

PETROLEUM DEVELOPMENT CORP Weld County CO

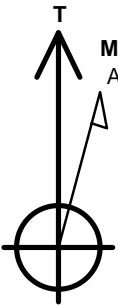
Well Name: R&R Farms 29L-301

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

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1377497.77	3287547.70	40.365040	-104.468060	
RKB - 13' WELL @ 4587.0ft (RKB - 13')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 641'FSL,434'FWL	1.0	0.0	0.0	Point
BHL 500'FNL, 1188'FWL	6454.0	4120.4	721.6	Point



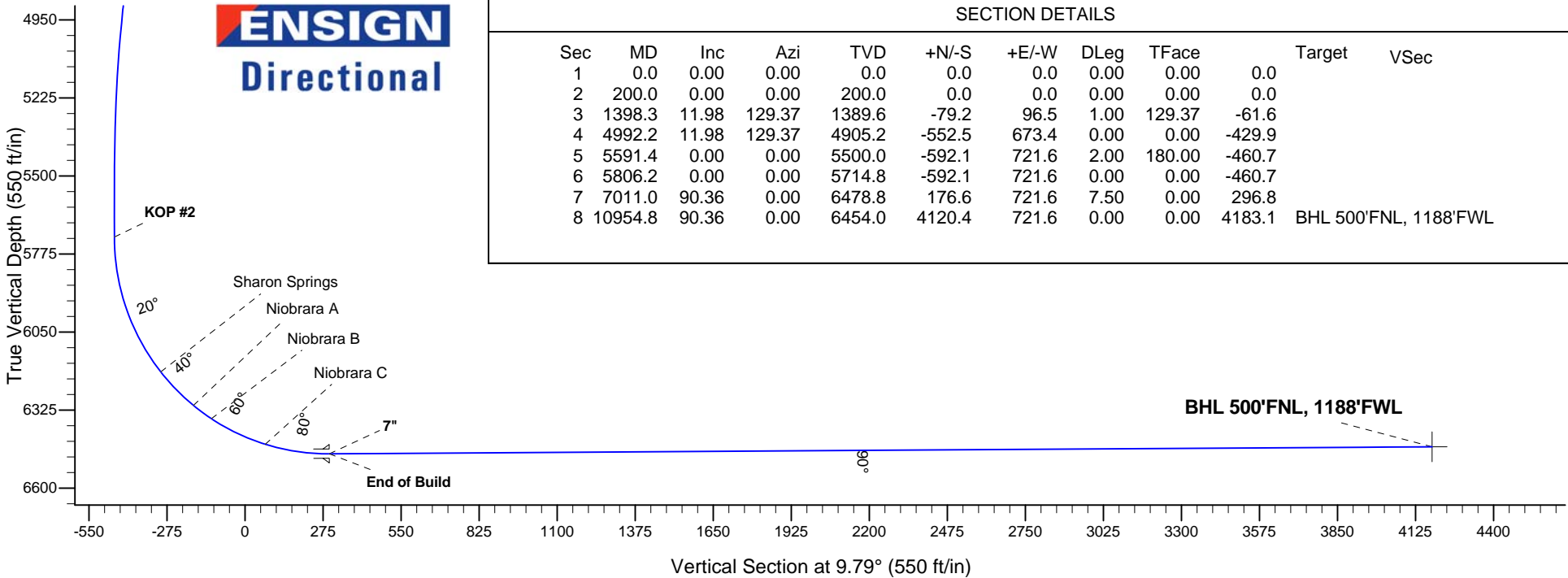
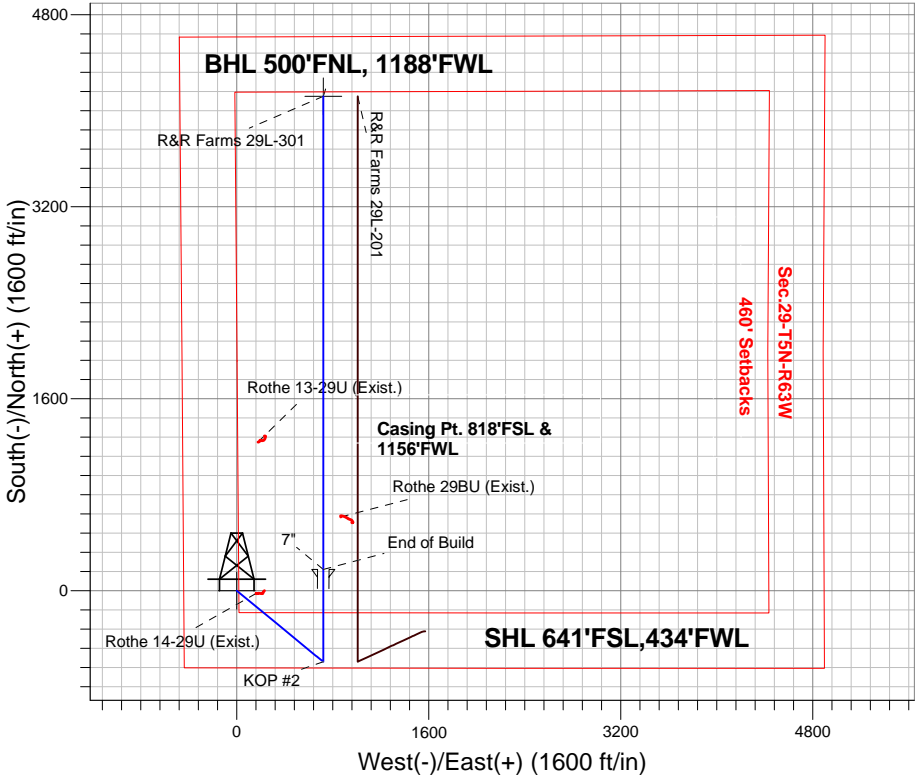
Azimuths to True North
Magnetic North: 8.19°

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

ANNOTATIONS

TVD	MD	Annotation
200.0	200.0	KOP #1
5714.8	5806.2	KOP #2
6478.8	7011.0	End of Build

R&R Farms 5N63W29L Pad Sec.29-T5N-R63W
R&R Farms 29L-301
Plan #3 (4-10-15)



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	Target	VSec
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
3	1398.3	11.98	129.37	1389.6	-79.2	96.5	1.00	129.37	-61.6	
4	4992.2	11.98	129.37	4905.2	-552.5	673.4	0.00	0.00	-429.9	
5	5591.4	0.00	0.00	5500.0	-592.1	721.6	2.00	180.00	-460.7	
6	5806.2	0.00	0.00	5714.8	-592.1	721.6	0.00	0.00	-460.7	
7	7011.0	90.36	0.00	6478.8	176.6	721.6	7.50	0.00	296.8	
8	10954.8	90.36	0.00	6454.0	4120.4	721.6	0.00	0.00	4183.1	BHL 500'FNL, 1188'FWL



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.29-T5N-R63W

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

R&R Farms 29L-301

Wellbore #1

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

Standard Planning Report

10 April, 2015

Database:	Landmark	Local Co-ordinate Reference:	Well R&R Farms 29L-301
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Project:	SEC.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	North Reference:	True
Well:	R&R Farms 29L-301	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (4-10-15)		

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

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

Well	R&R Farms 29L-301					
Well Position	+N-S	426.2 ft	Northing:	1,377,497.77 ft	Latitude:	40.365040
	+E-W	-501.6 ft	Easting:	3,287,547.70 ft	Longitude:	-104.468060
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,574.0 ft

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

Design	Plan #3 (4-10-15)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	9.79

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,398.3	11.98	129.37	1,389.6	-79.2	96.5	1.00	1.00	0.00	129.37	
4,992.2	11.98	129.37	4,905.2	-552.5	673.4	0.00	0.00	0.00	0.00	
5,591.4	0.00	0.00	5,500.0	-592.1	721.6	2.00	-2.00	0.00	180.00	
5,806.2	0.00	0.00	5,714.8	-592.1	721.6	0.00	0.00	0.00	0.00	
7,011.0	90.36	0.00	6,478.8	176.6	721.6	7.50	7.50	0.00	0.00	
10,954.8	90.36	0.00	6,454.0	4,120.4	721.6	0.00	0.00	0.00	0.00	BHL 500'FNL, 1188

Database:	Landmark	Local Co-ordinate Reference:	Well R&R Farms 29L-301
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Project:	SEC.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	North Reference:	True
Well:	R&R Farms 29L-301	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (4-10-15)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
300.0	1.00	129.37	300.0	-0.6	0.7	-0.4	1.00	1.00	0.00
400.0	2.00	129.37	400.0	-2.2	2.7	-1.7	1.00	1.00	0.00
500.0	3.00	129.37	499.9	-5.0	6.1	-3.9	1.00	1.00	0.00
600.0	4.00	129.37	599.7	-8.9	10.8	-6.9	1.00	1.00	0.00
700.0	5.00	129.37	699.4	-13.8	16.9	-10.8	1.00	1.00	0.00
800.0	6.00	129.37	798.9	-19.9	24.3	-15.5	1.00	1.00	0.00
900.0	7.00	129.37	898.3	-27.1	33.0	-21.1	1.00	1.00	0.00
1,000.0	8.00	129.37	997.4	-35.4	43.1	-27.5	1.00	1.00	0.00
1,100.0	9.00	129.37	1,096.3	-44.7	54.5	-34.8	1.00	1.00	0.00
1,200.0	10.00	129.37	1,194.9	-55.2	67.3	-43.0	1.00	1.00	0.00
1,300.0	11.00	129.37	1,293.3	-66.8	81.4	-52.0	1.00	1.00	0.00
1,398.3	11.98	129.37	1,389.6	-79.2	96.5	-61.6	1.00	1.00	0.00
1,400.0	11.98	129.37	1,391.2	-79.4	96.8	-61.8	0.00	0.00	0.00
1,500.0	11.98	129.37	1,489.1	-92.6	112.8	-72.0	0.00	0.00	0.00
1,600.0	11.98	129.37	1,586.9	-105.8	128.9	-82.3	0.00	0.00	0.00
1,700.0	11.98	129.37	1,684.7	-118.9	144.9	-92.5	0.00	0.00	0.00
1,800.0	11.98	129.37	1,782.5	-132.1	161.0	-102.8	0.00	0.00	0.00
1,900.0	11.98	129.37	1,880.4	-145.3	177.0	-113.0	0.00	0.00	0.00
2,000.0	11.98	129.37	1,978.2	-158.4	193.1	-123.3	0.00	0.00	0.00
2,100.0	11.98	129.37	2,076.0	-171.6	209.1	-133.5	0.00	0.00	0.00
2,200.0	11.98	129.37	2,173.8	-184.8	225.2	-143.8	0.00	0.00	0.00
2,300.0	11.98	129.37	2,271.6	-197.9	241.2	-154.0	0.00	0.00	0.00
2,400.0	11.98	129.37	2,369.5	-211.1	257.3	-164.3	0.00	0.00	0.00
2,500.0	11.98	129.37	2,467.3	-224.3	273.3	-174.5	0.00	0.00	0.00
2,600.0	11.98	129.37	2,565.1	-237.5	289.4	-184.8	0.00	0.00	0.00
2,700.0	11.98	129.37	2,662.9	-250.6	305.4	-195.0	0.00	0.00	0.00
2,800.0	11.98	129.37	2,760.7	-263.8	321.5	-205.3	0.00	0.00	0.00
2,900.0	11.98	129.37	2,858.6	-277.0	337.6	-215.5	0.00	0.00	0.00
3,000.0	11.98	129.37	2,956.4	-290.1	353.6	-225.8	0.00	0.00	0.00
3,100.0	11.98	129.37	3,054.2	-303.3	369.7	-236.0	0.00	0.00	0.00
3,200.0	11.98	129.37	3,152.0	-316.5	385.7	-246.3	0.00	0.00	0.00
3,300.0	11.98	129.37	3,249.8	-329.6	401.8	-256.5	0.00	0.00	0.00
3,340.0	11.98	129.37	3,289.0	-334.9	408.2	-260.6	0.00	0.00	0.00
Parkman									
3,400.0	11.98	129.37	3,347.7	-342.8	417.8	-266.7	0.00	0.00	0.00
3,500.0	11.98	129.37	3,445.5	-356.0	433.9	-277.0	0.00	0.00	0.00
3,600.0	11.98	129.37	3,543.3	-369.2	449.9	-287.2	0.00	0.00	0.00
3,700.0	11.98	129.37	3,641.1	-382.3	466.0	-297.5	0.00	0.00	0.00
3,800.0	11.98	129.37	3,738.9	-395.5	482.0	-307.7	0.00	0.00	0.00
3,900.0	11.98	129.37	3,836.8	-408.7	498.1	-318.0	0.00	0.00	0.00
4,000.0	11.98	129.37	3,934.6	-421.8	514.1	-328.2	0.00	0.00	0.00
4,056.6	11.98	129.37	3,990.0	-429.3	523.2	-334.0	0.00	0.00	0.00
Sussex									
4,100.0	11.98	129.37	4,032.4	-435.0	530.2	-338.5	0.00	0.00	0.00
4,200.0	11.98	129.37	4,130.2	-448.2	546.2	-348.7	0.00	0.00	0.00
4,300.0	11.98	129.37	4,228.1	-461.3	562.3	-359.0	0.00	0.00	0.00
4,400.0	11.98	129.37	4,325.9	-474.5	578.3	-369.2	0.00	0.00	0.00
4,500.0	11.98	129.37	4,423.7	-487.7	594.4	-379.5	0.00	0.00	0.00

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Project:	SEC.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	North Reference:	True
Well:	R&R Farms 29L-301	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (4-10-15)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,537.1	11.98	129.37	4,460.0	-492.6	600.3	-383.3	0.00	0.00	0.00
Shannon									
4,600.0	11.98	129.37	4,521.5	-500.8	610.4	-389.7	0.00	0.00	0.00
4,700.0	11.98	129.37	4,619.3	-514.0	626.5	-400.0	0.00	0.00	0.00
4,800.0	11.98	129.37	4,717.2	-527.2	642.5	-410.2	0.00	0.00	0.00
4,900.0	11.98	129.37	4,815.0	-540.4	658.6	-420.5	0.00	0.00	0.00
4,992.2	11.98	129.37	4,905.2	-552.5	673.4	-429.9	0.00	0.00	0.00
5,000.0	11.83	129.37	4,912.8	-553.5	674.6	-430.7	2.00	-2.00	0.00
5,100.0	9.83	129.37	5,011.0	-565.4	689.1	-440.0	2.00	-2.00	0.00
5,200.0	7.83	129.37	5,109.8	-575.2	701.0	-447.5	2.00	-2.00	0.00
5,300.0	5.83	129.37	5,209.1	-582.7	710.2	-453.4	2.00	-2.00	0.00
5,400.0	3.83	129.37	5,308.8	-588.0	716.7	-457.6	2.00	-2.00	0.00
5,500.0	1.83	129.37	5,408.6	-591.2	720.5	-460.0	2.00	-2.00	0.00
5,591.4	0.00	0.00	5,500.0	-592.1	721.6	-460.7	2.00	-2.00	0.00
5,600.0	0.00	0.00	5,508.6	-592.1	721.6	-460.7	0.00	0.00	0.00
5,700.0	0.00	0.00	5,608.6	-592.1	721.6	-460.7	0.00	0.00	0.00
5,800.0	0.00	0.00	5,708.6	-592.1	721.6	-460.7	0.00	0.00	0.00
5,806.2	0.00	0.00	5,714.8	-592.1	721.6	-460.7	0.00	0.00	0.00
KOP #2									
5,900.0	7.03	0.00	5,808.4	-586.4	721.6	-455.1	7.50	7.50	0.00
6,000.0	14.53	0.00	5,906.5	-567.7	721.6	-436.6	7.50	7.50	0.00
6,100.0	22.03	0.00	6,001.4	-536.3	721.6	-405.7	7.50	7.50	0.00
6,200.0	29.53	0.00	6,091.4	-492.8	721.6	-362.9	7.50	7.50	0.00
6,300.0	37.03	0.00	6,174.9	-438.0	721.6	-308.9	7.50	7.50	0.00
6,319.0	38.46	0.00	6,190.0	-426.4	721.6	-297.4	7.50	7.50	0.00
Sharon Springs									
6,400.0	44.53	0.00	6,250.6	-372.7	721.6	-244.6	7.50	7.50	0.00
6,485.4	50.93	0.00	6,308.0	-309.6	721.6	-182.3	7.50	7.50	0.00
Niobrara A									
6,500.0	52.03	0.00	6,317.1	-298.1	721.6	-171.1	7.50	7.50	0.00
6,565.2	56.92	0.00	6,355.0	-245.1	721.6	-118.8	7.50	7.50	0.00
Niobrara B									
6,600.0	59.53	0.00	6,373.3	-215.5	721.6	-89.6	7.50	7.50	0.00
6,700.0	67.03	0.00	6,418.2	-126.3	721.6	-1.7	7.50	7.50	0.00
6,778.2	72.89	0.00	6,445.0	-52.9	721.6	70.7	7.50	7.50	0.00
Niobrara C									
6,800.0	74.53	0.00	6,451.1	-31.9	721.6	91.3	7.50	7.50	0.00
6,900.0	82.03	0.00	6,471.4	65.9	721.6	187.7	7.50	7.50	0.00
7,000.0	89.53	0.00	6,478.8	165.6	721.6	285.9	7.50	7.50	0.00
7,011.0	90.36	0.00	6,478.8	176.6	721.6	296.8	7.50	7.50	0.00
End of Build - 7"									
7,100.0	90.36	0.00	6,478.2	265.6	721.6	384.5	0.00	0.00	0.00
7,200.0	90.36	0.00	6,477.6	365.6	721.6	483.0	0.00	0.00	0.00
7,300.0	90.36	0.00	6,477.0	465.6	721.6	581.6	0.00	0.00	0.00
7,400.0	90.36	0.00	6,476.3	565.6	721.6	680.1	0.00	0.00	0.00
7,500.0	90.36	0.00	6,475.7	665.6	721.6	778.6	0.00	0.00	0.00
7,600.0	90.36	0.00	6,475.1	765.6	721.6	877.2	0.00	0.00	0.00
7,700.0	90.36	0.00	6,474.5	865.6	721.6	975.7	0.00	0.00	0.00
7,800.0	90.36	0.00	6,473.8	965.6	721.6	1,074.3	0.00	0.00	0.00
7,900.0	90.36	0.00	6,473.2	1,065.6	721.6	1,172.8	0.00	0.00	0.00
8,000.0	90.36	0.00	6,472.6	1,165.6	721.6	1,271.3	0.00	0.00	0.00

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Project:	SEC.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
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Well:	R&R Farms 29L-301	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (4-10-15)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,100.0	90.36	0.00	6,471.9	1,265.6	721.6	1,369.9	0.00	0.00	0.00
8,200.0	90.36	0.00	6,471.3	1,365.6	721.6	1,468.4	0.00	0.00	0.00
8,300.0	90.36	0.00	6,470.7	1,465.6	721.6	1,567.0	0.00	0.00	0.00
8,400.0	90.36	0.00	6,470.1	1,565.6	721.6	1,665.5	0.00	0.00	0.00
8,500.0	90.36	0.00	6,469.4	1,665.6	721.6	1,764.1	0.00	0.00	0.00
8,600.0	90.36	0.00	6,468.8	1,765.6	721.6	1,862.6	0.00	0.00	0.00
8,700.0	90.36	0.00	6,468.2	1,865.6	721.6	1,961.1	0.00	0.00	0.00
8,800.0	90.36	0.00	6,467.5	1,965.6	721.6	2,059.7	0.00	0.00	0.00
8,900.0	90.36	0.00	6,466.9	2,065.6	721.6	2,158.2	0.00	0.00	0.00
9,000.0	90.36	0.00	6,466.3	2,165.6	721.6	2,256.8	0.00	0.00	0.00
9,100.0	90.36	0.00	6,465.7	2,265.6	721.6	2,355.3	0.00	0.00	0.00
9,200.0	90.36	0.00	6,465.0	2,365.6	721.6	2,453.8	0.00	0.00	0.00
9,300.0	90.36	0.00	6,464.4	2,465.6	721.6	2,552.4	0.00	0.00	0.00
9,400.0	90.36	0.00	6,463.8	2,565.6	721.6	2,650.9	0.00	0.00	0.00
9,500.0	90.36	0.00	6,463.1	2,665.6	721.6	2,749.5	0.00	0.00	0.00
9,600.0	90.36	0.00	6,462.5	2,765.6	721.6	2,848.0	0.00	0.00	0.00
9,700.0	90.36	0.00	6,461.9	2,865.6	721.6	2,946.5	0.00	0.00	0.00
9,800.0	90.36	0.00	6,461.3	2,965.6	721.6	3,045.1	0.00	0.00	0.00
9,900.0	90.36	0.00	6,460.6	3,065.5	721.6	3,143.6	0.00	0.00	0.00
10,000.0	90.36	0.00	6,460.0	3,165.5	721.6	3,242.2	0.00	0.00	0.00
10,100.0	90.36	0.00	6,459.4	3,265.5	721.6	3,340.7	0.00	0.00	0.00
10,200.0	90.36	0.00	6,458.7	3,365.5	721.6	3,439.2	0.00	0.00	0.00
10,300.0	90.36	0.00	6,458.1	3,465.5	721.6	3,537.8	0.00	0.00	0.00
10,400.0	90.36	0.00	6,457.5	3,565.5	721.6	3,636.3	0.00	0.00	0.00
10,500.0	90.36	0.00	6,456.9	3,665.5	721.6	3,734.9	0.00	0.00	0.00
10,600.0	90.36	0.00	6,456.2	3,765.5	721.6	3,833.4	0.00	0.00	0.00
10,700.0	90.36	0.00	6,455.6	3,865.5	721.6	3,931.9	0.00	0.00	0.00
10,800.0	90.36	0.00	6,455.0	3,965.5	721.6	4,030.5	0.00	0.00	0.00
10,900.0	90.36	0.00	6,454.3	4,065.5	721.6	4,129.0	0.00	0.00	0.00
10,954.8	90.36	0.00	6,454.0	4,120.4	721.6	4,183.1	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									
BHL 500'FNL, 1188'F ¹	0.00	0.00	6,454.0	4,120.4	721.6	1,381,626.09	3,288,221.30	40.376350	-104.465470
- plan hits target center									
- Point									
SHL 641'FSL,434'FW	0.00	0.00	1.0	0.0	0.0	1,377,497.79	3,287,547.70	40.365040	-104.468060
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
7,011.0	6,478.8	7"	7	7-1/2	

Database:	Landmark	Local Co-ordinate Reference:	Well R&R Farms 29L-301
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4587.0ft (RKB - 13')
Project:	SEC.29-T5N-R63W	MD Reference:	WELL @ 4587.0ft (RKB - 13')
Site:	R&R Farms 5N63W29L Pad Sec.29-T5N-R63W	North Reference:	True
Well:	R&R Farms 29L-301	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (4-10-15)		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,340.0	3,289.0	Parkman		0.00		
4,056.6	3,990.0	Sussex		0.00		
4,537.1	4,460.0	Shannon		0.00		
6,319.0	6,190.0	Sharon Springs		0.00		
6,485.4	6,308.0	Niobrara A		0.00		
6,565.2	6,355.0	Niobrara B		0.00		
6,778.2	6,445.0	Niobrara C		0.00		
	6,536.0	Fort Hays		0.00		
	6,564.0	Codell		0.00		

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
200.0	200.0	0.0	0.0	KOP #1	
5,806.2	5,714.8	-79.2	96.5	KOP #2	
7,011.0	6,478.8	-552.5	673.4	End of Build	



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.29-T5N-R63W

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

R&R Farms 29L-301

Wellbore #1

Plan #3 (4-10-15)

Anticollision Report

10 April, 2015



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Reference	Plan #3 (4-10-15)
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	MD Interval 100.0ft
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 1,000.0ft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Elliptical Conic

Survey Tool Program		Date	4/10/2015		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	10,954.2	Plan #3 (4-10-15) (Wellbore #1)	MWD	MWD - Standard	

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Existing Wells Sec.29-T5N-R63W						
Rothe 13-29U (Exist.) - Wellbore #1 - Wellbore #1	8,073.2	6,446.3	538.9	494.6	12.142	CC, ES
Rothe 13-29U (Exist.) - Wellbore #1 - Wellbore #1	8,200.0	6,445.2	553.7	507.2	11.916	SF
Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1	1,693.5	1,664.4	121.6	113.6	15.213	CC
Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1	1,700.0	1,670.8	121.6	113.6	15.137	ES
Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1	1,900.0	1,866.7	128.7	119.5	14.095	SF
Rothe 29BU (Exist.) - Wellbore #1 - Wellbore #1	7,454.7	6,455.4	146.0	110.7	4.133	CC, ES, SF
R&R Farms 5N63W29L Pad Sec.29-T5N-R63W						
R&R Farms 29L-221 - Wellbore #1 - Plan #2 (4-10-15)	200.0	200.0	119.8	119.2	177.705	CC, ES
R&R Farms 29L-221 - Wellbore #1 - Plan #2 (4-10-15)	10,954.8	10,846.0	910.2	743.5	5.460	SF
R&R Farms 29L-321 - Wellbore #1 - Plan #3 (4-10-15)	200.0	200.0	89.2	88.5	132.246	CC, ES
R&R Farms 29L-321 - Wellbore #1 - Plan #3 (4-10-15)	10,954.8	10,909.7	699.4	532.1	4.181	SF
R&R Farms 29L-401 - Wellbore #1 - Plan #2 (4-10-15)	200.0	201.0	150.5	149.8	222.423	CC, ES
R&R Farms 29L-401 - Wellbore #1 - Plan #2 (4-10-15)	4,800.0	4,707.6	984.1	954.9	33.702	SF
R&R Farms 29L-241 - Wellbore #1 - Plan #3 (4-10-15)	200.0	200.0	58.5	57.8	86.786	CC, ES
R&R Farms 29L-241 - Wellbore #1 - Plan #3 (4-10-15)	10,954.8	10,854.0	455.2	289.7	2.750	SF
R&R Farms 29L-441 - Wellbore #1 - Plan #3 (4-10-15)	200.0	200.0	30.7	30.0	45.460	CC, ES
R&R Farms 29L-441 - Wellbore #1 - Plan #3 (4-10-15)	10,954.8	11,014.1	236.6	83.3	1.544	SF
R&R Farms 5N63W29Q Pad Sec.29-T5N-R63W						
R&R Farms 29L-201 - Wellbore #1 - Plan #1 (9-19-14)	5,700.0	5,648.1	287.3	255.9	9.164	CC
R&R Farms 29L-201 - Wellbore #1 - Plan #1 (9-19-14)	10,954.8	10,816.1	294.7	126.9	1.756	ES, SF

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
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	
7,300.0	6,477.0	6,452.9	6,451.9	21.3	13.0	-89.87	1,238.7	182.6	942.5	909.0	33.44	28.181		
7,400.0	6,476.3	6,452.1	6,451.1	22.5	13.0	-89.78	1,238.7	182.7	862.3	827.7	34.60	24.922		
7,500.0	6,475.7	6,451.2	6,450.2	23.8	13.0	-89.69	1,238.7	182.7	786.8	750.9	35.86	21.939		
7,600.0	6,475.1	6,450.4	6,449.4	25.2	13.0	-89.60	1,238.7	182.7	717.2	680.0	37.21	19.276		
7,700.0	6,474.5	6,449.5	6,448.5	26.6	13.0	-89.51	1,238.7	182.7	655.5	616.9	38.63	16.972		

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-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.29-T5N-R63W - Rothe 13-29U (Exist.) - Wellbore #1 - Wellbore #1											Offset Site Error:		0.0 ft
Survey Program: 600-MWD													Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
							+N/-S (ft)	+E/-W (ft)							
7,800.0	6,473.8	6,448.7	6,447.7	28.1	13.0	-89.42	1,238.7	182.7	604.2	564.1	40.10	15.066	12.142 CC, ES		
7,900.0	6,473.2	6,447.8	6,446.8	29.7	13.0	-89.33	1,238.7	182.7	566.1	524.5	41.63	13.597			
8,000.0	6,472.6	6,446.9	6,446.0	31.3	13.0	-89.24	1,238.7	182.7	543.9	500.7	43.21	12.588			
8,073.2	6,472.1	6,446.3	6,445.3	32.4	12.9	-89.17	1,238.7	182.7	538.9	494.6	44.39	12.142 CC, ES			
8,100.0	6,471.9	6,446.1	6,445.1	32.9	12.9	-89.15	1,238.7	182.7	539.6	494.8	44.82	12.040			
8,200.0	6,471.3	6,445.2	6,444.3	34.5	12.9	-89.06	1,238.7	182.7	553.7	507.2	46.46	11.916 SF			
8,300.0	6,470.7	6,444.4	6,443.4	36.2	12.9	-88.97	1,238.7	182.8	584.7	536.6	48.13	12.148	13.338		
8,400.0	6,470.1	6,443.5	6,442.5	37.8	12.9	-88.88	1,238.7	182.8	630.3	580.5	49.83	12.649			
8,500.0	6,469.4	6,442.6	6,441.7	39.6	12.9	-88.78	1,238.7	182.8	687.5	635.9	51.54	13.338			
8,600.0	6,468.8	6,441.8	6,440.8	41.3	12.9	-88.69	1,238.7	182.8	753.6	700.4	53.27	14.147			
8,700.0	6,468.2	6,440.9	6,439.9	43.0	12.9	-88.60	1,238.7	182.8	826.6	771.6	55.02	15.024			
8,800.0	6,467.5	6,440.0	6,439.1	44.8	12.9	-88.51	1,238.7	182.8	904.8	848.0	56.78	15.935			
8,900.0	6,466.9	6,439.2	6,438.2	46.5	12.9	-88.42	1,238.7	182.8	986.9	928.4	58.55	16.855			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.29-T5N-R63W - Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 600-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	90.00	0.0	231.3	231.8					
100.0	100.0	85.5	85.5	0.1	0.1	90.03	-0.1	231.2	231.2	231.0	0.21	1,095.173		
200.0	200.0	186.1	186.1	0.3	0.2	90.14	-0.5	230.8	230.9	230.3	0.55	418.378		
300.0	300.0	286.7	286.7	0.5	0.3	-39.19	-1.3	230.2	229.6	228.7	0.87	263.279		
400.0	400.0	387.2	387.2	0.7	0.4	-39.36	-2.4	229.4	226.7	225.5	1.19	190.038		
500.0	499.9	487.7	487.7	1.0	0.6	-39.75	-3.8	228.2	222.2	220.7	1.53	145.329		
600.0	599.7	588.1	588.0	1.2	0.7	-40.37	-5.5	226.9	216.1	214.2	1.88	115.131		
700.0	699.4	687.7	687.6	1.5	0.9	-41.30	-7.4	225.4	208.6	206.3	2.32	89.786		
800.0	798.9	787.2	787.1	1.7	1.1	-42.59	-9.4	223.9	199.9	197.1	2.79	71.618		
900.0	898.3	886.1	885.9	2.0	1.3	-44.35	-11.5	222.5	190.1	186.9	3.26	58.375		
1,000.0	997.4	985.2	985.0	2.3	1.5	-46.75	-13.5	221.3	179.5	175.8	3.74	47.965		
1,100.0	1,096.3	1,083.7	1,083.5	2.7	1.7	-49.87	-15.3	220.2	168.2	164.0	4.26	39.533		
1,200.0	1,194.9	1,181.6	1,181.4	3.0	1.9	-53.97	-17.0	219.4	156.8	152.0	4.79	32.726		
1,300.0	1,293.3	1,279.8	1,279.6	3.4	2.1	-59.29	-18.5	218.9	145.8	140.4	5.38	27.114		
1,400.0	1,391.2	1,377.6	1,377.3	3.8	2.3	-66.04	-19.8	218.5	135.5	129.5	6.02	22.532		
1,500.0	1,489.1	1,474.8	1,474.6	4.3	2.5	-74.04	-20.7	218.3	127.7	121.0	6.69	19.068		
1,600.0	1,586.9	1,572.7	1,572.5	4.7	2.7	-82.99	-21.2	218.3	123.0	115.7	7.38	16.671		
1,693.5	1,678.3	1,664.4	1,664.1	5.1	2.9	-91.82	-21.7	218.1	121.6	113.6	7.99	15.213 CC		
1,700.0	1,684.7	1,670.8	1,670.5	5.2	2.9	-92.45	-21.8	218.0	121.6	113.6	8.03	15.137 ES		
1,800.0	1,782.5	1,768.8	1,768.5	5.6	3.1	-101.94	-22.3	217.6	123.5	114.9	8.62	14.326		
1,900.0	1,880.4	1,866.7	1,866.4	6.1	3.3	-110.99	-22.9	216.9	128.7	119.5	9.13	14.095 SF		
2,000.0	1,978.2	1,964.6	1,964.3	6.5	3.5	-119.27	-23.6	216.0	136.8	127.2	9.56	14.303		
2,100.0	2,076.0	2,062.1	2,061.9	7.0	3.7	-126.58	-24.2	214.9	147.5	137.6	9.95	14.825		
2,200.0	2,173.8	2,159.5	2,159.2	7.4	3.9	-132.85	-24.6	213.7	160.6	150.3	10.31	15.571		
2,300.0	2,271.6	2,256.8	2,256.5	7.9	4.1	-138.17	-24.9	212.5	175.5	164.8	10.66	16.456		
2,400.0	2,369.5	2,354.0	2,353.7	8.3	4.3	-142.66	-24.9	211.1	191.8	180.8	11.01	17.417		
2,500.0	2,467.3	2,451.1	2,450.8	8.8	4.6	-146.45	-24.8	209.7	209.4	198.0	11.37	18.412		
2,600.0	2,565.1	2,548.5	2,548.2	9.3	4.8	-149.66	-24.5	208.1	227.9	216.2	11.74	19.410		
2,700.0	2,662.9	2,646.2	2,645.8	9.7	5.0	-152.39	-24.2	206.6	247.0	234.9	12.12	20.377		
2,800.0	2,760.7	2,743.9	2,743.5	10.2	5.2	-154.74	-24.0	205.1	266.5	254.0	12.51	21.299		
2,900.0	2,858.6	2,841.6	2,841.3	10.6	5.4	-156.77	-23.9	203.6	286.3	273.4	12.91	22.172		
3,000.0	2,956.4	2,939.4	2,939.0	11.1	5.6	-158.53	-23.8	202.2	306.4	293.1	13.32	22.997		
3,100.0	3,054.2	3,037.1	3,036.7	11.6	5.8	-160.08	-23.8	200.7	326.6	312.9	13.74	23.775		
3,200.0	3,152.0	3,134.7	3,134.3	12.0	6.0	-161.44	-23.7	199.4	347.0	332.8	14.16	24.511		
3,300.0	3,249.8	3,232.3	3,231.9	12.5	6.2	-162.62	-23.6	198.2	367.6	353.0	14.58	25.205		
3,400.0	3,347.7	3,330.0	3,329.6	13.0	6.4	-163.66	-23.4	197.0	388.3	373.2	15.01	25.858		
3,500.0	3,445.5	3,427.6	3,427.2	13.4	6.6	-164.57	-23.2	196.0	409.0	393.6	15.45	26.473		
3,600.0	3,543.3	3,525.3	3,524.9	13.9	6.8	-165.39	-22.9	195.1	429.9	414.0	15.89	27.052		
3,700.0	3,641.1	3,622.8	3,622.3	14.3	7.0	-166.13	-22.6	194.2	450.9	434.5	16.34	27.599		
3,800.0	3,738.9	3,720.2	3,719.8	14.8	7.2	-166.81	-22.3	193.1	471.9	455.1	16.78	28.120		
3,900.0	3,836.8	3,817.7	3,817.2	15.3	7.4	-167.45	-22.1	192.0	493.1	475.8	17.23	28.616		
4,000.0	3,934.6	3,915.1	3,914.7	15.7	7.6	-168.04	-21.9	190.8	514.3	496.6	17.68	29.090		
4,100.0	4,032.4	4,012.4	4,011.9	16.2	7.8	-168.60	-21.7	189.5	535.6	517.5	18.13	29.543		
4,200.0	4,130.2	4,108.5	4,108.0	16.7	8.0	-169.14	-21.6	187.9	557.1	538.5	18.58	29.981		
4,300.0	4,228.1	4,204.5	4,204.0	17.1	8.2	-169.68	-21.6	185.8	578.9	559.9	19.03	30.415		
4,400.0	4,325.9	4,300.3	4,299.8	17.6	8.4	-170.22	-21.6	183.3	601.1	581.6	19.49	30.846		
4,500.0	4,423.7	4,395.9	4,395.4	18.1	8.6	-170.76	-21.8	180.2	623.5	603.6	19.94	31.273		
4,600.0	4,521.5	4,491.4	4,490.8	18.5	8.9	-171.31	-22.0	176.7	646.2	625.9	20.39	31.698		
4,700.0	4,619.3	4,590.8	4,590.1	19.0	9.1	-171.84	-22.3	173.0	669.0	648.2	20.84	32.096		
4,800.0	4,717.2	4,690.9	4,690.1	19.5	9.3	-172.30	-22.6	169.9	691.5	670.2	21.31	32.455		
4,900.0	4,815.0	4,791.1	4,790.3	19.9	9.5	-172.69	-22.8	167.4	713.6	691.8	21.77	32.777		

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-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.29-T5N-R63W - Rothe 14-29U (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error: 0.0 ft
Survey Program: 600-MWD													Offset Well Error: 0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
5,000.0	4,912.8	4,891.6	4,890.8	20.4	9.7	-173.03	-23.0	165.5	735.3	713.1	22.24	33.060	
5,100.0	5,011.0	4,992.7	4,991.9	20.7	9.9	-173.34	-23.2	164.2	754.7	732.0	22.71	33.226	
5,200.0	5,109.8	5,094.3	5,093.5	21.0	10.1	-173.55	-23.4	163.5	770.3	747.2	23.15	33.271	
5,300.0	5,209.1	5,196.4	5,195.6	21.2	10.3	-173.70	-23.5	163.4	782.1	758.6	23.56	33.195	
5,400.0	5,308.8	5,299.0	5,298.2	21.4	10.5	-173.77	-23.6	163.8	790.1	766.2	23.94	33.005	
5,500.0	5,408.6	5,401.9	5,401.1	21.5	10.8	-173.77	-23.8	164.8	794.3	770.0	24.28	32.707	
5,600.0	5,508.6	5,504.6	5,503.8	21.7	11.0	-44.34	-23.9	166.3	794.6	770.0	24.62	32.278	
5,700.0	5,608.6	5,602.8	5,601.9	21.8	11.2	-44.27	-24.0	167.8	793.4	768.4	24.99	31.755	
5,800.0	5,708.6	5,701.0	5,700.1	21.9	11.4	-44.21	-24.0	169.1	792.5	767.1	25.36	31.255	
5,900.0	5,808.4	5,799.0	5,798.1	21.9	11.6	-44.70	-24.1	170.0	787.7	762.2	25.44	30.960	
6,000.0	5,906.5	5,895.4	5,894.5	21.9	11.8	-46.37	-24.2	170.6	773.9	748.6	25.31	30.573	
6,100.0	6,001.4	5,988.6	5,987.7	21.8	12.0	-49.27	-24.2	170.9	752.0	726.9	25.12	29.938	
6,200.0	6,091.4	6,076.1	6,075.3	21.6	12.2	-53.45	-24.2	170.9	723.1	698.0	25.07	28.848	
6,300.0	6,174.9	6,157.3	6,156.5	21.4	12.3	-58.90	-24.2	170.6	689.1	663.7	25.38	27.156	
6,400.0	6,250.6	6,231.0	6,230.1	21.1	12.5	-65.42	-24.2	170.1	652.5	626.4	26.14	24.963	
6,500.0	6,317.1	6,295.8	6,294.9	20.8	12.6	-72.49	-24.1	169.4	616.6	589.4	27.20	22.669	
6,600.0	6,373.3	6,350.6	6,349.8	20.5	12.7	-79.30	-24.0	168.6	585.3	557.1	28.24	20.724	
6,700.0	6,418.2	6,394.6	6,393.7	20.2	12.8	-84.97	-23.9	167.9	563.2	534.1	29.05	19.385	
6,800.0	6,451.1	6,426.9	6,426.0	20.0	12.9	-88.77	-23.8	167.4	554.4	524.8	29.64	18.705	
6,805.6	6,452.6	6,428.3	6,427.5	19.9	12.9	-88.91	-23.8	167.4	554.4	524.7	29.67	18.683	
6,900.0	6,471.4	6,446.9	6,446.1	19.7	12.9	-90.22	-23.7	167.0	561.9	531.8	30.15	18.636	
7,000.0	6,478.8	6,454.4	6,453.5	19.5	13.0	-89.10	-23.7	166.9	586.3	555.6	30.68	19.106	
7,100.0	6,478.2	6,454.1	6,453.2	19.6	13.0	-88.78	-23.7	166.9	625.7	594.3	31.41	19.923	
7,200.0	6,477.6	6,453.8	6,452.9	20.2	13.0	-88.75	-23.7	166.9	677.8	645.5	32.31	20.979	
7,300.0	6,477.0	6,453.4	6,452.6	21.3	13.0	-88.71	-23.7	166.9	739.8	706.4	33.35	22.183	
7,400.0	6,476.3	6,453.1	6,452.2	22.5	13.0	-88.68	-23.7	166.9	809.4	774.9	34.51	23.454	
7,500.0	6,475.7	6,452.8	6,451.9	23.8	13.0	-88.64	-23.7	166.9	884.8	849.1	35.77	24.735	
7,600.0	6,475.1	6,452.4	6,451.5	25.2	13.0	-88.61	-23.7	166.9	964.8	927.7	37.12	25.989	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.29-T5N-R63W - Rothe 29BU (Exist.) - Wellbore #1 - Wellbore #1											Offset Site Error:	0.0 ft	
Survey Program: 600-MWD														Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning	
Measured Depth	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)				
6,500.0	6,317.1	6,307.1	6,305.1	20.8	12.7	14.60	622.3	867.1	931.9	908.0	23.94	38.925			
6,600.0	6,373.3	6,364.0	6,362.0	20.5	12.8	19.33	621.6	867.3	849.8	827.1	22.71	37.426			
6,700.0	6,418.2	6,408.9	6,406.8	20.2	12.9	27.35	621.0	867.4	761.4	738.7	22.67	33.588			
6,800.0	6,451.1	6,441.0	6,439.0	20.0	13.0	41.58	620.5	867.6	668.6	643.6	24.98	26.769			
6,900.0	6,471.4	6,460.1	6,458.1	19.7	13.0	64.95	620.2	867.6	573.2	544.0	29.21	19.626			
7,000.0	6,478.8	6,465.9	6,463.8	19.5	13.0	91.32	620.1	867.7	477.4	446.7	30.72	15.543			
7,100.0	6,478.2	6,463.6	6,461.6	19.6	13.0	92.97	620.1	867.7	383.4	352.1	31.35	12.232			
7,200.0	6,477.6	6,461.3	6,459.2	20.2	13.0	92.05	620.2	867.6	293.5	261.2	32.30	9.085			
7,300.0	6,477.0	6,458.9	6,456.9	21.3	13.0	91.14	620.2	867.6	212.7	179.3	33.40	6.367			
7,400.0	6,476.3	6,456.6	6,454.6	22.5	13.0	90.24	620.2	867.6	155.9	121.3	34.61	4.504			
7,454.7	6,476.0	6,455.4	6,453.4	23.2	13.0	89.75	620.3	867.6	146.0	110.7	35.32	4.133 CC, ES, SF			
7,500.0	6,475.7	6,454.3	6,452.3	23.8	13.0	89.34	620.3	867.6	152.9	117.0	35.91	4.257			
7,600.0	6,475.1	6,452.1	6,450.0	25.2	13.0	88.45	620.3	867.6	206.0	168.7	37.30	5.523			
7,700.0	6,474.5	6,449.8	6,447.8	26.6	13.0	87.57	620.3	867.6	285.4	246.7	38.75	7.367			
7,800.0	6,473.8	6,447.6	6,445.6	28.1	13.0	86.69	620.4	867.6	374.9	334.6	40.24	9.314			
7,900.0	6,473.2	6,445.4	6,443.3	29.7	13.0	85.82	620.4	867.6	468.6	426.8	41.79	11.213			
8,000.0	6,472.6	6,443.1	6,441.1	31.3	13.0	84.96	620.5	867.6	564.4	521.1	43.36	13.017			
8,100.0	6,471.9	6,441.0	6,438.9	32.9	13.0	84.11	620.5	867.6	661.5	616.5	44.96	14.713			
8,200.0	6,471.3	6,438.8	6,436.8	34.5	13.0	83.26	620.5	867.5	759.3	712.7	46.58	16.303			
8,300.0	6,470.7	6,436.6	6,434.6	36.2	13.0	82.43	620.6	867.5	857.6	809.4	48.21	17.790			
8,400.0	6,470.1	6,434.5	6,432.4	37.8	13.0	81.60	620.6	867.5	956.3	906.5	49.85	19.183			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-221 - Wellbore #1 - Plan #2 (4-10-15)											Offset Site Error: 0.0 ft		
Survey Program: 0-MWD											Offset Well Error: 0.0 ft		
Reference		Offset		Semi Major Axis			Distance						
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	-90.01	0.0	-119.8	119.8				
100.0	100.0	100.0	100.0	0.1	0.1	-90.01	0.0	-119.8	119.8	119.6	0.22	533.116	
200.0	200.0	200.0	200.0	0.3	0.3	-90.01	0.0	-119.8	119.8	119.2	0.67	177.705	CC, ES
300.0	300.0	300.0	300.0	0.5	0.6	140.88	0.0	-119.8	120.5	119.4	1.11	109.016	
400.0	400.0	400.0	400.0	0.7	0.8	141.64	0.0	-119.8	122.5	121.0	1.54	79.822	
500.0	499.9	499.9	499.9	1.0	1.0	142.85	0.0	-119.8	126.0	124.0	1.98	63.695	
600.0	599.7	599.7	599.7	1.2	1.2	144.44	0.0	-119.8	130.9	128.5	2.43	53.892	
700.0	699.4	699.4	699.4	1.5	1.5	146.30	0.0	-119.8	137.4	134.5	2.89	47.592	
800.0	798.9	798.9	798.9	1.7	1.7	148.35	0.0	-119.8	145.5	142.1	3.35	43.437	
900.0	898.3	898.3	898.3	2.0	1.9	150.49	0.0	-119.8	155.2	151.4	3.81	40.693	
1,000.0	997.4	997.4	997.4	2.3	2.1	152.65	0.0	-119.8	166.7	162.4	4.28	38.931	
1,100.0	1,096.3	1,096.3	1,096.3	2.7	2.4	154.75	0.0	-119.8	180.0	175.3	4.75	37.879	
1,200.0	1,194.9	1,194.9	1,194.9	3.0	2.6	156.75	0.0	-119.8	195.1	189.9	5.22	37.357	
1,300.0	1,293.3	1,294.0	1,294.0	3.4	2.8	158.44	-0.8	-119.9	211.8	206.2	5.67	37.367	
1,400.0	1,391.2	1,393.0	1,393.0	3.8	2.9	159.60	-3.2	-120.2	230.0	223.9	6.10	37.708	
1,500.0	1,489.1	1,492.2	1,492.0	4.3	3.1	160.32	-7.4	-120.7	248.6	242.0	6.55	37.964	
1,600.0	1,586.9	1,591.6	1,591.3	4.7	3.3	160.58	-13.3	-121.3	266.8	259.8	7.01	38.045	
1,700.0	1,684.7	1,691.1	1,690.5	5.2	3.5	160.47	-20.9	-122.2	284.6	277.1	7.50	37.966	
1,800.0	1,782.5	1,790.7	1,789.7	5.6	3.7	160.04	-30.2	-123.2	302.0	294.0	8.00	37.742	
1,900.0	1,880.4	1,890.4	1,888.8	6.1	3.9	159.35	-41.3	-124.5	319.1	310.5	8.53	37.390	
2,000.0	1,978.2	1,990.1	1,987.6	6.5	4.2	158.44	-54.1	-125.9	335.8	326.7	9.09	36.926	
2,100.0	2,076.0	2,089.7	2,086.1	7.0	4.5	157.34	-68.5	-127.6	352.3	342.6	9.69	36.365	
2,200.0	2,173.8	2,188.6	2,183.8	7.4	4.7	156.11	-84.4	-129.4	368.6	358.3	10.31	35.745	
2,300.0	2,271.6	2,287.0	2,280.8	7.9	5.0	154.95	-100.4	-131.2	385.1	374.1	10.96	35.141	
2,400.0	2,369.5	2,385.3	2,377.8	8.3	5.4	153.89	-116.4	-133.0	401.7	390.1	11.62	34.571	
2,500.0	2,467.3	2,483.7	2,474.8	8.8	5.7	152.92	-132.3	-134.8	418.4	406.1	12.29	34.036	
2,600.0	2,565.1	2,582.0	2,571.9	9.3	6.0	152.01	-148.3	-136.6	435.3	422.3	12.98	33.537	
2,700.0	2,662.9	2,680.4	2,668.9	9.7	6.3	151.18	-164.3	-138.4	452.2	438.5	13.67	33.072	
2,800.0	2,760.7	2,778.7	2,765.9	10.2	6.7	150.40	-180.3	-140.2	469.2	454.8	14.38	32.639	
2,900.0	2,858.6	2,877.1	2,862.9	10.6	7.0	149.68	-196.3	-142.0	486.3	471.2	15.09	32.237	
3,000.0	2,956.4	2,975.4	2,959.9	11.1	7.4	149.01	-212.3	-143.8	503.5	487.7	15.80	31.863	
3,100.0	3,054.2	3,073.8	3,057.0	11.6	7.7	148.38	-228.3	-145.6	520.7	504.2	16.52	31.515	
3,200.0	3,152.0	3,172.1	3,154.0	12.0	8.1	147.80	-244.3	-147.4	538.0	520.7	17.25	31.192	
3,300.0	3,249.8	3,270.5	3,251.0	12.5	8.4	147.25	-260.3	-149.2	555.3	537.3	17.98	30.891	
3,400.0	3,347.7	3,368.8	3,348.0	13.0	8.8	146.73	-276.3	-151.0	572.7	554.0	18.71	30.610	
3,500.0	3,445.5	3,467.2	3,445.1	13.4	9.1	146.24	-292.3	-152.8	590.1	570.7	19.45	30.348	
3,600.0	3,543.3	3,565.5	3,542.1	13.9	9.5	145.78	-308.3	-154.6	607.6	587.4	20.18	30.102	
3,700.0	3,641.1	3,663.9	3,639.1	14.3	9.8	145.35	-324.3	-156.4	625.1	604.2	20.93	29.873	
3,800.0	3,738.9	3,762.2	3,736.1	14.8	10.2	144.94	-340.3	-158.3	642.6	621.0	21.67	29.657	
3,900.0	3,836.8	3,860.6	3,833.2	15.3	10.6	144.55	-356.3	-160.1	660.2	637.8	22.41	29.455	
4,000.0	3,934.6	3,958.9	3,930.2	15.7	10.9	144.18	-372.2	-161.9	677.8	654.6	23.16	29.265	
4,100.0	4,032.4	4,057.3	4,027.2	16.2	11.3	143.83	-388.2	-163.7	695.4	671.5	23.91	29.086	
4,200.0	4,130.2	4,155.6	4,124.2	16.7	11.7	143.50	-404.2	-165.5	713.1	688.4	24.66	28.917	
4,300.0	4,228.1	4,254.0	4,221.3	17.1	12.0	143.19	-420.2	-167.3	730.7	705.3	25.41	28.757	
4,400.0	4,325.9	4,352.3	4,318.3	17.6	12.4	142.88	-436.2	-169.1	748.4	722.3	26.16	28.607	
4,500.0	4,423.7	4,450.7	4,415.3	18.1	12.8	142.60	-452.2	-170.9	766.1	739.2	26.92	28.464	
4,600.0	4,521.5	4,549.0	4,512.3	18.5	13.2	142.32	-468.2	-172.7	783.8	756.2	27.67	28.329	
4,700.0	4,619.3	4,647.4	4,609.3	19.0	13.5	142.06	-484.2	-174.5	801.6	773.2	28.42	28.200	
4,800.0	4,717.2	4,745.7	4,706.4	19.5	13.9	141.81	-500.2	-176.3	819.3	790.2	29.18	28.078	
4,900.0	4,815.0	4,844.1	4,803.4	19.9	14.3	141.57	-516.2	-178.1	837.1	807.2	29.94	27.963	
5,000.0	4,912.8	4,942.4	4,900.4	20.4	14.6	141.36	-532.2	-179.9	854.9	824.2	30.69	27.853	

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-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-221 - Wellbore #1 - Plan #2 (4-10-15)											Offset Site Error:		0.0 ft
Survey Program: 0-MWD											Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
5,100.0	5,011.0	5,041.0	4,997.6	20.7	15.0	141.26	-548.2	-181.7	871.1	839.8	31.38	27.759	
5,200.0	5,109.8	5,141.9	5,097.3	21.0	15.3	141.03	-563.9	-183.5	884.7	852.7	31.99	27.651	
5,300.0	5,209.1	5,244.5	5,199.2	21.2	15.6	140.85	-576.4	-184.9	895.2	862.7	32.49	27.550	
5,400.0	5,308.8	5,347.7	5,301.9	21.4	15.8	140.72	-585.3	-185.9	902.6	869.7	32.91	27.425	
5,500.0	5,408.6	5,451.2	5,405.3	21.5	16.0	140.65	-590.6	-186.5	907.0	873.8	33.25	27.277	
5,600.0	5,508.6	5,554.5	5,508.6	21.7	16.2	-90.00	-592.1	-186.7	908.3	874.8	33.54	27.081	
5,700.0	5,608.6	5,654.5	5,608.6	21.8	16.3	-90.00	-592.1	-186.7	908.3	874.5	33.81	26.867	
5,750.8	5,659.4	5,705.3	5,659.4	21.8	16.4	-90.00	-592.1	-186.7	908.3	874.4	33.94	26.762	
5,800.0	5,708.6	5,754.4	5,708.5	21.9	16.4	-89.88	-590.2	-186.7	908.3	874.3	34.04	26.685	
5,900.0	5,808.4	5,853.4	5,806.5	21.9	16.4	-89.40	-577.0	-186.7	908.4	874.3	34.07	26.664	
6,000.0	5,906.5	5,951.4	5,901.0	21.9	16.3	-88.92	-551.5	-186.7	908.5	874.6	33.88	26.813	
6,100.0	6,001.4	6,048.5	5,990.7	21.8	16.2	-88.47	-514.5	-186.7	908.6	875.1	33.53	27.103	
6,200.0	6,091.4	6,144.8	6,074.3	21.6	15.9	-88.04	-466.8	-186.7	908.9	875.8	33.05	27.496	
6,300.0	6,174.9	6,240.3	6,150.7	21.4	15.7	-87.65	-409.6	-186.7	909.1	876.5	32.54	27.935	
6,400.0	6,250.6	6,335.1	6,218.9	21.1	15.5	-87.29	-343.7	-186.7	909.3	877.3	32.07	28.352	
6,500.0	6,317.1	6,429.4	6,278.1	20.8	15.3	-86.98	-270.4	-186.7	909.6	877.9	31.73	28.666	
6,600.0	6,373.3	6,523.2	6,327.5	20.5	15.3	-86.72	-190.8	-186.7	909.8	878.2	31.60	28.792	
6,700.0	6,418.2	6,616.5	6,366.7	20.2	15.4	-86.52	-106.1	-186.7	910.0	878.3	31.75	28.660	
6,800.0	6,451.1	6,709.6	6,395.2	20.0	15.6	-86.37	-17.6	-186.7	910.2	877.9	32.24	28.234	
6,900.0	6,471.4	6,802.5	6,412.7	19.7	16.0	-86.27	73.6	-186.7	910.2	877.2	33.07	27.525	
7,000.0	6,478.8	6,895.3	6,419.1	19.5	16.7	-86.24	166.1	-186.7	910.3	876.0	34.25	26.580	
7,100.0	6,478.2	6,994.4	6,418.5	19.6	17.5	-86.24	265.2	-186.7	910.3	874.5	35.80	25.426	
7,200.0	6,477.6	7,094.4	6,417.9	20.2	18.5	-86.24	365.2	-186.7	910.3	872.6	37.69	24.155	
7,300.0	6,477.0	7,194.4	6,417.3	21.3	19.6	-86.24	465.2	-186.7	910.3	870.4	39.85	22.843	
7,400.0	6,476.3	7,294.4	6,416.7	22.5	20.8	-86.24	565.2	-186.7	910.3	868.0	42.25	21.544	
7,500.0	6,475.7	7,394.4	6,416.1	23.8	22.2	-86.24	665.2	-186.7	910.3	865.4	44.85	20.295	
7,600.0	6,475.1	7,494.4	6,415.5	25.2	23.6	-86.25	765.2	-186.7	910.3	862.7	47.62	19.116	
7,700.0	6,474.5	7,594.4	6,414.9	26.6	25.1	-86.25	865.2	-186.7	910.3	859.7	50.53	18.016	
7,800.0	6,473.8	7,694.4	6,414.3	28.1	26.6	-86.25	965.2	-186.7	910.3	856.7	53.55	16.999	
7,900.0	6,473.2	7,794.4	6,413.6	29.7	28.2	-86.25	1,065.2	-186.7	910.3	853.6	56.67	16.062	
8,000.0	6,472.6	7,894.4	6,413.0	31.3	29.8	-86.25	1,165.2	-186.7	910.3	850.4	59.88	15.203	
8,100.0	6,471.9	7,994.4	6,412.4	32.9	31.5	-86.25	1,265.2	-186.7	910.3	847.1	63.15	14.415	
8,200.0	6,471.3	8,094.4	6,411.8	34.5	33.2	-86.25	1,365.2	-186.7	910.3	843.8	66.48	13.692	
8,300.0	6,470.7	8,194.4	6,411.2	36.2	34.9	-86.25	1,465.2	-186.7	910.3	840.4	69.87	13.028	
8,400.0	6,470.1	8,294.4	6,410.6	37.8	36.6	-86.25	1,565.2	-186.7	910.3	837.0	73.30	12.419	
8,500.0	6,469.4	8,394.4	6,410.0	39.6	38.4	-86.26	1,665.2	-186.7	910.3	833.5	76.77	11.858	
8,600.0	6,468.8	8,494.4	6,409.4	41.3	40.1	-86.26	1,765.2	-186.7	910.3	830.0	80.27	11.341	
8,700.0	6,468.2	8,594.4	6,408.8	43.0	41.9	-86.26	1,865.2	-186.7	910.3	826.5	83.80	10.863	
8,800.0	6,467.5	8,694.4	6,408.1	44.8	43.7	-86.26	1,965.2	-186.7	910.3	822.9	87.35	10.421	
8,900.0	6,466.9	8,794.4	6,407.5	46.5	45.5	-86.26	2,065.2	-186.7	910.3	819.3	90.93	10.011	
9,000.0	6,466.3	8,894.4	6,406.9	48.3	47.3	-86.26	2,165.2	-186.7	910.3	815.7	94.53	9.630	
9,100.0	6,465.7	8,994.4	6,406.3	50.1	49.1	-86.26	2,265.2	-186.7	910.3	812.1	98.14	9.275	
9,200.0	6,465.0	9,094.4	6,405.7	51.9	51.0	-86.26	2,365.2	-186.7	910.3	808.5	101.78	8.944	
9,300.0	6,464.4	9,194.4	6,405.1	53.7	52.8	-86.26	2,465.2	-186.7	910.3	804.8	105.42	8.634	
9,400.0	6,463.8	9,294.4	6,404.5	55.5	54.7	-86.27	2,565.2	-186.7	910.3	801.2	109.08	8.345	
9,500.0	6,463.1	9,394.4	6,403.9	57.3	56.5	-86.27	2,665.2	-186.7	910.3	797.5	112.75	8.073	
9,600.0	6,462.5	9,494.4	6,403.3	59.1	58.3	-86.27	2,765.2	-186.7	910.3	793.8	116.43	7.818	
9,700.0	6,461.9	9,594.4	6,402.6	61.0	60.2	-86.27	2,865.2	-186.7	910.2	790.1	120.12	7.578	
9,800.0	6,461.3	9,694.4	6,402.0	62.8	62.1	-86.27	2,965.2	-186.7	910.2	786.4	123.82	7.351	
9,900.0	6,460.6	9,794.4	6,401.4	64.6	63.9	-86.27	3,065.2	-186.7	910.2	782.7	127.53	7.138	

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-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Offset														
Semi Major Axis														
Distance														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	6,460.0	9,894.4	6,400.8	66.5	65.8	-86.27	3,165.2	-186.7	910.2	779.0	131.24	6.936		
10,100.0	6,459.4	9,994.4	6,400.2	68.3	67.7	-86.27	3,265.2	-186.7	910.2	775.3	134.96	6.744		
10,200.0	6,458.7	10,094.4	6,399.6	70.2	69.5	-86.27	3,365.2	-186.7	910.2	771.6	138.69	6.563		
10,300.0	6,458.1	10,194.4	6,399.0	72.0	71.4	-86.28	3,465.2	-186.7	910.2	767.8	142.42	6.391		
10,400.0	6,457.5	10,294.4	6,398.4	73.9	73.3	-86.28	3,565.2	-186.7	910.2	764.1	146.16	6.228		
10,500.0	6,456.9	10,394.4	6,397.8	75.7	75.2	-86.28	3,665.2	-186.7	910.2	760.3	149.91	6.072		
10,600.0	6,456.2	10,494.4	6,397.1	77.6	77.0	-86.28	3,765.2	-186.7	910.2	756.6	153.65	5.924		
10,700.0	6,455.6	10,594.4	6,396.5	79.5	78.9	-86.28	3,865.2	-186.7	910.2	752.8	157.40	5.783		
10,800.0	6,455.0	10,694.4	6,395.9	81.3	80.8	-86.28	3,965.2	-186.7	910.2	749.1	161.16	5.648		
10,900.0	6,454.3	10,794.4	6,395.3	83.2	82.7	-86.28	4,065.2	-186.7	910.2	745.3	164.92	5.519		
10,940.5	6,454.1	10,834.9	6,395.1	83.8	83.4	-86.28	4,105.7	-186.7	910.2	743.9	166.29	5.474		
10,954.8	6,454.0	10,846.0	6,395.0	84.0	83.7	-86.28	4,116.7	-186.7	910.2	743.5	166.71	5.460 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0ft
Survey Program: 0-MWD													Offset Well Error:	0.0ft
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	-89.2	89.2					
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-89.2	89.2	88.9	0.22	396.738		
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-89.2	89.2	88.5	0.67	132.246 CC, ES		
300.0	300.0	300.0	300.0	0.5	0.6	140.98	0.0	-89.2	89.8	88.7	1.11	81.285		
400.0	400.0	400.0	400.0	0.7	0.8	141.99	0.0	-89.2	91.9	90.4	1.54	59.859		
500.0	499.9	499.9	499.9	1.0	1.0	143.58	0.0	-89.2	95.4	93.4	1.98	48.216		
600.0	599.7	599.7	599.7	1.2	1.2	145.62	0.0	-89.2	100.4	97.9	2.43	41.319		
700.0	699.4	699.4	699.4	1.5	1.5	147.96	0.0	-89.2	106.9	104.0	2.89	37.061		
800.0	798.9	798.9	798.9	1.7	1.7	150.45	0.0	-89.2	115.2	111.8	3.35	34.425		
900.0	898.3	898.3	898.3	2.0	1.9	152.96	0.0	-89.2	125.2	121.3	3.81	32.863		
1,000.0	997.4	997.4	997.4	2.3	2.1	155.39	0.0	-89.2	136.9	132.7	4.27	32.046		
1,100.0	1,096.3	1,097.5	1,097.5	2.7	2.3	157.42	-0.8	-89.0	150.1	145.4	4.71	31.852		
1,200.0	1,194.9	1,197.7	1,197.7	3.0	2.5	158.80	-3.4	-88.5	164.3	159.1	5.14	31.982		
1,300.0	1,293.3	1,298.0	1,297.9	3.4	2.7	159.66	-7.6	-87.7	179.2	173.7	5.57	32.158		
1,400.0	1,391.2	1,398.4	1,398.1	3.8	2.9	160.11	-13.6	-86.6	195.0	188.9	6.03	32.344		
1,500.0	1,489.1	1,499.0	1,498.4	4.3	3.1	160.20	-21.3	-85.2	210.6	204.1	6.51	32.356		
1,600.0	1,586.9	1,599.8	1,598.8	4.7	3.3	159.88	-30.8	-83.4	225.4	218.4	7.01	32.136		
1,700.0	1,684.7	1,700.9	1,699.1	5.2	3.6	159.24	-42.1	-81.3	239.3	231.8	7.55	31.719		
1,800.0	1,782.5	1,802.1	1,799.4	5.6	3.8	158.30	-55.1	-78.8	252.4	244.3	8.11	31.138		
1,900.0	1,880.4	1,903.1	1,899.4	6.1	4.1	157.12	-69.8	-76.0	264.8	256.1	8.70	30.426		
2,000.0	1,978.2	2,002.2	1,997.3	6.5	4.4	155.93	-84.9	-73.2	276.9	267.6	9.32	29.707		
2,100.0	2,076.0	2,101.3	2,095.2	7.0	4.7	154.84	-100.1	-70.3	289.1	279.2	9.96	29.038		
2,200.0	2,173.8	2,200.4	2,193.1	7.4	5.0	153.84	-115.2	-67.5	301.4	290.8	10.61	28.418		
2,300.0	2,271.6	2,299.5	2,291.0	7.9	5.3	152.92	-130.4	-64.6	313.9	302.6	11.27	27.846		
2,400.0	2,369.5	2,398.7	2,388.9	8.3	5.7	152.06	-145.5	-61.8	326.3	314.4	11.95	27.318		
2,500.0	2,467.3	2,497.8	2,486.8	8.8	6.0	151.27	-160.7	-58.9	338.9	326.2	12.63	26.832		
2,600.0	2,565.1	2,596.9	2,584.7	9.3	6.4	150.54	-175.8	-56.1	351.5	338.2	13.32	26.384		
2,700.0	2,662.9	2,696.0	2,682.6	9.7	6.7	149.86	-191.0	-53.2	364.1	350.1	14.02	25.970		
2,800.0	2,760.7	2,795.1	2,780.5	10.2	7.0	149.22	-206.1	-50.4	376.8	362.1	14.73	25.589		
2,900.0	2,858.6	2,894.2	2,878.4	10.6	7.4	148.62	-221.2	-47.5	389.6	374.2	15.44	25.236		
3,000.0	2,956.4	2,993.3	2,976.3	11.1	7.7	148.07	-236.4	-44.7	402.4	386.2	16.15	24.909		
3,100.0	3,054.2	3,092.4	3,074.2	11.6	8.1	147.54	-251.5	-41.8	415.2	398.3	16.87	24.606		
3,200.0	3,152.0	3,191.5	3,172.1	12.0	8.4	147.05	-266.7	-39.0	428.1	410.5	17.60	24.324		
3,300.0	3,249.8	3,290.6	3,270.0	12.5	8.8	146.59	-281.8	-36.1	440.9	422.6	18.33	24.061		
3,400.0	3,347.7	3,389.7	3,367.9	13.0	9.2	146.15	-297.0	-33.3	453.9	434.8	19.06	23.817		
3,500.0	3,445.5	3,488.8	3,465.8	13.4	9.5	145.74	-312.1	-30.4	466.8	447.0	19.79	23.588		
3,600.0	3,543.3	3,587.9	3,563.7	13.9	9.9	145.35	-327.2	-27.6	479.8	459.2	20.52	23.374		
3,700.0	3,641.1	3,687.0	3,661.6	14.3	10.2	144.98	-342.4	-24.7	492.7	471.5	21.26	23.174		
3,800.0	3,738.9	3,786.1	3,759.5	14.8	10.6	144.63	-357.5	-21.9	505.7	483.7	22.00	22.986		
3,900.0	3,836.8	3,885.2	3,857.4	15.3	11.0	144.29	-372.7	-19.0	518.7	496.0	22.74	22.809		
4,000.0	3,934.6	3,984.3	3,955.3	15.7	11.3	143.98	-387.8	-16.2	531.8	508.3	23.49	22.642		
4,100.0	4,032.4	4,083.4	4,053.2	16.2	11.7	143.67	-403.0	-13.3	544.8	520.6	24.23	22.485		
4,200.0	4,130.2	4,182.5	4,151.1	16.7	12.1	143.39	-418.1	-10.5	557.9	532.9	24.98	22.337		
4,300.0	4,228.1	4,281.7	4,249.0	17.1	12.4	143.11	-433.2	-7.6	571.0	545.2	25.72	22.196		
4,400.0	4,325.9	4,380.8	4,346.9	17.6	12.8	142.85	-448.4	-4.8	584.0	557.6	26.47	22.063		
4,500.0	4,423.7	4,479.9	4,444.8	18.1	13.1	142.60	-463.5	-1.9	597.1	569.9	27.22	21.937		
4,600.0	4,521.5	4,579.0	4,542.7	18.5	13.5	142.36	-478.7	0.9	610.3	582.3	27.97	21.818		
4,700.0	4,619.3	4,678.1	4,640.6	19.0	13.9	142.13	-493.8	3.8	623.4	594.7	28.72	21.704		
4,800.0	4,717.2	4,777.2	4,738.5	19.5	14.2	141.91	-509.0	6.6	636.5	607.0	29.47	21.596		
4,900.0	4,815.0	4,876.3	4,836.4	19.9	14.6	141.70	-524.1	9.5	649.6	619.4	30.23	21.493		
5,000.0	4,912.8	4,975.4	4,934.3	20.4	15.0	141.51	-539.3	12.3	662.8	631.8	30.98	21.395		

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-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29I-321 - Wellbore #1 - Plan #3 (4-10-15)												Offset Site Error: 0.0 ft	
Survey Program: 0-MWD												Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
5,100.0	5,011.0	5,074.7	5,032.3	20.7	15.3	141.35	-554.4	15.2	674.4	642.7	31.66	21.300	
5,200.0	5,109.8	5,170.6	5,127.3	21.0	15.6	141.08	-568.2	17.8	683.5	651.2	32.23	21.208	
5,300.0	5,209.1	5,265.9	5,221.9	21.2	15.8	140.88	-578.8	19.8	690.5	657.8	32.70	21.119	
5,400.0	5,308.8	5,361.4	5,317.1	21.4	16.0	140.74	-586.4	21.2	695.5	662.5	33.09	21.020	
5,500.0	5,408.6	5,457.0	5,412.6	21.5	16.2	140.65	-590.8	22.0	698.5	665.1	33.40	20.911	
5,600.0	5,508.6	5,553.0	5,508.6	21.7	16.4	-90.00	-592.1	22.3	699.3	665.7	33.67	20.771	
5,700.0	5,608.6	5,653.0	5,608.6	21.8	16.5	-90.00	-592.1	22.3	699.3	665.4	33.94	20.608	
5,800.0	5,708.6	5,753.0	5,708.6	21.9	16.6	-90.00	-592.1	22.3	699.3	665.2	34.20	20.450	
5,900.0	5,808.4	5,853.0	5,808.5	21.9	16.7	-90.05	-587.0	22.3	699.4	665.0	34.37	20.347	
6,000.0	5,906.5	5,953.2	5,906.9	21.9	16.7	-90.11	-569.0	22.3	699.4	665.0	34.32	20.378	
6,100.0	6,001.4	6,053.4	6,002.2	21.8	16.6	-90.17	-538.2	22.3	699.4	665.3	34.07	20.527	
6,200.0	6,091.4	6,153.7	6,092.7	21.6	16.4	-90.22	-495.2	22.3	699.4	665.7	33.67	20.771	
6,300.0	6,174.9	6,254.1	6,176.9	21.4	16.1	-90.27	-440.6	22.3	699.4	666.2	33.19	21.071	
6,400.0	6,250.6	6,354.6	6,253.3	21.1	15.9	-90.31	-375.5	22.3	699.4	666.6	32.71	21.379	
6,500.0	6,317.1	6,455.1	6,320.5	20.8	15.7	-90.35	-300.8	22.3	699.4	667.0	32.33	21.629	
6,600.0	6,373.3	6,555.7	6,377.4	20.5	15.6	-90.39	-217.9	22.3	699.4	667.2	32.15	21.751	
6,700.0	6,418.2	6,656.3	6,422.9	20.2	15.6	-90.41	-128.2	22.3	699.4	667.1	32.26	21.679	
6,800.0	6,451.1	6,757.0	6,456.2	20.0	15.9	-90.43	-33.3	22.3	699.4	666.7	32.72	21.375	
6,900.0	6,471.4	6,857.7	6,476.8	19.7	16.3	-90.44	65.2	22.3	699.4	665.8	33.56	20.839	
7,000.0	6,478.8	6,958.4	6,484.2	19.5	16.9	-90.45	165.6	22.3	699.4	664.6	34.77	20.112	
7,100.0	6,478.2	7,058.5	6,483.6	19.6	17.8	-90.44	265.6	22.3	699.4	663.0	36.35	19.238	
7,200.0	6,477.6	7,158.5	6,482.8	20.2	18.7	-90.43	365.6	22.3	699.4	661.1	38.23	18.292	
7,300.0	6,477.0	7,258.5	6,482.0	21.3	19.9	-90.42	465.6	22.3	699.4	659.0	40.39	17.315	
7,400.0	6,476.3	7,358.5	6,481.3	22.5	21.1	-90.40	565.6	22.3	699.4	656.6	42.79	16.346	
7,500.0	6,475.7	7,458.5	6,480.5	23.8	22.4	-90.39	665.6	22.3	699.4	654.0	45.38	15.411	
7,600.0	6,475.1	7,558.5	6,479.7	25.2	23.8	-90.38	765.6	22.3	699.4	651.2	48.14	14.528	
7,700.0	6,474.5	7,658.5	6,479.0	26.6	25.3	-90.37	865.6	22.3	699.4	648.3	51.04	13.702	
7,800.0	6,473.8	7,758.5	6,478.2	28.1	26.8	-90.36	965.6	22.3	699.4	645.3	54.06	12.937	
7,900.0	6,473.2	7,858.5	6,477.4	29.7	28.4	-90.35	1,065.6	22.3	699.4	642.2	57.17	12.232	
8,000.0	6,472.6	7,958.5	6,476.7	31.3	30.0	-90.34	1,165.6	22.3	699.4	639.0	60.37	11.584	
8,100.0	6,471.9	8,058.5	6,475.9	32.9	31.7	-90.32	1,265.6	22.3	699.4	635.7	63.65	10.988	
8,200.0	6,471.3	8,158.5	6,475.1	34.5	33.4	-90.31	1,365.6	22.3	699.4	632.4	66.98	10.442	
8,300.0	6,470.7	8,258.5	6,474.4	36.2	35.1	-90.30	1,465.6	22.3	699.4	629.0	70.36	9.940	
8,400.0	6,470.1	8,358.5	6,473.6	37.8	36.8	-90.29	1,565.6	22.3	699.4	625.6	73.79	9.478	
8,500.0	6,469.4	8,458.5	6,472.8	39.6	38.6	-90.28	1,665.6	22.3	699.4	622.1	77.25	9.053	
8,600.0	6,468.8	8,558.5	6,472.1	41.3	40.3	-90.27	1,765.6	22.3	699.4	618.6	80.75	8.660	
8,700.0	6,468.2	8,658.5	6,471.3	43.0	42.1	-90.26	1,865.6	22.3	699.4	615.1	84.28	8.298	
8,800.0	6,467.5	8,758.5	6,470.5	44.8	43.9	-90.24	1,965.6	22.3	699.4	611.5	87.84	7.962	
8,900.0	6,466.9	8,858.5	6,469.8	46.5	45.7	-90.23	2,065.6	22.3	699.4	607.9	91.42	7.650	
9,000.0	6,466.3	8,958.5	6,469.0	48.3	47.5	-90.22	2,165.6	22.3	699.4	604.3	95.02	7.360	
9,100.0	6,465.7	9,058.5	6,468.2	50.1	49.3	-90.21	2,265.6	22.3	699.4	600.7	98.64	7.090	
9,200.0	6,465.0	9,158.5	6,467.4	51.9	51.1	-90.20	2,365.6	22.3	699.4	597.1	102.27	6.838	
9,300.0	6,464.4	9,258.5	6,466.7	53.7	53.0	-90.19	2,465.6	22.3	699.4	593.4	105.92	6.603	
9,400.0	6,463.8	9,358.5	6,465.9	55.5	54.8	-90.18	2,565.6	22.3	699.4	589.8	109.58	6.382	
9,500.0	6,463.1	9,458.5	6,465.1	57.3	56.6	-90.16	2,665.6	22.3	699.4	586.1	113.25	6.175	
9,600.0	6,462.5	9,558.5	6,464.4	59.1	58.5	-90.15	2,765.6	22.3	699.4	582.4	116.93	5.981	
9,700.0	6,461.9	9,658.5	6,463.6	61.0	60.3	-90.14	2,865.6	22.3	699.4	578.7	120.63	5.798	
9,800.0	6,461.3	9,758.5	6,462.8	62.8	62.2	-90.13	2,965.6	22.3	699.4	575.0	124.33	5.625	
9,900.0	6,460.6	9,858.5	6,462.1	64.6	64.1	-90.12	3,065.6	22.3	699.4	571.3	128.04	5.462	
10,000.0	6,460.0	9,958.5	6,461.3	66.5	65.9	-90.11	3,165.6	22.3	699.4	567.6	131.76	5.308	

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-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29I-321 - Wellbore #1 - Plan #3 (4-10-15)										Offset Site Error:		0.0 ft	
Survey Program: 0-MWD												Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis			Distance							Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
10,100.0	6,459.4	10,058.5	6,460.5	68.3	67.8	-90.10	3,265.6	22.3	699.4	563.9	135.48	5.162			
10,200.0	6,458.7	10,158.5	6,459.8	70.2	69.7	-90.08	3,365.6	22.3	699.4	560.1	139.21	5.024			
10,300.0	6,458.1	10,258.5	6,459.0	72.0	71.5	-90.07	3,465.5	22.3	699.4	556.4	142.95	4.892			
10,400.0	6,457.5	10,358.5	6,458.2	73.9	73.4	-90.06	3,565.5	22.3	699.4	552.7	146.69	4.767			
10,500.0	6,456.9	10,458.5	6,457.5	75.7	75.3	-90.05	3,665.5	22.3	699.4	548.9	150.44	4.649			
10,600.0	6,456.2	10,558.5	6,456.7	77.6	77.2	-90.04	3,765.5	22.3	699.4	545.2	154.19	4.536			
10,700.0	6,455.6	10,658.5	6,455.9	79.5	79.0	-90.03	3,865.5	22.3	699.3	541.4	157.95	4.428			
10,800.0	6,455.0	10,758.5	6,455.2	81.3	80.9	-90.02	3,965.5	22.3	699.3	537.6	161.71	4.325			
10,900.0	6,454.3	10,858.5	6,454.4	83.2	82.8	-90.00	4,065.5	22.3	699.3	533.9	165.47	4.226			
10,934.7	6,454.1	10,893.2	6,454.1	83.7	83.5	-90.00	4,100.2	22.3	699.3	532.7	166.65	4.197			
10,954.8	6,454.0	10,909.7	6,454.0	84.0	83.8	-90.00	4,116.7	22.3	699.4	532.1	167.26	4.181 SF			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29I-401 - Wellbore #1 - Plan #2 (4-10-15)											Offset Site Error:		0.0 ft
Survey Program: 0-MWD											Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	
0.0	0.0	1.0	1.0	0.0	0.0	-90.01	0.0	-150.5	150.5				
100.0	100.0	101.0	101.0	0.1	0.1	-90.01	0.0	-150.5	150.5	150.3	0.23	662.866	CC, ES
200.0	200.0	201.0	201.0	0.3	0.3	-90.01	0.0	-150.5	150.5	149.8	0.68	222.423	
300.0	300.0	301.0	301.0	0.5	0.6	140.83	0.0	-150.5	151.2	150.0	1.11	136.470	
400.0	400.0	401.0	401.0	0.7	0.8	141.44	0.0	-150.5	153.2	151.7	1.54	99.641	
500.0	499.9	500.9	500.9	1.0	1.0	142.41	0.0	-150.5	156.6	154.6	1.98	79.091	
600.0	599.7	600.7	600.7	1.2	1.2	143.70	0.0	-150.5	161.5	159.1	2.43	66.419	
700.0	699.4	700.4	700.4	1.5	1.5	145.25	0.0	-150.5	167.9	165.0	2.89	58.105	
800.0	798.9	799.9	799.9	1.7	1.7	146.98	0.0	-150.5	175.9	172.5	3.35	52.451	
900.0	898.3	898.5	898.5	2.0	1.9	148.56	-0.8	-150.8	185.7	181.9	3.79	48.941	
1,000.0	997.4	997.1	997.0	2.3	2.1	149.74	-3.2	-151.7	197.5	193.2	4.22	46.759	
1,100.0	1,096.3	1,095.4	1,095.3	2.7	2.2	150.55	-7.1	-153.2	211.1	206.5	4.67	45.226	
1,200.0	1,194.9	1,193.5	1,193.2	3.0	2.4	151.03	-12.6	-155.3	226.7	221.6	5.13	44.156	
1,300.0	1,293.3	1,291.2	1,290.6	3.4	2.6	151.24	-19.6	-158.1	244.1	238.4	5.62	43.419	
1,400.0	1,391.2	1,388.6	1,387.6	3.8	2.9	151.22	-28.2	-161.4	263.2	257.1	6.13	42.915	
1,500.0	1,489.1	1,485.8	1,484.1	4.3	3.1	151.03	-38.3	-165.2	283.4	276.7	6.68	42.442	
1,600.0	1,586.9	1,582.7	1,580.3	4.7	3.4	150.56	-49.8	-169.7	303.9	296.6	7.25	41.921	
1,700.0	1,684.7	1,679.5	1,676.1	5.2	3.7	149.85	-62.9	-174.7	324.7	316.8	7.85	41.369	
1,800.0	1,782.5	1,777.2	1,772.7	5.6	3.9	149.12	-76.7	-180.1	345.7	337.2	8.47	40.793	
1,900.0	1,880.4	1,874.9	1,869.2	6.1	4.3	148.46	-90.4	-185.4	366.7	357.6	9.11	40.244	
2,000.0	1,978.2	1,972.6	1,965.8	6.5	4.6	147.88	-104.2	-190.7	387.8	378.1	9.76	39.733	
2,100.0	2,076.0	2,070.3	2,062.3	7.0	4.9	147.36	-118.0	-196.0	409.0	398.5	10.42	39.254	
2,200.0	2,173.8	2,167.9	2,158.9	7.4	5.2	146.89	-131.8	-201.3	430.1	419.0	11.08	38.810	
2,300.0	2,271.6	2,265.6	2,255.4	7.9	5.6	146.46	-145.6	-206.7	451.3	439.5	11.75	38.398	
2,400.0	2,369.5	2,363.3	2,352.0	8.3	5.9	146.08	-159.4	-212.0	472.5	460.0	12.43	38.018	
2,500.0	2,467.3	2,461.0	2,448.5	8.8	6.2	145.72	-173.2	-217.3	493.7	480.6	13.11	37.667	
2,600.0	2,565.1	2,558.7	2,545.1	9.3	6.6	145.40	-187.0	-222.6	514.9	501.1	13.79	37.341	
2,700.0	2,662.9	2,656.3	2,641.6	9.7	6.9	145.10	-200.8	-227.9	536.2	521.7	14.48	37.039	
2,800.0	2,760.7	2,754.0	2,738.2	10.2	7.3	144.82	-214.5	-233.3	557.4	542.3	15.16	36.760	
2,900.0	2,858.6	2,851.7	2,834.8	10.6	7.6	144.56	-228.3	-238.6	578.7	562.9	15.86	36.500	
3,000.0	2,956.4	2,949.4	2,931.3	11.1	7.9	144.32	-242.1	-243.9	600.0	583.4	16.55	36.257	
3,100.0	3,054.2	3,047.1	3,027.9	11.6	8.3	144.10	-255.9	-249.2	621.3	604.0	17.24	36.032	
3,200.0	3,152.0	3,144.7	3,124.4	12.0	8.6	143.89	-269.7	-254.5	642.6	624.6	17.94	35.821	
3,300.0	3,249.8	3,242.4	3,221.0	12.5	9.0	143.70	-283.5	-259.9	663.9	645.3	18.64	35.623	
3,400.0	3,347.7	3,340.1	3,317.5	13.0	9.3	143.52	-297.3	-265.2	685.2	665.9	19.34	35.438	
3,500.0	3,445.5	3,437.8	3,414.1	13.4	9.7	143.35	-311.1	-270.5	706.5	686.5	20.04	35.264	
3,600.0	3,543.3	3,535.5	3,510.6	13.9	10.0	143.19	-324.9	-275.8	727.9	707.1	20.74	35.101	
3,700.0	3,641.1	3,633.1	3,607.2	14.3	10.4	143.03	-338.7	-281.1	749.2	727.8	21.44	34.947	
3,800.0	3,738.9	3,730.8	3,703.8	14.8	10.8	142.89	-352.4	-286.5	770.5	748.4	22.14	34.801	
3,900.0	3,836.8	3,828.5	3,800.3	15.3	11.1	142.76	-366.2	-291.8	791.9	769.0	22.84	34.664	
4,000.0	3,934.6	3,926.2	3,896.9	15.7	11.5	142.63	-380.0	-297.1	813.2	789.7	23.55	34.534	
4,100.0	4,032.4	4,023.9	3,993.4	16.2	11.8	142.50	-393.8	-302.4	834.6	810.3	24.25	34.411	
4,200.0	4,130.2	4,121.5	4,090.0	16.7	12.2	142.39	-407.6	-307.7	855.9	831.0	24.96	34.294	
4,300.0	4,228.1	4,219.2	4,186.5	17.1	12.5	142.28	-421.4	-313.1	877.3	851.6	25.66	34.183	
4,400.0	4,325.9	4,316.9	4,283.1	17.6	12.9	142.17	-435.2	-318.4	898.6	872.3	26.37	34.077	
4,500.0	4,423.7	4,414.6	4,379.6	18.1	13.2	142.07	-449.0	-323.7	920.0	892.9	27.08	33.977	
4,600.0	4,521.5	4,512.3	4,476.2	18.5	13.6	141.98	-462.8	-329.0	941.4	913.6	27.78	33.881	
4,700.0	4,619.3	4,609.9	4,572.7	19.0	14.0	141.89	-476.5	-334.4	962.7	934.2	28.49	33.789	
4,800.0	4,717.2	4,707.6	4,669.3	19.5	14.3	141.80	-490.3	-339.7	984.1	954.9	29.20	33.702 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-241 - Wellbore #1 - Plan #3 (4-10-15)										Offset Site Error:		0.0 ft
Survey Program:		0-MWD										Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
0.0	0.0	0.0	0.0	0.0	0.0	-90.01	0.0	-58.5	58.5					
100.0	100.0	100.0	100.0	0.1	0.1	-90.01	0.0	-58.5	58.5	58.3	0.22	260.359	CC, ES	
200.0	200.0	200.0	200.0	0.3	0.3	-90.01	0.0	-58.5	58.5	57.8	0.67	86.786		
300.0	300.0	300.0	300.0	0.5	0.6	141.15	0.0	-58.5	59.2	58.1	1.11	53.554		
400.0	400.0	400.0	400.0	0.7	0.8	142.67	0.0	-58.5	61.3	59.7	1.54	39.901		
500.0	499.9	499.9	499.9	1.0	1.0	144.99	0.0	-58.5	64.8	62.8	1.98	32.752		
600.0	599.7	599.7	599.7	1.2	1.2	147.84	0.0	-58.5	69.9	67.4	2.43	28.777		
700.0	699.4	699.4	699.4	1.5	1.5	150.93	0.0	-58.5	76.6	73.7	2.88	26.583		
800.0	798.9	798.9	798.9	1.7	1.7	154.02	0.0	-58.5	85.1	81.8	3.34	25.489		
900.0	898.3	899.4	899.4	2.0	1.9	156.62	-0.8	-58.1	94.9	91.1	3.77	25.127		
1,000.0	997.4	1,000.1	1,000.1	2.3	2.1	158.43	-3.1	-56.8	105.1	100.9	4.19	25.054		
1,100.0	1,096.3	1,101.0	1,100.8	2.7	2.3	159.62	-6.9	-54.7	115.7	111.0	4.63	25.006		
1,200.0	1,194.9	1,202.0	1,201.6	3.0	2.5	160.35	-12.3	-51.7	126.6	121.6	5.07	24.961		
1,300.0	1,293.3	1,303.1	1,302.4	3.4	2.7	160.72	-19.3	-47.8	137.9	132.4	5.54	24.907		
1,400.0	1,391.2	1,404.3	1,403.2	3.8	2.9	160.80	-27.8	-43.1	149.5	143.5	6.02	24.833		
1,500.0	1,489.1	1,505.8	1,504.0	4.3	3.2	160.58	-38.0	-37.4	160.6	154.1	6.54	24.574		
1,600.0	1,586.9	1,607.5	1,604.9	4.7	3.5	159.99	-49.7	-30.9	170.3	163.3	7.07	24.078		
1,700.0	1,684.7	1,709.4	1,705.6	5.2	3.8	159.08	-63.0	-23.6	178.8	171.1	7.64	23.392		
1,800.0	1,782.5	1,810.5	1,805.3	5.6	4.1	157.92	-77.6	-15.5	186.1	177.8	8.24	22.579		
1,900.0	1,880.4	1,910.1	1,903.5	6.1	4.4	156.80	-92.2	-7.3	193.2	184.4	8.86	21.818		
2,000.0	1,978.2	2,009.8	2,001.8	6.5	4.8	155.76	-106.9	0.8	200.5	191.0	9.49	21.124		
2,100.0	2,076.0	2,109.5	2,100.0	7.0	5.1	154.79	-121.5	8.9	207.8	197.6	10.14	20.494		
2,200.0	2,173.8	2,209.2	2,198.3	7.4	5.5	153.89	-136.1	17.1	215.1	204.3	10.80	19.922		
2,300.0	2,271.6	2,308.8	2,296.5	7.9	5.8	153.05	-150.8	25.2	222.5	211.1	11.47	19.400		
2,400.0	2,369.5	2,408.5	2,394.8	8.3	6.2	152.26	-165.4	33.3	230.0	217.8	12.15	18.925		
2,500.0	2,467.3	2,508.2	2,493.1	8.8	6.6	151.52	-180.1	41.5	237.5	224.6	12.84	18.490		
2,600.0	2,565.1	2,607.9	2,591.3	9.3	6.9	150.83	-194.7	49.6	245.0	231.4	13.54	18.092		
2,700.0	2,662.9	2,707.5	2,689.6	9.7	7.3	150.18	-209.4	57.7	252.5	238.3	14.25	17.727		
2,800.0	2,760.7	2,807.2	2,787.8	10.2	7.7	149.56	-224.0	65.9	260.1	245.2	14.96	17.390		
2,900.0	2,858.6	2,906.9	2,886.1	10.6	8.1	148.98	-238.7	74.0	267.7	252.1	15.68	17.081		
3,000.0	2,956.4	3,006.6	2,984.3	11.1	8.5	148.44	-253.3	82.1	275.4	259.0	16.40	16.794		
3,100.0	3,054.2	3,106.2	3,082.6	11.6	8.8	147.92	-267.9	90.3	283.1	265.9	17.12	16.529		
3,200.0	3,152.0	3,205.9	3,180.9	12.0	9.2	147.43	-282.6	98.4	290.7	272.9	17.86	16.283		
3,300.0	3,249.8	3,305.6	3,279.1	12.5	9.6	146.96	-297.2	106.5	298.4	279.9	18.59	16.054		
3,400.0	3,347.7	3,405.2	3,377.4	13.0	10.0	146.52	-311.9	114.6	306.2	286.8	19.33	15.840		
3,500.0	3,445.5	3,504.9	3,475.6	13.4	10.4	146.10	-326.5	122.8	313.9	293.8	20.07	15.641		
3,600.0	3,543.3	3,604.6	3,573.9	13.9	10.8	145.70	-341.2	130.9	321.7	300.9	20.81	15.455		
3,700.0	3,641.1	3,704.3	3,672.1	14.3	11.2	145.32	-355.8	139.0	329.4	307.9	21.56	15.280		
3,800.0	3,738.9	3,803.9	3,770.4	14.8	11.5	144.96	-370.5	147.2	337.2	314.9	22.31	15.116		
3,900.0	3,836.8	3,903.6	3,868.6	15.3	11.9	144.61	-385.1	155.3	345.0	322.0	23.06	14.962		
4,000.0	3,934.6	4,003.3	3,966.9	15.7	12.3	144.28	-399.7	163.4	352.8	329.0	23.81	14.817		
4,100.0	4,032.4	4,103.0	4,065.2	16.2	12.7	143.96	-414.4	171.6	360.7	336.1	24.57	14.680		
4,200.0	4,130.2	4,202.6	4,163.4	16.7	13.1	143.66	-429.0	179.7	368.5	343.2	25.32	14.551		
4,300.0	4,228.1	4,302.3	4,261.7	17.1	13.5	143.37	-443.7	187.8	376.3	350.3	26.08	14.429		
4,400.0	4,325.9	4,402.0	4,359.9	17.6	13.9	143.09	-458.3	196.0	384.2	357.4	26.84	14.313		
4,500.0	4,423.7	4,501.7	4,458.2	18.1	14.3	142.82	-473.0	204.1	392.1	364.5	27.60	14.204		
4,600.0	4,521.5	4,601.3	4,556.4	18.5	14.7	142.57	-487.6	212.2	399.9	371.6	28.36	14.099		
4,700.0	4,619.3	4,701.0	4,654.7	19.0	15.1	142.32	-502.3	220.4	407.8	378.7	29.13	14.000		
4,800.0	4,717.2	4,800.7	4,753.0	19.5	15.5	142.08	-516.9	228.5	415.7	385.8	29.89	13.906		
4,900.0	4,815.0	4,900.4	4,851.2	19.9	15.8	141.85	-531.5	236.6	423.6	392.9	30.66	13.817		
5,000.0	4,912.8	5,000.0	4,949.5	20.4	16.2	141.64	-546.2	244.8	431.5	400.0	31.42	13.732		

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-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-241 - Wellbore #1 - Plan #3 (4-10-15)										Offset Site Error:		0.0 ft
Survey Program: 0-MWD												Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
5,100.0	5,011.0	5,097.7	5,045.7	20.7	16.6	141.36	-560.4	252.7	437.9	405.8	32.10	13.642		
5,200.0	5,109.8	5,190.4	5,137.5	21.0	16.9	141.09	-572.0	259.1	442.8	410.2	32.62	13.574		
5,300.0	5,209.1	5,283.2	5,229.8	21.2	17.1	140.88	-580.9	264.1	446.6	413.5	33.07	13.505		
5,400.0	5,308.8	5,376.1	5,322.3	21.4	17.2	140.74	-587.3	267.6	449.3	415.9	33.44	13.437		
5,500.0	5,408.6	5,469.0	5,415.1	21.5	17.4	140.65	-591.0	269.6	450.9	417.2	33.73	13.367		
5,600.0	5,508.6	5,562.5	5,508.6	21.7	17.5	-90.00	-592.1	270.3	451.4	417.4	33.98	13.282		
5,700.0	5,608.6	5,662.5	5,608.6	21.8	17.7	-90.00	-592.1	270.3	451.4	417.1	34.25	13.180		
5,750.9	5,659.5	5,713.3	5,659.5	21.8	17.7	-90.00	-592.1	270.3	451.4	417.0	34.38	13.130		
5,800.0	5,708.6	5,762.4	5,708.5	21.9	17.8	-89.76	-590.2	270.3	451.4	416.9	34.44	13.107		
5,900.0	5,808.4	5,861.3	5,806.5	21.9	17.8	-88.79	-577.0	270.3	451.5	417.1	34.33	13.153		
6,000.0	5,906.5	5,959.3	5,901.0	21.9	17.7	-87.83	-551.5	270.3	451.7	417.7	34.01	13.281		
6,100.0	6,001.4	6,056.4	5,990.7	21.8	17.5	-86.92	-514.5	270.3	452.0	418.5	33.55	13.475		
6,200.0	6,091.4	6,152.7	6,074.3	21.6	17.3	-86.06	-466.8	270.3	452.4	419.5	32.99	13.713		
6,300.0	6,174.9	6,248.2	6,150.7	21.4	17.1	-85.28	-409.6	270.3	452.9	420.5	32.43	13.966		
6,400.0	6,250.6	6,343.1	6,218.9	21.1	16.8	-84.57	-343.7	270.3	453.4	421.5	31.94	14.197		
6,500.0	6,317.1	6,437.3	6,278.1	20.8	16.6	-83.95	-270.4	270.3	453.9	422.3	31.60	14.366		
6,600.0	6,373.3	6,531.1	6,327.5	20.5	16.4	-83.43	-190.8	270.3	454.4	422.9	31.48	14.434		
6,700.0	6,418.2	6,624.5	6,366.7	20.2	16.3	-83.02	-106.1	270.3	454.7	423.1	31.65	14.368		
6,800.0	6,451.1	6,717.6	6,395.2	20.0	16.3	-82.72	-17.6	270.3	455.0	422.9	32.15	14.155		
6,900.0	6,471.4	6,810.5	6,412.7	19.7	16.6	-82.53	73.6	270.3	455.2	422.3	32.98	13.803		
7,000.0	6,478.8	6,903.2	6,419.1	19.5	17.1	-82.46	166.1	270.3	455.3	421.2	34.13	13.339		
7,100.0	6,478.2	7,002.4	6,418.5	19.6	17.9	-82.47	265.2	270.3	455.3	419.7	35.64	12.774		
7,200.0	6,477.6	7,102.4	6,417.9	20.2	18.9	-82.47	365.2	270.3	455.3	417.8	37.49	12.146		
7,300.0	6,477.0	7,202.4	6,417.3	21.3	20.0	-82.47	465.2	270.3	455.3	415.7	39.61	11.495		
7,400.0	6,476.3	7,302.4	6,416.7	22.5	21.2	-82.47	565.2	270.3	455.3	413.3	41.97	10.848		
7,500.0	6,475.7	7,402.4	6,416.1	23.8	22.6	-82.48	665.2	270.3	455.3	410.8	44.54	10.223		
7,600.0	6,475.1	7,502.4	6,415.5	25.2	24.0	-82.48	765.2	270.3	455.3	408.0	47.27	9.632		
7,700.0	6,474.5	7,602.4	6,414.9	26.6	25.5	-82.48	865.2	270.3	455.3	405.1	50.14	9.080		
7,800.0	6,473.8	7,702.4	6,414.3	28.1	27.0	-82.48	965.2	270.3	455.3	402.2	53.14	8.568		
7,900.0	6,473.2	7,802.4	6,413.6	29.7	28.6	-82.48	1,065.2	270.3	455.3	399.1	56.23	8.097		
8,000.0	6,472.6	7,902.4	6,413.0	31.3	30.2	-82.49	1,165.2	270.3	455.3	395.9	59.40	7.664		
8,100.0	6,471.9	8,002.4	6,412.4	32.9	31.8	-82.49	1,265.2	270.3	455.3	392.6	62.65	7.267		
8,200.0	6,471.3	8,102.4	6,411.8	34.5	33.5	-82.49	1,365.2	270.3	455.3	389.3	65.95	6.903		
8,300.0	6,470.7	8,202.4	6,411.2	36.2	35.2	-82.49	1,465.2	270.3	455.3	386.0	69.31	6.568		
8,400.0	6,470.1	8,302.4	6,410.6	37.8	36.9	-82.49	1,565.2	270.3	455.3	382.6	72.72	6.261		
8,500.0	6,469.4	8,402.4	6,410.0	39.6	38.7	-82.50	1,665.2	270.3	455.3	379.1	76.16	5.978		
8,600.0	6,468.8	8,502.4	6,409.4	41.3	40.4	-82.50	1,765.2	270.3	455.3	375.6	79.64	5.717		
8,700.0	6,468.2	8,602.4	6,408.8	43.0	42.2	-82.50	1,865.2	270.3	455.3	372.1	83.14	5.476		
8,800.0	6,467.5	8,702.4	6,408.1	44.8	44.0	-82.50	1,965.2	270.3	455.3	368.6	86.67	5.253		
8,900.0	6,466.9	8,802.4	6,407.5	46.5	45.8	-82.51	2,065.2	270.3	455.3	365.0	90.23	5.046		
9,000.0	6,466.3	8,902.4	6,406.9	48.3	47.6	-82.51	2,165.2	270.3	455.3	361.5	93.80	4.853		
9,100.0	6,465.7	9,002.4	6,406.3	50.1	49.4	-82.51	2,265.2	270.3	455.3	357.9	97.39	4.674		
9,200.0	6,465.0	9,102.4	6,405.7	51.9	51.2	-82.51	2,365.2	270.3	455.3	354.3	101.00	4.507		
9,300.0	6,464.4	9,202.4	6,405.1	53.7	53.0	-82.51	2,465.2	270.3	455.3	350.6	104.63	4.351		
9,400.0	6,463.8	9,302.4	6,404.5	55.5	54.9	-82.52	2,565.2	270.3	455.3	347.0	108.26	4.205		
9,500.0	6,463.1	9,402.4	6,403.9	57.3	56.7	-82.52	2,665.2	270.3	455.2	343.3	111.91	4.068		
9,600.0	6,462.5	9,502.4	6,403.3	59.1	58.6	-82.52	2,765.2	270.3	455.2	339.7	115.57	3.939		
9,700.0	6,461.9	9,602.4	6,402.6	61.0	60.4	-82.52	2,865.2	270.3	455.2	336.0	119.24	3.818		
9,800.0	6,461.3	9,702.4	6,402.0	62.8	62.3	-82.53	2,965.2	270.3	455.2	332.3	122.92	3.704		
9,900.0	6,460.6	9,802.4	6,401.4	64.6	64.1	-82.53	3,065.2	270.3	455.2	328.6	126.60	3.596		

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-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Offset														
Semi Major Axis														
Distance														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	6,460.0	9,902.4	6,400.8	66.5	66.0	-82.53	3,165.2	270.3	455.2	324.9	130.29	3.494		
10,100.0	6,459.4	10,002.4	6,400.2	68.3	67.8	-82.53	3,265.2	270.3	455.2	321.2	133.99	3.397		
10,200.0	6,458.7	10,102.4	6,399.6	70.2	69.7	-82.53	3,365.2	270.3	455.2	317.5	137.70	3.306		
10,300.0	6,458.1	10,202.4	6,399.0	72.0	71.6	-82.54	3,465.2	270.3	455.2	313.8	141.41	3.219		
10,400.0	6,457.5	10,302.4	6,398.4	73.9	73.4	-82.54	3,565.2	270.3	455.2	310.1	145.13	3.137		
10,500.0	6,456.9	10,402.4	6,397.8	75.7	75.3	-82.54	3,665.2	270.3	455.2	306.4	148.85	3.058		
10,600.0	6,456.2	10,502.4	6,397.1	77.6	77.2	-82.54	3,765.2	270.3	455.2	302.6	152.57	2.984		
10,700.0	6,455.6	10,602.4	6,396.5	79.5	79.1	-82.54	3,865.2	270.3	455.2	298.9	156.30	2.912		
10,800.0	6,455.0	10,702.4	6,395.9	81.3	80.9	-82.55	3,965.2	270.3	455.2	295.2	160.04	2.844		
10,900.0	6,454.3	10,802.4	6,395.3	83.2	82.8	-82.55	4,065.2	270.3	455.2	291.4	163.78	2.779		
10,940.5	6,454.1	10,842.9	6,395.1	83.8	83.6	-82.55	4,105.7	270.3	455.2	290.1	165.14	2.757		
10,954.8	6,454.0	10,854.0	6,395.0	84.0	83.8	-82.55	4,116.7	270.3	455.2	289.7	165.56	2.750 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-441 - Wellbore #1 - Plan #3 (4-10-15)										Offset Site Error:		0.0 ft	
Survey Program: 0-MWDD										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	-30.7	30.7				
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-30.7	30.7	30.4	0.22	136.379	
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-30.7	30.7	30.0	0.67	45.460	CC, ES
300.0	300.0	300.0	300.0	0.5	0.6	141.64	0.0	-30.7	31.3	30.2	1.11	28.346	
400.0	400.0	400.0	400.0	0.7	0.8	144.41	0.0	-30.7	33.4	31.9	1.54	21.771	
500.0	499.9	500.4	500.3	1.0	1.0	147.46	-0.6	-30.1	36.4	34.4	1.95	18.622	
600.0	599.7	600.8	600.8	1.2	1.2	149.73	-2.6	-28.3	39.6	37.2	2.37	16.704	
700.0	699.4	701.3	701.2	1.5	1.4	151.38	-5.8	-25.3	42.9	40.1	2.80	15.320	
800.0	798.9	801.9	801.6	1.7	1.6	152.52	-10.4	-21.1	46.5	43.2	3.25	14.284	
900.0	898.3	902.5	901.9	2.0	1.9	153.24	-16.2	-15.8	50.1	46.4	3.72	13.478	
1,000.0	997.4	1,003.2	1,002.1	2.3	2.1	153.63	-23.4	-9.2	53.9	49.7	4.20	12.829	
1,100.0	1,096.3	1,103.9	1,102.2	2.7	2.4	153.75	-31.8	-1.5	57.8	53.1	4.70	12.289	
1,200.0	1,194.9	1,204.7	1,202.1	3.0	2.7	153.65	-41.6	7.5	61.8	56.5	5.22	11.826	
1,300.0	1,293.3	1,305.6	1,301.8	3.4	3.0	153.37	-52.6	17.6	65.9	60.1	5.77	11.416	
1,400.0	1,391.2	1,406.4	1,401.3	3.8	3.4	152.94	-65.0	29.0	70.1	63.7	6.34	11.047	
1,500.0	1,489.1	1,506.6	1,499.8	4.3	3.7	152.33	-78.1	41.0	74.1	67.1	6.95	10.649	
1,600.0	1,586.9	1,606.5	1,598.1	4.7	4.1	151.76	-91.3	53.1	78.0	70.4	7.58	10.294	
1,700.0	1,684.7	1,706.4	1,696.4	5.2	4.5	151.24	-104.4	65.2	81.9	73.7	8.21	9.979	
1,800.0	1,782.5	1,806.3	1,794.8	5.6	4.9	150.78	-117.6	77.2	85.9	77.0	8.85	9.701	
1,900.0	1,880.4	1,906.3	1,893.1	6.1	5.3	150.35	-130.7	89.3	89.9	80.3	9.51	9.452	
2,000.0	1,978.2	2,006.2	1,991.4	6.5	5.7	149.96	-143.9	101.4	93.8	83.7	10.16	9.231	
2,100.0	2,076.0	2,106.1	2,089.7	7.0	6.1	149.60	-157.0	113.4	97.8	87.0	10.83	9.031	
2,200.0	2,173.8	2,206.0	2,188.0	7.4	6.5	149.27	-170.2	125.5	101.8	90.3	11.50	8.851	
2,300.0	2,271.6	2,305.9	2,286.3	7.9	6.9	148.97	-183.3	137.6	105.7	93.6	12.17	8.689	
2,400.0	2,369.5	2,405.9	2,384.6	8.3	7.3	148.68	-196.5	149.6	109.7	96.9	12.85	8.541	
2,500.0	2,467.3	2,505.8	2,482.9	8.8	7.7	148.42	-209.6	161.7	113.7	100.2	13.53	8.406	
2,600.0	2,565.1	2,605.7	2,581.3	9.3	8.1	148.18	-222.8	173.8	117.7	103.5	14.21	8.282	
2,700.0	2,662.9	2,705.6	2,679.6	9.7	8.5	147.95	-235.9	185.8	121.7	106.8	14.89	8.168	
2,800.0	2,760.7	2,805.5	2,777.9	10.2	8.9	147.73	-249.1	197.9	125.6	110.1	15.58	8.064	
2,900.0	2,858.6	2,905.5	2,876.2	10.6	9.4	147.53	-262.2	210.0	129.6	113.4	16.27	7.967	
3,000.0	2,956.4	3,005.4	2,974.5	11.1	9.8	147.34	-275.4	222.0	133.6	116.7	16.96	7.878	
3,100.0	3,054.2	3,105.3	3,072.8	11.6	10.2	147.16	-288.5	234.1	137.6	120.0	17.66	7.794	
3,200.0	3,152.0	3,205.2	3,171.1	12.0	10.6	146.99	-301.7	246.2	141.6	123.3	18.35	7.717	
3,300.0	3,249.8	3,305.1	3,269.4	12.5	11.0	146.83	-314.8	258.2	145.6	126.5	19.05	7.644	
3,400.0	3,347.7	3,405.1	3,367.8	13.0	11.4	146.68	-328.0	270.3	149.6	129.8	19.74	7.577	
3,500.0	3,445.5	3,505.0	3,466.1	13.4	11.8	146.54	-341.1	282.4	153.6	133.1	20.44	7.513	
3,600.0	3,543.3	3,604.9	3,564.4	13.9	12.2	146.40	-354.3	294.4	157.6	136.4	21.14	7.454	
3,700.0	3,641.1	3,704.8	3,662.7	14.3	12.6	146.28	-367.4	306.5	161.6	139.7	21.84	7.398	
3,800.0	3,738.9	3,804.7	3,761.0	14.8	13.1	146.15	-380.6	318.6	165.6	143.0	22.54	7.345	
3,900.0	3,836.8	3,904.7	3,859.3	15.3	13.5	146.04	-393.7	330.6	169.6	146.3	23.25	7.295	
4,000.0	3,934.6	4,004.6	3,957.6	15.7	13.9	145.92	-406.9	342.7	173.6	149.6	23.95	7.248	
4,100.0	4,032.4	4,104.5	4,055.9	16.2	14.3	145.82	-420.1	354.8	177.6	152.9	24.65	7.203	
4,200.0	4,130.2	4,204.4	4,154.3	16.7	14.7	145.72	-433.2	366.9	181.6	156.2	25.36	7.161	
4,300.0	4,228.1	4,304.3	4,252.6	17.1	15.1	145.62	-446.4	378.9	185.6	159.5	26.06	7.121	
4,400.0	4,325.9	4,404.3	4,350.9	17.6	15.5	145.52	-459.5	391.0	189.6	162.8	26.77	7.082	
4,500.0	4,423.7	4,504.2	4,449.2	18.1	15.9	145.43	-472.7	403.1	193.6	166.1	27.47	7.046	
4,600.0	4,521.5	4,604.1	4,547.5	18.5	16.4	145.35	-485.8	415.1	197.6	169.4	28.18	7.011	
4,700.0	4,619.3	4,704.0	4,645.8	19.0	16.8	145.27	-499.0	427.2	201.6	172.7	28.89	6.978	
4,800.0	4,717.2	4,803.9	4,744.1	19.5	17.2	145.19	-512.1	439.3	205.6	176.0	29.59	6.947	
4,900.0	4,815.0	4,903.9	4,842.4	19.9	17.6	145.11	-525.3	451.3	209.6	179.3	30.30	6.917	
5,000.0	4,912.8	5,003.8	4,940.7	20.4	18.0	145.04	-538.4	463.4	213.6	182.6	31.01	6.888	

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-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29L Pad Sec.29-T5N-R63W - R&R Farms 29L-441 - Wellbore #1 - Plan #3 (4-10-15)										Offset Site Error:		0.0 ft	
Survey Program: 0-MWD										Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis			Distance					Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)		Separation Factor
5,100.0	5,011.0	5,103.7	5,039.1	20.7	18.4	144.69	-551.6	475.5	215.9	184.2	31.70	6.813	
5,200.0	5,109.8	5,200.0	5,133.9	21.0	18.8	143.89	-564.0	486.8	215.8	183.4	32.42	6.656	
5,300.0	5,209.1	5,296.0	5,228.8	21.2	19.0	143.06	-574.3	496.3	214.9	181.9	33.03	6.507	
5,400.0	5,308.8	5,390.9	5,323.2	21.4	19.3	142.29	-582.2	503.6	213.7	180.1	33.56	6.367	
5,500.0	5,408.6	5,486.0	5,417.9	21.5	19.4	141.57	-587.8	508.7	212.0	178.0	34.02	6.232	
5,600.0	5,508.6	5,581.1	5,512.9	21.7	19.6	-89.73	-591.1	511.8	209.9	175.5	34.43	6.097	
5,700.0	5,608.6	5,676.8	5,608.6	21.8	19.7	-90.00	-592.1	512.7	209.0	174.2	34.76	6.012	
5,800.0	5,708.6	5,776.8	5,708.6	21.9	19.8	-90.00	-592.1	512.7	209.0	174.0	35.02	5.968	
5,826.9	5,735.5	5,803.7	5,735.5	21.9	19.9	-90.12	-592.1	512.7	209.0	173.9	35.10	5.953	
5,900.0	5,808.4	5,876.6	5,808.4	21.9	20.0	-91.56	-592.1	512.7	209.0	173.4	35.60	5.872	
6,000.0	5,906.5	5,977.5	5,908.9	21.9	20.0	-94.61	-584.4	512.7	209.7	173.3	36.33	5.771	
6,100.0	6,001.4	6,079.9	6,009.0	21.8	20.0	-97.58	-563.2	512.7	210.8	174.1	36.73	5.741	
6,200.0	6,091.4	6,183.9	6,106.9	21.6	19.8	-100.41	-528.2	512.7	212.5	175.8	36.75	5.783	
6,300.0	6,174.9	6,289.4	6,200.3	21.4	19.6	-103.03	-479.4	512.7	214.5	178.1	36.42	5.891	
6,400.0	6,250.6	6,396.4	6,287.4	21.1	19.4	-105.40	-417.3	512.7	216.8	181.0	35.81	6.055	
6,500.0	6,317.1	6,504.9	6,365.9	20.8	19.0	-107.47	-342.6	512.7	219.1	184.1	35.04	6.254	
6,600.0	6,373.3	6,614.7	6,433.7	20.5	18.7	-109.20	-256.4	512.7	221.3	187.0	34.29	6.454	
6,700.0	6,418.2	6,725.5	6,489.0	20.2	18.4	-110.58	-160.4	512.7	223.2	189.5	33.77	6.611	
6,800.0	6,451.1	6,837.2	6,530.0	20.0	18.1	-111.58	-56.6	512.7	224.7	191.1	33.67	6.674	
6,900.0	6,471.4	6,949.6	6,555.6	19.7	17.9	-112.19	52.6	512.7	225.7	191.6	34.14	6.610	
7,000.0	6,478.8	7,062.2	6,565.0	19.5	17.8	-112.42	164.8	512.7	226.1	190.8	35.25	6.413	
7,100.0	6,478.2	7,163.0	6,565.0	19.6	18.5	-112.55	265.6	512.7	226.3	189.5	36.75	6.157	
7,200.0	6,477.6	7,263.0	6,565.0	20.2	19.5	-112.70	365.6	512.7	226.5	188.0	38.51	5.882	
7,300.0	6,477.0	7,363.0	6,565.0	21.3	20.7	-112.84	465.6	512.7	226.8	186.3	40.51	5.598	
7,400.0	6,476.3	7,463.0	6,565.0	22.5	21.9	-112.99	565.6	512.7	227.0	184.3	42.70	5.316	
7,500.0	6,475.7	7,563.0	6,565.0	23.8	23.3	-113.14	665.6	512.7	227.2	182.2	45.08	5.041	
7,600.0	6,475.1	7,663.0	6,565.0	25.2	24.7	-113.28	765.6	512.7	227.5	179.9	47.59	4.780	
7,700.0	6,474.5	7,763.0	6,565.0	26.6	26.1	-113.43	865.6	512.7	227.7	177.5	50.23	4.534	
7,800.0	6,473.8	7,863.0	6,565.0	28.1	27.6	-113.57	965.6	512.7	228.0	175.0	52.97	4.304	
7,900.0	6,473.2	7,963.0	6,565.0	29.7	29.2	-113.72	1,065.6	512.7	228.2	172.4	55.80	4.091	
8,000.0	6,472.6	8,063.0	6,565.0	31.3	30.8	-113.86	1,165.6	512.7	228.5	169.8	58.70	3.893	
8,100.0	6,471.9	8,163.0	6,565.0	32.9	32.4	-114.00	1,265.6	512.7	228.8	167.1	61.66	3.710	
8,200.0	6,471.3	8,263.0	6,565.0	34.5	34.1	-114.15	1,365.6	512.7	229.0	164.3	64.67	3.541	
8,300.0	6,470.7	8,363.0	6,565.0	36.2	35.8	-114.29	1,465.6	512.7	229.3	161.5	67.72	3.386	
8,400.0	6,470.1	8,463.0	6,565.0	37.8	37.5	-114.43	1,565.6	512.7	229.5	158.7	70.81	3.241	
8,500.0	6,469.4	8,563.0	6,565.0	39.6	39.2	-114.58	1,665.6	512.7	229.8	155.9	73.93	3.108	
8,600.0	6,468.8	8,663.0	6,565.0	41.3	40.9	-114.72	1,765.6	512.7	230.1	153.0	77.08	2.985	
8,700.0	6,468.2	8,763.0	6,565.0	43.0	42.7	-114.86	1,865.6	512.7	230.3	150.1	80.25	2.870	
8,800.0	6,467.5	8,863.0	6,565.0	44.8	44.4	-115.00	1,965.6	512.7	230.6	147.1	83.44	2.763	
8,900.0	6,466.9	8,963.0	6,565.0	46.5	46.2	-115.14	2,065.6	512.7	230.8	144.2	86.65	2.664	
9,000.0	6,466.3	9,063.0	6,565.0	48.3	48.0	-115.29	2,165.6	512.7	231.1	141.2	89.87	2.572	
9,100.0	6,465.7	9,163.0	6,565.0	50.1	49.8	-115.43	2,265.6	512.7	231.4	138.3	93.10	2.485	
9,200.0	6,465.0	9,263.0	6,565.0	51.9	51.6	-115.57	2,365.6	512.7	231.7	135.3	96.34	2.405	
9,300.0	6,464.4	9,363.0	6,565.0	53.7	53.4	-115.71	2,465.6	512.7	231.9	132.3	99.58	2.329	
9,400.0	6,463.8	9,463.0	6,565.0	55.5	55.2	-115.85	2,565.6	512.7	232.2	129.4	102.84	2.258	
9,500.0	6,463.1	9,563.0	6,565.0	57.3	57.0	-115.99	2,665.6	512.7	232.5	126.4	106.10	2.191	
9,600.0	6,462.5	9,663.0	6,565.0	59.1	58.9	-116.12	2,765.6	512.7	232.7	123.4	109.36	2.128	
9,700.0	6,461.9	9,763.0	6,565.0	61.0	60.7	-116.26	2,865.6	512.7	233.0	120.4	112.62	2.069	
9,800.0	6,461.3	9,863.0	6,565.0	62.8	62.5	-116.40	2,965.6	512.7	233.3	117.4	115.89	2.013	
9,900.0	6,460.6	9,963.0	6,565.0	64.6	64.4	-116.54	3,065.5	512.7	233.6	114.4	119.16	1.960	

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-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Offset														
Semi Major Axis														
Distance														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	6,460.0	10,063.0	6,565.0	66.5	66.2	-116.68	3,165.5	512.7	233.9	111.4	122.43	1.910		
10,100.0	6,459.4	10,163.0	6,565.0	68.3	68.1	-116.81	3,265.5	512.7	234.1	108.5	125.70	1.863		
10,200.0	6,458.7	10,262.9	6,565.0	70.2	70.0	-116.95	3,365.5	512.7	234.4	105.5	128.96	1.818		
10,300.0	6,458.1	10,362.9	6,565.0	72.0	71.8	-117.09	3,465.5	512.7	234.7	102.5	132.23	1.775		
10,400.0	6,457.5	10,462.9	6,565.0	73.9	73.7	-117.23	3,565.5	512.7	235.0	99.5	135.49	1.734		
10,500.0	6,456.9	10,562.9	6,565.0	75.7	75.5	-117.36	3,665.5	512.7	235.3	96.5	138.76	1.696		
10,600.0	6,456.2	10,662.9	6,565.0	77.6	77.4	-117.50	3,765.5	512.7	235.6	93.6	142.02	1.659		
10,700.0	6,455.6	10,762.9	6,565.0	79.5	79.3	-117.63	3,865.5	512.7	235.9	90.6	145.27	1.624		
10,800.0	6,455.0	10,862.9	6,565.0	81.3	81.2	-117.77	3,965.5	512.7	236.2	87.6	148.53	1.590		
10,900.0	6,454.3	10,962.9	6,565.0	83.2	83.0	-117.90	4,065.5	512.7	236.5	84.7	151.78	1.558		
10,922.4	6,454.2	10,985.3	6,565.0	83.5	83.5	-117.93	4,087.9	512.7	236.5	84.1	152.42	1.552		
10,954.8	6,454.0	11,014.1	6,565.0	84.0	84.0	-117.97	4,116.7	512.7	236.6	83.3	153.30	1.544 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29Q Pad Sec.29-T5N-R63W - R&R Farms 29L-201 - Wellbore #1 - Plan #1 (9-19-1)										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
2,800.0	2,760.7	2,882.3	2,862.6	10.2	8.8	-28.68	-464.6	1,282.7	987.1	972.2	14.97	65.936	
2,900.0	2,858.6	2,978.2	2,957.8	10.6	9.1	-28.83	-469.8	1,271.6	958.8	943.3	15.56	61.632	
3,000.0	2,956.4	3,074.1	3,052.9	11.1	9.4	-28.98	-474.9	1,260.6	930.5	914.4	16.14	57.636	
3,100.0	3,054.2	3,169.9	3,148.0	11.6	9.7	-29.14	-480.1	1,249.5	902.2	885.5	16.73	53.918	
3,200.0	3,152.0	3,265.8	3,243.1	12.0	10.1	-29.32	-485.2	1,238.5	873.9	856.6	17.32	50.448	
3,300.0	3,249.8	3,361.7	3,338.2	12.5	10.4	-29.50	-490.4	1,227.4	845.7	827.7	17.91	47.204	
3,400.0	3,347.7	3,457.6	3,433.3	13.0	10.7	-29.70	-495.5	1,216.3	817.4	798.9	18.51	44.164	
3,500.0	3,445.5	3,553.5	3,528.4	13.4	11.0	-29.91	-500.7	1,205.3	789.1	770.0	19.10	41.310	
3,600.0	3,543.3	3,649.4	3,623.5	13.9	11.3	-30.14	-505.8	1,194.2	760.9	741.2	19.70	38.626	
3,700.0	3,641.1	3,745.2	3,718.6	14.3	11.7	-30.38	-511.0	1,183.2	732.6	712.3	20.30	36.096	
3,800.0	3,738.9	3,841.1	3,813.7	14.8	12.0	-30.65	-516.1	1,172.1	704.4	683.5	20.90	33.709	
3,900.0	3,836.8	3,937.0	3,908.8	15.3	12.3	-30.93	-521.3	1,161.0	676.2	654.7	21.50	31.452	
4,000.0	3,934.6	4,032.9	4,003.9	15.7	12.6	-31.24	-526.4	1,150.0	648.0	625.9	22.10	29.316	
4,100.0	4,032.4	4,128.8	4,099.0	16.2	12.9	-31.58	-531.6	1,138.9	619.8	597.1	22.71	27.290	
4,200.0	4,130.2	4,224.6	4,194.1	16.7	13.3	-31.96	-536.7	1,127.9	591.7	568.4	23.32	25.368	
4,300.0	4,228.1	4,320.5	4,289.2	17.1	13.6	-32.36	-541.8	1,116.8	563.6	539.6	23.94	23.541	
4,400.0	4,325.9	4,416.4	4,384.3	17.6	13.9	-32.82	-547.0	1,105.7	535.5	510.9	24.56	21.803	
4,500.0	4,423.7	4,512.3	4,479.4	18.1	14.2	-33.32	-552.1	1,094.7	507.4	482.2	25.18	20.148	
4,600.0	4,521.5	4,608.2	4,574.5	18.5	14.5	-33.88	-557.3	1,083.6	479.4	453.6	25.82	18.569	
4,700.0	4,619.3	4,704.1	4,669.6	19.0	14.9	-34.51	-562.4	1,072.6	451.4	425.0	26.45	17.064	
4,800.0	4,717.2	4,799.9	4,764.7	19.5	15.2	-35.22	-567.6	1,061.5	423.5	396.4	27.10	15.626	
4,900.0	4,815.0	4,895.8	4,859.8	19.9	15.5	-36.03	-572.7	1,050.4	395.6	367.9	27.76	14.252	
5,000.0	4,912.8	4,991.7	4,954.9	20.4	15.8	-36.94	-577.9	1,039.4	367.9	339.5	28.44	12.938	
5,100.0	5,011.0	5,086.6	5,049.1	20.7	16.1	-37.47	-583.0	1,028.5	341.8	312.8	29.05	11.766	
5,200.0	5,109.8	5,175.1	5,137.0	21.0	16.3	-37.91	-587.0	1,019.9	320.2	290.6	29.54	10.838	
5,300.0	5,209.1	5,265.0	5,226.6	21.2	16.5	-38.36	-589.8	1,013.7	304.0	274.0	29.98	10.139	
5,400.0	5,308.8	5,355.8	5,317.4	21.4	16.7	-38.81	-591.6	1,010.0	293.4	263.0	30.38	9.659	
5,500.0	5,408.6	5,448.1	5,409.6	21.5	16.8	-39.21	-592.1	1,008.9	288.4	257.7	30.73	9.385	
5,600.0	5,508.6	5,548.1	5,509.6	21.7	16.9	-39.59	-592.1	1,008.9	287.3	256.2	31.06	9.250	
5,700.0	5,608.6	5,648.1	5,609.6	21.8	17.1	-39.99	-592.1	1,008.9	287.3	255.9	31.35	9.164 CC	
5,738.2	5,646.8	5,686.3	5,647.8	21.8	17.1	-39.95	-591.8	1,008.9	287.3	255.8	31.46	9.131	
5,800.0	5,708.6	5,747.8	5,709.2	21.9	17.2	-39.15	-587.9	1,008.9	287.3	255.6	31.69	9.067	
5,900.0	5,808.4	5,845.9	5,805.8	21.9	17.3	-38.95	-571.4	1,008.9	287.7	255.7	32.03	8.982	
6,000.0	5,906.5	5,942.6	5,898.3	21.9	17.3	-38.81	-543.1	1,008.9	288.5	256.3	32.21	8.957	
6,100.0	6,001.4	6,038.2	5,985.4	21.8	17.3	-38.78	-503.9	1,008.9	289.6	257.4	32.24	8.983	
6,200.0	6,091.4	6,132.6	6,066.0	21.6	17.3	-38.89	-454.9	1,008.9	291.0	258.8	32.16	9.048	
6,300.0	6,174.9	6,226.0	6,139.1	21.4	17.2	-39.17	-396.9	1,008.9	292.5	260.5	32.01	9.139	
6,400.0	6,250.6	6,318.5	6,204.1	21.1	17.2	-39.64	-331.2	1,008.9	294.1	262.3	31.85	9.235	
6,500.0	6,317.1	6,410.2	6,260.2	20.8	17.2	-39.32	-258.7	1,008.9	295.7	263.9	31.76	9.310	
6,600.0	6,373.3	6,500.0	6,306.4	20.5	17.3	-39.24	-181.7	1,008.9	297.1	265.3	31.79	9.347	
6,700.0	6,418.2	6,592.0	6,343.9	20.2	17.5	-39.46	-97.8	1,008.9	298.3	266.3	32.08	9.299	
6,800.0	6,451.1	6,682.2	6,370.7	20.0	17.9	-39.73	-11.7	1,008.9	299.3	266.6	32.68	9.158	
6,900.0	6,471.4	6,772.2	6,387.2	19.7	18.6	-39.35	76.7	1,008.9	299.8	266.2	33.63	8.917	
7,000.0	6,478.8	6,862.0	6,393.1	19.5	19.4	-39.21	166.2	1,008.9	300.1	265.1	34.94	8.587	
7,100.0	6,478.2	6,961.3	6,393.0	19.6	20.5	-39.30	265.5	1,008.9	299.9	263.1	36.84	8.141	
7,200.0	6,477.6	7,061.3	6,392.9	20.2	21.8	-39.40	365.5	1,008.9	299.8	260.8	39.00	7.686	
7,300.0	6,477.0	7,161.3	6,392.8	21.3	23.1	-39.49	465.5	1,008.9	299.6	258.2	41.39	7.240	
7,400.0	6,476.3	7,261.3	6,392.7	22.5	24.5	-39.59	565.5	1,008.9	299.5	255.5	43.95	6.813	
7,500.0	6,475.7	7,361.3	6,392.6	23.8	26.0	-39.68	665.5	1,008.9	299.3	252.6	46.68	6.413	
7,600.0	6,475.1	7,461.3	6,392.5	25.2	27.5	-39.78	765.5	1,008.9	299.2	249.6	49.53	6.040	
7,700.0	6,474.5	7,561.3	6,392.4	26.6	29.1	-39.88	865.5	1,008.9	299.0	246.5	52.50	5.696	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

Offset Design R&R Farms 5N63W29Q Pad Sec.29-T5N-R63W - R&R Farms 29L-201 - Wellbore #1 - Plan #1 (9-19-1)										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
7,800.0	6,473.8	7,661.3	6,392.3	28.1	30.7	73.97	965.5	1,008.9	298.9	243.3	55.56	5.380	
7,900.0	6,473.2	7,761.3	6,392.2	29.7	32.4	74.07	1,065.5	1,008.9	298.7	240.0	58.70	5.090	
8,000.0	6,472.6	7,861.3	6,392.1	31.3	34.1	74.17	1,165.5	1,008.9	298.6	236.7	61.91	4.823	
8,100.0	6,471.9	7,961.2	6,392.0	32.9	35.8	74.26	1,265.5	1,008.9	298.5	233.3	65.17	4.580	
8,200.0	6,471.3	8,061.2	6,391.9	34.5	37.5	74.36	1,365.5	1,008.9	298.3	229.8	68.49	4.356	
8,300.0	6,470.7	8,161.2	6,391.8	36.2	39.2	74.46	1,465.5	1,008.9	298.2	226.3	71.85	4.150	
8,400.0	6,470.1	8,261.2	6,391.7	37.8	41.0	74.55	1,565.5	1,008.9	298.0	222.8	75.25	3.960	
8,500.0	6,469.4	8,361.2	6,391.6	39.6	42.8	74.65	1,665.5	1,008.9	297.9	219.2	78.69	3.786	
8,600.0	6,468.8	8,461.2	6,391.5	41.3	44.6	74.75	1,765.5	1,008.9	297.8	215.6	82.15	3.625	
8,700.0	6,468.2	8,561.2	6,391.4	43.0	46.4	74.85	1,865.5	1,008.9	297.6	212.0	85.64	3.475	
8,800.0	6,467.5	8,661.2	6,391.3	44.8	48.2	74.94	1,965.5	1,008.9	297.5	208.3	89.16	3.337	
8,900.0	6,466.9	8,761.2	6,391.2	46.5	50.0	75.04	2,065.5	1,008.9	297.3	204.7	92.69	3.208	
9,000.0	6,466.3	8,861.2	6,391.0	48.3	51.8	75.14	2,165.5	1,008.9	297.2	201.0	96.25	3.088	
9,100.0	6,465.7	8,961.2	6,390.9	50.1	53.6	75.24	2,265.5	1,008.9	297.1	197.3	99.83	2.976	
9,200.0	6,465.0	9,061.2	6,390.8	51.9	55.4	75.33	2,365.5	1,008.9	296.9	193.5	103.42	2.871	
9,300.0	6,464.4	9,161.2	6,390.7	53.7	57.3	75.43	2,465.5	1,008.9	296.8	189.8	107.02	2.773	
9,400.0	6,463.8	9,261.2	6,390.6	55.5	59.1	75.53	2,565.5	1,008.9	296.7	186.0	110.64	2.681	
9,500.0	6,463.1	9,361.2	6,390.5	57.3	61.0	75.63	2,665.5	1,008.9	296.5	182.3	114.27	2.595	
9,600.0	6,462.5	9,461.2	6,390.4	59.1	62.8	75.72	2,765.5	1,008.9	296.4	178.5	117.91	2.514	
9,700.0	6,461.9	9,561.2	6,390.3	61.0	64.7	75.82	2,865.5	1,008.9	296.3	174.7	121.57	2.437	
9,800.0	6,461.3	9,661.2	6,390.2	62.8	66.5	75.92	2,965.5	1,008.9	296.2	170.9	125.23	2.365	
9,900.0	6,460.6	9,761.2	6,390.1	64.6	68.4	76.02	3,065.5	1,008.9	296.0	167.1	128.90	2.297	
10,000.0	6,460.0	9,861.2	6,390.0	66.5	70.3	76.12	3,165.5	1,008.9	295.9	163.3	132.59	2.232	
10,100.0	6,459.4	9,961.2	6,389.9	68.3	72.1	76.22	3,265.5	1,008.9	295.8	159.5	136.27	2.170	
10,200.0	6,458.7	10,061.2	6,389.8	70.2	74.0	76.31	3,365.5	1,008.9	295.7	155.7	139.97	2.112	
10,300.0	6,458.1	10,161.2	6,389.7	72.0	75.9	76.41	3,465.5	1,008.9	295.5	151.9	143.68	2.057	
10,400.0	6,457.5	10,261.2	6,389.6	73.9	77.8	76.51	3,565.5	1,008.9	295.4	148.0	147.39	2.004	
10,500.0	6,456.9	10,361.2	6,389.5	75.7	79.6	76.61	3,665.5	1,008.9	295.3	144.2	151.11	1.954	
10,600.0	6,456.2	10,461.2	6,389.4	77.6	81.5	76.71	3,765.5	1,008.9	295.2	140.3	154.83	1.906	
10,700.0	6,455.6	10,561.2	6,389.3	79.5	83.4	76.81	3,865.5	1,008.9	295.0	136.5	158.56	1.861	
10,800.0	6,455.0	10,661.2	6,389.2	81.3	85.3	76.91	3,965.5	1,008.9	294.9	132.6	162.30	1.817	
10,900.0	6,454.3	10,761.2	6,389.1	83.2	87.2	77.01	4,065.5	1,008.9	294.8	128.8	166.04	1.776	
10,954.8	6,454.0	10,816.1	6,389.0	84.0	88.2	77.06	4,120.3	1,008.9	294.7	126.9	167.89	1.756 ES, SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

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

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: R&R Farms 29L-301

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.67°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well R&R Farms 29L-301
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-301	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #3 (4-10-15)	Offset TVD Reference:	Offset Datum

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

Coordinates are relative to: R&R Farms 29L-301
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.67°

