

PETROLEUM DEVELOPMENT CORP Weld County CO

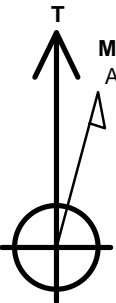
Well Name: R&R Farms 29L-441

Surface Location: R&R Farms 5N63W29L Pad Sec.29-T5N-R63W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4574.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1377497.42	3287517.05	40.365040	-104.468170	
RKB - 13' WELL @ 4587.0ft (RKB - 13')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 641'FSL, 404'FWL	1.0	0.0	0.0	Point
BHL 500'FNL, 980'FWL	6565.0	4116.7	543.3	Point



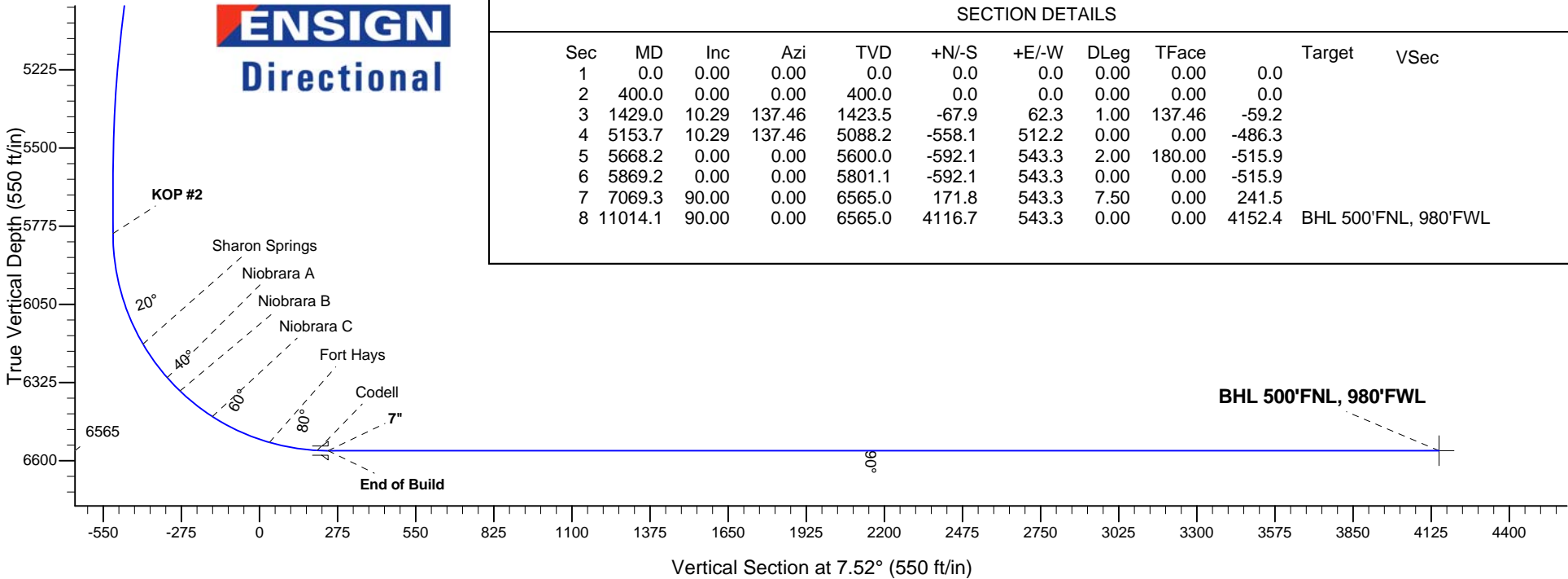
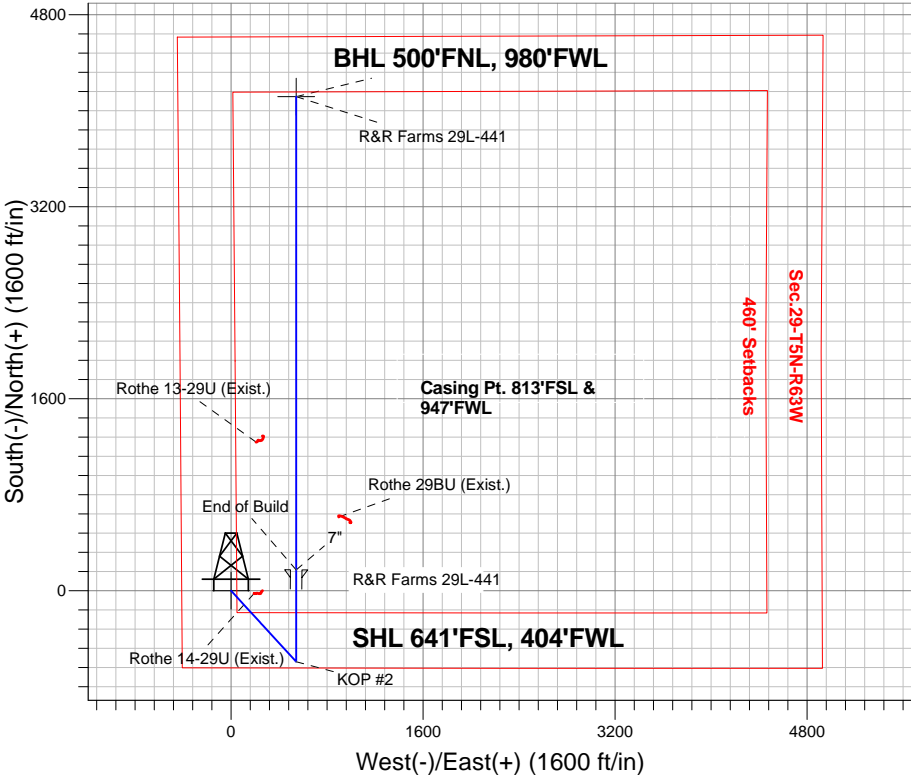
Azimuths to True North
Magnetic North: 8.19°

Magnetic Field
Strength: 52743.6snT
Dip Angle: 66.94°
Date: 4/9/2015
Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
400.0	400.0	KOP #1
5801.0	5869.2	KOP #2
6565.0	7069.3	End of Build

R&R Farms 5N63W29L Pad Sec.29-T5N-R63W
R&R Farms 29L-441
Plan #3 (4-10-15)



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	400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	
3	1429.0	10.29	137.46	1423.5	-67.9	62.3	1.00	137.46	-59.2	
4	5153.7	10.29	137.46	5088.2	-558.1	512.2	0.00	0.00	-486.3	
5	5668.2	0.00	0.00	5600.0	-592.1	543.3	2.00	180.00	-515.9	
6	5869.2	0.00	0.00	5801.1	-592.1	543.3	0.00	0.00	-515.9	
7	7069.3	90.00	0.00	6565.0	171.8	543.3	7.50	0.00	241.5	
8	11014.1	90.00	0.00	6565.0	4116.7	543.3	0.00	0.00	4152.4	BHL 500'FNL, 980'FWL



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.29-T5N-R63W

R&R Farms 5N63W29L Pad Sec.29-T5N-R63W

R&R Farms 29L-441

Wellbore #1

Plan: Plan #3 (4-10-15)

Standard Planning Report

10 April, 2015

Database:	Landmark	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Project:	SEC.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	North Reference:	True
Well:	R&R Farms 29L-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (4-10-15)		

Project	SEC.29-T5N-R63W, Weld County, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site						R&R Farms 5N63W29L Pad Sec.29-T5N-R63W											
Site Position:						Northing:			1,377,077.43ft			Latitude:			40.363870		
From:			Lat/Long			Easting:			3,288,054.21ft			Longitude:			-104.466260		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.67 °		

Well	R&R Farms 29L-441					
Well Position	+N/-S	426.2 ft	Northing:	1,377,497.42 ft	Latitude:	40.365040
	+E/-W	-532.3 ft	Easting:	3,287,517.05 ft	Longitude:	-104.468170
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,574.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/9/2015	8.19	66.94	52,744

Design	Plan #3 (4-10-15)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	7.52

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	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,429.0	10.29	137.46	1,423.5	-67.9	62.3	1.00	1.00	0.00	137.46	
5,153.7	10.29	137.46	5,088.2	-558.1	512.2	0.00	0.00	0.00	0.00	
5,668.2	0.00	0.00	5,600.0	-592.1	543.3	2.00	-2.00	0.00	180.00	
5,869.2	0.00	0.00	5,801.1	-592.1	543.3	0.00	0.00	0.00	0.00	
7,069.3	90.00	0.00	6,565.0	171.8	543.3	7.50	7.50	0.00	0.00	
11,014.1	90.00	0.00	6,565.0	4,116.7	543.3	0.00	0.00	0.00	0.00	BHL 500'FNL, 980'f

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Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Project:	SEC.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	North Reference:	True
Well:	R&R Farms 29L-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (4-10-15)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
500.0	1.00	137.46	500.0	-0.6	0.6	-0.6	1.00	1.00	0.00
600.0	2.00	137.46	600.0	-2.6	2.4	-2.2	1.00	1.00	0.00
700.0	3.00	137.46	699.9	-5.8	5.3	-5.0	1.00	1.00	0.00
800.0	4.00	137.46	799.7	-10.3	9.4	-9.0	1.00	1.00	0.00
900.0	5.00	137.46	899.4	-16.1	14.7	-14.0	1.00	1.00	0.00
1,000.0	6.00	137.46	998.9	-23.1	21.2	-20.2	1.00	1.00	0.00
1,100.0	7.00	137.46	1,098.3	-31.5	28.9	-27.4	1.00	1.00	0.00
1,200.0	8.00	137.46	1,197.4	-41.1	37.7	-35.8	1.00	1.00	0.00
1,300.0	9.00	137.46	1,296.3	-52.0	47.7	-45.3	1.00	1.00	0.00
1,400.0	10.00	137.46	1,394.9	-64.1	58.9	-55.9	1.00	1.00	0.00
1,429.0	10.29	137.46	1,423.5	-67.9	62.3	-59.2	1.00	1.00	0.00
1,500.0	10.29	137.46	1,493.3	-77.2	70.9	-67.3	0.00	0.00	0.00
1,600.0	10.29	137.46	1,591.7	-90.4	83.0	-78.8	0.00	0.00	0.00
1,700.0	10.29	137.46	1,690.1	-103.6	95.0	-90.2	0.00	0.00	0.00
1,800.0	10.29	137.46	1,788.5	-116.7	107.1	-101.7	0.00	0.00	0.00
1,900.0	10.29	137.46	1,886.9	-129.9	119.2	-113.2	0.00	0.00	0.00
2,000.0	10.29	137.46	1,985.3	-143.1	131.3	-124.7	0.00	0.00	0.00
2,100.0	10.29	137.46	2,083.7	-156.2	143.3	-136.1	0.00	0.00	0.00
2,200.0	10.29	137.46	2,182.1	-169.4	155.4	-147.6	0.00	0.00	0.00
2,300.0	10.29	137.46	2,280.5	-182.5	167.5	-159.1	0.00	0.00	0.00
2,400.0	10.29	137.46	2,378.9	-195.7	179.6	-170.5	0.00	0.00	0.00
2,500.0	10.29	137.46	2,477.3	-208.9	191.7	-182.0	0.00	0.00	0.00
2,600.0	10.29	137.46	2,575.6	-222.0	203.7	-193.5	0.00	0.00	0.00
2,700.0	10.29	137.46	2,674.0	-235.2	215.8	-204.9	0.00	0.00	0.00
2,800.0	10.29	137.46	2,772.4	-248.4	227.9	-216.4	0.00	0.00	0.00
2,900.0	10.29	137.46	2,870.8	-261.5	240.0	-227.9	0.00	0.00	0.00
3,000.0	10.29	137.46	2,969.2	-274.7	252.0	-239.3	0.00	0.00	0.00
3,100.0	10.29	137.46	3,067.6	-287.8	264.1	-250.8	0.00	0.00	0.00
3,200.0	10.29	137.46	3,166.0	-301.0	276.2	-262.3	0.00	0.00	0.00
3,300.0	10.29	137.46	3,264.4	-314.2	288.3	-273.7	0.00	0.00	0.00
3,325.0	10.29	137.46	3,289.0	-317.5	291.3	-276.6	0.00	0.00	0.00
Parkman									
3,400.0	10.29	137.46	3,362.8	-327.3	300.4	-285.2	0.00	0.00	0.00
3,500.0	10.29	137.46	3,461.2	-340.5	312.4	-296.7	0.00	0.00	0.00
3,600.0	10.29	137.46	3,559.6	-353.7	324.5	-308.2	0.00	0.00	0.00
3,700.0	10.29	137.46	3,657.9	-366.8	336.6	-319.6	0.00	0.00	0.00
3,800.0	10.29	137.46	3,756.3	-380.0	348.7	-331.1	0.00	0.00	0.00
3,900.0	10.29	137.46	3,854.7	-393.1	360.7	-342.6	0.00	0.00	0.00
4,000.0	10.29	137.46	3,953.1	-406.3	372.8	-354.0	0.00	0.00	0.00
4,037.5	10.29	137.46	3,990.0	-411.2	377.3	-358.3	0.00	0.00	0.00
Sussex									
4,100.0	10.29	137.46	4,051.5	-419.5	384.9	-365.5	0.00	0.00	0.00
4,200.0	10.29	137.46	4,149.9	-432.6	397.0	-377.0	0.00	0.00	0.00
4,300.0	10.29	137.46	4,248.3	-445.8	409.1	-388.4	0.00	0.00	0.00
4,400.0	10.29	137.46	4,346.7	-458.9	421.1	-399.9	0.00	0.00	0.00
4,500.0	10.29	137.46	4,445.1	-472.1	433.2	-411.4	0.00	0.00	0.00

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Project:	SEC.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	North Reference:	True
Well:	R&R Farms 29L-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (4-10-15)		

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)
4,515.2	10.29	137.46	4,460.0	-474.1	435.0	-413.1	0.00	0.00	0.00
Shannon									
4,600.0	10.29	137.46	4,543.5	-485.3	445.3	-422.8	0.00	0.00	0.00
4,700.0	10.29	137.46	4,641.9	-498.4	457.4	-434.3	0.00	0.00	0.00
4,800.0	10.29	137.46	4,740.3	-511.6	469.4	-445.8	0.00	0.00	0.00
4,900.0	10.29	137.46	4,838.6	-524.8	481.5	-457.2	0.00	0.00	0.00
5,000.0	10.29	137.46	4,937.0	-537.9	493.6	-468.7	0.00	0.00	0.00
5,100.0	10.29	137.46	5,035.4	-551.1	505.7	-480.2	0.00	0.00	0.00
5,153.7	10.29	137.46	5,088.2	-558.1	512.2	-486.3	0.00	0.00	0.00
5,200.0	9.36	137.46	5,133.9	-564.0	517.5	-491.4	2.00	-2.00	0.00
5,300.0	7.36	137.46	5,232.8	-574.7	527.3	-500.8	2.00	-2.00	0.00
5,400.0	5.36	137.46	5,332.2	-582.9	534.8	-507.9	2.00	-2.00	0.00
5,500.0	3.36	137.46	5,431.9	-588.5	540.0	-512.8	2.00	-2.00	0.00
5,600.0	1.36	137.46	5,531.8	-591.5	542.8	-515.4	2.00	-2.00	0.00
5,668.2	0.00	0.00	5,600.0	-592.1	543.3	-515.9	2.00	-2.00	0.00
5,700.0	0.00	0.00	5,631.8	-592.1	543.3	-515.9	0.00	0.00	0.00
5,800.0	0.00	0.00	5,731.8	-592.1	543.3	-515.9	0.00	0.00	0.00
5,869.2	0.00	0.00	5,801.0	-592.1	543.3	-515.9	0.00	0.00	0.00
KOP #2									
5,900.0	2.31	0.00	5,831.8	-591.5	543.3	-515.3	7.49	7.49	0.00
6,000.0	9.81	0.00	5,931.2	-580.9	543.3	-504.9	7.50	7.50	0.00
6,100.0	17.31	0.00	6,028.3	-557.5	543.3	-481.6	7.50	7.50	0.00
6,200.0	24.81	0.00	6,121.6	-521.6	543.3	-446.0	7.50	7.50	0.00
6,277.3	30.61	0.00	6,190.0	-485.7	543.3	-410.4	7.50	7.50	0.00
Sharon Springs									
6,300.0	32.31	0.00	6,209.3	-473.8	543.3	-398.7	7.50	7.50	0.00
6,400.0	39.81	0.00	6,290.1	-415.0	543.3	-340.4	7.50	7.50	0.00
6,423.6	41.57	0.00	6,308.0	-399.7	543.3	-325.1	7.50	7.50	0.00
Niobrara A									
6,489.0	46.48	0.00	6,355.0	-354.2	543.3	-280.1	7.50	7.50	0.00
Niobrara B									
6,500.0	47.31	0.00	6,362.5	-346.2	543.3	-272.1	7.50	7.50	0.00
6,600.0	54.81	0.00	6,425.4	-268.5	543.3	-195.1	7.50	7.50	0.00
6,635.2	57.45	0.00	6,445.0	-239.2	543.3	-166.0	7.50	7.50	0.00
Niobrara C									
6,700.0	62.31	0.00	6,477.5	-183.2	543.3	-110.5	7.50	7.50	0.00
6,800.0	69.81	0.00	6,518.0	-91.9	543.3	-20.0	7.50	7.50	0.00
6,858.1	74.16	0.00	6,536.0	-36.6	543.3	34.8	7.50	7.50	0.00
Fort Hays									
6,900.0	77.31	0.00	6,546.3	4.0	543.3	75.0	7.50	7.50	0.00
7,000.0	84.81	0.00	6,561.9	102.7	543.3	172.9	7.50	7.50	0.00
7,030.2	87.07	0.00	6,564.0	132.8	543.3	202.7	7.50	7.50	0.00
Codell									
7,069.3	90.00	0.00	6,565.0	171.9	543.3	241.5	7.49	7.49	0.00
End of Build - 7"									
7,100.0	90.00	0.00	6,565.0	202.6	543.3	271.9	0.00	0.00	0.00
7,200.0	90.00	0.00	6,565.0	302.6	543.3	371.1	0.00	0.00	0.00
7,300.0	90.00	0.00	6,565.0	402.6	543.3	470.2	0.00	0.00	0.00
7,400.0	90.00	0.00	6,565.0	502.6	543.3	569.4	0.00	0.00	0.00
7,500.0	90.00	0.00	6,565.0	602.6	543.3	668.5	0.00	0.00	0.00
7,600.0	90.00	0.00	6,565.0	702.6	543.3	767.6	0.00	0.00	0.00

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Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	North Reference:	True
Well:	R&R Farms 29L-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (4-10-15)		

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)
7,700.0	90.00	0.00	6,565.0	802.6	543.3	866.8	0.00	0.00	0.00
7,800.0	90.00	0.00	6,565.0	902.6	543.3	965.9	0.00	0.00	0.00
7,900.0	90.00	0.00	6,565.0	1,002.6	543.3	1,065.1	0.00	0.00	0.00
8,000.0	90.00	0.00	6,565.0	1,102.6	543.3	1,164.2	0.00	0.00	0.00
8,100.0	90.00	0.00	6,565.0	1,202.6	543.3	1,263.3	0.00	0.00	0.00
8,200.0	90.00	0.00	6,565.0	1,302.6	543.3	1,362.5	0.00	0.00	0.00
8,300.0	90.00	0.00	6,565.0	1,402.6	543.3	1,461.6	0.00	0.00	0.00
8,400.0	90.00	0.00	6,565.0	1,502.6	543.3	1,560.8	0.00	0.00	0.00
8,500.0	90.00	0.00	6,565.0	1,602.6	543.3	1,659.9	0.00	0.00	0.00
8,600.0	90.00	0.00	6,565.0	1,702.6	543.3	1,759.0	0.00	0.00	0.00
8,700.0	90.00	0.00	6,565.0	1,802.6	543.3	1,858.2	0.00	0.00	0.00
8,800.0	90.00	0.00	6,565.0	1,902.6	543.3	1,957.3	0.00	0.00	0.00
8,900.0	90.00	0.00	6,565.0	2,002.6	543.3	2,056.5	0.00	0.00	0.00
9,000.0	90.00	0.00	6,565.0	2,102.6	543.3	2,155.6	0.00	0.00	0.00
9,100.0	90.00	0.00	6,565.0	2,202.6	543.3	2,254.7	0.00	0.00	0.00
9,200.0	90.00	0.00	6,565.0	2,302.6	543.3	2,353.9	0.00	0.00	0.00
9,300.0	90.00	0.00	6,565.0	2,402.6	543.3	2,453.0	0.00	0.00	0.00
9,400.0	90.00	0.00	6,565.0	2,502.6	543.3	2,552.2	0.00	0.00	0.00
9,500.0	90.00	0.00	6,565.0	2,602.6	543.3	2,651.3	0.00	0.00	0.00
9,600.0	90.00	0.00	6,565.0	2,702.6	543.3	2,750.4	0.00	0.00	0.00
9,700.0	90.00	0.00	6,565.0	2,802.6	543.3	2,849.6	0.00	0.00	0.00
9,800.0	90.00	0.00	6,565.0	2,902.6	543.3	2,948.7	0.00	0.00	0.00
9,900.0	90.00	0.00	6,565.0	3,002.6	543.3	3,047.9	0.00	0.00	0.00
10,000.0	90.00	0.00	6,565.0	3,102.6	543.3	3,147.0	0.00	0.00	0.00
10,100.0	90.00	0.00	6,565.0	3,202.6	543.3	3,246.1	0.00	0.00	0.00
10,200.0	90.00	0.00	6,565.0	3,302.6	543.3	3,345.3	0.00	0.00	0.00
10,300.0	90.00	0.00	6,565.0	3,402.6	543.3	3,444.4	0.00	0.00	0.00
10,400.0	90.00	0.00	6,565.0	3,502.6	543.3	3,543.6	0.00	0.00	0.00
10,500.0	90.00	0.00	6,565.0	3,602.6	543.3	3,642.7	0.00	0.00	0.00
10,600.0	90.00	0.00	6,565.0	3,702.6	543.3	3,741.9	0.00	0.00	0.00
10,700.0	90.00	0.00	6,565.0	3,802.6	543.3	3,841.0	0.00	0.00	0.00
10,800.0	90.00	0.00	6,565.0	3,902.6	543.3	3,940.1	0.00	0.00	0.00
10,900.0	90.00	0.00	6,565.0	4,002.6	543.3	4,039.3	0.00	0.00	0.00
11,000.0	90.00	0.00	6,565.0	4,102.6	543.3	4,138.4	0.00	0.00	0.00
11,014.1	90.00	0.00	6,565.0	4,116.7	543.3	4,152.4	0.00	0.00	0.00

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
SHL 641'FSL, 404'FW	0.00	0.00	1.0	0.0	0.0	1,377,497.43	3,287,517.05	40.365040	-104.468170
- plan hits target center									
- Point									
BHL 500'FNL, 980'FW	0.00	0.00	6,565.0	4,116.7	543.3	1,381,620.01	3,288,012.40	40.376340	-104.466220
- plan hits target center									
- Point									

Database:	Landmark	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Project:	SEC.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	North Reference:	True
Well:	R&R Farms 29L-441	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (4-10-15)		

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
7,069.3	6,565.0	7"	7	7-1/2	

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,325.0	3,289.0	Parkman		0.00		
4,037.5	3,990.0	Sussex		0.00		
4,515.2	4,460.0	Shannon		0.00		
6,277.3	6,190.0	Sharon Springs		0.00		
6,423.6	6,308.0	Niobrara A		0.00		
6,489.0	6,355.0	Niobrara B		0.00		
6,635.2	6,445.0	Niobrara C		0.00		
6,858.1	6,536.0	Fort Hays		0.00		
7,030.2	6,564.0	Codell		0.00		

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
400.0	400.0	0.0	0.0	KOP #1	
5,869.2	5,801.0	-592.1	543.3	KOP #2	
7,069.3	6,565.0	171.9	543.3	End of Build	



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.29-T5N-R63W

R&R Farms 5N63W29L Pad Sec.29-T5N-R63W

R&R Farms 29L-441

Wellbore #1

Plan #3 (4-10-15)

Anticollision Report

10 April, 2015



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Reference	Plan #3 (4-10-15)		
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 4/10/2015			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,014.1	Plan #3 (4-10-15) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Existing Wells Sec.29-T5N-R63W						
Rothe 13-29U (Exist.) - Wellbore #1 - Wellbore #1	8,136.0	6,542.1	331.4	286.8	7.429	CC, ES
Rothe 13-29U (Exist.) - Wellbore #1 - Wellbore #1	8,200.0	6,542.0	337.5	291.9	7.393	SF
Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1	2,005.6	1,978.1	166.0	156.8	18.023	CC, ES
Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1	6,900.0	6,525.1	348.4	318.5	11.659	SF
Rothe 29BU (Exist.) - Wellbore #1 - Wellbore #1	7,516.0	6,543.8	355.4	319.9	10.032	CC, ES
Rothe 29BU (Exist.) - Wellbore #1 - Wellbore #1	7,600.0	6,541.9	365.1	328.6	9.995	SF
R&R Farms 5N63W29L Pad Sec.29-T5N-R63W						
R&R Farms 29L-221 - Wellbore #1 - Plan #2 (4-10-15)	400.0	400.0	89.2	87.6	56.677	CC, ES
R&R Farms 29L-221 - Wellbore #1 - Plan #2 (4-10-15)	11,014.1	10,845.0	719.7	556.7	4.414	SF
R&R Farms 29L-321 - Wellbore #1 - Plan #3 (4-10-15)	400.0	400.0	58.5	56.9	37.194	CC, ES
R&R Farms 29L-321 - Wellbore #1 - Plan #3 (4-10-15)	11,014.1	10,908.9	502.8	339.2	3.074	SF
R&R Farms 29L-401 - Wellbore #1 - Plan #2 (4-10-15)	400.0	401.0	119.8	118.3	76.051	CC, ES
R&R Farms 29L-401 - Wellbore #1 - Plan #2 (4-10-15)	11,014.1	10,996.7	891.6	724.1	5.324	SF
R&R Farms 29L-241 - Wellbore #1 - Plan #3 (4-10-15)	400.0	400.0	27.9	26.3	17.712	CC, ES
R&R Farms 29L-241 - Wellbore #1 - Plan #3 (4-10-15)	11,014.1	10,852.9	296.1	155.0	2.098	SF
R&R Farms 29L-301 - Wellbore #1 - Plan #2 (4-9-15)	200.0	200.0	30.7	30.0	45.460	CC, ES
R&R Farms 29L-301 - Wellbore #1 - Plan #2 (4-9-15)	11,014.1	10,950.5	236.6	83.4	1.544	SF

Offset Design	Existing Wells Sec.29-T5N-R63W - Rothe 13-29U (Exist.) - Wellbore #1 - Wellbore #1											Offset Site Error:	0.0ft
Survey Program:	600-MWD											Offset Well Error:	0.0ft
Reference	Offset	Semi Major Axis		Distance									
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,200.0	6,565.0	6,543.4	6,542.4	18.9	13.2	-89.38	1,238.5	212.0	992.9	961.0	31.89	31.136	
7,300.0	6,565.0	6,543.3	6,542.3	19.9	13.2	-89.36	1,238.5	212.0	899.2	866.4	32.86	27.365	
7,400.0	6,565.0	6,543.1	6,542.1	21.1	13.2	-89.33	1,238.5	212.0	807.1	773.1	33.97	23.763	
7,500.0	6,565.0	6,543.0	6,542.0	22.4	13.2	-89.31	1,238.5	212.0	717.1	681.9	35.18	20.383	
7,600.0	6,565.0	6,542.8	6,541.9	23.8	13.2	-89.28	1,238.5	212.0	630.1	593.6	36.49	17.267	
7,700.0	6,565.0	6,542.7	6,541.7	25.2	13.2	-89.26	1,238.5	212.0	547.6	509.7	37.88	14.455	
7,800.0	6,565.0	6,542.6	6,541.6	26.7	13.2	-89.23	1,238.5	212.0	471.9	432.5	39.34	11.995	
7,900.0	6,565.0	6,542.4	6,541.4	28.2	13.2	-89.21	1,238.5	212.0	406.8	365.9	40.85	9.957	

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.29-T5N-R63W - Rothe 13-29U (Exist.) - Wellbore #1 - Wellbore #1											Offset Site Error:		0.0 ft	
Survey Program: 600-MWD														Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor				
8,000.0	6,565.0	6,542.3	6,541.3	29.8	13.2	-89.19	1,238.5	212.0	358.2	315.8	42.41	8.445	7.429 CC, ES 7.393 SF			
8,100.0	6,565.0	6,542.1	6,541.1	31.4	13.2	-89.16	1,238.5	212.0	333.3	289.3	44.02	7.573				
8,136.0	6,565.0	6,542.1	6,541.1	32.0	13.2	-89.15	1,238.5	212.0	331.4	286.8	44.60					
8,200.0	6,565.0	6,542.0	6,541.0	33.0	13.2	-89.14	1,238.5	212.0	337.5	291.9	45.65					
8,300.0	6,565.0	6,541.8	6,540.9	34.7	13.2	-89.11	1,238.5	212.0	369.8	322.4	47.32	7.814				
8,400.0	6,565.0	6,541.7	6,540.7	36.4	13.2	-89.09	1,238.5	212.0	423.7	374.7	49.01	8.646				
8,500.0	6,565.0	6,541.6	6,540.6	38.1	13.2	-89.06	1,238.5	212.0	492.3	441.6	50.72	9.706	10.871 12.070 13.262 14.424			
8,600.0	6,565.0	6,541.4	6,540.4	39.8	13.2	-89.04	1,238.5	212.0	570.2	517.8	52.45	10.871				
8,700.0	6,565.0	6,541.3	6,540.3	41.6	13.2	-89.01	1,238.5	212.0	654.2	600.0	54.20	12.070				
8,800.0	6,565.0	6,541.1	6,540.1	43.3	13.2	-88.99	1,238.5	212.0	742.1	686.2	55.96	13.262				
8,900.0	6,565.0	6,541.0	6,540.0	45.1	13.2	-88.96	1,238.5	212.0	832.8	775.1	57.74	14.424				
9,000.0	6,565.0	6,540.8	6,539.9	46.9	13.2	-88.94	1,238.5	212.0	925.4	865.9	59.52	15.547				

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.29-T5N-R63W - Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 600-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	90.00	0.0	261.9	262.4					
100.0	100.0	85.6	85.6	0.1	0.1	90.03	-0.1	261.9	261.9	261.6	0.21	1,239.138		
200.0	200.0	186.2	186.2	0.3	0.2	90.12	-0.5	261.5	261.5	261.0	0.55	473.534		
300.0	300.0	286.9	286.9	0.6	0.3	90.29	-1.3	260.9	260.9	260.0	0.89	292.114		
400.0	400.0	387.6	387.6	0.8	0.4	90.52	-2.4	260.0	260.0	258.8	1.23	210.726		
500.0	500.0	488.2	488.2	1.0	0.6	-46.78	-3.8	258.9	258.3	256.8	1.55	166.786		
600.0	600.0	588.8	588.8	1.2	0.7	-46.85	-5.5	257.5	255.2	253.3	1.86	137.359		
700.0	699.9	688.7	688.6	1.4	0.9	-47.16	-7.4	256.0	250.7	248.4	2.27	110.366		
800.0	799.7	788.5	788.4	1.6	1.1	-47.77	-9.5	254.5	245.1	242.4	2.71	90.507		
900.0	899.4	887.6	887.4	1.9	1.3	-48.70	-11.6	253.1	238.4	235.3	3.14	75.951		
1,000.0	998.9	987.1	986.9	2.1	1.5	-50.07	-13.5	251.9	230.9	227.3	3.59	64.396		
1,100.0	1,098.3	1,086.0	1,085.8	2.4	1.7	-51.88	-15.4	250.8	222.5	218.5	4.05	54.952		
1,200.0	1,197.4	1,184.2	1,183.9	2.7	1.9	-54.24	-17.0	250.0	213.7	209.2	4.52	47.253		
1,300.0	1,296.3	1,283.0	1,282.7	3.0	2.1	-57.25	-18.5	249.5	204.6	199.6	5.02	40.722		
1,400.0	1,394.9	1,381.3	1,381.0	3.4	2.3	-60.99	-19.8	249.1	195.4	189.8	5.56	35.133		
1,500.0	1,493.3	1,479.0	1,478.8	3.7	2.5	-65.45	-20.7	249.0	186.8	180.7	6.13	30.457		
1,600.0	1,591.7	1,577.6	1,577.3	4.1	2.7	-70.42	-21.2	248.9	179.8	173.1	6.73	26.696		
1,700.0	1,690.1	1,676.4	1,676.2	4.5	2.9	-75.77	-21.8	248.7	174.0	166.7	7.35	23.679		
1,800.0	1,788.5	1,775.2	1,774.9	4.9	3.1	-81.46	-22.4	248.2	169.7	161.8	7.97	21.296		
1,900.0	1,886.9	1,873.9	1,873.6	5.3	3.3	-87.41	-23.0	247.5	167.0	158.4	8.58	19.458		
2,000.0	1,985.3	1,972.5	1,972.3	5.7	3.5	-93.53	-23.6	246.6	166.0	156.8	9.18	18.087		
2,005.6	1,990.8	1,978.1	1,977.8	5.7	3.6	-93.88	-23.7	246.5	166.0	156.8	9.21	18.023	CC, ES	
2,100.0	2,083.7	2,070.8	2,070.6	6.1	3.7	-99.69	-24.2	245.5	166.9	157.1	9.75	17.120		
2,200.0	2,182.1	2,169.0	2,168.7	6.5	4.0	-105.76	-24.7	244.3	169.8	159.5	10.28	16.513		
2,300.0	2,280.5	2,267.0	2,266.7	6.9	4.2	-111.62	-24.9	243.0	174.8	164.0	10.78	16.210		
2,400.0	2,378.9	2,364.9	2,364.7	7.3	4.4	-117.16	-24.9	241.6	181.7	170.5	11.25	16.155		
2,500.0	2,477.3	2,462.8	2,462.5	7.7	4.6	-122.30	-24.8	240.1	190.4	178.7	11.68	16.297		
2,600.0	2,575.6	2,560.9	2,560.6	8.1	4.8	-127.01	-24.5	238.6	200.6	188.5	12.09	16.589		
2,700.0	2,674.0	2,659.2	2,658.9	8.5	5.0	-131.24	-24.2	237.1	212.1	199.6	12.49	16.978		
2,800.0	2,772.4	2,757.5	2,757.2	8.9	5.2	-135.03	-24.0	235.5	224.5	211.6	12.88	17.431		
2,900.0	2,870.8	2,855.8	2,855.5	9.3	5.4	-138.41	-23.9	234.1	237.7	224.5	13.26	17.923		
3,000.0	2,969.2	2,954.2	2,953.8	9.7	5.6	-141.43	-23.8	232.6	251.6	238.0	13.65	18.437		
3,100.0	3,067.6	3,052.4	3,052.0	10.2	5.8	-144.12	-23.8	231.2	266.1	252.1	14.03	18.963		
3,200.0	3,166.0	3,150.5	3,150.1	10.6	6.0	-146.51	-23.7	229.8	281.1	266.7	14.42	19.495		
3,300.0	3,264.4	3,248.6	3,248.2	11.0	6.2	-148.63	-23.6	228.6	296.6	281.8	14.81	20.024		
3,400.0	3,362.8	3,346.7	3,346.3	11.4	6.4	-150.52	-23.4	227.5	312.5	297.3	15.21	20.546		
3,500.0	3,461.2	3,444.8	3,444.4	11.8	6.6	-152.20	-23.1	226.5	328.8	313.2	15.61	21.055		
3,600.0	3,559.6	3,543.0	3,542.6	12.2	6.8	-153.71	-22.8	225.6	345.3	329.3	16.02	21.548		
3,700.0	3,657.9	3,641.2	3,640.8	12.6	7.0	-155.10	-22.5	224.6	362.0	345.6	16.44	22.024		
3,800.0	3,756.3	3,739.5	3,739.0	13.0	7.2	-156.37	-22.3	223.6	378.9	362.1	16.85	22.485		
3,900.0	3,854.7	3,837.7	3,837.2	13.4	7.5	-157.55	-22.1	222.4	396.0	378.8	17.27	22.929		
4,000.0	3,953.1	3,935.9	3,935.4	13.9	7.7	-158.64	-21.8	221.2	413.3	395.6	17.69	23.359		
4,100.0	4,051.5	4,033.9	4,033.4	14.3	7.9	-159.66	-21.7	219.9	430.7	412.6	18.12	23.772		
4,200.0	4,149.9	4,131.5	4,131.0	14.7	8.1	-160.66	-21.6	218.1	448.3	429.7	18.54	24.175		
4,300.0	4,248.3	4,229.0	4,228.5	15.1	8.3	-161.63	-21.6	215.9	466.1	447.2	18.97	24.574		
4,400.0	4,346.7	4,326.4	4,325.9	15.5	8.5	-162.60	-21.7	213.1	484.3	464.9	19.39	24.969		
4,500.0	4,445.1	4,423.7	4,423.1	15.9	8.7	-163.55	-21.8	209.9	502.6	482.8	19.82	25.362		
4,600.0	4,543.5	4,521.3	4,520.6	16.3	8.9	-164.48	-22.1	206.2	521.3	501.1	20.24	25.751		
4,700.0	4,641.9	4,620.6	4,619.9	16.8	9.1	-165.35	-22.4	202.7	540.0	519.3	20.67	26.117		
4,800.0	4,740.3	4,720.1	4,719.3	17.2	9.3	-166.10	-22.6	199.7	558.4	537.3	21.11	26.453		
4,900.0	4,838.6	4,819.8	4,819.0	17.6	9.6	-166.75	-22.9	197.4	576.7	555.2	21.55	26.760		

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.29-T5N-R63W - Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1												Offset Site Error: 0.0 ft	
Survey Program: 600-MWD												Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,000.0	4,937.0	4,919.6	4,918.8	18.0	9.8	-167.30	-23.1	195.7	594.8	572.8	22.00	27.039	
5,100.0	5,035.4	5,019.6	5,018.8	18.4	10.0	-167.77	-23.2	194.6	612.7	590.2	22.45	27.293	
5,200.0	5,133.9	5,119.6	5,118.8	18.8	10.2	-168.20	-23.4	194.1	629.9	607.0	22.91	27.500	
5,300.0	5,232.8	5,220.2	5,219.4	19.1	10.4	-168.53	-23.5	194.1	644.1	620.7	23.34	27.596	
5,400.0	5,332.2	5,321.4	5,320.6	19.3	10.6	-168.73	-23.7	194.6	654.6	630.8	23.75	27.563	
5,500.0	5,431.9	5,422.9	5,422.1	19.5	10.8	-168.82	-23.8	195.7	661.4	637.2	24.13	27.408	
5,600.0	5,531.8	5,523.9	5,523.1	19.6	11.0	-168.79	-23.9	197.3	664.5	640.0	24.48	27.141	
5,700.0	5,631.8	5,622.8	5,621.9	19.7	11.2	-31.23	-24.0	198.8	664.5	639.6	24.84	26.751	
5,800.0	5,731.8	5,721.6	5,720.8	19.9	11.4	-31.15	-24.1	200.0	663.8	638.6	25.21	26.326	
5,900.0	5,831.8	5,820.5	5,819.6	20.0	11.6	-31.14	-24.1	200.8	662.7	637.2	25.52	25.971	
6,000.0	5,931.2	5,918.7	5,917.9	20.0	11.8	-31.95	-24.2	201.4	653.4	627.9	25.45	25.677	
6,100.0	6,028.3	6,014.7	6,013.8	20.0	12.0	-33.87	-24.2	201.6	633.4	608.3	25.09	25.240	
6,200.0	6,121.6	6,106.1	6,105.3	19.8	12.2	-37.10	-24.2	201.5	603.5	578.9	24.60	24.528	
6,300.0	6,209.3	6,192.3	6,191.4	19.6	12.4	-41.89	-24.2	201.0	565.1	540.9	24.23	23.319	
6,400.0	6,290.1	6,271.6	6,270.8	19.3	12.6	-48.53	-24.1	200.3	520.1	495.7	24.35	21.362	
6,500.0	6,362.5	6,342.8	6,342.0	19.1	12.7	-57.09	-24.0	199.4	471.3	446.1	25.23	18.683	
6,600.0	6,425.4	6,404.7	6,403.8	18.8	12.9	-67.01	-23.8	198.4	422.9	396.2	26.72	15.829	
6,700.0	6,477.5	6,456.1	6,455.3	18.5	13.0	-76.89	-23.7	197.5	380.9	352.7	28.21	13.502	
6,800.0	6,518.0	6,500.0	6,499.1	18.2	13.1	-85.50	-23.6	196.6	353.4	324.1	29.29	12.065	
6,869.7	6,539.1	6,517.7	6,516.8	18.0	13.1	-88.75	-23.5	196.2	347.2	317.5	29.73	11.676	
6,900.0	6,546.3	6,525.1	6,524.2	18.0	13.1	-89.85	-23.5	196.0	348.4	318.5	29.89	11.659 SF	
7,000.0	6,561.9	6,541.2	6,540.3	17.8	13.1	-90.80	-23.4	195.7	369.8	339.4	30.43	12.154	
7,100.0	6,565.0	6,544.8	6,543.9	18.0	13.1	-88.99	-23.4	195.6	414.7	383.7	31.02	13.368	
7,200.0	6,565.0	6,545.1	6,544.2	18.9	13.1	-89.05	-23.4	195.6	476.6	444.8	31.85	14.967	
7,300.0	6,565.0	6,545.5	6,544.6	19.9	13.1	-89.11	-23.4	195.6	549.9	517.1	32.82	16.753	
7,400.0	6,565.0	6,545.9	6,545.0	21.1	13.1	-89.18	-23.4	195.6	630.5	596.6	33.93	18.582	
7,500.0	6,565.0	6,546.3	6,545.4	22.4	13.2	-89.24	-23.4	195.6	716.1	680.9	35.15	20.370	
7,600.0	6,565.0	6,546.7	6,545.8	23.8	13.2	-89.30	-23.4	195.6	805.0	768.5	36.47	22.073	
7,700.0	6,565.0	6,547.1	6,546.2	25.2	13.2	-89.37	-23.4	195.6	896.2	858.3	37.86	23.669	
7,800.0	6,565.0	6,547.5	6,546.6	26.7	13.2	-89.43	-23.4	195.6	989.1	949.8	39.33	25.152	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.29-T5N-R63W - Rothe 29BU (Exist.) - Wellbore #1 - Wellbore #1											Offset Site Error:	0.0 ft	
Survey Program: 600-MWD														Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (")	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
6,600.0	6,425.4	6,417.5	6,415.5	18.8	12.9	35.22	620.9	898.1	957.5	932.1	25.48	37.580			
6,700.0	6,477.5	6,469.7	6,467.6	18.5	13.1	44.40	620.0	898.3	878.3	852.2	26.01	33.771			
6,800.0	6,518.0	6,510.1	6,508.0	18.2	13.1	56.60	619.3	898.5	795.0	767.5	27.56	28.843			
6,900.0	6,546.3	6,538.4	6,536.3	18.0	13.2	70.85	618.7	898.6	710.1	680.7	29.42	24.141			
7,000.0	6,561.9	6,552.6	6,550.5	17.8	13.2	84.21	618.4	898.7	626.4	595.9	30.53	20.517			
7,100.0	6,565.0	6,553.5	6,551.4	18.0	13.2	91.36	618.4	898.7	547.0	516.0	31.05	17.616			
7,200.0	6,565.0	6,551.1	6,549.0	18.9	13.2	90.97	618.4	898.7	475.5	443.6	31.88	14.913			
7,300.0	6,565.0	6,548.7	6,546.7	19.9	13.2	90.59	618.5	898.7	415.8	383.0	32.87	12.651			
7,400.0	6,565.0	6,546.4	6,544.4	21.1	13.2	90.22	618.5	898.7	373.8	339.8	33.98	10.999			
7,500.0	6,565.0	6,544.2	6,542.1	22.4	13.2	89.86	618.6	898.7	355.7	320.5	35.21	10.102			
7,516.0	6,565.0	6,543.8	6,541.8	22.6	13.2	89.80	618.6	898.7	355.4	319.9	35.42	10.032 CC, ES			
7,600.0	6,565.0	6,541.9	6,539.9	23.8	13.2	89.50	618.6	898.7	365.1	328.6	36.53	9.995 SF			
7,700.0	6,565.0	6,539.7	6,537.7	25.2	13.2	89.15	618.7	898.6	400.1	362.2	37.93	10.550			
7,800.0	6,565.0	6,537.6	6,535.6	26.7	13.2	88.80	618.7	898.6	454.9	415.5	39.39	11.547			
7,900.0	6,565.0	6,535.5	6,533.4	28.2	13.2	88.46	618.8	898.6	523.1	482.2	40.91	12.787			
8,000.0	6,565.0	6,533.4	6,531.4	29.8	13.2	88.13	618.8	898.6	600.4	557.9	42.47	14.135			
8,100.0	6,565.0	6,531.4	6,529.3	31.4	13.2	87.80	618.9	898.6	683.5	639.4	44.07	15.508			
8,200.0	6,565.0	6,529.4	6,527.3	33.0	13.2	87.48	618.9	898.6	770.7	725.0	45.71	16.860			
8,300.0	6,565.0	6,527.4	6,525.4	34.7	13.2	87.16	618.9	898.6	860.6	813.2	47.37	18.168			
8,400.0	6,565.0	6,525.5	6,523.4	36.4	13.2	86.85	619.0	898.6	952.6	903.5	49.06	19.418			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-221 - Wellbore #1 - Plan #2 (4-10-15)											Offset Site Error:		0.0 ft
Survey Program: 0-MWD											Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
0.0	0.0	0.0	0.0	0.0	0.0	-90.01	0.0	-89.2	89.2				
100.0	100.0	100.0	100.0	0.1	0.1	-90.01	0.0	-89.2	89.2	88.9	0.22	396.738	
200.0	200.0	200.0	200.0	0.3	0.3	-90.01	0.0	-89.2	89.2	88.5	0.67	132.246	
300.0	300.0	300.0	300.0	0.6	0.6	-90.01	0.0	-89.2	89.2	88.0	1.12	79.348	
400.0	400.0	400.0	400.0	0.8	0.8	-90.01	0.0	-89.2	89.2	87.6	1.57	56.677 CC, ES	
500.0	500.0	500.0	500.0	1.0	1.0	132.94	0.0	-89.2	89.8	87.8	2.00	44.881	
600.0	600.0	600.0	600.0	1.2	1.2	134.12	0.0	-89.2	91.6	89.2	2.42	37.890	
700.0	699.9	699.9	699.9	1.4	1.5	136.00	0.0	-89.2	94.7	91.8	2.85	33.259	
800.0	799.7	799.7	799.7	1.6	1.7	138.42	0.0	-89.2	99.1	95.9	3.29	30.177	
900.0	899.4	899.4	899.4	1.9	1.9	141.21	0.0	-89.2	105.1	101.4	3.73	28.172	
1,000.0	998.9	998.9	998.9	2.1	2.1	144.22	0.0	-89.2	112.8	108.6	4.19	26.950	
1,100.0	1,098.3	1,098.3	1,098.3	2.4	2.4	147.27	0.0	-89.2	122.2	117.5	4.64	26.318	
1,200.0	1,197.4	1,197.4	1,197.4	2.7	2.6	150.24	0.0	-89.2	133.4	128.3	5.10	26.143	
1,300.0	1,296.3	1,296.9	1,296.9	3.0	2.8	152.75	-0.8	-89.3	146.2	140.7	5.54	26.410	
1,400.0	1,394.9	1,396.5	1,396.4	3.4	2.9	154.51	-3.4	-89.6	160.4	154.4	5.95	26.941	
1,500.0	1,493.3	1,496.1	1,496.0	3.7	3.1	155.66	-7.6	-90.0	175.4	169.0	6.39	27.452	
1,600.0	1,591.7	1,596.0	1,595.7	4.1	3.3	156.14	-13.6	-90.7	189.9	183.1	6.84	27.766	
1,700.0	1,690.1	1,696.0	1,695.4	4.5	3.5	156.09	-21.3	-91.6	204.0	196.7	7.31	27.897	
1,800.0	1,788.5	1,796.2	1,795.1	4.9	3.7	155.59	-30.8	-92.7	217.6	209.8	7.81	27.866	
1,900.0	1,886.9	1,896.4	1,894.6	5.3	4.0	154.74	-42.0	-93.9	230.6	222.3	8.33	27.695	
2,000.0	1,985.3	1,996.5	1,994.0	5.7	4.2	153.58	-54.9	-95.4	243.3	234.4	8.88	27.404	
2,100.0	2,083.7	2,096.7	2,093.0	6.1	4.5	152.15	-69.6	-97.0	255.7	246.2	9.46	27.013	
2,200.0	2,182.1	2,196.1	2,191.2	6.5	4.8	150.55	-85.6	-98.8	267.9	257.8	10.08	26.564	
2,300.0	2,280.5	2,295.1	2,288.8	6.9	5.1	149.07	-101.7	-100.7	280.2	269.5	10.72	26.130	
2,400.0	2,378.9	2,394.1	2,386.5	7.3	5.4	147.71	-117.8	-102.5	292.7	281.3	11.38	25.724	
2,500.0	2,477.3	2,493.1	2,484.1	7.7	5.7	146.46	-133.9	-104.3	305.4	293.3	12.05	25.345	
2,600.0	2,575.6	2,592.1	2,581.8	8.1	6.0	145.31	-150.0	-106.1	318.2	305.4	12.73	24.994	
2,700.0	2,674.0	2,691.0	2,679.4	8.5	6.4	144.25	-166.1	-107.9	331.1	317.7	13.42	24.670	
2,800.0	2,772.4	2,790.0	2,777.0	8.9	6.7	143.27	-182.2	-109.7	344.1	330.0	14.12	24.370	
2,900.0	2,870.8	2,889.0	2,874.7	9.3	7.1	142.36	-198.3	-111.6	357.2	342.4	14.83	24.093	
3,000.0	2,969.2	2,988.0	2,972.3	9.7	7.4	141.51	-214.4	-113.4	370.4	354.8	15.54	23.837	
3,100.0	3,067.6	3,087.0	3,070.0	10.2	7.8	140.73	-230.5	-115.2	383.6	367.4	16.26	23.601	
3,200.0	3,166.0	3,186.0	3,167.6	10.6	8.1	139.99	-246.6	-117.0	397.0	380.0	16.98	23.383	
3,300.0	3,264.4	3,284.9	3,265.3	11.0	8.5	139.31	-262.6	-118.8	410.4	392.7	17.70	23.181	
3,400.0	3,362.8	3,383.9	3,362.9	11.4	8.8	138.66	-278.7	-120.7	423.8	405.4	18.43	22.994	
3,500.0	3,461.2	3,482.9	3,460.6	11.8	9.2	138.06	-294.8	-122.5	437.3	418.1	19.16	22.820	
3,600.0	3,559.6	3,581.9	3,558.2	12.2	9.5	137.49	-310.9	-124.3	450.8	430.9	19.90	22.658	
3,700.0	3,657.9	3,680.9	3,655.9	12.6	9.9	136.96	-327.0	-126.1	464.4	443.8	20.63	22.508	
3,800.0	3,756.3	3,779.9	3,753.5	13.0	10.3	136.45	-343.1	-127.9	478.0	456.6	21.37	22.368	
3,900.0	3,854.7	3,878.8	3,851.2	13.4	10.6	135.98	-359.2	-129.7	491.7	469.6	22.11	22.236	
4,000.0	3,953.1	3,977.8	3,948.8	13.9	11.0	135.53	-375.3	-131.6	505.3	482.5	22.85	22.114	
4,100.0	4,051.5	4,076.8	4,046.5	14.3	11.4	135.10	-391.4	-133.4	519.1	495.5	23.59	21.999	
4,200.0	4,149.9	4,175.8	4,144.1	14.7	11.8	134.70	-407.5	-135.2	532.8	508.5	24.34	21.891	
4,300.0	4,248.3	4,274.8	4,241.8	15.1	12.1	134.31	-423.6	-137.0	546.6	521.5	25.08	21.790	
4,400.0	4,346.7	4,373.8	4,339.4	15.5	12.5	133.95	-439.7	-138.8	560.3	534.5	25.83	21.694	
4,500.0	4,445.1	4,472.7	4,437.1	15.9	12.9	133.60	-455.8	-140.6	574.1	547.6	26.58	21.604	
4,600.0	4,543.5	4,571.7	4,534.7	16.3	13.2	133.27	-471.9	-142.5	588.0	560.6	27.32	21.519	
4,700.0	4,641.9	4,670.7	4,632.4	16.8	13.6	132.95	-488.0	-144.3	601.8	573.7	28.07	21.439	
4,800.0	4,740.3	4,769.7	4,730.0	17.2	14.0	132.65	-504.1	-146.1	615.7	586.9	28.82	21.363	
4,900.0	4,838.6	4,868.7	4,827.7	17.6	14.4	132.36	-520.2	-147.9	629.5	600.0	29.57	21.291	
5,000.0	4,937.0	4,967.7	4,925.3	18.0	14.7	132.08	-536.3	-149.7	643.4	613.1	30.32	21.223	

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29I-221 - Wellbore #1 - Plan #2 (4-10-15)											Offset Site Error:		0.0 ft
Survey Program: 0-MWD											Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
5,100.0	5,035.4	5,066.6	5,023.0	18.4	15.1	131.82	-552.4	-151.6	657.3	626.3	31.07	21.158	
5,200.0	5,133.9	5,168.3	5,123.5	18.8	15.4	131.75	-567.4	-153.3	670.8	639.1	31.71	21.156	
5,300.0	5,232.8	5,270.5	5,225.0	19.1	15.6	131.88	-579.0	-154.6	681.9	649.7	32.20	21.177	
5,400.0	5,332.2	5,373.1	5,327.3	19.3	15.9	132.05	-586.9	-155.5	690.3	657.7	32.62	21.160	
5,500.0	5,431.9	5,475.8	5,429.9	19.5	16.0	132.25	-591.3	-155.9	695.9	663.0	32.97	21.108	
5,600.0	5,531.8	5,577.7	5,531.8	19.6	16.2	132.48	-592.1	-156.0	698.8	665.5	33.26	21.013	
5,700.0	5,631.8	5,677.7	5,631.8	19.7	16.3	-90.00	-592.1	-156.0	699.4	665.8	33.52	20.861	
5,740.4	5,672.2	5,718.1	5,672.2	19.8	16.4	-89.99	-591.9	-156.0	699.4	665.7	33.62	20.799	
5,800.0	5,731.8	5,777.4	5,731.4	19.9	16.4	-89.69	-588.3	-156.0	699.4	665.6	33.72	20.739	
5,900.0	5,831.8	5,874.8	5,827.4	20.0	16.4	-88.43	-572.4	-156.0	699.6	665.9	33.72	20.751	
6,000.0	5,931.2	5,969.5	5,918.1	20.0	16.3	-86.95	-545.4	-156.0	700.4	666.9	33.50	20.905	
6,100.0	6,028.3	6,062.3	6,003.1	20.0	16.1	-85.54	-508.3	-156.0	701.5	668.4	33.12	21.182	
6,200.0	6,121.6	6,153.4	6,081.5	19.8	15.9	-84.21	-462.1	-156.0	703.0	670.4	32.62	21.550	
6,300.0	6,209.3	6,242.9	6,152.7	19.6	15.7	-82.99	-407.9	-156.0	704.7	672.7	32.08	21.971	
6,400.0	6,290.1	6,331.1	6,216.2	19.3	15.5	-81.87	-346.7	-156.0	706.6	675.0	31.55	22.394	
6,500.0	6,362.5	6,418.2	6,271.5	19.1	15.3	-80.89	-279.5	-156.0	708.4	677.3	31.13	22.759	
6,600.0	6,425.4	6,504.3	6,318.4	18.8	15.3	-80.05	-207.3	-156.0	710.1	679.3	30.87	23.005	
6,700.0	6,477.5	6,589.7	6,356.5	18.5	15.3	-79.36	-131.0	-156.0	711.7	680.8	30.86	23.063	
6,800.0	6,518.0	6,674.5	6,385.7	18.2	15.5	-78.83	-51.4	-156.0	712.9	681.8	31.14	22.893	
6,900.0	6,546.3	6,758.8	6,405.9	18.0	15.8	-78.46	30.4	-156.0	713.8	682.1	31.74	22.486	
7,000.0	6,561.9	6,842.9	6,416.9	17.8	16.3	-78.26	113.7	-156.0	714.3	681.6	32.68	21.859	
7,100.0	6,565.0	6,930.9	6,418.9	18.0	16.9	-78.20	201.7	-156.0	714.4	680.5	33.95	21.041	
7,200.0	6,565.0	7,030.9	6,418.3	18.9	17.8	-78.15	301.7	-156.0	714.6	678.9	35.62	20.061	
7,300.0	6,565.0	7,130.9	6,417.7	19.9	18.9	-78.11	401.7	-156.0	714.7	677.1	37.59	19.014	
7,400.0	6,565.0	7,230.9	6,417.1	21.1	20.0	-78.06	501.7	-156.0	714.8	675.0	39.81	17.954	
7,500.0	6,565.0	7,330.9	6,416.5	22.4	21.3	-78.01	601.7	-156.0	714.9	672.7	42.26	16.919	
7,600.0	6,565.0	7,430.9	6,415.9	23.8	22.7	-77.96	701.7	-156.0	715.1	670.2	44.88	15.932	
7,700.0	6,565.0	7,530.9	6,415.3	25.2	24.1	-77.91	801.7	-156.0	715.2	667.5	47.66	15.006	
7,800.0	6,565.0	7,630.9	6,414.6	26.7	25.6	-77.87	901.7	-156.0	715.3	664.8	50.57	14.147	
7,900.0	6,565.0	7,730.9	6,414.0	28.2	27.2	-77.82	1,001.7	-156.0	715.5	661.9	53.58	13.354	
8,000.0	6,565.0	7,830.9	6,413.4	29.8	28.8	-77.77	1,101.7	-156.0	715.6	658.9	56.67	12.626	
8,100.0	6,565.0	7,930.9	6,412.8	31.4	30.4	-77.72	1,201.7	-156.0	715.7	655.9	59.85	11.959	
8,200.0	6,565.0	8,030.9	6,412.2	33.0	32.1	-77.67	1,301.7	-156.0	715.8	652.8	63.08	11.347	
8,300.0	6,565.0	8,130.9	6,411.6	34.7	33.8	-77.63	1,401.7	-156.0	716.0	649.6	66.38	10.787	
8,400.0	6,565.0	8,230.9	6,411.0	36.4	35.5	-77.58	1,501.7	-156.0	716.1	646.4	69.71	10.273	
8,500.0	6,565.0	8,330.9	6,410.4	38.1	37.3	-77.53	1,601.6	-156.0	716.2	643.2	73.09	9.800	
8,600.0	6,565.0	8,430.9	6,409.8	39.8	39.0	-77.48	1,701.6	-156.0	716.4	639.9	76.50	9.365	
8,700.0	6,565.0	8,530.9	6,409.1	41.6	40.8	-77.44	1,801.6	-156.0	716.5	636.6	79.94	8.964	
8,800.0	6,565.0	8,630.9	6,408.5	43.3	42.6	-77.39	1,901.6	-156.0	716.6	633.2	83.40	8.593	
8,900.0	6,565.0	8,730.9	6,407.9	45.1	44.4	-77.34	2,001.6	-156.0	716.8	629.9	86.89	8.249	
9,000.0	6,565.0	8,830.9	6,407.3	46.9	46.2	-77.29	2,101.6	-156.0	716.9	626.5	90.39	7.931	
9,100.0	6,565.0	8,930.9	6,406.7	48.6	48.0	-77.25	2,201.6	-156.0	717.0	623.1	93.92	7.635	
9,200.0	6,565.0	9,030.9	6,406.1	50.4	49.8	-77.20	2,301.6	-156.0	717.2	619.7	97.46	7.359	
9,300.0	6,565.0	9,130.9	6,405.5	52.3	51.6	-77.15	2,401.6	-156.0	717.3	616.3	101.01	7.101	
9,400.0	6,565.0	9,230.9	6,404.9	54.1	53.5	-77.10	2,501.6	-156.0	717.4	612.9	104.58	6.861	
9,500.0	6,565.0	9,330.9	6,404.3	55.9	55.3	-77.06	2,601.6	-156.0	717.6	609.4	108.15	6.635	
9,600.0	6,565.0	9,430.9	6,403.6	57.7	57.2	-77.01	2,701.6	-156.0	717.7	606.0	111.74	6.423	
9,700.0	6,565.0	9,530.9	6,403.0	59.6	59.0	-76.96	2,801.6	-156.0	717.9	602.5	115.33	6.224	
9,800.0	6,565.0	9,630.9	6,402.4	61.4	60.9	-76.91	2,901.6	-156.0	718.0	599.1	118.93	6.037	
9,900.0	6,565.0	9,730.9	6,401.8	63.2	62.7	-76.87	3,001.6	-156.0	718.1	595.6	122.54	5.860	

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Offset														
Semi Major Axis														
Distance														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	6,565.0	9,830.9	6,401.2	65.1	64.6	-76.82	3,101.6	-156.0	718.3	592.1	126.16	5.694		
10,100.0	6,565.0	9,930.9	6,400.6	66.9	66.5	-76.77	3,201.6	-156.0	718.4	588.6	129.78	5.536		
10,200.0	6,565.0	10,030.8	6,400.0	68.8	68.3	-76.72	3,301.6	-156.0	718.6	585.2	133.40	5.386		
10,300.0	6,565.0	10,130.8	6,399.4	70.6	70.2	-76.68	3,401.6	-156.0	718.7	581.7	137.03	5.245		
10,400.0	6,565.0	10,230.8	6,398.8	72.5	72.1	-76.63	3,501.6	-156.0	718.8	578.2	140.66	5.110		
10,500.0	6,565.0	10,330.8	6,398.1	74.4	74.0	-76.58	3,601.6	-156.0	719.0	574.7	144.30	4.983		
10,600.0	6,565.0	10,430.8	6,397.5	76.2	75.8	-76.53	3,701.6	-156.0	719.1	571.2	147.94	4.861		
10,700.0	6,565.0	10,530.8	6,396.9	78.1	77.7	-76.49	3,801.6	-156.0	719.3	567.7	151.58	4.745		
10,800.0	6,565.0	10,630.8	6,396.3	80.0	79.6	-76.44	3,901.6	-156.0	719.4	564.2	155.23	4.635		
10,900.0	6,565.0	10,730.8	6,395.7	81.9	81.5	-76.39	4,001.6	-156.0	719.6	560.7	158.88	4.529		
11,000.0	6,565.0	10,830.8	6,395.1	83.7	83.4	-76.34	4,101.6	-156.0	719.7	557.2	162.53	4.428		
11,014.1	6,565.0	10,845.0	6,395.0	84.0	83.6	-76.34	4,115.7	-156.0	719.7	556.7	163.04	4.414 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29I-321 - Wellbore #1 - Plan #3 (4-10-15)												Offset Site Error: 0.0 ft	
Survey Program: 0-MWD												Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
0.0	0.0	0.0	0.0	0.0	0.0	-90.00	0.0	-58.5	58.5				
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-58.5	58.5	58.3	0.22	260.359	CC, ES
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-58.5	58.5	57.8	0.67	86.786	
300.0	300.0	300.0	300.0	0.6	0.6	-90.00	0.0	-58.5	58.5	57.4	1.12	52.072	
400.0	400.0	400.0	400.0	0.8	0.8	-90.00	0.0	-58.5	58.5	56.9	1.57	37.194	
500.0	500.0	500.0	500.0	1.0	1.0	133.15	0.0	-58.5	59.1	57.1	2.00	29.556	
600.0	600.0	600.0	600.0	1.2	1.2	134.94	0.0	-58.5	60.9	58.5	2.42	25.214	
700.0	699.9	699.9	699.9	1.4	1.5	137.68	0.0	-58.5	64.1	61.2	2.85	22.520	
800.0	799.7	799.7	799.7	1.6	1.7	141.07	0.0	-58.5	68.7	65.4	3.28	20.926	
900.0	899.4	899.4	899.4	1.9	1.9	144.80	0.0	-58.5	75.0	71.3	3.73	20.109	
1,000.0	998.9	998.9	998.9	2.1	2.1	148.57	0.0	-58.5	83.0	78.8	4.18	19.867	
1,100.0	1,098.3	1,099.1	1,099.1	2.4	2.3	151.73	-0.8	-58.4	92.5	87.9	4.60	20.078	
1,200.0	1,197.4	1,199.3	1,199.3	2.7	2.5	153.90	-3.4	-57.9	102.8	97.7	5.01	20.497	
1,300.0	1,296.3	1,299.7	1,299.6	3.0	2.7	155.29	-7.7	-57.1	113.8	108.3	5.44	20.932	
1,400.0	1,394.9	1,400.2	1,399.9	3.4	2.9	156.08	-13.7	-55.9	125.5	119.6	5.87	21.356	
1,500.0	1,493.3	1,500.8	1,500.2	3.7	3.1	156.38	-21.5	-54.5	137.4	131.0	6.34	21.672	
1,600.0	1,591.7	1,601.6	1,600.5	4.1	3.3	156.09	-31.0	-52.7	148.3	141.5	6.83	21.730	
1,700.0	1,690.1	1,702.6	1,700.9	4.5	3.6	155.31	-42.3	-50.6	158.3	151.0	7.34	21.571	
1,800.0	1,788.5	1,803.7	1,801.1	4.9	3.8	154.10	-55.3	-48.1	167.4	159.5	7.89	21.231	
1,900.0	1,886.9	1,904.7	1,900.9	5.3	4.1	152.53	-70.0	-45.3	175.6	167.2	8.47	20.748	
2,000.0	1,985.3	2,004.3	1,999.3	5.7	4.4	150.93	-85.3	-42.5	183.6	174.6	9.07	20.243	
2,100.0	2,083.7	2,103.8	2,097.6	6.1	4.7	149.46	-100.5	-39.6	191.8	182.1	9.70	19.776	
2,200.0	2,182.1	2,203.4	2,196.0	6.5	5.0	148.12	-115.7	-36.7	200.0	189.7	10.34	19.345	
2,300.0	2,280.5	2,302.9	2,294.3	6.9	5.4	146.88	-130.9	-33.9	208.4	197.4	11.00	18.950	
2,400.0	2,378.9	2,402.5	2,392.7	7.3	5.7	145.73	-146.1	-31.0	216.8	205.1	11.66	18.587	
2,500.0	2,477.3	2,502.0	2,491.0	7.7	6.0	144.67	-161.3	-28.2	225.3	213.0	12.34	18.254	
2,600.0	2,575.6	2,601.6	2,589.3	8.1	6.4	143.69	-176.5	-25.3	233.9	220.9	13.03	17.949	
2,700.0	2,674.0	2,701.1	2,687.7	8.5	6.7	142.78	-191.7	-22.4	242.6	228.8	13.73	17.668	
2,800.0	2,772.4	2,800.7	2,786.0	8.9	7.1	141.93	-207.0	-19.6	251.3	236.8	14.43	17.411	
2,900.0	2,870.8	2,900.2	2,884.4	9.3	7.4	141.14	-222.2	-16.7	260.0	244.9	15.14	17.174	
3,000.0	2,969.2	2,999.8	2,982.7	9.7	7.8	140.40	-237.4	-13.8	268.8	253.0	15.85	16.956	
3,100.0	3,067.6	3,099.3	3,081.1	10.2	8.1	139.71	-252.6	-11.0	277.7	261.1	16.57	16.755	
3,200.0	3,166.0	3,198.9	3,179.4	10.6	8.5	139.06	-267.8	-8.1	286.6	269.3	17.30	16.569	
3,300.0	3,264.4	3,298.5	3,277.7	11.0	8.8	138.45	-283.0	-5.3	295.5	277.5	18.02	16.396	
3,400.0	3,362.8	3,398.0	3,376.1	11.4	9.2	137.87	-298.2	-2.4	304.4	285.7	18.75	16.236	
3,500.0	3,461.2	3,497.6	3,474.4	11.8	9.5	137.33	-313.4	0.5	313.4	293.9	19.48	16.087	
3,600.0	3,559.6	3,597.1	3,572.8	12.2	9.9	136.82	-328.6	3.3	322.4	302.2	20.22	15.948	
3,700.0	3,657.9	3,696.7	3,671.1	12.6	10.3	136.33	-343.9	6.2	331.4	310.5	20.95	15.819	
3,800.0	3,756.3	3,796.2	3,769.5	13.0	10.6	135.87	-359.1	9.1	340.5	318.8	21.69	15.698	
3,900.0	3,854.7	3,895.8	3,867.8	13.4	11.0	135.44	-374.3	11.9	349.6	327.1	22.43	15.584	
4,000.0	3,953.1	3,995.3	3,966.1	13.9	11.4	135.03	-389.5	14.8	358.7	335.5	23.17	15.478	
4,100.0	4,051.5	4,094.9	4,064.5	14.3	11.7	134.63	-404.7	17.7	367.8	343.8	23.91	15.378	
4,200.0	4,149.9	4,194.4	4,162.8	14.7	12.1	134.26	-419.9	20.5	376.9	352.2	24.66	15.284	
4,300.0	4,248.3	4,294.0	4,261.2	15.1	12.5	133.91	-435.1	23.4	386.0	360.6	25.40	15.196	
4,400.0	4,346.7	4,393.5	4,359.5	15.5	12.8	133.57	-450.3	26.2	395.2	369.0	26.15	15.112	
4,500.0	4,445.1	4,493.1	4,457.9	15.9	13.2	133.24	-465.6	29.1	404.4	377.5	26.90	15.033	
4,600.0	4,543.5	4,592.6	4,556.2	16.3	13.6	132.93	-480.8	32.0	413.5	385.9	27.65	14.958	
4,700.0	4,641.9	4,692.2	4,654.5	16.8	13.9	132.64	-496.0	34.8	422.7	394.3	28.39	14.888	
4,800.0	4,740.3	4,791.8	4,752.9	17.2	14.3	132.35	-511.2	37.7	431.9	402.8	29.14	14.821	
4,900.0	4,838.6	4,891.3	4,851.2	17.6	14.7	132.08	-526.4	40.6	441.1	411.2	29.89	14.757	
5,000.0	4,937.0	4,990.9	4,949.6	18.0	15.0	131.82	-541.6	43.4	450.4	419.7	30.64	14.696	

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-321 - Wellbore #1 - Plan #3 (4-10-15)											Offset Site Error:		0.0 ft
Survey Program: 0-MWD											Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
5,100.0	5,035.4	5,090.4	5,047.9	18.4	15.4	131.57	-556.8	46.3	459.6	428.2	31.40	14.639	
5,200.0	5,133.9	5,187.4	5,144.0	18.8	15.7	131.54	-570.3	48.8	468.8	436.8	32.00	14.652	
5,300.0	5,232.8	5,284.4	5,240.3	19.1	15.9	131.69	-580.5	50.7	476.7	444.2	32.45	14.689	
5,400.0	5,332.2	5,381.3	5,337.0	19.3	16.1	131.90	-587.5	52.1	482.8	450.0	32.83	14.704	
5,500.0	5,431.9	5,478.3	5,433.9	19.5	16.2	132.16	-591.4	52.8	487.2	454.1	33.14	14.700	
5,600.0	5,531.8	5,576.2	5,531.8	19.6	16.4	132.46	-592.1	52.9	489.8	456.4	33.39	14.668	
5,700.0	5,631.8	5,676.2	5,631.8	19.7	16.5	-90.00	-592.1	52.9	490.4	456.7	33.65	14.572	
5,764.6	5,696.4	5,740.8	5,696.4	19.8	16.6	-90.00	-592.1	52.9	490.4	456.6	33.82	14.499	
5,800.0	5,731.8	5,776.2	5,731.8	19.9	16.7	-89.99	-592.0	52.9	490.4	456.5	33.91	14.461	
5,900.0	5,831.8	5,875.5	5,830.7	20.0	16.7	-89.13	-584.1	52.9	490.4	456.4	33.99	14.430	
6,000.0	5,931.2	5,973.3	5,926.4	20.0	16.7	-87.93	-563.8	52.9	490.7	456.9	33.82	14.508	
6,100.0	6,028.3	6,070.0	6,017.5	20.0	16.5	-86.77	-531.9	52.9	491.2	457.7	33.47	14.673	
6,200.0	6,121.6	6,165.4	6,102.9	19.8	16.3	-85.68	-489.4	52.9	491.8	458.8	33.00	14.904	
6,300.0	6,209.3	6,259.9	6,181.6	19.6	16.1	-84.66	-437.2	52.9	492.5	460.1	32.45	15.176	
6,400.0	6,290.1	6,353.4	6,252.5	19.3	15.9	-83.73	-376.3	52.9	493.3	461.4	31.92	15.454	
6,500.0	6,362.5	6,446.2	6,314.9	19.1	15.7	-82.91	-307.8	52.9	494.2	462.7	31.49	15.694	
6,600.0	6,425.4	6,538.3	6,368.3	18.8	15.6	-82.20	-232.8	52.9	495.0	463.7	31.23	15.850	
6,700.0	6,477.5	6,629.8	6,412.0	18.5	15.6	-81.62	-152.5	52.9	495.7	464.5	31.22	15.878	
6,800.0	6,518.0	6,720.8	6,445.7	18.2	15.8	-81.17	-67.9	52.9	496.3	464.8	31.51	15.750	
6,900.0	6,546.3	6,811.6	6,469.0	18.0	16.1	-80.86	19.7	52.9	496.7	464.6	32.14	15.456	
7,000.0	6,561.9	6,900.0	6,481.5	17.8	16.5	-80.69	107.2	52.9	496.9	463.9	33.09	15.020	
7,100.0	6,565.0	6,994.9	6,484.1	18.0	17.2	-80.63	202.0	52.9	497.0	462.6	34.39	14.451	
7,200.0	6,565.0	7,094.8	6,483.3	18.9	18.1	-80.54	302.0	52.9	497.1	461.1	36.06	13.787	
7,300.0	6,565.0	7,194.8	6,482.5	19.9	19.1	-80.45	402.0	52.9	497.3	459.2	38.02	13.078	
7,400.0	6,565.0	7,294.8	6,481.8	21.1	20.3	-80.37	502.0	52.9	497.4	457.1	40.25	12.358	
7,500.0	6,565.0	7,394.8	6,481.0	22.4	21.6	-80.28	601.9	52.9	497.5	454.8	42.69	11.653	
7,600.0	6,565.0	7,494.8	6,480.2	23.8	22.9	-80.19	701.9	52.9	497.7	452.3	45.32	10.980	
7,700.0	6,565.0	7,594.8	6,479.5	25.2	24.4	-80.10	801.9	52.9	497.8	449.7	48.10	10.348	
7,800.0	6,565.0	7,694.8	6,478.7	26.7	25.9	-80.02	901.9	52.9	497.9	446.9	51.01	9.761	
7,900.0	6,565.0	7,794.8	6,477.9	28.2	27.4	-79.93	1,001.9	52.9	498.1	444.0	54.03	9.218	
8,000.0	6,565.0	7,894.8	6,477.2	29.8	29.0	-79.84	1,101.9	52.9	498.2	441.1	57.13	8.720	
8,100.0	6,565.0	7,994.8	6,476.4	31.4	30.6	-79.76	1,201.9	52.9	498.3	438.0	60.31	8.262	
8,200.0	6,565.0	8,094.8	6,475.6	33.0	32.3	-79.67	1,301.9	52.9	498.5	434.9	63.56	7.843	
8,300.0	6,565.0	8,194.8	6,474.8	34.7	34.0	-79.58	1,401.9	52.9	498.6	431.7	66.85	7.458	
8,400.0	6,565.0	8,294.8	6,474.1	36.4	35.7	-79.50	1,501.9	52.9	498.7	428.5	70.20	7.105	
8,500.0	6,565.0	8,394.8	6,473.3	38.1	37.4	-79.41	1,601.9	52.9	498.9	425.3	73.58	6.780	
8,600.0	6,565.0	8,494.8	6,472.5	39.8	39.2	-79.32	1,701.9	52.9	499.0	422.0	77.00	6.481	
8,700.0	6,565.0	8,594.8	6,471.8	41.6	41.0	-79.24	1,801.9	52.9	499.2	418.7	80.44	6.205	
8,800.0	6,565.0	8,694.8	6,471.0	43.3	42.7	-79.15	1,901.9	52.9	499.3	415.4	83.91	5.950	
8,900.0	6,565.0	8,794.8	6,470.2	45.1	44.5	-79.06	2,001.9	52.9	499.5	412.0	87.41	5.714	
9,000.0	6,565.0	8,894.8	6,469.5	46.9	46.3	-78.98	2,101.9	52.9	499.6	408.7	90.92	5.495	
9,100.0	6,565.0	8,994.8	6,468.7	48.6	48.1	-78.89	2,201.9	52.9	499.7	405.3	94.45	5.291	
9,200.0	6,565.0	9,094.8	6,467.9	50.4	50.0	-78.80	2,301.8	52.9	499.9	401.9	97.99	5.101	
9,300.0	6,565.0	9,194.8	6,467.2	52.3	51.8	-78.72	2,401.8	52.9	500.0	398.5	101.55	4.924	
9,400.0	6,565.0	9,294.8	6,466.4	54.1	53.6	-78.63	2,501.8	52.9	500.2	395.1	105.12	4.758	
9,500.0	6,565.0	9,394.8	6,465.6	55.9	55.5	-78.55	2,601.8	52.9	500.3	391.6	108.70	4.603	
9,600.0	6,565.0	9,494.8	6,464.9	57.7	57.3	-78.46	2,701.8	52.9	500.5	388.2	112.29	4.457	
9,700.0	6,565.0	9,594.8	6,464.1	59.6	59.2	-78.37	2,801.8	52.9	500.7	384.8	115.88	4.320	
9,800.0	6,565.0	9,694.8	6,463.3	61.4	61.0	-78.29	2,901.8	52.9	500.8	381.3	119.49	4.191	
9,900.0	6,565.0	9,794.8	6,462.6	63.2	62.9	-78.20	3,001.8	52.9	501.0	377.9	123.09	4.070	

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Offset														
Semi Major Axis														
Distance														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	6,565.0	9,894.8	6,461.8	65.1	64.7	-78.11	3,101.8	52.9	501.1	374.4	126.71	3.955		
10,100.0	6,565.0	9,994.8	6,461.0	66.9	66.6	-78.03	3,201.8	52.9	501.3	371.0	130.33	3.846		
10,200.0	6,565.0	10,094.8	6,460.3	68.8	68.5	-77.94	3,301.8	52.9	501.4	367.5	133.95	3.743		
10,300.0	6,565.0	10,194.8	6,459.5	70.6	70.3	-77.86	3,401.8	52.9	501.6	364.0	137.58	3.646		
10,400.0	6,565.0	10,294.8	6,458.7	72.5	72.2	-77.77	3,501.8	52.9	501.8	360.6	141.21	3.553		
10,500.0	6,565.0	10,394.8	6,458.0	74.4	74.1	-77.69	3,601.8	52.9	501.9	357.1	144.84	3.465		
10,600.0	6,565.0	10,494.7	6,457.2	76.2	76.0	-77.60	3,701.8	52.9	502.1	353.6	148.47	3.382		
10,700.0	6,565.0	10,594.7	6,456.4	78.1	77.8	-77.51	3,801.8	52.9	502.3	350.1	152.11	3.302		
10,800.0	6,565.0	10,694.7	6,455.7	80.0	79.7	-77.43	3,901.8	52.9	502.4	346.7	155.75	3.226		
10,900.0	6,565.0	10,794.7	6,454.9	81.9	81.6	-77.34	4,001.7	52.9	502.6	343.2	159.39	3.153		
11,000.0	6,565.0	10,894.7	6,454.1	83.7	83.5	-77.26	4,101.7	52.9	502.8	339.7	163.03	3.084		
11,014.1	6,565.0	10,908.9	6,454.0	84.0	83.8	-77.25	4,115.9	52.9	502.8	339.2	163.54	3.074 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29I-401 - Wellbore #1 - Plan #2 (4-10-15)											Offset Site Error:		0.0 ft	
Survey Program: 0-MWD											Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	1.0	1.0	0.0	0.0	-90.01	0.0	-119.8	119.8	119.8	0.00	N/A		
100.0	100.0	101.0	101.0	0.1	0.1	-90.01	0.0	-119.8	119.8	119.6	0.23	527.838		
200.0	200.0	201.0	201.0	0.3	0.3	-90.01	0.0	-119.8	119.8	119.1	0.68	177.115		
300.0	300.0	301.0	301.0	0.6	0.6	-90.01	0.0	-119.8	119.8	118.7	1.13	106.410		
400.0	400.0	401.0	401.0	0.8	0.8	-90.01	0.0	-119.8	119.8	118.3	1.58	76.051	CC, ES	
500.0	500.0	501.0	501.0	1.0	1.0	132.83	0.0	-119.8	120.4	118.4	2.00	60.140		
600.0	600.0	601.0	601.0	1.2	1.2	133.72	0.0	-119.8	122.2	119.8	2.42	50.523		
700.0	699.9	700.9	700.9	1.4	1.5	135.14	0.0	-119.8	125.3	122.4	2.85	43.978		
800.0	799.7	800.7	800.7	1.6	1.7	137.01	0.0	-119.8	129.7	126.4	3.29	39.439		
900.0	899.4	900.0	900.0	1.9	1.9	138.87	-0.8	-120.1	135.7	132.0	3.71	36.602		
1,000.0	998.9	998.8	998.8	2.1	2.1	140.31	-3.2	-121.1	143.7	139.6	4.12	34.885		
1,100.0	1,098.3	1,097.7	1,097.6	2.4	2.2	141.37	-7.2	-122.6	153.4	148.9	4.55	33.729		
1,200.0	1,197.4	1,196.5	1,196.2	2.7	2.4	142.07	-12.8	-124.8	164.9	159.9	5.00	32.987		
1,300.0	1,296.3	1,295.0	1,294.4	3.0	2.7	142.46	-20.0	-127.5	178.1	172.7	5.47	32.541		
1,400.0	1,394.9	1,393.3	1,392.3	3.4	2.9	142.60	-28.7	-130.9	193.1	187.1	5.98	32.305		
1,500.0	1,493.3	1,491.4	1,489.7	3.7	3.1	142.52	-38.9	-134.8	209.3	202.8	6.51	32.153		
1,600.0	1,591.7	1,589.3	1,586.8	4.1	3.4	142.06	-50.7	-139.4	225.9	218.9	7.07	31.941		
1,700.0	1,690.1	1,687.1	1,683.6	4.5	3.7	141.28	-63.9	-144.5	242.9	235.2	7.67	31.680		
1,800.0	1,788.5	1,785.6	1,780.9	4.9	4.0	140.47	-77.8	-149.9	260.0	251.8	8.29	31.386		
1,900.0	1,886.9	1,884.0	1,878.2	5.3	4.3	139.77	-91.7	-155.2	277.2	268.3	8.92	31.090		
2,000.0	1,985.3	1,982.5	1,975.6	5.7	4.6	139.14	-105.6	-160.6	294.4	284.9	9.56	30.804		
2,100.0	2,083.7	2,081.0	2,072.9	6.1	4.9	138.58	-119.5	-165.9	311.7	301.5	10.21	30.530		
2,200.0	2,182.1	2,179.4	2,170.2	6.5	5.3	138.09	-133.4	-171.3	329.0	318.1	10.87	30.270		
2,300.0	2,280.5	2,277.9	2,267.5	6.9	5.6	137.64	-147.3	-176.7	346.2	334.7	11.53	30.027		
2,400.0	2,378.9	2,376.3	2,364.9	7.3	5.9	137.23	-161.2	-182.0	363.6	351.4	12.20	29.799		
2,500.0	2,477.3	2,474.8	2,462.2	7.7	6.3	136.86	-175.1	-187.4	380.9	368.0	12.87	29.586		
2,600.0	2,575.6	2,573.2	2,559.5	8.1	6.6	136.53	-189.0	-192.8	398.2	384.7	13.55	29.388		
2,700.0	2,674.0	2,671.7	2,656.8	8.5	7.0	136.22	-202.9	-198.1	415.6	401.4	14.23	29.203		
2,800.0	2,772.4	2,770.2	2,754.2	8.9	7.3	135.94	-216.8	-203.5	433.0	418.0	14.91	29.031		
2,900.0	2,870.8	2,868.6	2,851.5	9.3	7.7	135.67	-230.7	-208.8	450.3	434.7	15.60	28.870		
3,000.0	2,969.2	2,967.1	2,948.8	9.7	8.0	135.43	-244.6	-214.2	467.7	451.4	16.29	28.719		
3,100.0	3,067.6	3,065.5	3,046.1	10.2	8.4	135.21	-258.5	-219.6	485.1	468.1	16.97	28.578		
3,200.0	3,166.0	3,164.0	3,143.5	10.6	8.7	135.00	-272.4	-224.9	502.5	484.8	17.66	28.446		
3,300.0	3,264.4	3,262.5	3,240.8	11.0	9.1	134.80	-286.3	-230.3	519.9	501.5	18.36	28.323		
3,400.0	3,362.8	3,360.9	3,338.1	11.4	9.4	134.62	-300.2	-235.7	537.3	518.3	19.05	28.206		
3,500.0	3,461.2	3,459.4	3,435.4	11.8	9.8	134.45	-314.1	-241.0	554.7	535.0	19.74	28.097		
3,600.0	3,559.6	3,557.8	3,532.8	12.2	10.1	134.29	-328.0	-246.4	572.1	551.7	20.44	27.994		
3,700.0	3,657.9	3,656.3	3,630.1	12.6	10.5	134.13	-341.9	-251.8	589.6	568.4	21.13	27.896		
3,800.0	3,756.3	3,754.8	3,727.4	13.0	10.8	133.99	-355.8	-257.1	607.0	585.2	21.83	27.804		
3,900.0	3,854.7	3,853.2	3,824.7	13.4	11.2	133.86	-369.7	-262.5	624.4	601.9	22.53	27.717		
4,000.0	3,953.1	3,951.7	3,922.1	13.9	11.6	133.73	-383.6	-267.8	641.9	618.6	23.23	27.635		
4,100.0	4,051.5	4,050.1	4,019.4	14.3	11.9	133.61	-397.5	-273.2	659.3	635.4	23.93	27.557		
4,200.0	4,149.9	4,148.6	4,116.7	14.7	12.3	133.49	-411.4	-278.6	676.7	652.1	24.62	27.483		
4,300.0	4,248.3	4,247.0	4,214.0	15.1	12.6	133.39	-425.3	-283.9	694.2	668.9	25.32	27.412		
4,400.0	4,346.7	4,345.5	4,311.4	15.5	13.0	133.28	-439.2	-289.3	711.6	685.6	26.02	27.345		
4,500.0	4,445.1	4,444.0	4,408.7	15.9	13.3	133.18	-453.1	-294.7	729.1	702.3	26.72	27.281		
4,600.0	4,543.5	4,542.4	4,506.0	16.3	13.7	133.09	-467.0	-300.0	746.5	719.1	27.43	27.220		
4,700.0	4,641.9	4,640.9	4,603.3	16.8	14.1	133.00	-480.9	-305.4	764.0	735.8	28.13	27.161		
4,800.0	4,740.3	4,739.3	4,700.7	17.2	14.4	132.91	-494.8	-310.7	781.4	752.6	28.83	27.106		
4,900.0	4,838.6	4,837.8	4,798.0	17.6	14.8	132.83	-508.7	-316.1	798.9	769.3	29.53	27.052		
5,000.0	4,937.0	4,936.3	4,895.3	18.0	15.1	132.75	-522.6	-321.5	816.3	786.1	30.23	27.001		

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29I-401 - Wellbore #1 - Plan #2 (4-10-15)											Offset Site Error:		0.0 ft
Survey Program: 0-MWD											Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance					Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)		Separation Factor
5,100.0	5,035.4	5,034.7	4,992.6	18.4	15.5	132.68	-536.5	-326.8	833.8	802.9	30.94	26.952	
5,200.0	5,133.9	5,133.2	5,090.0	18.8	15.9	132.71	-550.4	-332.2	851.0	819.4	31.63	26.903	
5,300.0	5,232.8	5,234.5	5,190.2	19.1	16.2	132.70	-564.6	-337.7	866.2	833.9	32.25	26.860	
5,400.0	5,332.2	5,345.8	5,300.5	19.3	16.5	132.62	-577.5	-342.6	878.1	845.3	32.78	26.792	
5,500.0	5,431.9	5,457.7	5,412.1	19.5	16.7	132.57	-586.4	-346.1	886.3	853.1	33.20	26.698	
5,600.0	5,531.8	5,570.1	5,524.3	19.6	16.9	132.54	-591.2	-347.9	890.7	857.2	33.54	26.556	
5,700.0	5,631.8	5,678.6	5,632.8	19.7	17.1	-90.00	-592.1	-348.3	891.6	857.8	33.85	26.343	
5,800.0	5,731.8	5,778.6	5,732.8	19.9	17.2	-90.00	-592.1	-348.3	891.6	857.5	34.11	26.139	
5,851.3	5,783.1	5,829.9	5,784.1	19.9	17.3	-90.04	-592.1	-348.3	891.6	857.4	34.24	26.037	
5,900.0	5,831.8	5,878.6	5,832.8	20.0	17.3	-90.01	-591.6	-348.3	891.6	857.2	34.36	25.948	
6,000.0	5,931.2	5,978.6	5,932.3	20.0	17.4	-90.04	-581.6	-348.3	891.6	857.2	34.44	25.885	
6,100.0	6,028.3	6,078.8	6,029.7	20.0	17.3	-90.08	-558.7	-348.3	891.6	857.3	34.31	25.985	
6,200.0	6,121.6	6,178.9	6,123.3	19.8	17.2	-90.11	-523.1	-348.3	891.6	857.6	34.00	26.224	
6,300.0	6,209.3	6,279.2	6,211.5	19.6	17.0	-90.14	-475.7	-348.3	891.6	858.0	33.56	26.564	
6,400.0	6,290.1	6,379.5	6,292.8	19.3	16.7	-90.16	-417.0	-348.3	891.6	858.5	33.08	26.954	
6,500.0	6,362.5	6,479.9	6,365.7	19.1	16.5	-90.19	-348.2	-348.3	891.6	859.0	32.63	27.324	
6,600.0	6,425.4	6,580.3	6,429.0	18.8	16.2	-90.21	-270.3	-348.3	891.6	859.3	32.32	27.588	
6,700.0	6,477.5	6,680.7	6,481.6	18.5	16.1	-90.23	-184.9	-348.3	891.6	859.4	32.24	27.656	
6,800.0	6,518.0	6,781.2	6,522.6	18.2	16.1	-90.24	-93.2	-348.3	891.6	859.1	32.47	27.457	
6,900.0	6,546.3	6,881.7	6,551.1	18.0	16.3	-90.25	3.1	-348.3	891.6	858.5	33.07	26.959	
7,000.0	6,561.9	6,982.2	6,566.8	17.8	16.8	-90.26	102.3	-348.3	891.6	857.6	34.06	26.180	
7,100.0	6,565.0	7,082.6	6,570.0	18.0	17.4	-90.26	202.6	-348.3	891.6	856.2	35.40	25.186	
7,200.0	6,565.0	7,182.6	6,570.0	18.9	18.3	-90.26	302.6	-348.3	891.6	854.5	37.09	24.037	
7,300.0	6,565.0	7,282.6	6,570.0	19.9	19.3	-90.26	402.6	-348.3	891.6	852.5	39.08	22.814	
7,400.0	6,565.0	7,382.6	6,570.0	21.1	20.5	-90.26	502.6	-348.3	891.6	850.3	41.33	21.571	
7,500.0	6,565.0	7,482.6	6,570.0	22.4	21.8	-90.26	602.6	-348.3	891.6	847.8	43.81	20.354	
7,600.0	6,565.0	7,582.6	6,570.0	23.8	23.1	-90.26	702.6	-348.3	891.6	845.1	46.47	19.189	
7,700.0	6,565.0	7,682.6	6,570.0	25.2	24.5	-90.26	802.6	-348.3	891.6	842.3	49.28	18.093	
7,800.0	6,565.0	7,782.6	6,570.0	26.7	26.0	-90.26	902.6	-348.3	891.6	839.4	52.23	17.072	
7,900.0	6,565.0	7,882.6	6,570.0	28.2	27.6	-90.26	1,002.6	-348.3	891.6	836.3	55.28	16.128	
8,000.0	6,565.0	7,982.6	6,570.0	29.8	29.2	-90.26	1,102.6	-348.3	891.6	833.2	58.43	15.259	
8,100.0	6,565.0	8,082.6	6,570.0	31.4	30.8	-90.26	1,202.6	-348.3	891.6	830.0	61.66	14.461	
8,200.0	6,565.0	8,182.6	6,570.0	33.0	32.5	-90.26	1,302.6	-348.3	891.6	826.7	64.95	13.727	
8,300.0	6,565.0	8,282.6	6,570.0	34.7	34.1	-90.26	1,402.6	-348.3	891.6	823.3	68.30	13.054	
8,400.0	6,565.0	8,382.6	6,570.0	36.4	35.9	-90.26	1,502.6	-348.3	891.6	819.9	71.70	12.435	
8,500.0	6,565.0	8,482.6	6,570.0	38.1	37.6	-90.26	1,602.6	-348.3	891.6	816.5	75.14	11.865	
8,600.0	6,565.0	8,582.6	6,570.0	39.8	39.3	-90.26	1,702.6	-348.3	891.6	813.0	78.62	11.340	
8,700.0	6,565.0	8,682.6	6,570.0	41.6	41.1	-90.26	1,802.6	-348.3	891.6	809.5	82.14	10.855	
8,800.0	6,565.0	8,782.6	6,570.0	43.3	42.9	-90.26	1,902.6	-348.3	891.6	805.9	85.67	10.407	
8,900.0	6,565.0	8,882.6	6,570.0	45.1	44.6	-90.26	2,002.6	-348.3	891.6	802.4	89.24	9.991	
9,000.0	6,565.0	8,982.6	6,570.0	46.9	46.4	-90.26	2,102.6	-348.3	891.6	798.8	92.83	9.605	
9,100.0	6,565.0	9,082.6	6,570.0	48.6	48.3	-90.26	2,202.6	-348.3	891.6	795.2	96.43	9.246	
9,200.0	6,565.0	9,182.6	6,570.0	50.4	50.1	-90.26	2,302.6	-348.3	891.6	791.6	100.06	8.911	
9,300.0	6,565.0	9,282.6	6,570.0	52.3	51.9	-90.26	2,402.6	-348.3	891.6	787.9	103.69	8.598	
9,400.0	6,565.0	9,382.6	6,570.0	54.1	53.7	-90.26	2,502.6	-348.3	891.6	784.3	107.35	8.306	
9,500.0	6,565.0	9,482.6	6,570.0	55.9	55.6	-90.26	2,602.6	-348.3	891.6	780.6	111.01	8.032	
9,600.0	6,565.0	9,582.6	6,570.0	57.7	57.4	-90.26	2,702.6	-348.3	891.6	776.9	114.69	7.774	
9,700.0	6,565.0	9,682.6	6,570.0	59.6	59.2	-90.26	2,802.6	-348.3	891.6	773.2	118.38	7.532	
9,800.0	6,565.0	9,782.6	6,570.0	61.4	61.1	-90.26	2,902.6	-348.3	891.6	769.5	122.08	7.304	
9,900.0	6,565.0	9,882.6	6,570.0	63.2	62.9	-90.26	3,002.6	-348.3	891.6	765.8	125.78	7.089	

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Offset														
Semi Major Axis														
Distance														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	6,565.0	9,982.6	6,570.0	65.1	64.8	-90.26	3,102.6	-348.3	891.6	762.1	129.49	6.885		
10,100.0	6,565.0	10,082.6	6,570.0	66.9	66.7	-90.26	3,202.6	-348.3	891.6	758.4	133.22	6.693		
10,200.0	6,565.0	10,182.6	6,570.0	68.8	68.5	-90.26	3,302.6	-348.3	891.6	754.7	136.94	6.511		
10,300.0	6,565.0	10,282.6	6,570.0	70.6	70.4	-90.26	3,402.6	-348.3	891.6	750.9	140.68	6.338		
10,400.0	6,565.0	10,382.6	6,570.0	72.5	72.3	-90.26	3,502.6	-348.3	891.6	747.2	144.41	6.174		
10,500.0	6,565.0	10,482.6	6,570.0	74.4	74.1	-90.26	3,602.6	-348.3	891.6	743.5	148.16	6.018		
10,600.0	6,565.0	10,582.6	6,570.0	76.2	76.0	-90.26	3,702.6	-348.3	891.6	739.7	151.91	5.869		
10,700.0	6,565.0	10,682.6	6,570.0	78.1	77.9	-90.26	3,802.6	-348.3	891.6	736.0	155.66	5.728		
10,800.0	6,565.0	10,782.6	6,570.0	80.0	79.8	-90.26	3,902.6	-348.3	891.6	732.2	159.42	5.593		
10,900.0	6,565.0	10,882.6	6,570.0	81.9	81.7	-90.26	4,002.6	-348.3	891.6	728.4	163.18	5.464		
11,000.0	6,565.0	10,982.6	6,570.0	83.7	83.5	-90.26	4,102.6	-348.3	891.6	724.7	166.94	5.341		
11,003.9	6,565.0	10,986.5	6,570.0	83.8	83.6	-90.26	4,106.5	-348.3	891.6	724.5	167.09	5.336		
11,014.1	6,565.0	10,996.7	6,570.0	84.0	83.8	-90.26	4,116.7	-348.3	891.6	724.1	167.48	5.324 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-241 - Wellbore #1 - Plan #3 (4-10-15)										Offset Site Error:		0.0 ft
Survey Program: 0-MWD												Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-90.03	0.0	-27.9	27.9					
100.0	100.0	100.0	100.0	0.1	0.1	-90.03	0.0	-27.9	27.9	27.6	0.22	123.980		
200.0	200.0	200.0	200.0	0.3	0.3	-90.03	0.0	-27.9	27.9	27.2	0.67	41.327		
300.0	300.0	300.0	300.0	0.6	0.6	-90.03	0.0	-27.9	27.9	26.7	1.12	24.796		
400.0	400.0	400.0	400.0	0.8	0.8	-90.03	0.0	-27.9	27.9	26.3	1.57	17.712 CC, ES		
500.0	500.0	500.0	500.0	1.0	1.0	133.80	0.0	-27.9	28.5	26.5	2.00	14.231		
600.0	600.0	600.0	600.0	1.2	1.2	137.36	0.0	-27.9	30.3	27.9	2.42	12.552		
700.0	699.9	699.9	699.9	1.4	1.5	142.37	0.0	-27.9	33.7	30.8	2.85	11.834		
800.0	799.7	799.7	799.7	1.6	1.7	147.87	0.0	-27.9	38.7	35.4	3.28	11.787		
900.0	899.4	900.0	900.0	1.9	1.9	152.40	-0.8	-27.4	44.9	41.2	3.70	12.134		
1,000.0	998.9	1,000.4	1,000.3	2.1	2.1	155.42	-3.1	-26.2	51.5	47.4	4.10	12.558		
1,100.0	1,098.3	1,100.9	1,100.7	2.4	2.3	157.39	-6.9	-24.0	58.4	53.9	4.51	12.934		
1,200.0	1,197.4	1,201.5	1,201.2	2.7	2.5	158.62	-12.3	-21.0	65.5	60.6	4.94	13.257		
1,300.0	1,296.3	1,302.2	1,301.6	3.0	2.7	159.31	-19.2	-17.2	72.9	67.5	5.39	13.530		
1,400.0	1,394.9	1,403.1	1,402.0	3.4	2.9	159.60	-27.7	-12.5	80.4	74.5	5.84	13.754		
1,500.0	1,493.3	1,504.0	1,502.3	3.7	3.2	159.51	-37.8	-6.9	87.7	81.3	6.33	13.854		
1,600.0	1,591.7	1,605.2	1,602.5	4.1	3.4	158.84	-49.4	-0.4	93.6	86.7	6.84	13.685		
1,700.0	1,690.1	1,706.4	1,702.7	4.5	3.7	157.66	-62.6	6.9	98.0	90.7	7.37	13.296		
1,800.0	1,788.5	1,807.2	1,802.0	4.9	4.1	156.03	-77.1	14.9	101.3	93.3	7.94	12.748		
1,900.0	1,886.9	1,907.1	1,900.5	5.3	4.4	154.40	-91.8	23.1	104.3	95.8	8.53	12.221		
2,000.0	1,985.3	2,007.0	1,999.0	5.7	4.8	152.87	-106.5	31.2	107.4	98.3	9.14	11.745		
2,100.0	2,083.7	2,106.9	2,097.5	6.1	5.1	151.42	-121.1	39.4	110.6	100.8	9.77	11.315		
2,200.0	2,182.1	2,206.8	2,196.0	6.5	5.5	150.06	-135.8	47.5	113.8	103.4	10.42	10.927		
2,300.0	2,280.5	2,306.8	2,294.5	6.9	5.8	148.77	-150.5	55.7	117.2	106.1	11.08	10.575		
2,400.0	2,378.9	2,406.7	2,393.0	7.3	6.2	147.55	-165.2	63.8	120.5	108.8	11.75	10.255		
2,500.0	2,477.3	2,506.6	2,491.5	7.7	6.6	146.40	-179.8	72.0	124.0	111.5	12.44	9.965		
2,600.0	2,575.6	2,606.5	2,590.0	8.1	6.9	145.31	-194.5	80.1	127.4	114.3	13.14	9.701		
2,700.0	2,674.0	2,706.4	2,688.5	8.5	7.3	144.28	-209.2	88.3	130.9	117.1	13.84	9.460		
2,800.0	2,772.4	2,806.3	2,787.0	8.9	7.7	143.31	-223.9	96.4	134.5	119.9	14.56	9.239		
2,900.0	2,870.8	2,906.2	2,885.4	9.3	8.1	142.38	-238.6	104.6	138.1	122.8	15.28	9.037		
3,000.0	2,969.2	3,006.1	2,983.9	9.7	8.5	141.50	-253.2	112.7	141.7	125.7	16.01	8.852		
3,100.0	3,067.6	3,106.0	3,082.4	10.2	8.8	140.67	-267.9	120.9	145.4	128.6	16.74	8.681		
3,200.0	3,166.0	3,206.0	3,180.9	10.6	9.2	139.88	-282.6	129.0	149.0	131.6	17.49	8.524		
3,300.0	3,264.4	3,305.9	3,279.4	11.0	9.6	139.12	-297.3	137.2	152.8	134.5	18.23	8.379		
3,400.0	3,362.8	3,405.8	3,377.9	11.4	10.0	138.40	-312.0	145.3	156.5	137.5	18.98	8.244		
3,500.0	3,461.2	3,505.7	3,476.4	11.8	10.4	137.72	-326.6	153.5	160.3	140.5	19.74	8.120		
3,600.0	3,559.6	3,605.6	3,574.9	12.2	10.8	137.06	-341.3	161.6	164.0	143.5	20.50	8.004		
3,700.0	3,657.9	3,705.5	3,673.4	12.6	11.2	136.44	-356.0	169.8	167.8	146.6	21.26	7.896		
3,800.0	3,756.3	3,805.4	3,771.9	13.0	11.6	135.84	-370.7	178.0	171.7	149.6	22.02	7.795		
3,900.0	3,854.7	3,905.3	3,870.3	13.4	11.9	135.27	-385.4	186.1	175.5	152.7	22.79	7.701		
4,000.0	3,953.1	4,005.3	3,968.8	13.9	12.3	134.73	-400.0	194.3	179.4	155.8	23.56	7.613		
4,100.0	4,051.5	4,105.2	4,067.3	14.3	12.7	134.21	-414.7	202.4	183.2	158.9	24.33	7.531		
4,200.0	4,149.9	4,205.1	4,165.8	14.7	13.1	133.70	-429.4	210.6	187.1	162.0	25.11	7.453		
4,300.0	4,248.3	4,305.0	4,264.3	15.1	13.5	133.22	-444.1	218.7	191.0	165.1	25.88	7.380		
4,400.0	4,346.7	4,404.9	4,362.8	15.5	13.9	132.76	-458.8	226.9	194.9	168.3	26.66	7.312		
4,500.0	4,445.1	4,504.8	4,461.3	15.9	14.3	132.32	-473.4	235.0	198.9	171.4	27.44	7.247		
4,600.0	4,543.5	4,604.7	4,559.8	16.3	14.7	131.89	-488.1	243.2	202.8	174.6	28.22	7.186		
4,700.0	4,641.9	4,704.6	4,658.3	16.8	15.1	131.48	-502.8	251.3	206.8	177.7	29.00	7.129		
4,800.0	4,740.3	4,804.5	4,756.8	17.2	15.5	131.09	-517.5	259.5	210.7	180.9	29.78	7.074		
4,900.0	4,838.6	4,904.5	4,855.2	17.6	15.9	130.71	-532.2	267.6	214.7	184.1	30.57	7.023		
5,000.0	4,937.0	5,004.4	4,953.7	18.0	16.3	130.34	-546.8	275.8	218.7	187.3	31.35	6.974		

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-241 - Wellbore #1 - Plan #3 (4-10-15)										Offset Site Error:		0.0 ft
Survey Program: 0-MWD												Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
5,100.0	5,035.4	5,103.1	5,051.1	18.4	16.6	130.04	-561.2	283.7	222.7	190.6	32.11	6.937		
5,200.0	5,133.9	5,200.0	5,147.0	18.8	16.9	130.29	-573.0	290.3	227.8	195.1	32.65	6.976		
5,300.0	5,232.8	5,295.9	5,242.4	19.1	17.1	130.74	-582.0	295.3	232.4	199.4	33.02	7.037		
5,400.0	5,332.2	5,392.2	5,338.4	19.3	17.3	131.24	-588.1	298.7	236.3	203.0	33.33	7.090		
5,500.0	5,431.9	5,488.4	5,434.5	19.5	17.4	131.80	-591.5	300.5	239.5	205.9	33.55	7.137		
5,600.0	5,531.8	5,585.7	5,531.8	19.6	17.6	132.39	-592.1	300.9	241.9	208.1	33.73	7.170		
5,700.0	5,631.8	5,685.7	5,631.8	19.7	17.7	-90.00	-592.1	300.9	242.4	208.4	33.96	7.138		
5,740.4	5,672.2	5,726.1	5,672.2	19.8	17.7	-89.96	-591.9	300.9	242.4	208.3	34.06	7.118		
5,800.0	5,731.8	5,785.4	5,731.4	19.9	17.8	-89.10	-588.3	300.9	242.4	208.4	34.03	7.124		
5,900.0	5,831.8	5,882.7	5,827.4	20.0	17.8	-85.47	-572.4	300.9	243.2	209.7	33.51	7.258		
6,000.0	5,931.2	5,977.5	5,918.1	20.0	17.7	-81.27	-545.4	300.9	245.3	212.7	32.68	7.507		
6,100.0	6,028.3	6,070.3	6,003.1	20.0	17.5	-77.32	-508.3	300.9	248.6	216.9	31.74	7.834		
6,200.0	6,121.6	6,161.3	6,081.5	19.8	17.3	-73.70	-462.1	300.9	252.8	222.0	30.76	8.219		
6,300.0	6,209.3	6,250.0	6,152.0	19.6	17.1	-70.48	-408.4	300.9	257.5	227.7	29.81	8.640		
6,400.0	6,290.1	6,339.1	6,216.2	19.3	16.8	-67.61	-346.7	300.9	262.5	233.6	28.92	9.076		
6,500.0	6,362.5	6,426.1	6,271.5	19.1	16.6	-65.18	-279.5	300.9	267.4	239.2	28.18	9.489		
6,600.0	6,425.4	6,512.3	6,318.4	18.8	16.4	-63.16	-207.3	300.9	271.9	244.3	27.63	9.842		
6,700.0	6,477.5	6,600.0	6,357.4	18.5	16.3	-61.51	-128.8	300.9	275.9	248.6	27.34	10.091		
6,800.0	6,518.0	6,682.4	6,385.7	18.2	16.3	-60.32	-51.4	300.9	279.1	251.7	27.40	10.187		
6,900.0	6,546.3	6,766.8	6,405.9	18.0	16.4	-59.49	30.4	300.9	281.4	253.6	27.82	10.115		
7,000.0	6,561.9	6,850.0	6,416.8	17.8	16.8	-59.05	112.9	300.9	282.7	254.1	28.62	9.877		
7,100.0	6,565.0	6,938.9	6,418.9	18.0	17.4	-58.92	201.7	300.9	283.0	253.2	29.79	9.501		
7,200.0	6,565.0	7,038.9	6,418.3	18.9	18.2	-58.82	301.7	300.9	283.3	252.1	31.24	9.070		
7,300.0	6,565.0	7,138.9	6,417.7	19.9	19.3	-58.71	401.7	300.9	283.7	250.7	32.96	8.607		
7,400.0	6,565.0	7,238.9	6,417.1	21.1	20.4	-58.61	501.7	300.9	284.0	249.1	34.91	8.134		
7,500.0	6,565.0	7,338.9	6,416.5	22.4	21.7	-58.50	601.7	300.9	284.3	247.2	37.06	7.671		
7,600.0	6,565.0	7,438.9	6,415.9	23.8	23.1	-58.40	701.7	300.9	284.6	245.2	39.37	7.228		
7,700.0	6,565.0	7,538.9	6,415.3	25.2	24.5	-58.29	801.7	300.9	284.9	243.1	41.82	6.813		
7,800.0	6,565.0	7,638.9	6,414.6	26.7	26.0	-58.19	901.7	300.9	285.3	240.9	44.38	6.428		
7,900.0	6,565.0	7,738.9	6,414.0	28.2	27.6	-58.09	1,001.7	300.9	285.6	238.5	47.03	6.073		
8,000.0	6,565.0	7,838.8	6,413.4	29.8	29.2	-57.98	1,101.7	300.9	285.9	236.1	49.75	5.747		
8,100.0	6,565.0	7,938.8	6,412.8	31.4	30.8	-57.88	1,201.7	300.9	286.2	233.7	52.54	5.448		
8,200.0	6,565.0	8,038.8	6,412.2	33.0	32.5	-57.77	1,301.7	300.9	286.5	231.2	55.37	5.175		
8,300.0	6,565.0	8,138.8	6,411.6	34.7	34.1	-57.67	1,401.7	300.9	286.9	228.6	58.26	4.924		
8,400.0	6,565.0	8,238.8	6,411.0	36.4	35.8	-57.57	1,501.7	300.9	287.2	226.0	61.17	4.695		
8,500.0	6,565.0	8,338.8	6,410.4	38.1	37.6	-57.47	1,601.6	300.9	287.5	223.4	64.12	4.484		
8,600.0	6,565.0	8,438.8	6,409.8	39.8	39.3	-57.36	1,701.6	300.9	287.9	220.8	67.09	4.290		
8,700.0	6,565.0	8,538.8	6,409.1	41.6	41.1	-57.26	1,801.6	300.9	288.2	218.1	70.09	4.112		
8,800.0	6,565.0	8,638.8	6,408.5	43.3	42.9	-57.16	1,901.6	300.9	288.5	215.4	73.10	3.947		
8,900.0	6,565.0	8,738.8	6,407.9	45.1	44.6	-57.06	2,001.6	300.9	288.9	212.7	76.13	3.794		
9,000.0	6,565.0	8,838.8	6,407.3	46.9	46.4	-56.95	2,101.6	300.9	289.2	210.0	79.17	3.653		
9,100.0	6,565.0	8,938.8	6,406.7	48.6	48.2	-56.85	2,201.6	300.9	289.5	207.3	82.22	3.521		
9,200.0	6,565.0	9,038.8	6,406.1	50.4	50.1	-56.75	2,301.6	300.9	289.9	204.6	85.28	3.399		
9,300.0	6,565.0	9,138.8	6,405.5	52.3	51.9	-56.65	2,401.6	300.9	290.2	201.8	88.34	3.285		
9,400.0	6,565.0	9,238.8	6,404.9	54.1	53.7	-56.55	2,501.6	300.9	290.5	199.1	91.41	3.178		
9,500.0	6,565.0	9,338.8	6,404.3	55.9	55.5	-56.45	2,601.6	300.9	290.9	196.4	94.49	3.078		
9,600.0	6,565.0	9,438.8	6,403.6	57.7	57.4	-56.35	2,701.6	300.9	291.2	193.6	97.57	2.985		
9,700.0	6,565.0	9,538.8	6,403.0	59.6	59.2	-56.25	2,801.6	300.9	291.5	190.9	100.65	2.897		
9,800.0	6,565.0	9,638.8	6,402.4	61.4	61.1	-56.15	2,901.6	300.9	291.9	188.1	103.73	2.814		
9,900.0	6,565.0	9,738.8	6,401.8	63.2	62.9	-56.05	3,001.6	300.9	292.2	185.4	106.82	2.736		

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Offset														
Semi Major Axis														
Distance														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	6,565.0	9,838.8	6,401.2	65.1	64.8	-55.95	3,101.6	300.9	292.6	182.7	109.90	2.662		
10,100.0	6,565.0	9,938.8	6,400.6	66.9	66.6	-55.85	3,201.6	300.9	292.9	179.9	112.99	2.592		
10,200.0	6,565.0	10,038.8	6,400.0	68.8	68.5	-55.75	3,301.6	300.9	293.2	177.2	116.07	2.526		
10,300.0	6,565.0	10,138.8	6,399.4	70.6	70.4	-55.66	3,401.6	300.9	293.6	174.4	119.15	2.464		
10,400.0	6,565.0	10,238.8	6,398.8	72.5	72.2	-55.56	3,501.6	300.9	293.9	171.7	122.24	2.405		
10,500.0	6,565.0	10,338.8	6,398.1	74.4	74.1	-55.46	3,601.6	300.9	294.3	169.0	125.32	2.348		
10,600.0	6,565.0	10,438.8	6,397.5	76.2	76.0	-55.36	3,701.6	300.9	294.6	166.2	128.39	2.295		
10,700.0	6,565.0	10,538.8	6,396.9	78.1	77.9	-55.26	3,801.6	300.9	295.0	163.5	131.47	2.244		
10,800.0	6,565.0	10,638.8	6,396.3	80.0	79.7	-55.17	3,901.6	300.9	295.3	160.8	134.54	2.195		
10,900.0	6,565.0	10,738.8	6,395.7	81.9	81.6	-55.07	4,001.6	300.9	295.7	158.1	137.61	2.149		
11,000.0	6,565.0	10,838.8	6,395.1	83.7	83.5	-54.97	4,101.6	300.9	296.0	155.3	140.68	2.104		
11,014.1	6,565.0	10,852.9	6,395.0	84.0	83.8	-54.96	4,115.7	300.9	296.1	155.0	141.11	2.098 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-301 - Wellbore #1 - Plan #2 (4-9-15)												Offset Site Error: 0.0 ft	
Survey Program: 0-MWDD												Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
0.0	0.0	0.0	0.0	0.0	0.0	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	30.4	0.22	136.379	
200.0	200.0	200.0	200.0	0.3	0.3	90.00	0.0	30.7	30.7	30.0	0.67	45.460 CC, ES	
300.0	300.0	299.6	299.6	0.6	0.5	91.00	-0.5	31.3	31.3	30.2	1.10	28.378	
400.0	400.0	399.1	399.1	0.8	0.7	93.77	-2.2	33.3	33.4	31.9	1.53	21.796	
500.0	500.0	498.5	498.4	1.0	1.0	-40.66	-4.9	36.7	36.4	34.4	1.95	18.655	
600.0	600.0	597.9	597.6	1.2	1.2	-38.38	-8.8	41.3	39.5	37.2	2.36	16.729	
700.0	699.9	697.2	696.6	1.4	1.5	-36.72	-13.7	47.3	42.9	40.1	2.80	15.337	
800.0	799.7	796.5	795.4	1.6	1.7	-35.57	-19.7	54.6	46.4	43.1	3.24	14.295	
900.0	899.4	895.7	894.0	1.9	2.0	-34.83	-26.8	63.3	50.0	46.3	3.71	13.484	
1,000.0	998.9	994.8	992.2	2.1	2.3	-34.41	-34.9	73.2	53.7	49.5	4.19	12.831	
1,100.0	1,098.3	1,093.9	1,090.2	2.4	2.6	-34.26	-44.1	84.4	57.6	52.9	4.68	12.288	
1,200.0	1,197.4	1,192.9	1,187.9	2.7	3.0	-34.33	-54.4	97.0	61.5	56.3	5.20	11.822	
1,300.0	1,296.3	1,291.8	1,285.2	3.0	3.4	-34.58	-65.8	110.8	65.6	59.8	5.75	11.411	
1,400.0	1,394.9	1,390.7	1,382.1	3.4	3.8	-34.97	-78.2	126.0	69.7	63.4	6.32	11.040	
1,500.0	1,493.3	1,490.5	1,479.8	3.7	4.2	-35.57	-91.3	142.0	73.7	66.8	6.92	10.651	
1,600.0	1,591.7	1,590.4	1,577.5	4.1	4.7	-36.14	-104.5	158.0	77.7	70.1	7.54	10.296	
1,700.0	1,690.1	1,690.3	1,675.3	4.5	5.1	-36.66	-117.7	174.0	81.6	73.4	8.18	9.981	
1,800.0	1,788.5	1,790.3	1,773.0	4.9	5.6	-37.13	-130.8	190.1	85.6	76.8	8.82	9.702	
1,900.0	1,886.9	1,890.2	1,870.7	5.3	6.0	-37.56	-144.0	206.1	89.5	80.1	9.47	9.454	
2,000.0	1,985.3	1,990.1	1,968.5	5.7	6.5	-37.95	-157.1	222.2	93.5	83.4	10.13	9.232	
2,100.0	2,083.7	2,090.0	2,066.2	6.1	6.9	-38.31	-170.3	238.2	97.5	86.7	10.79	9.032	
2,200.0	2,182.1	2,189.9	2,164.0	6.5	7.4	-38.64	-183.5	254.2	101.4	90.0	11.46	8.852	
2,300.0	2,280.5	2,289.9	2,261.7	6.9	7.8	-38.95	-196.6	270.3	105.4	93.3	12.13	8.689	
2,400.0	2,378.9	2,389.8	2,359.5	7.3	8.3	-39.23	-209.8	286.3	109.4	96.6	12.81	8.541	
2,500.0	2,477.3	2,489.7	2,457.2	7.7	8.8	-39.50	-222.9	302.3	113.4	99.9	13.49	8.406	
2,600.0	2,575.6	2,589.6	2,554.9	8.1	9.2	-39.75	-236.1	318.4	117.4	103.2	14.17	8.282	
2,700.0	2,674.0	2,689.5	2,652.7	8.5	9.7	-39.98	-249.2	334.4	121.3	106.5	14.85	8.169	
2,800.0	2,772.4	2,789.5	2,750.4	8.9	10.1	-40.19	-262.4	350.5	125.3	109.8	15.54	8.064	
2,900.0	2,870.8	2,889.4	2,848.2	9.3	10.6	-40.39	-275.6	366.5	129.3	113.1	16.23	7.967	
3,000.0	2,969.2	2,989.3	2,945.9	9.7	11.1	-40.59	-288.7	382.5	133.3	116.4	16.92	7.877	
3,100.0	3,067.6	3,089.2	3,043.6	10.2	11.5	-40.77	-301.9	398.6	137.3	119.7	17.61	7.794	
3,200.0	3,166.0	3,189.1	3,141.4	10.6	12.0	-40.93	-315.0	414.6	141.3	123.0	18.31	7.717	
3,300.0	3,264.4	3,289.0	3,239.1	11.0	12.4	-41.09	-328.2	430.6	145.3	126.3	19.00	7.644	
3,400.0	3,362.8	3,389.0	3,336.9	11.4	12.9	-41.25	-341.4	446.7	149.3	129.6	19.70	7.576	
3,500.0	3,461.2	3,488.9	3,434.6	11.8	13.4	-41.39	-354.5	462.7	153.3	132.9	20.40	7.513	
3,600.0	3,559.6	3,588.8	3,532.4	12.2	13.8	-41.53	-367.7	478.8	157.3	136.2	21.10	7.453	
3,700.0	3,657.9	3,688.7	3,630.1	12.6	14.3	-41.66	-380.8	494.8	161.3	139.5	21.80	7.397	
3,800.0	3,756.3	3,788.6	3,727.8	13.0	14.8	-41.78	-394.0	510.8	165.3	142.8	22.50	7.344	
3,900.0	3,854.7	3,888.6	3,825.6	13.4	15.2	-41.90	-407.2	526.9	169.3	146.0	23.20	7.294	
4,000.0	3,953.1	3,988.5	3,923.3	13.9	15.7	-42.01	-420.3	542.9	173.3	149.3	23.91	7.247	
4,100.0	4,051.5	4,088.4	4,021.1	14.3	16.1	-42.11	-433.5	558.9	177.2	152.6	24.61	7.203	
4,200.0	4,149.9	4,188.3	4,118.8	14.7	16.6	-42.22	-446.6	575.0	181.3	155.9	25.31	7.160	
4,300.0	4,248.3	4,288.2	4,216.6	15.1	17.1	-42.31	-459.8	591.0	185.3	159.2	26.02	7.120	
4,400.0	4,346.7	4,388.2	4,314.3	15.5	17.5	-42.41	-472.9	607.1	189.3	162.5	26.72	7.082	
4,500.0	4,445.1	4,488.1	4,412.0	15.9	18.0	-42.50	-486.1	623.1	193.3	165.8	27.43	7.045	
4,600.0	4,543.5	4,588.0	4,509.8	16.3	18.5	-42.58	-499.3	639.1	197.3	169.1	28.14	7.011	
4,700.0	4,641.9	4,687.9	4,607.5	16.8	18.9	-42.67	-512.4	655.2	201.3	172.4	28.84	6.978	
4,800.0	4,740.3	4,787.8	4,705.3	17.2	19.4	-42.75	-525.6	671.2	205.3	175.7	29.55	6.946	
4,900.0	4,838.6	4,887.8	4,803.0	17.6	19.9	-42.82	-538.7	687.2	209.3	179.0	30.26	6.916	
5,000.0	4,937.0	4,987.7	4,900.7	18.0	20.3	-42.90	-551.9	703.3	213.3	182.3	30.97	6.887	

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-301 - Wellbore #1 - Plan #2 (4-9-15)										Offset Site Error:		0.0 ft
Survey Program: 0-MWD												Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
5,100.0	5,035.4	5,093.9	5,005.0	18.4	20.7	-43.25	-564.8	719.0	215.9	184.2	31.66	6.819		
5,200.0	5,133.9	5,200.3	5,110.2	18.8	21.0	-44.12	-575.2	731.7	215.8	183.4	32.43	6.655		
5,300.0	5,232.8	5,306.7	5,215.8	19.1	21.2	-45.02	-583.1	741.4	214.9	181.8	33.07	6.498		
5,400.0	5,332.2	5,413.0	5,321.7	19.3	21.4	-45.86	-588.6	748.0	213.5	179.9	33.63	6.348		
5,500.0	5,431.9	5,519.1	5,427.7	19.5	21.6	-46.63	-591.5	751.6	211.7	177.5	34.13	6.202		
5,600.0	5,531.8	5,623.2	5,531.8	19.6	21.7	-47.31	-592.1	752.3	209.5	175.0	34.55	6.065		
5,700.0	5,631.8	5,723.2	5,631.8	19.7	21.8	90.00	-592.1	752.3	209.0	174.1	34.82	6.001		
5,763.6	5,695.4	5,786.8	5,695.4	19.8	21.9	90.00	-592.1	752.3	209.0	174.0	34.98	5.973		
5,800.0	5,731.8	5,823.2	5,731.8	19.9	21.9	89.95	-591.9	752.3	209.0	173.9	35.08	5.956		
5,900.0	5,831.8	5,922.4	5,830.5	20.0	21.9	87.74	-583.3	752.3	209.1	173.3	35.79	5.843		
6,000.0	5,931.2	6,020.0	5,925.8	20.0	21.9	84.75	-562.4	752.3	209.9	173.4	36.46	5.756		
6,100.0	6,028.3	6,116.3	6,016.5	20.0	21.8	81.89	-530.0	752.3	211.1	174.3	36.82	5.734		
6,200.0	6,121.6	6,211.5	6,101.3	19.8	21.6	79.22	-487.1	752.3	212.8	175.9	36.84	5.775		
6,300.0	6,209.3	6,305.5	6,179.3	19.6	21.4	76.77	-434.7	752.3	214.7	178.2	36.55	5.875		
6,400.0	6,290.1	6,400.0	6,250.6	19.3	21.1	74.54	-372.7	752.3	216.8	180.8	36.00	6.023		
6,500.0	6,362.5	6,490.9	6,311.5	19.1	20.9	72.66	-305.3	752.3	219.0	183.7	35.31	6.202		
6,600.0	6,425.4	6,582.4	6,364.2	18.8	20.6	71.04	-230.6	752.3	221.0	186.4	34.59	6.389		
6,700.0	6,477.5	6,673.4	6,407.4	18.5	20.3	69.72	-150.6	752.3	222.8	188.8	34.02	6.550		
6,800.0	6,518.0	6,763.9	6,440.7	18.2	20.1	68.72	-66.5	752.3	224.3	190.5	33.74	6.647		
6,900.0	6,546.3	6,854.0	6,463.7	18.0	19.8	68.03	20.7	752.3	225.3	191.4	33.89	6.648		
7,000.0	6,561.9	6,944.0	6,476.3	17.8	19.6	67.66	109.7	752.3	225.9	191.4	34.56	6.537		
7,100.0	6,565.0	7,036.4	6,478.6	18.0	19.5	67.54	202.1	752.3	226.1	190.3	35.77	6.321		
7,200.0	6,565.0	7,136.4	6,478.0	18.9	19.7	67.39	302.0	752.3	226.4	189.0	37.36	6.059		
7,300.0	6,565.0	7,236.4	6,477.4	19.9	20.6	67.25	402.0	752.3	226.6	187.4	39.21	5.780		
7,400.0	6,565.0	7,336.4	6,476.7	21.1	21.7	67.10	502.0	752.3	226.8	185.6	41.28	5.496		
7,500.0	6,565.0	7,436.4	6,476.1	22.4	23.0	66.96	602.0	752.3	227.1	183.6	43.54	5.216		
7,600.0	6,565.0	7,536.4	6,475.5	23.8	24.3	66.81	702.0	752.3	227.3	181.4	45.97	4.946		
7,700.0	6,565.0	7,636.4	6,474.9	25.2	25.7	66.66	802.0	752.3	227.6	179.1	48.53	4.690		
7,800.0	6,565.0	7,736.4	6,474.2	26.7	27.2	66.52	902.0	752.3	227.8	176.6	51.20	4.450		
7,900.0	6,565.0	7,836.4	6,473.6	28.2	28.7	66.37	1,002.0	752.3	228.1	174.1	53.97	4.226		
8,000.0	6,565.0	7,936.4	6,473.0	29.8	30.3	66.23	1,102.0	752.3	228.3	171.5	56.83	4.018		
8,100.0	6,565.0	8,036.4	6,472.3	31.4	31.8	66.09	1,202.0	752.3	228.6	168.8	59.75	3.826		
8,200.0	6,565.0	8,136.4	6,471.7	33.0	33.5	65.94	1,302.0	752.3	228.8	166.1	62.73	3.648		
8,300.0	6,565.0	8,236.4	6,471.1	34.7	35.1	65.80	1,402.0	752.3	229.1	163.4	65.75	3.484		
8,400.0	6,565.0	8,336.4	6,470.5	36.4	36.8	65.66	1,502.0	752.3	229.4	160.5	68.82	3.333		
8,500.0	6,565.0	8,436.4	6,469.8	38.1	38.5	65.51	1,602.0	752.3	229.6	157.7	71.92	3.193		
8,600.0	6,565.0	8,536.4	6,469.2	39.8	40.2	65.37	1,702.0	752.3	229.9	154.8	75.05	3.063		
8,700.0	6,565.0	8,636.4	6,468.6	41.6	41.9	65.23	1,802.0	752.3	230.1	151.9	78.21	2.943		
8,800.0	6,565.0	8,736.4	6,467.9	43.3	43.6	65.09	1,902.0	752.3	230.4	149.0	81.38	2.831		
8,900.0	6,565.0	8,836.4	6,467.3	45.1	45.4	64.94	2,002.0	752.3	230.7	146.1	84.58	2.727		
9,000.0	6,565.0	8,936.4	6,466.7	46.9	47.2	64.80	2,102.0	752.3	230.9	143.2	87.79	2.631		
9,100.0	6,565.0	9,036.4	6,466.1	48.6	48.9	64.66	2,202.0	752.3	231.2	140.2	91.01	2.540		
9,200.0	6,565.0	9,136.4	6,465.4	50.4	50.7	64.52	2,302.0	752.3	231.5	137.2	94.25	2.456		
9,300.0	6,565.0	9,236.4	6,464.8	52.3	52.5	64.38	2,402.0	752.3	231.8	134.3	97.49	2.377		
9,400.0	6,565.0	9,336.4	6,464.2	54.1	54.3	64.24	2,502.0	752.3	232.0	131.3	100.74	2.303		
9,500.0	6,565.0	9,436.4	6,463.5	55.9	56.1	64.10	2,602.0	752.3	232.3	128.3	103.99	2.234		
9,600.0	6,565.0	9,536.4	6,462.9	57.7	58.0	63.96	2,702.0	752.3	232.6	125.3	107.25	2.168		
9,700.0	6,565.0	9,636.4	6,462.3	59.6	59.8	63.82	2,801.9	752.3	232.9	122.3	110.51	2.107		
9,800.0	6,565.0	9,736.4	6,461.7	61.4	61.6	63.69	2,901.9	752.3	233.1	119.3	113.78	2.049		
9,900.0	6,565.0	9,836.4	6,461.0	63.2	63.5	63.55	3,001.9	752.3	233.4	116.4	117.05	1.994		

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 R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Offset														
Semi Major Axis														
Distance														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	6,565.0	9,936.4	6,460.4	65.1	65.3	63.41	3,101.9	752.3	233.7	113.4	120.31	1.942		
10,100.0	6,565.0	10,036.4	6,459.8	66.9	67.1	63.27	3,201.9	752.3	234.0	110.4	123.58	1.893		
10,200.0	6,565.0	10,136.4	6,459.1	68.8	69.0	63.13	3,301.9	752.3	234.3	107.4	126.85	1.847		
10,300.0	6,565.0	10,236.4	6,458.5	70.6	70.8	63.00	3,401.9	752.3	234.5	104.4	130.12	1.803		
10,400.0	6,565.0	10,336.4	6,457.9	72.5	72.7	62.86	3,501.9	752.3	234.8	101.4	133.38	1.761		
10,500.0	6,565.0	10,436.4	6,457.3	74.4	74.5	62.72	3,601.9	752.3	235.1	98.5	136.65	1.721		
10,600.0	6,565.0	10,536.4	6,456.6	76.2	76.4	62.59	3,701.9	752.3	235.4	95.5	139.91	1.683		
10,700.0	6,565.0	10,636.4	6,456.0	78.1	78.3	62.45	3,801.9	752.3	235.7	92.5	143.17	1.646		
10,800.0	6,565.0	10,736.4	6,455.4	80.0	80.1	62.32	3,901.9	752.3	236.0	89.6	146.42	1.612		
10,900.0	6,565.0	10,836.4	6,454.7	81.9	82.0	62.18	4,001.9	752.3	236.3	86.6	149.67	1.579		
11,000.0	6,565.0	10,936.4	6,454.1	83.7	83.8	62.05	4,101.9	752.3	236.6	83.8	152.79	1.548		
11,014.1	6,565.0	10,950.5	6,454.0	84.0	84.0	62.03	4,116.0	752.3	236.6	83.4	153.20	1.544 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4587.0ft (RKB - 13')

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: R&R Farms 29L-441

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.67°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-441
Project:	SEC.29-T5N-R63W	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Reference Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	R&R Farms 29L-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 #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4587.0ft (RKB - 13')
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000 °

Coordinates are relative to: R&R Farms 29L-441
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.67°

