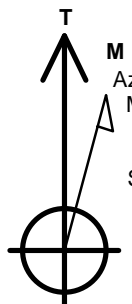


# PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: Sorin Natural Resources 2R-323  
 Surface Location: Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W  
 North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone  
 Ground Elevation: 4671.0  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.0 0.0 1370685.70 3211898.73 40.348440 -104.739740  
 RKB -15' WELL @ 4686.0ft (RKB -15')

## WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 20'FNL, 1394'FEL	1.0	0.0	0.0	Point
BHL 500' FSL, 834' FEL	7021.0	-4874.4	479.5	Point



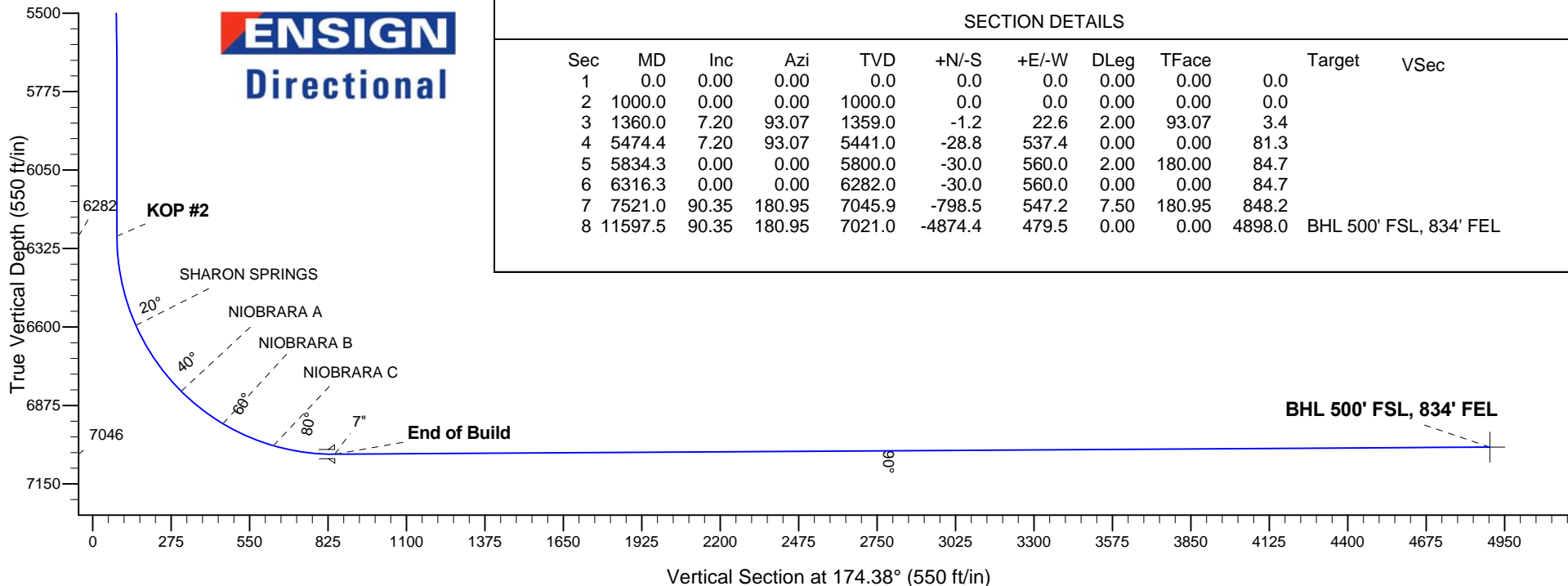
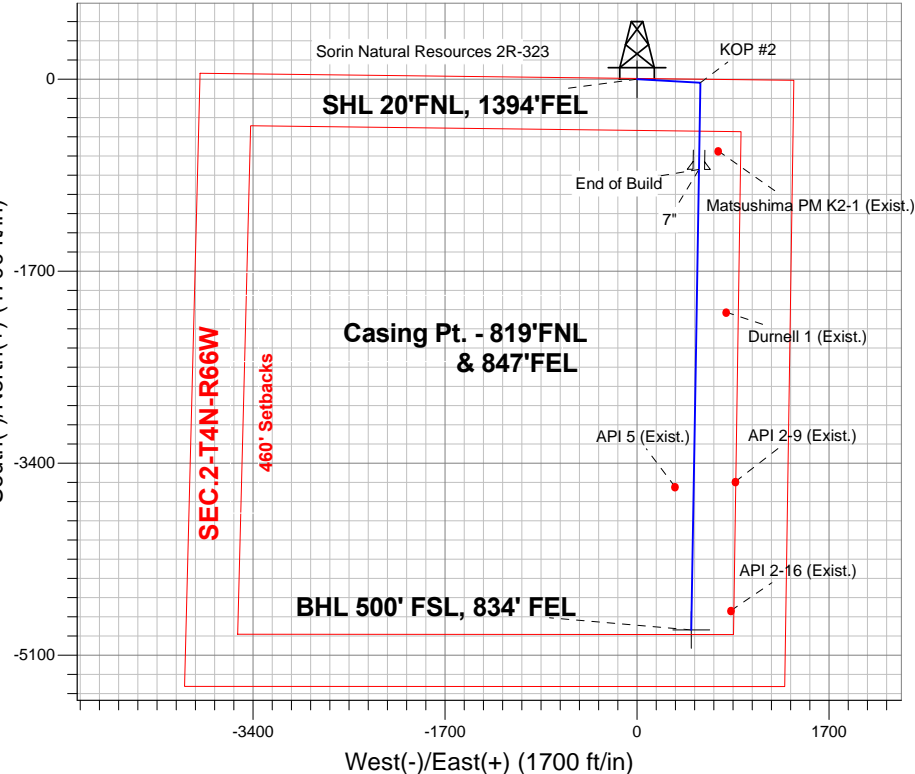
Azimuths to True North  
 Magnetic North: 8.52°  
 Magnetic Field  
 Strength: 52854.2snT  
 Dip Angle: 66.93°  
 Date: 11/12/2013  
 Model: IGRF2010

## ANNOTATIONS

TVD	MD	Annotation
1000.0	1000.0	KOP #1
6282.0	6316.3	KOP #2
7045.9	7521.0	End of Build

Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W  
 Sorin Natural Resources 2R-323  
 Plan #2 (11-12-13)  
 10:41, November 15 2013

South(-)/North(+) (1700 ft/in)



## SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	Target	VSec
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1000.0	0.00	0.00	1000.0	0.0	0.0	0.00	0.00	0.0	
3	1360.0	7.20	93.07	1359.0	-1.2	22.6	2.00	93.07	3.4	
4	5474.4	7.20	93.07	5441.0	-28.8	537.4	0.00	0.00	81.3	
5	5834.3	0.00	0.00	5800.0	-30.0	560.0	2.00	180.00	84.7	
6	6316.3	0.00	0.00	6282.0	-30.0	560.0	0.00	0.00	84.7	
7	7521.0	90.35	180.95	7045.9	-798.5	547.2	7.50	180.95	848.2	
8	11597.5	90.35	180.95	7021.0	-4874.4	479.5	0.00	0.00	4898.0	BHL 500' FSL, 834' FEL



# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.2-T4N-R66W**

**Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W**

**Sorin Natural Resources 2R-323**

**Wellbore #1**

**Plan: Plan #2 (11-12-13)**

## **Standard Planning Report**

**15 November, 2013**

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Project:</b>	SEC.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (11-12-13)		

<b>Project</b>	SEC.2-T4N-R66W, Weld County, Colorado		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

Site						Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W											
Site Position:						Northing:			1,370,685.98 ft			Latitude:			40.348440		
From:			Lat/Long			Easting:			3,211,929.38 ft			Longitude:			-104.739630		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.49 °		

Well	Sorin Natural Resources 2R-323					
Well Position	+N/-S	0.0 ft	Northing:	1,370,685.70 ft	Latitude:	40.348440
	+E/-W	-30.7 ft	Easting:	3,211,898.73 ft	Longitude:	-104.739740
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,671.0 ft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	11/12/2013	8.52	66.93	52,854

<b>Design</b>	Plan #2 (11-12-13)			
<b>Audit Notes:</b>				
<b>Version:</b>	<b>Phase:</b>	PROTOTYPE	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	174.38

<b>Plan Sections</b>										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,360.0	7.20	93.07	1,359.0	-1.2	22.6	2.00	2.00	0.00	93.07	
5,474.4	7.20	93.07	5,441.0	-28.8	537.4	0.00	0.00	0.00	0.00	
5,834.3	0.00	0.00	5,800.0	-30.0	560.0	2.00	-2.00	0.00	180.00	
6,316.3	0.00	0.00	6,282.0	-30.0	560.0	0.00	0.00	0.00	0.00	
7,521.0	90.35	180.95	7,045.9	-798.5	547.2	7.50	7.50	0.00	180.95	
11,597.5	90.35	180.95	7,021.0	-4,874.4	479.5	0.00	0.00	0.00	0.00	BHL 500' FSL, 834'

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Project:</b>	SEC.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (11-12-13)		

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
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>SHL 20'FNL, 1394'FEL</b>									
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
<b>KOP #1</b>									
1,100.0	2.00	93.07	1,100.0	-0.1	1.7	0.3	2.00	2.00	0.00
1,200.0	4.00	93.07	1,199.8	-0.4	7.0	1.1	2.00	2.00	0.00
1,300.0	6.00	93.07	1,299.5	-0.8	15.7	2.4	2.00	2.00	0.00
1,360.0	7.20	93.07	1,359.0	-1.2	22.6	3.4	2.00	2.00	0.00
1,400.0	7.20	93.07	1,398.7	-1.5	27.6	4.2	0.00	0.00	0.00
1,500.0	7.20	93.07	1,497.9	-2.1	40.1	6.1	0.00	0.00	0.00
1,600.0	7.20	93.07	1,597.2	-2.8	52.6	8.0	0.00	0.00	0.00
1,700.0	7.20	93.07	1,696.4	-3.5	65.1	9.8	0.00	0.00	0.00
1,800.0	7.20	93.07	1,795.6	-4.2	77.6	11.7	0.00	0.00	0.00
1,900.0	7.20	93.07	1,894.8	-4.8	90.1	13.6	0.00	0.00	0.00
2,000.0	7.20	93.07	1,994.0	-5.5	102.6	15.5	0.00	0.00	0.00
2,100.0	7.20	93.07	2,093.2	-6.2	115.2	17.4	0.00	0.00	0.00
2,200.0	7.20	93.07	2,192.4	-6.8	127.7	19.3	0.00	0.00	0.00
2,300.0	7.20	93.07	2,291.6	-7.5	140.2	21.2	0.00	0.00	0.00
2,400.0	7.20	93.07	2,390.9	-8.2	152.7	23.1	0.00	0.00	0.00
2,500.0	7.20	93.07	2,490.1	-8.9	165.2	25.0	0.00	0.00	0.00
2,600.0	7.20	93.07	2,589.3	-9.5	177.7	26.9	0.00	0.00	0.00
2,700.0	7.20	93.07	2,688.5	-10.2	190.3	28.8	0.00	0.00	0.00
2,800.0	7.20	93.07	2,787.7	-10.9	202.8	30.7	0.00	0.00	0.00
2,900.0	7.20	93.07	2,886.9	-11.5	215.3	32.6	0.00	0.00	0.00
3,000.0	7.20	93.07	2,986.1	-12.2	227.8	34.4	0.00	0.00	0.00
3,100.0	7.20	93.07	3,085.3	-12.9	240.3	36.3	0.00	0.00	0.00
3,200.0	7.20	93.07	3,184.5	-13.5	252.8	38.2	0.00	0.00	0.00
3,300.0	7.20	93.07	3,283.8	-14.2	265.3	40.1	0.00	0.00	0.00
3,400.0	7.20	93.07	3,383.0	-14.9	277.9	42.0	0.00	0.00	0.00
3,500.0	7.20	93.07	3,482.2	-15.6	290.4	43.9	0.00	0.00	0.00
3,600.0	7.20	93.07	3,581.4	-16.2	302.9	45.8	0.00	0.00	0.00
3,618.8	7.20	93.07	3,600.0	-16.4	305.2	46.2	0.00	0.00	0.00
<b>PARKMAN</b>									
3,700.0	7.20	93.07	3,680.6	-16.9	315.4	47.7	0.00	0.00	0.00
3,800.0	7.20	93.07	3,779.8	-17.6	327.9	49.6	0.00	0.00	0.00
3,900.0	7.20	93.07	3,879.0	-18.2	340.4	51.5	0.00	0.00	0.00
4,000.0	7.20	93.07	3,978.2	-18.9	352.9	53.4	0.00	0.00	0.00
4,100.0	7.20	93.07	4,077.5	-19.6	365.5	55.3	0.00	0.00	0.00
4,122.7	7.20	93.07	4,100.0	-19.7	368.3	55.7	0.00	0.00	0.00
<b>SUSSEX</b>									
4,200.0	7.20	93.07	4,176.7	-20.2	378.0	57.2	0.00	0.00	0.00
4,300.0	7.20	93.07	4,275.9	-20.9	390.5	59.0	0.00	0.00	0.00

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Project:</b>	SEC.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (11-12-13)		

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)
4,400.0	7.20	93.07	4,375.1	-21.6	403.0	60.9	0.00	0.00	0.00
4,500.0	7.20	93.07	4,474.3	-22.3	415.5	62.8	0.00	0.00	0.00
4,600.0	7.20	93.07	4,573.5	-22.9	428.0	64.7	0.00	0.00	0.00
4,700.0	7.20	93.07	4,672.7	-23.6	440.5	66.6	0.00	0.00	0.00
4,777.9	7.20	93.07	4,750.0	-24.1	450.3	68.1	0.00	0.00	0.00
<b>SHANNON</b>									
4,800.0	7.20	93.07	4,771.9	-24.3	453.1	68.5	0.00	0.00	0.00
4,900.0	7.20	93.07	4,871.1	-24.9	465.6	70.4	0.00	0.00	0.00
5,000.0	7.20	93.07	4,970.4	-25.6	478.1	72.3	0.00	0.00	0.00
5,100.0	7.20	93.07	5,069.6	-26.3	490.6	74.2	0.00	0.00	0.00
5,200.0	7.20	93.07	5,168.8	-27.0	503.1	76.1	0.00	0.00	0.00
5,300.0	7.20	93.07	5,268.0	-27.6	515.6	78.0	0.00	0.00	0.00
5,400.0	7.20	93.07	5,367.2	-28.3	528.1	79.9	0.00	0.00	0.00
5,474.4	7.20	93.07	5,441.0	-28.8	537.4	81.3	0.00	0.00	0.00
5,500.0	6.69	93.07	5,466.4	-29.0	540.5	81.7	2.00	-2.00	0.00
5,600.0	4.69	93.07	5,565.9	-29.5	550.4	83.2	2.00	-2.00	0.00
5,700.0	2.69	93.07	5,665.7	-29.8	556.9	84.2	2.00	-2.00	0.00
5,800.0	0.69	93.07	5,765.7	-30.0	559.8	84.6	2.00	-2.00	0.00
5,834.3	0.00	0.00	5,800.0	-30.0	560.0	84.7	2.00	-2.00	0.00
5,900.0	0.00	0.00	5,865.7	-30.0	560.0	84.7	0.00	0.00	0.00
6,000.0	0.00	0.00	5,965.7	-30.0	560.0	84.7	0.00	0.00	0.00
6,100.0	0.00	0.00	6,065.7	-30.0	560.0	84.7	0.00	0.00	0.00
6,200.0	0.00	0.00	6,165.7	-30.0	560.0	84.7	0.00	0.00	0.00
6,300.0	0.00	0.00	6,265.7	-30.0	560.0	84.7	0.00	0.00	0.00
6,316.3	0.00	0.00	6,282.0	-30.0	560.0	84.7	0.00	0.00	0.00
<b>KOP #2</b>									
6,400.0	6.28	180.95	6,365.5	-34.6	559.9	89.2	7.50	7.50	0.00
6,500.0	13.78	180.95	6,463.9	-52.0	559.6	106.5	7.50	7.50	0.00
6,600.0	21.28	180.95	6,559.2	-82.1	559.1	136.4	7.50	7.50	0.00
6,637.7	24.11	180.95	6,594.0	-96.6	558.9	150.9	7.50	7.50	0.00
<b>SHARON SPRINGS</b>									
6,700.0	28.78	180.95	6,649.7	-124.3	558.4	178.4	7.50	7.50	0.00
6,800.0	36.28	180.95	6,734.0	-178.1	557.5	231.8	7.50	7.50	0.00
6,900.0	43.78	180.95	6,810.5	-242.3	556.5	295.6	7.50	7.50	0.00
6,920.3	45.30	180.95	6,825.0	-256.6	556.2	309.8	7.50	7.50	0.00
<b>NIOBRARA A</b>									
7,000.0	51.28	180.95	6,878.0	-316.0	555.2	368.9	7.50	7.50	0.00
7,100.0	58.78	180.95	6,935.3	-397.9	553.9	450.2	7.50	7.50	0.00
7,107.3	59.32	180.95	6,939.0	-404.1	553.8	456.4	7.50	7.50	0.00
<b>NIOBRARA B</b>									
7,200.0	66.28	180.95	6,981.4	-486.5	552.4	538.3	7.50	7.50	0.00
7,300.0	73.78	180.95	7,015.5	-580.4	550.9	631.6	7.50	7.50	0.00
7,301.8	73.91	180.95	7,016.0	-582.2	550.8	633.3	7.50	7.50	0.00
<b>NIOBRARA C</b>									
7,400.0	81.28	180.95	7,037.1	-678.0	549.2	728.5	7.50	7.50	0.00
7,500.0	88.78	180.95	7,045.7	-777.5	547.6	827.4	7.50	7.50	0.00
7,521.0	90.35	180.95	7,045.9	-798.5	547.2	848.3	7.49	7.49	0.00
<b>End of Build - 7"</b>									
7,600.0	90.35	180.95	7,045.4	-877.5	545.9	926.8	0.00	0.00	0.00
7,700.0	90.35	180.95	7,044.8	-977.5	544.3	1,026.1	0.00	0.00	0.00
7,800.0	90.35	180.95	7,044.2	-1,077.5	542.6	1,125.4	0.00	0.00	0.00

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Project:</b>	SEC.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (11-12-13)		

## 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)
7,900.0	90.35	180.95	7,043.6	-1,177.5	540.9	1,224.8	0.00	0.00	0.00
8,000.0	90.35	180.95	7,043.0	-1,277.5	539.3	1,324.1	0.00	0.00	0.00
8,100.0	90.35	180.95	7,042.4	-1,377.4	537.6	1,423.5	0.00	0.00	0.00
8,200.0	90.35	180.95	7,041.8	-1,477.4	536.0	1,522.8	0.00	0.00	0.00
8,300.0	90.35	180.95	7,041.1	-1,577.4	534.3	1,622.1	0.00	0.00	0.00
8,400.0	90.35	180.95	7,040.5	-1,677.4	532.6	1,721.5	0.00	0.00	0.00
8,500.0	90.35	180.95	7,039.9	-1,777.4	531.0	1,820.8	0.00	0.00	0.00
8,600.0	90.35	180.95	7,039.3	-1,877.4	529.3	1,920.2	0.00	0.00	0.00
8,700.0	90.35	180.95	7,038.7	-1,977.3	527.6	2,019.5	0.00	0.00	0.00
8,800.0	90.35	180.95	7,038.1	-2,077.3	526.0	2,118.8	0.00	0.00	0.00
8,900.0	90.35	180.95	7,037.5	-2,177.3	524.3	2,218.2	0.00	0.00	0.00
9,000.0	90.35	180.95	7,036.9	-2,277.3	522.7	2,317.5	0.00	0.00	0.00
9,100.0	90.35	180.95	7,036.3	-2,377.3	521.0	2,416.9	0.00	0.00	0.00
9,200.0	90.35	180.95	7,035.6	-2,477.3	519.3	2,516.2	0.00	0.00	0.00
9,300.0	90.35	180.95	7,035.0	-2,577.3	517.7	2,615.6	0.00	0.00	0.00
9,400.0	90.35	180.95	7,034.4	-2,677.2	516.0	2,714.9	0.00	0.00	0.00
9,500.0	90.35	180.95	7,033.8	-2,777.2	514.4	2,814.2	0.00	0.00	0.00
9,600.0	90.35	180.95	7,033.2	-2,877.2	512.7	2,913.6	0.00	0.00	0.00
9,700.0	90.35	180.95	7,032.6	-2,977.2	511.0	3,012.9	0.00	0.00	0.00
9,800.0	90.35	180.95	7,032.0	-3,077.2	509.4	3,112.3	0.00	0.00	0.00
9,900.0	90.35	180.95	7,031.4	-3,177.2	507.7	3,211.6	0.00	0.00	0.00
10,000.0	90.35	180.95	7,030.8	-3,277.1	506.1	3,310.9	0.00	0.00	0.00
10,100.0	90.35	180.95	7,030.1	-3,377.1	504.4	3,410.3	0.00	0.00	0.00
10,200.0	90.35	180.95	7,029.5	-3,477.1	502.7	3,509.6	0.00	0.00	0.00
10,300.0	90.35	180.95	7,028.9	-3,577.1	501.1	3,609.0	0.00	0.00	0.00
10,400.0	90.35	180.95	7,028.3	-3,677.1	499.4	3,708.3	0.00	0.00	0.00
10,500.0	90.35	180.95	7,027.7	-3,777.1	497.7	3,807.7	0.00	0.00	0.00
10,600.0	90.35	180.95	7,027.1	-3,877.1	496.1	3,907.0	0.00	0.00	0.00
10,700.0	90.35	180.95	7,026.5	-3,977.0	494.4	4,006.3	0.00	0.00	0.00
10,800.0	90.35	180.95	7,025.9	-4,077.0	492.8	4,105.7	0.00	0.00	0.00
10,900.0	90.35	180.95	7,025.3	-4,177.0	491.1	4,205.0	0.00	0.00	0.00
11,000.0	90.35	180.95	7,024.7	-4,277.0	489.4	4,304.4	0.00	0.00	0.00
11,100.0	90.35	180.95	7,024.0	-4,377.0	487.8	4,403.7	0.00	0.00	0.00
11,200.0	90.35	180.95	7,023.4	-4,477.0	486.1	4,503.0	0.00	0.00	0.00
11,300.0	90.35	180.95	7,022.8	-4,576.9	484.5	4,602.4	0.00	0.00	0.00
11,400.0	90.35	180.95	7,022.2	-4,676.9	482.8	4,701.7	0.00	0.00	0.00
11,500.0	90.35	180.95	7,021.6	-4,776.9	481.1	4,801.1	0.00	0.00	0.00
11,597.5	90.35	180.95	7,021.0	-4,874.4	479.5	4,898.0	0.00	0.00	0.00

BHL 500' FSL, 834' FEL

## Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,521.0	7,045.9	7"	7	8-3/4

<b>Database:</b>	Landmark	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Project:</b>	SEC.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>North Reference:</b>	True
<b>Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Wellbore:</b>	Wellbore #1		
<b>Design:</b>	Plan #2 (11-12-13)		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,618.8	3,600.0	PARKMAN				
4,122.7	4,100.0	SUSSEX				
4,777.9	4,750.0	SHANNON				
6,637.7	6,594.0	SHARON SPRINGS				
6,920.3	6,825.0	NIOBRARA A				
7,107.3	6,939.0	NIOBRARA B				
7,301.8	7,016.0	NIOBRARA C				

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,000.0	1,000.0	0.0	0.0	KOP #1
6,316.3	6,282.0	-30.0	560.0	KOP #2
7,521.0	7,045.9	-798.5	547.2	End of Build

# **PETROLEUM DEVELOPMENT CORP Weld County CO**

**SEC.2-T4N-R66W**

**Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W**

**Sorin Natural Resources 2R-323**

**Wellbore #1**

**Plan #2 (11-12-13)**

## **Anticollision Report**

**15 November, 2013**



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Plan #2 (11-12-13)		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD Interval 100.0ft	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 1,000.0ft	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.00 Sigma		

<b>Survey Tool Program</b>	<b>Date</b> 11/12/2013			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	11,597.5	Plan #2 (11-12-13) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
<b>Offset Well - Wellbore - Design</b>						
Sorin Natural Existing wells Sec.2-T4N-R66W						
API 2-16 (Exist.) - Wellbore #1 - Wellbore #1	11,420.5	7,056.1	348.4	116.3	1.501	CC, ES, SF
API 2-9 (Exist.) - Wellbore #1 - Wellbore #1	10,279.7	7,063.1	368.4	157.6	1.748	CC, ES
API 2-9 (Exist.) - Wellbore #1 - Wellbore #1	10,300.0	7,062.9	369.0	157.8	1.747	SF
API 5 (Exist.) - Wellbore #1 - Wellbore #1	10,332.3	7,063.7	166.0	-45.8	0.784	Level 1, CC, ES, SF
Durnell 1 (Exist.) - Wellbore #1 - Wellbore #1	8,780.3	7,034.2	262.6	79.9	1.437	Level 3, CC, ES, SF
Matsushima PM K2-1 (Exist.) - Wellbore #1 - Wellbore #	7,352.3	7,026.4	166.4	6.4	1.040	Level 2, CC, ES, SF
Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W						
Sorin Natural Resources 2R-403 - Wellbore #1 - Plan #1	1,000.0	1,000.0	30.7	26.4	7.180	CC, ES
Sorin Natural Resources 2R-403 - Wellbore #1 - Plan #1	11,597.5	11,663.7	351.1	173.2	1.974	SF
Sorin Natural Resources 2U-443 - Wellbore #1 - Plan #1	400.0	400.0	30.7	29.1	19.487	CC, ES
Sorin Natural Resources 2U-443 - Wellbore #1 - Plan #1	11,597.5	11,732.7	404.5	225.1	2.254	SF

Offset Design		Sorin Natural Existing wells Sec.2-T4N-R66W - API 2-16 (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			Distance										
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning				
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)						
10,500.0	7,027.7	7,061.7	7,061.7	74.3	141.2	-90.92	-4,703.2	830.8	984.2	769.4	214.84	4.581					
10,600.0	7,027.1	7,061.1	7,061.1	76.1	141.2	-90.82	-4,703.2	830.8	891.4	674.7	216.71	4.113					
10,700.0	7,026.5	7,060.5	7,060.5	78.0	141.2	-90.72	-4,703.2	830.8	800.3	581.7	218.58	3.661					
10,800.0	7,025.9	7,059.9	7,059.9	79.8	141.2	-90.62	-4,703.2	830.8	711.6	491.1	220.45	3.228					
10,900.0	7,025.3	7,059.3	7,059.3	81.7	141.2	-90.52	-4,703.2	830.8	626.3	404.0	222.33	2.817					
11,000.0	7,024.7	7,058.7	7,058.7	83.6	141.2	-90.42	-4,703.2	830.8	546.1	321.9	224.20	2.436					
11,100.0	7,024.0	7,058.0	7,058.0	85.4	141.2	-90.32	-4,703.2	830.8	473.4	247.3	226.08	2.094					
11,200.0	7,023.4	7,057.4	7,057.4	87.3	141.1	-90.22	-4,703.2	830.8	412.3	184.3	227.95	1.809					
11,300.0	7,022.8	7,056.8	7,056.8	89.2	141.1	-90.12	-4,703.2	830.8	368.6	138.8	229.83	1.604					
11,400.0	7,022.2	7,056.2	7,056.2	91.1	141.1	-90.02	-4,703.2	830.8	349.0	117.3	231.71	1.506					
11,420.5	7,022.1	7,056.1	7,056.1	91.5	141.1	-90.00	-4,703.2	830.8	348.4	116.3	232.09	1.501	CC, ES, SF				
11,500.0	7,021.6	7,055.6	7,055.6	92.9	141.1	-89.92	-4,703.2	830.8	357.3	123.7	233.58	1.530					
11,597.5	7,021.0	7,055.0	7,055.0	94.8	141.1	-89.82	-4,703.2	830.8	390.8	155.4	235.42	1.660					

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Sorin Natural Existing wells Sec.2-T4N-R66W - API 2-9 (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			Distance							Warning			
Measured Depth Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference  (ft)	Offset  (ft)	Highside Toolface (°)	Offset Wellbore Centre  +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor					
9,400.0	7,034.4	7,068.4	7,068.4	54.1	141.4	-90.84	-3,562.9	869.8	953.7	759.1	194.58	4.901					
9,500.0	7,033.8	7,067.8	7,067.8	55.9	141.4	-90.74	-3,562.9	869.8	862.3	665.9	196.41	4.390					
9,600.0	7,033.2	7,067.2	7,067.2	57.7	141.3	-90.65	-3,562.9	869.8	773.1	574.9	198.25	3.900					
9,700.0	7,032.6	7,066.6	7,066.6	59.5	141.3	-90.55	-3,562.9	869.8	686.9	486.8	200.08	3.433					
9,800.0	7,032.0	7,066.0	7,066.0	61.3	141.3	-90.46	-3,562.9	869.8	604.8	402.9	201.93	2.995					
9,900.0	7,031.4	7,065.4	7,065.4	63.2	141.3	-90.36	-3,562.9	869.8	529.1	325.3	203.77	2.596					
10,000.0	7,030.8	7,064.8	7,064.8	65.0	141.3	-90.27	-3,562.9	869.8	462.6	256.9	205.62	2.250					
10,100.0	7,030.1	7,064.1	7,064.1	66.9	141.3	-90.17	-3,562.9	869.8	409.9	202.4	207.47	1.976					
10,200.0	7,029.5	7,063.5	7,063.5	68.7	141.3	-90.08	-3,562.9	869.8	376.9	167.6	209.33	1.801					
10,279.7	7,029.1	7,063.1	7,063.1	70.2	141.3	-90.00	-3,562.9	869.8	368.4	157.6	210.81	1.748 CC, ES					
10,300.0	7,028.9	7,062.9	7,062.9	70.6	141.3	-89.98	-3,562.9	869.8	369.0	157.8	211.18	1.747 SF					
10,400.0	7,028.3	7,062.3	7,062.3	72.4	141.2	-89.89	-3,562.9	869.8	387.6	174.5	213.04	1.819					
10,500.0	7,027.7	7,061.7	7,061.7	74.3	141.2	-89.79	-3,562.9	869.8	429.3	214.4	214.90	1.997					
10,600.0	7,027.1	7,061.1	7,061.1	76.1	141.2	-89.70	-3,562.9	869.8	488.2	271.4	216.76	2.252					
10,700.0	7,026.5	7,060.5	7,060.5	78.0	141.2	-89.60	-3,562.9	869.8	558.9	340.3	218.63	2.556					
10,800.0	7,025.9	7,059.9	7,059.9	79.8	141.2	-89.51	-3,562.9	869.8	637.5	417.0	220.49	2.891					
10,900.0	7,025.3	7,059.3	7,059.3	81.7	141.2	-89.41	-3,562.9	869.8	721.5	499.1	222.36	3.245					
11,000.0	7,024.7	7,058.7	7,058.7	83.6	141.2	-89.32	-3,562.9	869.8	809.0	584.8	224.23	3.608					
11,100.0	7,024.0	7,058.0	7,058.0	85.4	141.2	-89.22	-3,562.9	869.8	899.2	673.1	226.09	3.977					
11,200.0	7,023.4	7,057.4	7,057.4	87.3	141.1	-89.13	-3,562.9	869.8	991.3	763.3	227.96	4.348					

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
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<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Sorin Natural Existing wells Sec.2-T4N-R66W - API 5 (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			Distance							Warning			
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor					
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)						
9,400.0	7,034.4	7,069.4	7,069.4	54.1	141.4	91.96	-3,606.6	334.5	947.0	752.4	194.60	4.866					
9,500.0	7,033.8	7,068.8	7,068.8	55.9	141.4	91.75	-3,606.6	334.5	848.7	652.3	196.44	4.320					
9,600.0	7,033.2	7,068.2	7,068.2	57.7	141.4	91.54	-3,606.6	334.5	750.9	552.6	198.28	3.787					
9,700.0	7,032.6	7,067.6	7,067.6	59.5	141.4	91.33	-3,606.6	334.5	653.7	453.6	200.12	3.267					
9,800.0	7,032.0	7,067.0	7,067.0	61.3	141.3	91.12	-3,606.6	334.5	557.6	355.6	201.96	2.761					
9,900.0	7,031.4	7,066.4	7,066.4	63.2	141.3	90.91	-3,606.6	334.5	463.1	259.3	203.81	2.272					
10,000.0	7,030.8	7,065.8	7,065.8	65.0	141.3	90.70	-3,606.6	334.5	371.5	165.8	205.66	1.806					
10,100.0	7,030.1	7,065.1	7,065.1	66.9	141.3	90.49	-3,606.6	334.5	285.5	78.0	207.51	1.376	Level 3				
10,200.0	7,029.5	7,064.5	7,064.5	68.7	141.3	90.28	-3,606.6	334.5	212.3	2.9	209.36	1.014	Level 2				
10,300.0	7,028.9	7,063.9	7,063.9	70.6	141.3	90.07	-3,606.6	334.5	169.1	-42.1	211.20	0.801	Level 1				
10,332.3	7,028.7	7,063.7	7,063.7	71.2	141.3	90.00	-3,606.6	334.5	166.0	-45.8	211.80	0.784	Level 1, CC, ES, SF				
10,400.0	7,028.3	7,063.3	7,063.3	72.4	141.3	89.86	-3,606.6	334.5	179.3	-33.8	213.05	0.842	Level 1				
10,500.0	7,027.7	7,062.7	7,062.7	74.3	141.3	89.65	-3,606.6	334.5	236.0	21.1	214.90	1.098	Level 2				
10,600.0	7,027.1	7,062.1	7,062.1	76.1	141.2	89.44	-3,606.6	334.5	315.0	98.2	216.75	1.453	Level 3				
10,700.0	7,026.5	7,061.5	7,061.5	78.0	141.2	89.22	-3,606.6	334.5	403.4	184.8	218.60	1.846					
10,800.0	7,025.9	7,060.9	7,060.9	79.8	141.2	89.01	-3,606.6	334.5	496.3	275.8	220.44	2.251					
10,900.0	7,025.3	7,060.3	7,060.3	81.7	141.2	88.80	-3,606.6	334.5	591.5	369.2	222.29	2.661					
11,000.0	7,024.7	7,059.7	7,059.7	83.6	141.2	88.59	-3,606.6	334.5	688.0	463.9	224.13	3.070					
11,100.0	7,024.0	7,059.0	7,059.0	85.4	141.2	88.38	-3,606.6	334.5	785.4	559.4	225.97	3.476					
11,200.0	7,023.4	7,058.4	7,058.4	87.3	141.2	88.17	-3,606.6	334.5	883.4	655.6	227.81	3.878					
11,300.0	7,022.8	7,057.8	7,057.8	89.2	141.2	87.96	-3,606.6	334.5	981.8	752.2	229.65	4.275					

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Sorin Natural Existing wells Sec.2-T4N-R66W - Durnell 1 (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			Distance							Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor					
7,900.0	7,043.6	7,039.6	7,039.6	28.7	140.8	-91.17	-2,062.0	788.9	918.6	750.7	167.84	5.473					
8,000.0	7,043.0	7,039.0	7,039.0	30.2	140.8	-91.04	-2,062.0	788.9	823.3	653.8	169.43	4.859					
8,100.0	7,042.4	7,038.4	7,038.4	31.7	140.8	-90.91	-2,062.0	788.9	729.2	558.1	171.06	4.263					
8,200.0	7,041.8	7,037.8	7,037.8	33.3	140.8	-90.77	-2,062.0	788.9	636.9	464.2	172.71	3.688					
8,300.0	7,041.1	7,037.1	7,037.1	35.0	140.7	-90.64	-2,062.0	788.9	547.4	373.0	174.40	3.139					
8,400.0	7,040.5	7,036.5	7,036.5	36.6	140.7	-90.51	-2,062.0	788.9	462.1	286.0	176.10	2.624					
8,500.0	7,039.9	7,035.9	7,035.9	38.3	140.7	-90.37	-2,062.0	788.9	384.1	206.2	177.82	2.160					
8,600.0	7,039.3	7,035.3	7,035.3	40.0	140.7	-90.24	-2,062.0	788.9	318.5	139.0	179.57	1.774					
8,700.0	7,038.7	7,034.7	7,034.7	41.7	140.7	-90.11	-2,062.0	788.9	274.6	93.3	181.32	1.514					
8,780.3	7,038.2	7,034.2	7,034.2	43.1	140.7	-90.00	-2,062.0	788.9	262.6	79.9	182.74	1.437	Level 3, CC, ES, SF				
8,800.0	7,038.1	7,034.1	7,034.1	43.4	140.7	-89.97	-2,062.0	788.9	263.3	80.3	183.09	1.438	Level 3				
8,900.0	7,037.5	7,033.5	7,033.5	45.2	140.7	-89.84	-2,062.0	788.9	288.6	103.7	184.87	1.561					
9,000.0	7,036.9	7,032.9	7,032.9	46.9	140.7	-89.71	-2,062.0	788.9	342.4	155.8	186.65	1.834					
9,100.0	7,036.3	7,032.3	7,032.3	48.7	140.6	-89.57	-2,062.0	788.9	413.7	225.3	188.45	2.196					
9,200.0	7,035.6	7,031.6	7,031.6	50.5	140.6	-89.44	-2,062.0	788.9	495.1	304.9	190.25	2.602					
9,300.0	7,035.0	7,031.0	7,031.0	52.3	140.6	-89.31	-2,062.0	788.9	582.3	390.2	192.06	3.032					
9,400.0	7,034.4	7,030.4	7,030.4	54.1	140.6	-89.17	-2,062.0	788.9	673.1	479.2	193.88	3.472					
9,500.0	7,033.8	7,029.8	7,029.8	55.9	140.6	-89.04	-2,062.0	788.9	766.1	570.4	195.69	3.915					
9,600.0	7,033.2	7,029.2	7,029.2	57.7	140.6	-88.91	-2,062.0	788.9	860.8	663.2	197.52	4.358					
9,700.0	7,032.6	7,028.6	7,028.6	59.5	140.6	-88.77	-2,062.0	788.9	956.5	757.1	199.34	4.798					

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Sorin Natural Existing wells Sec.2-T4N-R66W - Matsushima PM K2-1 (Exist.) - Wellbore #1 - Wellbore #										Offset Site Error:		0.0 ft			
Survey Program: 7300-UNKNOWN														Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis			Distance							Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor					
0.0	0.0	0.0	0.0	0.0	0.0	131.50	-633.9	716.4	956.5								
100.0	100.0	98.0	98.0	0.1	2.0	131.50	-633.9	716.4	956.5	954.5	2.07	461.525					
200.0	200.0	198.0	198.0	0.3	4.0	131.50	-633.9	716.4	956.5	952.2	4.30	222.590					
300.0	300.0	298.0	298.0	0.6	6.0	131.50	-633.9	716.4	956.5	950.0	6.52	146.662					
400.0	400.0	398.0	398.0	0.8	8.0	131.50	-633.9	716.4	956.5	947.8	8.75	109.359					
500.0	500.0	498.0	498.0	1.0	10.0	131.50	-633.9	716.4	956.5	945.6	10.97	87.184					
600.0	600.0	598.0	598.0	1.2	12.0	131.50	-633.9	716.4	956.5	943.4	13.20	72.485					
700.0	700.0	698.0	698.0	1.5	14.0	131.50	-633.9	716.4	956.5	941.1	15.42	62.028					
800.0	800.0	798.0	798.0	1.7	16.0	131.50	-633.9	716.4	956.5	938.9	17.65	54.208					
900.0	900.0	898.0	898.0	1.9	18.0	131.50	-633.9	716.4	956.5	936.7	19.87	48.139					
1,000.0	1,000.0	998.0	998.0	2.1	20.0	131.50	-633.9	716.4	956.5	934.5	22.10	43.292					
1,100.0	1,100.0	1,098.0	1,098.0	2.3	22.0	38.52	-633.9	716.4	955.2	930.9	24.30	39.313					
1,200.0	1,199.8	1,197.8	1,197.8	2.6	24.0	38.77	-633.9	716.4	951.1	924.6	26.47	35.937					
1,300.0	1,299.5	1,297.5	1,297.5	2.8	25.9	39.18	-633.9	716.4	944.3	915.7	28.61	33.002					
1,400.0	1,398.7	1,396.7	1,396.7	3.0	27.9	39.71	-633.9	716.4	935.1	904.3	30.77	30.388					
1,500.0	1,497.9	1,495.9	1,495.9	3.3	29.9	40.21	-633.9	716.4	925.4	892.5	32.98	28.062					
1,600.0	1,597.2	1,595.2	1,595.2	3.5	31.9	40.71	-633.9	716.4	915.9	880.7	35.19	26.023					
1,700.0	1,696.4	1,694.4	1,694.4	3.8	33.9	41.23	-633.9	716.4	906.4	869.0	37.42	24.224					
1,800.0	1,795.6	1,793.6	1,793.6	4.1	35.9	41.75	-633.9	716.4	897.0	857.3	39.65	22.625					
1,900.0	1,894.8	1,892.8	1,892.8	4.4	37.9	42.29	-633.9	716.4	887.6	845.7	41.88	21.195					
2,000.0	1,994.0	1,992.0	1,992.0	4.7	39.8	42.84	-633.9	716.4	878.4	834.2	44.12	19.909					
2,100.0	2,093.2	2,091.2	2,091.2	5.0	41.8	43.40	-633.9	716.4	869.2	822.8	46.36	18.748					
2,200.0	2,192.4	2,190.4	2,190.4	5.3	43.8	43.97	-633.9	716.4	860.1	811.5	48.61	17.694					
2,300.0	2,291.6	2,289.6	2,289.6	5.6	45.8	44.55	-633.9	716.4	851.1	800.2	50.86	16.733					
2,400.0	2,390.9	2,388.9	2,388.9	5.9	47.8	45.15	-633.9	716.4	842.1	789.0	53.12	15.855					
2,500.0	2,490.1	2,488.1	2,488.1	6.2	49.8	45.75	-633.9	716.4	833.3	777.9	55.38	15.049					
2,600.0	2,589.3	2,587.3	2,587.3	6.5	51.7	46.38	-633.9	716.4	824.6	766.9	57.64	14.306					
2,700.0	2,688.5	2,686.5	2,686.5	6.8	53.7	47.01	-633.9	716.4	816.0	756.1	59.90	13.621					
2,800.0	2,787.7	2,785.7	2,785.7	7.1	55.7	47.66	-633.9	716.4	807.4	745.3	62.17	12.987					
2,900.0	2,886.9	2,884.9	2,884.9	7.5	57.7	48.32	-633.9	716.4	799.0	734.6	64.45	12.398					
3,000.0	2,986.1	2,984.1	2,984.1	7.8	59.7	48.99	-633.9	716.4	790.7	724.0	66.72	11.850					
3,100.0	3,085.3	3,083.3	3,083.3	8.1	61.7	49.68	-633.9	716.4	782.5	713.5	69.00	11.340					
3,200.0	3,184.5	3,182.5	3,182.5	8.4	63.7	50.39	-633.9	716.4	774.4	703.1	71.29	10.863					
3,300.0	3,283.8	3,281.8	3,281.8	8.7	65.6	51.11	-633.9	716.4	766.4	692.9	73.57	10.417					
3,400.0	3,383.0	3,381.0	3,381.0	9.1	67.6	51.84	-633.9	716.4	758.6	682.7	75.86	10.000					
3,500.0	3,482.2	3,480.2	3,480.2	9.4	69.6	52.59	-633.9	716.4	750.9	672.7	78.15	9.607					
3,600.0	3,581.4	3,579.4	3,579.4	9.7	71.6	53.35	-633.9	716.4	743.3	662.8	80.45	9.239					
3,700.0	3,680.6	3,678.6	3,678.6	10.0	73.6	54.13	-633.9	716.4	735.8	653.1	82.75	8.892					
3,800.0	3,779.8	3,777.8	3,777.8	10.3	75.6	54.92	-633.9	716.4	728.5	643.5	85.05	8.566					
3,900.0	3,879.0	3,877.0	3,877.0	10.7	77.5	55.73	-633.9	716.4	721.4	634.0	87.36	8.257					
4,000.0	3,978.2	3,976.2	3,976.2	11.0	79.5	56.56	-633.9	716.4	714.3	624.7	89.67	7.966					
4,100.0	4,077.5	4,075.5	4,075.5	11.3	81.5	57.40	-633.9	716.4	707.5	615.5	91.98	7.692					
4,200.0	4,176.7	4,174.7	4,174.7	11.6	83.5	58.26	-633.9	716.4	700.8	606.5	94.29	7.432					
4,300.0	4,275.9	4,273.9	4,273.9	11.9	85.5	59.14	-633.9	716.4	694.2	597.6	96.61	7.185					
4,400.0	4,375.1	4,373.1	4,373.1	12.3	87.5	60.03	-633.9	716.4	687.8	588.9	98.93	6.952					
4,500.0	4,474.3	4,472.3	4,472.3	12.6	89.4	60.93	-633.9	716.4	681.6	580.4	101.26	6.731					
4,600.0	4,573.5	4,571.5	4,571.5	12.9	91.4	61.86	-633.9	716.4	675.6	572.0	103.58	6.522					
4,700.0	4,672.7	4,670.7	4,670.7	13.2	93.4	62.80	-633.9	716.4	669.7	563.8	105.91	6.323					
4,800.0	4,771.9	4,769.9	4,769.9	13.6	95.4	63.75	-633.9	716.4	664.0	555.8	108.25	6.135					
4,900.0	4,871.1	4,869.1	4,869.1	13.9	97.4	64.72	-633.9	716.4	658.6	548.0	110.58	5.955					
5,000.0	4,970.4	4,968.4	4,968.4	14.2	99.4	65.71	-633.9	716.4	653.3	540.4	112.92	5.785					

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

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Sorin Natural Existing wells Sec.2-T4N-R66W - Matsushima PM K2-1 (Exist.) - Wellbore #1 - Wellbore #										Offset Site Error:		0.0 ft	
Survey Program: 7300-UNKNOWN												Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis		Distance							Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor			
5,100.0	5,069.6	5,067.6	5,067.6	14.5	101.4	66.71	-633.9	716.4	648.2	532.9	115.26	5.624			
5,200.0	5,168.8	5,166.8	5,166.8	14.9	103.3	67.73	-633.9	716.4	643.3	525.7	117.60	5.470			
5,300.0	5,268.0	5,266.0	5,266.0	15.2	105.3	68.77	-633.9	716.4	638.6	518.7	119.94	5.325			
5,400.0	5,367.2	5,365.2	5,365.2	15.5	107.3	69.81	-633.9	716.4	634.2	511.9	122.28	5.186			
5,500.0	5,466.4	5,464.4	5,464.4	15.8	109.3	70.85	-633.9	716.4	630.0	505.3	124.63	5.055			
5,600.0	5,565.9	5,563.9	5,563.9	16.0	111.3	71.64	-633.9	716.4	626.8	499.8	126.92	4.938			
5,700.0	5,665.7	5,663.7	5,663.7	16.2	113.3	72.16	-633.9	716.4	624.8	495.6	129.15	4.837			
5,800.0	5,765.7	5,763.7	5,763.7	16.4	115.3	72.40	-633.9	716.4	623.9	492.5	131.33	4.750			
5,855.7	5,821.4	5,819.4	5,819.4	16.5	116.4	72.44	-633.9	716.4	623.7	491.2	132.53	4.706			
5,900.0	5,865.7	5,863.7	5,863.7	16.6	117.3	165.48	-633.9	716.4	623.8	490.3	133.45	4.674			
6,000.0	5,965.7	5,963.7	5,963.7	16.7	119.3	165.48	-633.9	716.4	623.8	488.2	135.62	4.600			
6,100.0	6,065.7	6,063.7	6,063.7	16.9	121.3	165.48	-633.9	716.4	623.8	486.0	137.79	4.527			
6,200.0	6,165.7	6,163.7	6,163.7	17.0	123.3	165.48	-633.9	716.4	623.8	483.8	139.96	4.457			
6,300.0	6,265.7	6,263.7	6,263.7	17.2	125.3	165.48	-633.9	716.4	623.8	481.7	142.13	4.389			
6,400.0	6,365.5	6,363.5	6,363.5	17.4	127.3	-15.67	-633.9	716.4	619.4	475.9	143.53	4.315			
6,500.0	6,463.9	6,461.9	6,461.9	17.5	129.2	-16.48	-633.9	716.4	602.6	460.0	142.59	4.226			
6,600.0	6,559.2	6,557.2	6,557.2	17.7	131.1	-18.01	-633.9	716.4	573.8	434.4	139.40	4.116			
6,700.0	6,649.7	6,647.7	6,647.7	17.9	133.0	-20.53	-633.9	716.4	533.5	399.2	134.31	3.972			
6,800.0	6,734.0	6,732.0	6,732.0	18.2	134.6	-24.49	-633.9	716.4	482.7	354.4	128.26	3.763			
6,900.0	6,810.5	6,808.5	6,808.5	18.5	136.2	-30.65	-633.9	716.4	422.9	299.5	123.48	3.425			
7,000.0	6,878.0	6,876.0	6,876.0	19.0	137.5	-40.16	-633.9	716.4	356.4	232.1	124.29	2.867			
7,100.0	6,935.3	6,933.3	6,933.3	19.6	138.7	-53.99	-633.9	716.4	286.5	151.7	134.84	2.125			
7,200.0	6,981.4	6,979.4	6,979.4	20.3	139.6	-70.73	-633.9	716.4	220.4	70.3	150.14	1.468	Level 3		
7,300.0	7,015.5	7,013.5	7,013.5	21.1	140.3	-85.14	-633.9	716.4	173.9	15.3	158.65	1.096	Level 2		
7,352.3	7,028.4	7,026.4	7,026.4	21.6	140.5	-90.00	-633.9	716.4	166.4	6.4	160.02	1.040	Level 2, CC, ES, SF		
7,400.0	7,037.1	7,035.1	7,035.1	22.1	140.7	-92.45	-633.9	716.4	172.9	12.3	160.58	1.076	Level 2		
7,500.0	7,045.7	7,043.7	7,043.7	23.3	140.9	-91.08	-633.9	716.4	221.6	59.5	162.13	1.367	Level 3		
7,600.0	7,045.4	7,043.4	7,043.4	24.5	140.9	-89.48	-633.9	716.4	297.3	133.8	163.54	1.818			
7,700.0	7,044.8	7,042.8	7,042.8	25.8	140.9	-89.27	-633.9	716.4	384.3	219.4	164.95	2.330			
7,800.0	7,044.2	7,042.2	7,042.2	27.2	140.8	-89.06	-633.9	716.4	476.4	310.0	166.43	2.863			
7,900.0	7,043.6	7,041.6	7,041.6	28.7	140.8	-88.85	-633.9	716.4	571.2	403.2	167.96	3.401			
8,000.0	7,043.0	7,041.0	7,041.0	30.2	140.8	-88.64	-633.9	716.4	667.5	498.0	169.53	3.937			
8,100.0	7,042.4	7,040.4	7,040.4	31.7	140.8	-88.43	-633.9	716.4	764.7	593.6	171.13	4.469			
8,200.0	7,041.8	7,039.8	7,039.8	33.3	140.8	-88.22	-633.9	716.4	862.6	689.9	172.77	4.993			
8,300.0	7,041.1	7,039.1	7,039.1	35.0	140.8	-88.01	-633.9	716.4	960.9	786.5	174.43	5.509			

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2R-403 - Wellbore #1										Offset Site Error:		0.0 ft
Survey Program:		0-MWD										Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
0.0	0.0	0.0	0.0	0.0	0.0	-89.99	0.0	-30.7	30.7					
100.0	100.0	100.0	100.0	0.1	0.1	-89.99	0.0	-30.7	30.7	30.4	0.22	136.412		
200.0	200.0	200.0	200.0	0.3	0.3	-89.99	0.0	-30.7	30.7	30.0	0.67	45.471		
300.0	300.0	300.0	300.0	0.6	0.6	-89.99	0.0	-30.7	30.7	29.5	1.12	27.282		
400.0	400.0	400.0	400.0	0.8	0.8	-89.99	0.0	-30.7	30.7	29.1	1.57	19.487		
500.0	500.0	500.0	500.0	1.0	1.0	-89.99	0.0	-30.7	30.7	28.6	2.02	15.157		
600.0	600.0	600.0	600.0	1.2	1.2	-89.99	0.0	-30.7	30.7	28.2	2.47	12.401		
700.0	700.0	700.0	700.0	1.5	1.5	-89.99	0.0	-30.7	30.7	27.7	2.92	10.493		
800.0	800.0	800.0	800.0	1.7	1.7	-89.99	0.0	-30.7	30.7	27.3	3.37	9.094		
900.0	900.0	900.0	900.0	1.9	1.9	-89.99	0.0	-30.7	30.7	26.8	3.82	8.024		
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-89.99	0.0	-30.7	30.7	26.4	4.27	7.180 CC, ES		
1,100.0	1,100.0	1,100.0	1,100.0	2.3	2.4	177.10	0.0	-30.7	32.4	27.7	4.70	6.888		
1,200.0	1,199.8	1,199.8	1,199.8	2.6	2.6	177.50	0.0	-30.7	37.6	32.5	5.12	7.344		
1,300.0	1,299.5	1,299.5	1,299.5	2.8	2.8	177.97	0.0	-30.7	46.3	40.8	5.54	8.360		
1,400.0	1,398.7	1,398.7	1,398.7	3.0	3.0	178.38	0.0	-30.7	58.2	52.3	5.97	9.764		
1,500.0	1,497.9	1,497.9	1,497.9	3.3	3.3	178.66	0.0	-30.7	70.8	64.4	6.40	11.059		
1,600.0	1,597.2	1,600.0	1,600.0	3.5	3.5	178.77	-0.2	-28.9	81.6	74.8	6.83	11.957		
1,700.0	1,696.4	1,702.8	1,702.6	3.8	3.7	178.66	-0.8	-23.5	88.9	81.7	7.24	12.275		
1,800.0	1,795.6	1,806.0	1,805.4	4.1	3.9	178.38	-1.9	-14.4	92.6	84.9	7.67	12.075		
1,900.0	1,894.8	1,907.4	1,906.1	4.4	4.1	177.94	-3.2	-2.5	93.3	85.2	8.10	11.520		
2,000.0	1,994.0	2,007.4	2,005.4	4.7	4.4	177.50	-4.6	9.6	93.8	85.2	8.54	10.980		
2,100.0	2,093.2	2,107.4	2,104.6	5.0	4.6	177.07	-6.0	21.7	94.2	85.2	8.98	10.486		
2,200.0	2,192.4	2,207.4	2,203.9	5.3	4.9	176.63	-7.4	33.8	94.6	85.2	9.43	10.034		
2,300.0	2,291.6	2,307.4	2,303.1	5.6	5.1	176.20	-8.8	45.9	95.0	85.1	9.88	9.620		
2,400.0	2,390.9	2,407.4	2,402.4	5.9	5.4	175.78	-10.1	58.0	95.4	85.1	10.33	9.238		
2,500.0	2,490.1	2,507.4	2,501.6	6.2	5.7	175.36	-11.5	70.1	95.9	85.1	10.79	8.886		
2,600.0	2,589.3	2,607.4	2,600.9	6.5	6.0	174.94	-12.9	82.2	96.3	85.1	11.25	8.561		
2,700.0	2,688.5	2,707.4	2,700.1	6.8	6.3	174.52	-14.3	94.3	96.8	85.1	11.72	8.260		
2,800.0	2,787.7	2,807.4	2,799.4	7.1	6.6	174.11	-15.7	106.4	97.2	85.0	12.18	7.980		
2,900.0	2,886.9	2,907.4	2,898.6	7.5	6.9	173.71	-17.1	118.5	97.7	85.0	12.66	7.720		
3,000.0	2,986.1	3,007.4	2,997.9	7.8	7.1	173.30	-18.5	130.5	98.2	85.0	13.13	7.477		
3,100.0	3,085.3	3,107.4	3,097.1	8.1	7.4	172.91	-19.8	142.6	98.6	85.0	13.60	7.250		
3,200.0	3,184.5	3,207.4	3,196.4	8.4	7.7	172.51	-21.2	154.7	99.1	85.0	14.08	7.037		
3,300.0	3,283.8	3,307.4	3,295.6	8.7	8.0	172.12	-22.6	166.8	99.6	85.0	14.56	6.838		
3,400.0	3,383.0	3,407.4	3,394.9	9.1	8.3	171.73	-24.0	178.9	100.1	85.0	15.04	6.651		
3,500.0	3,482.2	3,507.3	3,494.2	9.4	8.7	171.35	-25.4	191.0	100.5	85.0	15.53	6.475		
3,600.0	3,581.4	3,607.3	3,593.4	9.7	9.0	170.97	-26.8	203.1	101.0	85.0	16.01	6.309		
3,700.0	3,680.6	3,705.9	3,691.3	10.0	9.2	170.63	-28.1	214.8	101.8	85.3	16.49	6.175		
3,800.0	3,779.8	3,802.5	3,787.4	10.3	9.5	170.64	-29.1	223.5	105.3	88.4	16.92	6.225		
3,900.0	3,879.0	3,900.0	3,884.8	10.7	9.7	171.03	-29.7	229.0	112.1	94.8	17.34	6.466		
4,000.0	3,978.2	3,994.4	3,979.1	11.0	9.8	171.67	-30.0	231.3	122.2	104.4	17.75	6.885		
4,100.0	4,077.5	4,092.7	4,077.5	11.3	10.0	172.43	-30.0	231.3	134.5	116.4	18.16	7.406		
4,200.0	4,176.7	4,191.9	4,176.7	11.6	10.2	173.08	-30.0	231.3	147.0	128.4	18.59	7.903		
4,300.0	4,275.9	4,291.1	4,275.9	11.9	10.4	173.62	-30.0	231.3	159.4	140.4	19.03	8.377		
4,400.0	4,375.1	4,390.3	4,375.1	12.3	10.6	174.08	-30.0	231.3	171.9	152.4	19.47	8.828		
4,500.0	4,474.3	4,489.5	4,474.3	12.6	10.8	174.48	-30.0	231.3	184.3	164.4	19.91	9.259		
4,600.0	4,573.5	4,588.8	4,573.5	12.9	10.9	174.84	-30.0	231.3	196.8	176.5	20.35	9.671		
4,700.0	4,672.7	4,688.0	4,672.7	13.2	11.1	175.14	-30.0	231.3	209.3	188.5	20.79	10.065		
4,800.0	4,771.9	4,787.2	4,771.9	13.6	11.3	175.42	-30.0	231.3	221.8	200.5	21.24	10.442		
4,900.0	4,871.1	4,886.4	4,871.1	13.9	11.5	175.66	-30.0	231.3	234.3	212.6	21.69	10.803		
5,000.0	4,970.4	4,985.6	4,970.4	14.2	11.7	175.88	-30.0	231.3	246.8	224.6	22.13	11.150		

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



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2R-403 - Wellbore #1										Offset Site Error:		0.0 ft	
Survey Program: 0-MWD										Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis			Distance					Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)		Separation Factor
5,100.0	5,069.6	5,084.8	5,069.6	14.5	11.9	176.08	-30.0	231.3	259.3	236.7	22.58	11.482	
5,200.0	5,168.8	5,184.0	5,168.8	14.9	12.1	176.26	-30.0	231.3	271.8	248.8	23.03	11.801	
5,300.0	5,268.0	5,283.2	5,268.0	15.2	12.3	176.43	-30.0	231.3	284.3	260.8	23.48	12.107	
5,400.0	5,367.2	5,382.4	5,367.2	15.5	12.5	176.58	-30.0	231.3	296.8	272.9	23.93	12.402	
5,500.0	5,466.4	5,481.7	5,466.4	15.8	12.7	176.72	-30.0	231.3	309.2	284.8	24.38	12.680	
5,600.0	5,565.9	5,581.2	5,565.9	16.0	12.9	176.83	-30.0	231.3	319.1	294.3	24.80	12.867	
5,700.0	5,665.7	5,681.0	5,665.7	16.2	13.1	176.90	-30.0	231.3	325.5	300.3	25.19	12.924	
5,800.0	5,765.7	5,780.9	5,765.7	16.4	13.3	176.93	-30.0	231.3	328.5	302.9	25.55	12.857	
5,900.0	5,865.7	5,880.9	5,865.7	16.6	13.5	-90.00	-30.0	231.3	328.7	302.7	25.95	12.666	
6,000.0	5,965.7	5,980.9	5,965.7	16.7	13.8	-90.00	-30.0	231.3	328.7	302.3	26.36	12.468	
6,100.0	6,065.7	6,080.9	6,065.7	16.9	14.0	-90.00	-30.0	231.3	328.7	301.9	26.77	12.275	
6,200.0	6,165.7	6,180.9	6,165.7	17.0	14.2	-90.00	-30.0	231.3	328.7	301.5	27.19	12.088	
6,300.0	6,265.7	6,280.9	6,265.7	17.2	14.4	-90.00	-30.0	231.3	328.7	301.1	27.61	11.906	
6,400.0	6,365.5	6,380.7	6,365.5	17.4	14.6	89.85	-30.0	231.3	328.6	300.6	27.99	11.741	
6,407.7	6,373.1	6,388.4	6,373.1	17.4	14.6	90.00	-30.0	231.3	328.6	300.6	28.02	11.728	
6,500.0	6,463.9	6,480.7	6,465.3	17.5	14.8	91.89	-35.7	231.2	328.8	300.4	28.36	11.593	
6,600.0	6,559.2	6,582.3	6,565.0	17.7	15.0	93.92	-54.7	230.9	329.4	300.6	28.75	11.455	
6,700.0	6,649.7	6,685.5	6,662.8	17.9	15.2	95.89	-87.4	230.4	330.3	301.2	29.19	11.317	
6,800.0	6,734.0	6,790.4	6,756.7	18.2	15.4	97.76	-133.8	229.7	331.6	301.9	29.71	11.161	
6,900.0	6,810.5	6,896.9	6,844.7	18.5	15.8	99.49	-193.6	228.7	333.1	302.7	30.38	10.964	
7,000.0	6,878.0	7,004.9	6,924.6	19.0	16.2	101.05	-266.2	227.5	334.7	303.4	31.29	10.696	
7,100.0	6,935.3	7,114.4	6,994.4	19.6	16.8	102.41	-350.5	226.2	336.3	303.8	32.53	10.339	
7,200.0	6,981.4	7,225.3	7,051.9	20.3	17.7	103.54	-445.1	224.7	337.8	303.6	34.16	9.888	
7,300.0	7,015.5	7,337.1	7,095.5	21.1	18.7	104.42	-548.0	223.0	339.0	302.8	36.22	9.360	
7,400.0	7,037.1	7,449.8	7,123.8	22.1	19.9	105.03	-656.9	221.3	339.9	301.2	38.69	8.784	
7,500.0	7,045.7	7,556.4	7,137.1	23.3	21.2	105.59	-762.7	219.6	340.8	299.4	41.42	8.228	
7,600.0	7,045.4	7,663.0	7,145.4	24.5	22.7	106.94	-868.9	217.9	343.1	299.0	44.02	7.794	
7,700.0	7,044.8	7,766.3	7,146.1	25.8	24.1	107.16	-972.1	216.2	343.4	296.6	46.78	7.340	
7,800.0	7,044.2	7,866.3	7,146.2	27.2	25.6	107.28	-1,072.1	214.6	343.6	293.9	49.64	6.921	
7,900.0	7,043.6	7,966.3	7,146.4	28.7	27.1	107.40	-1,172.1	213.0	343.7	291.1	52.59	6.536	
8,000.0	7,043.0	8,066.2	7,146.5	30.2	28.7	107.52	-1,272.0	211.4	343.9	288.3	55.62	6.183	
8,100.0	7,042.4	8,166.2	7,146.6	31.7	30.3	107.64	-1,372.0	209.8	344.1	285.3	58.72	5.859	
8,200.0	7,041.8	8,266.2	7,146.7	33.3	32.0	107.76	-1,472.0	208.2	344.2	282.4	61.88	5.563	
8,300.0	7,041.1	8,366.2	7,146.9	35.0	33.6	107.87	-1,572.0	206.5	344.4	279.3	65.09	5.292	
8,400.0	7,040.5	8,466.2	7,147.0	36.6	35.3	107.99	-1,672.0	204.9	344.6	276.3	68.33	5.043	
8,500.0	7,039.9	8,566.2	7,147.1	38.3	37.1	108.11	-1,772.0	203.3	344.8	273.2	71.62	4.814	
8,600.0	7,039.3	8,666.2	7,147.2	40.0	38.8	108.23	-1,872.0	201.7	345.0	270.0	74.93	4.604	
8,700.0	7,038.7	8,766.2	7,147.4	41.7	40.5	108.35	-1,971.9	200.1	345.1	266.9	78.26	4.410	
8,800.0	7,038.1	8,866.2	7,147.5	43.4	42.3	108.47	-2,071.9	198.5	345.3	263.7	81.62	4.231	
8,900.0	7,037.5	8,966.2	7,147.6	45.2	44.1	108.59	-2,171.9	196.9	345.5	260.5	84.99	4.065	
9,000.0	7,036.9	9,066.2	7,147.7	46.9	45.9	108.71	-2,271.9	195.3	345.7	257.3	88.38	3.912	
9,100.0	7,036.3	9,166.2	7,147.9	48.7	47.7	108.82	-2,371.9	193.7	345.9	254.1	91.78	3.769	
9,200.0	7,035.6	9,266.2	7,148.0	50.5	49.5	108.94	-2,471.9	192.0	346.1	250.9	95.19	3.636	
9,300.0	7,035.0	9,366.2	7,148.1	52.3	51.3	109.06	-2,571.8	190.4	346.3	247.7	98.62	3.511	
9,400.0	7,034.4	9,466.2	7,148.2	54.1	53.1	109.18	-2,671.8	188.8	346.5	244.4	102.05	3.395	
9,500.0	7,033.8	9,566.2	7,148.4	55.9	55.0	109.30	-2,771.8	187.2	346.7	241.2	105.48	3.286	
9,600.0	7,033.2	9,666.2	7,148.5	57.7	56.8	109.41	-2,871.8	185.6	346.9	237.9	108.93	3.184	
9,700.0	7,032.6	9,766.2	7,148.6	59.5	58.7	109.53	-2,971.8	184.0	347.1	234.7	112.37	3.088	
9,800.0	7,032.0	9,866.2	7,148.7	61.3	60.5	109.65	-3,071.8	182.4	347.3	231.4	115.83	2.998	
9,900.0	7,031.4	9,966.2	7,148.9	63.2	62.3	109.76	-3,171.7	180.8	347.5	228.2	119.28	2.913	

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



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
10,000.0	7,030.8	10,066.2	7,149.0	65.0	64.2	109.88	-3,271.7	179.2	347.7	224.9	122.74	2.833		
10,100.0	7,030.1	10,166.2	7,149.1	66.9	66.1	110.00	-3,371.7	177.5	347.9	221.7	126.19	2.757		
10,200.0	7,029.5	10,266.2	7,149.2	68.7	67.9	110.12	-3,471.7	175.9	348.1	218.4	129.65	2.685		
10,300.0	7,028.9	10,366.2	7,149.4	70.6	69.8	110.23	-3,571.7	174.3	348.3	215.2	133.11	2.616		
10,400.0	7,028.3	10,466.2	7,149.5	72.4	71.7	110.35	-3,671.7	172.7	348.5	211.9	136.57	2.552		
10,500.0	7,027.7	10,566.2	7,149.6	74.3	73.5	110.46	-3,771.7	171.1	348.7	208.7	140.03	2.490		
10,600.0	7,027.1	10,666.2	7,149.7	76.1	75.4	110.58	-3,871.6	169.5	348.9	205.4	143.49	2.432		
10,700.0	7,026.5	10,766.2	7,149.9	78.0	77.3	110.70	-3,971.6	167.9	349.1	202.2	146.95	2.376		
10,800.0	7,025.9	10,866.2	7,150.0	79.8	79.1	110.81	-4,071.6	166.3	349.3	198.9	150.41	2.323		
10,900.0	7,025.3	10,966.2	7,150.1	81.7	81.0	110.93	-4,171.6	164.7	349.5	195.7	153.86	2.272		
11,000.0	7,024.7	11,066.2	7,150.2	83.6	82.9	111.04	-4,271.6	163.1	349.8	192.4	157.31	2.223		
11,100.0	7,024.0	11,166.2	7,150.4	85.4	84.8	111.16	-4,371.6	161.4	350.0	189.2	160.76	2.177		
11,200.0	7,023.4	11,266.2	7,150.5	87.3	86.7	111.27	-4,471.5	159.8	350.2	186.0	164.21	2.133		
11,300.0	7,022.8	11,366.2	7,150.6	89.2	88.5	111.39	-4,571.5	158.2	350.4	182.8	167.66	2.090		
11,400.0	7,022.2	11,466.2	7,150.7	91.1	90.4	111.50	-4,671.5	156.6	350.6	179.5	171.10	2.049		
11,500.0	7,021.6	11,566.2	7,150.9	92.9	92.3	111.62	-4,771.5	155.0	350.9	176.3	174.54	2.010		
11,597.5	7,021.0	11,663.7	7,151.0	94.8	94.2	111.73	-4,869.0	153.4	351.1	173.2	177.90	1.974 SF		

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2U-443 - Wellbore #1												Offset Site Error: 0.0 ft	
Survey Program: 0-MWD												Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance					Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)		Separation Factor
0.0	0.0	0.0	0.0	0.0	0.0	89.99	0.0	30.7	30.7				
100.0	100.0	100.0	100.0	0.1	0.1	89.99	0.0	30.7	30.7	30.4	0.22	136.412	
200.0	200.0	200.0	200.0	0.3	0.3	89.99	0.0	30.7	30.7	30.0	0.67	45.471	
300.0	300.0	300.0	300.0	0.6	0.6	89.99	0.0	30.7	30.7	29.5	1.12	27.282	
400.0	400.0	400.0	400.0	0.8	0.8	89.99	0.0	30.7	30.7	29.1	1.57	19.487	CC, ES
500.0	500.0	498.9	498.9	1.0	1.0	90.09	-0.1	32.4	32.4	30.4	2.01	16.125	
600.0	600.0	597.6	597.4	1.2	1.2	90.34	-0.2	37.5	37.6	35.1	2.44	15.369	
700.0	700.0	695.8	695.2	1.5	1.4	90.62	-0.5	45.9	46.2	43.3	2.90	15.916	
800.0	800.0	793.3	792.0	1.7	1.7	90.88	-0.9	57.6	58.2	54.8	3.39	17.178	
900.0	900.0	889.9	887.5	1.9	2.0	91.08	-1.4	72.4	73.5	69.6	3.91	18.801	
1,000.0	1,000.0	987.8	983.9	2.1	2.3	91.23	-1.9	89.7	91.1	86.7	4.47	20.387	
1,100.0	1,100.0	1,086.5	1,081.0	2.3	2.7	-1.75	-2.5	107.1	107.1	102.4	4.68	22.885	
1,200.0	1,199.8	1,185.7	1,178.7	2.6	3.1	-1.73	-3.1	124.6	119.6	114.5	5.11	23.421	
1,300.0	1,299.5	1,285.3	1,276.7	2.8	3.4	-1.77	-3.7	142.3	128.6	123.1	5.54	23.211	
1,400.0	1,398.7	1,385.1	1,375.0	3.0	3.8	-1.84	-4.2	159.9	134.5	128.5	5.99	22.450	
1,500.0	1,497.9	1,485.0	1,473.2	3.3	4.2	-1.93	-4.8	177.5	139.7	133.2	6.45	21.653	
1,600.0	1,597.2	1,584.9	1,571.5	3.5	4.6	-2.00	-5.4	195.2	144.9	138.0	6.92	20.942	
1,700.0	1,696.4	1,684.7	1,669.8	3.8	5.0	-2.07	-6.0	212.9	150.1	142.7	7.39	20.311	
1,800.0	1,795.6	1,784.6	1,768.1	4.1	5.4	-2.14	-6.6	230.5	155.4	147.5	7.87	19.747	
1,900.0	1,894.8	1,884.5	1,866.4	4.4	5.8	-2.20	-7.1	248.2	160.6	152.2	8.35	19.240	
2,000.0	1,994.0	1,984.3	1,964.7	4.7	6.2	-2.26	-7.7	265.8	165.8	157.0	8.83	18.784	
2,100.0	2,093.2	2,084.2	2,063.0	5.0	6.6	-2.31	-8.3	283.5	171.0	161.7	9.31	18.370	
2,200.0	2,192.4	2,184.0	2,161.3	5.3	7.0	-2.36	-8.9	301.1	176.2	166.4	9.79	17.994	
2,300.0	2,291.6	2,283.9	2,259.6	5.6	7.4	-2.41	-9.5	318.8	181.4	171.2	10.28	17.651	
2,400.0	2,390.9	2,383.8	2,357.9	5.9	7.8	-2.45	-10.0	336.4	186.7	175.9	10.77	17.337	
2,500.0	2,490.1	2,483.6	2,456.1	6.2	8.2	-2.50	-10.6	354.1	191.9	180.6	11.25	17.048	
2,600.0	2,589.3	2,583.5	2,554.4	6.5	8.6	-2.54	-11.2	371.7	197.1	185.4	11.74	16.782	
2,700.0	2,688.5	2,683.4	2,652.7	6.8	9.0	-2.57	-11.8	389.4	202.3	190.1	12.23	16.536	
2,800.0	2,787.7	2,783.2	2,751.0	7.1	9.4	-2.61	-12.3	407.0	207.5	194.8	12.73	16.308	
2,900.0	2,886.9	2,883.1	2,849.3	7.5	9.8	-2.65	-12.9	424.7	212.8	199.5	13.22	16.096	
3,000.0	2,986.1	2,983.0	2,947.6	7.8	10.2	-2.68	-13.5	442.3	218.0	204.3	13.71	15.899	
3,100.0	3,085.3	3,082.8	3,045.9	8.1	10.6	-2.71	-14.1	460.0	223.2	209.0	14.20	15.714	
3,200.0	3,184.5	3,182.7	3,144.2	8.4	11.0	-2.74	-14.7	477.6	228.4	213.7	14.70	15.542	
3,300.0	3,283.8	3,282.5	3,242.5	8.7	11.4	-2.77	-15.2	495.3	233.6	218.4	15.19	15.380	
3,400.0	3,383.0	3,382.4	3,340.7	9.1	11.9	-2.80	-15.8	512.9	238.8	223.2	15.69	15.228	
3,500.0	3,482.2	3,482.3	3,439.0	9.4	12.3	-2.82	-16.4	530.6	244.1	227.9	16.18	15.084	
3,600.0	3,581.4	3,582.1	3,537.3	9.7	12.7	-2.85	-17.0	548.2	249.3	232.6	16.68	14.950	
3,700.0	3,680.6	3,682.0	3,635.6	10.0	13.1	-2.87	-17.6	565.9	254.5	237.3	17.17	14.822	
3,800.0	3,779.8	3,781.9	3,733.9	10.3	13.5	-2.89	-18.1	583.5	259.7	242.1	17.67	14.702	
3,900.0	3,879.0	3,881.7	3,832.2	10.7	13.9	-2.92	-18.7	601.2	264.9	246.8	18.16	14.587	
4,000.0	3,978.2	3,981.6	3,930.5	11.0	14.3	-2.94	-19.3	618.8	270.2	251.5	18.66	14.479	
4,100.0	4,077.5	4,081.5	4,028.8	11.3	14.7	-2.96	-19.9	636.5	275.4	256.2	19.16	14.376	
4,200.0	4,176.7	4,181.3	4,127.1	11.6	15.1	-2.98	-20.5	654.2	280.6	261.0	19.65	14.278	
4,300.0	4,275.9	4,281.2	4,225.3	11.9	15.5	-3.00	-21.0	671.8	285.8	265.7	20.15	14.185	
4,400.0	4,375.1	4,381.0	4,323.6	12.3	15.9	-3.02	-21.6	689.5	291.0	270.4	20.65	14.097	
4,500.0	4,474.3	4,480.9	4,421.9	12.6	16.3	-3.03	-22.2	707.1	296.3	275.1	21.14	14.012	
4,600.0	4,573.5	4,580.8	4,520.2	12.9	16.7	-3.05	-22.8	724.8	301.5	279.8	21.64	13.931	
4,700.0	4,672.7	4,680.6	4,618.5	13.2	17.1	-3.07	-23.4	742.4	306.7	284.6	22.14	13.854	
4,800.0	4,771.9	4,780.5	4,716.8	13.6	17.5	-3.08	-23.9	760.1	311.9	289.3	22.64	13.779	
4,900.0	4,871.1	4,880.4	4,815.1	13.9	17.9	-3.10	-24.5	777.7	317.1	294.0	23.13	13.709	
5,000.0	4,970.4	4,980.2	4,913.4	14.2	18.3	-3.11	-25.1	795.4	322.4	298.7	23.63	13.640	

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

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2U-443 - Wellbore #1										Offset Site Error:		0.0 ft	
Survey Program: 0-MWD												Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis			Distance								
Measured Depth	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre		Between	Between	Minimum	Separation	Warning		
Depth	Depth	Depth	Depth			Toolface	+N/-S	+E/-W	Centres	Ellipses	Separation	Factor			
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	(ft)	(ft)	(ft)	(ft)	(ft)				
5,100.0	5,069.6	5,080.1	5,011.7		14.5	18.7	-3.13	-25.7	813.0	327.6	303.5	24.13	13.575		
5,200.0	5,168.8	5,180.0	5,110.0		14.9	19.2	-3.14	-26.3	830.7	332.8	308.2	24.63	13.512		
5,300.0	5,268.0	5,279.8	5,208.2		15.2	19.6	-3.16	-26.8	848.3	338.0	312.9	25.13	13.452		
5,400.0	5,367.2	5,379.7	5,306.5		15.5	20.0	-3.17	-27.4	866.0	343.2	317.6	25.63	13.394		
5,500.0	5,466.4	5,479.5	5,404.8		15.8	20.4	-3.18	-28.0	883.6	348.6	322.5	26.12	13.347		
5,600.0	5,565.9	5,580.6	5,504.3		16.0	20.8	-3.18	-28.6	901.5	356.4	329.9	26.54	13.431		
5,700.0	5,665.7	5,694.6	5,616.9		16.2	21.1	-3.16	-29.2	918.9	365.4	338.5	26.90	13.584		
5,800.0	5,765.7	5,808.9	5,730.5		16.4	21.4	-3.13	-29.6	932.0	373.8	346.6	27.21	13.740		
5,900.0	5,865.7	5,923.8	5,845.1		16.6	21.6	89.98	-29.9	940.5	381.0	353.4	27.59	13.808		
6,000.0	5,965.7	6,039.2	5,960.4		16.7	21.7	90.00	-30.0	944.4	384.4	356.4	27.98	13.737		
6,100.0	6,065.7	6,144.5	6,065.7		16.9	21.9	90.00	-30.0	944.7	384.7	356.3	28.36	13.562		
6,200.0	6,165.7	6,244.5	6,165.7		17.0	22.0	90.00	-30.0	944.7	384.7	355.9	28.74	13.384		
6,300.0	6,265.7	6,344.5	6,265.7		17.2	22.1	90.00	-30.0	944.7	384.7	355.5	29.12	13.210		
6,300.0	6,265.7	6,344.5	6,265.7		17.2	22.1	90.00	-30.0	944.7	384.7	355.5	29.12	13.210		
6,400.0	6,365.5	6,444.3	6,365.5		17.4	22.3	-91.62	-30.0	944.7	384.8	355.3	29.47	13.054		
6,500.0	6,463.9	6,545.8	6,466.7		17.5	22.4	-93.35	-35.9	944.6	385.3	355.4	29.90	12.885		
6,600.0	6,559.2	6,649.0	6,567.9		17.7	22.5	-95.04	-55.5	944.2	386.1	355.7	30.38	12.711		
6,700.0	6,649.7	6,753.8	6,667.1		17.9	22.7	-96.64	-89.2	943.7	387.2	356.3	30.94	12.517		
6,800.0	6,734.0	6,860.3	6,762.2		18.2	22.9	-98.13	-137.0	942.9	388.6	356.9	31.61	12.292		
6,900.0	6,810.5	6,968.3	6,850.9		18.5	23.1	-99.48	-198.5	941.9	390.0	357.5	32.43	12.025		
7,000.0	6,878.0	7,077.8	6,931.0		19.0	23.4	-100.65	-272.9	940.6	391.4	358.0	33.42	11.710		
7,100.0	6,935.3	7,188.6	7,000.5		19.6	23.8	-101.63	-359.2	939.2	392.7	358.1	34.61	11.347		
7,200.0	6,981.4	7,300.5	7,057.2		20.3	24.4	-102.39	-455.5	937.6	393.8	357.8	36.01	10.937		
7,300.0	7,015.5	7,413.2	7,099.5		21.1	25.1	-102.91	-559.8	935.9	394.6	357.0	37.64	10.485		
7,400.0	7,037.1	7,526.4	7,126.1		22.1	26.0	-103.20	-669.7	934.1	395.1	355.6	39.49	10.004		
7,500.0	7,045.7	7,631.6	7,138.4		23.3	27.0	-103.57	-774.2	932.3	395.7	354.4	41.39	9.561		
7,600.0	7,045.4	7,739.5	7,145.7		24.5	28.1	-104.61	-881.8	930.5	397.5	353.8	43.71	9.095		
7,700.0	7,044.8	7,841.7	7,146.0		25.8	29.3	-104.73	-983.9	928.8	397.7	351.3	46.42	8.568		
7,800.0	7,044.2	7,941.7	7,146.0		27.2	30.5	-104.82	-1,083.9	927.2	397.9	348.6	49.24	8.080		
7,900.0	7,043.6	8,041.7	7,146.0		28.7	31.8	-104.90	-1,183.9	925.5	398.0	345.9	52.17	7.629		
8,000.0	7,043.0	8,141.7	7,146.0		30.2	33.1	-104.99	-1,283.8	923.9	398.2	343.0	55.19	7.215		
8,100.0	7,042.4	8,241.6	7,146.0		31.7	34.6	-105.07	-1,383.8	922.2	398.3	340.1	58.28	6.835		
8,200.0	7,041.8	8,341.6	7,146.0		33.3	36.0	-105.16	-1,483.8	920.5	398.5	337.1	61.44	6.486		
8,300.0	7,041.1	8,441.6	7,146.0		35.0	37.5	-105.24	-1,583.8	918.9	398.7	334.0	64.66	6.166		
8,400.0	7,040.5	8,541.6	7,146.0		36.6	39.1	-105.33	-1,683.8	917.2	398.8	330.9	67.92	5.872		
8,500.0	7,039.9	8,641.6	7,146.0		38.3	40.6	-105.41	-1,783.8	915.6	399.0	327.8	71.22	5.602		
8,600.0	7,039.3	8,741.6	7,146.0		40.0	42.2	-105.50	-1,883.7	913.9	399.2	324.6	74.55	5.354		
8,700.0	7,038.7	8,841.6	7,146.0		41.7	43.9	-105.58	-1,983.7	912.2	399.3	321.4	77.91	5.125		
8,800.0	7,038.1	8,941.6	7,146.0		43.4	45.5	-105.67	-2,083.7	910.6	399.5	318.2	81.30	4.914		
8,900.0	7,037.5	9,041.6	7,146.0		45.2	47.2	-105.75	-2,183.7	908.9	399.7	314.9	84.71	4.718		
9,000.0	7,036.9	9,141.6	7,146.0		46.9	48.9	-105.84	-2,283.7	907.3	399.8	311.7	88.14	4.536		
9,100.0	7,036.3	9,241.6	7,146.0		48.7	50.6	-105.92	-2,383.7	905.6	400.0	308.4	91.58	4.368		
9,200.0	7,035.6	9,341.6	7,146.0		50.5	52.3	-106.00	-2,483.7	903.9	400.2	305.1	95.04	4.211		
9,300.0	7,035.0	9,441.6	7,146.0		52.3	54.0	-106.09	-2,583.6	902.3	400.3	301.8	98.51	4.064		
9,400.0	7,034.4	9,541.6	7,146.0		54.1	55.8	-106.17	-2,683.6	900.6	400.5	298.5	101.99	3.927		
9,500.0	7,033.8	9,641.6	7,146.0		55.9	57.5	-106.26	-2,783.6	899.0	400.7	295.2	105.48	3.799		
9,600.0	7,033.2	9,741.6	7,146.0		57.7	59.3	-106.34	-2,883.6	897.3	400.8	291.9	108.98	3.678		
9,700.0	7,032.6	9,841.6	7,146.0		59.5	61.1	-106.42	-2,983.6	895.6	401.0	288.5	112.49	3.565		
9,800.0	7,032.0	9,941.6	7,146.0		61.3	62.9	-106.51	-3,083.6	894.0	401.2	285.2	116.00	3.459		
9,900.0	7,031.4	10,041.6	7,146.0		63.2	64.7	-106.59	-3,183.5	892.3	401.4	281.9	119.52	3.358		

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

<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Offset Design		Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2U-443 - Wellbore #1										Offset Site Error:		0.0 ft			
Survey Program: 0-MWD														Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis			Distance							Warning			
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor					
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)						
10,000.0	7,030.8	10,141.6	7,146.0	65.0	66.5	-106.68	-3,283.5	890.7	401.5	278.5	123.04	3.264					
10,100.0	7,030.1	10,241.6	7,146.0	66.9	68.3	-106.76	-3,383.5	889.0	401.7	275.2	126.56	3.174					
10,200.0	7,029.5	10,341.6	7,146.0	68.7	70.1	-106.84	-3,483.5	887.3	401.9	271.8	130.09	3.089					
10,300.0	7,028.9	10,441.6	7,146.0	70.6	71.9	-106.93	-3,583.5	885.7	402.1	268.4	133.63	3.009					
10,400.0	7,028.3	10,541.6	7,146.0	72.4	73.7	-107.01	-3,683.5	884.0	402.3	265.1	137.16	2.933					
10,500.0	7,027.7	10,641.6	7,146.0	74.3	75.5	-107.09	-3,783.5	882.4	402.4	261.7	140.70	2.860					
10,600.0	7,027.1	10,741.6	7,146.0	76.1	77.4	-107.18	-3,883.4	880.7	402.6	258.4	144.24	2.791					
10,700.0	7,026.5	10,841.6	7,146.0	78.0	79.2	-107.26	-3,983.4	879.0	402.8	255.0	147.78	2.726					
10,800.0	7,025.9	10,941.6	7,146.0	79.8	81.0	-107.34	-4,083.4	877.4	403.0	251.7	151.32	2.663					
10,900.0	7,025.3	11,041.6	7,146.0	81.7	82.9	-107.42	-4,183.4	875.7	403.2	248.3	154.86	2.603					
11,000.0	7,024.7	11,141.6	7,146.0	83.6	84.7	-107.51	-4,283.4	874.1	403.3	244.9	158.41	2.546					
11,100.0	7,024.0	11,241.6	7,146.0	85.4	86.6	-107.59	-4,383.4	872.4	403.5	241.6	161.95	2.492					
11,200.0	7,023.4	11,341.6	7,146.0	87.3	88.4	-107.67	-4,483.3	870.7	403.7	238.2	165.49	2.440					
11,300.0	7,022.8	11,441.6	7,146.0	89.2	90.3	-107.76	-4,583.3	869.1	403.9	234.9	169.03	2.390					
11,400.0	7,022.2	11,541.6	7,146.0	91.1	92.1	-107.84	-4,683.3	867.4	404.1	231.5	172.58	2.342					
11,500.0	7,021.6	11,641.6	7,146.0	92.9	94.0	-107.92	-4,783.3	865.8	404.3	228.2	176.12	2.296					
11,549.8	7,021.3	11,691.4	7,146.0	93.9	94.9	-107.96	-4,833.1	864.9	404.4	226.5	177.88	2.273					
11,597.5	7,021.0	11,732.7	7,146.0	94.8	95.7	-108.00	-4,874.4	864.2	404.5	225.1	179.46	2.254 SF					

Reference Depths are relative to WELL @ 4686.0ft (RKB -15')	Coordinates are relative to: Sorin Natural Resources 2R-323
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: 0.49°



<b>Company:</b>	PETROLEUM DEVELOPMENT CORP Weld County CO	<b>Local Co-ordinate Reference:</b>	Well Sorin Natural Resources 2R-323
<b>Project:</b>	SEC.2-T4N-R66W	<b>TVD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Reference Site:</b>	Sorin Natural Resources 2R-HZ Pad Sec.2-T4N-R66W	<b>MD Reference:</b>	WELL @ 4686.0ft (RKB -15')
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Sorin Natural Resources 2R-323	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Plan #2 (11-12-13)	<b>Offset TVD Reference:</b>	Offset Datum

Reference Depths are relative to WELL @ 4686.0ft (RKB -15')  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000 °

Coordinates are relative to: Sorin Natural Resources 2R-323  
Coordinate System is US State Plane 1983, Colorado Northern Zone  
Grid Convergence at Surface is: 0.49°

