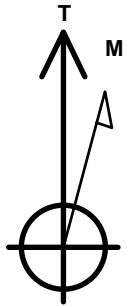


Ward Petroleum

Well Name: **Schaefer 2536-1-4HC**
 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 Longitude Slot
 0.0 1223383.99 3186524.49 39.944650 -104.834740
 Original Well Elev WELL @ 5035.0ft (Original Well Elev)

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Shape
SHL 484'FSL & 1935'FEL, Sec.24	1.0	0.0	0.0	Point
BHL 460'FSL & 710'FEL, Sec.36	7772.0	-10593.3	1220.2	Point
LPL 460'FNL & 710'FEL, Sec.25	7772.0	-947.1	1225.3	Point



Azimuths to True North
 Magnetic North: 8.11°

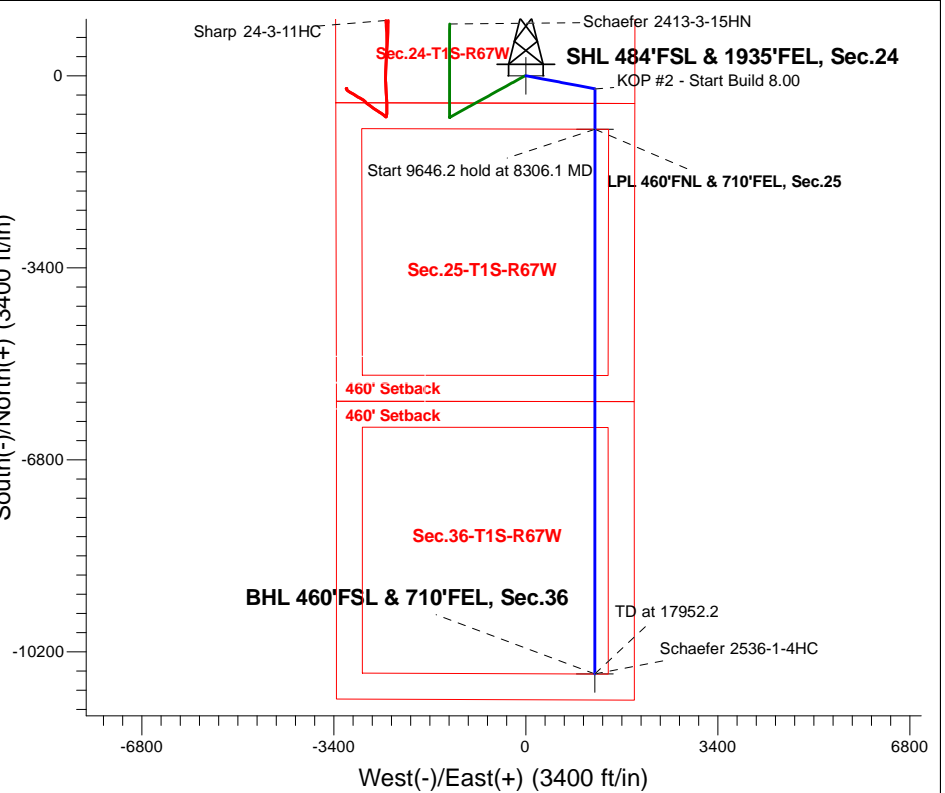
Magnetic Field
 Strength: 52294.8snT
 Dip Angle: 66.48°
 Date: 1/17/2017
 Model: IGRF2010

Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W
 Schaefer 2536-1-4HC
 Plan #1 (1-25-17)
 10:43, January 25 2017

ANNOTATIONS

TVD	MD	Annotation
200.0	200.0	KOP - Start Build 1.50
6207.6	6328.6	Start Drop -2.00
7055.9	7181.2	KOP #2 - Start Build 8.00
7772.0	8306.1	Start 9646.2 hold at 8306.1 MD
7772.0	17952.2	TD at 17952.2

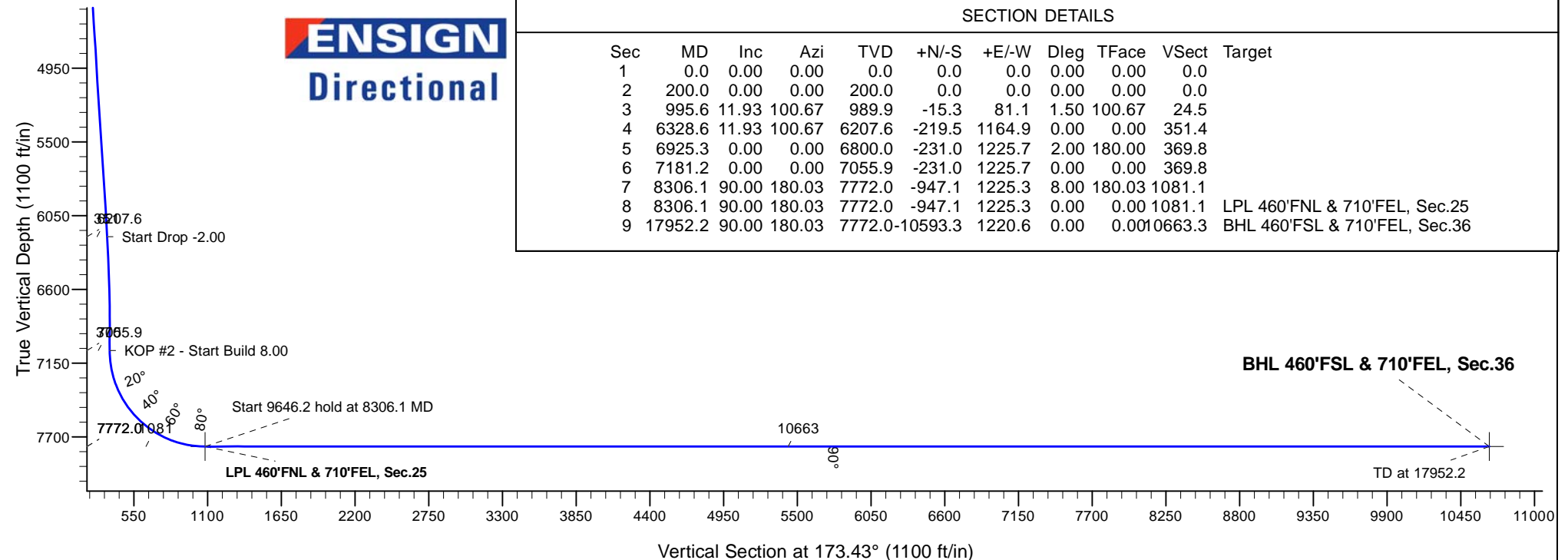
South(-)/North(+) (3400 ft/in)



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	995.6	11.93	100.67	989.9	-15.3	81.1	1.50	100.67	24.5	
4	6328.6	11.93	100.67	6207.6	-219.5	1164.9	0.00	0.00	351.4	
5	6925.3	0.00	0.00	6800.0	-231.0	1225.7	2.00	180.00	369.8	
6	7181.2	0.00	0.00	7055.9	-231.0	1225.7	0.00	0.00	369.8	
7	8306.1	90.00	180.03	7772.0	-947.1	1225.3	8.00	180.03	1081.1	
8	8306.1	90.00	180.03	7772.0	-947.1	1225.3	0.00	0.00	1081.1	LPL 460'FNL & 710'FEL, Sec.25
9	17952.2	90.00	180.03	7772.0-10593.3	1220.6	0.00	0.00	10663.3		BHL 460'FSL & 710'FEL, Sec.36

ENSIGN
 Directional





Ward Petroleum

SEC.24-T1S-R67W

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

Schaefer 2536-1-4HC

Wellbore #1

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

Standard Planning Report

25 January, 2017

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2536-1-4HC
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 2536-1-4HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (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 2536-1-4HC					
Well Position	+N/-S	0.0 ft	Northing:	1,223,383.98 usft	Latitude:	39.944650
	+E/-W	14.0 ft	Easting:	3,186,524.49 usft	Longitude:	-104.834740
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	1/17/2017	8.11	66.48	52,295

Design	Plan #1 (1-25-17)			
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	173.43

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	
995.6	11.93	100.67	989.9	-15.3	81.1	1.50	1.50	0.00	100.67	
6,328.6	11.93	100.67	6,207.6	-219.5	1,164.9	0.00	0.00	0.00	0.00	
6,925.3	0.00	0.00	6,800.0	-231.0	1,225.7	2.00	-2.00	0.00	180.00	
7,181.2	0.00	0.00	7,055.9	-231.0	1,225.7	0.00	0.00	0.00	0.00	
8,306.1	90.00	180.03	7,772.0	-947.1	1,225.3	8.00	8.00	0.00	180.03	
8,306.1	90.00	180.03	7,772.0	-947.1	1,225.3	0.00	0.00	0.00	0.00	LPL 460'FNL & 710'FI
17,952.2	90.00	180.03	7,772.0	-10,593.3	1,220.6	0.00	0.00	0.00	0.00	BHL 460'FSL & 710'F

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2536-1-4HC
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 2536-1-4HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (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 & 1935'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	100.67	300.0	-0.2	1.3	0.4	1.50	1.50	0.00
400.0	3.00	100.67	399.9	-1.0	5.1	1.6	1.50	1.50	0.00
500.0	4.50	100.67	499.7	-2.2	11.6	3.5	1.50	1.50	0.00
600.0	6.00	100.67	599.3	-3.9	20.6	6.2	1.50	1.50	0.00
700.0	7.50	100.67	698.6	-6.1	32.1	9.7	1.50	1.50	0.00
800.0	9.00	100.67	797.5	-8.7	46.2	13.9	1.50	1.50	0.00
900.0	10.50	100.67	896.1	-11.8	62.9	19.0	1.50	1.50	0.00
995.6	11.93	100.67	989.9	-15.3	81.1	24.5	1.50	1.50	0.00
1,000.0	11.93	100.67	994.2	-15.5	82.0	24.7	0.00	0.00	0.00
1,100.0	11.93	100.67	1,092.0	-19.3	102.3	30.9	0.00	0.00	0.00
1,200.0	11.93	100.67	1,189.8	-23.1	122.7	37.0	0.00	0.00	0.00
1,300.0	11.93	100.67	1,287.7	-26.9	143.0	43.1	0.00	0.00	0.00
1,400.0	11.93	100.67	1,385.5	-30.8	163.3	49.3	0.00	0.00	0.00
1,500.0	11.93	100.67	1,483.4	-34.6	183.6	55.4	0.00	0.00	0.00
1,600.0	11.93	100.67	1,581.2	-38.4	203.9	61.5	0.00	0.00	0.00
1,700.0	11.93	100.67	1,679.0	-42.3	224.3	67.7	0.00	0.00	0.00
1,800.0	11.93	100.67	1,776.9	-46.1	244.6	73.8	0.00	0.00	0.00
1,900.0	11.93	100.67	1,874.7	-49.9	264.9	79.9	0.00	0.00	0.00
2,000.0	11.93	100.67	1,972.6	-53.8	285.2	86.1	0.00	0.00	0.00
2,100.0	11.93	100.67	2,070.4	-57.6	305.6	92.2	0.00	0.00	0.00
2,200.0	11.93	100.67	2,168.2	-61.4	325.9	98.3	0.00	0.00	0.00
2,300.0	11.93	100.67	2,266.1	-65.2	346.2	104.4	0.00	0.00	0.00
2,400.0	11.93	100.67	2,363.9	-69.1	366.5	110.6	0.00	0.00	0.00
2,500.0	11.93	100.67	2,461.7	-72.9	386.8	116.7	0.00	0.00	0.00
2,600.0	11.93	100.67	2,559.6	-76.7	407.2	122.8	0.00	0.00	0.00
2,700.0	11.93	100.67	2,657.4	-80.6	427.5	129.0	0.00	0.00	0.00
2,800.0	11.93	100.67	2,755.3	-84.4	447.8	135.1	0.00	0.00	0.00
2,900.0	11.93	100.67	2,853.1	-88.2	468.1	141.2	0.00	0.00	0.00
3,000.0	11.93	100.67	2,950.9	-92.1	488.4	147.4	0.00	0.00	0.00
3,100.0	11.93	100.67	3,048.8	-95.9	508.8	153.5	0.00	0.00	0.00
3,200.0	11.93	100.67	3,146.6	-99.7	529.1	159.6	0.00	0.00	0.00
3,300.0	11.93	100.67	3,244.5	-103.5	549.4	165.8	0.00	0.00	0.00
3,400.0	11.93	100.67	3,342.3	-107.4	569.7	171.9	0.00	0.00	0.00
3,500.0	11.93	100.67	3,440.1	-111.2	590.0	178.0	0.00	0.00	0.00
3,600.0	11.93	100.67	3,538.0	-115.0	610.4	184.1	0.00	0.00	0.00
3,700.0	11.93	100.67	3,635.8	-118.9	630.7	190.3	0.00	0.00	0.00
3,800.0	11.93	100.67	3,733.6	-122.7	651.0	196.4	0.00	0.00	0.00
3,900.0	11.93	100.67	3,831.5	-126.5	671.3	202.5	0.00	0.00	0.00
4,000.0	11.93	100.67	3,929.3	-130.4	691.7	208.7	0.00	0.00	0.00
4,100.0	11.93	100.67	4,027.2	-134.2	712.0	214.8	0.00	0.00	0.00
4,200.0	11.93	100.67	4,125.0	-138.0	732.3	220.9	0.00	0.00	0.00
4,300.0	11.93	100.67	4,222.8	-141.8	752.6	227.1	0.00	0.00	0.00
4,400.0	11.93	100.67	4,320.7	-145.7	772.9	233.2	0.00	0.00	0.00
4,500.0	11.93	100.67	4,418.5	-149.5	793.3	239.3	0.00	0.00	0.00
4,600.0	11.93	100.67	4,516.4	-153.3	813.6	245.5	0.00	0.00	0.00
4,700.0	11.93	100.67	4,614.2	-157.2	833.9	251.6	0.00	0.00	0.00
4,800.0	11.93	100.67	4,712.0	-161.0	854.2	257.7	0.00	0.00	0.00
4,900.0	11.93	100.67	4,809.9	-164.8	874.5	263.8	0.00	0.00	0.00

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2536-1-4HC
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 2536-1-4HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (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	11.93	100.67	4,907.7	-168.6	894.9	270.0	0.00	0.00	0.00	
5,100.0	11.93	100.67	5,005.5	-172.5	915.2	276.1	0.00	0.00	0.00	
5,200.0	11.93	100.67	5,103.4	-176.3	935.5	282.2	0.00	0.00	0.00	
5,300.0	11.93	100.67	5,201.2	-180.1	955.8	288.4	0.00	0.00	0.00	
5,400.0	11.93	100.67	5,299.1	-184.0	976.1	294.5	0.00	0.00	0.00	
5,500.0	11.93	100.67	5,396.9	-187.8	996.5	300.6	0.00	0.00	0.00	
5,600.0	11.93	100.67	5,494.7	-191.6	1,016.8	306.8	0.00	0.00	0.00	
5,700.0	11.93	100.67	5,592.6	-195.5	1,037.1	312.9	0.00	0.00	0.00	
5,800.0	11.93	100.67	5,690.4	-199.3	1,057.4	319.0	0.00	0.00	0.00	
5,900.0	11.93	100.67	5,788.3	-203.1	1,077.8	325.2	0.00	0.00	0.00	
6,000.0	11.93	100.67	5,886.1	-206.9	1,098.1	331.3	0.00	0.00	0.00	
6,100.0	11.93	100.67	5,983.9	-210.8	1,118.4	337.4	0.00	0.00	0.00	
6,200.0	11.93	100.67	6,081.8	-214.6	1,138.7	343.5	0.00	0.00	0.00	
6,300.0	11.93	100.67	6,179.6	-218.4	1,159.0	349.7	0.00	0.00	0.00	
6,328.6	11.93	100.67	6,207.6	-219.5	1,164.9	351.4	0.00	0.00	0.00	
Start Drop -2.00										
6,400.0	10.51	100.67	6,277.6	-222.1	1,178.5	355.5	2.00	-2.00	0.00	
6,500.0	8.51	100.67	6,376.2	-225.2	1,194.7	360.4	2.00	-2.00	0.00	
6,600.0	6.51	100.67	6,475.4	-227.6	1,207.6	364.3	2.00	-2.00	0.00	
6,700.0	4.51	100.67	6,574.9	-229.4	1,217.0	367.2	2.00	-2.00	0.00	
6,800.0	2.51	100.67	6,674.7	-230.5	1,223.0	369.0	2.00	-2.00	0.00	
6,900.0	0.51	100.67	6,774.7	-231.0	1,225.6	369.8	2.00	-2.00	0.00	
6,925.3	0.00	0.00	6,800.0	-231.0	1,225.7	369.8	2.00	-2.00	0.00	
7,000.0	0.00	0.00	6,874.7	-231.0	1,225.7	369.8	0.00	0.00	0.00	
7,100.0	0.00	0.00	6,974.7	-231.0	1,225.7	369.8	0.00	0.00	0.00	
7,181.2	0.00	0.00	7,055.9	-231.0	1,225.7	369.8	0.00	0.00	0.00	
KOP #2 - Start Build 8.00										
7,200.0	1.50	180.03	7,074.7	-231.2	1,225.7	370.0	7.99	7.99	0.00	
7,300.0	9.50	180.03	7,174.1	-240.8	1,225.7	379.5	8.00	8.00	0.00	
7,400.0	17.50	180.03	7,271.3	-264.2	1,225.7	402.7	8.00	8.00	0.00	
7,500.0	25.51	180.03	7,364.3	-300.8	1,225.7	439.1	8.00	8.00	0.00	
7,600.0	33.51	180.03	7,451.2	-350.0	1,225.6	488.0	8.00	8.00	0.00	
7,700.0	41.51	180.03	7,530.5	-410.8	1,225.6	548.4	8.00	8.00	0.00	
7,800.0	49.51	180.03	7,600.5	-482.1	1,225.6	619.2	8.00	8.00	0.00	
7,900.0	57.51	180.03	7,659.9	-562.4	1,225.5	699.0	8.00	8.00	0.00	
8,000.0	65.51	180.03	7,707.6	-650.3	1,225.5	786.3	8.00	8.00	0.00	
8,100.0	73.51	180.03	7,742.6	-743.9	1,225.4	879.3	8.00	8.00	0.00	
8,200.0	81.51	180.03	7,764.2	-841.4	1,225.4	976.2	8.00	8.00	0.00	
8,300.0	89.52	180.03	7,772.0	-941.0	1,225.4	1,075.1	8.00	8.00	0.00	
8,306.1	90.00	180.03	7,772.0	-947.1	1,225.3	1,081.1	7.94	7.94	0.00	
Start 9646.2 hold at 8306.1 MD - LPL 460°FNL & 710°FEL, Sec.25										
8,400.0	90.00	180.03	7,772.0	-1,041.0	1,225.3	1,174.5	0.00	0.00	0.00	
8,500.0	90.00	180.03	7,772.0	-1,141.0	1,225.3	1,273.8	0.00	0.00	0.00	
8,600.0	90.00	180.03	7,772.0	-1,241.0	1,225.2	1,373.1	0.00	0.00	0.00	
8,700.0	90.00	180.03	7,772.0	-1,341.0	1,225.2	1,472.5	0.00	0.00	0.00	
8,800.0	90.00	180.03	7,772.0	-1,441.0	1,225.1	1,571.8	0.00	0.00	0.00	
8,900.0	90.00	180.03	7,772.0	-1,541.0	1,225.1	1,671.1	0.00	0.00	0.00	
9,000.0	90.00	180.03	7,772.0	-1,641.0	1,225.0	1,770.5	0.00	0.00	0.00	
9,100.0	90.00	180.03	7,772.0	-1,741.0	1,225.0	1,869.8	0.00	0.00	0.00	
9,200.0	90.00	180.03	7,772.0	-1,841.0	1,224.9	1,969.1	0.00	0.00	0.00	
9,300.0	90.00	180.03	7,772.0	-1,941.0	1,224.9	2,068.5	0.00	0.00	0.00	
9,400.0	90.00	180.03	7,772.0	-2,041.0	1,224.8	2,167.8	0.00	0.00	0.00	
9,500.0	90.00	180.03	7,772.0	-2,141.0	1,224.8	2,267.2	0.00	0.00	0.00	

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2536-1-4HC
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 2536-1-4HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (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	180.03	7,772.0	-2,241.0	1,224.7	2,366.5	0.00	0.00	0.00
9,700.0	90.00	180.03	7,772.0	-2,341.0	1,224.7	2,465.8	0.00	0.00	0.00
9,800.0	90.00	180.03	7,772.0	-2,441.0	1,224.6	2,565.2	0.00	0.00	0.00
9,900.0	90.00	180.03	7,772.0	-2,541.0	1,224.6	2,664.5	0.00	0.00	0.00
10,000.0	90.00	180.03	7,772.0	-2,641.0	1,224.5	2,763.8	0.00	0.00	0.00
10,100.0	90.00	180.03	7,772.0	-2,741.0	1,224.5	2,863.2	0.00	0.00	0.00
10,200.0	90.00	180.03	7,772.0	-2,841.0	1,224.4	2,962.5	0.00	0.00	0.00
10,300.0	90.00	180.03	7,772.0	-2,941.0	1,224.4	3,061.9	0.00	0.00	0.00
10,400.0	90.00	180.03	7,772.0	-3,041.0	1,224.3	3,161.2	0.00	0.00	0.00
10,500.0	90.00	180.03	7,772.0	-3,141.0	1,224.3	3,260.5	0.00	0.00	0.00
10,600.0	90.00	180.03	7,772.0	-3,241.0	1,224.2	3,359.9	0.00	0.00	0.00
10,700.0	90.00	180.03	7,772.0	-3,341.0	1,224.2	3,459.2	0.00	0.00	0.00
10,800.0	90.00	180.03	7,772.0	-3,441.0	1,224.1	3,558.5	0.00	0.00	0.00
10,900.0	90.00	180.03	7,772.0	-3,541.0	1,224.1	3,657.9	0.00	0.00	0.00
11,000.0	90.00	180.03	7,772.0	-3,641.0	1,224.0	3,757.2	0.00	0.00	0.00
11,100.0	90.00	180.03	7,772.0	-3,741.0	1,224.0	3,856.6	0.00	0.00	0.00
11,200.0	90.00	180.03	7,772.0	-3,841.0	1,223.9	3,955.9	0.00	0.00	0.00
11,300.0	90.00	180.03	7,772.0	-3,941.0	1,223.9	4,055.2	0.00	0.00	0.00
11,400.0	90.00	180.03	7,772.0	-4,041.0	1,223.8	4,154.6	0.00	0.00	0.00
11,500.0	90.00	180.03	7,772.0	-4,141.0	1,223.8	4,253.9	0.00	0.00	0.00
11,600.0	90.00	180.03	7,772.0	-4,241.0	1,223.7	4,353.2	0.00	0.00	0.00
11,700.0	90.00	180.03	7,772.0	-4,341.0	1,223.7	4,452.6	0.00	0.00	0.00
11,800.0	90.00	180.03	7,772.0	-4,441.0	1,223.6	4,551.9	0.00	0.00	0.00
11,900.0	90.00	180.03	7,772.0	-4,541.0	1,223.6	4,651.2	0.00	0.00	0.00
12,000.0	90.00	180.03	7,772.0	-4,641.0	1,223.5	4,750.6	0.00	0.00	0.00
12,100.0	90.00	180.03	7,772.0	-4,741.0	1,223.5	4,849.9	0.00	0.00	0.00
12,200.0	90.00	180.03	7,772.0	-4,841.0	1,223.4	4,949.3	0.00	0.00	0.00
12,300.0	90.00	180.03	7,772.0	-4,941.0	1,223.4	5,048.6	0.00	0.00	0.00
12,400.0	90.00	180.03	7,772.0	-5,041.0	1,223.3	5,147.9	0.00	0.00	0.00
12,500.0	90.00	180.03	7,772.0	-5,141.0	1,223.3	5,247.3	0.00	0.00	0.00
12,600.0	90.00	180.03	7,772.0	-5,241.0	1,223.2	5,346.6	0.00	0.00	0.00
12,700.0	90.00	180.03	7,772.0	-5,341.0	1,223.2	5,445.9	0.00	0.00	0.00
12,800.0	90.00	180.03	7,772.0	-5,441.0	1,223.1	5,545.3	0.00	0.00	0.00
12,900.0	90.00	180.03	7,772.0	-5,541.0	1,223.1	5,644.6	0.00	0.00	0.00
13,000.0	90.00	180.03	7,772.0	-5,641.0	1,223.1	5,744.0	0.00	0.00	0.00
13,100.0	90.00	180.03	7,772.0	-5,741.0	1,223.0	5,843.3	0.00	0.00	0.00
13,200.0	90.00	180.03	7,772.0	-5,841.0	1,223.0	5,942.6	0.00	0.00	0.00
13,300.0	90.00	180.03	7,772.0	-5,941.0	1,222.9	6,042.0	0.00	0.00	0.00
13,400.0	90.00	180.03	7,772.0	-6,041.0	1,222.9	6,141.3	0.00	0.00	0.00
13,500.0	90.00	180.03	7,772.0	-6,141.0	1,222.8	6,240.6	0.00	0.00	0.00
13,600.0	90.00	180.03	7,772.0	-6,241.0	1,222.8	6,340.0	0.00	0.00	0.00
13,700.0	90.00	180.03	7,772.0	-6,341.0	1,222.7	6,439.3	0.00	0.00	0.00
13,800.0	90.00	180.03	7,772.0	-6,441.0	1,222.7	6,538.7	0.00	0.00	0.00
13,900.0	90.00	180.03	7,772.0	-6,541.0	1,222.6	6,638.0	0.00	0.00	0.00
14,000.0	90.00	180.03	7,772.0	-6,641.0	1,222.6	6,737.3	0.00	0.00	0.00
14,100.0	90.00	180.03	7,772.0	-6,741.0	1,222.5	6,836.7	0.00	0.00	0.00
14,200.0	90.00	180.03	7,772.0	-6,841.0	1,222.5	6,936.0	0.00	0.00	0.00
14,300.0	90.00	180.03	7,772.0	-6,941.0	1,222.4	7,035.3	0.00	0.00	0.00
14,400.0	90.00	180.03	7,772.0	-7,041.0	1,222.4	7,134.7	0.00	0.00	0.00
14,500.0	90.00	180.03	7,772.0	-7,141.0	1,222.3	7,234.0	0.00	0.00	0.00
14,600.0	90.00	180.03	7,772.0	-7,241.0	1,222.3	7,333.3	0.00	0.00	0.00
14,700.0	90.00	180.03	7,772.0	-7,341.0	1,222.2	7,432.7	0.00	0.00	0.00
14,800.0	90.00	180.03	7,772.0	-7,441.0	1,222.2	7,532.0	0.00	0.00	0.00
14,900.0	90.00	180.03	7,772.0	-7,541.0	1,222.1	7,631.4	0.00	0.00	0.00

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2536-1-4HC
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 2536-1-4HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (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	180.03	7,772.0	-7,641.0	1,222.1	7,730.7	0.00	0.00	0.00
15,100.0	90.00	180.03	7,772.0	-7,741.0	1,222.0	7,830.0	0.00	0.00	0.00
15,200.0	90.00	180.03	7,772.0	-7,841.0	1,222.0	7,929.4	0.00	0.00	0.00
15,300.0	90.00	180.03	7,772.0	-7,941.0	1,221.9	8,028.7	0.00	0.00	0.00
15,400.0	90.00	180.03	7,772.0	-8,041.0	1,221.9	8,128.0	0.00	0.00	0.00
15,500.0	90.00	180.03	7,772.0	-8,141.0	1,221.8	8,227.4	0.00	0.00	0.00
15,600.0	90.00	180.03	7,772.0	-8,241.0	1,221.8	8,326.7	0.00	0.00	0.00
15,700.0	90.00	180.03	7,772.0	-8,341.0	1,221.7	8,426.1	0.00	0.00	0.00
15,800.0	90.00	180.03	7,772.0	-8,441.0	1,221.7	8,525.4	0.00	0.00	0.00
15,900.0	90.00	180.03	7,772.0	-8,541.0	1,221.6	8,624.7	0.00	0.00	0.00
16,000.0	90.00	180.03	7,772.0	-8,641.0	1,221.6	8,724.1	0.00	0.00	0.00
16,100.0	90.00	180.03	7,772.0	-8,741.0	1,221.5	8,823.4	0.00	0.00	0.00
16,200.0	90.00	180.03	7,772.0	-8,841.0	1,221.5	8,922.7	0.00	0.00	0.00
16,300.0	90.00	180.03	7,772.0	-8,941.0	1,221.4	9,022.1	0.00	0.00	0.00
16,400.0	90.00	180.03	7,772.0	-9,041.0	1,221.4	9,121.4	0.00	0.00	0.00
16,500.0	90.00	180.03	7,772.0	-9,141.0	1,221.3	9,220.8	0.00	0.00	0.00
16,600.0	90.00	180.03	7,772.0	-9,241.0	1,221.3	9,320.1	0.00	0.00	0.00
16,700.0	90.00	180.03	7,772.0	-9,341.0	1,221.2	9,419.4	0.00	0.00	0.00
16,800.0	90.00	180.03	7,772.0	-9,441.0	1,221.2	9,518.8	0.00	0.00	0.00
16,900.0	90.00	180.03	7,772.0	-9,541.0	1,221.1	9,618.1	0.00	0.00	0.00
17,000.0	90.00	180.03	7,772.0	-9,641.0	1,221.1	9,717.4	0.00	0.00	0.00
17,100.0	90.00	180.03	7,772.0	-9,741.0	1,221.0	9,816.8	0.00	0.00	0.00
17,200.0	90.00	180.03	7,772.0	-9,841.0	1,221.0	9,916.1	0.00	0.00	0.00
17,300.0	90.00	180.03	7,772.0	-9,941.0	1,220.9	10,015.4	0.00	0.00	0.00
17,400.0	90.00	180.03	7,772.0	-10,041.0	1,220.9	10,114.8	0.00	0.00	0.00
17,500.0	90.00	180.03	7,772.0	-10,141.0	1,220.8	10,214.1	0.00	0.00	0.00
17,600.0	90.00	180.03	7,772.0	-10,241.0	1,220.8	10,313.5	0.00	0.00	0.00
17,700.0	90.00	180.03	7,772.0	-10,341.0	1,220.8	10,412.8	0.00	0.00	0.00
17,800.0	90.00	180.03	7,772.0	-10,441.0	1,220.7	10,512.1	0.00	0.00	0.00
17,900.0	90.00	180.03	7,772.0	-10,541.0	1,220.7	10,611.5	0.00	0.00	0.00
17,952.2	90.00	180.03	7,772.0	-10,593.2	1,220.6	10,663.3	0.00	0.00	0.00
TD at 17952.2 - BHL 460'FSL & 710'FEL, Sec.36									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL 484'FSL & 1935'FE - hit/miss target - Shape - Point	0.00	0.00	1.0	0.0	0.0	1,223,384.00	3,186,524.49	39.944650	-104.834740
BHL 460'FSL & 710'FEL - plan misses target center by 0.4ft at 17952.2ft MD (7772.0 TVD, -10593.2 N, 1220.6 E) - Point	0.00	0.00	7,772.0	-10,593.3	1,220.2	1,212,800.46	3,187,824.11	39.915570	-104.830390
LPL 460'FNL & 710'FEL - plan hits target center - Point	0.00	0.00	7,772.0	-947.1	1,225.3	1,222,446.14	3,187,756.88	39.942050	-104.830370

Database:	US_EDM	Local Co-ordinate Reference:	Well Schaefer 2536-1-4HC
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 2536-1-4HC	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (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
6,328.6	6,207.6	-219.5	1,164.9	Start Drop -2.00
7,181.2	7,055.9	-231.0	1,225.7	KOP #2 - Start Build 8.00
8,306.1	7,772.0	-947.1	1,225.3	Start 9646.2 hold at 8306.1 MD
17,952.2	7,772.0	-10,593.2	1,220.6	TD at 17952.2



Ward Petroleum

SEC.24-T1S-R67W

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

Schaefer 2536-1-4HC

Wellbore #1

Plan #1 (1-25-17)

Anticollision Report

25 January, 2017

Company:	Ward Petroleum	Local Co-ordinate Reference:	Well Schaefer 2536-1-4HC
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 2536-1-4HC	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 #1 (1-25-17)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (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	17,952.2	Plan #1 (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 2413-3-15HN - Wellbore #1 - Plan #2 (1-25-17)	200.0	200.0	14.0	13.3	20.791	CC, ES
Schaefer 2413-3-15HN - Wellbore #1 - Plan #2 (1-25-17)	300.0	299.6	16.5	15.3	14.878	SF
Sharp 24-3-11HC Pad Sec.24-T1S-R67W						
Sharp 24-3-11HC - Wellbore #1 - Wellbore #1						Out of range
Sharp 24-3-11HC - Wellbore #2 - Wellbore #2						Out of range

Offset Design	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W - Schaefer 2413-3-15HN - Wellbore #1 - Plan #2 (1-25-17)												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	-89.97	0.0	-14.0	14.0	14.0	0.00	N/A		
100.0	100.0	100.0	100.0	0.1	0.1	-89.97	0.0	-14.0	14.0	13.8	0.22	62.374		
200.0	200.0	200.0	200.0	0.3	0.3	-89.97	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	168.00	-0.6	-15.2	16.5	15.3	1.11	14.878	SF	
400.0	399.9	398.9	398.8	0.8	0.8	165.60	-2.5	-18.6	23.8	22.2	1.55	15.327		
500.0	499.7	497.4	497.1	1.0	1.0	163.75	-5.6	-24.2	36.0	34.0	2.02	17.827		
600.0	599.3	594.9	594.2	1.3	1.2	162.58	-9.8	-31.9	53.0	50.5	2.50	21.231		
700.0	698.6	691.0	689.7	1.5	1.5	161.82	-15.2	-41.6	74.8	71.8	2.99	25.063		
800.0	797.5	785.4	783.1	1.9	1.8	161.31	-21.6	-53.2	101.3	97.8	3.48	29.092		
900.0	896.1	877.8	874.3	2.2	2.1	160.93	-29.0	-66.5	132.3	128.4	3.99	33.197		
1,000.0	994.2	968.0	962.9	2.6	2.5	160.63	-37.2	-81.4	167.8	163.3	4.50	37.309		
1,100.0	1,092.0	1,056.3	1,049.1	3.1	2.9	160.45	-46.1	-97.7	206.4	201.4	5.00	41.264		
1,200.0	1,189.8	1,142.9	1,133.3	3.5	3.3	160.14	-55.9	-115.4	246.9	241.4	5.51	44.771		
1,300.0	1,287.7	1,227.8	1,215.5	3.9	3.7	159.78	-66.4	-134.4	289.3	283.3	6.04	47.926		
1,400.0	1,385.5	1,315.3	1,299.6	4.4	4.2	159.39	-77.9	-155.2	333.3	326.7	6.57	50.698		
1,500.0	1,483.4	1,405.0	1,385.9	4.8	4.7	159.08	-89.7	-176.8	377.4	370.3	7.11	53.055		
1,600.0	1,581.2	1,494.7	1,472.2	5.3	5.2	158.84	-101.6	-198.3	421.5	413.8	7.66	55.038		
1,700.0	1,679.0	1,584.5	1,558.5	5.7	5.7	158.64	-113.5	-219.8	465.6	457.4	8.21	56.722		
1,800.0	1,776.9	1,674.2	1,644.8	6.2	6.2	158.47	-125.3	-241.3	509.7	501.0	8.76	58.168		
1,900.0	1,874.7	1,763.9	1,731.1	6.6	6.7	158.33	-137.2	-262.8	553.9	544.5	9.32	59.422		
2,000.0	1,972.6	1,853.7	1,817.4	7.1	7.3	158.21	-149.1	-284.4	598.0	588.1	9.88	60.517		

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

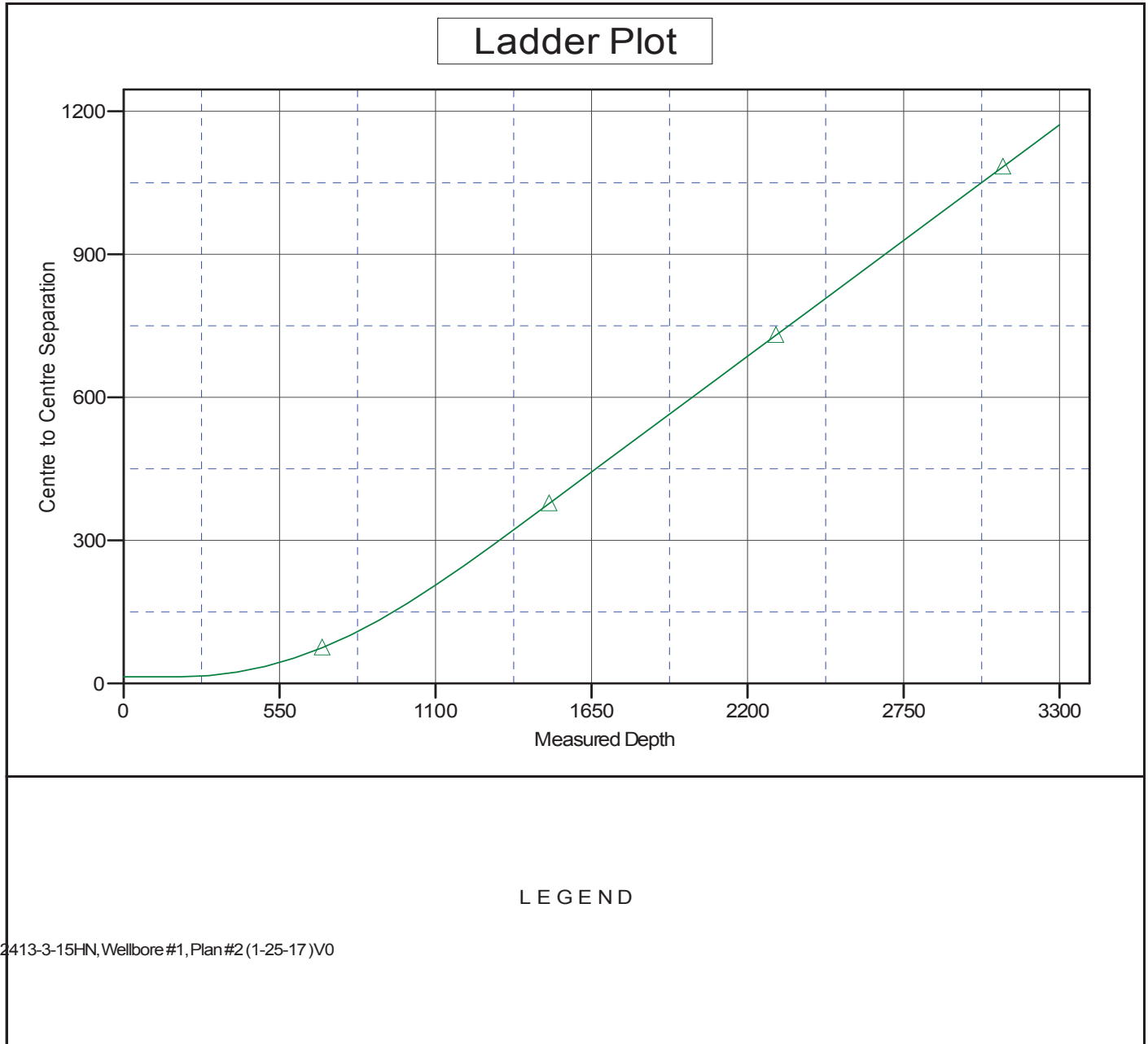
Company:	Ward Petroleum	Local Co-ordinate Reference:	Well Schaefer 2536-1-4HC
Project:	SEC.24-T1S-R67W	TVD Reference:	WELL @ 5035.0ft (Original Well Elev)
Reference Site:	Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W	MD Reference:	WELL @ 5035.0ft (Original Well Elev)
Site Error:	0.0 ft	North Reference:	True
Reference Well:	Schaefer 2536-1-4HC	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 #1 (1-25-17)	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error:	0.0 ft
Schaefer 2413-3-9HN Pad Sec.24-T1S-R67W - Schaefer 2413-3-15HN - Wellbore #1 - Plan #2 (1-25-17)												Offset Well Error:	0.0 ft
Survey Program: 0-MWD													
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	
2,100.0	2,070.4	1,943.4	1,903.7	7.5	7.8	158.11	-160.9	-305.9	642.1	631.7	10.44	61.480	
2,200.0	2,168.2	2,033.1	1,990.0	8.0	8.3	158.02	-172.8	-327.4	686.3	675.2	11.01	62.334	
2,300.0	2,266.1	2,122.8	2,076.3	8.4	8.8	157.95	-184.7	-348.9	730.4	718.8	11.58	63.096	
2,400.0	2,363.9	2,212.6	2,162.6	8.9	9.3	157.88	-196.5	-370.4	774.5	762.4	12.14	63.778	
2,500.0	2,461.7	2,302.3	2,248.9	9.4	9.9	157.81	-208.4	-392.0	818.7	805.9	12.71	64.394	
2,600.0	2,559.6	2,392.0	2,335.2	9.8	10.4	157.76	-220.3	-413.5	862.8	849.5	13.28	64.950	
2,700.0	2,657.4	2,481.8	2,421.5	10.3	10.9	157.71	-232.1	-435.0	906.9	893.1	13.86	65.457	
2,800.0	2,755.3	2,571.5	2,507.8	10.7	11.4	157.66	-244.0	-456.5	951.1	936.6	14.43	65.919	
2,900.0	2,853.1	2,661.2	2,594.1	11.2	12.0	157.62	-255.9	-478.0	995.2	980.2	15.00	66.343	
3,000.0	2,950.9	2,751.0	2,680.4	11.6	12.5	157.58	-267.7	-499.6	1,039.3	1,023.8	15.57	66.732	
3,100.0	3,048.8	2,840.7	2,766.7	12.1	13.0	157.55	-279.6	-521.1	1,083.5	1,067.3	16.15	67.092	
3,200.0	3,146.6	2,930.4	2,853.0	12.6	13.5	157.52	-291.5	-542.6	1,127.6	1,110.9	16.72	67.425	
3,300.0	3,244.5	3,020.2	2,939.3	13.0	14.0	157.49	-303.3	-564.1	1,171.8	1,154.5	17.30	67.733	

Company:	Ward Petroleum	Local Co-ordinate Reference:	Well Schaefer 2536-1-4HC
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 2536-1-4HC	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 #1 (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 2536-1-4HC
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 2536-1-4HC
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 2536-1-4HC	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 #1 (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

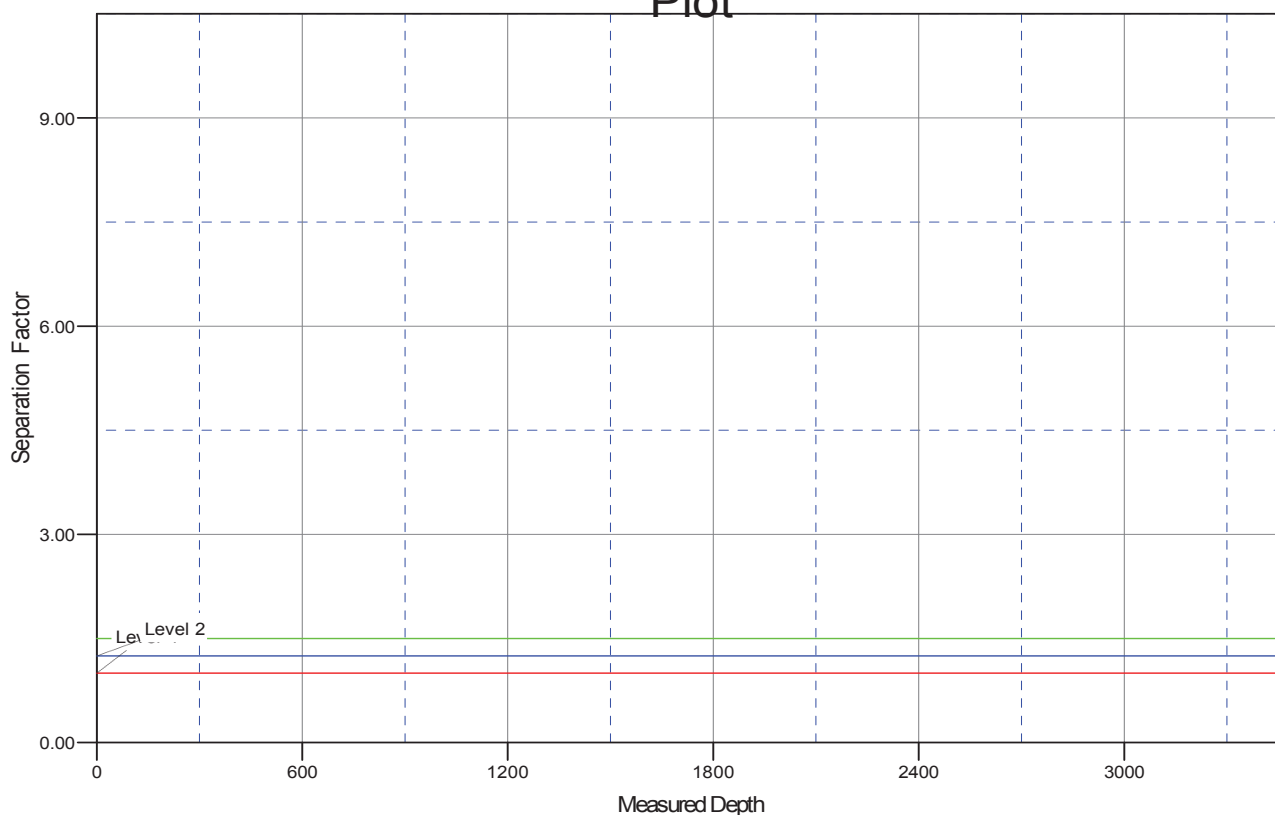
Central Meridian is -105.500000

Coordinates are relative to: Schaefer 2536-1-4HC

Coordinate System is US State Plane 1983, Colorado Northern Zone

Grid Convergence at Surface is: 0.43°

Separation Factor Plot



LEGEND

2413-3-15HN, Wellbore #1, Plan #2 (1-25-17) V0