

PETROLEUM DEVELOPMENT CORP Weld County CO

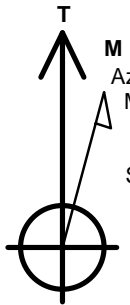
Well Name: **Sorin Natural Resources 2M-303**

Surface Location: Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4673.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1370695.38	3210900.78	40.348490	-104.743320	
RKB - 15' WELL @ 4688.0ft (RKB - 15')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 20'FNL, 2392'FEL	1.0	0.0	0.0	Point
BHL 500'FSL, 2523' FEL	7028.0	-4892.6	-209.1	Point



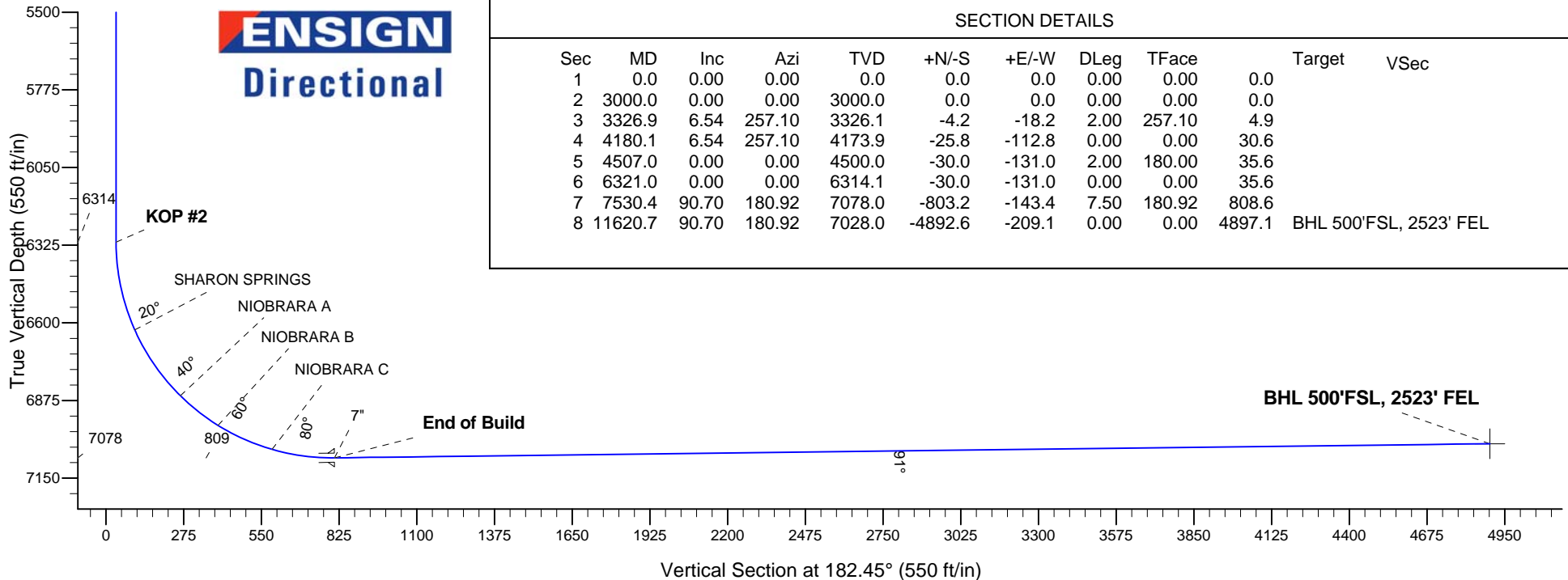
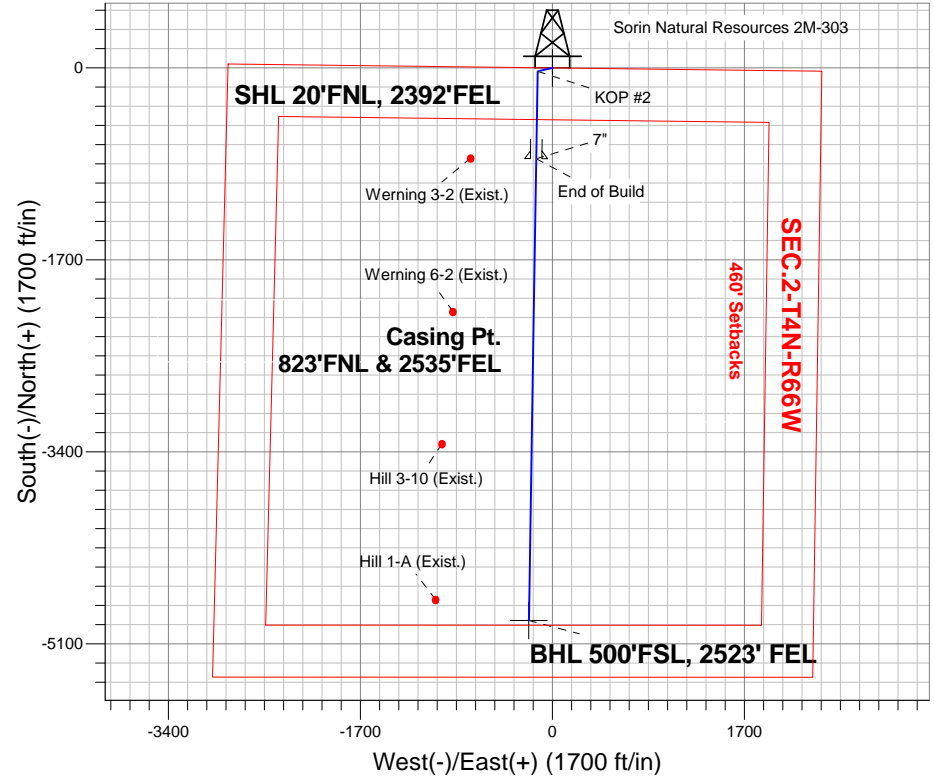
Azimuths to True North
Magnetic North: 8.52°

Magnetic Field
Strength: 52853.8snT
Dip Angle: 66.93°
Date: 11/12/2013
Model: IGRF2010

ANNOTATIONS

TVD	MD	Annotation
3000.0	3000.0	KOP #1
6314.0	6321.0	KOP #2
7078.0	7530.4	End of Build

Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W
Sorin Natural Resources 2M-303
Plan #2 (11-12-13)
12:34, November 15 2013



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	3000.0	0.00	0.00	3000.0	0.0	0.0	0.00	0.00	0.0	
3	3326.9	6.54	257.10	3326.1	-4.2	-18.2	2.00	257.10	4.9	
4	4180.1	6.54	257.10	4173.9	-25.8	-112.8	0.00	0.00	30.6	
5	4507.0	0.00	0.00	4500.0	-30.0	-131.0	2.00	180.00	35.6	
6	6321.0	0.00	0.00	6314.1	-30.0	-131.0	0.00	0.00	35.6	
7	7530.4	90.70	180.92	7078.0	-803.2	-143.4	7.50	180.92	808.6	
8	11620.7	90.70	180.92	7028.0	-4892.6	-209.1	0.00	0.00	4897.1	BHL 500'FSL, 2523' FEL



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.2-T4N-R66W

Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W

Sorin Natural Resources 2M-303

Wellbore #1

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

Standard Planning Report

15 November, 2013

Database:	Landmark	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Project:	SEC.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	North Reference:	True
Well:	Sorin Natural Resources 2M-303	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (11-12-13)		

Project	SEC.2-T4N-R66W, 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						Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W											
Site Position:						Northing:			1,370,695.40 ft			Latitude:			40.348490		
From:			Lat/Long			Easting:			3,210,900.78 ft			Longitude:			-104.743320		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.49 °		

Well Sorin Natural Resources 2M-303						
Well Position	+N/-S	0.0 ft	Northing:	1,370,695.38 ft	Latitude:	40.348490
	+E/-W	0.0 ft	Easting:	3,210,900.78 ft	Longitude:	-104.743320
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,673.0 ft

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

Design	Plan #2 (11-12-13)			
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	182.45

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	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,326.9	6.54	257.10	3,326.1	-4.2	-18.2	2.00	2.00	0.00	257.10	
4,180.1	6.54	257.10	4,173.9	-25.8	-112.8	0.00	0.00	0.00	0.00	
4,507.0	0.00	0.00	4,500.0	-30.0	-131.0	2.00	-2.00	0.00	180.00	
6,321.0	0.00	0.00	6,314.1	-30.0	-131.0	0.00	0.00	0.00	0.00	
7,530.4	90.70	180.92	7,078.0	-803.2	-143.4	7.50	7.50	0.00	180.92	
11,620.7	90.70	180.92	7,028.0	-4,892.6	-209.1	0.00	0.00	0.00	0.00	BHL 500'FSL, 2523

Database:	Landmark	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Project:	SEC.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	North Reference:	True
Well:	Sorin Natural Resources 2M-303	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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
SHL 20'FNL, 2392'FEL									
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
3,100.0	2.00	257.10	3,100.0	-0.4	-1.7	0.5	2.00	2.00	0.00
3,200.0	4.00	257.10	3,199.8	-1.6	-6.8	1.8	2.00	2.00	0.00
3,300.0	6.00	257.10	3,299.5	-3.5	-15.3	4.2	2.00	2.00	0.00
3,326.9	6.54	257.10	3,326.1	-4.2	-18.2	4.9	2.00	2.00	0.00
3,400.0	6.54	257.10	3,398.8	-6.0	-26.3	7.1	0.00	0.00	0.00
3,500.0	6.54	257.10	3,498.2	-8.6	-37.4	10.1	0.00	0.00	0.00
3,600.0	6.54	257.10	3,597.5	-11.1	-48.5	13.2	0.00	0.00	0.00
3,602.5	6.54	257.10	3,600.0	-11.2	-48.7	13.2	0.00	0.00	0.00
PARKMAN									
3,700.0	6.54	257.10	3,696.9	-13.6	-59.6	16.2	0.00	0.00	0.00
3,800.0	6.54	257.10	3,796.2	-16.2	-70.7	19.2	0.00	0.00	0.00
3,900.0	6.54	257.10	3,895.6	-18.7	-81.8	22.2	0.00	0.00	0.00
4,000.0	6.54	257.10	3,994.9	-21.3	-92.9	25.2	0.00	0.00	0.00
4,100.0	6.54	257.10	4,094.3	-23.8	-104.0	28.2	0.00	0.00	0.00
4,105.8	6.54	257.10	4,100.0	-24.0	-104.6	28.4	0.00	0.00	0.00
SUSSEX									
4,180.1	6.54	257.10	4,173.9	-25.8	-112.8	30.6	0.00	0.00	0.00
4,200.0	6.14	257.10	4,193.6	-26.3	-115.0	31.2	2.00	-2.00	0.00

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Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	North Reference:	True
Well:	Sorin Natural Resources 2M-303	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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)
4,300.0	4.14	257.10	4,293.2	-28.3	-123.7	33.6	2.00	-2.00	0.00
4,400.0	2.14	257.10	4,393.1	-29.6	-129.1	35.0	2.00	-2.00	0.00
4,500.0	0.14	257.10	4,493.0	-30.0	-131.0	35.6	2.00	-2.00	0.00
4,507.0	0.00	0.00	4,500.0	-30.0	-131.0	35.6	2.00	-2.00	0.00
4,600.0	0.00	0.00	4,593.0	-30.0	-131.0	35.6	0.00	0.00	0.00
4,700.0	0.00	0.00	4,693.0	-30.0	-131.0	35.6	0.00	0.00	0.00
4,757.0	0.00	0.00	4,750.0	-30.0	-131.0	35.6	0.00	0.00	0.00
SHANNON									
4,800.0	0.00	0.00	4,793.0	-30.0	-131.0	35.6	0.00	0.00	0.00
4,900.0	0.00	0.00	4,893.0	-30.0	-131.0	35.6	0.00	0.00	0.00
5,000.0	0.00	0.00	4,993.0	-30.0	-131.0	35.6	0.00	0.00	0.00
5,100.0	0.00	0.00	5,093.0	-30.0	-131.0	35.6	0.00	0.00	0.00
5,200.0	0.00	0.00	5,193.0	-30.0	-131.0	35.6	0.00	0.00	0.00
5,300.0	0.00	0.00	5,293.0	-30.0	-131.0	35.6	0.00	0.00	0.00
5,400.0	0.00	0.00	5,393.0	-30.0	-131.0	35.6	0.00	0.00	0.00
5,500.0	0.00	0.00	5,493.0	-30.0	-131.0	35.6	0.00	0.00	0.00
5,600.0	0.00	0.00	5,593.0	-30.0	-131.0	35.6	0.00	0.00	0.00
5,700.0	0.00	0.00	5,693.0	-30.0	-131.0	35.6	0.00	0.00	0.00
5,800.0	0.00	0.00	5,793.0	-30.0	-131.0	35.6	0.00	0.00	0.00
5,900.0	0.00	0.00	5,893.0	-30.0	-131.0	35.6	0.00	0.00	0.00
6,000.0	0.00	0.00	5,993.0	-30.0	-131.0	35.6	0.00	0.00	0.00
6,100.0	0.00	0.00	6,093.0	-30.0	-131.0	35.6	0.00	0.00	0.00
6,200.0	0.00	0.00	6,193.0	-30.0	-131.0	35.6	0.00	0.00	0.00
6,300.0	0.00	0.00	6,293.0	-30.0	-131.0	35.6	0.00	0.00	0.00
6,321.0	0.00	0.00	6,314.0	-30.0	-131.0	35.6	0.00	0.00	0.00
KOP #2									
6,400.0	5.92	180.92	6,392.9	-34.1	-131.1	39.6	7.50	7.50	0.00
6,500.0	13.42	180.92	6,491.4	-50.9	-131.3	56.4	7.50	7.50	0.00
6,600.0	20.92	180.92	6,586.9	-80.4	-131.8	85.9	7.50	7.50	0.00
6,641.3	24.02	180.92	6,625.0	-96.1	-132.1	101.7	7.50	7.50	0.00
SHARON SPRINGS									
6,700.0	28.42	180.92	6,677.7	-122.1	-132.5	127.6	7.50	7.50	0.00
6,800.0	35.92	180.92	6,762.3	-175.3	-133.3	180.8	7.50	7.50	0.00
6,900.0	43.42	180.92	6,839.2	-239.1	-134.4	244.6	7.50	7.50	0.00
6,926.3	45.40	180.92	6,858.0	-257.5	-134.7	263.0	7.50	7.50	0.00
NIOBRARA A									
7,000.0	50.92	180.92	6,907.1	-312.3	-135.5	317.8	7.50	7.50	0.00
7,096.4	58.15	180.92	6,963.0	-390.8	-136.8	396.2	7.50	7.50	0.00
NIOBRARA B									
7,100.0	58.42	180.92	6,964.9	-393.8	-136.8	399.3	7.50	7.50	0.00
7,200.0	65.92	180.92	7,011.6	-482.2	-138.3	487.7	7.50	7.50	0.00
7,300.0	73.42	180.92	7,046.3	-575.9	-139.8	581.3	7.50	7.50	0.00
7,306.1	73.88	180.92	7,048.0	-581.8	-139.9	587.2	7.50	7.50	0.00
NIOBRARA C									
7,400.0	80.92	180.92	7,068.5	-673.3	-141.3	678.7	7.50	7.50	0.00
7,500.0	88.42	180.92	7,077.7	-772.8	-142.9	778.2	7.50	7.50	0.00
7,530.4	90.70	180.92	7,078.0	-803.2	-143.4	808.6	7.50	7.50	0.00
End of Build - 7"									
7,600.0	90.70	180.92	7,077.1	-872.8	-144.5	878.2	0.00	0.00	0.00
7,700.0	90.70	180.92	7,075.9	-972.8	-146.1	978.1	0.00	0.00	0.00
7,800.0	90.70	180.92	7,074.7	-1,072.7	-147.7	1,078.1	0.00	0.00	0.00

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Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Project:	SEC.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	North Reference:	True
Well:	Sorin Natural Resources 2M-303	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	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	90.70	180.92	7,073.5	-1,172.7	-149.4	1,178.0	0.00	0.00	0.00
8,000.0	90.70	180.92	7,072.2	-1,272.7	-151.0	1,278.0	0.00	0.00	0.00
8,100.0	90.70	180.92	7,071.0	-1,372.7	-152.6	1,377.9	0.00	0.00	0.00
8,200.0	90.70	180.92	7,069.8	-1,472.7	-154.2	1,477.9	0.00	0.00	0.00
8,300.0	90.70	180.92	7,068.6	-1,572.6	-155.8	1,577.9	0.00	0.00	0.00
8,400.0	90.70	180.92	7,067.3	-1,672.6	-157.4	1,677.8	0.00	0.00	0.00
8,500.0	90.70	180.92	7,066.1	-1,772.6	-159.0	1,777.8	0.00	0.00	0.00
8,600.0	90.70	180.92	7,064.9	-1,872.6	-160.6	1,877.7	0.00	0.00	0.00
8,700.0	90.70	180.92	7,063.7	-1,972.6	-162.2	1,977.7	0.00	0.00	0.00
8,800.0	90.70	180.92	7,062.5	-2,072.5	-163.8	2,077.6	0.00	0.00	0.00
8,900.0	90.70	180.92	7,061.2	-2,172.5	-165.4	2,177.6	0.00	0.00	0.00
9,000.0	90.70	180.92	7,060.0	-2,272.5	-167.0	2,277.6	0.00	0.00	0.00
9,100.0	90.70	180.92	7,058.8	-2,372.5	-168.6	2,377.5	0.00	0.00	0.00
9,200.0	90.70	180.92	7,057.6	-2,472.5	-170.2	2,477.5	0.00	0.00	0.00
9,300.0	90.70	180.92	7,056.4	-2,572.4	-171.8	2,577.4	0.00	0.00	0.00
9,400.0	90.70	180.92	7,055.1	-2,672.4	-173.4	2,677.4	0.00	0.00	0.00
9,500.0	90.70	180.92	7,053.9	-2,772.4	-175.0	2,777.3	0.00	0.00	0.00
9,600.0	90.70	180.92	7,052.7	-2,872.4	-176.6	2,877.3	0.00	0.00	0.00
9,700.0	90.70	180.92	7,051.5	-2,972.4	-178.3	2,977.3	0.00	0.00	0.00
9,800.0	90.70	180.92	7,050.2	-3,072.3	-179.9	3,077.2	0.00	0.00	0.00
9,900.0	90.70	180.92	7,049.0	-3,172.3	-181.5	3,177.2	0.00	0.00	0.00
10,000.0	90.70	180.92	7,047.8	-3,272.3	-183.1	3,277.1	0.00	0.00	0.00
10,100.0	90.70	180.92	7,046.6	-3,372.3	-184.7	3,377.1	0.00	0.00	0.00
10,200.0	90.70	180.92	7,045.4	-3,472.3	-186.3	3,477.0	0.00	0.00	0.00
10,300.0	90.70	180.92	7,044.1	-3,572.2	-187.9	3,577.0	0.00	0.00	0.00
10,400.0	90.70	180.92	7,042.9	-3,672.2	-189.5	3,677.0	0.00	0.00	0.00
10,500.0	90.70	180.92	7,041.7	-3,772.2	-191.1	3,776.9	0.00	0.00	0.00
10,600.0	90.70	180.92	7,040.5	-3,872.2	-192.7	3,876.9	0.00	0.00	0.00
10,700.0	90.70	180.92	7,039.2	-3,972.1	-194.3	3,976.8	0.00	0.00	0.00
10,800.0	90.70	180.92	7,038.0	-4,072.1	-195.9	4,076.8	0.00	0.00	0.00
10,900.0	90.70	180.92	7,036.8	-4,172.1	-197.5	4,176.7	0.00	0.00	0.00
11,000.0	90.70	180.92	7,035.6	-4,272.1	-199.1	4,276.7	0.00	0.00	0.00
11,100.0	90.70	180.92	7,034.4	-4,372.1	-200.7	4,376.7	0.00	0.00	0.00
11,200.0	90.70	180.92	7,033.1	-4,472.0	-202.3	4,476.6	0.00	0.00	0.00
11,300.0	90.70	180.92	7,031.9	-4,572.0	-203.9	4,576.6	0.00	0.00	0.00
11,400.0	90.70	180.92	7,030.7	-4,672.0	-205.5	4,676.5	0.00	0.00	0.00
11,500.0	90.70	180.92	7,029.5	-4,772.0	-207.2	4,776.5	0.00	0.00	0.00
11,600.0	90.70	180.92	7,028.3	-4,872.0	-208.8	4,876.4	0.00	0.00	0.00
11,620.7	90.70	180.92	7,028.0	-4,892.6	-209.1	4,897.1	0.00	0.00	0.00
BHL 500'FSL, 2523' FEL									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
7,530.4	7,078.0	7"	7	8-3/4	

Database:	Landmark	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Project:	SEC.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	North Reference:	True
Well:	Sorin Natural Resources 2M-303	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (11-12-13)		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,602.5	3,600.0	PARKMAN				
4,105.8	4,100.0	SUSSEX				
4,757.0	4,750.0	SHANNON				
6,641.3	6,625.0	SHARON SPRINGS				
6,926.3	6,858.0	NIOBRARA A				
7,096.4	6,963.0	NIOBRARA B				
7,306.1	7,048.0	NIOBRARA C				

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
3,000.0	3,000.0	0.0	0.0	KOP #1
6,321.0	6,314.0	-30.0	-131.0	KOP #2
7,530.4	7,078.0	-803.2	-143.4	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.2-T4N-R66W

Sorin Natural Resources 2M-HZ Pad

Sec.2-T4N-R66W

Sorin Natural Resources 2M-303

Wellbore #1

Plan #2 (11-12-13)

Anticollision Report

15 November, 2013



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

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

Survey Tool Program	Date 11/12/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,620.0	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
Offset Well - Wellbore - Design						
Sorin Natural Existing wells Sec.2-T4N-R66W						
Hill 1-A (Exist.) - Wellbore #1 - Wellbore #1	11,448.1	7,066.1	828.1	595.5	3.560	CC, ES
Hill 1-A (Exist.) - Wellbore #1 - Wellbore #1	11,500.0	7,065.5	829.7	596.2	3.553	SF
Hill 3-10 (Exist.) - Wellbore #1 - Wellbore #1	10,066.6	7,081.0	794.5	587.5	3.839	CC, ES
Hill 3-10 (Exist.) - Wellbore #1 - Wellbore #1	10,100.0	7,080.6	795.2	587.6	3.831	SF
Werning 3-2 (Exist.) - Wellbore #1 - Wellbore #1	7,534.4	7,079.5	581.3	418.4	3.569	CC, ES, SF
Werning 6-2 (Exist.) - Wellbore #1 - Wellbore #1	8,895.7	7,061.3	715.6	530.6	3.868	CC
Werning 6-2 (Exist.) - Wellbore #1 - Wellbore #1	8,900.0	7,061.2	715.6	530.5	3.866	ES, SF
Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W						
Sorin Natural Resources 2M-423 - Wellbore #1 - Plan #1	1,000.0	1,000.0	30.7	26.4	7.180	CC, ES
Sorin Natural Resources 2M-423 - Wellbore #1 - Plan #1	11,620.7	11,708.7	414.0	233.3	2.291	SF
Sorin Natural Resources 2R-243 - Wellbore #1 - Plan #1	200.0	200.0	58.5	57.9	86.808	CC, ES
Sorin Natural Resources 2R-243 - Wellbore #1 - Plan #1	11,620.7	11,577.7	947.7	758.8	5.017	SF

Offset Design Sorin Natural Existing wells Sec.2-T4N-R66W - Hill 1-A (Exist.) - Wellbore #1 - Wellbore #1											
Survey Program: 7300-UNKNOWN											
Reference		Offset		Semi Major Axis		Distance		Offset Site Error:		Offset Well Error:	
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)
10,900.0	7,036.8	7,072.8	7,072.8	81.0	141.5	90.46	-4,706.8	-1,034.3	993.0	770.7	222.37
11,000.0	7,035.6	7,071.6	7,071.6	82.8	141.4	90.38	-4,706.8	-1,034.3	941.6	717.3	224.23
11,100.0	7,034.4	7,070.4	7,070.4	84.7	141.4	90.29	-4,706.8	-1,034.3	898.3	672.2	226.09
11,200.0	7,033.1	7,069.1	7,069.1	86.6	141.4	90.21	-4,706.8	-1,034.3	864.5	636.5	227.95
11,300.0	7,031.9	7,067.9	7,067.9	88.5	141.4	90.13	-4,706.8	-1,034.3	841.2	611.4	229.82
11,400.0	7,030.7	7,066.7	7,066.7	90.4	141.3	90.04	-4,706.8	-1,034.3	829.5	597.8	231.68
11,448.1	7,030.1	7,066.1	7,066.1	91.3	141.3	90.00	-4,706.8	-1,034.3	828.1	595.5	232.58
11,500.0	7,029.5	7,065.5	7,065.5	92.3	141.3	89.96	-4,706.8	-1,034.3	829.7	596.2	233.55
11,600.0	7,028.3	7,064.3	7,064.3	94.2	141.3	89.87	-4,706.8	-1,034.3	841.9	606.5	235.41
11,620.7	7,028.0	7,064.0	7,064.0	94.5	141.3	89.85	-4,706.8	-1,034.3	845.9	610.1	235.72
											Separation Factor
											Warning
											3.466
											4.199
											3.973
											3.792
											3.660
											3.580
											3.560 CC, ES
											3.553 SF
											3.576
											3.588

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

Offset Design		Sorin Natural Existing wells Sec.2-T4N-R66W - Hill 3-10 (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					
9,500.0	7,053.9	7,087.9	7,087.9	54.9	141.8	90.50	-3,326.1	-978.5	975.8	779.2	196.55	4.964					
9,600.0	7,052.7	7,086.7	7,086.7	56.7	141.7	90.41	-3,326.1	-978.5	921.3	722.9	198.38	4.644					
9,700.0	7,051.5	7,085.5	7,085.5	58.5	141.7	90.32	-3,326.1	-978.5	874.9	674.7	200.20	4.370					
9,800.0	7,050.2	7,084.2	7,084.2	60.4	141.7	90.23	-3,326.1	-978.5	838.0	635.9	202.03	4.148					
9,900.0	7,049.0	7,083.0	7,083.0	62.2	141.7	90.15	-3,326.1	-978.5	811.7	607.9	203.87	3.982					
10,000.0	7,047.8	7,081.8	7,081.8	64.1	141.6	90.06	-3,326.1	-978.5	797.2	591.5	205.70	3.876					
10,066.6	7,047.0	7,081.0	7,081.0	65.3	141.6	90.00	-3,326.1	-978.5	794.5	587.5	206.93	3.839 CC, ES					
10,100.0	7,046.6	7,080.6	7,080.6	66.0	141.6	89.97	-3,326.1	-978.5	795.2	587.6	207.54	3.831 SF					
10,200.0	7,045.4	7,079.4	7,079.4	67.8	141.6	89.88	-3,326.1	-978.5	805.6	596.2	209.38	3.847					
10,300.0	7,044.1	7,078.1	7,078.1	69.7	141.6	89.79	-3,326.1	-978.5	828.0	616.8	211.23	3.920					
10,400.0	7,042.9	7,076.9	7,076.9	71.6	141.5	89.71	-3,326.1	-978.5	861.6	648.5	213.07	4.044					
10,500.0	7,041.7	7,075.7	7,075.7	73.4	141.5	89.62	-3,326.1	-978.5	905.0	690.1	214.92	4.211					
10,600.0	7,040.5	7,074.5	7,074.5	75.3	141.5	89.53	-3,326.1	-978.5	956.9	740.1	216.77	4.414					

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

Offset Design		Sorin Natural Existing wells Sec.2-T4N-R66W - Werning 3-2 (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					
4,100.0	4,094.3	4,095.3	4,095.3	9.1	81.9	-38.55	-797.8	-724.7	992.2	901.7	90.50	10.963					
4,200.0	4,193.6	4,194.6	4,194.6	9.3	83.9	-38.94	-797.8	-724.7	983.4	890.6	92.75	10.602					
4,300.0	4,293.2	4,294.2	4,294.2	9.6	85.9	-39.18	-797.8	-724.7	976.4	881.3	95.12	10.264					
4,400.0	4,393.1	4,394.1	4,394.1	9.8	87.9	-39.33	-797.8	-724.7	972.1	874.7	97.43	9.978					
4,500.0	4,493.0	4,494.0	4,494.0	10.0	89.9	-39.39	-797.8	-724.7	970.6	870.9	99.66	9.739					
4,540.8	4,533.9	4,534.9	4,534.9	10.0	90.7	-39.39	-797.8	-724.7	970.5	870.0	100.55	9.652					
4,600.0	4,593.0	4,594.0	4,594.0	10.2	91.9	-142.29	-797.8	-724.7	970.6	868.7	101.86	9.529					
4,700.0	4,693.0	4,694.0	4,694.0	10.4	93.9	-142.29	-797.8	-724.7	970.6	866.5	104.08	9.326					
4,800.0	4,793.0	4,794.0	4,794.0	10.6	95.9	-142.29	-797.8	-724.7	970.6	864.3	106.30	9.131					
4,900.0	4,893.0	4,894.0	4,894.0	10.8	97.9	-142.29	-797.8	-724.7	970.6	862.1	108.52	8.944					
5,000.0	4,993.0	4,994.0	4,994.0	11.0	99.9	-142.29	-797.8	-724.7	970.6	859.9	110.74	8.765					
5,100.0	5,093.0	5,094.0	5,094.0	11.2	101.9	-142.29	-797.8	-724.7	970.6	857.6	112.96	8.593					
5,200.0	5,193.0	5,194.0	5,194.0	11.5	103.9	-142.29	-797.8	-724.7	970.6	855.4	115.18	8.427					
5,300.0	5,293.0	5,294.0	5,294.0	11.7	105.9	-142.29	-797.8	-724.7	970.6	853.2	117.40	8.268					
5,400.0	5,393.0	5,394.0	5,394.0	11.9	107.9	-142.29	-797.8	-724.7	970.6	851.0	119.62	8.114					
5,500.0	5,493.0	5,494.0	5,494.0	12.1	109.9	-142.29	-797.8	-724.7	970.6	848.8	121.84	7.966					
5,600.0	5,593.0	5,594.0	5,594.0	12.3	111.9	-142.29	-797.8	-724.7	970.6	846.5	124.06	7.824					
5,700.0	5,693.0	5,694.0	5,694.0	12.5	113.9	-142.29	-797.8	-724.7	970.6	844.3	126.28	7.686					
5,800.0	5,793.0	5,794.0	5,794.0	12.8	115.9	-142.29	-797.8	-724.7	970.6	842.1	128.50	7.553					
5,900.0	5,893.0	5,894.0	5,894.0	13.0	117.9	-142.29	-797.8	-724.7	970.6	839.9	130.72	7.425					
6,000.0	5,993.0	5,994.0	5,994.0	13.2	119.9	-142.29	-797.8	-724.7	970.6	837.7	132.94	7.301					
6,100.0	6,093.0	6,094.0	6,094.0	13.4	121.9	-142.29	-797.8	-724.7	970.6	835.4	135.17	7.181					
6,200.0	6,193.0	6,194.0	6,194.0	13.6	123.9	-142.29	-797.8	-724.7	970.6	833.2	137.39	7.065					
6,300.0	6,293.0	6,294.0	6,294.0	13.9	125.9	-142.29	-797.8	-724.7	970.6	831.0	139.61	6.952					
6,400.0	6,392.9	6,393.9	6,393.9	14.1	127.9	37.09	-797.8	-724.7	967.3	826.0	141.33	6.845					
6,500.0	6,491.4	6,492.4	6,492.4	14.2	129.8	38.31	-797.8	-724.7	954.0	812.4	141.59	6.738					
6,600.0	6,586.9	6,587.9	6,587.9	14.5	131.8	40.57	-797.8	-724.7	930.8	790.1	140.66	6.617					
6,700.0	6,677.7	6,678.7	6,678.7	14.7	133.6	43.97	-797.8	-724.7	898.6	759.3	139.26	6.452					
6,800.0	6,762.3	6,763.3	6,763.3	15.0	135.3	48.64	-797.8	-724.7	858.7	720.2	138.49	6.200					
6,900.0	6,839.2	6,840.2	6,840.2	15.4	136.8	54.63	-797.8	-724.7	812.9	673.3	139.61	5.823					
7,000.0	6,907.1	6,908.1	6,908.1	15.9	138.2	61.78	-797.8	-724.7	763.4	620.2	143.29	5.328					
7,100.0	6,964.9	6,965.9	6,965.9	16.6	139.3	69.58	-797.8	-724.7	713.3	564.5	148.82	4.793					
7,200.0	7,011.6	7,012.6	7,012.6	17.5	140.3	77.15	-797.8	-724.7	666.0	511.6	154.36	4.315					
7,300.0	7,046.3	7,047.3	7,047.3	18.5	140.9	83.52	-797.8	-724.7	625.6	467.2	158.42	3.949					
7,400.0	7,068.5	7,069.5	7,069.5	19.7	141.4	87.92	-797.8	-724.7	596.5	435.7	160.85	3.709					
7,500.0	7,077.7	7,078.7	7,078.7	20.9	141.6	89.91	-797.8	-724.7	582.3	419.9	162.41	3.586					
7,534.4	7,078.5	7,079.5	7,079.5	21.4	141.6	90.00	-797.8	-724.7	581.3	418.4	162.90	3.569 CC, ES, SF					
7,600.0	7,077.1	7,078.1	7,078.1	22.3	141.6	89.92	-797.8	-724.7	585.0	421.3	163.77	3.572					
7,700.0	7,075.9	7,076.9	7,076.9	23.7	141.5	89.80	-797.8	-724.7	604.5	439.3	165.18	3.659					
7,800.0	7,074.7	7,075.7	7,075.7	25.2	141.5	89.68	-797.8	-724.7	639.1	472.5	166.66	3.835					
7,900.0	7,073.5	7,074.5	7,074.5	26.8	141.5	89.56	-797.8	-724.7	686.7	518.5	168.20	4.083					
8,000.0	7,072.2	7,073.2	7,073.2	28.4	141.5	89.44	-797.8	-724.7	744.8	575.0	169.77	4.387					
8,100.0	7,071.0	7,072.0	7,072.0	30.0	141.4	89.32	-797.8	-724.7	811.1	639.7	171.38	4.733					
8,200.0	7,069.8	7,070.8	7,070.8	31.7	141.4	89.20	-797.8	-724.7	883.7	710.7	173.02	5.107					
8,300.0	7,068.6	7,069.6	7,069.6	33.4	141.4	89.08	-797.8	-724.7	961.3	786.6	174.69	5.503					

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

Offset Design											Sorin Natural Existing wells Sec.2-T4N-R66W - Werning 6-2 (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)				
8,200.0	7,069.8	7,069.8	7,069.8	31.7	141.4	90.68	-2,156.7	-880.9	998.0	825.0	173.00	5.769			
8,300.0	7,068.6	7,068.6	7,068.6	33.4	141.4	90.58	-2,156.7	-880.9	931.1	756.4	174.67	5.330			
8,400.0	7,067.3	7,067.3	7,067.3	35.1	141.3	90.48	-2,156.7	-880.9	870.5	694.1	176.37	4.936			
8,500.0	7,066.1	7,066.1	7,066.1	36.8	141.3	90.39	-2,156.7	-880.9	817.7	639.6	178.09	4.592			
8,600.0	7,064.9	7,064.9	7,064.9	38.6	141.3	90.29	-2,156.7	-880.9	774.3	594.5	179.82	4.306			
8,700.0	7,063.7	7,063.7	7,063.7	40.4	141.3	90.19	-2,156.7	-880.9	741.9	560.3	181.57	4.086			
8,800.0	7,062.5	7,062.5	7,062.5	42.1	141.2	90.09	-2,156.7	-880.9	722.0	538.7	183.33	3.938			
8,895.7	7,061.3	7,061.3	7,061.3	43.8	141.2	90.00	-2,156.7	-880.9	715.6	530.6	185.02	3.868 CC			
8,900.0	7,061.2	7,061.2	7,061.2	43.9	141.2	90.00	-2,156.7	-880.9	715.6	530.5	185.10	3.866 ES, SF			
9,000.0	7,060.0	7,060.0	7,060.0	45.7	141.2	89.90	-2,156.7	-880.9	723.2	536.3	186.88	3.870			
9,100.0	7,058.8	7,058.8	7,058.8	47.5	141.2	89.80	-2,156.7	-880.9	744.2	555.6	188.66	3.945			
9,200.0	7,057.6	7,057.6	7,057.6	49.4	141.2	89.70	-2,156.7	-880.9	777.6	587.2	190.46	4.083			
9,300.0	7,056.4	7,056.4	7,056.4	51.2	141.1	89.60	-2,156.7	-880.9	821.9	629.7	192.26	4.275			
9,400.0	7,055.1	7,055.1	7,055.1	53.0	141.1	89.51	-2,156.7	-880.9	875.5	681.4	194.07	4.511			
9,500.0	7,053.9	7,053.9	7,053.9	54.9	141.1	89.41	-2,156.7	-880.9	936.6	740.8	195.88	4.782			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

Offset Design		Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2M-423 - 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	90.02	0.0	30.7	30.7					
100.0	100.0	100.0	100.0	0.1	0.1	90.02	0.0	30.7	30.7	30.4	0.22	136.412		
200.0	200.0	200.0	200.0	0.3	0.3	90.02	0.0	30.7	30.7	30.0	0.67	45.471		
300.0	300.0	300.0	300.0	0.6	0.6	90.02	0.0	30.7	30.7	29.5	1.12	27.282		
400.0	400.0	400.0	400.0	0.8	0.8	90.02	0.0	30.7	30.7	29.1	1.57	19.487		
500.0	500.0	500.0	500.0	1.0	1.0	90.02	0.0	30.7	30.7	28.6	2.02	15.157		
600.0	600.0	600.0	600.0	1.2	1.2	90.02	0.0	30.7	30.7	28.2	2.47	12.401		
700.0	700.0	700.0	700.0	1.5	1.5	90.02	0.0	30.7	30.7	27.7	2.92	10.493		
800.0	800.0	800.0	800.0	1.7	1.7	90.02	0.0	30.7	30.7	27.3	3.37	9.094		
900.0	900.0	900.0	900.0	1.9	1.9	90.02	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	90.02	0.0	30.7	30.7	26.4	4.27	7.180 CC, ES		
1,100.0	1,100.0	1,099.2	1,099.2	2.4	2.3	90.32	-0.2	31.9	31.9	27.2	4.70	6.793		
1,200.0	1,200.0	1,198.2	1,198.2	2.6	2.5	91.08	-0.7	35.8	35.8	30.7	5.13	6.986		
1,300.0	1,300.0	1,297.0	1,296.7	2.8	2.8	92.03	-1.5	42.1	42.3	36.7	5.56	7.601		
1,400.0	1,400.0	1,396.2	1,395.6	3.0	3.0	92.92	-2.6	50.5	50.8	44.8	6.01	8.456		
1,500.0	1,500.0	1,495.9	1,494.8	3.3	3.2	93.58	-3.7	59.2	59.5	53.0	6.46	9.208		
1,600.0	1,600.0	1,595.5	1,594.0	3.5	3.4	94.06	-4.8	67.8	68.2	61.3	6.93	9.853		
1,700.0	1,700.0	1,695.1	1,693.3	3.7	3.7	94.44	-5.9	76.4	77.0	69.6	7.39	10.410		
1,800.0	1,800.0	1,794.7	1,792.5	3.9	3.9	94.74	-7.0	85.1	85.7	77.8	7.87	10.894		
1,900.0	1,900.0	1,894.3	1,891.8	4.2	4.2	94.98	-8.2	93.7	94.4	86.1	8.34	11.319		
2,000.0	2,000.0	1,993.9	1,991.0	4.4	4.4	95.18	-9.3	102.4	103.2	94.3	8.82	11.695		
2,100.0	2,100.0	2,093.6	2,090.2	4.6	4.7	95.35	-10.4	111.0	111.9	102.6	9.30	12.028		
2,200.0	2,200.0	2,193.2	2,189.5	4.8	5.0	95.50	-11.5	119.6	120.6	110.9	9.79	12.326		
2,300.0	2,300.0	2,292.8	2,288.7	5.1	5.2	95.63	-12.6	128.3	129.4	119.1	10.27	12.594		
2,400.0	2,400.0	2,392.4	2,387.9	5.3	5.5	95.74	-13.8	136.9	138.1	127.4	10.76	12.835		
2,500.0	2,500.0	2,492.0	2,487.2	5.5	5.8	95.83	-14.9	145.5	146.9	135.6	11.25	13.055		
2,600.0	2,600.0	2,591.6	2,586.4	5.7	6.0	95.92	-16.0	154.2	155.6	143.9	11.74	13.254		
2,700.0	2,700.0	2,691.3	2,685.6	6.0	6.3	96.00	-17.1	162.8	164.3	152.1	12.23	13.437		
2,800.0	2,800.0	2,790.9	2,784.9	6.2	6.6	96.07	-18.2	171.5	173.1	160.4	12.72	13.605		
2,900.0	2,900.0	2,890.5	2,884.1	6.4	6.8	96.13	-19.3	180.1	181.8	168.6	13.21	13.759		
3,000.0	3,000.0	2,990.1	2,983.3	6.6	7.1	96.18	-20.5	188.7	190.6	176.9	13.71	13.902		
3,100.0	3,100.0	3,089.6	3,082.4	6.8	7.4	-160.96	-21.6	197.4	200.9	187.4	13.52	14.864		
3,200.0	3,199.8	3,188.6	3,181.1	7.0	7.6	-161.28	-22.7	205.9	214.6	200.7	13.91	15.433		
3,300.0	3,299.5	3,287.1	3,279.2	7.2	7.9	-161.80	-23.8	214.5	231.6	217.3	14.28	16.216		
3,400.0	3,398.8	3,385.2	3,376.9	7.4	8.2	-162.49	-24.9	223.0	250.9	236.2	14.68	17.089		
3,500.0	3,498.2	3,483.2	3,474.6	7.7	8.4	-163.12	-26.0	231.5	270.5	255.3	15.11	17.905		
3,600.0	3,597.5	3,581.3	3,572.2	7.9	8.7	-163.67	-27.1	240.0	290.0	274.5	15.53	18.674		
3,700.0	3,696.9	3,679.6	3,670.2	8.1	9.0	-164.15	-28.2	248.5	309.6	293.6	15.96	19.401		
3,800.0	3,796.2	3,786.9	3,777.2	8.4	9.2	-164.63	-29.2	256.2	327.7	311.3	16.36	20.024		
3,900.0	3,895.6	3,895.1	3,885.3	8.6	9.4	-165.11	-29.8	261.0	343.0	326.3	16.77	20.456		
4,000.0	3,994.9	4,004.2	3,994.4	8.8	9.6	-165.60	-30.0	262.7	355.6	338.4	17.18	20.694		
4,100.0	4,094.3	4,104.1	4,094.3	9.1	9.8	-166.04	-30.0	262.7	366.7	349.1	17.59	20.841		
4,200.0	4,193.6	4,203.4	4,193.6	9.3	10.0	-166.47	-30.0	262.7	377.7	359.6	18.02	20.955		
4,300.0	4,293.2	4,303.0	4,293.2	9.6	10.2	-166.82	-30.0	262.7	386.4	367.9	18.49	20.900		
4,400.0	4,393.1	4,402.9	4,393.1	9.8	10.3	-167.03	-30.0	262.7	391.7	372.8	18.93	20.688		
4,500.0	4,493.0	4,502.9	4,493.0	10.0	10.5	-167.10	-30.0	262.7	393.7	374.3	19.35	20.341		
4,600.0	4,593.0	4,602.9	4,593.0	10.2	10.7	90.00	-30.0	262.7	393.7	373.9	19.77	19.917		
4,700.0	4,693.0	4,702.9	4,693.0	10.4	10.9	90.00	-30.0	262.7	393.7	373.5	20.19	19.493		
4,800.0	4,793.0	4,802.9	4,793.0	10.6	11.1	90.00	-30.0	262.7	393.7	373.0	20.62	19.087		
4,900.0	4,893.0	4,902.9	4,893.0	10.8	11.3	90.00	-30.0	262.7	393.7	372.6	21.06	18.696		
5,000.0	4,993.0	5,002.9	4,993.0	11.0	11.5	90.00	-30.0	262.7	393.7	372.2	21.49	18.321		

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 Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

Offset Design		Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2M-423 - 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 (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
5,100.0	5,093.0	5,102.9	5,093.0	11.2	11.7	90.00	-30.0	262.7	393.7	371.7	21.92	17.959		
5,200.0	5,193.0	5,202.9	5,193.0	11.5	11.9	90.00	-30.0	262.7	393.7	371.3	22.35	17.612		
5,300.0	5,293.0	5,302.9	5,293.0	11.7	12.1	90.00	-30.0	262.7	393.7	370.9	22.79	17.276		
5,400.0	5,393.0	5,402.9	5,393.0	11.9	12.3	90.00	-30.0	262.7	393.7	370.4	23.22	16.953		
5,500.0	5,493.0	5,502.9	5,493.0	12.1	12.5	90.00	-30.0	262.7	393.7	370.0	23.66	16.642		
5,600.0	5,593.0	5,602.9	5,593.0	12.3	12.7	90.00	-30.0	262.7	393.7	369.6	24.09	16.341		
5,700.0	5,693.0	5,702.9	5,693.0	12.5	12.9	90.00	-30.0	262.7	393.7	369.1	24.53	16.051		
5,800.0	5,793.0	5,802.9	5,793.0	12.8	13.2	90.00	-30.0	262.7	393.7	368.7	24.96	15.770		
5,900.0	5,893.0	5,902.9	5,893.0	13.0	13.4	90.00	-30.0	262.7	393.7	368.3	25.40	15.499		
6,000.0	5,993.0	6,002.9	5,993.0	13.2	13.6	90.00	-30.0	262.7	393.7	367.8	25.84	15.237		
6,100.0	6,093.0	6,102.9	6,093.0	13.4	13.8	90.00	-30.0	262.7	393.7	367.4	26.27	14.983		
6,200.0	6,193.0	6,202.9	6,193.0	13.6	14.0	90.00	-30.0	262.7	393.7	366.9	26.71	14.737		
6,300.0	6,293.0	6,302.9	6,293.0	13.9	14.2	90.00	-30.0	262.7	393.7	366.5	27.15	14.499		
6,303.1	6,296.1	6,305.9	6,296.1	13.9	14.2	-90.92	-30.0	262.7	393.7	366.5	27.16	14.494		
6,400.0	6,392.9	6,402.7	6,392.9	14.1	14.4	-91.50	-30.0	262.7	393.7	366.2	27.56	14.287		
6,500.0	6,491.4	6,504.2	6,494.1	14.2	14.6	-93.08	-36.0	262.6	394.2	366.2	27.95	14.104		
6,600.0	6,586.9	6,607.2	6,595.1	14.5	14.8	-94.62	-55.8	262.2	394.9	366.5	28.35	13.927		
6,700.0	6,677.7	6,711.8	6,694.0	14.7	15.0	-96.08	-89.6	261.7	395.8	367.0	28.82	13.733		
6,800.0	6,762.3	6,817.8	6,788.7	15.0	15.3	-97.44	-137.3	260.9	397.0	367.5	29.41	13.497		
6,900.0	6,839.2	6,925.4	6,876.9	15.4	15.7	-98.66	-198.5	259.9	398.2	368.0	30.17	13.195		
7,000.0	6,907.1	7,034.2	6,956.6	15.9	16.1	-99.73	-272.5	258.7	399.3	368.2	31.18	12.808		
7,100.0	6,964.9	7,144.2	7,025.7	16.6	16.8	-100.63	-358.0	257.3	400.4	368.0	32.49	12.326		
7,200.0	7,011.6	7,255.2	7,082.2	17.5	17.7	-101.32	-453.4	255.8	401.4	367.2	34.13	11.759		
7,300.0	7,046.3	7,367.0	7,124.5	18.5	18.7	-101.80	-556.7	254.1	402.0	365.9	36.13	11.128		
7,400.0	7,068.5	7,479.2	7,151.4	19.7	20.0	-102.06	-665.6	252.3	402.4	363.9	38.45	10.466		
7,500.0	7,077.7	7,584.5	7,163.9	20.9	21.3	-102.39	-770.1	250.6	402.9	362.0	40.92	9.847		
7,600.0	7,077.1	7,691.3	7,171.6	22.3	22.7	-103.50	-876.6	248.9	404.7	361.2	43.49	9.304		
7,700.0	7,075.9	7,794.2	7,171.8	23.7	24.2	-103.70	-979.5	247.3	405.0	358.7	46.31	8.746		
7,800.0	7,074.7	7,894.2	7,171.5	25.2	25.7	-103.82	-1,079.4	245.6	405.2	356.0	49.21	8.233		
7,900.0	7,073.5	7,994.2	7,171.1	26.8	27.2	-103.94	-1,179.4	244.0	405.4	353.2	52.22	7.763		
8,000.0	7,072.2	8,094.2	7,170.7	28.4	28.8	-104.06	-1,279.4	242.4	405.6	350.3	55.31	7.333		
8,100.0	7,071.0	8,194.2	7,170.4	30.0	30.4	-104.18	-1,379.4	240.8	405.8	347.3	58.47	6.940		
8,200.0	7,069.8	8,294.2	7,170.0	31.7	32.1	-104.30	-1,479.4	239.2	406.0	344.3	61.69	6.581		
8,300.0	7,068.6	8,394.2	7,169.7	33.4	33.8	-104.42	-1,579.4	237.6	406.2	341.2	64.95	6.254		
8,400.0	7,067.3	8,494.2	7,169.3	35.1	35.5	-104.53	-1,679.3	235.9	406.4	338.1	68.26	5.954		
8,500.0	7,066.1	8,594.2	7,169.0	36.8	37.2	-104.65	-1,779.3	234.3	406.6	335.0	71.60	5.679		
8,600.0	7,064.9	8,694.2	7,168.6	38.6	38.9	-104.77	-1,879.3	232.7	406.8	331.8	74.97	5.426		
8,700.0	7,063.7	8,794.2	7,168.3	40.4	40.7	-104.89	-1,979.3	231.1	407.0	328.6	78.37	5.194		
8,800.0	7,062.5	8,894.2	7,167.9	42.1	42.5	-105.01	-2,079.3	229.5	407.2	325.4	81.79	4.979		
8,900.0	7,061.2	8,994.2	7,167.6	43.9	44.2	-105.13	-2,179.2	227.9	407.4	322.2	85.23	4.781		
9,000.0	7,060.0	9,094.2	7,167.2	45.7	46.0	-105.25	-2,279.2	226.2	407.7	319.0	88.68	4.597		
9,100.0	7,058.8	9,194.2	7,166.9	47.5	47.8	-105.36	-2,379.2	224.6	407.9	315.7	92.15	4.426		
9,200.0	7,057.6	9,294.2	7,166.5	49.4	49.7	-105.48	-2,479.2	223.0	408.1	312.5	95.62	4.268		
9,300.0	7,056.4	9,394.1	7,166.2	51.2	51.5	-105.60	-2,579.2	221.4	408.3	309.2	99.11	4.120		
9,400.0	7,055.1	9,494.1	7,165.8	53.0	53.3	-105.72	-2,679.2	219.8	408.6	305.9	102.61	3.982		
9,500.0	7,053.9	9,594.1	7,165.5	54.9	55.1	-105.84	-2,779.1	218.2	408.8	302.7	106.11	3.852		
9,600.0	7,052.7	9,694.1	7,165.1	56.7	57.0	-105.95	-2,879.1	216.5	409.0	299.4	109.62	3.731		
9,700.0	7,051.5	9,794.1	7,164.8	58.5	58.8	-106.07	-2,979.1	214.9	409.2	296.1	113.14	3.617		
9,800.0	7,050.2	9,894.1	7,164.4	60.4	60.7	-106.19	-3,079.1	213.3	409.5	292.8	116.66	3.510		
9,900.0	7,049.0	9,994.1	7,164.0	62.2	62.5	-106.30	-3,179.1	211.7	409.7	289.5	120.18	3.409		

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 Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

Offset Design		Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2M-423 - 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	7,047.8	10,094.1	7,163.7	64.1	64.4	-106.42	-3,279.1	210.1	409.9	286.2	123.71	3.314			
10,100.0	7,046.6	10,194.1	7,163.3	66.0	66.2	-106.54	-3,379.0	208.5	410.2	282.9	127.24	3.224			
10,200.0	7,045.4	10,294.1	7,163.0	67.8	68.1	-106.66	-3,479.0	206.8	410.4	279.6	130.76	3.139			
10,300.0	7,044.1	10,394.1	7,162.6	69.7	70.0	-106.77	-3,579.0	205.2	410.6	276.4	134.30	3.058			
10,400.0	7,042.9	10,494.1	7,162.3	71.6	71.8	-106.89	-3,679.0	203.6	410.9	273.1	137.83	2.981			
10,500.0	7,041.7	10,594.1	7,161.9	73.4	73.7	-107.00	-3,779.0	202.0	411.1	269.8	141.36	2.908			
10,600.0	7,040.5	10,694.1	7,161.6	75.3	75.6	-107.12	-3,879.0	200.4	411.4	266.5	144.89	2.839			
10,700.0	7,039.2	10,794.1	7,161.2	77.2	77.4	-107.24	-3,978.9	198.8	411.6	263.2	148.42	2.773			
10,800.0	7,038.0	10,894.1	7,160.9	79.1	79.3	-107.35	-4,078.9	197.1	411.9	259.9	151.95	2.711			
10,900.0	7,036.8	10,994.1	7,160.5	81.0	81.2	-107.47	-4,178.9	195.5	412.1	256.6	155.48	2.651			
11,000.0	7,035.6	11,094.1	7,160.2	82.8	83.1	-107.58	-4,278.9	193.9	412.4	253.4	159.01	2.593			
11,100.0	7,034.4	11,194.1	7,159.8	84.7	85.0	-107.70	-4,378.9	192.3	412.6	250.1	162.54	2.539			
11,200.0	7,033.1	11,294.1	7,159.5	86.6	86.8	-107.81	-4,478.8	190.7	412.9	246.8	166.06	2.486			
11,300.0	7,031.9	11,394.1	7,159.1	88.5	88.7	-107.93	-4,578.8	189.1	413.1	243.5	169.59	2.436			
11,400.0	7,030.7	11,494.1	7,158.8	90.4	90.6	-108.05	-4,678.8	187.5	413.4	240.3	173.11	2.388			
11,500.0	7,029.5	11,594.1	7,158.4	92.3	92.5	-108.16	-4,778.8	185.8	413.7	237.0	176.63	2.342			
11,600.0	7,028.3	11,694.1	7,158.0	94.2	94.4	-108.27	-4,878.8	184.2	413.9	233.8	180.14	2.298			
11,620.7	7,028.0	11,708.7	7,158.0	94.5	94.7	-108.29	-4,893.4	184.0	414.0	233.3	180.69	2.291 SF			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

Offset Design		Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2R-243 - 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	90.02	0.0	58.5	58.5					
100.0	100.0	100.0	100.0	0.1	0.1	90.02	0.0	58.5	58.5	58.3	0.22	260.423		
200.0	200.0	200.0	200.0	0.3	0.3	90.02	0.0	58.5	58.5	57.9	0.67	86.808	CC, ES	
300.0	300.0	298.0	297.9	0.6	0.5	90.08	-0.1	60.2	60.2	59.1	1.11	54.322		
400.0	400.0	395.7	395.5	0.8	0.8	90.25	-0.3	65.2	65.4	63.8	1.55	42.141		
500.0	500.0	493.0	492.5	1.0	1.0	90.48	-0.6	73.5	73.9	71.9	2.02	36.600		
600.0	600.0	589.6	588.4	1.2	1.3	90.72	-1.1	85.0	85.8	83.2	2.52	34.058		
700.0	700.0	687.5	685.3	1.5	1.6	90.95	-1.6	99.2	100.3	97.2	3.05	32.830		
800.0	800.0	786.4	783.1	1.7	1.9	91.12	-2.2	113.7	115.0	111.4	3.61	31.866		
900.0	900.0	885.3	880.9	1.9	2.3	91.25	-2.8	128.2	129.7	125.5	4.17	31.108		
1,000.0	1,000.0	984.2	978.8	2.1	2.6	91.35	-3.4	142.8	144.4	139.6	4.73	30.501		
1,100.0	1,100.0	1,083.2	1,076.6	2.4	3.0	91.44	-3.9	157.3	159.1	153.8	5.30	30.008		
1,200.0	1,200.0	1,182.1	1,174.5	2.6	3.3	91.51	-4.5	171.8	173.8	167.9	5.87	29.601		
1,300.0	1,300.0	1,281.0	1,272.3	2.8	3.7	91.57	-5.1	186.3	188.5	182.0	6.44	29.259		
1,400.0	1,400.0	1,379.9	1,370.1	3.0	4.0	91.62	-5.7	200.9	203.2	196.2	7.01	28.969		
1,500.0	1,500.0	1,478.8	1,468.0	3.3	4.4	91.67	-6.3	215.4	217.9	210.3	7.59	28.720		
1,600.0	1,600.0	1,577.7	1,565.8	3.5	4.7	91.70	-6.8	229.9	232.6	224.4	8.16	28.503		
1,700.0	1,700.0	1,676.6	1,663.6	3.7	5.1	91.74	-7.4	244.5	247.3	238.5	8.73	28.314		
1,800.0	1,800.0	1,775.5	1,761.5	3.9	5.4	91.77	-8.0	259.0	262.0	252.7	9.31	28.147		
1,900.0	1,900.0	1,874.5	1,859.3	4.2	5.8	91.80	-8.6	273.5	276.7	266.8	9.88	27.998		
2,000.0	2,000.0	1,973.4	1,957.2	4.4	6.1	91.82	-9.2	288.1	291.4	280.9	10.46	27.865		
2,100.0	2,100.0	2,072.3	2,055.0	4.6	6.5	91.84	-9.7	302.6	306.1	295.1	11.03	27.746		
2,200.0	2,200.0	2,171.2	2,152.8	4.8	6.8	91.86	-10.3	317.1	320.8	309.2	11.61	27.637		
2,300.0	2,300.0	2,270.1	2,250.7	5.1	7.2	91.88	-10.9	331.7	335.5	323.3	12.18	27.539		
2,400.0	2,400.0	2,369.0	2,348.5	5.3	7.5	91.90	-11.5	346.2	350.2	337.4	12.76	27.449		
2,500.0	2,500.0	2,467.9	2,446.4	5.5	7.9	91.91	-12.0	360.7	364.9	351.6	13.33	27.367		
2,600.0	2,600.0	2,566.8	2,544.2	5.7	8.2	91.93	-12.6	375.3	379.6	365.7	13.91	27.291		
2,700.0	2,700.0	2,665.8	2,642.0	6.0	8.6	91.94	-13.2	389.8	394.3	379.8	14.48	27.222		
2,800.0	2,800.0	2,764.7	2,739.9	6.2	9.0	91.95	-13.8	404.3	409.0	393.9	15.06	27.157		
2,900.0	2,900.0	2,863.6	2,837.7	6.4	9.3	91.96	-14.4	418.9	423.7	408.1	15.64	27.097		
3,000.0	3,000.0	2,962.5	2,935.5	6.6	9.7	91.97	-14.9	433.4	438.4	422.2	16.21	27.041		
3,100.0	3,100.0	3,061.1	3,033.1	6.8	10.0	-165.09	-15.5	447.9	454.8	440.8	14.01	32.469		
3,200.0	3,199.8	3,159.2	3,130.1	7.0	10.4	-165.14	-16.1	462.3	474.5	460.1	14.39	32.978		
3,300.0	3,299.5	3,256.5	3,226.3	7.2	10.7	-165.27	-16.7	476.6	497.5	482.7	14.75	33.722		
3,400.0	3,398.8	3,353.2	3,322.0	7.4	11.1	-165.53	-17.2	490.8	522.9	507.7	15.16	34.489		
3,500.0	3,498.2	3,449.8	3,417.6	7.7	11.4	-165.80	-17.8	505.0	548.4	532.8	15.59	35.172		
3,600.0	3,597.5	3,546.5	3,513.2	7.9	11.8	-166.05	-18.3	519.2	573.9	557.9	16.03	35.812		
3,700.0	3,696.9	3,643.1	3,608.8	8.1	12.1	-166.28	-18.9	533.4	599.5	583.0	16.46	36.413		
3,800.0	3,796.2	3,739.8	3,704.4	8.4	12.4	-166.48	-19.5	547.6	625.0	608.1	16.90	36.978		
3,900.0	3,895.6	3,836.4	3,800.0	8.6	12.8	-166.68	-20.0	561.8	650.6	633.3	17.34	37.510		
4,000.0	3,994.9	3,933.1	3,895.6	8.8	13.1	-166.85	-20.6	576.0	676.2	658.4	17.79	38.012		
4,100.0	4,094.3	4,029.7	3,991.2	9.1	13.5	-167.02	-21.2	590.2	701.8	683.5	18.23	38.485		
4,200.0	4,193.6	4,126.4	4,086.8	9.3	13.8	-167.19	-21.7	604.4	727.3	708.6	18.70	38.893		
4,300.0	4,293.2	4,223.7	4,183.0	9.6	14.2	-167.40	-22.3	618.7	750.5	731.3	19.22	39.043		
4,400.0	4,393.1	4,321.6	4,279.9	9.8	14.5	-167.53	-22.9	633.1	770.5	750.8	19.73	39.050		
4,500.0	4,493.0	4,420.2	4,377.4	10.0	14.9	-167.58	-23.5	647.5	787.1	766.9	20.21	38.942		
4,600.0	4,593.0	4,519.2	4,475.3	10.2	15.2	89.57	-24.0	662.1	801.8	781.1	20.67	38.786		
4,700.0	4,693.0	4,618.1	4,573.1	10.4	15.6	89.62	-24.6	676.6	816.5	795.3	21.14	38.629		
4,800.0	4,793.0	4,717.0	4,671.0	10.6	16.0	89.66	-25.2	691.1	831.2	809.6	21.60	38.480		
4,900.0	4,893.0	4,815.9	4,768.8	10.8	16.3	89.71	-25.8	705.7	845.9	823.8	22.06	38.336		
5,000.0	4,993.0	4,914.8	4,866.6	11.0	16.7	89.75	-26.3	720.2	860.5	838.0	22.53	38.198		

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 Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

Offset Design		Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2R-243 - 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	5,093.0	5,013.7	4,964.5	11.2	17.0	89.80	-26.9	734.7	875.2	852.2	22.99	38.065		
5,200.0	5,193.0	5,112.6	5,062.3	11.5	17.4	89.84	-27.5	749.3	889.9	866.5	23.46	37.937		
5,300.0	5,293.0	5,211.5	5,160.1	11.7	17.7	89.88	-28.1	763.8	904.6	880.7	23.92	37.814		
5,400.0	5,393.0	5,310.5	5,258.0	11.9	18.1	89.92	-28.7	778.3	919.3	894.9	24.39	37.695		
5,500.0	5,493.0	5,446.9	5,393.3	12.1	18.5	89.96	-29.4	796.1	932.4	907.5	24.89	37.455		
5,600.0	5,593.0	5,595.0	5,540.8	12.3	18.8	89.99	-29.8	808.1	940.6	915.2	25.38	37.060		
5,700.0	5,693.0	5,743.9	5,689.6	12.5	19.0	90.00	-30.0	812.5	943.5	917.7	25.85	36.497		
5,800.0	5,793.0	5,847.3	5,793.0	12.8	19.1	90.00	-30.0	812.5	943.5	917.3	26.26	35.930		
5,900.0	5,893.0	5,947.3	5,893.0	13.0	19.3	90.00	-30.0	812.5	943.5	916.9	26.66	35.385		
6,000.0	5,993.0	6,047.3	5,993.0	13.2	19.4	90.00	-30.0	812.5	943.5	916.5	27.07	34.854		
6,100.0	6,093.0	6,147.3	6,093.0	13.4	19.5	90.00	-30.0	812.5	943.5	916.1	27.48	34.338		
6,200.0	6,193.0	6,247.3	6,193.0	13.6	19.7	90.00	-30.0	812.5	943.5	915.6	27.89	33.836		
6,300.0	6,293.0	6,348.4	6,294.1	13.9	19.8	90.20	-33.2	812.5	943.5	915.2	28.29	33.346		
6,398.6	6,391.4	6,447.3	6,391.7	14.1	20.0	-90.09	-48.6	812.2	943.4	914.8	28.65	32.924		
6,400.0	6,392.9	6,448.5	6,392.9	14.1	20.0	-90.02	-48.9	812.2	943.4	914.8	28.66	32.919		
6,500.0	6,491.4	6,547.1	6,487.3	14.2	20.1	-89.30	-76.8	811.8	943.5	914.5	29.05	32.483		
6,600.0	6,586.9	6,644.2	6,576.1	14.5	20.3	-88.61	-115.9	811.2	943.7	914.2	29.48	32.009		
6,700.0	6,677.7	6,739.9	6,658.1	14.7	20.5	-87.94	-165.3	810.4	944.1	914.1	30.02	31.451		
6,800.0	6,762.3	6,834.5	6,732.4	15.0	20.8	-87.30	-223.6	809.5	944.5	913.8	30.70	30.767		
6,900.0	6,839.2	6,927.9	6,798.2	15.4	21.1	-86.72	-289.9	808.4	945.1	913.5	31.59	29.921		
7,000.0	6,907.1	7,020.4	6,854.8	15.9	21.5	-86.18	-362.9	807.3	945.6	912.9	32.72	28.898		
7,100.0	6,964.9	7,112.0	6,901.9	16.6	22.1	-85.71	-441.5	806.1	946.2	912.1	34.14	27.712		
7,200.0	7,011.6	7,202.9	6,938.9	17.5	22.7	-85.31	-524.4	804.8	946.7	910.9	35.86	26.400		
7,300.0	7,046.3	7,293.3	6,965.7	18.5	23.4	-84.99	-610.6	803.4	947.2	909.4	37.87	25.013		
7,400.0	7,068.5	7,383.2	6,982.1	19.7	24.3	-84.74	-699.0	802.0	947.6	907.5	40.14	23.611		
7,500.0	7,077.7	7,472.8	6,988.0	20.9	25.2	-84.57	-788.3	800.6	947.9	905.3	42.61	22.249		
7,600.0	7,077.1	7,571.4	6,987.4	22.3	26.3	-84.57	-887.0	799.0	947.9	902.6	45.32	20.917		
7,700.0	7,075.9	7,671.4	6,986.6	23.7	27.6	-84.60	-987.0	797.5	947.9	899.8	48.17	19.678		
7,800.0	7,074.7	7,771.4	6,985.9	25.2	28.9	-84.63	-1,086.9	795.9	947.9	896.8	51.15	18.533		
7,900.0	7,073.5	7,871.4	6,985.2	26.8	30.3	-84.66	-1,186.9	794.3	947.9	893.7	54.23	17.479		
8,000.0	7,072.2	7,971.4	6,984.4	28.4	31.7	-84.69	-1,286.9	792.7	947.9	890.5	57.40	16.513		
8,100.0	7,071.0	8,071.4	6,983.7	30.0	33.2	-84.71	-1,386.9	791.2	947.9	887.2	60.65	15.629		
8,200.0	7,069.8	8,171.4	6,983.0	31.7	34.7	-84.74	-1,486.9	789.6	947.9	883.9	63.96	14.820		
8,300.0	7,068.6	8,271.4	6,982.2	33.4	36.3	-84.77	-1,586.9	788.0	947.8	880.5	67.32	14.079		
8,400.0	7,067.3	8,371.4	6,981.5	35.1	37.9	-84.80	-1,686.8	786.5	947.8	877.1	70.73	13.400		
8,500.0	7,066.1	8,471.4	6,980.8	36.8	39.5	-84.83	-1,786.8	784.9	947.8	873.6	74.18	12.777		
8,600.0	7,064.9	8,571.4	6,980.0	38.6	41.2	-84.86	-1,886.8	783.3	947.8	870.1	77.67	12.203		
8,700.0	7,063.7	8,671.4	6,979.3	40.4	42.9	-84.89	-1,986.8	781.7	947.8	866.6	81.18	11.675		
8,800.0	7,062.5	8,771.4	6,978.6	42.1	44.6	-84.92	-2,086.8	780.2	947.8	863.1	84.73	11.186		
8,900.0	7,061.2	8,871.4	6,977.8	43.9	46.3	-84.95	-2,186.8	778.6	947.8	859.5	88.29	10.735		
9,000.0	7,060.0	8,971.4	6,977.1	45.7	48.0	-84.98	-2,286.7	777.0	947.8	855.9	91.88	10.315		
9,100.0	7,058.8	9,071.4	6,976.4	47.5	49.7	-85.01	-2,386.7	775.4	947.8	852.3	95.48	9.926		
9,200.0	7,057.6	9,171.4	6,975.6	49.4	51.5	-85.04	-2,486.7	773.9	947.7	848.6	99.10	9.563		
9,300.0	7,056.4	9,271.4	6,974.9	51.2	53.3	-85.07	-2,586.7	772.3	947.7	845.0	102.74	9.225		
9,400.0	7,055.1	9,371.4	6,974.2	53.0	55.0	-85.10	-2,686.7	770.7	947.7	841.3	106.39	8.908		
9,500.0	7,053.9	9,471.4	6,973.4	54.9	56.8	-85.13	-2,786.7	769.1	947.7	837.7	110.05	8.612		
9,600.0	7,052.7	9,571.4	6,972.7	56.7	58.6	-85.16	-2,886.7	767.6	947.7	834.0	113.72	8.334		
9,700.0	7,051.5	9,671.4	6,972.0	58.5	60.4	-85.19	-2,986.6	766.0	947.7	830.3	117.40	8.072		
9,800.0	7,050.2	9,771.4	6,971.2	60.4	62.2	-85.22	-3,086.6	764.4	947.7	826.6	121.09	7.826		
9,900.0	7,049.0	9,871.4	6,970.5	62.2	64.0	-85.25	-3,186.6	762.8	947.7	822.9	124.79	7.594		

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 Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

Offset Design		Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W - Sorin Natural Resources 2R-243 - 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	7,047.8	9,971.4	6,969.8	64.1	65.9	-85.28	-3,286.6	761.3	947.7	819.2	128.50	7.375					
10,100.0	7,046.6	10,071.4	6,969.0	66.0	67.7	-85.31	-3,386.6	759.7	947.7	815.4	132.21	7.168					
10,200.0	7,045.4	10,171.4	6,968.3	67.8	69.5	-85.34	-3,486.6	758.1	947.7	811.7	135.93	6.971					
10,300.0	7,044.1	10,271.4	6,967.6	69.7	71.3	-85.37	-3,586.5	756.6	947.6	808.0	139.66	6.785					
10,400.0	7,042.9	10,371.4	6,966.8	71.6	73.2	-85.40	-3,686.5	755.0	947.6	804.2	143.39	6.609					
10,500.0	7,041.7	10,471.4	6,966.1	73.4	75.0	-85.43	-3,786.5	753.4	947.6	800.5	147.12	6.441					
10,600.0	7,040.5	10,571.4	6,965.4	75.3	76.9	-85.45	-3,886.5	751.8	947.6	796.8	150.86	6.281					
10,700.0	7,039.2	10,671.4	6,964.6	77.2	78.7	-85.48	-3,986.5	750.3	947.6	793.0	154.61	6.129					
10,800.0	7,038.0	10,771.4	6,963.9	79.1	80.6	-85.51	-4,086.5	748.7	947.6	789.2	158.36	5.984					
10,900.0	7,036.8	10,871.4	6,963.2	81.0	82.4	-85.54	-4,186.4	747.1	947.6	785.5	162.11	5.845					
11,000.0	7,035.6	10,971.4	6,962.4	82.8	84.3	-85.57	-4,286.4	745.5	947.6	781.7	165.87	5.713					
11,100.0	7,034.4	11,071.4	6,961.7	84.7	86.1	-85.60	-4,386.4	744.0	947.6	778.0	169.63	5.586					
11,200.0	7,033.1	11,171.4	6,961.0	86.6	88.0	-85.63	-4,486.4	742.4	947.6	774.2	173.39	5.465					
11,300.0	7,031.9	11,271.4	6,960.2	88.5	89.9	-85.66	-4,586.4	740.8	947.6	770.4	177.16	5.349					
11,400.0	7,030.7	11,371.4	6,959.5	90.4	91.7	-85.69	-4,686.4	739.2	947.6	766.7	180.92	5.237					
11,500.0	7,029.5	11,471.4	6,958.8	92.3	93.6	-85.72	-4,786.3	737.7	947.6	762.9	184.69	5.130					
11,600.0	7,028.3	11,571.4	6,958.0	94.2	95.5	-85.75	-4,886.3	736.1	947.6	759.1	188.47	5.028					
11,605.6	7,028.2	11,577.0	6,958.0	94.2	95.6	-85.75	-4,891.9	736.0	947.6	758.9	188.66	5.023					
11,620.7	7,028.0	11,577.7	6,958.0	94.5	95.6	-85.75	-4,892.6	736.0	947.7	758.8	188.90	5.017 SF					

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
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Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	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 #2 (11-12-13)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4688.0ft (RKB - 15')

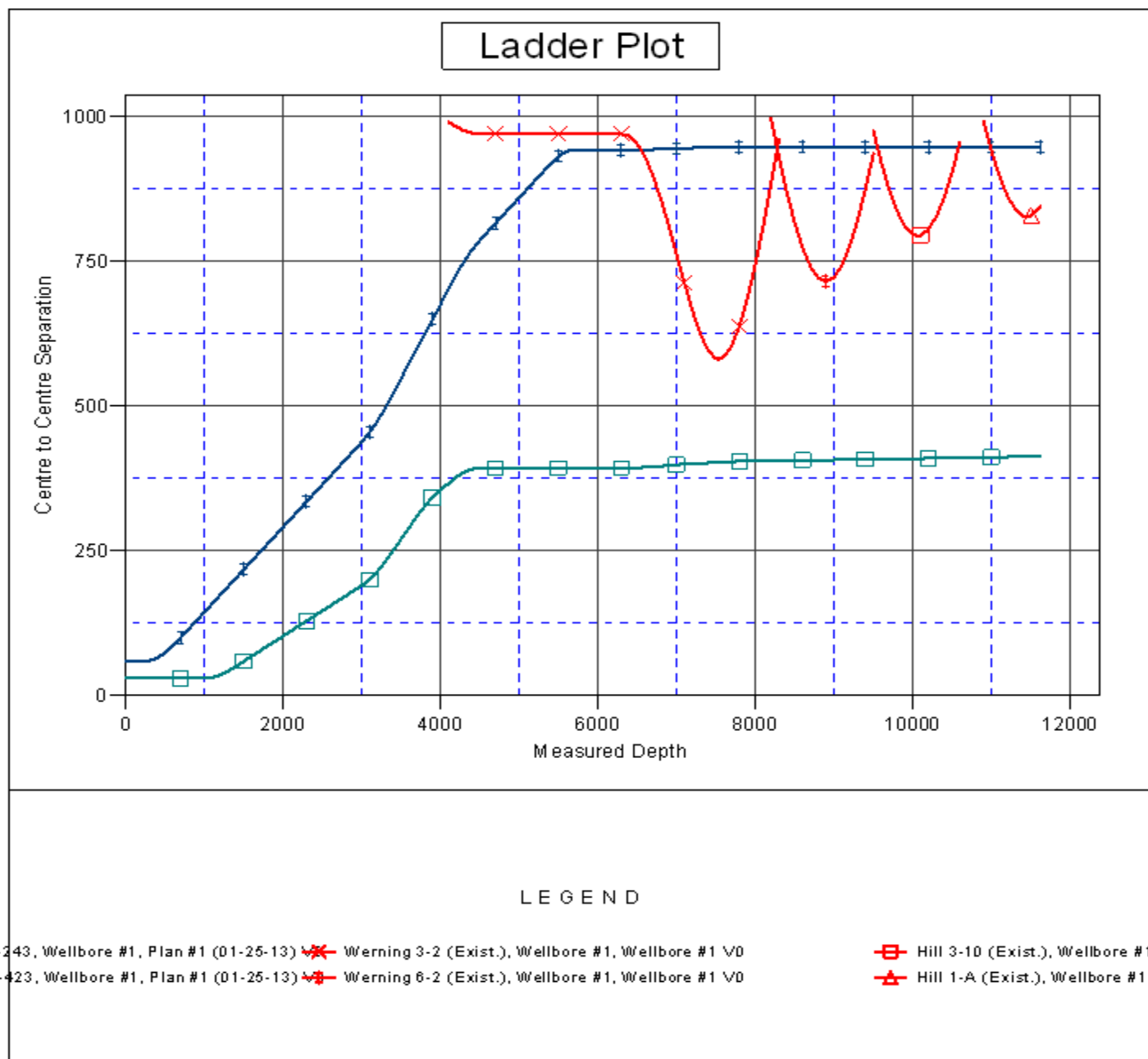
Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Sorin Natural Resources 2M-303

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.49°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sorin Natural Resources 2M-303
Project:	SEC.2-T4N-R66W	TVD Reference:	WELL @ 4688.0ft (RKB - 15')
Reference Site:	Sorin Natural Resources 2M-HZ Pad Sec.2-T4N-R66W	MD Reference:	WELL @ 4688.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sorin Natural Resources 2M-303	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
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Reference Depths are relative to WELL @ 4688.0ft (RKB - 15')
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000 °

Coordinates are relative to: Sorin Natural Resources 2M-303
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.49°

