

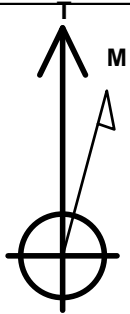
PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Ledford 22Y-241**

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 1382195.78 3270959.85 40.378450 -104.527400
 RKB - 15' WELL @ 4613.0ft (RKB - 15')

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 299'FSL & 287'FEL	1.0	0.0	0.0	Point
BHL 500'FNL & 405'FEL	6553.0	4462.8	-130.9	Point



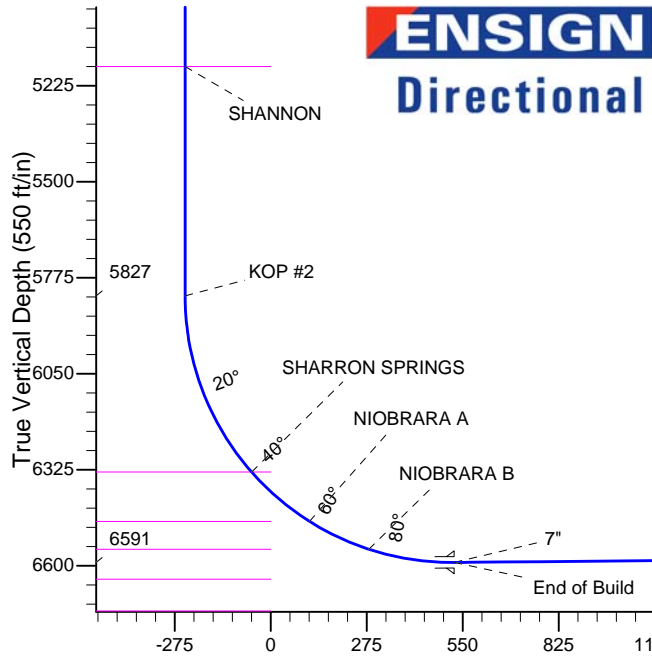
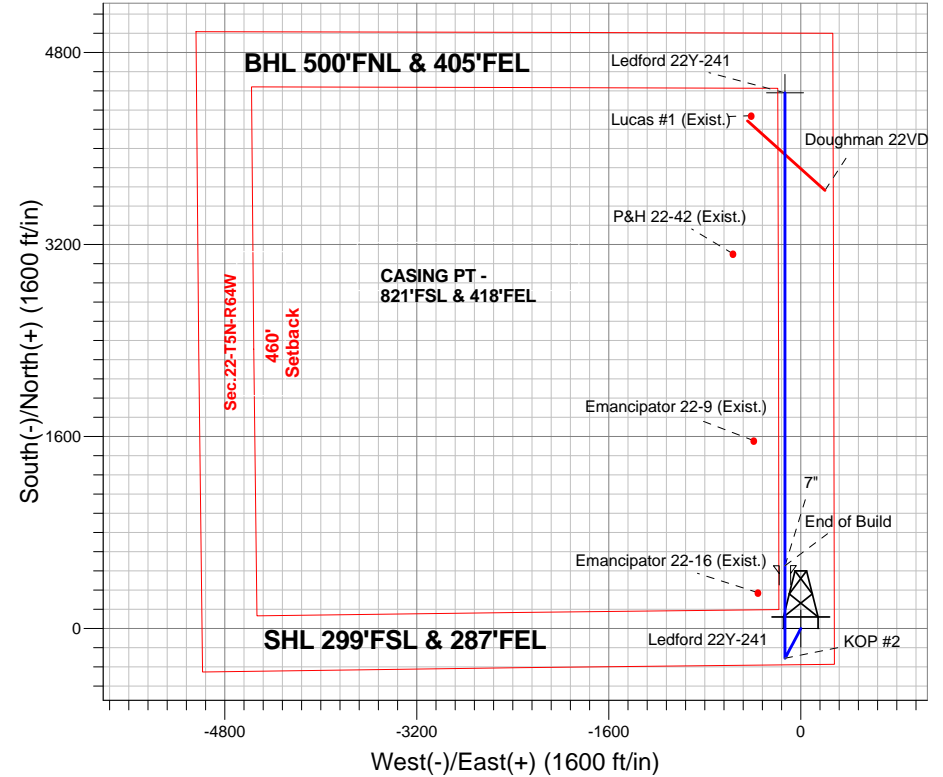
Azimuths to True North
 Magnetic North: 8.32°

Magnetic Field
 Strength: 52889.5nT
 Dip Angle: 66.99°
 Date: 2/25/2014
 Model: IGRF200510

Ledford 22Y-HZ Pad Sec.22-T5N-R64W
 Ledford 22Y-241
 Plan #1 (2-25-14)
 14:19, March 06 2014

ANNOTATIONS

TVD	MD	Annotation
1800.0	1800.0	KOP
5827.0	5847.0	KOP #2
6590.8	7054.3	End of Build



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	1800.0	0.00	0.00	1800.0	0.0	0.0	0.00	0.00	0.0	
3	2745.4	9.45	207.73	2741.2	-68.9	-36.2	1.00	207.73	-67.8	
4	3747.3	9.45	207.73	3729.4	-214.6	-112.8	0.00	0.00	-211.2	
5	4220.0	0.00	0.00	4200.0	-249.0	-130.9	2.00	180.00	-245.1	
6	5847.0	0.00	0.00	5826.9	-249.0	-130.9	0.00	0.00	-245.1	
7	7054.3	90.55	360.00	6590.8	522.3	-130.9	7.50	360.00	525.9	
8	10995.0	90.55	360.00	6553.0	4462.8	-130.9	0.00	0.00	4464.7	BHL 500'FNL & 405'FEL

BHL 500'FNL & 405'FEL



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W

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

Ledford 22Y-241

Wellbore #1

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

Standard Planning Report

06 March, 2014

Database:	landmark	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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 22Y-241					
Well Position	+N/-S	43.7 ft	Northing:	1,382,195.78 ft	Latitude:	40.378450
	+E/-W	41.8 ft	Easting:	3,270,959.85 ft	Longitude:	-104.527400
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	52,890

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	358.32

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,745.4	9.45	207.73	2,741.2	-68.9	-36.2	1.00	1.00	0.00	207.73	
3,747.3	9.45	207.73	3,729.4	-214.6	-112.8	0.00	0.00	0.00	0.00	
4,220.0	0.00	0.00	4,200.0	-249.0	-130.9	2.00	-2.00	0.00	180.00	
5,847.0	0.00	0.00	5,826.9	-249.0	-130.9	0.00	0.00	0.00	0.00	
7,054.3	90.55	360.00	6,590.8	522.3	-130.9	7.50	7.50	0.00	360.00	
10,995.0	90.55	360.00	6,553.0	4,462.8	-130.9	0.00	0.00	0.00	0.00	BHL 500'FNL & 405

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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 22Y-241	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 299'FSL & 287'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
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP									
1,900.0	1.00	207.73	1,900.0	-0.8	-0.4	-0.8	1.00	1.00	0.00
2,000.0	2.00	207.73	2,000.0	-3.1	-1.6	-3.0	1.00	1.00	0.00
2,100.0	3.00	207.73	2,099.9	-7.0	-3.7	-6.8	1.00	1.00	0.00
2,200.0	4.00	207.73	2,199.7	-12.4	-6.5	-12.2	1.00	1.00	0.00
2,300.0	5.00	207.73	2,299.4	-19.3	-10.1	-19.0	1.00	1.00	0.00
2,400.0	6.00	207.73	2,398.9	-27.8	-14.6	-27.3	1.00	1.00	0.00
2,500.0	7.00	207.73	2,498.3	-37.8	-19.9	-37.2	1.00	1.00	0.00
2,600.0	8.00	207.73	2,597.4	-49.4	-25.9	-48.6	1.00	1.00	0.00
2,700.0	9.00	207.73	2,696.3	-62.4	-32.8	-61.4	1.00	1.00	0.00
2,745.4	9.45	207.73	2,741.2	-68.9	-36.2	-67.8	1.00	1.00	0.00
2,800.0	9.45	207.73	2,795.0	-76.8	-40.4	-75.6	0.00	0.00	0.00
2,900.0	9.45	207.73	2,893.6	-91.4	-48.0	-89.9	0.00	0.00	0.00
3,000.0	9.45	207.73	2,992.3	-105.9	-55.7	-104.2	0.00	0.00	0.00
3,100.0	9.45	207.73	3,090.9	-120.4	-63.3	-118.5	0.00	0.00	0.00
3,200.0	9.45	207.73	3,189.5	-135.0	-71.0	-132.8	0.00	0.00	0.00
3,300.0	9.45	207.73	3,288.2	-149.5	-78.6	-147.1	0.00	0.00	0.00
3,400.0	9.45	207.73	3,386.8	-164.1	-86.2	-161.5	0.00	0.00	0.00
3,413.4	9.45	207.73	3,400.0	-166.0	-87.3	-163.4	0.00	0.00	0.00
PARKMAN									
3,500.0	9.45	207.73	3,485.5	-178.6	-93.9	-175.8	0.00	0.00	0.00
3,600.0	9.45	207.73	3,584.1	-193.1	-101.5	-190.1	0.00	0.00	0.00
3,700.0	9.45	207.73	3,682.7	-207.7	-109.2	-204.4	0.00	0.00	0.00
3,747.3	9.45	207.73	3,729.4	-214.6	-112.8	-211.2	0.00	0.00	0.00
3,800.0	8.40	207.73	3,781.5	-221.8	-116.6	-218.3	2.00	-2.00	0.00
3,900.0	6.40	207.73	3,880.6	-233.2	-122.6	-229.5	2.00	-2.00	0.00
4,000.0	4.40	207.73	3,980.2	-241.5	-127.0	-237.7	2.00	-2.00	0.00
4,100.0	2.40	207.73	4,080.0	-246.8	-129.7	-242.9	2.00	-2.00	0.00
4,200.0	0.40	207.73	4,180.0	-248.9	-130.9	-245.0	2.00	-2.00	0.00
4,220.0	0.00	0.00	4,200.0	-249.0	-130.9	-245.1	2.00	-2.00	0.00
4,270.0	0.00	0.00	4,250.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
SUSSEX									

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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 22Y-241	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)
4,300.0	0.00	0.00	4,280.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
4,400.0	0.00	0.00	4,380.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
4,500.0	0.00	0.00	4,480.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
4,600.0	0.00	0.00	4,580.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
4,700.0	0.00	0.00	4,680.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
4,800.0	0.00	0.00	4,780.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
4,900.0	0.00	0.00	4,880.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
5,000.0	0.00	0.00	4,980.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
5,100.0	0.00	0.00	5,080.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
5,190.0	0.00	0.00	5,170.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
SHANNON									
5,200.0	0.00	0.00	5,180.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
5,300.0	0.00	0.00	5,280.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
5,400.0	0.00	0.00	5,380.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
5,500.0	0.00	0.00	5,480.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
5,600.0	0.00	0.00	5,580.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
5,700.0	0.00	0.00	5,680.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
5,800.0	0.00	0.00	5,780.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
5,847.0	0.00	0.00	5,827.0	-249.0	-130.9	-245.1	0.00	0.00	0.00
KOP #2									
5,900.0	3.98	360.00	5,879.9	-247.2	-130.9	-243.2	7.51	7.51	0.00
6,000.0	11.48	360.00	5,978.9	-233.7	-130.9	-229.8	7.50	7.50	0.00
6,100.0	18.98	360.00	6,075.4	-207.5	-130.9	-203.5	7.50	7.50	0.00
6,200.0	26.48	360.00	6,167.5	-168.9	-130.9	-165.0	7.50	7.50	0.00
6,300.0	33.98	360.00	6,253.9	-118.6	-130.9	-114.7	7.50	7.50	0.00
6,398.8	41.39	360.00	6,332.0	-58.2	-130.9	-54.3	7.50	7.50	0.00
SHARRON SPRINGS									
6,400.0	41.48	360.00	6,332.9	-57.4	-130.9	-53.5	7.50	7.50	0.00
6,500.0	48.98	360.00	6,403.3	13.5	-130.9	17.4	7.50	7.50	0.00
6,600.0	56.48	360.00	6,463.8	93.1	-130.9	96.9	7.50	7.50	0.00
6,616.9	57.75	360.00	6,473.0	107.3	-130.9	111.1	7.50	7.50	0.00
NIOBRARA A									
6,700.0	63.98	360.00	6,513.4	179.8	-130.9	183.6	7.50	7.50	0.00
6,800.0	71.48	360.00	6,551.3	272.3	-130.9	276.0	7.50	7.50	0.00
6,805.4	71.89	360.00	6,553.0	277.4	-130.9	281.1	7.50	7.50	0.00
NIOBRARA B									
6,900.0	78.98	360.00	6,576.8	368.9	-130.9	372.6	7.50	7.50	0.00
7,000.0	86.48	360.00	6,589.4	468.0	-130.9	471.7	7.50	7.50	0.00
7,054.3	90.55	360.00	6,590.8	522.3	-130.9	525.9	7.50	7.50	0.00
End of Build - 7"									
7,100.0	90.55	360.00	6,590.4	568.0	-130.9	571.6	0.00	0.00	0.00
7,200.0	90.55	360.00	6,589.4	668.0	-130.9	671.5	0.00	0.00	0.00
7,300.0	90.55	360.00	6,588.5	768.0	-130.9	771.5	0.00	0.00	0.00
7,400.0	90.55	360.00	6,587.5	868.0	-130.9	871.4	0.00	0.00	0.00
7,500.0	90.55	360.00	6,586.5	968.0	-130.9	971.4	0.00	0.00	0.00
7,600.0	90.55	360.00	6,585.6	1,068.0	-130.9	1,071.3	0.00	0.00	0.00
7,700.0	90.55	360.00	6,584.6	1,168.0	-130.9	1,171.3	0.00	0.00	0.00
7,800.0	90.55	360.00	6,583.7	1,268.0	-130.9	1,271.2	0.00	0.00	0.00
7,900.0	90.55	360.00	6,582.7	1,368.0	-130.9	1,371.2	0.00	0.00	0.00
8,000.0	90.55	360.00	6,581.7	1,467.9	-130.9	1,471.2	0.00	0.00	0.00
8,100.0	90.55	360.00	6,580.8	1,567.9	-130.9	1,571.1	0.00	0.00	0.00
8,200.0	90.55	360.00	6,579.8	1,667.9	-130.9	1,671.1	0.00	0.00	0.00

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Site:	Ledford 22Y-HZ Pad Sec.22-T5N-R64W	North Reference:	True
Well:	Ledford 22Y-241	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)
8,300.0	90.55	360.00	6,578.9	1,767.9	-130.9	1,771.0	0.00	0.00	0.00
8,400.0	90.55	360.00	6,577.9	1,867.9	-130.9	1,871.0	0.00	0.00	0.00
8,500.0	90.55	360.00	6,577.0	1,967.9	-130.9	1,970.9	0.00	0.00	0.00
8,600.0	90.55	360.00	6,576.0	2,067.9	-130.9	2,070.9	0.00	0.00	0.00
8,700.0	90.55	360.00	6,575.0	2,167.9	-130.9	2,170.8	0.00	0.00	0.00
8,800.0	90.55	360.00	6,574.1	2,267.9	-130.9	2,270.8	0.00	0.00	0.00
8,900.0	90.55	360.00	6,573.1	2,367.9	-130.9	2,370.7	0.00	0.00	0.00
9,000.0	90.55	360.00	6,572.2	2,467.9	-130.9	2,470.7	0.00	0.00	0.00
9,100.0	90.55	360.00	6,571.2	2,567.9	-130.9	2,570.6	0.00	0.00	0.00
9,200.0	90.55	360.00	6,570.2	2,667.9	-130.9	2,670.6	0.00	0.00	0.00
9,300.0	90.55	360.00	6,569.3	2,767.9	-130.9	2,770.5	0.00	0.00	0.00
9,400.0	90.55	360.00	6,568.3	2,867.9	-130.9	2,870.5	0.00	0.00	0.00
9,500.0	90.55	360.00	6,567.4	2,967.9	-130.9	2,970.4	0.00	0.00	0.00
9,600.0	90.55	360.00	6,566.4	3,067.9	-130.9	3,070.4	0.00	0.00	0.00
9,700.0	90.55	360.00	6,565.4	3,167.9	-130.9	3,170.3	0.00	0.00	0.00
9,800.0	90.55	360.00	6,564.5	3,267.9	-130.9	3,270.3	0.00	0.00	0.00
9,900.0	90.55	360.00	6,563.5	3,367.9	-130.9	3,370.2	0.00	0.00	0.00
10,000.0	90.55	360.00	6,562.6	3,467.9	-130.9	3,470.2	0.00	0.00	0.00
10,100.0	90.55	360.00	6,561.6	3,567.8	-130.9	3,570.2	0.00	0.00	0.00
10,200.0	90.55	360.00	6,560.6	3,667.8	-130.9	3,670.1	0.00	0.00	0.00
10,300.0	90.55	360.00	6,559.7	3,767.8	-130.9	3,770.1	0.00	0.00	0.00
10,400.0	90.55	360.00	6,558.7	3,867.8	-130.9	3,870.0	0.00	0.00	0.00
10,500.0	90.55	360.00	6,557.8	3,967.8	-130.9	3,970.0	0.00	0.00	0.00
10,600.0	90.55	360.00	6,556.8	4,067.8	-130.9	4,069.9	0.00	0.00	0.00
10,700.0	90.55	360.00	6,555.8	4,167.8	-130.9	4,169.9	0.00	0.00	0.00
10,800.0	90.55	360.00	6,554.9	4,267.8	-130.9	4,269.8	0.00	0.00	0.00
10,900.0	90.55	360.00	6,553.9	4,367.8	-130.9	4,369.8	0.00	0.00	0.00
10,995.0	90.55	360.00	6,553.0	4,462.8	-130.9	4,464.7	0.00	0.00	0.00
BHL 500'FNL & 405'FEL									

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,054.3	6,590.8	7"	7	7-1/2

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,413.4	3,400.0	PARKMAN		0.00	
4,270.0	4,250.0	SUSSEX		0.00	
5,190.0	5,170.0	SHANNON		0.00	
6,398.8	6,332.0	SHARRON SPRINGS		0.00	
6,616.9	6,473.0	NIOBRARA A		0.00	
6,805.4	6,553.0	NIOBRARA B		0.00	
	6,639.0	NIOBRARA C		0.00	
	6,730.0	FT HAYS		0.00	

Database:	landmark	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-25-14)		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,800.0	1,800.0	0.0	0.0	KOP
5,847.0	5,827.0	-249.0	-130.9	KOP #2
7,054.3	6,590.8	522.3	-130.9	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W

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

Ledford 22Y-241

Wellbore #1

Plan #1 (2-25-14)

Anticollision Report

06 March, 2014



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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	10,995.0	Plan #1 (2-25-14) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Doughman 22VD Pad Sec.22-T5N-R64W						
Doughman 22VD - Wellbore #1 - Plan #2 (8-11-10)	10,182.6	6,628.6	331.6	240.9	3.657	CC, ES
Doughman 22VD - Wellbore #1 - Plan #2 (8-11-10)	10,200.0	6,628.4	332.1	241.1	3.649	SF
Doughman 22VD - Wellbore #1 - Wellbore #1	10,187.2	6,623.1	353.8	264.1	3.943	CC
Doughman 22VD - Wellbore #1 - Wellbore #1	10,200.0	6,623.0	354.0	264.1	3.935	ES, SF
Lucas #1 (Exist.) - Wellbore #1 - Design #1	10,805.6	6,524.8	281.4	182.7	2.851	CC, ES, SF
Lucas #1 (Exist.) - Wellbore #1 - Wellbore #1	10,757.8	6,525.9	241.2	144.3	2.491	CC, ES, SF
Existing Wells Sec.22-T5N-R64W						
Emancipator 22-16 (Exist.) - Wellbore #1 - Wellbore #1	6,827.8	6,546.6	225.7	79.3	1.541	CC, ES, SF
Emancipator 22-9 (Exist.) - Wellbore #1 - Wellbore #1	8,098.6	6,570.8	261.9	96.5	1.583	CC
Emancipator 22-9 (Exist.) - Wellbore #1 - Wellbore #1	8,100.0	6,570.8	261.9	96.5	1.583	ES, SF
P&H 22-42 (Exist.) - Wellbore #1 - Wellbore #1	9,654.3	6,532.9	434.6	241.5	2.251	CC, ES, SF
Ledford 22Y-HZ Pad Sec.22-T5N-R64W						
Ledford 22T-321 - Wellbore #1 - Plan #1 (2-25-14)	400.0	400.0	60.5	58.9	38.441	CC, ES
Ledford 22T-321 - Wellbore #1 - Plan #1 (2-25-14)	10,995.0	11,115.7	664.2	489.2	3.795	SF
Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14)	1,000.0	1,000.0	29.3	25.0	6.860	CC, ES
Ledford 22T-421 - Wellbore #1 - Plan #1 (2-25-14)	10,995.0	11,184.1	565.0	398.0	3.382	SF
Ledford 22Y-401 - Wellbore #1 - Plan #1 (2-25-14)	1,800.0	1,800.0	32.1	24.2	4.081	CC, ES
Ledford 22Y-401 - Wellbore #1 - Plan #1 (2-25-14)	10,995.0	11,147.1	318.4	169.7	2.142	SF

Doughman 22VD Pad Sec.22-T5N-R64W - Doughman 22VD - Wellbore #1 - Plan #2 (8-11-10)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	
Depth (ft)	Depth (ft)	Depth (ft)	Depth (ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)		
9,300.0	6,569.3	6,637.0	6,541.3	55.9	21.7	91.46	3,650.4	200.7	942.8	868.7	74.11	12.721	
9,400.0	6,568.3	6,636.1	6,540.3	57.7	21.7	91.30	3,650.4	200.7	849.9	773.9	75.98	11.186	
9,500.0	6,567.4	6,635.1	6,539.4	59.6	21.7	91.13	3,650.4	200.7	758.9	681.0	77.85	9.748	
9,600.0	6,566.4	6,634.2	6,538.4	61.5	21.7	90.97	3,650.4	200.7	670.3	590.6	79.72	8.409	
9,700.0	6,565.4	6,633.2	6,537.4	63.3	21.7	90.80	3,650.4	200.7	585.5	503.9	81.59	7.176	
9,800.0	6,564.5	6,632.2	6,536.5	65.2	21.7	90.63	3,650.4	200.7	506.3	422.8	83.47	6.065	
9,900.0	6,563.5	6,631.3	6,535.5	67.1	21.7	90.47	3,650.4	200.7	435.7	350.3	85.35	5.105	
10,000.0	6,562.6	6,630.3	6,534.6	69.0	21.7	90.30	3,650.4	200.7	378.5	291.3	87.23	4.340	

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 22Y-241
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 22Y-241	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 22VD - Wellbore #1 - Plan #2 (8-11-10)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
10,100.0	6,561.6	6,629.4	6,533.6	70.8	21.7	90.14	3,650.4	200.7	341.7	252.6	89.11	3.835		
10,182.6	6,560.8	6,628.6	6,532.8	72.4	21.7	90.00	3,650.4	200.7	331.6	240.9	90.67	3.657 CC, ES		
10,200.0	6,560.6	6,628.4	6,532.6	72.7	21.7	89.97	3,650.4	200.7	332.1	241.1	91.00	3.649 SF		
10,300.0	6,559.7	6,627.4	6,531.7	74.6	21.7	89.81	3,650.4	200.7	351.8	258.9	92.88	3.787		
10,400.0	6,558.7	6,626.5	6,530.7	76.5	21.7	89.64	3,650.4	200.7	396.5	301.7	94.77	4.184		
10,500.0	6,557.8	6,625.5	6,529.8	78.4	21.7	89.47	3,650.4	200.7	459.0	362.4	96.66	4.749		
10,600.0	6,556.8	6,624.6	6,528.8	80.3	21.7	89.31	3,650.4	200.7	533.1	434.5	98.55	5.409		
10,700.0	6,555.8	6,623.6	6,527.8	82.2	21.7	89.14	3,650.4	200.7	614.5	514.1	100.43	6.119		
10,800.0	6,554.9	6,622.6	6,526.9	84.1	21.7	88.98	3,650.4	200.7	700.8	598.5	102.32	6.849		
10,900.0	6,553.9	6,621.7	6,525.9	85.9	21.7	88.81	3,650.4	200.7	790.3	686.1	104.21	7.583		
10,995.0	6,553.0	6,620.8	6,525.0	87.7	21.7	88.65	3,650.4	200.7	877.4	771.4	106.01	8.277		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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 22VD - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 671-MWD												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
9,300.0	6,569.3	6,627.8	6,525.4	55.9	20.6	88.81	3,655.0	222.9	955.2	882.0	73.15	13.057	
9,400.0	6,568.3	6,627.2	6,524.9	57.7	20.6	88.72	3,655.0	222.8	863.1	788.1	75.01	11.506	
9,500.0	6,567.4	6,626.7	6,524.3	59.6	20.6	88.64	3,655.0	222.8	772.9	696.1	76.88	10.055	
9,600.0	6,566.4	6,626.2	6,523.8	61.5	20.6	88.55	3,655.0	222.8	685.6	606.8	78.74	8.707	
9,700.0	6,565.4	6,625.6	6,523.3	63.3	20.6	88.46	3,655.0	222.8	602.1	521.5	80.61	7.470	
9,800.0	6,564.5	6,625.1	6,522.7	65.2	20.6	88.38	3,655.0	222.8	524.5	442.0	82.48	6.359	
9,900.0	6,563.5	6,624.6	6,522.2	67.1	20.6	88.29	3,655.0	222.7	455.7	371.4	84.35	5.403	
10,000.0	6,562.6	6,624.1	6,521.7	69.0	20.6	88.21	3,655.0	222.7	400.3	314.1	86.23	4.642	
10,100.0	6,561.6	6,623.5	6,521.2	70.8	20.6	88.12	3,655.0	222.7	364.4	276.3	88.10	4.136	
10,187.2	6,560.8	6,623.1	6,520.7	72.5	20.6	88.05	3,655.0	222.7	353.8	264.1	89.74	3.943 CC	
10,200.0	6,560.6	6,623.0	6,520.6	72.7	20.6	88.04	3,655.0	222.7	354.0	264.1	89.98	3.935 ES, SF	
10,300.0	6,559.7	6,622.5	6,520.1	74.6	20.6	87.95	3,655.0	222.7	371.4	279.5	91.86	4.042	
10,400.0	6,558.7	6,622.0	6,519.6	76.5	20.6	87.87	3,654.9	222.7	412.9	319.1	93.75	4.404	
10,500.0	6,557.8	6,621.4	6,519.1	78.4	20.6	87.78	3,654.9	222.6	472.2	376.6	95.63	4.938	
10,600.0	6,556.8	6,620.9	6,518.5	80.3	20.6	87.70	3,654.9	222.6	543.7	446.1	97.51	5.575	
10,700.0	6,555.8	6,620.4	6,518.0	82.2	20.6	87.61	3,654.9	222.6	623.0	523.6	99.40	6.268	
10,800.0	6,554.9	6,619.9	6,517.5	84.1	20.6	87.53	3,654.9	222.6	707.6	606.3	101.29	6.986	
10,900.0	6,553.9	6,619.3	6,517.0	85.9	20.6	87.44	3,654.9	222.6	795.8	692.6	103.17	7.713	
10,995.0	6,553.0	6,618.8	6,516.5	87.7	20.6	87.36	3,654.9	222.5	881.9	776.9	104.97	8.401	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
9,900.0	6,563.5	6,533.5	6,533.5	67.1	14.6	-91.77	4,273.4	-412.3	948.2	866.6	81.58	11.623	
10,000.0	6,562.6	6,532.6	6,532.6	69.0	14.6	-91.57	4,273.4	-412.3	853.2	769.8	83.47	10.222	
10,100.0	6,561.6	6,531.6	6,531.6	70.8	14.6	-91.38	4,273.4	-412.3	759.6	674.2	85.35	8.899	
10,200.0	6,560.6	6,530.6	6,530.6	72.7	14.6	-91.18	4,273.4	-412.3	667.7	580.5	87.24	7.653	
10,300.0	6,559.7	6,529.7	6,529.7	74.6	14.6	-90.99	4,273.4	-412.3	578.6	489.4	89.13	6.491	
10,400.0	6,558.7	6,528.7	6,528.7	76.5	14.6	-90.79	4,273.4	-412.3	493.6	402.6	91.02	5.423	
10,500.0	6,557.8	6,527.8	6,527.8	78.4	14.6	-90.60	4,273.4	-412.3	415.3	322.4	92.91	4.470	
10,600.0	6,556.8	6,526.8	6,526.8	80.3	14.6	-90.40	4,273.4	-412.3	348.4	253.6	94.80	3.675	
10,700.0	6,555.8	6,525.8	6,525.8	82.2	14.6	-90.21	4,273.4	-412.3	300.5	203.8	96.69	3.108	
10,800.0	6,554.9	6,524.9	6,524.9	84.1	14.6	-90.01	4,273.4	-412.3	281.4	182.8	98.59	2.854	
10,805.6	6,554.8	6,524.8	6,524.8	84.2	14.6	-90.00	4,273.4	-412.3	281.4	182.7	98.69	2.851 CC, ES, SF	
10,900.0	6,553.9	6,523.9	6,523.9	85.9	14.6	-89.82	4,273.4	-412.3	296.8	196.3	100.48	2.954	
10,995.0	6,553.0	6,523.0	6,523.0	87.7	14.5	-89.63	4,273.4	-412.3	339.2	236.9	102.28	3.316	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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			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	
9,800.0	6,564.5	6,506.7	6,505.2	65.2	13.6	-85.24	4,225.0	-372.0	987.5	908.9	78.53	12.574	
9,900.0	6,563.5	6,508.7	6,507.2	67.1	13.6	-85.70	4,225.1	-372.0	890.8	810.4	80.45	11.073	
10,000.0	6,562.6	6,510.7	6,509.1	69.0	13.6	-86.17	4,225.1	-372.0	795.1	712.7	82.36	9.653	
10,100.0	6,561.6	6,512.6	6,511.1	70.8	13.6	-86.64	4,225.2	-372.0	700.4	616.2	84.28	8.311	
10,200.0	6,560.6	6,514.6	6,513.1	72.7	13.6	-87.11	4,225.2	-372.0	607.6	521.4	86.19	7.049	
10,300.0	6,559.7	6,516.6	6,515.1	74.6	13.6	-87.59	4,225.3	-372.0	517.3	429.2	88.11	5.872	
10,400.0	6,558.7	6,518.7	6,517.1	76.5	13.6	-88.06	4,225.3	-372.1	431.4	341.4	90.02	4.792	
10,500.0	6,557.8	6,520.7	6,519.2	78.4	13.6	-88.54	4,225.4	-372.1	352.9	261.0	91.92	3.840	
10,600.0	6,556.8	6,522.7	6,521.2	80.3	13.6	-89.03	4,225.5	-372.1	288.2	194.3	93.83	3.071	
10,700.0	6,555.8	6,524.8	6,523.2	82.2	13.6	-89.51	4,225.5	-372.1	248.0	152.3	95.73	2.590	
10,757.8	6,555.3	6,525.9	6,524.4	83.3	13.6	-89.79	4,225.6	-372.1	241.2	144.3	96.83	2.491 CC, ES, SF	
10,800.0	6,554.9	6,526.8	6,525.3	84.1	13.6	-90.00	4,225.6	-372.1	244.8	147.2	97.63	2.508	
10,900.0	6,553.9	6,528.9	6,527.3	85.9	13.6	-90.49	4,225.6	-372.1	280.0	180.5	99.52	2.813	
10,995.0	6,553.0	6,530.8	6,529.3	87.7	13.6	-90.96	4,225.7	-372.1	338.3	237.0	101.31	3.339	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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 (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	-50.05	298.7	-356.6	465.4					
100.0	100.0	87.0	87.0	0.1	1.7	-50.05	298.7	-356.6	465.2	463.4	1.85	251.114		
200.0	200.0	187.0	187.0	0.3	3.7	-50.05	298.7	-356.6	465.2	461.1	4.08	114.096		
300.0	300.0	287.0	287.0	0.6	5.7	-50.05	298.7	-356.6	465.2	458.9	6.30	73.818		
400.0	400.0	387.0	387.0	0.8	7.7	-50.05	298.7	-356.6	465.2	456.7	8.53	54.558		
500.0	500.0	487.0	487.0	1.0	9.7	-50.05	298.7	-356.6	465.2	454.5	10.75	43.269		
600.0	600.0	587.0	587.0	1.2	11.7	-50.05	298.7	-356.6	465.2	452.2	12.98	35.850		
700.0	700.0	687.0	687.0	1.5	13.7	-50.05	298.7	-356.6	465.2	450.0	15.20	30.604		
800.0	800.0	787.0	787.0	1.7	15.7	-50.05	298.7	-356.6	465.2	447.8	17.43	26.696		
900.0	900.0	887.0	887.0	1.9	17.7	-50.05	298.7	-356.6	465.2	445.6	19.65	23.674		
1,000.0	1,000.0	987.0	987.0	2.1	19.7	-50.05	298.7	-356.6	465.2	443.3	21.88	21.266		
1,100.0	1,100.0	1,087.0	1,087.0	2.4	21.7	-50.05	298.7	-356.6	465.2	441.1	24.10	19.303		
1,200.0	1,200.0	1,187.0	1,187.0	2.6	23.7	-50.05	298.7	-356.6	465.2	438.9	26.32	17.672		
1,300.0	1,300.0	1,287.0	1,287.0	2.8	25.7	-50.05	298.7	-356.6	465.2	436.7	28.55	16.295		
1,400.0	1,400.0	1,387.0	1,387.0	3.0	27.7	-50.05	298.7	-356.6	465.2	434.4	30.77	15.117		
1,500.0	1,500.0	1,487.0	1,487.0	3.3	29.7	-50.05	298.7	-356.6	465.2	432.2	33.00	14.098		
1,600.0	1,600.0	1,587.0	1,587.0	3.5	31.7	-50.05	298.7	-356.6	465.2	430.0	35.22	13.207		
1,700.0	1,700.0	1,687.0	1,687.0	3.7	33.7	-50.05	298.7	-356.6	465.2	427.8	37.45	12.423		
1,800.0	1,800.0	1,787.0	1,787.0	3.9	35.7	-50.05	298.7	-356.6	465.2	425.5	39.67	11.726		
1,900.0	1,900.0	1,887.0	1,887.0	4.1	37.7	102.32	298.7	-356.6	465.4	423.5	41.87	11.115		
2,000.0	2,000.0	1,987.0	1,987.0	4.3	39.7	102.63	298.7	-356.6	466.0	421.9	44.04	10.580		
2,100.0	2,099.9	2,086.9	2,086.9	4.5	41.7	103.15	298.7	-356.6	466.9	420.7	46.22	10.103		
2,200.0	2,199.7	2,186.7	2,186.7	4.7	43.7	103.86	298.7	-356.6	468.4	420.0	48.40	9.678		
2,300.0	2,299.4	2,286.4	2,286.4	4.9	45.7	104.76	298.7	-356.6	470.3	419.7	50.58	9.298		
2,400.0	2,398.9	2,385.9	2,385.9	5.1	47.7	105.86	298.7	-356.6	472.9	420.1	52.77	8.961		
2,500.0	2,498.3	2,485.3	2,485.3	5.3	49.7	107.13	298.7	-356.6	476.1	421.1	54.96	8.663		
2,600.0	2,597.4	2,584.4	2,584.4	5.5	51.7	108.57	298.7	-356.6	480.1	423.0	57.15	8.401		
2,700.0	2,696.3	2,683.3	2,683.3	5.8	53.7	110.16	298.7	-356.6	485.1	425.7	59.34	8.174		
2,800.0	2,795.0	2,782.0	2,782.0	6.0	55.6	111.90	298.7	-356.6	491.0	429.4	61.55	7.977		
2,900.0	2,893.6	2,880.6	2,880.6	6.3	57.6	113.63	298.7	-356.6	497.4	433.6	63.77	7.800		
3,000.0	2,992.3	2,979.3	2,979.3	6.6	59.6	115.32	298.7	-356.6	504.3	438.3	65.99	7.642		
3,100.0	3,090.9	3,077.9	3,077.9	6.9	61.6	116.97	298.7	-356.6	511.6	443.4	68.22	7.500		
3,200.0	3,189.5	3,176.5	3,176.5	7.2	63.5	118.57	298.7	-356.6	519.3	448.9	70.45	7.372		
3,300.0	3,288.2	3,275.2	3,275.2	7.5	65.5	120.12	298.7	-356.6	527.5	454.8	72.67	7.258		
3,400.0	3,386.8	3,373.8	3,373.8	7.9	67.5	121.62	298.7	-356.6	536.0	461.1	74.90	7.156		
3,500.0	3,485.5	3,472.5	3,472.5	8.2	69.4	123.08	298.7	-356.6	544.9	467.7	77.13	7.064		
3,600.0	3,584.1	3,571.1	3,571.1	8.5	71.4	124.49	298.7	-356.6	554.1	474.7	79.36	6.982		
3,700.0	3,682.7	3,669.7	3,669.7	8.9	73.4	125.86	298.7	-356.6	563.6	482.0	81.58	6.909		
3,800.0	3,781.5	3,768.5	3,768.5	9.2	75.4	127.22	298.7	-356.6	573.2	489.3	83.88	6.834		
3,900.0	3,880.6	3,867.6	3,867.6	9.5	77.4	128.35	298.7	-356.6	581.1	494.9	86.20	6.742		
4,000.0	3,980.2	3,967.2	3,967.2	9.7	79.3	129.16	298.7	-356.6	587.0	498.5	88.50	6.633		
4,100.0	4,080.0	4,067.0	4,067.0	9.9	81.3	129.66	298.7	-356.6	590.8	500.0	90.77	6.509		
4,200.0	4,180.0	4,167.0	4,167.0	10.1	83.3	129.87	298.7	-356.6	592.4	499.4	92.99	6.371		
4,300.0	4,280.0	4,267.0	4,267.0	10.3	85.3	-22.40	298.7	-356.6	592.4	497.2	95.17	6.225		
4,400.0	4,380.0	4,367.0	4,367.0	10.5	87.3	-22.40	298.7	-356.6	592.4	495.1	97.37	6.084		
4,500.0	4,480.0	4,467.0	4,467.0	10.7	89.3	-22.40	298.7	-356.6	592.4	492.9	99.56	5.950		
4,600.0	4,580.0	4,567.0	4,567.0	10.9	91.3	-22.40	298.7	-356.6	592.4	490.7	101.75	5.822		
4,700.0	4,680.0	4,667.0	4,667.0	11.0	93.3	-22.40	298.7	-356.6	592.4	488.5	103.95	5.699		
4,800.0	4,780.0	4,767.0	4,767.0	11.2	95.3	-22.40	298.7	-356.6	592.4	486.3	106.15	5.581		
4,900.0	4,880.0	4,867.0	4,867.0	11.4	97.3	-22.40	298.7	-356.6	592.4	484.1	108.35	5.468		
5,000.0	4,980.0	4,967.0	4,967.0	11.6	99.3	-22.40	298.7	-356.6	592.4	481.9	110.55	5.359		

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 22Y-241
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 22Y-241	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 (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
5,100.0	5,080.0	5,067.0	5,067.0	11.8	101.3	-22.40	298.7	-356.6	592.4	479.7	112.75	5.255		
5,200.0	5,180.0	5,167.0	5,167.0	12.0	103.3	-22.40	298.7	-356.6	592.4	477.5	114.95	5.154		
5,300.0	5,280.0	5,267.0	5,267.0	12.2	105.3	-22.40	298.7	-356.6	592.4	475.3	117.15	5.057		
5,400.0	5,380.0	5,367.0	5,367.0	12.4	107.3	-22.40	298.7	-356.6	592.4	473.1	119.35	4.964		
5,500.0	5,480.0	5,467.0	5,467.0	12.6	109.3	-22.40	298.7	-356.6	592.4	470.9	121.55	4.874		
5,600.0	5,580.0	5,567.0	5,567.0	12.8	111.3	-22.40	298.7	-356.6	592.4	468.7	123.76	4.787		
5,700.0	5,680.0	5,667.0	5,667.0	13.0	113.3	-22.40	298.7	-356.6	592.4	466.5	125.96	4.703		
5,800.0	5,780.0	5,767.0	5,767.0	13.2	115.3	-22.40	298.7	-356.6	592.4	464.3	128.17	4.622		
5,900.0	5,879.9	5,866.9	5,866.9	13.4	117.3	-22.51	298.7	-356.6	590.7	460.6	130.09	4.541		
6,000.0	5,978.9	5,965.9	5,965.9	13.5	119.3	-23.39	298.7	-356.6	578.3	448.0	130.31	4.438		
6,100.0	6,075.4	6,062.4	6,062.4	13.6	121.2	-25.24	298.7	-356.6	554.3	425.5	128.73	4.305		
6,200.0	6,167.5	6,154.5	6,154.5	13.6	123.1	-28.34	298.7	-356.6	519.2	393.4	125.82	4.127		
6,300.0	6,253.9	6,240.9	6,240.9	13.7	124.8	-33.12	298.7	-356.6	474.4	351.8	122.65	3.868		
6,400.0	6,332.9	6,319.9	6,319.9	13.7	126.4	-40.23	298.7	-356.6	421.6	300.3	121.30	3.476		
6,500.0	6,403.3	6,390.3	6,390.3	13.8	127.8	-50.33	298.7	-356.6	363.7	239.1	124.57	2.920		
6,600.0	6,463.8	6,450.8	6,450.8	14.1	129.0	-63.29	298.7	-356.6	305.4	172.4	132.98	2.296		
6,700.0	6,513.4	6,500.4	6,500.4	14.6	130.0	-76.98	298.7	-356.6	255.1	113.4	141.71	1.800		
6,800.0	6,551.3	6,538.3	6,538.3	15.3	130.8	-87.87	298.7	-356.6	227.3	81.3	145.96	1.557		
6,827.8	6,559.6	6,546.6	6,546.6	15.6	130.9	-90.00	298.7	-356.6	225.7	79.3	146.45	1.541 CC, ES, SF		
6,900.0	6,576.8	6,563.8	6,563.8	16.2	131.3	-93.40	298.7	-356.6	236.4	89.2	147.17	1.606		
7,000.0	6,589.4	6,576.4	6,576.4	17.2	131.5	-92.64	298.7	-356.6	282.1	133.6	148.55	1.899		
7,100.0	6,590.4	6,577.4	6,577.4	18.4	131.5	-89.34	298.7	-356.6	351.3	201.4	149.90	2.344		
7,200.0	6,589.4	6,576.4	6,576.4	19.7	131.5	-89.10	298.7	-356.6	432.8	281.6	151.17	2.863		
7,300.0	6,588.5	6,575.5	6,575.5	21.1	131.5	-88.86	298.7	-356.6	520.7	368.2	152.52	3.414		
7,400.0	6,587.5	6,574.5	6,574.5	22.5	131.5	-88.61	298.7	-356.6	612.4	458.4	153.95	3.977		
7,500.0	6,586.5	6,573.5	6,573.5	24.1	131.5	-88.37	298.7	-356.6	706.3	550.8	155.45	4.543		
7,600.0	6,585.6	6,572.6	6,572.6	25.7	131.5	-88.13	298.7	-356.6	801.7	644.7	156.99	5.106		
7,700.0	6,584.6	6,571.6	6,571.6	27.3	131.4	-87.88	298.7	-356.6	898.0	739.5	158.58	5.663		
7,800.0	6,583.7	6,570.7	6,570.7	28.9	131.4	-87.64	298.7	-356.6	995.2	835.0	160.19	6.212		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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 (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,200.0	6,589.4	6,579.4	6,579.4	19.7	131.6	-91.89	1,566.5	-392.8	935.9	784.8	151.14	6.192	
7,300.0	6,588.5	6,578.5	6,578.5	21.1	131.6	-91.68	1,566.5	-392.8	840.4	687.9	152.53	5.510	
7,400.0	6,587.5	6,577.5	6,577.5	22.5	131.6	-91.47	1,566.5	-392.8	746.0	592.1	153.99	4.845	
7,500.0	6,586.5	6,576.5	6,576.5	24.1	131.5	-91.26	1,566.5	-392.8	653.4	497.9	155.51	4.201	
7,600.0	6,585.6	6,575.6	6,575.6	25.7	131.5	-91.05	1,566.5	-392.8	563.2	406.1	157.08	3.585	
7,700.0	6,584.6	6,574.6	6,574.6	27.3	131.5	-90.84	1,566.5	-392.8	476.9	318.2	158.70	3.005	
7,800.0	6,583.7	6,573.7	6,573.7	28.9	131.5	-90.63	1,566.5	-392.8	397.2	236.8	160.35	2.477	
7,900.0	6,582.7	6,572.7	6,572.7	30.6	131.5	-90.42	1,566.5	-392.8	328.7	166.7	162.03	2.029	
8,000.0	6,581.7	6,571.7	6,571.7	32.3	131.4	-90.21	1,566.5	-392.8	279.8	116.1	163.73	1.709	
8,098.6	6,580.8	6,570.8	6,570.8	34.1	131.4	-90.00	1,566.5	-392.8	261.9	96.5	165.43	1.583 CC	
8,100.0	6,580.8	6,570.8	6,570.8	34.1	131.4	-90.00	1,566.5	-392.8	261.9	96.5	165.46	1.583 ES, SF	
8,200.0	6,579.8	6,569.8	6,569.8	35.8	131.4	-89.79	1,566.5	-392.8	280.9	113.7	167.19	1.680	
8,300.0	6,578.9	6,568.9	6,568.9	37.6	131.4	-89.58	1,566.5	-392.8	330.4	161.4	168.95	1.956	
8,400.0	6,577.9	6,567.9	6,567.9	39.4	131.4	-89.37	1,566.5	-392.8	399.3	228.6	170.71	2.339	
8,500.0	6,577.0	6,567.0	6,567.0	41.2	131.3	-89.16	1,566.5	-392.8	479.3	306.8	172.48	2.779	
8,600.0	6,576.0	6,566.0	6,566.0	43.0	131.3	-88.95	1,566.5	-392.8	565.7	391.4	174.27	3.246	
8,700.0	6,575.0	6,565.0	6,565.0	44.8	131.3	-88.74	1,566.5	-392.8	655.9	479.9	176.05	3.726	
8,800.0	6,574.1	6,564.1	6,564.1	46.6	131.3	-88.53	1,566.5	-392.8	748.7	570.8	177.85	4.210	
8,900.0	6,573.1	6,563.1	6,563.1	48.5	131.3	-88.32	1,566.5	-392.8	843.1	663.4	179.65	4.693	
9,000.0	6,572.2	6,562.2	6,562.2	50.3	131.2	-88.11	1,566.5	-392.8	938.6	757.2	181.45	5.173	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
8,800.0	6,574.1	6,541.1	6,541.1	46.6	130.8	-91.08	3,122.2	-565.5	958.4	781.0	177.40	5.403	
8,900.0	6,573.1	6,540.1	6,540.1	48.5	130.8	-90.95	3,122.2	-565.5	870.5	691.3	179.22	4.857	
9,000.0	6,572.2	6,539.2	6,539.2	50.3	130.8	-90.83	3,122.2	-565.5	785.4	604.4	181.05	4.338	
9,100.0	6,571.2	6,538.2	6,538.2	52.2	130.8	-90.70	3,122.2	-565.5	704.3	521.4	182.88	3.851	
9,200.0	6,570.2	6,537.2	6,537.2	54.0	130.7	-90.57	3,122.2	-565.5	628.7	444.0	184.72	3.403	
9,300.0	6,569.3	6,536.3	6,536.3	55.9	130.7	-90.45	3,122.2	-565.5	560.7	374.1	186.56	3.005	
9,400.0	6,568.3	6,535.3	6,535.3	57.7	130.7	-90.32	3,122.2	-565.5	503.5	315.1	188.40	2.673	
9,500.0	6,567.4	6,534.4	6,534.4	59.6	130.7	-90.20	3,122.2	-565.5	461.2	270.9	190.25	2.424	
9,600.0	6,566.4	6,533.4	6,533.4	61.5	130.7	-90.07	3,122.2	-565.5	438.0	245.9	192.10	2.280	
9,654.3	6,565.9	6,532.9	6,532.9	62.5	130.7	-90.00	3,122.2	-565.5	434.6	241.5	193.11	2.251 CC, ES, SF	
9,700.0	6,565.4	6,532.4	6,532.4	63.3	130.6	-89.94	3,122.2	-565.5	437.0	243.0	193.95	2.253	
9,800.0	6,564.5	6,531.5	6,531.5	65.2	130.6	-89.82	3,122.2	-565.5	458.4	262.6	195.81	2.341	
9,900.0	6,563.5	6,530.5	6,530.5	67.1	130.6	-89.69	3,122.2	-565.5	499.2	301.6	197.66	2.526	
10,000.0	6,562.6	6,529.6	6,529.6	69.0	130.6	-89.56	3,122.2	-565.5	555.3	355.8	199.52	2.783	
10,100.0	6,561.6	6,528.6	6,528.6	70.8	130.6	-89.44	3,122.2	-565.5	622.5	421.1	201.38	3.091	
10,200.0	6,560.6	6,527.6	6,527.6	72.7	130.6	-89.31	3,122.2	-565.5	697.6	494.4	203.24	3.432	
10,300.0	6,559.7	6,526.7	6,526.7	74.6	130.5	-89.18	3,122.2	-565.5	778.3	573.2	205.10	3.795	
10,400.0	6,558.7	6,525.7	6,525.7	76.5	130.5	-89.06	3,122.2	-565.5	863.1	656.1	206.96	4.170	
10,500.0	6,557.8	6,524.8	6,524.8	78.4	130.5	-88.93	3,122.2	-565.5	950.8	742.0	208.83	4.553	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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	-136.29	-136.29	-43.7	-41.8	60.5				
100.0	100.0	100.0	100.0	0.1	0.1	-136.29	-136.29	-43.7	-41.8	60.5	60.3	0.22	269.090	
200.0	200.0	200.0	200.0	0.3	0.3	-136.29	-136.29	-43.7	-41.8	60.5	59.8	0.67	89.697	
300.0	300.0	300.0	300.0	0.6	0.6	-136.29	-136.29	-43.7	-41.8	60.5	59.4	1.12	53.818	
400.0	400.0	400.0	400.0	0.8	0.8	-136.29	-136.29	-43.7	-41.8	60.5	58.9	1.57	38.441 CC, ES	
500.0	500.0	498.2	498.2	1.0	1.0	-135.49	-135.49	-44.2	-43.4	62.0	60.0	2.00	30.916	
600.0	600.0	596.1	596.0	1.2	1.2	-133.30	-133.30	-45.5	-48.3	66.4	64.0	2.43	27.303	
700.0	700.0	693.6	693.1	1.5	1.4	-130.26	-130.26	-47.7	-56.3	74.1	71.2	2.88	25.718	
800.0	800.0	790.5	789.3	1.7	1.7	-126.94	-126.94	-50.7	-67.4	85.0	81.7	3.35	25.412	
900.0	900.0	886.7	884.4	1.9	2.0	-123.77	-123.77	-54.6	-81.6	99.4	95.5	3.83	25.939	
1,000.0	1,000.0	985.3	981.6	2.1	2.3	-121.15	-121.15	-58.8	-97.3	115.2	110.9	4.33	26.620	
1,100.0	1,100.0	1,083.9	1,078.9	2.4	2.7	-119.17	-119.17	-63.1	-113.1	131.2	126.4	4.83	27.194	
1,200.0	1,200.0	1,182.6	1,176.1	2.6	3.0	-117.62	-117.62	-67.4	-128.9	147.4	142.1	5.33	27.673	
1,300.0	1,300.0	1,281.2	1,273.4	2.8	3.4	-116.38	-116.38	-71.7	-144.6	163.6	157.8	5.83	28.078	
1,400.0	1,400.0	1,379.8	1,370.6	3.0	3.8	-115.36	-115.36	-76.0	-160.4	179.9	173.6	6.33	28.426	
1,500.0	1,500.0	1,478.4	1,467.9	3.3	4.1	-114.51	-114.51	-80.3	-176.2	196.3	189.4	6.83	28.727	
1,600.0	1,600.0	1,577.0	1,565.2	3.5	4.5	-113.79	-113.79	-84.6	-191.9	212.6	205.3	7.33	28.990	
1,700.0	1,700.0	1,675.6	1,662.4	3.7	4.9	-113.17	-113.17	-88.9	-207.7	229.0	221.2	7.84	29.221	
1,800.0	1,800.0	1,774.3	1,759.7	3.9	5.3	-112.64	-112.64	-93.2	-223.5	245.5	237.1	8.34	29.427	
1,900.0	1,900.0	1,873.0	1,857.0	4.1	5.6	-112.12	-112.12	-97.5	-239.3	261.2	252.9	8.86	31.253	
2,000.0	2,000.0	1,971.9	1,954.5	4.3	6.0	-111.60	-111.60	-101.8	-255.1	275.7	267.0	9.38	31.422	
2,100.0	2,099.9	2,070.9	2,052.2	4.5	6.4	-111.08	-111.08	-106.1	-270.9	289.0	279.8	9.90	31.424	
2,200.0	2,199.7	2,170.0	2,149.9	4.7	6.8	-110.56	-110.56	-110.4	-286.7	301.0	291.4	10.42	31.284	
2,300.0	2,299.4	2,269.2	2,247.7	4.9	7.2	-110.04	-110.04	-114.7	-302.6	311.9	301.9	10.94	31.020	
2,400.0	2,398.9	2,368.4	2,345.6	5.1	7.6	-109.52	-109.52	-119.0	-318.5	321.7	311.2	11.46	30.646	
2,500.0	2,498.3	2,467.7	2,443.5	5.3	8.0	-109.00	-109.00	-123.4	-334.3	330.5	319.5	11.98	30.175	
2,600.0	2,597.4	2,566.9	2,541.4	5.5	8.3	-108.48	-108.48	-127.7	-350.2	338.3	326.8	12.50	29.615	
2,700.0	2,696.3	2,666.1	2,639.2	5.8	8.7	-107.96	-107.96	-132.0	-366.1	345.2	333.3	13.02	28.976	
2,800.0	2,795.0	2,765.3	2,737.0	6.0	9.1	-107.44	-107.44	-136.3	-381.9	351.5	339.1	13.54	28.276	
2,900.0	2,893.6	2,864.4	2,834.7	6.3	9.5	-106.92	-106.92	-140.6	-397.8	358.1	345.1	14.06	27.602	
3,000.0	2,992.3	2,963.6	2,932.5	6.6	9.9	-106.40	-106.40	-144.9	-413.6	365.0	351.4	14.58	26.967	
3,100.0	3,090.9	3,062.7	3,030.3	6.9	10.3	-105.88	-105.88	-149.3	-429.5	372.2	358.1	15.10	26.370	
3,200.0	3,189.5	3,161.8	3,128.0	7.2	10.7	-105.36	-105.36	-153.6	-445.3	379.8	365.1	15.62	25.810	
3,300.0	3,288.2	3,260.9	3,225.8	7.5	11.1	-104.84	-104.84	-157.9	-461.2	387.7	372.4	16.14	25.284	
3,400.0	3,386.8	3,360.1	3,323.6	7.9	11.4	-104.32	-104.32	-162.2	-477.0	395.8	379.9	16.66	24.792	
3,500.0	3,485.5	3,459.2	3,421.3	8.2	11.8	-103.80	-103.80	-166.5	-492.9	404.3	387.7	17.18	24.333	
3,600.0	3,584.1	3,558.3	3,519.1	8.5	12.2	-103.28	-103.28	-170.8	-508.7	412.9	395.7	17.70	23.903	
3,700.0	3,682.7	3,657.5	3,616.8	8.9	12.6	-102.76	-102.76	-175.2	-524.5	421.8	403.9	18.22	23.503	
3,800.0	3,781.5	3,756.6	3,714.6	9.2	13.0	-102.24	-102.24	-179.5	-540.4	431.1	412.5	18.74	23.164	
3,900.0	3,880.6	3,855.9	3,812.5	9.5	13.4	-101.72	-101.72	-183.8	-556.3	441.8	422.6	19.26	23.005	
4,000.0	3,980.2	3,955.1	3,910.4	9.7	13.8	-101.20	-101.20	-188.1	-572.1	453.8	434.0	19.78	22.978	
4,100.0	4,080.0	4,054.2	4,008.1	9.9	14.2	-100.68	-100.68	-192.4	-588.0	467.0	446.8	20.30	23.075	
4,200.0	4,180.0	4,153.1	4,105.6	10.1	14.6	-100.16	-100.16	-196.7	-603.8	481.6	460.9	20.82	23.288	
4,300.0	4,280.0	4,251.7	4,202.9	10.3	14.9	-99.64	-99.64	-201.0	-619.6	497.0	475.9	21.34	23.579	
4,400.0	4,380.0	4,350.3	4,300.1	10.5	15.3	-99.12	-99.12	-205.3	-635.3	512.6	491.1	21.86	23.863	
4,500.0	4,480.0	4,448.9	4,397.4	10.7	15.7	-98.60	-98.60	-209.6	-651.1	528.2	506.3	22.38	24.136	
4,600.0	4,580.0	4,547.6	4,494.6	10.9	16.1	-98.08	-98.08	-213.9	-666.8	543.8	521.5	22.90	24.397	
4,700.0	4,680.0	4,646.2	4,591.9	11.0	16.5	-97.56	-97.56	-218.2	-682.6	559.6	536.9	23.42	24.649	
4,800.0	4,780.0	4,744.8	4,689.1	11.2	16.9	-97.04	-97.04	-222.5	-698.4	575.3	552.2	23.94	24.890	
4,900.0	4,880.0	4,843.4	4,786.4	11.4	17.3	-96.52	-96.52	-226.8	-714.1	591.1	567.6	24.46	25.123	
5,000.0	4,980.0	4,942.0	4,883.6	11.6	17.6	-96.00	-96.00	-231.1	-729.9	607.0	583.0	24.98	25.346	

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 22Y-241
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 22Y-241	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)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,080.0	5,040.7	4,980.9	11.8	18.0	-88.73		-235.4	-745.7	622.9	598.5	24.37	25.560	
5,200.0	5,180.0	5,153.9	5,092.7	12.0	18.4	-89.19		-240.1	-763.0	638.2	613.4	24.78	25.749	
5,300.0	5,280.0	5,280.6	5,218.5	12.2	18.7	-89.56		-244.1	-777.7	649.7	624.6	25.19	25.793	
5,400.0	5,380.0	5,408.4	5,345.9	12.4	18.9	-89.79		-246.6	-787.1	657.1	631.5	25.60	25.672	
5,500.0	5,480.0	5,536.8	5,474.2	12.6	19.1	-89.89		-247.7	-791.0	660.1	634.1	26.00	25.390	
5,600.0	5,580.0	5,642.5	5,580.0	12.8	19.3	-89.89		-247.7	-791.1	660.2	633.8	26.38	25.027	
5,700.0	5,680.0	5,742.5	5,680.0	13.0	19.4	-89.89		-247.7	-791.1	660.2	633.4	26.75	24.680	
5,800.0	5,780.0	5,842.5	5,780.0	13.2	19.5	-89.89		-247.7	-791.1	660.2	633.1	27.12	24.341	
5,869.6	5,849.6	5,912.1	5,849.6	13.3	19.6	-90.03		-247.7	-791.1	660.2	632.8	27.37	24.125	
5,900.0	5,879.9	5,942.5	5,879.9	13.4	19.7	-90.05		-247.7	-791.1	660.2	632.7	27.48	24.028	
6,000.0	5,978.9	6,042.7	5,980.0	13.5	19.8	-90.90		-244.1	-791.1	660.3	632.6	27.70	23.838	
6,100.0	6,075.4	6,144.2	6,080.1	13.6	19.9	-91.78		-227.5	-791.1	660.5	632.7	27.82	23.740	
6,200.0	6,167.5	6,247.2	6,178.4	13.6	19.9	-92.63		-197.3	-791.1	660.9	633.0	27.89	23.693	
6,300.0	6,253.9	6,351.5	6,273.0	13.7	20.0	-93.44		-153.5	-791.1	661.4	633.4	27.98	23.640	
6,400.0	6,332.9	6,457.3	6,361.9	13.7	20.0	-94.19		-96.3	-791.1	662.0	633.8	28.16	23.511	
6,500.0	6,403.3	6,564.3	6,443.0	13.8	20.0	-94.87		-26.6	-791.1	662.6	634.1	28.52	23.235	
6,600.0	6,463.8	6,672.6	6,514.3	14.1	20.1	-95.47		54.8	-791.1	663.2	634.1	29.14	22.763	
6,700.0	6,513.4	6,781.9	6,573.9	14.6	20.2	-95.97		146.3	-791.1	663.8	633.7	30.10	22.051	
6,800.0	6,551.3	6,892.1	6,620.1	15.3	20.5	-96.35		246.3	-791.1	664.3	632.8	31.43	21.134	
6,900.0	6,576.8	7,003.0	6,651.6	16.2	21.0	-96.62		352.5	-791.1	664.6	631.5	33.13	20.059	
7,000.0	6,589.4	7,114.3	6,667.5	17.2	21.7	-96.76		462.5	-791.1	664.8	629.6	35.18	18.899	
7,100.0	6,590.4	7,220.6	6,668.9	18.4	22.6	-96.78		568.8	-791.1	664.8	627.3	37.49	17.731	
7,200.0	6,589.4	7,320.6	6,667.8	19.7	23.7	-96.77		668.8	-791.1	664.8	624.8	40.02	16.612	
7,300.0	6,588.5	7,420.6	6,666.7	21.1	24.8	-96.75		768.8	-791.1	664.8	622.1	42.74	15.555	
7,400.0	6,587.5	7,520.6	6,665.6	22.5	26.1	-96.74		868.8	-791.1	664.8	619.2	45.61	14.574	
7,500.0	6,586.5	7,620.6	6,664.5	24.1	27.5	-96.73		968.8	-791.1	664.8	616.2	48.62	13.673	
7,600.0	6,585.6	7,720.6	6,663.4	25.7	28.9	-96.72		1,068.8	-791.1	664.8	613.0	51.74	12.849	
7,700.0	6,584.6	7,820.6	6,662.3	27.3	30.4	-96.71		1,168.8	-791.1	664.7	609.8	54.94	12.100	
7,800.0	6,583.7	7,920.6	6,661.2	28.9	31.9	-96.70		1,268.8	-791.1	664.7	606.5	58.22	11.418	
7,900.0	6,582.7	8,020.6	6,660.1	30.6	33.5	-96.68		1,368.8	-791.1	664.7	603.2	61.56	10.798	
8,000.0	6,581.7	8,120.6	6,659.0	32.3	35.1	-96.67		1,468.8	-791.1	664.7	599.7	64.95	10.234	
8,100.0	6,580.8	8,220.6	6,657.9	34.1	36.7	-96.66		1,568.8	-791.1	664.7	596.3	68.39	9.719	
8,200.0	6,579.8	8,320.6	6,656.8	35.8	38.4	-96.65		1,668.8	-791.1	664.7	592.8	71.87	9.248	
8,300.0	6,578.9	8,420.6	6,655.7	37.6	40.1	-96.64		1,768.8	-791.1	664.6	589.3	75.38	8.817	
8,400.0	6,577.9	8,520.6	6,654.6	39.4	41.8	-96.62		1,868.8	-791.1	664.6	585.7	78.92	8.422	
8,500.0	6,577.0	8,620.6	6,653.5	41.2	43.5	-96.61		1,968.8	-791.1	664.6	582.1	82.48	8.057	
8,600.0	6,576.0	8,720.6	6,652.4	43.0	45.3	-96.60		2,068.8	-791.1	664.6	578.5	86.07	7.721	
8,700.0	6,575.0	8,820.6	6,651.3	44.8	47.0	-96.59		2,168.7	-791.1	664.6	574.9	89.68	7.411	
8,800.0	6,574.1	8,920.6	6,650.2	46.6	48.8	-96.58		2,268.7	-791.1	664.6	571.3	93.30	7.123	
8,900.0	6,573.1	9,020.6	6,649.1	48.5	50.6	-96.56		2,368.7	-791.1	664.5	567.6	96.94	6.855	
9,000.0	6,572.2	9,120.6	6,648.0	50.3	52.4	-96.55		2,468.7	-791.1	664.5	563.9	100.60	6.606	
9,100.0	6,571.2	9,220.6	6,646.9	52.2	54.2	-96.54		2,568.7	-791.1	664.5	560.3	104.26	6.374	
9,200.0	6,570.2	9,320.6	6,645.8	54.0	56.0	-96.53		2,668.7	-791.1	664.5	556.6	107.94	6.156	
9,300.0	6,569.3	9,420.6	6,644.7	55.9	57.8	-96.52		2,768.7	-791.1	664.5	552.9	111.62	5.953	
9,400.0	6,568.3	9,520.6	6,643.6	57.7	59.6	-96.50		2,868.7	-791.1	664.5	549.2	115.32	5.762	
9,500.0	6,567.4	9,620.6	6,642.5	59.6	61.4	-96.49		2,968.7	-791.1	664.5	545.4	119.02	5.583	
9,600.0	6,566.4	9,720.6	6,641.4	61.5	63.3	-96.48		3,068.7	-791.1	664.4	541.7	122.74	5.414	
9,700.0	6,565.4	9,820.6	6,640.3	63.3	65.1	-96.47		3,168.7	-791.1	664.4	538.0	126.45	5.254	
9,800.0	6,564.5	9,920.6	6,639.2	65.2	66.9	-96.46		3,268.7	-791.1	664.4	534.2	130.18	5.104	
9,900.0	6,563.5	10,020.6	6,638.1	67.1	68.8	-96.44		3,368.7	-791.1	664.4	530.5	133.91	4.962	
10,000.0	6,562.6	10,120.6	6,637.0	69.0	70.6	-96.43		3,468.7	-791.1	664.4	526.7	137.64	4.827	

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 22Y-241
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 22Y-241	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-321 - 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	6,561.6	10,220.6	6,635.9	70.8	72.5	-96.42	3,568.7	-791.1	664.4	523.0	141.38	4.699	
10,200.0	6,560.6	10,320.6	6,634.8	72.7	74.3	-96.41	3,668.7	-791.1	664.3	519.2	145.13	4.578	
10,300.0	6,559.7	10,420.6	6,633.7	74.6	76.2	-96.40	3,768.6	-791.1	664.3	515.5	148.88	4.462	
10,400.0	6,558.7	10,520.6	6,632.6	76.5	78.1	-96.38	3,868.6	-791.1	664.3	511.7	152.63	4.352	
10,500.0	6,557.8	10,620.6	6,631.5	78.4	79.9	-96.37	3,968.6	-791.1	664.3	507.9	156.39	4.248	
10,600.0	6,556.8	10,720.6	6,630.4	80.3	81.8	-96.36	4,068.6	-791.1	664.3	504.1	160.15	4.148	
10,700.0	6,555.8	10,820.6	6,629.3	82.2	83.7	-96.35	4,168.6	-791.1	664.3	500.4	163.91	4.053	
10,800.0	6,554.9	10,920.6	6,628.2	84.1	85.5	-96.34	4,268.6	-791.1	664.3	496.6	167.67	3.962	
10,900.0	6,553.9	11,020.6	6,627.1	85.9	87.4	-96.32	4,368.6	-791.1	664.2	492.8	171.44	3.874	
10,995.0	6,553.0	11,115.7	6,626.0	87.7	89.2	-96.31	4,463.6	-791.1	664.2	489.2	175.03	3.795 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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)	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	-138.26	-138.26	-21.9	-19.5	29.3				
100.0	100.0	100.0	100.0	0.1	0.1	-138.26	-138.26	-21.9	-19.5	29.3	29.1	0.22	130.333	
200.0	200.0	200.0	200.0	0.3	0.3	-138.26	-138.26	-21.9	-19.5	29.3	28.6	0.67	43.444	
300.0	300.0	300.0	300.0	0.6	0.6	-138.26	-138.26	-21.9	-19.5	29.3	28.2	1.12	26.067	
400.0	400.0	400.0	400.0	0.8	0.8	-138.26	-138.26	-21.9	-19.5	29.3	27.7	1.57	18.619	
500.0	500.0	500.0	500.0	1.0	1.0	-138.26	-138.26	-21.9	-19.5	29.3	27.3	2.02	14.481	
600.0	600.0	600.0	600.0	1.2	1.2	-138.26	-138.26	-21.9	-19.5	29.3	26.8	2.47	11.848	
700.0	700.0	700.0	700.0	1.5	1.5	-138.26	-138.26	-21.9	-19.5	29.3	26.4	2.92	10.026	
800.0	800.0	800.0	800.0	1.7	1.7	-138.26	-138.26	-21.9	-19.5	29.3	25.9	3.37	8.689	
900.0	900.0	900.0	900.0	1.9	1.9	-138.26	-138.26	-21.9	-19.5	29.3	25.5	3.82	7.667	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-138.26	-138.26	-21.9	-19.5	29.3	25.0	4.27	6.860 CC, ES	
1,100.0	1,100.0	1,099.5	1,099.5	2.4	2.3	-137.46	-137.46	-22.1	-20.3	30.1	25.4	4.70	6.394	
1,200.0	1,200.0	1,199.0	1,199.0	2.6	2.5	-135.29	-135.29	-23.0	-22.8	32.4	27.3	5.12	6.326	
1,300.0	1,300.0	1,298.4	1,298.3	2.8	2.7	-132.31	-132.31	-24.4	-26.8	36.3	30.8	5.54	6.554	
1,400.0	1,400.0	1,397.6	1,397.3	3.0	2.9	-129.08	-129.08	-26.4	-32.5	42.0	36.0	5.97	7.028	
1,500.0	1,500.0	1,496.5	1,495.9	3.3	3.2	-126.04	-126.04	-29.0	-39.8	49.4	43.0	6.41	7.705	
1,600.0	1,600.0	1,595.2	1,594.1	3.5	3.4	-123.38	-123.38	-32.1	-48.7	58.6	51.7	6.85	8.547	
1,700.0	1,700.0	1,693.5	1,691.8	3.7	3.6	-121.15	-121.15	-35.7	-59.1	69.5	62.2	7.30	9.521	
1,800.0	1,800.0	1,791.4	1,788.9	3.9	3.9	-119.32	-119.32	-39.9	-71.0	82.2	74.4	7.75	10.601	
1,900.0	1,900.0	1,888.9	1,885.3	4.1	4.2	34.65	34.65	-44.6	-84.5	95.9	87.8	8.12	11.816	
2,000.0	2,000.0	1,986.1	1,981.2	4.3	4.5	36.54	36.54	-49.8	-99.4	110.0	101.5	8.51	12.928	
2,100.0	2,099.9	2,084.5	2,078.2	4.5	4.8	38.54	38.54	-55.5	-115.7	124.0	115.1	8.90	13.923	
2,200.0	2,199.7	2,183.6	2,175.7	4.7	5.2	40.60	40.60	-61.2	-132.1	136.9	127.6	9.31	14.700	
2,300.0	2,299.4	2,282.7	2,273.3	4.9	5.5	42.75	42.75	-67.0	-148.5	148.6	138.9	9.73	15.281	
2,400.0	2,398.9	2,382.0	2,371.0	5.1	5.9	45.02	45.02	-72.7	-164.9	159.4	149.2	10.15	15.693	
2,500.0	2,498.3	2,481.2	2,468.7	5.3	6.2	47.43	47.43	-78.5	-181.4	169.1	158.5	10.60	15.956	
2,600.0	2,597.4	2,580.5	2,566.4	5.5	6.6	49.99	49.99	-84.2	-197.8	178.1	167.0	11.07	16.090	
2,700.0	2,696.3	2,679.8	2,664.2	5.8	7.0	52.72	52.72	-90.0	-214.2	186.3	174.7	11.56	16.112	
2,800.0	2,795.0	2,779.0	2,761.9	6.0	7.3	55.60	55.60	-95.7	-230.7	194.1	182.0	12.09	16.047	
2,900.0	2,893.6	2,878.2	2,859.5	6.3	7.7	58.33	58.33	-101.5	-247.1	202.2	189.6	12.66	15.979	
3,000.0	2,992.3	2,977.4	2,957.2	6.6	8.1	60.84	60.84	-107.2	-263.5	210.8	197.6	13.24	15.919	
3,100.0	3,090.9	3,076.7	3,054.9	6.9	8.5	63.15	63.15	-113.0	-280.0	219.7	205.9	13.85	15.866	
3,200.0	3,189.5	3,175.9	3,152.6	7.2	8.9	65.28	65.28	-118.7	-296.4	229.0	214.5	14.48	15.818	
3,300.0	3,288.2	3,275.1	3,250.3	7.5	9.3	67.24	67.24	-124.5	-312.8	238.6	223.5	15.12	15.775	
3,400.0	3,386.8	3,374.3	3,347.9	7.9	9.7	69.05	69.05	-130.2	-329.3	248.4	232.6	15.79	15.737	
3,500.0	3,485.5	3,473.5	3,445.6	8.2	10.0	70.72	70.72	-136.0	-345.7	258.5	242.0	16.46	15.703	
3,600.0	3,584.1	3,572.8	3,543.3	8.5	10.4	72.26	72.26	-141.7	-362.1	268.7	251.6	17.15	15.674	
3,700.0	3,682.7	3,672.0	3,641.0	8.9	10.8	73.69	73.69	-147.5	-378.6	279.2	261.3	17.84	15.648	
3,800.0	3,781.5	3,771.2	3,738.7	9.2	11.2	75.04	75.04	-153.2	-395.0	289.9	271.4	18.53	15.648	
3,900.0	3,880.6	3,870.5	3,836.4	9.5	11.6	75.84	75.84	-159.0	-411.4	301.5	282.4	19.13	15.762	
4,000.0	3,980.2	3,969.7	3,934.1	9.7	12.0	75.99	75.99	-164.7	-427.9	313.9	294.3	19.67	15.958	
4,100.0	4,080.0	4,068.7	4,031.6	9.9	12.4	75.57	75.57	-170.5	-444.3	327.3	307.1	20.16	16.234	
4,200.0	4,180.0	4,167.5	4,128.8	10.1	12.8	74.65	74.65	-176.2	-460.6	341.5	321.0	20.58	16.592	
4,300.0	4,280.0	4,265.9	4,225.7	10.3	13.2	-79.02	-79.02	-181.9	-476.9	356.6	335.7	20.96	17.012	
4,400.0	4,380.0	4,364.4	4,322.6	10.5	13.6	-80.38	-80.38	-187.6	-493.2	371.9	350.6	21.34	17.428	
4,500.0	4,480.0	4,462.8	4,419.5	10.7	14.0	-81.63	-81.63	-193.3	-509.5	387.4	365.7	21.72	17.835	
4,600.0	4,580.0	4,561.3	4,516.5	10.9	14.4	-82.78	-82.78	-199.0	-525.8	403.1	381.0	22.11	18.232	
4,700.0	4,680.0	4,659.7	4,613.4	11.0	14.8	-83.85	-83.85	-204.7	-542.1	418.9	396.4	22.50	18.618	
4,800.0	4,780.0	4,758.2	4,710.3	11.2	15.2	-84.84	-84.84	-210.4	-558.4	434.9	412.0	22.90	18.993	
4,900.0	4,880.0	4,856.6	4,807.2	11.4	15.6	-85.76	-85.76	-216.1	-574.7	451.0	427.7	23.30	19.358	
5,000.0	4,980.0	4,955.1	4,904.2	11.6	16.0	-86.62	-86.62	-221.8	-591.1	467.1	443.4	23.70	19.712	

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 22Y-241
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 22Y-241	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	5,080.0	5,053.5	5,001.1	11.8	16.4	-87.42	-227.5	-607.4	483.4	459.3	24.11	20.055	
5,200.0	5,180.0	5,152.1	5,098.1	12.0	16.8	-88.17	-233.2	-623.7	499.8	475.3	24.51	20.387	
5,300.0	5,280.0	5,270.5	5,215.1	12.2	17.1	-88.91	-239.3	-641.0	514.3	489.4	24.91	20.643	
5,400.0	5,380.0	5,390.3	5,334.1	12.4	17.4	-89.43	-243.8	-653.8	525.0	499.7	25.31	20.745	
5,500.0	5,480.0	5,511.0	5,454.5	12.6	17.6	-89.75	-246.6	-662.0	531.7	506.0	25.70	20.690	
5,600.0	5,580.0	5,632.3	5,575.7	12.8	17.8	-89.87	-247.8	-665.4	534.5	508.4	26.10	20.481	
5,700.0	5,680.0	5,736.5	5,680.0	13.0	18.0	-89.88	-247.9	-665.5	534.6	508.1	26.48	20.187	
5,800.0	5,780.0	5,836.5	5,780.0	13.2	18.1	-89.88	-247.9	-665.5	534.6	507.7	26.86	19.902	
5,866.0	5,845.9	5,902.5	5,845.9	13.3	18.2	-90.04	-247.9	-665.5	534.6	507.5	27.09	19.732	
5,900.0	5,879.9	5,936.5	5,879.9	13.4	18.3	-90.07	-247.9	-665.5	534.6	507.4	27.22	19.642	
6,000.0	5,978.9	6,035.5	5,978.9	13.5	18.4	-91.48	-247.9	-665.5	534.8	507.4	27.42	19.504	
6,100.0	6,075.4	6,136.7	6,079.8	13.6	18.5	-93.58	-241.3	-665.5	535.7	508.2	27.50	19.483	
6,200.0	6,167.5	6,240.7	6,181.7	13.6	18.6	-95.64	-220.8	-665.5	537.3	509.8	27.51	19.530	
6,300.0	6,253.9	6,347.8	6,282.7	13.7	18.7	-97.63	-185.4	-665.5	539.5	512.0	27.52	19.606	
6,400.0	6,332.9	6,458.0	6,380.4	13.7	18.7	-99.49	-134.7	-665.5	542.2	514.7	27.59	19.653	
6,500.0	6,403.3	6,571.4	6,472.2	13.8	18.7	-101.19	-68.4	-665.5	545.2	517.4	27.81	19.608	
6,600.0	6,463.8	6,687.7	6,555.2	14.1	18.7	-102.69	13.1	-665.5	548.2	520.0	28.25	19.406	
6,700.0	6,513.4	6,806.9	6,626.4	14.6	18.8	-103.95	108.5	-665.5	551.0	522.0	29.00	19.000	
6,800.0	6,551.3	6,928.6	6,682.9	15.3	19.0	-104.93	216.1	-665.5	553.4	523.3	30.13	18.365	
6,900.0	6,576.8	7,052.0	6,722.0	16.2	19.5	-105.61	333.1	-665.5	555.1	523.5	31.66	17.532	
7,000.0	6,589.4	7,172.7	6,741.7	17.2	20.3	-105.97	452.0	-665.5	556.1	522.5	33.55	16.574	
7,100.0	6,590.4	7,279.1	6,751.8	18.4	21.3	-106.79	557.9	-665.5	558.5	523.0	35.56	15.707	
7,200.0	6,589.4	7,390.0	6,753.9	19.7	22.5	-107.10	668.8	-665.5	559.3	521.3	38.04	14.702	
7,300.0	6,588.5	7,490.0	6,753.4	21.1	23.7	-107.15	768.8	-665.5	559.5	518.8	40.65	13.763	
7,400.0	6,587.5	7,590.0	6,752.9	22.5	25.1	-107.19	868.8	-665.5	559.6	516.2	43.41	12.891	
7,500.0	6,586.5	7,690.0	6,752.5	24.1	26.5	-107.24	968.8	-665.5	559.8	513.5	46.30	12.090	
7,600.0	6,585.6	7,790.0	6,752.0	25.7	27.9	-107.29	1,068.7	-665.5	559.9	510.6	49.29	11.358	
7,700.0	6,584.6	7,890.0	6,751.5	27.3	29.4	-107.34	1,168.7	-665.5	560.0	507.7	52.37	10.693	
7,800.0	6,583.7	7,990.0	6,751.1	28.9	31.0	-107.39	1,268.7	-665.5	560.2	504.7	55.53	10.089	
7,900.0	6,582.7	8,090.0	6,750.6	30.6	32.6	-107.43	1,368.7	-665.5	560.3	501.6	58.74	9.539	
8,000.0	6,581.7	8,190.0	6,750.1	32.3	34.2	-107.48	1,468.7	-665.5	560.5	498.5	62.00	9.040	
8,100.0	6,580.8	8,290.0	6,749.6	34.1	35.9	-107.53	1,568.7	-665.5	560.6	495.3	65.31	8.584	
8,200.0	6,579.8	8,390.0	6,749.2	35.8	37.6	-107.58	1,668.7	-665.5	560.8	492.1	68.65	8.169	
8,300.0	6,578.9	8,490.0	6,748.7	37.6	39.3	-107.62	1,768.7	-665.5	560.9	488.9	72.02	7.788	
8,400.0	6,577.9	8,590.0	6,748.2	39.4	41.0	-107.67	1,868.7	-665.5	561.1	485.6	75.42	7.439	
8,500.0	6,577.0	8,690.0	6,747.8	41.2	42.8	-107.72	1,968.7	-665.5	561.2	482.4	78.84	7.118	
8,600.0	6,576.0	8,790.0	6,747.3	43.0	44.5	-107.77	2,068.7	-665.5	561.4	479.1	82.28	6.822	
8,700.0	6,575.0	8,890.0	6,746.8	44.8	46.3	-107.81	2,168.7	-665.5	561.5	475.8	85.74	6.549	
8,800.0	6,574.1	8,990.0	6,746.3	46.6	48.1	-107.86	2,268.7	-665.5	561.7	472.4	89.22	6.295	
8,900.0	6,573.1	9,090.0	6,745.9	48.5	49.9	-107.91	2,368.7	-665.5	561.8	469.1	92.70	6.060	
9,000.0	6,572.2	9,190.0	6,745.4	50.3	51.7	-107.96	2,468.7	-665.5	562.0	465.8	96.20	5.841	
9,100.0	6,571.2	9,290.0	6,744.9	52.2	53.5	-108.00	2,568.7	-665.5	562.1	462.4	99.71	5.637	
9,200.0	6,570.2	9,390.0	6,744.5	54.0	55.3	-108.05	2,668.7	-665.5	562.3	459.0	103.23	5.447	
9,300.0	6,569.3	9,490.0	6,744.0	55.9	57.1	-108.10	2,768.7	-665.5	562.4	455.7	106.75	5.268	
9,400.0	6,568.3	9,590.0	6,743.5	57.7	58.9	-108.15	2,868.7	-665.5	562.6	452.3	110.28	5.101	
9,500.0	6,567.4	9,690.0	6,743.0	59.6	60.8	-108.19	2,968.7	-665.5	562.7	448.9	113.82	4.944	
9,600.0	6,566.4	9,790.0	6,742.6	61.5	62.6	-108.24	3,068.7	-665.5	562.9	445.5	117.37	4.796	
9,700.0	6,565.4	9,890.0	6,742.1	63.3	64.5	-108.29	3,168.7	-665.5	563.0	442.1	120.91	4.656	
9,800.0	6,564.5	9,990.0	6,741.6	65.2	66.3	-108.33	3,268.7	-665.5	563.2	438.7	124.47	4.525	
9,900.0	6,563.5	10,090.0	6,741.2	67.1	68.2	-108.38	3,368.7	-665.5	563.3	435.3	128.02	4.400	
10,000.0	6,562.6	10,190.0	6,740.7	69.0	70.0	-108.43	3,468.7	-665.5	563.5	431.9	131.58	4.282	

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 22Y-241
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 22Y-241	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)	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	6,561.6	10,290.0	6,740.2	70.8	71.9	-108.48	3,568.7	-665.5	563.6	428.5	135.14	4.171	
10,200.0	6,560.6	10,390.0	6,739.7	72.7	73.7	-108.52	3,668.7	-665.5	563.8	425.1	138.71	4.065	
10,300.0	6,559.7	10,490.0	6,739.3	74.6	75.6	-108.57	3,768.7	-665.5	563.9	421.7	142.27	3.964	
10,400.0	6,558.7	10,590.0	6,738.8	76.5	77.5	-108.62	3,868.7	-665.5	564.1	418.3	145.84	3.868	
10,500.0	6,557.8	10,690.0	6,738.3	78.4	79.3	-108.66	3,968.7	-665.5	564.3	414.8	149.41	3.777	
10,600.0	6,556.8	10,790.0	6,737.9	80.3	81.2	-108.71	4,068.7	-665.5	564.4	411.4	152.98	3.689	
10,700.0	6,555.8	10,890.0	6,737.4	82.2	83.1	-108.76	4,168.7	-665.5	564.6	408.0	156.56	3.606	
10,800.0	6,554.9	10,990.0	6,736.9	84.1	85.0	-108.81	4,268.7	-665.5	564.7	404.6	160.13	3.527	
10,900.0	6,553.9	11,090.0	6,736.4	85.9	86.8	-108.85	4,368.7	-665.5	564.9	401.2	163.70	3.451	
10,995.0	6,553.0	11,184.1	6,736.0	87.7	88.6	-108.90	4,462.8	-665.5	565.0	398.0	167.08	3.382 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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
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)				
0.0	0.0	0.0	0.0	0.0	0.0	37.41	25.5	19.5	32.1					
100.0	100.0	100.0	100.0	0.1	0.1	37.41	25.5	19.5	32.1	31.9	0.22	142.835		
200.0	200.0	200.0	200.0	0.3	0.3	37.41	25.5	19.5	32.1	31.4	0.67	47.612		
300.0	300.0	300.0	300.0	0.6	0.6	37.41	25.5	19.5	32.1	31.0	1.12	28.567		
400.0	400.0	400.0	400.0	0.8	0.8	37.41	25.5	19.5	32.1	30.5	1.57	20.405		
500.0	500.0	500.0	500.0	1.0	1.0	37.41	25.5	19.5	32.1	30.1	2.02	15.871		
600.0	600.0	600.0	600.0	1.2	1.2	37.41	25.5	19.5	32.1	29.6	2.47	12.985		
700.0	700.0	700.0	700.0	1.5	1.5	37.41	25.5	19.5	32.1	29.2	2.92	10.987		
800.0	800.0	800.0	800.0	1.7	1.7	37.41	25.5	19.5	32.1	28.7	3.37	9.522		
900.0	900.0	900.0	900.0	1.9	1.9	37.41	25.5	19.5	32.1	28.3	3.82	8.402		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	37.41	25.5	19.5	32.1	27.8	4.27	7.518		
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	37.41	25.5	19.5	32.1	27.4	4.72	6.802		
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	37.41	25.5	19.5	32.1	26.9	5.17	6.210		
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	37.41	25.5	19.5	32.1	26.5	5.62	5.713		
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	37.41	25.5	19.5	32.1	26.0	6.07	5.290		
1,500.0	1,500.0	1,500.0	1,500.0	3.3	3.3	37.41	25.5	19.5	32.1	25.6	6.52	4.925		
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	37.41	25.5	19.5	32.1	25.1	6.97	4.608		
1,700.0	1,700.0	1,700.0	1,700.0	3.7	3.7	37.41	25.5	19.5	32.1	24.7	7.42	4.328		
1,800.0	1,800.0	1,800.0	1,800.0	3.9	3.9	37.41	25.5	19.5	32.1	24.2	7.87	4.081CC, ES		
1,900.0	1,900.0	1,900.0	1,900.0	4.1	4.2	-170.58	25.5	19.5	33.0	24.7	8.29	3.977		
2,000.0	2,000.0	2,000.0	2,000.0	4.3	4.4	-171.26	25.5	19.5	35.5	26.9	8.68	4.094		
2,100.0	2,099.9	2,100.2	2,100.2	4.5	4.6	-171.14	24.7	19.8	39.4	30.4	9.05	4.352		
2,200.0	2,199.7	2,200.5	2,200.4	4.7	4.8	-169.43	22.3	20.8	44.1	34.7	9.40	4.690		
2,300.0	2,299.4	2,300.7	2,300.5	4.9	4.9	-166.69	18.2	22.5	49.7	40.0	9.76	5.095		
2,400.0	2,398.9	2,400.8	2,400.5	5.1	5.1	-163.35	12.5	24.8	56.4	46.3	10.12	5.571		
2,500.0	2,498.3	2,500.8	2,500.2	5.3	5.3	-159.78	5.2	27.7	64.2	53.7	10.49	6.118		
2,600.0	2,597.4	2,600.7	2,599.6	5.5	5.5	-156.21	-3.6	31.3	73.3	62.4	10.89	6.736		
2,700.0	2,696.3	2,700.4	2,698.6	5.8	5.7	-152.79	-14.1	35.6	83.8	72.5	11.30	7.418		
2,800.0	2,795.0	2,799.9	2,797.3	6.0	5.9	-149.58	-26.1	40.5	95.5	83.7	11.75	8.128		
2,900.0	2,893.6	2,899.3	2,895.6	6.3	6.2	-146.23	-39.7	46.0	107.3	95.1	12.23	8.769		
3,000.0	2,992.3	2,998.5	2,993.4	6.6	6.4	-142.72	-54.9	52.2	119.3	106.5	12.76	9.351		
3,100.0	3,090.9	3,097.5	3,090.9	6.9	6.7	-139.40	-71.0	58.7	131.7	118.3	13.31	9.889		
3,200.0	3,189.5	3,196.4	3,188.3	7.2	7.0	-136.65	-87.1	65.3	144.4	130.5	13.89	10.395		
3,300.0	3,288.2	3,295.4	3,285.7	7.5	7.3	-134.35	-103.2	71.8	157.4	142.9	14.48	10.867		
3,400.0	3,386.8	3,394.4	3,383.2	7.9	7.6	-132.40	-119.3	78.3	170.6	155.5	15.09	11.304		
3,500.0	3,485.5	3,493.3	3,480.6	8.2	8.0	-130.73	-135.4	84.9	184.0	168.3	15.71	11.708		
3,600.0	3,584.1	3,592.3	3,578.0	8.5	8.3	-129.29	-151.5	91.4	197.5	181.1	16.35	12.081		
3,700.0	3,682.7	3,691.3	3,675.5	8.9	8.6	-128.03	-167.6	98.0	211.1	194.1	16.99	12.425		
3,800.0	3,781.5	3,790.3	3,772.9	9.2	9.0	-126.94	-183.8	104.5	224.5	206.9	17.64	12.726		
3,900.0	3,880.6	3,889.3	3,870.4	9.5	9.3	-125.45	-199.9	111.1	236.2	218.0	18.27	12.931		
4,000.0	3,980.2	3,990.2	3,969.9	9.7	9.6	-123.60	-215.4	117.4	246.0	227.1	18.86	13.044		
4,100.0	4,080.0	4,092.3	4,071.0	9.9	9.9	-121.91	-227.9	122.5	253.1	233.7	19.37	13.065		
4,200.0	4,180.0	4,194.8	4,173.1	10.1	10.2	-120.34	-237.2	126.2	257.4	237.6	19.83	12.983		
4,300.0	4,280.0	4,297.9	4,276.0	10.3	10.4	88.68	-243.0	128.6	259.6	239.3	20.25	12.821		
4,400.0	4,380.0	4,401.2	4,379.3	10.5	10.6	89.21	-245.4	129.6	260.5	239.9	20.64	12.621		
4,500.0	4,480.0	4,501.9	4,480.0	10.7	10.8	89.23	-245.5	129.6	260.5	239.5	21.01	12.399		
4,600.0	4,580.0	4,601.9	4,580.0	10.9	11.0	89.23	-245.5	129.6	260.5	239.1	21.39	12.182		
4,700.0	4,680.0	4,701.9	4,680.0	11.0	11.1	89.23	-245.5	129.6	260.5	238.8	21.76	11.970		
4,800.0	4,780.0	4,801.9	4,780.0	11.2	11.3	89.23	-245.5	129.6	260.5	238.4	22.14	11.765		
4,900.0	4,880.0	4,901.9	4,880.0	11.4	11.5	89.23	-245.5	129.6	260.5	238.0	22.53	11.565		
5,000.0	4,980.0	5,001.9	4,980.0	11.6	11.7	89.23	-245.5	129.6	260.5	237.6	22.91	11.371		

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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
Reference		Offset		Semi Major Axis		Distance								Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor					
							+N/-S (ft)	+E/-W (ft)									
5,100.0	5,080.0	5,101.9	5,080.0	11.8	11.9	89.23	-245.5	129.6	260.5	237.2	23.30	11.182					
5,200.0	5,180.0	5,201.9	5,180.0	12.0	12.1	89.23	-245.5	129.6	260.5	236.8	23.69	10.998					
5,300.0	5,280.0	5,301.9	5,280.0	12.2	12.3	89.23	-245.5	129.6	260.5	236.4	24.08	10.819					
5,400.0	5,380.0	5,401.9	5,380.0	12.4	12.5	89.23	-245.5	129.6	260.5	236.1	24.47	10.645					
5,500.0	5,480.0	5,501.9	5,480.0	12.6	12.7	89.23	-245.5	129.6	260.5	235.7	24.87	10.476					
5,600.0	5,580.0	5,601.9	5,580.0	12.8	12.9	89.23	-245.5	129.6	260.5	235.3	25.27	10.311					
5,700.0	5,680.0	5,701.9	5,680.0	13.0	13.1	89.23	-245.5	129.6	260.5	234.9	25.67	10.151					
5,800.0	5,780.0	5,801.9	5,780.0	13.2	13.3	89.23	-245.5	129.6	260.5	234.5	26.07	9.995					
5,900.0	5,879.9	5,901.9	5,879.9	13.4	13.5	89.64	-245.5	129.6	260.5	234.0	26.46	9.846					
5,920.1	5,900.0	5,921.9	5,900.0	13.4	13.5	90.00	-245.5	129.6	260.5	234.0	26.53	9.821					
6,000.0	5,978.9	6,000.9	5,978.9	13.5	13.7	92.54	-245.5	129.6	260.8	234.0	26.79	9.735					
6,100.0	6,075.4	6,101.7	6,079.5	13.6	13.8	96.83	-239.0	129.6	262.4	235.4	27.00	9.721					
6,200.0	6,167.5	6,205.4	6,181.1	13.6	13.9	100.99	-218.6	129.6	265.6	238.5	27.06	9.815					
6,300.0	6,253.9	6,312.1	6,281.8	13.7	14.0	104.92	-183.5	129.6	269.9	242.9	26.99	10.002					
6,400.0	6,332.9	6,422.0	6,379.2	13.7	14.0	108.54	-133.0	129.6	275.2	248.3	26.85	10.249					
6,500.0	6,403.3	6,535.0	6,470.9	13.8	14.1	111.75	-67.1	129.6	281.0	254.2	26.73	10.509					
6,600.0	6,463.8	6,651.0	6,553.8	14.1	14.2	114.52	13.8	129.6	286.8	260.0	26.76	10.716					
6,700.0	6,513.4	6,769.9	6,625.1	14.6	14.5	116.79	108.8	129.6	292.2	265.1	27.08	10.789					
6,800.0	6,551.3	6,891.3	6,681.8	15.3	15.1	118.53	216.0	129.6	296.7	268.9	27.80	10.673					
6,900.0	6,576.8	7,014.5	6,721.3	16.2	16.0	119.73	332.7	129.6	300.1	271.1	29.03	10.336					
7,000.0	6,589.4	7,135.7	6,741.4	17.2	17.2	120.38	452.0	129.6	302.0	271.3	30.76	9.819					
7,100.0	6,590.4	7,241.7	6,751.6	18.4	18.4	121.74	557.5	129.6	306.5	274.0	32.49	9.434					
7,200.0	6,589.4	7,353.0	6,753.9	19.7	19.8	122.26	668.8	129.6	308.1	273.4	34.67	8.887					
7,300.0	6,588.5	7,453.0	6,753.4	21.1	21.1	122.34	768.8	129.6	308.3	271.3	37.01	8.330					
7,400.0	6,587.5	7,553.0	6,752.9	22.5	22.6	122.42	868.8	129.6	308.6	269.1	39.49	7.814					
7,500.0	6,586.5	7,653.0	6,752.5	24.1	24.1	122.49	968.8	129.6	308.9	266.8	42.09	7.339					
7,600.0	6,585.6	7,753.0	6,752.0	25.7	25.6	122.57	1,068.7	129.6	309.1	264.4	44.77	6.905					
7,700.0	6,584.6	7,853.0	6,751.5	27.3	27.2	122.65	1,168.7	129.6	309.4	261.9	47.53	6.509					
7,800.0	6,583.7	7,953.0	6,751.1	28.9	28.9	122.72	1,268.7	129.6	309.6	259.3	50.35	6.150					
7,900.0	6,582.7	8,053.0	6,750.6	30.6	30.5	122.80	1,368.7	129.6	309.9	256.7	53.22	5.823					
8,000.0	6,581.7	8,153.0	6,750.1	32.3	32.2	122.87	1,468.7	129.6	310.2	254.0	56.13	5.526					
8,100.0	6,580.8	8,253.0	6,749.6	34.1	34.0	122.95	1,568.7	129.6	310.4	251.4	59.08	5.254					
8,200.0	6,579.8	8,353.0	6,749.2	35.8	35.7	123.02	1,668.7	129.6	310.7	248.6	62.06	5.006					
8,300.0	6,578.9	8,453.0	6,748.7	37.6	37.5	123.10	1,768.7	129.6	311.0	245.9	65.07	4.779					
8,400.0	6,577.9	8,553.0	6,748.2	39.4	39.2	123.18	1,868.7	129.6	311.2	243.2	68.09	4.571					
8,500.0	6,577.0	8,653.0	6,747.8	41.2	41.0	123.25	1,968.7	129.6	311.5	240.4	71.14	4.379					
8,600.0	6,576.0	8,753.0	6,747.3	43.0	42.8	123.33	2,068.7	129.6	311.8	237.6	74.19	4.202					
8,700.0	6,575.0	8,853.0	6,746.8	44.8	44.6	123.40	2,168.7	129.6	312.1	234.8	77.26	4.039					
8,800.0	6,574.1	8,953.0	6,746.3	46.6	46.5	123.48	2,268.7	129.6	312.3	232.0	80.34	3.887					
8,900.0	6,573.1	9,053.0	6,745.9	48.5	48.3	123.55	2,368.7	129.6	312.6	229.2	83.43	3.747					
9,000.0	6,572.2	9,153.0	6,745.4	50.3	50.1	123.62	2,468.7	129.6	312.9	226.3	86.53	3.616					
9,100.0	6,571.2	9,253.0	6,744.9	52.2	52.0	123.70	2,568.7	129.6	313.1	223.5	89.63	3.494					
9,200.0	6,570.2	9,353.0	6,744.5	54.0	53.8	123.77	2,668.7	129.6	313.4	220.7	92.74	3.379					
9,300.0	6,569.3	9,453.0	6,744.0	55.9	55.7	123.85	2,768.7	129.6	313.7	217.8	95.85	3.273					
9,400.0	6,568.3	9,553.0	6,743.5	57.7	57.5	123.92	2,868.7	129.6	314.0	215.0	98.96	3.172					
9,500.0	6,567.4	9,653.0	6,743.0	59.6	59.4	124.00	2,968.7	129.6	314.2	212.1	102.08	3.078					
9,600.0	6,566.4	9,753.0	6,742.6	61.5	61.2	124.07	3,068.7	129.6	314.5	209.3	105.20	2.990					
9,700.0	6,565.4	9,853.0	6,742.1	63.3	63.1	124.14	3,168.7	129.6	314.8	206.5	108.32	2.906					
9,800.0	6,564.5	9,953.0	6,741.6	65.2	65.0	124.22	3,268.7	129.6	315.0	203.6	111.44	2.827					
9,900.0	6,563.5	10,053.0	6,741.2	67.1	66.9	124.29	3,368.7	129.6	315.3	200.8	114.56	2.752					
10,000.0	6,562.6	10,153.0	6,740.7	69.0	68.7	124.36	3,468.7	129.6	315.6	197.9	117.68	2.682					

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 22Y-241
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 22Y-241	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	6,561.6	10,253.0	6,740.2	70.8	70.6	124.44	3,568.7	129.6	315.9	195.1	120.81	2.615	
10,200.0	6,560.6	10,353.0	6,739.7	72.7	72.5	124.51	3,668.7	129.6	316.2	192.2	123.93	2.551	
10,300.0	6,559.7	10,453.0	6,739.3	74.6	74.4	124.58	3,768.7	129.6	316.4	189.4	127.05	2.491	
10,400.0	6,558.7	10,553.0	6,738.8	76.5	76.3	124.65	3,868.7	129.6	316.7	186.5	130.16	2.433	
10,500.0	6,557.8	10,653.0	6,738.3	78.4	78.1	124.73	3,968.7	129.6	317.0	183.7	133.28	2.378	
10,600.0	6,556.8	10,753.0	6,737.9	80.3	80.0	124.80	4,068.7	129.6	317.3	180.9	136.39	2.326	
10,700.0	6,555.8	10,853.0	6,737.4	82.2	81.9	124.87	4,168.7	129.6	317.5	178.0	139.51	2.276	
10,800.0	6,554.9	10,953.0	6,736.9	84.1	83.8	124.94	4,268.7	129.6	317.8	175.2	142.62	2.229	
10,900.0	6,553.9	11,053.0	6,736.4	85.9	85.7	125.02	4,368.7	129.6	318.1	172.4	145.73	2.183	
10,995.0	6,553.0	11,147.1	6,736.0	87.7	87.5	125.08	4,462.8	129.6	318.4	169.7	148.66	2.142 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Ledford 22Y-241
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 22Y-241	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')

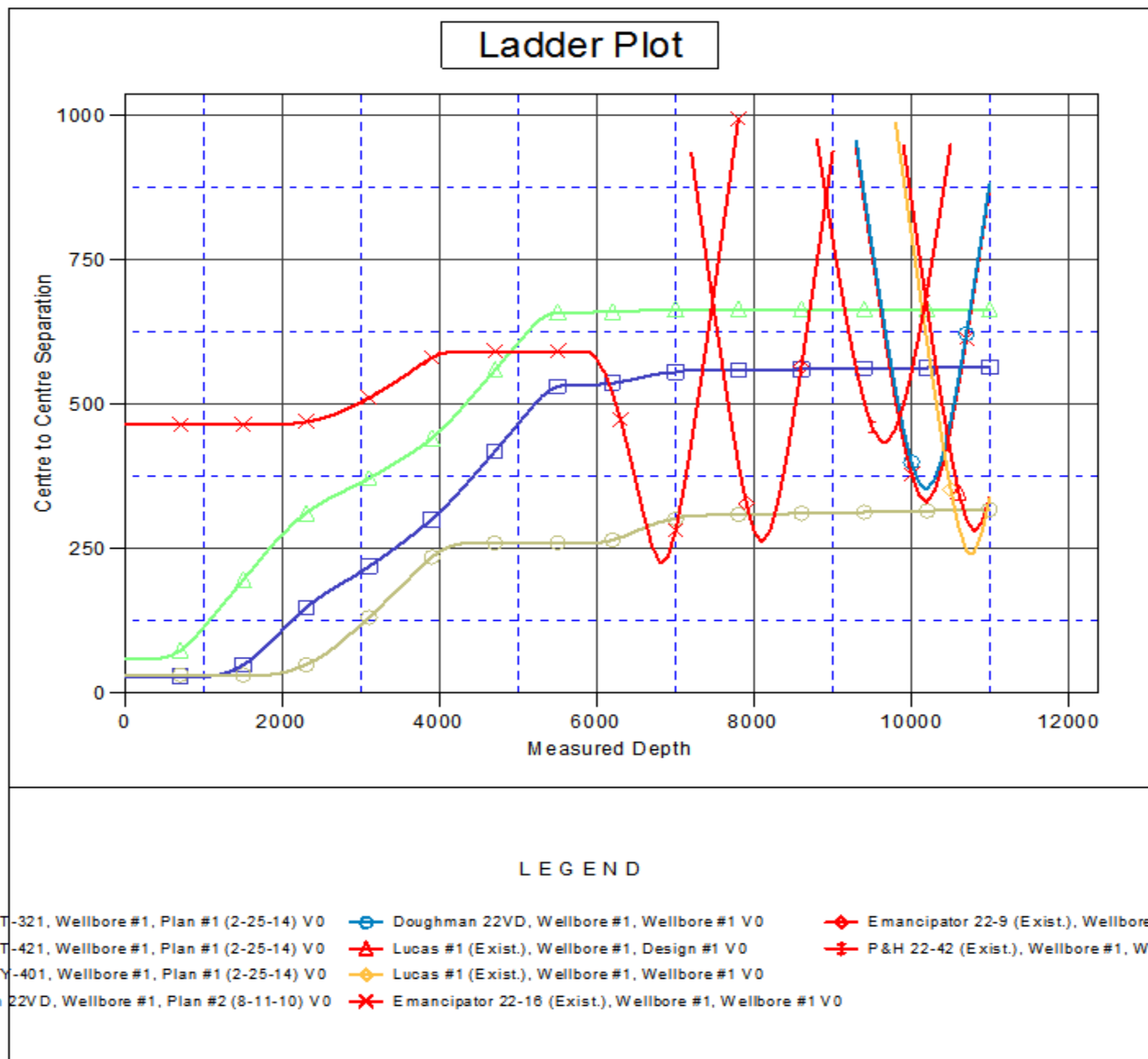
Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Ledford 22Y-241

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 22Y-241
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 22Y-241	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	landmark
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Reference Depths are relative to WELL @ 4613.0ft (RKB - 15')

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Central Meridian is -105.500000 °

Coordinates are relative to: Ledford 22Y-241

Coordinate System is US State Plane 1983, Colorado Northern Zone

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