	5,506.9	32.6	20.3	-32.21	-353.8	-1,311.6	178.1	136.0	42.14	4.226		
5,800.0	5,650.9	5,661.1	5,607.0	32.9	20.5	-34.58	-354.2	-1,312.3	167.2	123.8	43.36	3.856		
5,900.0	5,750.4	5,760.5	5,706.4	33.2	20.7	-36.74	-354.8	-1,312.4	159.2	114.8	44.44	3.583		
6,000.0	5,850.1	5,860.0	5,805.9	33.4	20.8	-38.46	-355.7	-1,312.4	154.4	109.0	45.33	3.405		
6,100.0	5,950.1	5,959.2	5,905.2	33.5	21.0	-39.54	-357.0	-1,312.5	152.7	106.7	45.96	3.322		
6,103.8	5,953.9	5,963.1	5,909.0	33.5	21.0	-39.56	-357.0	-1,312.5	152.7	106.7	45.98	3.321 CC, ES		
6,150.0	6,000.0	6,009.1	5,955.0	33.6	21.1	-140.91	-357.7	-1,312.6	153.0	106.8	46.17	3.313		
6,200.0	6,050.0	6,058.7	6,004.6	33.6	21.2	-141.09	-358.6	-1,312.6	153.7	107.3	46.39	3.313		
6,300.0	6,150.0	6,159.7	6,105.6	33.8	21.4	-141.46	-360.4	-1,312.8	155.2	108.4	46.85	3.313		
6,400.0	6,250.0	6,259.7	6,205.6	33.9	21.6	-141.48	-361.0	-1,313.2	155.9	108.7	47.20	3.304		
6,500.0	6,350.0	6,359.3	6,305.2	34.0	21.8	-141.71	-362.2	-1,313.4	157.0	109.4	47.62	3.297		
6,600.0	6,450.0	6,459.2	6,405.1	34.1	21.9	-142.22	-364.1	-1,313.1	158.3	110.2	48.11	3.290		
6,700.0	6,550.0	6,559.6	6,505.4	34.3	22.1	-142.91	-366.1	-1,312.2	159.4	110.7	48.65	3.276		
6,713.1	6,563.2	6,572.7	6,518.6	34.3	22.1	-143.01	-366.4	-1,312.1	159.5	110.8	48.73	3.273 SF		
6,750.0	6,600.0	6,608.4	6,554.3	34.3	22.2	-143.43	-367.2	-1,311.7	160.7	111.8	48.82	3.291		
6,800.0	6,649.9	6,655.0	6,600.8	34.4	22.3	-144.57	-369.1	-1,311.1	165.3	116.3	48.99	3.373		
6,850.0	6,699.3	6,691.4	6,637.0	34.4	22.3	-145.97	-372.7	-1,310.8	175.0	126.0	49.03	3.569		
6,900.0	6,748.2	6,726.8	6,671.9	34.5	22.4	-147.64	-378.6	-1,310.8	190.8	141.9	48.95	3.899		
6,950.0	6,796.3	6,760.1	6,704.3	34.5	22.4	-149.24	-386.0	-1,311.2	212.4	163.7	48.64	4.366		
7,000.0	6,843.4	6,790.6	6,733.7	34.5	22.5	-150.54	-394.3	-1,311.9	239.0	190.9	48.05	4.974		
7,050.0	6,889.2	6,826.0	6,767.2	34.5	22.5	-152.10	-405.6	-1,313.0	270.3	223.0	47.30	5.715		
7,100.0	6,933.7	6,842.0	6,782.2	34.5	22.5	-151.80	-411.2	-1,313.6	305.2	259.3	45.97	6.640		
7,150.0	6,976.6	6,869.0	6,807.1	34.5	22.6	-152.23	-421.4	-1,314.7	343.7	299.1	44.62	7.703		
7,200.0	7,017.7	6,882.4	6,819.4	34.5	22.6	-151.07	-426.9	-1,315.1	384.8	341.9	42.88	8.975		
7,250.0	7,056.9	6,898.3	6,833.8	34.5	22.6	-149.81	-433.6	-1,315.2	428.2	387.2	41.05	10.431		
7,300.0	7,094.0	6,911.0	6,845.2	34.5	22.6	-147.54	-439.2	-1,314.9	473.5	434.3	39.13	12.099		
7,350.0	7,128.8	6,922.2	6,855.2	34.5	22.6	-144.06	-444.3	-1,314.4	520.2	482.9	37.28	13.952		
7,400.0	7,161.2	6,930.6	6,862.6	34.6	22.6	-138.27	-448.2	-1,314.0	568.0	532.2	35.84	15.847		
7,450.0	7,191.0	6,936.2	6,867.5	34.6	22.6	-128.46	-450.8	-1,313.7	616.7	581.1	35.59	17.325		
7,500.0	7,218.1	6,939.2	6,870.1	34.6	22.6	-111.90	-452.2	-1,313.5	665.9	628.2	37.69	17.666		
7,550.0	7,242.4	6,939.8	6,870.6	34.7	22.6	-87.05	-452.5	-1,313.4	715.4	674.4	40.97	17.460		
7,600.0	7,263.8	6,938.1	6,869.2	34.8	22.6	-60.72	-451.7	-1,313.5	764.9	724.8	40.06	19.093		
7,650.0	7,282.2	6,934.5	6,866.0	34.9	22.6	-41.79	-450.0	-1,313.8	814.2	778.8	35.38	23.016		
7,700.0	7,297.6	6,928.9	6,861.1	35.0	22.6	-30.18	-447.4	-1,314.1	863.2	832.7	30.52	28.285		
7,750.0	7,309.8	6,921.7	6,854.7	35.2	22.6	-23.00	-444.1	-1,314.5	911.6	885.0	26.54	34.342		
7,800.0	7,318.7	6,911.0	6,845.2	35.4	22.6	-18.21	-439.2	-1,314.9	959.3	935.8	23.44	40.917		

Company:	PETROLEUM DEVELOPMENT CORP DJ	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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 (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-139.44	-546.6	-467.7	720.6					
100.0	100.0	58.0	58.0	0.1	0.1	-139.44	-546.6	-467.8	719.4	719.1	0.27	2,646.108		
134.2	134.2	92.2	92.2	0.2	0.2	-139.44	-546.5	-467.8	719.4	718.9	0.46	1,569.093		
200.0	200.0	156.8	156.8	0.4	0.4	-139.43	-546.5	-467.9	719.4	718.6	0.81	887.521		
300.0	300.0	255.3	255.3	0.7	0.6	-139.41	-546.6	-468.3	719.8	718.4	1.34	538.570		
400.0	400.0	355.2	355.2	1.0	0.9	-139.39	-546.7	-468.7	720.1	718.3	1.86	387.270		
500.0	500.0	453.8	453.8	1.2	1.1	-38.31	-546.8	-469.3	719.6	717.2	2.37	303.645		
600.0	599.9	554.8	554.8	1.5	1.4	-38.47	-546.8	-470.3	717.1	714.2	2.89	248.480		
700.0	699.7	656.7	656.7	1.7	1.7	-38.77	-546.2	-471.2	712.2	708.7	3.42	208.002		
800.0	799.3	754.4	754.4	2.0	1.9	-39.19	-545.7	-472.3	705.3	701.4	3.96	178.043		
900.0	898.6	854.6	854.5	2.4	2.2	-39.80	-545.3	-473.4	696.7	692.1	4.52	154.231		
1,000.0	997.5	955.5	955.5	2.8	2.4	-40.58	-544.6	-474.4	685.7	680.7	5.10	134.563		
1,100.0	1,096.1	1,053.4	1,053.4	3.2	2.7	-41.57	-544.2	-475.1	673.0	667.3	5.69	118.316		
1,200.0	1,194.2	1,150.5	1,150.4	3.6	2.9	-42.77	-544.0	-475.6	658.6	652.2	6.32	104.282		
1,300.0	1,291.7	1,253.9	1,253.9	4.2	3.2	-44.29	-543.8	-476.3	642.6	635.6	7.00	91.755		
1,376.7	1,366.1	1,352.5	1,352.4	4.6	3.5	-46.02	-541.7	-474.8	627.2	619.6	7.62	82.284		
1,400.0	1,388.6	1,382.4	1,382.2	4.8	3.5	-46.56	-540.6	-473.8	621.9	614.1	7.82	79.556		
1,500.0	1,485.4	1,505.9	1,505.3	5.4	3.8	-49.10	-533.7	-465.8	596.4	587.8	8.67	68.784		
1,600.0	1,582.1	1,607.9	1,606.6	6.0	4.1	-51.64	-526.5	-455.8	569.0	559.5	9.51	59.805		
1,700.0	1,678.9	1,706.1	1,703.7	6.6	4.4	-54.54	-519.4	-443.8	541.3	530.9	10.39	52.115		
1,800.0	1,775.6	1,805.5	1,801.9	7.3	4.8	-58.01	-512.4	-429.5	514.3	503.0	11.34	45.372		
1,900.0	1,872.4	1,902.1	1,896.9	7.9	5.1	-61.89	-504.5	-413.7	487.6	475.2	12.34	39.497		
2,000.0	1,969.1	1,991.0	1,984.2	8.6	5.4	-65.82	-497.0	-399.1	462.9	449.5	13.37	34.617		
2,100.0	2,065.9	2,085.5	2,077.0	9.2	5.8	-70.42	-489.2	-383.2	440.9	426.4	14.49	30.436		
2,200.0	2,162.6	2,168.7	2,158.8	9.9	6.1	-74.77	-482.3	-369.4	422.2	406.6	15.57	27.109		
2,300.0	2,259.4	2,259.5	2,248.2	10.5	6.5	-79.73	-475.7	-355.3	408.0	391.2	16.71	24.410		
2,400.0	2,356.1	2,349.3	2,336.8	11.2	6.8	-84.83	-469.3	-341.8	397.6	379.7	17.84	22.290		
2,500.0	2,452.9	2,440.0	2,426.4	11.8	7.2	-90.01	-463.3	-329.1	391.4	372.5	18.93	20.680		
2,597.3	2,547.0	2,528.3	2,513.7	12.5	7.5	-95.11	-457.5	-317.1	389.3	369.4	19.93	19.538 CC		
2,600.0	2,549.6	2,530.6	2,516.0	12.5	7.5	-95.25	-457.4	-316.7	389.3	369.4	19.95	19.513 ES		
2,700.0	2,646.4	2,615.5	2,600.0	13.2	7.8	-100.01	-453.3	-305.7	392.4	371.5	20.88	18.790		
2,800.0	2,743.1	2,709.4	2,693.0	13.8	8.2	-105.21	-449.1	-293.0	399.7	377.9	21.77	18.359		
2,900.0	2,839.9	2,801.7	2,784.1	14.5	8.6	-110.37	-443.9	-279.0	410.4	387.9	22.54	18.204 SF		
3,000.0	2,936.6	2,893.0	2,873.9	15.2	9.0	-115.44	-437.6	-263.8	424.7	401.5	23.21	18.297		
3,100.0	3,033.4	2,983.9	2,963.0	15.8	9.4	-120.32	-430.5	-247.8	442.6	418.8	23.80	18.597		
3,200.0	3,130.1	3,075.1	3,052.8	16.5	9.8	-124.74	-424.1	-232.6	463.6	439.3	24.30	19.078		
3,300.0	3,226.9	3,173.9	3,150.2	17.2	10.2	-128.96	-417.9	-217.4	486.8	462.1	24.74	19.680		
3,400.0	3,323.6	3,264.4	3,239.6	17.8	10.5	-132.50	-411.4	-204.6	511.0	485.8	25.13	20.331		
3,500.0	3,420.4	3,358.8	3,332.9	18.5	10.9	-135.76	-405.7	-191.3	537.4	511.9	25.50	21.070		
3,600.0	3,517.1	3,457.2	3,430.2	19.2	11.3	-138.88	-399.1	-178.3	564.4	538.5	25.85	21.835		
3,700.0	3,613.8	3,545.0	3,516.9	19.8	11.7	-141.43	-393.0	-166.6	592.7	566.4	26.21	22.615		
3,800.0	3,710.6	3,619.3	3,590.3	20.5	12.0	-143.44	-388.2	-155.5	623.7	597.1	26.60	23.452		
3,900.0	3,807.3	3,693.1	3,662.8	21.2	12.3	-145.35	-383.6	-142.5	658.2	631.3	26.97	24.402		
4,000.0	3,904.1	3,786.2	3,753.9	21.8	12.8	-147.57	-378.0	-124.6	695.0	667.7	27.33	25.432		
4,100.0	4,000.8	3,879.7	3,845.7	22.5	13.2	-149.57	-372.1	-107.6	731.7	704.1	27.69	26.429		
4,200.0	4,097.6	3,980.7	3,945.0	23.2	13.6	-151.49	-366.0	-90.3	768.3	740.2	28.05	27.385		
4,300.0	4,194.3	4,065.3	4,028.1	23.9	14.0	-152.96	-360.7	-75.8	805.3	776.8	28.45	28.305		
4,400.0	4,291.1	4,168.1	4,129.3	24.5	14.5	-154.61	-354.0	-58.6	842.4	813.5	28.85	29.202		
4,500.0	4,387.8	4,280.7	4,240.5	25.2	15.0	-156.17	-347.3	-41.9	878.4	849.1	29.26	30.025		
4,600.0	4,484.6	4,405.8	4,364.7	25.9	15.4	-157.50	-342.6	-28.0	911.7	882.0	29.70	30.692		
4,700.0	4,581.3	4,540.1	4,498.6	26.5	15.8	-158.61	-339.7	-18.8	941.3	911.2	30.18	31.191		

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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 (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					
4,800.0	4,678.1	4,667.4	4,625.9	27.2	16.1	-159.44	-338.5	-15.3	967.5	936.8	30.68	31.534					
4,900.0	4,774.8	4,770.6	4,729.1	27.9	16.3	-160.03	-337.8	-14.5	992.0	960.8	31.17	31.824					

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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	-137.81	-546.9	-495.7	739.4					
100.0	100.0	59.1	59.1	0.1	0.1	-137.81	-546.9	-495.6	738.1	737.8	0.28	2,675.112		
200.0	200.0	160.9	160.9	0.4	0.4	-137.81	-546.4	-495.4	737.5	736.7	0.82	901.756		
300.0	300.0	259.9	259.9	0.7	0.7	-137.80	-546.0	-495.2	737.1	735.8	1.34	550.747		
400.0	400.0	359.9	359.9	1.0	0.9	-137.80	-545.8	-494.8	736.7	734.8	1.86	395.112		
500.0	500.0	459.8	459.8	1.2	1.2	-36.75	-545.5	-494.7	735.3	732.9	2.38	308.896		
600.0	599.9	560.0	560.0	1.5	1.4	-36.97	-545.2	-494.3	731.7	728.8	2.89	252.791		
700.0	699.7	658.8	658.8	1.7	1.7	-37.32	-544.9	-494.2	726.2	722.7	3.42	212.456		
800.0	799.3	758.6	758.6	2.0	1.9	-37.87	-544.9	-493.7	718.6	714.7	3.96	181.595		
900.0	898.6	856.9	856.9	2.4	2.2	-38.52	-544.6	-493.6	709.0	704.5	4.51	157.241		
1,000.0	997.5	952.1	952.1	2.8	2.4	-39.29	-544.3	-494.0	697.9	692.8	5.07	137.593		
1,100.0	1,096.1	1,086.7	1,086.7	3.2	2.8	-40.59	-542.2	-493.5	683.7	677.9	5.78	118.328		
1,200.0	1,194.2	1,211.0	1,210.6	3.6	3.1	-41.85	-533.1	-491.4	662.2	655.7	6.50	101.940		
1,300.0	1,291.7	1,323.7	1,322.3	4.2	3.4	-42.81	-518.4	-491.8	635.8	628.5	7.22	88.032		
1,376.7	1,366.1	1,410.7	1,408.0	4.6	3.8	-43.54	-503.7	-492.8	612.3	604.5	7.82	78.260		
1,400.0	1,388.6	1,436.7	1,433.6	4.8	3.9	-43.70	-499.0	-492.9	604.8	596.8	8.01	75.505		
1,500.0	1,485.4	1,547.3	1,542.0	5.4	4.3	-44.38	-477.0	-492.7	570.6	561.7	8.81	64.728		
1,600.0	1,582.1	1,637.6	1,630.2	6.0	4.6	-44.95	-457.5	-492.0	534.8	525.2	9.58	55.808		
1,700.0	1,678.9	1,726.9	1,717.6	6.6	5.0	-45.57	-439.3	-492.3	500.6	490.2	10.35	48.359		
1,800.0	1,775.6	1,822.2	1,810.9	7.3	5.4	-46.40	-420.1	-492.3	466.4	455.2	11.16	41.782		
1,900.0	1,872.4	1,908.3	1,895.4	7.9	5.8	-47.38	-403.6	-491.6	432.8	420.8	11.96	36.198		
2,000.0	1,969.1	1,999.3	1,985.0	8.6	6.1	-48.68	-387.7	-491.3	400.9	388.1	12.78	31.363		
2,100.0	2,065.9	2,087.4	2,072.0	9.2	6.5	-50.33	-373.7	-490.4	370.2	356.6	13.63	27.169		
2,200.0	2,162.6	2,178.8	2,162.4	9.9	6.8	-52.27	-360.2	-490.4	341.3	326.7	14.51	23.519		
2,300.0	2,259.4	2,267.0	2,249.8	10.5	7.2	-54.45	-348.3	-491.0	314.3	298.9	15.41	20.391		
2,400.0	2,356.1	2,353.1	2,335.4	11.2	7.4	-57.12	-339.4	-491.8	290.6	274.2	16.34	17.786		
2,500.0	2,452.9	2,438.0	2,420.1	11.8	7.7	-60.36	-333.4	-492.5	270.9	253.6	17.31	15.653		
2,600.0	2,549.6	2,529.2	2,511.2	12.5	7.9	-64.44	-330.0	-493.4	255.6	237.3	18.34	13.936		
2,700.0	2,646.4	2,621.4	2,603.4	13.2	8.1	-69.19	-329.2	-494.1	244.6	225.2	19.43	12.593		
2,800.0	2,743.1	2,721.2	2,703.3	13.8	8.4	-74.82	-328.3	-494.6	235.7	215.2	20.57	11.458		
2,900.0	2,839.9	2,816.8	2,798.8	14.5	8.6	-80.53	-327.0	-495.1	228.8	207.1	21.69	10.551		
3,000.0	2,936.6	2,911.4	2,893.4	15.2	8.8	-86.48	-326.8	-495.3	225.6	202.9	22.76	9.915		
3,050.3	2,985.2	2,959.8	2,941.8	15.5	8.9	-89.54	-326.9	-495.5	225.2	202.0	23.27	9.680 CC		
3,100.0	3,033.4	3,007.8	2,989.8	15.8	9.0	-92.57	-327.1	-495.7	225.6	201.8	23.75	9.498 ES		
3,200.0	3,130.1	3,102.5	3,084.5	16.5	9.2	-98.53	-327.6	-495.8	228.7	204.1	24.64	9.281		
3,300.0	3,226.9	3,196.9	3,178.9	17.2	9.4	-104.41	-328.9	-494.9	235.6	210.2	25.42	9.270 SF		
3,400.0	3,323.6	3,293.5	3,275.5	17.8	9.6	-110.08	-330.6	-493.5	245.5	219.5	26.07	9.417		
3,500.0	3,420.4	3,391.3	3,373.2	18.5	9.8	-115.11	-332.6	-493.2	257.5	230.9	26.64	9.667		
3,600.0	3,517.1	3,489.7	3,471.6	19.2	10.0	-119.44	-335.1	-494.4	270.6	243.5	27.14	9.971		
3,700.0	3,613.8	3,585.7	3,567.6	19.8	10.2	-123.42	-336.9	-494.9	285.1	257.6	27.58	10.339		
3,800.0	3,710.6	3,682.3	3,664.1	20.5	10.4	-127.26	-338.1	-494.4	301.3	273.4	27.96	10.777		
3,900.0	3,807.3	3,779.8	3,761.7	21.2	10.6	-130.84	-338.8	-493.7	318.6	290.3	28.31	11.254		
4,000.0	3,904.1	3,877.4	3,859.2	21.8	10.8	-134.11	-339.0	-493.0	336.7	308.0	28.63	11.759		
4,100.0	4,000.8	3,976.0	3,957.9	22.5	11.1	-137.07	-339.1	-492.8	355.3	326.4	28.95	12.273		
4,200.0	4,097.6	4,072.1	4,054.0	23.2	11.3	-139.61	-339.4	-492.8	374.6	345.3	29.29	12.789		
4,300.0	4,194.3	4,168.5	4,150.3	23.9	11.5	-141.93	-339.7	-492.7	394.7	365.0	29.63	13.321		
4,400.0	4,291.1	4,264.7	4,246.5	24.5	11.7	-143.99	-340.1	-492.7	415.3	385.3	29.98	13.852		
4,500.0	4,387.8	4,361.1	4,343.0	25.2	12.0	-145.85	-340.8	-492.4	436.8	406.4	30.35	14.393		
4,600.0	4,484.6	4,458.5	4,440.4	25.9	12.2	-147.53	-341.5	-492.4	458.4	427.7	30.73	14.918		
4,700.0	4,581.3	4,554.6	4,536.4	26.5	12.4	-149.00	-342.6	-492.5	480.4	449.3	31.13	15.433		
4,800.0	4,678.1	4,642.2	4,624.1	27.2	12.6	-150.20	-344.1	-491.9	503.6	472.0	31.55	15.961		

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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)			
4,900.0	4,774.8	4,739.3	4,721.1	27.9	12.8	-151.39	-346.3	-490.3	528.0	496.0	31.98	16.513		
5,000.0	4,871.6	4,838.3	4,820.0	28.5	13.0	-152.50	-348.3	-489.0	552.2	519.8	32.41	17.036		
5,100.0	4,968.3	4,934.6	4,916.4	29.2	13.3	-153.55	-349.7	-487.9	576.4	543.6	32.86	17.544		
5,200.0	5,065.1	5,031.4	5,013.1	29.9	13.5	-154.60	-350.3	-486.5	600.8	567.5	33.29	18.048		
5,300.0	5,161.8	5,131.0	5,112.8	30.6	13.7	-155.60	-350.8	-485.3	625.2	591.4	33.74	18.530		
5,400.0	5,258.6	5,230.6	5,212.4	31.2	14.0	-156.53	-351.1	-484.7	649.1	614.9	34.20	18.980		
5,417.4	5,275.4	5,247.8	5,229.5	31.3	14.0	-156.68	-351.2	-484.6	653.2	618.9	34.28	19.056		
5,500.0	5,355.6	5,329.6	5,311.4	31.8	14.2	-157.47	-351.7	-484.4	671.7	637.0	34.68	19.367		
5,600.0	5,453.4	5,433.7	5,415.5	32.2	14.5	-158.27	-352.0	-484.8	690.8	655.6	35.13	19.665		
5,700.0	5,551.9	5,532.7	5,514.4	32.6	14.7	-158.89	-352.1	-485.7	706.1	670.5	35.55	19.862		
5,800.0	5,650.9	5,625.3	5,607.0	32.9	15.0	-159.38	-351.8	-486.0	718.8	682.8	35.94	20.001		
5,900.0	5,750.4	5,723.3	5,705.0	33.2	15.2	-159.84	-350.5	-485.3	729.0	692.7	36.29	20.089		
6,000.0	5,850.1	5,829.2	5,810.9	33.4	15.5	-160.19	-349.2	-485.2	735.5	698.8	36.64	20.073		
6,100.0	5,950.1	5,922.9	5,904.6	33.5	15.7	-160.40	-347.9	-485.2	738.5	701.6	36.93	19.997		
6,150.0	6,000.0	5,972.9	5,954.6	33.6	15.8	98.40	-346.9	-484.9	739.1	702.1	37.07	19.938		
6,200.0	6,050.0	6,024.4	6,006.1	33.6	16.0	98.33	-346.1	-484.6	739.3	702.0	37.28	19.829		
6,300.0	6,150.0	6,126.2	6,107.9	33.8	16.2	98.22	-344.7	-484.4	739.3	701.6	37.70	19.609		
6,400.0	6,250.0	6,231.5	6,213.2	33.9	16.5	98.15	-343.7	-484.7	738.9	700.7	38.14	19.375		
6,500.0	6,350.0	6,334.3	6,315.9	34.0	16.8	98.12	-343.3	-485.8	737.7	699.2	38.57	19.125		
6,600.0	6,450.0	6,434.3	6,415.9	34.1	17.0	98.11	-342.9	-487.0	736.5	697.5	39.01	18.883		
6,700.0	6,550.0	6,533.1	6,514.7	34.3	17.3	98.10	-342.6	-488.1	735.3	695.9	39.44	18.646		
6,713.1	6,563.2	6,544.1	6,525.7	34.3	17.3	98.10	-342.6	-488.2	735.2	695.7	39.49	18.619		
6,732.0	6,582.0	6,560.0	6,541.6	34.3	17.3	98.12	-342.7	-488.3	735.1	695.6	39.58	18.575		
6,750.0	6,600.0	6,569.0	6,550.6	34.3	17.3	98.14	-342.7	-488.4	735.2	695.6	39.64	18.546		
6,800.0	6,649.9	6,611.0	6,592.6	34.4	17.4	98.42	-344.3	-487.9	736.7	696.8	39.88	18.472		
6,850.0	6,699.3	6,636.7	6,618.2	34.4	17.5	98.68	-347.0	-487.2	739.7	699.7	40.03	18.479		
6,900.0	6,748.2	6,673.2	6,654.1	34.5	17.5	99.36	-353.2	-486.0	744.6	704.3	40.24	18.503		
6,950.0	6,796.3	6,710.1	6,689.9	34.5	17.6	100.25	-361.8	-485.0	750.9	710.5	40.44	18.568		
7,000.0	6,843.4	6,739.0	6,717.6	34.5	17.6	100.91	-370.2	-484.3	759.2	718.7	40.54	18.726		
7,050.0	6,889.2	6,767.7	6,744.6	34.5	17.7	101.56	-379.7	-483.5	769.9	729.3	40.60	18.964		
7,100.0	6,933.7	6,792.3	6,767.5	34.5	17.7	101.92	-388.6	-482.8	783.1	742.5	40.57	19.304		
7,150.0	6,976.6	6,815.0	6,788.5	34.5	17.7	102.06	-397.4	-482.1	798.8	758.4	40.48	19.736		
7,200.0	7,017.7	6,835.3	6,807.0	34.5	17.7	101.87	-405.6	-481.5	817.3	777.0	40.34	20.260		
7,250.0	7,056.9	6,852.8	6,822.9	34.5	17.7	101.33	-412.9	-481.0	838.4	798.2	40.18	20.864		
7,300.0	7,094.0	6,867.0	6,835.7	34.5	17.8	100.33	-419.1	-480.6	862.0	822.0	40.02	21.537		
7,350.0	7,128.8	6,867.0	6,835.7	34.5	17.8	98.06	-419.1	-480.6	888.2	848.3	39.84	22.295		
7,400.0	7,161.2	6,881.0	6,848.2	34.6	17.8	96.52	-425.4	-480.2	916.5	876.7	39.81	23.023		
7,450.0	7,191.0	6,885.1	6,851.8	34.6	17.8	93.97	-427.2	-480.0	946.9	907.1	39.79	23.796		
7,500.0	7,218.1	6,887.3	6,853.8	34.6	17.8	90.99	-428.3	-480.0	979.1	939.3	39.82	24.590		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Soco 20-2K (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)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,600.0	7,288.3	7,246.8	7,243.7	81.8	20.6	-98.76	4,208.1	-1,260.5	999.6	903.8	95.88	10.426		
10,700.0	7,286.8	7,244.9	7,241.8	83.9	20.6	-97.91	4,208.1	-1,260.5	900.6	802.2	98.35	9.157		
10,800.0	7,285.4	7,242.9	7,239.8	86.0	20.6	-97.05	4,208.1	-1,260.5	801.7	700.9	100.83	7.952		
10,900.0	7,283.9	7,240.9	7,237.8	88.1	20.6	-96.17	4,208.1	-1,260.5	703.2	599.9	103.30	6.808		
11,000.0	7,282.5	7,238.9	7,235.8	90.2	20.6	-95.27	4,208.1	-1,260.4	605.2	499.5	105.76	5.722		
11,100.0	7,281.0	7,236.8	7,233.7	92.4	20.6	-94.35	4,208.1	-1,260.4	508.0	399.8	108.22	4.694		
11,200.0	7,279.6	7,234.7	7,231.6	94.5	20.6	-93.42	4,208.1	-1,260.4	412.0	301.4	110.66	3.723		
11,300.0	7,278.1	7,232.6	7,229.4	96.7	20.6	-92.46	4,208.2	-1,260.4	318.6	205.5	113.09	2.817		
11,400.0	7,276.7	7,230.4	7,227.3	98.9	20.6	-91.49	4,208.2	-1,260.4	230.6	115.1	115.50	1.997		
11,500.0	7,275.2	7,228.2	7,225.0	101.1	20.6	-90.51	4,208.2	-1,260.4	157.8	39.9	117.88	1.338	Level 3	
11,591.6	7,273.9	7,226.1	7,223.0	103.1	20.6	-89.59	4,208.2	-1,260.3	128.5	8.4	120.04	1.070	Level 2, CC, ES, SF	
11,600.0	7,273.8	7,225.9	7,222.8	103.2	20.6	-89.50	4,208.2	-1,260.3	128.7	8.5	120.24	1.071	Level 2	
11,700.0	7,272.3	7,223.6	7,220.5	105.4	20.6	-88.48	4,208.2	-1,260.3	168.1	45.5	122.57	1.371	Level 3	
11,800.0	7,270.9	7,221.3	7,218.2	107.6	20.6	-87.44	4,208.3	-1,260.3	244.8	119.9	124.87	1.960		
11,861.4	7,270.0	7,219.8	7,216.7	109.0	20.6	-86.79	4,208.3	-1,260.3	298.8	172.5	126.26	2.366		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.20-T3N-R66W - Soco 20-7K (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)			
9,600.0	7,302.7	7,266.3	7,264.2	61.4	17.2	92.60	3,154.1	-926.9	985.7	911.4	74.28	13.271		
9,700.0	7,301.3	7,265.1	7,263.0	63.4	17.2	92.36	3,154.1	-926.9	890.6	814.1	76.43	11.652		
9,800.0	7,299.8	7,263.9	7,261.8	65.5	17.2	92.13	3,154.1	-926.8	796.6	718.0	78.60	10.135		
9,900.0	7,298.4	7,262.8	7,260.7	67.5	17.2	91.90	3,154.1	-926.8	704.4	623.6	80.78	8.720		
10,000.0	7,297.0	7,261.6	7,259.5	69.6	17.2	91.67	3,154.1	-926.8	614.5	531.6	82.97	7.407		
10,100.3	7,295.5	7,260.4	7,258.3	71.7	17.2	91.43	3,154.1	-926.8	528.1	442.9	85.18	6.200		
10,200.0	7,294.1	7,259.2	7,257.1	73.7	17.2	91.29	3,154.1	-926.8	446.9	360.4	86.45	5.169		
10,269.9	7,293.0	7,258.4	7,256.3	74.9	17.2	91.16	3,154.1	-926.8	393.5	306.3	87.20	4.513		
10,300.0	7,292.6	7,258.0	7,255.9	75.5	17.2	91.08	3,154.1	-926.8	372.0	284.2	87.82	4.236		
10,400.0	7,291.2	7,256.8	7,254.7	77.6	17.2	90.82	3,154.1	-926.8	310.8	220.8	90.01	3.453		
10,500.0	7,289.7	7,255.6	7,253.5	79.7	17.2	90.56	3,154.1	-926.8	273.5	181.3	92.20	2.966		
10,558.9	7,288.9	7,254.9	7,252.8	80.9	17.2	90.41	3,154.1	-926.8	267.1	173.6	93.50	2.857 CC, ES, SF		
10,600.0	7,288.3	7,254.4	7,252.3	81.8	17.2	90.30	3,154.1	-926.8	270.2	175.8	94.40	2.863		
10,700.0	7,286.8	7,253.1	7,251.0	83.9	17.2	90.04	3,154.1	-926.8	302.0	205.4	96.61	3.127		
10,800.0	7,285.4	7,251.9	7,249.8	86.0	17.2	89.78	3,154.1	-926.8	359.8	261.0	98.81	3.641		
10,900.0	7,283.9	7,250.7	7,248.6	88.1	17.2	89.52	3,154.0	-926.8	433.2	332.2	101.03	4.288		
11,000.0	7,282.5	7,249.5	7,247.4	90.2	17.2	89.26	3,154.0	-926.7	515.6	412.4	103.24	4.994		
11,100.0	7,281.0	7,248.3	7,246.2	92.4	17.2	89.00	3,154.0	-926.7	603.4	497.9	105.46	5.721		
11,200.0	7,279.6	7,247.1	7,245.0	94.5	17.2	88.74	3,154.0	-926.7	694.4	586.8	107.68	6.449		
11,300.0	7,278.1	7,245.8	7,243.8	96.7	17.2	88.48	3,154.0	-926.7	787.7	677.8	109.90	7.167		
11,400.0	7,276.7	7,244.6	7,242.5	98.9	17.2	88.22	3,154.0	-926.7	882.4	770.3	112.12	7.870		
11,500.0	7,275.2	7,243.4	7,241.3	101.1	17.2	87.95	3,154.0	-926.7	978.2	863.8	114.34	8.555		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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	179.13	-15.0	0.2	15.0	15.0	0.00	N/A			
100.0	100.0	100.0	100.0	0.1	0.1	179.13	-15.0	0.2	15.0	14.7	0.27	54.478			
200.0	200.0	200.0	200.0	0.4	0.4	179.13	-15.0	0.2	15.0	14.1	0.82	18.159 CC			
300.0	300.0	299.9	299.9	0.7	0.7	-175.97	-15.2	-1.1	15.2	13.8	1.36	11.178 ES			
400.0	400.0	399.7	399.6	1.0	0.9	-162.54	-15.7	-4.9	16.5	14.6	1.90	8.678			
500.0	500.0	499.3	499.0	1.2	1.2	-47.18	-16.6	-11.4	19.3	16.8	2.43	7.914			
600.0	599.9	598.8	598.1	1.5	1.5	-36.75	-17.9	-20.4	22.8	19.8	2.97	7.675			
700.0	699.7	698.1	696.7	1.7	1.9	-29.08	-19.6	-31.9	26.8	23.3	3.53	7.602			
800.0	799.3	797.3	794.9	2.0	2.3	-23.27	-21.6	-45.9	31.1	27.0	4.10	7.596			
900.0	898.6	896.4	892.6	2.4	2.7	-18.72	-23.9	-62.4	35.6	30.9	4.68	7.613			
1,000.0	997.5	995.4	989.6	2.8	3.2	-15.03	-26.6	-81.5	40.2	34.9	5.27	7.634			
1,100.0	1,096.1	1,094.2	1,086.0	3.2	3.7	-11.95	-29.7	-102.9	44.9	39.0	5.87	7.651			
1,200.0	1,194.2	1,192.8	1,181.7	3.6	4.3	-9.32	-33.1	-126.8	49.6	43.1	6.48	7.659			
1,300.0	1,291.7	1,291.4	1,276.6	4.2	5.0	-7.02	-36.8	-153.1	54.3	47.2	7.10	7.657			
1,376.7	1,366.1	1,367.1	1,349.0	4.6	5.5	-5.43	-40.0	-174.9	58.0	50.4	7.58	7.646			
1,400.0	1,388.6	1,390.3	1,371.2	4.8	5.7	-4.98	-40.9	-181.8	59.0	51.3	7.73	7.630			
1,500.0	1,485.4	1,490.2	1,466.6	5.4	6.4	-3.22	-45.1	-211.2	63.5	55.1	8.39	7.569			
1,600.0	1,582.1	1,590.1	1,561.9	6.0	7.2	-1.69	-49.3	-240.7	68.1	59.0	9.06	7.513			
1,700.0	1,678.9	1,690.0	1,657.3	6.6	7.9	-0.36	-53.5	-270.1	72.7	62.9	9.74	7.461			
1,800.0	1,775.6	1,789.9	1,752.6	7.3	8.7	0.82	-57.8	-299.6	77.3	66.9	10.43	7.411			
1,900.0	1,872.4	1,889.7	1,848.0	7.9	9.5	1.86	-62.0	-329.0	82.0	70.9	11.14	7.364			
2,000.0	1,969.1	1,989.6	1,943.3	8.6	10.2	2.79	-66.2	-358.5	86.7	74.8	11.85	7.318			
2,100.0	2,065.9	2,089.5	2,038.7	9.2	11.0	3.62	-70.4	-387.9	91.4	78.8	12.56	7.274			
2,200.0	2,162.6	2,189.4	2,134.0	9.9	11.8	4.37	-74.6	-417.4	96.1	82.8	13.29	7.232			
2,300.0	2,259.4	2,289.3	2,229.3	10.5	12.5	5.05	-78.8	-446.8	100.9	86.8	14.03	7.192			
2,400.0	2,356.1	2,389.2	2,324.7	11.2	13.3	5.67	-83.0	-476.3	105.6	90.9	14.77	7.153			
2,500.0	2,452.9	2,489.0	2,420.0	11.8	14.1	6.24	-87.2	-505.7	110.4	94.9	15.51	7.116			
2,600.0	2,549.6	2,588.9	2,515.4	12.5	14.9	6.76	-91.4	-535.2	115.2	98.9	16.27	7.080			
2,700.0	2,646.4	2,688.8	2,610.7	13.2	15.6	7.24	-95.6	-564.6	120.0	102.9	17.02	7.046			
2,800.0	2,743.1	2,788.7	2,706.1	13.8	16.4	7.68	-99.8	-594.1	124.8	107.0	17.79	7.014			
2,900.0	2,839.9	2,888.6	2,801.4	14.5	17.2	8.09	-104.0	-623.5	129.6	111.0	18.55	6.983			
3,000.0	2,936.6	2,988.4	2,896.8	15.2	18.0	8.47	-108.2	-653.0	134.4	115.0	19.32	6.954			
3,100.0	3,033.4	3,088.3	2,992.1	15.8	18.7	8.82	-112.4	-682.4	139.2	119.1	20.10	6.925			
3,200.0	3,130.1	3,188.2	3,087.5	16.5	19.5	9.15	-116.6	-711.9	144.0	123.1	20.87	6.898			
3,300.0	3,226.9	3,288.1	3,182.8	17.2	20.3	9.46	-120.8	-741.3	148.8	127.2	21.65	6.873			
3,400.0	3,323.6	3,388.0	3,278.2	17.8	21.1	9.75	-125.0	-770.8	153.6	131.2	22.44	6.848			
3,500.0	3,420.4	3,487.8	3,373.5	18.5	21.9	10.02	-129.2	-800.2	158.5	135.3	23.22	6.825			
3,600.0	3,517.1	3,587.7	3,468.9	19.2	22.6	10.27	-133.4	-829.7	163.3	139.3	24.01	6.802			
3,700.0	3,613.8	3,687.6	3,564.2	19.8	23.4	10.51	-137.6	-859.1	168.2	143.4	24.80	6.781			
3,800.0	3,710.6	3,787.5	3,659.6	20.5	24.2	10.74	-141.8	-888.6	173.0	147.4	25.59	6.760			
3,900.0	3,807.3	3,887.4	3,754.9	21.2	25.0	10.96	-146.0	-918.0	177.8	151.5	26.38	6.741			
4,000.0	3,904.1	3,987.2	3,850.3	21.8	25.8	11.16	-150.2	-947.5	182.7	155.5	27.18	6.722			
4,100.0	4,000.8	4,087.1	3,945.6	22.5	26.5	11.35	-154.4	-976.9	187.5	159.6	27.97	6.704			
4,200.0	4,097.6	4,187.0	4,040.9	23.2	27.3	11.53	-158.6	-1,006.4	192.4	163.6	28.77	6.686			
4,300.0	4,194.3	4,286.9	4,136.3	23.9	28.1	11.71	-162.8	-1,035.8	197.2	167.7	29.57	6.670			
4,400.0	4,291.1	4,386.8	4,231.6	24.5	28.9	11.87	-167.0	-1,065.3	202.1	171.7	30.37	6.654			
4,500.0	4,387.8	4,486.6	4,327.0	25.2	29.7	12.03	-171.2	-1,094.7	206.9	175.8	31.17	6.639			
4,600.0	4,484.6	4,586.5	4,422.3	25.9	30.4	12.18	-175.4	-1,124.2	211.8	179.8	31.97	6.624			
4,700.0	4,581.3	4,686.4	4,517.7	26.5	31.2	12.33	-179.6	-1,153.6	216.6	183.9	32.78	6.610			
4,800.0	4,678.1	4,786.3	4,613.0	27.2	32.0	12.46	-183.8	-1,183.1	221.5	187.9	33.58	6.596			
4,900.0	4,774.8	4,886.2	4,708.4	27.9	32.8	12.60	-188.0	-1,212.5	226.4	192.0	34.39	6.583			

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
	Sec.20-T3N-R66W		
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 ft
Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20Q-221 - 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	4,871.6	4,986.0	4,803.7	28.5	33.6	12.72	-192.3	-1,242.0	231.2	196.0	35.19	6.570			
5,100.0	4,968.3	5,085.9	4,899.1	29.2	34.3	12.84	-196.5	-1,271.4	236.1	200.1	36.00	6.558			
5,200.0	5,065.1	5,185.8	4,994.4	29.9	35.1	12.96	-200.7	-1,300.9	240.9	204.1	36.81	6.546			
5,300.0	5,161.8	5,285.7	5,089.8	30.6	35.9	13.07	-204.9	-1,330.3	245.8	208.2	37.62	6.535			
5,400.0	5,258.6	5,385.6	5,185.1	31.2	36.7	13.18	-209.1	-1,359.8	250.7	212.2	38.43	6.524			
5,417.4	5,275.4	5,402.9	5,201.7	31.3	36.8	13.20	-209.8	-1,364.9	251.5	213.0	38.57	6.522			
5,500.0	5,355.6	5,485.4	5,280.4	31.8	37.5	13.24	-213.3	-1,389.2	256.7	217.5	39.17	6.553			
5,600.0	5,453.4	5,584.9	5,375.4	32.2	38.2	13.16	-217.5	-1,418.6	266.1	226.3	39.77	6.690			
5,700.0	5,551.9	5,686.7	5,472.6	32.6	39.0	12.93	-221.7	-1,448.5	278.7	238.4	40.25	6.924			
5,800.0	5,650.9	5,796.6	5,578.4	32.9	39.6	12.63	-225.9	-1,477.9	292.0	251.4	40.60	7.192			
5,900.0	5,750.4	5,907.1	5,685.8	33.2	40.1	12.34	-229.6	-1,503.4	305.0	264.1	40.87	7.461			
6,000.0	5,850.1	6,018.2	5,794.8	33.4	40.6	12.05	-232.6	-1,524.9	317.5	276.5	41.06	7.734			
6,100.0	5,950.1	6,129.9	5,905.1	33.5	41.0	11.76	-235.1	-1,542.2	329.7	288.5	41.15	8.011			
6,150.0	6,000.0	6,185.9	5,960.7	33.6	41.1	-89.50	-236.1	-1,549.4	335.6	294.4	41.17	8.150			
6,200.0	6,050.0	6,242.3	6,016.7	33.6	41.3	-89.66	-237.0	-1,555.4	341.0	299.6	41.35	8.246			
6,300.0	6,150.0	6,355.4	6,129.5	33.8	41.5	-89.88	-238.3	-1,564.3	348.8	307.1	41.70	8.364			
6,400.0	6,250.0	6,469.2	6,243.1	33.9	41.7	-89.98	-238.9	-1,568.8	352.7	310.7	42.07	8.384			
6,500.0	6,350.0	6,576.1	6,350.0	34.0	41.8	-89.99	-239.0	-1,569.3	353.2	310.8	42.45	8.321			
6,600.0	6,450.0	6,676.1	6,450.0	34.1	41.9	-89.99	-239.0	-1,569.3	353.2	310.4	42.83	8.247			
6,637.1	6,487.1	6,713.2	6,487.1	34.2	41.9	-89.94	-238.7	-1,569.3	353.2	310.2	42.98	8.218			
6,700.0	6,550.0	6,775.8	6,549.5	34.3	42.0	-89.24	-234.3	-1,569.3	353.2	309.8	43.41	8.138			
6,713.1	6,563.2	6,788.7	6,562.4	34.3	42.0	-88.99	-232.8	-1,569.3	353.3	309.7	43.52	8.117			
6,750.0	6,600.0	6,824.9	6,598.1	34.3	42.0	-88.25	-227.3	-1,569.3	353.4	309.5	43.88	8.053			
6,800.0	6,649.9	6,873.6	6,645.8	34.4	42.1	-87.24	-217.3	-1,569.3	353.6	309.3	44.35	7.973			
6,850.0	6,699.3	6,921.9	6,692.4	34.4	42.1	-86.25	-204.4	-1,569.3	354.0	309.2	44.80	7.901			
6,900.0	6,748.2	6,969.9	6,737.7	34.5	42.1	-85.28	-188.8	-1,569.3	354.4	309.2	45.22	7.838			
6,950.0	6,796.3	7,017.5	6,781.7	34.5	42.1	-84.34	-170.4	-1,569.3	355.0	309.4	45.59	7.786			
7,000.0	6,843.4	7,064.8	6,824.1	34.5	42.1	-83.42	-149.5	-1,569.3	355.6	309.7	45.91	7.745			
7,050.0	6,889.2	7,111.8	6,864.9	34.5	42.1	-82.53	-126.2	-1,569.3	356.3	310.1	46.17	7.716			
7,100.0	6,933.7	7,158.5	6,903.9	34.5	42.1	-81.68	-100.5	-1,569.3	357.0	310.6	46.37	7.699			
7,150.0	6,976.6	7,205.0	6,941.1	34.5	42.1	-80.87	-72.7	-1,569.3	357.8	311.3	46.52	7.691			
7,200.0	7,017.7	7,250.0	6,975.5	34.5	42.1	-80.12	-43.7	-1,569.3	358.6	312.0	46.62	7.692			
7,250.0	7,056.9	7,297.1	7,009.5	34.5	42.1	-79.37	-11.2	-1,569.3	359.4	312.7	46.69	7.698			
7,300.0	7,094.0	7,342.8	7,040.6	34.5	42.2	-78.69	22.3	-1,569.2	360.2	313.5	46.73	7.708			
7,350.0	7,128.8	7,388.3	7,069.5	34.5	42.2	-78.05	57.4	-1,569.2	361.1	314.3	46.77	7.719			
7,400.0	7,161.2	7,433.6	7,096.2	34.6	42.2	-77.46	94.1	-1,569.2	361.9	315.0	46.89	7.716			
7,450.0	7,191.0	7,478.7	7,120.5	34.6	42.2	-76.92	132.1	-1,569.2	362.6	315.6	46.98	7.718			
7,500.0	7,218.1	7,523.6	7,142.5	34.6	42.3	-76.44	171.3	-1,569.2	363.3	316.2	47.17	7.703			
7,550.0	7,242.4	7,568.5	7,162.1	34.7	42.3	-76.01	211.6	-1,569.2	364.0	316.5	47.46	7.670			
7,600.0	7,263.8	7,613.2	7,179.2	34.8	42.4	-75.63	252.9	-1,569.2	364.6	316.7	47.86	7.617			
7,650.0	7,282.2	7,657.8	7,193.9	34.9	42.5	-75.30	295.0	-1,569.2	365.1	316.7	48.41	7.542			
7,700.0	7,297.6	7,700.0	7,205.4	35.0	42.6	-75.04	335.6	-1,569.2	365.6	316.5	49.09	7.447			
7,750.0	7,309.8	7,746.8	7,215.6	35.2	42.8	-74.82	381.2	-1,569.1	365.9	315.9	49.97	7.322			
7,800.0	7,318.7	7,791.1	7,222.7	35.4	42.9	-74.66	425.0	-1,569.1	366.2	315.2	51.01	7.179			
7,850.0	7,324.5	7,835.5	7,227.2	35.6	43.1	-74.56	469.1	-1,569.1	366.4	314.2	52.20	7.019			
7,900.0	7,327.0	7,879.8	7,229.2	35.9	43.3	-74.52	513.4	-1,569.1	366.4	312.9	53.54	6.844			
7,924.2	7,327.0	7,901.4	7,229.2	36.0	43.4	-74.52	535.0	-1,569.1	366.4	312.2	54.24	6.756			
8,000.0	7,325.9	7,977.3	7,228.4	36.5	43.8	-74.56	610.9	-1,569.1	366.3	310.2	56.15	6.525			
8,100.0	7,324.5	8,077.3	7,227.3	37.3	44.4	-74.61	710.8	-1,569.1	366.2	307.4	58.87	6.221			
8,200.0	7,323.0	8,177.3	7,226.2	38.3	45.2	-74.66	810.8	-1,569.0	366.1	304.3	61.81	5.924			

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
	Sec.20-T3N-R66W		
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design													Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20Q-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)						
8,300.0	7,321.6	8,277.3	7,225.1	39.4	46.0	-74.72	910.8	-1,569.0	366.0	301.1	64.93	5.637					
8,400.0	7,320.1	8,377.3	7,224.0	40.6	47.0	-74.77	1,010.8	-1,569.0	365.9	297.7	68.22	5.364					
8,500.0	7,318.7	8,477.3	7,222.9	41.9	48.1	-74.82	1,110.8	-1,568.9	365.8	294.2	71.64	5.106					
8,600.0	7,317.2	8,577.3	7,221.8	43.4	49.4	-74.87	1,210.8	-1,568.9	365.7	290.5	75.19	4.864					
8,700.0	7,315.8	8,677.3	7,220.7	44.9	50.7	-74.93	1,310.8	-1,568.9	365.6	286.8	78.84	4.638					
8,800.0	7,314.3	8,777.3	7,219.6	46.6	52.0	-74.98	1,410.8	-1,568.9	365.5	283.0	82.58	4.426					
8,900.0	7,312.9	8,877.3	7,218.5	48.3	53.5	-75.03	1,510.8	-1,568.8	365.4	279.0	86.40	4.230					
9,000.0	7,311.4	8,977.3	7,217.4	50.0	55.1	-75.08	1,610.8	-1,568.8	365.3	275.0	90.29	4.046					
9,100.0	7,310.0	9,077.3	7,216.3	51.8	56.7	-75.14	1,710.8	-1,568.8	365.2	271.0	94.24	3.875					
9,200.0	7,308.5	9,177.3	7,215.2	53.7	58.3	-75.19	1,810.8	-1,568.7	365.1	266.9	98.25	3.716					
9,300.0	7,307.1	9,277.3	7,214.1	55.5	60.0	-75.24	1,910.8	-1,568.7	365.0	262.7	102.30	3.568					
9,400.0	7,305.6	9,377.3	7,213.0	57.5	61.8	-75.29	2,010.8	-1,568.7	364.9	258.5	106.40	3.430					
9,500.0	7,304.2	9,477.3	7,211.9	59.4	63.6	-75.35	2,110.8	-1,568.7	364.8	254.3	110.53	3.301					
9,600.0	7,302.7	9,577.3	7,210.8	61.4	65.5	-75.40	2,210.7	-1,568.6	364.7	250.0	114.70	3.180					
9,700.0	7,301.3	9,677.3	7,209.7	63.4	67.3	-75.45	2,310.7	-1,568.6	364.6	245.7	118.90	3.067					
9,800.0	7,299.8	9,777.3	7,208.6	65.5	69.3	-75.50	2,410.7	-1,568.6	364.5	241.4	123.13	2.961					
9,900.0	7,298.4	9,877.3	7,207.5	67.5	71.2	-75.56	2,510.7	-1,568.6	364.4	237.1	127.39	2.861					
10,000.0	7,297.0	9,977.3	7,206.4	69.6	73.2	-75.61	2,610.7	-1,568.5	364.3	232.7	131.66	2.767					
10,100.3	7,295.5	10,077.6	7,205.3	71.7	75.2	-75.66	2,711.0	-1,568.5	364.2	228.3	135.97	2.679					
10,103.2	7,295.5	10,080.4	7,205.3	71.8	75.2	-75.66	2,713.9	-1,568.5	364.2	228.2	136.05	2.677					
10,200.0	7,294.1	10,177.2	7,204.2	73.7	77.2	-75.74	2,810.7	-1,568.5	365.8	227.4	138.47	2.642					
10,269.9	7,293.0	10,247.1	7,203.4	74.9	78.6	-75.87	2,880.5	-1,568.5	368.9	228.9	140.06	2.634					
10,300.0	7,292.6	10,277.1	7,203.1	75.5	79.2	-75.95	2,910.5	-1,568.4	370.6	229.3	141.33	2.622					
10,400.0	7,291.2	10,376.9	7,202.0	77.6	81.2	-76.22	3,010.4	-1,568.4	376.3	230.6	145.70	2.583					
10,500.0	7,289.7	10,476.8	7,200.9	79.7	83.3	-76.48	3,110.2	-1,568.4	382.0	231.9	150.09	2.545					
10,600.0	7,288.3	10,576.6	7,199.8	81.8	85.4	-76.74	3,210.0	-1,568.4	387.6	233.1	154.50	2.509					
10,700.0	7,286.8	10,676.4	7,198.7	83.9	87.5	-76.98	3,309.8	-1,568.3	393.3	234.4	158.92	2.475					
10,800.0	7,285.4	10,776.2	7,197.6	86.0	89.6	-77.22	3,409.6	-1,568.3	399.0	235.6	163.35	2.442					
10,900.0	7,283.9	10,876.1	7,196.5	88.1	91.7	-77.46	3,509.5	-1,568.3	404.7	236.9	167.80	2.412					
11,000.0	7,282.5	10,975.9	7,195.4	90.2	93.8	-77.68	3,609.3	-1,568.2	410.4	238.1	172.26	2.382					
11,100.0	7,281.0	11,075.7	7,194.3	92.4	95.9	-77.90	3,709.1	-1,568.2	416.1	239.3	176.74	2.354					
11,200.0	7,279.6	11,175.5	7,193.2	94.5	98.1	-78.12	3,808.9	-1,568.2	421.8	240.6	181.22	2.327					
11,300.0	7,278.1	11,275.4	7,192.1	96.7	100.2	-78.33	3,908.7	-1,568.2	427.5	241.8	185.71	2.302					
11,400.0	7,276.7	11,375.2	7,191.0	98.9	102.4	-78.53	4,008.6	-1,568.1	433.2	243.0	190.22	2.277					
11,500.0	7,275.2	11,475.0	7,189.9	101.1	104.6	-78.73	4,108.4	-1,568.1	438.9	244.2	194.73	2.254					
11,600.0	7,273.8	11,574.8	7,188.8	103.2	106.8	-78.92	4,208.2	-1,568.1	444.7	245.4	199.25	2.232					
11,700.0	7,272.3	11,674.7	7,187.7	105.4	108.9	-79.11	4,308.0	-1,568.1	450.4	246.6	203.77	2.210					
11,800.0	7,270.9	11,774.5	7,186.6	107.6	111.1	-79.29	4,407.8	-1,568.0	456.1	247.8	208.31	2.190					
11,861.4	7,270.0	11,832.9	7,186.0	109.0	112.4	-79.39	4,466.2	-1,568.0	459.7	248.6	211.03	2.178 SF					

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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 (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	1.0	1.0	0.0	0.0	-0.66	45.1	-0.5	45.1	45.1	0.00	N/A			
100.0	100.0	101.0	101.0	0.1	0.1	-0.66	45.1	-0.5	45.1	44.8	0.28	162.435			
200.0	200.0	201.0	201.0	0.4	0.4	-0.66	45.1	-0.5	45.1	44.3	0.83	54.505			
300.0	300.0	301.0	301.0	0.7	0.7	-0.66	45.1	-0.5	45.1	43.7	1.38	32.746			
400.0	400.0	401.0	401.0	1.0	1.0	-0.66	45.1	-0.5	45.1	43.2	1.93	23.404 CC			
500.0	500.0	501.0	501.0	1.2	1.2	102.09	45.1	-0.5	45.3	42.9	2.46	18.445 ES			
600.0	599.9	600.9	600.9	1.5	1.5	106.82	45.1	-0.5	46.3	43.3	2.99	15.510			
700.0	699.7	700.7	700.7	1.7	1.8	114.17	45.1	-0.5	48.6	45.1	3.53	13.754			
800.0	799.3	800.3	800.3	2.0	2.1	123.15	45.1	-0.5	53.0	48.9	4.10	12.931			
900.0	898.6	899.6	899.6	2.4	2.3	132.42	45.1	-0.5	60.3	55.6	4.68	12.887			
1,000.0	997.5	998.5	998.5	2.8	2.6	140.89	45.1	-0.5	70.8	65.6	5.26	13.470			
1,100.0	1,096.1	1,099.2	1,099.2	3.2	2.9	148.29	44.1	-1.3	83.4	77.6	5.80	14.387			
1,200.0	1,194.2	1,200.1	1,200.0	3.6	3.1	154.79	40.9	-3.7	96.9	90.6	6.31	15.365			
1,300.0	1,291.7	1,301.1	1,300.8	4.2	3.3	160.64	35.7	-7.7	111.3	104.5	6.81	16.332			
1,376.7	1,366.1	1,378.7	1,378.1	4.6	3.5	164.76	30.2	-11.9	123.0	115.8	7.21	17.069			
1,400.0	1,388.6	1,402.2	1,401.5	4.8	3.6	165.97	28.3	-13.4	126.7	119.3	7.33	17.283			
1,500.0	1,485.4	1,503.2	1,501.8	5.4	3.9	170.76	18.8	-20.6	141.4	133.5	7.86	17.982			
1,600.0	1,582.1	1,601.6	1,599.3	6.0	4.2	174.75	8.8	-28.3	156.1	147.6	8.43	18.512			
1,700.0	1,678.9	1,700.0	1,696.9	6.6	4.5	178.04	-1.2	-36.0	171.4	162.3	9.03	18.981			
1,800.0	1,775.6	1,798.4	1,794.5	7.3	4.8	-179.21	-11.2	-43.7	187.1	177.5	9.66	19.380			
1,900.0	1,872.4	1,896.7	1,892.0	7.9	5.2	-176.89	-21.2	-51.3	203.2	192.9	10.31	19.716			
2,000.0	1,969.1	1,995.1	1,989.6	8.6	5.5	-174.91	-31.2	-59.0	219.6	208.6	10.98	19.995			
2,100.0	2,065.9	2,093.5	2,087.2	9.2	5.9	-173.20	-41.2	-66.7	236.2	224.6	11.68	20.225			
2,200.0	2,162.6	2,191.9	2,184.7	9.9	6.2	-171.73	-51.2	-74.4	253.0	240.6	12.39	20.416			
2,300.0	2,259.4	2,290.3	2,282.3	10.5	6.6	-170.43	-61.2	-82.0	270.0	256.9	13.12	20.575			
2,400.0	2,356.1	2,388.6	2,379.9	11.2	7.0	-169.29	-71.2	-89.7	287.0	273.2	13.86	20.707			
2,500.0	2,452.9	2,487.0	2,477.5	11.8	7.3	-168.27	-81.2	-97.4	304.2	289.6	14.61	20.817			
2,600.0	2,549.6	2,585.4	2,575.0	12.5	7.7	-167.37	-91.2	-105.1	321.4	306.1	15.37	20.909			
2,700.0	2,646.4	2,683.8	2,672.6	13.2	8.1	-166.55	-101.2	-112.7	338.7	322.6	16.14	20.987			
2,800.0	2,743.1	2,782.2	2,770.2	13.8	8.5	-165.82	-111.2	-120.4	356.1	339.2	16.91	21.053			
2,900.0	2,839.9	2,880.6	2,867.7	14.5	8.9	-165.15	-121.2	-128.1	373.5	355.8	17.70	21.109			
3,000.0	2,936.6	2,978.9	2,965.3	15.2	9.3	-164.54	-131.2	-135.7	391.0	372.5	18.48	21.157			
3,100.0	3,033.4	3,077.3	3,062.9	15.8	9.6	-163.99	-141.2	-143.4	408.5	389.2	19.27	21.198			
3,200.0	3,130.1	3,175.7	3,160.5	16.5	10.0	-163.48	-151.2	-151.1	426.0	406.0	20.06	21.233			
3,300.0	3,226.9	3,274.1	3,258.0	17.2	10.4	-163.01	-161.2	-158.8	443.6	422.7	20.86	21.263			
3,400.0	3,323.6	3,372.5	3,355.6	17.8	10.8	-162.58	-171.2	-166.4	461.2	439.5	21.66	21.290			
3,500.0	3,420.4	3,470.9	3,453.2	18.5	11.2	-162.18	-181.2	-174.1	478.8	456.3	22.47	21.312			
3,600.0	3,517.1	3,569.2	3,550.7	19.2	11.6	-161.80	-191.3	-181.8	496.4	473.2	23.27	21.332			
3,700.0	3,613.8	3,667.6	3,648.3	19.8	12.0	-161.45	-201.3	-189.5	514.1	490.0	24.08	21.350			
3,800.0	3,710.6	3,766.0	3,745.9	20.5	12.4	-161.13	-211.3	-197.1	531.8	506.9	24.89	21.365			
3,900.0	3,807.3	3,863.4	3,842.5	21.2	12.8	-160.83	-221.2	-204.7	549.5	523.8	25.69	21.386			
4,000.0	3,904.1	3,953.0	3,931.5	21.8	13.0	-160.72	-228.9	-210.7	568.1	541.7	26.37	21.547			
4,100.0	4,000.8	4,042.0	4,020.3	22.5	13.3	-160.86	-234.4	-214.9	588.3	561.3	26.96	21.817			
4,200.0	4,097.6	4,130.3	4,108.4	23.2	13.5	-161.22	-237.8	-217.5	609.9	582.4	27.50	22.179			
4,300.0	4,194.3	4,217.7	4,195.8	23.9	13.6	-161.76	-238.9	-218.4	633.2	605.2	27.99	22.626			
4,400.0	4,291.1	4,313.9	4,292.1	24.5	13.8	-162.45	-238.9	-218.4	657.3	628.9	28.46	23.100			
4,500.0	4,387.8	4,410.7	4,388.8	25.2	14.0	-163.09	-238.9	-218.4	681.5	652.6	28.92	23.563			
4,600.0	4,484.6	4,507.4	4,485.6	25.9	14.2	-163.68	-238.9	-218.4	705.8	676.4	29.40	24.008			
4,700.0	4,581.3	4,604.2	4,582.3	26.5	14.4	-164.24	-238.9	-218.4	730.2	700.3	29.88	24.436			
4,800.0	4,678.1	4,700.9	4,679.1	27.2	14.6	-164.76	-238.9	-218.4	754.6	724.3	30.37	24.847			
4,900.0	4,774.8	4,797.7	4,775.8	27.9	14.8	-165.25	-238.9	-218.4	779.1	748.3	30.87	25.242			

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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								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	4,871.6	4,894.4	4,872.6	28.5	15.0	-165.71	-238.9	-218.4	803.7	772.3	31.37	25.621			
5,100.0	4,968.3	4,991.2	4,969.3	29.2	15.2	-166.14	-238.9	-218.4	828.2	796.4	31.87	25.986			
5,200.0	5,065.1	5,087.9	5,066.1	29.9	15.4	-166.54	-238.9	-218.4	852.9	820.5	32.38	26.337			
5,300.0	5,161.8	5,184.7	5,162.8	30.6	15.6	-166.93	-238.9	-218.4	877.5	844.6	32.90	26.675			
5,400.0	5,258.6	5,281.4	5,259.6	31.2	15.8	-167.29	-238.9	-218.4	902.2	868.8	33.42	27.000			
5,417.4	5,275.4	5,298.2	5,276.4	31.3	15.8	-167.35	-238.9	-218.4	906.5	873.0	33.51	27.055			
5,500.0	5,355.6	5,378.5	5,356.6	31.8	16.0	-167.70	-238.9	-218.4	925.8	891.8	33.98	27.248			
5,600.0	5,453.4	5,476.3	5,454.4	32.2	16.2	-168.06	-238.9	-218.4	946.2	911.7	34.48	27.440			
5,700.0	5,551.9	5,574.7	5,552.9	32.6	16.4	-168.34	-238.9	-218.4	963.2	928.2	34.95	27.559			
5,800.0	5,650.9	5,673.8	5,651.9	32.9	16.7	-168.56	-238.9	-218.4	976.8	941.4	35.38	27.611			
5,900.0	5,750.4	5,773.2	5,751.4	33.2	16.9	-168.72	-238.9	-218.4	987.1	951.3	35.76	27.599			
6,000.0	5,850.1	5,873.0	5,851.1	33.4	17.1	-168.83	-238.9	-218.4	993.9	957.8	36.11	27.526			
6,100.0	5,950.1	5,972.9	5,951.1	33.5	17.3	-168.88	-238.9	-218.4	997.3	960.9	36.40	27.396			
6,150.0	6,000.0	6,022.8	6,001.0	33.6	17.4	90.00	-238.9	-218.4	997.7	961.2	36.54	27.306			
6,200.0	6,050.0	6,072.9	6,051.0	33.6	17.6	90.00	-238.9	-218.4	997.7	961.0	36.75	27.147			
6,300.0	6,150.0	6,172.9	6,151.0	33.8	17.8	90.00	-238.9	-218.4	997.7	960.6	37.18	26.836			
6,400.0	6,250.0	6,272.9	6,251.0	33.9	18.0	90.00	-238.9	-218.4	997.7	960.1	37.61	26.530			
6,500.0	6,350.0	6,372.9	6,351.0	34.0	18.2	90.00	-238.9	-218.4	997.7	959.7	38.04	26.228			
6,600.0	6,450.0	6,472.9	6,451.0	34.1	18.5	90.00	-238.9	-218.4	997.7	959.3	38.48	25.931			
6,635.7	6,485.8	6,508.6	6,486.8	34.2	18.6	89.98	-238.6	-218.4	997.7	959.1	38.63	25.831			
6,700.0	6,550.0	6,572.5	6,550.5	34.3	18.7	89.71	-233.9	-218.4	997.8	958.9	38.83	25.694			
6,713.1	6,563.2	6,585.4	6,563.3	34.3	18.7	89.62	-232.4	-218.4	997.8	958.9	38.87	25.672			
6,750.0	6,600.0	6,621.6	6,599.0	34.3	18.8	89.34	-226.8	-218.4	997.8	958.9	38.94	25.622			
6,800.0	6,649.9	6,670.2	6,646.6	34.4	18.8	88.97	-216.6	-218.4	997.9	958.9	39.02	25.576			
6,850.0	6,699.3	6,718.5	6,693.1	34.4	18.8	88.61	-203.6	-218.4	998.0	959.0	39.06	25.549			
6,900.0	6,748.2	6,766.4	6,738.3	34.5	18.9	88.25	-187.8	-218.4	998.2	959.1	39.09	25.537			
6,950.0	6,796.3	6,814.0	6,782.1	34.5	18.9	87.91	-169.3	-218.4	998.4	959.3	39.10	25.535			
7,000.0	6,843.4	6,861.2	6,824.3	34.5	18.9	87.57	-148.3	-218.4	998.6	959.5	39.10	25.538			
7,050.0	6,889.2	6,908.1	6,865.0	34.5	18.9	87.24	-124.9	-218.4	998.9	959.8	39.11	25.539			
7,100.0	6,933.7	6,954.7	6,903.8	34.5	18.9	86.93	-99.2	-218.4	999.2	960.0	39.13	25.533			
7,150.0	6,976.6	7,000.0	6,940.1	34.5	18.9	86.63	-72.0	-218.4	999.4	960.3	39.17	25.515			
7,200.0	7,017.7	7,047.0	6,975.9	34.5	18.9	86.34	-41.5	-218.4	999.7	960.5	39.24	25.475			
10,200.0	7,294.1	9,970.9	7,197.1	73.7	69.0	84.40	2,810.4	-218.8	999.8	863.1	136.69	7.314			
10,269.9	7,293.0	10,040.7	7,196.2	74.9	70.5	84.40	2,880.3	-218.8	996.5	857.7	138.85	7.177			
10,300.0	7,292.6	10,070.7	7,195.8	75.5	71.2	84.40	2,910.3	-218.9	994.7	854.6	140.14	7.098			
10,400.0	7,291.2	10,170.6	7,194.5	77.6	73.5	84.37	3,010.1	-218.9	988.8	844.2	144.58	6.839			
10,500.0	7,289.7	10,270.4	7,193.1	79.7	75.7	84.34	3,109.9	-218.9	982.9	833.8	149.03	6.595			
10,600.0	7,288.3	10,370.2	7,191.8	81.8	78.0	84.31	3,209.7	-218.9	976.9	823.4	153.49	6.365			
10,700.0	7,286.8	10,470.0	7,190.5	83.9	80.3	84.29	3,309.5	-218.9	971.0	813.0	157.96	6.147			
10,800.0	7,285.4	10,569.9	7,189.2	86.0	82.5	84.26	3,409.4	-218.9	965.1	802.6	162.44	5.941			
10,900.0	7,283.9	10,669.7	7,187.8	88.1	84.8	84.23	3,509.2	-218.9	959.1	792.2	166.93	5.746			
11,000.0	7,282.5	10,769.5	7,186.5	90.2	87.1	84.20	3,609.0	-219.0	953.2	781.8	171.42	5.561			
11,100.0	7,281.0	10,869.3	7,185.2	92.4	89.4	84.17	3,708.8	-219.0	947.3	771.4	175.92	5.385			
11,200.0	7,279.6	10,969.1	7,183.9	94.5	91.7	84.14	3,808.6	-219.0	941.3	760.9	180.42	5.217			
11,300.0	7,278.1	11,069.0	7,182.5	96.7	94.0	84.11	3,908.4	-219.0	935.4	750.5	184.94	5.058			
11,400.0	7,276.7	11,168.8	7,181.2	98.9	96.3	84.08	4,008.2	-219.0	929.5	740.0	189.45	4.906			
11,500.0	7,275.2	11,268.6	7,179.9	101.1	98.5	84.05	4,108.1	-219.0	923.5	729.6	193.97	4.761			
11,600.0	7,273.8	11,368.4	7,178.6	103.2	100.8	84.02	4,207.9	-219.1	917.6	719.1	198.50	4.623			
11,700.0	7,272.3	11,468.3	7,177.2	105.4	103.1	83.99	4,307.7	-219.1	911.7	708.7	203.03	4.490			
11,800.0	7,270.9	11,568.1	7,175.9	107.6	105.4	83.96	4,407.5	-219.1	905.8	698.2	207.56	4.364			

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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								
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		
11,861.4	7,270.0	11,629.4	7,175.1	109.0	106.9	83.94	4,468.8	-219.1	902.1	691.8	210.34	4.289 SF			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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 #2 (2-5-16)													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	1.0	1.0	0.0	0.0	-0.32	15.0	-0.1	15.0	15.0	0.00	9,276.620		
100.0	100.0	101.0	101.0	0.1	0.1	-0.32	15.0	-0.1	15.0	14.7	0.28	54.015		
200.0	200.0	201.0	201.0	0.4	0.4	-0.32	15.0	-0.1	15.0	14.2	0.83	18.125		
300.0	300.0	301.0	301.0	0.7	0.7	-0.32	15.0	-0.1	15.0	13.6	1.38	10.889		
400.0	400.0	401.0	401.0	1.0	1.0	-0.32	15.0	-0.1	15.0	13.1	1.93	7.782 CC		
500.0	500.0	501.0	501.0	1.2	1.2	105.62	15.0	-0.1	15.3	12.8	2.46	6.220 ES		
600.0	599.9	600.9	600.9	1.5	1.5	118.61	15.0	-0.1	16.8	13.8	2.99	5.616		
700.0	699.7	701.1	701.1	1.7	1.8	132.18	14.6	-1.4	19.7	16.2	3.51	5.612		
800.0	799.3	801.4	801.3	2.0	2.0	142.29	13.5	-5.2	23.3	19.3	4.04	5.779		
900.0	898.6	901.8	901.5	2.4	2.3	149.93	11.7	-11.5	27.4	22.8	4.58	5.980		
1,000.0	997.5	1,002.4	1,001.7	2.8	2.6	155.92	9.1	-20.4	31.7	26.5	5.12	6.179		
1,100.0	1,096.1	1,103.1	1,101.7	3.2	2.9	160.78	5.8	-31.9	36.1	30.4	5.68	6.364		
1,200.0	1,194.2	1,204.0	1,201.5	3.6	3.3	164.86	1.8	-45.9	40.7	34.5	6.24	6.529		
1,300.0	1,291.7	1,305.0	1,301.0	4.2	3.7	168.38	-3.0	-62.4	45.4	38.6	6.81	6.674		
1,376.7	1,366.1	1,382.6	1,377.1	4.6	4.0	170.79	-7.1	-76.8	49.1	41.8	7.25	6.770		
1,400.0	1,388.6	1,406.1	1,400.1	4.8	4.1	171.47	-8.4	-81.5	50.1	42.8	7.39	6.787		
1,500.0	1,485.4	1,505.9	1,497.8	5.4	4.6	174.06	-14.2	-101.6	54.5	46.5	7.99	6.813		
1,600.0	1,582.1	1,605.8	1,595.4	6.0	5.1	176.26	-20.0	-121.7	58.9	50.2	8.61	6.838		
1,700.0	1,678.9	1,705.7	1,693.1	6.6	5.6	178.16	-25.8	-141.7	63.3	54.1	9.24	6.854		
1,800.0	1,775.6	1,805.6	1,790.8	7.3	6.2	179.80	-31.6	-161.8	67.9	58.0	9.89	6.865		
1,900.0	1,872.4	1,905.5	1,888.4	7.9	6.7	-178.76	-37.3	-181.9	72.5	61.9	10.55	6.870		
2,000.0	1,969.1	2,005.3	1,986.1	8.6	7.2	-177.50	-43.1	-202.0	77.1	65.9	11.22	6.870		
2,100.0	2,065.9	2,105.2	2,083.8	9.2	7.8	-176.38	-48.9	-222.1	81.8	69.8	11.91	6.867		
2,200.0	2,162.6	2,205.1	2,181.5	9.9	8.3	-175.38	-54.7	-242.1	86.4	73.8	12.60	6.860		
2,300.0	2,259.4	2,305.0	2,279.1	10.5	8.9	-174.48	-60.5	-262.2	91.2	77.8	13.31	6.850		
2,400.0	2,356.1	2,404.9	2,376.8	11.2	9.4	-173.67	-66.2	-282.3	95.9	81.9	14.02	6.839		
2,500.0	2,452.9	2,504.7	2,474.5	11.8	10.0	-172.94	-72.0	-302.4	100.6	85.9	14.74	6.827		
2,600.0	2,549.6	2,604.6	2,572.1	12.5	10.5	-172.28	-77.8	-322.4	105.4	89.9	15.47	6.814		
2,700.0	2,646.4	2,704.5	2,669.8	13.2	11.1	-171.67	-83.6	-342.5	110.2	94.0	16.20	6.800		
2,800.0	2,743.1	2,804.4	2,767.5	13.8	11.7	-171.11	-89.3	-362.6	115.0	98.0	16.94	6.785		
2,900.0	2,839.9	2,904.3	2,865.1	14.5	12.2	-170.60	-95.1	-382.7	119.8	102.1	17.69	6.771		
3,000.0	2,936.6	3,004.1	2,962.8	15.2	12.8	-170.12	-100.9	-402.8	124.6	106.1	18.44	6.756		
3,100.0	3,033.4	3,104.0	3,060.5	15.8	13.3	-169.69	-106.7	-422.8	129.4	110.2	19.19	6.742		
3,200.0	3,130.1	3,203.9	3,158.2	16.5	13.9	-169.28	-112.5	-442.9	134.2	114.3	19.95	6.728		
3,300.0	3,226.9	3,303.8	3,255.8	17.2	14.5	-168.90	-118.2	-463.0	139.0	118.3	20.71	6.714		
3,400.0	3,323.6	3,403.7	3,353.5	17.8	15.0	-168.55	-124.0	-483.1	143.9	122.4	21.47	6.700		
3,500.0	3,420.4	3,503.5	3,451.2	18.5	15.6	-168.22	-129.8	-503.2	148.7	126.5	22.24	6.687		
3,600.0	3,517.1	3,603.4	3,548.8	19.2	16.2	-167.91	-135.6	-523.2	153.6	130.6	23.01	6.674		
3,700.0	3,613.8	3,703.3	3,646.5	19.8	16.7	-167.62	-141.4	-543.3	158.4	134.6	23.78	6.661		
3,800.0	3,710.6	3,803.2	3,744.2	20.5	17.3	-167.34	-147.1	-563.4	163.3	138.7	24.55	6.649		
3,900.0	3,807.3	3,903.1	3,841.8	21.2	17.9	-167.09	-152.9	-583.5	168.1	142.8	25.33	6.637		
4,000.0	3,904.1	4,002.9	3,939.5	21.8	18.4	-166.84	-158.7	-603.5	173.0	146.9	26.11	6.625		
4,100.0	4,000.8	4,102.8	4,037.2	22.5	19.0	-166.61	-164.5	-623.6	177.8	151.0	26.89	6.614		
4,200.0	4,097.6	4,202.7	4,134.9	23.2	19.6	-166.40	-170.2	-643.7	182.7	155.0	27.67	6.603		
4,300.0	4,194.3	4,302.6	4,232.5	23.9	20.1	-166.19	-176.0	-663.8	187.6	159.1	28.45	6.593		
4,400.0	4,291.1	4,402.4	4,330.2	24.5	20.7	-165.99	-181.8	-683.9	192.4	163.2	29.23	6.583		
4,500.0	4,387.8	4,502.3	4,427.9	25.2	21.3	-165.81	-187.6	-703.9	197.3	167.3	30.02	6.573		
4,600.0	4,484.6	4,602.2	4,525.5	25.9	21.8	-165.63	-193.4	-724.0	202.2	171.4	30.80	6.564		
4,700.0	4,581.3	4,702.1	4,623.2	26.5	22.4	-165.46	-199.1	-744.1	207.1	175.5	31.59	6.555		
4,800.0	4,678.1	4,802.0	4,720.9	27.2	23.0	-165.30	-204.9	-764.2	211.9	179.6	32.38	6.546		
4,900.0	4,774.8	4,901.8	4,818.5	27.9	23.5	-165.15	-210.7	-784.2	216.8	183.6	33.17	6.537		

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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		
5,000.0	4,871.6	5,001.7	4,916.2	28.5	24.1	-165.00	-216.5	-804.3	221.7	187.7	33.96	6.529			
5,100.0	4,968.3	5,100.0	5,012.3	29.2	24.7	-164.86	-222.2	-824.1	226.6	191.9	34.74	6.524			
5,200.0	5,065.1	5,193.4	5,104.1	29.9	25.0	-164.90	-227.0	-841.0	233.4	198.1	35.37	6.600			
5,300.0	5,161.8	5,285.7	5,195.2	30.6	25.3	-165.17	-231.1	-855.0	243.3	207.3	35.91	6.774			
5,400.0	5,258.6	5,377.3	5,286.1	31.2	25.6	-165.65	-234.2	-866.0	256.1	219.7	36.38	7.040			
5,417.4	5,275.4	5,393.2	5,301.9	31.3	25.7	-165.75	-234.7	-867.7	258.7	222.2	36.46	7.095			
5,500.0	5,355.6	5,468.3	5,376.6	31.8	25.8	-166.28	-236.6	-874.2	270.8	234.1	36.79	7.363			
5,600.0	5,453.4	5,558.9	5,467.0	32.2	26.0	-166.89	-238.2	-879.6	285.3	248.2	37.10	7.690			
5,700.0	5,551.9	5,649.1	5,557.2	32.6	26.2	-167.47	-238.9	-882.3	299.3	262.0	37.35	8.013			
5,800.0	5,650.9	5,743.8	5,651.9	32.9	26.3	-168.04	-239.0	-882.6	312.6	275.0	37.57	8.319			
5,900.0	5,750.4	5,843.3	5,751.4	33.2	26.5	-168.46	-239.0	-882.6	322.8	285.0	37.78	8.544			
6,000.0	5,850.1	5,943.0	5,851.1	33.4	26.6	-168.73	-239.0	-882.6	329.6	291.7	37.98	8.680			
6,100.0	5,950.1	6,042.9	5,951.1	33.5	26.8	-168.86	-239.0	-882.6	333.1	294.9	38.15	8.730			
6,150.0	6,000.0	6,092.9	6,001.0	33.6	26.8	90.00	-239.0	-882.6	333.5	295.3	38.23	8.723			
6,200.0	6,050.0	6,142.9	6,051.0	33.6	26.9	90.00	-239.0	-882.6	333.5	295.1	38.43	8.677			
6,300.0	6,150.0	6,242.9	6,151.0	33.8	27.1	90.00	-239.0	-882.6	333.5	294.7	38.83	8.588			
6,400.0	6,250.0	6,342.9	6,251.0	33.9	27.2	90.00	-239.0	-882.6	333.5	294.3	39.24	8.500			
6,500.0	6,350.0	6,442.9	6,351.0	34.0	27.4	90.00	-239.0	-882.6	333.5	293.9	39.64	8.412			
6,600.0	6,450.0	6,542.9	6,451.0	34.1	27.5	90.00	-239.0	-882.6	333.5	293.4	40.05	8.326			
6,600.3	6,450.3	6,543.2	6,451.3	34.1	27.5	90.00	-239.0	-882.6	333.5	293.4	40.06	8.326			
6,700.0	6,550.0	6,641.9	6,549.9	34.3	27.7	89.20	-234.3	-882.5	333.6	293.4	40.25	8.288			
6,713.1	6,563.2	6,654.8	6,562.6	34.3	27.7	88.94	-232.8	-882.5	333.7	293.4	40.24	8.291			
6,750.0	6,600.0	6,690.7	6,598.1	34.3	27.7	88.13	-227.4	-882.4	333.9	293.7	40.19	8.308			
6,800.0	6,649.9	6,739.0	6,645.4	34.4	27.8	87.06	-217.5	-882.2	334.3	294.2	40.10	8.338			
6,850.0	6,699.3	6,787.0	6,691.7	34.4	27.8	86.02	-204.7	-882.0	334.9	294.9	40.00	8.373			
6,900.0	6,748.2	6,834.7	6,736.7	34.5	27.8	84.99	-189.2	-881.7	335.7	295.8	39.91	8.411			
6,950.0	6,796.3	6,882.0	6,780.4	34.5	27.8	84.00	-171.1	-881.4	336.6	296.7	39.83	8.450			
7,000.0	6,843.4	6,928.9	6,822.6	34.5	27.8	83.03	-150.4	-881.1	337.6	297.8	39.77	8.489			
7,050.0	6,889.2	6,975.6	6,863.1	34.5	27.8	82.11	-127.3	-880.7	338.7	299.0	39.73	8.526			
7,100.0	6,933.7	7,022.0	6,902.0	34.5	27.8	81.22	-102.0	-880.2	340.0	300.2	39.71	8.560			
7,150.0	6,976.6	7,068.2	6,939.1	34.5	27.8	80.38	-74.5	-879.7	341.3	301.5	39.73	8.591			
7,200.0	7,017.7	7,114.1	6,974.2	34.5	27.8	79.58	-45.0	-879.2	342.6	302.9	39.77	8.616			
7,250.0	7,056.9	7,159.7	7,007.3	34.5	27.8	78.83	-13.6	-878.7	344.0	304.2	39.84	8.637			
7,300.0	7,094.0	7,205.2	7,038.4	34.5	27.8	77.13	19.6	-878.1	345.5	305.6	39.94	8.651			
7,350.0	7,128.8	7,250.0	7,067.0	34.5	27.8	76.49	54.1	-877.5	347.0	306.9	40.07	8.659			
7,400.0	7,161.2	7,295.5	7,094.0	34.6	27.8	76.89	90.7	-876.9	348.4	308.2	40.25	8.657			
7,450.0	7,191.0	7,340.5	7,118.4	34.6	27.8	76.35	128.4	-876.2	349.9	309.4	40.44	8.651			
7,500.0	7,218.1	7,385.3	7,140.5	34.6	27.8	75.87	167.3	-875.5	351.3	310.6	40.71	8.628			
7,550.0	7,242.4	7,429.9	7,160.3	34.7	27.9	75.44	207.4	-874.8	352.6	311.6	41.02	8.597			
7,600.0	7,263.8	7,474.5	7,177.6	34.8	28.0	75.07	248.4	-874.1	354.0	312.6	41.38	8.554			
7,650.0	7,282.2	7,518.9	7,192.5	34.9	28.1	74.76	290.3	-873.4	355.2	313.4	41.79	8.500			
7,700.0	7,297.6	7,563.3	7,204.9	35.0	28.2	74.51	332.9	-872.6	356.4	314.1	42.26	8.433			
7,750.0	7,309.8	7,607.6	7,214.8	35.2	28.4	74.32	376.1	-871.9	357.5	314.7	42.79	8.354			
7,800.0	7,318.7	7,650.0	7,221.8	35.4	28.6	74.19	417.9	-871.2	358.5	315.1	43.37	8.265			
7,850.0	7,324.5	7,696.2	7,226.9	35.6	28.9	74.11	463.8	-870.4	359.4	315.3	44.07	8.156			
7,900.0	7,327.0	7,740.5	7,229.2	35.9	29.2	74.09	508.0	-869.6	360.2	315.4	44.82	8.038			
7,924.2	7,327.0	7,761.9	7,229.4	36.0	29.4	74.10	529.4	-869.2	360.6	315.4	45.20	7.978			
8,000.0	7,325.9	7,837.2	7,228.5	36.5	30.0	74.20	604.7	-867.9	361.8	314.7	47.11	7.678			
8,100.0	7,324.5	7,937.2	7,227.4	37.3	31.0	74.33	704.6	-866.2	363.3	313.5	49.88	7.284			
8,200.0	7,323.0	8,037.2	7,226.3	38.3	32.2	74.45	804.6	-864.4	364.9	312.0	52.90	6.898			

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	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	
8,300.0	7,321.6	8,137.1	7,225.2	39.4	33.6	74.58	904.6	-862.7	366.5	310.3	56.13	6.529		
8,400.0	7,320.1	8,237.1	7,224.1	40.6	35.1	74.70	1,004.5	-860.9	368.0	308.5	59.54	6.182		
8,500.0	7,318.7	8,337.1	7,223.0	41.9	36.7	74.83	1,104.5	-859.2	369.6	306.5	63.10	5.858		
8,600.0	7,317.2	8,437.1	7,221.9	43.4	38.4	74.95	1,204.5	-857.5	371.2	304.4	66.78	5.558		
8,700.0	7,315.8	8,537.1	7,220.8	44.9	40.1	75.07	1,304.4	-855.7	372.8	302.2	70.58	5.282		
8,800.0	7,314.3	8,637.1	7,219.7	46.6	41.9	75.19	1,404.4	-854.0	374.3	299.9	74.47	5.027		
8,900.0	7,312.9	8,737.0	7,218.6	48.3	43.8	75.31	1,504.3	-852.2	375.9	297.5	78.43	4.793		
9,000.0	7,311.4	8,837.0	7,217.5	50.0	45.7	75.42	1,604.3	-850.5	377.5	295.0	82.47	4.578		
9,100.0	7,310.0	8,937.0	7,216.4	51.8	47.7	75.54	1,704.3	-848.7	379.1	292.5	86.56	4.379		
9,200.0	7,308.5	9,037.0	7,215.3	53.7	49.6	75.66	1,804.2	-847.0	380.7	290.0	90.70	4.197		
9,300.0	7,307.1	9,137.0	7,214.2	55.5	51.7	75.77	1,904.2	-845.3	382.3	287.4	94.89	4.028		
9,400.0	7,305.6	9,237.0	7,213.1	57.5	53.7	75.88	2,004.2	-843.5	383.8	284.7	99.12	3.872		
9,500.0	7,304.2	9,337.0	7,212.0	59.4	55.8	76.00	2,104.1	-841.8	385.4	282.0	103.39	3.728		
9,600.0	7,302.7	9,436.9	7,210.9	61.4	57.8	76.11	2,204.1	-840.0	387.0	279.3	107.68	3.594		
9,700.0	7,301.3	9,536.9	7,209.8	63.4	60.0	76.22	2,304.1	-838.3	388.6	276.6	112.01	3.469		
9,800.0	7,299.8	9,636.9	7,208.7	65.5	62.1	76.33	2,404.0	-836.5	390.2	273.8	116.36	3.353		
9,900.0	7,298.4	9,736.9	7,207.6	67.5	64.2	76.44	2,504.0	-834.8	391.8	271.1	120.73	3.245		
10,000.0	7,297.0	9,836.9	7,206.5	69.6	66.4	76.55	2,603.9	-833.1	393.4	268.3	125.13	3.144		
10,100.3	7,295.5	9,937.2	7,205.4	71.7	68.5	76.66	2,704.2	-831.3	395.0	265.4	129.55	3.049		
10,200.0	7,294.1	10,036.9	7,204.3	73.7	70.7	76.73	2,803.9	-829.6	394.9	262.4	132.50	2.980		
10,269.9	7,293.0	10,106.8	7,203.6	74.9	72.2	76.71	2,873.8	-828.4	392.8	258.5	134.33	2.924		
10,300.0	7,292.6	10,136.8	7,203.3	75.5	72.9	76.68	2,903.8	-827.8	391.6	256.0	135.58	2.888		
10,400.0	7,291.2	10,236.7	7,202.2	77.6	75.1	76.59	3,003.7	-826.1	387.4	247.5	139.87	2.770		
10,500.0	7,289.7	10,336.6	7,201.1	79.7	77.3	76.49	3,103.6	-824.4	383.2	239.1	144.17	2.658		
10,600.0	7,288.3	10,443.8	7,199.9	81.8	79.5	76.37	3,210.8	-823.1	378.6	230.2	148.45	2.550		
10,700.0	7,286.8	10,558.0	7,198.6	83.9	81.7	76.09	3,324.9	-825.6	370.6	218.0	152.58	2.429		
10,800.0	7,285.4	10,660.4	7,197.5	86.0	83.9	75.71	3,427.2	-830.7	359.9	203.3	156.66	2.298		
10,900.0	7,283.9	10,759.8	7,196.4	88.1	86.2	75.32	3,526.5	-835.7	349.2	188.5	160.75	2.172		
11,000.0	7,282.5	10,859.2	7,195.3	90.2	88.5	74.91	3,625.7	-840.8	338.5	173.7	164.82	2.054		
11,100.0	7,281.0	10,958.6	7,194.2	92.4	90.7	74.46	3,725.0	-845.8	327.8	159.0	168.85	1.942		
11,200.0	7,279.6	11,058.0	7,193.1	94.5	93.0	73.99	3,824.2	-850.8	317.1	144.3	172.83	1.835		
11,300.0	7,278.1	11,157.4	7,192.0	96.7	95.3	73.49	3,923.5	-855.9	306.5	129.7	176.77	1.734		
11,400.0	7,276.7	11,256.8	7,191.0	98.9	97.6	72.95	4,022.8	-860.9	295.9	115.2	180.65	1.638		
11,500.0	7,275.2	11,356.2	7,189.9	101.1	99.8	72.37	4,122.0	-865.9	285.3	100.8	184.46	1.547		
11,600.0	7,273.8	11,455.6	7,188.8	103.2	102.1	71.74	4,221.3	-871.0	274.7	86.5	188.19	1.460 Level 3		
11,700.0	7,272.3	11,555.0	7,187.7	105.4	104.4	71.06	4,320.5	-876.0	264.2	72.4	191.82	1.377 Level 3		
11,800.0	7,270.9	11,654.4	7,186.6	107.6	106.7	70.33	4,419.8	-881.1	253.7	58.4	195.35	1.299 Level 3		
11,861.4	7,270.0	11,708.1	7,186.0	109.0	107.9	69.91	4,473.5	-883.8	247.4	50.0	197.36	1.254 Level 3, SF		

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	1.0	1.0	0.0	0.0	-0.73	30.0	-0.4	30.0	30.0	0.00	N/A		
100.0	100.0	101.0	101.0	0.1	0.1	-0.73	30.0	-0.4	30.0	29.7	0.28	108.072		
200.0	200.0	201.0	201.0	0.4	0.4	-0.73	30.0	-0.4	30.0	29.2	0.83	36.263		
300.0	300.0	301.0	301.0	0.7	0.7	-0.73	30.0	-0.4	30.0	28.6	1.38	21.787		
400.0	400.0	401.0	401.0	1.0	1.0	-0.73	30.0	-0.4	30.0	28.1	1.93	15.571 CC		
500.0	500.0	501.0	501.0	1.2	1.2	102.82	30.0	-0.4	30.3	27.8	2.46	12.310 ES		
600.0	599.9	600.9	600.9	1.5	1.5	109.81	30.0	-0.4	31.4	28.4	2.99	10.501		
700.0	699.7	700.7	700.7	1.7	1.8	120.14	30.0	-0.4	34.1	30.6	3.54	9.657		
800.0	799.3	800.3	800.3	2.0	2.1	131.59	30.0	-0.4	39.5	35.4	4.10	9.648		
900.0	898.6	900.7	900.7	2.4	2.3	141.51	29.4	-1.6	47.0	42.3	4.64	10.115		
1,000.0	997.5	1,001.4	1,001.3	2.8	2.6	149.26	27.6	-5.1	55.1	49.9	5.17	10.662		
1,100.0	1,096.1	1,102.4	1,102.1	3.2	2.8	155.58	24.6	-11.1	63.7	58.0	5.70	11.186		
1,200.0	1,194.2	1,203.6	1,202.8	3.6	3.1	160.91	20.3	-19.4	72.8	66.5	6.23	11.678		
1,300.0	1,291.7	1,305.0	1,303.5	4.2	3.4	165.54	14.9	-30.1	82.2	75.4	6.77	12.136		
1,376.7	1,366.1	1,383.0	1,380.7	4.6	3.7	168.74	9.9	-40.0	89.6	82.5	7.19	12.460		
1,400.0	1,388.6	1,406.6	1,404.1	4.8	3.7	169.66	8.2	-43.3	91.9	84.6	7.32	12.545		
1,500.0	1,485.4	1,506.2	1,502.4	5.4	4.1	173.11	1.0	-57.5	101.2	93.3	7.90	12.812		
1,600.0	1,582.1	1,605.6	1,600.5	6.0	4.5	175.97	-6.2	-71.7	110.8	102.3	8.49	13.044		
1,700.0	1,678.9	1,705.0	1,698.6	6.6	4.9	178.37	-13.4	-85.9	120.6	111.5	9.11	13.246		
1,800.0	1,775.6	1,804.4	1,796.8	7.3	5.3	-179.59	-20.6	-100.1	130.6	120.9	9.74	13.412		
1,900.0	1,872.4	1,903.8	1,894.9	7.9	5.7	-177.85	-27.8	-114.3	140.8	130.4	10.39	13.548		
2,000.0	1,969.1	2,003.2	1,993.0	8.6	6.2	-176.34	-35.0	-128.5	151.1	140.0	11.06	13.659		
2,100.0	2,065.9	2,102.6	2,091.1	9.2	6.6	-175.02	-42.2	-142.7	161.4	149.7	11.74	13.748		
2,200.0	2,162.6	2,202.0	2,189.2	9.9	7.0	-173.86	-49.5	-156.9	171.8	159.4	12.43	13.820		
2,300.0	2,259.4	2,301.4	2,287.3	10.5	7.5	-172.84	-56.7	-171.1	182.3	169.2	13.14	13.877		
2,400.0	2,356.1	2,400.8	2,385.4	11.2	7.9	-171.93	-63.9	-185.3	192.9	179.0	13.85	13.922		
2,500.0	2,452.9	2,500.2	2,483.5	11.8	8.4	-171.11	-71.1	-199.5	203.4	188.9	14.58	13.958		
2,600.0	2,549.6	2,599.6	2,581.7	12.5	8.8	-170.37	-78.3	-213.7	214.1	198.8	15.31	13.986		
2,700.0	2,646.4	2,699.0	2,679.8	13.2	9.3	-169.70	-85.5	-227.9	224.7	208.7	16.04	14.007		
2,800.0	2,743.1	2,798.4	2,777.9	13.8	9.7	-169.10	-92.7	-242.1	235.4	218.6	16.79	14.024		
2,900.0	2,839.9	2,897.8	2,876.0	14.5	10.2	-168.54	-99.9	-256.3	246.1	228.6	17.53	14.036		
3,000.0	2,936.6	2,997.2	2,974.1	15.2	10.6	-168.03	-107.1	-270.5	256.8	238.6	18.29	14.045		
3,100.0	3,033.4	3,096.6	3,072.2	15.8	11.1	-167.57	-114.3	-284.7	267.6	248.5	19.04	14.051		
3,200.0	3,130.1	3,196.0	3,170.3	16.5	11.6	-167.13	-121.5	-298.9	278.3	258.5	19.80	14.055		
3,300.0	3,226.9	3,295.4	3,268.5	17.2	12.0	-166.74	-128.8	-313.2	289.1	268.5	20.57	14.057		
3,400.0	3,323.6	3,394.8	3,366.6	17.8	12.5	-166.37	-136.0	-327.4	299.9	278.6	21.33	14.058		
3,500.0	3,420.4	3,494.2	3,464.7	18.5	12.9	-166.02	-143.2	-341.6	310.7	288.6	22.10	14.057		
3,600.0	3,517.1	3,593.6	3,562.8	19.2	13.4	-165.70	-150.4	-355.8	321.5	298.6	22.87	14.056		
3,700.0	3,613.8	3,693.0	3,660.9	19.8	13.9	-165.40	-157.6	-370.0	332.3	308.7	23.65	14.053		
3,800.0	3,710.6	3,792.4	3,759.0	20.5	14.3	-165.12	-164.8	-384.2	343.2	318.7	24.42	14.050		
3,900.0	3,807.3	3,891.8	3,857.1	21.2	14.8	-164.85	-172.0	-398.4	354.0	328.8	25.20	14.047		
4,000.0	3,904.1	3,991.2	3,955.3	21.8	15.2	-164.60	-179.2	-412.6	364.8	338.9	25.98	14.043		
4,100.0	4,000.8	4,090.6	4,053.4	22.5	15.7	-164.37	-186.4	-426.8	375.7	348.9	26.76	14.038		
4,200.0	4,097.6	4,190.0	4,151.5	23.2	16.2	-164.15	-193.6	-441.0	386.5	359.0	27.54	14.034		
4,300.0	4,194.3	4,289.4	4,249.6	23.9	16.6	-163.94	-200.8	-455.2	397.4	369.1	28.33	14.029		
4,400.0	4,291.1	4,388.8	4,347.7	24.5	17.1	-163.74	-208.1	-469.4	408.3	379.2	29.11	14.024		
4,500.0	4,387.8	4,488.2	4,445.8	25.2	17.6	-163.55	-215.3	-483.6	419.1	389.2	29.90	14.019		
4,600.0	4,484.6	4,587.2	4,543.6	25.9	18.0	-163.38	-222.4	-497.8	430.0	399.3	30.68	14.016		
4,700.0	4,581.3	4,675.2	4,630.6	26.5	18.3	-163.33	-228.2	-509.1	442.3	410.9	31.32	14.121		
4,800.0	4,678.1	4,762.5	4,717.3	27.2	18.5	-163.46	-232.7	-517.9	457.1	425.2	31.89	14.331		
4,900.0	4,774.8	4,849.0	4,803.5	27.9	18.8	-163.75	-236.0	-524.4	474.4	442.0	32.41	14.637		

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 ft
Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20T-301 - Wellbore #1 - Plan #2 (2-5-16)														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		
5,000.0	4,871.6	4,934.5	4,889.0	28.5	18.9	-164.19	-238.0	-528.5	494.3	461.4	32.88	15.035			
5,100.0	4,968.3	5,019.1	4,973.4	29.2	19.1	-164.73	-239.0	-530.3	516.7	483.4	33.31	15.516			
5,200.0	5,065.1	5,111.7	5,066.1	29.9	19.3	-165.40	-239.0	-530.4	541.1	507.4	33.72	16.048			
5,300.0	5,161.8	5,208.4	5,162.8	30.6	19.4	-166.04	-239.0	-530.4	565.7	531.5	34.14	16.570			
5,400.0	5,258.6	5,305.2	5,259.6	31.2	19.6	-166.63	-239.0	-530.4	590.3	555.7	34.57	17.074			
5,417.4	5,275.4	5,322.0	5,276.4	31.3	19.6	-166.73	-239.0	-530.4	594.6	559.9	34.65	17.160			
5,500.0	5,355.6	5,402.2	5,356.6	31.8	19.8	-167.24	-239.0	-530.4	613.8	578.8	35.03	17.522			
5,600.0	5,453.4	5,500.0	5,454.4	32.2	19.9	-167.75	-239.0	-530.4	634.2	598.7	35.45	17.891			
5,700.0	5,551.9	5,598.5	5,552.9	32.6	20.1	-168.14	-239.0	-530.4	651.2	615.3	35.84	18.171			
5,800.0	5,650.9	5,697.5	5,651.9	32.9	20.3	-168.44	-239.0	-530.4	664.8	628.6	36.19	18.367			
5,900.0	5,750.4	5,797.0	5,751.4	33.2	20.5	-168.66	-239.0	-530.4	675.0	638.5	36.52	18.484			
6,000.0	5,850.1	5,896.7	5,851.1	33.4	20.7	-168.80	-239.0	-530.4	681.9	645.1	36.81	18.525			
6,100.0	5,950.1	5,996.7	5,951.1	33.5	20.9	-168.87	-239.0	-530.4	685.3	648.2	37.06	18.493			
6,150.0	6,000.0	6,046.6	6,001.0	33.6	20.9	90.00	-239.0	-530.4	685.7	648.5	37.17	18.448			
6,200.0	6,050.0	6,096.7	6,051.0	33.6	21.0	90.00	-239.0	-530.4	685.7	648.3	37.38	18.345			
6,300.0	6,150.0	6,196.7	6,151.0	33.8	21.2	90.00	-239.0	-530.4	685.7	647.9	37.79	18.144			
6,400.0	6,250.0	6,296.7	6,251.0	33.9	21.4	90.00	-239.0	-530.4	685.7	647.5	38.21	17.945			
6,500.0	6,350.0	6,396.7	6,351.0	34.0	21.6	90.00	-239.0	-530.4	685.7	647.1	38.63	17.749			
6,600.0	6,450.0	6,496.7	6,451.0	34.1	21.8	90.00	-239.0	-530.4	685.7	646.7	39.06	17.556			
6,700.0	6,550.0	6,596.7	6,551.0	34.3	22.0	90.00	-239.0	-530.4	685.7	646.2	39.49	17.366			
6,713.1	6,563.2	6,609.8	6,564.2	34.3	22.0	90.00	-239.0	-530.4	685.7	646.2	39.54	17.341			
6,750.0	6,600.0	6,647.2	6,601.6	34.3	22.1	89.99	-238.1	-530.4	685.7	646.0	39.69	17.275			
6,800.0	6,649.9	6,698.0	6,652.2	34.4	22.2	89.99	-233.9	-530.5	685.6	645.8	39.86	17.200			
6,850.0	6,699.3	6,748.7	6,702.4	34.4	22.3	89.98	-226.3	-530.6	685.5	645.5	40.00	17.139			
6,900.0	6,748.2	6,799.5	6,751.9	34.5	22.3	89.98	-215.5	-530.8	685.3	645.2	40.10	17.091			
6,950.0	6,796.3	6,850.2	6,800.6	34.5	22.4	89.98	-201.3	-531.0	685.1	644.9	40.17	17.054			
7,000.0	6,843.4	6,900.9	6,848.3	34.5	22.4	89.98	-184.0	-531.3	684.8	644.6	40.22	17.025			
7,050.0	6,889.2	6,951.6	6,894.6	34.5	22.4	89.97	-163.6	-531.6	684.5	644.2	40.26	17.000			
7,100.0	6,933.7	7,002.2	6,939.5	34.5	22.4	89.97	-140.2	-532.0	684.1	643.8	40.30	16.976			
7,150.0	6,976.6	7,052.9	6,982.7	34.5	22.4	89.97	-113.8	-532.5	683.6	643.3	40.34	16.947			
7,200.0	7,017.7	7,103.5	7,024.1	34.5	22.4	89.97	-84.7	-533.0	683.1	642.7	40.40	16.910			
7,250.0	7,056.9	7,154.0	7,063.4	34.5	22.4	89.96	-52.9	-533.5	682.6	642.1	40.49	16.858			
7,300.0	7,094.0	7,204.6	7,100.5	34.5	22.4	89.96	-18.6	-534.1	682.0	641.4	40.62	16.789			
7,350.0	7,128.8	7,255.1	7,135.2	34.5	22.4	89.96	18.0	-534.7	681.4	640.6	40.81	16.696			
7,400.0	7,161.2	7,305.5	7,167.4	34.6	22.4	89.96	56.9	-535.3	680.8	639.7	41.07	16.576			
7,450.0	7,191.0	7,355.9	7,197.0	34.6	22.4	89.96	97.7	-536.0	680.1	638.7	41.40	16.426			
7,500.0	7,218.1	7,406.3	7,223.8	34.6	22.5	89.96	140.3	-536.7	679.4	637.5	41.82	16.245			
7,550.0	7,242.4	7,456.6	7,247.6	34.7	22.6	89.95	184.6	-537.5	678.6	636.3	42.33	16.030			
7,600.0	7,263.8	7,506.9	7,268.5	34.8	22.7	89.95	230.3	-538.2	677.9	634.9	42.95	15.784			
7,650.0	7,282.2	7,557.1	7,286.4	34.9	22.9	89.95	277.3	-539.0	677.1	633.4	43.66	15.507			
7,700.0	7,297.6	7,607.3	7,301.1	35.0	23.1	89.95	325.2	-539.8	676.3	631.8	44.48	15.205			
7,750.0	7,309.8	7,657.4	7,312.6	35.2	23.5	89.95	374.0	-540.7	675.4	630.0	45.39	14.880			
7,800.0	7,318.7	7,707.5	7,320.8	35.4	23.9	89.95	423.4	-541.5	674.6	628.2	46.40	14.537			
7,850.0	7,324.5	7,757.6	7,325.8	35.6	24.4	89.95	473.2	-542.3	673.8	626.3	47.51	14.183			
7,900.0	7,327.0	7,807.5	7,327.6	35.9	25.0	89.95	523.1	-543.2	672.9	624.2	48.69	13.822			
7,924.2	7,327.0	7,831.8	7,327.3	36.0	25.3	89.96	547.3	-543.6	672.5	623.2	49.27	13.649			
8,000.0	7,325.9	7,907.6	7,326.2	36.5	26.2	89.95	623.1	-544.8	671.2	620.1	51.15	13.122			
8,100.0	7,324.5	8,007.6	7,324.6	37.3	27.6	89.94	723.1	-546.5	669.5	615.5	54.03	12.392			
8,200.0	7,323.0	8,107.5	7,323.1	38.3	29.2	89.94	823.0	-548.2	667.8	610.7	57.15	11.686			
8,300.0	7,321.6	8,207.5	7,321.6	39.4	30.8	89.93	923.0	-549.9	666.1	605.6	60.47	11.016			

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 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design		Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20T-301 - Wellbore #1 - Plan #2 (2-5-16)										Offset Site Error:		0.0 ft		
Survey Program:		0-MWD												Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning		
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor				
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)					
8,400.0	7,320.1	8,307.5	7,320.0	40.6	32.6	89.92	1,023.0	-551.6	664.4	600.4	63.96	10.388				
8,500.0	7,318.7	8,407.5	7,318.5	41.9	34.4	89.91	1,122.9	-553.3	662.7	595.1	67.60	9.803				
8,600.0	7,317.2	8,507.5	7,317.0	43.4	36.2	89.90	1,222.9	-554.9	661.0	589.6	71.36	9.263				
8,700.0	7,315.8	8,607.5	7,315.4	44.9	38.2	89.90	1,322.8	-556.6	659.3	584.1	75.23	8.764				
8,800.0	7,314.3	8,707.5	7,313.9	46.6	40.1	89.89	1,422.8	-558.3	657.6	578.4	79.19	8.304				
8,900.0	7,312.9	8,807.4	7,312.4	48.3	42.1	89.88	1,522.8	-560.0	655.9	572.7	83.22	7.882				
9,000.0	7,311.4	8,907.4	7,310.8	50.0	44.2	89.87	1,622.7	-561.7	654.2	566.9	87.32	7.492				
9,100.0	7,310.0	9,007.4	7,309.3	51.8	46.2	89.87	1,722.7	-563.4	652.5	561.0	91.47	7.133				
9,200.0	7,308.5	9,107.4	7,307.8	53.7	48.3	89.86	1,822.6	-565.0	650.8	555.1	95.68	6.802				
9,300.0	7,307.1	9,207.4	7,306.2	55.5	50.5	89.85	1,922.6	-566.7	649.1	549.2	99.93	6.496				
9,400.0	7,305.6	9,307.4	7,304.7	57.5	52.6	89.84	2,022.5	-568.4	647.4	543.2	104.22	6.212				
9,500.0	7,304.2	9,407.4	7,303.2	59.4	54.8	89.83	2,122.5	-570.1	645.7	537.2	108.54	5.949				
9,600.0	7,302.7	9,507.3	7,301.6	61.4	56.9	89.82	2,222.5	-571.8	644.0	531.1	112.89	5.705				
9,700.0	7,301.3	9,607.3	7,300.1	63.4	59.1	89.82	2,322.4	-573.5	642.3	525.0	117.26	5.477				
9,800.0	7,299.8	9,707.3	7,298.6	65.5	61.3	89.81	2,422.4	-575.1	640.6	518.9	121.66	5.265				
9,900.0	7,298.4	9,807.3	7,297.0	67.5	63.5	89.80	2,522.3	-576.8	638.9	512.8	126.09	5.067				
10,000.0	7,297.0	9,907.3	7,295.5	69.6	65.7	89.79	2,622.3	-578.5	637.2	506.7	130.53	4.882				
10,100.3	7,295.5	10,007.6	7,293.9	71.7	68.0	89.78	2,722.6	-580.2	635.5	500.5	135.00	4.708				
10,200.0	7,294.1	10,107.2	7,292.4	73.7	70.2	89.80	2,822.2	-581.9	632.1	493.9	138.14	4.575				
10,269.9	7,293.0	10,177.0	7,291.3	74.9	71.7	89.82	2,891.9	-583.0	627.6	487.4	140.16	4.478				
10,300.0	7,292.6	10,207.0	7,290.9	75.5	72.4	89.81	2,921.9	-583.6	625.3	483.9	141.45	4.421				
10,400.0	7,291.2	10,306.7	7,289.4	77.6	74.7	89.80	3,021.6	-585.2	617.7	471.8	145.91	4.233				
10,500.0	7,289.7	10,406.4	7,287.8	79.7	76.9	89.79	3,121.3	-586.9	610.1	459.7	150.37	4.057				
10,600.0	7,288.3	10,506.1	7,286.3	81.8	79.2	89.78	3,221.0	-588.6	602.5	447.6	154.85	3.891				
10,700.0	7,286.8	10,605.8	7,284.8	83.9	81.4	89.77	3,320.7	-590.3	594.9	435.5	159.34	3.733				
10,800.0	7,285.4	10,705.5	7,283.2	86.0	83.7	89.76	3,420.3	-591.9	587.2	423.4	163.84	3.584				
10,900.0	7,283.9	10,805.2	7,281.7	88.1	85.9	89.74	3,520.0	-593.6	579.6	411.3	168.35	3.443				
11,000.0	7,282.5	10,900.0	7,280.2	90.2	88.0	89.73	3,614.8	-594.9	572.4	399.7	172.69	3.314				
11,100.0	7,281.0	10,980.2	7,279.0	92.4	89.6	89.72	3,694.9	-593.9	567.6	391.1	176.52	3.216				
11,200.0	7,279.6	11,065.3	7,277.7	94.5	91.3	89.71	3,780.0	-590.4	565.8	385.3	180.45	3.135				
11,300.0	7,278.1	11,163.3	7,276.2	96.7	93.4	89.71	3,877.8	-584.9	565.4	380.6	184.88	3.058				
11,400.0	7,276.7	11,263.3	7,274.7	98.9	95.7	89.70	3,977.6	-579.3	565.1	375.7	189.40	2.984				
11,500.0	7,275.2	11,363.3	7,273.1	101.1	97.9	89.69	4,077.5	-573.7	564.8	370.8	193.93	2.912				
11,600.0	7,273.8	11,463.3	7,271.6	103.2	100.1	89.68	4,177.3	-568.1	564.4	366.0	198.46	2.844				
11,700.0	7,272.3	11,563.3	7,270.0	105.4	102.4	89.67	4,277.1	-562.5	564.1	361.1	203.00	2.779				
11,800.0	7,270.9	11,663.3	7,268.5	107.6	104.6	89.66	4,377.0	-556.9	563.8	356.2	207.54	2.716				
11,861.4	7,270.0	11,724.7	7,267.5	109.0	106.0	89.65	4,438.2	-553.4	563.6	353.2	210.33	2.679 SF				

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 ft
Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20T-321 - 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	3.0	3.0	0.0	0.0	-0.65	90.0	-1.0	90.0	90.0	0.00	N/A			
100.0	100.0	103.0	103.0	0.1	0.1	-0.65	90.0	-1.0	90.0	89.8	0.28	318.157			
200.0	200.0	203.0	203.0	0.4	0.4	-0.65	90.0	-1.0	90.0	89.2	0.83	108.152			
300.0	300.0	303.0	303.0	0.7	0.7	-0.65	90.0	-1.0	90.0	88.7	1.38	65.149			
400.0	400.0	403.0	403.0	1.0	1.0	-0.65	90.0	-1.0	90.0	88.1	1.93	46.615 CC			
500.0	500.0	503.0	503.0	1.2	1.2	101.28	90.0	-1.0	90.3	87.8	2.46	36.654 ES			
600.0	599.9	602.9	602.9	1.5	1.5	103.69	90.0	-1.0	91.1	88.2	2.99	30.467			
700.0	699.7	702.7	702.7	1.7	1.8	107.58	90.0	-1.0	92.9	89.4	3.54	26.247			
800.0	799.3	802.3	802.3	2.0	2.1	112.73	90.0	-1.0	96.1	92.0	4.11	23.377			
900.0	898.6	901.6	901.6	2.4	2.3	118.77	90.0	-1.0	101.2	96.5	4.70	21.532			
1,000.0	997.5	1,000.5	1,000.5	2.8	2.6	125.27	90.0	-1.0	108.9	103.6	5.31	20.522			
1,100.0	1,096.1	1,099.1	1,099.1	3.2	2.9	131.73	90.0	-1.0	119.6	113.6	5.92	20.204 SF			
1,200.0	1,194.2	1,197.2	1,197.2	3.6	3.2	137.80	90.0	-1.0	133.4	126.9	6.52	20.452			
1,300.0	1,291.7	1,294.7	1,294.7	4.2	3.4	143.24	90.0	-1.0	150.7	143.5	7.12	21.150			
1,376.7	1,366.1	1,369.1	1,369.1	4.6	3.6	146.93	90.0	-1.0	166.1	158.6	7.58	21.927			
1,400.0	1,388.6	1,391.6	1,391.6	4.8	3.7	148.00	90.0	-1.0	171.1	163.4	7.71	22.189			
1,500.0	1,485.4	1,488.4	1,488.4	5.4	4.0	151.95	90.0	-1.0	193.2	184.9	8.29	23.300			
1,600.0	1,582.1	1,585.1	1,585.1	6.0	4.2	155.09	90.0	-1.0	216.0	207.1	8.87	24.357			
1,700.0	1,678.9	1,683.1	1,683.1	6.6	4.5	157.87	89.2	-0.7	239.1	229.7	9.41	25.403			
1,800.0	1,775.6	1,781.1	1,781.0	7.3	4.7	160.70	86.0	0.4	262.1	252.2	9.91	26.443			
1,900.0	1,872.4	1,878.6	1,878.4	7.9	4.9	163.57	80.4	2.2	285.3	274.9	10.41	27.418			
2,000.0	1,969.1	1,975.7	1,975.1	8.6	5.1	166.46	72.6	4.9	308.8	297.9	10.90	28.319			
2,100.0	2,065.9	2,071.7	2,070.6	9.2	5.3	169.24	63.0	8.2	332.8	321.4	11.42	29.154			
2,200.0	2,162.6	2,167.6	2,165.9	9.9	5.6	171.68	53.3	11.4	357.5	345.5	11.95	29.910			
2,300.0	2,259.4	2,263.4	2,261.2	10.5	5.9	173.80	43.7	14.7	382.7	370.2	12.51	30.590			
2,400.0	2,356.1	2,359.3	2,356.5	11.2	6.1	175.66	34.0	18.0	408.4	395.3	13.09	31.198			
2,500.0	2,452.9	2,455.1	2,451.8	11.8	6.4	177.30	24.3	21.3	434.4	420.7	13.69	31.739			
2,600.0	2,549.6	2,550.9	2,547.1	12.5	6.7	178.76	14.7	24.6	460.7	446.4	14.30	32.222			
2,700.0	2,646.4	2,646.8	2,642.4	13.2	7.0	-179.94	5.0	27.9	487.2	472.3	14.92	32.651			
2,800.0	2,743.1	2,742.6	2,737.7	13.8	7.3	-178.77	-4.7	31.1	514.0	498.5	15.56	33.035			
2,900.0	2,839.9	2,838.5	2,833.0	14.5	7.6	-177.72	-14.3	34.4	541.0	524.8	16.21	33.377			
3,000.0	2,936.6	2,934.3	2,928.3	15.2	7.9	-176.77	-24.0	37.7	568.1	551.2	16.87	33.685			
3,100.0	3,033.4	3,030.1	3,023.6	15.8	8.2	-175.90	-33.7	41.0	595.3	577.8	17.53	33.961			
3,200.0	3,130.1	3,126.0	3,118.8	16.5	8.5	-175.11	-43.4	44.3	622.7	604.5	18.20	34.210			
3,300.0	3,226.9	3,221.8	3,214.1	17.2	8.9	-174.38	-53.0	47.6	650.2	631.3	18.88	34.435			
3,400.0	3,323.6	3,317.7	3,309.4	17.8	9.2	-173.71	-62.7	50.8	677.7	658.2	19.57	34.639			
3,500.0	3,420.4	3,413.5	3,404.7	18.5	9.5	-173.10	-72.4	54.1	705.4	685.1	20.25	34.825			
3,600.0	3,517.1	3,509.3	3,500.0	19.2	9.8	-172.53	-82.0	57.4	733.1	712.1	20.95	34.994			
3,700.0	3,613.8	3,605.2	3,595.3	19.8	10.2	-172.00	-91.7	60.7	760.8	739.2	21.65	35.149			
3,800.0	3,710.6	3,701.0	3,690.6	20.5	10.5	-171.51	-101.4	64.0	788.6	766.3	22.35	35.292			
3,900.0	3,807.3	3,796.9	3,785.9	21.2	10.8	-171.06	-111.0	67.3	816.5	793.5	23.05	35.423			
4,000.0	3,904.1	3,892.7	3,881.2	21.8	11.2	-170.63	-120.7	70.5	844.4	820.7	23.76	35.543			
4,100.0	4,000.8	3,988.5	3,976.5	22.5	11.5	-170.23	-130.4	73.8	872.4	847.9	24.47	35.655			
4,200.0	4,097.6	4,084.4	4,071.8	23.2	11.8	-169.85	-140.0	77.1	900.4	875.2	25.18	35.758			
4,300.0	4,194.3	4,180.2	4,167.1	23.9	12.2	-169.50	-149.7	80.4	928.4	902.5	25.89	35.854			
4,400.0	4,291.1	4,276.1	4,262.4	24.5	12.5	-169.17	-159.4	83.7	956.5	929.9	26.61	35.944			
4,500.0	4,387.8	4,371.9	4,357.7	25.2	12.9	-168.86	-169.0	87.0	984.5	957.2	27.33	36.027			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design		Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20Y-241 - 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	2.0	2.0	0.0	0.0	-0.58	75.0	-0.8	75.0	75.0	0.00	N/A			
100.0	100.0	102.0	102.0	0.1	0.1	-0.58	75.0	-0.8	75.0	74.7	0.28	267.462			
200.0	200.0	202.0	202.0	0.4	0.4	-0.58	75.0	-0.8	75.0	74.1	0.83	90.335			
300.0	300.0	302.0	302.0	0.7	0.7	-0.58	75.0	-0.8	75.0	73.6	1.38	54.345			
400.0	400.0	402.0	402.0	1.0	1.0	-0.58	75.0	-0.8	75.0	73.0	1.93	38.862 CC			
500.0	500.0	502.0	502.0	1.2	1.2	101.52	75.0	-0.8	75.2	72.8	2.46	30.566 ES			
600.0	599.9	601.9	601.9	1.5	1.5	104.40	75.0	-0.8	76.1	73.1	2.99	25.460			
700.0	699.7	701.7	701.7	1.7	1.8	109.02	75.0	-0.8	78.0	74.4	3.54	22.047			
800.0	799.3	801.3	801.3	2.0	2.1	115.05	75.0	-0.8	81.4	77.3	4.11	19.830			
900.0	898.6	900.6	900.6	2.4	2.3	121.97	75.0	-0.8	87.1	82.4	4.69	18.551			
1,000.0	997.5	999.5	999.5	2.8	2.6	129.15	75.0	-0.8	95.5	90.2	5.29	18.044 SF			
1,100.0	1,096.1	1,098.1	1,098.1	3.2	2.9	136.02	75.0	-0.8	107.1	101.2	5.89	18.173			
1,200.0	1,194.2	1,196.2	1,196.2	3.6	3.1	142.22	75.0	-0.8	122.0	115.5	6.49	18.807			
1,300.0	1,291.7	1,293.7	1,293.7	4.2	3.4	147.56	75.0	-0.8	140.2	133.1	7.07	19.829			
1,376.7	1,366.1	1,368.1	1,368.1	4.6	3.6	151.09	75.0	-0.8	156.4	148.9	7.51	20.815			
1,400.0	1,388.6	1,390.6	1,390.6	4.8	3.7	152.09	75.0	-0.8	161.6	153.9	7.65	21.133			
1,500.0	1,485.4	1,486.1	1,486.1	5.4	3.9	156.00	74.4	0.0	184.8	176.6	8.19	22.563			
1,600.0	1,582.1	1,580.5	1,580.5	6.0	4.1	159.63	72.4	2.6	209.5	200.8	8.70	24.080			
1,700.0	1,678.9	1,673.9	1,673.7	6.6	4.4	163.00	69.0	7.0	235.8	226.6	9.20	25.624			
1,800.0	1,775.6	1,766.2	1,765.6	7.3	4.6	166.13	64.3	13.2	263.9	254.2	9.71	27.175			
1,900.0	1,872.4	1,857.3	1,856.2	7.9	4.8	169.03	58.3	21.0	293.8	283.6	10.23	28.719			
2,000.0	1,969.1	1,947.4	1,945.5	8.6	5.1	171.71	51.2	30.3	325.5	314.8	10.76	30.243			
2,100.0	2,065.9	2,040.8	2,038.0	9.2	5.4	174.15	43.2	40.8	358.4	347.1	11.32	31.656			
2,200.0	2,162.6	2,134.2	2,130.5	9.9	5.7	176.18	35.2	51.3	391.8	379.9	11.90	32.932			
2,300.0	2,259.4	2,227.6	2,223.0	10.5	6.0	177.89	27.1	61.8	425.5	413.1	12.49	34.069			
2,400.0	2,356.1	2,321.1	2,315.4	11.2	6.3	179.36	19.1	72.2	459.6	446.5	13.10	35.096			
2,500.0	2,452.9	2,414.5	2,407.9	11.8	6.7	-179.38	11.1	82.7	493.9	480.2	13.71	36.019			
2,600.0	2,549.6	2,507.9	2,500.4	12.5	7.0	-178.28	3.1	93.2	528.3	514.0	14.34	36.853			
2,700.0	2,646.4	2,601.3	2,592.9	13.2	7.3	-177.31	-4.9	103.6	562.9	548.0	14.97	37.607			
2,800.0	2,743.1	2,694.7	2,685.4	13.8	7.7	-176.45	-12.9	114.1	597.7	582.1	15.61	38.292			
2,900.0	2,839.9	2,788.1	2,777.9	14.5	8.1	-175.69	-20.9	124.6	632.5	616.3	16.25	38.915			
3,000.0	2,936.6	2,881.6	2,870.3	15.2	8.4	-175.01	-28.9	135.1	667.5	650.5	16.90	39.484			
3,100.0	3,033.4	2,975.0	2,962.8	15.8	8.8	-174.39	-36.9	145.5	702.5	684.9	17.56	40.006			
3,200.0	3,130.1	3,068.4	3,055.3	16.5	9.2	-173.83	-44.9	156.0	737.5	719.3	18.22	40.486			
3,300.0	3,226.9	3,161.8	3,147.8	17.2	9.5	-173.33	-52.9	166.5	772.7	753.8	18.88	40.928			
3,400.0	3,323.6	3,255.2	3,240.3	17.8	9.9	-172.86	-60.9	176.9	807.8	788.3	19.54	41.337			
3,500.0	3,420.4	3,348.6	3,332.7	18.5	10.3	-172.44	-69.0	187.4	843.1	822.8	20.21	41.715			
3,600.0	3,517.1	3,442.1	3,425.2	19.2	10.7	-172.05	-77.0	197.9	878.3	857.4	20.88	42.066			
3,700.0	3,613.8	3,535.5	3,517.7	19.8	11.0	-171.69	-85.0	208.3	913.6	892.1	21.55	42.393			
3,800.0	3,710.6	3,628.9	3,610.2	20.5	11.4	-171.36	-93.0	218.8	948.9	926.7	22.22	42.698			
3,900.0	3,807.3	3,722.3	3,702.7	21.2	11.8	-171.05	-101.0	229.3	984.3	961.4	22.90	42.983			

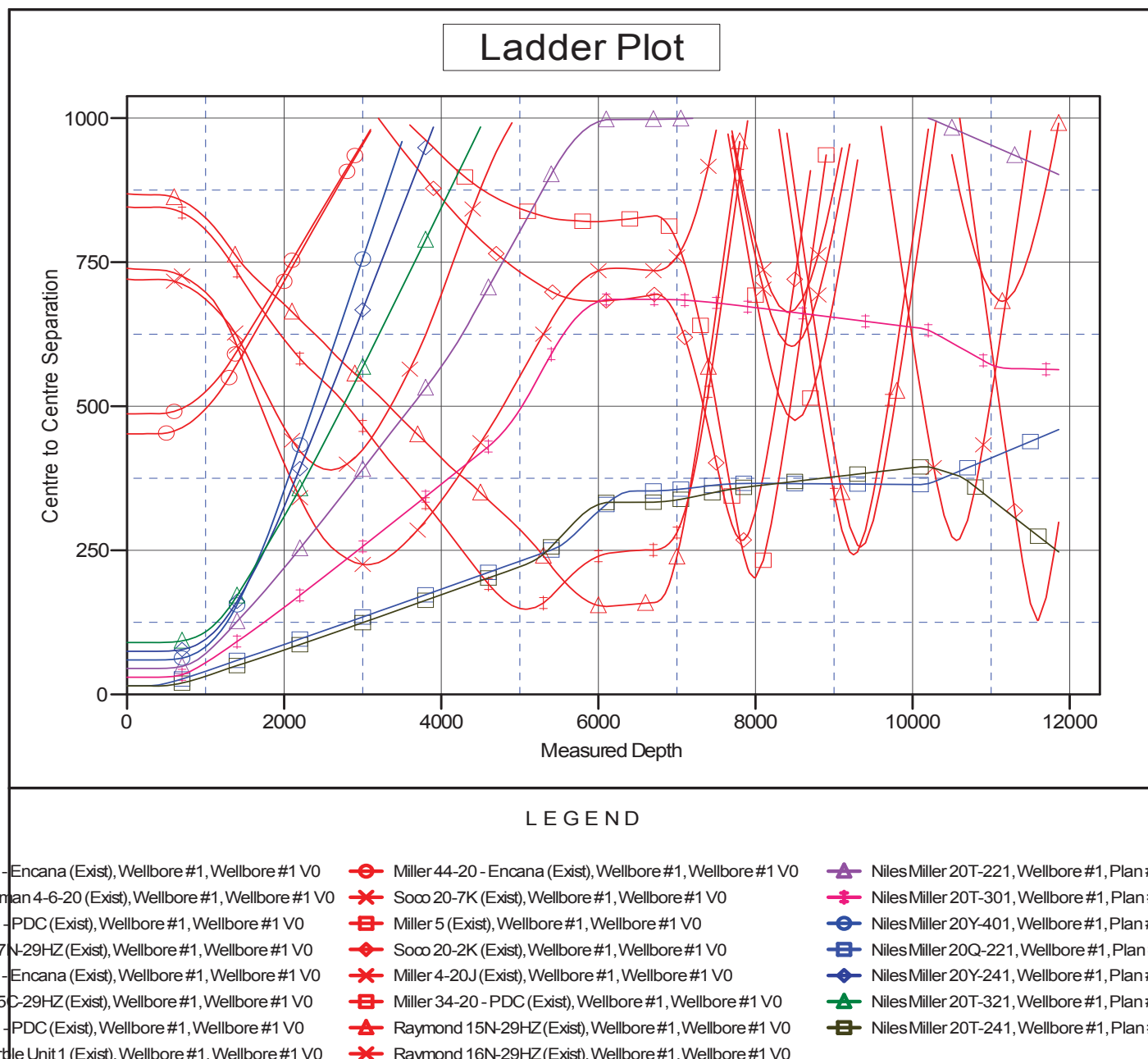
Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 ft
Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W - Niles Miller 20Y-401 - 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	2.0	2.0	0.0	0.0	-0.63	60.0	-0.7	60.0	60.0	0.00	N/A			
100.0	100.0	102.0	102.0	0.1	0.1	-0.63	60.0	-0.7	60.0	59.7	0.28	213.942			
200.0	200.0	202.0	202.0	0.4	0.4	-0.63	60.0	-0.7	60.0	59.1	0.83	72.258			
300.0	300.0	302.0	302.0	0.7	0.7	-0.63	60.0	-0.7	60.0	58.6	1.38	43.470			
400.0	400.0	402.0	402.0	1.0	1.0	-0.63	60.0	-0.7	60.0	58.0	1.93	31.086 CC			
500.0	500.0	502.0	502.0	1.2	1.2	101.71	60.0	-0.7	60.2	57.8	2.46	24.471 ES			
600.0	599.9	601.9	601.9	1.5	1.5	105.30	60.0	-0.7	61.1	58.1	2.99	20.453			
700.0	699.7	701.7	701.7	1.7	1.8	110.99	60.0	-0.7	63.2	59.6	3.54	17.860			
800.0	799.3	801.3	801.3	2.0	2.1	118.24	60.0	-0.7	67.0	62.9	4.11	16.321			
900.0	898.6	900.6	900.6	2.4	2.3	126.25	60.0	-0.7	73.3	68.6	4.69	15.638 SF			
1,000.0	997.5	999.5	999.5	2.8	2.6	134.15	60.0	-0.7	82.7	77.4	5.28	15.661			
1,100.0	1,096.1	1,098.1	1,098.1	3.2	2.9	141.31	60.0	-0.7	95.3	89.4	5.86	16.251			
1,200.0	1,194.2	1,196.2	1,196.2	3.6	3.1	147.44	60.0	-0.7	111.3	104.8	6.44	17.270			
1,300.0	1,291.7	1,292.2	1,292.2	4.2	3.4	152.86	59.5	0.4	131.1	124.1	6.99	18.754			
1,376.7	1,366.1	1,364.7	1,364.6	4.6	3.6	156.77	58.5	2.6	149.4	142.0	7.39	20.221			
1,400.0	1,388.6	1,386.4	1,386.4	4.8	3.6	157.92	58.1	3.5	155.4	147.9	7.51	20.703			
1,500.0	1,485.4	1,479.3	1,479.1	5.4	3.8	162.33	55.9	8.7	182.8	174.8	8.02	22.794			
1,600.0	1,582.1	1,570.8	1,570.3	6.0	4.1	166.04	52.8	15.8	212.5	204.0	8.54	24.893			
1,700.0	1,678.9	1,661.0	1,659.9	6.6	4.3	169.21	48.9	24.8	244.5	235.5	9.06	26.977			
1,800.0	1,775.6	1,749.7	1,747.8	7.3	4.6	171.94	44.3	35.6	278.7	269.1	9.60	29.028			
1,900.0	1,872.4	1,837.0	1,834.0	7.9	4.9	174.32	38.9	48.0	315.0	304.9	10.15	31.034			
2,000.0	1,969.1	1,923.2	1,918.9	8.6	5.2	176.43	32.8	62.0	353.4	342.7	10.72	32.975			
2,100.0	2,065.9	2,014.4	2,008.5	9.2	5.6	178.31	26.1	77.5	392.9	381.6	11.30	34.766			
2,200.0	2,162.6	2,105.6	2,098.1	9.9	5.9	179.85	19.3	93.1	432.6	420.7	11.90	36.359			
2,300.0	2,259.4	2,196.8	2,187.7	10.5	6.3	-178.86	12.6	108.6	472.6	460.1	12.51	37.793			
2,400.0	2,356.1	2,288.0	2,277.3	11.2	6.7	-177.78	5.8	124.2	512.7	499.6	13.12	39.079			
2,500.0	2,452.9	2,379.2	2,366.9	11.8	7.1	-176.85	-0.9	139.7	553.0	539.3	13.74	40.240			
2,600.0	2,549.6	2,470.4	2,456.5	12.5	7.5	-176.04	-7.6	155.3	593.4	579.0	14.37	41.291			
2,700.0	2,646.4	2,561.5	2,546.1	13.2	8.0	-175.34	-14.4	170.9	633.9	618.8	15.00	42.246			
2,800.0	2,743.1	2,652.7	2,635.7	13.8	8.4	-174.72	-21.1	186.4	674.4	658.7	15.64	43.116			
2,900.0	2,839.9	2,743.9	2,725.3	14.5	8.8	-174.18	-27.9	202.0	715.0	698.7	16.28	43.911			
3,000.0	2,936.6	2,835.1	2,814.9	15.2	9.3	-173.69	-34.6	217.5	755.6	738.7	16.93	44.640			
3,100.0	3,033.4	2,926.3	2,904.5	15.8	9.7	-173.25	-41.4	233.1	796.3	778.7	17.57	45.310			
3,200.0	3,130.1	3,017.5	2,994.1	16.5	10.1	-172.85	-48.1	248.6	837.0	818.8	18.22	45.929			
3,300.0	3,226.9	3,108.7	3,083.7	17.2	10.6	-172.49	-54.8	264.2	877.8	858.9	18.88	46.501			
3,400.0	3,323.6	3,199.9	3,173.3	17.8	11.0	-172.16	-61.6	279.8	918.5	899.0	19.53	47.031			
3,500.0	3,420.4	3,291.0	3,262.9	18.5	11.5	-171.86	-68.3	295.3	959.3	939.2	20.19	47.523			

Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4967.0ft (Original Well Elev)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

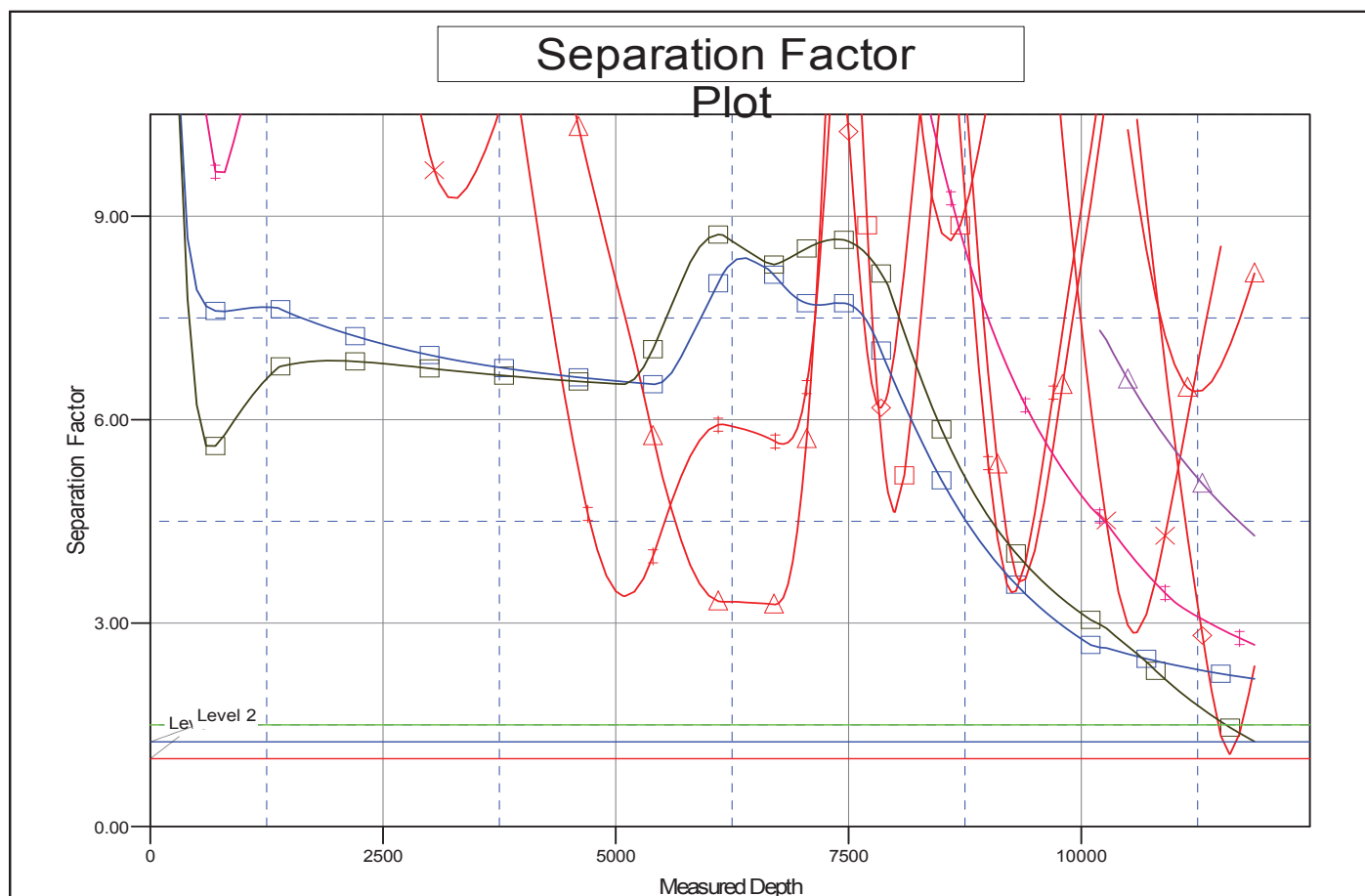
Coordinates are relative to: Niles Miller 20Q-321
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.46°



Company:	PETROLEUM DEVELOPMENT CORP DJ Basin	Local Co-ordinate Reference:	Well Niles Miller 20Q-321
Project:	SEC.20-T3N-R66W	TVD Reference:	WELL @ 4967.0ft (Original Well Elev)
Reference Site:	Niles Miller 3N66W20Y Pad Sec.20-T3N-R66W	MD Reference:	WELL @ 4967.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Niles Miller 20Q-321	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.45 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (2-5-16)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4967.0ft (Original Well Elev)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: Niles Miller 20Q-321
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.46°



LEGEND

0 - Encana (Exist), Wellbore #1, Wellbore #1 V0	Miller 44-20 - Encana (Exist), Wellbore #1, Wellbore #1 V0	Niles Miller 20T-221, Wellbore #1, Plan #1 (
0 - Encana (Exist), Wellbore #1, Wellbore #1 V0	Soco 20-7K (Exist), Wellbore #1, Wellbore #1 V0	Niles Miller 20T-301, Wellbore #1, Plan #2 (
0 - PDC (Exist), Wellbore #1, Wellbore #1 V0	Miller 5 (Exist), Wellbore #1, Wellbore #1 V0	Niles Miller 20Y-401, Wellbore #1, Plan #1 (
37 N-29HZ (Exist), Wellbore #1, Wellbore #1 V0	Soco 20-2K (Exist), Wellbore #1, Wellbore #1 V0	Niles Miller 20Q-221, Wellbore #1, Plan #1 (
0 - Encana (Exist), Wellbore #1, Wellbore #1 V0	Miller 4-20J (Exist), Wellbore #1, Wellbore #1 V0	Niles Miller 20Y-241, Wellbore #1, Plan #1 (
15 C-29HZ (Exist), Wellbore #1, Wellbore #1 V0	Miller 34-20 - PDC (Exist), Wellbore #1, Wellbore #1 V0	Niles Miller 20T-321, Wellbore #1, Plan #1 (
0 - PDC (Exist), Wellbore #1, Wellbore #1 V0	Raymond 15N-29HZ (Exist), Wellbore #1, Wellbore #1 V0	Niles Miller 20T-241, Wellbore #1, Plan #2 (
0 - PDC (Exist), Wellbore #1, Wellbore #1 V0	Raymond 16N-29HZ (Exist), Wellbore #1, Wellbore #1 V0	