PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Sappington 22T-201**

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

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

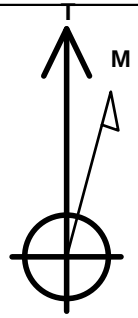
Ground Elevation: 4601.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1382719.52	3269547.12	40.379930	-104.532450	

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

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
50'E/W Hardline (22T-201)	1.0	1949.6	286.9	Rectangle (Sides: L3955.4 W100.0)
SHL 853'FSL & 1692'FEL	1.0	0.0	0.0	Point
BHL 500'FNL & 1395'FEL	6555.0	3927.3	286.9	Point



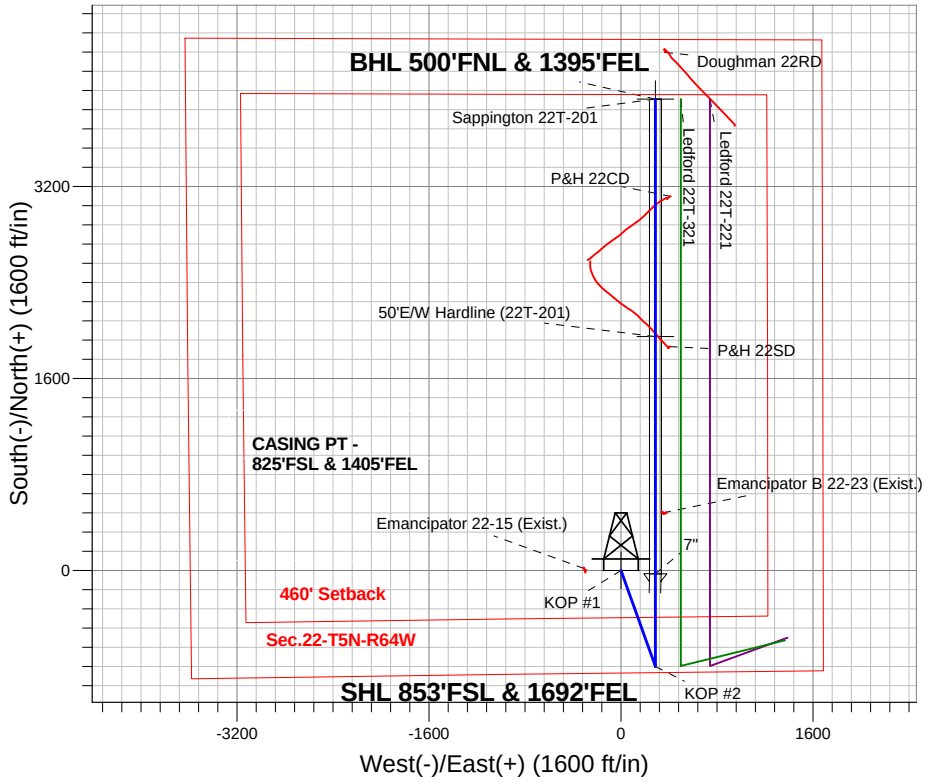
Azimuths to True North
Magnetic North: 8.26°

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

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

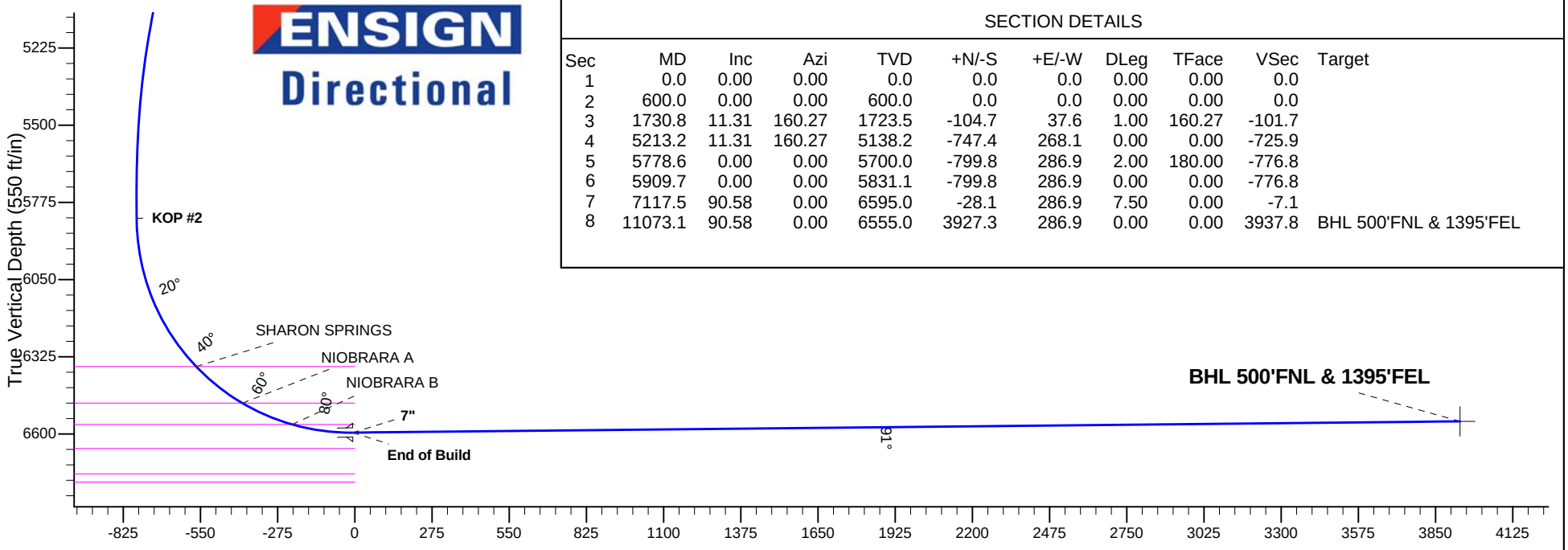
ANNOTATIONS

TVD	MD	Annotation
600.0	600.0	KOP #1
5831.1	5909.7	KOP #2
6595.0	7117.5	End of Build



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.0	
3	1730.8	11.31	160.27	1723.5	-104.7	37.6	1.00	160.27	-101.7	
4	5213.2	11.31	160.27	5138.2	-747.4	268.1	0.00	0.00	-725.9	
5	5778.6	0.00	0.00	5700.0	-799.8	286.9	2.00	180.00	-776.8	
6	5909.7	0.00	0.00	5831.1	-799.8	286.9	0.00	0.00	-776.8	
7	7117.5	90.58	0.00	6595.0	-28.1	286.9	7.50	0.00	-7.1	
8	11073.1	90.58	0.00	6555.0	3927.3	286.9	0.00	0.00	3937.8	BHL 500'FNL & 1395'FEL



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W
Sappington 5N64W22D Sec.22-T5N-R64W
Sappington 22T-201

Wellbore #1

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

Standard Planning Report

06 March, 2015

Database:	landmark	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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-201

Well Position	**+N/-S**	0.0 ft	**Northing:**	1,382,719.52 ft	**Latitude:**	40.379930
	+E/-W	58.5 ft	**Easting:**	3,269,547.12 ft	**Longitude:**	-104.532450
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	4.18

Plan Sections

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
600.0	0.00	0.00	600.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,730.8	11.31	160.27	1,723.5	-104.7	37.6	1.00	1.00	0.00	160.27	
5,213.2	11.31	160.27	5,138.2	-747.4	268.1	0.00	0.00	0.00	0.00	
5,778.6	0.00	0.00	5,700.0	-799.8	286.9	2.00	-2.00	0.00	180.00	
5,909.7	0.00	0.00	5,831.1	-799.8	286.9	0.00	0.00	0.00	0.00	
7,117.5	90.58	0.00	6,595.0	-28.1	286.9	7.50	7.50	0.00	0.00	
11,073.1	90.58	0.00	6,555.0	3,927.3	286.9	0.00	0.00	0.00	0.00	BHL 500'FNL & 139

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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-201	**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
KOP #1									
700.0	1.00	160.27	700.0	-0.8	0.3	-0.8	1.00	1.00	0.00
800.0	2.00	160.27	800.0	-3.3	1.2	-3.2	1.00	1.00	0.00
900.0	3.00	160.27	899.9	-7.4	2.7	-7.2	1.00	1.00	0.00
1,000.0	4.00	160.27	999.7	-13.1	4.7	-12.8	1.00	1.00	0.00
1,100.0	5.00	160.27	1,099.4	-20.5	7.4	-19.9	1.00	1.00	0.00
1,200.0	6.00	160.27	1,198.9	-29.5	10.6	-28.7	1.00	1.00	0.00
1,300.0	7.00	160.27	1,298.3	-40.2	14.4	-39.0	1.00	1.00	0.00
1,400.0	8.00	160.27	1,397.4	-52.5	18.8	-51.0	1.00	1.00	0.00
1,500.0	9.00	160.27	1,496.3	-66.4	23.8	-64.5	1.00	1.00	0.00
1,600.0	10.00	160.27	1,594.9	-81.9	29.4	-79.6	1.00	1.00	0.00
1,700.0	11.00	160.27	1,693.3	-99.1	35.5	-96.2	1.00	1.00	0.00
1,730.8	11.31	160.27	1,723.5	-104.7	37.6	-101.7	1.00	1.00	0.00
1,800.0	11.31	160.27	1,791.3	-117.5	42.1	-114.1	0.00	0.00	0.00
1,900.0	11.31	160.27	1,889.4	-135.9	48.8	-132.0	0.00	0.00	0.00
2,000.0	11.31	160.27	1,987.4	-154.4	55.4	-149.9	0.00	0.00	0.00
2,100.0	11.31	160.27	2,085.5	-172.8	62.0	-167.9	0.00	0.00	0.00
2,200.0	11.31	160.27	2,183.6	-191.3	68.6	-185.8	0.00	0.00	0.00
2,300.0	11.31	160.27	2,281.6	-209.8	75.2	-203.7	0.00	0.00	0.00
2,400.0	11.31	160.27	2,379.7	-228.2	81.9	-221.6	0.00	0.00	0.00
2,500.0	11.31	160.27	2,477.7	-246.7	88.5	-239.6	0.00	0.00	0.00
2,600.0	11.31	160.27	2,575.8	-265.1	95.1	-257.5	0.00	0.00	0.00
2,700.0	11.31	160.27	2,673.9	-283.6	101.7	-275.4	0.00	0.00	0.00
2,800.0	11.31	160.27	2,771.9	-302.0	108.4	-293.3	0.00	0.00	0.00
2,900.0	11.31	160.27	2,870.0	-320.5	115.0	-311.3	0.00	0.00	0.00
3,000.0	11.31	160.27	2,968.0	-339.0	121.6	-329.2	0.00	0.00	0.00
3,100.0	11.31	160.27	3,066.1	-357.4	128.2	-347.1	0.00	0.00	0.00
3,200.0	11.31	160.27	3,164.1	-375.9	134.8	-365.0	0.00	0.00	0.00
3,300.0	11.31	160.27	3,262.2	-394.3	141.5	-383.0	0.00	0.00	0.00
3,400.0	11.31	160.27	3,360.3	-412.8	148.1	-400.9	0.00	0.00	0.00
3,440.5	11.31	160.27	3,400.0	-420.3	150.8	-408.2	0.00	0.00	0.00
PARKMAN									
3,500.0	11.31	160.27	3,458.3	-431.2	154.7	-418.8	0.00	0.00	0.00
3,600.0	11.31	160.27	3,556.4	-449.7	161.3	-436.7	0.00	0.00	0.00
3,700.0	11.31	160.27	3,654.4	-468.2	167.9	-454.7	0.00	0.00	0.00
3,800.0	11.31	160.27	3,752.5	-486.6	174.6	-472.6	0.00	0.00	0.00
3,900.0	11.31	160.27	3,850.6	-505.1	181.2	-490.5	0.00	0.00	0.00
4,000.0	11.31	160.27	3,948.6	-523.5	187.8	-508.5	0.00	0.00	0.00
4,100.0	11.31	160.27	4,046.7	-542.0	194.4	-526.4	0.00	0.00	0.00
4,200.0	11.31	160.27	4,144.7	-560.4	201.1	-544.3	0.00	0.00	0.00
4,205.4	11.31	160.27	4,150.0	-561.4	201.4	-545.3	0.00	0.00	0.00
SUSSEX									
4,276.8	11.31	160.27	4,220.0	-574.6	206.1	-558.1	0.00	0.00	0.00
SHANNON									
4,300.0	11.31	160.27	4,242.8	-578.9	207.7	-562.2	0.00	0.00	0.00
4,400.0	11.31	160.27	4,340.9	-597.4	214.3	-580.2	0.00	0.00	0.00

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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-201	**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	11.31	160.27	4,438.9	-615.8	220.9	-598.1	0.00	0.00	0.00
4,600.0	11.31	160.27	4,537.0	-634.3	227.5	-616.0	0.00	0.00	0.00
4,700.0	11.31	160.27	4,635.0	-652.7	234.2	-633.9	0.00	0.00	0.00
4,800.0	11.31	160.27	4,733.1	-671.2	240.8	-651.9	0.00	0.00	0.00
4,900.0	11.31	160.27	4,831.1	-689.6	247.4	-669.8	0.00	0.00	0.00
5,000.0	11.31	160.27	4,929.2	-708.1	254.0	-687.7	0.00	0.00	0.00
5,100.0	11.31	160.27	5,027.3	-726.6	260.6	-705.6	0.00	0.00	0.00
5,200.0	11.31	160.27	5,125.3	-745.0	267.3	-723.6	0.00	0.00	0.00
5,213.2	11.31	160.27	5,138.2	-747.4	268.1	-725.9	0.00	0.00	0.00
5,300.0	9.57	160.27	5,223.6	-762.3	273.4	-740.3	2.00	-2.00	0.00
5,400.0	7.57	160.27	5,322.5	-776.3	278.5	-753.9	2.00	-2.00	0.00
5,500.0	5.57	160.27	5,421.8	-787.1	282.3	-764.4	2.00	-2.00	0.00
5,600.0	3.57	160.27	5,521.5	-794.6	285.0	-771.7	2.00	-2.00	0.00
5,700.0	1.57	160.27	5,621.4	-798.8	286.6	-775.8	2.00	-2.00	0.00
5,778.6	0.00	0.00	5,700.0	-799.8	286.9	-776.8	2.00	-2.00	0.00
5,800.0	0.00	0.00	5,721.4	-799.8	286.9	-776.8	0.00	0.00	0.00
5,900.0	0.00	0.00	5,821.4	-799.8	286.9	-776.8	0.00	0.00	0.00
5,909.7	0.00	0.00	5,831.1	-799.8	286.9	-776.8	0.00	0.00	0.00
KOP #2									
6,000.0	6.77	0.00	5,921.2	-794.5	286.9	-771.5	7.50	7.50	0.00
6,100.0	14.27	0.00	6,019.4	-776.2	286.9	-753.3	7.50	7.50	0.00
6,200.0	21.77	0.00	6,114.5	-745.3	286.9	-722.4	7.50	7.50	0.00
6,300.0	29.27	0.00	6,204.6	-702.3	286.9	-679.5	7.50	7.50	0.00
6,400.0	36.77	0.00	6,288.4	-647.8	286.9	-625.2	7.50	7.50	0.00
6,493.9	43.81	0.00	6,360.0	-587.1	286.9	-564.7	7.50	7.50	0.00
SHARON SPRINGS									
6,500.0	44.27	0.00	6,364.4	-582.9	286.9	-560.4	7.50	7.50	0.00
6,600.0	51.77	0.00	6,431.2	-508.6	286.9	-486.3	7.50	7.50	0.00
6,700.0	59.27	0.00	6,487.8	-426.2	286.9	-404.2	7.50	7.50	0.00
6,704.3	59.59	0.00	6,490.0	-422.5	286.9	-400.5	7.50	7.50	0.00
NIOBRARA A									
6,800.0	66.77	0.00	6,533.1	-337.2	286.9	-315.4	7.50	7.50	0.00
6,898.3	74.14	0.00	6,566.0	-244.6	286.9	-223.1	7.50	7.50	0.00
NIOBRARA B									
6,900.0	74.27	0.00	6,566.5	-243.0	286.9	-221.4	7.50	7.50	0.00
7,000.0	81.77	0.00	6,587.2	-145.2	286.9	-123.9	7.50	7.50	0.00
7,100.0	89.27	0.00	6,595.0	-45.6	286.9	-24.6	7.50	7.50	0.00
7,117.5	90.58	0.00	6,595.0	-28.1	286.9	-7.1	7.49	7.49	0.00
End of Build - 7"									
7,200.0	90.58	0.00	6,594.2	54.4	286.9	75.2	0.00	0.00	0.00
7,300.0	90.58	0.00	6,593.2	154.4	286.9	174.9	0.00	0.00	0.00
7,400.0	90.58	0.00	6,592.2	254.4	286.9	274.6	0.00	0.00	0.00
7,500.0	90.58	0.00	6,591.2	354.4	286.9	374.4	0.00	0.00	0.00
7,600.0	90.58	0.00	6,590.2	454.4	286.9	474.1	0.00	0.00	0.00
7,700.0	90.58	0.00	6,589.1	554.4	286.9	573.8	0.00	0.00	0.00
7,800.0	90.58	0.00	6,588.1	654.4	286.9	673.5	0.00	0.00	0.00
7,900.0	90.58	0.00	6,587.1	754.4	286.9	773.3	0.00	0.00	0.00
8,000.0	90.58	0.00	6,586.1	854.4	286.9	873.0	0.00	0.00	0.00
8,100.0	90.58	0.00	6,585.1	954.4	286.9	972.7	0.00	0.00	0.00
8,200.0	90.58	0.00	6,584.1	1,054.4	286.9	1,072.5	0.00	0.00	0.00
8,300.0	90.58	0.00	6,583.1	1,154.3	286.9	1,172.2	0.00	0.00	0.00
8,400.0	90.58	0.00	6,582.1	1,254.3	286.9	1,271.9	0.00	0.00	0.00

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Well:	Sappington 22T-201	**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)
8,500.0	90.58	0.00	6,581.0	1,354.3	286.9	1,371.6	0.00	0.00	0.00
8,600.0	90.58	0.00	6,580.0	1,454.3	286.9	1,471.4	0.00	0.00	0.00
8,700.0	90.58	0.00	6,579.0	1,554.3	286.9	1,571.1	0.00	0.00	0.00
8,800.0	90.58	0.00	6,578.0	1,654.3	286.9	1,670.8	0.00	0.00	0.00
8,900.0	90.58	0.00	6,577.0	1,754.3	286.9	1,770.6	0.00	0.00	0.00
9,000.0	90.58	0.00	6,576.0	1,854.3	286.9	1,870.3	0.00	0.00	0.00
9,100.0	90.58	0.00	6,575.0	1,954.3	286.9	1,970.0	0.00	0.00	0.00
9,200.0	90.58	0.00	6,574.0	2,054.3	286.9	2,069.7	0.00	0.00	0.00
9,300.0	90.58	0.00	6,572.9	2,154.3	286.9	2,169.5	0.00	0.00	0.00
9,400.0	90.58	0.00	6,571.9	2,254.3	286.9	2,269.2	0.00	0.00	0.00
9,500.0	90.58	0.00	6,570.9	2,354.3	286.9	2,368.9	0.00	0.00	0.00
9,600.0	90.58	0.00	6,569.9	2,454.3	286.9	2,468.7	0.00	0.00	0.00
9,700.0	90.58	0.00	6,568.9	2,554.3	286.9	2,568.4	0.00	0.00	0.00
9,800.0	90.58	0.00	6,567.9	2,654.3	286.9	2,668.1	0.00	0.00	0.00
9,900.0	90.58	0.00	6,566.9	2,754.3	286.9	2,767.9	0.00	0.00	0.00
10,000.0	90.58	0.00	6,565.9	2,854.3	286.9	2,867.6	0.00	0.00	0.00
10,100.0	90.58	0.00	6,564.9	2,954.3	286.9	2,967.3	0.00	0.00	0.00
10,200.0	90.58	0.00	6,563.8	3,054.3	286.9	3,067.0	0.00	0.00	0.00
10,300.0	90.58	0.00	6,562.8	3,154.2	286.9	3,166.8	0.00	0.00	0.00
10,400.0	90.58	0.00	6,561.8	3,254.2	286.9	3,266.5	0.00	0.00	0.00
10,500.0	90.58	0.00	6,560.8	3,354.2	286.9	3,366.2	0.00	0.00	0.00
10,600.0	90.58	0.00	6,559.8	3,454.2	286.9	3,466.0	0.00	0.00	0.00
10,700.0	90.58	0.00	6,558.8	3,554.2	286.9	3,565.7	0.00	0.00	0.00
10,800.0	90.58	0.00	6,557.8	3,654.2	286.9	3,665.4	0.00	0.00	0.00
10,900.0	90.58	0.00	6,556.8	3,754.2	286.9	3,765.1	0.00	0.00	0.00
11,000.0	90.58	0.00	6,555.7	3,854.2	286.9	3,864.9	0.00	0.00	0.00
11,073.1	90.58	0.00	6,555.0	3,927.3	286.9	3,937.8	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
BHL 500'FNL & 1395' - plan hits target - Point	0.00	0.00	6,555.0	3,927.3	286.9	1,386,649.53	3,269,791.16	40.390710	-104.531420
50'E/W Hardline (22T· - plan misses by 1970.6ft at 1.0ft MD (1.0 TVD, 0.0 N, 0.0 E) - Rectangle (sides W3,955.4 H100.0 D0.0)	0.00	0.00	1.0	1,949.6	286.9	1,384,672.05	3,269,812.72	40.385281	-104.531420
SHL 853'FSL & 1692'I - plan hits target - Point	0.00	0.00	1.0	0.0	0.0	1,382,719.53	3,269,547.12	40.379930	-104.532450

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,117.5	6,595.0	7"	7	7-1/2

Database:	landmark	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (3-4-15)		

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,440.5	3,400.0	PARKMAN		0.00	
4,205.4	4,150.0	SUSSEX		0.00	
4,276.8	4,220.0	SHANNON		0.00	
6,493.9	6,360.0	SHARON SPRINGS		0.00	
6,704.3	6,490.0	NIOBRARA A		0.00	
6,898.3	6,566.0	NIOBRARA B		0.00	
	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
600.0	600.0	0.0	0.0	KOP #1
5,909.7	5,831.1	-799.8	286.9	KOP #2
7,117.5	6,595.0	-28.1	286.9	End of Build

ENSIGN Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.22-T5N-R64W
Sappington 5N64W22D Sec.22-T5N-R64W
Sappington 22T-201

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-201
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-201	**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	11,073.1	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
Doughman 22VD Pad Sec.22-T5N-R64W						
Doughman 22RD - Wellbore #1 - Wellbore #1	11,073.1	6,632.1	405.7	307.5	4.132	CC, ES, SF
Existing Wells Sec.22-T5N-R64W (Grid)						
Emancipator 22-15 (Exist.) - Wellbore #1 - Wellbore #1	0.0	0.0	290.0			
Emancipator 22-15 (Exist.) - Wellbore #1 - Wellbore #1	100.0	86.8	290.0	289.8	1,273.795	ES
Emancipator 22-15 (Exist.) - Wellbore #1 - Wellbore #1	7,200.0	6,586.6	597.2	566.3	19.295	SF
Emancipator B 22-23 (Exist.) - Wellbore #1 - Wellbore #1	7,629.7	6,576.2	56.8	22.9	1.674	CC, ES, SF
Ledford 22Y-HZ Pad Sec.22-T5N-R64W						
Ledford 22T-221 - Wellbore #1 - Plan #2 (3-5-15)	8,207.6	8,178.3	454.3	388.6	6.915	CC
Ledford 22T-221 - Wellbore #1 - Plan #2 (3-5-15)	11,073.1	11,043.7	454.3	284.3	2.673	ES, SF
Ledford 22T-321 - Wellbore #1 - Plan #2 (3-5-15)	5,979.5	5,980.3	212.0	177.3	6.113	CC
Ledford 22T-321 - Wellbore #1 - Plan #2 (3-5-15)	11,073.1	11,148.3	224.7	61.6	1.378	Level 3, ES, SF
P&H 22CD Pad Sec.22-T5N-R64W						
P&H 22CD - Wellbore #1 - Wellbore #1	10,257.1	6,645.7	113.2	29.5	1.352	Level 3, CC, ES, SF
P&H 22SD - Wellbore #1 - Wellbore #1	9,012.9	6,693.4	119.8	56.5	1.894	CC, ES, SF
Sappington 5N64W22D Sec.22-T5N-R64W						
Sappington 22Q-221 - Wellbore #1 - Plan #1 (3-4-15)	400.0	399.0	58.5	56.9	37.239	CC
Sappington 22Q-221 - Wellbore #1 - Plan #1 (3-4-15)	500.0	498.6	58.8	56.8	29.497	ES
Sappington 22Q-221 - Wellbore #1 - Plan #1 (3-4-15)	11,073.1	11,089.7	660.2	496.7	4.039	SF
Sappington 22Q-301 - Wellbore #1 - Plan #1 (3-4-15)	200.0	200.0	89.2	88.6	132.327	CC, ES
Sappington 22Q-301 - Wellbore #1 - Plan #1 (3-4-15)	5,300.0	5,188.4	984.2	946.6	26.152	SF
Sappington 22T-341 - Wellbore #1 - Plan #1 (3-4-15)	600.0	600.0	27.9	25.4	11.268	CC
Sappington 22T-341 - Wellbore #1 - Plan #1 (3-4-15)	700.0	700.0	28.2	25.3	9.730	ES
Sappington 22T-341 - Wellbore #1 - Plan #1 (3-4-15)	11,073.1	11,163.8	338.8	178.0	2.107	SF

Offset Design Doughman 22VD Pad Sec.22-T5N-R64W - Doughman 22RD - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 765-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
10,500.0	6,560.8	6,652.8	6,555.8	71.2	20.1	113.51	4,324.6	365.8	973.9	891.1	82.72	11.773	

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-201
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-201	**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 Doughman 22VD Pad Sec.22-T5N-R64W - Doughman 22RD - Wellbore #1 - Wellbore #1

Offset Site Error: 0.0 ft

Survey Program: 765-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
10,600.0	6,559.8	6,649.1	6,552.1	73.0	20.1	111.20	4,324.7	365.8	874.3	788.7	85.56	10.218	
10,700.0	6,558.8	6,645.4	6,548.4	74.9	20.1	108.84	4,324.8	365.8	774.8	686.5	88.36	8.768	
10,800.0	6,557.8	6,641.8	6,544.7	76.8	20.1	106.44	4,324.9	365.8	675.5	584.4	91.11	7.414	
10,900.0	6,556.8	6,638.2	6,541.1	78.6	20.1	104.01	4,325.0	365.8	576.3	482.6	93.78	6.146	
11,000.0	6,555.7	6,634.6	6,537.6	80.5	20.1	101.55	4,325.0	365.8	477.5	381.2	96.36	4.956	
11,073.1	6,555.0	6,632.1	6,535.0	81.9	20.1	99.74	4,325.1	365.8	405.7	307.5	98.17	4.132	CC, ES, SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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	-89.28	3.6	-289.7	290.0				
100.0	100.0	86.8	86.8	0.1	0.1	-89.34	3.3	-290.0	290.0	289.8	0.23	1,273.795	ES
200.0	200.0	184.3	184.3	0.3	0.4	-89.54	2.4	-291.0	291.0	290.3	0.69	419.734	
300.0	300.0	286.0	285.9	0.6	0.6	-89.82	0.9	-292.3	292.3	291.1	1.19	246.622	
400.0	400.0	386.0	386.0	0.8	0.9	-90.10	-0.5	-293.1	293.1	291.5	1.67	175.170	
500.0	500.0	485.8	485.8	1.0	1.2	-90.37	-1.9	-294.0	294.0	291.9	2.16	135.954	
600.0	600.0	586.1	586.0	1.2	1.4	-90.64	-3.3	-294.9	294.9	292.3	2.65	111.144	
700.0	700.0	687.5	687.4	1.4	1.7	108.98	-4.7	-295.5	295.8	292.7	3.11	95.012	
800.0	800.0	788.3	788.2	1.6	1.9	109.15	-6.3	-295.7	296.9	293.4	3.55	83.693	
900.0	899.9	888.7	888.6	1.8	2.2	109.63	-7.8	-295.7	298.3	294.4	3.99	74.785	
1,000.0	999.7	989.0	988.9	2.0	2.4	110.41	-9.4	-295.5	300.3	295.8	4.44	67.593	
1,100.0	1,099.4	1,087.3	1,087.2	2.2	2.7	111.47	-10.9	-295.5	303.0	298.1	4.91	61.686	
1,200.0	1,198.9	1,187.3	1,187.2	2.5	2.9	112.86	-12.2	-295.8	306.9	301.5	5.41	56.726	
1,300.0	1,298.3	1,288.0	1,287.8	2.7	3.2	114.52	-13.5	-295.7	311.3	305.4	5.92	52.622	
1,400.0	1,397.4	1,384.6	1,384.5	3.0	3.4	116.32	-14.7	-295.8	316.9	310.5	6.43	49.314	
1,500.0	1,496.3	1,482.6	1,482.5	3.3	3.7	118.35	-15.8	-296.6	324.4	317.5	6.96	46.619	
1,600.0	1,594.9	1,581.5	1,581.3	3.7	3.9	120.55	-16.9	-297.5	333.3	325.8	7.51	44.406	
1,700.0	1,693.3	1,681.1	1,680.9	4.0	4.1	122.96	-17.5	-298.1	343.5	335.5	8.01	42.906	
1,800.0	1,791.3	1,779.3	1,779.1	4.4	4.2	125.58	-17.3	-298.3	354.9	346.5	8.40	42.241	
1,900.0	1,889.4	1,876.7	1,876.5	4.8	4.2	128.14	-16.5	-298.3	367.0	358.3	8.74	42.017	
2,000.0	1,987.4	1,972.8	1,972.6	5.2	4.3	130.57	-15.3	-298.5	380.2	371.1	9.08	41.895	
2,100.0	2,085.5	2,071.3	2,071.1	5.6	4.3	132.90	-13.8	-298.8	394.3	384.9	9.43	41.833	
2,200.0	2,183.6	2,169.1	2,168.9	6.0	4.4	135.12	-12.1	-298.7	408.8	399.0	9.77	41.827	
2,300.0	2,281.6	2,267.0	2,266.7	6.4	4.4	137.24	-9.9	-298.6	423.9	413.8	10.12	41.871	
2,400.0	2,379.7	2,364.3	2,364.1	6.9	4.5	139.14	-8.3	-298.6	439.4	429.0	10.49	41.905	
2,500.0	2,477.7	2,461.6	2,461.3	7.3	4.6	140.92	-6.5	-298.7	455.6	444.8	10.87	41.926	
2,600.0	2,575.8	2,558.4	2,558.2	7.7	4.7	142.51	-5.2	-299.1	472.3	461.0	11.27	41.924	
2,700.0	2,673.9	2,656.1	2,655.8	8.1	4.9	144.07	-3.2	-299.4	489.5	477.8	11.66	41.969	
2,800.0	2,771.9	2,755.2	2,754.9	8.6	5.0	145.50	-1.6	-299.8	506.8	494.8	12.07	41.981	
2,900.0	2,870.0	2,854.2	2,853.8	9.0	5.2	146.78	-0.6	-300.2	524.2	511.7	12.50	41.945	
3,000.0	2,968.0	2,952.5	2,952.1	9.4	5.3	147.97	0.3	-300.6	541.6	528.7	12.93	41.880	
3,100.0	3,066.1	3,049.5	3,049.2	9.9	5.5	149.04	1.0	-301.1	559.3	545.9	13.38	41.795	
3,200.0	3,164.1	3,146.5	3,146.1	10.3	5.7	150.05	1.8	-301.8	577.3	563.5	13.83	41.733	
3,300.0	3,262.2	3,244.5	3,244.1	10.7	5.9	151.04	2.9	-302.3	595.6	581.3	14.28	41.710	
3,400.0	3,360.3	3,341.8	3,341.4	11.2	6.1	151.99	4.2	-302.5	614.0	599.3	14.72	41.724	
3,500.0	3,458.3	3,440.4	3,440.0	11.6	6.3	152.91	5.7	-302.9	632.7	617.6	15.15	41.765	
3,600.0	3,556.4	3,540.7	3,540.3	12.0	6.5	153.80	7.0	-302.7	651.1	635.5	15.58	41.786	
3,700.0	3,654.4	3,637.3	3,637.0	12.5	6.6	154.58	7.9	-302.8	669.6	653.6	16.02	41.798	
3,800.0	3,752.5	3,735.2	3,734.8	12.9	6.8	155.34	9.1	-303.0	688.4	671.9	16.47	41.801	
3,900.0	3,850.6	3,834.7	3,834.3	13.3	7.0	156.05	10.0	-303.1	707.0	690.1	16.92	41.782	
4,000.0	3,948.6	3,932.0	3,931.6	13.8	7.3	156.72	10.8	-303.2	725.7	708.4	17.38	41.764	
4,100.0	4,046.7	4,029.9	4,029.5	14.2	7.5	157.32	11.5	-303.6	744.6	726.8	17.85	41.720	
4,200.0	4,144.7	4,128.4	4,128.0	14.7	7.7	157.89	12.0	-304.1	763.5	745.2	18.33	41.656	
4,300.0	4,242.8	4,225.2	4,224.8	15.1	7.9	158.46	12.9	-304.2	782.5	763.7	18.79	41.637	
4,400.0	4,340.9	4,322.9	4,322.5	15.5	8.1	159.00	13.7	-304.5	801.6	782.3	19.26	41.612	
4,500.0	4,438.9	4,419.3	4,418.8	16.0	8.4	159.49	14.6	-305.0	821.0	801.3	19.74	41.589	
4,600.0	4,537.0	4,521.1	4,520.7	16.4	8.6	159.99	15.2	-305.3	840.1	819.9	20.23	41.538	
4,700.0	4,635.0	4,615.1	4,614.7	16.9	8.8	160.42	15.9	-305.8	859.5	838.8	20.70	41.523	
4,800.0	4,733.1	4,717.0	4,716.6	17.3	9.1	160.86	16.4	-306.3	878.7	857.5	21.20	41.455	
4,900.0	4,831.1	4,813.4	4,813.0	17.7	9.3	161.26	16.9	-306.8	898.0	876.3	21.68	41.411	
5,000.0	4,929.2	4,914.1	4,913.6	18.2	9.5	161.66	17.4	-307.1	917.2	895.0	22.18	41.360	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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
5,100.0	5,027.3	5,009.9	5,009.5	18.6	9.8	162.04	17.9	-307.4	936.4	913.8	22.65	41.334	
5,200.0	5,125.3	5,111.2	5,110.8	19.1	10.0	162.42	18.3	-307.6	955.6	932.4	23.15	41.281	
5,300.0	5,223.6	5,203.0	5,202.6	19.4	10.2	162.81	18.7	-308.0	973.7	950.1	23.64	41.184	
5,400.0	5,322.5	5,300.1	5,299.6	19.7	10.5	163.14	19.4	-308.8	989.0	964.9	24.11	41.024	
6,100.0	6,019.4	6,013.2	6,012.8	20.5	11.9	-37.64	23.2	-309.8	997.6	971.6	25.97	38.410	
6,200.0	6,114.5	6,110.3	6,109.8	20.3	12.0	-40.00	22.8	-309.4	972.4	946.7	25.69	37.849	
6,300.0	6,204.6	6,199.0	6,198.5	20.0	12.0	-43.46	22.1	-309.4	938.2	912.7	25.48	36.817	
6,400.0	6,288.4	6,285.8	6,285.3	19.7	12.1	-48.33	21.1	-309.5	896.2	870.6	25.59	35.022	
6,500.0	6,364.4	6,362.7	6,362.2	19.3	12.2	-54.52	20.0	-309.6	848.1	822.0	26.14	32.450	
6,600.0	6,431.2	6,430.2	6,429.7	18.9	12.3	-61.90	18.8	-309.6	796.3	769.2	27.11	29.377	
6,700.0	6,487.8	6,487.1	6,486.6	18.5	12.3	-69.92	17.7	-309.5	743.6	715.3	28.24	26.329	
6,800.0	6,533.1	6,530.4	6,529.9	18.2	12.4	-77.51	16.9	-309.4	693.5	664.4	29.17	23.776	
6,900.0	6,566.5	6,561.9	6,561.4	18.0	12.4	-83.86	16.4	-309.2	650.2	620.4	29.77	21.842	
7,000.0	6,587.2	6,581.5	6,581.0	18.0	12.4	-88.28	16.2	-309.1	617.5	587.4	30.14	20.491	
7,100.0	6,595.0	6,588.4	6,587.9	18.2	12.4	-90.34	16.1	-309.1	599.2	568.7	30.48	19.657	
7,161.7	6,595.4	6,588.1	6,587.6	18.4	12.4	-90.36	16.1	-309.1	596.0	565.2	30.77	19.367	
7,200.0	6,594.2	6,586.6	6,586.0	18.6	12.4	-90.28	16.1	-309.1	597.2	566.3	30.95	19.295	SF
7,300.0	6,593.2	6,584.5	6,583.9	19.2	12.4	-90.08	16.2	-309.1	611.8	580.2	31.60	19.361	
7,400.0	6,592.2	6,582.3	6,581.8	20.0	12.4	-89.87	16.2	-309.1	641.9	609.5	32.41	19.803	
7,500.0	6,591.2	6,580.1	6,579.6	21.0	12.4	-89.66	16.2	-309.1	685.3	651.9	33.37	20.537	
7,600.0	6,590.2	6,577.8	6,577.3	22.1	12.4	-89.44	16.2	-309.1	739.8	705.3	34.45	21.475	
7,700.0	6,589.1	6,575.5	6,575.0	23.3	12.4	-89.22	16.2	-309.2	803.1	767.4	35.64	22.535	
7,800.0	6,588.1	6,573.1	6,572.6	24.6	12.4	-88.99	16.3	-309.2	873.2	836.3	36.92	23.655	
7,900.0	6,587.1	6,570.6	6,570.1	26.0	12.4	-88.75	16.3	-309.2	948.7	910.5	38.27	24.790	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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	36.97	470.0	353.8	588.4				
100.0	100.0	85.4	85.4	0.1	0.1	36.98	470.0	353.9	588.4	588.1	0.23	2,605.957	
200.0	200.0	185.4	185.4	0.3	0.3	36.97	470.2	354.0	588.6	587.9	0.64	914.841	
300.0	300.0	286.3	286.3	0.6	0.5	36.94	470.5	353.7	588.7	587.6	1.07	550.264	
400.0	400.0	386.9	386.9	0.8	0.7	36.90	470.7	353.5	588.7	587.1	1.51	389.007	
450.3	450.3	436.8	436.8	0.9	0.8	36.89	470.8	353.3	588.6	586.9	1.72	341.395	
500.0	500.0	485.9	485.9	1.0	0.9	36.88	470.8	353.3	588.7	586.7	1.93	305.381	
600.0	600.0	583.8	583.8	1.2	1.1	36.89	471.0	353.5	588.9	586.6	2.34	251.231	
700.0	700.0	684.4	684.4	1.4	1.3	-123.42	471.3	353.9	589.9	587.1	2.74	215.452	
800.0	800.0	784.5	784.5	1.6	1.5	-123.57	471.2	354.6	591.6	588.5	3.10	190.808	
900.0	899.9	884.1	884.1	1.8	1.7	-123.83	471.1	355.3	594.4	590.9	3.49	170.547	
1,000.0	999.7	984.7	984.7	2.0	1.9	-124.19	470.8	356.3	598.2	594.3	3.89	153.787	
1,100.0	1,099.4	1,082.1	1,082.1	2.2	2.1	-124.67	470.6	357.2	603.0	598.7	4.32	139.518	
1,200.0	1,198.9	1,181.0	1,180.9	2.5	2.3	-125.30	470.8	358.1	609.2	604.4	4.79	127.070	
1,300.0	1,298.3	1,279.4	1,279.3	2.7	2.6	-126.04	471.2	359.0	616.6	611.4	5.29	116.648	
1,400.0	1,397.4	1,378.2	1,378.1	3.0	2.8	-126.87	471.6	360.0	625.4	619.6	5.79	107.919	
1,500.0	1,496.3	1,481.2	1,481.2	3.3	3.1	-127.82	471.7	361.1	635.1	628.7	6.31	100.632	
1,600.0	1,594.9	1,577.3	1,577.3	3.7	3.3	-128.77	471.4	362.1	645.7	638.9	6.82	94.670	
1,700.0	1,693.3	1,671.9	1,671.8	4.0	3.5	-129.78	471.8	363.3	658.3	650.9	7.35	89.551	
1,800.0	1,791.3	1,766.9	1,766.8	4.4	3.8	-130.95	472.8	364.2	672.5	664.6	7.89	85.187	
1,900.0	1,889.4	1,862.7	1,862.6	4.8	4.0	-132.13	474.3	365.2	687.5	679.0	8.44	81.423	
2,000.0	1,987.4	1,962.4	1,962.3	5.2	4.3	-133.28	475.7	366.6	702.8	693.8	9.01	78.019	
2,100.0	2,085.5	2,058.9	2,058.8	5.6	4.5	-134.33	476.7	368.0	718.1	708.6	9.57	75.026	
2,200.0	2,183.6	2,154.7	2,154.6	6.0	4.8	-135.30	478.0	370.0	734.1	724.0	10.13	72.438	
2,300.0	2,281.6	2,252.8	2,252.6	6.4	5.0	-136.26	479.4	371.8	750.4	739.7	10.70	70.137	
2,400.0	2,379.7	2,352.4	2,352.2	6.9	5.3	-137.23	480.9	373.3	766.8	755.5	11.26	68.087	
2,500.0	2,477.7	2,453.5	2,453.3	7.3	5.5	-138.17	482.2	374.5	783.0	771.2	11.83	66.207	
2,600.0	2,575.8	2,553.0	2,552.8	7.7	5.8	-139.04	482.9	376.0	799.1	786.7	12.39	64.500	
2,700.0	2,673.9	2,655.7	2,655.5	8.1	6.1	-139.87	483.4	377.8	815.2	802.2	12.95	62.954	
2,800.0	2,771.9	2,757.1	2,756.9	8.6	6.3	-140.66	483.1	379.4	830.6	817.1	13.49	61.582	
2,900.0	2,870.0	2,852.8	2,852.5	9.0	6.5	-141.36	482.8	381.0	846.2	832.2	14.02	60.377	
3,000.0	2,968.0	2,955.0	2,954.7	9.4	6.8	-142.10	482.8	382.6	862.2	847.7	14.53	59.328	
3,100.0	3,066.1	3,057.3	3,057.0	9.9	6.9	-142.89	482.3	382.8	877.4	862.5	14.95	58.684	
3,200.0	3,164.1	3,159.1	3,158.8	10.3	6.9	-143.74	482.0	381.7	892.7	877.4	15.28	58.429	
3,300.0	3,262.2	3,259.4	3,259.1	10.7	6.9	-144.54	481.1	380.5	907.5	892.0	15.58	58.237	
3,400.0	3,360.3	3,353.5	3,353.2	11.2	7.0	-145.27	480.4	379.4	922.7	906.8	15.89	58.053	
3,500.0	3,458.3	3,452.4	3,452.1	11.6	7.0	-146.00	480.1	378.5	938.4	922.2	16.21	57.892	
3,600.0	3,556.4	3,555.0	3,554.7	12.0	7.1	-146.78	479.4	376.7	953.8	937.3	16.53	57.701	
3,700.0	3,654.4	3,651.5	3,651.2	12.5	7.1	-147.52	478.7	374.4	969.2	952.3	16.86	57.498	
3,800.0	3,752.5	3,740.8	3,740.5	12.9	7.2	-148.19	478.5	372.3	985.1	967.9	17.19	57.297	
6,600.0	6,431.2	6,421.2	6,420.4	18.9	11.2	4.94	485.5	339.9	995.5	978.0	17.56	56.690	
6,700.0	6,487.8	6,481.4	6,480.5	18.5	11.3	6.76	485.1	341.5	913.0	897.1	15.91	57.375	
6,800.0	6,533.1	6,528.2	6,527.3	18.2	11.4	9.97	484.7	342.7	823.8	809.0	14.80	55.666	
6,900.0	6,566.5	6,561.7	6,560.7	18.0	11.5	16.59	484.3	343.4	729.5	714.3	15.15	48.138	
7,000.0	6,587.2	6,581.8	6,580.9	18.0	11.5	34.44	484.0	343.8	631.9	611.8	20.05	31.520	
7,100.0	6,595.0	6,588.5	6,587.6	18.2	11.5	89.32	484.0	343.9	532.6	503.0	29.60	17.997	
7,200.0	6,594.2	6,586.3	6,585.4	18.6	11.5	99.01	484.0	343.9	433.4	403.8	29.58	14.652	
7,300.0	6,593.2	6,583.9	6,583.0	19.2	11.5	96.66	484.0	343.8	334.5	304.1	30.40	11.003	
7,400.0	6,592.2	6,581.6	6,580.6	20.0	11.5	94.31	484.0	343.8	236.6	205.2	31.36	7.546	
7,500.0	6,591.2	6,579.2	6,578.3	21.0	11.5	91.96	484.1	343.8	141.6	109.2	32.42	4.368	
7,600.0	6,590.2	6,576.9	6,576.0	22.1	11.5	89.62	484.1	343.7	64.1	30.5	33.57	1.910	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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
7,629.7	6,589.9	6,576.2	6,575.3	22.4	11.5	88.92	484.1	343.7	56.8	22.9	33.93	1.674	CC, ES, SF
7,700.0	6,589.1	6,574.6	6,573.7	23.3	11.5	87.29	484.1	343.7	90.3	55.6	34.78	2.597	
7,800.0	6,588.1	6,572.3	6,571.4	24.6	11.5	84.99	484.2	343.6	179.4	143.4	36.04	4.979	
7,900.0	6,587.1	6,570.0	6,569.1	26.0	11.5	82.73	484.2	343.6	276.1	238.8	37.32	7.399	
8,000.0	6,586.1	6,567.8	6,566.9	27.4	11.5	80.50	484.2	343.5	374.5	335.9	38.61	9.700	
8,100.0	6,585.1	6,565.6	6,564.6	28.9	11.5	78.31	484.2	343.5	473.6	433.7	39.90	11.869	
8,200.0	6,584.1	6,563.4	6,562.4	30.5	11.5	76.17	484.3	343.5	572.9	531.8	41.18	13.914	
8,300.0	6,583.1	6,561.2	6,560.2	32.0	11.5	74.08	484.3	343.4	672.5	630.1	42.43	15.848	
8,400.0	6,582.1	6,559.0	6,558.1	33.7	11.5	72.05	484.3	343.4	772.2	728.5	43.66	17.684	
8,500.0	6,581.0	6,556.8	6,555.9	35.3	11.5	70.08	484.4	343.3	871.9	827.0	44.86	19.435	
8,600.0	6,580.0	6,554.7	6,553.8	37.0	11.5	68.17	484.4	343.3	971.7	925.6	46.02	21.112	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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 Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-221 - Wellbore #1 - Plan #2 (3-5-15)

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
3,300.0	3,262.2	3,425.2	3,397.7	10.7	9.9	-55.21	-676.7	1,069.3	979.8	961.6	18.20	53.851	
3,400.0	3,360.3	3,521.7	3,492.8	11.2	10.3	-55.55	-682.5	1,053.3	954.3	935.4	18.87	50.560	
3,500.0	3,458.3	3,618.2	3,587.8	11.6	10.6	-55.91	-688.3	1,037.3	928.9	909.3	19.56	47.496	
3,600.0	3,556.4	3,714.8	3,682.8	12.0	11.0	-56.29	-694.1	1,021.3	903.5	883.2	20.24	44.637	
3,700.0	3,654.4	3,811.3	3,777.8	12.5	11.4	-56.70	-700.0	1,005.3	878.1	857.1	20.92	41.963	
3,800.0	3,752.5	3,907.8	3,872.8	12.9	11.8	-57.13	-705.8	989.3	852.7	831.1	21.61	39.458	
3,900.0	3,850.6	4,004.4	3,967.9	13.3	12.2	-57.58	-711.6	973.3	827.5	805.2	22.30	37.108	
4,000.0	3,948.6	4,100.9	4,062.9	13.8	12.6	-58.06	-717.4	957.3	802.2	779.2	22.99	34.898	
4,100.0	4,046.7	4,197.5	4,157.9	14.2	13.0	-58.58	-723.3	941.3	777.0	753.4	23.68	32.819	
4,200.0	4,144.7	4,294.0	4,252.9	14.7	13.3	-59.12	-729.1	925.3	751.9	727.6	24.37	30.858	
4,300.0	4,242.8	4,390.5	4,347.9	15.1	13.7	-59.71	-734.9	909.3	726.9	701.8	25.06	29.007	
4,400.0	4,340.9	4,487.1	4,443.0	15.5	14.1	-60.34	-740.7	893.2	701.9	676.2	25.75	27.258	
4,500.0	4,438.9	4,583.6	4,538.0	16.0	14.5	-61.01	-746.5	877.2	677.0	650.6	26.44	25.603	
4,600.0	4,537.0	4,680.1	4,633.0	16.4	14.9	-61.73	-752.4	861.2	652.2	625.1	27.14	24.035	
4,700.0	4,635.0	4,776.7	4,728.0	16.9	15.3	-62.51	-758.2	845.2	627.6	599.7	27.83	22.549	
4,800.0	4,733.1	4,873.2	4,823.0	17.3	15.7	-63.35	-764.0	829.2	603.0	574.5	28.52	21.140	
4,900.0	4,831.1	4,969.7	4,918.1	17.7	16.1	-64.27	-769.8	813.2	578.6	549.3	29.22	19.802	
5,000.0	4,929.2	5,066.3	5,013.1	18.2	16.5	-65.26	-775.6	797.2	554.3	524.4	29.91	18.532	
5,100.0	5,027.3	5,160.8	5,106.2	18.6	16.9	-66.32	-781.3	781.5	530.2	499.6	30.59	17.331	
5,200.0	5,125.3	5,244.0	5,188.3	19.1	17.1	-67.41	-785.8	769.2	507.9	476.7	31.20	16.280	
5,300.0	5,223.6	5,328.1	5,271.7	19.4	17.3	-68.28	-789.5	759.0	489.0	457.2	31.76	15.399	
5,400.0	5,322.5	5,413.3	5,356.4	19.7	17.5	-69.04	-792.5	751.0	474.2	442.0	32.20	14.727	
5,500.0	5,421.8	5,500.0	5,442.9	19.9	17.7	-69.71	-794.5	745.3	463.6	431.0	32.60	14.220	
5,600.0	5,521.5	5,585.8	5,528.7	20.1	17.8	-70.24	-795.7	742.1	457.1	424.2	32.96	13.871	
5,700.0	5,621.4	5,675.1	5,617.9	20.3	17.9	-70.62	-796.0	741.2	454.7	421.4	33.28	13.663	
5,800.0	5,721.4	5,775.0	5,717.9	20.4	18.1	89.52	-796.0	741.2	454.3	420.7	33.60	13.522	
5,900.0	5,821.4	5,875.0	5,817.9	20.5	18.2	89.52	-796.0	741.2	454.3	420.4	33.89	13.407	
6,000.0	5,921.2	5,974.6	5,917.2	20.5	18.3	89.52	-790.7	741.2	454.3	420.2	34.09	13.326	
6,100.0	6,019.4	6,074.1	6,015.0	20.5	18.4	89.52	-772.5	741.2	454.3	420.2	34.11	13.319	
6,200.0	6,114.5	6,173.6	6,109.6	20.3	18.5	89.53	-741.8	741.2	454.3	420.3	33.97	13.374	
6,300.0	6,204.6	6,273.1	6,199.4	20.0	18.5	89.54	-699.1	741.2	454.3	420.6	33.72	13.474	
6,400.0	6,288.4	6,372.7	6,282.9	19.7	18.5	89.57	-645.1	741.2	454.3	420.9	33.42	13.594	
6,500.0	6,364.4	6,472.2	6,358.7	19.3	18.5	89.60	-580.6	741.2	454.3	421.2	33.15	13.703	
6,600.0	6,431.2	6,571.8	6,425.5	18.9	18.5	89.64	-506.8	741.2	454.3	421.3	33.00	13.765	
6,700.0	6,487.8	6,671.5	6,482.2	18.5	18.6	89.69	-425.0	741.2	454.3	421.3	33.06	13.743	
6,800.0	6,533.1	6,771.2	6,527.8	18.2	18.8	89.74	-336.4	741.2	454.3	420.9	33.39	13.607	
6,900.0	6,566.5	6,871.0	6,561.4	18.0	19.1	89.80	-242.5	741.2	454.3	420.3	34.04	13.346	
7,000.0	6,587.2	6,970.8	6,582.6	18.0	19.7	89.85	-145.0	741.2	454.3	419.3	35.04	12.965	
7,100.0	6,595.0	7,070.6	6,590.9	18.2	20.5	89.92	-45.6	741.2	454.3	417.9	36.38	12.489	
7,200.0	6,594.2	7,170.6	6,590.2	18.6	21.5	89.93	54.4	741.2	454.3	416.3	38.03	11.945	
7,300.0	6,593.2	7,270.6	6,589.2	19.2	22.6	89.94	154.4	741.2	454.3	414.3	39.97	11.365	
7,400.0	6,592.2	7,370.6	6,588.3	20.0	23.9	89.95	254.4	741.2	454.3	412.1	42.17	10.773	
7,500.0	6,591.2	7,470.6	6,587.3	21.0	25.2	89.95	354.4	741.2	454.3	409.7	44.59	10.190	
7,600.0	6,590.2	7,570.6	6,586.3	22.1	26.7	89.96	454.4	741.2	454.3	407.1	47.19	9.627	
7,700.0	6,589.1	7,670.6	6,585.4	23.3	28.2	89.97	554.4	741.2	454.3	404.4	49.95	9.094	
7,800.0	6,588.1	7,770.6	6,584.4	24.6	29.7	89.97	654.4	741.2	454.3	401.5	52.85	8.595	
7,900.0	6,587.1	7,870.6	6,583.5	26.0	31.3	89.98	754.4	741.2	454.3	398.4	55.87	8.131	
8,000.0	6,586.1	7,970.6	6,582.5	27.4	32.9	89.99	854.4	741.2	454.3	395.3	58.98	7.702	
8,100.0	6,585.1	8,070.6	6,581.5	28.9	34.6	89.99	954.4	741.2	454.3	392.1	62.18	7.307	
8,200.0	6,584.1	8,170.6	6,580.6	30.5	36.2	90.00	1,054.4	741.2	454.3	388.9	65.44	6.942	
8,207.6	6,584.0	8,178.3	6,580.5	30.6	36.4	90.00	1,062.0	741.2	454.3	388.6	65.70	6.915	CC

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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 Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-221 - Wellbore #1 - Plan #2 (3-5-15)

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
8,300.0	6,583.1	8,270.6	6,579.6	32.0	37.9	90.01	1,154.3	741.2	454.3	385.5	68.77	6.606	
8,400.0	6,582.1	8,370.6	6,578.7	33.7	39.7	90.01	1,254.3	741.2	454.3	382.2	72.15	6.297	
8,500.0	6,581.0	8,470.6	6,577.7	35.3	41.4	90.02	1,354.3	741.2	454.3	378.7	75.57	6.012	
8,600.0	6,580.0	8,570.6	6,576.7	37.0	43.1	90.03	1,454.3	741.2	454.3	375.3	79.03	5.748	
8,700.0	6,579.0	8,670.6	6,575.8	38.7	44.9	90.03	1,554.3	741.2	454.3	371.8	82.53	5.505	
8,800.0	6,578.0	8,770.6	6,574.8	40.4	46.7	90.04	1,654.3	741.2	454.3	368.2	86.06	5.279	
8,900.0	6,577.0	8,870.6	6,573.9	42.1	48.5	90.05	1,754.3	741.2	454.3	364.7	89.61	5.070	
9,000.0	6,576.0	8,970.6	6,572.9	43.9	50.3	90.05	1,854.3	741.2	454.3	361.1	93.19	4.875	
9,100.0	6,575.0	9,070.6	6,571.9	45.6	52.1	90.06	1,954.3	741.2	454.3	357.5	96.78	4.694	
9,200.0	6,574.0	9,170.6	6,571.0	47.4	53.9	90.07	2,054.3	741.2	454.3	353.9	100.40	4.525	
9,300.0	6,572.9	9,270.6	6,570.0	49.2	55.7	90.07	2,154.3	741.2	454.3	350.3	104.03	4.367	
9,400.0	6,571.9	9,370.6	6,569.1	51.0	57.5	90.08	2,254.3	741.2	454.3	346.6	107.68	4.219	
9,500.0	6,570.9	9,470.6	6,568.1	52.8	59.4	90.09	2,354.3	741.2	454.3	343.0	111.34	4.080	
9,600.0	6,569.9	9,570.6	6,567.1	54.6	61.2	90.09	2,454.3	741.2	454.3	339.3	115.01	3.950	
9,700.0	6,568.9	9,670.6	6,566.2	56.4	63.1	90.10	2,554.3	741.2	454.3	335.6	118.69	3.828	
9,800.0	6,567.9	9,770.6	6,565.2	58.3	64.9	90.11	2,654.3	741.2	454.3	331.9	122.38	3.712	
9,900.0	6,566.9	9,870.6	6,564.3	60.1	66.8	90.11	2,754.3	741.2	454.3	328.2	126.09	3.603	
10,000.0	6,565.9	9,970.6	6,563.3	61.9	68.6	90.12	2,854.3	741.2	454.3	324.5	129.80	3.500	
10,100.0	6,564.9	10,070.6	6,562.3	63.8	70.5	90.12	2,954.3	741.2	454.3	320.8	133.51	3.403	
10,200.0	6,563.8	10,170.6	6,561.4	65.6	72.3	90.13	3,054.3	741.2	454.3	317.1	137.24	3.310	
10,300.0	6,562.8	10,270.6	6,560.4	67.5	74.2	90.14	3,154.3	741.2	454.3	313.3	140.97	3.223	
10,400.0	6,561.8	10,370.6	6,559.5	69.3	76.1	90.14	3,254.3	741.2	454.3	309.6	144.70	3.140	
10,500.0	6,560.8	10,470.6	6,558.5	71.2	77.9	90.15	3,354.2	741.2	454.3	305.9	148.45	3.060	
10,600.0	6,559.8	10,570.6	6,557.5	73.0	79.8	90.16	3,454.2	741.2	454.3	302.1	152.19	2.985	
10,700.0	6,558.8	10,670.6	6,556.6	74.9	81.7	90.16	3,554.2	741.2	454.3	298.4	155.94	2.913	
10,800.0	6,557.8	10,770.6	6,555.6	76.8	83.6	90.17	3,654.2	741.2	454.3	294.6	159.70	2.845	
10,900.0	6,556.8	10,870.6	6,554.7	78.6	85.4	90.18	3,754.2	741.2	454.3	290.8	163.46	2.779	
11,000.0	6,555.7	10,970.6	6,553.7	80.5	87.3	90.18	3,854.2	741.2	454.3	287.1	167.22	2.717	
11,073.1	6,555.0	11,043.7	6,553.0	81.9	88.7	90.19	3,927.3	741.2	454.3	284.3	169.97	2.673	ES, SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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 Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-321 - Wellbore #1 - Plan #2 (3-5-15)

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
2,700.0	2,673.9	2,860.7	2,827.4	8.1	9.6	-48.88	-672.0	1,003.1	994.0	979.0	14.99	66.303	
2,800.0	2,771.9	2,956.4	2,921.2	8.6	10.0	-49.07	-676.5	984.8	965.3	949.6	15.66	61.630	
2,900.0	2,870.0	3,052.2	3,015.1	9.0	10.4	-49.26	-681.0	966.6	936.6	920.3	16.34	57.336	
3,000.0	2,968.0	3,147.9	3,109.0	9.4	10.8	-49.47	-685.5	948.3	907.9	890.9	17.01	53.378	
3,100.0	3,066.1	3,243.7	3,202.9	9.9	11.3	-49.69	-690.0	930.0	879.3	861.6	17.68	49.719	
3,200.0	3,164.1	3,339.4	3,296.7	10.3	11.7	-49.93	-694.5	911.7	850.6	832.2	18.36	46.327	
3,300.0	3,262.2	3,435.2	3,390.6	10.7	12.1	-50.18	-699.0	893.4	822.0	802.9	19.04	43.176	
3,400.0	3,360.3	3,530.9	3,484.5	11.2	12.5	-50.45	-703.5	875.1	793.3	773.6	19.72	40.239	
3,500.0	3,458.3	3,626.6	3,578.4	11.6	12.9	-50.75	-708.0	856.8	764.7	744.3	20.39	37.498	
3,600.0	3,556.4	3,722.4	3,672.2	12.0	13.4	-51.06	-712.5	838.5	736.1	715.1	21.07	34.934	
3,700.0	3,654.4	3,818.1	3,766.1	12.5	13.8	-51.40	-717.0	820.2	707.6	685.8	21.75	32.530	
3,800.0	3,752.5	3,913.9	3,860.0	12.9	14.2	-51.77	-721.5	801.9	679.0	656.6	22.43	30.273	
3,900.0	3,850.6	4,009.6	3,953.9	13.3	14.6	-52.17	-726.0	783.6	650.5	627.4	23.11	28.149	
4,000.0	3,948.6	4,105.4	4,047.7	13.8	15.1	-52.61	-730.5	765.4	622.0	598.2	23.79	26.148	
4,100.0	4,046.7	4,201.1	4,141.6	14.2	15.5	-53.08	-735.0	747.1	593.6	569.1	24.47	24.260	
4,200.0	4,144.7	4,296.9	4,235.5	14.7	15.9	-53.61	-739.5	728.8	565.2	540.0	25.15	22.477	
4,300.0	4,242.8	4,392.6	4,329.3	15.1	16.3	-54.19	-744.0	710.5	536.8	511.0	25.82	20.789	
4,400.0	4,340.9	4,488.3	4,423.2	15.5	16.8	-54.84	-748.5	692.2	508.5	482.0	26.50	19.190	
4,500.0	4,438.9	4,584.1	4,517.1	16.0	17.2	-55.56	-753.0	673.9	480.3	453.1	27.18	17.674	
4,600.0	4,537.0	4,679.8	4,611.0	16.4	17.6	-56.38	-757.5	655.6	452.1	424.3	27.85	16.236	
4,700.0	4,635.0	4,775.6	4,704.8	16.9	18.0	-57.30	-762.0	637.3	424.1	395.6	28.52	14.869	
4,800.0	4,733.1	4,871.3	4,798.7	17.3	18.5	-58.35	-766.5	619.0	396.2	367.0	29.19	13.571	
4,900.0	4,831.1	4,967.1	4,892.6	17.7	18.9	-59.55	-771.0	600.7	368.4	338.5	29.86	12.337	
5,000.0	4,929.2	5,062.8	4,986.5	18.2	19.3	-60.95	-775.5	582.5	340.7	310.2	30.52	11.164	
5,100.0	5,027.3	5,158.6	5,080.3	18.6	19.7	-62.60	-780.0	564.2	313.3	282.2	31.18	10.049	
5,200.0	5,125.3	5,251.0	5,171.0	19.1	20.1	-64.50	-784.3	546.7	286.4	254.6	31.81	9.004	
5,300.0	5,223.6	5,339.6	5,258.4	19.4	20.4	-66.20	-787.9	532.1	262.7	230.4	32.38	8.115	
5,400.0	5,322.5	5,429.8	5,347.6	19.7	20.6	-67.82	-790.9	520.0	243.6	210.8	32.82	7.423	
5,500.0	5,421.8	5,521.2	5,438.5	19.9	20.8	-69.27	-793.2	510.5	229.1	195.9	33.22	6.896	
5,600.0	5,521.5	5,613.5	5,530.6	20.1	21.0	-70.41	-794.9	503.7	219.1	185.5	33.58	6.523	
5,700.0	5,621.4	5,706.5	5,623.5	20.3	21.2	-71.11	-795.8	499.9	213.4	179.5	33.90	6.295	
5,800.0	5,721.4	5,800.9	5,717.9	20.4	21.3	88.99	-796.1	498.9	212.0	177.8	34.20	6.198	
5,900.0	5,821.4	5,900.9	5,817.9	20.5	21.4	88.99	-796.1	498.9	212.0	177.5	34.48	6.148	
5,979.5	5,900.8	5,980.3	5,897.3	20.5	21.5	90.00	-796.1	498.9	212.0	177.3	34.67	6.113	CC
6,000.0	5,921.2	6,000.8	5,917.7	20.5	21.5	90.40	-796.0	498.9	212.0	177.2	34.73	6.104	
6,100.0	6,019.4	6,101.1	6,017.7	20.5	21.6	93.11	-787.7	498.9	212.3	177.4	34.84	6.093	
6,200.0	6,114.5	6,202.8	6,117.0	20.3	21.7	95.78	-766.0	498.9	213.0	178.3	34.76	6.129	
6,300.0	6,204.6	6,305.9	6,213.8	20.0	21.7	98.34	-730.8	498.9	214.2	179.8	34.49	6.211	
6,400.0	6,288.4	6,410.4	6,306.2	19.7	21.7	100.75	-682.2	498.9	215.8	181.7	34.07	6.333	
6,500.0	6,364.4	6,516.2	6,392.1	19.3	21.7	102.95	-620.5	498.9	217.5	184.0	33.57	6.480	
6,600.0	6,431.2	6,623.3	6,469.5	18.9	21.8	104.90	-546.7	498.9	219.4	186.3	33.10	6.628	
6,700.0	6,487.8	6,731.6	6,536.5	18.5	21.9	106.57	-461.8	498.9	221.2	188.3	32.82	6.739	
6,800.0	6,533.1	6,840.9	6,591.3	18.2	22.0	107.93	-367.3	498.9	222.8	189.9	32.86	6.780	
6,900.0	6,566.5	6,951.0	6,632.4	18.0	22.3	108.96	-265.2	498.9	224.1	190.8	33.37	6.716	
7,000.0	6,587.2	7,061.8	6,658.4	18.0	22.8	109.66	-157.7	498.9	225.1	190.7	34.43	6.538	
7,100.0	6,595.0	7,172.9	6,668.7	18.2	23.5	110.00	-47.1	498.9	225.6	189.5	36.01	6.264	
7,200.0	6,594.2	7,275.3	6,667.9	18.6	24.3	110.01	55.2	498.9	225.6	187.9	37.67	5.989	
7,300.0	6,593.2	7,375.3	6,666.8	19.2	25.2	110.00	155.2	498.9	225.6	186.0	39.51	5.709	
7,400.0	6,592.2	7,475.3	6,665.7	20.0	26.3	109.98	255.2	498.9	225.5	183.9	41.59	5.423	
7,500.0	6,591.2	7,575.3	6,664.7	21.0	27.6	109.96	355.2	498.9	225.5	181.6	43.87	5.140	
7,600.0	6,590.2	7,675.3	6,663.6	22.1	28.9	109.95	455.2	498.9	225.5	179.1	46.33	4.867	

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-201
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-201	**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 Ledford 22Y-HZ Pad Sec.22-T5N-R64W - Ledford 22T-321 - Wellbore #1 - Plan #2 (3-5-15)

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
7,700.0	6,589.1	7,775.3	6,662.5	23.3	30.2	109.93	555.2	498.9	225.5	176.5	48.95	4.606	
7,800.0	6,588.1	7,875.3	6,661.4	24.6	31.7	109.91	655.2	498.9	225.4	173.7	51.69	4.361	
7,900.0	6,587.1	7,975.3	6,660.3	26.0	33.2	109.90	755.2	498.9	225.4	170.9	54.54	4.133	
8,000.0	6,586.1	8,075.3	6,659.2	27.4	34.7	109.88	855.2	498.9	225.4	167.9	57.49	3.921	
8,100.0	6,585.1	8,175.3	6,658.2	28.9	36.3	109.86	955.2	498.9	225.4	164.8	60.51	3.724	
8,200.0	6,584.1	8,275.3	6,657.1	30.5	37.9	109.85	1,055.2	498.9	225.3	161.7	63.61	3.543	
8,300.0	6,583.1	8,375.3	6,656.0	32.0	39.6	109.83	1,155.2	498.9	225.3	158.6	66.76	3.375	
8,400.0	6,582.1	8,475.3	6,654.9	33.7	41.2	109.81	1,255.2	498.9	225.3	155.3	69.96	3.220	
8,500.0	6,581.0	8,575.3	6,653.8	35.3	42.9	109.80	1,355.2	498.9	225.3	152.1	73.21	3.077	
8,600.0	6,580.0	8,675.3	6,652.8	37.0	44.6	109.78	1,455.2	498.9	225.2	148.8	76.49	2.945	
8,700.0	6,579.0	8,775.3	6,651.7	38.7	46.3	109.76	1,555.2	498.9	225.2	145.4	79.81	2.822	
8,800.0	6,578.0	8,875.3	6,650.6	40.4	48.1	109.75	1,655.1	498.9	225.2	142.0	83.15	2.708	
8,900.0	6,577.0	8,975.3	6,649.5	42.1	49.8	109.73	1,755.1	498.9	225.2	138.6	86.53	2.602	
9,000.0	6,576.0	9,075.3	6,648.4	43.9	51.6	109.71	1,855.1	498.9	225.1	135.2	89.92	2.504	
9,100.0	6,575.0	9,175.3	6,647.3	45.6	53.4	109.70	1,955.1	498.9	225.1	131.8	93.34	2.412	
9,200.0	6,574.0	9,275.3	6,646.3	47.4	55.1	109.68	2,055.1	498.9	225.1	128.3	96.77	2.326	
9,300.0	6,572.9	9,375.3	6,645.2	49.2	56.9	109.66	2,155.1	498.9	225.1	124.9	100.22	2.246	
9,400.0	6,571.9	9,475.3	6,644.1	51.0	58.7	109.65	2,255.1	498.9	225.1	121.4	103.69	2.170	
9,500.0	6,570.9	9,575.3	6,643.0	52.8	60.5	109.63	2,355.1	498.9	225.0	117.9	107.17	2.100	
9,600.0	6,569.9	9,675.3	6,641.9	54.6	62.4	109.61	2,455.1	498.9	225.0	114.3	110.66	2.033	
9,700.0	6,568.9	9,775.3	6,640.8	56.4	64.2	109.60	2,555.1	498.9	225.0	110.8	114.16	1.971	
9,800.0	6,567.9	9,875.3	6,639.8	58.3	66.0	109.58	2,655.1	498.9	225.0	107.3	117.68	1.912	
9,900.0	6,566.9	9,975.3	6,638.7	60.1	67.8	109.56	2,755.1	498.9	224.9	103.7	121.20	1.856	
10,000.0	6,565.9	10,075.3	6,637.6	61.9	69.7	109.55	2,855.1	498.9	224.9	100.2	124.73	1.803	
10,100.0	6,564.9	10,175.3	6,636.5	63.8	71.5	109.53	2,955.1	498.9	224.9	96.6	128.27	1.753	
10,200.0	6,563.8	10,275.3	6,635.4	65.6	73.4	109.51	3,055.1	498.9	224.9	93.0	131.82	1.706	
10,300.0	6,562.8	10,375.3	6,634.4	67.5	75.2	109.49	3,155.1	498.9	224.8	89.5	135.37	1.661	
10,400.0	6,561.8	10,475.3	6,633.3	69.3	77.1	109.48	3,255.1	498.9	224.8	85.9	138.93	1.618	
10,500.0	6,560.8	10,575.3	6,632.2	71.2	78.9	109.46	3,355.0	498.9	224.8	82.3	142.50	1.578	
10,600.0	6,559.8	10,675.3	6,631.1	73.0	80.8	109.44	3,455.0	498.9	224.8	78.7	146.07	1.539	
10,700.0	6,558.8	10,775.3	6,630.0	74.9	82.6	109.43	3,555.0	498.9	224.8	75.1	149.65	1.502	
10,800.0	6,557.8	10,875.3	6,628.9	76.8	84.5	109.41	3,655.0	498.9	224.7	71.5	153.23	1.467	Level 3
10,900.0	6,556.8	10,975.3	6,627.9	78.6	86.4	109.39	3,755.0	498.9	224.7	67.9	156.81	1.433	Level 3
11,000.0	6,555.7	11,075.3	6,626.8	80.5	88.2	109.38	3,855.0	498.9	224.7	64.3	160.41	1.401	Level 3
11,070.2	6,555.0	11,145.4	6,626.0	81.8	89.5	109.37	3,925.2	498.9	224.7	61.7	162.93	1.379	Level 3
11,073.1	6,555.0	11,148.3	6,626.0	81.9	89.6	109.37	3,928.0	498.9	224.7	61.6	163.03	1.378	Level 3, ES, SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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
9,300.0	6,572.9	6,615.4	6,525.1	49.2	20.5	71.77	3,109.8	398.4	963.1	898.8	64.31	14.975	
9,400.0	6,571.9	6,618.0	6,527.7	51.0	20.5	73.02	3,109.9	398.5	864.0	797.6	66.34	13.023	
9,500.0	6,570.9	6,620.8	6,530.4	52.8	20.5	74.33	3,110.1	398.7	765.0	696.6	68.39	11.186	
9,600.0	6,569.9	6,623.6	6,533.3	54.6	20.5	75.71	3,110.2	398.8	666.3	595.9	70.45	9.458	
9,700.0	6,568.9	6,626.6	6,536.2	56.4	20.5	77.17	3,110.3	399.0	568.1	495.6	72.52	7.834	
9,800.0	6,567.9	6,629.7	6,539.3	58.3	20.5	78.69	3,110.5	399.1	470.6	396.0	74.58	6.309	
9,900.0	6,566.9	6,632.9	6,542.6	60.1	20.5	80.30	3,110.6	399.3	374.3	297.7	76.64	4.884	
10,000.0	6,565.9	6,636.3	6,545.9	61.9	20.5	81.99	3,110.8	399.5	280.7	202.0	78.68	3.568	
10,100.0	6,564.9	6,639.8	6,549.4	63.8	20.5	83.76	3,111.0	399.6	193.5	112.8	80.69	2.398	
10,200.0	6,563.8	6,643.5	6,553.1	65.6	20.5	85.62	3,111.1	399.8	126.8	44.1	82.66	1.534	
10,257.1	6,563.3	6,645.7	6,555.3	66.7	20.5	86.72	3,111.2	400.0	113.2	29.5	83.76	1.352	Level 3, CC, ES, SF
10,300.0	6,562.8	6,647.3	6,556.9	67.5	20.5	87.56	3,111.3	400.1	121.1	36.5	84.57	1.432	Level 3
10,400.0	6,561.8	6,651.4	6,561.0	69.3	20.5	89.60	3,111.5	400.3	182.3	95.9	86.41	2.109	
10,500.0	6,560.8	6,655.6	6,565.2	71.2	20.6	91.73	3,111.8	400.6	267.9	179.7	88.16	3.038	
10,600.0	6,559.8	6,660.0	6,569.6	73.0	20.6	93.95	3,112.0	400.8	360.9	271.1	89.80	4.019	
10,700.0	6,558.8	6,664.7	6,574.3	74.9	20.6	96.26	3,112.2	401.1	456.8	365.5	91.30	5.003	
10,800.0	6,557.8	6,669.0	6,578.5	76.8	20.6	98.34	3,112.5	401.4	554.1	461.4	92.73	5.976	
10,900.0	6,556.8	6,669.0	6,578.5	78.6	20.6	98.34	3,112.5	401.4	652.3	557.7	94.59	6.896	
11,000.0	6,555.7	6,669.0	6,578.5	80.5	20.6	98.34	3,112.5	401.4	750.9	654.5	96.44	7.786	
11,073.1	6,555.0	6,669.0	6,578.5	81.9	20.6	98.34	3,112.5	401.4	823.2	725.4	97.80	8.417	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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
8,100.0	6,585.1	6,703.8	6,585.5	28.9	22.3	95.30	1,867.2	406.7	920.7	872.9	47.75	19.283	
8,200.0	6,584.1	6,702.6	6,584.3	30.5	22.3	94.73	1,867.2	406.7	821.6	772.3	49.33	16.654	
8,300.0	6,583.1	6,701.4	6,583.1	32.0	22.3	94.17	1,867.2	406.7	722.8	671.9	50.96	14.184	
8,400.0	6,582.1	6,700.2	6,581.9	33.7	22.3	93.62	1,867.2	406.7	624.5	571.8	52.62	11.867	
8,500.0	6,581.0	6,699.1	6,580.8	35.3	22.3	93.07	1,867.2	406.7	526.7	472.4	54.31	9.697	
8,600.0	6,580.0	6,697.9	6,579.6	37.0	22.3	92.53	1,867.2	406.7	429.9	373.9	56.02	7.674	
8,700.0	6,579.0	6,696.8	6,578.5	38.7	22.3	91.99	1,867.2	406.7	335.0	277.3	57.75	5.801	
8,800.0	6,578.0	6,695.7	6,577.4	40.4	22.3	91.46	1,867.2	406.7	244.3	184.8	59.50	4.105	
8,900.0	6,577.0	6,694.6	6,576.3	42.1	22.3	90.93	1,867.2	406.7	164.6	103.3	61.26	2.687	
9,000.0	6,576.0	6,693.5	6,575.2	43.9	22.3	90.41	1,867.2	406.7	120.5	57.5	63.04	1.912	
9,012.9	6,575.9	6,693.4	6,575.1	44.1	22.3	90.34	1,867.2	406.7	119.8	56.5	63.27	1.894	CC, ES, SF
9,100.0	6,575.0	6,692.4	6,574.1	45.6	22.3	89.89	1,867.2	406.7	148.1	83.3	64.82	2.285	
9,200.0	6,574.0	6,691.4	6,573.1	47.4	22.3	89.38	1,867.2	406.7	222.2	155.6	66.61	3.335	
9,300.0	6,572.9	6,690.3	6,572.0	49.2	22.3	88.87	1,867.2	406.7	311.1	242.7	68.41	4.548	
9,400.0	6,571.9	6,689.2	6,570.9	51.0	22.3	88.37	1,867.2	406.7	405.2	335.0	70.21	5.771	
9,500.0	6,570.9	6,688.2	6,569.9	52.8	22.3	87.87	1,867.2	406.7	501.6	429.6	72.01	6.965	
9,600.0	6,569.9	6,687.2	6,568.9	54.6	22.3	87.38	1,867.2	406.8	599.2	525.4	73.82	8.117	
9,700.0	6,568.9	6,686.2	6,567.9	56.4	22.3	86.90	1,867.2	406.8	697.4	621.8	75.63	9.222	
9,800.0	6,567.9	6,685.1	6,566.8	58.3	22.2	86.42	1,867.2	406.8	796.1	718.7	77.44	10.281	
9,900.0	6,566.9	6,684.1	6,565.8	60.1	22.2	85.94	1,867.2	406.8	895.1	815.9	79.25	11.295	
10,000.0	6,565.9	6,683.2	6,564.9	61.9	22.2	85.47	1,867.2	406.8	994.3	913.2	81.06	12.266	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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	-90.00	0.0	-58.5	58.5				
100.0	100.0	99.0	99.0	0.1	0.1	-90.00	0.0	-58.5	58.5	58.3	0.22	261.607	
200.0	200.0	199.0	199.0	0.3	0.3	-90.00	0.0	-58.5	58.5	57.8	0.67	87.057	
300.0	300.0	299.0	299.0	0.6	0.6	-90.00	0.0	-58.5	58.5	57.4	1.12	52.165	
400.0	400.0	399.0	399.0	0.8	0.8	-90.00	0.0	-58.5	58.5	56.9	1.57	37.239	CC
500.0	500.0	498.6	498.6	1.0	1.0	-90.77	-0.8	-58.8	58.8	56.8	1.99	29.497	ES
600.0	600.0	598.2	598.1	1.2	1.2	-93.05	-3.2	-59.8	59.8	57.4	2.41	24.874	
700.0	700.0	697.7	697.5	1.4	1.4	103.80	-7.2	-61.3	62.0	59.2	2.81	22.082	
800.0	800.0	797.0	796.7	1.6	1.6	101.29	-12.8	-63.5	65.4	62.2	3.20	20.425	
900.0	899.9	896.3	895.7	1.8	1.8	99.22	-20.0	-66.3	70.2	66.6	3.63	19.355	
1,000.0	999.7	995.4	994.3	2.0	2.1	97.62	-28.8	-69.7	76.2	72.1	4.08	18.695	
1,100.0	1,099.4	1,094.4	1,092.7	2.2	2.3	96.44	-39.1	-73.8	83.4	78.9	4.56	18.319	
1,200.0	1,198.9	1,193.1	1,190.6	2.5	2.6	95.64	-51.1	-78.4	91.9	86.8	5.07	18.135	
1,300.0	1,298.3	1,291.7	1,288.1	2.7	3.0	95.14	-64.5	-83.7	101.5	95.9	5.61	18.079	
1,400.0	1,397.4	1,390.1	1,385.1	3.0	3.3	94.88	-79.5	-89.5	112.2	106.0	6.20	18.105	
1,500.0	1,496.3	1,488.2	1,481.6	3.3	3.7	94.80	-96.0	-95.9	124.1	117.3	6.83	18.183	
1,600.0	1,594.9	1,587.3	1,578.9	3.7	4.0	95.11	-113.5	-102.8	136.7	129.2	7.50	18.232	
1,700.0	1,693.3	1,686.4	1,676.3	4.0	4.4	96.01	-131.1	-109.6	149.5	141.3	8.21	18.207	
1,800.0	1,791.3	1,785.5	1,773.6	4.4	4.8	97.30	-148.6	-116.5	162.5	153.5	8.96	18.135	
1,900.0	1,889.4	1,884.6	1,870.8	4.8	5.2	98.47	-166.2	-123.3	175.6	165.9	9.73	18.051	
2,000.0	1,987.4	1,983.7	1,968.1	5.2	5.6	99.47	-183.7	-130.2	188.7	178.2	10.50	17.966	
2,100.0	2,085.5	2,082.8	2,065.4	5.6	6.0	100.34	-201.2	-137.0	201.9	190.6	11.29	17.884	
2,200.0	2,183.6	2,181.8	2,162.7	6.0	6.5	101.11	-218.8	-143.8	215.1	203.1	12.08	17.804	
2,300.0	2,281.6	2,280.9	2,259.9	6.4	6.9	101.78	-236.3	-150.7	228.4	215.5	12.88	17.730	
2,400.0	2,379.7	2,380.0	2,357.2	6.9	7.3	102.39	-253.9	-157.5	241.7	228.0	13.69	17.660	
2,500.0	2,477.7	2,479.1	2,454.5	7.3	7.7	102.92	-271.4	-164.4	255.0	240.5	14.49	17.595	
2,600.0	2,575.8	2,578.2	2,551.8	7.7	8.1	103.41	-288.9	-171.2	268.4	253.1	15.30	17.535	
2,700.0	2,673.9	2,677.2	2,649.1	8.1	8.5	103.85	-306.5	-178.0	281.7	265.6	16.12	17.479	
2,800.0	2,771.9	2,776.3	2,746.3	8.6	9.0	104.25	-324.0	-184.9	295.1	278.1	16.93	17.427	
2,900.0	2,870.0	2,875.4	2,843.6	9.0	9.4	104.62	-341.6	-191.7	308.5	290.7	17.75	17.379	
3,000.0	2,968.0	2,974.5	2,940.9	9.4	9.8	104.95	-359.1	-198.6	321.9	303.3	18.57	17.334	
3,100.0	3,066.1	3,073.6	3,038.2	9.9	10.2	105.26	-376.6	-205.4	335.3	315.9	19.39	17.293	
3,200.0	3,164.1	3,172.7	3,135.4	10.3	10.6	105.54	-394.2	-212.2	348.7	328.5	20.21	17.254	
3,300.0	3,262.2	3,271.7	3,232.7	10.7	11.1	105.81	-411.7	-219.1	362.1	341.1	21.03	17.217	
3,400.0	3,360.3	3,370.8	3,330.0	11.2	11.5	106.05	-429.3	-225.9	375.5	353.7	21.85	17.183	
3,500.0	3,458.3	3,469.9	3,427.3	11.6	11.9	106.28	-446.8	-232.8	388.9	366.3	22.68	17.151	
3,600.0	3,556.4	3,569.0	3,524.5	12.0	12.3	106.49	-464.4	-239.6	402.4	378.9	23.50	17.121	
3,700.0	3,654.4	3,668.1	3,621.8	12.5	12.7	106.69	-481.9	-246.4	415.8	391.5	24.33	17.093	
3,800.0	3,752.5	3,767.2	3,719.1	12.9	13.2	106.88	-499.4	-253.3	429.3	404.1	25.15	17.067	
3,900.0	3,850.6	3,866.2	3,816.4	13.3	13.6	107.05	-517.0	-260.1	442.7	416.7	25.98	17.042	
4,000.0	3,948.6	3,965.3	3,913.7	13.8	14.0	107.22	-534.5	-267.0	456.2	429.4	26.81	17.018	
4,100.0	4,046.7	4,064.4	4,010.9	14.2	14.4	107.37	-552.1	-273.8	469.6	442.0	27.63	16.996	
4,200.0	4,144.7	4,163.5	4,108.2	14.7	14.9	107.52	-569.6	-280.7	483.1	454.6	28.46	16.975	
4,300.0	4,242.8	4,262.6	4,205.5	15.1	15.3	107.66	-587.1	-287.5	496.6	467.3	29.29	16.955	
4,400.0	4,340.9	4,361.6	4,302.8	15.5	15.7	107.79	-604.7	-294.3	510.0	479.9	30.12	16.936	
4,500.0	4,438.9	4,460.7	4,400.0	16.0	16.1	107.91	-622.2	-301.2	523.5	492.6	30.94	16.918	
4,600.0	4,537.0	4,559.8	4,497.3	16.4	16.6	108.03	-639.8	-308.0	537.0	505.2	31.77	16.900	
4,700.0	4,635.0	4,658.9	4,594.6	16.9	17.0	108.14	-657.3	-314.9	550.5	517.8	32.60	16.884	
4,800.0	4,733.1	4,758.0	4,691.9	17.3	17.4	108.25	-674.8	-321.7	563.9	530.5	33.43	16.868	
4,900.0	4,831.1	4,857.1	4,789.1	17.7	17.8	108.35	-692.4	-328.5	577.4	543.1	34.26	16.853	
5,000.0	4,929.2	4,956.1	4,886.4	18.2	18.3	108.45	-709.9	-335.4	590.9	555.8	35.09	16.839	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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	5,027.3	5,055.2	4,983.7	18.6	18.7	108.54	-727.5	-342.2	604.4	568.4	35.92	16.825	
5,200.0	5,125.3	5,154.3	5,081.0	19.1	19.1	108.63	-745.0	-349.1	617.9	581.1	36.75	16.812	
5,300.0	5,223.6	5,255.5	5,180.3	19.4	19.5	108.82	-762.8	-356.0	630.9	593.4	37.52	16.812	
5,400.0	5,322.5	5,363.8	5,287.2	19.7	19.8	108.93	-779.2	-362.4	641.8	603.7	38.11	16.843	
5,500.0	5,421.8	5,472.5	5,395.1	19.9	20.1	109.01	-791.9	-367.4	650.2	611.7	38.59	16.850	
5,600.0	5,521.5	5,581.6	5,503.8	20.1	20.3	109.07	-800.8	-370.8	656.1	617.1	39.00	16.825	
5,700.0	5,621.4	5,691.0	5,612.9	20.3	20.5	109.10	-805.9	-372.8	659.4	620.1	39.33	16.768	
5,800.0	5,721.4	5,798.4	5,720.4	20.4	20.6	-90.63	-807.1	-373.3	660.2	620.6	39.61	16.668	
5,900.0	5,821.4	5,898.4	5,820.4	20.5	20.7	-90.63	-807.1	-373.3	660.2	620.4	39.83	16.576	
6,000.0	5,921.2	5,999.3	5,921.1	20.5	20.8	-90.73	-802.9	-373.3	660.3	620.3	39.95	16.526	
6,100.0	6,019.4	6,100.5	6,020.7	20.5	20.7	-90.84	-785.6	-373.3	660.3	620.5	39.81	16.585	
6,200.0	6,114.5	6,201.8	6,117.4	20.3	20.5	-90.93	-755.3	-373.3	660.3	620.9	39.43	16.748	
6,300.0	6,204.6	6,303.3	6,209.2	20.0	20.2	-91.01	-712.4	-373.3	660.3	621.5	38.84	17.001	
6,400.0	6,288.4	6,404.9	6,294.7	19.7	19.9	-91.06	-657.7	-373.3	660.3	622.2	38.11	17.328	
6,500.0	6,364.4	6,506.5	6,372.3	19.3	19.5	-91.10	-592.0	-373.3	660.3	623.0	37.31	17.699	
6,600.0	6,431.2	6,608.3	6,440.4	18.9	19.0	-91.12	-516.6	-373.3	660.3	623.8	36.53	18.077	
6,700.0	6,487.8	6,710.0	6,498.0	18.5	18.6	-91.13	-432.8	-373.3	660.3	624.5	35.87	18.411	
6,800.0	6,533.1	6,811.7	6,543.9	18.2	18.3	-91.11	-342.2	-373.3	660.3	624.9	35.41	18.646	
6,900.0	6,566.5	6,913.4	6,577.3	18.0	18.1	-91.07	-246.2	-373.3	660.3	625.1	35.25	18.730	
7,000.0	6,587.2	7,015.0	6,597.8	18.0	18.0	-91.01	-146.8	-373.3	660.3	624.9	35.45	18.628	
7,100.0	6,595.0	7,116.5	6,604.8	18.2	18.1	-90.94	-45.6	-373.3	660.3	624.3	36.01	18.337	
7,200.0	6,594.2	7,216.6	6,603.7	18.6	18.5	-90.91	54.5	-373.3	660.3	623.3	36.96	17.865	
7,300.0	6,593.2	7,316.6	6,602.4	19.2	19.1	-90.89	154.5	-373.3	660.3	622.0	38.26	17.258	
7,400.0	6,592.2	7,416.6	6,601.2	20.0	19.9	-90.87	254.5	-373.3	660.3	620.4	39.89	16.552	
7,500.0	6,591.2	7,516.6	6,599.9	21.0	20.8	-90.84	354.5	-373.3	660.3	618.5	41.81	15.792	
7,600.0	6,590.2	7,616.6	6,598.6	22.1	22.0	-90.82	454.5	-373.3	660.3	616.3	43.98	15.012	
7,700.0	6,589.1	7,716.6	6,597.4	23.3	23.2	-90.80	554.5	-373.3	660.3	613.9	46.37	14.238	
7,800.0	6,588.1	7,816.6	6,596.1	24.6	24.5	-90.78	654.5	-373.3	660.3	611.3	48.95	13.489	
7,900.0	6,587.1	7,916.6	6,594.9	26.0	25.8	-90.76	754.5	-373.3	660.3	608.6	51.68	12.776	
8,000.0	6,586.1	8,016.6	6,593.6	27.4	27.3	-90.74	854.5	-373.3	660.3	605.7	54.55	12.104	
8,100.0	6,585.1	8,116.6	6,592.4	28.9	28.8	-90.72	954.5	-373.3	660.2	602.7	57.53	11.477	
8,200.0	6,584.1	8,216.6	6,591.1	30.5	30.3	-90.70	1,054.5	-373.3	660.2	599.6	60.60	10.895	
8,300.0	6,583.1	8,316.6	6,589.8	32.0	31.9	-90.67	1,154.4	-373.3	660.2	596.5	63.76	10.355	
8,400.0	6,582.1	8,416.6	6,588.6	33.7	33.5	-90.65	1,254.4	-373.3	660.2	593.2	66.99	9.855	
8,500.0	6,581.0	8,516.6	6,587.3	35.3	35.2	-90.63	1,354.4	-373.3	660.2	590.0	70.29	9.394	
8,600.0	6,580.0	8,616.6	6,586.1	37.0	36.9	-90.61	1,454.4	-373.3	660.2	586.6	73.63	8.967	
8,700.0	6,579.0	8,716.6	6,584.8	38.7	38.6	-90.59	1,554.4	-373.3	660.2	583.2	77.02	8.572	
8,800.0	6,578.0	8,816.6	6,583.6	40.4	40.3	-90.57	1,654.4	-373.3	660.2	579.8	80.46	8.206	
8,900.0	6,577.0	8,916.6	6,582.3	42.1	42.0	-90.55	1,754.4	-373.3	660.2	576.3	83.92	7.867	
9,000.0	6,576.0	9,016.6	6,581.1	43.9	43.8	-90.53	1,854.4	-373.3	660.2	572.8	87.42	7.552	
9,100.0	6,575.0	9,116.6	6,579.8	45.6	45.5	-90.51	1,954.4	-373.3	660.2	569.3	90.95	7.259	
9,200.0	6,574.0	9,216.6	6,578.5	47.4	47.3	-90.48	2,054.4	-373.3	660.2	565.7	94.50	6.986	
9,300.0	6,572.9	9,316.6	6,577.3	49.2	49.1	-90.46	2,154.4	-373.3	660.2	562.1	98.07	6.732	
9,400.0	6,571.9	9,416.6	6,576.0	51.0	50.9	-90.44	2,254.4	-373.3	660.2	558.6	101.67	6.494	
9,500.0	6,570.9	9,516.6	6,574.8	52.8	52.7	-90.42	2,354.3	-373.3	660.2	554.9	105.28	6.271	
9,600.0	6,569.9	9,616.6	6,573.5	54.6	54.5	-90.40	2,454.3	-373.3	660.2	551.3	108.90	6.062	
9,700.0	6,568.9	9,716.6	6,572.3	56.4	56.3	-90.38	2,554.3	-373.3	660.2	547.7	112.54	5.866	
9,800.0	6,567.9	9,816.6	6,571.0	58.3	58.1	-90.36	2,654.3	-373.3	660.2	544.0	116.20	5.682	
9,900.0	6,566.9	9,916.6	6,569.7	60.1	60.0	-90.34	2,754.3	-373.3	660.2	540.3	119.86	5.508	
10,000.0	6,565.9	10,016.6	6,568.5	61.9	61.8	-90.31	2,854.3	-373.3	660.2	536.7	123.54	5.344	
10,100.0	6,564.9	10,116.6	6,567.2	63.8	63.7	-90.29	2,954.3	-373.3	660.2	533.0	127.22	5.189	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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
10,200.0	6,563.8	10,216.6	6,566.0	65.6	65.5	-90.27	3,054.3	-373.3	660.2	529.3	130.92	5.043	
10,300.0	6,562.8	10,316.6	6,564.7	67.5	67.3	-90.25	3,154.3	-373.3	660.2	525.6	134.62	4.904	
10,400.0	6,561.8	10,416.6	6,563.5	69.3	69.2	-90.23	3,254.3	-373.3	660.2	521.9	138.33	4.773	
10,500.0	6,560.8	10,516.6	6,562.2	71.2	71.1	-90.21	3,354.3	-373.3	660.2	518.2	142.05	4.648	
10,600.0	6,559.8	10,616.6	6,560.9	73.0	72.9	-90.19	3,454.3	-373.3	660.2	514.4	145.77	4.529	
10,700.0	6,558.8	10,716.6	6,559.7	74.9	74.8	-90.17	3,554.2	-373.3	660.2	510.7	149.50	4.416	
10,800.0	6,557.8	10,816.6	6,558.4	76.8	76.6	-90.14	3,654.2	-373.3	660.2	507.0	153.23	4.308	
10,900.0	6,556.8	10,916.6	6,557.2	78.6	78.5	-90.12	3,754.2	-373.3	660.2	503.2	156.97	4.206	
11,000.0	6,555.7	11,016.6	6,555.9	80.5	80.4	-90.10	3,854.2	-373.3	660.2	499.5	160.72	4.108	
11,055.4	6,555.2	11,072.1	6,555.2	81.5	81.4	-90.09	3,909.7	-373.3	660.2	497.4	162.80	4.055	
11,073.1	6,555.0	11,089.7	6,555.0	81.9	81.8	-90.09	3,927.3	-373.3	660.2	496.7	163.46	4.039 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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	-92.34	-3.6	-89.2	89.2				
100.0	100.0	100.0	100.0	0.1	0.1	-92.34	-3.6	-89.2	89.2	89.0	0.22	396.981	
200.0	200.0	200.0	200.0	0.3	0.3	-92.34	-3.6	-89.2	89.2	88.6	0.67	132.327	CC, ES
300.0	300.0	299.0	299.0	0.6	0.5	-92.75	-4.3	-89.7	89.8	88.7	1.10	81.609	
400.0	400.0	397.9	397.8	0.8	0.7	-93.93	-6.3	-91.3	91.6	90.0	1.53	60.011	
500.0	500.0	496.6	496.5	1.0	1.0	-95.81	-9.6	-94.0	94.6	92.6	1.97	48.075	
600.0	600.0	595.3	594.9	1.2	1.2	-98.23	-14.2	-97.8	99.0	96.6	2.42	40.867	
700.0	700.0	693.7	693.1	1.4	1.4	99.10	-20.0	-102.7	105.0	102.1	2.85	36.881	
800.0	800.0	791.9	790.8	1.6	1.7	97.27	-27.2	-108.6	112.7	109.4	3.27	34.488	
900.0	899.9	889.8	888.1	1.8	2.0	96.00	-35.6	-115.5	122.1	118.4	3.71	32.899	
1,000.0	999.7	987.4	985.0	2.0	2.3	95.19	-45.3	-123.5	133.0	128.9	4.18	31.858	
1,100.0	1,099.4	1,084.7	1,081.2	2.2	2.6	94.77	-56.2	-132.5	145.5	140.8	4.67	31.187	
1,200.0	1,198.9	1,181.7	1,176.9	2.5	3.0	94.65	-68.4	-142.5	159.5	154.3	5.18	30.767	
1,300.0	1,298.3	1,278.2	1,271.8	2.7	3.3	94.75	-81.7	-153.5	175.0	169.2	5.73	30.515	
1,400.0	1,397.4	1,374.2	1,366.0	3.0	3.7	95.03	-96.1	-165.4	192.0	185.6	6.32	30.375	
1,500.0	1,496.3	1,469.8	1,459.4	3.3	4.1	95.41	-111.8	-178.3	210.4	203.5	6.94	30.311	
1,600.0	1,594.9	1,567.7	1,554.9	3.7	4.6	96.01	-128.4	-192.1	229.8	222.2	7.61	30.192	
1,700.0	1,693.3	1,665.6	1,650.4	4.0	5.0	96.88	-145.1	-205.8	249.4	241.1	8.32	29.986	
1,800.0	1,791.3	1,763.5	1,745.9	4.4	5.5	98.02	-161.8	-219.6	269.3	260.3	9.06	29.715	
1,900.0	1,889.4	1,861.3	1,841.3	4.8	5.9	99.07	-178.5	-233.3	289.3	279.5	9.83	29.444	
2,000.0	1,987.4	1,959.2	1,936.7	5.2	6.4	99.99	-195.2	-247.1	309.4	298.8	10.60	29.188	
2,100.0	2,085.5	2,057.0	2,032.2	5.6	6.9	100.79	-211.8	-260.8	329.5	318.2	11.38	28.949	
2,200.0	2,183.6	2,154.9	2,127.6	6.0	7.3	101.50	-228.5	-274.6	349.7	337.6	12.17	28.728	
2,300.0	2,281.6	2,252.7	2,223.0	6.4	7.8	102.14	-245.2	-288.4	370.0	357.0	12.97	28.525	
2,400.0	2,379.7	2,350.6	2,318.5	6.9	8.3	102.71	-261.9	-302.1	390.3	376.5	13.77	28.339	
2,500.0	2,477.7	2,448.4	2,413.9	7.3	8.7	103.22	-278.6	-315.9	410.6	396.0	14.58	28.168	
2,600.0	2,575.8	2,546.3	2,509.3	7.7	9.2	103.68	-295.2	-329.6	431.0	415.6	15.39	28.010	
2,700.0	2,673.9	2,644.1	2,604.8	8.1	9.7	104.10	-311.9	-343.4	451.3	435.1	16.20	27.865	
2,800.0	2,771.9	2,742.0	2,700.2	8.6	10.1	104.49	-328.6	-357.1	471.7	454.7	17.01	27.731	
2,900.0	2,870.0	2,839.8	2,795.6	9.0	10.6	104.84	-345.3	-370.9	492.1	474.3	17.83	27.608	
3,000.0	2,968.0	2,937.7	2,891.1	9.4	11.1	105.17	-362.0	-384.6	512.6	493.9	18.64	27.493	
3,100.0	3,066.1	3,035.5	2,986.5	9.9	11.6	105.47	-378.6	-398.4	533.0	513.5	19.46	27.387	
3,200.0	3,164.1	3,133.4	3,081.9	10.3	12.0	105.75	-395.3	-412.1	553.5	533.2	20.28	27.289	
3,300.0	3,262.2	3,231.2	3,177.4	10.7	12.5	106.01	-412.0	-425.9	573.9	552.8	21.10	27.197	
3,400.0	3,360.3	3,329.1	3,272.8	11.2	13.0	106.25	-428.7	-439.7	594.4	572.5	21.93	27.111	
3,500.0	3,458.3	3,426.9	3,368.2	11.6	13.4	106.47	-445.3	-453.4	614.9	592.2	22.75	27.031	
3,600.0	3,556.4	3,524.8	3,463.7	12.0	13.9	106.68	-462.0	-467.2	635.4	611.8	23.57	26.955	
3,700.0	3,654.4	3,622.7	3,559.1	12.5	14.4	106.88	-478.7	-480.9	655.9	631.5	24.40	26.885	
3,800.0	3,752.5	3,720.5	3,654.5	12.9	14.9	107.07	-495.4	-494.7	676.4	651.2	25.22	26.818	
3,900.0	3,850.6	3,818.4	3,750.0	13.3	15.3	107.24	-512.1	-508.4	696.9	670.9	26.05	26.756	
4,000.0	3,948.6	3,916.2	3,845.4	13.8	15.8	107.40	-528.7	-522.2	717.5	690.6	26.87	26.697	
4,100.0	4,046.7	4,014.1	3,940.8	14.2	16.3	107.56	-545.4	-535.9	738.0	710.3	27.70	26.641	
4,200.0	4,144.7	4,111.9	4,036.2	14.7	16.7	107.71	-562.1	-549.7	758.5	730.0	28.53	26.589	
4,300.0	4,242.8	4,209.8	4,131.7	15.1	17.2	107.85	-578.8	-563.4	779.1	749.7	29.36	26.539	
4,400.0	4,340.9	4,307.6	4,227.1	15.5	17.7	107.98	-595.5	-577.2	799.6	769.4	30.18	26.491	
4,500.0	4,438.9	4,405.5	4,322.5	16.0	18.2	108.10	-612.1	-590.9	820.2	789.2	31.01	26.446	
4,600.0	4,537.0	4,503.3	4,418.0	16.4	18.6	108.22	-628.8	-604.7	840.7	808.9	31.84	26.403	
4,700.0	4,635.0	4,601.2	4,513.4	16.9	19.1	108.33	-645.5	-618.5	861.3	828.6	32.67	26.363	
4,800.0	4,733.1	4,699.0	4,608.8	17.3	19.6	108.44	-662.2	-632.2	881.8	848.3	33.50	26.324	
4,900.0	4,831.1	4,796.9	4,704.3	17.7	20.1	108.55	-678.8	-646.0	902.4	868.1	34.33	26.287	
5,000.0	4,929.2	4,894.7	4,799.7	18.2	20.5	108.65	-695.5	-659.7	923.0	887.8	35.16	26.251	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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	5,027.3	4,992.6	4,895.1	18.6	21.0	108.74	-712.2	-673.5	943.5	907.5	35.99	26.217	
5,200.0	5,125.3	5,090.4	4,990.6	19.1	21.5	108.83	-728.9	-687.2	964.1	927.3	36.82	26.185	
5,300.0	5,223.6	5,188.4	5,086.1	19.4	22.0	109.18	-745.6	-701.0	984.2	946.6	37.64	26.152	SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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-341 - 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	700.0	700.0	1.4	1.5	111.40	0.0	-27.9	28.2	25.3	2.89	9.730	ES
800.0	800.0	800.0	800.0	1.6	1.7	116.18	0.0	-27.9	29.2	25.9	3.30	8.853	
900.0	899.9	899.9	899.9	1.8	1.9	123.32	0.0	-27.9	31.4	27.7	3.72	8.441	
1,000.0	999.7	999.7	999.7	2.0	2.1	131.63	0.0	-27.9	35.1	31.0	4.15	8.470	
1,100.0	1,099.4	1,099.7	1,099.7	2.2	2.3	138.80	-0.9	-27.9	40.4	35.8	4.55	8.864	
1,200.0	1,198.9	1,199.8	1,199.8	2.5	2.5	143.72	-3.5	-27.9	46.5	41.6	4.94	9.414	
1,300.0	1,298.3	1,300.0	1,299.9	2.7	2.7	146.97	-7.9	-28.0	53.4	48.0	5.35	9.985	
1,400.0	1,397.4	1,400.4	1,400.0	3.0	2.9	149.01	-14.0	-28.2	60.8	55.0	5.77	10.542	
1,500.0	1,496.3	1,500.7	1,500.1	3.3	3.1	150.18	-21.9	-28.3	68.7	62.5	6.21	11.066	
1,600.0	1,594.9	1,601.2	1,600.1	3.7	3.3	150.74	-31.5	-28.5	77.0	70.3	6.66	11.548	
1,700.0	1,693.3	1,701.8	1,700.0	4.0	3.6	150.85	-42.9	-28.8	85.6	78.5	7.15	11.983	
1,800.0	1,791.3	1,802.4	1,799.8	4.4	3.8	150.53	-56.1	-29.0	94.4	86.7	7.67	12.308	
1,900.0	1,889.4	1,903.2	1,899.4	4.8	4.1	149.54	-71.0	-29.3	102.0	93.8	8.22	12.408	
2,000.0	1,987.4	2,004.1	1,998.9	5.2	4.4	147.95	-87.7	-29.7	108.7	99.9	8.82	12.315	
2,100.0	2,085.5	2,105.0	2,098.1	5.6	4.7	145.82	-106.2	-30.1	114.4	104.9	9.48	12.068	
2,200.0	2,183.6	2,205.3	2,196.5	6.0	5.1	143.28	-126.1	-30.5	119.3	109.2	10.18	11.721	
2,300.0	2,281.6	2,305.0	2,294.2	6.4	5.5	140.88	-146.0	-30.9	124.4	113.5	10.92	11.394	
2,400.0	2,379.7	2,404.8	2,391.9	6.9	5.9	138.68	-166.0	-31.3	129.7	118.0	11.69	11.100	
2,500.0	2,477.7	2,504.5	2,489.6	7.3	6.2	136.64	-186.0	-31.7	135.2	122.7	12.47	10.837	
2,600.0	2,575.8	2,604.3	2,587.3	7.7	6.6	134.77	-206.0	-32.1	140.8	127.5	13.28	10.603	
2,700.0	2,673.9	2,704.0	2,685.1	8.1	7.0	133.04	-225.9	-32.6	146.6	132.5	14.10	10.394	
2,800.0	2,771.9	2,803.7	2,782.8	8.6	7.4	131.44	-245.9	-33.0	152.5	137.5	14.93	10.209	
2,900.0	2,870.0	2,903.5	2,880.5	9.0	7.9	129.97	-265.9	-33.4	158.4	142.7	15.78	10.043	
3,000.0	2,968.0	3,003.2	2,978.2	9.4	8.3	128.60	-285.9	-33.8	164.5	147.9	16.63	9.895	
3,100.0	3,066.1	3,103.0	3,075.9	9.9	8.7	127.33	-305.8	-34.2	170.7	153.2	17.49	9.763	
3,200.0	3,164.1	3,202.7	3,173.7	10.3	9.1	126.15	-325.8	-34.6	177.0	158.6	18.35	9.644	
3,300.0	3,262.2	3,302.4	3,271.4	10.7	9.5	125.05	-345.8	-35.1	183.3	164.1	19.22	9.538	
3,400.0	3,360.3	3,402.2	3,369.1	11.2	10.0	124.02	-365.8	-35.5	189.7	169.6	20.09	9.442	
3,500.0	3,458.3	3,501.9	3,466.8	11.6	10.4	123.06	-385.7	-35.9	196.1	175.2	20.96	9.356	
3,600.0	3,556.4	3,601.7	3,564.5	12.0	10.8	122.16	-405.7	-36.3	202.6	180.8	21.84	9.278	
3,700.0	3,654.4	3,701.4	3,662.3	12.5	11.2	121.32	-425.7	-36.7	209.2	186.4	22.72	9.207	
3,800.0	3,752.5	3,801.1	3,760.0	12.9	11.7	120.53	-445.7	-37.1	215.8	192.2	23.60	9.143	
3,900.0	3,850.6	3,900.9	3,857.7	13.3	12.1	119.79	-465.6	-37.5	222.4	197.9	24.48	9.084	
4,000.0	3,948.6	4,000.6	3,955.4	13.8	12.5	119.09	-485.6	-38.0	229.0	203.7	25.36	9.031	
4,100.0	4,046.7	4,100.4	4,053.1	14.2	13.0	118.42	-505.6	-38.4	235.7	209.5	26.24	8.982	
4,200.0	4,144.7	4,200.1	4,150.8	14.7	13.4	117.80	-525.6	-38.8	242.4	215.3	27.13	8.937	
4,300.0	4,242.8	4,299.8	4,248.6	15.1	13.8	117.21	-545.5	-39.2	249.2	221.2	28.01	8.896	
4,400.0	4,340.9	4,399.6	4,346.3	15.5	14.3	116.65	-565.5	-39.6	256.0	227.1	28.90	8.858	
4,500.0	4,438.9	4,499.3	4,444.0	16.0	14.7	116.12	-585.5	-40.0	262.8	233.0	29.78	8.823	
4,600.0	4,537.0	4,599.1	4,541.7	16.4	15.1	115.61	-605.4	-40.5	269.6	238.9	30.67	8.791	
4,700.0	4,635.0	4,698.8	4,639.4	16.9	15.6	115.14	-625.4	-40.9	276.4	244.9	31.55	8.761	
4,800.0	4,733.1	4,798.5	4,737.2	17.3	16.0	114.68	-645.4	-41.3	283.3	250.8	32.43	8.734	
4,900.0	4,831.1	4,898.3	4,834.9	17.7	16.5	114.24	-665.4	-41.7	290.1	256.8	33.32	8.708	
5,000.0	4,929.2	4,998.0	4,932.6	18.2	16.9	113.83	-685.3	-42.1	297.0	262.8	34.20	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-201
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-201	**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-341 - 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	5,027.3	5,097.8	5,030.3	18.6	17.3	113.43	-705.3	-42.5	303.9	268.8	35.09	8.662	
5,200.0	5,125.3	5,197.5	5,128.0	19.1	17.8	113.06	-725.3	-42.9	310.9	274.9	35.97	8.641	
5,300.0	5,223.6	5,297.2	5,225.8	19.4	18.2	112.58	-745.3	-43.4	317.3	280.5	36.81	8.618	
5,400.0	5,322.5	5,396.7	5,323.5	19.7	18.5	111.85	-763.5	-43.7	322.5	285.1	37.43	8.616	
5,500.0	5,421.8	5,496.4	5,422.1	19.9	18.8	111.17	-778.4	-44.1	326.5	288.5	37.97	8.600	
5,600.0	5,521.5	5,596.3	5,521.3	20.1	19.0	110.52	-789.8	-44.3	329.4	290.9	38.43	8.570	
5,700.0	5,621.4	5,696.3	5,621.0	20.3	19.2	109.90	-797.8	-44.5	331.0	292.2	38.82	8.527	
5,800.0	5,721.4	5,796.5	5,721.1	20.4	19.4	-90.43	-802.3	-44.6	331.5	292.3	39.15	8.467	
5,900.0	5,821.4	5,896.8	5,821.4	20.5	19.5	-90.62	-803.4	-44.6	331.5	292.1	39.41	8.411	
5,903.3	5,824.7	5,900.1	5,824.7	20.5	19.5	-90.62	-803.4	-44.6	331.5	292.1	39.42	8.410	
6,000.0	5,921.2	5,996.6	5,921.2	20.5	19.6	-91.53	-803.4	-44.6	331.6	292.0	39.63	8.367	
6,100.0	6,019.4	6,097.9	6,022.2	20.5	19.7	-93.54	-796.7	-44.6	332.1	292.4	39.69	8.369	
6,200.0	6,114.5	6,200.8	6,122.9	20.3	19.6	-95.50	-776.3	-44.6	333.0	293.6	39.44	8.444	
6,300.0	6,204.6	6,305.3	6,221.6	20.0	19.4	-97.36	-741.9	-44.6	334.3	295.4	38.92	8.589	
6,400.0	6,288.4	6,411.5	6,316.0	19.7	19.0	-99.10	-693.5	-44.6	335.8	297.6	38.17	8.797	
6,500.0	6,364.4	6,519.3	6,404.0	19.3	18.6	-100.67	-631.5	-44.6	337.4	300.1	37.26	9.055	
6,600.0	6,431.2	6,628.5	6,483.5	18.9	18.2	-102.05	-556.6	-44.6	339.0	302.7	36.30	9.339	
6,700.0	6,487.8	6,739.0	6,552.2	18.5	17.8	-103.20	-470.2	-44.6	340.5	305.1	35.41	9.616	
6,800.0	6,533.1	6,850.7	6,608.2	18.2	17.5	-104.11	-373.7	-44.6	341.8	307.1	34.74	9.841	
6,900.0	6,566.5	6,963.2	6,649.8	18.0	17.3	-104.75	-269.2	-44.6	342.8	308.4	34.40	9.965	
7,000.0	6,587.2	7,076.3	6,675.7	18.0	17.4	-105.12	-159.3	-44.6	343.4	308.9	34.50	9.952	
7,100.0	6,595.0	7,189.7	6,685.1	18.2	17.7	-105.21	-46.4	-44.6	343.5	308.4	35.08	9.793	
7,200.0	6,594.2	7,291.8	6,683.8	18.6	18.2	-105.12	55.8	-44.6	343.4	307.3	36.06	9.524	
7,300.0	6,593.2	7,391.8	6,682.3	19.2	18.8	-105.04	155.8	-44.6	343.3	305.9	37.37	9.185	
7,400.0	6,592.2	7,491.8	6,680.8	20.0	19.7	-104.96	255.7	-44.6	343.1	304.1	39.00	8.798	
7,500.0	6,591.2	7,591.8	6,679.2	21.0	20.6	-104.88	355.7	-44.6	343.0	302.1	40.91	8.384	
7,600.0	6,590.2	7,691.8	6,677.7	22.1	21.7	-104.80	455.7	-44.6	342.9	299.8	43.06	7.963	
7,700.0	6,589.1	7,791.8	6,676.2	23.3	23.0	-104.72	555.7	-44.6	342.7	297.3	45.42	7.547	
7,800.0	6,588.1	7,891.8	6,674.7	24.6	24.3	-104.63	655.7	-44.6	342.6	294.7	47.95	7.145	
7,900.0	6,587.1	7,991.8	6,673.2	26.0	25.6	-104.55	755.7	-44.6	342.5	291.8	50.64	6.763	
8,000.0	6,586.1	8,091.8	6,671.6	27.4	27.1	-104.47	855.7	-44.6	342.4	288.9	53.45	6.405	
8,100.0	6,585.1	8,191.8	6,670.1	28.9	28.6	-104.39	955.6	-44.6	342.2	285.8	56.38	6.070	
8,200.0	6,584.1	8,291.8	6,668.6	30.5	30.1	-104.31	1,055.6	-44.6	342.1	282.7	59.40	5.760	
8,300.0	6,583.1	8,391.8	6,667.1	32.0	31.7	-104.22	1,155.6	-44.6	342.0	279.5	62.50	5.472	
8,400.0	6,582.1	8,491.8	6,665.6	33.7	33.3	-104.14	1,255.6	-44.6	341.9	276.2	65.67	5.206	
8,500.0	6,581.0	8,591.8	6,664.1	35.3	35.0	-104.06	1,355.6	-44.6	341.7	272.8	68.90	4.960	
8,600.0	6,580.0	8,691.8	6,662.5	37.0	36.7	-103.98	1,455.6	-44.6	341.6	269.4	72.18	4.732	
8,700.0	6,579.0	8,791.8	6,661.0	38.7	38.4	-103.89	1,555.6	-44.6	341.5	266.0	75.51	4.522	
8,800.0	6,578.0	8,891.8	6,659.5	40.4	40.1	-103.81	1,655.6	-44.6	341.4	262.5	78.88	4.327	
8,900.0	6,577.0	8,991.8	6,658.0	42.1	41.8	-103.73	1,755.5	-44.6	341.2	259.0	82.29	4.147	
9,000.0	6,576.0	9,091.8	6,656.5	43.9	43.6	-103.65	1,855.5	-44.6	341.1	255.4	85.73	3.979	
9,100.0	6,575.0	9,191.8	6,654.9	45.6	45.4	-103.56	1,955.5	-44.6	341.0	251.8	89.20	3.823	
9,200.0	6,574.0	9,291.8	6,653.4	47.4	47.1	-103.48	2,055.5	-44.6	340.9	248.2	92.69	3.678	
9,300.0	6,572.9	9,391.8	6,651.9	49.2	48.9	-103.40	2,155.5	-44.6	340.8	244.6	96.21	3.542	
9,400.0	6,571.9	9,491.8	6,650.4	51.0	50.7	-103.32	2,255.5	-44.6	340.7	240.9	99.74	3.415	
9,500.0	6,570.9	9,591.8	6,648.9	52.8	52.5	-103.23	2,355.5	-44.6	340.5	237.2	103.30	3.297	
9,600.0	6,569.9	9,691.8	6,647.4	54.6	54.4	-103.15	2,455.5	-44.6	340.4	233.5	106.87	3.185	
9,700.0	6,568.9	9,791.8	6,645.8	56.4	56.2	-103.07	2,555.4	-44.6	340.3	229.8	110.46	3.081	
9,800.0	6,567.9	9,891.8	6,644.3	58.3	58.0	-102.98	2,655.4	-44.6	340.2	226.1	114.06	2.982	
9,900.0	6,566.9	9,991.8	6,642.8	60.1	59.8	-102.90	2,755.4	-44.6	340.1	222.4	117.68	2.890	
10,000.0	6,565.9	10,091.8	6,641.3	61.9	61.7	-102.82	2,855.4	-44.6	340.0	218.7	121.31	2.803	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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-341 - Wellbore #1 - Plan #1 (3-4-15)

Offset Site Error: 0.0 ft

Survey Program: 0-MWD

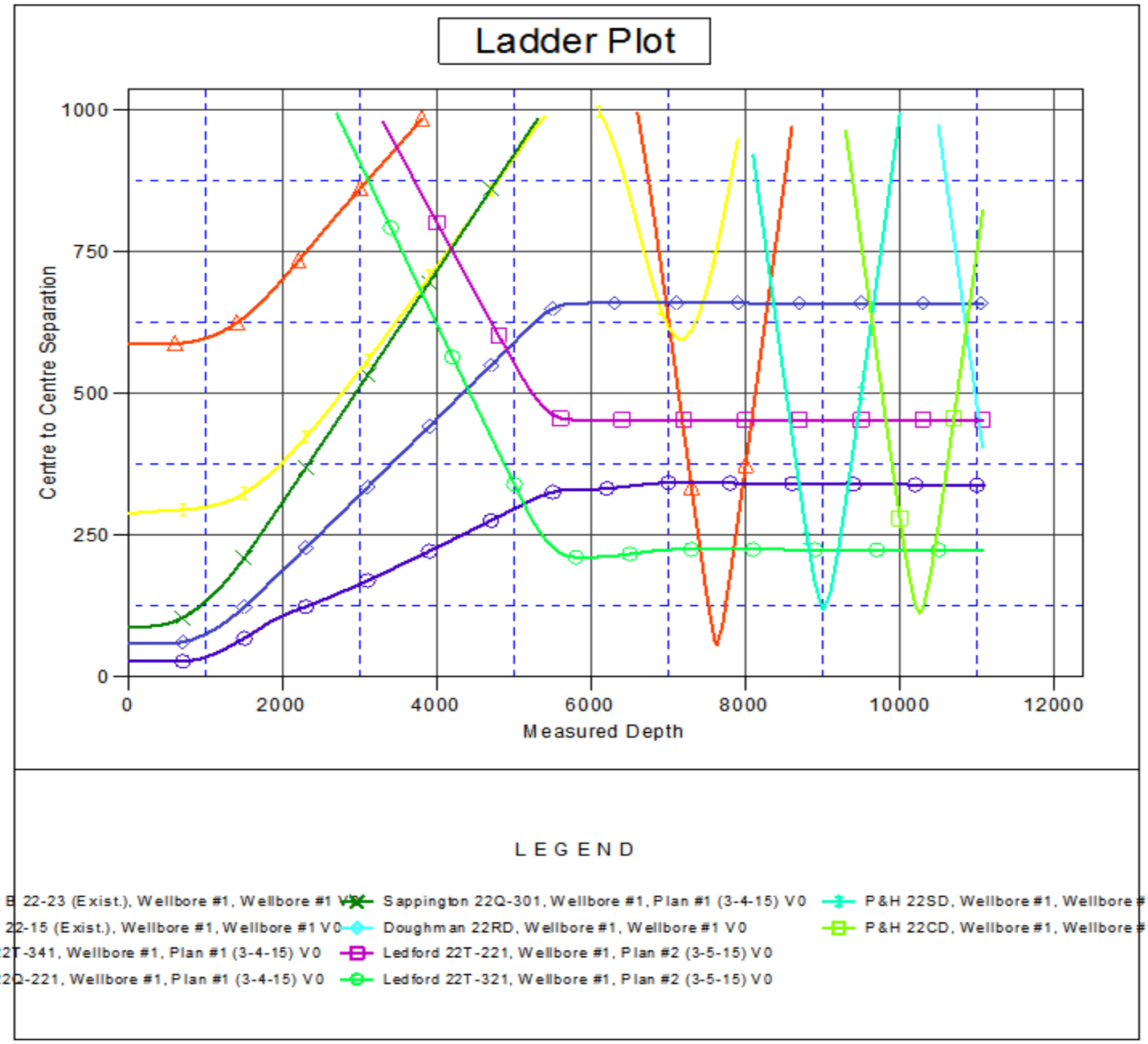
Offset Well Error: 0.0 ft

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	6,564.9	10,191.8	6,639.8	63.8	63.5	-102.73	2,955.4	-44.6	339.9	214.9	124.95	2.720	
10,200.0	6,563.8	10,291.8	6,638.2	65.6	65.4	-102.65	3,055.4	-44.6	339.7	211.1	128.60	2.642	
10,300.0	6,562.8	10,391.8	6,636.7	67.5	67.2	-102.57	3,155.4	-44.6	339.6	207.4	132.26	2.568	
10,400.0	6,561.8	10,491.8	6,635.2	69.3	69.1	-102.48	3,255.4	-44.6	339.5	203.6	135.92	2.498	
10,500.0	6,560.8	10,591.8	6,633.7	71.2	71.0	-102.40	3,355.3	-44.6	339.4	199.8	139.60	2.431	
10,600.0	6,559.8	10,691.8	6,632.2	73.0	72.8	-102.32	3,455.3	-44.6	339.3	196.0	143.29	2.368	
10,700.0	6,558.8	10,791.8	6,630.6	74.9	74.7	-102.23	3,555.3	-44.6	339.2	192.2	146.98	2.308	
10,800.0	6,557.8	10,891.8	6,629.1	76.8	76.6	-102.15	3,655.3	-44.6	339.1	188.4	150.68	2.250	
10,900.0	6,556.8	10,991.8	6,627.6	78.6	78.4	-102.07	3,755.3	-44.6	339.0	184.6	154.39	2.196	
11,000.0	6,555.7	11,091.8	6,626.1	80.5	80.3	-101.98	3,855.3	-44.6	338.9	180.8	158.10	2.143	
11,058.6	6,555.1	11,150.4	6,625.2	81.6	81.4	-101.93	3,913.9	-44.6	338.8	178.5	160.28	2.114	
11,073.1	6,555.0	11,163.8	6,625.0	81.9	81.6	-101.92	3,927.3	-44.6	338.8	178.0	160.80	2.107	SF

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	**Local Co-ordinate Reference:**	Well Sappington 22T-201
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-201	**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

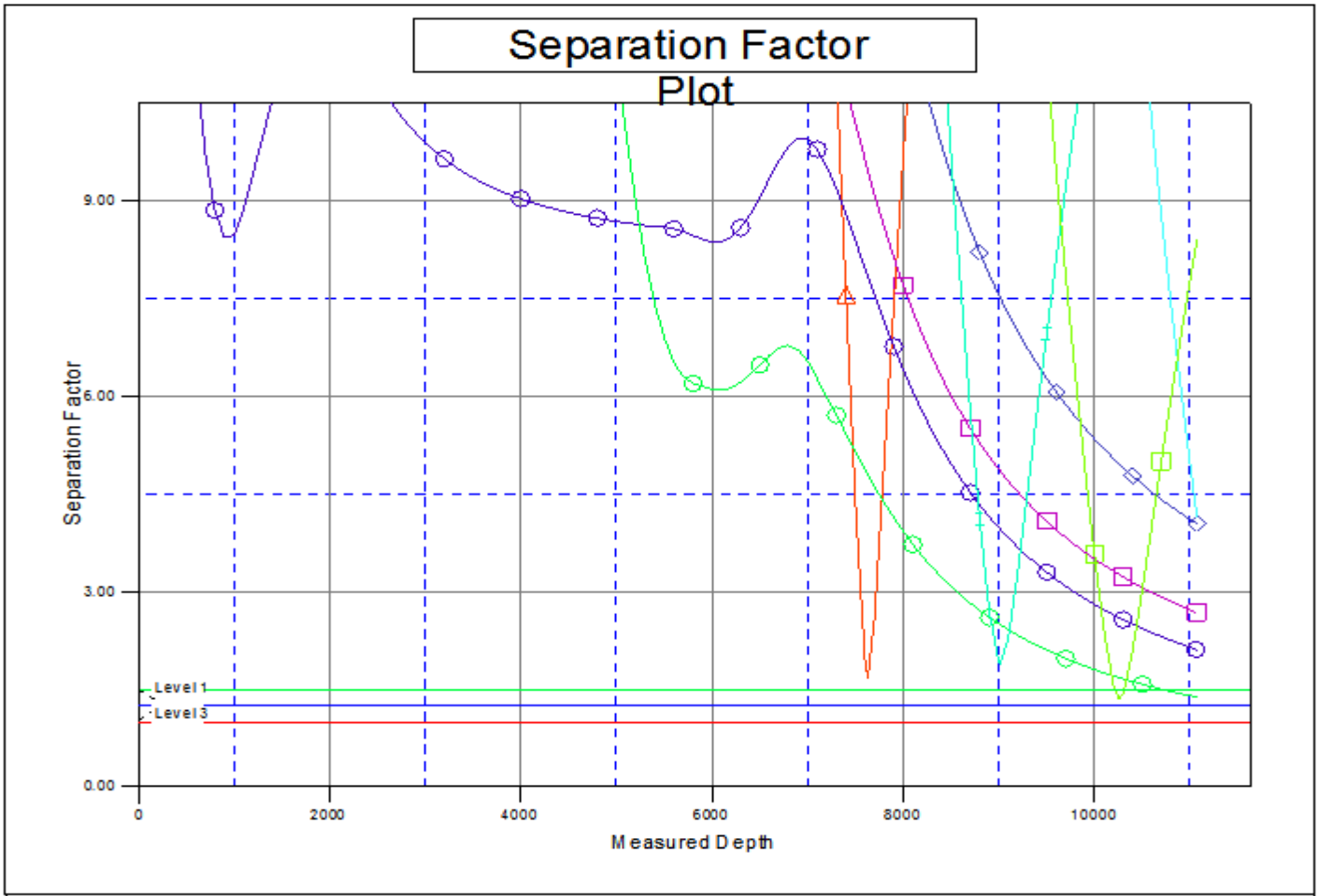
Reference Depths are relative to WELL @ 4614.5ft (RKB - 13.5')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Sappington 22T-201
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-201
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-201	**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')	Coordinates are relative to: Sappington 22T-201
Offset Depths are relative to Offset Datum	Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is -105.500000 °	Grid Convergence at Surface is: 0.63°



LEGEND

r B 22-23 (Exist.), Wellbore #1, Wellbore #1 V0
r 22-15 (Exist.), Wellbore #1, Wellbore #1 V0
22T-341, Wellbore #1, Plan #1 (3-4-15) V0
22Q-221, Wellbore #1, Plan #1 (3-4-15) V0
Sappington 22Q-301, Wellbore #1, Plan #1 (3-4-15) V0
Doughman 22RD, Wellbore #1, Wellbore #1 V0
Ledford 22T-221, Wellbore #1, Plan #2 (3-5-15) V0
Ledford 22T-321, Wellbore #1, Plan #2 (3-5-15) V0
P&H 22SD, Wellbore #1, Wellbore #1
P&H 22CD, Wellbore #1, Wellbore #1