

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Sunmarke 28V-404**

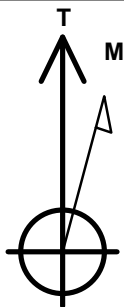
Surface Location: Sunmarke 28U-HZ Pad Sec.28-T4N-R67W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4894.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1349028.23	3171000.06	40.289860	-104.887010	
RKB - 15' WELL @ 4909.0ft (RKB - 15')						

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 398'FNL, 210'FEL		0.0	0.0	Point
BHL 1115'FNL, 500'FWL	7254.0	-633.5	-4611.6	Point



Azimuths to True North
Magnetic North: 8.59°

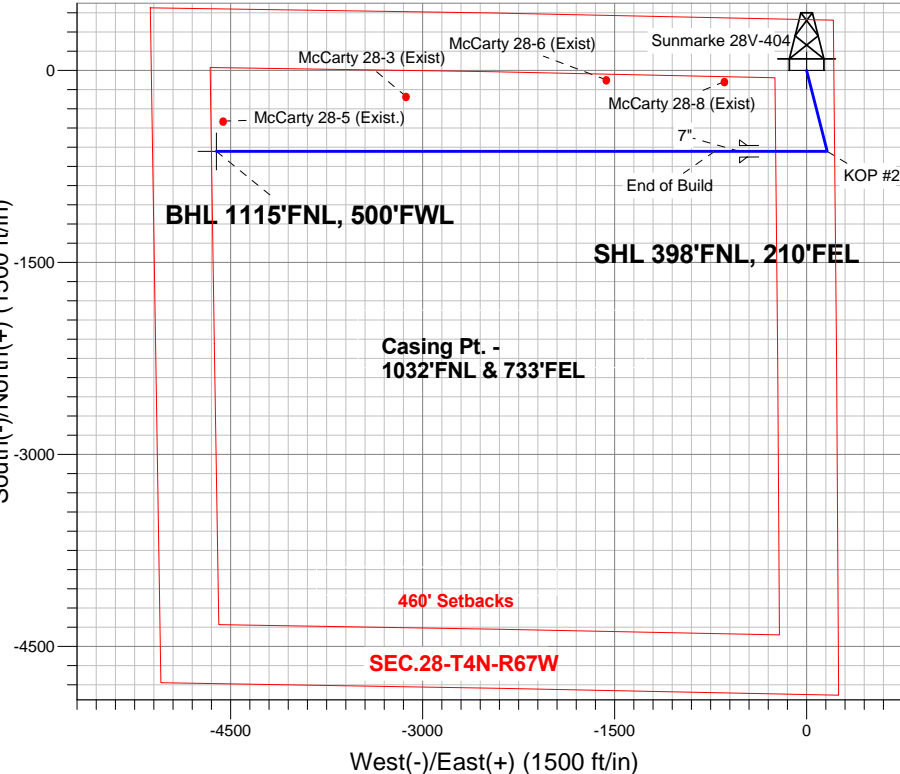
Magnetic Field
Strength: 52803.4snT
Dip Angle: 66.86°
Date: 11/21/2013
Model: IGRF2010

ANNOTATIONS

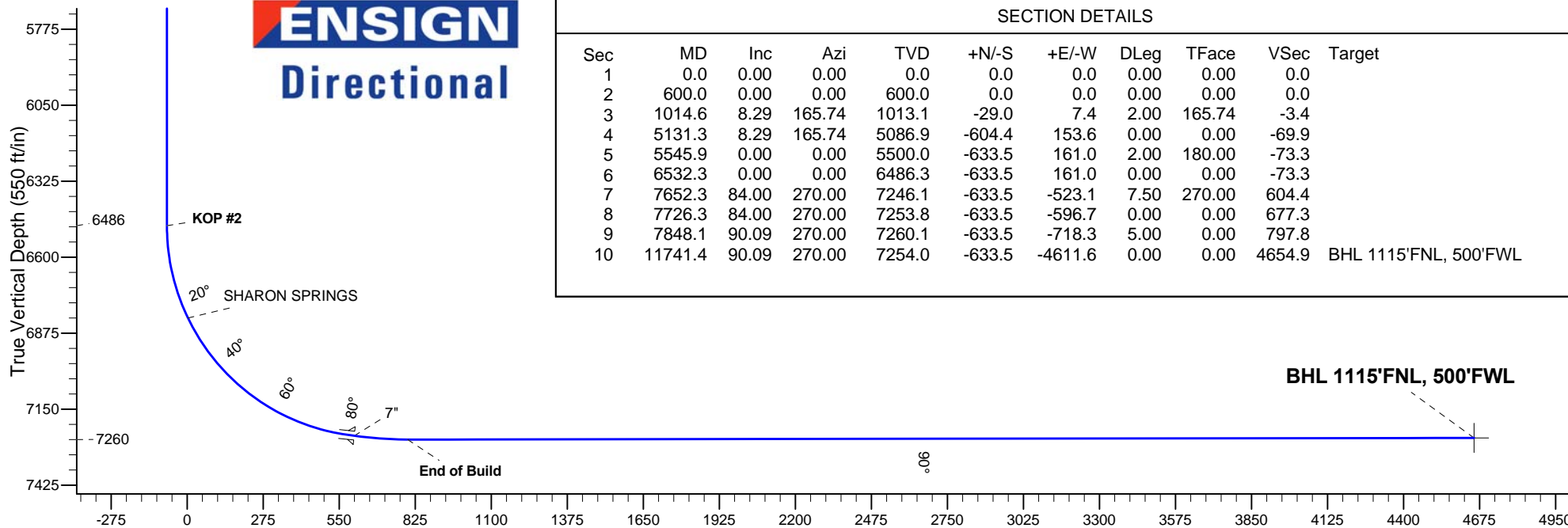
TVD	MD	Annotation
600.0	600.0	KOP #1
6486.4	6532.3	KOP #2
7260.1	7848.1	End of Build

Sunmarke 28U-HZ Pad Sec.28-T4N-R67W
Sunmarke 28V-404
Plan #1 (11-18-13)
8:08, November 21 2013

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	600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.0	
3	1014.6	8.29	165.74	1013.1	-29.0	7.4	2.00	165.74	-3.4	
4	5131.3	8.29	165.74	5086.9	-604.4	153.6	0.00	0.00	-69.9	
5	5545.9	0.00	0.00	5500.0	-633.5	161.0	2.00	180.00	-73.3	
6	6532.3	0.00	0.00	6486.3	-633.5	161.0	0.00	0.00	-73.3	
7	7652.3	84.00	270.00	7246.1	-633.5	-523.1	7.50	270.00	604.4	
8	7726.3	84.00	270.00	7253.8	-633.5	-596.7	0.00	0.00	677.3	
9	7848.1	90.09	270.00	7260.1	-633.5	-718.3	5.00	0.00	797.8	
10	11741.4	90.09	270.00	7254.0	-633.5	-4611.6	0.00	0.00	4654.9	BHL 1115'FNL, 500'FWL

BHL 1115'FNL, 500'FWL

Vertical Section at 262.18° (550 ft/in)



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.28-T4N-R67W

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

Sunmarke 28V-404

Wellbore #1

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

Standard Planning Report

21 November, 2013

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 28V-404
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28V-404	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 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 28V-404					
Well Position	+N/-S	-91.1 ft	Northing:	1,349,028.23 ft	Latitude:	40.289860
	+E/-W	0.0 ft	Easting:	3,171,000.06 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	11/21/2013	8.59	66.86	52,803

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	262.18

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	
1,014.6	8.29	165.74	1,013.1	-29.0	7.4	2.00	2.00	0.00	165.74	
5,131.3	8.29	165.74	5,086.9	-604.4	153.6	0.00	0.00	0.00	0.00	
5,545.9	0.00	0.00	5,500.0	-633.5	161.0	2.00	-2.00	0.00	180.00	
6,532.3	0.00	0.00	6,486.3	-633.5	161.0	0.00	0.00	0.00	0.00	
7,652.3	84.00	270.00	7,246.1	-633.5	-523.1	7.50	7.50	0.00	270.00	
7,726.3	84.00	270.00	7,253.8	-633.5	-596.7	0.00	0.00	0.00	0.00	
7,848.1	90.09	270.00	7,260.1	-633.5	-718.3	5.00	5.00	0.00	0.00	
11,741.4	90.09	270.00	7,254.0	-633.5	-4,611.6	0.00	0.00	0.00	0.00	BHL 1115'FNL, 500

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Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28V-404	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 398'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
KOP #1									
700.0	2.00	165.74	700.0	-1.7	0.4	-0.2	2.00	2.00	0.00
800.0	4.00	165.74	799.8	-6.8	1.7	-0.8	2.00	2.00	0.00
900.0	6.00	165.74	899.5	-15.2	3.9	-1.8	2.00	2.00	0.00
1,000.0	8.00	165.74	998.7	-27.0	6.9	-3.1	2.00	2.00	0.00
1,014.6	8.29	165.74	1,013.1	-29.0	7.4	-3.4	2.00	2.00	0.00
1,100.0	8.29	165.74	1,097.7	-41.0	10.4	-4.7	0.00	0.00	0.00
1,200.0	8.29	165.74	1,196.6	-54.9	14.0	-6.4	0.00	0.00	0.00
1,300.0	8.29	165.74	1,295.6	-68.9	17.5	-8.0	0.00	0.00	0.00
1,400.0	8.29	165.74	1,394.5	-82.9	21.1	-9.6	0.00	0.00	0.00
1,500.0	8.29	165.74	1,493.5	-96.9	24.6	-11.2	0.00	0.00	0.00
1,600.0	8.29	165.74	1,592.4	-110.8	28.2	-12.8	0.00	0.00	0.00
1,700.0	8.29	165.74	1,691.4	-124.8	31.7	-14.4	0.00	0.00	0.00
1,800.0	8.29	165.74	1,790.3	-138.8	35.3	-16.1	0.00	0.00	0.00
1,900.0	8.29	165.74	1,889.3	-152.8	38.8	-17.7	0.00	0.00	0.00
2,000.0	8.29	165.74	1,988.3	-166.8	42.4	-19.3	0.00	0.00	0.00
2,100.0	8.29	165.74	2,087.2	-180.7	45.9	-20.9	0.00	0.00	0.00
2,200.0	8.29	165.74	2,186.2	-194.7	49.5	-22.5	0.00	0.00	0.00
2,300.0	8.29	165.74	2,285.1	-208.7	53.0	-24.1	0.00	0.00	0.00
2,400.0	8.29	165.74	2,384.1	-222.7	56.6	-25.8	0.00	0.00	0.00
2,500.0	8.29	165.74	2,483.0	-236.6	60.1	-27.4	0.00	0.00	0.00
2,600.0	8.29	165.74	2,582.0	-250.6	63.7	-29.0	0.00	0.00	0.00
2,700.0	8.29	165.74	2,680.9	-264.6	67.3	-30.6	0.00	0.00	0.00
2,800.0	8.29	165.74	2,779.9	-278.6	70.8	-32.2	0.00	0.00	0.00
2,900.0	8.29	165.74	2,878.8	-292.6	74.4	-33.9	0.00	0.00	0.00
3,000.0	8.29	165.74	2,977.8	-306.5	77.9	-35.5	0.00	0.00	0.00
3,100.0	8.29	165.74	3,076.8	-320.5	81.5	-37.1	0.00	0.00	0.00
3,200.0	8.29	165.74	3,175.7	-334.5	85.0	-38.7	0.00	0.00	0.00
3,300.0	8.29	165.74	3,274.7	-348.5	88.6	-40.3	0.00	0.00	0.00
3,400.0	8.29	165.74	3,373.6	-362.4	92.1	-41.9	0.00	0.00	0.00
3,500.0	8.29	165.74	3,472.6	-376.4	95.7	-43.6	0.00	0.00	0.00
3,600.0	8.29	165.74	3,571.5	-390.4	99.2	-45.2	0.00	0.00	0.00
3,669.2	8.29	165.74	3,640.0	-400.1	101.7	-46.3	0.00	0.00	0.00
PARKMAN									
3,700.0	8.29	165.74	3,670.5	-404.4	102.8	-46.8	0.00	0.00	0.00
3,800.0	8.29	165.74	3,769.4	-418.3	106.3	-48.4	0.00	0.00	0.00
3,900.0	8.29	165.74	3,868.4	-432.3	109.9	-50.0	0.00	0.00	0.00
4,000.0	8.29	165.74	3,967.3	-446.3	113.4	-51.6	0.00	0.00	0.00
4,100.0	8.29	165.74	4,066.3	-460.3	117.0	-53.3	0.00	0.00	0.00
4,184.6	8.29	165.74	4,150.0	-472.1	120.0	-54.6	0.00	0.00	0.00
SUSSEX									
4,200.0	8.29	165.74	4,165.3	-474.3	120.5	-54.9	0.00	0.00	0.00
4,300.0	8.29	165.74	4,264.2	-488.2	124.1	-56.5	0.00	0.00	0.00
4,400.0	8.29	165.74	4,363.2	-502.2	127.6	-58.1	0.00	0.00	0.00

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Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28V-404	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	8.29	165.74	4,462.1	-516.2	131.2	-59.7	0.00	0.00	0.00
4,600.0	8.29	165.74	4,561.1	-530.2	134.7	-61.3	0.00	0.00	0.00
4,700.0	8.29	165.74	4,660.0	-544.1	138.3	-63.0	0.00	0.00	0.00
4,703.0	8.29	165.74	4,663.0	-544.6	138.4	-63.0	0.00	0.00	0.00
SHANNON									
4,800.0	8.29	165.74	4,759.0	-558.1	141.9	-64.6	0.00	0.00	0.00
4,900.0	8.29	165.74	4,857.9	-572.1	145.4	-66.2	0.00	0.00	0.00
5,000.0	8.29	165.74	4,956.9	-586.1	149.0	-67.8	0.00	0.00	0.00
5,100.0	8.29	165.74	5,055.8	-600.0	152.5	-69.4	0.00	0.00	0.00
5,131.3	8.29	165.74	5,086.9	-604.4	153.6	-69.9	0.00	0.00	0.00
5,200.0	6.92	165.74	5,154.9	-613.2	155.9	-71.0	2.00	-2.00	0.00
5,300.0	4.92	165.74	5,254.4	-623.2	158.4	-72.1	2.00	-2.00	0.00
5,400.0	2.92	165.74	5,354.1	-629.9	160.1	-72.9	2.00	-2.00	0.00
5,500.0	0.92	165.74	5,454.1	-633.1	160.9	-73.3	2.00	-2.00	0.00
5,545.9	0.00	0.00	5,500.0	-633.5	161.0	-73.3	2.00	-2.00	0.00
5,600.0	0.00	0.00	5,554.1	-633.5	161.0	-73.3	0.00	0.00	0.00
5,700.0	0.00	0.00	5,654.1	-633.5	161.0	-73.3	0.00	0.00	0.00
5,800.0	0.00	0.00	5,754.1	-633.5	161.0	-73.3	0.00	0.00	0.00
5,900.0	0.00	0.00	5,854.1	-633.5	161.0	-73.3	0.00	0.00	0.00
6,000.0	0.00	0.00	5,954.1	-633.5	161.0	-73.3	0.00	0.00	0.00
6,100.0	0.00	0.00	6,054.1	-633.5	161.0	-73.3	0.00	0.00	0.00
6,200.0	0.00	0.00	6,154.1	-633.5	161.0	-73.3	0.00	0.00	0.00
6,300.0	0.00	0.00	6,254.1	-633.5	161.0	-73.3	0.00	0.00	0.00
6,400.0	0.00	0.00	6,354.1	-633.5	161.0	-73.3	0.00	0.00	0.00
6,500.0	0.00	0.00	6,454.1	-633.5	161.0	-73.3	0.00	0.00	0.00
6,532.3	0.00	0.00	6,486.4	-633.5	161.0	-73.3	0.00	0.00	0.00
KOP #2									
6,600.0	5.08	270.00	6,554.0	-633.5	158.0	-70.3	7.50	7.50	0.00
6,700.0	12.58	270.00	6,652.7	-633.5	142.7	-55.1	7.50	7.50	0.00
6,800.0	20.08	270.00	6,748.6	-633.5	114.6	-27.3	7.50	7.50	0.00
6,877.6	25.90	270.00	6,820.0	-633.5	84.3	2.7	7.50	7.50	0.00
SHARON SPRINGS									
6,900.0	27.58	270.00	6,840.0	-633.5	74.2	12.7	7.50	7.50	0.00
7,000.0	35.08	270.00	6,925.4	-633.5	22.2	64.2	7.50	7.50	0.00
7,100.0	42.58	270.00	7,003.2	-633.5	-40.4	126.2	7.50	7.50	0.00
7,200.0	50.08	270.00	7,072.2	-633.5	-112.7	197.9	7.50	7.50	0.00
7,300.0	57.58	270.00	7,131.2	-633.5	-193.4	277.8	7.50	7.50	0.00
7,400.0	65.08	270.00	7,179.2	-633.5	-281.0	364.6	7.50	7.50	0.00
7,500.0	72.58	270.00	7,215.2	-633.5	-374.2	457.0	7.50	7.50	0.00
7,600.0	80.08	270.00	7,238.9	-633.5	-471.3	553.1	7.50	7.50	0.00
7,652.3	84.00	270.00	7,246.1	-633.5	-523.1	604.5	7.50	7.50	0.00
7"									
7,700.0	84.00	270.00	7,251.1	-633.5	-570.6	651.5	0.00	0.00	0.00
7,726.3	84.00	270.00	7,253.8	-633.5	-596.7	677.3	0.00	0.00	0.00
7,800.0	87.69	270.00	7,259.2	-633.5	-670.2	750.2	5.00	5.00	0.00
7,848.1	90.09	270.00	7,260.1	-633.5	-718.3	797.8	5.00	5.00	0.00
End of Build									
7,900.0	90.09	270.00	7,260.0	-633.5	-770.2	849.2	0.00	0.00	0.00
8,000.0	90.09	270.00	7,259.9	-633.5	-870.2	948.3	0.00	0.00	0.00
8,100.0	90.09	270.00	7,259.7	-633.5	-970.2	1,047.4	0.00	0.00	0.00
8,200.0	90.09	270.00	7,259.6	-633.5	-1,070.2	1,146.4	0.00	0.00	0.00
8,300.0	90.09	270.00	7,259.4	-633.5	-1,170.2	1,245.5	0.00	0.00	0.00

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Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28V-404	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	90.09	270.00	7,259.2	-633.5	-1,270.2	1,344.6	0.00	0.00	0.00
8,500.0	90.09	270.00	7,259.1	-633.5	-1,370.2	1,443.6	0.00	0.00	0.00
8,600.0	90.09	270.00	7,258.9	-633.5	-1,470.2	1,542.7	0.00	0.00	0.00
8,700.0	90.09	270.00	7,258.8	-633.5	-1,570.2	1,641.8	0.00	0.00	0.00
8,800.0	90.09	270.00	7,258.6	-633.5	-1,670.2	1,740.9	0.00	0.00	0.00
8,900.0	90.09	270.00	7,258.5	-633.5	-1,770.2	1,839.9	0.00	0.00	0.00
9,000.0	90.09	270.00	7,258.3	-633.5	-1,870.2	1,939.0	0.00	0.00	0.00
9,100.0	90.09	270.00	7,258.1	-633.5	-1,970.2	2,038.1	0.00	0.00	0.00
9,200.0	90.09	270.00	7,258.0	-633.5	-2,070.2	2,137.1	0.00	0.00	0.00
9,300.0	90.09	270.00	7,257.8	-633.5	-2,170.2	2,236.2	0.00	0.00	0.00
9,400.0	90.09	270.00	7,257.7	-633.5	-2,270.2	2,335.3	0.00	0.00	0.00
9,500.0	90.09	270.00	7,257.5	-633.5	-2,370.2	2,434.3	0.00	0.00	0.00
9,600.0	90.09	270.00	7,257.4	-633.5	-2,470.2	2,533.4	0.00	0.00	0.00
9,700.0	90.09	270.00	7,257.2	-633.5	-2,570.2	2,632.5	0.00	0.00	0.00
9,800.0	90.09	270.00	7,257.0	-633.5	-2,670.2	2,731.6	0.00	0.00	0.00
9,900.0	90.09	270.00	7,256.9	-633.5	-2,770.2	2,830.6	0.00	0.00	0.00
10,000.0	90.09	270.00	7,256.7	-633.5	-2,870.2	2,929.7	0.00	0.00	0.00
10,100.0	90.09	270.00	7,256.6	-633.5	-2,970.2	3,028.8	0.00	0.00	0.00
10,200.0	90.09	270.00	7,256.4	-633.5	-3,070.2	3,127.8	0.00	0.00	0.00
10,300.0	90.09	270.00	7,256.3	-633.5	-3,170.2	3,226.9	0.00	0.00	0.00
10,400.0	90.09	270.00	7,256.1	-633.5	-3,270.2	3,326.0	0.00	0.00	0.00
10,500.0	90.09	270.00	7,255.9	-633.5	-3,370.2	3,425.0	0.00	0.00	0.00
10,600.0	90.09	270.00	7,255.8	-633.5	-3,470.2	3,524.1	0.00	0.00	0.00
10,700.0	90.09	270.00	7,255.6	-633.5	-3,570.2	3,623.2	0.00	0.00	0.00
10,800.0	90.09	270.00	7,255.5	-633.5	-3,670.2	3,722.3	0.00	0.00	0.00
10,900.0	90.09	270.00	7,255.3	-633.5	-3,770.2	3,821.3	0.00	0.00	0.00
11,000.0	90.09	270.00	7,255.2	-633.5	-3,870.2	3,920.4	0.00	0.00	0.00
11,100.0	90.09	270.00	7,255.0	-633.5	-3,970.2	4,019.5	0.00	0.00	0.00
11,200.0	90.09	270.00	7,254.9	-633.5	-4,070.2	4,118.5	0.00	0.00	0.00
11,300.0	90.09	270.00	7,254.7	-633.5	-4,170.2	4,217.6	0.00	0.00	0.00
11,400.0	90.09	270.00	7,254.5	-633.5	-4,270.2	4,316.7	0.00	0.00	0.00
11,500.0	90.09	270.00	7,254.4	-633.5	-4,370.2	4,415.7	0.00	0.00	0.00
11,600.0	90.09	270.00	7,254.2	-633.5	-4,470.2	4,514.8	0.00	0.00	0.00
11,700.0	90.09	270.00	7,254.1	-633.5	-4,570.2	4,613.9	0.00	0.00	0.00
11,741.4	90.09	270.00	7,254.0	-633.5	-4,611.6	4,654.9	0.00	0.00	0.00
BHL 1115'FNL, 500'FWL									

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
SHL 398'FNL, 210'FE	0.00	0.00	1.0	0.0	0.0	1,349,028.24	3,171,000.06	40.289860	-104.887010
- plan hits target center									
- Point									
BHL 1115'FNL, 500'F	0.00	0.00	7,254.0	-633.5	-4,611.6	1,348,362.94	3,166,393.18	40.288120	-104.903540
- plan hits target center									
- Point									

Database:	Landmark	Local Co-ordinate Reference:	Well Sunmarke 28V-404
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Project:	SEC.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	North Reference:	True
Well:	Sunmarke 28V-404	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 (")
7,652.3	7,246.1	7"	7	7-1/2

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,669.2	3,640.0	PARKMAN			
4,184.6	4,150.0	SUSSEX			
4,703.0	4,663.0	SHANNON			
6,877.6	6,820.0	SHARON SPRINGS			

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
600.0	600.0	0.0	0.0	KOP #1
6,532.3	6,486.4	-633.5	161.0	KOP #2
7,848.1	7,260.1	-633.5	-718.3	End of Build



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.28-T4N-R67W

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

Sunmarke 28V-404

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 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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	11/20/2013		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
0.0	11,741.4	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 28-3 (Exist) - Wellbore #1 - Wellbore #1	10,259.9	7,308.3	429.6	194.1	1.824	CC, ES
McCarty 28-3 (Exist) - Wellbore #1 - Wellbore #1	10,300.0	7,308.3	431.5	194.9	1.824	SF
McCarty 28-5 (Exist) - Wellbore #1 - Wellbore #1	11,688.3	7,318.1	236.8	-38.5	0.860	Level 1, CC, SF
McCarty 28-5 (Exist) - Wellbore #1 - Wellbore #1	11,700.0	7,318.1	237.1	-38.6	0.860	Level 1, ES
McCarty 28-6 (Exist) - Wellbore #1 - Wellbore #1	8,694.9	7,273.8	560.6	368.3	2.915	CC
McCarty 28-6 (Exist) - Wellbore #1 - Wellbore #1	8,700.0	7,273.8	560.7	368.2	2.913	ES, SF
McCarty 28-8 (Exist) - Wellbore #1 - Wellbore #1	7,771.4	7,254.7	546.0	376.6	3.223	CC, ES
McCarty 28-8 (Exist) - Wellbore #1 - Wellbore #1	7,800.0	7,256.2	546.8	376.7	3.215	SF
Sunmarke 28U-HZ Pad Sec.28-T4N-R67W						
Sunmarke 28U-334 - Wellbore #1 - Plan #1 (11-18-13)	600.0	600.0	91.1	88.6	36.835	CC, ES
Sunmarke 28U-334 - Wellbore #1 - Plan #1 (11-18-13)	11,741.4	11,597.5	809.1	552.9	3.157	SF
Sunmarke 28U-434 - Wellbore #1 - Plan #1 (11-18-13)	600.0	600.0	61.9	59.5	25.051	CC, ES
Sunmarke 28U-434 - Wellbore #1 - Plan #1 (11-18-13)	11,741.4	11,702.4	528.2	267.4	2.025	SF
Sunmarke 28V-214 - Wellbore #1 - Plan #1 (11-18-13)	600.0	600.0	29.1	26.7	11.788	CC, ES
Sunmarke 28V-214 - Wellbore #1 - Plan #1 (11-18-13)	11,741.4	11,508.4	348.3	145.3	1.715	SF

Offset Design													
Existing wells - Sec.28-T4N-R67W - McCarty 28-3 (Exist) - Wellbore #1 - Wellbore #1													
Survey Program: 7600-UNKNOWN													
Reference													
Offset													
Semi Major Axis													
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)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
9,400.0	7,257.7	7,309.7	7,309.7	66.1	146.2	90.18	-203.8	-3,130.1	961.3	749.3	211.97	4.535	
9,500.0	7,257.5	7,309.5	7,309.5	68.8	146.2	90.16	-203.8	-3,130.1	873.0	658.3	214.69	4.066	
9,600.0	7,257.4	7,309.4	7,309.4	71.5	146.2	90.14	-203.8	-3,130.1	787.5	570.1	217.41	3.622	
9,700.0	7,257.2	7,309.2	7,309.2	74.2	146.2	90.12	-203.8	-3,130.1	705.8	485.6	220.14	3.206	
9,800.0	7,257.0	7,309.0	7,309.0	77.0	146.2	90.10	-203.8	-3,130.1	629.4	406.5	222.88	2.824	
9,900.0	7,256.9	7,308.9	7,308.9	79.7	146.2	90.08	-203.8	-3,130.1	560.5	334.9	225.62	2.484	
10,000.0	7,256.7	7,308.7	7,308.7	82.4	146.2	90.05	-203.8	-3,130.1	502.2	273.8	228.36	2.199	
10,100.0	7,256.6	7,308.6	7,308.6	85.2	146.2	90.03	-203.8	-3,130.1	458.4	227.3	231.11	1.984	
10,200.0	7,256.4	7,308.4	7,308.4	87.9	146.2	90.01	-203.8	-3,130.1	433.8	199.9	233.87	1.855	
10,259.9	7,256.3	7,308.3	7,308.3	89.6	146.2	90.00	-203.8	-3,130.1	429.6	194.1	235.52	1.824	CC, ES
10,300.0	7,256.3	7,308.3	7,308.3	90.7	146.2	89.99	-203.8	-3,130.1	431.5	194.9	236.62	1.824	SF

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 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28-3 (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		Highside Toolface (°)	Offset Wellbore Centre		Distance		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)			Minimum Separation (ft)
10,400.0	7,256.1	7,308.1	7,308.1	93.4	146.2	89.97	-203.8	-3,130.1	451.9	212.5	239.38	1.888	
10,500.0	7,255.9	7,307.9	7,307.9	96.2	146.2	89.95	-203.8	-3,130.1	492.2	250.0	242.14	2.033	
10,600.0	7,255.8	7,307.8	7,307.8	99.0	146.2	89.93	-203.8	-3,130.1	547.9	303.0	244.90	2.237	
10,700.0	7,255.6	7,307.6	7,307.6	101.7	146.2	89.91	-203.8	-3,130.1	615.0	367.3	247.67	2.483	
10,800.0	7,255.5	7,307.5	7,307.5	104.5	146.1	89.89	-203.8	-3,130.1	690.1	439.7	250.43	2.756	
10,900.0	7,255.3	7,307.3	7,307.3	107.2	146.1	89.87	-203.8	-3,130.1	770.9	517.7	253.20	3.045	
11,000.0	7,255.2	7,307.2	7,307.2	110.0	146.1	89.84	-203.8	-3,130.1	855.7	599.8	255.97	3.343	
11,100.0	7,255.0	7,307.0	7,307.0	112.8	146.1	89.82	-203.8	-3,130.1	943.6	684.8	258.75	3.647	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28-5 (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)		
10,800.0	7,255.5	7,319.5	7,319.5	104.5	146.4	90.34	-396.7	-4,558.5	919.4	668.7	250.68	3.667	
10,900.0	7,255.3	7,319.3	7,319.3	107.2	146.4	90.30	-396.7	-4,558.5	823.1	569.7	253.45	3.248	
11,000.0	7,255.2	7,319.2	7,319.2	110.0	146.4	90.26	-396.7	-4,558.5	727.9	471.7	256.22	2.841	
11,100.0	7,255.0	7,319.0	7,319.0	112.8	146.4	90.22	-396.7	-4,558.5	634.2	375.2	258.99	2.449	
11,200.0	7,254.9	7,318.9	7,318.9	115.6	146.4	90.19	-396.7	-4,558.5	542.7	281.0	261.77	2.073	
11,300.0	7,254.7	7,318.7	7,318.7	118.3	146.4	90.15	-396.7	-4,558.5	454.8	190.3	264.54	1.719	
11,400.0	7,254.5	7,318.5	7,318.5	121.1	146.4	90.11	-396.7	-4,558.5	373.1	105.8	267.32	1.396 Level 3	
11,500.0	7,254.4	7,318.4	7,318.4	123.9	146.4	90.07	-396.7	-4,558.5	302.6	32.5	270.10	1.120 Level 2	
11,600.0	7,254.2	7,318.2	7,318.2	126.7	146.4	90.03	-396.7	-4,558.5	252.7	-20.1	272.88	0.926 Level 1	
11,688.3	7,254.1	7,318.1	7,318.1	129.1	146.4	90.00	-396.7	-4,558.5	236.8	-38.5	275.33	0.860 Level 1, CC, SF	
11,700.0	7,254.1	7,318.1	7,318.1	129.5	146.4	90.00	-396.7	-4,558.5	237.1	-38.6	275.66	0.860 Level 1, ES	
11,741.4	7,254.0	7,318.0	7,318.0	130.6	146.4	89.98	-396.7	-4,558.5	242.7	-34.2	276.81	0.877 Level 1	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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												Offset Site Error:	0.0 ft
Survey Program: 7600-UNKNOWN												Offset Well Error:	0.0 ft
Existing wells - Sec.28-T4N-R67W - McCarty 28-6 (Exist) - Wellbore #1 - Wellbore #1													
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
7,900.0	7,260.0	7,275.0	7,275.0	27.8	145.5	90.13	-72.8	-1,565.1	972.7	800.1	172.61	5.635	
8,000.0	7,259.9	7,274.9	7,274.9	30.0	145.5	90.11	-72.8	-1,565.1	892.8	717.9	174.89	5.105	
8,100.0	7,259.7	7,274.7	7,274.7	32.3	145.5	90.10	-72.8	-1,565.1	817.4	640.2	177.25	4.612	
8,200.0	7,259.6	7,274.6	7,274.6	34.7	145.5	90.08	-72.8	-1,565.1	747.8	568.1	179.69	4.162	
8,300.0	7,259.4	7,274.4	7,274.4	37.2	145.5	90.06	-72.8	-1,565.1	685.7	503.6	182.17	3.764	
8,400.0	7,259.2	7,274.2	7,274.2	39.7	145.5	90.05	-72.8	-1,565.1	633.5	448.8	184.70	3.430	
8,500.0	7,259.1	7,274.1	7,274.1	42.2	145.5	90.03	-72.8	-1,565.1	593.5	406.3	187.26	3.170	
8,600.0	7,258.9	7,273.9	7,273.9	44.8	145.5	90.02	-72.8	-1,565.1	568.6	378.8	189.86	2.995	
8,694.9	7,258.8	7,273.8	7,273.8	47.3	145.5	90.00	-72.8	-1,565.1	560.6	368.3	192.34	2.915 CC	
8,700.0	7,258.8	7,273.8	7,273.8	47.4	145.5	90.00	-72.8	-1,565.1	560.7	368.2	192.47	2.913 ES, SF	
8,800.0	7,258.6	7,273.6	7,273.6	50.0	145.5	89.98	-72.8	-1,565.1	570.4	375.3	195.11	2.924	
8,900.0	7,258.5	7,273.5	7,273.5	52.7	145.5	89.97	-72.8	-1,565.1	597.0	399.2	197.77	3.019	
9,000.0	7,258.3	7,273.3	7,273.3	55.3	145.5	89.95	-72.8	-1,565.1	638.3	437.9	200.43	3.185	
9,100.0	7,258.1	7,273.1	7,273.1	58.0	145.5	89.93	-72.8	-1,565.1	691.7	488.6	203.12	3.405	
9,200.0	7,258.0	7,273.0	7,273.0	60.7	145.5	89.92	-72.8	-1,565.1	754.6	548.8	205.81	3.667	
9,300.0	7,257.8	7,272.8	7,272.8	63.4	145.5	89.90	-72.8	-1,565.1	824.9	616.4	208.51	3.956	
9,400.0	7,257.7	7,272.7	7,272.7	66.1	145.5	89.89	-72.8	-1,565.1	900.9	689.6	211.22	4.265	
9,500.0	7,257.5	7,272.5	7,272.5	68.8	145.5	89.87	-72.8	-1,565.1	981.1	767.2	213.94	4.586	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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												Offset Site Error:	0.0 ft
Survey Program: 7600-UNKNOWN												Offset Well Error:	0.0 ft
Existing wells - Sec.28-T4N-R67W - McCarty 28-8 (Exist) - Wellbore #1 - Wellbore #1													
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
0.0	0.0	0.0	0.0	0.0	0.0	-97.76	-87.4	-641.6	647.6				
100.0	100.0	97.0	97.0	0.1	1.9	-97.76	-87.4	-641.6	647.6	645.5	2.05	315.493	
200.0	200.0	197.0	197.0	0.3	3.9	-97.76	-87.4	-641.6	647.6	643.3	4.28	151.396	
300.0	300.0	297.0	297.0	0.6	5.9	-97.76	-87.4	-641.6	647.6	641.1	6.50	99.594	
400.0	400.0	397.0	397.0	0.8	7.9	-97.76	-87.4	-641.6	647.6	638.8	8.73	74.205	
500.0	500.0	497.0	497.0	1.0	9.9	-97.76	-87.4	-641.6	647.6	636.6	10.95	59.130	
600.0	600.0	597.0	597.0	1.2	11.9	-97.76	-87.4	-641.6	647.6	634.4	13.18	49.147	
700.0	700.0	697.0	697.0	1.4	13.9	96.65	-87.4	-641.6	647.8	632.4	15.37	42.137	
800.0	799.8	796.8	796.8	1.6	15.9	97.10	-87.4	-641.6	648.4	630.8	17.55	36.939	
900.0	899.5	896.5	896.5	1.8	17.9	97.83	-87.4	-641.6	649.5	629.8	19.75	32.886	
1,000.0	998.7	995.7	995.7	2.1	19.9	98.85	-87.4	-641.6	651.3	629.3	21.97	29.642	
1,014.6	1,013.1	1,010.1	1,010.1	2.1	20.2	99.03	-87.4	-641.6	651.6	629.3	22.30	29.222	
1,100.0	1,097.7	1,094.7	1,094.7	2.3	21.9	100.08	-87.4	-641.6	653.7	629.5	24.22	26.988	
1,200.0	1,196.6	1,193.6	1,193.6	2.6	23.9	101.31	-87.4	-641.6	656.4	629.9	26.49	24.778	
1,300.0	1,295.6	1,292.6	1,292.6	2.9	25.9	102.52	-87.4	-641.6	659.4	630.6	28.77	22.919	
1,400.0	1,394.5	1,391.5	1,391.5	3.3	27.8	103.73	-87.4	-641.6	662.7	631.7	31.06	21.337	
1,500.0	1,493.5	1,490.5	1,490.5	3.6	29.8	104.92	-87.4	-641.6	666.3	633.0	33.35	19.978	
1,600.0	1,592.4	1,589.4	1,589.4	3.9	31.8	106.10	-87.4	-641.6	670.2	634.6	35.65	18.800	
1,700.0	1,691.4	1,688.4	1,688.4	4.3	33.8	107.27	-87.4	-641.6	674.4	636.5	37.95	17.772	
1,800.0	1,790.3	1,787.3	1,787.3	4.6	35.7	108.42	-87.4	-641.6	678.9	638.6	40.24	16.869	
1,900.0	1,889.3	1,886.3	1,886.3	4.9	37.7	109.56	-87.4	-641.6	683.6	641.1	42.54	16.069	
2,000.0	1,988.3	1,985.3	1,985.3	5.3	39.7	110.68	-87.4	-641.6	688.6	643.8	44.84	15.358	
2,100.0	2,087.2	2,084.2	2,084.2	5.6	41.7	111.78	-87.4	-641.6	693.9	646.8	47.13	14.722	
2,200.0	2,186.2	2,183.2	2,183.2	6.0	43.7	112.87	-87.4	-641.6	699.4	650.0	49.42	14.151	
2,300.0	2,285.1	2,282.1	2,282.1	6.3	45.6	113.94	-87.4	-641.6	705.2	653.5	51.71	13.637	
2,400.0	2,384.1	2,381.1	2,381.1	6.7	47.6	114.99	-87.4	-641.6	711.2	657.2	54.00	13.171	
2,500.0	2,483.0	2,480.0	2,480.0	7.0	49.6	116.03	-87.4	-641.6	717.5	661.2	56.28	12.748	
2,600.0	2,582.0	2,579.0	2,579.0	7.4	51.6	117.04	-87.4	-641.6	724.0	665.4	58.56	12.362	
2,700.0	2,680.9	2,677.9	2,677.9	7.7	53.6	118.04	-87.4	-641.6	730.7	669.9	60.84	12.010	
2,800.0	2,779.9	2,776.9	2,776.9	8.1	55.5	119.02	-87.4	-641.6	737.6	674.5	63.12	11.687	
2,900.0	2,878.8	2,875.8	2,875.8	8.5	57.5	119.99	-87.4	-641.6	744.8	679.4	65.39	11.390	
3,000.0	2,977.8	2,974.8	2,974.8	8.8	59.5	120.93	-87.4	-641.6	752.2	684.5	67.66	11.117	
3,100.0	3,076.8	3,073.8	3,073.8	9.2	61.5	121.86	-87.4	-641.6	759.7	689.8	69.92	10.865	
3,200.0	3,175.7	3,172.7	3,172.7	9.5	63.5	122.76	-87.4	-641.6	767.5	695.3	72.18	10.633	
3,300.0	3,274.7	3,271.7	3,271.7	9.9	65.4	123.65	-87.4	-641.6	775.5	701.0	74.44	10.417	
3,400.0	3,373.6	3,370.6	3,370.6	10.2	67.4	124.52	-87.4	-641.6	783.6	706.9	76.70	10.217	
3,500.0	3,472.6	3,469.6	3,469.6	10.6	69.4	125.38	-87.4	-641.6	791.9	713.0	78.95	10.030	
3,600.0	3,571.5	3,568.5	3,568.5	10.9	71.4	126.21	-87.4	-641.6	800.4	719.2	81.20	9.857	
3,700.0	3,670.5	3,667.5	3,667.5	11.3	73.3	127.03	-87.4	-641.6	809.1	725.6	83.45	9.695	
3,800.0	3,769.4	3,766.4	3,766.4	11.7	75.3	127.83	-87.4	-641.6	817.9	732.2	85.70	9.544	
3,900.0	3,868.4	3,865.4	3,865.4	12.0	77.3	128.62	-87.4	-641.6	826.9	739.0	87.94	9.403	
4,000.0	3,967.3	3,964.3	3,964.3	12.4	79.3	129.39	-87.4	-641.6	836.0	745.8	90.18	9.271	
4,100.0	4,066.3	4,063.3	4,063.3	12.7	81.3	130.14	-87.4	-641.6	845.3	752.9	92.41	9.147	
4,200.0	4,165.3	4,162.3	4,162.3	13.1	83.2	130.87	-87.4	-641.6	854.7	760.1	94.65	9.031	
4,300.0	4,264.2	4,261.2	4,261.2	13.4	85.2	131.59	-87.4	-641.6	864.3	767.4	96.88	8.921	
4,400.0	4,363.2	4,360.2	4,360.2	13.8	87.2	132.29	-87.4	-641.6	874.0	774.9	99.11	8.818	
4,500.0	4,462.1	4,459.1	4,459.1	14.2	89.2	132.98	-87.4	-641.6	883.8	782.5	101.34	8.721	
4,600.0	4,561.1	4,558.1	4,558.1	14.5	91.2	133.65	-87.4	-641.6	893.8	790.2	103.57	8.630	
4,700.0	4,660.0	4,657.0	4,657.0	14.9	93.1	134.31	-87.4	-641.6	903.8	798.0	105.79	8.544	
4,800.0	4,759.0	4,756.0	4,756.0	15.2	95.1	134.96	-87.4	-641.6	914.0	806.0	108.01	8.462	
4,900.0	4,857.9	4,854.9	4,854.9	15.6	97.1	135.58	-87.4	-641.6	924.3	814.1	110.23	8.385	

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 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28-8 (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		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	Offset		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
5,000.0	4,956.9	4,953.9	4,953.9	15.9	99.1	136.20	-87.4	-641.6	934.7	822.3	112.45	8.312		
5,100.0	5,055.8	5,052.8	5,052.8	16.3	101.1	136.80	-87.4	-641.6	945.2	830.6	114.67	8.243		
5,131.3	5,086.9	5,083.9	5,083.9	16.4	101.7	136.99	-87.4	-641.6	948.5	833.2	115.36	8.222		
5,200.0	5,154.9	5,151.9	5,151.9	16.6	103.0	137.45	-87.4	-641.6	955.2	838.2	117.03	8.163		
5,300.0	5,254.4	5,251.4	5,251.4	16.8	105.0	137.97	-87.4	-641.6	962.9	843.5	119.36	8.067		
5,400.0	5,354.1	5,351.1	5,351.1	17.0	107.0	138.30	-87.4	-641.6	968.0	846.4	121.64	7.958		
5,500.0	5,454.1	5,451.1	5,451.1	17.2	109.0	138.47	-87.4	-641.6	970.5	846.7	123.83	7.837		
5,545.9	5,500.0	5,497.0	5,497.0	17.2	109.9	-55.77	-87.4	-641.6	970.8	845.5	125.29	7.748		
5,600.0	5,554.1	5,551.1	5,551.1	17.3	111.0	-55.77	-87.4	-641.6	970.8	844.3	126.46	7.677		
5,700.0	5,654.1	5,651.1	5,651.1	17.4	113.0	-55.77	-87.4	-641.6	970.8	842.2	128.60	7.549		
5,800.0	5,754.1	5,751.1	5,751.1	17.6	115.0	-55.77	-87.4	-641.6	970.8	840.0	130.74	7.425		
5,900.0	5,854.1	5,851.1	5,851.1	17.7	117.0	-55.77	-87.4	-641.6	970.8	837.9	132.89	7.305		
6,000.0	5,954.1	5,951.1	5,951.1	17.8	119.0	-55.77	-87.4	-641.6	970.8	835.7	135.03	7.189		
6,100.0	6,054.1	6,051.1	6,051.1	17.9	121.0	-55.77	-87.4	-641.6	970.8	833.6	137.18	7.076		
6,200.0	6,154.1	6,151.1	6,151.1	18.1	123.0	-55.77	-87.4	-641.6	970.8	831.4	139.33	6.967		
6,300.0	6,254.1	6,251.1	6,251.1	18.2	125.0	-55.77	-87.4	-641.6	970.8	829.3	141.49	6.861		
6,400.0	6,354.1	6,351.1	6,351.1	18.4	127.0	-55.77	-87.4	-641.6	970.8	827.1	143.64	6.758		
6,500.0	6,454.1	6,451.1	6,451.1	18.5	129.0	-55.77	-87.4	-641.6	970.8	825.0	145.79	6.658		
6,532.3	6,486.3	6,483.3	6,483.3	18.5	129.7	-55.77	-87.4	-641.6	970.8	824.3	146.49	6.627		
6,550.0	6,504.1	6,501.1	6,501.1	18.6	130.0	34.24	-87.4	-641.6	970.6	824.2	146.38	6.631		
6,600.0	6,554.0	6,551.0	6,551.0	18.6	131.0	34.43	-87.4	-641.6	968.3	821.2	147.04	6.585		
6,650.0	6,603.6	6,600.6	6,600.6	18.7	132.0	34.85	-87.4	-641.6	963.3	816.0	147.27	6.541		
6,700.0	6,652.7	6,649.7	6,649.7	18.7	133.0	35.50	-87.4	-641.6	955.7	808.6	147.08	6.497		
6,750.0	6,701.1	6,698.1	6,698.1	18.8	134.0	36.40	-87.4	-641.6	945.4	798.9	146.53	6.452		
6,800.0	6,748.6	6,745.6	6,745.6	18.8	134.9	37.55	-87.4	-641.6	932.7	787.1	145.66	6.403		
6,850.0	6,795.0	6,792.0	6,792.0	18.9	135.8	38.99	-87.4	-641.6	917.7	773.1	144.59	6.346		
6,900.0	6,840.0	6,837.0	6,837.0	18.9	136.7	40.71	-87.4	-641.6	900.3	756.9	143.44	6.277		
6,950.0	6,883.6	6,880.6	6,880.6	18.9	137.6	42.76	-87.4	-641.6	880.9	738.5	142.36	6.188		
7,000.0	6,925.4	6,922.4	6,922.4	19.0	138.4	45.14	-87.4	-641.6	859.6	718.0	141.54	6.073		
7,050.0	6,965.3	6,962.3	6,962.3	19.0	139.2	47.88	-87.4	-641.6	836.6	695.4	141.18	5.926		
7,100.0	7,003.2	7,000.2	7,000.2	19.1	140.0	50.97	-87.4	-641.6	812.2	670.7	141.46	5.741		
7,150.0	7,038.9	7,035.9	7,035.9	19.1	140.7	54.40	-87.4	-641.6	786.6	644.1	142.51	5.520		
7,200.0	7,072.2	7,069.2	7,069.2	19.2	141.4	58.13	-87.4	-641.6	760.2	615.8	144.37	5.266		
7,250.0	7,103.1	7,100.1	7,100.1	19.3	142.0	62.11	-87.4	-641.6	733.4	586.4	146.95	4.991		
7,300.0	7,131.2	7,128.2	7,128.2	19.4	142.6	66.24	-87.4	-641.6	706.5	556.4	150.04	4.708		
7,350.0	7,156.6	7,153.6	7,153.6	19.6	143.1	70.40	-87.4	-641.6	680.0	526.6	153.35	4.434		
7,400.0	7,179.2	7,176.2	7,176.2	19.8	143.5	74.45	-87.4	-641.6	654.4	497.8	156.58	4.179		
7,450.0	7,198.7	7,195.7	7,195.7	20.1	143.9	78.25	-87.4	-641.6	630.2	470.7	159.47	3.952		
7,500.0	7,215.2	7,212.2	7,212.2	20.6	144.2	81.66	-87.4	-641.6	608.0	446.1	161.90	3.755		
7,550.0	7,228.6	7,225.6	7,225.6	21.2	144.5	84.58	-87.4	-641.6	588.4	424.6	163.85	3.591		
7,600.0	7,238.9	7,235.9	7,235.9	22.0	144.7	86.92	-87.4	-641.6	572.0	406.6	165.40	3.458		
7,652.3	7,246.1	7,243.1	7,243.1	22.9	144.9	88.70	-87.4	-641.6	558.8	392.0	166.72	3.351		
7,700.0	7,251.1	7,248.1	7,248.1	23.7	145.0	89.22	-87.4	-641.6	550.6	382.8	167.79	3.282		
7,726.3	7,253.8	7,250.8	7,250.8	24.2	145.0	89.51	-87.4	-641.6	547.9	379.5	168.39	3.254		
7,771.4	7,257.7	7,254.7	7,254.7	25.1	145.1	90.00	-87.4	-641.6	546.0	376.6	169.42	3.223 CC, ES		
7,800.0	7,259.2	7,256.2	7,256.2	25.7	145.1	90.12	-87.4	-641.6	546.8	376.7	170.05	3.215 SF		
7,848.1	7,260.1	7,257.1	7,257.1	26.7	145.1	89.99	-87.4	-641.6	551.4	380.3	171.10	3.223		
7,900.0	7,260.0	7,257.0	7,257.0	27.8	145.1	89.98	-87.4	-641.6	561.0	388.7	172.24	3.257		
8,000.0	7,259.9	7,256.9	7,256.9	30.0	145.1	89.96	-87.4	-641.6	591.9	417.4	174.52	3.392		
8,100.0	7,259.7	7,256.7	7,256.7	32.3	145.1	89.95	-87.4	-641.6	637.3	460.4	176.89	3.603		
8,200.0	7,259.6	7,256.6	7,256.6	34.7	145.1	89.93	-87.4	-641.6	694.1	514.8	179.32	3.871		

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 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28-8 (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
8,300.0	7,259.4	7,256.4	7,256.4	37.2	145.1	89.91	-87.4	-641.6	759.9	578.1	181.81	4.180	
8,400.0	7,259.2	7,256.2	7,256.2	39.7	145.1	89.90	-87.4	-641.6	832.6	648.3	184.34	4.517	
8,500.0	7,259.1	7,256.1	7,256.1	42.2	145.1	89.88	-87.4	-641.6	910.5	723.6	186.90	4.871	
8,600.0	7,258.9	7,255.9	7,255.9	44.8	145.1	89.86	-87.4	-641.6	992.3	802.8	189.49	5.237	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28U-334 - 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 (ft)	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	100.0	100.0	0.1	0.1	0.00	0.00	91.1	0.0	91.1	90.8	0.22	405.187	
200.0	200.0	200.0	200.0	0.3	0.3	0.00	0.00	91.1	0.0	91.1	90.4	0.67	135.062	
300.0	300.0	300.0	300.0	0.6	0.6	0.00	0.00	91.1	0.0	91.1	89.9	1.12	81.037	
400.0	400.0	400.0	400.0	0.8	0.8	0.00	0.00	91.1	0.0	91.1	89.5	1.57	57.884	
500.0	500.0	500.0	500.0	1.0	1.0	0.00	0.00	91.1	0.0	91.1	89.0	2.02	45.021	
600.0	600.0	600.0	600.0	1.2	1.2	0.00	0.00	91.1	0.0	91.1	88.6	2.47	36.835 CC, ES	
700.0	700.0	700.0	700.0	1.4	1.5	-166.00	0.00	91.1	0.0	92.8	89.9	2.90	32.027	
800.0	799.8	799.8	799.8	1.6	1.7	-166.71	0.00	91.1	0.0	97.9	94.5	3.30	29.615	
900.0	899.5	899.5	899.5	1.8	1.9	-167.76	0.00	91.1	0.0	106.4	102.6	3.72	28.587	
1,000.0	998.7	998.7	998.7	2.1	2.1	-168.96	0.00	91.1	0.0	118.3	114.2	4.14	28.558	
1,014.6	1,013.1	1,013.1	1,013.1	2.1	2.2	-169.14	0.00	91.1	0.0	120.3	116.1	4.20	28.621	
1,100.0	1,097.7	1,097.7	1,097.7	2.3	2.4	-170.15	0.00	91.1	0.0	132.4	127.9	4.57	28.963	
1,200.0	1,196.6	1,196.6	1,196.6	2.6	2.6	-171.11	0.00	91.1	0.0	146.7	141.7	5.01	29.272	
1,300.0	1,295.6	1,295.6	1,295.6	2.9	2.8	-171.90	0.00	91.1	0.0	160.9	155.5	5.45	29.510	
1,400.0	1,394.5	1,394.5	1,394.5	3.3	3.0	-172.57	0.00	91.1	0.0	175.2	169.3	5.90	29.698	
1,500.0	1,493.5	1,493.5	1,493.5	3.6	3.2	-173.13	0.00	91.1	0.0	189.5	183.2	6.35	29.848	
1,600.0	1,592.4	1,592.4	1,592.4	3.9	3.5	-173.62	0.00	91.1	0.0	203.9	197.1	6.80	29.971	
1,700.0	1,691.4	1,691.4	1,691.4	4.3	3.7	-174.04	0.00	91.1	0.0	218.2	211.0	7.26	30.071	
1,800.0	1,790.3	1,790.3	1,790.3	4.6	3.9	-174.41	0.00	91.1	0.0	232.6	224.9	7.71	30.155	
1,900.0	1,889.3	1,889.3	1,889.3	4.9	4.1	-174.73	0.00	91.1	0.0	246.9	238.8	8.17	30.226	
2,000.0	1,988.3	1,988.3	1,988.3	5.3	4.4	-175.02	0.00	91.1	0.0	261.3	252.7	8.63	30.286	
2,100.0	2,087.2	2,085.2	2,085.2	5.6	4.6	-175.02	0.00	91.6	1.2	276.0	266.9	9.08	30.405	
2,200.0	2,186.2	2,181.7	2,181.6	6.0	4.8	-174.39	0.00	93.4	5.3	291.5	282.0	9.52	30.605	
2,300.0	2,285.1	2,280.3	2,280.0	6.3	5.0	-173.54	0.00	95.8	10.9	307.4	297.5	9.98	30.803	
2,400.0	2,384.1	2,378.9	2,378.4	6.7	5.2	-172.78	0.00	98.2	16.4	323.4	313.0	10.44	30.979	
2,500.0	2,483.0	2,477.6	2,476.9	7.0	5.4	-172.09	0.00	100.7	22.0	339.5	328.6	10.90	31.133	
2,600.0	2,582.0	2,576.2	2,575.3	7.4	5.6	-171.46	0.00	103.1	27.6	355.6	344.2	11.37	31.268	
2,700.0	2,680.9	2,674.8	2,673.7	7.7	5.9	-170.88	0.00	105.5	33.2	371.7	359.9	11.84	31.389	
2,800.0	2,779.9	2,773.4	2,772.2	8.1	6.1	-170.35	0.00	107.9	38.7	387.9	375.6	12.32	31.496	
2,900.0	2,878.8	2,872.0	2,870.6	8.5	6.3	-169.87	0.00	110.4	44.3	404.1	391.3	12.79	31.591	
3,000.0	2,977.8	2,970.7	2,969.0	8.8	6.5	-169.42	0.00	112.8	49.9	420.4	407.1	13.27	31.677	
3,100.0	3,076.8	3,069.3	3,067.5	9.2	6.8	-169.01	0.00	115.2	55.5	436.6	422.9	13.75	31.753	
3,200.0	3,175.7	3,167.9	3,165.9	9.5	7.0	-168.62	0.00	117.7	61.1	452.9	438.6	14.23	31.822	
3,300.0	3,274.7	3,266.5	3,264.3	9.9	7.2	-168.26	0.00	120.1	66.6	469.2	454.5	14.71	31.884	
3,400.0	3,373.6	3,365.2	3,362.8	10.2	7.5	-167.93	0.00	122.5	72.2	485.5	470.3	15.20	31.941	
3,500.0	3,472.6	3,463.8	3,461.2	10.6	7.7	-167.62	0.00	124.9	77.8	501.8	486.1	15.69	31.992	
3,600.0	3,571.5	3,562.4	3,559.7	10.9	7.9	-167.32	0.00	127.4	83.4	518.1	502.0	16.17	32.039	
3,700.0	3,670.5	3,661.0	3,658.1	11.3	8.2	-167.05	0.00	129.8	89.0	534.5	517.8	16.66	32.081	
3,800.0	3,769.4	3,759.6	3,756.5	11.7	8.4	-166.79	0.00	132.2	94.5	550.9	533.7	17.15	32.120	
3,900.0	3,868.4	3,858.3	3,855.0	12.0	8.6	-166.54	0.00	134.7	100.1	567.2	549.6	17.64	32.156	
4,000.0	3,967.3	3,956.9	3,953.4	12.4	8.9	-166.31	0.00	137.1	105.7	583.6	565.5	18.13	32.188	
4,100.0	4,066.3	4,055.5	4,051.8	12.7	9.1	-166.10	0.00	139.5	111.3	600.0	581.4	18.62	32.219	
4,200.0	4,165.3	4,154.1	4,150.3	13.1	9.4	-165.89	0.00	141.9	116.9	616.4	597.3	19.12	32.246	
4,300.0	4,264.2	4,252.8	4,248.7	13.4	9.6	-165.70	0.00	144.4	122.4	632.8	613.2	19.61	32.272	
4,400.0	4,363.2	4,351.4	4,347.1	13.8	9.8	-165.51	0.00	146.8	128.0	649.2	629.1	20.10	32.296	
4,500.0	4,462.1	4,450.0	4,445.6	14.2	10.1	-165.33	0.00	149.2	133.6	665.6	645.0	20.60	32.318	
4,600.0	4,561.1	4,548.6	4,544.0	14.5	10.3	-165.17	0.00	151.7	139.2	682.0	661.0	21.09	32.338	
4,700.0	4,660.0	4,647.3	4,642.4	14.9	10.6	-165.01	0.00	154.1	144.7	698.5	676.9	21.59	32.357	
4,800.0	4,759.0	4,745.9	4,740.9	15.2	10.8	-164.85	0.00	156.5	150.3	714.9	692.8	22.08	32.375	
4,900.0	4,857.9	4,846.4	4,841.2	15.6	11.0	-164.71	0.00	159.0	156.0	731.3	708.8	22.58	32.392	

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 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28U-334 - 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	4,956.9	4,957.0	4,951.7	15.9	11.3	-164.75		160.6	159.6	746.7	723.7	23.04	32.406	
5,100.0	5,055.8	5,061.1	5,055.8	16.3	11.4	-165.03		160.7	160.0	760.8	737.3	23.48	32.405	
5,131.3	5,086.9	5,092.1	5,086.9	16.4	11.5	-165.11		160.7	160.0	765.2	741.6	23.61	32.405	
5,200.0	5,154.9	5,160.2	5,154.9	16.6	11.6	-165.33		160.7	160.0	774.0	750.0	23.94	32.335	
5,300.0	5,254.4	5,259.7	5,254.4	16.8	11.9	-165.57		160.7	160.0	784.0	759.6	24.36	32.178	
5,400.0	5,354.1	5,359.4	5,354.1	17.0	12.1	-165.73		160.7	160.0	790.6	765.8	24.76	31.927	
5,500.0	5,454.1	5,459.4	5,454.1	17.2	12.3	-165.80		160.7	160.0	793.8	768.7	25.13	31.586	
5,545.9	5,500.0	5,505.3	5,500.0	17.2	12.4	-0.07		160.7	160.0	794.2	765.1	29.03	27.354	
5,600.0	5,554.1	5,559.3	5,554.1	17.3	12.5	-0.07		160.7	160.0	794.2	765.0	29.23	27.172	
5,700.0	5,654.1	5,659.3	5,654.1	17.4	12.7	-0.07		160.7	160.0	794.2	764.6	29.57	26.858	
5,800.0	5,754.1	5,759.3	5,754.1	17.6	12.9	-0.07		160.7	160.0	794.2	764.3	29.91	26.550	
5,900.0	5,854.1	5,859.3	5,854.1	17.7	13.1	-0.07		160.7	160.0	794.2	763.9	30.26	26.246	
6,000.0	5,954.1	5,959.3	5,954.1	17.8	13.4	-0.07		160.7	160.0	794.2	763.6	30.61	25.947	
6,100.0	6,054.1	6,059.3	6,054.1	17.9	13.6	-0.07		160.7	160.0	794.2	763.2	30.96	25.654	
6,200.0	6,154.1	6,159.3	6,154.1	18.1	13.8	-0.07		160.7	160.0	794.2	762.9	31.31	25.365	
6,300.0	6,254.1	6,259.3	6,254.1	18.2	14.0	-0.07		160.7	160.0	794.2	762.5	31.66	25.081	
6,400.0	6,354.1	6,359.3	6,354.1	18.4	14.2	-0.07		160.7	160.0	794.2	762.2	32.02	24.802	
6,436.5	6,390.5	6,395.8	6,390.5	18.4	14.3	-0.07		160.7	160.0	794.2	762.0	32.15	24.701	
6,500.0	6,454.1	6,459.1	6,453.7	18.5	14.4	-0.29		160.7	157.0	794.2	761.8	32.36	24.540	
6,532.3	6,486.3	6,490.9	6,485.4	18.5	14.4	-0.54		160.7	153.5	794.2	761.7	32.47	24.457	
6,550.0	6,504.1	6,508.3	6,502.6	18.6	14.5	89.30		160.7	151.1	794.2	765.1	29.14	27.260	
6,600.0	6,554.0	6,557.1	6,550.5	18.6	14.5	88.84		160.7	142.1	794.3	765.1	29.27	27.136	
6,650.0	6,603.6	6,605.4	6,597.4	18.7	14.6	88.38		160.7	130.2	794.5	765.1	29.40	27.027	
6,700.0	6,652.7	6,653.4	6,643.0	18.7	14.7	87.94		160.7	115.5	794.7	765.2	29.51	26.930	
6,750.0	6,701.1	6,700.0	6,686.4	18.8	14.7	87.51		160.7	98.5	794.9	765.3	29.62	26.838	
6,800.0	6,748.6	6,748.4	6,730.3	18.8	14.8	87.08		160.7	78.1	795.2	765.5	29.74	26.741	
6,850.0	6,795.0	6,795.4	6,771.5	18.9	14.9	86.67		160.7	55.7	795.5	765.7	29.87	26.633	
6,900.0	6,840.0	6,842.0	6,811.1	18.9	15.0	86.27		160.7	30.9	795.9	765.9	30.03	26.503	
6,950.0	6,883.6	6,888.4	6,848.8	18.9	15.1	85.89		160.7	4.0	796.2	766.0	30.23	26.341	
7,000.0	6,925.4	6,934.6	6,884.7	19.0	15.3	85.53		160.7	-25.0	796.6	766.1	30.48	26.136	
7,050.0	6,965.3	6,980.4	6,918.5	19.0	15.5	85.19		160.7	-56.0	797.0	766.2	30.80	25.877	
7,100.0	7,003.2	7,026.1	6,950.3	19.1	15.7	84.86		160.7	-88.8	797.4	766.2	31.20	25.556	
7,150.0	7,038.9	7,071.5	6,979.9	19.1	16.0	84.56		160.7	-123.2	797.8	766.1	31.70	25.166	
7,200.0	7,072.2	7,116.7	7,007.3	19.2	16.4	84.28		160.7	-159.2	798.2	765.9	32.31	24.704	
7,250.0	7,103.1	7,161.8	7,032.5	19.3	16.8	84.02		160.7	-196.6	798.6	765.5	33.04	24.169	
7,300.0	7,131.2	7,206.7	7,055.3	19.4	17.2	83.78		160.7	-235.2	798.9	765.0	33.90	23.567	
7,350.0	7,156.6	7,250.0	7,075.1	19.6	17.7	83.57		160.7	-273.7	799.2	764.4	34.87	22.918	
7,400.0	7,179.2	7,296.1	7,093.7	19.8	18.3	83.38		160.7	-315.8	799.5	763.5	36.03	22.193	
7,450.0	7,198.7	7,340.6	7,109.3	20.1	19.0	83.22		160.7	-357.5	799.8	762.5	37.29	21.445	
7,500.0	7,215.2	7,385.0	7,122.4	20.6	19.7	83.09		160.7	-400.0	800.0	761.3	38.69	20.678	
7,550.0	7,228.6	7,429.3	7,133.0	21.2	20.4	82.98		160.7	-443.0	800.2	760.0	40.20	19.904	
7,600.0	7,238.9	7,473.6	7,141.1	22.0	21.2	82.90		160.7	-486.5	800.3	758.5	41.82	19.137	
7,652.3	7,246.1	7,519.9	7,146.8	22.9	22.1	82.84		160.7	-532.4	800.4	756.8	43.61	18.353	
7,700.0	7,251.1	7,562.0	7,149.6	23.7	22.9	82.73		160.7	-574.5	800.7	755.3	45.34	17.658	
7,726.3	7,253.8	7,585.1	7,150.1	24.2	23.4	82.59		160.7	-597.6	800.9	754.6	46.31	17.294	
7,800.0	7,259.2	7,656.3	7,149.4	25.7	24.9	82.14		160.7	-668.8	801.7	752.5	49.23	16.287	
7,848.1	7,260.1	7,704.4	7,148.8	26.7	25.9	82.02		160.7	-716.8	801.9	750.7	51.23	15.655	
7,900.0	7,260.0	7,756.3	7,148.1	27.8	27.1	81.98		160.7	-768.8	802.0	748.5	53.51	14.989	
8,000.0	7,259.9	7,856.3	7,146.8	30.0	29.4	81.90		160.7	-868.8	802.2	744.2	58.03	13.824	
8,100.0	7,259.7	7,956.3	7,145.6	32.3	31.7	81.82		160.7	-968.7	802.3	739.6	62.72	12.793	
8,200.0	7,259.6	8,056.3	7,144.3	34.7	34.2	81.74		160.7	-1,068.7	802.5	735.0	67.53	11.883	

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 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28U-334 - 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
8,300.0	7,259.4	8,156.3	7,143.0	37.2	36.7	81.66	81.66	160.7	-1,168.7	802.7	730.2	72.45	11.079	
8,400.0	7,259.2	8,256.3	7,141.7	39.7	39.2	81.58	81.58	160.7	-1,268.7	802.8	725.4	77.45	10.365	
8,500.0	7,259.1	8,356.3	7,140.5	42.2	41.8	81.50	81.50	160.7	-1,368.7	803.0	720.5	82.52	9.731	
8,600.0	7,258.9	8,456.3	7,139.2	44.8	44.4	81.43	81.43	160.7	-1,468.7	803.2	715.5	87.65	9.164	
8,700.0	7,258.8	8,556.3	7,137.9	47.4	47.0	81.35	81.35	160.7	-1,568.7	803.3	710.5	92.82	8.655	
8,800.0	7,258.6	8,656.3	7,136.6	50.0	49.6	81.27	81.27	160.7	-1,668.6	803.5	705.5	98.03	8.197	
8,900.0	7,258.5	8,756.2	7,135.4	52.7	52.3	81.19	81.19	160.7	-1,768.6	803.7	700.4	103.27	7.782	
9,000.0	7,258.3	8,856.2	7,134.1	55.3	54.9	81.11	81.11	160.7	-1,868.6	803.8	695.3	108.53	7.406	
9,100.0	7,258.1	8,956.2	7,132.8	58.0	57.6	81.03	81.03	160.7	-1,968.6	804.0	690.2	113.82	7.064	
9,200.0	7,258.0	9,056.2	7,131.5	60.7	60.3	80.95	80.95	160.7	-2,068.6	804.2	685.1	119.13	6.750	
9,300.0	7,257.8	9,156.2	7,130.3	63.4	63.0	80.87	80.87	160.7	-2,168.6	804.4	679.9	124.46	6.463	
9,400.0	7,257.7	9,256.2	7,129.0	66.1	65.8	80.80	80.80	160.7	-2,268.6	804.5	674.7	129.80	6.198	
9,500.0	7,257.5	9,356.2	7,127.7	68.8	68.5	80.72	80.72	160.7	-2,368.5	804.7	669.6	135.15	5.954	
9,600.0	7,257.4	9,456.2	7,126.4	71.5	71.2	80.64	80.64	160.7	-2,468.5	804.9	664.4	140.51	5.728	
9,700.0	7,257.2	9,556.2	7,125.2	74.2	73.9	80.56	80.56	160.7	-2,568.5	805.1	659.2	145.88	5.519	
9,800.0	7,257.0	9,656.2	7,123.9	77.0	76.7	80.48	80.48	160.7	-2,668.5	805.3	654.0	151.26	5.324	
9,900.0	7,256.9	9,756.2	7,122.6	79.7	79.4	80.40	80.40	160.7	-2,768.5	805.5	648.8	156.65	5.142	
10,000.0	7,256.7	9,856.2	7,121.4	82.4	82.2	80.33	80.33	160.7	-2,868.5	805.6	643.6	162.04	4.972	
10,100.0	7,256.6	9,956.2	7,120.1	85.2	84.9	80.25	80.25	160.7	-2,968.5	805.8	638.4	167.44	4.813	
10,200.0	7,256.4	10,056.2	7,118.8	87.9	87.7	80.17	80.17	160.7	-3,068.4	806.0	633.2	172.84	4.663	
10,300.0	7,256.3	10,156.2	7,117.5	90.7	90.4	80.09	80.09	160.7	-3,168.4	806.2	628.0	178.24	4.523	
10,400.0	7,256.1	10,256.2	7,116.3	93.4	93.2	80.01	80.01	160.7	-3,268.4	806.4	622.8	183.65	4.391	
10,500.0	7,255.9	10,356.1	7,115.0	96.2	96.0	79.93	79.93	160.7	-3,368.4	806.6	617.5	189.06	4.266	
10,600.0	7,255.8	10,456.1	7,113.7	99.0	98.7	79.86	79.86	160.7	-3,468.4	806.8	612.3	194.47	4.149	
10,700.0	7,255.6	10,556.1	7,112.4	101.7	101.5	79.78	79.78	160.7	-3,568.4	807.0	607.1	199.88	4.037	
10,800.0	7,255.5	10,656.1	7,111.2	104.5	104.3	79.70	79.70	160.7	-3,668.3	807.2	601.9	205.30	3.932	
10,900.0	7,255.3	10,756.1	7,109.9	107.2	107.0	79.62	79.62	160.7	-3,768.3	807.4	596.7	210.71	3.832	
11,000.0	7,255.2	10,856.1	7,108.6	110.0	109.8	79.54	79.54	160.7	-3,868.3	807.6	591.5	216.13	3.737	
11,100.0	7,255.0	10,956.1	7,107.3	112.8	112.6	79.47	79.47	160.7	-3,968.3	807.8	586.3	221.54	3.646	
11,200.0	7,254.9	11,056.1	7,106.1	115.6	115.4	79.39	79.39	160.7	-4,068.3	808.0	581.0	226.96	3.560	
11,300.0	7,254.7	11,156.1	7,104.8	118.3	118.1	79.31	79.31	160.7	-4,168.3	808.2	575.8	232.38	3.478	
11,400.0	7,254.5	11,256.1	7,103.5	121.1	120.9	79.23	79.23	160.7	-4,268.3	808.4	570.6	237.79	3.400	
11,500.0	7,254.4	11,356.1	7,102.2	123.9	123.7	79.16	79.16	160.7	-4,368.2	808.6	565.4	243.21	3.325	
11,600.0	7,254.2	11,456.1	7,101.0	126.7	126.5	79.08	79.08	160.7	-4,468.2	808.8	560.2	248.62	3.253	
11,700.0	7,254.1	11,556.1	7,099.7	129.5	129.3	79.00	79.00	160.7	-4,568.2	809.1	555.0	254.03	3.185	
11,741.4	7,254.0	11,597.5	7,099.2	130.6	130.4	78.97	78.97	160.7	-4,609.6	809.1	552.9	256.27	3.157 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28U-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 (ft)	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	61.9				
100.0	100.0	100.0	100.0	0.1	0.1	0.00	0.00	61.9	0.0	61.9	61.7	0.22	275.558	
200.0	200.0	200.0	200.0	0.3	0.3	0.00	0.00	61.9	0.0	61.9	61.3	0.67	91.853	
300.0	300.0	300.0	300.0	0.6	0.6	0.00	0.00	61.9	0.0	61.9	60.8	1.12	55.112	
400.0	400.0	400.0	400.0	0.8	0.8	0.00	0.00	61.9	0.0	61.9	60.4	1.57	39.365	
500.0	500.0	500.0	500.0	1.0	1.0	0.00	0.00	61.9	0.0	61.9	59.9	2.02	30.618	
600.0	600.0	600.0	600.0	1.2	1.2	0.00	0.00	61.9	0.0	61.9	59.5	2.47	25.051	CC, ES
700.0	700.0	700.0	700.0	1.4	1.5	-166.12	0.00	61.9	0.0	63.6	60.7	2.90	21.968	
800.0	799.8	799.8	799.8	1.6	1.7	-167.14	0.00	61.9	0.0	68.7	65.4	3.30	20.799	
900.0	899.5	899.5	899.5	1.8	1.9	-168.55	0.00	61.9	0.0	77.2	73.5	3.72	20.763	
1,000.0	998.7	998.7	998.7	2.1	2.1	-170.06	0.00	61.9	0.0	89.2	85.1	4.14	21.542	
1,014.6	1,013.1	1,013.1	1,013.1	2.1	2.2	-170.28	0.00	61.9	0.0	91.3	87.1	4.20	21.710	
1,100.0	1,097.7	1,097.7	1,097.7	2.3	2.4	-171.43	0.00	61.9	0.0	103.4	98.9	4.57	22.622	
1,200.0	1,196.6	1,196.6	1,196.6	2.6	2.6	-172.47	0.00	61.9	0.0	117.7	112.7	5.01	23.497	
1,300.0	1,295.6	1,295.6	1,295.6	2.9	2.8	-173.29	0.00	61.9	0.0	132.0	126.6	5.45	24.216	
1,400.0	1,394.5	1,394.5	1,394.5	3.3	3.0	-173.95	0.00	61.9	0.0	146.4	140.5	5.90	24.813	
1,500.0	1,493.5	1,493.5	1,493.5	3.6	3.2	-174.50	0.00	61.9	0.0	160.7	154.4	6.35	25.317	
1,600.0	1,592.4	1,592.3	1,592.3	3.9	3.5	-174.66	0.00	60.7	1.1	173.8	167.0	6.79	25.610	
1,700.0	1,691.4	1,702.1	1,701.9	4.3	3.6	-174.12	0.00	56.8	4.9	183.9	176.7	7.21	25.514	
1,800.0	1,790.3	1,801.6	1,801.2	4.6	3.8	-173.36	0.00	51.8	9.7	192.6	184.9	7.63	25.231	
1,900.0	1,889.3	1,901.2	1,900.6	4.9	4.0	-172.66	0.00	46.7	14.6	201.3	193.2	8.07	24.953	
2,000.0	1,988.3	2,000.8	1,999.9	5.3	4.2	-172.02	0.00	41.7	19.4	210.0	201.5	8.51	24.687	
2,100.0	2,087.2	2,100.4	2,099.3	5.6	4.5	-171.43	0.00	36.7	24.2	218.8	209.9	8.96	24.433	
2,200.0	2,186.2	2,200.0	2,198.6	6.0	4.7	-170.89	0.00	31.6	29.0	227.6	218.2	9.41	24.192	
2,300.0	2,285.1	2,299.6	2,298.0	6.3	4.9	-170.38	0.00	26.6	33.8	236.4	226.5	9.87	23.963	
2,400.0	2,384.1	2,399.2	2,397.3	6.7	5.1	-169.92	0.00	21.6	38.6	245.2	234.9	10.33	23.747	
2,500.0	2,483.0	2,498.8	2,496.7	7.0	5.3	-169.48	0.00	16.5	43.5	254.1	243.3	10.79	23.542	
2,600.0	2,582.0	2,598.4	2,596.0	7.4	5.6	-169.08	0.00	11.5	48.3	262.9	251.7	11.26	23.348	
2,700.0	2,680.9	2,698.0	2,695.4	7.7	5.8	-168.70	0.00	6.5	53.1	271.8	260.1	11.73	23.165	
2,800.0	2,779.9	2,797.6	2,794.7	8.1	6.0	-168.34	0.00	1.4	57.9	280.7	268.5	12.21	22.992	
2,900.0	2,878.8	2,897.1	2,894.0	8.5	6.3	-168.01	0.00	-3.6	62.7	289.6	276.9	12.69	22.827	
3,000.0	2,977.8	2,996.7	2,993.4	8.8	6.5	-167.70	0.00	-8.6	67.6	298.5	285.3	13.17	22.672	
3,100.0	3,076.8	3,096.3	3,092.7	9.2	6.8	-167.40	0.00	-13.7	72.4	307.4	293.7	13.65	22.525	
3,200.0	3,175.7	3,195.9	3,192.1	9.5	7.0	-167.12	0.00	-18.7	77.2	316.3	302.2	14.13	22.385	
3,300.0	3,274.7	3,295.5	3,291.4	9.9	7.3	-166.86	0.00	-23.7	82.0	325.2	310.6	14.62	22.252	
3,400.0	3,373.6	3,395.1	3,390.8	10.2	7.5	-166.61	0.00	-28.8	86.8	334.2	319.0	15.10	22.126	
3,500.0	3,472.6	3,494.7	3,490.1	10.6	7.8	-166.38	0.00	-33.8	91.6	343.1	327.5	15.59	22.007	
3,600.0	3,571.5	3,594.3	3,589.5	10.9	8.0	-166.15	0.00	-38.8	96.5	352.0	335.9	16.08	21.893	
3,700.0	3,670.5	3,693.9	3,688.8	11.3	8.2	-165.94	0.00	-43.9	101.3	361.0	344.4	16.57	21.784	
3,800.0	3,769.4	3,793.5	3,788.2	11.7	8.5	-165.74	0.00	-48.9	106.1	369.9	352.9	17.06	21.680	
3,900.0	3,868.4	3,893.0	3,887.5	12.0	8.8	-165.54	0.00	-53.9	110.9	378.9	361.3	17.56	21.582	
4,000.0	3,967.3	3,992.6	3,986.9	12.4	9.0	-165.36	0.00	-59.0	115.7	387.8	369.8	18.05	21.487	
4,100.0	4,066.3	4,092.2	4,086.2	12.7	9.3	-165.18	0.00	-64.0	120.6	396.8	378.2	18.54	21.397	
4,200.0	4,165.3	4,191.8	4,185.5	13.1	9.5	-165.01	0.00	-69.0	125.4	405.8	386.7	19.04	21.311	
4,300.0	4,264.2	4,291.4	4,284.9	13.4	9.8	-164.85	0.00	-74.1	130.2	414.7	395.2	19.54	21.228	
4,400.0	4,363.2	4,391.0	4,384.2	13.8	10.0	-164.70	0.00	-79.1	135.0	423.7	403.7	20.03	21.149	
4,500.0	4,462.1	4,490.6	4,483.6	14.2	10.3	-164.55	0.00	-84.1	139.8	432.7	412.1	20.53	21.073	
4,600.0	4,561.1	4,590.2	4,582.9	14.5	10.5	-164.41	0.00	-89.2	144.6	441.7	420.6	21.03	21.001	
4,700.0	4,660.0	4,689.8	4,682.3	14.9	10.8	-164.27	0.00	-94.2	149.5	450.6	429.1	21.53	20.931	
4,800.0	4,759.0	4,789.4	4,781.6	15.2	11.0	-164.14	0.00	-99.2	154.3	459.6	437.6	22.03	20.864	
4,900.0	4,857.9	4,880.5	4,872.6	15.6	11.2	-164.11	0.00	-103.2	158.0	469.3	446.8	22.49	20.870	

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 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28U-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)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
5,000.0	4,956.9	4,969.4	4,961.5	15.9	11.4	-164.31	-105.0	159.8	481.2	458.3	22.91	21.003		
5,100.0	5,055.8	5,063.8	5,055.8	16.3	11.6	-164.72	-105.2	160.0	494.9	471.6	23.33	21.215		
5,131.3	5,086.9	5,094.8	5,086.9	16.4	11.7	-164.86	-105.2	160.0	499.3	475.8	23.46	21.282		
5,200.0	5,154.9	5,162.9	5,154.9	16.6	11.8	-165.17	-105.2	160.0	508.0	484.3	23.75	21.391		
5,300.0	5,254.4	5,262.3	5,254.4	16.8	12.0	-165.51	-105.2	160.0	518.0	493.9	24.13	21.465		
5,400.0	5,354.1	5,362.1	5,354.1	17.0	12.2	-165.73	-105.2	160.0	524.6	500.1	24.49	21.420		
5,500.0	5,454.1	5,462.0	5,454.1	17.2	12.3	-165.84	-105.2	160.0	527.9	503.1	24.83	21.261		
5,545.9	5,500.0	5,507.9	5,500.0	17.2	12.4	-0.11	-105.2	160.0	528.2	499.1	29.11	18.149		
5,600.0	5,554.1	5,562.0	5,554.1	17.3	12.5	-0.11	-105.2	160.0	528.2	499.0	29.29	18.037		
5,700.0	5,654.1	5,662.0	5,654.1	17.4	12.7	-0.11	-105.2	160.0	528.2	498.6	29.61	17.843		
5,800.0	5,754.1	5,762.0	5,754.1	17.6	12.9	-0.11	-105.2	160.0	528.2	498.3	29.93	17.651		
5,900.0	5,854.1	5,862.0	5,854.1	17.7	13.1	-0.11	-105.2	160.0	528.2	498.0	30.25	17.461		
6,000.0	5,954.1	5,962.0	5,954.1	17.8	13.3	-0.11	-105.2	160.0	528.2	497.7	30.58	17.274		
6,100.0	6,054.1	6,062.0	6,054.1	17.9	13.5	-0.11	-105.2	160.0	528.2	497.3	30.91	17.089		
6,200.0	6,154.1	6,162.0	6,154.1	18.1	13.7	-0.11	-105.2	160.0	528.2	497.0	31.24	16.907		
6,300.0	6,254.1	6,262.0	6,254.1	18.2	13.9	-0.11	-105.2	160.0	528.2	496.7	31.58	16.727		
6,400.0	6,354.1	6,362.0	6,354.1	18.4	14.1	-0.11	-105.2	160.0	528.2	496.3	31.92	16.550		
6,500.0	6,454.1	6,462.0	6,454.1	18.5	14.3	-0.11	-105.2	160.0	528.2	496.0	32.26	16.375		
6,532.3	6,486.3	6,494.3	6,486.3	18.5	14.4	-0.11	-105.2	160.0	528.2	495.9	32.37	16.319		
6,550.0	6,504.1	6,512.0	6,504.0	18.6	14.4	89.89	-105.2	159.8	528.2	499.5	28.76	18.368		
6,600.0	6,554.0	6,561.9	6,553.9	18.6	14.5	89.89	-105.2	157.0	528.2	499.3	28.93	18.260		
6,650.0	6,603.6	6,611.9	6,603.5	18.7	14.6	89.89	-105.2	151.0	528.2	499.2	29.08	18.166		
6,700.0	6,652.7	6,661.8	6,652.5	18.7	14.6	89.89	-105.2	141.7	528.2	499.0	29.21	18.083		
6,750.0	6,701.1	6,711.7	6,700.9	18.8	14.7	89.90	-105.2	129.3	528.2	498.9	29.33	18.009		
6,800.0	6,748.6	6,761.7	6,748.3	18.8	14.7	89.90	-105.2	113.7	528.2	498.8	29.45	17.938		
6,850.0	6,795.0	6,811.6	6,794.6	18.9	14.8	89.90	-105.2	95.0	528.2	498.7	29.57	17.865		
6,900.0	6,840.0	6,861.6	6,839.6	18.9	14.9	89.90	-105.2	73.4	528.2	498.5	29.70	17.783		
6,950.0	6,883.6	6,911.5	6,883.1	18.9	14.9	89.91	-105.2	48.9	528.2	498.4	29.87	17.686		
7,000.0	6,925.4	6,961.4	6,924.9	19.0	15.0	89.91	-105.2	21.6	528.2	498.2	30.08	17.563		
7,050.0	6,965.3	7,011.4	6,964.9	19.0	15.0	89.92	-105.2	-8.4	528.2	497.9	30.35	17.406		
7,100.0	7,003.2	7,061.3	7,002.7	19.1	15.1	89.92	-105.2	-41.0	528.2	497.5	30.70	17.207		
7,150.0	7,038.9	7,111.3	7,038.4	19.1	15.3	89.93	-105.2	-75.9	528.2	497.1	31.15	16.957		
7,200.0	7,072.2	7,161.3	7,071.8	19.2	15.6	89.93	-105.2	-113.1	528.2	496.5	31.72	16.651		
7,250.0	7,103.1	7,211.2	7,102.6	19.3	16.0	89.94	-105.2	-152.4	528.2	495.8	32.43	16.288		
7,300.0	7,131.2	7,261.2	7,130.8	19.4	16.4	89.94	-105.2	-193.7	528.2	495.0	33.28	15.871		
7,350.0	7,166.6	7,311.1	7,166.2	19.6	17.0	89.95	-105.2	-236.7	528.2	493.9	34.29	15.403		
7,400.0	7,179.2	7,361.1	7,178.8	19.8	17.6	89.96	-105.2	-281.2	528.2	492.8	35.46	14.895		
7,450.0	7,198.7	7,411.1	7,198.4	20.1	18.2	89.96	-105.2	-327.2	528.2	491.5	36.79	14.357		
7,500.0	7,215.2	7,461.1	7,215.0	20.6	19.0	89.97	-105.2	-374.3	528.2	490.0	38.27	13.802		
7,550.0	7,228.6	7,511.1	7,228.4	21.2	19.8	89.98	-105.2	-422.5	528.2	488.3	39.90	13.240		
7,600.0	7,238.9	7,561.0	7,238.7	22.0	20.7	89.98	-105.2	-471.4	528.2	486.6	41.65	12.684		
7,652.3	7,246.1	7,613.3	7,246.0	22.9	21.7	89.99	-105.2	-523.1	528.2	484.7	43.59	12.119		
7,668.6	7,247.8	7,629.6	7,247.7	23.1	22.0	89.99	-105.2	-539.3	528.2	484.0	44.23	11.943		
7,700.0	7,251.1	7,661.0	7,251.0	23.7	22.6	89.99	-105.2	-570.6	528.2	482.8	45.47	11.618		
7,726.3	7,253.8	7,687.3	7,253.7	24.2	23.2	89.99	-105.2	-596.7	528.2	481.7	46.52	11.355		
7,800.0	7,259.2	7,761.0	7,259.2	25.7	24.7	90.00	-105.2	-670.2	528.2	478.6	49.62	10.647		
7,834.0	7,260.1	7,795.0	7,260.1	26.4	25.5	90.00	-105.2	-704.2	528.2	477.2	51.07	10.343		
7,848.1	7,260.1	7,809.1	7,260.1	26.7	25.8	90.00	-105.2	-718.3	528.2	476.6	51.68	10.221		
7,900.0	7,260.0	7,861.0	7,260.0	27.8	26.9	90.00	-105.2	-770.2	528.2	474.2	54.00	9.783		
8,000.0	7,259.9	7,961.0	7,259.9	30.0	29.2	90.00	-105.2	-870.2	528.2	469.7	58.59	9.016		
8,100.0	7,259.7	8,061.0	7,259.7	32.3	31.6	90.00	-105.2	-970.2	528.2	464.9	63.34	8.340		

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 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28U-434 - 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 (°)	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)			
8,200.0	7,259.6	8,161.0	7,259.6	34.7	34.1	90.00	-105.2	-1,070.2	528.2	460.0	68.23	7.743	
8,300.0	7,259.4	8,261.0	7,259.4	37.2	36.6	90.00	-105.2	-1,170.2	528.2	455.0	73.21	7.215	
8,400.0	7,259.2	8,361.0	7,259.3	39.7	39.1	90.00	-105.2	-1,270.2	528.2	450.0	78.29	6.747	
8,500.0	7,259.1	8,461.0	7,259.1	42.2	41.7	90.00	-105.2	-1,370.2	528.2	444.8	83.43	6.332	
8,600.0	7,258.9	8,561.0	7,258.9	44.8	44.3	90.00	-105.2	-1,470.2	528.2	439.6	88.63	5.960	
8,700.0	7,258.8	8,661.0	7,258.8	47.4	46.9	90.00	-105.2	-1,570.2	528.2	434.4	93.88	5.627	
8,800.0	7,258.6	8,761.0	7,258.6	50.0	49.6	90.00	-105.2	-1,670.2	528.2	429.1	99.17	5.327	
8,900.0	7,258.5	8,861.0	7,258.5	52.7	52.2	90.00	-105.2	-1,770.2	528.2	423.8	104.49	5.056	
9,000.0	7,258.3	8,961.0	7,258.3	55.3	54.9	90.00	-105.2	-1,870.2	528.2	418.4	109.84	4.809	
9,100.0	7,258.1	9,061.0	7,258.2	58.0	57.6	90.00	-105.2	-1,970.2	528.2	413.0	115.21	4.585	
9,200.0	7,258.0	9,161.0	7,258.0	60.7	60.3	90.00	-105.2	-2,070.2	528.2	407.6	120.61	4.380	
9,300.0	7,257.8	9,261.0	7,257.8	63.4	63.0	90.00	-105.2	-2,170.2	528.2	402.2	126.03	4.191	
9,400.0	7,257.7	9,361.0	7,257.7	66.1	65.7	90.00	-105.2	-2,270.2	528.2	396.8	131.46	4.018	
9,500.0	7,257.5	9,461.0	7,257.5	68.8	68.4	90.00	-105.2	-2,370.2	528.2	391.3	136.91	3.858	
9,600.0	7,257.4	9,561.0	7,257.4	71.5	71.2	90.00	-105.2	-2,470.2	528.2	385.9	142.37	3.710	
9,700.0	7,257.2	9,661.0	7,257.2	74.2	73.9	90.00	-105.2	-2,570.2	528.2	380.4	147.84	3.573	
9,800.0	7,257.0	9,761.0	7,257.1	77.0	76.6	90.00	-105.2	-2,670.2	528.2	374.9	153.32	3.445	
9,900.0	7,256.9	9,861.0	7,256.9	79.7	79.4	90.00	-105.2	-2,770.2	528.2	369.4	158.81	3.326	
10,000.0	7,256.7	9,961.0	7,256.7	82.4	82.1	90.00	-105.2	-2,870.2	528.2	363.9	164.31	3.215	
10,100.0	7,256.6	10,061.0	7,256.6	85.2	84.9	90.00	-105.2	-2,970.2	528.2	358.4	169.82	3.111	
10,200.0	7,256.4	10,161.0	7,256.4	87.9	87.7	90.00	-105.2	-3,070.2	528.2	352.9	175.33	3.013	
10,300.0	7,256.3	10,261.0	7,256.3	90.7	90.4	90.00	-105.2	-3,170.2	528.2	347.4	180.85	2.921	
10,400.0	7,256.1	10,361.0	7,256.1	93.4	93.2	90.00	-105.2	-3,270.2	528.2	341.9	186.38	2.834	
10,500.0	7,255.9	10,461.0	7,256.0	96.2	95.9	90.00	-105.2	-3,370.2	528.2	336.3	191.91	2.753	
10,600.0	7,255.8	10,561.0	7,255.8	99.0	98.7	90.00	-105.2	-3,470.2	528.2	330.8	197.44	2.675	
10,700.0	7,255.6	10,661.0	7,255.6	101.7	101.5	90.00	-105.2	-3,570.2	528.2	325.3	202.98	2.602	
10,800.0	7,255.5	10,761.0	7,255.5	104.5	104.3	90.00	-105.2	-3,670.2	528.2	319.7	208.53	2.533	
10,900.0	7,255.3	10,861.0	7,255.3	107.2	107.0	90.00	-105.2	-3,770.2	528.2	314.2	214.07	2.468	
11,000.0	7,255.2	10,961.0	7,255.2	110.0	109.8	90.00	-105.2	-3,870.2	528.2	308.6	219.62	2.405	
11,100.0	7,255.0	11,061.0	7,255.0	112.8	112.6	90.00	-105.2	-3,970.2	528.2	303.1	225.18	2.346	
11,200.0	7,254.9	11,161.0	7,254.9	115.6	115.4	90.00	-105.2	-4,070.2	528.2	297.5	230.73	2.289	
11,300.0	7,254.7	11,261.0	7,254.7	118.3	118.1	90.00	-105.2	-4,170.2	528.2	292.0	236.29	2.236	
11,400.0	7,254.5	11,361.0	7,254.5	121.1	120.9	90.00	-105.2	-4,270.2	528.2	286.4	241.85	2.184	
11,500.0	7,254.4	11,461.0	7,254.4	123.9	123.7	90.00	-105.2	-4,370.2	528.2	280.8	247.42	2.135	
11,600.0	7,254.2	11,561.0	7,254.2	126.7	126.5	90.00	-105.2	-4,470.2	528.2	275.3	252.98	2.088	
11,700.0	7,254.1	11,661.0	7,254.1	129.5	129.3	90.00	-105.2	-4,570.2	528.2	269.7	258.55	2.043	
11,741.4	7,254.0	11,702.4	7,254.0	130.6	130.4	90.00	-105.2	-4,611.6	528.2	267.4	260.85	2.025 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-214 - 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	
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	29.1	0.0	29.1	28.9	0.22	129.666		
200.0	200.0	200.0	200.0	0.3	0.3	0.00	29.1	0.0	29.1	28.5	0.67	43.222		
300.0	300.0	300.0	300.0	0.6	0.6	0.00	29.1	0.0	29.1	28.0	1.12	25.933		
400.0	400.0	400.0	400.0	0.8	0.8	0.00	29.1	0.0	29.1	27.6	1.57	18.524		
500.0	500.0	500.0	500.0	1.0	1.0	0.00	29.1	0.0	29.1	27.1	2.02	14.407		
600.0	600.0	600.0	600.0	1.2	1.2	0.00	29.1	0.0	29.1	26.7	2.47	11.788 CC, ES		
700.0	700.0	700.0	700.0	1.4	1.5	-166.53	29.1	0.0	30.8	27.9	2.90	10.647		
800.0	799.8	799.8	799.8	1.6	1.7	-168.45	29.1	0.0	35.9	32.6	3.30	10.880		
900.0	899.5	899.5	899.5	1.8	1.9	-170.67	29.1	0.0	44.5	40.8	3.72	11.969		
1,000.0	998.7	998.7	998.7	2.1	2.1	-172.64	29.1	0.0	56.6	52.4	4.14	13.665		
1,014.6	1,013.1	1,013.4	1,013.4	2.1	2.2	-172.89	29.1	0.0	58.6	54.4	4.20	13.956		
1,100.0	1,097.7	1,100.0	1,100.0	2.3	2.3	-173.81	27.5	0.7	69.2	64.7	4.54	15.232		
1,200.0	1,196.6	1,202.2	1,202.0	2.6	2.5	-174.03	22.5	2.7	78.5	73.5	4.94	15.897		
1,300.0	1,295.6	1,304.4	1,303.8	2.9	2.7	-173.63	14.2	6.0	84.3	79.0	5.35	15.770		
1,400.0	1,394.5	1,404.3	1,403.2	3.3	2.9	-173.08	4.8	9.8	88.9	83.1	5.77	15.403		
1,500.0	1,493.5	1,504.2	1,502.6	3.6	3.2	-172.58	-4.5	13.6	93.4	87.2	6.20	15.063		
1,600.0	1,592.4	1,604.1	1,602.0	3.9	3.4	-172.13	-13.9	17.4	98.0	91.4	6.65	14.750		
1,700.0	1,691.4	1,704.0	1,701.4	4.3	3.6	-171.72	-23.3	21.1	102.6	95.5	7.09	14.462		
1,800.0	1,790.3	1,803.9	1,800.7	4.6	3.9	-171.35	-32.6	24.9	107.2	99.6	7.55	14.199		
1,900.0	1,889.3	1,903.8	1,900.1	4.9	4.2	-171.00	-42.0	28.7	111.8	103.8	8.01	13.957		
2,000.0	1,988.3	2,003.7	1,999.5	5.3	4.4	-170.68	-51.4	32.5	116.4	107.9	8.47	13.735		
2,100.0	2,087.2	2,103.5	2,098.9	5.6	4.7	-170.39	-60.7	36.2	121.0	112.0	8.94	13.531		
2,200.0	2,186.2	2,203.4	2,198.3	6.0	5.0	-170.12	-70.1	40.0	125.6	116.2	9.41	13.343		
2,300.0	2,285.1	2,303.3	2,297.6	6.3	5.2	-169.86	-79.4	43.8	130.2	120.3	9.88	13.170		
2,400.0	2,384.1	2,403.2	2,397.0	6.7	5.5	-169.63	-88.8	47.6	134.8	124.4	10.36	13.009		
2,500.0	2,483.0	2,503.1	2,496.4	7.0	5.8	-169.41	-98.2	51.4	139.4	128.6	10.84	12.860		
2,600.0	2,582.0	2,603.0	2,595.8	7.4	6.1	-169.20	-107.5	55.1	144.0	132.7	11.32	12.722		
2,700.0	2,680.9	2,702.9	2,695.2	7.7	6.4	-169.01	-116.9	58.9	148.6	136.8	11.80	12.594		
2,800.0	2,779.9	2,802.8	2,794.5	8.1	6.7	-168.83	-126.3	62.7	153.2	140.9	12.28	12.474		
2,900.0	2,878.8	2,902.7	2,893.9	8.5	6.9	-168.66	-135.6	66.5	157.8	145.1	12.77	12.362		
3,000.0	2,977.8	3,002.6	2,993.3	8.8	7.2	-168.50	-145.0	70.2	162.5	149.2	13.25	12.257		
3,100.0	3,076.8	3,102.5	3,092.7	9.2	7.5	-168.34	-154.4	74.0	167.1	153.3	13.74	12.158		
3,200.0	3,175.7	3,202.4	3,192.1	9.5	7.8	-168.20	-163.7	77.8	171.7	157.5	14.23	12.066		
3,300.0	3,274.7	3,302.3	3,291.5	9.9	8.1	-168.06	-173.1	81.6	176.3	161.6	14.72	11.979		
3,400.0	3,373.6	3,402.1	3,390.8	10.2	8.4	-167.93	-182.5	85.4	180.9	165.7	15.21	11.896		
3,500.0	3,472.6	3,502.0	3,490.2	10.6	8.7	-167.81	-191.8	89.1	185.6	169.9	15.70	11.819		
3,600.0	3,571.5	3,601.9	3,589.6	10.9	9.0	-167.69	-201.2	92.9	190.2	174.0	16.19	11.746		
3,700.0	3,670.5	3,701.8	3,689.0	11.3	9.3	-167.58	-210.5	96.7	194.8	178.1	16.68	11.676		
3,800.0	3,769.4	3,801.7	3,788.4	11.7	9.6	-167.48	-219.9	100.5	199.4	182.2	17.18	11.611		
3,900.0	3,868.4	3,901.6	3,887.7	12.0	9.9	-167.38	-229.3	104.2	204.0	186.4	17.67	11.548		
4,000.0	3,967.3	4,001.5	3,987.1	12.4	10.1	-167.28	-238.6	108.0	208.7	190.5	18.16	11.489		
4,100.0	4,066.3	4,101.4	4,086.5	12.7	10.4	-167.19	-248.0	111.8	213.3	194.6	18.66	11.432		
4,200.0	4,165.3	4,201.3	4,185.9	13.1	10.7	-167.10	-257.4	115.6	217.9	198.8	19.15	11.379		
4,300.0	4,264.2	4,301.2	4,285.3	13.4	11.0	-167.01	-266.7	119.3	222.6	202.9	19.65	11.327		
4,400.0	4,363.2	4,401.1	4,384.6	13.8	11.3	-166.93	-276.1	123.1	227.2	207.0	20.14	11.278		
4,500.0	4,462.1	4,501.0	4,484.0	14.2	11.6	-166.85	-285.5	126.9	231.8	211.2	20.64	11.232		
4,600.0	4,561.1	4,600.9	4,583.4	14.5	11.9	-166.78	-294.8	130.7	236.4	215.3	21.14	11.187		
4,700.0	4,660.0	4,700.7	4,682.8	14.9	12.2	-166.70	-304.2	134.5	241.1	219.4	21.63	11.144		
4,800.0	4,759.0	4,800.6	4,782.2	15.2	12.5	-166.63	-313.5	138.2	245.7	223.6	22.13	11.103		
4,900.0	4,857.9	4,900.5	4,881.5	15.6	12.8	-166.57	-322.9	142.0	250.3	227.7	22.63	11.063		

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 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-214 - 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							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)			
5,000.0	4,956.9	5,000.4	4,980.9	15.9	13.1	-166.50	-332.3	145.8	254.9	231.8	23.12	11.026		
5,100.0	5,055.8	5,100.3	5,080.3	16.3	13.4	-166.44	-341.6	149.6	259.6	236.0	23.62	10.989		
5,131.3	5,086.9	5,131.6	5,111.4	16.4	13.5	-166.42	-344.6	150.7	261.0	237.3	23.78	10.978		
5,200.0	5,154.9	5,200.2	5,179.7	16.6	13.7	-166.35	-351.0	153.3	263.4	239.3	24.12	10.922		
5,300.0	5,254.4	5,294.8	5,273.8	16.8	13.9	-166.16	-359.2	156.7	264.7	240.2	24.54	10.788		
5,400.0	5,354.1	5,386.8	5,365.7	17.0	14.1	-166.03	-364.6	158.8	265.5	240.6	24.89	10.667		
5,500.0	5,454.1	5,478.9	5,457.7	17.2	14.3	-165.96	-367.2	159.9	265.9	240.7	25.20	10.554		
5,545.9	5,500.0	5,521.2	5,500.0	17.2	14.3	-0.22	-367.5	160.0	265.9	234.8	31.10	8.552		
5,600.0	5,554.1	5,575.2	5,554.1	17.3	14.4	-0.22	-367.5	160.0	265.9	234.7	31.26	8.506		
5,700.0	5,654.1	5,675.2	5,654.1	17.4	14.6	-0.22	-367.5	160.0	265.9	234.4	31.55	8.430		
5,800.0	5,754.1	5,775.2	5,754.1	17.6	14.7	-0.22	-367.5	160.0	265.9	234.1	31.83	8.355		
5,900.0	5,854.1	5,875.2	5,854.1	17.7	14.9	-0.22	-367.5	160.0	265.9	233.8	32.12	8.281		
6,000.0	5,954.1	5,975.2	5,954.1	17.8	15.1	-0.22	-367.5	160.0	265.9	233.5	32.41	8.206		
6,100.0	6,054.1	6,075.2	6,054.1	17.9	15.2	-0.22	-367.5	160.0	265.9	233.2	32.70	8.133		
6,200.0	6,154.1	6,175.2	6,154.1	18.1	15.4	-0.22	-367.5	160.0	265.9	232.9	33.00	8.059		
6,300.0	6,254.1	6,275.2	6,254.1	18.2	15.5	-0.22	-367.5	160.0	265.9	232.6	33.30	7.987		
6,333.8	6,287.9	6,309.0	6,287.9	18.3	15.6	-0.22	-367.5	160.0	265.9	232.5	33.40	7.962		
6,400.0	6,354.1	6,374.9	6,353.6	18.4	15.7	-0.97	-367.5	156.5	266.0	232.3	33.64	7.907		
6,500.0	6,454.1	6,472.1	6,449.5	18.5	15.8	-4.29	-367.5	141.1	266.7	232.6	34.08	7.826		
6,532.3	6,486.3	6,502.5	6,479.0	18.5	15.9	-5.85	-367.5	133.7	267.4	233.2	34.23	7.814		
6,550.0	6,504.1	6,519.0	6,494.9	18.6	15.9	83.20	-367.5	129.3	268.0	239.4	28.53	9.392		
6,600.0	6,554.0	6,564.9	6,538.6	18.6	15.9	80.58	-367.5	115.1	269.8	241.2	28.58	9.439		
6,650.0	6,603.6	6,610.3	6,580.8	18.7	16.0	78.04	-367.5	98.5	272.2	243.6	28.66	9.499		
6,700.0	6,652.7	6,655.0	6,621.3	18.7	16.0	75.60	-367.5	79.7	275.1	246.3	28.75	9.568		
6,750.0	6,701.1	6,700.0	6,661.0	18.8	16.0	73.24	-367.5	58.5	278.4	249.5	28.86	9.644		
6,800.0	6,748.6	6,742.8	6,697.5	18.8	16.1	71.07	-367.5	36.1	281.9	253.0	28.98	9.727		
6,850.0	6,795.0	6,786.0	6,733.0	18.9	16.1	68.98	-367.5	11.5	285.8	256.7	29.12	9.816		
6,900.0	6,840.0	6,828.7	6,766.7	18.9	16.1	67.02	-367.5	-14.7	289.8	260.6	29.25	9.910		
6,950.0	6,883.6	6,871.0	6,798.5	18.9	16.2	65.20	-367.5	-42.5	294.0	264.6	29.39	10.004		
7,000.0	6,925.4	6,912.9	6,828.6	19.0	16.2	63.50	-367.5	-71.8	298.2	268.7	29.49	10.112		
7,050.0	6,965.3	6,954.5	6,856.7	19.0	16.3	61.93	-367.5	-102.4	302.4	272.8	29.64	10.204		
7,100.0	7,003.2	6,995.7	6,882.9	19.1	16.4	60.50	-367.5	-134.2	306.6	276.8	29.78	10.294		
7,150.0	7,038.9	7,036.7	6,907.2	19.1	16.5	59.19	-367.5	-167.2	310.6	280.7	29.95	10.372		
7,200.0	7,072.2	7,077.4	6,929.6	19.2	16.7	58.00	-367.5	-201.2	314.5	284.3	30.14	10.433		
7,250.0	7,103.1	7,117.9	6,950.0	19.3	17.0	56.93	-367.5	-236.1	318.1	287.8	30.37	10.474		
7,300.0	7,131.2	7,158.1	6,968.5	19.4	17.5	55.98	-367.5	-271.9	321.5	290.9	30.65	10.490		
7,350.0	7,156.6	7,200.0	6,985.6	19.6	18.0	55.12	-367.5	-310.1	324.6	293.6	31.01	10.468		
7,400.0	7,179.2	7,238.1	6,999.4	19.8	18.5	54.42	-367.5	-345.6	327.4	296.0	31.43	10.417		
7,450.0	7,198.7	7,277.9	7,011.9	20.1	19.1	53.81	-367.5	-383.4	329.9	297.9	31.95	10.325		
7,500.0	7,215.2	7,317.5	7,022.3	20.6	19.8	53.29	-367.5	-421.6	332.0	299.4	32.57	10.193		
7,550.0	7,228.6	7,357.1	7,030.8	21.2	20.5	52.89	-367.5	-460.3	333.6	300.4	33.29	10.024		
7,600.0	7,238.9	7,400.0	7,037.6	22.0	21.2	52.56	-367.5	-502.6	335.0	300.8	34.16	9.805		
7,652.3	7,246.1	7,437.8	7,041.7	22.9	22.0	52.37	-367.5	-540.2	335.8	300.7	35.11	9.567		
7,700.0	7,251.1	7,475.4	7,043.9	23.7	22.7	52.14	-367.5	-577.7	337.2	300.8	36.36	9.273		
7,726.3	7,253.8	7,495.9	7,044.4	24.2	23.1	51.91	-367.5	-598.2	338.5	301.5	37.02	9.144		
7,800.0	7,259.2	7,567.1	7,044.1	25.7	24.6	51.07	-367.5	-669.4	342.0	303.3	38.73	8.830		
7,848.1	7,260.1	7,615.1	7,044.0	26.7	25.7	50.90	-367.5	-717.4	342.7	302.6	40.08	8.552		
7,900.0	7,260.0	7,667.0	7,043.8	27.8	26.9	50.88	-367.5	-769.4	342.8	300.9	41.88	8.184		
8,000.0	7,259.9	7,767.0	7,043.4	30.0	29.2	50.85	-367.5	-869.4	342.9	297.4	45.48	7.540		
8,100.0	7,259.7	7,867.0	7,043.0	32.3	31.6	50.82	-367.5	-969.4	343.1	293.9	49.22	6.971		
8,200.0	7,259.6	7,967.0	7,042.6	34.7	34.0	50.79	-367.5	-1,069.4	343.2	290.2	53.06	6.469		

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 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 28U-HZ Pad Sec.28-T4N-R67W - Sunmarke 28V-214 - 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)	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	7,259.4	8,067.0	7,042.2	37.2	36.5	50.76	-367.5	-1,169.4	343.4	286.4	56.98	6.026		
8,400.0	7,259.2	8,167.0	7,041.8	39.7	39.0	50.73	-367.5	-1,269.4	343.5	282.5	60.97	5.634		
8,500.0	7,259.1	8,267.0	7,041.5	42.2	41.6	50.71	-367.5	-1,369.4	343.6	278.6	65.02	5.285		
8,600.0	7,258.9	8,367.0	7,041.1	44.8	44.2	50.68	-367.5	-1,469.4	343.8	274.7	69.11	4.975		
8,700.0	7,258.8	8,467.0	7,040.7	47.4	46.9	50.65	-367.5	-1,569.4	343.9	270.7	73.23	4.696		
8,800.0	7,258.6	8,567.0	7,040.3	50.0	49.5	50.62	-367.5	-1,669.4	344.1	266.7	77.39	4.446		
8,900.0	7,258.5	8,667.0	7,039.9	52.7	52.2	50.59	-367.5	-1,769.4	344.2	262.7	81.57	4.220		
9,000.0	7,258.3	8,767.0	7,039.5	55.3	54.8	50.56	-367.5	-1,869.4	344.4	258.6	85.77	4.015		
9,100.0	7,258.1	8,867.0	7,039.2	58.0	57.5	50.53	-367.5	-1,969.4	344.5	254.5	89.98	3.829		
9,200.0	7,258.0	8,967.0	7,038.8	60.7	60.2	50.50	-367.5	-2,069.4	344.7	250.4	94.21	3.658		
9,300.0	7,257.8	9,067.0	7,038.4	63.4	62.9	50.47	-367.5	-2,169.3	344.8	246.3	98.46	3.502		
9,400.0	7,257.7	9,167.0	7,038.0	66.1	65.7	50.44	-367.5	-2,269.3	344.9	242.2	102.71	3.358		
9,500.0	7,257.5	9,267.0	7,037.6	68.8	68.4	50.41	-367.5	-2,369.3	345.1	238.1	106.97	3.226		
9,600.0	7,257.4	9,367.0	7,037.2	71.5	71.1	50.38	-367.5	-2,469.3	345.2	234.0	111.24	3.103		
9,700.0	7,257.2	9,467.0	7,036.9	74.2	73.9	50.36	-367.5	-2,569.3	345.4	229.9	115.52	2.990		
9,800.0	7,257.0	9,567.0	7,036.5	77.0	76.6	50.33	-367.5	-2,669.3	345.5	225.7	119.80	2.884		
9,900.0	7,256.9	9,667.0	7,036.1	79.7	79.3	50.30	-367.5	-2,769.3	345.7	221.6	124.08	2.786		
10,000.0	7,256.7	9,767.0	7,035.7	82.4	82.1	50.27	-367.5	-2,869.3	345.8	217.4	128.37	2.694		
10,100.0	7,256.6	9,867.0	7,035.3	85.2	84.9	50.24	-367.5	-2,969.3	346.0	213.3	132.66	2.608		
10,200.0	7,256.4	9,967.0	7,034.9	87.9	87.6	50.21	-367.5	-3,069.3	346.1	209.1	136.95	2.527		
10,300.0	7,256.3	10,067.0	7,034.5	90.7	90.4	50.18	-367.5	-3,169.3	346.2	205.0	141.24	2.451		
10,400.0	7,256.1	10,167.0	7,034.2	93.4	93.1	50.15	-367.5	-3,269.3	346.4	200.9	145.54	2.380		
10,500.0	7,255.9	10,267.0	7,033.8	96.2	95.9	50.12	-367.5	-3,369.3	346.5	196.7	149.83	2.313		
10,600.0	7,255.8	10,367.0	7,033.4	99.0	98.7	50.10	-367.5	-3,469.3	346.7	192.5	154.13	2.249		
10,700.0	7,255.6	10,467.0	7,033.0	101.7	101.4	50.07	-367.5	-3,569.3	346.8	188.4	158.43	2.189		
10,800.0	7,255.5	10,567.0	7,032.6	104.5	104.2	50.04	-367.5	-3,669.3	347.0	184.2	162.72	2.132		
10,900.0	7,255.3	10,667.0	7,032.2	107.2	107.0	50.01	-367.5	-3,769.3	347.1	180.1	167.02	2.078		
11,000.0	7,255.2	10,767.0	7,031.9	110.0	109.8	49.98	-367.5	-3,869.3	347.3	175.9	171.32	2.027		
11,100.0	7,255.0	10,867.0	7,031.5	112.8	112.5	49.95	-367.5	-3,969.3	347.4	171.8	175.61	1.978		
11,200.0	7,254.9	10,967.0	7,031.1	115.6	115.3	49.92	-367.5	-4,069.3	347.6	167.7	179.90	1.932		
11,300.0	7,254.7	11,067.0	7,030.7	118.3	118.1	49.89	-367.5	-4,169.3	347.7	163.5	184.20	1.888		
11,400.0	7,254.5	11,167.0	7,030.3	121.1	120.9	49.87	-367.5	-4,269.3	347.8	159.4	188.49	1.845		
11,500.0	7,254.4	11,267.0	7,029.9	123.9	123.7	49.84	-367.5	-4,369.3	348.0	155.2	192.78	1.805		
11,600.0	7,254.2	11,367.0	7,029.6	126.7	126.4	49.81	-367.5	-4,469.3	348.1	151.1	197.07	1.767		
11,700.0	7,254.1	11,467.0	7,029.2	129.5	129.2	49.78	-367.5	-4,569.3	348.3	146.9	201.35	1.730		
11,741.4	7,254.0	11,508.4	7,029.0	130.6	130.3	49.77	-367.5	-4,610.7	348.3	145.3	203.06	1.715 SF		

Reference Depths are relative to WELL @ 4909.0ft (RKB - 15')	Coordinates are relative to: Sunmarke 28V-404
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.500000 °	Grid Convergence at Surface is: 0.40°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sunmarke 28V-404
Project:	SEC.28-T4N-R67W	TVD Reference:	WELL @ 4909.0ft (RKB - 15')
Reference Site:	Sunmarke 28U-HZ Pad Sec.28-T4N-R67W	MD Reference:	WELL @ 4909.0ft (RKB - 15')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sunmarke 28V-404	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 @ 4909.0ft (RKB - 15')

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Sunmarke 28V-404

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.40°

