

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Sunmarke 28U-434**

Surface Location: Sunmarke 28U-HZ Pad Sec.28-T4N-R67W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

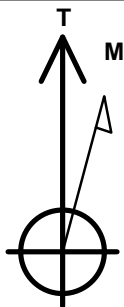
Ground Elevation: 4894.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1349090.16	3170999.64	40.290030	-104.887010	

Ensign 32 RKB - 15' WELL @ 4909.0ft (Ensign 32 RKB - 15')

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 338'FNL, 210'FEL	1.0	0.0	0.0	Point
BHL 465'FNL,500'FWL	7254.0	-47.1	-4619.9	Point



Azimuths to True North
Magnetic North: 8.51°

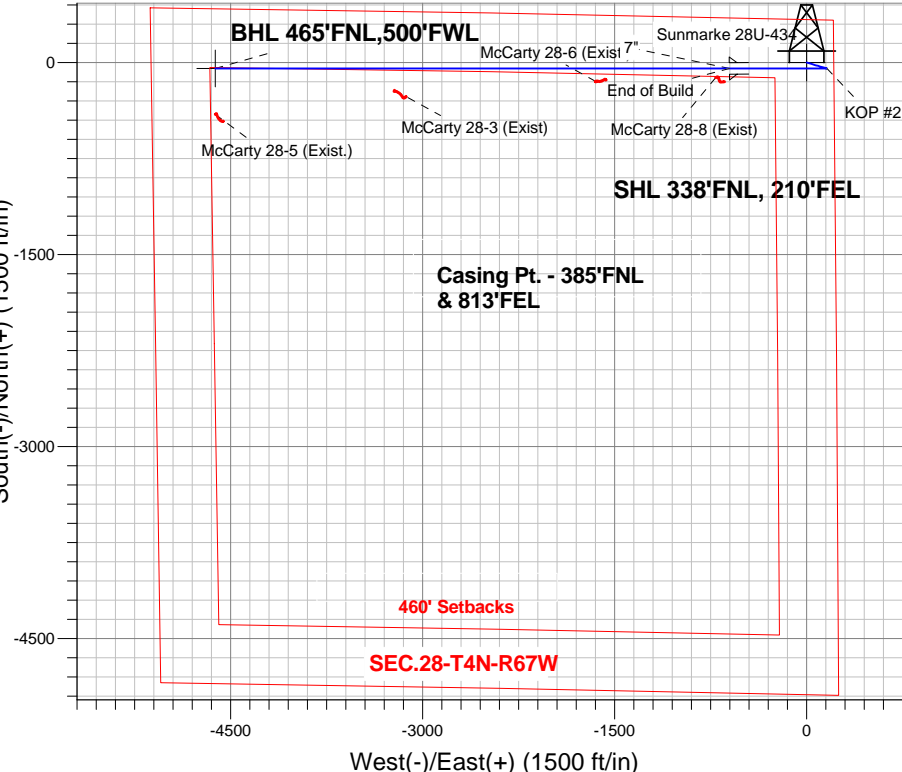
Magnetic Field
Strength: 52741.6snT
Dip Angle: 66.84°
Date: 6/24/2014
Model: IGRF2010

ANNOTATIONS

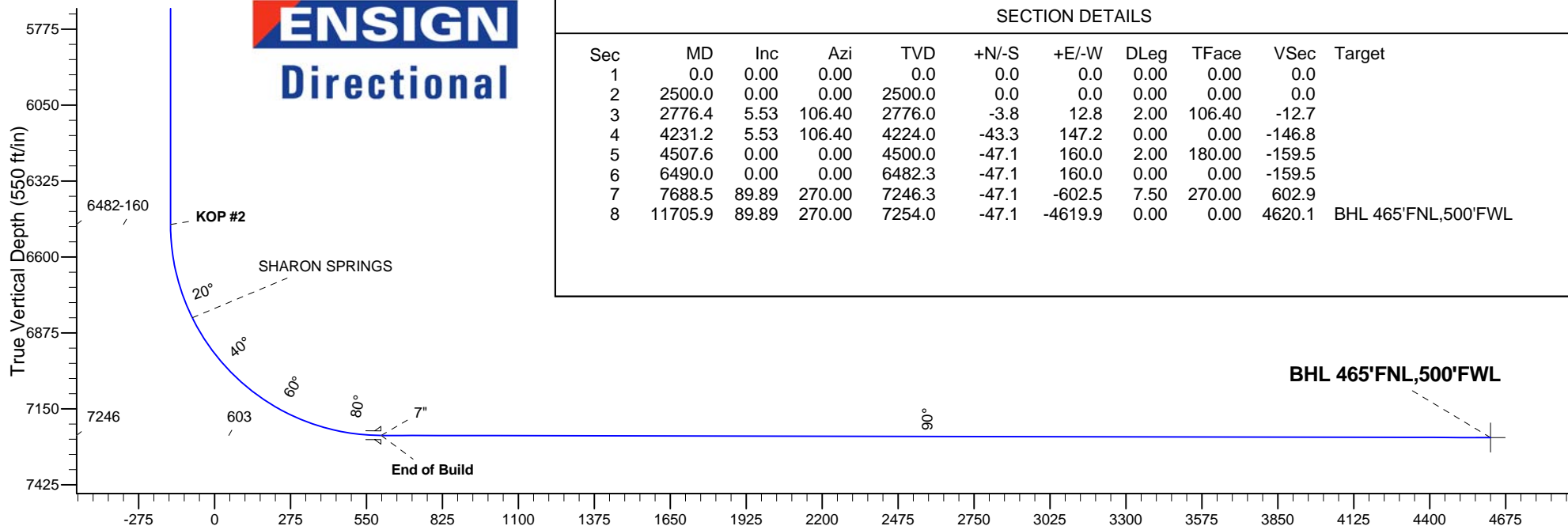
TVD	MD	Annotation
2500.0	2500.0	KOP #1
6482.4	6490.0	KOP #2
7246.3	7688.5	End of Build

Sunmarke 28U-HZ Pad Sec.28-T4N-R67W
Sunmarke 28U-434
Plan #3 (7-09-14)
16:26, July 09 2014

South(-)/North(+) (1500 ft/in)



ENSIGN
Directional



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	2500.0	0.00	0.00	2500.0	0.0	0.0	0.00	0.00	0.0	
3	2776.4	5.53	106.40	2776.0	-3.8	12.8	2.00	106.40	-12.7	
4	4231.2	5.53	106.40	4224.0	-43.3	147.2	0.00	0.00	-146.8	
5	4507.6	0.00	0.00	4500.0	-47.1	160.0	2.00	180.00	-159.5	
6	6490.0	0.00	0.00	6482.3	-47.1	160.0	0.00	0.00	-159.5	
7	7688.5	89.89	270.00	7246.3	-47.1	-602.5	7.50	270.00	602.9	
8	11705.9	89.89	270.00	7254.0	-47.1	-4619.9	0.00	0.00	4620.1	BHL 465'FNL,500'FWL

Vertical Section at 269.42° (550 ft/in)



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.28-T4N-R67W

Sunmarke 28U-HZ Pad Sec.28-T4N-R67W

Sunmarke 28U-434

Wellbore #1

Plan: Plan #3 (7-09-14)

Standard Planning Report

09 July, 2014

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28U-434	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (7-09-14)		

Project	SEC.28-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						Sunmarke 28U-HZ Pad Sec.28-T4N-R67W											
Site Position:						Northing:			1,349,119.31 ft			Latitude:			40.290110		
From:			Lat/Long			Easting:			3,170,999.44 ft			Longitude:			-104.887010		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.40 °		

Well	Sunmarke 28U-434					
Well Position	+N-S	-29.2 ft	Northing:	1,349,090.16 ft	Latitude:	40.290030
	+E-W	0.0 ft	Easting:	3,170,999.64 ft	Longitude:	-104.887010
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,894.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/24/2014	8.51	66.84	52,742

Design	Plan #3 (7-09-14)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	269.42

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	
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,776.4	5.53	106.40	2,776.0	-3.8	12.8	2.00	2.00	0.00	106.40	
4,231.2	5.53	106.40	4,224.0	-43.3	147.2	0.00	0.00	0.00	0.00	
4,507.6	0.00	0.00	4,500.0	-47.1	160.0	2.00	-2.00	0.00	180.00	
6,490.0	0.00	0.00	6,482.3	-47.1	160.0	0.00	0.00	0.00	0.00	
7,688.5	89.89	270.00	7,246.3	-47.1	-602.5	7.50	7.50	0.00	270.00	
11,705.9	89.89	270.00	7,254.0	-47.1	-4,619.9	0.00	0.00	0.00	0.00	BHL 465'FNL,500'F

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Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28U-434	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (7-09-14)		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
SHL 338°FNL, 210°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
KOP #1									
2,600.0	2.00	106.40	2,600.0	-0.5	1.7	-1.7	2.00	2.00	0.00
2,700.0	4.00	106.40	2,699.8	-2.0	6.7	-6.7	2.00	2.00	0.00
2,776.4	5.53	106.40	2,776.0	-3.8	12.8	-12.7	2.00	2.00	0.00
2,800.0	5.53	106.40	2,799.5	-4.4	15.0	-14.9	0.00	0.00	0.00
2,900.0	5.53	106.40	2,899.0	-7.1	24.2	-24.1	0.00	0.00	0.00
3,000.0	5.53	106.40	2,998.5	-9.8	33.4	-33.3	0.00	0.00	0.00
3,100.0	5.53	106.40	3,098.1	-12.6	42.7	-42.6	0.00	0.00	0.00
3,200.0	5.53	106.40	3,197.6	-15.3	51.9	-51.8	0.00	0.00	0.00
3,300.0	5.53	106.40	3,297.1	-18.0	61.2	-61.0	0.00	0.00	0.00
3,400.0	5.53	106.40	3,396.7	-20.7	70.4	-70.2	0.00	0.00	0.00
3,500.0	5.53	106.40	3,496.2	-23.4	79.6	-79.4	0.00	0.00	0.00
3,600.0	5.53	106.40	3,595.7	-26.2	88.9	-88.6	0.00	0.00	0.00
3,644.5	5.53	106.40	3,640.0	-27.4	93.0	-92.7	0.00	0.00	0.00
PARKMAN									
3,700.0	5.53	106.40	3,695.3	-28.9	98.1	-97.8	0.00	0.00	0.00
3,800.0	5.53	106.40	3,794.8	-31.6	107.4	-107.0	0.00	0.00	0.00
3,900.0	5.53	106.40	3,894.3	-34.3	116.6	-116.3	0.00	0.00	0.00
4,000.0	5.53	106.40	3,993.9	-37.0	125.9	-125.5	0.00	0.00	0.00
4,100.0	5.53	106.40	4,093.4	-39.8	135.1	-134.7	0.00	0.00	0.00
4,156.8	5.53	106.40	4,150.0	-41.3	140.3	-139.9	0.00	0.00	0.00
SUSSEX									
4,200.0	5.53	106.40	4,193.0	-42.5	144.3	-143.9	0.00	0.00	0.00
4,231.2	5.53	106.40	4,224.0	-43.3	147.2	-146.8	0.00	0.00	0.00
4,300.0	4.15	106.40	4,292.6	-45.0	152.8	-152.3	2.00	-2.00	0.00

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Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28U-434	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (7-09-14)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,400.0	2.15	106.40	4,392.4	-46.5	158.1	-157.6	2.00	-2.00	0.00
4,500.0	0.15	106.40	4,492.4	-47.1	160.0	-159.5	2.00	-2.00	0.00
4,507.6	0.00	0.00	4,500.0	-47.1	160.0	-159.5	2.00	-2.00	0.00
4,600.0	0.00	0.00	4,592.4	-47.1	160.0	-159.5	0.00	0.00	0.00
4,670.6	0.00	0.00	4,663.0	-47.1	160.0	-159.5	0.00	0.00	0.00
SHANNON									
4,700.0	0.00	0.00	4,692.4	-47.1	160.0	-159.5	0.00	0.00	0.00
4,800.0	0.00	0.00	4,792.4	-47.1	160.0	-159.5	0.00	0.00	0.00
4,900.0	0.00	0.00	4,892.4	-47.1	160.0	-159.5	0.00	0.00	0.00
5,000.0	0.00	0.00	4,992.4	-47.1	160.0	-159.5	0.00	0.00	0.00
5,100.0	0.00	0.00	5,092.4	-47.1	160.0	-159.5	0.00	0.00	0.00
5,200.0	0.00	0.00	5,192.4	-47.1	160.0	-159.5	0.00	0.00	0.00
5,300.0	0.00	0.00	5,292.4	-47.1	160.0	-159.5	0.00	0.00	0.00
5,400.0	0.00	0.00	5,392.4	-47.1	160.0	-159.5	0.00	0.00	0.00
5,500.0	0.00	0.00	5,492.4	-47.1	160.0	-159.5	0.00	0.00	0.00
5,600.0	0.00	0.00	5,592.4	-47.1	160.0	-159.5	0.00	0.00	0.00
5,700.0	0.00	0.00	5,692.4	-47.1	160.0	-159.5	0.00	0.00	0.00
5,800.0	0.00	0.00	5,792.4	-47.1	160.0	-159.5	0.00	0.00	0.00
5,900.0	0.00	0.00	5,892.4	-47.1	160.0	-159.5	0.00	0.00	0.00
6,000.0	0.00	0.00	5,992.4	-47.1	160.0	-159.5	0.00	0.00	0.00
6,100.0	0.00	0.00	6,092.4	-47.1	160.0	-159.5	0.00	0.00	0.00
6,200.0	0.00	0.00	6,192.4	-47.1	160.0	-159.5	0.00	0.00	0.00
6,300.0	0.00	0.00	6,292.4	-47.1	160.0	-159.5	0.00	0.00	0.00
6,400.0	0.00	0.00	6,392.4	-47.1	160.0	-159.5	0.00	0.00	0.00
6,490.0	0.00	0.00	6,482.4	-47.1	160.0	-159.5	0.00	0.00	0.00
KOP #2									
6,500.0	0.75	270.00	6,492.4	-47.1	159.9	-159.4	7.53	7.53	0.00
6,600.0	8.25	270.00	6,592.0	-47.1	152.1	-151.6	7.50	7.50	0.00
6,700.0	15.75	270.00	6,689.7	-47.1	131.3	-130.8	7.50	7.50	0.00
6,800.0	23.25	270.00	6,783.9	-47.1	97.9	-97.5	7.50	7.50	0.00
6,839.7	26.23	270.00	6,820.0	-47.1	81.3	-80.8	7.50	7.50	0.00
SHARON SPRINGS									
6,900.0	30.75	270.00	6,873.0	-47.1	52.6	-52.1	7.50	7.50	0.00
7,000.0	38.25	270.00	6,955.3	-47.1	-4.0	4.5	7.50	7.50	0.00
7,100.0	45.75	270.00	7,029.6	-47.1	-70.9	71.4	7.50	7.50	0.00
7,200.0	53.25	270.00	7,094.5	-47.1	-146.9	147.4	7.50	7.50	0.00
7,300.0	60.75	270.00	7,148.9	-47.1	-230.7	231.2	7.50	7.50	0.00
7,400.0	68.25	270.00	7,191.9	-47.1	-320.9	321.4	7.50	7.50	0.00
7,500.0	75.75	270.00	7,222.8	-47.1	-415.9	416.4	7.50	7.50	0.00
7,600.0	83.25	270.00	7,241.0	-47.1	-514.2	514.6	7.50	7.50	0.00
7,688.5	89.89	270.00	7,246.3	-47.1	-602.5	602.9	7.50	7.50	0.00
End of Build - 7"									
7,700.0	89.89	270.00	7,246.3	-47.1	-614.0	614.4	0.00	0.00	0.00
7,800.0	89.89	270.00	7,246.5	-47.1	-714.0	714.4	0.00	0.00	0.00
7,900.0	89.89	270.00	7,246.7	-47.1	-814.0	814.4	0.00	0.00	0.00
8,000.0	89.89	270.00	7,246.9	-47.1	-914.0	914.4	0.00	0.00	0.00
8,100.0	89.89	270.00	7,247.1	-47.1	-1,014.0	1,014.4	0.00	0.00	0.00
8,200.0	89.89	270.00	7,247.3	-47.1	-1,114.0	1,114.4	0.00	0.00	0.00
8,300.0	89.89	270.00	7,247.5	-47.1	-1,214.0	1,214.4	0.00	0.00	0.00
8,400.0	89.89	270.00	7,247.7	-47.1	-1,314.0	1,314.4	0.00	0.00	0.00
8,500.0	89.89	270.00	7,247.8	-47.1	-1,414.0	1,414.4	0.00	0.00	0.00
8,600.0	89.89	270.00	7,248.0	-47.1	-1,514.0	1,514.4	0.00	0.00	0.00

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Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28U-434	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (7-09-14)		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,700.0	89.89	270.00	7,248.2	-47.1	-1,614.0	1,614.4	0.00	0.00	0.00
8,800.0	89.89	270.00	7,248.4	-47.1	-1,714.0	1,714.4	0.00	0.00	0.00
8,900.0	89.89	270.00	7,248.6	-47.1	-1,814.0	1,814.4	0.00	0.00	0.00
9,000.0	89.89	270.00	7,248.8	-47.1	-1,914.0	1,914.4	0.00	0.00	0.00
9,100.0	89.89	270.00	7,249.0	-47.1	-2,014.0	2,014.3	0.00	0.00	0.00
9,200.0	89.89	270.00	7,249.2	-47.1	-2,114.0	2,114.3	0.00	0.00	0.00
9,300.0	89.89	270.00	7,249.4	-47.1	-2,214.0	2,214.3	0.00	0.00	0.00
9,400.0	89.89	270.00	7,249.6	-47.1	-2,314.0	2,314.3	0.00	0.00	0.00
9,500.0	89.89	270.00	7,249.8	-47.1	-2,414.0	2,414.3	0.00	0.00	0.00
9,600.0	89.89	270.00	7,250.0	-47.1	-2,514.0	2,514.3	0.00	0.00	0.00
9,700.0	89.89	270.00	7,250.1	-47.1	-2,614.0	2,614.3	0.00	0.00	0.00
9,800.0	89.89	270.00	7,250.3	-47.1	-2,714.0	2,714.3	0.00	0.00	0.00
9,900.0	89.89	270.00	7,250.5	-47.1	-2,814.0	2,814.3	0.00	0.00	0.00
10,000.0	89.89	270.00	7,250.7	-47.1	-2,914.0	2,914.3	0.00	0.00	0.00
10,100.0	89.89	270.00	7,250.9	-47.1	-3,014.0	3,014.3	0.00	0.00	0.00
10,200.0	89.89	270.00	7,251.1	-47.1	-3,114.0	3,114.3	0.00	0.00	0.00
10,300.0	89.89	270.00	7,251.3	-47.1	-3,214.0	3,214.3	0.00	0.00	0.00
10,400.0	89.89	270.00	7,251.5	-47.1	-3,314.0	3,314.3	0.00	0.00	0.00
10,500.0	89.89	270.00	7,251.7	-47.1	-3,414.0	3,414.3	0.00	0.00	0.00
10,600.0	89.89	270.00	7,251.9	-47.1	-3,514.0	3,514.3	0.00	0.00	0.00
10,700.0	89.89	270.00	7,252.1	-47.1	-3,614.0	3,614.3	0.00	0.00	0.00
10,800.0	89.89	270.00	7,252.3	-47.1	-3,714.0	3,714.3	0.00	0.00	0.00
10,900.0	89.89	270.00	7,252.5	-47.1	-3,814.0	3,814.3	0.00	0.00	0.00
11,000.0	89.89	270.00	7,252.6	-47.1	-3,914.0	3,914.2	0.00	0.00	0.00
11,100.0	89.89	270.00	7,252.8	-47.1	-4,014.0	4,014.2	0.00	0.00	0.00
11,200.0	89.89	270.00	7,253.0	-47.1	-4,114.0	4,114.2	0.00	0.00	0.00
11,300.0	89.89	270.00	7,253.2	-47.1	-4,214.0	4,214.2	0.00	0.00	0.00
11,400.0	89.89	270.00	7,253.4	-47.1	-4,314.0	4,314.2	0.00	0.00	0.00
11,500.0	89.89	270.00	7,253.6	-47.1	-4,414.0	4,414.2	0.00	0.00	0.00
11,600.0	89.89	270.00	7,253.8	-47.1	-4,514.0	4,514.2	0.00	0.00	0.00
11,700.0	89.89	270.00	7,254.0	-47.1	-4,614.0	4,614.2	0.00	0.00	0.00
11,705.9	89.89	270.00	7,254.0	-47.1	-4,619.9	4,620.1	0.00	0.00	0.00

BHL 465'FNL,500'FWL

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,688.5	7,246.3	7"	7	7-1/2

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,644.5	3,640.0	PARKMAN			
4,156.8	4,150.0	SUSSEX			
4,670.6	4,663.0	SHANNON			
6,839.7	6,820.0	SHARON SPRINGS			

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28U-434	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #3 (7-09-14)		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,500.0	2,500.0	0.0	0.0	KOP #1
6,490.0	6,482.4	-47.1	160.0	KOP #2
7,688.5	7,246.3	-47.1	-602.5	End of Build



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.28-T4N-R67W

Sunmarke 28U-HZ Pad Sec.28-T4N-R67W

Sunmarke 28U-434

Wellbore #1

Plan #3 (7-09-14)

Anticollision Report

09 July, 2014



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Reference	Plan #3 (7-09-14)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date 7/9/2014			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,705.4	Plan #3 (7-09-14) (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						
Existing wells - Sec.28-T4N-R67W						
McCarty 28-3 (Exist) - Wellbore #1 - Wellbore #1	10,307.1	7,307.3	171.4	63.3	1.586	CC, ES, SF
McCarty 28-5 (Exist.) - Wellbore #1 - Wellbore #1	11,704.3	7,318.2	357.7	212.4	2.461	CC
McCarty 28-5 (Exist.) - Wellbore #1 - Wellbore #1	11,705.9	7,318.3	357.7	212.4	2.461	ES, SF
McCarty 28-6 (Exist.) - Wellbore #1 - Wellbore #1	8,736.4	7,264.3	100.8	35.1	1.534	CC, ES, SF
McCarty 28-8 (Exist) - Wellbore #1 - Wellbore #1	7,795.8	7,244.0	70.7	28.5	1.676	CC, ES
McCarty 28-8 (Exist) - Wellbore #1 - Wellbore #1	7,800.0	7,244.0	70.8	28.5	1.675	SF
Sunmarke 28U-HZ Pad Sec.28-T4N-R67W						
Sunmarke 28U-334 - Wellbore #1 - Plan #2 (6-20-14)	1,500.0	1,500.0	29.1	22.6	4.471	CC, ES
Sunmarke 28U-334 - Wellbore #1 - Plan #2 (6-20-14)	11,705.9	11,606.9	212.8	26.8	1.144	Level 2, SF
Sunmarke 28V-214 - Wellbore #1 - Plan #3 (7-09-14)	1,000.0	1,000.0	32.8	28.5	7.679	CC, ES
Sunmarke 28V-214 - Wellbore #1 - Plan #3 (7-09-14)	11,600.0	11,410.4	443.5	220.4	1.987	SF
Sunmarke 28V-404 - Wellbore #1 - Plan #1 (6-20-14)	600.0	600.0	61.9	59.5	25.049	CC, ES
Sunmarke 28V-404 - Wellbore #1 - Plan #1 (6-20-14)	11,705.9	11,741.4	648.3	388.1	2.491	SF

Offset Design Existing wells - Sec.28-T4N-R67W - McCarty 28-3 (Exist) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0ft
Survey Program: 100-NS-GYRO-MS												Offset Well Error:	0.0ft
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	
9,400.0	7,249.6	7,310.7	7,309.3	67.1	16.1	-92.00	-218.5	-3,221.0	923.1	839.9	83.19	11.096	
9,500.0	7,249.8	7,310.3	7,308.9	69.8	16.1	-91.87	-218.5	-3,221.0	825.1	739.1	85.92	9.603	
9,600.0	7,250.0	7,309.9	7,308.5	72.6	16.1	-91.75	-218.5	-3,221.0	727.5	638.9	88.66	8.206	
9,700.0	7,250.1	7,309.6	7,308.2	75.3	16.1	-91.62	-218.5	-3,221.0	630.8	539.4	91.40	6.902	
9,800.0	7,250.3	7,309.2	7,307.8	78.1	16.1	-91.50	-218.5	-3,221.0	535.3	441.1	94.14	5.685	
9,900.0	7,250.5	7,308.8	7,307.4	80.8	16.1	-91.37	-218.5	-3,221.0	441.7	344.8	96.89	4.558	
10,000.0	7,250.7	7,308.4	7,307.0	83.6	16.1	-91.25	-218.5	-3,221.0	351.7	252.0	99.65	3.529	
10,100.0	7,250.9	7,308.1	7,306.7	86.3	16.1	-91.12	-218.5	-3,221.0	268.8	166.4	102.41	2.625	
10,200.0	7,251.1	7,307.7	7,306.3	89.1	16.1	-91.00	-218.5	-3,221.0	202.1	97.0	105.17	1.922	
10,300.0	7,251.3	7,307.3	7,305.9	91.8	16.1	-90.87	-218.5	-3,221.0	171.6	63.6	107.93	1.590	
10,307.1	7,251.3	7,307.3	7,305.9	92.0	16.1	-90.86	-218.5	-3,221.0	171.4	63.3	108.12	1.586	CC, ES, SF
10,400.0	7,251.5	7,306.9	7,305.5	94.6	16.1	-90.74	-218.5	-3,221.0	195.0	84.3	110.69	1.762	
10,500.0	7,251.7	7,306.6	7,305.2	97.4	16.1	-90.62	-218.5	-3,221.0	258.1	144.6	113.46	2.275	

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 Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing wells - Sec.28-T4N-R67W - McCarty 28-3 (Exist) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS												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
10,600.0	7,251.9	7,306.2	7,304.8	100.1	16.1	-90.49	-218.5	-3,221.0	339.4	223.2	116.23	2.920	
10,700.0	7,252.1	7,305.8	7,304.4	102.9	16.1	-90.37	-218.5	-3,221.0	428.7	309.7	119.00	3.602	
10,800.0	7,252.3	7,305.4	7,304.0	105.7	16.1	-90.24	-218.5	-3,221.0	521.9	400.1	121.78	4.286	
10,900.0	7,252.5	7,305.1	7,303.7	108.4	16.1	-90.12	-218.5	-3,221.0	617.2	492.7	124.55	4.956	
11,000.0	7,252.6	7,304.7	7,303.3	111.2	16.1	-89.99	-218.6	-3,221.0	713.8	586.5	127.32	5.606	
11,100.0	7,252.8	7,304.3	7,302.9	114.0	16.1	-89.87	-218.6	-3,221.0	811.3	681.2	130.10	6.236	
11,200.0	7,253.0	7,303.9	7,302.5	116.8	16.1	-89.74	-218.6	-3,221.0	909.2	776.4	132.88	6.843	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing wells - Sec.28-T4N-R67W - McCarty 28-5 (Exist.) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
10,800.0	7,252.3	7,311.9	7,310.6	105.7	15.6	-88.81	-404.8	-4,618.2	972.4	851.2	121.20	8.023	
10,900.0	7,252.5	7,312.6	7,311.3	108.4	15.6	-88.92	-404.8	-4,618.2	880.2	756.2	123.98	7.100	
11,000.0	7,252.6	7,313.3	7,312.0	111.2	15.6	-89.04	-404.8	-4,618.2	789.9	663.1	126.76	6.231	
11,100.0	7,252.8	7,314.0	7,312.7	114.0	15.6	-89.15	-404.8	-4,618.2	702.2	572.7	129.54	5.421	
11,200.0	7,253.0	7,314.7	7,313.4	116.8	15.6	-89.26	-404.8	-4,618.2	618.3	485.9	132.33	4.672	
11,300.0	7,253.2	7,315.4	7,314.1	119.6	15.6	-89.37	-404.8	-4,618.2	539.8	404.7	135.11	3.995	
11,400.0	7,253.4	7,316.1	7,314.8	122.3	15.6	-89.48	-404.8	-4,618.2	469.6	331.7	137.90	3.406	
11,500.0	7,253.6	7,316.8	7,315.5	125.1	15.6	-89.59	-404.8	-4,618.2	411.9	271.3	140.68	2.928	
11,600.0	7,253.8	7,317.5	7,316.2	127.9	15.6	-89.71	-404.8	-4,618.2	372.6	229.1	143.47	2.597	
11,700.0	7,254.0	7,318.2	7,316.9	129.7	15.6	-89.82	-404.8	-4,618.2	357.8	212.5	145.28	2.463	
11,704.3	7,254.0	7,318.2	7,316.9	129.8	15.6	-89.82	-404.8	-4,618.2	357.7	212.4	145.36	2.461 CC	
11,705.9	7,254.0	7,318.3	7,316.9	129.8	15.6	-89.82	-404.8	-4,618.2	357.7	212.4	145.38	2.461 ES, SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design		Existing wells - Sec.28-T4N-R67W - McCarty 28-6 (Exist.) - Wellbore #1 - Wellbore #1											Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													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)			
7,800.0	7,246.5	7,265.4	7,264.4	26.0	16.5	-90.61	-147.9	-1,650.3	941.8	899.4	42.41	22.204		
7,900.0	7,246.7	7,265.3	7,264.2	28.2	16.5	-90.54	-147.9	-1,650.3	842.4	797.8	44.65	18.866		
8,000.0	7,246.9	7,265.2	7,264.1	30.5	16.5	-90.47	-147.9	-1,650.3	743.2	696.2	46.99	15.819		
8,100.0	7,247.1	7,265.0	7,264.0	32.9	16.5	-90.41	-147.9	-1,650.3	644.3	594.9	49.39	13.045		
8,200.0	7,247.3	7,264.9	7,263.9	35.4	16.5	-90.34	-147.9	-1,650.3	545.8	493.9	51.86	10.524		
8,300.0	7,247.5	7,264.8	7,263.8	37.9	16.5	-90.27	-147.9	-1,650.3	447.9	393.5	54.37	8.237		
8,400.0	7,247.7	7,264.7	7,263.7	40.5	16.5	-90.20	-147.9	-1,650.3	351.1	294.2	56.92	6.169		
8,500.0	7,247.8	7,264.6	7,263.5	43.1	16.5	-90.14	-147.9	-1,650.3	257.0	197.4	59.51	4.318		
8,600.0	7,248.0	7,264.5	7,263.4	45.7	16.5	-90.07	-147.9	-1,650.3	169.6	107.4	62.12	2.730		
8,700.0	7,248.2	7,264.3	7,263.3	48.3	16.5	-90.00	-147.9	-1,650.3	107.1	42.4	64.75	1.655		
8,736.4	7,248.3	7,264.3	7,263.3	49.3	16.5	-89.98	-147.9	-1,650.3	100.8	35.1	65.71	1.534 CC, ES, SF		
8,800.0	7,248.4	7,264.2	7,263.2	50.9	16.5	-89.94	-147.9	-1,650.3	119.2	51.8	67.40	1.768		
8,900.0	7,248.6	7,264.1	7,263.1	53.6	16.5	-89.87	-147.9	-1,650.3	192.2	122.1	70.06	2.743		
9,000.0	7,248.8	7,264.0	7,263.0	56.3	16.5	-89.80	-147.9	-1,650.3	282.2	209.5	72.74	3.880		
9,100.0	7,249.0	7,263.9	7,262.8	59.0	16.5	-89.74	-147.9	-1,650.3	377.3	301.9	75.44	5.002		
9,200.0	7,249.2	7,263.7	7,262.7	61.7	16.5	-89.67	-147.9	-1,650.3	474.5	396.3	78.14	6.072		
9,300.0	7,249.4	7,263.6	7,262.6	64.4	16.5	-89.60	-147.9	-1,650.3	572.6	491.7	80.85	7.082		
9,400.0	7,249.6	7,263.5	7,262.5	67.1	16.5	-89.53	-147.9	-1,650.3	671.2	587.7	83.57	8.032		
9,500.0	7,249.8	7,263.4	7,262.4	69.8	16.5	-89.47	-147.9	-1,650.3	770.2	684.0	86.29	8.926		
9,600.0	7,250.0	7,263.3	7,262.2	72.6	16.5	-89.40	-147.9	-1,650.3	869.5	780.5	89.02	9.767		
9,700.0	7,250.1	7,263.2	7,262.1	75.3	16.5	-89.33	-147.9	-1,650.3	968.9	877.1	91.76	10.559		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing wells - Sec.28-T4N-R67W - McCarty 28-8 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-103.10	-103.10	-149.4	-641.6	658.8				
100.0	100.0	97.1	97.1	0.1	0.1	-103.07	-103.07	-149.0	-641.7	658.8	658.6	0.24	2,730.079	
105.4	105.4	102.4	102.4	0.1	0.1	-103.07	-103.07	-149.0	-641.7	658.8	658.5	0.26	2,521.455	
200.0	200.0	192.5	192.5	0.3	0.3	-103.06	-103.06	-149.0	-642.0	659.1	658.5	0.63	1,054.168	
300.0	300.0	298.1	298.1	0.6	0.5	-103.08	-103.08	-149.2	-642.3	659.4	658.4	1.03	637.599	
318.6	318.6	315.6	315.6	0.6	0.5	-103.07	-103.07	-149.1	-642.3	659.4	658.3	1.11	592.457	
400.0	400.0	391.3	391.3	0.8	0.7	-103.05	-103.05	-148.9	-642.7	659.8	658.3	1.46	452.365	
500.0	500.0	496.4	496.4	1.0	0.9	-103.04	-103.04	-149.0	-643.3	660.3	658.5	1.88	352.088	
600.0	600.0	590.0	590.0	1.2	1.0	-103.06	-103.06	-149.3	-643.7	660.9	658.6	2.28	289.347	
700.0	700.0	692.6	692.6	1.5	1.3	-103.10	-103.10	-150.0	-644.6	661.8	659.1	2.73	242.047	
800.0	800.0	787.9	787.9	1.7	1.5	-103.15	-103.15	-150.7	-645.3	662.8	659.6	3.18	208.450	
900.0	900.0	893.7	893.7	1.9	1.7	-103.16	-103.16	-151.2	-646.4	663.8	660.2	3.66	181.508	
1,000.0	1,000.0	991.2	991.1	2.1	2.0	-103.18	-103.18	-151.5	-647.0	664.5	660.4	4.11	161.534	
1,100.0	1,100.0	1,090.0	1,089.9	2.4	2.2	-103.16	-103.16	-151.5	-648.0	665.5	660.9	4.58	145.184	
1,200.0	1,200.0	1,193.0	1,193.0	2.6	2.5	-103.13	-103.13	-151.3	-648.9	666.3	661.3	5.05	131.870	
1,300.0	1,300.0	1,289.2	1,289.2	2.8	2.7	-103.11	-103.11	-151.3	-649.7	667.2	661.7	5.51	121.123	
1,400.0	1,400.0	1,394.5	1,394.5	3.0	3.0	-103.10	-103.10	-151.4	-650.6	668.0	662.0	5.99	111.615	
1,500.0	1,500.0	1,491.8	1,491.8	3.3	3.2	-103.09	-103.09	-151.4	-651.2	668.6	662.1	6.44	103.764	
1,600.0	1,600.0	1,588.6	1,588.5	3.5	3.4	-103.09	-103.09	-151.6	-652.2	669.6	662.7	6.92	96.808	
1,700.0	1,700.0	1,694.0	1,693.9	3.7	3.7	-103.07	-103.07	-151.6	-653.2	670.5	663.1	7.41	90.478	
1,800.0	1,800.0	1,786.3	1,786.2	3.9	3.9	-103.05	-103.05	-151.6	-654.1	671.5	663.6	7.87	85.298	
1,900.0	1,900.0	1,889.0	1,888.9	4.2	4.2	-103.01	-103.01	-151.5	-655.7	673.0	664.7	8.36	80.512	
2,000.0	2,000.0	1,988.2	1,988.1	4.4	4.5	-102.98	-102.98	-151.4	-657.0	674.3	665.4	8.84	76.301	
2,100.0	2,100.0	2,090.0	2,089.9	4.6	4.7	-102.96	-102.96	-151.4	-658.2	675.5	666.1	9.32	72.470	
2,200.0	2,200.0	2,187.0	2,186.8	4.8	5.0	-102.93	-102.93	-151.4	-659.5	676.7	666.9	9.79	69.109	
2,300.0	2,300.0	2,287.7	2,287.6	5.1	5.2	-102.94	-102.94	-151.8	-660.9	678.2	667.9	10.28	65.980	
2,400.0	2,400.0	2,390.0	2,389.9	5.3	5.5	-102.92	-102.92	-151.9	-662.2	679.4	668.6	10.77	63.075	
2,500.0	2,500.0	2,486.5	2,486.4	5.5	5.7	-102.92	-102.92	-152.1	-663.4	680.7	669.4	11.25	60.529	
2,600.0	2,600.0	2,587.9	2,587.8	5.7	6.0	150.69	150.69	-152.8	-664.8	683.7	672.0	11.70	58.419	
2,700.0	2,699.8	2,686.9	2,686.7	5.9	6.3	150.84	150.84	-153.2	-666.1	689.7	677.5	12.13	56.835	
2,800.0	2,799.5	2,789.6	2,789.5	6.1	6.5	151.14	151.14	-153.4	-667.4	698.5	685.9	12.58	55.540	
2,900.0	2,899.0	2,886.4	2,886.2	6.3	6.8	151.52	151.52	-153.5	-668.5	708.1	695.1	13.03	54.362	
3,000.0	2,998.5	2,986.2	2,986.0	6.5	7.0	151.88	151.88	-153.8	-669.9	718.0	704.5	13.49	53.231	
3,100.0	3,098.1	3,088.8	3,088.6	6.8	7.3	152.27	152.27	-153.9	-671.0	727.6	713.6	13.96	52.125	
3,200.0	3,197.6	3,184.8	3,184.7	7.0	7.6	152.63	152.63	-153.7	-672.1	737.2	722.8	14.41	51.145	
3,300.0	3,297.1	3,285.1	3,284.8	7.2	7.8	153.05	153.05	-153.0	-673.6	747.1	732.3	14.86	50.273	
3,400.0	3,396.7	3,379.6	3,379.4	7.4	8.0	153.49	153.49	-151.5	-675.3	757.3	742.0	15.29	49.540	
3,500.0	3,496.2	3,484.2	3,483.9	7.7	8.2	153.99	153.99	-149.7	-677.4	767.6	751.9	15.73	48.813	
3,600.0	3,595.7	3,590.0	3,589.7	7.9	8.4	154.50	154.50	-147.5	-678.6	777.1	760.9	16.14	48.155	
3,700.0	3,695.3	3,687.2	3,686.9	8.2	8.6	154.93	154.93	-145.8	-679.4	786.3	769.7	16.53	47.557	
3,800.0	3,794.8	3,784.8	3,784.5	8.4	8.8	155.33	155.33	-144.3	-680.4	795.8	778.9	16.95	46.949	
3,900.0	3,894.3	3,889.9	3,889.5	8.7	9.0	155.78	155.78	-142.4	-681.4	805.2	787.9	17.37	46.357	
4,000.0	3,993.9	3,988.8	3,988.4	8.9	9.2	156.21	156.21	-140.3	-681.8	814.3	796.5	17.76	45.843	
4,100.0	4,093.4	4,088.4	4,088.0	9.2	9.4	156.66	156.66	-137.8	-682.5	823.4	805.3	18.16	45.346	
4,200.0	4,193.0	4,188.3	4,187.9	9.4	9.6	157.12	157.12	-134.9	-683.1	832.6	814.0	18.56	44.866	
4,300.0	4,292.6	4,284.3	4,283.8	9.7	9.7	157.56	157.56	-132.5	-683.8	841.1	822.2	18.98	44.320	
4,400.0	4,392.4	4,390.3	4,389.8	9.9	9.9	157.94	157.94	-129.8	-684.5	846.6	827.2	19.40	43.644	
4,500.0	4,492.4	4,488.3	4,487.7	10.1	10.1	158.18	158.18	-127.2	-684.7	848.5	828.8	19.77	42.916	
4,600.0	4,592.4	4,588.4	4,587.9	10.3	10.3	-95.26	-95.26	-125.0	-685.2	848.8	828.2	20.50	41.393	
4,700.0	4,692.4	4,685.3	4,684.7	10.5	10.5	-95.13	-95.13	-123.0	-685.7	849.1	828.2	20.91	40.605	
4,800.0	4,792.4	4,784.3	4,783.7	10.7	10.7	-95.01	-95.01	-121.3	-686.5	849.7	828.4	21.34	39.817	

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 Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Existing wells - Sec.28-T4N-R67W - McCarty 28-8 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 100-NS-GYRO-MS													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,900.0	4,892.4	4,885.3	4,884.7	10.9	10.9	-94.90	-94.90	-119.7	-687.2	850.3	828.6	21.78	39.044	
5,000.0	4,992.4	4,989.0	4,988.3	11.1	11.2	-94.79	-94.79	-118.1	-687.7	850.7	828.5	22.21	38.304	
5,100.0	5,092.4	5,083.8	5,083.1	11.3	11.4	-94.72	-94.72	-117.2	-688.2	851.1	828.4	22.63	37.602	
5,200.0	5,192.4	5,181.1	5,180.5	11.5	11.6	-94.64	-94.64	-116.1	-689.2	852.0	828.9	23.09	36.905	
5,300.0	5,292.4	5,284.2	5,283.5	11.8	11.9	-94.54	-94.54	-114.7	-690.2	852.9	829.4	23.55	36.217	
5,400.0	5,392.4	5,381.1	5,380.4	12.0	12.1	-94.47	-94.47	-113.6	-691.1	853.7	829.7	24.00	35.567	
5,500.0	5,492.4	5,480.0	5,479.3	12.2	12.4	-94.43	-94.43	-113.1	-692.3	854.9	830.4	24.47	34.932	
5,600.0	5,592.4	5,579.5	5,578.8	12.4	12.6	-94.36	-94.36	-112.1	-693.6	856.1	831.1	24.95	34.317	
5,700.0	5,692.4	5,680.9	5,680.2	12.6	12.9	-94.30	-94.30	-111.4	-694.8	857.3	831.9	25.43	33.717	
5,800.0	5,792.4	5,787.5	5,786.8	12.8	13.1	-94.30	-94.30	-111.4	-695.6	858.0	832.2	25.86	33.183	
5,900.0	5,892.4	5,877.7	5,876.9	13.0	13.3	-94.32	-94.32	-111.8	-696.2	858.8	832.5	26.24	32.731	
6,000.0	5,992.4	5,976.9	5,976.2	13.3	13.5	-94.34	-94.34	-112.1	-697.9	860.4	833.8	26.68	32.251	
6,100.0	6,092.4	6,079.8	6,079.0	13.5	13.7	-94.34	-94.34	-112.3	-699.3	861.8	834.6	27.15	31.742	
6,200.0	6,192.4	6,182.5	6,181.7	13.7	14.0	-94.35	-94.35	-112.6	-700.3	862.8	835.2	27.60	31.266	
6,300.0	6,292.4	6,284.9	6,284.1	13.9	14.2	-94.40	-94.40	-113.4	-701.0	863.6	835.6	28.00	30.838	
6,400.0	6,392.4	6,380.6	6,379.9	14.1	14.3	-94.43	-94.43	-113.9	-701.7	864.4	836.0	28.41	30.420	
6,500.0	6,492.4	6,478.3	6,477.6	14.3	14.6	-4.45	-4.45	-114.2	-703.0	865.6	837.0	28.57	30.293	
6,600.0	6,592.0	6,581.2	6,580.4	14.5	14.8	-4.55	-4.55	-114.6	-704.2	859.0	830.3	28.73	29.895	
6,700.0	6,689.7	6,682.3	6,681.5	14.6	15.0	-4.83	-4.83	-115.3	-705.0	839.1	810.6	28.44	29.504	
6,800.0	6,783.9	6,774.9	6,774.1	14.8	15.2	-5.28	-5.28	-115.6	-705.6	806.5	778.8	27.71	29.100	
6,900.0	6,873.0	6,863.6	6,862.8	15.0	15.4	-6.00	-6.00	-116.0	-706.4	762.1	735.5	26.59	28.656	
7,000.0	6,955.3	6,946.5	6,945.7	15.2	15.6	-7.10	-7.10	-116.4	-707.1	706.5	681.4	25.13	28.117	
7,100.0	7,029.6	7,021.3	7,020.5	15.7	15.8	-8.82	-8.82	-116.8	-707.8	640.7	617.3	23.41	27.368	
7,200.0	7,094.5	7,086.9	7,086.1	16.3	16.0	-11.62	-11.62	-117.1	-708.4	565.9	544.2	21.66	26.125	
7,300.0	7,148.9	7,142.1	7,141.3	17.3	16.1	-16.46	-16.46	-117.3	-708.9	483.3	462.9	20.41	23.675	
7,400.0	7,191.9	7,185.9	7,185.1	18.5	16.2	-25.53	-25.53	-117.5	-709.3	394.7	373.5	21.21	18.611	
7,500.0	7,222.8	7,217.6	7,216.8	20.1	16.3	-43.20	-43.20	-117.7	-709.5	302.0	274.9	27.07	11.155	
7,600.0	7,241.0	7,236.7	7,235.9	21.9	16.3	-70.48	-70.48	-117.8	-709.7	207.9	171.7	36.23	5.738	
7,700.0	7,246.3	7,242.9	7,242.1	23.8	16.3	-88.89	-88.89	-117.8	-709.8	119.1	78.9	40.15	2.965	
7,795.8	7,246.5	7,244.0	7,243.2	25.9	16.3	-89.74	-89.74	-117.8	-709.8	70.7	28.5	42.19	1.676 CC, ES	
7,800.0	7,246.5	7,244.0	7,243.2	26.0	16.3	-89.77	-89.77	-117.8	-709.8	70.8	28.5	42.28	1.675 SF	
7,900.0	7,246.7	7,245.1	7,244.3	28.2	16.3	-90.66	-90.66	-117.8	-709.8	125.9	81.4	44.52	2.828	
8,000.0	7,246.9	7,246.2	7,245.4	30.5	16.3	-91.54	-91.54	-117.8	-709.8	216.1	169.2	46.84	4.613	
8,100.0	7,247.1	7,247.3	7,246.5	32.9	16.3	-92.43	-92.43	-117.8	-709.8	312.3	263.1	49.23	6.344	
8,200.0	7,247.3	7,248.4	7,247.6	35.4	16.3	-93.31	-93.31	-117.8	-709.8	410.3	358.6	51.66	7.943	
8,300.0	7,247.5	7,249.5	7,248.7	37.9	16.3	-94.19	-94.19	-117.8	-709.8	509.1	455.0	54.12	9.407	
8,400.0	7,247.7	7,250.6	7,249.8	40.5	16.3	-95.07	-95.07	-117.8	-709.8	608.3	551.7	56.60	10.746	
8,500.0	7,247.8	7,251.7	7,250.9	43.1	16.3	-95.95	-95.95	-117.8	-709.9	707.7	648.6	59.10	11.974	
8,600.0	7,248.0	7,252.8	7,252.0	45.7	16.3	-96.82	-96.82	-117.8	-709.9	807.2	745.6	61.60	13.104	
8,700.0	7,248.2	7,253.9	7,253.0	48.3	16.3	-97.69	-97.69	-117.8	-709.9	906.9	842.8	64.11	14.146	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28U-334 - Wellbore #1 - Plan #2 (6-20-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	29.1	0.0	29.1				
100.0	100.0	100.0	100.0	0.1	0.1	0.00	0.00	29.1	0.0	29.1	28.9	0.22	129.647	
200.0	200.0	200.0	200.0	0.3	0.3	0.00	0.00	29.1	0.0	29.1	28.5	0.67	43.216	
300.0	300.0	300.0	300.0	0.6	0.6	0.00	0.00	29.1	0.0	29.1	28.0	1.12	25.929	
400.0	400.0	400.0	400.0	0.8	0.8	0.00	0.00	29.1	0.0	29.1	27.6	1.57	18.521	
500.0	500.0	500.0	500.0	1.0	1.0	0.00	0.00	29.1	0.0	29.1	27.1	2.02	14.405	
600.0	600.0	600.0	600.0	1.2	1.2	0.00	0.00	29.1	0.0	29.1	26.7	2.47	11.786	
700.0	700.0	700.0	700.0	1.5	1.5	0.00	0.00	29.1	0.0	29.1	26.2	2.92	9.973	
800.0	800.0	800.0	800.0	1.7	1.7	0.00	0.00	29.1	0.0	29.1	25.8	3.37	8.643	
900.0	900.0	900.0	900.0	1.9	1.9	0.00	0.00	29.1	0.0	29.1	25.3	3.82	7.626	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	0.00	0.00	29.1	0.0	29.1	24.9	4.27	6.824	
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	0.00	0.00	29.1	0.0	29.1	24.4	4.72	6.174	
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	0.00	0.00	29.1	0.0	29.1	24.0	5.17	5.637	
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	0.00	0.00	29.1	0.0	29.1	23.5	5.62	5.186	
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	0.00	0.00	29.1	0.0	29.1	23.1	6.07	4.802	
1,500.0	1,500.0	1,500.0	1,500.0	3.3	3.3	0.00	0.00	29.1	0.0	29.1	22.6	6.52	4.471 CC, ES	
1,600.0	1,600.0	1,599.6	1,599.5	3.5	3.5	3.04	0.00	29.8	1.6	29.9	22.9	6.96	4.294	
1,700.0	1,700.0	1,698.9	1,698.7	3.7	3.7	11.22	0.00	31.9	6.3	32.5	25.1	7.39	4.402	
1,800.0	1,800.0	1,798.5	1,798.0	3.9	3.9	20.76	0.00	34.9	13.2	37.4	29.5	7.83	4.774	
1,900.0	1,900.0	1,898.2	1,897.4	4.2	4.1	28.04	0.00	37.9	20.2	43.1	34.8	8.27	5.208	
2,000.0	2,000.0	1,997.9	1,996.8	4.4	4.4	33.55	0.00	41.0	27.2	49.3	40.6	8.71	5.655	
2,100.0	2,100.0	2,097.6	2,096.3	4.6	4.6	37.81	0.00	44.0	34.1	55.8	46.7	9.16	6.094	
2,200.0	2,200.0	2,197.3	2,195.7	4.8	4.8	41.16	0.00	47.0	41.1	62.6	53.0	9.61	6.515	
2,300.0	2,300.0	2,297.0	2,295.1	5.1	5.1	43.84	0.00	50.1	48.1	69.6	59.5	10.07	6.912	
2,400.0	2,400.0	2,396.7	2,394.5	5.3	5.3	46.03	0.00	53.1	55.1	76.7	66.2	10.53	7.284	
2,500.0	2,500.0	2,496.4	2,493.9	5.5	5.6	47.85	0.00	56.1	62.0	83.9	72.9	10.99	7.633	
2,600.0	2,600.0	2,596.2	2,593.4	5.7	5.8	-57.84	0.00	59.2	69.0	90.2	78.8	11.37	7.932	
2,700.0	2,699.8	2,696.1	2,693.0	5.9	6.0	-59.02	0.00	62.2	76.0	94.7	82.9	11.79	8.032	
2,800.0	2,799.5	2,795.9	2,792.6	6.1	6.3	-61.85	0.00	65.3	83.0	97.6	85.4	12.22	7.985	
2,900.0	2,899.0	2,895.7	2,892.1	6.3	6.5	-65.08	0.00	68.3	90.0	100.3	87.6	12.67	7.915	
3,000.0	2,998.5	2,995.5	2,991.6	6.5	6.8	-68.12	0.00	71.3	96.9	103.3	90.2	13.13	7.866	
3,100.0	3,098.1	3,095.3	3,091.1	6.8	7.0	-70.98	0.00	74.4	103.9	106.6	93.0	13.60	7.836	
3,200.0	3,197.6	3,195.1	3,190.6	7.0	7.3	-73.67	0.00	77.4	110.9	110.1	96.0	14.08	7.821	
3,300.0	3,297.1	3,295.0	3,290.2	7.2	7.5	-76.19	0.00	80.5	117.9	113.8	99.3	14.56	7.818	
3,400.0	3,396.7	3,394.8	3,389.7	7.4	7.8	-78.54	0.00	83.5	124.9	117.8	102.8	15.05	7.827	
3,500.0	3,496.2	3,494.6	3,489.2	7.7	8.1	-80.74	0.00	86.5	131.8	121.9	106.4	15.55	7.844	
3,600.0	3,595.7	3,594.4	3,588.7	7.9	8.3	-82.79	0.00	89.6	138.8	126.3	110.2	16.05	7.867	
3,700.0	3,695.3	3,694.2	3,688.2	8.2	8.6	-84.70	0.00	92.6	145.8	130.7	114.2	16.55	7.897	
3,800.0	3,794.8	3,794.2	3,787.9	8.4	8.8	-86.50	0.00	95.7	152.8	135.3	118.2	17.06	7.932	
3,900.0	3,894.3	3,897.3	3,890.9	8.7	9.0	-88.86	0.00	98.0	158.1	138.7	121.2	17.52	7.915	
4,000.0	3,993.9	4,000.1	3,993.7	8.9	9.2	-92.28	0.00	98.8	160.0	140.1	122.1	17.98	7.789	
4,100.0	4,093.4	4,099.9	4,093.4	9.2	9.4	-96.18	0.00	98.8	160.0	140.8	122.3	18.45	7.630	
4,200.0	4,193.0	4,199.4	4,193.0	9.4	9.6	-100.03	0.00	98.8	160.0	142.1	123.2	18.93	7.508	
4,300.0	4,292.6	4,299.0	4,292.6	9.7	9.8	-103.50	0.00	98.8	160.0	144.0	124.6	19.39	7.423	
4,400.0	4,392.4	4,398.9	4,392.4	9.9	10.0	-105.63	0.00	98.8	160.0	145.3	125.5	19.82	7.334	
4,500.0	4,492.4	4,498.8	4,492.4	10.1	10.2	-106.40	0.00	98.8	160.0	145.9	125.7	20.22	7.215	
4,600.0	4,592.4	4,598.8	4,592.4	10.3	10.4	0.00	0.00	98.8	160.0	145.9	126.0	19.85	7.348	
4,700.0	4,692.4	4,698.8	4,692.4	10.5	10.6	0.00	0.00	98.8	160.0	145.9	125.6	20.29	7.191	
4,800.0	4,792.4	4,798.8	4,792.4	10.7	10.9	0.00	0.00	98.8	160.0	145.9	125.2	20.72	7.041	
4,900.0	4,892.4	4,898.8	4,892.4	10.9	11.1	0.00	0.00	98.8	160.0	145.9	124.7	21.16	6.896	
5,000.0	4,992.4	4,998.8	4,992.4	11.1	11.3	0.00	0.00	98.8	160.0	145.9	124.3	21.59	6.757	

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 Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28U-334 - Wellbore #1 - Plan #2 (6-20-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,092.4	5,098.8	5,092.4	11.3	11.5	0.00	0.00	98.8	160.0	145.9	123.9	22.03	6.624	
5,200.0	5,192.4	5,198.8	5,192.4	11.5	11.7	0.00	0.00	98.8	160.0	145.9	123.4	22.46	6.495	
5,300.0	5,292.4	5,298.8	5,292.4	11.8	11.9	0.00	0.00	98.8	160.0	145.9	123.0	22.90	6.372	
5,400.0	5,392.4	5,398.8	5,392.4	12.0	12.1	0.00	0.00	98.8	160.0	145.9	122.6	23.33	6.252	
5,500.0	5,492.4	5,498.8	5,492.4	12.2	12.3	0.00	0.00	98.8	160.0	145.9	122.1	23.77	6.137	
5,600.0	5,592.4	5,598.8	5,592.4	12.4	12.6	0.00	0.00	98.8	160.0	145.9	121.7	24.21	6.026	
5,700.0	5,692.4	5,698.8	5,692.4	12.6	12.8	0.00	0.00	98.8	160.0	145.9	121.2	24.65	5.919	
5,800.0	5,792.4	5,798.8	5,792.4	12.8	13.0	0.00	0.00	98.8	160.0	145.9	120.8	25.09	5.816	
5,900.0	5,892.4	5,898.8	5,892.4	13.0	13.2	0.00	0.00	98.8	160.0	145.9	120.4	25.53	5.716	
6,000.0	5,992.4	5,998.8	5,992.4	13.3	13.4	0.00	0.00	98.8	160.0	145.9	119.9	25.97	5.619	
6,100.0	6,092.4	6,098.8	6,092.4	13.5	13.6	0.00	0.00	98.8	160.0	145.9	119.5	26.40	5.525	
6,200.0	6,192.4	6,198.8	6,192.4	13.7	13.9	0.00	0.00	98.8	160.0	145.9	119.0	26.85	5.435	
6,300.0	6,292.4	6,298.8	6,292.4	13.9	14.1	0.00	0.00	98.8	160.0	145.9	118.6	27.29	5.347	
6,365.6	6,358.0	6,364.4	6,358.0	14.0	14.2	0.00	0.00	98.8	160.0	145.9	118.3	27.57	5.291	
6,400.0	6,392.4	6,398.8	6,392.4	14.1	14.3	-0.01	-0.01	98.8	160.0	145.9	118.2	27.73	5.262	
6,414.2	6,406.6	6,413.1	6,406.6	14.1	14.3	89.90	89.90	98.8	159.7	145.9	117.5	28.40	5.137	
6,500.0	6,492.4	6,498.2	6,491.4	14.3	14.5	87.17	87.17	98.8	152.7	146.1	117.3	28.73	5.085	
6,600.0	6,592.0	6,595.7	6,586.8	14.5	14.6	82.40	82.40	98.8	133.2	147.2	118.2	29.03	5.071	
6,700.0	6,689.7	6,691.8	6,677.7	14.6	14.7	77.90	77.90	98.8	102.2	149.3	120.0	29.26	5.101	
6,800.0	6,783.9	6,786.5	6,762.8	14.8	14.9	73.74	73.74	98.8	60.7	152.0	122.6	29.44	5.165	
6,900.0	6,873.0	6,880.0	6,841.2	15.0	15.1	70.01	70.01	98.8	9.7	155.3	125.7	29.60	5.248	
7,000.0	6,955.3	6,972.5	6,912.0	15.2	15.4	66.74	66.74	98.8	-49.7	158.9	129.1	29.83	5.328	
7,100.0	7,029.6	7,064.1	6,974.5	15.7	16.0	63.94	63.94	98.8	-116.6	162.5	132.3	30.20	5.380	
7,200.0	7,094.5	7,154.9	7,028.1	16.3	16.7	61.62	61.62	98.8	-189.7	165.9	135.1	30.86	5.376	
7,300.0	7,148.9	7,245.0	7,072.4	17.3	17.7	59.76	59.76	98.8	-268.1	168.9	137.0	31.91	5.294	
7,400.0	7,191.9	7,334.6	7,107.0	18.5	18.9	58.34	58.34	98.8	-350.7	171.4	138.0	33.45	5.126	
7,500.0	7,222.8	7,423.8	7,131.6	20.1	20.4	57.35	57.35	98.8	-436.4	173.3	137.8	35.50	4.882	
7,600.0	7,241.0	7,512.7	7,146.0	21.9	22.0	56.78	56.78	98.8	-524.2	174.4	136.3	38.06	4.582	
7,700.0	7,246.3	7,602.4	7,150.1	23.8	23.8	56.59	56.59	98.8	-613.7	174.8	133.7	41.09	4.254	
7,800.0	7,246.5	7,701.4	7,148.8	26.0	25.8	56.20	56.20	98.8	-712.7	175.6	131.1	44.44	3.951	
7,900.0	7,246.7	7,801.4	7,147.5	28.2	28.1	55.80	55.80	98.8	-812.7	176.4	128.4	47.98	3.676	
8,000.0	7,246.9	7,901.4	7,146.3	30.5	30.4	55.41	55.41	98.8	-912.7	177.2	125.6	51.66	3.431	
8,100.0	7,247.1	8,001.4	7,145.0	32.9	32.8	55.02	55.02	98.8	-1,012.7	178.1	122.6	55.43	3.213	
8,200.0	7,247.3	8,101.4	7,143.7	35.4	35.3	54.64	54.64	98.8	-1,112.7	178.9	119.6	59.26	3.019	
8,300.0	7,247.5	8,201.4	7,142.4	37.9	37.8	54.26	54.26	98.8	-1,212.6	179.8	116.6	63.15	2.847	
8,400.0	7,247.7	8,301.4	7,141.2	40.5	40.3	53.88	53.88	98.8	-1,312.6	180.6	113.6	67.06	2.694	
8,500.0	7,247.8	8,401.4	7,139.9	43.1	42.9	53.50	53.50	98.8	-1,412.6	181.5	110.5	70.99	2.557	
8,600.0	7,248.0	8,501.4	7,138.6	45.7	45.5	53.13	53.13	98.8	-1,512.6	182.4	107.4	74.93	2.434	
8,700.0	7,248.2	8,601.3	7,137.4	48.3	48.2	52.77	52.77	98.8	-1,612.6	183.3	104.4	78.88	2.323	
8,800.0	7,248.4	8,701.3	7,136.1	50.9	50.8	52.40	52.40	98.8	-1,712.5	184.1	101.3	82.81	2.224	
8,900.0	7,248.6	8,801.3	7,134.8	53.6	53.5	52.04	52.04	98.8	-1,812.5	185.0	98.3	86.74	2.133	
9,000.0	7,248.8	8,901.3	7,133.5	56.3	56.2	51.69	51.69	98.8	-1,912.5	185.9	95.3	90.66	2.051	
9,100.0	7,249.0	9,001.3	7,132.3	59.0	58.9	51.34	51.34	98.8	-2,012.5	186.9	92.3	94.56	1.976	
9,200.0	7,249.2	9,101.3	7,131.0	61.7	61.6	50.99	50.99	98.8	-2,112.5	187.8	89.3	98.44	1.908	
9,300.0	7,249.4	9,201.3	7,129.7	64.4	64.3	50.64	50.64	98.8	-2,212.4	188.7	86.4	102.29	1.845	
9,400.0	7,249.6	9,301.3	7,128.4	67.1	67.0	50.30	50.30	98.8	-2,312.4	189.6	83.5	106.13	1.787	
9,500.0	7,249.8	9,401.3	7,127.2	69.8	69.7	49.96	49.96	98.8	-2,412.4	190.6	80.6	109.94	1.734	
9,600.0	7,250.0	9,501.3	7,125.9	72.6	72.4	49.62	49.62	98.8	-2,512.4	191.5	77.8	113.72	1.684	
9,700.0	7,250.1	9,601.2	7,124.6	75.3	75.2	49.29	49.29	98.8	-2,612.4	192.5	75.0	117.48	1.638	
9,800.0	7,250.3	9,701.2	7,123.3	78.1	77.9	48.96	48.96	98.8	-2,712.4	193.4	72.2	121.21	1.596	
9,900.0	7,250.5	9,801.2	7,122.1	80.8	80.7	48.64	48.64	98.8	-2,812.3	194.4	69.5	124.92	1.556	

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 Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28U-334 - Wellbore #1 - Plan #2 (6-20-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	7,250.7	9,901.2	7,120.8	83.6	83.4	48.31	98.8	-2,912.3	195.4	66.8	128.59	1.519		
10,100.0	7,250.9	10,001.2	7,119.5	86.3	86.2	47.99	98.8	-3,012.3	196.4	64.1	132.23	1.485 Level 3		
10,200.0	7,251.1	10,101.2	7,118.2	89.1	88.9	47.68	98.8	-3,112.3	197.3	61.5	135.85	1.453 Level 3		
10,300.0	7,251.3	10,201.2	7,117.0	91.8	91.7	47.36	98.8	-3,212.3	198.3	58.9	139.44	1.422 Level 3		
10,400.0	7,251.5	10,301.2	7,115.7	94.6	94.5	47.05	98.8	-3,312.2	199.3	56.3	142.99	1.394 Level 3		
10,500.0	7,251.7	10,401.2	7,114.4	97.4	97.2	46.75	98.8	-3,412.2	200.3	53.8	146.52	1.367 Level 3		
10,600.0	7,251.9	10,501.1	7,113.1	100.1	100.0	46.44	98.8	-3,512.2	201.3	51.3	150.02	1.342 Level 3		
10,700.0	7,252.1	10,601.1	7,111.9	102.9	102.8	46.14	98.8	-3,612.2	202.3	48.9	153.49	1.318 Level 3		
10,800.0	7,252.3	10,701.1	7,110.6	105.7	105.5	45.85	98.8	-3,712.2	203.4	46.4	156.93	1.296 Level 3		
10,900.0	7,252.5	10,801.1	7,109.3	108.4	108.3	45.55	98.8	-3,812.1	204.4	44.1	160.34	1.275 Level 3		
11,000.0	7,252.6	10,901.1	7,108.1	111.2	111.1	45.26	98.8	-3,912.1	205.4	41.7	163.72	1.255 Level 3		
11,100.0	7,252.8	11,001.1	7,106.8	114.0	113.9	44.97	98.8	-4,012.1	206.5	39.4	167.07	1.236 Level 2		
11,200.0	7,253.0	11,101.1	7,105.5	116.8	116.6	44.68	98.8	-4,112.1	207.5	37.1	170.39	1.218 Level 2		
11,300.0	7,253.2	11,201.1	7,104.2	119.6	119.4	44.40	98.8	-4,212.1	208.5	34.9	173.68	1.201 Level 2		
11,400.0	7,253.4	11,301.1	7,103.0	122.3	122.2	44.12	98.8	-4,312.1	209.6	32.6	176.94	1.185 Level 2		
11,500.0	7,253.6	11,401.0	7,101.7	125.1	125.0	43.84	98.8	-4,412.0	210.6	30.5	180.18	1.169 Level 2		
11,600.0	7,253.8	11,501.0	7,100.4	127.9	127.8	43.57	98.8	-4,512.0	211.7	28.3	183.38	1.154 Level 2		
11,700.0	7,254.0	11,601.0	7,099.1	129.7	130.6	43.30	98.8	-4,612.0	212.8	26.9	185.84	1.145 Level 2		
11,705.9	7,254.0	11,606.9	7,099.1	129.8	130.7	43.28	98.8	-4,617.9	212.8	26.8	185.98	1.144 Level 2, SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-214 - Wellbore #1 - Plan #3 (7-09-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	180.00	180.00	-32.8	0.0	32.8				
100.0	100.0	100.0	100.0	0.1	0.1	180.00	180.00	-32.8	0.0	32.8	32.6	0.22	145.892	
200.0	200.0	200.0	200.0	0.3	0.3	180.00	180.00	-32.8	0.0	32.8	32.1	0.67	48.631	
300.0	300.0	300.0	300.0	0.6	0.6	180.00	180.00	-32.8	0.0	32.8	31.7	1.12	29.178	
400.0	400.0	400.0	400.0	0.8	0.8	180.00	180.00	-32.8	0.0	32.8	31.2	1.57	20.842	
500.0	500.0	500.0	500.0	1.0	1.0	180.00	180.00	-32.8	0.0	32.8	30.8	2.02	16.210	
600.0	600.0	600.0	600.0	1.2	1.2	180.00	180.00	-32.8	0.0	32.8	30.3	2.47	13.263	
700.0	700.0	700.0	700.0	1.5	1.5	180.00	180.00	-32.8	0.0	32.8	29.9	2.92	11.222	
800.0	800.0	800.0	800.0	1.7	1.7	180.00	180.00	-32.8	0.0	32.8	29.4	3.37	9.726	
900.0	900.0	900.0	900.0	1.9	1.9	180.00	180.00	-32.8	0.0	32.8	29.0	3.82	8.582	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	180.00	180.00	-32.8	0.0	32.8	28.5	4.27	7.679 CC, ES	
1,100.0	1,100.0	1,098.9	1,098.9	2.4	2.3	178.94	178.94	-34.4	0.6	34.4	29.7	4.69	7.334	
1,200.0	1,200.0	1,197.6	1,197.4	2.6	2.5	176.27	176.27	-39.1	2.5	39.3	34.2	5.09	7.715	
1,300.0	1,300.0	1,295.9	1,295.4	2.8	2.7	173.07	173.07	-46.9	5.7	47.5	42.0	5.51	8.630	
1,400.0	1,400.0	1,395.4	1,394.3	3.0	2.9	170.45	170.45	-56.3	9.5	57.3	51.4	5.94	9.649	
1,500.0	1,500.0	1,494.9	1,493.3	3.3	3.1	168.59	168.59	-65.6	13.2	67.2	60.9	6.39	10.519	
1,600.0	1,600.0	1,594.3	1,592.3	3.5	3.4	167.22	167.22	-74.9	17.0	77.2	70.4	6.85	11.264	
1,700.0	1,700.0	1,693.8	1,691.3	3.7	3.6	166.16	166.16	-84.2	20.8	87.2	79.9	7.32	11.906	
1,800.0	1,800.0	1,793.3	1,790.3	3.9	3.9	165.32	165.32	-93.6	24.5	97.2	89.4	7.80	12.463	
1,900.0	1,900.0	1,892.8	1,889.2	4.2	4.1	164.63	164.63	-102.9	28.3	107.3	99.0	8.28	12.949	
2,000.0	2,000.0	1,992.3	1,988.2	4.4	4.4	164.06	164.06	-112.2	32.0	117.3	108.5	8.77	13.376	
2,100.0	2,100.0	2,091.8	2,087.2	4.6	4.7	163.59	163.59	-121.5	35.8	127.4	118.1	9.26	13.753	
2,200.0	2,200.0	2,191.3	2,186.2	4.8	4.9	163.18	163.18	-130.9	39.6	137.4	127.7	9.75	14.089	
2,300.0	2,300.0	2,290.8	2,285.1	5.1	5.2	162.83	162.83	-140.2	43.3	147.5	137.2	10.25	14.389	
2,400.0	2,400.0	2,390.3	2,384.1	5.3	5.5	162.52	162.52	-149.5	47.1	157.6	146.8	10.75	14.659	
2,500.0	2,500.0	2,489.7	2,483.1	5.5	5.8	162.25	162.25	-158.8	50.9	167.6	156.4	11.25	14.903	
2,600.0	2,600.0	2,589.3	2,582.2	5.7	6.0	55.92	55.92	-168.2	54.6	176.7	165.6	11.16	15.843	
2,700.0	2,699.8	2,689.0	2,681.3	5.9	6.3	56.91	56.91	-177.5	58.4	183.9	172.4	11.57	15.891	
2,800.0	2,799.5	2,788.6	2,780.5	6.1	6.6	58.74	58.74	-186.9	62.2	189.4	177.4	12.00	15.780	
2,900.0	2,899.0	2,888.3	2,879.6	6.3	6.9	60.78	60.78	-196.2	65.9	194.6	182.1	12.45	15.635	
3,000.0	2,998.5	2,987.9	2,978.7	6.5	7.2	62.72	62.72	-205.5	69.7	200.0	187.1	12.90	15.507	
3,100.0	3,098.1	3,087.5	3,077.8	6.8	7.5	64.56	64.56	-214.9	73.5	205.6	192.3	13.36	15.394	
3,200.0	3,197.6	3,187.2	3,177.0	7.0	7.8	66.29	66.29	-224.2	77.2	211.5	197.6	13.83	15.294	
3,300.0	3,297.1	3,286.8	3,276.1	7.2	8.1	67.94	67.94	-233.5	81.0	217.5	203.2	14.30	15.205	
3,400.0	3,396.7	3,386.4	3,375.2	7.4	8.3	69.49	69.49	-242.9	84.8	223.7	208.9	14.79	15.126	
3,500.0	3,496.2	3,486.1	3,474.3	7.7	8.6	70.96	70.96	-252.2	88.5	230.0	214.7	15.28	15.055	
3,600.0	3,595.7	3,585.7	3,573.4	7.9	8.9	72.35	72.35	-261.6	92.3	236.5	220.7	15.77	14.992	
3,700.0	3,695.3	3,685.3	3,672.6	8.2	9.2	73.66	73.66	-270.9	96.1	243.1	226.8	16.28	14.935	
3,800.0	3,794.8	3,784.9	3,771.7	8.4	9.5	74.90	74.90	-280.2	99.8	249.8	233.0	16.78	14.885	
3,900.0	3,894.3	3,884.6	3,870.8	8.7	9.8	76.08	76.08	-289.6	103.6	256.7	239.4	17.30	14.839	
4,000.0	3,993.9	3,984.2	3,969.9	8.9	10.1	77.20	77.20	-298.9	107.4	263.6	245.8	17.81	14.799	
4,100.0	4,093.4	4,083.8	4,069.0	9.2	10.4	78.26	78.26	-308.3	111.1	270.7	252.3	18.33	14.762	
4,200.0	4,193.0	4,183.5	4,168.2	9.4	10.7	79.27	79.27	-317.6	114.9	277.8	258.9	18.86	14.730	
4,300.0	4,292.6	4,283.1	4,267.3	9.7	11.0	80.16	80.16	-326.9	118.7	285.1	265.8	19.37	14.722	
4,400.0	4,392.4	4,382.8	4,366.5	9.9	11.3	80.42	80.42	-336.3	122.4	293.1	273.3	19.83	14.782	
4,500.0	4,492.4	4,482.4	4,465.5	10.1	11.6	80.04	80.04	-345.6	126.2	301.6	281.4	20.25	14.896	
4,600.0	4,592.4	4,581.9	4,564.5	10.3	11.9	-174.43	-174.43	-354.9	130.0	310.5	289.2	21.32	14.567	
4,700.0	4,692.4	4,681.4	4,663.5	10.5	12.2	-175.26	-175.26	-364.3	133.7	319.6	297.7	21.84	14.631	
4,800.0	4,792.4	4,780.8	4,762.5	10.7	12.4	-176.06	-176.06	-373.6	137.5	328.6	306.3	22.36	14.694	
4,900.0	4,892.4	4,880.3	4,861.5	10.9	12.7	-176.80	-176.80	-382.9	141.2	337.7	314.9	22.89	14.756	
5,000.0	4,992.4	4,979.8	4,960.4	11.1	13.0	-177.51	-177.51	-392.2	145.0	346.9	323.5	23.41	14.818	

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 Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-214 - Wellbore #1 - Plan #3 (7-09-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	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	5,092.4	5,079.3	5,059.4	11.3	13.3	-178.19	-401.6	148.8	356.2	332.2	23.94	14.880		
5,200.0	5,192.4	5,178.8	5,158.4	11.5	13.6	-178.82	-410.9	152.5	365.4	341.0	24.46	14.941		
5,300.0	5,292.4	5,284.8	5,263.9	11.8	13.9	-179.44	-420.4	156.4	374.4	349.4	24.98	14.987		
5,400.0	5,392.4	5,398.4	5,377.3	12.0	14.1	-179.85	-427.0	159.0	380.2	354.7	25.43	14.948		
5,500.0	5,492.4	5,512.5	5,491.3	12.2	14.3	-180.00	-429.4	160.0	382.3	356.4	25.85	14.790		
5,600.0	5,592.4	5,613.5	5,592.4	12.4	14.5	180.00	-429.4	160.0	382.3	356.1	26.24	14.571		
5,700.0	5,692.4	5,713.5	5,692.4	12.6	14.7	180.00	-429.4	160.0	382.3	355.7	26.61	14.366		
5,800.0	5,792.4	5,813.5	5,792.4	12.8	14.8	180.00	-429.4	160.0	382.3	355.3	26.99	14.166		
5,900.0	5,892.4	5,913.5	5,892.4	13.0	15.0	180.00	-429.4	160.0	382.3	354.9	27.37	13.970		
6,000.0	5,992.4	6,013.5	5,992.4	13.3	15.1	180.00	-429.4	160.0	382.3	354.5	27.75	13.778		
6,100.0	6,092.4	6,113.5	6,092.4	13.5	15.3	180.00	-429.4	160.0	382.3	354.2	28.13	13.591		
6,200.0	6,192.4	6,213.5	6,192.4	13.7	15.4	180.00	-429.4	160.0	382.3	353.8	28.51	13.408		
6,264.4	6,256.8	6,277.9	6,256.8	13.8	15.6	180.00	-429.4	160.0	382.3	353.5	28.76	13.292		
6,300.0	6,292.4	6,313.5	6,292.4	13.9	15.6	-179.99	-429.4	159.9	382.3	353.4	28.90	13.229		
6,317.7	6,310.1	6,331.3	6,310.1	13.9	15.6	-179.91	-429.4	159.4	382.3	353.3	28.96	13.199		
6,400.0	6,392.4	6,412.7	6,391.2	14.1	15.8	-178.78	-429.4	151.9	382.4	353.1	29.25	13.072		
6,500.0	6,492.4	6,508.3	6,484.6	14.3	15.9	-85.82	-429.4	132.1	383.4	354.8	28.55	13.428		
6,600.0	6,592.0	6,600.0	6,571.3	14.5	16.0	-82.22	-429.4	102.3	386.1	357.2	28.91	13.354		
6,700.0	6,689.7	6,689.6	6,651.9	14.6	16.0	-78.81	-429.4	63.4	390.1	360.9	29.21	13.356		
6,800.0	6,783.9	6,776.9	6,725.6	14.8	16.1	-75.66	-429.4	16.6	395.2	365.7	29.47	13.410		
6,900.0	6,873.0	6,862.4	6,792.1	15.0	16.2	-72.80	-429.4	-37.0	400.9	371.2	29.73	13.484		
7,000.0	6,955.3	6,950.0	6,853.6	15.2	16.3	-70.18	-429.4	-99.3	406.9	376.8	30.10	13.518		
7,100.0	7,029.6	7,029.0	6,902.6	15.7	16.5	-68.07	-429.4	-161.2	412.8	382.2	30.64	13.471		
7,200.0	7,094.5	7,110.5	6,946.3	16.3	17.0	-66.21	-429.4	-230.1	418.4	386.9	31.50	13.282		
7,300.0	7,148.9	7,191.3	6,982.0	17.3	17.9	-64.70	-429.4	-302.4	423.3	390.5	32.78	12.914		
7,400.0	7,191.9	7,271.3	7,009.7	18.5	19.0	-63.54	-429.4	-377.5	427.3	392.7	34.55	12.367		
7,500.0	7,222.8	7,350.0	7,029.1	20.1	20.3	-62.73	-429.4	-453.7	430.2	393.4	36.82	11.683		
7,600.0	7,241.0	7,430.1	7,040.7	21.9	21.8	-62.25	-429.4	-532.9	432.0	392.4	39.63	10.901		
7,700.0	7,246.3	7,510.5	7,044.0	23.8	23.5	-62.11	-429.4	-613.2	432.5	389.7	42.86	10.093		
7,800.0	7,246.5	7,610.5	7,043.6	26.0	25.6	-62.04	-429.4	-713.2	432.8	386.2	46.61	9.286		
7,900.0	7,246.7	7,710.5	7,043.2	28.2	27.9	-61.98	-429.4	-813.2	433.1	382.5	50.56	8.565		
8,000.0	7,246.9	7,810.5	7,042.8	30.5	30.2	-61.91	-429.4	-913.2	433.4	378.7	54.68	7.925		
8,100.0	7,247.1	7,910.5	7,042.4	32.9	32.6	-61.84	-429.4	-1,013.2	433.6	374.7	58.93	7.358		
8,200.0	7,247.3	8,010.5	7,042.1	35.4	35.1	-61.77	-429.4	-1,113.2	433.9	370.6	63.28	6.857		
8,300.0	7,247.5	8,110.5	7,041.7	37.9	37.6	-61.71	-429.4	-1,213.2	434.2	366.5	67.70	6.413		
8,400.0	7,247.7	8,210.5	7,041.3	40.5	40.2	-61.64	-429.4	-1,313.2	434.4	362.3	72.19	6.018		
8,500.0	7,247.8	8,310.5	7,040.9	43.1	42.8	-61.57	-429.4	-1,413.2	434.7	358.0	76.73	5.665		
8,600.0	7,248.0	8,410.5	7,040.5	45.7	45.4	-61.51	-429.4	-1,513.2	435.0	353.7	81.32	5.349		
8,700.0	7,248.2	8,510.5	7,040.1	48.3	48.0	-61.44	-429.4	-1,613.2	435.3	349.3	85.93	5.065		
8,800.0	7,248.4	8,610.5	7,039.8	50.9	50.7	-61.37	-429.4	-1,713.2	435.6	345.0	90.58	4.809		
8,900.0	7,248.6	8,710.5	7,039.4	53.6	53.3	-61.31	-429.4	-1,813.2	435.8	340.6	95.24	4.576		
9,000.0	7,248.8	8,810.5	7,039.0	56.3	56.0	-61.24	-429.4	-1,913.2	436.1	336.2	99.93	4.364		
9,100.0	7,249.0	8,910.5	7,038.6	59.0	58.7	-61.18	-429.4	-2,013.2	436.4	331.8	104.63	4.171		
9,200.0	7,249.2	9,010.5	7,038.2	61.7	61.4	-61.11	-429.4	-2,113.2	436.7	327.3	109.35	3.993		
9,300.0	7,249.4	9,110.5	7,037.8	64.4	64.1	-61.04	-429.4	-2,213.2	436.9	322.9	114.07	3.830		
9,400.0	7,249.6	9,210.5	7,037.5	67.1	66.9	-60.98	-429.4	-2,313.2	437.2	318.4	118.80	3.680		
9,500.0	7,249.8	9,310.5	7,037.1	69.8	69.6	-60.91	-429.4	-2,413.2	437.5	314.0	123.54	3.541		
9,600.0	7,250.0	9,410.5	7,036.7	72.6	72.3	-60.85	-429.4	-2,513.2	437.8	309.5	128.29	3.413		
9,700.0	7,250.1	9,510.5	7,036.3	75.3	75.1	-60.78	-429.4	-2,613.1	438.1	305.0	133.04	3.293		
9,800.0	7,250.3	9,610.5	7,035.9	78.1	77.8	-60.71	-429.4	-2,713.1	438.3	300.6	137.79	3.181		
9,900.0	7,250.5	9,710.5	7,035.5	80.8	80.6	-60.65	-429.4	-2,813.1	438.6	296.1	142.54	3.077		

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 Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-214 - Wellbore #1 - Plan #3 (7-09-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	7,250.7	9,810.4	7,035.1	83.6	83.3	-60.58	-429.4	-2,913.1	438.9	291.6	147.30	2.980		
10,100.0	7,250.9	9,910.4	7,034.8	86.3	86.1	-60.52	-429.4	-3,013.1	439.2	287.1	152.05	2.888		
10,200.0	7,251.1	10,010.4	7,034.4	89.1	88.8	-60.45	-429.4	-3,113.1	439.5	282.7	156.81	2.803		
10,300.0	7,251.3	10,110.4	7,034.0	91.8	91.6	-60.39	-429.4	-3,213.1	439.8	278.2	161.56	2.722		
10,400.0	7,251.5	10,210.4	7,033.6	94.6	94.4	-60.32	-429.4	-3,313.1	440.1	273.7	166.32	2.646		
10,500.0	7,251.7	10,310.4	7,033.2	97.4	97.1	-60.26	-429.4	-3,413.1	440.3	269.3	171.07	2.574		
10,600.0	7,251.9	10,410.4	7,032.8	100.1	99.9	-60.19	-429.4	-3,513.1	440.6	264.8	175.82	2.506		
10,700.0	7,252.1	10,510.4	7,032.5	102.9	102.7	-60.13	-429.4	-3,613.1	440.9	260.3	180.57	2.442		
10,800.0	7,252.3	10,610.4	7,032.1	105.7	105.4	-60.06	-429.4	-3,713.1	441.2	255.9	185.32	2.381		
10,900.0	7,252.5	10,710.4	7,031.7	108.4	108.2	-60.00	-429.4	-3,813.1	441.5	251.4	190.06	2.323		
11,000.0	7,252.6	10,810.4	7,031.3	111.2	111.0	-59.93	-429.4	-3,913.1	441.8	247.0	194.80	2.268		
11,100.0	7,252.8	10,910.4	7,030.9	114.0	113.8	-59.87	-429.4	-4,013.1	442.1	242.5	199.54	2.215		
11,200.0	7,253.0	11,010.4	7,030.5	116.8	116.5	-59.80	-429.4	-4,113.1	442.4	238.1	204.27	2.166		
11,300.0	7,253.2	11,110.4	7,030.2	119.6	119.3	-59.74	-429.4	-4,213.1	442.7	233.6	209.00	2.118		
11,400.0	7,253.4	11,210.4	7,029.8	122.3	122.1	-59.68	-429.4	-4,313.1	442.9	229.2	213.73	2.072		
11,500.0	7,253.6	11,310.4	7,029.4	125.1	124.9	-59.61	-429.4	-4,413.1	443.2	224.8	218.45	2.029		
11,600.0	7,253.8	11,410.4	7,029.0	127.9	127.7	-59.55	-429.4	-4,513.1	443.5	220.4	223.17	1.987 SF		
11,700.0	7,254.0	11,411.6	7,029.0	129.7	127.7	-59.55	-429.4	-4,514.3	454.7	229.9	224.76	2.023		
11,705.9	7,254.0	11,411.6	7,029.0	129.8	127.7	-59.55	-429.4	-4,514.3	456.0	231.2	224.86	2.028		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-404 - Wellbore #1 - Plan #1 (6-20-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	180.00	180.00	-61.9	0.0	61.9				
100.0	100.0	100.0	100.0	0.1	0.1	180.00	180.00	-61.9	0.0	61.9	61.7	0.22	275.539	
200.0	200.0	200.0	200.0	0.3	0.3	180.00	180.00	-61.9	0.0	61.9	61.3	0.67	91.846	
300.0	300.0	300.0	300.0	0.6	0.6	180.00	180.00	-61.9	0.0	61.9	60.8	1.12	55.108	
400.0	400.0	400.0	400.0	0.8	0.8	180.00	180.00	-61.9	0.0	61.9	60.4	1.57	39.363	
500.0	500.0	500.0	500.0	1.0	1.0	180.00	180.00	-61.9	0.0	61.9	59.9	2.02	30.615	
600.0	600.0	600.0	600.0	1.2	1.2	180.00	180.00	-61.9	0.0	61.9	59.5	2.47	25.049 CC, ES	
700.0	700.0	697.9	697.9	1.5	1.4	179.63	179.63	-63.6	0.4	63.6	60.7	2.89	22.002	
800.0	800.0	795.6	795.4	1.7	1.6	178.62	178.62	-68.4	1.6	68.6	65.3	3.29	20.812	
900.0	900.0	892.8	892.3	1.9	1.8	177.24	177.24	-76.4	3.7	76.9	73.2	3.72	20.668	
1,000.0	1,000.0	989.4	988.2	2.1	2.0	175.75	175.75	-87.5	6.5	88.6	84.4	4.18	21.214	
1,100.0	1,100.0	1,087.6	1,085.4	2.4	2.3	174.37	174.37	-101.2	10.0	102.7	98.0	4.67	22.012	
1,200.0	1,200.0	1,186.5	1,183.3	2.6	2.6	173.31	173.31	-115.0	13.5	117.0	111.8	5.18	22.589	
1,300.0	1,300.0	1,285.5	1,281.2	2.8	2.9	172.48	172.48	-128.8	17.0	131.3	125.6	5.71	23.013	
1,400.0	1,400.0	1,384.4	1,379.1	3.0	3.2	171.82	171.82	-142.6	20.5	145.6	139.4	6.24	23.332	
1,500.0	1,500.0	1,483.4	1,477.0	3.3	3.5	171.27	171.27	-156.5	24.0	160.0	153.2	6.78	23.579	
1,600.0	1,600.0	1,582.3	1,575.0	3.5	3.9	170.81	170.81	-170.3	27.5	174.3	167.0	7.33	23.774	
1,700.0	1,700.0	1,681.3	1,672.9	3.7	4.2	170.43	170.43	-184.1	31.1	188.7	180.8	7.89	23.932	
1,800.0	1,800.0	1,780.2	1,770.8	3.9	4.5	170.09	170.09	-198.0	34.6	203.1	194.6	8.44	24.060	
1,900.0	1,900.0	1,879.2	1,868.7	4.2	4.9	169.80	169.80	-211.8	38.1	217.5	208.5	9.00	24.167	
2,000.0	2,000.0	1,978.2	1,966.6	4.4	5.2	169.55	169.55	-225.6	41.6	231.9	222.3	9.56	24.257	
2,100.0	2,100.0	2,077.1	2,064.6	4.6	5.6	169.33	169.33	-239.5	45.1	246.2	236.1	10.12	24.334	
2,200.0	2,200.0	2,176.1	2,162.5	4.8	5.9	169.13	169.13	-253.3	48.6	260.6	250.0	10.68	24.400	
2,300.0	2,300.0	2,275.0	2,260.4	5.1	6.3	168.95	168.95	-267.1	52.2	275.0	263.8	11.25	24.457	
2,400.0	2,400.0	2,374.0	2,358.3	5.3	6.6	168.79	168.79	-281.0	55.7	289.4	277.6	11.81	24.507	
2,500.0	2,500.0	2,472.9	2,456.2	5.5	6.9	168.65	168.65	-294.8	59.2	303.8	291.5	12.38	24.552	
2,600.0	2,600.0	2,572.0	2,554.3	5.7	7.3	62.15	62.15	-308.6	62.7	317.4	306.1	11.38	27.900	
2,700.0	2,699.8	2,671.2	2,652.4	5.9	7.6	62.62	62.62	-322.5	66.2	329.4	317.6	11.81	27.884	
2,800.0	2,799.5	2,770.4	2,750.6	6.1	8.0	63.61	63.61	-336.4	69.8	340.0	327.7	12.26	27.729	
2,900.0	2,899.0	2,869.6	2,848.8	6.3	8.3	64.83	64.83	-350.2	73.3	350.2	337.5	12.72	27.541	
3,000.0	2,998.5	2,968.8	2,946.9	6.5	8.7	65.99	65.99	-364.1	76.8	360.6	347.4	13.18	27.360	
3,100.0	3,098.1	3,068.0	3,045.1	6.8	9.1	67.08	67.08	-378.0	80.3	371.1	357.5	13.65	27.186	
3,200.0	3,197.6	3,167.2	3,143.3	7.0	9.4	68.10	68.10	-391.8	83.8	381.8	367.7	14.13	27.018	
3,300.0	3,297.1	3,266.4	3,241.4	7.2	9.8	69.08	69.08	-405.7	87.4	392.5	377.9	14.62	26.857	
3,400.0	3,396.7	3,365.6	3,339.6	7.4	10.1	70.00	70.00	-419.6	90.9	403.4	388.3	15.11	26.702	
3,500.0	3,496.2	3,464.8	3,437.8	7.7	10.5	70.87	70.87	-433.4	94.4	414.4	398.8	15.61	26.553	
3,600.0	3,595.7	3,564.0	3,535.9	7.9	10.8	71.70	71.70	-447.3	97.9	425.5	409.3	16.11	26.409	
3,700.0	3,695.3	3,663.2	3,634.1	8.2	11.2	72.48	72.48	-461.2	101.5	436.6	420.0	16.62	26.272	
3,800.0	3,794.8	3,762.4	3,732.3	8.4	11.5	73.23	73.23	-475.0	105.0	447.8	430.7	17.13	26.139	
3,900.0	3,894.3	3,861.6	3,830.4	8.7	11.9	73.94	73.94	-488.9	108.5	459.1	441.5	17.65	26.012	
4,000.0	3,993.9	3,960.8	3,928.6	8.9	12.2	74.62	74.62	-502.8	112.0	470.5	452.3	18.17	25.890	
4,100.0	4,093.4	4,060.0	4,026.8	9.2	12.6	75.26	75.26	-516.6	115.6	481.9	463.2	18.70	25.773	
4,200.0	4,193.0	4,159.2	4,124.9	9.4	12.9	75.87	75.87	-530.5	119.1	493.4	474.1	19.23	25.661	
4,300.0	4,292.6	4,258.5	4,223.1	9.7	13.3	76.53	76.53	-544.4	122.6	505.1	485.3	19.74	25.585	
4,400.0	4,392.4	4,357.7	4,321.3	9.9	13.7	76.88	76.88	-558.2	126.1	517.6	497.4	20.21	25.610	
4,500.0	4,492.4	4,456.7	4,419.3	10.1	14.0	76.88	76.88	-572.1	129.7	530.9	510.3	20.65	25.714	
4,600.0	4,592.4	4,555.7	4,517.2	10.3	14.4	-177.15	-177.15	-585.9	133.2	544.7	520.8	23.91	22.783	
4,700.0	4,692.4	4,654.7	4,615.2	10.5	14.7	-177.58	-177.58	-599.7	136.7	558.5	534.0	24.49	22.808	
4,800.0	4,792.4	4,753.6	4,713.1	10.7	15.1	-178.00	-178.00	-613.6	140.2	572.3	547.3	25.07	22.833	
4,900.0	4,892.4	4,852.6	4,811.0	10.9	15.4	-178.39	-178.39	-627.4	143.7	586.2	560.6	25.64	22.859	
5,000.0	4,992.4	4,951.5	4,908.9	11.1	15.8	-178.77	-178.77	-641.2	147.2	600.1	573.9	26.22	22.884	

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 Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-404 - Wellbore #1 - Plan #1 (6-20-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,092.4	5,050.5	5,006.8	11.3	16.1	-179.13		-655.1	150.8	614.0	587.2	26.80	22.909	
5,200.0	5,192.4	5,154.3	5,109.6	11.5	16.5	-179.49		-669.5	154.4	627.9	600.5	27.38	22.928	
5,300.0	5,292.4	5,280.7	5,235.2	11.8	16.8	-179.82		-683.5	158.0	639.0	611.0	27.92	22.886	
5,400.0	5,392.4	5,408.2	5,362.3	12.0	17.0	179.98		-692.2	160.2	645.8	617.4	28.38	22.754	
5,500.0	5,492.4	5,536.2	5,490.2	12.2	17.2	179.91		-695.4	161.0	648.3	619.5	28.79	22.514	
5,600.0	5,592.4	5,638.3	5,592.4	12.4	17.4	179.91		-695.4	161.0	648.3	619.1	29.15	22.239	
5,700.0	5,692.4	5,738.3	5,692.4	12.6	17.5	179.91		-695.4	161.0	648.3	618.8	29.49	21.980	
5,800.0	5,792.4	5,838.3	5,792.4	12.8	17.6	179.91		-695.4	161.0	648.3	618.4	29.84	21.725	
5,900.0	5,892.4	5,938.3	5,892.4	13.0	17.7	179.91		-695.4	161.0	648.3	618.1	30.19	21.475	
6,000.0	5,992.4	6,038.3	5,992.4	13.3	17.9	179.91		-695.4	161.0	648.3	617.7	30.54	21.229	
6,100.0	6,092.4	6,138.3	6,092.4	13.5	18.0	179.91		-695.4	161.0	648.3	617.4	30.89	20.986	
6,200.0	6,192.4	6,238.3	6,192.4	13.7	18.1	179.91		-695.4	161.0	648.3	617.0	31.24	20.749	
6,300.0	6,292.4	6,338.3	6,292.4	13.9	18.3	179.91		-695.4	161.0	648.3	616.7	31.60	20.515	
6,400.0	6,392.4	6,438.3	6,392.4	14.1	18.4	179.91		-695.4	161.0	648.3	616.3	31.96	20.285	
6,460.4	6,452.8	6,498.7	6,452.8	14.2	18.5	-90.11		-695.4	161.0	648.3	619.5	28.83	22.487	
6,500.0	6,492.4	6,538.3	6,492.4	14.3	18.5	-90.09		-695.4	161.0	648.3	619.3	28.99	22.365	
6,600.0	6,592.0	6,638.5	6,592.2	14.5	18.7	-90.14		-695.4	153.6	648.3	619.0	29.32	22.114	
6,700.0	6,689.7	6,738.7	6,690.3	14.6	18.8	-90.18		-695.4	133.3	648.3	618.7	29.59	21.913	
6,800.0	6,783.9	6,839.0	6,784.9	14.8	18.9	-90.22		-695.4	100.2	648.3	618.5	29.84	21.727	
6,900.0	6,873.0	6,939.4	6,874.4	15.0	18.9	-90.26		-695.4	55.1	648.3	618.1	30.15	21.503	
7,000.0	6,955.3	7,039.8	6,957.3	15.2	19.0	-90.29		-695.4	-1.5	648.3	617.7	30.63	21.163	
7,100.0	7,029.6	7,140.2	7,032.1	15.7	19.1	-90.31		-695.4	-68.4	648.3	616.9	31.43	20.626	
7,200.0	7,094.5	7,240.7	7,097.5	16.3	19.3	-90.34		-695.4	-144.6	648.3	615.6	32.69	19.833	
7,300.0	7,148.9	7,341.2	7,152.4	17.3	19.5	-90.35		-695.4	-228.7	648.3	613.8	34.52	18.780	
7,400.0	7,191.9	7,441.7	7,195.7	18.5	20.1	-90.36		-695.4	-319.4	648.3	611.3	36.98	17.531	
7,500.0	7,222.8	7,542.3	7,226.8	20.1	21.1	-90.36		-695.4	-414.9	648.3	608.3	40.04	16.190	
7,600.0	7,241.0	7,642.8	7,245.1	21.9	22.7	-90.36		-695.4	-513.7	648.3	604.7	43.62	14.863	
7,605.7	7,241.6	7,648.5	7,245.7	22.0	22.8	-90.36		-695.4	-519.4	648.3	604.5	43.84	14.789	
7,700.0	7,246.3	7,742.8	7,255.4	23.8	24.5	-90.81		-695.4	-613.1	648.3	600.8	47.55	13.635	
7,800.0	7,246.5	7,843.8	7,260.1	26.0	26.6	-91.20		-695.4	-713.9	648.4	596.6	51.78	12.523	
7,900.0	7,246.7	7,943.8	7,260.0	28.2	28.8	-91.17		-695.4	-814.0	648.4	592.2	56.26	11.525	
8,000.0	7,246.9	8,043.8	7,259.8	30.5	31.0	-91.14		-695.4	-914.0	648.4	587.5	60.92	10.644	
8,100.0	7,247.1	8,143.8	7,259.7	32.9	33.4	-91.11		-695.4	-1,014.0	648.4	582.7	65.72	9.866	
8,200.0	7,247.3	8,243.8	7,259.5	35.4	35.8	-91.08		-695.4	-1,114.0	648.4	577.8	70.65	9.178	
8,300.0	7,247.5	8,343.8	7,259.3	37.9	38.3	-91.05		-695.4	-1,214.0	648.4	572.7	75.67	8.569	
8,400.0	7,247.7	8,443.8	7,259.2	40.5	40.8	-91.02		-695.4	-1,314.0	648.4	567.6	80.77	8.028	
8,500.0	7,247.8	8,543.8	7,259.0	43.1	43.4	-90.99		-695.4	-1,414.0	648.4	562.4	85.93	7.545	
8,600.0	7,248.0	8,643.8	7,258.9	45.7	45.9	-90.96		-695.4	-1,514.0	648.4	557.2	91.15	7.113	
8,700.0	7,248.2	8,743.8	7,258.7	48.3	48.6	-90.93		-695.4	-1,614.0	648.4	552.0	96.41	6.725	
8,800.0	7,248.4	8,843.8	7,258.6	50.9	51.2	-90.90		-695.4	-1,714.0	648.4	546.6	101.71	6.374	
8,900.0	7,248.6	8,943.8	7,258.4	53.6	53.8	-90.86		-695.4	-1,814.0	648.4	541.3	107.05	6.057	
9,000.0	7,248.8	9,043.8	7,258.2	56.3	56.5	-90.83		-695.4	-1,914.0	648.4	535.9	112.41	5.768	
9,100.0	7,249.0	9,143.8	7,258.1	59.0	59.2	-90.80		-695.4	-2,014.0	648.3	530.6	117.79	5.504	
9,200.0	7,249.2	9,243.8	7,257.9	61.7	61.9	-90.77		-695.4	-2,114.0	648.3	525.1	123.19	5.263	
9,300.0	7,249.4	9,343.8	7,257.8	64.4	64.6	-90.74		-695.4	-2,214.0	648.3	519.7	128.62	5.041	
9,400.0	7,249.6	9,443.8	7,257.6	67.1	67.3	-90.71		-695.4	-2,314.0	648.3	514.3	134.05	4.836	
9,500.0	7,249.8	9,543.8	7,257.5	69.8	70.0	-90.68		-695.4	-2,414.0	648.3	508.8	139.51	4.647	
9,600.0	7,250.0	9,643.8	7,257.3	72.6	72.7	-90.65		-695.4	-2,514.0	648.3	503.4	144.97	4.472	
9,700.0	7,250.1	9,743.8	7,257.1	75.3	75.4	-90.62		-695.4	-2,614.0	648.3	497.9	150.45	4.309	
9,800.0	7,250.3	9,843.8	7,257.0	78.1	78.2	-90.59		-695.4	-2,714.0	648.3	492.4	155.93	4.158	
9,900.0	7,250.5	9,943.8	7,256.8	80.8	80.9	-90.56		-695.4	-2,814.0	648.3	486.9	161.43	4.016	

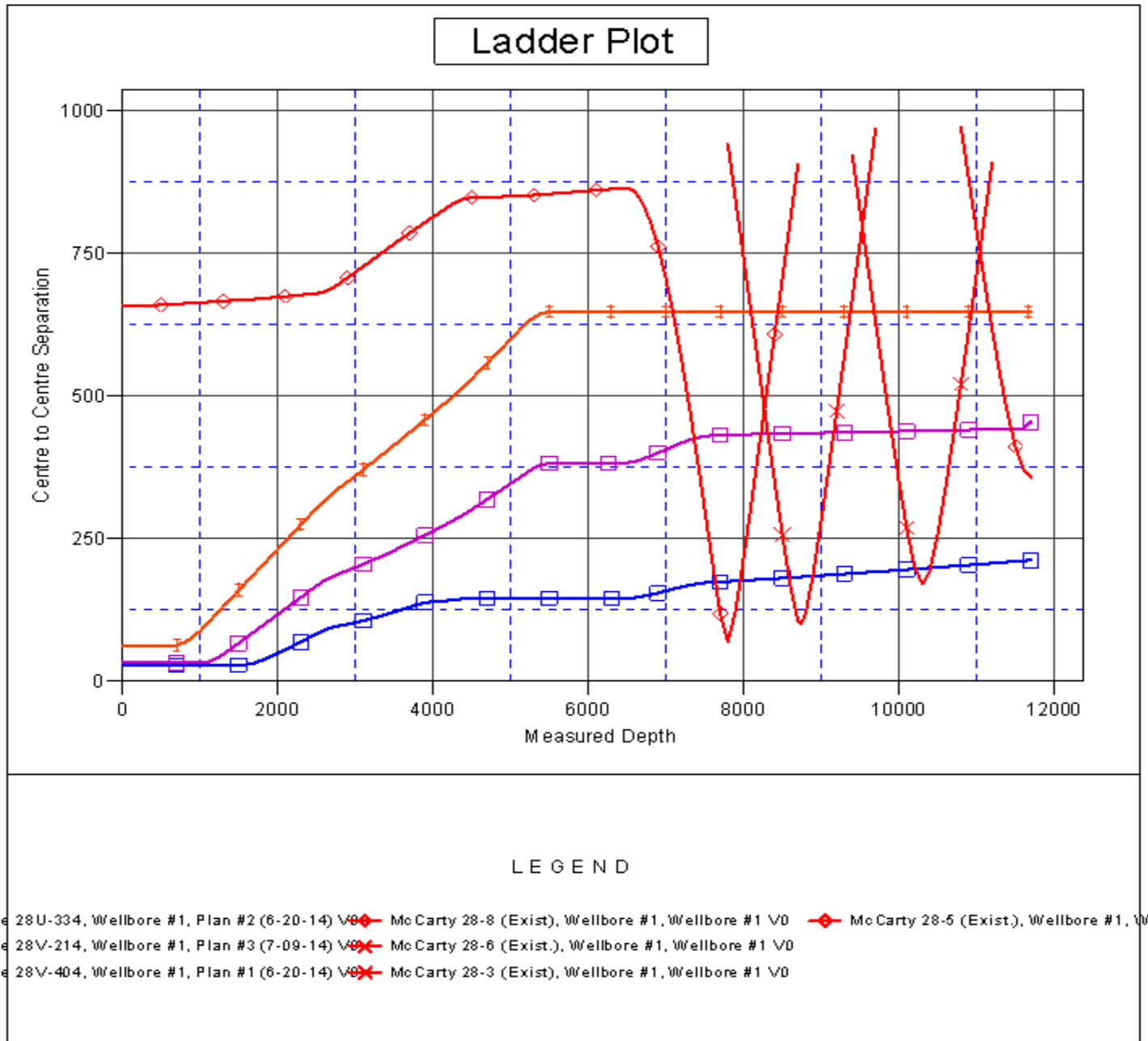
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-404 - Wellbore #1 - Plan #1 (6-20-14)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
10,000.0	7,250.7	10,043.8	7,256.7	83.6	83.6	-90.53	-695.4	-2,914.0	648.3	481.4	166.93	3.884		
10,100.0	7,250.9	10,143.8	7,256.5	86.3	86.4	-90.49	-695.4	-3,014.0	648.3	475.9	172.44	3.760		
10,200.0	7,251.1	10,243.8	7,256.4	89.1	89.1	-90.46	-695.4	-3,114.0	648.3	470.4	177.95	3.643		
10,300.0	7,251.3	10,343.8	7,256.2	91.8	91.9	-90.43	-695.4	-3,214.0	648.3	464.8	183.48	3.533		
10,400.0	7,251.5	10,443.8	7,256.0	94.6	94.6	-90.40	-695.4	-3,314.0	648.3	459.3	189.00	3.430		
10,500.0	7,251.7	10,543.8	7,255.9	97.4	97.4	-90.37	-695.4	-3,414.0	648.3	453.8	194.54	3.333		
10,600.0	7,251.9	10,643.8	7,255.7	100.1	100.2	-90.34	-695.4	-3,514.0	648.3	448.2	200.07	3.240		
10,700.0	7,252.1	10,743.8	7,255.6	102.9	102.9	-90.31	-695.4	-3,614.0	648.3	442.7	205.61	3.153		
10,800.0	7,252.3	10,843.8	7,255.4	105.7	105.7	-90.28	-695.4	-3,714.0	648.3	437.1	211.16	3.070		
10,900.0	7,252.5	10,943.8	7,255.3	108.4	108.5	-90.25	-695.4	-3,814.0	648.3	431.6	216.71	2.992		
11,000.0	7,252.6	11,043.8	7,255.1	111.2	111.2	-90.22	-695.4	-3,914.0	648.3	426.0	222.26	2.917		
11,100.0	7,252.8	11,143.8	7,254.9	114.0	114.0	-90.19	-695.4	-4,014.0	648.3	420.5	227.81	2.846		
11,200.0	7,253.0	11,243.8	7,254.8	116.8	116.8	-90.15	-695.4	-4,114.0	648.3	414.9	233.37	2.778		
11,300.0	7,253.2	11,343.8	7,254.6	119.6	119.6	-90.12	-695.4	-4,214.0	648.3	409.4	238.93	2.713		
11,400.0	7,253.4	11,443.8	7,254.5	122.3	122.3	-90.09	-695.4	-4,314.0	648.3	403.8	244.49	2.652		
11,500.0	7,253.6	11,543.8	7,254.3	125.1	125.1	-90.06	-695.4	-4,414.0	648.3	398.2	250.06	2.593		
11,600.0	7,253.8	11,643.8	7,254.2	127.9	127.9	-90.03	-695.4	-4,514.0	648.3	392.7	255.63	2.536		
11,670.9	7,253.9	11,714.6	7,254.0	129.2	129.9	-90.01	-695.4	-4,584.8	648.3	389.4	258.88	2.504		
11,700.0	7,254.0	11,741.4	7,254.0	129.7	130.6	-90.00	-695.4	-4,611.6	648.3	388.1	260.15	2.492		
11,705.9	7,254.0	11,741.4	7,254.0	129.8	130.6	-90.00	-695.4	-4,611.6	648.3	388.1	260.25	2.491 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28U-434	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 #3 (7-09-14)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4909.0ft (Ensign 32 RKB - 1 Coordinates are relative to: Sunmarke 28U-434
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.40°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28U-434
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (Ensign 32 RKB - 15')
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