

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Lofland 22D-232**

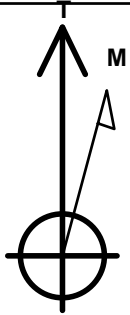
Surface Location: Lofland 22T-HZ Pad Sec.22-T5N-R65W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4647.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1381877.64	3238329.12	40.378500	-104.644530	

Original Well Elev WELL @ 4662.0ft (Original Well Elev)

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
BHL 500'FEL, 1010'FSL	6809.0	631.0	6048.5	Point



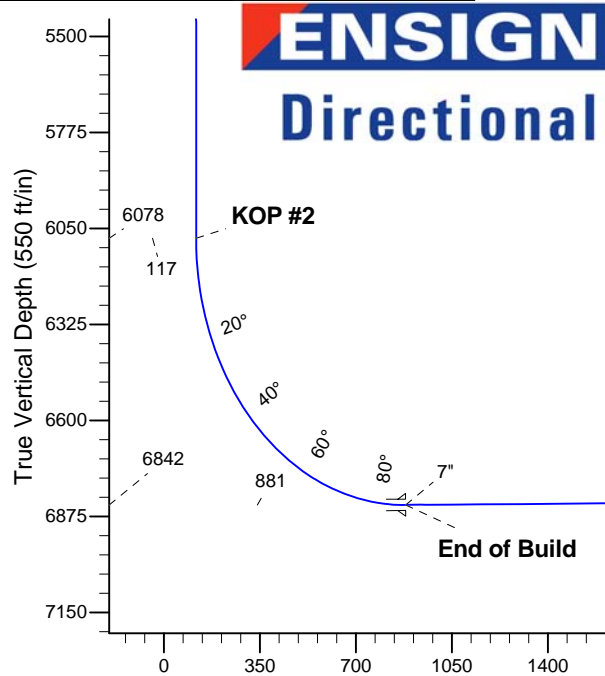
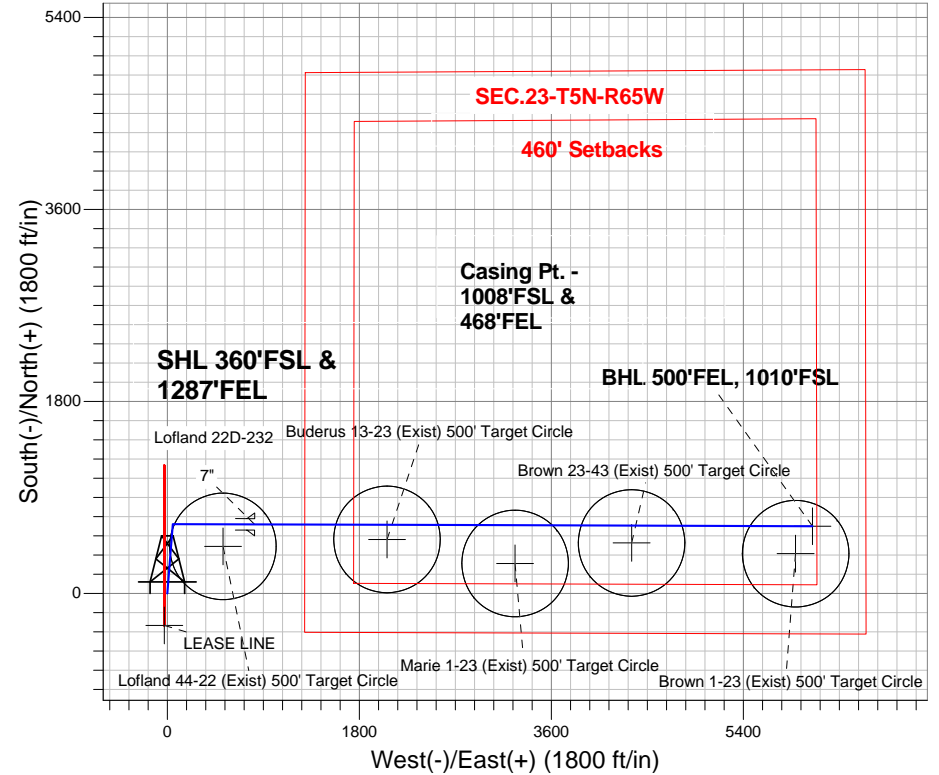
Azimuths to True North
Magnetic North: 8.54°

Magnetic Field
Strength: 52932.7nT
Dip Angle: 66.99°
Date: 5/14/2013
Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
400.0	400.0	KOP #1
6077.9	6121.6	KOP #2
6841.9	7326.4	End of Build

Lofland 22T-HZ Pad Sec.22-T5N-R65W
Lofland 22D-232
Plan #1 (5-14-13)
14:01, May 16 2013



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	794.4	7.89	4.40	793.2	27.0	2.1	2.00	4.40	4.9	
4	5149.3	7.89	4.40	5106.8	623.0	47.9	0.00	0.00	112.3	
5	5543.7	0.00	0.00	5500.0	650.0	50.0	2.00	180.00	117.2	
6	6121.6	0.00	0.00	6077.9	650.0	50.0	0.00	0.00	117.2	
7	7326.4	90.36	90.18	6841.9	647.6	818.7	7.50	90.18	881.5	
8	12556.3	90.36	90.18	6809.0	631.0	6048.5	0.00	0.00	6081.3	BHL 500'FEL, 1010'FSL

BHL 500'FEL, 1010'FSL

Vertical Section at 84.04° (700 ft/in)



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R65W

Lofland 22T-HZ Pad Sec.22-T5N-R65W

Lofland 22D-232

Wellbore #1

Plan: Plan #1 (5-14-13)

Standard Planning Report

15 May, 2013

Database:	Landmark	Local Co-ordinate Reference:	Well Lofland 22D-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Lofland 22D-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (5-14-13)		

Project	SEC.22-T5N-R65W, 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						Lofland 22T-HZ Pad Sec.22-T5N-R65W											
Site Position:						Northing:			1,381,877.65 ft			Latitude:			40.378500		
From:			Lat/Long			Easting:			3,238,329.12 ft			Longitude:			-104.644530		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.55 °		

Well	Lofland 22D-232					
Well Position	+N/-S	0.0 ft	Northing:	1,381,877.64 ft	Latitude:	40.378500
	+E/-W	0.0 ft	Easting:	3,238,329.12 ft	Longitude:	-104.644530
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,647.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/14/2013	8.54	66.99	52,933

Design	Plan #1 (5-14-13)			
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	84.04

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	
794.4	7.89	4.40	793.2	27.0	2.1	2.00	2.00	0.00	4.40	
5,149.3	7.89	4.40	5,106.8	623.0	47.9	0.00	0.00	0.00	0.00	
5,543.7	0.00	0.00	5,500.0	650.0	50.0	2.00	-2.00	0.00	180.00	
6,121.6	0.00	0.00	6,077.9	650.0	50.0	0.00	0.00	0.00	0.00	
7,326.4	90.36	90.18	6,841.9	647.6	818.7	7.50	7.50	0.00	90.18	
12,556.3	90.36	90.18	6,809.0	631.0	6,048.5	0.00	0.00	0.00	0.00	BHL 500'FEL, 1010

Database:	Landmark	Local Co-ordinate Reference:	Well Lofland 22D-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Lofland 22D-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (5-14-13)		

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
Lofland 44-22 (Exist) 500' Target Circle									
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
Buderus 13-23 (Exist) 500' Target Circle									
2.0	0.00	0.00	2.0	0.0	0.0	0.0	0.00	0.00	0.00
Marie 1-23 (Exist) 500' Target Circle									
3.0	0.00	0.00	3.0	0.0	0.0	0.0	0.00	0.00	0.00
Brown 23-43 (Exist) 500' Target Circle									
5.0	0.00	0.00	5.0	0.0	0.0	0.0	0.00	0.00	0.00
Brown 1-23 (Exist) 500' Target Circle									
40.0	0.00	0.00	40.0	0.0	0.0	0.0	0.00	0.00	0.00
80.0	0.00	0.00	80.0	0.0	0.0	0.0	0.00	0.00	0.00
120.0	0.00	0.00	120.0	0.0	0.0	0.0	0.00	0.00	0.00
160.0	0.00	0.00	160.0	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
240.0	0.00	0.00	240.0	0.0	0.0	0.0	0.00	0.00	0.00
280.0	0.00	0.00	280.0	0.0	0.0	0.0	0.00	0.00	0.00
320.0	0.00	0.00	320.0	0.0	0.0	0.0	0.00	0.00	0.00
360.0	0.00	0.00	360.0	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 #1									
440.0	0.80	4.40	440.0	0.3	0.0	0.1	2.00	2.00	0.00
480.0	1.60	4.40	480.0	1.1	0.1	0.2	2.00	2.00	0.00
520.0	2.40	4.40	520.0	2.5	0.2	0.5	2.00	2.00	0.00
560.0	3.20	4.40	559.9	4.5	0.3	0.8	2.00	2.00	0.00
600.0	4.00	4.40	599.8	7.0	0.5	1.3	2.00	2.00	0.00
640.0	4.80	4.40	639.7	10.0	0.8	1.8	2.00	2.00	0.00
680.0	5.60	4.40	679.6	13.6	1.0	2.5	2.00	2.00	0.00
720.0	6.40	4.40	719.3	17.8	1.4	3.2	2.00	2.00	0.00
760.0	7.20	4.40	759.1	22.5	1.7	4.1	2.00	2.00	0.00
794.4	7.89	4.40	793.2	27.0	2.1	4.9	2.00	2.00	0.00
800.0	7.89	4.40	798.7	27.8	2.1	5.0	0.00	0.00	0.00
840.0	7.89	4.40	838.3	33.3	2.6	6.0	0.00	0.00	0.00
880.0	7.89	4.40	877.9	38.7	3.0	7.0	0.00	0.00	0.00
920.0	7.89	4.40	917.6	44.2	3.4	8.0	0.00	0.00	0.00
960.0	7.89	4.40	957.2	49.7	3.8	9.0	0.00	0.00	0.00
1,000.0	7.89	4.40	996.8	55.2	4.2	9.9	0.00	0.00	0.00
1,040.0	7.89	4.40	1,036.4	60.6	4.7	10.9	0.00	0.00	0.00
1,080.0	7.89	4.40	1,076.1	66.1	5.1	11.9	0.00	0.00	0.00
1,120.0	7.89	4.40	1,115.7	71.6	5.5	12.9	0.00	0.00	0.00
1,160.0	7.89	4.40	1,155.3	77.1	5.9	13.9	0.00	0.00	0.00
1,200.0	7.89	4.40	1,194.9	82.5	6.3	14.9	0.00	0.00	0.00
1,240.0	7.89	4.40	1,234.5	88.0	6.8	15.9	0.00	0.00	0.00
1,280.0	7.89	4.40	1,274.2	93.5	7.2	16.9	0.00	0.00	0.00
1,320.0	7.89	4.40	1,313.8	99.0	7.6	17.8	0.00	0.00	0.00
1,360.0	7.89	4.40	1,353.4	104.4	8.0	18.8	0.00	0.00	0.00
1,400.0	7.89	4.40	1,393.0	109.9	8.5	19.8	0.00	0.00	0.00
1,440.0	7.89	4.40	1,432.6	115.4	8.9	20.8	0.00	0.00	0.00
1,480.0	7.89	4.40	1,472.3	120.8	9.3	21.8	0.00	0.00	0.00
1,520.0	7.89	4.40	1,511.9	126.3	9.7	22.8	0.00	0.00	0.00
1,560.0	7.89	4.40	1,551.5	131.8	10.1	23.8	0.00	0.00	0.00
1,600.0	7.89	4.40	1,591.1	137.3	10.6	24.7	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Lofland 22D-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Lofland 22D-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (5-14-13)		

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)	
1,640.0	7.89	4.40	1,630.8	142.7	11.0	25.7	0.00	0.00	0.00	
1,680.0	7.89	4.40	1,670.4	148.2	11.4	26.7	0.00	0.00	0.00	
1,720.0	7.89	4.40	1,710.0	153.7	11.8	27.7	0.00	0.00	0.00	
1,760.0	7.89	4.40	1,749.6	159.2	12.2	28.7	0.00	0.00	0.00	
1,800.0	7.89	4.40	1,789.2	164.6	12.7	29.7	0.00	0.00	0.00	
1,840.0	7.89	4.40	1,828.9	170.1	13.1	30.7	0.00	0.00	0.00	
1,880.0	7.89	4.40	1,868.5	175.6	13.5	31.7	0.00	0.00	0.00	
1,920.0	7.89	4.40	1,908.1	181.1	13.9	32.6	0.00	0.00	0.00	
1,960.0	7.89	4.40	1,947.7	186.5	14.3	33.6	0.00	0.00	0.00	
2,000.0	7.89	4.40	1,987.3	192.0	14.8	34.6	0.00	0.00	0.00	
2,040.0	7.89	4.40	2,027.0	197.5	15.2	35.6	0.00	0.00	0.00	
2,080.0	7.89	4.40	2,066.6	203.0	15.6	36.6	0.00	0.00	0.00	
2,120.0	7.89	4.40	2,106.2	208.4	16.0	37.6	0.00	0.00	0.00	
2,160.0	7.89	4.40	2,145.8	213.9	16.5	38.6	0.00	0.00	0.00	
2,200.0	7.89	4.40	2,185.5	219.4	16.9	39.5	0.00	0.00	0.00	
2,240.0	7.89	4.40	2,225.1	224.8	17.3	40.5	0.00	0.00	0.00	
2,280.0	7.89	4.40	2,264.7	230.3	17.7	41.5	0.00	0.00	0.00	
2,320.0	7.89	4.40	2,304.3	235.8	18.1	42.5	0.00	0.00	0.00	
2,360.0	7.89	4.40	2,343.9	241.3	18.6	43.5	0.00	0.00	0.00	
2,400.0	7.89	4.40	2,383.6	246.7	19.0	44.5	0.00	0.00	0.00	
2,440.0	7.89	4.40	2,423.2	252.2	19.4	45.5	0.00	0.00	0.00	
2,480.0	7.89	4.40	2,462.8	257.7	19.8	46.5	0.00	0.00	0.00	
2,520.0	7.89	4.40	2,502.4	263.2	20.2	47.4	0.00	0.00	0.00	
2,560.0	7.89	4.40	2,542.0	268.6	20.7	48.4	0.00	0.00	0.00	
2,600.0	7.89	4.40	2,581.7	274.1	21.1	49.4	0.00	0.00	0.00	
2,640.0	7.89	4.40	2,621.3	279.6	21.5	50.4	0.00	0.00	0.00	
2,680.0	7.89	4.40	2,660.9	285.1	21.9	51.4	0.00	0.00	0.00	
2,720.0	7.89	4.40	2,700.5	290.5	22.3	52.4	0.00	0.00	0.00	
2,760.0	7.89	4.40	2,740.2	296.0	22.8	53.4	0.00	0.00	0.00	
2,800.0	7.89	4.40	2,779.8	301.5	23.2	54.3	0.00	0.00	0.00	
2,840.0	7.89	4.40	2,819.4	307.0	23.6	55.3	0.00	0.00	0.00	
2,880.0	7.89	4.40	2,859.0	312.4	24.0	56.3	0.00	0.00	0.00	
2,920.0	7.89	4.40	2,898.6	317.9	24.5	57.3	0.00	0.00	0.00	
2,960.0	7.89	4.40	2,938.3	323.4	24.9	58.3	0.00	0.00	0.00	
3,000.0	7.89	4.40	2,977.9	328.9	25.3	59.3	0.00	0.00	0.00	
3,040.0	7.89	4.40	3,017.5	334.3	25.7	60.3	0.00	0.00	0.00	
3,080.0	7.89	4.40	3,057.1	339.8	26.1	61.3	0.00	0.00	0.00	
3,120.0	7.89	4.40	3,096.7	345.3	26.6	62.2	0.00	0.00	0.00	
3,160.0	7.89	4.40	3,136.4	350.7	27.0	63.2	0.00	0.00	0.00	
3,200.0	7.89	4.40	3,176.0	356.2	27.4	64.2	0.00	0.00	0.00	
3,240.0	7.89	4.40	3,215.6	361.7	27.8	65.2	0.00	0.00	0.00	
3,280.0	7.89	4.40	3,255.2	367.2	28.2	66.2	0.00	0.00	0.00	
3,320.0	7.89	4.40	3,294.9	372.6	28.7	67.2	0.00	0.00	0.00	
3,360.0	7.89	4.40	3,334.5	378.1	29.1	68.2	0.00	0.00	0.00	
3,400.0	7.89	4.40	3,374.1	383.6	29.5	69.1	0.00	0.00	0.00	
3,440.0	7.89	4.40	3,413.7	389.1	29.9	70.1	0.00	0.00	0.00	
3,480.0	7.89	4.40	3,453.3	394.5	30.3	71.1	0.00	0.00	0.00	
3,520.0	7.89	4.40	3,493.0	400.0	30.8	72.1	0.00	0.00	0.00	
3,560.0	7.89	4.40	3,532.6	405.5	31.2	73.1	0.00	0.00	0.00	
3,600.0	7.89	4.40	3,572.2	411.0	31.6	74.1	0.00	0.00	0.00	
3,640.0	7.89	4.40	3,611.8	416.4	32.0	75.1	0.00	0.00	0.00	
3,680.0	7.89	4.40	3,651.4	421.9	32.5	76.1	0.00	0.00	0.00	
3,720.0	7.89	4.40	3,691.1	427.4	32.9	77.0	0.00	0.00	0.00	

Database:	Landmark	Local Co-ordinate Reference:	Well Lofland 22D-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Lofland 22D-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (5-14-13)		

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)
3,760.0	7.89	4.40	3,730.7	432.9	33.3	78.0	0.00	0.00	0.00
3,800.0	7.89	4.40	3,770.3	438.3	33.7	79.0	0.00	0.00	0.00
3,840.0	7.89	4.40	3,809.9	443.8	34.1	80.0	0.00	0.00	0.00
3,880.0	7.89	4.40	3,849.6	449.3	34.6	81.0	0.00	0.00	0.00
3,920.0	7.89	4.40	3,889.2	454.7	35.0	82.0	0.00	0.00	0.00
3,960.0	7.89	4.40	3,928.8	460.2	35.4	83.0	0.00	0.00	0.00
4,000.0	7.89	4.40	3,968.4	465.7	35.8	84.0	0.00	0.00	0.00
4,040.0	7.89	4.40	4,008.0	471.2	36.2	84.9	0.00	0.00	0.00
4,080.0	7.89	4.40	4,047.7	476.6	36.7	85.9	0.00	0.00	0.00
4,120.0	7.89	4.40	4,087.3	482.1	37.1	86.9	0.00	0.00	0.00
4,160.0	7.89	4.40	4,126.9	487.6	37.5	87.9	0.00	0.00	0.00
4,200.0	7.89	4.40	4,166.5	493.1	37.9	88.9	0.00	0.00	0.00
4,240.0	7.89	4.40	4,206.1	498.5	38.3	89.9	0.00	0.00	0.00
4,280.0	7.89	4.40	4,245.8	504.0	38.8	90.9	0.00	0.00	0.00
4,320.0	7.89	4.40	4,285.4	509.5	39.2	91.8	0.00	0.00	0.00
4,360.0	7.89	4.40	4,325.0	515.0	39.6	92.8	0.00	0.00	0.00
4,400.0	7.89	4.40	4,364.6	520.4	40.0	93.8	0.00	0.00	0.00
4,440.0	7.89	4.40	4,404.3	525.9	40.5	94.8	0.00	0.00	0.00
4,480.0	7.89	4.40	4,443.9	531.4	40.9	95.8	0.00	0.00	0.00
4,520.0	7.89	4.40	4,483.5	536.9	41.3	96.8	0.00	0.00	0.00
4,560.0	7.89	4.40	4,523.1	542.3	41.7	97.8	0.00	0.00	0.00
4,600.0	7.89	4.40	4,562.7	547.8	42.1	98.8	0.00	0.00	0.00
4,640.0	7.89	4.40	4,602.4	553.3	42.6	99.7	0.00	0.00	0.00
4,680.0	7.89	4.40	4,642.0	558.8	43.0	100.7	0.00	0.00	0.00
4,720.0	7.89	4.40	4,681.6	564.2	43.4	101.7	0.00	0.00	0.00
4,760.0	7.89	4.40	4,721.2	569.7	43.8	102.7	0.00	0.00	0.00
4,800.0	7.89	4.40	4,760.8	575.2	44.2	103.7	0.00	0.00	0.00
4,840.0	7.89	4.40	4,800.5	580.6	44.7	104.7	0.00	0.00	0.00
4,880.0	7.89	4.40	4,840.1	586.1	45.1	105.7	0.00	0.00	0.00
4,920.0	7.89	4.40	4,879.7	591.6	45.5	106.6	0.00	0.00	0.00
4,960.0	7.89	4.40	4,919.3	597.1	45.9	107.6	0.00	0.00	0.00
5,000.0	7.89	4.40	4,959.0	602.5	46.3	108.6	0.00	0.00	0.00
5,040.0	7.89	4.40	4,998.6	608.0	46.8	109.6	0.00	0.00	0.00
5,080.0	7.89	4.40	5,038.2	613.5	47.2	110.6	0.00	0.00	0.00
5,120.0	7.89	4.40	5,077.8	619.0	47.6	111.6	0.00	0.00	0.00
5,149.3	7.89	4.40	5,106.8	623.0	47.9	112.3	0.00	0.00	0.00
5,160.0	7.67	4.40	5,117.4	624.4	48.0	112.6	2.00	-2.00	0.00
5,200.0	6.87	4.40	5,157.1	629.5	48.4	113.5	2.00	-2.00	0.00
5,240.0	6.07	4.40	5,196.9	634.0	48.8	114.3	2.00	-2.00	0.00
5,280.0	5.27	4.40	5,236.7	637.9	49.1	115.0	2.00	-2.00	0.00
5,320.0	4.47	4.40	5,276.5	641.3	49.3	115.6	2.00	-2.00	0.00
5,360.0	3.67	4.40	5,316.4	644.1	49.5	116.1	2.00	-2.00	0.00
5,400.0	2.87	4.40	5,356.4	646.4	49.7	116.5	2.00	-2.00	0.00
5,440.0	2.07	4.40	5,396.3	648.1	49.9	116.8	2.00	-2.00	0.00
5,480.0	1.27	4.40	5,436.3	649.3	49.9	117.0	2.00	-2.00	0.00
5,520.0	0.47	4.40	5,476.3	649.9	50.0	117.2	2.00	-2.00	0.00
5,543.7	0.00	0.00	5,500.0	650.0	50.0	117.2	2.00	-2.00	0.00
5,560.0	0.00	0.00	5,516.3	650.0	50.0	117.2	0.00	0.00	0.00
5,600.0	0.00	0.00	5,556.3	650.0	50.0	117.2	0.00	0.00	0.00
5,640.0	0.00	0.00	5,596.3	650.0	50.0	117.2	0.00	0.00	0.00
5,680.0	0.00	0.00	5,636.3	650.0	50.0	117.2	0.00	0.00	0.00
5,720.0	0.00	0.00	5,676.3	650.0	50.0	117.2	0.00	0.00	0.00
5,760.0	0.00	0.00	5,716.3	650.0	50.0	117.2	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Lofland 22D-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Lofland 22D-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (5-14-13)		

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)
5,800.0	0.00	0.00	5,756.3	650.0	50.0	117.2	0.00	0.00	0.00
5,840.0	0.00	0.00	5,796.3	650.0	50.0	117.2	0.00	0.00	0.00
5,880.0	0.00	0.00	5,836.3	650.0	50.0	117.2	0.00	0.00	0.00
5,920.0	0.00	0.00	5,876.3	650.0	50.0	117.2	0.00	0.00	0.00
5,960.0	0.00	0.00	5,916.3	650.0	50.0	117.2	0.00	0.00	0.00
6,000.0	0.00	0.00	5,956.3	650.0	50.0	117.2	0.00	0.00	0.00
6,040.0	0.00	0.00	5,996.3	650.0	50.0	117.2	0.00	0.00	0.00
6,080.0	0.00	0.00	6,036.3	650.0	50.0	117.2	0.00	0.00	0.00
6,120.0	0.00	0.00	6,076.3	650.0	50.0	117.2	0.00	0.00	0.00
6,121.6	0.00	0.00	6,077.9	650.0	50.0	117.2	0.00	0.00	0.00
KOP #2									
6,160.0	2.88	90.18	6,116.3	650.0	51.0	118.1	7.49	7.49	0.00
6,200.0	5.88	90.18	6,156.2	650.0	54.0	121.2	7.50	7.50	0.00
6,240.0	8.88	90.18	6,195.8	650.0	59.2	126.3	7.50	7.50	0.00
6,280.0	11.88	90.18	6,235.2	649.9	66.4	133.4	7.50	7.50	0.00
6,320.0	14.88	90.18	6,274.1	649.9	75.6	142.6	7.50	7.50	0.00
6,360.0	17.88	90.18	6,312.4	649.9	86.9	153.9	7.50	7.50	0.00
6,400.0	20.88	90.18	6,350.2	649.8	100.2	167.0	7.50	7.50	0.00
6,440.0	23.88	90.18	6,387.2	649.8	115.4	182.2	7.50	7.50	0.00
6,480.0	26.88	90.18	6,423.3	649.7	132.5	199.2	7.50	7.50	0.00
6,520.0	29.88	90.18	6,458.5	649.7	151.5	218.1	7.50	7.50	0.00
6,560.0	32.88	90.18	6,492.6	649.6	172.4	238.8	7.50	7.50	0.00
6,600.0	35.88	90.18	6,525.6	649.5	194.9	261.3	7.50	7.50	0.00
6,640.0	38.88	90.18	6,557.4	649.5	219.2	285.4	7.50	7.50	0.00
6,672.5	41.31	90.18	6,582.3	649.4	240.1	306.2	7.50	7.50	0.00
LEASE LINE									
6,680.0	41.88	90.18	6,587.9	649.4	245.1	311.2	7.50	7.50	0.00
6,720.0	44.88	90.18	6,617.0	649.3	272.6	338.5	7.50	7.50	0.00
6,760.0	47.88	90.18	6,644.6	649.2	301.6	367.3	7.50	7.50	0.00
6,800.0	50.88	90.18	6,670.6	649.1	331.9	397.5	7.50	7.50	0.00
6,840.0	53.88	90.18	6,695.0	649.0	363.6	429.0	7.50	7.50	0.00
6,880.0	56.88	90.18	6,717.7	648.9	396.5	461.7	7.50	7.50	0.00
6,920.0	59.88	90.18	6,738.7	648.8	430.6	495.6	7.50	7.50	0.00
6,960.0	62.88	90.18	6,757.9	648.7	465.7	530.5	7.50	7.50	0.00
7,000.0	65.88	90.18	6,775.2	648.6	501.7	566.3	7.50	7.50	0.00
7,040.0	68.88	90.18	6,790.5	648.5	538.6	603.0	7.50	7.50	0.00
7,080.0	71.88	90.18	6,804.0	648.3	576.3	640.5	7.50	7.50	0.00
7,120.0	74.88	90.18	6,815.4	648.2	614.6	678.6	7.50	7.50	0.00
7,160.0	77.88	90.18	6,824.8	648.1	653.5	717.2	7.50	7.50	0.00
7,200.0	80.88	90.18	6,832.2	648.0	692.8	756.3	7.50	7.50	0.00
7,240.0	83.88	90.18	6,837.5	647.8	732.5	795.7	7.50	7.50	0.00
7,280.0	86.88	90.18	6,840.7	647.7	772.3	835.4	7.50	7.50	0.00
7,320.0	89.88	90.18	6,841.9	647.6	812.3	875.1	7.50	7.50	0.00
7,326.4	90.36	90.18	6,841.9	647.6	818.7	881.5	7.50	7.50	0.00
End of Build - 7"									
7,360.0	90.36	90.18	6,841.6	647.5	852.3	914.9	0.01	0.01	0.00
7,400.0	90.36	90.18	6,841.4	647.3	892.3	954.7	0.00	0.00	0.00
7,440.0	90.36	90.18	6,841.1	647.2	932.3	994.4	0.00	0.00	0.00
7,480.0	90.36	90.18	6,840.9	647.1	972.3	1,034.2	0.00	0.00	0.00
7,520.0	90.36	90.18	6,840.6	647.0	1,012.3	1,074.0	0.00	0.00	0.00
7,560.0	90.36	90.18	6,840.4	646.8	1,052.3	1,113.7	0.00	0.00	0.00
7,600.0	90.36	90.18	6,840.1	646.7	1,092.3	1,153.5	0.00	0.00	0.00
7,640.0	90.36	90.18	6,839.9	646.6	1,132.3	1,193.3	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Lofland 22D-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Lofland 22D-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (5-14-13)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,680.0	90.36	90.18	6,839.6	646.4	1,172.3	1,233.0	0.00	0.00	0.00
7,720.0	90.36	90.18	6,839.4	646.3	1,212.3	1,272.8	0.00	0.00	0.00
7,760.0	90.36	90.18	6,839.1	646.2	1,252.3	1,312.6	0.00	0.00	0.00
7,800.0	90.36	90.18	6,838.9	646.1	1,292.3	1,352.4	0.00	0.00	0.00
7,840.0	90.36	90.18	6,838.6	645.9	1,332.3	1,392.1	0.00	0.00	0.00
7,880.0	90.36	90.18	6,838.4	645.8	1,372.3	1,431.9	0.00	0.00	0.00
7,920.0	90.36	90.18	6,838.1	645.7	1,412.3	1,471.7	0.00	0.00	0.00
7,960.0	90.36	90.18	6,837.9	645.6	1,452.3	1,511.4	0.00	0.00	0.00
8,000.0	90.36	90.18	6,837.6	645.4	1,492.3	1,551.2	0.00	0.00	0.00
8,040.0	90.36	90.18	6,837.4	645.3	1,532.3	1,591.0	0.00	0.00	0.00
8,080.0	90.36	90.18	6,837.1	645.2	1,572.3	1,630.7	0.00	0.00	0.00
8,120.0	90.36	90.18	6,836.9	645.1	1,612.3	1,670.5	0.00	0.00	0.00
8,160.0	90.36	90.18	6,836.6	644.9	1,652.3	1,710.3	0.00	0.00	0.00
8,200.0	90.36	90.18	6,836.4	644.8	1,692.3	1,750.1	0.00	0.00	0.00
8,240.0	90.36	90.18	6,836.1	644.7	1,732.3	1,789.8	0.00	0.00	0.00
8,280.0	90.36	90.18	6,835.9	644.5	1,772.3	1,829.6	0.00	0.00	0.00
8,320.0	90.36	90.18	6,835.6	644.4	1,812.3	1,869.4	0.00	0.00	0.00
8,360.0	90.36	90.18	6,835.4	644.3	1,852.3	1,909.1	0.00	0.00	0.00
8,400.0	90.36	90.18	6,835.1	644.2	1,892.3	1,948.9	0.00	0.00	0.00
8,440.0	90.36	90.18	6,834.9	644.0	1,932.3	1,988.7	0.00	0.00	0.00
8,480.0	90.36	90.18	6,834.6	643.9	1,972.3	2,028.4	0.00	0.00	0.00
8,520.0	90.36	90.18	6,834.4	643.8	2,012.3	2,068.2	0.00	0.00	0.00
8,560.0	90.36	90.18	6,834.1	643.7	2,052.3	2,108.0	0.00	0.00	0.00
8,600.0	90.36	90.18	6,833.9	643.5	2,092.3	2,147.8	0.00	0.00	0.00
8,640.0	90.36	90.18	6,833.6	643.4	2,132.3	2,187.5	0.00	0.00	0.00
8,680.0	90.36	90.18	6,833.4	643.3	2,172.3	2,227.3	0.00	0.00	0.00
8,720.0	90.36	90.18	6,833.1	643.2	2,212.3	2,267.1	0.00	0.00	0.00
8,760.0	90.36	90.18	6,832.9	643.0	2,252.3	2,306.8	0.00	0.00	0.00
8,800.0	90.36	90.18	6,832.6	642.9	2,292.3	2,346.6	0.00	0.00	0.00
8,840.0	90.36	90.18	6,832.4	642.8	2,332.3	2,386.4	0.00	0.00	0.00
8,880.0	90.36	90.18	6,832.1	642.6	2,372.3	2,426.1	0.00	0.00	0.00
8,920.0	90.36	90.18	6,831.8	642.5	2,412.3	2,465.9	0.00	0.00	0.00
8,960.0	90.36	90.18	6,831.6	642.4	2,452.3	2,505.7	0.00	0.00	0.00
9,000.0	90.36	90.18	6,831.3	642.3	2,492.3	2,545.5	0.00	0.00	0.00
9,040.0	90.36	90.18	6,831.1	642.1	2,532.3	2,585.2	0.00	0.00	0.00
9,080.0	90.36	90.18	6,830.8	642.0	2,572.3	2,625.0	0.00	0.00	0.00
9,120.0	90.36	90.18	6,830.6	641.9	2,612.3	2,664.8	0.00	0.00	0.00
9,160.0	90.36	90.18	6,830.3	641.8	2,652.3	2,704.5	0.00	0.00	0.00
9,200.0	90.36	90.18	6,830.1	641.6	2,692.3	2,744.3	0.00	0.00	0.00
9,240.0	90.36	90.18	6,829.8	641.5	2,732.3	2,784.1	0.00	0.00	0.00
9,280.0	90.36	90.18	6,829.6	641.4	2,772.3	2,823.8	0.00	0.00	0.00
9,320.0	90.36	90.18	6,829.3	641.3	2,812.3	2,863.6	0.00	0.00	0.00
9,360.0	90.36	90.18	6,829.1	641.1	2,852.3	2,903.4	0.00	0.00	0.00
9,400.0	90.36	90.18	6,828.8	641.0	2,892.3	2,943.2	0.00	0.00	0.00
9,440.0	90.36	90.18	6,828.6	640.9	2,932.3	2,982.9	0.00	0.00	0.00
9,480.0	90.36	90.18	6,828.3	640.7	2,972.3	3,022.7	0.00	0.00	0.00
9,520.0	90.36	90.18	6,828.1	640.6	3,012.3	3,062.5	0.00	0.00	0.00
9,560.0	90.36	90.18	6,827.8	640.5	3,052.3	3,102.2	0.00	0.00	0.00
9,600.0	90.36	90.18	6,827.6	640.4	3,092.3	3,142.0	0.00	0.00	0.00
9,640.0	90.36	90.18	6,827.3	640.2	3,132.2	3,181.8	0.00	0.00	0.00
9,680.0	90.36	90.18	6,827.1	640.1	3,172.2	3,221.5	0.00	0.00	0.00
9,720.0	90.36	90.18	6,826.8	640.0	3,212.2	3,261.3	0.00	0.00	0.00
9,760.0	90.36	90.18	6,826.6	639.9	3,252.2	3,301.1	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Lofland 22D-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Lofland 22D-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (5-14-13)		

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)
9,800.0	90.36	90.18	6,826.3	639.7	3,292.2	3,340.9	0.00	0.00	0.00
9,840.0	90.36	90.18	6,826.1	639.6	3,332.2	3,380.6	0.00	0.00	0.00
9,880.0	90.36	90.18	6,825.8	639.5	3,372.2	3,420.4	0.00	0.00	0.00
9,920.0	90.36	90.18	6,825.6	639.4	3,412.2	3,460.2	0.00	0.00	0.00
9,960.0	90.36	90.18	6,825.3	639.2	3,452.2	3,499.9	0.00	0.00	0.00
10,000.0	90.36	90.18	6,825.1	639.1	3,492.2	3,539.7	0.00	0.00	0.00
10,040.0	90.36	90.18	6,824.8	639.0	3,532.2	3,579.5	0.00	0.00	0.00
10,080.0	90.36	90.18	6,824.6	638.8	3,572.2	3,619.2	0.00	0.00	0.00
10,120.0	90.36	90.18	6,824.3	638.7	3,612.2	3,659.0	0.00	0.00	0.00
10,160.0	90.36	90.18	6,824.1	638.6	3,652.2	3,698.8	0.00	0.00	0.00
10,200.0	90.36	90.18	6,823.8	638.5	3,692.2	3,738.6	0.00	0.00	0.00
10,240.0	90.36	90.18	6,823.6	638.3	3,732.2	3,778.3	0.00	0.00	0.00
10,280.0	90.36	90.18	6,823.3	638.2	3,772.2	3,818.1	0.00	0.00	0.00
10,320.0	90.36	90.18	6,823.1	638.1	3,812.2	3,857.9	0.00	0.00	0.00
10,360.0	90.36	90.18	6,822.8	638.0	3,852.2	3,897.6	0.00	0.00	0.00
10,400.0	90.36	90.18	6,822.5	637.8	3,892.2	3,937.4	0.00	0.00	0.00
10,440.0	90.36	90.18	6,822.3	637.7	3,932.2	3,977.2	0.00	0.00	0.00
10,480.0	90.36	90.18	6,822.0	637.6	3,972.2	4,016.9	0.00	0.00	0.00
10,520.0	90.36	90.18	6,821.8	637.5	4,012.2	4,056.7	0.00	0.00	0.00
10,560.0	90.36	90.18	6,821.5	637.3	4,052.2	4,096.5	0.00	0.00	0.00
10,600.0	90.36	90.18	6,821.3	637.2	4,092.2	4,136.3	0.00	0.00	0.00
10,640.0	90.36	90.18	6,821.0	637.1	4,132.2	4,176.0	0.00	0.00	0.00
10,680.0	90.36	90.18	6,820.8	636.9	4,172.2	4,215.8	0.00	0.00	0.00
10,720.0	90.36	90.18	6,820.5	636.8	4,212.2	4,255.6	0.00	0.00	0.00
10,760.0	90.36	90.18	6,820.3	636.7	4,252.2	4,295.3	0.00	0.00	0.00
10,800.0	90.36	90.18	6,820.0	636.6	4,292.2	4,335.1	0.00	0.00	0.00
10,840.0	90.36	90.18	6,819.8	636.4	4,332.2	4,374.9	0.00	0.00	0.00
10,880.0	90.36	90.18	6,819.5	636.3	4,372.2	4,414.6	0.00	0.00	0.00
10,920.0	90.36	90.18	6,819.3	636.2	4,412.2	4,454.4	0.00	0.00	0.00
10,960.0	90.36	90.18	6,819.0	636.1	4,452.2	4,494.2	0.00	0.00	0.00
11,000.0	90.36	90.18	6,818.8	635.9	4,492.2	4,534.0	0.00	0.00	0.00
11,040.0	90.36	90.18	6,818.5	635.8	4,532.2	4,573.7	0.00	0.00	0.00
11,080.0	90.36	90.18	6,818.3	635.7	4,572.2	4,613.5	0.00	0.00	0.00
11,120.0	90.36	90.18	6,818.0	635.6	4,612.2	4,653.3	0.00	0.00	0.00
11,160.0	90.36	90.18	6,817.8	635.4	4,652.2	4,693.0	0.00	0.00	0.00
11,200.0	90.36	90.18	6,817.5	635.3	4,692.2	4,732.8	0.00	0.00	0.00
11,240.0	90.36	90.18	6,817.3	635.2	4,732.2	4,772.6	0.00	0.00	0.00
11,280.0	90.36	90.18	6,817.0	635.0	4,772.2	4,812.3	0.00	0.00	0.00
11,320.0	90.36	90.18	6,816.8	634.9	4,812.2	4,852.1	0.00	0.00	0.00
11,360.0	90.36	90.18	6,816.5	634.8	4,852.2	4,891.9	0.00	0.00	0.00
11,400.0	90.36	90.18	6,816.3	634.7	4,892.2	4,931.7	0.00	0.00	0.00
11,440.0	90.36	90.18	6,816.0	634.5	4,932.2	4,971.4	0.00	0.00	0.00
11,480.0	90.36	90.18	6,815.8	634.4	4,972.2	5,011.2	0.00	0.00	0.00
11,520.0	90.36	90.18	6,815.5	634.3	5,012.2	5,051.0	0.00	0.00	0.00
11,560.0	90.36	90.18	6,815.3	634.2	5,052.2	5,090.7	0.00	0.00	0.00
11,600.0	90.36	90.18	6,815.0	634.0	5,092.2	5,130.5	0.00	0.00	0.00
11,640.0	90.36	90.18	6,814.8	633.9	5,132.2	5,170.3	0.00	0.00	0.00
11,680.0	90.36	90.18	6,814.5	633.8	5,172.2	5,210.0	0.00	0.00	0.00
11,720.0	90.36	90.18	6,814.3	633.7	5,212.2	5,249.8	0.00	0.00	0.00
11,760.0	90.36	90.18	6,814.0	633.5	5,252.2	5,289.6	0.00	0.00	0.00
11,800.0	90.36	90.18	6,813.8	633.4	5,292.2	5,329.4	0.00	0.00	0.00
11,840.0	90.36	90.18	6,813.5	633.3	5,332.2	5,369.1	0.00	0.00	0.00
11,880.0	90.36	90.18	6,813.2	633.1	5,372.2	5,408.9	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Lofland 22D-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Lofland 22D-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (5-14-13)		

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)
11,920.0	90.36	90.18	6,813.0	633.0	5,412.2	5,448.7	0.00	0.00	0.00
11,960.0	90.36	90.18	6,812.7	632.9	5,452.2	5,488.4	0.00	0.00	0.00
12,000.0	90.36	90.18	6,812.5	632.8	5,492.2	5,528.2	0.00	0.00	0.00
12,040.0	90.36	90.18	6,812.2	632.6	5,532.2	5,568.0	0.00	0.00	0.00
12,080.0	90.36	90.18	6,812.0	632.5	5,572.2	5,607.7	0.00	0.00	0.00
12,120.0	90.36	90.18	6,811.7	632.4	5,612.2	5,647.5	0.00	0.00	0.00
12,160.0	90.36	90.18	6,811.5	632.3	5,652.2	5,687.3	0.00	0.00	0.00
12,200.0	90.36	90.18	6,811.2	632.1	5,692.2	5,727.1	0.00	0.00	0.00
12,240.0	90.36	90.18	6,811.0	632.0	5,732.2	5,766.8	0.00	0.00	0.00
12,280.0	90.36	90.18	6,810.7	631.9	5,772.2	5,806.6	0.00	0.00	0.00
12,320.0	90.36	90.18	6,810.5	631.8	5,812.2	5,846.4	0.00	0.00	0.00
12,360.0	90.36	90.18	6,810.2	631.6	5,852.2	5,886.1	0.00	0.00	0.00
12,400.0	90.36	90.18	6,810.0	631.5	5,892.2	5,925.9	0.00	0.00	0.00
12,440.0	90.36	90.18	6,809.7	631.4	5,932.2	5,965.7	0.00	0.00	0.00
12,480.0	90.36	90.18	6,809.5	631.2	5,972.2	6,005.4	0.00	0.00	0.00
12,520.0	90.36	90.18	6,809.2	631.1	6,012.2	6,045.2	0.00	0.00	0.00
12,556.3	90.36	90.18	6,809.0	631.0	6,048.5	6,081.3	0.00	0.00	0.00
BHL 500'FEL, 1010'FSL									

Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N-S (ft)	+E-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Brown 1-23 (Exist) 50 - plan misses target center by 5901.5ft at 5.0ft MD (5.0 TVD, 0.0 N, 0.0 E) - Circle (radius 500.0)	0.00	0.00	5.0	372.3	5,889.7	1,382,306.72	3,244,214.74	40.379520	-104.623390
Marie 1-23 (Exist) 500 - plan misses target center by 3271.8ft at 2.0ft MD (2.0 TVD, 0.0 N, 0.0 E) - Circle (radius 500.0)	0.00	0.00	2.0	280.7	3,259.7	1,382,189.79	3,241,585.83	40.379270	-104.632830
Buderus 13-23 (Exist) - plan misses target center by 2120.3ft at 1.0ft MD (1.0 TVD, 0.0 N, 0.0 E) - Circle (radius 500.0)	0.00	0.00	1.0	506.5	2,058.9	1,382,403.93	3,240,382.94	40.379890	-104.637140
BHL 500'FEL, 1010'FSL - plan hits target center - Point	0.00	0.00	6,809.0	631.0	6,048.5	1,382,566.94	3,244,370.97	40.380230	-104.622820
Brown 23-43 (Exist) 50 - plan misses target center by 4377.5ft at 3.0ft MD (3.0 TVD, 0.0 N, 0.0 E) - Circle (radius 500.0)	0.00	0.00	3.0	474.0	4,351.8	1,382,393.57	3,242,675.97	40.379800	-104.628910
Lofland 44-22 (Exist) 10 - plan misses target center by 682.5ft at 0.0ft MD (0.0 TVD, 0.0 N, 0.0 E) - Circle (radius 500.0)	0.00	0.00	-1.0	440.8	521.0	1,382,323.45	3,238,845.81	40.379710	-104.642660
LEASE LINE - plan misses target center by 1012.7ft at 6672.5ft MD (6582.3 TVD, 649.4 N, 240.1 E) - Polygon	0.00	0.00	6,809.0	-300.0	-29.5	1,381,577.39	3,238,302.52	40.377677	-104.644636
Point 1			6,809.0	0.0	0.0	1,381,577.39	3,238,302.52		
Point 2			6,809.0	1,500.0	0.0	1,383,077.25	3,238,288.05		

Database:	Landmark	Local Co-ordinate Reference:	Well Lofland 22D-232
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Project:	SEC.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	North Reference:	True
Well:	Lofland 22D-232	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (5-14-13)		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,326.4	6,841.9	7"	7	7-1/2

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 #1
6,121.6	6,077.9	650.0	50.0	KOP #2
7,326.4	6,841.9	647.6	818.7	End of Build



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R65W

Lofland 22T-HZ Pad Sec.22-T5N-R65W

Lofland 22D-232

Wellbore #1

Plan #1 (5-14-13)

Anticollision Report

15 May, 2013



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (5-14-13)
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	Stations
Depth Range:	Unlimited
Results Limited by:	Maximum center-center distance of 10,000.0ft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Elliptical Conic

Survey Tool Program		Date	5/15/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	12,556.3	Plan #1 (5-14-13) (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						
Lofland 22T-HZ Existing Wells						
Brown 1-23 (Exist) - Wellbore #1 - Wellbore #1	12,398.4	6,805.0	259.2	-39.6	0.868	Level 1, CC
Brown 1-23 (Exist) - Wellbore #1 - Wellbore #1	12,400.0	6,805.0	259.2	-39.6	0.867	Level 1, ES, SF
Brown 23-43 (Exist) - Wellbore #1 - Wellbore #1	10,860.1	6,816.7	162.4	-93.7	0.634	Level 1, CC, ES, SF
Buderus 13-23 (Exist) - Wellbore #1 - Wellbore #1	8,567.0	6,833.1	137.2	-56.2	0.709	Level 1, CC, ES, SF
Lofland 44-22 (Exist) - Wellbore #1 - Wellbore #1	7,021.7	6,784.7	207.7	52.3	1.337	Level 3, CC, ES, SF
Marie 1-23 (Exist) - Wellbore #1 - Wellbore #1	9,768.6	6,824.5	359.1	133.1	1.589	CC, ES, SF
Lofland 22T-HZ Pad Sec.22-T5N-R65W						
Lofland 22T-402 - Wellbore #1 - Plan #1 (5-14-13)	400.0	401.0	29.0	27.4	18.408	CC, ES
Lofland 22T-402 - Wellbore #1 - Plan #1 (5-14-13)	12,556.3	12,695.3	824.9	494.6	2.497	SF

Offset Design	Lofland 22T-HZ Existing Wells - Brown 1-23 (Exist) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0ft
Survey Program:	7300-UNKNOWN												Offset Well Error:	0.0ft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		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	86.38	372.3	5,889.7	5,901.5					
100.0	100.0	95.0	95.0	0.1	1.9	86.38	372.3	5,889.7	5,901.5	5,899.5	2.01	2,932.302		
200.0	200.0	195.0	195.0	0.3	3.9	86.38	372.3	5,889.7	5,901.5	5,897.3	4.24	1,392.734		
300.0	300.0	295.0	295.0	0.6	5.9	86.38	372.3	5,889.7	5,901.5	5,895.0	6.46	913.246		
400.0	400.0	395.0	395.0	0.8	7.9	86.38	372.3	5,889.7	5,901.5	5,892.8	8.69	679.358		
500.0	500.0	495.0	495.0	1.0	9.9	82.01	372.3	5,889.7	5,901.3	5,890.3	10.91	540.885		
600.0	599.8	594.8	594.8	1.2	11.9	82.07	372.3	5,889.7	5,900.5	5,887.4	13.13	449.245		
700.0	699.5	694.5	694.5	1.5	13.9	82.18	372.3	5,889.7	5,899.3	5,884.0	15.37	383.911		
794.4	793.2	788.2	788.2	1.7	15.8	82.32	372.3	5,889.7	5,897.8	5,880.3	17.49	337.212		
800.0	798.7	793.7	793.7	1.7	15.9	82.32	372.3	5,889.7	5,897.7	5,880.1	17.62	334.798		
900.0	897.8	892.8	892.8	2.0	17.9	82.46	372.3	5,889.7	5,895.8	5,876.0	19.89	296.488		
1,000.0	996.8	991.8	991.8	2.3	19.8	82.59	372.3	5,889.7	5,894.0	5,871.9	22.17	265.881		
1,100.0	1,095.9	1,090.9	1,090.9	2.6	21.8	82.72	372.3	5,889.7	5,892.3	5,867.8	24.46	240.909		
1,200.0	1,194.9	1,189.9	1,189.9	3.0	23.8	82.85	372.3	5,889.7	5,890.5	5,863.8	26.75	220.169		
1,300.0	1,294.0	1,289.0	1,289.0	3.3	25.8	82.98	372.3	5,889.7	5,888.8	5,859.8	29.05	202.680		
1,400.0	1,393.0	1,388.0	1,388.0	3.6	27.8	83.11	372.3	5,889.7	5,887.1	5,855.8	31.36	187.741		
1,500.0	1,492.1	1,487.1	1,487.1	3.9	29.7	83.24	372.3	5,889.7	5,885.5	5,851.8	33.66	174.834		

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN													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)						
1,600.0	1,591.1	1,586.1	1,586.1	4.3	31.7	83.37	372.3	5,889.7	5,883.9	5,847.9	35.97	163.575		
1,700.0	1,690.2	1,685.2	1,685.2	4.6	33.7	83.51	372.3	5,889.7	5,882.3	5,844.0	38.28	153.669		
1,800.0	1,789.2	1,784.2	1,784.2	4.9	35.7	83.64	372.3	5,889.7	5,880.7	5,840.2	40.59	144.886		
1,900.0	1,888.3	1,883.3	1,883.3	5.2	37.7	83.77	372.3	5,889.7	5,879.2	5,836.3	42.90	137.046		
2,000.0	1,987.3	1,982.3	1,982.3	5.6	39.6	83.90	372.3	5,889.7	5,877.7	5,832.5	45.21	130.007		
2,100.0	2,086.4	2,081.4	2,081.4	5.9	41.6	84.03	372.3	5,889.7	5,876.3	5,828.8	47.52	123.651		
2,200.0	2,185.5	2,180.5	2,180.5	6.2	43.6	84.17	372.3	5,889.7	5,874.9	5,825.0	49.84	117.884		
2,300.0	2,284.5	2,279.5	2,279.5	6.6	45.6	84.30	372.3	5,889.7	5,873.5	5,821.3	52.15	112.628		
2,400.0	2,383.6	2,378.6	2,378.6	6.9	47.6	84.43	372.3	5,889.7	5,872.1	5,817.6	54.46	107.819		
2,500.0	2,482.6	2,477.6	2,477.6	7.2	49.6	84.56	372.3	5,889.7	5,870.8	5,814.0	56.78	103.401		
2,600.0	2,581.7	2,576.7	2,576.7	7.6	51.5	84.69	372.3	5,889.7	5,869.5	5,810.4	59.09	99.329		
2,700.0	2,680.7	2,675.7	2,675.7	7.9	53.5	84.83	372.3	5,889.7	5,868.2	5,806.8	61.41	95.564		
2,800.0	2,779.8	2,774.8	2,774.8	8.2	55.5	84.96	372.3	5,889.7	5,867.0	5,803.3	63.72	92.073		
2,900.0	2,878.8	2,873.8	2,873.8	8.6	57.5	85.09	372.3	5,889.7	5,865.8	5,799.7	66.04	88.827		
3,000.0	2,977.9	2,972.9	2,972.9	8.9	59.5	85.22	372.3	5,889.7	5,864.6	5,796.3	68.35	85.801		
3,100.0	3,076.9	3,071.9	3,071.9	9.2	61.4	85.35	372.3	5,889.7	5,863.5	5,792.8	70.67	82.973		
3,200.0	3,176.0	3,171.0	3,171.0	9.6	63.4	85.49	372.3	5,889.7	5,862.4	5,789.4	72.98	80.325		
3,300.0	3,275.0	3,270.0	3,270.0	9.9	65.4	85.62	372.3	5,889.7	5,861.3	5,786.0	75.30	77.841		
3,400.0	3,374.1	3,369.1	3,369.1	10.2	67.4	85.75	372.3	5,889.7	5,860.2	5,782.6	77.61	75.504		
3,500.0	3,473.2	3,468.2	3,468.2	10.6	69.4	85.88	372.3	5,889.7	5,859.2	5,779.3	79.93	73.304		
3,600.0	3,572.2	3,567.2	3,567.2	10.9	71.3	86.02	372.3	5,889.7	5,858.3	5,776.0	82.25	71.228		
3,700.0	3,671.3	3,666.3	3,666.3	11.3	73.3	86.15	372.3	5,889.7	5,857.3	5,772.7	84.56	69.265		
3,800.0	3,770.3	3,765.3	3,765.3	11.6	75.3	86.28	372.3	5,889.7	5,856.4	5,769.5	86.88	67.408		
3,900.0	3,869.4	3,864.4	3,864.4	11.9	77.3	86.42	372.3	5,889.7	5,855.5	5,766.3	89.20	65.647		
4,000.0	3,968.4	3,963.4	3,963.4	12.3	79.3	86.55	372.3	5,889.7	5,854.7	5,763.1	91.51	63.976		
4,100.0	4,067.5	4,062.5	4,062.5	12.6	81.2	86.68	372.3	5,889.7	5,853.8	5,760.0	93.83	62.388		
4,200.0	4,166.5	4,161.5	4,161.5	12.9	83.2	86.81	372.3	5,889.7	5,853.1	5,756.9	96.15	60.876		
4,300.0	4,265.6	4,260.6	4,260.6	13.3	85.2	86.95	372.3	5,889.7	5,852.3	5,753.8	98.46	59.436		
4,400.0	4,364.6	4,359.6	4,359.6	13.6	87.2	87.08	372.3	5,889.7	5,851.6	5,750.8	100.78	58.063		
4,500.0	4,463.7	4,458.7	4,458.7	13.9	89.2	87.21	372.3	5,889.7	5,850.9	5,747.8	103.10	56.751		
4,600.0	4,562.7	4,557.7	4,557.7	14.3	91.2	87.35	372.3	5,889.7	5,850.2	5,744.8	105.41	55.497		
4,700.0	4,661.8	4,656.8	4,656.8	14.6	93.1	87.48	372.3	5,889.7	5,849.6	5,741.9	107.73	54.298		
4,800.0	4,760.8	4,755.8	4,755.8	14.9	95.1	87.61	372.3	5,889.7	5,849.0	5,739.0	110.05	53.149		
4,900.0	4,859.9	4,854.9	4,854.9	15.3	97.1	87.74	372.3	5,889.7	5,848.5	5,736.1	112.37	52.048		
5,000.0	4,959.0	4,954.0	4,954.0	15.6	99.1	87.88	372.3	5,889.7	5,847.9	5,733.2	114.68	50.992		
5,100.0	5,058.0	5,053.0	5,053.0	15.9	101.1	88.01	372.3	5,889.7	5,847.4	5,730.4	117.00	49.978		
5,149.3	5,106.8	5,101.8	5,101.8	16.1	102.0	88.08	372.3	5,889.7	5,847.2	5,729.1	118.14	49.493		
5,200.0	5,157.1	5,152.1	5,152.1	16.3	103.0	88.14	372.3	5,889.7	5,847.0	5,727.7	119.30	49.012		
5,300.0	5,256.6	5,251.6	5,251.6	16.5	105.0	88.23	372.3	5,889.7	5,846.7	5,725.1	121.52	48.113		
5,400.0	5,356.4	5,351.4	5,351.4	16.7	107.0	88.29	372.3	5,889.7	5,846.4	5,722.7	123.71	47.259		
5,500.0	5,456.3	5,451.3	5,451.3	16.8	109.0	88.32	372.3	5,889.7	5,846.3	5,720.5	125.87	46.447		
5,543.7	5,500.0	5,495.0	5,495.0	16.9	109.9	92.72	372.3	5,889.7	5,846.3	5,723.5	122.80	47.607		
5,600.0	5,556.3	5,551.3	5,551.3	17.0	111.0	92.72	372.3	5,889.7	5,846.3	5,722.3	124.03	47.135		
5,700.0	5,656.3	5,651.3	5,651.3	17.1	113.0	92.72	372.3	5,889.7	5,846.3	5,720.1	126.24	46.310		
5,800.0	5,756.3	5,751.3	5,751.3	17.3	115.0	92.72	372.3	5,889.7	5,846.3	5,717.9	128.45	45.514		
5,900.0	5,856.3	5,851.3	5,851.3	17.5	117.0	92.72	372.3	5,889.7	5,846.3	5,715.7	130.66	44.745		
6,000.0	5,956.3	5,951.3	5,951.3	17.6	119.0	92.72	372.3	5,889.7	5,846.3	5,713.5	132.87	44.000		
6,100.0	6,056.3	6,051.3	6,051.3	17.8	121.0	92.72	372.3	5,889.7	5,846.3	5,711.3	135.08	43.280		
6,121.6	6,077.9	6,072.9	6,072.9	17.8	121.5	92.72	372.3	5,889.7	5,846.3	5,710.8	135.56	43.128		
6,150.0	6,106.3	6,101.3	6,101.3	17.9	122.0	2.54	372.3	5,889.7	5,845.8	5,706.0	139.79	41.818		
6,200.0	6,156.2	6,151.2	6,151.2	17.9	123.0	2.56	372.3	5,889.7	5,842.3	5,702.1	140.23	41.661		

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN													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)						
6,250.0	6,205.7	6,200.7	6,200.7	18.0	124.0	2.58	372.3	5,889.7	5,835.6	5,695.5	140.07	41.662		
6,300.0	6,254.7	6,249.7	6,249.7	18.1	125.0	2.62	372.3	5,889.7	5,825.6	5,686.3	139.29	41.825		
6,350.0	6,302.9	6,297.9	6,297.9	18.2	126.0	2.67	372.3	5,889.7	5,812.5	5,674.6	137.88	42.157		
6,400.0	6,350.2	6,345.2	6,345.2	18.3	126.9	2.74	372.3	5,889.7	5,796.2	5,660.4	135.84	42.670		
6,450.0	6,396.3	6,391.3	6,391.3	18.4	127.8	2.83	372.3	5,889.7	5,776.9	5,643.7	133.17	43.380		
6,500.0	6,441.0	6,436.0	6,436.0	18.5	128.7	2.93	372.3	5,889.7	5,754.6	5,624.8	129.88	44.309		
6,550.0	6,484.2	6,479.2	6,479.2	18.6	129.6	3.06	372.3	5,889.7	5,729.5	5,603.5	125.97	45.483		
6,600.0	6,525.6	6,520.6	6,520.6	18.8	130.4	3.21	372.3	5,889.7	5,701.5	5,580.1	121.46	46.941		
6,650.0	6,565.2	6,560.2	6,560.2	19.0	131.2	3.40	372.3	5,889.7	5,671.0	5,554.6	116.37	48.731		
6,700.0	6,602.6	6,597.6	6,597.6	19.1	132.0	3.62	372.3	5,889.7	5,637.9	5,527.1	110.74	50.913		
6,750.0	6,637.8	6,632.8	6,632.8	19.4	132.7	3.89	372.3	5,889.7	5,602.4	5,497.8	104.58	53.571		
6,800.0	6,670.6	6,665.6	6,665.6	19.6	133.3	4.23	372.3	5,889.7	5,564.7	5,466.8	97.95	56.812		
6,850.0	6,700.9	6,695.9	6,695.9	19.9	133.9	4.64	372.3	5,889.7	5,525.0	5,434.1	90.90	60.778		
6,900.0	6,728.4	6,723.4	6,723.4	20.3	134.5	5.16	372.3	5,889.7	5,483.3	5,399.8	83.52	65.650		
6,950.0	6,753.2	6,748.2	6,748.2	20.8	135.0	5.83	372.3	5,889.7	5,440.0	5,364.0	75.93	71.648		
7,000.0	6,775.2	6,770.2	6,770.2	21.3	135.4	6.71	372.3	5,889.7	5,395.1	5,326.8	68.31	78.979		
7,050.0	6,794.1	6,789.1	6,789.1	21.9	135.8	7.93	372.3	5,889.7	5,348.9	5,287.8	61.05	87.613		
7,100.0	6,809.9	6,804.9	6,804.9	22.6	136.1	9.71	372.3	5,889.7	5,301.5	5,246.6	54.96	96.461		
7,150.0	6,822.7	6,817.7	6,817.7	23.4	136.4	12.50	372.3	5,889.7	5,253.2	5,201.3	51.94	101.140		
7,200.0	6,832.2	6,827.2	6,827.2	24.3	136.5	17.46	372.3	5,889.7	5,204.2	5,147.8	56.41	92.262		
7,250.0	6,838.5	6,833.5	6,833.5	25.2	136.7	28.27	372.3	5,889.7	5,154.7	5,076.2	78.53	65.639		
7,300.0	6,841.6	6,836.6	6,836.6	26.1	136.7	60.89	372.3	5,889.7	5,104.9	4,964.0	140.87	36.239		
7,326.4	6,841.9	6,836.9	6,836.9	26.7	136.7	97.01	372.3	5,889.7	5,078.5	4,917.2	161.22	31.501		
7,400.0	6,841.4	6,836.4	6,836.4	28.2	136.7	96.91	372.3	5,889.7	5,005.0	4,842.2	162.83	30.737		
7,500.0	6,840.8	6,835.8	6,835.8	30.3	136.7	96.77	372.3	5,889.7	4,905.1	4,740.0	165.12	29.706		
7,600.0	6,840.1	6,835.1	6,835.1	32.6	136.7	96.63	372.3	5,889.7	4,805.3	4,637.8	167.50	28.689		
7,700.0	6,839.5	6,834.5	6,834.5	35.0	136.7	96.50	372.3	5,889.7	4,705.4	4,535.5	169.94	27.689		
7,800.0	6,838.9	6,833.9	6,833.9	37.4	136.7	96.36	372.3	5,889.7	4,605.6	4,433.2	172.43	26.709		
7,900.0	6,838.3	6,833.3	6,833.3	39.9	136.7	96.22	372.3	5,889.7	4,505.8	4,330.8	174.97	25.751		
8,000.0	6,837.6	6,832.6	6,832.6	42.4	136.7	96.09	372.3	5,889.7	4,405.9	4,228.4	177.55	24.815		
8,100.0	6,837.0	6,832.0	6,832.0	44.9	136.6	95.95	372.3	5,889.7	4,306.1	4,125.9	180.16	23.902		
8,200.0	6,836.4	6,831.4	6,831.4	47.5	136.6	95.81	372.3	5,889.7	4,206.3	4,023.5	182.79	23.012		
8,300.0	6,835.7	6,830.7	6,830.7	50.1	136.6	95.67	372.3	5,889.7	4,106.5	3,921.0	185.44	22.145		
8,400.0	6,835.1	6,830.1	6,830.1	52.7	136.6	95.54	372.3	5,889.7	4,006.7	3,818.6	188.11	21.300		
8,500.0	6,834.5	6,829.5	6,829.5	55.4	136.6	95.40	372.3	5,889.7	3,906.9	3,716.1	190.80	20.477		
8,600.0	6,833.9	6,828.9	6,828.9	58.0	136.6	95.26	372.3	5,889.7	3,807.1	3,613.6	193.50	19.676		
8,700.0	6,833.2	6,828.2	6,828.2	60.7	136.6	95.12	372.3	5,889.7	3,707.4	3,511.2	196.21	18.895		
8,800.0	6,832.6	6,827.6	6,827.6	63.4	136.6	94.98	372.3	5,889.7	3,607.6	3,408.7	198.93	18.136		
8,900.0	6,832.0	6,827.0	6,827.0	66.1	136.5	94.85	372.3	5,889.7	3,507.9	3,306.2	201.65	17.396		
9,000.0	6,831.3	6,826.3	6,826.3	68.8	136.5	94.71	372.3	5,889.7	3,408.2	3,203.8	204.39	16.675		
9,100.0	6,830.7	6,825.7	6,825.7	71.5	136.5	94.57	372.3	5,889.7	3,308.5	3,101.3	207.13	15.973		
9,200.0	6,830.1	6,825.1	6,825.1	74.2	136.5	94.43	372.3	5,889.7	3,208.8	2,998.9	209.88	15.289		
9,300.0	6,829.5	6,824.5	6,824.5	77.0	136.5	94.29	372.3	5,889.7	3,109.1	2,896.5	212.64	14.622		
9,400.0	6,828.8	6,823.8	6,823.8	79.7	136.5	94.16	372.3	5,889.7	3,009.5	2,794.1	215.39	13.972		
9,500.0	6,828.2	6,823.2	6,823.2	82.4	136.5	94.02	372.3	5,889.7	2,909.9	2,691.7	218.16	13.339		
9,600.0	6,827.6	6,822.6	6,822.6	85.2	136.5	93.88	372.3	5,889.7	2,810.3	2,589.4	220.92	12.721		
9,700.0	6,826.9	6,821.9	6,821.9	87.9	136.4	93.74	372.3	5,889.7	2,710.7	2,487.1	223.69	12.118		
9,800.0	6,826.3	6,821.3	6,821.3	90.7	136.4	93.60	372.3	5,889.7	2,611.2	2,384.8	226.46	11.530		
9,900.0	6,825.7	6,820.7	6,820.7	93.4	136.4	93.47	372.3	5,889.7	2,511.7	2,282.5	229.24	10.957		
10,000.0	6,825.1	6,820.1	6,820.1	96.2	136.4	93.33	372.3	5,889.7	2,412.3	2,180.3	232.01	10.397		
10,100.0	6,824.4	6,819.4	6,819.4	98.9	136.4	93.19	372.3	5,889.7	2,312.9	2,078.1	234.79	9.851		

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T-HZ Existing Wells - Brown 1-23 (Exist) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN												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	Offset		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
10,200.0	6,823.8	6,818.8	6,818.8	101.7	136.4	93.05	372.3	5,889.7	2,213.6	1,976.0	237.57	9.317	
10,300.0	6,823.2	6,818.2	6,818.2	104.5	136.4	92.91	372.3	5,889.7	2,114.3	1,873.9	240.35	8.797	
10,400.0	6,822.5	6,817.5	6,817.5	107.2	136.4	92.77	372.3	5,889.7	2,015.1	1,771.9	243.14	8.288	
10,500.0	6,821.9	6,816.9	6,816.9	110.0	136.3	92.63	372.3	5,889.7	1,916.0	1,670.0	245.92	7.791	
10,600.0	6,821.3	6,816.3	6,816.3	112.8	136.3	92.50	372.3	5,889.7	1,816.9	1,568.2	248.70	7.306	
10,700.0	6,820.7	6,815.7	6,815.7	115.5	136.3	92.36	372.3	5,889.7	1,718.0	1,466.5	251.49	6.831	
10,800.0	6,820.0	6,815.0	6,815.0	118.3	136.3	92.22	372.3	5,889.7	1,619.2	1,365.0	254.27	6.368	
10,900.0	6,819.4	6,814.4	6,814.4	121.1	136.3	92.08	372.3	5,889.7	1,520.6	1,263.5	257.06	5.915	
11,000.0	6,818.8	6,813.8	6,813.8	123.9	136.3	91.94	372.3	5,889.7	1,422.2	1,162.3	259.85	5.473	
11,100.0	6,818.2	6,813.2	6,813.2	126.6	136.3	91.80	372.3	5,889.7	1,324.0	1,061.3	262.63	5.041	
11,200.0	6,817.5	6,812.5	6,812.5	129.4	136.3	91.66	372.3	5,889.7	1,226.1	960.7	265.42	4.619	
11,300.0	6,816.9	6,811.9	6,811.9	132.2	136.2	91.53	372.3	5,889.7	1,128.5	860.3	268.20	4.208	
11,400.0	6,816.3	6,811.3	6,811.3	135.0	136.2	91.39	372.3	5,889.7	1,031.5	760.5	270.99	3.806	
11,500.0	6,815.6	6,810.6	6,810.6	137.8	136.2	91.25	372.3	5,889.7	935.0	661.2	273.77	3.415	
11,600.0	6,815.0	6,810.0	6,810.0	140.6	136.2	91.11	372.3	5,889.7	839.4	562.8	276.56	3.035	
11,700.0	6,814.4	6,809.4	6,809.4	143.3	136.2	90.97	372.3	5,889.7	744.9	465.6	279.34	2.667	
11,800.0	6,813.8	6,808.8	6,808.8	146.1	136.2	90.83	372.3	5,889.7	652.1	370.0	282.13	2.311	
11,900.0	6,813.1	6,808.1	6,808.1	148.9	136.2	90.69	372.3	5,889.7	561.7	276.8	284.91	1.972	
12,000.0	6,812.5	6,807.5	6,807.5	151.7	136.1	90.55	372.3	5,889.7	475.3	187.6	287.69	1.652	
12,100.0	6,811.9	6,806.9	6,806.9	154.5	136.1	90.41	372.3	5,889.7	395.2	104.8	290.47	1.361 Level 3	
12,200.0	6,811.2	6,806.2	6,806.2	157.3	136.1	90.28	372.3	5,889.7	326.4	33.2	293.25	1.113 Level 2	
12,300.0	6,810.6	6,805.6	6,805.6	160.1	136.1	90.14	372.3	5,889.7	277.2	-18.8	296.03	0.937 Level 1	
12,398.4	6,810.0	6,805.0	6,805.0	162.8	136.1	90.00	372.3	5,889.7	259.2	-39.6	298.76	0.868 Level 1, CC	
12,400.0	6,810.0	6,805.0	6,805.0	162.9	136.1	90.00	372.3	5,889.7	259.2	-39.6	298.81	0.867 Level 1, ES, SF	
12,500.0	6,809.4	6,804.4	6,804.4	165.7	136.1	89.86	372.3	5,889.7	278.4	-23.2	301.59	0.923 Level 1	
12,556.3	6,809.0	6,804.0	6,804.0	167.2	136.1	89.78	372.3	5,889.7	303.5	0.4	303.15	1.001 Level 2	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN													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
0.0	0.0	0.0	0.0	0.0	0.0	83.78	83.78	474.0	4,351.8	4,377.6				
100.0	100.0	97.0	97.0	0.1	1.9	83.78	83.78	474.0	4,351.8	4,377.5	4,375.5	2.05	2,132.706	
200.0	200.0	197.0	197.0	0.3	3.9	83.78	83.78	474.0	4,351.8	4,377.5	4,373.3	4.28	1,023.427	
300.0	300.0	297.0	297.0	0.6	5.9	83.78	83.78	474.0	4,351.8	4,377.5	4,371.0	6.50	673.251	
400.0	400.0	397.0	397.0	0.8	7.9	83.78	83.78	474.0	4,351.8	4,377.5	4,368.8	8.73	501.617	
500.0	500.0	497.0	497.0	1.0	9.9	79.41	79.41	474.0	4,351.8	4,377.2	4,366.3	10.95	399.736	
600.0	599.8	596.8	596.8	1.2	11.9	79.50	79.50	474.0	4,351.8	4,376.3	4,363.1	13.17	332.192	
700.0	699.5	696.5	696.5	1.5	13.9	79.64	79.64	474.0	4,351.8	4,374.7	4,359.3	15.41	283.976	
794.4	793.2	790.2	790.2	1.7	15.8	79.83	79.83	474.0	4,351.8	4,372.6	4,355.1	17.53	249.477	
800.0	798.7	795.7	795.7	1.7	15.9	79.84	79.84	474.0	4,351.8	4,372.5	4,354.8	17.65	247.692	
900.0	897.8	894.8	894.8	2.0	17.9	80.01	80.01	474.0	4,351.8	4,370.1	4,350.2	19.92	219.358	
1,000.0	996.8	993.8	993.8	2.3	19.9	80.19	80.19	474.0	4,351.8	4,367.7	4,345.5	22.20	196.711	
1,100.0	1,095.9	1,092.9	1,092.9	2.6	21.9	80.37	80.37	474.0	4,351.8	4,365.4	4,340.9	24.49	178.227	
1,200.0	1,194.9	1,191.9	1,191.9	3.0	23.8	80.54	80.54	474.0	4,351.8	4,363.1	4,336.3	26.79	162.871	
1,300.0	1,294.0	1,291.0	1,291.0	3.3	25.8	80.72	80.72	474.0	4,351.8	4,360.8	4,331.7	29.09	149.918	
1,400.0	1,393.0	1,390.0	1,390.0	3.6	27.8	80.90	80.90	474.0	4,351.8	4,358.6	4,327.2	31.39	138.852	
1,500.0	1,492.1	1,489.1	1,489.1	3.9	29.8	81.07	81.07	474.0	4,351.8	4,356.4	4,322.7	33.70	129.290	
1,600.0	1,591.1	1,588.1	1,588.1	4.3	31.8	81.25	81.25	474.0	4,351.8	4,354.3	4,318.3	36.00	120.947	
1,700.0	1,690.2	1,687.2	1,687.2	4.6	33.7	81.43	81.43	474.0	4,351.8	4,352.2	4,313.9	38.31	113.606	
1,800.0	1,789.2	1,786.2	1,786.2	4.9	35.7	81.60	81.60	474.0	4,351.8	4,350.2	4,309.5	40.62	107.097	
1,900.0	1,888.3	1,885.3	1,885.3	5.2	37.7	81.78	81.78	474.0	4,351.8	4,348.2	4,305.2	42.93	101.286	
2,000.0	1,987.3	1,984.3	1,984.3	5.6	39.7	81.96	81.96	474.0	4,351.8	4,346.2	4,301.0	45.24	96.069	
2,100.0	2,086.4	2,083.4	2,083.4	5.9	41.7	82.13	82.13	474.0	4,351.8	4,344.3	4,296.7	47.55	91.358	
2,200.0	2,185.5	2,182.5	2,182.5	6.2	43.6	82.31	82.31	474.0	4,351.8	4,342.4	4,292.5	49.86	87.083	
2,300.0	2,284.5	2,281.5	2,281.5	6.6	45.6	82.49	82.49	474.0	4,351.8	4,340.6	4,288.4	52.18	83.188	
2,400.0	2,383.6	2,380.6	2,380.6	6.9	47.6	82.67	82.67	474.0	4,351.8	4,338.8	4,284.3	54.49	79.623	
2,500.0	2,482.6	2,479.6	2,479.6	7.2	49.6	82.85	82.85	474.0	4,351.8	4,337.0	4,280.2	56.81	76.349	
2,600.0	2,581.7	2,578.7	2,578.7	7.6	51.6	83.02	83.02	474.0	4,351.8	4,335.3	4,276.2	59.12	73.331	
2,700.0	2,680.7	2,677.7	2,677.7	7.9	53.6	83.20	83.20	474.0	4,351.8	4,333.7	4,272.2	61.43	70.541	
2,800.0	2,779.8	2,776.8	2,776.8	8.2	55.5	83.38	83.38	474.0	4,351.8	4,332.1	4,268.3	63.75	67.954	
2,900.0	2,878.8	2,875.8	2,875.8	8.6	57.5	83.56	83.56	474.0	4,351.8	4,330.5	4,264.4	66.06	65.549	
3,000.0	2,977.9	2,974.9	2,974.9	8.9	59.5	83.74	83.74	474.0	4,351.8	4,329.0	4,260.6	68.38	63.307	
3,100.0	3,076.9	3,073.9	3,073.9	9.2	61.5	83.92	83.92	474.0	4,351.8	4,327.5	4,256.8	70.70	61.212	
3,200.0	3,176.0	3,173.0	3,173.0	9.6	63.5	84.10	84.10	474.0	4,351.8	4,326.0	4,253.0	73.01	59.251	
3,300.0	3,275.0	3,272.0	3,272.0	9.9	65.4	84.28	84.28	474.0	4,351.8	4,324.6	4,249.3	75.33	57.410	
3,400.0	3,374.1	3,371.1	3,371.1	10.2	67.4	84.46	84.46	474.0	4,351.8	4,323.3	4,245.6	77.64	55.680	
3,500.0	3,473.2	3,470.2	3,470.2	10.6	69.4	84.64	84.64	474.0	4,351.8	4,321.9	4,242.0	79.96	54.050	
3,600.0	3,572.2	3,569.2	3,569.2	10.9	71.4	84.81	84.81	474.0	4,351.8	4,320.7	4,238.4	82.28	52.513	
3,700.0	3,671.3	3,668.3	3,668.3	11.3	73.4	84.99	84.99	474.0	4,351.8	4,319.4	4,234.8	84.59	51.060	
3,800.0	3,770.3	3,767.3	3,767.3	11.6	75.3	85.17	85.17	474.0	4,351.8	4,318.2	4,231.3	86.91	49.686	
3,900.0	3,869.4	3,866.4	3,866.4	11.9	77.3	85.35	85.35	474.0	4,351.8	4,317.1	4,227.9	89.23	48.383	
4,000.0	3,968.4	3,965.4	3,965.4	12.3	79.3	85.53	85.53	474.0	4,351.8	4,316.0	4,224.5	91.55	47.146	
4,100.0	4,067.5	4,064.5	4,064.5	12.6	81.3	85.71	85.71	474.0	4,351.8	4,314.9	4,221.1	93.86	45.971	
4,200.0	4,166.5	4,163.5	4,163.5	12.9	83.3	85.89	85.89	474.0	4,351.8	4,313.9	4,217.7	96.18	44.853	
4,300.0	4,265.6	4,262.6	4,262.6	13.3	85.3	86.07	86.07	474.0	4,351.8	4,313.0	4,214.5	98.50	43.788	
4,400.0	4,364.6	4,361.6	4,361.6	13.6	87.2	86.25	86.25	474.0	4,351.8	4,312.0	4,211.2	100.81	42.772	
4,500.0	4,463.7	4,460.7	4,460.7	13.9	89.2	86.43	86.43	474.0	4,351.8	4,311.1	4,208.0	103.13	41.802	
4,600.0	4,562.7	4,559.7	4,559.7	14.3	91.2	86.61	86.61	474.0	4,351.8	4,310.3	4,204.9	105.45	40.875	
4,700.0	4,661.8	4,658.8	4,658.8	14.6	93.2	86.80	86.80	474.0	4,351.8	4,309.5	4,201.7	107.77	39.989	
4,800.0	4,760.8	4,757.8	4,757.8	14.9	95.2	86.98	86.98	474.0	4,351.8	4,308.8	4,198.7	110.08	39.140	
4,900.0	4,859.9	4,856.9	4,856.9	15.3	97.1	87.16	87.16	474.0	4,351.8	4,308.0	4,195.6	112.40	38.327	

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T-HZ Existing Wells - Brown 23-43 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7300-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
5,000.0	4,959.0	4,956.0	4,956.0	15.6	99.1	87.34		474.0	4,351.8	4,307.4	4,192.7	114.72	37.547	
5,100.0	5,058.0	5,055.0	5,055.0	15.9	101.1	87.52		474.0	4,351.8	4,306.8	4,189.7	117.04	36.798	
5,149.3	5,106.8	5,103.8	5,103.8	16.1	102.1	87.61		474.0	4,351.8	4,306.5	4,188.3	118.18	36.440	
5,200.0	5,157.1	5,154.1	5,154.1	16.3	103.1	87.69		474.0	4,351.8	4,306.2	4,186.9	119.33	36.085	
5,300.0	5,256.6	5,253.6	5,253.6	16.5	105.1	87.81		474.0	4,351.8	4,305.8	4,184.2	121.56	35.422	
5,400.0	5,356.4	5,353.4	5,353.4	16.7	107.1	87.90		474.0	4,351.8	4,305.5	4,181.8	123.75	34.792	
5,500.0	5,456.3	5,453.3	5,453.3	16.8	109.1	87.94		474.0	4,351.8	4,305.4	4,179.5	125.91	34.194	
5,543.7	5,500.0	5,497.0	5,497.0	16.9	109.9	92.34		474.0	4,351.8	4,305.4	4,182.6	122.85	35.047	
5,600.0	5,556.3	5,553.3	5,553.3	17.0	111.1	92.34		474.0	4,351.8	4,305.4	4,181.3	124.08	34.700	
5,700.0	5,656.3	5,653.3	5,653.3	17.1	113.1	92.34		474.0	4,351.8	4,305.4	4,179.1	126.28	34.093	
5,800.0	5,756.3	5,753.3	5,753.3	17.3	115.1	92.34		474.0	4,351.8	4,305.4	4,176.9	128.49	33.507	
5,900.0	5,856.3	5,853.3	5,853.3	17.5	117.1	92.34		474.0	4,351.8	4,305.4	4,174.7	130.70	32.941	
6,000.0	5,956.3	5,953.3	5,953.3	17.6	119.1	92.34		474.0	4,351.8	4,305.4	4,172.5	132.91	32.393	
6,100.0	6,056.3	6,053.3	6,053.3	17.8	121.1	92.34		474.0	4,351.8	4,305.4	4,170.3	135.12	31.863	
6,121.6	6,077.9	6,074.9	6,074.9	17.8	121.5	92.34		474.0	4,351.8	4,305.4	4,169.8	135.60	31.751	
6,150.0	6,106.3	6,103.3	6,103.3	17.9	122.1	2.16		474.0	4,351.8	4,304.9	4,165.1	139.83	30.787	
6,200.0	6,156.2	6,153.2	6,153.2	17.9	123.1	2.18		474.0	4,351.8	4,301.4	4,161.1	140.27	30.664	
6,250.0	6,205.7	6,202.7	6,202.7	18.0	124.1	2.20		474.0	4,351.8	4,294.7	4,154.6	140.11	30.653	
6,300.0	6,254.7	6,251.7	6,251.7	18.1	125.0	2.23		474.0	4,351.8	4,284.7	4,145.4	139.32	30.754	
6,350.0	6,302.9	6,299.9	6,299.9	18.2	126.0	2.28		474.0	4,351.8	4,271.6	4,133.6	137.91	30.973	
6,400.0	6,350.2	6,347.2	6,347.2	18.3	126.9	2.34		474.0	4,351.8	4,255.3	4,119.4	135.87	31.319	
6,450.0	6,396.3	6,393.3	6,393.3	18.4	127.9	2.42		474.0	4,351.8	4,236.0	4,102.8	133.19	31.803	
6,500.0	6,441.0	6,438.0	6,438.0	18.5	128.8	2.51		474.0	4,351.8	4,213.7	4,083.8	129.90	32.439	
6,550.0	6,484.2	6,481.2	6,481.2	18.6	129.6	2.62		474.0	4,351.8	4,188.5	4,062.5	125.98	33.247	
6,600.0	6,525.6	6,522.6	6,522.6	18.8	130.5	2.76		474.0	4,351.8	4,160.6	4,039.1	121.46	34.254	
6,650.0	6,565.2	6,562.2	6,562.2	19.0	131.2	2.92		474.0	4,351.8	4,130.0	4,013.6	116.37	35.492	
6,700.0	6,602.6	6,599.6	6,599.6	19.1	132.0	3.12		474.0	4,351.8	4,096.9	3,986.2	110.71	37.006	
6,750.0	6,637.8	6,634.8	6,634.8	19.4	132.7	3.37		474.0	4,351.8	4,061.4	3,956.9	104.53	38.853	
6,800.0	6,670.6	6,667.6	6,667.6	19.6	133.4	3.66		474.0	4,351.8	4,023.7	3,925.8	97.87	41.112	
6,850.0	6,700.9	6,697.9	6,697.9	19.9	134.0	4.03		474.0	4,351.8	3,984.0	3,893.2	90.79	43.883	
6,900.0	6,728.4	6,725.4	6,725.4	20.3	134.5	4.50		474.0	4,351.8	3,942.3	3,859.0	83.34	47.303	
6,950.0	6,753.2	6,750.2	6,750.2	20.8	135.0	5.10		474.0	4,351.8	3,898.9	3,823.3	75.65	51.542	
7,000.0	6,775.2	6,772.2	6,772.2	21.3	135.4	5.89		474.0	4,351.8	3,854.0	3,786.2	67.87	56.790	
7,050.0	6,794.1	6,791.1	6,791.1	21.9	135.8	6.99		474.0	4,351.8	3,807.8	3,747.5	60.32	63.128	
7,100.0	6,809.9	6,806.9	6,806.9	22.6	136.1	8.59		474.0	4,351.8	3,760.5	3,706.8	53.70	70.030	
7,150.0	6,822.7	6,819.7	6,819.7	23.4	136.4	11.12		474.0	4,351.8	3,712.2	3,662.5	49.69	74.700	
7,200.0	6,832.2	6,829.2	6,829.2	24.3	136.6	15.64		474.0	4,351.8	3,663.1	3,610.6	52.52	69.749	
7,250.0	6,838.5	6,835.5	6,835.5	25.2	136.7	25.66		474.0	4,351.8	3,613.6	3,541.1	72.49	49.851	
7,300.0	6,841.6	6,838.6	6,838.6	26.1	136.8	58.17		474.0	4,351.8	3,563.7	3,426.7	137.04	26.004	
7,326.4	6,841.9	6,838.9	6,838.9	26.7	136.8	97.79		474.0	4,351.8	3,537.3	3,376.3	161.00	21.971	
7,400.0	6,841.4	6,838.4	6,838.4	28.2	136.8	97.63		474.0	4,351.8	3,463.8	3,301.2	162.64	21.298	
7,500.0	6,840.8	6,837.8	6,837.8	30.3	136.8	97.41		474.0	4,351.8	3,364.0	3,199.0	164.96	20.393	
7,600.0	6,840.1	6,837.1	6,837.1	32.6	136.7	97.19		474.0	4,351.8	3,264.1	3,096.7	167.36	19.503	
7,700.0	6,839.5	6,836.5	6,836.5	35.0	136.7	96.97		474.0	4,351.8	3,164.2	2,994.4	169.83	18.632	
7,800.0	6,838.9	6,835.9	6,835.9	37.4	136.7	96.75		474.0	4,351.8	3,064.4	2,892.0	172.35	17.780	
7,900.0	6,838.3	6,835.3	6,835.3	39.9	136.7	96.53		474.0	4,351.8	2,964.5	2,789.6	174.92	16.948	
8,000.0	6,837.6	6,834.6	6,834.6	42.4	136.7	96.31		474.0	4,351.8	2,864.7	2,687.1	177.52	16.137	
8,100.0	6,837.0	6,834.0	6,834.0	44.9	136.7	96.10		474.0	4,351.8	2,764.8	2,584.7	180.15	15.347	
8,200.0	6,836.4	6,833.4	6,833.4	47.5	136.7	95.88		474.0	4,351.8	2,665.0	2,482.2	182.81	14.578	
8,300.0	6,835.7	6,832.7	6,832.7	50.1	136.7	95.66		474.0	4,351.8	2,565.2	2,379.7	185.48	13.830	
8,400.0	6,835.1	6,832.1	6,832.1	52.7	136.6	95.44		474.0	4,351.8	2,465.4	2,277.2	188.18	13.102	

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 7300-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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
8,500.0	6,834.5	6,831.5	6,831.5	55.4	136.6	95.22	474.0	4,351.8	2,365.6	2,174.8	190.89	12.393		
8,600.0	6,833.9	6,830.9	6,830.9	58.0	136.6	95.00	474.0	4,351.8	2,265.9	2,072.3	193.61	11.704		
8,700.0	6,833.2	6,830.2	6,830.2	60.7	136.6	94.78	474.0	4,351.8	2,166.2	1,969.8	196.34	11.033		
8,800.0	6,832.6	6,829.6	6,829.6	63.4	136.6	94.56	474.0	4,351.8	2,066.5	1,867.4	199.07	10.380		
8,900.0	6,832.0	6,829.0	6,829.0	66.1	136.6	94.34	474.0	4,351.8	1,966.8	1,765.0	201.82	9.745		
9,000.0	6,831.3	6,828.3	6,828.3	68.8	136.6	94.12	474.0	4,351.8	1,867.1	1,662.6	204.57	9.127		
9,100.0	6,830.7	6,827.7	6,827.7	71.5	136.6	93.90	474.0	4,351.8	1,767.5	1,560.2	207.33	8.525		
9,200.0	6,830.1	6,827.1	6,827.1	74.2	136.5	93.68	474.0	4,351.8	1,668.0	1,457.9	210.09	7.939		
9,300.0	6,829.5	6,826.5	6,826.5	77.0	136.5	93.45	474.0	4,351.8	1,568.5	1,355.6	212.86	7.369		
9,400.0	6,828.8	6,825.8	6,825.8	79.7	136.5	93.23	474.0	4,351.8	1,469.1	1,253.5	215.63	6.813		
9,500.0	6,828.2	6,825.2	6,825.2	82.4	136.5	93.01	474.0	4,351.8	1,369.7	1,151.3	218.40	6.272		
9,600.0	6,827.6	6,824.6	6,824.6	85.2	136.5	92.79	474.0	4,351.8	1,270.5	1,049.3	221.17	5.744		
9,700.0	6,826.9	6,823.9	6,823.9	87.9	136.5	92.57	474.0	4,351.8	1,171.4	947.5	223.94	5.231		
9,800.0	6,826.3	6,823.3	6,823.3	90.7	136.5	92.35	474.0	4,351.8	1,072.5	845.7	226.72	4.730		
9,900.0	6,825.7	6,822.7	6,822.7	93.4	136.5	92.13	474.0	4,351.8	973.7	744.2	229.49	4.243		
10,000.0	6,825.1	6,822.1	6,822.1	96.2	136.4	91.91	474.0	4,351.8	875.3	643.0	232.27	3.768		
10,100.0	6,824.4	6,821.4	6,821.4	98.9	136.4	91.68	474.0	4,351.8	777.2	542.2	235.04	3.307		
10,200.0	6,823.8	6,820.8	6,820.8	101.7	136.4	91.46	474.0	4,351.8	679.8	442.0	237.82	2.858		
10,300.0	6,823.2	6,820.2	6,820.2	104.5	136.4	91.24	474.0	4,351.8	583.2	342.6	240.59	2.424		
10,400.0	6,822.5	6,819.5	6,819.5	107.2	136.4	91.02	474.0	4,351.8	487.9	244.6	243.36	2.005		
10,500.0	6,821.9	6,818.9	6,818.9	110.0	136.4	90.80	474.0	4,351.8	395.0	148.9	246.14	1.605		
10,600.0	6,821.3	6,818.3	6,818.3	112.8	136.4	90.58	474.0	4,351.8	306.6	57.7	248.91	1.232 Level 2		
10,700.0	6,820.7	6,817.7	6,817.7	115.5	136.4	90.35	474.0	4,351.8	228.0	-23.6	251.67	0.906 Level 1		
10,800.0	6,820.0	6,817.0	6,817.0	118.3	136.3	90.13	474.0	4,351.8	173.2	-81.3	254.44	0.681 Level 1		
10,860.1	6,819.7	6,816.7	6,816.7	120.0	136.3	90.00	474.0	4,351.8	162.4	-93.7	256.10	0.634 Level 1, CC, ES, SF		
10,900.0	6,819.4	6,816.4	6,816.4	121.1	136.3	89.91	474.0	4,351.8	167.2	-90.0	257.20	0.650 Level 1		
11,000.0	6,818.8	6,815.8	6,815.8	123.9	136.3	89.69	474.0	4,351.8	214.3	-45.6	259.96	0.824 Level 1		
11,100.0	6,818.2	6,815.2	6,815.2	126.6	136.3	89.47	474.0	4,351.8	289.7	27.0	262.72	1.103 Level 2		
11,200.0	6,817.5	6,814.5	6,814.5	129.4	136.3	89.25	474.0	4,351.8	376.7	111.2	265.47	1.419 Level 3		
11,300.0	6,816.9	6,813.9	6,813.9	132.2	136.3	89.02	474.0	4,351.8	468.9	200.7	268.23	1.748		
11,400.0	6,816.3	6,813.3	6,813.3	135.0	136.3	88.80	474.0	4,351.8	563.8	292.8	270.97	2.081		
11,500.0	6,815.6	6,812.6	6,812.6	137.8	136.3	88.58	474.0	4,351.8	660.2	386.4	273.72	2.412		
11,600.0	6,815.0	6,812.0	6,812.0	140.6	136.2	88.36	474.0	4,351.8	757.5	481.0	276.46	2.740		
11,700.0	6,814.4	6,811.4	6,811.4	143.3	136.2	88.14	474.0	4,351.8	855.4	576.2	279.20	3.064		
11,800.0	6,813.8	6,810.8	6,810.8	146.1	136.2	87.92	474.0	4,351.8	953.8	671.9	281.93	3.383		
11,900.0	6,813.1	6,810.1	6,810.1	148.9	136.2	87.70	474.0	4,351.8	1,052.5	767.8	284.66	3.697		
12,000.0	6,812.5	6,809.5	6,809.5	151.7	136.2	87.47	474.0	4,351.8	1,151.4	864.0	287.38	4.006		
12,100.0	6,811.9	6,808.9	6,808.9	154.5	136.2	87.25	474.0	4,351.8	1,250.5	960.4	290.11	4.310		
12,200.0	6,811.2	6,808.2	6,808.2	157.3	136.2	87.03	474.0	4,351.8	1,349.7	1,056.8	292.82	4.609		
12,300.0	6,810.6	6,807.6	6,807.6	160.1	136.2	86.81	474.0	4,351.8	1,449.0	1,153.5	295.53	4.903		
12,400.0	6,810.0	6,807.0	6,807.0	162.9	136.1	86.59	474.0	4,351.8	1,548.4	1,250.2	298.24	5.192		
12,500.0	6,809.4	6,806.4	6,806.4	165.7	136.1	86.37	474.0	4,351.8	1,647.9	1,346.9	300.94	5.476		
12,556.3	6,809.0	6,806.0	6,806.0	167.2	136.1	86.25	474.0	4,351.8	1,703.9	1,401.5	302.46	5.634		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN													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)						
0.0	0.0	0.0	0.0	0.0	0.0	76.18	506.5	2,058.9	2,120.3					
100.0	100.0	99.0	99.0	0.1	2.0	76.18	506.5	2,058.9	2,120.3	2,118.2	2.09	1,013.232		
200.0	200.0	199.0	199.0	0.3	4.0	76.18	506.5	2,058.9	2,120.3	2,116.0	4.32	491.105		
300.0	300.0	299.0	299.0	0.6	6.0	76.18	506.5	2,058.9	2,120.3	2,113.7	6.54	324.096		
400.0	400.0	399.0	399.0	0.8	8.0	76.18	506.5	2,058.9	2,120.3	2,111.5	8.77	241.850		
500.0	500.0	499.0	499.0	1.0	10.0	71.84	506.5	2,058.9	2,119.7	2,108.7	10.99	192.877		
600.0	599.8	598.8	598.8	1.2	12.0	72.00	506.5	2,058.9	2,118.1	2,104.9	13.21	160.314		
700.0	699.5	698.5	698.5	1.5	14.0	72.28	506.5	2,058.9	2,115.4	2,100.0	15.44	137.012		
794.4	793.2	792.2	792.2	1.7	15.8	72.64	506.5	2,058.9	2,112.0	2,094.4	17.56	120.300		
800.0	798.7	797.7	797.7	1.7	16.0	72.66	506.5	2,058.9	2,111.7	2,094.0	17.68	119.432		
900.0	897.8	896.8	896.8	2.0	17.9	73.01	506.5	2,058.9	2,107.6	2,087.7	19.95	105.662		
1,000.0	996.8	995.8	995.8	2.3	19.9	73.36	506.5	2,058.9	2,103.6	2,081.4	22.22	94.652		
1,100.0	1,095.9	1,094.9	1,094.9	2.6	21.9	73.72	506.5	2,058.9	2,099.7	2,075.2	24.51	85.664		
1,200.0	1,194.9	1,193.9	1,193.9	3.0	23.9	74.08	506.5	2,058.9	2,095.9	2,069.1	26.80	78.195		
1,300.0	1,294.0	1,293.0	1,293.0	3.3	25.9	74.43	506.5	2,058.9	2,092.1	2,063.0	29.10	71.895		
1,400.0	1,393.0	1,392.0	1,392.0	3.6	27.8	74.79	506.5	2,058.9	2,088.4	2,057.0	31.40	66.512		
1,500.0	1,492.1	1,491.1	1,491.1	3.9	29.8	75.15	506.5	2,058.9	2,084.8	2,051.1	33.70	61.862		
1,600.0	1,591.1	1,590.1	1,590.1	4.3	31.8	75.52	506.5	2,058.9	2,081.3	2,045.3	36.01	57.805		
1,700.0	1,690.2	1,689.2	1,689.2	4.6	33.8	75.88	506.5	2,058.9	2,077.9	2,039.6	38.31	54.236		
1,800.0	1,789.2	1,788.2	1,788.2	4.9	35.8	76.24	506.5	2,058.9	2,074.6	2,034.0	40.62	51.072		
1,900.0	1,888.3	1,887.3	1,887.3	5.2	37.7	76.61	506.5	2,058.9	2,071.3	2,028.4	42.93	48.249		
2,000.0	1,987.3	1,986.3	1,986.3	5.6	39.7	76.98	506.5	2,058.9	2,068.2	2,022.9	45.24	45.715		
2,100.0	2,086.4	2,085.4	2,085.4	5.9	41.7	77.34	506.5	2,058.9	2,065.1	2,017.5	47.55	43.428		
2,200.0	2,185.5	2,184.5	2,184.5	6.2	43.7	77.71	506.5	2,058.9	2,062.1	2,012.2	49.86	41.354		
2,300.0	2,284.5	2,283.5	2,283.5	6.6	45.7	78.08	506.5	2,058.9	2,059.2	2,007.0	52.18	39.465		
2,400.0	2,383.6	2,382.6	2,382.6	6.9	47.7	78.45	506.5	2,058.9	2,056.4	2,001.9	54.49	37.737		
2,500.0	2,482.6	2,481.6	2,481.6	7.2	49.6	78.82	506.5	2,058.9	2,053.6	1,996.8	56.81	36.151		
2,600.0	2,581.7	2,580.7	2,580.7	7.6	51.6	79.20	506.5	2,058.9	2,051.0	1,991.9	59.12	34.691		
2,700.0	2,680.7	2,679.7	2,679.7	7.9	53.6	79.57	506.5	2,058.9	2,048.5	1,987.0	61.44	33.342		
2,800.0	2,779.8	2,778.8	2,778.8	8.2	55.6	79.95	506.5	2,058.9	2,046.0	1,982.2	63.75	32.092		
2,900.0	2,878.8	2,877.8	2,877.8	8.6	57.6	80.32	506.5	2,058.9	2,043.6	1,977.5	66.07	30.930		
3,000.0	2,977.9	2,976.9	2,976.9	8.9	59.5	80.70	506.5	2,058.9	2,041.3	1,972.9	68.39	29.849		
3,100.0	3,076.9	3,075.9	3,075.9	9.2	61.5	81.07	506.5	2,058.9	2,039.1	1,968.4	70.71	28.840		
3,200.0	3,176.0	3,175.0	3,175.0	9.6	63.5	81.45	506.5	2,058.9	2,037.0	1,964.0	73.02	27.895		
3,300.0	3,275.0	3,274.0	3,274.0	9.9	65.5	81.83	506.5	2,058.9	2,035.0	1,959.7	75.34	27.010		
3,400.0	3,374.1	3,373.1	3,373.1	10.2	67.5	82.21	506.5	2,058.9	2,033.1	1,955.4	77.66	26.179		
3,500.0	3,473.2	3,472.2	3,472.2	10.6	69.4	82.59	506.5	2,058.9	2,031.3	1,951.3	79.98	25.397		
3,600.0	3,572.2	3,571.2	3,571.2	10.9	71.4	82.97	506.5	2,058.9	2,029.5	1,947.2	82.30	24.660		
3,700.0	3,671.3	3,670.3	3,670.3	11.3	73.4	83.35	506.5	2,058.9	2,027.9	1,943.3	84.62	23.965		
3,800.0	3,770.3	3,769.3	3,769.3	11.6	75.4	83.73	506.5	2,058.9	2,026.3	1,939.4	86.94	23.308		
3,900.0	3,869.4	3,868.4	3,868.4	11.9	77.4	84.12	506.5	2,058.9	2,024.9	1,935.6	89.26	22.686		
4,000.0	3,968.4	3,967.4	3,967.4	12.3	79.3	84.50	506.5	2,058.9	2,023.5	1,931.9	91.58	22.096		
4,100.0	4,067.5	4,066.5	4,066.5	12.6	81.3	84.88	506.5	2,058.9	2,022.2	1,928.3	93.90	21.537		
4,200.0	4,166.5	4,165.5	4,165.5	12.9	83.3	85.27	506.5	2,058.9	2,021.0	1,924.8	96.21	21.005		
4,300.0	4,265.6	4,264.6	4,264.6	13.3	85.3	85.65	506.5	2,058.9	2,019.9	1,921.4	98.53	20.500		
4,400.0	4,364.6	4,363.6	4,363.6	13.6	87.3	86.04	506.5	2,058.9	2,018.9	1,918.1	100.85	20.018		
4,500.0	4,463.7	4,462.7	4,462.7	13.9	89.3	86.42	506.5	2,058.9	2,018.0	1,914.8	103.17	19.559		
4,600.0	4,562.7	4,561.7	4,561.7	14.3	91.2	86.81	506.5	2,058.9	2,017.2	1,911.7	105.49	19.122		
4,700.0	4,661.8	4,660.8	4,660.8	14.6	93.2	87.19	506.5	2,058.9	2,016.4	1,908.6	107.81	18.704		
4,800.0	4,760.8	4,759.8	4,759.8	14.9	95.2	87.58	506.5	2,058.9	2,015.8	1,905.7	110.13	18.304		
4,900.0	4,859.9	4,858.9	4,858.9	15.3	97.2	87.96	506.5	2,058.9	2,015.3	1,902.8	112.45	17.922		

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN													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)						
5,000.0	4,959.0	4,958.0	4,958.0	15.6	99.2	88.35	506.5	2,058.9	2,014.8	1,900.1	114.76	17.556		
5,100.0	5,058.0	5,057.0	5,057.0	15.9	101.1	88.74	506.5	2,058.9	2,014.5	1,897.4	117.08	17.206		
5,149.3	5,106.8	5,105.8	5,105.8	16.1	102.1	88.93	506.5	2,058.9	2,014.3	1,896.1	118.22	17.038		
5,200.0	5,157.1	5,156.1	5,156.1	16.3	103.1	89.11	506.5	2,058.9	2,014.2	1,894.8	119.38	16.872		
5,300.0	5,256.6	5,255.6	5,255.6	16.5	105.1	89.40	506.5	2,058.9	2,014.1	1,892.5	121.60	16.563		
5,400.0	5,356.4	5,355.4	5,355.4	16.7	107.1	89.59	506.5	2,058.9	2,014.0	1,890.2	123.79	16.269		
5,500.0	5,456.3	5,455.3	5,455.3	16.8	109.1	89.68	506.5	2,058.9	2,014.0	1,888.1	125.95	15.990		
5,543.7	5,500.0	5,499.0	5,499.0	16.9	110.0	94.09	506.5	2,058.9	2,014.0	1,891.1	122.88	16.390		
5,600.0	5,556.3	5,555.3	5,555.3	17.0	111.1	94.09	506.5	2,058.9	2,014.0	1,889.9	124.11	16.228		
5,700.0	5,656.3	5,655.3	5,655.3	17.1	113.1	94.09	506.5	2,058.9	2,014.0	1,887.7	126.32	15.944		
5,800.0	5,756.3	5,755.3	5,755.3	17.3	115.1	94.09	506.5	2,058.9	2,014.0	1,885.5	128.53	15.670		
5,900.0	5,856.3	5,855.3	5,855.3	17.5	117.1	94.09	506.5	2,058.9	2,014.0	1,883.3	130.74	15.405		
6,000.0	5,956.3	5,955.3	5,955.3	17.6	119.1	94.09	506.5	2,058.9	2,014.0	1,881.1	132.95	15.149		
6,100.0	6,056.3	6,055.3	6,055.3	17.8	121.1	94.09	506.5	2,058.9	2,014.0	1,878.9	135.16	14.901		
6,121.6	6,077.9	6,076.9	6,076.9	17.8	121.5	94.09	506.5	2,058.9	2,014.0	1,878.4	135.64	14.849		
6,150.0	6,106.3	6,105.3	6,105.3	17.9	122.1	3.91	506.5	2,058.9	2,013.5	1,873.6	139.87	14.395		
6,200.0	6,156.2	6,155.2	6,155.2	17.9	123.1	3.93	506.5	2,058.9	2,010.0	1,869.7	140.32	14.325		
6,250.0	6,205.7	6,204.7	6,204.7	18.0	124.1	3.98	506.5	2,058.9	2,003.3	1,863.1	140.15	14.293		
6,300.0	6,254.7	6,253.7	6,253.7	18.1	125.1	4.06	506.5	2,058.9	1,993.3	1,854.0	139.38	14.302		
6,350.0	6,302.9	6,301.9	6,301.9	18.2	126.0	4.16	506.5	2,058.9	1,980.2	1,842.2	137.97	14.352		
6,400.0	6,350.2	6,349.2	6,349.2	18.3	127.0	4.29	506.5	2,058.9	1,964.0	1,828.0	135.95	14.447		
6,450.0	6,396.3	6,395.3	6,395.3	18.4	127.9	4.45	506.5	2,058.9	1,944.7	1,811.4	133.29	14.589		
6,500.0	6,441.0	6,440.0	6,440.0	18.5	128.8	4.65	506.5	2,058.9	1,922.4	1,792.4	130.03	14.785		
6,550.0	6,484.2	6,483.2	6,483.2	18.6	129.7	4.89	506.5	2,058.9	1,897.3	1,771.2	126.15	15.040		
6,600.0	6,525.6	6,524.6	6,524.6	18.8	130.5	5.19	506.5	2,058.9	1,869.4	1,747.7	121.69	15.362		
6,650.0	6,565.2	6,564.2	6,564.2	19.0	131.3	5.55	506.5	2,058.9	1,838.9	1,722.2	116.68	15.761		
6,700.0	6,602.6	6,601.6	6,601.6	19.1	132.0	5.98	506.5	2,058.9	1,805.9	1,694.7	111.14	16.249		
6,750.0	6,637.8	6,636.8	6,636.8	19.4	132.7	6.52	506.5	2,058.9	1,770.5	1,665.3	105.13	16.840		
6,800.0	6,670.6	6,669.6	6,669.6	19.6	133.4	7.17	506.5	2,058.9	1,732.9	1,634.1	98.74	17.550		
6,850.0	6,700.9	6,699.9	6,699.9	19.9	134.0	7.99	506.5	2,058.9	1,693.2	1,601.1	92.05	18.394		
6,900.0	6,728.4	6,727.4	6,727.4	20.3	134.5	9.03	506.5	2,058.9	1,651.6	1,566.4	85.26	19.373		
6,950.0	6,753.2	6,752.2	6,752.2	20.8	135.0	10.37	506.5	2,058.9	1,608.4	1,529.8	78.63	20.455		
7,000.0	6,775.2	6,774.2	6,774.2	21.3	135.5	12.16	506.5	2,058.9	1,563.6	1,490.9	72.70	21.508		
7,050.0	6,794.1	6,793.1	6,793.1	21.9	135.9	14.61	506.5	2,058.9	1,517.5	1,449.1	68.42	22.181		
7,100.0	6,809.9	6,808.9	6,808.9	22.6	136.2	18.14	506.5	2,058.9	1,470.3	1,402.8	67.55	21.765		
7,150.0	6,822.7	6,821.7	6,821.7	23.4	136.4	23.51	506.5	2,058.9	1,422.2	1,349.2	73.06	19.467		
7,200.0	6,832.2	6,831.2	6,831.2	24.3	136.6	32.34	506.5	2,058.9	1,373.4	1,284.2	89.14	15.407		
7,250.0	6,838.5	6,837.5	6,837.5	25.2	136.8	48.05	506.5	2,058.9	1,324.0	1,204.1	119.97	11.036		
7,300.0	6,841.6	6,840.6	6,840.6	26.1	136.8	75.34	506.5	2,058.9	1,274.4	1,118.3	156.14	8.162		
7,326.4	6,841.9	6,840.9	6,840.9	26.7	136.8	93.25	506.5	2,058.9	1,248.1	1,086.0	162.11	7.699		
7,400.0	6,841.4	6,840.4	6,840.4	28.2	136.8	93.06	506.5	2,058.9	1,175.1	1,011.3	163.73	7.177		
7,500.0	6,840.8	6,839.8	6,839.8	30.3	136.8	92.80	506.5	2,058.9	1,075.8	909.8	166.02	6.480		
7,600.0	6,840.1	6,839.1	6,839.1	32.6	136.8	92.54	506.5	2,058.9	976.7	808.3	168.40	5.800		
7,700.0	6,839.5	6,838.5	6,838.5	35.0	136.8	92.27	506.5	2,058.9	877.8	707.0	170.83	5.138		
7,800.0	6,838.9	6,837.9	6,837.9	37.4	136.8	92.01	506.5	2,058.9	779.2	605.9	173.32	4.496		
7,900.0	6,838.3	6,837.3	6,837.3	39.9	136.7	91.75	506.5	2,058.9	681.0	505.1	175.85	3.872		
8,000.0	6,837.6	6,836.6	6,836.6	42.4	136.7	91.49	506.5	2,058.9	583.4	405.0	178.42	3.270		
8,100.0	6,837.0	6,836.0	6,836.0	44.9	136.7	91.23	506.5	2,058.9	486.8	305.8	181.01	2.689		
8,200.0	6,836.4	6,835.4	6,835.4	47.5	136.7	90.96	506.5	2,058.9	391.8	208.2	183.62	2.134		
8,300.0	6,835.7	6,834.7	6,834.7	50.1	136.7	90.70	506.5	2,058.9	300.2	114.0	186.25	1.612		
8,400.0	6,835.1	6,834.1	6,834.1	52.7	136.7	90.44	506.5	2,058.9	216.1	27.2	188.90	1.144 Level 2		

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN													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)						
8,500.0	6,834.5	6,833.5	6,833.5	55.4	136.7	90.18	506.5	2,058.9	152.7	-38.9	191.55	0.797	Level 1	
8,567.0	6,834.1	6,833.1	6,833.1	57.2	136.7	90.00	506.5	2,058.9	137.2	-56.2	193.34	0.709	Level 1, CC, ES, SF	
8,600.0	6,833.9	6,832.9	6,832.9	58.0	136.7	89.91	506.5	2,058.9	141.1	-53.2	194.22	0.726	Level 1	
8,700.0	6,833.2	6,832.2	6,832.2	60.7	136.6	89.65	506.5	2,058.9	191.0	-5.9	196.89	0.970	Level 1	
8,800.0	6,832.6	6,831.6	6,831.6	63.4	136.6	89.39	506.5	2,058.9	270.3	70.8	199.57	1.355	Level 3	
8,900.0	6,832.0	6,831.0	6,831.0	66.1	136.6	89.13	506.5	2,058.9	360.1	157.8	202.25	1.780		
9,000.0	6,831.3	6,830.3	6,830.3	68.8	136.6	88.86	506.5	2,058.9	454.2	249.2	204.94	2.216		
9,100.0	6,830.7	6,829.7	6,829.7	71.5	136.6	88.60	506.5	2,058.9	550.3	342.7	207.62	2.650		
9,200.0	6,830.1	6,829.1	6,829.1	74.2	136.6	88.34	506.5	2,058.9	647.6	437.3	210.31	3.079		
9,300.0	6,829.5	6,828.5	6,828.5	77.0	136.6	88.08	506.5	2,058.9	745.7	532.7	213.00	3.501		
9,400.0	6,828.8	6,827.8	6,827.8	79.7	136.6	87.81	506.5	2,058.9	844.2	628.5	215.69	3.914		
9,500.0	6,828.2	6,827.2	6,827.2	82.4	136.5	87.55	506.5	2,058.9	943.0	724.6	218.38	4.318		
9,600.0	6,827.6	6,826.6	6,826.6	85.2	136.5	87.29	506.5	2,058.9	1,042.0	820.9	221.07	4.714		
9,700.0	6,826.9	6,825.9	6,825.9	87.9	136.5	87.03	506.5	2,058.9	1,141.2	917.5	223.75	5.100		
9,800.0	6,826.3	6,825.3	6,825.3	90.7	136.5	86.77	506.5	2,058.9	1,240.5	1,014.1	226.43	5.479		
9,900.0	6,825.7	6,824.7	6,824.7	93.4	136.5	86.51	506.5	2,058.9	1,340.0	1,110.9	229.11	5.849		
10,000.0	6,825.1	6,824.1	6,824.1	96.2	136.5	86.24	506.5	2,058.9	1,439.5	1,207.7	231.79	6.210		
10,100.0	6,824.4	6,823.4	6,823.4	98.9	136.5	85.98	506.5	2,058.9	1,539.0	1,304.6	234.46	6.564		
10,200.0	6,823.8	6,822.8	6,822.8	101.7	136.5	85.72	506.5	2,058.9	1,638.7	1,401.5	237.13	6.911		
10,300.0	6,823.2	6,822.2	6,822.2	104.5	136.4	85.46	506.5	2,058.9	1,738.3	1,498.5	239.79	7.249		
10,400.0	6,822.5	6,821.5	6,821.5	107.2	136.4	85.20	506.5	2,058.9	1,838.0	1,595.6	242.45	7.581		
10,500.0	6,821.9	6,820.9	6,820.9	110.0	136.4	84.94	506.5	2,058.9	1,937.8	1,692.7	245.10	7.906		
10,600.0	6,821.3	6,820.3	6,820.3	112.8	136.4	84.68	506.5	2,058.9	2,037.5	1,789.8	247.75	8.224		
10,700.0	6,820.7	6,819.7	6,819.7	115.5	136.4	84.42	506.5	2,058.9	2,137.3	1,886.9	250.39	8.536		
10,800.0	6,820.0	6,819.0	6,819.0	118.3	136.4	84.16	506.5	2,058.9	2,237.1	1,984.1	253.03	8.841		
10,900.0	6,819.4	6,818.4	6,818.4	121.1	136.4	83.90	506.5	2,058.9	2,336.9	2,081.3	255.66	9.141		
11,000.0	6,818.8	6,817.8	6,817.8	123.9	136.4	83.64	506.5	2,058.9	2,436.8	2,178.5	258.28	9.434		
11,100.0	6,818.2	6,817.2	6,817.2	126.6	136.3	83.38	506.5	2,058.9	2,536.6	2,275.7	260.90	9.722		
11,200.0	6,817.5	6,816.5	6,816.5	129.4	136.3	83.12	506.5	2,058.9	2,636.5	2,373.0	263.51	10.005		
11,300.0	6,816.9	6,815.9	6,815.9	132.2	136.3	82.86	506.5	2,058.9	2,736.3	2,470.2	266.12	10.282		
11,400.0	6,816.3	6,815.3	6,815.3	135.0	136.3	82.61	506.5	2,058.9	2,836.2	2,567.5	268.71	10.555		
11,500.0	6,815.6	6,814.6	6,814.6	137.8	136.3	82.35	506.5	2,058.9	2,936.1	2,664.8	271.31	10.822		
11,600.0	6,815.0	6,814.0	6,814.0	140.6	136.3	82.09	506.5	2,058.9	3,036.0	2,762.1	273.89	11.085		
11,700.0	6,814.4	6,813.4	6,813.4	143.3	136.3	81.83	506.5	2,058.9	3,135.9	2,859.4	276.46	11.343		
11,800.0	6,813.8	6,812.8	6,812.8	146.1	136.3	81.58	506.5	2,058.9	3,235.8	2,956.8	279.03	11.597		
11,900.0	6,813.1	6,812.1	6,812.1	148.9	136.2	81.32	506.5	2,058.9	3,335.7	3,054.1	281.59	11.846		
12,000.0	6,812.5	6,811.5	6,811.5	151.7	136.2	81.06	506.5	2,058.9	3,435.6	3,151.5	284.14	12.091		
12,100.0	6,811.9	6,810.9	6,810.9	154.5	136.2	80.81	506.5	2,058.9	3,535.5	3,248.9	286.68	12.333		
12,200.0	6,811.2	6,810.2	6,810.2	157.3	136.2	80.55	506.5	2,058.9	3,635.5	3,346.2	289.22	12.570		
12,300.0	6,810.6	6,809.6	6,809.6	160.1	136.2	80.30	506.5	2,058.9	3,735.4	3,443.7	291.75	12.804		
12,400.0	6,810.0	6,809.0	6,809.0	162.9	136.2	80.04	506.5	2,058.9	3,835.3	3,541.1	294.26	13.034		
12,500.0	6,809.4	6,808.4	6,808.4	165.7	136.2	79.79	506.5	2,058.9	3,935.3	3,638.5	296.77	13.260		
12,556.3	6,809.0	6,808.0	6,808.0	167.2	136.2	79.64	506.5	2,058.9	3,991.5	3,693.4	298.18	13.386		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 7300-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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
0.0	0.0	1.0	1.0	0.0	0.0	49.77	440.8	521.0	682.5	682.4	0.02	N/A		
100.0	100.0	101.0	101.0	0.1	2.0	49.77	440.8	521.0	682.5	680.3	2.13	320.017		
200.0	200.0	201.0	201.0	0.3	4.0	49.77	440.8	521.0	682.5	678.1	4.36	156.623		
300.0	300.0	301.0	301.0	0.6	6.0	49.77	440.8	521.0	682.5	675.9	6.58	103.684		
400.0	400.0	401.0	401.0	0.8	8.0	49.77	440.8	521.0	682.5	673.7	8.81	77.492		
500.0	500.0	501.0	501.0	1.0	10.0	45.49	440.8	521.0	681.2	670.2	11.03	61.771		
600.0	599.8	600.8	600.8	1.2	12.0	45.86	440.8	521.0	677.6	664.3	13.24	51.173		
700.0	699.5	700.5	700.5	1.5	14.0	46.48	440.8	521.0	671.5	656.1	15.44	43.479		
794.4	793.2	794.2	794.2	1.7	15.9	47.30	440.8	521.0	663.7	646.2	17.52	37.878		
800.0	798.7	799.7	799.7	1.7	16.0	47.35	440.8	521.0	663.2	645.5	17.65	37.582		
900.0	897.8	898.8	898.8	2.0	18.0	48.23	440.8	521.0	653.9	634.0	19.89	32.880		
1,000.0	996.8	997.8	997.8	2.3	20.0	49.14	440.8	521.0	644.8	622.7	22.14	29.123		
1,100.0	1,095.9	1,096.9	1,096.9	2.6	21.9	50.07	440.8	521.0	635.9	611.4	24.40	26.057		
1,200.0	1,194.9	1,195.9	1,195.9	3.0	23.9	51.02	440.8	521.0	627.1	600.4	26.67	23.512		
1,300.0	1,294.0	1,295.0	1,295.0	3.3	25.9	52.01	440.8	521.0	618.5	589.5	28.95	21.367		
1,400.0	1,393.0	1,394.0	1,394.0	3.6	27.9	53.02	440.8	521.0	610.1	578.9	31.23	19.537		
1,500.0	1,492.1	1,493.1	1,493.1	3.9	29.9	54.05	440.8	521.0	601.9	568.4	33.51	17.960		
1,600.0	1,591.1	1,592.1	1,592.1	4.3	31.8	55.12	440.8	521.0	593.9	558.1	35.80	16.587		
1,700.0	1,690.2	1,691.2	1,691.2	4.6	33.8	56.21	440.8	521.0	586.1	548.0	38.10	15.383		
1,800.0	1,789.2	1,790.2	1,790.2	4.9	35.8	57.33	440.8	521.0	578.5	538.1	40.40	14.319		
1,900.0	1,888.3	1,889.3	1,889.3	5.2	37.8	58.48	440.8	521.0	571.2	528.5	42.71	13.375		
2,000.0	1,987.3	1,988.3	1,988.3	5.6	39.8	59.67	440.8	521.0	564.1	519.0	45.01	12.531		
2,100.0	2,086.4	2,087.4	2,087.4	5.9	41.7	60.87	440.8	521.0	557.2	509.9	47.33	11.773		
2,200.0	2,185.5	2,186.5	2,186.5	6.2	43.7	62.11	440.8	521.0	550.6	501.0	49.65	11.091		
2,300.0	2,284.5	2,285.5	2,285.5	6.6	45.7	63.38	440.8	521.0	544.3	492.3	51.97	10.474		
2,400.0	2,383.6	2,384.6	2,384.6	6.9	47.7	64.68	440.8	521.0	538.2	483.9	54.29	9.913		
2,500.0	2,482.6	2,483.6	2,483.6	7.2	49.7	66.00	440.8	521.0	532.4	475.8	56.62	9.404		
2,600.0	2,581.7	2,582.7	2,582.7	7.6	51.7	67.35	440.8	521.0	527.0	468.0	58.95	8.939		
2,700.0	2,680.7	2,681.7	2,681.7	7.9	53.6	68.73	440.8	521.0	521.8	460.5	61.28	8.514		
2,800.0	2,779.8	2,780.8	2,780.8	8.2	55.6	70.14	440.8	521.0	516.9	453.3	63.62	8.125		
2,900.0	2,878.8	2,879.8	2,879.8	8.6	57.6	71.57	440.8	521.0	512.4	446.4	65.96	7.769		
3,000.0	2,977.9	2,978.9	2,978.9	8.9	59.6	73.03	440.8	521.0	508.2	439.9	68.30	7.441		
3,100.0	3,076.9	3,077.9	3,077.9	9.2	61.6	74.50	440.8	521.0	504.3	433.7	70.64	7.140		
3,200.0	3,176.0	3,177.0	3,177.0	9.6	63.5	76.00	440.8	521.0	500.8	427.8	72.98	6.862		
3,300.0	3,275.0	3,276.0	3,276.0	9.9	65.5	77.52	440.8	521.0	497.6	422.3	75.32	6.607		
3,400.0	3,374.1	3,375.1	3,375.1	10.2	67.5	79.06	440.8	521.0	494.8	417.2	77.66	6.372		
3,500.0	3,473.2	3,474.2	3,474.2	10.6	69.5	80.62	440.8	521.0	492.4	412.4	79.99	6.155		
3,600.0	3,572.2	3,573.2	3,573.2	10.9	71.5	82.18	440.8	521.0	490.3	408.0	82.33	5.955		
3,700.0	3,671.3	3,672.3	3,672.3	11.3	73.4	83.76	440.8	521.0	488.6	403.9	84.66	5.771		
3,800.0	3,770.3	3,771.3	3,771.3	11.6	75.4	85.35	440.8	521.0	487.3	400.3	86.99	5.601		
3,900.0	3,869.4	3,870.4	3,870.4	11.9	77.4	86.95	440.8	521.0	486.4	397.0	89.32	5.445		
4,000.0	3,968.4	3,969.4	3,969.4	12.3	79.4	88.55	440.8	521.0	485.8	394.2	91.64	5.301		
4,090.4	4,057.9	4,058.9	4,058.9	12.6	81.2	90.00	440.8	521.0	485.6	391.9	93.74	5.181		
4,100.0	4,067.5	4,068.5	4,068.5	12.6	81.4	90.15	440.8	521.0	485.7	391.7	93.96	5.169		
4,200.0	4,166.5	4,167.5	4,167.5	12.9	83.4	91.76	440.8	521.0	485.9	389.6	96.27	5.047		
4,300.0	4,265.6	4,266.6	4,266.6	13.3	85.3	93.36	440.8	521.0	486.5	387.9	98.58	4.935		
4,400.0	4,364.6	4,365.6	4,365.6	13.6	87.3	94.95	440.8	521.0	487.5	386.6	100.88	4.832		
4,500.0	4,463.7	4,464.7	4,464.7	13.9	89.3	96.54	440.8	521.0	488.9	385.7	103.18	4.738		
4,600.0	4,562.7	4,563.7	4,563.7	14.3	91.3	98.12	440.8	521.0	490.7	385.2	105.46	4.652		
4,700.0	4,661.8	4,662.8	4,662.8	14.6	93.3	99.68	440.8	521.0	492.8	385.1	107.74	4.574		
4,800.0	4,760.8	4,761.8	4,761.8	14.9	95.2	101.24	440.8	521.0	495.3	385.3	110.02	4.502		

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T-HZ Existing Wells - Lofland 44-22 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7300-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
4,900.0	4,859.9	4,860.9	4,860.9	15.3	97.2	102.77		440.8	521.0	498.2	385.9	112.29	4.437	
5,000.0	4,959.0	4,960.0	4,960.0	15.6	99.2	104.29		440.8	521.0	501.4	386.9	114.55	4.378	
5,100.0	5,058.0	5,059.0	5,059.0	15.9	101.2	105.78		440.8	521.0	505.0	388.2	116.80	4.324	
5,149.3	5,106.8	5,107.8	5,107.8	16.1	102.2	106.51		440.8	521.0	506.9	389.0	117.91	4.299	
5,200.0	5,157.1	5,158.1	5,158.1	16.3	103.2	107.25		440.8	521.0	508.8	389.8	119.05	4.274	
5,300.0	5,256.6	5,257.6	5,257.6	16.5	105.2	108.39		440.8	521.0	512.0	390.7	121.25	4.223	
5,400.0	5,356.4	5,357.4	5,357.4	16.7	107.1	109.15		440.8	521.0	514.2	390.7	123.43	4.166	
5,500.0	5,456.3	5,457.3	5,457.3	16.8	109.1	109.51		440.8	521.0	515.2	389.7	125.59	4.103	
5,543.7	5,500.0	5,501.0	5,501.0	16.9	110.0	113.95		440.8	521.0	515.4	391.9	123.43	4.175	
5,600.0	5,556.3	5,557.3	5,557.3	17.0	111.1	113.95		440.8	521.0	515.4	390.7	124.65	4.134	
5,700.0	5,656.3	5,657.3	5,657.3	17.1	113.1	113.95		440.8	521.0	515.4	388.5	126.85	4.063	
5,800.0	5,756.3	5,757.3	5,757.3	17.3	115.1	113.95		440.8	521.0	515.4	386.3	129.05	3.993	
5,900.0	5,856.3	5,857.3	5,857.3	17.5	117.1	113.95		440.8	521.0	515.4	384.1	131.26	3.926	
6,000.0	5,956.3	5,957.3	5,957.3	17.6	119.1	113.95		440.8	521.0	515.4	381.9	133.46	3.862	
6,100.0	6,056.3	6,057.3	6,057.3	17.8	121.1	113.95		440.8	521.0	515.4	379.7	135.66	3.799	
6,121.6	6,077.9	6,078.9	6,078.9	17.8	121.6	113.95		440.8	521.0	515.4	379.2	136.14	3.786	
6,150.0	6,106.3	6,107.3	6,107.3	17.9	122.1	23.80		440.8	521.0	514.9	375.3	139.53	3.690	
6,200.0	6,156.2	6,157.2	6,157.2	17.9	123.1	24.06		440.8	521.0	511.7	371.6	140.06	3.653	
6,250.0	6,205.7	6,206.7	6,206.7	18.0	124.1	24.56		440.8	521.0	505.5	365.4	140.08	3.609	
6,300.0	6,254.7	6,255.7	6,255.7	18.1	125.1	25.33		440.8	521.0	496.5	356.8	139.63	3.555	
6,350.0	6,302.9	6,303.9	6,303.9	18.2	126.1	26.40		440.8	521.0	484.5	345.8	138.74	3.492	
6,400.0	6,350.2	6,351.2	6,351.2	18.3	127.0	27.81		440.8	521.0	469.9	332.4	137.47	3.418	
6,450.0	6,396.3	6,397.3	6,397.3	18.4	127.9	29.60		440.8	521.0	452.6	316.7	135.94	3.329	
6,500.0	6,441.0	6,442.0	6,442.0	18.5	128.8	31.86		440.8	521.0	432.9	298.6	134.32	3.223	
6,550.0	6,484.2	6,485.2	6,485.2	18.6	129.7	34.66		440.8	521.0	411.0	278.2	132.84	3.094	
6,600.0	6,525.6	6,526.6	6,526.6	18.8	130.5	38.12		440.8	521.0	387.1	255.3	131.83	2.937	
6,650.0	6,565.2	6,566.2	6,566.2	19.0	131.3	42.32		440.8	521.0	361.7	230.0	131.68	2.747	
6,700.0	6,602.6	6,603.6	6,603.6	19.1	132.1	47.38		440.8	521.0	335.1	202.3	132.80	2.523	
6,750.0	6,637.8	6,638.8	6,638.8	19.4	132.8	53.31		440.8	521.0	308.0	172.6	135.45	2.274	
6,800.0	6,670.6	6,671.6	6,671.6	19.6	133.4	60.04		440.8	521.0	281.3	141.8	139.49	2.017	
6,850.0	6,700.9	6,701.9	6,701.9	19.9	134.0	67.32		440.8	521.0	256.2	111.8	144.32	1.775	
6,900.0	6,728.4	6,729.4	6,729.4	20.3	134.6	74.71		440.8	521.0	234.2	85.3	148.95	1.572	
6,950.0	6,753.2	6,754.2	6,754.2	20.8	135.1	81.69		440.8	521.0	217.6	65.0	152.54	1.426	Level 3
7,000.0	6,775.2	6,776.2	6,776.2	21.3	135.5	87.75		440.8	521.0	208.6	53.9	154.77	1.348	Level 3
7,021.7	6,783.7	6,784.7	6,784.7	21.6	135.7	90.00		440.8	521.0	207.7	52.3	155.37	1.337	Level 3, CC, ES, SF
7,050.0	6,794.1	6,795.1	6,795.1	21.9	135.9	92.53		440.8	521.0	209.4	53.5	155.89	1.343	Level 3
7,100.0	6,809.9	6,810.9	6,810.9	22.6	136.2	95.80		440.8	521.0	220.4	63.9	156.49	1.408	Level 3
7,150.0	6,822.7	6,823.7	6,823.7	23.4	136.5	97.46		440.8	521.0	240.9	83.7	157.17	1.533	
7,200.0	6,832.2	6,833.2	6,833.2	24.3	136.7	97.44		440.8	521.0	269.1	110.8	158.33	1.700	
7,250.0	6,838.5	6,839.5	6,839.5	25.2	136.8	95.68		440.8	521.0	303.1	143.1	159.99	1.894	
7,300.0	6,841.6	6,842.6	6,842.6	26.1	136.9	92.11		440.8	521.0	341.2	179.5	161.69	2.110	
7,326.4	6,841.9	6,842.9	6,842.9	26.7	136.9	89.49		440.8	521.0	362.5	200.2	162.29	2.234	
7,400.0	6,841.4	6,842.4	6,842.4	28.2	136.8	89.36		440.8	521.0	424.9	261.0	163.88	2.593	
7,500.0	6,840.8	6,841.8	6,841.8	30.3	136.8	89.18		440.8	521.0	514.4	348.3	166.13	3.097	
7,600.0	6,840.1	6,841.1	6,841.1	32.6	136.8	89.01		440.8	521.0	607.3	438.8	168.46	3.605	
7,700.0	6,839.5	6,840.5	6,840.5	35.0	136.8	88.84		440.8	521.0	702.1	531.2	170.87	4.109	
7,800.0	6,838.9	6,839.9	6,839.9	37.4	136.8	88.66		440.8	521.0	798.1	624.8	173.32	4.605	
7,900.0	6,838.3	6,839.3	6,839.3	39.9	136.8	88.49		440.8	521.0	895.1	719.3	175.82	5.091	
8,000.0	6,837.6	6,838.6	6,838.6	42.4	136.8	88.32		440.8	521.0	992.6	814.3	178.35	5.566	
8,100.0	6,837.0	6,838.0	6,838.0	44.9	136.8	88.14		440.8	521.0	1,090.6	909.7	180.91	6.029	
8,200.0	6,836.4	6,837.4	6,837.4	47.5	136.7	87.97		440.8	521.0	1,188.9	1,005.4	183.49	6.480	

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T-HZ Existing Wells - Lofland 44-22 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7300-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
8,300.0	6,835.7	6,836.7	6,836.7	50.1	136.7	87.80		440.8	521.0	1,287.5	1,101.4	186.09	6.919	
8,400.0	6,835.1	6,836.1	6,836.1	52.7	136.7	87.63		440.8	521.0	1,386.3	1,197.6	188.70	7.346	
8,500.0	6,834.5	6,835.5	6,835.5	55.4	136.7	87.45		440.8	521.0	1,485.2	1,293.9	191.33	7.763	
8,600.0	6,833.9	6,834.9	6,834.9	58.0	136.7	87.28		440.8	521.0	1,584.3	1,390.3	193.97	8.168	
8,700.0	6,833.2	6,834.2	6,834.2	60.7	136.7	87.11		440.8	521.0	1,683.5	1,486.9	196.62	8.562	
8,800.0	6,832.6	6,833.6	6,833.6	63.4	136.7	86.93		440.8	521.0	1,782.8	1,583.5	199.27	8.946	
8,900.0	6,832.0	6,833.0	6,833.0	66.1	136.7	86.76		440.8	521.0	1,882.1	1,680.2	201.93	9.321	
9,000.0	6,831.3	6,832.3	6,832.3	68.8	136.6	86.59		440.8	521.0	1,981.5	1,776.9	204.60	9.685	
9,100.0	6,830.7	6,831.7	6,831.7	71.5	136.6	86.42		440.8	521.0	2,081.0	1,873.7	207.27	10.040	
9,200.0	6,830.1	6,831.1	6,831.1	74.2	136.6	86.24		440.8	521.0	2,180.5	1,970.6	209.94	10.387	
9,300.0	6,829.5	6,830.5	6,830.5	77.0	136.6	86.07		440.8	521.0	2,280.1	2,067.5	212.61	10.724	
9,400.0	6,828.8	6,829.8	6,829.8	79.7	136.6	85.90		440.8	521.0	2,379.7	2,164.4	215.29	11.053	
9,500.0	6,828.2	6,829.2	6,829.2	82.4	136.6	85.73		440.8	521.0	2,479.3	2,261.4	217.97	11.375	
9,600.0	6,827.6	6,828.6	6,828.6	85.2	136.6	85.55		440.8	521.0	2,579.0	2,358.3	220.65	11.688	
9,700.0	6,826.9	6,827.9	6,827.9	87.9	136.6	85.38		440.8	521.0	2,678.7	2,455.3	223.33	11.994	
9,800.0	6,826.3	6,827.3	6,827.3	90.7	136.5	85.21		440.8	521.0	2,778.4	2,552.4	226.01	12.293	
9,900.0	6,825.7	6,826.7	6,826.7	93.4	136.5	85.04		440.8	521.0	2,878.1	2,649.4	228.69	12.585	
10,000.0	6,825.1	6,826.1	6,826.1	96.2	136.5	84.86		440.8	521.0	2,977.9	2,746.5	231.37	12.871	
10,100.0	6,824.4	6,825.4	6,825.4	98.9	136.5	84.69		440.8	521.0	3,077.6	2,843.6	234.04	13.150	
10,200.0	6,823.8	6,824.8	6,824.8	101.7	136.5	84.52		440.8	521.0	3,177.4	2,940.7	236.72	13.423	
10,300.0	6,823.2	6,824.2	6,824.2	104.5	136.5	84.35		440.8	521.0	3,277.2	3,037.8	239.40	13.689	
10,400.0	6,822.5	6,823.5	6,823.5	107.2	136.5	84.18		440.8	521.0	3,377.0	3,134.9	242.07	13.951	
10,500.0	6,821.9	6,822.9	6,822.9	110.0	136.5	84.01		440.8	521.0	3,476.8	3,232.1	244.74	14.206	
10,600.0	6,821.3	6,822.3	6,822.3	112.8	136.4	83.83		440.8	521.0	3,576.6	3,329.2	247.41	14.456	
10,700.0	6,820.7	6,821.7	6,821.7	115.5	136.4	83.66		440.8	521.0	3,676.5	3,426.4	250.08	14.701	
10,800.0	6,820.0	6,821.0	6,821.0	118.3	136.4	83.49		440.8	521.0	3,776.3	3,523.6	252.74	14.941	
10,900.0	6,819.4	6,820.4	6,820.4	121.1	136.4	83.32		440.8	521.0	3,876.2	3,620.8	255.40	15.177	
11,000.0	6,818.8	6,819.8	6,819.8	123.9	136.4	83.15		440.8	521.0	3,976.0	3,718.0	258.06	15.407	
11,100.0	6,818.2	6,819.2	6,819.2	126.6	136.4	82.98		440.8	521.0	4,075.9	3,815.2	260.72	15.633	
11,200.0	6,817.5	6,818.5	6,818.5	129.4	136.4	82.81		440.8	521.0	4,175.8	3,912.4	263.37	15.855	
11,300.0	6,816.9	6,817.9	6,817.9	132.2	136.4	82.64		440.8	521.0	4,275.6	4,009.6	266.02	16.072	
11,400.0	6,816.3	6,817.3	6,817.3	135.0	136.3	82.47		440.8	521.0	4,375.5	4,106.8	268.67	16.286	
11,500.0	6,815.6	6,816.6	6,816.6	137.8	136.3	82.30		440.8	521.0	4,475.4	4,204.1	271.31	16.495	
11,600.0	6,815.0	6,816.0	6,816.0	140.6	136.3	82.13		440.8	521.0	4,575.3	4,301.3	273.95	16.701	
11,700.0	6,814.4	6,815.4	6,815.4	143.3	136.3	81.96		440.8	521.0	4,675.2	4,398.6	276.59	16.903	
11,800.0	6,813.8	6,814.8	6,814.8	146.1	136.3	81.79		440.8	521.0	4,775.1	4,495.9	279.22	17.101	
11,900.0	6,813.1	6,814.1	6,814.1	148.9	136.3	81.62		440.8	521.0	4,875.0	4,593.1	281.85	17.296	
12,000.0	6,812.5	6,813.5	6,813.5	151.7	136.3	81.45		440.8	521.0	4,974.9	4,690.4	284.48	17.488	
12,100.0	6,811.9	6,812.9	6,812.9	154.5	136.3	81.28		440.8	521.0	5,074.8	4,787.7	287.10	17.676	
12,200.0	6,811.2	6,812.2	6,812.2	157.3	136.2	81.11		440.8	521.0	5,174.7	4,885.0	289.71	17.862	
12,300.0	6,810.6	6,811.6	6,811.6	160.1	136.2	80.94		440.8	521.0	5,274.7	4,982.3	292.33	18.044	
12,400.0	6,810.0	6,811.0	6,811.0	162.9	136.2	80.77		440.8	521.0	5,374.6	5,079.6	294.93	18.223	
12,500.0	6,809.4	6,810.4	6,810.4	165.7	136.2	80.60		440.8	521.0	5,474.5	5,177.0	297.54	18.399	
12,556.3	6,809.0	6,810.0	6,810.0	167.2	136.2	80.51		440.8	521.0	5,530.8	5,231.8	299.00	18.497	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 ft
Survey Program: 7300-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
0.0	0.0	0.0	0.0	0.0	0.0	85.08	280.7	3,259.7	3,271.8				
100.0	100.0	98.0	98.0	0.1	2.0	85.08	280.7	3,259.7	3,271.8	3,269.7	2.07	1,578.599	
200.0	200.0	198.0	198.0	0.3	4.0	85.08	280.7	3,259.7	3,271.8	3,267.5	4.30	761.348	
300.0	300.0	298.0	298.0	0.6	6.0	85.08	280.7	3,259.7	3,271.8	3,265.3	6.52	501.644	
400.0	400.0	398.0	398.0	0.8	8.0	85.08	280.7	3,259.7	3,271.8	3,263.0	8.75	374.051	
500.0	500.0	498.0	498.0	1.0	10.0	80.71	280.7	3,259.7	3,271.5	3,260.5	10.97	298.212	
600.0	599.8	597.8	597.8	1.2	12.0	80.82	280.7	3,259.7	3,270.6	3,257.5	13.19	247.887	
700.0	699.5	697.5	697.5	1.5	13.9	81.00	280.7	3,259.7	3,269.3	3,253.8	15.43	211.935	
794.4	793.2	791.2	791.2	1.7	15.8	81.23	280.7	3,259.7	3,267.5	3,249.9	17.55	186.195	
800.0	798.7	796.7	796.7	1.7	15.9	81.24	280.7	3,259.7	3,267.4	3,249.7	17.67	184.863	
900.0	897.8	895.8	895.8	2.0	17.9	81.48	280.7	3,259.7	3,265.3	3,245.3	19.94	163.720	
1,000.0	996.8	994.8	994.8	2.3	19.9	81.72	280.7	3,259.7	3,263.3	3,241.0	22.23	146.819	
1,100.0	1,095.9	1,093.9	1,093.9	2.6	21.9	81.95	280.7	3,259.7	3,261.3	3,236.8	24.52	133.023	
1,200.0	1,194.9	1,192.9	1,192.9	3.0	23.9	82.19	280.7	3,259.7	3,259.4	3,232.6	26.81	121.560	
1,300.0	1,294.0	1,292.0	1,292.0	3.3	25.8	82.43	280.7	3,259.7	3,257.5	3,228.4	29.11	111.892	
1,400.0	1,393.0	1,391.0	1,391.0	3.6	27.8	82.66	280.7	3,259.7	3,255.7	3,224.3	31.42	103.632	
1,500.0	1,492.1	1,490.1	1,490.1	3.9	29.8	82.90	280.7	3,259.7	3,254.0	3,220.3	33.72	96.495	
1,600.0	1,591.1	1,589.1	1,589.1	4.3	31.8	83.14	280.7	3,259.7	3,252.3	3,216.3	36.03	90.268	
1,700.0	1,690.2	1,688.2	1,688.2	4.6	33.8	83.38	280.7	3,259.7	3,250.7	3,212.3	38.34	84.789	
1,800.0	1,789.2	1,787.2	1,787.2	4.9	35.7	83.61	280.7	3,259.7	3,249.1	3,208.5	40.65	79.932	
1,900.0	1,888.3	1,886.3	1,886.3	5.2	37.7	83.85	280.7	3,259.7	3,247.6	3,204.6	42.96	75.596	
2,000.0	1,987.3	1,985.3	1,985.3	5.6	39.7	84.09	280.7	3,259.7	3,246.1	3,200.9	45.27	71.704	
2,100.0	2,086.4	2,084.4	2,084.4	5.9	41.7	84.33	280.7	3,259.7	3,244.8	3,197.2	47.58	68.189	
2,200.0	2,185.5	2,183.5	2,183.5	6.2	43.7	84.57	280.7	3,259.7	3,243.4	3,193.5	49.90	65.001	
2,300.0	2,284.5	2,282.5	2,282.5	6.6	45.7	84.81	280.7	3,259.7	3,242.1	3,189.9	52.21	62.096	
2,400.0	2,383.6	2,381.6	2,381.6	6.9	47.6	85.05	280.7	3,259.7	3,240.9	3,186.4	54.53	59.438	
2,500.0	2,482.6	2,480.6	2,480.6	7.2	49.6	85.29	280.7	3,259.7	3,239.7	3,182.9	56.84	56.997	
2,600.0	2,581.7	2,579.7	2,579.7	7.6	51.6	85.53	280.7	3,259.7	3,238.6	3,179.5	59.16	54.748	
2,700.0	2,680.7	2,678.7	2,678.7	7.9	53.6	85.77	280.7	3,259.7	3,237.6	3,176.1	61.47	52.668	
2,800.0	2,779.8	2,777.8	2,777.8	8.2	55.6	86.01	280.7	3,259.7	3,236.6	3,172.8	63.79	50.741	
2,900.0	2,878.8	2,876.8	2,876.8	8.6	57.5	86.25	280.7	3,259.7	3,235.6	3,169.5	66.10	48.949	
3,000.0	2,977.9	2,975.9	2,975.9	8.9	59.5	86.49	280.7	3,259.7	3,234.8	3,166.4	68.42	47.279	
3,100.0	3,076.9	3,074.9	3,074.9	9.2	61.5	86.73	280.7	3,259.7	3,233.9	3,163.2	70.73	45.720	
3,200.0	3,176.0	3,174.0	3,174.0	9.6	63.5	86.97	280.7	3,259.7	3,233.2	3,160.1	73.05	44.260	
3,300.0	3,275.0	3,273.0	3,273.0	9.9	65.5	87.21	280.7	3,259.7	3,232.5	3,157.1	75.37	42.890	
3,400.0	3,374.1	3,372.1	3,372.1	10.2	67.4	87.45	280.7	3,259.7	3,231.8	3,154.2	77.68	41.603	
3,500.0	3,473.2	3,471.2	3,471.2	10.6	69.4	87.69	280.7	3,259.7	3,231.2	3,151.2	80.00	40.391	
3,600.0	3,572.2	3,570.2	3,570.2	10.9	71.4	87.93	280.7	3,259.7	3,230.7	3,148.4	82.32	39.248	
3,700.0	3,671.3	3,669.3	3,669.3	11.3	73.4	88.17	280.7	3,259.7	3,230.2	3,145.6	84.63	38.168	
3,800.0	3,770.3	3,768.3	3,768.3	11.6	75.4	88.41	280.7	3,259.7	3,229.8	3,142.9	86.95	37.146	
3,900.0	3,869.4	3,867.4	3,867.4	11.9	77.3	88.65	280.7	3,259.7	3,229.5	3,140.2	89.27	36.178	
4,000.0	3,968.4	3,966.4	3,966.4	12.3	79.3	88.90	280.7	3,259.7	3,229.2	3,137.6	91.58	35.260	
4,100.0	4,067.5	4,065.5	4,065.5	12.6	81.3	89.14	280.7	3,259.7	3,228.9	3,135.0	93.90	34.387	
4,200.0	4,166.5	4,164.5	4,164.5	12.9	83.3	89.38	280.7	3,259.7	3,228.8	3,132.6	96.22	33.557	
4,300.0	4,265.6	4,263.6	4,263.6	13.3	85.3	89.62	280.7	3,259.7	3,228.6	3,130.1	98.53	32.767	
4,400.0	4,364.6	4,362.6	4,362.6	13.6	87.3	89.86	280.7	3,259.7	3,228.6	3,127.7	100.85	32.014	
4,457.8	4,421.9	4,419.9	4,419.9	13.8	88.4	90.00	280.7	3,259.7	3,228.6	3,126.4	102.19	31.594	
4,500.0	4,463.7	4,461.7	4,461.7	13.9	89.2	90.10	280.7	3,259.7	3,228.6	3,125.4	103.17	31.295	
4,600.0	4,562.7	4,560.7	4,560.7	14.3	91.2	90.34	280.7	3,259.7	3,228.6	3,123.2	105.48	30.609	
4,700.0	4,661.8	4,659.8	4,659.8	14.6	93.2	90.58	280.7	3,259.7	3,228.7	3,120.9	107.80	29.952	
4,800.0	4,760.8	4,758.8	4,758.8	14.9	95.2	90.83	280.7	3,259.7	3,228.9	3,118.8	110.11	29.323	

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

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN													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)						
8,400.0	6,835.1	6,833.1	6,833.1	52.7	136.7	91.37	280.7	3,259.7	1,414.9	1,226.0	188.86	7.492		
8,500.0	6,834.5	6,832.5	6,832.5	55.4	136.6	91.27	280.7	3,259.7	1,318.4	1,126.9	191.52	6.884		
8,600.0	6,833.9	6,831.9	6,831.9	58.0	136.6	91.17	280.7	3,259.7	1,222.5	1,028.3	194.20	6.295		
8,700.0	6,833.2	6,831.2	6,831.2	60.7	136.6	91.07	280.7	3,259.7	1,127.3	930.4	196.88	5.726		
8,800.0	6,832.6	6,830.6	6,830.6	63.4	136.6	90.97	280.7	3,259.7	1,033.0	833.4	199.58	5.176		
8,900.0	6,832.0	6,830.0	6,830.0	66.1	136.6	90.87	280.7	3,259.7	939.9	737.6	202.28	4.646		
9,000.0	6,831.3	6,829.3	6,829.3	68.8	136.6	90.77	280.7	3,259.7	848.3	643.3	204.99	4.138		
9,100.0	6,830.7	6,828.7	6,828.7	71.5	136.6	90.67	280.7	3,259.7	758.9	551.2	207.71	3.654		
9,200.0	6,830.1	6,828.1	6,828.1	74.2	136.6	90.57	280.7	3,259.7	672.5	462.1	210.43	3.196		
9,300.0	6,829.5	6,827.5	6,827.5	77.0	136.5	90.47	280.7	3,259.7	590.4	377.2	213.16	2.770		
9,400.0	6,828.8	6,826.8	6,826.8	79.7	136.5	90.37	280.7	3,259.7	514.6	298.7	215.89	2.384		
9,500.0	6,828.2	6,826.2	6,826.2	82.4	136.5	90.27	280.7	3,259.7	448.4	229.8	218.63	2.051		
9,600.0	6,827.6	6,825.6	6,825.6	85.2	136.5	90.17	280.7	3,259.7	396.7	175.3	221.37	1.792		
9,700.0	6,826.9	6,824.9	6,824.9	87.9	136.5	90.07	280.7	3,259.7	365.6	141.5	224.11	1.631		
9,768.6	6,826.5	6,824.5	6,824.5	89.8	136.5	90.00	280.7	3,259.7	359.1	133.1	225.99	1.589	CC, ES, SF	
9,800.0	6,826.3	6,824.3	6,824.3	90.7	136.5	89.97	280.7	3,259.7	360.5	133.6	226.86	1.589		
9,900.0	6,825.7	6,823.7	6,823.7	93.4	136.5	89.87	280.7	3,259.7	382.4	152.8	229.60	1.665		
10,000.0	6,825.1	6,823.1	6,823.1	96.2	136.5	89.77	280.7	3,259.7	427.2	194.8	232.35	1.839		
10,100.0	6,824.4	6,822.4	6,822.4	98.9	136.4	89.67	280.7	3,259.7	488.6	253.5	235.10	2.078		
10,200.0	6,823.8	6,821.8	6,821.8	101.7	136.4	89.57	280.7	3,259.7	561.3	323.4	237.85	2.360		
10,300.0	6,823.2	6,821.2	6,821.2	104.5	136.4	89.47	280.7	3,259.7	641.4	400.7	240.61	2.666		
10,400.0	6,822.5	6,820.5	6,820.5	107.2	136.4	89.37	280.7	3,259.7	726.4	483.0	243.36	2.985		
10,500.0	6,821.9	6,819.9	6,819.9	110.0	136.4	89.27	280.7	3,259.7	814.8	568.7	246.12	3.311		
10,600.0	6,821.3	6,819.3	6,819.3	112.8	136.4	89.17	280.7	3,259.7	905.6	656.8	248.87	3.639		
10,700.0	6,820.7	6,818.7	6,818.7	115.5	136.4	89.07	280.7	3,259.7	998.2	746.6	251.63	3.967		
10,800.0	6,820.0	6,818.0	6,818.0	118.3	136.4	88.97	280.7	3,259.7	1,092.1	837.7	254.38	4.293		
10,900.0	6,819.4	6,817.4	6,817.4	121.1	136.3	88.87	280.7	3,259.7	1,187.0	929.9	257.14	4.616		
11,000.0	6,818.8	6,816.8	6,816.8	123.9	136.3	88.77	280.7	3,259.7	1,282.7	1,022.8	259.90	4.935		
11,100.0	6,818.2	6,816.2	6,816.2	126.6	136.3	88.67	280.7	3,259.7	1,379.0	1,116.3	262.66	5.250		
11,200.0	6,817.5	6,815.5	6,815.5	129.4	136.3	88.57	280.7	3,259.7	1,475.7	1,210.3	265.42	5.560		
11,300.0	6,816.9	6,814.9	6,814.9	132.2	136.3	88.47	280.7	3,259.7	1,572.9	1,304.7	268.17	5.865		
11,400.0	6,816.3	6,814.3	6,814.3	135.0	136.3	88.37	280.7	3,259.7	1,670.4	1,399.5	270.93	6.165		
11,500.0	6,815.6	6,813.6	6,813.6	137.8	136.3	88.26	280.7	3,259.7	1,768.2	1,494.5	273.69	6.461		
11,600.0	6,815.0	6,813.0	6,813.0	140.6	136.3	88.16	280.7	3,259.7	1,866.2	1,589.8	276.45	6.751		
11,700.0	6,814.4	6,812.4	6,812.4	143.3	136.2	88.06	280.7	3,259.7	1,964.5	1,685.3	279.20	7.036		
11,800.0	6,813.8	6,811.8	6,811.8	146.1	136.2	87.96	280.7	3,259.7	2,062.9	1,780.9	281.96	7.316		
11,900.0	6,813.1	6,811.1	6,811.1	148.9	136.2	87.86	280.7	3,259.7	2,161.4	1,876.7	284.72	7.591		
12,000.0	6,812.5	6,810.5	6,810.5	151.7	136.2	87.76	280.7	3,259.7	2,260.1	1,972.6	287.47	7.862		
12,100.0	6,811.9	6,809.9	6,809.9	154.5	136.2	87.66	280.7	3,259.7	2,358.9	2,068.6	290.23	8.128		
12,200.0	6,811.2	6,809.2	6,809.2	157.3	136.2	87.56	280.7	3,259.7	2,457.7	2,164.7	292.98	8.389		
12,300.0	6,810.6	6,808.6	6,808.6	160.1	136.2	87.46	280.7	3,259.7	2,556.7	2,261.0	295.73	8.645		
12,400.0	6,810.0	6,808.0	6,808.0	162.9	136.2	87.36	280.7	3,259.7	2,655.7	2,357.3	298.49	8.897		
12,500.0	6,809.4	6,807.4	6,807.4	165.7	136.1	87.26	280.7	3,259.7	2,754.9	2,453.6	301.24	9.145		
12,556.3	6,809.0	6,807.0	6,807.0	167.2	136.1	87.21	280.7	3,259.7	2,810.7	2,507.9	302.79	9.283		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T-HZ Pad Sec.22-T5N-R65W - Lofland 22T-402 - Wellbore #1 - Plan #1 (5-14-13)													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 (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
0.0	0.0	1.0	1.0	0.0	0.0	-120.17	-120.17	-14.6	-25.1	29.0	29.0	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	-120.17	-120.17	-14.6	-25.1	29.0	28.8	0.23	127.763	
200.0	200.0	201.0	201.0	0.3	0.3	-120.17	-120.17	-14.6	-25.1	29.0	28.3	0.68	42.871	
300.0	300.0	301.0	301.0	0.6	0.6	-120.17	-120.17	-14.6	-25.1	29.0	27.9	1.13	25.757	
400.0	400.0	401.0	401.0	0.8	0.8	-120.17	-120.17	-14.6	-25.1	29.0	27.4	1.58	18.408 CC, ES	
500.0	500.0	501.0	501.0	1.0	1.0	-127.30	-127.30	-14.6	-25.1	30.0	28.0	2.03	14.822	
600.0	599.8	600.8	600.8	1.2	1.2	-134.39	-134.39	-14.6	-25.1	33.5	31.0	2.48	13.492	
700.0	699.5	700.5	700.5	1.5	1.5	-143.24	-143.24	-14.6	-25.1	40.1	37.1	2.94	13.625	
794.4	793.2	794.2	794.2	1.7	1.7	-151.04	-151.04	-14.6	-25.1	49.7	46.3	3.38	14.720	
800.0	798.7	799.7	799.7	1.7	1.7	-151.46	-151.46	-14.6	-25.1	50.4	47.0	3.40	14.807	
900.0	897.8	898.8	898.8	2.0	1.9	-157.45	-157.45	-14.6	-25.1	62.8	58.9	3.86	16.270	
1,000.0	996.8	997.8	997.8	2.3	2.1	-161.43	-161.43	-14.6	-25.1	75.7	71.3	4.32	17.529	
1,100.0	1,095.9	1,096.9	1,096.9	2.6	2.4	-164.25	-164.25	-14.6	-25.1	88.8	84.0	4.77	18.597	
1,200.0	1,194.9	1,195.9	1,195.9	3.0	2.6	-166.34	-166.34	-14.6	-25.1	102.1	96.8	5.23	19.506	
1,300.0	1,294.0	1,295.0	1,295.0	3.3	2.8	-167.95	-167.95	-14.6	-25.1	115.5	109.8	5.69	20.284	
1,400.0	1,393.0	1,394.0	1,394.0	3.6	3.0	-169.22	-169.22	-14.6	-25.1	128.9	122.8	6.15	20.955	
1,500.0	1,492.1	1,493.1	1,493.1	3.9	3.2	-170.26	-170.26	-14.6	-25.1	142.4	135.8	6.61	21.538	
1,600.0	1,591.1	1,592.1	1,592.1	4.3	3.5	-171.11	-171.11	-14.6	-25.1	156.0	148.9	7.07	22.048	
1,700.0	1,690.2	1,691.2	1,691.2	4.6	3.7	-171.83	-171.83	-14.6	-25.1	169.5	162.0	7.54	22.499	
1,800.0	1,789.2	1,790.2	1,790.2	4.9	3.9	-172.44	-172.44	-14.6	-25.1	183.1	175.1	8.00	22.899	
1,900.0	1,888.3	1,889.3	1,889.3	5.2	4.1	-172.96	-172.96	-14.6	-25.1	196.8	188.3	8.46	23.256	
2,000.0	1,987.3	1,988.3	1,988.3	5.6	4.4	-173.42	-173.42	-14.6	-25.1	210.4	201.5	8.92	23.577	
2,100.0	2,086.4	2,087.4	2,087.4	5.9	4.6	-173.82	-173.82	-14.6	-25.1	224.0	214.6	9.39	23.867	
2,200.0	2,185.5	2,186.5	2,186.5	6.2	4.8	-174.18	-174.18	-14.6	-25.1	237.7	227.8	9.85	24.130	
2,300.0	2,284.5	2,285.5	2,285.5	6.6	5.0	-174.50	-174.50	-14.6	-25.1	251.3	241.0	10.31	24.370	
2,400.0	2,383.6	2,384.6	2,384.6	6.9	5.2	-174.78	-174.78	-14.6	-25.1	265.0	254.2	10.78	24.589	
2,500.0	2,482.6	2,483.6	2,483.6	7.2	5.5	-175.04	-175.04	-14.6	-25.1	278.7	267.4	11.24	24.791	
2,600.0	2,581.7	2,575.8	2,575.8	7.6	5.7	-175.35	-175.35	-15.5	-24.7	293.3	281.7	11.67	25.135	
2,700.0	2,680.7	2,665.9	2,665.8	7.9	5.8	-175.87	-175.87	-19.1	-23.5	310.7	298.6	12.07	25.732	
2,800.0	2,779.8	2,755.5	2,755.2	8.2	6.0	-176.57	-176.57	-25.3	-21.3	330.8	318.3	12.48	26.519	
2,900.0	2,878.8	2,853.1	2,852.4	8.6	6.2	-177.34	-177.34	-33.3	-18.6	352.2	339.3	12.89	27.324	
3,000.0	2,977.9	2,950.7	2,949.6	8.9	6.3	-178.03	-178.03	-41.3	-15.8	373.6	360.3	13.31	28.078	
3,100.0	3,076.9	3,048.3	3,046.8	9.2	6.5	-178.63	-178.63	-49.3	-13.0	395.0	381.3	13.73	28.780	
3,200.0	3,176.0	3,145.9	3,144.1	9.6	6.7	-179.18	-179.18	-57.3	-10.2	416.5	402.4	14.15	29.435	
3,300.0	3,275.0	3,243.5	3,241.3	9.9	6.9	-179.67	-179.67	-65.3	-7.5	438.1	423.5	14.58	30.049	
3,400.0	3,374.1	3,341.0	3,338.5	10.2	7.1	-179.88	-179.88	-73.3	-4.7	459.6	444.6	15.01	30.623	
3,500.0	3,473.2	3,438.6	3,435.7	10.6	7.3	179.47	179.47	-81.3	-1.9	481.2	465.8	15.44	31.161	
3,600.0	3,572.2	3,536.2	3,532.9	10.9	7.6	179.10	179.10	-89.3	0.9	502.8	486.9	15.88	31.667	
3,700.0	3,671.3	3,633.8	3,630.2	11.3	7.8	178.76	178.76	-97.3	3.6	524.4	508.1	16.32	32.142	
3,800.0	3,770.3	3,731.4	3,727.4	11.6	8.0	178.44	178.44	-105.3	6.4	546.1	529.3	16.76	32.589	
3,900.0	3,869.4	3,829.0	3,824.6	11.9	8.2	178.15	178.15	-113.3	9.2	567.7	550.5	17.20	33.010	
4,000.0	3,968.4	3,926.6	3,921.8	12.3	8.4	177.88	177.88	-121.3	12.0	589.4	571.7	17.64	33.408	
4,100.0	4,067.5	4,024.2	4,019.1	12.6	8.7	177.63	177.63	-129.3	14.7	611.0	593.0	18.09	33.784	
4,200.0	4,166.5	4,121.8	4,116.3	12.9	8.9	177.40	177.40	-137.3	17.5	632.7	614.2	18.53	34.140	
4,300.0	4,265.6	4,219.3	4,213.5	13.3	9.1	177.18	177.18	-145.3	20.3	654.4	635.4	18.98	34.477	
4,400.0	4,364.6	4,333.8	4,327.6	13.6	9.4	176.98	176.98	-153.7	23.2	675.4	655.9	19.47	34.693	
4,500.0	4,463.7	4,460.7	4,454.3	13.9	9.7	176.91	176.91	-158.2	24.8	692.6	672.6	19.98	34.673	
4,600.0	4,562.7	4,570.1	4,563.7	14.3	9.9	176.97	176.97	-158.6	24.9	706.6	686.1	20.44	34.565	
4,700.0	4,661.8	4,669.1	4,662.8	14.6	10.1	177.03	177.03	-158.6	24.9	720.3	699.4	20.89	34.472	
4,800.0	4,760.8	4,768.2	4,761.8	14.9	10.3	177.08	177.08	-158.6	24.9	734.0	712.7	21.35	34.379	
4,900.0	4,859.9	4,867.2	4,860.9	15.3	10.5	177.14	177.14	-158.6	24.9	747.7	725.9	21.81	34.289	

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T-HZ Pad Sec.22-T5N-R65W - Lofland 22T-402 - Wellbore #1 - Plan #1 (5-14-13)													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
5,000.0	4,959.0	4,966.3	4,960.0	15.6	10.7	177.19		-158.6	24.9	761.4	739.2	22.26	34.202	
5,100.0	5,058.0	5,065.3	5,059.0	15.9	10.9	177.24		-158.6	24.9	775.1	752.4	22.72	34.118	
5,149.3	5,106.8	5,114.1	5,107.8	16.1	11.0	177.26		-158.6	24.9	781.9	758.9	22.94	34.078	
5,200.0	5,157.1	5,164.4	5,158.1	16.3	11.1	177.29		-158.6	24.9	788.4	765.2	23.19	34.003	
5,300.0	5,256.6	5,263.9	5,257.6	16.5	11.4	177.33		-158.6	24.9	798.6	775.0	23.61	33.820	
5,400.0	5,356.4	5,363.7	5,357.4	16.7	11.6	177.36		-158.6	24.9	805.4	781.4	24.01	33.540	
5,500.0	5,456.3	5,463.6	5,457.3	16.8	11.8	177.38		-158.6	24.9	808.6	784.3	24.38	33.169	
5,543.7	5,500.0	5,507.3	5,501.0	16.9	11.9	-178.22		-158.6	24.9	809.0	780.2	28.72	28.171	
5,600.0	5,556.3	5,563.6	5,557.3	17.0	12.0	-178.22		-158.6	24.9	809.0	780.1	28.91	27.977	
5,700.0	5,656.3	5,663.6	5,657.3	17.1	12.2	-178.22		-158.6	24.9	809.0	779.7	29.28	27.626	
5,800.0	5,756.3	5,763.6	5,757.3	17.3	12.4	-178.22		-158.6	24.9	809.0	779.3	29.65	27.281	
5,900.0	5,856.3	5,863.6	5,857.3	17.5	12.6	-178.22		-158.6	24.9	809.0	778.9	30.02	26.944	
6,000.0	5,956.3	5,963.6	5,957.3	17.6	12.8	-178.22		-158.6	24.9	809.0	778.6	30.40	26.612	
6,100.0	6,056.3	6,063.6	6,057.3	17.8	13.0	-178.22		-158.6	24.9	809.0	778.2	30.77	26.288	
6,121.6	6,077.9	6,085.2	6,078.9	17.8	13.1	-178.22		-158.6	24.9	809.0	778.1	30.85	26.219	
6,150.0	6,106.3	6,113.6	6,107.3	17.9	13.2	91.63		-158.6	24.9	809.0	781.9	27.10	29.849	
6,200.0	6,156.2	6,163.5	6,157.2	17.9	13.3	91.87		-158.6	24.9	809.1	781.8	27.31	29.625	
6,250.0	6,205.7	6,213.0	6,206.7	18.0	13.4	92.32		-158.6	24.9	809.3	781.8	27.52	29.405	
6,300.0	6,254.7	6,263.5	6,257.2	18.1	13.5	92.97		-158.6	25.4	809.8	782.0	27.74	29.188	
6,350.0	6,302.9	6,315.7	6,309.3	18.2	13.6	93.65		-158.6	29.0	810.4	782.4	27.98	28.967	
6,400.0	6,350.2	6,368.8	6,361.8	18.3	13.7	94.32		-158.6	36.3	811.0	782.8	28.22	28.736	
6,450.0	6,396.3	6,422.5	6,414.4	18.4	13.8	94.97		-158.7	47.4	811.8	783.3	28.49	28.492	
6,500.0	6,441.0	6,477.1	6,466.8	18.5	14.0	95.60		-158.7	62.5	812.7	783.9	28.79	28.226	
6,550.0	6,484.2	6,532.5	6,518.8	18.6	14.1	96.22		-158.8	81.5	813.6	784.5	29.13	27.932	
6,600.0	6,525.6	6,588.6	6,570.0	18.8	14.3	96.81		-158.9	104.6	814.6	785.1	29.52	27.597	
6,650.0	6,565.2	6,645.5	6,619.9	19.0	14.5	97.37		-159.0	131.8	815.6	785.6	29.98	27.210	
6,700.0	6,602.6	6,703.2	6,668.4	19.1	14.8	97.89		-159.1	163.0	816.7	786.1	30.52	26.757	
6,750.0	6,637.8	6,761.6	6,714.9	19.4	15.1	98.39		-159.2	198.3	817.7	786.5	31.18	26.224	
6,800.0	6,670.6	6,820.7	6,759.1	19.6	15.5	98.84		-159.4	237.6	818.7	786.7	31.97	25.608	
6,850.0	6,700.9	6,880.5	6,800.6	19.9	16.0	99.25		-159.6	280.6	819.6	786.7	32.91	24.906	
6,900.0	6,728.4	6,940.9	6,839.0	20.3	16.5	99.62		-159.7	327.2	820.5	786.5	34.02	24.121	
6,950.0	6,753.2	7,001.8	6,873.8	20.8	17.2	99.94		-159.9	377.2	821.3	786.0	35.31	23.263	
7,000.0	6,775.2	7,063.3	6,904.8	21.3	18.0	100.20		-160.1	430.2	822.0	785.2	36.80	22.339	
7,050.0	6,794.1	7,125.1	6,931.6	21.9	18.9	100.41		-160.3	485.9	822.6	784.1	38.47	21.380	
7,100.0	6,809.9	7,187.2	6,953.9	22.6	19.9	100.57		-160.6	543.9	823.0	782.7	40.33	20.406	
7,150.0	6,822.7	7,249.6	6,971.4	23.4	21.1	100.67		-160.8	603.7	823.3	780.9	42.35	19.439	
7,200.0	6,832.2	7,312.1	6,984.1	24.3	22.3	100.71		-161.0	664.9	823.4	778.9	44.53	18.490	
7,250.0	6,838.5	7,371.0	6,991.5	25.2	23.5	100.70		-161.3	723.3	823.4	776.7	46.76	17.612	
7,300.0	6,841.6	7,420.9	6,996.8	26.1	24.6	100.82		-161.4	773.0	823.9	775.0	48.86	16.862	
7,326.4	6,841.9	7,449.9	6,999.6	26.7	25.2	100.96		-161.6	801.8	824.3	774.3	50.05	16.471	
7,400.0	6,841.4	7,535.3	7,003.9	28.2	27.1	101.29		-161.9	887.1	825.2	771.7	53.47	15.434	
7,500.0	6,840.8	7,639.0	7,003.2	30.3	29.5	101.28		-162.3	990.8	825.2	767.2	58.08	14.209	
7,600.0	6,840.1	7,739.0	7,002.2	32.6	31.9	101.26		-162.7	1,090.8	825.2	762.5	62.76	13.148	
7,700.0	6,839.5	7,839.0	7,001.2	35.0	34.4	101.23		-163.0	1,190.8	825.2	757.6	67.57	12.212	
7,800.0	6,838.9	7,939.0	7,000.2	37.4	36.9	101.21		-163.4	1,290.8	825.2	752.7	72.49	11.384	
7,900.0	6,838.3	8,039.0	6,999.2	39.9	39.5	101.18		-163.8	1,390.8	825.2	747.7	77.48	10.650	
8,000.0	6,837.6	8,139.0	6,998.3	42.4	42.0	101.15		-164.2	1,490.8	825.2	742.6	82.55	9.996	
8,100.0	6,837.0	8,239.0	6,997.3	44.9	44.7	101.13		-164.5	1,590.8	825.2	737.5	87.67	9.412	
8,200.0	6,836.4	8,339.0	6,996.3	47.5	47.3	101.10		-164.9	1,690.8	825.2	732.3	92.84	8.888	
8,300.0	6,835.7	8,439.0	6,995.3	50.1	50.0	101.08		-165.3	1,790.8	825.2	727.1	98.05	8.416	
8,400.0	6,835.1	8,539.0	6,994.3	52.7	52.6	101.05		-165.7	1,890.8	825.1	721.9	103.29	7.989	

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 Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Offset Design Lofland 22T-HZ Pad Sec.22-T5N-R65W - Lofland 22T-402 - Wellbore #1 - Plan #1 (5-14-13)													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
8,500.0	6,834.5	8,639.0	6,993.3	55.4	55.3	101.03	101.03	-166.1	1,990.8	825.1	716.6	108.56	7.601	
8,600.0	6,833.9	8,739.0	6,992.3	58.0	58.0	101.00	101.00	-166.4	2,090.8	825.1	711.3	113.86	7.247	
8,700.0	6,833.2	8,839.0	6,991.3	60.7	60.7	100.97	100.97	-166.8	2,190.8	825.1	705.9	119.18	6.923	
8,800.0	6,832.6	8,939.0	6,990.3	63.4	63.4	100.95	100.95	-167.2	2,290.8	825.1	700.6	124.52	6.626	
8,900.0	6,832.0	9,039.0	6,989.3	66.1	66.2	100.92	100.92	-167.6	2,390.8	825.1	695.2	129.88	6.353	
9,000.0	6,831.3	9,139.0	6,988.3	68.8	68.9	100.90	100.90	-167.9	2,490.8	825.1	689.8	135.25	6.101	
9,100.0	6,830.7	9,239.0	6,987.3	71.5	71.6	100.87	100.87	-168.3	2,590.7	825.1	684.5	140.63	5.867	
9,200.0	6,830.1	9,339.0	6,986.3	74.2	74.4	100.85	100.85	-168.7	2,690.7	825.1	679.1	146.03	5.650	
9,300.0	6,829.5	9,439.0	6,985.3	77.0	77.1	100.82	100.82	-169.1	2,790.7	825.1	673.6	151.43	5.448	
9,400.0	6,828.8	9,539.0	6,984.4	79.7	79.9	100.79	100.79	-169.5	2,890.7	825.1	668.2	156.85	5.260	
9,500.0	6,828.2	9,639.0	6,983.4	82.4	82.6	100.77	100.77	-169.8	2,990.7	825.1	662.8	162.28	5.084	
9,600.0	6,827.6	9,739.0	6,982.4	85.2	85.4	100.74	100.74	-170.2	3,090.7	825.0	657.3	167.71	4.919	
9,700.0	6,826.9	9,839.0	6,981.4	87.9	88.1	100.72	100.72	-170.6	3,190.7	825.0	651.9	173.15	4.765	
9,800.0	6,826.3	9,939.0	6,980.4	90.7	90.9	100.69	100.69	-171.0	3,290.7	825.0	646.4	178.60	4.619	
9,900.0	6,825.7	10,039.0	6,979.4	93.4	93.7	100.67	100.67	-171.4	3,390.7	825.0	641.0	184.06	4.482	
10,000.0	6,825.1	10,139.0	6,978.4	96.2	96.4	100.64	100.64	-171.7	3,490.7	825.0	635.5	189.52	4.353	
10,100.0	6,824.4	10,239.0	6,977.4	98.9	99.2	100.62	100.62	-172.1	3,590.7	825.0	630.0	194.99	4.231	
10,200.0	6,823.8	10,339.0	6,976.4	101.7	102.0	100.59	100.59	-172.5	3,690.7	825.0	624.5	200.46	4.116	
10,300.0	6,823.2	10,439.0	6,975.4	104.5	104.8	100.56	100.56	-172.9	3,790.7	825.0	619.1	205.93	4.006	
10,400.0	6,822.5	10,539.0	6,974.4	107.2	107.5	100.54	100.54	-173.2	3,890.7	825.0	613.6	211.41	3.902	
10,500.0	6,821.9	10,639.0	6,973.4	110.0	110.3	100.51	100.51	-173.6	3,990.7	825.0	608.1	216.90	3.804	
10,600.0	6,821.3	10,739.0	6,972.4	112.8	113.1	100.49	100.49	-174.0	4,090.6	825.0	602.6	222.39	3.710	
10,700.0	6,820.7	10,839.0	6,971.4	115.5	115.9	100.46	100.46	-174.4	4,190.6	825.0	597.1	227.88	3.620	
10,800.0	6,820.0	10,939.0	6,970.5	118.3	118.7	100.44	100.44	-174.8	4,290.6	825.0	591.6	233.38	3.535	
10,900.0	6,819.4	11,039.0	6,969.5	121.1	121.4	100.41	100.41	-175.1	4,390.6	825.0	586.1	238.87	3.454	
11,000.0	6,818.8	11,139.0	6,968.5	123.9	124.2	100.38	100.38	-175.5	4,490.6	825.0	580.6	244.38	3.376	
11,100.0	6,818.2	11,239.0	6,967.5	126.6	127.0	100.36	100.36	-175.9	4,590.6	825.0	575.1	249.88	3.301	
11,200.0	6,817.5	11,339.0	6,966.5	129.4	129.8	100.33	100.33	-176.3	4,690.6	824.9	569.6	255.39	3.230	
11,300.0	6,816.9	11,439.0	6,965.5	132.2	132.6	100.31	100.31	-176.6	4,790.6	824.9	564.0	260.90	3.162	
11,400.0	6,816.3	11,539.0	6,964.5	135.0	135.4	100.28	100.28	-177.0	4,890.6	824.9	558.5	266.41	3.096	
11,500.0	6,815.6	11,639.0	6,963.5	137.8	138.2	100.26	100.26	-177.4	4,990.6	824.9	553.0	271.93	3.034	
11,600.0	6,815.0	11,739.0	6,962.5	140.6	140.9	100.23	100.23	-177.8	5,090.6	824.9	547.5	277.45	2.973	
11,700.0	6,814.4	11,839.0	6,961.5	143.3	143.7	100.20	100.20	-178.2	5,190.6	824.9	542.0	282.97	2.915	
11,800.0	6,813.8	11,939.0	6,960.5	146.1	146.5	100.18	100.18	-178.5	5,290.6	824.9	536.4	288.49	2.859	
11,900.0	6,813.1	12,039.0	6,959.5	148.9	149.3	100.15	100.15	-178.9	5,390.6	824.9	530.9	294.01	2.806	
12,000.0	6,812.5	12,139.0	6,958.5	151.7	152.1	100.13	100.13	-179.3	5,490.6	824.9	525.4	299.54	2.754	
12,100.0	6,811.9	12,239.0	6,957.5	154.5	154.9	100.10	100.10	-179.7	5,590.6	824.9	519.8	305.07	2.704	
12,200.0	6,811.2	12,339.0	6,956.6	157.3	157.7	100.08	100.08	-180.1	5,690.5	824.9	514.3	310.60	2.656	
12,300.0	6,810.6	12,439.0	6,955.6	160.1	160.5	100.05	100.05	-180.4	5,790.5	824.9	508.8	316.13	2.609	
12,400.0	6,810.0	12,539.0	6,954.6	162.9	163.3	100.02	100.02	-180.8	5,890.5	824.9	503.2	321.66	2.564	
12,500.0	6,809.4	12,639.0	6,953.6	165.7	166.1	100.00	100.00	-181.2	5,990.5	824.9	497.7	327.20	2.521	
12,556.3	6,809.0	12,695.3	6,953.0	167.2	167.7	99.98	99.98	-181.4	6,046.8	824.9	494.6	330.31	2.497 SF	

Reference Depths are relative to WELL @ 4662.0ft (Original Well Elev) Coordinates are relative to: Lofland 22D-232
Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.500000 ° Grid Convergence at Surface is: 0.55°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Lofland 22D-232
Project:	SEC.22-T5N-R65W	TVD Reference:	WELL @ 4662.0ft (Original Well Elev)
Reference Site:	Lofland 22T-HZ Pad Sec.22-T5N-R65W	MD Reference:	WELL @ 4662.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Lofland 22D-232	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 (5-14-13)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4662.0ft (Original Well Elev) Coordinates are relative to: Lofland 22D-232
Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.500000 ° Grid Convergence at Surface is: 0.55°

