PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Sappington 22T-341**

Surface Location: Sappington 5N64W22D Sec.22-T5N-R64W

North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

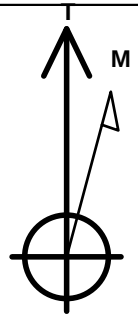
Ground Elevation: 4601.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1382719.21	3269519.27	40.379930	-104.532550	

RKB - 13.5' WELL @ 4614.5ft (RKB - 13.5')

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
50'E/W Hardline (22T-341)	1.0	1949.7	-16.7	Rectangle (Sides: L3955.2 W100.0)
SHL 853'FSL & 1722'FEL	1.0	0.0	0.0	Point
BHL 500'FNL & 1725'FEL	6625.0	3927.3	-16.7	Point



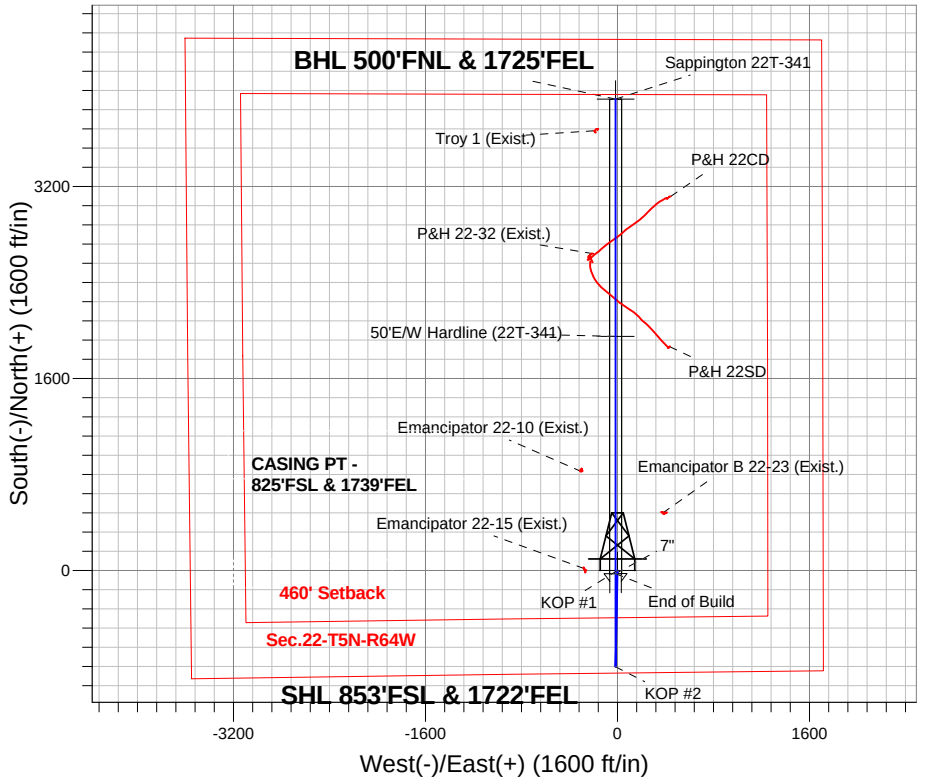
Azimuths to True North
Magnetic North: 8.26°

Magnetic Field
Strength: 52773.1snT
Dip Angle: 66.95°
Date: 12/31/2014
Model: IGRF2010

Sappington 5N64W22D Sec.22-T5N-R64W
Sappington 22T-341
Plan #1 (3-4-15)

ANNOTATIONS

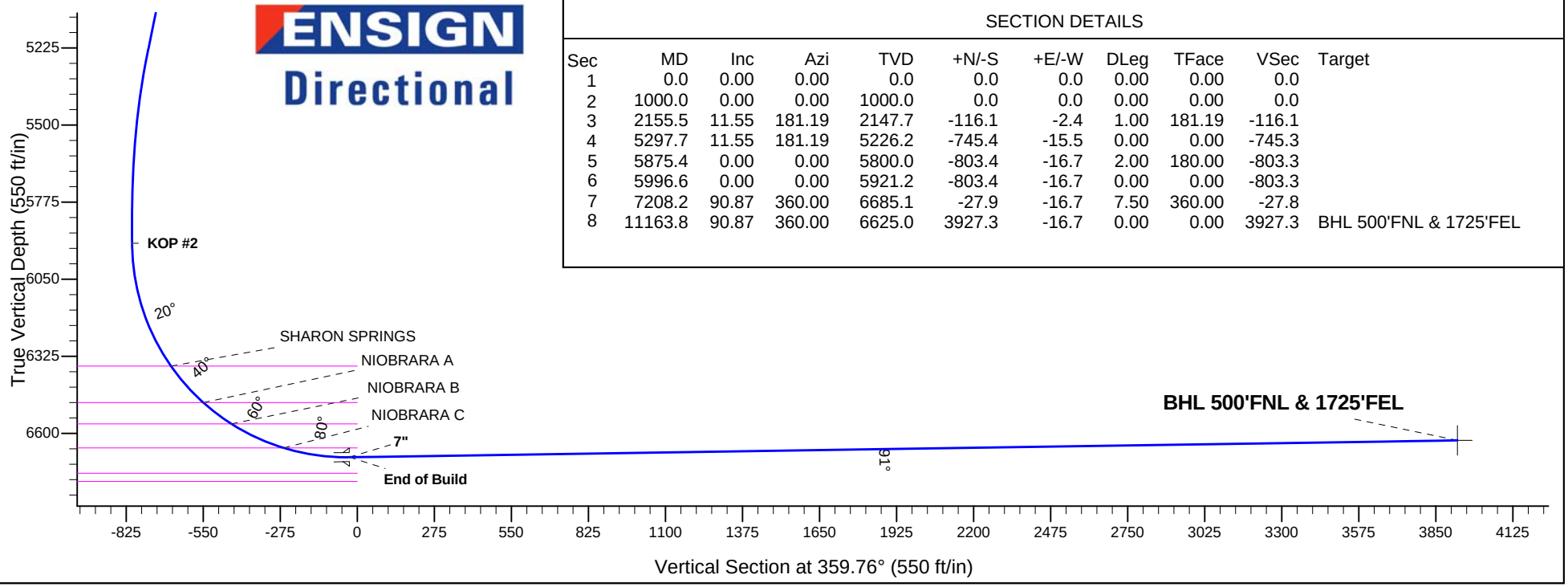
TVD	MD	Annotation
1000.0	1000.0	KOP #1
5921.2	5996.6	KOP #2
6685.1	7208.2	End of Build



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	1000.0	0.00	0.00	1000.0	0.0	0.0	0.00	0.00	0.0	
3	2155.5	11.55	181.19	2147.7	-116.1	-2.4	1.00	181.19	-116.1	
4	5297.7	11.55	181.19	5226.2	-745.4	-15.5	0.00	0.00	-745.3	
5	5875.4	0.00	0.00	5800.0	-803.4	-16.7	2.00	180.00	-803.3	
6	5996.6	0.00	0.00	5921.2	-803.4	-16.7	0.00	0.00	-803.3	
7	7208.2	90.87	360.00	6685.1	-27.9	-16.7	7.50	360.00	-27.8	
8	11163.8	90.87	360.00	6625.0	3927.3	-16.7	0.00	0.00	3927.3	BHL 500'FNL & 1725'FEL



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W
Sappington 5N64W22D Sec.22-T5N-R64W
Sappington 22T-341

Wellbore #1

Plan: Plan #1 (3-4-15)

Standard Planning Report

06 March, 2015

Database:	landmark	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Project:	SEC.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**North Reference:**	True
Well:	Sappington 22T-341	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (3-4-15)		

Project SEC.22-T5N-R64W, 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 Sappington 5N64W22D Sec.22-T5N-R64W

Site Position:		**Northing:**	1,382,718.89 ft	**Latitude:**	40.379930
From:	Lat/Long	**Easting:**	3,269,488.62 ft	**Longitude:**	-104.532660
Position Uncertainty:	0.0 ft	**Slot Radius:**	"	**Grid Convergence:**	0.63 °

Well Sappington 22T-341

Well Position	**+N/-S**	0.0 ft	**Northing:**	1,382,719.21 ft	**Latitude:**	40.379930
	+E/-W	30.6 ft	**Easting:**	3,269,519.27 ft	**Longitude:**	-104.532550
Position Uncertainty		0.0 ft	**Wellhead Elevation:**	ft	**Ground Level:**	4,601.0 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/31/2014	8.26	66.95	52,773

Design Plan #1 (3-4-15)

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	359.76

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,155.5	11.55	181.19	2,147.7	-116.1	-2.4	1.00	1.00	0.00	181.19	
5,297.7	11.55	181.19	5,226.2	-745.4	-15.5	0.00	0.00	0.00	0.00	
5,875.4	0.00	0.00	5,800.0	-803.4	-16.7	2.00	-2.00	0.00	180.00	
5,996.6	0.00	0.00	5,921.2	-803.4	-16.7	0.00	0.00	0.00	0.00	
7,208.2	90.87	360.00	6,685.1	-27.9	-16.7	7.50	7.50	0.00	360.00	
11,163.8	90.87	360.00	6,625.0	3,927.3	-16.7	0.00	0.00	0.00	0.00	BHL 500'FNL & 172

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Project:	SEC.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**North Reference:**	True
Well:	Sappington 22T-341	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (3-4-15)		

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
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
1,100.0	1.00	181.19	1,100.0	-0.9	0.0	-0.9	1.00	1.00	0.00
1,200.0	2.00	181.19	1,200.0	-3.5	-0.1	-3.5	1.00	1.00	0.00
1,300.0	3.00	181.19	1,299.9	-7.9	-0.2	-7.8	1.00	1.00	0.00
1,400.0	4.00	181.19	1,399.7	-14.0	-0.3	-14.0	1.00	1.00	0.00
1,500.0	5.00	181.19	1,499.4	-21.8	-0.5	-21.8	1.00	1.00	0.00
1,600.0	6.00	181.19	1,598.9	-31.4	-0.7	-31.4	1.00	1.00	0.00
1,700.0	7.00	181.19	1,698.3	-42.7	-0.9	-42.7	1.00	1.00	0.00
1,800.0	8.00	181.19	1,797.4	-55.7	-1.2	-55.7	1.00	1.00	0.00
1,900.0	9.00	181.19	1,896.3	-70.5	-1.5	-70.5	1.00	1.00	0.00
2,000.0	10.00	181.19	1,994.9	-87.0	-1.8	-87.0	1.00	1.00	0.00
2,100.0	11.00	181.19	2,093.3	-105.2	-2.2	-105.2	1.00	1.00	0.00
2,155.5	11.55	181.19	2,147.7	-116.1	-2.4	-116.1	1.00	1.00	0.00
2,200.0	11.55	181.19	2,191.3	-125.0	-2.6	-125.0	0.00	0.00	0.00
2,300.0	11.55	181.19	2,289.3	-145.0	-3.0	-145.0	0.00	0.00	0.00
2,400.0	11.55	181.19	2,387.2	-165.1	-3.4	-165.0	0.00	0.00	0.00
2,500.0	11.55	181.19	2,485.2	-185.1	-3.9	-185.1	0.00	0.00	0.00
2,600.0	11.55	181.19	2,583.2	-205.1	-4.3	-205.1	0.00	0.00	0.00
2,700.0	11.55	181.19	2,681.1	-225.1	-4.7	-225.1	0.00	0.00	0.00
2,800.0	11.55	181.19	2,779.1	-245.2	-5.1	-245.1	0.00	0.00	0.00
2,900.0	11.55	181.19	2,877.1	-265.2	-5.5	-265.2	0.00	0.00	0.00
3,000.0	11.55	181.19	2,975.1	-285.2	-5.9	-285.2	0.00	0.00	0.00
3,100.0	11.55	181.19	3,073.0	-305.2	-6.4	-305.2	0.00	0.00	0.00
3,200.0	11.55	181.19	3,171.0	-325.3	-6.8	-325.2	0.00	0.00	0.00
3,300.0	11.55	181.19	3,269.0	-345.3	-7.2	-345.3	0.00	0.00	0.00
3,400.0	11.55	181.19	3,367.0	-365.3	-7.6	-365.3	0.00	0.00	0.00
3,433.7	11.55	181.19	3,400.0	-372.1	-7.7	-372.0	0.00	0.00	0.00
PARKMAN									
3,500.0	11.55	181.19	3,464.9	-385.3	-8.0	-385.3	0.00	0.00	0.00
3,600.0	11.55	181.19	3,562.9	-405.4	-8.4	-405.3	0.00	0.00	0.00
3,700.0	11.55	181.19	3,660.9	-425.4	-8.8	-425.4	0.00	0.00	0.00
3,800.0	11.55	181.19	3,758.9	-445.4	-9.3	-445.4	0.00	0.00	0.00
3,900.0	11.55	181.19	3,856.8	-465.5	-9.7	-465.4	0.00	0.00	0.00
4,000.0	11.55	181.19	3,954.8	-485.5	-10.1	-485.4	0.00	0.00	0.00
4,100.0	11.55	181.19	4,052.8	-505.5	-10.5	-505.5	0.00	0.00	0.00
4,199.2	11.55	181.19	4,150.0	-525.4	-10.9	-525.3	0.00	0.00	0.00
SUSSEX									
4,200.0	11.55	181.19	4,150.7	-525.5	-10.9	-525.5	0.00	0.00	0.00
4,270.7	11.55	181.19	4,220.0	-539.7	-11.2	-539.6	0.00	0.00	0.00
SHANNON									
4,300.0	11.55	181.19	4,248.7	-545.6	-11.3	-545.5	0.00	0.00	0.00
4,400.0	11.55	181.19	4,346.7	-565.6	-11.8	-565.5	0.00	0.00	0.00

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Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**North Reference:**	True
Well:	Sappington 22T-341	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (3-4-15)		

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	11.55	181.19	4,444.7	-585.6	-12.2	-585.6	0.00	0.00	0.00
4,600.0	11.55	181.19	4,542.6	-605.6	-12.6	-605.6	0.00	0.00	0.00
4,700.0	11.55	181.19	4,640.6	-625.7	-13.0	-625.6	0.00	0.00	0.00
4,800.0	11.55	181.19	4,738.6	-645.7	-13.4	-645.6	0.00	0.00	0.00
4,900.0	11.55	181.19	4,836.6	-665.7	-13.8	-665.7	0.00	0.00	0.00
5,000.0	11.55	181.19	4,934.5	-685.7	-14.3	-685.7	0.00	0.00	0.00
5,100.0	11.55	181.19	5,032.5	-705.8	-14.7	-705.7	0.00	0.00	0.00
5,200.0	11.55	181.19	5,130.5	-725.8	-15.1	-725.7	0.00	0.00	0.00
5,297.7	11.55	181.19	5,226.2	-745.4	-15.5	-745.3	0.00	0.00	0.00
5,300.0	11.51	181.19	5,228.5	-745.8	-15.5	-745.7	2.00	-2.00	0.00
5,400.0	9.51	181.19	5,326.8	-764.1	-15.9	-764.0	2.00	-2.00	0.00
5,500.0	7.51	181.19	5,425.7	-778.8	-16.2	-778.8	2.00	-2.00	0.00
5,600.0	5.51	181.19	5,525.0	-790.2	-16.4	-790.1	2.00	-2.00	0.00
5,700.0	3.51	181.19	5,624.7	-798.0	-16.6	-798.0	2.00	-2.00	0.00
5,800.0	1.51	181.19	5,724.6	-802.4	-16.7	-802.3	2.00	-2.00	0.00
5,875.4	0.00	0.00	5,800.0	-803.4	-16.7	-803.3	2.00	-2.00	0.00
5,900.0	0.00	0.00	5,824.6	-803.4	-16.7	-803.3	0.00	0.00	0.00
5,996.6	0.00	0.00	5,921.2	-803.4	-16.7	-803.3	0.00	0.00	0.00
KOP #2									
6,000.0	0.25	360.00	5,924.6	-803.4	-16.7	-803.3	7.48	7.48	0.00
6,100.0	7.75	360.00	6,024.3	-796.4	-16.7	-796.3	7.50	7.50	0.00
6,200.0	15.25	360.00	6,122.2	-776.5	-16.7	-776.4	7.50	7.50	0.00
6,300.0	22.75	360.00	6,216.7	-743.9	-16.7	-743.9	7.50	7.50	0.00
6,400.0	30.25	360.00	6,306.1	-699.3	-16.7	-699.3	7.50	7.50	0.00
6,464.0	35.06	360.00	6,360.0	-664.8	-16.7	-664.7	7.50	7.50	0.00
SHARON SPRINGS									
6,500.0	37.75	360.00	6,388.9	-643.5	-16.7	-643.4	7.50	7.50	0.00
6,600.0	45.25	360.00	6,463.8	-577.2	-16.7	-577.2	7.50	7.50	0.00
6,638.2	48.12	360.00	6,490.0	-549.4	-16.7	-549.4	7.50	7.50	0.00
NIOBRARA A									
6,700.0	52.75	360.00	6,529.3	-501.8	-16.7	-501.7	7.50	7.50	0.00
6,764.2	57.57	360.00	6,566.0	-449.1	-16.7	-449.1	7.50	7.50	0.00
NIOBRARA B									
6,800.0	60.25	360.00	6,584.5	-418.5	-16.7	-418.4	7.50	7.50	0.00
6,900.0	67.75	360.00	6,628.3	-328.7	-16.7	-328.6	7.50	7.50	0.00
6,970.7	73.06	360.00	6,652.0	-262.1	-16.7	-262.0	7.50	7.50	0.00
NIOBRARA C									
7,000.0	75.25	360.00	6,660.0	-233.9	-16.7	-233.8	7.50	7.50	0.00
7,100.0	82.75	360.00	6,679.0	-135.8	-16.7	-135.7	7.50	7.50	0.00
7,200.0	90.25	360.00	6,685.1	-36.1	-16.7	-36.0	7.50	7.50	0.00
7,208.2	90.87	360.00	6,685.1	-27.9	-16.7	-27.8	7.50	7.50	0.00
End of Build - 7"									
7,300.0	90.87	360.00	6,683.7	63.9	-16.7	64.0	0.00	0.00	0.00
7,400.0	90.87	360.00	6,682.1	163.9	-16.7	164.0	0.00	0.00	0.00
7,500.0	90.87	360.00	6,680.6	263.9	-16.7	264.0	0.00	0.00	0.00
7,600.0	90.87	360.00	6,679.1	363.9	-16.7	364.0	0.00	0.00	0.00
7,700.0	90.87	360.00	6,677.6	463.9	-16.7	463.9	0.00	0.00	0.00
7,800.0	90.87	360.00	6,676.1	563.9	-16.7	563.9	0.00	0.00	0.00
7,900.0	90.87	360.00	6,674.6	663.9	-16.7	663.9	0.00	0.00	0.00
8,000.0	90.87	360.00	6,673.0	763.8	-16.7	763.9	0.00	0.00	0.00
8,100.0	90.87	360.00	6,671.5	863.8	-16.7	863.9	0.00	0.00	0.00
8,200.0	90.87	360.00	6,670.0	963.8	-16.7	963.9	0.00	0.00	0.00

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Wellbore:	Wellbore #1		
Design:	Plan #1 (3-4-15)		

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)
8,300.0	90.87	360.00	6,668.5	1,063.8	-16.7	1,063.9	0.00	0.00	0.00
8,400.0	90.87	360.00	6,667.0	1,163.8	-16.7	1,163.9	0.00	0.00	0.00
8,500.0	90.87	360.00	6,665.4	1,263.8	-16.7	1,263.8	0.00	0.00	0.00
8,600.0	90.87	360.00	6,663.9	1,363.8	-16.7	1,363.8	0.00	0.00	0.00
8,700.0	90.87	360.00	6,662.4	1,463.8	-16.7	1,463.8	0.00	0.00	0.00
8,800.0	90.87	360.00	6,660.9	1,563.7	-16.7	1,563.8	0.00	0.00	0.00
8,900.0	90.87	360.00	6,659.4	1,663.7	-16.7	1,663.8	0.00	0.00	0.00
9,000.0	90.87	360.00	6,657.9	1,763.7	-16.7	1,763.8	0.00	0.00	0.00
9,100.0	90.87	360.00	6,656.3	1,863.7	-16.7	1,863.8	0.00	0.00	0.00
9,200.0	90.87	360.00	6,654.8	1,963.7	-16.7	1,963.8	0.00	0.00	0.00
9,300.0	90.87	360.00	6,653.3	2,063.7	-16.7	2,063.7	0.00	0.00	0.00
9,400.0	90.87	360.00	6,651.8	2,163.7	-16.7	2,163.7	0.00	0.00	0.00
9,500.0	90.87	360.00	6,650.3	2,263.7	-16.7	2,263.7	0.00	0.00	0.00
9,600.0	90.87	360.00	6,648.7	2,363.7	-16.7	2,363.7	0.00	0.00	0.00
9,700.0	90.87	360.00	6,647.2	2,463.6	-16.7	2,463.7	0.00	0.00	0.00
9,800.0	90.87	360.00	6,645.7	2,563.6	-16.7	2,563.7	0.00	0.00	0.00
9,900.0	90.87	360.00	6,644.2	2,663.6	-16.7	2,663.7	0.00	0.00	0.00
10,000.0	90.87	360.00	6,642.7	2,763.6	-16.7	2,763.7	0.00	0.00	0.00
10,100.0	90.87	360.00	6,641.2	2,863.6	-16.7	2,863.6	0.00	0.00	0.00
10,200.0	90.87	360.00	6,639.6	2,963.6	-16.7	2,963.6	0.00	0.00	0.00
10,300.0	90.87	360.00	6,638.1	3,063.6	-16.7	3,063.6	0.00	0.00	0.00
10,400.0	90.87	360.00	6,636.6	3,163.6	-16.7	3,163.6	0.00	0.00	0.00
10,500.0	90.87	360.00	6,635.1	3,263.6	-16.7	3,263.6	0.00	0.00	0.00
10,600.0	90.87	360.00	6,633.6	3,363.5	-16.7	3,363.6	0.00	0.00	0.00
10,700.0	90.87	360.00	6,632.0	3,463.5	-16.7	3,463.6	0.00	0.00	0.00
10,800.0	90.87	360.00	6,630.5	3,563.5	-16.7	3,563.6	0.00	0.00	0.00
10,900.0	90.87	360.00	6,629.0	3,663.5	-16.7	3,663.5	0.00	0.00	0.00
11,000.0	90.87	360.00	6,627.5	3,763.5	-16.7	3,763.5	0.00	0.00	0.00
11,100.0	90.87	360.00	6,626.0	3,863.5	-16.7	3,863.5	0.00	0.00	0.00
11,163.8	90.87	360.00	6,625.0	3,927.3	-16.7	3,927.3	0.00	0.00	0.00

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
SHL 853'FSL & 1722'I - plan hits target - Point	0.00	0.00	1.0	0.0	0.0	1,382,719.22	3,269,519.27	40.379930	-104.532550
50'E/W Hardline (22T· - plan misses by 1949.8ft at 1.0ft MD (1.0 TVD, 0.0 N, 0.0 E) - Rectangle (sides W3,955.2 H100.0 D0.0)	0.00	0.00	1.0	1,949.7	-16.7	1,384,668.53	3,269,481.30	40.385282	-104.532610
BHL 500'FNL & 1725' - plan hits target - Point	0.00	0.00	6,625.0	3,927.3	-16.7	1,386,645.91	3,269,459.71	40.390710	-104.532610

Database:	landmark	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Project:	SEC.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**North Reference:**	True
Well:	Sappington 22T-341	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (3-4-15)		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,208.2	6,685.1	7"	7	7-1/2

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,433.7	3,400.0	PARKMAN		0.00	
4,199.2	4,150.0	SUSSEX		0.00	
4,270.7	4,220.0	SHANNON		0.00	
6,464.0	6,360.0	SHARON SPRINGS		0.00	
6,638.2	6,490.0	NIOBRARA A		0.00	
6,764.2	6,566.0	NIOBRARA B		0.00	
6,970.7	6,652.0	NIOBRARA C		0.00	
	6,742.0	FT HAYS		0.00	
	6,771.0	CODELL		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
1,000.0	1,000.0	0.0	0.0	KOP #1
5,996.6	5,921.2	-803.4	-16.7	KOP #2
7,208.2	6,685.1	-27.9	-16.7	End of Build

ENSIGN Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W
Sappington 5N64W22D Sec.22-T5N-R64W
Sappington 22T-341

Wellbore #1
Plan #1 (3-4-15)

Anticollision Report

06 March, 2015

PDC ENERGY
Growing E&P Value

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Reference Plan #1 (3-4-15)

Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	**Error Model:**	ISCWSA
Depth Range:	Unlimited	**Scan Method:**	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0ft	**Error Surface:**	Elliptical Conic

Warning Levels Evaluated at: 2.00 **Sigma**

Survey Tool Program **Date** 3/6/2015

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,163.8	Plan #1 (3-4-15) (Wellbore #1)	MWD	MWD - Standard

Summary

Site Name / Offset Well - Wellbore - Design	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Existing Wells Sec.22-T5N-R64W						
Troy 1 (Exist.) - Wellbore #1 - Wellbore #1	10,897.7	6,588.2	176.7	88.1	1.994	CC
Troy 1 (Exist.) - Wellbore #1 - Wellbore #1	10,900.0	6,588.2	176.7	88.0	1.993	ES, SF
Existing Wells Sec.22-T5N-R64W (Grid)						
Emancipator 22-10 (Exist.) - Wellbore #1 - Wellbore #1	8,060.7	6,664.6	286.1	247.6	7.429	CC, ES
Emancipator 22-10 (Exist.) - Wellbore #1 - Wellbore #1	8,100.0	6,663.8	288.8	249.7	7.390	SF
Emancipator 22-15 (Exist.) - Wellbore #1 - Wellbore #1	0.0	0.0	262.2			
Emancipator 22-15 (Exist.) - Wellbore #1 - Wellbore #1	7,251.8	6,675.2	264.0	233.5	8.666	ES, SF
Emancipator B 22-23 (Exist.) - Wellbore #1 - Wellbore #1	7,719.3	6,659.5	389.6	355.9	11.565	CC, ES
Emancipator B 22-23 (Exist.) - Wellbore #1 - Wellbore #1	7,800.0	6,657.4	397.9	363.2	11.478	SF
P&H 22CD Pad Sec.22-T5N-R64W						
P&H 22-32 (Exist.) - Wellbore #1 - Wellbore #1	9,877.3	6,649.5	191.7	121.7	2.741	CC, ES, SF
P&H 22CD - Wellbore #1 - Wellbore #1	10,350.8	6,701.0	448.7	365.0	5.360	CC, ES
P&H 22CD - Wellbore #1 - Wellbore #1	10,400.0	6,702.4	451.4	366.7	5.333	SF
P&H 22SD - Wellbore #1 - Wellbore #1	9,103.2	6,774.5	450.9	387.8	7.137	CC, ES
P&H 22SD - Wellbore #1 - Wellbore #1	9,200.0	6,772.6	461.2	396.3	7.107	SF
Sappington 5N64W22D Sec.22-T5N-R64W						
Sappington 22Q-221 - Wellbore #1 - Plan #1 (3-4-15)	400.0	399.0	30.6	29.1	19.506	CC
Sappington 22Q-221 - Wellbore #1 - Plan #1 (3-4-15)	500.0	498.8	31.0	29.0	15.526	ES
Sappington 22Q-221 - Wellbore #1 - Plan #1 (3-4-15)	11,163.8	11,088.8	335.9	175.2	2.090	SF
Sappington 22Q-301 - Wellbore #1 - Plan #1 (3-4-15)	200.0	200.0	61.4	60.7	91.059	CC, ES
Sappington 22Q-301 - Wellbore #1 - Plan #1 (3-4-15)	11,163.8	11,208.5	713.1	550.1	4.373	SF
Sappington 22T-201 - Wellbore #1 - Plan #1 (3-4-15)	600.0	600.0	27.9	25.4	11.268	CC
Sappington 22T-201 - Wellbore #1 - Plan #1 (3-4-15)	700.0	699.8	28.2	25.3	9.731	ES
Sappington 22T-201 - Wellbore #1 - Plan #1 (3-4-15)	11,163.8	11,072.4	338.8	178.0	2.107	SF

Offset Design Existing Wells Sec.22-T5N-R64W - Troy 1 (Exist.) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 100-NS-GYRO-MS

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,000.0	6,642.7	6,594.0	6,593.3	60.0	12.0	-91.21	3,661.2	-193.5	914.9	842.9	71.95	12.716	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W - Troy 1 (Exist.) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 100-NS-GYRO-MS

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	6,641.2	6,593.4	6,592.6	61.8	12.0	-91.00	3,661.2	-193.4	817.0	743.2	73.79	11.071	
10,200.0	6,639.6	6,592.7	6,592.0	63.7	12.0	-90.79	3,661.2	-193.4	719.7	644.1	75.64	9.514	
10,300.0	6,638.1	6,592.1	6,591.3	65.5	12.0	-90.58	3,661.2	-193.4	623.2	545.7	77.49	8.042	
10,400.0	6,636.6	6,591.4	6,590.7	67.4	12.0	-90.37	3,661.2	-193.4	528.1	448.8	79.35	6.656	
10,500.0	6,635.1	6,590.8	6,590.0	69.2	12.0	-90.16	3,661.2	-193.4	435.2	354.0	81.21	5.359	
10,600.0	6,633.6	6,590.1	6,589.4	71.1	12.0	-89.95	3,661.2	-193.4	346.2	263.1	83.07	4.167	
10,700.0	6,632.0	6,589.5	6,588.7	73.0	12.0	-89.74	3,661.2	-193.4	265.1	180.2	84.93	3.122	
10,800.0	6,630.5	6,588.9	6,588.1	74.8	12.0	-89.53	3,661.2	-193.4	201.9	115.1	86.79	2.326	
10,897.7	6,629.0	6,588.2	6,587.5	76.7	12.0	-89.33	3,661.2	-193.4	176.7	88.1	88.62	1.994	CC
10,900.0	6,629.0	6,588.2	6,587.5	76.7	12.0	-89.32	3,661.2	-193.4	176.7	88.0	88.66	1.993	ES, SF
11,000.0	6,627.5	6,587.6	6,586.8	78.6	12.0	-89.12	3,661.2	-193.4	204.2	113.6	90.53	2.255	
11,100.0	6,626.0	6,586.9	6,586.2	80.5	12.0	-88.91	3,661.2	-193.4	268.6	176.2	92.40	2.907	
11,163.8	6,625.0	6,586.5	6,585.8	81.6	12.0	-88.78	3,661.1	-193.4	319.4	225.8	93.59	3.413	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W (Grid) - Emancipator 22-10 (Exist.) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 100-NS-GYRO-MS

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-19.52	848.8	-300.9	900.7				
100.0	100.0	102.6	102.6	0.1	0.1	-19.53	848.1	-300.8	899.9	899.7	0.25	3,564.393	
200.0	200.0	203.6	203.6	0.3	0.4	-19.54	846.6	-300.5	898.4	897.7	0.75	1,205.266	
300.0	300.0	304.4	304.3	0.6	0.7	-19.55	845.0	-300.0	896.8	895.6	1.24	725.604	
400.0	400.0	400.7	400.6	0.8	0.9	-19.57	843.5	-299.9	895.3	893.6	1.71	524.473	
500.0	500.0	501.6	501.5	1.0	1.2	-19.63	842.0	-300.3	894.0	891.9	2.19	408.586	
600.0	600.0	602.0	601.9	1.2	1.4	-19.68	840.5	-300.6	892.7	890.0	2.68	333.704	
700.0	700.0	700.0	699.9	1.5	1.7	-19.70	839.2	-300.5	891.5	888.3	3.16	282.243	
800.0	800.0	795.5	795.5	1.7	2.0	-19.71	838.4	-300.4	890.6	887.0	3.64	244.957	
893.9	893.9	883.5	883.4	1.9	2.1	-19.72	838.1	-300.4	890.3	886.3	3.97	224.257	
900.0	900.0	889.2	889.1	1.9	2.1	-19.72	838.1	-300.4	890.3	886.3	3.99	223.057	
1,000.0	1,000.0	989.0	989.0	2.1	2.1	-19.71	838.2	-300.3	890.4	886.1	4.25	209.496	
1,100.0	1,100.0	1,083.8	1,083.7	2.3	2.2	159.12	838.6	-300.2	891.5	887.0	4.48	198.849	
1,200.0	1,200.0	1,184.1	1,184.0	2.5	2.2	159.19	839.3	-300.2	894.7	889.9	4.72	189.665	
1,300.0	1,299.9	1,281.3	1,281.2	2.7	2.3	159.28	840.0	-300.2	899.5	894.5	4.98	180.605	
1,400.0	1,399.7	1,381.1	1,381.0	2.9	2.4	159.41	841.0	-300.4	906.1	900.8	5.27	171.802	
1,500.0	1,499.4	1,479.9	1,479.8	3.1	2.5	159.55	841.9	-300.7	914.4	908.8	5.59	163.445	
1,600.0	1,598.9	1,578.6	1,578.5	3.3	2.7	159.74	842.9	-300.8	924.4	918.5	5.94	155.635	
1,700.0	1,698.3	1,685.7	1,685.6	3.6	2.9	159.99	843.8	-300.6	935.8	929.5	6.33	147.954	
1,800.0	1,797.4	1,786.8	1,786.7	3.8	3.1	160.24	844.0	-300.2	948.2	941.4	6.72	141.006	
1,900.0	1,896.3	1,892.3	1,892.2	4.1	3.3	160.52	843.8	-300.0	961.8	954.7	7.14	134.791	
2,000.0	1,994.9	1,993.4	1,993.2	4.4	3.4	160.80	843.0	-299.8	976.6	969.1	7.53	129.618	
2,100.0	2,093.3	2,094.3	2,094.1	4.7	3.6	161.09	841.9	-299.7	992.9	984.9	7.94	125.004	
7,200.0	6,685.1	6,683.2	6,682.6	17.7	11.9	-92.36	824.4	-302.6	906.8	877.2	29.62	30.612	
7,300.0	6,683.7	6,681.0	6,680.5	18.2	11.9	-93.78	824.5	-302.6	812.5	782.5	30.08	27.014	
7,400.0	6,682.1	6,678.9	6,678.3	18.9	11.9	-93.35	824.5	-302.7	719.8	689.1	30.76	23.399	
7,500.0	6,680.6	6,676.7	6,676.2	19.7	11.9	-92.91	824.5	-302.7	629.3	597.7	31.61	19.909	
7,600.0	6,679.1	6,674.6	6,674.0	20.7	11.9	-92.48	824.5	-302.7	542.2	509.6	32.60	16.631	
7,700.0	6,677.6	6,672.4	6,671.9	21.8	11.9	-92.05	824.5	-302.7	460.3	426.6	33.71	13.653	
7,800.0	6,676.1	6,670.2	6,669.7	23.1	11.9	-91.62	824.5	-302.7	387.0	352.1	34.93	11.078	
7,900.0	6,674.6	6,668.1	6,667.5	24.4	11.9	-91.19	824.5	-302.7	328.1	291.9	36.24	9.053	
8,000.0	6,673.0	6,665.9	6,665.4	25.7	11.9	-90.75	824.6	-302.8	292.4	254.8	37.63	7.772	
8,060.7	6,672.1	6,664.6	6,664.1	26.6	11.9	-90.49	824.6	-302.8	286.1	247.6	38.51	7.429	CC, ES
8,100.0	6,671.5	6,663.8	6,663.2	27.2	11.9	-90.32	824.6	-302.8	288.8	249.7	39.08	7.390	SF
8,200.0	6,670.0	6,661.6	6,661.1	28.7	11.9	-89.89	824.6	-302.8	318.2	277.6	40.58	7.841	
8,300.0	6,668.5	6,659.4	6,658.9	30.3	11.9	-89.45	824.6	-302.8	372.9	330.8	42.13	8.853	
8,400.0	6,667.0	6,657.3	6,656.7	31.8	11.9	-89.02	824.6	-302.8	443.7	400.0	43.71	10.152	
8,500.0	6,665.4	6,655.1	6,654.6	33.5	11.9	-88.59	824.6	-302.9	524.2	478.8	45.33	11.564	
8,600.0	6,663.9	6,653.0	6,652.4	35.1	11.9	-88.16	824.6	-302.9	610.4	563.4	46.97	12.994	
8,700.0	6,662.4	6,650.8	6,650.2	36.8	11.9	-87.73	824.7	-302.9	700.3	651.6	48.64	14.397	
8,800.0	6,660.9	6,650.0	6,649.4	38.5	11.9	-87.57	824.7	-302.9	792.6	742.2	50.34	15.745	
8,900.0	6,659.4	6,646.8	6,646.2	40.2	11.8	-86.92	824.7	-302.9	886.5	834.5	52.03	17.039	
9,000.0	6,657.9	6,644.8	6,644.2	42.0	11.8	-86.53	824.7	-302.9	981.7	927.9	53.75	18.264	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W (Grid) - Emancipator 22-15 (Exist.) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 100-NS-GYRO-MS

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-89.20	3.6	-261.9	262.2				
100.0	100.0	87.0	87.0	0.1	0.1	-89.27	3.3	-262.1	262.2	261.9	0.23	1,150.200	
200.0	200.0	184.7	184.7	0.3	0.4	-89.49	2.4	-263.1	263.2	262.5	0.69	378.916	
300.0	300.0	286.2	286.2	0.6	0.6	-89.80	0.9	-264.4	264.5	263.3	1.19	222.999	
400.0	400.0	386.2	386.2	0.8	0.9	-90.11	-0.5	-265.3	265.3	263.6	1.67	158.481	
500.0	500.0	486.1	486.0	1.0	1.2	-90.41	-1.9	-266.2	266.2	264.0	2.16	123.053	
600.0	600.0	586.3	586.2	1.2	1.4	-90.70	-3.3	-267.0	267.1	264.4	2.65	100.639	
700.0	700.0	687.6	687.5	1.5	1.7	-91.00	-4.7	-267.7	267.7	264.6	3.14	85.226	
800.0	800.0	788.3	788.3	1.7	1.9	-91.34	-6.3	-267.8	267.9	264.3	3.62	74.048	
900.0	900.0	888.7	888.6	1.9	2.2	-91.67	-7.8	-267.8	267.9	263.9	4.09	65.503	
1,000.0	1,000.0	989.1	989.0	2.1	2.4	-92.01	-9.4	-267.7	267.9	263.3	4.56	58.721	
1,053.1	1,053.1	1,041.6	1,041.5	2.2	2.6	86.67	-10.2	-267.6	267.8	263.0	4.80	55.811	
1,100.0	1,100.0	1,087.8	1,087.6	2.3	2.7	86.66	-10.9	-267.7	267.8	262.8	5.01	53.486	
1,200.0	1,200.0	1,188.1	1,188.0	2.5	2.9	86.95	-12.2	-267.9	268.0	262.5	5.44	49.224	
1,300.0	1,299.9	1,289.1	1,288.9	2.7	3.2	87.61	-13.5	-267.9	267.8	261.9	5.88	45.507	
1,357.1	1,356.9	1,345.0	1,344.8	2.8	3.3	88.14	-14.2	-267.8	267.6	261.5	6.14	43.608	
1,400.0	1,399.7	1,386.7	1,386.5	2.9	3.4	88.62	-14.7	-268.0	267.7	261.4	6.33	42.321	
1,500.0	1,499.4	1,485.7	1,485.5	3.1	3.7	90.03	-15.9	-268.8	268.4	261.6	6.79	39.552	
1,600.0	1,598.9	1,585.4	1,585.3	3.3	4.0	91.83	-16.9	-269.7	269.4	262.2	7.26	37.093	
1,700.0	1,698.3	1,686.3	1,686.1	3.6	4.1	94.10	-17.5	-270.3	270.6	262.9	7.70	35.157	
1,800.0	1,797.4	1,785.7	1,785.5	3.8	4.2	96.87	-17.3	-270.4	272.0	264.0	8.03	33.884	
1,900.0	1,896.3	1,884.3	1,884.1	4.1	4.2	100.03	-16.4	-270.5	274.4	266.0	8.32	32.973	
2,000.0	1,994.9	1,981.4	1,981.2	4.4	4.3	103.50	-15.1	-270.6	278.3	269.6	8.65	32.178	
2,100.0	2,093.3	2,080.4	2,080.2	4.7	4.3	107.26	-13.7	-271.0	283.9	274.9	9.01	31.526	
2,200.0	2,191.3	2,178.0	2,177.8	5.1	4.4	111.20	-11.9	-270.9	291.1	281.8	9.38	31.045	
2,300.0	2,289.3	2,275.7	2,275.5	5.5	4.4	115.08	-9.8	-270.7	299.9	290.2	9.76	30.721	
2,400.0	2,387.2	2,373.0	2,372.7	5.8	4.5	118.63	-8.1	-270.7	310.0	299.8	10.16	30.511	
2,500.0	2,485.2	2,470.4	2,470.1	6.2	4.6	121.97	-6.4	-270.8	321.3	310.7	10.57	30.391	
2,600.0	2,583.2	2,567.3	2,567.0	6.6	4.8	124.97	-5.0	-271.3	333.7	322.7	11.00	30.347	
2,700.0	2,681.1	2,665.0	2,664.7	7.0	4.9	127.88	-3.0	-271.6	347.3	335.9	11.42	30.415	
2,800.0	2,779.1	2,763.8	2,763.5	7.4	5.0	130.53	-1.5	-272.0	361.4	349.6	11.85	30.503	
2,900.0	2,877.1	2,862.4	2,862.1	7.8	5.2	132.91	-0.5	-272.4	375.9	363.6	12.29	30.594	
3,000.0	2,975.1	2,960.6	2,960.3	8.3	5.4	135.10	0.4	-272.8	390.9	378.1	12.73	30.691	
3,100.0	3,073.0	3,057.8	3,057.4	8.7	5.5	137.07	1.0	-273.3	406.3	393.1	13.19	30.798	
3,200.0	3,171.0	3,154.9	3,154.5	9.1	5.7	138.90	1.9	-274.0	422.5	408.8	13.65	30.947	
3,300.0	3,269.0	3,252.5	3,252.2	9.5	5.9	140.65	3.0	-274.5	439.1	425.0	14.10	31.143	
3,400.0	3,367.0	3,349.6	3,349.2	9.9	6.1	142.29	4.3	-274.7	456.1	441.6	14.54	31.379	
3,500.0	3,464.9	3,448.1	3,447.8	10.4	6.3	143.85	5.8	-275.0	473.6	458.7	14.97	31.644	
3,600.0	3,562.9	3,547.5	3,547.1	10.8	6.5	145.35	7.1	-274.8	491.0	475.6	15.40	31.893	
3,700.0	3,660.9	3,644.5	3,644.2	11.2	6.7	146.65	8.0	-275.0	508.6	492.8	15.83	32.125	
3,800.0	3,758.9	3,742.5	3,742.1	11.7	6.9	147.90	9.2	-275.1	526.7	510.4	16.28	32.357	
3,900.0	3,856.8	3,841.5	3,841.1	12.1	7.1	149.06	10.0	-275.3	544.7	527.9	16.73	32.564	
4,000.0	3,954.8	3,939.0	3,938.6	12.5	7.3	150.14	10.9	-275.4	562.8	545.7	17.18	32.766	
4,100.0	4,052.8	4,037.5	4,037.1	13.0	7.5	151.11	11.6	-275.8	581.2	563.5	17.65	32.935	
4,200.0	4,150.7	4,135.2	4,134.8	13.4	7.7	152.02	12.1	-276.2	599.5	581.4	18.12	33.089	
4,300.0	4,248.7	4,231.9	4,231.5	13.8	7.9	152.90	13.0	-276.4	618.2	599.7	18.58	33.278	
4,400.0	4,346.7	4,329.9	4,329.5	14.3	8.2	153.73	13.7	-276.7	637.0	618.0	19.04	33.450	
4,500.0	4,444.7	4,427.0	4,426.6	14.7	8.4	154.48	14.6	-277.2	656.2	636.7	19.52	33.619	
4,600.0	4,542.6	4,527.3	4,526.9	15.1	8.6	155.23	15.3	-277.4	675.1	655.1	19.99	33.764	
4,700.0	4,640.6	4,623.2	4,622.7	15.6	8.8	155.89	16.0	-278.0	694.2	673.8	20.47	33.919	
4,800.0	4,738.6	4,723.8	4,723.3	16.0	9.1	156.54	16.5	-278.5	713.2	692.3	20.96	34.033	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W (Grid) - Emancipator 22-15 (Exist.) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 100-NS-GYRO-MS

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,900.0	4,836.6	4,820.6	4,820.2	16.5	9.3	157.13	16.9	-279.0	732.3	710.9	21.44	34.157	
5,000.0	4,934.5	4,919.8	4,919.4	16.9	9.6	157.73	17.4	-279.3	751.4	729.5	21.92	34.276	
5,100.0	5,032.5	5,016.5	5,016.1	17.3	9.8	158.28	17.9	-279.5	770.6	748.2	22.40	34.405	
5,200.0	5,130.5	5,116.6	5,116.2	17.8	10.0	158.83	18.3	-279.7	789.8	766.9	22.88	34.512	
5,300.0	5,228.5	5,210.5	5,210.1	18.2	10.3	159.29	18.7	-280.2	809.1	785.8	23.36	34.636	
5,400.0	5,326.8	5,306.9	5,306.5	18.5	10.5	159.83	19.5	-281.0	827.2	803.4	23.85	34.680	
5,500.0	5,425.7	5,409.6	5,409.2	18.8	10.7	160.27	20.2	-281.5	841.9	817.6	24.34	34.593	
5,600.0	5,525.0	5,505.3	5,504.8	19.0	11.0	160.58	20.8	-282.0	853.4	828.6	24.78	34.434	
5,700.0	5,624.7	5,605.4	5,604.9	19.2	11.2	160.79	21.7	-282.5	861.8	836.6	25.21	34.183	
5,800.0	5,724.6	5,708.9	5,708.4	19.4	11.5	160.91	22.4	-283.0	866.7	841.1	25.61	33.837	
5,900.0	5,824.6	5,813.8	5,813.4	19.5	11.6	-17.87	22.6	-283.0	867.8	841.9	25.93	33.471	
5,907.1	5,831.7	5,820.5	5,820.1	19.5	11.7	-17.87	22.6	-283.0	867.8	841.9	25.95	33.446	
6,000.0	5,924.6	5,909.5	5,909.1	19.6	11.8	-17.83	23.0	-282.6	868.1	841.9	26.20	33.131	
6,100.0	6,024.3	6,016.2	6,015.7	19.7	11.9	-18.09	23.2	-281.9	861.5	835.4	26.13	32.968	
6,200.0	6,122.2	6,117.7	6,117.2	19.6	12.0	-19.00	22.7	-281.6	842.0	816.3	25.69	32.775	
6,300.0	6,216.7	6,212.1	6,211.6	19.4	12.1	-20.62	22.0	-281.5	810.4	785.4	24.99	32.435	
6,400.0	6,306.1	6,305.6	6,305.1	19.1	12.1	-23.24	20.8	-281.6	767.5	743.3	24.17	31.749	
6,500.0	6,388.9	6,388.8	6,388.3	18.7	12.2	-27.11	19.5	-281.7	714.1	690.6	23.44	30.459	
6,600.0	6,463.8	6,464.8	6,464.3	18.3	12.3	-32.83	18.2	-281.7	651.8	628.7	23.17	28.133	
6,700.0	6,529.3	6,528.3	6,527.8	17.9	12.4	-40.87	16.9	-281.5	582.5	558.7	23.76	24.517	
6,800.0	6,584.5	6,579.7	6,579.2	17.6	12.4	-51.52	16.2	-281.3	508.9	483.5	25.39	20.043	
6,900.0	6,628.3	6,620.8	6,620.3	17.4	12.4	-64.31	15.9	-281.0	434.2	406.7	27.55	15.763	
7,000.0	6,660.0	6,650.9	6,650.4	17.3	12.5	-76.84	15.8	-280.8	363.4	334.3	29.15	12.468	
7,100.0	6,679.0	6,669.8	6,669.2	17.4	12.5	-86.22	15.7	-280.7	304.4	274.6	29.85	10.197	
7,200.0	6,685.1	6,675.7	6,675.2	17.7	12.5	-90.38	15.7	-280.7	269.0	238.8	30.21	8.906	
7,251.8	6,684.8	6,675.2	6,674.7	18.0	12.5	-90.31	15.7	-280.7	264.0	233.5	30.46	8.666	ES, SF
7,300.0	6,683.7	6,674.0	6,673.5	18.2	12.5	-90.13	15.7	-280.7	268.4	237.7	30.70	8.741	
7,400.0	6,682.1	6,672.3	6,671.8	18.9	12.5	-89.76	15.7	-280.7	302.7	271.4	31.38	9.649	
7,500.0	6,680.6	6,670.6	6,670.1	19.7	12.5	-89.39	15.7	-280.7	362.3	330.1	32.22	11.247	
7,600.0	6,679.1	6,668.9	6,668.4	20.7	12.5	-89.03	15.7	-280.7	436.9	403.7	33.20	13.162	
7,700.0	6,677.6	6,667.2	6,666.7	21.8	12.5	-88.66	15.7	-280.7	520.1	485.8	34.30	15.162	
7,800.0	6,676.1	6,665.5	6,665.0	23.1	12.5	-88.29	15.7	-280.7	608.4	572.9	35.52	17.130	
7,900.0	6,674.6	6,663.8	6,663.3	24.4	12.5	-87.92	15.7	-280.8	699.8	663.0	36.82	19.009	
8,000.0	6,673.0	6,662.1	6,661.6	25.7	12.5	-87.55	15.7	-280.8	793.3	755.1	38.19	20.772	
8,100.0	6,671.5	6,660.4	6,659.9	27.2	12.5	-87.19	15.7	-280.8	888.2	848.6	39.63	22.413	
8,200.0	6,670.0	6,658.7	6,658.2	28.7	12.5	-86.82	15.7	-280.8	984.2	943.0	41.12	23.932	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W (Grid) - Emancipator B 22-23 (Exist.) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 100-NS-GYRO-MS

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	39.08	470.0	381.7	605.6				
100.0	100.0	85.3	85.3	0.1	0.1	39.09	470.0	381.8	605.5	605.3	0.23	2,682.897	
200.0	200.0	185.5	185.5	0.3	0.3	39.08	470.2	381.8	605.7	605.1	0.64	941.392	
300.0	300.0	286.4	286.4	0.6	0.5	39.04	470.5	381.6	605.8	604.7	1.07	566.223	
400.0	400.0	386.9	386.9	0.8	0.7	39.01	470.7	381.3	605.8	604.3	1.51	400.284	
453.7	453.7	440.2	440.2	0.9	0.8	39.00	470.8	381.2	605.8	604.0	1.74	348.524	
500.0	500.0	485.9	485.9	1.0	0.9	38.99	470.8	381.2	605.8	603.9	1.93	314.275	
600.0	600.0	583.7	583.7	1.2	1.1	39.00	471.0	381.4	606.1	603.7	2.34	258.558	
700.0	700.0	684.2	684.2	1.5	1.3	39.01	471.3	381.8	606.5	603.7	2.76	219.421	
800.0	800.0	784.4	784.4	1.7	1.5	39.06	471.2	382.4	606.9	603.7	3.17	191.436	
900.0	900.0	883.9	883.9	1.9	1.7	39.12	471.1	383.2	607.2	603.7	3.59	169.370	
1,000.0	1,000.0	984.7	984.7	2.1	1.9	39.22	470.8	384.2	607.6	603.6	4.01	151.561	
1,100.0	1,100.0	1,082.4	1,082.4	2.3	2.1	-141.94	470.6	385.1	608.8	604.3	4.42	137.694	
1,200.0	1,200.0	1,181.8	1,181.8	2.5	2.3	-142.03	470.8	386.0	611.6	606.7	4.84	126.381	
1,300.0	1,299.9	1,280.6	1,280.6	2.7	2.6	-142.20	471.2	386.8	615.9	610.6	5.27	116.834	
1,400.0	1,399.7	1,380.1	1,380.1	2.9	2.8	-142.46	471.6	387.9	621.7	616.0	5.71	108.803	
1,500.0	1,499.4	1,483.7	1,483.7	3.1	3.1	-142.80	471.7	389.0	628.6	622.5	6.16	102.108	
1,600.0	1,598.9	1,580.5	1,580.4	3.3	3.3	-143.16	471.4	390.0	636.8	630.2	6.59	96.672	
1,700.0	1,698.3	1,676.5	1,676.4	3.6	3.6	-143.63	471.8	391.2	646.9	639.9	7.03	91.965	
1,800.0	1,797.4	1,773.0	1,772.9	3.8	3.8	-144.20	472.9	392.1	659.0	651.5	7.49	88.015	
1,900.0	1,896.3	1,869.5	1,869.4	4.1	4.0	-144.84	474.4	393.1	672.9	665.0	7.95	84.675	
2,000.0	1,994.9	1,969.8	1,969.7	4.4	4.3	-145.53	475.8	394.5	688.4	680.0	8.43	81.664	
2,100.0	2,093.3	2,065.4	2,065.3	4.7	4.5	-146.20	476.8	396.0	705.3	696.4	8.92	79.117	
2,200.0	2,191.3	2,161.4	2,161.2	5.1	4.8	-146.92	478.1	398.0	724.2	714.7	9.42	76.905	
2,300.0	2,289.3	2,259.7	2,259.5	5.5	5.0	-147.71	479.5	399.8	743.3	733.4	9.93	74.823	
2,400.0	2,387.2	2,359.6	2,359.4	5.8	5.3	-148.50	481.0	401.2	762.5	752.0	10.46	72.916	
2,500.0	2,485.2	2,460.1	2,459.9	6.2	5.6	-149.25	482.2	402.5	781.4	770.4	10.98	71.136	
2,600.0	2,583.2	2,558.6	2,558.4	6.6	5.8	-149.92	483.0	404.0	800.2	788.6	11.51	69.512	
2,700.0	2,681.1	2,661.3	2,661.1	7.0	6.1	-150.56	483.4	405.8	818.9	806.8	12.04	68.015	
2,800.0	2,779.1	2,761.8	2,761.5	7.4	6.3	-151.15	483.1	407.3	836.9	824.4	12.55	66.694	
2,900.0	2,877.1	2,857.2	2,856.9	7.8	6.5	-151.67	482.8	409.0	855.2	842.2	13.05	65.526	
3,000.0	2,975.1	2,961.1	2,960.9	8.3	6.8	-152.24	482.8	410.5	873.6	860.1	13.55	64.488	
3,100.0	3,073.0	3,065.0	3,064.8	8.7	6.9	-152.85	482.2	410.6	891.1	877.1	13.94	63.912	
3,200.0	3,171.0	3,168.2	3,167.9	9.1	6.9	-153.51	481.9	409.5	908.2	894.0	14.25	63.732	
3,300.0	3,269.0	3,267.8	3,267.5	9.5	6.9	-154.11	481.0	408.3	925.0	910.4	14.55	63.593	
3,400.0	3,367.0	3,361.3	3,361.0	9.9	7.0	-154.65	480.4	407.2	942.0	927.2	14.85	63.454	
3,500.0	3,464.9	3,462.2	3,461.8	10.4	7.0	-155.22	480.1	406.2	959.5	944.3	15.15	63.317	
3,600.0	3,562.9	3,565.6	3,565.3	10.8	7.1	-155.82	479.3	404.3	976.4	960.9	15.47	63.117	
3,700.0	3,660.9	3,662.2	3,661.8	11.2	7.1	-156.39	478.6	402.1	993.1	977.3	15.79	62.893	
6,800.0	6,584.5	6,576.2	6,575.3	17.6	11.5	41.16	484.1	371.6	982.6	960.6	22.03	44.603	
6,900.0	6,628.3	6,619.7	6,618.7	17.4	11.6	52.01	483.5	372.3	900.6	876.4	24.14	37.305	
7,000.0	6,660.0	6,649.1	6,648.2	17.3	11.6	65.09	483.2	372.7	816.0	789.4	26.69	30.578	
7,100.0	6,679.0	6,667.2	6,666.3	17.4	11.6	78.78	483.0	373.0	731.3	702.7	28.58	25.585	
7,200.0	6,685.1	6,672.3	6,671.4	17.7	11.6	90.30	483.0	373.0	649.1	619.7	29.37	22.103	
7,300.0	6,683.7	6,669.9	6,669.0	18.2	11.6	90.76	483.0	373.0	572.3	542.4	29.86	19.169	
7,400.0	6,682.1	6,667.4	6,666.5	18.9	11.6	90.39	483.0	373.0	503.7	473.2	30.53	16.498	
7,500.0	6,680.6	6,664.9	6,664.0	19.7	11.6	90.03	483.1	372.9	447.1	415.7	31.37	14.252	
7,600.0	6,679.1	6,662.4	6,661.5	20.7	11.6	89.66	483.1	372.9	407.5	375.1	32.35	12.596	
7,700.0	6,677.6	6,659.9	6,659.0	21.8	11.6	89.29	483.1	372.9	390.1	356.6	33.45	11.660	
7,719.3	6,677.3	6,659.5	6,658.5	22.1	11.6	89.22	483.1	372.9	389.6	355.9	33.69	11.565	CC, ES
7,800.0	6,676.1	6,657.4	6,656.5	23.1	11.6	88.93	483.1	372.8	397.9	363.2	34.67	11.478	SF

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Existing Wells Sec.22-T5N-R64W (Grid) - Emancipator B 22-23 (Exist.) - Wellbore #1 - Wellbore #1

Survey Program: 100-NS-GYRO-MS

Offset Site Error: 0.0 ft

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,900.0	6,674.6	6,655.0	6,654.0	24.4	11.6	88.56	483.2	372.8	429.4	393.5	35.97	11.941	
8,000.0	6,673.0	6,652.5	6,651.5	25.7	11.6	88.20	483.2	372.8	480.1	442.8	37.34	12.858	
8,100.0	6,671.5	6,650.0	6,649.0	27.2	11.6	87.83	483.2	372.7	544.6	505.9	38.78	14.045	
8,200.0	6,670.0	6,647.3	6,646.4	28.7	11.6	87.44	483.2	372.7	618.6	578.4	40.27	15.362	
8,300.0	6,668.5	6,644.6	6,643.7	30.3	11.6	87.04	483.3	372.7	699.1	657.3	41.81	16.723	
8,400.0	6,667.0	6,641.8	6,640.9	31.8	11.6	86.64	483.3	372.6	784.1	740.7	43.38	18.076	
8,500.0	6,665.4	6,639.0	6,638.1	33.5	11.6	86.23	483.3	372.6	872.3	827.3	44.98	19.391	
8,600.0	6,663.9	6,636.2	6,635.3	35.1	11.6	85.81	483.3	372.5	962.8	916.1	46.61	20.654	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design P&H 22CD Pad Sec.22-T5N-R64W - P&H 22-32 (Exist.) - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 100-NS-GYRO-MS

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
8,900.0	6,659.4	6,667.1	6,664.6	40.2	12.2	-96.43	2,640.9	-208.0	995.8	943.6	52.20	19.077	
9,000.0	6,657.9	6,665.3	6,662.8	42.0	12.2	-95.90	2,640.9	-208.0	897.9	843.9	53.97	16.636	
9,100.0	6,656.3	6,663.5	6,661.0	43.7	12.2	-95.37	2,640.9	-208.1	800.5	744.7	55.76	14.356	
9,200.0	6,654.8	6,661.7	6,659.2	45.5	12.2	-94.83	2,640.9	-208.1	703.8	646.2	57.56	12.228	
9,300.0	6,653.3	6,659.9	6,657.4	47.3	12.2	-94.29	2,641.0	-208.1	608.2	548.8	59.36	10.245	
9,400.0	6,651.8	6,658.1	6,655.6	49.1	12.2	-93.76	2,641.0	-208.2	514.3	453.1	61.18	8.406	
9,500.0	6,650.3	6,656.3	6,653.8	50.9	12.2	-93.22	2,641.0	-208.2	423.1	360.1	63.00	6.716	
9,600.0	6,648.7	6,654.5	6,652.0	52.7	12.2	-92.68	2,641.0	-208.2	337.1	272.2	64.83	5.199	
9,700.0	6,647.2	6,652.7	6,650.2	54.5	12.2	-92.14	2,641.0	-208.3	261.1	194.4	66.67	3.916	
9,800.0	6,645.7	6,650.9	6,648.4	56.3	12.2	-91.61	2,641.0	-208.3	206.7	138.2	68.50	3.017	
9,877.3	6,644.5	6,649.5	6,647.0	57.7	12.2	-91.19	2,641.0	-208.3	191.7	121.7	69.93	2.741	CC, ES, SF
9,900.0	6,644.2	6,649.1	6,646.6	58.2	12.2	-91.07	2,641.0	-208.4	193.0	122.7	70.34	2.744	
10,000.0	6,642.7	6,647.3	6,644.8	60.0	12.2	-90.53	2,641.0	-208.4	227.6	155.4	72.18	3.153	
10,100.0	6,641.2	6,645.5	6,643.0	61.8	12.2	-89.99	2,641.0	-208.4	293.8	219.8	74.02	3.969	
10,200.0	6,639.6	6,643.7	6,641.2	63.7	12.2	-89.45	2,641.0	-208.5	375.3	299.4	75.86	4.947	
10,300.0	6,638.1	6,641.9	6,639.4	65.5	12.2	-88.92	2,641.0	-208.5	464.1	386.4	77.70	5.973	
10,400.0	6,636.6	6,640.1	6,637.6	67.4	12.2	-88.38	2,641.0	-208.5	556.7	477.1	79.54	6.999	
10,500.0	6,635.1	6,638.3	6,635.8	69.2	12.2	-87.84	2,641.0	-208.6	651.4	570.1	81.37	8.006	
10,600.0	6,633.6	6,636.5	6,634.0	71.1	12.2	-87.31	2,641.0	-208.6	747.6	664.4	83.20	8.985	
10,700.0	6,632.0	6,634.7	6,632.2	73.0	12.2	-86.77	2,641.0	-208.7	844.6	759.6	85.02	9.934	
10,800.0	6,630.5	6,632.9	6,630.4	74.8	12.2	-86.24	2,641.0	-208.7	942.3	855.4	86.84	10.850	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design P&H 22CD Pad Sec.22-T5N-R64W - P&H 22CD - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 175-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
9,500.0	6,650.3	6,669.0	6,578.5	50.9	20.6	82.68	3,112.5	429.3	961.4	893.6	67.81	14.178	
9,600.0	6,648.7	6,669.0	6,578.5	52.7	20.6	82.68	3,112.5	429.3	874.3	804.7	69.61	12.560	
9,700.0	6,647.2	6,670.5	6,580.0	54.5	20.6	82.86	3,112.6	429.4	790.2	718.8	71.43	11.062	
9,800.0	6,645.7	6,677.4	6,586.9	56.3	20.6	83.74	3,112.9	429.8	710.2	636.9	73.35	9.683	
9,900.0	6,644.2	6,683.2	6,592.7	58.2	20.6	84.49	3,113.2	430.2	635.9	560.7	75.24	8.451	
10,000.0	6,642.7	6,688.2	6,597.7	60.0	20.6	85.12	3,113.5	430.5	569.5	492.3	77.13	7.383	
10,100.0	6,641.2	6,692.5	6,602.0	61.8	20.6	85.67	3,113.7	430.8	514.0	435.0	79.01	6.505	
10,200.0	6,639.6	6,696.2	6,605.7	63.7	20.6	86.14	3,113.8	431.0	473.3	392.5	80.89	5.852	
10,300.0	6,638.1	6,699.5	6,608.9	65.5	20.7	86.56	3,114.0	431.2	451.5	368.8	82.76	5.456	
10,350.8	6,637.3	6,701.0	6,610.5	66.5	20.7	86.76	3,114.0	431.2	448.7	365.0	83.71	5.360	CC, ES
10,400.0	6,636.6	6,702.4	6,611.8	67.4	20.7	86.93	3,114.1	431.3	451.4	366.7	84.63	5.333	SF
10,500.0	6,635.1	6,705.0	6,614.4	69.2	20.7	87.26	3,114.2	431.5	472.8	386.3	86.51	5.465	
10,600.0	6,633.6	6,707.3	6,616.8	71.1	20.7	87.56	3,114.3	431.6	513.2	424.8	88.38	5.806	
10,700.0	6,632.0	6,709.4	6,618.8	73.0	20.7	87.83	3,114.3	431.7	568.5	478.2	90.26	6.298	
10,800.0	6,630.5	6,711.3	6,620.7	74.8	20.7	88.07	3,114.4	431.8	634.8	542.6	92.13	6.890	
10,900.0	6,629.0	6,713.1	6,622.5	76.7	20.7	88.29	3,114.5	431.9	709.0	615.0	94.01	7.542	
11,000.0	6,627.5	6,714.6	6,624.1	78.6	20.7	88.50	3,114.5	432.0	789.0	693.1	95.89	8.228	
11,100.0	6,626.0	6,716.1	6,625.5	80.5	20.7	88.68	3,114.6	432.1	873.1	775.3	97.76	8.930	
11,163.8	6,625.0	6,717.0	6,626.4	81.6	20.7	88.79	3,114.6	432.1	928.4	829.4	98.96	9.381	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design P&H 22CD Pad Sec.22-T5N-R64W - P&H 22SD - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 140-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
8,300.0	6,668.5	6,791.1	6,672.8	30.3	22.4	92.28	1,866.9	434.2	921.0	871.4	49.60	18.570	
8,400.0	6,667.0	6,788.9	6,670.6	31.8	22.4	92.01	1,866.9	434.2	835.3	784.1	51.20	16.315	
8,500.0	6,665.4	6,786.8	6,668.5	33.5	22.4	91.75	1,866.9	434.2	753.1	700.2	52.83	14.254	
8,600.0	6,663.9	6,784.8	6,666.5	35.1	22.4	91.48	1,866.9	434.2	675.7	621.2	54.50	12.398	
8,700.0	6,662.4	6,782.7	6,664.4	36.8	22.4	91.22	1,866.9	434.2	604.9	548.7	56.18	10.766	
8,800.0	6,660.9	6,780.6	6,662.3	38.5	22.4	90.96	1,867.0	434.2	543.4	485.5	57.89	9.386	
8,900.0	6,659.4	6,778.6	6,660.3	40.2	22.4	90.70	1,867.0	434.2	494.6	435.0	59.62	8.296	
9,000.0	6,657.9	6,776.6	6,658.3	42.0	22.4	90.44	1,867.0	434.2	462.6	401.2	61.37	7.538	
9,100.0	6,656.3	6,774.6	6,656.3	43.7	22.4	90.19	1,867.0	434.2	451.0	387.8	63.13	7.144	
9,103.2	6,656.3	6,774.5	6,656.2	43.8	22.4	90.18	1,867.0	434.2	450.9	387.8	63.18	7.137	CC, ES
9,200.0	6,654.8	6,772.6	6,654.3	45.5	22.4	89.94	1,867.0	434.2	461.2	396.3	64.90	7.107	SF
9,300.0	6,653.3	6,770.6	6,652.3	47.3	22.4	89.68	1,867.0	434.2	492.0	425.3	66.68	7.378	
9,400.0	6,651.8	6,768.6	6,650.3	49.1	22.4	89.43	1,867.0	434.2	539.8	471.3	68.47	7.884	
9,500.0	6,650.3	6,766.7	6,648.4	50.9	22.4	89.19	1,867.0	434.3	600.6	530.3	70.27	8.547	
9,600.0	6,648.7	6,764.8	6,646.4	52.7	22.3	88.94	1,867.0	434.3	670.8	598.8	72.08	9.307	
9,700.0	6,647.2	6,762.8	6,644.5	54.5	22.3	88.70	1,867.0	434.3	747.9	674.0	73.89	10.122	
9,800.0	6,645.7	6,762.0	6,643.7	56.3	22.3	88.59	1,867.0	434.3	829.8	754.1	75.71	10.960	
9,900.0	6,644.2	6,759.1	6,640.8	58.2	22.3	88.23	1,867.1	434.3	915.4	837.8	77.53	11.806	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Sappington 5N64W22D Sec.22-T5N-R64W - Sappington 22Q-221 - Wellbore #1 - Plan #1 (3-4-15)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-89.99	0.0	-30.6	30.7				
100.0	100.0	99.0	99.0	0.1	0.1	-89.99	0.0	-30.6	30.6	30.4	0.22	137.032	
200.0	200.0	199.0	199.0	0.3	0.3	-89.99	0.0	-30.6	30.6	30.0	0.67	45.602	
300.0	300.0	299.0	299.0	0.6	0.6	-89.99	0.0	-30.6	30.6	29.5	1.12	27.324	
400.0	400.0	399.0	399.0	0.8	0.8	-89.99	0.0	-30.6	30.6	29.1	1.57	19.506	CC
500.0	500.0	498.8	498.8	1.0	1.0	-91.46	-0.8	-31.0	31.0	29.0	1.99	15.526	ES
600.0	600.0	598.5	598.5	1.2	1.2	-95.73	-3.2	-31.9	32.1	29.7	2.41	13.322	
700.0	700.0	698.2	698.0	1.5	1.4	-102.18	-7.2	-33.5	34.2	31.4	2.83	12.088	
800.0	800.0	797.6	797.3	1.7	1.6	-109.81	-12.8	-35.7	37.9	34.7	3.27	11.598	
900.0	900.0	896.8	896.2	1.9	1.8	-117.53	-20.0	-38.5	43.5	39.8	3.72	11.697	
1,000.0	1,000.0	995.7	994.6	2.1	2.1	-124.53	-28.8	-41.9	51.0	46.9	4.17	12.251	
1,100.0	1,100.0	1,094.3	1,092.6	2.3	2.3	48.91	-39.1	-45.9	60.1	55.5	4.59	13.095	
1,200.0	1,200.0	1,192.8	1,190.2	2.5	2.6	45.37	-51.0	-50.5	69.9	64.9	4.99	13.990	
1,300.0	1,299.9	1,291.0	1,287.4	2.7	3.0	43.06	-64.4	-55.8	80.1	74.7	5.41	14.807	
1,400.0	1,399.7	1,389.1	1,384.2	2.9	3.3	41.60	-79.3	-61.6	90.8	84.9	5.84	15.535	
1,500.0	1,499.4	1,486.9	1,480.4	3.1	3.6	40.73	-95.8	-68.0	101.8	95.5	6.29	16.174	
1,600.0	1,598.9	1,586.2	1,577.9	3.3	4.0	40.42	-113.3	-74.8	112.3	105.6	6.76	16.624	
1,700.0	1,698.3	1,685.8	1,675.7	3.6	4.4	40.68	-131.0	-81.7	121.6	114.4	7.24	16.794	
1,800.0	1,797.4	1,785.5	1,773.5	3.8	4.8	41.42	-148.6	-88.6	129.6	121.8	7.75	16.721	
1,900.0	1,896.3	1,885.2	1,871.4	4.1	5.2	42.56	-166.3	-95.5	136.3	128.0	8.29	16.450	
2,000.0	1,994.9	1,985.0	1,969.4	4.4	5.6	44.09	-183.9	-102.4	141.8	132.9	8.85	16.013	
2,100.0	2,093.3	2,084.8	2,067.4	4.7	6.1	45.99	-201.6	-109.3	146.2	136.7	9.47	15.441	
2,200.0	2,191.3	2,184.5	2,165.3	5.1	6.5	48.24	-219.3	-116.2	149.7	139.5	10.13	14.774	
2,300.0	2,289.3	2,284.3	2,263.2	5.5	6.9	50.47	-236.9	-123.0	153.2	142.4	10.83	14.145	
2,400.0	2,387.2	2,384.0	2,361.2	5.8	7.3	52.60	-254.6	-129.9	157.0	145.4	11.56	13.578	
2,500.0	2,485.2	2,483.8	2,459.1	6.2	7.7	54.63	-272.2	-136.8	160.9	148.6	12.32	13.068	
2,600.0	2,583.2	2,583.6	2,557.1	6.6	8.1	56.56	-289.9	-143.7	165.1	152.0	13.09	12.610	
2,700.0	2,681.1	2,683.3	2,655.0	7.0	8.6	58.39	-307.6	-150.6	169.5	155.6	13.89	12.200	
2,800.0	2,779.1	2,783.1	2,753.0	7.4	9.0	60.13	-325.2	-157.5	174.0	159.3	14.70	11.832	
2,900.0	2,877.1	2,882.9	2,850.9	7.8	9.4	61.78	-342.9	-164.4	178.6	163.1	15.53	11.501	
3,000.0	2,975.1	2,982.6	2,948.9	8.3	9.8	63.34	-360.5	-171.3	183.4	167.0	16.37	11.204	
3,100.0	3,073.0	3,082.4	3,046.8	8.7	10.3	64.82	-378.2	-178.1	188.3	171.1	17.22	10.937	
3,200.0	3,171.0	3,182.1	3,144.7	9.1	10.7	66.23	-395.9	-185.0	193.4	175.3	18.08	10.697	
3,300.0	3,269.0	3,281.9	3,242.7	9.5	11.1	67.57	-413.5	-191.9	198.6	179.6	18.95	10.480	
3,400.0	3,367.0	3,381.7	3,340.6	9.9	11.5	68.84	-431.2	-198.8	203.8	184.0	19.82	10.285	
3,500.0	3,464.9	3,481.4	3,438.6	10.4	11.9	70.04	-448.8	-205.7	209.2	188.5	20.69	10.108	
3,600.0	3,562.9	3,581.2	3,536.5	10.8	12.4	71.18	-466.5	-212.6	214.6	193.0	21.58	9.947	
3,700.0	3,660.9	3,681.0	3,634.5	11.2	12.8	72.27	-484.2	-219.5	220.1	197.7	22.46	9.802	
3,800.0	3,758.9	3,780.7	3,732.4	11.7	13.2	73.30	-501.8	-226.4	225.7	202.4	23.35	9.670	
3,900.0	3,856.8	3,880.5	3,830.4	12.1	13.7	74.28	-519.5	-233.3	231.4	207.2	24.23	9.549	
4,000.0	3,954.8	3,980.2	3,928.3	12.5	14.1	75.22	-537.2	-240.1	237.1	212.0	25.12	9.439	
4,100.0	4,052.8	4,080.0	4,026.3	13.0	14.5	76.11	-554.8	-247.0	242.9	216.9	26.02	9.338	
4,200.0	4,150.7	4,179.8	4,124.2	13.4	14.9	76.96	-572.5	-253.9	248.8	221.9	26.91	9.246	
4,300.0	4,248.7	4,279.5	4,222.1	13.8	15.4	77.77	-590.1	-260.8	254.7	226.9	27.80	9.161	
4,400.0	4,346.7	4,379.3	4,320.1	14.3	15.8	78.54	-607.8	-267.7	260.6	232.0	28.69	9.084	
4,500.0	4,444.7	4,479.1	4,418.0	14.7	16.2	79.28	-625.5	-274.6	266.6	237.1	29.59	9.012	
4,600.0	4,542.6	4,578.8	4,516.0	15.1	16.6	79.98	-643.1	-281.5	272.7	242.2	30.48	8.946	
4,700.0	4,640.6	4,678.6	4,613.9	15.6	17.1	80.66	-660.8	-288.4	278.8	247.4	31.37	8.885	
4,800.0	4,738.6	4,778.3	4,711.9	16.0	17.5	81.31	-678.4	-295.2	284.9	252.6	32.27	8.829	
4,900.0	4,836.6	4,878.1	4,809.8	16.5	17.9	81.92	-696.1	-302.1	291.0	257.9	33.16	8.777	
5,000.0	4,934.5	4,977.9	4,907.8	16.9	18.3	82.52	-713.8	-309.0	297.2	263.2	34.05	8.729	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Sappington 5N64W22D Sec.22-T5N-R64W - Sappington 22Q-221 - Wellbore #1 - Plan #1 (3-4-15)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,032.5	5,077.6	5,005.7	17.3	18.8	83.09	-731.4	-315.9	303.4	268.5	34.94	8.684	
5,200.0	5,130.5	5,177.4	5,103.6	17.8	19.2	83.63	-749.1	-322.8	309.7	273.8	35.83	8.642	
5,300.0	5,228.5	5,279.5	5,204.0	18.2	19.6	84.24	-766.8	-329.7	315.8	279.1	36.70	8.603	
5,400.0	5,326.8	5,384.2	5,307.4	18.5	19.9	85.13	-781.9	-335.6	320.7	283.4	37.35	8.586	
5,500.0	5,425.7	5,488.9	5,411.4	18.8	20.1	85.94	-793.5	-340.1	324.5	286.6	37.92	8.559	
5,600.0	5,525.0	5,593.6	5,515.7	19.0	20.3	86.69	-801.6	-343.3	327.1	288.7	38.41	8.517	
5,700.0	5,624.7	5,698.2	5,620.2	19.2	20.5	87.38	-806.1	-345.0	328.5	289.7	38.82	8.463	
5,800.0	5,724.6	5,801.6	5,723.6	19.4	20.6	87.99	-807.1	-345.4	328.8	289.6	39.17	8.394	
5,900.0	5,824.6	5,901.6	5,823.6	19.5	20.7	-90.64	-807.1	-345.4	328.7	289.3	39.43	8.337	
5,992.2	5,916.8	5,994.0	5,915.8	19.6	20.8	-90.03	-803.4	-345.4	328.7	289.1	39.64	8.292	
6,000.0	5,924.6	6,001.7	5,923.5	19.6	20.8	-89.86	-802.6	-345.4	328.7	289.0	39.66	8.287	
6,100.0	6,024.3	6,100.4	6,020.7	19.7	20.7	-88.08	-785.6	-345.4	328.9	289.1	39.76	8.272	
6,200.0	6,122.2	6,197.9	6,113.7	19.6	20.5	-86.34	-756.7	-345.4	329.4	289.8	39.58	8.323	
6,300.0	6,216.7	6,294.1	6,201.2	19.4	20.3	-84.67	-716.8	-345.4	330.1	291.0	39.14	8.435	
6,400.0	6,306.1	6,389.3	6,282.1	19.1	19.9	-83.11	-666.8	-345.4	331.1	292.6	38.49	8.602	
6,500.0	6,388.9	6,483.5	6,355.5	18.7	19.6	-81.68	-607.8	-345.4	332.2	294.5	37.70	8.813	
6,600.0	6,463.8	6,576.8	6,420.4	18.3	19.2	-80.39	-540.9	-345.4	333.4	296.6	36.83	9.053	
6,700.0	6,529.3	6,669.4	6,476.4	17.9	18.8	-79.26	-467.1	-345.4	334.6	298.6	35.98	9.299	
6,800.0	6,584.5	6,761.4	6,522.7	17.6	18.4	-78.31	-387.8	-345.4	335.7	300.4	35.25	9.523	
6,900.0	6,628.3	6,852.9	6,559.0	17.4	18.2	-77.54	-303.9	-345.4	336.6	301.9	34.73	9.692	
7,000.0	6,660.0	6,943.9	6,584.9	17.3	18.0	-76.97	-216.6	-345.4	337.4	302.9	34.52	9.773	
7,100.0	6,679.0	7,034.7	6,600.2	17.4	18.0	-76.60	-127.2	-345.4	337.9	303.2	34.68	9.743	
7,200.0	6,685.1	7,125.4	6,604.8	17.7	18.1	-76.43	-36.7	-345.4	338.1	302.9	35.22	9.601	
7,300.0	6,683.7	7,225.0	6,603.6	18.2	18.5	-76.47	62.9	-345.4	338.1	301.9	36.22	9.334	
7,400.0	6,682.1	7,325.0	6,602.3	18.9	19.1	-76.51	162.9	-345.4	338.0	300.5	37.56	9.000	
7,500.0	6,680.6	7,425.0	6,601.1	19.7	20.0	-76.55	262.9	-345.4	338.0	298.8	39.21	8.619	
7,600.0	6,679.1	7,525.0	6,599.8	20.7	20.9	-76.60	362.9	-345.4	337.9	296.8	41.14	8.214	
7,700.0	6,677.6	7,625.0	6,598.5	21.8	22.1	-76.64	462.9	-345.4	337.8	294.5	43.31	7.801	
7,800.0	6,676.1	7,725.0	6,597.3	23.1	23.3	-76.68	562.9	-345.4	337.8	292.1	45.69	7.394	
7,900.0	6,674.6	7,825.0	6,596.0	24.4	24.6	-76.73	662.9	-345.4	337.7	289.5	48.24	7.001	
8,000.0	6,673.0	7,925.0	6,594.8	25.7	26.0	-76.77	762.9	-345.4	337.7	286.7	50.94	6.629	
8,100.0	6,671.5	8,025.0	6,593.5	27.2	27.4	-76.81	862.9	-345.4	337.6	283.8	53.77	6.279	
8,200.0	6,670.0	8,125.0	6,592.3	28.7	28.9	-76.86	962.9	-345.4	337.5	280.8	56.71	5.952	
8,300.0	6,668.5	8,225.0	6,591.0	30.3	30.5	-76.90	1,062.8	-345.4	337.5	277.7	59.74	5.649	
8,400.0	6,667.0	8,325.0	6,589.7	31.8	32.1	-76.94	1,162.8	-345.4	337.4	274.6	62.85	5.368	
8,500.0	6,665.4	8,425.0	6,588.5	33.5	33.7	-76.99	1,262.8	-345.4	337.4	271.3	66.04	5.109	
8,600.0	6,663.9	8,525.0	6,587.2	35.1	35.3	-77.03	1,362.8	-345.4	337.3	268.0	69.27	4.869	
8,700.0	6,662.4	8,625.0	6,586.0	36.8	37.0	-77.07	1,462.8	-345.4	337.3	264.7	72.57	4.648	
8,800.0	6,660.9	8,725.0	6,584.7	38.5	38.7	-77.12	1,562.8	-345.4	337.2	261.3	75.90	4.443	
8,900.0	6,659.4	8,825.0	6,583.5	40.2	40.4	-77.16	1,662.8	-345.4	337.1	257.9	79.28	4.253	
9,000.0	6,657.9	8,925.0	6,582.2	42.0	42.2	-77.20	1,762.8	-345.4	337.1	254.4	82.69	4.077	
9,100.0	6,656.3	9,025.0	6,580.9	43.7	43.9	-77.25	1,862.8	-345.4	337.0	250.9	86.13	3.913	
9,200.0	6,654.8	9,125.0	6,579.7	45.5	45.7	-77.29	1,962.8	-345.4	337.0	247.4	89.60	3.761	
9,300.0	6,653.3	9,225.0	6,578.4	47.3	47.5	-77.33	2,062.8	-345.4	336.9	243.8	93.09	3.619	
9,400.0	6,651.8	9,325.0	6,577.2	49.1	49.2	-77.38	2,162.8	-345.4	336.8	240.2	96.60	3.487	
9,500.0	6,650.3	9,425.0	6,575.9	50.9	51.0	-77.42	2,262.7	-345.4	336.8	236.7	100.14	3.363	
9,600.0	6,648.7	9,525.0	6,574.7	52.7	52.8	-77.46	2,362.7	-345.4	336.7	233.0	103.69	3.247	
9,700.0	6,647.2	9,625.0	6,573.4	54.5	54.7	-77.51	2,462.7	-345.4	336.7	229.4	107.26	3.139	
9,800.0	6,645.7	9,725.0	6,572.1	56.3	56.5	-77.55	2,562.7	-345.4	336.6	225.8	110.84	3.037	
9,900.0	6,644.2	9,825.0	6,570.9	58.2	58.3	-77.59	2,662.7	-345.4	336.6	222.1	114.44	2.941	
10,000.0	6,642.7	9,925.0	6,569.6	60.0	60.1	-77.64	2,762.7	-345.4	336.5	218.5	118.05	2.851	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Sappington 5N64W22D Sec.22-T5N-R64W - Sappington 22Q-221 - Wellbore #1 - Plan #1 (3-4-15)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	6,641.2	10,025.0	6,568.4	61.8	62.0	-77.68	2,862.7	-345.4	336.5	214.8	121.67	2.765	
10,200.0	6,639.6	10,125.0	6,567.1	63.7	63.8	-77.73	2,962.7	-345.4	336.4	211.1	125.30	2.685	
10,300.0	6,638.1	10,225.0	6,565.9	65.5	65.7	-77.77	3,062.7	-345.4	336.3	207.4	128.94	2.609	
10,400.0	6,636.6	10,325.0	6,564.6	67.4	67.5	-77.81	3,162.7	-345.4	336.3	203.7	132.59	2.536	
10,500.0	6,635.1	10,425.0	6,563.4	69.2	69.4	-77.86	3,262.7	-345.4	336.2	200.0	136.24	2.468	
10,600.0	6,633.6	10,525.0	6,562.1	71.1	71.2	-77.90	3,362.7	-345.4	336.2	196.3	139.91	2.403	
10,700.0	6,632.0	10,625.0	6,560.8	73.0	73.1	-77.94	3,462.6	-345.4	336.1	192.5	143.58	2.341	
10,800.0	6,630.5	10,725.0	6,559.6	74.8	74.9	-77.99	3,562.6	-345.4	336.1	188.8	147.26	2.282	
10,900.0	6,629.0	10,825.0	6,558.3	76.7	76.8	-78.03	3,662.6	-345.4	336.0	185.1	150.94	2.226	
11,000.0	6,627.5	10,925.0	6,557.1	78.6	78.7	-78.07	3,762.6	-345.4	336.0	181.3	154.63	2.173	
11,100.0	6,626.0	11,025.0	6,555.8	80.5	80.5	-78.12	3,862.6	-345.4	335.9	177.6	158.33	2.122	
11,163.8	6,625.0	11,088.8	6,555.0	81.6	81.7	-78.15	3,926.4	-345.4	335.9	175.2	160.69	2.090	SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Sappington 5N64W22D Sec.22-T5N-R64W - Sappington 22Q-301 - Wellbore #1 - Plan #1 (3-4-15)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-93.40	-3.6	-61.3	61.4				
100.0	100.0	100.0	100.0	0.1	0.1	-93.40	-3.6	-61.3	61.4	61.2	0.22	273.178	
200.0	200.0	200.0	200.0	0.3	0.3	-93.40	-3.6	-61.3	61.4	60.7	0.67	91.059	CC, ES
300.0	300.0	299.3	299.3	0.6	0.5	-93.98	-4.3	-61.8	62.0	60.9	1.10	56.297	
400.0	400.0	398.5	398.4	0.8	0.7	-95.66	-6.3	-63.5	63.8	62.3	1.53	41.781	
500.0	500.0	497.6	497.4	1.0	1.0	-98.25	-9.6	-66.2	67.0	65.0	1.97	34.026	
600.0	600.0	596.5	596.2	1.2	1.2	-101.48	-14.2	-70.0	71.6	69.1	2.42	29.604	
700.0	700.0	695.1	694.5	1.5	1.4	-105.05	-20.1	-74.9	77.7	74.9	2.87	27.070	
800.0	800.0	793.5	792.5	1.7	1.7	-108.69	-27.3	-80.8	85.7	82.3	3.33	25.715	
900.0	900.0	891.6	889.9	1.9	2.0	-112.18	-35.8	-87.8	95.4	91.6	3.79	25.148	
1,000.0	1,000.0	989.2	986.7	2.1	2.3	-115.41	-45.5	-95.8	106.9	102.7	4.25	25.127	
1,100.0	1,100.0	1,086.4	1,082.9	2.3	2.6	60.76	-56.4	-104.8	119.9	115.2	4.69	25.537	
1,200.0	1,200.0	1,183.4	1,178.6	2.5	3.0	58.98	-68.6	-114.9	133.7	128.6	5.11	26.151	
1,300.0	1,299.9	1,280.1	1,273.7	2.7	3.3	57.87	-82.0	-125.9	148.3	142.7	5.55	26.735	
1,400.0	1,399.7	1,376.4	1,368.2	2.9	3.7	57.25	-96.5	-137.9	163.5	157.5	5.99	27.272	
1,500.0	1,499.4	1,472.4	1,462.0	3.1	4.1	57.00	-112.2	-150.8	179.4	172.9	6.46	27.755	
1,600.0	1,598.9	1,571.1	1,558.2	3.3	4.6	57.11	-129.0	-164.7	195.2	188.2	6.96	28.049	
1,700.0	1,698.3	1,669.9	1,654.6	3.6	5.1	57.60	-145.9	-178.6	210.1	202.6	7.48	28.089	
1,800.0	1,797.4	1,768.9	1,751.1	3.8	5.5	58.40	-162.7	-192.5	224.0	216.0	8.03	27.913	
1,900.0	1,896.3	1,867.9	1,847.7	4.1	6.0	59.46	-179.6	-206.4	237.2	228.6	8.61	27.556	
2,000.0	1,994.9	1,967.0	1,944.3	4.4	6.4	60.76	-196.5	-220.3	249.6	240.4	9.23	27.047	
2,100.0	2,093.3	2,066.0	2,040.9	4.7	6.9	62.26	-213.4	-234.3	261.3	251.4	9.89	26.417	
2,200.0	2,191.3	2,165.0	2,137.5	5.1	7.4	63.96	-230.3	-248.2	272.5	261.9	10.60	25.703	
2,300.0	2,289.3	2,264.1	2,234.1	5.5	7.9	65.64	-247.1	-262.1	283.9	272.5	11.35	25.022	
2,400.0	2,387.2	2,363.1	2,330.7	5.8	8.3	67.18	-264.0	-276.0	295.4	283.3	12.11	24.400	
2,500.0	2,485.2	2,462.1	2,427.2	6.2	8.8	68.60	-280.9	-289.9	307.2	294.3	12.89	23.834	
2,600.0	2,583.2	2,561.1	2,523.8	6.6	9.3	69.92	-297.8	-303.8	319.2	305.5	13.69	23.319	
2,700.0	2,681.1	2,660.2	2,620.4	7.0	9.7	71.15	-314.6	-317.8	331.2	316.8	14.50	22.851	
2,800.0	2,779.1	2,759.2	2,717.0	7.4	10.2	72.29	-331.5	-331.7	343.5	328.2	15.32	22.426	
2,900.0	2,877.1	2,858.2	2,813.5	7.8	10.7	73.35	-348.4	-345.6	355.8	339.7	16.15	22.039	
3,000.0	2,975.1	2,957.2	2,910.1	8.3	11.2	74.34	-365.3	-359.5	368.3	351.3	16.98	21.687	
3,100.0	3,073.0	3,056.3	3,006.7	8.7	11.7	75.26	-382.2	-373.4	380.9	363.1	17.83	21.365	
3,200.0	3,171.0	3,155.3	3,103.3	9.1	12.1	76.13	-399.0	-387.4	393.6	374.9	18.68	21.071	
3,300.0	3,269.0	3,254.3	3,199.8	9.5	12.6	76.94	-415.9	-401.3	406.3	386.8	19.53	20.802	
3,400.0	3,367.0	3,353.3	3,296.4	9.9	13.1	77.70	-432.8	-415.2	419.1	398.7	20.39	20.554	
3,500.0	3,464.9	3,452.4	3,393.0	10.4	13.6	78.42	-449.7	-429.1	432.0	410.8	21.25	20.327	
3,600.0	3,562.9	3,551.4	3,489.6	10.8	14.0	79.09	-466.6	-443.0	445.0	422.9	22.12	20.117	
3,700.0	3,660.9	3,650.4	3,586.2	11.2	14.5	79.73	-483.4	-457.0	458.0	435.0	22.99	19.923	
3,800.0	3,758.9	3,749.4	3,682.7	11.7	15.0	80.33	-500.3	-470.9	471.0	447.2	23.86	19.744	
3,900.0	3,856.8	3,848.5	3,779.3	12.1	15.5	80.90	-517.2	-484.8	484.2	459.4	24.73	19.577	
4,000.0	3,954.8	3,947.5	3,875.9	12.5	16.0	81.44	-534.1	-498.7	497.3	471.7	25.61	19.423	
4,100.0	4,052.8	4,046.5	3,972.5	13.0	16.4	81.95	-550.9	-512.6	510.5	484.0	26.48	19.279	
4,200.0	4,150.7	4,145.5	4,069.0	13.4	16.9	82.44	-567.8	-526.5	523.8	496.4	27.36	19.144	
4,300.0	4,248.7	4,244.6	4,165.6	13.8	17.4	82.90	-584.7	-540.5	537.0	508.8	28.24	19.019	
4,400.0	4,346.7	4,343.6	4,262.2	14.3	17.9	83.34	-601.6	-554.4	550.3	521.2	29.12	18.901	
4,500.0	4,444.7	4,442.6	4,358.8	14.7	18.3	83.76	-618.5	-568.3	563.7	533.7	30.00	18.791	
4,600.0	4,542.6	4,541.6	4,455.4	15.1	18.8	84.16	-635.3	-582.2	577.0	546.2	30.88	18.688	
4,700.0	4,640.6	4,640.7	4,551.9	15.6	19.3	84.54	-652.2	-596.1	590.4	558.7	31.76	18.591	
4,800.0	4,738.6	4,739.7	4,648.5	16.0	19.8	84.91	-669.1	-610.1	603.8	571.2	32.64	18.499	
4,900.0	4,836.6	4,838.7	4,745.1	16.5	20.3	85.25	-686.0	-624.0	617.3	583.8	33.53	18.413	
5,000.0	4,934.5	4,937.7	4,841.7	16.9	20.7	85.59	-702.9	-637.9	630.7	596.3	34.41	18.331	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Sappington 5N64W22D Sec.22-T5N-R64W - Sappington 22Q-301 - Wellbore #1 - Plan #1 (3-4-15)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,032.5	5,036.8	4,938.2	17.3	21.2	85.91	-719.7	-651.8	644.2	608.9	35.29	18.254	
5,200.0	5,130.5	5,135.8	5,034.8	17.8	21.7	86.22	-736.6	-665.7	657.7	621.5	36.18	18.181	
5,300.0	5,228.5	5,234.8	5,131.4	18.2	22.2	86.52	-753.5	-679.7	671.2	634.2	37.06	18.112	
5,400.0	5,326.8	5,345.4	5,239.5	18.5	22.6	86.98	-771.6	-694.6	684.3	646.6	37.79	18.109	
5,500.0	5,425.7	5,463.3	5,355.5	18.8	23.0	87.34	-787.6	-707.8	695.2	656.8	38.40	18.101	
5,600.0	5,525.0	5,581.7	5,472.9	19.0	23.2	87.62	-799.9	-717.9	703.5	664.5	38.94	18.068	
5,700.0	5,624.7	5,700.6	5,591.2	19.2	23.5	87.80	-808.5	-725.0	709.3	669.9	39.38	18.011	
5,800.0	5,724.6	5,819.7	5,710.1	19.4	23.7	87.91	-813.3	-728.9	712.5	672.7	39.73	17.933	
5,900.0	5,824.6	5,934.2	5,824.6	19.5	23.8	-90.88	-814.3	-729.8	713.2	673.2	40.03	17.819	
6,000.0	5,924.6	6,034.2	5,924.6	19.6	23.9	-90.88	-814.3	-729.8	713.2	672.9	40.26	17.715	
6,100.0	6,024.3	6,135.7	6,025.8	19.7	23.9	-90.87	-807.1	-729.8	713.2	672.9	40.34	17.681	
6,200.0	6,122.2	6,237.1	6,125.0	19.6	23.8	-90.84	-786.6	-729.8	713.2	673.0	40.15	17.762	
6,300.0	6,216.7	6,338.4	6,220.6	19.4	23.6	-90.80	-753.1	-729.8	713.2	673.5	39.73	17.951	
6,400.0	6,306.1	6,439.7	6,310.8	19.1	23.4	-90.74	-707.3	-729.8	713.2	674.1	39.11	18.234	
6,500.0	6,388.9	6,540.9	6,394.1	18.7	23.0	-90.67	-650.1	-729.8	713.2	674.8	38.36	18.593	
6,600.0	6,463.8	6,641.9	6,469.1	18.3	22.6	-90.59	-582.4	-729.8	713.2	675.6	37.54	18.998	
6,700.0	6,529.3	6,742.8	6,534.4	17.9	22.1	-90.50	-505.6	-729.8	713.2	676.4	36.75	19.407	
6,800.0	6,584.5	6,843.5	6,588.9	17.6	21.6	-90.41	-420.9	-729.8	713.1	677.1	36.07	19.770	
6,900.0	6,628.3	6,944.1	6,631.8	17.4	21.2	-90.30	-330.0	-729.8	713.1	677.5	35.61	20.026	
7,000.0	6,660.0	7,044.5	6,662.3	17.3	20.8	-90.19	-234.5	-729.8	713.1	677.7	35.44	20.121	
7,100.0	6,679.0	7,144.7	6,680.0	17.4	20.4	-90.07	-135.9	-729.8	713.1	677.5	35.62	20.020	
7,165.2	6,684.5	7,209.9	6,684.5	17.6	20.1	-90.00	-70.9	-729.8	713.1	677.2	35.96	19.832	
7,200.0	6,685.1	7,244.7	6,684.6	17.7	20.0	-89.96	-36.1	-729.8	713.1	677.0	36.17	19.716	
7,300.0	6,683.7	7,344.7	6,683.0	18.2	19.7	-89.95	63.9	-729.8	713.1	676.0	37.12	19.212	
7,400.0	6,682.1	7,444.7	6,681.4	18.9	19.5	-89.94	163.9	-729.8	713.1	674.7	38.41	18.568	
7,500.0	6,680.6	7,544.7	6,679.8	19.7	20.3	-89.94	263.9	-729.8	713.1	673.1	40.02	17.817	
7,600.0	6,679.1	7,644.7	6,678.2	20.7	21.4	-89.93	363.9	-729.8	713.1	671.2	41.93	17.007	
7,700.0	6,677.6	7,744.7	6,676.6	21.8	22.6	-89.92	463.9	-729.8	713.1	669.0	44.09	16.174	
7,800.0	6,676.1	7,844.7	6,675.0	23.1	23.9	-89.91	563.8	-729.8	713.1	666.7	46.47	15.346	
7,900.0	6,674.6	7,944.7	6,673.4	24.4	25.2	-89.91	663.8	-729.8	713.1	664.1	49.03	14.544	
8,000.0	6,673.0	8,044.7	6,671.8	25.7	26.6	-89.90	763.8	-729.8	713.1	661.4	51.75	13.779	
8,100.0	6,671.5	8,144.7	6,670.2	27.2	28.0	-89.89	863.8	-729.8	713.1	658.5	54.61	13.058	
8,200.0	6,670.0	8,244.7	6,668.6	28.7	29.5	-89.89	963.8	-729.8	713.1	655.5	57.58	12.385	
8,300.0	6,668.5	8,344.7	6,667.0	30.3	31.1	-89.88	1,063.8	-729.8	713.1	652.5	60.65	11.758	
8,400.0	6,667.0	8,444.7	6,665.4	31.8	32.6	-89.87	1,163.8	-729.8	713.1	649.3	63.80	11.177	
8,500.0	6,665.4	8,544.7	6,663.8	33.5	34.2	-89.87	1,263.8	-729.8	713.1	646.1	67.03	10.639	
8,600.0	6,663.9	8,644.7	6,662.2	35.1	35.9	-89.86	1,363.7	-729.8	713.1	642.8	70.31	10.142	
8,700.0	6,662.4	8,744.7	6,660.6	36.8	37.5	-89.85	1,463.7	-729.8	713.1	639.5	73.65	9.682	
8,800.0	6,660.9	8,844.7	6,659.0	38.5	39.2	-89.84	1,563.7	-729.8	713.1	636.1	77.04	9.256	
8,900.0	6,659.4	8,944.7	6,657.3	40.2	40.9	-89.84	1,663.7	-729.8	713.1	632.7	80.47	8.862	
9,000.0	6,657.9	9,044.7	6,655.7	42.0	42.6	-89.83	1,763.7	-729.8	713.1	629.2	83.93	8.496	
9,100.0	6,656.3	9,144.7	6,654.1	43.7	44.3	-89.82	1,863.7	-729.8	713.1	625.7	87.43	8.157	
9,200.0	6,654.8	9,244.7	6,652.5	45.5	46.1	-89.82	1,963.7	-729.8	713.1	622.2	90.95	7.841	
9,300.0	6,653.3	9,344.7	6,650.9	47.3	47.8	-89.81	2,063.7	-729.8	713.1	618.6	94.50	7.546	
9,400.0	6,651.8	9,444.7	6,649.3	49.1	49.6	-89.80	2,163.6	-729.8	713.1	615.1	98.07	7.272	
9,500.0	6,650.3	9,544.7	6,647.7	50.9	51.4	-89.80	2,263.6	-729.8	713.1	611.5	101.66	7.015	
9,600.0	6,648.7	9,644.7	6,646.1	52.7	53.2	-89.79	2,363.6	-729.8	713.1	607.9	105.27	6.775	
9,700.0	6,647.2	9,744.7	6,644.5	54.5	55.0	-89.78	2,463.6	-729.8	713.1	604.2	108.89	6.549	
9,800.0	6,645.7	9,844.7	6,642.9	56.3	56.8	-89.77	2,563.6	-729.8	713.1	600.6	112.53	6.337	
9,900.0	6,644.2	9,944.7	6,641.3	58.2	58.6	-89.77	2,663.6	-729.8	713.1	597.0	116.18	6.138	
10,000.0	6,642.7	10,044.7	6,639.7	60.0	60.4	-89.76	2,763.6	-729.8	713.1	593.3	119.84	5.951	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Sappington 5N64W22D Sec.22-T5N-R64W - Sappington 22Q-301 - Wellbore #1 - Plan #1 (3-4-15)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	6,641.2	10,144.7	6,638.1	61.8	62.2	-89.75	2,863.6	-729.8	713.1	589.6	123.51	5.774	
10,200.0	6,639.6	10,244.7	6,636.5	63.7	64.0	-89.75	2,963.5	-729.8	713.1	585.9	127.20	5.607	
10,300.0	6,638.1	10,344.7	6,634.9	65.5	65.9	-89.74	3,063.5	-729.8	713.1	582.2	130.89	5.448	
10,400.0	6,636.6	10,444.7	6,633.3	67.4	67.7	-89.73	3,163.5	-729.8	713.1	578.5	134.59	5.299	
10,500.0	6,635.1	10,544.7	6,631.7	69.2	69.5	-89.73	3,263.5	-729.8	713.1	574.8	138.30	5.156	
10,600.0	6,633.6	10,644.7	6,630.1	71.1	71.4	-89.72	3,363.5	-729.8	713.1	571.1	142.01	5.022	
10,700.0	6,632.0	10,744.7	6,628.4	73.0	73.2	-89.71	3,463.5	-729.8	713.1	567.4	145.74	4.893	
10,800.0	6,630.5	10,844.7	6,626.8	74.8	75.1	-89.70	3,563.5	-729.8	713.1	563.7	149.46	4.771	
10,900.0	6,629.0	10,944.7	6,625.2	76.7	77.0	-89.70	3,663.4	-729.8	713.1	559.9	153.20	4.655	
11,000.0	6,627.5	11,044.7	6,623.6	78.6	78.8	-89.69	3,763.4	-729.8	713.1	556.2	156.94	4.544	
11,100.0	6,626.0	11,144.7	6,622.0	80.5	80.7	-89.68	3,863.4	-729.8	713.1	552.5	160.68	4.438	
11,163.8	6,625.0	11,208.5	6,621.0	81.6	81.9	-89.68	3,927.2	-729.8	713.1	550.1	163.07	4.373	SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Sappington 5N64W22D Sec.22-T5N-R64W - Sappington 22T-201 - Wellbore #1 - Plan #1 (3-4-15)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	90.00	0.0	27.9	27.9				
100.0	100.0	100.0	100.0	0.1	0.1	90.00	0.0	27.9	27.9	27.6	0.22	123.953	
200.0	200.0	200.0	200.0	0.3	0.3	90.00	0.0	27.9	27.9	27.2	0.67	41.318	
300.0	300.0	300.0	300.0	0.6	0.6	90.00	0.0	27.9	27.9	26.7	1.12	24.791	
400.0	400.0	400.0	400.0	0.8	0.8	90.00	0.0	27.9	27.9	26.3	1.57	17.708	
500.0	500.0	500.0	500.0	1.0	1.0	90.00	0.0	27.9	27.9	25.8	2.02	13.773	
600.0	600.0	600.0	600.0	1.2	1.2	90.00	0.0	27.9	27.9	25.4	2.47	11.268	CC
700.0	700.0	699.8	699.8	1.5	1.4	91.67	-0.8	28.2	28.2	25.3	2.89	9.731	ES
800.0	800.0	799.6	799.6	1.7	1.6	96.43	-3.3	29.0	29.2	25.9	3.30	8.854	
900.0	900.0	899.2	899.1	1.9	1.8	103.56	-7.4	30.5	31.4	27.7	3.72	8.440	
1,000.0	1,000.0	998.7	998.4	2.1	2.0	111.85	-13.1	32.5	35.1	31.0	4.15	8.462	
1,100.0	1,100.0	1,098.0	1,097.4	2.3	2.2	-62.16	-20.4	35.2	40.3	35.7	4.55	8.848	
1,200.0	1,200.0	1,197.1	1,196.1	2.5	2.5	-57.22	-29.3	38.4	46.4	41.5	4.95	9.387	
1,300.0	1,299.9	1,296.2	1,294.5	2.7	2.7	-53.94	-39.8	42.1	53.3	47.9	5.35	9.946	
1,400.0	1,399.7	1,395.0	1,392.5	2.9	3.0	-51.86	-51.8	46.5	60.6	54.8	5.78	10.489	
1,500.0	1,499.4	1,493.8	1,490.1	3.1	3.3	-50.63	-65.5	51.4	68.4	62.2	6.22	10.998	
1,600.0	1,598.9	1,592.3	1,587.4	3.3	3.6	-50.01	-80.7	56.8	76.6	69.9	6.68	11.466	
1,700.0	1,698.3	1,690.8	1,684.2	3.6	4.0	-49.83	-97.4	62.8	85.2	78.0	7.16	11.887	
1,800.0	1,797.4	1,789.9	1,781.4	3.8	4.4	-50.07	-115.6	69.3	93.8	86.2	7.68	12.223	
1,900.0	1,896.3	1,889.5	1,879.1	4.1	4.8	-50.98	-134.0	75.9	101.6	93.3	8.23	12.346	
2,000.0	1,994.9	1,989.3	1,976.9	4.4	5.2	-52.49	-152.4	82.5	108.2	99.4	8.81	12.277	
2,100.0	2,093.3	2,089.0	2,074.7	4.7	5.6	-54.54	-170.8	89.1	113.9	104.5	9.45	12.053	
2,200.0	2,191.3	2,188.8	2,172.6	5.1	6.0	-57.03	-189.2	95.7	118.9	108.8	10.15	11.717	
2,300.0	2,289.3	2,288.5	2,270.4	5.5	6.4	-59.45	-207.6	102.3	124.0	113.1	10.89	11.391	
2,400.0	2,387.2	2,388.3	2,368.2	5.8	6.8	-61.67	-226.0	108.9	129.3	117.6	11.65	11.098	
2,500.0	2,485.2	2,488.0	2,466.0	6.2	7.2	-63.72	-244.5	115.6	134.7	122.3	12.43	10.836	
2,600.0	2,583.2	2,587.7	2,563.8	6.6	7.7	-65.60	-262.9	122.2	140.3	127.1	13.24	10.602	
2,700.0	2,681.1	2,687.5	2,661.6	7.0	8.1	-67.34	-281.3	128.8	146.1	132.0	14.06	10.394	
2,800.0	2,779.1	2,787.2	2,759.4	7.4	8.5	-68.95	-299.7	135.4	152.0	137.1	14.89	10.208	
2,900.0	2,877.1	2,887.0	2,857.2	7.8	8.9	-70.43	-318.1	142.0	157.9	142.2	15.73	10.043	
3,000.0	2,975.1	2,986.7	2,955.0	8.3	9.4	-71.81	-336.5	148.6	164.0	147.5	16.58	9.895	
3,100.0	3,073.0	3,086.4	3,052.8	8.7	9.8	-73.09	-354.9	155.2	170.2	152.8	17.43	9.763	
3,200.0	3,171.0	3,186.2	3,150.6	9.1	10.2	-74.28	-373.3	161.8	176.5	158.2	18.30	9.645	
3,300.0	3,269.0	3,285.9	3,248.4	9.5	10.7	-75.38	-391.7	168.4	182.8	163.6	19.16	9.538	
3,400.0	3,367.0	3,385.7	3,346.2	9.9	11.1	-76.42	-410.1	175.0	189.2	169.1	20.03	9.443	
3,500.0	3,464.9	3,485.4	3,444.0	10.4	11.5	-77.38	-428.5	181.6	195.6	174.7	20.91	9.356	
3,600.0	3,562.9	3,585.1	3,541.8	10.8	12.0	-78.28	-447.0	188.2	202.1	180.3	21.78	9.278	
3,700.0	3,660.9	3,684.9	3,639.6	11.2	12.4	-79.13	-465.4	194.8	208.6	186.0	22.66	9.207	
3,800.0	3,758.9	3,784.6	3,737.4	11.7	12.8	-79.93	-483.8	201.4	215.2	191.7	23.54	9.143	
3,900.0	3,856.8	3,884.4	3,835.2	12.1	13.3	-80.67	-502.2	208.0	221.8	197.4	24.42	9.085	
4,000.0	3,954.8	3,984.1	3,933.0	12.5	13.7	-81.38	-520.6	214.6	228.5	203.2	25.30	9.031	
4,100.0	4,052.8	4,083.8	4,030.8	13.0	14.2	-82.04	-539.0	221.2	235.2	209.0	26.18	8.982	
4,200.0	4,150.7	4,183.6	4,128.6	13.4	14.6	-82.67	-557.4	227.8	241.9	214.8	27.06	8.937	
4,300.0	4,248.7	4,283.3	4,226.4	13.8	15.0	-83.26	-575.8	234.4	248.6	220.7	27.95	8.896	
4,400.0	4,346.7	4,383.1	4,324.2	14.3	15.5	-83.83	-594.2	241.0	255.4	226.6	28.83	8.858	
4,500.0	4,444.7	4,482.8	4,422.0	14.7	15.9	-84.36	-612.6	247.6	262.2	232.5	29.72	8.824	
4,600.0	4,542.6	4,582.5	4,519.8	15.1	16.3	-84.87	-631.0	254.2	269.0	238.4	30.60	8.791	
4,700.0	4,640.6	4,682.3	4,617.6	15.6	16.8	-85.35	-649.5	260.8	275.9	244.4	31.48	8.761	
4,800.0	4,738.6	4,782.0	4,715.4	16.0	17.2	-85.80	-667.9	267.4	282.7	250.3	32.37	8.734	
4,900.0	4,836.6	4,881.8	4,813.3	16.5	17.7	-86.24	-686.3	274.1	289.6	256.3	33.25	8.708	
5,000.0	4,934.5	4,981.5	4,911.1	16.9	18.1	-86.66	-704.7	280.7	296.5	262.3	34.14	8.684	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Sappington 5N64W22D Sec.22-T5N-R64W - Sappington 22T-201 - Wellbore #1 - Plan #1 (3-4-15)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,032.5	5,081.2	5,008.9	17.3	18.5	-87.05	-723.1	287.3	303.4	268.3	35.02	8.662	
5,200.0	5,130.5	5,181.0	5,106.7	17.8	19.0	-87.43	-741.5	293.9	310.3	274.4	35.91	8.641	
5,300.0	5,228.5	5,283.7	5,207.6	18.2	19.4	-87.95	-759.7	300.4	316.9	280.1	36.76	8.620	
5,400.0	5,326.8	5,387.9	5,310.5	18.5	19.7	-88.82	-774.8	305.8	322.3	284.9	37.40	8.618	
5,500.0	5,425.7	5,492.0	5,413.9	18.8	19.9	-89.61	-786.3	309.9	326.4	288.5	37.95	8.602	
5,600.0	5,525.0	5,596.2	5,517.7	19.0	20.1	-90.34	-794.3	312.8	329.4	290.9	38.43	8.571	
5,700.0	5,624.7	5,700.2	5,621.6	19.2	20.3	-91.03	-798.8	314.4	331.0	292.2	38.82	8.526	
5,800.0	5,724.6	5,803.2	5,724.6	19.4	20.4	-91.64	-799.8	314.8	331.5	292.3	39.16	8.465	
5,900.0	5,824.6	5,903.2	5,824.6	19.5	20.5	89.38	-799.8	314.8	331.5	292.1	39.42	8.410	
6,000.0	5,924.6	6,002.3	5,923.5	19.6	20.5	88.41	-794.2	314.8	331.6	292.0	39.64	8.366	
6,100.0	6,024.3	6,100.0	6,019.4	19.7	20.5	86.43	-776.2	314.8	332.1	292.4	39.69	8.368	
6,200.0	6,122.2	6,195.8	6,110.6	19.6	20.3	84.55	-746.9	314.8	333.0	293.5	39.47	8.438	
6,300.0	6,216.7	6,290.6	6,196.5	19.4	20.0	82.76	-706.8	314.8	334.2	295.2	38.99	8.571	
6,400.0	6,306.1	6,384.4	6,275.8	19.1	19.7	81.12	-657.0	314.8	335.6	297.2	38.31	8.758	
6,500.0	6,388.9	6,477.1	6,347.8	18.7	19.4	79.63	-598.6	314.8	337.0	299.5	37.50	8.988	
6,600.0	6,463.8	6,569.0	6,411.6	18.3	19.0	78.32	-532.6	314.8	338.5	301.9	36.62	9.244	
6,700.0	6,529.3	6,660.2	6,466.6	17.9	18.6	77.20	-459.9	314.8	340.0	304.2	35.77	9.503	
6,800.0	6,584.5	6,750.0	6,511.9	17.6	18.3	76.29	-382.4	314.8	341.2	306.2	35.06	9.734	
6,900.0	6,628.3	6,840.8	6,548.2	17.4	18.1	75.58	-299.3	314.8	342.3	307.7	34.57	9.901	
7,000.0	6,660.0	6,930.6	6,574.2	17.3	18.0	75.10	-213.4	314.8	343.0	308.6	34.39	9.974	
7,100.0	6,679.0	7,020.1	6,589.8	17.4	18.0	74.84	-125.3	314.8	343.4	308.9	34.58	9.931	
7,200.0	6,685.1	7,109.5	6,595.1	17.7	18.2	74.80	-36.0	314.8	343.5	308.4	35.15	9.772	
7,300.0	6,683.7	7,208.6	6,594.1	18.2	18.6	74.88	63.0	314.8	343.4	307.2	36.15	9.498	
7,400.0	6,682.1	7,308.6	6,593.1	18.9	19.3	74.96	163.0	314.8	343.2	305.7	37.50	9.154	
7,500.0	6,680.6	7,408.6	6,592.1	19.7	20.1	75.05	263.0	314.8	343.1	304.0	39.15	8.763	
7,600.0	6,679.1	7,508.6	6,591.1	20.7	21.1	75.13	363.0	314.8	343.0	301.9	41.08	8.349	
7,700.0	6,677.6	7,608.6	6,590.1	21.8	22.2	75.21	463.0	314.8	342.9	299.6	43.25	7.927	
7,800.0	6,676.1	7,708.6	6,589.1	23.1	23.4	75.29	563.0	314.8	342.7	297.1	45.62	7.512	
7,900.0	6,674.6	7,808.6	6,588.0	24.4	24.7	75.37	663.0	314.8	342.6	294.4	48.17	7.112	
8,000.0	6,673.0	7,908.6	6,587.0	25.7	26.1	75.45	763.0	314.8	342.5	291.6	50.87	6.732	
8,100.0	6,671.5	8,008.6	6,586.0	27.2	27.5	75.54	863.0	314.8	342.3	288.6	53.70	6.376	
8,200.0	6,670.0	8,108.6	6,585.0	28.7	29.0	75.62	963.0	314.8	342.2	285.6	56.63	6.043	
8,300.0	6,668.5	8,208.6	6,584.0	30.3	30.6	75.70	1,063.0	314.8	342.1	282.4	59.66	5.734	
8,400.0	6,667.0	8,308.6	6,583.0	31.8	32.2	75.78	1,162.9	314.8	342.0	279.2	62.76	5.448	
8,500.0	6,665.4	8,408.6	6,582.0	33.5	33.8	75.87	1,262.9	314.8	341.8	275.9	65.94	5.184	
8,600.0	6,663.9	8,508.6	6,581.0	35.1	35.5	75.95	1,362.9	314.8	341.7	272.5	69.18	4.940	
8,700.0	6,662.4	8,608.6	6,579.9	36.8	37.1	76.03	1,462.9	314.8	341.6	269.1	72.46	4.714	
8,800.0	6,660.9	8,708.6	6,578.9	38.5	38.8	76.11	1,562.9	314.8	341.5	265.7	75.80	4.505	
8,900.0	6,659.4	8,808.6	6,577.9	40.2	40.5	76.19	1,662.9	314.8	341.4	262.2	79.17	4.311	
9,000.0	6,657.9	8,908.6	6,576.9	42.0	42.3	76.28	1,762.9	314.8	341.2	258.6	82.58	4.132	
9,100.0	6,656.3	9,008.6	6,575.9	43.7	44.0	76.36	1,862.9	314.8	341.1	255.1	86.02	3.965	
9,200.0	6,654.8	9,108.6	6,574.9	45.5	45.8	76.44	1,962.9	314.8	341.0	251.5	89.49	3.810	
9,300.0	6,653.3	9,208.6	6,573.9	47.3	47.6	76.53	2,062.9	314.8	340.9	247.9	92.99	3.666	
9,400.0	6,651.8	9,308.6	6,572.9	49.1	49.4	76.61	2,162.9	314.8	340.8	244.3	96.51	3.531	
9,500.0	6,650.3	9,408.6	6,571.8	50.9	51.1	76.69	2,262.9	314.8	340.6	240.6	100.04	3.405	
9,600.0	6,648.7	9,508.6	6,570.8	52.7	53.0	76.77	2,362.9	314.8	340.5	236.9	103.60	3.287	
9,700.0	6,647.2	9,608.6	6,569.8	54.5	54.8	76.86	2,462.9	314.8	340.4	233.2	107.18	3.176	
9,800.0	6,645.7	9,708.6	6,568.8	56.3	56.6	76.94	2,562.9	314.8	340.3	229.5	110.77	3.072	
9,900.0	6,644.2	9,808.6	6,567.8	58.2	58.4	77.02	2,662.8	314.8	340.2	225.8	114.37	2.974	
10,000.0	6,642.7	9,908.6	6,566.8	60.0	60.2	77.11	2,762.8	314.8	340.1	222.1	117.99	2.882	
10,100.0	6,641.2	10,008.6	6,565.8	61.8	62.1	77.19	2,862.8	314.8	340.0	218.3	121.62	2.795	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Offset Design Sappington 5N64W22D Sec.22-T5N-R64W - Sappington 22T-201 - Wellbore #1 - Plan #1 (3-4-15)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

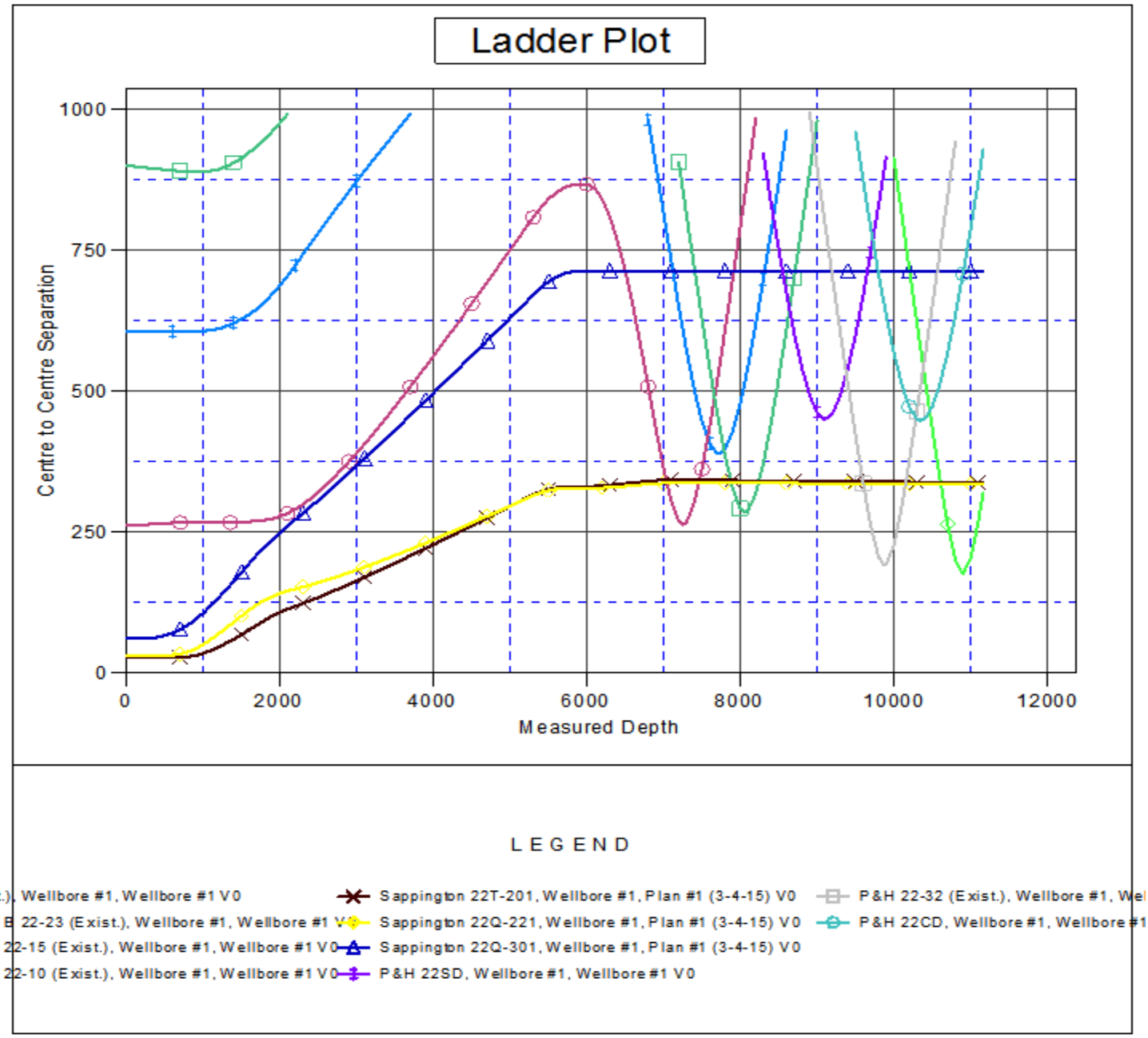
Offset Well Error: 0.0 ft

Reference Measured Depth (ft)	Reference Vertical Depth (ft)	Offset Measured Depth (ft)	Offset Vertical Depth (ft)	Semi Major Axis Reference (ft)	Semi Major Axis Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,200.0	6,639.6	10,108.6	6,564.8	63.7	63.9	77.27	2,962.8	314.8	339.8	214.6	125.26	2.713	
10,300.0	6,638.1	10,208.6	6,563.8	65.5	65.8	77.36	3,062.8	314.8	339.7	210.8	128.91	2.635	
10,400.0	6,636.6	10,308.6	6,562.7	67.4	67.6	77.44	3,162.8	314.8	339.6	207.1	132.57	2.562	
10,500.0	6,635.1	10,408.6	6,561.7	69.2	69.5	77.52	3,262.8	314.8	339.5	203.3	136.24	2.492	
10,600.0	6,633.6	10,508.6	6,560.7	71.1	71.3	77.61	3,362.8	314.8	339.4	199.5	139.92	2.426	
10,700.0	6,632.0	10,608.6	6,559.7	73.0	73.2	77.69	3,462.8	314.8	339.3	195.7	143.60	2.363	
10,800.0	6,630.5	10,708.6	6,558.7	74.8	75.0	77.77	3,562.8	314.8	339.2	191.9	147.30	2.303	
10,900.0	6,629.0	10,808.6	6,557.7	76.7	76.9	77.86	3,662.8	314.8	339.1	188.1	151.00	2.246	
11,000.0	6,627.5	10,908.6	6,556.7	78.6	78.8	77.94	3,762.8	314.8	339.0	184.3	154.70	2.191	
11,100.0	6,626.0	11,008.6	6,555.7	80.5	80.7	78.02	3,862.8	314.8	338.9	180.5	158.42	2.139	
11,163.8	6,625.0	11,072.4	6,555.0	81.6	81.8	78.08	3,926.6	314.8	338.8	178.0	160.79	2.107	SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 4614.5ft (RKB - 13.5')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Sappington 22T-341
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.63°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-341
Project:	SEC.22-T5N-R64W	**TVD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Reference Site:	Sappington 5N64W22D Sec.22-T5N-R64W	**MD Reference:**	WELL @ 4614.5ft (RKB - 13.5')
Site Error:	0.0ft	**North Reference:**	True
Reference Well:	Sappington 22T-341	**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 (3-4-15)	**Offset TVD Reference:**	Offset Datum

Reference Depths are relative to WELL @ 4614.5ft (RKB - 13.5')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Sappington 22T-341
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.63°