

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Sater 19M-243**

Surface Location: Sater 4N63W19M Pad Sec.19-T4N-R63W

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

Ground Elevation: 4664.0

+N/-S

+E/-W

Northing

Easting

Latitude

Longitude

Slot

0.0

0.0

1355376.94

3284120.58

40.304430

-104.481270

RKB - 13' WELL @ 4677.0ft (RKB - 13')

WELLBORE TARGET DETAILS				
Name	TVD	+N/-S	+E/-W	Shape
50' E/W Hardline (19M-243)	1.0	-2625.2	-8.4	Rectangle (Sides: L3922.7 W100.0)
SHL 155'FNL & 2349'FWL	1.0	0.0	0.0	Point
BHL 500'FSL & 2356'FWL	6504.0	-4586.6	-8.4	Point

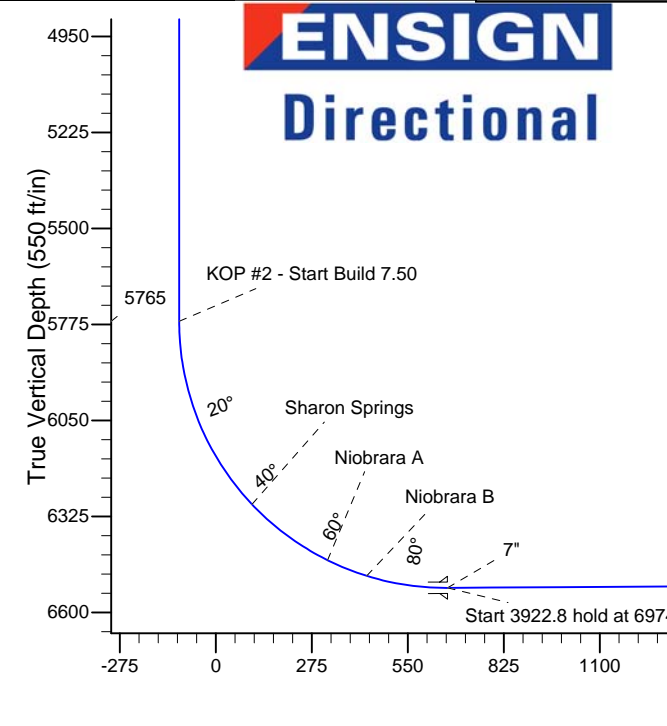
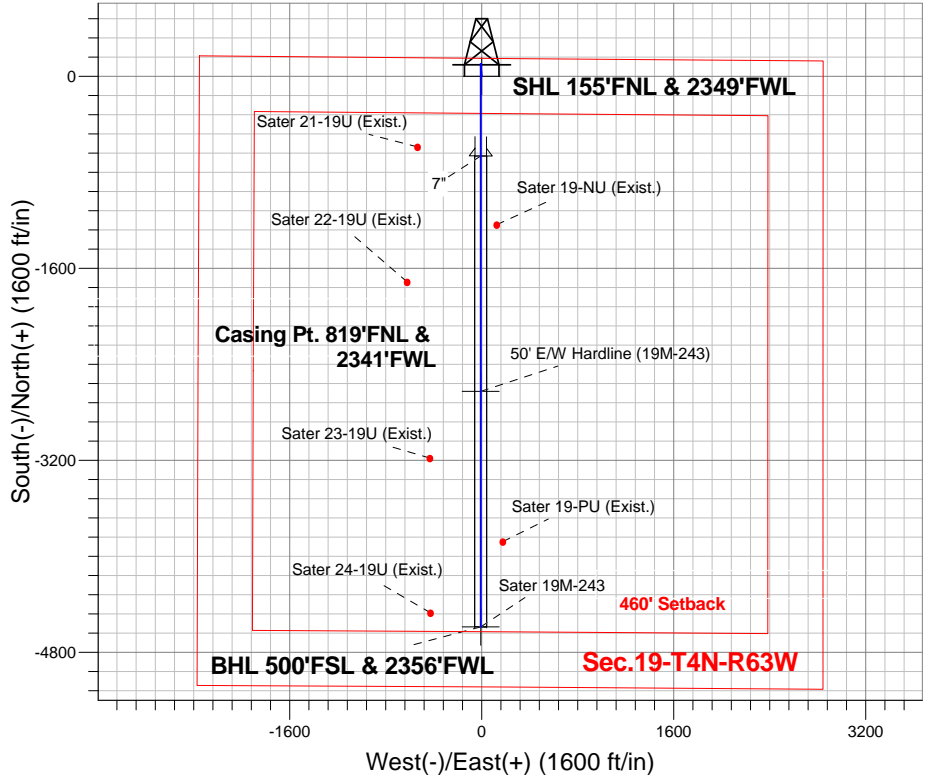
Azimuths to True North
Magnetic North: 8.21°

Magnetic Field
Strength: 52726.6nT
Dip Angle: 66.89°
Date: 2/10/2015
Model: IGRF2010

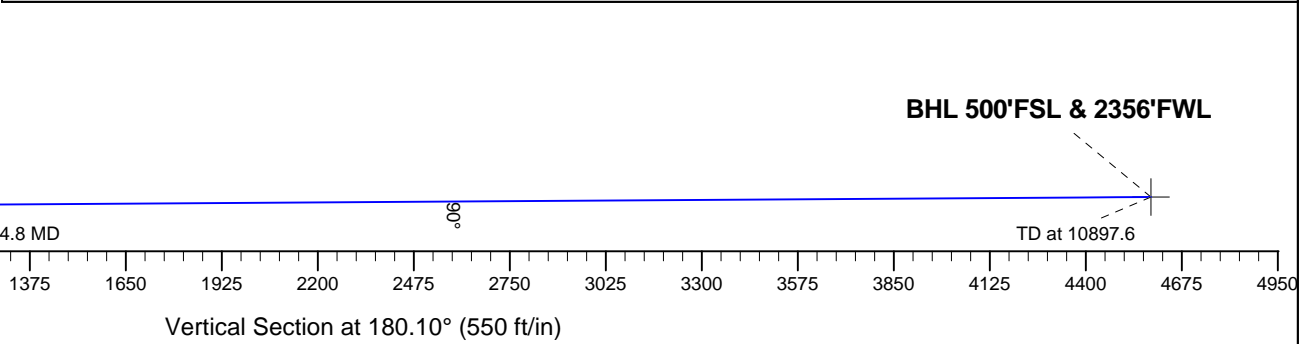
Sater 4N63W19M Pad Sec.19-T4N-R63W
Sater 19M-243
Plan #1 (2-10-15)
11:50, February 12 2015

ANNOTATIONS

TVD	MD	Annotation
3000.0	3000.0	KOP - Start Build 1.00
4222.7	4226.7	Start Drop -2.00
5765.4	5769.9	KOP #2 - Start Build 7.50
6529.3	6974.8	Start 3922.8 hold at 6974.8 MD
6504.0	10897.6	TD at 10897.6



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	3000.0	0.00	0.00	3000.0	0.0	0.0	0.00	0.00	0.0	
3	3555.5	5.55	355.44	3554.6	26.8	-2.1	1.00	355.44	-26.8	
4	4226.7	5.55	355.44	4222.7	91.6	-7.3	0.00	0.00	-91.6	
5	4504.5	0.00	0.00	4500.0	105.0	-8.4	2.00	180.00	-105.0	
6	5769.9	0.00	0.00	5765.4	105.0	-8.4	0.00	0.00	-105.0	
7	6974.8	90.37	180.00	6529.3	-663.9	-8.4	7.50	180.00	663.9	
8	10897.6	90.37	180.00	6504.0	-4586.6	-8.4	0.00	0.00	4586.6	BHL 500'FSL & 2356'FWL





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.19-T4N-R63W

Sater 4N63W19M Pad Sec.19-T4N-R63W

Sater 19M-243

Wellbore #1

Plan: Plan #1 (2-10-15)

Standard Planning Report

12 February, 2015

Database:	Landmark	Local Co-ordinate Reference:	Well Sater 19M-243
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Project:	SEC.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	North Reference:	True
Well:	Sater 19M-243	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-10-15)		

Project	SEC.19-T4N-R63W, Weld County, CO		
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						Sater 4N63W19M Pad Sec.19-T4N-R63W											
Site Position:						Northing:			1,355,375.92 ft			Latitude:			40.304430		
From:			Lat/Long			Easting:			3,284,031.34 ft			Longitude:			-104.481590		
Position Uncertainty:			0.0 ft			Slot Radius:			"			Grid Convergence:			0.66 °		

Well	Sater 19M-243					
Well Position	+N/-S	0.0 ft	Northing:	1,355,376.94 ft	Latitude:	40.304430
	+E/-W	89.3 ft	Easting:	3,284,120.58 ft	Longitude:	-104.481270
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,664.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/10/2015	8.21	66.89	52,727

Design	Plan #1 (2-10-15)			
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	180.10

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	
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
3,555.5	5.55	355.44	3,554.6	26.8	-2.1	1.00	1.00	0.00	355.44	
4,226.7	5.55	355.44	4,222.7	91.6	-7.3	0.00	0.00	0.00	0.00	
4,504.5	0.00	0.00	4,500.0	105.0	-8.4	2.00	-2.00	0.00	180.00	
5,769.9	0.00	0.00	5,765.4	105.0	-8.4	0.00	0.00	0.00	0.00	
6,974.8	90.37	180.00	6,529.3	-663.9	-8.4	7.50	7.50	0.00	180.00	
10,897.6	90.37	180.00	6,504.0	-4,586.6	-8.4	0.00	0.00	0.00	0.00	BHL 500'FSL & 235°

Database:	Landmark	Local Co-ordinate Reference:	Well Sater 19M-243
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Project:	SEC.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	North Reference:	True
Well:	Sater 19M-243	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-10-15)		

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
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
SHL 155°FNL & 2349°FNL - 50' E/W Hardline (19M-243)									
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP - Start Build 1.00									
3,100.0	1.00	355.44	3,100.0	0.9	-0.1	-0.9	1.00	1.00	0.00
3,200.0	2.00	355.44	3,200.0	3.5	-0.3	-3.5	1.00	1.00	0.00
3,300.0	3.00	355.44	3,299.9	7.8	-0.6	-7.8	1.00	1.00	0.00
3,400.0	4.00	355.44	3,399.7	13.9	-1.1	-13.9	1.00	1.00	0.00
3,450.5	4.50	355.44	3,450.0	17.6	-1.4	-17.6	1.00	1.00	0.00
Parkman									
3,500.0	5.00	355.44	3,499.4	21.7	-1.7	-21.7	1.00	1.00	0.00
3,555.5	5.55	355.44	3,554.6	26.8	-2.1	-26.8	1.00	1.00	0.00
3,600.0	5.55	355.44	3,598.9	31.1	-2.5	-31.1	0.00	0.00	0.00
3,700.0	5.55	355.44	3,698.5	40.8	-3.2	-40.8	0.00	0.00	0.00
3,800.0	5.55	355.44	3,798.0	50.4	-4.0	-50.4	0.00	0.00	0.00
3,900.0	5.55	355.44	3,897.5	60.1	-4.8	-60.1	0.00	0.00	0.00
4,000.0	5.55	355.44	3,997.0	69.7	-5.6	-69.7	0.00	0.00	0.00
4,100.0	5.55	355.44	4,096.6	79.4	-6.3	-79.4	0.00	0.00	0.00
4,103.4	5.55	355.44	4,100.0	79.7	-6.4	-79.7	0.00	0.00	0.00
Sussex									
4,200.0	5.55	355.44	4,196.1	89.0	-7.1	-89.0	0.00	0.00	0.00
4,226.7	5.55	355.44	4,222.7	91.6	-7.3	-91.6	0.00	0.00	0.00
Start Drop -2.00									

Database:	Landmark	Local Co-ordinate Reference:	Well Sater 19M-243
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Project:	SEC.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	North Reference:	True
Well:	Sater 19M-243	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-10-15)		

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)
4,300.0	4.09	355.44	4,295.7	97.7	-7.8	-97.7	2.00	-2.00	0.00
4,400.0	2.09	355.44	4,395.6	103.1	-8.2	-103.1	2.00	-2.00	0.00
4,500.0	0.09	355.44	4,495.5	105.0	-8.4	-105.0	2.00	-2.00	0.00
4,504.5	0.00	0.00	4,500.0	105.0	-8.4	-105.0	2.00	-2.00	0.00
4,600.0	0.00	0.00	4,595.5	105.0	-8.4	-105.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,695.5	105.0	-8.4	-105.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,795.5	105.0	-8.4	-105.0	0.00	0.00	0.00
4,869.5	0.00	0.00	4,865.0	105.0	-8.4	-105.0	0.00	0.00	0.00
Shannon									
4,900.0	0.00	0.00	4,895.5	105.0	-8.4	-105.0	0.00	0.00	0.00
5,000.0	0.00	0.00	4,995.5	105.0	-8.4	-105.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,095.5	105.0	-8.4	-105.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,195.5	105.0	-8.4	-105.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,295.5	105.0	-8.4	-105.0	0.00	0.00	0.00
5,400.0	0.00	0.00	5,395.5	105.0	-8.4	-105.0	0.00	0.00	0.00
5,500.0	0.00	0.00	5,495.5	105.0	-8.4	-105.0	0.00	0.00	0.00
5,600.0	0.00	0.00	5,595.5	105.0	-8.4	-105.0	0.00	0.00	0.00
5,700.0	0.00	0.00	5,695.5	105.0	-8.4	-105.0	0.00	0.00	0.00
5,769.9	0.00	0.00	5,765.4	105.0	-8.4	-105.0	0.00	0.00	0.00
KOP #2 - Start Build 7.50									
5,800.0	2.26	180.00	5,795.5	104.4	-8.4	-104.4	7.51	7.51	0.00
5,900.0	9.76	180.00	5,894.9	93.9	-8.4	-93.9	7.50	7.50	0.00
6,000.0	17.26	180.00	5,992.1	70.6	-8.4	-70.6	7.50	7.50	0.00
6,100.0	24.76	180.00	6,085.4	34.8	-8.4	-34.8	7.50	7.50	0.00
6,200.0	32.26	180.00	6,173.2	-12.9	-8.4	12.9	7.50	7.50	0.00
6,300.0	39.76	180.00	6,254.0	-71.7	-8.4	71.7	7.50	7.50	0.00
6,348.1	43.37	180.00	6,290.0	-103.6	-8.4	103.6	7.50	7.50	0.00
Sharon Springs									
6,400.0	47.26	180.00	6,326.5	-140.5	-8.4	140.5	7.50	7.50	0.00
6,500.0	54.76	180.00	6,389.4	-218.2	-8.4	218.2	7.50	7.50	0.00
6,600.0	62.26	180.00	6,441.5	-303.4	-8.4	303.4	7.50	7.50	0.00
6,618.6	63.65	180.00	6,450.0	-319.9	-8.4	319.9	7.50	7.50	0.00
Niobrara A									
6,700.0	69.76	180.00	6,482.2	-394.7	-8.4	394.7	7.50	7.50	0.00
6,739.9	72.75	180.00	6,495.0	-432.4	-8.4	432.5	7.50	7.50	0.00
Niobrara B									
6,800.0	77.26	180.00	6,510.5	-490.5	-8.4	490.5	7.50	7.50	0.00
6,900.0	84.76	180.00	6,526.2	-589.2	-8.4	589.2	7.50	7.50	0.00
6,974.8	90.37	180.00	6,529.3	-663.9	-8.4	663.9	7.50	7.50	0.00
Start 3922.8 hold at 6974.8 MD - 7"									
7,000.0	90.37	180.00	6,529.2	-689.1	-8.4	689.1	0.00	0.00	0.00
7,100.0	90.37	180.00	6,528.5	-789.1	-8.4	789.1	0.00	0.00	0.00
7,200.0	90.37	180.00	6,527.9	-889.1	-8.4	889.1	0.00	0.00	0.00
7,300.0	90.37	180.00	6,527.2	-989.1	-8.4	989.1	0.00	0.00	0.00
7,400.0	90.37	180.00	6,526.6	-1,089.1	-8.4	1,089.1	0.00	0.00	0.00
7,500.0	90.37	180.00	6,525.9	-1,189.1	-8.4	1,189.1	0.00	0.00	0.00
7,600.0	90.37	180.00	6,525.3	-1,289.1	-8.4	1,289.1	0.00	0.00	0.00
7,700.0	90.37	180.00	6,524.6	-1,389.1	-8.4	1,389.1	0.00	0.00	0.00
7,800.0	90.37	180.00	6,524.0	-1,489.1	-8.4	1,489.1	0.00	0.00	0.00
7,900.0	90.37	180.00	6,523.4	-1,589.1	-8.4	1,589.1	0.00	0.00	0.00
8,000.0	90.37	180.00	6,522.7	-1,689.1	-8.4	1,689.1	0.00	0.00	0.00
8,100.0	90.37	180.00	6,522.1	-1,789.1	-8.4	1,789.1	0.00	0.00	0.00

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Project:	SEC.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	North Reference:	True
Well:	Sater 19M-243	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-10-15)		

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)
8,200.0	90.37	180.00	6,521.4	-1,889.1	-8.4	1,889.1	0.00	0.00	0.00
8,300.0	90.37	180.00	6,520.8	-1,989.1	-8.4	1,989.1	0.00	0.00	0.00
8,400.0	90.37	180.00	6,520.1	-2,089.1	-8.4	2,089.1	0.00	0.00	0.00
8,500.0	90.37	180.00	6,519.5	-2,189.1	-8.4	2,189.1	0.00	0.00	0.00
8,600.0	90.37	180.00	6,518.8	-2,289.0	-8.4	2,289.1	0.00	0.00	0.00
8,700.0	90.37	180.00	6,518.2	-2,389.0	-8.4	2,389.1	0.00	0.00	0.00
8,800.0	90.37	180.00	6,517.5	-2,489.0	-8.4	2,489.1	0.00	0.00	0.00
8,900.0	90.37	180.00	6,516.9	-2,589.0	-8.4	2,589.1	0.00	0.00	0.00
9,000.0	90.37	180.00	6,516.3	-2,689.0	-8.4	2,689.1	0.00	0.00	0.00
9,100.0	90.37	180.00	6,515.6	-2,789.0	-8.4	2,789.0	0.00	0.00	0.00
9,200.0	90.37	180.00	6,515.0	-2,889.0	-8.4	2,889.0	0.00	0.00	0.00
9,300.0	90.37	180.00	6,514.3	-2,989.0	-8.4	2,989.0	0.00	0.00	0.00
9,400.0	90.37	180.00	6,513.7	-3,089.0	-8.4	3,089.0	0.00	0.00	0.00
9,500.0	90.37	180.00	6,513.0	-3,189.0	-8.4	3,189.0	0.00	0.00	0.00
9,600.0	90.37	180.00	6,512.4	-3,289.0	-8.4	3,289.0	0.00	0.00	0.00
9,700.0	90.37	180.00	6,511.7	-3,389.0	-8.4	3,389.0	0.00	0.00	0.00
9,800.0	90.37	180.00	6,511.1	-3,489.0	-8.4	3,489.0	0.00	0.00	0.00
9,900.0	90.37	180.00	6,510.4	-3,589.0	-8.4	3,589.0	0.00	0.00	0.00
10,000.0	90.37	180.00	6,509.8	-3,689.0	-8.4	3,689.0	0.00	0.00	0.00
10,100.0	90.37	180.00	6,509.2	-3,789.0	-8.4	3,789.0	0.00	0.00	0.00
10,200.0	90.37	180.00	6,508.5	-3,889.0	-8.4	3,889.0	0.00	0.00	0.00
10,300.0	90.37	180.00	6,507.9	-3,989.0	-8.4	3,989.0	0.00	0.00	0.00
10,400.0	90.37	180.00	6,507.2	-4,089.0	-8.4	4,089.0	0.00	0.00	0.00
10,500.0	90.37	180.00	6,506.6	-4,189.0	-8.4	4,189.0	0.00	0.00	0.00
10,600.0	90.37	180.00	6,505.9	-4,289.0	-8.4	4,289.0	0.00	0.00	0.00
10,700.0	90.37	180.00	6,505.3	-4,389.0	-8.4	4,389.0	0.00	0.00	0.00
10,800.0	90.37	180.00	6,504.6	-4,489.0	-8.4	4,489.0	0.00	0.00	0.00
10,897.6	90.37	180.00	6,504.0	-4,586.6	-8.4	4,586.6	0.00	0.00	0.00
BHL 500'FSL & 2356'FWL									

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
BHL 500'FSL & 2356'I - hit/miss target - Shape - Point	0.00	0.00	6,504.0	-4,586.6	-8.4	1,350,790.75	3,284,164.90	40.291840	-104.481300
SHL 155'FNL & 2349' - plan hits target center - Point	0.00	0.00	1.0	0.0	0.0	1,355,376.95	3,284,120.58	40.304430	-104.481270
50' E/W Hardline (19M - plan misses target center by 2625.3ft at 1.0ft MD (1.0 TVD, 0.0 N, 0.0 E) - Rectangle (sides W3,922.7 H100.0 D0.0)	0.00	0.00	1.0	-2,625.2	-8.4	1,352,751.88	3,284,142.34	40.297224	-104.481300

Database:	Landmark	Local Co-ordinate Reference:	Well Sater 19M-243
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Project:	SEC.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	North Reference:	True
Well:	Sater 19M-243	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-10-15)		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
6,974.8	6,529.3	7"	7	7-1/2

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,450.5	3,450.0	Parkman		0.00	
4,103.4	4,100.0	Sussex		0.00	
4,869.5	4,865.0	Shannon		0.00	
6,348.1	6,290.0	Sharon Springs		0.00	
6,618.6	6,450.0	Niobrara A		0.00	
6,739.9	6,495.0	Niobrara B		0.00	
	6,580.0	Niobrara C		0.00	
	6,685.0	Ft. Hays		0.00	
	6,710.0	Codell		0.00	

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
3,000.0	3,000.0	0.0	0.0	KOP - Start Build 1.00
4,226.7	4,222.7	91.6	-7.3	Start Drop -2.00
5,769.9	5,765.4	105.0	-8.4	KOP #2 - Start Build 7.50
6,974.8	6,529.3	-663.9	-8.4	Start 3922.8 hold at 6974.8 MD
10,897.6	6,504.0	-4,586.6	-8.4	TD at 10897.6



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.19-T4N-R63W

Sater 4N63W19M Pad Sec.19-T4N-R63W

Sater 19M-243

Wellbore #1

Plan #1 (2-10-15)

Anticollision Report

12 February, 2015



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (2-10-15)		
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 2/12/2015			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	10,897.6	Plan #1 (2-10-15) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Existing Wells Sec.19-T4N-R63W						
Sater 19-NU (Exist.) - Wellbore #1 - Wellbore #1	7,545.9	6,522.6	133.9	-24.2	0.847	Level 1, CC, ES, SF
Sater 19-PU (Exist.) - Wellbore #1 - Wellbore #1	10,187.2	6,539.6	184.1	-22.5	0.891	Level 1, CC, ES, SF
Sater 21-19U (Exist.) - Wellbore #1 - Wellbore #1	6,897.3	6,534.9	527.2	378.4	3.544	CC
Sater 21-19U (Exist.) - Wellbore #1 - Wellbore #1	6,900.0	6,535.2	527.2	378.4	3.544	ES, SF
Sater 22-19U (Exist.) - Wellbore #1 - Wellbore #1	8,023.2	6,529.6	613.7	447.2	3.688	CC, ES
Sater 22-19U (Exist.) - Wellbore #1 - Wellbore #1	8,100.0	6,529.1	618.4	450.7	3.687	SF
Sater 23-19U (Exist.) - Wellbore #1 - Wellbore #1	9,491.4	6,537.1	424.0	230.5	2.192	CC
Sater 23-19U (Exist.) - Wellbore #1 - Wellbore #1	9,500.0	6,537.0	424.1	230.5	2.190	ES, SF
Sater 24-19U (Exist.) - Wellbore #1 - Wellbore #1	10,781.0	6,562.8	418.4	200.2	1.917	CC, ES
Sater 24-19U (Exist.) - Wellbore #1 - Wellbore #1	10,800.0	6,562.6	418.9	200.2	1.916	SF
Sater 4N63W19M Pad Sec.19-T4N-R63W						
Sater 19J-203 - Wellbore #1 - Plan #1 (2-10-15)	200.0	200.0	89.3	88.6	132.364	CC, ES
Sater 19J-203 - Wellbore #1 - Plan #1 (2-10-15)	900.0	876.9	151.2	147.4	39.682	SF
Sater 19J-323 - Wellbore #1 - Plan #1 (2-10-15)	800.0	800.0	58.6	55.2	17.373	CC, ES
Sater 19J-323 - Wellbore #1 - Plan #1 (2-10-15)	10,898.2	11,019.2	737.1	559.5	4.148	SF
Sater 19M-443 - Wellbore #1 - Plan #1 (2-10-15)	1,600.0	1,600.0	27.9	20.9	4.003	CC, ES
Sater 19M-443 - Wellbore #1 - Plan #1 (2-10-15)	10,898.2	11,084.9	346.2	197.6	2.330	SF

Offset Design		Existing Wells Sec.19-T4N-R63W - Sater 19-NU (Exist.) - Wellbore #1 - Wellbore #1										Offset Site Error:		0.0 ft			
Survey Program: 6885-UNKNOWN														Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis			Distance										
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning				
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)						
6,600.0	6,441.5	6,438.5	6,438.5	15.1	128.8	-17.16	-1,235.0	125.5	941.2	862.9	78.30	12.021					
6,700.0	6,482.2	6,479.2	6,479.2	15.9	129.6	-24.73	-1,235.0	125.5	850.9	773.1	77.83	10.933					
6,800.0	6,510.5	6,507.5	6,507.5	16.9	130.2	-39.20	-1,235.0	125.5	756.5	659.0	97.51	7.758					
6,900.0	6,526.2	6,523.2	6,523.2	18.1	130.5	-66.23	-1,235.0	125.5	659.5	523.2	136.31	4.839					
7,000.0	6,529.2	6,526.2	6,526.2	19.3	130.5	-91.51	-1,235.0	125.5	562.1	412.3	149.81	3.752					
7,100.0	6,528.5	6,525.5	6,525.5	20.7	130.5	-91.23	-1,235.0	125.5	465.6	314.4	151.18	3.080					
7,200.0	6,527.9	6,524.9	6,524.9	22.2	130.5	-90.96	-1,235.0	125.5	370.9	218.3	152.63	2.430					
7,300.0	6,527.2	6,524.2	6,524.2	23.7	130.5	-90.68	-1,235.0	125.5	280.0	125.9	154.15	1.816					
7,400.0	6,526.6	6,523.6	6,523.6	25.2	130.5	-90.40	-1,235.0	125.5	198.0	42.3	155.71	1.272	Level 3				

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 Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 19-NU (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 6885-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,500.0	6,525.9	6,522.9	6,522.9	26.9	130.5	-90.13		-1,235.0	125.5	141.5	-15.8	157.32	0.900	Level 1
7,545.9	6,525.6	6,522.6	6,522.6	27.6	130.5	-90.00		-1,235.0	125.5	133.9	-24.2	158.08	0.847	Level 1, CC, ES, SF
7,600.0	6,525.3	6,522.3	6,522.3	28.5	130.4	-89.85		-1,235.0	125.5	144.4	-14.6	158.96	0.908	Level 1
7,700.0	6,524.6	6,521.6	6,521.6	30.2	130.4	-89.57		-1,235.0	125.5	204.1	43.5	160.63	1.271	Level 3
7,800.0	6,524.0	6,521.0	6,521.0	31.9	130.4	-89.30		-1,235.0	125.5	287.2	124.9	162.33	1.769	
7,900.0	6,523.4	6,520.4	6,520.4	33.7	130.4	-89.02		-1,235.0	125.5	378.5	214.5	164.04	2.308	
8,000.0	6,522.7	6,519.7	6,519.7	35.4	130.4	-88.75		-1,235.0	125.5	473.4	307.6	165.76	2.856	
8,100.0	6,522.1	6,519.1	6,519.1	37.2	130.4	-88.47		-1,235.0	125.5	570.0	402.5	167.50	3.403	
8,200.0	6,521.4	6,518.4	6,518.4	39.0	130.4	-88.19		-1,235.0	125.5	667.6	498.4	169.25	3.945	
8,300.0	6,520.8	6,517.8	6,517.8	40.8	130.4	-87.92		-1,235.0	125.5	765.9	594.8	171.00	4.479	
8,400.0	6,520.1	6,517.1	6,517.1	42.6	130.3	-87.64		-1,235.0	125.5	864.5	691.7	172.77	5.004	
8,500.0	6,519.5	6,516.5	6,516.5	44.4	130.3	-87.37		-1,235.0	125.5	963.4	788.9	174.53	5.520	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 19-PU (Exist.) - Wellbore #1 - Wellbore #1												Offset Site Error: 0.0 ft	
Survey Program: 6920-UNKNOWN												Offset Well Error: 0.0 ft	
Reference		Offset		Semi Major Axis		Highside Toolface (')	Distance		Minimum Separation (ft)	Separation Factor	Warning		
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Between Centres (ft)	Between Ellipses (ft)					
							Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)					
9,300.0	6,514.3	6,545.3	6,545.3	59.1	130.9	-91.78	-3,876.2	175.7	906.1	716.1	189.97	4.770	
9,400.0	6,513.7	6,544.7	6,544.7	61.0	130.9	-91.58	-3,876.2	175.7	808.4	616.6	191.84	4.214	
9,500.0	6,513.0	6,544.0	6,544.0	62.9	130.9	-91.38	-3,876.2	175.7	711.4	517.7	193.71	3.673	
9,600.0	6,512.4	6,543.4	6,543.4	64.8	130.9	-91.18	-3,876.2	175.7	615.4	419.8	195.58	3.146	
9,700.0	6,511.7	6,542.7	6,542.7	66.6	130.9	-90.98	-3,876.2	175.7	520.8	323.4	197.46	2.638	
9,800.0	6,511.1	6,542.1	6,542.1	68.5	130.8	-90.78	-3,876.2	175.7	428.7	229.4	199.33	2.151	
9,900.0	6,510.4	6,541.4	6,541.4	70.4	130.8	-90.58	-3,876.2	175.7	341.1	139.9	201.21	1.695	
10,000.0	6,509.8	6,540.8	6,540.8	72.3	130.8	-90.38	-3,876.2	175.7	262.6	59.5	203.08	1.293 Level 3	
10,100.0	6,509.2	6,540.2	6,540.2	74.2	130.8	-90.18	-3,876.2	175.7	203.7	-1.2	204.96	0.994 Level 1	
10,187.2	6,508.6	6,539.6	6,539.6	75.8	130.8	-90.00	-3,876.2	175.7	184.1	-22.5	206.59	0.891 Level 1, CC, ES, SF	
10,200.0	6,508.5	6,539.5	6,539.5	76.0	130.8	-89.97	-3,876.2	175.7	184.6	-22.3	206.83	0.892 Level 1	
10,300.0	6,507.9	6,538.9	6,538.9	77.9	130.8	-89.77	-3,876.2	175.7	215.9	7.2	208.70	1.035 Level 2	
10,400.0	6,507.2	6,538.2	6,538.2	79.8	130.8	-89.57	-3,876.2	175.7	281.4	70.8	210.57	1.336 Level 3	
10,500.0	6,506.6	6,537.6	6,537.6	81.7	130.8	-89.37	-3,876.2	175.7	363.0	150.5	212.44	1.708	
10,600.0	6,505.9	6,536.9	6,536.9	83.6	130.7	-89.17	-3,876.2	175.7	452.0	237.7	214.31	2.109	
10,700.0	6,505.3	6,536.3	6,536.3	85.5	130.7	-88.97	-3,876.2	175.7	544.8	328.7	216.18	2.520	
10,800.0	6,504.6	6,535.6	6,535.6	87.4	130.7	-88.77	-3,876.2	175.7	639.9	421.8	218.05	2.934	
10,898.2	6,504.0	6,535.0	6,535.0	89.2	130.7	-88.57	-3,876.2	175.7	734.4	514.5	219.88	3.340	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.19-T4N-R63W - Sater 21-19U (Exist.) - Wellbore #1 - Wellbore #1											Offset Site Error:		0.0 ft	
Survey Program: 7333-UNKNOWN														Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning			
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)						
0.0	0.0	9.0	9.0	0.0	0.2	-137.60	-586.5	-535.5	794.2	794.1	0.18	4,407.516				
100.0	100.0	109.0	109.0	0.1	2.2	-137.60	-586.5	-535.5	794.2	791.9	2.29	346.436				
200.0	200.0	209.0	209.0	0.3	4.2	-137.60	-586.5	-535.5	794.2	789.7	4.52	175.819				
300.0	300.0	309.0	309.0	0.6	6.2	-137.60	-586.5	-535.5	794.2	787.5	6.74	117.802				
400.0	400.0	409.0	409.0	0.8	8.2	-137.60	-586.5	-535.5	794.2	785.3	8.97	88.574				
500.0	500.0	509.0	509.0	1.0	10.2	-137.60	-586.5	-535.5	794.2	783.0	11.19	70.967				
600.0	600.0	609.0	609.0	1.2	12.2	-137.60	-586.5	-535.5	794.2	780.8	13.42	59.199				
700.0	700.0	709.0	709.0	1.5	14.2	-137.60	-586.5	-535.5	794.2	778.6	15.64	50.778				
800.0	800.0	809.0	809.0	1.7	16.2	-137.60	-586.5	-535.5	794.2	776.4	17.87	44.455				
900.0	900.0	909.0	909.0	1.9	18.2	-137.60	-586.5	-535.5	794.2	774.1	20.09	39.532				
1,000.0	1,000.0	1,009.0	1,009.0	2.1	20.2	-137.60	-586.5	-535.5	794.2	771.9	22.32	35.591				
1,100.0	1,100.0	1,109.0	1,109.0	2.4	22.2	-137.60	-586.5	-535.5	794.2	769.7	24.54	32.365				
1,200.0	1,200.0	1,209.0	1,209.0	2.6	24.2	-137.60	-586.5	-535.5	794.2	767.5	26.76	29.674				
1,300.0	1,300.0	1,309.0	1,309.0	2.8	26.2	-137.60	-586.5	-535.5	794.2	765.2	28.99	27.397				
1,400.0	1,400.0	1,409.0	1,409.0	3.0	28.2	-137.60	-586.5	-535.5	794.2	763.0	31.21	25.444				
1,500.0	1,500.0	1,509.0	1,509.0	3.3	30.2	-137.60	-586.5	-535.5	794.2	760.8	33.44	23.752				
1,600.0	1,600.0	1,609.0	1,609.0	3.5	32.2	-137.60	-586.5	-535.5	794.2	758.6	35.66	22.270				
1,700.0	1,700.0	1,709.0	1,709.0	3.7	34.2	-137.60	-586.5	-535.5	794.2	756.3	37.89	20.962				
1,800.0	1,800.0	1,809.0	1,809.0	3.9	36.2	-137.60	-586.5	-535.5	794.2	754.1	40.11	19.800				
1,900.0	1,900.0	1,909.0	1,909.0	4.2	38.2	-137.60	-586.5	-535.5	794.2	751.9	42.34	18.759				
2,000.0	2,000.0	2,009.0	2,009.0	4.4	40.2	-137.60	-586.5	-535.5	794.2	749.7	44.56	17.823				
2,100.0	2,100.0	2,109.0	2,109.0	4.6	42.2	-137.60	-586.5	-535.5	794.2	747.4	46.79	16.975				
2,200.0	2,200.0	2,209.0	2,209.0	4.8	44.2	-137.60	-586.5	-535.5	794.2	745.2	49.01	16.205				
2,300.0	2,300.0	2,309.0	2,309.0	5.1	46.2	-137.60	-586.5	-535.5	794.2	743.0	51.24	15.501				
2,400.0	2,400.0	2,409.0	2,409.0	5.3	48.2	-137.60	-586.5	-535.5	794.2	740.8	53.46	14.856				
2,500.0	2,500.0	2,509.0	2,509.0	5.5	50.2	-137.60	-586.5	-535.5	794.2	738.5	55.69	14.262				
2,600.0	2,600.0	2,609.0	2,609.0	5.7	52.2	-137.60	-586.5	-535.5	794.2	736.3	57.91	13.715				
2,700.0	2,700.0	2,709.0	2,709.0	6.0	54.2	-137.60	-586.5	-535.5	794.2	734.1	60.14	13.207				
2,800.0	2,800.0	2,809.0	2,809.0	6.2	56.2	-137.60	-586.5	-535.5	794.2	731.9	62.36	12.736				
2,900.0	2,900.0	2,909.0	2,909.0	6.4	58.2	-137.60	-586.5	-535.5	794.2	729.6	64.59	12.297				
3,000.0	3,000.0	3,009.0	3,009.0	6.6	60.2	-137.60	-586.5	-535.5	794.2	727.4	66.81	11.888				
3,100.0	3,100.0	3,109.0	3,109.0	6.9	62.2	-133.09	-586.5	-535.5	794.8	725.8	69.03	11.514				
3,200.0	3,200.0	3,209.0	3,209.0	7.1	64.2	-133.21	-586.5	-535.5	796.6	725.4	71.24	11.182				
3,300.0	3,299.9	3,308.9	3,308.9	7.3	66.2	-133.42	-586.5	-535.5	799.6	726.2	73.43	10.889				
3,400.0	3,399.7	3,408.7	3,408.7	7.5	68.2	-133.70	-586.5	-535.5	803.8	728.2	75.62	10.630				
3,500.0	3,499.4	3,508.4	3,508.4	7.8	70.2	-134.06	-586.5	-535.5	809.3	731.5	77.78	10.405				
3,600.0	3,598.9	3,607.9	3,607.9	8.0	72.2	-134.51	-586.5	-535.5	815.9	735.9	79.96	10.203				
3,700.0	3,698.5	3,707.5	3,707.5	8.2	74.1	-134.99	-586.5	-535.5	822.7	740.5	82.17	10.012				
3,800.0	3,798.0	3,807.0	3,807.0	8.4	76.1	-135.46	-586.5	-535.5	829.6	745.2	84.39	9.831				
3,900.0	3,897.5	3,906.5	3,906.5	8.7	78.1	-135.93	-586.5	-535.5	836.5	749.9	86.60	9.659				
4,000.0	3,997.0	4,006.0	4,006.0	8.9	80.1	-136.38	-586.5	-535.5	843.5	754.7	88.82	9.497				
4,100.0	4,096.6	4,105.6	4,105.6	9.2	82.1	-136.83	-586.5	-535.5	850.6	759.5	91.04	9.343				
4,200.0	4,196.1	4,205.1	4,205.1	9.4	84.1	-137.27	-586.5	-535.5	857.7	764.4	93.26	9.197				
4,300.0	4,295.7	4,304.7	4,304.7	9.6	86.1	-137.73	-586.5	-535.5	864.1	768.6	95.56	9.042				
4,400.0	4,395.6	4,404.6	4,404.6	9.8	88.1	-138.02	-586.5	-535.5	868.1	770.3	97.83	8.874				
4,500.0	4,495.5	4,504.5	4,504.5	10.0	90.1	-138.12	-586.5	-535.5	869.5	769.5	100.03	8.693				
4,600.0	4,595.5	4,604.5	4,604.5	10.2	92.1	-142.68	-586.5	-535.5	869.5	767.3	102.23	8.506				
4,700.0	4,695.5	4,704.5	4,704.5	10.4	94.1	-142.68	-586.5	-535.5	869.5	765.1	104.45	8.325				
4,800.0	4,795.5	4,804.5	4,804.5	10.6	96.1	-142.68	-586.5	-535.5	869.5	762.9	106.67	8.152				
4,900.0	4,895.5	4,904.5	4,904.5	10.9	98.1	-142.68	-586.5	-535.5	869.5	760.7	108.89	7.985				
5,000.0	4,995.5	5,004.5	5,004.5	11.1	100.1	-142.68	-586.5	-535.5	869.5	758.4	111.12	7.826				

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 21-19U (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7333-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,095.5	5,104.5	5,104.5	11.3	102.1	-142.68		-586.5	-535.5	869.5	756.2	113.34	7.672	
5,200.0	5,195.5	5,204.5	5,204.5	11.5	104.1	-142.68		-586.5	-535.5	869.5	754.0	115.56	7.524	
5,300.0	5,295.5	5,304.5	5,304.5	11.7	106.1	-142.68		-586.5	-535.5	869.5	751.8	117.79	7.382	
5,400.0	5,395.5	5,404.5	5,404.5	12.0	108.1	-142.68		-586.5	-535.5	869.5	749.5	120.01	7.246	
5,500.0	5,495.5	5,504.5	5,504.5	12.2	110.1	-142.68		-586.5	-535.5	869.5	747.3	122.23	7.114	
5,600.0	5,595.5	5,604.5	5,604.5	12.4	112.1	-142.68		-586.5	-535.5	869.5	745.1	124.45	6.987	
5,700.0	5,695.5	5,704.5	5,704.5	12.6	114.1	-142.68		-586.5	-535.5	869.5	742.9	126.68	6.864	
5,800.0	5,795.5	5,804.5	5,804.5	12.8	116.1	37.36		-586.5	-535.5	869.1	740.2	128.82	6.746	
5,900.0	5,894.9	5,903.9	5,903.9	13.0	118.1	38.17		-586.5	-535.5	860.8	730.9	129.87	6.628	
6,000.0	5,992.1	6,001.1	6,001.1	13.1	120.0	40.03		-586.5	-535.5	842.4	712.8	129.68	6.496	
6,100.0	6,085.4	6,094.4	6,094.4	13.3	121.9	43.06		-586.5	-535.5	814.8	686.1	128.74	6.329	
6,200.0	6,173.2	6,182.2	6,182.2	13.4	123.6	47.38		-586.5	-535.5	779.0	651.1	127.93	6.090	
6,300.0	6,254.0	6,263.0	6,263.0	13.6	125.3	53.10		-586.5	-535.5	736.9	608.5	128.40	5.739	
6,400.0	6,326.5	6,335.5	6,335.5	13.9	126.7	60.13		-586.5	-535.5	690.5	559.5	131.07	5.269	
6,500.0	6,389.4	6,398.4	6,398.4	14.4	128.0	68.04		-586.5	-535.5	643.1	507.4	135.69	4.739	
6,600.0	6,441.5	6,450.5	6,450.5	15.1	129.0	75.96		-586.5	-535.5	598.4	457.6	140.78	4.251	
6,700.0	6,482.2	6,491.2	6,491.2	15.9	129.8	82.82		-586.5	-535.5	561.0	416.3	144.74	3.876	
6,800.0	6,510.5	6,519.5	6,519.5	16.9	130.4	87.70		-586.5	-535.5	535.8	388.6	147.19	3.640	
6,897.3	6,525.9	6,534.9	6,534.9	18.0	130.7	90.00		-586.5	-535.5	527.2	378.4	148.73	3.544 CC	
6,900.0	6,526.2	6,535.2	6,535.2	18.1	130.7	90.03		-586.5	-535.5	527.2	378.4	148.77	3.544 ES, SF	
7,000.0	6,529.2	6,538.2	6,538.2	19.3	130.8	89.93		-586.5	-535.5	537.0	386.9	150.10	3.578	
7,100.0	6,528.5	6,537.5	6,537.5	20.7	130.8	89.86		-586.5	-535.5	564.7	413.3	151.46	3.729	
7,200.0	6,527.9	6,536.9	6,536.9	22.2	130.7	89.79		-586.5	-535.5	607.8	454.9	152.89	3.975	
7,300.0	6,527.2	6,536.2	6,536.2	23.7	130.7	89.72		-586.5	-535.5	663.3	508.9	154.40	4.296	
7,400.0	6,526.6	6,535.6	6,535.6	25.2	130.7	89.65		-586.5	-535.5	728.3	572.4	155.96	4.670	
7,500.0	6,525.9	6,534.9	6,534.9	26.9	130.7	89.58		-586.5	-535.5	800.6	643.0	157.56	5.081	
7,600.0	6,525.3	6,534.3	6,534.3	28.5	130.7	89.51		-586.5	-535.5	878.3	719.1	159.20	5.517	
7,700.0	6,524.6	6,533.6	6,533.6	30.2	130.7	89.44		-586.5	-535.5	960.2	799.3	160.87	5.969	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 22-19U (Exist.) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7343-UNKNOWN												Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
7,300.0	6,527.2	6,534.2	6,534.2	23.7	130.7	90.44	-1,712.2	-622.0	948.4	794.1	154.35	6.145	
7,400.0	6,526.6	6,533.6	6,533.6	25.2	130.7	90.38	-1,712.2	-622.0	874.6	718.7	155.91	5.609	
7,500.0	6,525.9	6,532.9	6,532.9	26.9	130.7	90.32	-1,712.2	-622.0	806.4	648.9	157.52	5.119	
7,600.0	6,525.3	6,532.3	6,532.3	28.5	130.6	90.26	-1,712.2	-622.0	745.4	586.2	159.16	4.683	
7,700.0	6,524.6	6,531.6	6,531.6	30.2	130.6	90.19	-1,712.2	-622.0	693.5	532.7	160.84	4.312	
7,800.0	6,524.0	6,531.0	6,531.0	31.9	130.6	90.13	-1,712.2	-622.0	653.0	490.4	162.54	4.017	
7,900.0	6,523.4	6,530.4	6,530.4	33.7	130.6	90.07	-1,712.2	-622.0	625.9	461.6	164.26	3.810	
8,000.0	6,522.7	6,529.7	6,529.7	35.4	130.6	90.01	-1,712.2	-622.0	614.1	448.1	166.00	3.699	
8,023.2	6,522.6	6,529.6	6,529.6	35.8	130.6	90.00	-1,712.2	-622.0	613.7	447.2	166.41	3.688 CC, ES	
8,100.0	6,522.1	6,529.1	6,529.1	37.2	130.6	89.95	-1,712.2	-622.0	618.4	450.7	167.76	3.687 SF	
8,200.0	6,521.4	6,528.4	6,528.4	39.0	130.6	89.89	-1,712.2	-622.0	638.6	469.1	169.53	3.767	
8,300.0	6,520.8	6,527.8	6,527.8	40.8	130.6	89.83	-1,712.2	-622.0	673.2	501.9	171.31	3.930	
8,400.0	6,520.1	6,527.1	6,527.1	42.6	130.5	89.77	-1,712.2	-622.0	720.1	547.0	173.11	4.160	
8,500.0	6,519.5	6,526.5	6,526.5	44.4	130.5	89.71	-1,712.2	-622.0	777.1	602.2	174.91	4.443	
8,600.0	6,518.8	6,525.8	6,525.8	46.2	130.5	89.65	-1,712.2	-622.0	842.2	665.5	176.72	4.766	
8,700.0	6,518.2	6,525.2	6,525.2	48.0	130.5	89.59	-1,712.2	-622.0	913.6	735.1	178.54	5.117	
8,800.0	6,517.5	6,524.5	6,524.5	49.9	130.5	89.53	-1,712.2	-622.0	990.0	809.6	180.36	5.489	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 23-19U (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7363-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
8,600.0	6,518.8	6,542.8	6,542.8	46.2	130.9	90.78	90.78	-3,180.4	-432.4	987.0	810.0	177.05	5.575	
8,700.0	6,518.2	6,542.2	6,542.2	48.0	130.8	90.69	90.69	-3,180.4	-432.4	897.8	718.9	178.87	5.019	
8,800.0	6,517.5	6,541.5	6,541.5	49.9	130.8	90.60	90.60	-3,180.4	-432.4	811.0	630.3	180.70	4.488	
8,900.0	6,516.9	6,540.9	6,540.9	51.7	130.8	90.52	90.52	-3,180.4	-432.4	727.6	545.1	182.53	3.986	
9,000.0	6,516.3	6,540.3	6,540.3	53.6	130.8	90.43	90.43	-3,180.4	-432.4	649.0	464.6	184.37	3.520	
9,100.0	6,515.6	6,539.6	6,539.6	55.4	130.8	90.34	90.34	-3,180.4	-432.4	577.0	390.8	186.22	3.099	
9,200.0	6,515.0	6,539.0	6,539.0	57.3	130.8	90.25	90.25	-3,180.4	-432.4	514.5	326.4	188.06	2.736	
9,300.0	6,514.3	6,538.3	6,538.3	59.1	130.8	90.17	90.17	-3,180.4	-432.4	465.2	275.3	189.91	2.449	
9,400.0	6,513.7	6,537.7	6,537.7	61.0	130.8	90.08	90.08	-3,180.4	-432.4	433.7	242.0	191.77	2.262	
9,491.4	6,513.1	6,537.1	6,537.1	62.7	130.7	90.00	90.00	-3,180.4	-432.4	424.0	230.5	193.46	2.192 CC	
9,500.0	6,513.0	6,537.0	6,537.0	62.9	130.7	89.99	89.99	-3,180.4	-432.4	424.1	230.5	193.62	2.190 ES, SF	
9,600.0	6,512.4	6,536.4	6,536.4	64.8	130.7	89.91	89.91	-3,180.4	-432.4	437.7	242.2	195.48	2.239	
9,700.0	6,511.7	6,535.7	6,535.7	66.6	130.7	89.82	89.82	-3,180.4	-432.4	472.6	275.2	197.34	2.395	
9,800.0	6,511.1	6,535.1	6,535.1	68.5	130.7	89.73	89.73	-3,180.4	-432.4	524.4	325.2	199.21	2.633	
9,900.0	6,510.4	6,534.4	6,534.4	70.4	130.7	89.64	89.64	-3,180.4	-432.4	588.9	387.8	201.07	2.929	
10,000.0	6,509.8	6,533.8	6,533.8	72.3	130.7	89.56	89.56	-3,180.4	-432.4	662.2	459.2	202.94	3.263	
10,100.0	6,509.2	6,533.2	6,533.2	74.2	130.7	89.47	89.47	-3,180.4	-432.4	741.8	537.0	204.81	3.622	
10,200.0	6,508.5	6,532.5	6,532.5	76.0	130.7	89.38	89.38	-3,180.4	-432.4	825.8	619.1	206.68	3.996	
10,300.0	6,507.9	6,531.9	6,531.9	77.9	130.6	89.29	89.29	-3,180.4	-432.4	913.1	704.5	208.55	4.378	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 24-19U (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7395-UNKNOWN													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
9,900.0	6,510.4	6,568.4	6,568.4	70.4	131.4	90.78	-4,470.0	-426.8	975.3	773.6	201.74	4.835		
10,000.0	6,509.8	6,567.8	6,567.8	72.3	131.4	90.69	-4,470.0	-426.8	886.0	682.4	203.61	4.352		
10,100.0	6,509.2	6,567.2	6,567.2	74.2	131.3	90.60	-4,470.0	-426.8	799.3	593.8	205.49	3.890		
10,200.0	6,508.5	6,566.5	6,566.5	76.0	131.3	90.51	-4,470.0	-426.8	716.0	508.7	207.36	3.453		
10,300.0	6,507.9	6,565.9	6,565.9	77.9	131.3	90.43	-4,470.0	-426.8	637.6	428.3	209.24	3.047		
10,400.0	6,507.2	6,565.2	6,565.2	79.8	131.3	90.34	-4,470.0	-426.8	565.9	354.8	211.12	2.681		
10,500.0	6,506.6	6,564.6	6,564.6	81.7	131.3	90.25	-4,470.0	-426.8	504.1	291.1	212.99	2.367		
10,600.0	6,505.9	6,563.9	6,563.9	83.6	131.3	90.16	-4,470.0	-426.8	455.9	241.1	214.87	2.122		
10,700.0	6,505.3	6,563.3	6,563.3	85.5	131.3	90.07	-4,470.0	-426.8	426.2	209.5	216.75	1.966		
10,781.0	6,504.8	6,562.8	6,562.8	87.0	131.3	90.00	-4,470.0	-426.8	418.4	200.2	218.28	1.917 CC, ES		
10,800.0	6,504.6	6,562.6	6,562.6	87.4	131.3	89.98	-4,470.0	-426.8	418.9	200.2	218.64	1.916 SF		
10,898.2	6,504.0	6,562.0	6,562.0	89.2	131.2	89.90	-4,470.0	-426.8	434.5	214.1	220.48	1.971		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19M Pad Sec.19-T4N-R63W - Sater 19J-203 - Wellbore #1 - Plan #1 (2-10-15)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-90.00	-90.00	0.0	-89.3	89.3				
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	-90.00	0.0	-89.3	89.3	89.0	0.22	397.093	
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	-90.00	0.0	-89.3	89.3	88.6	0.67	132.364 CC, ES	
300.0	300.0	297.7	297.7	0.6	0.5	-89.91	-89.91	0.1	-90.5	90.5	89.4	1.11	81.563	
400.0	400.0	395.3	395.2	0.8	0.8	-89.67	-89.67	0.5	-94.2	94.3	92.8	1.55	60.911	
500.0	500.0	492.6	492.3	1.0	1.0	-89.31	-89.31	1.2	-100.4	100.7	98.7	1.99	50.490	
600.0	600.0	589.6	588.9	1.2	1.2	-88.87	-88.87	2.1	-109.0	109.6	107.1	2.44	44.838	
700.0	700.0	686.0	684.7	1.5	1.5	-88.41	-88.41	3.3	-119.9	121.0	118.1	2.90	41.763	
800.0	800.0	781.8	779.6	1.7	1.8	-87.94	-87.94	4.8	-133.2	134.9	131.5	3.35	40.231	
900.0	900.0	876.9	873.4	1.9	2.2	-87.51	-87.51	6.5	-148.7	151.2	147.4	3.81	39.682 SF	
1,000.0	1,000.0	971.2	966.0	2.1	2.5	-87.11	-87.11	8.4	-166.4	170.0	165.8	4.27	39.792	
1,100.0	1,100.0	1,068.0	1,060.7	2.4	2.9	-86.76	-86.76	10.5	-186.2	190.6	185.8	4.74	40.181	
1,200.0	1,200.0	1,165.9	1,156.5	2.6	3.4	-86.47	-86.47	12.7	-206.3	211.2	206.0	5.21	40.536	
1,300.0	1,300.0	1,263.7	1,252.2	2.8	3.8	-86.23	-86.23	14.9	-226.3	231.8	226.1	5.68	40.812	
1,400.0	1,400.0	1,361.6	1,347.9	3.0	4.2	-86.03	-86.03	17.1	-246.4	252.4	246.3	6.15	41.031	
1,500.0	1,500.0	1,459.4	1,443.7	3.3	4.7	-85.86	-85.86	19.3	-266.5	273.1	266.4	6.63	41.207	
1,600.0	1,600.0	1,557.2	1,539.4	3.5	5.1	-85.72	-85.72	21.5	-286.6	293.7	286.6	7.10	41.351	
1,700.0	1,700.0	1,655.1	1,635.2	3.7	5.5	-85.59	-85.59	23.6	-306.7	314.3	306.7	7.58	41.472	
1,800.0	1,800.0	1,752.9	1,730.9	3.9	6.0	-85.48	-85.48	25.8	-326.7	335.0	326.9	8.06	41.573	
1,900.0	1,900.0	1,850.8	1,826.6	4.2	6.4	-85.38	-85.38	28.0	-346.8	355.6	347.1	8.54	41.658	
2,000.0	2,000.0	1,948.6	1,922.4	4.4	6.9	-85.29	-85.29	30.2	-366.9	376.2	367.2	9.02	41.732	
2,100.0	2,100.0	2,046.5	2,018.1	4.6	7.3	-85.22	-85.22	32.4	-387.0	396.9	387.4	9.50	41.796	
2,200.0	2,200.0	2,144.3	2,113.9	4.8	7.8	-85.15	-85.15	34.6	-407.0	417.5	407.5	9.98	41.851	
2,300.0	2,300.0	2,242.2	2,209.6	5.1	8.2	-85.08	-85.08	36.8	-427.1	438.1	427.7	10.46	41.900	
2,400.0	2,400.0	2,340.0	2,305.3	5.3	8.6	-85.02	-85.02	38.9	-447.2	458.8	447.8	10.94	41.943	
2,500.0	2,500.0	2,437.9	2,401.1	5.5	9.1	-84.97	-84.97	41.1	-467.3	479.4	468.0	11.42	41.981	
2,600.0	2,600.0	2,535.7	2,496.8	5.7	9.5	-84.92	-84.92	43.3	-487.4	500.0	488.1	11.90	42.015	
2,700.0	2,700.0	2,633.6	2,592.5	6.0	10.0	-84.88	-84.88	45.5	-507.4	520.7	508.3	12.38	42.046	
2,800.0	2,800.0	2,731.4	2,688.3	6.2	10.4	-84.84	-84.84	47.7	-527.5	541.3	528.4	12.87	42.074	
2,900.0	2,900.0	2,829.3	2,784.0	6.4	10.9	-84.80	-84.80	49.9	-547.6	561.9	548.6	13.35	42.098	
3,000.0	3,000.0	2,927.1	2,879.8	6.6	11.3	-84.76	-84.76	52.0	-567.7	582.6	568.8	13.83	42.121	
3,100.0	3,100.0	3,025.0	2,975.5	6.9	11.8	-80.05	-80.05	54.2	-587.7	603.1	588.8	14.27	42.258	
3,200.0	3,200.0	3,122.9	3,071.3	7.1	12.2	-80.05	-80.05	56.4	-607.8	623.3	608.5	14.75	42.246	
3,300.0	3,299.9	3,220.8	3,167.2	7.3	12.7	-80.20	-80.20	58.6	-627.9	643.2	628.0	15.24	42.217	
3,400.0	3,399.7	3,318.7	3,262.9	7.5	13.1	-80.49	-80.49	60.8	-648.0	662.9	647.1	15.72	42.173	
3,500.0	3,499.4	3,416.6	3,358.7	7.8	13.6	-80.89	-80.89	63.0	-668.1	682.3	666.1	16.20	42.113	
3,600.0	3,598.9	3,514.3	3,454.3	8.0	14.0	-81.48	-81.48	65.2	-688.2	701.6	684.9	16.69	42.040	
3,700.0	3,698.5	3,612.1	3,550.0	8.2	14.5	-82.16	-82.16	67.3	-708.2	720.9	703.7	17.18	41.966	
3,800.0	3,798.0	3,709.8	3,645.7	8.4	14.9	-82.80	-82.80	69.5	-728.3	740.4	722.7	17.67	41.889	
3,900.0	3,897.5	3,807.6	3,741.3	8.7	15.4	-83.41	-83.41	71.7	-748.3	759.9	741.7	18.17	41.809	
4,000.0	3,997.0	3,905.4	3,837.0	8.9	15.8	-84.00	-84.00	73.9	-768.4	779.5	760.8	18.68	41.728	
4,100.0	4,096.6	4,003.1	3,932.6	9.2	16.3	-84.55	-84.55	76.1	-788.5	799.1	779.9	19.19	41.646	
4,200.0	4,196.1	4,100.9	4,028.3	9.4	16.7	-85.07	-85.07	78.2	-808.5	818.9	799.2	19.70	41.562	
4,300.0	4,295.7	4,198.7	4,124.0	9.6	17.2	-85.81	-85.81	80.4	-828.6	838.8	818.6	20.20	41.522	
4,400.0	4,395.6	4,296.6	4,219.8	9.8	17.6	-86.41	-86.41	82.6	-848.7	858.9	838.2	20.66	41.578	
4,500.0	4,495.5	4,394.5	4,315.6	10.0	18.1	-86.77	-86.77	84.8	-868.8	879.3	858.2	21.10	41.669	
4,600.0	4,495.5	4,492.3	4,411.3	10.2	18.5	-91.17	-91.17	87.0	-888.8	899.7	878.2	21.55	41.751	
4,700.0	4,695.5	4,590.2	4,507.0	10.4	19.0	-91.01	-91.01	89.2	-908.9	920.2	898.2	22.02	41.781	
4,800.0	4,795.5	4,688.0	4,602.8	10.6	19.4	-90.85	-90.85	91.4	-929.0	940.7	918.2	22.50	41.810	
4,900.0	4,895.5	4,785.9	4,698.5	10.9	19.9	-90.70	-90.70	93.5	-949.1	961.2	938.2	22.97	41.837	
5,000.0	4,895.5	4,883.7	4,794.3	11.1	20.3	-90.55	-90.55	95.7	-969.2	981.7	958.2	23.45	41.862	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19M Pad Sec.19-T4N-R63W - Sater 19J-323 - Wellbore #1 - Plan #1 (2-10-15)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-90.00	-90.00	0.0	-58.6	58.6				
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	-90.00	0.0	-58.6	58.6	58.3	0.22	260.592	
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	-90.00	0.0	-58.6	58.6	57.9	0.67	86.864	
300.0	300.0	300.0	300.0	0.6	0.6	-90.00	-90.00	0.0	-58.6	58.6	57.4	1.12	52.118	
400.0	400.0	400.0	400.0	0.8	0.8	-90.00	-90.00	0.0	-58.6	58.6	57.0	1.57	37.227	
500.0	500.0	500.0	500.0	1.0	1.0	-90.00	-90.00	0.0	-58.6	58.6	56.5	2.02	28.955	
600.0	600.0	600.0	600.0	1.2	1.2	-90.00	-90.00	0.0	-58.6	58.6	56.1	2.47	23.690	
700.0	700.0	700.0	700.0	1.5	1.5	-90.00	-90.00	0.0	-58.6	58.6	55.7	2.92	20.046	
800.0	800.0	800.0	800.0	1.7	1.7	-90.00	-90.00	0.0	-58.6	58.6	55.2	3.37	17.373 CC, ES	
900.0	900.0	898.5	898.5	1.9	1.9	-89.82	-89.82	0.2	-59.8	59.8	56.0	3.81	15.723	
1,000.0	1,000.0	996.8	996.8	2.1	2.1	-89.31	-89.31	0.8	-63.6	63.7	59.4	4.23	15.035	
1,100.0	1,100.0	1,094.9	1,094.6	2.4	2.3	-88.58	-88.58	1.7	-69.8	70.0	65.4	4.67	15.007	
1,200.0	1,200.0	1,192.6	1,191.9	2.6	2.5	-87.77	-87.77	3.1	-78.5	79.0	73.9	5.10	15.472	
1,300.0	1,300.0	1,289.8	1,288.5	2.8	2.8	-86.96	-86.96	4.8	-89.6	90.4	84.9	5.54	16.313	
1,400.0	1,400.0	1,386.4	1,384.1	3.0	3.1	-86.21	-86.21	6.8	-103.0	104.4	98.4	5.99	17.443	
1,500.0	1,500.0	1,484.3	1,480.8	3.3	3.4	-85.56	-85.56	9.2	-118.4	120.3	113.8	6.43	18.693	
1,600.0	1,600.0	1,583.0	1,578.2	3.5	3.7	-85.06	-85.06	11.6	-134.0	136.3	129.4	6.88	19.797	
1,700.0	1,700.0	1,681.8	1,675.7	3.7	4.0	-84.66	-84.66	14.0	-149.6	152.2	144.9	7.33	20.760	
1,800.0	1,800.0	1,780.5	1,773.1	3.9	4.3	-84.34	-84.34	16.4	-165.3	168.2	160.5	7.79	21.604	
1,900.0	1,900.0	1,879.2	1,870.5	4.2	4.7	-84.07	-84.07	18.8	-180.9	184.2	176.0	8.24	22.350	
2,000.0	2,000.0	1,977.9	1,968.0	4.4	5.0	-83.85	-83.85	21.2	-196.5	200.2	191.5	8.70	23.013	
2,100.0	2,100.0	2,076.6	2,065.4	4.6	5.4	-83.65	-83.65	23.6	-212.1	216.2	207.1	9.16	23.606	
2,200.0	2,200.0	2,175.3	2,162.8	4.8	5.7	-83.49	-83.49	26.0	-227.8	232.2	222.6	9.62	24.140	
2,300.0	2,300.0	2,274.0	2,260.3	5.1	6.1	-83.35	-83.35	28.4	-243.4	248.3	238.2	10.08	24.622	
2,400.0	2,400.0	2,372.7	2,357.7	5.3	6.4	-83.22	-83.22	30.8	-259.0	264.3	253.7	10.55	25.060	
2,500.0	2,500.0	2,471.4	2,455.1	5.5	6.8	-83.11	-83.11	33.2	-274.7	280.3	269.3	11.01	25.459	
2,600.0	2,600.0	2,570.1	2,552.6	5.7	7.1	-83.01	-83.01	35.6	-290.3	296.3	284.8	11.47	25.824	
2,700.0	2,700.0	2,668.8	2,650.0	6.0	7.5	-82.92	-82.92	38.0	-305.9	312.3	300.4	11.94	26.160	
2,800.0	2,800.0	2,767.5	2,747.4	6.2	7.9	-82.84	-82.84	40.4	-321.5	328.3	315.9	12.40	26.469	
2,900.0	2,900.0	2,866.3	2,844.9	6.4	8.2	-82.77	-82.77	42.8	-337.2	344.3	331.5	12.87	26.754	
3,000.0	3,000.0	2,965.0	2,942.3	6.6	8.6	-82.70	-82.70	45.2	-352.8	360.3	347.0	13.34	27.019	
3,100.0	3,100.0	3,063.7	3,039.8	6.9	9.0	-78.06	-78.06	47.6	-368.4	376.2	362.4	13.79	27.287	
3,200.0	3,200.0	3,162.5	3,137.3	7.1	9.3	-78.22	-78.22	50.0	-384.1	391.7	377.4	14.25	27.481	
3,300.0	3,299.9	3,261.2	3,234.8	7.3	9.7	-78.61	-78.61	52.4	-399.7	406.8	392.1	14.72	27.641	
3,400.0	3,399.7	3,360.0	3,332.2	7.5	10.1	-79.19	-79.19	54.8	-415.3	421.7	406.5	15.18	27.770	
3,500.0	3,499.4	3,458.7	3,429.6	7.8	10.4	-79.96	-79.96	57.2	-431.0	436.3	420.7	15.65	27.871	
3,600.0	3,598.9	3,557.3	3,527.0	8.0	10.8	-80.92	-80.92	59.6	-446.6	450.8	434.7	16.13	27.951	
3,700.0	3,698.5	3,655.9	3,624.3	8.2	11.2	-81.94	-81.94	62.0	-462.2	465.4	448.8	16.61	28.023	
3,800.0	3,798.0	3,754.5	3,721.6	8.4	11.6	-82.89	-82.89	64.4	-477.8	480.1	463.0	17.09	28.090	
3,900.0	3,897.5	3,853.1	3,819.0	8.7	11.9	-83.79	-83.79	66.8	-493.4	494.9	477.4	17.58	28.152	
4,000.0	3,997.0	3,951.7	3,916.3	8.9	12.3	-84.64	-84.64	69.2	-509.0	509.9	491.8	18.08	28.209	
4,100.0	4,096.6	4,050.3	4,013.6	9.2	12.7	-85.43	-85.43	71.6	-524.6	525.0	506.4	18.57	28.262	
4,200.0	4,196.1	4,148.9	4,111.0	9.4	13.0	-86.19	-86.19	74.0	-540.2	540.1	521.0	19.08	28.311	
4,300.0	4,295.7	4,247.6	4,208.3	9.6	13.4	-87.03	-87.03	76.4	-555.9	555.4	535.8	19.56	28.388	
4,400.0	4,395.6	4,346.3	4,305.8	9.8	13.8	-87.58	-87.58	78.8	-571.5	570.9	550.9	20.01	28.535	
4,500.0	4,495.5	4,445.1	4,403.3	10.0	14.2	-87.78	-87.78	81.2	-587.1	586.6	566.1	20.43	28.705	
4,600.0	4,595.5	4,543.8	4,500.7	10.2	14.5	-92.06	-92.06	83.6	-602.8	602.3	581.4	20.87	28.860	
4,700.0	4,695.5	4,642.5	4,598.2	10.4	14.9	-91.78	-91.78	86.0	-618.4	618.0	596.7	21.33	28.975	
4,800.0	4,795.5	4,741.2	4,695.6	10.6	15.3	-91.52	-91.52	88.4	-634.0	633.8	612.0	21.79	29.084	
4,900.0	4,895.5	4,839.9	4,793.0	10.9	15.6	-91.27	-91.27	90.8	-649.6	649.6	627.3	22.25	29.190	
5,000.0	4,995.5	4,938.6	4,890.5	11.1	16.0	-91.03	-91.03	93.2	-665.3	665.4	642.6	22.72	29.290	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19M Pad Sec.19-T4N-R63W - Sater 19J-323 - Wellbore #1 - Plan #1 (2-10-15)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
5,100.0	5,095.5	5,037.3	4,987.9	11.3	16.4	-90.80		95.6	-680.9	681.2	658.0	23.18	29.387	
5,200.0	5,195.5	5,136.0	5,085.3	11.5	16.8	-90.58		98.0	-696.5	697.0	673.3	23.64	29.481	
5,300.0	5,295.5	5,248.5	5,196.4	11.7	17.1	-90.35		100.7	-713.8	712.4	688.3	24.11	29.543	
5,400.0	5,395.5	5,380.5	5,327.5	12.0	17.4	-90.16		103.0	-729.2	724.0	699.5	24.59	29.446	
5,500.0	5,495.5	5,513.7	5,460.3	12.2	17.7	-90.04		104.5	-738.7	731.2	706.1	25.05	29.185	
5,600.0	5,595.5	5,647.4	5,594.0	12.4	17.9	-90.00		105.0	-742.0	733.7	708.2	25.51	28.765	
5,700.0	5,695.5	5,749.0	5,695.5	12.6	18.0	-90.00		105.0	-742.0	733.7	707.8	25.92	28.308	
5,760.8	5,756.3	5,809.7	5,756.3	12.8	18.1	90.06		105.0	-742.0	733.7	707.5	26.16	28.044	
5,800.0	5,795.5	5,849.0	5,795.5	12.8	18.2	90.05		105.0	-742.0	733.7	707.4	26.32	27.874	
5,900.0	5,894.9	5,949.0	5,895.5	13.0	18.3	90.73		103.3	-742.0	733.7	707.1	26.63	27.556	
6,000.0	5,992.1	6,050.4	5,996.0	13.1	18.4	91.54		90.0	-742.0	733.9	707.1	26.88	27.308	
6,100.0	6,085.4	6,153.2	6,095.1	13.3	18.6	92.32		63.0	-742.0	734.3	707.2	27.12	27.080	
6,200.0	6,173.2	6,257.5	6,191.0	13.4	18.7	93.07		22.3	-742.0	734.7	707.3	27.41	26.810	
6,300.0	6,254.0	6,363.2	6,281.7	13.6	18.8	93.76		-31.9	-742.0	735.3	707.5	27.82	26.431	
6,400.0	6,326.5	6,470.2	6,365.0	13.9	18.9	94.40		-99.0	-742.0	735.8	707.4	28.44	25.873	
6,500.0	6,389.4	6,578.5	6,438.8	14.4	19.2	94.95		-178.1	-742.0	736.4	707.1	29.34	25.096	
6,600.0	6,441.5	6,687.9	6,501.4	15.1	19.5	95.42		-267.7	-742.0	737.0	706.4	30.58	24.097	
6,700.0	6,482.2	6,798.2	6,550.9	15.9	20.0	95.78		-366.2	-742.0	737.4	705.2	32.19	22.911	
6,800.0	6,510.5	6,909.2	6,585.8	16.9	20.8	96.04		-471.4	-742.0	737.8	703.6	34.15	21.602	
6,900.0	6,526.2	7,020.7	6,605.2	18.1	21.7	96.18		-581.1	-742.0	738.0	701.5	36.43	20.254	
7,000.0	6,529.2	7,129.5	6,608.9	19.3	22.8	96.21		-689.8	-742.0	738.0	699.0	38.96	18.941	
7,100.0	6,528.5	7,229.5	6,608.1	20.7	24.0	96.19		-789.8	-742.0	738.0	696.3	41.65	17.717	
7,200.0	6,527.9	7,329.5	6,607.2	22.2	25.2	96.17		-889.8	-742.0	737.9	693.4	44.51	16.581	
7,300.0	6,527.2	7,429.5	6,606.3	23.7	26.6	96.15		-989.8	-742.0	737.9	690.4	47.50	15.537	
7,400.0	6,526.6	7,529.5	6,605.5	25.2	28.0	96.14		-1,089.8	-742.0	737.9	687.3	50.60	14.584	
7,500.0	6,525.9	7,629.5	6,604.6	26.9	29.4	96.12		-1,189.8	-742.0	737.9	684.1	53.79	13.717	
7,600.0	6,525.3	7,729.5	6,603.7	28.5	31.0	96.10		-1,289.8	-742.0	737.9	680.8	57.06	12.930	
7,700.0	6,524.6	7,829.5	6,602.8	30.2	32.5	96.08		-1,389.8	-742.0	737.8	677.4	60.40	12.215	
7,800.0	6,524.0	7,929.5	6,602.0	31.9	34.1	96.07		-1,489.7	-742.0	737.8	674.0	63.79	11.566	
7,900.0	6,523.4	8,029.5	6,601.1	33.7	35.8	96.05		-1,589.7	-742.0	737.8	670.5	67.23	10.974	
8,000.0	6,522.7	8,129.5	6,600.2	35.4	37.4	96.03		-1,689.7	-742.0	737.8	667.0	70.71	10.434	
8,100.0	6,522.1	8,229.5	6,599.3	37.2	39.1	96.01		-1,789.7	-742.0	737.7	663.5	74.22	9.940	
8,200.0	6,521.4	8,329.5	6,598.5	39.0	40.8	96.00		-1,889.7	-742.0	737.7	659.9	77.76	9.487	
8,300.0	6,520.8	8,429.5	6,597.6	40.8	42.6	95.98		-1,989.7	-742.0	737.7	656.4	81.33	9.070	
8,400.0	6,520.1	8,529.5	6,596.7	42.6	44.3	95.96		-2,089.7	-742.0	737.7	652.7	84.92	8.687	
8,500.0	6,519.5	8,629.5	6,595.9	44.4	46.1	95.94		-2,189.7	-742.0	737.6	649.1	88.53	8.332	
8,600.0	6,518.8	8,729.5	6,595.0	46.2	47.8	95.93		-2,289.7	-742.0	737.6	645.5	92.16	8.004	
8,700.0	6,518.2	8,829.5	6,594.1	48.0	49.6	95.91		-2,389.7	-742.0	737.6	641.8	95.80	7.699	
8,800.0	6,517.5	8,929.5	6,593.2	49.9	51.4	95.89		-2,489.7	-742.0	737.6	638.1	99.45	7.416	
8,900.0	6,516.9	9,029.5	6,592.4	51.7	53.2	95.87		-2,589.7	-742.0	737.5	634.4	103.12	7.152	
9,000.0	6,516.3	9,129.5	6,591.5	53.6	55.0	95.86		-2,689.7	-742.0	737.5	630.7	106.80	6.905	
9,100.0	6,515.6	9,229.5	6,590.6	55.4	56.8	95.84		-2,789.7	-742.0	737.5	627.0	110.49	6.675	
9,200.0	6,515.0	9,329.5	6,589.7	57.3	58.6	95.82		-2,889.7	-742.0	737.5	623.3	114.19	6.458	
9,300.0	6,514.3	9,429.5	6,588.9	59.1	60.5	95.80		-2,989.7	-742.0	737.5	619.6	117.90	6.255	
9,400.0	6,513.7	9,529.5	6,588.0	61.0	62.3	95.79		-3,089.7	-742.0	737.4	615.8	121.61	6.064	
9,500.0	6,513.0	9,629.5	6,587.1	62.9	64.1	95.77		-3,189.7	-742.0	737.4	612.1	125.34	5.883	
9,600.0	6,512.4	9,729.5	6,586.3	64.8	66.0	95.75		-3,289.7	-742.0	737.4	608.3	129.06	5.713	
9,700.0	6,511.7	9,829.5	6,585.4	66.6	67.8	95.73		-3,389.7	-742.0	737.4	604.6	132.80	5.553	
9,800.0	6,511.1	9,929.5	6,584.5	68.5	69.7	95.71		-3,489.7	-742.0	737.3	600.8	136.54	5.400	
9,900.0	6,510.4	10,029.5	6,583.6	70.4	71.5	95.70		-3,589.7	-742.0	737.3	597.0	140.28	5.256	
10,000.0	6,509.8	10,129.5	6,582.8	72.3	73.4	95.68		-3,689.7	-742.0	737.3	593.3	144.03	5.119	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19M Pad Sec.19-T4N-R63W - Sater 19J-323 - Wellbore #1 - Plan #1 (2-10-15)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
10,100.0	6,509.2	10,229.5	6,581.9	74.2	75.2	95.66	-3,789.7	-742.0	737.3	589.5	147.78	4.989	
10,200.0	6,508.5	10,329.5	6,581.0	76.0	77.1	95.64	-3,889.6	-742.0	737.2	585.7	151.54	4.865	
10,300.0	6,507.9	10,429.5	6,580.1	77.9	79.0	95.63	-3,989.6	-742.0	737.2	581.9	155.30	4.747	
10,400.0	6,507.2	10,529.5	6,579.3	79.8	80.8	95.61	-4,089.6	-742.0	737.2	578.1	159.06	4.635	
10,500.0	6,506.6	10,629.5	6,578.4	81.7	82.7	95.59	-4,189.6	-742.0	737.2	574.4	162.83	4.527	
10,600.0	6,505.9	10,729.5	6,577.5	83.6	84.6	95.57	-4,289.6	-742.0	737.2	570.6	166.60	4.425	
10,700.0	6,505.3	10,829.5	6,576.7	85.5	86.4	95.56	-4,389.6	-742.0	737.1	566.8	170.37	4.327	
10,800.0	6,504.6	10,929.5	6,575.8	87.4	88.3	95.54	-4,489.6	-742.0	737.1	563.0	174.14	4.233	
10,868.4	6,504.2	10,997.9	6,575.2	88.7	89.6	95.53	-4,558.0	-742.0	737.1	560.4	176.73	4.171	
10,898.2	6,504.0	11,019.2	6,575.0	89.2	90.0	95.52	-4,579.3	-742.0	737.1	559.5	177.69	4.148 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19M Pad Sec.19-T4N-R63W - Sater 19M-443 - Wellbore #1 - Plan #1 (2-10-15)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	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	-90.00	0.0	-27.9	27.9				
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	-90.00	0.0	-27.9	27.9	27.7	0.22	124.091	
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	-90.00	0.0	-27.9	27.9	27.2	0.67	41.364	
300.0	300.0	300.0	300.0	0.6	0.6	-90.00	-90.00	0.0	-27.9	27.9	26.8	1.12	24.818	
400.0	400.0	400.0	400.0	0.8	0.8	-90.00	-90.00	0.0	-27.9	27.9	26.3	1.57	17.727	
500.0	500.0	500.0	500.0	1.0	1.0	-90.00	-90.00	0.0	-27.9	27.9	25.9	2.02	13.788	
600.0	600.0	600.0	600.0	1.2	1.2	-90.00	-90.00	0.0	-27.9	27.9	25.4	2.47	11.281	
700.0	700.0	700.0	700.0	1.5	1.5	-90.00	-90.00	0.0	-27.9	27.9	25.0	2.92	9.545	
800.0	800.0	800.0	800.0	1.7	1.7	-90.00	-90.00	0.0	-27.9	27.9	24.5	3.37	8.273	
900.0	900.0	900.0	900.0	1.9	1.9	-90.00	-90.00	0.0	-27.9	27.9	24.1	3.82	7.299	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	-90.00	-90.00	0.0	-27.9	27.9	23.6	4.27	6.531	
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	-90.00	-90.00	0.0	-27.9	27.9	23.2	4.72	5.909	
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	-90.00	-90.00	0.0	-27.9	27.9	22.7	5.17	5.395	
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	-90.00	-90.00	0.0	-27.9	27.9	22.3	5.62	4.964	
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	-90.00	-90.00	0.0	-27.9	27.9	21.8	6.07	4.596	
1,500.0	1,500.0	1,500.0	1,500.0	3.3	3.3	-90.00	-90.00	0.0	-27.9	27.9	21.4	6.52	4.279	
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	-90.00	-90.00	0.0	-27.9	27.9	20.9	6.97	4.003 CC, ES	
1,700.0	1,700.0	1,699.5	1,699.5	3.7	3.7	-89.35	-89.35	0.3	-28.7	28.7	21.3	7.41	3.874	
1,800.0	1,800.0	1,799.0	1,799.0	3.9	3.9	-87.61	-87.61	1.3	-31.1	31.1	23.3	7.84	3.972	
1,900.0	1,900.0	1,898.4	1,898.2	4.2	4.1	-85.25	-85.25	2.9	-35.1	35.3	27.0	8.27	4.261	
2,000.0	2,000.0	1,997.6	1,997.2	4.4	4.3	-82.75	-82.75	5.2	-40.7	41.1	32.4	8.71	4.718	
2,100.0	2,100.0	2,096.5	2,095.9	4.6	4.6	-80.43	-80.43	8.1	-47.8	48.7	39.5	9.15	5.321	
2,200.0	2,200.0	2,195.2	2,194.1	4.8	4.8	-78.42	-78.42	11.6	-56.5	58.0	48.4	9.58	6.051	
2,300.0	2,300.0	2,293.4	2,291.8	5.1	5.0	-76.74	-76.74	15.7	-66.7	69.1	59.0	10.02	6.890	
2,400.0	2,400.0	2,392.6	2,390.2	5.3	5.3	-75.43	-75.43	20.3	-78.0	81.2	70.7	10.47	7.755	
2,500.0	2,500.0	2,491.8	2,488.7	5.5	5.5	-74.45	-74.45	24.8	-89.2	93.3	82.4	10.91	8.552	
2,600.0	2,600.0	2,591.1	2,587.2	5.7	5.8	-73.70	-73.70	29.4	-100.5	105.4	94.1	11.35	9.288	
2,700.0	2,700.0	2,690.3	2,685.7	6.0	6.1	-73.11	-73.11	33.9	-111.7	117.6	105.8	11.80	9.968	
2,800.0	2,800.0	2,789.6	2,784.2	6.2	6.4	-72.62	-72.62	38.5	-122.9	129.8	117.5	12.25	10.598	
2,900.0	2,900.0	2,888.8	2,882.7	6.4	6.6	-72.22	-72.22	43.0	-134.2	142.0	129.3	12.70	11.184	
3,000.0	3,000.0	2,988.1	2,981.2	6.6	6.9	-71.89	-71.89	47.6	-145.4	154.2	141.0	13.14	11.728	
3,100.0	3,100.0	3,087.4	3,079.7	6.9	7.2	-67.21	-67.21	52.1	-156.7	166.0	152.4	13.59	12.215	
3,200.0	3,200.0	3,186.8	3,178.4	7.1	7.5	-67.62	-67.62	56.7	-167.9	177.2	163.2	14.04	12.621	
3,300.0	3,299.9	3,286.1	3,277.0	7.3	7.8	-68.48	-68.48	61.2	-179.2	187.8	173.3	14.49	12.957	
3,400.0	3,399.7	3,385.5	3,375.7	7.5	8.1	-69.71	-69.71	65.8	-190.5	197.8	182.9	14.95	13.235	
3,500.0	3,499.4	3,484.9	3,474.3	7.8	8.4	-71.27	-71.27	70.4	-201.7	207.3	191.9	15.40	13.462	
3,600.0	3,598.9	3,584.2	3,572.9	8.0	8.7	-73.12	-73.12	74.9	-213.0	216.6	200.7	15.86	13.652	
3,700.0	3,698.5	3,683.6	3,671.4	8.2	9.0	-74.93	-74.93	79.5	-224.2	226.0	209.6	16.33	13.835	
3,800.0	3,798.0	3,782.9	3,770.0	8.4	9.3	-76.60	-76.60	84.0	-235.5	235.6	218.7	16.81	14.015	
3,900.0	3,897.5	3,882.2	3,868.6	8.7	9.6	-78.13	-78.13	88.6	-246.7	245.3	228.0	17.29	14.190	
4,000.0	3,997.0	3,981.5	3,967.1	8.9	9.9	-79.55	-79.55	93.1	-258.0	255.3	237.5	17.77	14.361	
4,100.0	4,096.6	4,082.4	4,067.3	9.2	10.2	-80.88	-80.88	97.7	-269.4	265.3	247.0	18.27	14.525	
4,200.0	4,196.1	4,191.6	4,175.9	9.4	10.4	-82.40	-82.40	101.7	-279.2	273.1	254.4	18.74	14.574	
4,300.0	4,295.7	4,301.1	4,285.3	9.6	10.6	-83.98	-83.98	104.1	-285.2	277.7	258.5	19.19	14.468	
4,400.0	4,395.6	4,411.0	4,395.1	9.8	10.8	-85.05	-85.05	105.0	-287.3	279.1	259.5	19.59	14.248	
4,500.0	4,495.5	4,511.4	4,495.5	10.0	11.0	-85.44	-85.44	105.0	-287.3	279.0	259.0	19.97	13.972	
4,539.9	4,535.4	4,551.3	4,535.4	10.1	11.1	-85.45	-85.45	105.0	-287.3	279.0	258.8	20.13	13.860	
4,600.0	4,595.5	4,611.4	4,595.5	10.2	11.2	-90.00	-90.00	105.0	-287.3	279.0	258.6	20.37	13.694	
4,700.0	4,695.5	4,711.4	4,695.5	10.4	11.4	-90.00	-90.00	105.0	-287.3	279.0	258.2	20.80	13.410	
4,800.0	4,795.5	4,811.4	4,795.5	10.6	11.6	-90.00	-90.00	105.0	-287.3	279.0	257.7	21.24	13.137	
4,900.0	4,895.5	4,911.4	4,895.5	10.9	11.8	-90.00	-90.00	105.0	-287.3	279.0	257.3	21.67	12.874	

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

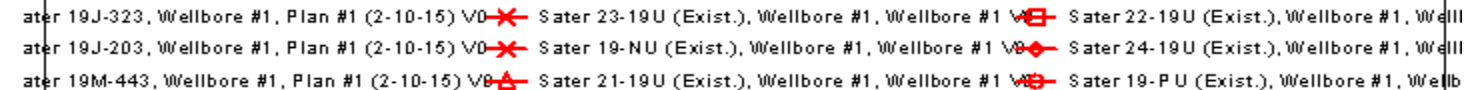
Offset Design		Sater 4N63W19M Pad Sec.19-T4N-R63W - Sater 19M-443 - Wellbore #1 - Plan #1 (2-10-15)											Offset Site Error:		0.0 ft
Survey Program: 0-MWD													Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning	
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor			
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)				
5,000.0	4,995.5	5,011.4	4,995.5	11.1	12.0	-90.00	105.0	-287.3	279.0	256.9	22.10	12.621			
5,100.0	5,095.5	5,111.4	5,095.5	11.3	12.2	-90.00	105.0	-287.3	279.0	256.4	22.54	12.378			
5,200.0	5,195.5	5,211.4	5,195.5	11.5	12.4	-90.00	105.0	-287.3	279.0	256.0	22.97	12.143			
5,300.0	5,295.5	5,311.4	5,295.5	11.7	12.6	-90.00	105.0	-287.3	279.0	255.6	23.41	11.917			
5,400.0	5,395.5	5,411.4	5,395.5	12.0	12.8	-90.00	105.0	-287.3	279.0	255.1	23.84	11.699			
5,500.0	5,495.5	5,511.4	5,495.5	12.2	13.0	-90.00	105.0	-287.3	279.0	254.7	24.28	11.489			
5,600.0	5,595.5	5,611.4	5,595.5	12.4	13.2	-90.00	105.0	-287.3	279.0	254.2	24.72	11.286			
5,700.0	5,695.5	5,711.4	5,695.5	12.6	13.4	-90.00	105.0	-287.3	279.0	253.8	25.16	11.090			
5,760.8	5,756.3	5,772.1	5,756.3	12.8	13.5	90.15	105.0	-287.3	279.0	253.5	25.41	10.977			
5,800.0	5,795.5	5,811.4	5,795.5	12.8	13.6	90.12	105.0	-287.3	279.0	253.4	25.58	10.904			
5,900.0	5,894.9	5,910.8	5,894.9	13.0	13.8	92.24	105.0	-287.3	279.2	253.3	25.92	10.773			
6,000.0	5,992.1	6,010.1	5,994.2	13.1	14.0	96.54	103.4	-287.3	280.9	254.7	26.17	10.732			
6,100.0	6,085.4	6,113.4	6,096.5	13.3	14.2	101.09	89.8	-287.3	284.6	258.2	26.35	10.801			
6,200.0	6,173.2	6,220.2	6,199.4	13.4	14.3	105.41	61.4	-287.3	289.9	263.4	26.47	10.950			
6,300.0	6,254.0	6,330.9	6,300.7	13.6	14.4	109.39	17.1	-287.3	296.5	269.9	26.58	11.154			
6,400.0	6,326.5	6,445.5	6,397.8	13.9	14.6	112.95	-43.6	-287.3	303.8	277.1	26.72	11.370			
6,500.0	6,389.4	6,563.9	6,487.4	14.4	14.8	116.02	-120.9	-287.3	311.3	284.3	26.98	11.536			
6,600.0	6,441.5	6,686.1	6,566.1	15.1	15.3	118.55	-214.1	-287.3	318.3	290.8	27.47	11.586			
6,700.0	6,482.2	6,811.6	6,630.5	15.9	16.0	120.52	-321.7	-287.3	324.3	296.0	28.30	11.458			
6,800.0	6,510.5	6,939.7	6,677.2	16.9	17.1	121.88	-440.8	-287.3	328.7	299.2	29.56	11.121			
6,900.0	6,526.2	7,069.6	6,703.6	18.1	18.4	122.63	-567.9	-287.3	331.3	300.0	31.29	10.586			
7,000.0	6,529.2	7,191.0	6,709.0	19.3	19.9	122.81	-689.1	-287.3	331.9	298.5	33.44	9.926			
7,100.0	6,528.5	7,291.0	6,709.0	20.7	21.3	122.90	-789.1	-287.3	332.3	296.5	35.74	9.298			
7,200.0	6,527.9	7,391.0	6,709.0	22.2	22.7	122.99	-889.1	-287.3	332.6	294.4	38.17	8.713			
7,300.0	6,527.2	7,491.0	6,709.0	23.7	24.2	123.09	-989.1	-287.3	333.0	292.2	40.73	8.175			
7,400.0	6,526.6	7,591.0	6,709.0	25.2	25.7	123.18	-1,089.1	-287.3	333.3	289.9	43.38	7.684			
7,500.0	6,525.9	7,691.0	6,709.0	26.9	27.3	123.27	-1,189.1	-287.3	333.7	287.6	46.10	7.237			
7,600.0	6,525.3	7,791.0	6,709.0	28.5	28.9	123.37	-1,289.1	-287.3	334.0	285.1	48.89	6.832			
7,700.0	6,524.6	7,891.0	6,709.0	30.2	30.6	123.46	-1,389.1	-287.3	334.4	282.6	51.73	6.464			
7,800.0	6,524.0	7,991.0	6,709.0	31.9	32.3	123.55	-1,489.1	-287.3	334.7	280.1	54.61	6.129			
7,900.0	6,523.4	8,091.0	6,709.0	33.7	34.0	123.64	-1,589.1	-287.3	335.1	277.6	57.53	5.824			
8,000.0	6,522.7	8,191.0	6,709.0	35.4	35.7	123.73	-1,689.1	-287.3	335.4	275.0	60.48	5.546			
8,100.0	6,522.1	8,291.0	6,709.0	37.2	37.5	123.83	-1,789.1	-287.3	335.8	272.4	63.45	5.292			
8,200.0	6,521.4	8,391.0	6,709.0	39.0	39.3	123.92	-1,889.1	-287.3	336.2	269.7	66.44	5.059			
8,300.0	6,520.8	8,491.0	6,709.0	40.8	41.0	124.01	-1,989.1	-287.3	336.5	267.1	69.45	4.845			
8,400.0	6,520.1	8,591.0	6,709.0	42.6	42.8	124.10	-2,089.1	-287.3	336.9	264.4	72.48	4.648			
8,500.0	6,519.5	8,691.0	6,709.0	44.4	44.6	124.19	-2,189.1	-287.3	337.2	261.7	75.51	4.466			
8,600.0	6,518.8	8,791.0	6,709.0	46.2	46.5	124.28	-2,289.0	-287.3	337.6	259.1	78.55	4.298			
8,700.0	6,518.2	8,891.0	6,709.0	48.0	48.3	124.37	-2,389.0	-287.3	338.0	256.4	81.61	4.142			
8,800.0	6,517.5	8,991.0	6,709.0	49.9	50.1	124.46	-2,489.0	-287.3	338.3	253.7	84.66	3.996			
8,900.0	6,516.9	9,091.0	6,709.0	51.7	51.9	124.55	-2,589.0	-287.3	338.7	251.0	87.73	3.861			
9,000.0	6,516.3	9,191.0	6,709.0	53.6	53.8	124.64	-2,689.0	-287.3	339.1	248.3	90.79	3.735			
9,100.0	6,515.6	9,291.0	6,709.0	55.4	55.6	124.73	-2,789.0	-287.3	339.4	245.6	93.86	3.616			
9,200.0	6,515.0	9,391.0	6,709.0	57.3	57.5	124.82	-2,889.0	-287.3	339.8	242.9	96.94	3.506			
9,300.0	6,514.3	9,491.0	6,709.0	59.1	59.3	124.91	-2,989.0	-287.3	340.2	240.2	100.01	3.401			
9,400.0	6,513.7	9,591.0	6,709.0	61.0	61.2	125.00	-3,089.0	-287.3	340.5	237.5	103.08	3.304			
9,500.0	6,513.0	9,691.0	6,709.0	62.9	63.1	125.09	-3,189.0	-287.3	340.9	234.8	106.16	3.211			
9,600.0	6,512.4	9,791.0	6,709.0	64.8	64.9	125.18	-3,289.0	-287.3	341.3	232.1	109.23	3.124			
9,700.0	6,511.7	9,891.0	6,709.0	66.6	66.8	125.27	-3,389.0	-287.3	341.7	229.4	112.31	3.042			
9,800.0	6,511.1	9,991.0	6,709.0	68.5	68.7	125.35	-3,489.0	-287.3	342.0	226.7	115.38	2.965			
9,900.0	6,510.4	10,091.0	6,709.0	70.4	70.5	125.44	-3,589.0	-287.3	342.4	224.0	118.45	2.891			

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

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19M Pad Sec.19-T4N-R63W - Sater 19M-443 - Wellbore #1 - Plan #1 (2-10-15)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning
Reference	Offset	Reference	Offset	Reference	Offset		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)			
10,000.0	6,509.8	10,191.0	6,709.0	72.3	72.4	125.53	-3,689.0	-287.3	342.8	221.3	121.52	2.821	
10,100.0	6,509.2	10,291.0	6,709.0	74.2	74.3	125.62	-3,789.0	-287.3	343.2	218.6	124.58	2.754	
10,200.0	6,508.5	10,391.0	6,709.0	76.0	76.2	125.70	-3,889.0	-287.3	343.5	215.9	127.65	2.691	
10,300.0	6,507.9	10,491.0	6,709.0	77.9	78.1	125.79	-3,989.0	-287.3	343.9	213.2	130.71	2.631	
10,400.0	6,507.2	10,591.0	6,709.0	79.8	79.9	125.88	-4,089.0	-287.3	344.3	210.5	133.77	2.574	
10,500.0	6,506.6	10,691.0	6,709.0	81.7	81.8	125.97	-4,189.0	-287.3	344.7	207.8	136.83	2.519	
10,600.0	6,505.9	10,791.0	6,709.0	83.6	83.7	126.05	-4,289.0	-287.3	345.1	205.2	139.88	2.467	
10,700.0	6,505.3	10,891.0	6,709.0	85.5	85.6	126.14	-4,389.0	-287.3	345.4	202.5	142.93	2.417	
10,800.0	6,504.6	10,991.0	6,709.0	87.4	87.5	126.23	-4,489.0	-287.3	345.8	199.8	145.97	2.369	
10,898.2	6,504.0	11,084.9	6,709.0	89.2	89.0	126.31	-4,583.0	-287.3	346.2	197.6	148.61	2.330 SF	

Reference Depths are relative to WELL @ 4677.0ft (RKB - 13')	Coordinates are relative to: Sater 19M-243
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: 0.66°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19M-243
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4677.0ft (RKB - 13')
Reference Site:	Sater 4N63W19M Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4677.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19M-243	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 (2-10-15)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4677.0ft (RKB - 13')
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000 °

Coordinates are relative to: Sater 19M-243
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.66°

