

PETROLEUM DEVELOPMENT CORP Weld County CO

Well Name: **Guttersen 31T-301**

Surface Location: Guttersen 31Q-401 Pad Sec.31-T3N-R63W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

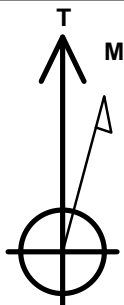
Ground Elevation: 4823.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1308192.45	3285467.50	40.174870	-104.478390	

Original Well Elev WELL @ 4838.0ft (Original Well Elev)

WELLBORE TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 75'FSL, 2089'FEL		0.0	0.0	Point
BHL 500'FNL, 1495'FEL	6716.0	4699.5	536.4	Point



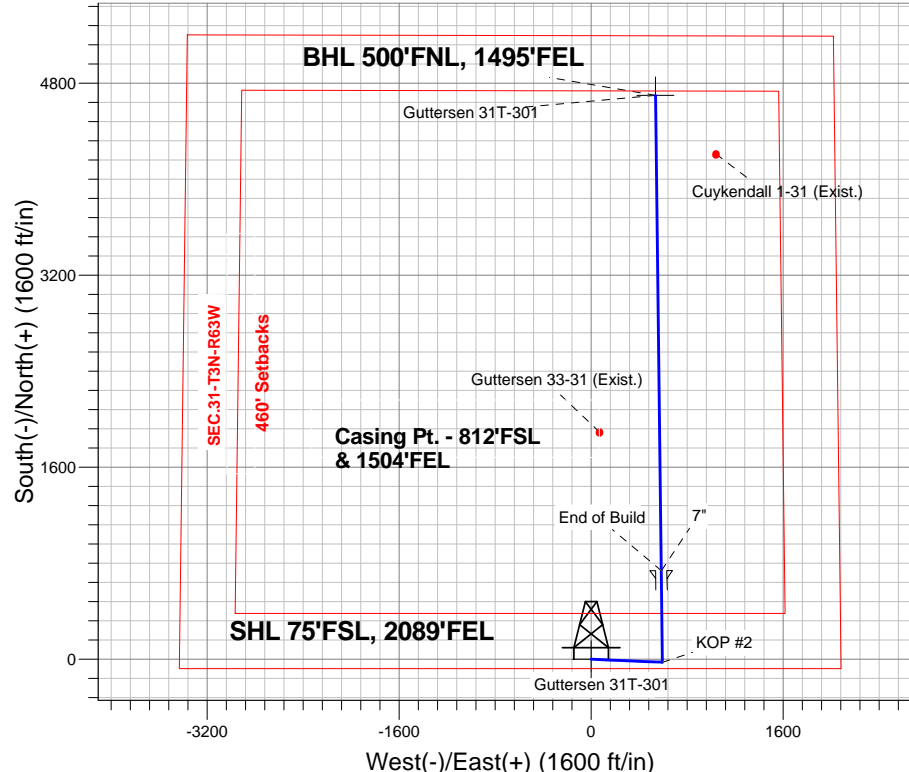
Azimuths to True North
Magnetic North: 8.37°

Magnetic Field
Strength: 52788.6snT
Dip Angle: 66.83°
Date: 11/14/2013
Model: IGRF2010

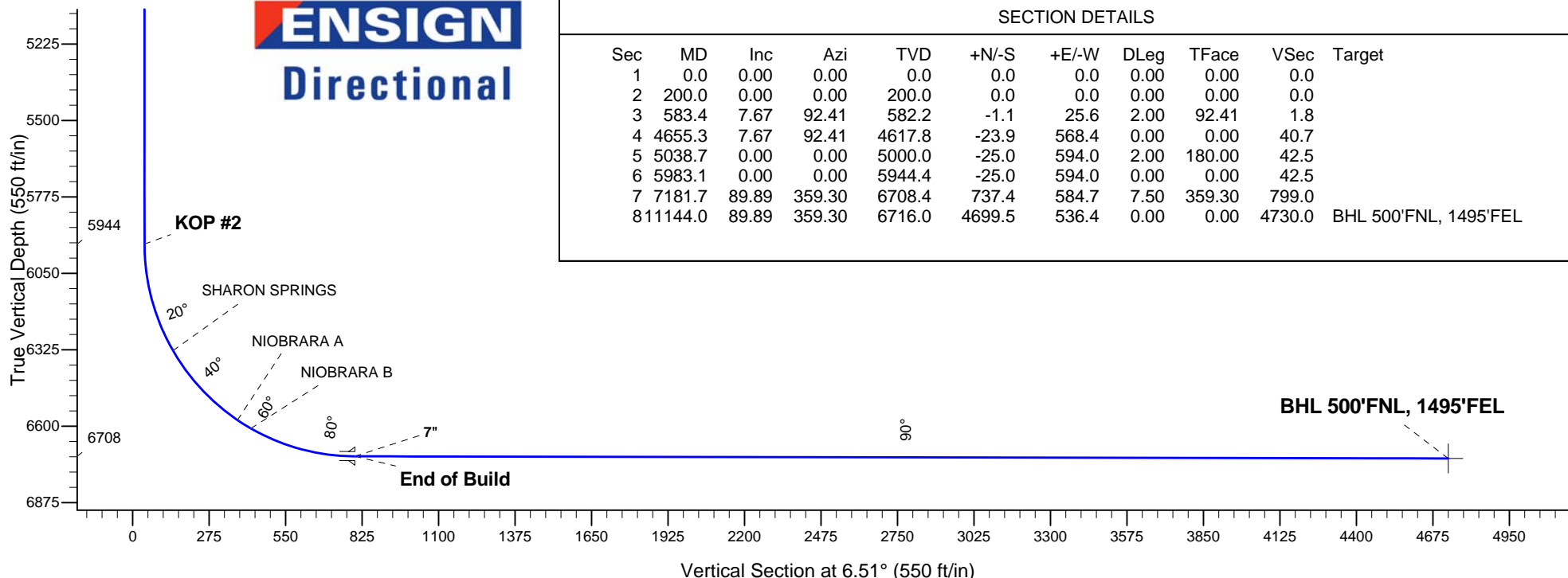
ANNOTATIONS

TVD	MD	Annotation
200.0	200.0	KOP #1
5944.4	5983.1	KOP #2
6708.4	7181.7	End of Build

Guttersen 31Q-401 Pad Sec.31-T3N-R63W
Guttersen 31T-301
Plan # 2 (11-11-13)
11:33, November 14 2013



ENSIGN
Directional



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.0	
3	583.4	7.67	92.41	582.2	-1.1	25.6	2.00	92.41	1.8	
4	4655.3	7.67	92.41	4617.8	-23.9	568.4	0.00	0.00	40.7	
5	5038.7	0.00	0.00	5000.0	-25.0	594.0	2.00	180.00	42.5	
6	5983.1	0.00	0.00	5944.4	-25.0	594.0	0.00	0.00	42.5	
7	7181.7	89.89	359.30	6708.4	737.4	584.7	7.50	359.30	799.0	
8	11144.0	89.89	359.30	6716.0	4699.5	536.4	0.00	0.00	4730.0	BHL 500'FNL, 1495'FEL



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.31-T3N-R63W

Guttersen 31Q-401 Pad Sec.31-T3N-R63W

Guttersen 31T-301

Wellbore #1

Plan: Plan # 2 (11-11-13)

Standard Planning Report

14 November, 2013

Database:	Landmark	Local Co-ordinate Reference:	Well Guttersen 31T-301
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Project:	SEC.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	North Reference:	True
Well:	Guttersen 31T-301	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan # 2 (11-11-13)		

Project	SEC.31-T3N-R63W, Weld County, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site Guttersen 31Q-401 Pad Sec.31-T3N-R63W					
Site Position:		Northing:	1,308,191.41 ft	Latitude:	40.174870
From:	Lat/Long	Easting:	3,285,375.30 ft	Longitude:	-104.478720
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.66 °

Well	Guttersen 31T-301					
Well Position	+N/-S	0.0 ft	Northing:	1,308,192.45 ft	Latitude:	40.174870
	+E/-W	92.2 ft	Easting:	3,285,467.50 ft	Longitude:	-104.478390
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,823.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/14/2013	8.37	66.83	52,789

Design	Plan # 2 (11-11-13)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	6.51

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	
200.0	0.00	0.00	200.0	0.0	0.0	0.00	0.00	0.00	0.00	
583.4	7.67	92.41	582.2	-1.1	25.6	2.00	2.00	0.00	92.41	
4,655.3	7.67	92.41	4,617.8	-23.9	568.4	0.00	0.00	0.00	0.00	
5,038.7	0.00	0.00	5,000.0	-25.0	594.0	2.00	-2.00	0.00	180.00	
5,983.1	0.00	0.00	5,944.4	-25.0	594.0	0.00	0.00	0.00	0.00	
7,181.7	89.89	359.30	6,708.4	737.4	584.7	7.50	7.50	0.00	359.30	
11,144.0	89.89	359.30	6,716.0	4,699.5	536.4	0.00	0.00	0.00	0.00	BHL 500'FNL, 1495

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Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Project:	SEC.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	North Reference:	True
Well:	Guttersen 31T-301	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan # 2 (11-11-13)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
SHL 75'FSL, 2089'FEL									
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
KOP #1									
300.0	2.00	92.41	300.0	-0.1	1.7	0.1	2.00	2.00	0.00
400.0	4.00	92.41	399.8	-0.3	7.0	0.5	2.00	2.00	0.00
500.0	6.00	92.41	499.5	-0.7	15.7	1.1	2.00	2.00	0.00
583.4	7.67	92.41	582.2	-1.1	25.6	1.8	2.00	2.00	0.00
600.0	7.67	92.41	598.7	-1.2	27.8	2.0	0.00	0.00	0.00
700.0	7.67	92.41	697.8	-1.7	41.1	2.9	0.00	0.00	0.00
800.0	7.67	92.41	796.9	-2.3	54.5	3.9	0.00	0.00	0.00
900.0	7.67	92.41	896.0	-2.9	67.8	4.9	0.00	0.00	0.00
1,000.0	7.67	92.41	995.1	-3.4	81.1	5.8	0.00	0.00	0.00
1,100.0	7.67	92.41	1,094.2	-4.0	94.5	6.8	0.00	0.00	0.00
1,200.0	7.67	92.41	1,193.3	-4.5	107.8	7.7	0.00	0.00	0.00
1,300.0	7.67	92.41	1,292.4	-5.1	121.1	8.7	0.00	0.00	0.00
1,400.0	7.67	92.41	1,391.6	-5.7	134.5	9.6	0.00	0.00	0.00
1,500.0	7.67	92.41	1,490.7	-6.2	147.8	10.6	0.00	0.00	0.00
1,600.0	7.67	92.41	1,589.8	-6.8	161.1	11.5	0.00	0.00	0.00
1,700.0	7.67	92.41	1,688.9	-7.3	174.4	12.5	0.00	0.00	0.00
1,800.0	7.67	92.41	1,788.0	-7.9	187.8	13.4	0.00	0.00	0.00
1,900.0	7.67	92.41	1,887.1	-8.5	201.1	14.4	0.00	0.00	0.00
2,000.0	7.67	92.41	1,986.2	-9.0	214.4	15.4	0.00	0.00	0.00
2,100.0	7.67	92.41	2,085.3	-9.6	227.8	16.3	0.00	0.00	0.00
2,200.0	7.67	92.41	2,184.4	-10.1	241.1	17.3	0.00	0.00	0.00
2,300.0	7.67	92.41	2,283.5	-10.7	254.4	18.2	0.00	0.00	0.00
2,400.0	7.67	92.41	2,382.6	-11.3	267.8	19.2	0.00	0.00	0.00
2,500.0	7.67	92.41	2,481.7	-11.8	281.1	20.1	0.00	0.00	0.00
2,600.0	7.67	92.41	2,580.8	-12.4	294.4	21.1	0.00	0.00	0.00
2,700.0	7.67	92.41	2,679.9	-13.0	307.8	22.0	0.00	0.00	0.00
2,800.0	7.67	92.41	2,779.0	-13.5	321.1	23.0	0.00	0.00	0.00
2,900.0	7.67	92.41	2,878.1	-14.1	334.4	23.9	0.00	0.00	0.00
3,000.0	7.67	92.41	2,977.2	-14.6	347.7	24.9	0.00	0.00	0.00
3,100.0	7.67	92.41	3,076.4	-15.2	361.1	25.9	0.00	0.00	0.00
3,200.0	7.67	92.41	3,175.5	-15.8	374.4	26.8	0.00	0.00	0.00
3,300.0	7.67	92.41	3,274.6	-16.3	387.7	27.8	0.00	0.00	0.00
3,400.0	7.67	92.41	3,373.7	-16.9	401.1	28.7	0.00	0.00	0.00
3,500.0	7.67	92.41	3,472.8	-17.4	414.4	29.7	0.00	0.00	0.00
3,600.0	7.67	92.41	3,571.9	-18.0	427.7	30.6	0.00	0.00	0.00
3,688.9	7.67	92.41	3,660.0	-18.5	439.6	31.5	0.00	0.00	0.00
PARKMAN									
3,700.0	7.67	92.41	3,671.0	-18.6	441.1	31.6	0.00	0.00	0.00
3,800.0	7.67	92.41	3,770.1	-19.1	454.4	32.5	0.00	0.00	0.00
3,900.0	7.67	92.41	3,869.2	-19.7	467.7	33.5	0.00	0.00	0.00
4,000.0	7.67	92.41	3,968.3	-20.2	481.1	34.4	0.00	0.00	0.00
4,100.0	7.67	92.41	4,067.4	-20.8	494.4	35.4	0.00	0.00	0.00
4,200.0	7.67	92.41	4,166.5	-21.4	507.7	36.4	0.00	0.00	0.00
4,243.9	7.67	92.41	4,210.0	-21.6	513.6	36.8	0.00	0.00	0.00
SUSSEX									
4,300.0	7.67	92.41	4,265.6	-21.9	521.0	37.3	0.00	0.00	0.00
4,400.0	7.67	92.41	4,364.7	-22.5	534.4	38.3	0.00	0.00	0.00

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Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	North Reference:	True
Well:	Guttersen 31T-301	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan # 2 (11-11-13)		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,435.6	7.67	92.41	4,400.0	-22.7	539.1	38.6	0.00	0.00	0.00
SHANNON									
4,500.0	7.67	92.41	4,463.8	-23.1	547.7	39.2	0.00	0.00	0.00
4,600.0	7.67	92.41	4,562.9	-23.6	561.0	40.2	0.00	0.00	0.00
4,655.3	7.67	92.41	4,617.8	-23.9	568.4	40.7	0.00	0.00	0.00
4,700.0	6.77	92.41	4,662.1	-24.2	574.0	41.1	2.00	-2.00	0.00
4,800.0	4.77	92.41	4,761.6	-24.6	584.1	41.8	2.00	-2.00	0.00
4,900.0	2.77	92.41	4,861.4	-24.9	590.6	42.3	2.00	-2.00	0.00
5,000.0	0.77	92.41	4,961.3	-25.0	593.7	42.5	2.00	-2.00	0.00
5,038.7	0.00	0.00	5,000.0	-25.0	594.0	42.5	2.00	-2.00	0.00
5,100.0	0.00	0.00	5,061.3	-25.0	594.0	42.5	0.00	0.00	0.00
5,200.0	0.00	0.00	5,161.3	-25.0	594.0	42.5	0.00	0.00	0.00
5,300.0	0.00	0.00	5,261.3	-25.0	594.0	42.5	0.00	0.00	0.00
5,400.0	0.00	0.00	5,361.3	-25.0	594.0	42.5	0.00	0.00	0.00
5,500.0	0.00	0.00	5,461.3	-25.0	594.0	42.5	0.00	0.00	0.00
5,600.0	0.00	0.00	5,561.3	-25.0	594.0	42.5	0.00	0.00	0.00
5,700.0	0.00	0.00	5,661.3	-25.0	594.0	42.5	0.00	0.00	0.00
5,800.0	0.00	0.00	5,761.3	-25.0	594.0	42.5	0.00	0.00	0.00
5,900.0	0.00	0.00	5,861.3	-25.0	594.0	42.5	0.00	0.00	0.00
5,983.1	0.00	0.00	5,944.4	-25.0	594.0	42.5	0.00	0.00	0.00
KOP #2									
6,000.0	1.26	359.30	5,961.3	-24.8	594.0	42.7	7.48	7.48	0.00
6,100.0	8.76	359.30	6,060.9	-16.1	593.9	51.4	7.50	7.50	0.00
6,200.0	16.26	359.30	6,158.4	5.6	593.6	72.9	7.50	7.50	0.00
6,300.0	23.76	359.30	6,252.3	39.8	593.2	106.8	7.50	7.50	0.00
6,385.0	30.14	359.30	6,328.0	78.3	592.7	145.0	7.50	7.50	0.00
SHARON SPRINGS									
6,400.0	31.26	359.30	6,340.9	85.9	592.6	152.6	7.50	7.50	0.00
6,500.0	38.76	359.30	6,422.8	143.3	591.9	209.5	7.50	7.50	0.00
6,600.0	46.26	359.30	6,496.4	210.8	591.1	276.5	7.50	7.50	0.00
6,700.0	53.76	359.30	6,560.6	287.3	590.2	352.4	7.50	7.50	0.00
6,730.2	56.03	359.30	6,578.0	312.0	589.9	376.9	7.50	7.50	0.00
NIOBRARA A									
6,787.1	60.29	359.30	6,608.0	360.4	589.3	424.9	7.50	7.50	0.00
NIOBRARA B									
6,800.0	61.26	359.30	6,614.3	371.6	589.2	436.1	7.50	7.50	0.00
6,900.0	68.76	359.30	6,656.5	462.2	588.1	525.9	7.50	7.50	0.00
7,000.0	76.26	359.30	6,686.5	557.5	586.9	620.5	7.50	7.50	0.00
7,100.0	83.76	359.30	6,703.9	655.9	585.7	718.1	7.50	7.50	0.00
7,181.7	89.89	359.30	6,708.4	737.4	584.7	799.0	7.50	7.50	0.00
End of Build - 7"									
7,200.0	89.89	359.30	6,708.4	755.7	584.5	817.2	0.00	0.00	0.00
7,300.0	89.89	359.30	6,708.6	855.7	583.3	916.4	0.00	0.00	0.00
7,400.0	89.89	359.30	6,708.8	955.7	582.1	1,015.6	0.00	0.00	0.00
7,500.0	89.89	359.30	6,709.0	1,055.7	580.8	1,114.8	0.00	0.00	0.00
7,600.0	89.89	359.30	6,709.2	1,155.7	579.6	1,214.0	0.00	0.00	0.00
7,700.0	89.89	359.30	6,709.4	1,255.7	578.4	1,313.2	0.00	0.00	0.00
7,800.0	89.89	359.30	6,709.6	1,355.7	577.2	1,412.4	0.00	0.00	0.00
7,900.0	89.89	359.30	6,709.8	1,455.7	576.0	1,511.6	0.00	0.00	0.00
8,000.0	89.89	359.30	6,710.0	1,555.7	574.7	1,610.8	0.00	0.00	0.00
8,100.0	89.89	359.30	6,710.2	1,655.7	573.5	1,710.0	0.00	0.00	0.00
8,200.0	89.89	359.30	6,710.3	1,755.7	572.3	1,809.2	0.00	0.00	0.00

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Project:	SEC.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	North Reference:	True
Well:	Guttersen 31T-301	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan # 2 (11-11-13)		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,300.0	89.89	359.30	6,710.5	1,855.7	571.1	1,908.5	0.00	0.00	0.00
8,400.0	89.89	359.30	6,710.7	1,955.7	569.9	2,007.7	0.00	0.00	0.00
8,500.0	89.89	359.30	6,710.9	2,055.6	568.6	2,106.9	0.00	0.00	0.00
8,600.0	89.89	359.30	6,711.1	2,155.6	567.4	2,206.1	0.00	0.00	0.00
8,700.0	89.89	359.30	6,711.3	2,255.6	566.2	2,305.3	0.00	0.00	0.00
8,800.0	89.89	359.30	6,711.5	2,355.6	565.0	2,404.5	0.00	0.00	0.00
8,900.0	89.89	359.30	6,711.7	2,455.6	563.8	2,503.7	0.00	0.00	0.00
9,000.0	89.89	359.30	6,711.9	2,555.6	562.6	2,602.9	0.00	0.00	0.00
9,100.0	89.89	359.30	6,712.1	2,655.6	561.3	2,702.1	0.00	0.00	0.00
9,200.0	89.89	359.30	6,712.3	2,755.6	560.1	2,801.3	0.00	0.00	0.00
9,300.0	89.89	359.30	6,712.5	2,855.6	558.9	2,900.5	0.00	0.00	0.00
9,400.0	89.89	359.30	6,712.7	2,955.6	557.7	2,999.8	0.00	0.00	0.00
9,500.0	89.89	359.30	6,712.8	3,055.6	556.5	3,099.0	0.00	0.00	0.00
9,600.0	89.89	359.30	6,713.0	3,155.6	555.2	3,198.2	0.00	0.00	0.00
9,700.0	89.89	359.30	6,713.2	3,255.6	554.0	3,297.4	0.00	0.00	0.00
9,800.0	89.89	359.30	6,713.4	3,355.5	552.8	3,396.6	0.00	0.00	0.00
9,900.0	89.89	359.30	6,713.6	3,455.5	551.6	3,495.8	0.00	0.00	0.00
10,000.0	89.89	359.30	6,713.8	3,555.5	550.4	3,595.0	0.00	0.00	0.00
10,100.0	89.89	359.30	6,714.0	3,655.5	549.2	3,694.2	0.00	0.00	0.00
10,200.0	89.89	359.30	6,714.2	3,755.5	547.9	3,793.4	0.00	0.00	0.00
10,300.0	89.89	359.30	6,714.4	3,855.5	546.7	3,892.6	0.00	0.00	0.00
10,400.0	89.89	359.30	6,714.6	3,955.5	545.5	3,991.8	0.00	0.00	0.00
10,500.0	89.89	359.30	6,714.8	4,055.5	544.3	4,091.1	0.00	0.00	0.00
10,600.0	89.89	359.30	6,715.0	4,155.5	543.1	4,190.3	0.00	0.00	0.00
10,700.0	89.89	359.30	6,715.1	4,255.5	541.8	4,289.5	0.00	0.00	0.00
10,800.0	89.89	359.30	6,715.3	4,355.5	540.6	4,388.7	0.00	0.00	0.00
10,900.0	89.89	359.30	6,715.5	4,455.5	539.4	4,487.9	0.00	0.00	0.00
11,000.0	89.89	359.30	6,715.7	4,555.5	538.2	4,587.1	0.00	0.00	0.00
11,100.0	89.89	359.30	6,715.9	4,655.4	537.0	4,686.3	0.00	0.00	0.00
11,144.0	89.89	359.30	6,716.0	4,699.5	536.4	4,730.0	0.00	0.00	0.00
BHL 500'FNL, 1495'FEL									

Targets

Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
BHL 500'FNL, 1495'FI	- plan hits target center	0.00	0.00	6,716.0	4,699.5	536.4	1,312,897.59	3,285,949.74	40.187770	-104.476470
SHL 75'FSL, 2089'FE	- plan hits target center	0.00	0.00	1.0	0.0	0.0	1,308,192.47	3,285,467.50	40.174870	-104.478390

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,181.7	6,708.4	7"	7	8-3/4

Database:	Landmark	Local Co-ordinate Reference:	Well Guttersen 31T-301
Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Project:	SEC.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	North Reference:	True
Well:	Guttersen 31T-301	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan # 2 (11-11-13)		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,688.9	3,660.0	PARKMAN				
4,243.9	4,210.0	SUSSEX				
4,435.6	4,400.0	SHANNON				
6,385.0	6,328.0	SHARON SPRINGS				
6,730.2	6,578.0	NIOBRARA A				
6,787.1	6,608.0	NIOBRARA B				

Plan Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
200.0	200.0	0.0	0.0	KOP #1	
5,983.1	5,944.4	-25.0	594.0	KOP #2	
7,181.7	6,708.4	737.4	584.7	End of Build	



Directional

PETROLEUM DEVELOPMENT CORP Weld County CO

SEC.31-T3N-R63W

Guttersen 31Q-401 Pad Sec.31-T3N-R63W

Guttersen 31T-301

Wellbore #1

Plan # 2 (11-11-13)

Anticollision Report

14 November, 2013



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Reference	Plan # 2 (11-11-13)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 1,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date 11/11/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	11,143.3	Plan # 2 (11-11-13) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Guttersen 31Q-401 Pad Sec.31-T3N-R63W						
Cuykendall 1-31 (Exist.) - Wellbore #1 - Wellbore #1	10,649.8	6,715.1	496.9	280.7	2.298	CC, ES, SF
Guttersen 31Q-221 - Wellbore #1 - Plan #1 (5-31-13)	200.0	200.0	61.5	60.8	91.174	CC, ES
Guttersen 31Q-221 - Wellbore #1 - Plan #1 (5-31-13)	11,144.0	11,056.2	661.1	481.0	3.671	SF
Guttersen 31Q-401 - Wellbore #1 - Plan #1 (5-31-13)	200.0	200.0	92.2	91.5	136.761	CC, ES
Guttersen 31Q-401 - Wellbore #1 - Plan #1 (5-31-13)	11,144.0	11,216.4	953.5	772.6	5.271	SF
Guttersen 31T-441 - Wellbore #1 - Plan #1 (5-31-13)	200.0	200.0	30.7	30.1	45.587	CC, ES
Guttersen 31T-441 - Wellbore #1 - Plan #1 (5-31-13)	11,144.0	11,224.0	378.6	205.2	2.183	SF
Guttersen 33-31 (Exist.) - Wellbore #1 - Wellbore #1	8,344.8	6,710.6	500.7	327.2	2.886	CC, ES, SF

Offset Design												
Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Cuykendall 1-31 (Exist.) - Wellbore #1 - Wellbore #1												
Survey Program: 7300-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)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor
9,800.0	6,713.4	6,713.4	6,713.4	66.6	134.3	89.81	4,211.3	1,039.4	984.4	784.2	200.27	4.916
9,900.0	6,713.6	6,713.6	6,713.6	68.4	134.3	89.83	4,211.3	1,039.4	899.5	697.4	202.15	4.450
10,000.0	6,713.8	6,713.8	6,713.8	70.3	134.3	89.86	4,211.3	1,039.4	818.0	614.0	204.02	4.009
10,100.0	6,714.0	6,714.0	6,714.0	72.2	134.3	89.88	4,211.3	1,039.4	741.1	535.2	205.91	3.599
10,200.0	6,714.2	6,714.2	6,714.2	74.0	134.3	89.90	4,211.3	1,039.4	670.3	462.5	207.79	3.226
10,300.0	6,714.4	6,714.4	6,714.4	75.9	134.3	89.92	4,211.3	1,039.4	607.7	398.0	209.68	2.898
10,400.0	6,714.6	6,714.6	6,714.6	77.8	134.3	89.94	4,211.3	1,039.4	556.2	344.6	211.56	2.629
10,500.0	6,714.8	6,714.8	6,714.8	79.6	134.3	89.97	4,211.3	1,039.4	519.0	305.6	213.45	2.432
10,600.0	6,715.0	6,715.0	6,715.0	81.5	134.3	89.99	4,211.3	1,039.4	499.4	284.1	215.34	2.319
10,649.8	6,715.1	6,715.1	6,715.1	82.5	134.3	90.00	4,211.3	1,039.4	496.9	280.7	216.29	2.298
10,700.0	6,715.1	6,715.1	6,715.1	83.4	134.3	90.01	4,211.3	1,039.4	499.5	282.2	217.24	2.299
10,800.0	6,715.3	6,715.3	6,715.3	85.3	134.3	90.03	4,211.3	1,039.4	519.2	300.0	219.13	2.369
10,900.0	6,715.5	6,715.5	6,715.5	87.2	134.3	90.06	4,211.3	1,039.4	556.4	335.4	221.03	2.517
11,000.0	6,715.7	6,715.7	6,715.7	89.1	134.3	90.08	4,211.3	1,039.4	608.0	385.0	222.92	2.727
11,100.0	6,715.9	6,715.9	6,715.9	90.9	134.3	90.10	4,211.3	1,039.4	670.6	445.7	224.82	2.983
11,144.0	6,716.0	6,716.0	6,716.0	91.6	134.3	90.11	4,211.3	1,039.4	700.9	475.4	225.50	3.108

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 Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Offset Design Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Guttersen 31Q-221 - Wellbore #1 - Plan #1 (5-31-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-89.99	-89.99	0.0	-61.5	61.5				
100.0	100.0	100.0	100.0	0.1	0.1	-89.99	-89.99	0.0	-61.5	61.5	61.3	0.22	273.522	
200.0	200.0	200.0	200.0	0.3	0.3	-89.99	-89.99	0.0	-61.5	61.5	60.8	0.67	91.174 CC, ES	
300.0	300.0	300.0	300.0	0.6	0.6	177.66	177.66	0.0	-61.5	63.2	62.1	1.12	56.477	
400.0	399.8	399.8	399.8	0.8	0.8	177.84	177.84	0.0	-61.5	68.5	66.9	1.57	43.679	
500.0	499.5	499.5	499.5	1.0	1.0	178.08	178.08	0.0	-61.5	77.2	75.1	2.02	38.177	
583.4	582.2	582.2	582.2	1.3	1.2	178.29	178.29	0.0	-61.5	87.1	84.7	2.40	36.251	
600.0	598.7	598.7	598.7	1.3	1.2	178.33	178.33	0.0	-61.5	89.3	86.8	2.48	36.064	
700.0	697.8	697.8	697.8	1.6	1.5	178.55	178.55	0.0	-61.5	102.6	99.7	2.92	35.094	
800.0	796.9	796.9	796.9	1.9	1.7	178.72	178.72	0.0	-61.5	116.0	112.6	3.38	34.337	
900.0	896.0	896.0	896.0	2.3	1.9	178.85	178.85	0.0	-61.5	129.3	125.5	3.83	33.733	
1,000.0	995.1	995.1	995.1	2.6	2.1	178.96	178.96	0.0	-61.5	142.6	138.4	4.29	33.243	
1,100.0	1,094.2	1,094.2	1,094.2	2.9	2.3	179.04	179.04	0.0	-61.5	156.0	151.2	4.75	32.837	
1,200.0	1,193.3	1,193.3	1,193.3	3.3	2.6	179.12	179.12	0.0	-61.5	169.3	164.1	5.21	32.497	
1,300.0	1,292.4	1,292.4	1,292.4	3.6	2.8	179.18	179.18	0.0	-61.5	182.7	177.0	5.67	32.208	
1,400.0	1,391.6	1,391.6	1,391.6	3.9	3.0	179.24	179.24	0.0	-61.5	196.0	189.9	6.13	31.959	
1,500.0	1,490.7	1,490.7	1,490.7	4.3	3.2	179.29	179.29	0.0	-61.5	209.4	202.8	6.60	31.743	
1,600.0	1,589.8	1,589.8	1,589.8	4.6	3.5	179.33	179.33	0.0	-61.5	222.7	215.6	7.06	31.553	
1,700.0	1,688.9	1,688.9	1,688.9	4.9	3.7	179.37	179.37	0.0	-61.5	236.0	228.5	7.52	31.385	
1,800.0	1,788.0	1,788.0	1,788.0	5.3	3.9	179.40	179.40	0.0	-61.5	249.4	241.4	7.98	31.236	
1,900.0	1,887.1	1,887.1	1,887.1	5.6	4.1	179.43	179.43	0.0	-61.5	262.7	254.3	8.45	31.103	
2,000.0	1,986.2	1,986.2	1,986.2	5.9	4.4	179.46	179.46	0.0	-61.5	276.1	267.2	8.91	30.982	
2,100.0	2,085.3	2,085.3	2,085.3	6.3	4.6	179.49	179.49	0.0	-61.5	289.4	280.0	9.37	30.873	
2,200.0	2,184.4	2,184.4	2,184.4	6.6	4.8	179.51	179.51	0.0	-61.5	302.7	292.9	9.84	30.774	
2,300.0	2,283.5	2,283.5	2,283.5	7.0	5.0	179.53	179.53	0.0	-61.5	316.1	305.8	10.30	30.683	
2,400.0	2,382.6	2,382.6	2,382.6	7.3	5.2	179.55	179.55	0.0	-61.5	329.4	318.7	10.77	30.600	
2,500.0	2,481.7	2,481.7	2,481.7	7.6	5.5	179.57	179.57	0.0	-61.5	342.8	331.5	11.23	30.524	
2,600.0	2,580.8	2,580.8	2,580.8	8.0	5.7	179.58	179.58	0.0	-61.5	356.1	344.4	11.69	30.453	
2,700.0	2,679.9	2,679.9	2,679.9	8.3	5.9	179.60	179.60	0.0	-61.5	369.5	357.3	12.16	30.388	
2,800.0	2,779.0	2,779.0	2,779.0	8.7	6.1	179.61	179.61	0.0	-61.5	382.8	370.2	12.62	30.327	
2,900.0	2,878.1	2,878.1	2,878.1	9.0	6.4	179.62	179.62	0.0	-61.5	396.1	383.1	13.09	30.271	
3,000.0	2,977.2	2,977.2	2,977.2	9.3	6.6	179.64	179.64	0.0	-61.5	409.5	395.9	13.55	30.218	
3,100.0	3,076.4	3,069.4	3,069.4	9.7	6.8	179.61	179.61	-0.2	-62.1	423.4	409.5	13.99	30.275	
3,200.0	3,175.5	3,159.1	3,159.0	10.0	6.9	179.46	179.46	-1.3	-64.5	439.5	425.0	14.40	30.511	
3,300.0	3,274.6	3,248.0	3,247.8	10.3	7.1	179.21	179.21	-3.3	-68.8	457.5	442.7	14.81	30.885	
3,400.0	3,373.7	3,336.2	3,335.7	10.7	7.3	178.87	178.87	-6.0	-75.0	477.7	462.4	15.23	31.372	
3,500.0	3,472.8	3,429.8	3,428.9	11.0	7.5	178.45	178.45	-9.7	-83.1	499.5	483.8	15.65	31.914	
3,600.0	3,571.9	3,527.3	3,525.9	11.4	7.7	178.04	178.04	-13.5	-91.7	521.5	505.4	16.08	32.425	
3,700.0	3,671.0	3,624.7	3,623.0	11.7	7.9	177.67	177.67	-17.4	-100.3	543.5	527.0	16.52	32.903	
3,800.0	3,770.1	3,736.3	3,734.2	12.0	8.1	177.33	177.33	-21.2	-108.9	564.4	547.5	16.99	33.222	
3,900.0	3,869.2	3,850.3	3,848.0	12.4	8.4	177.15	177.15	-23.8	-114.6	582.7	565.2	17.47	33.357	
4,000.0	3,968.3	3,965.4	3,963.0	12.7	8.6	177.11	177.11	-24.9	-117.2	598.3	580.3	17.94	33.350	
4,100.0	4,067.4	4,069.8	4,067.4	13.0	8.8	177.17	177.17	-25.0	-117.4	611.8	593.4	18.39	33.269	
4,200.0	4,166.5	4,168.9	4,166.5	13.4	9.0	177.23	177.23	-25.0	-117.4	625.1	606.2	18.84	33.170	
4,300.0	4,265.6	4,268.0	4,265.6	13.7	9.2	177.29	177.29	-25.0	-117.4	638.4	619.1	19.31	33.065	
4,400.0	4,364.7	4,367.1	4,364.7	14.1	9.5	177.35	177.35	-25.0	-117.4	651.7	632.0	19.77	32.964	
4,500.0	4,463.8	4,466.2	4,463.8	14.4	9.7	177.40	177.40	-25.0	-117.4	665.1	644.8	20.23	32.868	
4,600.0	4,562.9	4,565.3	4,562.9	14.7	9.9	177.45	177.45	-25.0	-117.4	678.4	657.7	20.70	32.776	
4,655.3	4,617.8	4,620.2	4,617.8	14.9	10.0	177.48	177.48	-25.0	-117.4	685.8	664.8	20.95	32.727	
4,700.0	4,662.1	4,664.5	4,662.1	15.1	10.1	177.50	177.50	-25.0	-117.4	691.4	670.2	21.17	32.664	
4,800.0	4,761.6	4,764.0	4,761.6	15.3	10.3	177.55	177.55	-25.0	-117.4	701.4	679.8	21.59	32.482	

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 Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Offset Design		Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Guttersen 31Q-221 - Wellbore #1 - Plan #1 (5-31-13)											Offset Site Error:		0.0 ft
Survey Program: 0-MWD													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)				
4,900.0	4,861.4	4,863.7	4,861.4	15.5	10.6	177.58	-25.0	-117.4	708.0	686.0	22.00	32.189			
5,000.0	4,961.3	4,963.7	4,961.3	15.6	10.8	177.59	-25.0	-117.4	711.1	688.7	22.37	31.793			
5,038.7	5,000.0	5,002.4	5,000.0	15.7	10.9	-90.00	-25.0	-117.4	711.4	688.9	22.50	31.617			
5,100.0	5,061.3	5,063.7	5,061.3	15.7	11.0	-90.00	-25.0	-117.4	711.4	688.6	22.75	31.270			
5,200.0	5,161.3	5,163.7	5,161.3	15.9	11.2	-90.00	-25.0	-117.4	711.4	688.2	23.16	30.717			
5,300.0	5,261.3	5,263.7	5,261.3	16.0	11.5	-90.00	-25.0	-117.4	711.4	687.8	23.57	30.182			
5,400.0	5,361.3	5,363.7	5,361.3	16.2	11.7	-90.00	-25.0	-117.4	711.4	687.4	23.98	29.664			
5,500.0	5,461.3	5,463.7	5,461.3	16.3	11.9	-90.00	-25.0	-117.4	711.4	687.0	24.39	29.161			
5,600.0	5,561.3	5,563.7	5,561.3	16.5	12.1	-90.00	-25.0	-117.4	711.4	686.5	24.81	28.674			
5,700.0	5,661.3	5,663.7	5,661.3	16.6	12.3	-90.00	-25.0	-117.4	711.4	686.1	25.22	28.202			
5,800.0	5,761.3	5,763.7	5,761.3	16.8	12.6	-90.00	-25.0	-117.4	711.4	685.7	25.64	27.744			
5,900.0	5,861.3	5,863.7	5,861.3	17.0	12.8	-90.00	-25.0	-117.4	711.4	685.3	26.06	27.299			
5,937.7	5,899.0	5,901.4	5,899.0	17.0	12.9	-90.00	-25.0	-117.4	711.4	685.1	26.22	27.135			
5,983.1	5,944.4	5,946.8	5,944.3	17.1	13.0	-89.87	-23.3	-117.4	711.4	685.0	26.40	26.943			
6,000.0	5,961.3	5,963.5	5,961.1	17.1	13.0	-89.08	-22.1	-117.4	711.4	684.9	26.48	26.868			
6,050.0	6,011.2	6,013.1	6,010.3	17.2	13.1	-88.82	-16.1	-117.4	711.3	684.7	26.67	26.670			
6,100.0	6,060.9	6,062.5	6,058.8	17.3	13.2	-88.56	-7.0	-117.4	711.3	684.4	26.86	26.478			
6,150.0	6,110.0	6,111.7	6,106.5	17.4	13.3	-88.32	5.1	-117.4	711.2	684.2	27.06	26.288			
6,200.0	6,158.4	6,160.7	6,153.1	17.4	13.5	-88.07	20.3	-117.4	711.2	683.9	27.25	26.096			
6,250.0	6,205.9	6,209.6	6,198.5	17.5	13.6	-87.84	38.3	-117.4	711.0	683.6	27.46	25.897			
6,300.0	6,252.3	6,258.2	6,242.4	17.6	13.7	-87.62	59.0	-117.4	710.9	683.2	27.68	25.686			
6,350.0	6,297.4	6,306.6	6,284.8	17.7	13.8	-87.41	82.5	-117.4	710.7	682.8	27.92	25.457			
6,400.0	6,340.9	6,354.9	6,325.5	17.7	13.9	-87.20	108.5	-117.4	710.5	682.3	28.19	25.203			
6,450.0	6,382.8	6,403.0	6,364.3	17.8	14.1	-87.01	136.9	-117.4	710.3	681.8	28.50	24.920			
6,500.0	6,422.8	6,450.0	6,400.4	17.9	14.2	-86.84	166.9	-117.4	710.1	681.2	28.86	24.607			
6,550.0	6,460.7	6,498.8	6,436.0	18.0	14.5	-86.67	200.4	-117.4	709.8	680.5	29.27	24.249			
6,600.0	6,496.4	6,546.5	6,468.5	18.2	14.7	-86.52	235.3	-117.4	709.5	679.7	29.74	23.855			
6,650.0	6,529.8	6,594.1	6,498.7	18.3	15.0	-86.38	272.0	-117.4	709.1	678.8	30.28	23.421			
6,700.0	6,560.6	6,641.6	6,526.6	18.5	15.3	-86.26	310.4	-117.4	708.7	677.9	30.88	22.951			
6,750.0	6,588.9	6,688.9	6,551.9	18.7	15.6	-86.15	350.4	-117.4	708.4	676.8	31.56	22.446			
6,800.0	6,614.3	6,736.2	6,574.7	18.9	16.0	-86.06	391.9	-117.4	707.9	675.6	32.31	21.911			
6,850.0	6,636.9	6,783.4	6,594.8	19.2	16.4	-85.98	434.5	-117.4	707.5	674.3	33.13	21.352			
6,900.0	6,656.5	6,830.5	6,612.2	19.6	16.9	-85.92	478.3	-117.4	707.0	673.0	34.03	20.775			
6,950.0	6,673.1	6,877.5	6,626.9	19.9	17.4	-85.88	523.0	-117.4	706.5	671.5	35.00	20.186			
7,000.0	6,686.5	6,924.5	6,638.8	20.4	17.9	-85.85	568.4	-117.4	706.0	669.9	36.03	19.592			
7,050.0	6,696.8	6,971.5	6,647.9	20.8	18.4	-85.84	614.5	-117.4	705.4	668.3	37.13	19.000			
7,100.0	6,703.9	7,018.4	6,654.1	21.4	19.0	-85.85	661.0	-117.4	704.8	666.6	38.28	18.414			
7,150.0	6,707.7	7,065.3	6,657.4	21.9	19.6	-85.87	707.8	-117.4	704.3	664.8	39.48	17.840			
7,181.7	6,708.4	7,095.1	6,658.1	22.3	20.0	-85.90	737.5	-117.4	703.9	663.6	40.26	17.484			
7,200.0	6,708.4	7,112.8	6,657.9	22.5	20.2	-85.88	755.2	-117.4	703.7	662.9	40.73	17.275			
7,300.0	6,708.6	7,212.8	6,656.9	23.7	21.6	-85.78	855.2	-117.4	702.5	659.1	43.47	16.163			
7,400.0	6,708.8	7,312.7	6,655.9	25.1	23.1	-85.67	955.2	-117.4	701.4	655.1	46.35	15.133			
7,500.0	6,709.0	7,412.7	6,654.9	26.5	24.6	-85.57	1,055.2	-117.4	700.3	650.9	49.36	14.187			
7,600.0	6,709.2	7,512.7	6,653.9	28.0	26.1	-85.46	1,155.2	-117.4	699.2	646.7	52.48	13.323			
7,700.0	6,709.4	7,612.7	6,652.9	29.5	27.8	-85.35	1,255.1	-117.4	698.0	642.4	55.68	12.537			
7,800.0	6,709.6	7,712.7	6,651.9	31.1	29.4	-85.25	1,355.1	-117.4	696.9	638.0	58.96	11.821			
7,900.0	6,709.8	7,812.7	6,650.8	32.7	31.1	-85.14	1,455.1	-117.4	695.8	633.5	62.29	11.170			
8,000.0	6,710.0	7,912.7	6,649.8	34.4	32.8	-85.03	1,555.1	-117.4	694.7	629.0	65.68	10.577			
8,100.0	6,710.2	8,012.6	6,648.8	36.0	34.5	-84.93	1,655.1	-117.4	693.6	624.5	69.11	10.036			
8,200.0	6,710.3	8,112.6	6,647.8	37.7	36.3	-84.82	1,755.0	-117.4	692.5	619.9	72.58	9.541			
8,300.0	6,710.5	8,212.6	6,646.8	39.5	38.0	-84.71	1,855.0	-117.4	691.4	615.3	76.08	9.088			

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 Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Offset Design		Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Guttersen 31Q-221 - Wellbore #1 - Plan #1 (5-31-13)											Offset Site Error:		0.0 ft
Survey Program: 0-MWD													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)				
8,400.0	6,710.7	8,312.6	6,645.8	41.2	39.8	-84.60	1,955.0	-117.4	690.3	610.7	79.61	8.671			
8,500.0	6,710.9	8,412.6	6,644.8	42.9	41.6	-84.49	2,055.0	-117.4	689.2	606.0	83.16	8.288			
8,600.0	6,711.1	8,512.6	6,643.8	44.7	43.4	-84.38	2,155.0	-117.4	688.1	601.4	86.73	7.934			
8,700.0	6,711.3	8,612.6	6,642.7	46.5	45.2	-84.27	2,254.9	-117.4	687.0	596.7	90.32	7.606			
8,800.0	6,711.5	8,712.5	6,641.7	48.3	47.0	-84.16	2,354.9	-117.4	685.9	592.0	93.93	7.303			
8,900.0	6,711.7	8,812.5	6,640.7	50.1	48.9	-84.05	2,454.9	-117.4	684.8	587.3	97.54	7.021			
9,000.0	6,711.9	8,912.5	6,639.7	51.9	50.7	-83.94	2,554.9	-117.4	683.7	582.6	101.18	6.758			
9,100.0	6,712.1	9,012.5	6,638.7	53.7	52.5	-83.83	2,654.9	-117.4	682.7	577.8	104.82	6.513			
9,200.0	6,712.3	9,112.5	6,637.7	55.5	54.4	-83.72	2,754.8	-117.4	681.6	573.1	108.47	6.284			
9,300.0	6,712.5	9,212.5	6,636.7	57.4	56.2	-83.60	2,854.8	-117.4	680.5	568.4	112.13	6.069			
9,400.0	6,712.7	9,312.5	6,635.7	59.2	58.1	-83.49	2,954.8	-117.4	679.4	563.6	115.79	5.868			
9,500.0	6,712.8	9,412.4	6,634.6	61.0	60.0	-83.38	3,054.8	-117.4	678.3	558.9	119.46	5.678			
9,600.0	6,713.0	9,512.4	6,633.6	62.9	61.8	-83.27	3,154.8	-117.4	677.3	554.1	123.14	5.500			
9,700.0	6,713.2	9,612.4	6,632.6	64.7	63.7	-83.15	3,254.7	-117.4	676.2	549.4	126.82	5.332			
9,800.0	6,713.4	9,712.4	6,631.6	66.6	65.6	-83.04	3,354.7	-117.4	675.1	544.6	130.51	5.173			
9,900.0	6,713.6	9,812.4	6,630.6	68.4	67.4	-82.92	3,454.7	-117.4	674.1	539.9	134.20	5.023			
10,000.0	6,713.8	9,912.4	6,629.6	70.3	69.3	-82.81	3,554.7	-117.4	673.0	535.1	137.89	4.881			
10,100.0	6,714.0	10,012.4	6,628.6	72.2	71.2	-82.70	3,654.7	-117.4	672.0	530.4	141.58	4.746			
10,200.0	6,714.2	10,112.3	6,627.6	74.0	73.1	-82.58	3,754.6	-117.4	670.9	525.6	145.28	4.618			
10,300.0	6,714.4	10,212.3	6,626.6	75.9	74.9	-82.46	3,854.6	-117.4	669.9	520.9	148.98	4.496			
10,400.0	6,714.6	10,312.3	6,625.5	77.8	76.8	-82.35	3,954.6	-117.4	668.8	516.1	152.68	4.380			
10,500.0	6,714.8	10,412.3	6,624.5	79.6	78.7	-82.23	4,054.6	-117.4	667.8	511.4	156.38	4.270			
10,600.0	6,715.0	10,512.3	6,623.5	81.5	80.6	-82.12	4,154.6	-117.4	666.7	506.6	160.08	4.165			
10,700.0	6,715.1	10,612.3	6,622.5	83.4	82.5	-82.00	4,254.5	-117.4	665.7	501.9	163.79	4.064			
10,800.0	6,715.3	10,712.3	6,621.5	85.3	84.4	-81.88	4,354.5	-117.4	664.6	497.2	167.49	3.968			
10,900.0	6,715.5	10,812.2	6,620.5	87.2	86.2	-81.76	4,454.5	-117.4	663.6	492.4	171.19	3.876			
11,000.0	6,715.7	10,912.2	6,619.5	89.1	88.1	-81.65	4,554.5	-117.4	662.6	487.7	174.89	3.788			
11,100.0	6,715.9	11,012.2	6,618.5	90.9	90.0	-81.53	4,654.5	-117.4	661.6	483.0	178.60	3.704			
11,144.0	6,716.0	11,056.2	6,618.0	91.6	90.9	-81.47	4,698.5	-117.4	661.1	481.0	180.07	3.671 SF			

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Offset Design Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Guttersen 31Q-401 - Wellbore #1 - Plan #1 (5-31-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-89.99	-89.99	0.0	-92.2	92.2				
100.0	100.0	100.0	100.0	0.1	0.1	-89.99	-89.99	0.0	-92.2	92.2	92.0	0.22	410.283	
200.0	200.0	200.0	200.0	0.3	0.3	-89.99	-89.99	0.0	-92.2	92.2	91.5	0.67	136.761 CC, ES	
300.0	300.0	300.0	300.0	0.6	0.6	177.64	177.64	0.0	-92.2	94.0	92.8	1.12	83.937	
400.0	399.8	399.8	399.8	0.8	0.8	177.76	177.76	0.0	-92.2	99.2	97.6	1.57	63.294	
500.0	499.5	499.5	499.5	1.0	1.0	177.94	177.94	0.0	-92.2	107.9	105.9	2.02	53.386	
583.4	582.2	582.2	582.2	1.3	1.2	178.11	178.11	0.0	-92.2	117.8	115.4	2.40	49.046	
600.0	598.7	598.7	598.7	1.3	1.2	178.14	178.14	0.0	-92.2	120.0	117.6	2.48	48.477	
700.0	697.8	697.8	697.8	1.6	1.5	178.33	178.33	0.0	-92.2	133.4	130.4	2.92	45.602	
800.0	796.9	796.9	796.9	1.9	1.7	178.48	178.48	0.0	-92.2	146.7	143.3	3.38	43.434	
900.0	896.0	896.0	896.0	2.3	1.9	178.61	178.61	0.0	-92.2	160.0	156.2	3.83	41.748	
1,000.0	995.1	995.1	995.1	2.6	2.1	178.71	178.71	0.0	-92.2	173.4	169.1	4.29	40.402	
1,100.0	1,094.2	1,089.9	1,089.8	2.9	2.3	178.76	178.76	-0.1	-93.3	187.8	183.1	4.73	39.704	
1,200.0	1,193.3	1,183.6	1,183.6	3.3	2.5	178.73	178.73	-0.4	-96.6	204.7	199.5	5.16	39.648	
1,300.0	1,292.4	1,276.6	1,276.4	3.6	2.7	178.63	178.63	-0.9	-102.2	223.9	218.3	5.60	40.018	
1,400.0	1,391.6	1,368.6	1,368.0	3.9	2.9	178.49	178.49	-1.7	-109.9	245.5	239.5	6.03	40.712	
1,500.0	1,490.7	1,465.1	1,464.1	4.3	3.1	178.33	178.33	-2.6	-119.5	268.6	262.1	6.47	41.487	
1,600.0	1,589.8	1,562.4	1,560.9	4.6	3.4	178.19	178.19	-3.5	-129.1	291.7	284.8	6.92	42.170	
1,700.0	1,688.9	1,659.7	1,657.7	4.9	3.6	178.08	178.08	-4.4	-138.8	314.8	307.4	7.36	42.751	
1,800.0	1,788.0	1,757.0	1,754.5	5.3	3.9	177.98	177.98	-5.4	-148.4	337.9	330.0	7.81	43.252	
1,900.0	1,887.1	1,854.3	1,851.3	5.6	4.1	177.89	177.89	-6.3	-158.1	360.9	352.7	8.26	43.682	
2,000.0	1,986.2	1,951.6	1,948.1	5.9	4.4	177.81	177.81	-7.2	-167.7	384.0	375.3	8.72	44.062	
2,100.0	2,085.3	2,048.9	2,044.9	6.3	4.7	177.74	177.74	-8.1	-177.4	407.1	398.0	9.17	44.396	
2,200.0	2,184.4	2,146.2	2,141.7	6.6	4.9	177.68	177.68	-9.1	-187.0	430.2	420.6	9.63	44.691	
2,300.0	2,283.5	2,243.5	2,238.6	7.0	5.2	177.63	177.63	-10.0	-196.7	453.3	443.2	10.08	44.954	
2,400.0	2,382.6	2,340.8	2,335.4	7.3	5.5	177.58	177.58	-10.9	-206.3	476.4	465.9	10.54	45.190	
2,500.0	2,481.7	2,438.1	2,432.2	7.6	5.7	177.53	177.53	-11.8	-216.0	499.5	488.5	11.00	45.402	
2,600.0	2,580.8	2,535.4	2,529.0	8.0	6.0	177.49	177.49	-12.8	-225.6	522.6	511.1	11.46	45.593	
2,700.0	2,679.9	2,632.7	2,625.8	8.3	6.3	177.46	177.46	-13.7	-235.3	545.7	533.8	11.92	45.767	
2,800.0	2,779.0	2,730.0	2,722.6	8.7	6.5	177.42	177.42	-14.6	-244.9	568.8	556.4	12.39	45.926	
2,900.0	2,878.1	2,827.3	2,819.4	9.0	6.8	177.39	177.39	-15.5	-254.6	591.9	579.0	12.85	46.070	
3,000.0	2,977.2	2,924.5	2,916.2	9.3	7.1	177.36	177.36	-16.5	-264.2	615.0	601.7	13.31	46.203	
3,100.0	3,076.4	3,021.8	3,013.0	9.7	7.4	177.33	177.33	-17.4	-273.9	638.1	624.3	13.77	46.326	
3,200.0	3,175.5	3,119.1	3,109.9	10.0	7.7	177.31	177.31	-18.3	-283.5	661.2	646.9	14.24	46.439	
3,300.0	3,274.6	3,216.4	3,206.7	10.3	7.9	177.28	177.28	-19.2	-293.2	684.3	669.6	14.70	46.543	
3,400.0	3,373.7	3,313.7	3,303.5	10.7	8.2	177.26	177.26	-20.2	-302.8	707.4	692.2	15.17	46.640	
3,500.0	3,472.8	3,411.0	3,400.3	11.0	8.5	177.24	177.24	-21.1	-312.5	730.5	714.8	15.63	46.730	
3,600.0	3,571.9	3,508.3	3,497.1	11.4	8.8	177.22	177.22	-22.0	-322.1	753.6	737.5	16.10	46.814	
3,700.0	3,671.0	3,605.6	3,593.9	11.7	9.1	177.20	177.20	-22.9	-331.8	776.7	760.1	16.56	46.892	
3,800.0	3,770.1	3,721.8	3,709.6	12.0	9.3	177.19	177.19	-23.9	-342.2	798.9	781.9	17.05	46.869	
3,900.0	3,869.2	3,846.1	3,833.7	12.4	9.6	177.20	177.20	-24.6	-349.6	818.1	800.6	17.52	46.709	
4,000.0	3,968.3	3,972.0	3,959.5	12.7	9.8	177.24	177.24	-25.0	-353.0	834.1	816.1	17.99	46.377	
4,100.0	4,067.4	4,079.9	4,067.4	13.0	10.0	177.28	177.28	-25.0	-353.2	847.6	829.2	18.43	45.978	
4,200.0	4,166.5	4,179.0	4,166.5	13.4	10.2	177.33	177.33	-25.0	-353.2	860.9	842.1	18.88	45.601	
4,300.0	4,265.6	4,278.1	4,265.6	13.7	10.4	177.37	177.37	-25.0	-353.2	874.3	854.9	19.33	45.237	
4,400.0	4,364.7	4,377.2	4,364.7	14.1	10.6	177.41	177.41	-25.0	-353.2	887.6	867.8	19.77	44.887	
4,500.0	4,463.8	4,476.3	4,463.8	14.4	10.7	177.44	177.44	-25.0	-353.2	900.9	880.7	20.22	44.550	
4,600.0	4,562.9	4,575.4	4,562.9	14.7	10.9	177.48	177.48	-25.0	-353.2	914.3	893.6	20.67	44.227	
4,655.3	4,617.8	4,630.2	4,617.8	14.9	11.0	177.50	177.50	-25.0	-353.2	921.6	900.7	20.92	44.053	
4,700.0	4,662.1	4,674.6	4,662.1	15.1	11.1	177.52	177.52	-25.0	-353.2	927.2	906.1	21.13	43.876	
4,800.0	4,761.6	4,774.0	4,761.6	15.3	11.3	177.56	177.56	-25.0	-353.2	937.3	915.7	21.56	43.468	

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 Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Offset Design Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Guttersen 31Q-401 - Wellbore #1 - Plan #1 (5-31-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,900.0	4,861.4	4,873.8	4,861.4	15.5	11.5	177.58		-25.0	-353.2	943.9	921.9	21.96	42.972	
5,000.0	4,961.3	4,973.8	4,961.3	15.6	11.7	177.59		-25.0	-353.2	947.0	924.6	22.34	42.393	
5,038.7	5,000.0	5,012.5	5,000.0	15.7	11.8	-90.00		-25.0	-353.2	947.2	924.7	22.47	42.148	
5,100.0	5,061.3	5,073.8	5,061.3	15.7	11.9	-90.00		-25.0	-353.2	947.2	924.5	22.72	41.697	
5,200.0	5,161.3	5,173.8	5,161.3	15.9	12.1	-90.00		-25.0	-353.2	947.2	924.1	23.11	40.980	
5,300.0	5,261.3	5,273.8	5,261.3	16.0	12.3	-90.00		-25.0	-353.2	947.2	923.7	23.51	40.285	
5,400.0	5,361.3	5,373.8	5,361.3	16.2	12.5	-90.00		-25.0	-353.2	947.2	923.3	23.91	39.609	
5,500.0	5,461.3	5,473.8	5,461.3	16.3	12.7	-90.00		-25.0	-353.2	947.2	922.9	24.32	38.954	
5,600.0	5,561.3	5,573.8	5,561.3	16.5	12.9	-90.00		-25.0	-353.2	947.2	922.5	24.72	38.317	
5,700.0	5,661.3	5,673.8	5,661.3	16.6	13.1	-90.00		-25.0	-353.2	947.2	922.1	25.13	37.698	
5,800.0	5,761.3	5,773.8	5,761.3	16.8	13.3	-90.00		-25.0	-353.2	947.2	921.7	25.53	37.097	
5,900.0	5,861.3	5,873.8	5,861.3	17.0	13.5	-90.00		-25.0	-353.2	947.2	921.3	25.94	36.513	
5,983.1	5,944.4	5,956.9	5,944.4	17.1	13.7	-90.00		-25.0	-353.2	947.2	920.9	26.28	36.040	
6,000.0	5,961.3	5,973.8	5,961.3	17.1	13.7	-89.31		-25.0	-353.2	947.2	920.9	26.36	35.940	
6,050.0	6,011.2	6,023.7	6,011.2	17.2	13.8	-89.48		-25.0	-353.2	947.2	920.6	26.56	35.663	
6,100.0	6,060.9	6,073.3	6,060.8	17.3	13.9	-89.84		-25.0	-353.2	947.2	920.4	26.76	35.391	
6,119.5	6,080.1	6,092.6	6,080.1	17.3	14.0	-90.01		-24.5	-353.2	947.1	920.3	26.84	35.286	
6,150.0	6,110.0	6,122.9	6,110.4	17.4	14.0	-90.27		-22.9	-353.2	947.2	920.2	26.96	35.127	
6,200.0	6,158.4	6,172.9	6,160.1	17.4	14.1	-90.70		-17.6	-353.3	947.2	920.1	27.16	34.869	
6,250.0	6,205.9	6,223.5	6,209.9	17.5	14.2	-91.14		-8.9	-353.4	947.3	920.0	27.37	34.615	
6,300.0	6,252.3	6,274.5	6,259.5	17.6	14.3	-91.57		3.1	-353.5	947.5	919.9	27.58	34.359	
6,350.0	6,297.4	6,326.0	6,308.6	17.7	14.4	-91.99		18.6	-353.7	947.7	919.9	27.80	34.093	
6,400.0	6,340.9	6,378.1	6,357.1	17.7	14.5	-92.41		37.6	-353.9	948.0	919.9	28.04	33.809	
6,450.0	6,382.8	6,430.7	6,404.6	17.8	14.6	-92.82		60.1	-354.2	948.3	919.9	28.31	33.498	
6,500.0	6,422.8	6,483.8	6,450.9	17.9	14.8	-93.22		86.1	-354.5	948.6	920.0	28.61	33.151	
6,550.0	6,460.7	6,537.4	6,495.7	18.0	14.9	-93.60		115.5	-354.8	949.0	920.0	28.97	32.759	
6,600.0	6,496.4	6,591.5	6,538.7	18.2	15.1	-93.97		148.3	-355.2	949.3	920.0	29.38	32.313	
6,650.0	6,529.8	6,646.1	6,579.7	18.3	15.2	-94.33		184.5	-355.6	949.7	919.9	29.86	31.809	
6,700.0	6,560.6	6,701.3	6,618.3	18.5	15.4	-94.66		223.8	-356.1	950.2	919.7	30.41	31.241	
6,750.0	6,588.9	6,756.9	6,654.3	18.7	15.7	-94.98		266.2	-356.6	950.6	919.5	31.06	30.606	
6,800.0	6,614.3	6,812.9	6,687.3	18.9	16.0	-95.27		311.4	-357.1	951.0	919.2	31.79	29.911	
6,850.0	6,636.9	6,869.4	6,717.2	19.2	16.4	-95.54		359.4	-357.6	951.4	918.7	32.63	29.161	
6,900.0	6,656.5	6,926.3	6,743.6	19.6	16.9	-95.79		409.7	-358.2	951.7	918.2	33.55	28.364	
6,950.0	6,673.1	6,983.5	6,766.3	19.9	17.4	-96.00		462.3	-358.8	952.1	917.5	34.58	27.533	
7,000.0	6,686.5	7,041.1	6,785.1	20.4	17.9	-96.19		516.6	-359.5	952.4	916.7	35.70	26.678	
7,050.0	6,696.8	7,098.9	6,799.8	20.8	18.6	-96.35		572.5	-360.1	952.6	915.7	36.91	25.812	
7,100.0	6,703.9	7,157.0	6,810.3	21.4	19.2	-96.47		629.6	-360.8	952.8	914.6	38.20	24.945	
7,150.0	6,707.7	7,211.1	6,816.5	21.9	19.9	-96.58		683.4	-361.4	953.0	913.5	39.51	24.122	
7,181.7	6,708.4	7,242.7	6,819.8	22.3	20.3	-96.71		714.8	-361.7	953.3	912.9	40.33	23.639	
7,200.0	6,708.4	7,261.0	6,821.7	22.5	20.5	-96.83		733.0	-361.9	953.5	912.7	40.80	23.372	
7,300.0	6,708.6	7,372.1	6,827.9	23.7	22.0	-97.18		843.9	-363.2	954.1	910.4	43.65	21.856	
7,400.0	6,708.8	7,472.4	6,828.5	25.1	23.5	-97.20		944.1	-364.4	954.0	907.5	46.54	20.500	
7,500.0	6,709.0	7,572.4	6,829.0	26.5	25.0	-97.22		1,044.1	-365.6	954.0	904.5	49.54	19.257	
7,600.0	6,709.2	7,672.4	6,829.5	28.0	26.5	-97.24		1,144.1	-366.7	954.0	901.4	52.65	18.120	
7,700.0	6,709.4	7,772.4	6,830.0	29.5	28.1	-97.26		1,244.1	-367.9	954.0	898.2	55.85	17.083	
7,800.0	6,709.6	7,872.4	6,830.5	31.1	29.8	-97.28		1,344.1	-369.0	954.0	894.9	59.11	16.138	
7,900.0	6,709.8	7,972.4	6,831.1	32.7	31.4	-97.30		1,444.1	-370.2	954.0	891.5	62.45	15.277	
8,000.0	6,710.0	8,072.4	6,831.6	34.4	33.1	-97.32		1,544.1	-371.3	953.9	888.1	65.83	14.491	
8,100.0	6,710.2	8,172.4	6,832.1	36.0	34.8	-97.34		1,644.1	-372.5	953.9	884.7	69.26	13.773	
8,200.0	6,710.3	8,272.4	6,832.6	37.7	36.6	-97.36		1,744.1	-373.7	953.9	881.2	72.73	13.117	
8,300.0	6,710.5	8,372.4	6,833.1	39.5	38.3	-97.38		1,844.1	-374.8	953.9	877.7	76.23	12.514	

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 Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Offset Design Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Guttersen 31Q-401 - Wellbore #1 - Plan #1 (5-31-13)												Offset Site Error:	0.0 ft
Survey Program: 0-MWD												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)		
8,400.0	6,710.7	8,472.4	6,833.7	41.2	40.1	-97.40	1,944.0	-376.0	953.9	874.1	79.75	11.960	
8,500.0	6,710.9	8,572.4	6,834.2	42.9	41.9	-97.42	2,044.0	-377.1	953.9	870.6	83.31	11.450	
8,600.0	6,711.1	8,672.4	6,834.7	44.7	43.7	-97.44	2,144.0	-378.3	953.8	867.0	86.88	10.979	
8,700.0	6,711.3	8,772.4	6,835.2	46.5	45.5	-97.46	2,244.0	-379.5	953.8	863.4	90.48	10.542	
8,800.0	6,711.5	8,872.4	6,835.7	48.3	47.3	-97.48	2,344.0	-380.6	953.8	859.7	94.09	10.137	
8,900.0	6,711.7	8,972.4	6,836.3	50.1	49.1	-97.50	2,444.0	-381.8	953.8	856.1	97.72	9.761	
9,000.0	6,711.9	9,072.4	6,836.8	51.9	51.0	-97.52	2,544.0	-382.9	953.8	852.4	101.36	9.410	
9,100.0	6,712.1	9,172.4	6,837.3	53.7	52.8	-97.54	2,644.0	-384.1	953.8	848.8	105.01	9.083	
9,200.0	6,712.3	9,272.4	6,837.8	55.5	54.7	-97.56	2,744.0	-385.3	953.8	845.1	108.67	8.776	
9,300.0	6,712.5	9,372.4	6,838.3	57.4	56.5	-97.58	2,844.0	-386.4	953.7	841.4	112.34	8.489	
9,400.0	6,712.7	9,472.4	6,838.9	59.2	58.4	-97.60	2,944.0	-387.6	953.7	837.7	116.03	8.220	
9,500.0	6,712.8	9,572.4	6,839.4	61.0	60.2	-97.62	3,043.9	-388.7	953.7	834.0	119.71	7.967	
9,600.0	6,713.0	9,672.4	6,839.9	62.9	62.1	-97.64	3,143.9	-389.9	953.7	830.3	123.41	7.728	
9,700.0	6,713.2	9,772.4	6,840.4	64.7	63.9	-97.66	3,243.9	-391.1	953.7	826.6	127.11	7.503	
9,800.0	6,713.4	9,872.4	6,840.9	66.6	65.8	-97.68	3,343.9	-392.2	953.7	822.8	130.82	7.290	
9,900.0	6,713.6	9,972.4	6,841.5	68.4	67.7	-97.70	3,443.9	-393.4	953.7	819.1	134.54	7.088	
10,000.0	6,713.8	10,072.4	6,842.0	70.3	69.6	-97.72	3,543.9	-394.5	953.6	815.4	138.25	6.898	
10,100.0	6,714.0	10,172.4	6,842.5	72.2	71.4	-97.74	3,643.9	-395.7	953.6	811.6	141.98	6.717	
10,200.0	6,714.2	10,272.4	6,843.0	74.0	73.3	-97.76	3,743.9	-396.9	953.6	807.9	145.71	6.545	
10,300.0	6,714.4	10,372.4	6,843.5	75.9	75.2	-97.78	3,843.9	-398.0	953.6	804.2	149.44	6.381	
10,400.0	6,714.6	10,472.4	6,844.1	77.8	77.1	-97.80	3,943.9	-399.2	953.6	800.4	153.17	6.226	
10,500.0	6,714.8	10,572.4	6,844.6	79.6	79.0	-97.82	4,043.9	-400.3	953.6	796.7	156.91	6.077	
10,600.0	6,715.0	10,672.4	6,845.1	81.5	80.8	-97.84	4,143.9	-401.5	953.6	792.9	160.65	5.936	
10,700.0	6,715.1	10,772.4	6,845.6	83.4	82.7	-97.86	4,243.8	-402.7	953.5	789.1	164.40	5.800	
10,800.0	6,715.3	10,872.4	6,846.1	85.3	84.6	-97.89	4,343.8	-403.8	953.5	785.4	168.14	5.671	
10,900.0	6,715.5	10,972.4	6,846.7	87.2	86.5	-97.91	4,443.8	-405.0	953.5	781.6	171.89	5.547	
11,000.0	6,715.7	11,072.4	6,847.2	89.1	88.4	-97.93	4,543.8	-406.1	953.5	777.9	175.64	5.429	
11,100.0	6,715.9	11,172.3	6,847.7	90.9	90.3	-97.95	4,643.8	-407.3	953.5	774.1	179.39	5.315	
11,144.0	6,716.0	11,216.4	6,847.9	91.6	91.1	-97.95	4,687.8	-407.8	953.5	772.6	180.89	5.271 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Offset Design Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Guttersen 31T-441 - Wellbore #1 - Plan #1 (5-31-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	-89.98	-89.98	0.0	-30.7	30.7				
100.0	100.0	100.0	100.0	0.1	0.1	-89.98	-89.98	0.0	-30.7	30.7	30.5	0.22	136.761	
200.0	200.0	200.0	200.0	0.3	0.3	-89.98	-89.98	0.0	-30.7	30.7	30.1	0.67	45.587 CC, ES	
300.0	300.0	300.0	300.0	0.6	0.6	177.74	177.74	0.0	-30.7	32.5	31.4	1.12	29.017	
400.0	399.8	399.8	399.8	0.8	0.8	178.05	178.05	0.0	-30.7	37.7	36.1	1.57	24.065	
500.0	499.5	499.5	499.5	1.0	1.0	178.41	178.41	0.0	-30.7	46.4	44.4	2.02	22.970	
583.4	582.2	582.2	582.2	1.3	1.2	178.69	178.69	0.0	-30.7	56.3	53.9	2.40	23.456	
600.0	598.7	598.7	598.7	1.3	1.2	178.74	178.74	0.0	-30.7	58.6	56.1	2.48	23.652	
700.0	697.8	697.8	697.8	1.6	1.5	178.97	178.97	0.0	-30.7	71.9	69.0	2.92	24.587	
800.0	796.9	796.9	796.9	1.9	1.7	179.13	179.13	0.0	-30.7	85.2	81.9	3.38	25.240	
900.0	896.0	896.0	896.0	2.3	1.9	179.25	179.25	0.0	-30.7	98.6	94.7	3.83	25.719	
1,000.0	995.1	995.1	995.1	2.6	2.1	179.34	179.34	0.0	-30.7	111.9	107.6	4.29	26.084	
1,100.0	1,094.2	1,097.4	1,097.4	2.9	2.3	179.38	179.38	-0.1	-29.5	124.1	119.3	4.74	26.179	
1,200.0	1,193.3	1,200.4	1,200.3	3.3	2.5	179.34	179.34	-0.5	-25.5	133.5	128.4	5.18	25.795	
1,300.0	1,292.4	1,303.9	1,303.6	3.6	2.8	179.23	179.23	-1.1	-18.7	140.3	134.7	5.62	24.952	
1,400.0	1,391.6	1,407.3	1,406.5	3.9	3.0	179.06	179.06	-2.0	-9.2	144.4	138.4	6.08	23.764	
1,500.0	1,490.7	1,507.2	1,505.9	4.3	3.2	178.88	178.88	-2.9	1.2	147.5	140.9	6.53	22.574	
1,600.0	1,589.8	1,607.2	1,605.3	4.6	3.5	178.70	178.70	-3.9	11.5	150.5	143.5	6.99	21.528	
1,700.0	1,688.9	1,707.1	1,704.7	4.9	3.7	178.53	178.53	-4.9	21.8	153.5	146.1	7.45	20.601	
1,800.0	1,788.0	1,807.1	1,804.1	5.3	4.0	178.37	178.37	-5.8	32.1	156.5	148.6	7.92	19.776	
1,900.0	1,887.1	1,907.0	1,903.6	5.6	4.3	178.21	178.21	-6.8	42.4	159.6	151.2	8.38	19.039	
2,000.0	1,986.2	2,007.0	2,003.0	5.9	4.5	178.06	178.06	-7.7	52.7	162.6	153.8	8.85	18.374	
2,100.0	2,085.3	2,106.9	2,102.4	6.3	4.8	177.92	177.92	-8.7	63.0	165.6	156.3	9.32	17.774	
2,200.0	2,184.4	2,206.9	2,201.8	6.6	5.1	177.78	177.78	-9.6	73.3	168.7	158.9	9.79	17.228	
2,300.0	2,283.5	2,306.8	2,301.2	7.0	5.4	177.65	177.65	-10.6	83.6	171.7	161.4	10.26	16.731	
2,400.0	2,382.6	2,406.8	2,400.6	7.3	5.7	177.52	177.52	-11.5	94.0	174.7	164.0	10.74	16.276	
2,500.0	2,481.7	2,506.7	2,500.1	7.6	5.9	177.39	177.39	-12.5	104.3	177.8	166.6	11.21	15.858	
2,600.0	2,580.8	2,606.7	2,599.5	8.0	6.2	177.27	177.27	-13.4	114.6	180.8	169.1	11.69	15.473	
2,700.0	2,679.9	2,706.6	2,698.9	8.3	6.5	177.15	177.15	-14.4	124.9	183.8	171.7	12.16	15.117	
2,800.0	2,779.0	2,806.6	2,798.3	8.7	6.8	177.04	177.04	-15.4	135.2	186.9	174.2	12.64	14.787	
2,900.0	2,878.1	2,906.6	2,897.7	9.0	7.1	176.93	176.93	-16.3	145.5	189.9	176.8	13.12	14.480	
3,000.0	2,977.2	3,006.5	2,997.1	9.3	7.4	176.82	176.82	-17.3	155.8	193.0	179.4	13.59	14.195	
3,100.0	3,076.4	3,106.5	3,096.5	9.7	7.7	176.72	176.72	-18.2	166.1	196.0	181.9	14.07	13.928	
3,200.0	3,175.5	3,206.4	3,196.0	10.0	8.0	176.62	176.62	-19.2	176.4	199.0	184.5	14.55	13.678	
3,300.0	3,274.6	3,306.4	3,295.4	10.3	8.2	176.52	176.52	-20.1	186.8	202.1	187.1	15.03	13.444	
3,400.0	3,373.7	3,406.3	3,394.8	10.7	8.5	176.43	176.43	-21.1	197.1	205.1	189.6	15.51	13.224	
3,500.0	3,472.8	3,506.3	3,494.2	11.0	8.8	176.34	176.34	-22.0	207.4	208.2	192.2	15.99	13.017	
3,600.0	3,571.9	3,606.2	3,593.6	11.4	9.1	176.25	176.25	-23.0	217.7	211.2	194.7	16.47	12.822	
3,700.0	3,671.0	3,700.0	3,687.0	11.7	9.4	176.20	176.20	-23.8	226.5	215.2	198.3	16.92	12.722	
3,800.0	3,770.1	3,795.9	3,782.6	12.0	9.6	176.21	176.21	-24.4	233.1	221.7	204.4	17.34	12.783	
3,900.0	3,869.2	3,890.0	3,876.6	12.4	9.7	176.30	176.30	-24.8	237.3	230.6	212.9	17.76	12.984	
4,000.0	3,968.3	3,983.6	3,970.2	12.7	9.9	176.44	176.44	-25.0	239.1	242.0	223.8	18.18	13.312	
4,100.0	4,067.4	4,080.8	4,067.4	13.0	10.1	176.62	176.62	-25.0	239.3	255.2	236.5	18.61	13.714	
4,200.0	4,166.5	4,179.9	4,166.5	13.4	10.2	176.79	176.79	-25.0	239.3	268.5	249.4	19.05	14.096	
4,300.0	4,265.6	4,279.0	4,265.6	13.7	10.4	176.94	176.94	-25.0	239.3	281.8	262.3	19.49	14.459	
4,400.0	4,364.7	4,378.1	4,364.7	14.1	10.6	177.08	177.08	-25.0	239.3	295.1	275.2	19.93	14.804	
4,500.0	4,463.8	4,477.2	4,463.8	14.4	10.8	177.21	177.21	-25.0	239.3	308.4	288.1	20.38	15.135	
4,600.0	4,562.9	4,576.3	4,562.9	14.7	11.0	177.32	177.32	-25.0	239.3	321.8	300.9	20.83	15.450	
4,655.3	4,617.8	4,631.1	4,617.8	14.9	11.1	177.38	177.38	-25.0	239.3	329.1	308.1	21.07	15.618	
4,700.0	4,662.1	4,675.5	4,662.1	15.1	11.2	177.43	177.43	-25.0	239.3	334.8	313.5	21.27	15.739	
4,800.0	4,761.6	4,775.0	4,761.6	15.3	11.4	177.51	177.51	-25.0	239.3	344.8	323.1	21.66	15.918	

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 Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Offset Design Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Guttersen 31T-441 - Wellbore #1 - Plan #1 (5-31-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
4,900.0	4,861.4	4,874.7	4,861.4	15.5	11.6	177.57		-25.0	239.3	351.4	329.4	22.03	15.953	
5,000.0	4,961.3	4,974.7	4,961.3	15.6	11.8	177.59		-25.0	239.3	354.5	332.1	22.36	15.851	
5,038.7	5,000.0	5,013.4	5,000.0	15.7	11.8	-90.00		-25.0	239.3	354.7	332.3	22.48	15.781	
5,100.0	5,061.3	5,074.7	5,061.3	15.7	12.0	-90.00		-25.0	239.3	354.7	332.0	22.72	15.613	
5,200.0	5,161.3	5,174.7	5,161.3	15.9	12.1	-90.00		-25.0	239.3	354.7	331.6	23.12	15.344	
5,300.0	5,261.3	5,274.7	5,261.3	16.0	12.3	-90.00		-25.0	239.3	354.7	331.2	23.52	15.084	
5,400.0	5,361.3	5,374.7	5,361.3	16.2	12.5	-90.00		-25.0	239.3	354.7	330.8	23.92	14.831	
5,500.0	5,461.3	5,474.7	5,461.3	16.3	12.7	-90.00		-25.0	239.3	354.7	330.4	24.32	14.586	
5,600.0	5,561.3	5,574.7	5,561.3	16.5	12.9	-90.00		-25.0	239.3	354.7	330.0	24.73	14.347	
5,700.0	5,661.3	5,674.7	5,661.3	16.6	13.1	-90.00		-25.0	239.3	354.7	329.6	25.13	14.116	
5,800.0	5,761.3	5,774.7	5,761.3	16.8	13.4	-90.00		-25.0	239.3	354.7	329.2	25.54	13.891	
5,900.0	5,861.3	5,874.7	5,861.3	17.0	13.6	-90.00		-25.0	239.3	354.7	328.8	25.95	13.672	
5,983.1	5,944.4	5,957.8	5,944.4	17.1	13.7	-90.00		-25.0	239.3	354.7	328.5	26.29	13.495	
6,000.0	5,961.3	5,974.7	5,961.3	17.1	13.8	-89.33		-25.0	239.3	354.7	328.4	26.37	13.455	
6,050.0	6,011.2	6,024.6	6,011.2	17.2	13.9	-89.77		-25.0	239.3	354.7	328.1	26.58	13.348	
6,064.6	6,025.7	6,039.1	6,025.7	17.2	13.9	-90.00		-25.0	239.3	354.7	328.1	26.64	13.316	
6,100.0	6,060.9	6,074.3	6,060.9	17.3	14.0	-90.73		-25.0	239.3	354.7	327.9	26.79	13.239	
6,150.0	6,110.0	6,124.3	6,110.9	17.4	14.1	-91.88		-22.9	239.2	354.9	327.9	27.02	13.136	
6,200.0	6,158.4	6,174.8	6,161.0	17.4	14.2	-93.02		-17.5	239.2	355.2	328.0	27.24	13.040	
6,250.0	6,205.9	6,225.8	6,211.3	17.5	14.3	-94.16		-8.7	239.1	355.7	328.2	27.46	12.952	
6,300.0	6,252.3	6,277.3	6,261.3	17.6	14.4	-95.28		3.6	238.9	356.3	328.6	27.68	12.871	
6,350.0	6,297.4	6,329.3	6,310.8	17.7	14.5	-96.38		19.4	238.7	357.0	329.1	27.90	12.795	
6,400.0	6,340.9	6,381.8	6,359.6	17.7	14.6	-97.45		38.7	238.5	357.8	329.7	28.13	12.720	
6,450.0	6,382.8	6,434.8	6,407.5	17.8	14.7	-98.49		61.6	238.2	358.7	330.3	28.37	12.645	
6,500.0	6,422.8	6,488.4	6,454.1	17.9	14.8	-99.49		88.0	237.9	359.7	331.1	28.63	12.565	
6,550.0	6,460.7	6,542.5	6,499.1	18.0	14.9	-100.46		117.9	237.5	360.8	331.9	28.92	12.474	
6,600.0	6,496.4	6,597.0	6,542.3	18.2	15.1	-101.37		151.2	237.1	361.9	332.6	29.26	12.368	
6,650.0	6,529.8	6,652.1	6,583.3	18.3	15.2	-102.23		187.9	236.7	363.1	333.4	29.66	12.240	
6,700.0	6,560.6	6,707.6	6,622.0	18.5	15.4	-103.04		227.8	236.2	364.2	334.1	30.13	12.087	
6,750.0	6,588.9	6,763.6	6,657.9	18.7	15.7	-103.78		270.7	235.6	365.3	334.6	30.69	11.904	
6,800.0	6,614.3	6,820.1	6,690.8	18.9	16.0	-104.46		316.6	235.1	366.4	335.1	31.34	11.691	
6,850.0	6,636.9	6,876.9	6,720.4	19.2	16.4	-105.07		365.0	234.5	367.4	335.3	32.10	11.448	
6,900.0	6,656.5	6,934.1	6,746.5	19.6	16.9	-105.61		415.9	233.9	368.4	335.4	32.96	11.175	
6,950.0	6,673.1	6,991.6	6,768.8	19.9	17.4	-106.07		468.8	233.2	369.2	335.3	33.95	10.876	
7,000.0	6,686.5	7,049.3	6,787.2	20.4	18.0	-106.46		523.6	232.6	369.9	334.9	35.04	10.557	
7,050.0	6,696.8	7,107.3	6,801.4	20.8	18.6	-106.77		579.8	231.9	370.5	334.3	36.25	10.220	
7,100.0	6,703.9	7,165.5	6,811.4	21.4	19.3	-107.00		637.1	231.2	370.9	333.4	37.57	9.874	
7,150.0	6,707.7	7,218.6	6,817.2	21.9	19.9	-107.22		689.9	230.5	371.4	332.5	38.90	9.548	
7,181.7	6,708.4	7,250.2	6,820.5	22.3	20.3	-107.55		721.3	230.1	372.2	332.5	39.73	9.368	
7,200.0	6,708.4	7,269.2	6,822.5	22.5	20.6	-107.83		740.2	229.9	372.8	332.6	40.17	9.281	
7,300.0	6,708.6	7,380.0	6,828.0	23.7	22.1	-108.60		850.8	228.6	374.3	331.5	42.82	8.740	
7,400.0	6,708.8	7,480.0	6,828.5	25.1	23.5	-108.65		950.8	227.3	374.4	328.8	45.59	8.212	
7,500.0	6,709.0	7,580.0	6,829.0	26.5	25.0	-108.70		1,050.8	226.1	374.5	326.0	48.47	7.726	
7,600.0	6,709.2	7,680.0	6,829.6	28.0	26.6	-108.74		1,150.8	224.9	374.6	323.2	51.45	7.281	
7,700.0	6,709.4	7,780.0	6,830.1	29.5	28.2	-108.79		1,250.7	223.7	374.7	320.2	54.51	6.874	
7,800.0	6,709.6	7,880.0	6,830.6	31.1	29.8	-108.84		1,350.7	222.5	374.8	317.2	57.64	6.502	
7,900.0	6,709.8	7,980.0	6,831.1	32.7	31.5	-108.88		1,450.7	221.2	374.9	314.1	60.83	6.163	
8,000.0	6,710.0	8,080.0	6,831.6	34.4	33.2	-108.93		1,550.7	220.0	375.0	311.0	64.07	5.854	
8,100.0	6,710.2	8,180.0	6,832.2	36.0	34.9	-108.98		1,650.7	218.8	375.2	307.8	67.35	5.570	
8,200.0	6,710.3	8,280.0	6,832.7	37.7	36.6	-109.03		1,750.7	217.6	375.3	304.6	70.66	5.311	
8,300.0	6,710.5	8,380.0	6,833.2	39.5	38.4	-109.07		1,850.7	216.4	375.4	301.4	74.01	5.072	

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 Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Offset Design Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Guttersen 31T-441 - Wellbore #1 - Plan #1 (5-31-13)													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning
8,400.0	6,710.7	8,480.0	6,833.7	41.2	40.2	-109.12		1,950.7	215.1	375.5	298.1	77.38	4.853	
8,500.0	6,710.9	8,580.0	6,834.2	42.9	42.0	-109.17		2,050.7	213.9	375.6	294.8	80.77	4.650	
8,600.0	6,711.1	8,680.0	6,834.8	44.7	43.8	-109.21		2,150.7	212.7	375.7	291.5	84.18	4.463	
8,700.0	6,711.3	8,780.0	6,835.3	46.5	45.6	-109.26		2,250.7	211.5	375.8	288.2	87.61	4.289	
8,800.0	6,711.5	8,880.0	6,835.8	48.3	47.4	-109.31		2,350.6	210.3	375.9	284.9	91.06	4.128	
8,900.0	6,711.7	8,980.0	6,836.3	50.1	49.2	-109.36		2,450.6	209.0	376.0	281.5	94.52	3.978	
9,000.0	6,711.9	9,080.0	6,836.8	51.9	51.0	-109.40		2,550.6	207.8	376.1	278.1	97.99	3.839	
9,100.0	6,712.1	9,180.0	6,837.4	53.7	52.9	-109.45		2,650.6	206.6	376.2	274.8	101.47	3.708	
9,200.0	6,712.3	9,280.0	6,837.9	55.5	54.7	-109.50		2,750.6	205.4	376.4	271.4	104.95	3.586	
9,300.0	6,712.5	9,380.0	6,838.4	57.4	56.6	-109.54		2,850.6	204.2	376.5	268.0	108.45	3.471	
9,400.0	6,712.7	9,480.0	6,838.9	59.2	58.4	-109.59		2,950.6	202.9	376.6	264.6	111.96	3.364	
9,500.0	6,712.8	9,580.0	6,839.4	61.0	60.3	-109.64		3,050.6	201.7	376.7	261.2	115.47	3.262	
9,600.0	6,713.0	9,680.0	6,840.0	62.9	62.1	-109.68		3,150.6	200.5	376.8	257.8	118.98	3.167	
9,700.0	6,713.2	9,780.0	6,840.5	64.7	64.0	-109.73		3,250.6	199.3	376.9	254.4	122.50	3.077	
9,800.0	6,713.4	9,880.0	6,841.0	66.6	65.9	-109.78		3,350.6	198.1	377.0	251.0	126.03	2.992	
9,900.0	6,713.6	9,980.0	6,841.5	68.4	67.7	-109.82		3,450.5	196.8	377.1	247.6	129.55	2.911	
10,000.0	6,713.8	10,080.0	6,842.0	70.3	69.6	-109.87		3,550.5	195.6	377.3	244.2	133.09	2.835	
10,100.0	6,714.0	10,180.0	6,842.6	72.2	71.5	-109.92		3,650.5	194.4	377.4	240.7	136.62	2.762	
10,200.0	6,714.2	10,280.0	6,843.1	74.0	73.4	-109.96		3,750.5	193.2	377.5	237.3	140.16	2.693	
10,300.0	6,714.4	10,380.0	6,843.6	75.9	75.3	-110.01		3,850.5	192.0	377.6	233.9	143.70	2.628	
10,400.0	6,714.6	10,480.0	6,844.1	77.8	77.1	-110.06		3,950.5	190.7	377.7	230.5	147.24	2.565	
10,500.0	6,714.8	10,580.0	6,844.6	79.6	79.0	-110.10		4,050.5	189.5	377.8	227.0	150.78	2.506	
10,600.0	6,715.0	10,680.0	6,845.1	81.5	80.9	-110.15		4,150.5	188.3	377.9	223.6	154.32	2.449	
10,700.0	6,715.1	10,780.0	6,845.7	83.4	82.8	-110.20		4,250.5	187.1	378.0	220.2	157.87	2.395	
10,800.0	6,715.3	10,880.0	6,846.2	85.3	84.7	-110.24		4,350.5	185.9	378.2	216.7	161.42	2.343	
10,900.0	6,715.5	10,980.0	6,846.7	87.2	86.6	-110.29		4,450.5	184.6	378.3	213.3	164.96	2.293	
11,000.0	6,715.7	11,080.0	6,847.2	89.1	88.5	-110.34		4,550.4	183.4	378.4	209.9	168.51	2.246	
11,100.0	6,715.9	11,180.0	6,847.7	90.9	90.4	-110.38		4,650.4	182.2	378.5	206.5	172.06	2.200	
11,144.0	6,716.0	11,224.0	6,848.0	91.6	91.1	-110.40		4,694.5	181.7	378.6	205.2	173.38	2.183 SF	

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Offset Design Guttersen 31Q-401 Pad Sec.31-T3N-R63W - Guttersen 33-31 (Exist.) - Wellbore #1 - Wellbore #1													Offset Site Error:	0.0 ft
Survey Program: 7300-UNKNOWN													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	
7,500.0	6,709.0	6,709.0	6,709.0	26.5	134.2	-89.81	1,894.4	69.9	982.0	822.8	159.23	6.167		
7,600.0	6,709.2	6,709.2	6,709.2	28.0	134.2	-89.84	1,894.4	69.9	897.5	736.7	160.80	5.581		
7,700.0	6,709.4	6,709.4	6,709.4	29.5	134.2	-89.86	1,894.4	69.9	816.4	654.0	162.41	5.027		
7,800.0	6,709.6	6,709.6	6,709.6	31.1	134.2	-89.88	1,894.4	69.9	740.0	575.9	164.06	4.510		
7,900.0	6,709.8	6,709.8	6,709.8	32.7	134.2	-89.90	1,894.4	69.9	669.8	504.0	165.74	4.041		
8,000.0	6,710.0	6,710.0	6,710.0	34.4	134.2	-89.92	1,894.4	69.9	608.0	440.5	167.45	3.631		
8,100.0	6,710.2	6,710.2	6,710.2	36.0	134.2	-89.95	1,894.4	69.9	557.4	388.2	169.18	3.295		
8,200.0	6,710.3	6,710.3	6,710.3	37.7	134.2	-89.97	1,894.4	69.9	521.2	350.3	170.93	3.049		
8,300.0	6,710.5	6,710.5	6,710.5	39.5	134.2	-89.99	1,894.4	69.9	502.7	330.0	172.69	2.911		
8,344.8	6,710.6	6,710.6	6,710.6	40.2	134.2	-90.00	1,894.4	69.9	500.7	327.2	173.49	2.886 CC, ES, SF		
8,400.0	6,710.7	6,710.7	6,710.7	41.2	134.2	-90.01	1,894.4	69.9	503.8	329.3	174.48	2.887		
8,500.0	6,710.9	6,710.9	6,710.9	42.9	134.2	-90.03	1,894.4	69.9	524.2	348.0	176.27	2.974		
8,600.0	6,711.1	6,711.1	6,711.1	44.7	134.2	-90.06	1,894.4	69.9	562.0	383.9	178.07	3.156		
8,700.0	6,711.3	6,711.3	6,711.3	46.5	134.2	-90.08	1,894.4	69.9	613.9	434.0	179.89	3.413		
8,800.0	6,711.5	6,711.5	6,711.5	48.3	134.2	-90.10	1,894.4	69.9	676.7	495.0	181.71	3.724		
8,900.0	6,711.7	6,711.7	6,711.7	50.1	134.2	-90.12	1,894.4	69.9	747.6	564.1	183.54	4.073		
9,000.0	6,711.9	6,711.9	6,711.9	51.9	134.2	-90.14	1,894.4	69.9	824.6	639.2	185.38	4.448		
9,100.0	6,712.1	6,712.1	6,712.1	53.7	134.2	-90.17	1,894.4	69.9	906.1	718.9	187.23	4.840		
9,200.0	6,712.3	6,712.3	6,712.3	55.5	134.2	-90.19	1,894.4	69.9	991.0	801.9	189.08	5.241		

Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Guttersen 31T-301	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 # 2 (11-11-13)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4838.0ft (Original Well Elev) Coordinates are relative to: Guttersen 31T-301
 Offset Depths are relative to Offset Datum
 Central Meridian is -105.500000 °
 Coordinate System is US State Plane 1983, Colorado Northern Zone
 Grid Convergence at Surface is: 0.66°



Company:	PETROLEUM DEVELOPMENT CORP Weld County CO	Local Co-ordinate Reference:	Well Guttersen 31T-301
Project:	SEC.31-T3N-R63W	TVD Reference:	WELL @ 4838.0ft (Original Well Elev)
Reference Site:	Guttersen 31Q-401 Pad Sec.31-T3N-R63W	MD Reference:	WELL @ 4838.0ft (Original Well Elev)
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