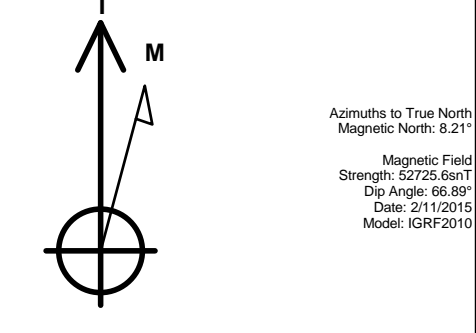


PETROLEUM DEVELOPMENT CORP Weld County CO

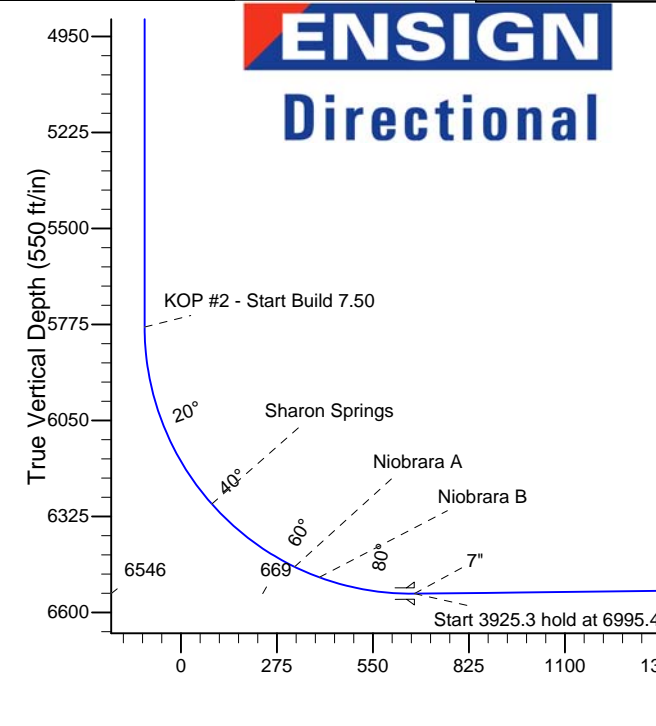
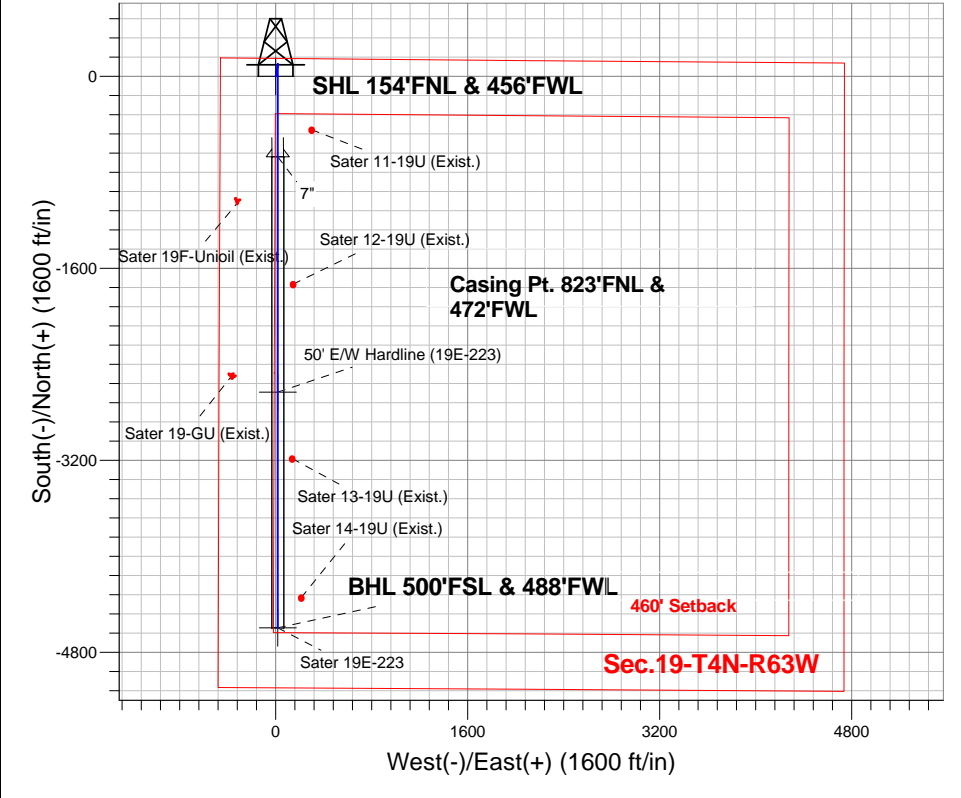
Well Name: **Sater 19E-223**
Surface Location: Sater 4N63W19E Pad Sec.19-T4N-R63W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4660.0
+N/-S +E/-W Northing Easting Latitude Longitude Slot
0.0 0.0 1355373.50 3282229.53 40.304480 -104.488050
RKB - 13' WELL @ 4673.0ft (RKB - 13')

WELLBORE TARGET DETAILS				
Name	TVD	+N/-S	+E/-W	Shape
50' E/W Hardline (19E-223)	1.0	-2631.4	16.7	Rectangle (Sides: L3925.0 W100.0)
SHL 154'FNL & 456'FWL	1.0	0.0	0.0	Point
BHL 500'FSL & 488'FWL	6500.0	-4593.9	16.7	Point

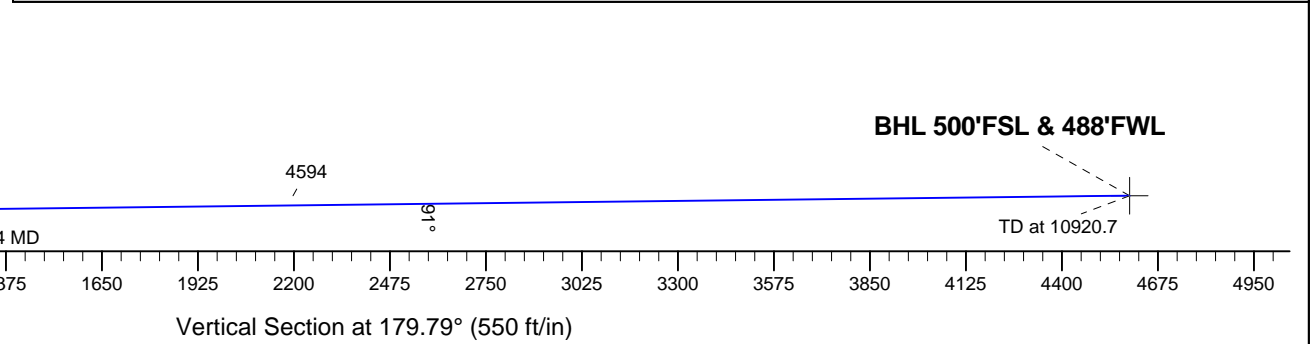


Sater 4N63W19E Pad Sec.19-T4N-R63W
Sater 19E-223
Plan #1 (2-11-15)
10:36, February 12 2015

ANNOTATIONS		
TVD	MD	Annotation
3000.0	3000.0	KOP - Start Build 1.00
4222.7	4226.7	Start Drop -2.00
5782.0	5786.5	KOP #2 - Start Build 7.50
6545.9	6995.4	Start 3925.3 hold at 6995.4 MD
6500.0	10920.7	TD at 10920.7



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	5.56	9.14	3554.7	26.6	4.3	1.00	9.14	-26.6	
4	4226.7	5.56	9.14	4222.7	90.7	14.6	0.00	0.00	-90.7	
5	4504.5	0.00	0.00	4500.0	104.0	16.7	2.00	180.00	-103.9	
6	5786.5	0.00	0.00	5782.0	104.0	16.7	0.00	0.00	-103.9	
7	6995.4	90.67	180.00	6545.9	-668.9	16.7	7.50	180.00	668.9	
8	10920.7	90.67	180.00	6500.0	-4593.9	16.7	0.00	0.00	4593.9	BHL 500'FSL & 488'FWL





PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.19-T4N-R63W

Sater 4N63W19E Pad Sec.19-T4N-R63W

Sater 19E-223

Wellbore #1

Plan: Plan #1 (2-11-15)

Standard Planning Report

12 February, 2015

Database:	Landmark	Local Co-ordinate Reference:	Well Sater 19E-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Project:	SEC.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	North Reference:	True
Well:	Sater 19E-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-11-15)		

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 4N63W19E Pad Sec.19-T4N-R63W		
Site Position:		Northing:	1,355,372.81 ft
From:	Lat/Long	Easting:	3,282,168.18 ft
Position Uncertainty:	0.0 ft	Slot Radius:	"
		Latitude:	40.304480
		Longitude:	-104.488270
		Grid Convergence:	0.65 °

Well	Sater 19E-223		
Well Position	+N/-S	0.0 ft	Northing:
	+E/-W	61.4 ft	Easting:
Position Uncertainty		0.0 ft	Wellhead Elevation:
			Latitude:
			Longitude:
			Ground Level:

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/11/2015	8.21	66.89	52,726

Design	Plan #1 (2-11-15)			
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	179.79

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	5.56	9.14	3,554.7	26.6	4.3	1.00	1.00	0.00	9.14	
4,226.7	5.56	9.14	4,222.7	90.7	14.6	0.00	0.00	0.00	0.00	
4,504.5	0.00	0.00	4,500.0	104.0	16.7	2.00	-2.00	0.00	180.00	
5,786.5	0.00	0.00	5,782.0	104.0	16.7	0.00	0.00	0.00	0.00	
6,995.4	90.67	180.00	6,545.9	-668.9	16.7	7.50	7.50	0.00	180.00	
10,920.7	90.67	180.00	6,500.0	-4,593.9	16.7	0.00	0.00	0.00	0.00	BHL 500'FSL & 48E

Database:	Landmark	Local Co-ordinate Reference:	Well Sater 19E-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Project:	SEC.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	North Reference:	True
Well:	Sater 19E-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-11-15)		

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 154'FNL & 456'FWL - 50' E/W Hardline (19E-223)									
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	9.14	3,100.0	0.9	0.1	-0.9	1.00	1.00	0.00
3,200.0	2.00	9.14	3,200.0	3.4	0.6	-3.4	1.00	1.00	0.00
3,300.0	3.00	9.14	3,299.9	7.8	1.2	-7.7	1.00	1.00	0.00
3,400.0	4.00	9.14	3,399.7	13.8	2.2	-13.8	1.00	1.00	0.00
3,449.5	4.49	9.14	3,449.0	17.4	2.8	-17.4	1.00	1.00	0.00
Parkman									
3,500.0	5.00	9.14	3,499.4	21.5	3.5	-21.5	1.00	1.00	0.00
3,555.5	5.56	9.14	3,554.7	26.6	4.3	-26.6	1.00	1.00	0.00
3,600.0	5.56	9.14	3,598.9	30.8	5.0	-30.8	0.00	0.00	0.00
3,700.0	5.56	9.14	3,698.5	40.4	6.5	-40.4	0.00	0.00	0.00
3,800.0	5.56	9.14	3,798.0	49.9	8.0	-49.9	0.00	0.00	0.00
3,900.0	5.56	9.14	3,897.5	59.5	9.6	-59.5	0.00	0.00	0.00
4,000.0	5.56	9.14	3,997.0	69.0	11.1	-69.0	0.00	0.00	0.00
4,100.0	5.56	9.14	4,096.6	78.6	12.7	-78.6	0.00	0.00	0.00
4,102.4	5.56	9.14	4,099.0	78.8	12.7	-78.8	0.00	0.00	0.00
Sussex									
4,200.0	5.56	9.14	4,196.1	88.2	14.2	-88.1	0.00	0.00	0.00
4,226.7	5.56	9.14	4,222.7	90.7	14.6	-90.7	0.00	0.00	0.00
Start Drop -2.00									

Database:	Landmark	Local Co-ordinate Reference:	Well Sater 19E-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Project:	SEC.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	North Reference:	True
Well:	Sater 19E-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-11-15)		

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	9.14	4,295.7	96.8	15.6	-96.7	2.00	-2.00	0.00
4,400.0	2.09	9.14	4,395.6	102.1	16.4	-102.1	2.00	-2.00	0.00
4,500.0	0.09	9.14	4,495.5	104.0	16.7	-103.9	2.00	-2.00	0.00
4,504.5	0.00	0.00	4,500.0	104.0	16.7	-103.9	2.00	-2.00	0.00
4,600.0	0.00	0.00	4,595.5	104.0	16.7	-103.9	0.00	0.00	0.00
4,700.0	0.00	0.00	4,695.5	104.0	16.7	-103.9	0.00	0.00	0.00
4,800.0	0.00	0.00	4,795.5	104.0	16.7	-103.9	0.00	0.00	0.00
4,868.5	0.00	0.00	4,864.0	104.0	16.7	-103.9	0.00	0.00	0.00
Shannon									
4,900.0	0.00	0.00	4,895.5	104.0	16.7	-103.9	0.00	0.00	0.00
5,000.0	0.00	0.00	4,995.5	104.0	16.7	-103.9	0.00	0.00	0.00
5,100.0	0.00	0.00	5,095.5	104.0	16.7	-103.9	0.00	0.00	0.00
5,200.0	0.00	0.00	5,195.5	104.0	16.7	-103.9	0.00	0.00	0.00
5,300.0	0.00	0.00	5,295.5	104.0	16.7	-103.9	0.00	0.00	0.00
5,400.0	0.00	0.00	5,395.5	104.0	16.7	-103.9	0.00	0.00	0.00
5,500.0	0.00	0.00	5,495.5	104.0	16.7	-103.9	0.00	0.00	0.00
5,600.0	0.00	0.00	5,595.5	104.0	16.7	-103.9	0.00	0.00	0.00
5,700.0	0.00	0.00	5,695.5	104.0	16.7	-103.9	0.00	0.00	0.00
5,786.5	0.00	0.00	5,782.0	104.0	16.7	-103.9	0.00	0.00	0.00
KOP #2 - Start Build 7.50									
5,800.0	1.02	180.00	5,795.5	103.9	16.7	-103.8	7.52	7.52	0.00
5,900.0	8.52	180.00	5,895.1	95.6	16.7	-95.5	7.50	7.50	0.00
6,000.0	16.02	180.00	5,992.8	74.4	16.7	-74.3	7.50	7.50	0.00
6,100.0	23.52	180.00	6,086.8	40.6	16.7	-40.5	7.50	7.50	0.00
6,200.0	31.02	180.00	6,175.6	-5.2	16.7	5.3	7.50	7.50	0.00
6,300.0	38.52	180.00	6,257.7	-62.2	16.7	62.3	7.50	7.50	0.00
6,340.9	41.58	180.00	6,289.0	-88.5	16.7	88.5	7.50	7.50	0.00
Sharon Springs									
6,400.0	46.02	180.00	6,331.7	-129.4	16.7	129.5	7.50	7.50	0.00
6,500.0	53.52	180.00	6,396.2	-205.7	16.7	205.8	7.50	7.50	0.00
6,600.0	61.02	180.00	6,450.3	-289.8	16.7	289.8	7.50	7.50	0.00
6,640.6	64.06	180.00	6,469.0	-325.8	16.7	325.9	7.50	7.50	0.00
Niobrara A									
6,700.0	68.52	180.00	6,492.9	-380.1	16.7	380.2	7.50	7.50	0.00
6,717.2	69.81	180.00	6,499.0	-396.3	16.7	396.3	7.50	7.50	0.00
Niobrara B									
6,800.0	76.02	180.00	6,523.3	-475.3	16.7	475.4	7.50	7.50	0.00
6,900.0	83.52	180.00	6,541.1	-573.7	16.7	573.7	7.50	7.50	0.00
6,995.4	90.67	180.00	6,545.9	-668.9	16.7	668.9	7.50	7.50	0.00
Start 3925.3 hold at 6995.4 MD - 7"									
7,000.0	90.67	180.00	6,545.8	-673.5	16.7	673.5	0.00	0.00	0.00
7,100.0	90.67	180.00	6,544.7	-773.5	16.7	773.5	0.00	0.00	0.00
7,200.0	90.67	180.00	6,543.5	-873.5	16.7	873.5	0.00	0.00	0.00
7,300.0	90.67	180.00	6,542.3	-973.5	16.7	973.5	0.00	0.00	0.00
7,400.0	90.67	180.00	6,541.2	-1,073.5	16.7	1,073.5	0.00	0.00	0.00
7,500.0	90.67	180.00	6,540.0	-1,173.4	16.7	1,173.5	0.00	0.00	0.00
7,600.0	90.67	180.00	6,538.8	-1,273.4	16.7	1,273.5	0.00	0.00	0.00
7,700.0	90.67	180.00	6,537.7	-1,373.4	16.7	1,373.5	0.00	0.00	0.00
7,800.0	90.67	180.00	6,536.5	-1,473.4	16.7	1,473.5	0.00	0.00	0.00
7,900.0	90.67	180.00	6,535.3	-1,573.4	16.7	1,573.5	0.00	0.00	0.00
8,000.0	90.67	180.00	6,534.2	-1,673.4	16.7	1,673.5	0.00	0.00	0.00
8,100.0	90.67	180.00	6,533.0	-1,773.4	16.7	1,773.5	0.00	0.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Sater 19E-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Project:	SEC.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	North Reference:	True
Well:	Sater 19E-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-11-15)		

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	90.67	180.00	6,531.8	-1,873.4	16.7	1,873.4	0.00	0.00	0.00
8,300.0	90.67	180.00	6,530.6	-1,973.4	16.7	1,973.4	0.00	0.00	0.00
8,400.0	90.67	180.00	6,529.5	-2,073.4	16.7	2,073.4	0.00	0.00	0.00
8,500.0	90.67	180.00	6,528.3	-2,173.4	16.7	2,173.4	0.00	0.00	0.00
8,600.0	90.67	180.00	6,527.1	-2,273.4	16.7	2,273.4	0.00	0.00	0.00
8,700.0	90.67	180.00	6,526.0	-2,373.4	16.7	2,373.4	0.00	0.00	0.00
8,800.0	90.67	180.00	6,524.8	-2,473.4	16.7	2,473.4	0.00	0.00	0.00
8,900.0	90.67	180.00	6,523.6	-2,573.3	16.7	2,573.4	0.00	0.00	0.00
9,000.0	90.67	180.00	6,522.5	-2,673.3	16.7	2,673.4	0.00	0.00	0.00
9,100.0	90.67	180.00	6,521.3	-2,773.3	16.7	2,773.4	0.00	0.00	0.00
9,200.0	90.67	180.00	6,520.1	-2,873.3	16.7	2,873.4	0.00	0.00	0.00
9,300.0	90.67	180.00	6,519.0	-2,973.3	16.7	2,973.4	0.00	0.00	0.00
9,400.0	90.67	180.00	6,517.8	-3,073.3	16.7	3,073.4	0.00	0.00	0.00
9,500.0	90.67	180.00	6,516.6	-3,173.3	16.7	3,173.3	0.00	0.00	0.00
9,600.0	90.67	180.00	6,515.4	-3,273.3	16.7	3,273.3	0.00	0.00	0.00
9,700.0	90.67	180.00	6,514.3	-3,373.3	16.7	3,373.3	0.00	0.00	0.00
9,800.0	90.67	180.00	6,513.1	-3,473.3	16.7	3,473.3	0.00	0.00	0.00
9,900.0	90.67	180.00	6,511.9	-3,573.3	16.7	3,573.3	0.00	0.00	0.00
10,000.0	90.67	180.00	6,510.8	-3,673.3	16.7	3,673.3	0.00	0.00	0.00
10,100.0	90.67	180.00	6,509.6	-3,773.3	16.7	3,773.3	0.00	0.00	0.00
10,200.0	90.67	180.00	6,508.4	-3,873.3	16.7	3,873.3	0.00	0.00	0.00
10,300.0	90.67	180.00	6,507.3	-3,973.3	16.7	3,973.3	0.00	0.00	0.00
10,400.0	90.67	180.00	6,506.1	-4,073.2	16.7	4,073.3	0.00	0.00	0.00
10,500.0	90.67	180.00	6,504.9	-4,173.2	16.7	4,173.3	0.00	0.00	0.00
10,600.0	90.67	180.00	6,503.7	-4,273.2	16.7	4,273.3	0.00	0.00	0.00
10,700.0	90.67	180.00	6,502.6	-4,373.2	16.7	4,373.3	0.00	0.00	0.00
10,800.0	90.67	180.00	6,501.4	-4,473.2	16.7	4,473.2	0.00	0.00	0.00
10,900.0	90.67	180.00	6,500.2	-4,573.2	16.7	4,573.2	0.00	0.00	0.00
10,920.7	90.67	180.00	6,500.0	-4,593.9	16.7	4,593.9	0.00	0.00	0.00
BHL 500'FSL & 488'FWL									

Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
SHL 154'FNL & 456'F	0.00	0.00	1.0	0.0	0.0	1,355,373.51	3,282,229.53	40.304480	-104.488050
- plan hits target center									
- Point									
50' E/W Hardline (19E	0.00	0.00	1.0	-2,631.4	16.7	1,352,742.58	3,282,276.26	40.297257	-104.487990
- plan misses target center by 2631.5ft at 1.0ft MD (1.0 TVD, 0.0 N, 0.0 E)									
- Rectangle (sides W3,925.0 H100.0 D0.0)									
BHL 500'FSL & 488'F	0.00	0.00	6,500.0	-4,593.9	16.7	1,350,780.31	3,282,298.69	40.291870	-104.487990
- plan hits target center									
- Point									

Database:	Landmark	Local Co-ordinate Reference:	Well Sater 19E-223
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Project:	SEC.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	North Reference:	True
Well:	Sater 19E-223	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (2-11-15)		

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
6,995.4	6,545.9	7"	7	7-1/2

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,449.5	3,449.0	Parkman		0.00	
4,102.4	4,099.0	Sussex		0.00	
4,868.5	4,864.0	Shannon		0.00	
6,340.9	6,289.0	Sharon Springs		0.00	
6,640.6	6,469.0	Niobrara A		0.00	
6,717.2	6,499.0	Niobrara B		0.00	
	6,594.0	Niobrara C		0.00	
	6,689.0	Ft. Hays		0.00	
	6,709.0	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	90.7	14.6	Start Drop -2.00
5,786.5	5,782.0	104.0	16.7	KOP #2 - Start Build 7.50
6,995.4	6,545.9	-668.9	16.7	Start 3925.3 hold at 6995.4 MD
10,920.7	6,500.0	-4,593.9	16.7	TD at 10920.7



PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.19-T4N-R63W

Sater 4N63W19E Pad Sec.19-T4N-R63W

Sater 19E-223

Wellbore #1

Plan #1 (2-11-15)

Anticollision Report

12 February, 2015



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (2-11-15)		
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	10,920.7	Plan #1 (2-11-15) (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 11-19U (Exist.) - Wellbore #1 - Wellbore #1	6,768.0	6,516.9	281.7	134.9	1.919	CC, ES, SF
Sater 12-19U (Exist.) - Wellbore #1 - Wellbore #1	8,057.0	6,546.5	128.3	-38.8	0.768	Level 1, CC, ES, SF
Sater 13-19U (Exist.) - Wellbore #1 - Wellbore #1	9,510.7	6,585.5	119.9	-74.6	0.617	Level 1, CC, ES, SF
Sater 14-19U (Exist.) - Wellbore #1 - Wellbore #1	10,669.3	6,564.9	195.3	-20.6	0.904	Level 1, CC, ES, SF
Sater 19F-Unioil (Exist.) - Wellbore #1 - Wellbore #1	7,355.7	6,561.5	320.3	285.0	9.069	CC, ES
Sater 19F-Unioil (Exist.) - Wellbore #1 - Wellbore #1	7,400.0	6,560.9	323.4	287.3	8.980	SF
Sater 19-GU (Exist.) - Wellbore #1 - Wellbore #1	8,807.0	6,587.5	380.0	319.1	6.236	CC, ES, SF
Sater 4N63W19E Pad Sec.19-T4N-R63W						
Sater 19E-203 - Wellbore #1 - Plan #1 (2-10-15)	1,366.3	1,367.3	61.4	55.4	10.366	CC
Sater 19E-203 - Wellbore #1 - Plan #1 (2-10-15)	1,400.0	1,401.0	61.4	55.3	10.108	ES
Sater 19E-203 - Wellbore #1 - Plan #1 (2-10-15)	10,920.7	10,941.6	458.2	279.7	2.568	SF
Sater 19E-323 - Wellbore #1 - Plan #1 (2-11-15)	1,766.3	1,767.3	30.7	23.0	3.975	CC
Sater 19E-323 - Wellbore #1 - Plan #1 (2-11-15)	1,800.0	1,801.0	30.7	22.8	3.899	ES
Sater 19E-323 - Wellbore #1 - Plan #1 (2-11-15)	10,920.7	10,998.5	260.3	92.4	1.550	SF
Sater 19J-443 - Wellbore #1 - Plan #1 (2-11-15)	1,600.0	1,600.0	30.7	23.7	4.403	CC, ES
Sater 19J-443 - Wellbore #1 - Plan #1 (2-11-15)	10,920.7	11,103.7	433.6	274.4	2.723	SF

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 11-19U (Exist.) - Wellbore #1 - Wellbore #1											
Survey Program: 7340-UNKNOWN											
Reference											
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	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)
0.0	0.0	2.0	2.0	0.0	0.0	146.12	-444.5	298.4	535.4	535.3	0.04
100.0	100.0	102.0	102.0	0.1	2.0	146.12	-444.5	298.4	535.4	533.2	2.15
200.0	200.0	202.0	202.0	0.3	4.0	146.12	-444.5	298.4	535.4	531.0	4.38
300.0	300.0	302.0	302.0	0.6	6.0	146.12	-444.5	298.4	535.4	528.8	6.60
400.0	400.0	402.0	402.0	0.8	8.0	146.12	-444.5	298.4	535.4	526.5	8.83
500.0	500.0	502.0	502.0	1.0	10.0	146.12	-444.5	298.4	535.4	524.3	11.05
600.0	600.0	602.0	602.0	1.2	12.0	146.12	-444.5	298.4	535.4	522.1	13.28
700.0	700.0	702.0	702.0	1.5	14.0	146.12	-444.5	298.4	535.4	519.9	15.50
800.0	800.0	802.0	802.0	1.7	16.0	146.12	-444.5	298.4	535.4	517.6	17.73
900.0	900.0	902.0	902.0	1.9	18.0	146.12	-444.5	298.4	535.4	515.4	19.95
											26.834

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 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 11-19U (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7340-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
1,000.0	1,000.0	1,002.0	1,002.0	2.1	20.0	146.12	-444.5	298.4	535.4	513.2	22.18	24.142		
1,100.0	1,100.0	1,102.0	1,102.0	2.4	22.0	146.12	-444.5	298.4	535.4	511.0	24.40	21.941		
1,200.0	1,200.0	1,202.0	1,202.0	2.6	24.0	146.12	-444.5	298.4	535.4	508.7	26.62	20.107		
1,300.0	1,300.0	1,302.0	1,302.0	2.8	26.0	146.12	-444.5	298.4	535.4	506.5	28.85	18.557		
1,400.0	1,400.0	1,402.0	1,402.0	3.0	28.0	146.12	-444.5	298.4	535.4	504.3	31.07	17.228		
1,500.0	1,500.0	1,502.0	1,502.0	3.3	30.0	146.12	-444.5	298.4	535.4	502.1	33.30	16.077		
1,600.0	1,600.0	1,602.0	1,602.0	3.5	32.0	146.12	-444.5	298.4	535.4	499.8	35.52	15.070		
1,700.0	1,700.0	1,702.0	1,702.0	3.7	34.0	146.12	-444.5	298.4	535.4	497.6	37.75	14.182		
1,800.0	1,800.0	1,802.0	1,802.0	3.9	36.0	146.12	-444.5	298.4	535.4	495.4	39.97	13.393		
1,900.0	1,900.0	1,902.0	1,902.0	4.2	38.0	146.12	-444.5	298.4	535.4	493.2	42.20	12.687		
2,000.0	2,000.0	2,002.0	2,002.0	4.4	40.0	146.12	-444.5	298.4	535.4	490.9	44.42	12.051		
2,100.0	2,100.0	2,102.0	2,102.0	4.6	42.0	146.12	-444.5	298.4	535.4	488.7	46.65	11.477		
2,200.0	2,200.0	2,202.0	2,202.0	4.8	44.0	146.12	-444.5	298.4	535.4	486.5	48.87	10.954		
2,300.0	2,300.0	2,302.0	2,302.0	5.1	46.0	146.12	-444.5	298.4	535.4	484.3	51.10	10.477		
2,400.0	2,400.0	2,402.0	2,402.0	5.3	48.0	146.12	-444.5	298.4	535.4	482.0	53.32	10.040		
2,500.0	2,500.0	2,502.0	2,502.0	5.5	50.0	146.12	-444.5	298.4	535.4	479.8	55.55	9.638		
2,600.0	2,600.0	2,602.0	2,602.0	5.7	52.0	146.12	-444.5	298.4	535.4	477.6	57.77	9.267		
2,700.0	2,700.0	2,702.0	2,702.0	6.0	54.0	146.12	-444.5	298.4	535.4	475.4	60.00	8.923		
2,800.0	2,800.0	2,802.0	2,802.0	6.2	56.0	146.12	-444.5	298.4	535.4	473.1	62.22	8.604		
2,900.0	2,900.0	2,902.0	2,902.0	6.4	58.0	146.12	-444.5	298.4	535.4	470.9	64.45	8.307		
3,000.0	3,000.0	3,002.0	3,002.0	6.6	60.0	146.12	-444.5	298.4	535.4	468.7	66.67	8.030		
3,100.0	3,100.0	3,102.0	3,102.0	6.9	62.0	137.04	-444.5	298.4	536.0	467.1	68.89	7.781		
3,200.0	3,200.0	3,202.0	3,202.0	7.1	64.0	137.21	-444.5	298.4	537.9	466.8	71.10	7.566		
3,300.0	3,299.9	3,301.9	3,301.9	7.3	66.0	137.50	-444.5	298.4	541.1	467.8	73.29	7.384		
3,400.0	3,399.7	3,401.7	3,401.7	7.5	68.0	137.91	-444.5	298.4	545.6	470.2	75.46	7.231		
3,500.0	3,499.4	3,501.4	3,501.4	7.8	70.0	138.41	-444.5	298.4	551.5	473.9	77.62	7.105		
3,600.0	3,598.9	3,600.9	3,600.9	8.0	72.0	139.03	-444.5	298.4	558.6	478.8	79.79	7.001		
3,700.0	3,698.5	3,700.5	3,700.5	8.2	74.0	139.67	-444.5	298.4	565.9	483.9	82.00	6.902		
3,800.0	3,798.0	3,800.0	3,800.0	8.4	76.0	140.29	-444.5	298.4	573.4	489.2	84.21	6.809		
3,900.0	3,897.5	3,899.5	3,899.5	8.7	78.0	140.90	-444.5	298.4	580.9	494.4	86.42	6.721		
4,000.0	3,997.0	3,999.0	3,999.0	8.9	80.0	141.50	-444.5	298.4	588.4	499.8	88.63	6.639		
4,100.0	4,096.6	4,098.6	4,098.6	9.2	82.0	142.07	-444.5	298.4	596.0	505.2	90.85	6.561		
4,200.0	4,196.1	4,198.1	4,198.1	9.4	84.0	142.64	-444.5	298.4	603.7	510.7	93.06	6.487		
4,300.0	4,295.7	4,297.7	4,297.7	9.6	86.0	143.19	-444.5	298.4	610.7	515.3	95.39	6.403		
4,400.0	4,395.6	4,397.6	4,397.6	9.8	88.0	143.55	-444.5	298.4	615.0	517.4	97.67	6.297		
4,500.0	4,495.5	4,497.5	4,497.5	10.0	90.0	143.67	-444.5	298.4	616.6	516.7	99.87	6.173		
4,600.0	4,595.5	4,597.5	4,597.5	10.2	92.0	152.81	-444.5	298.4	616.6	514.5	102.07	6.041		
4,700.0	4,695.5	4,697.5	4,697.5	10.4	94.0	152.81	-444.5	298.4	616.6	512.3	104.29	5.912		
4,800.0	4,795.5	4,797.5	4,797.5	10.6	96.0	152.81	-444.5	298.4	616.6	510.1	106.51	5.789		
4,900.0	4,895.5	4,897.5	4,897.5	10.9	98.0	152.81	-444.5	298.4	616.6	507.8	108.74	5.670		
5,000.0	4,995.5	4,997.5	4,997.5	11.1	100.0	152.81	-444.5	298.4	616.6	505.6	110.96	5.557		
5,100.0	5,095.5	5,097.5	5,097.5	11.3	102.0	152.81	-444.5	298.4	616.6	503.4	113.18	5.448		
5,200.0	5,195.5	5,197.5	5,197.5	11.5	104.0	152.81	-444.5	298.4	616.6	501.2	115.41	5.343		
5,300.0	5,295.5	5,297.5	5,297.5	11.7	106.0	152.81	-444.5	298.4	616.6	498.9	117.63	5.242		
5,400.0	5,395.5	5,397.5	5,397.5	12.0	108.0	152.81	-444.5	298.4	616.6	496.7	119.85	5.144		
5,500.0	5,495.5	5,497.5	5,497.5	12.2	110.0	152.81	-444.5	298.4	616.6	494.5	122.08	5.051		
5,600.0	5,595.5	5,597.5	5,597.5	12.4	112.0	152.81	-444.5	298.4	616.6	492.3	124.30	4.960		
5,700.0	5,695.5	5,697.5	5,697.5	12.6	114.0	152.81	-444.5	298.4	616.6	490.0	126.52	4.873		
5,800.0	5,795.5	5,797.5	5,797.5	12.8	116.0	-27.20	-444.5	298.4	616.5	487.7	128.72	4.789		
5,900.0	5,895.1	5,897.1	5,897.1	13.0	117.9	-27.81	-444.5	298.4	609.1	479.3	129.77	4.694		
6,000.0	5,992.8	5,994.8	5,994.8	13.1	119.9	-29.46	-444.5	298.4	590.4	461.2	129.15	4.571		

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 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 ft
Existing Wells Sec.19-T4N-R63W - Sater 11-19U (Exist.) - Wellbore #1 - Wellbore #1												Offset Well Error:	0.0 ft
Survey Program: 7340-UNKNOWN													
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)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
6,100.0	6,086.8	6,088.8	6,088.8	13.3	121.8	-32.35	-444.5	298.4	560.9	433.6	127.24	4.408	
6,200.0	6,175.6	6,177.6	6,177.6	13.4	123.6	-36.81	-444.5	298.4	521.8	396.9	124.95	4.176	
6,300.0	6,257.7	6,259.7	6,259.7	13.6	125.2	-43.29	-444.5	298.4	474.8	350.9	123.97	3.830	
6,400.0	6,331.7	6,333.7	6,333.7	13.9	126.7	-52.17	-444.5	298.4	422.6	296.2	126.39	3.344	
6,500.0	6,396.2	6,398.2	6,398.2	14.4	128.0	-63.25	-444.5	298.4	369.3	236.4	132.84	2.780	
6,600.0	6,450.3	6,452.3	6,452.3	15.0	129.0	-75.10	-444.5	298.4	321.4	181.0	140.40	2.289	
6,700.0	6,492.9	6,494.9	6,494.9	15.8	129.9	-85.22	-444.5	298.4	289.0	143.7	145.25	1.989	
6,768.0	6,514.9	6,516.9	6,516.9	16.5	130.3	-90.00	-444.5	298.4	281.7	134.9	146.79	1.919	CC, ES, SF
6,800.0	6,523.3	6,525.3	6,525.3	16.8	130.5	-91.52	-444.5	298.4	283.4	136.2	147.22	1.925	
6,900.0	6,541.1	6,543.1	6,543.1	17.9	130.9	-92.97	-444.5	298.4	309.9	161.4	148.57	2.086	
7,000.0	6,545.8	6,547.8	6,547.8	19.2	131.0	-89.46	-444.5	298.4	363.1	213.0	150.10	2.419	
7,100.0	6,544.7	6,546.7	6,546.7	20.5	130.9	-89.22	-444.5	298.4	433.1	281.7	151.43	2.860	
7,200.0	6,543.5	6,545.5	6,545.5	21.9	130.9	-88.98	-444.5	298.4	513.2	360.4	152.83	3.358	
7,300.0	6,542.3	6,544.3	6,544.3	23.5	130.9	-88.74	-444.5	298.4	599.3	445.0	154.30	3.884	
7,400.0	6,541.2	6,543.2	6,543.2	25.0	130.9	-88.50	-444.5	298.4	689.2	533.4	155.83	4.423	
7,500.0	6,540.0	6,542.0	6,542.0	26.6	130.8	-88.27	-444.5	298.4	781.5	624.1	157.40	4.965	
7,600.0	6,538.8	6,540.8	6,540.8	28.3	130.8	-88.03	-444.5	298.4	875.5	716.5	159.00	5.507	
7,700.0	6,537.7	6,539.7	6,539.7	30.0	130.8	-87.79	-444.5	298.4	970.8	810.1	160.63	6.043	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 12-19U (Exist.) - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 ft
Survey Program: 7372-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)		
7,100.0	6,544.7	6,557.7	6,557.7	20.5	131.2	-94.98	-1,730.5	145.0	965.5	814.5	151.09	6.390	
7,200.0	6,543.5	6,556.5	6,556.5	21.9	131.1	-94.47	-1,730.5	145.0	866.5	713.9	152.62	5.678	
7,300.0	6,542.3	6,555.3	6,555.3	23.5	131.1	-93.95	-1,730.5	145.0	767.8	613.6	154.20	4.979	
7,400.0	6,541.2	6,554.2	6,554.2	25.0	131.1	-93.43	-1,730.5	145.0	669.4	513.6	155.82	4.296	
7,500.0	6,540.0	6,553.0	6,553.0	26.6	131.1	-92.91	-1,730.5	145.0	571.6	414.1	157.48	3.630	
7,600.0	6,538.8	6,551.8	6,551.8	28.3	131.0	-92.39	-1,730.5	145.0	474.7	315.5	159.17	2.982	
7,700.0	6,537.7	6,550.7	6,550.7	30.0	131.0	-91.86	-1,730.5	145.0	379.4	218.5	160.88	2.358	
7,800.0	6,536.5	6,549.5	6,549.5	31.7	131.0	-91.34	-1,730.5	145.0	287.3	124.7	162.61	1.767	
7,900.0	6,535.3	6,548.3	6,548.3	33.4	131.0	-90.82	-1,730.5	145.0	202.8	38.4	164.34	1.234 Level 2	
8,000.0	6,534.2	6,547.2	6,547.2	35.1	130.9	-90.30	-1,730.5	145.0	140.4	-25.7	166.08	0.845 Level 1	
8,057.0	6,533.5	6,546.5	6,546.5	36.2	130.9	-90.00	-1,730.5	145.0	128.3	-38.8	167.08	0.768 Level 1, CC, ES, SF	
8,100.0	6,533.0	6,546.0	6,546.0	36.9	130.9	-89.78	-1,730.5	145.0	135.3	-32.5	167.83	0.806 Level 1	
8,200.0	6,531.8	6,544.8	6,544.8	38.7	130.9	-89.25	-1,730.5	145.0	192.1	22.5	169.58	1.133 Level 2	
8,300.0	6,530.6	6,543.6	6,543.6	40.5	130.9	-88.73	-1,730.5	145.0	274.7	103.4	171.32	1.604	
8,400.0	6,529.5	6,542.5	6,542.5	42.3	130.8	-88.21	-1,730.5	145.0	366.1	193.1	173.06	2.116	
8,500.0	6,528.3	6,541.3	6,541.3	44.1	130.8	-87.69	-1,730.5	145.0	461.1	286.3	174.80	2.638	
8,600.0	6,527.1	6,540.1	6,540.1	45.9	130.8	-87.17	-1,730.5	145.0	557.9	381.3	176.53	3.160	
8,700.0	6,526.0	6,539.0	6,539.0	47.8	130.8	-86.65	-1,730.5	145.0	655.6	477.3	178.25	3.678	
8,800.0	6,524.8	6,537.8	6,537.8	49.6	130.8	-86.13	-1,730.5	145.0	753.9	573.9	179.96	4.189	
8,900.0	6,523.6	6,536.6	6,536.6	51.4	130.7	-85.61	-1,730.5	145.0	852.6	670.9	181.67	4.693	
9,000.0	6,522.5	6,535.5	6,535.5	53.3	130.7	-85.09	-1,730.5	145.0	951.6	768.2	183.36	5.190	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design		Existing Wells Sec.19-T4N-R63W - Sater 13-19U (Exist.) - Wellbore #1 - Wellbore #1											Offset Site Error:	0.0 ft
Survey Program: 7394-UNKNOWN													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
8,600.0	6,527.1	6,596.1	6,596.1	45.9	131.9	-95.07	-3,184.0	136.7	918.5	741.4	177.17	5.184		
8,700.0	6,526.0	6,595.0	6,595.0	47.8	131.9	-94.52	-3,184.0	136.7	819.5	640.4	179.12	4.575		
8,800.0	6,524.8	6,593.8	6,593.8	49.6	131.9	-93.96	-3,184.0	136.7	720.7	539.7	181.05	3.981		
8,900.0	6,523.6	6,592.6	6,592.6	51.4	131.9	-93.41	-3,184.0	136.7	622.4	439.4	182.98	3.401		
9,000.0	6,522.5	6,591.5	6,591.5	53.3	131.8	-92.85	-3,184.0	136.7	524.6	339.7	184.90	2.837		
9,100.0	6,521.3	6,590.3	6,590.3	55.1	131.8	-92.29	-3,184.0	136.7	427.9	241.1	186.80	2.290		
9,200.0	6,520.1	6,589.1	6,589.1	57.0	131.8	-91.73	-3,184.0	136.7	333.1	144.4	188.70	1.765		
9,300.0	6,519.0	6,588.0	6,588.0	58.9	131.8	-91.18	-3,184.0	136.7	242.5	51.9	190.58	1.272	Level 3	
9,400.0	6,517.8	6,586.8	6,586.8	60.7	131.7	-90.62	-3,184.0	136.7	163.2	-29.2	192.45	0.848	Level 1	
9,500.0	6,516.6	6,585.6	6,585.6	62.6	131.7	-90.06	-3,184.0	136.7	120.4	-73.9	194.31	0.620	Level 1	
9,510.7	6,516.5	6,585.5	6,585.5	62.8	131.7	-90.00	-3,184.0	136.7	119.9	-74.6	194.51	0.617	Level 1, CC, ES, SF	
9,600.0	6,515.4	6,584.4	6,584.4	64.5	131.7	-89.50	-3,184.0	136.7	149.5	-46.6	196.15	0.762	Level 1	
9,700.0	6,514.3	6,583.3	6,583.3	66.3	131.7	-88.94	-3,184.0	136.7	224.1	26.1	197.98	1.132	Level 2	
9,800.0	6,513.1	6,582.1	6,582.1	68.2	131.6	-88.38	-3,184.0	136.7	313.1	113.3	199.79	1.567		
9,900.0	6,511.9	6,580.9	6,580.9	70.1	131.6	-87.83	-3,184.0	136.7	407.3	205.7	201.58	2.021		
10,000.0	6,510.8	6,579.8	6,579.8	72.0	131.6	-87.27	-3,184.0	136.7	503.7	300.4	203.36	2.477		
10,100.0	6,509.6	6,578.6	6,578.6	73.9	131.6	-86.71	-3,184.0	136.7	601.3	396.2	205.12	2.932		
10,200.0	6,508.4	6,577.4	6,577.4	75.7	131.5	-86.16	-3,184.0	136.7	699.6	492.7	206.86	3.382		
10,300.0	6,507.3	6,576.3	6,576.3	77.6	131.5	-85.60	-3,184.0	136.7	798.3	589.7	208.59	3.827		
10,400.0	6,506.1	6,575.1	6,575.1	79.5	131.5	-85.05	-3,184.0	136.7	897.3	687.0	210.29	4.267		
10,500.0	6,504.9	6,573.9	6,573.9	81.4	131.5	-84.49	-3,184.0	136.7	996.5	784.5	211.97	4.701		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design										Existing Wells Sec.19-T4N-R63W - Sater 14-19U (Exist.) - Wellbore #1 - Wellbore #1				Offset Site Error:		0.0 ft
Survey Program: 7424-UNKNOWN														Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis		Distance							Warning			
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor				
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)					
9,700.0	6,514.3	6,576.3	6,576.3	66.3	131.5	-93.32	-4,342.5	212.0	988.7	791.2	197.55	5.005				
9,800.0	6,513.1	6,575.1	6,575.1	68.2	131.5	-92.98	-4,342.5	212.0	890.9	691.4	199.46	4.467				
9,900.0	6,511.9	6,573.9	6,573.9	70.1	131.5	-92.64	-4,342.5	212.0	793.6	592.3	201.37	3.941				
10,000.0	6,510.8	6,572.8	6,572.8	72.0	131.5	-92.29	-4,342.5	212.0	697.2	493.9	203.28	3.430				
10,100.0	6,509.6	6,571.6	6,571.6	73.9	131.4	-91.95	-4,342.5	212.0	601.8	396.6	205.18	2.933				
10,200.0	6,508.4	6,570.4	6,570.4	75.7	131.4	-91.61	-4,342.5	212.0	508.3	301.2	207.08	2.455				
10,300.0	6,507.3	6,569.3	6,569.3	77.6	131.4	-91.27	-4,342.5	212.0	417.7	208.8	208.97	1.999				
10,400.0	6,506.1	6,568.1	6,568.1	79.5	131.4	-90.92	-4,342.5	212.0	332.6	121.8	210.86	1.578				
10,500.0	6,504.9	6,566.9	6,566.9	81.4	131.3	-90.58	-4,342.5	212.0	258.4	45.7	212.74	1.215 Level 2				
10,600.0	6,503.7	6,565.7	6,565.7	83.3	131.3	-90.24	-4,342.5	212.0	207.2	-7.4	214.62	0.965 Level 1				
10,669.3	6,502.9	6,564.9	6,564.9	84.6	131.3	-90.00	-4,342.5	212.0	195.3	-20.6	215.91	0.904 Level 1, CC, ES, SF				
10,700.0	6,502.6	6,564.6	6,564.6	85.2	131.3	-89.89	-4,342.5	212.0	197.7	-18.8	216.49	0.913 Level 1				
10,800.0	6,501.4	6,563.4	6,563.4	87.1	131.3	-89.55	-4,342.5	212.0	235.0	16.6	218.35	1.076 Level 2				
10,900.0	6,500.2	6,562.2	6,562.2	89.0	131.2	-89.21	-4,342.5	212.0	302.2	82.0	220.21	1.372 Level 3				
10,920.7	6,500.0	6,562.0	6,562.0	89.4	131.2	-89.14	-4,342.5	212.0	318.3	97.7	220.59	1.443 Level 3				

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 19F-Unioil (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 600-NS-GYRO-MS													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
6,400.0	6,331.7	6,361.5	6,360.1	13.9	10.6	27.78	27.78	-1,030.1	-307.0	957.2	937.4	19.78	48.399	
6,500.0	6,396.2	6,421.6	6,420.2	14.4	10.7	33.85	33.85	-1,029.6	-305.9	884.9	865.2	19.66	44.999	
6,600.0	6,450.3	6,472.4	6,471.0	15.0	10.8	42.46	42.46	-1,029.3	-305.1	806.6	785.9	20.64	39.080	
6,700.0	6,492.9	6,513.6	6,512.2	15.8	10.9	54.16	54.16	-1,029.2	-304.3	724.2	701.2	23.01	31.473	
6,800.0	6,523.3	6,544.1	6,542.7	16.8	11.0	68.29	68.29	-1,029.2	-303.8	640.0	613.8	26.13	24.490	
6,900.0	6,541.1	6,561.8	6,560.4	17.9	11.0	81.97	81.97	-1,029.2	-303.5	556.9	528.2	28.65	19.439	
7,000.0	6,545.8	6,566.4	6,565.0	19.2	11.0	91.84	91.84	-1,029.2	-303.4	478.6	448.4	30.15	15.874	
7,100.0	6,544.7	6,565.0	6,563.6	20.5	11.0	91.59	91.59	-1,029.2	-303.5	409.8	378.3	31.50	13.008	
7,200.0	6,543.5	6,563.6	6,562.2	21.9	11.0	91.35	91.35	-1,029.2	-303.5	356.1	323.2	32.94	10.811	
7,300.0	6,542.3	6,562.2	6,560.8	23.5	11.0	91.10	91.10	-1,029.2	-303.5	325.1	290.7	34.45	9.438	
7,355.7	6,541.7	6,561.5	6,560.1	24.3	11.0	90.96	90.96	-1,029.2	-303.5	320.3	285.0	35.32	9.069 CC, ES	
7,400.0	6,541.2	6,560.9	6,559.5	25.0	11.0	90.85	90.85	-1,029.2	-303.5	323.4	287.3	36.01	8.980 SF	
7,500.0	6,540.0	6,559.5	6,558.1	26.6	11.0	90.61	90.61	-1,029.2	-303.6	351.3	313.7	37.62	9.339	
7,600.0	6,538.8	6,558.2	6,556.7	28.3	11.0	90.37	90.37	-1,029.2	-303.6	402.9	363.6	39.26	10.260	
7,700.0	6,537.7	6,556.8	6,555.4	30.0	11.0	90.13	90.13	-1,029.2	-303.6	470.3	429.3	40.94	11.486	
7,800.0	6,536.5	6,555.4	6,554.0	31.7	11.0	89.88	89.88	-1,029.2	-303.6	547.7	505.1	42.65	12.843	
7,900.0	6,535.3	6,554.1	6,552.7	33.4	11.0	89.64	89.64	-1,029.2	-303.6	631.6	587.2	44.37	14.232	
8,000.0	6,534.2	6,552.8	6,551.4	35.1	11.0	89.40	89.40	-1,029.2	-303.7	719.5	673.4	46.12	15.601	
8,100.0	6,533.0	6,551.4	6,550.0	36.9	11.0	89.17	89.17	-1,029.2	-303.7	810.3	762.4	47.88	16.922	
8,200.0	6,531.8	6,550.1	6,548.7	38.7	11.0	88.93	88.93	-1,029.2	-303.7	903.0	853.3	49.66	18.184	
8,300.0	6,530.6	6,548.8	6,547.4	40.5	11.0	88.69	88.69	-1,029.2	-303.7	997.1	945.7	51.44	19.382	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Existing Wells Sec.19-T4N-R63W - Sater 19-GU (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 550-NS-GYRO-MS													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
7,900.0	6,535.3	6,607.5	6,605.8	33.4	11.3	94.69	94.69	-2,480.3	-362.5	983.2	938.7	44.53	22.080	
8,000.0	6,534.2	6,605.3	6,603.6	35.1	11.3	94.36	94.36	-2,480.3	-362.6	891.8	845.5	46.29	19.266	
8,100.0	6,533.0	6,603.1	6,601.5	36.9	11.3	94.03	94.03	-2,480.3	-362.7	802.5	754.4	48.07	16.696	
8,200.0	6,531.8	6,600.9	6,599.3	38.7	11.3	93.70	93.70	-2,480.3	-362.7	716.0	666.2	49.86	14.361	
8,300.0	6,530.6	6,598.7	6,597.1	40.5	11.3	93.37	93.37	-2,480.4	-362.8	633.5	581.8	51.66	12.263	
8,400.0	6,529.5	6,596.5	6,594.9	42.3	11.3	93.04	93.04	-2,480.4	-362.8	556.7	503.3	53.48	10.411	
8,500.0	6,528.3	6,594.3	6,592.7	44.1	11.3	92.71	92.71	-2,480.4	-362.9	488.5	433.2	55.30	8.833	
8,600.0	6,527.1	6,592.1	6,590.4	45.9	11.2	92.37	92.37	-2,480.4	-363.0	432.7	375.6	57.13	7.574	
8,700.0	6,526.0	6,589.9	6,588.2	47.8	11.2	92.04	92.04	-2,480.5	-363.0	394.8	335.8	58.97	6.695	
8,800.0	6,524.8	6,587.7	6,586.0	49.6	11.2	91.70	91.70	-2,480.5	-363.1	380.1	319.3	60.81	6.250	
8,807.0	6,524.7	6,587.5	6,585.8	49.7	11.2	91.68	91.68	-2,480.5	-363.1	380.0	319.1	60.94	6.236 CC, ES, SF	
8,900.0	6,523.6	6,585.4	6,583.8	51.4	11.2	91.36	91.36	-2,480.5	-363.2	391.2	328.6	62.66	6.244	
9,000.0	6,522.5	6,583.2	6,581.5	53.3	11.2	91.03	91.03	-2,480.5	-363.2	426.2	361.7	64.51	6.606	
9,100.0	6,521.3	6,580.9	6,579.3	55.1	11.2	90.69	90.69	-2,480.5	-363.3	479.8	413.4	66.37	7.230	
9,200.0	6,520.1	6,578.7	6,577.0	57.0	11.2	90.35	90.35	-2,480.6	-363.4	546.6	478.4	68.23	8.012	
9,300.0	6,519.0	6,576.4	6,574.7	58.9	11.2	90.01	90.01	-2,480.6	-363.4	622.4	552.3	70.09	8.880	
9,400.0	6,517.8	6,574.1	6,572.5	60.7	11.2	89.66	89.66	-2,480.6	-363.5	704.2	632.2	71.95	9.788	
9,500.0	6,516.6	6,571.8	6,570.2	62.6	11.2	89.32	89.32	-2,480.6	-363.6	790.2	716.4	73.81	10.706	
9,600.0	6,515.4	6,569.6	6,567.9	64.5	11.2	88.98	88.98	-2,480.7	-363.6	879.2	803.5	75.67	11.618	
9,700.0	6,514.3	6,567.3	6,565.6	66.3	11.2	88.63	88.63	-2,480.7	-363.7	970.3	892.8	77.53	12.514	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19E Pad Sec.19-T4N-R63W - Sater 19E-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	1.0	1.0	0.0	0.0	-90.00	-90.00	0.0	-61.4	61.4	61.4	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	-90.00	-90.00	0.0	-61.4	61.4	61.1	0.23	270.298	
200.0	200.0	201.0	201.0	0.3	0.3	-90.00	-90.00	0.0	-61.4	61.4	60.7	0.68	90.698	
300.0	300.0	301.0	301.0	0.6	0.6	-90.00	-90.00	0.0	-61.4	61.4	60.2	1.13	54.491	
400.0	400.0	401.0	401.0	0.8	0.8	-90.00	-90.00	0.0	-61.4	61.4	59.8	1.58	38.945	
500.0	500.0	501.0	501.0	1.0	1.0	-90.00	-90.00	0.0	-61.4	61.4	59.3	2.03	30.300	
600.0	600.0	601.0	601.0	1.2	1.2	-90.00	-90.00	0.0	-61.4	61.4	58.9	2.47	24.796	
700.0	700.0	701.0	701.0	1.5	1.5	-90.00	-90.00	0.0	-61.4	61.4	58.4	2.92	20.984	
800.0	800.0	801.0	801.0	1.7	1.7	-90.00	-90.00	0.0	-61.4	61.4	58.0	3.37	18.188	
900.0	900.0	901.0	901.0	1.9	1.9	-90.00	-90.00	0.0	-61.4	61.4	57.5	3.82	16.049	
1,000.0	1,000.0	1,001.0	1,001.0	2.1	2.1	-90.00	-90.00	0.0	-61.4	61.4	57.1	4.27	14.361	
1,100.0	1,100.0	1,101.0	1,101.0	2.4	2.4	-90.00	-90.00	0.0	-61.4	61.4	56.6	4.72	12.994	
1,200.0	1,200.0	1,201.0	1,201.0	2.6	2.6	-90.00	-90.00	0.0	-61.4	61.4	56.2	5.17	11.864	
1,300.0	1,300.0	1,301.0	1,301.0	2.8	2.8	-90.00	-90.00	0.0	-61.4	61.4	55.7	5.62	10.916	
1,366.3	1,366.3	1,367.3	1,367.3	3.0	3.0	-90.00	-90.00	0.0	-61.4	61.4	55.4	5.92	10.366 CC	
1,400.0	1,400.0	1,401.0	1,401.0	3.0	3.0	-90.00	-90.00	0.0	-61.4	61.4	55.3	6.07	10.108 ES	
1,500.0	1,500.0	1,500.0	1,500.0	3.3	3.2	-89.79	-89.79	0.2	-62.2	62.2	55.7	6.51	9.560	
1,600.0	1,600.0	1,598.9	1,598.8	3.5	3.5	-89.19	-89.19	0.9	-64.7	64.7	57.8	6.94	9.332	
1,700.0	1,700.0	1,697.7	1,697.5	3.7	3.7	-88.30	-88.30	2.0	-68.8	68.9	61.6	7.37	9.357	
1,800.0	1,800.0	1,796.3	1,796.0	3.9	3.9	-87.22	-87.22	3.6	-74.6	74.8	67.0	7.80	9.593	
1,900.0	1,900.0	1,894.6	1,894.0	4.2	4.1	-86.06	-86.06	5.6	-81.9	82.4	74.2	8.24	10.009	
2,000.0	2,000.0	1,992.7	1,991.7	4.4	4.3	-84.91	-84.91	8.1	-90.9	91.7	83.1	8.67	10.578	
2,100.0	2,100.0	2,090.5	2,088.8	4.6	4.6	-83.82	-83.82	11.0	-101.4	102.8	93.6	9.11	11.278	
2,200.0	2,200.0	2,188.9	2,186.4	4.8	4.8	-82.83	-82.83	14.3	-113.4	115.2	105.7	9.55	12.062	
2,300.0	2,300.0	2,288.0	2,284.8	5.1	5.1	-82.02	-82.02	17.6	-125.7	127.9	117.9	10.00	12.795	
2,400.0	2,400.0	2,387.2	2,383.1	5.3	5.4	-81.35	-81.35	21.0	-137.9	140.6	130.2	10.44	13.465	
2,500.0	2,500.0	2,486.4	2,481.5	5.5	5.6	-80.79	-80.79	24.3	-150.1	153.4	142.5	10.89	14.080	
2,600.0	2,600.0	2,585.6	2,579.8	5.7	5.9	-80.32	-80.32	27.7	-162.4	166.1	154.8	11.34	14.645	
2,700.0	2,700.0	2,684.7	2,678.2	6.0	6.2	-79.92	-79.92	31.1	-174.6	178.8	167.0	11.79	15.166	
2,800.0	2,800.0	2,783.9	2,776.6	6.2	6.5	-79.57	-79.57	34.4	-186.9	191.6	179.3	12.24	15.649	
2,900.0	2,900.0	2,883.1	2,874.9	6.4	6.8	-79.26	-79.26	37.8	-199.1	204.3	191.7	12.70	16.096	
3,000.0	3,000.0	2,982.3	2,973.3	6.6	7.1	-78.99	-78.99	41.1	-211.4	217.1	204.0	13.15	16.511	
3,100.0	3,100.0	3,081.5	3,071.7	6.9	7.4	-78.98	-78.98	44.5	-223.6	229.9	216.3	13.58	16.923	
3,200.0	3,200.0	3,180.6	3,170.0	7.1	7.7	-88.25	-88.25	47.8	-235.9	242.5	228.5	14.03	17.282	
3,300.0	3,299.9	3,279.8	3,268.3	7.3	8.0	-88.88	-88.88	51.2	-248.1	255.2	240.7	14.49	17.616	
3,400.0	3,399.7	3,378.8	3,366.6	7.5	8.3	-89.80	-89.80	54.5	-260.3	267.9	252.9	14.94	17.931	
3,500.0	3,499.4	3,477.8	3,464.8	7.8	8.6	-90.99	-90.99	57.9	-272.6	280.7	265.3	15.40	18.230	
3,600.0	3,598.9	3,576.7	3,562.8	8.0	8.9	-92.43	-92.43	61.2	-284.8	293.7	277.8	15.86	18.518	
3,700.0	3,698.5	3,675.5	3,660.8	8.2	9.2	-93.86	-93.86	64.6	-297.0	306.9	290.5	16.33	18.795	
3,800.0	3,798.0	3,774.4	3,758.9	8.4	9.6	-95.17	-95.17	67.9	-309.2	320.2	303.4	16.80	19.062	
3,900.0	3,897.5	3,873.2	3,856.9	8.7	9.9	-96.38	-96.38	71.3	-321.4	333.8	316.5	17.28	19.317	
4,000.0	3,997.0	3,972.1	3,954.9	8.9	10.2	-97.49	-97.49	74.6	-333.6	347.4	329.7	17.76	19.560	
4,100.0	4,096.6	4,070.9	4,053.0	9.2	10.5	-98.52	-98.52	78.0	-345.8	361.2	343.0	18.25	19.794	
4,200.0	4,196.1	4,169.8	4,151.0	9.4	10.8	-99.47	-99.47	81.3	-358.0	375.1	356.3	18.74	20.016	
4,300.0	4,295.7	4,268.7	4,249.1	9.6	11.1	-100.42	-100.42	84.7	-370.2	388.9	369.7	19.22	20.238	
4,400.0	4,395.6	4,367.8	4,347.4	9.8	11.4	-100.91	-100.91	88.0	-382.4	402.1	382.5	19.65	20.464	
4,500.0	4,495.5	4,467.0	4,445.8	10.0	11.8	-100.89	-100.89	91.4	-394.7	414.7	394.7	20.07	20.664	
4,600.0	4,595.5	4,566.1	4,544.1	10.2	12.1	-91.25	-91.25	94.7	-406.9	427.0	406.5	20.50	20.831	
4,700.0	4,695.5	4,666.9	4,644.1	10.4	12.4	-90.77	-90.77	98.1	-419.4	439.3	418.3	20.95	20.966	
4,800.0	4,795.5	4,783.8	4,760.3	10.6	12.7	-90.34	-90.34	101.3	-431.1	449.3	427.9	21.40	20.994	
4,900.0	4,895.5	4,901.5	4,877.8	10.9	12.9	-90.09	-90.09	103.3	-438.2	455.4	433.5	21.84	20.853	

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 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19E Pad Sec.19-T4N-R63W - Sater 19E-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
5,000.0	4,995.5	5,019.7	4,995.9	11.1	13.1	-90.00	-90.00	104.0	-440.8	457.5	435.2	22.27	20.544	
5,100.0	5,095.5	5,120.3	5,096.5	11.3	13.3	-90.00	-90.00	104.0	-440.8	457.5	434.8	22.69	20.166	
5,200.0	5,195.5	5,220.3	5,196.5	11.5	13.5	-90.00	-90.00	104.0	-440.8	457.5	434.4	23.11	19.793	
5,300.0	5,295.5	5,320.3	5,296.5	11.7	13.6	-90.00	-90.00	104.0	-440.8	457.5	434.0	23.54	19.433	
5,400.0	5,395.5	5,420.3	5,396.5	12.0	13.8	-90.00	-90.00	104.0	-440.8	457.5	433.5	23.97	19.085	
5,500.0	5,495.5	5,520.3	5,496.5	12.2	14.0	-90.00	-90.00	104.0	-440.8	457.5	433.1	24.40	18.749	
5,600.0	5,595.5	5,620.3	5,596.5	12.4	14.2	-90.00	-90.00	104.0	-440.8	457.5	432.7	24.83	18.424	
5,700.0	5,695.5	5,720.3	5,696.5	12.6	14.4	-90.00	-90.00	104.0	-440.8	457.5	432.2	25.26	18.110	
5,762.4	5,757.9	5,782.7	5,758.9	12.8	14.5	90.04	90.04	104.0	-440.8	457.5	432.0	25.53	17.921	
5,800.0	5,795.5	5,820.3	5,796.5	12.8	14.6	90.01	90.01	103.9	-440.8	457.5	431.8	25.69	17.809	
5,900.0	5,895.1	5,920.4	5,896.2	13.0	14.7	90.08	90.08	96.2	-440.8	457.5	431.5	26.00	17.596	
6,000.0	5,992.8	6,020.5	5,994.1	13.1	14.9	90.15	90.15	75.5	-440.8	457.5	431.2	26.26	17.424	
6,100.0	6,086.8	6,120.7	6,088.5	13.3	15.0	90.22	90.22	42.2	-440.8	457.5	431.0	26.50	17.263	
6,200.0	6,175.6	6,220.9	6,177.8	13.4	15.1	90.28	90.28	-3.3	-440.8	457.5	430.7	26.80	17.072	
6,300.0	6,257.7	6,321.3	6,260.4	13.6	15.3	90.34	90.34	-60.0	-440.8	457.5	430.3	27.22	16.806	
6,400.0	6,331.7	6,421.6	6,335.0	13.9	15.5	90.40	90.40	-127.2	-440.8	457.5	429.6	27.86	16.421	
6,500.0	6,396.2	6,522.1	6,400.1	14.4	15.8	90.44	90.44	-203.6	-440.8	457.5	428.7	28.78	15.896	
6,600.0	6,450.3	6,622.6	6,454.6	15.0	16.3	90.48	90.48	-287.9	-440.8	457.5	427.5	30.04	15.231	
6,700.0	6,492.9	6,723.1	6,497.7	15.8	16.9	90.51	90.51	-378.6	-440.8	457.5	425.9	31.65	14.453	
6,800.0	6,523.3	6,823.7	6,528.5	16.8	17.8	90.54	90.54	-474.3	-440.8	457.5	423.9	33.61	13.610	
6,900.0	6,541.1	6,924.2	6,546.4	17.9	18.9	90.55	90.55	-573.2	-440.8	457.5	421.6	35.88	12.752	
6,964.1	6,545.7	6,988.7	6,551.0	18.7	19.6	90.54	90.54	-637.5	-440.8	457.5	420.0	37.47	12.209	
7,000.0	6,545.8	7,024.8	6,551.3	19.2	20.1	90.56	90.56	-673.5	-440.8	457.5	419.1	38.39	11.919	
7,100.0	6,544.7	7,124.8	6,550.6	20.5	21.4	90.62	90.62	-773.5	-440.8	457.5	416.4	41.09	11.134	
7,200.0	6,543.5	7,224.7	6,550.0	21.9	22.8	90.69	90.69	-873.5	-440.8	457.5	413.6	43.96	10.408	
7,300.0	6,542.3	7,324.7	6,549.4	23.5	24.2	90.75	90.75	-973.5	-440.8	457.5	410.6	46.97	9.741	
7,400.0	6,541.2	7,424.7	6,548.7	25.0	25.8	90.82	90.82	-1,073.5	-440.8	457.5	407.5	50.09	9.135	
7,500.0	6,540.0	7,524.7	6,548.1	26.6	27.3	90.88	90.88	-1,173.5	-440.8	457.5	404.2	53.30	8.584	
7,600.0	6,538.8	7,624.7	6,547.4	28.3	28.9	90.95	90.95	-1,273.5	-440.8	457.6	401.0	56.59	8.085	
7,700.0	6,537.7	7,724.7	6,546.8	30.0	30.6	91.02	91.02	-1,373.5	-440.8	457.6	397.6	59.95	7.632	
7,800.0	6,536.5	7,824.7	6,546.1	31.7	32.3	91.08	91.08	-1,473.5	-440.8	457.6	394.2	63.36	7.222	
7,900.0	6,535.3	7,924.7	6,545.5	33.4	34.0	91.15	91.15	-1,573.5	-440.8	457.6	390.8	66.82	6.848	
8,000.0	6,534.2	8,024.7	6,544.8	35.1	35.7	91.21	91.21	-1,673.5	-440.8	457.6	387.3	70.31	6.508	
8,100.0	6,533.0	8,124.7	6,544.2	36.9	37.4	91.28	91.28	-1,773.5	-440.8	457.6	383.8	73.84	6.197	
8,200.0	6,531.8	8,224.7	6,543.5	38.7	39.2	91.34	91.34	-1,873.5	-440.8	457.6	380.2	77.40	5.912	
8,300.0	6,530.6	8,324.7	6,542.9	40.5	41.0	91.41	91.41	-1,973.5	-440.8	457.6	376.6	80.98	5.651	
8,400.0	6,529.5	8,424.7	6,542.3	42.3	42.8	91.47	91.47	-2,073.5	-440.8	457.6	373.1	84.59	5.410	
8,500.0	6,528.3	8,524.7	6,541.6	44.1	44.6	91.54	91.54	-2,173.5	-440.8	457.7	369.4	88.21	5.188	
8,600.0	6,527.1	8,624.7	6,541.0	45.9	46.4	91.61	91.61	-2,273.5	-440.8	457.7	365.8	91.85	4.983	
8,700.0	6,526.0	8,724.7	6,540.3	47.8	48.2	91.67	91.67	-2,373.4	-440.8	457.7	362.2	95.51	4.792	
8,800.0	6,524.8	8,824.7	6,539.7	49.6	50.0	91.74	91.74	-2,473.4	-440.8	457.7	358.5	99.18	4.615	
8,900.0	6,523.6	8,924.7	6,539.0	51.4	51.8	91.80	91.80	-2,573.4	-440.8	457.7	354.9	102.86	4.450	
9,000.0	6,522.5	9,024.7	6,538.4	53.3	53.7	91.87	91.87	-2,673.4	-440.8	457.7	351.2	106.55	4.296	
9,100.0	6,521.3	9,124.7	6,537.7	55.1	55.5	91.93	91.93	-2,773.4	-440.8	457.8	347.5	110.25	4.152	
9,200.0	6,520.1	9,224.7	6,537.1	57.0	57.4	92.00	92.00	-2,873.4	-440.8	457.8	343.8	113.96	4.017	
9,300.0	6,519.0	9,324.7	6,536.4	58.9	59.2	92.06	92.06	-2,973.4	-440.8	457.8	340.1	117.67	3.890	
9,400.0	6,517.8	9,424.7	6,535.8	60.7	61.1	92.13	92.13	-3,073.4	-440.8	457.8	336.4	121.40	3.771	
9,500.0	6,516.6	9,524.7	6,535.1	62.6	62.9	92.20	92.20	-3,173.4	-440.8	457.8	332.7	125.12	3.659	
9,600.0	6,515.4	9,624.7	6,534.5	64.5	64.8	92.26	92.26	-3,273.4	-440.8	457.9	329.0	128.86	3.553	
9,700.0	6,514.3	9,724.7	6,533.9	66.3	66.7	92.33	92.33	-3,373.4	-440.8	457.9	325.3	132.60	3.453	
9,800.0	6,513.1	9,824.7	6,533.2	68.2	68.5	92.39	92.39	-3,473.4	-440.8	457.9	321.6	136.34	3.358	

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 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19E Pad Sec.19-T4N-R63W - Sater 19E-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 (ft)	Offset (ft)	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	
9,900.0	6,511.9	9,924.7	6,532.6	70.1	70.4	92.46	-3,573.4	-440.8	457.9	317.8	140.09	3.269		
10,000.0	6,510.8	10,024.7	6,531.9	72.0	72.3	92.52	-3,673.4	-440.8	457.9	314.1	143.84	3.184		
10,100.0	6,509.6	10,124.7	6,531.3	73.9	74.2	92.59	-3,773.4	-440.8	458.0	310.4	147.60	3.103		
10,200.0	6,508.4	10,224.7	6,530.6	75.7	76.0	92.65	-3,873.4	-440.8	458.0	306.6	151.36	3.026		
10,300.0	6,507.3	10,324.7	6,530.0	77.6	77.9	92.72	-3,973.4	-440.8	458.0	302.9	155.12	2.953		
10,400.0	6,506.1	10,424.7	6,529.3	79.5	79.8	92.78	-4,073.4	-440.8	458.0	299.2	158.88	2.883		
10,500.0	6,504.9	10,524.7	6,528.7	81.4	81.7	92.85	-4,173.4	-440.8	458.1	295.4	162.65	2.816		
10,600.0	6,503.7	10,624.7	6,528.0	83.3	83.6	92.92	-4,273.4	-440.8	458.1	291.7	166.42	2.753		
10,700.0	6,502.6	10,724.7	6,527.4	85.2	85.5	92.98	-4,373.4	-440.8	458.1	287.9	170.19	2.692		
10,800.0	6,501.4	10,824.7	6,526.8	87.1	87.3	93.05	-4,473.4	-440.8	458.1	284.2	173.96	2.634		
10,900.0	6,500.2	10,924.7	6,526.1	89.0	89.2	93.11	-4,573.4	-440.8	458.2	280.4	177.73	2.578		
10,906.2	6,500.2	10,930.9	6,526.1	89.1	89.3	93.12	-4,579.5	-440.8	458.2	280.2	177.97	2.574		
10,920.7	6,500.0	10,941.6	6,526.0	89.4	89.6	93.12	-4,590.2	-440.8	458.2	279.7	178.44	2.568 SF		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19E Pad Sec.19-T4N-R63W - Sater 19E-323 - Wellbore #1 - Plan #1 (2-11-15)													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	1.0	1.0	0.0	0.0	-90.00	-90.00	0.0	-30.7	30.7	30.7	0.00	N/A	
100.0	100.0	101.0	101.0	0.1	0.1	-90.00	-90.00	0.0	-30.7	30.7	30.5	0.23	135.149	
200.0	200.0	201.0	201.0	0.3	0.3	-90.00	-90.00	0.0	-30.7	30.7	30.0	0.68	45.349	
300.0	300.0	301.0	301.0	0.6	0.6	-90.00	-90.00	0.0	-30.7	30.7	29.6	1.13	27.246	
400.0	400.0	401.0	401.0	0.8	0.8	-90.00	-90.00	0.0	-30.7	30.7	29.1	1.58	19.472	
500.0	500.0	501.0	501.0	1.0	1.0	-90.00	-90.00	0.0	-30.7	30.7	28.7	2.03	15.150	
600.0	600.0	601.0	601.0	1.2	1.2	-90.00	-90.00	0.0	-30.7	30.7	28.2	2.47	12.398	
700.0	700.0	701.0	701.0	1.5	1.5	-90.00	-90.00	0.0	-30.7	30.7	27.8	2.92	10.492	
800.0	800.0	801.0	801.0	1.7	1.7	-90.00	-90.00	0.0	-30.7	30.7	27.3	3.37	9.094	
900.0	900.0	901.0	901.0	1.9	1.9	-90.00	-90.00	0.0	-30.7	30.7	26.9	3.82	8.025	
1,000.0	1,000.0	1,001.0	1,001.0	2.1	2.1	-90.00	-90.00	0.0	-30.7	30.7	26.4	4.27	7.180	
1,100.0	1,100.0	1,101.0	1,101.0	2.4	2.4	-90.00	-90.00	0.0	-30.7	30.7	26.0	4.72	6.497	
1,200.0	1,200.0	1,201.0	1,201.0	2.6	2.6	-90.00	-90.00	0.0	-30.7	30.7	25.5	5.17	5.932	
1,300.0	1,300.0	1,301.0	1,301.0	2.8	2.8	-90.00	-90.00	0.0	-30.7	30.7	25.1	5.62	5.458	
1,400.0	1,400.0	1,401.0	1,401.0	3.0	3.0	-90.00	-90.00	0.0	-30.7	30.7	24.6	6.07	5.054	
1,500.0	1,500.0	1,501.0	1,501.0	3.3	3.3	-90.00	-90.00	0.0	-30.7	30.7	24.2	6.52	4.705	
1,600.0	1,600.0	1,601.0	1,601.0	3.5	3.5	-90.00	-90.00	0.0	-30.7	30.7	23.7	6.97	4.402	
1,700.0	1,700.0	1,701.0	1,701.0	3.7	3.7	-90.00	-90.00	0.0	-30.7	30.7	23.3	7.42	4.135	
1,766.3	1,766.3	1,767.3	1,767.3	3.9	3.9	-90.00	-90.00	0.0	-30.7	30.7	23.0	7.72	3.975 CC	
1,800.0	1,800.0	1,801.0	1,801.0	3.9	3.9	-90.00	-90.00	0.0	-30.7	30.7	22.8	7.87	3.899 ES	
1,900.0	1,900.0	1,900.5	1,900.5	4.2	4.2	-89.25	-89.25	0.4	-31.5	31.5	23.2	8.31	3.787	
2,000.0	2,000.0	2,000.0	2,000.0	4.4	4.4	-87.22	-87.22	1.6	-33.8	33.8	25.1	8.74	3.867	
2,100.0	2,100.0	2,099.3	2,099.2	4.6	4.6	-84.42	-84.42	3.7	-37.6	37.8	28.6	9.18	4.118	
2,200.0	2,200.0	2,198.5	2,198.1	4.8	4.8	-81.37	-81.37	6.5	-42.9	43.5	33.9	9.62	4.522	
2,300.0	2,300.0	2,297.4	2,296.8	5.1	5.0	-78.47	-78.47	10.1	-49.7	50.9	40.9	10.05	5.065	
2,400.0	2,400.0	2,396.0	2,394.9	5.3	5.2	-75.91	-75.91	14.6	-58.0	60.1	49.6	10.49	5.729	
2,500.0	2,500.0	2,494.7	2,493.0	5.5	5.5	-73.76	-73.76	19.7	-67.7	71.0	60.1	10.94	6.493	
2,600.0	2,600.0	2,594.0	2,591.6	5.7	5.7	-72.11	-72.11	25.1	-77.9	82.3	71.0	11.38	7.238	
2,700.0	2,700.0	2,693.3	2,690.3	6.0	6.0	-70.87	-70.87	30.5	-88.0	93.7	81.9	11.82	7.930	
2,800.0	2,800.0	2,792.6	2,789.0	6.2	6.3	-69.89	-69.89	35.9	-98.1	105.2	92.9	12.27	8.574	
2,900.0	2,900.0	2,892.0	2,887.6	6.4	6.5	-69.11	-69.11	41.3	-108.3	116.6	103.9	12.71	9.174	
3,000.0	3,000.0	2,991.3	2,986.3	6.6	6.8	-68.47	-68.47	46.7	-118.4	128.1	115.0	13.16	9.734	
3,100.0	3,100.0	3,090.7	3,085.0	6.9	7.1	-77.31	-77.31	52.1	-128.5	139.4	125.8	13.60	10.249	
3,200.0	3,200.0	3,190.1	3,183.7	7.1	7.3	-77.70	-77.70	57.5	-138.7	150.3	136.3	14.05	10.700	
3,300.0	3,299.9	3,289.5	3,282.4	7.3	7.6	-78.64	-78.64	62.9	-148.8	160.9	146.4	14.50	11.099	
3,400.0	3,399.7	3,388.8	3,381.1	7.5	7.9	-80.02	-80.02	68.3	-158.9	171.2	156.3	14.95	11.456	
3,500.0	3,499.4	3,488.1	3,479.8	7.8	8.2	-81.78	-81.78	73.7	-169.1	181.4	166.0	15.40	11.778	
3,600.0	3,598.9	3,587.4	3,578.4	8.0	8.5	-83.86	-83.86	79.1	-179.2	191.6	175.7	15.86	12.077	
3,700.0	3,698.5	3,686.6	3,676.9	8.2	8.7	-85.85	-85.85	84.5	-189.3	202.0	185.6	16.33	12.368	
3,800.0	3,798.0	3,785.8	3,775.5	8.4	9.0	-87.64	-87.64	89.9	-199.4	212.6	195.8	16.80	12.651	
3,900.0	3,897.5	3,885.5	3,874.5	8.7	9.3	-89.27	-89.27	95.3	-209.6	223.4	206.1	17.28	12.926	
4,000.0	3,997.0	3,992.9	3,981.4	8.9	9.5	-91.05	-91.05	100.1	-218.6	232.4	214.6	17.74	13.100	
4,100.0	4,096.6	4,100.7	4,089.0	9.2	9.8	-93.05	-93.05	103.0	-224.1	238.1	219.9	18.20	13.084	
4,200.0	4,196.1	4,208.6	4,196.9	9.4	10.0	-95.34	-95.34	104.0	-226.0	240.7	222.0	18.66	12.898	
4,300.0	4,295.7	4,308.4	4,296.7	9.6	10.1	-97.42	-97.42	104.0	-226.0	241.6	222.5	19.10	12.651	
4,400.0	4,395.6	4,408.3	4,396.6	9.8	10.3	-98.69	-98.69	104.0	-226.0	242.4	222.9	19.51	12.422	
4,500.0	4,495.5	4,508.3	4,496.5	10.0	10.5	-99.14	-99.14	104.0	-226.0	242.7	222.8	19.91	12.190	
4,600.0	4,595.5	4,608.3	4,596.5	10.2	10.7	-90.00	-90.00	104.0	-226.0	242.7	222.4	20.32	11.944	
4,700.0	4,695.5	4,708.3	4,696.5	10.4	11.0	-90.00	-90.00	104.0	-226.0	242.7	221.9	20.76	11.693	
4,800.0	4,795.5	4,808.3	4,796.5	10.6	11.2	-90.00	-90.00	104.0	-226.0	242.7	221.5	21.19	11.452	
4,900.0	4,895.5	4,908.3	4,896.5	10.9	11.4	-90.00	-90.00	104.0	-226.0	242.7	221.1	21.63	11.221	

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 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19E Pad Sec.19-T4N-R63W - Sater 19E-323 - Wellbore #1 - Plan #1 (2-11-15)													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
5,000.0	4,995.5	5,008.3	4,996.5	11.1	11.6	-90.00		104.0	-226.0	242.7	220.6	22.07	10.999	
5,100.0	5,095.5	5,108.3	5,096.5	11.3	11.8	-90.00		104.0	-226.0	242.7	220.2	22.50	10.785	
5,200.0	5,195.5	5,208.3	5,196.5	11.5	12.0	-90.00		104.0	-226.0	242.7	219.8	22.94	10.579	
5,300.0	5,295.5	5,308.3	5,296.5	11.7	12.2	-90.00		104.0	-226.0	242.7	219.3	23.38	10.380	
5,400.0	5,395.5	5,408.3	5,396.5	12.0	12.4	-90.00		104.0	-226.0	242.7	218.9	23.82	10.189	
5,500.0	5,495.5	5,508.3	5,496.5	12.2	12.6	-90.00		104.0	-226.0	242.7	218.4	24.26	10.004	
5,600.0	5,595.5	5,608.3	5,596.5	12.4	12.8	-90.00		104.0	-226.0	242.7	218.0	24.70	9.826	
5,700.0	5,695.5	5,708.3	5,696.5	12.6	13.0	-90.00		104.0	-226.0	242.7	217.6	25.14	9.654	
5,764.2	5,759.8	5,772.5	5,760.8	12.8	13.2	90.09		104.0	-226.0	242.7	217.3	25.42	9.548	
5,800.0	5,795.5	5,808.3	5,796.5	12.8	13.3	90.03		104.0	-226.0	242.7	217.1	25.58	9.490	
5,900.0	5,895.1	5,908.2	5,896.5	13.0	13.5	91.73		102.9	-226.0	242.8	216.9	25.91	9.369	
6,000.0	5,992.8	6,009.4	5,996.9	13.1	13.6	93.97		91.0	-226.0	243.3	217.1	26.16	9.298	
6,100.0	6,086.8	6,111.9	6,096.0	13.3	13.7	96.14		65.4	-226.0	244.1	217.7	26.38	9.252	
6,200.0	6,175.6	6,215.6	6,192.1	13.4	13.9	98.20		26.3	-226.0	245.2	218.6	26.62	9.212	
6,300.0	6,257.7	6,320.7	6,283.0	13.6	14.0	100.11		-26.2	-226.0	246.5	219.6	26.93	9.154	
6,400.0	6,331.7	6,427.0	6,366.7	13.9	14.2	101.84		-91.5	-226.0	248.0	220.6	27.42	9.046	
6,500.0	6,396.2	6,534.4	6,441.4	14.4	14.5	103.34		-168.6	-226.0	249.5	221.3	28.13	8.866	
6,600.0	6,450.3	6,642.9	6,505.0	15.0	15.1	104.60		-256.3	-226.0	250.8	221.7	29.16	8.601	
6,700.0	6,492.9	6,752.2	6,555.9	15.8	15.8	105.60		-352.9	-226.0	252.0	221.4	30.55	8.249	
6,800.0	6,523.3	6,862.1	6,592.8	16.8	16.8	106.30		-456.4	-226.0	252.9	220.6	32.31	7.825	
6,900.0	6,541.1	6,972.5	6,614.4	17.9	18.1	106.72		-564.6	-226.0	253.4	219.0	34.43	7.359	
7,000.0	6,545.8	7,082.1	6,620.3	19.2	19.4	106.84		-674.0	-226.0	253.6	216.7	36.85	6.881	
7,100.0	6,544.7	7,182.1	6,619.6	20.5	20.8	106.95		-773.9	-226.0	253.7	214.3	39.43	6.435	
7,200.0	6,543.5	7,282.1	6,619.0	21.9	22.2	107.06		-873.9	-226.0	253.9	211.7	42.16	6.021	
7,300.0	6,542.3	7,382.1	6,618.4	23.5	23.7	107.18		-973.9	-226.0	254.0	209.0	45.03	5.642	
7,400.0	6,541.2	7,482.1	6,617.7	25.0	25.2	107.29		-1,073.9	-226.0	254.2	206.2	48.00	5.295	
7,500.0	6,540.0	7,582.1	6,617.1	26.6	26.8	107.40		-1,173.9	-226.0	254.3	203.3	51.06	4.981	
7,600.0	6,538.8	7,682.1	6,616.4	28.3	28.4	107.51		-1,273.9	-226.0	254.5	200.3	54.19	4.696	
7,700.0	6,537.7	7,782.1	6,615.8	30.0	30.1	107.63		-1,373.9	-226.0	254.7	197.3	57.39	4.437	
7,800.0	6,536.5	7,882.1	6,615.1	31.7	31.8	107.74		-1,473.9	-226.0	254.8	194.2	60.63	4.203	
7,900.0	6,535.3	7,982.1	6,614.5	33.4	33.5	107.85		-1,573.9	-226.0	255.0	191.1	63.91	3.989	
8,000.0	6,534.2	8,082.1	6,613.8	35.1	35.3	107.96		-1,673.9	-226.0	255.1	187.9	67.23	3.795	
8,100.0	6,533.0	8,182.1	6,613.2	36.9	37.0	108.07		-1,773.9	-226.0	255.3	184.7	70.57	3.617	
8,200.0	6,531.8	8,282.1	6,612.5	38.7	38.8	108.19		-1,873.9	-226.0	255.5	181.5	73.94	3.455	
8,300.0	6,530.6	8,382.1	6,611.9	40.5	40.6	108.30		-1,973.9	-226.0	255.6	178.3	77.33	3.305	
8,400.0	6,529.5	8,482.1	6,611.3	42.3	42.4	108.41		-2,073.9	-226.0	255.8	175.0	80.74	3.168	
8,500.0	6,528.3	8,582.1	6,610.6	44.1	44.2	108.52		-2,173.9	-226.0	256.0	171.8	84.17	3.041	
8,600.0	6,527.1	8,682.1	6,610.0	45.9	46.0	108.63		-2,273.9	-226.0	256.1	168.5	87.60	2.924	
8,700.0	6,526.0	8,782.1	6,609.3	47.8	47.9	108.74		-2,373.9	-226.0	256.3	165.2	91.05	2.815	
8,800.0	6,524.8	8,882.1	6,608.7	49.6	49.7	108.85		-2,473.9	-226.0	256.5	162.0	94.50	2.714	
8,900.0	6,523.6	8,982.1	6,608.0	51.4	51.5	108.96		-2,573.9	-226.0	256.6	158.7	97.96	2.620	
9,000.0	6,522.5	9,082.1	6,607.4	53.3	53.4	109.07		-2,673.9	-226.0	256.8	155.4	101.43	2.532	
9,100.0	6,521.3	9,182.1	6,606.7	55.1	55.2	109.18		-2,773.9	-226.0	257.0	152.1	104.91	2.449	
9,200.0	6,520.1	9,282.1	6,606.1	57.0	57.1	109.29		-2,873.9	-226.0	257.1	148.8	108.38	2.372	
9,300.0	6,519.0	9,382.1	6,605.4	58.9	58.9	109.40		-2,973.9	-226.0	257.3	145.4	111.86	2.300	
9,400.0	6,517.8	9,482.1	6,604.8	60.7	60.8	109.51		-3,073.9	-226.0	257.5	142.1	115.35	2.232	
9,500.0	6,516.6	9,582.1	6,604.1	62.6	62.7	109.62		-3,173.9	-226.0	257.7	138.8	118.83	2.168	
9,600.0	6,515.4	9,682.1	6,603.5	64.5	64.5	109.73		-3,273.9	-226.0	257.8	135.5	122.32	2.108	
9,700.0	6,514.3	9,782.1	6,602.9	66.3	66.4	109.84		-3,373.9	-226.0	258.0	132.2	125.81	2.051	
9,800.0	6,513.1	9,882.1	6,602.2	68.2	68.3	109.95		-3,473.9	-226.0	258.2	128.9	129.30	1.997	
9,900.0	6,511.9	9,982.1	6,601.6	70.1	70.2	110.06		-3,573.9	-226.0	258.4	125.6	132.78	1.946	

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 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19E Pad Sec.19-T4N-R63W - Sater 19E-323 - Wellbore #1 - Plan #1 (2-11-15)												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 (ft)	Offset (ft)	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
10,000.0	6,510.8	10,082.1	6,600.9	72.0	72.0	110.17	-3,673.8	-226.0	258.6	122.3	136.27	1.897	
10,100.0	6,509.6	10,182.1	6,600.3	73.9	73.9	110.28	-3,773.8	-226.0	258.7	119.0	139.76	1.851	
10,200.0	6,508.4	10,282.1	6,599.6	75.7	75.8	110.39	-3,873.8	-226.0	258.9	115.7	143.25	1.807	
10,300.0	6,507.3	10,382.1	6,599.0	77.6	77.7	110.50	-3,973.8	-226.0	259.1	112.4	146.73	1.766	
10,400.0	6,506.1	10,482.1	6,598.3	79.5	79.6	110.60	-4,073.8	-226.0	259.3	109.1	150.21	1.726	
10,500.0	6,504.9	10,582.1	6,597.7	81.4	81.5	110.71	-4,173.8	-226.0	259.5	105.8	153.69	1.688	
10,600.0	6,503.7	10,682.1	6,597.0	83.3	83.3	110.82	-4,273.8	-226.0	259.7	102.5	157.17	1.652	
10,700.0	6,502.6	10,782.1	6,596.4	85.2	85.2	110.93	-4,373.8	-226.0	259.8	99.2	160.65	1.617	
10,800.0	6,501.4	10,882.1	6,595.8	87.1	87.1	111.04	-4,473.8	-226.0	260.0	95.9	164.13	1.584	
10,900.0	6,500.2	10,982.1	6,595.1	89.0	88.7	111.14	-4,573.8	-226.0	260.2	92.9	167.31	1.555	
10,904.4	6,500.2	10,986.4	6,595.1	89.1	88.8	111.15	-4,578.2	-226.0	260.2	92.8	167.45	1.554	
10,920.7	6,500.0	10,998.5	6,595.0	89.4	89.0	111.16	-4,590.2	-226.0	260.3	92.4	167.90	1.550 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19E Pad Sec.19-T4N-R63W - Sater 19J-443 - Wellbore #1 - Plan #1 (2-11-15)													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	30.7	30.7				
100.0	100.0	100.0	100.0	0.1	0.1	90.00	90.00	0.0	30.7	30.7	30.5	0.22	136.501	
200.0	200.0	200.0	200.0	0.3	0.3	90.00	90.00	0.0	30.7	30.7	30.0	0.67	45.500	
300.0	300.0	300.0	300.0	0.6	0.6	90.00	90.00	0.0	30.7	30.7	29.6	1.12	27.300	
400.0	400.0	400.0	400.0	0.8	0.8	90.00	90.00	0.0	30.7	30.7	29.1	1.57	19.500	
500.0	500.0	500.0	500.0	1.0	1.0	90.00	90.00	0.0	30.7	30.7	28.7	2.02	15.167	
600.0	600.0	600.0	600.0	1.2	1.2	90.00	90.00	0.0	30.7	30.7	28.2	2.47	12.409	
700.0	700.0	700.0	700.0	1.5	1.5	90.00	90.00	0.0	30.7	30.7	27.8	2.92	10.500	
800.0	800.0	800.0	800.0	1.7	1.7	90.00	90.00	0.0	30.7	30.7	27.3	3.37	9.100	
900.0	900.0	900.0	900.0	1.9	1.9	90.00	90.00	0.0	30.7	30.7	26.9	3.82	8.029	
1,000.0	1,000.0	1,000.0	1,000.0	2.1	2.1	90.00	90.00	0.0	30.7	30.7	26.4	4.27	7.184	
1,100.0	1,100.0	1,100.0	1,100.0	2.4	2.4	90.00	90.00	0.0	30.7	30.7	26.0	4.72	6.500	
1,200.0	1,200.0	1,200.0	1,200.0	2.6	2.6	90.00	90.00	0.0	30.7	30.7	25.5	5.17	5.935	
1,300.0	1,300.0	1,300.0	1,300.0	2.8	2.8	90.00	90.00	0.0	30.7	30.7	25.1	5.62	5.460	
1,400.0	1,400.0	1,400.0	1,400.0	3.0	3.0	90.00	90.00	0.0	30.7	30.7	24.6	6.07	5.056	
1,500.0	1,500.0	1,500.0	1,500.0	3.3	3.3	90.00	90.00	0.0	30.7	30.7	24.2	6.52	4.707	
1,600.0	1,600.0	1,600.0	1,600.0	3.5	3.5	90.00	90.00	0.0	30.7	30.7	23.7	6.97	4.403 CC, ES	
1,700.0	1,700.0	1,699.5	1,699.5	3.7	3.7	89.57	89.57	0.2	31.5	31.5	24.1	7.41	4.256	
1,800.0	1,800.0	1,798.9	1,798.9	3.9	3.9	88.41	88.41	0.9	34.0	34.0	26.2	7.84	4.343	
1,900.0	1,900.0	1,898.2	1,898.2	4.2	4.1	86.81	86.81	2.1	38.1	38.3	30.0	8.27	4.627	
2,000.0	2,000.0	1,997.3	1,997.0	4.4	4.3	85.10	85.10	3.8	43.9	44.2	35.5	8.70	5.079	
2,100.0	2,100.0	2,096.2	2,095.6	4.6	4.5	83.47	83.47	5.9	51.3	51.9	42.7	9.14	5.676	
2,200.0	2,200.0	2,194.8	2,193.7	4.8	4.8	82.04	82.04	8.4	60.3	61.3	51.7	9.57	6.399	
2,300.0	2,300.0	2,293.0	2,291.3	5.1	5.0	80.83	80.83	11.5	70.9	72.4	62.4	10.01	7.231	
2,400.0	2,400.0	2,391.2	2,388.7	5.3	5.3	79.82	79.82	14.9	83.1	85.2	74.7	10.45	8.149	
2,500.0	2,500.0	2,490.3	2,486.9	5.5	5.5	79.05	79.05	18.5	95.8	98.4	87.6	10.89	9.036	
2,600.0	2,600.0	2,589.4	2,585.1	5.7	5.8	78.46	78.46	22.1	108.5	111.7	100.4	11.34	9.854	
2,700.0	2,700.0	2,688.5	2,683.4	6.0	6.1	78.00	78.00	25.8	121.2	125.0	113.2	11.79	10.609	
2,800.0	2,800.0	2,787.6	2,781.6	6.2	6.4	77.63	77.63	29.4	133.9	138.3	126.1	12.23	11.307	
2,900.0	2,900.0	2,886.7	2,879.8	6.4	6.6	77.32	77.32	33.0	146.6	151.6	139.0	12.68	11.956	
3,000.0	3,000.0	2,985.8	2,978.0	6.6	6.9	77.06	77.06	36.6	159.3	165.0	151.8	13.14	12.558	
3,100.0	3,100.0	3,085.0	3,076.3	6.9	7.2	67.84	67.84	40.2	172.1	177.9	164.4	13.57	13.113	
3,200.0	3,200.0	3,184.2	3,174.6	7.1	7.5	68.25	68.25	43.9	184.8	190.3	176.3	14.02	13.573	
3,300.0	3,299.9	3,283.5	3,273.0	7.3	7.8	69.07	69.07	47.5	197.5	202.0	187.6	14.47	13.961	
3,400.0	3,399.7	3,382.7	3,371.4	7.5	8.1	70.23	70.23	51.1	210.2	213.2	198.3	14.92	14.288	
3,500.0	3,499.4	3,482.0	3,469.7	7.8	8.4	71.69	71.69	54.7	223.0	224.0	208.6	15.38	14.563	
3,600.0	3,598.9	3,581.2	3,568.1	8.0	8.8	73.42	73.42	58.3	235.7	234.4	218.6	15.84	14.797	
3,700.0	3,698.5	3,680.4	3,666.4	8.2	9.1	75.11	75.11	62.0	248.4	245.0	228.7	16.31	15.020	
3,800.0	3,798.0	3,779.6	3,764.7	8.4	9.4	76.67	76.67	65.6	261.1	255.7	239.0	16.78	15.237	
3,900.0	3,897.5	3,878.7	3,863.0	8.7	9.7	78.10	78.10	69.2	273.8	266.7	249.4	17.26	15.447	
4,000.0	3,997.0	3,977.9	3,961.3	8.9	10.0	79.41	79.41	72.8	286.6	277.8	260.0	17.75	15.649	
4,100.0	4,096.6	4,077.1	4,059.6	9.2	10.3	80.62	80.62	76.4	299.3	289.0	270.8	18.24	15.844	
4,200.0	4,196.1	4,176.3	4,157.9	9.4	10.6	81.75	81.75	80.1	312.0	300.4	281.6	18.74	16.031	
4,300.0	4,295.7	4,275.5	4,256.2	9.6	11.0	82.79	82.79	83.7	324.7	311.9	292.7	19.21	16.235	
4,400.0	4,395.6	4,374.8	4,354.6	9.8	11.3	83.24	83.24	87.3	337.4	323.9	304.3	19.64	16.492	
4,500.0	4,495.5	4,474.0	4,452.9	10.0	11.6	83.09	83.09	90.9	350.2	336.4	316.3	20.05	16.774	
4,600.0	4,595.5	4,573.1	4,551.1	10.2	11.9	91.57	91.57	94.5	362.9	349.1	328.6	20.48	17.047	
4,700.0	4,695.5	4,676.5	4,653.7	10.4	12.2	90.92	90.92	98.2	375.9	361.7	340.7	20.93	17.278	
4,800.0	4,795.5	4,789.9	4,766.5	10.6	12.5	90.40	90.40	101.4	387.0	371.4	350.0	21.37	17.378	
4,900.0	4,895.5	4,904.1	4,880.4	10.9	12.7	90.10	90.10	103.3	393.7	377.3	355.5	21.80	17.306	
5,000.0	4,995.5	5,018.6	4,994.9	11.1	12.9	90.00	90.00	104.0	396.1	379.4	357.2	22.23	17.068	

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 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19E Pad Sec.19-T4N-R63W - Sater 19J-443 - Wellbore #1 - Plan #1 (2-11-15)													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	5,119.3	5,095.5	11.3	13.1	90.00		104.0	396.1	379.4	356.7	22.65	16.754	
5,200.0	5,195.5	5,219.3	5,195.5	11.5	13.3	90.00		104.0	396.1	379.4	356.3	23.07	16.442	
5,300.0	5,295.5	5,319.3	5,295.5	11.7	13.5	90.00		104.0	396.1	379.4	355.9	23.50	16.142	
5,400.0	5,395.5	5,419.3	5,395.5	12.0	13.6	90.00		104.0	396.1	379.4	355.5	23.93	15.852	
5,500.0	5,495.5	5,519.3	5,495.5	12.2	13.8	90.00		104.0	396.1	379.4	355.0	24.36	15.571	
5,600.0	5,595.5	5,619.3	5,595.5	12.4	14.0	90.00		104.0	396.1	379.4	354.6	24.80	15.300	
5,700.0	5,695.5	5,719.3	5,695.5	12.6	14.2	90.00		104.0	396.1	379.4	354.2	25.23	15.038	
5,764.2	5,759.8	5,783.5	5,759.8	12.8	14.3	-90.06		104.0	396.1	379.4	353.9	25.50	14.876	
5,800.0	5,795.5	5,819.3	5,795.5	12.8	14.4	-90.02		104.0	396.1	379.4	353.7	25.66	14.787	
5,817.0	5,812.6	5,836.3	5,812.6	12.9	14.4	-90.09		104.0	396.1	379.4	353.7	25.72	14.752	
5,900.0	5,895.1	5,918.9	5,895.1	13.0	14.6	-91.26		104.0	396.1	379.5	353.5	26.00	14.597	
6,000.0	5,992.8	6,018.3	5,994.6	13.1	14.8	-94.15		102.5	396.1	380.4	354.2	26.27	14.482	
6,100.0	6,086.8	6,121.3	6,096.6	13.3	14.9	-97.26		89.0	396.1	382.6	356.1	26.49	14.445	
6,200.0	6,175.6	6,227.4	6,198.8	13.4	15.1	-100.26		61.0	396.1	385.8	359.1	26.70	14.451	
6,300.0	6,257.7	6,337.0	6,299.3	13.6	15.2	-103.08		17.4	396.1	389.9	362.9	26.95	14.467	
6,400.0	6,331.7	6,449.9	6,395.2	13.9	15.4	-105.67		-42.0	396.1	394.5	367.2	27.30	14.449	
6,500.0	6,396.2	6,566.3	6,483.8	14.4	15.6	-107.96		-117.3	396.1	399.3	371.4	27.84	14.342	
6,600.0	6,450.3	6,686.0	6,561.8	15.0	16.0	-109.90		-207.8	396.1	403.9	375.2	28.64	14.103	
6,700.0	6,492.9	6,808.5	6,626.1	15.8	16.6	-111.44		-312.0	396.1	407.9	378.1	29.77	13.701	
6,800.0	6,523.3	6,933.3	6,673.7	16.8	17.6	-112.55		-427.2	396.1	410.9	379.6	31.30	13.129	
6,900.0	6,541.1	7,059.8	6,702.1	17.9	18.8	-113.20		-550.3	396.1	412.8	379.6	33.24	12.420	
7,000.0	6,545.8	7,183.3	6,710.0	19.2	20.3	-113.40		-673.5	396.1	413.4	377.9	35.53	11.636	
7,100.0	6,544.7	7,283.3	6,710.0	20.5	21.5	-113.54		-773.5	396.1	413.8	375.9	37.97	10.899	
7,200.0	6,543.5	7,383.3	6,710.0	21.9	22.9	-113.69		-873.5	396.1	414.3	373.7	40.57	10.213	
7,300.0	6,542.3	7,483.3	6,710.0	23.5	24.4	-113.84		-973.5	396.1	414.8	371.5	43.29	9.581	
7,400.0	6,541.2	7,583.3	6,710.0	25.0	25.9	-113.99		-1,073.5	396.1	415.3	369.1	46.12	9.004	
7,500.0	6,540.0	7,683.3	6,710.0	26.6	27.4	-114.14		-1,173.4	396.1	415.7	366.7	49.03	8.479	
7,600.0	6,538.8	7,783.3	6,710.0	28.3	29.0	-114.28		-1,273.4	396.1	416.2	364.2	52.01	8.003	
7,700.0	6,537.7	7,883.3	6,710.0	30.0	30.7	-114.43		-1,373.4	396.1	416.7	361.7	55.04	7.570	
7,800.0	6,536.5	7,983.3	6,710.0	31.7	32.4	-114.57		-1,473.4	396.1	417.2	359.1	58.13	7.177	
7,900.0	6,535.3	8,083.3	6,710.0	33.4	34.0	-114.72		-1,573.4	396.1	417.7	356.4	61.25	6.820	
8,000.0	6,534.2	8,183.3	6,710.0	35.1	35.8	-114.87		-1,673.4	396.1	418.2	353.8	64.40	6.494	
8,100.0	6,533.0	8,283.3	6,710.0	36.9	37.5	-115.01		-1,773.4	396.1	418.7	351.1	67.57	6.196	
8,200.0	6,531.8	8,383.3	6,710.0	38.7	39.3	-115.16		-1,873.4	396.1	419.1	348.4	70.77	5.923	
8,300.0	6,530.6	8,483.3	6,710.0	40.5	41.0	-115.30		-1,973.4	396.1	419.6	345.7	73.98	5.672	
8,400.0	6,529.5	8,583.3	6,710.0	42.3	42.8	-115.44		-2,073.4	396.1	420.1	342.9	77.21	5.441	
8,500.0	6,528.3	8,683.3	6,710.0	44.1	44.6	-115.59		-2,173.4	396.1	420.7	340.2	80.45	5.228	
8,600.0	6,527.1	8,783.3	6,710.0	45.9	46.4	-115.73		-2,273.4	396.1	421.2	337.5	83.70	5.032	
8,700.0	6,526.0	8,883.3	6,710.0	47.8	48.2	-115.88		-2,373.4	396.1	421.7	334.7	86.96	4.849	
8,800.0	6,524.8	8,983.3	6,710.0	49.6	50.0	-116.02		-2,473.4	396.1	422.2	332.0	90.22	4.679	
8,900.0	6,523.6	9,083.3	6,710.0	51.4	51.9	-116.16		-2,573.3	396.1	422.7	329.2	93.49	4.521	
9,000.0	6,522.5	9,183.3	6,710.0	53.3	53.7	-116.30		-2,673.3	396.1	423.2	326.4	96.76	4.374	
9,100.0	6,521.3	9,283.3	6,710.0	55.1	55.5	-116.44		-2,773.3	396.1	423.7	323.7	100.03	4.236	
9,200.0	6,520.1	9,383.3	6,710.0	57.0	57.4	-116.59		-2,873.3	396.1	424.3	320.9	103.31	4.107	
9,300.0	6,519.0	9,483.3	6,710.0	58.9	59.2	-116.73		-2,973.3	396.1	424.8	318.2	106.58	3.985	
9,400.0	6,517.8	9,583.3	6,710.0	60.7	61.1	-116.87		-3,073.3	396.1	425.3	315.4	109.86	3.871	
9,500.0	6,516.6	9,683.1	6,710.0	62.6	62.9	-117.01		-3,173.3	396.1	425.8	312.7	113.13	3.764	
9,600.0	6,515.4	9,783.1	6,710.0	64.5	64.8	-117.15		-3,273.3	396.1	426.4	310.0	116.40	3.663	
9,700.0	6,514.3	9,883.1	6,710.0	66.3	66.7	-117.29		-3,373.3	396.1	426.9	307.2	119.67	3.567	
9,800.0	6,513.1	9,983.1	6,710.0	68.2	68.5	-117.43		-3,473.3	396.1	427.4	304.5	122.93	3.477	
9,900.0	6,511.9	10,083.1	6,710.0	70.1	70.4	-117.57		-3,573.3	396.1	428.0	301.8	126.20	3.391	

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 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Offset Design Sater 4N63W19E Pad Sec.19-T4N-R63W - Sater 19J-443 - Wellbore #1 - Plan #1 (2-11-15)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												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
10,000.0	6,510.8	10,183.1	6,710.0	72.0	72.3	-117.70	-3,673.3	396.1	428.5	299.1	129.46	3.310	
10,100.0	6,509.6	10,283.1	6,710.0	73.9	74.2	-117.84	-3,773.3	396.1	429.1	296.4	132.71	3.233	
10,200.0	6,508.4	10,383.1	6,710.0	75.7	76.0	-117.98	-3,873.3	396.1	429.6	293.6	135.96	3.160	
10,300.0	6,507.3	10,483.1	6,710.0	77.6	77.9	-118.12	-3,973.3	396.1	430.2	291.0	139.21	3.090	
10,400.0	6,506.1	10,583.1	6,710.0	79.5	79.8	-118.26	-4,073.2	396.1	430.7	288.3	142.46	3.024	
10,500.0	6,504.9	10,683.1	6,710.0	81.4	81.7	-118.39	-4,173.2	396.1	431.3	285.6	145.69	2.960	
10,600.0	6,503.7	10,783.1	6,710.0	83.3	83.6	-118.53	-4,273.2	396.1	431.8	282.9	148.93	2.900	
10,700.0	6,502.6	10,883.1	6,710.0	85.2	85.5	-118.66	-4,373.2	396.1	432.4	280.2	152.16	2.842	
10,800.0	6,501.4	10,983.1	6,710.0	87.1	87.3	-118.80	-4,473.2	396.1	433.0	277.6	155.38	2.786	
10,900.0	6,500.2	11,083.0	6,710.0	89.0	89.2	-118.94	-4,573.2	396.1	433.5	274.9	158.60	2.733	
10,920.7	6,500.0	11,103.7	6,710.0	89.4	89.6	-118.96	-4,593.9	396.1	433.6	274.4	159.26	2.723 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4673.0ft (RKB - 13')

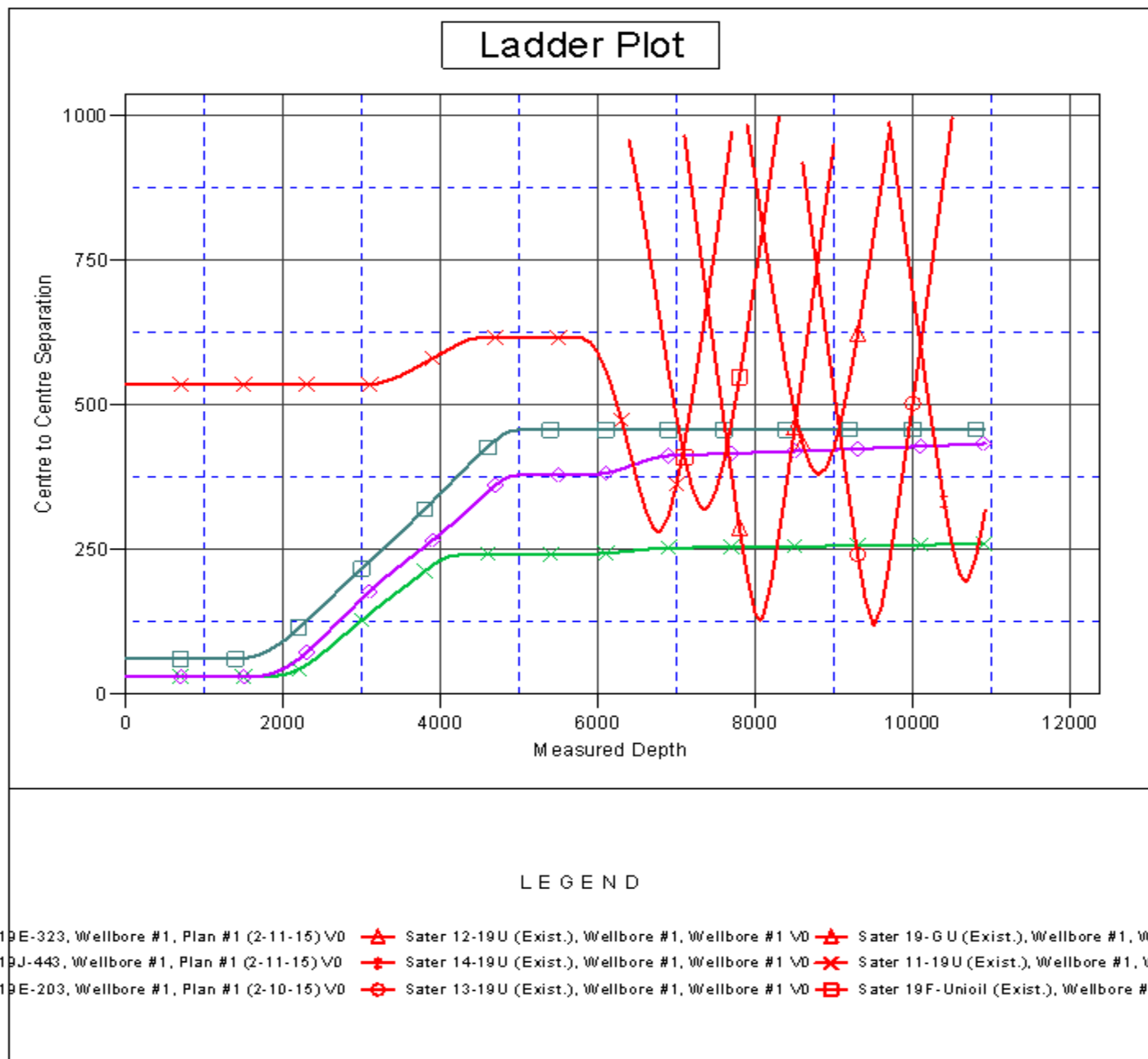
Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Sater 19E-223

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.65°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Sater 19E-223
Project:	SEC.19-T4N-R63W	TVD Reference:	WELL @ 4673.0ft (RKB - 13')
Reference Site:	Sater 4N63W19E Pad Sec.19-T4N-R63W	MD Reference:	WELL @ 4673.0ft (RKB - 13')
Site Error:	0.0ft	North Reference:	True
Reference Well:	Sater 19E-223	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 (2-11-15)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4673.0ft (RKB - 13')

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000 °

Coordinates are relative to: Sater 19E-223

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.65°

