

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Ledford 22T-321**

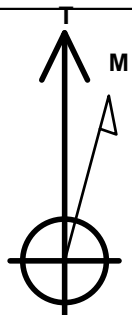
Surface Location: Ledford 22Y-HZ Pad Sec.22-T5N-R64W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4598.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1382151.61	3270918.54	40.378330	-104.527550	

RKB - 15' WELL @ 4613.0ft (RKB - 15')

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 254'FSL & 327'FEL	1.0	0.0	0.0	Point
BHL 500'FNL & 1065'FEL	6626.0	4510.2	-749.3	Point



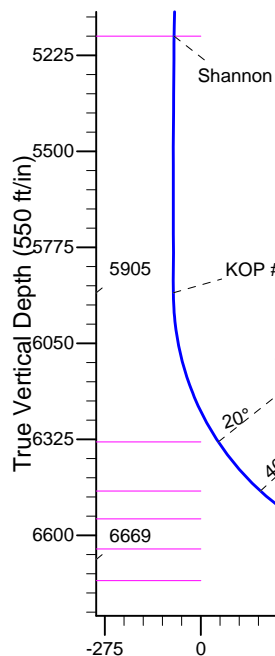
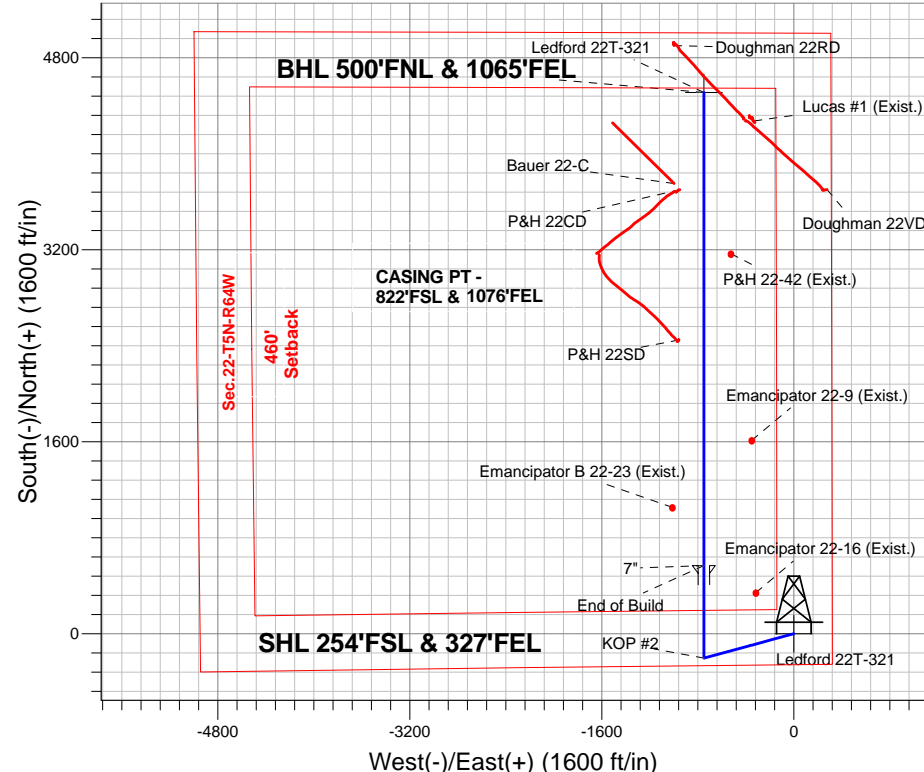
Azimuths to True North
Magnetic North: 8.32°

Magnetic Field
Strength: 52889.4nT
Dip Angle: 66.99°
Date: 2/25/2014
Model: IGRF200510

Ledford 22Y-HZ Pad Sec.22-T5N-R64W
Ledford 22T-321
Plan #1 (2-25-14)
16:17, March 06 2014

ANNOTATIONS

TVD	MD	Annotation
400.0	400.0	KOP
5905.4	5968.0	KOP #2
6669.3	7176.4	End of Build



ENSIGN
Directional

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	400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.0	
3	876.9	9.54	254.77	874.7	-10.4	-38.2	2.00	254.77	-4.0	
4	5085.7	9.54	254.77	5025.3	-193.6	-711.1	0.00	0.00	-74.4	
5	5562.6	0.00	0.00	5500.0	-204.0	-749.3	2.00	180.00	-78.4	
6	5968.0	0.00	0.00	5905.4	-204.0	-749.3	0.00	0.00	-78.4	
7	7176.4	90.63	360.00	6669.3	568.3	-749.3	7.50	360.00	683.5	
8	11118.5	90.63	360.00	6626.0	4510.2	-749.3	0.00	0.00	4572.0	BHL 500'FNL & 1065'FEL

BHL 500'FNL & 1065'FEL

Vertical Section at 350.57° (550 ft/in)



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W

Ledford 22Y-HZ Pad Sec.22-T5N-R64W

Ledford 22T-321

Wellbore #1

Plan: Plan #1 (2-25-14)

Standard Planning Report

03 March, 2014

Database:	Landmark	Local Co-ordinate Reference:	Well Ledford 22T-321
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Project:	SEC.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	North Reference:	True
Well:	Ledford 22T-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-25-14)		

Project	SEC.22-T5N-R64W, 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						Ledford 22Y-HZ Pad Sec.22-T5N-R64W											
Site Position:						Northing:			1,382,151.62 ft			Latitude:			40.378330		
From:			Lat/Long			Easting:			3,270,918.54 ft			Longitude:			-104.527550		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.63 °		

Well	Ledford 22T-321					
Well Position	+N/-S	0.0 ft	Northing:	1,382,151.61 ft	Latitude:	40.378330
	+E/-W	0.0 ft	Easting:	3,270,918.54 ft	Longitude:	-104.527550
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,598.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2/25/2014	8.32	66.99	52,889

Design	Plan #1 (2-25-14)			
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	350.57

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
400.0	0.00	0.00	400.0	0.0	0.0	0.00	0.00	0.00	0.00	
876.9	9.54	254.77	874.7	-10.4	-38.2	2.00	2.00	0.00	254.77	
5,085.7	9.54	254.77	5,025.3	-193.6	-711.1	0.00	0.00	0.00	0.00	
5,562.6	0.00	0.00	5,500.0	-204.0	-749.3	2.00	-2.00	0.00	180.00	
5,968.0	0.00	0.00	5,905.4	-204.0	-749.3	0.00	0.00	0.00	0.00	
7,176.4	90.63	360.00	6,669.3	568.3	-749.3	7.50	7.50	0.00	360.00	
11,118.5	90.63	360.00	6,626.0	4,510.2	-749.3	0.00	0.00	0.00	0.00	BHL 500'FNL & 100'

Database:	Landmark	Local Co-ordinate Reference:	Well Ledford 22T-321
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Project:	SEC.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	North Reference:	True
Well:	Ledford 22T-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-25-14)		

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 254'FSL & 327'FEL									
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP									
500.0	2.00	254.77	500.0	-0.5	-1.7	-0.2	2.00	2.00	0.00
600.0	4.00	254.77	599.8	-1.8	-6.7	-0.7	2.00	2.00	0.00
700.0	6.00	254.77	699.5	-4.1	-15.1	-1.6	2.00	2.00	0.00
800.0	8.00	254.77	798.7	-7.3	-26.9	-2.8	2.00	2.00	0.00
876.9	9.54	254.77	874.7	-10.4	-38.2	-4.0	2.00	2.00	0.00
900.0	9.54	254.77	897.5	-11.4	-41.9	-4.4	0.00	0.00	0.00
1,000.0	9.54	254.77	996.1	-15.8	-57.9	-6.1	0.00	0.00	0.00
1,100.0	9.54	254.77	1,094.7	-20.1	-73.9	-7.7	0.00	0.00	0.00
1,200.0	9.54	254.77	1,193.3	-24.5	-89.9	-9.4	0.00	0.00	0.00
1,300.0	9.54	254.77	1,292.0	-28.8	-105.9	-11.1	0.00	0.00	0.00
1,400.0	9.54	254.77	1,390.6	-33.2	-121.8	-12.8	0.00	0.00	0.00
1,500.0	9.54	254.77	1,489.2	-37.5	-137.8	-14.4	0.00	0.00	0.00
1,600.0	9.54	254.77	1,587.8	-41.9	-153.8	-16.1	0.00	0.00	0.00
1,700.0	9.54	254.77	1,686.4	-46.2	-169.8	-17.8	0.00	0.00	0.00
1,800.0	9.54	254.77	1,785.0	-50.6	-185.8	-19.4	0.00	0.00	0.00
1,900.0	9.54	254.77	1,883.7	-54.9	-201.8	-21.1	0.00	0.00	0.00
2,000.0	9.54	254.77	1,982.3	-59.3	-217.8	-22.8	0.00	0.00	0.00
2,100.0	9.54	254.77	2,080.9	-63.6	-233.8	-24.5	0.00	0.00	0.00
2,200.0	9.54	254.77	2,179.5	-68.0	-249.7	-26.1	0.00	0.00	0.00
2,300.0	9.54	254.77	2,278.1	-72.3	-265.7	-27.8	0.00	0.00	0.00
2,400.0	9.54	254.77	2,376.7	-76.7	-281.7	-29.5	0.00	0.00	0.00
2,500.0	9.54	254.77	2,475.4	-81.1	-297.7	-31.2	0.00	0.00	0.00
2,600.0	9.54	254.77	2,574.0	-85.4	-313.7	-32.8	0.00	0.00	0.00
2,700.0	9.54	254.77	2,672.6	-89.8	-329.7	-34.5	0.00	0.00	0.00
2,800.0	9.54	254.77	2,771.2	-94.1	-345.7	-36.2	0.00	0.00	0.00
2,900.0	9.54	254.77	2,869.8	-98.5	-361.7	-37.9	0.00	0.00	0.00
3,000.0	9.54	254.77	2,968.5	-102.8	-377.6	-39.5	0.00	0.00	0.00
3,100.0	9.54	254.77	3,067.1	-107.2	-393.6	-41.2	0.00	0.00	0.00
3,200.0	9.54	254.77	3,165.7	-111.5	-409.6	-42.9	0.00	0.00	0.00
3,300.0	9.54	254.77	3,264.3	-115.9	-425.6	-44.6	0.00	0.00	0.00
3,400.0	9.54	254.77	3,362.9	-120.2	-441.6	-46.2	0.00	0.00	0.00
Parkman									
3,500.0	9.54	254.77	3,461.5	-124.6	-457.6	-47.9	0.00	0.00	0.00
3,600.0	9.54	254.77	3,560.2	-128.9	-473.6	-49.6	0.00	0.00	0.00
3,700.0	9.54	254.77	3,658.8	-133.3	-489.6	-51.2	0.00	0.00	0.00
3,800.0	9.54	254.77	3,757.4	-137.6	-505.5	-52.9	0.00	0.00	0.00
3,900.0	9.54	254.77	3,856.0	-142.0	-521.5	-54.6	0.00	0.00	0.00
4,000.0	9.54	254.77	3,954.6	-146.3	-537.5	-56.3	0.00	0.00	0.00
4,100.0	9.54	254.77	4,053.2	-150.7	-553.5	-57.9	0.00	0.00	0.00
4,200.0	9.54	254.77	4,151.9	-155.0	-569.5	-59.6	0.00	0.00	0.00
4,250.0	9.54	254.77	4,201.2	-157.2	-577.5	-60.5	0.00	0.00	0.00
Sussex									
4,300.0	9.54	254.77	4,250.5	-159.4	-585.5	-61.3	0.00	0.00	0.00
4,400.0	9.54	254.77	4,349.1	-163.8	-601.5	-63.0	0.00	0.00	0.00
4,500.0	9.54	254.77	4,447.7	-168.1	-617.5	-64.6	0.00	0.00	0.00

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Project:	SEC.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	North Reference:	True
Well:	Ledford 22T-321	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-25-14)		

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)
4,600.0	9.54	254.77	4,546.3	-172.5	-633.4	-66.3	0.00	0.00	0.00
4,700.0	9.54	254.77	4,645.0	-176.8	-649.4	-68.0	0.00	0.00	0.00
4,800.0	9.54	254.77	4,743.6	-181.2	-665.4	-69.7	0.00	0.00	0.00
4,900.0	9.54	254.77	4,842.2	-185.5	-681.4	-71.3	0.00	0.00	0.00
5,000.0	9.54	254.77	4,940.8	-189.9	-697.4	-73.0	0.00	0.00	0.00
5,085.7	9.54	254.77	5,025.3	-193.6	-711.1	-74.4	0.00	0.00	0.00
5,100.0	9.25	254.77	5,039.4	-194.2	-713.3	-74.7	2.00	-2.00	0.00
5,170.0	7.85	254.77	5,108.7	-196.9	-723.4	-75.7	2.00	-2.00	0.00
Shannon									
5,200.0	7.25	254.77	5,138.4	-198.0	-727.2	-76.1	2.00	-2.00	0.00
5,300.0	5.25	254.77	5,237.8	-200.8	-737.7	-77.2	2.00	-2.00	0.00
5,400.0	3.25	254.77	5,337.5	-202.8	-744.9	-78.0	2.00	-2.00	0.00
5,500.0	1.25	254.77	5,437.4	-203.8	-748.6	-78.4	2.00	-2.00	0.00
5,562.6	0.00	0.00	5,500.0	-204.0	-749.3	-78.4	2.00	-2.00	0.00
5,600.0	0.00	0.00	5,537.4	-204.0	-749.3	-78.4	0.00	0.00	0.00
5,700.0	0.00	0.00	5,637.4	-204.0	-749.3	-78.4	0.00	0.00	0.00
5,800.0	0.00	0.00	5,737.4	-204.0	-749.3	-78.4	0.00	0.00	0.00
5,900.0	0.00	0.00	5,837.4	-204.0	-749.3	-78.4	0.00	0.00	0.00
5,968.0	0.00	0.00	5,905.4	-204.0	-749.3	-78.4	0.00	0.00	0.00
KOP #2									
6,000.0	2.40	360.00	5,937.4	-203.3	-749.3	-77.8	7.49	7.49	0.00
6,100.0	9.90	360.00	6,036.8	-192.6	-749.3	-67.2	7.50	7.50	0.00
6,200.0	17.40	360.00	6,133.9	-169.0	-749.3	-44.0	7.50	7.50	0.00
6,300.0	24.90	360.00	6,227.1	-133.0	-749.3	-8.4	7.50	7.50	0.00
6,332.0	27.30	360.00	6,255.8	-118.9	-749.3	5.5	7.50	7.50	0.00
Sharon springs									
6,400.0	32.40	360.00	6,314.8	-85.1	-749.3	38.9	7.50	7.50	0.00
6,473.0	37.87	360.00	6,374.4	-43.1	-749.3	80.3	7.50	7.50	0.00
Niobrara A									
6,500.0	39.90	360.00	6,395.5	-26.1	-749.3	97.0	7.50	7.50	0.00
6,553.0	43.87	360.00	6,434.9	9.2	-749.3	131.9	7.50	7.50	0.00
Niobrara B									
6,600.0	47.40	360.00	6,467.8	42.8	-749.3	165.1	7.50	7.50	0.00
6,639.0	50.32	360.00	6,493.4	72.2	-749.3	194.0	7.50	7.50	0.00
Niobrara C									
6,700.0	54.90	360.00	6,530.5	120.7	-749.3	241.8	7.50	7.50	0.00
6,730.0	57.15	360.00	6,547.2	145.5	-749.3	266.4	7.50	7.50	0.00
Ft Hays									
6,800.0	62.40	360.00	6,582.4	206.0	-749.3	326.0	7.50	7.50	0.00
6,900.0	69.90	360.00	6,622.9	297.4	-749.3	416.2	7.50	7.50	0.00
7,000.0	77.40	360.00	6,651.0	393.3	-749.3	510.8	7.50	7.50	0.00
7,100.0	84.90	360.00	6,666.4	492.0	-749.3	608.2	7.50	7.50	0.00
7,176.4	90.63	360.00	6,669.3	568.3	-749.3	683.4	7.50	7.50	0.00
End of Build - 7"									
7,200.0	90.63	360.00	6,669.1	591.9	-749.3	706.7	0.01	0.01	0.00
7,300.0	90.63	360.00	6,668.0	691.9	-749.3	805.4	0.00	0.00	0.00
7,400.0	90.63	360.00	6,666.9	791.9	-749.3	904.0	0.00	0.00	0.00
7,500.0	90.63	360.00	6,665.8	891.9	-749.3	1,002.6	0.00	0.00	0.00
7,600.0	90.63	360.00	6,664.7	991.9	-749.3	1,101.3	0.00	0.00	0.00
7,700.0	90.63	360.00	6,663.6	1,091.9	-749.3	1,199.9	0.00	0.00	0.00
7,800.0	90.63	360.00	6,662.5	1,191.9	-749.3	1,298.6	0.00	0.00	0.00
7,900.0	90.63	360.00	6,661.4	1,291.9	-749.3	1,397.2	0.00	0.00	0.00

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
400.0	400.0	0.0	0.0	KOP
5,968.0	5,905.4	-204.0	-749.3	KOP #2
7,176.4	6,669.3	568.3	-749.3	End of Build

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Reference													
Reference				Offset			Semi Major Axis		Distance				
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,039.4	5,116.3	5,062.9	18.3	16.6	-167.77	-187.4	-576.0	139.5	114.4	25.16	5.545	
5,200.0	5,138.4	5,213.4	5,158.6	18.5	17.0	-167.08	-192.8	-591.4	137.4	111.7	25.69	5.348	
5,300.0	5,237.8	5,309.1	5,253.3	18.7	17.2	-166.42	-197.2	-603.8	134.8	108.7	26.13	5.159	
5,400.0	5,337.5	5,404.8	5,348.5	18.9	17.4	-165.82	-200.5	-613.3	132.1	105.5	26.52	4.979	
5,500.0	5,437.4	5,500.0	5,443.5	19.1	17.6	-165.27	-202.7	-619.7	129.1	102.3	26.86	4.806	
5,600.0	5,537.4	5,596.5	5,539.9	19.2	17.8	89.97	-203.9	-623.1	126.2	99.0	27.21	4.639	
5,689.0	5,626.5	5,683.0	5,626.5	19.3	17.9	90.06	-204.1	-623.7	125.6	98.1	27.52	4.563	
5,700.0	5,637.4	5,694.0	5,637.4	19.3	17.9	90.06	-204.1	-623.7	125.6	98.0	27.56	4.557	
5,800.0	5,737.4	5,794.0	5,737.4	19.5	18.1	90.06	-204.1	-623.7	125.6	97.7	27.91	4.500	
5,900.0	5,837.4	5,894.0	5,837.4	19.6	18.2	90.06	-204.1	-623.7	125.6	97.3	28.26	4.444	
5,953.4	5,890.9	5,947.4	5,890.9	19.7	18.3	90.34	-204.1	-623.7	125.6	97.1	28.48	4.410	
6,000.0	5,937.4	5,994.0	5,937.4	19.7	18.3	90.37	-204.1	-623.7	125.6	96.9	28.65	4.384	
6,100.0	6,036.8	6,094.1	6,037.5	19.8	18.5	94.26	-202.0	-623.7	125.9	96.4	29.49	4.271	
6,200.0	6,133.9	6,195.5	6,137.8	19.9	18.6	98.60	-187.7	-623.7	127.0	96.7	30.30	4.193	
6,300.0	6,227.1	6,298.3	6,236.6	19.9	18.6	102.73	-159.8	-623.7	128.8	97.9	30.87	4.172	
6,400.0	6,314.8	6,402.4	6,332.0	20.0	18.7	106.55	-118.3	-623.7	131.1	99.9	31.12	4.211	
6,500.0	6,395.5	6,507.8	6,421.9	20.0	18.7	109.98	-63.5	-623.7	133.7	102.6	31.09	4.300	
6,600.0	6,467.8	6,614.4	6,504.4	20.0	18.7	112.97	4.0	-623.7	136.5	105.6	30.87	4.421	
6,700.0	6,530.5	6,722.2	6,577.3	20.1	18.7	115.49	83.2	-623.7	139.2	108.5	30.64	4.543	
6,800.0	6,582.4	6,831.0	6,638.9	20.3	18.8	117.52	172.8	-623.7	141.7	111.0	30.69	4.616	
6,900.0	6,622.9	6,940.7	6,687.5	20.5	19.1	119.06	271.0	-623.7	143.7	112.5	31.20	4.607	
7,000.0	6,651.0	7,050.9	6,721.7	21.0	19.5	120.12	375.7	-623.7	145.2	112.8	32.37	4.485	
7,100.0	6,666.4	7,161.1	6,740.5	21.6	20.2	120.68	484.2	-623.7	146.0	111.8	34.28	4.260	
7,200.0	6,669.1	7,263.1	6,750.7	22.4	21.1	122.99	585.7	-623.7	149.9	113.7	36.18	4.143	
7,300.0	6,668.0	7,369.8	6,754.0	23.4	22.3	124.40	692.3	-623.7	152.2	114.1	38.08	3.997	
7,400.0	6,666.9	7,469.8	6,753.5	24.6	23.5	124.59	792.3	-623.7	152.6	112.2	40.33	3.783	
7,500.0	6,665.8	7,569.8	6,753.0	25.8	24.8	124.79	892.3	-623.7	152.9	110.2	42.69	3.582	
7,600.0	6,664.7	7,669.8	6,752.6	27.2	26.2	124.98	992.3	-623.7	153.3	108.1	45.15	3.395	
7,700.0	6,663.6	7,769.8	6,752.1	28.6	27.6	125.17	1,092.3	-623.7	153.6	106.0	47.69	3.222	
7,800.0	6,662.5	7,869.8	6,751.6	30.1	29.1	125.36	1,192.3	-623.7	154.0	103.7	50.29	3.062	
7,900.0	6,661.4	7,969.8	6,751.1	31.6	30.7	125.55	1,292.3	-623.7	154.4	101.4	52.95	2.915	
8,000.0	6,660.3	8,069.8	6,750.7	33.2	32.3	125.74	1,392.3	-623.7	154.7	99.1	55.66	2.780	
8,100.0	6,659.2	8,169.8	6,750.2	34.8	33.9	125.93	1,492.3	-623.7	155.1	96.7	58.39	2.656	
8,200.0	6,658.1	8,269.8	6,749.7	36.4	35.6	126.12	1,592.3	-623.7	155.5	94.3	61.16	2.542	
8,300.0	6,657.0	8,369.8	6,749.3	38.1	37.2	126.30	1,692.3	-623.7	155.9	91.9	63.95	2.437	
8,400.0	6,655.9	8,469.8	6,748.8	39.7	38.9	126.49	1,792.3	-623.7	156.2	89.5	66.76	2.340	
8,500.0	6,654.8	8,569.8	6,748.3	41.4	40.7	126.67	1,892.3	-623.7	156.6	87.0	69.58	2.250	
8,600.0	6,653.7	8,669.8	6,747.8	43.2	42.4	126.86	1,992.3	-623.7	157.0	84.6	72.42	2.168	
8,700.0	6,652.6	8,769.8	6,747.4	44.9	44.2	127.04	2,092.3	-623.7	157.4	82.1	75.27	2.091	
8,800.0	6,651.5	8,869.8	6,746.9	46.7	45.9	127.22	2,192.3	-623.7	157.7	79.6	78.12	2.019	
8,900.0	6,650.4	8,969.8	6,746.4	48.4	47.7	127.40	2,292.3	-623.7	158.1	77.1	80.97	1.953	
9,000.0	6,649.3	9,069.8	6,746.0	50.2	49.5	127.58	2,392.3	-623.7	158.5	74.7	83.83	1.891	
9,100.0	6,648.2	9,169.8	6,745.5	52.0	51.3	127.76	2,492.3	-623.7	158.9	72.2	86.69	1.833	
9,200.0	6,647.1	9,269.8	6,745.0	53.8	53.1	127.94	2,592.3	-623.7	159.3	69.7	89.55	1.778	
9,300.0	6,646.0	9,369.8	6,744.5	55.6	54.9	128.12	2,692.3	-623.7	159.7	67.2	92.41	1.728	
9,400.0	6,644.9	9,469.8	6,744.1	57.4	56.7	128.30	2,792.3	-623.7	160.0	64.8	95.27	1.680	
9,500.0	6,643.8	9,569.8	6,743.6	59.2	58.6	128.47	2,892.3	-623.7	160.4	62.3	98.12	1.635	
9,600.0	6,642.7	9,669.8	6,743.1	61.1	60.4	128.65	2,992.2	-623.7	160.8	59.9	100.97	1.593	
9,700.0	6,641.6	9,769.8	6,742.7	62.9	62.2	128.82	3,092.2	-623.7	161.2	57.4	103.82	1.553	
9,800.0	6,640.5	9,869.8	6,742.2	64.7	64.1	128.99	3,192.2	-623.7	161.6	55.0	106.66	1.515	
9,900.0	6,639.4	9,969.8	6,741.7	66.6	65.9	129.17	3,292.2	-623.7	162.0	52.5	109.49	1.480 Level 3	

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14)												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)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
Reference	Offset	Reference	Offset	(ft)	(ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
10,000.0	6,638.3	10,069.8	6,741.3	68.4	67.8	129.34	3,392.2	-623.7	162.4	50.1	112.32	1.446	Level 3
10,100.0	6,637.2	10,169.8	6,740.8	70.3	69.6	129.51	3,492.2	-623.7	162.8	47.7	115.14	1.414	Level 3
10,200.0	6,636.1	10,269.8	6,740.3	72.1	71.5	129.68	3,592.2	-623.7	163.2	45.3	117.96	1.384	Level 3
10,300.0	6,635.0	10,369.8	6,739.8	74.0	73.4	129.85	3,692.2	-623.7	163.6	42.8	120.77	1.355	Level 3
10,400.0	6,633.9	10,469.8	6,739.4	75.8	75.2	130.02	3,792.2	-623.7	164.0	40.4	123.57	1.327	Level 3
10,500.0	6,632.8	10,569.8	6,738.9	77.7	77.1	130.18	3,892.2	-623.7	164.4	38.1	126.36	1.301	Level 3
10,600.0	6,631.7	10,669.8	6,738.4	79.6	79.0	130.35	3,992.2	-623.7	164.8	35.7	129.15	1.276	Level 3
10,700.0	6,630.6	10,769.8	6,738.0	81.4	80.8	130.52	4,092.2	-623.7	165.2	33.3	131.93	1.252	Level 3
10,800.0	6,629.5	10,869.8	6,737.5	83.3	82.7	130.68	4,192.2	-623.7	165.6	31.0	134.70	1.230	Level 2
10,900.0	6,628.4	10,969.8	6,737.0	85.2	84.6	130.85	4,292.2	-623.7	166.1	28.6	137.46	1.208	Level 2
11,000.0	6,627.3	11,069.8	6,736.5	87.0	86.5	131.01	4,392.2	-623.7	166.5	26.3	140.21	1.187	Level 2
11,100.0	6,626.2	11,169.8	6,736.1	88.9	88.3	131.17	4,492.2	-623.7	166.9	23.9	142.95	1.167	Level 2
11,118.5	6,626.0	11,184.1	6,736.0	89.3	88.6	131.20	4,506.5	-623.7	167.0	23.6	143.41	1.165	Level 2, ES, SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design													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	43.71	43.71	43.7	41.8	60.5				
100.0	100.0	100.0	100.0	0.1	0.1	43.71	43.71	43.7	41.8	60.5	60.3	0.22	269.090	
200.0	200.0	200.0	200.0	0.3	0.3	43.71	43.71	43.7	41.8	60.5	59.8	0.67	89.697	
300.0	300.0	300.0	300.0	0.6	0.6	43.71	43.71	43.7	41.8	60.5	59.4	1.12	53.818	
400.0	400.0	400.0	400.0	0.8	0.8	43.71	43.71	43.7	41.8	60.5	58.9	1.57	38.441 CC, ES	
500.0	500.0	500.0	500.0	1.0	1.0	149.75	149.75	43.7	41.8	62.0	60.0	2.01	30.846	
600.0	599.8	599.8	599.8	1.2	1.2	151.98	151.98	43.7	41.8	66.6	64.1	2.44	27.264	
700.0	699.5	699.5	699.5	1.4	1.5	155.07	155.07	43.7	41.8	74.4	71.5	2.88	25.802	
800.0	798.7	798.7	798.7	1.7	1.7	158.42	158.42	43.7	41.8	85.6	82.3	3.33	25.707	
900.0	897.5	897.5	897.5	2.0	1.9	161.62	161.62	43.7	41.8	100.2	96.4	3.78	26.524	
1,000.0	996.1	996.1	996.1	2.4	2.1	164.20	164.20	43.7	41.8	116.1	111.9	4.23	27.439	
1,100.0	1,094.7	1,094.7	1,094.7	2.7	2.3	166.15	166.15	43.7	41.8	132.1	127.4	4.69	28.196	
1,200.0	1,193.3	1,193.3	1,193.3	3.1	2.6	167.68	167.68	43.7	41.8	148.3	143.1	5.14	28.828	
1,300.0	1,292.0	1,292.0	1,292.0	3.5	2.8	168.91	168.91	43.7	41.8	164.5	158.9	5.60	29.361	
1,400.0	1,390.6	1,390.6	1,390.6	3.8	3.0	169.92	169.92	43.7	41.8	180.8	174.7	6.06	29.816	
1,500.0	1,489.2	1,489.2	1,489.2	4.2	3.2	170.77	170.77	43.7	41.8	197.1	190.6	6.53	30.207	
1,600.0	1,587.8	1,587.8	1,587.8	4.6	3.5	171.48	171.48	43.7	41.8	213.5	206.5	6.99	30.546	
1,700.0	1,686.4	1,686.4	1,686.4	5.0	3.7	172.09	172.09	43.7	41.8	229.9	222.5	7.45	30.843	
1,800.0	1,785.0	1,785.0	1,785.0	5.4	3.9	172.62	172.62	43.7	41.8	246.3	238.4	7.92	31.104	
1,900.0	1,883.7	1,883.7	1,883.7	5.7	4.1	173.19	173.19	43.1	41.5	262.3	253.9	8.37	31.347	
2,000.0	1,982.3	1,982.3	1,982.3	6.1	4.3	173.95	173.95	41.0	40.3	277.0	268.2	8.79	31.507	
2,100.0	2,080.9	2,080.9	2,080.9	6.5	4.5	174.87	174.87	37.1	38.3	290.4	281.1	9.22	31.506	
2,200.0	2,179.5	2,179.5	2,179.5	6.9	4.7	175.95	175.95	31.7	35.5	302.5	292.8	9.65	31.355	
2,300.0	2,278.1	2,278.1	2,278.1	7.3	4.9	177.18	177.18	24.6	31.7	313.4	303.4	10.09	31.072	
2,400.0	2,376.7	2,376.7	2,376.7	7.7	5.1	178.56	178.56	15.8	27.1	323.3	312.7	10.54	30.674	
2,500.0	2,475.4	2,475.4	2,475.4	8.1	5.3	-179.91	-179.91	5.4	21.6	332.0	321.0	11.00	30.171	
2,600.0	2,574.0	2,574.0	2,574.0	8.5	5.5	-178.23	-178.23	-6.7	15.3	339.8	328.3	11.49	29.577	
2,700.0	2,672.6	2,672.6	2,672.6	8.9	5.8	-176.40	-176.40	-20.3	8.1	346.6	334.7	11.99	28.901	
2,800.0	2,771.2	2,771.2	2,771.2	9.3	6.1	-174.50	-174.50	-34.8	0.5	353.0	340.5	12.52	28.191	
2,900.0	2,869.8	2,869.8	2,869.8	9.6	6.4	-172.69	-172.69	-49.3	-7.1	359.6	346.6	13.07	27.523	
3,000.0	2,968.5	2,968.5	2,968.5	10.0	6.6	-170.94	-170.94	-63.7	-14.7	366.7	353.0	13.63	26.893	
3,100.0	3,067.1	3,067.1	3,067.1	10.4	6.9	-169.26	-169.26	-78.1	-22.2	374.0	359.8	14.22	26.300	
3,200.0	3,165.7	3,165.7	3,165.7	10.8	7.3	-167.64	-167.64	-92.5	-29.8	381.6	366.8	14.82	25.744	
3,300.0	3,264.3	3,264.3	3,264.3	11.2	7.6	-166.09	-166.09	-106.9	-37.4	389.6	374.1	15.45	25.222	
3,400.0	3,362.9	3,362.9	3,362.9	11.6	7.9	-164.60	-164.60	-121.3	-45.0	397.8	381.7	16.08	24.733	
3,500.0	3,461.5	3,461.5	3,461.5	12.0	8.2	-163.17	-163.17	-135.7	-52.5	406.3	389.5	16.73	24.277	
3,600.0	3,560.2	3,560.2	3,560.2	12.4	8.6	-161.80	-161.80	-150.1	-60.1	415.0	397.6	17.40	23.851	
3,700.0	3,658.8	3,658.8	3,658.8	12.8	8.9	-160.49	-160.49	-164.6	-67.7	423.9	405.9	18.08	23.454	
3,800.0	3,757.4	3,757.4	3,757.4	13.2	9.2	-159.33	-159.33	-178.1	-74.8	433.3	414.6	18.73	23.136	
3,900.0	3,856.0	3,856.0	3,856.0	13.6	9.4	-158.58	-158.58	-188.9	-80.5	443.9	424.6	19.30	22.997	
4,000.0	3,954.6	3,954.6	3,954.6	14.0	9.7	-158.22	-158.22	-197.0	-84.7	455.8	436.0	19.84	22.979	
4,100.0	4,053.2	4,053.2	4,053.2	14.3	9.9	-158.24	-158.24	-202.3	-87.6	468.9	448.6	20.32	23.075	
4,200.0	4,151.9	4,151.9	4,151.9	14.7	10.1	-158.59	-158.59	-205.0	-88.9	483.1	462.4	20.76	23.277	
4,300.0	4,250.5	4,250.5	4,250.5	15.1	10.2	-159.23	-159.23	-205.3	-89.1	498.5	477.3	21.16	23.557	
4,400.0	4,349.1	4,349.1	4,349.1	15.5	10.4	-159.88	-159.88	-205.3	-89.1	514.0	492.5	21.56	23.838	
4,500.0	4,447.7	4,447.7	4,447.7	15.9	10.6	-160.50	-160.50	-205.3	-89.1	529.7	507.7	21.97	24.108	
4,600.0	4,546.3	4,546.3	4,546.3	16.3	10.8	-161.08	-161.08	-205.3	-89.1	545.3	522.9	22.38	24.367	
4,700.0	4,645.0	4,645.0	4,645.0	16.7	11.0	-161.62	-161.62	-205.3	-89.1	561.0	538.3	22.79	24.616	
4,800.0	4,743.6	4,743.6	4,743.6	17.1	11.2	-162.14	-162.14	-205.3	-89.1	576.8	553.6	23.21	24.856	
4,900.0	4,842.2	4,842.2	4,842.2	17.5	11.3	-162.63	-162.63	-205.3	-89.1	592.6	569.0	23.62	25.086	
5,000.0	4,940.8	4,940.8	4,940.8	17.9	11.5	-163.10	-163.10	-205.3	-89.1	608.5	584.4	24.04	25.307	

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	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		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
5,100.0	5,039.4	5,059.5	5,039.4	18.3	11.7	-163.55	-205.3	-89.1	624.3	599.9	24.47	25.517		
5,200.0	5,138.4	5,158.4	5,138.4	18.5	11.9	-163.99	-205.3	-89.1	638.1	613.3	24.85	25.674		
5,300.0	5,237.8	5,257.8	5,237.8	18.7	12.1	-164.32	-205.3	-89.1	648.6	623.4	25.22	25.716		
5,400.0	5,337.5	5,357.5	5,337.5	18.9	12.3	-164.53	-205.3	-89.1	655.7	630.2	25.57	25.648		
5,500.0	5,437.4	5,457.5	5,437.4	19.1	12.5	-164.64	-205.3	-89.1	659.5	633.6	25.89	25.478		
5,600.0	5,537.4	5,557.5	5,537.4	19.2	12.7	90.11	-205.3	-89.1	660.2	634.0	26.22	25.177		
5,700.0	5,637.4	5,657.5	5,637.4	19.3	12.9	90.11	-205.3	-89.1	660.2	633.6	26.59	24.827		
5,800.0	5,737.4	5,757.5	5,737.4	19.5	13.1	90.11	-205.3	-89.1	660.2	633.2	26.96	24.484		
5,900.0	5,837.4	5,857.5	5,837.4	19.6	13.3	90.10	-205.2	-89.1	660.2	632.9	27.34	24.151		
5,929.8	5,867.2	5,887.3	5,867.2	19.6	13.3	90.04	-204.2	-89.1	660.2	632.8	27.44	24.063		
6,000.0	5,937.4	5,957.0	5,936.6	19.7	13.4	89.48	-197.4	-89.1	660.2	632.6	27.62	23.905		
6,100.0	6,036.8	6,055.0	6,032.4	19.8	13.5	88.61	-177.1	-89.1	660.4	632.6	27.78	23.772		
6,200.0	6,133.9	6,151.9	6,123.8	19.9	13.6	87.77	-145.2	-89.1	660.7	632.8	27.87	23.709		
6,300.0	6,227.1	6,247.6	6,209.5	19.9	13.6	86.97	-102.6	-89.1	661.1	633.2	27.93	23.668		
6,400.0	6,314.8	6,342.4	6,288.3	20.0	13.7	86.22	-50.2	-89.1	661.6	633.6	28.05	23.590		
6,500.0	6,395.5	6,436.2	6,359.4	20.0	13.7	85.54	10.9	-89.1	662.2	633.9	28.28	23.418		
6,600.0	6,467.8	6,529.2	6,422.0	20.0	13.8	84.93	79.7	-89.1	662.8	634.1	28.70	23.098		
6,700.0	6,530.5	6,621.5	6,475.4	20.1	14.2	84.40	154.9	-89.1	663.4	634.0	29.35	22.598		
6,800.0	6,582.4	6,713.3	6,519.2	20.3	14.7	83.97	235.5	-89.1	663.9	633.6	30.30	21.912		
6,900.0	6,622.9	6,804.6	6,552.8	20.5	15.3	83.63	320.4	-89.1	664.3	632.8	31.54	21.062		
7,000.0	6,651.0	6,895.6	6,575.9	21.0	16.2	83.39	408.3	-89.1	664.6	631.5	33.08	20.089		
7,100.0	6,666.4	6,986.4	6,588.5	21.6	17.1	83.25	498.2	-89.1	664.8	629.9	34.90	19.049		
7,200.0	6,669.1	7,079.5	6,590.6	22.4	18.2	83.22	591.2	-89.1	664.8	627.8	37.00	17.971		
7,300.0	6,668.0	7,179.5	6,589.6	23.4	19.4	83.23	691.2	-89.1	664.8	625.3	39.48	16.839		
7,400.0	6,666.9	7,279.5	6,588.7	24.6	20.8	83.24	791.2	-89.1	664.8	622.6	42.16	15.767		
7,500.0	6,665.8	7,379.5	6,587.7	25.8	22.2	83.25	891.2	-89.1	664.8	619.8	45.01	14.770		
7,600.0	6,664.7	7,479.5	6,586.7	27.2	23.8	83.27	991.2	-89.1	664.8	616.8	47.99	13.852		
7,700.0	6,663.6	7,579.5	6,585.8	28.6	25.3	83.28	1,091.1	-89.1	664.8	613.7	51.08	13.013		
7,800.0	6,662.5	7,679.5	6,584.8	30.1	26.9	83.29	1,191.1	-89.1	664.7	610.5	54.27	12.249		
7,900.0	6,661.4	7,779.5	6,583.9	31.6	28.6	83.30	1,291.1	-89.1	664.7	607.2	57.53	11.554		
8,000.0	6,660.3	7,879.5	6,582.9	33.2	30.3	83.31	1,391.1	-89.1	664.7	603.8	60.86	10.921		
8,100.0	6,659.2	7,979.5	6,581.9	34.8	32.0	83.33	1,491.1	-89.1	664.7	600.5	64.25	10.346		
8,200.0	6,658.1	8,079.5	6,581.0	36.4	33.7	83.34	1,591.1	-89.1	664.7	597.0	67.68	9.821		
8,300.0	6,657.0	8,179.5	6,580.0	38.1	35.5	83.35	1,691.1	-89.1	664.7	593.5	71.15	9.342		
8,400.0	6,655.9	8,279.5	6,579.1	39.7	37.2	83.36	1,791.1	-89.1	664.6	590.0	74.65	8.903		
8,500.0	6,654.8	8,379.5	6,578.1	41.4	39.0	83.37	1,891.1	-89.1	664.6	586.4	78.19	8.501		
8,600.0	6,653.7	8,479.5	6,577.1	43.2	40.8	83.39	1,991.1	-89.1	664.6	582.9	81.75	8.130		
8,700.0	6,652.6	8,579.5	6,576.2	44.9	42.6	83.40	2,091.1	-89.1	664.6	579.3	85.33	7.789		
8,800.0	6,651.5	8,679.5	6,575.2	46.7	44.4	83.41	2,191.1	-89.1	664.6	575.7	88.93	7.473		
8,900.0	6,650.4	8,779.5	6,574.3	48.4	46.3	83.42	2,291.1	-89.1	664.6	572.0	92.55	7.180		
9,000.0	6,649.3	8,879.5	6,573.3	50.2	48.1	83.43	2,391.1	-89.1	664.6	568.4	96.19	6.909		
9,100.0	6,648.2	8,979.5	6,572.3	52.0	49.9	83.45	2,491.1	-89.1	664.5	564.7	99.84	6.656		
9,200.0	6,647.1	9,079.5	6,571.4	53.8	51.8	83.46	2,591.1	-89.1	664.5	561.0	103.50	6.420		
9,300.0	6,646.0	9,179.5	6,570.4	55.6	53.6	83.47	2,691.1	-89.1	664.5	557.3	107.18	6.200		
9,400.0	6,644.9	9,279.5	6,569.5	57.4	55.5	83.48	2,791.1	-89.1	664.5	553.6	110.86	5.994		
9,500.0	6,643.8	9,379.5	6,568.5	59.2	57.3	83.49	2,891.1	-89.1	664.5	549.9	114.56	5.800		
9,600.0	6,642.7	9,479.5	6,567.5	61.1	59.2	83.51	2,991.1	-89.1	664.5	546.2	118.26	5.619		
9,700.0	6,641.6	9,579.5	6,566.6	62.9	61.1	83.52	3,091.1	-89.1	664.4	542.5	121.97	5.448		
9,800.0	6,640.5	9,679.5	6,565.6	64.7	62.9	83.53	3,191.0	-89.1	664.4	538.7	125.69	5.286		
9,900.0	6,639.4	9,779.5	6,564.7	66.6	64.8	83.54	3,291.0	-89.1	664.4	535.0	129.41	5.134		
10,000.0	6,638.3	9,879.5	6,563.7	68.4	66.7	83.55	3,391.0	-89.1	664.4	531.3	133.14	4.990		

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22Y-241 - Wellbore #1 - Plan #1 (2-25-14)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	6,637.2	9,979.5	6,562.7	70.3	68.6	83.57	3,491.0	-89.1	664.4	527.5	136.87	4.854	
10,200.0	6,636.1	10,079.5	6,561.8	72.1	70.5	83.58	3,591.0	-89.1	664.4	523.8	140.61	4.725	
10,300.0	6,635.0	10,179.5	6,560.8	74.0	72.3	83.59	3,691.0	-89.1	664.3	520.0	144.35	4.602	
10,400.0	6,633.9	10,279.5	6,559.9	75.8	74.2	83.60	3,791.0	-89.1	664.3	516.2	148.10	4.486	
10,500.0	6,632.8	10,379.5	6,558.9	77.7	76.1	83.61	3,891.0	-89.1	664.3	512.5	151.85	4.375	
10,600.0	6,631.7	10,479.5	6,557.9	79.6	78.0	83.63	3,991.0	-89.1	664.3	508.7	155.61	4.269	
10,700.0	6,630.6	10,579.5	6,557.0	81.4	79.9	83.64	4,091.0	-89.1	664.3	504.9	159.37	4.168	
10,800.0	6,629.5	10,679.5	6,556.0	83.3	81.8	83.65	4,191.0	-89.1	664.3	501.1	163.13	4.072	
10,900.0	6,628.4	10,779.5	6,555.1	85.2	83.7	83.66	4,291.0	-89.1	664.3	497.4	166.90	3.980	
11,000.0	6,627.3	10,879.5	6,554.1	87.0	85.6	83.67	4,391.0	-89.1	664.2	493.6	170.66	3.892	
11,100.0	6,626.2	10,979.5	6,553.1	88.9	87.5	83.69	4,491.0	-89.1	664.2	489.8	174.43	3.808	
11,115.7	6,626.0	10,995.0	6,553.0	89.2	87.7	83.69	4,506.5	-89.1	664.2	489.2	175.02	3.795	
11,118.5	6,626.0	10,995.0	6,553.0	89.3	87.7	83.69	4,506.5	-89.1	664.2	489.2	175.08	3.794 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
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	
0.0	0.0	0.0	0.0	0.0	0.0	41.52	69.2	61.3	92.5					
100.0	100.0	100.0	100.0	0.1	0.1	41.52	69.2	61.3	92.5	92.2	0.22	411.361		
200.0	200.0	200.0	200.0	0.3	0.3	41.52	69.2	61.3	92.5	91.8	0.67	137.120		
300.0	300.0	300.0	300.0	0.6	0.6	41.52	69.2	61.3	92.5	91.3	1.12	82.272		
400.0	400.0	400.0	400.0	0.8	0.8	41.52	69.2	61.3	92.5	90.9	1.57	58.766 CC, ES		
500.0	500.0	500.0	500.0	1.0	1.0	147.32	69.2	61.3	93.9	91.9	2.01	46.743		
600.0	599.8	599.8	599.8	1.2	1.2	148.92	69.2	61.3	98.4	95.9	2.44	40.296		
700.0	699.5	699.5	699.5	1.4	1.5	151.28	69.2	61.3	105.9	103.1	2.88	36.739		
800.0	798.7	798.7	798.7	1.7	1.7	154.05	69.2	61.3	116.8	113.4	3.33	35.036		
900.0	897.5	897.5	897.5	2.0	1.9	156.94	69.2	61.3	131.0	127.2	3.79	34.579		
1,000.0	996.1	996.1	996.1	2.4	2.1	159.48	69.2	61.3	146.4	142.1	4.24	34.490		
1,100.0	1,094.7	1,094.7	1,094.7	2.7	2.3	161.53	69.2	61.3	162.0	157.3	4.70	34.452		
1,200.0	1,193.3	1,193.3	1,193.3	3.1	2.6	163.22	69.2	61.3	177.8	172.7	5.16	34.443		
1,300.0	1,292.0	1,292.0	1,292.0	3.5	2.8	164.63	69.2	61.3	193.8	188.2	5.62	34.451		
1,400.0	1,390.6	1,390.6	1,390.6	3.8	3.0	165.83	69.2	61.3	209.8	203.7	6.09	34.469		
1,500.0	1,489.2	1,489.2	1,489.2	4.2	3.2	166.86	69.2	61.3	225.9	219.4	6.55	34.491		
1,600.0	1,587.8	1,587.8	1,587.8	4.6	3.5	167.75	69.2	61.3	242.1	235.1	7.01	34.516		
1,700.0	1,686.4	1,686.4	1,686.4	5.0	3.7	168.53	69.2	61.3	258.3	250.9	7.48	34.540		
1,800.0	1,785.0	1,785.0	1,785.0	5.4	3.9	169.22	69.2	61.3	274.6	266.7	7.94	34.565		
1,900.0	1,883.7	1,883.7	1,883.7	5.7	4.1	169.83	69.2	61.3	290.9	282.5	8.41	34.588		
2,000.0	1,982.3	1,982.3	1,982.3	6.1	4.3	170.37	69.2	61.3	307.2	298.4	8.88	34.611		
2,100.0	2,080.9	2,081.1	2,081.1	6.5	4.5	170.97	68.7	61.5	323.6	314.2	9.32	34.715		
2,200.0	2,179.5	2,179.8	2,179.7	6.9	4.7	171.79	66.6	62.4	339.9	330.1	9.74	34.905		
2,300.0	2,278.1	2,278.3	2,278.2	7.3	4.9	172.81	63.0	63.8	356.3	346.1	10.15	35.092		
2,400.0	2,376.7	2,376.6	2,376.3	7.7	5.1	174.00	57.8	66.0	372.8	362.2	10.57	35.261		
2,500.0	2,475.4	2,474.6	2,474.1	8.1	5.3	175.34	51.0	68.7	389.5	378.5	11.00	35.413		
2,600.0	2,574.0	2,572.3	2,571.3	8.5	5.4	176.80	42.8	72.0	406.5	395.0	11.43	35.549		
2,700.0	2,672.6	2,669.6	2,668.0	8.9	5.7	178.37	33.0	76.0	423.9	412.0	11.88	35.669		
2,800.0	2,771.2	2,766.4	2,764.1	9.3	5.9	-179.98	21.8	80.6	441.8	429.4	12.35	35.773		
2,900.0	2,869.8	2,862.7	2,859.4	9.6	6.1	-178.27	9.2	85.7	460.2	447.4	12.83	35.860		
3,000.0	2,968.5	2,958.4	2,954.0	10.0	6.3	-176.50	-4.9	91.4	479.4	466.0	13.34	35.935		
3,100.0	3,067.1	3,054.4	3,048.4	10.4	6.6	-174.70	-20.3	97.6	499.3	485.4	13.87	35.993		
3,200.0	3,165.7	3,151.1	3,143.7	10.8	6.9	-172.99	-36.0	104.0	519.6	505.2	14.42	36.030		
3,300.0	3,264.3	3,247.8	3,238.9	11.2	7.2	-171.41	-51.7	110.4	540.5	525.5	14.99	36.057		
3,400.0	3,362.9	3,344.6	3,334.1	11.6	7.5	-169.94	-67.5	116.8	561.7	546.1	15.57	36.077		
3,500.0	3,461.5	3,441.3	3,429.4	12.0	7.8	-168.58	-83.2	123.2	583.2	567.0	16.16	36.093		
3,600.0	3,560.2	3,538.0	3,524.6	12.4	8.1	-167.32	-99.0	129.6	605.0	588.2	16.76	36.106		
3,700.0	3,658.8	3,634.8	3,619.8	12.8	8.4	-166.14	-114.7	136.0	627.1	609.7	17.36	36.118		
3,800.0	3,757.4	3,731.5	3,715.1	13.2	8.8	-165.05	-130.5	142.4	649.4	631.4	17.97	36.130		
3,900.0	3,856.0	3,828.2	3,810.3	13.6	9.1	-164.02	-146.2	148.8	671.9	653.3	18.59	36.142		
4,000.0	3,954.6	3,925.9	3,906.5	14.0	9.4	-163.05	-162.1	155.3	694.6	675.4	19.21	36.155		
4,100.0	4,053.2	4,033.9	4,013.2	14.3	9.7	-162.23	-177.5	161.5	716.6	696.8	19.82	36.151		
4,200.0	4,151.9	4,143.2	4,121.7	14.7	10.0	-161.75	-189.2	166.3	737.2	716.8	20.39	36.157		
4,300.0	4,250.5	4,253.5	4,231.7	15.1	10.3	-161.59	-197.2	169.5	756.2	735.3	20.92	36.147		
4,400.0	4,349.1	4,364.5	4,342.6	15.5	10.5	-161.73	-201.2	171.2	773.6	752.2	21.41	36.126		
4,500.0	4,447.7	4,469.7	4,447.7	15.9	10.7	-162.09	-201.8	171.4	789.6	767.7	21.86	36.112		
4,600.0	4,546.3	4,568.3	4,546.3	16.3	10.9	-162.46	-201.8	171.4	805.4	783.1	22.30	36.116		
4,700.0	4,645.0	4,666.9	4,645.0	16.7	11.1	-162.80	-201.8	171.4	821.2	798.5	22.74	36.119		
4,800.0	4,743.6	4,765.5	4,743.6	17.1	11.3	-163.14	-201.8	171.4	837.1	813.9	23.17	36.121		
4,900.0	4,842.2	4,864.1	4,842.2	17.5	11.4	-163.46	-201.8	171.4	853.0	829.3	23.61	36.123		
5,000.0	4,940.8	4,962.7	4,940.8	17.9	11.6	-163.77	-201.8	171.4	868.9	844.8	24.05	36.125		

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
5,100.0	5,039.4	5,061.4	5,039.4	18.3	11.8	-164.08	-201.8	171.4	884.8	860.3	24.50	36.119		
5,200.0	5,138.4	5,160.3	5,138.4	18.5	12.0	-164.41	-201.8	171.4	898.6	873.7	24.92	36.062		
5,300.0	5,237.8	5,259.7	5,237.8	18.7	12.2	-164.65	-201.8	171.4	909.1	883.8	25.31	35.914		
5,400.0	5,337.5	5,359.4	5,337.5	18.9	12.4	-164.81	-201.8	171.4	916.2	890.6	25.68	35.679		
5,500.0	5,437.4	5,459.4	5,437.4	19.1	12.6	-164.89	-201.8	171.4	920.0	894.0	26.02	35.362		
5,600.0	5,537.4	5,559.4	5,537.4	19.2	12.8	89.86	-201.8	171.4	920.7	894.3	26.36	34.928		
5,700.0	5,637.4	5,659.4	5,637.4	19.3	13.0	89.86	-201.8	171.4	920.7	894.0	26.73	34.448		
5,800.0	5,737.4	5,759.4	5,737.4	19.5	13.2	89.86	-201.8	171.4	920.7	893.6	27.10	33.977		
5,900.0	5,837.4	5,859.4	5,837.4	19.6	13.4	89.86	-201.8	171.4	920.7	893.2	27.47	33.516		
6,000.0	5,937.4	5,959.4	5,937.4	19.7	13.6	89.90	-201.8	171.4	920.7	892.9	27.84	33.066		
6,022.3	5,959.6	5,981.6	5,959.6	19.8	13.6	89.98	-201.8	171.4	920.7	892.8	27.92	32.974		
6,100.0	6,036.8	6,059.3	6,037.3	19.8	13.8	90.44	-199.6	171.4	920.7	892.5	28.19	32.661		
6,200.0	6,133.9	6,160.4	6,137.3	19.9	13.9	91.04	-185.5	171.4	920.8	892.4	28.43	32.388		
6,300.0	6,227.1	6,262.8	6,235.9	19.9	14.0	91.63	-157.8	171.4	921.1	892.5	28.58	32.227		
6,400.0	6,314.8	6,366.6	6,331.0	20.0	14.0	92.19	-116.5	171.4	921.4	892.7	28.69	32.114		
6,500.0	6,395.5	6,471.7	6,420.8	20.0	14.0	92.72	-62.0	171.4	921.7	892.9	28.84	31.961		
6,600.0	6,467.8	6,578.1	6,503.1	20.0	14.1	93.20	5.2	171.4	922.1	893.0	29.12	31.665		
6,700.0	6,530.5	6,685.6	6,576.1	20.1	14.2	93.63	84.0	171.4	922.6	892.9	29.64	31.124		
6,800.0	6,582.4	6,794.2	6,637.8	20.3	14.6	93.99	173.2	171.4	922.9	892.5	30.49	30.271		
6,900.0	6,622.9	6,903.6	6,686.6	20.5	15.2	94.28	271.1	171.4	923.3	891.5	31.74	29.093		
7,000.0	6,651.0	7,013.8	6,721.1	21.0	16.0	94.49	375.6	171.4	923.5	890.1	33.40	27.649		
7,100.0	6,666.4	7,124.2	6,740.2	21.6	17.1	94.61	484.2	171.4	923.7	888.2	35.45	26.054		
7,200.0	6,669.1	7,225.9	6,750.5	22.4	18.2	95.05	585.5	171.4	924.3	886.6	37.73	24.498		
7,300.0	6,668.0	7,332.8	6,754.0	23.4	19.5	95.34	692.3	171.4	924.7	884.4	40.26	22.969		
7,400.0	6,666.9	7,432.8	6,753.5	24.6	20.9	95.37	792.3	171.4	924.8	881.8	42.92	21.546		
7,500.0	6,665.8	7,532.8	6,753.0	25.8	22.3	95.41	892.3	171.4	924.8	879.1	45.74	20.219		
7,600.0	6,664.7	7,632.8	6,752.6	27.2	23.8	95.45	992.3	171.4	924.9	876.2	48.70	18.992		
7,700.0	6,663.6	7,732.8	6,752.1	28.6	25.3	95.49	1,092.3	171.4	924.9	873.2	51.77	17.866		
7,800.0	6,662.5	7,832.8	6,751.6	30.1	26.9	95.53	1,192.3	171.4	925.0	870.1	54.94	16.838		
7,900.0	6,661.4	7,932.8	6,751.1	31.6	28.5	95.57	1,292.3	171.4	925.1	866.9	58.18	15.900		
8,000.0	6,660.3	8,032.8	6,750.7	33.2	30.2	95.61	1,392.3	171.4	925.1	863.6	61.49	15.045		
8,100.0	6,659.2	8,132.8	6,750.2	34.8	31.9	95.65	1,492.3	171.4	925.2	860.3	64.86	14.265		
8,200.0	6,658.1	8,232.8	6,749.7	36.4	33.6	95.68	1,592.3	171.4	925.3	857.0	68.27	13.552		
8,300.0	6,657.0	8,332.8	6,749.3	38.1	35.4	95.72	1,692.3	171.4	925.3	853.6	71.73	12.900		
8,400.0	6,655.9	8,432.8	6,748.8	39.7	37.1	95.76	1,792.3	171.4	925.4	850.2	75.22	12.302		
8,500.0	6,654.8	8,532.8	6,748.3	41.4	38.9	95.80	1,892.3	171.4	925.4	846.7	78.74	11.753		
8,600.0	6,653.7	8,632.8	6,747.8	43.2	40.7	95.84	1,992.3	171.4	925.5	843.2	82.29	11.247		
8,700.0	6,652.6	8,732.8	6,747.4	44.9	42.5	95.88	2,092.3	171.4	925.6	839.7	85.86	10.780		
8,800.0	6,651.5	8,832.8	6,746.9	46.7	44.3	95.92	2,192.3	171.4	925.6	836.2	89.45	10.348		
8,900.0	6,650.4	8,932.8	6,746.4	48.4	46.1	95.96	2,292.3	171.4	925.7	832.6	93.06	9.948		
9,000.0	6,649.3	9,032.8	6,746.0	50.2	47.9	95.99	2,392.3	171.4	925.8	829.1	96.68	9.575		
9,100.0	6,648.2	9,132.8	6,745.5	52.0	49.8	96.03	2,492.3	171.4	925.8	825.5	100.32	9.229		
9,200.0	6,647.1	9,232.8	6,745.0	53.8	51.6	96.07	2,592.3	171.4	925.9	821.9	103.97	8.906		
9,300.0	6,646.0	9,332.8	6,744.5	55.6	53.4	96.11	2,692.3	171.4	926.0	818.3	107.63	8.603		
9,400.0	6,644.9	9,432.8	6,744.1	57.4	55.3	96.15	2,792.3	171.4	926.0	814.7	111.30	8.320		
9,500.0	6,643.8	9,532.8	6,743.6	59.2	57.1	96.19	2,892.3	171.4	926.1	811.1	114.98	8.054		
9,600.0	6,642.7	9,632.8	6,743.1	61.1	59.0	96.23	2,992.2	171.4	926.2	807.5	118.67	7.804		
9,700.0	6,641.6	9,732.8	6,742.7	62.9	60.9	96.26	3,092.2	171.4	926.2	803.9	122.37	7.569		
9,800.0	6,640.5	9,832.8	6,742.2	64.7	62.7	96.30	3,192.2	171.4	926.3	800.2	126.07	7.348		
9,900.0	6,639.4	9,932.8	6,741.7	66.6	64.6	96.34	3,292.2	171.4	926.4	796.6	129.78	7.138		
10,000.0	6,638.3	10,032.8	6,741.3	68.4	66.5	96.38	3,392.2	171.4	926.5	793.0	133.49	6.940		

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22Y-401 - Wellbore #1 - Plan #1 (2-25-14)												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)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
Reference	Offset	Reference	Offset	(ft)	(ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
10,100.0	6,637.2	10,132.8	6,740.8	70.3	68.3	96.42	3,492.2	171.4	926.5	789.3	137.21	6.753	
10,200.0	6,636.1	10,232.8	6,740.3	72.1	70.2	96.46	3,592.2	171.4	926.6	785.7	140.94	6.575	
10,300.0	6,635.0	10,332.8	6,739.8	74.0	72.1	96.50	3,692.2	171.4	926.7	782.0	144.66	6.406	
10,400.0	6,633.9	10,432.8	6,739.4	75.8	74.0	96.53	3,792.2	171.4	926.7	778.3	148.39	6.245	
10,500.0	6,632.8	10,532.8	6,738.9	77.7	75.9	96.57	3,892.2	171.4	926.8	774.7	152.13	6.092	
10,600.0	6,631.7	10,632.8	6,738.4	79.6	77.8	96.61	3,992.2	171.4	926.9	771.0	155.87	5.947	
10,700.0	6,630.6	10,732.8	6,738.0	81.4	79.6	96.65	4,092.2	171.4	927.0	767.3	159.61	5.808	
10,800.0	6,629.5	10,832.8	6,737.5	83.3	81.5	96.69	4,192.2	171.4	927.0	763.7	163.35	5.675	
10,900.0	6,628.4	10,932.8	6,737.0	85.2	83.4	96.73	4,292.2	171.4	927.1	760.0	167.10	5.548	
11,000.0	6,627.3	11,032.8	6,736.5	87.0	85.3	96.77	4,392.2	171.4	927.2	756.3	170.84	5.427	
11,100.0	6,626.2	11,132.8	6,736.1	88.9	87.2	96.80	4,492.2	171.4	927.3	752.7	174.59	5.311	
11,118.5	6,626.0	11,147.1	6,736.0	89.3	87.5	96.81	4,506.5	171.4	927.3	752.1	175.21	5.292 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4613.0ft (RKB - 15')

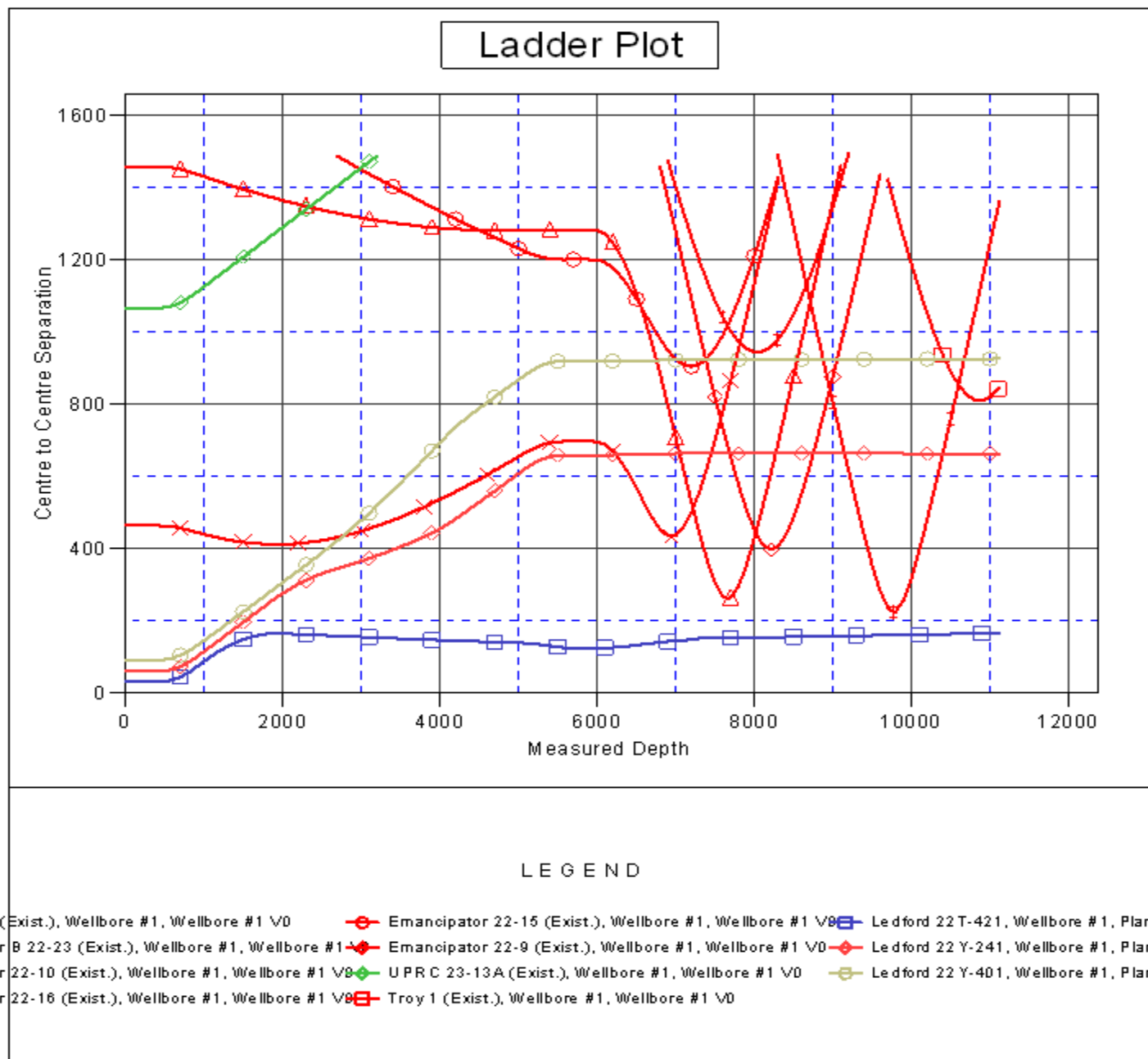
Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Ledford 22T-321

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.63°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4613.0ft (RKB - 15')

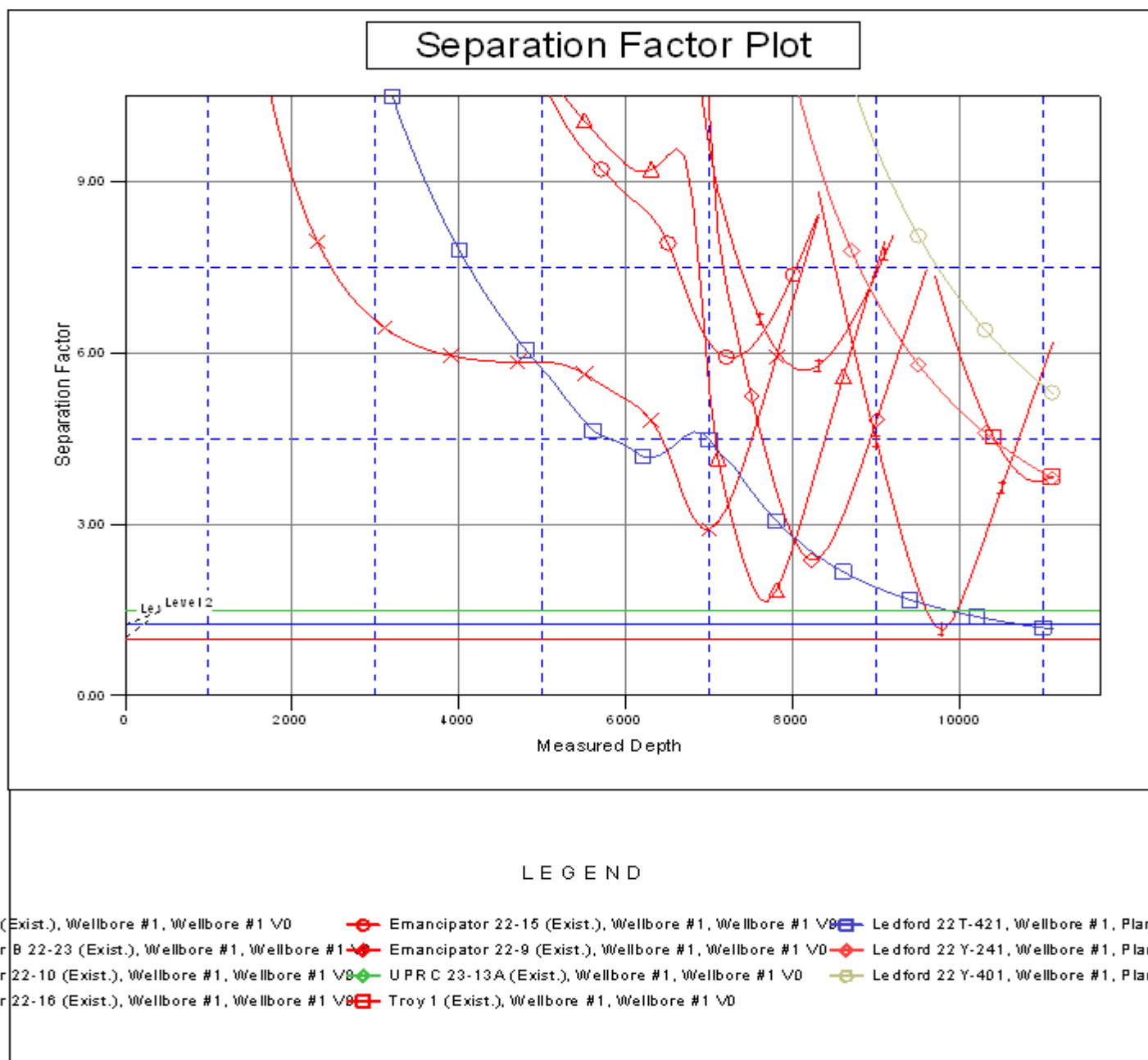
Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Ledford 22T-321

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.63°





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W

Ledford 22Y-HZ Pad Sec.22-T5N-R64W

Ledford 22T-321

Wellbore #1

Plan #1 (2-25-14)

Anticollision Report

07 March, 2014



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (2-25-14)		
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	3/6/2014		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,118.5	Plan #1 (2-25-14) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Separation Factor	Warning
Bauer 22-C Sec. 22-T5N-R64W						
Bauer 22-C - Wellbore #1 - Design #1	10,360.7	6,678.3	249.3	157.7	2.723	CC, ES, SF
Doughman 22VD Pad Sec.22-T5N-R64W						
Doughman 22RD - Wellbore #1 - Plan #2 (8-11-10)	11,118.5	6,695.1	493.7	386.2	4.591	CC, ES, SF
Doughman 22RD - Wellbore #1 - Wellbore #1	11,118.5	6,706.2	468.3	362.4	4.425	CC, ES, SF
Lucas #1 (Exist.) - Wellbore #1 - Design #1	10,925.4	6,598.1	378.8	279.2	3.803	CC, ES, SF
Lucas #1 (Exist.) - Wellbore #1 - Wellbore #1	10,879.8	6,600.0	419.2	321.4	4.286	CC, ES
Lucas #1 (Exist.) - Wellbore #1 - Wellbore #1	10,900.0	6,600.0	419.7	321.5	4.275	SF
Existing Wells Sec.22-T5N-R64W						
Emancipator 22-16 (Exist.) - Wellbore #1 - Wellbore #1	1,928.3	1,898.5	413.1	369.3	9.426	CC
Emancipator 22-16 (Exist.) - Wellbore #1 - Wellbore #1	6,947.5	6,624.8	434.5	285.1	2.908	ES, SF
Emancipator 22-9 (Exist.) - Wellbore #1 - Wellbore #1	8,218.4	6,647.9	398.3	230.3	2.371	CC, ES, SF
Emancipator B 22-23 (Exist.) - Wellbore #1 - Wellbore #1	7,661.0	6,652.0	262.0	103.1	1.649	CC, ES, SF
P&H 22-42 (Exist.) - Wellbore #1 - Wellbore #1	9,774.1	6,607.8	225.6	30.2	1.154	Level 2, CC, ES, SF
Ledford 22Y-HZ Pad Sec.22-T5N-R64W						
Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14)	400.0	400.0	31.2	29.6	19.844	CC
Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14)	11,118.5	11,184.1	167.0	23.6	1.165	Level 2, ES, SF
Ledford 22Y-241 - Wellbore #1 - Plan #1 (2-25-14)	400.0	400.0	60.5	58.9	38.441	CC, ES
Ledford 22Y-241 - Wellbore #1 - Plan #1 (2-25-14)	11,118.5	10,995.0	664.2	489.2	3.794	SF
Ledford 22Y-401 - Wellbore #1 - Plan #1 (2-25-14)	400.0	400.0	92.5	90.9	58.766	CC, ES
Ledford 22Y-401 - Wellbore #1 - Plan #1 (2-25-14)	11,118.5	11,147.1	927.3	752.1	5.292	SF
P&H 22CD Pad Sec.22-T5N-R64W						
P&H 22CD - Wellbore #1 - Plan #2 (11-12-10)	10,308.7	6,716.2	253.6	162.5	2.782	CC, ES, SF
P&H 22CD - Wellbore #1 - Wellbore #1	10,306.2	6,735.2	210.8	120.3	2.330	CC, ES, SF
P&H 22SD - Wellbore #1 - Plan #2 (11-12-10)	9,066.1	6,750.2	246.3	176.1	3.509	CC, ES, SF
P&H 22SD - Wellbore #1 - Wellbore #1	9,058.2	6,766.3	209.3	139.9	3.014	CC, ES, SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Bauer 22-C Sec. 22-T5N-R64W - Bauer 22-C - Wellbore #1 - Design #1												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
9,400.0	6,644.9	6,688.8	6,617.9	57.4	19.6	-92.43	3,752.5	-998.6	992.5	919.0	73.54	13.497	
9,500.0	6,643.8	6,687.7	6,616.8	59.2	19.6	-92.17	3,752.5	-998.6	896.1	820.7	75.40	11.884	
9,600.0	6,642.7	6,686.6	6,615.7	61.1	19.6	-91.92	3,752.5	-998.6	800.5	723.2	77.27	10.360	
9,700.0	6,641.6	6,685.5	6,614.6	62.9	19.6	-91.67	3,752.5	-998.6	706.2	627.0	79.14	8.923	
9,800.0	6,640.5	6,684.4	6,613.5	64.7	19.6	-91.42	3,752.5	-998.6	613.6	532.6	81.02	7.574	
9,900.0	6,639.4	6,683.3	6,612.4	66.6	19.6	-91.16	3,752.5	-998.6	523.8	440.9	82.90	6.319	
10,000.0	6,638.3	6,682.2	6,611.3	68.4	19.6	-90.91	3,752.5	-998.6	438.5	353.7	84.78	5.172	
10,100.0	6,637.2	6,681.1	6,610.2	70.3	19.6	-90.66	3,752.5	-998.6	360.7	274.1	86.66	4.163	
10,200.0	6,636.1	6,680.0	6,609.1	72.1	19.6	-90.41	3,752.5	-998.6	296.6	208.1	88.54	3.350	
10,300.0	6,635.0	6,678.9	6,608.0	74.0	19.6	-90.15	3,752.5	-998.6	256.6	166.2	90.42	2.838	
10,360.7	6,634.3	6,678.3	6,607.3	75.1	19.6	-90.00	3,752.5	-998.6	249.3	157.7	91.57	2.723 CC, ES, SF	
10,400.0	6,633.9	6,677.8	6,606.9	75.8	19.6	-89.90	3,752.5	-998.6	252.4	160.1	92.31	2.734	
10,500.0	6,632.8	6,676.7	6,605.8	77.7	19.6	-89.65	3,752.5	-998.6	285.6	191.4	94.19	3.032	
10,600.0	6,631.7	6,675.6	6,604.7	79.6	19.6	-89.40	3,752.5	-998.6	345.5	249.5	96.08	3.596	
10,700.0	6,630.6	6,674.6	6,603.6	81.4	19.6	-89.14	3,752.5	-998.6	421.0	323.0	97.96	4.298	
10,800.0	6,629.5	6,673.5	6,602.5	83.3	19.6	-88.89	3,752.5	-998.6	505.1	405.2	99.85	5.058	
10,900.0	6,628.4	6,672.4	6,601.4	85.2	19.6	-88.64	3,752.5	-998.6	594.1	492.3	101.73	5.840	
11,000.0	6,627.3	6,671.3	6,600.3	87.0	19.6	-88.39	3,752.5	-998.6	686.1	582.5	103.62	6.622	
11,100.0	6,626.2	6,670.2	6,599.2	88.9	19.6	-88.13	3,752.5	-998.6	780.1	674.6	105.50	7.395	
11,118.5	6,626.0	6,669.9	6,599.0	89.3	19.6	-88.09	3,752.5	-998.6	797.7	691.8	105.85	7.536	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Doughman 22VD Pad Sec.22-T5N-R64W - Doughman 22RD - Wellbore #1 - Plan #2 (8-11-10)												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)	Semi Major Axis Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,600.0	6,631.7	6,700.8	6,603.7	79.6	21.8	-92.34	4,933.8	-1,002.8	975.6	878.0	97.62	9.994	
10,700.0	6,630.6	6,699.7	6,602.6	81.4	21.8	-92.09	4,933.8	-1,002.8	879.5	779.9	99.53	8.836	
10,800.0	6,629.5	6,698.6	6,601.5	83.3	21.8	-91.84	4,933.8	-1,002.8	784.2	682.8	101.44	7.731	
10,900.0	6,628.4	6,697.5	6,600.4	85.2	21.8	-91.60	4,933.8	-1,002.8	690.4	587.0	103.35	6.680	
11,000.0	6,627.3	6,696.4	6,599.3	87.0	21.8	-91.35	4,933.8	-1,002.8	598.5	493.2	105.27	5.686	
11,100.0	6,626.2	6,695.3	6,598.2	88.9	21.8	-91.10	4,933.8	-1,002.8	509.7	402.5	107.18	4.755	
11,118.5	6,626.0	6,695.1	6,598.0	89.3	21.8	-91.05	4,933.8	-1,002.8	493.7	386.2	107.53	4.591 CC, ES, SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 ft
Survey Program: 765-MWD												Offset Well Error:	0.0 ft
Doughman 22VD Pad Sec.22-T5N-R64W - Doughman 22RD - Wellbore #1 - Wellbore #1													
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,600.0	6,631.7	6,727.5	6,630.5	79.6	20.2	-98.38	4,905.4	-999.2	947.7	852.6	95.07	9.968	
10,700.0	6,630.6	6,723.3	6,626.2	81.4	20.2	-97.43	4,905.6	-999.2	851.7	754.5	97.18	8.764	
10,800.0	6,629.5	6,719.2	6,622.1	83.3	20.2	-96.49	4,905.7	-999.2	756.7	657.5	99.27	7.623	
10,900.0	6,628.4	6,715.0	6,617.9	85.2	20.2	-95.55	4,905.8	-999.2	663.2	561.9	101.35	6.544	
11,000.0	6,627.3	6,710.9	6,613.9	87.0	20.2	-94.63	4,905.9	-999.2	571.9	468.5	103.40	5.531	
11,100.0	6,626.2	6,706.9	6,609.8	88.9	20.2	-93.71	4,906.0	-999.2	484.0	378.6	105.44	4.590	
11,118.5	6,626.0	6,706.2	6,609.1	89.3	20.2	-93.54	4,906.1	-999.2	468.3	362.4	105.82	4.425 CC, ES, SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Doughman 22VD Pad Sec.22-T5N-R64W - Lucas #1 (Exist.) - Wellbore #1 - Design #1												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)	Semi Major Axis Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,000.0	6,638.3	6,608.3	6,608.3	68.4	14.7	91.54	4,317.1	-370.5	999.9	917.6	82.29	12.151	
10,100.0	6,637.2	6,607.2	6,607.2	70.3	14.7	91.37	4,317.1	-370.5	908.1	824.0	84.15	10.792	
10,200.0	6,636.1	6,606.1	6,606.1	72.1	14.7	91.21	4,317.1	-370.5	818.3	732.3	86.02	9.513	
10,300.0	6,635.0	6,605.0	6,605.0	74.0	14.7	91.04	4,317.1	-370.5	731.2	643.3	87.89	8.319	
10,400.0	6,633.9	6,603.9	6,603.9	75.8	14.7	90.87	4,317.1	-370.5	647.7	557.9	89.76	7.216	
10,500.0	6,632.8	6,602.8	6,602.8	77.7	14.7	90.71	4,317.1	-370.5	569.6	478.0	91.64	6.216	
10,600.0	6,631.7	6,601.7	6,601.7	79.6	14.7	90.54	4,317.1	-370.5	499.4	405.9	93.51	5.340	
10,700.0	6,630.6	6,600.6	6,600.6	81.4	14.7	90.37	4,317.1	-370.5	440.8	345.4	95.39	4.621	
10,800.0	6,629.5	6,599.5	6,599.5	83.3	14.7	90.21	4,317.1	-370.5	399.1	301.8	97.27	4.103	
10,900.0	6,628.4	6,598.4	6,598.4	85.2	14.7	90.04	4,317.1	-370.5	379.7	280.5	99.15	3.830	
10,925.4	6,628.1	6,598.1	6,598.1	85.6	14.7	90.00	4,317.1	-370.5	378.8	279.2	99.62	3.803 CC, ES, SF	
11,000.0	6,627.3	6,597.3	6,597.3	87.0	14.7	89.88	4,317.1	-370.5	386.1	285.1	101.03	3.822	
11,100.0	6,626.2	6,596.2	6,596.2	88.9	14.7	89.71	4,317.1	-370.5	417.1	314.2	102.91	4.054	
11,118.5	6,626.0	6,596.0	6,596.0	89.3	14.7	89.68	4,317.1	-370.5	425.2	322.0	103.26	4.118	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Doughman 22VD Pad Sec.22-T5N-R64W - Lucas #1 (Exist.) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 100-MWD												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
10,000.0	6,638.3	6,581.0	6,579.4	68.4	13.7	87.37	4,270.9	-330.3	974.4	893.3	81.03	12.025	
10,100.0	6,637.2	6,582.8	6,581.2	70.3	13.7	87.62	4,271.0	-330.3	885.2	802.2	82.93	10.674	
10,200.0	6,636.1	6,584.6	6,583.0	72.1	13.7	87.87	4,271.0	-330.3	798.5	713.7	84.83	9.413	
10,300.0	6,635.0	6,586.4	6,584.8	74.0	13.7	88.12	4,271.1	-330.2	715.3	628.6	86.73	8.248	
10,400.0	6,633.9	6,588.2	6,586.7	75.8	13.7	88.37	4,271.2	-330.2	637.0	548.4	88.63	7.187	
10,500.0	6,632.8	6,590.1	6,588.5	77.7	13.7	88.62	4,271.2	-330.2	565.6	475.0	90.53	6.247	
10,600.0	6,631.7	6,591.9	6,590.4	79.6	13.7	88.87	4,271.3	-330.2	503.9	411.5	92.44	5.452	
10,700.0	6,630.6	6,600.0	6,598.4	81.4	13.8	89.97	4,271.5	-330.2	456.1	361.7	94.40	4.832	
10,800.0	6,629.5	6,600.0	6,598.4	83.3	13.8	89.97	4,271.5	-330.2	426.7	330.4	96.28	4.432	
10,879.8	6,628.6	6,600.0	6,598.4	84.8	13.8	89.97	4,271.5	-330.2	419.2	321.4	97.79	4.286 CC, ES	
10,900.0	6,628.4	6,600.0	6,598.4	85.2	13.8	89.97	4,271.5	-330.2	419.7	321.5	98.17	4.275 SF	
11,000.0	6,627.3	6,600.0	6,598.4	87.0	13.8	89.97	4,271.5	-330.2	436.1	336.0	100.06	4.358	
11,100.0	6,626.2	6,600.0	6,598.4	88.9	13.8	89.97	4,271.5	-330.2	473.5	371.5	101.95	4.644	
11,118.5	6,626.0	6,600.0	6,598.4	89.3	13.8	89.97	4,271.5	-330.2	482.4	380.1	102.30	4.715	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W - Emancipator 22-16 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 6906-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-42.59		342.5	-314.8	465.4				
100.0	100.0	87.0	87.0	0.1	1.7	-42.59		342.5	-314.8	465.2	463.3	1.85	251.099	
200.0	200.0	187.0	187.0	0.3	3.7	-42.59		342.5	-314.8	465.2	461.1	4.08	114.089	
300.0	300.0	287.0	287.0	0.6	5.7	-42.59		342.5	-314.8	465.2	458.9	6.30	73.814	
400.0	400.0	387.0	387.0	0.8	7.7	-42.59		342.5	-314.8	465.2	456.7	8.53	54.555	
500.0	500.0	487.0	487.0	1.0	9.7	62.84		342.5	-314.8	464.4	453.6	10.73	43.261	
600.0	599.8	586.8	586.8	1.2	11.7	63.46		342.5	-314.8	462.0	449.1	12.93	35.720	
700.0	699.5	686.5	686.5	1.4	13.7	64.50		342.5	-314.8	458.2	443.0	15.15	30.245	
800.0	798.7	785.7	785.7	1.7	15.7	65.98		342.5	-314.8	453.0	435.7	17.39	26.059	
900.0	897.5	884.5	884.5	2.0	17.7	67.87		342.5	-314.8	446.9	427.2	19.66	22.735	
1,000.0	996.1	983.1	983.1	2.4	19.7	69.84		342.5	-314.8	440.8	418.9	21.97	20.068	
1,100.0	1,094.7	1,081.7	1,081.7	2.7	21.6	71.86		342.5	-314.8	435.3	411.0	24.30	17.918	
1,200.0	1,193.3	1,180.3	1,180.3	3.1	23.6	73.93		342.5	-314.8	430.4	403.8	26.64	16.158	
1,300.0	1,292.0	1,279.0	1,279.0	3.5	25.6	76.04		342.5	-314.8	426.0	397.1	28.99	14.697	
1,400.0	1,390.6	1,377.6	1,377.6	3.8	27.6	78.20		342.5	-314.8	422.3	391.0	31.35	13.472	
1,500.0	1,489.2	1,476.2	1,476.2	4.2	29.5	80.39		342.5	-314.8	419.2	385.5	33.71	12.436	
1,600.0	1,587.8	1,574.8	1,574.8	4.6	31.5	82.60		342.5	-314.8	416.7	380.6	36.07	11.552	
1,700.0	1,686.4	1,673.4	1,673.4	5.0	33.5	84.84		342.5	-314.8	414.9	376.4	38.44	10.793	
1,800.0	1,785.0	1,772.0	1,772.0	5.4	35.4	87.10		342.5	-314.8	413.7	372.9	40.80	10.139	
1,900.0	1,883.7	1,870.7	1,870.7	5.7	37.4	89.36		342.5	-314.8	413.2	370.0	43.16	9.573	
1,928.3	1,911.5	1,898.5	1,898.5	5.9	38.0	90.00		342.5	-314.8	413.1	369.3	43.83	9.426 CC	
2,000.0	1,982.3	1,969.3	1,969.3	6.1	39.4	91.63		342.5	-314.8	413.3	367.8	45.52	9.080	
2,100.0	2,080.9	2,067.9	2,067.9	6.5	41.4	93.89		342.5	-314.8	414.1	366.2	47.86	8.652	
2,200.0	2,179.5	2,166.5	2,166.5	6.9	43.3	96.13		342.5	-314.8	415.6	365.4	50.21	8.278	
2,300.0	2,278.1	2,265.1	2,265.1	7.3	45.3	98.36		342.5	-314.8	417.7	365.2	52.54	7.950	
2,400.0	2,376.7	2,363.7	2,363.7	7.7	47.3	100.57		342.5	-314.8	420.5	365.6	54.86	7.664	
2,500.0	2,475.4	2,462.4	2,462.4	8.1	49.2	102.74		342.5	-314.8	423.9	366.7	57.17	7.414	
2,600.0	2,574.0	2,561.0	2,561.0	8.5	51.2	104.88		342.5	-314.8	427.9	368.4	59.47	7.194	
2,700.0	2,672.6	2,659.6	2,659.6	8.9	53.2	106.97		342.5	-314.8	432.5	370.7	61.76	7.002	
2,800.0	2,771.2	2,758.2	2,758.2	9.3	55.2	109.02		342.5	-314.8	437.7	373.6	64.04	6.834	
2,900.0	2,869.8	2,856.8	2,856.8	9.6	57.1	111.02		342.5	-314.8	443.4	377.1	66.31	6.687	
3,000.0	2,968.5	2,955.5	2,955.5	10.0	59.1	112.97		342.5	-314.8	449.7	381.1	68.57	6.558	
3,100.0	3,067.1	3,054.1	3,054.1	10.4	61.1	114.87		342.5	-314.8	456.5	385.7	70.82	6.446	
3,200.0	3,165.7	3,152.7	3,152.7	10.8	63.1	116.70		342.5	-314.8	463.8	390.7	73.05	6.348	
3,300.0	3,264.3	3,251.3	3,251.3	11.2	65.0	118.48		342.5	-314.8	471.5	396.2	75.28	6.264	
3,400.0	3,362.9	3,349.9	3,349.9	11.6	67.0	120.20		342.5	-314.8	479.7	402.2	77.50	6.190	
3,500.0	3,461.5	3,448.5	3,448.5	12.0	69.0	121.87		342.5	-314.8	488.4	408.7	79.71	6.127	
3,600.0	3,560.2	3,547.2	3,547.2	12.4	70.9	123.47		342.5	-314.8	497.4	415.5	81.91	6.072	
3,700.0	3,658.8	3,645.8	3,645.8	12.8	72.9	125.02		342.5	-314.8	506.8	422.7	84.11	6.026	
3,800.0	3,757.4	3,744.4	3,744.4	13.2	74.9	126.51		342.5	-314.8	516.6	430.3	86.30	5.986	
3,900.0	3,856.0	3,843.0	3,843.0	13.6	76.9	127.95		342.5	-314.8	526.7	438.2	88.48	5.953	
4,000.0	3,954.6	3,941.6	3,941.6	14.0	78.8	129.33		342.5	-314.8	537.1	446.5	90.66	5.925	
4,100.0	4,053.2	4,040.2	4,040.2	14.3	80.8	130.66		342.5	-314.8	547.9	455.0	92.84	5.901	
4,200.0	4,151.9	4,138.9	4,138.9	14.7	82.8	131.94		342.5	-314.8	558.9	463.9	95.01	5.883	
4,300.0	4,250.5	4,237.5	4,237.5	15.1	84.7	133.17		342.5	-314.8	570.2	473.0	97.18	5.867	
4,400.0	4,349.1	4,336.1	4,336.1	15.5	86.7	134.35		342.5	-314.8	581.7	482.4	99.34	5.856	
4,500.0	4,447.7	4,434.7	4,434.7	15.9	88.7	135.49		342.5	-314.8	593.5	492.0	101.51	5.847	
4,600.0	4,546.3	4,533.3	4,533.3	16.3	90.7	136.58		342.5	-314.8	605.5	501.9	103.67	5.841	
4,700.0	4,645.0	4,632.0	4,632.0	16.7	92.6	137.63		342.5	-314.8	617.7	511.9	105.83	5.837	
4,800.0	4,743.6	4,730.6	4,730.6	17.1	94.6	138.64		342.5	-314.8	630.2	522.2	107.98	5.836	
4,900.0	4,842.2	4,829.2	4,829.2	17.5	96.6	139.61		342.5	-314.8	642.8	532.6	110.14	5.836	

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W - Emancipator 22-16 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 6906-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)			
5,000.0	4,940.8	4,927.8	4,927.8	17.9	98.6	140.54	342.5	-314.8	655.5	543.2	112.30	5.838		
5,100.0	5,039.4	5,026.4	5,026.4	18.3	100.5	141.46	342.5	-314.8	668.5	554.0	114.50	5.838		
5,200.0	5,138.4	5,125.4	5,125.4	18.5	102.5	142.35	342.5	-314.8	679.8	562.9	116.90	5.815		
5,300.0	5,237.8	5,224.8	5,224.8	18.7	104.5	143.01	342.5	-314.8	688.5	569.2	119.25	5.773		
5,400.0	5,337.5	5,324.5	5,324.5	18.9	106.5	143.45	342.5	-314.8	694.4	572.9	121.54	5.713		
5,500.0	5,437.4	5,424.4	5,424.4	19.1	108.5	143.68	342.5	-314.8	697.6	573.8	123.75	5.637		
5,600.0	5,537.4	5,524.4	5,524.4	19.2	110.5	38.49	342.5	-314.8	698.1	572.2	125.90	5.545		
5,700.0	5,637.4	5,624.4	5,624.4	19.3	112.5	38.49	342.5	-314.8	698.1	570.1	128.06	5.452		
5,800.0	5,737.4	5,724.4	5,724.4	19.5	114.5	38.49	342.5	-314.8	698.1	567.9	130.22	5.361		
5,900.0	5,837.4	5,824.4	5,824.4	19.6	116.5	38.49	342.5	-314.8	698.1	565.8	132.38	5.274		
6,000.0	5,937.4	5,924.4	5,924.4	19.7	118.5	38.55	342.5	-314.8	697.6	563.2	134.42	5.190		
6,100.0	6,036.8	6,023.8	6,023.8	19.8	120.5	39.50	342.5	-314.8	689.3	554.0	135.25	5.096		
6,200.0	6,133.9	6,120.9	6,120.9	19.9	122.4	41.67	342.5	-314.8	671.1	536.3	134.77	4.980		
6,300.0	6,227.1	6,214.1	6,214.1	19.9	124.3	45.21	342.5	-314.8	644.1	510.5	133.61	4.821		
6,400.0	6,314.8	6,301.8	6,301.8	20.0	126.0	50.28	342.5	-314.8	609.6	476.7	132.82	4.589		
6,500.0	6,395.5	6,382.5	6,382.5	20.0	127.6	56.94	342.5	-314.8	569.8	436.1	133.71	4.261		
6,600.0	6,467.8	6,454.8	6,454.8	20.0	129.1	64.98	342.5	-314.8	527.8	390.8	136.95	3.854		
6,700.0	6,530.5	6,517.5	6,517.5	20.1	130.3	73.64	342.5	-314.8	487.8	346.1	141.67	3.443		
6,800.0	6,582.4	6,569.4	6,569.4	20.3	131.4	81.72	342.5	-314.8	455.4	309.5	145.93	3.121		
6,900.0	6,622.9	6,609.9	6,609.9	20.5	132.2	87.96	342.5	-314.8	436.8	288.2	148.59	2.940		
6,947.5	6,637.8	6,624.8	6,624.8	20.7	132.5	90.00	342.5	-314.8	434.5	285.1	149.41	2.908 ES, SF		
7,000.0	6,651.0	6,638.0	6,638.0	21.0	132.8	91.46	342.5	-314.8	437.4	287.3	150.10	2.914		
7,100.0	6,666.4	6,653.4	6,653.4	21.6	133.1	91.75	342.5	-314.8	459.5	308.1	151.40	3.035		
7,200.0	6,669.1	6,656.1	6,656.1	22.4	133.1	89.64	342.5	-314.8	501.0	348.4	152.56	3.284		
7,300.0	6,668.0	6,655.0	6,655.0	23.4	133.1	89.49	342.5	-314.8	557.6	403.8	153.76	3.626		
7,400.0	6,666.9	6,653.9	6,653.9	24.6	133.1	89.35	342.5	-314.8	625.1	470.1	155.06	4.031		
7,500.0	6,665.8	6,652.8	6,652.8	25.8	133.1	89.20	342.5	-314.8	700.5	544.0	156.45	4.477		
7,600.0	6,664.7	6,651.7	6,651.7	27.2	133.0	89.06	342.5	-314.8	781.4	623.5	157.89	4.949		
7,700.0	6,663.6	6,650.6	6,650.6	28.6	133.0	88.91	342.5	-314.8	866.3	706.9	159.40	5.435		
7,800.0	6,662.5	6,649.5	6,649.5	30.1	133.0	88.77	342.5	-314.8	954.1	793.1	160.95	5.928		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W - Emancipator 22-9 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 6919-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)			
7,400.0	6,666.9	6,656.9	6,656.9	24.6	133.1	91.29	1,610.3	-351.0	910.1	754.9	155.19	5.865		
7,500.0	6,665.8	6,655.8	6,655.8	25.8	133.1	91.14	1,610.3	-351.0	821.4	664.8	156.58	5.246		
7,600.0	6,664.7	6,654.7	6,654.7	27.2	133.1	90.98	1,610.3	-351.0	735.5	577.5	158.04	4.654		
7,700.0	6,663.6	6,653.6	6,653.6	28.6	133.1	90.82	1,610.3	-351.0	653.7	494.1	159.56	4.097		
7,800.0	6,662.5	6,652.5	6,652.5	30.1	133.0	90.66	1,610.3	-351.0	577.6	416.5	161.12	3.585		
7,900.0	6,661.4	6,651.4	6,651.4	31.6	133.0	90.50	1,610.3	-351.0	509.9	347.2	162.73	3.133		
8,000.0	6,660.3	6,650.3	6,650.3	33.2	133.0	90.35	1,610.3	-351.0	454.2	289.9	164.36	2.764		
8,100.0	6,659.2	6,649.2	6,649.2	34.8	133.0	90.19	1,610.3	-351.0	415.5	249.5	166.02	2.503		
8,200.0	6,658.1	6,648.1	6,648.1	36.4	133.0	90.03	1,610.3	-351.0	398.7	231.0	167.70	2.377		
8,218.4	6,657.9	6,647.9	6,647.9	36.7	133.0	90.00	1,610.3	-351.0	398.3	230.3	168.02	2.371 CC, ES, SF		
8,300.0	6,657.0	6,647.0	6,647.0	38.1	132.9	89.87	1,610.3	-351.0	406.6	237.2	169.41	2.400		
8,400.0	6,655.9	6,645.9	6,645.9	39.7	132.9	89.71	1,610.3	-351.0	437.7	266.6	171.13	2.558		
8,500.0	6,654.8	6,644.8	6,644.8	41.4	132.9	89.55	1,610.3	-351.0	487.8	314.9	172.86	2.822		
8,600.0	6,653.7	6,643.7	6,643.7	43.2	132.9	89.40	1,610.3	-351.0	551.6	377.0	174.61	3.159		
8,700.0	6,652.6	6,642.6	6,642.6	44.9	132.9	89.24	1,610.3	-351.0	624.9	448.6	176.36	3.543		
8,800.0	6,651.5	6,641.5	6,641.5	46.7	132.8	89.08	1,610.3	-351.0	704.9	526.7	178.13	3.957		
8,900.0	6,650.4	6,640.4	6,640.4	48.4	132.8	88.92	1,610.3	-351.0	789.4	609.5	179.90	4.388		
9,000.0	6,649.3	6,639.3	6,639.3	50.2	132.8	88.76	1,610.3	-351.0	877.2	695.5	181.69	4.828		
9,100.0	6,648.2	6,638.2	6,638.2	52.0	132.8	88.61	1,610.3	-351.0	967.3	783.9	183.47	5.272		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W - Emancipator B 22-23 (Exist.) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7912-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
6,700.0	6,530.5	6,518.5	6,518.5	20.1	130.4	-26.05	1,052.9	-1,011.3	968.4	865.9	102.47	9.450	
6,800.0	6,582.4	6,570.4	6,570.4	20.3	131.4	-33.73	1,052.9	-1,011.3	886.5	784.0	102.48	8.650	
6,900.0	6,622.9	6,610.9	6,610.9	20.5	132.2	-45.26	1,052.9	-1,011.3	799.6	685.9	113.70	7.033	
7,000.0	6,651.0	6,639.0	6,639.0	21.0	132.8	-61.22	1,052.9	-1,011.3	709.7	576.0	133.76	5.306	
7,100.0	6,666.4	6,654.4	6,654.4	21.6	133.1	-79.22	1,052.9	-1,011.3	619.1	469.8	149.23	4.148	
7,200.0	6,669.1	6,657.1	6,657.1	22.4	133.1	-91.11	1,052.9	-1,011.3	530.2	377.7	152.52	3.476	
7,300.0	6,668.0	6,656.0	6,656.0	23.4	133.1	-90.87	1,052.9	-1,011.3	446.0	292.3	153.75	2.901	
7,400.0	6,666.9	6,654.9	6,654.9	24.6	133.1	-90.63	1,052.9	-1,011.3	369.8	214.7	155.09	2.385	
7,500.0	6,665.8	6,653.8	6,653.8	25.8	133.1	-90.39	1,052.9	-1,011.3	307.5	151.0	156.50	1.965	
7,600.0	6,664.7	6,652.7	6,652.7	27.2	133.1	-90.15	1,052.9	-1,011.3	269.0	111.0	157.97	1.703	
7,661.0	6,664.0	6,652.0	6,652.0	28.0	133.0	-90.00	1,052.9	-1,011.3	262.0	103.1	158.91	1.649	CC, ES, SF
7,700.0	6,663.6	6,651.6	6,651.6	28.6	133.0	-89.91	1,052.9	-1,011.3	264.9	105.4	159.50	1.661	
7,800.0	6,662.5	6,650.5	6,650.5	30.1	133.0	-89.67	1,052.9	-1,011.3	296.6	135.5	161.08	1.841	
7,900.0	6,661.4	6,649.4	6,649.4	31.6	133.0	-89.43	1,052.9	-1,011.3	354.6	191.9	162.69	2.180	
8,000.0	6,660.3	6,648.3	6,648.3	33.2	133.0	-89.18	1,052.9	-1,011.3	428.4	264.1	164.33	2.607	
8,100.0	6,659.2	6,647.2	6,647.2	34.8	132.9	-88.94	1,052.9	-1,011.3	511.2	345.2	165.99	3.080	
8,200.0	6,658.1	6,646.1	6,646.1	36.4	132.9	-88.70	1,052.9	-1,011.3	599.3	431.6	167.68	3.574	
8,300.0	6,657.0	6,645.0	6,645.0	38.1	132.9	-88.46	1,052.9	-1,011.3	690.6	521.2	169.39	4.077	
8,400.0	6,655.9	6,643.9	6,643.9	39.7	132.9	-88.22	1,052.9	-1,011.3	784.0	612.9	171.10	4.582	
8,500.0	6,654.8	6,642.8	6,642.8	41.4	132.9	-87.98	1,052.9	-1,011.3	878.9	706.1	172.84	5.085	
8,600.0	6,653.7	6,641.7	6,641.7	43.2	132.8	-87.74	1,052.9	-1,011.3	974.8	800.2	174.58	5.584	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W - P&H 22-42 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error: 0.0 ft	
Survey Program: 6896-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	
8,800.0	6,651.5	6,618.5	6,618.5	46.7	132.4	92.72	3,165.9	-523.7	999.8	822.2	177.67	5.628		
8,900.0	6,650.4	6,617.4	6,617.4	48.4	132.3	92.44	3,165.9	-523.7	902.7	723.2	179.48	5.030		
9,000.0	6,649.3	6,616.3	6,616.3	50.2	132.3	92.16	3,165.9	-523.7	806.3	625.0	181.30	4.447		
9,100.0	6,648.2	6,615.2	6,615.2	52.0	132.3	91.88	3,165.9	-523.7	710.8	527.7	183.12	3.882		
9,200.0	6,647.1	6,614.1	6,614.1	53.8	132.3	91.60	3,165.9	-523.7	616.8	431.9	184.94	3.335		
9,300.0	6,646.0	6,613.0	6,613.0	55.6	132.3	91.32	3,165.9	-523.7	525.0	338.3	186.77	2.811		
9,400.0	6,644.9	6,611.9	6,611.9	57.4	132.2	91.04	3,165.9	-523.7	436.8	248.2	188.60	2.316		
9,500.0	6,643.8	6,610.8	6,610.8	59.2	132.2	90.77	3,165.9	-523.7	355.0	164.6	190.43	1.864		
9,600.0	6,642.7	6,609.7	6,609.7	61.1	132.2	90.49	3,165.9	-523.7	285.0	92.7	192.26	1.482	Level 3	
9,700.0	6,641.6	6,608.6	6,608.6	62.9	132.2	90.21	3,165.9	-523.7	237.5	43.4	194.09	1.223	Level 2	
9,774.1	6,640.8	6,607.8	6,607.8	64.2	132.2	90.00	3,165.9	-523.7	225.6	30.2	195.44	1.154	Level 2, CC, ES, SF	
9,800.0	6,640.5	6,607.5	6,607.5	64.7	132.1	89.93	3,165.9	-523.7	227.1	31.2	195.92	1.159	Level 2	
9,900.0	6,639.4	6,606.4	6,606.4	66.6	132.1	89.65	3,165.9	-523.7	258.3	60.6	197.74	1.306	Level 3	
10,000.0	6,638.3	6,605.3	6,605.3	68.4	132.1	89.37	3,165.9	-523.7	319.2	119.7	199.57	1.600		
10,100.0	6,637.2	6,604.2	6,604.2	70.3	132.1	89.09	3,165.9	-523.7	396.3	194.9	201.40	1.968		
10,200.0	6,636.1	6,603.1	6,603.1	72.1	132.1	88.81	3,165.9	-523.7	481.9	278.7	203.22	2.371		
10,300.0	6,635.0	6,602.0	6,602.0	74.0	132.0	88.53	3,165.9	-523.7	572.2	367.2	205.04	2.791		
10,400.0	6,633.9	6,600.9	6,600.9	75.8	132.0	88.25	3,165.9	-523.7	665.3	458.4	206.86	3.216		
10,500.0	6,632.8	6,599.8	6,599.8	77.7	132.0	87.97	3,165.9	-523.7	760.1	551.4	208.67	3.643		
10,600.0	6,631.7	6,598.7	6,598.7	79.6	132.0	87.70	3,165.9	-523.7	856.1	645.6	210.48	4.067		
10,700.0	6,630.6	6,597.6	6,597.6	81.4	132.0	87.42	3,165.9	-523.7	952.9	740.6	212.29	4.489		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	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		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	45.55	21.9	22.3	31.2					
100.0	100.0	100.0	100.0	0.1	0.1	45.55	21.9	22.3	31.2	31.0	0.22	138.906		
200.0	200.0	200.0	200.0	0.3	0.3	45.55	21.9	22.3	31.2	30.5	0.67	46.302		
300.0	300.0	300.0	300.0	0.6	0.6	45.55	21.9	22.3	31.2	30.1	1.12	27.781		
400.0	400.0	400.0	400.0	0.8	0.8	45.55	21.9	22.3	31.2	29.6	1.57	19.844 CC		
500.0	500.0	500.0	500.0	1.0	1.0	152.26	21.9	22.3	32.8	30.7	2.01	16.300		
600.0	599.8	599.8	599.8	1.2	1.2	155.95	21.9	22.3	37.5	35.0	2.44	15.348		
700.0	699.5	699.5	699.5	1.4	1.5	160.36	21.9	22.3	45.6	42.7	2.88	15.817		
800.0	798.7	798.7	798.7	1.7	1.7	164.40	21.9	22.3	57.2	53.9	3.32	17.204		
900.0	897.5	897.5	897.5	2.0	1.9	167.67	21.9	22.3	72.3	68.5	3.77	19.179		
1,000.0	996.1	996.1	996.1	2.4	2.1	169.96	21.9	22.3	88.6	84.4	4.22	20.994		
1,100.0	1,094.7	1,096.5	1,096.5	2.7	2.3	171.52	21.6	21.5	104.1	99.5	4.66	22.368		
1,200.0	1,193.3	1,197.4	1,197.4	3.1	2.5	172.64	20.7	19.1	118.0	112.9	5.08	23.227		
1,300.0	1,292.0	1,298.9	1,298.7	3.5	2.7	173.48	19.3	14.9	130.2	124.7	5.52	23.601		
1,400.0	1,390.6	1,400.7	1,400.4	3.8	2.9	174.16	17.2	9.1	140.6	134.7	5.96	23.592		
1,500.0	1,489.2	1,502.9	1,502.3	4.2	3.2	174.73	14.6	1.5	149.3	142.9	6.41	23.283		
1,600.0	1,587.8	1,605.4	1,604.3	4.6	3.4	175.22	11.3	-7.9	156.2	149.3	6.87	22.733		
1,700.0	1,686.4	1,708.1	1,706.3	5.0	3.7	175.68	7.4	-19.0	161.3	154.0	7.34	21.991		
1,800.0	1,785.0	1,811.0	1,808.3	5.4	4.0	176.10	2.9	-31.8	164.7	156.9	7.81	21.092		
1,900.0	1,883.7	1,913.9	1,910.1	5.7	4.3	176.52	-2.2	-46.4	166.2	158.0	8.29	20.065		
2,000.0	1,982.3	2,016.7	2,011.4	6.1	4.6	176.93	-7.8	-62.6	166.0	157.2	8.77	18.935		
2,100.0	2,080.9	2,116.7	2,109.8	6.5	4.9	177.35	-13.6	-79.2	165.0	155.8	9.25	17.843		
2,200.0	2,179.5	2,216.7	2,208.3	6.9	5.3	177.76	-19.4	-95.8	164.0	154.3	9.73	16.853		
2,300.0	2,278.1	2,316.7	2,306.7	7.3	5.6	178.19	-25.2	-112.3	163.0	152.8	10.22	15.953		
2,400.0	2,376.7	2,416.7	2,405.1	7.7	6.0	178.61	-31.0	-128.9	162.0	151.3	10.71	15.132		
2,500.0	2,475.4	2,516.7	2,503.6	8.1	6.4	179.05	-36.8	-145.4	161.1	149.9	11.20	14.379		
2,600.0	2,574.0	2,616.7	2,602.0	8.5	6.7	179.48	-42.6	-162.0	160.1	148.4	11.70	13.688		
2,700.0	2,672.6	2,716.6	2,700.5	8.9	7.1	179.93	-48.4	-178.5	159.1	146.9	12.19	13.051		
2,800.0	2,771.2	2,816.6	2,798.9	9.3	7.5	-179.62	-54.2	-195.1	158.2	145.5	12.69	12.462		
2,900.0	2,869.8	2,916.6	2,897.3	9.6	7.9	-179.17	-60.0	-211.7	157.3	144.1	13.20	11.916		
3,000.0	2,968.5	3,016.6	2,995.8	10.0	8.3	-178.71	-65.8	-228.2	156.3	142.6	13.70	11.409		
3,100.0	3,067.1	3,116.6	3,094.2	10.4	8.6	-178.25	-71.6	-244.8	155.4	141.2	14.21	10.937		
3,200.0	3,165.7	3,216.6	3,192.6	10.8	9.0	-177.78	-77.4	-261.3	154.5	139.8	14.72	10.496		
3,300.0	3,264.3	3,316.6	3,291.1	11.2	9.4	-177.30	-83.2	-277.9	153.6	138.4	15.24	10.083		
3,400.0	3,362.9	3,416.6	3,389.5	11.6	9.8	-176.82	-89.0	-294.5	152.7	137.0	15.75	9.696		
3,500.0	3,461.5	3,516.5	3,488.0	12.0	10.2	-176.33	-94.7	-311.0	151.9	135.6	16.27	9.333		
3,600.0	3,560.2	3,616.5	3,586.4	12.4	10.6	-175.84	-100.5	-327.6	151.0	134.2	16.80	8.991		
3,700.0	3,658.8	3,716.5	3,684.8	12.8	11.0	-175.34	-106.3	-344.1	150.2	132.8	17.32	8.668		
3,800.0	3,757.4	3,816.5	3,783.3	13.2	11.4	-174.84	-112.1	-360.7	149.3	131.5	17.85	8.364		
3,900.0	3,856.0	3,916.5	3,881.7	13.6	11.8	-174.33	-117.9	-377.3	148.5	130.1	18.39	8.076		
4,000.0	3,954.6	4,016.5	3,980.1	14.0	12.2	-173.81	-123.7	-393.8	147.7	128.8	18.93	7.803		
4,100.0	4,053.2	4,116.5	4,078.6	14.3	12.6	-173.29	-129.5	-410.4	146.9	127.4	19.47	7.545		
4,200.0	4,151.9	4,216.5	4,177.0	14.7	13.0	-172.77	-135.3	-426.9	146.1	126.1	20.01	7.299		
4,300.0	4,250.5	4,316.4	4,275.4	15.1	13.4	-172.24	-141.1	-443.5	145.3	124.7	20.57	7.066		
4,400.0	4,349.1	4,416.4	4,373.9	15.5	13.8	-171.70	-146.9	-460.1	144.5	123.4	21.12	6.844		
4,500.0	4,447.7	4,516.4	4,472.3	15.9	14.2	-171.15	-152.7	-476.6	143.8	122.1	21.68	6.632		
4,600.0	4,546.3	4,616.4	4,570.8	16.3	14.6	-170.61	-158.5	-493.2	143.1	120.8	22.25	6.430		
4,700.0	4,645.0	4,716.4	4,669.2	16.7	15.0	-170.05	-164.3	-509.7	142.3	119.5	22.82	6.237		
4,800.0	4,743.6	4,816.4	4,767.6	17.1	15.4	-169.49	-170.1	-526.3	141.6	118.2	23.40	6.053		
4,900.0	4,842.2	4,916.4	4,866.1	17.5	15.8	-168.92	-175.9	-542.9	140.9	116.9	23.98	5.877		
5,000.0	4,940.8	5,016.4	4,964.5	17.9	16.2	-168.35	-181.6	-559.4	140.2	115.7	24.57	5.708		

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14)														
Reference				Offset			Semi Major Axis			Distance				
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
5,100.0	5,039.4	5,116.3	5,062.9	18.3	16.6	-167.77	-187.4	-576.0	139.5	114.4	25.16	5.545		
5,200.0	5,138.4	5,213.4	5,158.6	18.5	17.0	-167.08	-192.8	-591.4	137.4	111.7	25.69	5.348		
5,300.0	5,237.8	5,309.1	5,253.3	18.7	17.2	-166.42	-197.2	-603.8	134.8	108.7	26.13	5.159		
5,400.0	5,337.5	5,404.8	5,348.5	18.9	17.4	-165.82	-200.5	-613.3	132.1	105.5	26.52	4.979		
5,500.0	5,437.4	5,500.0	5,443.5	19.1	17.6	-165.27	-202.7	-619.7	129.1	102.3	26.86	4.806		
5,600.0	5,537.4	5,596.5	5,539.9	19.2	17.8	89.97	-203.9	-623.1	126.2	99.0	27.21	4.639		
5,689.0	5,626.5	5,683.0	5,626.5	19.3	17.9	90.06	-204.1	-623.7	125.6	98.1	27.52	4.563		
5,700.0	5,637.4	5,694.0	5,637.4	19.3	17.9	90.06	-204.1	-623.7	125.6	98.0	27.56	4.557		
5,800.0	5,737.4	5,794.0	5,737.4	19.5	18.1	90.06	-204.1	-623.7	125.6	97.7	27.91	4.500		
5,900.0	5,837.4	5,894.0	5,837.4	19.6	18.2	90.06	-204.1	-623.7	125.6	97.3	28.26	4.444		
5,953.4	5,890.9	5,947.4	5,890.9	19.7	18.3	90.34	-204.1	-623.7	125.6	97.1	28.48	4.410		
6,000.0	5,937.4	5,994.0	5,937.4	19.7	18.3	90.37	-204.1	-623.7	125.6	96.9	28.65	4.384		
6,100.0	6,036.8	6,094.1	6,037.5	19.8	18.5	94.26	-202.0	-623.7	125.9	96.4	29.49	4.271		
6,200.0	6,133.9	6,195.5	6,137.8	19.9	18.6	98.60	-187.7	-623.7	127.0	96.7	30.30	4.193		
6,300.0	6,227.1	6,298.3	6,236.6	19.9	18.6	102.73	-159.8	-623.7	128.8	97.9	30.87	4.172		
6,400.0	6,314.8	6,402.4	6,332.0	20.0	18.7	106.55	-118.3	-623.7	131.1	99.9	31.12	4.211		
6,500.0	6,395.5	6,507.8	6,421.9	20.0	18.7	109.98	-63.5	-623.7	133.7	102.6	31.09	4.300		
6,600.0	6,467.8	6,614.4	6,504.4	20.0	18.7	112.97	4.0	-623.7	136.5	105.6	30.87	4.421		
6,700.0	6,530.5	6,722.2	6,577.3	20.1	18.7	115.49	83.2	-623.7	139.2	108.5	30.64	4.543		
6,800.0	6,582.4	6,831.0	6,638.9	20.3	18.8	117.52	172.8	-623.7	141.7	111.0	30.69	4.616		
6,900.0	6,622.9	6,940.7	6,687.5	20.5	19.1	119.06	271.0	-623.7	143.7	112.5	31.20	4.607		
7,000.0	6,651.0	7,050.9	6,721.7	21.0	19.5	120.12	375.7	-623.7	145.2	112.8	32.37	4.485		
7,100.0	6,666.4	7,161.1	6,740.5	21.6	20.2	120.68	484.2	-623.7	146.0	111.8	34.28	4.260		
7,200.0	6,669.1	7,263.1	6,750.7	22.4	21.1	122.99	585.7	-623.7	149.9	113.7	36.18	4.143		
7,300.0	6,668.0	7,369.8	6,754.0	23.4	22.3	124.40	692.3	-623.7	152.2	114.1	38.08	3.997		
7,400.0	6,666.9	7,469.8	6,753.5	24.6	23.5	124.59	792.3	-623.7	152.6	112.2	40.33	3.783		
7,500.0	6,665.8	7,569.8	6,753.0	25.8	24.8	124.79	892.3	-623.7	152.9	110.2	42.69	3.582		
7,600.0	6,664.7	7,669.8	6,752.6	27.2	26.2	124.98	992.3	-623.7	153.3	108.1	45.15	3.395		
7,700.0	6,663.6	7,769.8	6,752.1	28.6	27.6	125.17	1,092.3	-623.7	153.6	106.0	47.69	3.222		
7,800.0	6,662.5	7,869.8	6,751.6	30.1	29.1	125.36	1,192.3	-623.7	154.0	103.7	50.29	3.062		
7,900.0	6,661.4	7,969.8	6,751.1	31.6	30.7	125.55	1,292.3	-623.7	154.4	101.4	52.95	2.915		
8,000.0	6,660.3	8,069.8	6,750.7	33.2	32.3	125.74	1,392.3	-623.7	154.7	99.1	55.66	2.780		
8,100.0	6,659.2	8,169.8	6,750.2	34.8	33.9	125.93	1,492.3	-623.7	155.1	96.7	58.39	2.656		
8,200.0	6,658.1	8,269.8	6,749.7	36.4	35.6	126.12	1,592.3	-623.7	155.5	94.3	61.16	2.542		
8,300.0	6,657.0	8,369.8	6,749.3	38.1	37.2	126.30	1,692.3	-623.7	155.9	91.9	63.95	2.437		
8,400.0	6,655.9	8,469.8	6,748.8	39.7	38.9	126.49	1,792.3	-623.7	156.2	89.5	66.76	2.340		
8,500.0	6,654.8	8,569.8	6,748.3	41.4	40.7	126.67	1,892.3	-623.7	156.6	87.0	69.58	2.250		
8,600.0	6,653.7	8,669.8	6,747.8	43.2	42.4	126.86	1,992.3	-623.7	157.0	84.6	72.42	2.168		
8,700.0	6,652.6	8,769.8	6,747.4	44.9	44.2	127.04	2,092.3	-623.7	157.4	82.1	75.27	2.091		
8,800.0	6,651.5	8,869.8	6,746.9	46.7	45.9	127.22	2,192.3	-623.7	157.7	79.6	78.12	2.019		
8,900.0	6,650.4	8,969.8	6,746.4	48.4	47.7	127.40	2,292.3	-623.7	158.1	77.1	80.97	1.953		
9,000.0	6,649.3	9,069.8	6,746.0	50.2	49.5	127.58	2,392.3	-623.7	158.5	74.7	83.83	1.891		
9,100.0	6,648.2	9,169.8	6,745.5	52.0	51.3	127.76	2,492.3	-623.7	158.9	72.2	86.69	1.833		
9,200.0	6,647.1	9,269.8	6,745.0	53.8	53.1	127.94	2,592.3	-623.7	159.3	69.7	89.55	1.778		
9,300.0	6,646.0	9,369.8	6,744.5	55.6	54.9	128.12	2,692.3	-623.7	159.7	67.2	92.41	1.728		
9,400.0	6,644.9	9,469.8	6,744.1	57.4	56.7	128.30	2,792.3	-623.7	160.0	64.8	95.27	1.680		
9,500.0	6,643.8	9,569.8	6,743.6	59.2	58.6	128.47	2,892.3	-623.7	160.4	62.3	98.12	1.635		
9,600.0	6,642.7	9,669.8	6,743.1	61.1	60.4	128.65	2,992.2	-623.7	160.8	59.9	100.97	1.593		
9,700.0	6,641.6	9,769.8	6,742.7	62.9	62.2	128.82	3,092.2	-623.7	161.2	57.4	103.82	1.553		
9,800.0	6,640.5	9,869.8	6,742.2	64.7	64.1	128.99	3,192.2	-623.7	161.6	55.0	106.66	1.515		
9,900.0	6,639.4	9,969.8	6,741.7	66.6	65.9	129.17	3,292.2	-623.7	162.0	52.5	109.49	1.480 Level 3		

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14)												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 +N/-S	Offset Wellbore Centre +E/-W	Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning
Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)		
10,000.0	6,638.3	10,069.8	6,741.3	68.4	67.8	129.34	3,392.2	-623.7	162.4	50.1	112.32	1.446	Level 3
10,100.0	6,637.2	10,169.8	6,740.8	70.3	69.6	129.51	3,492.2	-623.7	162.8	47.7	115.14	1.414	Level 3
10,200.0	6,636.1	10,269.8	6,740.3	72.1	71.5	129.68	3,592.2	-623.7	163.2	45.3	117.96	1.384	Level 3
10,300.0	6,635.0	10,369.8	6,739.8	74.0	73.4	129.85	3,692.2	-623.7	163.6	42.8	120.77	1.355	Level 3
10,400.0	6,633.9	10,469.8	6,739.4	75.8	75.2	130.02	3,792.2	-623.7	164.0	40.4	123.57	1.327	Level 3
10,500.0	6,632.8	10,569.8	6,738.9	77.7	77.1	130.18	3,892.2	-623.7	164.4	38.1	126.36	1.301	Level 3
10,600.0	6,631.7	10,669.8	6,738.4	79.6	79.0	130.35	3,992.2	-623.7	164.8	35.7	129.15	1.276	Level 3
10,700.0	6,630.6	10,769.8	6,738.0	81.4	80.8	130.52	4,092.2	-623.7	165.2	33.3	131.93	1.252	Level 3
10,800.0	6,629.5	10,869.8	6,737.5	83.3	82.7	130.68	4,192.2	-623.7	165.6	31.0	134.70	1.230	Level 2
10,900.0	6,628.4	10,969.8	6,737.0	85.2	84.6	130.85	4,292.2	-623.7	166.1	28.6	137.46	1.208	Level 2
11,000.0	6,627.3	11,069.8	6,736.5	87.0	86.5	131.01	4,392.2	-623.7	166.5	26.3	140.21	1.187	Level 2
11,100.0	6,626.2	11,169.8	6,736.1	88.9	88.3	131.17	4,492.2	-623.7	166.9	23.9	142.95	1.167	Level 2
11,118.5	6,626.0	11,184.1	6,736.0	89.3	88.6	131.20	4,506.5	-623.7	167.0	23.6	143.41	1.165	Level 2, ES, SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22Y-241 - Wellbore #1 - Plan #1 (2-25-14)													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	43.71	43.7	41.8	60.5					
100.0	100.0	100.0	100.0	0.1	0.1	43.71	43.7	41.8	60.5	60.3	0.22	269.090		
200.0	200.0	200.0	200.0	0.3	0.3	43.71	43.7	41.8	60.5	59.8	0.67	89.697		
300.0	300.0	300.0	300.0	0.6	0.6	43.71	43.7	41.8	60.5	59.4	1.12	53.818		
400.0	400.0	400.0	400.0	0.8	0.8	43.71	43.7	41.8	60.5	58.9	1.57	38.441 CC, ES		
500.0	500.0	500.0	500.0	1.0	1.0	149.75	43.7	41.8	62.0	60.0	2.01	30.846		
600.0	599.8	599.8	599.8	1.2	1.2	151.98	43.7	41.8	66.6	64.1	2.44	27.264		
700.0	699.5	699.5	699.5	1.4	1.5	155.07	43.7	41.8	74.4	71.5	2.88	25.802		
800.0	798.7	798.7	798.7	1.7	1.7	158.42	43.7	41.8	85.6	82.3	3.33	25.707		
900.0	897.5	897.5	897.5	2.0	1.9	161.62	43.7	41.8	100.2	96.4	3.78	26.524		
1,000.0	996.1	996.1	996.1	2.4	2.1	164.20	43.7	41.8	116.1	111.9	4.23	27.439		
1,100.0	1,094.7	1,094.7	1,094.7	2.7	2.3	166.15	43.7	41.8	132.1	127.4	4.69	28.196		
1,200.0	1,193.3	1,193.3	1,193.3	3.1	2.6	167.68	43.7	41.8	148.3	143.1	5.14	28.828		
1,300.0	1,292.0	1,292.0	1,292.0	3.5	2.8	168.91	43.7	41.8	164.5	158.9	5.60	29.361		
1,400.0	1,390.6	1,390.6	1,390.6	3.8	3.0	169.92	43.7	41.8	180.8	174.7	6.06	29.816		
1,500.0	1,489.2	1,489.2	1,489.2	4.2	3.2	170.77	43.7	41.8	197.1	190.6	6.53	30.207		
1,600.0	1,587.8	1,587.8	1,587.8	4.6	3.5	171.48	43.7	41.8	213.5	206.5	6.99	30.546		
1,700.0	1,686.4	1,686.4	1,686.4	5.0	3.7	172.09	43.7	41.8	229.9	222.5	7.45	30.843		
1,800.0	1,785.0	1,785.0	1,785.0	5.4	3.9	172.62	43.7	41.8	246.3	238.4	7.92	31.104		
1,900.0	1,883.7	1,886.7	1,886.7	5.7	4.1	173.19	43.1	41.5	262.3	253.9	8.37	31.347		
2,000.0	1,982.3	1,989.2	1,989.2	6.1	4.3	173.95	41.0	40.3	277.0	268.2	8.79	31.507		
2,100.0	2,080.9	2,092.0	2,091.9	6.5	4.5	174.87	37.1	38.3	290.4	281.1	9.22	31.506		
2,200.0	2,179.5	2,195.1	2,194.8	6.9	4.7	175.95	31.7	35.5	302.5	292.8	9.65	31.355		
2,300.0	2,278.1	2,298.3	2,297.7	7.3	4.9	177.18	24.6	31.7	313.4	303.4	10.09	31.072		
2,400.0	2,376.7	2,401.6	2,400.5	7.7	5.1	178.56	15.8	27.1	323.3	312.7	10.54	30.674		
2,500.0	2,475.4	2,505.0	2,503.2	8.1	5.3	-179.91	5.4	21.6	332.0	321.0	11.00	30.171		
2,600.0	2,574.0	2,608.3	2,605.6	8.5	5.5	-178.23	-6.7	15.3	339.8	328.3	11.49	29.577		
2,700.0	2,672.6	2,711.5	2,707.7	8.9	5.8	-176.40	-20.3	8.1	346.6	334.7	11.99	28.901		
2,800.0	2,771.2	2,812.0	2,806.8	9.3	6.1	-174.50	-34.8	0.5	353.0	340.5	12.52	28.191		
2,900.0	2,869.8	2,911.1	2,904.6	9.6	6.4	-172.69	-49.3	-7.1	359.6	346.6	13.07	27.523		
3,000.0	2,968.5	3,010.2	3,002.4	10.0	6.6	-170.94	-63.7	-14.7	366.7	353.0	13.63	26.893		
3,100.0	3,067.1	3,109.4	3,100.1	10.4	6.9	-169.26	-78.1	-22.2	374.0	359.8	14.22	26.300		
3,200.0	3,165.7	3,208.5	3,197.9	10.8	7.3	-167.64	-92.5	-29.8	381.6	366.8	14.82	25.744		
3,300.0	3,264.3	3,307.6	3,295.7	11.2	7.6	-166.09	-106.9	-37.4	389.6	374.1	15.45	25.222		
3,400.0	3,362.9	3,406.8	3,393.5	11.6	7.9	-164.60	-121.3	-45.0	397.8	381.7	16.08	24.733		
3,500.0	3,461.5	3,505.9	3,491.3	12.0	8.2	-163.17	-135.7	-52.5	406.3	389.5	16.73	24.277		
3,600.0	3,560.2	3,605.0	3,589.1	12.4	8.6	-161.80	-150.1	-60.1	415.0	397.6	17.40	23.851		
3,700.0	3,658.8	3,704.2	3,686.9	12.8	8.9	-160.49	-164.6	-67.7	423.9	405.9	18.08	23.454		
3,800.0	3,757.4	3,800.0	3,781.5	13.2	9.2	-159.33	-178.1	-74.8	433.3	414.6	18.73	23.136		
3,900.0	3,856.0	3,894.1	3,874.7	13.6	9.4	-158.58	-188.9	-80.5	443.9	424.6	19.30	22.997		
4,000.0	3,954.6	3,987.9	3,968.1	14.0	9.7	-158.22	-197.0	-84.7	455.8	436.0	19.84	22.979		
4,100.0	4,053.2	4,081.5	4,061.5	14.3	9.9	-158.24	-202.3	-87.6	468.9	448.6	20.32	23.075		
4,200.0	4,151.9	4,174.7	4,154.7	14.7	10.1	-158.59	-205.0	-88.9	483.1	462.4	20.76	23.277		
4,300.0	4,250.5	4,270.5	4,250.5	15.1	10.2	-159.23	-205.3	-89.1	498.5	477.3	21.16	23.557		
4,400.0	4,349.1	4,369.1	4,349.1	15.5	10.4	-159.88	-205.3	-89.1	514.0	492.5	21.56	23.838		
4,500.0	4,447.7	4,467.8	4,447.7	15.9	10.6	-160.50	-205.3	-89.1	529.7	507.7	21.97	24.108		
4,600.0	4,546.3	4,566.4	4,546.3	16.3	10.8	-161.08	-205.3	-89.1	545.3	522.9	22.38	24.367		
4,700.0	4,645.0	4,665.0	4,645.0	16.7	11.0	-161.62	-205.3	-89.1	561.0	538.3	22.79	24.616		
4,800.0	4,743.6	4,763.6	4,743.6	17.1	11.2	-162.14	-205.3	-89.1	576.8	553.6	23.21	24.856		
4,900.0	4,842.2	4,862.2	4,842.2	17.5	11.3	-162.63	-205.3	-89.1	592.6	569.0	23.62	25.086		
5,000.0	4,940.8	4,960.8	4,940.8	17.9	11.5	-163.10	-205.3	-89.1	608.5	584.4	24.04	25.307		

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference														
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,039.4	5,059.5	5,039.4	18.3	11.7	-163.55	-205.3	-89.1	624.3	599.9	24.47	25.517		
5,200.0	5,138.4	5,158.4	5,138.4	18.5	11.9	-163.99	-205.3	-89.1	638.1	613.3	24.85	25.674		
5,300.0	5,237.8	5,257.8	5,237.8	18.7	12.1	-164.32	-205.3	-89.1	648.6	623.4	25.22	25.716		
5,400.0	5,337.5	5,357.5	5,337.5	18.9	12.3	-164.53	-205.3	-89.1	655.7	630.2	25.57	25.648		
5,500.0	5,437.4	5,457.5	5,437.4	19.1	12.5	-164.64	-205.3	-89.1	659.5	633.6	25.89	25.478		
5,600.0	5,537.4	5,557.5	5,537.4	19.2	12.7	90.11	-205.3	-89.1	660.2	634.0	26.22	25.177		
5,700.0	5,637.4	5,657.5	5,637.4	19.3	12.9	90.11	-205.3	-89.1	660.2	633.6	26.59	24.827		
5,800.0	5,737.4	5,757.5	5,737.4	19.5	13.1	90.11	-205.3	-89.1	660.2	633.2	26.96	24.484		
5,900.0	5,837.4	5,857.5	5,837.4	19.6	13.3	90.10	-205.2	-89.1	660.2	632.9	27.34	24.151		
5,929.8	5,867.2	5,887.3	5,867.2	19.6	13.3	90.04	-204.2	-89.1	660.2	632.8	27.44	24.063		
6,000.0	5,937.4	5,957.0	5,936.6	19.7	13.4	89.48	-197.4	-89.1	660.2	632.6	27.62	23.905		
6,100.0	6,036.8	6,055.0	6,032.4	19.8	13.5	88.61	-177.1	-89.1	660.4	632.6	27.78	23.772		
6,200.0	6,133.9	6,151.9	6,123.8	19.9	13.6	87.77	-145.2	-89.1	660.7	632.8	27.87	23.709		
6,300.0	6,227.1	6,247.6	6,209.5	19.9	13.6	86.97	-102.6	-89.1	661.1	633.2	27.93	23.668		
6,400.0	6,314.8	6,342.4	6,288.3	20.0	13.7	86.22	-50.2	-89.1	661.6	633.6	28.05	23.590		
6,500.0	6,395.5	6,436.2	6,359.4	20.0	13.7	85.54	10.9	-89.1	662.2	633.9	28.28	23.418		
6,600.0	6,467.8	6,529.2	6,422.0	20.0	13.8	84.93	79.7	-89.1	662.8	634.1	28.70	23.098		
6,700.0	6,530.5	6,621.5	6,475.4	20.1	14.2	84.40	154.9	-89.1	663.4	634.0	29.35	22.598		
6,800.0	6,582.4	6,713.3	6,519.2	20.3	14.7	83.97	235.5	-89.1	663.9	633.6	30.30	21.912		
6,900.0	6,622.9	6,804.6	6,552.8	20.5	15.3	83.63	320.4	-89.1	664.3	632.8	31.54	21.062		
7,000.0	6,651.0	6,895.6	6,575.9	21.0	16.2	83.39	408.3	-89.1	664.6	631.5	33.08	20.089		
7,100.0	6,666.4	6,986.4	6,588.5	21.6	17.1	83.25	498.2	-89.1	664.8	629.9	34.90	19.049		
7,200.0	6,669.1	7,079.5	6,590.6	22.4	18.2	83.22	591.2	-89.1	664.8	627.8	37.00	17.971		
7,300.0	6,668.0	7,179.5	6,589.6	23.4	19.4	83.23	691.2	-89.1	664.8	625.3	39.48	16.839		
7,400.0	6,666.9	7,279.5	6,588.7	24.6	20.8	83.24	791.2	-89.1	664.8	622.6	42.16	15.767		
7,500.0	6,665.8	7,379.5	6,587.7	25.8	22.2	83.25	891.2	-89.1	664.8	619.8	45.01	14.770		
7,600.0	6,664.7	7,479.5	6,586.7	27.2	23.8	83.27	991.2	-89.1	664.8	616.8	47.99	13.852		
7,700.0	6,663.6	7,579.5	6,585.8	28.6	25.3	83.28	1,091.1	-89.1	664.8	613.7	51.08	13.013		
7,800.0	6,662.5	7,679.5	6,584.8	30.1	26.9	83.29	1,191.1	-89.1	664.7	610.5	54.27	12.249		
7,900.0	6,661.4	7,779.5	6,583.9	31.6	28.6	83.30	1,291.1	-89.1	664.7	607.2	57.53	11.554		
8,000.0	6,660.3	7,879.5	6,582.9	33.2	30.3	83.31	1,391.1	-89.1	664.7	603.8	60.86	10.921		
8,100.0	6,659.2	7,979.5	6,581.9	34.8	32.0	83.33	1,491.1	-89.1	664.7	600.5	64.25	10.346		
8,200.0	6,658.1	8,079.5	6,581.0	36.4	33.7	83.34	1,591.1	-89.1	664.7	597.0	67.68	9.821		
8,300.0	6,657.0	8,179.5	6,580.0	38.1	35.5	83.35	1,691.1	-89.1	664.7	593.5	71.15	9.342		
8,400.0	6,655.9	8,279.5	6,579.1	39.7	37.2	83.36	1,791.1	-89.1	664.6	590.0	74.65	8.903		
8,500.0	6,654.8	8,379.5	6,578.1	41.4	39.0	83.37	1,891.1	-89.1	664.6	586.4	78.19	8.501		
8,600.0	6,653.7	8,479.5	6,577.1	43.2	40.8	83.39	1,991.1	-89.1	664.6	582.9	81.75	8.130		
8,700.0	6,652.6	8,579.5	6,576.2	44.9	42.6	83.40	2,091.1	-89.1	664.6	579.3	85.33	7.789		
8,800.0	6,651.5	8,679.5	6,575.2	46.7	44.4	83.41	2,191.1	-89.1	664.6	575.7	88.93	7.473		
8,900.0	6,650.4	8,779.5	6,574.3	48.4	46.3	83.42	2,291.1	-89.1	664.6	572.0	92.55	7.180		
9,000.0	6,649.3	8,879.5	6,573.3	50.2	48.1	83.43	2,391.1	-89.1	664.6	568.4	96.19	6.909		
9,100.0	6,648.2	8,979.5	6,572.3	52.0	49.9	83.45	2,491.1	-89.1	664.5	564.7	99.84	6.656		
9,200.0	6,647.1	9,079.5	6,571.4	53.8	51.8	83.46	2,591.1	-89.1	664.5	561.0	103.50	6.420		
9,300.0	6,646.0	9,179.5	6,570.4	55.6	53.6	83.47	2,691.1	-89.1	664.5	557.3	107.18	6.200		
9,400.0	6,644.9	9,279.5	6,569.5	57.4	55.5	83.48	2,791.1	-89.1	664.5	553.6	110.86	5.994		
9,500.0	6,643.8	9,379.5	6,568.5	59.2	57.3	83.49	2,891.1	-89.1	664.5	549.9	114.56	5.800		
9,600.0	6,642.7	9,479.5	6,567.5	61.1	59.2	83.51	2,991.1	-89.1	664.5	546.2	118.26	5.619		
9,700.0	6,641.6	9,579.5	6,566.6	62.9	61.1	83.52	3,091.1	-89.1	664.4	542.5	121.97	5.448		
9,800.0	6,640.5	9,679.5	6,565.6	64.7	62.9	83.53	3,191.0	-89.1	664.4	538.7	125.69	5.286		
9,900.0	6,639.4	9,779.5	6,564.7	66.6	64.8	83.54	3,291.0	-89.1	664.4	535.0	129.41	5.134		
10,000.0	6,638.3	9,879.5	6,563.7	68.4	66.7	83.55	3,391.0	-89.1	664.4	531.3	133.14	4.990		

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22Y-241 - Wellbore #1 - Plan #1 (2-25-14)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	6,637.2	9,979.5	6,562.7	70.3	68.6	83.57	3,491.0	-89.1	664.4	527.5	136.87	4.854	
10,200.0	6,636.1	10,079.5	6,561.8	72.1	70.5	83.58	3,591.0	-89.1	664.4	523.8	140.61	4.725	
10,300.0	6,635.0	10,179.5	6,560.8	74.0	72.3	83.59	3,691.0	-89.1	664.3	520.0	144.35	4.602	
10,400.0	6,633.9	10,279.5	6,559.9	75.8	74.2	83.60	3,791.0	-89.1	664.3	516.2	148.10	4.486	
10,500.0	6,632.8	10,379.5	6,558.9	77.7	76.1	83.61	3,891.0	-89.1	664.3	512.5	151.85	4.375	
10,600.0	6,631.7	10,479.5	6,557.9	79.6	78.0	83.63	3,991.0	-89.1	664.3	508.7	155.61	4.269	
10,700.0	6,630.6	10,579.5	6,557.0	81.4	79.9	83.64	4,091.0	-89.1	664.3	504.9	159.37	4.168	
10,800.0	6,629.5	10,679.5	6,556.0	83.3	81.8	83.65	4,191.0	-89.1	664.3	501.1	163.13	4.072	
10,900.0	6,628.4	10,779.5	6,555.1	85.2	83.7	83.66	4,291.0	-89.1	664.3	497.4	166.90	3.980	
11,000.0	6,627.3	10,879.5	6,554.1	87.0	85.6	83.67	4,391.0	-89.1	664.2	493.6	170.66	3.892	
11,100.0	6,626.2	10,979.5	6,553.1	88.9	87.5	83.69	4,491.0	-89.1	664.2	489.8	174.43	3.808	
11,115.7	6,626.0	10,995.0	6,553.0	89.2	87.7	83.69	4,506.5	-89.1	664.2	489.2	175.02	3.795	
11,118.5	6,626.0	10,995.0	6,553.0	89.3	87.7	83.69	4,506.5	-89.1	664.2	489.2	175.08	3.794 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design													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
0.0	0.0	0.0	0.0	0.0	0.0	41.52		69.2	61.3	92.5				
100.0	100.0	100.0	100.0	0.1	0.1	41.52		69.2	61.3	92.5	92.2	0.22	411.361	
200.0	200.0	200.0	200.0	0.3	0.3	41.52		69.2	61.3	92.5	91.8	0.67	137.120	
300.0	300.0	300.0	300.0	0.6	0.6	41.52		69.2	61.3	92.5	91.3	1.12	82.272	
400.0	400.0	400.0	400.0	0.8	0.8	41.52		69.2	61.3	92.5	90.9	1.57	58.766 CC, ES	
500.0	500.0	500.0	500.0	1.0	1.0	147.32		69.2	61.3	93.9	91.9	2.01	46.743	
600.0	599.8	599.8	599.8	1.2	1.2	148.92		69.2	61.3	98.4	95.9	2.44	40.296	
700.0	699.5	699.5	699.5	1.4	1.5	151.28		69.2	61.3	105.9	103.1	2.88	36.739	
800.0	798.7	798.7	798.7	1.7	1.7	154.05		69.2	61.3	116.8	113.4	3.33	35.036	
900.0	897.5	897.5	897.5	2.0	1.9	156.94		69.2	61.3	131.0	127.2	3.79	34.579	
1,000.0	996.1	996.1	996.1	2.4	2.1	159.48		69.2	61.3	146.4	142.1	4.24	34.490	
1,100.0	1,094.7	1,094.7	1,094.7	2.7	2.3	161.53		69.2	61.3	162.0	157.3	4.70	34.452	
1,200.0	1,193.3	1,193.3	1,193.3	3.1	2.6	163.22		69.2	61.3	177.8	172.7	5.16	34.443	
1,300.0	1,292.0	1,292.0	1,292.0	3.5	2.8	164.63		69.2	61.3	193.8	188.2	5.62	34.451	
1,400.0	1,390.6	1,390.6	1,390.6	3.8	3.0	165.83		69.2	61.3	209.8	203.7	6.09	34.469	
1,500.0	1,489.2	1,489.2	1,489.2	4.2	3.2	166.86		69.2	61.3	225.9	219.4	6.55	34.491	
1,600.0	1,587.8	1,587.8	1,587.8	4.6	3.5	167.75		69.2	61.3	242.1	235.1	7.01	34.516	
1,700.0	1,686.4	1,686.4	1,686.4	5.0	3.7	168.53		69.2	61.3	258.3	250.9	7.48	34.540	
1,800.0	1,785.0	1,785.0	1,785.0	5.4	3.9	169.22		69.2	61.3	274.6	266.7	7.94	34.565	
1,900.0	1,883.7	1,883.7	1,883.7	5.7	4.1	169.83		69.2	61.3	290.9	282.5	8.41	34.588	
2,000.0	1,982.3	1,982.3	1,982.3	6.1	4.3	170.37		69.2	61.3	307.2	298.4	8.88	34.611	
2,100.0	2,080.9	2,081.1	2,081.1	6.5	4.5	170.97		68.7	61.5	323.6	314.2	9.32	34.715	
2,200.0	2,179.5	2,179.8	2,179.7	6.9	4.7	171.79		66.6	62.4	339.9	330.1	9.74	34.905	
2,300.0	2,278.1	2,278.3	2,278.2	7.3	4.9	172.81		63.0	63.8	356.3	346.1	10.15	35.092	
2,400.0	2,376.7	2,376.6	2,376.3	7.7	5.1	174.00		57.8	66.0	372.8	362.2	10.57	35.261	
2,500.0	2,475.4	2,474.6	2,474.1	8.1	5.3	175.34		51.0	68.7	389.5	378.5	11.00	35.413	
2,600.0	2,574.0	2,572.3	2,571.3	8.5	5.4	176.80		42.8	72.0	406.5	395.0	11.43	35.549	
2,700.0	2,672.6	2,669.6	2,668.0	8.9	5.7	178.37		33.0	76.0	423.9	412.0	11.88	35.669	
2,800.0	2,771.2	2,766.4	2,764.1	9.3	5.9	-179.98		21.8	80.6	441.8	429.4	12.35	35.773	
2,900.0	2,869.8	2,862.7	2,859.4	9.6	6.1	-178.27		9.2	85.7	460.2	447.4	12.83	35.860	
3,000.0	2,968.5	2,958.4	2,954.0	10.0	6.3	-176.50		-4.9	91.4	479.4	466.0	13.34	35.935	
3,100.0	3,067.1	3,054.4	3,048.4	10.4	6.6	-174.70		-20.3	97.6	499.3	485.4	13.87	35.993	
3,200.0	3,165.7	3,151.1	3,143.7	10.8	6.9	-172.99		-36.0	104.0	519.6	505.2	14.42	36.030	
3,300.0	3,264.3	3,247.8	3,238.9	11.2	7.2	-171.41		-51.7	110.4	540.5	525.5	14.99	36.057	
3,400.0	3,362.9	3,344.6	3,334.1	11.6	7.5	-169.94		-67.5	116.8	561.7	546.1	15.57	36.077	
3,500.0	3,461.5	3,441.3	3,429.4	12.0	7.8	-168.58		-83.2	123.2	583.2	567.0	16.16	36.093	
3,600.0	3,560.2	3,538.0	3,524.6	12.4	8.1	-167.32		-99.0	129.6	605.0	588.2	16.76	36.106	
3,700.0	3,658.8	3,634.8	3,619.8	12.8	8.4	-166.14		-114.7	136.0	627.1	609.7	17.36	36.118	
3,800.0	3,757.4	3,731.5	3,715.1	13.2	8.8	-165.05		-130.5	142.4	649.4	631.4	17.97	36.130	
3,900.0	3,856.0	3,828.2	3,810.3	13.6	9.1	-164.02		-146.2	148.8	671.9	653.3	18.59	36.142	
4,000.0	3,954.6	3,925.9	3,906.5	14.0	9.4	-163.05		-162.1	155.3	694.6	675.4	19.21	36.155	
4,100.0	4,053.2	4,033.9	4,013.2	14.3	9.7	-162.23		-177.5	161.5	716.6	696.8	19.82	36.151	
4,200.0	4,151.9	4,143.2	4,121.7	14.7	10.0	-161.75		-189.2	166.3	737.2	716.8	20.39	36.157	
4,300.0	4,250.5	4,253.5	4,231.7	15.1	10.3	-161.59		-197.2	169.5	756.2	735.3	20.92	36.147	
4,400.0	4,349.1	4,364.5	4,342.6	15.5	10.5	-161.73		-201.2	171.2	773.6	752.2	21.41	36.126	
4,500.0	4,447.7	4,469.7	4,447.7	15.9	10.7	-162.09		-201.8	171.4	789.6	767.7	21.86	36.112	
4,600.0	4,546.3	4,568.3	4,546.3	16.3	10.9	-162.46		-201.8	171.4	805.4	783.1	22.30	36.116	
4,700.0	4,645.0	4,666.9	4,645.0	16.7	11.1	-162.80		-201.8	171.4	821.2	798.5	22.74	36.119	
4,800.0	4,743.6	4,765.5	4,743.6	17.1	11.3	-163.14		-201.8	171.4	837.1	813.9	23.17	36.121	
4,900.0	4,842.2	4,864.1	4,842.2	17.5	11.4	-163.46		-201.8	171.4	853.0	829.3	23.61	36.123	
5,000.0	4,940.8	4,962.7	4,940.8	17.9	11.6	-163.77		-201.8	171.4	868.9	844.8	24.05	36.125	

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	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		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
5,100.0	5,039.4	5,061.4	5,039.4	18.3	11.8	-164.08	-201.8	171.4	884.8	860.3	24.50	36.119		
5,200.0	5,138.4	5,160.3	5,138.4	18.5	12.0	-164.41	-201.8	171.4	898.6	873.7	24.92	36.062		
5,300.0	5,237.8	5,259.7	5,237.8	18.7	12.2	-164.65	-201.8	171.4	909.1	883.8	25.31	35.914		
5,400.0	5,337.5	5,359.4	5,337.5	18.9	12.4	-164.81	-201.8	171.4	916.2	890.6	25.68	35.679		
5,500.0	5,437.4	5,459.4	5,437.4	19.1	12.6	-164.89	-201.8	171.4	920.0	894.0	26.02	35.362		
5,600.0	5,537.4	5,559.4	5,537.4	19.2	12.8	89.86	-201.8	171.4	920.7	894.3	26.36	34.928		
5,700.0	5,637.4	5,659.4	5,637.4	19.3	13.0	89.86	-201.8	171.4	920.7	894.0	26.73	34.448		
5,800.0	5,737.4	5,759.4	5,737.4	19.5	13.2	89.86	-201.8	171.4	920.7	893.6	27.10	33.977		
5,900.0	5,837.4	5,859.4	5,837.4	19.6	13.4	89.86	-201.8	171.4	920.7	893.2	27.47	33.516		
6,000.0	5,937.4	5,959.4	5,937.4	19.7	13.6	89.90	-201.8	171.4	920.7	892.9	27.84	33.066		
6,022.3	5,959.6	5,981.6	5,959.6	19.8	13.6	89.98	-201.8	171.4	920.7	892.8	27.92	32.974		
6,100.0	6,036.8	6,059.3	6,037.3	19.8	13.8	90.44	-199.6	171.4	920.7	892.5	28.19	32.661		
6,200.0	6,133.9	6,160.4	6,137.3	19.9	13.9	91.04	-185.5	171.4	920.8	892.4	28.43	32.388		
6,300.0	6,227.1	6,262.8	6,235.9	19.9	14.0	91.63	-157.8	171.4	921.1	892.5	28.58	32.227		
6,400.0	6,314.8	6,366.6	6,331.0	20.0	14.0	92.19	-116.5	171.4	921.4	892.7	28.69	32.114		
6,500.0	6,395.5	6,471.7	6,420.8	20.0	14.0	92.72	-62.0	171.4	921.7	892.9	28.84	31.961		
6,600.0	6,467.8	6,578.1	6,503.1	20.0	14.1	93.20	5.2	171.4	922.1	893.0	29.12	31.665		
6,700.0	6,530.5	6,685.6	6,576.1	20.1	14.2	93.63	84.0	171.4	922.6	892.9	29.64	31.124		
6,800.0	6,582.4	6,794.2	6,637.8	20.3	14.6	93.99	173.2	171.4	922.9	892.5	30.49	30.271		
6,900.0	6,622.9	6,903.6	6,686.6	20.5	15.2	94.28	271.1	171.4	923.3	891.5	31.74	29.093		
7,000.0	6,651.0	7,013.8	6,721.1	21.0	16.0	94.49	375.6	171.4	923.5	890.1	33.40	27.649		
7,100.0	6,666.4	7,124.2	6,740.2	21.6	17.1	94.61	484.2	171.4	923.7	888.2	35.45	26.054		
7,200.0	6,669.1	7,225.9	6,750.5	22.4	18.2	95.05	585.5	171.4	924.3	886.6	37.73	24.498		
7,300.0	6,668.0	7,332.8	6,754.0	23.4	19.5	95.34	692.3	171.4	924.7	884.4	40.26	22.969		
7,400.0	6,666.9	7,432.8	6,753.5	24.6	20.9	95.37	792.3	171.4	924.8	881.8	42.92	21.546		
7,500.0	6,665.8	7,532.8	6,753.0	25.8	22.3	95.41	892.3	171.4	924.8	879.1	45.74	20.219		
7,600.0	6,664.7	7,632.8	6,752.6	27.2	23.8	95.45	992.3	171.4	924.9	876.2	48.70	18.992		
7,700.0	6,663.6	7,732.8	6,752.1	28.6	25.3	95.49	1,092.3	171.4	924.9	873.2	51.77	17.866		
7,800.0	6,662.5	7,832.8	6,751.6	30.1	26.9	95.53	1,192.3	171.4	925.0	870.1	54.94	16.838		
7,900.0	6,661.4	7,932.8	6,751.1	31.6	28.5	95.57	1,292.3	171.4	925.1	866.9	58.18	15.900		
8,000.0	6,660.3	8,032.8	6,750.7	33.2	30.2	95.61	1,392.3	171.4	925.1	863.6	61.49	15.045		
8,100.0	6,659.2	8,132.8	6,750.2	34.8	31.9	95.65	1,492.3	171.4	925.2	860.3	64.86	14.265		
8,200.0	6,658.1	8,232.8	6,749.7	36.4	33.6	95.68	1,592.3	171.4	925.3	857.0	68.27	13.552		
8,300.0	6,657.0	8,332.8	6,749.3	38.1	35.4	95.72	1,692.3	171.4	925.3	853.6	71.73	12.900		
8,400.0	6,655.9	8,432.8	6,748.8	39.7	37.1	95.76	1,792.3	171.4	925.4	850.2	75.22	12.302		
8,500.0	6,654.8	8,532.8	6,748.3	41.4	38.9	95.80	1,892.3	171.4	925.4	846.7	78.74	11.753		
8,600.0	6,653.7	8,632.8	6,747.8	43.2	40.7	95.84	1,992.3	171.4	925.5	843.2	82.29	11.247		
8,700.0	6,652.6	8,732.8	6,747.4	44.9	42.5	95.88	2,092.3	171.4	925.6	839.7	85.86	10.780		
8,800.0	6,651.5	8,832.8	6,746.9	46.7	44.3	95.92	2,192.3	171.4	925.6	836.2	89.45	10.348		
8,900.0	6,650.4	8,932.8	6,746.4	48.4	46.1	95.96	2,292.3	171.4	925.7	832.6	93.06	9.948		
9,000.0	6,649.3	9,032.8	6,746.0	50.2	47.9	95.99	2,392.3	171.4	925.8	829.1	96.68	9.575		
9,100.0	6,648.2	9,132.8	6,745.5	52.0	49.8	96.03	2,492.3	171.4	925.8	825.5	100.32	9.229		
9,200.0	6,647.1	9,232.8	6,745.0	53.8	51.6	96.07	2,592.3	171.4	925.9	821.9	103.97	8.906		
9,300.0	6,646.0	9,332.8	6,744.5	55.6	53.4	96.11	2,692.3	171.4	926.0	818.3	107.63	8.603		
9,400.0	6,644.9	9,432.8	6,744.1	57.4	55.3	96.15	2,792.3	171.4	926.0	814.7	111.30	8.320		
9,500.0	6,643.8	9,532.8	6,743.6	59.2	57.1	96.19	2,892.3	171.4	926.1	811.1	114.98	8.054		
9,600.0	6,642.7	9,632.8	6,743.1	61.1	59.0	96.23	2,992.2	171.4	926.2	807.5	118.67	7.804		
9,700.0	6,641.6	9,732.8	6,742.7	62.9	60.9	96.26	3,092.2	171.4	926.2	803.9	122.37	7.569		
9,800.0	6,640.5	9,832.8	6,742.2	64.7	62.7	96.30	3,192.2	171.4	926.3	800.2	126.07	7.348		
9,900.0	6,639.4	9,932.8	6,741.7	66.6	64.6	96.34	3,292.2	171.4	926.4	796.6	129.78	7.138		
10,000.0	6,638.3	10,032.8	6,741.3	68.4	66.5	96.38	3,392.2	171.4	926.5	793.0	133.49	6.940		

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 Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22Y-401 - Wellbore #1 - Plan #1 (2-25-14)												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	6,637.2	10,132.8	6,740.8	70.3	68.3	96.42	3,492.2	171.4	926.5	789.3	137.21	6.753	
10,200.0	6,636.1	10,232.8	6,740.3	72.1	70.2	96.46	3,592.2	171.4	926.6	785.7	140.94	6.575	
10,300.0	6,635.0	10,332.8	6,739.8	74.0	72.1	96.50	3,692.2	171.4	926.7	782.0	144.66	6.406	
10,400.0	6,633.9	10,432.8	6,739.4	75.8	74.0	96.53	3,792.2	171.4	926.7	778.3	148.39	6.245	
10,500.0	6,632.8	10,532.8	6,738.9	77.7	75.9	96.57	3,892.2	171.4	926.8	774.7	152.13	6.092	
10,600.0	6,631.7	10,632.8	6,738.4	79.6	77.8	96.61	3,992.2	171.4	926.9	771.0	155.87	5.947	
10,700.0	6,630.6	10,732.8	6,738.0	81.4	79.6	96.65	4,092.2	171.4	927.0	767.3	159.61	5.808	
10,800.0	6,629.5	10,832.8	6,737.5	83.3	81.5	96.69	4,192.2	171.4	927.0	763.7	163.35	5.675	
10,900.0	6,628.4	10,932.8	6,737.0	85.2	83.4	96.73	4,292.2	171.4	927.1	760.0	167.10	5.548	
11,000.0	6,627.3	11,032.8	6,736.5	87.0	85.3	96.77	4,392.2	171.4	927.2	756.3	170.84	5.427	
11,100.0	6,626.2	11,132.8	6,736.1	88.9	87.2	96.80	4,492.2	171.4	927.3	752.7	174.59	5.311	
11,118.5	6,626.0	11,147.1	6,736.0	89.3	87.5	96.81	4,506.5	171.4	927.3	752.1	175.21	5.292 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design P&H 22CD Pad Sec.22-T5N-R64W - P&H 22CD - Wellbore #1 - Plan #2 (11-12-10)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
9,400.0	6,644.9	6,726.2	6,644.9	57.4	21.2	-92.26	3,700.4	-1,002.9	943.3	869.2	74.12	12.727	
9,500.0	6,643.8	6,725.1	6,643.8	59.2	21.2	-92.01	3,700.4	-1,002.9	847.5	771.5	75.99	11.153	
9,600.0	6,642.7	6,724.0	6,642.7	61.1	21.2	-91.76	3,700.4	-1,002.9	752.6	674.8	77.85	9.667	
9,700.0	6,641.6	6,722.9	6,641.6	62.9	21.2	-91.51	3,700.4	-1,002.9	659.4	579.6	79.72	8.271	
9,800.0	6,640.5	6,721.8	6,640.5	64.7	21.2	-91.26	3,700.4	-1,002.9	568.4	486.8	81.60	6.966	
9,900.0	6,639.4	6,720.7	6,639.4	66.6	21.2	-91.01	3,700.4	-1,002.9	481.0	397.5	83.47	5.762	
10,000.0	6,638.3	6,719.6	6,638.3	68.4	21.2	-90.77	3,700.4	-1,002.9	399.5	314.1	85.35	4.681	
10,100.0	6,637.2	6,718.5	6,637.2	70.3	21.2	-90.52	3,700.4	-1,002.9	328.4	241.2	87.23	3.765	
10,200.0	6,636.1	6,717.4	6,636.1	72.1	21.2	-90.27	3,700.4	-1,002.9	275.9	186.8	89.11	3.097	
10,300.0	6,635.0	6,716.3	6,635.0	74.0	21.2	-90.02	3,700.4	-1,002.9	253.8	162.8	90.99	2.789	
10,308.7	6,634.9	6,716.2	6,634.9	74.1	21.2	-90.00	3,700.4	-1,002.9	253.6	162.5	91.15	2.782 CC, ES, SF	
10,400.0	6,633.9	6,715.2	6,633.9	75.8	21.2	-89.77	3,700.4	-1,002.9	269.6	176.7	92.87	2.903	
10,500.0	6,632.8	6,714.1	6,632.8	77.7	21.2	-89.52	3,700.4	-1,002.9	317.7	222.9	94.75	3.353	
10,600.0	6,631.7	6,713.0	6,631.7	79.6	21.2	-89.28	3,700.4	-1,002.9	386.2	289.6	96.63	3.997	
10,700.0	6,630.6	6,711.9	6,630.6	81.4	21.2	-89.03	3,700.4	-1,002.9	466.3	367.8	98.52	4.733	
10,800.0	6,629.5	6,710.8	6,629.5	83.3	21.2	-88.78	3,700.4	-1,002.9	552.9	452.5	100.40	5.507	
10,900.0	6,628.4	6,709.7	6,628.4	85.2	21.2	-88.53	3,700.4	-1,002.9	643.4	541.1	102.28	6.290	
11,000.0	6,627.3	6,708.6	6,627.3	87.0	21.2	-88.28	3,700.4	-1,002.9	736.3	632.2	104.16	7.069	
11,100.0	6,626.2	6,707.5	6,626.2	88.9	21.2	-88.04	3,700.4	-1,002.9	830.9	724.9	106.04	7.836	
11,118.5	6,626.0	6,707.3	6,626.0	89.3	21.2	-87.99	3,700.4	-1,002.9	848.6	742.2	106.39	7.976	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design P&H 22CD Pad Sec.22-T5N-R64W - P&H 22CD - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 175-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	
9,400.0	6,644.9	6,717.6	6,627.0	57.4	20.7	-87.86	3,697.6	-960.7	930.3	856.7	73.65	12.631	
9,500.0	6,643.8	6,720.8	6,630.2	59.2	20.7	-88.71	3,697.7	-960.6	833.2	757.7	75.52	11.034	
9,600.0	6,642.7	6,723.5	6,632.8	61.1	20.7	-89.43	3,697.8	-960.4	736.9	659.6	77.38	9.524	
9,700.0	6,641.6	6,725.8	6,635.2	62.9	20.7	-90.07	3,697.8	-960.3	641.8	562.5	79.23	8.100	
9,800.0	6,640.5	6,727.8	6,637.2	64.7	20.7	-90.62	3,697.9	-960.2	548.3	467.2	81.08	6.763	
9,900.0	6,639.4	6,729.6	6,639.0	66.6	20.7	-91.11	3,697.9	-960.1	457.6	374.7	82.93	5.518	
10,000.0	6,638.3	6,731.2	6,640.6	68.4	20.7	-91.54	3,698.0	-960.1	371.7	287.0	84.78	4.385	
10,100.0	6,637.2	6,732.7	6,642.0	70.3	20.7	-91.93	3,698.0	-960.0	294.9	208.2	86.63	3.404	
10,200.0	6,636.1	6,734.0	6,643.3	72.1	20.7	-92.29	3,698.0	-959.9	236.0	147.5	88.48	2.667	
10,300.0	6,635.0	6,735.1	6,644.5	74.0	20.7	-92.60	3,698.1	-959.9	210.9	120.5	90.34	2.334	
10,306.2	6,634.9	6,735.2	6,644.6	74.1	20.7	-92.62	3,698.1	-959.9	210.8	120.3	90.45	2.330 CC, ES, SF	
10,400.0	6,633.9	6,736.2	6,645.6	75.8	20.7	-92.89	3,698.1	-959.8	230.7	138.5	92.19	2.502	
10,500.0	6,632.8	6,737.2	6,646.5	77.7	20.7	-93.16	3,698.1	-959.8	286.3	192.3	94.05	3.044	
10,600.0	6,631.7	6,738.1	6,647.4	79.6	20.7	-93.40	3,698.1	-959.8	361.6	265.7	95.91	3.770	
10,700.0	6,630.6	6,738.9	6,648.2	81.4	20.7	-93.62	3,698.1	-959.7	446.6	348.9	97.77	4.568	
10,800.0	6,629.5	6,739.6	6,649.0	83.3	20.7	-93.83	3,698.2	-959.7	536.9	437.2	99.63	5.389	
10,900.0	6,628.4	6,740.3	6,649.7	85.2	20.7	-94.02	3,698.2	-959.7	630.1	528.6	101.49	6.208	
11,000.0	6,627.3	6,741.0	6,650.4	87.0	20.7	-94.19	3,698.2	-959.6	725.1	621.7	103.36	7.015	
11,100.0	6,626.2	6,741.6	6,651.0	88.9	20.7	-94.36	3,698.2	-959.6	821.3	716.0	105.22	7.805	
11,118.5	6,626.0	6,741.7	6,651.1	89.3	20.7	-94.39	3,698.2	-959.6	839.2	733.6	105.57	7.949	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design P&H 22CD Pad Sec.22-T5N-R64W - P&H 22SD - Wellbore #1 - Plan #2 (11-12-10)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
8,100.0	6,659.2	6,760.8	6,659.2	34.8	22.9	-92.47	2,457.9	-995.6	996.9	944.0	52.90	18.847	
8,200.0	6,658.1	6,759.7	6,658.1	36.4	22.9	-92.21	2,457.9	-995.6	900.4	845.7	54.62	16.483	
8,300.0	6,657.0	6,758.6	6,657.0	38.1	22.9	-91.96	2,457.9	-995.6	804.6	748.3	56.37	14.275	
8,400.0	6,655.9	6,757.5	6,655.9	39.7	22.9	-91.70	2,457.9	-995.6	710.1	652.0	58.13	12.216	
8,500.0	6,654.8	6,756.5	6,654.8	41.4	22.9	-91.45	2,457.9	-995.6	617.3	557.4	59.91	10.304	
8,600.0	6,653.7	6,755.4	6,653.7	43.2	22.9	-91.19	2,457.9	-995.6	527.1	465.4	61.70	8.543	
8,700.0	6,652.6	6,754.3	6,652.6	44.9	22.9	-90.94	2,457.9	-995.6	441.2	377.7	63.50	6.948	
8,800.0	6,651.5	6,753.2	6,651.5	46.7	22.9	-90.68	2,457.9	-995.6	362.5	297.2	65.31	5.551	
8,900.0	6,650.4	6,752.1	6,650.4	48.4	22.9	-90.42	2,457.9	-995.6	297.0	229.9	67.13	4.424	
9,000.0	6,649.3	6,751.0	6,649.3	50.2	22.9	-90.17	2,457.9	-995.6	255.0	186.0	68.96	3.697	
9,066.1	6,648.6	6,750.2	6,648.6	51.4	22.9	-90.00	2,457.9	-995.6	246.3	176.1	70.17	3.509 CC, ES, SF	
9,100.0	6,648.2	6,749.9	6,648.2	52.0	22.9	-89.91	2,457.9	-995.6	248.6	177.8	70.79	3.511	
9,200.0	6,647.1	6,748.8	6,647.1	53.8	22.9	-89.66	2,457.9	-995.6	280.3	207.7	72.63	3.859	
9,300.0	6,646.0	6,747.7	6,646.0	55.6	22.9	-89.40	2,457.9	-995.6	339.6	265.2	74.47	4.560	
9,400.0	6,644.9	6,746.6	6,644.9	57.4	22.9	-89.15	2,457.9	-995.6	414.9	338.6	76.32	5.436	
9,500.0	6,643.8	6,745.5	6,643.8	59.2	22.9	-88.89	2,457.9	-995.6	498.9	420.7	78.17	6.382	
9,600.0	6,642.7	6,744.4	6,642.7	61.1	22.9	-88.63	2,457.9	-995.6	587.9	507.9	80.02	7.347	
9,700.0	6,641.6	6,743.3	6,641.6	62.9	22.9	-88.38	2,457.9	-995.6	680.0	598.2	81.88	8.306	
9,800.0	6,640.5	6,742.2	6,640.5	64.7	22.9	-88.12	2,457.9	-995.6	774.1	690.4	83.73	9.245	
9,900.0	6,639.4	6,741.1	6,639.4	66.6	22.9	-87.87	2,457.9	-995.6	869.5	783.9	85.59	10.158	
10,000.0	6,638.3	6,740.0	6,638.3	68.4	22.9	-87.61	2,457.9	-995.6	965.8	878.3	87.45	11.044	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Offset Design P&H 22CD Pad Sec.22-T5N-R64W - P&H 22SD - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 140-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
8,100.0	6,659.2	6,781.6	6,663.3	34.8	22.4	-94.00	2,449.9	-958.7	980.7	928.4	52.21	18.782	
8,200.0	6,658.1	6,779.9	6,661.6	36.4	22.4	-93.55	2,449.9	-958.7	883.2	829.3	53.96	16.369	
8,300.0	6,657.0	6,778.3	6,660.0	38.1	22.4	-93.10	2,449.9	-958.7	786.4	730.7	55.72	14.115	
8,400.0	6,655.9	6,776.7	6,658.4	39.7	22.4	-92.66	2,449.9	-958.7	690.6	633.1	57.50	12.011	
8,500.0	6,654.8	6,775.1	6,656.8	41.4	22.4	-92.22	2,449.9	-958.7	596.1	536.8	59.29	10.054	
8,600.0	6,653.7	6,773.5	6,655.2	43.2	22.4	-91.79	2,449.9	-958.6	503.7	442.6	61.09	8.245	
8,700.0	6,652.6	6,771.9	6,653.6	44.9	22.4	-91.35	2,449.9	-958.6	414.8	351.9	62.90	6.595	
8,800.0	6,651.5	6,770.3	6,652.0	46.7	22.4	-90.92	2,450.0	-958.6	332.3	267.6	64.72	5.135	
8,900.0	6,650.4	6,768.8	6,650.5	48.4	22.4	-90.49	2,450.0	-958.6	262.3	195.8	66.54	3.942	
9,000.0	6,649.3	6,767.2	6,648.9	50.2	22.4	-90.07	2,450.0	-958.6	217.2	148.9	68.38	3.177	
9,058.2	6,648.7	6,766.3	6,648.0	51.2	22.4	-89.82	2,450.0	-958.6	209.3	139.9	69.44	3.014 CC, ES, SF	
9,100.0	6,648.2	6,765.7	6,647.4	52.0	22.4	-89.65	2,450.0	-958.6	213.4	143.2	70.21	3.040	
9,200.0	6,647.1	6,764.1	6,645.8	53.8	22.3	-89.23	2,450.0	-958.6	252.8	180.8	72.05	3.509	
9,300.0	6,646.0	6,762.6	6,644.3	55.6	22.3	-88.81	2,450.0	-958.6	319.8	245.9	73.89	4.328	
9,400.0	6,644.9	6,761.1	6,642.8	57.4	22.3	-88.40	2,450.0	-958.6	400.8	325.1	75.73	5.292	
9,500.0	6,643.8	6,759.6	6,641.3	59.2	22.3	-87.99	2,450.0	-958.6	488.8	411.3	77.57	6.302	
9,600.0	6,642.7	6,758.1	6,639.8	61.1	22.3	-87.58	2,450.0	-958.6	580.8	501.4	79.42	7.313	
9,700.0	6,641.6	6,756.6	6,638.3	62.9	22.3	-87.18	2,450.0	-958.6	675.0	593.8	81.26	8.307	
9,800.0	6,640.5	6,755.2	6,636.9	64.7	22.3	-86.78	2,450.0	-958.6	770.7	687.6	83.10	9.274	
9,900.0	6,639.4	6,753.7	6,635.4	66.6	22.3	-86.39	2,450.0	-958.6	867.4	782.4	84.94	10.211	
10,000.0	6,638.3	6,752.3	6,634.0	68.4	22.3	-86.00	2,450.0	-958.6	964.7	877.9	86.78	11.117	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4613.0ft (RKB - 15')

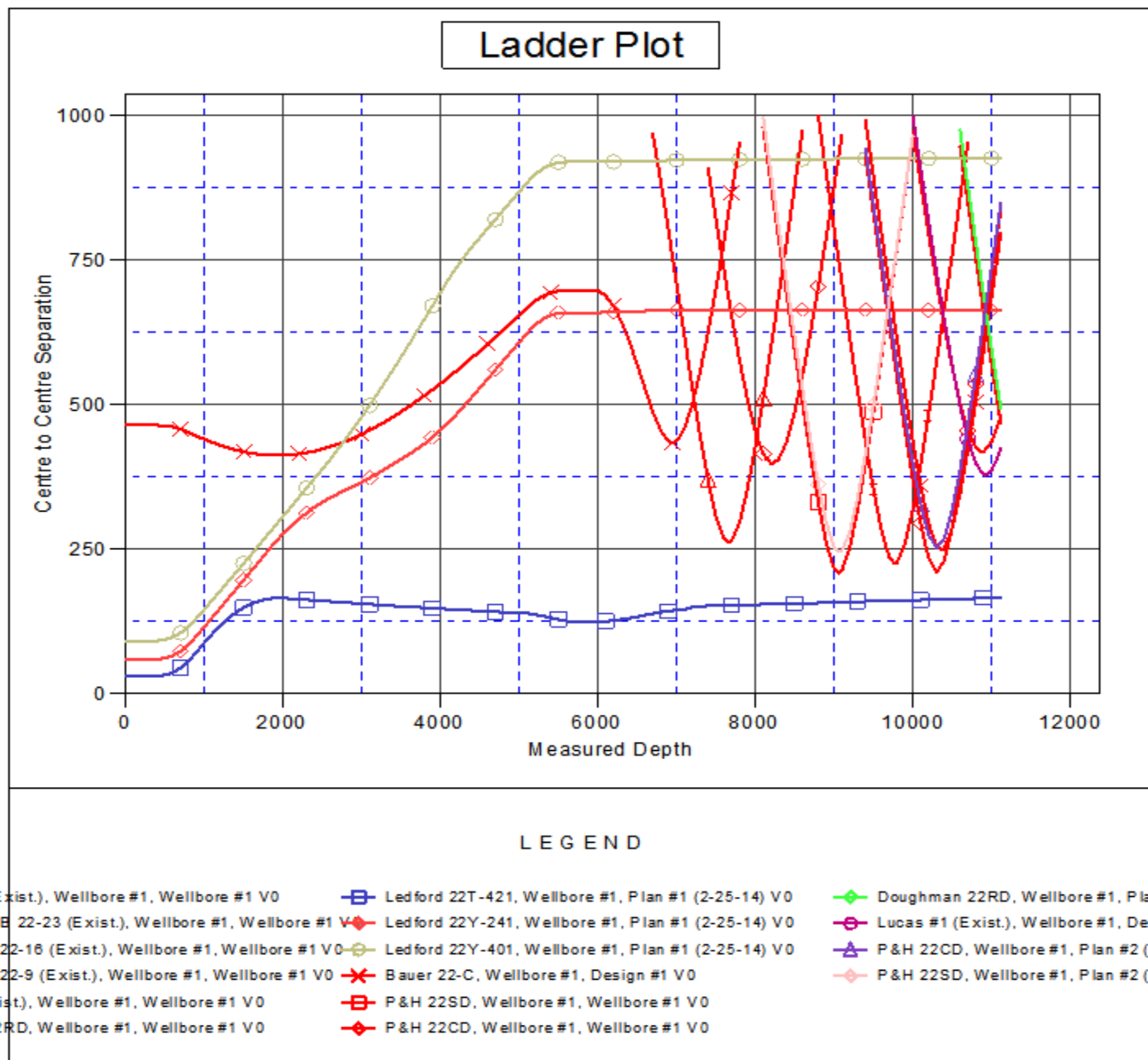
Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Ledford 22T-321

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.63°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22T-321
Project:	SEC.22-T5N-R64W	TVD Reference:	WELL @ 4613.0ft (RKB - 15')
Reference Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	MD Reference:	WELL @ 4613.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Ledford 22T-321	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 (2-25-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4613.0ft (RKB - 15')

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Ledford 22T-321

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.63°

