

PETROLEUM DEVELOPMENT CORP Weld County CO

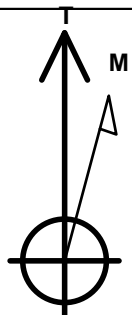
Well Name: **Bernhardt Farms 13W-403**

Surface Location: Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4737.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1357120.42	3186285.28	40.311770	-104.832000	
RKB - 15' WELL @ 4752.0ft (RKB - 15')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 2663'FSL, 640'FEL	1.0	0.0	0.0	Point
TRACT 115'FEL & 115'S OF CENTER LINE	1.0	-96.8	526.4	Polygon
BHL 500'FSL, 75'FEL	7257.0	-7428.2	546.8	Point



Azimuths to True North
Magnetic North: 8.57°

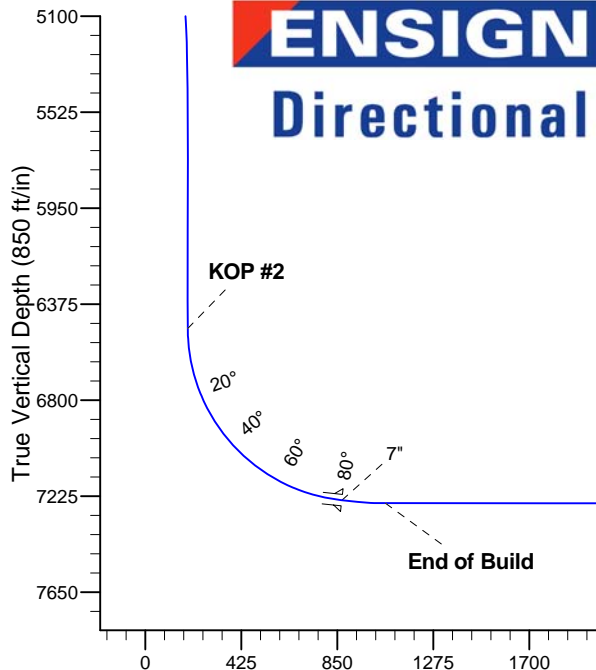
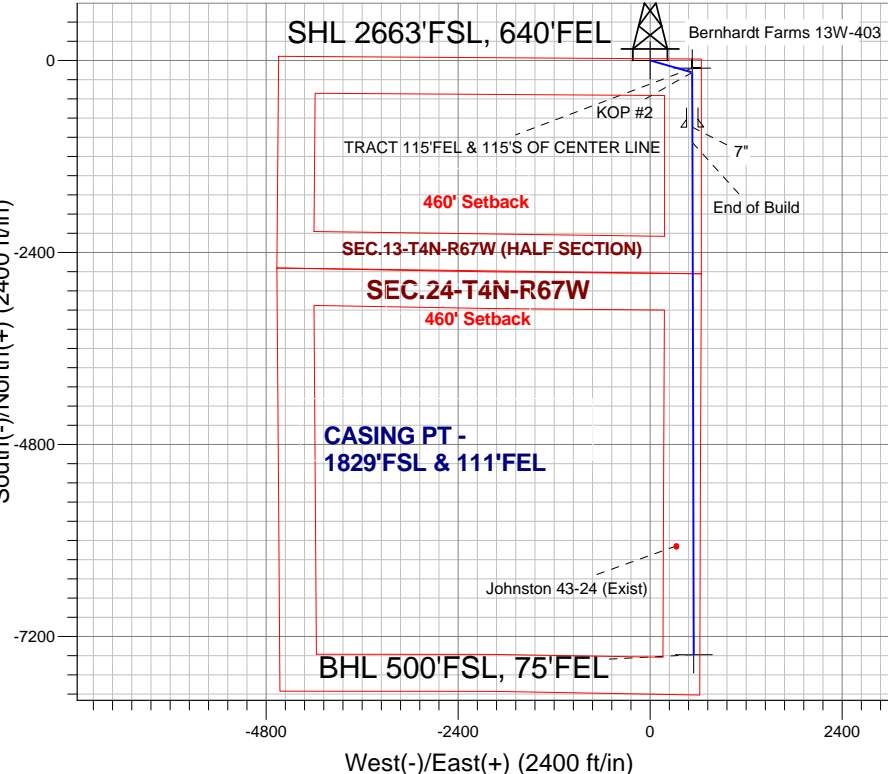
Magnetic Field
Strength: 52824.4snT
Dip Angle: 66.89°
Date: 11/13/2013
Model: IGRF2010

Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W
Bernhardt Farms 13W-403
Plan #1 (11-13-13)
7:32, November 20 2013

ANNOTATIONS

TVD	MD	Annotation
1000.0	1000.0	KOP #1
6483.3	6518.4	KOP #2
7257.0	7832.4	End of Build

South(-)/North(+) (2400 ft/in)



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1000.0	0.00	0.00	1000.0	0.0	0.0	0.00	0.00	0.0	
3	1378.6	7.57	105.89	1377.5	-6.8	24.0	2.00	105.89	8.6	
4	5156.6	7.57	105.89	5122.5	-143.2	502.8	0.00	0.00	179.7	
5	5535.1	0.00	0.00	5500.0	-150.0	526.8	2.00	180.00	188.3	
6	6518.4	0.00	0.00	6483.2	-150.0	526.8	0.00	0.00	188.3	
7	7638.4	84.00	179.84	7243.0	-834.1	528.7	7.50	179.84	870.6	
8	7712.4	84.00	179.84	7250.7	-907.7	528.9	0.00	0.00	944.1	
9	7832.4	90.00	179.84	7257.0	-1027.5	529.2	5.00	0.00	1063.5	
10	14233.1	90.00	179.84	7257.0	-7428.2	546.8	0.00	0.00	7448.3	BHL 500'FSL, 75'FEL

BHL 500'FSL, 75'FEL

Vertical Section at 175.79° (850 ft/in)



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.13-T4N-R67W

Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W

Bernhardt Farms 13W-403

Wellbore #1

Plan: Plan #1 (11-13-13)

Standard Planning Report

20 November, 2013

Database:	Landmark	Local Co-ordinate Reference:	Well Bernhardt Farms 13W-403
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4752.0ft (RKB - 15')
Project:	SEC.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	North Reference:	True
Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-13-13)		

Project	SEC.13-T4N-R67W, 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						Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W											
Site Position:						Northing:			1,357,036.42 ft			Latitude:			40.311540		
From:			Lat/Long			Easting:			3,186,255.24 ft			Longitude:			-104.832110		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.43 °		

Well	Bernhardt Farms 13W-403					
Well Position	+N/-S	83.8 ft	Northing:	1,357,120.42 ft	Latitude:	40.311770
	+E/-W	30.7 ft	Easting:	3,186,285.28 ft	Longitude:	-104.832000
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,737.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/13/2013	8.57	66.89	52,824

Design	Plan #1 (11-13-13)			
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	175.79

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,378.6	7.57	105.89	1,377.5	-6.8	24.0	2.00	2.00	0.00	105.89	
5,156.6	7.57	105.89	5,122.5	-143.2	502.8	0.00	0.00	0.00	0.00	
5,535.1	0.00	0.00	5,500.0	-150.0	526.8	2.00	-2.00	0.00	180.00	
6,518.4	0.00	0.00	6,483.2	-150.0	526.8	0.00	0.00	0.00	0.00	
7,638.4	84.00	179.84	7,243.0	-834.1	528.7	7.50	7.50	0.00	179.84	
7,712.4	84.00	179.84	7,250.7	-907.7	528.9	0.00	0.00	0.00	0.00	
7,832.4	90.00	179.84	7,257.0	-1,027.5	529.2	5.00	5.00	0.00	0.00	
14,233.1	90.00	179.84	7,257.0	-7,428.2	546.8	0.00	0.00	0.00	0.00	BHL 500'FSL, 75'F

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Project:	SEC.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	North Reference:	True
Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-13-13)		

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
TRACT 115'FEL & 115'S OF CENTER LINE - SHL 2663'FSL, 640'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
KOP #1									
1,100.0	2.00	105.89	1,100.0	-0.5	1.7	0.6	2.00	2.00	0.00
1,200.0	4.00	105.89	1,199.8	-1.9	6.7	2.4	2.00	2.00	0.00
1,300.0	6.00	105.89	1,299.5	-4.3	15.1	5.4	2.00	2.00	0.00
1,378.6	7.57	105.89	1,377.5	-6.8	24.0	8.6	2.00	2.00	0.00
1,400.0	7.57	105.89	1,398.7	-7.6	26.7	9.6	0.00	0.00	0.00
1,500.0	7.57	105.89	1,497.8	-11.2	39.4	14.1	0.00	0.00	0.00
1,600.0	7.57	105.89	1,597.0	-14.8	52.1	18.6	0.00	0.00	0.00
1,700.0	7.57	105.89	1,696.1	-18.4	64.8	23.1	0.00	0.00	0.00
1,800.0	7.57	105.89	1,795.2	-22.0	77.4	27.7	0.00	0.00	0.00
1,900.0	7.57	105.89	1,894.4	-25.7	90.1	32.2	0.00	0.00	0.00
2,000.0	7.57	105.89	1,993.5	-29.3	102.8	36.7	0.00	0.00	0.00
2,100.0	7.57	105.89	2,092.6	-32.9	115.4	41.3	0.00	0.00	0.00
2,200.0	7.57	105.89	2,191.7	-36.5	128.1	45.8	0.00	0.00	0.00
2,300.0	7.57	105.89	2,290.9	-40.1	140.8	50.3	0.00	0.00	0.00
2,400.0	7.57	105.89	2,390.0	-43.7	153.5	54.8	0.00	0.00	0.00
2,500.0	7.57	105.89	2,489.1	-47.3	166.1	59.4	0.00	0.00	0.00
2,600.0	7.57	105.89	2,588.3	-50.9	178.8	63.9	0.00	0.00	0.00
2,700.0	7.57	105.89	2,687.4	-54.5	191.5	68.4	0.00	0.00	0.00
2,800.0	7.57	105.89	2,786.5	-58.1	204.1	73.0	0.00	0.00	0.00
2,900.0	7.57	105.89	2,885.6	-61.7	216.8	77.5	0.00	0.00	0.00
3,000.0	7.57	105.89	2,984.8	-65.3	229.5	82.0	0.00	0.00	0.00
3,100.0	7.57	105.89	3,083.9	-69.0	242.2	86.5	0.00	0.00	0.00
3,200.0	7.57	105.89	3,183.0	-72.6	254.8	91.1	0.00	0.00	0.00
3,300.0	7.57	105.89	3,282.1	-76.2	267.5	95.6	0.00	0.00	0.00
3,400.0	7.57	105.89	3,381.3	-79.8	280.2	100.1	0.00	0.00	0.00
3,500.0	7.57	105.89	3,480.4	-83.4	292.9	104.7	0.00	0.00	0.00
3,600.0	7.57	105.89	3,579.5	-87.0	305.5	109.2	0.00	0.00	0.00
3,700.0	7.57	105.89	3,678.7	-90.6	318.2	113.7	0.00	0.00	0.00
3,800.0	7.57	105.89	3,777.8	-94.2	330.9	118.2	0.00	0.00	0.00
3,900.0	7.57	105.89	3,876.9	-97.8	343.5	122.8	0.00	0.00	0.00
4,000.0	7.57	105.89	3,976.0	-101.4	356.2	127.3	0.00	0.00	0.00
4,100.0	7.57	105.89	4,075.2	-105.0	368.9	131.8	0.00	0.00	0.00
4,200.0	7.57	105.89	4,174.3	-108.6	381.6	136.4	0.00	0.00	0.00
4,300.0	7.57	105.89	4,273.4	-112.3	394.2	140.9	0.00	0.00	0.00
4,400.0	7.57	105.89	4,372.6	-115.9	406.9	145.4	0.00	0.00	0.00
4,500.0	7.57	105.89	4,471.7	-119.5	419.6	149.9	0.00	0.00	0.00
4,600.0	7.57	105.89	4,570.8	-123.1	432.2	154.5	0.00	0.00	0.00
4,700.0	7.57	105.89	4,669.9	-126.7	444.9	159.0	0.00	0.00	0.00

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Project:	SEC.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	North Reference:	True
Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-13-13)		

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)
4,800.0	7.57	105.89	4,769.1	-130.3	457.6	163.5	0.00	0.00	0.00
4,900.0	7.57	105.89	4,868.2	-133.9	470.3	168.1	0.00	0.00	0.00
5,000.0	7.57	105.89	4,967.3	-137.5	482.9	172.6	0.00	0.00	0.00
5,100.0	7.57	105.89	5,066.5	-141.1	495.6	177.1	0.00	0.00	0.00
5,156.6	7.57	105.89	5,122.5	-143.2	502.8	179.7	0.00	0.00	0.00
5,200.0	6.70	105.89	5,165.6	-144.6	508.0	181.5	2.00	-2.00	0.00
5,300.0	4.70	105.89	5,265.1	-147.4	517.5	185.0	2.00	-2.00	0.00
5,400.0	2.70	105.89	5,364.9	-149.1	523.7	187.2	2.00	-2.00	0.00
5,500.0	0.70	105.89	5,464.9	-149.9	526.6	188.2	2.00	-2.00	0.00
5,535.1	0.00	0.00	5,500.0	-150.0	526.8	188.3	2.00	-2.00	0.00
5,600.0	0.00	0.00	5,564.9	-150.0	526.8	188.3	0.00	0.00	0.00
5,700.0	0.00	0.00	5,664.9	-150.0	526.8	188.3	0.00	0.00	0.00
5,800.0	0.00	0.00	5,764.9	-150.0	526.8	188.3	0.00	0.00	0.00
5,900.0	0.00	0.00	5,864.9	-150.0	526.8	188.3	0.00	0.00	0.00
6,000.0	0.00	0.00	5,964.9	-150.0	526.8	188.3	0.00	0.00	0.00
6,100.0	0.00	0.00	6,064.9	-150.0	526.8	188.3	0.00	0.00	0.00
6,200.0	0.00	0.00	6,164.9	-150.0	526.8	188.3	0.00	0.00	0.00
6,300.0	0.00	0.00	6,264.9	-150.0	526.8	188.3	0.00	0.00	0.00
6,400.0	0.00	0.00	6,364.9	-150.0	526.8	188.3	0.00	0.00	0.00
6,500.0	0.00	0.00	6,464.9	-150.0	526.8	188.3	0.00	0.00	0.00
6,518.4	0.00	0.00	6,483.3	-150.0	526.8	188.3	0.00	0.00	0.00
KOP #2									
6,600.0	6.12	179.84	6,564.7	-154.4	526.8	192.6	7.50	7.50	0.00
6,700.0	13.62	179.84	6,663.2	-171.5	526.9	209.7	7.50	7.50	0.00
6,800.0	21.12	179.84	6,758.5	-201.3	526.9	239.5	7.50	7.50	0.00
6,900.0	28.62	179.84	6,849.2	-243.4	527.1	281.4	7.50	7.50	0.00
7,000.0	36.12	179.84	6,933.6	-296.9	527.2	334.8	7.50	7.50	0.00
7,100.0	43.62	179.84	7,010.3	-360.9	527.4	398.7	7.50	7.50	0.00
7,200.0	51.12	179.84	7,078.0	-434.4	527.6	472.0	7.50	7.50	0.00
7,300.0	58.62	179.84	7,135.4	-516.2	527.8	553.5	7.50	7.50	0.00
7,400.0	66.12	179.84	7,181.8	-604.7	528.0	641.8	7.50	7.50	0.00
7,500.0	73.62	179.84	7,216.2	-698.5	528.3	735.4	7.50	7.50	0.00
7,600.0	81.12	179.84	7,238.0	-796.0	528.6	832.7	7.50	7.50	0.00
7,638.4	84.00	179.84	7,243.0	-834.1	528.7	870.7	7.49	7.49	0.00
7"									
7,700.0	84.00	179.84	7,249.4	-895.4	528.8	931.8	0.00	0.00	0.00
7,712.4	84.00	179.84	7,250.7	-907.7	528.9	944.1	0.00	0.00	0.00
7,800.0	88.38	179.84	7,256.5	-995.1	529.1	1,031.3	5.00	5.00	0.00
7,832.4	90.00	179.84	7,257.0	-1,027.5	529.2	1,063.6	5.00	5.00	0.00
End of Build									
7,900.0	90.00	179.84	7,257.0	-1,095.1	529.4	1,131.0	0.00	0.00	0.00
8,000.0	90.00	179.84	7,257.0	-1,195.1	529.7	1,230.8	0.00	0.00	0.00
8,100.0	90.00	179.84	7,257.0	-1,295.1	529.9	1,330.5	0.00	0.00	0.00
8,200.0	90.00	179.84	7,257.0	-1,395.1	530.2	1,430.3	0.00	0.00	0.00
8,300.0	90.00	179.84	7,257.0	-1,495.1	530.5	1,530.0	0.00	0.00	0.00
8,400.0	90.00	179.84	7,257.0	-1,595.1	530.8	1,629.8	0.00	0.00	0.00
8,500.0	90.00	179.84	7,257.0	-1,695.1	531.0	1,729.5	0.00	0.00	0.00
8,600.0	90.00	179.84	7,257.0	-1,795.1	531.3	1,829.3	0.00	0.00	0.00
8,700.0	90.00	179.84	7,257.0	-1,895.1	531.6	1,929.0	0.00	0.00	0.00
8,800.0	90.00	179.84	7,257.0	-1,995.1	531.9	2,028.8	0.00	0.00	0.00
8,900.0	90.00	179.84	7,257.0	-2,095.1	532.1	2,128.5	0.00	0.00	0.00
9,000.0	90.00	179.84	7,257.0	-2,195.1	532.4	2,228.3	0.00	0.00	0.00

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Project:	SEC.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	North Reference:	True
Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-13-13)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,100.0	90.00	179.84	7,257.0	-2,295.1	532.7	2,328.0	0.00	0.00	0.00
9,200.0	90.00	179.84	7,257.0	-2,395.1	533.0	2,427.8	0.00	0.00	0.00
9,300.0	90.00	179.84	7,257.0	-2,495.1	533.2	2,527.5	0.00	0.00	0.00
9,400.0	90.00	179.84	7,257.0	-2,595.1	533.5	2,627.3	0.00	0.00	0.00
9,500.0	90.00	179.84	7,257.0	-2,695.1	533.8	2,727.0	0.00	0.00	0.00
9,600.0	90.00	179.84	7,257.0	-2,795.1	534.1	2,826.8	0.00	0.00	0.00
9,700.0	90.00	179.84	7,257.0	-2,895.1	534.3	2,926.5	0.00	0.00	0.00
9,800.0	90.00	179.84	7,257.0	-2,995.1	534.6	3,026.3	0.00	0.00	0.00
9,900.0	90.00	179.84	7,257.0	-3,095.1	534.9	3,126.0	0.00	0.00	0.00
10,000.0	90.00	179.84	7,257.0	-3,195.1	535.2	3,225.8	0.00	0.00	0.00
10,100.0	90.00	179.84	7,257.0	-3,295.1	535.4	3,325.5	0.00	0.00	0.00
10,200.0	90.00	179.84	7,257.0	-3,395.1	535.7	3,425.3	0.00	0.00	0.00
10,300.0	90.00	179.84	7,257.0	-3,495.1	536.0	3,525.0	0.00	0.00	0.00
10,400.0	90.00	179.84	7,257.0	-3,595.1	536.3	3,624.8	0.00	0.00	0.00
10,500.0	90.00	179.84	7,257.0	-3,695.1	536.5	3,724.5	0.00	0.00	0.00
10,600.0	90.00	179.84	7,257.0	-3,795.1	536.8	3,824.3	0.00	0.00	0.00
10,700.0	90.00	179.84	7,257.0	-3,895.1	537.1	3,924.0	0.00	0.00	0.00
10,800.0	90.00	179.84	7,257.0	-3,995.1	537.4	4,023.8	0.00	0.00	0.00
10,900.0	90.00	179.84	7,257.0	-4,095.1	537.6	4,123.5	0.00	0.00	0.00
11,000.0	90.00	179.84	7,257.0	-4,195.1	537.9	4,223.3	0.00	0.00	0.00
11,100.0	90.00	179.84	7,257.0	-4,295.1	538.2	4,323.0	0.00	0.00	0.00
11,200.0	90.00	179.84	7,257.0	-4,395.1	538.5	4,422.8	0.00	0.00	0.00
11,300.0	90.00	179.84	7,257.0	-4,495.1	538.7	4,522.5	0.00	0.00	0.00
11,400.0	90.00	179.84	7,257.0	-4,595.1	539.0	4,622.3	0.00	0.00	0.00
11,500.0	90.00	179.84	7,257.0	-4,695.1	539.3	4,722.0	0.00	0.00	0.00
11,600.0	90.00	179.84	7,257.0	-4,795.1	539.6	4,821.8	0.00	0.00	0.00
11,700.0	90.00	179.84	7,257.0	-4,895.1	539.8	4,921.5	0.00	0.00	0.00
11,800.0	90.00	179.84	7,257.0	-4,995.1	540.1	5,021.3	0.00	0.00	0.00
11,900.0	90.00	179.84	7,257.0	-5,095.1	540.4	5,121.0	0.00	0.00	0.00
12,000.0	90.00	179.84	7,257.0	-5,195.1	540.6	5,220.8	0.00	0.00	0.00
12,100.0	90.00	179.84	7,257.0	-5,295.1	540.9	5,320.5	0.00	0.00	0.00
12,200.0	90.00	179.84	7,257.0	-5,395.1	541.2	5,420.3	0.00	0.00	0.00
12,300.0	90.00	179.84	7,257.0	-5,495.1	541.5	5,520.0	0.00	0.00	0.00
12,400.0	90.00	179.84	7,257.0	-5,595.1	541.7	5,619.8	0.00	0.00	0.00
12,500.0	90.00	179.84	7,257.0	-5,695.1	542.0	5,719.5	0.00	0.00	0.00
12,600.0	90.00	179.84	7,257.0	-5,795.1	542.3	5,819.3	0.00	0.00	0.00
12,700.0	90.00	179.84	7,257.0	-5,895.1	542.6	5,919.0	0.00	0.00	0.00
12,800.0	90.00	179.84	7,257.0	-5,995.1	542.8	6,018.8	0.00	0.00	0.00
12,900.0	90.00	179.84	7,257.0	-6,095.1	543.1	6,118.5	0.00	0.00	0.00
13,000.0	90.00	179.84	7,257.0	-6,195.1	543.4	6,218.3	0.00	0.00	0.00
13,100.0	90.00	179.84	7,257.0	-6,295.1	543.7	6,318.0	0.00	0.00	0.00
13,200.0	90.00	179.84	7,257.0	-6,395.1	543.9	6,417.8	0.00	0.00	0.00
13,300.0	90.00	179.84	7,257.0	-6,495.1	544.2	6,517.5	0.00	0.00	0.00
13,400.0	90.00	179.84	7,257.0	-6,595.1	544.5	6,617.3	0.00	0.00	0.00
13,500.0	90.00	179.84	7,257.0	-6,695.1	544.8	6,717.0	0.00	0.00	0.00
13,600.0	90.00	179.84	7,257.0	-6,795.1	545.0	6,816.8	0.00	0.00	0.00
13,700.0	90.00	179.84	7,257.0	-6,895.1	545.3	6,916.5	0.00	0.00	0.00
13,800.0	90.00	179.84	7,257.0	-6,995.1	545.6	7,016.3	0.00	0.00	0.00
13,900.0	90.00	179.84	7,257.0	-7,095.1	545.9	7,116.0	0.00	0.00	0.00
14,000.0	90.00	179.84	7,257.0	-7,195.1	546.1	7,215.8	0.00	0.00	0.00
14,100.0	90.00	179.84	7,257.0	-7,295.1	546.4	7,315.5	0.00	0.00	0.00
14,200.0	90.00	179.84	7,257.0	-7,395.1	546.7	7,415.3	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Bernhardt Farms 13W-403
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4752.0ft (RKB - 15')
Project:	SEC.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	North Reference:	True
Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-13-13)		

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)
14,233.1	90.00	179.84	7,257.0	-7,428.2	546.8	7,448.3	0.00	0.00	0.00
BHL 500'FSL, 75'FEL									

Casing Points				
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,638.4	7,243.0	7"	7	7-1/2

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
6,518.4	6,483.3	-150.0	526.8	KOP #2
7,832.4	7,257.0	-1,027.5	529.2	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.13-T4N-R67W

Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W

Bernhardt Farms 13W-403

Wellbore #1

Plan #1 (11-13-13)

Anticollision Report

20 November, 2013

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt Farms 13W-403
Project:	SEC.13-T4N-R67W	TVD Reference:	WELL @ 4752.0ft (RKB - 15')
Reference Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-13-13)	Offset TVD Reference:	Offset Datum

Offset Design Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W - Bernhardt Farms 13S-423 - Wellbore #1 - Plan #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	-160.34	-54.6	-19.5	58.0					
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-160.34	-54.6	-19.5	58.0	53.8	4.27	13.587	CC, ES	
2,000.0	1,993.5	1,993.5	1,993.5	4.7	4.4	152.18	-54.6	-19.5	124.9	116.2	8.70	14.355		
3,000.0	2,984.8	2,969.2	2,967.8	7.9	6.5	167.64	-45.9	-69.2	299.8	286.8	13.02	23.026		
4,000.0	3,976.0	3,951.5	3,948.5	11.2	8.8	171.70	-36.2	-124.2	485.6	468.1	17.51	27.738		
5,000.0	4,967.3	4,961.8	4,957.3	14.5	11.2	173.55	-26.7	-178.2	670.4	648.4	22.09	30.353		
6,000.0	5,964.9	5,969.4	5,964.9	16.5	13.3	-80.08	-26.6	-178.5	716.0	689.8	26.28	27.250		
7,000.0	6,933.6	7,053.2	6,999.3	18.7	15.6	97.99	-224.2	-178.5	712.5	681.3	31.20	22.836		
7,772.8	7,345.9	7,831.4	7,260.4	26.4	22.8	83.29	-930.4	-178.5	712.6	665.2	47.44	15.020		
8,000.0	7,257.0	8,096.1	7,260.3	29.1	26.7	90.26	-1,195.1	-178.5	708.2	654.0	54.24	13.058		
9,000.0	7,257.0	9,096.1	7,259.7	45.6	43.8	90.22	-2,195.1	-178.5	710.9	622.6	88.37	8.045		
10,000.0	7,257.0	10,096.1	7,259.2	63.7	62.1	90.18	-3,195.1	-178.5	713.7	588.7	125.01	5.709		
11,000.0	7,257.0	11,096.1	7,258.7	82.2	80.8	90.13	-4,195.1	-178.5	716.4	554.0	162.47	4.410		
12,000.0	7,257.0	12,096.1	7,258.2	101.1	99.7	90.09	-5,195.1	-178.5	719.2	518.9	200.29	3.591		
13,000.0	7,257.0	13,096.1	7,257.6	120.0	118.7	90.05	-6,195.1	-178.5	721.9	483.6	238.30	3.029		
14,000.0	7,257.0	14,096.1	7,257.1	139.0	137.7	90.01	-7,195.1	-178.5	724.7	448.2	276.42	2.622		
14,118.0	7,257.0	14,214.1	7,257.1	141.3	140.0	90.00	-7,313.0	-178.5	725.0	444.1	280.93	2.581		
14,233.1	7,257.0	14,318.3	7,257.0	143.5	142.0	90.00	-7,417.3	-178.5	725.4	440.3	285.11	2.544	SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt Farms 13W-403
Project:	SEC.13-T4N-R67W	TVD Reference:	WELL @ 4752.0ft (RKB - 15')
Reference Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-13-13)	Offset TVD Reference:	Offset Datum

Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W - Bernhardt Farms 13S-443 - Wellbore #1 - Plan #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)		
0.0	0.0	0.0	0.0	0.0	0.0	-159.67	-112.9	-41.8	120.4				
1,000.0	1,000.0	980.8	972.6	2.1	2.8	-126.60	-104.6	-140.9	177.6	173.0	4.55	39.014 SF	
2,000.0	1,993.5	1,932.1	1,904.0	4.7	7.1	155.57	-88.4	-333.9	449.7	440.7	9.00	49.985	
3,000.0	2,984.8	2,876.3	2,828.4	7.9	11.3	162.98	-72.3	-525.5	771.1	757.4	13.65	56.506	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt Farms 13W-403
Project:	SEC.13-T4N-R67W	TVD Reference:	WELL @ 4752.0ft (RKB - 15')
Reference Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-13-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W - Bernhardt Farms 13W-343 - Wellbore #1 - Plan #													Offset Well Error:	0.0 ft
Survey Program: 0-MWD														
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	-156.37	-25.5	-11.2	27.8					
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-156.37	-25.5	-11.2	27.8	23.6	4.27	6.517 CC, ES		
2,000.0	1,993.5	1,998.6	1,997.6	4.7	4.3	166.99	-25.5	28.5	74.5	66.0	8.50	8.762		
3,000.0	2,984.8	2,995.4	2,992.8	7.9	6.7	179.37	-25.5	83.5	151.6	138.6	12.99	11.669		
4,000.0	3,976.0	3,992.2	3,988.1	11.2	9.1	-176.66	-25.5	138.5	230.9	213.3	17.61	13.110		
5,000.0	4,967.3	4,988.9	4,983.3	14.5	11.5	-174.73	-25.5	193.4	310.8	288.5	22.29	13.942		
6,000.0	5,964.9	5,971.1	5,964.9	16.5	13.6	-68.07	-25.5	217.6	333.3	307.0	26.36	12.646		
6,990.6	6,892.3	7,128.4	6,997.3	18.7	17.0	110.44	-383.5	217.6	333.9	302.6	31.31	10.662		
7,000.0	6,933.6	7,020.7	6,933.8	18.7	16.3	90.18	-296.7	217.6	309.6	277.6	31.96	9.687		
8,000.0	7,257.0	7,961.9	7,114.0	29.1	27.3	65.38	-1,195.1	217.6	343.3	293.7	49.54	6.930		
9,000.0	7,257.0	8,961.9	7,114.0	45.6	44.4	65.57	-2,195.1	217.6	345.8	264.6	81.13	4.262		
10,000.0	7,257.0	9,961.9	7,114.0	63.7	62.7	65.76	-3,195.1	217.6	348.3	233.1	115.14	3.025		
11,000.0	7,257.0	10,961.9	7,114.0	82.2	81.4	65.94	-4,195.1	217.6	350.8	200.8	149.99	2.339		
12,000.0	7,257.0	11,961.9	7,114.0	101.1	100.3	66.12	-5,195.1	217.6	353.3	168.0	185.24	1.907		
13,000.0	7,257.0	12,961.9	7,114.0	120.0	119.3	66.30	-6,195.1	217.6	355.8	135.0	220.75	1.612		
14,000.0	7,257.0	13,961.9	7,114.0	139.0	138.4	66.48	-7,195.1	217.6	358.3	101.9	256.44	1.397 Level 3		
14,233.1	7,257.0	14,191.4	7,114.0	143.5	142.8	66.52	-7,424.5	217.6	358.9	94.2	264.71	1.356 Level 3, SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt Farms 13W-403
Project:	SEC.13-T4N-R67W	TVD Reference:	WELL @ 4752.0ft (RKB - 15')
Reference Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-13-13)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Existing Wells - Sec.13-T4N-R67W - Johnston 43-24 (Exist) - Wellbore #1 - Wellbore #1													Offset Well Error:	0.0 ft
Survey Program: 7600-UNKNOWN														
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	
12,000.0	7,257.0	7,228.0	7,228.0	101.1	144.6	90.00	-6,069.3	329.2	899.5	654.3	245.20	3.668		
12,834.0	7,257.0	7,228.0	7,228.0	116.8	144.6	90.00	-6,069.3	329.2	217.5	-43.5	261.05	0.833	Level 1, CC, ES, SF	
13,000.0	7,257.0	7,228.0	7,228.0	120.0	144.6	90.00	-6,069.3	329.2	248.4	-15.8	264.21	0.940	Level 1	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt Farms 13W-403
Project:	SEC.13-T4N-R67W	TVD Reference:	WELL @ 4752.0ft (RKB - 15')
Reference Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-13-13)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4752.0ft (RKB - 15')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Bernhardt Farms 13W-403
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.43°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Bernhardt Farms 13W-403
Project:	SEC.13-T4N-R67W	TVD Reference:	WELL @ 4752.0ft (RKB - 15')
Reference Site:	Bernhardt Farms 13SW-HZ Pad Sec.13-T4N-R67W	MD Reference:	WELL @ 4752.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Bernhardt Farms 13W-403	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	Landmark
Reference Design:	Plan #1 (11-13-13)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4752.0ft (RKB - 15')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Bernhardt Farms 13W-403
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.43°

