

PETROLEUM DEVELOPMENT CORP Weld County CO

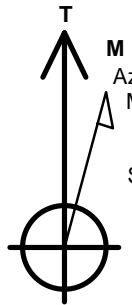
Well Name: **R&R Farms 29I-221**

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	1377496.37	3287427.88	40.365040	-104.468490	
RKB - 13' WELL @ 4587.0ft (RKB - 13')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 641'FSL & 314'FWL	1.0	0.0	0.0	Point
BHL 500'FNL, 281'FWL	6395.0	4116.7	-66.9	Point



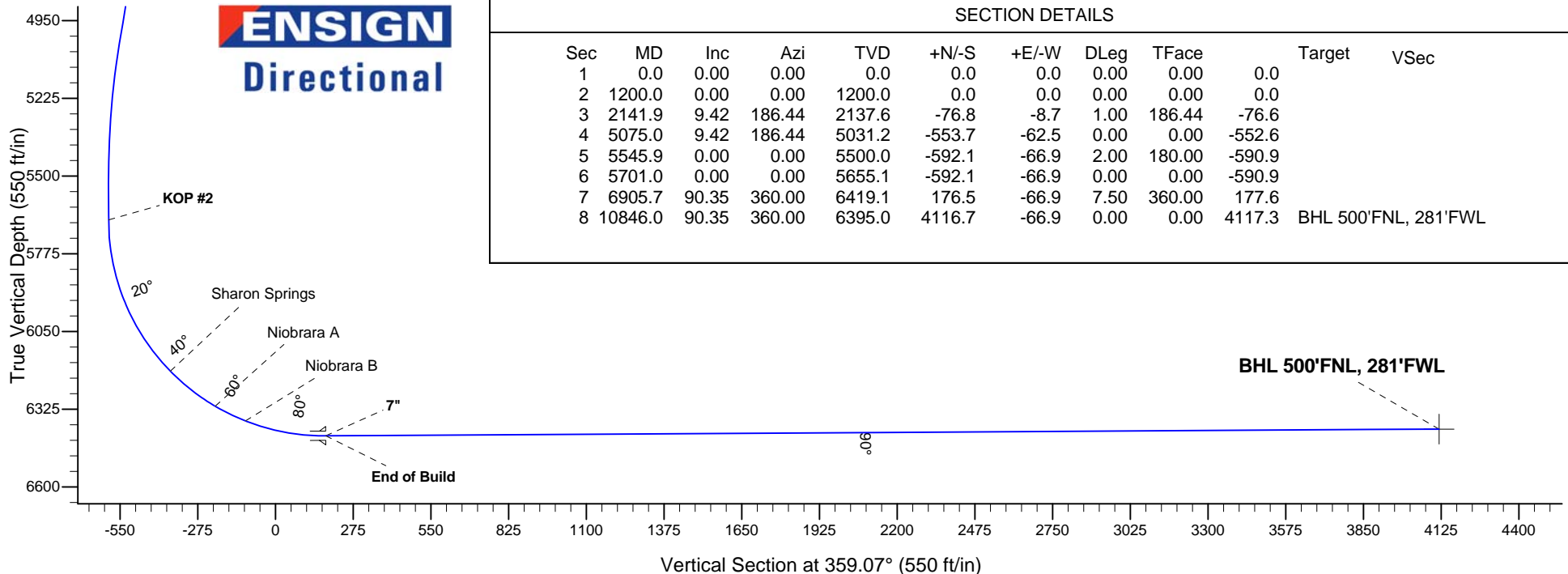
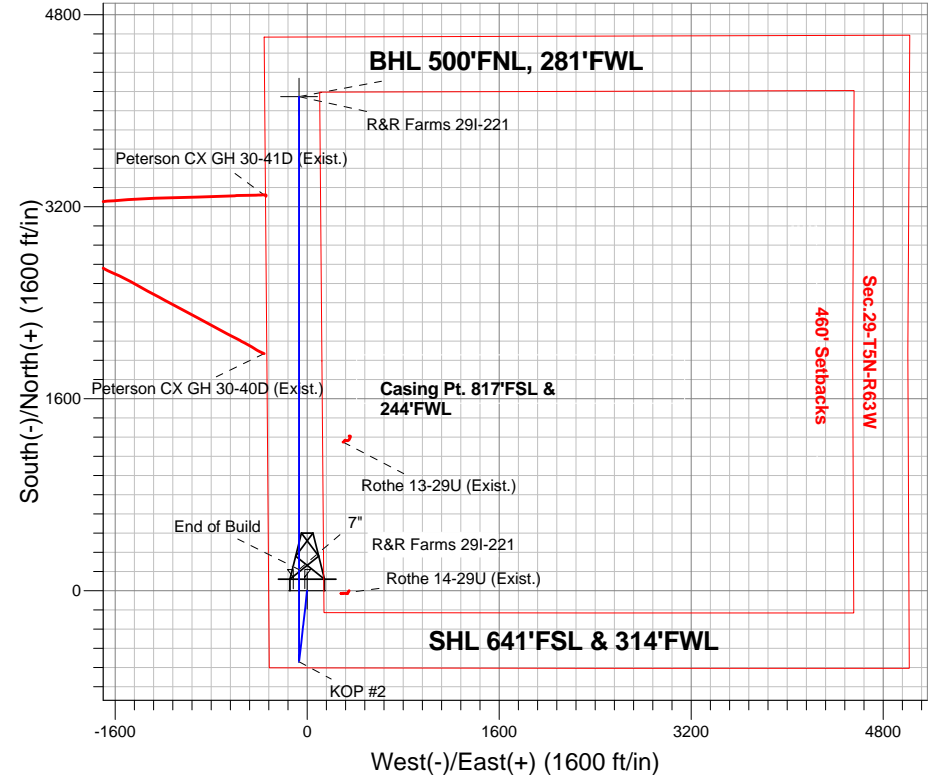
Azimuths to True North
 Magnetic North: 8.19°

Magnetic Field
 Strength: 52743.5snT
 Dip Angle: 66.94°
 Date: 4/9/2015
 Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
1200.0	1200.0	KOP #1
5655.1	5701.0	KOP #2
6419.1	6905.7	End of Build

R&R Farms 5N63W29L Pad Sec.29-T5N-R63W
 R&R Farms 29I-221
 Plan #2 (4-10-15)





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.29-T5N-R63W

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

R&R Farms 29I-221

Wellbore #1

Plan: Plan #2 (4-10-15)

Standard Planning Report

10 April, 2015

Database:	Landmark	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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 29I-221	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (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 29I-221					
Well Position	+N-S	426.2 ft	Northing:	1,377,496.37 ft	Latitude:	40.365040
	+E-W	-621.4 ft	Easting:	3,287,427.88 ft	Longitude:	-104.468490
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	52,743

Design	Plan #2 (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	359.07

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,141.9	9.42	186.44	2,137.6	-76.8	-8.7	1.00	1.00	0.00	186.44	
5,075.0	9.42	186.44	5,031.2	-553.7	-62.5	0.00	0.00	0.00	0.00	
5,545.9	0.00	0.00	5,500.0	-592.1	-66.9	2.00	-2.00	0.00	180.00	
5,701.0	0.00	0.00	5,655.1	-592.1	-66.9	0.00	0.00	0.00	0.00	
6,905.7	90.35	360.00	6,419.1	176.5	-66.9	7.50	7.50	0.00	360.00	
10,846.0	90.35	360.00	6,395.0	4,116.7	-66.9	0.00	0.00	0.00	0.00	BHL 500'FNL, 281'f

Database:	Landmark	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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 29I-221	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (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
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
1,300.0	1.00	186.44	1,300.0	-0.9	-0.1	-0.9	1.00	1.00	0.00
1,400.0	2.00	186.44	1,400.0	-3.5	-0.4	-3.5	1.00	1.00	0.00
1,500.0	3.00	186.44	1,499.9	-7.8	-0.9	-7.8	1.00	1.00	0.00
1,600.0	4.00	186.44	1,599.7	-13.9	-1.6	-13.8	1.00	1.00	0.00
1,700.0	5.00	186.44	1,699.4	-21.7	-2.4	-21.6	1.00	1.00	0.00
1,800.0	6.00	186.44	1,798.9	-31.2	-3.5	-31.1	1.00	1.00	0.00
1,900.0	7.00	186.44	1,898.3	-42.4	-4.8	-42.4	1.00	1.00	0.00
2,000.0	8.00	186.44	1,997.4	-55.4	-6.3	-55.3	1.00	1.00	0.00
2,100.0	9.00	186.44	2,096.3	-70.1	-7.9	-70.0	1.00	1.00	0.00
2,141.9	9.42	186.44	2,137.6	-76.8	-8.7	-76.6	1.00	1.00	0.00
2,200.0	9.42	186.44	2,195.0	-86.2	-9.7	-86.0	0.00	0.00	0.00
2,300.0	9.42	186.44	2,293.6	-102.5	-11.6	-102.3	0.00	0.00	0.00
2,400.0	9.42	186.44	2,392.3	-118.7	-13.4	-118.5	0.00	0.00	0.00
2,500.0	9.42	186.44	2,490.9	-135.0	-15.2	-134.7	0.00	0.00	0.00
2,600.0	9.42	186.44	2,589.6	-151.3	-17.1	-151.0	0.00	0.00	0.00
2,700.0	9.42	186.44	2,688.2	-167.5	-18.9	-167.2	0.00	0.00	0.00
2,800.0	9.42	186.44	2,786.9	-183.8	-20.8	-183.4	0.00	0.00	0.00
2,900.0	9.42	186.44	2,885.5	-200.0	-22.6	-199.6	0.00	0.00	0.00
3,000.0	9.42	186.44	2,984.2	-216.3	-24.4	-215.9	0.00	0.00	0.00
3,100.0	9.42	186.44	3,082.8	-232.6	-26.3	-232.1	0.00	0.00	0.00
3,200.0	9.42	186.44	3,181.5	-248.8	-28.1	-248.3	0.00	0.00	0.00
3,300.0	9.42	186.44	3,280.2	-265.1	-29.9	-264.6	0.00	0.00	0.00
3,309.0	9.42	186.44	3,289.0	-266.5	-30.1	-266.0	0.00	0.00	0.00
Parkman									
3,400.0	9.42	186.44	3,378.8	-281.3	-31.8	-280.8	0.00	0.00	0.00
3,500.0	9.42	186.44	3,477.5	-297.6	-33.6	-297.0	0.00	0.00	0.00
3,600.0	9.42	186.44	3,576.1	-313.9	-35.4	-313.3	0.00	0.00	0.00
3,700.0	9.42	186.44	3,674.8	-330.1	-37.3	-329.5	0.00	0.00	0.00
3,800.0	9.42	186.44	3,773.4	-346.4	-39.1	-345.7	0.00	0.00	0.00
3,900.0	9.42	186.44	3,872.1	-362.7	-41.0	-361.9	0.00	0.00	0.00
4,000.0	9.42	186.44	3,970.7	-378.9	-42.8	-378.2	0.00	0.00	0.00
4,019.6	9.42	186.44	3,990.0	-382.1	-43.2	-381.3	0.00	0.00	0.00
Sussex									
4,100.0	9.42	186.44	4,069.4	-395.2	-44.6	-394.4	0.00	0.00	0.00
4,200.0	9.42	186.44	4,168.0	-411.4	-46.5	-410.6	0.00	0.00	0.00
4,300.0	9.42	186.44	4,266.7	-427.7	-48.3	-426.9	0.00	0.00	0.00
4,400.0	9.42	186.44	4,365.3	-444.0	-50.1	-443.1	0.00	0.00	0.00
4,496.0	9.42	186.44	4,460.0	-459.6	-51.9	-458.7	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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 29I-221	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (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)
Shannon									
4,500.0	9.42	186.44	4,464.0	-460.2	-52.0	-459.3	0.00	0.00	0.00
4,600.0	9.42	186.44	4,562.6	-476.5	-53.8	-475.5	0.00	0.00	0.00
4,700.0	9.42	186.44	4,661.3	-492.7	-55.6	-491.8	0.00	0.00	0.00
4,800.0	9.42	186.44	4,759.9	-509.0	-57.5	-508.0	0.00	0.00	0.00
4,900.0	9.42	186.44	4,858.6	-525.3	-59.3	-524.2	0.00	0.00	0.00
5,000.0	9.42	186.44	4,957.2	-541.5	-61.2	-540.5	0.00	0.00	0.00
5,075.0	9.42	186.44	5,031.2	-553.7	-62.5	-552.6	0.00	0.00	0.00
5,100.0	8.92	186.44	5,055.9	-557.7	-63.0	-556.6	2.00	-2.00	0.00
5,200.0	6.92	186.44	5,154.9	-571.4	-64.5	-570.3	2.00	-2.00	0.00
5,300.0	4.92	186.44	5,254.4	-581.6	-65.7	-580.5	2.00	-2.00	0.00
5,400.0	2.92	186.44	5,354.2	-588.4	-66.5	-587.3	2.00	-2.00	0.00
5,500.0	0.92	186.44	5,454.1	-591.7	-66.8	-590.6	2.00	-2.00	0.00
5,545.9	0.00	0.00	5,500.0	-592.1	-66.9	-590.9	2.00	-2.00	0.00
5,600.0	0.00	0.00	5,554.1	-592.1	-66.9	-590.9	0.00	0.00	0.00
5,700.0	0.00	0.00	5,654.1	-592.1	-66.9	-590.9	0.00	0.00	0.00
5,701.0	0.00	0.00	5,655.1	-592.1	-66.9	-590.9	0.00	0.00	0.00
KOP #2									
5,800.0	7.42	360.00	5,753.8	-585.7	-66.9	-584.5	7.50	7.50	0.00
5,900.0	14.92	360.00	5,851.9	-566.3	-66.9	-565.2	7.50	7.50	0.00
6,000.0	22.42	360.00	5,946.5	-534.3	-66.9	-533.2	7.50	7.50	0.00
6,100.0	29.92	360.00	6,036.2	-490.3	-66.9	-489.1	7.50	7.50	0.00
6,200.0	37.42	360.00	6,119.4	-434.9	-66.9	-433.7	7.50	7.50	0.00
6,293.5	44.44	360.00	6,190.0	-373.6	-66.9	-372.5	7.50	7.50	0.00
Sharon Springs									
6,300.0	44.92	360.00	6,194.6	-369.1	-66.9	-367.9	7.50	7.50	0.00
6,400.0	52.42	360.00	6,260.6	-294.0	-66.9	-292.9	7.50	7.50	0.00
6,495.6	59.59	360.00	6,314.0	-214.8	-66.9	-213.7	7.50	7.50	0.00
Niobrara A									
6,500.0	59.92	360.00	6,316.2	-211.0	-66.9	-209.9	7.50	7.50	0.00
6,600.0	67.42	360.00	6,360.5	-121.5	-66.9	-120.4	7.50	7.50	0.00
6,614.6	68.51	360.00	6,366.0	-108.0	-66.9	-106.9	7.50	7.50	0.00
Niobrara B									
6,700.0	74.92	360.00	6,392.8	-26.9	-66.9	-25.8	7.50	7.50	0.00
6,800.0	82.42	360.00	6,412.4	71.1	-66.9	72.2	7.50	7.50	0.00
6,900.0	89.92	360.00	6,419.1	170.8	-66.9	171.9	7.50	7.50	0.00
6,905.7	90.35	360.00	6,419.1	176.5	-66.9	177.6	7.50	7.50	0.00
End of Build - 7"									
7,000.0	90.35	360.00	6,418.5	270.8	-66.9	271.9	0.00	0.00	0.00
7,100.0	90.35	360.00	6,417.9	370.8	-66.9	371.8	0.00	0.00	0.00
7,200.0	90.35	360.00	6,417.3	470.8	-66.9	471.8	0.00	0.00	0.00
7,300.0	90.35	360.00	6,416.7	570.8	-66.9	571.8	0.00	0.00	0.00
7,400.0	90.35	360.00	6,416.1	670.8	-66.9	671.8	0.00	0.00	0.00
7,500.0	90.35	360.00	6,415.4	770.8	-66.9	771.8	0.00	0.00	0.00
7,600.0	90.35	360.00	6,414.8	870.8	-66.9	871.8	0.00	0.00	0.00
7,700.0	90.35	360.00	6,414.2	970.8	-66.9	971.7	0.00	0.00	0.00
7,800.0	90.35	360.00	6,413.6	1,070.8	-66.9	1,071.7	0.00	0.00	0.00
7,900.0	90.35	360.00	6,413.0	1,170.8	-66.9	1,171.7	0.00	0.00	0.00
8,000.0	90.35	360.00	6,412.4	1,270.8	-66.9	1,271.7	0.00	0.00	0.00
8,100.0	90.35	360.00	6,411.8	1,370.8	-66.9	1,371.7	0.00	0.00	0.00
8,200.0	90.35	360.00	6,411.2	1,470.8	-66.9	1,471.7	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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 29I-221	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (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)
8,300.0	90.35	360.00	6,410.6	1,570.8	-66.9	1,571.7	0.00	0.00	0.00
8,400.0	90.35	360.00	6,409.9	1,670.8	-66.9	1,671.6	0.00	0.00	0.00
8,500.0	90.35	360.00	6,409.3	1,770.8	-66.9	1,771.6	0.00	0.00	0.00
8,600.0	90.35	360.00	6,408.7	1,870.8	-66.9	1,871.6	0.00	0.00	0.00
8,700.0	90.35	360.00	6,408.1	1,970.8	-66.9	1,971.6	0.00	0.00	0.00
8,800.0	90.35	360.00	6,407.5	2,070.8	-66.9	2,071.6	0.00	0.00	0.00
8,900.0	90.35	360.00	6,406.9	2,170.8	-66.9	2,171.6	0.00	0.00	0.00
9,000.0	90.35	360.00	6,406.3	2,270.8	-66.9	2,271.6	0.00	0.00	0.00
9,100.0	90.35	360.00	6,405.7	2,370.8	-66.9	2,371.5	0.00	0.00	0.00
9,200.0	90.35	360.00	6,405.1	2,470.8	-66.9	2,471.5	0.00	0.00	0.00
9,300.0	90.35	360.00	6,404.4	2,570.8	-66.9	2,571.5	0.00	0.00	0.00
9,400.0	90.35	360.00	6,403.8	2,670.8	-66.9	2,671.5	0.00	0.00	0.00
9,500.0	90.35	360.00	6,403.2	2,770.8	-66.9	2,771.5	0.00	0.00	0.00
9,600.0	90.35	360.00	6,402.6	2,870.8	-66.9	2,871.5	0.00	0.00	0.00
9,700.0	90.35	360.00	6,402.0	2,970.8	-66.9	2,971.4	0.00	0.00	0.00
9,800.0	90.35	360.00	6,401.4	3,070.8	-66.9	3,071.4	0.00	0.00	0.00
9,900.0	90.35	360.00	6,400.8	3,170.8	-66.9	3,171.4	0.00	0.00	0.00
10,000.0	90.35	360.00	6,400.2	3,270.7	-66.9	3,271.4	0.00	0.00	0.00
10,100.0	90.35	360.00	6,399.6	3,370.7	-66.9	3,371.4	0.00	0.00	0.00
10,200.0	90.35	360.00	6,398.9	3,470.7	-66.9	3,471.4	0.00	0.00	0.00
10,300.0	90.35	360.00	6,398.3	3,570.7	-66.9	3,571.4	0.00	0.00	0.00
10,400.0	90.35	360.00	6,397.7	3,670.7	-66.9	3,671.3	0.00	0.00	0.00
10,500.0	90.35	360.00	6,397.1	3,770.7	-66.9	3,771.3	0.00	0.00	0.00
10,600.0	90.35	360.00	6,396.5	3,870.7	-66.9	3,871.3	0.00	0.00	0.00
10,700.0	90.35	360.00	6,395.9	3,970.7	-66.9	3,971.3	0.00	0.00	0.00
10,800.0	90.35	360.00	6,395.3	4,070.7	-66.9	4,071.3	0.00	0.00	0.00
10,846.0	90.35	360.00	6,395.0	4,116.7	-66.9	4,117.3	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 & 314'F	0.00	0.00	1.0	0.0	0.0	1,377,496.39	3,287,427.88	40.365040	-104.468490
- plan hits target center									
- Point									
BHL 500'FNL, 281'FW	0.00	0.00	6,395.0	4,116.7	-66.9	1,381,611.86	3,287,313.14	40.376340	-104.468730
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
6,905.7	6,419.1	7"	7	7-1/2	

Database:	Landmark	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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	North Reference:	True
	Sec.29-T5N-R63W		
Well:	R&R Farms 29I-221	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (4-10-15)		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,309.0	3,289.0	Parkman		0.00		
4,019.6	3,990.0	Sussex		0.00		
4,496.0	4,460.0	Shannon		0.00		
6,293.5	6,190.0	Sharon Springs		0.00		
6,495.6	6,314.0	Niobrara A		0.00		
6,614.6	6,366.0	Niobrara B		0.00		
	6,450.0	Niobrara C		0.00		
	6,542.0	Fort Hays		0.00		
	6,570.0	Codell		0.00		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,200.0	1,200.0	0.0	0.0	KOP #1
5,701.0	5,655.1	-76.8	-8.7	KOP #2
6,905.7	6,419.1	-553.7	-62.5	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 29I-221

Wellbore #1

Plan #2 (4-10-15)

Anticollision Report

10 April, 2015



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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 29I-221	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 #2 (4-10-15)	Offset TVD Reference:	Offset Datum

Reference	Plan #2 (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	10,846.0	Plan #2 (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	7,968.0	6,399.7	370.1	326.2	8.436	CC, ES
Rothe 13-29U (Exist.) - Wellbore #1 - Wellbore #1	8,000.0	6,399.4	371.5	327.1	8.366	SF
Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1	1,409.3	1,395.3	339.1	333.8	63.924	CC
Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1	6,704.7	6,385.7	354.8	326.5	12.512	ES, SF
Peterson CX GH 30-41D Pad Sec.30-T5N-R63W						
Peterson CX GH 30-40D - Wellbore #1 - Wellbore #1	8,706.8	7,038.2	295.6	220.4	3.933	CC, ES, SF
Peterson CX GH 30-41D - Wellbore #1 - Wellbore #1	10,019.5	6,992.3	276.4	189.2	3.169	CC, ES, SF
R&R Farms 5N63W29L Pad Sec.29-T5N-R63W						
R&R Farms 29I-32I - Wellbore #1 - Plan #2 (4-9-15)	1,000.0	1,000.0	30.7	26.4	7.178	CC
R&R Farms 29I-32I - Wellbore #1 - Plan #2 (4-9-15)	1,100.0	1,099.9	30.8	26.1	6.571	ES
R&R Farms 29I-32I - Wellbore #1 - Plan #2 (4-9-15)	10,846.0	10,909.7	217.1	55.0	1.339	Level 3, SF
R&R Farms 29I-40I - Wellbore #1 - Plan #2 (4-10-15)	766.3	767.3	30.7	27.4	9.513	CC
R&R Farms 29I-40I - Wellbore #1 - Plan #2 (4-10-15)	900.0	900.8	31.0	27.2	8.165	ES
R&R Farms 29I-40I - Wellbore #1 - Plan #2 (4-10-15)	10,846.0	10,996.7	259.3	127.3	1.965	SF
R&R Farms 29L-24I - Wellbore #1 - Plan #2 (4-9-15)	800.0	800.0	61.3	57.9	18.184	CC, ES
R&R Farms 29L-24I - Wellbore #1 - Plan #2 (4-9-15)	10,846.0	10,854.0	456.9	289.6	2.730	SF
R&R Farms 29L-30I - Wellbore #1 - Plan #2 (4-9-15)	200.0	200.0	119.8	119.2	177.705	CC, ES
R&R Farms 29L-30I - Wellbore #1 - Plan #2 (4-9-15)	10,846.0	10,951.6	910.2	743.6	5.461	SF
R&R Farms 29L-44I - Wellbore #1 - Plan #2 (4-9-15)	400.0	400.0	89.2	87.6	56.677	CC, ES
R&R Farms 29L-44I - Wellbore #1 - Plan #2 (4-9-15)	10,846.0	11,014.1	719.7	556.7	4.414	SF

Offset Design											
Existing Wells Sec.29-T5N-R63W - Rothe 13-29U (Exist.) - Wellbore #1 - Wellbore #1											
Survey Program: 600-MWD											
Reference		Offset		Semi Major Axis		Distance					
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)
7,100.0	6,417.9	6,407.4	6,406.4	18.5	12.9	91.98	1,238.8	303.1	943.6	912.3	31.35
7,200.0	6,417.3	6,406.5	6,405.5	19.6	12.9	91.85	1,238.8	303.1	852.5	820.1	32.48
7,300.0	6,416.7	6,405.6	6,404.6	20.9	12.9	91.71	1,238.8	303.1	763.7	730.0	33.73
7,400.0	6,416.1	6,404.7	6,403.8	22.2	12.9	91.58	1,238.8	303.1	678.0	642.9	35.07
7,500.0	6,415.4	6,403.9	6,402.9	23.7	12.9	91.44	1,238.8	303.2	596.7	560.2	36.49
											Warning

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 29I-221
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 29I-221	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 #2 (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		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore +N/-S (ft)	Centre +E/-W (ft)					
7,600.0	6,414.8	6,403.0	6,402.0	25.2	12.9	91.30	1,238.9	303.2	522.0	484.0	37.98	13.742	
7,700.0	6,414.2	6,402.1	6,401.1	26.7	12.9	91.17	1,238.9	303.2	457.0	417.5	39.53	11.562	
7,800.0	6,413.6	6,401.2	6,400.2	28.3	12.9	91.03	1,238.9	303.2	406.5	365.4	41.11	9.886	
7,900.0	6,413.0	6,400.3	6,399.4	29.9	12.9	90.89	1,238.9	303.2	376.3	333.6	42.74	8.804	
7,968.0	6,412.6	6,399.7	6,398.8	31.1	12.9	90.80	1,238.9	303.2	370.1	326.2	43.87	8.436 CC, ES	
8,000.0	6,412.4	6,399.4	6,398.5	31.6	12.8	90.76	1,238.9	303.2	371.5	327.1	44.40	8.366 SF	
8,100.0	6,411.8	6,398.5	6,397.6	33.3	12.8	90.62	1,238.9	303.2	392.9	346.8	46.09	8.525	
8,200.0	6,411.2	6,397.7	6,396.7	35.0	12.8	90.48	1,238.9	303.2	436.8	389.0	47.80	9.137	
8,300.0	6,410.6	6,396.8	6,395.8	36.7	12.8	90.34	1,238.9	303.3	497.2	447.6	49.54	10.036	
8,400.0	6,409.9	6,395.9	6,394.9	38.5	12.8	90.20	1,238.9	303.3	568.8	517.5	51.29	11.091	
8,500.0	6,409.3	6,395.0	6,394.0	40.2	12.8	90.07	1,238.9	303.3	648.0	595.0	53.05	12.215	
8,600.0	6,408.7	6,394.1	6,393.1	42.0	12.8	89.93	1,238.9	303.3	732.3	677.5	54.83	13.357	
8,700.0	6,408.1	6,393.2	6,392.2	43.8	12.8	89.79	1,238.9	303.3	820.2	763.6	56.62	14.486	
8,800.0	6,407.5	6,392.3	6,391.3	45.6	12.8	89.65	1,238.9	303.3	910.5	852.1	58.42	15.587	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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 29I-221	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 #2 (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	351.1	351.4					
100.0	100.0	85.8	85.8	0.1	0.1	90.02	-0.1	351.0	351.0	350.8	0.21	1,666.715		
200.0	200.0	186.7	186.7	0.3	0.2	90.09	-0.5	350.7	350.7	350.1	0.55	636.781		
300.0	300.0	287.6	287.6	0.6	0.3	90.21	-1.3	350.1	350.1	349.2	0.89	392.984		
400.0	400.0	388.5	388.4	0.8	0.4	90.39	-2.4	349.2	349.2	348.0	1.23	283.701		
500.0	500.0	489.3	489.3	1.0	0.6	90.62	-3.8	348.1	348.1	346.5	1.57	221.572		
600.0	600.0	590.2	590.1	1.2	0.7	90.91	-5.5	346.7	346.7	344.8	1.91	181.426		
700.0	700.0	690.1	690.0	1.5	0.9	91.23	-7.4	345.1	345.3	342.9	2.34	147.301		
800.0	800.0	790.1	789.9	1.7	1.1	91.58	-9.5	343.6	343.8	341.0	2.79	123.325		
900.0	900.0	889.2	889.0	1.9	1.3	91.94	-11.6	342.3	342.5	339.3	3.22	106.514		
1,000.0	1,000.0	989.1	988.9	2.1	1.5	92.27	-13.5	341.0	341.3	337.7	3.65	93.628		
1,100.0	1,100.0	1,088.3	1,088.1	2.4	1.7	92.60	-15.4	339.9	340.3	336.2	4.08	83.472		
1,200.0	1,200.0	1,186.8	1,186.6	2.6	1.9	92.88	-17.1	339.2	339.6	335.1	4.50	75.525		
1,300.0	1,300.0	1,286.5	1,286.3	2.8	2.1	-93.46	-18.5	338.7	339.3	334.4	4.90	69.299		
1,400.0	1,400.0	1,386.1	1,385.8	3.0	2.3	-93.67	-19.9	338.3	339.1	333.8	5.27	64.353		
1,409.3	1,409.2	1,395.3	1,395.0	3.0	2.3	-93.71	-20.0	338.3	339.1	333.8	5.30	63.924 CC		
1,500.0	1,499.9	1,485.1	1,484.8	3.1	2.5	-94.25	-20.7	338.1	339.3	333.6	5.65	60.019		
1,600.0	1,599.7	1,585.4	1,585.2	3.3	2.7	-95.19	-21.3	338.1	339.7	333.7	6.05	56.149		
1,700.0	1,699.4	1,685.9	1,685.7	3.5	2.9	-96.41	-21.8	337.8	340.3	333.8	6.46	52.670		
1,800.0	1,798.9	1,786.3	1,786.1	3.7	3.2	-97.91	-22.4	337.3	340.9	334.1	6.88	49.539		
1,900.0	1,898.3	1,886.5	1,886.3	4.0	3.4	-99.68	-23.1	336.6	341.9	334.6	7.32	46.717		
2,000.0	1,997.4	1,986.5	1,986.3	4.2	3.6	-101.72	-23.7	335.6	343.3	335.6	7.77	44.180		
2,100.0	2,096.3	2,085.9	2,085.6	4.5	3.8	-104.00	-24.3	334.5	345.5	337.2	8.24	41.910		
2,200.0	2,195.0	2,184.8	2,184.6	4.8	4.0	-106.52	-24.7	333.3	348.5	339.8	8.73	39.917		
2,300.0	2,293.6	2,283.7	2,283.4	5.1	4.2	-109.05	-24.9	331.9	352.2	343.0	9.23	38.175		
2,400.0	2,392.3	2,382.6	2,382.3	5.4	4.4	-111.56	-24.9	330.5	356.5	346.8	9.73	36.661		
2,500.0	2,490.9	2,481.3	2,481.0	5.7	4.6	-114.04	-24.7	329.0	361.5	351.3	10.23	35.354		
2,600.0	2,589.6	2,580.0	2,579.6	6.1	4.8	-116.46	-24.4	327.5	367.2	356.5	10.73	34.237		
2,700.0	2,688.2	2,678.6	2,678.3	6.4	5.0	-118.80	-24.1	325.9	373.5	362.3	11.22	33.284		
2,800.0	2,786.9	2,777.2	2,776.9	6.7	5.2	-121.05	-24.0	324.4	380.4	368.7	11.72	32.470		
2,900.0	2,885.5	2,875.9	2,875.6	7.1	5.4	-123.21	-23.8	322.9	387.9	375.7	12.21	31.776		
3,000.0	2,984.2	2,974.6	2,974.2	7.4	5.7	-125.27	-23.8	321.5	395.9	383.2	12.69	31.187		
3,100.0	3,082.8	3,072.9	3,072.5	7.8	5.9	-127.24	-23.8	320.1	404.4	391.2	13.18	30.694		
3,200.0	3,181.5	3,171.0	3,170.7	8.2	6.1	-129.12	-23.7	318.8	413.5	399.9	13.65	30.289		
3,300.0	3,280.2	3,269.2	3,268.8	8.5	6.3	-130.92	-23.5	317.6	423.2	409.1	14.13	29.960		
3,400.0	3,378.8	3,367.3	3,366.9	8.9	6.5	-132.64	-23.3	316.5	433.4	418.8	14.60	29.696		
3,500.0	3,477.5	3,465.3	3,464.9	9.2	6.7	-134.27	-23.1	315.5	444.1	429.1	15.06	29.489		
3,600.0	3,576.1	3,564.0	3,563.6	9.6	6.9	-135.84	-22.8	314.6	455.3	439.7	15.52	29.325		
3,700.0	3,674.8	3,663.0	3,662.6	10.0	7.1	-137.34	-22.5	313.6	466.7	450.7	15.99	29.189		
3,800.0	3,773.4	3,762.0	3,761.6	10.4	7.3	-138.77	-22.2	312.5	478.3	461.8	16.45	29.080		
3,900.0	3,872.1	3,861.1	3,860.6	10.7	7.5	-140.15	-22.0	311.3	490.1	473.2	16.90	28.993		
4,000.0	3,970.7	3,960.1	3,959.7	11.1	7.7	-141.46	-21.8	310.1	502.1	484.7	17.36	28.926		
4,100.0	4,069.4	4,060.3	4,059.8	11.5	7.9	-142.73	-21.6	308.6	514.2	496.3	17.81	28.867		
4,200.0	4,168.0	4,161.2	4,160.7	11.8	8.1	-143.99	-21.6	306.7	526.1	507.8	18.27	28.803		
4,300.0	4,266.7	4,262.1	4,261.6	12.2	8.4	-145.22	-21.6	304.2	537.9	519.1	18.72	28.738		
4,400.0	4,365.3	4,363.0	4,362.5	12.6	8.6	-146.44	-21.7	301.2	549.4	530.3	19.16	28.671		
4,500.0	4,464.0	4,464.0	4,463.4	13.0	8.8	-147.65	-21.9	297.6	560.8	541.2	19.61	28.603		
4,600.0	4,562.6	4,562.1	4,561.4	13.3	9.0	-148.79	-22.2	293.8	572.2	552.2	20.04	28.549		
4,700.0	4,661.3	4,658.6	4,657.9	13.7	9.2	-149.83	-22.5	290.7	584.1	563.7	20.48	28.527		
4,800.0	4,759.9	4,755.2	4,754.4	14.1	9.4	-150.79	-22.7	288.0	596.6	575.7	20.91	28.530		
4,900.0	4,858.6	4,851.7	4,850.9	14.5	9.6	-151.67	-22.9	286.0	609.6	588.3	21.35	28.555		

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 29I-221
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 29I-221	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 #2 (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		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
							+N/-S (ft)	+E/-W (ft)					
5,000.0	4,957.2	4,948.2	4,947.4	14.9	9.8	-152.47	-23.1	284.5	623.1	601.3	21.79	28.599	
5,100.0	5,055.9	5,044.9	5,044.1	15.2	10.0	-153.22	-23.3	283.6	637.0	614.8	22.23	28.654	
5,200.0	5,154.9	5,142.1	5,141.3	15.5	10.2	-153.89	-23.4	283.2	649.0	626.3	22.65	28.658	
5,300.0	5,254.4	5,239.7	5,238.9	15.7	10.4	-154.34	-23.5	283.3	658.2	635.2	23.05	28.560	
5,400.0	5,354.2	5,337.6	5,336.8	15.9	10.6	-154.59	-23.7	283.9	664.6	641.2	23.43	28.366	
5,500.0	5,454.1	5,435.6	5,434.8	16.1	10.8	-154.66	-23.8	285.0	668.1	644.3	23.79	28.081	
5,600.0	5,554.1	5,534.7	5,533.9	16.2	11.0	31.89	-23.9	286.6	669.2	645.1	24.17	27.686	
5,700.0	5,654.1	5,635.8	5,634.9	16.4	11.2	32.00	-24.0	288.1	669.9	645.4	24.56	27.278	
5,800.0	5,753.8	5,736.6	5,735.7	16.4	11.4	32.58	-24.1	289.3	665.1	640.3	24.72	26.906	
5,900.0	5,851.9	5,835.7	5,834.8	16.4	11.7	34.24	-24.1	290.1	649.2	624.5	24.68	26.299	
6,000.0	5,946.5	5,931.4	5,930.5	16.3	11.9	37.14	-24.2	290.6	622.9	598.4	24.54	25.382	
6,100.0	6,036.2	6,022.1	6,021.2	16.1	12.0	41.52	-24.2	290.8	587.5	563.0	24.45	24.032	
6,200.0	6,119.4	6,106.3	6,105.5	15.8	12.2	47.69	-24.2	290.7	544.5	519.9	24.60	22.130	
6,300.0	6,194.6	6,182.6	6,181.8	15.6	12.4	55.81	-24.2	290.3	496.5	471.3	25.19	19.710	
6,400.0	6,260.6	6,249.7	6,248.8	15.4	12.5	65.56	-24.1	289.7	447.2	421.1	26.16	17.095	
6,500.0	6,316.2	6,306.3	6,305.4	15.3	12.6	75.79	-24.0	289.1	402.1	374.9	27.17	14.798	
6,600.0	6,360.5	6,351.4	6,350.6	15.3	12.7	84.73	-23.9	288.4	368.5	340.6	27.88	13.217	
6,700.0	6,392.8	6,384.4	6,383.5	15.6	12.8	90.77	-23.9	287.9	354.9	326.5	28.33	12.524	
6,704.7	6,394.0	6,385.7	6,384.8	15.6	12.8	90.97	-23.9	287.9	354.8	326.5	28.36	12.512 ES, SF	
6,800.0	6,412.4	6,404.6	6,403.7	16.0	12.9	93.03	-23.8	287.6	367.0	338.2	28.82	12.734	
6,900.0	6,419.1	6,411.7	6,410.8	16.7	12.9	91.13	-23.8	287.5	404.3	374.8	29.50	13.704	
7,000.0	6,418.5	6,411.3	6,410.4	17.5	12.9	90.83	-23.8	287.5	460.9	430.5	30.34	15.192	
7,100.0	6,417.9	6,410.9	6,410.1	18.5	12.9	90.77	-23.8	287.5	530.4	499.1	31.33	16.929	
7,200.0	6,417.3	6,410.6	6,409.7	19.6	12.9	90.71	-23.8	287.5	608.5	576.0	32.46	18.744	
7,300.0	6,416.7	6,410.2	6,409.3	20.9	12.9	90.65	-23.8	287.5	692.2	658.5	33.71	20.534	
7,400.0	6,416.1	6,409.8	6,409.0	22.2	12.9	90.59	-23.8	287.5	779.8	744.8	35.05	22.246	
7,500.0	6,415.4	6,409.5	6,408.6	23.7	12.9	90.53	-23.8	287.5	870.1	833.6	36.48	23.852	
7,600.0	6,414.8	6,409.1	6,408.2	25.2	12.9	90.47	-23.8	287.5	962.3	924.3	37.97	25.345	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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 29I-221	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 #2 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Peterson CX GH 30-41D Pad Sec.30-T5N-R63W - Peterson CX GH 30-40D - Wellbore #1 - Wellbore #1														Offset Site Error:	0.0 ft
Survey Program: 61-Reference														Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning		
7,800.0	6,413.6	7,049.2	6,424.6	28.3	53.4	-93.00	1,977.6	-362.2	953.7	894.1	59.64	15.992			
7,900.0	6,413.0	7,047.9	6,423.4	29.9	53.4	-92.77	1,977.6	-362.2	859.2	797.9	61.26	14.026			
8,000.0	6,412.4	7,046.7	6,422.2	31.6	53.4	-92.54	1,977.6	-362.3	766.1	703.2	62.91	12.178			
8,100.0	6,411.8	7,045.5	6,421.0	33.3	53.4	-92.30	1,977.6	-362.3	674.9	610.4	64.58	10.451			
8,200.0	6,411.2	7,044.3	6,419.7	35.0	53.4	-92.07	1,977.6	-362.3	586.7	520.4	66.28	8.851			
8,300.0	6,410.6	7,043.1	6,418.5	36.7	53.4	-91.84	1,977.6	-362.3	502.8	434.8	68.00	7.394			
8,400.0	6,409.9	7,041.9	6,417.3	38.5	53.4	-91.60	1,977.6	-362.3	426.0	356.3	69.74	6.109			
8,500.0	6,409.3	7,040.7	6,416.1	40.2	53.4	-91.37	1,977.6	-362.4	360.7	289.2	71.49	5.046			
8,600.0	6,408.7	7,039.5	6,414.9	42.0	53.4	-91.14	1,977.6	-362.4	314.3	241.0	73.26	4.290			
8,700.0	6,408.1	7,038.3	6,413.7	43.8	53.4	-90.90	1,977.6	-362.4	295.6	220.6	75.03	3.940			
8,706.8	6,408.1	7,038.2	6,413.6	43.9	53.4	-90.89	1,977.6	-362.4	295.6	220.4	75.15	3.933 CC, ES, SF			
8,800.0	6,407.5	7,037.1	6,412.5	45.6	53.4	-90.67	1,977.6	-362.4	309.9	233.1	76.82	4.034			
8,900.0	6,406.9	7,035.9	6,411.3	47.4	53.4	-90.44	1,977.6	-362.4	353.1	274.5	78.61	4.492			
9,000.0	6,406.3	7,034.7	6,410.1	49.3	53.4	-90.20	1,977.6	-362.4	416.3	335.9	80.41	5.177			
9,100.0	6,405.7	7,033.5	6,408.9	51.1	53.4	-89.97	1,977.7	-362.5	491.9	409.6	82.22	5.982			
9,200.0	6,405.1	7,032.3	6,407.7	52.9	53.4	-89.73	1,977.7	-362.5	574.9	490.9	84.03	6.842			
9,300.0	6,404.4	7,031.1	6,406.5	54.8	53.4	-89.50	1,977.7	-362.5	662.7	576.8	85.85	7.719			
9,400.0	6,403.8	7,029.9	6,405.3	56.6	53.4	-89.27	1,977.7	-362.5	753.5	665.8	87.67	8.595			
9,500.0	6,403.2	7,028.7	6,404.1	58.4	53.4	-89.04	1,977.7	-362.5	846.4	756.9	89.49	9.458			
9,600.0	6,402.6	7,027.5	6,402.9	60.3	53.4	-88.80	1,977.7	-362.6	940.7	849.4	91.32	10.302			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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 29I-221	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 #2 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		Peterson CX GH 30-41D Pad Sec.30-T5N-R63W - Peterson CX GH 30-41D - Wellbore #1 - Wellbore #1										Offset Site Error:		0.0 ft		
Survey Program: 181-Reference													Offset Well Error:		0.0 ft	
Offset		Semi Major Axis				Distance										
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning				
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)					
9,100.0	6,405.7	7,011.4	6,419.8	51.1	49.0	-93.87	3,289.9	-343.3	959.9	889.3	70.63	13.591				
9,200.0	6,405.1	7,009.4	6,417.7	52.9	49.0	-93.45	3,289.9	-343.3	864.7	792.2	72.43	11.938				
9,300.0	6,404.4	7,007.4	6,415.7	54.8	49.0	-93.03	3,290.0	-343.3	770.6	696.4	74.23	10.381				
9,400.0	6,403.8	7,005.3	6,413.6	56.6	49.0	-92.61	3,290.0	-343.3	678.2	602.2	76.03	8.920				
9,500.0	6,403.2	7,003.2	6,411.6	58.4	49.0	-92.18	3,290.0	-343.3	588.3	510.5	77.84	7.558				
9,600.0	6,402.6	7,001.2	6,409.5	60.3	49.0	-91.75	3,290.1	-343.3	502.3	422.6	79.65	6.306				
9,700.0	6,402.0	6,999.1	6,407.4	62.2	49.0	-91.32	3,290.1	-343.3	422.4	340.9	81.46	5.186				
9,800.0	6,401.4	6,996.9	6,405.3	64.0	49.0	-90.88	3,290.1	-343.3	352.9	269.7	83.27	4.239				
9,900.0	6,400.8	6,994.8	6,403.2	65.9	49.0	-90.44	3,290.2	-343.3	301.1	216.1	85.07	3.540				
10,000.0	6,400.2	6,992.7	6,401.0	67.8	49.0	-89.99	3,290.2	-343.3	277.1	190.2	86.88	3.190				
10,019.5	6,400.0	6,992.3	6,400.6	68.1	49.0	-89.91	3,290.2	-343.3	276.4	189.2	87.23	3.169	CC, ES, SF			
10,100.0	6,399.6	6,990.5	6,398.9	69.6	49.0	-89.55	3,290.2	-343.3	287.9	199.2	88.69	3.247				
10,200.0	6,398.9	6,988.3	6,396.7	71.5	49.0	-89.10	3,290.3	-343.3	330.2	239.7	90.49	3.649				
10,300.0	6,398.3	6,986.2	6,394.5	73.4	49.0	-88.64	3,290.3	-343.3	393.8	301.5	92.29	4.267				
10,400.0	6,397.7	6,983.9	6,392.3	75.3	49.0	-88.19	3,290.3	-343.3	470.3	376.2	94.08	4.999				
10,500.0	6,397.1	6,981.7	6,390.1	77.1	49.0	-87.73	3,290.4	-343.3	554.3	458.4	95.87	5.782				
10,600.0	6,396.5	6,979.5	6,387.8	79.0	49.0	-87.26	3,290.4	-343.3	642.9	545.2	97.66	6.583				
10,700.0	6,395.9	6,977.2	6,385.6	80.9	49.0	-86.80	3,290.4	-343.3	734.4	635.0	99.44	7.386				
10,800.0	6,395.3	6,975.0	6,383.3	82.8	49.0	-86.33	3,290.5	-343.3	827.9	726.7	101.21	8.180				
10,846.0	6,395.0	6,973.9	6,382.3	83.7	49.0	-86.11	3,290.5	-343.3	871.4	769.3	102.03	8.541				

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 291-221
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 291-221	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 #2 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 291-321 - 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						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	89.98	0.0	30.7	30.7				
100.0	100.0	100.0	100.0	0.1	0.1	89.98	0.0	30.7	30.7	30.4	0.22	136.379	
200.0	200.0	200.0	200.0	0.3	0.3	89.98	0.0	30.7	30.7	30.0	0.67	45.460	
300.0	300.0	300.0	300.0	0.6	0.6	89.98	0.0	30.7	30.7	29.5	1.12	27.276	
400.0	400.0	400.0	400.0	0.8	0.8	89.98	0.0	30.7	30.7	29.1	1.57	19.483	
500.0	500.0	500.0	500.0	1.0	1.0	89.98	0.0	30.7	30.7	28.6	2.02	15.153	
600.0	600.0	600.0	600.0	1.2	1.2	89.98	0.0	30.7	30.7	28.2	2.47	12.398	
700.0	700.0	700.0	700.0	1.5	1.5	89.98	0.0	30.7	30.7	27.7	2.92	10.491	
800.0	800.0	800.0	800.0	1.7	1.7	89.98	0.0	30.7	30.7	27.3	3.37	9.092	
900.0	900.0	900.0	900.0	1.9	1.9	89.98	0.0	30.7	30.7	26.8	3.82	8.022	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	89.98	0.0	30.7	30.7	26.4	4.27	7.178 CC	
1,100.0	1,100.0	1,099.9	1,099.9	2.4	2.3	91.58	-0.8	30.8	30.8	26.1	4.69	6.571 ES	
1,200.0	1,200.0	1,199.7	1,199.7	2.6	2.5	96.22	-3.4	31.3	31.5	26.4	5.09	6.185	
1,300.0	1,300.0	1,299.5	1,299.3	2.8	2.7	-84.48	-7.7	32.1	32.9	27.4	5.47	6.018	
1,400.0	1,400.0	1,399.2	1,398.8	3.0	2.9	-79.54	-13.6	33.2	35.1	29.3	5.84	6.022	
1,500.0	1,499.9	1,498.8	1,498.1	3.1	3.1	-75.52	-21.3	34.7	38.1	31.8	6.22	6.121	
1,600.0	1,599.7	1,598.3	1,597.2	3.3	3.3	-72.41	-30.7	36.4	41.6	35.0	6.62	6.285	
1,700.0	1,699.4	1,697.8	1,696.0	3.5	3.5	-70.11	-41.7	38.5	45.7	38.7	7.04	6.488	
1,800.0	1,798.9	1,797.1	1,794.6	3.7	3.8	-68.48	-54.4	40.9	50.3	42.8	7.49	6.713	
1,900.0	1,898.3	1,896.4	1,892.8	4.0	4.1	-67.40	-68.8	43.6	55.4	47.4	7.97	6.948	
2,000.0	1,997.4	1,996.3	1,991.4	4.2	4.4	-67.41	-84.0	46.5	60.3	51.8	8.48	7.113	
2,100.0	2,096.3	2,096.2	2,090.1	4.5	4.7	-68.85	-99.3	49.3	64.6	55.5	9.02	7.155	
2,200.0	2,195.0	2,196.1	2,188.8	4.8	5.0	-71.28	-114.6	52.2	68.4	58.8	9.62	7.114	
2,300.0	2,293.6	2,296.0	2,287.5	5.1	5.3	-73.57	-129.8	55.1	72.3	62.1	10.24	7.065	
2,400.0	2,392.3	2,395.9	2,386.1	5.4	5.7	-75.62	-145.1	58.0	76.3	65.5	10.88	7.018	
2,500.0	2,490.9	2,495.7	2,484.8	5.7	6.0	-77.47	-160.3	60.8	80.4	68.9	11.54	6.972	
2,600.0	2,589.6	2,595.6	2,583.5	6.1	6.3	-79.14	-175.6	63.7	84.6	72.4	12.21	6.930	
2,700.0	2,688.2	2,695.5	2,682.1	6.4	6.7	-80.65	-190.9	66.6	88.8	75.9	12.89	6.891	
2,800.0	2,786.9	2,795.4	2,780.8	6.7	7.0	-82.02	-206.1	69.5	93.1	79.5	13.59	6.855	
2,900.0	2,885.5	2,895.3	2,879.5	7.1	7.4	-83.27	-221.4	72.3	97.5	83.2	14.29	6.822	
3,000.0	2,984.2	2,995.2	2,978.1	7.4	7.7	-84.41	-236.7	75.2	101.9	86.9	15.00	6.791	
3,100.0	3,082.8	3,095.0	3,076.8	7.8	8.1	-85.46	-251.9	78.1	106.3	90.6	15.71	6.764	
3,200.0	3,181.5	3,194.9	3,175.5	8.2	8.5	-86.42	-267.2	80.9	110.7	94.3	16.44	6.738	
3,300.0	3,280.2	3,294.8	3,274.2	8.5	8.8	-87.31	-282.4	83.8	115.2	98.1	17.16	6.715	
3,400.0	3,378.8	3,394.7	3,372.8	8.9	9.2	-88.13	-297.7	86.7	119.7	101.9	17.89	6.694	
3,500.0	3,477.5	3,494.6	3,471.5	9.2	9.5	-88.89	-313.0	89.6	124.3	105.7	18.62	6.675	
3,600.0	3,576.1	3,594.5	3,570.2	9.6	9.9	-89.60	-328.2	92.4	128.8	109.5	19.35	6.657	
3,700.0	3,674.8	3,694.3	3,668.8	10.0	10.3	-90.26	-343.5	95.3	133.4	113.3	20.09	6.641	
3,800.0	3,773.4	3,794.2	3,767.5	10.4	10.6	-90.88	-358.8	98.2	138.0	117.2	20.82	6.627	
3,900.0	3,872.1	3,894.1	3,866.2	10.7	11.0	-91.45	-374.0	101.1	142.6	121.0	21.56	6.613	
4,000.0	3,970.7	3,994.0	3,964.8	11.1	11.4	-92.00	-389.3	103.9	147.2	124.9	22.30	6.601	
4,100.0	4,069.4	4,093.9	4,063.5	11.5	11.7	-92.50	-404.5	106.8	151.8	128.8	23.04	6.589	
4,200.0	4,168.0	4,193.8	4,162.2	11.8	12.1	-92.98	-419.8	109.7	156.5	132.7	23.79	6.579	
4,300.0	4,266.7	4,293.7	4,260.8	12.2	12.5	-93.43	-435.1	112.5	161.1	136.6	24.53	6.569	
4,400.0	4,365.3	4,393.5	4,359.5	12.6	12.8	-93.85	-450.3	115.4	165.8	140.5	25.27	6.560	
4,500.0	4,464.0	4,493.4	4,458.2	13.0	13.2	-94.26	-465.6	118.3	170.5	144.4	26.02	6.551	
4,600.0	4,562.6	4,593.3	4,556.9	13.3	13.6	-94.64	-480.9	121.2	175.1	148.4	26.76	6.544	
4,700.0	4,661.3	4,693.2	4,655.5	13.7	13.9	-95.00	-496.1	124.0	179.8	152.3	27.51	6.536	
4,800.0	4,759.9	4,793.1	4,754.2	14.1	14.3	-95.34	-511.4	126.9	184.5	156.2	28.26	6.530	
4,900.0	4,858.6	4,893.0	4,852.9	14.5	14.7	-95.66	-526.6	129.8	189.2	160.2	29.00	6.523	
5,000.0	4,957.2	4,992.8	4,951.5	14.9	15.0	-95.97	-541.9	132.7	193.9	164.1	29.75	6.518	

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 291-221
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 291-221	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 #2 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 291-321 - 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						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	5,055.9	5,092.7	5,050.2	15.2	15.4	-96.26	-557.2	135.5	198.6	168.1	30.48	6.515		
5,200.0	5,154.9	5,193.9	5,150.4	15.5	15.7	-96.34	-571.0	138.1	202.7	171.7	31.00	6.538		
5,300.0	5,254.4	5,295.2	5,251.1	15.7	15.9	-96.39	-581.4	140.1	205.8	174.3	31.46	6.542		
5,400.0	5,354.2	5,396.5	5,352.2	15.9	16.1	-96.43	-588.3	141.4	207.9	176.0	31.86	6.525		
5,500.0	5,454.1	5,497.9	5,453.5	16.1	16.3	-96.44	-591.7	142.0	208.9	176.7	32.19	6.489		
5,600.0	5,554.1	5,598.5	5,554.1	16.2	16.4	90.00	-592.1	142.1	209.0	176.5	32.49	6.432		
5,700.0	5,654.1	5,698.5	5,654.1	16.4	16.6	90.00	-592.1	142.1	209.0	176.2	32.76	6.379		
5,704.4	5,658.5	5,702.9	5,658.5	16.4	16.6	90.00	-592.1	142.1	209.0	176.2	32.77	6.377		
5,800.0	5,753.8	5,798.5	5,754.1	16.4	16.7	91.54	-591.3	142.1	209.0	176.1	32.95	6.345		
5,900.0	5,851.9	5,899.4	5,854.3	16.4	16.7	93.85	-580.2	142.1	209.4	176.5	32.90	6.366		
6,000.0	5,946.5	6,001.5	5,953.4	16.3	16.6	96.10	-555.7	142.1	210.2	177.6	32.61	6.444		
6,100.0	6,036.2	6,104.8	6,049.3	16.1	16.5	98.23	-517.6	142.1	211.2	179.0	32.13	6.571		
6,200.0	6,119.4	6,209.2	6,140.1	15.8	16.2	100.22	-466.4	142.1	212.4	180.8	31.53	6.736		
6,300.0	6,194.6	6,314.6	6,224.0	15.6	16.0	102.01	-402.6	142.1	213.7	182.8	30.88	6.919		
6,400.0	6,260.6	6,421.1	6,298.9	15.4	15.7	103.58	-327.0	142.1	215.0	184.7	30.31	7.092		
6,500.0	6,316.2	6,528.4	6,363.0	15.3	15.6	104.90	-241.1	142.1	216.3	186.3	29.95	7.221		
6,600.0	6,360.5	6,636.5	6,414.8	15.3	15.6	105.95	-146.3	142.1	217.3	187.4	29.90	7.269		
6,700.0	6,392.8	6,745.2	6,452.9	15.6	15.8	106.71	-44.7	142.1	218.2	187.9	30.27	7.207		
6,800.0	6,412.4	6,854.3	6,476.3	16.0	16.3	107.17	61.8	142.1	218.7	187.6	31.12	7.029		
6,900.0	6,419.1	6,963.6	6,484.3	16.7	17.0	107.33	170.7	142.1	218.9	186.5	32.42	6.751		
7,000.0	6,418.5	7,064.2	6,483.5	17.5	17.8	107.29	271.3	142.1	218.9	184.8	34.06	6.426		
7,100.0	6,417.9	7,164.2	6,482.8	18.5	18.8	107.25	371.3	142.1	218.8	182.8	35.98	6.082		
7,200.0	6,417.3	7,264.2	6,482.0	19.6	19.9	107.21	471.3	142.1	218.8	180.6	38.16	5.733		
7,300.0	6,416.7	7,364.2	6,481.2	20.9	21.2	107.17	571.3	142.1	218.7	178.2	40.56	5.392		
7,400.0	6,416.1	7,464.2	6,480.5	22.2	22.5	107.13	671.3	142.1	218.7	175.5	43.15	5.068		
7,500.0	6,415.4	7,564.2	6,479.7	23.7	23.9	107.09	771.3	142.1	218.6	172.7	45.89	4.764		
7,600.0	6,414.8	7,664.2	6,478.9	25.2	25.4	107.05	871.3	142.1	218.6	169.8	48.76	4.483		
7,700.0	6,414.2	7,764.2	6,478.2	26.7	26.9	107.01	971.3	142.1	218.5	166.8	51.73	4.224		
7,800.0	6,413.6	7,864.2	6,477.4	28.3	28.5	106.97	1,071.3	142.1	218.5	163.7	54.80	3.987		
7,900.0	6,413.0	7,964.2	6,476.6	29.9	30.1	106.93	1,171.3	142.1	218.4	160.5	57.94	3.770		
8,000.0	6,412.4	8,064.2	6,475.9	31.6	31.8	106.89	1,271.3	142.1	218.4	157.3	61.14	3.572		
8,100.0	6,411.8	8,164.2	6,475.1	33.3	33.5	106.86	1,371.3	142.1	218.4	153.9	64.41	3.390		
8,200.0	6,411.2	8,264.2	6,474.3	35.0	35.2	106.82	1,471.3	142.1	218.3	150.6	67.71	3.224		
8,300.0	6,410.6	8,364.2	6,473.5	36.7	36.9	106.78	1,571.3	142.1	218.3	147.2	71.06	3.071		
8,400.0	6,409.9	8,464.2	6,472.8	38.5	38.7	106.74	1,671.3	142.1	218.2	143.8	74.45	2.931		
8,500.0	6,409.3	8,564.2	6,472.0	40.2	40.4	106.70	1,771.3	142.1	218.2	140.3	77.86	2.802		
8,600.0	6,408.7	8,664.2	6,471.2	42.0	42.2	106.66	1,871.3	142.1	218.1	136.8	81.30	2.683		
8,700.0	6,408.1	8,764.2	6,470.5	43.8	44.0	106.62	1,971.3	142.1	218.1	133.3	84.77	2.573		
8,800.0	6,407.5	8,864.2	6,469.7	45.6	45.8	106.58	2,071.2	142.1	218.0	129.8	88.26	2.470		
8,900.0	6,406.9	8,964.2	6,468.9	47.4	47.6	106.54	2,171.2	142.1	218.0	126.2	91.77	2.375		
9,000.0	6,406.3	9,064.2	6,468.2	49.3	49.4	106.50	2,271.2	142.1	217.9	122.7	95.29	2.287		
9,100.0	6,405.7	9,164.2	6,467.4	51.1	51.2	106.46	2,371.2	142.1	217.9	119.1	98.83	2.205		
9,200.0	6,405.1	9,264.2	6,466.6	52.9	53.1	106.42	2,471.2	142.1	217.9	115.5	102.38	2.128		
9,300.0	6,404.4	9,364.2	6,465.9	54.8	54.9	106.38	2,571.2	142.1	217.8	111.9	105.95	2.056		
9,400.0	6,403.8	9,464.2	6,465.1	56.6	56.7	106.34	2,671.2	142.1	217.8	108.2	109.53	1.988		
9,500.0	6,403.2	9,564.2	6,464.3	58.4	58.6	106.30	2,771.2	142.1	217.7	104.6	113.12	1.925		
9,600.0	6,402.6	9,664.2	6,463.6	60.3	60.4	106.26	2,871.2	142.1	217.7	101.0	116.72	1.865		
9,700.0	6,402.0	9,764.2	6,462.8	62.2	62.3	106.22	2,971.2	142.1	217.6	97.3	120.32	1.809		
9,800.0	6,401.4	9,864.2	6,462.0	64.0	64.2	106.18	3,071.2	142.1	217.6	93.7	123.94	1.756		
9,900.0	6,400.8	9,964.2	6,461.3	65.9	66.0	106.14	3,171.2	142.1	217.5	90.0	127.56	1.705		

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 29I-221
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 29I-221	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 #2 (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	6,400.2	10,064.2	6,460.5	67.8	67.9	106.10	3,271.2	142.1	217.5	86.3	131.19	1.658		
10,100.0	6,399.6	10,164.2	6,459.7	69.6	69.8	106.06	3,371.2	142.1	217.5	82.6	134.83	1.613		
10,200.0	6,398.9	10,264.2	6,459.0	71.5	71.6	106.02	3,471.2	142.1	217.4	78.9	138.48	1.570		
10,300.0	6,398.3	10,364.2	6,458.2	73.4	73.5	105.98	3,571.2	142.1	217.4	75.2	142.13	1.529		
10,400.0	6,397.7	10,464.2	6,457.4	75.3	75.4	105.94	3,671.2	142.1	217.3	71.5	145.78	1.491 Level 3		
10,500.0	6,397.1	10,564.2	6,456.7	77.1	77.3	105.90	3,771.2	142.1	217.3	67.8	149.44	1.454 Level 3		
10,600.0	6,396.5	10,664.2	6,455.9	79.0	79.1	105.86	3,871.2	142.1	217.2	64.1	153.11	1.419 Level 3		
10,700.0	6,395.9	10,764.2	6,455.1	80.9	81.0	105.82	3,971.2	142.1	217.2	60.4	156.78	1.385 Level 3		
10,800.0	6,395.3	10,864.2	6,454.3	82.8	82.9	105.78	4,071.2	142.1	217.2	56.7	160.45	1.353 Level 3		
10,834.7	6,395.1	10,898.9	6,454.1	83.4	83.6	105.77	4,105.9	142.1	217.1	55.4	161.73	1.343 Level 3		
10,846.0	6,395.0	10,909.7	6,454.0	83.7	83.8	105.77	4,116.7	142.1	217.1	55.0	162.13	1.339 Level 3, SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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 29I-221	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 #2 (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	
0.0	0.0	1.0	1.0	0.0	0.0	-90.01	0.0	-30.7	30.7	30.7	0.00	N/A		
100.0	100.0	101.0	101.0	0.1	0.1	-90.01	0.0	-30.7	30.7	30.4	0.23	135.028		
200.0	200.0	201.0	201.0	0.3	0.3	-90.01	0.0	-30.7	30.7	30.0	0.68	45.308		
300.0	300.0	301.0	301.0	0.6	0.6	-90.01	0.0	-30.7	30.7	29.5	1.13	27.221		
400.0	400.0	401.0	401.0	0.8	0.8	-90.01	0.0	-30.7	30.7	29.1	1.58	19.455		
500.0	500.0	501.0	501.0	1.0	1.0	-90.01	0.0	-30.7	30.7	28.6	2.03	15.136		
600.0	600.0	601.0	601.0	1.2	1.2	-90.01	0.0	-30.7	30.7	28.2	2.47	12.387		
700.0	700.0	701.0	701.0	1.5	1.5	-90.01	0.0	-30.7	30.7	27.7	2.92	10.483		
766.3	766.3	767.3	767.3	1.6	1.6	-90.01	0.0	-30.7	30.7	27.4	3.22	9.513 CC		
800.0	800.0	801.0	801.0	1.7	1.7	-90.01	0.0	-30.7	30.7	27.3	3.37	9.087		
900.0	900.0	900.8	900.8	1.9	1.9	-91.54	-0.8	-31.0	31.0	27.2	3.79	8.165 ES		
1,000.0	1,000.0	1,000.5	1,000.5	2.1	2.1	-95.86	-3.3	-31.9	32.1	27.9	4.20	7.644		
1,100.0	1,100.0	1,100.0	1,099.9	2.4	2.3	-102.35	-7.3	-33.5	34.3	29.7	4.61	7.438		
1,200.0	1,200.0	1,199.6	1,199.3	2.6	2.5	-110.02	-13.0	-35.7	38.0	33.0	5.03	7.552		
1,300.0	1,300.0	1,298.8	1,298.2	2.8	2.7	56.70	-20.3	-38.5	43.1	37.6	5.43	7.929		
1,400.0	1,400.0	1,398.0	1,396.9	3.0	2.9	51.74	-29.1	-41.9	48.9	43.1	5.82	8.412		
1,500.0	1,499.9	1,497.0	1,495.3	3.1	3.1	48.21	-39.5	-45.9	55.3	49.1	6.21	8.907		
1,600.0	1,599.7	1,595.9	1,593.3	3.3	3.4	45.74	-51.5	-50.5	62.2	55.6	6.62	9.388		
1,700.0	1,699.4	1,694.9	1,691.2	3.5	3.7	44.08	-65.0	-55.7	69.3	62.3	7.05	9.832		
1,800.0	1,798.9	1,794.7	1,789.9	3.7	4.0	43.43	-79.1	-61.2	75.6	68.1	7.49	10.098		
1,900.0	1,898.3	1,894.5	1,888.6	4.0	4.3	43.73	-93.2	-66.6	80.7	72.8	7.95	10.150		
2,000.0	1,997.4	1,994.4	1,987.4	4.2	4.6	44.83	-107.3	-72.1	84.5	76.1	8.44	10.019		
2,100.0	2,096.3	2,094.4	2,086.1	4.5	5.0	46.65	-121.4	-77.5	87.2	78.2	8.95	9.737		
2,200.0	2,195.0	2,194.3	2,184.9	4.8	5.3	49.08	-135.5	-82.9	89.0	79.4	9.51	9.352		
2,300.0	2,293.6	2,294.2	2,283.7	5.1	5.6	51.49	-149.6	-88.4	90.8	80.7	10.10	8.989		
2,400.0	2,392.3	2,394.1	2,382.4	5.4	6.0	53.80	-163.7	-93.8	92.8	82.1	10.71	8.660		
2,500.0	2,490.9	2,494.0	2,481.2	5.7	6.3	56.01	-177.8	-99.3	94.9	83.6	11.35	8.363		
2,600.0	2,589.6	2,593.9	2,579.9	6.1	6.7	58.12	-191.9	-104.7	97.2	85.2	12.01	8.096		
2,700.0	2,688.2	2,693.8	2,678.7	6.4	7.0	60.13	-206.0	-110.2	99.6	86.9	12.68	7.855		
2,800.0	2,786.9	2,793.7	2,777.5	6.7	7.4	62.04	-220.1	-115.6	102.1	88.7	13.37	7.639		
2,900.0	2,885.5	2,893.7	2,876.2	7.1	7.7	63.86	-234.3	-121.0	104.7	90.7	14.07	7.444		
3,000.0	2,984.2	2,993.6	2,975.0	7.4	8.1	65.59	-248.4	-126.5	107.5	92.7	14.78	7.269		
3,100.0	3,082.8	3,093.5	3,073.8	7.8	8.5	67.23	-262.5	-131.9	110.3	94.8	15.51	7.112		
3,200.0	3,181.5	3,193.4	3,172.5	8.2	8.8	68.79	-276.6	-137.4	113.2	96.9	16.24	6.970		
3,300.0	3,280.2	3,293.3	3,271.3	8.5	9.2	70.27	-290.7	-142.8	116.2	99.2	16.98	6.843		
3,400.0	3,378.8	3,393.2	3,370.0	8.9	9.5	71.68	-304.8	-148.3	119.2	101.5	17.72	6.728		
3,500.0	3,477.5	3,493.1	3,468.8	9.2	9.9	73.01	-318.9	-153.7	122.3	103.9	18.47	6.624		
3,600.0	3,576.1	3,593.0	3,567.6	9.6	10.3	74.28	-333.0	-159.1	125.5	106.3	19.22	6.531		
3,700.0	3,674.8	3,693.0	3,666.3	10.0	10.6	75.49	-347.1	-164.6	128.8	108.8	19.97	6.446		
3,800.0	3,773.4	3,792.9	3,765.1	10.4	11.0	76.63	-361.2	-170.0	132.1	111.3	20.73	6.370		
3,900.0	3,872.1	3,892.8	3,863.8	10.7	11.3	77.72	-375.3	-175.5	135.4	113.9	21.49	6.301		
4,000.0	3,970.7	3,992.7	3,962.6	11.1	11.7	78.75	-389.4	-180.9	138.8	116.6	22.25	6.238		
4,100.0	4,069.4	4,092.6	4,061.4	11.5	12.1	79.74	-403.5	-186.3	142.2	119.2	23.01	6.181		
4,200.0	4,168.0	4,192.5	4,160.1	11.8	12.4	80.68	-417.6	-191.8	145.7	121.9	23.78	6.129		
4,300.0	4,266.7	4,292.4	4,258.9	12.2	12.8	81.57	-431.7	-197.2	149.2	124.7	24.54	6.081		
4,400.0	4,365.3	4,392.3	4,357.7	12.6	13.2	82.43	-445.8	-202.7	152.8	127.5	25.30	6.038		
4,500.0	4,464.0	4,492.2	4,456.4	13.0	13.5	83.24	-459.9	-208.1	156.4	130.3	26.07	5.999		
4,600.0	4,562.6	4,592.2	4,555.2	13.3	13.9	84.02	-474.0	-213.6	160.0	133.2	26.83	5.963		
4,700.0	4,661.3	4,692.1	4,653.9	13.7	14.3	84.77	-488.1	-219.0	163.6	136.0	27.59	5.930		
4,800.0	4,759.9	4,792.0	4,752.7	14.1	14.6	85.48	-502.2	-224.4	167.3	138.9	28.36	5.900		
4,900.0	4,858.6	4,891.9	4,851.5	14.5	15.0	86.16	-516.3	-229.9	171.0	141.9	29.12	5.872		

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 29I-221
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 29I-221	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 #2 (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	
5,000.0	4,957.2	4,991.8	4,950.2	14.9	15.3	86.81	-530.4	-235.3	174.7	144.8	29.88	5.847	
5,100.0	5,055.9	5,091.7	5,049.0	15.2	15.7	87.42	-544.5	-240.8	178.4	147.8	30.63	5.826	
5,200.0	5,154.9	5,191.6	5,147.7	15.5	16.1	87.27	-558.6	-246.2	182.3	151.1	31.24	5.837	
5,300.0	5,254.4	5,293.1	5,248.3	15.7	16.4	86.38	-571.9	-251.3	186.0	154.3	31.73	5.862	
5,400.0	5,354.2	5,395.2	5,349.7	15.9	16.6	85.46	-581.9	-255.2	188.9	156.8	32.11	5.884	
5,500.0	5,454.1	5,497.4	5,451.7	16.1	16.8	84.51	-588.5	-257.7	191.0	158.6	32.41	5.892	
5,600.0	5,554.1	5,599.8	5,554.0	16.2	17.0	-89.90	-591.8	-259.0	192.1	159.4	32.68	5.880	
5,700.0	5,654.1	5,700.9	5,655.1	16.4	17.1	-90.00	-592.1	-259.1	192.3	159.3	32.96	5.833	
5,728.3	5,682.4	5,729.2	5,683.4	16.4	17.2	-90.16	-592.1	-259.1	192.3	159.2	33.01	5.825	
5,800.0	5,753.8	5,800.6	5,754.8	16.4	17.3	-91.89	-592.1	-259.1	192.4	159.3	33.05	5.820	
5,900.0	5,851.9	5,900.2	5,854.4	16.4	17.4	-97.06	-590.6	-259.1	193.8	161.0	32.74	5.919	
6,000.0	5,946.5	6,002.9	5,956.1	16.3	17.4	-102.58	-577.2	-259.1	197.2	165.1	32.08	6.145	
6,100.0	6,036.2	6,108.4	6,057.9	16.1	17.3	-107.76	-549.4	-259.1	202.2	171.1	31.15	6.491	
6,200.0	6,119.4	6,217.0	6,157.5	15.8	17.1	-112.45	-506.5	-259.1	208.5	178.5	30.02	6.945	
6,300.0	6,194.6	6,328.6	6,252.5	15.6	16.8	-116.56	-448.1	-259.1	215.5	186.7	28.80	7.482	
6,400.0	6,260.6	6,443.3	6,340.1	15.4	16.5	-120.06	-374.4	-259.1	222.7	195.0	27.63	8.058	
6,500.0	6,316.2	6,560.7	6,417.5	15.3	16.3	-122.91	-286.1	-259.1	229.5	202.8	26.68	8.601	
6,600.0	6,360.5	6,680.7	6,481.6	15.3	16.1	-125.12	-184.9	-259.1	235.4	209.3	26.12	9.012	
6,700.0	6,392.8	6,802.7	6,529.8	15.6	16.1	-126.69	-72.9	-259.1	239.9	213.8	26.08	9.198	
6,800.0	6,412.4	6,926.3	6,559.7	16.0	16.5	-127.63	46.8	-259.1	242.8	216.1	26.69	9.097	
6,900.0	6,419.1	7,050.5	6,570.0	16.7	17.2	-127.95	170.6	-259.1	243.8	215.9	27.92	8.731	
7,000.0	6,418.5	7,150.8	6,570.0	17.5	18.0	-128.06	270.8	-259.1	244.2	214.8	29.31	8.329	
7,100.0	6,417.9	7,250.8	6,570.0	18.5	19.0	-128.17	370.8	-259.1	244.5	213.6	30.93	7.905	
7,200.0	6,417.3	7,350.8	6,570.0	19.6	20.1	-128.28	470.8	-259.1	244.9	212.1	32.77	7.474	
7,300.0	6,416.7	7,450.8	6,570.0	20.9	21.4	-128.39	570.8	-259.1	245.3	210.5	34.79	7.051	
7,400.0	6,416.1	7,550.8	6,570.0	22.2	22.7	-128.50	670.8	-259.1	245.7	208.7	36.95	6.648	
7,500.0	6,415.4	7,650.8	6,570.0	23.7	24.1	-128.62	770.8	-259.1	246.1	206.8	39.24	6.270	
7,600.0	6,414.8	7,750.8	6,570.0	25.2	25.6	-128.73	870.8	-259.1	246.4	204.8	41.63	5.919	
7,700.0	6,414.2	7,850.8	6,570.0	26.7	27.1	-128.84	970.8	-259.1	246.8	202.7	44.11	5.596	
7,800.0	6,413.6	7,950.8	6,570.0	28.3	28.7	-128.95	1,070.8	-259.1	247.2	200.6	46.65	5.299	
7,900.0	6,413.0	8,050.8	6,570.0	29.9	30.3	-129.06	1,170.8	-259.1	247.6	198.3	49.25	5.028	
8,000.0	6,412.4	8,150.8	6,570.0	31.6	31.9	-129.17	1,270.8	-259.1	248.0	196.1	51.89	4.779	
8,100.0	6,411.8	8,250.8	6,570.0	33.3	33.6	-129.28	1,370.8	-259.1	248.4	193.8	54.57	4.551	
8,200.0	6,411.2	8,350.8	6,570.0	35.0	35.3	-129.38	1,470.8	-259.1	248.7	191.5	57.29	4.342	
8,300.0	6,410.6	8,450.8	6,570.0	36.7	37.0	-129.49	1,570.8	-259.1	249.1	189.1	60.03	4.150	
8,400.0	6,409.9	8,550.8	6,570.0	38.5	38.8	-129.60	1,670.8	-259.1	249.5	186.7	62.79	3.974	
8,500.0	6,409.3	8,650.8	6,570.0	40.2	40.5	-129.71	1,770.8	-259.1	249.9	184.3	65.57	3.811	
8,600.0	6,408.7	8,750.8	6,570.0	42.0	42.3	-129.82	1,870.8	-259.1	250.3	181.9	68.37	3.661	
8,700.0	6,408.1	8,850.8	6,570.0	43.8	44.1	-129.92	1,970.8	-259.1	250.7	179.5	71.18	3.522	
8,800.0	6,407.5	8,950.8	6,570.0	45.6	45.9	-130.03	2,070.8	-259.1	251.1	177.1	73.99	3.393	
8,900.0	6,406.9	9,050.8	6,570.0	47.4	47.7	-130.14	2,170.8	-259.1	251.5	174.7	76.82	3.274	
9,000.0	6,406.3	9,150.8	6,570.0	49.3	49.5	-130.24	2,270.8	-259.1	251.9	172.2	79.65	3.162	
9,100.0	6,405.7	9,250.8	6,570.0	51.1	51.3	-130.35	2,370.8	-259.1	252.3	169.8	82.49	3.058	
9,200.0	6,405.1	9,350.8	6,570.0	52.9	53.1	-130.46	2,470.8	-259.1	252.7	167.3	85.33	2.961	
9,300.0	6,404.4	9,450.8	6,570.0	54.8	55.0	-130.56	2,570.8	-259.1	253.1	164.9	88.17	2.870	
9,400.0	6,403.8	9,550.8	6,570.0	56.6	56.8	-130.67	2,670.8	-259.1	253.5	162.4	91.02	2.785	
9,500.0	6,403.2	9,650.8	6,570.0	58.4	58.7	-130.77	2,770.8	-259.1	253.9	160.0	93.86	2.704	
9,600.0	6,402.6	9,750.7	6,570.0	60.3	60.5	-130.87	2,870.8	-259.1	254.3	157.5	96.71	2.629	
9,700.0	6,402.0	9,850.7	6,570.0	62.2	62.4	-130.98	2,970.8	-259.1	254.7	155.1	99.56	2.558	
9,800.0	6,401.4	9,950.7	6,570.0	64.0	64.2	-131.08	3,070.8	-259.1	255.1	152.7	102.40	2.491	

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 29I-221
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 29I-221	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 #2 (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	
9,900.0	6,400.8	10,050.7	6,570.0	65.9	66.1	-131.19	3,170.8	-259.1	255.5	150.2	105.24	2.427		
10,000.0	6,400.2	10,150.7	6,570.0	67.8	67.9	-131.29	3,270.7	-259.1	255.9	147.8	108.08	2.367		
10,100.0	6,399.6	10,250.7	6,570.0	69.6	69.8	-131.39	3,370.7	-259.1	256.3	145.3	110.92	2.310		
10,200.0	6,398.9	10,350.7	6,570.0	71.5	71.7	-131.49	3,470.7	-259.1	256.7	142.9	113.76	2.256		
10,300.0	6,398.3	10,450.7	6,570.0	73.4	73.5	-131.60	3,570.7	-259.1	257.1	140.5	116.59	2.205		
10,400.0	6,397.7	10,550.7	6,570.0	75.3	75.4	-131.70	3,670.7	-259.1	257.5	138.1	119.42	2.156		
10,500.0	6,397.1	10,650.7	6,570.0	77.1	77.3	-131.80	3,770.7	-259.1	257.9	135.6	122.24	2.110		
10,600.0	6,396.5	10,750.7	6,570.0	79.0	79.2	-131.90	3,870.7	-259.1	258.3	133.2	125.06	2.065		
10,700.0	6,395.9	10,850.7	6,570.0	80.9	81.1	-132.00	3,970.7	-259.1	258.7	130.8	127.88	2.023		
10,800.0	6,395.3	10,950.7	6,570.0	82.8	82.9	-132.10	4,070.7	-259.1	259.1	128.4	130.69	1.983		
10,846.0	6,395.0	10,996.7	6,570.0	83.7	83.8	-132.15	4,116.7	-259.1	259.3	127.3	131.98	1.965 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-221
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-221	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 #2 (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 #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
0.0	0.0	0.0	0.0	0.0	0.0	90.00	0.0	61.3	61.3				
100.0	100.0	100.0	100.0	0.1	0.1	90.00	0.0	61.3	61.3	61.1	0.22	272.757	
200.0	200.0	200.0	200.0	0.3	0.3	90.00	0.0	61.3	61.3	60.6	0.67	90.919	
300.0	300.0	300.0	300.0	0.6	0.6	90.00	0.0	61.3	61.3	60.2	1.12	54.551	
400.0	400.0	400.0	400.0	0.8	0.8	90.00	0.0	61.3	61.3	59.7	1.57	38.965	
500.0	500.0	500.0	500.0	1.0	1.0	90.00	0.0	61.3	61.3	59.3	2.02	30.306	
600.0	600.0	600.0	600.0	1.2	1.2	90.00	0.0	61.3	61.3	58.8	2.47	24.796	
700.0	700.0	700.0	700.0	1.5	1.5	90.00	0.0	61.3	61.3	58.4	2.92	20.981	
800.0	800.0	800.0	800.0	1.7	1.7	90.00	0.0	61.3	61.3	57.9	3.37	18.184 CC, ES	
900.0	900.0	899.5	899.5	1.9	1.9	90.70	-0.8	61.7	61.7	57.9	3.79	16.274	
1,000.0	1,000.0	998.9	998.8	2.1	2.1	92.74	-3.0	63.0	63.1	58.9	4.20	15.025	
1,100.0	1,100.0	1,098.2	1,098.0	2.4	2.3	95.95	-6.8	65.1	65.5	60.8	4.61	14.195	
1,200.0	1,200.0	1,197.3	1,197.0	2.6	2.5	100.04	-12.0	68.0	69.1	64.1	5.03	13.728	
1,300.0	1,300.0	1,296.2	1,295.6	2.8	2.7	-82.39	-18.8	71.7	74.2	68.7	5.44	13.642	
1,400.0	1,400.0	1,395.0	1,393.9	3.0	2.9	-79.25	-27.0	76.3	80.4	74.6	5.82	13.811	
1,500.0	1,499.9	1,493.6	1,491.9	3.1	3.1	-76.93	-36.7	81.7	87.8	81.6	6.23	14.097	
1,600.0	1,599.7	1,592.0	1,589.5	3.3	3.4	-75.29	-47.8	87.8	96.2	89.5	6.65	14.457	
1,700.0	1,699.4	1,690.3	1,686.7	3.5	3.7	-74.23	-60.3	94.8	105.4	98.3	7.10	14.859	
1,800.0	1,798.9	1,788.6	1,783.7	3.7	4.0	-73.63	-74.3	102.6	115.6	108.0	7.56	15.275	
1,900.0	1,898.3	1,888.1	1,881.8	4.0	4.3	-73.72	-89.0	110.7	125.6	117.5	8.06	15.577	
2,000.0	1,997.4	1,987.6	1,979.9	4.2	4.7	-74.51	-103.6	118.8	135.2	126.6	8.59	15.731	
2,100.0	2,096.3	2,087.1	2,078.0	4.5	5.0	-75.85	-118.2	126.9	144.3	135.2	9.16	15.761	
2,200.0	2,195.0	2,186.6	2,176.0	4.8	5.4	-77.61	-132.8	135.1	153.3	143.5	9.76	15.701	
2,300.0	2,293.6	2,286.1	2,274.1	5.1	5.8	-79.25	-147.4	143.2	162.3	151.9	10.39	15.621	
2,400.0	2,392.3	2,385.6	2,372.2	5.4	6.1	-80.72	-162.1	151.3	171.5	160.4	11.04	15.536	
2,500.0	2,490.9	2,485.1	2,470.3	5.7	6.5	-82.04	-176.7	159.4	180.7	169.0	11.70	15.448	
2,600.0	2,589.6	2,584.6	2,568.3	6.1	6.9	-83.24	-191.3	167.5	190.1	177.7	12.38	15.360	
2,700.0	2,688.2	2,684.0	2,666.4	6.4	7.2	-84.32	-205.9	175.6	199.5	186.4	13.06	15.274	
2,800.0	2,786.9	2,783.5	2,764.5	6.7	7.6	-85.30	-220.5	183.8	209.0	195.2	13.76	15.192	
2,900.0	2,885.5	2,883.0	2,862.6	7.1	8.0	-86.20	-235.1	191.9	218.5	204.1	14.46	15.113	
3,000.0	2,984.2	2,982.5	2,960.6	7.4	8.4	-87.02	-249.8	200.0	228.1	212.9	15.17	15.038	
3,100.0	3,082.8	3,082.0	3,058.7	7.8	8.8	-87.77	-264.4	208.1	237.7	221.9	15.88	14.967	
3,200.0	3,181.5	3,181.5	3,156.8	8.2	9.1	-88.47	-279.0	216.2	247.4	230.8	16.61	14.900	
3,300.0	3,280.2	3,281.0	3,254.9	8.5	9.5	-89.11	-293.6	224.3	257.1	239.8	17.33	14.837	
3,400.0	3,378.8	3,380.5	3,352.9	8.9	9.9	-89.71	-308.2	232.5	266.8	248.8	18.06	14.778	
3,500.0	3,477.5	3,479.9	3,451.0	9.2	10.3	-90.27	-322.8	240.6	276.6	257.8	18.79	14.722	
3,600.0	3,576.1	3,579.4	3,549.1	9.6	10.7	-90.79	-337.5	248.7	286.4	266.9	19.52	14.669	
3,700.0	3,674.8	3,678.9	3,647.1	10.0	11.1	-91.27	-352.1	256.8	296.2	275.9	20.26	14.620	
3,800.0	3,773.4	3,778.4	3,745.2	10.4	11.5	-91.72	-366.7	264.9	306.0	285.0	21.00	14.574	
3,900.0	3,872.1	3,877.9	3,843.3	10.7	11.8	-92.14	-381.3	273.0	315.9	294.1	21.74	14.530	
4,000.0	3,970.7	3,977.4	3,941.4	11.1	12.2	-92.54	-395.9	281.2	325.7	303.2	22.48	14.488	
4,100.0	4,069.4	4,076.9	4,039.4	11.5	12.6	-92.92	-410.5	289.3	335.6	312.4	23.22	14.450	
4,200.0	4,168.0	4,176.4	4,137.5	11.8	13.0	-93.27	-425.2	297.4	345.5	321.5	23.97	14.413	
4,300.0	4,266.7	4,275.9	4,235.6	12.2	13.4	-93.61	-439.8	305.5	355.4	330.7	24.72	14.378	
4,400.0	4,365.3	4,375.3	4,333.7	12.6	13.8	-93.92	-454.4	313.6	365.3	339.8	25.46	14.345	
4,500.0	4,464.0	4,474.8	4,431.7	13.0	14.2	-94.22	-469.0	321.7	375.2	349.0	26.21	14.314	
4,600.0	4,562.6	4,574.3	4,529.8	13.3	14.6	-94.50	-483.6	329.9	385.1	358.2	26.96	14.284	
4,700.0	4,661.3	4,673.8	4,627.9	13.7	15.0	-94.77	-498.3	338.0	395.1	367.4	27.71	14.256	
4,800.0	4,759.9	4,773.3	4,726.0	14.1	15.3	-95.03	-512.9	346.1	405.0	376.6	28.46	14.229	
4,900.0	4,858.6	4,872.8	4,824.0	14.5	15.7	-95.27	-527.5	354.2	415.0	385.8	29.21	14.204	
5,000.0	4,957.2	4,972.3	4,922.1	14.9	16.1	-95.51	-542.1	362.3	424.9	395.0	29.97	14.180	

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-221
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-221	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 #2 (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 #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						Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)		
5,100.0	5,055.9	5,071.9	5,020.3	15.2	16.5	-95.76	-556.7	370.4	434.9	404.2	30.71	14.162	
5,200.0	5,154.9	5,179.6	5,126.8	15.5	16.8	-96.04	-570.8	378.2	443.6	412.4	31.26	14.191	
5,300.0	5,254.4	5,287.6	5,234.1	15.7	17.1	-96.24	-581.3	384.1	450.2	418.5	31.74	14.184	
5,400.0	5,354.2	5,395.8	5,342.0	15.9	17.3	-96.37	-588.3	388.0	454.6	422.4	32.15	14.138	
5,500.0	5,454.1	5,504.1	5,450.3	16.1	17.5	-96.44	-591.7	389.9	456.7	424.2	32.50	14.055	
5,600.0	5,554.1	5,608.0	5,554.1	16.2	17.6	90.00	-592.1	390.1	456.9	424.1	32.80	13.931	
5,700.0	5,654.1	5,708.0	5,654.1	16.4	17.7	90.00	-592.1	390.1	456.9	423.9	33.07	13.818	
5,800.0	5,753.8	5,808.0	5,753.8	16.4	17.8	90.00	-585.7	390.1	456.9	423.7	33.22	13.755	
5,900.0	5,851.9	5,908.0	5,851.9	16.4	17.8	90.00	-566.3	390.1	456.9	423.8	33.14	13.787	
6,000.0	5,946.5	6,008.0	5,946.5	16.3	17.6	90.00	-534.3	390.1	456.9	424.1	32.87	13.903	
6,100.0	6,036.2	6,108.0	6,036.2	16.1	17.4	90.00	-490.3	390.1	456.9	424.5	32.45	14.083	
6,200.0	6,119.4	6,208.0	6,119.4	15.8	17.2	90.00	-434.9	390.1	456.9	425.0	31.95	14.301	
6,300.0	6,194.6	6,308.0	6,194.6	15.6	16.9	90.00	-369.1	390.1	456.9	425.5	31.47	14.520	
6,400.0	6,260.6	6,408.0	6,260.6	15.4	16.6	90.00	-294.0	390.1	456.9	425.8	31.10	14.692	
6,500.0	6,316.2	6,508.0	6,316.2	15.3	16.4	90.00	-211.0	390.1	456.9	426.0	30.94	14.767	
6,600.0	6,360.5	6,608.0	6,360.5	15.3	16.3	90.00	-121.5	390.1	456.9	425.9	31.09	14.698	
6,700.0	6,392.8	6,708.0	6,392.8	15.6	16.3	90.00	-26.9	390.1	456.9	425.3	31.60	14.459	
6,800.0	6,412.4	6,808.0	6,412.4	16.0	16.6	90.00	71.1	390.1	456.9	424.4	32.51	14.056	
6,900.0	6,419.1	6,908.0	6,419.1	16.7	17.1	90.00	170.8	390.1	456.9	423.2	33.79	13.522	
7,000.0	6,418.5	7,008.0	6,418.5	17.5	17.9	90.00	270.8	390.1	456.9	421.5	35.44	12.894	
7,100.0	6,417.9	7,108.0	6,417.9	18.5	18.9	90.00	370.8	390.1	456.9	419.5	37.40	12.217	
7,200.0	6,417.3	7,208.0	6,417.3	19.6	20.1	90.00	470.8	390.1	456.9	417.3	39.64	11.526	
7,300.0	6,416.7	7,308.0	6,416.7	20.9	21.3	90.00	570.8	390.1	456.9	414.8	42.12	10.850	
7,400.0	6,416.1	7,408.0	6,416.1	22.2	22.7	90.00	670.8	390.1	456.9	412.2	44.78	10.204	
7,500.0	6,415.4	7,508.0	6,415.4	23.7	24.1	90.00	770.8	390.1	456.9	409.3	47.61	9.598	
7,600.0	6,414.8	7,608.0	6,414.8	25.2	25.6	90.00	870.8	390.1	456.9	406.4	50.57	9.037	
7,700.0	6,414.2	7,708.0	6,414.2	26.7	27.1	90.00	970.8	390.1	456.9	403.3	53.64	8.519	
7,800.0	6,413.6	7,808.0	6,413.6	28.3	28.7	90.00	1,070.8	390.1	456.9	400.1	56.80	8.044	
7,900.0	6,413.0	7,908.0	6,413.0	29.9	30.3	90.00	1,170.8	390.1	456.9	396.9	60.05	7.610	
8,000.0	6,412.4	8,008.0	6,412.4	31.6	31.9	90.00	1,270.8	390.1	456.9	393.6	63.36	7.212	
8,100.0	6,411.8	8,108.0	6,411.8	33.3	33.6	90.00	1,370.8	390.1	456.9	390.2	66.73	6.848	
8,200.0	6,411.2	8,208.0	6,411.2	35.0	35.3	90.00	1,470.8	390.1	456.9	386.8	70.14	6.515	
8,300.0	6,410.6	8,308.0	6,410.6	36.7	37.0	90.00	1,570.8	390.1	456.9	383.3	73.60	6.209	
8,400.0	6,409.9	8,408.0	6,409.9	38.5	38.8	90.00	1,670.8	390.1	456.9	379.9	77.09	5.927	
8,500.0	6,409.3	8,508.0	6,409.3	40.2	40.5	90.00	1,770.8	390.1	456.9	376.3	80.62	5.668	
8,600.0	6,408.7	8,608.0	6,408.7	42.0	42.3	90.00	1,870.8	390.1	456.9	372.8	84.17	5.429	
8,700.0	6,408.1	8,708.0	6,408.1	43.8	44.1	90.00	1,970.8	390.1	456.9	369.2	87.75	5.207	
8,800.0	6,407.5	8,808.0	6,407.5	45.6	45.9	90.00	2,070.8	390.1	456.9	365.6	91.35	5.002	
8,900.0	6,406.9	8,908.0	6,406.9	47.4	47.7	90.00	2,170.8	390.1	456.9	362.0	94.97	4.812	
9,000.0	6,406.3	9,008.0	6,406.3	49.3	49.5	90.00	2,270.8	390.1	456.9	358.3	98.60	4.634	
9,100.0	6,405.7	9,108.0	6,405.7	51.1	51.3	90.00	2,370.8	390.1	456.9	354.7	102.25	4.469	
9,200.0	6,405.1	9,208.0	6,405.1	52.9	53.1	90.00	2,470.8	390.1	456.9	351.0	105.91	4.314	
9,300.0	6,404.4	9,308.0	6,404.4	54.8	55.0	90.00	2,570.8	390.1	456.9	347.4	109.59	4.170	
9,400.0	6,403.8	9,408.0	6,403.8	56.6	56.8	90.00	2,670.8	390.1	456.9	343.7	113.27	4.034	
9,500.0	6,403.2	9,508.0	6,403.2	58.4	58.7	90.00	2,770.8	390.1	456.9	340.0	116.97	3.907	
9,600.0	6,402.6	9,608.0	6,402.6	60.3	60.5	90.00	2,870.8	390.1	456.9	336.3	120.68	3.787	
9,700.0	6,402.0	9,708.0	6,402.0	62.2	62.4	90.00	2,970.8	390.1	456.9	332.6	124.39	3.674	
9,800.0	6,401.4	9,808.0	6,401.4	64.0	64.2	90.00	3,070.8	390.1	456.9	328.8	128.11	3.567	
9,900.0	6,400.8	9,908.0	6,400.8	65.9	66.1	90.00	3,170.8	390.1	456.9	325.1	131.84	3.466	
10,000.0	6,400.2	10,008.0	6,400.2	67.8	67.9	90.00	3,270.7	390.1	456.9	321.4	135.57	3.371	

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 29I-221
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 29I-221	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 #2 (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	
10,100.0	6,399.6	10,108.0	6,399.6	69.6	69.8	90.00	3,370.7	390.1	456.9	317.6	139.31	3.280		
10,200.0	6,398.9	10,208.0	6,398.9	71.5	71.7	90.00	3,470.7	390.1	456.9	313.9	143.06	3.194		
10,300.0	6,398.3	10,308.0	6,398.3	73.4	73.5	90.00	3,570.7	390.1	456.9	310.1	146.81	3.113		
10,400.0	6,397.7	10,408.0	6,397.7	75.3	75.4	90.00	3,670.7	390.1	456.9	306.4	150.56	3.035		
10,500.0	6,397.1	10,508.0	6,397.1	77.1	77.3	90.00	3,770.7	390.1	456.9	302.6	154.32	2.961		
10,600.0	6,396.5	10,608.0	6,396.5	79.0	79.2	90.00	3,870.7	390.1	456.9	298.9	158.08	2.891		
10,700.0	6,395.9	10,708.0	6,395.9	80.9	81.0	90.00	3,970.7	390.1	456.9	295.1	161.85	2.823		
10,800.0	6,395.3	10,808.0	6,395.3	82.8	82.9	90.00	4,070.7	390.1	456.9	291.3	165.62	2.759		
10,846.0	6,395.0	10,854.0	6,395.0	83.7	83.8	90.00	4,116.7	390.1	456.9	289.6	167.35	2.730 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-221
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-221	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 #2 (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						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	89.99	0.0	119.8	119.8				
100.0	100.0	100.0	100.0	0.1	0.1	89.99	0.0	119.8	119.8	119.6	0.22	533.116	
200.0	200.0	200.0	200.0	0.3	0.3	89.99	0.0	119.8	119.8	119.2	0.67	177.705 CC, ES	
300.0	300.0	298.4	298.4	0.6	0.5	90.25	-0.5	120.5	120.5	119.4	1.10	109.412	
400.0	400.0	396.7	396.7	0.8	0.7	91.00	-2.1	122.4	122.5	121.0	1.53	80.181	
500.0	500.0	495.0	494.8	1.0	1.0	92.19	-4.8	125.7	125.9	123.9	1.97	63.981	
600.0	600.0	593.0	592.7	1.2	1.2	93.75	-8.5	130.2	130.7	128.3	2.42	54.088	
700.0	700.0	690.8	690.2	1.5	1.4	95.59	-13.3	136.1	137.1	134.2	2.87	47.695	
800.0	800.0	788.4	787.3	1.7	1.7	97.61	-19.1	143.2	145.0	141.6	3.34	43.444	
900.0	900.0	885.6	883.9	1.9	2.0	99.73	-26.0	151.5	154.5	150.7	3.81	40.601	
1,000.0	1,000.0	982.4	979.9	2.1	2.3	101.86	-33.8	161.1	165.8	161.5	4.28	38.736	
1,100.0	1,100.0	1,078.7	1,075.3	2.4	2.6	103.94	-42.6	171.8	178.7	174.0	4.76	37.576	
1,200.0	1,200.0	1,174.6	1,169.9	2.6	2.9	105.93	-52.4	183.7	193.4	188.2	5.24	36.939	
1,300.0	1,300.0	1,270.0	1,263.8	2.8	3.3	-78.72	-63.2	196.8	209.7	204.1	5.64	37.185	
1,400.0	1,400.0	1,364.9	1,356.9	3.0	3.7	-77.42	-74.8	211.1	227.3	221.2	6.06	37.482	
1,500.0	1,499.9	1,461.9	1,451.8	3.1	4.1	-76.55	-87.6	226.6	245.8	239.3	6.51	37.766	
1,600.0	1,599.7	1,560.2	1,548.0	3.3	4.5	-76.14	-100.5	242.3	263.9	257.0	6.97	37.891	
1,700.0	1,699.4	1,658.6	1,644.3	3.5	5.0	-76.12	-113.5	258.1	281.7	274.3	7.44	37.850	
1,800.0	1,798.9	1,757.1	1,740.6	3.7	5.4	-76.41	-126.4	273.9	299.1	291.2	7.94	37.662	
1,900.0	1,898.3	1,855.6	1,836.9	4.0	5.9	-76.96	-139.4	289.7	316.1	307.6	8.46	37.342	
2,000.0	1,997.4	1,954.0	1,933.2	4.2	6.3	-77.74	-152.4	305.5	332.8	323.8	9.02	36.907	
2,100.0	2,096.3	2,052.4	2,029.5	4.5	6.8	-78.71	-165.3	321.3	349.2	339.6	9.60	36.372	
2,200.0	2,195.0	2,150.8	2,125.7	4.8	7.2	-79.91	-178.3	337.1	365.5	355.3	10.22	35.764	
2,300.0	2,293.6	2,249.1	2,221.9	5.1	7.6	-81.08	-191.2	352.9	381.9	371.1	10.86	35.168	
2,400.0	2,392.3	2,347.5	2,318.1	5.4	8.1	-82.16	-204.2	368.7	398.5	387.0	11.52	34.603	
2,500.0	2,490.9	2,445.8	2,414.3	5.7	8.6	-83.15	-217.1	384.5	415.2	403.0	12.19	34.071	
2,600.0	2,589.6	2,544.2	2,510.5	6.1	9.0	-84.07	-230.1	400.3	432.0	419.2	12.87	33.573	
2,700.0	2,688.2	2,642.5	2,606.7	6.4	9.5	-84.91	-243.0	416.1	448.9	435.4	13.56	33.109	
2,800.0	2,786.9	2,740.9	2,702.9	6.7	9.9	-85.70	-256.0	431.8	465.9	451.7	14.26	32.676	
2,900.0	2,885.5	2,839.2	2,799.1	7.1	10.4	-86.43	-268.9	447.6	483.0	468.1	14.97	32.274	
3,000.0	2,984.2	2,937.6	2,895.3	7.4	10.8	-87.11	-281.9	463.4	500.2	484.5	15.68	31.900	
3,100.0	3,082.8	3,035.9	2,991.5	7.8	11.3	-87.75	-294.9	479.2	517.4	501.0	16.40	31.553	
3,200.0	3,181.5	3,134.3	3,087.7	8.2	11.7	-88.34	-307.8	495.0	534.7	517.6	17.12	31.229	
3,300.0	3,280.2	3,232.6	3,183.9	8.5	12.2	-88.90	-320.8	510.8	552.0	534.2	17.85	30.927	
3,400.0	3,378.8	3,331.0	3,280.1	8.9	12.6	-89.42	-333.7	526.5	569.4	550.8	18.58	30.646	
3,500.0	3,477.5	3,429.3	3,376.3	9.2	13.1	-89.91	-346.7	542.3	586.8	567.5	19.31	30.383	
3,600.0	3,576.1	3,527.7	3,472.6	9.6	13.5	-90.38	-359.6	558.1	604.3	584.2	20.05	30.137	
3,700.0	3,674.8	3,626.0	3,568.8	10.0	14.0	-90.82	-372.6	573.9	621.8	601.0	20.79	29.906	
3,800.0	3,773.4	3,724.4	3,665.0	10.4	14.5	-91.23	-385.5	589.7	639.3	617.8	21.53	29.691	
3,900.0	3,872.1	3,822.7	3,761.2	10.7	14.9	-91.62	-398.5	605.5	656.9	634.6	22.28	29.488	
4,000.0	3,970.7	3,921.1	3,857.4	11.1	15.4	-91.99	-411.4	621.3	674.4	651.4	23.02	29.297	
4,100.0	4,069.4	4,019.4	3,953.6	11.5	15.8	-92.35	-424.4	637.0	692.1	668.3	23.77	29.117	
4,200.0	4,168.0	4,117.8	4,049.8	11.8	16.3	-92.68	-437.3	652.8	709.7	685.2	24.52	28.948	
4,300.0	4,266.7	4,216.1	4,146.0	12.2	16.7	-93.00	-450.3	668.6	727.4	702.1	25.27	28.788	
4,400.0	4,365.3	4,314.5	4,242.2	12.6	17.2	-93.31	-463.2	684.4	745.0	719.0	26.02	28.637	
4,500.0	4,464.0	4,412.8	4,338.4	13.0	17.7	-93.60	-476.2	700.2	762.7	736.0	26.77	28.494	
4,600.0	4,562.6	4,511.2	4,434.6	13.3	18.1	-93.87	-489.1	716.0	780.5	752.9	27.52	28.358	
4,700.0	4,661.3	4,609.5	4,530.8	13.7	18.6	-94.14	-502.1	731.8	798.2	769.9	28.28	28.230	
4,800.0	4,759.9	4,707.9	4,627.0	14.1	19.0	-94.39	-515.0	747.5	816.0	786.9	29.03	28.107	
4,900.0	4,858.6	4,806.2	4,723.2	14.5	19.5	-94.63	-528.0	763.3	833.7	803.9	29.78	27.991	
5,000.0	4,957.2	4,904.6	4,819.4	14.9	19.9	-94.86	-540.9	779.1	851.5	821.0	30.54	27.881	

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 29I-221
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 29I-221	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 #2 (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						Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)		
5,100.0	5,055.9	5,006.2	4,918.9	15.2	20.4	-95.18	-554.3	795.4	869.3	838.0	31.30	27.774	
5,200.0	5,154.9	5,135.8	5,046.3	15.5	20.8	-95.69	-569.2	813.5	884.7	852.8	31.94	27.702	
5,300.0	5,254.4	5,266.6	5,175.9	15.7	21.1	-96.07	-580.4	827.2	896.4	863.9	32.50	27.584	
5,400.0	5,354.2	5,398.3	5,307.1	15.9	21.4	-96.31	-588.0	836.4	904.1	871.1	32.97	27.422	
5,500.0	5,454.1	5,530.6	5,439.2	16.1	21.6	-96.43	-591.7	841.0	907.9	874.5	33.35	27.221	
5,600.0	5,554.1	5,645.5	5,554.1	16.2	21.7	90.00	-592.1	841.5	908.3	874.7	33.67	26.981	
5,700.0	5,654.1	5,745.5	5,654.1	16.4	21.8	90.00	-592.1	841.5	908.3	874.4	33.93	26.772	
5,800.0	5,753.8	5,845.5	5,754.1	16.4	21.9	90.34	-591.1	841.5	908.3	874.3	34.08	26.653	
5,900.0	5,851.9	5,946.4	5,854.3	16.4	21.9	90.83	-579.3	841.5	908.4	874.4	34.00	26.715	
6,000.0	5,946.5	6,048.4	5,953.0	16.3	21.9	91.30	-554.0	841.5	908.6	874.8	33.73	26.939	
6,100.0	6,036.2	6,151.4	6,048.4	16.1	21.7	91.76	-515.4	841.5	908.7	875.5	33.29	27.297	
6,200.0	6,119.4	6,255.5	6,138.6	15.8	21.5	92.19	-463.8	841.5	909.0	876.2	32.77	27.739	
6,300.0	6,194.6	6,360.5	6,221.7	15.6	21.2	92.57	-399.7	841.5	909.2	877.0	32.25	28.195	
6,400.0	6,260.6	6,466.4	6,295.9	15.4	20.9	92.92	-324.2	841.5	909.5	877.7	31.83	28.576	
6,500.0	6,316.2	6,573.1	6,359.3	15.3	20.6	93.21	-238.4	841.5	909.8	878.1	31.61	28.777	
6,600.0	6,360.5	6,680.5	6,410.4	15.3	20.3	93.45	-144.1	841.5	910.0	878.3	31.70	28.703	
6,700.0	6,392.8	6,788.4	6,447.9	15.6	20.0	93.62	-43.1	841.5	910.1	878.0	32.17	28.293	
6,800.0	6,412.4	6,896.7	6,470.9	16.0	19.7	93.73	62.6	841.5	910.2	877.2	33.04	27.549	
6,900.0	6,419.1	7,005.1	6,478.8	16.7	19.5	93.76	170.7	841.5	910.3	876.0	34.31	26.528	
7,000.0	6,418.5	7,105.6	6,478.2	17.5	19.6	93.76	271.2	841.5	910.3	874.4	35.90	25.357	
7,100.0	6,417.9	7,205.6	6,477.6	18.5	20.3	93.76	371.2	841.5	910.3	872.5	37.80	24.082	
7,200.0	6,417.3	7,305.6	6,476.9	19.6	21.4	93.76	471.2	841.5	910.3	870.3	39.98	22.770	
7,300.0	6,416.7	7,405.6	6,476.3	20.9	22.6	93.76	571.2	841.5	910.3	867.9	42.39	21.473	
7,400.0	6,416.1	7,505.6	6,475.7	22.2	23.9	93.76	671.2	841.5	910.3	865.3	45.00	20.228	
7,500.0	6,415.4	7,605.6	6,475.0	23.7	25.3	93.75	771.2	841.5	910.3	862.5	47.78	19.052	
7,600.0	6,414.8	7,705.6	6,474.4	25.2	26.7	93.75	871.2	841.5	910.3	859.6	50.69	17.957	
7,700.0	6,414.2	7,805.6	6,473.8	26.7	28.2	93.75	971.2	841.5	910.3	856.6	53.72	16.944	
7,800.0	6,413.6	7,905.6	6,473.2	28.3	29.8	93.75	1,071.2	841.5	910.3	853.4	56.85	16.013	
7,900.0	6,413.0	8,005.6	6,472.5	29.9	31.3	93.75	1,171.2	841.5	910.3	850.2	60.06	15.157	
8,000.0	6,412.4	8,105.6	6,471.9	31.6	33.0	93.75	1,271.2	841.5	910.3	846.9	63.33	14.373	
8,100.0	6,411.8	8,205.6	6,471.3	33.3	34.6	93.75	1,371.2	841.5	910.3	843.6	66.67	13.653	
8,200.0	6,411.2	8,305.6	6,470.6	35.0	36.3	93.75	1,471.2	841.5	910.3	840.2	70.06	12.993	
8,300.0	6,410.6	8,405.6	6,470.0	36.7	37.9	93.75	1,571.2	841.5	910.3	836.8	73.49	12.386	
8,400.0	6,409.9	8,505.6	6,469.4	38.5	39.6	93.74	1,671.2	841.5	910.3	833.3	76.96	11.828	
8,500.0	6,409.3	8,605.6	6,468.8	40.2	41.4	93.74	1,771.2	841.5	910.3	829.8	80.46	11.313	
8,600.0	6,408.7	8,705.6	6,468.1	42.0	43.1	93.74	1,871.1	841.5	910.3	826.3	83.99	10.837	
8,700.0	6,408.1	8,805.6	6,467.5	43.8	44.9	93.74	1,971.1	841.5	910.3	822.7	87.55	10.397	
8,800.0	6,407.5	8,905.6	6,466.9	45.6	46.6	93.74	2,071.1	841.5	910.3	819.1	91.13	9.989	
8,900.0	6,406.9	9,005.6	6,466.2	47.4	48.4	93.74	2,171.1	841.5	910.3	815.5	94.73	9.609	
9,000.0	6,406.3	9,105.6	6,465.6	49.3	50.2	93.74	2,271.1	841.5	910.3	811.9	98.35	9.256	
9,100.0	6,405.7	9,205.6	6,465.0	51.1	52.0	93.74	2,371.1	841.5	910.3	808.3	101.98	8.926	
9,200.0	6,405.1	9,305.6	6,464.4	52.9	53.8	93.74	2,471.1	841.5	910.3	804.6	105.62	8.618	
9,300.0	6,404.4	9,405.6	6,463.7	54.8	55.6	93.73	2,571.1	841.5	910.3	801.0	109.28	8.329	
9,400.0	6,403.8	9,505.6	6,463.1	56.6	57.4	93.73	2,671.1	841.5	910.3	797.3	112.96	8.059	
9,500.0	6,403.2	9,605.6	6,462.5	58.4	59.2	93.73	2,771.1	841.5	910.3	793.6	116.64	7.804	
9,600.0	6,402.6	9,705.6	6,461.8	60.3	61.1	93.73	2,871.1	841.5	910.2	789.9	120.33	7.565	
9,700.0	6,402.0	9,805.6	6,461.2	62.2	62.9	93.73	2,971.1	841.5	910.2	786.2	124.03	7.339	
9,800.0	6,401.4	9,905.6	6,460.6	64.0	64.7	93.73	3,071.1	841.5	910.2	782.5	127.74	7.126	
9,900.0	6,400.8	10,005.6	6,460.0	65.9	66.6	93.73	3,171.1	841.5	910.2	778.8	131.45	6.925	
10,000.0	6,400.2	10,105.6	6,459.3	67.8	68.4	93.73	3,271.1	841.5	910.2	775.1	135.17	6.734	

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 29I-221
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 29I-221	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 #2 (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	
10,100.0	6,399.6	10,205.6	6,458.7	69.6	70.3	93.73	3,371.1	841.5	910.2	771.3	138.90	6.553		
10,200.0	6,398.9	10,305.6	6,458.1	71.5	72.1	93.72	3,471.1	841.5	910.2	767.6	142.63	6.382		
10,300.0	6,398.3	10,405.6	6,457.5	73.4	74.0	93.72	3,571.1	841.5	910.2	763.9	146.37	6.219		
10,400.0	6,397.7	10,505.6	6,456.8	75.3	75.8	93.72	3,671.1	841.5	910.2	760.1	150.11	6.064		
10,500.0	6,397.1	10,605.6	6,456.2	77.1	77.7	93.72	3,771.1	841.5	910.2	756.4	153.86	5.916		
10,600.0	6,396.5	10,705.6	6,455.6	79.0	79.6	93.72	3,871.1	841.5	910.2	752.6	157.61	5.775		
10,700.0	6,395.9	10,805.6	6,454.9	80.9	81.4	93.72	3,971.1	841.5	910.2	748.9	161.37	5.641		
10,800.0	6,395.3	10,905.6	6,454.3	82.8	83.3	93.72	4,071.1	841.5	910.2	745.1	165.11	5.513		
10,846.0	6,395.0	10,951.6	6,454.0	83.7	84.0	93.72	4,117.1	841.5	910.2	743.6	166.67	5.461 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-221
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-221	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 #2 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-441 - 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						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	89.99	0.0	89.2	89.2				
100.0	100.0	100.0	100.0	0.1	0.1	89.99	0.0	89.2	89.2	88.9	0.22	396.738	
200.0	200.0	200.0	200.0	0.3	0.3	89.99	0.0	89.2	89.2	88.5	0.67	132.246	
300.0	300.0	300.0	300.0	0.6	0.6	89.99	0.0	89.2	89.2	88.0	1.12	79.348	
400.0	400.0	400.0	400.0	0.8	0.8	89.99	0.0	89.2	89.2	87.6	1.57	56.677 CC, ES	
500.0	500.0	498.9	498.9	1.0	1.0	90.39	-0.6	89.8	89.8	87.8	2.00	44.931	
600.0	600.0	597.8	597.8	1.2	1.2	91.57	-2.5	91.5	91.5	89.1	2.41	37.944	
700.0	700.0	696.6	696.5	1.5	1.4	93.42	-5.6	94.4	94.6	91.8	2.84	33.302	
800.0	800.0	795.2	794.9	1.7	1.6	95.82	-10.0	98.4	99.0	95.7	3.28	30.196	
900.0	900.0	893.6	893.0	1.9	1.8	98.59	-15.6	103.5	104.9	101.2	3.73	28.153	
1,000.0	1,000.0	991.6	990.6	2.1	2.1	101.57	-22.5	109.8	112.5	108.3	4.18	26.883	
1,100.0	1,100.0	1,089.4	1,087.7	2.4	2.4	104.59	-30.5	117.2	121.7	117.1	4.65	26.194	
1,200.0	1,200.0	1,186.7	1,184.2	2.6	2.6	107.54	-39.7	125.6	132.7	127.6	5.11	25.950	
1,300.0	1,300.0	1,283.6	1,280.1	2.8	3.0	-76.31	-50.1	135.2	145.3	139.8	5.53	26.278	
1,400.0	1,400.0	1,380.3	1,375.5	3.0	3.3	-74.45	-61.6	145.7	159.2	153.2	5.95	26.769	
1,500.0	1,499.9	1,477.8	1,471.5	3.1	3.6	-73.19	-74.3	157.4	174.0	167.6	6.38	27.275	
1,600.0	1,599.7	1,576.8	1,568.9	3.3	4.0	-72.59	-87.3	169.3	188.5	181.7	6.83	27.613	
1,700.0	1,699.4	1,675.8	1,666.3	3.5	4.4	-72.53	-100.4	181.3	202.6	195.3	7.30	27.770	
1,800.0	1,798.9	1,774.8	1,763.8	3.7	4.8	-72.91	-113.4	193.2	216.1	208.3	7.78	27.764	
1,900.0	1,898.3	1,873.9	1,861.2	4.0	5.2	-73.65	-126.4	205.2	229.2	220.9	8.30	27.617	
2,000.0	1,997.4	1,973.0	1,958.7	4.2	5.6	-74.71	-139.5	217.2	241.8	233.0	8.84	27.348	
2,100.0	2,096.3	2,072.0	2,056.2	4.5	6.0	-76.03	-152.5	229.1	254.2	244.7	9.42	26.979	
2,200.0	2,195.0	2,171.0	2,153.6	4.8	6.4	-77.59	-165.6	241.1	266.3	256.3	10.03	26.541	
2,300.0	2,293.6	2,270.0	2,251.0	5.1	6.8	-79.10	-178.6	253.1	278.6	268.0	10.67	26.114	
2,400.0	2,392.3	2,369.0	2,348.4	5.4	7.2	-80.47	-191.6	265.0	291.1	279.8	11.32	25.713	
2,500.0	2,490.9	2,468.0	2,445.8	5.7	7.6	-81.73	-204.6	277.0	303.8	291.8	11.99	25.339	
2,600.0	2,589.6	2,567.0	2,543.1	6.1	8.0	-82.89	-217.7	288.9	316.5	303.9	12.67	24.991	
2,700.0	2,688.2	2,666.0	2,640.5	6.4	8.4	-83.97	-230.7	300.9	329.4	316.1	13.35	24.668	
2,800.0	2,786.9	2,764.9	2,737.9	6.7	8.8	-84.96	-243.7	312.8	342.4	328.4	14.05	24.370	
2,900.0	2,885.5	2,863.9	2,835.3	7.1	9.2	-85.87	-256.8	324.8	355.5	340.8	14.76	24.095	
3,000.0	2,984.2	2,962.9	2,932.7	7.4	9.6	-86.73	-269.8	336.7	368.7	353.2	15.47	23.841	
3,100.0	3,082.8	3,061.9	3,030.1	7.8	10.0	-87.52	-282.8	348.7	382.0	365.8	16.18	23.605	
3,200.0	3,181.5	3,160.9	3,127.5	8.2	10.4	-88.26	-295.8	360.6	395.3	378.4	16.90	23.388	
3,300.0	3,280.2	3,259.9	3,224.9	8.5	10.8	-88.95	-308.9	372.6	408.7	391.0	17.63	23.186	
3,400.0	3,378.8	3,358.8	3,322.3	8.9	11.2	-89.60	-321.9	384.6	422.1	403.7	18.35	23.000	
3,500.0	3,477.5	3,457.8	3,419.7	9.2	11.6	-90.21	-334.9	396.5	435.6	416.5	19.08	22.826	
3,600.0	3,576.1	3,556.8	3,517.1	9.6	12.0	-90.78	-348.0	408.5	449.1	429.3	19.82	22.665	
3,700.0	3,674.8	3,655.8	3,614.4	10.0	12.4	-91.32	-361.0	420.4	462.7	442.1	20.55	22.514	
3,800.0	3,773.4	3,754.8	3,711.8	10.4	12.8	-91.83	-374.0	432.4	476.3	455.0	21.29	22.374	
3,900.0	3,872.1	3,853.8	3,809.2	10.7	13.3	-92.31	-387.0	444.3	489.9	467.9	22.03	22.243	
4,000.0	3,970.7	3,952.7	3,906.6	11.1	13.7	-92.76	-400.1	456.3	503.6	480.9	22.77	22.121	
4,100.0	4,069.4	4,051.7	4,004.0	11.5	14.1	-93.19	-413.1	468.2	517.3	493.8	23.51	22.006	
4,200.0	4,168.0	4,150.7	4,101.4	11.8	14.5	-93.60	-426.1	480.2	531.1	506.8	24.25	21.898	
4,300.0	4,266.7	4,249.7	4,198.8	12.2	14.9	-93.98	-439.2	492.1	544.8	519.8	25.00	21.797	
4,400.0	4,365.3	4,348.7	4,296.2	12.6	15.3	-94.35	-452.2	504.1	558.6	532.9	25.74	21.701	
4,500.0	4,464.0	4,447.7	4,393.6	13.0	15.7	-94.70	-465.2	516.1	572.4	545.9	26.49	21.611	
4,600.0	4,562.6	4,546.6	4,491.0	13.3	16.1	-95.04	-478.2	528.0	586.2	559.0	27.23	21.526	
4,700.0	4,661.3	4,645.6	4,588.4	13.7	16.5	-95.35	-491.3	540.0	600.1	572.1	27.98	21.446	
4,800.0	4,759.9	4,744.6	4,685.8	14.1	16.9	-95.66	-504.3	551.9	613.9	585.2	28.73	21.370	
4,900.0	4,858.6	4,843.6	4,783.1	14.5	17.4	-95.95	-517.3	563.9	627.8	598.3	29.48	21.298	
5,000.0	4,957.2	4,942.6	4,880.5	14.9	17.8	-96.23	-530.3	575.8	641.7	611.5	30.23	21.230	

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 29I-221
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 29I-221	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 #2 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-441 - 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					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	5,055.9	5,041.6	4,977.9	15.2	18.2	-96.55	-543.4	587.8	655.6	624.6	30.97	21.169	
5,200.0	5,154.9	5,140.6	5,075.4	15.5	18.6	-96.86	-556.4	599.8	669.2	637.6	31.61	21.172	
5,300.0	5,254.4	5,256.0	5,189.2	15.7	18.9	-96.91	-570.3	612.5	681.4	649.2	32.16	21.188	
5,400.0	5,354.2	5,374.5	5,306.8	15.9	19.2	-96.85	-581.0	622.3	690.4	657.8	32.61	21.174	
5,500.0	5,454.1	5,493.7	5,425.6	16.1	19.5	-96.70	-588.2	628.9	696.3	663.3	32.98	21.113	
5,600.0	5,554.1	5,613.2	5,545.0	16.2	19.6	89.97	-591.7	632.1	699.1	665.8	33.30	20.995	
5,700.0	5,654.1	5,722.3	5,654.1	16.4	19.8	90.00	-592.1	632.5	699.4	665.8	33.58	20.824	
5,728.5	5,682.6	5,750.8	5,682.6	16.4	19.8	90.04	-592.1	632.5	699.4	665.7	33.64	20.790	
5,800.0	5,753.8	5,822.0	5,753.8	16.4	19.9	90.52	-592.1	632.5	699.4	665.6	33.74	20.728	
5,900.0	5,851.9	5,921.7	5,853.5	16.4	20.0	91.93	-590.3	632.5	699.8	666.1	33.68	20.778	
6,000.0	5,946.5	6,024.4	5,955.2	16.3	20.0	93.45	-576.4	632.5	700.7	667.3	33.41	20.975	
6,100.0	6,036.2	6,130.0	6,056.7	16.1	19.9	94.93	-548.0	632.5	702.0	669.1	32.96	21.303	
6,200.0	6,119.4	6,238.4	6,156.0	15.8	19.7	96.34	-504.6	632.5	703.8	671.4	32.39	21.730	
6,300.0	6,194.6	6,349.7	6,250.5	15.6	19.5	97.64	-445.9	632.5	705.8	674.0	31.78	22.205	
6,400.0	6,260.6	6,464.0	6,337.5	15.4	19.2	98.82	-372.0	632.5	707.9	676.6	31.25	22.652	
6,500.0	6,316.2	6,581.0	6,414.2	15.3	18.8	99.84	-283.8	632.5	709.9	679.0	30.91	22.968	
6,600.0	6,360.5	6,700.4	6,477.7	15.3	18.5	100.67	-182.9	632.5	711.7	680.9	30.88	23.050	
6,700.0	6,392.8	6,821.7	6,525.2	15.6	18.2	101.28	-71.4	632.5	713.2	681.9	31.28	22.802	
6,800.0	6,412.4	6,944.5	6,554.8	16.0	17.9	101.66	47.6	632.5	714.1	681.9	32.14	22.215	
6,900.0	6,419.1	7,068.0	6,565.0	16.7	17.8	101.79	170.6	632.5	714.4	680.9	33.49	21.334	
7,000.0	6,418.5	7,168.2	6,565.0	17.5	18.5	101.83	270.8	632.5	714.5	679.5	35.07	20.376	
7,100.0	6,417.9	7,268.2	6,565.0	18.5	19.6	101.88	370.8	632.5	714.7	677.7	36.94	19.345	
7,200.0	6,417.3	7,368.2	6,565.0	19.6	20.7	101.93	470.8	632.5	714.8	675.7	39.09	18.285	
7,300.0	6,416.7	7,468.2	6,565.0	20.9	22.0	101.98	570.8	632.5	714.9	673.4	41.47	17.239	
7,400.0	6,416.1	7,568.2	6,565.0	22.2	23.3	102.02	670.8	632.5	715.0	671.0	44.04	16.236	
7,500.0	6,415.4	7,668.2	6,565.0	23.7	24.7	102.07	770.8	632.5	715.2	668.4	46.77	15.290	
7,600.0	6,414.8	7,768.2	6,565.0	25.2	26.2	102.12	870.8	632.5	715.3	665.7	49.64	14.409	
7,700.0	6,414.2	7,868.2	6,565.0	26.7	27.7	102.17	970.8	632.5	715.4	662.8	52.62	13.596	
7,800.0	6,413.6	7,968.2	6,565.0	28.3	29.3	102.21	1,070.8	632.5	715.5	659.9	55.69	12.848	
7,900.0	6,413.0	8,068.2	6,565.0	29.9	30.9	102.26	1,170.8	632.5	715.7	656.8	58.84	12.163	
8,000.0	6,412.4	8,168.2	6,565.0	31.6	32.5	102.31	1,270.8	632.5	715.8	653.7	62.06	11.534	
8,100.0	6,411.8	8,268.2	6,565.0	33.3	34.2	102.36	1,370.8	632.5	715.9	650.6	65.33	10.958	
8,200.0	6,411.2	8,368.2	6,565.0	35.0	35.8	102.41	1,470.8	632.5	716.1	647.4	68.66	10.430	
8,300.0	6,410.6	8,468.2	6,565.0	36.7	37.5	102.45	1,570.8	632.5	716.2	644.2	72.02	9.945	
8,400.0	6,409.9	8,568.2	6,565.0	38.5	39.3	102.50	1,670.8	632.5	716.3	640.9	75.42	9.498	
8,500.0	6,409.3	8,668.2	6,565.0	40.2	41.0	102.55	1,770.8	632.5	716.5	637.6	78.85	9.087	
8,600.0	6,408.7	8,768.2	6,565.0	42.0	42.8	102.60	1,870.8	632.5	716.6	634.3	82.31	8.707	
8,700.0	6,408.1	8,868.2	6,565.0	43.8	44.5	102.64	1,970.8	632.5	716.7	630.9	85.79	8.355	
8,800.0	6,407.5	8,968.2	6,565.0	45.6	46.3	102.69	2,070.8	632.5	716.9	627.6	89.29	8.029	
8,900.0	6,406.9	9,068.2	6,565.0	47.4	48.1	102.74	2,170.8	632.5	717.0	624.2	92.81	7.726	
9,000.0	6,406.3	9,168.2	6,565.0	49.3	49.9	102.79	2,270.8	632.5	717.1	620.8	96.34	7.444	
9,100.0	6,405.7	9,268.2	6,565.0	51.1	51.7	102.83	2,370.8	632.5	717.3	617.4	99.89	7.181	
9,200.0	6,405.1	9,368.2	6,565.0	52.9	53.5	102.88	2,470.8	632.5	717.4	614.0	103.45	6.935	
9,300.0	6,404.4	9,468.2	6,565.0	54.8	55.3	102.93	2,570.8	632.5	717.5	610.5	107.02	6.705	
9,400.0	6,403.8	9,568.2	6,565.0	56.6	57.1	102.98	2,670.8	632.5	717.7	607.1	110.61	6.489	
9,500.0	6,403.2	9,668.2	6,565.0	58.4	59.0	103.02	2,770.8	632.5	717.8	603.6	114.20	6.286	
9,600.0	6,402.6	9,768.2	6,565.0	60.3	60.8	103.07	2,870.8	632.5	718.0	600.2	117.80	6.095	
9,700.0	6,402.0	9,868.1	6,565.0	62.2	62.6	103.12	2,970.8	632.5	718.1	596.7	121.40	5.915	
9,800.0	6,401.4	9,968.1	6,565.0	64.0	64.5	103.17	3,070.8	632.5	718.2	593.2	125.02	5.745	
9,900.0	6,400.8	10,068.1	6,565.0	65.9	66.3	103.21	3,170.8	632.5	718.4	589.7	128.63	5.585	

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 29I-221
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 29I-221	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 #2 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design										R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-441 - 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						Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
10,000.0	6,400.2	10,168.1	6,565.0	67.8	68.2	103.26	3,270.7	632.5	718.5	586.3	132.26	5.433			
10,100.0	6,399.6	10,268.1	6,565.0	69.6	70.1	103.31	3,370.7	632.5	718.7	582.8	135.88	5.289			
10,200.0	6,398.9	10,368.1	6,565.0	71.5	71.9	103.36	3,470.7	632.5	718.8	579.3	139.52	5.152			
10,300.0	6,398.3	10,468.1	6,565.0	73.4	73.8	103.40	3,570.7	632.5	718.9	575.8	143.15	5.022			
10,400.0	6,397.7	10,568.1	6,565.0	75.3	75.6	103.45	3,670.7	632.5	719.1	572.3	146.79	4.899			
10,500.0	6,397.1	10,668.1	6,565.0	77.1	77.5	103.50	3,770.7	632.5	719.2	568.8	150.43	4.781			
10,600.0	6,396.5	10,768.1	6,565.0	79.0	79.4	103.55	3,870.7	632.5	719.4	565.3	154.08	4.669			
10,700.0	6,395.9	10,868.1	6,565.0	80.9	81.3	103.59	3,970.7	632.5	719.5	561.8	157.72	4.562			
10,800.0	6,395.3	10,968.1	6,565.0	82.8	83.1	103.64	4,070.7	632.5	719.6	558.3	161.37	4.460			
10,846.0	6,395.0	11,014.1	6,565.0	83.7	84.0	103.66	4,116.7	632.5	719.7	556.7	163.05	4.414 SF			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29I-221
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 29I-221	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 #2 (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 29I-221

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 29I-221
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 29I-221	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 #2 (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 29I-221
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.67°

