

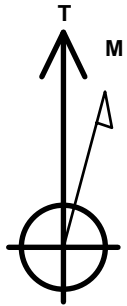
Ward Petroleum

Well Name: **Schaefer 2413-3-15HN**

Surface Location: Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W
 North American Datum 1983 , US State Plane 1983, Colorado Northern Zone
 Ground Elevation: 5022.0
 +N/-S +E/-W Northing Easting Latitude Longitude Slot
 0.0 0.0 1223383.89 3186510.47 39.944650 -104.834790
 Original Well Elev WELL @ 5035.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 484'FSL & 1950'FEL, Sec.24	1.0	0.0	0.0	Point
BHL 460'FNL & 2010'FWL, Sec.13	7650.0	9631.7	-1325.7	Point
LPL 460'FSL & 2010'FWL, Sec.24	7650.0	-21.8	-1337.5	Point



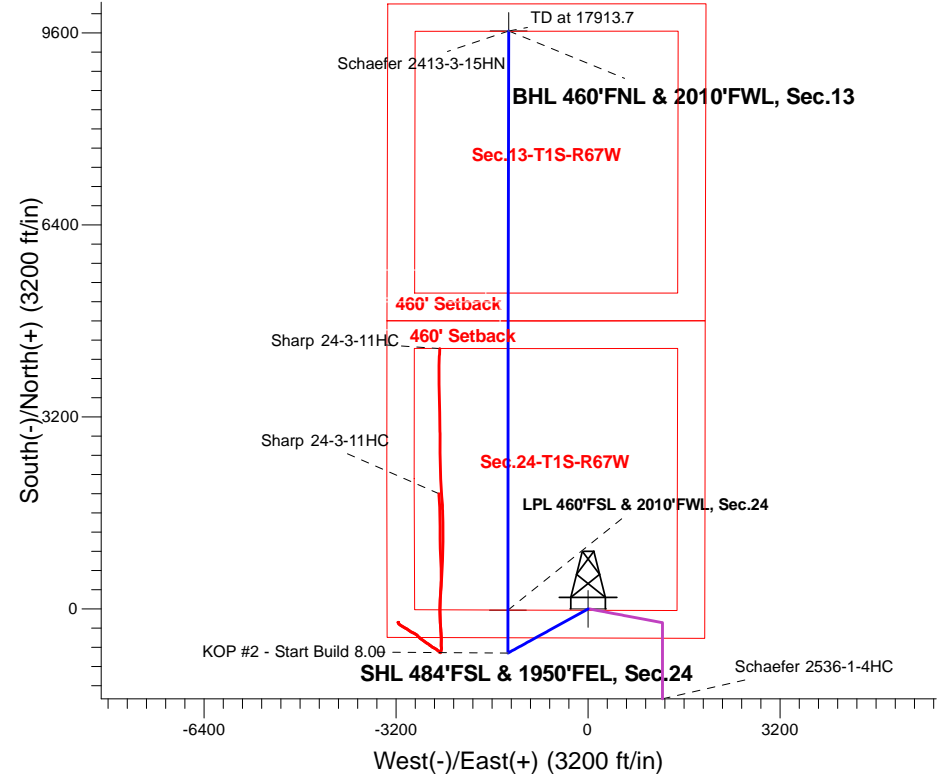
Azimuths to True North
 Magnetic North: 8.11°

Magnetic Field
 Strength: 52293.1snT
 Dip Angle: 66.48°
 Date: 1/23/2017
 Model: IGRF2010

Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W
 Schaefer 2413-3-15HN
 Plan #2 (1-25-17)
 9:46, January 25 2017

ANNOTATIONS

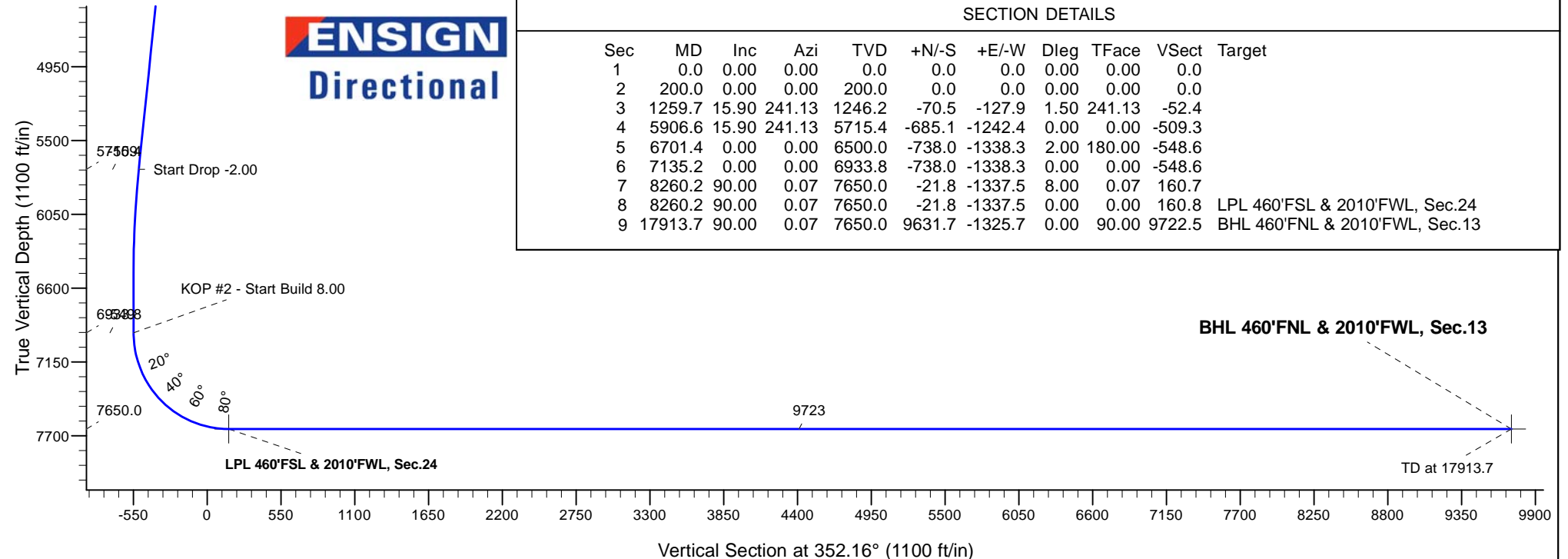
TVD	MD	Annotation
200.0	200.0	KOP - Start Build 1.50
5715.4	5906.6	Start Drop -2.00
6933.8	7135.2	KOP #2 - Start Build 8.00
7650.0	17913.7	TD at 17913.7



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	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	1259.7	15.90	241.13	1246.2	-70.5	-127.9	1.50	241.13	-52.4	
4	5906.6	15.90	241.13	5715.4	-685.1	-1242.4	0.00	0.00	-509.3	
5	6701.4	0.00	0.00	6500.0	-738.0	-1338.3	2.00	180.00	-548.6	
6	7135.2	0.00	0.00	6933.8	-738.0	-1338.3	0.00	0.00	-548.6	
7	8260.2	90.00	0.07	7650.0	-21.8	-1337.5	8.00	0.07	160.7	
8	8260.2	90.00	0.07	7650.0	-21.8	-1337.5	0.00	0.00	160.8	LPL 460'FSL & 2010'FWL, Sec.24
9	17913.7	90.00	0.07	7650.0	9631.7	-1325.7	0.00	90.00	9722.5	BHL 460'FNL & 2010'FWL, Sec.13

ENSIGN
 Directional



BHL 460'FNL & 2010'FWL, Sec.13

TD at 17913.7



Ward Petroleum

SEC.24-T1S-R67W

Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W

Schaefer 2413-3-15HN

Wellbore #1

Plan: Plan #2 (1-25-17)

Standard Planning Report

25 January, 2017

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Company:	Ward Petroleum	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Project:	SEC.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	North Reference:	True
Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (1-25-17)		

Project	SEC.24-T1S-R67W, Adams 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	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W				
Site Position:		Northing:	1,223,383.89 usft	Latitude:	39.944650
From:	Lat/Long	Easting:	3,186,510.48 usft	Longitude:	-104.834790
Position Uncertainty:	0.0 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.43

Well	Schaefer 2413-3-15HN					
Well Position	+N/-S	0.0 ft	Northing:	1,223,383.89 usft	Latitude:	39.944650
	+E/-W	0.0 ft	Easting:	3,186,510.48 usft	Longitude:	-104.834790
Position Uncertainty		0.0 ft	Wellhead Elevation:	0.0 ft	Ground Level:	5,022.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/23/2017	8.11	66.48	52,293

Design	Plan #2 (1-25-17)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0.0	0.0	0.0	352.16

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	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	
1,259.7	15.90	241.13	1,246.2	-70.5	-127.9	1.50	1.50	0.00	241.13	
5,906.6	15.90	241.13	5,715.4	-685.1	-1,242.4	0.00	0.00	0.00	0.00	
6,701.4	0.00	0.00	6,500.0	-738.0	-1,338.3	2.00	-2.00	0.00	180.00	
7,135.2	0.00	0.00	6,933.8	-738.0	-1,338.3	0.00	0.00	0.00	0.00	
8,260.2	90.00	0.07	7,650.0	-21.8	-1,337.5	8.00	8.00	0.00	0.07	
8,260.2	90.00	0.07	7,650.0	-21.8	-1,337.5	0.00	0.00	0.00	0.00	LPL 460'FSL & 2010'
17,913.7	90.00	0.07	7,650.0	9,631.7	-1,325.7	0.00	0.00	0.00	90.00	BHL 460'FNL & 2010'

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Company:	Ward Petroleum	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Project:	SEC.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	North Reference:	True
Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (1-25-17)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
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 484'FSL & 1950'FEL, Sec.24									
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 - Start Build 1.50									
300.0	1.50	241.13	300.0	-0.6	-1.1	-0.5	1.50	1.50	0.00
400.0	3.00	241.13	399.9	-2.5	-4.6	-1.9	1.50	1.50	0.00
500.0	4.50	241.13	499.7	-5.7	-10.3	-4.2	1.50	1.50	0.00
600.0	6.00	241.13	599.3	-10.1	-18.3	-7.5	1.50	1.50	0.00
700.0	7.50	241.13	698.6	-15.8	-28.6	-11.7	1.50	1.50	0.00
800.0	9.00	241.13	797.5	-22.7	-41.2	-16.9	1.50	1.50	0.00
900.0	10.50	241.13	896.1	-30.9	-56.0	-23.0	1.50	1.50	0.00
1,000.0	12.00	241.13	994.2	-40.3	-73.1	-30.0	1.50	1.50	0.00
1,100.0	13.50	241.13	1,091.7	-51.0	-92.4	-37.9	1.50	1.50	0.00
1,200.0	15.00	241.13	1,188.6	-62.8	-114.0	-46.7	1.50	1.50	0.00
1,259.7	15.90	241.13	1,246.2	-70.5	-127.9	-52.4	1.50	1.50	0.00
1,300.0	15.90	241.13	1,284.9	-75.9	-137.6	-56.4	0.00	0.00	0.00
1,400.0	15.90	241.13	1,381.1	-89.1	-161.5	-66.2	0.00	0.00	0.00
1,500.0	15.90	241.13	1,477.3	-102.3	-185.5	-76.1	0.00	0.00	0.00
1,600.0	15.90	241.13	1,573.4	-115.5	-209.5	-85.9	0.00	0.00	0.00
1,700.0	15.90	241.13	1,669.6	-128.8	-233.5	-95.7	0.00	0.00	0.00
1,800.0	15.90	241.13	1,765.8	-142.0	-257.5	-105.6	0.00	0.00	0.00
1,900.0	15.90	241.13	1,862.0	-155.2	-281.5	-115.4	0.00	0.00	0.00
2,000.0	15.90	241.13	1,958.2	-168.4	-305.4	-125.2	0.00	0.00	0.00
2,100.0	15.90	241.13	2,054.3	-181.7	-329.4	-135.0	0.00	0.00	0.00
2,200.0	15.90	241.13	2,150.5	-194.9	-353.4	-144.9	0.00	0.00	0.00
2,300.0	15.90	241.13	2,246.7	-208.1	-377.4	-154.7	0.00	0.00	0.00
2,400.0	15.90	241.13	2,342.9	-221.3	-401.4	-164.5	0.00	0.00	0.00
2,500.0	15.90	241.13	2,439.0	-234.6	-425.4	-174.4	0.00	0.00	0.00
2,600.0	15.90	241.13	2,535.2	-247.8	-449.3	-184.2	0.00	0.00	0.00
2,700.0	15.90	241.13	2,631.4	-261.0	-473.3	-194.0	0.00	0.00	0.00
2,800.0	15.90	241.13	2,727.6	-274.2	-497.3	-203.9	0.00	0.00	0.00
2,900.0	15.90	241.13	2,823.7	-287.5	-521.3	-213.7	0.00	0.00	0.00
3,000.0	15.90	241.13	2,919.9	-300.7	-545.3	-223.5	0.00	0.00	0.00
3,100.0	15.90	241.13	3,016.1	-313.9	-569.3	-233.4	0.00	0.00	0.00
3,200.0	15.90	241.13	3,112.3	-327.1	-593.2	-243.2	0.00	0.00	0.00
3,300.0	15.90	241.13	3,208.4	-340.4	-617.2	-253.0	0.00	0.00	0.00
3,400.0	15.90	241.13	3,304.6	-353.6	-641.2	-262.9	0.00	0.00	0.00
3,500.0	15.90	241.13	3,400.8	-366.8	-665.2	-272.7	0.00	0.00	0.00
3,600.0	15.90	241.13	3,497.0	-380.0	-689.2	-282.5	0.00	0.00	0.00
3,700.0	15.90	241.13	3,593.2	-393.3	-713.2	-292.4	0.00	0.00	0.00
3,800.0	15.90	241.13	3,689.3	-406.5	-737.1	-302.2	0.00	0.00	0.00
3,900.0	15.90	241.13	3,785.5	-419.7	-761.1	-312.0	0.00	0.00	0.00
4,000.0	15.90	241.13	3,881.7	-432.9	-785.1	-321.8	0.00	0.00	0.00
4,100.0	15.90	241.13	3,977.9	-446.2	-809.1	-331.7	0.00	0.00	0.00
4,200.0	15.90	241.13	4,074.0	-459.4	-833.1	-341.5	0.00	0.00	0.00
4,300.0	15.90	241.13	4,170.2	-472.6	-857.1	-351.3	0.00	0.00	0.00
4,400.0	15.90	241.13	4,266.4	-485.8	-881.0	-361.2	0.00	0.00	0.00
4,500.0	15.90	241.13	4,362.6	-499.1	-905.0	-371.0	0.00	0.00	0.00
4,600.0	15.90	241.13	4,458.7	-512.3	-929.0	-380.8	0.00	0.00	0.00
4,700.0	15.90	241.13	4,554.9	-525.5	-953.0	-390.7	0.00	0.00	0.00
4,800.0	15.90	241.13	4,651.1	-538.7	-977.0	-400.5	0.00	0.00	0.00
4,900.0	15.90	241.13	4,747.3	-552.0	-1,001.0	-410.3	0.00	0.00	0.00

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Company:	Ward Petroleum	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Project:	SEC.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	North Reference:	True
Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (1-25-17)		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,000.0	15.90	241.13	4,843.4	-565.2	-1,024.9	-420.2	0.00	0.00	0.00
5,100.0	15.90	241.13	4,939.6	-578.4	-1,048.9	-430.0	0.00	0.00	0.00
5,200.0	15.90	241.13	5,035.8	-591.7	-1,072.9	-439.8	0.00	0.00	0.00
5,300.0	15.90	241.13	5,132.0	-604.9	-1,096.9	-449.7	0.00	0.00	0.00
5,400.0	15.90	241.13	5,228.1	-618.1	-1,120.9	-459.5	0.00	0.00	0.00
5,500.0	15.90	241.13	5,324.3	-631.3	-1,144.9	-469.3	0.00	0.00	0.00
5,600.0	15.90	241.13	5,420.5	-644.6	-1,168.8	-479.2	0.00	0.00	0.00
5,700.0	15.90	241.13	5,516.7	-657.8	-1,192.8	-489.0	0.00	0.00	0.00
5,800.0	15.90	241.13	5,612.9	-671.0	-1,216.8	-498.8	0.00	0.00	0.00
5,900.0	15.90	241.13	5,709.0	-684.2	-1,240.8	-508.6	0.00	0.00	0.00
5,906.6	15.90	241.13	5,715.4	-685.1	-1,242.4	-509.3	0.00	0.00	0.00
Start Drop -2.00									
6,000.0	14.03	241.13	5,805.6	-696.7	-1,263.5	-518.0	2.00	-2.00	0.00
6,100.0	12.03	241.13	5,903.0	-707.6	-1,283.2	-526.0	2.00	-2.00	0.00
6,200.0	10.03	241.13	6,001.2	-716.9	-1,300.0	-532.9	2.00	-2.00	0.00
6,300.0	8.03	241.13	6,099.9	-724.4	-1,313.7	-538.5	2.00	-2.00	0.00
6,400.0	6.03	241.13	6,199.2	-730.4	-1,324.4	-542.9	2.00	-2.00	0.00
6,500.0	4.03	241.13	6,298.8	-734.6	-1,332.1	-546.1	2.00	-2.00	0.00
6,600.0	2.03	241.13	6,398.6	-737.1	-1,336.7	-548.0	2.00	-2.00	0.00
6,700.0	0.03	241.13	6,498.6	-738.0	-1,338.3	-548.6	2.00	-2.00	0.00
6,701.4	0.00	0.00	6,500.0	-738.0	-1,338.3	-548.6	2.00	-2.00	0.00
6,800.0	0.00	0.00	6,598.6	-738.0	-1,338.3	-548.6	0.00	0.00	0.00
6,900.0	0.00	0.00	6,698.6	-738.0	-1,338.3	-548.6	0.00	0.00	0.00
7,000.0	0.00	0.00	6,798.6	-738.0	-1,338.3	-548.6	0.00	0.00	0.00
7,100.0	0.00	0.00	6,898.6	-738.0	-1,338.3	-548.6	0.00	0.00	0.00
7,135.2	0.00	0.00	6,933.8	-738.0	-1,338.3	-548.6	0.00	0.00	0.00
KOP #2 - Start Build 8.00									
7,200.0	5.18	0.07	6,998.5	-735.1	-1,338.3	-545.7	8.00	8.00	0.00
7,300.0	13.18	0.07	7,097.2	-719.1	-1,338.3	-529.9	8.00	8.00	0.00
7,400.0	21.18	0.07	7,192.6	-689.6	-1,338.2	-500.7	8.00	8.00	0.00
7,500.0	29.18	0.07	7,283.0	-647.1	-1,338.2	-458.6	8.00	8.00	0.00
7,600.0	37.18	0.07	7,366.7	-592.4	-1,338.1	-404.4	8.00	8.00	0.00
7,700.0	45.19	0.07	7,441.9	-526.6	-1,338.1	-339.2	8.00	8.00	0.00
7,800.0	53.19	0.07	7,507.2	-451.0	-1,338.0	-264.3	8.00	8.00	0.00
7,900.0	61.19	0.07	7,561.3	-367.0	-1,337.9	-181.1	8.00	8.00	0.00
8,000.0	69.19	0.07	7,603.3	-276.3	-1,337.8	-91.3	8.00	8.00	0.00
8,100.0	77.19	0.07	7,632.2	-180.7	-1,337.6	3.4	8.00	8.00	0.00
8,200.0	85.19	0.07	7,647.5	-81.9	-1,337.5	101.2	8.00	8.00	0.00
8,260.2	90.00	0.07	7,650.0	-21.8	-1,337.5	160.8	8.00	8.00	0.00
LPL 460'FSL & 2010'FWL, Sec.24									
8,300.0	90.00	0.07	7,650.0	18.0	-1,337.4	200.2	0.00	0.00	0.00
8,400.0	90.00	0.07	7,650.0	118.0	-1,337.3	299.3	0.00	0.00	0.00
8,500.0	90.00	0.07	7,650.0	218.0	-1,337.2	398.3	0.00	0.00	0.00
8,600.0	90.00	0.07	7,650.0	318.0	-1,337.1	497.4	0.00	0.00	0.00
8,700.0	90.00	0.07	7,650.0	418.0	-1,336.9	596.4	0.00	0.00	0.00
8,800.0	90.00	0.07	7,650.0	518.0	-1,336.8	695.5	0.00	0.00	0.00
8,900.0	90.00	0.07	7,650.0	618.0	-1,336.7	794.5	0.00	0.00	0.00
9,000.0	90.00	0.07	7,650.0	718.0	-1,336.6	893.6	0.00	0.00	0.00
9,100.0	90.00	0.07	7,650.0	818.0	-1,336.5	992.6	0.00	0.00	0.00
9,200.0	90.00	0.07	7,650.0	918.0	-1,336.4	1,091.7	0.00	0.00	0.00
9,300.0	90.00	0.07	7,650.0	1,018.0	-1,336.2	1,190.7	0.00	0.00	0.00
9,400.0	90.00	0.07	7,650.0	1,118.0	-1,336.1	1,289.8	0.00	0.00	0.00
9,500.0	90.00	0.07	7,650.0	1,218.0	-1,336.0	1,388.8	0.00	0.00	0.00

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Company:	Ward Petroleum	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Project:	SEC.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	North Reference:	True
Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (1-25-17)		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
9,600.0	90.00	0.07	7,650.0	1,318.0	-1,335.9	1,487.8	0.00	0.00	0.00	
9,700.0	90.00	0.07	7,650.0	1,418.0	-1,335.8	1,586.9	0.00	0.00	0.00	
9,800.0	90.00	0.07	7,650.0	1,518.0	-1,335.6	1,685.9	0.00	0.00	0.00	
9,900.0	90.00	0.07	7,650.0	1,618.0	-1,335.5	1,785.0	0.00	0.00	0.00	
10,000.0	90.00	0.07	7,650.0	1,718.0	-1,335.4	1,884.0	0.00	0.00	0.00	
10,100.0	90.00	0.07	7,650.0	1,818.0	-1,335.3	1,983.1	0.00	0.00	0.00	
10,200.0	90.00	0.07	7,650.0	1,918.0	-1,335.2	2,082.1	0.00	0.00	0.00	
10,300.0	90.00	0.07	7,650.0	2,018.0	-1,335.0	2,181.2	0.00	0.00	0.00	
10,400.0	90.00	0.07	7,650.0	2,118.0	-1,334.9	2,280.2	0.00	0.00	0.00	
10,500.0	90.00	0.07	7,650.0	2,218.0	-1,334.8	2,379.3	0.00	0.00	0.00	
10,600.0	90.00	0.07	7,650.0	2,318.0	-1,334.7	2,478.3	0.00	0.00	0.00	
10,700.0	90.00	0.07	7,650.0	2,418.0	-1,334.6	2,577.4	0.00	0.00	0.00	
10,800.0	90.00	0.07	7,650.0	2,518.0	-1,334.5	2,676.4	0.00	0.00	0.00	
10,900.0	90.00	0.07	7,650.0	2,618.0	-1,334.3	2,775.5	0.00	0.00	0.00	
11,000.0	90.00	0.07	7,650.0	2,718.0	-1,334.2	2,874.5	0.00	0.00	0.00	
11,100.0	90.00	0.07	7,650.0	2,818.0	-1,334.1	2,973.6	0.00	0.00	0.00	
11,200.0	90.00	0.07	7,650.0	2,918.0	-1,334.0	3,072.6	0.00	0.00	0.00	
11,300.0	90.00	0.07	7,650.0	3,018.0	-1,333.9	3,171.7	0.00	0.00	0.00	
11,400.0	90.00	0.07	7,650.0	3,118.0	-1,333.7	3,270.7	0.00	0.00	0.00	
11,500.0	90.00	0.07	7,650.0	3,218.0	-1,333.6	3,369.8	0.00	0.00	0.00	
11,600.0	90.00	0.07	7,650.0	3,318.0	-1,333.5	3,468.8	0.00	0.00	0.00	
11,700.0	90.00	0.07	7,650.0	3,418.0	-1,333.4	3,567.9	0.00	0.00	0.00	
11,800.0	90.00	0.07	7,650.0	3,518.0	-1,333.3	3,666.9	0.00	0.00	0.00	
11,900.0	90.00	0.07	7,650.0	3,618.0	-1,333.1	3,766.0	0.00	0.00	0.00	
12,000.0	90.00	0.07	7,650.0	3,718.0	-1,333.0	3,865.0	0.00	0.00	0.00	
12,100.0	90.00	0.07	7,650.0	3,818.0	-1,332.9	3,964.1	0.00	0.00	0.00	
12,200.0	90.00	0.07	7,650.0	3,918.0	-1,332.8	4,063.1	0.00	0.00	0.00	
12,300.0	90.00	0.07	7,650.0	4,018.0	-1,332.6	4,162.2	0.00	0.00	0.00	
12,400.0	90.00	0.07	7,650.0	4,118.0	-1,332.5	4,261.2	0.00	0.00	0.00	
12,500.0	90.00	0.07	7,650.0	4,218.0	-1,332.4	4,360.3	0.00	0.00	0.00	
12,600.0	90.00	0.07	7,650.0	4,318.0	-1,332.3	4,459.3	0.00	0.00	0.00	
12,700.0	90.00	0.07	7,650.0	4,418.0	-1,332.2	4,558.4	0.00	0.00	0.00	
12,800.0	90.00	0.07	7,650.0	4,518.0	-1,332.0	4,657.4	0.00	0.00	0.00	
12,900.0	90.00	0.07	7,650.0	4,618.0	-1,331.9	4,756.5	0.00	0.00	0.00	
13,000.0	90.00	0.07	7,650.0	4,718.0	-1,331.8	4,855.5	0.00	0.00	0.00	
13,100.0	90.00	0.07	7,650.0	4,818.0	-1,331.7	4,954.6	0.00	0.00	0.00	
13,200.0	90.00	0.07	7,650.0	4,918.0	-1,331.6	5,053.6	0.00	0.00	0.00	
13,300.0	90.00	0.07	7,650.0	5,018.0	-1,331.4	5,152.7	0.00	0.00	0.00	
13,400.0	90.00	0.07	7,650.0	5,118.0	-1,331.3	5,251.7	0.00	0.00	0.00	
13,500.0	90.00	0.07	7,650.0	5,218.0	-1,331.2	5,350.8	0.00	0.00	0.00	
13,600.0	90.00	0.07	7,650.0	5,318.0	-1,331.1	5,449.8	0.00	0.00	0.00	
13,700.0	90.00	0.07	7,650.0	5,418.0	-1,330.9	5,548.9	0.00	0.00	0.00	
13,800.0	90.00	0.07	7,650.0	5,518.0	-1,330.8	5,647.9	0.00	0.00	0.00	
13,900.0	90.00	0.07	7,650.0	5,618.0	-1,330.7	5,747.0	0.00	0.00	0.00	
14,000.0	90.00	0.07	7,650.0	5,718.0	-1,330.6	5,846.0	0.00	0.00	0.00	
14,100.0	90.00	0.07	7,650.0	5,818.0	-1,330.5	5,945.1	0.00	0.00	0.00	
14,200.0	90.00	0.07	7,650.0	5,918.0	-1,330.3	6,044.1	0.00	0.00	0.00	
14,300.0	90.00	0.07	7,650.0	6,018.0	-1,330.2	6,143.2	0.00	0.00	0.00	
14,400.0	90.00	0.07	7,650.0	6,118.0	-1,330.1	6,242.2	0.00	0.00	0.00	
14,500.0	90.00	0.07	7,650.0	6,218.0	-1,330.0	6,341.3	0.00	0.00	0.00	
14,600.0	90.00	0.07	7,650.0	6,318.0	-1,329.8	6,440.3	0.00	0.00	0.00	
14,700.0	90.00	0.07	7,650.0	6,418.0	-1,329.7	6,539.4	0.00	0.00	0.00	
14,800.0	90.00	0.07	7,650.0	6,518.0	-1,329.6	6,638.4	0.00	0.00	0.00	
14,900.0	90.00	0.07	7,650.0	6,618.0	-1,329.5	6,737.5	0.00	0.00	0.00	

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Company:	Ward Petroleum	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Project:	SEC.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	North Reference:	True
Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (1-25-17)		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
15,000.0	90.00	0.07	7,650.0	6,718.0	-1,329.4	6,836.5	0.00	0.00	0.00	
15,100.0	90.00	0.07	7,650.0	6,818.0	-1,329.2	6,935.6	0.00	0.00	0.00	
15,200.0	90.00	0.07	7,650.0	6,918.0	-1,329.1	7,034.6	0.00	0.00	0.00	
15,300.0	90.00	0.07	7,650.0	7,018.0	-1,329.0	7,133.7	0.00	0.00	0.00	
15,400.0	90.00	0.07	7,650.0	7,118.0	-1,328.9	7,232.7	0.00	0.00	0.00	
15,500.0	90.00	0.07	7,650.0	7,218.0	-1,328.7	7,331.8	0.00	0.00	0.00	
15,600.0	90.00	0.07	7,650.0	7,318.0	-1,328.6	7,430.8	0.00	0.00	0.00	
15,700.0	90.00	0.07	7,650.0	7,418.0	-1,328.5	7,529.9	0.00	0.00	0.00	
15,800.0	90.00	0.07	7,650.0	7,518.0	-1,328.4	7,628.9	0.00	0.00	0.00	
15,900.0	90.00	0.07	7,650.0	7,618.0	-1,328.2	7,728.0	0.00	0.00	0.00	
16,000.0	90.00	0.07	7,650.0	7,718.0	-1,328.1	7,827.0	0.00	0.00	0.00	
16,100.0	90.00	0.07	7,650.0	7,818.0	-1,328.0	7,926.1	0.00	0.00	0.00	
16,200.0	90.00	0.07	7,650.0	7,918.0	-1,327.9	8,025.1	0.00	0.00	0.00	
16,300.0	90.00	0.07	7,650.0	8,018.0	-1,327.7	8,124.2	0.00	0.00	0.00	
16,400.0	90.00	0.07	7,650.0	8,118.0	-1,327.6	8,223.2	0.00	0.00	0.00	
16,500.0	90.00	0.07	7,650.0	8,218.0	-1,327.5	8,322.3	0.00	0.00	0.00	
16,600.0	90.00	0.07	7,650.0	8,318.0	-1,327.4	8,421.3	0.00	0.00	0.00	
16,700.0	90.00	0.07	7,650.0	8,418.0	-1,327.2	8,520.4	0.00	0.00	0.00	
16,800.0	90.00	0.07	7,650.0	8,518.0	-1,327.1	8,619.4	0.00	0.00	0.00	
16,900.0	90.00	0.07	7,650.0	8,618.0	-1,327.0	8,718.4	0.00	0.00	0.00	
17,000.0	90.00	0.07	7,650.0	8,718.0	-1,326.9	8,817.5	0.00	0.00	0.00	
17,100.0	90.00	0.07	7,650.0	8,818.0	-1,326.7	8,916.5	0.00	0.00	0.00	
17,200.0	90.00	0.07	7,650.0	8,918.0	-1,326.6	9,015.6	0.00	0.00	0.00	
17,300.0	90.00	0.07	7,650.0	9,018.0	-1,326.5	9,114.6	0.00	0.00	0.00	
17,400.0	90.00	0.07	7,650.0	9,118.0	-1,326.4	9,213.7	0.00	0.00	0.00	
17,500.0	90.00	0.07	7,650.0	9,218.0	-1,326.2	9,312.7	0.00	0.00	0.00	
17,600.0	90.00	0.07	7,650.0	9,318.0	-1,326.1	9,411.8	0.00	0.00	0.00	
17,700.0	90.00	0.07	7,650.0	9,418.0	-1,326.0	9,510.8	0.00	0.00	0.00	
17,800.0	90.00	0.07	7,650.0	9,518.0	-1,325.9	9,609.9	0.00	0.00	0.00	
17,900.0	90.00	0.07	7,650.0	9,618.0	-1,325.7	9,708.9	0.00	0.00	0.00	
17,913.7	90.00	0.07	7,650.0	9,631.7	-1,325.7	9,722.5	0.00	0.00	0.00	
TD at 17913.7 - BHL 460'FNL & 2010'FWL, Sec.13										

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude		
- hit/miss target										
- Shape								Longitude		
SHL 484'FSL & 1950'FE - plan hits target center - Point	0.00	0.00	1.0	0.0	0.0	1,223,383.89	3,186,510.48	39.944650 -104.834790		
LPL 460'FSL & 2010'FW - plan hits target center - Point	0.00	0.00	7,650.0	-21.8	-1,337.5	1,223,352.04	3,185,173.26	39.944590 -104.839560		
BHL 460'FNL & 2010'FW - plan hits target center - Point	0.00	0.00	7,650.0	9,631.7	-1,325.7	1,233,005.08	3,185,112.57	39.971090 -104.839520		

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Company:	Ward Petroleum	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Project:	SEC.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	North Reference:	True
Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #2 (1-25-17)		

Plan Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
200.0	200.0	0.0	0.0	KOP - Start Build 1.50
5,906.6	5,715.4	-685.1	-1,242.4	Start Drop -2.00
7,135.2	6,933.8	-738.0	-1,338.3	KOP #2 - Start Build 8.00
17,913.7	7,650.0	-21.8	-1,337.5	TD at 17913.7



Ward Petroleum

SEC.24-T1S-R67W

Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W

Schaefer 2413-3-15HN

Wellbore #1

Plan #2 (1-25-17)

Anticollision Report

25 January, 2017

Company:	Ward Petroleum	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Project:	SEC.24-T1S-R67W	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Reference Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (1-25-17)	Offset TVD Reference:	Offset Datum

Reference	Plan #2 (1-25-17)		
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 1,200.0 ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date	1/25/2017		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	17,913.7	Plan #2 (1-25-17) (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						
Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W						
Schaefer 2536-1-4HC - Wellbore #1 - Plan #1 (1-23-17)	200.0	200.0	14.0	13.3	20.791	CC, ES
Schaefer 2536-1-4HC - Wellbore #1 - Plan #1 (1-23-17)	300.0	299.6	16.5	15.3	14.901	SF
Sharp 24-3-11HC Pad Sec.24-T1S-R67W						
Sharp 24-3-11HC - Wellbore #1 - Wellbore #1	7,480.6	7,358.5	1,107.9	1,067.6	27.508	CC
Sharp 24-3-11HC - Wellbore #1 - Wellbore #1	10,000.0	9,929.9	1,145.0	1,065.2	14.353	ES
Sharp 24-3-11HC - Wellbore #1 - Wellbore #1	10,500.0	10,161.0	1,196.0	1,104.1	13.011	SF
Sharp 24-3-11HC - Wellbore #2 - Wellbore #2	9,449.6	9,410.8	1,087.1	1,026.0	17.792	CC
Sharp 24-3-11HC - Wellbore #2 - Wellbore #2	12,617.7	12,582.0	1,145.7	977.8	6.822	ES
Sharp 24-3-11HC - Wellbore #2 - Wellbore #2	12,800.0	12,582.0	1,160.1	988.8	6.771	SF

Offset Design	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W - Schaefer 2536-1-4HC - Wellbore #1 - Plan #1 (1-23-17)											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
0.0	0.0	0.0	0.0	0.0	0.0	90.03	0.0	14.0	14.0	14.0	0.00	N/A	
100.0	100.0	100.0	100.0	0.1	0.1	90.03	0.0	14.0	14.0	13.8	0.22	62.374	
200.0	200.0	200.0	200.0	0.3	0.3	90.03	0.0	14.0	14.0	13.3	0.67	20.791	CC, ES
300.0	300.0	299.6	299.6	0.5	0.5	-152.44	-0.2	15.3	16.5	15.3	1.10	14.901	SF
400.0	399.9	398.8	398.7	0.8	0.8	-154.80	-1.0	19.1	23.8	22.2	1.55	15.354	
500.0	499.7	497.3	497.0	1.0	1.0	-156.58	-2.2	25.4	36.0	34.0	2.01	17.852	
600.0	599.3	594.8	594.1	1.3	1.2	-157.67	-3.8	34.0	53.0	50.5	2.49	21.251	
700.0	698.6	690.8	689.5	1.5	1.5	-158.31	-5.8	45.0	74.8	71.8	2.98	25.078	
800.0	797.5	785.2	782.9	1.9	1.8	-158.68	-8.3	58.0	101.3	97.8	3.48	29.102	
900.0	896.1	877.6	874.0	2.2	2.1	-158.89	-11.1	72.9	132.3	128.3	3.98	33.200	
1,000.0	994.2	967.7	962.6	2.6	2.5	-158.98	-14.2	89.6	167.8	163.3	4.50	37.298	
1,100.0	1,091.7	1,058.5	1,051.4	3.1	2.9	-159.07	-17.7	107.9	207.0	202.0	5.02	41.237	
1,200.0	1,188.6	1,149.4	1,140.3	3.6	3.3	-159.27	-21.2	126.4	248.7	243.2	5.54	44.890	
1,300.0	1,284.9	1,239.3	1,228.3	4.1	3.7	-159.61	-24.6	144.7	292.4	286.3	6.06	48.220	
1,400.0	1,381.1	1,329.0	1,316.1	4.7	4.1	-160.01	-28.1	162.9	336.5	329.9	6.60	50.960	
1,500.0	1,477.3	1,418.8	1,403.9	5.2	4.5	-160.31	-31.5	181.1	380.6	373.4	7.14	53.274	
1,600.0	1,573.4	1,508.5	1,491.7	5.8	4.9	-160.56	-34.9	199.4	424.7	417.0	7.69	55.210	
1,700.0	1,669.6	1,598.2	1,579.5	6.4	5.3	-160.75	-38.4	217.6	468.8	460.6	8.25	56.852	

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

Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W - Schaefer 2536-1-4HC - Wellbore #1 - Plan #1 (1-23-17)													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)			
1,800.0	1,765.8	1,688.0	1,667.3	7.0	5.7	-160.92	-41.8	235.8	512.9	504.1	8.80	58.259		
1,900.0	1,862.0	1,777.7	1,755.0	7.5	6.1	-161.05	-45.3	254.1	557.1	547.7	9.37	59.476		
2,000.0	1,958.2	1,867.4	1,842.8	8.1	6.5	-161.17	-48.7	272.3	601.2	591.3	9.93	60.538		
2,100.0	2,054.3	1,957.2	1,930.6	8.7	6.9	-161.27	-52.1	290.5	645.3	634.8	10.50	61.472		
2,200.0	2,150.5	2,046.9	2,018.4	9.3	7.3	-161.36	-55.6	308.8	689.5	678.4	11.07	62.298		
2,300.0	2,246.7	2,136.6	2,106.2	9.8	7.7	-161.44	-59.0	327.0	733.6	722.0	11.64	63.034		
2,400.0	2,342.9	2,226.3	2,194.0	10.4	8.1	-161.50	-62.4	345.2	777.7	765.5	12.21	63.694		
2,500.0	2,439.0	2,316.1	2,281.8	11.0	8.5	-161.57	-65.9	363.5	821.9	809.1	12.78	64.288		
2,600.0	2,535.2	2,405.8	2,369.6	11.6	8.9	-161.62	-69.3	381.7	866.0	852.6	13.36	64.825		
2,700.0	2,631.4	2,495.5	2,457.4	12.2	9.3	-161.67	-72.7	400.0	910.1	896.2	13.94	65.313		
2,800.0	2,727.6	2,585.3	2,545.2	12.8	9.7	-161.72	-76.2	418.2	954.3	939.8	14.51	65.758		
2,900.0	2,823.7	2,675.0	2,633.0	13.3	10.2	-161.76	-79.6	436.4	998.4	983.3	15.09	66.166		
3,000.0	2,919.9	2,764.7	2,720.7	13.9	10.6	-161.79	-83.1	454.7	1,042.5	1,026.9	15.67	66.540		
3,100.0	3,016.1	2,854.5	2,808.5	14.5	11.0	-161.83	-86.5	472.9	1,086.7	1,070.4	16.25	66.886		
3,200.0	3,112.3	2,944.2	2,896.3	15.1	11.4	-161.86	-89.9	491.1	1,130.8	1,114.0	16.83	67.205		
3,300.0	3,208.4	3,033.9	2,984.1	15.7	11.8	-161.89	-93.4	509.4	1,175.0	1,157.6	17.41	67.501		

Company:	Ward Petroleum	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Project:	SEC.24-T1S-R67W	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Reference Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (1-25-17)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 111-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
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		
6,300.0	6,099.9	6,306.7	6,238.1	32.4	19.4	30.97	-695.3	-2,504.4	1,198.0	1,159.8	38.19	31.367		
6,400.0	6,199.2	6,379.2	6,310.0	32.6	19.6	30.70	-701.3	-2,497.6	1,177.9	1,139.3	38.56	30.545		
6,500.0	6,298.8	6,466.2	6,396.5	32.8	19.8	30.38	-708.4	-2,491.0	1,162.6	1,123.6	38.91	29.879		
6,600.0	6,398.6	6,561.6	6,491.4	32.9	20.1	30.10	-714.4	-2,483.8	1,150.4	1,111.2	39.22	29.335		
6,700.0	6,498.6	6,648.6	6,578.2	33.0	20.3	29.84	-718.7	-2,478.0	1,142.1	1,102.6	39.46	28.943		
6,800.0	6,598.6	6,740.9	6,670.2	33.1	20.5	-89.26	-723.3	-2,472.9	1,136.4	1,096.7	39.74	28.597		
6,900.0	6,698.6	6,836.5	6,765.6	33.2	20.8	-89.46	-727.4	-2,467.6	1,130.9	1,090.8	40.03	28.252		
7,000.0	6,798.6	6,927.3	6,856.2	33.3	20.9	-89.56	-729.4	-2,463.6	1,126.3	1,086.0	40.31	27.945		
7,100.0	6,898.6	7,023.9	6,952.7	33.4	21.1	-89.46	-727.4	-2,459.3	1,122.0	1,081.4	40.60	27.632		
7,200.0	6,998.5	7,101.1	7,029.7	33.5	21.2	-89.60	-723.9	-2,456.8	1,118.8	1,078.0	40.80	27.418		
7,300.0	7,097.2	7,260.1	7,184.5	33.4	21.3	-89.49	-689.3	-2,450.1	1,115.0	1,074.2	40.80	27.329		
7,400.0	7,192.6	7,316.0	7,238.0	33.4	21.3	-89.97	-673.5	-2,446.8	1,109.3	1,068.8	40.55	27.354		
7,480.6	7,266.0	7,358.5	7,278.6	33.2	21.3	-90.35	-660.8	-2,446.1	1,107.9	1,067.6	40.27	27.508 CC		
7,500.0	7,283.0	7,370.0	7,289.5	33.2	21.3	-90.45	-657.1	-2,446.1	1,107.9	1,067.7	40.21	27.556		
7,600.0	7,366.7	7,468.1	7,380.0	32.9	21.2	-91.30	-619.5	-2,447.0	1,109.2	1,069.5	39.67	27.959		
7,700.0	7,441.9	7,600.3	7,492.0	32.7	21.0	-92.40	-549.7	-2,446.7	1,109.7	1,070.7	38.97	28.475		
7,734.9	7,465.9	7,626.3	7,512.6	32.5	20.9	-92.62	-533.9	-2,446.3	1,109.4	1,070.7	38.78	28.606		
7,800.0	7,507.2	7,667.2	7,543.7	32.3	20.9	-92.92	-507.3	-2,446.5	1,110.3	1,071.9	38.47	28.862		
7,900.0	7,561.3	7,749.3	7,600.6	32.0	20.7	-93.42	-448.2	-2,448.9	1,114.4	1,076.4	38.02	29.311		
8,000.0	7,603.3	7,837.6	7,650.9	31.7	20.5	-93.69	-376.0	-2,453.6	1,120.9	1,083.2	37.74	29.705		
8,100.0	7,632.2	7,938.3	7,696.3	31.4	20.3	-93.95	-286.3	-2,459.4	1,128.1	1,090.4	37.68	29.941		
8,200.0	7,647.5	8,065.7	7,746.6	31.1	20.2	-94.92	-169.5	-2,466.0	1,135.5	1,097.5	37.93	29.937		
8,300.0	7,650.0	8,297.3	7,786.4	30.9	21.0	-96.42	57.0	-2,468.9	1,139.3	1,100.1	39.20	29.062		
8,400.0	7,650.0	8,416.7	7,787.0	30.8	21.8	-96.48	176.2	-2,463.7	1,135.2	1,094.8	40.34	28.140		
8,500.0	7,650.0	8,529.4	7,785.2	30.8	22.8	-96.43	288.7	-2,457.2	1,129.4	1,087.7	41.68	27.097		
8,600.0	7,650.0	8,615.1	7,781.0	30.9	23.7	-96.24	374.2	-2,453.0	1,124.0	1,080.9	43.17	26.040		
8,700.0	7,650.0	8,701.2	7,775.5	31.1	24.5	-95.98	460.1	-2,449.4	1,119.3	1,074.5	44.84	24.960		
8,800.0	7,650.0	8,774.0	7,771.7	31.4	25.3	-95.80	532.8	-2,447.7	1,116.7	1,070.2	46.48	24.026		
8,820.4	7,650.0	8,781.0	7,771.5	31.5	25.3	-95.78	539.7	-2,447.7	1,116.6	1,069.8	46.76	23.881		
8,900.0	7,650.0	8,837.3	7,770.4	31.9	25.9	-95.72	596.0	-2,448.5	1,117.6	1,069.4	48.17	23.202		
9,000.0	7,650.0	8,922.0	7,769.5	32.6	26.8	-95.66	680.7	-2,451.0	1,120.5	1,070.2	50.27	22.290		
9,100.0	7,650.0	9,001.0	7,771.8	33.4	27.7	-95.76	759.6	-2,454.0	1,124.7	1,072.4	52.38	21.473		
9,200.0	7,650.0	9,108.7	7,776.8	34.3	29.0	-95.99	867.0	-2,458.9	1,129.8	1,074.7	55.15	20.488		
9,300.0	7,650.0	9,214.8	7,779.8	35.4	30.4	-96.12	973.0	-2,463.1	1,134.2	1,076.2	57.98	19.562		
9,400.0	7,650.0	9,346.0	7,782.8	36.5	32.2	-96.25	1,104.1	-2,466.5	1,137.2	1,075.9	61.26	18.564		
9,500.0	7,650.0	9,437.6	7,783.1	37.8	33.5	-96.26	1,195.6	-2,468.1	1,139.1	1,075.0	64.11	17.769		
9,600.0	7,650.0	9,580.1	7,781.6	39.1	35.6	-96.18	1,338.2	-2,468.2	1,139.1	1,071.3	67.80	16.801		
9,698.7	7,650.0	9,660.0	7,780.0	40.4	36.8	-96.10	1,418.0	-2,467.2	1,137.9	1,067.3	70.55	16.130		
9,700.0	7,650.0	9,660.0	7,780.0	40.4	36.8	-96.10	1,418.0	-2,467.2	1,137.9	1,067.3	70.57	16.125		
9,800.0	7,650.0	9,722.0	7,779.8	41.8	37.7	-96.08	1,480.0	-2,468.6	1,140.1	1,067.0	73.08	15.600		
9,900.0	7,650.0	9,832.6	7,778.1	43.3	39.4	-95.99	1,590.6	-2,471.6	1,142.6	1,066.1	76.51	14.935		
10,000.0	7,650.0	9,929.9	7,774.1	44.8	40.9	-95.77	1,687.8	-2,474.2	1,145.0	1,065.2	79.77	14.353 ES		
10,100.0	7,650.0	10,005.0	7,772.1	46.3	42.1	-95.66	1,762.8	-2,477.2	1,148.9	1,066.2	82.63	13.903		
10,200.0	7,650.0	10,081.4	7,772.6	47.9	43.2	-95.66	1,839.0	-2,482.1	1,155.2	1,069.7	85.50	13.511		
10,300.0	7,650.0	10,161.0	7,774.1	49.5	44.5	-95.70	1,918.4	-2,487.0	1,162.0	1,073.5	88.48	13.132		
10,400.0	7,650.0	10,161.0	7,774.1	51.1	44.5	-95.70	1,918.4	-2,487.0	1,174.9	1,084.7	90.20	13.025		
10,500.0	7,650.0	10,161.0	7,774.1	52.7	44.5	-95.70	1,918.4	-2,487.0	1,196.0	1,104.1	91.93	13.011 SF		

Company:	Ward Petroleum	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Project:	SEC.24-T1S-R67W	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Reference Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (1-25-17)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 111-MWD, 8638-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
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		
6,300.0	6,099.9	6,306.7	6,238.1	32.4	19.4	30.97	-695.3	-2,504.4	1,198.0	1,159.8	38.19	31.367		
6,400.0	6,199.2	6,379.2	6,310.0	32.6	19.6	30.70	-701.3	-2,497.6	1,177.9	1,139.3	38.56	30.545		
6,500.0	6,298.8	6,466.2	6,396.5	32.8	19.8	30.38	-708.4	-2,491.0	1,162.6	1,123.6	38.91	29.879		
6,600.0	6,398.6	6,561.6	6,491.4	32.9	20.1	30.10	-714.4	-2,483.8	1,150.4	1,111.2	39.22	29.335		
6,700.0	6,498.6	6,648.6	6,578.2	33.0	20.3	29.84	-718.7	-2,478.0	1,142.1	1,102.6	39.46	28.943		
6,800.0	6,598.6	6,740.9	6,670.2	33.1	20.5	-89.26	-723.3	-2,472.9	1,136.4	1,096.7	39.74	28.597		
6,900.0	6,698.6	6,836.5	6,765.6	33.2	20.8	-89.46	-727.4	-2,467.6	1,130.9	1,090.8	40.03	28.252		
7,000.0	6,798.6	6,927.3	6,856.2	33.3	20.9	-89.56	-729.4	-2,463.6	1,126.3	1,086.0	40.31	27.945		
7,100.0	6,898.6	7,023.9	6,952.7	33.4	21.1	-89.46	-727.4	-2,459.3	1,122.0	1,081.4	40.60	27.632		
7,200.0	6,998.5	7,101.1	7,029.7	33.5	21.2	-89.60	-723.9	-2,456.8	1,118.8	1,078.0	40.80	27.418		
7,300.0	7,097.2	7,260.1	7,184.5	33.4	21.3	-89.49	-689.3	-2,450.1	1,115.0	1,074.2	40.80	27.329		
7,400.0	7,192.6	7,316.0	7,238.0	33.4	21.3	-89.97	-673.5	-2,446.8	1,109.3	1,068.8	40.55	27.354		
7,480.6	7,266.0	7,358.5	7,278.6	33.2	21.3	-90.35	-660.8	-2,446.1	1,107.9	1,067.6	40.27	27.508		
7,500.0	7,283.0	7,370.0	7,289.5	33.2	21.3	-90.45	-657.1	-2,446.1	1,107.9	1,067.7	40.21	27.556		
7,600.0	7,366.7	7,468.1	7,380.0	32.9	21.2	-91.30	-619.5	-2,447.0	1,109.2	1,069.5	39.67	27.959		
7,700.0	7,441.9	7,600.3	7,492.0	32.7	21.0	-92.40	-549.7	-2,446.7	1,109.7	1,070.7	38.97	28.475		
7,734.9	7,465.9	7,626.3	7,512.6	32.5	20.9	-92.62	-533.9	-2,446.3	1,109.4	1,070.7	38.78	28.606		
7,800.0	7,507.2	7,667.2	7,543.7	32.3	20.9	-92.92	-507.3	-2,446.5	1,110.3	1,071.9	38.47	28.862		
7,900.0	7,561.3	7,749.3	7,600.6	32.0	20.7	-93.42	-448.2	-2,448.9	1,114.4	1,076.4	38.02	29.311		
8,000.0	7,603.3	7,837.6	7,650.9	31.7	20.5	-93.69	-376.0	-2,453.6	1,120.9	1,083.2	37.74	29.705		
8,100.0	7,632.2	7,938.3	7,696.3	31.4	20.3	-93.95	-286.3	-2,459.4	1,128.1	1,090.4	37.68	29.941		
8,200.0	7,647.5	8,065.7	7,746.6	31.1	20.2	-94.92	-169.5	-2,466.0	1,135.5	1,097.5	37.93	29.937		
8,300.0	7,650.0	8,297.3	7,786.4	30.9	21.0	-96.42	57.0	-2,468.9	1,139.3	1,100.1	39.20	29.063		
8,400.0	7,650.0	8,416.7	7,787.0	30.8	21.8	-96.48	176.2	-2,463.7	1,135.2	1,094.8	40.34	28.140		
8,500.0	7,650.0	8,529.4	7,785.2	30.8	22.8	-96.43	288.7	-2,457.2	1,129.4	1,087.7	41.68	27.098		
8,600.0	7,650.0	8,615.1	7,781.0	30.9	23.7	-96.24	374.2	-2,453.0	1,124.0	1,080.9	43.16	26.040		
8,700.0	7,650.0	8,779.0	7,782.8	31.1	26.7	-96.42	537.2	-2,437.8	1,114.2	1,069.1	45.17	24.669		
8,800.0	7,650.0	8,835.4	7,783.6	31.4	27.1	-96.48	593.4	-2,432.7	1,105.5	1,058.9	46.53	23.756		
8,900.0	7,650.0	8,874.0	7,783.7	31.9	27.3	-96.50	631.9	-2,431.0	1,101.4	1,053.5	47.90	22.995		
8,951.4	7,650.0	8,910.3	7,783.0	32.2	27.6	-96.46	668.3	-2,430.9	1,101.2	1,052.4	48.82	22.556		
9,000.0	7,650.0	8,962.2	7,780.6	32.6	27.9	-96.34	720.1	-2,431.1	1,101.2	1,051.3	49.89	22.072		
9,100.0	7,650.0	9,106.7	7,774.1	33.4	29.1	-96.03	864.4	-2,426.7	1,097.3	1,044.6	52.66	20.838		
9,200.0	7,650.0	9,199.4	7,773.5	34.3	30.0	-96.02	957.0	-2,422.8	1,093.1	1,038.1	55.00	19.877		
9,300.0	7,650.0	9,292.9	7,773.9	35.4	30.9	-96.05	1,050.4	-2,419.8	1,090.1	1,032.6	57.46	18.970		
9,400.0	7,650.0	9,376.0	7,773.3	36.5	31.8	-96.03	1,133.5	-2,417.5	1,087.5	1,027.6	59.93	18.147		
9,449.6	7,650.0	9,410.8	7,773.1	37.1	32.2	-96.03	1,168.3	-2,417.2	1,087.1	1,026.0	61.10	17.792 CC		
9,500.0	7,650.0	9,449.8	7,773.0	37.8	32.6	-96.02	1,207.2	-2,417.4	1,087.4	1,025.1	62.35	17.440		
9,600.0	7,650.0	9,543.4	7,773.0	39.1	33.7	-96.01	1,300.9	-2,418.4	1,088.7	1,023.5	65.11	16.719		
9,700.0	7,650.0	9,637.9	7,772.9	40.4	34.9	-95.99	1,395.3	-2,420.7	1,091.1	1,023.2	67.98	16.052		
9,800.0	7,650.0	9,740.6	7,771.6	41.8	36.2	-95.92	1,498.0	-2,422.6	1,092.9	1,021.9	71.02	15.390		
9,900.0	7,650.0	9,828.5	7,770.7	43.3	37.4	-95.86	1,585.9	-2,425.0	1,095.7	1,021.8	73.93	14.821		
10,000.0	7,650.0	9,921.8	7,769.0	44.8	38.6	-95.75	1,679.1	-2,427.9	1,098.7	1,021.8	76.97	14.274		
10,100.0	7,650.0	10,004.0	7,767.1	46.3	39.8	-95.63	1,761.2	-2,432.0	1,103.5	1,023.5	79.90	13.810		
10,200.0	7,650.0	10,098.0	7,766.4	47.9	41.1	-95.57	1,855.0	-2,437.1	1,108.9	1,025.9	83.02	13.356		
10,300.0	7,650.0	10,193.0	7,766.1	49.5	42.5	-95.52	1,949.9	-2,443.0	1,115.2	1,029.0	86.19	12.939		
10,400.0	7,650.0	10,285.4	7,765.9	51.1	43.8	-95.48	2,042.0	-2,449.2	1,121.9	1,032.6	89.37	12.554		
10,500.0	7,650.0	10,380.8	7,766.0	52.7	45.2	-95.45	2,137.2	-2,455.5	1,128.7	1,036.1	92.61	12.188		
10,600.0	7,650.0	10,508.0	7,767.0	54.4	47.2	-95.47	2,264.2	-2,462.9	1,134.7	1,038.3	96.38	11.774		
10,700.0	7,650.0	10,685.3	7,769.1	56.0	49.9	-95.55	2,441.3	-2,467.2	1,138.2	1,037.2	100.97	11.273		
10,800.0	7,650.0	10,779.5	7,768.7	57.7	51.4	-95.54	2,535.6	-2,465.8	1,136.7	1,032.5	104.27	10.902		
10,900.0	7,650.0	10,879.9	7,766.8	59.4	53.1	-95.45	2,635.9	-2,464.4	1,135.4	1,027.7	107.70	10.542		
11,000.0	7,650.0	10,968.0	7,765.0	61.1	54.5	-95.36	2,724.0	-2,463.9	1,134.6	1,023.7	110.94	10.227		

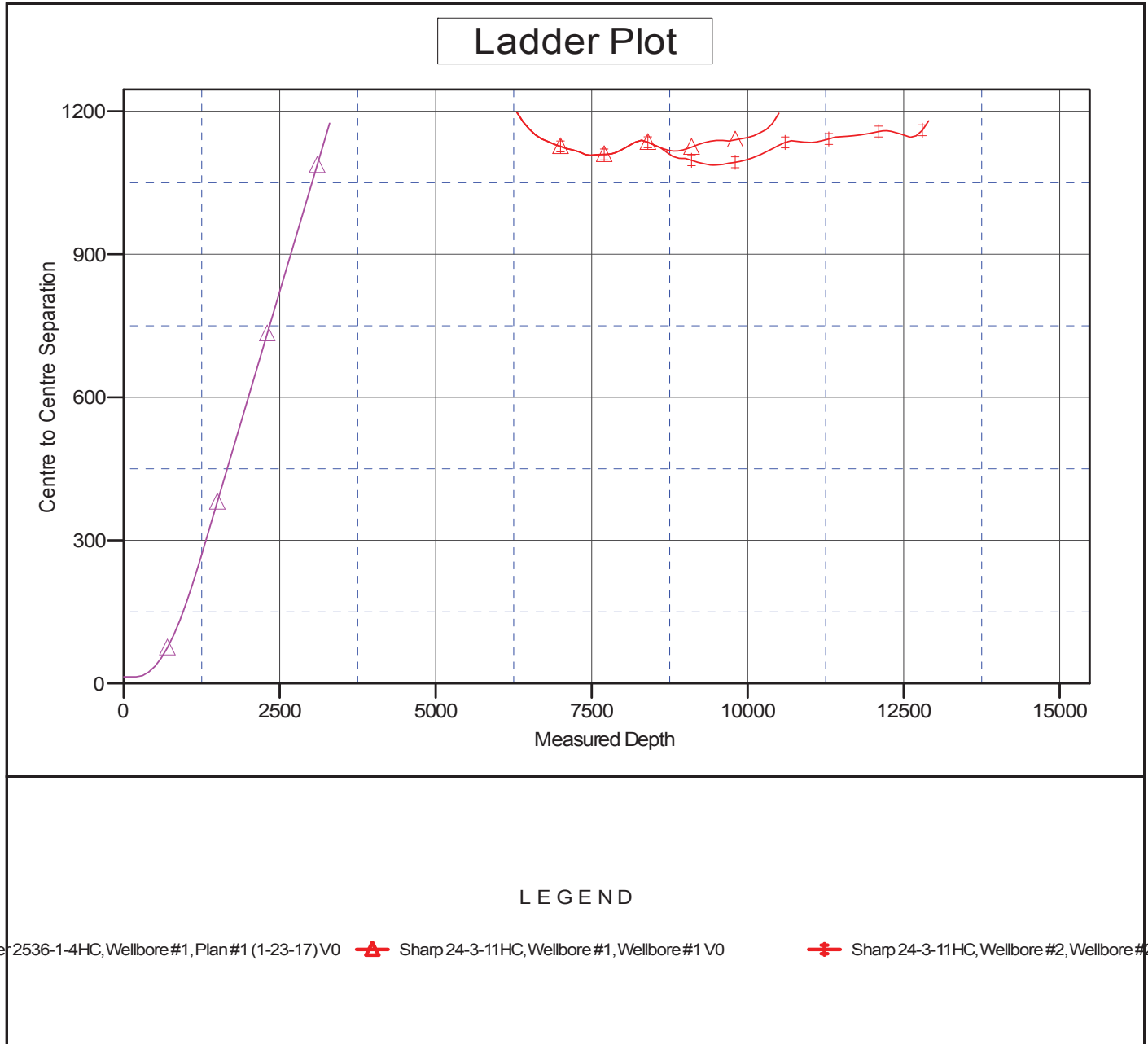
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Offset Design												Offset Site Error:	
Survey Program: 111-MWD, 8638-MWD												Offset Well Error:	
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)		
11,016.6	7,650.0	10,980.0	7,764.9	61.4	54.7	-95.35	2,736.0	-2,463.8	1,134.6	1,023.1	111.44	10.181	
11,100.0	7,650.0	11,041.7	7,764.3	62.8	55.7	-95.32	2,797.7	-2,464.6	1,135.6	1,021.6	113.97	9.964	
11,200.0	7,650.0	11,124.6	7,765.6	64.6	57.0	-95.38	2,880.6	-2,466.9	1,138.6	1,021.4	117.13	9.720	
11,300.0	7,650.0	11,227.1	7,767.4	66.3	58.7	-95.45	2,983.0	-2,470.2	1,142.1	1,021.4	120.63	9.468	
11,400.0	7,650.0	11,332.3	7,768.5	68.0	60.4	-95.49	3,088.1	-2,473.9	1,145.8	1,021.7	124.19	9.226	
11,500.0	7,650.0	11,460.2	7,768.0	69.8	62.5	-95.45	3,216.0	-2,475.1	1,146.7	1,018.6	128.15	8.949	
11,600.0	7,650.0	11,546.0	7,767.2	71.6	64.0	-95.41	3,301.8	-2,475.8	1,147.5	1,016.1	131.44	8.731	
11,700.0	7,650.0	11,648.8	7,765.6	73.3	65.7	-95.32	3,404.5	-2,477.1	1,148.8	1,013.7	135.02	8.508	
11,800.0	7,650.0	11,741.8	7,762.3	75.1	67.3	-95.15	3,497.5	-2,478.8	1,150.4	1,011.9	138.48	8.307	
11,900.0	7,650.0	11,840.8	7,759.3	76.9	68.9	-95.00	3,596.4	-2,480.6	1,152.0	1,010.0	142.03	8.111	
12,000.0	7,650.0	11,924.0	7,761.3	78.7	70.3	-95.09	3,679.6	-2,482.6	1,154.8	1,009.5	145.26	7.950	
12,100.0	7,650.0	12,043.2	7,764.0	80.5	72.4	-95.21	3,798.7	-2,485.4	1,157.4	1,008.3	149.11	7.762	
12,200.0	7,650.0	12,138.2	7,765.5	82.3	74.0	-95.27	3,893.7	-2,486.9	1,159.3	1,006.7	152.57	7.599	
12,300.0	7,650.0	12,296.3	7,765.4	84.1	76.7	-95.27	4,051.7	-2,485.4	1,158.1	1,001.0	157.10	7.372	
12,400.0	7,650.0	12,412.0	7,762.4	85.9	78.6	-95.14	4,167.4	-2,481.1	1,154.3	993.4	160.96	7.172	
12,500.0	7,650.0	12,516.1	7,759.4	87.7	80.4	-95.01	4,271.3	-2,476.7	1,149.9	985.3	164.61	6.986	
12,600.0	7,650.0	12,582.0	7,757.4	89.5	81.5	-94.93	4,337.1	-2,473.8	1,145.9	978.3	167.62	6.836	
12,617.7	7,650.0	12,582.0	7,757.4	89.9	81.5	-94.93	4,337.1	-2,473.8	1,145.7	977.8	167.94	6.822 ES	
12,700.0	7,650.0	12,582.0	7,757.4	91.4	81.5	-94.93	4,337.1	-2,473.8	1,148.7	979.2	169.47	6.778	
12,800.0	7,650.0	12,582.0	7,757.4	93.2	81.5	-94.93	4,337.1	-2,473.8	1,160.1	988.8	171.33	6.771 SF	
12,900.0	7,650.0	12,582.0	7,757.4	95.0	81.5	-94.93	4,337.1	-2,473.8	1,180.0	1,006.8	173.19	6.813	

Company:	Ward Petroleum	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Project:	SEC.24-T1S-R67W	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Reference Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (1-25-17)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 5035.0ft (Original Well Elev)
Offset Depths are relative to Offset Datum
Central Meridian is -105.500000

Coordinates are relative to: Schaefer 2413-3-15HN
Coordinate System is US State Plane 1983, Colorado Northern Zone
Grid Convergence at Surface is: 0.43°



Company:	Ward Petroleum	Local Co-ordinate Reference:	Well Schaefer 2413-3-15HN
Project:	SEC.24-T1S-R67W	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Reference Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Schaefer 2413-3-15HN	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	US_EDM
Reference Design:	Plan #2 (1-25-17)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 5035.0ft (Original Well Elev)

Offset Depths are relative to Offset Datum

Central Meridian is -105.500000

Coordinates are relative to: Schaefer 2413-3-15HN

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.43°

