

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Rieder 18Y-441**

Surface Location: Rieder 4N67W18Y Pad Sec.18-T4N-R67W
 North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
 Ground Elevation: 4806.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1355510.01	3160259.61	40.307850	-104.925360	

RKB - 15' WELL @ 4821.0ft (RKB - 15')

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 679'FSL & 622'FEL	1.0	0.0	0.0	Point
BHL 500'FNL & 230'FEL	7170.0	4094.8	220.3	Point



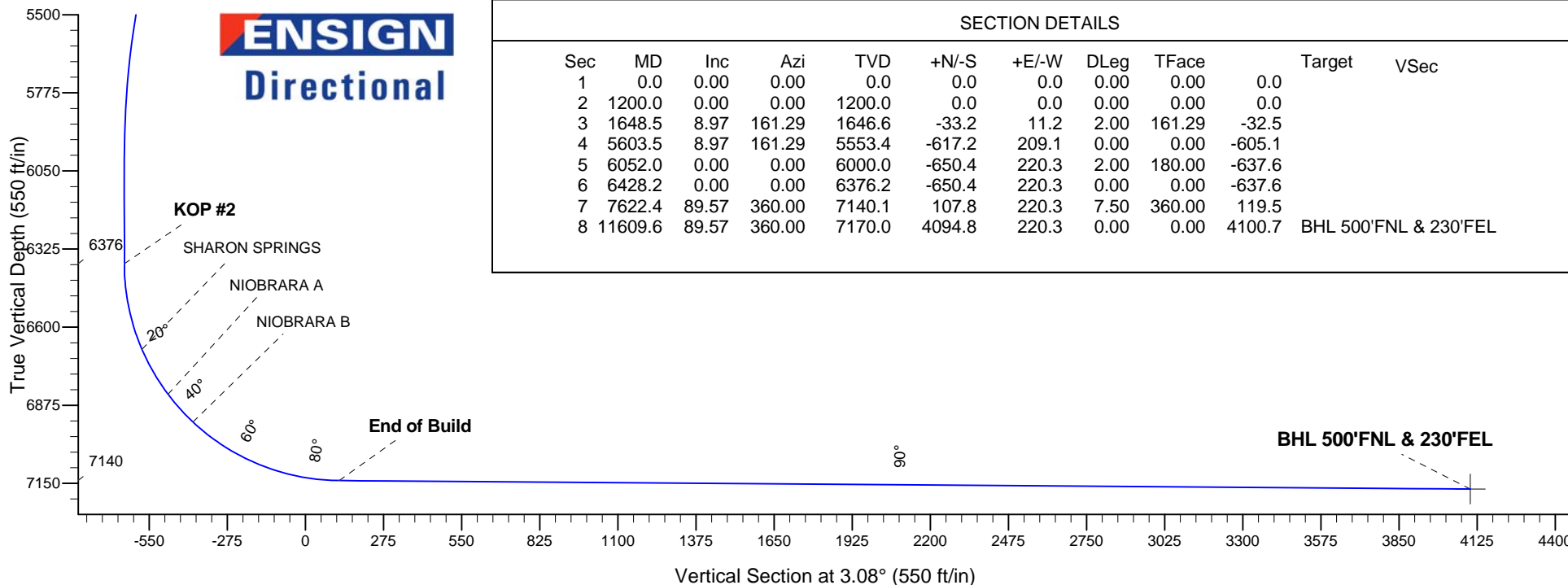
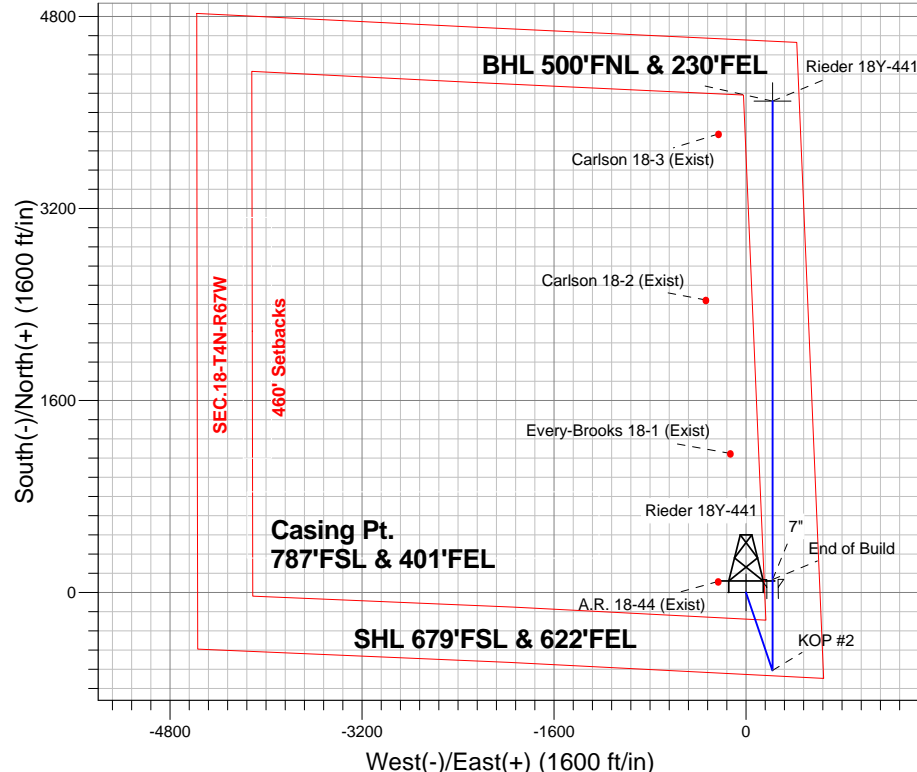
Azimuths to True North
 Magnetic North: 8.52°

Magnetic Field
 Strength: 52736.9snT
 Dip Angle: 66.84°
 Date: 7/31/2014
 Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
1200.0	1200.0	KOP #1
6376.2	6428.2	KOP #2
7140.1	7622.4	End of Build

Rieder 4N67W18Y Pad Sec.18-T4N-R67W
 Rieder 18Y-441
 Plan #1 (7-31-14)
 11:34, August 05 2014



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	Target	VSec
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1200.0	0.00	0.00	1200.0	0.0	0.0	0.00	0.00	0.0	
3	1648.5	8.97	161.29	1646.6	-33.2	11.2	2.00	161.29	-32.5	
4	5603.5	8.97	161.29	5553.4	-617.2	209.1	0.00	0.00	-605.1	
5	6052.0	0.00	0.00	6000.0	-650.4	220.3	2.00	180.00	-637.6	
6	6428.2	0.00	0.00	6376.2	-650.4	220.3	0.00	0.00	-637.6	
7	7622.4	89.57	360.00	7140.1	107.8	220.3	7.50	360.00	119.5	
8	11609.6	89.57	360.00	7170.0	4094.8	220.3	0.00	0.00	4100.7	BHL 500'FNL & 230'FEL



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.18-T4N-R67W

Rieder 4N67W18Y Pad Sec.18-T4N-R67W

Rieder 18Y-441

Wellbore #1

Plan: Plan #1 (7-31-14)

Standard Planning Report

05 August, 2014

Database:	Landmark	Local Co-ordinate Reference:	Well Rieder 18Y-441
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Project:	SEC.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	North Reference:	True
Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-31-14)		

Project	SEC.18-T4N-R67W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site						Rieder 4N67W18Y Pad Sec.18-T4N-R67W											
Site Position:						Northing:			1,355,509.65ft			Latitude:			40.307850		
From:			Lat/Long			Easting:			3,160,201.05ft			Longitude:			-104.925570		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.37 °		

Well	Rieder 18Y-441					
Well Position	+N-S	0.0 ft	Northing:	1,355,510.01 ft	Latitude:	40.307850
	+E-W	58.6 ft	Easting:	3,160,259.61 ft	Longitude:	-104.925360
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,806.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/31/2014	8.52	66.84	52,737

Design	Plan #1 (7-31-14)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	3.08

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,648.5	8.97	161.29	1,646.6	-33.2	11.2	2.00	2.00	0.00	161.29	
5,603.5	8.97	161.29	5,553.4	-617.2	209.1	0.00	0.00	0.00	0.00	
6,052.0	0.00	0.00	6,000.0	-650.4	220.3	2.00	-2.00	0.00	180.00	
6,428.2	0.00	0.00	6,376.2	-650.4	220.3	0.00	0.00	0.00	0.00	
7,622.4	89.57	360.00	7,140.1	107.8	220.3	7.50	7.50	0.00	360.00	
11,609.6	89.57	360.00	7,170.0	4,094.8	220.3	0.00	0.00	0.00	0.00	BHL 500'FNL & 23C

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Project:	SEC.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	North Reference:	True
Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-31-14)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
SHL 679'FSL & 622'FEL									
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
1,300.0	2.00	161.29	1,300.0	-1.7	0.6	-1.6	2.00	2.00	0.00
1,400.0	4.00	161.29	1,399.8	-6.6	2.2	-6.5	2.00	2.00	0.00
1,500.0	6.00	161.29	1,499.5	-14.9	5.0	-14.6	2.00	2.00	0.00
1,600.0	8.00	161.29	1,598.7	-26.4	8.9	-25.9	2.00	2.00	0.00
1,648.5	8.97	161.29	1,646.6	-33.2	11.2	-32.5	2.00	2.00	0.00
1,700.0	8.97	161.29	1,697.5	-40.8	13.8	-40.0	0.00	0.00	0.00
1,800.0	8.97	161.29	1,796.3	-55.6	18.8	-54.5	0.00	0.00	0.00
1,900.0	8.97	161.29	1,895.1	-70.3	23.8	-68.9	0.00	0.00	0.00
2,000.0	8.97	161.29	1,993.9	-85.1	28.8	-83.4	0.00	0.00	0.00
2,100.0	8.97	161.29	2,092.6	-99.9	33.8	-97.9	0.00	0.00	0.00
2,200.0	8.97	161.29	2,191.4	-114.6	38.8	-112.4	0.00	0.00	0.00
2,300.0	8.97	161.29	2,290.2	-129.4	43.8	-126.8	0.00	0.00	0.00
2,400.0	8.97	161.29	2,389.0	-144.2	48.8	-141.3	0.00	0.00	0.00
2,500.0	8.97	161.29	2,487.8	-158.9	53.8	-155.8	0.00	0.00	0.00
2,600.0	8.97	161.29	2,586.5	-173.7	58.8	-170.3	0.00	0.00	0.00
2,700.0	8.97	161.29	2,685.3	-188.5	63.8	-184.8	0.00	0.00	0.00
2,800.0	8.97	161.29	2,784.1	-203.2	68.8	-199.2	0.00	0.00	0.00
2,900.0	8.97	161.29	2,882.9	-218.0	73.8	-213.7	0.00	0.00	0.00
3,000.0	8.97	161.29	2,981.6	-232.8	78.8	-228.2	0.00	0.00	0.00
3,100.0	8.97	161.29	3,080.4	-247.5	83.8	-242.7	0.00	0.00	0.00
3,200.0	8.97	161.29	3,179.2	-262.3	88.8	-257.1	0.00	0.00	0.00
3,300.0	8.97	161.29	3,278.0	-277.1	93.8	-271.6	0.00	0.00	0.00
3,400.0	8.97	161.29	3,376.8	-291.8	98.8	-286.1	0.00	0.00	0.00
3,474.2	8.97	161.29	3,450.0	-302.8	102.6	-296.8	0.00	0.00	0.00
PARKMAN									
3,500.0	8.97	161.29	3,475.5	-306.6	103.8	-300.6	0.00	0.00	0.00
3,600.0	8.97	161.29	3,574.3	-321.4	108.8	-315.0	0.00	0.00	0.00
3,700.0	8.97	161.29	3,673.1	-336.1	113.9	-329.5	0.00	0.00	0.00
3,800.0	8.97	161.29	3,771.9	-350.9	118.9	-344.0	0.00	0.00	0.00
3,900.0	8.97	161.29	3,870.6	-365.7	123.9	-358.5	0.00	0.00	0.00
3,990.5	8.97	161.29	3,960.0	-379.0	128.4	-371.6	0.00	0.00	0.00
SUSSEX									
4,000.0	8.97	161.29	3,969.4	-380.4	128.9	-373.0	0.00	0.00	0.00
4,100.0	8.97	161.29	4,068.2	-395.2	133.9	-387.4	0.00	0.00	0.00
4,200.0	8.97	161.29	4,167.0	-410.0	138.9	-401.9	0.00	0.00	0.00
4,300.0	8.97	161.29	4,265.7	-424.7	143.9	-416.4	0.00	0.00	0.00
4,400.0	8.97	161.29	4,364.5	-439.5	148.9	-430.9	0.00	0.00	0.00

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Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-31-14)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,500.0	8.97	161.29	4,463.3	-454.3	153.9	-445.3	0.00	0.00	0.00
4,557.4	8.97	161.29	4,520.0	-462.7	156.7	-453.6	0.00	0.00	0.00
SHANNON									
4,600.0	8.97	161.29	4,562.1	-469.0	158.9	-459.8	0.00	0.00	0.00
4,700.0	8.97	161.29	4,660.9	-483.8	163.9	-474.3	0.00	0.00	0.00
4,800.0	8.97	161.29	4,759.6	-498.6	168.9	-488.8	0.00	0.00	0.00
4,900.0	8.97	161.29	4,858.4	-513.3	173.9	-503.2	0.00	0.00	0.00
5,000.0	8.97	161.29	4,957.2	-528.1	178.9	-517.7	0.00	0.00	0.00
5,100.0	8.97	161.29	5,056.0	-542.9	183.9	-532.2	0.00	0.00	0.00
5,200.0	8.97	161.29	5,154.7	-557.6	188.9	-546.7	0.00	0.00	0.00
5,300.0	8.97	161.29	5,253.5	-572.4	193.9	-561.2	0.00	0.00	0.00
5,400.0	8.97	161.29	5,352.3	-587.2	198.9	-575.6	0.00	0.00	0.00
5,500.0	8.97	161.29	5,451.1	-601.9	203.9	-590.1	0.00	0.00	0.00
5,600.0	8.97	161.29	5,549.8	-616.7	208.9	-604.6	0.00	0.00	0.00
5,603.5	8.97	161.29	5,553.4	-617.2	209.1	-605.1	0.00	0.00	0.00
5,700.0	7.04	161.29	5,648.9	-629.9	213.4	-617.6	2.00	-2.00	0.00
5,800.0	5.04	161.29	5,748.3	-639.9	216.7	-627.3	2.00	-2.00	0.00
5,900.0	3.04	161.29	5,848.0	-646.6	219.0	-633.9	2.00	-2.00	0.00
6,000.0	1.04	161.29	5,948.0	-650.0	220.1	-637.2	2.00	-2.00	0.00
6,052.0	0.00	0.00	6,000.0	-650.4	220.3	-637.6	2.00	-2.00	0.00
6,100.0	0.00	0.00	6,048.0	-650.4	220.3	-637.6	0.00	0.00	0.00
6,200.0	0.00	0.00	6,148.0	-650.4	220.3	-637.6	0.00	0.00	0.00
6,300.0	0.00	0.00	6,248.0	-650.4	220.3	-637.6	0.00	0.00	0.00
6,400.0	0.00	0.00	6,348.0	-650.4	220.3	-637.6	0.00	0.00	0.00
6,428.2	0.00	0.00	6,376.2	-650.4	220.3	-637.6	0.00	0.00	0.00
KOP #2									
6,500.0	5.39	360.00	6,447.9	-647.0	220.3	-634.3	7.50	7.50	0.00
6,600.0	12.89	360.00	6,546.5	-631.2	220.3	-618.4	7.50	7.50	0.00
6,700.0	20.39	360.00	6,642.3	-602.5	220.3	-589.8	7.50	7.50	0.00
6,738.5	23.27	360.00	6,678.0	-588.2	220.3	-575.6	7.50	7.50	0.00
SHARON SPRINGS									
6,800.0	27.89	360.00	6,733.5	-561.7	220.3	-549.0	7.50	7.50	0.00
6,900.0	35.39	360.00	6,818.5	-509.3	220.3	-496.7	7.50	7.50	0.00
6,921.6	37.01	360.00	6,836.0	-496.5	220.3	-483.9	7.50	7.50	0.00
NIOBRARA A									
7,000.0	42.89	360.00	6,896.1	-446.2	220.3	-433.7	7.50	7.50	0.00
7,053.6	46.90	360.00	6,934.0	-408.4	220.3	-396.0	7.50	7.50	0.00
NIOBRARA B									
7,100.0	50.39	360.00	6,964.7	-373.5	220.3	-361.2	7.50	7.50	0.00
7,172.2	55.80	360.00	7,008.0	-315.9	220.3	-303.6	7.50	7.50	0.00
NIOBRARA C									
7,200.0	57.89	360.00	7,023.2	-292.6	220.3	-280.3	7.50	7.50	0.00
7,300.0	65.39	360.00	7,070.7	-204.6	220.3	-192.5	7.50	7.50	0.00
7,400.0	72.89	360.00	7,106.3	-111.3	220.3	-99.3	7.50	7.50	0.00
7,500.0	80.39	360.00	7,129.4	-14.0	220.3	-2.2	7.50	7.50	0.00
7,516.8	81.65	360.00	7,132.0	2.6	220.3	14.4	7.50	7.50	0.00
FT HAYS									
7,600.0	87.89	360.00	7,139.6	85.4	220.3	97.1	7.50	7.50	0.00
7,622.4	89.57	360.00	7,140.1	107.8	220.3	119.4	7.50	7.50	0.00
End of Build - 7"									
7,700.0	89.57	360.00	7,140.7	185.4	220.3	196.9	0.00	0.00	0.00
7,800.0	89.57	360.00	7,141.4	285.4	220.3	296.8	0.00	0.00	0.00

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Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-31-14)		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,900.0	89.57	360.00	7,142.2	385.4	220.3	396.6	0.00	0.00	0.00
8,000.0	89.57	360.00	7,142.9	485.4	220.3	496.5	0.00	0.00	0.00
8,100.0	89.57	360.00	7,143.7	585.4	220.3	596.3	0.00	0.00	0.00
8,200.0	89.57	360.00	7,144.4	685.3	220.3	696.2	0.00	0.00	0.00
8,300.0	89.57	360.00	7,145.2	785.3	220.3	796.0	0.00	0.00	0.00
8,400.0	89.57	360.00	7,145.9	885.3	220.3	895.9	0.00	0.00	0.00
8,500.0	89.57	360.00	7,146.7	985.3	220.3	995.8	0.00	0.00	0.00
8,600.0	89.57	360.00	7,147.4	1,085.3	220.3	1,095.6	0.00	0.00	0.00
8,700.0	89.57	360.00	7,148.2	1,185.3	220.3	1,195.5	0.00	0.00	0.00
8,800.0	89.57	360.00	7,148.9	1,285.3	220.3	1,295.3	0.00	0.00	0.00
8,900.0	89.57	360.00	7,149.7	1,385.3	220.3	1,395.2	0.00	0.00	0.00
9,000.0	89.57	360.00	7,150.4	1,485.3	220.3	1,495.0	0.00	0.00	0.00
9,100.0	89.57	360.00	7,151.2	1,585.3	220.3	1,594.9	0.00	0.00	0.00
9,200.0	89.57	360.00	7,151.9	1,685.3	220.3	1,694.7	0.00	0.00	0.00
9,300.0	89.57	360.00	7,152.7	1,785.3	220.3	1,794.6	0.00	0.00	0.00
9,400.0	89.57	360.00	7,153.4	1,885.3	220.3	1,894.4	0.00	0.00	0.00
9,477.6	89.57	360.00	7,154.0	1,962.9	220.3	1,971.9	0.00	0.00	0.00
CODELL									
9,500.0	89.57	360.00	7,154.2	1,985.3	220.3	1,994.3	0.00	0.00	0.00
9,600.0	89.57	360.00	7,154.9	2,085.3	220.3	2,094.1	0.00	0.00	0.00
9,700.0	89.57	360.00	7,155.7	2,185.3	220.3	2,194.0	0.00	0.00	0.00
9,800.0	89.57	360.00	7,156.4	2,285.3	220.3	2,293.8	0.00	0.00	0.00
9,900.0	89.57	360.00	7,157.2	2,385.3	220.3	2,393.7	0.00	0.00	0.00
10,000.0	89.57	360.00	7,157.9	2,485.3	220.3	2,493.5	0.00	0.00	0.00
10,100.0	89.57	360.00	7,158.7	2,585.3	220.3	2,593.4	0.00	0.00	0.00
10,200.0	89.57	360.00	7,159.4	2,685.3	220.3	2,693.2	0.00	0.00	0.00
10,300.0	89.57	360.00	7,160.2	2,785.3	220.3	2,793.1	0.00	0.00	0.00
10,400.0	89.57	360.00	7,160.9	2,885.3	220.3	2,893.0	0.00	0.00	0.00
10,500.0	89.57	360.00	7,161.7	2,985.3	220.3	2,992.8	0.00	0.00	0.00
10,600.0	89.57	360.00	7,162.4	3,085.3	220.3	3,092.7	0.00	0.00	0.00
10,700.0	89.57	360.00	7,163.2	3,185.3	220.3	3,192.5	0.00	0.00	0.00
10,800.0	89.57	360.00	7,163.9	3,285.3	220.3	3,292.4	0.00	0.00	0.00
10,900.0	89.57	360.00	7,164.7	3,385.3	220.3	3,392.2	0.00	0.00	0.00
11,000.0	89.57	360.00	7,165.4	3,485.3	220.3	3,492.1	0.00	0.00	0.00
11,100.0	89.57	360.00	7,166.2	3,585.3	220.3	3,591.9	0.00	0.00	0.00
11,200.0	89.57	360.00	7,166.9	3,685.3	220.3	3,691.8	0.00	0.00	0.00
11,300.0	89.57	360.00	7,167.7	3,785.3	220.3	3,791.6	0.00	0.00	0.00
11,400.0	89.57	360.00	7,168.4	3,885.3	220.3	3,891.5	0.00	0.00	0.00
11,500.0	89.57	360.00	7,169.2	3,985.3	220.3	3,991.3	0.00	0.00	0.00
11,600.0	89.57	360.00	7,169.9	4,085.3	220.3	4,091.2	0.00	0.00	0.00
11,609.6	89.57	360.00	7,170.0	4,094.8	220.3	4,100.7	0.00	0.00	0.00
BHL 500°FNL & 230°FEL									

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,622.4	7,140.1	7"	7	7-1/2

Database:	Landmark	Local Co-ordinate Reference:	Well Rieder 18Y-441
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Project:	SEC.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	North Reference:	True
Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (7-31-14)		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,474.2	3,450.0	PARKMAN				
3,990.5	3,960.0	SUSSEX				
4,557.4	4,520.0	SHANNON				
6,738.5	6,678.0	SHARON SPRINGS				
6,921.6	6,836.0	NIOBRARA A				
7,053.6	6,934.0	NIOBRARA B				
7,172.2	7,008.0	NIOBRARA C				
7,516.8	7,132.0	FT HAYS				
9,477.6	7,154.0	CODELL				

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,200.0	1,200.0	0.0	0.0	KOP #1
6,428.2	6,376.2	-650.4	220.3	KOP #2
7,622.4	7,140.1	107.8	220.3	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.18-T4N-R67W

Rieder 4N67W18Y Pad Sec.18-T4N-R67W

Rieder 18Y-441

Wellbore #1

Plan #1 (7-31-14)

Anticollision Report

05 August, 2014



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (7-31-14)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date 8/5/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,609.6	Plan #1 (7-31-14) (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.18-T4N-R67W						
A.R. 18-44 (Exist) - Wellbore #1 - Wellbore #1	1,200.0	1,184.0	248.8	222.5	9.471	CC
A.R. 18-44 (Exist) - Wellbore #1 - Wellbore #1	1,300.0	1,284.0	249.9	221.4	8.782	ES
A.R. 18-44 (Exist) - Wellbore #1 - Wellbore #1	7,605.7	7,123.8	451.8	291.1	2.812	SF
Carlson 18-2 (Exist) - Wellbore #1 - Wellbore #1	9,951.9	7,138.6	554.9	358.9	2.831	CC, ES
Carlson 18-2 (Exist) - Wellbore #1 - Wellbore #1	10,000.0	7,138.9	557.0	360.1	2.829	SF
Carlson 18-3 (Exist) - Wellbore #1 - Wellbore #1	11,336.3	7,158.9	449.0	226.9	2.022	CC, ES, SF
Every-Brooks 18-1 (Exist) - Wellbore #1 - Wellbore #1	8,673.2	7,129.0	351.4	177.7	2.023	CC, ES, SF
Rieder 4N67W18Y Pad Sec.18-T4N-R67W						
Rieder 18T-221 - Wellbore #1 - Plan #1 (7-31-14)	1,200.0	1,200.0	58.6	53.4	11.330	CC, ES
Rieder 18T-221 - Wellbore #1 - Plan #1 (7-31-14)	11,609.6	11,386.5	727.6	567.0	4.530	SF
Rieder 18T-321 - Wellbore #1 - Plan #1 (7-31-14)	1,000.0	1,000.0	89.2	85.0	20.899	CC, ES
Rieder 18T-321 - Wellbore #1 - Plan #1 (7-31-14)	11,609.6	11,481.2	860.0	694.7	5.201	SF
Rieder 18T-401 - Wellbore #1 - Plan #1 (7-31-14)	800.0	799.0	119.9	116.6	35.595	CC, ES
Rieder 18T-401 - Wellbore #1 - Plan #1 (7-31-14)	6,000.0	5,943.4	994.6	958.8	27.772	SF
Rieder 18Y-241 - Wellbore #1 - Plan #1 (7-31-14)	1,200.0	1,200.0	30.7	25.5	5.935	CC, ES
Rieder 18Y-241 - Wellbore #1 - Plan #1 (7-31-14)	11,609.6	11,400.8	274.7	164.0	2.481	SF
Rieder 18Y-301 - Wellbore #1 - Plan #1 (7-31-14)	1,000.0	1,000.0	30.7	26.4	7.184	CC, ES
Rieder 18Y-301 - Wellbore #1 - Plan #1 (7-31-14)	11,609.6	11,513.9	213.2	80.0	1.601	SF

Offset Design Existing Wells Sec.18-T4N-R67W - A.R. 18-44 (Exist) - Wellbore #1 - Wellbore #1											
Survey Program: 7290-UNKNOWN											
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)
0.0	0.0	0.0	0.0	0.0	0.0	-68.52	91.1	-231.5	249.3		
100.0	100.0	84.0	84.0	0.1	1.7	-68.52	91.1	-231.5	248.8	247.0	1.79
200.0	200.0	184.0	184.0	0.3	3.7	-68.52	91.1	-231.5	248.8	244.7	4.02
300.0	300.0	284.0	284.0	0.6	5.7	-68.52	91.1	-231.5	248.8	242.5	6.24
400.0	400.0	384.0	384.0	0.8	7.7	-68.52	91.1	-231.5	248.8	240.3	8.47
500.0	500.0	484.0	484.0	1.0	9.7	-68.52	91.1	-231.5	248.8	238.1	10.69
600.0	600.0	584.0	584.0	1.2	11.7	-68.52	91.1	-231.5	248.8	235.8	12.92
700.0	700.0	684.0	684.0	1.5	13.7	-68.52	91.1	-231.5	248.8	233.6	15.14
											16.429

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.18-T4N-R67W - A.R. 18-44 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7290-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
800.0	800.0	784.0	784.0	1.7	15.7	-68.52		91.1	-231.5	248.8	231.4	17.37	14.325	
900.0	900.0	884.0	884.0	1.9	17.7	-68.52		91.1	-231.5	248.8	229.2	19.59	12.698	
1,000.0	1,000.0	984.0	984.0	2.1	19.7	-68.52		91.1	-231.5	248.8	226.9	21.82	11.403	
1,100.0	1,100.0	1,084.0	1,084.0	2.4	21.7	-68.52		91.1	-231.5	248.8	224.7	24.04	10.348	
1,200.0	1,200.0	1,184.0	1,184.0	2.6	23.7	-68.52		91.1	-231.5	248.8	222.5	26.26	9.471 CC	
1,300.0	1,300.0	1,284.0	1,284.0	2.8	25.7	130.48		91.1	-231.5	249.9	221.4	28.45	8.782 ES	
1,400.0	1,399.8	1,383.8	1,383.8	3.0	27.7	131.33		91.1	-231.5	253.3	222.7	30.60	8.278	
1,500.0	1,499.5	1,483.5	1,483.5	3.1	29.7	132.68		91.1	-231.5	259.2	226.4	32.73	7.919	
1,600.0	1,598.7	1,582.7	1,582.7	3.4	31.7	134.47		91.1	-231.5	267.6	232.8	34.83	7.683	
1,700.0	1,697.5	1,681.5	1,681.5	3.6	33.6	136.62		91.1	-231.5	278.5	241.6	36.95	7.537	
1,800.0	1,796.3	1,780.3	1,780.3	3.9	35.6	138.73		91.1	-231.5	290.1	251.0	39.12	7.415	
1,900.0	1,895.1	1,879.1	1,879.1	4.1	37.6	140.67		91.1	-231.5	302.0	260.7	41.30	7.313	
2,000.0	1,993.9	1,977.9	1,977.9	4.4	39.6	142.46		91.1	-231.5	314.3	270.8	43.49	7.228	
2,100.0	2,092.6	2,076.6	2,076.6	4.7	41.5	144.12		91.1	-231.5	326.9	281.2	45.67	7.157	
2,200.0	2,191.4	2,175.4	2,175.4	5.1	43.5	145.66		91.1	-231.5	339.7	291.8	47.86	7.097	
2,300.0	2,290.2	2,274.2	2,274.2	5.4	45.5	147.08		91.1	-231.5	352.7	302.7	50.05	7.047	
2,400.0	2,389.0	2,373.0	2,373.0	5.7	47.5	148.40		91.1	-231.5	365.9	313.7	52.25	7.004	
2,500.0	2,487.8	2,471.8	2,471.8	6.0	49.4	149.63		91.1	-231.5	379.4	324.9	54.44	6.968	
2,600.0	2,586.5	2,570.5	2,570.5	6.4	51.4	150.78		91.1	-231.5	392.9	336.3	56.63	6.938	
2,700.0	2,685.3	2,669.3	2,669.3	6.7	53.4	151.85		91.1	-231.5	406.6	347.8	58.82	6.913	
2,800.0	2,784.1	2,768.1	2,768.1	7.1	55.4	152.85		91.1	-231.5	420.5	359.5	61.02	6.891	
2,900.0	2,882.9	2,866.9	2,866.9	7.4	57.3	153.78		91.1	-231.5	434.5	371.2	63.21	6.873	
3,000.0	2,981.6	2,965.6	2,965.6	7.8	59.3	154.66		91.1	-231.5	448.5	383.1	65.40	6.858	
3,100.0	3,080.4	3,064.4	3,064.4	8.1	61.3	155.49		91.1	-231.5	462.7	395.1	67.59	6.845	
3,200.0	3,179.2	3,163.2	3,163.2	8.5	63.3	156.26		91.1	-231.5	477.0	407.2	69.79	6.834	
3,300.0	3,278.0	3,262.0	3,262.0	8.9	65.2	156.99		91.1	-231.5	491.3	419.3	71.98	6.825	
3,400.0	3,376.8	3,360.8	3,360.8	9.2	67.2	157.68		91.1	-231.5	505.7	431.5	74.17	6.818	
3,500.0	3,475.5	3,459.5	3,459.5	9.6	69.2	158.33		91.1	-231.5	520.2	443.8	76.37	6.812	
3,600.0	3,574.3	3,558.3	3,558.3	9.9	71.2	158.95		91.1	-231.5	534.7	456.2	78.56	6.807	
3,700.0	3,673.1	3,657.1	3,657.1	10.3	73.1	159.53		91.1	-231.5	549.3	468.6	80.75	6.803	
3,800.0	3,771.9	3,755.9	3,755.9	10.7	75.1	160.08		91.1	-231.5	564.0	481.0	82.95	6.799	
3,900.0	3,870.6	3,854.6	3,854.6	11.0	77.1	160.61		91.1	-231.5	578.7	493.5	85.14	6.797	
4,000.0	3,969.4	3,953.4	3,953.4	11.4	79.1	161.11		91.1	-231.5	593.4	506.1	87.33	6.795	
4,100.0	4,068.2	4,052.2	4,052.2	11.8	81.0	161.58		91.1	-231.5	608.2	518.7	89.53	6.794	
4,200.0	4,167.0	4,151.0	4,151.0	12.1	83.0	162.04		91.1	-231.5	623.1	531.3	91.72	6.793	
4,300.0	4,265.7	4,249.7	4,249.7	12.5	85.0	162.47		91.1	-231.5	637.9	544.0	93.91	6.793	
4,400.0	4,364.5	4,348.5	4,348.5	12.9	87.0	162.88		91.1	-231.5	652.8	556.7	96.11	6.793	
4,500.0	4,463.3	4,447.3	4,447.3	13.2	88.9	163.27		91.1	-231.5	667.8	569.5	98.30	6.793	
4,600.0	4,562.1	4,546.1	4,546.1	13.6	90.9	163.65		91.1	-231.5	682.7	582.2	100.50	6.793	
4,700.0	4,660.9	4,644.9	4,644.9	14.0	92.9	164.01		91.1	-231.5	697.7	595.0	102.69	6.794	
4,800.0	4,759.6	4,743.6	4,743.6	14.4	94.9	164.35		91.1	-231.5	712.7	607.8	104.89	6.795	
4,900.0	4,858.4	4,842.4	4,842.4	14.7	96.8	164.68		91.1	-231.5	727.8	620.7	107.08	6.796	
5,000.0	4,957.2	4,941.2	4,941.2	15.1	98.8	165.00		91.1	-231.5	742.8	633.5	109.27	6.798	
5,100.0	5,056.0	5,040.0	5,040.0	15.5	100.8	165.31		91.1	-231.5	757.9	646.4	111.47	6.799	
5,200.0	5,154.7	5,138.7	5,138.7	15.8	102.8	165.60		91.1	-231.5	773.0	659.3	113.67	6.801	
5,300.0	5,253.5	5,237.5	5,237.5	16.2	104.8	165.88		91.1	-231.5	788.1	672.3	115.86	6.802	
5,400.0	5,352.3	5,336.3	5,336.3	16.6	106.7	166.15		91.1	-231.5	803.3	685.2	118.06	6.804	
5,500.0	5,451.1	5,435.1	5,435.1	17.0	108.7	166.41		91.1	-231.5	818.4	698.2	120.25	6.806	
5,600.0	5,549.8	5,533.8	5,533.8	17.3	110.7	166.67		91.1	-231.5	833.6	711.1	122.45	6.808	
5,700.0	5,648.9	5,632.9	5,632.9	17.6	112.7	166.94		91.1	-231.5	847.2	722.1	125.13	6.771	
5,800.0	5,748.3	5,732.3	5,732.3	17.9	114.6	167.15		91.1	-231.5	857.5	729.8	127.69	6.715	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.18-T4N-R67W - A.R. 18-44 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7290-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,900.0	5,848.0	5,832.0	5,832.0	18.1	116.6	167.28		91.1	-231.5	864.3	734.2	130.12	6.643	
6,000.0	5,948.0	5,932.0	5,932.0	18.2	118.6	167.35		91.1	-231.5	867.8	735.4	132.40	6.555	
6,100.0	6,048.0	6,032.0	6,032.0	18.4	120.6	-31.35		91.1	-231.5	868.3	733.7	134.58	6.452	
6,200.0	6,148.0	6,132.0	6,132.0	18.5	122.6	-31.35		91.1	-231.5	868.3	731.5	136.76	6.349	
6,300.0	6,248.0	6,232.0	6,232.0	18.6	124.6	-31.35		91.1	-231.5	868.3	729.3	138.93	6.250	
6,400.0	6,348.0	6,332.0	6,332.0	18.8	126.6	-31.35		91.1	-231.5	868.3	727.2	141.11	6.153	
6,500.0	6,447.9	6,431.9	6,431.9	18.9	128.6	-31.58		91.1	-231.5	865.4	722.7	142.74	6.063	
6,600.0	6,546.5	6,530.5	6,530.5	18.9	130.6	-32.69		91.1	-231.5	851.9	709.2	142.68	5.971	
6,700.0	6,642.3	6,626.3	6,626.3	18.8	132.5	-34.79		91.1	-231.5	827.8	686.6	141.19	5.863	
6,800.0	6,733.5	6,717.5	6,717.5	18.6	134.3	-38.06		91.1	-231.5	793.9	654.9	138.94	5.714	
6,900.0	6,818.5	6,802.5	6,802.5	18.3	136.1	-42.71		91.1	-231.5	751.4	614.2	137.13	5.479	
7,000.0	6,896.1	6,880.1	6,880.1	18.1	137.6	-48.93		91.1	-231.5	702.0	564.6	137.36	5.111	
7,100.0	6,964.7	6,948.7	6,948.7	17.8	139.0	-56.75		91.1	-231.5	648.1	507.2	140.85	4.601	
7,200.0	7,023.2	7,007.2	7,007.2	17.6	140.1	-65.70		91.1	-231.5	592.7	445.6	147.07	4.030	
7,300.0	7,070.7	7,054.7	7,054.7	17.5	141.1	-74.75		91.1	-231.5	540.0	386.4	153.52	3.517	
7,400.0	7,106.3	7,090.3	7,090.3	17.5	141.8	-82.49		91.1	-231.5	495.0	337.2	157.84	3.136	
7,500.0	7,129.4	7,113.4	7,113.4	17.7	142.3	-87.77		91.1	-231.5	463.9	304.1	159.80	2.903	
7,600.0	7,139.6	7,123.6	7,123.6	18.2	142.5	-89.97		91.1	-231.5	451.8	291.2	160.62	2.813	
7,605.7	7,139.8	7,123.8	7,123.8	18.2	142.5	-90.00		91.1	-231.5	451.8	291.1	160.66	2.812 SF	
7,700.0	7,140.7	7,124.7	7,124.7	18.8	142.5	-90.09		91.1	-231.5	461.5	300.2	161.28	2.862	
7,800.0	7,141.4	7,125.4	7,125.4	19.6	142.5	-90.18		91.1	-231.5	491.8	329.7	162.10	3.034	
7,900.0	7,142.2	7,126.2	7,126.2	20.6	142.5	-90.28		91.1	-231.5	539.2	376.1	163.08	3.306	
8,000.0	7,142.9	7,126.9	7,126.9	21.7	142.5	-90.38		91.1	-231.5	599.6	435.5	164.18	3.652	
8,100.0	7,143.7	7,127.7	7,127.7	22.9	142.6	-90.47		91.1	-231.5	669.6	504.3	165.38	4.049	
8,200.0	7,144.4	7,128.4	7,128.4	24.2	142.6	-90.57		91.1	-231.5	746.5	579.8	166.69	4.478	
8,300.0	7,145.2	7,129.2	7,129.2	25.5	142.6	-90.66		91.1	-231.5	828.3	660.3	168.07	4.928	
8,400.0	7,145.9	7,129.9	7,129.9	27.0	142.6	-90.76		91.1	-231.5	913.8	744.2	169.52	5.390	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.18-T4N-R67W - Carlson 18-2 (Exist) - Wellbore #1 - Wellbore #1										Offset Site Error:		0.0 ft	
Survey Program: 7255-UNKNOWN										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
9,200.0	7,151.9	7,132.9	7,132.9	40.0	142.7	-89.42	2,437.2	-334.6	934.5	752.0	182.54	5.120	
9,300.0	7,152.7	7,133.7	7,133.7	41.7	142.7	-89.49	2,437.2	-334.6	856.1	671.8	184.29	4.645	
9,400.0	7,153.4	7,134.4	7,134.4	43.4	142.7	-89.57	2,437.2	-334.6	782.7	596.6	186.06	4.206	
9,500.0	7,154.2	7,135.2	7,135.2	45.2	142.7	-89.65	2,437.2	-334.6	715.7	527.8	187.85	3.810	
9,600.0	7,154.9	7,135.9	7,135.9	47.0	142.7	-89.73	2,437.2	-334.6	657.1	467.5	189.64	3.465	
9,700.0	7,155.7	7,136.7	7,136.7	48.8	142.7	-89.80	2,437.2	-334.6	609.4	418.0	191.45	3.183	
9,800.0	7,156.4	7,137.4	7,137.4	50.6	142.7	-89.88	2,437.2	-334.6	575.4	382.1	193.26	2.977	
9,900.0	7,157.2	7,138.2	7,138.2	52.4	142.8	-89.96	2,437.2	-334.6	557.4	362.3	195.08	2.857	
9,951.9	7,157.6	7,138.6	7,138.6	53.3	142.8	-90.00	2,437.2	-334.6	554.9	358.9	196.03	2.831 CC, ES	
10,000.0	7,157.9	7,138.9	7,138.9	54.2	142.8	-90.04	2,437.2	-334.6	557.0	360.1	196.91	2.829 SF	
10,100.0	7,158.7	7,139.7	7,139.7	56.0	142.8	-90.11	2,437.2	-334.6	574.4	375.6	198.75	2.890	
10,200.0	7,159.4	7,140.4	7,140.4	57.8	142.8	-90.19	2,437.2	-334.6	607.9	407.3	200.60	3.030	
10,300.0	7,160.2	7,141.2	7,141.2	59.7	142.8	-90.27	2,437.2	-334.6	655.1	452.6	202.44	3.236	
10,400.0	7,160.9	7,141.9	7,141.9	61.5	142.8	-90.35	2,437.2	-334.6	713.3	509.0	204.30	3.491	
10,500.0	7,161.7	7,142.7	7,142.7	63.4	142.9	-90.42	2,437.2	-334.6	780.0	573.8	206.15	3.783	
10,600.0	7,162.4	7,143.4	7,143.4	65.2	142.9	-90.50	2,437.2	-334.6	853.2	645.2	208.02	4.102	
10,700.0	7,163.2	7,144.2	7,144.2	67.0	142.9	-90.58	2,437.2	-334.6	931.4	721.5	209.88	4.438	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.18-T4N-R67W - Carlson 18-3 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7288-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,500.0	7,161.7	7,152.7	7,152.7	63.4	143.1	-89.20	3,821.6	-228.7	949.2	742.9	206.32	4.600		
10,600.0	7,162.4	7,153.4	7,153.4	65.2	143.1	-89.29	3,821.6	-228.7	862.4	654.2	208.19	4.142		
10,700.0	7,163.2	7,154.2	7,154.2	67.0	143.1	-89.39	3,821.6	-228.7	778.7	568.7	210.06	3.707		
10,800.0	7,163.9	7,154.9	7,154.9	68.9	143.1	-89.49	3,821.6	-228.7	699.4	487.5	211.94	3.300		
10,900.0	7,164.7	7,155.7	7,155.7	70.8	143.1	-89.58	3,821.6	-228.7	626.0	412.2	213.82	2.928		
11,000.0	7,165.4	7,156.4	7,156.4	72.6	143.1	-89.68	3,821.6	-228.7	561.0	345.3	215.70	2.601		
11,100.0	7,166.2	7,157.2	7,157.2	74.5	143.1	-89.77	3,821.6	-228.7	507.4	289.8	217.58	2.332		
11,200.0	7,166.9	7,157.9	7,157.9	76.4	143.2	-89.87	3,821.6	-228.7	469.2	249.7	219.47	2.138		
11,300.0	7,167.7	7,158.7	7,158.7	78.2	143.2	-89.97	3,821.6	-228.7	450.4	229.1	221.35	2.035		
11,336.3	7,167.9	7,158.9	7,158.9	78.9	143.2	-90.00	3,821.6	-228.7	449.0	226.9	222.04	2.022 CC, ES, SF		
11,400.0	7,168.4	7,159.4	7,159.4	80.1	143.2	-90.06	3,821.6	-228.7	453.5	230.2	223.24	2.031		
11,500.0	7,169.2	7,160.2	7,160.2	82.0	143.2	-90.16	3,821.6	-228.7	477.9	252.7	225.13	2.123		
11,600.0	7,169.9	7,160.9	7,160.9	83.8	143.2	-90.25	3,821.6	-228.7	520.7	293.6	227.03	2.293		
11,609.6	7,170.0	7,161.0	7,161.0	84.0	143.2	-90.26	3,821.6	-228.7	525.6	298.4	227.21	2.313		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.18-T4N-R67W - Every-Brooks 18-1 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7263-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
7,800.0	7,141.4	7,122.4	7,122.4	19.6	142.4	-88.93	1,158.5	-131.1	941.2	779.2	162.00	5.810		
7,900.0	7,142.2	7,123.2	7,123.2	20.6	142.5	-89.05	1,158.5	-131.1	849.2	686.3	162.98	5.211		
8,000.0	7,142.9	7,123.9	7,123.9	21.7	142.5	-89.18	1,158.5	-131.1	759.3	595.3	164.08	4.628		
8,100.0	7,143.7	7,124.7	7,124.7	22.9	142.5	-89.30	1,158.5	-131.1	672.3	507.0	165.30	4.067		
8,200.0	7,144.4	7,125.4	7,125.4	24.2	142.5	-89.42	1,158.5	-131.1	589.4	422.7	166.61	3.537		
8,300.0	7,145.2	7,126.2	7,126.2	25.5	142.5	-89.54	1,158.5	-131.1	512.6	344.6	168.00	3.051		
8,400.0	7,145.9	7,126.9	7,126.9	27.0	142.5	-89.67	1,158.5	-131.1	445.1	275.6	169.45	2.626		
8,500.0	7,146.7	7,127.7	7,127.7	28.5	142.6	-89.79	1,158.5	-131.1	391.7	220.8	170.96	2.291		
8,600.0	7,147.4	7,128.4	7,128.4	30.0	142.6	-89.91	1,158.5	-131.1	358.9	186.4	172.52	2.080		
8,673.2	7,148.0	7,129.0	7,129.0	31.2	142.6	-90.00	1,158.5	-131.1	351.4	177.7	173.69	2.023 CC, ES, SF		
8,700.0	7,148.2	7,129.2	7,129.2	31.6	142.6	-90.03	1,158.5	-131.1	352.4	178.3	174.12	2.024		
8,800.0	7,148.9	7,129.9	7,129.9	33.2	142.6	-90.16	1,158.5	-131.1	373.6	197.8	175.76	2.125		
8,900.0	7,149.7	7,130.7	7,130.7	34.9	142.6	-90.28	1,158.5	-131.1	418.2	240.8	177.42	2.357		
9,000.0	7,150.4	7,131.4	7,131.4	36.5	142.6	-90.40	1,158.5	-131.1	479.9	300.8	179.11	2.679		
9,100.0	7,151.2	7,132.2	7,132.2	38.2	142.6	-90.52	1,158.5	-131.1	552.9	372.0	180.82	3.057		
9,200.0	7,151.9	7,132.9	7,132.9	40.0	142.7	-90.64	1,158.5	-131.1	633.3	450.7	182.56	3.469		
9,300.0	7,152.7	7,133.7	7,133.7	41.7	142.7	-90.77	1,158.5	-131.1	718.6	534.3	184.30	3.899		
9,400.0	7,153.4	7,134.4	7,134.4	43.4	142.7	-90.89	1,158.5	-131.1	807.3	621.2	186.07	4.339		
9,500.0	7,154.2	7,135.2	7,135.2	45.2	142.7	-91.01	1,158.5	-131.1	898.4	710.5	187.84	4.783		
9,600.0	7,154.9	7,135.9	7,135.9	47.0	142.7	-91.13	1,158.5	-131.1	991.2	801.6	189.63	5.227		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design		Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18T-221 - Wellbore #1 - Plan #1 (7-31-14)											Offset Site Error: 0.0 ft	
Survey Program: 0-MWD													Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
0.0	0.0	0.0	0.0	0.0	0.0	-90.00	0.0	-58.6	58.6					
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-58.6	58.6	58.3	0.22	260.579		
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-58.6	58.6	57.9	0.67	86.860		
300.0	300.0	300.0	300.0	0.6	0.6	-90.00	0.0	-58.6	58.6	57.4	1.12	52.116		
400.0	400.0	400.0	400.0	0.8	0.8	-90.00	0.0	-58.6	58.6	57.0	1.57	37.226		
500.0	500.0	500.0	500.0	1.0	1.0	-90.00	0.0	-58.6	58.6	56.5	2.02	28.953		
600.0	600.0	600.0	600.0	1.2	1.2	-90.00	0.0	-58.6	58.6	56.1	2.47	23.689		
700.0	700.0	700.0	700.0	1.5	1.5	-90.00	0.0	-58.6	58.6	55.6	2.92	20.045		
800.0	800.0	800.0	800.0	1.7	1.7	-90.00	0.0	-58.6	58.6	55.2	3.37	17.372		
900.0	900.0	900.0	900.0	1.9	1.9	-90.00	0.0	-58.6	58.6	54.7	3.82	15.328		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-90.00	0.0	-58.6	58.6	54.3	4.27	13.715		
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	-90.00	0.0	-58.6	58.6	53.8	4.72	12.409		
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	-90.00	0.0	-58.6	58.6	53.4	5.17	11.330	CC, ES	
1,300.0	1,300.0	1,298.8	1,298.8	2.8	2.8	108.90	-1.4	-59.5	60.1	54.5	5.56	10.805		
1,400.0	1,399.8	1,397.6	1,397.4	3.0	3.0	109.38	-5.6	-62.4	64.7	58.7	5.91	10.936		
1,500.0	1,499.5	1,496.0	1,495.5	3.1	3.2	110.04	-12.7	-67.1	72.3	66.0	6.29	11.495		
1,600.0	1,598.7	1,594.0	1,592.8	3.4	3.4	110.73	-22.4	-73.7	82.9	76.2	6.70	12.383		
1,700.0	1,697.5	1,691.5	1,689.1	3.6	3.6	111.25	-34.9	-82.0	96.4	89.2	7.15	13.479		
1,800.0	1,796.3	1,790.0	1,786.1	3.9	3.9	110.88	-49.4	-91.8	111.2	103.6	7.66	14.530		
1,900.0	1,895.1	1,888.9	1,883.4	4.1	4.2	110.56	-64.0	-101.6	126.1	117.9	8.19	15.392		
2,000.0	1,993.9	1,987.8	1,980.7	4.4	4.5	110.32	-78.6	-111.4	141.0	132.3	8.76	16.097		
2,100.0	2,092.6	2,086.7	2,078.0	4.7	4.8	110.11	-93.3	-121.3	155.9	146.6	9.35	16.674		
2,200.0	2,191.4	2,185.6	2,175.3	5.1	5.1	109.95	-107.9	-131.1	170.8	160.9	9.96	17.151		
2,300.0	2,290.2	2,284.5	2,272.6	5.4	5.5	109.81	-122.5	-140.9	185.7	175.1	10.58	17.546		
2,400.0	2,389.0	2,383.3	2,369.9	5.7	5.8	109.69	-137.1	-150.8	200.6	189.4	11.22	17.877		
2,500.0	2,487.8	2,482.2	2,467.2	6.0	6.2	109.59	-151.7	-160.6	215.5	203.7	11.87	18.155		
2,600.0	2,586.5	2,581.1	2,564.5	6.4	6.6	109.50	-166.4	-170.4	230.4	217.9	12.53	18.390		
2,700.0	2,685.3	2,680.0	2,661.8	6.7	6.9	109.42	-181.0	-180.2	245.3	232.1	13.20	18.591		
2,800.0	2,784.1	2,778.9	2,759.1	7.1	7.3	109.35	-195.6	-190.1	260.2	246.4	13.87	18.763		
2,900.0	2,882.9	2,877.8	2,856.4	7.4	7.7	109.29	-210.2	-199.9	275.1	260.6	14.55	18.912		
3,000.0	2,981.6	2,976.6	2,953.7	7.8	8.1	109.23	-224.9	-209.7	290.0	274.8	15.23	19.042		
3,100.0	3,080.4	3,075.5	3,051.0	8.1	8.5	109.18	-239.5	-219.6	304.9	289.0	15.92	19.155		
3,200.0	3,179.2	3,174.4	3,148.3	8.5	8.8	109.14	-254.1	-229.4	319.8	303.2	16.61	19.254		
3,300.0	3,278.0	3,273.3	3,245.6	8.9	9.2	109.10	-268.7	-239.2	334.7	317.4	17.31	19.341		
3,400.0	3,376.8	3,372.2	3,342.9	9.2	9.6	109.06	-283.3	-249.0	349.6	331.6	18.01	19.419		
3,500.0	3,475.5	3,471.1	3,440.2	9.6	10.0	109.03	-298.0	-258.9	364.5	345.8	18.71	19.487		
3,600.0	3,574.3	3,569.9	3,537.5	9.9	10.4	108.99	-312.6	-268.7	379.4	360.0	19.41	19.549		
3,700.0	3,673.1	3,668.8	3,634.8	10.3	10.8	108.96	-327.2	-278.5	394.4	374.2	20.12	19.604		
3,800.0	3,771.9	3,767.7	3,732.1	10.7	11.2	108.94	-341.8	-288.4	409.3	388.4	20.82	19.654		
3,900.0	3,870.6	3,866.6	3,829.4	11.0	11.6	108.91	-356.4	-298.2	424.2	402.6	21.53	19.698		
4,000.0	3,969.4	3,965.5	3,926.7	11.4	12.0	108.89	-371.1	-308.0	439.1	416.8	22.24	19.739		
4,100.0	4,068.2	4,064.3	4,024.0	11.8	12.4	108.87	-385.7	-317.9	454.0	431.0	22.96	19.776		
4,200.0	4,167.0	4,163.2	4,121.3	12.1	12.8	108.84	-400.3	-327.7	468.9	445.2	23.67	19.809		
4,300.0	4,265.7	4,262.1	4,218.6	12.5	13.2	108.82	-414.9	-337.5	483.8	459.4	24.38	19.840		
4,400.0	4,364.5	4,361.0	4,315.9	12.9	13.6	108.81	-429.5	-347.3	498.7	473.6	25.10	19.868		
4,500.0	4,463.3	4,459.9	4,413.2	13.2	14.0	108.79	-444.2	-357.2	513.6	487.8	25.82	19.893		
4,600.0	4,562.1	4,558.8	4,510.5	13.6	14.4	108.77	-458.8	-367.0	528.5	502.0	26.53	19.917		
4,700.0	4,660.9	4,657.6	4,607.8	14.0	14.8	108.76	-473.4	-376.8	543.4	516.1	27.25	19.938		
4,800.0	4,759.6	4,756.5	4,705.1	14.4	15.2	108.74	-488.0	-386.7	558.3	530.3	27.97	19.959		
4,900.0	4,858.4	4,855.4	4,802.4	14.7	15.6	108.73	-502.6	-396.5	573.2	544.5	28.69	19.977		
5,000.0	4,957.2	4,954.3	4,899.7	15.1	16.0	108.72	-517.3	-406.3	588.1	558.7	29.41	19.994		

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18T-221 - Wellbore #1 - Plan #1 (7-31-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,056.0	5,053.2	4,997.0	15.5	16.4	108.70		-531.9	-416.1	603.0	572.9	30.14	20.010	
5,200.0	5,154.7	5,152.1	5,094.3	15.8	16.8	108.69		-546.5	-426.0	617.9	587.1	30.86	20.025	
5,300.0	5,253.5	5,250.9	5,191.6	16.2	17.2	108.68		-561.1	-435.8	632.8	601.2	31.58	20.039	
5,400.0	5,352.3	5,349.8	5,288.9	16.6	17.6	108.67		-575.8	-445.6	647.7	615.4	32.30	20.052	
5,500.0	5,451.1	5,462.9	5,400.6	17.0	17.9	108.82		-590.7	-455.7	661.6	628.6	32.98	20.059	
5,600.0	5,549.8	5,576.6	5,513.4	17.3	18.2	109.28		-602.0	-463.2	673.3	639.7	33.62	20.028	
5,700.0	5,648.9	5,690.4	5,626.9	17.6	18.4	110.07		-609.5	-468.3	682.4	648.2	34.19	19.959	
5,800.0	5,748.3	5,804.5	5,740.8	17.9	18.6	110.80		-613.4	-470.9	688.2	653.6	34.64	19.868	
5,900.0	5,848.0	5,911.7	5,848.0	18.1	18.8	111.40		-613.9	-471.3	691.0	656.0	35.02	19.733	
6,000.0	5,948.0	6,011.7	5,948.0	18.2	18.9	111.69		-613.9	-471.3	692.4	657.0	35.33	19.595	
6,100.0	6,048.0	6,111.7	6,048.0	18.4	19.0	-86.98		-613.9	-471.3	692.5	656.9	35.62	19.441	
6,200.0	6,148.0	6,211.7	6,148.0	18.5	19.2	-86.98		-613.9	-471.3	692.5	656.6	35.89	19.293	
6,300.0	6,248.0	6,308.3	6,244.5	18.6	19.3	-86.74		-611.0	-471.3	692.7	656.6	36.14	19.166	
6,400.0	6,348.0	6,400.0	6,335.2	18.8	19.3	-85.63		-597.5	-471.3	693.7	657.4	36.31	19.106	
6,500.0	6,447.9	6,491.1	6,423.0	18.9	19.2	-83.77		-573.5	-471.3	695.9	659.6	36.35	19.143	
6,600.0	6,546.5	6,578.4	6,503.9	18.9	19.1	-81.97		-540.9	-471.3	698.7	662.5	36.19	19.305	
6,700.0	6,642.3	6,663.9	6,579.1	18.8	18.9	-80.31		-500.1	-471.3	702.0	666.1	35.85	19.578	
6,800.0	6,733.5	6,750.0	6,649.6	18.6	18.6	-78.78		-450.9	-471.3	705.4	670.0	35.37	19.945	
6,900.0	6,818.5	6,830.6	6,710.3	18.3	18.4	-77.49		-397.9	-471.3	708.8	674.0	34.80	20.366	
7,000.0	6,896.1	6,912.3	6,765.7	18.1	18.2	-76.35		-338.0	-471.3	712.0	677.8	34.21	20.810	
7,100.0	6,964.7	6,993.0	6,813.9	17.8	17.9	-75.40		-273.2	-471.3	714.9	681.2	33.69	21.221	
7,200.0	7,023.2	7,073.1	6,854.7	17.6	17.7	-74.67		-204.3	-471.3	717.2	683.9	33.31	21.532	
7,300.0	7,070.7	7,150.0	6,886.9	17.5	17.5	-74.16		-134.6	-471.3	719.0	685.8	33.16	21.685	
7,400.0	7,106.3	7,232.0	6,913.3	17.5	17.4	-73.84		-56.9	-471.3	720.0	686.7	33.31	21.617	
7,500.0	7,129.4	7,311.2	6,930.8	17.7	17.3	-73.76		20.2	-471.3	720.3	686.5	33.80	21.313	
7,600.0	7,139.6	7,390.3	6,940.2	18.2	17.4	-73.89		98.8	-471.3	719.9	685.2	34.64	20.783	
7,679.8	7,141.6	7,456.9	6,941.9	18.7	17.8	-73.90		165.3	-471.3	719.8	684.3	35.54	20.254	
7,700.0	7,140.7	7,477.1	6,941.9	18.8	17.9	-73.97		185.5	-471.3	719.6	683.7	35.81	20.093	
7,800.0	7,141.4	7,577.1	6,942.0	19.6	18.7	-73.91		285.5	-471.3	719.7	682.4	37.37	19.261	
7,900.0	7,142.2	7,677.1	6,942.0	20.6	19.7	-73.86		385.5	-471.3	719.9	680.7	39.21	18.363	
8,000.0	7,142.9	7,777.1	6,942.1	21.7	20.9	-73.81		485.5	-471.3	720.1	678.8	41.29	17.439	
8,100.0	7,143.7	7,877.1	6,942.1	22.9	22.1	-73.75		585.5	-471.3	720.3	676.7	43.60	16.522	
8,200.0	7,144.4	7,977.1	6,942.2	24.2	23.4	-73.70		685.5	-471.3	720.5	674.4	46.08	15.635	
8,300.0	7,145.2	8,077.1	6,942.3	25.5	24.8	-73.65		785.5	-471.3	720.7	672.0	48.72	14.793	
8,400.0	7,145.9	8,177.0	6,942.3	27.0	26.3	-73.60		885.4	-471.3	720.9	669.4	51.49	14.001	
8,500.0	7,146.7	8,277.0	6,942.4	28.5	27.8	-73.54		985.4	-471.3	721.1	666.7	54.37	13.264	
8,600.0	7,147.4	8,377.0	6,942.4	30.0	29.3	-73.49		1,085.4	-471.3	721.3	664.0	57.34	12.580	
8,700.0	7,148.2	8,477.0	6,942.5	31.6	30.9	-73.44		1,185.4	-471.3	721.5	661.1	60.39	11.948	
8,800.0	7,148.9	8,577.0	6,942.5	33.2	32.5	-73.38		1,285.4	-471.3	721.7	658.2	63.50	11.365	
8,900.0	7,149.7	8,677.0	6,942.6	34.9	34.2	-73.33		1,385.4	-471.3	721.9	655.2	66.68	10.827	
9,000.0	7,150.4	8,777.0	6,942.6	36.5	35.9	-73.28		1,485.4	-471.3	722.1	652.2	69.90	10.331	
9,100.0	7,151.2	8,877.0	6,942.7	38.2	37.6	-73.22		1,585.4	-471.3	722.3	649.1	73.17	9.872	
9,200.0	7,151.9	8,977.0	6,942.7	40.0	39.3	-73.17		1,685.4	-471.3	722.5	646.0	76.47	9.449	
9,300.0	7,152.7	9,077.0	6,942.8	41.7	41.0	-73.12		1,785.4	-471.3	722.7	642.9	79.80	9.056	
9,400.0	7,153.4	9,177.0	6,942.8	43.4	42.8	-73.06		1,885.4	-471.3	722.9	639.8	83.16	8.693	
9,500.0	7,154.2	9,277.0	6,942.9	45.2	44.6	-73.01		1,985.4	-471.3	723.1	636.6	86.55	8.355	
9,600.0	7,154.9	9,377.0	6,942.9	47.0	46.3	-72.96		2,085.4	-471.3	723.3	633.4	89.96	8.041	
9,700.0	7,155.7	9,477.0	6,943.0	48.8	48.1	-72.91		2,185.4	-471.3	723.5	630.2	93.38	7.745	
9,800.0	7,156.4	9,577.0	6,943.0	50.6	49.9	-72.85		2,285.4	-471.3	723.7	626.9	96.83	7.478	
9,900.0	7,157.2	9,677.0	6,943.1	52.4	51.7	-72.80		2,385.4	-471.3	723.9	623.7	100.29	7.219	
10,000.0	7,157.9	9,777.0	6,943.1	54.2	53.6	-72.75		2,485.4	-471.3	724.2	620.4	103.76	6.979	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18T-221 - Wellbore #1 - Plan #1 (7-31-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	7,158.7	9,877.0	6,943.2	56.0	55.4	-72.69	-72.69	2,585.4	-471.3	724.4	617.1	107.24	6.755	
10,200.0	7,159.4	9,977.0	6,943.2	57.8	57.2	-72.64	-72.64	2,685.4	-471.3	724.6	613.8	110.73	6.544	
10,300.0	7,160.2	10,077.0	6,943.3	59.7	59.0	-72.59	-72.59	2,785.4	-471.3	724.8	610.5	114.23	6.345	
10,400.0	7,160.9	10,177.0	6,943.3	61.5	60.9	-72.54	-72.54	2,885.4	-471.3	725.0	607.2	117.74	6.157	
10,500.0	7,161.7	10,277.0	6,943.4	63.4	62.7	-72.48	-72.48	2,985.4	-471.3	725.2	603.9	121.26	5.981	
10,600.0	7,162.4	10,377.0	6,943.5	65.2	64.6	-72.43	-72.43	3,085.4	-471.3	725.4	600.6	124.78	5.813	
10,700.0	7,163.2	10,477.0	6,943.5	67.0	66.4	-72.38	-72.38	3,185.4	-471.3	725.6	597.3	128.31	5.655	
10,800.0	7,163.9	10,577.0	6,943.6	68.9	68.3	-72.33	-72.33	3,285.4	-471.3	725.8	594.0	131.85	5.505	
10,900.0	7,164.7	10,677.0	6,943.6	70.8	70.1	-72.27	-72.27	3,385.4	-471.3	726.0	590.7	135.39	5.363	
11,000.0	7,165.4	10,777.0	6,943.7	72.6	72.0	-72.22	-72.22	3,485.4	-471.3	726.3	587.3	138.93	5.227	
11,100.0	7,166.2	10,877.0	6,943.7	74.5	73.9	-72.17	-72.17	3,585.4	-471.3	726.5	584.0	142.48	5.099	
11,200.0	7,166.9	10,977.0	6,943.8	76.4	75.7	-72.12	-72.12	3,685.4	-471.3	726.7	580.7	146.03	4.976	
11,300.0	7,167.7	11,077.0	6,943.8	78.2	77.6	-72.06	-72.06	3,785.4	-471.3	726.9	577.3	149.58	4.860	
11,400.0	7,168.4	11,177.0	6,943.9	80.1	79.5	-72.01	-72.01	3,885.4	-471.3	727.1	574.0	153.14	4.748	
11,500.0	7,169.2	11,277.0	6,943.9	82.0	81.4	-71.96	-71.96	3,985.4	-471.3	727.3	570.6	156.69	4.642	
11,600.0	7,169.9	11,377.0	6,944.0	83.8	83.2	-71.91	-71.91	4,085.4	-471.3	727.5	567.3	160.25	4.540	
11,609.6	7,170.0	11,386.5	6,944.0	84.0	83.4	-71.90	-71.90	4,094.9	-471.3	727.6	567.0	160.59	4.530 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18T-321 - Wellbore #1 - Plan #1 (7-31-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-90.00	-90.00	0.0	-89.2	89.2				
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	-90.00	0.0	-89.2	89.2	89.0	0.22	397.073	
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	-90.00	0.0	-89.2	89.2	88.6	0.67	132.358	
300.0	300.0	300.0	300.0	0.6	0.6	-90.00	-90.00	0.0	-89.2	89.2	88.1	1.12	79.415	
400.0	400.0	400.0	400.0	0.8	0.8	-90.00	-90.00	0.0	-89.2	89.2	87.7	1.57	56.725	
500.0	500.0	500.0	500.0	1.0	1.0	-90.00	-90.00	0.0	-89.2	89.2	87.2	2.02	44.119	
600.0	600.0	600.0	600.0	1.2	1.2	-90.00	-90.00	0.0	-89.2	89.2	86.8	2.47	36.098	
700.0	700.0	700.0	700.0	1.5	1.5	-90.00	-90.00	0.0	-89.2	89.2	86.3	2.92	30.544	
800.0	800.0	800.0	800.0	1.7	1.7	-90.00	-90.00	0.0	-89.2	89.2	85.9	3.37	26.472	
900.0	900.0	900.0	900.0	1.9	1.9	-90.00	-90.00	0.0	-89.2	89.2	85.4	3.82	23.357	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-90.00	-90.00	0.0	-89.2	89.2	85.0	4.27	20.899 CC, ES	
1,100.0	1,100.0	1,097.9	1,097.9	2.4	2.3	-90.79	-90.79	-1.3	-90.4	90.4	85.7	4.69	19.270	
1,200.0	1,200.0	1,195.6	1,195.6	2.6	2.5	-93.05	-93.05	-5.0	-93.7	93.9	88.8	5.09	18.435	
1,300.0	1,300.0	1,293.0	1,292.5	2.8	2.7	103.09	103.09	-11.2	-99.2	100.5	95.0	5.48	18.333	
1,400.0	1,399.8	1,389.8	1,388.6	3.0	2.9	101.38	101.38	-19.8	-106.8	110.4	104.6	5.86	18.850	
1,500.0	1,499.5	1,485.9	1,483.6	3.1	3.2	100.44	100.44	-30.8	-116.5	123.6	117.4	6.26	19.733	
1,600.0	1,598.7	1,583.8	1,579.9	3.4	3.4	100.34	100.34	-43.7	-128.0	139.3	132.6	6.71	20.754	
1,700.0	1,697.5	1,682.4	1,677.0	3.6	3.8	101.43	101.43	-56.8	-139.6	155.7	148.5	7.20	21.612	
1,800.0	1,796.3	1,781.0	1,774.0	3.9	4.1	102.58	102.58	-69.9	-151.3	172.2	164.4	7.73	22.273	
1,900.0	1,895.1	1,879.6	1,871.0	4.1	4.4	103.52	103.52	-83.0	-162.9	188.7	180.4	8.29	22.775	
2,000.0	1,993.9	1,978.1	1,968.0	4.4	4.8	104.32	104.32	-96.2	-174.6	205.3	196.5	8.87	23.157	
2,100.0	2,092.6	2,076.7	2,065.0	4.7	5.1	104.99	104.99	-109.3	-186.2	222.0	212.5	9.47	23.448	
2,200.0	2,191.4	2,175.3	2,162.0	5.1	5.5	105.57	105.57	-122.4	-197.8	238.6	228.5	10.08	23.669	
2,300.0	2,290.2	2,273.9	2,259.0	5.4	5.9	106.07	106.07	-135.5	-209.5	255.3	244.6	10.71	23.837	
2,400.0	2,389.0	2,372.4	2,356.0	5.7	6.2	106.51	106.51	-148.6	-221.1	272.0	260.6	11.35	23.965	
2,500.0	2,487.8	2,471.0	2,453.0	6.0	6.6	106.90	106.90	-161.7	-232.7	288.7	276.7	12.00	24.062	
2,600.0	2,586.5	2,569.6	2,550.0	6.4	7.0	107.25	107.25	-174.8	-244.4	305.4	292.8	12.65	24.135	
2,700.0	2,685.3	2,668.2	2,647.0	6.7	7.4	107.56	107.56	-188.0	-256.0	322.1	308.8	13.32	24.190	
2,800.0	2,784.1	2,766.7	2,744.0	7.1	7.8	107.85	107.85	-201.1	-267.7	338.9	324.9	13.99	24.230	
2,900.0	2,882.9	2,865.3	2,841.0	7.4	8.2	108.10	108.10	-214.2	-279.3	355.6	341.0	14.66	24.259	
3,000.0	2,981.6	2,963.9	2,938.0	7.8	8.5	108.33	108.33	-227.3	-290.9	372.4	357.0	15.34	24.279	
3,100.0	3,080.4	3,062.5	3,035.0	8.1	8.9	108.54	108.54	-240.4	-302.6	389.1	373.1	16.02	24.292	
3,200.0	3,179.2	3,161.0	3,132.0	8.5	9.3	108.74	108.74	-253.5	-314.2	405.9	389.2	16.70	24.299	
3,300.0	3,278.0	3,259.6	3,229.0	8.9	9.7	108.92	108.92	-266.7	-325.8	422.7	405.3	17.39	24.302	
3,400.0	3,376.8	3,358.2	3,326.0	9.2	10.1	109.08	109.08	-279.8	-337.5	439.4	421.3	18.08	24.302	
3,500.0	3,475.5	3,456.8	3,423.0	9.6	10.5	109.24	109.24	-292.9	-349.1	456.2	437.4	18.77	24.299	
3,600.0	3,574.3	3,555.4	3,520.0	9.9	10.9	109.38	109.38	-306.0	-360.8	473.0	453.5	19.47	24.294	
3,700.0	3,673.1	3,653.9	3,617.1	10.3	11.3	109.51	109.51	-319.1	-372.4	489.8	469.6	20.17	24.287	
3,800.0	3,771.9	3,752.5	3,714.1	10.7	11.7	109.63	109.63	-332.2	-384.0	506.5	485.7	20.86	24.278	
3,900.0	3,870.6	3,851.1	3,811.1	11.0	12.1	109.75	109.75	-345.4	-395.7	523.3	501.8	21.56	24.269	
4,000.0	3,969.4	3,949.7	3,908.1	11.4	12.5	109.86	109.86	-358.5	-407.3	540.1	517.8	22.26	24.259	
4,100.0	4,068.2	4,048.2	4,005.1	11.8	12.9	109.96	109.96	-371.6	-418.9	556.9	533.9	22.97	24.248	
4,200.0	4,167.0	4,146.8	4,102.1	12.1	13.3	110.06	110.06	-384.7	-430.6	573.7	550.0	23.67	24.237	
4,300.0	4,265.7	4,245.4	4,199.1	12.5	13.7	110.15	110.15	-397.8	-442.2	590.5	566.1	24.37	24.226	
4,400.0	4,364.5	4,344.0	4,296.1	12.9	14.1	110.23	110.23	-410.9	-453.8	607.3	582.2	25.08	24.214	
4,500.0	4,463.3	4,442.5	4,393.1	13.2	14.5	110.31	110.31	-424.1	-465.5	624.1	598.3	25.78	24.203	
4,600.0	4,562.1	4,541.1	4,490.1	13.6	14.9	110.39	110.39	-437.2	-477.1	640.8	614.4	26.49	24.191	
4,700.0	4,660.9	4,639.7	4,587.1	14.0	15.3	110.46	110.46	-450.3	-488.8	657.6	630.4	27.20	24.179	
4,800.0	4,759.6	4,738.3	4,684.1	14.4	15.7	110.53	110.53	-463.4	-500.4	674.4	646.5	27.91	24.167	
4,900.0	4,858.4	4,836.8	4,781.1	14.7	16.1	110.60	110.60	-476.5	-512.0	691.2	662.6	28.62	24.156	
5,000.0	4,957.2	4,935.4	4,878.1	15.1	16.5	110.66	110.66	-489.6	-523.7	708.0	678.7	29.33	24.144	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18T-321 - Wellbore #1 - Plan #1 (7-31-14)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,056.0	5,034.0	4,975.1	15.5	16.9	110.72	-502.8	-535.3	724.8	694.8	30.03	24.133	
5,200.0	5,154.7	5,132.6	5,072.1	15.8	17.3	110.78	-515.9	-546.9	741.6	710.9	30.75	24.121	
5,300.0	5,253.5	5,231.1	5,169.1	16.2	17.7	110.83	-529.0	-558.6	758.4	727.0	31.46	24.110	
5,400.0	5,352.3	5,329.7	5,266.1	16.6	18.1	110.89	-542.1	-570.2	775.2	743.1	32.17	24.100	
5,500.0	5,451.1	5,428.3	5,363.1	17.0	18.5	110.94	-555.2	-581.9	792.0	759.1	32.88	24.089	
5,600.0	5,549.8	5,526.9	5,460.1	17.3	18.9	110.98	-568.3	-593.5	808.8	775.2	33.59	24.078	
5,700.0	5,648.9	5,640.4	5,572.0	17.6	19.3	111.26	-582.6	-606.1	824.4	790.2	34.27	24.060	
5,800.0	5,748.3	5,761.6	5,692.2	17.9	19.6	111.46	-594.2	-616.4	836.3	801.5	34.79	24.036	
5,900.0	5,848.0	5,883.6	5,813.8	18.1	19.9	111.59	-602.1	-623.4	844.3	809.1	35.25	23.953	
6,000.0	5,948.0	6,006.1	5,936.2	18.2	20.1	111.66	-606.1	-627.0	848.3	812.7	35.62	23.814	
6,100.0	6,048.0	6,117.9	6,048.0	18.4	20.2	-87.04	-606.6	-627.4	848.9	812.9	35.94	23.617	
6,200.0	6,148.0	6,217.9	6,148.0	18.5	20.3	-87.04	-606.6	-627.4	848.9	812.7	36.21	23.443	
6,300.0	6,248.0	6,317.9	6,248.0	18.6	20.5	-87.04	-606.6	-627.4	848.9	812.4	36.48	23.268	
6,400.0	6,348.0	6,413.7	6,343.7	18.8	20.6	-86.83	-603.4	-627.4	849.1	812.3	36.73	23.116	
6,500.0	6,447.9	6,506.6	6,435.4	18.9	20.6	-86.05	-589.4	-627.4	849.8	812.9	36.88	23.044	
6,600.0	6,546.5	6,600.0	6,525.3	18.9	20.5	-85.28	-564.2	-627.4	850.7	813.8	36.81	23.108	
6,700.0	6,642.3	6,688.8	6,607.2	18.8	20.4	-84.61	-530.2	-627.4	851.6	815.0	36.56	23.295	
6,800.0	6,733.5	6,778.4	6,685.4	18.6	20.2	-84.01	-486.5	-627.4	852.4	816.3	36.15	23.581	
6,900.0	6,818.5	6,867.3	6,757.4	18.3	19.9	-83.51	-434.4	-627.4	853.2	817.6	35.65	23.934	
7,000.0	6,896.1	6,955.6	6,822.4	18.1	19.7	-83.11	-374.7	-627.4	853.9	818.8	35.13	24.310	
7,100.0	6,964.7	7,043.4	6,879.8	17.8	19.4	-82.81	-308.3	-627.4	854.5	819.8	34.66	24.654	
7,200.0	7,023.2	7,131.0	6,929.1	17.6	19.1	-82.62	-236.0	-627.4	854.8	820.5	34.33	24.898	
7,300.0	7,070.7	7,218.3	6,969.7	17.5	18.9	-82.55	-158.7	-627.4	855.0	820.7	34.23	24.980	
7,400.0	7,106.3	7,305.7	7,001.2	17.5	18.6	-82.58	-77.3	-627.4	854.9	820.5	34.40	24.850	
7,500.0	7,129.4	7,393.1	7,023.3	17.7	18.4	-82.73	7.2	-627.4	854.6	819.7	34.91	24.480	
7,600.0	7,139.6	7,480.8	7,035.6	18.2	18.2	-82.99	94.0	-627.4	854.1	818.4	35.76	23.884	
7,681.8	7,141.6	7,553.7	7,038.2	18.7	18.1	-83.04	166.8	-627.4	854.0	817.3	36.70	23.268	
7,700.0	7,140.7	7,571.9	7,038.1	18.8	18.2	-83.10	185.0	-627.4	853.9	817.0	36.95	23.113	
7,800.0	7,141.4	7,671.9	7,037.8	19.6	19.1	-83.03	285.0	-627.4	854.1	815.5	38.51	22.175	
7,900.0	7,142.2	7,771.9	7,037.4	20.6	20.1	-82.96	385.0	-627.4	854.2	813.8	40.37	21.158	
8,000.0	7,142.9	7,871.9	7,037.1	21.7	21.3	-82.89	485.0	-627.4	854.3	811.8	42.49	20.106	
8,100.0	7,143.7	7,971.9	7,036.8	22.9	22.5	-82.81	585.0	-627.4	854.5	809.6	44.83	19.058	
8,200.0	7,144.4	8,071.9	7,036.4	24.2	23.8	-82.74	685.0	-627.4	854.6	807.2	47.37	18.042	
8,300.0	7,145.2	8,171.9	7,036.1	25.5	25.2	-82.67	785.0	-627.4	854.7	804.7	50.06	17.073	
8,400.0	7,145.9	8,271.8	7,035.8	27.0	26.7	-82.60	885.0	-627.4	854.9	802.0	52.89	16.162	
8,500.0	7,146.7	8,371.8	7,035.4	28.5	28.1	-82.53	985.0	-627.4	855.0	799.2	55.84	15.312	
8,600.0	7,147.4	8,471.8	7,035.1	30.0	29.7	-82.45	1,085.0	-627.4	855.1	796.3	58.88	14.522	
8,700.0	7,148.2	8,571.8	7,034.8	31.6	31.3	-82.38	1,185.0	-627.4	855.3	793.3	62.01	13.792	
8,800.0	7,148.9	8,671.8	7,034.5	33.2	32.9	-82.31	1,285.0	-627.4	855.4	790.2	65.21	13.118	
8,900.0	7,149.7	8,771.8	7,034.1	34.9	34.5	-82.24	1,384.9	-627.4	855.6	787.1	68.47	12.495	
9,000.0	7,150.4	8,871.8	7,033.8	36.5	36.2	-82.17	1,484.9	-627.4	855.7	783.9	71.78	11.921	
9,100.0	7,151.2	8,971.8	7,033.5	38.2	37.9	-82.10	1,584.9	-627.4	855.9	780.7	75.14	11.390	
9,200.0	7,151.9	9,071.8	7,033.1	40.0	39.6	-82.02	1,684.9	-627.4	856.0	777.5	78.54	10.899	
9,300.0	7,152.7	9,171.8	7,032.8	41.7	41.3	-81.95	1,784.9	-627.4	856.2	774.2	81.97	10.445	
9,400.0	7,153.4	9,271.8	7,032.5	43.4	43.0	-81.88	1,884.9	-627.4	856.3	770.9	85.43	10.024	
9,500.0	7,154.2	9,371.8	7,032.1	45.2	44.8	-81.81	1,984.9	-627.4	856.5	767.6	88.92	9.632	
9,600.0	7,154.9	9,471.8	7,031.8	47.0	46.6	-81.74	2,084.9	-627.4	856.6	764.2	92.43	9.268	
9,700.0	7,155.7	9,571.8	7,031.5	48.8	48.3	-81.67	2,184.9	-627.4	856.8	760.8	95.96	8.929	
9,800.0	7,156.4	9,671.8	7,031.1	50.6	50.1	-81.59	2,284.9	-627.4	856.9	757.4	99.51	8.612	
9,900.0	7,157.2	9,771.8	7,030.8	52.4	51.9	-81.52	2,384.9	-627.4	857.1	754.0	103.07	8.315	
10,000.0	7,157.9	9,871.8	7,030.5	54.2	53.7	-81.45	2,484.9	-627.4	857.3	750.6	106.65	8.038	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18T-321 - Wellbore #1 - Plan #1 (7-31-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor			
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
10,100.0	7,158.7	9,971.7	7,030.1	56.0	55.5	-81.38	2,584.9	-627.4	857.4	747.2	110.24	7.778		
10,200.0	7,159.4	10,071.7	7,029.8	57.8	57.4	-81.31	2,684.9	-627.4	857.6	743.7	113.85	7.533		
10,300.0	7,160.2	10,171.7	7,029.5	59.7	59.2	-81.24	2,784.9	-627.4	857.8	740.3	117.46	7.302		
10,400.0	7,160.9	10,271.7	7,029.1	61.5	61.0	-81.16	2,884.9	-627.4	857.9	736.8	121.08	7.085		
10,500.0	7,161.7	10,371.7	7,028.8	63.4	62.9	-81.09	2,984.8	-627.4	858.1	733.4	124.71	6.880		
10,600.0	7,162.4	10,471.7	7,028.5	65.2	64.7	-81.02	3,084.8	-627.4	858.3	729.9	128.35	6.687		
10,700.0	7,163.2	10,571.7	7,028.2	67.0	66.5	-80.95	3,184.8	-627.4	858.4	726.4	132.00	6.503		
10,800.0	7,163.9	10,671.7	7,027.8	68.9	68.4	-80.88	3,284.8	-627.4	858.6	722.9	135.65	6.330		
10,900.0	7,164.7	10,771.7	7,027.5	70.8	70.2	-80.81	3,384.8	-627.4	858.8	719.5	139.30	6.165		
11,000.0	7,165.4	10,871.7	7,027.2	72.6	72.1	-80.74	3,484.8	-627.4	858.9	716.0	142.97	6.008		
11,100.0	7,166.2	10,971.7	7,026.8	74.5	74.0	-80.67	3,584.8	-627.4	859.1	712.5	146.63	5.859		
11,200.0	7,166.9	11,071.7	7,026.5	76.4	75.8	-80.59	3,684.8	-627.4	859.3	709.0	150.30	5.717		
11,300.0	7,167.7	11,171.7	7,026.2	78.2	77.7	-80.52	3,784.8	-627.4	859.5	705.5	153.97	5.582		
11,400.0	7,168.4	11,271.7	7,025.8	80.1	79.6	-80.45	3,884.8	-627.4	859.6	702.0	157.65	5.453		
11,500.0	7,169.2	11,371.7	7,025.5	82.0	81.4	-80.38	3,984.8	-627.4	859.8	698.5	161.33	5.330		
11,600.0	7,169.9	11,471.7	7,025.2	83.8	83.3	-80.31	4,084.8	-627.4	860.0	695.0	165.01	5.212		
11,609.6	7,170.0	11,481.2	7,025.1	84.0	83.5	-80.30	4,094.3	-627.4	860.0	694.7	165.36	5.201 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18T-401 - Wellbore #1 - Plan #1 (7-31-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	-90.00	0.0	-119.9	119.9					
100.0	100.0	99.0	99.0	0.1	0.1	-90.00	0.0	-119.9	119.9	119.7	0.22	536.243		
200.0	200.0	199.0	199.0	0.3	0.3	-90.00	0.0	-119.9	119.9	119.3	0.67	178.450		
300.0	300.0	299.0	299.0	0.6	0.6	-90.00	0.0	-119.9	119.9	118.8	1.12	106.927		
400.0	400.0	399.0	399.0	0.8	0.8	-90.00	0.0	-119.9	119.9	118.4	1.57	76.333		
500.0	500.0	499.0	499.0	1.0	1.0	-90.00	0.0	-119.9	119.9	117.9	2.02	59.351		
600.0	600.0	599.0	599.0	1.2	1.2	-90.00	0.0	-119.9	119.9	117.5	2.47	48.550		
700.0	700.0	699.0	699.0	1.5	1.5	-90.00	0.0	-119.9	119.9	117.0	2.92	41.075		
800.0	800.0	799.0	799.0	1.7	1.7	-90.00	0.0	-119.9	119.9	116.6	3.37	35.595 CC, ES		
900.0	900.0	896.0	896.0	1.9	1.9	-90.51	-1.1	-121.1	121.2	117.4	3.79	31.974		
1,000.0	1,000.0	992.7	992.6	2.1	2.1	-91.99	-4.3	-124.7	125.0	120.8	4.20	29.782		
1,100.0	1,100.0	1,089.0	1,088.5	2.4	2.3	-94.27	-9.8	-130.7	131.5	126.9	4.62	28.491		
1,200.0	1,200.0	1,184.6	1,183.5	2.6	2.5	-97.08	-17.3	-139.1	141.0	135.9	5.05	27.901		
1,300.0	1,300.0	1,279.5	1,277.3	2.8	2.7	-98.91	-26.8	-149.6	153.8	148.4	5.46	28.190		
1,400.0	1,399.8	1,376.3	1,372.5	3.0	3.0	97.16	-38.3	-162.4	169.7	163.8	5.87	28.935		
1,500.0	1,499.5	1,474.9	1,469.5	3.1	3.4	96.65	-50.3	-175.6	186.3	180.0	6.30	29.591		
1,600.0	1,598.7	1,573.4	1,566.4	3.4	3.7	97.15	-62.2	-188.8	203.3	196.6	6.76	30.076		
1,700.0	1,697.5	1,671.7	1,663.1	3.6	4.1	98.48	-74.0	-201.9	220.8	213.6	7.27	30.381		
1,800.0	1,796.3	1,770.0	1,759.8	3.9	4.4	99.85	-85.9	-215.1	238.5	230.7	7.81	30.536		
1,900.0	1,895.1	1,868.3	1,856.4	4.1	4.8	101.04	-97.8	-228.2	256.3	247.9	8.38	30.591		
2,000.0	1,993.9	1,966.5	1,953.1	4.4	5.2	102.07	-109.7	-241.4	274.2	265.2	8.97	30.578		
2,100.0	2,092.6	2,064.8	2,049.8	4.7	5.5	102.98	-121.5	-254.5	292.2	282.6	9.57	30.520		
2,200.0	2,191.4	2,163.1	2,146.4	5.1	5.9	103.78	-133.4	-267.7	310.2	300.0	10.19	30.433		
2,300.0	2,290.2	2,261.4	2,243.1	5.4	6.3	104.50	-145.3	-280.8	328.3	317.5	10.82	30.329		
2,400.0	2,389.0	2,359.6	2,339.8	5.7	6.7	105.13	-157.2	-294.0	346.4	334.9	11.46	30.214		
2,500.0	2,487.8	2,457.9	2,436.4	6.0	7.1	105.71	-169.0	-307.1	364.6	352.5	12.11	30.095		
2,600.0	2,586.5	2,556.2	2,533.1	6.4	7.5	106.23	-180.9	-320.3	382.8	370.0	12.77	29.975		
2,700.0	2,685.3	2,654.5	2,629.7	6.7	7.9	106.70	-192.8	-333.4	401.0	387.6	13.43	29.855		
2,800.0	2,784.1	2,752.7	2,726.4	7.1	8.3	107.14	-204.7	-346.6	419.2	405.1	14.10	29.738		
2,900.0	2,882.9	2,851.0	2,823.1	7.4	8.7	107.53	-216.5	-359.7	437.5	422.7	14.77	29.625		
3,000.0	2,981.6	2,949.3	2,919.7	7.8	9.1	107.90	-228.4	-372.8	455.8	440.4	15.44	29.516		
3,100.0	3,080.4	3,047.6	3,016.4	8.1	9.5	108.23	-240.3	-386.0	474.1	458.0	16.12	29.411		
3,200.0	3,179.2	3,145.8	3,113.1	8.5	9.9	108.54	-252.2	-399.1	492.4	475.6	16.80	29.310		
3,300.0	3,278.0	3,244.1	3,209.7	8.9	10.3	108.83	-264.0	-412.3	510.8	493.3	17.48	29.214		
3,400.0	3,376.8	3,342.4	3,306.4	9.2	10.7	109.10	-275.9	-425.4	529.1	510.9	18.17	29.122		
3,500.0	3,475.5	3,440.7	3,403.1	9.6	11.1	109.35	-287.8	-438.6	547.4	528.6	18.86	29.034		
3,600.0	3,574.3	3,538.9	3,499.7	9.9	11.5	109.59	-299.7	-451.7	565.8	546.3	19.54	28.951		
3,700.0	3,673.1	3,637.2	3,596.4	10.3	11.9	109.81	-311.5	-464.9	584.2	564.0	20.23	28.871		
3,800.0	3,771.9	3,735.5	3,693.0	10.7	12.3	110.02	-323.4	-478.0	602.6	581.6	20.93	28.795		
3,900.0	3,870.6	3,833.7	3,789.7	11.0	12.7	110.21	-335.3	-491.2	621.0	599.3	21.62	28.723		
4,000.0	3,969.4	3,932.0	3,886.4	11.4	13.1	110.39	-347.2	-504.3	639.3	617.0	22.31	28.654		
4,100.0	4,068.2	4,030.3	3,983.0	11.8	13.5	110.57	-359.0	-517.5	657.7	634.7	23.01	28.588		
4,200.0	4,167.0	4,128.6	4,079.7	12.1	14.0	110.73	-370.9	-530.6	676.2	652.5	23.70	28.525		
4,300.0	4,265.7	4,226.8	4,176.4	12.5	14.4	110.88	-382.8	-543.8	694.6	670.2	24.40	28.465		
4,400.0	4,364.5	4,325.1	4,273.0	12.9	14.8	111.03	-394.7	-556.9	713.0	687.9	25.10	28.407		
4,500.0	4,463.3	4,423.4	4,369.7	13.2	15.2	111.17	-406.5	-570.1	731.4	705.6	25.80	28.352		
4,600.0	4,562.1	4,521.7	4,466.4	13.6	15.6	111.30	-418.4	-583.2	749.8	723.3	26.50	28.299		
4,700.0	4,660.9	4,619.9	4,563.0	14.0	16.0	111.43	-430.3	-596.4	768.3	741.1	27.20	28.249		
4,800.0	4,759.6	4,718.2	4,659.7	14.4	16.4	111.55	-442.2	-609.5	786.7	758.8	27.90	28.200		
4,900.0	4,858.4	4,816.5	4,756.3	14.7	16.8	111.66	-454.0	-622.7	805.1	776.5	28.60	28.154		
5,000.0	4,957.2	4,914.8	4,853.0	15.1	17.2	111.77	-465.9	-635.8	823.6	794.3	29.30	28.109		

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18T-401 - Wellbore #1 - Plan #1 (7-31-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,056.0	5,013.0	4,949.7	15.5	17.6	111.88		-477.8	-649.0	842.0	812.0	30.00	28.066	
5,200.0	5,154.7	5,111.3	5,046.3	15.8	18.0	111.98		-489.7	-662.1	860.4	829.7	30.70	28.025	
5,300.0	5,253.5	5,209.6	5,143.0	16.2	18.4	112.08		-501.5	-675.3	878.9	847.5	31.41	27.985	
5,400.0	5,352.3	5,307.9	5,239.7	16.6	18.8	112.17		-513.4	-688.4	897.3	865.2	32.11	27.947	
5,500.0	5,451.1	5,406.1	5,336.3	17.0	19.2	112.26		-525.3	-701.6	915.8	883.0	32.81	27.910	
5,600.0	5,549.8	5,504.4	5,433.0	17.3	19.7	112.34		-537.2	-714.7	934.2	900.7	33.52	27.875	
5,700.0	5,648.9	5,602.8	5,529.8	17.6	20.1	112.65		-549.0	-727.9	952.1	917.9	34.21	27.832	
5,800.0	5,748.3	5,701.4	5,626.7	17.9	20.5	112.76		-561.0	-741.1	968.6	933.8	34.81	27.827	
5,900.0	5,848.0	5,812.8	5,736.4	18.1	20.9	112.62		-574.1	-755.6	983.5	948.2	35.37	27.811	
6,000.0	5,948.0	5,943.4	5,865.7	18.2	21.2	112.31		-586.3	-769.1	994.6	958.8	35.81	27.772 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18Y-241 - Wellbore #1 - Plan #1 (7-31-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-90.01	-90.01	0.0	-30.7	30.7				
100.0	100.0	100.0	100.0	0.1	0.1	-90.01	-90.01	0.0	-30.7	30.7	30.5	0.22	136.494	
200.0	200.0	200.0	200.0	0.3	0.3	-90.01	-90.01	0.0	-30.7	30.7	30.0	0.67	45.498	
300.0	300.0	300.0	300.0	0.6	0.6	-90.01	-90.01	0.0	-30.7	30.7	29.6	1.12	27.299	
400.0	400.0	400.0	400.0	0.8	0.8	-90.01	-90.01	0.0	-30.7	30.7	29.1	1.57	19.499	
500.0	500.0	500.0	500.0	1.0	1.0	-90.01	-90.01	0.0	-30.7	30.7	28.7	2.02	15.166	
600.0	600.0	600.0	600.0	1.2	1.2	-90.01	-90.01	0.0	-30.7	30.7	28.2	2.47	12.409	
700.0	700.0	700.0	700.0	1.5	1.5	-90.01	-90.01	0.0	-30.7	30.7	27.8	2.92	10.500	
800.0	800.0	800.0	800.0	1.7	1.7	-90.01	-90.01	0.0	-30.7	30.7	27.3	3.37	9.100	
900.0	900.0	900.0	900.0	1.9	1.9	-90.01	-90.01	0.0	-30.7	30.7	26.9	3.82	8.029	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-90.01	-90.01	0.0	-30.7	30.7	26.4	4.27	7.184	
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	-90.01	-90.01	0.0	-30.7	30.7	26.0	4.72	6.500	
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	-90.01	-90.01	0.0	-30.7	30.7	25.5	5.17	5.935 CC, ES	
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	111.72	111.72	0.0	-30.7	31.3	25.7	5.59	5.596	
1,400.0	1,399.8	1,399.8	1,399.8	3.0	3.0	120.00	120.00	0.0	-30.7	33.6	27.6	5.99	5.607	
1,500.0	1,499.5	1,500.1	1,500.1	3.1	3.2	128.96	128.96	-1.7	-30.4	37.8	31.5	6.36	5.944	
1,600.0	1,598.7	1,600.6	1,600.4	3.4	3.4	135.41	135.41	-7.0	-29.7	43.3	36.5	6.72	6.440	
1,700.0	1,697.5	1,701.4	1,700.8	3.6	3.6	139.52	139.52	-15.7	-28.4	49.2	42.1	7.10	6.930	
1,800.0	1,796.3	1,802.4	1,801.1	3.9	3.8	140.22	140.22	-27.9	-26.6	53.3	45.8	7.52	7.093	
1,900.0	1,895.1	1,902.9	1,900.4	4.1	4.0	138.52	138.52	-43.0	-24.3	55.6	47.7	7.98	6.969	
2,000.0	1,993.9	2,002.9	1,999.2	4.4	4.3	136.71	136.71	-58.3	-22.1	57.8	49.3	8.48	6.816	
2,100.0	2,092.6	2,102.8	2,097.9	4.7	4.5	135.03	135.03	-73.6	-19.8	60.0	51.0	9.00	6.664	
2,200.0	2,191.4	2,202.8	2,196.7	5.1	4.8	133.47	133.47	-88.8	-17.6	62.2	52.7	9.55	6.516	
2,300.0	2,290.2	2,302.8	2,295.5	5.4	5.1	132.03	132.03	-104.1	-15.3	64.5	54.4	10.13	6.374	
2,400.0	2,389.0	2,402.7	2,394.2	5.7	5.4	130.68	130.68	-119.4	-13.1	66.9	56.1	10.72	6.238	
2,500.0	2,487.8	2,502.7	2,493.0	6.0	5.7	129.42	129.42	-134.7	-10.8	69.2	57.9	11.33	6.111	
2,600.0	2,586.5	2,602.6	2,591.7	6.4	6.1	128.25	128.25	-150.0	-8.6	71.6	59.7	11.96	5.991	
2,700.0	2,685.3	2,702.6	2,690.5	6.7	6.4	127.16	127.16	-165.3	-6.3	74.1	61.5	12.60	5.878	
2,800.0	2,784.1	2,802.6	2,789.3	7.1	6.7	126.13	126.13	-180.6	-4.1	76.5	63.3	13.25	5.774	
2,900.0	2,882.9	2,902.5	2,888.0	7.4	7.0	125.17	125.17	-195.9	-1.8	79.0	65.1	13.91	5.676	
3,000.0	2,981.6	3,002.5	2,986.8	7.8	7.4	124.26	124.26	-211.1	0.4	81.5	66.9	14.59	5.586	
3,100.0	3,080.4	3,102.4	3,085.5	8.1	7.7	123.41	123.41	-226.4	2.7	84.0	68.7	15.27	5.501	
3,200.0	3,179.2	3,202.4	3,184.3	8.5	8.1	122.61	122.61	-241.7	5.0	86.5	70.6	15.95	5.423	
3,300.0	3,278.0	3,302.4	3,283.1	8.9	8.4	121.86	121.86	-257.0	7.2	89.1	72.4	16.65	5.350	
3,400.0	3,376.8	3,402.3	3,381.8	9.2	8.8	121.15	121.15	-272.3	9.5	91.6	74.3	17.35	5.282	
3,500.0	3,475.5	3,502.3	3,480.6	9.6	9.1	120.47	120.47	-287.6	11.7	94.2	76.2	18.05	5.219	
3,600.0	3,574.3	3,602.2	3,579.3	9.9	9.5	119.84	119.84	-302.9	14.0	96.8	78.0	18.76	5.160	
3,700.0	3,673.1	3,702.2	3,678.1	10.3	9.8	119.23	119.23	-318.2	16.2	99.4	79.9	19.47	5.104	
3,800.0	3,771.9	3,802.2	3,776.9	10.7	10.2	118.66	118.66	-333.5	18.5	102.0	81.8	20.19	5.053	
3,900.0	3,870.6	3,902.1	3,875.6	11.0	10.5	118.11	118.11	-348.7	20.7	104.6	83.7	20.91	5.004	
4,000.0	3,969.4	4,002.1	3,974.4	11.4	10.9	117.60	117.60	-364.0	23.0	107.3	85.6	21.63	4.959	
4,100.0	4,068.2	4,102.0	4,073.1	11.8	11.3	117.10	117.10	-379.3	25.2	109.9	87.5	22.35	4.916	
4,200.0	4,167.0	4,202.0	4,171.9	12.1	11.6	116.63	116.63	-394.6	27.5	112.5	89.5	23.08	4.876	
4,300.0	4,265.7	4,302.0	4,270.6	12.5	12.0	116.18	116.18	-409.9	29.7	115.2	91.4	23.81	4.838	
4,400.0	4,364.5	4,401.9	4,369.4	12.9	12.3	115.76	115.76	-425.2	32.0	117.8	93.3	24.54	4.803	
4,500.0	4,463.3	4,501.9	4,468.2	13.2	12.7	115.35	115.35	-440.5	34.2	120.5	95.2	25.27	4.769	
4,600.0	4,562.1	4,601.9	4,566.9	13.6	13.1	114.96	114.96	-455.8	36.5	123.2	97.2	26.00	4.737	
4,700.0	4,660.9	4,701.8	4,665.7	14.0	13.4	114.58	114.58	-471.0	38.8	125.9	99.1	26.74	4.707	
4,800.0	4,759.6	4,801.8	4,764.4	14.4	13.8	114.22	114.22	-486.3	41.0	128.5	101.1	27.47	4.679	
4,900.0	4,858.4	4,901.7	4,863.2	14.7	14.2	113.88	113.88	-501.6	43.3	131.2	103.0	28.21	4.652	
5,000.0	4,957.2	5,001.7	4,962.0	15.1	14.5	113.55	113.55	-516.9	45.5	133.9	105.0	28.94	4.626	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18Y-241 - Wellbore #1 - Plan #1 (7-31-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,056.0	5,101.7	5,060.7	15.5	14.9	113.23		-532.2	47.8	136.6	106.9	29.68	4.602	
5,200.0	5,154.7	5,201.6	5,159.5	15.8	15.3	112.92		-547.5	50.0	139.3	108.9	30.42	4.579	
5,300.0	5,253.5	5,301.6	5,258.2	16.2	15.6	112.63		-562.8	52.3	142.0	110.8	31.16	4.557	
5,400.0	5,352.3	5,401.5	5,357.0	16.6	16.0	112.35		-578.1	54.5	144.7	112.8	31.90	4.536	
5,500.0	5,451.1	5,501.5	5,455.8	17.0	16.4	112.07		-593.3	56.8	147.4	114.8	32.64	4.516	
5,600.0	5,549.8	5,601.5	5,554.5	17.3	16.7	111.81		-608.6	59.0	150.1	116.7	33.39	4.497	
5,700.0	5,648.9	5,700.0	5,652.1	17.6	17.0	111.64		-622.1	61.0	152.6	118.6	34.00	4.487	
5,800.0	5,748.3	5,799.4	5,750.9	17.9	17.3	111.51		-632.4	62.5	154.4	120.0	34.46	4.481	
5,900.0	5,848.0	5,898.3	5,849.6	18.1	17.5	111.43		-639.2	63.5	155.6	120.8	34.85	4.466	
6,000.0	5,948.0	5,997.3	5,948.5	18.2	17.6	111.39		-642.6	64.1	156.3	121.1	35.18	4.443	
6,100.0	6,048.0	6,096.7	6,048.0	18.4	17.8	-87.33		-643.1	64.1	156.3	120.9	35.47	4.407	
6,200.0	6,148.0	6,196.7	6,148.0	18.5	17.9	-87.33		-643.1	64.1	156.3	120.6	35.75	4.374	
6,217.6	6,165.6	6,214.3	6,165.6	18.5	17.9	-87.33		-643.1	64.1	156.3	120.6	35.79	4.368	
6,300.0	6,248.0	6,295.9	6,247.0	18.6	18.0	-86.18		-640.0	64.1	156.5	120.6	35.90	4.360	
6,400.0	6,348.0	6,392.5	6,342.4	18.8	18.0	-80.83		-625.2	64.1	158.3	122.7	35.58	4.449	
6,500.0	6,447.9	6,484.9	6,431.3	18.9	17.9	-72.75		-599.9	64.1	164.0	129.3	34.70	4.726	
6,600.0	6,546.5	6,574.9	6,514.2	18.9	17.8	-65.38		-565.1	64.1	172.6	139.1	33.53	5.147	
6,700.0	6,642.3	6,662.7	6,590.6	18.8	17.5	-59.11		-522.1	64.1	183.1	150.9	32.21	5.685	
6,800.0	6,733.5	6,750.0	6,661.3	18.6	17.3	-53.85		-470.8	64.1	194.6	163.8	30.78	6.322	
6,900.0	6,818.5	6,833.0	6,722.6	18.3	17.1	-49.69		-414.9	64.1	206.2	176.9	29.32	7.031	
7,000.0	6,896.1	6,916.1	6,777.5	18.1	16.9	-46.30		-352.6	64.1	217.3	189.4	27.87	7.795	
7,100.0	6,964.7	7,000.0	6,825.8	17.8	16.8	-43.59		-284.0	64.1	227.4	200.8	26.51	8.577	
7,200.0	7,023.2	7,079.2	6,864.2	17.6	16.8	-41.59		-214.8	64.1	236.0	210.6	25.39	9.296	
7,300.0	7,070.7	7,159.6	6,895.7	17.5	16.8	-40.07		-140.8	64.1	243.1	218.5	24.61	9.877	
7,400.0	7,106.3	7,239.6	6,919.1	17.5	17.0	-39.03		-64.5	64.1	248.2	223.9	24.30	10.214	
7,500.0	7,129.4	7,319.1	6,934.4	17.7	17.3	-38.42		13.6	64.1	251.4	226.8	24.54	10.242	
7,600.0	7,139.6	7,400.0	6,941.4	18.2	17.7	-38.22		94.1	64.1	252.4	227.1	25.34	9.960	
7,616.4	7,140.1	7,411.6	6,941.8	18.3	17.7	-38.21		105.7	64.1	252.5	227.0	25.49	9.907	
7,700.0	7,140.7	7,491.4	6,941.9	18.8	18.3	-38.17		185.5	64.1	252.7	226.4	26.36	9.589	
7,800.0	7,141.4	7,591.4	6,942.0	19.6	19.1	-38.07		285.5	64.1	253.3	225.7	27.54	9.196	
7,900.0	7,142.2	7,691.4	6,942.1	20.6	20.1	-37.97		385.5	64.1	253.8	224.9	28.91	8.779	
8,000.0	7,142.9	7,791.4	6,942.1	21.7	21.2	-37.87		485.5	64.1	254.4	223.9	30.45	8.356	
8,100.0	7,143.7	7,891.3	6,942.2	22.9	22.4	-37.78		585.5	64.1	254.9	222.8	32.11	7.940	
8,200.0	7,144.4	7,991.3	6,942.2	24.2	23.7	-37.68		685.5	64.1	255.5	221.6	33.89	7.539	
8,300.0	7,145.2	8,091.3	6,942.3	25.5	25.1	-37.59		785.5	64.1	256.0	220.3	35.76	7.160	
8,400.0	7,145.9	8,191.3	6,942.3	27.0	26.6	-37.49		885.5	64.1	256.6	218.9	37.71	6.804	
8,500.0	7,146.7	8,291.3	6,942.4	28.5	28.1	-37.40		985.4	64.1	257.2	217.4	39.73	6.473	
8,600.0	7,147.4	8,391.3	6,942.4	30.0	29.6	-37.30		1,085.4	64.1	257.7	215.9	41.80	6.165	
8,700.0	7,148.2	8,491.3	6,942.5	31.6	31.2	-37.21		1,185.4	64.1	258.3	214.3	43.92	5.881	
8,800.0	7,148.9	8,591.3	6,942.5	33.2	32.9	-37.12		1,285.4	64.1	258.8	212.7	46.07	5.618	
8,900.0	7,149.7	8,691.3	6,942.6	34.9	34.5	-37.02		1,385.4	64.1	259.4	211.1	48.26	5.375	
9,000.0	7,150.4	8,791.3	6,942.6	36.5	36.2	-36.93		1,485.4	64.1	259.9	209.5	50.47	5.150	
9,100.0	7,151.2	8,891.3	6,942.7	38.2	37.9	-36.84		1,585.4	64.1	260.5	207.8	52.71	4.942	
9,200.0	7,151.9	8,991.3	6,942.7	40.0	39.7	-36.75		1,685.4	64.1	261.0	206.1	54.97	4.749	
9,300.0	7,152.7	9,091.3	6,942.8	41.7	41.4	-36.65		1,785.4	64.1	261.6	204.4	57.24	4.571	
9,400.0	7,153.4	9,191.3	6,942.8	43.4	43.2	-36.56		1,885.4	64.1	262.2	202.6	59.52	4.405	
9,500.0	7,154.2	9,291.3	6,942.9	45.2	44.9	-36.47		1,985.4	64.1	262.7	200.9	61.82	4.250	
9,600.0	7,154.9	9,391.3	6,942.9	47.0	46.7	-36.38		2,085.4	64.1	263.3	199.2	64.12	4.106	
9,700.0	7,155.7	9,491.3	6,943.0	48.8	48.5	-36.29		2,185.4	64.1	263.9	197.4	66.43	3.972	
9,800.0	7,156.4	9,591.3	6,943.0	50.6	50.3	-36.20		2,285.4	64.1	264.4	195.7	68.74	3.846	
9,900.0	7,157.2	9,691.3	6,943.1	52.4	52.1	-36.11		2,385.4	64.1	265.0	193.9	71.06	3.729	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18Y-241 - Wellbore #1 - Plan #1 (7-31-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,000.0	7,157.9	9,791.3	6,943.2	54.2	54.0	-36.02	-36.02	2,485.4	64.1	265.5	192.2	73.39	3.618	
10,100.0	7,158.7	9,891.3	6,943.2	56.0	55.8	-35.94	-35.94	2,585.4	64.1	266.1	190.4	75.71	3.515	
10,200.0	7,159.4	9,991.3	6,943.3	57.8	57.6	-35.85	-35.85	2,685.4	64.1	266.7	188.6	78.04	3.417	
10,300.0	7,160.2	10,091.3	6,943.3	59.7	59.5	-35.76	-35.76	2,785.4	64.1	267.2	186.9	80.37	3.325	
10,400.0	7,160.9	10,191.3	6,943.4	61.5	61.3	-35.67	-35.67	2,885.4	64.1	267.8	185.1	82.70	3.238	
10,500.0	7,161.7	10,291.3	6,943.4	63.4	63.1	-35.59	-35.59	2,985.4	64.1	268.4	183.4	85.02	3.156	
10,600.0	7,162.4	10,391.3	6,943.5	65.2	65.0	-35.50	-35.50	3,085.4	64.1	268.9	181.6	87.35	3.079	
10,700.0	7,163.2	10,491.3	6,943.5	67.0	66.9	-35.41	-35.41	3,185.4	64.1	269.5	179.8	89.68	3.005	
10,800.0	7,163.9	10,591.3	6,943.6	68.9	68.7	-35.33	-35.33	3,285.4	64.1	270.1	178.1	92.00	2.936	
10,900.0	7,164.7	10,691.3	6,943.6	70.8	70.6	-35.24	-35.24	3,385.4	64.1	270.6	176.3	94.32	2.869	
11,000.0	7,165.4	10,791.3	6,943.7	72.6	72.4	-35.16	-35.16	3,485.4	64.1	271.2	174.6	96.64	2.806	
11,100.0	7,166.2	10,891.3	6,943.7	74.5	74.3	-35.07	-35.07	3,585.4	64.1	271.8	172.8	98.96	2.747	
11,200.0	7,166.9	10,991.3	6,943.8	76.4	76.2	-34.99	-34.99	3,685.4	64.1	272.4	171.1	101.27	2.689	
11,300.0	7,167.7	11,091.3	6,943.8	78.2	78.1	-34.90	-34.90	3,785.4	64.1	272.9	169.4	103.58	2.635	
11,400.0	7,168.4	11,191.3	6,943.9	80.1	79.9	-34.82	-34.82	3,885.4	64.1	273.5	167.6	105.89	2.583	
11,500.0	7,169.2	11,291.3	6,943.9	82.0	81.8	-34.74	-34.74	3,985.4	64.1	274.1	165.9	108.19	2.533	
11,600.0	7,169.9	11,391.3	6,944.0	83.8	83.7	-34.65	-34.65	4,085.4	64.1	274.7	164.2	110.49	2.486	
11,609.6	7,170.0	11,400.8	6,944.0	84.0	83.9	-34.64	-34.64	4,094.9	64.1	274.7	164.0	110.71	2.481 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design		Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18Y-301 - Wellbore #1 - Plan #1 (7-31-14)											Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface	Offset Wellbore Centre		Distance		Minimum Separation	Separation Factor	Warning	
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset		+N/-S	+E/-W	Between Centres	Between Ellipses				
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)			
0.0	0.0	0.0	0.0	0.0	0.0	90.00	0.0	30.7	30.7					
100.0	100.0	100.0	100.0	0.1	0.1	90.00	0.0	30.7	30.7	30.5	0.22	136.494		
200.0	200.0	200.0	200.0	0.3	0.3	90.00	0.0	30.7	30.7	30.0	0.67	45.498		
300.0	300.0	300.0	300.0	0.6	0.6	90.00	0.0	30.7	30.7	29.6	1.12	27.299		
400.0	400.0	400.0	400.0	0.8	0.8	90.00	0.0	30.7	30.7	29.1	1.57	19.499		
500.0	500.0	500.0	500.0	1.0	1.0	90.00	0.0	30.7	30.7	28.7	2.02	15.166		
600.0	600.0	600.0	600.0	1.2	1.2	90.00	0.0	30.7	30.7	28.2	2.47	12.409		
700.0	700.0	700.0	700.0	1.5	1.5	90.00	0.0	30.7	30.7	27.8	2.92	10.500		
800.0	800.0	800.0	800.0	1.7	1.7	90.00	0.0	30.7	30.7	27.3	3.37	9.100		
900.0	900.0	900.0	900.0	1.9	1.9	90.00	0.0	30.7	30.7	26.9	3.82	8.029		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	90.00	0.0	30.7	30.7	26.4	4.27	7.184 CC, ES		
1,100.0	1,100.0	1,099.5	1,099.4	2.4	2.3	92.78	-1.5	31.5	31.5	26.8	4.69	6.719		
1,200.0	1,200.0	1,198.7	1,198.5	2.6	2.5	100.20	-6.1	33.9	34.5	29.4	5.10	6.763		
1,300.0	1,300.0	1,297.6	1,297.1	2.8	2.7	-53.33	-13.7	37.9	39.3	33.8	5.48	7.175		
1,400.0	1,399.8	1,396.3	1,395.0	3.0	2.9	-47.88	-24.2	43.4	45.0	39.2	5.85	7.702		
1,500.0	1,499.5	1,495.1	1,492.7	3.1	3.2	-44.26	-37.6	50.5	51.3	45.0	6.24	8.218		
1,600.0	1,598.7	1,595.0	1,591.3	3.4	3.5	-43.33	-51.9	58.0	55.8	49.1	6.65	8.385		
1,700.0	1,697.5	1,695.0	1,689.9	3.6	3.8	-44.59	-66.2	65.5	58.1	51.0	7.11	8.173		
1,800.0	1,796.3	1,794.9	1,788.6	3.9	4.1	-46.05	-80.6	73.0	60.2	52.6	7.61	7.911		
1,900.0	1,895.1	1,894.9	1,887.2	4.1	4.4	-47.41	-94.9	80.6	62.3	54.2	8.14	7.660		
2,000.0	1,993.9	1,994.9	1,985.9	4.4	4.7	-48.68	-109.2	88.1	64.5	55.8	8.69	7.423		
2,100.0	2,092.6	2,094.8	2,084.5	4.7	5.1	-49.86	-123.5	95.6	66.7	57.4	9.26	7.200		
2,200.0	2,191.4	2,194.8	2,183.2	5.1	5.4	-50.98	-137.8	103.1	68.9	59.0	9.85	6.992		
2,300.0	2,290.2	2,294.8	2,281.8	5.4	5.8	-52.02	-152.1	110.7	71.1	60.6	10.46	6.799		
2,400.0	2,389.0	2,394.7	2,380.5	5.7	6.1	-53.00	-166.4	118.2	73.3	62.3	11.08	6.621		
2,500.0	2,487.8	2,494.7	2,479.1	6.0	6.5	-53.92	-180.7	125.7	75.6	63.9	11.71	6.456		
2,600.0	2,586.5	2,594.7	2,577.8	6.4	6.9	-54.78	-195.0	133.2	77.9	65.5	12.36	6.303		
2,700.0	2,685.3	2,694.6	2,676.4	6.7	7.2	-55.60	-209.3	140.8	80.2	67.2	13.01	6.163		
2,800.0	2,784.1	2,794.6	2,775.1	7.1	7.6	-56.37	-223.6	148.3	82.5	68.8	13.68	6.033		
2,900.0	2,882.9	2,894.6	2,873.7	7.4	8.0	-57.10	-238.0	155.8	84.9	70.5	14.35	5.913		
3,000.0	2,981.6	2,994.5	2,972.4	7.8	8.3	-57.79	-252.3	163.3	87.2	72.2	15.03	5.801		
3,100.0	3,080.4	3,094.5	3,071.0	8.1	8.7	-58.44	-266.6	170.9	89.6	73.9	15.72	5.698		
3,200.0	3,179.2	3,194.5	3,169.7	8.5	9.1	-59.06	-280.9	178.4	91.9	75.5	16.41	5.603		
3,300.0	3,278.0	3,294.4	3,268.3	8.9	9.4	-59.65	-295.2	185.9	94.3	77.2	17.11	5.514		
3,400.0	3,376.8	3,394.4	3,367.0	9.2	9.8	-60.21	-309.5	193.4	96.7	78.9	17.81	5.431		
3,500.0	3,475.5	3,494.4	3,465.6	9.6	10.2	-60.74	-323.8	201.0	99.1	80.6	18.52	5.353		
3,600.0	3,574.3	3,594.3	3,564.3	9.9	10.6	-61.25	-338.1	208.5	101.5	82.3	19.22	5.281		
3,700.0	3,673.1	3,694.3	3,662.9	10.3	11.0	-61.73	-352.4	216.0	103.9	84.0	19.94	5.214		
3,800.0	3,771.9	3,794.3	3,761.6	10.7	11.3	-62.20	-366.7	223.5	106.4	85.7	20.65	5.150		
3,900.0	3,870.6	3,894.2	3,860.2	11.0	11.7	-62.64	-381.1	231.1	108.8	87.4	21.37	5.091		
4,000.0	3,969.4	3,994.2	3,958.9	11.4	12.1	-63.06	-395.4	238.6	111.2	89.1	22.09	5.035		
4,100.0	4,068.2	4,094.2	4,057.5	11.8	12.5	-63.46	-409.7	246.1	113.7	90.9	22.81	4.983		
4,200.0	4,167.0	4,194.1	4,156.2	12.1	12.9	-63.85	-424.0	253.6	116.1	92.6	23.54	4.933		
4,300.0	4,265.7	4,294.1	4,254.8	12.5	13.2	-64.22	-438.3	261.2	118.6	94.3	24.27	4.886		
4,400.0	4,364.5	4,394.1	4,353.5	12.9	13.6	-64.57	-452.6	268.7	121.0	96.0	25.00	4.842		
4,500.0	4,463.3	4,494.0	4,452.1	13.2	14.0	-64.92	-466.9	276.2	123.5	97.8	25.73	4.801		
4,600.0	4,562.1	4,594.0	4,550.8	13.6	14.4	-65.24	-481.2	283.7	126.0	99.5	26.46	4.761		
4,700.0	4,660.9	4,694.0	4,649.4	14.0	14.8	-65.56	-495.5	291.3	128.4	101.2	27.19	4.724		
4,800.0	4,759.6	4,793.9	4,748.1	14.4	15.2	-65.86	-509.8	298.8	130.9	103.0	27.92	4.688		
4,900.0	4,858.4	4,893.9	4,846.7	14.7	15.5	-66.16	-524.1	306.3	133.4	104.7	28.66	4.654		
5,000.0	4,957.2	4,993.9	4,945.4	15.1	15.9	-66.44	-538.5	313.8	135.9	106.5	29.40	4.622		

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18Y-301 - Wellbore #1 - Plan #1 (7-31-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,056.0	5,093.9	5,044.0	15.5	16.3	-66.71	-66.71	-552.8	321.4	138.3	108.2	30.13	4.591	
5,200.0	5,154.7	5,193.8	5,142.7	15.8	16.7	-66.97	-66.97	-567.1	328.9	140.8	110.0	30.87	4.562	
5,300.0	5,253.5	5,293.8	5,241.3	16.2	17.1	-67.22	-67.22	-581.4	336.4	143.3	111.7	31.61	4.534	
5,400.0	5,352.3	5,393.8	5,340.0	16.6	17.5	-67.47	-67.47	-595.7	343.9	145.8	113.5	32.35	4.507	
5,500.0	5,451.1	5,493.7	5,438.6	17.0	17.8	-67.70	-67.70	-610.0	351.4	148.3	115.2	33.09	4.482	
5,600.0	5,549.8	5,593.7	5,537.3	17.3	18.2	-67.93	-67.93	-624.3	359.0	150.8	117.0	33.83	4.458	
5,700.0	5,648.9	5,696.5	5,639.0	17.6	18.5	-68.22	-68.22	-637.4	365.9	153.0	118.6	34.42	4.445	
5,800.0	5,748.3	5,799.3	5,741.2	17.9	18.7	-68.43	-68.43	-647.2	371.0	154.6	119.7	34.88	4.433	
5,900.0	5,848.0	5,902.1	5,843.7	18.1	18.9	-68.57	-68.57	-653.8	374.5	155.7	120.4	35.27	4.414	
6,000.0	5,948.0	6,004.9	5,946.5	18.2	19.1	-68.64	-68.64	-657.2	376.2	156.3	120.7	35.60	4.390	
6,100.0	6,048.0	6,106.4	6,048.0	18.4	19.2	92.64	92.64	-657.6	376.5	156.3	120.5	35.89	4.356	
6,200.0	6,148.0	6,206.4	6,148.0	18.5	19.4	92.64	92.64	-657.6	376.5	156.3	120.2	36.16	4.324	
6,300.0	6,248.0	6,306.4	6,248.0	18.6	19.5	92.64	92.64	-657.6	376.5	156.3	119.9	36.43	4.292	
6,400.0	6,348.0	6,406.9	6,348.3	18.8	19.6	91.32	91.32	-654.0	376.5	156.2	119.4	36.82	4.242	
6,433.3	6,381.3	6,440.1	6,381.3	18.8	19.6	90.07	90.07	-650.1	376.5	156.2	119.2	37.01	4.220	
6,500.0	6,447.9	6,505.7	6,445.8	18.9	19.6	86.67	86.67	-638.1	376.5	156.4	119.0	37.41	4.182	
6,600.0	6,546.5	6,602.9	6,538.8	18.9	19.5	81.97	81.97	-610.3	376.5	157.8	120.1	37.68	4.187	
6,700.0	6,642.3	6,698.5	6,626.2	18.8	19.3	77.54	77.54	-571.7	376.5	160.0	122.4	37.57	4.259	
6,800.0	6,733.5	6,792.7	6,707.0	18.6	19.0	73.46	73.46	-523.2	376.5	163.0	125.9	37.11	4.393	
6,900.0	6,818.5	6,885.8	6,780.3	18.3	18.8	69.80	69.80	-466.0	376.5	166.5	130.2	36.35	4.581	
7,000.0	6,896.1	6,977.7	6,845.3	18.1	18.5	66.60	66.60	-401.1	376.5	170.3	134.9	35.39	4.812	
7,100.0	6,964.7	7,068.6	6,901.5	17.8	18.3	63.87	63.87	-329.7	376.5	174.1	139.7	34.36	5.067	
7,200.0	7,023.2	7,158.8	6,948.5	17.6	18.1	61.61	61.61	-252.8	376.5	177.6	144.2	33.39	5.320	
7,300.0	7,070.7	7,250.0	6,986.5	17.5	17.9	59.77	59.77	-169.9	376.5	180.8	148.1	32.65	5.538	
7,400.0	7,106.3	7,337.3	7,013.3	17.5	17.9	58.43	58.43	-87.0	376.5	183.4	151.1	32.29	5.678	
7,500.0	7,129.4	7,425.8	7,030.7	17.7	18.0	57.48	57.48	-0.1	376.5	185.2	152.8	32.42	5.714	
7,600.0	7,139.6	7,514.2	7,038.0	18.2	18.2	56.95	56.95	87.8	376.5	186.3	153.3	33.07	5.635	
7,700.0	7,140.7	7,611.4	7,037.9	18.8	18.8	56.67	56.67	185.0	376.5	186.9	152.7	34.20	5.466	
7,800.0	7,141.4	7,711.4	7,037.6	19.6	19.6	56.39	56.39	285.0	376.5	187.5	151.9	35.60	5.267	
7,900.0	7,142.2	7,811.3	7,037.3	20.6	20.6	56.12	56.12	385.0	376.5	188.1	150.9	37.23	5.053	
8,000.0	7,142.9	7,911.3	7,036.9	21.7	21.7	55.84	55.84	485.0	376.5	188.7	149.7	39.06	4.832	
8,100.0	7,143.7	8,011.3	7,036.6	22.9	22.9	55.57	55.57	585.0	376.5	189.3	148.3	41.05	4.612	
8,200.0	7,144.4	8,111.3	7,036.3	24.2	24.2	55.30	55.30	685.0	376.5	190.0	146.8	43.18	4.399	
8,300.0	7,145.2	8,211.3	7,036.0	25.5	25.6	55.04	55.04	785.0	376.5	190.6	145.1	45.43	4.195	
8,400.0	7,145.9	8,311.3	7,035.6	27.0	27.0	54.77	54.77	885.0	376.5	191.2	143.4	47.77	4.002	
8,500.0	7,146.7	8,411.3	7,035.3	28.5	28.5	54.51	54.51	985.0	376.5	191.8	141.6	50.20	3.821	
8,600.0	7,147.4	8,511.3	7,035.0	30.0	30.1	54.24	54.24	1,085.0	376.5	192.4	139.8	52.69	3.653	
8,700.0	7,148.2	8,611.3	7,034.6	31.6	31.7	53.98	53.98	1,185.0	376.5	193.1	137.9	55.23	3.496	
8,800.0	7,148.9	8,711.3	7,034.3	33.2	33.3	53.73	53.73	1,285.0	376.5	193.7	135.9	57.82	3.350	
8,900.0	7,149.7	8,811.3	7,034.0	34.9	34.9	53.47	53.47	1,384.9	376.5	194.4	133.9	60.44	3.216	
9,000.0	7,150.4	8,911.3	7,033.6	36.5	36.6	53.21	53.21	1,484.9	376.5	195.0	131.9	63.10	3.091	
9,100.0	7,151.2	9,011.3	7,033.3	38.2	38.3	52.96	52.96	1,584.9	376.5	195.7	129.9	65.77	2.975	
9,200.0	7,151.9	9,111.3	7,033.0	40.0	40.0	52.71	52.71	1,684.9	376.5	196.3	127.8	68.47	2.867	
9,300.0	7,152.7	9,211.3	7,032.6	41.7	41.7	52.46	52.46	1,784.9	376.5	197.0	125.8	71.18	2.767	
9,400.0	7,153.4	9,311.3	7,032.3	43.4	43.5	52.21	52.21	1,884.9	376.5	197.6	123.7	73.89	2.674	
9,500.0	7,154.2	9,411.3	7,032.0	45.2	45.3	51.96	51.96	1,984.9	376.5	198.3	121.7	76.62	2.588	
9,600.0	7,154.9	9,511.2	7,031.6	47.0	47.0	51.71	51.71	2,084.9	376.5	199.0	119.6	79.35	2.507	
9,700.0	7,155.7	9,611.2	7,031.3	48.8	48.8	51.47	51.47	2,184.9	376.5	199.6	117.5	82.09	2.432	
9,800.0	7,156.4	9,711.2	7,031.0	50.6	50.6	51.23	51.23	2,284.9	376.5	200.3	115.5	84.82	2.362	
9,900.0	7,157.2	9,811.2	7,030.6	52.4	52.4	50.99	50.99	2,384.9	376.5	201.0	113.4	87.56	2.296	
10,000.0	7,157.9	9,911.2	7,030.3	54.2	54.2	50.75	50.75	2,484.9	376.5	201.7	111.4	90.29	2.234	

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

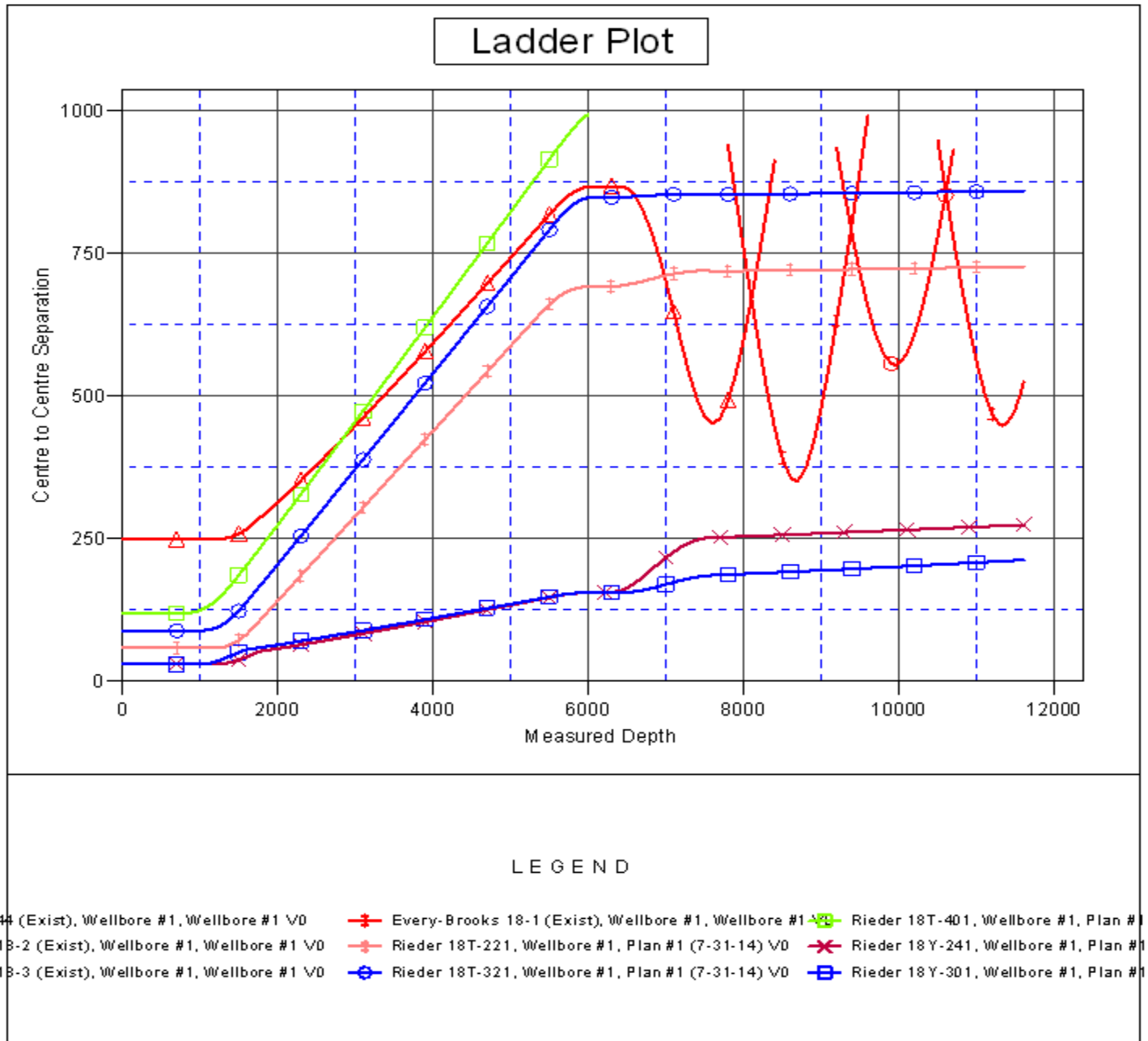
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Offset Design Rieder 4N67W18Y Pad Sec.18-T4N-R67W - Rieder 18Y-301 - Wellbore #1 - Plan #1 (7-31-14)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	7,158.7	10,011.2	7,030.0	56.0	56.0	50.51	2,584.9	376.5	202.4	109.3	93.02	2.175	
10,200.0	7,159.4	10,111.2	7,029.7	57.8	57.9	50.28	2,684.9	376.5	203.0	107.3	95.74	2.121	
10,300.0	7,160.2	10,211.2	7,029.3	59.7	59.7	50.04	2,784.9	376.5	203.7	105.3	98.46	2.069	
10,400.0	7,160.9	10,311.2	7,029.0	61.5	61.5	49.81	2,884.9	376.5	204.4	103.3	101.17	2.021	
10,500.0	7,161.7	10,411.2	7,028.7	63.4	63.4	49.58	2,984.8	376.5	205.1	101.3	103.88	1.975	
10,600.0	7,162.4	10,511.2	7,028.3	65.2	65.2	49.35	3,084.8	376.5	205.8	99.3	106.58	1.931	
10,700.0	7,163.2	10,611.2	7,028.0	67.0	67.1	49.12	3,184.8	376.5	206.5	97.3	109.27	1.890	
10,800.0	7,163.9	10,711.2	7,027.7	68.9	68.9	48.90	3,284.8	376.5	207.3	95.3	111.95	1.851	
10,900.0	7,164.7	10,811.2	7,027.3	70.8	70.8	48.67	3,384.8	376.5	208.0	93.3	114.62	1.814	
11,000.0	7,165.4	10,911.2	7,027.0	72.6	72.6	48.45	3,484.8	376.5	208.7	91.4	117.28	1.779	
11,100.0	7,166.2	11,011.2	7,026.7	74.5	74.5	48.23	3,584.8	376.5	209.4	89.5	119.94	1.746	
11,200.0	7,166.9	11,111.2	7,026.3	76.4	76.4	48.01	3,684.8	376.5	210.1	87.5	122.58	1.714	
11,300.0	7,167.7	11,211.1	7,026.0	78.2	78.2	47.79	3,784.8	376.5	210.9	85.6	125.21	1.684	
11,400.0	7,168.4	11,311.1	7,025.7	80.1	80.1	47.57	3,884.8	376.5	211.6	83.7	127.83	1.655	
11,500.0	7,169.2	11,411.1	7,025.3	82.0	82.0	47.35	3,984.8	376.5	212.3	81.9	130.44	1.628	
11,600.0	7,169.9	11,511.1	7,025.0	83.8	83.9	47.14	4,084.8	376.5	213.0	80.0	133.04	1.601	
11,609.6	7,170.0	11,513.9	7,025.0	84.0	83.9	47.13	4,087.5	376.5	213.2	80.0	133.22	1.601 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4821.0ft (RKB - 15')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Rieder 18Y-441
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.37°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Rieder 18Y-441
Project:	SEC.18-T4N-R67W	TVD Reference:	WELL @ 4821.0ft (RKB - 15')
Reference Site:	Rieder 4N67W18Y Pad Sec.18-T4N-R67W	MD Reference:	WELL @ 4821.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Rieder 18Y-441	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (7-31-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4821.0ft (RKB - 15')

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Rieder 18Y-441

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.37°

