

PETROLEUM DEVELOPMENT CORP Weld County CO

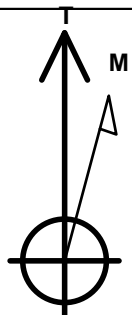
Well Name: **Klein 19N-412**

Surface Location: Klein 19MN-HZ Pad Sec.19-T5N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4628.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1386209.06	3252956.53	40.389990	-104.591870	
RKB - 15' WELL @ 4643.0ft (RKB - 15')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 689'FNL & 2372'FEL, Sec.19	1.0	0.0	0.0	Point
BHL 1065'FNL & 500'FEL, SEC. 20	6826.0	-315.9	7159.2	Point



Azimuths to True North
Magnetic North: 8.40°

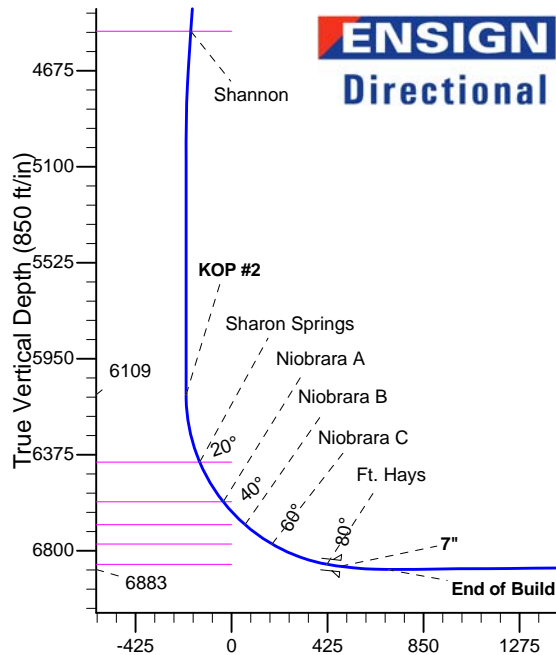
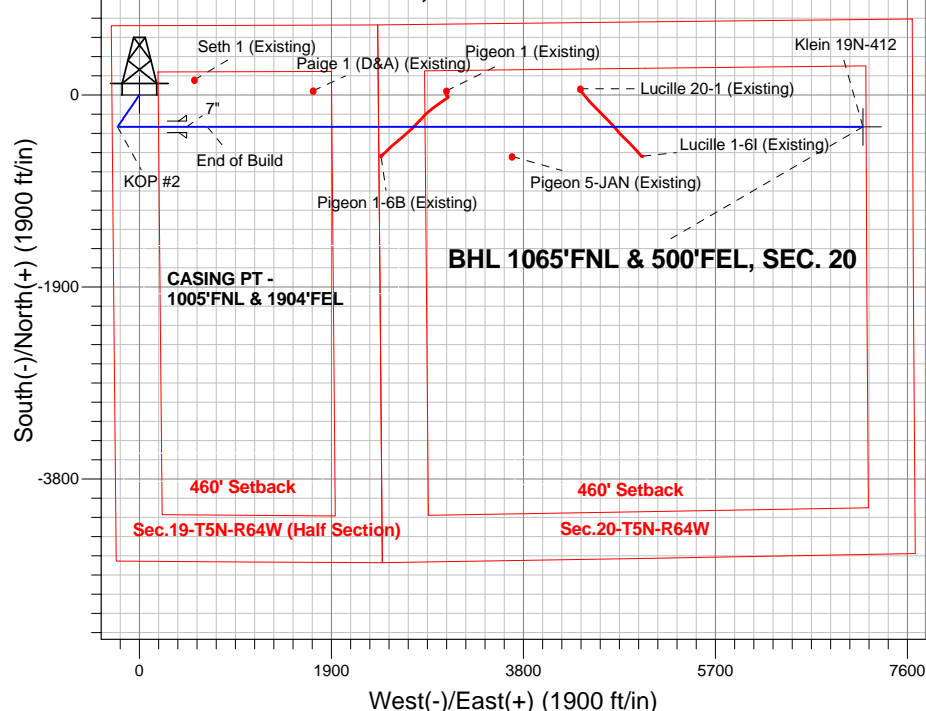
Magnetic Field
Strength: 52859.4nT
Dip Angle: 66.98°
Date: 3/4/2014
Model: IGRF2010

Klein 19MN-HZ Pad Sec.19-T5N-R64W
Klein 19N-412
Plan #1 (2-26-14)
10:35, March 06 2014

ANNOTATIONS

TVD	MD	Annotation
1500.0	1500.0	KOP #1
6108.9	6131.2	KOP #2
6882.6	7455.2	End of Build

SHL 689'FNL & 2372'FEL, Sec.19



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1500.0	0.00	0.00	1500.0	0.0	0.0	0.00	0.00	0.0	
3	1846.0	6.92	214.36	1845.1	-17.2	-11.8	2.00	214.36	-11.0	
4	4676.3	6.92	214.36	4654.9	-298.7	-204.2	0.00	0.00	-190.9	
5	5022.3	0.00	0.00	5000.0	-315.9	-216.0	2.00	180.00	-201.9	
6	6131.2	0.00	0.00	6108.9	-315.9	-216.0	0.00	0.00	-201.9	
7	7251.2	84.00	90.00	6868.6	-315.9	468.1	7.50	90.00	481.6	
8	7325.2	84.00	90.00	6876.4	-315.9	541.7	0.00	0.00	555.1	
9	7455.2	90.50	90.00	6882.6	-315.9	671.5	5.00	0.00	684.7	
10	13943.1	90.50	90.00	6826.0	-315.9	7159.2	0.00	0.00	7166.1	BHL 1065'FNL & 500'FEL, SEC. 20

BHL 1065'FNL & 500'FEL, SEC. 20



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.19-T5N-R64W

Klein 19MN-HZ Pad Sec.19-T5N-R64W

Klein 19N-412

Wellbore #1

Plan: Plan #1 (2-26-14)

Standard Planning Report

06 March, 2014

Database:	landmark	Local Co-ordinate Reference:	Well Klein 19N-412
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Project:	SEC.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	North Reference:	True
Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-26-14)		

Project	SEC.19-T5N-R64W		
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 Klein 19MN-HZ Pad Sec.19-T5N-R64W					
Site Position:		Northing:	1,386,208.48 ft	Latitude:	40.389990
From:	Lat/Long	Easting:	3,252,898.04 ft	Longitude:	-104.592080
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.59 °

Well	Klein 19N-412					
Well Position	+N-S	0.0 ft	Northing:	1,386,209.06 ft	Latitude:	40.389990
	+E-W	58.5 ft	Easting:	3,252,956.53 ft	Longitude:	-104.591870
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,628.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/4/2014	8.40	66.98	52,859

Design	Plan #1 (2-26-14)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	92.53

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,846.0	6.92	214.36	1,845.1	-17.2	-11.8	2.00	2.00	0.00	214.36	
4,676.3	6.92	214.36	4,654.9	-298.7	-204.2	0.00	0.00	0.00	0.00	
5,022.3	0.00	0.00	5,000.0	-315.9	-216.0	2.00	-2.00	0.00	180.00	
6,131.2	0.00	0.00	6,108.9	-315.9	-216.0	0.00	0.00	0.00	0.00	
7,251.2	84.00	90.00	6,868.6	-315.9	468.1	7.50	7.50	0.00	90.00	
7,325.2	84.00	90.00	6,876.4	-315.9	541.7	0.00	0.00	0.00	0.00	
7,455.2	90.50	90.00	6,882.6	-315.9	671.5	5.00	5.00	0.00	0.00	
13,943.1	90.50	90.00	6,826.0	-315.9	7,159.2	0.00	0.00	0.00	0.00	BHL 1065'FNL & 5C

Database:	landmark	Local Co-ordinate Reference:	Well Klein 19N-412
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Project:	SEC.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	North Reference:	True
Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-26-14)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
SHL 689'FNL & 2342'FEL, SEC.19 - SHL 689'FNL & 2372'FEL, Sec.19									
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
1,600.0	2.00	214.36	1,600.0	-1.4	-1.0	-0.9	2.00	2.00	0.00
1,700.0	4.00	214.36	1,699.8	-5.8	-3.9	-3.7	2.00	2.00	0.00
1,800.0	6.00	214.36	1,799.5	-13.0	-8.9	-8.3	2.00	2.00	0.00
1,846.0	6.92	214.36	1,845.1	-17.2	-11.8	-11.0	2.00	2.00	0.00
1,900.0	6.92	214.36	1,898.8	-22.6	-15.5	-14.4	0.00	0.00	0.00
2,000.0	6.92	214.36	1,998.0	-32.5	-22.2	-20.8	0.00	0.00	0.00
2,100.0	6.92	214.36	2,097.3	-42.5	-29.0	-27.1	0.00	0.00	0.00
2,200.0	6.92	214.36	2,196.6	-52.4	-35.8	-33.5	0.00	0.00	0.00
2,300.0	6.92	214.36	2,295.9	-62.4	-42.6	-39.9	0.00	0.00	0.00
2,400.0	6.92	214.36	2,395.1	-72.3	-49.4	-46.2	0.00	0.00	0.00
2,500.0	6.92	214.36	2,494.4	-82.3	-56.2	-52.6	0.00	0.00	0.00
2,600.0	6.92	214.36	2,593.7	-92.2	-63.0	-58.9	0.00	0.00	0.00
2,700.0	6.92	214.36	2,692.9	-102.2	-69.8	-65.3	0.00	0.00	0.00
2,800.0	6.92	214.36	2,792.2	-112.1	-76.6	-71.6	0.00	0.00	0.00
2,900.0	6.92	214.36	2,891.5	-122.0	-83.4	-78.0	0.00	0.00	0.00
3,000.0	6.92	214.36	2,990.8	-132.0	-90.2	-84.3	0.00	0.00	0.00
3,100.0	6.92	214.36	3,090.0	-141.9	-97.0	-90.7	0.00	0.00	0.00
3,200.0	6.92	214.36	3,189.3	-151.9	-103.8	-97.0	0.00	0.00	0.00
3,300.0	6.92	214.36	3,288.6	-161.8	-110.6	-103.4	0.00	0.00	0.00
3,400.0	6.92	214.36	3,387.8	-171.8	-117.4	-109.8	0.00	0.00	0.00
3,500.0	6.92	214.36	3,487.1	-181.7	-124.2	-116.1	0.00	0.00	0.00
3,563.3	6.92	214.36	3,550.0	-188.0	-128.5	-120.1	0.00	0.00	0.00
Parkman									
3,600.0	6.92	214.36	3,586.4	-191.7	-131.0	-122.5	0.00	0.00	0.00
3,700.0	6.92	214.36	3,685.7	-201.6	-137.8	-128.8	0.00	0.00	0.00
3,800.0	6.92	214.36	3,784.9	-211.5	-144.6	-135.2	0.00	0.00	0.00
3,900.0	6.92	214.36	3,884.2	-221.5	-151.4	-141.5	0.00	0.00	0.00
4,000.0	6.92	214.36	3,983.5	-231.4	-158.2	-147.9	0.00	0.00	0.00
4,100.0	6.92	214.36	4,082.7	-241.4	-165.0	-154.2	0.00	0.00	0.00
4,200.0	6.92	214.36	4,182.0	-251.3	-171.8	-160.6	0.00	0.00	0.00
4,300.0	6.92	214.36	4,281.3	-261.3	-178.6	-166.9	0.00	0.00	0.00
4,318.8	6.92	214.36	4,300.0	-263.1	-179.9	-168.1	0.00	0.00	0.00
Sussex									
4,400.0	6.92	214.36	4,380.6	-271.2	-185.4	-173.3	0.00	0.00	0.00

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Project:	SEC.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	North Reference:	True
Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-26-14)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,500.0	6.92	214.36	4,479.8	-281.2	-192.2	-179.7	0.00	0.00	0.00
4,520.3	6.92	214.36	4,500.0	-283.2	-193.6	-180.9	0.00	0.00	0.00
Shannon									
4,600.0	6.92	214.36	4,579.1	-291.1	-199.0	-186.0	0.00	0.00	0.00
4,676.3	6.92	214.36	4,654.9	-298.7	-204.2	-190.9	0.00	0.00	0.00
4,700.0	6.45	214.36	4,678.4	-301.0	-205.8	-192.3	2.00	-2.00	0.00
4,800.0	4.45	214.36	4,777.9	-308.8	-211.1	-197.3	2.00	-2.00	0.00
4,900.0	2.45	214.36	4,877.7	-313.8	-214.5	-200.5	2.00	-2.00	0.00
5,000.0	0.45	214.36	4,977.7	-315.8	-216.0	-201.8	2.00	-2.00	0.00
5,022.3	0.00	0.00	5,000.0	-315.9	-216.0	-201.9	2.00	-2.00	0.00
5,100.0	0.00	0.00	5,077.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
5,200.0	0.00	0.00	5,177.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
5,300.0	0.00	0.00	5,277.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
5,400.0	0.00	0.00	5,377.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
5,500.0	0.00	0.00	5,477.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
5,600.0	0.00	0.00	5,577.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
5,700.0	0.00	0.00	5,677.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
5,800.0	0.00	0.00	5,777.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
5,900.0	0.00	0.00	5,877.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
6,000.0	0.00	0.00	5,977.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
6,100.0	0.00	0.00	6,077.7	-315.9	-216.0	-201.9	0.00	0.00	0.00
6,131.2	0.00	0.00	6,108.9	-315.9	-216.0	-201.9	0.00	0.00	0.00
KOP #2									
6,200.0	5.16	90.00	6,177.6	-315.9	-212.9	-198.8	7.50	7.50	0.00
6,300.0	12.66	90.00	6,276.3	-315.9	-197.4	-183.3	7.50	7.50	0.00
6,400.0	20.16	90.00	6,372.2	-315.9	-169.2	-155.1	7.50	7.50	0.00
6,437.4	22.97	90.00	6,407.0	-315.9	-155.4	-141.4	7.50	7.50	0.00
Sharon Springs									
6,500.0	27.66	90.00	6,463.5	-315.9	-128.7	-114.6	7.50	7.50	0.00
6,600.0	35.16	90.00	6,548.8	-315.9	-76.6	-62.6	7.50	7.50	0.00
6,642.7	38.36	90.00	6,583.0	-315.9	-51.1	-37.1	7.50	7.50	0.00
Niobrara A									
6,700.0	42.66	90.00	6,626.6	-315.9	-13.8	0.1	7.50	7.50	0.00
6,782.3	48.84	90.00	6,684.0	-315.9	45.1	59.0	7.50	7.50	0.00
Niobrara B									
6,800.0	50.16	90.00	6,695.5	-315.9	58.5	72.4	7.50	7.50	0.00
6,900.0	57.66	90.00	6,754.3	-315.9	139.3	153.1	7.50	7.50	0.00
6,930.2	59.93	90.00	6,770.0	-315.9	165.1	178.9	7.50	7.50	0.00
Niobrara C									
7,000.0	65.16	90.00	6,802.2	-315.9	227.0	240.7	7.50	7.50	0.00
7,100.0	72.66	90.00	6,838.1	-315.9	320.3	333.9	7.50	7.50	0.00
7,191.0	79.48	90.00	6,860.0	-315.9	408.5	422.0	7.50	7.50	0.00
Ft. Hays									
7,200.0	80.16	90.00	6,861.6	-315.9	417.4	430.9	7.50	7.50	0.00
7,251.2	84.00	90.00	6,868.7	-315.9	468.1	481.6	7.50	7.50	0.00
7"									
7,300.0	84.00	90.00	6,873.8	-315.9	516.6	530.1	0.00	0.00	0.00
7,325.2	84.00	90.00	6,876.4	-315.9	541.7	555.1	0.00	0.00	0.00
7,400.0	87.74	90.00	6,881.8	-315.9	616.3	629.6	5.00	5.00	0.00
7,455.2	90.50	90.00	6,882.6	-315.9	671.5	684.8	5.00	5.00	0.00
End of Build									
7,500.0	90.50	90.00	6,882.2	-315.9	716.3	729.5	0.00	0.00	0.00

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Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Project:	SEC.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	North Reference:	True
Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-26-14)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,600.0	90.50	90.00	6,881.4	-315.9	816.3	829.4	0.00	0.00	0.00
7,700.0	90.50	90.00	6,880.5	-315.9	916.3	929.3	0.00	0.00	0.00
7,800.0	90.50	90.00	6,879.6	-315.9	1,016.3	1,029.2	0.00	0.00	0.00
7,900.0	90.50	90.00	6,878.7	-315.9	1,116.3	1,129.1	0.00	0.00	0.00
8,000.0	90.50	90.00	6,877.9	-315.9	1,216.3	1,229.0	0.00	0.00	0.00
8,100.0	90.50	90.00	6,877.0	-315.9	1,316.3	1,328.9	0.00	0.00	0.00
8,200.0	90.50	90.00	6,876.1	-315.9	1,416.3	1,428.8	0.00	0.00	0.00
8,300.0	90.50	90.00	6,875.2	-315.9	1,516.3	1,528.7	0.00	0.00	0.00
8,400.0	90.50	90.00	6,874.4	-315.9	1,616.2	1,628.6	0.00	0.00	0.00
8,500.0	90.50	90.00	6,873.5	-315.9	1,716.2	1,728.5	0.00	0.00	0.00
8,600.0	90.50	90.00	6,872.6	-315.9	1,816.2	1,828.4	0.00	0.00	0.00
8,700.0	90.50	90.00	6,871.8	-315.9	1,916.2	1,928.3	0.00	0.00	0.00
8,800.0	90.50	90.00	6,870.9	-315.9	2,016.2	2,028.2	0.00	0.00	0.00
8,900.0	90.50	90.00	6,870.0	-315.9	2,116.2	2,128.1	0.00	0.00	0.00
9,000.0	90.50	90.00	6,869.1	-315.9	2,216.2	2,228.0	0.00	0.00	0.00
9,100.0	90.50	90.00	6,868.3	-315.9	2,316.2	2,327.9	0.00	0.00	0.00
9,200.0	90.50	90.00	6,867.4	-315.9	2,416.2	2,427.8	0.00	0.00	0.00
9,300.0	90.50	90.00	6,866.5	-315.9	2,516.2	2,527.7	0.00	0.00	0.00
9,400.0	90.50	90.00	6,865.6	-315.9	2,616.2	2,627.6	0.00	0.00	0.00
9,500.0	90.50	90.00	6,864.8	-315.9	2,716.2	2,727.5	0.00	0.00	0.00
9,600.0	90.50	90.00	6,863.9	-315.9	2,816.2	2,827.4	0.00	0.00	0.00
9,700.0	90.50	90.00	6,863.0	-315.9	2,916.2	2,927.3	0.00	0.00	0.00
9,800.0	90.50	90.00	6,862.2	-315.9	3,016.2	3,027.2	0.00	0.00	0.00
9,900.0	90.50	90.00	6,861.3	-315.9	3,116.2	3,127.1	0.00	0.00	0.00
10,000.0	90.50	90.00	6,860.4	-315.9	3,216.2	3,227.0	0.00	0.00	0.00
10,100.0	90.50	90.00	6,859.5	-315.9	3,316.2	3,326.9	0.00	0.00	0.00
10,200.0	90.50	90.00	6,858.7	-315.9	3,416.2	3,426.8	0.00	0.00	0.00
10,300.0	90.50	90.00	6,857.8	-315.9	3,516.2	3,526.7	0.00	0.00	0.00
10,400.0	90.50	90.00	6,856.9	-315.9	3,616.2	3,626.6	0.00	0.00	0.00
10,500.0	90.50	90.00	6,856.0	-315.9	3,716.2	3,726.5	0.00	0.00	0.00
10,600.0	90.50	90.00	6,855.2	-315.9	3,816.2	3,826.4	0.00	0.00	0.00
10,700.0	90.50	90.00	6,854.3	-315.9	3,916.2	3,926.3	0.00	0.00	0.00
10,800.0	90.50	90.00	6,853.4	-315.9	4,016.2	4,026.2	0.00	0.00	0.00
10,900.0	90.50	90.00	6,852.6	-315.9	4,116.2	4,126.1	0.00	0.00	0.00
11,000.0	90.50	90.00	6,851.7	-315.9	4,216.1	4,226.0	0.00	0.00	0.00
11,100.0	90.50	90.00	6,850.8	-315.9	4,316.1	4,325.9	0.00	0.00	0.00
11,200.0	90.50	90.00	6,849.9	-315.9	4,416.1	4,425.8	0.00	0.00	0.00
11,300.0	90.50	90.00	6,849.1	-315.9	4,516.1	4,525.7	0.00	0.00	0.00
11,400.0	90.50	90.00	6,848.2	-315.9	4,616.1	4,625.6	0.00	0.00	0.00
11,500.0	90.50	90.00	6,847.3	-315.9	4,716.1	4,725.5	0.00	0.00	0.00
11,600.0	90.50	90.00	6,846.4	-315.9	4,816.1	4,825.4	0.00	0.00	0.00
11,700.0	90.50	90.00	6,845.6	-315.9	4,916.1	4,925.3	0.00	0.00	0.00
11,800.0	90.50	90.00	6,844.7	-315.9	5,016.1	5,025.2	0.00	0.00	0.00
11,900.0	90.50	90.00	6,843.8	-315.9	5,116.1	5,125.1	0.00	0.00	0.00
12,000.0	90.50	90.00	6,843.0	-315.9	5,216.1	5,225.0	0.00	0.00	0.00
12,100.0	90.50	90.00	6,842.1	-315.9	5,316.1	5,324.9	0.00	0.00	0.00
12,200.0	90.50	90.00	6,841.2	-315.9	5,416.1	5,424.8	0.00	0.00	0.00
12,300.0	90.50	90.00	6,840.3	-315.9	5,516.1	5,524.7	0.00	0.00	0.00
12,400.0	90.50	90.00	6,839.5	-315.9	5,616.1	5,624.6	0.00	0.00	0.00
12,500.0	90.50	90.00	6,838.6	-315.9	5,716.1	5,724.5	0.00	0.00	0.00
12,600.0	90.50	90.00	6,837.7	-315.9	5,816.1	5,824.4	0.00	0.00	0.00
12,700.0	90.50	90.00	6,836.8	-315.9	5,916.1	5,924.3	0.00	0.00	0.00
12,800.0	90.50	90.00	6,836.0	-315.9	6,016.1	6,024.2	0.00	0.00	0.00

Database:	landmark	Local Co-ordinate Reference:	Well Klein 19N-412
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Project:	SEC.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	North Reference:	True
Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-26-14)		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
12,900.0	90.50	90.00	6,835.1	-315.9	6,116.1	6,124.1	0.00	0.00	0.00
13,000.0	90.50	90.00	6,834.2	-315.9	6,216.1	6,224.0	0.00	0.00	0.00
13,100.0	90.50	90.00	6,833.4	-315.9	6,316.1	6,323.9	0.00	0.00	0.00
13,200.0	90.50	90.00	6,832.5	-315.9	6,416.1	6,423.8	0.00	0.00	0.00
13,300.0	90.50	90.00	6,831.6	-315.9	6,516.1	6,523.7	0.00	0.00	0.00
13,400.0	90.50	90.00	6,830.7	-315.9	6,616.1	6,623.6	0.00	0.00	0.00
13,500.0	90.50	90.00	6,829.9	-315.9	6,716.1	6,723.4	0.00	0.00	0.00
13,600.0	90.50	90.00	6,829.0	-315.9	6,816.0	6,823.3	0.00	0.00	0.00
13,700.0	90.50	90.00	6,828.1	-315.9	6,916.0	6,923.2	0.00	0.00	0.00
13,800.0	90.50	90.00	6,827.2	-315.9	7,016.0	7,023.1	0.00	0.00	0.00
13,900.0	90.50	90.00	6,826.4	-315.9	7,116.0	7,123.0	0.00	0.00	0.00
13,943.1	90.50	90.00	6,826.0	-315.9	7,159.2	7,166.1	0.00	0.00	0.00
BHL 1065'FNL & 500'FEL, SEC. 20									

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,251.2	6,868.7	7"	7	7-1/2

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,563.3	3,550.0	Parkman		0.00	
4,318.8	4,300.0	Sussex		0.00	
4,520.3	4,500.0	Shannon		0.00	
6,437.4	6,407.0	Sharon Springs		0.00	
6,642.7	6,583.0	Niobrara A		0.00	
6,782.3	6,684.0	Niobrara B		0.00	
6,930.2	6,770.0	Niobrara C		0.00	
7,191.0	6,860.0	Ft. Hays		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,500.0	1,500.0	0.0	0.0	KOP #1
6,131.2	6,108.9	-315.9	-216.0	KOP #2
7,455.2	6,882.6	-315.9	671.5	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.19-T5N-R64W

Klein 19MN-HZ Pad Sec.19-T5N-R64W

Klein 19N-412

Wellbore #1

Plan #1 (2-26-14)

Anticollision Report

06 March, 2014



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (2-26-14)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date	3/4/2014		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	13,943.1	Plan #1 (2-26-14) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Klein (Existing) Sec.19-T5N-R64W						
Lucille 1-6I (Existing) - Wellbore #1 - Wellbore #1	11,764.8	6,950.7	290.8	134.0	1.854	CC, ES, SF
Lucille 20-1 (Existing) - Wellbore #1 - Wellbore #1	11,148.9	6,827.4	378.2	117.0	1.448	Level 3, CC, ES, SF
Paige 1 (D&A) (Existing) - Wellbore #1 - Wellbore #1	8,503.6	6,845.5	359.7	171.0	1.907	CC, ES, SF
Pigeon 1 (Existing) - Wellbore #1 - Wellbore #1	9,822.9	6,841.0	356.2	131.5	1.585	CC, ES, SF
Pigeon 1-6B (Existing) - Wellbore #1 - Wellbore #1	9,175.7	6,959.5	292.7	206.9	3.410	CC, ES
Pigeon 1-6B (Existing) - Wellbore #1 - Wellbore #1	9,200.0	6,959.5	293.7	207.2	3.395	SF
Pigeon 5-JAN (Existing) - Wellbore #1 - Wellbore #1	10,472.1	6,834.3	292.2	49.7	1.205	Level 2, CC, ES, SF
Seth 1 (Existing) - Wellbore #1 - Wellbore #1	7,329.5	6,860.5	465.3	305.6	2.914	CC, ES, SF
Klein 19MN-HZ Pad Sec.19-T5N-R64W						
Klein 19M-202 - Wellbore #1 - Plan #1 (2-26-14)	1,000.0	1,000.0	58.5	54.2	13.698	CC
Klein 19M-202 - Wellbore #1 - Plan #1 (2-26-14)	1,100.0	1,099.5	58.9	54.2	12.487	ES
Klein 19M-202 - Wellbore #1 - Plan #1 (2-26-14)	1,300.0	1,297.6	63.8	58.2	11.364	SF
Klein 19M-432 - Wellbore #1 - Plan #1 (2-26-14)	1,200.0	1,200.0	30.6	25.5	5.927	CC, ES
Klein 19M-432 - Wellbore #1 - Plan #1 (2-26-14)	13,943.1	13,942.5	659.4	253.5	1.624	SF
Klein 19N-312 - Wellbore #1 - Plan #1 (2-26-14)	1,500.0	1,500.0	30.6	24.1	4.701	CC
Klein 19N-312 - Wellbore #1 - Plan #1 (2-26-14)	13,943.1	13,860.1	279.2	-95.3	0.746	Level 1, ES, SF

Offset Design	Klein (Existing) Sec.19-T5N-R64W - Lucille 1-6I (Existing) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program:	641-NS-GYRO-MS												Offset Well Error:	0.0 ft
Reference	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,900.0	6,852.6	6,944.4	6,818.0	117.8	15.9	89.42	-606.7	4,980.9	912.4	779.7	132.72	6.874		
11,000.0	6,851.7	6,945.1	6,818.8	120.6	15.9	89.56	-606.7	4,980.9	818.2	682.7	135.51	6.038		
11,100.0	6,850.8	6,945.9	6,819.5	123.3	15.9	89.71	-606.7	4,980.9	725.6	587.3	138.29	5.247		
11,200.0	6,849.9	6,946.6	6,820.3	126.1	15.9	89.85	-606.7	4,980.9	635.3	494.2	141.08	4.503		
11,300.0	6,849.1	6,947.3	6,821.0	128.9	15.9	90.00	-606.7	4,980.9	548.3	404.4	143.86	3.811		
11,400.0	6,848.2	6,948.1	6,821.7	131.7	15.9	90.14	-606.7	4,980.9	466.5	319.9	146.65	3.181		
11,500.0	6,847.3	6,948.8	6,822.4	134.5	15.9	90.28	-606.7	4,980.9	393.3	243.9	149.43	2.632		
11,600.0	6,846.4	6,949.5	6,823.1	137.3	15.9	90.42	-606.7	4,980.9	334.2	182.0	152.22	2.196		
11,700.0	6,845.6	6,950.2	6,823.8	140.1	15.9	90.56	-606.7	4,981.0	297.9	142.9	155.00	1.922		
11,764.8	6,845.0	6,950.7	6,824.3	141.9	15.9	90.65	-606.7	4,981.0	290.8	134.0	156.81	1.854	CC, ES, SF	

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 Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein (Existing) Sec.19-T5N-R64W - Lucille 1-6I (Existing) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 641-NS-GYRO-MS													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance								Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
11,800.0	6,844.7	6,950.9	6,824.5	142.9	15.9	90.70	-606.7	4,981.0	292.9	135.1	157.79	1.856		
11,900.0	6,843.8	6,951.6	6,825.2	145.7	15.9	90.83	-606.7	4,981.0	320.7	160.1	160.57	1.997		
12,000.0	6,843.0	6,952.3	6,825.9	148.5	15.9	90.97	-606.7	4,981.0	374.0	210.6	163.35	2.289		
12,100.0	6,842.1	6,953.0	6,826.6	151.2	15.9	91.11	-606.6	4,981.0	443.7	277.6	166.14	2.671		
12,200.0	6,841.2	6,953.7	6,827.3	154.0	15.9	91.24	-606.6	4,981.0	523.4	354.5	168.92	3.098		
12,300.0	6,840.3	6,954.4	6,828.0	156.8	15.9	91.38	-606.6	4,981.0	609.1	437.4	171.70	3.547		
12,400.0	6,839.5	6,955.0	6,828.7	159.6	15.9	91.51	-606.6	4,981.0	698.6	524.1	174.49	4.004		
12,500.0	6,838.6	6,955.7	6,829.3	162.4	15.9	91.64	-606.6	4,981.0	790.6	613.3	177.27	4.460		
12,600.0	6,837.7	6,956.4	6,830.0	165.2	15.9	91.77	-606.6	4,981.1	884.3	704.3	180.05	4.912		
12,700.0	6,836.8	6,957.0	6,830.7	168.0	15.9	91.90	-606.6	4,981.1	979.3	796.5	182.83	5.357		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein (Existing) Sec.19-T5N-R64W - Lucille 20-1 (Existing) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7055-UNKNOWN												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,300.0	6,857.8	6,834.8	6,834.8	101.1	136.7	-91.12	62.3	4,365.1	929.3	691.6	237.71	3.910	
10,400.0	6,856.9	6,833.9	6,833.9	103.9	136.7	-90.99	62.3	4,365.1	839.0	598.5	240.48	3.489	
10,500.0	6,856.0	6,833.0	6,833.0	106.7	136.7	-90.86	62.3	4,365.1	751.1	507.8	243.25	3.088	
10,600.0	6,855.2	6,832.2	6,832.2	109.4	136.6	-90.73	62.3	4,365.1	666.6	420.6	246.02	2.710	
10,700.0	6,854.3	6,831.3	6,831.3	112.2	136.6	-90.59	62.3	4,365.1	587.0	338.2	248.79	2.359	
10,800.0	6,853.4	6,830.4	6,830.4	115.0	136.6	-90.46	62.3	4,365.1	514.6	263.0	251.56	2.046	
10,900.0	6,852.6	6,829.6	6,829.6	117.8	136.6	-90.33	62.3	4,365.1	452.8	198.5	254.33	1.780	
11,000.0	6,851.7	6,828.7	6,828.7	120.6	136.6	-90.20	62.3	4,365.1	406.5	149.4	257.10	1.581	
11,100.0	6,850.8	6,827.8	6,827.8	123.3	136.6	-90.06	62.3	4,365.1	381.4	121.5	259.87	1.468	Level 3
11,148.9	6,850.4	6,827.4	6,827.4	124.7	136.5	-90.00	62.3	4,365.1	378.2	117.0	261.22	1.448	Level 3, CC, ES, SF
11,200.0	6,849.9	6,826.9	6,826.9	126.1	136.5	-89.93	62.3	4,365.1	381.7	119.0	262.63	1.453	Level 3
11,300.0	6,849.1	6,826.1	6,826.1	128.9	136.5	-89.80	62.3	4,365.1	407.3	141.9	265.40	1.535	
11,400.0	6,848.2	6,825.2	6,825.2	131.7	136.5	-89.67	62.3	4,365.1	454.0	185.8	268.17	1.693	
11,500.0	6,847.3	6,824.3	6,824.3	134.5	136.5	-89.54	62.3	4,365.1	516.0	245.1	270.94	1.905	
11,600.0	6,846.4	6,823.4	6,823.4	137.3	136.5	-89.40	62.3	4,365.1	588.6	314.9	273.71	2.151	
11,700.0	6,845.6	6,822.6	6,822.6	140.1	136.5	-89.27	62.3	4,365.1	668.4	391.9	276.47	2.417	
11,800.0	6,844.7	6,821.7	6,821.7	142.9	136.4	-89.14	62.3	4,365.1	752.9	473.7	279.24	2.696	
11,900.0	6,843.8	6,820.8	6,820.8	145.7	136.4	-89.01	62.3	4,365.1	840.9	558.9	282.00	2.982	
12,000.0	6,843.0	6,820.0	6,820.0	148.5	136.4	-88.88	62.3	4,365.1	931.3	646.5	284.76	3.270	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein (Existing) Sec.19-T5N-R64W - Paige 1 (D&A) (Existing) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7003-UNKNOWN												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,600.0	6,881.4	6,853.4	6,853.4	28.6	137.1	-91.26	43.8	1,719.8	972.5	807.0	165.55	5.875	
7,700.0	6,880.5	6,852.5	6,852.5	31.0	137.0	-91.12	43.8	1,719.8	880.4	712.5	167.94	5.242	
7,800.0	6,879.6	6,851.6	6,851.6	33.5	137.0	-90.98	43.8	1,719.8	790.2	619.8	170.40	4.637	
7,900.0	6,878.7	6,850.7	6,850.7	36.0	137.0	-90.84	43.8	1,719.8	702.6	529.7	172.91	4.064	
8,000.0	6,877.9	6,849.9	6,849.9	38.6	137.0	-90.70	43.8	1,719.8	618.9	443.4	175.45	3.527	
8,100.0	6,877.0	6,849.0	6,849.0	41.1	137.0	-90.56	43.8	1,719.8	540.6	362.6	178.03	3.037	
8,200.0	6,876.1	6,848.1	6,848.1	43.8	137.0	-90.42	43.8	1,719.8	470.7	290.1	180.63	2.606	
8,300.0	6,875.2	6,847.2	6,847.2	46.4	136.9	-90.28	43.8	1,719.8	413.3	230.1	183.26	2.255	
8,400.0	6,874.4	6,846.4	6,846.4	49.1	136.9	-90.14	43.8	1,719.8	374.3	188.4	185.90	2.014	
8,500.0	6,873.5	6,845.5	6,845.5	51.7	136.9	-90.01	43.8	1,719.8	359.7	171.2	188.56	1.908	
8,503.6	6,873.5	6,845.5	6,845.5	51.8	136.9	-90.00	43.8	1,719.8	359.7	171.0	188.65	1.907	CC, ES, SF
8,600.0	6,872.6	6,844.6	6,844.6	54.4	136.9	-89.87	43.8	1,719.8	372.4	181.2	191.23	1.947	
8,700.0	6,871.8	6,843.8	6,843.8	57.1	136.9	-89.73	43.8	1,719.8	409.8	215.9	193.91	2.113	
8,800.0	6,870.9	6,842.9	6,842.9	59.8	136.9	-89.59	43.8	1,719.8	466.1	269.5	196.60	2.371	
8,900.0	6,870.0	6,842.0	6,842.0	62.5	136.8	-89.45	43.8	1,719.8	535.3	336.0	199.29	2.686	
9,000.0	6,869.1	6,841.1	6,841.1	65.3	136.8	-89.31	43.8	1,719.8	613.0	411.0	202.00	3.035	
9,100.0	6,868.3	6,840.3	6,840.3	68.0	136.8	-89.17	43.8	1,719.8	696.4	491.7	204.70	3.402	
9,200.0	6,867.4	6,839.4	6,839.4	70.7	136.8	-89.03	43.8	1,719.8	783.8	576.4	207.42	3.779	
9,300.0	6,866.5	6,838.5	6,838.5	73.5	136.8	-88.89	43.8	1,719.8	873.8	663.7	210.13	4.158	
9,400.0	6,865.6	6,837.6	6,837.6	76.2	136.8	-88.75	43.8	1,719.8	965.8	753.0	212.85	4.538	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein (Existing) Sec.19-T5N-R64W - Pigeon 1 (Existing) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7029-UNKNOWN												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
8,900.0	6,870.0	6,849.0	6,849.0	62.5	137.0	-91.30	40.3	3,039.1	989.2	789.8	199.41	4.961	
9,000.0	6,869.1	6,848.1	6,848.1	65.3	137.0	-91.16	40.3	3,039.1	896.7	694.5	202.13	4.436	
9,100.0	6,868.3	6,847.3	6,847.3	68.0	136.9	-91.01	40.3	3,039.1	805.9	601.0	204.85	3.934	
9,200.0	6,867.4	6,846.4	6,846.4	70.7	136.9	-90.87	40.3	3,039.1	717.5	510.0	207.58	3.457	
9,300.0	6,866.5	6,845.5	6,845.5	73.5	136.9	-90.73	40.3	3,039.1	632.7	422.4	210.31	3.008	
9,400.0	6,865.6	6,844.6	6,844.6	76.2	136.9	-90.59	40.3	3,039.1	552.9	339.9	213.05	2.595	
9,500.0	6,864.8	6,843.8	6,843.8	79.0	136.9	-90.45	40.3	3,039.1	480.8	265.0	215.79	2.228	
9,600.0	6,863.9	6,842.9	6,842.9	81.7	136.9	-90.31	40.3	3,039.1	420.2	201.7	218.53	1.923	
9,700.0	6,863.0	6,842.0	6,842.0	84.5	136.8	-90.17	40.3	3,039.1	376.8	155.5	221.27	1.703	
9,800.0	6,862.2	6,841.2	6,841.2	87.2	136.8	-90.03	40.3	3,039.1	356.9	132.9	224.02	1.593	
9,822.9	6,862.0	6,841.0	6,841.0	87.9	136.8	-90.00	40.3	3,039.1	356.2	131.5	224.65	1.585 CC, ES, SF	
9,900.0	6,861.3	6,840.3	6,840.3	90.0	136.8	-89.89	40.3	3,039.1	364.4	137.6	226.77	1.607	
10,000.0	6,860.4	6,839.4	6,839.4	92.8	136.8	-89.75	40.3	3,039.1	397.8	168.2	229.52	1.733	
10,100.0	6,859.5	6,838.5	6,838.5	95.6	136.8	-89.61	40.3	3,039.1	451.2	219.0	232.27	1.943	
10,200.0	6,858.7	6,837.7	6,837.7	98.3	136.8	-89.47	40.3	3,039.1	518.7	283.7	235.02	2.207	
10,300.0	6,857.8	6,836.8	6,836.8	101.1	136.7	-89.33	40.3	3,039.1	595.3	357.6	237.77	2.504	
10,400.0	6,856.9	6,835.9	6,835.9	103.9	136.7	-89.19	40.3	3,039.1	678.1	437.6	240.52	2.819	
10,500.0	6,856.0	6,835.0	6,835.0	106.7	136.7	-89.05	40.3	3,039.1	765.0	521.7	243.27	3.145	
10,600.0	6,855.2	6,834.2	6,834.2	109.4	136.7	-88.91	40.3	3,039.1	854.8	608.8	246.02	3.474	
10,700.0	6,854.3	6,833.3	6,833.3	112.2	136.7	-88.77	40.3	3,039.1	946.6	697.8	248.77	3.805	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein (Existing) Sec.19-T5N-R64W - Pigeon 1-6B (Existing) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 487-NS-GYRO-MS												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
8,300.0	6,875.2	6,962.1	6,839.0	46.4	16.6	88.51	-608.5	2,391.9	923.3	861.2	62.17	14.852	
8,400.0	6,874.4	6,961.8	6,838.7	49.1	16.6	88.45	-608.5	2,391.9	829.1	764.3	64.83	12.789	
8,500.0	6,873.5	6,961.5	6,838.4	51.7	16.6	88.39	-608.5	2,391.9	736.4	668.9	67.50	10.909	
8,600.0	6,872.6	6,961.2	6,838.1	54.4	16.6	88.34	-608.5	2,391.9	645.9	575.7	70.19	9.202	
8,700.0	6,871.8	6,960.9	6,837.8	57.1	16.6	88.28	-608.5	2,391.9	558.6	485.7	72.89	7.663	
8,800.0	6,870.9	6,960.6	6,837.5	59.8	16.6	88.22	-608.5	2,391.9	476.3	400.7	75.60	6.300	
8,900.0	6,870.0	6,960.3	6,837.2	62.5	16.6	88.16	-608.5	2,391.9	402.1	323.8	78.31	5.135	
9,000.0	6,869.1	6,960.0	6,836.9	65.3	16.6	88.11	-608.5	2,391.9	341.4	260.4	81.04	4.213	
9,100.0	6,868.3	6,959.7	6,836.6	68.0	16.6	88.05	-608.4	2,391.9	302.3	218.6	83.77	3.609	
9,175.7	6,867.6	6,959.5	6,836.4	70.1	16.6	88.01	-608.4	2,391.9	292.7	206.9	85.84	3.410 CC, ES	
9,200.0	6,867.4	6,959.5	6,836.4	70.7	16.6	88.00	-608.4	2,391.8	293.7	207.2	86.51	3.395 SF	
9,300.0	6,866.5	6,959.2	6,836.1	73.5	16.6	87.94	-608.4	2,391.8	318.0	228.7	89.25	3.563	
9,400.0	6,865.6	6,958.9	6,835.8	76.2	16.6	87.89	-608.4	2,391.8	368.8	276.8	91.99	4.008	
9,500.0	6,864.8	6,958.6	6,835.5	79.0	16.6	87.83	-608.4	2,391.8	436.8	342.1	94.74	4.611	
9,600.0	6,863.9	6,958.3	6,835.3	81.7	16.6	87.78	-608.4	2,391.8	515.4	418.0	97.50	5.287	
9,700.0	6,863.0	6,958.1	6,835.0	84.5	16.6	87.73	-608.4	2,391.8	600.5	500.2	100.25	5.989	
9,800.0	6,862.2	6,957.8	6,834.7	87.2	16.6	87.67	-608.4	2,391.8	689.5	586.5	103.01	6.693	
9,900.0	6,861.3	6,957.6	6,834.5	90.0	16.6	87.62	-608.4	2,391.8	781.2	675.4	105.77	7.385	
10,000.0	6,860.4	6,957.3	6,834.2	92.8	16.6	87.57	-608.4	2,391.8	874.7	766.2	108.54	8.059	
10,100.0	6,859.5	6,957.0	6,833.9	95.6	16.6	87.52	-608.3	2,391.8	969.5	858.2	111.31	8.710	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein (Existing) Sec.19-T5N-R64W - Pigeon 5-JAN (Existing) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7105-UNKNOWN												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
9,600.0	6,863.9	6,841.9	6,841.9	81.7	136.8	91.49	-608.1	3,688.3	919.7	701.3	218.42	4.211	
9,700.0	6,863.0	6,841.0	6,841.0	84.5	136.8	91.32	-608.1	3,688.3	825.5	604.3	221.18	3.732	
9,800.0	6,862.2	6,840.2	6,840.2	87.2	136.8	91.15	-608.1	3,688.3	732.9	508.9	223.95	3.272	
9,900.0	6,861.3	6,839.3	6,839.3	90.0	136.8	90.98	-608.1	3,688.3	642.4	415.7	226.71	2.834	
10,000.0	6,860.4	6,838.4	6,838.4	92.8	136.8	90.81	-608.1	3,688.3	555.2	325.7	229.47	2.419	
10,100.0	6,859.5	6,837.5	6,837.5	95.6	136.8	90.64	-608.1	3,688.3	473.1	240.9	232.23	2.037	
10,200.0	6,858.7	6,836.7	6,836.7	98.3	136.7	90.47	-608.1	3,688.3	399.3	164.3	235.00	1.699	
10,300.0	6,857.8	6,835.8	6,835.8	101.1	136.7	90.29	-608.1	3,688.3	339.1	101.4	237.76	1.426	Level 3
10,400.0	6,856.9	6,834.9	6,834.9	103.9	136.7	90.12	-608.1	3,688.3	301.0	60.5	240.53	1.251	Level 3
10,472.1	6,856.3	6,834.3	6,834.3	105.9	136.7	90.00	-608.1	3,688.3	292.2	49.7	242.52	1.205	Level 2, CC, ES, SF
10,500.0	6,856.0	6,834.0	6,834.0	106.7	136.7	89.95	-608.1	3,688.3	293.5	50.3	243.29	1.207	Level 2
10,600.0	6,855.2	6,833.2	6,833.2	109.4	136.7	89.78	-608.1	3,688.3	319.0	72.9	246.05	1.296	Level 3
10,700.0	6,854.3	6,832.3	6,832.3	112.2	136.6	89.61	-608.1	3,688.3	370.6	121.8	248.81	1.489	Level 3
10,800.0	6,853.4	6,831.4	6,831.4	115.0	136.6	89.44	-608.1	3,688.3	439.2	187.6	251.57	1.746	
10,900.0	6,852.6	6,830.6	6,830.6	117.8	136.6	89.27	-608.1	3,688.3	518.1	263.8	254.33	2.037	
11,000.0	6,851.7	6,829.7	6,829.7	120.6	136.6	89.10	-608.1	3,688.3	603.4	346.3	257.09	2.347	
11,100.0	6,850.8	6,828.8	6,828.8	123.3	136.6	88.93	-608.1	3,688.3	692.5	432.7	259.85	2.665	
11,200.0	6,849.9	6,827.9	6,827.9	126.1	136.6	88.75	-608.1	3,688.3	784.3	521.7	262.61	2.987	
11,300.0	6,849.1	6,827.1	6,827.1	128.9	136.5	88.58	-608.1	3,688.3	877.9	612.6	265.36	3.308	
11,400.0	6,848.2	6,826.2	6,826.2	131.7	136.5	88.41	-608.1	3,688.3	972.8	704.7	268.11	3.628	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein (Existing) Sec.19-T5N-R64W - Seth 1 (Existing) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 6997-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +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	74.70	149.4	546.0	566.3					
100.0	100.0	84.0	84.0	0.1	1.7	74.70	149.4	546.0	566.0	564.3	1.79	315.771		
200.0	200.0	184.0	184.0	0.3	3.7	74.70	149.4	546.0	566.0	562.0	4.02	140.900		
300.0	300.0	284.0	284.0	0.6	5.7	74.70	149.4	546.0	566.0	559.8	6.24	90.682		
400.0	400.0	384.0	384.0	0.8	7.7	74.70	149.4	546.0	566.0	557.6	8.47	66.854		
500.0	500.0	484.0	484.0	1.0	9.7	74.70	149.4	546.0	566.0	555.4	10.69	52.943		
600.0	600.0	584.0	584.0	1.2	11.7	74.70	149.4	546.0	566.0	553.1	12.92	43.824		
700.0	700.0	684.0	684.0	1.5	13.7	74.70	149.4	546.0	566.0	550.9	15.14	37.385		
800.0	800.0	784.0	784.0	1.7	15.7	74.70	149.4	546.0	566.0	548.7	17.37	32.595		
900.0	900.0	884.0	884.0	1.9	17.7	74.70	149.4	546.0	566.0	546.5	19.59	28.894		
1,000.0	1,000.0	984.0	984.0	2.1	19.7	74.70	149.4	546.0	566.0	544.2	21.82	25.947		
1,100.0	1,100.0	1,084.0	1,084.0	2.4	21.7	74.70	149.4	546.0	566.0	542.0	24.04	23.546		
1,200.0	1,200.0	1,184.0	1,184.0	2.6	23.7	74.70	149.4	546.0	566.0	539.8	26.26	21.551		
1,300.0	1,300.0	1,284.0	1,284.0	2.8	25.7	74.70	149.4	546.0	566.0	537.6	28.49	19.868		
1,400.0	1,400.0	1,384.0	1,384.0	3.0	27.7	74.70	149.4	546.0	566.0	535.3	30.71	18.429		
1,500.0	1,500.0	1,484.0	1,484.0	3.3	29.7	74.70	149.4	546.0	566.0	533.1	32.94	17.185		
1,600.0	1,600.0	1,584.0	1,584.0	3.5	31.7	-139.76	149.4	546.0	567.4	532.3	35.12	16.153		
1,700.0	1,699.8	1,683.8	1,683.8	3.6	33.7	-140.05	149.4	546.0	571.4	534.1	37.26	15.336		
1,800.0	1,799.5	1,783.5	1,783.5	3.8	35.7	-140.52	149.4	546.0	578.1	538.7	39.36	14.688		
1,900.0	1,898.8	1,882.8	1,882.8	4.0	37.7	-141.19	149.4	546.0	587.2	545.7	41.48	14.154		
2,000.0	1,998.0	1,982.0	1,982.0	4.3	39.6	-141.91	149.4	546.0	596.6	553.0	43.66	13.666		
2,100.0	2,097.3	2,081.3	2,081.3	4.5	41.6	-142.61	149.4	546.0	606.2	560.4	45.84	13.224		
2,200.0	2,196.6	2,180.6	2,180.6	4.7	43.6	-143.29	149.4	546.0	615.8	567.8	48.03	12.822		
2,300.0	2,295.9	2,279.9	2,279.9	5.0	45.6	-143.95	149.4	546.0	625.6	575.3	50.22	12.456		
2,400.0	2,395.1	2,379.1	2,379.1	5.2	47.6	-144.59	149.4	546.0	635.4	582.9	52.42	12.121		
2,500.0	2,494.4	2,478.4	2,478.4	5.5	49.6	-145.20	149.4	546.0	645.2	590.6	54.62	11.813		
2,600.0	2,593.7	2,577.7	2,577.7	5.8	51.6	-145.80	149.4	546.0	655.2	598.4	56.82	11.531		
2,700.0	2,692.9	2,676.9	2,676.9	6.1	53.5	-146.39	149.4	546.0	665.2	606.2	59.03	11.270		
2,800.0	2,792.2	2,776.2	2,776.2	6.4	55.5	-146.95	149.4	546.0	675.3	614.1	61.23	11.028		
2,900.0	2,891.5	2,875.5	2,875.5	6.6	57.5	-147.50	149.4	546.0	685.5	622.0	63.44	10.804		
3,000.0	2,990.8	2,974.8	2,974.8	6.9	59.5	-148.03	149.4	546.0	695.7	630.0	65.65	10.596		
3,100.0	3,090.0	3,074.0	3,074.0	7.2	61.5	-148.55	149.4	546.0	705.9	638.1	67.86	10.403		
3,200.0	3,189.3	3,173.3	3,173.3	7.5	63.5	-149.05	149.4	546.0	716.3	646.2	70.07	10.222		
3,300.0	3,288.6	3,272.6	3,272.6	7.8	65.5	-149.54	149.4	546.0	726.6	654.3	72.28	10.053		
3,400.0	3,387.8	3,371.8	3,371.8	8.1	67.4	-150.01	149.4	546.0	737.1	662.6	74.49	9.894		
3,500.0	3,487.1	3,471.1	3,471.1	8.4	69.4	-150.47	149.4	546.0	747.5	670.8	76.71	9.745		
3,600.0	3,586.4	3,570.4	3,570.4	8.7	71.4	-150.92	149.4	546.0	758.1	679.1	78.92	9.606		
3,700.0	3,685.7	3,669.7	3,669.7	9.0	73.4	-151.36	149.4	546.0	768.6	687.5	81.13	9.474		
3,800.0	3,784.9	3,768.9	3,768.9	9.3	75.4	-151.78	149.4	546.0	779.2	695.9	83.34	9.350		
3,900.0	3,884.2	3,868.2	3,868.2	9.7	77.4	-152.19	149.4	546.0	789.9	704.3	85.56	9.232		
4,000.0	3,983.5	3,967.5	3,967.5	10.0	79.3	-152.59	149.4	546.0	800.6	712.8	87.77	9.122		
4,100.0	4,082.7	4,066.7	4,066.7	10.3	81.3	-152.98	149.4	546.0	811.3	721.3	89.98	9.016		
4,200.0	4,182.0	4,166.0	4,166.0	10.6	83.3	-153.36	149.4	546.0	822.1	729.9	92.19	8.917		
4,300.0	4,281.3	4,265.3	4,265.3	10.9	85.3	-153.74	149.4	546.0	832.9	738.5	94.41	8.822		
4,400.0	4,380.6	4,364.6	4,364.6	11.2	87.3	-154.10	149.4	546.0	843.7	747.1	96.62	8.732		
4,500.0	4,479.8	4,463.8	4,463.8	11.5	89.3	-154.45	149.4	546.0	854.6	755.8	98.83	8.647		
4,600.0	4,579.1	4,563.1	4,563.1	11.8	91.3	-154.79	149.4	546.0	865.5	764.4	101.04	8.565		
4,700.0	4,678.4	4,662.4	4,662.4	12.1	93.2	-155.15	149.4	546.0	876.3	773.0	103.33	8.481		
4,800.0	4,777.9	4,761.9	4,761.9	12.4	95.2	-155.48	149.4	546.0	885.0	779.2	105.77	8.367		
4,900.0	4,877.7	4,861.7	4,861.7	12.6	97.2	-155.68	149.4	546.0	890.4	782.3	108.12	8.236		
5,000.0	4,977.7	4,961.7	4,961.7	12.7	99.2	-155.77	149.4	546.0	892.7	782.4	110.36	8.089		

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein (Existing) Sec.19-T5N-R64W - Seth 1 (Existing) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 6997-UNKNOWN													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
5,100.0	5,077.7	5,061.7	5,061.7	12.9	101.2	58.59	149.4	546.0	892.8	779.0	113.85	7.842		
5,200.0	5,177.7	5,161.7	5,161.7	13.1	103.2	58.59	149.4	546.0	892.8	776.8	116.02	7.696		
5,300.0	5,277.7	5,261.7	5,261.7	13.3	105.2	58.59	149.4	546.0	892.8	774.6	118.19	7.554		
5,400.0	5,377.7	5,361.7	5,361.7	13.4	107.2	58.59	149.4	546.0	892.8	772.4	120.36	7.418		
5,500.0	5,477.7	5,461.7	5,461.7	13.6	109.2	58.59	149.4	546.0	892.8	770.3	122.54	7.286		
5,600.0	5,577.7	5,561.7	5,561.7	13.8	111.2	58.59	149.4	546.0	892.8	768.1	124.72	7.159		
5,700.0	5,677.7	5,661.7	5,661.7	13.9	113.2	58.59	149.4	546.0	892.8	765.9	126.89	7.036		
5,800.0	5,777.7	5,761.7	5,761.7	14.1	115.2	58.59	149.4	546.0	892.8	763.7	129.07	6.917		
5,900.0	5,877.7	5,861.7	5,861.7	14.3	117.2	58.59	149.4	546.0	892.8	761.6	131.26	6.802		
6,000.0	5,977.7	5,961.7	5,961.7	14.5	119.2	58.59	149.4	546.0	892.8	759.4	133.44	6.691		
6,100.0	6,077.7	6,061.7	6,061.7	14.6	121.2	58.59	149.4	546.0	892.8	757.2	135.62	6.583		
6,200.0	6,177.6	6,161.6	6,161.6	14.8	123.2	-31.62	149.4	546.0	890.2	753.9	136.23	6.534		
6,300.0	6,276.3	6,260.3	6,260.3	14.9	125.2	-32.68	149.4	546.0	877.0	740.6	136.36	6.432		
6,400.0	6,372.2	6,356.2	6,356.2	15.0	127.1	-34.72	149.4	546.0	853.2	718.2	135.05	6.318		
6,500.0	6,463.5	6,447.5	6,447.5	15.0	129.0	-37.91	149.4	546.0	819.6	686.7	132.90	6.167		
6,600.0	6,548.8	6,532.8	6,532.8	15.1	130.7	-42.43	149.4	546.0	777.2	646.2	131.03	5.932		
6,700.0	6,626.6	6,610.6	6,610.6	15.1	132.2	-48.50	149.4	546.0	727.9	596.9	131.02	5.556		
6,800.0	6,695.5	6,679.5	6,679.5	15.2	133.6	-56.13	149.4	546.0	673.9	539.6	134.22	5.021		
6,900.0	6,754.3	6,738.3	6,738.3	15.7	134.8	-64.94	149.4	546.0	618.0	477.5	140.46	4.399		
7,000.0	6,802.2	6,786.2	6,786.2	16.8	135.7	-73.94	149.4	546.0	564.1	416.5	147.57	3.823		
7,100.0	6,838.1	6,822.1	6,822.1	18.3	136.4	-81.77	149.4	546.0	517.1	364.0	153.14	3.377		
7,200.0	6,861.6	6,845.6	6,845.6	20.0	136.9	-87.30	149.4	546.0	482.7	326.1	156.62	3.082		
7,300.0	6,873.8	6,857.8	6,857.8	21.9	137.2	-89.62	149.4	546.0	466.2	307.2	158.99	2.932		
7,329.5	6,876.5	6,860.5	6,860.5	22.6	137.2	-90.00	149.4	546.0	465.3	305.6	159.67	2.914	CC, ES, SF	
7,400.0	6,881.8	6,865.8	6,865.8	24.1	137.3	-90.34	149.4	546.0	470.6	309.3	161.27	2.918		
7,500.0	6,882.2	6,866.2	6,866.2	26.3	137.3	-89.82	149.4	546.0	495.5	332.0	163.50	3.030		
7,600.0	6,881.4	6,865.4	6,865.4	28.6	137.3	-89.71	149.4	546.0	538.1	372.3	165.81	3.245		
7,700.0	6,880.5	6,864.5	6,864.5	31.0	137.3	-89.60	149.4	546.0	594.6	426.5	168.19	3.536		
7,800.0	6,879.6	6,863.6	6,863.6	33.5	137.3	-89.49	149.4	546.0	661.6	490.9	170.64	3.877		
7,900.0	6,878.7	6,862.7	6,862.7	36.0	137.3	-89.39	149.4	546.0	736.0	562.9	173.14	4.251		
8,000.0	6,877.9	6,861.9	6,861.9	38.6	137.2	-89.28	149.4	546.0	815.9	640.3	175.68	4.645		
8,100.0	6,877.0	6,861.0	6,861.0	41.1	137.2	-89.17	149.4	546.0	899.9	721.7	178.24	5.049		
8,200.0	6,876.1	6,860.1	6,860.1	43.8	137.2	-89.06	149.4	546.0	986.8	806.0	180.84	5.457		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein 19MN-HZ Pad Sec.19-T5N-R64W - Klein 19M-202 - Wellbore #1 - Plan #1 (2-26-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	0.0	0.0	0.0	0.0	-90.00	0.0	-58.5	58.5					
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-58.5	58.5	58.3	0.22	260.263		
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-58.5	58.5	57.8	0.67	86.754		
300.0	300.0	300.0	300.0	0.6	0.6	-90.00	0.0	-58.5	58.5	57.4	1.12	52.053		
400.0	400.0	400.0	400.0	0.8	0.8	-90.00	0.0	-58.5	58.5	56.9	1.57	37.180		
500.0	500.0	500.0	500.0	1.0	1.0	-90.00	0.0	-58.5	58.5	56.5	2.02	28.918		
600.0	600.0	600.0	600.0	1.2	1.2	-90.00	0.0	-58.5	58.5	56.0	2.47	23.660		
700.0	700.0	700.0	700.0	1.5	1.5	-90.00	0.0	-58.5	58.5	55.6	2.92	20.020		
800.0	800.0	800.0	800.0	1.7	1.7	-90.00	0.0	-58.5	58.5	55.1	3.37	17.351		
900.0	900.0	900.0	900.0	1.9	1.9	-90.00	0.0	-58.5	58.5	54.7	3.82	15.310		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-90.00	0.0	-58.5	58.5	54.2	4.27	13.698 CC		
1,100.0	1,100.0	1,099.5	1,099.5	2.4	2.4	-88.36	1.7	-58.9	58.9	54.2	4.72	12.487 ES		
1,200.0	1,200.0	1,198.8	1,198.6	2.6	2.6	-83.62	6.7	-60.1	60.4	55.3	5.17	11.700		
1,300.0	1,300.0	1,297.6	1,297.0	2.8	2.8	-76.35	15.0	-62.0	63.8	58.2	5.62	11.364 SF		
1,400.0	1,400.0	1,395.6	1,394.4	3.0	3.1	-67.65	26.6	-64.6	70.1	64.0	6.08	11.528		
1,500.0	1,500.0	1,493.6	1,491.2	3.3	3.3	-58.88	41.1	-68.0	79.9	73.3	6.57	12.170		
1,600.0	1,600.0	1,592.1	1,588.5	3.5	3.6	94.64	56.2	-71.5	91.8	84.8	6.98	13.144		
1,700.0	1,699.8	1,690.2	1,685.3	3.6	3.9	102.37	71.2	-75.0	105.7	98.3	7.39	14.306		
1,800.0	1,799.5	1,787.6	1,781.6	3.8	4.2	109.64	86.2	-78.4	122.4	114.6	7.80	15.693		
1,900.0	1,898.8	1,884.5	1,877.2	4.0	4.5	116.27	101.0	-81.8	142.0	133.7	8.21	17.280		
2,000.0	1,998.0	1,981.2	1,972.7	4.3	4.8	121.51	115.8	-85.3	163.2	154.5	8.64	18.884		
2,100.0	2,097.3	2,078.0	2,068.3	4.5	5.1	125.54	130.7	-88.7	185.4	176.4	9.08	20.426		
2,200.0	2,196.6	2,174.7	2,163.8	4.7	5.5	128.70	145.5	-92.1	208.4	198.9	9.52	21.880		
2,300.0	2,295.9	2,271.4	2,259.4	5.0	5.8	131.24	160.4	-95.6	231.8	221.8	9.98	23.235		
2,400.0	2,395.1	2,368.2	2,354.9	5.2	6.1	133.31	175.2	-99.0	255.6	245.2	10.44	24.493		
2,500.0	2,494.4	2,464.9	2,450.4	5.5	6.4	135.03	190.0	-102.4	279.7	268.8	10.90	25.657		
2,600.0	2,593.7	2,561.7	2,546.0	5.8	6.8	136.47	204.9	-105.8	303.9	292.6	11.37	26.733		
2,700.0	2,692.9	2,658.4	2,641.5	6.1	7.1	137.71	219.7	-109.3	328.3	316.5	11.84	27.728		
2,800.0	2,792.2	2,755.2	2,737.1	6.4	7.5	138.77	234.6	-112.7	352.9	340.5	12.32	28.649		
2,900.0	2,891.5	2,851.9	2,832.6	6.6	7.8	139.70	249.4	-116.1	377.5	364.7	12.80	29.503		
3,000.0	2,990.8	2,948.7	2,928.2	6.9	8.1	140.51	264.2	-119.6	402.2	388.9	13.28	30.295		
3,100.0	3,090.0	3,045.4	3,023.7	7.2	8.5	141.23	279.1	-123.0	427.0	413.2	13.76	31.031		
3,200.0	3,189.3	3,142.2	3,119.2	7.5	8.8	141.86	293.9	-126.4	451.8	437.6	14.25	31.716		
3,300.0	3,288.6	3,238.9	3,214.8	7.8	9.2	142.44	308.8	-129.9	476.7	462.0	14.73	32.355		
3,400.0	3,387.8	3,335.7	3,310.3	8.1	9.5	142.95	323.6	-133.3	501.6	486.4	15.22	32.952		
3,500.0	3,487.1	3,432.4	3,405.9	8.4	9.9	143.42	338.4	-136.7	526.6	510.9	15.71	33.511		
3,600.0	3,586.4	3,529.2	3,501.4	8.7	10.2	143.85	353.3	-140.1	551.6	535.4	16.21	34.035		
3,700.0	3,685.7	3,625.9	3,597.0	9.0	10.6	144.23	368.1	-143.6	576.6	559.9	16.70	34.527		
3,800.0	3,784.9	3,722.7	3,692.5	9.3	10.9	144.59	383.0	-147.0	601.6	584.4	17.19	34.990		
3,900.0	3,884.2	3,819.4	3,788.1	9.7	11.3	144.92	397.8	-150.4	626.7	609.0	17.69	35.426		
4,000.0	3,983.5	3,916.2	3,883.6	10.0	11.6	145.22	412.6	-153.9	651.8	633.6	18.19	35.837		
4,100.0	4,082.7	4,012.9	3,979.1	10.3	12.0	145.50	427.5	-157.3	676.9	658.2	18.69	36.225		
4,200.0	4,182.0	4,109.7	4,074.7	10.6	12.3	145.76	442.3	-160.7	702.0	682.8	19.18	36.592		
4,300.0	4,281.3	4,206.4	4,170.2	10.9	12.6	146.00	457.2	-164.1	727.1	707.4	19.68	36.940		
4,400.0	4,380.6	4,303.2	4,265.8	11.2	13.0	146.23	472.0	-167.6	752.2	732.0	20.18	37.270		
4,500.0	4,479.8	4,399.9	4,361.3	11.5	13.3	146.44	486.8	-171.0	777.4	756.7	20.68	37.583		
4,600.0	4,579.1	4,496.7	4,456.9	11.8	13.7	146.64	501.7	-174.4	802.5	781.3	21.19	37.880		
4,700.0	4,678.4	4,593.5	4,552.4	12.1	14.1	146.89	516.5	-177.9	827.6	805.9	21.70	38.140		
4,800.0	4,777.9	4,690.8	4,648.5	12.4	14.4	147.22	531.4	-181.3	850.7	828.5	22.22	38.289		
4,900.0	4,877.7	4,788.7	4,745.2	12.6	14.8	147.39	546.5	-184.8	870.9	848.2	22.71	38.345		
5,000.0	4,977.7	4,887.1	4,842.4	12.7	15.1	147.41	561.6	-188.3	888.2	865.0	23.18	38.315		

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 Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein 19MN-HZ Pad Sec.19-T5N-R64W - Klein 19M-202 - Wellbore #1 - Plan #1 (2-26-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
5,100.0	5,077.7	4,985.9	4,939.9	12.9	15.5	1.55	576.7	-191.8	903.5	875.9	27.61	32.723		
5,200.0	5,177.7	5,084.6	5,037.5	13.1	15.8	1.31	591.8	-195.3	918.8	890.6	28.13	32.657		
5,300.0	5,277.7	5,183.4	5,135.0	13.3	16.2	1.07	607.0	-198.8	934.0	905.4	28.66	32.591		
5,400.0	5,377.7	5,282.1	5,232.5	13.4	16.6	0.84	622.1	-202.3	949.3	920.1	29.19	32.525		
5,500.0	5,477.7	5,380.9	5,330.0	13.6	16.9	0.61	637.3	-205.8	964.6	934.9	29.72	32.460		
5,600.0	5,577.7	5,519.3	5,467.0	13.8	17.3	0.35	656.1	-210.1	978.3	948.0	30.31	32.273		
5,700.0	5,677.7	5,668.8	5,616.0	13.9	17.7	0.16	669.3	-213.2	987.1	956.3	30.82	32.028		
5,800.0	5,777.7	5,819.4	5,766.4	14.1	17.9	0.09	674.9	-214.5	990.8	959.6	31.26	31.701		
5,900.0	5,877.7	5,930.7	5,877.7	14.3	18.1	0.09	675.0	-214.5	991.0	959.4	31.60	31.361		
5,958.1	5,935.8	5,988.8	5,935.8	14.4	18.2	0.09	675.0	-214.5	991.0	959.2	31.80	31.166		
6,000.0	5,977.7	6,030.6	5,977.7	14.5	18.2	0.11	675.0	-214.2	991.0	959.0	31.94	31.029		
6,100.0	6,077.7	6,129.4	6,075.9	14.6	18.3	0.64	675.0	-204.9	991.0	958.8	32.26	30.719		
6,200.0	6,177.6	6,225.1	6,169.2	14.8	18.4	-88.29	675.0	-184.0	991.4	963.2	28.25	35.100		
6,300.0	6,276.3	6,318.4	6,257.0	14.9	18.5	-87.22	675.0	-152.4	992.2	963.7	28.49	34.820		
6,400.0	6,372.2	6,409.9	6,338.7	15.0	18.6	-86.20	675.0	-111.4	993.2	964.5	28.73	34.576		
6,500.0	6,463.5	6,500.0	6,413.8	15.0	18.6	-85.24	675.0	-61.7	994.5	965.5	29.01	34.281		
6,600.0	6,548.8	6,587.9	6,480.9	15.1	18.7	-84.37	675.0	-5.0	995.9	966.4	29.46	33.809		
6,700.0	6,626.6	6,675.0	6,540.5	15.1	18.8	-83.59	675.0	58.4	997.3	967.1	30.17	33.055		
6,800.0	6,695.5	6,760.9	6,592.0	15.2	19.0	-82.90	675.0	127.2	998.7	967.4	31.28	31.927		
6,900.0	6,754.3	6,846.0	6,635.0	15.7	19.4	-82.32	675.0	200.6	1,000.0	967.1	32.89	30.405		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein 19MN-HZ Pad Sec.19-T5N-R64W - Klein 19M-432 - Wellbore #1 - Plan #1 (2-26-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-89.99	-89.99	0.0	-30.6	30.6				
100.0	100.0	100.0	100.0	0.1	0.1	-89.99	-89.99	0.0	-30.6	30.6	30.4	0.22	136.328	
200.0	200.0	200.0	200.0	0.3	0.3	-89.99	-89.99	0.0	-30.6	30.6	30.0	0.67	45.443	
300.0	300.0	300.0	300.0	0.6	0.6	-89.99	-89.99	0.0	-30.6	30.6	29.5	1.12	27.266	
400.0	400.0	400.0	400.0	0.8	0.8	-89.99	-89.99	0.0	-30.6	30.6	29.1	1.57	19.475	
500.0	500.0	500.0	500.0	1.0	1.0	-89.99	-89.99	0.0	-30.6	30.6	28.6	2.02	15.148	
600.0	600.0	600.0	600.0	1.2	1.2	-89.99	-89.99	0.0	-30.6	30.6	28.2	2.47	12.393	
700.0	700.0	700.0	700.0	1.5	1.5	-89.99	-89.99	0.0	-30.6	30.6	27.7	2.92	10.487	
800.0	800.0	800.0	800.0	1.7	1.7	-89.99	-89.99	0.0	-30.6	30.6	27.3	3.37	9.089	
900.0	900.0	900.0	900.0	1.9	1.9	-89.99	-89.99	0.0	-30.6	30.6	26.8	3.82	8.019	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-89.99	-89.99	0.0	-30.6	30.6	26.4	4.27	7.175	
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	-89.99	-89.99	0.0	-30.6	30.6	25.9	4.72	6.492	
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	-89.99	-89.99	0.0	-30.6	30.6	25.5	5.17	5.927 CC, ES	
1,300.0	1,300.0	1,299.5	1,299.4	2.8	2.8	-87.23	-87.23	1.5	-31.5	31.5	25.9	5.62	5.610	
1,400.0	1,400.0	1,398.7	1,398.5	3.0	3.0	-79.87	-79.87	6.1	-33.9	34.5	28.4	6.06	5.691	
1,500.0	1,500.0	1,497.4	1,496.9	3.3	3.3	-70.35	-70.35	13.6	-38.0	40.5	33.9	6.51	6.215	
1,600.0	1,600.0	1,596.7	1,595.6	3.5	3.5	85.41	85.41	22.7	-43.0	48.6	41.7	6.93	7.015	
1,700.0	1,699.8	1,695.8	1,694.1	3.6	3.7	95.80	95.80	31.9	-47.9	58.2	50.8	7.33	7.932	
1,800.0	1,799.5	1,794.4	1,792.2	3.8	4.0	105.77	105.77	41.0	-52.8	70.0	62.2	7.74	9.037	
1,900.0	1,898.8	1,892.6	1,889.9	4.0	4.2	114.61	114.61	50.1	-57.8	84.5	76.4	8.17	10.353	
2,000.0	1,998.0	1,990.8	1,987.5	4.3	4.5	121.04	121.04	59.1	-62.7	100.7	92.1	8.60	11.711	
2,100.0	2,097.3	2,088.9	2,085.1	4.5	4.8	125.66	125.66	68.2	-67.6	117.8	108.8	9.05	13.024	
2,200.0	2,196.6	2,187.0	2,182.7	4.7	5.0	129.11	129.11	77.3	-72.5	135.5	126.0	9.50	14.263	
2,300.0	2,295.9	2,285.2	2,280.3	5.0	5.3	131.75	131.75	86.3	-77.4	153.5	143.5	9.96	15.416	
2,400.0	2,395.1	2,383.3	2,377.9	5.2	5.6	133.84	133.84	95.4	-82.3	171.8	161.3	10.42	16.483	
2,500.0	2,494.4	2,481.5	2,475.5	5.5	5.8	135.53	135.53	104.5	-87.2	190.2	179.3	10.89	17.469	
2,600.0	2,593.7	2,579.6	2,573.1	5.8	6.1	136.92	136.92	113.5	-92.1	208.8	197.4	11.36	18.379	
2,700.0	2,692.9	2,677.8	2,670.7	6.1	6.4	138.08	138.08	122.6	-97.0	227.5	215.6	11.84	19.219	
2,800.0	2,792.2	2,775.9	2,768.3	6.4	6.7	139.07	139.07	131.7	-101.9	246.2	233.9	12.31	19.995	
2,900.0	2,891.5	2,874.0	2,865.9	6.6	6.9	139.91	139.91	140.7	-106.8	265.0	252.2	12.80	20.714	
3,000.0	2,990.8	2,972.2	2,963.5	6.9	7.2	140.65	140.65	149.8	-111.7	283.9	270.6	13.28	21.381	
3,100.0	3,090.0	3,070.3	3,061.1	7.2	7.5	141.29	141.29	158.9	-116.7	302.8	289.0	13.76	22.001	
3,200.0	3,189.3	3,168.5	3,158.7	7.5	7.8	141.85	141.85	167.9	-121.6	321.7	307.5	14.25	22.577	
3,300.0	3,288.6	3,266.6	3,256.3	7.8	8.1	142.36	142.36	177.0	-126.5	340.7	326.0	14.74	23.115	
3,400.0	3,387.8	3,364.8	3,353.9	8.1	8.3	142.81	142.81	186.1	-131.4	359.7	344.5	15.23	23.617	
3,500.0	3,487.1	3,462.9	3,451.5	8.4	8.6	143.21	143.21	195.1	-136.3	378.7	363.0	15.72	24.087	
3,600.0	3,586.4	3,561.1	3,549.1	8.7	8.9	143.58	143.58	204.2	-141.2	397.7	381.5	16.21	24.528	
3,700.0	3,685.7	3,659.2	3,646.7	9.0	9.2	143.91	143.91	213.2	-146.1	416.8	400.0	16.71	24.942	
3,800.0	3,784.9	3,757.3	3,744.3	9.3	9.5	144.22	144.22	222.3	-151.0	435.8	418.6	17.20	25.331	
3,900.0	3,884.2	3,855.5	3,841.9	9.7	9.8	144.50	144.50	231.4	-155.9	454.9	437.2	17.70	25.698	
4,000.0	3,983.5	3,953.6	3,939.5	10.0	10.0	144.75	144.75	240.4	-160.8	473.9	455.7	18.20	26.043	
4,100.0	4,082.7	4,051.8	4,037.1	10.3	10.3	144.99	144.99	249.5	-165.7	493.0	474.3	18.70	26.370	
4,200.0	4,182.0	4,149.9	4,134.7	10.6	10.6	145.21	145.21	258.6	-170.7	512.1	492.9	19.19	26.679	
4,300.0	4,281.3	4,248.1	4,232.3	10.9	10.9	145.41	145.41	267.6	-175.6	531.2	511.5	19.69	26.972	
4,400.0	4,380.6	4,346.2	4,329.9	11.2	11.2	145.60	145.60	276.7	-180.5	550.3	530.1	20.19	27.250	
4,500.0	4,479.8	4,444.4	4,427.5	11.5	11.5	145.78	145.78	285.8	-185.4	569.4	548.7	20.69	27.513	
4,600.0	4,579.1	4,542.5	4,525.1	11.8	11.8	145.94	145.94	294.8	-190.3	588.5	567.3	21.20	27.764	
4,700.0	4,678.4	4,640.7	4,622.7	12.1	12.0	146.14	146.14	303.9	-195.2	607.5	585.8	21.70	27.990	
4,800.0	4,777.9	4,739.2	4,720.7	12.4	12.3	146.35	146.35	313.0	-200.1	624.5	602.3	22.20	28.126	
4,900.0	4,877.7	4,838.2	4,819.2	12.6	12.6	146.34	146.34	322.2	-205.1	638.7	616.0	22.68	28.159	
5,000.0	4,977.7	4,942.2	4,922.6	12.7	12.9	146.12	146.12	331.7	-210.2	649.9	626.7	23.14	28.089	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein 19MN-HZ Pad Sec.19-T5N-R64W - Klein 19M-432 - Wellbore #1 - Plan #1 (2-26-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,077.7	5,066.8	5,046.9	12.9	13.2	0.11		339.9	-214.7	656.6	631.5	25.09	26.171	
5,200.0	5,177.7	5,192.1	5,172.0	13.1	13.4	-0.05		343.4	-216.6	659.3	633.9	25.48	25.878	
5,300.0	5,277.7	5,297.7	5,277.7	13.3	13.6	-0.06		343.5	-216.6	659.4	633.6	25.83	25.527	
5,400.0	5,377.7	5,397.7	5,377.7	13.4	13.8	-0.06		343.5	-216.6	659.4	633.2	26.20	25.169	
5,500.0	5,477.7	5,497.7	5,477.7	13.6	14.0	-0.06		343.5	-216.6	659.4	632.9	26.57	24.818	
5,600.0	5,577.7	5,597.7	5,577.7	13.8	14.2	-0.06		343.5	-216.6	659.4	632.5	26.94	24.475	
5,700.0	5,677.7	5,697.7	5,677.7	13.9	14.3	-0.06		343.5	-216.6	659.4	632.1	27.32	24.139	
5,800.0	5,777.7	5,797.7	5,777.7	14.1	14.5	-0.06		343.5	-216.6	659.4	631.7	27.70	23.810	
5,900.0	5,877.7	5,897.7	5,877.7	14.3	14.7	-0.06		343.5	-216.6	659.4	631.4	28.07	23.488	
6,000.0	5,977.7	5,997.7	5,977.7	14.5	14.9	-0.06		343.5	-216.6	659.4	631.0	28.46	23.173	
6,100.0	6,077.7	6,097.7	6,077.7	14.6	15.1	-0.06		343.5	-216.6	659.4	630.6	28.84	22.865	
6,200.0	6,177.6	6,197.8	6,177.7	14.8	15.3	-90.06		343.5	-213.6	659.4	631.5	27.94	23.605	
6,300.0	6,276.3	6,297.9	6,276.5	14.9	15.4	-90.08		343.5	-198.3	659.4	631.2	28.20	23.387	
6,400.0	6,372.2	6,398.0	6,372.5	15.0	15.5	-90.09		343.5	-170.1	659.4	631.0	28.40	23.219	
6,500.0	6,463.5	6,498.1	6,464.1	15.0	15.6	-90.10		343.5	-129.7	659.4	630.8	28.61	23.045	
6,600.0	6,548.8	6,598.3	6,549.5	15.1	15.6	-90.10		343.5	-77.6	659.4	630.5	28.94	22.784	
6,700.0	6,626.6	6,698.5	6,627.4	15.1	15.7	-90.11		343.5	-14.8	659.4	629.9	29.53	22.333	
6,800.0	6,695.5	6,798.6	6,696.5	15.2	15.8	-90.11		343.5	57.7	659.4	628.9	30.53	21.602	
6,900.0	6,754.3	6,898.8	6,755.4	15.7	16.5	-90.11		343.5	138.6	659.4	627.3	32.08	20.553	
7,000.0	6,802.2	6,999.0	6,803.3	16.8	17.7	-90.11		343.5	226.5	659.4	625.1	34.29	19.232	
7,100.0	6,838.1	7,099.1	6,839.3	18.3	19.1	-90.11		343.5	319.9	659.4	622.3	37.14	17.755	
7,200.0	6,861.6	7,199.3	6,862.8	20.0	20.8	-90.11		343.5	417.2	659.4	618.9	40.56	16.256	
7,300.0	6,873.8	7,299.4	6,874.9	21.9	22.7	-90.10		343.5	516.5	659.4	615.0	44.43	14.841	
7,400.0	6,881.8	7,399.5	6,882.9	24.1	24.8	-90.10		343.5	616.2	659.4	610.8	48.63	13.561	
7,500.0	6,882.2	7,499.5	6,883.3	26.3	27.0	-90.10		343.5	716.3	659.4	606.4	53.05	12.429	
7,600.0	6,881.4	7,599.5	6,882.5	28.6	29.3	-90.10		343.5	816.3	659.4	601.7	57.68	11.432	
7,700.0	6,880.5	7,699.5	6,881.6	31.0	31.7	-90.09		343.5	916.3	659.4	597.0	62.47	10.555	
7,800.0	6,879.6	7,799.5	6,880.7	33.5	34.1	-90.09		343.5	1,016.3	659.4	592.0	67.39	9.785	
7,900.0	6,878.7	7,899.5	6,879.8	36.0	36.6	-90.09		343.5	1,116.3	659.4	587.0	72.41	9.106	
8,000.0	6,877.9	7,999.5	6,878.9	38.6	39.2	-90.09		343.5	1,216.3	659.4	581.9	77.52	8.507	
8,100.0	6,877.0	8,099.5	6,878.0	41.1	41.7	-90.09		343.5	1,316.3	659.4	576.7	82.68	7.975	
8,200.0	6,876.1	8,199.5	6,877.1	43.8	44.3	-90.09		343.5	1,416.3	659.4	571.5	87.91	7.501	
8,300.0	6,875.2	8,299.5	6,876.2	46.4	47.0	-90.09		343.5	1,516.3	659.4	566.2	93.18	7.077	
8,400.0	6,874.4	8,399.5	6,875.3	49.1	49.6	-90.08		343.5	1,616.3	659.4	560.9	98.49	6.696	
8,500.0	6,873.5	8,499.5	6,874.4	51.7	52.3	-90.08		343.5	1,716.3	659.4	555.6	103.83	6.351	
8,600.0	6,872.6	8,599.5	6,873.6	54.4	55.0	-90.08		343.5	1,816.2	659.4	550.2	109.20	6.039	
8,700.0	6,871.8	8,699.5	6,872.7	57.1	57.6	-90.08		343.5	1,916.2	659.4	544.8	114.59	5.755	
8,800.0	6,870.9	8,799.5	6,871.8	59.8	60.3	-90.08		343.5	2,016.2	659.4	539.4	120.00	5.495	
8,900.0	6,870.0	8,899.5	6,870.9	62.5	63.0	-90.08		343.5	2,116.2	659.4	534.0	125.43	5.257	
9,000.0	6,869.1	8,999.5	6,870.0	65.3	65.8	-90.07		343.5	2,216.2	659.4	528.5	130.88	5.038	
9,100.0	6,868.3	9,099.5	6,869.1	68.0	68.5	-90.07		343.5	2,316.2	659.4	523.1	136.34	4.837	
9,200.0	6,867.4	9,199.5	6,868.2	70.7	71.2	-90.07		343.5	2,416.2	659.4	517.6	141.81	4.650	
9,300.0	6,866.5	9,299.5	6,867.3	73.5	74.0	-90.07		343.5	2,516.2	659.4	512.1	147.30	4.477	
9,400.0	6,865.6	9,399.5	6,866.4	76.2	76.7	-90.07		343.5	2,616.2	659.4	506.6	152.79	4.316	
9,500.0	6,864.8	9,499.5	6,865.5	79.0	79.4	-90.07		343.5	2,716.2	659.4	501.1	158.29	4.166	
9,600.0	6,863.9	9,599.5	6,864.7	81.7	82.2	-90.07		343.5	2,816.2	659.4	495.6	163.80	4.026	
9,700.0	6,863.0	9,699.5	6,863.8	84.5	84.9	-90.06		343.5	2,916.2	659.4	490.1	169.32	3.895	
9,800.0	6,862.2	9,799.5	6,862.9	87.2	87.7	-90.06		343.5	3,016.2	659.4	484.6	174.84	3.772	
9,900.0	6,861.3	9,899.5	6,862.0	90.0	90.5	-90.06		343.5	3,116.2	659.4	479.1	180.37	3.656	
10,000.0	6,860.4	9,999.5	6,861.1	92.8	93.2	-90.06		343.5	3,216.2	659.4	473.5	185.90	3.547	
10,100.0	6,859.5	10,099.5	6,860.2	95.6	96.0	-90.06		343.5	3,316.2	659.4	468.0	191.44	3.444	

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 Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein 19MN-HZ Pad Sec.19-T5N-R64W - Klein 19M-432 - Wellbore #1 - Plan #1 (2-26-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,200.0	6,858.7	10,199.5	6,859.3	98.3	98.8	-90.06		343.5	3,416.2	659.4	462.4	196.99	3.348	
10,300.0	6,857.8	10,299.5	6,858.4	101.1	101.5	-90.06		343.5	3,516.2	659.4	456.9	202.53	3.256	
10,400.0	6,856.9	10,399.5	6,857.5	103.9	104.3	-90.05		343.5	3,616.2	659.4	451.3	208.09	3.169	
10,500.0	6,856.0	10,499.5	6,856.6	106.7	107.1	-90.05		343.5	3,716.2	659.4	445.8	213.64	3.087	
10,600.0	6,855.2	10,599.5	6,855.8	109.4	109.9	-90.05		343.5	3,816.2	659.4	440.2	219.20	3.008	
10,700.0	6,854.3	10,699.5	6,854.9	112.2	112.6	-90.05		343.5	3,916.2	659.4	434.7	224.76	2.934	
10,800.0	6,853.4	10,799.5	6,854.0	115.0	115.4	-90.05		343.5	4,016.2	659.4	429.1	230.32	2.863	
10,900.0	6,852.6	10,899.5	6,853.1	117.8	118.2	-90.05		343.5	4,116.2	659.4	423.5	235.89	2.795	
11,000.0	6,851.7	10,999.5	6,852.2	120.6	121.0	-90.04		343.5	4,216.2	659.4	418.0	241.46	2.731	
11,100.0	6,850.8	11,099.5	6,851.3	123.3	123.8	-90.04		343.5	4,316.1	659.4	412.4	247.03	2.669	
11,200.0	6,849.9	11,199.5	6,850.4	126.1	126.5	-90.04		343.5	4,416.1	659.4	406.8	252.60	2.611	
11,300.0	6,849.1	11,299.5	6,849.5	128.9	129.3	-90.04		343.5	4,516.1	659.4	401.2	258.18	2.554	
11,400.0	6,848.2	11,399.5	6,848.6	131.7	132.1	-90.04		343.5	4,616.1	659.4	395.7	263.75	2.500	
11,500.0	6,847.3	11,499.5	6,847.7	134.5	134.9	-90.04		343.5	4,716.1	659.4	390.1	269.33	2.448	
11,600.0	6,846.4	11,599.5	6,846.9	137.3	137.7	-90.04		343.5	4,816.1	659.4	384.5	274.91	2.399	
11,700.0	6,845.6	11,699.5	6,846.0	140.1	140.5	-90.03		343.5	4,916.1	659.4	378.9	280.49	2.351	
11,800.0	6,844.7	11,799.5	6,845.1	142.9	143.3	-90.03		343.5	5,016.1	659.4	373.3	286.08	2.305	
11,900.0	6,843.8	11,899.5	6,844.2	145.7	146.1	-90.03		343.5	5,116.1	659.4	367.8	291.66	2.261	
12,000.0	6,843.0	11,999.5	6,843.3	148.5	148.9	-90.03		343.5	5,216.1	659.4	362.2	297.24	2.218	
12,100.0	6,842.1	12,099.5	6,842.4	151.2	151.6	-90.03		343.5	5,316.1	659.4	356.6	302.83	2.178	
12,200.0	6,841.2	12,199.5	6,841.5	154.0	154.4	-90.03		343.5	5,416.1	659.4	351.0	308.42	2.138	
12,300.0	6,840.3	12,299.5	6,840.6	156.8	157.2	-90.02		343.5	5,516.1	659.4	345.4	314.01	2.100	
12,400.0	6,839.5	12,399.5	6,839.7	159.6	160.0	-90.02		343.5	5,616.1	659.4	339.8	319.60	2.063	
12,500.0	6,838.6	12,499.5	6,838.8	162.4	162.8	-90.02		343.5	5,716.1	659.4	334.2	325.19	2.028	
12,600.0	6,837.7	12,599.5	6,838.0	165.2	165.6	-90.02		343.5	5,816.1	659.4	328.6	330.78	1.994	
12,700.0	6,836.8	12,699.5	6,837.1	168.0	168.4	-90.02		343.5	5,916.1	659.4	323.0	336.37	1.960	
12,800.0	6,836.0	12,799.5	6,836.2	170.8	171.2	-90.02		343.5	6,016.1	659.4	317.4	341.97	1.928	
12,900.0	6,835.1	12,899.5	6,835.3	173.6	174.0	-90.02		343.5	6,116.1	659.4	311.9	347.56	1.897	
13,000.0	6,834.2	12,999.5	6,834.4	176.4	176.8	-90.01		343.5	6,216.1	659.4	306.3	353.15	1.867	
13,100.0	6,833.4	13,099.5	6,833.5	179.2	179.6	-90.01		343.5	6,316.1	659.4	300.7	358.75	1.838	
13,200.0	6,832.5	13,199.5	6,832.6	182.0	182.4	-90.01		343.5	6,416.1	659.4	295.1	364.35	1.810	
13,300.0	6,831.6	13,299.5	6,831.7	184.8	185.2	-90.01		343.5	6,516.1	659.4	289.5	369.94	1.782	
13,400.0	6,830.7	13,399.5	6,830.8	187.6	188.0	-90.01		343.5	6,616.1	659.4	283.9	375.54	1.756	
13,500.0	6,829.9	13,499.5	6,829.9	190.4	190.8	-90.01		343.5	6,716.1	659.4	278.3	381.14	1.730	
13,600.0	6,829.0	13,599.5	6,829.1	193.2	193.6	-90.01		343.5	6,816.0	659.4	272.7	386.74	1.705	
13,700.0	6,828.1	13,699.5	6,828.2	196.0	196.4	-90.00		343.5	6,916.0	659.4	267.1	392.34	1.681	
13,800.0	6,827.2	13,799.5	6,827.3	198.8	199.2	-90.00		343.5	7,016.0	659.4	261.5	397.93	1.657	
13,900.0	6,826.4	13,899.5	6,826.4	201.6	202.0	-90.00		343.5	7,116.0	659.4	255.9	403.53	1.634	
13,933.8	6,826.1	13,933.3	6,826.1	202.6	202.9	-90.00		343.5	7,149.9	659.4	254.0	405.43	1.626	
13,943.1	6,826.0	13,942.5	6,826.0	202.8	203.2	-90.00		343.5	7,159.0	659.4	253.5	405.95	1.624 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein 19MN-HZ Pad Sec.19-T5N-R64W - Klein 19N-312 - Wellbore #1 - Plan #1 (2-26-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	90.01	90.01	0.0	30.6	30.6				
100.0	100.0	100.0	100.0	0.1	0.1	90.01	90.01	0.0	30.6	30.6	30.4	0.22	136.328	
200.0	200.0	200.0	200.0	0.3	0.3	90.01	90.01	0.0	30.6	30.6	30.0	0.67	45.443	
300.0	300.0	300.0	300.0	0.6	0.6	90.01	90.01	0.0	30.6	30.6	29.5	1.12	27.266	
400.0	400.0	400.0	400.0	0.8	0.8	90.01	90.01	0.0	30.6	30.6	29.1	1.57	19.475	
500.0	500.0	500.0	500.0	1.0	1.0	90.01	90.01	0.0	30.6	30.6	28.6	2.02	15.148	
600.0	600.0	600.0	600.0	1.2	1.2	90.01	90.01	0.0	30.6	30.6	28.2	2.47	12.393	
700.0	700.0	700.0	700.0	1.5	1.5	90.01	90.01	0.0	30.6	30.6	27.7	2.92	10.487	
800.0	800.0	800.0	800.0	1.7	1.7	90.01	90.01	0.0	30.6	30.6	27.3	3.37	9.089	
900.0	900.0	900.0	900.0	1.9	1.9	90.01	90.01	0.0	30.6	30.6	26.8	3.82	8.019	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	90.01	90.01	0.0	30.6	30.6	26.4	4.27	7.175	
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	90.01	90.01	0.0	30.6	30.6	25.9	4.72	6.492	
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	90.01	90.01	0.0	30.6	30.6	25.5	5.17	5.927	
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	90.01	90.01	0.0	30.6	30.6	25.0	5.62	5.453	
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	90.01	90.01	0.0	30.6	30.6	24.6	6.07	5.049	
1,500.0	1,500.0	1,500.0	1,500.0	3.3	3.3	90.01	90.01	0.0	30.6	30.6	24.1	6.52	4.701 CC	
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	-126.95	-126.95	0.0	30.6	31.7	24.7	6.94	4.562	
1,700.0	1,699.8	1,699.8	1,699.8	3.6	3.7	-133.74	-133.74	0.0	30.6	35.1	27.7	7.34	4.779	
1,800.0	1,799.5	1,799.5	1,799.5	3.8	3.9	-142.36	-142.36	0.0	30.6	41.6	33.8	7.73	5.378	
1,900.0	1,898.8	1,898.8	1,898.8	4.0	4.2	-150.29	-150.29	0.0	30.6	51.3	43.2	8.13	6.314	
2,000.0	1,998.0	1,998.0	1,998.0	4.3	4.4	-155.80	-155.80	0.0	30.6	62.1	53.6	8.54	7.268	
2,100.0	2,097.3	2,097.3	2,097.3	4.5	4.6	-159.66	-159.66	0.0	30.6	73.3	64.3	8.96	8.174	
2,200.0	2,196.6	2,196.6	2,196.6	4.7	4.8	-162.50	-162.50	0.0	30.6	84.7	75.3	9.39	9.020	
2,300.0	2,295.9	2,295.9	2,295.9	5.0	5.0	-164.65	-164.65	0.0	30.6	96.2	86.4	9.81	9.806	
2,400.0	2,395.1	2,395.1	2,395.1	5.2	5.3	-166.35	-166.35	0.0	30.6	107.9	97.7	10.24	10.533	
2,500.0	2,494.4	2,494.4	2,494.4	5.5	5.5	-167.71	-167.71	0.0	30.6	119.7	109.0	10.68	11.206	
2,600.0	2,593.7	2,597.5	2,597.5	5.8	5.7	-169.24	-169.24	-0.4	29.0	130.1	119.0	11.10	11.716	
2,700.0	2,692.9	2,701.2	2,701.0	6.1	5.9	-171.38	-171.38	-1.7	23.8	137.6	126.1	11.51	11.949	
2,800.0	2,792.2	2,805.0	2,804.4	6.4	6.1	-174.17	-174.17	-3.8	14.9	142.3	130.4	11.93	11.926	
2,900.0	2,891.5	2,905.8	2,904.6	6.6	6.3	-177.35	-177.35	-6.6	3.6	145.2	132.9	12.36	11.755	
3,000.0	2,990.8	3,005.4	3,003.5	6.9	6.6	-179.60	-179.60	-9.3	-7.6	148.5	135.7	12.79	11.612	
3,100.0	3,090.0	3,105.1	3,102.5	7.2	6.8	-176.69	-176.69	-12.0	-18.8	152.2	138.9	13.23	11.498	
3,200.0	3,189.3	3,204.7	3,201.5	7.5	7.0	-173.93	-173.93	-14.7	-30.1	156.2	142.5	13.69	11.409	
3,300.0	3,288.6	3,304.4	3,300.4	7.8	7.3	-171.31	-171.31	-17.5	-41.3	160.6	146.4	14.16	11.340	
3,400.0	3,387.8	3,404.0	3,399.4	8.1	7.5	-168.83	-168.83	-20.2	-52.5	165.3	150.6	14.64	11.287	
3,500.0	3,487.1	3,503.6	3,498.4	8.4	7.8	-166.49	-166.49	-22.9	-63.8	170.3	155.1	15.14	11.248	
3,600.0	3,586.4	3,603.3	3,597.3	8.7	8.0	-164.29	-164.29	-25.6	-75.0	175.5	159.9	15.65	11.221	
3,700.0	3,685.7	3,702.9	3,696.3	9.0	8.3	-162.22	-162.22	-28.4	-86.3	181.1	164.9	16.16	11.202	
3,800.0	3,784.9	3,802.6	3,795.3	9.3	8.6	-160.28	-160.28	-31.1	-97.5	186.8	170.1	16.69	11.192	
3,900.0	3,884.2	3,902.2	3,894.2	9.7	8.8	-158.45	-158.45	-33.8	-108.7	192.7	175.5	17.23	11.188	
4,000.0	3,983.5	4,001.8	3,993.2	10.0	9.1	-156.73	-156.73	-36.6	-120.0	198.8	181.1	17.77	11.190	
4,100.0	4,082.7	4,101.5	4,092.2	10.3	9.4	-155.11	-155.11	-39.3	-131.2	205.1	186.8	18.32	11.196	
4,200.0	4,182.0	4,201.1	4,191.1	10.6	9.6	-153.60	-153.60	-42.0	-142.4	211.6	192.7	18.88	11.205	
4,300.0	4,281.3	4,300.8	4,290.1	10.9	9.9	-152.17	-152.17	-44.7	-153.7	218.1	198.7	19.45	11.218	
4,400.0	4,380.6	4,400.4	4,389.1	11.2	10.2	-150.83	-150.83	-47.5	-164.9	224.8	204.8	20.02	11.233	
4,500.0	4,479.8	4,500.0	4,488.0	11.5	10.5	-149.56	-149.56	-50.2	-176.2	231.7	211.1	20.59	11.251	
4,600.0	4,579.1	4,599.7	4,587.0	11.8	10.8	-148.37	-148.37	-52.9	-187.4	238.6	217.4	21.17	11.270	
4,700.0	4,678.4	4,698.9	4,685.6	12.1	11.1	-147.27	-147.27	-55.6	-198.5	245.6	223.8	21.75	11.290	
4,800.0	4,777.9	4,796.5	4,782.7	12.4	11.3	-146.47	-146.47	-57.8	-207.3	251.1	228.9	22.24	11.293	
4,900.0	4,877.7	4,894.3	4,880.3	12.6	11.5	-145.99	-145.99	-59.1	-212.9	254.7	232.0	22.67	11.235	
5,000.0	4,977.7	4,992.2	4,978.2	12.7	11.7	-145.79	-145.79	-59.7	-215.3	256.2	233.1	23.04	11.116	

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 Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein 19MN-HZ Pad Sec.19-T5N-R64W - Klein 19N-312 - Wellbore #1 - Plan #1 (2-26-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,077.7	5,091.7	5,077.7	12.9	11.9	0.14		-59.7	-215.4	256.2	232.9	23.29	11.000	
5,200.0	5,177.7	5,191.7	5,177.7	13.1	12.0	0.14		-59.7	-215.4	256.2	232.5	23.68	10.822	
5,300.0	5,277.7	5,291.7	5,277.7	13.3	12.3	0.14		-59.7	-215.4	256.2	232.1	24.06	10.648	
5,400.0	5,377.7	5,391.7	5,377.7	13.4	12.5	0.14		-59.7	-215.4	256.2	231.8	24.45	10.478	
5,500.0	5,477.7	5,491.7	5,477.7	13.6	12.7	0.14		-59.7	-215.4	256.2	231.4	24.84	10.313	
5,600.0	5,577.7	5,591.7	5,577.7	13.8	12.9	0.14		-59.7	-215.4	256.2	231.0	25.24	10.153	
5,700.0	5,677.7	5,691.7	5,677.7	13.9	13.1	0.14		-59.7	-215.4	256.2	230.6	25.63	9.997	
5,800.0	5,777.7	5,791.7	5,777.7	14.1	13.3	0.14		-59.7	-215.4	256.2	230.2	26.03	9.844	
5,900.0	5,877.7	5,891.7	5,877.7	14.3	13.5	0.14		-59.7	-215.4	256.2	229.8	26.42	9.696	
6,000.0	5,977.7	5,991.7	5,977.7	14.5	13.7	0.14		-59.7	-215.4	256.2	229.4	26.82	9.552	
6,053.6	6,031.3	6,045.2	6,031.3	14.6	13.8	0.14		-59.7	-215.4	256.2	229.2	27.04	9.476	
6,100.0	6,077.7	6,091.6	6,077.6	14.6	13.9	0.39		-59.7	-214.2	256.2	229.0	27.23	9.411	
6,200.0	6,177.6	6,190.5	6,175.7	14.8	14.0	-87.66		-59.7	-202.5	256.4	228.8	27.60	9.291	
6,300.0	6,276.3	6,288.1	6,270.3	14.9	14.1	-85.62		-59.7	-178.7	257.0	229.2	27.75	9.261	
6,400.0	6,372.2	6,384.7	6,360.1	15.0	14.2	-83.67		-59.7	-143.4	257.8	229.9	27.86	9.254	
6,500.0	6,463.5	6,480.2	6,443.9	15.0	14.3	-81.85		-59.7	-97.6	258.8	230.8	28.01	9.242	
6,600.0	6,548.8	6,574.9	6,520.7	15.1	14.5	-80.19		-59.7	-42.2	260.0	231.7	28.29	9.192	
6,700.0	6,626.6	6,668.8	6,589.4	15.1	14.8	-78.69		-59.7	21.6	261.3	232.5	28.83	9.063	
6,800.0	6,695.5	6,762.0	6,649.4	15.2	15.4	-77.40		-59.7	92.8	262.6	232.8	29.76	8.822	
6,900.0	6,754.3	6,854.5	6,700.1	15.7	16.2	-76.31		-59.7	170.2	263.7	232.5	31.19	8.456	
7,000.0	6,802.2	6,946.7	6,740.7	16.8	17.3	-75.43		-59.7	252.8	264.7	231.5	33.18	7.978	
7,100.0	6,838.1	7,038.4	6,771.1	18.3	18.7	-74.79		-59.7	339.4	265.5	229.8	35.74	7.428	
7,200.0	6,861.6	7,129.9	6,790.8	20.0	20.3	-74.38		-59.7	428.7	266.0	227.2	38.81	6.855	
7,300.0	6,873.8	7,221.2	6,799.8	21.9	22.0	-73.91		-59.7	519.5	266.7	224.4	42.26	6.311	
7,400.0	6,881.8	7,317.0	6,799.5	24.1	24.0	-72.22		-59.7	615.2	269.1	223.3	45.79	5.877	
7,500.0	6,882.2	7,417.0	6,798.2	26.3	26.2	-71.85		-59.7	715.2	269.6	219.7	49.88	5.406	
7,600.0	6,881.4	7,517.0	6,796.9	28.6	28.5	-71.76		-59.7	815.2	269.8	215.5	54.27	4.971	
7,700.0	6,880.5	7,617.0	6,795.6	31.0	30.9	-71.68		-59.7	915.2	269.9	211.1	58.81	4.589	
7,800.0	6,879.6	7,717.0	6,794.4	33.5	33.4	-71.59		-59.7	1,015.2	270.0	206.6	63.47	4.254	
7,900.0	6,878.7	7,817.0	6,793.1	36.0	35.9	-71.51		-59.7	1,115.2	270.2	201.9	68.22	3.960	
8,000.0	6,877.9	7,917.0	6,791.8	38.6	38.4	-71.43		-59.7	1,215.1	270.3	197.2	73.05	3.700	
8,100.0	6,877.0	8,017.0	6,790.5	41.1	41.0	-71.34		-59.7	1,315.1	270.4	192.5	77.94	3.470	
8,200.0	6,876.1	8,117.0	6,789.2	43.8	43.6	-71.26		-59.7	1,415.1	270.6	187.7	82.88	3.265	
8,300.0	6,875.2	8,217.0	6,787.9	46.4	46.3	-71.17		-59.7	1,515.1	270.7	182.8	87.85	3.081	
8,400.0	6,874.4	8,317.0	6,786.6	49.1	48.9	-71.09		-59.7	1,615.1	270.8	178.0	92.86	2.917	
8,500.0	6,873.5	8,417.0	6,785.3	51.7	51.6	-71.01		-59.7	1,715.1	271.0	173.1	97.89	2.768	
8,600.0	6,872.6	8,517.0	6,784.0	54.4	54.3	-70.92		-59.7	1,815.1	271.1	168.2	102.95	2.633	
8,700.0	6,871.8	8,617.0	6,782.7	57.1	57.0	-70.84		-59.7	1,915.1	271.2	163.2	108.02	2.511	
8,800.0	6,870.9	8,717.0	6,781.4	59.8	59.7	-70.75		-59.7	2,015.1	271.4	158.3	113.10	2.399	
8,900.0	6,870.0	8,817.0	6,780.1	62.5	62.4	-70.67		-59.7	2,115.1	271.5	153.3	118.20	2.297	
9,000.0	6,869.1	8,917.0	6,778.9	65.3	65.1	-70.59		-59.7	2,215.1	271.6	148.3	123.31	2.203	
9,100.0	6,868.3	9,017.0	6,777.6	68.0	67.8	-70.50		-59.7	2,315.0	271.8	143.4	128.43	2.116	
9,200.0	6,867.4	9,117.0	6,776.3	70.7	70.6	-70.42		-59.7	2,415.0	271.9	138.4	133.55	2.036	
9,300.0	6,866.5	9,217.0	6,775.0	73.5	73.3	-70.34		-59.7	2,515.0	272.1	133.4	138.68	1.962	
9,400.0	6,865.6	9,317.0	6,773.7	76.2	76.1	-70.25		-59.7	2,615.0	272.2	128.4	143.81	1.893	
9,500.0	6,864.8	9,417.0	6,772.4	79.0	78.8	-70.17		-59.7	2,715.0	272.3	123.4	148.94	1.829	
9,600.0	6,863.9	9,517.0	6,771.1	81.7	81.6	-70.09		-59.7	2,815.0	272.5	118.4	154.08	1.769	
9,700.0	6,863.0	9,617.0	6,769.8	84.5	84.3	-70.01		-59.7	2,915.0	272.6	113.4	159.22	1.712	
9,800.0	6,862.2	9,717.0	6,768.5	87.2	87.1	-69.92		-59.7	3,015.0	272.8	108.4	164.36	1.660	
9,900.0	6,861.3	9,817.0	6,767.2	90.0	89.9	-69.84		-59.7	3,115.0	272.9	103.4	169.49	1.610	
10,000.0	6,860.4	9,917.0	6,765.9	92.8	92.6	-69.76		-59.7	3,215.0	273.1	98.4	174.63	1.564	

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 Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Offset Design Klein 19MN-HZ Pad Sec.19-T5N-R64W - Klein 19N-312 - Wellbore #1 - Plan #1 (2-26-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	6,859.5	10,017.0	6,764.7	95.6	95.4	-69.68	-59.7	3,315.0	273.2	93.4	179.77	1.520		
10,200.0	6,858.7	10,117.0	6,763.4	98.3	98.2	-69.59	-59.7	3,414.9	273.4	88.5	184.91	1.478	Level 3	
10,300.0	6,857.8	10,217.0	6,762.1	101.1	100.9	-69.51	-59.7	3,514.9	273.5	83.5	190.04	1.439	Level 3	
10,400.0	6,856.9	10,317.0	6,760.8	103.9	103.7	-69.43	-59.7	3,614.9	273.6	78.5	195.17	1.402	Level 3	
10,500.0	6,856.0	10,417.0	6,759.5	106.7	106.5	-69.35	-59.7	3,714.9	273.8	73.5	200.30	1.367	Level 3	
10,600.0	6,855.2	10,517.0	6,758.2	109.4	109.3	-69.27	-59.7	3,814.9	273.9	68.5	205.43	1.334	Level 3	
10,700.0	6,854.3	10,617.0	6,756.9	112.2	112.1	-69.18	-59.7	3,914.9	274.1	63.5	210.56	1.302	Level 3	
10,800.0	6,853.4	10,717.0	6,755.6	115.0	114.8	-69.10	-59.7	4,014.9	274.2	58.6	215.68	1.272	Level 3	
10,900.0	6,852.6	10,817.0	6,754.3	117.8	117.6	-69.02	-59.7	4,114.9	274.4	53.6	220.80	1.243	Level 2	
11,000.0	6,851.7	10,917.0	6,753.0	120.6	120.4	-68.94	-59.7	4,214.9	274.5	48.6	225.91	1.215	Level 2	
11,100.0	6,850.8	11,017.0	6,751.7	123.3	123.2	-68.86	-59.7	4,314.9	274.7	43.7	231.03	1.189	Level 2	
11,200.0	6,849.9	11,117.0	6,750.4	126.1	126.0	-68.78	-59.7	4,414.9	274.8	38.7	236.13	1.164	Level 2	
11,300.0	6,849.1	11,217.0	6,749.2	128.9	128.8	-68.69	-59.7	4,514.8	275.0	33.8	241.24	1.140	Level 2	
11,400.0	6,848.2	11,316.9	6,747.9	131.7	131.6	-68.61	-59.7	4,614.8	275.1	28.8	246.34	1.117	Level 2	
11,500.0	6,847.3	11,416.9	6,746.6	134.5	134.3	-68.53	-59.7	4,714.8	275.3	23.9	251.44	1.095	Level 2	
11,600.0	6,846.4	11,516.9	6,745.3	137.3	137.1	-68.45	-59.7	4,814.8	275.5	18.9	256.53	1.074	Level 2	
11,700.0	6,845.6	11,616.9	6,744.0	140.1	139.9	-68.37	-59.7	4,914.8	275.6	14.0	261.62	1.053	Level 2	
11,800.0	6,844.7	11,716.9	6,742.7	142.9	142.7	-68.29	-59.7	5,014.8	275.8	9.1	266.70	1.034	Level 2	
11,900.0	6,843.8	11,816.9	6,741.4	145.7	145.5	-68.21	-59.7	5,114.8	275.9	4.1	271.78	1.015	Level 2	
12,000.0	6,843.0	11,916.9	6,740.1	148.5	148.3	-68.13	-59.7	5,214.8	276.1	-0.8	276.86	0.997	Level 1	
12,100.0	6,842.1	12,016.9	6,738.8	151.2	151.1	-68.05	-59.7	5,314.8	276.2	-5.7	281.93	0.980	Level 1	
12,200.0	6,841.2	12,116.9	6,737.5	154.0	153.9	-67.97	-59.7	5,414.8	276.4	-10.6	286.99	0.963	Level 1	
12,300.0	6,840.3	12,216.9	6,736.2	156.8	156.7	-67.89	-59.7	5,514.8	276.5	-15.5	292.05	0.947	Level 1	
12,400.0	6,839.5	12,316.9	6,734.9	159.6	159.5	-67.80	-59.7	5,614.7	276.7	-20.4	297.11	0.931	Level 1	
12,500.0	6,838.6	12,416.9	6,733.7	162.4	162.3	-67.72	-59.7	5,714.7	276.9	-25.3	302.16	0.916	Level 1	
12,600.0	6,837.7	12,516.9	6,732.4	165.2	165.1	-67.64	-59.7	5,814.7	277.0	-30.2	307.20	0.902	Level 1	
12,700.0	6,836.8	12,616.9	6,731.1	168.0	167.9	-67.56	-59.7	5,914.7	277.2	-35.1	312.24	0.888	Level 1	
12,800.0	6,836.0	12,716.9	6,729.8	170.8	170.7	-67.48	-59.7	6,014.7	277.3	-39.9	317.28	0.874	Level 1	
12,900.0	6,835.1	12,816.9	6,728.5	173.6	173.5	-67.40	-59.7	6,114.7	277.5	-44.8	322.31	0.861	Level 1	
13,000.0	6,834.2	12,916.9	6,727.2	176.4	176.3	-67.32	-59.7	6,214.7	277.7	-49.7	327.34	0.848	Level 1	
13,100.0	6,833.4	13,016.9	6,725.9	179.2	179.1	-67.24	-59.7	6,314.7	277.8	-54.5	332.36	0.836	Level 1	
13,200.0	6,832.5	13,116.9	6,724.6	182.0	181.8	-67.16	-59.7	6,414.7	278.0	-59.4	337.37	0.824	Level 1	
13,300.0	6,831.6	13,216.9	6,723.3	184.8	184.6	-67.09	-59.7	6,514.7	278.1	-64.2	342.38	0.812	Level 1	
13,400.0	6,830.7	13,316.9	6,722.0	187.6	187.4	-67.01	-59.7	6,614.7	278.3	-69.1	347.38	0.801	Level 1	
13,500.0	6,829.9	13,416.9	6,720.7	190.4	190.2	-66.93	-59.7	6,714.6	278.5	-73.9	352.38	0.790	Level 1	
13,600.0	6,829.0	13,516.9	6,719.4	193.2	193.0	-66.85	-59.7	6,814.6	278.6	-78.7	357.37	0.780	Level 1	
13,700.0	6,828.1	13,616.9	6,718.2	196.0	195.8	-66.77	-59.7	6,914.6	278.8	-83.6	362.36	0.769	Level 1	
13,800.0	6,827.2	13,716.9	6,716.9	198.8	198.6	-66.69	-59.7	7,014.6	279.0	-88.4	367.34	0.759	Level 1	
13,900.0	6,826.4	13,816.9	6,715.6	201.6	201.4	-66.61	-59.7	7,114.6	279.1	-93.2	372.32	0.750	Level 1	
13,943.1	6,826.0	13,860.1	6,715.0	202.8	202.6	-66.58	-59.7	7,157.7	279.2	-95.3	374.46	0.746	Level 1, ES, SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
Reference Site:	Klein 19MN-HZ Pad Sec.19-T5N-R64W	MD Reference:	WELL @ 4643.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Klein 19N-412	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
Reference Design:	Plan #1 (2-26-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4643.0ft (RKB - 15')

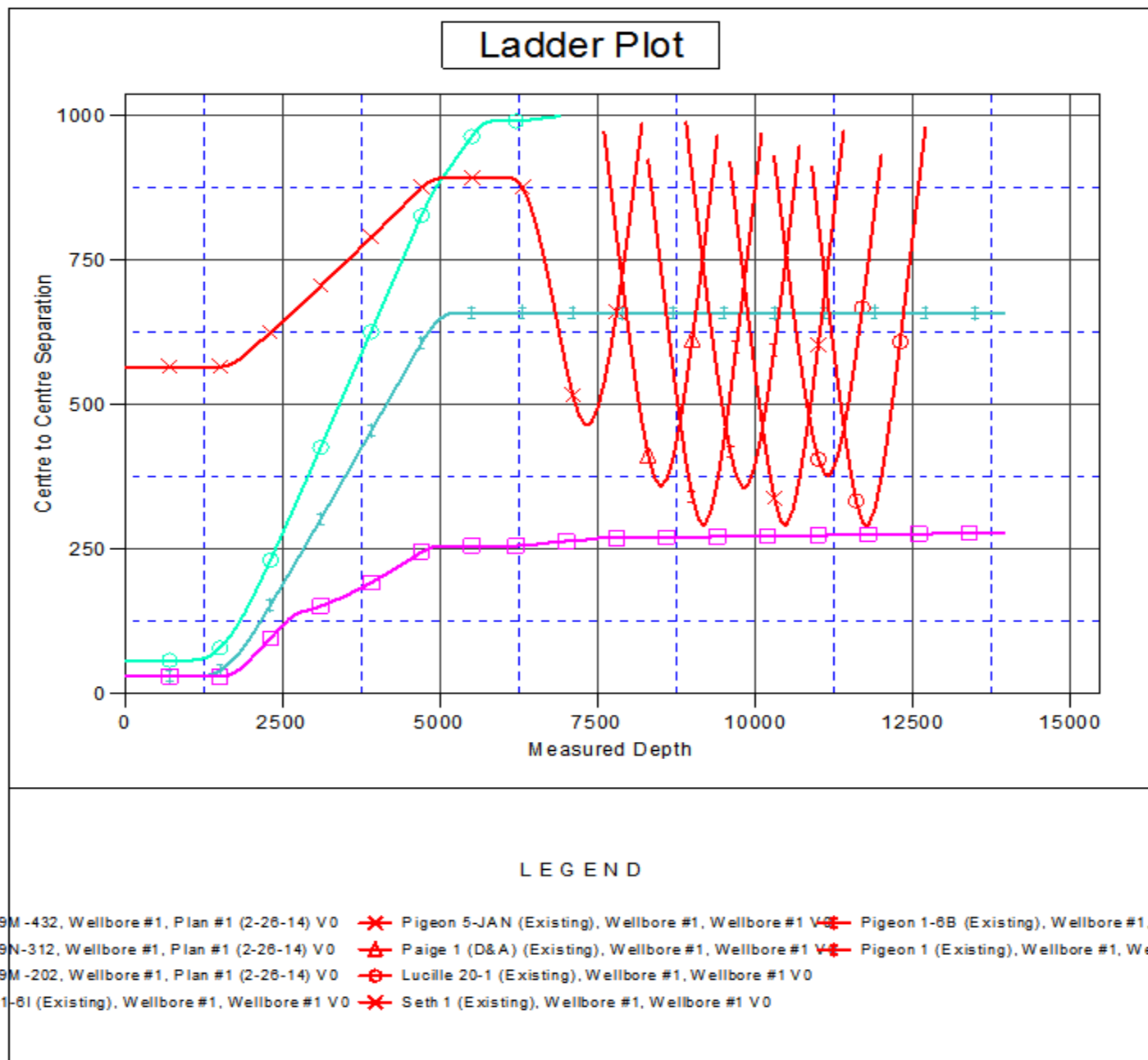
Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Klein 19N-412

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.59°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Klein 19N-412
Project:	SEC.19-T5N-R64W	TVD Reference:	WELL @ 4643.0ft (RKB - 15')
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