

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Sunmarke 28W-414**

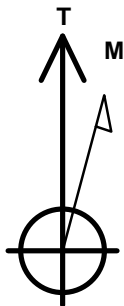
Surface Location: Sunmarke 28V-HZ Pad Sec.28-T4N-R67W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4908.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1347866.25	3171019.26	40.286670	-104.886970	
RKB - 15' WELL @ 4923.0ft (RKB - 15')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 1560'FNL, 211'FEL		0.0	0.0	Point
BHL 2193'FNL, 500'FWL	7281.0	-549.7	-4606.2	Point



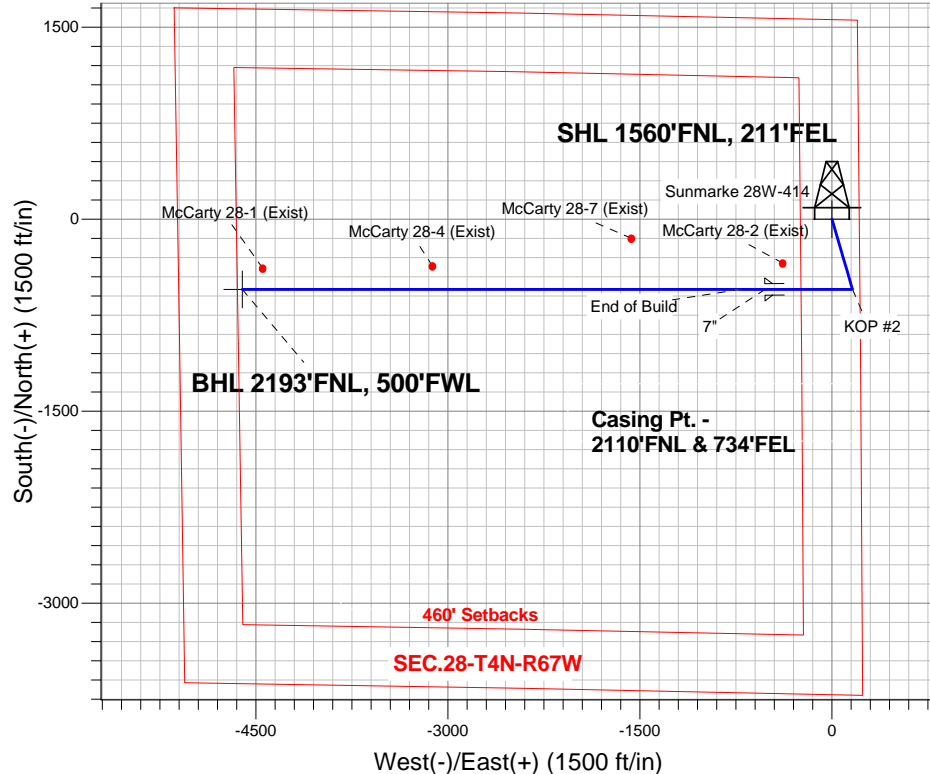
Azimuths to True North
Magnetic North: 8.59°

Magnetic Field
Strength: 52801.6snT
Dip Angle: 66.86°
Date: 11/21/2013
Model: IGRF2010

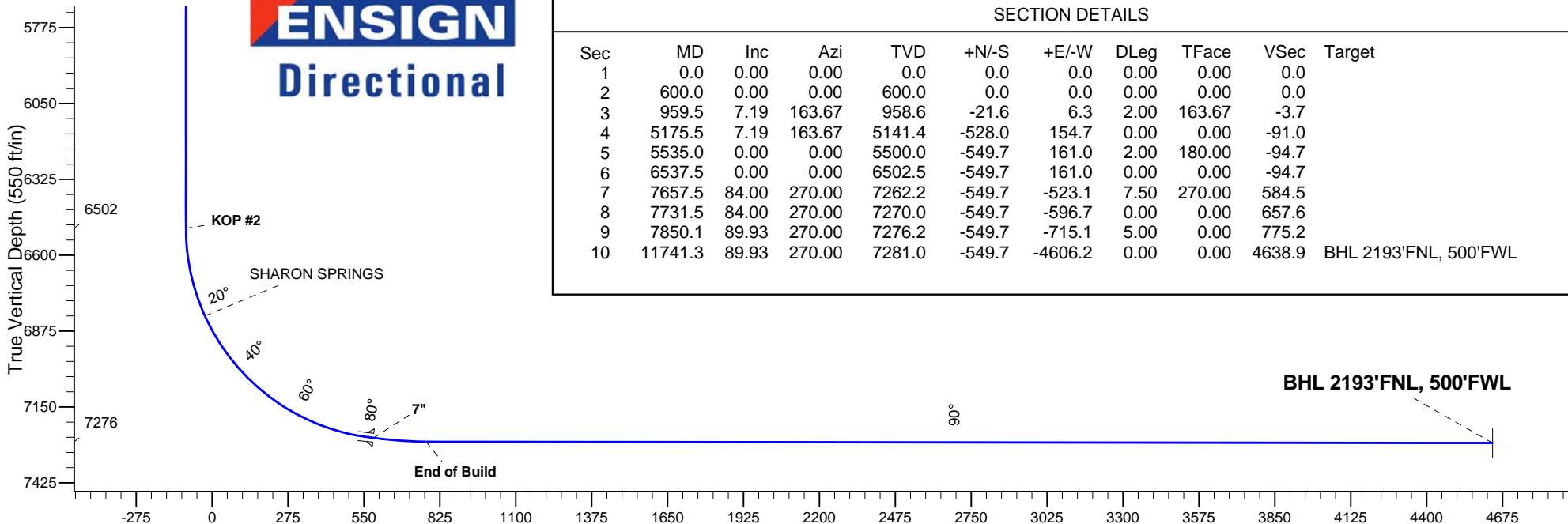
ANNOTATIONS

TVD	MD	Annotation
600.0	600.0	KOP #1
6502.5	6537.5	KOP #2
7276.2	7850.1	End of Build

Sunmarke 28V-HZ Pad Sec.28-T4N-R67W
Sunmarke 28W-414
Plan #1 (11-18-13)
11:41, November 21 2013



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	600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.0	
3	959.5	7.19	163.67	958.6	-21.6	6.3	2.00	163.67	-3.7	
4	5175.5	7.19	163.67	5141.4	-528.0	154.7	0.00	0.00	-91.0	
5	5535.0	0.00	0.00	5500.0	-549.7	161.0	2.00	180.00	-94.7	
6	6537.5	0.00	0.00	6502.5	-549.7	161.0	0.00	0.00	-94.7	
7	7657.5	84.00	270.00	7262.2	-549.7	-523.1	7.50	270.00	584.5	
8	7731.5	84.00	270.00	7270.0	-549.7	-596.7	0.00	0.00	657.6	
9	7850.1	89.93	270.00	7276.2	-549.7	-715.1	5.00	0.00	775.2	
10	11741.3	89.93	270.00	7281.0	-549.7	-4606.2	0.00	0.00	4638.9	BHL 2193'FNL, 500'FWL

Vertical Section at 263.20° (550 ft/in)



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.28-T4N-R67W

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

Sunmarke 28W-414

Wellbore #1

Plan: Plan #1 (11-18-13)

Standard Planning Report

21 November, 2013

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 28W-414
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28W-414	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-18-13)		

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 28V-HZ Pad Sec.28-T4N-R67W											
Site Position:						Northing:			1,347,957.33ft			Latitude:			40.286920		
From:			Lat/Long			Easting:			3,171,018.63ft			Longitude:			-104.886970		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.40 °		

Well	Sunmarke 28W-414					
Well Position	+N/-S	-91.1 ft	Northing:	1,347,866.25 ft	Latitude:	40.286670
	+E/-W	0.0 ft	Easting:	3,171,019.26 ft	Longitude:	-104.886970
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,908.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/21/2013	8.59	66.86	52,802

Design	Plan #1 (11-18-13)			
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	263.20

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	
600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.00	0.00	
959.5	7.19	163.67	958.6	-21.6	6.3	2.00	2.00	0.00	163.67	
5,175.5	7.19	163.67	5,141.4	-528.0	154.7	0.00	0.00	0.00	0.00	
5,535.0	0.00	0.00	5,500.0	-549.7	161.0	2.00	-2.00	0.00	180.00	
6,537.5	0.00	0.00	6,502.5	-549.7	161.0	0.00	0.00	0.00	0.00	
7,657.5	84.00	270.00	7,262.2	-549.7	-523.1	7.50	7.50	0.00	270.00	
7,731.5	84.00	270.00	7,270.0	-549.7	-596.7	0.00	0.00	0.00	0.00	
7,850.1	89.93	270.00	7,276.2	-549.7	-715.1	5.00	5.00	0.00	0.00	
11,741.3	89.93	270.00	7,281.0	-549.7	-4,606.2	0.00	0.00	0.00	0.00	BHL 2193'FNL, 500

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Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28W-414	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-18-13)		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
SHL 1560'FNL, 211'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
KOP #1									
700.0	2.00	163.67	700.0	-1.7	0.5	-0.3	2.00	2.00	0.00
800.0	4.00	163.67	799.8	-6.7	2.0	-1.2	2.00	2.00	0.00
900.0	6.00	163.67	899.5	-15.1	4.4	-2.6	2.00	2.00	0.00
959.5	7.19	163.67	958.6	-21.6	6.3	-3.7	2.00	2.00	0.00
1,000.0	7.19	163.67	998.7	-26.5	7.8	-4.6	0.00	0.00	0.00
1,100.0	7.19	163.67	1,098.0	-38.5	11.3	-6.6	0.00	0.00	0.00
1,200.0	7.19	163.67	1,197.2	-50.5	14.8	-8.7	0.00	0.00	0.00
1,300.0	7.19	163.67	1,296.4	-62.5	18.3	-10.8	0.00	0.00	0.00
1,400.0	7.19	163.67	1,395.6	-74.5	21.8	-12.8	0.00	0.00	0.00
1,500.0	7.19	163.67	1,494.8	-86.5	25.3	-14.9	0.00	0.00	0.00
1,600.0	7.19	163.67	1,594.0	-98.6	28.9	-17.0	0.00	0.00	0.00
1,700.0	7.19	163.67	1,693.2	-110.6	32.4	-19.1	0.00	0.00	0.00
1,800.0	7.19	163.67	1,792.4	-122.6	35.9	-21.1	0.00	0.00	0.00
1,900.0	7.19	163.67	1,891.7	-134.6	39.4	-23.2	0.00	0.00	0.00
2,000.0	7.19	163.67	1,990.9	-146.6	42.9	-25.3	0.00	0.00	0.00
2,100.0	7.19	163.67	2,090.1	-158.6	46.5	-27.3	0.00	0.00	0.00
2,200.0	7.19	163.67	2,189.3	-170.6	50.0	-29.4	0.00	0.00	0.00
2,300.0	7.19	163.67	2,288.5	-182.6	53.5	-31.5	0.00	0.00	0.00
2,400.0	7.19	163.67	2,387.7	-194.6	57.0	-33.5	0.00	0.00	0.00
2,500.0	7.19	163.67	2,486.9	-206.7	60.5	-35.6	0.00	0.00	0.00
2,600.0	7.19	163.67	2,586.2	-218.7	64.1	-37.7	0.00	0.00	0.00
2,700.0	7.19	163.67	2,685.4	-230.7	67.6	-39.8	0.00	0.00	0.00
2,800.0	7.19	163.67	2,784.6	-242.7	71.1	-41.8	0.00	0.00	0.00
2,900.0	7.19	163.67	2,883.8	-254.7	74.6	-43.9	0.00	0.00	0.00
3,000.0	7.19	163.67	2,983.0	-266.7	78.1	-46.0	0.00	0.00	0.00
3,100.0	7.19	163.67	3,082.2	-278.7	81.6	-48.0	0.00	0.00	0.00
3,200.0	7.19	163.67	3,181.4	-290.7	85.2	-50.1	0.00	0.00	0.00
3,300.0	7.19	163.67	3,280.7	-302.8	88.7	-52.2	0.00	0.00	0.00
3,400.0	7.19	163.67	3,379.9	-314.8	92.2	-54.3	0.00	0.00	0.00
3,500.0	7.19	163.67	3,479.1	-326.8	95.7	-56.3	0.00	0.00	0.00
3,600.0	7.19	163.67	3,578.3	-338.8	99.2	-58.4	0.00	0.00	0.00
3,662.2	7.19	163.67	3,640.0	-346.3	101.4	-59.7	0.00	0.00	0.00
PARKMAN									
3,700.0	7.19	163.67	3,677.5	-350.8	102.8	-60.5	0.00	0.00	0.00
3,800.0	7.19	163.67	3,776.7	-362.8	106.3	-62.5	0.00	0.00	0.00
3,900.0	7.19	163.67	3,875.9	-374.8	109.8	-64.6	0.00	0.00	0.00
4,000.0	7.19	163.67	3,975.1	-386.8	113.3	-66.7	0.00	0.00	0.00
4,100.0	7.19	163.67	4,074.4	-398.9	116.8	-68.7	0.00	0.00	0.00
4,176.2	7.19	163.67	4,150.0	-408.0	119.5	-70.3	0.00	0.00	0.00
SUSSEX									
4,200.0	7.19	163.67	4,173.6	-410.9	120.3	-70.8	0.00	0.00	0.00
4,300.0	7.19	163.67	4,272.8	-422.9	123.9	-72.9	0.00	0.00	0.00
4,400.0	7.19	163.67	4,372.0	-434.9	127.4	-75.0	0.00	0.00	0.00

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Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28W-414	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-18-13)		

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)
4,500.0	7.19	163.67	4,471.2	-446.9	130.9	-77.0	0.00	0.00	0.00
4,600.0	7.19	163.67	4,570.4	-458.9	134.4	-79.1	0.00	0.00	0.00
4,693.3	7.19	163.67	4,663.0	-470.1	137.7	-81.0	0.00	0.00	0.00
SHANNON									
4,700.0	7.19	163.67	4,669.6	-470.9	137.9	-81.2	0.00	0.00	0.00
4,800.0	7.19	163.67	4,768.9	-482.9	141.5	-83.2	0.00	0.00	0.00
4,900.0	7.19	163.67	4,868.1	-494.9	145.0	-85.3	0.00	0.00	0.00
5,000.0	7.19	163.67	4,967.3	-507.0	148.5	-87.4	0.00	0.00	0.00
5,100.0	7.19	163.67	5,066.5	-519.0	152.0	-89.4	0.00	0.00	0.00
5,175.5	7.19	163.67	5,141.4	-528.0	154.7	-91.0	0.00	0.00	0.00
5,200.0	6.70	163.67	5,165.7	-530.9	155.5	-91.5	2.00	-2.00	0.00
5,300.0	4.70	163.67	5,265.2	-540.4	158.3	-93.1	2.00	-2.00	0.00
5,400.0	2.70	163.67	5,365.0	-546.6	160.1	-94.2	2.00	-2.00	0.00
5,500.0	0.70	163.67	5,465.0	-549.5	160.9	-94.7	2.00	-2.00	0.00
5,535.0	0.00	0.00	5,500.0	-549.7	161.0	-94.7	2.00	-2.00	0.00
5,600.0	0.00	0.00	5,565.0	-549.7	161.0	-94.7	0.00	0.00	0.00
5,700.0	0.00	0.00	5,665.0	-549.7	161.0	-94.7	0.00	0.00	0.00
5,800.0	0.00	0.00	5,765.0	-549.7	161.0	-94.7	0.00	0.00	0.00
5,900.0	0.00	0.00	5,865.0	-549.7	161.0	-94.7	0.00	0.00	0.00
6,000.0	0.00	0.00	5,965.0	-549.7	161.0	-94.7	0.00	0.00	0.00
6,100.0	0.00	0.00	6,065.0	-549.7	161.0	-94.7	0.00	0.00	0.00
6,200.0	0.00	0.00	6,165.0	-549.7	161.0	-94.7	0.00	0.00	0.00
6,300.0	0.00	0.00	6,265.0	-549.7	161.0	-94.7	0.00	0.00	0.00
6,400.0	0.00	0.00	6,365.0	-549.7	161.0	-94.7	0.00	0.00	0.00
6,500.0	0.00	0.00	6,465.0	-549.7	161.0	-94.7	0.00	0.00	0.00
6,537.5	0.00	0.00	6,502.5	-549.7	161.0	-94.7	0.00	0.00	0.00
KOP #2									
6,600.0	4.69	270.00	6,564.9	-549.7	158.4	-92.2	7.50	7.50	0.00
6,700.0	12.19	270.00	6,663.7	-549.7	143.8	-77.6	7.50	7.50	0.00
6,800.0	19.69	270.00	6,759.8	-549.7	116.3	-50.4	7.50	7.50	0.00
6,865.0	24.56	270.00	6,820.0	-549.7	91.9	-26.1	7.50	7.50	0.00
SHARON SPRINGS									
6,900.0	27.19	270.00	6,851.5	-549.7	76.6	-10.9	7.50	7.50	0.00
7,000.0	34.69	270.00	6,937.2	-549.7	25.2	40.1	7.50	7.50	0.00
7,100.0	42.19	270.00	7,015.5	-549.7	-36.9	101.8	7.50	7.50	0.00
7,200.0	49.69	270.00	7,085.0	-549.7	-108.7	173.1	7.50	7.50	0.00
7,300.0	57.19	270.00	7,144.5	-549.7	-189.0	252.8	7.50	7.50	0.00
7,400.0	64.69	270.00	7,193.1	-549.7	-276.3	339.5	7.50	7.50	0.00
7,500.0	72.19	270.00	7,229.8	-549.7	-369.2	431.8	7.50	7.50	0.00
7,600.0	79.69	270.00	7,254.1	-549.7	-466.2	528.0	7.50	7.50	0.00
7,657.5	84.00	270.00	7,262.2	-549.7	-523.1	584.5	7.50	7.50	0.00
7"									
7,700.0	84.00	270.00	7,266.7	-549.7	-565.3	626.5	0.00	0.00	0.00
7,731.5	84.00	270.00	7,270.0	-549.7	-596.7	657.6	0.00	0.00	0.00
7,800.0	87.42	270.00	7,275.1	-549.7	-665.0	725.4	5.00	5.00	0.00
7,850.1	89.93	270.00	7,276.2	-549.7	-715.0	775.1	5.00	5.00	0.00
End of Build									
7,900.0	89.93	270.00	7,276.3	-549.7	-764.9	824.7	0.00	0.00	0.00
8,000.0	89.93	270.00	7,276.4	-549.7	-864.9	924.0	0.00	0.00	0.00
8,100.0	89.93	270.00	7,276.6	-549.7	-964.9	1,023.3	0.00	0.00	0.00
8,200.0	89.93	270.00	7,276.7	-549.7	-1,064.9	1,122.6	0.00	0.00	0.00
8,300.0	89.93	270.00	7,276.8	-549.7	-1,164.9	1,221.9	0.00	0.00	0.00

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Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28W-414	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-18-13)		

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)
8,400.0	89.93	270.00	7,276.9	-549.7	-1,264.9	1,321.2	0.00	0.00	0.00
8,500.0	89.93	270.00	7,277.0	-549.7	-1,364.9	1,420.5	0.00	0.00	0.00
8,600.0	89.93	270.00	7,277.2	-549.7	-1,464.9	1,519.8	0.00	0.00	0.00
8,700.0	89.93	270.00	7,277.3	-549.7	-1,564.9	1,619.1	0.00	0.00	0.00
8,800.0	89.93	270.00	7,277.4	-549.7	-1,664.9	1,718.3	0.00	0.00	0.00
8,900.0	89.93	270.00	7,277.5	-549.7	-1,764.9	1,817.6	0.00	0.00	0.00
9,000.0	89.93	270.00	7,277.7	-549.7	-1,864.9	1,916.9	0.00	0.00	0.00
9,100.0	89.93	270.00	7,277.8	-549.7	-1,964.9	2,016.2	0.00	0.00	0.00
9,200.0	89.93	270.00	7,277.9	-549.7	-2,064.9	2,115.5	0.00	0.00	0.00
9,300.0	89.93	270.00	7,278.0	-549.7	-2,164.9	2,214.8	0.00	0.00	0.00
9,400.0	89.93	270.00	7,278.1	-549.7	-2,264.9	2,314.1	0.00	0.00	0.00
9,500.0	89.93	270.00	7,278.3	-549.7	-2,364.9	2,413.4	0.00	0.00	0.00
9,600.0	89.93	270.00	7,278.4	-549.7	-2,464.9	2,512.7	0.00	0.00	0.00
9,700.0	89.93	270.00	7,278.5	-549.7	-2,564.9	2,612.0	0.00	0.00	0.00
9,800.0	89.93	270.00	7,278.6	-549.7	-2,664.9	2,711.3	0.00	0.00	0.00
9,900.0	89.93	270.00	7,278.8	-549.7	-2,764.9	2,810.6	0.00	0.00	0.00
10,000.0	89.93	270.00	7,278.9	-549.7	-2,864.9	2,909.9	0.00	0.00	0.00
10,100.0	89.93	270.00	7,279.0	-549.7	-2,964.9	3,009.2	0.00	0.00	0.00
10,200.0	89.93	270.00	7,279.1	-549.7	-3,064.9	3,108.5	0.00	0.00	0.00
10,300.0	89.93	270.00	7,279.2	-549.7	-3,164.9	3,207.8	0.00	0.00	0.00
10,400.0	89.93	270.00	7,279.4	-549.7	-3,264.9	3,307.1	0.00	0.00	0.00
10,500.0	89.93	270.00	7,279.5	-549.7	-3,364.9	3,406.4	0.00	0.00	0.00
10,600.0	89.93	270.00	7,279.6	-549.7	-3,464.9	3,505.7	0.00	0.00	0.00
10,700.0	89.93	270.00	7,279.7	-549.7	-3,564.9	3,605.0	0.00	0.00	0.00
10,800.0	89.93	270.00	7,279.9	-549.7	-3,664.9	3,704.3	0.00	0.00	0.00
10,900.0	89.93	270.00	7,280.0	-549.7	-3,764.9	3,803.6	0.00	0.00	0.00
11,000.0	89.93	270.00	7,280.1	-549.7	-3,864.9	3,902.8	0.00	0.00	0.00
11,100.0	89.93	270.00	7,280.2	-549.7	-3,964.9	4,002.1	0.00	0.00	0.00
11,200.0	89.93	270.00	7,280.3	-549.7	-4,064.9	4,101.4	0.00	0.00	0.00
11,300.0	89.93	270.00	7,280.5	-549.7	-4,164.9	4,200.7	0.00	0.00	0.00
11,400.0	89.93	270.00	7,280.6	-549.7	-4,264.9	4,300.0	0.00	0.00	0.00
11,500.0	89.93	270.00	7,280.7	-549.7	-4,364.9	4,399.3	0.00	0.00	0.00
11,600.0	89.93	270.00	7,280.8	-549.7	-4,464.9	4,498.6	0.00	0.00	0.00
11,700.0	89.93	270.00	7,280.9	-549.7	-4,564.9	4,597.9	0.00	0.00	0.00
11,741.3	89.93	270.00	7,281.0	-549.7	-4,606.2	4,638.9	0.00	0.00	0.00
BHL 2193'FNL, 500'FWL									

Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
BHL 2193'FNL, 500'F ¹ - hit/miss target - Shape - Point	0.00	0.00	7,281.0	-549.7	-4,606.2	1,347,284.79	3,166,417.17	40.285160	-104.903480
SHL 1560'FNL, 211'F ¹ - plan hits target center - Point	0.00	0.00	1.0	0.0	0.0	1,347,866.26	3,171,019.26	40.286670	-104.886970

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 28W-414
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28W-414	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (11-18-13)		

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
7,657.5	7,262.2	7"	7	7-1/2	

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,662.2	3,640.0	PARKMAN			
4,176.2	4,150.0	SUSSEX			
4,693.3	4,663.0	SHANNON			
6,865.0	6,820.0	SHARON SPRINGS			

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
600.0	600.0	0.0	0.0	KOP #1	
6,537.5	6,502.5	-549.7	161.0	KOP #2	
7,850.1	7,276.2	-549.7	-715.0	End of Build	



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.28-T4N-R67W

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

Sunmarke 28W-414

Wellbore #1

Plan #1 (11-18-13)

Anticollision Report

21 November, 2013



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (11-18-13)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date	11/21/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,741.3	Plan #1 (11-18-13) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Existing wells - Sec.28-T4N-R67W						
McCarty 28-1 (Exist) - Wellbore #1 - Wellbore #1	11,582.2	7,345.8	167.5	-105.2	0.614	Level 1, CC, ES, SF
McCarty 28-2 (Exist) - Wellbore #1 - Wellbore #1	7,516.5	7,228.7	207.2	43.2	1.264	Level 3, CC, ES, SF
McCarty 28-4 (Exist) - Wellbore #1 - Wellbore #1	10,257.0	7,326.2	185.6	-50.1	0.787	Level 1, CC, ES, SF
McCarty 28-7 (Exist) - Wellbore #1 - Wellbore #1	8,703.0	7,280.3	400.3	207.8	2.080	CC, ES, SF
Sunmarke 28V-HZ Pad Sec.28-T4N-R67W						
Sunmarke 28V-234 - Wellbore #1 - Plan #1 (11-18-13)	600.0	599.0	29.1	26.7	11.798	CC, ES
Sunmarke 28V-234 - Wellbore #1 - Plan #1 (11-18-13)	11,741.3	11,511.0	361.2	152.5	1.731	SF
Sunmarke 28V-304 - Wellbore #1 - Plan #1 (11-18-13)	600.0	598.0	91.1	88.6	36.902	CC, ES
Sunmarke 28V-304 - Wellbore #1 - Plan #1 (11-18-13)	11,741.3	11,607.4	826.7	570.3	3.224	SF
Sunmarke 28V-434 - Wellbore #1 - Plan #1 (11-18-13)	600.0	598.0	61.9	59.5	25.095	CC, ES
Sunmarke 28V-434 - Wellbore #1 - Plan #1 (11-18-13)	11,741.3	11,709.8	546.5	286.1	2.098	SF

Offset Design												
Existing wells - Sec.28-T4N-R67W - McCarty 28-1 (Exist) - Wellbore #1 - Wellbore #1												
Survey Program: 7600-UNKNOWN												
Offset Site Error: 0.0 ft												
Offset Well Error: 0.0 ft												
Reference Measured Depth (ft)	Vertical Depth (ft)	Offset Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor
10,600.0	7,279.6	7,344.6	7,344.6	98.7	146.9	89.59	-382.1	-4,447.1	996.4	750.9	245.46	4.059
10,700.0	7,279.7	7,344.7	7,344.7	101.5	146.9	89.63	-382.1	-4,447.1	898.0	649.7	248.24	3.617
10,800.0	7,279.9	7,344.9	7,344.9	104.3	146.9	89.67	-382.1	-4,447.1	799.9	548.9	251.01	3.187
10,900.0	7,280.0	7,345.0	7,345.0	107.0	146.9	89.71	-382.1	-4,447.1	702.5	448.7	253.79	2.768
11,000.0	7,280.1	7,345.1	7,345.1	109.8	146.9	89.76	-382.1	-4,447.1	605.8	349.3	256.57	2.361
11,100.0	7,280.2	7,345.2	7,345.2	112.6	146.9	89.80	-382.1	-4,447.1	510.5	251.1	259.35	1.968
11,200.0	7,280.3	7,345.3	7,345.3	115.4	146.9	89.84	-382.1	-4,447.1	417.3	155.2	262.13	1.592
11,300.0	7,280.5	7,345.5	7,345.5	118.1	146.9	89.88	-382.1	-4,447.1	328.2	63.3	264.91	1.239 Level 2
11,400.0	7,280.6	7,345.6	7,345.6	120.9	146.9	89.92	-382.1	-4,447.1	247.5	-20.2	267.70	0.925 Level 1
11,500.0	7,280.7	7,345.7	7,345.7	123.7	146.9	89.97	-382.1	-4,447.1	186.6	-83.9	270.48	0.690 Level 1
11,582.2	7,280.8	7,345.8	7,345.8	126.0	146.9	90.00	-382.1	-4,447.1	167.5	-105.2	272.77	0.614 Level 1, CC, ES, SF
11,600.0	7,280.8	7,345.8	7,345.8	126.5	146.9	90.01	-382.1	-4,447.1	168.5	-104.8	273.27	0.617 Level 1
11,700.0	7,280.9	7,345.9	7,345.9	129.3	146.9	90.05	-382.1	-4,447.1	204.8	-71.2	276.05	0.742 Level 1
11,741.3	7,281.0	7,346.0	7,346.0	130.4	146.9	90.07	-382.1	-4,447.1	231.0	-46.2	277.20	0.833 Level 1

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 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Existing wells - Sec.28-T4N-R67W - McCarty 28-2 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7600-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-131.65	-131.65	-342.4	-385.0	515.3				
100.0	100.0	94.0	94.0	0.1	1.9	-131.65	-131.65	-342.4	-385.0	515.3	513.3	1.99	258.593	
200.0	200.0	194.0	194.0	0.3	3.9	-131.65	-131.65	-342.4	-385.0	515.3	511.0	4.22	122.178	
300.0	300.0	294.0	294.0	0.6	5.9	-131.65	-131.65	-342.4	-385.0	515.3	508.8	6.44	79.984	
400.0	400.0	394.0	394.0	0.8	7.9	-131.65	-131.65	-342.4	-385.0	515.3	506.6	8.67	59.452	
500.0	500.0	494.0	494.0	1.0	9.9	-131.65	-131.65	-342.4	-385.0	515.3	504.4	10.89	47.308	
600.0	600.0	594.0	594.0	1.2	11.9	-131.65	-131.65	-342.4	-385.0	515.3	502.2	13.12	39.284	
700.0	700.0	694.0	694.0	1.4	13.9	64.86	64.86	-342.4	-385.0	514.5	499.2	15.31	33.602	
800.0	799.8	793.8	793.8	1.6	15.9	65.43	65.43	-342.4	-385.0	512.3	494.8	17.49	29.295	
900.0	899.5	893.5	893.5	1.8	17.9	66.39	66.39	-342.4	-385.0	508.8	489.1	19.68	25.855	
959.5	958.6	952.6	952.6	2.0	19.1	67.14	67.14	-342.4	-385.0	506.0	485.1	20.99	24.110	
1,000.0	998.7	992.7	992.7	2.1	19.9	67.67	67.67	-342.4	-385.0	504.1	482.2	21.89	23.027	
1,100.0	1,098.0	1,092.0	1,092.0	2.3	21.8	68.99	68.99	-342.4	-385.0	499.4	475.3	24.13	20.694	
1,200.0	1,197.2	1,191.2	1,191.2	2.6	23.8	70.33	70.33	-342.4	-385.0	495.0	468.7	26.39	18.757	
1,300.0	1,296.4	1,290.4	1,290.4	2.9	25.8	71.70	71.70	-342.4	-385.0	490.9	462.3	28.66	17.127	
1,400.0	1,395.6	1,389.6	1,389.6	3.2	27.8	73.09	73.09	-342.4	-385.0	487.1	456.2	30.95	15.741	
1,500.0	1,494.8	1,488.8	1,488.8	3.5	29.8	74.49	74.49	-342.4	-385.0	483.6	450.4	33.24	14.551	
1,600.0	1,594.0	1,588.0	1,588.0	3.8	31.8	75.92	75.92	-342.4	-385.0	480.4	444.9	35.53	13.521	
1,700.0	1,693.2	1,687.2	1,687.2	4.1	33.7	77.37	77.37	-342.4	-385.0	477.5	439.6	37.83	12.621	
1,800.0	1,792.4	1,786.4	1,786.4	4.4	35.7	78.83	78.83	-342.4	-385.0	474.9	434.7	40.14	11.832	
1,900.0	1,891.7	1,885.7	1,885.7	4.8	37.7	80.31	80.31	-342.4	-385.0	472.6	430.2	42.44	11.135	
2,000.0	1,990.9	1,984.9	1,984.9	5.1	39.7	81.80	81.80	-342.4	-385.0	470.6	425.9	44.75	10.516	
2,100.0	2,090.1	2,084.1	2,084.1	5.4	41.7	83.30	83.30	-342.4	-385.0	469.0	421.9	47.06	9.965	
2,200.0	2,189.3	2,183.3	2,183.3	5.7	43.7	84.81	84.81	-342.4	-385.0	467.7	418.3	49.38	9.472	
2,300.0	2,288.5	2,282.5	2,282.5	6.0	45.7	86.33	86.33	-342.4	-385.0	466.7	415.0	51.69	9.029	
2,400.0	2,387.7	2,381.7	2,381.7	6.4	47.6	87.85	87.85	-342.4	-385.0	466.1	412.1	54.00	8.631	
2,500.0	2,486.9	2,480.9	2,480.9	6.7	49.6	89.38	89.38	-342.4	-385.0	465.8	409.5	56.31	8.271	
2,540.5	2,527.1	2,521.1	2,521.1	6.8	50.4	90.00	90.00	-342.4	-385.0	465.7	408.5	57.25	8.136	
2,600.0	2,586.2	2,580.2	2,580.2	7.0	51.6	90.91	90.91	-342.4	-385.0	465.8	407.2	58.62	7.946	
2,700.0	2,685.4	2,679.4	2,679.4	7.3	53.6	92.44	92.44	-342.4	-385.0	466.2	405.2	60.93	7.651	
2,800.0	2,784.6	2,778.6	2,778.6	7.7	55.6	93.96	93.96	-342.4	-385.0	466.9	403.6	63.24	7.383	
2,900.0	2,883.8	2,877.8	2,877.8	8.0	57.6	95.48	95.48	-342.4	-385.0	467.9	402.4	65.54	7.139	
3,000.0	2,983.0	2,977.0	2,977.0	8.3	59.5	96.99	96.99	-342.4	-385.0	469.3	401.4	67.84	6.917	
3,100.0	3,082.2	3,076.2	3,076.2	8.7	61.5	98.49	98.49	-342.4	-385.0	471.0	400.8	70.14	6.715	
3,200.0	3,181.4	3,175.4	3,175.4	9.0	63.5	99.97	99.97	-342.4	-385.0	473.0	400.6	72.43	6.530	
3,300.0	3,280.7	3,274.7	3,274.7	9.3	65.5	101.45	101.45	-342.4	-385.0	475.3	400.6	74.72	6.361	
3,400.0	3,379.9	3,373.9	3,373.9	9.6	67.5	102.91	102.91	-342.4	-385.0	478.0	401.0	77.01	6.207	
3,500.0	3,479.1	3,473.1	3,473.1	10.0	69.5	104.35	104.35	-342.4	-385.0	481.0	401.7	79.29	6.066	
3,600.0	3,578.3	3,572.3	3,572.3	10.3	71.4	105.77	105.77	-342.4	-385.0	484.3	402.7	81.57	5.937	
3,700.0	3,677.5	3,671.5	3,671.5	10.6	73.4	107.18	107.18	-342.4	-385.0	487.8	404.0	83.84	5.819	
3,800.0	3,776.7	3,770.7	3,770.7	11.0	75.4	108.56	108.56	-342.4	-385.0	491.7	405.6	86.11	5.710	
3,900.0	3,875.9	3,869.9	3,869.9	11.3	77.4	109.92	109.92	-342.4	-385.0	495.9	407.5	88.37	5.611	
4,000.0	3,975.1	3,969.1	3,969.1	11.6	79.4	111.26	111.26	-342.4	-385.0	500.3	409.7	90.63	5.520	
4,100.0	4,074.4	4,068.4	4,068.4	11.9	81.4	112.58	112.58	-342.4	-385.0	505.0	412.1	92.89	5.437	
4,200.0	4,173.6	4,167.6	4,167.6	12.3	83.4	113.87	113.87	-342.4	-385.0	510.0	414.8	95.14	5.360	
4,300.0	4,272.8	4,266.8	4,266.8	12.6	85.3	115.13	115.13	-342.4	-385.0	515.2	417.8	97.38	5.290	
4,400.0	4,372.0	4,366.0	4,366.0	12.9	87.3	116.37	116.37	-342.4	-385.0	520.7	421.0	99.62	5.226	
4,500.0	4,471.2	4,465.2	4,465.2	13.3	89.3	117.59	117.59	-342.4	-385.0	526.4	424.5	101.86	5.168	
4,600.0	4,570.4	4,564.4	4,564.4	13.6	91.3	118.77	118.77	-342.4	-385.0	532.3	428.2	104.10	5.114	
4,700.0	4,669.6	4,663.6	4,663.6	13.9	93.3	119.93	119.93	-342.4	-385.0	538.5	432.2	106.33	5.065	
4,800.0	4,768.9	4,762.9	4,762.9	14.3	95.3	121.07	121.07	-342.4	-385.0	544.9	436.3	108.55	5.020	

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 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Existing wells - Sec.28-T4N-R67W - McCarty 28-2 (Exist) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7600-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,900.0	4,868.1	4,862.1	4,862.1	14.6	97.2	122.17		-342.4	-385.0	551.5	440.7	110.78	4.978	
5,000.0	4,967.3	4,961.3	4,961.3	14.9	99.2	123.26		-342.4	-385.0	558.3	445.3	113.00	4.941	
5,100.0	5,066.5	5,060.5	5,060.5	15.3	101.2	124.31		-342.4	-385.0	565.3	450.1	115.21	4.906	
5,175.5	5,141.4	5,135.4	5,135.4	15.5	102.7	125.09		-342.4	-385.0	570.7	453.8	116.89	4.883	
5,200.0	5,165.7	5,159.7	5,159.7	15.6	103.2	125.36		-342.4	-385.0	572.4	455.0	117.45	4.874	
5,300.0	5,265.2	5,259.2	5,259.2	15.8	105.2	126.25		-342.4	-385.0	578.2	458.5	119.70	4.831	
5,400.0	5,365.0	5,359.0	5,359.0	16.0	107.2	126.83		-342.4	-385.0	582.1	460.2	121.92	4.774	
5,500.0	5,465.0	5,459.0	5,459.0	16.1	109.2	127.09		-342.4	-385.0	583.9	459.8	124.10	4.705	
5,535.0	5,500.0	5,494.0	5,494.0	16.2	109.9	-69.22		-342.4	-385.0	584.0	460.2	123.77	4.718	
5,600.0	5,565.0	5,559.0	5,559.0	16.3	111.2	-69.22		-342.4	-385.0	584.0	458.8	125.18	4.665	
5,700.0	5,665.0	5,659.0	5,659.0	16.4	113.2	-69.22		-342.4	-385.0	584.0	456.7	127.34	4.586	
5,800.0	5,765.0	5,759.0	5,759.0	16.5	115.2	-69.22		-342.4	-385.0	584.0	454.5	129.50	4.510	
5,900.0	5,865.0	5,859.0	5,859.0	16.7	117.2	-69.22		-342.4	-385.0	584.0	452.4	131.66	4.436	
6,000.0	5,965.0	5,959.0	5,959.0	16.8	119.2	-69.22		-342.4	-385.0	584.0	450.2	133.82	4.364	
6,100.0	6,065.0	6,059.0	6,059.0	16.9	121.2	-69.22		-342.4	-385.0	584.0	448.0	135.98	4.295	
6,200.0	6,165.0	6,159.0	6,159.0	17.1	123.2	-69.22		-342.4	-385.0	584.0	445.9	138.15	4.227	
6,300.0	6,265.0	6,259.0	6,259.0	17.2	125.2	-69.22		-342.4	-385.0	584.0	443.7	140.32	4.162	
6,400.0	6,365.0	6,359.0	6,359.0	17.4	127.2	-69.22		-342.4	-385.0	584.0	441.5	142.49	4.099	
6,500.0	6,465.0	6,459.0	6,459.0	17.5	129.2	-69.22		-342.4	-385.0	584.0	439.4	144.66	4.037	
6,537.5	6,502.5	6,496.5	6,496.5	17.6	129.9	-69.22		-342.4	-385.0	584.0	438.5	145.47	4.015	
6,550.0	6,515.0	6,509.0	6,509.0	17.6	130.2	20.79		-342.4	-385.0	583.9	437.3	146.65	3.982	
6,600.0	6,564.9	6,558.9	6,558.9	17.7	131.2	20.94		-342.4	-385.0	581.6	434.3	147.28	3.949	
6,650.0	6,614.6	6,608.6	6,608.6	17.7	132.2	21.28		-342.4	-385.0	576.3	428.9	147.36	3.911	
6,700.0	6,663.7	6,657.7	6,657.7	17.8	133.2	21.85		-342.4	-385.0	567.9	421.1	146.89	3.867	
6,750.0	6,712.2	6,706.2	6,706.2	17.8	134.1	22.64		-342.4	-385.0	556.7	410.8	145.89	3.816	
6,800.0	6,759.8	6,753.8	6,753.8	17.9	135.1	23.70		-342.4	-385.0	542.5	398.1	144.41	3.757	
6,850.0	6,806.3	6,800.3	6,800.3	17.9	136.0	25.06		-342.4	-385.0	525.6	383.0	142.52	3.688	
6,900.0	6,851.5	6,845.5	6,845.5	18.0	136.9	26.78		-342.4	-385.0	506.0	365.6	140.35	3.605	
6,950.0	6,895.2	6,889.2	6,889.2	18.0	137.8	28.92		-342.4	-385.0	483.9	345.9	138.08	3.505	
7,000.0	6,937.2	6,931.2	6,931.2	18.0	138.6	31.56		-342.4	-385.0	459.6	323.6	135.96	3.380	
7,050.0	6,977.4	6,971.4	6,971.4	18.1	139.4	34.81		-342.4	-385.0	433.2	298.9	134.36	3.224	
7,100.0	7,015.5	7,009.5	7,009.5	18.1	140.2	38.78		-342.4	-385.0	405.1	271.4	133.73	3.029	
7,150.0	7,051.4	7,045.4	7,045.4	18.2	140.9	43.56		-342.4	-385.0	375.7	241.1	134.57	2.792	
7,200.0	7,085.0	7,079.0	7,079.0	18.3	141.6	49.22		-342.4	-385.0	345.4	208.1	137.23	2.517	
7,250.0	7,116.1	7,110.1	7,110.1	18.3	142.2	55.71		-342.4	-385.0	314.9	173.2	141.73	2.222	
7,300.0	7,144.5	7,138.5	7,138.5	18.5	142.8	62.86		-342.4	-385.0	285.3	137.8	147.47	1.934	
7,350.0	7,170.2	7,164.2	7,164.2	18.7	143.3	70.25		-342.4	-385.0	257.7	104.3	153.36	1.680	
7,400.0	7,193.1	7,187.1	7,187.1	19.0	143.7	77.36		-342.4	-385.0	234.0	75.7	158.28	1.478 Level 3	
7,450.0	7,213.0	7,207.0	7,207.0	19.4	144.1	83.64		-342.4	-385.0	216.5	54.9	161.64	1.340 Level 3	
7,500.0	7,229.8	7,223.8	7,223.8	20.0	144.5	88.67		-342.4	-385.0	207.8	44.3	163.56	1.271 Level 3	
7,516.5	7,234.7	7,228.7	7,228.7	20.2	144.6	90.00		-342.4	-385.0	207.2	43.2	163.97	1.264 Level 3, CC, ES, SF	
7,550.0	7,243.5	7,237.5	7,237.5	20.7	144.8	92.17		-342.4	-385.0	209.7	45.1	164.60	1.274 Level 3	
7,600.0	7,254.1	7,248.1	7,248.1	21.5	145.0	94.01		-342.4	-385.0	222.5	57.1	165.43	1.345 Level 3	
7,650.0	7,261.4	7,255.4	7,255.4	22.3	145.1	94.12		-342.4	-385.0	244.9	78.5	166.48	1.471 Level 3	
7,657.5	7,262.2	7,256.2	7,256.2	22.5	145.1	93.98		-342.4	-385.0	249.0	82.3	166.67	1.494 Level 3	
7,700.0	7,266.7	7,260.7	7,260.7	23.3	145.2	95.20		-342.4	-385.0	274.7	107.4	167.33	1.642	
7,731.5	7,270.0	7,264.0	7,264.0	23.9	145.3	96.09		-342.4	-385.0	296.2	128.4	167.78	1.765	
7,800.0	7,275.1	7,269.1	7,269.1	25.3	145.4	93.47		-342.4	-385.0	348.3	178.4	169.89	2.050	
7,850.1	7,276.2	7,270.2	7,270.2	26.3	145.4	90.11		-342.4	-385.0	389.7	218.5	171.23	2.276	
7,900.0	7,276.3	7,270.3	7,270.3	27.4	145.4	90.13		-342.4	-385.0	432.8	260.4	172.33	2.511	
8,000.0	7,276.4	7,270.4	7,270.4	29.7	145.4	90.16		-342.4	-385.0	522.8	348.1	174.62	2.994	

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 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design													Existing wells - Sec.28-T4N-R67W - McCarty 28-2 (Exist) - Wellbore #1 - Wellbore #1		Offset Site Error:		0.0 ft	
Survey Program: 7600-UNKNOWN													Offset Well Error:		0.0 ft			
Reference		Offset		Semi Major Axis			Distance							Warning				
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor							
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)							
8,100.0	7,276.6	7,270.6	7,270.6	32.0	145.4	90.20	-342.4	-385.0	615.8	438.9	176.99	3.479						
8,200.0	7,276.7	7,270.7	7,270.7	34.4	145.4	90.23	-342.4	-385.0	710.8	531.4	179.43	3.961						
8,300.0	7,276.8	7,270.8	7,270.8	36.9	145.4	90.26	-342.4	-385.0	807.0	625.1	181.93	4.436						
8,400.0	7,276.9	7,270.9	7,270.9	39.4	145.4	90.30	-342.4	-385.0	904.0	719.5	184.46	4.901						

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design													Existing wells - Sec.28-T4N-R67W - McCarty 28-4 (Exist) - Wellbore #1 - Wellbore #1	Offset Site Error:	0.0 ft
Survey Program: 7600-UNKNOWN														Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance									
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning		
9,300.0	7,278.0	7,325.0	7,325.0	63.1	146.5	89.64	-364.1	-3,121.9	974.8	765.4	209.38	4.656			
9,400.0	7,278.1	7,325.1	7,325.1	65.8	146.5	89.68	-364.1	-3,121.9	876.8	664.7	212.10	4.134			
9,500.0	7,278.3	7,325.3	7,325.3	68.5	146.5	89.71	-364.1	-3,121.9	779.4	564.6	214.82	3.628			
9,600.0	7,278.4	7,325.4	7,325.4	71.3	146.5	89.75	-364.1	-3,121.9	682.7	465.1	217.56	3.138			
9,700.0	7,278.5	7,325.5	7,325.5	74.0	146.5	89.79	-364.1	-3,121.9	587.1	366.8	220.29	2.665			
9,800.0	7,278.6	7,325.6	7,325.6	76.7	146.5	89.83	-364.1	-3,121.9	493.2	270.2	223.04	2.211			
9,900.0	7,278.8	7,325.8	7,325.8	79.5	146.5	89.87	-364.1	-3,121.9	402.3	176.5	225.79	1.782			
10,000.0	7,278.9	7,325.9	7,325.9	82.2	146.5	89.90	-364.1	-3,121.9	317.0	88.4	228.54	1.387 Level 3			
10,100.0	7,279.0	7,326.0	7,326.0	85.0	146.5	89.94	-364.1	-3,121.9	243.1	11.8	231.29	1.051 Level 2			
10,200.0	7,279.1	7,326.1	7,326.1	87.7	146.5	89.98	-364.1	-3,121.9	194.1	-39.9	234.05	0.829 Level 1			
10,257.0	7,279.2	7,326.2	7,326.2	89.3	146.5	90.00	-364.1	-3,121.9	185.6	-50.1	235.63	0.787 Level 1, CC, ES, SF			
10,300.0	7,279.2	7,326.2	7,326.2	90.5	146.5	90.02	-364.1	-3,121.9	190.5	-46.3	236.82	0.804 Level 1			
10,400.0	7,279.4	7,326.4	7,326.4	93.2	146.5	90.05	-364.1	-3,121.9	234.3	-5.3	239.58	0.978 Level 1			
10,500.0	7,279.5	7,326.5	7,326.5	96.0	146.5	90.09	-364.1	-3,121.9	305.8	63.4	242.35	1.262 Level 3			
10,600.0	7,279.6	7,326.6	7,326.6	98.7	146.5	90.13	-364.1	-3,121.9	390.0	144.9	245.12	1.591			
10,700.0	7,279.7	7,326.7	7,326.7	101.5	146.5	90.17	-364.1	-3,121.9	480.3	232.4	247.89	1.938			
10,800.0	7,279.9	7,326.9	7,326.9	104.3	146.5	90.20	-364.1	-3,121.9	573.8	323.2	250.66	2.289			
10,900.0	7,280.0	7,327.0	7,327.0	107.0	146.5	90.24	-364.1	-3,121.9	669.3	415.8	253.44	2.641			
11,000.0	7,280.1	7,327.1	7,327.1	109.8	146.5	90.28	-364.1	-3,121.9	765.8	509.6	256.22	2.989			
11,100.0	7,280.2	7,327.2	7,327.2	112.6	146.5	90.32	-364.1	-3,121.9	863.2	604.2	258.99	3.333			
11,200.0	7,280.3	7,327.3	7,327.3	115.4	146.5	90.36	-364.1	-3,121.9	961.1	699.3	261.77	3.671			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design		Existing wells - Sec.28-T4N-R67W - McCarty 28-7 (Exist) - Wellbore #1 - Wellbore #1											Offset Site Error:	0.0 ft
Survey Program: 7600-UNKNOWN													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance							Warning	
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor		
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
7,800.0	7,275.1	7,278.1	7,278.1	25.3	145.6	84.21	-149.3	-1,567.9	987.7	818.4	169.33	5.833	2.080 CC, ES, SF	
7,850.1	7,276.2	7,279.2	7,279.2	26.3	145.6	89.85	-149.3	-1,567.9	942.1	770.7	171.40	5.497		
7,900.0	7,276.3	7,279.3	7,279.3	27.4	145.6	89.86	-149.3	-1,567.9	897.2	724.7	172.50	5.201		
8,000.0	7,276.4	7,279.4	7,279.4	29.7	145.6	89.88	-149.3	-1,567.9	809.0	634.2	174.79	4.628		
8,100.0	7,276.6	7,279.6	7,279.6	32.0	145.6	89.89	-149.3	-1,567.9	723.8	546.6	177.17	4.085		
8,200.0	7,276.7	7,279.7	7,279.7	34.4	145.6	89.91	-149.3	-1,567.9	642.9	463.2	179.61	3.579		
8,300.0	7,276.8	7,279.8	7,279.8	36.9	145.6	89.93	-149.3	-1,567.9	568.0	385.9	182.10	3.119		
8,400.0	7,276.9	7,279.9	7,279.9	39.4	145.6	89.95	-149.3	-1,567.9	502.1	317.4	184.64	2.719		
8,500.0	7,277.0	7,280.0	7,280.0	41.9	145.6	89.96	-149.3	-1,567.9	448.9	261.7	187.21	2.398		
8,600.0	7,277.2	7,280.2	7,280.2	44.5	145.6	89.98	-149.3	-1,567.9	413.4	223.6	189.81	2.178		
8,700.0	7,277.3	7,280.3	7,280.3	47.1	145.6	90.00	-149.3	-1,567.9	400.4	207.9	192.43	2.081		
8,703.0	7,277.3	7,280.3	7,280.3	47.2	145.6	90.00	-149.3	-1,567.9	400.3	207.8	192.51			
8,800.0	7,277.4	7,280.4	7,280.4	49.8	145.6	90.02	-149.3	-1,567.9	411.9	216.9	195.07	2.112		
8,900.0	7,277.5	7,280.5	7,280.5	52.4	145.6	90.03	-149.3	-1,567.9	446.2	248.5	197.74	2.257		
9,000.0	7,277.7	7,280.7	7,280.7	55.1	145.6	90.05	-149.3	-1,567.9	498.5	298.1	200.41	2.487		
9,100.0	7,277.8	7,280.8	7,280.8	57.7	145.6	90.07	-149.3	-1,567.9	563.8	360.7	203.10	2.776		
9,200.0	7,277.9	7,280.9	7,280.9	60.4	145.6	90.09	-149.3	-1,567.9	638.2	432.4	205.80	3.101		
9,300.0	7,278.0	7,281.0	7,281.0	63.1	145.6	90.10	-149.3	-1,567.9	718.8	510.3	208.51	3.447		
9,400.0	7,278.1	7,281.1	7,281.1	65.8	145.6	90.12	-149.3	-1,567.9	803.8	592.6	211.23	3.805		
9,500.0	7,278.3	7,281.3	7,281.3	68.5	145.6	90.14	-149.3	-1,567.9	891.9	678.0	213.95	4.169		
9,600.0	7,278.4	7,281.4	7,281.4	71.3	145.6	90.16	-149.3	-1,567.9	982.3	765.6	216.68	4.533		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28V-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-234 - Wellbore #1 - Plan #1 (11-18-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	29.1	0.0	29.2				
100.0	100.0	99.0	99.0	0.1	0.1	0.00	0.00	29.1	0.0	29.1	28.9	0.22	130.316	
200.0	200.0	199.0	199.0	0.3	0.3	0.00	0.00	29.1	0.0	29.1	28.5	0.67	43.366	
300.0	300.0	299.0	299.0	0.6	0.6	0.00	0.00	29.1	0.0	29.1	28.0	1.12	25.985	
400.0	400.0	399.0	399.0	0.8	0.8	0.00	0.00	29.1	0.0	29.1	27.6	1.57	18.550	
500.0	500.0	499.0	499.0	1.0	1.0	0.00	0.00	29.1	0.0	29.1	27.1	2.02	14.423	
600.0	600.0	599.0	599.0	1.2	1.2	0.00	0.00	29.1	0.0	29.1	26.7	2.47	11.798 CC, ES	
700.0	700.0	699.0	699.0	1.4	1.5	-164.58	0.00	29.1	0.0	30.8	27.9	2.89	10.649	
800.0	799.8	798.8	798.8	1.6	1.7	-166.78	0.00	29.1	0.0	35.9	32.6	3.30	10.870	
900.0	899.5	898.5	898.5	1.8	1.9	-169.32	0.00	29.1	0.0	44.4	40.7	3.72	11.947	
959.5	958.6	957.6	957.6	2.0	2.0	-170.71	0.00	29.1	0.0	51.2	47.2	3.97	12.891	
1,000.0	998.7	997.7	997.7	2.1	2.1	-171.55	0.00	29.1	0.0	56.2	52.0	4.14	13.565	
1,100.0	1,098.0	1,099.2	1,099.1	2.3	2.3	-172.63	0.00	27.6	0.8	67.0	62.4	4.55	14.733	
1,200.0	1,197.2	1,201.3	1,201.1	2.6	2.5	-172.50	0.00	22.9	3.4	74.5	69.6	4.94	15.077	
1,300.0	1,296.4	1,302.5	1,302.0	2.9	2.7	-171.61	0.00	15.5	7.5	79.0	73.7	5.35	14.766	
1,400.0	1,395.6	1,402.4	1,401.5	3.2	2.9	-170.69	0.00	7.6	11.8	83.1	77.3	5.77	14.385	
1,500.0	1,494.8	1,502.3	1,501.0	3.5	3.1	-169.86	0.00	-0.2	16.0	87.1	80.9	6.21	14.037	
1,600.0	1,594.0	1,602.2	1,600.5	3.8	3.4	-169.10	0.00	-8.0	20.3	91.2	84.6	6.65	13.719	
1,700.0	1,693.2	1,702.1	1,700.0	4.1	3.6	-168.41	0.00	-15.9	24.6	95.3	88.2	7.10	13.430	
1,800.0	1,792.4	1,802.1	1,799.5	4.4	3.9	-167.77	0.00	-23.7	28.9	99.5	91.9	7.56	13.165	
1,900.0	1,891.7	1,902.0	1,899.0	4.8	4.1	-167.19	0.00	-31.5	33.2	103.6	95.6	8.02	12.924	
2,000.0	1,990.9	2,001.9	1,998.6	5.1	4.4	-166.65	0.00	-39.4	37.4	107.7	99.3	8.48	12.703	
2,100.0	2,090.1	2,101.8	2,098.1	5.4	4.6	-166.15	0.00	-47.2	41.7	111.9	102.9	8.95	12.500	
2,200.0	2,189.3	2,201.7	2,197.6	5.7	4.9	-165.68	0.00	-55.0	46.0	116.0	106.6	9.42	12.314	
2,300.0	2,288.5	2,301.6	2,297.1	6.0	5.2	-165.25	0.00	-62.9	50.3	120.2	110.3	9.90	12.142	
2,400.0	2,387.7	2,401.5	2,396.6	6.4	5.4	-164.85	0.00	-70.7	54.5	124.4	114.0	10.38	11.983	
2,500.0	2,486.9	2,501.4	2,496.1	6.7	5.7	-164.47	0.00	-78.5	58.8	128.6	117.7	10.86	11.836	
2,600.0	2,586.2	2,601.3	2,595.6	7.0	6.0	-164.12	0.00	-86.4	63.1	132.7	121.4	11.34	11.700	
2,700.0	2,685.4	2,701.2	2,695.1	7.3	6.2	-163.79	0.00	-94.2	67.4	136.9	125.1	11.83	11.574	
2,800.0	2,784.6	2,801.1	2,794.6	7.7	6.5	-163.48	0.00	-102.0	71.7	141.1	128.8	12.32	11.456	
2,900.0	2,883.8	2,901.1	2,894.1	8.0	6.8	-163.18	0.00	-109.8	75.9	145.3	132.5	12.81	11.345	
3,000.0	2,983.0	3,001.0	2,993.7	8.3	7.1	-162.90	0.00	-117.7	80.2	149.5	136.2	13.30	11.242	
3,100.0	3,082.2	3,100.9	3,093.2	8.7	7.3	-162.64	0.00	-125.5	84.5	153.7	139.9	13.79	11.146	
3,200.0	3,181.4	3,200.8	3,192.7	9.0	7.6	-162.39	0.00	-133.3	88.8	157.9	143.6	14.28	11.055	
3,300.0	3,280.7	3,300.7	3,292.2	9.3	7.9	-162.16	0.00	-141.2	93.1	162.1	147.3	14.78	10.970	
3,400.0	3,379.9	3,400.6	3,391.7	9.6	8.2	-161.93	0.00	-149.0	97.3	166.3	151.1	15.28	10.889	
3,500.0	3,479.1	3,500.5	3,491.2	10.0	8.4	-161.72	0.00	-156.8	101.6	170.5	154.8	15.77	10.813	
3,600.0	3,578.3	3,600.4	3,590.7	10.3	8.7	-161.52	0.00	-164.7	105.9	174.8	158.5	16.27	10.742	
3,700.0	3,677.5	3,700.3	3,690.2	10.6	9.0	-161.33	0.00	-172.5	110.2	179.0	162.2	16.77	10.674	
3,800.0	3,776.7	3,800.2	3,789.7	11.0	9.3	-161.14	0.00	-180.3	114.5	183.2	165.9	17.27	10.610	
3,900.0	3,875.9	3,900.2	3,889.2	11.3	9.6	-160.97	0.00	-188.2	118.7	187.4	169.7	17.77	10.549	
4,000.0	3,975.1	4,000.1	3,988.7	11.6	9.8	-160.80	0.00	-196.0	123.0	191.6	173.4	18.27	10.491	
4,100.0	4,074.4	4,100.0	4,088.3	11.9	10.1	-160.64	0.00	-203.8	127.3	195.9	177.1	18.77	10.436	
4,200.0	4,173.6	4,199.9	4,187.8	12.3	10.4	-160.49	0.00	-211.7	131.6	200.1	180.8	19.27	10.383	
4,300.0	4,272.8	4,299.8	4,287.3	12.6	10.7	-160.34	0.00	-219.5	135.9	204.3	184.5	19.77	10.333	
4,400.0	4,372.0	4,399.7	4,386.8	12.9	11.0	-160.20	0.00	-227.3	140.1	208.5	188.3	20.28	10.285	
4,500.0	4,471.2	4,499.6	4,486.3	13.3	11.2	-160.06	0.00	-235.2	144.4	212.8	192.0	20.78	10.240	
4,600.0	4,570.4	4,599.5	4,585.8	13.6	11.5	-159.93	0.00	-243.0	148.7	217.0	195.7	21.28	10.196	
4,700.0	4,669.6	4,699.4	4,685.3	13.9	11.8	-159.81	0.00	-250.8	153.0	221.2	199.4	21.79	10.154	
4,800.0	4,768.9	4,796.8	4,782.3	14.3	12.1	-159.72	0.00	-258.2	157.0	225.7	203.4	22.27	10.133	
4,900.0	4,868.1	4,890.2	4,875.6	14.6	12.2	-159.98	0.00	-263.1	159.7	232.4	209.7	22.69	10.243	

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 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28V-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-234 - Wellbore #1 - Plan #1 (11-18-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,000.0	4,967.3	4,983.2	4,968.5	14.9	12.4	-160.61	-160.61	-265.4	160.9	241.9	218.9	23.07	10.486	
5,100.0	5,066.5	5,080.2	5,065.5	15.3	12.6	-161.51	-161.51	-265.5	161.0	253.6	230.2	23.45	10.815	
5,175.5	5,141.4	5,155.1	5,140.4	15.5	12.7	-162.16	-162.16	-265.5	161.0	262.6	238.9	23.74	11.064	
5,200.0	5,165.7	5,179.4	5,164.7	15.6	12.7	-162.37	-162.37	-265.5	161.0	265.4	241.6	23.83	11.141	
5,300.0	5,265.2	5,278.9	5,264.2	15.8	12.9	-163.06	-163.06	-265.5	161.0	274.9	250.8	24.17	11.375	
5,400.0	5,365.0	5,378.7	5,364.0	16.0	13.1	-163.47	-163.47	-265.5	161.0	281.1	256.6	24.50	11.473	
5,500.0	5,465.0	5,478.6	5,464.0	16.1	13.2	-163.66	-163.66	-265.5	161.0	284.0	259.1	24.82	11.441	
5,535.0	5,500.0	5,513.7	5,499.0	16.2	13.3	0.00	0.00	-265.5	161.0	284.2	255.2	28.91	9.828	
5,600.0	5,565.0	5,578.6	5,564.0	16.3	13.4	0.00	0.00	-265.5	161.0	284.2	255.0	29.12	9.757	
5,700.0	5,665.0	5,678.6	5,664.0	16.4	13.6	0.00	0.00	-265.5	161.0	284.2	254.7	29.43	9.655	
5,800.0	5,765.0	5,778.6	5,764.0	16.5	13.7	0.00	0.00	-265.5	161.0	284.2	254.4	29.74	9.554	
5,900.0	5,865.0	5,878.6	5,864.0	16.7	13.9	0.00	0.00	-265.5	161.0	284.2	254.1	30.06	9.454	
6,000.0	5,965.0	5,978.6	5,964.0	16.8	14.1	0.00	0.00	-265.5	161.0	284.2	253.8	30.38	9.355	
6,100.0	6,065.0	6,078.6	6,064.0	16.9	14.3	0.00	0.00	-265.5	161.0	284.2	253.5	30.70	9.257	
6,200.0	6,165.0	6,178.6	6,164.0	17.1	14.5	0.00	0.00	-265.5	161.0	284.2	253.1	31.02	9.160	
6,300.0	6,265.0	6,278.6	6,264.0	17.2	14.6	0.00	0.00	-265.5	161.0	284.2	252.8	31.35	9.064	
6,342.7	6,307.7	6,321.4	6,306.7	17.3	14.7	-0.02	-0.02	-265.5	160.9	284.2	252.7	31.49	9.024	
6,400.0	6,365.0	6,378.4	6,363.7	17.4	14.8	-0.66	-0.66	-265.5	157.7	284.2	252.5	31.71	8.963	
6,500.0	6,465.0	6,475.9	6,459.8	17.5	14.9	-3.71	-3.71	-265.5	142.6	284.8	252.6	32.15	8.859	
6,537.5	6,502.5	6,511.2	6,494.1	17.6	15.0	-5.41	-5.41	-265.5	134.1	285.5	253.2	32.32	8.835	
6,550.0	6,515.0	6,522.8	6,505.3	17.6	15.0	83.95	83.95	-265.5	130.9	285.9	257.5	28.32	10.094	
6,600.0	6,564.9	6,568.8	6,549.1	17.7	15.0	81.45	81.45	-265.5	116.8	287.6	259.2	28.38	10.134	
6,650.0	6,614.6	6,614.2	6,591.3	17.7	15.1	79.03	79.03	-265.5	100.4	289.8	261.4	28.44	10.188	
6,700.0	6,663.7	6,658.9	6,632.0	17.8	15.1	76.70	76.70	-265.5	81.7	292.5	264.0	28.52	10.255	
6,750.0	6,712.2	6,703.1	6,671.0	17.8	15.2	74.46	74.46	-265.5	61.0	295.6	267.0	28.61	10.330	
6,800.0	6,759.8	6,746.7	6,708.3	17.9	15.2	72.33	72.33	-265.5	38.3	299.0	270.3	28.71	10.413	
6,850.0	6,806.3	6,789.9	6,743.8	17.9	15.2	70.32	70.32	-265.5	13.8	302.7	273.8	28.82	10.501	
6,900.0	6,851.5	6,832.6	6,777.6	18.0	15.3	68.42	68.42	-265.5	-12.3	306.5	277.6	28.94	10.591	
6,950.0	6,895.2	6,874.9	6,809.5	18.0	15.3	66.64	66.64	-265.5	-40.0	310.6	281.5	29.07	10.682	
7,000.0	6,937.2	6,916.7	6,839.6	18.0	15.4	64.98	64.98	-265.5	-69.2	314.6	285.4	29.21	10.771	
7,050.0	6,977.4	6,958.3	6,867.8	18.1	15.4	63.45	63.45	-265.5	-99.6	318.7	289.4	29.35	10.859	
7,100.0	7,015.5	7,000.0	6,894.4	18.1	15.6	62.02	62.02	-265.5	-131.8	322.8	293.2	29.52	10.932	
7,150.0	7,051.4	7,040.4	6,918.5	18.2	15.8	60.74	60.74	-265.5	-164.2	326.7	297.0	29.73	10.989	
7,200.0	7,085.0	7,081.1	6,940.9	18.3	16.2	59.56	59.56	-265.5	-198.1	330.5	300.5	29.97	11.026	
7,250.0	7,116.1	7,121.5	6,961.4	18.3	16.6	58.50	58.50	-265.5	-232.9	334.1	303.8	30.27	11.036	
7,300.0	7,144.5	7,161.7	6,979.9	18.5	17.1	57.56	57.56	-265.5	-268.6	337.4	306.8	30.62	11.019	
7,350.0	7,170.2	7,200.0	6,995.8	18.7	17.6	56.75	56.75	-265.5	-303.5	340.5	309.5	31.03	10.973	
7,400.0	7,193.1	7,241.5	7,011.1	19.0	18.2	55.99	55.99	-265.5	-342.1	343.3	311.7	31.56	10.875	
7,450.0	7,213.0	7,281.2	7,023.7	19.4	18.8	55.37	55.37	-265.5	-379.7	345.7	313.5	32.18	10.744	
7,500.0	7,229.8	7,320.8	7,034.2	20.0	19.5	54.85	54.85	-265.5	-417.8	347.8	314.9	32.88	10.577	
7,550.0	7,243.5	7,360.2	7,042.8	20.7	20.2	54.43	54.43	-265.5	-456.4	349.5	315.8	33.69	10.373	
7,600.0	7,254.1	7,400.0	7,049.4	21.5	20.9	54.11	54.11	-265.5	-495.6	350.8	316.2	34.62	10.135	
7,650.0	7,261.4	7,439.0	7,053.9	22.3	21.7	53.89	53.89	-265.5	-534.3	351.8	316.1	35.64	9.869	
7,657.5	7,262.2	7,450.0	7,054.8	22.5	21.9	53.85	53.85	-265.5	-545.3	351.9	316.0	35.88	9.808	
7,658.0	7,262.3	7,450.0	7,054.8	22.5	21.9	53.85	53.85	-265.5	-545.3	351.9	316.0	35.89	9.806	
7,700.0	7,266.7	7,478.2	7,056.4	23.3	22.5	53.67	53.67	-265.5	-573.4	353.0	316.0	36.95	9.552	
7,731.5	7,270.0	7,502.8	7,057.0	23.9	23.0	53.41	53.41	-265.5	-598.0	354.5	316.8	37.77	9.387	
7,800.0	7,275.1	7,569.8	7,057.0	25.3	24.4	52.65	52.65	-265.5	-665.0	357.6	318.1	39.50	9.053	
7,850.1	7,276.2	7,619.9	7,057.0	26.3	25.5	52.47	52.47	-265.5	-715.1	358.3	317.3	40.99	8.741	
7,900.0	7,276.3	7,669.7	7,057.0	27.4	26.6	52.47	52.47	-265.5	-764.9	358.3	315.6	42.76	8.380	
8,000.0	7,276.4	7,769.7	7,057.0	29.7	28.9	52.45	52.45	-265.5	-864.9	358.4	312.0	46.44	7.717	

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 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28V-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-234 - Wellbore #1 - Plan #1 (11-18-13)												Offset Site Error: 0.0 ft	
Survey Program: 0-MWD												Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis			Distance						
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)		
8,100.0	7,276.6	7,869.7	7,057.0	32.0	31.3	52.44	-265.5	-964.9	358.5	308.2	50.26	7.133	
8,200.0	7,276.7	7,969.7	7,057.0	34.4	33.8	52.42	-265.5	-1,064.9	358.6	304.4	54.19	6.617	
8,300.0	7,276.8	8,069.7	7,057.0	36.9	36.3	52.40	-265.5	-1,164.9	358.6	300.4	58.20	6.162	
8,400.0	7,276.9	8,169.7	7,057.0	39.4	38.9	52.39	-265.5	-1,264.9	358.7	296.4	62.29	5.759	
8,500.0	7,277.0	8,269.7	7,057.0	41.9	41.4	52.37	-265.5	-1,364.9	358.8	292.4	66.43	5.401	
8,600.0	7,277.2	8,369.7	7,057.0	44.5	44.0	52.36	-265.5	-1,464.9	358.9	288.2	70.62	5.082	
8,700.0	7,277.3	8,469.7	7,057.0	47.1	46.7	52.34	-265.5	-1,564.9	358.9	284.1	74.84	4.796	
8,800.0	7,277.4	8,569.7	7,057.0	49.8	49.3	52.33	-265.5	-1,664.9	359.0	279.9	79.10	4.539	
8,900.0	7,277.5	8,669.7	7,057.0	52.4	52.0	52.31	-265.5	-1,764.9	359.1	275.7	83.38	4.306	
9,000.0	7,277.7	8,769.7	7,057.0	55.1	54.7	52.30	-265.5	-1,864.9	359.2	271.5	87.69	4.096	
9,100.0	7,277.8	8,869.7	7,057.0	57.7	57.4	52.28	-265.5	-1,964.9	359.2	267.2	92.02	3.904	
9,200.0	7,277.9	8,969.7	7,057.0	60.4	60.1	52.27	-265.5	-2,064.9	359.3	262.9	96.36	3.729	
9,300.0	7,278.0	9,069.7	7,057.0	63.1	62.8	52.25	-265.5	-2,164.9	359.4	258.7	100.72	3.568	
9,400.0	7,278.1	9,169.7	7,057.0	65.8	65.5	52.23	-265.5	-2,264.9	359.5	254.4	105.08	3.421	
9,500.0	7,278.3	9,269.7	7,057.0	68.5	68.2	52.22	-265.5	-2,364.9	359.5	250.1	109.46	3.285	
9,600.0	7,278.4	9,369.7	7,057.0	71.3	71.0	52.20	-265.5	-2,464.9	359.6	245.8	113.85	3.159	
9,700.0	7,278.5	9,469.7	7,057.0	74.0	73.7	52.19	-265.5	-2,564.9	359.7	241.4	118.24	3.042	
9,800.0	7,278.6	9,569.7	7,057.0	76.7	76.5	52.17	-265.5	-2,664.9	359.8	237.1	122.65	2.933	
9,900.0	7,278.8	9,669.7	7,057.0	79.5	79.2	52.16	-265.5	-2,764.9	359.8	232.8	127.05	2.832	
10,000.0	7,278.9	9,769.7	7,057.0	82.2	82.0	52.14	-265.5	-2,864.9	359.9	228.4	131.47	2.738	
10,100.0	7,279.0	9,869.7	7,057.0	85.0	84.7	52.13	-265.5	-2,964.9	360.0	224.1	135.88	2.649	
10,200.0	7,279.1	9,969.7	7,057.0	87.7	87.5	52.11	-265.5	-3,064.9	360.1	219.7	140.30	2.566	
10,300.0	7,279.2	10,069.7	7,057.0	90.5	90.2	52.10	-265.5	-3,164.9	360.1	215.4	144.73	2.488	
10,400.0	7,279.4	10,169.7	7,057.0	93.2	93.0	52.08	-265.5	-3,264.9	360.2	211.0	149.16	2.415	
10,500.0	7,279.5	10,269.7	7,057.0	96.0	95.8	52.07	-265.5	-3,364.9	360.3	206.7	153.59	2.346	
10,600.0	7,279.6	10,369.7	7,057.0	98.7	98.5	52.05	-265.5	-3,464.9	360.4	202.3	158.02	2.280	
10,700.0	7,279.7	10,469.7	7,057.0	101.5	101.3	52.04	-265.5	-3,564.9	360.4	198.0	162.45	2.219	
10,800.0	7,279.9	10,569.7	7,057.0	104.3	104.1	52.02	-265.5	-3,664.9	360.5	193.6	166.89	2.160	
10,900.0	7,280.0	10,669.7	7,057.0	107.0	106.9	52.00	-265.5	-3,764.9	360.6	189.3	171.32	2.105	
11,000.0	7,280.1	10,769.7	7,057.0	109.8	109.6	51.99	-265.5	-3,864.9	360.7	184.9	175.76	2.052	
11,100.0	7,280.2	10,869.7	7,057.0	112.6	112.4	51.97	-265.5	-3,964.9	360.7	180.5	180.20	2.002	
11,200.0	7,280.3	10,969.7	7,057.0	115.4	115.2	51.96	-265.5	-4,064.9	360.8	176.2	184.64	1.954	
11,300.0	7,280.5	11,069.7	7,057.0	118.1	118.0	51.94	-265.5	-4,164.9	360.9	171.8	189.08	1.909	
11,400.0	7,280.6	11,169.7	7,057.0	120.9	120.7	51.93	-265.5	-4,264.9	361.0	167.4	193.52	1.865	
11,500.0	7,280.7	11,269.7	7,057.0	123.7	123.5	51.91	-265.5	-4,364.9	361.0	163.1	197.96	1.824	
11,600.0	7,280.8	11,369.7	7,057.0	126.5	126.3	51.90	-265.5	-4,464.9	361.1	158.7	202.40	1.784	
11,700.0	7,280.9	11,469.7	7,057.0	129.3	129.1	51.88	-265.5	-4,564.9	361.2	154.3	206.84	1.746	
11,741.3	7,281.0	11,511.0	7,057.0	130.4	130.2	51.88	-265.5	-4,606.2	361.2	152.5	208.67	1.731 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28V-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-304 - Wellbore #1 - Plan #1 (11-18-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	91.1	0.0	91.1				
100.0	100.0	98.0	98.0	0.1	0.1	0.00	0.00	91.1	0.0	91.1	90.8	0.22	409.272	
200.0	200.0	198.0	198.0	0.3	0.3	0.00	0.00	91.1	0.0	91.1	90.4	0.67	135.969	
300.0	300.0	298.0	298.0	0.6	0.6	0.00	0.00	91.1	0.0	91.1	90.0	1.12	81.363	
400.0	400.0	398.0	398.0	0.8	0.8	0.00	0.00	91.1	0.0	91.1	89.5	1.57	58.050	
500.0	500.0	498.0	498.0	1.0	1.0	0.00	0.00	91.1	0.0	91.1	89.1	2.02	45.121	
600.0	600.0	598.0	598.0	1.2	1.2	0.00	0.00	91.1	0.0	91.1	88.6	2.47	36.902 CC, ES	
700.0	700.0	698.0	698.0	1.4	1.5	-163.97	0.00	91.1	0.0	92.7	89.9	2.89	32.069	
800.0	799.8	797.8	797.8	1.6	1.7	-164.79	0.00	91.1	0.0	97.8	94.5	3.30	29.633	
900.0	899.5	897.5	897.5	1.8	1.9	-165.98	0.00	91.1	0.0	106.2	102.5	3.72	28.579	
959.5	958.6	956.6	956.6	2.0	2.0	-166.79	0.00	91.1	0.0	112.9	108.9	3.97	28.448	
1,000.0	998.7	996.7	996.7	2.1	2.1	-167.35	0.00	91.1	0.0	117.8	113.7	4.14	28.455	
1,100.0	1,098.0	1,096.0	1,096.0	2.3	2.4	-168.56	0.00	91.1	0.0	130.1	125.5	4.57	28.445	
1,200.0	1,197.2	1,195.2	1,195.2	2.6	2.6	-169.56	0.00	91.1	0.0	142.4	137.3	5.01	28.415	
1,300.0	1,296.4	1,294.4	1,294.4	2.9	2.8	-170.40	0.00	91.1	0.0	154.7	149.2	5.45	28.373	
1,400.0	1,395.6	1,393.6	1,393.6	3.2	3.0	-171.12	0.00	91.1	0.0	167.0	161.1	5.90	28.327	
1,500.0	1,494.8	1,492.8	1,492.8	3.5	3.2	-171.73	0.00	91.1	0.0	179.4	173.1	6.34	28.280	
1,600.0	1,594.0	1,592.0	1,592.0	3.8	3.5	-172.27	0.00	91.1	0.0	191.8	185.0	6.79	28.232	
1,700.0	1,693.2	1,691.2	1,691.2	4.1	3.7	-172.74	0.00	91.1	0.0	204.2	197.0	7.25	28.187	
1,800.0	1,792.4	1,790.4	1,790.4	4.4	3.9	-173.16	0.00	91.1	0.0	216.6	208.9	7.70	28.143	
1,900.0	1,891.7	1,889.7	1,889.7	4.8	4.1	-173.53	0.00	91.1	0.0	229.1	220.9	8.15	28.101	
2,000.0	1,990.9	1,988.9	1,988.9	5.1	4.4	-173.87	0.00	91.1	0.0	241.5	232.9	8.61	28.061	
2,100.0	2,090.1	2,088.7	2,088.7	5.4	4.6	-173.93	0.00	92.0	0.8	254.7	245.7	9.05	28.143	
2,200.0	2,189.3	2,177.4	2,177.2	5.7	4.8	-173.46	0.00	95.1	3.8	269.9	260.4	9.50	28.420	
2,300.0	2,288.5	2,274.3	2,274.0	6.0	5.0	-172.64	100.0	100.0	8.4	286.5	276.6	9.95	28.791	
2,400.0	2,387.7	2,372.9	2,372.3	6.4	5.2	-171.88	105.1	105.1	13.2	303.3	292.9	10.41	29.129	
2,500.0	2,486.9	2,471.4	2,470.5	6.7	5.4	-171.20	110.3	110.3	18.0	320.1	309.2	10.87	29.436	
2,600.0	2,586.2	2,569.9	2,568.8	7.0	5.7	-170.59	115.4	115.4	22.8	336.9	325.6	11.34	29.713	
2,700.0	2,685.4	2,668.4	2,667.0	7.3	5.9	-170.03	120.5	120.5	27.6	353.8	342.0	11.81	29.967	
2,800.0	2,784.6	2,766.9	2,765.3	7.7	6.1	-169.53	125.6	125.6	32.4	370.7	358.5	12.28	30.199	
2,900.0	2,883.8	2,865.4	2,863.5	8.0	6.4	-169.07	130.7	130.7	37.2	387.7	374.9	12.75	30.411	
3,000.0	2,983.0	2,963.9	2,961.8	8.3	6.6	-168.65	135.8	135.8	42.0	404.6	391.4	13.22	30.607	
3,100.0	3,082.2	3,062.4	3,060.1	8.7	6.8	-168.26	141.0	141.0	46.8	421.6	407.9	13.69	30.787	
3,200.0	3,181.4	3,160.9	3,158.3	9.0	7.1	-167.90	146.1	146.1	51.6	438.6	424.5	14.17	30.954	
3,300.0	3,280.7	3,259.4	3,256.6	9.3	7.3	-167.57	151.2	151.2	56.4	455.6	441.0	14.65	31.109	
3,400.0	3,379.9	3,357.9	3,354.8	9.6	7.5	-167.27	156.3	156.3	61.2	472.7	457.5	15.12	31.253	
3,500.0	3,479.1	3,456.5	3,453.1	10.0	7.8	-166.98	161.4	161.4	66.0	489.7	474.1	15.60	31.387	
3,600.0	3,578.3	3,555.0	3,551.4	10.3	8.0	-166.71	166.6	166.6	70.8	506.8	490.7	16.08	31.512	
3,700.0	3,677.5	3,653.5	3,649.6	10.6	8.3	-166.46	171.7	171.7	75.6	523.8	507.3	16.56	31.629	
3,800.0	3,776.7	3,752.0	3,747.9	11.0	8.5	-166.23	176.8	176.8	80.4	540.9	523.9	17.04	31.739	
3,900.0	3,875.9	3,850.5	3,846.1	11.3	8.7	-166.01	181.9	181.9	85.2	558.0	540.5	17.52	31.842	
4,000.0	3,975.1	3,949.0	3,944.4	11.6	9.0	-165.81	187.0	187.0	90.0	575.1	557.1	18.00	31.939	
4,100.0	4,074.4	4,047.5	4,042.7	11.9	9.2	-165.61	192.1	192.1	94.8	592.2	573.7	18.49	32.031	
4,200.0	4,173.6	4,146.0	4,140.9	12.3	9.5	-165.43	197.3	197.3	99.6	609.3	590.3	18.97	32.117	
4,300.0	4,272.8	4,244.5	4,239.2	12.6	9.7	-165.25	202.4	202.4	104.4	626.4	606.9	19.45	32.199	
4,400.0	4,372.0	4,343.0	4,337.4	12.9	10.0	-165.09	207.5	207.5	109.2	643.5	623.5	19.94	32.276	
4,500.0	4,471.2	4,441.5	4,435.7	13.3	10.2	-164.93	212.6	212.6	114.0	660.6	640.2	20.42	32.349	
4,600.0	4,570.4	4,540.1	4,533.9	13.6	10.5	-164.79	217.7	217.7	118.8	677.7	656.8	20.90	32.419	
4,700.0	4,669.6	4,638.6	4,632.2	13.9	10.7	-164.65	222.9	222.9	123.6	694.8	673.4	21.39	32.485	
4,800.0	4,768.9	4,737.1	4,730.5	14.3	11.0	-164.51	228.0	228.0	128.4	712.0	690.1	21.87	32.548	
4,900.0	4,868.1	4,835.6	4,828.7	14.6	11.2	-164.39	233.1	233.1	133.2	729.1	706.7	22.36	32.608	

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 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28V-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-304 - Wellbore #1 - Plan #1 (11-18-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,000.0	4,967.3	4,934.1	4,927.0	14.9	11.5	-164.26		238.2	138.0	746.2	723.4	22.85	32.665	
5,100.0	5,066.5	5,032.6	5,025.2	15.3	11.7	-164.15		243.3	142.8	763.4	740.0	23.33	32.719	
5,175.5	5,141.4	5,107.0	5,099.4	15.5	11.9	-164.06		247.2	146.4	776.3	752.6	23.70	32.759	
5,200.0	5,165.7	5,131.1	5,123.5	15.6	12.0	-164.06		248.4	147.6	780.4	756.6	23.82	32.759	
5,300.0	5,265.2	5,230.0	5,222.2	15.8	12.2	-163.98		253.6	152.4	795.1	770.8	24.29	32.727	
5,400.0	5,365.0	5,335.8	5,327.7	16.0	12.5	-163.81		259.0	157.5	806.3	781.6	24.74	32.586	
5,500.0	5,465.0	5,461.5	5,453.3	16.1	12.7	-163.68		262.5	160.7	812.0	786.8	25.16	32.277	
5,535.0	5,500.0	5,505.7	5,497.5	16.2	12.8	0.00		262.7	161.0	812.4	784.0	28.38	28.627	
5,600.0	5,565.0	5,571.2	5,563.0	16.3	12.9	0.00		262.7	161.0	812.4	783.8	28.60	28.404	
5,700.0	5,665.0	5,671.2	5,663.0	16.4	13.1	0.00		262.7	161.0	812.4	783.5	28.94	28.070	
5,800.0	5,765.0	5,771.2	5,763.0	16.5	13.3	0.00		262.7	161.0	812.4	783.1	29.29	27.735	
5,900.0	5,865.0	5,871.2	5,863.0	16.7	13.5	0.00		262.7	161.0	812.4	782.8	29.64	27.407	
6,000.0	5,965.0	5,971.2	5,963.0	16.8	13.7	0.00		262.7	161.0	812.4	782.4	30.00	27.084	
6,100.0	6,065.0	6,071.2	6,063.0	16.9	13.9	0.00		262.7	161.0	812.4	782.1	30.35	26.767	
6,200.0	6,165.0	6,171.2	6,163.0	17.1	14.2	0.00		262.7	161.0	812.4	781.7	30.71	26.455	
6,300.0	6,265.0	6,271.2	6,263.0	17.2	14.4	0.00		262.7	161.0	812.4	781.3	31.07	26.148	
6,400.0	6,365.0	6,371.2	6,363.0	17.4	14.6	0.00		262.7	161.0	812.4	781.0	31.43	25.847	
6,444.7	6,409.6	6,415.9	6,407.6	17.4	14.7	-0.01		262.7	160.9	812.4	780.8	31.59	25.716	
6,500.0	6,465.0	6,471.0	6,462.7	17.5	14.8	-0.20		262.7	158.2	812.4	780.6	31.78	25.561	
6,537.5	6,502.5	6,508.1	6,499.5	17.6	14.8	-0.49		262.7	154.1	812.4	780.5	31.91	25.459	
6,550.0	6,515.0	6,520.3	6,511.7	17.6	14.8	89.40		262.7	152.4	812.4	783.3	29.19	27.830	
6,600.0	6,564.9	6,569.1	6,559.6	17.7	14.9	88.93		262.7	143.5	812.5	783.2	29.34	27.698	
6,650.0	6,614.6	6,617.5	6,606.6	17.7	15.0	88.47		262.7	131.7	812.7	783.2	29.46	27.582	
6,700.0	6,663.7	6,665.5	6,652.3	17.8	15.0	88.02		262.7	117.1	812.9	783.3	29.58	27.478	
6,750.0	6,712.2	6,713.1	6,696.7	17.8	15.1	87.58		262.7	99.8	813.1	783.4	29.70	27.381	
6,800.0	6,759.8	6,760.4	6,739.6	17.9	15.1	87.15		262.7	79.9	813.4	783.6	29.82	27.282	
6,850.0	6,806.3	6,807.4	6,780.9	17.9	15.2	86.73		262.7	57.6	813.7	783.8	29.95	27.173	
6,900.0	6,851.5	6,854.0	6,820.4	18.0	15.2	86.33		262.7	32.9	814.1	784.0	30.10	27.045	
6,950.0	6,895.2	6,900.0	6,857.9	18.0	15.3	85.95		262.7	6.3	814.5	784.2	30.29	26.888	
7,000.0	6,937.2	6,946.4	6,894.1	18.0	15.4	85.57		262.7	-22.8	814.9	784.3	30.54	26.686	
7,050.0	6,977.4	6,992.2	6,928.0	18.1	15.6	85.22		262.7	-53.6	815.3	784.4	30.85	26.430	
7,100.0	7,015.5	7,037.8	6,959.8	18.1	15.9	84.89		262.7	-86.2	815.7	784.4	31.24	26.111	
7,150.0	7,051.4	7,083.1	6,989.4	18.2	16.2	84.58		262.7	-120.5	816.1	784.4	31.73	25.723	
7,200.0	7,085.0	7,128.3	7,016.9	18.3	16.5	84.29		262.7	-156.3	816.5	784.2	32.32	25.261	
7,250.0	7,116.1	7,173.2	7,042.1	18.3	16.9	84.02		262.7	-193.6	816.9	783.8	33.04	24.724	
7,300.0	7,144.5	7,218.0	7,064.9	18.5	17.4	83.78		262.7	-232.0	817.2	783.4	33.89	24.118	
7,350.0	7,170.2	7,262.6	7,085.4	18.7	17.9	83.56		262.7	-271.7	817.6	782.7	34.86	23.450	
7,400.0	7,193.1	7,307.1	7,103.6	19.0	18.5	83.37		262.7	-312.3	817.9	781.9	35.98	22.732	
7,450.0	7,213.0	7,350.0	7,118.7	19.4	19.1	83.20		262.7	-352.4	818.2	781.0	37.21	21.990	
7,500.0	7,229.8	7,395.8	7,132.5	20.0	19.8	83.05		262.7	-396.1	818.4	779.8	38.61	21.195	
7,550.0	7,243.5	7,440.0	7,143.2	20.7	20.5	82.94		262.7	-438.9	818.6	778.5	40.12	20.405	
7,600.0	7,254.1	7,484.1	7,151.4	21.5	21.3	82.85		262.7	-482.3	818.8	777.0	41.73	19.620	
7,650.0	7,261.4	7,528.2	7,157.1	22.3	22.1	82.79		262.7	-526.0	818.9	775.4	43.44	18.852	
7,657.5	7,262.2	7,534.8	7,157.8	22.5	22.3	82.78		262.7	-532.6	818.9	775.2	43.70	18.739	
7,700.0	7,266.7	7,572.2	7,160.3	23.3	23.0	82.68		262.7	-569.9	819.1	773.9	45.24	18.107	
7,731.5	7,270.0	7,600.0	7,161.0	23.9	23.5	82.53		262.7	-597.7	819.4	773.0	46.40	17.662	
7,800.0	7,275.1	7,666.3	7,160.5	25.3	24.9	82.12		262.7	-664.0	820.2	771.1	49.11	16.700	
7,850.1	7,276.2	7,716.4	7,160.1	26.3	26.0	82.00		262.7	-714.1	820.4	769.2	51.21	16.020	
7,900.0	7,276.3	7,766.3	7,159.6	27.4	27.1	81.97		262.7	-763.9	820.5	767.1	53.39	15.367	
8,000.0	7,276.4	7,866.3	7,158.8	29.7	29.4	81.90		262.7	-863.9	820.6	762.7	57.90	14.172	
8,100.0	7,276.6	7,966.3	7,157.9	32.0	31.7	81.83		262.7	-963.9	820.7	758.2	62.58	13.115	

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 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28V-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-304 - Wellbore #1 - Plan #1 (11-18-13)											Offset Site Error: 0.0 ft	
Survey Program: 0-MWD											Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)				Between Centres (ft)
8,200.0	7,276.7	8,066.3	7,157.0	34.4	34.2	81.76	262.7	-1,063.9	820.9	753.5	67.39	12.181
8,300.0	7,276.8	8,166.3	7,156.1	36.9	36.6	81.69	262.7	-1,163.9	821.0	748.7	72.31	11.355
8,400.0	7,276.9	8,266.3	7,155.3	39.4	39.2	81.62	262.7	-1,263.9	821.2	743.9	77.31	10.622
8,500.0	7,277.0	8,366.3	7,154.4	41.9	41.7	81.55	262.7	-1,363.9	821.3	738.9	82.37	9.970
8,600.0	7,277.2	8,466.3	7,153.5	44.5	44.3	81.48	262.7	-1,463.9	821.5	734.0	87.50	9.388
8,700.0	7,277.3	8,566.2	7,152.6	47.1	46.9	81.42	262.7	-1,563.9	821.6	728.9	92.67	8.866
8,800.0	7,277.4	8,666.2	7,151.8	49.8	49.6	81.35	262.7	-1,663.9	821.8	723.9	97.88	8.396
8,900.0	7,277.5	8,766.2	7,150.9	52.4	52.2	81.28	262.7	-1,763.9	821.9	718.8	103.12	7.970
9,000.0	7,277.7	8,866.2	7,150.0	55.1	54.9	81.21	262.7	-1,863.9	822.1	713.7	108.39	7.584
9,100.0	7,277.8	8,966.2	7,149.2	57.7	57.6	81.14	262.7	-1,963.8	822.2	708.5	113.68	7.233
9,200.0	7,277.9	9,066.2	7,148.3	60.4	60.3	81.07	262.7	-2,063.8	822.4	703.4	119.00	6.911
9,300.0	7,278.0	9,166.2	7,147.4	63.1	63.0	81.00	262.7	-2,163.8	822.5	698.2	124.33	6.616
9,400.0	7,278.1	9,266.2	7,146.5	65.8	65.7	80.94	262.7	-2,263.8	822.7	693.0	129.67	6.344
9,500.0	7,278.3	9,366.2	7,145.7	68.5	68.4	80.87	262.7	-2,363.8	822.8	687.8	135.03	6.094
9,600.0	7,278.4	9,466.2	7,144.8	71.3	71.1	80.80	262.7	-2,463.8	823.0	682.6	140.40	5.862
9,700.0	7,278.5	9,566.2	7,143.9	74.0	73.9	80.73	262.7	-2,563.8	823.2	677.4	145.77	5.647
9,800.0	7,278.6	9,666.2	7,143.0	76.7	76.6	80.66	262.7	-2,663.8	823.3	672.2	151.16	5.447
9,900.0	7,278.8	9,766.2	7,142.2	79.5	79.3	80.59	262.7	-2,763.8	823.5	666.9	156.55	5.260
10,000.0	7,278.9	9,866.2	7,141.3	82.2	82.1	80.53	262.7	-2,863.8	823.6	661.7	161.95	5.086
10,100.0	7,279.0	9,966.2	7,140.4	85.0	84.8	80.46	262.7	-2,963.8	823.8	656.4	167.36	4.922
10,200.0	7,279.1	10,066.2	7,139.6	87.7	87.6	80.39	262.7	-3,063.7	824.0	651.2	172.77	4.769
10,300.0	7,279.2	10,166.2	7,138.7	90.5	90.4	80.32	262.7	-3,163.7	824.1	646.0	178.18	4.625
10,400.0	7,279.4	10,266.2	7,137.8	93.2	93.1	80.25	262.7	-3,263.7	824.3	640.7	183.60	4.490
10,500.0	7,279.5	10,366.2	7,136.9	96.0	95.9	80.19	262.7	-3,363.7	824.5	635.5	189.02	4.362
10,600.0	7,279.6	10,466.2	7,136.1	98.7	98.6	80.12	262.7	-3,463.7	824.6	630.2	194.44	4.241
10,700.0	7,279.7	10,566.2	7,135.2	101.5	101.4	80.05	262.7	-3,563.7	824.8	625.0	199.86	4.127
10,800.0	7,279.9	10,666.1	7,134.3	104.3	104.2	79.98	262.7	-3,663.7	825.0	619.7	205.29	4.019
10,900.0	7,280.0	10,766.1	7,133.4	107.0	107.0	79.91	262.7	-3,763.7	825.2	614.4	210.71	3.916
11,000.0	7,280.1	10,866.1	7,132.6	109.8	109.7	79.84	262.7	-3,863.7	825.3	609.2	216.14	3.818
11,100.0	7,280.2	10,966.1	7,131.7	112.6	112.5	79.78	262.7	-3,963.7	825.5	603.9	221.57	3.726
11,200.0	7,280.3	11,066.1	7,130.8	115.4	115.3	79.71	262.7	-4,063.7	825.7	598.7	227.00	3.637
11,300.0	7,280.5	11,166.1	7,130.0	118.1	118.1	79.64	262.7	-4,163.7	825.9	593.4	232.43	3.553
11,400.0	7,280.6	11,266.1	7,129.1	120.9	120.8	79.57	262.7	-4,263.6	826.0	588.2	237.86	3.473
11,500.0	7,280.7	11,366.1	7,128.2	123.7	123.6	79.51	262.7	-4,363.6	826.2	582.9	243.29	3.396
11,600.0	7,280.8	11,466.1	7,127.3	126.5	126.4	79.44	262.7	-4,463.6	826.4	577.7	248.72	3.323
11,700.0	7,280.9	11,566.1	7,126.5	129.3	129.2	79.37	262.7	-4,563.6	826.6	572.4	254.14	3.252
11,741.3	7,281.0	11,607.4	7,126.1	130.4	130.3	79.34	262.7	-4,604.9	826.7	570.3	256.38	3.224 SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28V-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-434 - Wellbore #1 - Plan #1 (11-18-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	61.9	0.0	62.0				
100.0	100.0	98.0	98.0	0.1	0.1	0.00	0.00	61.9	0.0	61.9	61.7	0.22	278.317	
200.0	200.0	198.0	198.0	0.3	0.3	0.00	0.00	61.9	0.0	61.9	61.3	0.67	92.463	
300.0	300.0	298.0	298.0	0.6	0.6	0.00	0.00	61.9	0.0	61.9	60.8	1.12	55.329	
400.0	400.0	398.0	398.0	0.8	0.8	0.00	0.00	61.9	0.0	61.9	60.4	1.57	39.476	
500.0	500.0	498.0	498.0	1.0	1.0	0.00	0.00	61.9	0.0	61.9	59.9	2.02	30.684	
600.0	600.0	598.0	598.0	1.2	1.2	0.00	0.00	61.9	0.0	61.9	59.5	2.47	25.095 CC, ES	
700.0	700.0	698.0	698.0	1.4	1.5	-164.11	0.00	61.9	0.0	63.6	60.7	2.89	21.994	
800.0	799.8	797.8	797.8	1.6	1.7	-165.28	0.00	61.9	0.0	68.7	65.4	3.30	20.805	
900.0	899.5	897.5	897.5	1.8	1.9	-166.88	0.00	61.9	0.0	77.1	73.4	3.72	20.750	
959.5	958.6	956.6	956.6	2.0	2.0	-167.92	0.00	61.9	0.0	83.8	79.8	3.97	21.121	
1,000.0	998.7	996.7	996.7	2.1	2.1	-168.60	0.00	61.9	0.0	88.8	84.6	4.14	21.440	
1,100.0	1,098.0	1,096.0	1,096.0	2.3	2.4	-170.00	0.00	61.9	0.0	101.1	96.5	4.57	22.109	
1,200.0	1,197.2	1,195.2	1,195.2	2.6	2.6	-171.10	0.00	61.9	0.0	113.4	108.4	5.01	22.646	
1,300.0	1,296.4	1,294.4	1,294.4	2.9	2.8	-171.98	0.00	61.9	0.0	125.8	120.3	5.45	23.084	
1,400.0	1,395.6	1,393.6	1,393.6	3.2	3.0	-172.71	0.00	61.9	0.0	138.2	132.3	5.89	23.448	
1,500.0	1,494.8	1,492.8	1,492.8	3.5	3.2	-173.31	0.00	61.9	0.0	150.6	144.3	6.34	23.753	
1,600.0	1,594.0	1,594.9	1,594.8	3.8	3.5	-173.36	0.00	61.3	1.5	162.3	155.5	6.78	23.935	
1,700.0	1,693.2	1,695.9	1,695.8	4.1	3.7	-172.51	0.00	59.6	5.8	172.3	165.0	7.20	23.912	
1,800.0	1,792.4	1,795.4	1,795.2	4.4	3.8	-171.62	0.00	57.6	10.6	182.0	174.4	7.64	23.842	
1,900.0	1,891.7	1,894.9	1,894.5	4.8	4.1	-170.83	0.00	55.7	15.4	191.9	183.8	8.07	23.765	
2,000.0	1,990.9	1,994.4	1,993.9	5.1	4.3	-170.11	0.00	53.8	20.2	201.7	193.2	8.52	23.684	
2,100.0	2,090.1	2,093.9	2,093.2	5.4	4.5	-169.47	0.00	51.8	24.9	211.6	202.7	8.97	23.601	
2,200.0	2,189.3	2,193.4	2,192.6	5.7	4.7	-168.87	0.00	49.9	29.7	221.5	212.1	9.42	23.518	
2,300.0	2,288.5	2,292.8	2,291.9	6.0	4.9	-168.33	0.00	48.0	34.5	231.5	221.6	9.88	23.435	
2,400.0	2,387.7	2,392.3	2,391.3	6.4	5.1	-167.84	0.00	46.1	39.2	241.4	231.1	10.34	23.354	
2,500.0	2,486.9	2,491.8	2,490.6	6.7	5.3	-167.38	0.00	44.1	44.0	251.4	240.6	10.80	23.274	
2,600.0	2,586.2	2,591.3	2,590.0	7.0	5.6	-166.96	0.00	42.2	48.8	261.4	250.1	11.27	23.197	
2,700.0	2,685.4	2,690.8	2,689.3	7.3	5.8	-166.57	0.00	40.3	53.6	271.4	259.6	11.74	23.123	
2,800.0	2,784.6	2,790.3	2,788.7	7.7	6.0	-166.20	0.00	38.3	58.3	281.4	269.2	12.21	23.051	
2,900.0	2,883.8	2,889.7	2,888.0	8.0	6.2	-165.87	0.00	36.4	63.1	291.4	278.7	12.68	22.981	
3,000.0	2,983.0	2,989.2	2,987.4	8.3	6.5	-165.55	0.00	34.5	67.9	301.4	288.3	13.15	22.915	
3,100.0	3,082.2	3,088.7	3,086.7	8.7	6.7	-165.26	0.00	32.5	72.7	311.5	297.8	13.63	22.851	
3,200.0	3,181.4	3,188.2	3,186.1	9.0	6.9	-164.98	0.00	30.6	77.4	321.5	307.4	14.11	22.789	
3,300.0	3,280.7	3,287.7	3,285.4	9.3	7.2	-164.72	0.00	28.7	82.2	331.6	317.0	14.59	22.730	
3,400.0	3,379.9	3,387.1	3,384.8	9.6	7.4	-164.47	0.00	26.7	87.0	341.6	326.6	15.07	22.673	
3,500.0	3,479.1	3,486.6	3,484.1	10.0	7.6	-164.24	0.00	24.8	91.7	351.7	336.1	15.55	22.619	
3,600.0	3,578.3	3,586.1	3,583.5	10.3	7.9	-164.02	0.00	22.9	96.5	361.8	345.7	16.03	22.567	
3,700.0	3,677.5	3,685.6	3,682.8	10.6	8.1	-163.82	0.00	21.0	101.3	371.8	355.3	16.51	22.516	
3,800.0	3,776.7	3,785.1	3,782.1	11.0	8.3	-163.62	0.00	19.0	106.1	381.9	364.9	17.00	22.468	
3,900.0	3,875.9	3,884.6	3,881.5	11.3	8.6	-163.44	0.00	17.1	110.8	392.0	374.5	17.48	22.422	
4,000.0	3,975.1	3,984.0	3,980.8	11.6	8.8	-163.26	0.00	15.2	115.6	402.1	384.1	17.97	22.378	
4,100.0	4,074.4	4,083.5	4,080.2	11.9	9.1	-163.09	0.00	13.2	120.4	412.2	393.7	18.45	22.335	
4,200.0	4,173.6	4,183.0	4,179.5	12.3	9.3	-162.94	0.00	11.3	125.2	422.3	403.3	18.94	22.294	
4,300.0	4,272.8	4,282.5	4,278.9	12.6	9.5	-162.78	0.00	9.4	129.9	432.4	412.9	19.43	22.254	
4,400.0	4,372.0	4,382.0	4,378.2	12.9	9.8	-162.64	0.00	7.4	134.7	442.5	422.5	19.92	22.216	
4,500.0	4,471.2	4,481.5	4,477.6	13.3	10.0	-162.50	0.00	5.5	139.5	452.6	432.2	20.40	22.180	
4,600.0	4,570.4	4,580.9	4,576.9	13.6	10.2	-162.37	0.00	3.6	144.2	462.7	441.8	20.89	22.144	
4,700.0	4,669.6	4,680.4	4,676.3	13.9	10.5	-162.24	0.00	1.6	149.0	472.8	451.4	21.38	22.110	
4,800.0	4,768.9	4,779.9	4,775.6	14.3	10.7	-162.12	0.00	-0.3	153.8	482.9	461.0	21.87	22.077	
4,900.0	4,868.1	4,878.1	4,873.7	14.6	11.0	-162.01	0.00	-2.2	158.4	493.0	470.7	22.35	22.055	

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 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28V-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-434 - Wellbore #1 - Plan #1 (11-18-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,000.0	4,967.3	4,971.7	4,967.3	14.9	11.1	-162.15		-3.1	160.8	504.0	481.2	22.78	22.122	
5,100.0	5,066.5	5,068.9	5,064.5	15.3	11.3	-162.55		-3.2	161.0	515.8	492.6	23.20	22.233	
5,175.5	5,141.4	5,143.9	5,139.4	15.5	11.5	-162.86		-3.2	161.0	524.9	501.4	23.52	22.312	
5,200.0	5,165.7	5,168.2	5,163.7	15.6	11.5	-162.97		-3.2	161.0	527.7	504.1	23.63	22.331	
5,300.0	5,265.2	5,267.7	5,263.2	15.8	11.7	-163.33		-3.2	161.0	537.2	513.2	24.03	22.355	
5,400.0	5,365.0	5,367.4	5,363.0	16.0	11.9	-163.56		-3.2	161.0	543.4	519.0	24.41	22.262	
5,500.0	5,465.0	5,467.4	5,463.0	16.1	12.1	-163.67		-3.2	161.0	546.3	521.5	24.76	22.060	
5,535.0	5,500.0	5,502.4	5,498.0	16.2	12.2	0.00		-3.2	161.0	546.5	518.7	27.76	19.687	
5,600.0	5,565.0	5,567.4	5,563.0	16.3	12.3	0.00		-3.2	161.0	546.5	518.5	27.99	19.524	
5,700.0	5,665.0	5,667.4	5,663.0	16.4	12.5	0.00		-3.2	161.0	546.5	518.1	28.33	19.290	
5,800.0	5,765.0	5,767.4	5,763.0	16.5	12.7	0.00		-3.2	161.0	546.5	517.8	28.67	19.060	
5,900.0	5,865.0	5,867.4	5,863.0	16.7	12.9	0.00		-3.2	161.0	546.5	517.4	29.01	18.834	
6,000.0	5,965.0	5,967.4	5,963.0	16.8	13.1	0.00		-3.2	161.0	546.5	517.1	29.36	18.611	
6,100.0	6,065.0	6,067.4	6,063.0	16.9	13.3	0.00		-3.2	161.0	546.5	516.7	29.71	18.392	
6,200.0	6,165.0	6,167.4	6,163.0	17.1	13.5	0.00		-3.2	161.0	546.5	516.4	30.06	18.177	
6,300.0	6,265.0	6,267.4	6,263.0	17.2	13.7	0.00		-3.2	161.0	546.5	516.0	30.42	17.965	
6,400.0	6,365.0	6,367.4	6,363.0	17.4	14.0	0.00		-3.2	161.0	546.5	515.7	30.77	17.758	
6,500.0	6,465.0	6,467.4	6,463.0	17.5	14.2	0.00		-3.2	161.0	546.5	515.3	31.13	17.553	
6,537.5	6,502.5	6,504.9	6,500.5	17.6	14.2	0.00		-3.2	161.0	546.5	515.2	31.27	17.477	
6,550.0	6,515.0	6,517.4	6,513.0	17.6	14.3	90.00		-3.2	160.9	546.5	517.7	28.78	18.990	
6,600.0	6,564.9	6,567.4	6,562.9	17.7	14.4	90.01		-3.2	158.5	546.5	517.5	28.95	18.875	
6,650.0	6,614.6	6,617.4	6,612.6	17.7	14.4	90.02		-3.2	152.9	546.5	517.4	29.10	18.777	
6,700.0	6,663.7	6,667.4	6,661.8	17.8	14.5	90.03		-3.2	144.0	546.5	517.2	29.24	18.689	
6,750.0	6,712.2	6,717.4	6,710.3	17.8	14.6	90.03		-3.2	131.9	546.5	517.1	29.36	18.611	
6,800.0	6,759.8	6,767.5	6,758.0	17.9	14.6	90.04		-3.2	116.7	546.5	517.0	29.48	18.536	
6,850.0	6,806.3	6,817.5	6,804.5	17.9	14.7	90.05		-3.2	98.4	546.5	516.9	29.60	18.461	
6,900.0	6,851.5	6,867.5	6,849.7	18.0	14.8	90.06		-3.2	77.1	546.5	516.7	29.74	18.377	
6,950.0	6,895.2	6,917.6	6,893.5	18.0	14.8	90.06		-3.2	52.8	546.5	516.6	29.90	18.277	
7,000.0	6,937.2	6,967.6	6,935.6	18.0	14.9	90.07		-3.2	25.8	546.5	516.4	30.10	18.152	
7,050.0	6,977.4	7,017.6	6,975.8	18.1	15.1	90.08		-3.2	-4.0	546.5	516.1	30.37	17.993	
7,100.0	7,015.5	7,067.7	7,014.0	18.1	15.2	90.08		-3.2	-36.3	546.5	515.7	30.72	17.790	
7,150.0	7,051.4	7,117.7	7,050.0	18.2	15.5	90.09		-3.2	-71.1	546.5	515.3	31.16	17.537	
7,200.0	7,085.0	7,167.8	7,083.7	18.3	15.8	90.09		-3.2	-108.1	546.5	514.7	31.72	17.227	
7,250.0	7,116.1	7,217.9	7,114.8	18.3	16.1	90.10		-3.2	-147.3	546.5	514.0	32.42	16.858	
7,300.0	7,144.5	7,267.9	7,143.3	18.5	16.5	90.10		-3.2	-188.4	546.5	513.2	33.26	16.432	
7,350.0	7,170.2	7,318.0	7,169.1	18.7	17.1	90.11		-3.2	-231.3	546.5	512.2	34.25	15.955	
7,400.0	7,193.1	7,368.0	7,192.0	19.0	17.6	90.11		-3.2	-275.9	546.5	511.1	35.41	15.434	
7,450.0	7,213.0	7,418.1	7,211.9	19.4	18.3	90.11		-3.2	-321.8	546.5	509.7	36.72	14.882	
7,500.0	7,229.8	7,468.2	7,228.8	20.0	19.1	90.12		-3.2	-368.9	546.5	508.3	38.19	14.311	
7,550.0	7,243.5	7,518.3	7,242.6	20.7	19.9	90.12		-3.2	-417.0	546.5	506.7	39.79	13.732	
7,600.0	7,254.1	7,568.3	7,253.2	21.5	20.7	90.12		-3.2	-466.0	546.5	504.9	41.53	13.158	
7,650.0	7,261.4	7,618.4	7,260.6	22.3	21.7	90.12		-3.2	-515.5	546.5	503.1	43.38	12.598	
7,657.5	7,262.2	7,625.9	7,261.4	22.5	21.8	90.12		-3.2	-523.0	546.5	502.8	43.66	12.516	
7,700.0	7,266.7	7,668.4	7,265.8	23.3	22.6	90.12		-3.2	-565.2	546.5	501.1	45.33	12.055	
7,731.5	7,270.0	7,699.9	7,269.1	23.9	23.3	90.12		-3.2	-596.6	546.5	499.9	46.59	11.729	
7,800.0	7,275.1	7,768.5	7,274.2	25.3	24.7	90.12		-3.2	-664.9	546.5	497.0	49.46	11.048	
7,850.1	7,276.2	7,818.7	7,275.4	26.3	25.8	90.12		-3.2	-715.1	546.5	494.8	51.61	10.588	
7,900.0	7,276.3	7,868.5	7,275.4	27.4	26.9	90.11		-3.2	-765.0	546.5	492.6	53.83	10.152	
8,000.0	7,276.4	7,968.5	7,275.3	29.7	29.2	90.09		-3.2	-864.9	546.5	488.1	58.40	9.357	
8,100.0	7,276.6	8,068.5	7,275.2	32.0	31.6	90.07		-3.2	-964.9	546.5	483.3	63.15	8.654	
8,200.0	7,276.7	8,168.5	7,275.1	34.4	34.0	90.04		-3.2	-1,064.9	546.5	478.4	68.02	8.034	

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 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Offset Design Sunmarke 28V-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-434 - Wellbore #1 - Plan #1 (11-18-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
8,300.0	7,276.8	8,268.5	7,275.0	36.9	36.5	90.02	-3.2	-1,164.9	546.5	473.5	73.00	7.486		
8,400.0	7,276.9	8,368.5	7,274.9	39.4	39.0	90.00	-3.2	-1,264.9	546.5	468.4	78.07	7.000		
8,402.4	7,276.9	8,371.0	7,274.9	39.5	39.1	90.00	-3.2	-1,267.4	546.5	468.3	78.19	6.989		
8,500.0	7,277.0	8,468.5	7,274.8	41.9	41.6	89.98	-3.2	-1,364.9	546.5	463.3	83.21	6.568		
8,600.0	7,277.2	8,568.5	7,274.7	44.5	44.2	89.96	-3.2	-1,464.9	546.5	458.1	88.40	6.182		
8,700.0	7,277.3	8,668.5	7,274.7	47.1	46.8	89.93	-3.2	-1,564.9	546.5	452.8	93.64	5.835		
8,800.0	7,277.4	8,768.5	7,274.6	49.8	49.5	89.91	-3.2	-1,664.9	546.5	447.5	98.93	5.524		
8,900.0	7,277.5	8,868.5	7,274.5	52.4	52.1	89.89	-3.2	-1,764.9	546.5	442.2	104.25	5.242		
9,000.0	7,277.7	8,968.5	7,274.4	55.1	54.8	89.87	-3.2	-1,864.9	546.5	436.9	109.59	4.986		
9,100.0	7,277.8	9,068.5	7,274.3	57.7	57.5	89.85	-3.2	-1,964.9	546.5	431.5	114.97	4.753		
9,200.0	7,277.9	9,168.5	7,274.2	60.4	60.2	89.82	-3.2	-2,064.9	546.5	426.1	120.36	4.540		
9,300.0	7,278.0	9,268.5	7,274.1	63.1	62.9	89.80	-3.2	-2,164.9	546.5	420.7	125.78	4.345		
9,400.0	7,278.1	9,368.5	7,274.1	65.8	65.6	89.78	-3.2	-2,264.9	546.5	415.3	131.21	4.165		
9,500.0	7,278.3	9,468.5	7,274.0	68.5	68.3	89.76	-3.2	-2,364.9	546.5	409.8	136.65	3.999		
9,600.0	7,278.4	9,568.5	7,273.9	71.3	71.1	89.74	-3.2	-2,464.9	546.5	404.4	142.11	3.845		
9,700.0	7,278.5	9,668.5	7,273.8	74.0	73.8	89.72	-3.2	-2,564.9	546.5	398.9	147.58	3.703		
9,800.0	7,278.6	9,768.5	7,273.7	76.7	76.5	89.69	-3.2	-2,664.9	546.5	393.4	153.06	3.570		
9,900.0	7,278.8	9,868.5	7,273.6	79.5	79.3	89.67	-3.2	-2,764.9	546.5	387.9	158.55	3.447		
10,000.0	7,278.9	9,968.5	7,273.5	82.2	82.0	89.65	-3.2	-2,864.9	546.5	382.4	164.05	3.331		
10,100.0	7,279.0	10,068.5	7,273.4	85.0	84.8	89.63	-3.2	-2,964.9	546.5	376.9	169.55	3.223		
10,200.0	7,279.1	10,168.5	7,273.4	87.7	87.5	89.61	-3.2	-3,064.9	546.5	371.4	175.06	3.122		
10,300.0	7,279.2	10,268.5	7,273.3	90.5	90.3	89.58	-3.2	-3,164.9	546.5	365.9	180.58	3.026		
10,400.0	7,279.4	10,368.5	7,273.2	93.2	93.1	89.56	-3.2	-3,264.9	546.5	360.4	186.10	2.936		
10,500.0	7,279.5	10,468.5	7,273.1	96.0	95.8	89.54	-3.2	-3,364.9	546.5	354.8	191.63	2.852		
10,600.0	7,279.6	10,568.5	7,273.0	98.7	98.6	89.52	-3.2	-3,464.9	546.5	349.3	197.17	2.772		
10,700.0	7,279.7	10,668.5	7,272.9	101.5	101.4	89.50	-3.2	-3,564.9	546.5	343.8	202.70	2.696		
10,800.0	7,279.9	10,768.5	7,272.8	104.3	104.1	89.47	-3.2	-3,664.9	546.5	338.2	208.25	2.624		
10,900.0	7,280.0	10,868.5	7,272.7	107.0	106.9	89.45	-3.2	-3,764.9	546.5	332.7	213.79	2.556		
11,000.0	7,280.1	10,968.5	7,272.7	109.8	109.7	89.43	-3.2	-3,864.9	546.5	327.1	219.34	2.492		
11,100.0	7,280.2	11,068.5	7,272.6	112.6	112.5	89.41	-3.2	-3,964.9	546.5	321.6	224.89	2.430		
11,200.0	7,280.3	11,168.5	7,272.5	115.4	115.2	89.39	-3.2	-4,064.9	546.5	316.0	230.44	2.371		
11,300.0	7,280.5	11,268.5	7,272.4	118.1	118.0	89.36	-3.2	-4,164.9	546.5	310.5	236.00	2.316		
11,400.0	7,280.6	11,368.5	7,272.3	120.9	120.8	89.34	-3.2	-4,264.9	546.5	304.9	241.56	2.262		
11,500.0	7,280.7	11,468.5	7,272.2	123.7	123.6	89.32	-3.2	-4,364.9	546.5	299.4	247.12	2.211		
11,600.0	7,280.8	11,568.5	7,272.1	126.5	126.4	89.30	-3.2	-4,464.9	546.5	293.8	252.69	2.163		
11,700.0	7,280.9	11,668.5	7,272.0	129.3	129.2	89.28	-3.2	-4,564.9	546.5	288.2	258.25	2.116		
11,741.3	7,281.0	11,709.8	7,272.0	130.4	130.2	89.27	-3.2	-4,606.2	546.5	286.1	260.45	2.098 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4923.0ft (RKB - 15')

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Sunmarke 28W-414

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 28W-414
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4923.0ft (RKB - 15')
Reference Site:	Sunmarke 28V-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4923.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28W-414	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 (11-18-13)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4923.0ft (RKB - 15')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Sunmarke 28W-414
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.40°

